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November 30, 2020

VIA ELECTRONIC MAIL

Mr. Andrew Wheeler
Administrator
USEPA Headquarters
1200 Pennsylvania Ave N.W.
Washington, DC 20460

RE: CCR Alternative Liner Application

Dear Mr. Wheeler:

Great River Energy is submitting the attached Alternative Liner Application for the Upstream Raise 91 CCR surface impoundment at Coal Creek Station. This application was prepared in response to the requirements at 40 CFR 257.71(d)(1).

Should you have any questions regarding the attached report, please contact Shane Stockdill at 701-442-7010 or sstockdill@grenergy.com or Erik Heinen at 612.801.1269 or eheinen@grenergy.com.

Sincerely,

GREAT RIVER ENERGY

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Manager, Environmental Services

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GOLDER

REPORT

Application to Submit an Alternative Liner Demonstration for the Upstream Raise 91 CCR Surface Impoundment

Great River Energy - Coal Creek Station

Submitted to:

Great River Energy

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Executive Summary

Golder Associates Inc. (Golder) has prepared this application in support of submitting an alternative liner demonstration for the Upstream Raise 91 coal combustion residual (CCR) surface impoundment (Upstream Raise 91) at Great River Energy's (GRE's) Coal Creek Station (CCS). This application includes a discussion of background information regarding the existing CCR facility, documentation regarding the design and construction of the liner system, documentation of current facility compliance with the CCR Rule, and information regarding the current groundwater monitoring system network and statistical results for Upstream Raise 91.

A summary of CCR Rule requirements for this application and where they are addressed in this application is found in Table ES-1.

Table ES-1: Summary of Application Information

CCR Rule Citation 40 CFR Part 257	Information Requested	Where Addressed in this Demonstration
71(d)(1)(i)	Letter to the Administrator or the Participating State Director, announcing their intention to submit a demonstration under paragraph (d)(1)(ii) of this section, including the location and specific CCR surface impoundment for which the demonstration will be made.	Cover letter
71(d)(1)(i)(A)	A certification signed by the owner or operator that the CCR unit is in full compliance with 40 CFR 257 except for 257.71(a)(1).	Appendix A-1
71(d)(1)(i)(B)(1)	Documentation that the groundwater monitoring network meets all the requirements of 40 CFR 257.91.	Section 4.0 and Appendix B
71(d)(1)(i)(B)(1)(i)	Map(s) of groundwater monitoring well locations in relation to the CCR unit(s) that depict the elevation of the potentiometric surface and the direction(s) of groundwater flow across the site;	Figures 5, 6, and 7
71(d)(1)(i)(B)(1)(ii)	Well construction diagrams and drilling logs for all groundwater monitoring wells;	Appendix B-7
71(d)(1)(i)(B)(1)(iii)	Maps that characterize the direction of groundwater flow accounting for temporal variations;	Figures 5, 6, and 7
71(d)(1)(i)(B)(1)(iv)	Any other data and analyses the owner or operator of the CCR surface impoundment relied upon when determining the design and location of the groundwater monitoring network.	Section 4.3 and Appendix B-3, Appendix B-4, Appendix B-5, and Appendix B-6,

CCR Rule Citation 40 CFR Part 257	Information Requested	Where Addressed in this Demonstration
71(d)(1)(i)(B)(2)	Documentation that the CCR surface impoundment remains in detection monitoring.	Section 5.0 and Appendix C
71(d)(1)(i)(B)(3)	Documentation that the unit meets all the location restrictions under 40 CFR 257.60 through 257.64.	Section 3.2 and Appendix A-2
71(d)(1)(i)(B)(4)	The most recent structural stability assessment required at 40 CFR 257.73(d).	Appendix A-3
71(d)(1)(i)(B)(5)	The most recent safety factor assessment required at 40 CFR 257.73(e).	Appendix A-3
71(d)(1)(i)(C)	Documentation of the design specifications for any engineered liner components and supporting data.	Section 6.0 and Appendix D
71(d)(1)(i)(D)	A demonstration that there is no reasonable probability that a complete and direct transport pathway (i.e., not mediated by groundwater) can exist between the impoundment and any nearby water body.	Section 7.0

GRE manages CCR in three CCR surface impoundments and one CCR landfill at CCS (Figure ES-1). These CCR surface impoundments and CCR landfill are regulated by the CCR Rule and are also permitted and regulated by the North Dakota Department of Environmental Quality (NDDEQ). Upstream Raise 91 and Upstream Raise 92 both operate as CCR surface impoundments and will be closed with CCR in-place. The Drains Pond System is currently being used to dewater bottom ash and as a process water impoundment that is used to return conveyance water back to the plant. Southeast 16 operates as a landfill and is used as a storage/disposal facility for CCRs that do not contain free liquid. This application to submit an alternative liner demonstration is only focused on Upstream Raise 91.



Figure ES-1: Coal Creek Station Coal Combustion Residual Facilities

Upstream Raise 91 was constructed as an above-grade impoundment with soil embankments and a composite liner system in 1992. The Upstream Raise 91 composite liner system was constructed with an upper component consisting of high-density polyethylene (HDPE) geomembrane having a minimum thickness of 40 mils and a lower component consisting of a compacted soil layer at least two feet thick with a hydraulic conductivity less than $1x10^{-7}$ centimeters per second (cm/sec). Construction Quality Assurance (CQA) monitoring was performed during installation of the Upstream Raise 91 composite liner system in 1992. Both the low-permeability soil layer and geomembrane layer were monitored as part of the CQA monitoring effort and confirmed the integrity and longevity of the 40-mil HDPE geomembrane materials and the capability to produce quality welded seams, even 20 years or more after the 40-mil geomembrane was originally installed. In fact, as outlined in this application, the geomembrane strength information appears comparable to, and in most cases higher than, those required for 60-mil HDPE field seams under current industry standards. In addition, several evaluations by industry experts have been performed comparing the performance of the CCR rule prescriptive composite liner with alternative composite liners like Upstream Raise 91 with its thinner geomembrane layer. Conclusions from these reports indicate hydraulic flux through alternative composite liner systems similar to that of Upstream Raise 91 are comparable to the prescriptive liner system.

Due to the upstream raise design, distance from the facility to the adjacent water body (Samuelson Slough), groundwater monitoring system, and existing composite liner system, no reasonable probability exists for a sub-surface water release from the facility not mediated by groundwater.

A monitoring well network meeting the requirements of 40 CFR 257.91 has been used to monitor the groundwater upgradient and downgradient of Upstream Raise 91. Detailed information is included to describe the hydrogeologic conditions to support the vertical placement of the monitoring well screens and spatial conditions

surrounding the monitoring well network. As a part of the evaluation, vertical gradients were reviewed and concluded that an upward gradient generally exists on site, which would indicate that the wells, which are placed in the uppermost water bearing zone are appropriately placed to monitor potential releases from the facility. In addition, historic documentation, including previous groundwater monitoring plans and documentation reviewed and approved by the NDDEQ indicate the well network at Upstream Raise 91 is adequate.

Intra-well statistics (comparing compliance data to baseline data within a single well) was identified as an appropriate method for groundwater detection monitoring for Upstream Raise 91. This conclusion is based on an evaluation of the spatial variability within the monitoring network as evidenced by geochemical information, as well as ongoing observations from the historical impacts as demonstrated through hydrogeological travel time calculations and comparisons between historic and recent geochemical conditions. At present, the groundwater monitoring system for Upstream Raise 91 remains in detection monitoring, as defined by 40 CFR 257.94. As such, groundwater at the facilities is monitored on a semi-annual basis for the parameters listed in Appendix III of the CCR Rule. Assessment monitoring as defined in 40 CFR 257.95 has not been initiated. Groundwater Protection Standards (GWPS) have not been formally developed as described in 40 CFR 257.95(d)(2) and 40 CFR 257.95(h) due to the program remaining in detection monitoring. Additional analysis of groundwater monitoring data has been performed as a part of this application to support the groundwater monitoring program conclusions, including a comparison to alternate statistical methods and a preliminary review of parameters listed in Appendix IV of the CCR Rule.

As required by the alternative liner application, Upstream Raise 91 has also maintained compliance with all CCR Rule requirements as specified in 40 CFR part 257 subpart D (see Section 3.0). Information that supports compliance with CCR Rule requirements includes:

- Owner's Certification of Compliance – 257.71(d)(1)(i)(A)
- Location Restrictions – 257.71(d)(1)(i)(B)(3)
- Structural Stability and Safety Factor Assessment - 257.71(d)(1)(i)(B)(4) and 257.71(d)(1)(i)(B)(5)

Additional documents pertaining to CCR requirements that are not included as part of this application are accessible on GRE's publicly accessible CCR website, located at: https://ccr.greatriverenergy.com/.

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1.0 INTRODUCTION

Golder Associates Inc. (Golder) has prepared this application in support of submitting an alternative liner demonstration for the Upstream Raise 91 coal combustion residual (CCR) surface impoundment (Upstream Raise 91) at Great River Energy's (GRE's) Coal Creek Station (CCS). Coal Creek Station is a 1,200-megawatt coal-fired electric generation facility owned and operated by GRE, located in McLean County, approximately 10 miles northwest of Washburn, North Dakota. Upstream Raise 91 is located in the south-central portion of the plant site east of the plant buildings (Figure 1). Upstream Raise 91 operates as a CCR surface impoundment and will eventually be closed with CCR in-place. The facility is used as a combined dewatering and storage facility for CCR including fly ash, bottom ash, economizer ash, and flue gas desulfurization (FGD) material.

This application includes documentation to support an alternative liner demonstration and has been prepared in response to the requirements previously promulgated in April 2015 under Title 40 of the Code of Federal Regulations (40 CFR) Part 257 (the CCR Rule, USEPA 2015) as well as in the rule revision entitled "A Holistic Approach to Closure Part B: Alternate Demonstration for Unlined Surface Impoundments," which was entered onto the Federal Register on November 12, 2020 (USEPA 2020b).

This application includes a discussion of background information regarding the existing CCR facility, documentation regarding the design and construction of the liner system, documentation of current facility compliance with the CCR Rule, and information regarding the current groundwater monitoring system network and statistical results for Upstream Raise 91.

A summary of CCR Rule requirements for this application and where they are addressed in this application is found in Table 1.

Table 1: Summary of Application Information

CCR Rule Citation 40 CFR Part 257	Information Requested	Where Addressed in this Demonstration
71(d)(1)(i)	Letter to the Administrator or the Participating State Director, announcing their intention to submit a demonstration under paragraph (d)(1)(ii) of this section, including the location and specific CCR surface impoundment for which the demonstration will be made.	Cover letter
71(d)(1)(i)(A)	A certification signed by the owner or operator that the CCR unit is in full compliance with 40 CFR 257 except for 257.71(a)(1).	Appendix A1
71(d)(1)(i)(B)(1)	Documentation that the groundwater monitoring network meets all the requirements of 40 CFR 257.91.	Section 4.0 and Appendix B
71(d)(1)(i)(B)(1)(i)	Map(s) of groundwater monitoring well locations in relation to the CCR unit(s) that depict the elevation of the potentiometric surface and the direction(s) of groundwater flow across the site;	Figures 5, 6, and 7

CCR Rule Citation 40 CFR Part 257	Information Requested	Where Addressed in this Demonstration
71(d)(1)(i)(B)(1)(ii)	Well construction diagrams and drilling logs for all groundwater monitoring wells;	Appendix B7
71(d)(1)(i)(B)(1)(iii)	Maps that characterize the direction of groundwater flow accounting for temporal variations;	Figures 5, 6, and 7
71(d)(1)(i)(B)(1)(iv)	Any other data and analyses the owner or operator of the CCR surface impoundment relied upon when determining the design and location of the groundwater monitoring network.	Section 4.3 and Appendices B3, B4, B5, and B6
71(d)(1)(i)(B)(2)	Documentation that the CCR surface impoundment remains in detection monitoring.	Section 5.0 and Appendix C
71(d)(1)(i)(B)(3)	Documentation that the unit meets all the location restrictions under 40 CFR 257.60 through 257.64.	Section 3.2 and Appendix A2
71(d)(1)(i)(B)(4)	The most recent structural stability assessment required at 40 CFR 257.73(d).	Appendix A3
71(d)(1)(i)(B)(5)	The most recent safety factor assessment required at 40 CFR 257.73(e).	Appendix A3
71(d)(1)(i)(C)	Documentation of the design specifications for any engineered liner components and supporting data.	Section 6.0 and Appendix D
71(d)(1)(i)(D)	A demonstration that there is no reasonable probability that a complete and direct transport pathway (i.e., not mediated by groundwater) can exist between the impoundment and any nearby water body.	Section 7.0

2.0 BACKGROUND

GRE manages CCR in three CCR surface impoundments and one CCR landfill at CCS. The location of each CCR management facility is shown on Figure 1. These CCR surface impoundments and landfill are regulated by the CCR Rule and are permitted and regulated by the North Dakota Department of Environmental Quality (NDDEQ). The four facilities are:

- Southeast Section 16 CCR Landfill (Southeast 16)
- Drains Pond System CCR Surface Impoundment (Drains Pond System)
- Upstream Raise 91 CCR Surface Impoundment (Upstream Raise 91)

- Upstream Raise 92 CCR Surface Impoundment (Upstream Raise 92)

Upstream Raise 91 and Upstream Raise 92 both operate as CCR surface impoundments and will be closed with CCR in-place. The Drains Pond System is currently being used to dewater bottom ash and as a process water impoundment that is used to return conveyance water back to the plant. Southeast 16 operates as a landfill and is used as a storage/disposal facility for CCRs that do not contain free liquid. This application to submit an alternative liner demonstration is only focused on Upstream Raise 91.

2.1 CCR Management at CCS

To provide an overview of how CCR and related materials are managed at the facility, a simplified process flow diagram for CCR and non-CCR material management at CCS is shown in Figure 2. GRE produces approximately 1.1 million cubic yards (cy) of CCR and non-CCR every year. Of this material, approximately 300 to 400 thousand cy of CCR per year (predominantly fly ash) is beneficially used offsite, and approximately 700 to 800 thousand cy of CCRs and non-CCR waste per year is deposited into the four CCR facilities described above.

- Bottom ash, economizer ash, and pulverizer rejects (referred to collectively as bottom ash throughout this document) are collected wet in the plant and hydraulically transported to the Drains Pond System (west cell) where the material is allowed to dewater and then hauled and deposited primarily to either Upstream Raise 91 or Upstream Raise 92, with some material being placed at Southeast 16.
- Fly ash is handled dry with most of the fly ash produced at CCS being beneficially used offsite. CCS also receives CCR from GRE's Spiritwood Station, which is a product having similar physical characteristics to CCS fly ash. Since the amount of CCR from Spiritwood Station is relatively small compared with the quantity of fly ash produced at CCS and the materials have similar characteristics, mention of fly ash in the remainder of this document refers to the combined CCS fly ash and Spiritwood Station ash. Most of the fly ash not beneficially used offsite is used in construction of the fly ash shell of Upstream Raise 91 and Upstream Raise 92.
- FGD material is a wet product and is hydraulically transported to either Upstream Raise 91 or Upstream Raise 92.
- Air jig rejects (non-CCR waste) are collected dry and are temporarily stored in a silo north of the main plant buildings prior to being loaded into haul trucks for transport to permitted containment facilities. Upstream Raise 91, Upstream Raise 92, and Southeast 16 are permitted to receive air jig rejects via NDDEQ permits. Air jig rejects are occasionally used to supplement bottom ash within Upstream Raise 91 and Upstream Raise 92 since the material has similar desirable physical properties to that of the bottom ash. However, a majority of the air jig rejects are hauled for placement in Southeast 16.

2.2 Upstream Raise 91 Site History

CCRs were originally managed in the South Ash Pond, which is a legacy facility at CCS. The South Ash Pond CCR and process water containment area was made by constructing a clay core dike around the perimeter and relying on in-situ low permeability soil to act as a soil liner across the floor. This facility was put into operation in 1979 and operated intermittently from 1979 through 1990. Due to the identification of groundwater impacts, the South Ash Pond was removed from service in 1990. In the early 1990s, as part of the site corrective action to address the groundwater impacts, the South Ash Pond was closed by removal of CCRs. In-place CCRs and a portion of the underlying subsoil were excavated from the South Ash Pond and transported to an offsite landfill. After CCRs were cleaned out of the South Ash Pond, that facility ceased to exist.

A portion of the remaining clay core dikes were salvaged, and additional soil embankments were constructed to outline the footprint of both Upstream Raise 91 and the adjacent Upstream Raise 92. A new composite liner was completed over the regraded Upstream Raise 91 floor and embankments in 1992, the specifics of which are discussed in more detail in Section 6.0. In addition, composite liner was installed in the area between Upstream Raise 91 and Upstream Raise 92 in 2016. This additional liner completes a continuous composite-lined area between Upstream Raise 91 and Upstream Raise 92. Typical west-east and south-north cross sections through Upstream Raise 91 are shown on Figure 3 along with details of the existing composite liners.

2.3 Upstream Raise 91 and Upstream Raise 92

Upstream Raise 91 and Upstream Raise 92 have been designed, constructed, and operated as separate units. As such, the groundwater associated with these facilities are monitored as separate units under the CCR Rule and NDDEQ regulations. The key factors that differentiate these units are described below.

- **Design and Construction Components:** The composite liner systems for Upstream Raise 91 and Upstream Raise 92 were constructed at different times with different components. Each impoundment relies on separate sumps and drainage systems. The separate liner systems, drainage systems, and sumps allow for the water within these impoundments to be managed through different closure timeframes.
- **Operations:**
  - Upstream Raise 92 is anticipated to cease receipt of sluiced FGD material at the end of 2020.
  - Upstream Raise 91 began operating in its current condition in 2015. Beginning in 2021, Upstream Raise 91 will be the only facility for FGD material deposition at CCS and the primary facility for fly ash and bottom ash deposition. Fly ash and bottom ash must be deposited concurrently with FGD due to the upstream raise design.
- **Groundwater Flow Regime:**
  - The groundwater flow direction beneath Upstream Raise 91 is generally from south to north toward Lower Samuelson Slough, with a slight west to east flow component. The gradient beneath the facility appears to be relatively consistent.
  - The groundwater flow direction beneath Upstream Raise 92 is generally from west to east, with a slight south to north component. The gradient is generally consistent with Upstream Raise 91 on the west side of the facility. On the east side of the facility, the gradient decreases due to an apparent break in the groundwater flow regime where groundwater appears to flow generally toward Sayler Slough as opposed to Lower Samuelson Slough.

2.4 Upstream Raise 91 Operation and Lifespan

The structural perimeter of Upstream Raise 91 is constructed using bottom ash and fly ash, while FGD material is contained in the center of the facility. While the primary use of Upstream Raise 91 is the disposal of FGD material, the design of this facility requires the deposition of bottom ash and fly ash for its construction. As a result, fly ash, bottom ash, and FGD material are functionally inseparable waste streams that must be deposited together for the continued safe operation of Upstream Raise 91 (see Figure 4). The perimeter foundation drainage layer of Upstream Raise 91 is constructed using the relatively permeable bottom ash and also include perforated drainage piping. As construction proceeds vertically upward with continued FGD material deposition, a perimeter bottom

ash drainage layer and a structurally competent fly ash shell are constructed on the exterior of the facility. The bottom ash drainage layer increases the factor of safety against potential slope movement by keeping the phreatic surface toward the center of the facility, while the exterior fly ash slopes provide a stable trafficking surface for haul trucks and limits erosion due to precipitation. Inherent physical properties of both the bottom ash and fly ash materials are well-suited to serve as materials to construct the upstream raise in compliance with the engineering design. Construction progresses in an upstream direction (toward the middle of the facility) to keep CCR over the lined footprint and at engineered slopes designed to increase stability and capacity and minimize the effects due to erosion.

Process water used to convey FGD material to the interior of Upstream Raise 91 passively drains through bottom ash perimeter containment berms and/or supplemental surficial piping to the foundation drainage system. From the drainage system within the foundation, the process water eventually flows to the northwest corner of Upstream Raise 91 where it is directed to the Drains Pond System.

Starting in December of 2020, Upstream Raise 91 will be the only facility for FGD deposition at CCS and the primary facility for fly ash and bottom ash deposition. There is an estimated 6,000,000 cy of capacity for waste disposal remaining in Upstream Raise 91, with an expected lifespan of approximately 10 years (depending on the rate of FGD deposition).

Upstream Raise 91 was designed and constructed to have a bottom ash drainage layer on the north, south, and west sides of the facility. As the facility construction progresses vertically, the perimeter foundation bottom ash drainage layer and fly ash shell will be raised on these three sides as described above. The east side is designed to buttress against the existing fly ash shell and perimeter foundation bottom ash drainage layer of Upstream Raise 92, and no drainage or structural zone is required for stability (Figure 3). Since the east side of Upstream Raise 91 buttresses onto the west slope of Upstream Raise 92, GRE plans to pursue construction of a new composite liner (likely Geosynthetic Clay Liner and 60-mil geomembrane) up the west slope of Upstream Raise 92 that is tied into the Upstream Raise 91 composite liner. This portion of the liner will be constructed to be consistent with the CCR Rule's definition of a liner and therefore is not a subject of this request to submit an alternative liner application.

3.0 CCR RULE COMPLIANCE

As part of the application requesting approval to submit an alternative liner demonstration, the EPA has requested documentation showing full compliance with applicable requirements in 40 CFR part 257 subpart D except for 40 CFR 257.71(a)(1). Upstream Raise 91 has maintained compliance with all CCR requirements to date. Additional documents pertaining to CCR requirements that are not included as part of this demonstration are available on GRE's publicly accessible CCR website, located at: https://ccr.greatriverenergy.com/.

3.1 Owner's Certification of Compliance – 257.71(d)(1)(i)(A)

As part of the application package, 40 CFR 257.71(d)(1)(i)(A) requires "A certification signed by the owner or operator that the CCR unit is in full compliance with this subpart except for 40 CFR 257.71(a)(1)." A certification letter signed by GRE for Upstream Raise 91 stating full compliance with applicable requirements in 40 CFR part 257 subpart D, except 40 CFR 257.71(a)(1), is attached as Appendix A1.

3.2 Location Restrictions – 257.71(d)(1)(i)(B)(*3*)

In addition to the certification, 40 CFR 257.71(d)(1)(i)(B)(*3*) requires "Documentation that the unit meets all the location restrictions under 40 CFR 257.60 through 257.64" be included as part of the application letter. Location

Restrictions Demonstrations were finalized for Upstream Raise 91 in October 2018 and are included as Appendix A-2 (Golder 2018). Upstream Raise 91 meets the requirements detailed in 40 CFR 257.60 through 257.64, summarized as follows:

- 40 CFR 257.60 – Placement above the uppermost aquifer
  - Based on groundwater elevations, the base of the liner system for Upstream Raise 91 is above the upper limits of the uppermost water bearing zone and no intermittent, recurring or sustained hydraulic connection between any portions of the base of the CCR units and the uppermost aquifer exists.
- 40 CFR 257.61 – Wetlands
  - Upstream Raise 91 was constructed as an above-grade impoundment with grass covered perimeter earthen embankments and is located several hundred feet uphill of Samuelson Slough (closest surface water body). There are no visual indications suggesting the impoundment is located in wetlands. In addition, the NDDEQ, as part of the permit requirements of each facility, has previously accepted that Upstream Raise 91 is not located in wetlands.
- 40 CFR 257.62 – Fault areas
  - As evidence of being outside of fault areas, United States Geological Survey's (USGS) Earthquake Hazards Program's U.S. Quaternary Faults and Folds Database information was reviewed, including a map of the known faults in the contiguous United States. No known quaternary faults are located in the state of North Dakota (USGS 2020). Upstream Raise 91 is not located within 200 feet of a fault (or the outermost damage zone of fault) that has had displacement in Holocene time.
- 40 CFR 257.63 – Seismic impact zones
  - A seismic impact zone is defined as an area having a 2% or greater probability that the maximum expected horizontal acceleration, expressed as a percentage of the earth's gravitational pull (g), will exceed 0.10 g in 50 years. Based on a review of USGS information, the majority of North Dakota, including CCS, is given a 2% probability of exceeding 0.02 g in 50 years, below the 0.10 g threshold for defining a seismic impact zone (Petersen, et al. 2019).
- 40 CFR 257.64 – Unstable areas
  - The Upstream Raise 91 facility was assessed for the presence of unstable areas based on a review of historic soil, geologic, and geomorphologic references. Upstream Raise 91 is generally constructed over a glacial till layer consisting of sand and silty-clay soils. Glacial till varies in thickness from 20 feet to several hundred feet in the area of CCS. No prior mining has occurred within the footprint of the facility, or adjacent to the facility, that would undermine the stability of the facility. No significant fills, excavations, or structures are present adjacent to the facilities. Based on this assessment, Upstream Raise 91 is not located in an unstable area.

3.3 Structural Stability and Safety Factor Assessment – 257.71(d)(1)(i)(B)(*4*) and 257.71(d)(1)(i)(B)(*5*)

As part of the application package, 40 CFR 257.71(d)(1)(i)(B)(4) requires "The most recent structural stability assessment required at 40 CFR 257.73(d)" and 40 CFR 257.71(d)(1)(i)(B)(5) requires "The most recent safety factor assessment required at 40 CFR 257.73(e)." The most recent version of the structural stability assessments

and safety factor assessments for Upstream Raise 91 has been included in Appendix A-3 (Golder 2016). These documents demonstrate that Upstream Raise 91 meets the applicable structural stability and safety factors.

4.0 GROUNDWATER MONITORING NETWORK – 257.71(D)(1)(I)(B)(*1*)

For documenting the compliance certification, 40 CFR 257.71(d)(1)(i)(B)(*1*) requires:

> "Documentation that the groundwater monitoring network meets all the requirements of 40 CFR 257.91. This must include documentation that the existing network of groundwater monitoring wells is sufficient to ensure detection of any groundwater contamination resulting from the impoundment, based on direction of flow, well location, screening depth and other relevant factors. At a minimum, the documentation must include all of the following:
>
> i) Map(s) of groundwater monitoring well locations in relation to the CCR unit(s) that depict the elevation of the potentiometric surface and the direction(s) of groundwater flow across the site;
>
> ii) Well construction diagrams and drilling logs for all groundwater monitoring wells;
>
> iii) Maps that characterize the direction of groundwater flow accounting for temporal variations; and
>
> iv) Any other data and analyses the owner or operator of the CCR surface impoundment relied upon when determining the design and location of the groundwater monitoring network."

As part of the CCR Rule, a monitoring well network meeting the requirements of 40 CFR 257.91 has been used to monitor the groundwater upgradient and downgradient of Upstream Raise 91. The current CCR groundwater monitoring system certification for CCS is included as Appendix B1 (Golder 2019a). A summary of CCR Rule requirements associated with the groundwater monitoring network and where they are addressed in this document can be found in Table 2.

Table 2: Monitoring Well Network Documentation

CCR Rule Citation 40 CFR Part 257	Information Requested	Where Addressed in this Demonstration
71(d)(1)(i)(B)(1)(i)	Map(s) of groundwater monitoring well locations in relation to the CCR unit(s) that depict the elevation of the potentiometric surface and the direction(s) of groundwater flow across the site;	Section 4.1.3 and Figures 5, 6, and 7
71(d)(1)(i)(B)(1)(ii)	Well construction diagrams and drilling logs for all groundwater monitoring wells;	Section 4.4.1 and Appendix B-7
71(d)(1)(i)(B)(1)(iii)	Maps that characterize the direction of groundwater flow accounting for temporal variations;	Section 4.1.3 and Figures 5, 6, and 7
71(d)(1)(i)(B)(1)(iv)	Any other data and analyses the owner or operator of the CCR surface impoundment relied upon when determining the design and location of the groundwater monitoring network.	Section 4.3 and Appendix B-3, Appendix B-4, Appendix B-5, and Appendix B-6

4.1 Description of Site Hydrogeology

The area surrounding CCS is primarily characterized by the presence of mixed glacial deposits. The following section describes the regional and site geology and hydrogeology.

4.1.1 Regional and Site Geology

CCS and McLean County are situated at the eastern-most extent of the Williston Basin, a structural and sedimentary basin (USGS 1999). The region is characterized by the presence of glacial drift, reaching thicknesses of several hundred feet, and overlying the Sentinel Butte Member, the source of commercially mined coal in the direct vicinity of CCS (Falkirk 1979). The Sentinel Butte Member is the highest strata of the Paleocene Fort Union Formation, overlying the Tongue River, Ludlow, and Cannonball Members (USGS 1999). The Sentinel Butte Member is marked by drab-gray units, separating it from the lower Tongue River Member.

The near-surface site geology of CCS includes unconsolidated surficial deposits of the Coleharbor formation consisting of stratified and unstratified glacial drift. Geologic conditions are heterogeneous, with materials varying from silty clay and sandy clay till to interbedded sand lenses and discontinuous coal seams (Appendix B-4, CPA/UPA 1989).

4.1.2 Stratigraphic Cross Sections

Stratigraphic cross sections were compiled based on boring information from current CCR monitoring wells and historical monitoring wells and boreholes (Appendix B-2). Borings within lined facility boundaries were completed prior to composite liner construction.

As shown in the cross sections, within the area of the site there is variability in the near-surface geologic units encountered. Discontinuous seams of coal are located throughout the site, in addition to gravel, sand, silt, and clay.

Note that boring information has been projected to applicable sections and that historical borings may be truncated at the top of liner or current existing ground surface grades due to changes in site geometry since borings were completed.

4.1.3 Site Hydrogeology

Regional groundwater flow of the uppermost water-bearing unit in the vicinity of CCS is a subtle expression of the surface topography, which is influenced by the configuration of the eroded bedrock.

- Map(s) of groundwater monitoring well locations in relation to the CCR unit are included as Figures 5 and 6. In addition to well and facility locations, a potentiometric surface of the shallow groundwater has been developed from the October 2019 and April-May 2020 detection monitoring events and included on the maps to show direction of groundwater flow accounting for temporal variation.
- A map showing a potentiometric surface of the shallow groundwater across the entire CCS site was developed from the April-May 2020 monitoring well and piezometer information and is included as Figure 7.

Based on the groundwater elevations (shown in Figures 5, 6, and 7), the shallow groundwater at the CCR facilities generally follows surface topography, flowing to the east and north towards Lower Samuelson Slough and Sayler Slough. Paired wells (shallow and deep) located north and northeast of Upstream Raise 91 indicate that an upward gradient is common across the site. Therefore, the horizonal gradient beneath Upstream Raise 91

is likely to be the primary component to groundwater flow and impact from a conceptual release would likely remain in the uppermost portion of the shallow water-bearing unit (Appendix B-3, Braun 1990).

The groundwater gradient across Upstream Raise 91 was estimated from the April 2020 groundwater levels, and ranges from 0.01 to 0.02 feet per feet (ft/ft). Slug testing was performed at several site monitoring wells in 2007 and resulting estimated hydraulic conductivity values ranged between 8 x 10^{-3} cm/sec (22.6 feet/day) and 1 x 10^{-4} cm/sec (0.28 feet/day). These slug test results are representative of the sandier units screened in these well, but geologic conditions at Upstream Raise 91 are significantly more heterogeneous and this field testing is not representative of widespread conditions beneath the facility. Approximately 10 to more than 50 feet of low-permeability soil exists below the composite liner system of Upstream Raise 91 (see Appendix B-2).

Permeability tests have been conducted on nine relatively undisturbed (i.e., Shelby tube) samples obtained from relevant depths in boreholes drilled in and around the areas occupied by Upstream Raise 91 to characterize the hydraulic conductivity of the near-surface native soils. The locations of the boreholes from which the samples were obtained are shown in Figure 8. The results of the permeability tests are summarized in Table 3 and indicate that native soils underlying Upstream Raise 91 are characterized by hydraulic conductivity values ranging from 4.6x10^{-8} cm/sec to 1.8x10^{-6} cm/sec.

Table 3: Permeability Test Results for Native Soils

Year	Borehole	Sample Depth	Soil Description	Hydraulic Conductivity
2014	DP-A	25 feet	Clayey silt, brown	8.6x10^{-8} cm/sec
2014	DP-B	15 feet	Silty clay, trace gravel, dark brown	4.6x10^{-8} cm/sec
2014	DP-C	25 feet	Clayey sand, dark brown, moist	1.2x10^{-7} cm/sec
2014	DP-D	20 feet	Sandy silty clay, dark brown, moist	1.8x10^{-6} cm/sec
2002	SW16-8	76 feet	Clay, some silt, little sand, yellowish-brown	3.9x10^{-7} cm/sec
2001	BH-8	61 feet	Clay, some sand and gravel, dark grayish-brown	8.3x10^{-8} cm/sec
1978	SAP-1	3.5 feet	Silty clay	4.2x10^{-7} cm/sec
1978	SAP-8	12.5 feet	Lean clay	1.5x10^{-7} cm/sec
1978	SAP-10	3.5 feet	Lean clay	1.8x10^{-7} cm/sec
Geometric mean				1.9x10^{-7} cm/sec

4.2 Release Conceptual Model

A hypothetical subsurface release from Upstream Raise 91 would be expected to migrate vertically downward through the unsaturated zone to the uppermost groundwater, approximately 5 to 15 feet below the bottom of the composite liner system, before flowing toward downgradient monitoring wells (see Figure 9). As described in

Section 4.1.3, the horizontal hydraulic gradient beneath Upstream Raise 91 is likely the primary component to groundwater flow and an upward hydraulic gradient also generally exists on site, indicating a conceptual release would likely stay in the shallow groundwater system and not migrate vertically. The downgradient wells discussed below are positioned along the downgradient edges of the CCR facility to detect a release, if occurring.

4.3 Information Reviewed

Golder reviewed information from the operating record documenting the design, installation, and development of the monitoring wells and/or describing hydrogeologic conditions at the site to assess the design and location of the groundwater monitoring network. The information reviewed included:

- Braun Environmental Laboratories. 1990. Hydrogeological Analysis Annual Report, Coal Creek Station, McLean County, North Dakota. December 1990. (included as Appendix B-3)
- Cooperative Power and United Power Associations (CPA/UPA). 1989. Application to Renew Permit SU-033 – Coal Creek Station, McLean County, North Dakota. Submitted to the North Dakota State Department of Health. February 1989. (Appendix B-4)
- Environmental and Regulatory Services Division – Cooperative Power Association (ERSD/CPA). 1993. Coal Creek Station 1993 Water Quality Monitoring Report. Submitted to the North Dakota State Department of Health and Consolidated Laboratories. 1993. (included as Appendix B-5)
- Dames & Moore. 1991. Revised Water Quality Monitoring Plan, Coal Creek Station for Cooperative Power Association. December 1991. (included as Appendix B-6)
- Falkirk Mining Company. 1979. Land Use Analysis/Technical Examination/Environmental Assessment Record – Falkirk Coal Lease Application M-31053 (ND). Submitted to the United States Department of the Interior, July 1979. https://books.google.com/books?id=KwUyAQAAMAAJ&lpg=PP1&ots=vAdnubfhR2&dq=land%20use%20analysis%20falkirk%20M31053&pg=PT2#v=onepage&q&f=false
- United States Geological Survey. 1999. Fort Union Coal in the Williston Basin, North Dakota: A Synthesis. Chapter WS in 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region, U.S. Geological Survey Professional Paper 1625-A. https://pubs.usgs.gov/pp/p1625a/Chapters/WS.pdf

As described in subsequent sections, the information in these reports supports our conclusion that the monitoring well network meets the applicable requirements.

4.4 Monitoring Wells

The monitoring well network for Upstream Raise 91 consists of three downgradient wells (MW-49, MW-91-1 and MW-51), positioned along the northern boundary of the facility (see Figures 5 and 6). There are four monitoring wells (MW-DP3, MW-91-2, MW-75, and MW-16-6) that are upgradient of Upstream Raise 91 used to evaluate upgradient water quality (Figures 5 and 6).

4.4.1 Monitoring Well Geologic Conditions

Monitoring well construction diagrams and drilling logs for the Upstream Raise 91 monitoring wells are included in Appendix B-7. Table 4 and Appendix B-7 present the variability of the screened geologic units for wells associated with Upstream Raise 91 and demonstrate that heterogeneity is an important consideration for the groundwater

monitoring system and statistical methods. The monitoring wells associated with Upstream Raise 91 are screened in the upper most water bearing zone. There is variation in the material each well is screened in due to the non-uniformity of the unconfined layers of the glacial till.

Table 4: Upstream Raise 91 Monitoring Well Screened Lithologies

Location	Well ID	Geologic Unit(s) Screened In
Upgradient	MW-DP3	Fill, Coal, Fat Clay
	MW-91-2	Fat Clay, Coal
	MW-75	Clayey Silt, Silty Sand
	MW-16-6	Sandy Lean Clay, Coal, Lean Clay
Downgradient	MW-49	Sandy Gravelly Clay, Sandy Silt, Fat Clay (Shale)
	MW-51	Silty and Gravelly Sand, Lean Clay
	MW-91-1	Sand with Silt and Gravel, Fat Clay

4.4.2 Vertical Placement of Monitoring Well Screens

The upgradient and downgradient monitoring wells associated with Upstream Raise 91 are installed and screened at appropriate depths to monitor groundwater in the uppermost water bearing zone. As described in Section 4.2, a release from Upstream Raise 91 is expected to move laterally in the uppermost water bearing zone beneath the facility toward the monitoring wells. Therefore, these wells are expected to detect a release from the facility.

A pair of wells (MW-9 and MW-10) located east of MW-51 along the downgradient boundary of Upstream Raise 92 support the placement of the well screens in the Upstream Raise 91 monitoring network. MW-10 is screened relatively shallow (15-25 feet below ground surface) to intercept the uppermost water bearing zone, and MW-9, located approximately 7 feet from MW-10, is screened deeper (43-53 feet below ground surface). While these wells are not part of the monitoring network for Upstream Raise 91, they provide important information on the groundwater system in the vicinity. Two observations have been made from this well pair that support the placement of Upstream Raise 91 monitoring well screens.

- An upward gradient exists between MW-9 and MW-10 which is to be expected for a groundwater discharge area. Groundwater in this area discharges to the nearby Samuelson Slough (Appendix B-3, Braun 1990). With an upward gradient, potential impacts to groundwater would be expected to be observed in wells screened in the uppermost water bearing zone.
- Differences in chloride, sulfate, and total boron concentrations in samples collected from MW-9 and MW-10 are shown on Figures 10, 11 and 12. MW-10 (shallower well) was impacted by the subsurface release from the legacy unit (South Ash Pond), while chloride, sulfate, and total boron concentrations in MW-9 were stable and apparently unaffected by the subsurface release from the legacy unit. This observation indicates that the Upstream Raise 91 downgradient monitoring wells are screened to intercept groundwater in the uppermost water bearing zone and are expected to detect a release.

4.4.3 Downgradient Monitoring Well Spatial Conditions

Based on site geometry and the groundwater flow direction, the spacing of the downgradient wells along the northern boundary of Upstream Raise 91 are adequate to accurately represent the quality of groundwater passing the waste boundary, ensure the detection of groundwater contamination in the upper most aquifer, and monitor all potential contaminate pathways. The number and spacing of the downgradient monitoring wells were selected based on the hydrogeologic conditions at the site, the areal extent of Upstream Raise 91 along the downgradient boundary, and the monitoring network previously approved by the NDDEQ (North Dakota State Director) so that impacts to groundwater quality in the uppermost water bearing unit can be detected if a subsurface release were to occur.

Groundwater has been monitored at CCS since the late 1970s. The initial groundwater monitoring system downgradient of Upstream Raise 91 was installed in 1988 and included three wells (MW-49, MW-50, and MW-51). Annual groundwater monitoring reports that include these wells have been submitted to the NDDEQ since 1989. The initial groundwater monitoring system was evaluated by Dames & Moore in 1991 (Appendix B-6, Dames & Moore 1991) and a conclusion from this report indicated the “current ground water and surface water locations are adequate to effectively monitor known water quality conditions.”

In 1992, the monitoring locations in the program were re-evaluated by GRE environmental personnel and approved by the NDDEQ, so that the “program could track representative and significant data” (Appendix B-5, ERSD/CPA 1993). Upstream Raise 91 had recently been constructed and composite lined at this time, as part of corrective actions at the site associated with the legacy unit, which was part of the reason the groundwater monitoring program was re-evaluated. The location of the three downgradient wells were deemed adequate by GRE environmental personnel and the NDDEQ for monitoring the newly composite-lined Upstream Raise 91. Groundwater beneath Upstream Raise 91 continued to be monitored via the North Dakota state program, with results being submitted to the NDDEQ annually.

Golder re-evaluated the monitoring network as a part of the CCR Rule network certification. This evaluation took into consideration the historical monitoring well network approved by the NDDEQ. The water levels decreased in one of the existing downgradient monitoring wells (MW-50, last sample collected in 2014) to the point that insufficient water was able to be measured and collected for sampling. Therefore, a new monitoring well (MW-91-1) was installed near MW-50, screened in the uppermost water bearing zone, and was included as part of the downgradient monitoring well network. Golder’s review, which is summarized in the groundwater monitoring system certification (Appendix B-1, Golder 2019a), indicated that the three monitoring wells along the downgradient side of Upstream Raise 91 (MW-49, MW-91-1, and MW-51) were adequate to meet the requirements of 40 CFR 257.91(b).

The three downgradient monitoring wells along the northern boundary of Upstream Raise 91 were located based on observations that show groundwater flows from southwest to northeast below the facility towards Lower Samuelson Slough (see Section 4.1.3). Upstream Raise 91 lies adjacent to and in between Upstream Raise 92 and the Drains Pond System, which are also monitored as a part of the CCR Rule program. Since these facilities are monitored separately as described in Section 2.2, the effective downgradient length along the north boundary of Upstream Raise 91 that can be monitored is approximately 1,400 feet. The three downgradient wells are positioned at an approximately even spacing downgradient of Upstream Raise 91, meaning that the wells have an average lateral spacing of approximately 465 feet.

The north embankment of Upstream Raise 91 functions as an anchor to the composite liner systems for the facility, as a utility corridor for CCR and process water conveyance piping and electrical duct banks, and as an access/haul route for equipment operating and performing maintenance onsite. The downstream slopes of the north embankment are 3 horizontal units to 1 vertical unit (3H:1V) slopes that are vegetated and are approximately 25 feet high. The slopes are too steep for drilling equipment and installation of monitoring wells. Due to the presence of utilities and heavy equipment operation on the embankment crest, the location of the CCR sluice piping, and the slope of the embankment, the downgradient monitoring wells around Upstream Raise 91 were installed at the downstream toe of the soil embankment, which is approximately 100 feet downgradient of the composite liner anchor trench along the embankment crest.

4.4.4 Upgradient Monitoring Wells

As part of the network certification evaluation, additional upgradient monitoring wells were installed in accordance with the requirements of the CCR Rule and to provide a representative range in variability of groundwater conditions upgradient of the CCR units at CCS. A review of recent groundwater levels indicates that there are four applicable upgradient wells to Upstream Raise 91 (MW-DP3, MW-91-2, MW-75, MW-16-6). These wells yield groundwater samples from the uppermost water bearing zone that represent the quality of background that has not been affected by leakage from Upstream Raise 91 as required by 40 CFR 257.91(a).

These four upgradient wells are screened in the uppermost water bearing zone. As shown in the cross sections (Appendix B-2) and the monitoring well logs (Appendix B-7), variability within the area of the site results in a range of materials within the near-surface geologic units. Discontinuous seams of coal are located throughout the site, in addition to gravel, sand, silt, and clay. This geologic spatial variability influences the water quality variability observed in the upgradient wells (see Section 5.2.1.1). The comparative statistical approach selected for detection monitoring (intra-well analysis) does not rely on the upgradient wells capturing all the possible upgradient waters.

In addition to the four upgradient monitoring wells, there are several monitoring wells in the plant area being used for other programs that can also be used to evaluate further upgradient sources that may not be captured by the four designated upgradient monitoring wells. These additional upgradient wells near the plant, including a brief discussion of how upgradient sources may be impacting the wells near the plant, are discussed more in Section 5.4.1.

5.0 GROUNDWATER MONITORING PROGRAM – 257.71(D)(1)(I)(B)(*2*)

As part of the compliance documentation, 40 CFR 257.71(d)(1)(i)(B)(*2*) requires:

> “Documentation that the CCR surface impoundment remains in detection monitoring pursuant to 40 CFR 257.94 as a precondition for submitting an application. This includes documentation that the groundwater monitoring program meets the requirements of 40 CFR 257.93 and 257.94. Such documentation includes data of constituent concentrations, summarized in table format, at each groundwater monitoring well monitored during each sampling event, and documentation of the most recent statistical tests conducted, analyses of the tests, and the rationale for the methods used in these comparisons. As part of this rationale, the owner or operator of the CCR surface impoundment must provide all data and analyses relied upon to comply with each of the requirements of this part.”

At present, the groundwater monitoring system for Upstream Raise 91 remains in detection monitoring, as defined by 40 CFR 257.94. As such, groundwater at the facilities is monitored on a semi-annual basis for the parameters

listed in Appendix III of the CCR Rule. Assessment monitoring as defined in 40 CFR 257.95 has not been initiated. Groundwater Protection Standards (GWPS) have not been formally developed as described in 40 CFR 257.95(d)(2) and 40 CFR 257.95(h) due to the program remaining in detection monitoring.

The following additional information for the current groundwater monitoring program for Upstream Raise 91 has been provided to aid in the EPA's review of the site's compliance with the requirements of 40 CFR 257.93 and 257.94.

5.1 Groundwater Monitoring Data

Tables summarizing Appendix III and Appendix IV constituent concentrations for samples collected for baseline and detection monitoring from the Upstream Raise 91 monitoring wells is included in Appendix C-1.

5.2 Detection Monitoring Statistical Approach

The current CCR statistical methods certification for CCS was last revised March of 2019 and is included as Appendix C-2 (Golder 2019b). The statistical approach used at the site is based on guidance provided in the USEPA's Unified Guidance (USEPA 2009), as well as information detailed in 40 CFR 257.93 and 257.94. Further information regarding the basis for the statistical approach as well as the application of the statistical approach for detection monitoring is provided in the following sections.

5.2.1 Intra-well Statistics

Intra-well statistics (comparing compliance data to baseline data within a single well) was identified as an appropriate method for groundwater detection monitoring for Upstream Raise 91. As discussed by the EPA in the preamble to the Part A final rule (USEPA 2020a), "The regulations of 257.93(f) and (g) establish the allowable statistical approaches and the performance standards that must be met. There are some circumstances in which intra-well comparison can meet these requirements. Additional information about these approaches may be found in the Unified Guidance, which EPA relied upon, as well as 40 CFR 258."

The Unified Guidance provides procedures for both inter-well and intra-well methods: "Groundwater detection monitoring involves either a comparison between different monitoring stations (i.e., downgradient compliance wells vs. upgradient wells) or a contrast between past and present data within a given station (i.e., intra-well comparisons)" (USEPA 2009). The Unified Guidance further identifies circumstances in which intra-well comparison may be preferred over inter-well comparison. Two situations where intra-well statistics may be preferable to inter-well statistics are where spatial variability is present, and where legacy impacts not stemming from current facilities or handling practices are known to have occurred. Upstream Raise 91 has both spatial variability and historical impacts from a legacy unit.

5.2.1.1 Spatial Variability

The Unified Guidance indicates that where spatial variability is evident, "the statistical approach would need to be modified so that distinct wells are treated as individual populations with statistical testing being conducted separately at each one (i.e., intrawell comparisons)" (USEPA 2009). Per the Unified Guidance, "Confounding results stemming from spatial variability can be eliminated" through the use of intra-well statistics (USEPA 2009). Specifically, the Unified Guidance notes that "substantial differences in mean concentration levels can *invalidate* interwell, upgradient-to-downgradient comparisons and point instead toward *intrawell* tests" (USEPA 2009, original emphasis included).

Due to the heterogeneity of the glacial geology at CCS, spatial variability is displayed throughout the groundwater monitoring networks. Use of intra-well statistics allows comparisons to be made on a per well basis, which avoids comparisons being made between differing geologic/geochemical conditions. The Unified Guidance identifies spatial variability as “statistically identifiable differences in mean and/or variance levels (but usually means) across the well field (i.e., spatial non-stationarity) (USEPA 2009).”

Three lines of evidence demonstrate the geochemical spatial variability across the site. First, side-by-side box plots of the Appendix III parameters for the upgradient wells are provided in Figures 13 through 19. The Unified Guidance notes that side-by-side box plots “can be further employed to screen for possible spatial variation in mean levels (USEPA 2009),” Further, “the extent to which apparent differences in mean levels seem to be real rather than chance fluctuations can be examined” through the comparison of side-by-side box plots (USEPA 2009). The side-by-side box plots for the four upgradient wells display variable water quality in the area upgradient of Upstream Raise 91.

Analysis of variance (ANOVA) testing provides further confirmation of upgradient spatial variability, as described in the Unified Guidance (USEPA 2009). Determination of the distribution for ANOVA testing is based on the residuals, or the calculated difference between the observed values and the values predicted by the ANOVA model. ANOVA testing was conducted for data collected from the upgradient locations between the start of the baseline period and the second quarter (Q2) 2020 detection monitoring event. For each of the seven Appendix III parameters, either variation (in the case of parametric ANOVA tests for parameters with residuals exhibiting normal or transform-normal distributions), or difference (for non-parametric ANOVA tests for parameters with residuals exhibiting non-normal distributions) is indicated at the 5% significance level (α = 95%). The Appendix III parameters exhibit ANOVA significance between upgradient wells, indicating statistically significant geochemical spatial variability. As noted by the Unified Guidance, “substantial differences among the mean levels at a set of uncontaminated sampling locations [such as the tested upgradient wells] are suggestive of natural spatial variability (USEPA 2009,).” ANOVA evaluation of the four upgradient wells identified significant difference between well means or medians. The Unified Guidance indicates that pooling should not occur among well means or medians determined to be significantly different using ANOVA (USEPA 2009) and therefore inter-well statistical analyses are not recommended in this situation. Appendix C-3 provides results of ANOVA testing on data collected at wells upgradient from Upstream Raise 91

A major ions trilinear diagram (piper diagram), developed from water chemistry results collected from the upgradient wells in the CCR groundwater program for each of the four CCR monitoring units (Upstream Raise 91, Upstream Raise 92, Southeast 16, and the Drains Pond System), show the variability in water types across the site in upgradient wells (Figure 20). Data used for constructing the piper diagram were collected during four monitoring events between 2017 and 2020.

As recommended by the Unified Guidance, the evidence of spatial variability amongst the upgradient wells has driven the selection of an intra-well statistical approach for Upstream Raise 91.

5.2.1.2 Historical Impacts – Hydrogeological Evaluation

In addition to the identification and evaluation of spatial variability discussed above, the Unified Guidance indicates that intra-well testing is also useful when there are historical impacts. “Another advantage using intrawell background is that a *reasonable baseline* for tests of future observations can be established at historically contaminated wells. In this case, the intrawell background can be used to track the onset of even more extensive contamination in the future” (USEPA 2009, original emphasis included).

Historical subsurface releases from legacy CCR facilities are known to have impacted groundwater levels and chemistry at CCS. Those facilities have been removed and/or closed, and new facilities with engineered composite liner systems have been constructed. However, the monitoring well network is likely continuing to detect historical impacts from the legacy unit due to the hydrogeological conditions described in Section 4.1.

To evaluate the potential for ongoing historical impacts on downgradient groundwater quality, the travel time in the unsaturated/vadose zone and uppermost water bearing zone were estimated using simplified, yet conservative, analytical methods for advective transport. The total travel time for potential subsurface impacts to affect downgradient well groundwater quality is based on:

- Vadose zone thickness, i.e., the vertical separation between the base of the composite liner system and the uppermost water bearing zone (see Appendix A-2 (Golder 2018) and Appendix B-2),
- Site-specific hydraulic conductivity values and material properties from laboratory testing of the native soil samples from the vadose zone (described in Section 4.1.3),
- Site-specific hydraulic conductivity values of the uppermost water bearing zone from slug testing conducted in upgradient and downgradient monitoring wells adjacent to Upstream Raise 91 (described in Section 4.1.3),
- Estimated effective porosity of glacial till, and
- Groundwater gradients across Upstream Raise 91 (described in Section 4.1.3).

Estimates of the above properties at the site were used to evaluate unsaturated flow from the bottom of the composite liner to the uppermost water bearing zone (vadose zone) and saturated flow through the uppermost groundwater to the downgradient monitoring wells. The total estimated travel time (through the vadose zone and uppermost groundwater) for a subsurface release from the near the north side of Upstream Raise 91 to the downgradient monitoring well MW-91-1 is approximately 13 years, while the total travel time from the southwest side of Upstream Raise 91 to MW-91-1 is approximately 33 years. These travel time estimates are conservative since they are based on advective transport in homogeneous, laterally continuous, sandy glacial till, and do not incorporate retardation in transport processes or travel time due to sorption or dispersion. In addition, site heterogeneity, e.g., in groundwater flow paths, hydraulic conductivity, soil and contaminant properties, are not accounted for in this estimate and will also influence travel time; such variations will generally increase travel times.

Based on this analysis, it is likely that groundwater samples from the downgradient monitoring wells continue to be affected by the historical impacts from the legacy unit even though the legacy unit was removed and corrective measures were implemented. This provides another basis for using intra-well comparisons as they allow for a reasonable baseline (reflective of historic impact from the legacy unit) to be established so that future monitoring can focus on identifying impacts from Upstream Raise 91.

5.2.1.3 Historical Impacts – Geochemical Evaluation

Historical impacts from legacy facilities may also be able to be evaluated using geochemical information. By comparing the water types from historical conditions to those of more recent conditions as well as the water within Upstream Raise 91, an evaluation can be performed to determine the similarities of source water. Piper diagrams (also referred to as trilinear diagrams), are a visualization tool useful to compare the chemistry of different water.

The below discussion supports the conclusion that the legacy facilities have impacted groundwater and that Upstream Raise 91 does not appear to be negatively influencing downgradient water quality.

Piper diagrams for groundwater samples with the full suite of major cations and anions collected between 1988 and the present from Upstream Raise 91 downgradient monitoring wells MW-91-1, MW-49, and MW-51 are presented in Figures 21, 22, and 23, respectively. The symbols for data associated with MW-91-1, MW-49, and MW-51 are color coded according to the dates when they were sampled. These colors were included to help the reader understand the overall temporal “trends” within the datasets. The Piper diagrams also include groundwater samples from Upstream Raise 91 upgradient monitoring wells (MW-16-6, MW-75, MW-91-2, and MW-DP3) as an indicator of unimpacted groundwater. As well as water samples taken from within the current CCR surface impoundments (UR91-Sump and UR92-Sump), water samples from the legacy unit (SW-106, SW-126, SW-127), and water samples from synthetic precipitation leached procedure (SPLP) testing of site CCRs, which are likely representative of the water quality of potential seepage from the CCR facilities at CCS.

Groundwater quality associated with samples collected from MW-49 and MW-51 have changed over their respective monitoring periods. Water quality data associated with historical samples plot closer to the water samples collected from within the CCR surface impoundments (SPLP, Sumps, and Pond Water) on the Piper diagrams, which would be indicative of seepage from the facility. This is consistent with the site history as discussed in Section 2.0, in which seepage was noted from the legacy unit (South Ash Pond) prior to removing this facility and constructing new facilities with composite liner systems. More recent water quality data associated with samples collected since the initiation of the CCR program plot further from water samples collected from within the CCR surface impoundments on the Piper diagrams. The data associated with these samples are within the range of water quality data associated with unimpacted upgradient monitoring wells, indicating that the removal of the South Ash Pond and construction of Upstream Raise 91 has improved groundwater conditions beneath and surrounding Upstream Raise 91.

Water quality data associated with samples from MW-91-1 have been relatively unchanged over the testing period and plot on the Piper diagrams within the range of unimpacted upgradient monitoring wells. This indicates that impacts from seepage out of the South Ash Pond are not apparent since MW-91-1 was first sampled in 2018.

Without baseline groundwater quality data collected prior to impacts from the South Ash Pond at MW-49 and MW-51, it is not possible to determine if groundwater downgradient of Upstream Raise 91 has returned to pre-impact conditions. If new impacts were occurring from Upstream Raise 91, a shift towards the water quality observed within the CCR surface impoundments would be expected. However, observations from water quality data for MW-49 and MW-51 are indicating a shift away from water quality observed within the CCR surface impoundments, suggesting no new impacts are occurring from Upstream Raise 91.

5.2.2 Baseline Statistics

As part of the detection monitoring program for Upstream Raise 91, comparative statistical analysis is performed following each monitoring event to determine whether concentrations of the Appendix III parameters are potentially statistically significant in comparison to baseline limits. Original baseline limits were developed using samples collected at each well as part of the baseline monitoring conducted prior to the start of detection monitoring. The baseline data for all constituents, as determined by the monitoring programs, is periodically reviewed to determine if recent results that are not statistically significant in comparison to baseline values can be incorporated into an updated baseline period. This review for baseline data occurs approximately every two to three years, based on the semi-annual sampling frequency during detection monitoring as recommended in the

USEPA's Unified Guidance (USEPA 2009), or roughly following collection of every four to eight comparative samples. A baseline update was conducted for the wells monitoring Upstream Raise 91 following the Q2 2019 detection monitoring event, following collection of four comparative samples as part of the detection monitoring program.

Statistical limits for the detection monitoring programs at Upstream Raise 91 have been made with either a parametric or non-parametric method for each constituent-well pair. The statistical method varies between constituents and has been selected based on the percentage of non-detect values in the baseline period and the baseline data distribution for each constituent at each well, in accordance with recommendations within the Unified Guidance (USEPA 2009).

5.2.3 Parametric Detection Monitoring Method – Shewhart-CUSUM Control Charts

For those constituent-well pairs where concentrations of a given analyte are normally or transform-normally distributed and have equal to or greater than 50% detections, Shewhart-CUSUM control charts are used for comparative statistics. The Unified Guidance (USEPA 2009) notes that Shewhart-CUSUM control charts use two separate evaluation procedures. The Shewhart evaluation procedure is similar to a parametric prediction limit, comparing compliance measurements to a baseline limit. The CUSUM, or cumulative summation, evaluation procedure analyzes new measurements against prior compliance measurements. The mean and standard deviation of the baseline dataset are used to calculate the limit.

Shewhart-CUSUM control charts were chosen as the primary statistical method for the detection monitoring program for a number of reasons. First, control charts are identified by the Unified Guidance as a "core strategy for detection monitoring" (USEPA 2009). As such, control charts have been identified as an appropriate statistical method for use in detection monitoring programs and are further identified as one of the explicitly stated options for statistical methods to use for CCR programs under 40 CFR 257.93. Second, control charts show increased sensitivity to gradual trends and shifts within datasets due to the dual evaluation process built into the methodology. Per the Unified Guidance (USEPA 2009), the two portions of the Shewhart-CUSUM control chart work in tandem to detect both sudden changes through the Shewhart portion of the test, and gradual increases through the CUSUM portion. For monitoring Upstream Raise 91, using a statistical methodology that is sensitive to gradual changes allows for more rapid determination of critical changes within the system.

5.2.4 Non-Parametric Detection Monitoring Method – Non-Parametric Prediction Limits

Where concentrations of a given constituent-well pair are not normally or transform-normally distributed, or contain less than or equal to 50% detections, a non-parametric prediction limit is used for comparative statistics. The non-parametric prediction limit is assigned as the highest detected value, excluding outliers, or the highest primary quantitation limit (PQL), whichever is greater.

A potential disadvantage of a control chart approach is the lack of a direct non-parametric alternative. However, per the Unified Guidance (USEPA 2009), using a paired approach of control charts for the chosen parametric methodology and non-parametric prediction limits as the non-parametric alternative addresses this perceived deficiency, providing appropriate coverage for variability in data distribution.

5.2.5 Detection Monitoring Method – Trending Data

Most statistical tests, including the two options identified for setting statistical limits within this program, assume that concentrations do not demonstrate temporal correlation. The Sen's Slope methodology is an intra-well

statistical analysis of increases or decreases in measured concentration over time measured by calculating slope of the linear relationship of concentration levels and time. Sen's Slope methodology is paired with the Mann-Kendall test to determine the statistical significance of the calculated Sen's Slope. The methodology involves examining all possible pairs of measurements in the dataset and scoring each pair to determine if a trend exists.

Where temporal trends have been identified within the proposed baseline periods, either the data is adjusted to account for trends, the time period used for the baseline period is reassessed, and/or an alternative statistical method is used to establish a limit. For datasets with statistically significant decreasing trends, no adjustments may be appropriate, and a constituent may not be considered for statistical analysis until further data is collected. In the case of decreasing trends, the Sen's Slope Methodology at a target confidence level of 99 percent serves as the alternative method for assessing compliance until the trend statistically stabilizes.

5.3 Recent Groundwater Monitoring Results

At present, the groundwater monitoring systems for Upstream Raise 91 remains in detection monitoring, as defined by 40 CFR 257.94. As such, groundwater at the site is monitored on a semi-annual basis for the parameters listed in Appendix III of the CCR Rule.

The most recent annual groundwater monitoring report is the 2019 annual report and is included as Appendix C-4 (Golder 2020a).

Comparative statistical analysis is conducted following each detection monitoring event, consisting of Appendix III parameters (40 CFR 247.93(h)(1) and (2) and 40 CFR 247.94(a) and (b), USEPA 2015). For both Shewhart-CUSUM limits and non-parametric prediction limits, the comparative statistical analysis consists of a comparison of detection monitoring results collected during the period of interest to the statistical limit calculated from the baseline data collection period.

The following definitions, specific to the statistical program but consistent with the Unified Guidance (USEPA 2009), will be used in discussion of the comparative statistical analysis:

- Elevated CUSUM – an elevated CUSUM occurs when the CUSUM is greater than the Shewhart-CUSUM limit established by the baseline statistical analysis, but the analytical result does not exceed the Shewhart-CUSUM limit. An elevated CUSUM is an indication that concentrations are gradually increasing and that analytical results may exceed the Shewhart-CUSUM limit in the future. For elevated CUSUMs in the case of two-tailed analysis, as used for field-measured pH, the CUSUM value may also be below the lower Shewhart-CUSUM limit established by the baseline statistical analysis.
- Potential Exceedance – is defined as an initial elevated CUSUM or an initial analytical result that exceeds the Shewhart-CUSUM limit or non-parametric statistical limit established by the baseline statistical analysis. Confirmatory re-sampling will determine if the potential exceedance is a false-positive or a verified statistically significant increase (SSI). Non-detect results that exceed either the Shewhart-CUSUM limit or the non-parametric statistical limit are not considered potential exceedances.
- False-positive – is defined as an analytical result that exceeds the statistical limit that can clearly be attributed to laboratory error, changes in analytical precision, or is invalidated through confirmatory re-sampling. False-positives are not used in calculation of any subsequent CUSUMs.
- Confirmatory re-sampling – is designated as the next scheduled sampling event.

- Verified SSI – is interpreted as two consecutive exceedances (the original sample and the confirmatory re-sample for analytical results, or two consecutive elevated CUSUMs) for the same constituent at the same well.

Results of the statistical analysis for the Q4 2019 and Q2 2020 detection monitoring events as the most recent detection monitoring events are shown on the tables in Appendix C5 and discussed in the following sections.

5.3.1 Potential Exceedances

Total boron at MW-51 was identified as a potential exceedance during the comparative statistical analysis for the Q4 2019 detection monitoring event. Confirmatory re-sampling for this constituent-well pair occurred during the Q2 2020 detection monitoring sampling event; results are discussed in Section 5.3.2. The statistical analysis of the results of this sampling determined the initial potential exceedance was a false positive.

Field-measured pH at MW-16-6 (upgradient) was identified as a potential exceedance during the comparative statistical analysis for the Q4 2019 detection monitoring event. Confirmatory re-sampling for this constituent-well pair occurred during the Q2 2020 detection monitoring sampling event; results are discussed in Section 5.3.2. The statistical analysis of the results of this sampling determined the initial potential exceedance was a false positive.

No potential exceedances were identified for the Q2 2020 detection monitoring event for the wells monitoring Upstream Raise 91.

5.3.2 False-Positives

No false positives were identified during the Q4 2019 detection monitoring event for the wells monitoring Upstream Raise 91.

Following the Q2 2020 confirmatory re-sampling event, the potential exceedance identified during the Q4 2019 detection monitoring event for total boron at MW-51 (downgradient) was determined to be a false-positive.

Following the Q2 2020 confirmatory re-sampling event, the potential exceedance identified during the Q4 2019 detection monitoring event for field-measured pH at MW-16-6 (upgradient) was determined to be a false-positive.

5.3.3 Trending Data

With inclusion of the Q4 2019 result and Q2 2020 result, the complete data set for calcium at MW-91-2 (upgradient, Upstream Raise 91) continues to have a statistically significant decreasing trend, based on Sen's Slope analysis at the target confidence level of 99%. Following collection of further data during the next sampling event, the calcium data for this location will be reassessed to determine if a baseline period can be established based on non-trending data.

5.3.4 Verified SSIs

Verified SSIs associated with Upstream Raise 91 have been observed as indicated below:

- Following the Q4 2019 confirmatory re-sampling event, chloride at MW-49 was identified as a verified SSI for Upstream Raise 91 based on data from the Q4 confirmatory re-sampling event. Both the potential exceedance and the verified SSI were elevated CUSUMs, with analytical results for both sampling events below the statistical limit. Chloride at MW-49 continued to be identified as a verified SSI following the Q2 2020 detection monitoring event.

- Total dissolved solids at MW-16-6 (upgradient) was identified as a verified SSI following the Q4 2019 detection monitoring event based on data from the Q4 confirmatory re-sampling event. Total dissolved solids at MW-16-6 (upgradient) continued to be identified as a verified SSI following the Q2 2020 detection monitoring event.

40 CFR 257.94(e) states the conditions under which a CCR unit must transition to assessment monitoring or complete an alternative source demonstration (ASD): "If the owner or operator of the CCR unit determines, pursuant to § 257.93(h) that there is a statistically significant increase over background levels for one or more of the constituents listed in Appendix III to this part at any monitoring well at the waste boundary specified under § 257.91(a)(2), the owner or operator must: (1) Except as provided for in paragraph (e)(2) of this section, within 90 days of detecting a statistically significant increase over background levels for any constituent, establish an assessment monitoring program meeting the requirements of § 257.95. (2) The owner or operator may demonstrate that a source other than the CCR unit caused the statistically significant levels for a constituent or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality."

5.3.4.1 Alternative Source Demonstration – Chloride at MW-49

A successful ASD was completed within 90 days of identification of the verified SSI for chloride at MW-49 in Q4 2019 and is included in Appendix C6 (Golder 2020b). Lines of evidence indicating that the facility was not the cause of increased concentrations of chloride at MW-49 include:

- Changes in field personnel, analytical laboratories, and analytical methodologies.
- Laboratory artifacts biasing high sample concentrations.
- Geochemical signatures that are inconsistent with ash-impacted waters collected from the facility sumps.
- Elevated chloride concentrations at upgradient non-CCR facilities.

Following the Q2 2020 sampling event, chloride at MW-49 (downgradient) continued to be a verified SSI for Upstream Raise 91. An updated ASD was completed and is included in Appendix C7 (Golder 2020c) and identified similar lines of evidence in support of the ASD that were previously identified in the ASD completed for the Q4 2019 sampling event.

5.3.4.2 Upgradient Verified SSI – Total Dissolved Solids at MW-16-6

A review of site observations and measured groundwater levels as well as the geographic location of the well (Figures 5 and 6) indicate that MW-16-6, which is approximately 550 feet upgradient of the waste boundary, is hydraulically upgradient of Upstream Raise 91 (approximately 15 feet higher groundwater elevation and approximately 12 feet higher than a surface water drainage ditch between Upstream Raise 91 and the well). The groundwater contours between MW-16-6 and Upstream Raise 91 are based on measured groundwater levels in MW-16-6 and groundwater levels measured in piezometers located along the south embankment of Upstream Raise 91 (PZ-AP91C) and Upstream Raise 92 (PZ-AP92A) as shown on the stratigraphic sections (Appendix B-2). Since MW-16-6 is upgradient of Upstream Raise 91 and not at the waste boundary, the SSI was determined not to be related to Upstream Raise 91 and neither an ASD nor a transition to assessment monitoring is required.

5.4 Additional Groundwater Analysis

Additional analysis of groundwater monitoring data has been performed to support the program conclusions described above, particularly that Upstream Raise 91 remains in detection monitoring. Two sets of analyses were performed to evaluate this conclusion. The analyses performed strengthen the case that Upstream Raise 91 remains in detection monitoring and has not contributed to the degradation of downgradient groundwater quality. These analyses should be considered for discussion purposes only.

5.4.1 Inter-well Statistical Analysis

As discussed above, ANOVA evaluation of the four upgradient wells identified significant difference between well means or medians. The Unified Guidance indicates that pooling should not occur among well means or medians determined to be significantly different using ANOVA (USEPA 2009) and therefore inter-well statistical analyses are not recommended in this situation. Although not recommended by the Unified Guidance for the conditions at CCS due to spatial variability (Section 5.2.1.1) and historical impacts (Section 5.2.1.2), inter-well statistics can be performed to demonstrate that the use of intra-well statistics is not biasing the conclusion that Upstream Raise 91 remains in detection monitoring.

Inter-well statistics were conducted for Upstream Raise 91 using an inter-well prediction limit methodology. Data collected between 2015 and 2020 as part of the CCR program from four locations representing the various upgradient waters entering Upstream Raise 91 (MW-DP3, MW-91-2, MW-75, and MW-16-6) were first pooled and tested for normality using the Shapiro-Francia method, based on the number of samples within the pooled dataset. Given the documented spatial variability between the upgradient wells, as discussed in Section 5.2.1, each pooled dataset for the Appendix III parameters at the upgradient locations was determined to be non-normal and non-transform normal. As a result of the non-parametric distributions in the pooled upgradient data, each statistical limit is constrained to be the highest value observed in the upgradient wells with non-parametric prediction limits.

Detection monitoring results from the three downgradient wells are compared to these non-parametric limits in Appendix C8. For each of the three downgradient monitoring wells from Upstream Raise 91, the only Appendix III constituent that was identified above the hypothetical statistical limit in more than one consecutive sample was chloride. The majority of chloride values measured as part of the CCR monitoring program in the three downgradient wells are higher than the non-parametric limit determined from the four upgradient wells, set at the highest value within the upgradient pool. However, the downgradient chloride concentrations can be attributed to the historical impacts and/or an alternative source, as discussed below.

Figure 24 shows chloride concentrations collected at the two downgradient monitoring wells for Upstream Raise 91 that have been monitored since 1988. Chloride concentrations have generally decreased at wells MW-49 and MW-51 since being installed in 1988. Both wells pre-date the installation of the associated upgradient wells (including MW-75), the removal of the legacy unit, and the construction of Upstream Raise 91. Early concentrations at the wells are indicative of historical impacts stemming from the legacy unit (South Ash Pond), with movement towards more steady-state conditions since the legacy unit was removed and Upstream Raise 91 was constructed. The current steady-state conditions could be reflective of:

- Ongoing observations of legacy impacts in samples collected from the downgradient wells as discussed in Section 5.2.1.2.

- A return to background conditions (since no data exists for pre-impact conditions, pre-impact water quality at these locations remain unknown).
- Elevated chloride due to an alternative upgradient source other than Upstream Raise 91.

If inter-well statistics were appropriate for this site, an ASD would be pursued based on the three items discussed above. In particular, supporting information prepared as part of the successful intra-well ASD for chloride at MW-49 (Appendix C-6 [Golder 2020b] and Appendix C-7 [Golder 2020c]), would remain applicable. The intra-well ASD for chloride at MW-49 identified the Extended Basin, a cooling water recirculation pond approximately 0.75 miles upgradient of Upstream Raise 91, as a source for elevated chloride in groundwater:

- Between 1988 and 2019, chloride concentrations in the Extended Basin ranged between 158 and 300 milligrams per liter (mg/L).
- Nearby monitoring wells (MW-62, MW-63, and MW-65) located upgradient of the powerplant and immediately adjacent to the Extended Basin also have elevated chloride concentrations ranging from 8.0 to 290 mg/L indicating that water from the Extended Basin is impacting groundwater chloride concentrations.

Water from the Extended Basin also appears to be impacting wells further downgradient. The concentrations observed along the flow path between the Extended Basin and MW-49 (Figures 25 and 26) include:

- The EEG wells located east of the Extended Basin which have chloride concentrations ranging between 58 and 130 mg/L.
- Well MW-DP5, located downgradient from the plant and upgradient of the Drains Pond System, which has chloride concentrations ranging between 66.0 and 84.8 mg/L.
- Wells MW-DP3, MW-91-2, MW-75, and MW-16-6 upgradient of Upstream Raise 91 and downgradient/side-gradient to the plant and Extended Basin have chloride concentrations between 1.1 and 45.0 mg/L.

The chloride concentrations in the Extended Basin, nearby groundwater, and groundwater further downgradient of the Extended Basin are considerably above concentrations in MW-96, a background well for the plant that is side-gradient to the Extended Basin. Chloride concentrations at MW-96 range between 4.2 and 7.8 mg/L.

Variations in screened lithology and preferential flow paths in the glacial till may explain why some wells downgradient from the Extended Basin have elevated chloride concentrations while other wells (MW-DP3, MW-91-2, MW-75, and MW-16-6) have chloride concentrations more similar to MW-96.

It should be reiterated that inter-well statistical analyses are not recommended in this situation due to spatial variability and historical impacts and are included for discussion purposes only.

5.4.2 Appendix IV Parameters

To date, the Appendix IV parameters that are required as part of an assessment monitoring program under 40 CFR 257.95 have been collected solely as part of the initial baseline collection period described in 40 CFR 257.94(b), and approximately once annually for ongoing confirmation. Between 11 and 16 samples have been analyzed for each Appendix IV parameter for each Upstream Raise 91 groundwater monitoring well (through April 2020).

Results of the Appendix IV parameters in samples collected from monitoring network wells for Upstream Raise 91 are provided in Appendix C-1. In the event of a transition to assessment monitoring, a site-specific Ground Water

Protection Standard (GWPS) would be established for the detected Appendix IV parameters in accordance with 40 CFR 257.95(d)(2) and 40 CFR 257.95(h). For informational purposes only, confidence intervals were constructed using the non-site-specific GWPS detailed in 40 CFR 257.95(h)(1) and 40 CFR 257.95(h)(2) and are provided in Appendix C9.

Per the Unified Guidance, “A confidence interval is an estimated concentration or measurement range intended to contain a given statistical characteristic of the population form which the sample is drawn. When using a lower confidence interval on the mean, median, or upper percentile, an SSI occurs whenever the lower edge of the confidence interval range exceeds the GWPS (USEPA 2009).” Further, the Unified Guidance notes that. “By requiring that a lower confidence limit be used as the basis of comparison, the statistical test will account for data variability and ensure that the apparent violation is unlikely to have occurred by chance…Where the confidence interval straddles the limit, the test results are inconclusive (USEPA 2009).”

Based on the preliminary analyses of confidence intervals (Appendix C-9), no statistically significant levels of Appendix IV parameters would be identified for the current dataset, except for lithium. Lithium has consistently been detected at both the upgradient and downgradient monitoring wells at concentrations higher than the non-site-specific limit provided in 40 CFR 257.95(h)(2).

If assessment monitoring is initiated, a site-specific GWPS would be developed for lithium at CCS. Based on the concentrations of lithium in upgradient wells, a comparison of the downgradient concentrations to a site-specific GWPS would likely indicate that current concentrations are not statistically significant. It should be reiterated that these analyses are for information only and to-date a statistically robust comparative approach for determining statistically significant levels of Appendix IV parameters has not been developed. In addition, in the event of entering assessment monitoring, site-specific GWPS would be established for each parameter, which could vary from the non-site specific GWPS (see 40 CFR 257.95(h)).

6.0 LINER DESIGN SPECIFICATIONS AND CQA DOCUMENTATION – 257.71(D)(1)(I)(C)

As part of the application documentation, 40 CFR 257.71(d)(1)(i)(C) requires “Documentation of the design specifications for any engineered liner components, as well as all data and analyses the owner or operator of the CCR surface impoundment relied on when determining that the materials are suitable for use and that the construction of the liner is of good quality and in-line with proven and accepted engineering practices.”

The liner system in Upstream Raise 91 was constructed with an upper component consisting of high-density polyethylene (HDPE) geomembrane having a thickness of 40 mils (0.040 inches) and a lower component consisting of a compacted soil layer at least two feet thick with a hydraulic conductivity less than $1x10^{-7}$ centimeters per second (cm/sec). Construction Quality Assurance (CQA) monitoring was performed during installation of the Upstream Raise 91 composite liner system in 1992. Both the low-permeability soil layer and geomembrane layer were monitored as part of these CQA programs. The CQA report for Upstream Raise 91 (referred to as Ash Pond 91 in the report) is included as Appendix D-1 (CPA 1993) and applicable CQA documentation is provided below.

An additional 7 acres of composite liner was installed in the southeast corner of Upstream Raise 91 and in the area between Upstream Raise 91 and the Upstream Raise 92 in 2016 (Figure 27). Prior to composite liner construction, these areas were outside of the Upstream Raise 91 and Upstream Raise 92 CCR deposition footprint. This additional liner completes a continuous composite-lined area between Upstream Raise 91 and

Upstream Raise 92. The composite liner system installed in 2016 consists of (from bottom to top): Geosynthetic Clay Liner (GCL) and 60-mil HDPE liner. Typical west-east and south-north cross sections through Upstream Raise 91 are shown on Figure 3 along with details of the existing composite liners.

6.1 Native Soil Below the Composite Liner

As described in Section 4.1.3, native soils underlying the composite liner systems are characterized by hydraulic conductivity values ranging from $4.6x10^{-8}$ cm/sec to $1.8x10^{-6}$ cm/sec, with a geometric mean of $1.9x10^{-7}$ cm/sec. These near-surface native soils with relatively low hydraulic conductivity provide added protection of groundwater beneath the composite liner system for Upstream Raise 91.

6.2 Compacted Low-Permeability Soil Layers

CQA data obtained during installation of the composite liner systems included detailed information about the actual hydraulic conductivity of the low-permeability soil layers. 170 falling-head permeability tests were conducted on Shelby tube samples taken from the low-permeability soil layer for Upstream Raise 91. The hydraulic conductivity from these tests ranged from approximately $5x10^{-9}$ cm/sec to $1x10^{-7}$ cm/sec with a geometric mean hydraulic conductivity of $1.7x10^{-8}$ cm/sec. Summary tables of falling-head permeability tests conducted on Shelby tube samples taken from the low-permeability soil layer for Upstream Raise 91 (CPA 1993) are included in Appendix D2.

CQA data obtained during installation of the composite liner systems also included detailed information about the actual thickness of the low-permeability soil layers. Golder evaluated the actual thickness of the low-permeability soil layer for Upstream Raise 91 by comparing topographic surveys conducted immediately before and immediately after installation of the low-permeability soil layer (CPA 1993). The thickness of the low-permeability soil layer ranged between approximately 2 and 4.5 feet with an average thickness of 2.4 feet.

6.3 Geomembrane

CQA data obtained during installation of the composite liner systems included detailed information about the strength of the 40-mil HDPE geomembrane materials. The tests were performed on geomembrane samples either taken from rolls that were delivered to the site or on destructive geomembrane seam samples taken during installation. All tests (manufacturer quality control reports, laboratory conformance testing, and laboratory seam strength testing of field-welded seams) met or exceeded the requirements of the geomembrane liner specifications. The average results from these tests are shown in Table 5 and Table 6. Summary tables of geomembrane properties from manufacturer quality control certificates, laboratory conformance testing, and laboratory seam strength testing of field welded seams are included in Appendix D-3 for Upstream Raise 91 (CPA 1993).

Table 5: Geomembrane Roll Quality Control and Conformance Testing Results

Property	Units	Test Method	Upstream Raise 91 Average	40-mil HDPE Industry Standard GRI GM13 (GSI 2019b)
Thickness	mils	ASTM D1593	44	40 (nominal)
Yield Strength	pounds per inch	ASTM D638 ASTM D6693	121	84
Break Strength	pounds per inch	ASTM D638 ASTM D6693	220	152
Tear Resistance	pounds	ASTM D1004	37	28
Puncture Resistance	pounds	FTMS 101C 2065 ASTM D4833	86	72

Table 6: Geomembrane Field Seam Destructive Testing Results

Property	Units	Test Method	Upstream Raise 91 Average	40-mil HDPE Industry Standard GRI GM19a (GSI 2017)
Seam Shear Strength	pounds per inch	ASTM D638	127	80
Seam Peel Strength	pounds per inch	ASTM D638	86	60

The information pertaining to the actual strength of the 40-mil HDPE geomembrane materials is used in Section 6.4 to help assess the adequacy of 40-mil HDPE geomembrane to withstand the anticipated stresses on the composite liner system for Upstream Raise 91.

6.4 Geomembrane Integrity

The demonstrated integrity of the geomembrane materials and field seams produced for the Upstream Raise 91 (formerly referred to as Ash Pond 91) composite liner system is described in Sections 6.4.1, 6.4.2, and 6.4.3.

6.4.1 Minimum Geomembrane Properties for Survivability

Koerner (2012) provides guidance for the selection of minimum geomembrane properties for installation survivability, which refers to the ability of the geomembrane to survive the packaging, transportation, handling, unloading, storage, and installation processes. More severe installation conditions tend to require a higher degree of survivability; the required degree of survivability for the Upstream Raise 91 composite liner system would be categorized as Medium to High due to the machine-graded subgrade and relatively high loads. The minimum properties for installation survivability are summarized in Table 7 and compared against actual average properties for geomembrane materials used in the composite liner system for Upstream Raise 91.

Table 7: Comparison of Geomembrane Properties for Installation Survivability

Property	Required Degree of Installation Survivability				Upstream Raise 91 Average
	Low[1]	Medium[2]	High[3]	Very High[4]	
Thickness (ASTM D1593)	25 mil	30 mil	35 mil	40 mil	44 mil
Tensile Strength	52 pounds per inch (ASTM D882)	66 pounds per inch (ASTM D882)	81 pounds per inch (ASTM D882)	96 pounds per inch (ASTM D882)	121 pounds per inch (ASTM D638)
Tear Resistance (ASTM D1004)	7 pounds	10 pounds	15 pounds	20 pounds	37 pounds
Puncture Resistance	25 pounds (ASTM D4833)	32 pounds (ASTM D4833)	38 pounds (ASTM D4833)	45 pounds (ASTM D4833)	86 pounds (99 to 116 pounds[5]) (FTMS 101C 2065)

1. "Low" refers to careful hand placement on very uniform well-graded subgrade with light loads of a static nature, typical of vapor barriers beneath building floor slabs (Koerner 2012).

2. "Medium" refers to hand or machine placement on smooth, machine-graded subgrade with medium load, typical of canal liners (Koerner 2012).

3. "High" refers to hand or machine placement on machine-graded subgrade of poor texture with high loads, typical of landfill liners and covers (Koerner 2012).

4. "Very High" refers to hand or machine placement on machine-graded subgrade of very poor texture with high loads, typical of liners for heap leach pads and construction/demolition wastes (Koerner 2012).

5. Values determined from FTMS 101C 2065 are typically 15 to 35 percent lower than values determined from ASTM D4833 (Scheirs 2009).

Based on the information presented in Table 7 the geomembrane components of the composite liner system for Upstream Raise 91 exceeds even the Very High survivability requirements, which would be applicable to more severe installation conditions than those that existed during construction of Upstream Raise 91. This provides confidence that the geomembrane components were robust enough to be delivered, handled, and installed without damage.

6.4.2 Geomembrane Material Properties

The material strength properties for the geomembrane used in the composite liner system for Upstream Raise 91 is compared with the required material strength properties (based on current specifications) for various geomembranes types and thicknesses that are acceptable under the CCR Rule in Table 8.

Table 8: Comparison of Geomembrane Material Properties

Material	Yield Strength	Yield Elongation	Break Strength	Break Elongation	Tear Resistance	Puncture Resistance
	ASTM D638	ASTM D638	ASTM D638	ASTM D638	ASTM D1004	FTMS 101C 2065
Upstream Raise 91 40-mil HDPE (average)	121 pounds per inch (actual)	18% (actual)	220 pounds per inch (actual)	818% (actual)	37 pounds (actual)	86 pounds (actual) (99 to 116 pounds [1])
Material	**ASTM D6693**	**ASTM D6693**	**ASTM D6693**	**ASTM D6693**	**ASTM D1004**	**ASTM D4833**
40-mil HDPE GRI GM13 (GSI 2019b)	84 pounds per inch (minimum)	12% (minimum)	152 pounds per inch (minimum)	700% (minimum)	28 pounds (minimum)	72 pounds (minimum)
60-mil HDPE (smooth) GRI GM13 (GSI 2019b)	126 pounds per inch (minimum)	12% (minimum)	228 pounds per inch (minimum)	700% (minimum)	42 pounds (minimum)	108 pounds (minimum)
60-mil HDPE (textured) GRI GM13 (GSI 2019b)	126 pounds per inch (minimum)	12% (minimum)	90 pounds per inch (minimum)	100% (minimum)	42 pounds (minimum)	90 pounds (minimum)
30-mil LLDPE GRI GM17 (GSI 2019a)	None	None	114 pounds per inch	800% (minimum)	16 pounds (minimum)	42 pounds (minimum)
30-mil fPP GRI GM18 (GSI 2015)	None	None	60 pounds per inch (minimum)	700% (minimum)	10 pounds (minimum)	25 pounds (minimum)
Material	**ASTM D882**	**ASTM D882**	**ASTM D882**	**ASTM D882**	**ASTM D1004**	**None**
30-mil PVC ASTM D7176	None	None	73 pounds per inch (minimum)	380% (minimum)	8 pounds (minimum)	None

1. Actual average value increased by 15 to 35 percent for comparison against puncture resistance determined from ASTM D4833 (Scheirs 2009).

Based on the comparisons shown in Table 8, in all cases, the actual geomembrane property averages for Upstream Raise 91 exceeded the specified values for 30-mil LLDPE (linear low density polyethylene), 30-mil fPP (flexible polypropylene), and 30-mil PVC, all of which are accepted as the upper component in a composite liner system under 40 CFR 257.71(a)(1)(ii). Additionally, the actual geomembrane property averages for Upstream Raise 91 exceeded the requirements for 40-mil HDPE geomembrane and are comparable to the requirements for 60-mil HDPE geomembrane (smooth and textured). Therefore, the yield stress, yield elongation, break strength, break elongation, tear resistance, and puncture resistance for the 40-mil geomembrane materials used for Upstream Raise 91 are superior to those specified for materials that could be used in composite liner systems under the CCR Rule.

Design calculations can be used to evaluate the strength of a geomembrane with a given thickness and material composition against the range of stresses that could be imposed. Koerner (2012) presents an equation that can be used to determine the minimum geomembrane thickness, t, that is needed to resist the estimated tensile forces introduced by subsurface deformation that may be experienced during the geomembrane's service lifetime. The inputs to the equation are as follows:

- Normal stress on the composite liner system, σ_n, which results from the weight of the CCRs contained in the surface impoundment. For the most conservative application of the equation, σ_n is the product of the maximum height of the CCR deposit, H, and the unit weight of the CCRs, ɣ.
- Distance of mobilized geomembrane deformation, X. A value of 2 inches is appropriate for relatively high normal stress conditions, like in the Upstream Raise 91 composite liner system (Koerner 2012).
- Angle of shearing resistance between the geomembrane and the material overlying the geomembrane, δ_U.
- Angle of shearing resistance between the geomembrane and the material underlying the geomembrane, δ_L.
- Allowable shear stress for geomembrane, σ_{allow}. For purposes of this calculation, allowable shear stress is taken as the average yield strength (refer to Table 8) divided by the geomembrane thickness.
- Deformation angle mobilizing the tension in the geomembrane, β.

The equation for minimum geomembrane thickness is as follows:

$$t = \frac{\sigma_n \, X \, (tan \, \delta_U + tan \, \delta_L)}{\sigma_{allow} \, (cos \, \beta - sin \, \beta \, tan \, \delta_L)}$$

Based on consolidation analyses completed by Golder along Cross Sections B, and D through Upstream Raise 91 (refer to Appendix B-2), the maximum strain that the geomembrane component of the composite liner systems would be expected to experience is less than 1 percent. The relatively homogeneous near-surface soils, gradual changes in stratum thickness and impoundment geometry, and slow rate of CCR loading contribute to these relatively low expected strain levels. As a result, the deformation angle mobilizing the tension in the geomembrane, β, is estimated to be no greater than 5 degrees.

The angle of shearing resistance between the geomembrane and the sand overlying the geomembrane, δ_U, is estimated as 17 degrees based on a best-fit of 128 interface friction tests between smooth HDPE and granular soil reported by the Geosynthetics Research Institute (GRI 2005). The angle of shearing resistance between the geomembrane and the clay underlying the geomembrane, δ_L, has been evaluated through interface friction testing of site-specific materials and was determined to be 7 degrees (Appendix A-3, Golder 2016).

For the conservative case with the highest anticipated normal stresses at Upstream Raise 91 (H = 110 feet and ɣ = 100 pounds per cubic foot), the calculated minimum geomembrane thickness for Upstream Raise 91 is 0.022 inches (22 mils). The existing 40-mil HDPE geomembrane is sufficiently thick to withstand the anticipated stresses on the composite liner system.

6.4.3 Field Seaming

Extensive CQA observation and testing were conducted on the field seams between 40-mil geomembrane panels for the Upstream Raise 91 composite liner system during installation. The results of destructive testing on seam samples taken during installation indicate that the seam strengths met the project requirements. Table 9 compares the destructive test results for Upstream Raise 91 against industry-accepted seam strength requirements for 40-mil HDPE and for various geomembrane materials and thicknesses that are adequate for use as the upper component of a composite liner system under the CCR Rule.

Table 9: Comparison of Geomembrane Seam Strengths

Material	Test Method [1]	Shear Strength	Peel Strength
Upstream Raise 91 40-mil HDPE (average)	ASTM D638	127 pounds per inch (actual)	86 pounds per inch (actual)
40-mil HDPE GRI GM19a (GSI 2017)	ASTM D6392	80 pounds per inch (minimum)	60 pounds per inch (minimum)
60-mil HDPE GRI GM19a (GSI 2017)	ASTM D6392	120 pounds per inch (minimum)	91 pounds per inch (minimum)
30-mil LLDPE GRI GM19a (GSI 2017)	ASTM D6392	45 pounds per inch (minimum)	38 pounds per inch (minimum)
30-mil fPP GRI GM19a (GSI 2017)	ASTM D6392	25 pounds per inch (minimum)	20 pounds per inch (minimum)
30-mil PVC ASTM D7176	ASTM D882	58 pounds per inch (minimum)	15 pounds per inch (minimum)

1. ASTM D638 is applicable to tensile testing of various plastics and was commonly used for destructive testing of geomembrane seams when Upstream Raise 91 was constructed. Test methods like ASTM D6392 have since been developed specifically for testing geomembrane seams. The test procedures and the strengths measured by the two test methods are comparable.

Based on the comparisons shown in Table 9, the actual seam strength averages exceeded the required values for 30-mil LLDPE, 30-mil fPP, and 30-mil PVC, all of which are adequate to serve as the upper component in a composite liner system under 40 CFR 257.71(a)(1)(ii). Additionally, the actual seam shear strength and peel strength averages for Upstream Raise 91 exceeded the requirements for 40-mil HDPE geomembrane and are comparable to the strength requirements for 60-mil HDPE geomembrane.

In 2016, the composite liner system for Upstream Raise 91 was exposed in some locations to extend the lined area, and the 40-mil HDPE geomembrane component was joined by field seaming to new 60-mil HDPE geomembrane. CQA observations indicated excellent longevity of the 40-mil HDPE geomembrane, and

destructive samples of the resulting field seams were obtained and tested to verify that project requirements were being met. The test results are summarized in Table 10.

Table 10: Destructive Test Results for 2016 Field Seams

Specimen Identifier, Year, and Location	Shear Strength (ASTM D6392, Average of 5 Tests)	Shear Strength Requirement GRI GM-19a 40-mil HDPE	Upper Peel Strength (ASTM D6392, Average of 5 Tests)	Lower Peel Strength (ASTM D6392, Average of 5 Tests)	Peel Strength Requirement GRI GM-19a 40-mil HDPE
DS10 (2016) Upstream Raise 91	115 pounds per inch	80 pounds per inch (minimum)	103 pounds per inch	108 pounds per inch	60 pounds per inch (minimum)
DS15 (2016) Upstream Raise 91	114 pounds per inch	80 pounds per inch (minimum)	102 pounds per inch	94 pounds per inch	60 pounds per inch (minimum)
DS35 (2016) Upstream Raise 91	128 pounds per inch	80 pounds per inch (minimum)	101 pounds per inch	102 pounds per inch	60 pounds per inch (minimum)
DS36 (2016) Upstream Raise 91	145 pounds per inch	80 pounds per inch (minimum)	131 pounds per inch	124 pounds per inch	60 pounds per inch (minimum)

The CQA observations and the test results summarized in Table 10 confirm the integrity and longevity of the 40-mil HDPE geomembrane materials and the capability to produce quality welded seams, even 20 years or more after the 40-mil geomembrane was originally installed. In fact, the shear strengths and peel strengths are comparable to, and in most cases higher than, those required for 60-mil HDPE field seams under current industry standards.

6.5 Composite Liner Evaluations

In addition to the site-specific information provided above, several evaluations by industry experts have been performed comparing the performance of the CCR rule prescriptive composite liner with alternative composite liners like what exists at Upstream Raise 91 (thinner geomembrane layer). These reports were part of the work done to inform the alternative liner rulemaking in 2018 and 2019. Two of these reports are discussed below.

The Utility Solid Waste Activities Group (USWAG) engaged Gradient to prepare a performance evaluation methodology for composite and alternative surface impoundment liner systems (Appendix D-4, Gradient 2018). This report proposed a methodology for evaluating alternative liner systems and then presented performance evaluations for several liners. One scenario compares the hydraulic flux through a prescriptive composite liner (60-mil HDPE geomembrane underlain by a 2-foot soil layer with a hydraulic conductivity of $1x10^{-7}$ cm/sec) with an alternative composite liner (30-mil HDPE geomembrane underlain by a 2-foot soil layer with a hydraulic conductivity of $1x10^{-8}$ cm/sec). Even with modeling three times more defects in the 30-mil HDPE geomembrane, the modeled hydraulic flux through the alternative liner was estimated to be 54% of the hydraulic flux through the prescriptive composite liner. The alternative composite liner considered in this evaluation is very similar to the

composite liner system at Upstream Raise 91 which consists of a 40-mil HDPE geomembrane underlain by an average 2.4-foot soil layer with a hydraulic conductivity of $1.7x10^{-8}$ cm/sec (geometric mean).

The Electric Power Research Institute (EPRI) also evaluated the relative performance of liners for CCR surface impoundments (EPRI 2019). This report presents a proposed methodology for evaluating several alternative liner systems and the associated hydraulic flux through these liner systems. One scenario compares the hydraulic flux through the base case prescriptive composite liner (60-mil HDPE geomembrane underlain by a 2-foot soil layer with a hydraulic conductivity of $1x10^{-7}$ cm/sec) with an alternative composite liner (40-mil HDPE geomembrane underlain by a 2-foot soil layer with a hydraulic conductivity of $1x10^{-7}$ cm/sec). Similar to the Gradient (2018) report (Appendix D4), the evaluation assumed a higher defect density (2 times more defects) in the 40-mil HDPE geomembrane as compared to the 60-mil HDPE geomembrane. The evaluation did indicate "…that a thinner GM (geomembrane) will be more flexible, potentially resulting in better contact with the substrate, than a thicker GM of the same material, which can result in reduced leakage that - conceptually - offsets increased potential for perforations (defects)." Through modeling, the evaluation concluded that "All of the composite liners simulated in this evaluation performed similarly, with low (<0.13%) percentages of scenarios having maximum model-predicted concentrations higher than the lithium RSL or arsenic MCL. Even composite liners with a high defect density, representative of a thin (40-mil), non-federally compliant GM, achieved a level of protection comparable to the baseline composite scenario."

7.0 DIRECT TRANSPORT PATHWAY TO NEARBY SURFACE WATER – 257.71(D)(1)(I)(D)

For the application, 40 CFR 257.71(d)(1)(i)(D) states:

> "Facilities with CCR surface impoundment located on properties adjacent to a water body must demonstrate that there is no reasonable probability that a complete and direct transport pathway (i.e., not mediated by groundwater) can exist between the impoundment and any nearby water body. If the potential for such a pathway is identified, then the unit would not be eligible to submit a demonstration. If ongoing releases are identified, the owner or operator of the CCR unit must address these releases in accordance with 40 CFR 257.96(a)."

This language has been interpreted to require a demonstration that sub-surface releases do not have a potential to reach any nearby water body without being mediated by groundwater. The evaluation in this section is based on this interpretation.

Upstream Raise 91 was constructed as an above-grade impoundment with soil embankments and the minimum distance between the composite liner system and Samuelson Slough is approximately 300 feet laterally. Surface water drainage ditches exist on the west and south sides of Upstream Raise 91 and Upstream Raise 92 lies adjacent to the east side of the facility.

The foundation soils underlying Upstream Raise 91 consist of native soils (predominantly lean clay, fat clay, and sandy clay) and embankment fill materials sourced from nearby native soils. The downstream soil embankment slopes constructed in 1992 were compacted to a minimum of 93% standard Proctor density (CPA 1993). Based on historical site information and geotechnical testing during construction, the soils used in construction appear relatively consistent throughout the embankments, which are protected from erosion and deterioration by the establishment of a vegetative cover consisting of native grasses. The soils used in construction of Upstream

Raise 91 are relatively consistent and therefore a preferential flow path resulting in the transport of a release from the facility directly to Samuelson Slough is unlikely.

The composite liner system associated with Upstream Raise 91 extends from a low elevation of approximately 1898 feet in the northeast corner of the facility to an anchor trench surrounding the facility at a constant elevation of 1920 feet. The facility does not have openings in the liner system or other conduits that would allow water to be released and transported to nearby surface water without intersection with the uppermost water bearing zones of groundwater. As discussed above, the composite liner system is in direct contact with native soils (lean clay, fat clay, and sandy clay) and embankment fill materials sourced from nearby native soils. Potential leakage from the facility would be expected to migrate downward to the uppermost groundwater that lies approximately 5 to 15 feet below the bottom of the composite liner system (Appendix A-2, Golder 2018) before proceeding toward downgradient monitoring wells prior to reaching the nearest surface water.

As discussed in Section 2.4, the structural perimeter of CCR within Upstream Raise 91 is constructed using bottom ash and fly ash, while FGD material is contained in the center of the facility with a typical freeboard between 6 and 15 feet. Construction progresses in an upstream direction (toward the middle of the facility) and contact water from exterior fly ash slopes is contained within perimeter ditches inside the limits of the composite lined footprint. These ditches are generally dry, but during large storm events may manage between 1 and 2 feet of water before gravity draining into adjacent process water facilities. Due to the capacity of these ditches and the adjacent process water facilities, contact water is not able overtop the soil embankments and be transported offsite.

Based on the combination of sub-surface characteristics, the distance from the unit to the nearest water body, and operational and engineering controls associated with the water within the impoundment, there is no reasonable probability for a complete and direct pathway to a nearby water body that is not mediated by groundwater.

Any release that would be transported by groundwater would be detected by the installed groundwater monitoring well network. The monitoring wells are installed and screened at appropriate locations and depths to obtain groundwater from the uppermost water bearing zone between the facility and the nearest downgradient water body (Samuelson Slough). Cross Section D (Appendix B-2) shows the representative position of downgradient wells in relation to Upstream Raise 91 (e.g., Monitoring Well MW91-1 is representative of the location of the three wells downgradient of Upstream Raise 91). The number and spacing of the downgradient monitoring wells were selected based on the hydrogeologic conditions at the site and the areal extent of Upstream Raise 91 as discussed in Section 4.0 so as to identify groundwater impacts downstream of Upstream Raise 91 and upstream of Samuelson Slough.

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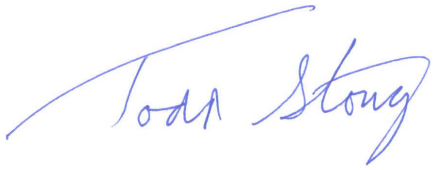

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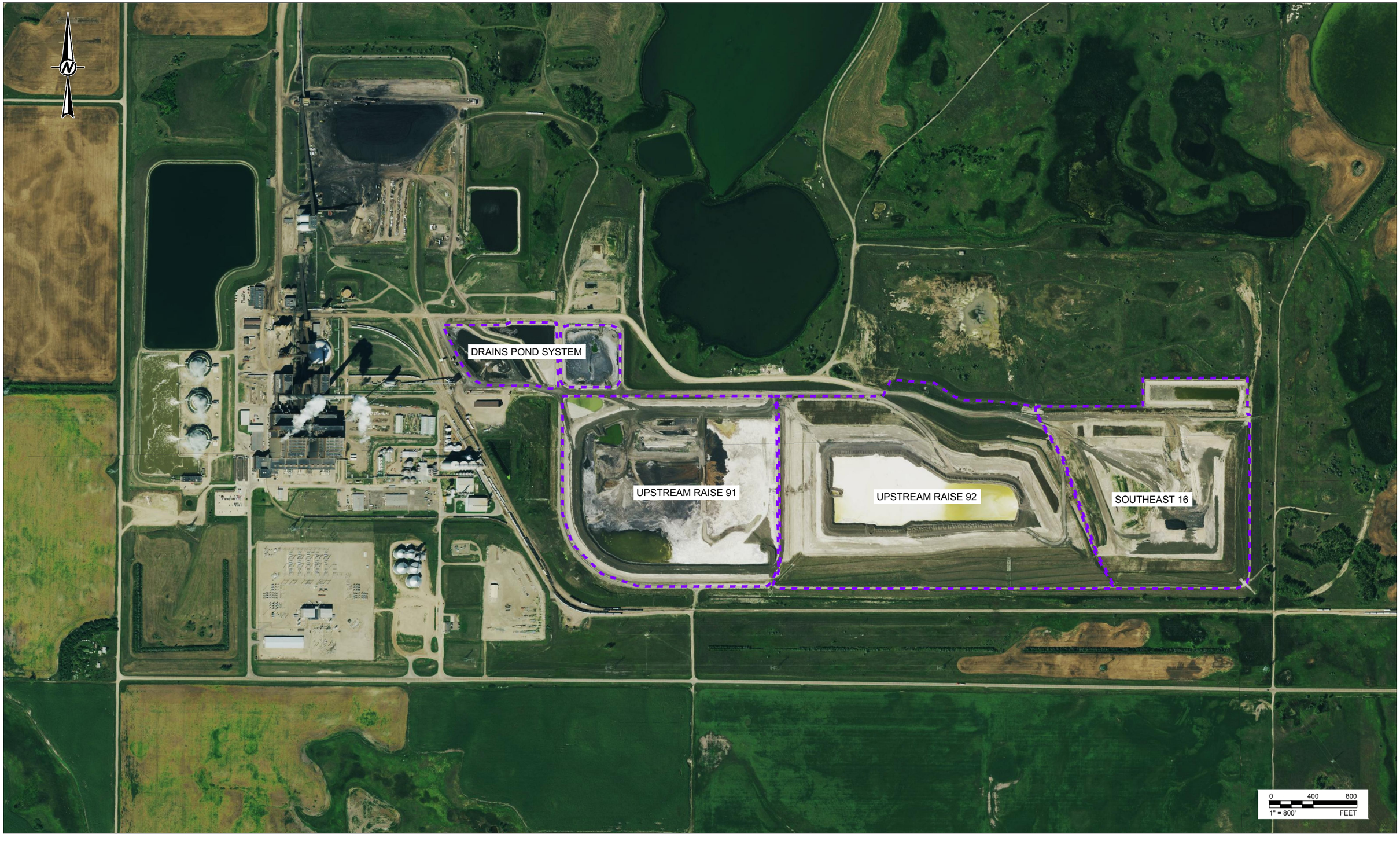
Figures



GOLDER

LEGEND

EXSTING CCR FACILITIES

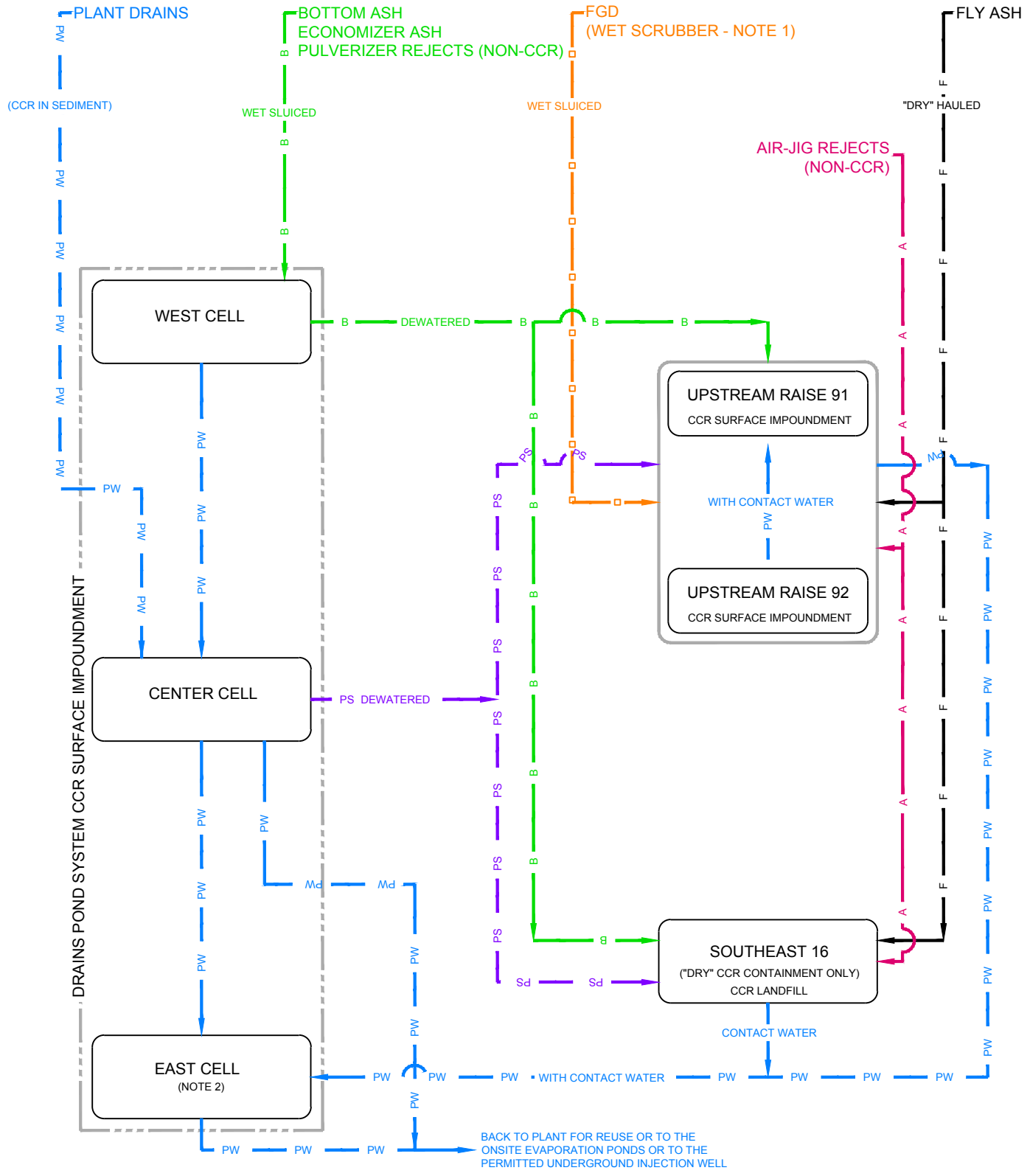
REFERENCE(S)

1. AERIAL IMAGERY FROM THE UNITED STATES DEPARTMENT OF AGRICULTURE NATIONAL AGRICULTURE IMAGERY PROGRAM, TAKEN 2019.

COAL CREEK STATION
CCR FACILITIES

FIGURE 1

Path: \\Denvelacad\GREAT RIVER ENERGY\COAL CREEK\99_PROJECTS\19136224-Alt Liner\Application\ | File Name: 19136224-Alt Liner\App-F\figures1-2.dwg



LEGEND

- B — BOTTOM ASH AND ECONOMIZER ASH AND PULVERIZER REJECTS (NON-CCR)
- F — FLY ASH
- FGD
- PW — PROCESS WATER
- PS — PLANT DRAINS SEDIMENT (CONTAINS CCR)
- A — AIR-JIG REJECTS (NON-CCR)

NOTE(S)

1. WET FGD CAN ONLY BE DEPOSITED AT UPSTREAM RAISE 91 OR UPSTREAM RAISE 92.
2. THE EAST CELL OF THE DRAINS POND SYSTEM IS A NON-CCR SURFACE IMPOUNDMENT FOR THE MANAGEMENT OF SITE PROCESS WATER (IT IS NOT USED TO TREAT, STORE, OR DISPOSE OF CCR).

GOLDER

COAL CREEK STATION
CCR AND NON-CCR PROCESS FLOW DIAGRAM

FIGURE 2

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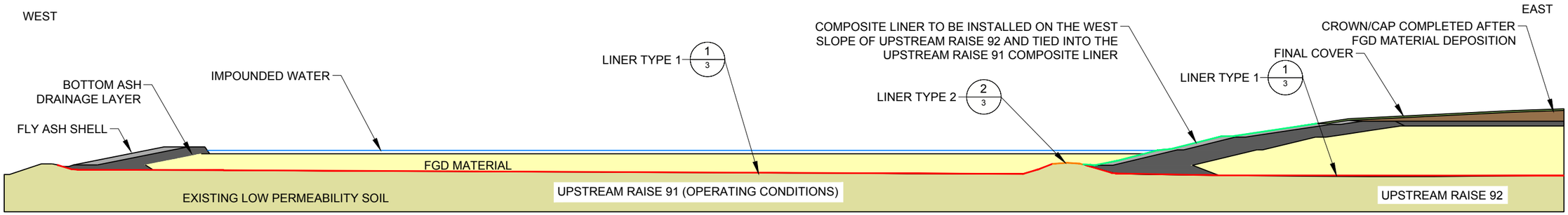

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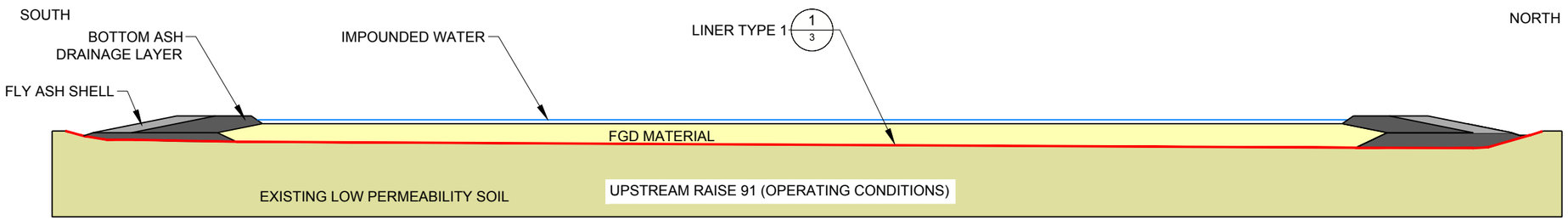

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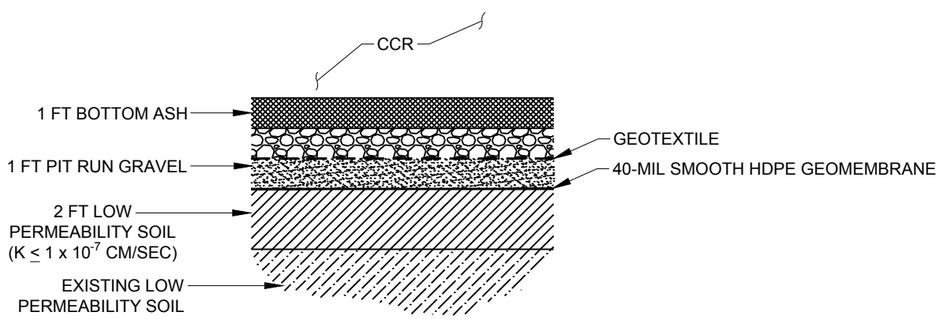

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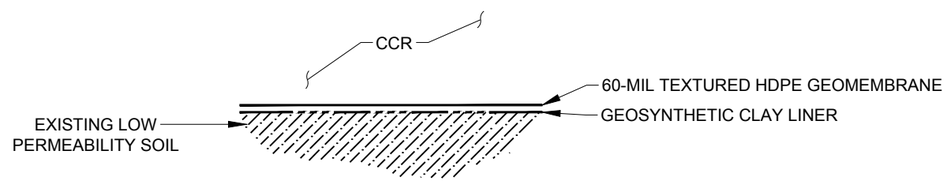

SCALE N.T.S. 2/3 LINER TYPE 2

COAL CREEK STATION
UPSTREAM RAISE 91 - TYPICAL CROSS SECTIONS

FIGURE 3

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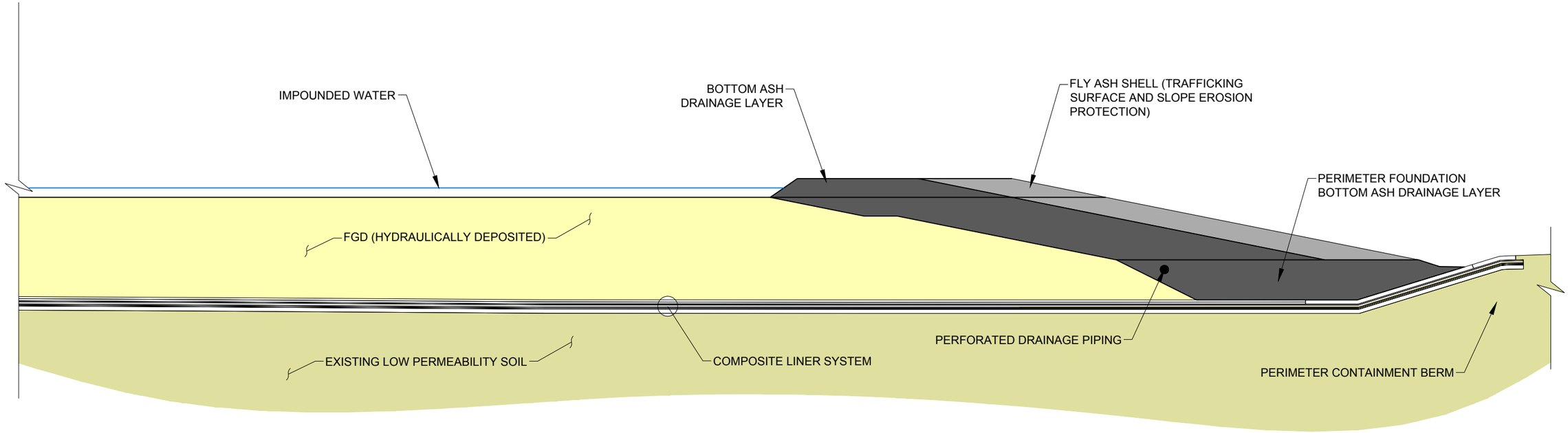

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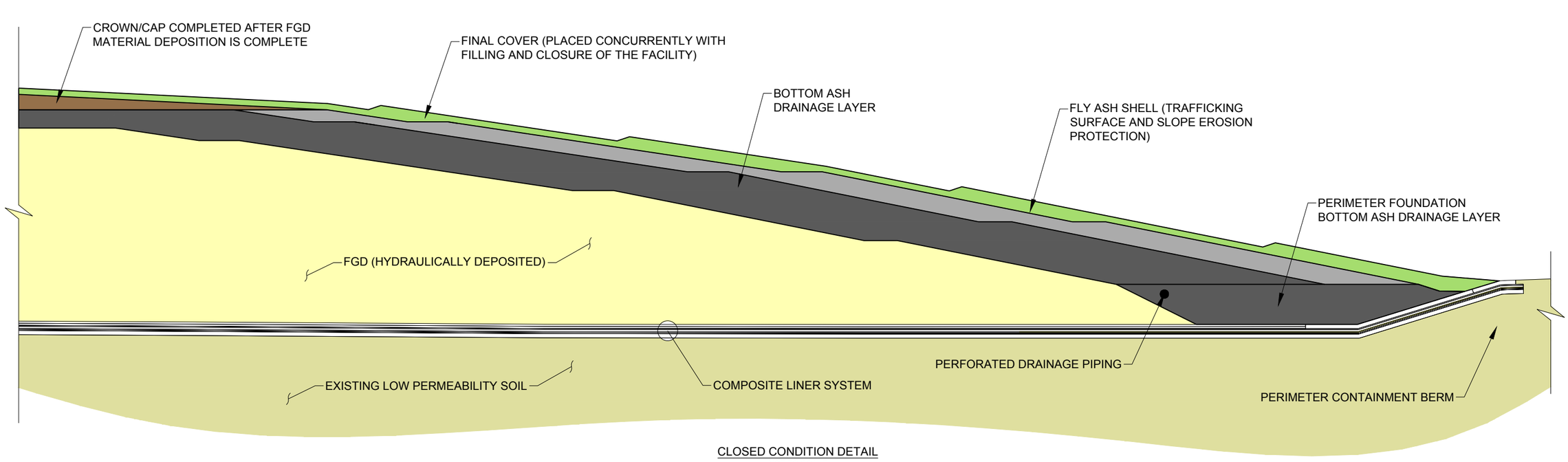

CLOSED CONDITION DETAIL
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COAL CREEK STATION
UPSTREAM RAISE CONCEPTUAL DESIGN CROSS SECTION

FIGURE 4

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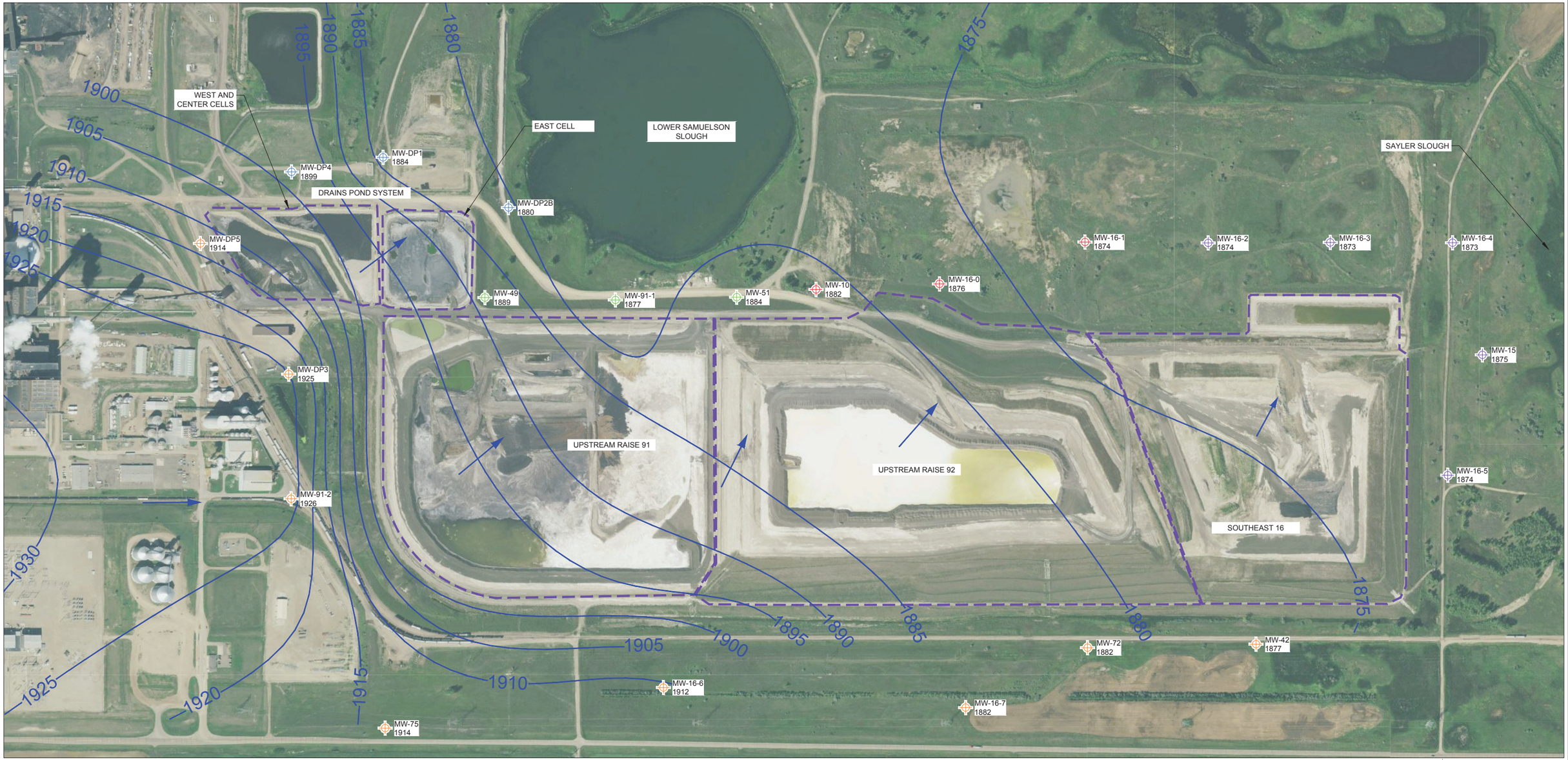


LEGEND

- UPGRADIENT MONITORING WELL
- DOWNGRADIENT MONITORING WELL - DRAINS POND SYSTEM
- DOWNGRADIENT MONITORING WELL - UPSTREAM RAISE 91
- DOWNGRADIENT MONITORING WELL - UPSTREAM RAISE 92
- DOWNGRADIENT MONITORING WELL - SOUTHEAST 16
- GENERAL DIRECTION OF GROUNDWATER FLOW
- 1930 — POTENTIOMETRIC SURFACE CONTOURS (SEE NOTE 2)
- PERMITTED FACILITY BOUNDARY

NOTE(S)

1. GROUNDWATER ELEVATIONS SHOWN WERE MEASURED OCTOBER 2019.
2. POTENTIOMETRIC SURFACE CONTOURS WERE CREATED USING WATER LEVEL INFORMATION FROM THE OCTOBER 2019 GROUNDWATER ELEVATIONS SHOWN, AS WELL AS SURVEYED SURFACE WATER EXPRESSIONS, ADDITIONAL SITE WELLS, AND PIEZOMETERS NOT SHOWN. CONTOUR INTERVAL IS 5 FEET.

REFERENCE(S)

1. AERIAL IMAGERY OBTAINED FROM UNITED STATES DEPARTMENT OF AGRICULTURE, NATIONAL AGRICULTURE IMAGERY PROGRAM, 2019.

N

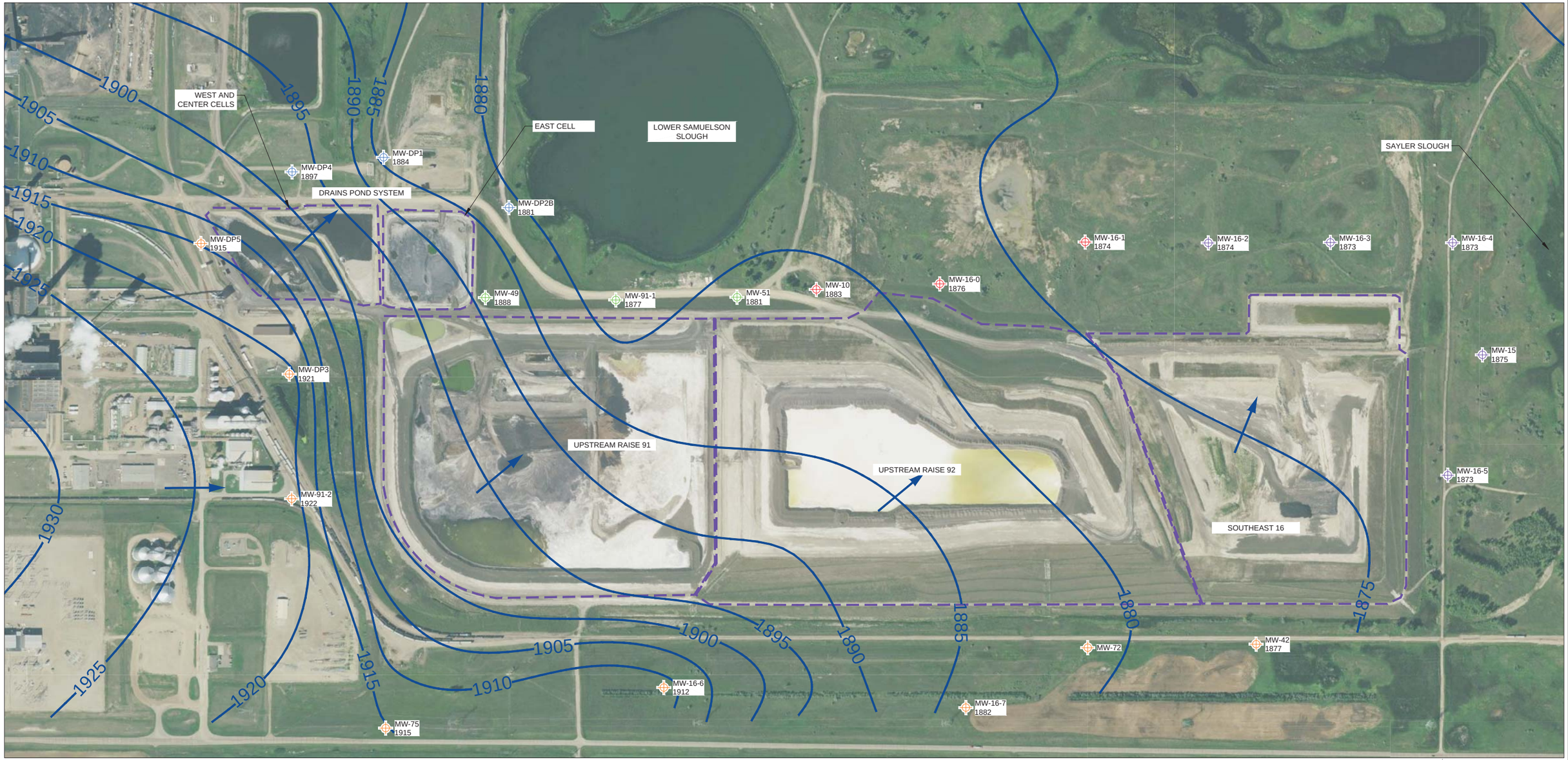
0 300 600
1" = 300' FEET

GOLDER

COAL CREEK STATION
MONITORING WELL LOCATIONS - OCTOBER 2019
GROUNDWATER CONDITIONS

FIGURE 5

Path: \\Denverlace\GREAT RIVER ENERGY\COAL CREEK\09_PROJECTS\19138224\AltLiner\Application\ | File Name: 19138224-AltLiner-App-Figures 5-6.dwg



LEGEND

- UPGRADIENT MONITORING WELL
- DOWNGRADIENT MONITORING WELL - DRAINS POND SYSTEM
- DOWNGRADIENT MONITORING WELL - UPSTREAM RAISE 91
- DOWNGRADIENT MONITORING WELL - UPSTREAM RAISE 92
- DOWNGRADIENT MONITORING WELL - SOUTHEAST 16
- GENERAL DIRECTION OF GROUNDWATER FLOW
- 1930 POTENTIOMETRIC SURFACE CONTOURS (SEE NOTE 2)
- PERMITTED FACILITY BOUNDARY

NOTE(S)

1. GROUNDWATER ELEVATIONS SHOWN WERE MEASURED APRIL-MAY 2020.
2. POTENTIOMETRIC SURFACE CONTOURS WERE CREATED USING WATER LEVEL INFORMATION FROM THE APRIL-MAY 2020. GROUNDWATER ELEVATIONS SHOWN, AS WELL AS SURVEYED SURFACE WATER EXPRESSIONS, ADDITIONAL SITE WELLS, AND PIEZOMETERS NOT SHOWN. CONTOUR INTERVAL IS 5 FEET.

REFERENCE(S)

1. AERIAL IMAGERY OBTAINED FROM UNITED STATES DEPARTMENT OF AGRICULTURE, NATIONAL AGRICULTURE IMAGERY PROGRAM, 2019.

N

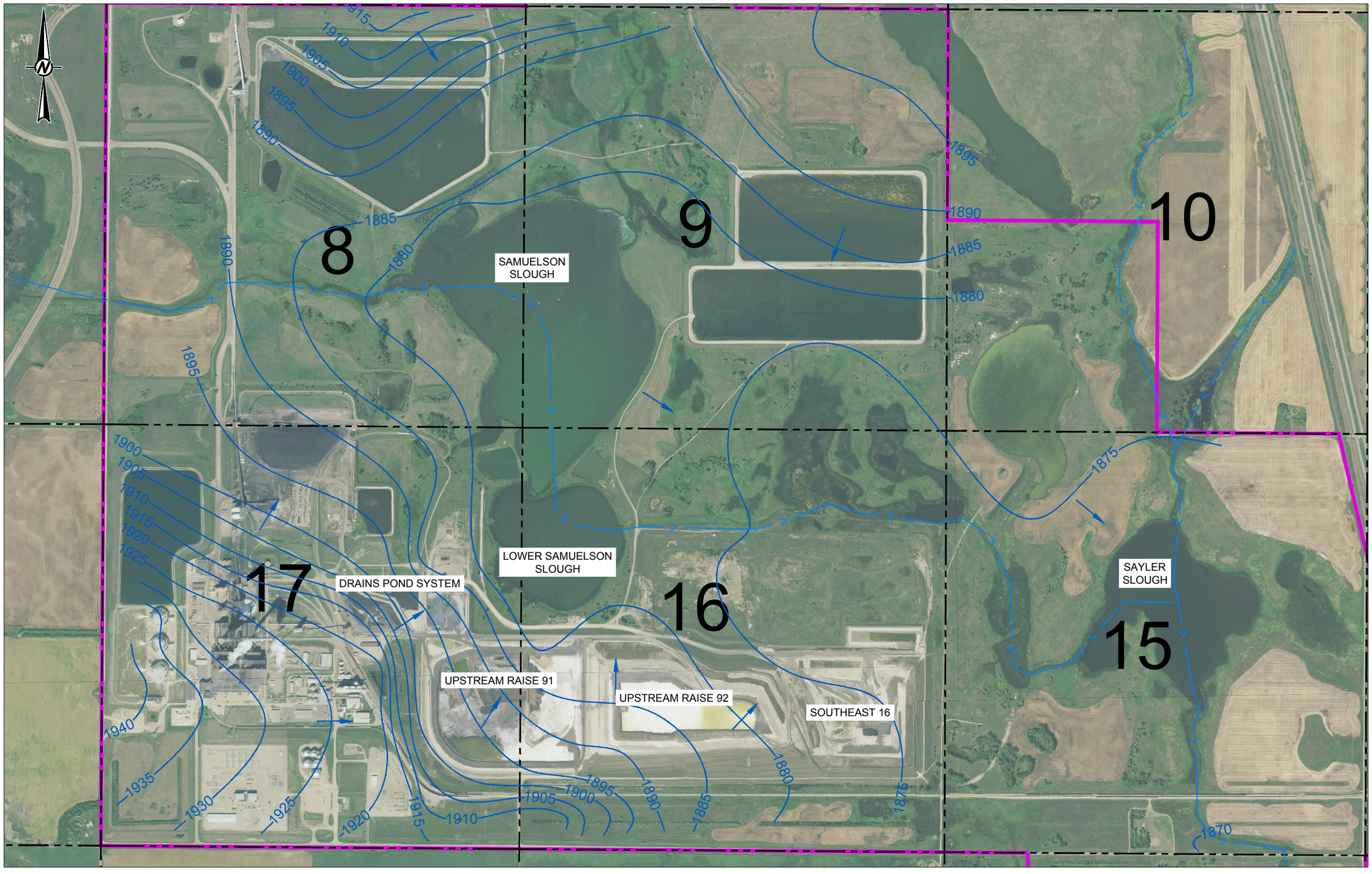
0 600 1200
1" = 600' FEET

GOLDER

COAL CREEK STATION
MONITORING WELL LOCATIONS - APRIL-MAY 2020
GROUNDWATER CONDITIONS

FIGURE 6

Path: \\Denver\acad\GREAT RIVER ENERGY\COAL CREEK\99_PROJECTS\19136224\AltLinerApplication\ | File Name: 19136224-AltLinerApp-Figures 5-6.dwg



LEGEND

- POTENTIOMETRIC SURFACE CONTOURS (NOTE 1)
- GENERAL DIRECTION OF GROUNDWATER FLOW
- GRE PROPERTY BOUNDARY
- APPROXIMATE SURFACE WATER FLOW DIRECTION
- SECTION LINE

NOTE(S)

1. POTENTIOMETRIC SURFACE CONTOURS WERE CREATED USING WATER LEVEL INFORMATION FROM THE MEASURED APRIL-MAY 2020 GROUNDWATER ELEVATIONS, AS WELL AS SURVEYED SURFACE WATER EXPRESSIONS, ADDITIONAL SITE WELLS, AND PIEZOMETERS NOT SHOWN. CONTOUR INTERVAL IS 5 FEET.

REFERENCE(S)

1. AERIAL IMAGERY FROM THE UNITED STATES DEPARTMENT OF AGRICULTURE NATIONAL AGRICULTURE IMAGERY PROGRAM, TAKEN 2019.

0 600 1200
1" = 1200' FEET

GOLDER

COAL CREEK STATION
APRIL-MAY 2020 GROUNDWATER CONDITIONS

FIGURE 7

Path: \\Denvefacad\GREAT RIVER ENERGY\COAL CREEK\99_PROJECTS\19136224-AltLiner\Application\ | File Name: 19136224-AltLiner\App-Figure7.dwg



GOLDER

LEGEND

IN-SITU SOIL SAMPLE LOCATION
(MAY HAVE BEEN OBTAINED PRIOR TO COMPOSITE LINER CONSTRUCTION)

REFERENCE(S)

1. AERIAL IMAGERY FROM THE UNITED STATES DEPARTMENT OF AGRICULTURE NATIONAL AGRICULTURE IMAGERY PROGRAM, TAKEN 2019.

COAL CREEK STATION
LOCATION OF UNDISTURBED SAMPLES FOR IN-SITU PERMEABILITY OF NATIVE SOILS

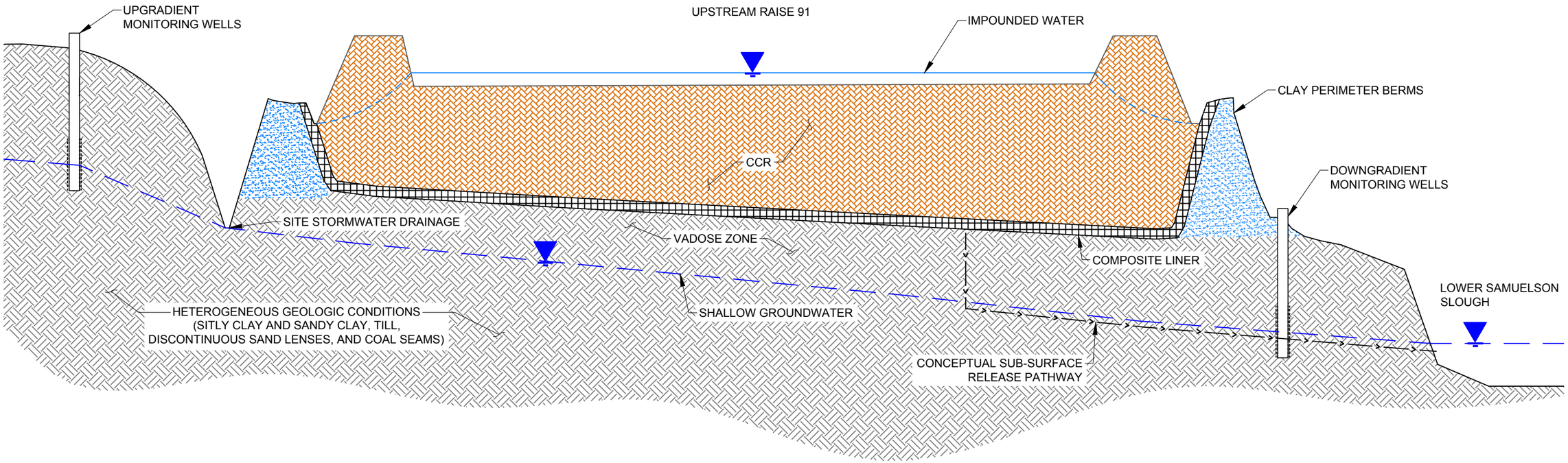
FIGURE 8

Path: \\Denver\acad\GREAT RIVER ENERGY\COAL CREEK\99_PROJECTS\19136224-AltLinerApplication\ | File Name: 19136224-AltLinerApp-Figures 8.dwg

UPGRADIENT SOURCES
EXTENDED BASIN
POWER PLANT
ETHANOL PLANT
RAILROAD
STORMWATER DRAINAGE
COAL SEAMS

SOUTH

NORTH



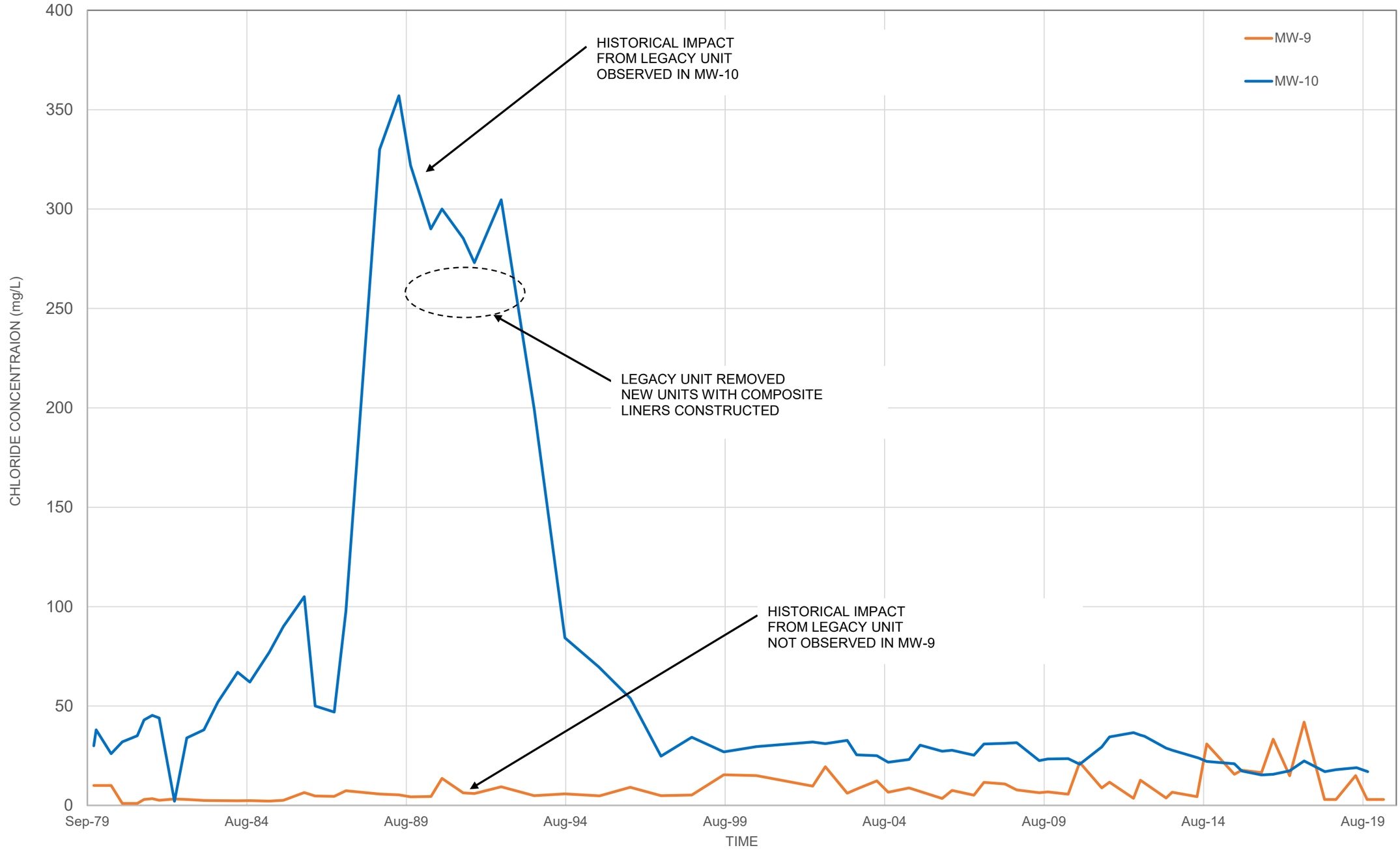
SOUTH-NORTH SECTION
NOT TO SCALE

GOLDER

COAL CREEK STATION
RELEASE CONCEPTUAL SITE MODEL

FIGURE 9

Path: \\Denver\acad\GREAT RIVER ENERGY\COAL CREEK\99_PROJECTS\19138224\AltLiner\Application\ | File Name: 19138224-AltLinerApp-Figures 8.dwg



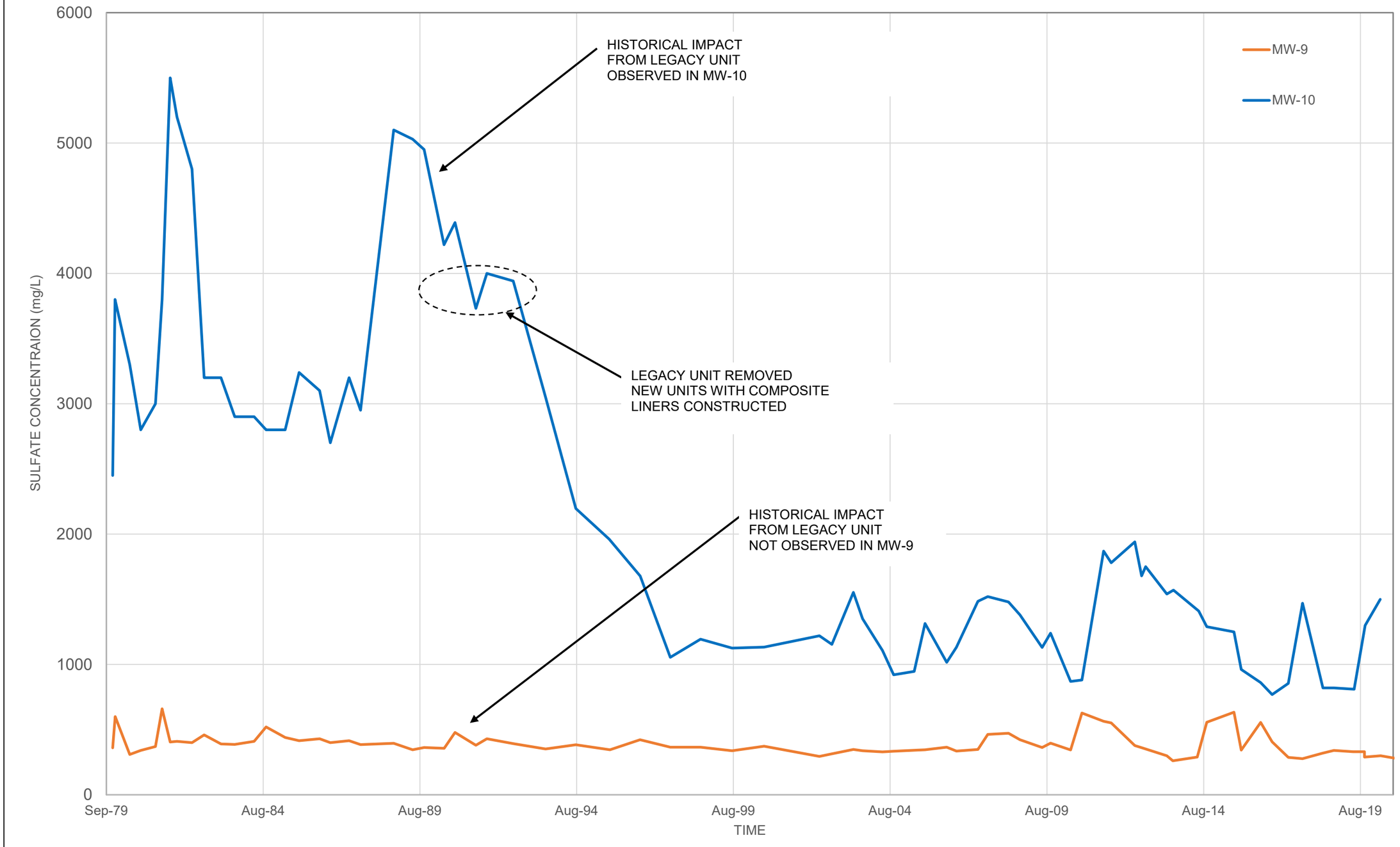
COAL CREEK STATION
CHLORIDE CONCENTRATIONS
AT MW-9 AND MW-10

GOLDER

FIGURE 10

https://golderassociates.sharepoint.com/sites/120551/Project Files/5 Technical Work/3 - Permit Support/CCR/Holistic B Rules/Alt Liner Application/Final_UR91_Rev0_25Nov20/Figures/[Fig 10-12 and 24.xlsx]Fig 10

https://golderassociates.sharepoint.com/sites/120551/Project Files/5 Technical Work/3 - Permit Support/CCR/Holistic B Rules/Alt Liner Application/Final_UR91_Rev0_25Nov20/Figures/[Fig 10-12 and 24.xlsx]Fig 11

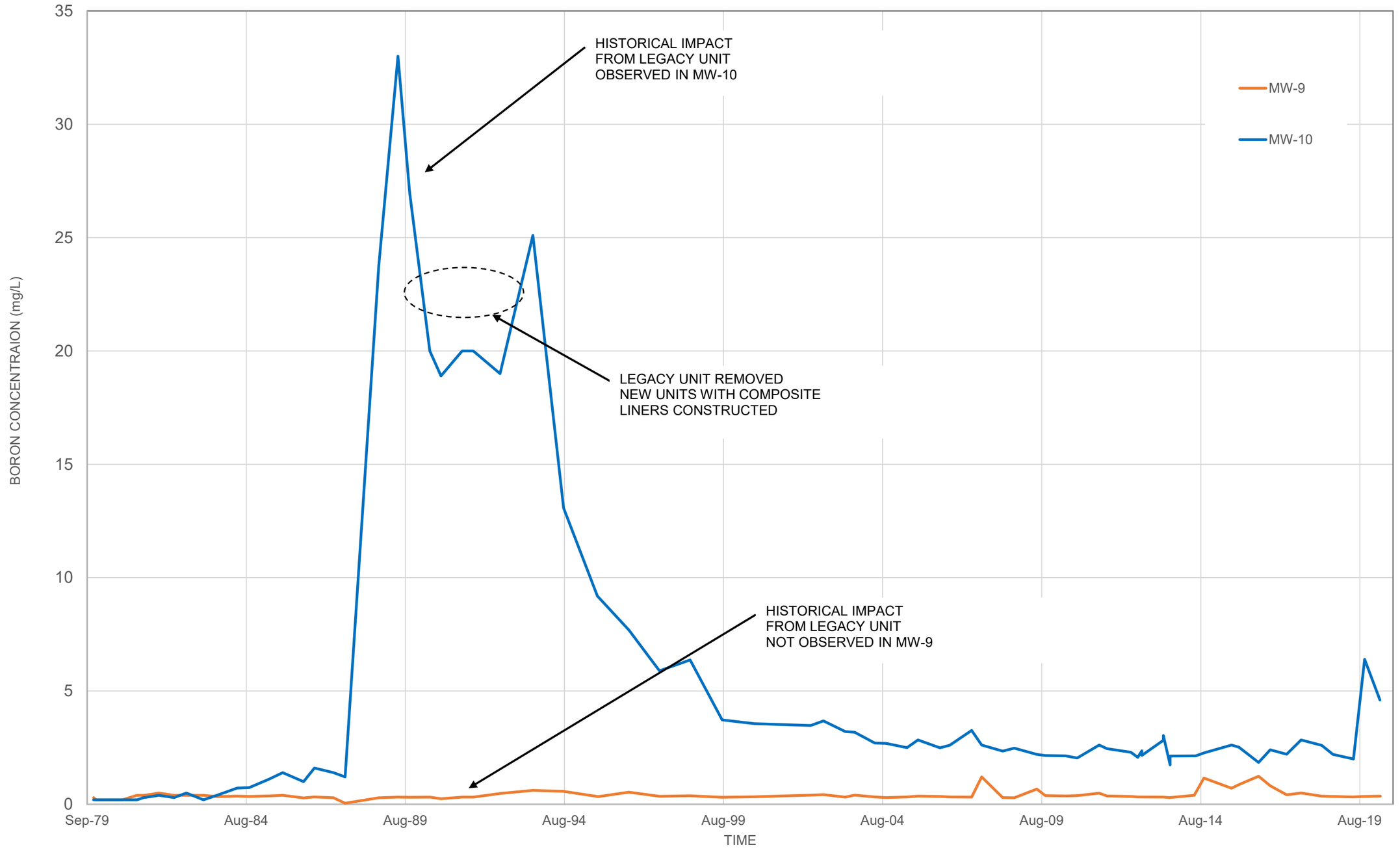


COAL CREEK STATION
SULFATE CONCENTRATIONS
AT MW-9 AND MW-10

GOLDER

FIGURE 11

https://golderassociates.sharepoint.com/sites/120551/Project Files/5 Technical Work/3 - Permit Support/CCR/Holistic B Rules/Alt Liner Application/Final_UR91_Rev0_25Nov20/Figures/[Fig 10-12 and 24.xlsx]Fig 12



COAL CREEK STATION
BORON CONCENTRATIONS
AT MW-9 AND MW-10

GOLDER

FIGURE 12

https://golderassociates.sharepoint.com/sites/120551/Project Files/5 Technical Work/3 - Permit Support/CCR/Holistic B Rules/Alt Liner Application/Final_UR91_Rev0_25Nov20/Figures/[Fig 13-20 and 21-23.xlsx]Fig 13

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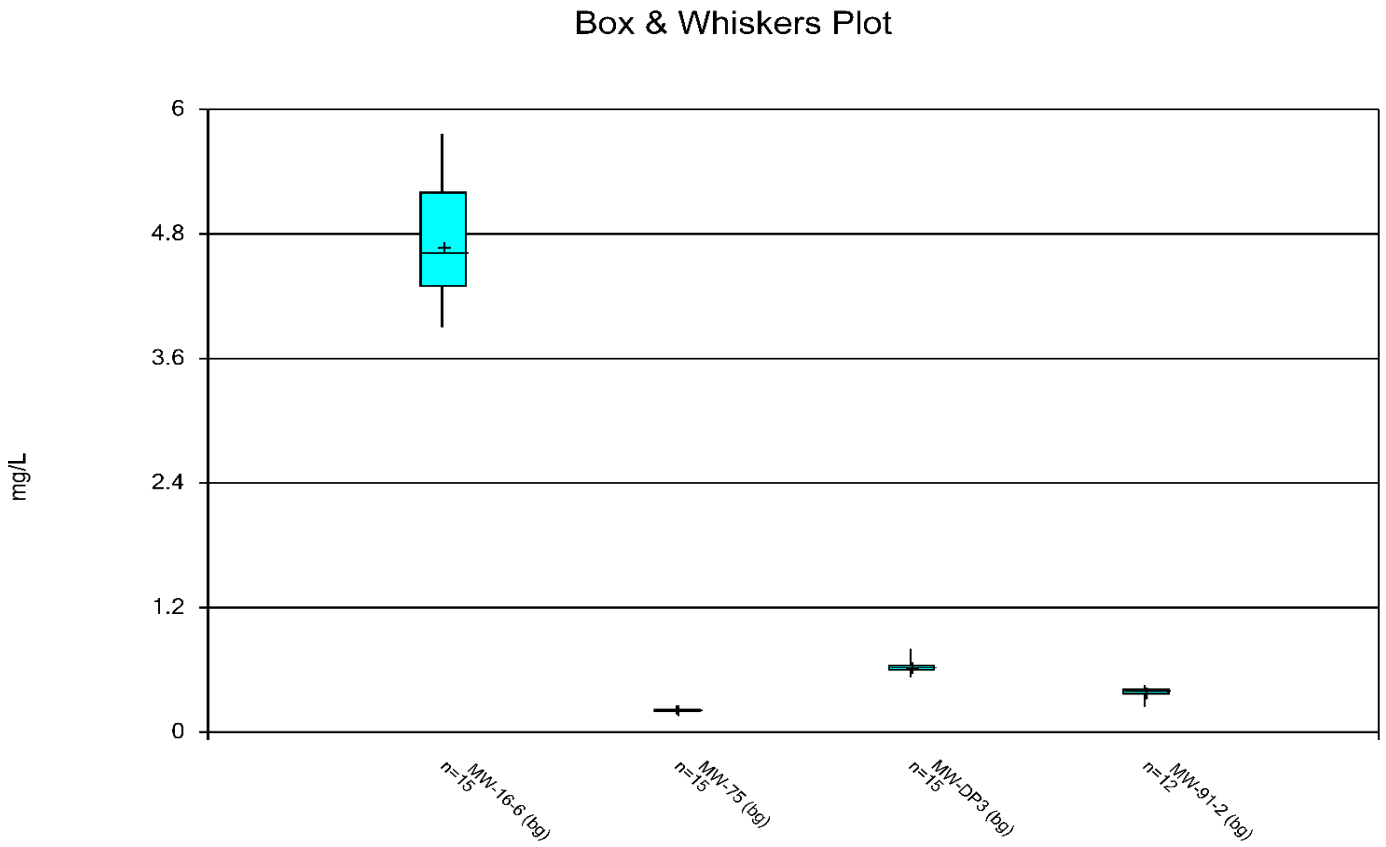

COAL CREEK STATION
BORON SIDE-BY-SIDE BOX PLOT
UPGRADIENT WELLS

GOLDER

FIGURE 13

https://golderassociates.sharepoint.com/sites/120551/Project Files/5 Technical Work/3 - Permit Support/CCR/Holistic B Rules/Alt Liner Application/Final_UR91_Rev0_25Nov20/Figures/[Fig 13-20 and 21-23.xlsx]Fig 14

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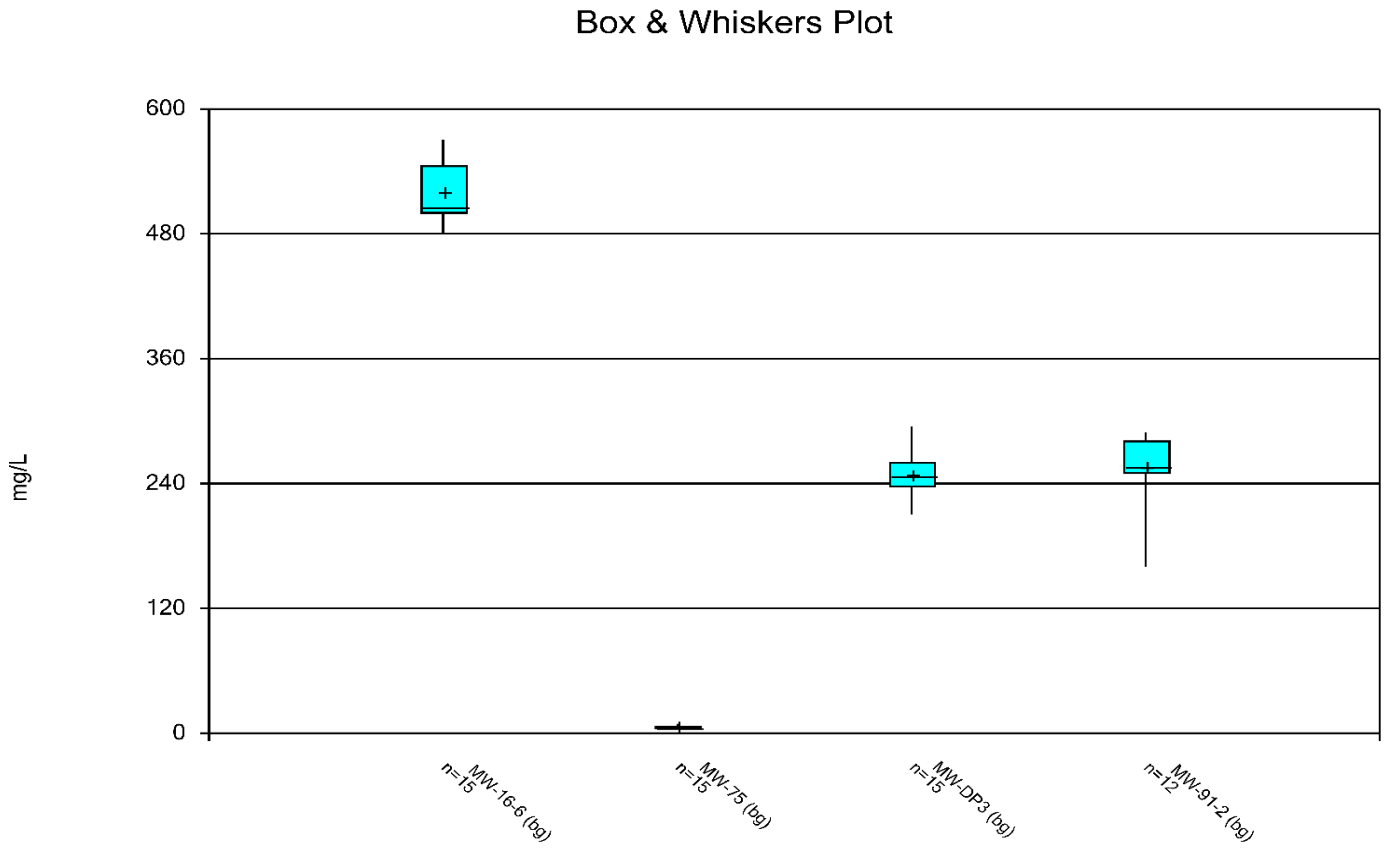

Constituent: Calcium, Total Analysis Run 11/16/2020 10:34 AM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020

COAL CREEK STATION
CALCIUM SIDE-BY-SIDE BOX PLOT
UPGRADIENT WELLS

GOLDER

FIGURE 14

https://golderassociates.sharepoint.com/sites/120551/Project Files/5 Technical Work/3 - Permit Support/CCR/Holistic B Rules/Alt Liner Application/Final_UR91_Rev0_25Nov20/Figures/[Fig 13-20 and 21-23.xlsx]Fig 15

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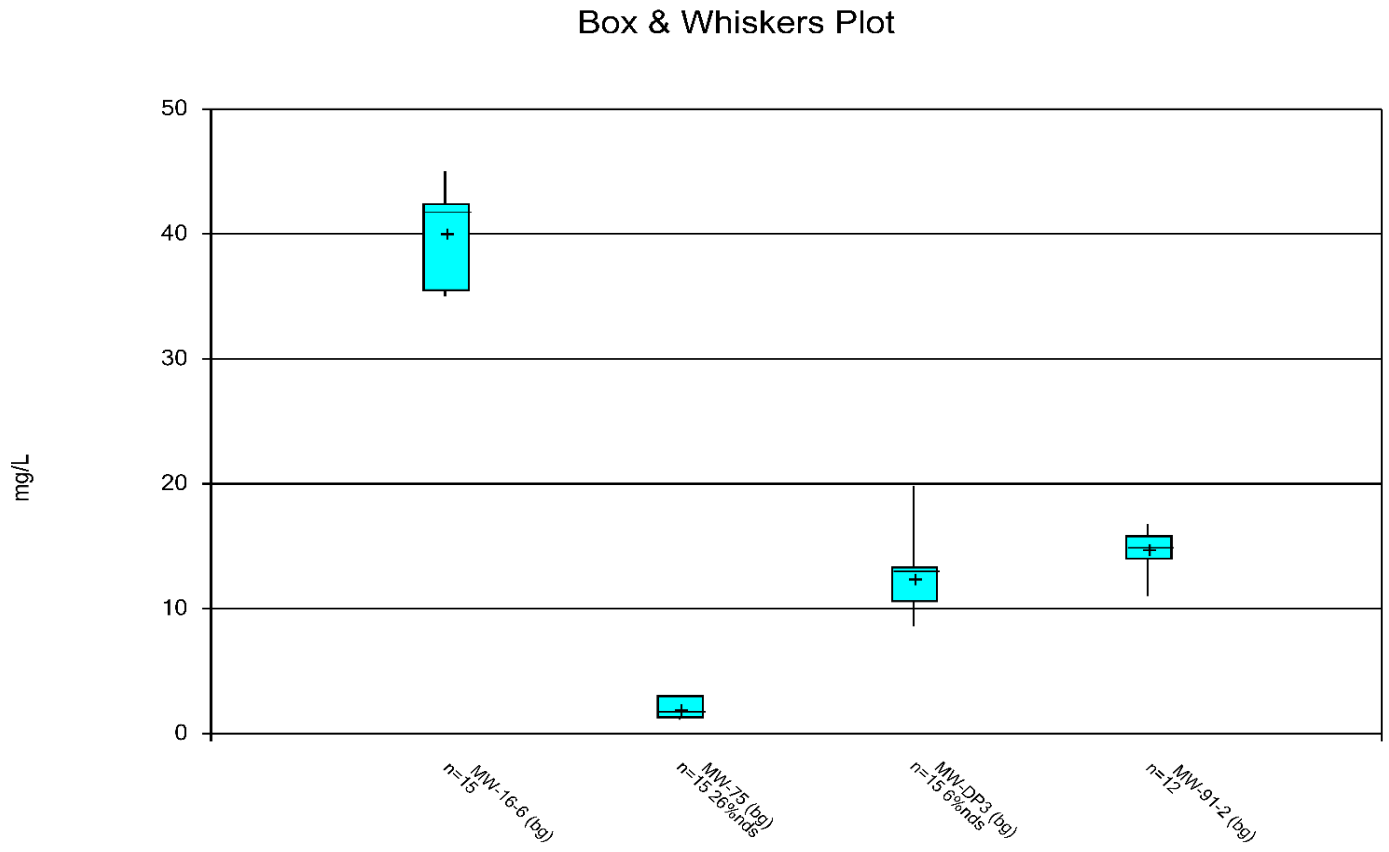


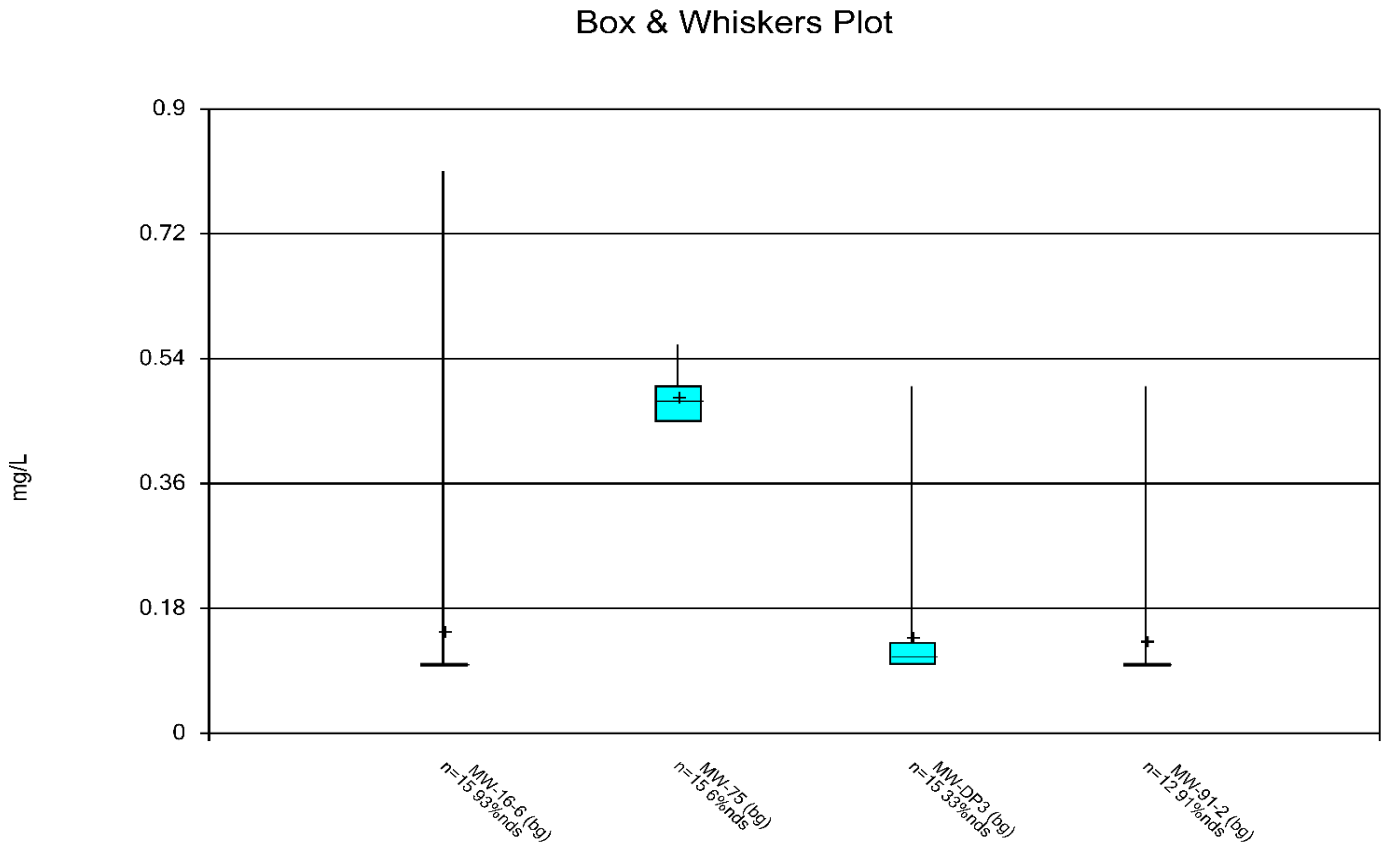
COAL CREEK STATION
CHLORIDE SIDE-BY-SIDE BOX PLOT
UPGRADIENT WELLS

GOLDER

FIGURE 15

https://golderassociates.sharepoint.com/sites/120551/Project Files/5 Technical Work/3 - Permit Support/CCR/Holistic B Rules/Alt Liner Application/Final_UR91_Rev0_25Nov20/Figures/[Fig 13-20 and 21-23.xlsx]Fig 16

Sanitas™ v.9.6.27 Sanitas software licensed to Golder Associates. UG



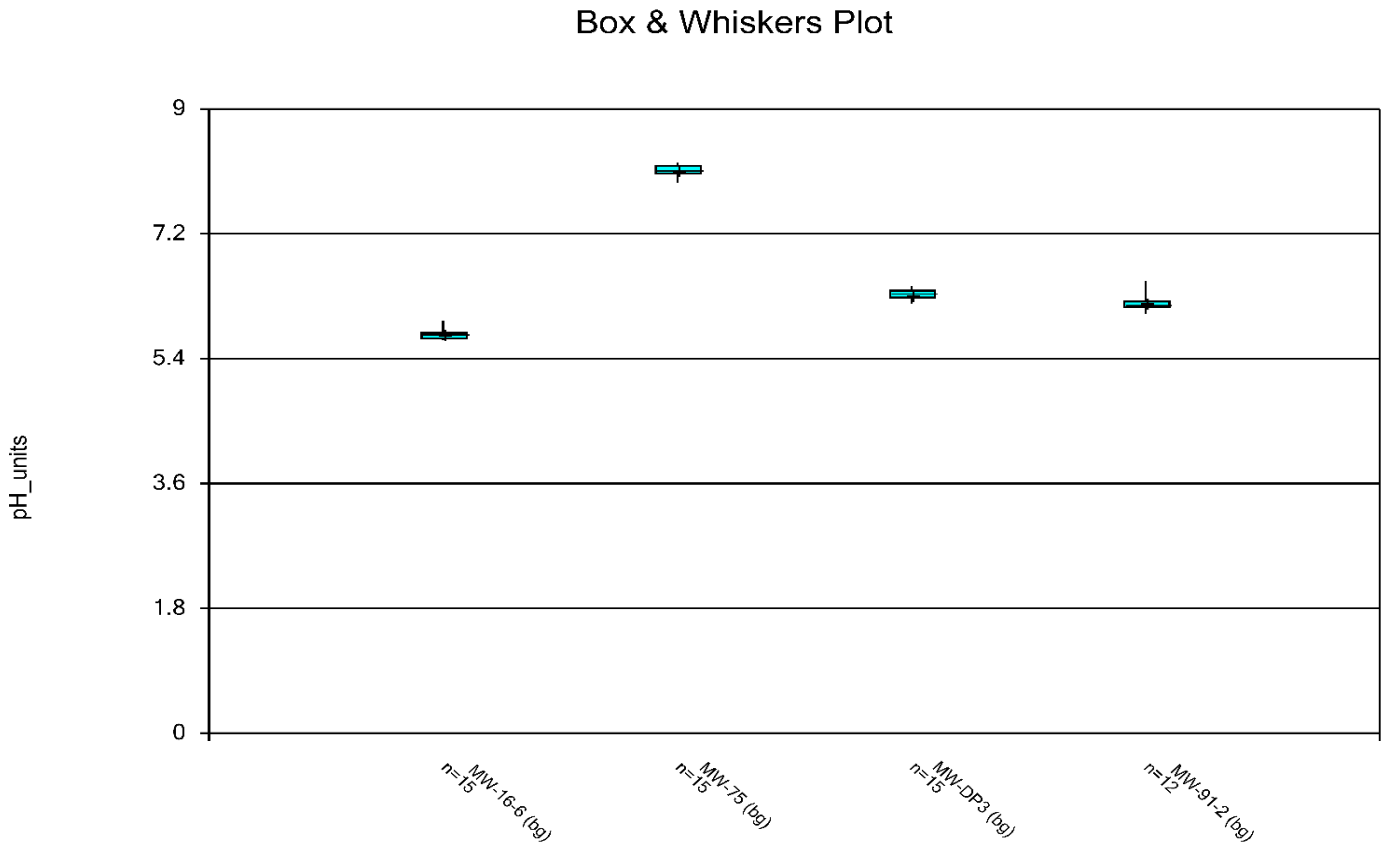
COAL CREEK STATION
FLUORIDE SIDE-BY-SIDE BOX PLOT
UPGRADIENT WELLS

GOLDER

FIGURE 16

https://golderassociates.sharepoint.com/sites/120551/Project Files/5 Technical Work/3 - Permit Support/CCR/Holistic B Rules/Alt Liner Application/Final_UR91_Rev0_25Nov20/Figures/[Fig 13-20 and 21-23.xlsx]Fig 17

Sanitas™ v.9.6.27 Sanitas software licensed to Golder Associates. UG



Constituent: pH, Field-Measured Analysis Run 11/16/2020 10:34 AM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020

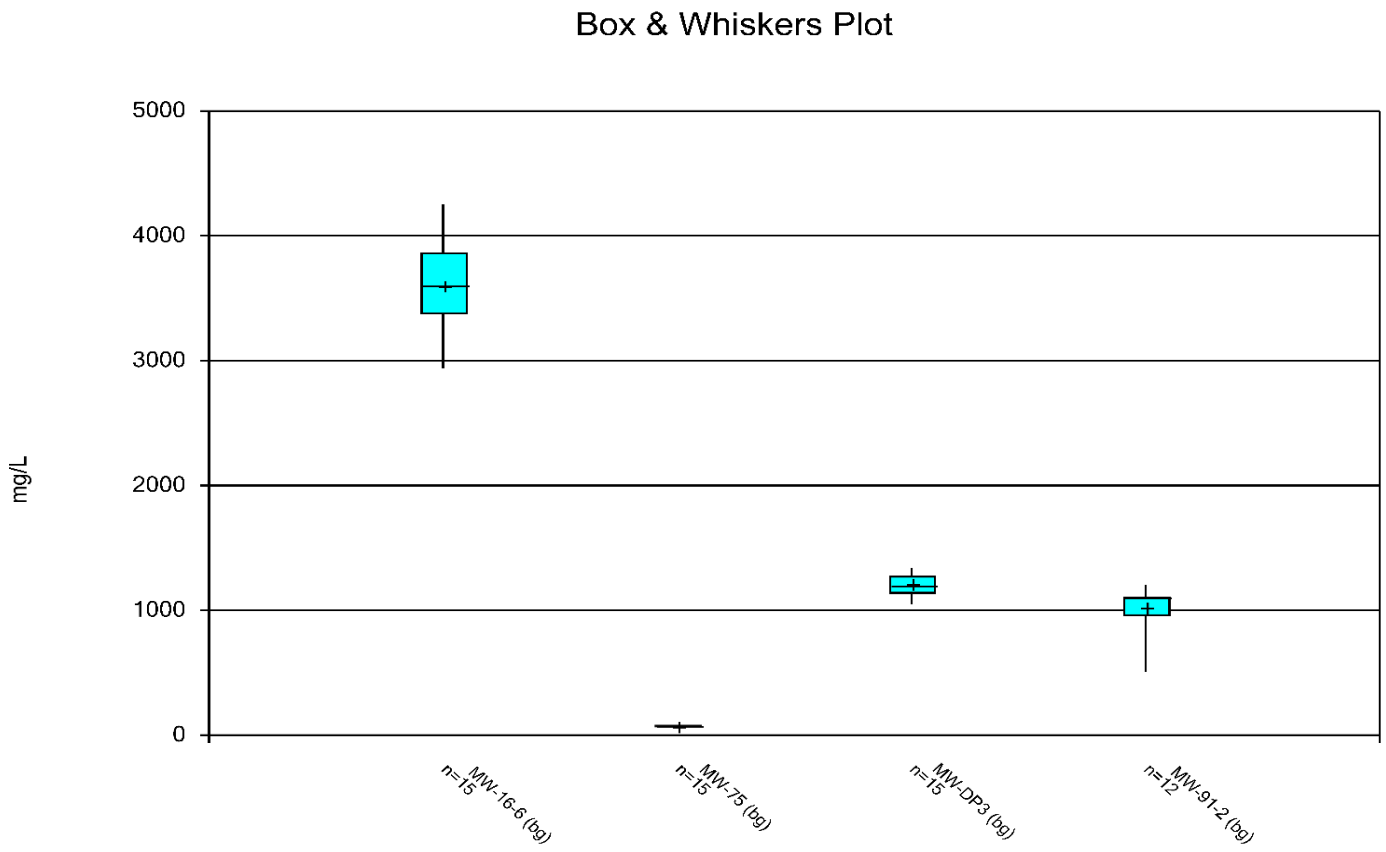
COAL CREEK STATION
FIELD pH SIDE-BY-SIDE BOX PLOT
UPGRADIENT WELLS

GOLDER

FIGURE 17

https://golderassociates.sharepoint.com/sites/120551/Project Files/5 Technical Work/3 - Permit Support/CCR/Holistic B Rules/Alt Liner Application/Final_UR91_Rev0_25Nov20/Figures/[Fig 13-20 and 21-23.xlsx]Fig 18

Sanitas™ v.9.6.27 Sanitas software licensed to Golder Associates. UG



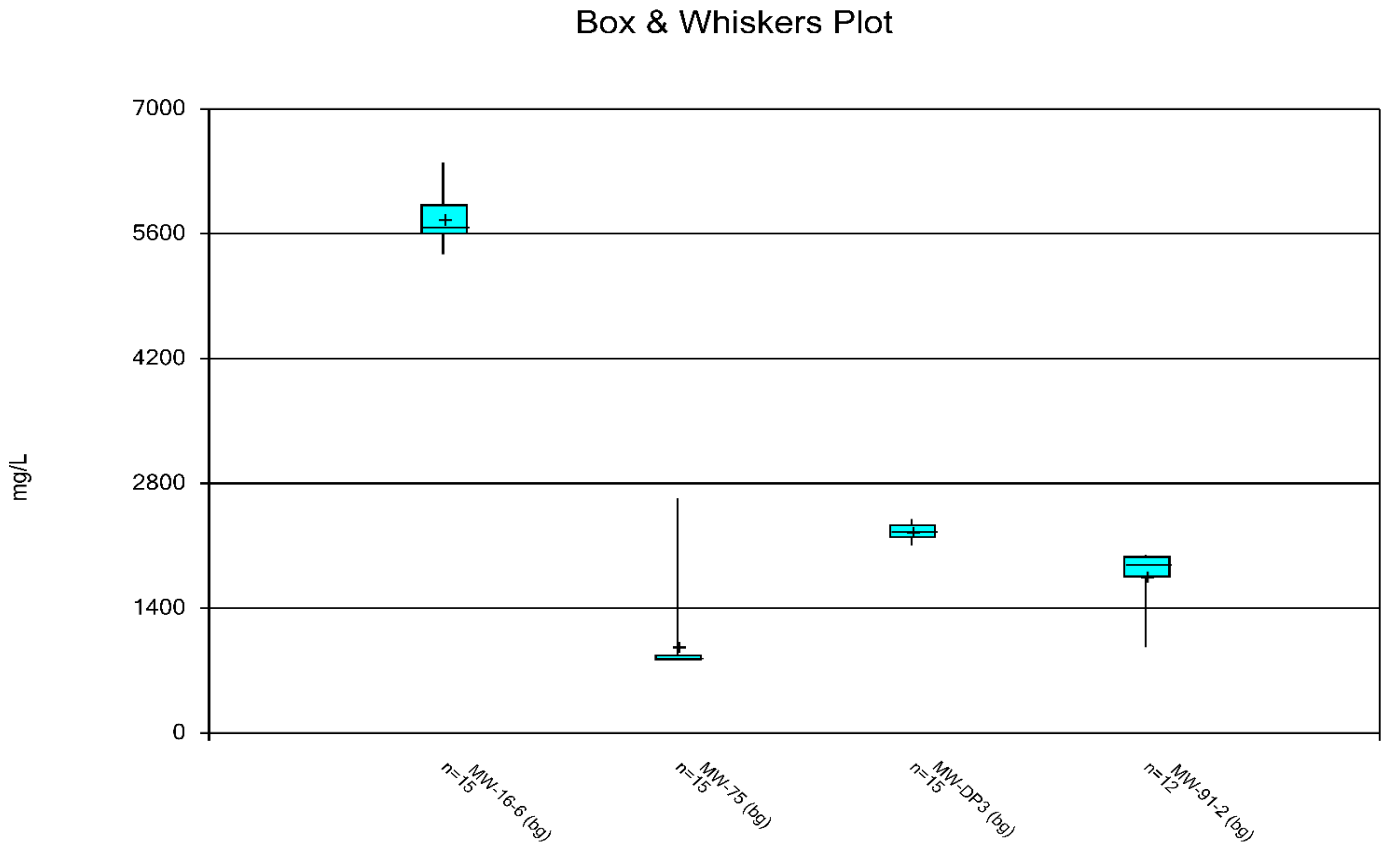
COAL CREEK STATION
SULFATE SIDE-BY-SIDE BOX PLOT
UPGRADIENT WELLS

GOLDER

FIGURE 18

https://golderassociates.sharepoint.com/sites/120551/Project Files/5 Technical Work/3 - Permit Support/CCR/Holistic B Rules/Alt Liner Application/Final_UR91_Rev0_25Nov20/Figures/[Fig 13-20 and 21-23.xlsx]Fig 19

Sanitas™ v.9.6.27 Sanitas software licensed to Golder Associates. UG

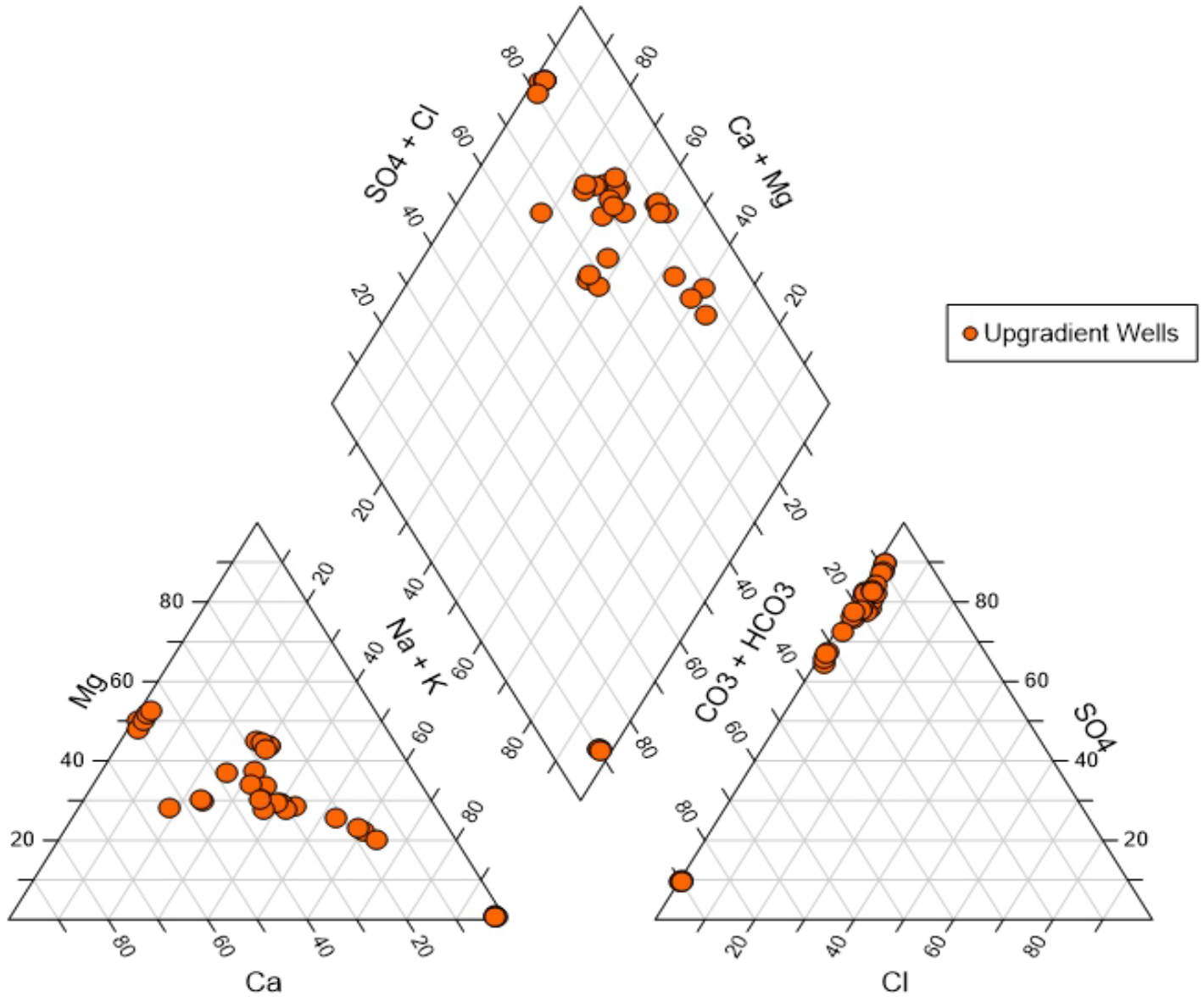


COAL CREEK STATION
TOTAL DISSOLVED SOLIDS SIDE-BY-SIDE BOX PLOT
UPGRADIENT WELLS

GOLDER

FIGURE 19

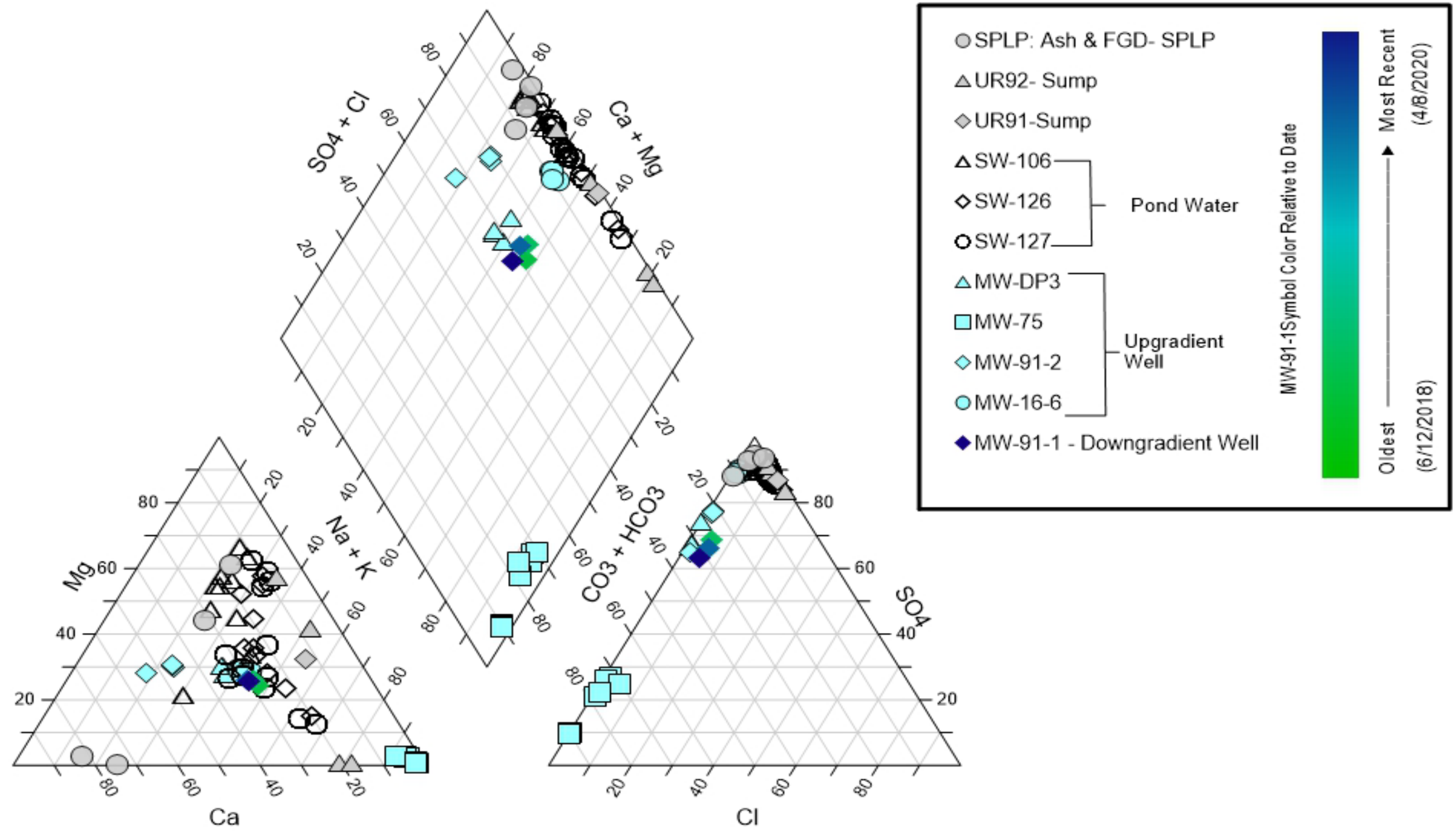
https://golderassociates.sharepoint.com/sites/120551/Project Files/5 Technical Work/3 - Permit Support/CCR/Holistic B Rules/Alt Liner Application/Final_UR91_Rev0_25Nov20/Figures/[Fig 13-20 and 21-23.xlsx]Fig 20



COAL CREEK STATION
PIPER DIAGRAM
UPGRADIENT WELLS

GOLDER

FIGURE 20

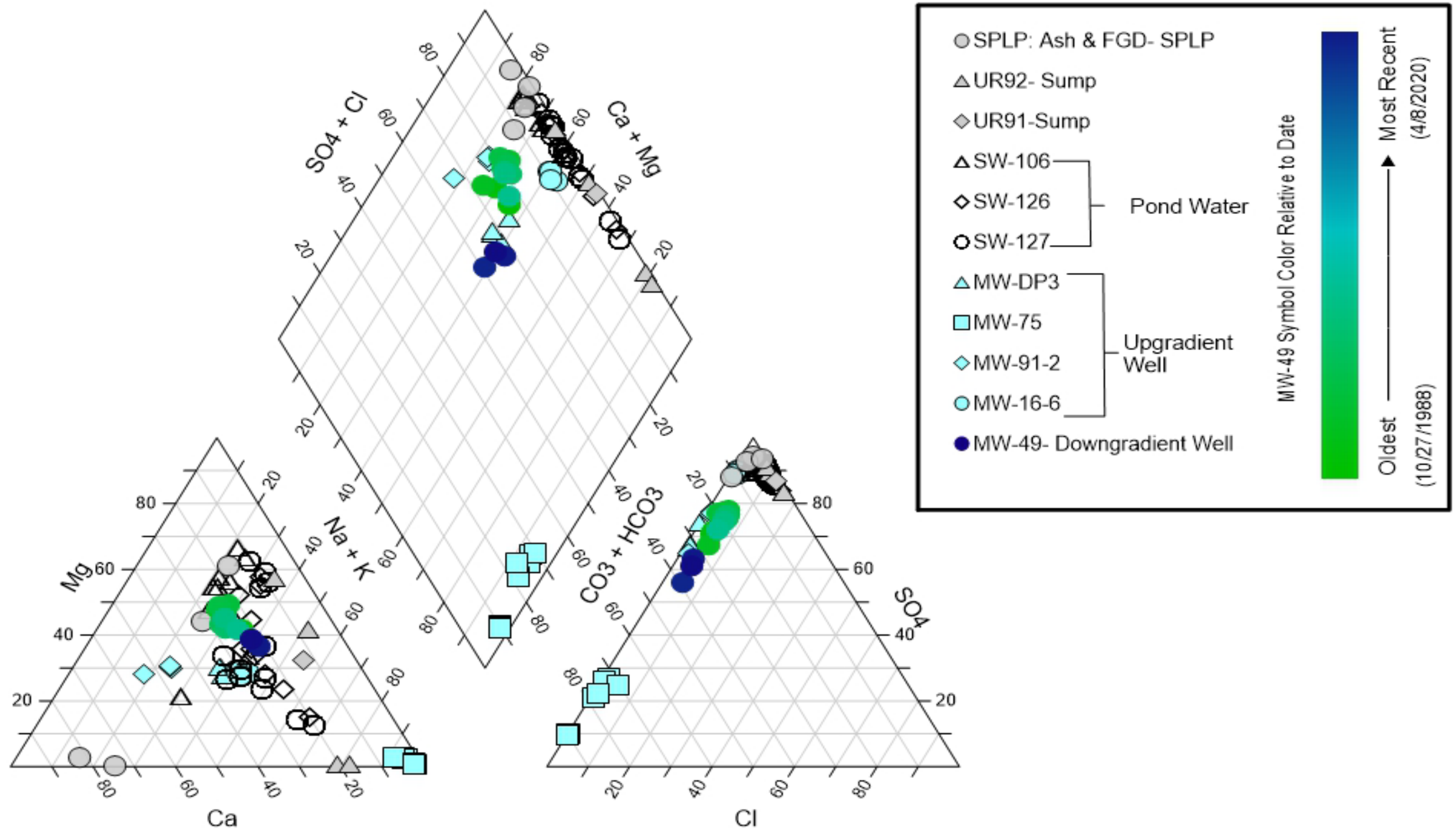


COAL CREEK STATION
PIPER DIAGRAM MW-91-1

GOLDER

FIGURE 21

https://golderassociates.sharepoint.com/sites/120551/Project Files/5 Technical Work/3 - Permit Support/CCR/Holistic B Rules/Alt Liner Application/Final_UR91_Rev0_25Nov20/Figures/[Fig 13-20 and 21-23.xlsx]Fig 21

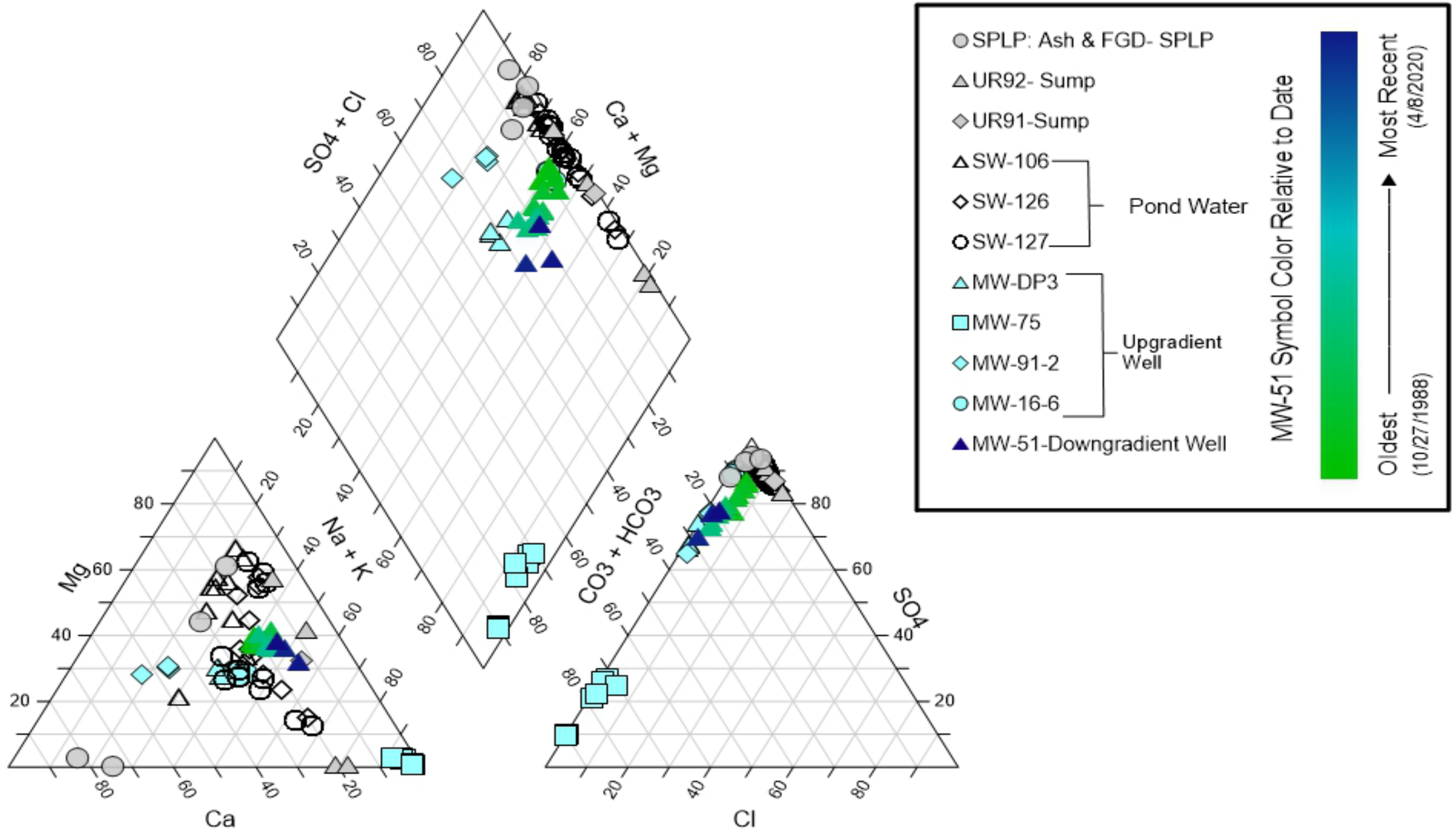


COAL CREEK STATION
PIPER DIAGRAM MW-49

GOLDER

FIGURE 22

https://golderassociates.sharepoint.com/sites/120551/Project Files/5 Technical Work/3 - Permit Support/CCR/Holistic B Rules/Alt Liner Application/Final_UR91_Rev0_25Nov20/Figures/[Fig 13-20 and 21-23.xlsx]Fig 22



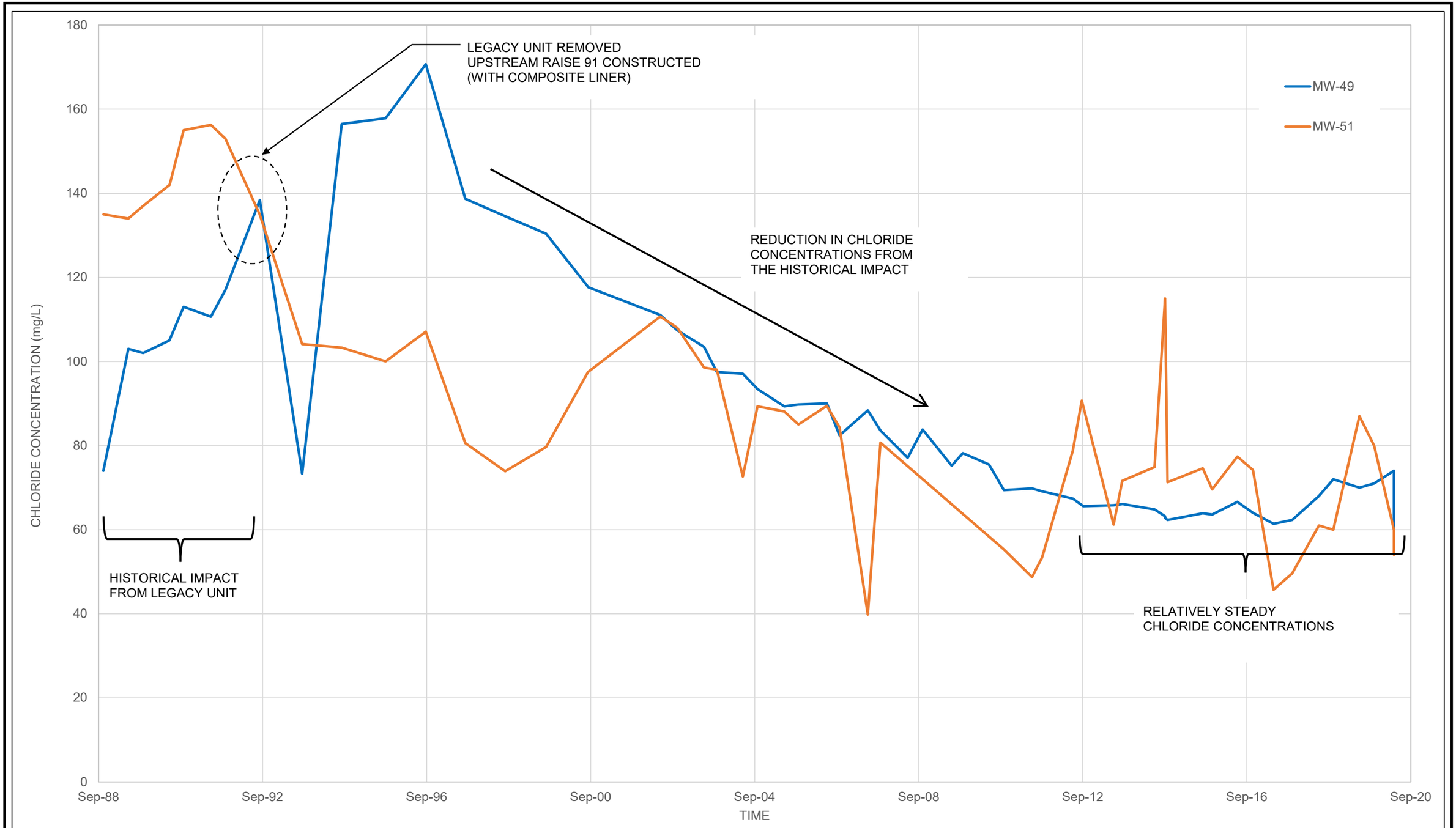
COAL CREEK STATION
PIPER DIAGRAM MW-51

GOLDER

FIGURE 23

https://golderassociates.sharepoint.com/sites/120551/Project Files/5 Technical Work/3 - Permit Support/CCR/Holistic B Rules/Alt Liner Application/Final_UR91_Rev0_25Nov20/Figures/[Fig 13-20 and 21-23.xlsx]Fig 23

https://golderassociates.sharepoint.com/sites/120551/Project Files/5 Technical Work/3 - Permit Support/CCR/Holistic B Rules/Alt Liner Application/Final_UR91_Rev0_25Nov20/Figures/[Fig 10-12 and 24.xlsx]Fig 24



GOLDER

COAL CREEK STATION
CHLORIDE CONCENTRATIONS
AT MW-49 AND MW-51

FIGURE 24



LEGEND

NDDEQ PLANT AREA UPGRADIENT WELL	71.0	APRIL-MAY 2020 CHLORIDE CONCENTRATION (mg/L)
NDDEQ PLANT AREA DOWNGRADIENT WELL	(59.2-72.0)	RANGE IN CHLORIDE CONCENTRATIONS, (mg/L)
EEG PROGRAM WELL		
UPGRADIENT WELL		
UPSTREAM RAISE 91 DOWNGRADIENT WELL		
OTHER SAMPLING LOCATION (SUMP OR IMPOUNDED WATER)		
GENERAL DIRECTION OF GROUNDWATER FLOW		

NOTE(S)

1. AERIAL IMAGERY OBTAINED FROM UNITED STATES DEPARTMENT OF AGRICULTURE, NATIONAL AGRICULTURE IMAGERY PROGRAM, 2019.
2. SAMPLES FROM MW-DP5, MW-DP3, MW-16-6, MW-91-2, MW-75, MW-49, MW-91-1, AND MW-51 WERE COLLECTED BETWEEN SEPTEMBER 2015 AND APRIL 2020. JUNE 2019 SAMPLES FROM MW-91-1 AND MW-91-2 WERE NOT USED BECAUSE OF SUSPECTED QUALITY CONTROL ISSUE.
3. SAMPLES FROM SW-DP101 WERE COLLECTED BETWEEN 2014 AND APRIL 2020.
4. SAMPLE FROM SUMP-UR91 WAS COLLECTED FROM NOVEMBER 2018. THE RANGE SHOWN FOR SUMP-UR91 REPRESENTS THE SINGLE CHLORIDE SAMPLE COLLECTED FROM THE LOCATION.
5. SAMPLES FROM MW-17-1, MW-17-2, MW-17-3, MW-17-4, AND MW-17-5 WERE COLLECTED BETWEEN JANUARY 2018 AND MAY 2020.
6. SAMPLES FROM MW-96, MW-62, MW-63, AND MW-65 WERE COLLECTED BETWEEN OCTOBER 1988 AND APRIL 2020.
7. SAMPLES WERE COLLECTED FROM SW-107 BETWEEN OCTOBER 1988 AND APRIL 2020.

N

0 250 500
1" = 500' FEET

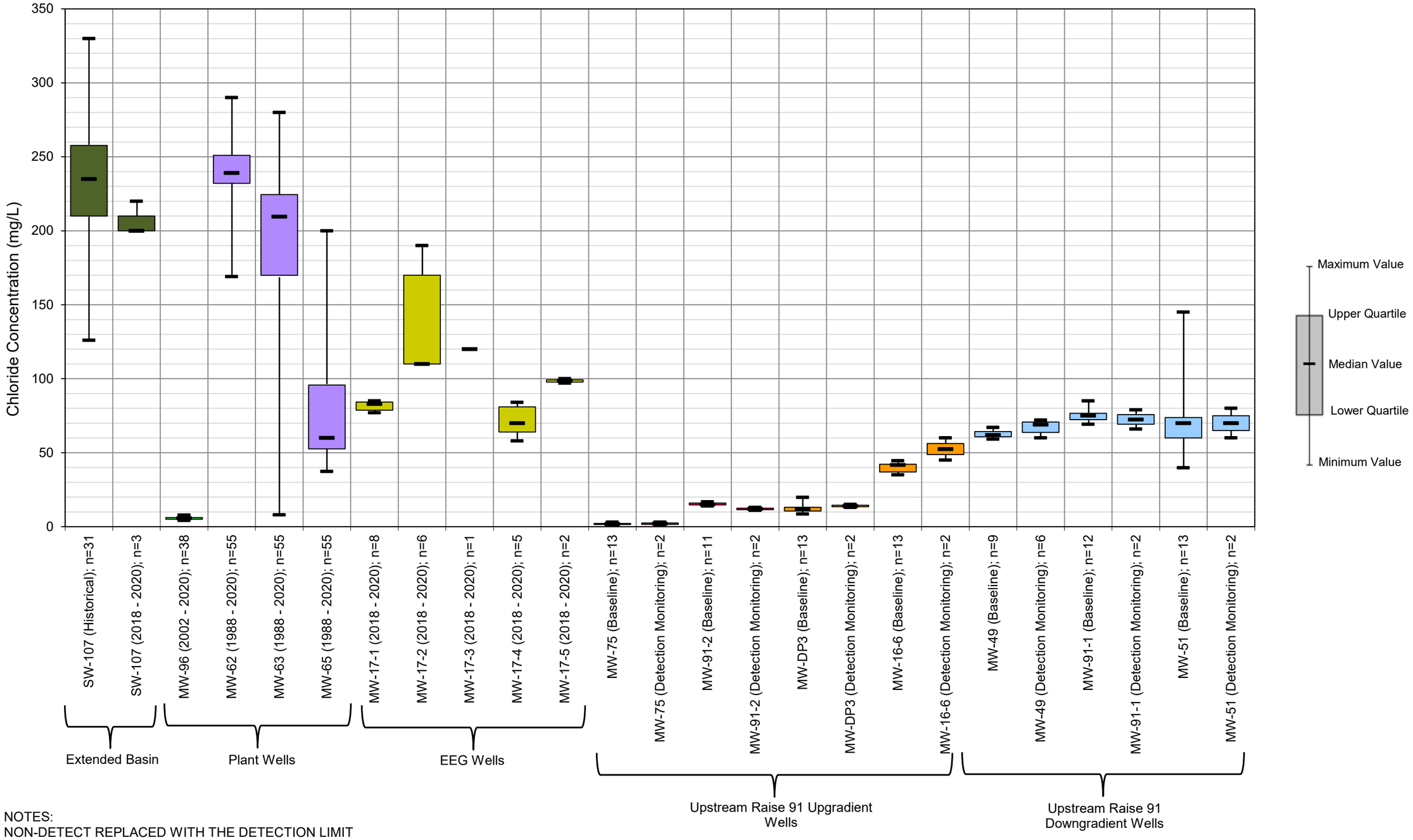
GOLDER

COAL CREEK STATION
CHLORIDE CONCENTRATIONS MAP

FIGURE 25

Path: \\Denver\acad\GREAT RIVER ENERGY\COAL CREEK\99_PROJECTS\19138224A\LINER\Application\ | File Name: 19138224-AllLiner-App-Figure 10.dwg

https://golderassociates.sharepoint.com/sites/120551/Project Files/5 Technical Work/3 - Permit Support/CCR/Holistic B Rules/Alt Liner Application/Final_UR91_Rev0_25Nov20/Figures/[CCS_Box and Whisker_Cl.xlsm]Fig 26



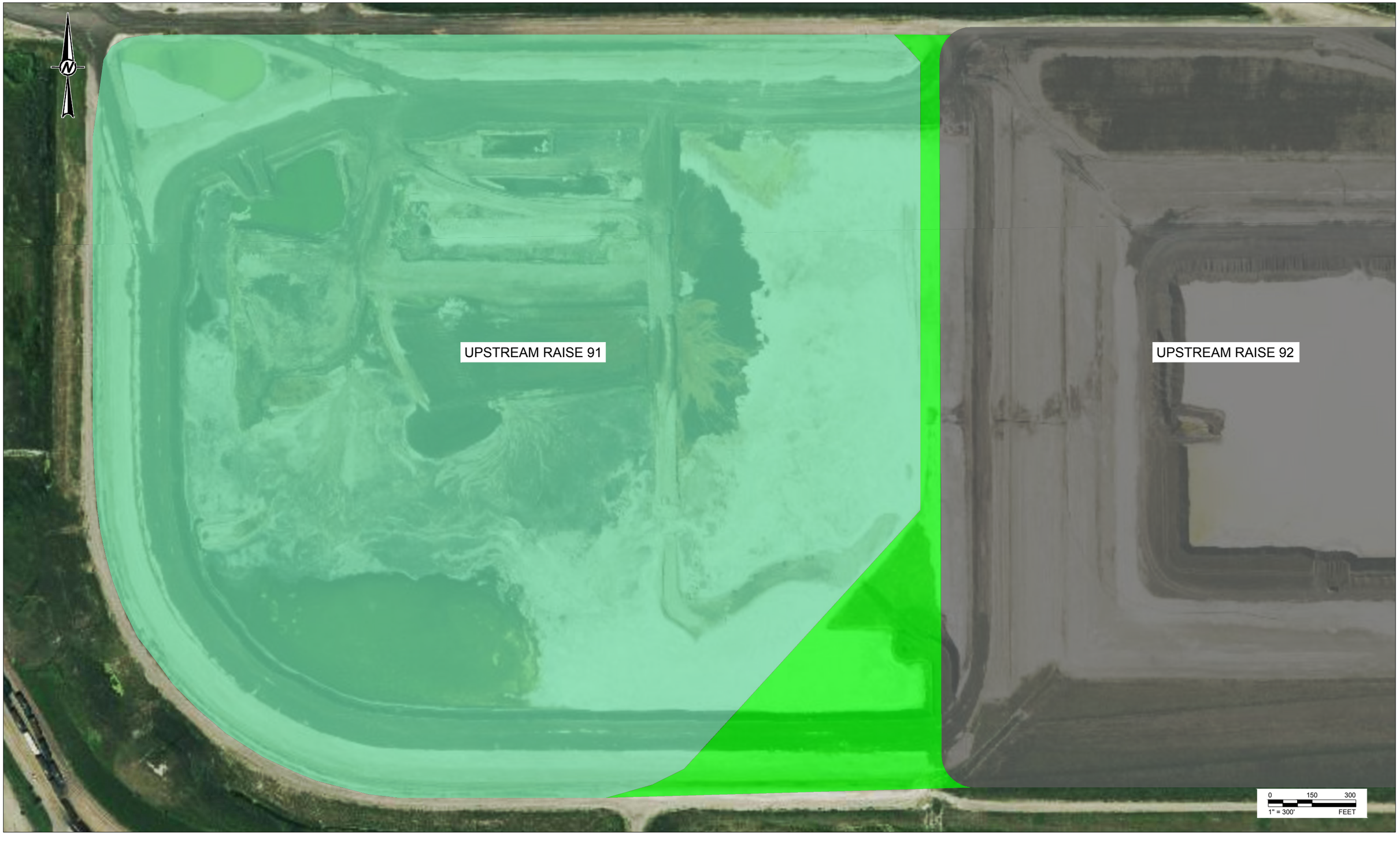
NOTES:
NON-DETECT REPLACED WITH THE DETECTION LIMIT

JUNE 2019 SAMPLES FROM MW-91-1 AND MW-91-2 NOT USED BECAUSE OF A SUSPECTED QUALITY CONTROL ISSUE.

GOLDER

COAL CREEK STATION
CHLORIDE BOX AND WHISKER PLOT

FIGURE 26



GOLDER

LEGEND

- COMPOSITE LINER INSTALLED IN 1989
- COMPOSITE LINER INSTALLED IN 1992
- COMPOSITE LINER INSTALLED IN 2016

REFERENCE(S)

1. AERIAL IMAGERY FROM THE UNITED STATES DEPARTMENT OF AGRICULTURE NATIONAL AGRICULTURE IMAGERY PROGRAM, TAKEN 2019.

COAL CREEK STATION
UPSTREAM RAISE 91/92 - COMPOSITE LINED AREAS

FIGURE 27

Path: \\Denver\acad\GREAT RIVER ENERGY\COAL CREEK\99_PROJECTS\19138224\AltLinerApplication\ | File Name: 19138224-AltLinerApp-Figures 27.dwg

APPENDIX A

CCR Rule Compliance

APPENDIX A-1

Owner's Certification of Compliance

GREAT RIVER ENERGY™

12300 Elm Creek Boulevard
Maple Grove, Minnesota 55369-4718
763-445-5000
greatriverenergy.com

Owners Certification of Compliance

I hereby certify that, based on my inquiry of those persons who are immediately responsible for compliance with environmental regulations applicable to the Upstream Raise 91 CCR surface impoundment at Coal Creek Station (the "Facility"), the Facility is in compliance with all of the requirements contained in 40 CFR Part 257, Subpart D – Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments applicable to the Facility, except for 40 CFR 257.71(a)(1).



Eric J. Olsen, VP & General Counsel

November 24, 2020
Date

APPENDIX A-2

Location Restrictions Demonstration – Upstream Raise 91

REPORT

Location Restrictions Demonstration - Upstream Raise 91

Great River Energy - Coal Creek Station

Submitted to:

Great River Energy
Coal Creek Station
2875 Third Street SW
Underwood, North Dakota 58576

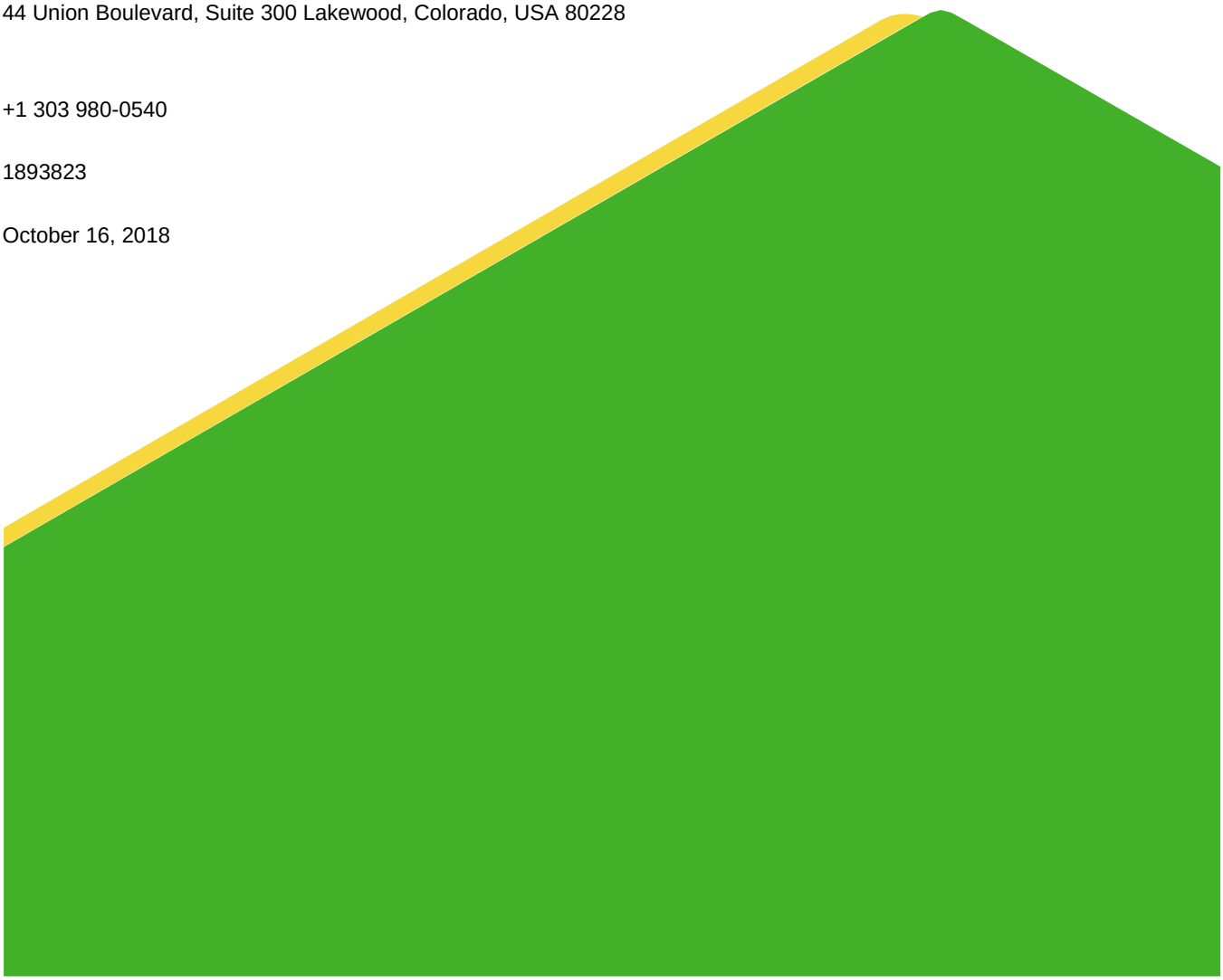
Submitted by:

Golder Associates Inc.
44 Union Boulevard, Suite 300 Lakewood, Colorado, USA 80228

+1 303 980-0540

1893823

October 16, 2018



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1.0 INTRODUCTION

This report presents documentation and certification of the Location Restrictions Demonstration for the Upstream Raise 91 CCR Surface Impoundment (Upstream Raise 91) at Great River Energy's (GRE) Coal Creek Station (CCS). Upstream Raise 91 is an existing coal combustion residuals (CCR) surface impoundment. This report addresses the requirements of the United States Environmental Protection Agency's (EPA's) CCR rule (40 CFR 257.60 through 257.64, (EPA, 2015)). The location restrictions as defined in the CCR rule are summarized in the following sections.

1.1 Site Background

CCS is a coal-fired electric generation facility located in McLean County, North Dakota, approximately 10 miles northwest of Washburn, North Dakota. CCRs are managed in composite-lined surface impoundments and dry waste landfill facilities regulated and permitted by the North Dakota Department of Health (NDDH) in accordance with North Dakota Administrative Code (NDAC) Article 33-20, Solid Waste Management and Land Protection.

CCS has four CCR facilities that are within the purview of the EPA CCR rule (Figure 1):

- Drains Pond System CCR Surface Impoundment (Drains Pond System) is located in the south central portion of the plant site, northeast of the plant buildings.
- Upstream Raise 91 CCR Surface Impoundment (Upstream Raise 91) is located in the south central portion of the plant site, east of the plant buildings.
- Upstream Raise 92 CCR Surface Impoundment (Upstream Raise 92) is located in the southeast portion of the plant site, between Upstream Raise 91 and Southeast Section 16 CCR Landfill.
- Southeast Section 16 CCR Landfill (Southeast 16) is located in the southeast portion of the plant site, east of Upstream Raise 92.

2.0 LOCATION RESTRICTIONS

The location restrictions are found within the following sections of the Code of Federal Regulations:

- 40 CFR 257.60 – Placement above the uppermost aquifer
- 40 CFR 257.61 – Wetlands
- 40 CFR 257.62 – Fault areas
- 40 CFR 257.63 – Seismic impact zones
- 40 CFR 257.64 – Unstable areas

Per the CCR rule definitions, Upstream Raise 91 is considered an existing CCR surface impoundment and is subject to each of the location restriction requirements above.

3.0 PLACEMENT ABOVE THE UPPERMOST AQUIFER

Per 40 CFR 257.60, the base of existing and new CCR surface impoundments, new CCR landfills, and all lateral expansions must be no less than five feet (1.52 meters) above the uppermost aquifer, or a demonstration must be made that there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR unit and the uppermost aquifer due to normal fluctuations in groundwater elevations, including

fluctuations due to the seasonal high water table. The CCR rule defines the uppermost aquifer as the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer within the facility's property boundary.

To provide support for the groundwater separation demonstration, groundwater levels were measured in the monitoring wells and piezometers surrounding Upstream Raise 91 from June 2017 through June 2018 (Figure 2). This was done to evaluate the normal fluctuations (including seasonal high water table) of groundwater elevation in the area of Upstream Raise 91.

Based on this measured data, the groundwater level fluctuated up to approximately 2.8 feet at individual wells/piezometers between June 2017 and June 2018. Groundwater contours were drawn based on the measured groundwater levels from October 2017 since groundwater levels were measured at additional site piezometers during this period, providing more detailed information for the development of groundwater contours. These groundwater contours were then compared to the as-built bottom of composite liner grades (Interstate Engineering, 1994). Figure 3 provides a visualization of the separation between the bottom of the composite liner (bottom of two feet of mechanically compacted clay liner) and the October 2017 groundwater contours. Most of the Upstream Raise 91 footprint has a separation between the bottom of the composite liner and groundwater greater than 5 feet. A small area in the northwest corner of the facility indicates a minimum separation of approximately 3.5 feet. From June 2017 through June 2018, the piezometer nearest this corner of Upstream Raise 91 (DP-B) showed groundwater elevations up to approximately 1.5 feet higher than the October 2017 readings. Therefore, the separation between the bottom of the composite liner and groundwater is anticipated to be greater than approximately 2.0 feet after considering potential site variations, including anticipated site seasonality based on the information collected.

Based on information acquired between June 2017 and June 2018, the base of the liner system at Upstream Raise 91 is above the upper limits of the uppermost aquifer and no intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR unit and the uppermost aquifer exists.

4.0 WETLANDS

Per 40 CFR 257.61, existing and new CCR surface impoundments, new CCR landfills, and all lateral expansions must not be located in wetlands, unless a specific demonstration has been made by the owner or operator of a CCR unit ensuring that the unit will not degrade sensitive wetland ecosystems. Wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and over a duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions, and may include marshes, swamps, bogs, or other similar areas.

Upstream Raise 91 was constructed as an above-grade impoundment with grass covered perimeter earthen embankments and is located several hundred feet uphill of Samuelson Slough (closest surface water body). There are no visual indications suggesting the impoundment is located in wetlands. In addition, the NDDH, as part of the permit requirements of each facility, has previously accepted that Upstream Raise 91 is not located in wetlands (Golder, 2004).

Upstream Raise 91 is not located in wetlands.

5.0 FAULT AREAS

Per 40 CFR 257.62, new CCR landfills, new and existing CCR surface impoundments, and all lateral expansions must not be located within 200 feet of a fault (or the outermost damage zone of a fault) that has had displacement in Holocene time, unless a demonstration can be made that an alternative setback distance of less than 200 feet will not result in damage to the structural integrity of the unit. Holocene time is defined as the geological epoch which began at the end of the Pleistocene, roughly 11,700 years before the present, and continues to present time.

As evidence of being outside of fault areas, Figures 4 through 6 contain images derived from the United States Geological Survey's (USGS) Earthquake Hazards Program's U.S. Quaternary Faults and Folds Database. An overall map of the known faults in the contiguous United States is shown in Figure 4, while Figure 5 focuses on North Dakota. No known quaternary faults are located in the state of North Dakota. Further, Figure 6 provides the 2018 national earthquake probability map. North Dakota as a whole is predicted to have a less than 1% chance of potentially minor-damage ground shaking in 2018 (Petersen, et al., 2018).

Upstream Raise 91 is not located within 200 feet of a fault (or the outermost damage zone of a fault) that has had displacement in Holocene time.

6.0 SEISMIC IMPACT ZONES

Per 40 CFR 257.63, new CCR landfills, new and existing CCR surface impoundments, and all lateral expansions must not be located in seismic impact zones, unless a demonstration is made that shows all structural components, including liner, leachate collection systems, and surface water control systems are designed to resist the maximum horizontal acceleration in lithified earth material from a probable earthquake at the site. A seismic impact zone is defined as an area having a 2% or greater probability that the maximum expected horizontal acceleration, expressed as a percentage of the earth's gravitational pull (g), will exceed 0.10 g in 50 years. Maximum horizontal acceleration in lithified earthen materials is defined as the maximum expected horizontal acceleration at the ground surface as depicted on a seismic hazard map, with a 98% or greater probability that the acceleration will not be exceeded in 50 years.

Figure 7 is a map prepared by the USGS (Petersen, et al., 2014) showing the nationwide 2% probability in 50 years of exceedance of peak ground acceleration. On the map, the majority of North Dakota, including CCS, is given a 2% probability of exceeding 0.02 g in 50 years, below the 0.10 g threshold for defining a seismic impact zone.

Upstream Raise 91 is not located in a seismic impact zone.

7.0 UNSTABLE AREAS

Per 40 CFR 257.64, new and existing CCR landfills, new and existing CCR surface impoundments, and all lateral expansions must not be located in unstable areas, unless a demonstration can be made that shows the structural components of the unit will not be disrupted. The rule defines an unstable area as a location that is susceptible to natural or human-induced events or forces capable of impairing the integrity of some or all of the structural components responsible for preventing releases from a CCR unit. Unstable areas can include poor foundation conditions, areas susceptible to mass movements, and karst terrains. Per the rule, structural components are any component used in the construction and operation of the unit that are necessary to ensure the integrity of the unit and to prevent a release, and can include liners, leachate collection systems, embankments, spillways, outlets, final covers, and inflow design flood control systems.

Per the rule, the following factors were considered in determining whether the facilities have been located within unstable areas:

- On-site or local soil conditions that may result in significant differential settlement;
- On-site or local geologic or geomorphologic features; and
- On-site or local human-made features or events (both surface and subsurface).

Potential indications of unstable areas are evaluated during the annual visual inspections required to satisfy 40 CFR Part 257.83. These inspections are specifically meant to assess hydraulic structures, upstream and downstream slopes, berm crests, and the toe of the facility to look for signs of structural weakness, differential settlement, or other conditions that could affect stability. No evidence of differential settlement or other indications of unstable areas has been observed at the facility during the annual inspections performed in 2015, 2016, 2017, and 2018 (Golder, 2016a) (Golder, 2017) (Golder, 2018) (2018 inspection report not yet issued).

An assessment of structural stability and slope stability was completed for Upstream Raise 91 in 2016 (Golder, 2016b). This assessment evaluated foundation conditions as well as overall mass movement of the facility and indicated that no structural stability deficiencies were identified.

7.1 Soil Conditions

Upstream Raise 91 is generally constructed over a glacial till layer consisting of sand and silty-clay soils. Glacial till varies in thickness from 20 feet to several hundred feet in the area of CCS. Silty-sand and sand lenses are present throughout the glacial till formation, which is underlain by poorly consolidated siltstone/sandstone bedrock (Barr, 1982) (CPA and UPA, 1989).

The foundation soils of Upstream Raise 91 consist of native soils (sandy and silty-clay) and embankment fill materials sourced from nearby native soils (sandy and silty clay). Upstream Raise 91 was cleaned out and relined in 1993. According to construction documents, the foundation materials were compacted to 93% standard Proctor density. Based on historic site information of CCRs and native soils, observations, and geotechnical testing, Upstream Raise 91 is not built over wet ash or other unsuitable materials and foundation soils are stable (CPA, 1993).

Foundation site soil conditions do not indicate that the facility is located in an unstable area susceptible to significant differential settlement. Additionally, the site facilities are routinely inspected for both state and federal regulatory requirements. The facility will continue to be inspected per state and federal regulatory requirements, and signs of significant differential settlement will be documented and corrected as needed.

7.2 Geologic and Geomorphologic Features

CCS and McLean County are situated at the eastern-most extent of the Williston Basin, a structural and sedimentary basin (USGS, 1999). The region is characterized by the presence of glacial drift, reaching thicknesses of several hundred feet, and overlying the Sentinel Butte Member, the source of commercially mined coal in the direct vicinity of CCS (Falkirk Mining Company, 1979). The Sentinel Butte Member is the highest strata of the Paleocene Fort Union Formation, overlying the Tongue River, Ludlow, and Cannonball Members (USGS, 1999). The Sentinel Butte Member is marked by drab-gray units, separating it from the lower Tongue River Member.

The site geology of CCS includes unconsolidated surficial deposits of the Coleharbor formation consisting of stratified and unstratified glacial drift. The near-surface materials are silty clay and sandy clay till with interbedded

sand lenses (CPA and UPA, 1989). Karst is not known to exist at CCS based on USGS information (USGS, 2004) or site historical information from site borings and test pits (see Figure 8).

7.3 Human-Made Features

Although commercial mining occurs in the vicinity of CCS, no prior mining has occurred within the footprint of the facility, or adjacent to the facility, that would undermine the stability of the facility.

No significant fills, excavations, or structures are present adjacent to the facilities.

Upstream Raise 91 is not located in an unstable area caused by human-made features.

8.0 CERTIFICATION

The undersigned attest to the completeness and accuracy of the above written Location Restrictions Demonstration and certify that the location of Upstream Raise 91 at CCS meets the requirements detailed in 40 CFR 257.60 through 257.64, summarized as follows:

- 40 CFR 257.60 – Placement above the uppermost aquifer
  - Based on information acquired between June 2017 and June 2018, the base of the liner system for Upstream Raise 91 is above the upper limits of the uppermost aquifer and no intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR unit and the uppermost aquifer exists.
- 40 CFR 257.61 – Wetlands
  - Upstream Raise 91 is not located in wetlands.
- 40 CFR 257.62 – Fault areas
  - Upstream Raise 91 is not located within 200 feet of a fault (or the outermost damage zone of a fault) that has had displacement in Holocene time.
- 40 CFR 257.63 – Seismic impact zones
  - Upstream Raise 91 is not located in a seismic impact zone.
- 40 CFR 257.64 – Unstable areas
  - Upstream Raise 91 is not located in an unstable area.

Golder Associates Inc.

Craig Schuettpelz, PE
Senior Project Engineer

Todd Stong, PE
Associate and Senior Consultant

REGISTERED PROFESSIONAL ENGINEER
TODD J. STONG
PE-6144
DATE 10/15/2018
NORTH DAKOTA

CCS/TJS/ds

https://golderassociates.sharepoint.com/sites/22722g/deliverables/report/ccs_ur91_locationdemorpt_fnl_16oct18/18939823_ur91_location_demo_fnl_16oct18.docx

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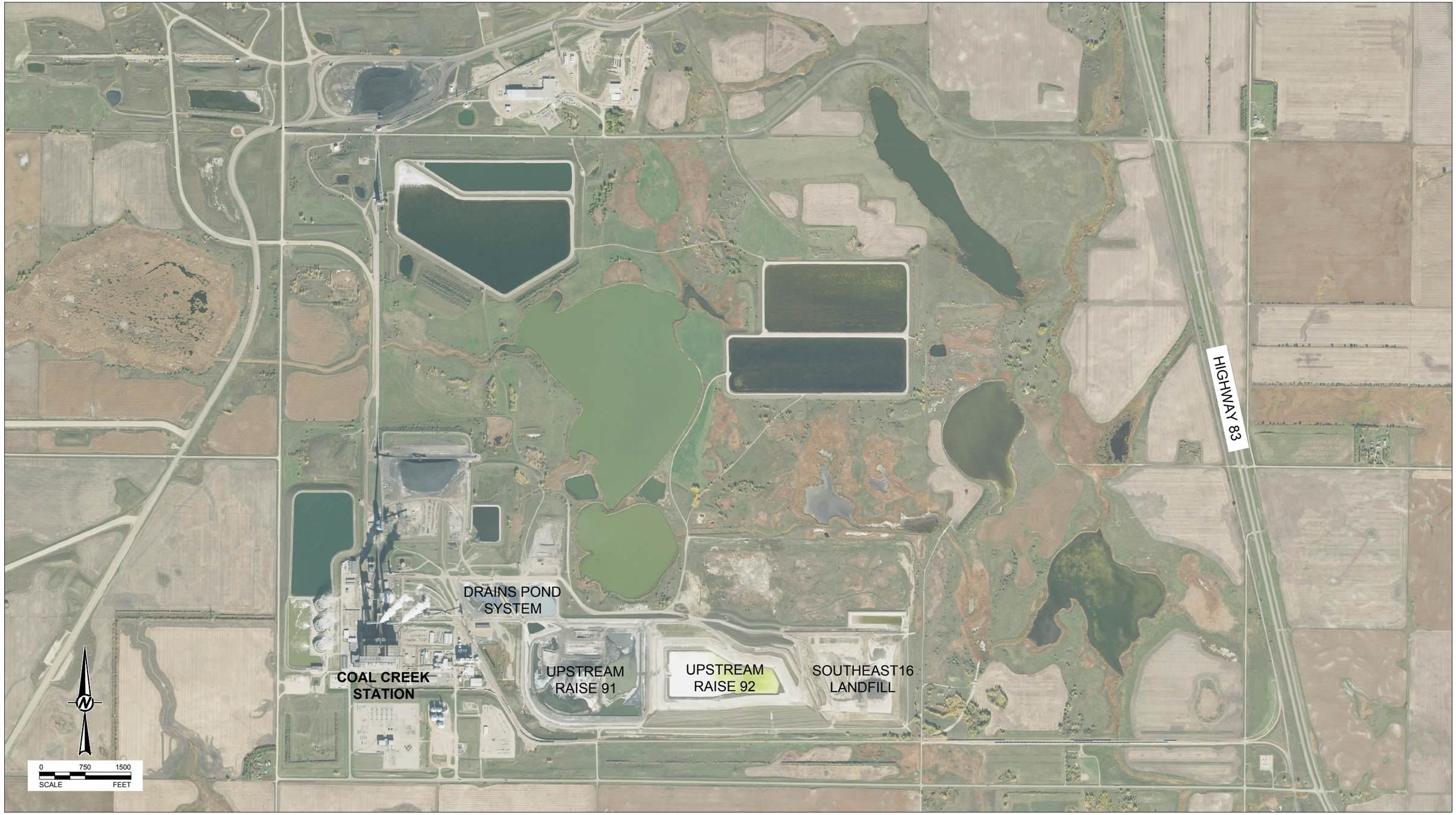
FIGURE 1

Coal Creek Station CCR Facilities



REFERENCES

1. AERIAL IMAGE FROM UNITED STATES DEPARTMENT OF AGRICULTURE NATIONAL AERIAL IMAGERY PROGRAM, PUBLISHED 2017.

CLIENT
GREAT RIVER ENERGY
COAL CREEK STATION
UNDERWOOD, NORTH DAKOTA

CONSULTANT
GOLDER

YYYY-MM-DD	2018-09-12
DESIGNED	RFS
PREPARED	KAC
REVIEWED	CCS
APPROVED	TJS

PROJECT
LOCATION RESTRICTION DEMONSTRATION

TITLE
COAL CREEK STATION CCR FACILITIES

PROJECT NO.	REV.	FIGURE
1893823	A	1

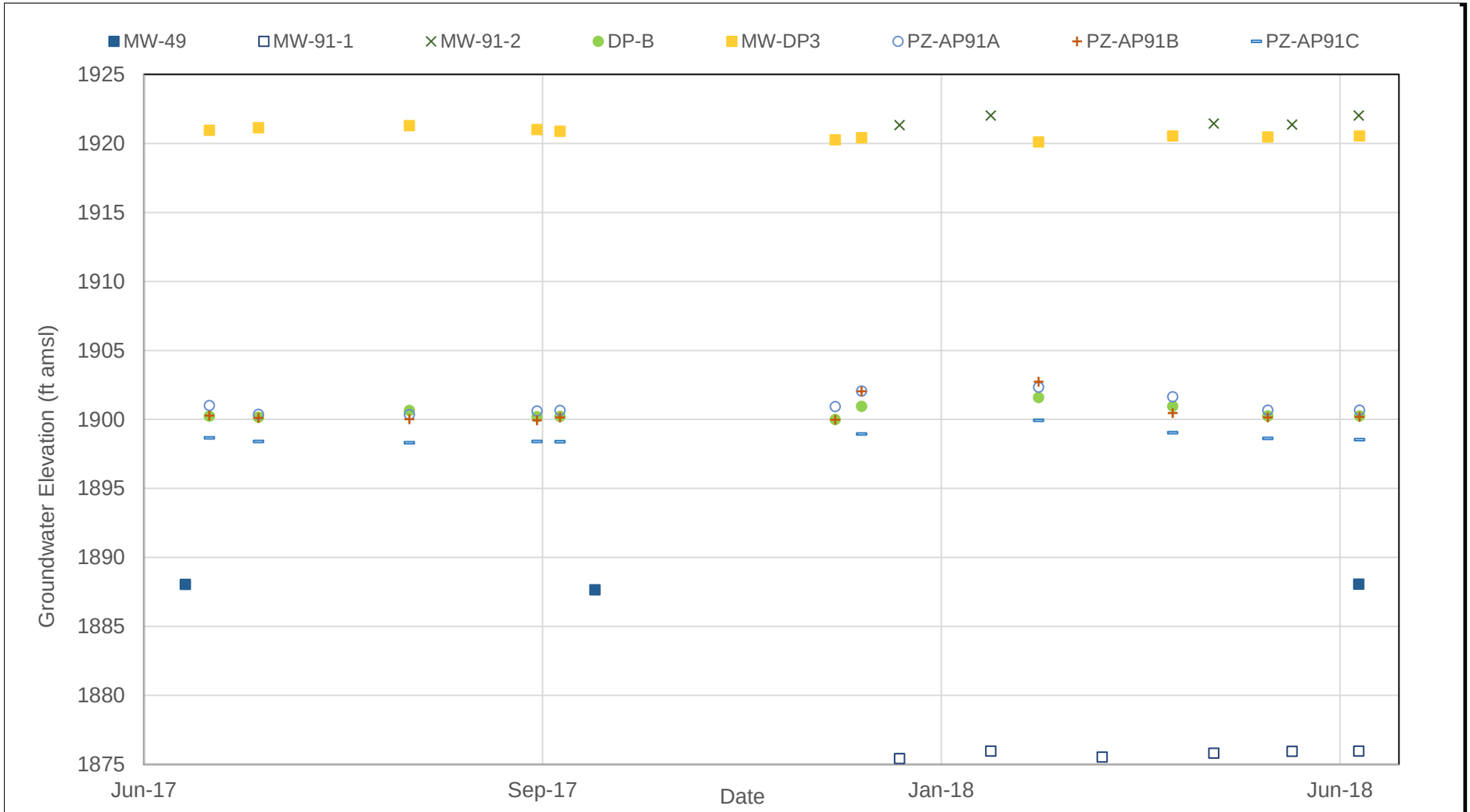
Path: \\Denver\acad\GREAT RIVER ENERGY\COAL CREEK\99_PROJECTS\1893823\Groundwater Separation\ | File Name: Figure1.dwg

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

1 in
0

FIGURE 2

Groundwater Level Measurements (June 2017 through June 2018)

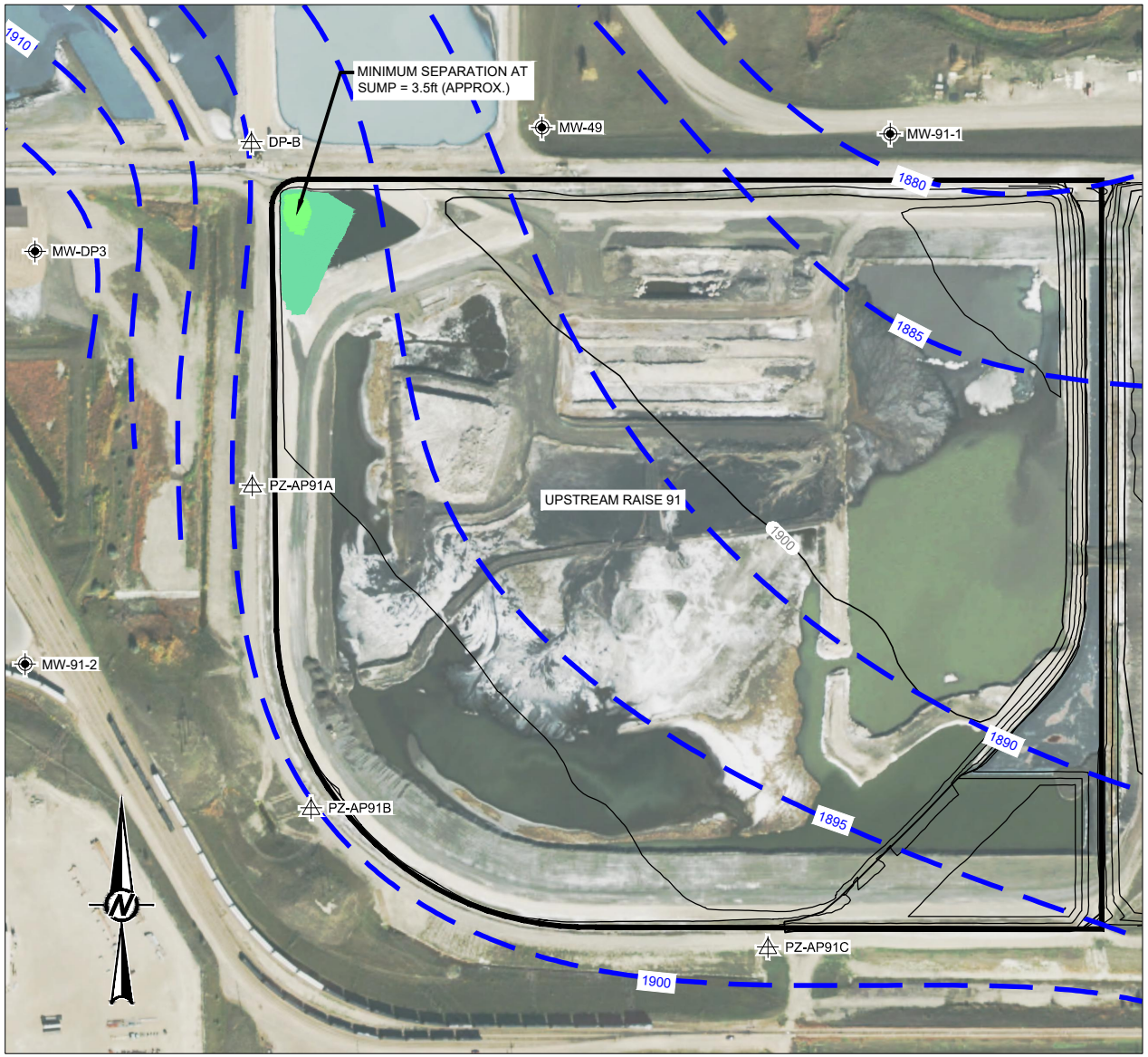


GOLDER DENVER, COLORADO	**Groundwater Level Measurements (June 2017 through June 2018) Upstream Raise 91**	
GREAT RIVER ENERGY COAL CREEK STATION	9/17/2018	Job No. 1893823
	1893823_CCS_GWElev_All.xlsx	**Figure 2**

FIGURE 3

Groundwater Separation
October 2017 Water Levels

Last Edited By: kcernik Date: 2018-09-12 Time:4:45:06 PM | Printed By: KCernik Date: 2018-09-12 Time:4:46:09 PM
Path: \\Denver\acad\GREAT RIVER ENERGY\COAL CREEK\99_PROJECTS\1893823\Groundwater Separation\ | File Name: 1893823_GWSeparation_2017-18_06Aug17_SMALL.dwg



LEGEND

- 1908 — BOTTOM OF LINER GRADES (REFERENCE 2)
- 1900 — GROUNDWATER ELEVATION CONTOUR - OCTOBER 2017 (NOTE 1)
- APPROXIMATE EXTENTS OF LINED SURFACE IMPOUNDMENT
- MONITORING WELL
- PIEZOMETER

NOTE(S)

1. GROUNDWATER ELEVATION CONTOURS WERE INTERPRETED FROM WATER LEVELS MEASURED IN MONITORING WELLS AND PIEZOMETERS ON OCTOBER 2017.
2. GROUNDWATER ELEVATION CONTOUR INTERVALS ARE FIVE FEET.
3. BOTTOM OF LINER CONTOUR INTERVALS ARE TWO FEET.
4. ADDITIONAL INFORMATION (SURFACE WATER BODIES AND ADDITIONAL MONITORING WELLS/PIEZOMETERS) NOT SHOWN WAS CONSIDERED WHEN CREATING GROUNDWATER ELEVATION CONTOURS.

REFERENCE(S)

1. AERIAL IMAGE FROM THE UNITED STATES DEPARTMENT OF AGRICULTURE NATIONAL IMAGERY PROGRAM ACQUIRED IN 2017. THE LOCATION OF THE AERIAL IMAGE IS APPROXIMATE.
2. BOTTOM OF LINER GRADES REPRESENT THE BOTTOM OF THE COMPOSITE LINER SYSTEMS (BOTTOM OF CLAY AND/OR GEOSYNTHETIC CLAY LINER) AND ARE BASED ON AS-BUILT INFORMATION PROVIDED BY GRE.

GROUNDWATER SEPARATION
(GROUNDWATER TO BOTTOM OF LINER IN FEET)

NUMBER	MINIMUM	MAXIMUM	COLOR
1	0.0	1.0	
2	1.0	2.0	
3	2.0	3.0	
4	3.0	4.0	
5	4.0	5.0	

*THE LACK OF SHADING INDICATES GROUNDWATER SEPARATION IS GREATER THAN FIVE FEET.

0 200 400
1" = 400' FEET

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
1 in
0

CLIENT
GREAT RIVER ENERGY
COAL CREEK STATION
UNDERWOOD, NORTH DAKOTA

CONSULTANT
GOLDER

YYYY-MM-DD	2018-09-06
DESIGNED	KAC
PREPARED	KAC
REVIEWED	CCS
APPROVED	TJS

PROJECT
COAL CREEK STATION
CCR SITING DEMONSTRATION
PLACEMENT ABOVE THE UPPERMOST AQUIFER

TITLE
GROUNDWATER SEPARATION
OCTOBER 2017 WATER LEVELS
UPSTREAM RAISE 91

PROJECT NO.	REV.	FIGURE
1893823	A	3

FIGURE 4

USGS Quaternary Faults and Folds Database Map – United States

USGS Quaternary Faults and Folds Database



May 30, 2018

Quaternary Faults

- historical (<150 years), well constrained location
- historical (<150 years), moderately constrained location
- historical (<150 years), inferred location
- latest Quaternary (<15,000 years), well constrained location
- latest Quaternary (<15,000 years), moderately constrained location

1:29,007,920

0 250 500 1,000 mi

0 387.5 775 1,550 km

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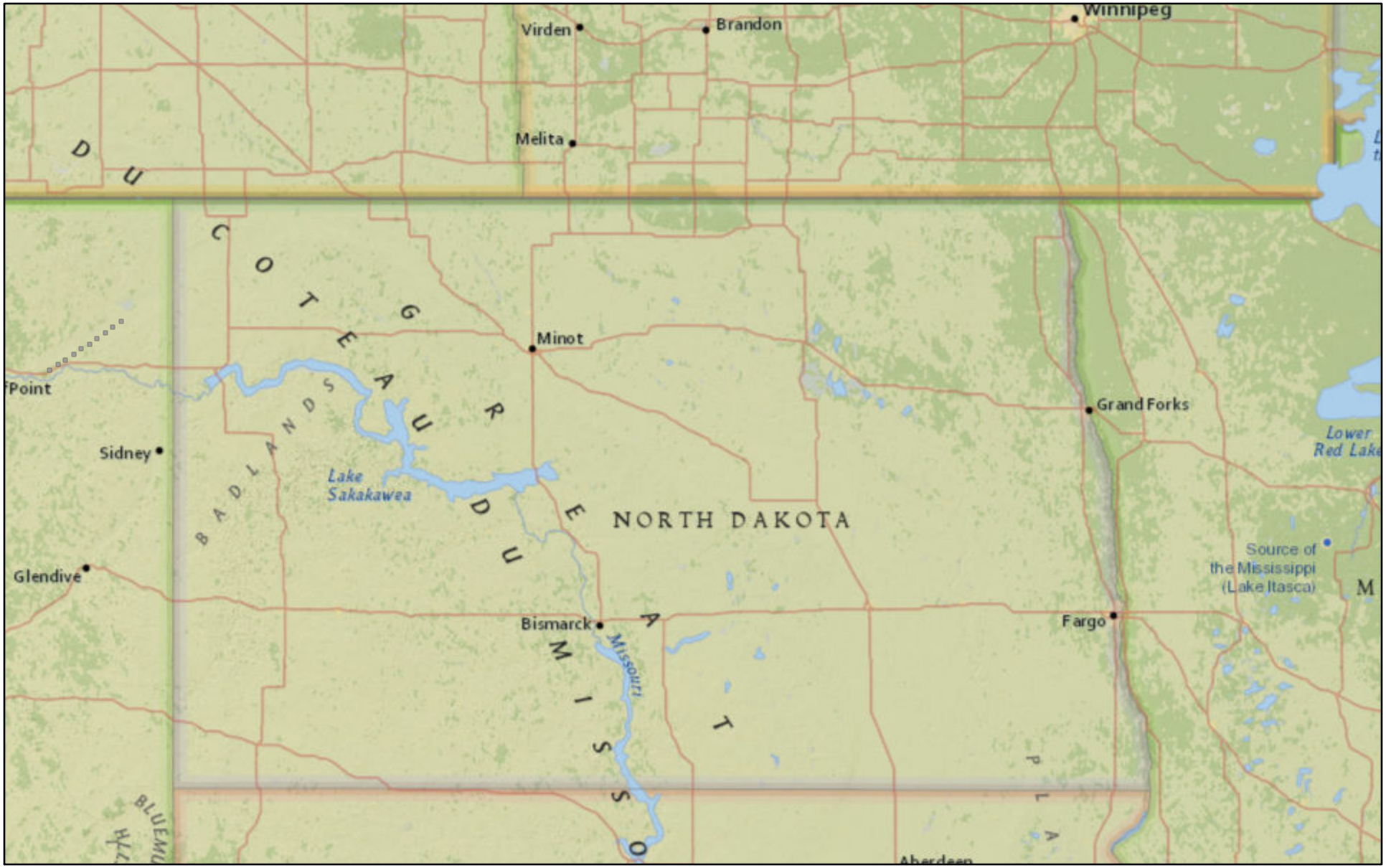
Content may not reflect National Geographic's current map policy. Sources: National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp. |

FIGURE 5

USGS Quaternary Faults and Folds Database Map – North Dakota

USGS Quaternary Faults and Folds Database - North Dakota



May 30, 2018

Site Investigations

Quaternary Faults

historical (<150 years), well constrained location

historical (<150 years), moderately constrained location

historical (<150 years), inferred location

latest Quaternary (<15,000 years), well constrained location

1:4,622,324

0 25 50 100 mi

0 40 80 160 km

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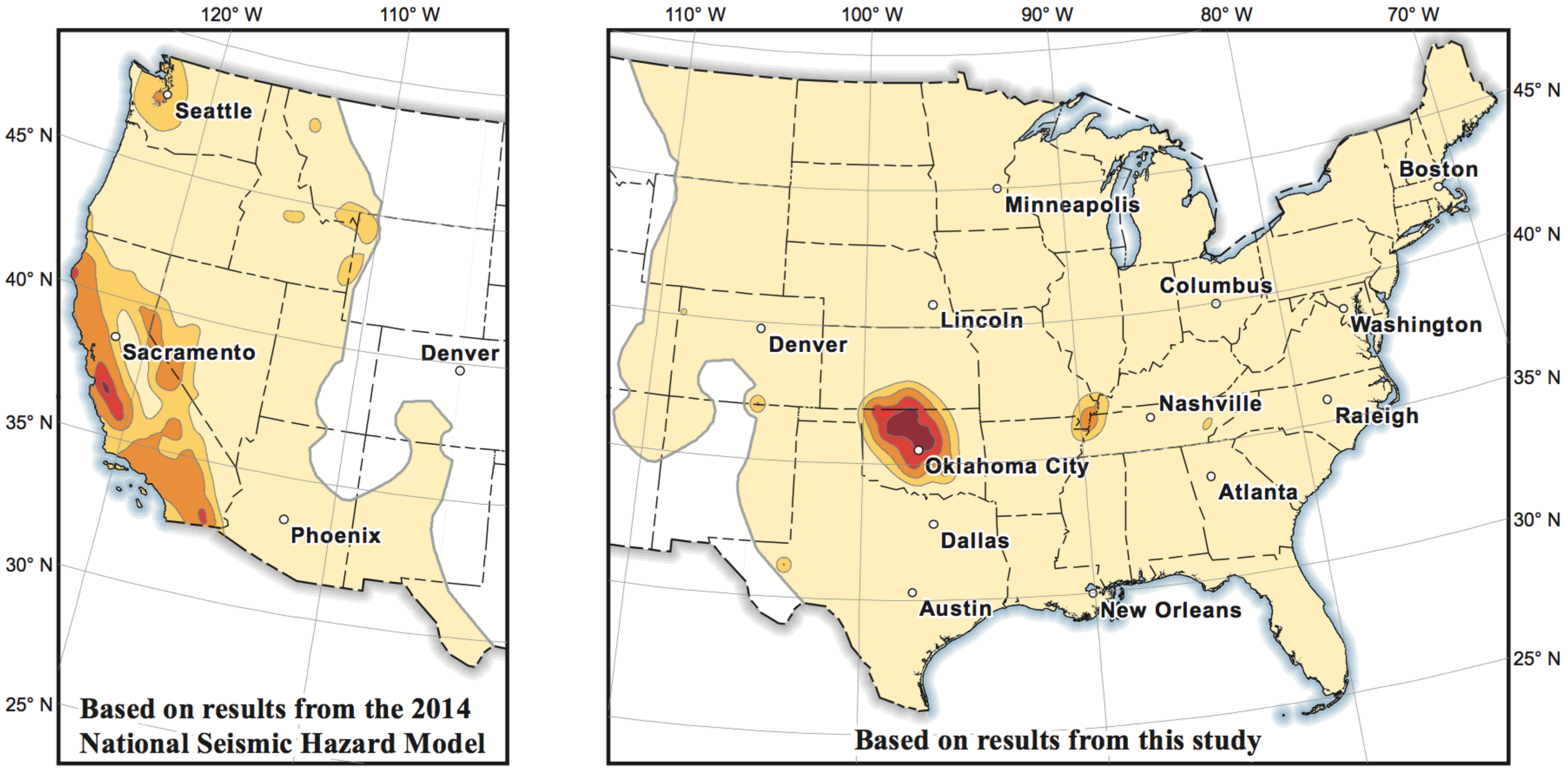
FIGURE 6

Chance of Potentially Minor Damage Ground Shaking in 2018 Map



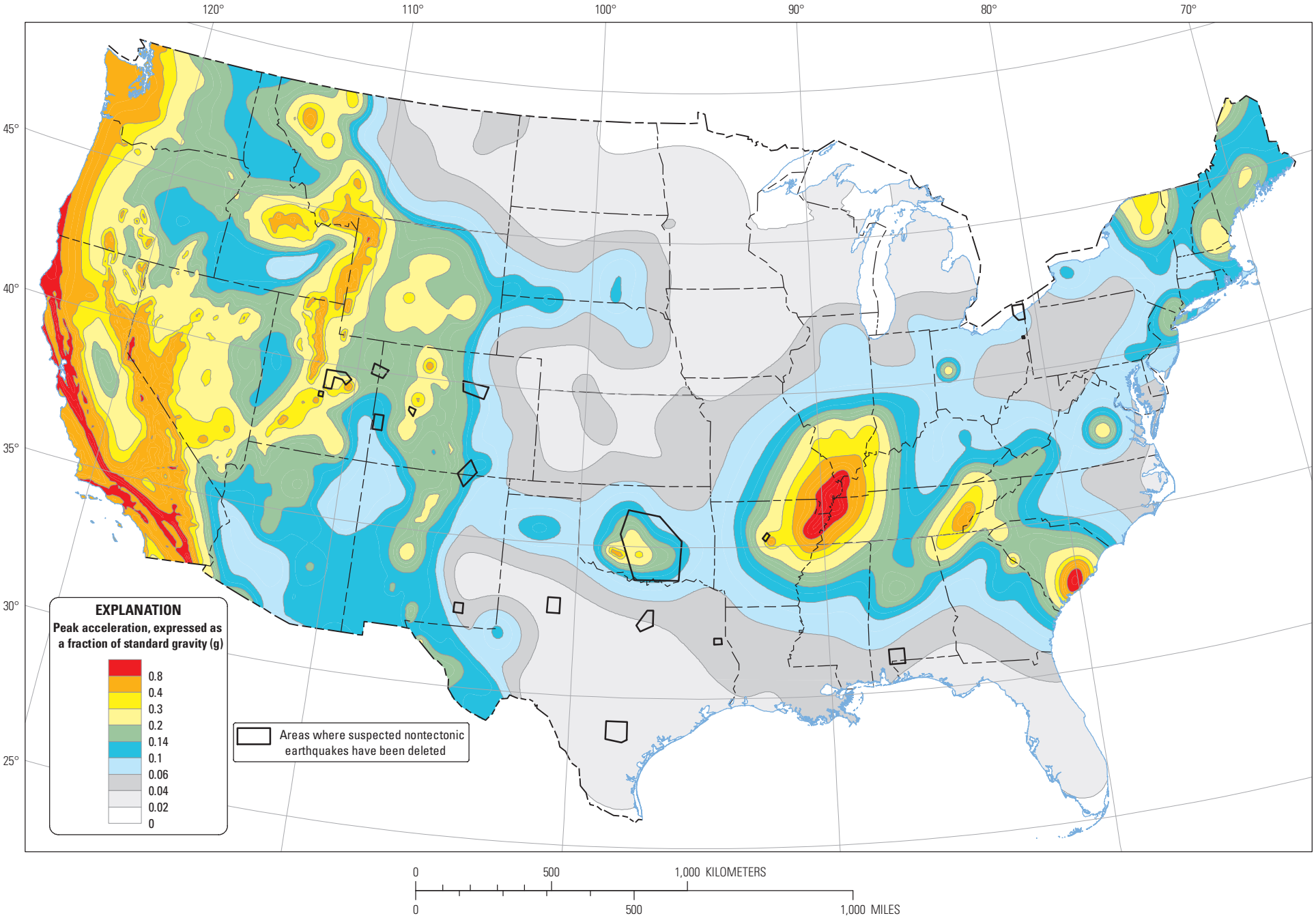
Chance of potentially minor-damage* ground shaking in 2018

<1%	1% – 2%	2% – 5%	5% – 10%	10% – 14%

* equivalent to Modified Mercalli Intensity VI, which is defined as: "Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight."

FIGURE 7

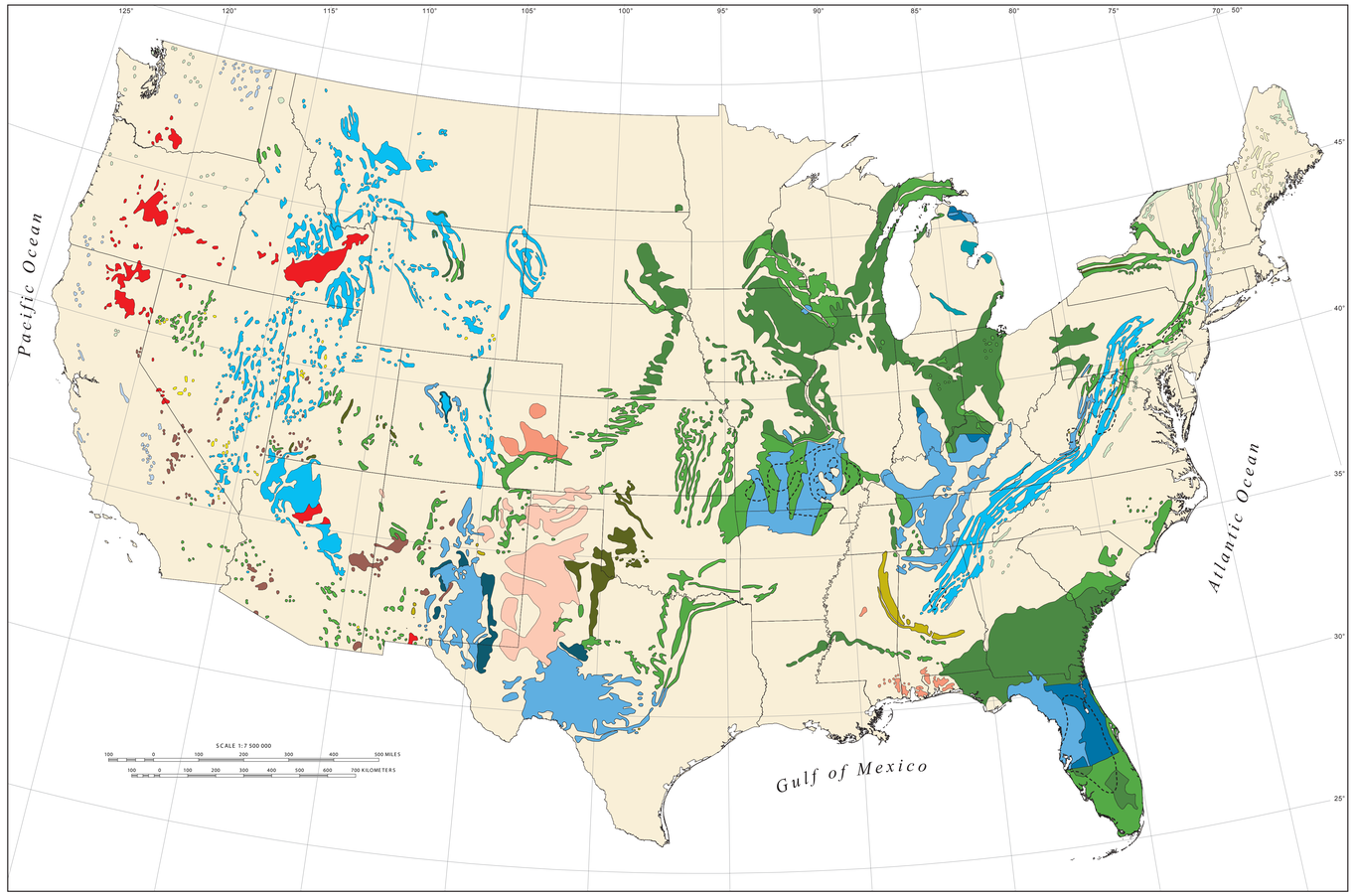
Two-percent Probability of Exceedance in 50 Years Map or Peak Ground Acceleration

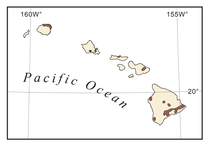


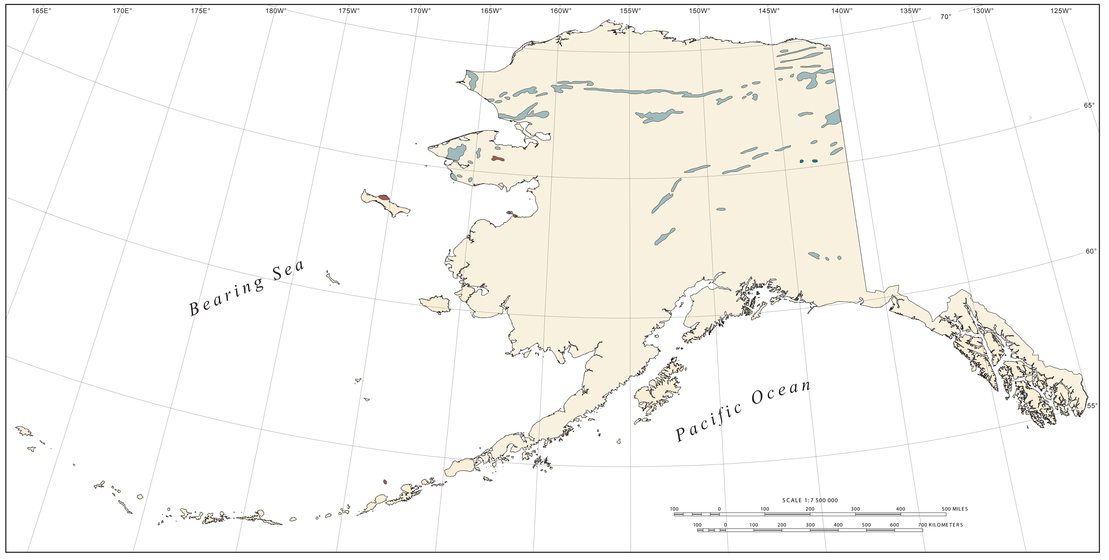
Two-percent probability of exceedance in 50 years map of peak ground acceleration

FIGURE 8

Digital Engineering Aspects of Karst Map







Albers equal area projection
North American Datum 1983
standard parallels 25°N and 50°N
longitude of central meridian 96°W
latitude of projection origin 37°N

Digital Engineering Aspects of Karst Map : A GIS version of Davies, W.E., Simpson, J.H., Ohlmacher, G.C., Kirk, W.S., and Newton, E.G., 1984, Engineering aspects of karst: U.S. Geological Survey, National Atlas of the United States of America, scale 1:7,500,000

by Bret D. Tobin and David J. Weary
U.S. Geological Survey Open-File Report 2004-1352

FISSURES, TUBES, AND CAVES OVER 1,000 FT (300 M) LONG; 50 FT (15 M) TO OVER 250 FT (75 M) VERTICAL EXTENT

- In metamorphosed limestone, dolostone, and marble
- In moderately to steeply dipping beds of carbonate rock
- In gently dipping to flat-lying beds of carbonate rock
- In gently dipping to flat-lying beds of carbonate rock beneath an overburden of noncarbonate material 10 ft (3 m) to 200 ft (60 m) thick
- In moderately to steeply dipping beds of gypsum
- In gently dipping to flat-lying beds of gypsum

FISSURES, TUBES, AND CAVES GENERALLY LESS THAN 1,000 FT (300 M) LONG; 50 FT (15 M) OR LESS VERTICAL EXTENT

- In metamorphosed limestone, dolostone, and marble
- In crystalline, highly silicieous intensely folded cabonate rock
- In moderately to steeply dipping carbonate rock
- In gently dipping to flat-lying carbonate rock
- In gently dipping to flat-lying beds of carbonate rock beneath an overburden of noncarbonate material 10 ft (3 m) to 200 ft (60 m) thick
- In moderately to steeply dipping beds of gypsum
- In gently dipping to flat-lying beds of gypsum
- In gently dipping to flat-lying beds of gypsum beneath and overburden of nongypsiferous material 10 ft (3 m) to 200 ft (60 m) thick
- In carbonate zones in highly calcic granite (Alaska only)
- In moderately to steeply dipping beds of carbonate rock with a thin cover of glacial till and frost-derived residual soil (Alaska only)

FISSURES, TUBES, AND CAVES GENERALLY ABSENT; WHERE PRESENT IN SMALL ISOLATED AREAS, LESS THAN 50 FT (15 M) LONG; LESS THAN 10 FT (3 M) VERTICAL EXTENT

- In crystalline, highly silicieous intensely folded carbonate rock
- In moderately to steeply dipping beds of carbonate rock
- In gently dipping to flat-lying beds of carbonate rock

FEATURES ANALOGOUS TO KARST

- Fissures and voids present to a depth of 250 ft (75 m) or more in areas of subsidence from piping in thick unconsolidated material
- Fissures and voids present to a depth of 50 ft (15 m) in areas of subsidence from piping in thick, unconsolidated material
- Fissures, tubes, and tunnels present to a depth of 250 ft (75 m) or more in lava
- Fissures, tubes, and tunnels present to a depth of 50 ft (15 m) in lava

- Areas in which extensive historical susidence has occurred

Introduction

This data set was converted from a printed map to a digital GIS coverage to provide users with a citable national-scale karst data set to use for graphic and demonstration purposes until new, improved data are developed. These data may be served on the internet or distributed freely with proper citation. Because it has been converted to GIS format, this data can be easily projected, displayed and queried for multiple uses in GIS. The karst polygons of the original map were scanned from the stable base negatives of the original, vectorized, edited, and then attributed with unit descriptions. All of these processes potentially introduce small errors and distortions to the geography. The original map was produced at a scale of 1:7,500,000; this coverage is not as accurate and should be used for broad scale purposes only. It is not intended for any site-specific studies.

The following text is taken verbatim from the original map, which was printed front and back on a single sheet.

ENGINEERING ASPECTS OF KARST

By
William E. Davies

Distinctive surficial and subterranean features developed by solution of carbonate and other rocks and characterized by closed depressions, sinking streams, and cavern openings are commonly referred to as karst. The term was used first to describe the region of Carso in northeastern Italy and northern Yugoslavia, where solution landscape was studied in the 19th century. Originally the term defined surface features derived by solution of carbonate rocks, but subsequent use has broadened the definition to include sulfates, halides, and other soluble rocks. The term has also been extended also to cover interrelated forms derived by solution on the surface in the subsurface. A further expansion of the concept of karst was the introduction of the term "pseudokarst" to designate karstlike terrain produced by processes other than the dissolution of rocks (Bergar and Dubertret, 1975). When used in its broadest sense, the term encompasses many surface and subsurface conditions that give rise to problems in engineering geology. Most of these problems pertain to subterranean karst and pseudokarst features that affect foundations, tunnels, reservoir tightness, and diversion of surface drainage. Environmental aspects of karst lead to additional problems in engineering geology, especially in site selection. Subterranean openings may be the habitat of unique and, in some cases, endangered fauna. The openings are also conduits for water and refuse disposal from the surface or, in caves, for pollutants that can be carried for great distances. Many caves contain features of beauty and scientific interest that can be important esthetic factors in site selection for structures, transportation routes, and impoundments.

Although surface features of karst terrain (primarily sinkholes, solution valleys, and solution-sculptured rock ledges) are significant in engineering geology, they have been included on this map because of the additional complexity that would occur in classification and portrayal.

The systematic study of karst in the United States started with W. M. Davis' (1930) theory on the origin of caves by deep-seated solution. Bretz (1942) obtained data, from studies in flat-lying carbonate rocks in the Midwestern States that supported Davis' theory. After World War II, studies of karst in the United States became widespread beginning with investigations in the Appalachian Mountains. Based on these studies, many of which were in areas of folded rock, older theories were modified with emphasis on maximum solution activity in a zone directly beneath a uniform water table (Davies, 1960). Since 1948, the exploration of caves and studies of landforms in carbonate terrains have produced a vast amount of data on karst. Reports of these explorations and studies have been primary sources in compiling this map on the subterranean aspects of engineering geology of karst and pseudokarst. In addition, published logs of borings were used. Much of the information on the Eastern United States, principally for the Appalachian Mountains and Plateau, is from field observations.

The small scale of the map and the limited data on openings, other than caves, in soluble rocks restrict the use of the map to the most general types of planning and as a guide to areas where subterranean karst and pseudokarst features occur. The map cannot be used either for specific site selection or as a substitute for field examination in planning and site development. Because cartographic license was taken to portray the features at the small scale of this map, enlargement can lead to gross errors in location of the data presented.

Subterranean openings in karst range in size from minute voids to large caverns. Most of the openings are formed by solution processes along fractures, joints, and bedding planes. Caves and related solution features are common in most carbonate and gypsum terrains in the United States, except in the area formerly covered by Pleistocene ice sheets (Davies and LeGrand, 1972). The southward advance of these ice sheets covered New England, New York, northeastern and northwestern Pennsylvania, most of the States bordering the Great Lakes, and much of the area north of the Missouri River. Karst features in the formerly glaciated area are covered by glacial drift, and most caves and fissure openings have been eroded away or filled. The caves and open fissures that remain generally have less than 1,000 ft (300 m) each of passages large enough to be traversed by humans.

South of the formerly glaciated area, caves, open joints, fissures, and other subterranean karst features are present in most soluble rocks. In general, both the number and size of solution features increase inversely with latitude. In addition, the number and size also vary according to the age and structure of the soluble rock in which solution features develop. Solution features in folded rocks are subordinate to those in nondeformed rocks; those in rocks older than Mississippian are subordinate to those in Mississippian and younger rocks. These are broad generalizations, and local exceptions exist. However, these generalizations can be used as a hasty estimate of karst conditions.

Most caves consist of a series of passages on one level. Some caves have multiple levels of passages that extend vertically as much as 300 ft (90 m). The levels are generally connected by shafts or large galleries. Most passages are less than 10 ft (3 m) high and less than 10 ft (3 m) wide. Maximum size of passages is about 100 ft (30 m) in height and width. In many caves, passages expand into galleries or rooms that are 30 to 200 ft (9 to 60 m) long and wide and up to 150 ft (45 m) high. The largest known solution opening in the United States is in Carlsbad Caverns, New Mexico, where a T-shaped room is 1,800 ft (550 m) long in one section, 1,100 ft (330 m) long in the other section, 255 ft (77 m) high, and up to 300 ft (90 m) wide.

Shafts are present in multiple-level caves and in some single-level caves. The deepest shafts are about 1,000 ft (300 m) deep, but in most caves they are less than 300 ft (90 m) deep. Most shafts are 30 ft (10 m) or less wide. In multiple-level caves, shafts connect levels; in other caves, the shafts are pits with no apparent connection at the base. Shafts are irregular in shape; some resemble funnels, and others are shaped like cylinders. Dome pits are cylindrical shafts that develop upward from a passage towards the surface of the Earth. Dome pits are up to 50 ft (15 m) wide and extend upward for as much as 150 ft (45 m). Their walls are uniform. Dome pits are capped by a cover of carbonate rocks 10 to 50 ft (3 to 15 m) thick. In many domes, the caps have collapsed and left vertical-sided open pits.

Virginia, West Virginia, Kentucky, Tennessee, Alabama, Missouri, Texas, and New Mexico contain hundreds of caves, each of which has over a mile of passages. At least one cavern system in each of these States has 10 to more than 100 mi (16 to 160 km) of passages. The largest known system is Flint Ridge-Mammoth Cave in Kentucky (Brucker, 1979), with over 200 mi (320 km) of passageways in an area of 362 mi (902 km).

Solution tubes with openings as much as 1 ft (0.3 m) wide and irregular alignment occupy portions of the carbonate bedrock. In some cases, the tubes connect with caves. However, the tubes generally lack the systematic patterns that are common in development of cavern passages. These tubes apparently predate cavern development. Although most tubes are seldom longer than a few hundred feet, they are interconnected and commonly act as conduits for subsurface drainage. During freezing weather, water from tubes can cause large buildups of ice where excavations intersect the tubes. At other times, the tubes lead to flooding of excavations and leaks in reservoirs and contribute to weakening of retaining walls.

Fissures (also referred to as open joints) up to 1 ft (0.3 m) wide result from limited solution along joints, fractures, and bedding planes. Fissures occur in various attitudes from vertical to gently inclined and generally are in repetitive geometrical patterns or sets. Fissures form systems that may extend for several thousand feet horizontally and over 300 ft (90 m) vertically. Some fissures or parts of fissures are filled with consolidated clay-silt and clay-gravel that seal them. The seals, however, are altered in contact with water and can be removed by running water. Fissures are commonly conduits for subterranean streams. In addition, they can cause serious engineering problems, such as reservoir leakage and instability of cuts, bridge abutments, piers, and dam foundations and abutments.

The depth to which solution openings occur depends on relief in an area, thickness of soluble rock, and geologic structure. The configuration and depth of the water table, in some cases, are controlling factors. Ground water in karst terrain generally is found in existing openings that extend tens to hundreds of feet below the water table. In the mountainous areas of the Western United States, the known vertical extent of solution openings is as much as 1,100 ft (330 m). In the Eastern United States, where relief is less, the vertical extent is generally less than 400 ft (120 m), with a maximum of 650 ft (200 m). Beneath many broad river valleys, solution features in carbonate rocks are present to a depth of about 100 ft (30 m) in both the Eastern and Western United States.

Surface subsidence (sinkhole development) occurs most commonly in areas where ground-water conditions are altered by excessive pumping or by diversion of surface drainage. Subsidence generally involves weathered bedrock and soil that bridge caverns, subterranean galleries, and dome pits. The collapse is caused by loss of support resulting from the reduction of hydrostatic pressure of ground water, by sapping, and by piping. Most subsidence forms shallow, steep-sided depressions up to 100 ft (30 m) wide and up to 20 ft (6 m) deep. However, in Florida and central Alabama, recent subsidence has resulted in nearly vertical sided sinkholes up to 425 ft (130 m) wide and 150 ft (45 m) deep.

Areas of local subsidence caused by mining operations and regional subsidence caused by withdrawal of ground water and petroleum in thick, unconsolidated sediments have not been included on the map of subterranean aspects of engineering geology of karst and pseudokarst because natural processes are involved only in a subordinate way in development of these phenomena. The problems of these types of subsidence are complex, and the areas involved are so extensive that they are best treated as subjects for another map.

In the New England States, solution terrain is confined to crystalline limestones and marbles mainly in northeastern Maine, western Vermont, and western Massachusetts. Solution features in these areas are primarily narrow fissures generally less than 200 ft (60 m) long and less than 30 ft (10 m) deep. A few small caves are known in western Vermont and in the Berkshire Mountains of western Massachusetts. In eastern Vermont and much of Maine, carbonate rocks high in silica and other impurities' are commonly, yet incorrectly, referred to as limestone. Solution features are generally absent in these rocks.

In the Appalachian Highlands, three major groups of carbonate rocks are in the karst regions. The Great Valley, in the eastern part of the Highlands, from southeastern New York to central Alabama, is a lowland up to 26 mi (42 km) wide eroded across dolomite, limestone, and shale of Cambrian and Ordovician age. Regionally, and to some extend reflecting differences in degree of karst development, the Great Valley is designated from north to south as the Kittatinny, Lehigh, Lebanon, Cumberland, Hagerstown, Shenandoah, and Tennessee Valleys. All types of solution features are present in the Great Valley, with small caves and fissures in southeastern New York and like features increasing in size and numbers southward. From central Virginia southward, large caves with over 1 mi (1.6 km) of passages in each are common, and fissures extend hundreds of feet in length and over 100 ft (30 m) in depth. The major geologic units involved in karst development in the Great Valley are the Elbrook (Cambrian), Conococheague (Cambrian-Ordovician), Beekmantown (Ordovician), and their equivalents. All are folded with steep dips, and overturning is common along the east half of the lowland. Faults are numerous and some major fault zones extend over 200 mi (320 km). Active subsidence is prevalent throughout the Great Valley and is a result primarily of alteration of the water table. Generally, the subsidence involves the opening of shallow fissures and shafts up to 10 ft (3 m) in diameter in farmland through removal of soil and thin rock cover over fissures, shallow cavern passages, and small dome pits. More extensive subsidence is in progress in the vicinity of Allentown and Harrisburg, Pennsylvania, where numerous subsidence depressions up to 100 ft (30 m) in diameter have developed. In Staunton, Virginia, active subsidence from collapse of rocks and soil covering shallow caves and fissures was recorded as early as 1911. Subsidence in the Staunton area resulted from large-scale piping of sinkhole soils by leakage from settling basins and from drawdown of the water table. In central Alabama, steep-sided, water-filled sinks, up to 425 ft (130 m) wide and 150 ft (45 m) deep, have formed recently by collapse of weathered limestone and thick soils covering limestone.

In the area west of the Great Valley, a sequence of limestones in the Upper Silurian (Tonoloway) and the Lower Devonian (Helderberg Group) forms subordinate ridges in southeastern New York, central Pennsylvania, eastern West Virginia, and western Virginia. The rock is folded, and dips are steep. Karst features include fissures extending several hundred feet vertically and caves with up to 1 mi (1.6 km) of large passageways. Subsidence is uncommon, but the fissures and caves have caused problems in foundations and abutments of dams, in cuts because of unstable wedges, and in tunnels that encounter earth fills in solution cavities.

Along the western edge of the Valley and Ridge province of the Appalachian Highlands, several large basinlike lowlands underlain by Cambrian and Ordovician carbonate rocks occur. The lowlands are eroded across large anticlines with steep dips on the flanks and moderate to steep plunges along the axes of the anticlines. In the Nittany and Kishacoquillas Valleys of Pennsylvania, and some smaller valleys designated as "coves," numerous caves occur, each with passageways 1,000 to 5,000 ft (300 to 1,5'j0 m) long The passages generally are 100 ft (30 m) or less below the surface. Many act as subterranean feeders that carry runoff from adjacent ridges to a few points of resurgence. The resurgent points are large springs with a daily flow of up to 1 million gallons or more (4 million or more). Fissures are present but seldom exceed 200 ft (60 m) in depth. Subsidence is not common, but deep cuts and excavations are subject to uncontrollable flooding if major subterranean conduits are encountered. In Germany Valley, West Virginia, solution features, primarily multiple-level caves and fissures, extend to depths of 350 ft (105 m) or more. Drainage of most of this valley is by way of one large spring. Subsidence from collapse of sinkholes is common, and potential for subsidence exists over numerous dome pits above caves.

The Appalachian Plateau's province and adjacent parts of the Interior Plains in West Virginia, Kentucky, Tennessee, northern Alabama, and southern Indiana contain the most intensely developed karst areas in the United States. The karstic carbonate rocks are Mississippian in age and include the Greenbrier limestone (West Virginia) and the Golconda, Ste. Genevieve. St. Louis, and Warsaw limestones and their equivalents elsewhere. Caves generally contain 3,000 ft (900 m) or more of passageways. Multiple-level caves are not common, but some large cave systems, such as Flint Ridge-Mammoth Cave in Kentucky and Organ Cave in West Virginia, have a multitude of complex passageways at various elevations that extend in aggregate from 30 to over 200 miles (48 to over 320 km). Dome pits, common in many caves, are areas of potential collapse. Many of the caves are large subterranean drainageways that receive streams flowing from adjacent highlands. Cuts and excavations intersecting these caves are subject to inundation from over 1 million cubic ft (40,000 m³) of water stored in the subterranean reservoirs. Large sinkholes, up to 1 mi (1.6 km) wide and several hundred feet deep, are so numerous that the rims of many sinkholes intersect the rims of their neighbors. Suitable foundations for large structures are difficult to site. Deep cuts, mines, tunnels, and excavations commonly encounter deeply weathered rock and large volumes of weak soil filling cavern passages and fissures. Seasonal flooding is common from snow melt and from heavy rainfall that exceeds the infiltration capacity of sinkholes and the capacity of subterranean channels to carry the runoff. Subsidence in most of the area is not extensive except above the dome pits and along karst valleys in southern Indiana and in the Mammoth Cave plateau in Kentucky.

In the Southeastern United States, karst is extensive on the Coastal Plain in southern Alabama, Georgia, and Florida. The limestones in the karst area are primarily the Ocala Limestone and Jackson Formation of Eocene age and their equivalents. In the Dougherty Plain of southeastern Alabama and southern Georgia, the limestone has been weathered deeply, and in the southern part of the plain the limestone is covered by a residuum of sandy clay. In the northern part of the plain, only small areas of the limestone remain within the residuum. Subsidence occurs as broad, slowly developing, shallow sinkholes in the residuum. In Florida, subsidence is more extensive. In the northern half of the State, the limestone is covered by younger sand deposits that are locally over 100 ft (30 m) thick. In Polk County, subsidence has resulted in vertical-sided sinkholes up to 150 ft (45 m) deep and 425 ft (130 m) wide. The subsidence has engulfed several houses and resulted in large property losses to homeowners. The subsidence is related to alteration of ground-water levels in caverns and to collapse of the weathered carbonate rock that supports the surface deposits.

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Cretaceous carbonate rocks of the Selma Group are extensive in central and western Alabama and northeastern Mississippi. These rocks show little alteration by solution, and open fissures, open joints, and caves are generally not present.

The Silurian limestones and dolomites (Niagaran) of northwestern Ohio and adjacent Indiana are buried beneath glacial drift. Only in northwestern Ohio, where the glacial deposits are less than 20 ft (6 m) thick, are there karst features large enough to cause problems in engineering geology. Caves, each generally with less than 1,000 ft (300 m) of passages, are present but not numerous. Fissures less than 100 ft (30 m) wide extend for hundreds of feet. Small areas of subsidence have been attributed to alteration of the water table by pumping processes in quarries several miles from the site of subsidence. Because of the flat terrain, excavations and cuts seldom are deep enough to encounter major karst features. In the vicinity of Sandusky, Ohio, and on some of the nearby islands in Lake Erie, beds of calcium sulfate expand and change because of weathering and may cause local problems in heaving.

Broad anticlines with gentle dips bring Ordovician limestones and dolomite to the surface in southwestern Ohio and north-central Kentucky. Small caves and numerous joint-controlled fissures occur. Subsidence is not common or extensive, but the fissures and caves that result contain a large volume of water that may flood excavations. Ordovician and Silurian carbonate rocks also are brought to the surface in a broad anticline in central Tennessee around Nashville. Karst conditions are similar to those in north-central Kentucky.

In the Lower Peninsula of Michigan, carbonate rocks are extensive but are buried deeply beneath glacial deposits. Silurian limestones along Lake Huron between Alpena and the Straits of Mackinac contain several large sinkholes up to 1 mi (1.6 km) long and 200 ft (60 m) deep. The sinkholes are interconnected by an extensive fissure system. Normally, the sinkholes are filled with water, but, over time, plugs in the fissure system fail and the lakes drain through the subterranean openings. Subsidence generally does not occur in the Lower Peninsula.

Ordovician limestones cover the south half of the Upper Peninsula of Michigan and extend through eastern and southern Wisconsin, eastern Iowa, and parts of southeastern Minnesota. Karstic features are poorly developed and consist of simple caves, each with less than 1,000 ft (300 m) of passageways and less than 50 ft (15 m) of vertical extent. Fissures developed along joint lines are in about the same size range as the caves. In the vicinity of Dubuque, Iowa, and extending into adjacent Wisconsin and Illinois, fissures several hundred feet long and more than 300 ft (90 m) deep have been encountered in lead-zinc mines. The fissures possibly are relict from older buried karst. Subsidence from karst features is rare, although subsidence over mines is extensive.

The Ozark Plateaus province and adjacent plains in Missouri and northern Arkansas have extensive karst areas. The Ozarks are a large regional structural dome with steep dips along the southern flank. The dome brings Cambrian and Ordovician limestones and dolomites to the surface. North and west of the dome are plains underlain by Mississippian carbonate rocks (Warsaw, St Louis, Ste. Genevieve, and equivalents). Within the Ozarks, caves, each with passages 1,000 ft (300 m) or more long, are common. The passages in most caves extend to a depth of less than 100 ft (30 m). Pits, formed by collapse into cavern shafts and dome pits, are common, and, in southern Missouri, active subsidence is extensive. Most of the pits are water filled. Fissures over 1,000 ft (300 m) long and more than 300 ft (90 m) deep are present in much of the area. Similar fissures are numerous in the lead-zinc mining region in southwestern Missouri and adjacent Oklahoma and Arkansas. Throughout the Ozarks, the caves and fissures give rise to serious problems in foundations and abutments of dams and with reservoir tightness, stability of bridge piers, and stability of cut slopes. The presence of large quantities of subterranean water is a problem in deep foundations.

The Niobrara Formation (Upper Cretaceous) and its equivalents are the most widespread carbonate rocks in western Kansas, eastern Nebraska, and southeastern South Dakota. The Niobrara is generally covered by more than 50 ft (15 m) of younger sediments. Small fissures, less than 1,000 ft (300 m) long and up to 100 ft (30 m) deep, are present, but they are not common and are generally irregularly spaced with 1,000 ft (300 m) or more of solid rock between fissures.

Salt beds in south-central and southwestern Kansas form karst areas. Fissures are extensive, with openings more than 1,000 ft (300 m) long and over 300 ft (90 m) deep. Throughout the saline rock, recent subsidence has resulted from natural causes, as well as from alteration of the water table by solution mining and open pit mining.

In western South Dakota and adjacent parts of Wyoming and Montana, Paleozoic and Cretaceous carbonate rocks, arched steeply upwards, encircle the structural dome that forms the Black Hills. Caves and open fissures are common in the Paleozoic carbonate rocks. A few caves contain many miles of passages but most of the cave passages and fissures in the Black Hills area only extend up to 3,000 ft (900 m) in length and are generally less than 150 ft (45 m) in depth. Closely spaced solution joints also are prevalent.

In western Oklahoma and in the eastern part of the Texas Panhandle, extensive areas of karstic gypsum occur. Small open fissures up to 50 ft (15 m) deep and 1,000 ft (300 m) long are present. Passages in caves in gypsum are generally of similar length and depth.

The Edwards Limestone (Cretaceous) in west-central Texas forms an extensive plateau. Large caves and fissures are present to a depth of 600 ft (180 m), and both fissure systems and passages of single caves commonly extend for more than 1 mi (1.6 km). Both the caves and fissures contain large quantities of water in their deeper parts.

Permian carbonate rocks in central and southern New Mexico contain numerous well-developed karst features. Caves are generally very large and contain miles of passages with a vertical extent of 1,000 ft (300 m) or more. Fissures are of similar size and are interconnected, forming networks that extend for several miles. Closely spaced open joints, enlarged by solution, and numerous small, near-surface solution tubes cause extensive trouble in reservoir tightness throughout this karst area.

In northern and central Arizona, the Kaibab Limestone (Lower Permian) and its equivalents are karstic. North of the Grand Canyon, subterranean openings are primarily widely spaced fissures up to 1,000 ft (300 m) long and 250 ft (75 m) or more deep. South of the Grand Canyon, the fissures are more closely spaced and a few shallow caves are present. East of Flagstaff, there is an area of open fissures. These fissures are over 300 ft (90 m) deep, up to 1,000 ft (300 m) long, and up to 3 ft (1 m) wide. They cut the Coconino Sandstone, as well as the Kaibab Limestone (Colton, 1938).

The Madison Limestone (Mississippian) lies under karst areas in western Montana and adjacent parts of Idaho and Wyoming. Passages in a single cave are commonly up to 2 mi (3.2 km) long. Open fissures up to 1,000 ft (300 m) long and shallow, open joint systems are also common. Fissures and cavern passages extend as much as 1,000 ft (300 m) deep. Large quantities of water are present in the lower parts of the fissures and in some of the deeper cavern passages. Relict karst features developed during times of disconformity at the top of the Mississippian are common in the Madison Limestone. Most of the relict features are solution tubes, caves, and small fissures that have been filled with younger deposits that are now lithified. Because of differences in materials, residual openings, and secondary solution, these features can give rise to foundation problems and leakage.

Karst features in Alaska are not well known. Most of these features are shallow, swalelike depressions developed in a thin cover of residual soil and glacial till that lies over intensely folded limestone. A few cave openings are in limestone bluffs, but most cave entrances are hidden by a cover of spalled rock fragments. Streams crossing limestone terrains commonly disappear into the soil mantle and resurge at contact with insoluble rocks bordering the limestone. No subsidence features have been reported in Alaska.

Pseudokarst conditions in the United States develop in areas of thick, unconsolidated sediments and are primary features in basalt lava. In addition, in Mississippi and Alabama. numerous subsidence features occur in unconsolidated silt, sand and gravel of the Coastal Plain; these subsidence features are analogous to karst features. The subsidence occurs as numerous shallow depressions that are generally less than 50 ft (15 m) deep and up to 1 mi (1.6 km) or more wide. The depressions occur in Miocene and Pliocene sediments 800 to 1,000 ft (240 to 300 m) or more thick. Oligocene carbonate rocks are present beneath these sediments. The origin of the depressions is not understood The depressions appear to be associated with poorly drained areas such as flat lowlands and elevated, dissected, higher erosion surfaces. The depressions apparently are confined to flat surfaces and are not present on slopes that bound the flat surfaces. Excavations in the depressions probably would encounter weak and unstable soil and would be subject to flooding.

The High Plains of western Texas and adjacent States contain numerous depressions, some of which are as much as 3 mi (4.8 km) long and up to 1 mi (1.6 km) wide. They vary from "buffalo wallows," 3 to 10 ft (1 to 3 m) deep, to steep-sided features as much as 250 ft (75 m) deep. The depressions are aligned along a series of major joints and apparently formed by piping and removal of fine-grained material along joint planes at depths greater than 250 ft (75 m). Deep excavations in the depressions encounter weak, unstable soils and are subject to flooding from ground water during occasional periods of high rainfall.

Pseudokarst features in late Cenozoic basalt lava fields are extensive in some regions of the west. The largest regions with this type of pseudokarst are in the Snake River area of Idaho, in part of the Columbia Basalt Plateau in Washington and Oregon, and in the lava fields of northeastern California. Smaller areas are in New Mexico, Arizona, Utah, Nevada, southern California and on the Seward Peninsula in Alaska. The pseudokarst features include lava tubes, fissures, open sinkholes, and caves formed by extrusion of the still-liquid portion of the lava. Subsurface solution of the bedrock and subsequent collapse are not involved in the formation of these features. Lava tubes, in the form of tunnels, are commonly 10 ft (3 m) in diameter, and some extend for several miles. Fissures are common but seldom extend for more than 1,000 ft (300 m). The fissures and lava tubes, in contrast to solution features, are not in geometrical sets but are generally parallel and extend in the direction of the flow of the lava. Fissures and lava tubes are generally near-surface features, but some are as much as 250 ft (75 m) deep. "Sinkholes" in lava generally lack the symmetry of those developed in solution terrain. Most lava sinks are commonly less than 100 ft (30 m) wide, but a few large sinks, notably in the Snake River area of Idaho, are as much as 1 mi (1.6 km) or more wide. Most of the lava sinks are irregular in shape and generally are shallow features (less than 30 ft (10 m) deep), although some are 150 ft (45 m) or more deep. Many of the sinks have near-vertical sides or overhangs. Lava pseudokarst features present problems in foundations, abutments, and reservoir tightness. In addition, the tubes and related permeable lava often contain large quantities of water that may lead to flooding and slope-stability problems in cuts and excavations.

Acknowledgments and gratitude are extended to Allen W. Hatheway, Cambridge, Massachusetts, for information and guidance on pseudokarst in lava, to the thousands of members of the National Speleological Society whose papers on caves and karst areas they explored are the basic sources used in compilation of this map, and to members of the U.S. Geological Survey and various State Geological Surveys for information they contributed and for technical review and advice on this map and text.

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APPENDIX A-3

Upstream Raise 91 Stability Assessment

HAZARD POTENTIAL CLASSIFICATION, STRUCTURAL STABILITY, AND SAFETY FACTOR ASSESSMENTS

HAZARD POTENTIAL CLASSIFICATION, STRUCTURAL STABILITY, AND SAFETY FACTOR ASSESSMENTS

Ash Pond 91 CCR Surface Impoundment
Great River Energy – Coal Creek Station
Underwood, North Dakota

Submitted To: Great River Energy
Coal Creek Station
2875 Third Street SW
Underwood, North Dakota 58576

Submitted By: Golder Associates Inc.
44 Union Boulevard, Suite 300
Lakewood, Colorado 80228

October 13, 2016 **1649586**

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1.0 INTRODUCTION

1.1 Purpose

The “Disposal of Coal Combustion Residuals (CCR) from Electric Utilities rule” (40 Code of Federal Regulations (40 CFR) Part 257), effective October 19, 2015, requires that existing CCR surface impoundments meeting the requirements of §257.73(a) and §257.73(b) conduct initial and periodic:

- Hazard potential classification assessments in accordance with §257.73(a)(2),
- Structural stability assessments in accordance with §257.73(d), and
- Safety factor assessments in accordance with §257.73(e).

This report documents the hazard potential classification assessment, structural stability assessment, and safety factor assessment for Great River Energy’s (GRE’s) Coal Creek Station (CCS) Ash Pond 91 CCR Surface Impoundment (Ash Pond 91).

1.2 Site Background

CCS is located in McLean County, approximately 10 miles northwest of Washburn, North Dakota. Ash Pond 91 covers approximately 75 acres (lined area) and is used as a combined dewatering and storage facility for CCRs including fly ash, bottom ash, and flue-gas desulfurization (FGD) material.

Ash Pond 91 was originally part of the South Ash Pond. The South Ash Pond was divided into Ash Pond 91 and Ash Pond 92. Ash Pond 91 was deepened and a new composite liner consisting of a 2-foot thick clay and 40-mil high-density polyethylene (HDPE) liner was completed in 1993. The liner is overlain with 1 foot of sand, 1 foot of Pit Run gravel, and a drainage system with collection pipes that slope to the north side of the facility. The composite liners of the Upstream Raise CCR Surface Impoundment (Upstream Raise) and Ash Pond 91 are connected and CCR deposition in Ash Pond 91 will piggyback onto the west side of Upstream Raise.

1.3 Geological Conditions

Ash Pond 91 is generally constructed over a glacial till layer consisting of sandy and silty-clay soils. Glacial till varies in thickness from 20 feet to several hundred feet in the area of Coal Creek Station. Silty-sand and sand lenses are present throughout the glacial till formation, which is underlain by poorly consolidated siltstone/sandstone bedrock (Barr 1982; CPA and UPA 1989).

1.4 Dam Oversight/Permits

The North Dakota State Engineer regulates, controls, and supervises the construction and operation of dams within the state of North Dakota. All dams and impoundments that contain more than 50 acre-feet of water require a construction permit (NDCC 2003).

The North Dakota Department of Health (NDDH) Division of Waste Management is the environmental regulatory body for the CCR facilities at CCS. Ash Pond 91 is currently permitted with the North Dakota Department of Health (NDDH) under Permit Number 0033.

1.5 Previous Evaluations

The following evaluations were previously performed on Ash Pond 91 at CCS:

- Golder Associates Inc., Evaluation of Ash Pond 91 Berm Stability Report, Great River Energy Coal Creek Station, dated April 13, 2010
- Golder Associates Inc., Seismic Stability Evaluation Addendum to Evaluation of Ash Pond 92/SW Section 16 Stability and Evaluation of Ash Pond 91 Stability, Great River Energy Stanton Station, dated February 27, 2012
- Kleinfelder, Coal Ash Impoundment Site Assessment Final Report, Coal Creek Station, October 31, 2012

In this study, we have reviewed the previous analyses, modified the analyses as deemed appropriate, and added suitable cases to evaluate whether the impoundment meets the required safety factors in §257.73(e)(1)(i)-(iv).

2.0 HAZARD POTENTIAL CLASSIFICATION ASSESSMENT – §257.73(A)(2)

The CCR rules require conducting initial and periodic hazard potential classification assessments by a qualified professional engineer to document the hazard potential classification of CCR surface impoundments and the basis for the classifications. Hazard classifications include the following listed in §257.73(a)(2):

- High hazard potential CCR surface impoundment,
- Significant hazard potential CCR surface impoundment,
- Low hazard potential CCR surface impoundment.

These hazard classifications are defined under §257.53 as:

> **High hazard potential CCR surface impoundment** – means a diked surface impoundment where failure or mis-operation will probably cause loss of human life.
>
> **Significant hazard potential CCR surface impoundment** – means a diked surface impoundment where failure or mis-operation results in no probable loss of human life, but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.
>
> **Low hazard potential CCR surface impoundment** – means a diked surface impoundment where failure or mis-operation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the surface impoundment owner's property.

2.1 Hazard Potential Classification Assessment

Based on the hazard classification definitions and review of the site and surroundings, Golder recommends Ash Pond 91 be categorized as a **Low Hazard Potential CCR Surface Impoundment**. This recommended designation is based on the following:

- The amount of impounded water is relatively small.
- There are no residences or occupied structures directly adjacent to the facility and loss of human life is not probable.
- Discharge of water or other materials contained within the impoundment is unlikely to have a significant environmental impact and is not likely to leave the owner's property. Samuelson Slough has significant volume to contain discharge from the impoundment and has a controlled discharge that can be closed in the event of a release.
- The economic impacts associated with a failure will primarily be to the owner's property.
- A USEPA consultant performed a site assessment of Coal Creek Station in 2011 under USEPA supervision. Following the USEPA dam hazard classification system, Ash Pond 91 was given a "Low Hazard" classification (Kleinfelder 2012).

2.2 Emergency Action Plan – §257.73(a)(3)

The CCR rules require the development of an Emergency Action Plan (EAP) for a CCR unit determined to be either a high hazard potential CCR surface impoundment or a significant hazard potential CCR impoundment. Ash Pond 91 has been categorized as a low hazard potential CCR surface impoundment and no EAP is required.

3.0 STRUCTURAL STABILITY ASSESSMENT – §257.73(D)(1)(I)-(VII)

The CCR rules (§257.73(d)(1)) require conducting initial and periodic structural stability assessments by a qualified professional engineer to "document whether the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering practices for the maximum volume of CCR and CCR wastewater that can be impounded therein."

3.1 Foundation – §257.73(d)(1)(i)

The location of Ash Pond 91 was originally characterized by Burns & McDonnell in 1973 and a hydrogeologic study was performed for CCS by Barr Engineering in 1982. Site geology, soils, and hydrology, including drainage and surface water flow, were examined during these prior studies to determine site suitability for disposal of CCRs.

The foundation soils of Ash Pond 91 consist of native soils (lean clay, fat clay, and sandy clay) and embankment fill materials sourced from nearby native soils (lean clay, fat clay, and sandy clay). Ash Pond 91 was cleaned out, deepened, and relined in 1993 (CPA 1993). According to construction documents, the foundation materials were compacted to 93% standard Proctor density.

Based on historic site information of CCRs and native soils, observations, and geotechnical testing, Ash Pond 91 is not built over wet ash or other unsuitable materials and foundation soils are stable.

3.2 Slope Protection – §257.73(d)(1)(ii)

The downstream slopes are divided into two sections, the soil embankment, and the Ash Pond 91 CCR slopes. Ash Pond 91 soil embankments are protected from erosion and deterioration by the establishment of a vegetative cover consisting of native grasses. The vegetative cover is inspected weekly for erosion, signs of seepage, animal burrows, sloughing, and woody vegetation that could affect the performance of the embankments.

Ash Pond 91 CCR slopes are protected from erosion and deterioration by a hardened fly ash surface. The fly ash slopes are inspected weekly for erosion, cracking, signs of seepage, animal burrows, sloughing, and woody vegetation that could affect the performance of the slopes.

The upstream slopes of the soil embankments are protected by a 2-foot thick layer of hardened fly ash. Active CCR upstream slopes are protected by a 6 to 15-foot high layer of trafficked bottom ash or other CCR material. The location of this layer of bottom ash changes as Ash Pond 91 increases in height and is maintained by GRE personnel on a weekly basis if deterioration is noted. Based on site experience and observations, the fly ash and bottom ash provide sufficient protection from deterioration due to wave action.

3.3 Dikes (Embankment) – §257.73(d)(1)(iii)

Embankments that are a part of Ash Pond 91 constructed in 1992 were compacted to a minimum of 93% standard Proctor density (CPA 1993). Based on historic site information and geotechnical testing during construction, the embankment soils are stable.

3.4 Vegetated Slopes – §257.73(d)(1)(iv)

Ash Pond 91 is inspected weekly. As part of these inspections, unusual or woody vegetative growth on slopes with final cover and soil embankments is documented. Vegetated slopes of Ash Pond 91 are re-seeded and mowed as required to maintain good vegetative growth and to limit woody vegetation from growing on the side slopes or near the toe of impoundments.

3.5 Spillways – §257.73(d)(1)(v)

Current inflows to the facility (besides precipitation) include hydraulically conveyed coal rejects material and passive drainage from the adjacent Upstream Raise CCR Surface Impoundment (Upstream Raise). Ash Pond 91 is designed to receive inflows from hydraulically conveyed FGD material and passive drainage from the Upstream Raise in the future. The design crest of the soil perimeter berms surrounding Ash Pond 91 is at an approximate elevation of 1922 feet, which is approximately 24 feet above surrounding topography, preventing stormwater run-on into Ash Pond 91.

Existing controls in place to monitor the water levels in Ash Pond 91 include weekly observations of water levels by CCS personnel, and daily observations by CCS operations personnel. Additional observations are noted by GRE employees familiar with site CCR units. After large storm events, CCS personnel evaluate site conditions, including impoundment water levels, and are able to adjust operations to maintain water levels below design maximum elevations. Should water levels within Ash Pond 91 reach above desired operating levels, GRE has operating procedures to lower gravity drain (decant) pipelines into the water to transfer water to the adjacent Drains Pond System CCR Surface Impoundment (Drains Pond System) facility. Contact water in perimeter ditches flows passively from the Ash Pond 91 to the Drains Pond System.

After 2016, Ash Pond 91 is designed to operate with a minimum freeboard of approximately 3 feet and a design freeboard of approximately 6-feet. A run-on analysis was performed as part of the inflow design flood control system plan (Golder 2016) indicating that Ash Pond 91 is operated with adequate freeboard to contain the 100-year, 24-hour storm event.

3.6 Hydraulic Structures – §257.73(d)(1)(vi)

Ash Pond 91 is designed to have an inflow pipe for depositing FGD material. The on-grade HDPE pipe will be 8 inches in diameter and will be periodically moved to different areas of the facility to achieve an even distribution of FGD material in the facility.

The outflows from Ash Pond 91 will consist of a series of gravity drainage pipes and culverts that transfer CCR conveyance water from the facility to the adjacent Drains Pond System.

No significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, or debris were observed that may negatively affect the operation of the facility.

3.7 Downstream Slopes Adjacent to Water Body – §257.73(d)(1)(vii)

Samuelson Slough lies downstream of Ash Pond 91 (approximately 400 feet away); however, the outlet elevation of Samuelson Slough (and the site surface water drainages) are controlled and water cannot inundate the downstream toe or slopes of Ash Pond 91.

3.8 Structural Stability Deficiencies – §257.73(d)(2)

No structural stability deficiencies were identified during this assessment.

4.0 SAFETY FACTOR ASSESSMENT – §257.73(E)

The CCR rules require that safety factors need to be evaluated for the critical cross-section of each CCR facility under static and seismic loading for long-term maximum storage pool loading conditions and maximum surcharge pool loading conditions. Liquefaction potential analysis is only necessary when soil

sampling, construction documentation, or anecdotal evidence from personnel with knowledge about the facility, indicates that soils of the embankment are susceptible to liquefaction.

Slope stability analyses were performed using a limit-equilibrium-based commercial computer program, SLIDE v7.0 (Rocscience 2016). Factors of safety were computed for non-circular failure surfaces using Spencer's method for force and moment equilibrium. Global stability was analyzed, which evaluates the overall stability of a cross section through the entire facility.

4.1 Model Scenarios

Two types of loading conditions for the stability analyses were performed: static and seismic (pseudostatic analyses). For each of the two loading conditions, the critical cross section was modeled. Two impoundment pool loading scenarios were considered to evaluate the slope: long-term maximum storage pool loading condition and maximum surcharge pool loading condition. Four stability scenarios were analyzed (two static loading scenarios and two pseudostatic loading scenarios).

4.2 Slope Geometries and Critical Slope

A critical cross section for Ash Pond 91 was identified and used for the stability analyses. The critical cross section is anticipated to be the most susceptible to structural failure and was selected based on loading conditions, geometry of the slopes, and the soil profile.

The critical cross section for Ash Pond 91 is located across the north embankment (Figure 1) at the full height of the facility during operation as a surface impoundment. Subsequent to this phase of construction, Ash Pond 91 is planned to be dewatered, covered, and closed with CCR in place. The design crest of the soil perimeter berm at the critical section is at an approximate elevation of 1920 feet. The critical cross section has an approximately 100 foot wide crest at elevation 2004 feet and downstream slopes between 15% and 20% from elevation 2004 feet to approximately elevation 1920 feet (Figure 2). Based on existing topography, original downstream slopes generally have 3H:1V slopes down to perimeter drainage ditches with an elevation of approximately 1898 feet. Original soil perimeter berm upstream slopes have an approximate 3H:1V slope from this soil perimeter berm to the interior base elevation within the facility of 1900 feet.

4.3 Material Properties

Material properties (Table 1) were developed through Golder's site experience with onsite materials, laboratory tests completed on Coal Creek Station CCRs and onsite soils, reviews of technical literature, and Golder's professional judgment and experience with similar materials used for this slope stability analysis. Additional static materials properties information is included in Appendix A.

Table 1 Material Properties

Material	Wet Unit Weight (pcf)	Shear Strength Static Analysis		Shear Strength Pseudostatic Analysis		
		Effective Cohesion (psf)	Effective Friction Angle (degrees)	Undrained Cohesion (psf)	Undrained Friction Angle (degrees)	Undrained Shear Strength (psf)
Existing Natural Soil and Embankment Fill	127	500	19	165	14	NA
Clay Liner	122	500	19	NA	NA	1,600
Sand Layer	125	0	37	0	37	NA
Pit Run	125	420	34	420	34	NA
FGD Material	Varies	Appendix A	Appendix A	Appendix A	Appendix A	Appendix A
Bottom Ash	83	50	40	50	40	NA
Fly Ash	107	1610	32	1610	32	NA
Smooth Geomembrane – Clay Liner Interface	NA	200	7.5	200	7.5	NA
Smooth Geomembrane – Bottom Ash	NA	0	17	0	17	NA

4.3.1 Pseudostatic Material Properties

The material properties for each soil type included in the pseudostatic stability analysis of Ash Pond 91 are provided in Table 1 and were developed following the recommendations contained within Section 6.1 of *RCRA Subtitle D (258) Seismic Design Guidance for Municipal Solid Waste Landfill Facilities* (EPA 1995). Fine-grained soils (existing natural soil, embankment fill, and clay liner) were assigned strength parameters corresponding to 80% of the total stress (undrained) strength parameters.

- The existing natural soil and embankment fill were assigned strength parameters based on laboratory testing of those materials. The reduction of the strength parameters to 80% of the total stress strength parameters resulted in cohesion intercept of 165 pounds per square foot (psf) and a friction angle of 14 degrees.
- The clay liner was assigned an undrained shear strength of 1,600 psf based on literature values for CH material (NAVFAC 1996).
- The geosynthetic interface strength parameters were not modified (from the static stability material properties) for the pseudostatic stability analyses based on recommendations contained within Section 6.1.2 of *RCRA Subtitle D (258) Seismic Design Guidance for Municipal Solid Waste Landfill Facilities* (EPA 1995).
- Fly ash is a cemented material and is modeled with static shear strengths with no seismic reduction.
- FGD material properties were unchanged since undrained strengths are used for this material in both the static and seismic conditions.

Coarse-grained materials (i.e., sand, pit run, and bottom ash) are modeled with static shear strengths with no seismic reduction because they are not prone to developing excess pore pressure from the cyclic loading caused during seismic conditions. These materials are well compacted within the facility and are not likely to be saturated in the critical section evaluated.

4.4 Impoundment Pool Loading Conditions

Two different impoundment pool loading conditions were considered in these stability analyses:

- Long-term maximum storage pool loading condition
- Maximum surcharge pool loading condition

The depth of impounded water in Ash Pond 91 varies with time as more CCRs are deposited and as operational variables change (such as drainage pipe elevations). Based on facility operations in the adjacent Upstream Raise facility over the past 10 years, the maximum storage pool loading condition is anticipated to occur when the elevation of water within the impoundment is maintained at the approximate same elevation as FGD material, which equates to a freeboard to the surrounding embankments of approximately 9 feet. Slope stability was modeled at maximum facility height (when Ash Pond 91 is operating as an impoundment) with an embankment elevation of 2004 feet and a FGD material/water elevation of 1995 feet.

The maximum surcharge pool loading condition is conservatively modeled with a freeboard of zero feet (embankment elevation of 2004 feet and a water elevation of 2004 feet). In this scenario, the FGD material elevation within the facility remains at approximately 1995 feet. The likelihood of the water within Ash Pond 91 reaching an elevation of 2004 feet or overtopping the embankment is very low, based on the following reasoning:

- Primary design inflows to Ash Pond 91 are via the FGD pipeline from the plant. The FGD material inflow is actively managed per the operations plan and can be shut off at any time.
- Additional inflow may come from precipitation events; however, the only areas running into the impoundment pool include a small area on the upper surface of the facility (see Inflow Flood Control Plan, Golder 2016). Based on the Inflow Flood Control Plan, the maximum increase in elevation of Ash Pond 91 pool from a precipitation event is approximately 1 foot.

The operations plan discusses the operation and contingency plans associated with Ash Pond 91 (Golder 2015a).

4.5 Subsurface Water Conditions

Ash Pond 91 is lined with a composite geomembrane/clay liner. Readings from the piezometers and monitoring wells installed near Ash Pond 91 demonstrate that groundwater generally flows northeast under the facility toward Samuelson Slough and that groundwater elevations vary from approximately 1880 feet in the northeast corner of Ash Pond 91 to 1900 feet in the southwest corner of Ash Pond 91. Based on these data and the location of the critical section, the stability analyses were performed with a groundwater elevation of between approximately 1890 feet and 1895 feet.

4.6 Interior Impoundment Phreatic Surface

Seepage analyses were performed on Ash Pond 91 to determine the phreatic surface within the facility at the maximum impoundment elevation (FGD material elevation 1995 feet, Golder 2015b). The phreatic surface is shown in Figure 2 and was assumed to follow the bottom ash/FGD material interface for full height steady state conditions. Hydrostatic pore pressures were assumed below the phreatic surface as water is anticipated to drain relatively slowly through FGD materials toward perimeter drainage piping. After FGD material deposition ceases, the phreatic surface decreases in elevation as the FGD material consolidates and drains.

4.7 Seismic Loading Conditions

Coal Creek Station, located in central North Dakota, is in an area with low historic seismic activity. No earthquakes of Magnitude V (i.e., Moderate-Strong) or greater (Mercalli intensity scale) have occurred in North Dakota during historical times (USGS 2016).

4.7.1 Peak Ground Acceleration Determination

For the site location, the peak (bedrock) ground acceleration (PGA) with a 2% probability of exceedance in 50 years is between 0.02g (1g equals 32.2 ft/sec^2) and 0.04g using the *US Seismic Hazard 2014 Map* (USGS 2014) and the *US Seismic Hazard 2008 Map* (USGS 2008); for purposes of this analysis, the bedrock PGA was estimated to be 0.03g (Appendix B). The peak ground acceleration at Coal Creek Station was estimated to be 0.05g using the simplified analysis guidelines presented in Section 4.1.1 of the *RCRA Subtitle D (258) Seismic Design Guidance for Municipal Solid Waste Landfill Facilities* (EPA 1995, see Appendix B).

4.7.2 Horizontal Seismic Coefficient Determination

The horizontal seismic load coefficient (k_s), for use in the pseudostatic slope stability analysis, was determined using the procedures recommended in Section 6.2 of the *RCRA Subtitle D (258) Seismic Design Guidance for Municipal Solid Waste Landfill Facilities* (EPA 1995). Based on Step 2 of the Seismic Stability and Deformation and Analysis section of the guidance (Section 6.2), the maximum value of the horizontal seismic load coefficient may be safely determined as one-half of the peak ground acceleration (determined in Section 4.7.1). As a result, a horizontal seismic load coefficient of 0.025g (0.5 * 0.05g = 0.025g) was used in the pseudostatic analysis.

4.8 Liquefaction Potential

Soil liquefaction describes a phenomenon in which a saturated or partially saturated soil substantially loses strength and stiffness in response to an applied stress, usually earthquake shaking or other sudden change in stress condition, causing it to behave like a liquid. The phenomenon is most often observed in saturated, loose (low density or uncompacted), sandy soils. The foundation and embankment materials (existing

natural soils, embankment fill, and clay liner) of Ash Pond 91 are classified as either low or high plasticity clay.

In addition, an assessment of liquefaction potential was evaluated given the limited information about the site and in-situ testing of FGD material. The analysis of liquefaction potential is based partially on EPA's "Seismic Design Guidance for Municipal Solid Waste Landfill Facilities" published in 1995 (EPA 1995) and the evaluation of liquefaction resistance based on SPT values described by Youd and Idriss (2001). This method uses material SPT values, material unit weight, and expected ground motion for North Dakota (acceleration) to evaluate liquefaction potential. Based on a range of cyclic stress ratios (CSR) between 0.04 and 0.11 and corrected SPT blow counts of between 3 and 14 for FGD material, Ash Pond 91 is not anticipated to be susceptible to liquefaction due to low seismic stresses.

4.9 Stability Analysis Results

Slope stability analyses were performed under static and pseudostatic conditions for the critical section (Figure 3 and Figure 4). The results of the slope stability analyses are presented in Table 2. The results indicate that Ash Pond 91 slopes comply with the required safety factors per §257.73(e).

Table 2 Slope Stability Analyses Results

Loading Condition	Water Level	Required Factor of Safety	Calculated Factor of Safety	Figure for Stability Analysis Results
Static	Max Storage (el. 1995 ft)	1.50	1.59	3
	Max Surcharge (el. 2004 ft)	1.40	1.59	3
Pseudostatic	Max Storage (el. 1995 ft)	1.00	1.34	4
	Max Surcharge (el. 2004 ft)	1.00	1.34	4

5.0 CERTIFICATION

Based on the review of the information provided by GRE and on-site observations, we have classified the Coal Creek Station Ash Pond 91 CCR Surface Impoundment as a Low Hazard Potential CCR Surface Impoundment; additionally, no structural stability deficiencies were identified during this assessment. Calculated factors of safety through the critical cross sections in the surface impoundment embankments exceed the values listed in §257.73(e)(1)(i)-(iv).

The undersigned attest to the completeness and accuracy of this hazard potential classification, structural stability assessment, and safety factor assessment, and certify that the assessments meet the requirements of 40 CFR §257.73(a)(2), §257.73(a)(3), §257.73(d), and §257.73(e).

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Senior Project Engineer

TS/CS/rjg



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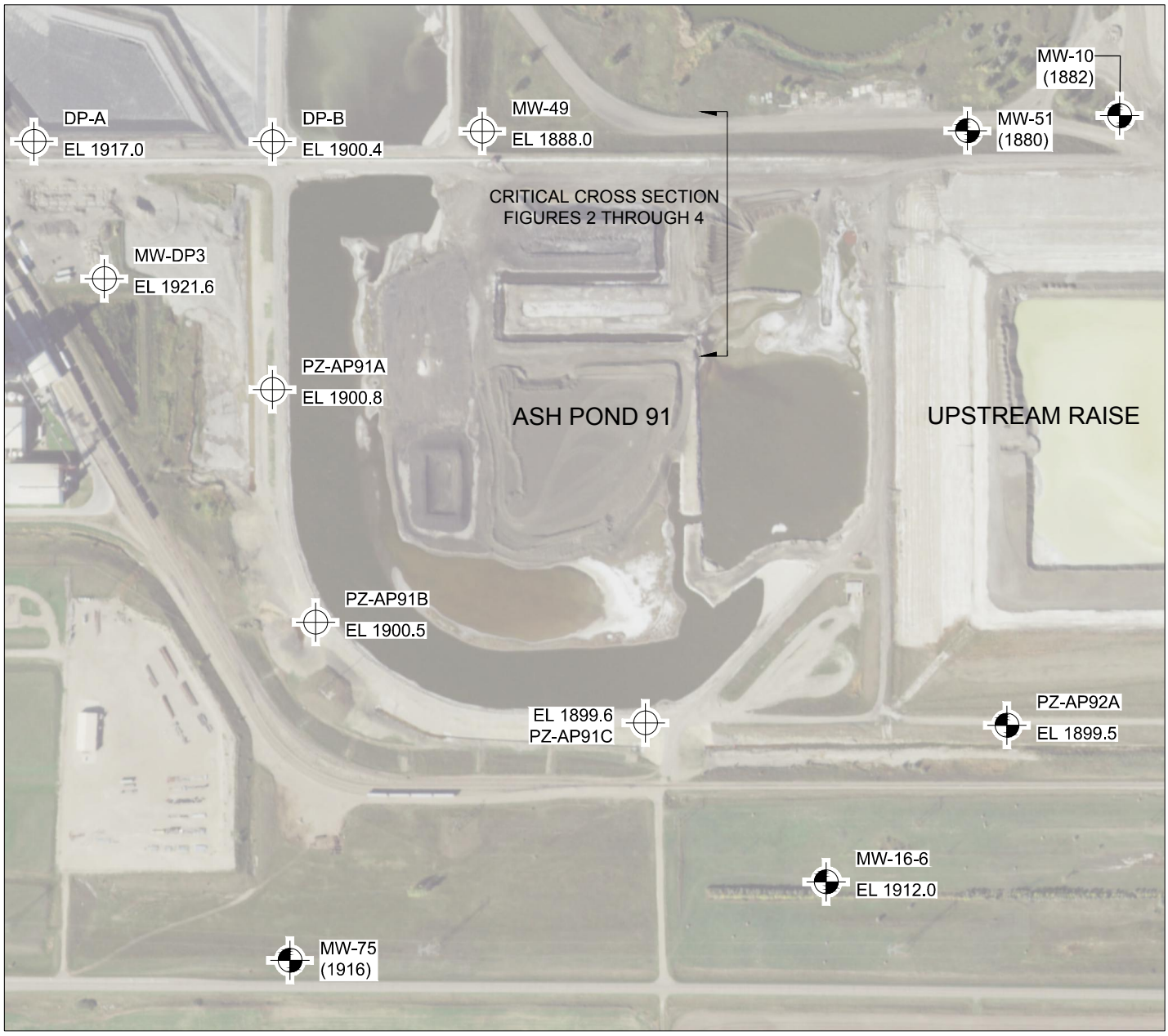
FIGURES





0 250 500
1" = 500' FEET

GREAT RIVER ENERGY
COAL CREEK STATION
ASH POND 91
SITE OVERVIEW

FIGURE 1

Golder Associates

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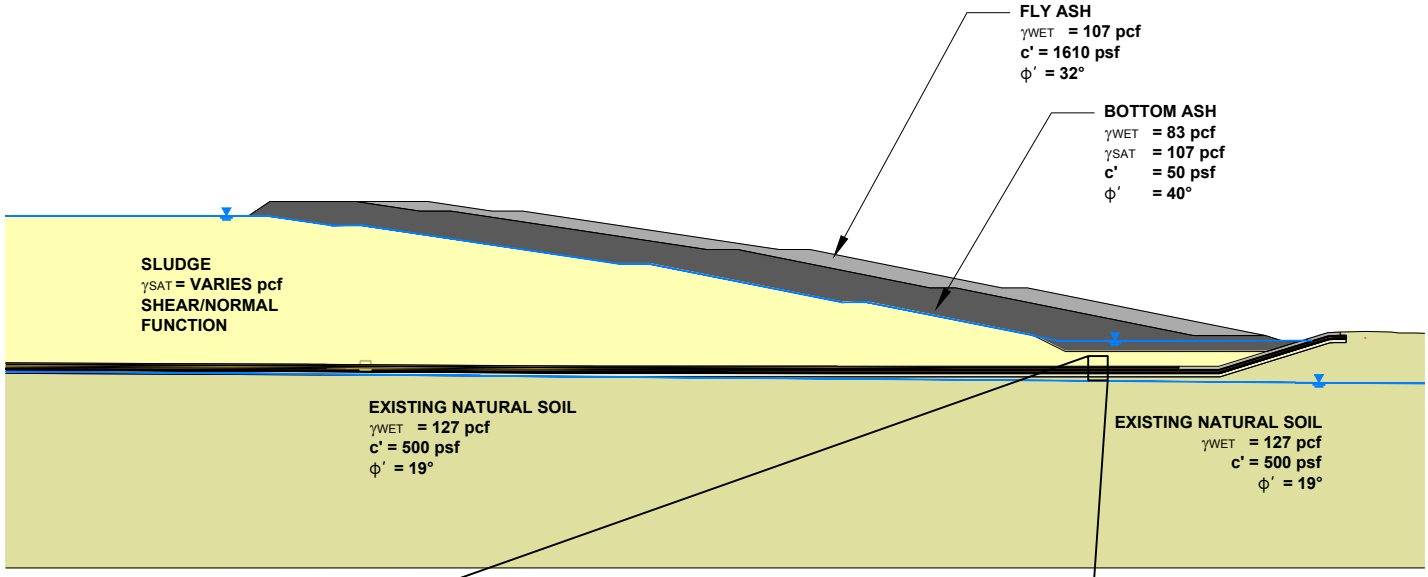

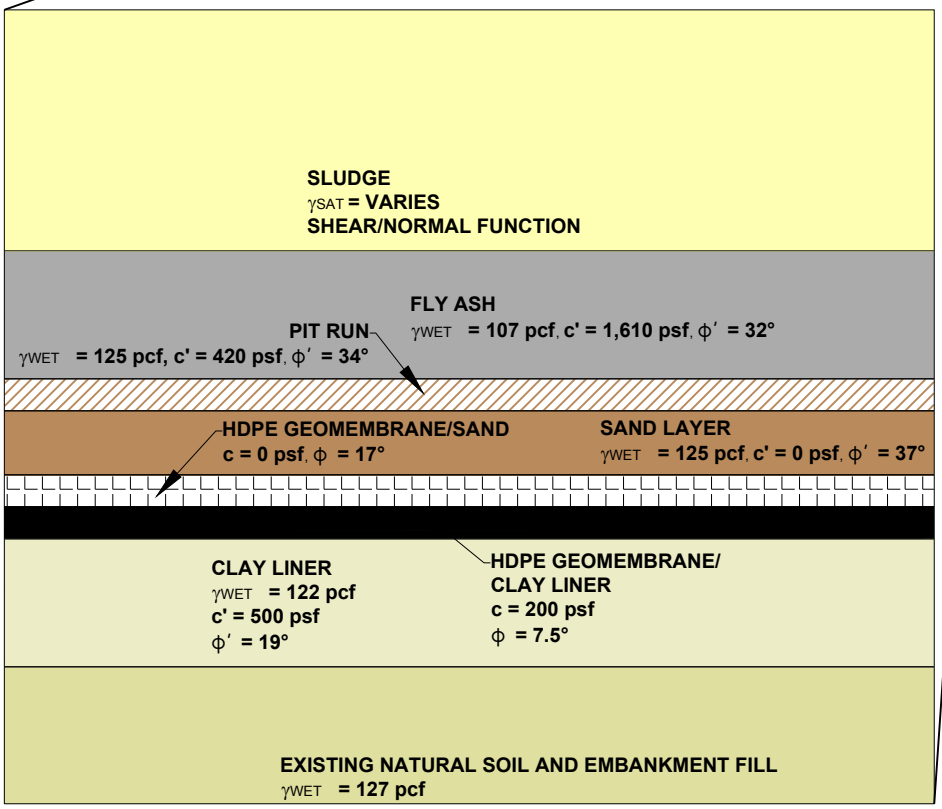

GREAT RIVER ENERGY
COAL CREEK STATION
ASH POND 91
CRITICAL SECTION

FIGURE 2

Golder Associates

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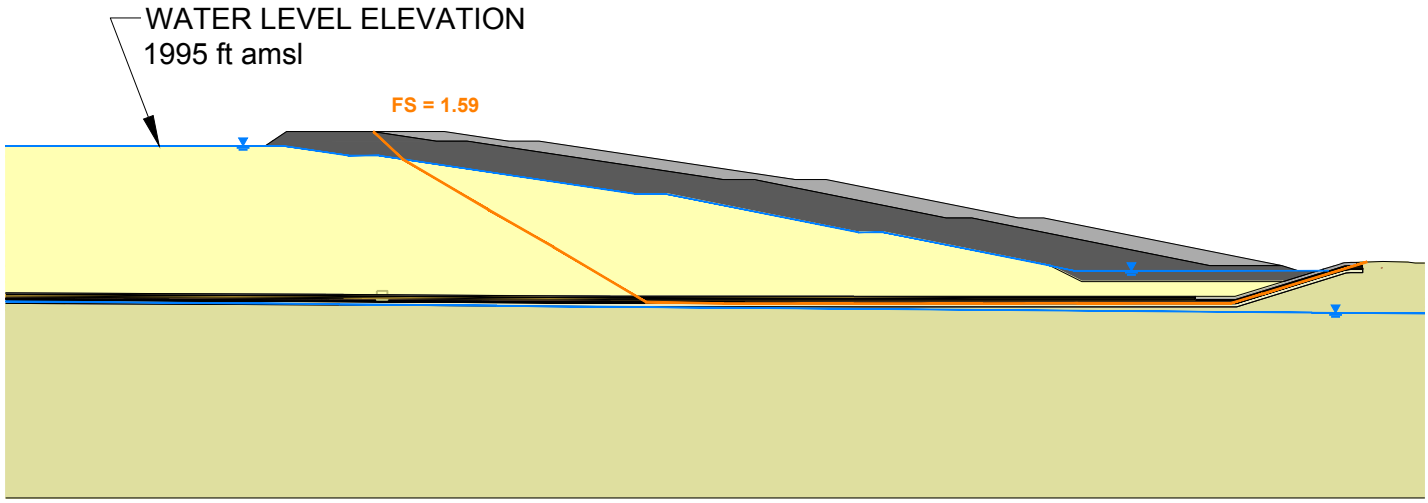
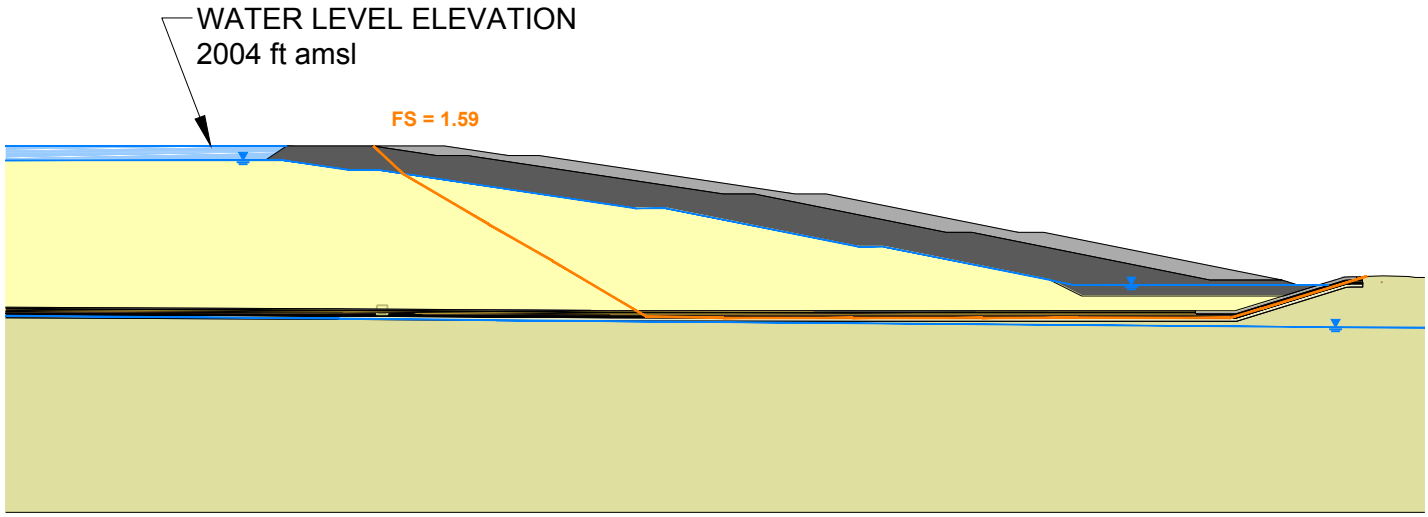


STATIC ANALYSIS
MAXIMUM STORAGE POOL



STATIC ANALYSIS
MAXIMUM SURCHARGE POOL

GREAT RIVER ENERGY
COAL CREEK STATION
ASH POND 91
STATIC STABILITY ANALYSIS RESULTS

FIGURE 3

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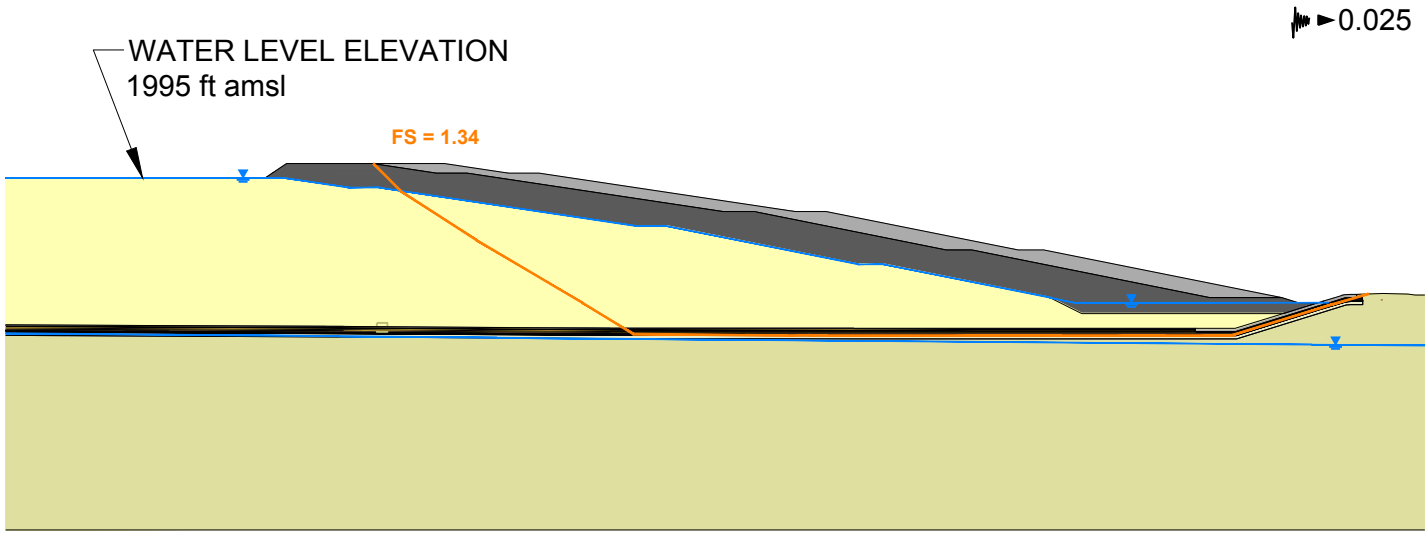
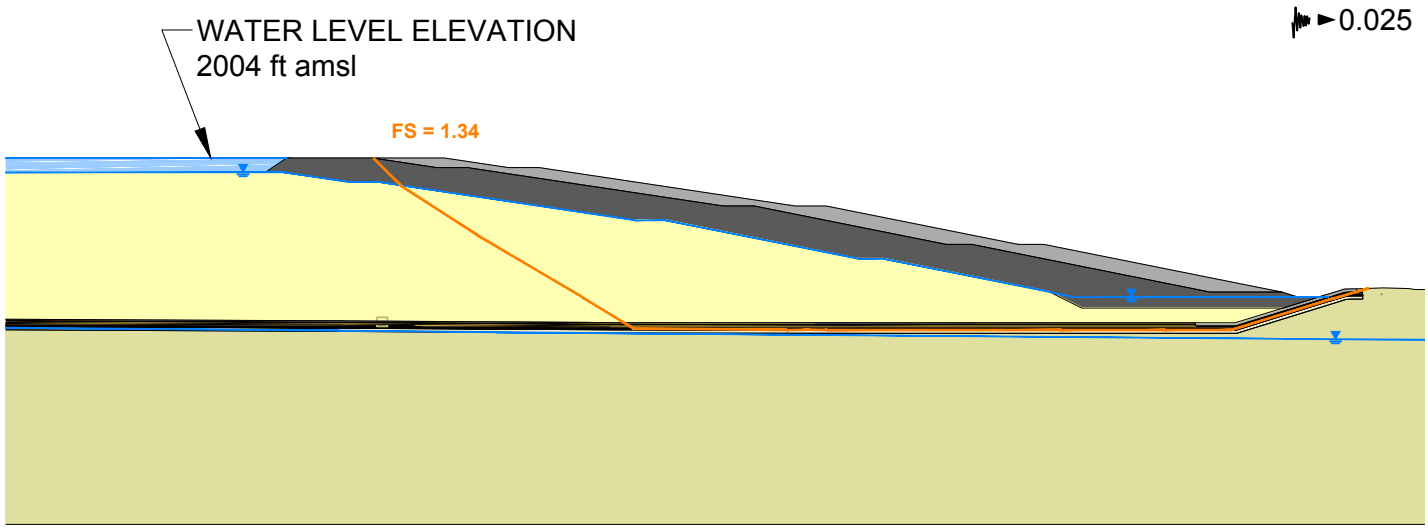


PSEUDOSTATIC ANALYSIS
MAXIMUM STORAGE POOL



PSEUDOSTATIC ANALYSIS
MAXIMUM SURCHARGE POOL

GREAT RIVER ENERGY
COAL CREEK STATION
ASH POND 91
SEISMIC (PSEUDOSTATIC) STABILITY ANALYSIS RESULTS

FIGURE 4

Golder Associates

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APPENDIX A
MATERIAL PROPERTIES

1.0 OBJECTIVE

Compile a list of material properties used in the engineering evaluation and indicate sources for all inputs.

2.0 MATERIALS

2.1 Existing Natural Soil and Embankment Fill

Existing natural soil and embankment fill properties were based on lab work performed by Golder on samples taken from the SW Section 16 area in 2001, 2008, and 2011. Soils on site are generally low plasticity clay (CL), but high plasticity clays (CH) are also present. Samples yielded an average dry unit weight of 105.1 pcf and an average moisture content of 20.7 %. Values of 105 pcf for the dry unit weight and 21 % for the moisture content were chosen resulting in a moist unit weight of approximately 127 pcf.

Two triaxial shear strength tests were performed from the SW Section 16 Shelby tube samples in 2001 (BH3 and BH6). Three additional triaxial tests were performed on existing natural soil near the River Water Holding Basin in 1981 (boreholes BR-1 and BR-2) and two triaxial tests were performed on existing natural soil near the cooling towers in 2008 (Tower 91 and Tower 92). Based on triaxial test information, a conservative strength envelope was developed for existing natural soil. The strength envelope is shown in Figure 1 and is defined by an effective cohesion of 500 psf and an effective friction angle of 19 degrees.

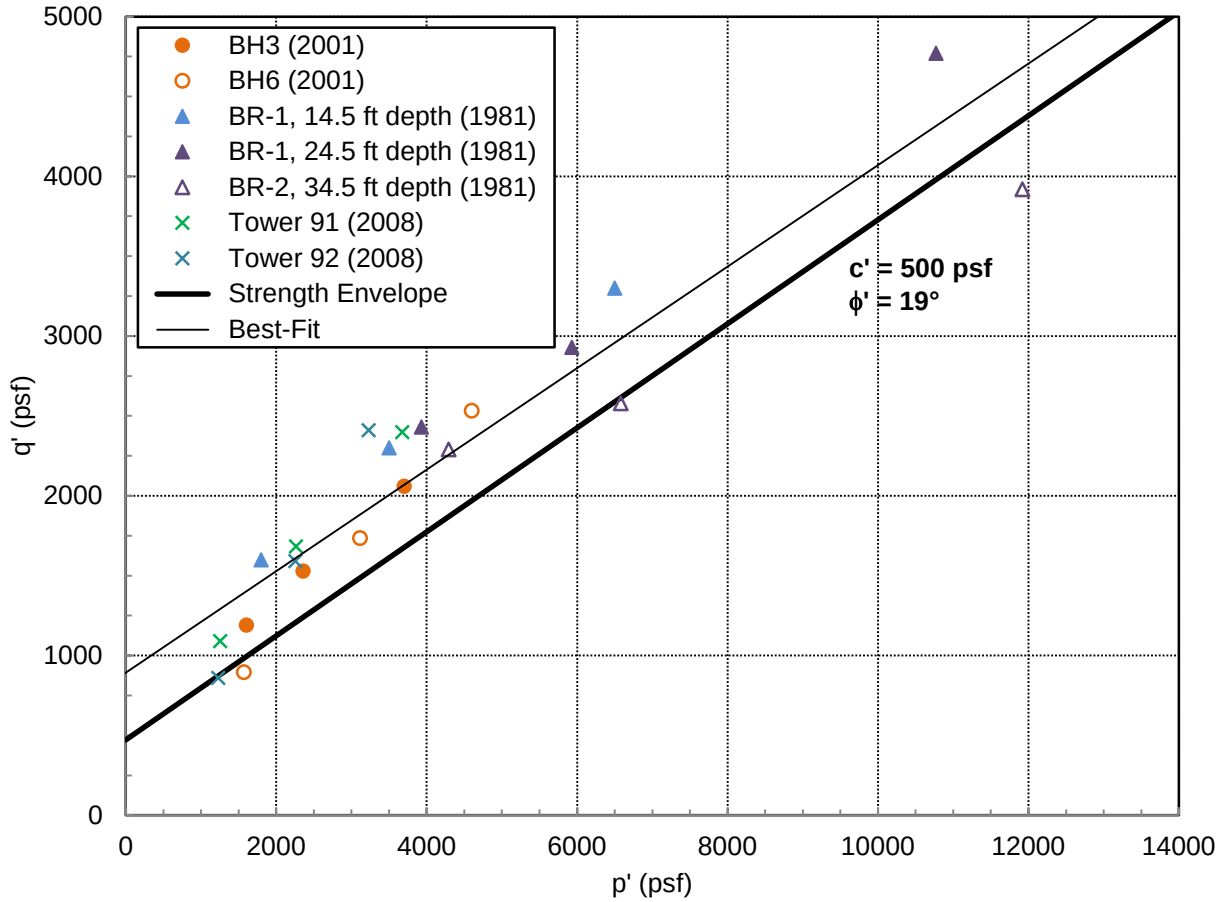


Figure 1: Strength Envelope for Existing Natural Soil Based on Triaxial Test Information

2.2 Clay Liner

Clay liner inputs are based on field experience and laboratory testing of materials at CCS. Dry unit weight and moisture content have been evaluated based on Shelby tube samples of other clay liners at CCS. Results yielded a dry unit weight ranging between 91.9 and 103.8 pcf (99.5 pcf average) and moisture content ranging between 18.6 % and 27. 7% (22.8 % average). Using a dry unit weight of 99.5 pcf and a moisture content of 23 %, a moist unit weight of 122 pcf was calculated and used for these stability analyses. Clay liner materials used at CCS come from existing natural clays onsite. Therefore, shear strength properties of the clay liner are the same as the existing natural soils: the effective cohesion is 500 psf and the effective friction angle is 19 degrees.

2.3 Sand Layer

Sand layer inputs were based on published values for SW and SP type material (NAVFAC 7.02).

Published maximum dry unit weight values range between 100 and 130 pcf (115 pcf average) with optimum moisture contents between 9 % and 21 % (15 % average). Assuming a construction specification of 95 % maximum dry density and optimum moisture, the dry unit weight chosen is 109 pcf with a moisture content of 15 %. This results in a moist unit weight value of approximately 125 pcf.

Published values for effective cohesion of SW and SP material suggest a value of 0 psf. Published values for effective friction angle of SW material suggest a value of 38 degrees. Published values for effective friction angle of SP material suggest a value of 37 degrees. For conservatism, the lower effective friction angle of the SP material was chosen for analyses.

2.4 Pit Run

Pit Run is described as a silty sand and inputs were based on published values for SM type material (NAVFAC 7.02).

Published maximum dry unit weight values range between 110 and 125 pcf (117.5 pcf average), with optimum moisture contents between 11 % and 16 % (13.5 % average). Assuming a construction specification of 95 % maximum dry density and optimum moisture, the dry unit weight chosen is 112 pcf with a moisture content of 13.5 %. This results in a moist unit weight value of approximately 125 pcf.

Strength parameters were based on the published values of 420 psf for effective cohesion and 34 degrees for effective friction angle (NAVFAC 7.02).

2.5 FGD Sludge Waste

FGD sludge waste input parameters are based on published data, field testing, design calculations, and lab work performed by Golder between 2001 and 2014.

Nine laboratory tests between 2002 and 2012 indicate an average specific gravity (G_s) of 2.7. Consolidation analyses indicate an average dry unit weight of about 45 pcf at the end of FGD sludge deposition, and an average dry unit weight of approximately 53 pcf after closure. Field sampling of saturated FGD sludge in test pits and from Shelby tubes indicate dry unit weights between 27 and 60 pcf. Assuming the FGD sludge is fully saturated during the active life of the facility, the saturated unit weight ranges between approximately 80 pcf at initial deposition and during intermediate deposition and 100 pcf at final deposition heights. Saturated unit weights are based on moisture contents as low as 65 % after closure to more than 100 % during deposition. Saturated unit weights used in analyses were based on consolidation analyses and generally vary between 89 pcf and 98 pcf depending on material depth. Saturated unit weight as a function

of depth is shown in the following table for the end of sludge deposition and after final cover has been placed:

Saturated Unit Weight vs. Height of Sludge

	Saturated Unit Weight	
Average Depth (ft)	**End of Sludge Deposition (pcf)**	**Final Cover Placed (pcf)**
>75	95	98
54-75	94	97
30-54	92	96
0-30	89	96

Consolidated-undrained triaxial lab testing was used to evaluate the strength of FGD sludge. Triaxial tests were performed on seventeen samples of FGD material between 2010 and 2014 at normal stresses between 1,000 and 10,000 psf on both remolded samples (2010 and 2012 samples) and intact Shelby tube samples (2014 samples). Golder conservatively developed the shear strength envelope based on triaxial tests to approximate the lower bound of shear strength test results (Figure 3). The strength envelope chosen for use in stability analyses is given in the following table:

Normal Stress (psf)	**Shear Strength (psf)**
0	270
5,500	1,500
10,000	2,500

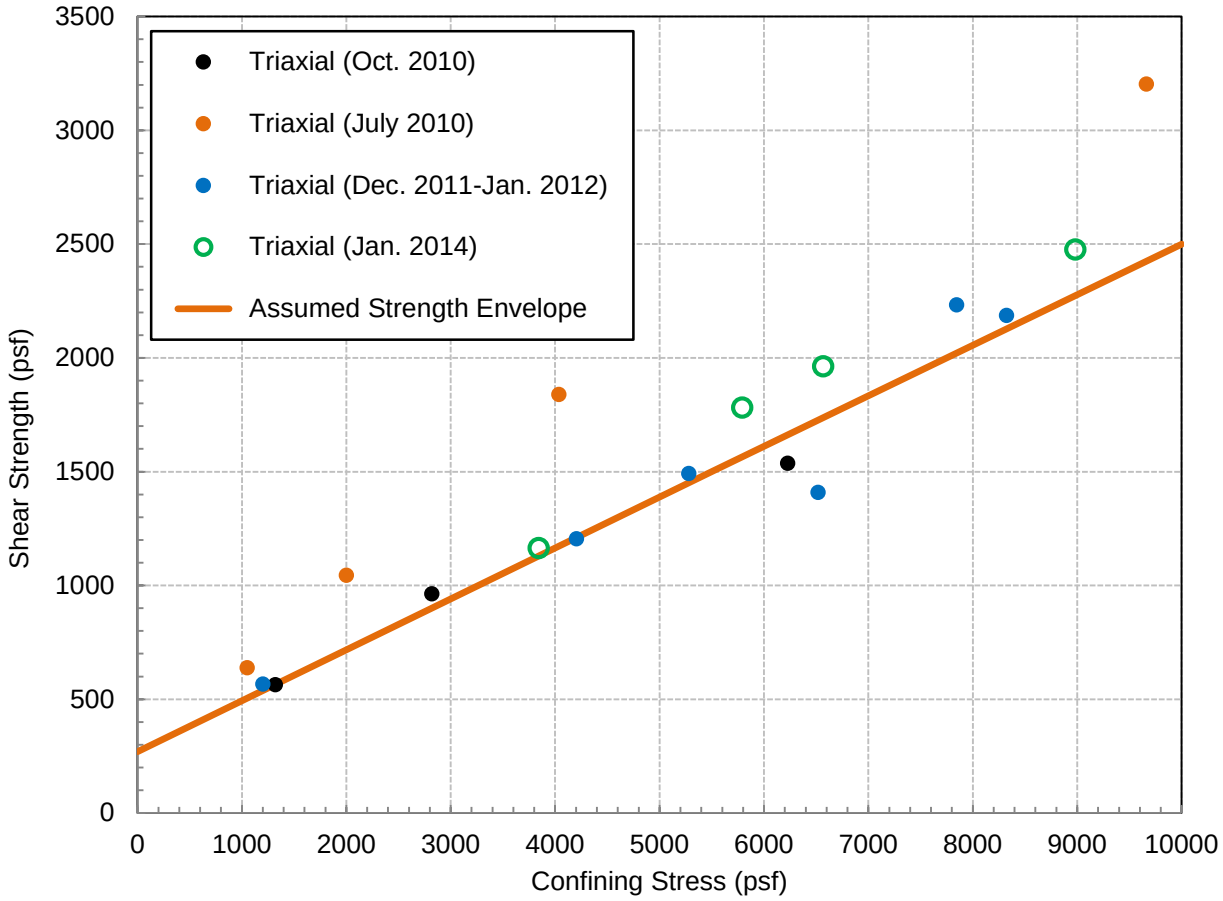


Figure 2: Shear Strength Tests Performed on FGD Sludge

2.6 Bottom Ash

Bottom Ash input parameters are based on lab and field work performed by Golder.

The dry unit weight for compacted bottom ash is based on 95 % standard Proctor densities from lab testing which gives a value of approximately 81 pcf. The dry unit weight of sluiced bottom ash is 60 pcf. An average value of 70 pcf was chosen for analysis based on a combination of compacted material and loosely placed material. The moisture content from field sampling of drained and saturated bottom ash ranged between 12 % and 61 %. For unsaturated conditions, a moisture content of 19 % was assumed. Using the lab measured specific gravity of bottom ash (2.60); the moisture content of bottom ash for saturated conditions was determined to be between 40 % and 65 % (average 53 %). Bottom ash was assigned an average moist unit weight of 83 pcf and an average saturated unit weight of 107 pcf.

Lab direct shear strength testing of bottom ash indicated a residual effective cohesion of 463 psf and a residual friction angle of 40.3 degrees. Visual observations of the bottom ash material indicates little cohesion, therefore the effective cohesion was chosen as 50 psf and an effective friction angle of 40 degrees was chosen for analysis.

2.7 Fly Ash

Fly Ash input parameters are based on triaxial tests performed by Golder for a 75 % solids paste mix and unconfined compression tests performed on fly ash samples prepared using standard Proctor compaction techniques.

Dry unit weights from triaxial tests ranged between 87.8 pcf and 94.5 pcf with an average value of 91.9 pcf; a value of 92 pcf was chosen. Moisture contents from the same testing ranged between 6.3 % and 27.7 % with an average value of 16 %; a value of 16% was chosen. These values result in a moist unit weight of 107 pcf.

Triaxial tests were performed on the fly ash to evaluate the shear strength. Samples were allowed to “cure” for between 28 and 56 days prior to testing to evaluate long-term behavior. The results of the test provided an average cohesion of 1610 psf with a friction angle of 32 degrees. These properties were used in the stability analyses.

2.8 Geosynthetic Interfaces

Geomembrane Interface inputs are based on lab work performed by Golder and published values (GRI 2005). The interfaces of interest are:

- Smooth HDPE against clay liner.
- Smooth HDPE against sand or bottom ash.

Geosynthetic interface shear strengths are based on interface shear test results and consider both peak and residual shear strengths. Two large-scale direct shear interface friction tests were performed between a 40-mil smooth high density polyethylene (HDPE) liner and site specific clays representative of those used in liner construction. The HDPE liner used in testing was excavated from site facilities and is similar to what was used during construction of Ash Pond 91. Results of the two tests indicate a friction angle of about 7.5 degrees and a residual adhesion intercept of approximately 200 psf for smooth HDPE against clay liner (Figure 2).

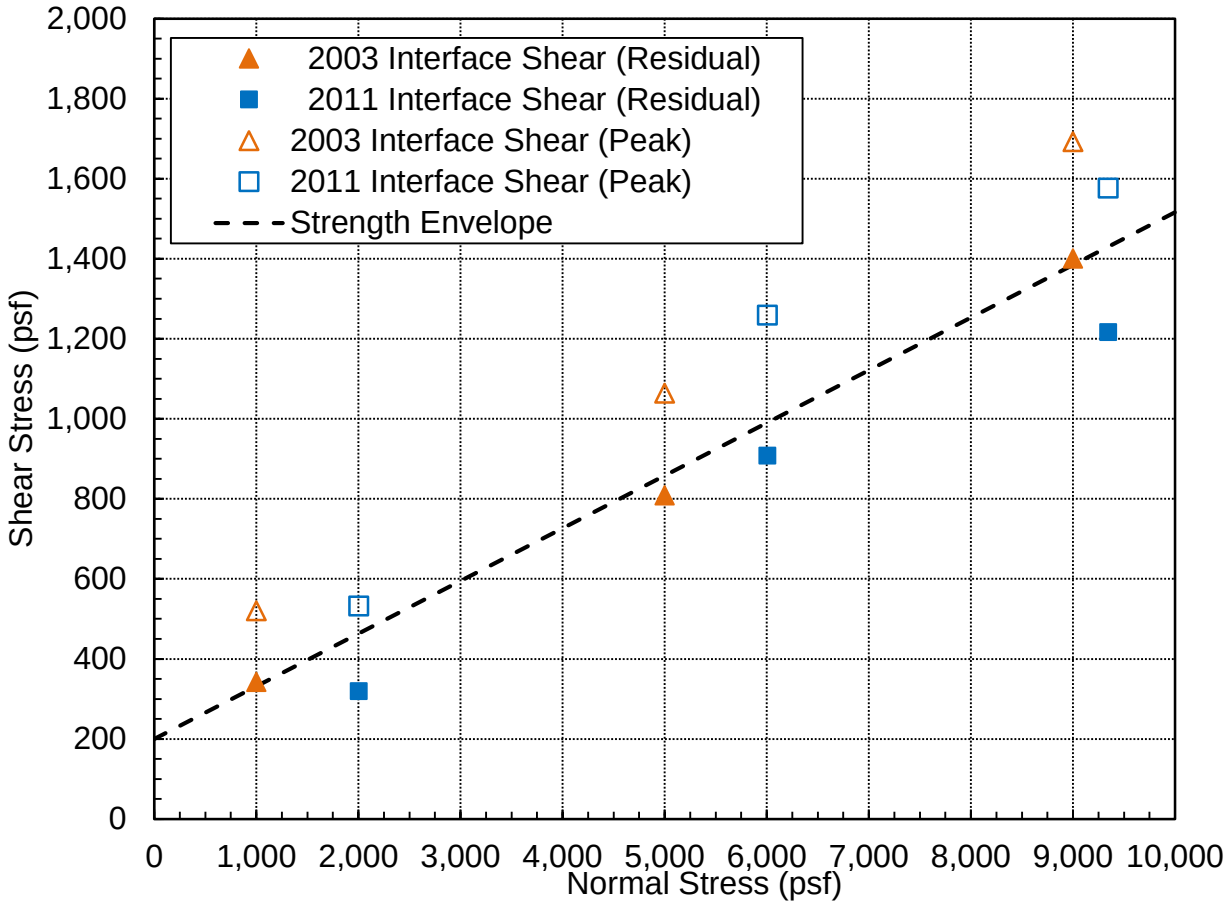


Figure 3: Interface Shear Tests for Smooth HDPE against Site-Specific Clay

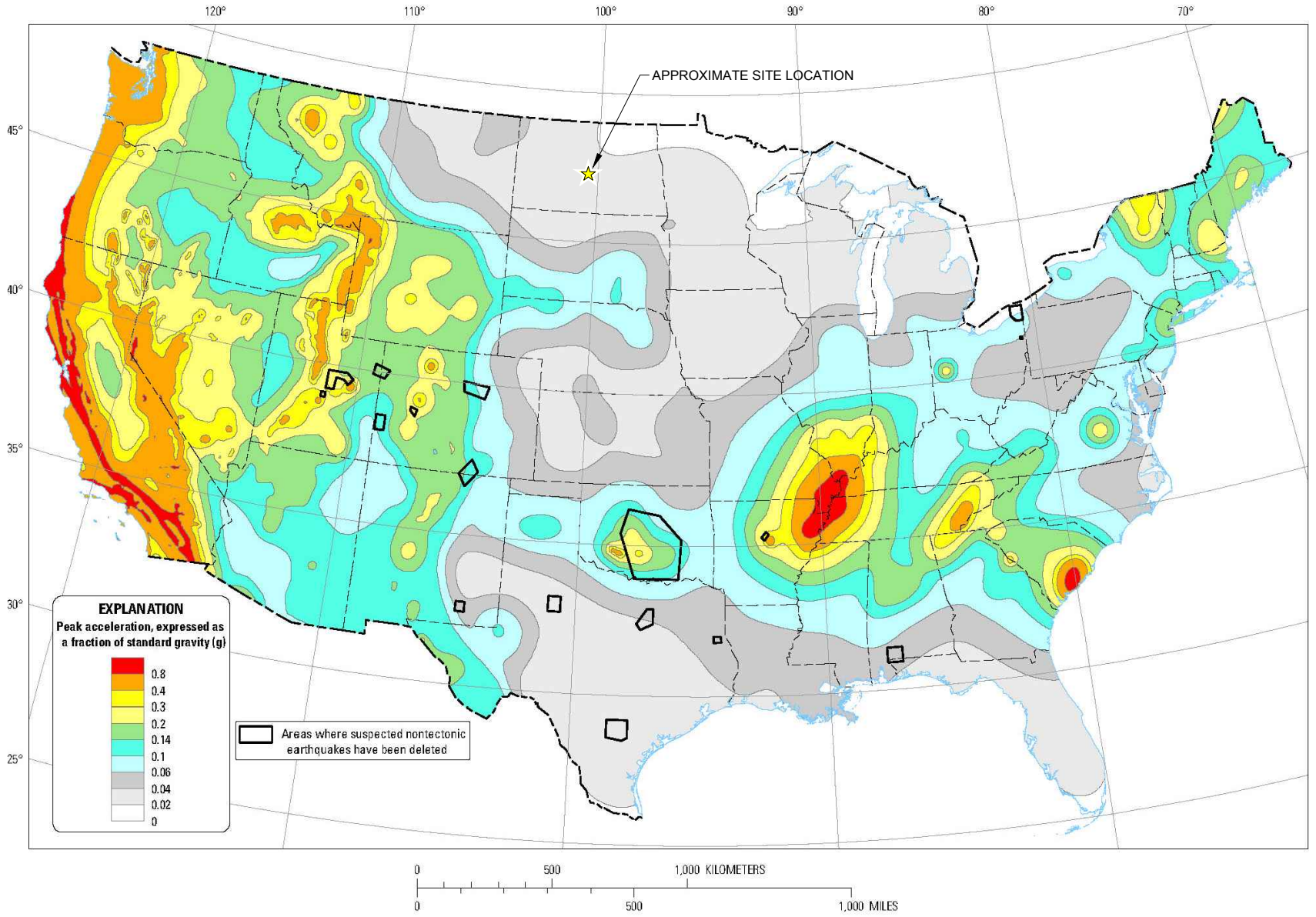
Golder lab experience for smooth HDPE against sand indicates a residual friction angle between 13.4 and 20 degrees (average of 16.7 degrees) and a residual adhesion intercept between 0 and 72 psf (average of 36 psf). The Geosynthetic Research Institute (GRI 2005) published a residual friction angle of 17 degrees and a residual adhesion intercept of 0 psf for smooth HDPE against granular soil based on 128 tests. Based on Golder lab experience and GRI (2005), a friction angle of 17 degrees with no adhesion intercept was chosen for use in engineering analysis.

3.0 REFERENCES

Foundations and Earth Structures, Design Manual 7.02, Naval Facilities Engineering Command, September 1996 (NAVFAC 7.02).

Koerner, G.R. and Narejo, D. (2005). *Direct Shear Database of Geosynthetic-to-Geosynthetic and Geosynthetic-to-Soil Interfaces, Geosynthetic Research Institute Report #30.* June 14 2005 (GRI 2005).

APPENDIX B
SEISMIC LOADING CONDITIONS



2% PROBABILITY OF EXCEEDANCE IN 50 YEARS MAP OF PEAK GROUND ACCELERATION
USGS SEISMIC HAZARD MAP (2014)

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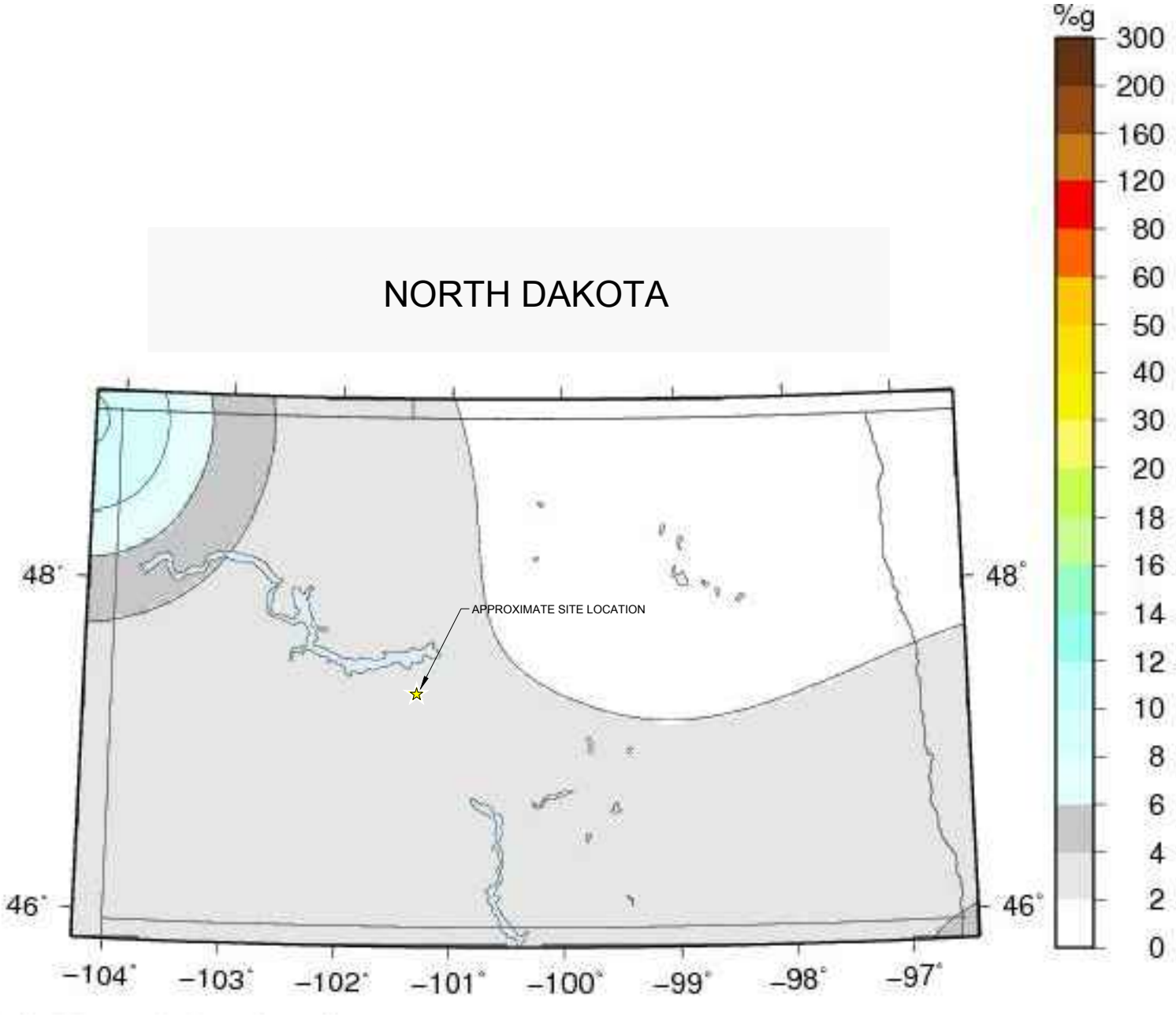
FIGURE B-1



2% PROBABILITY OF EXCEEDANCE IN 50 YEARS MAP OF PEAK GROUND ACCELERATION
USGS SEISMIC HAZARD MAP (2008)

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FIGURE B-2

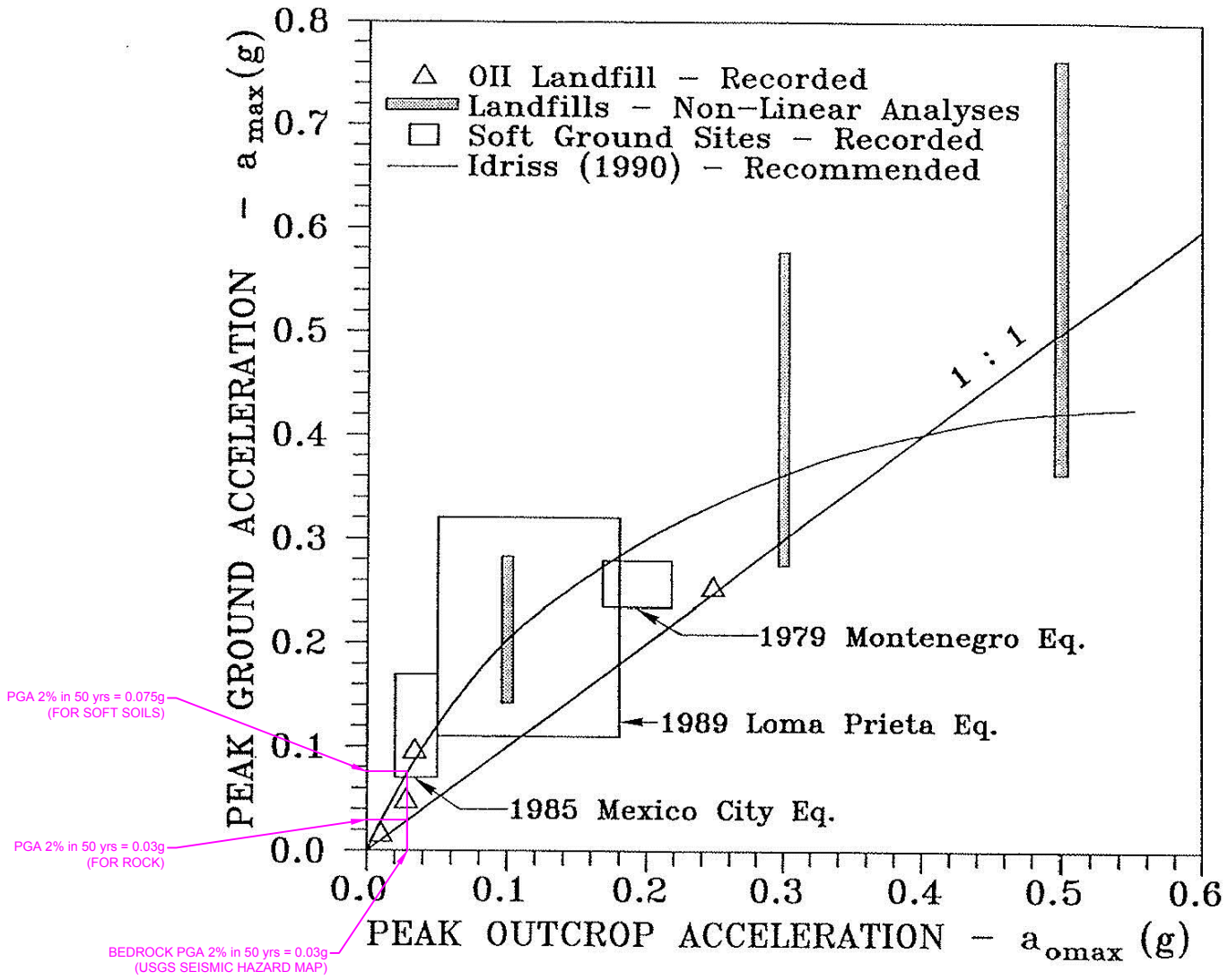

Figure 4.5 Observed Variations of Peak Horizontal Accelerations on Soft Soil and MSW Sites in Comparison to Rock Sites (Kavazanjian and Matasović, 1994).

COMPARISON OF PEAK GROUND ACCELERATION AND PEAK OUTCROP ACCELERATION

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PROJECT No. 1649586 CADD: CCS DATE: 09/22/2016 FILE No. Seismic Loading Figures.dwg

FIGURE B-3

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APPENDIX B

Groundwater Monitoring Network

APPENDIX B-1

Groundwater Monitoring System Certification

REPORT

Coal Combustion Residuals Groundwater Monitoring System Certification, Revision 1

Great River Energy - Coal Creek Station

Submitted to:

Great River Energy
Coal Creek Station
2875 Third Street SW
Underwood, North Dakota 58576



Submitted by:

Golder Associates Inc.
44 Union Boulevard, Suite 300
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19115185D

March 8, 2019

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Monitoring Well Boring Logs and Installation Information

1.0 INTRODUCTION

Golder Associates Inc. (Golder) has prepared this revision to the Coal Combustion Residual (CCR) Groundwater Monitoring System Certification Report on behalf of Great River Energy (GRE) to certify that the groundwater monitoring system for the CCR facilities at Coal Creek Station regulated by the United States Environmental Protection Agency's (EPA) CCR rule meets the requirements of 40 CFR 257.91.

2.0 SITE BACKGROUND

GRE's Coal Creek Station (CCS) is a coal-fired electric generation facility located in McLean County, North Dakota, approximately 10 miles northwest of Washburn, ND. CCRs are managed in composite-lined surface water impoundment cells and dry waste facilities regulated and permitted by the North Dakota Department of Health (NDDH) in accordance with North Dakota Administrative Code (NDAC) Article 33-10, Solid Waste Management and Land Protection.

Coal Creek Station has four CCR facilities that are within the purview of the EPA CCR rule (see Figure 1):

- Drains Pond System CCR Surface Impoundment (Drains Pond System) is located in the south-central portion of the plant site, northeast of the plant buildings.
- Upstream Raise 91 CCR Surface Impoundment (Upstream Raise 91) is located in the south-central portion of the plant site, east of the plant buildings.
- Upstream Raise 92 CCR Surface Impoundment (Upstream Raise 92) is located in the southeast portion of the plant site, between Upstream Raise 91 and Southeast Section 16.
- Southeast Section 16 CCR Landfill (Southeast 16) is located in the southeast portion of the plant site, east of Upstream Raise 92.

2.1 Site Setting

The area surrounding CCS is primarily characterized by the presence of mixed glacial deposits. The following section detail the regional and site geology and hydrogeology.

2.1.1 Regional and Site Geology

CCS and McLean County are situated at the eastern-most extent of the Williston Basin, a structural and sedimentary basin (USGS 1999). The region is characterized by the presence of glacial drift, reaching thicknesses of several hundred feet, and overlying the Sentinel Butte Member, the source of commercially mined coal in the direct vicinity of CCS (Falkirk 1979). The Sentinel Butte Member is the highest strata of the Paleocene Fort Union Formation, overlying the Tongue River, Ludlow, and Cannonball Members (USGS 1999). The Sentinel Butte Member is marked by drab-gray units, separating it from the lower Tongue River Member.

The site geology of CCS includes unconsolidated surficial deposits of the Coleharbor formation consisting of stratified and unstratified glacial drift. The near-surface materials are silty clay and sandy clay till with interbedded sand lenses (CP/UPA 1989).

2.1.2 Site Hydrogeology

Regional groundwater flow of the uppermost water-bearing unit in the vicinity of CCS is a subtle expression of the surface topography, which is influenced by the configuration of the eroded bedrock. Based on the October 2018

groundwater elevations (shown in Figure 1), the shallow groundwater at the CCR facilities generally follows surface topography, flowing the east and north towards Lower Samuelson Slough and Sayler Slough.

The groundwater gradient across the CCR sites was estimated from the October 2018 groundwater levels, and ranges from 0.002 to 0.03 feet per feet (ft/ft). Slug testing was performed at several site monitoring wells in 2007 and resulting in estimated hydraulic conductivity values between 8×10^{-3} centimeters per second (cm/sec; 22.7 feet/day) and 1×10^{-4} cm/sec (0.28 feet/day).

2.1.3 Geologic Cross Sections

Geologic cross sections were compiled based on boring information from current CCR monitoring wells and historic site monitoring wells and boreholes (Appendix A).

As shown in the cross sections and described previously, variability within the area of the site results in a range of geologic materials within the near-surface geologic units. Discontinuous seams of coal are located throughout the site, in addition to gravel, sand, silt, and clay.

2.2 Release Conceptual Model

A hypothetical subsurface release from any of the four facilities located at CCS, would be transported downgradient of each facility, as demonstrated by the groundwater information presented in Figure 1. The downgradient wells discussed in Section 3.2 are positioned along the downgradient edges of each CCR facility to detect a release.

3.0 GROUNDWATER MONITORING SYSTEM

The CCR groundwater monitoring system at CCS consists of a total of 23 monitoring locations (eight upgradient and fifteen downgradient wells). The monitoring locations are shown on Figure 1 and listed on Table 1.

3.1 Information Reviewed

Golder reviewed information from the operating record documenting the design, installation, and development of the monitoring wells and/or describing hydrogeologic conditions at the site to help assess the adequacy of the monitoring network. The information reviewed included:

Cooperative Power and United Power Associations. 1989. Application to Renew Permit SU-033 – Coal Creek Station, McLean County, North Dakota. Submitted to the North Dakota State Department of Health. February 1989.

Falkirk Mining Company. 1979. Land Use Analysis/Technical Examination/Environmental Assessment Record – Falkirk Coal Lease Application M-31053 (ND). Submitted to the United States Department of the Interior, July 1979.

Foth & Van Dyke and Associates, Inc. 1988. Hydrogeological Analysis – Coal Creek Station, McLean County, North Dakota. Prepared for Cooperative Power, Eden Prairie, Minnesota, and United Power Association, Elk River, Minnesota. December 1988.

Foth & Van Dyke and Associates, Inc. 1989. Drilling Data – Summer 1989 – Coal Creek Station, McLean County, North Dakota. Prepared for Cooperative Power, Eden Prairie, Minnesota, and United Power Association, Elk River, Minnesota. December 1989.

United States Geological Survey. 1999. Fort Union Coal in the Williston Basin, North Dakota: A Synthesis. Chapter WS in 1999 Resource Assessment of Selected Tertiary Coal Beds and Zones in the Northern Rocky Mountains and Great Plains Region, U.S. Geological Survey Professional Paper 1625-A.

3.2 Number, Locations, and Depths of Monitoring Wells

40 CFR 257.91 includes the following requirements for the number, locations, and depths of monitoring wells:

- The owner or operator of a CCR unit must install a groundwater monitoring system that consists of a sufficient number of wells, installed at appropriate locations and depths, to yield groundwater samples from the upper most aquifer that:
  - Accurately represent the quality of background groundwater.
  - Accurately represent the quality of groundwater passing the waste boundary of the CCR unit.
- The number, spacing, and depths of monitoring wells must be based on site-specific technical information that must include thorough characterization of the uppermost aquifer and overlying materials.
- The groundwater monitoring system must include the minimum number of monitoring wells necessary to meet the performance standards based on the site-specific information. The groundwater monitoring system must contain a minimum of one upgradient monitoring well and three downgradient monitoring wells per unit.

Each CCR unit has a monitoring network consisting of a least one upgradient and three downgradient monitoring wells as specified within the rule, as discussed below.

- The Drains Pond System has two upgradient and four downgradient monitoring wells.
- Upstream Raise 91 has two upgradient and three downgradient monitoring wells.
- Upstream Raise 92 has two upgradient and three downgradient monitoring wells.
- Southeast 16 has two upgradient and five downgradient monitoring wells.

Monitoring well construction details are provided on Table 1 and Appendix B. The monitoring wells assigned to each facility are as follows:

Table 2: CCR Units Monitoring Wells

Drains Pond System	Upgradient	MW-DP3
		MW-DP5
	Downgradient	MW-DP1
		MW-DP2
		MW-DP2B
		MW-DP4
Upstream Raise 91	Upgradient	MW-91-2
		MW-75
	Downgradient	MW-49
		MW-51
		MW-91-1
Upstream Raise 92	Upgradient	MW-16-6
		MW-16-7
	Downgradient	MW-10
		MW-16-0
		MW-16-1
Southeast 16	Upgradient	MW-42
		MW-72
	Downgradient	MW-16-2
		MW-16-3
		MW-16-4
		MW-16-5
		MW-15

The monitoring wells are installed and screened at appropriate locations and depths to obtain groundwater from the uppermost water bearing zone. The number and spacing of the downgradient monitoring wells were selected based on the hydrogeologic conditions at the site and the areal extent of the CCR units, such that impacts to groundwater quality in the uppermost water bearing unit can be detected along potential flow pathways if they were to occur.

General solid waste industry practice includes placing monitoring wells downgradient of the waste disposal area within the property boundary and within 150 meters of the waste boundary. The distance from the waste boundary to the monitoring wells should be based on the presumed flow directions, groundwater seepage velocity, access/location limitations, and distance to provide sufficient space between the waste boundary and the monitoring network to allow for hydrodynamic dispersion, which increases the probability of detection of a potential release. The downgradient monitoring wells at the CCR facilities at CCS were primarily installed as part of previous state monitoring requirements and are located at appropriate distances as close as practical to the waste boundary. Further, the downgradient wells for Section 16 have been placed based on the historic permitted waste boundary for the facility.

3.2.1 Drains Pond System

The Drains Pond System has four downgradient monitoring wells monitoring downgradient water at three locations. MW-DP2B was installed as a companion well to MW-DP2, which has on occasion not had enough groundwater present in the well for water quality sampling. The three downgradient monitoring locations are based on observations that show groundwater flows to the northeast corner of the facility. A hypothetical release from this facility is anticipated to impact a relatively small areal extent, based on the footprint of the system and groundwater flow information. Therefore, based on site geometry and the groundwater flow direction, the four downgradient wells shown on Figure 1 were deemed adequate to monitor the groundwater flow regime of the Drains Pond System.

3.2.2 Upstream Raise 91

Upstream Raise 91 has three downgradient monitoring wells based on the length of the northern boundary of the facility and observations that show groundwater flows from southwest to northeast across the facility towards Lower Samuelson Slough. Based on site geometry and the groundwater flow direction, the spacing of the downgradient wells across the northern boundary as shown on Figure 1 were deemed adequate to monitor the groundwater flow regime of Upstream Raise 91.

3.2.3 Upstream Raise 92

Upstream Raise 92 has three downgradient monitoring wells based on observations that show groundwater flows from southwest to northeast across the facility. Based on the footprint of the system, the areal extent of the northern boundary of the facility, and the groundwater flow information, the three downgradient wells shown on Figure 1 were deemed adequate to monitor the groundwater flow regime of Upstream Raise 92.

3.2.4 Southeast 16

Southeast 16 has five downgradient wells along the northern and eastern boundaries of the facility, based on observations that show groundwater flows generally to the northeast of the facility. Based on the site geometry and the groundwater flow direction within the facility, the five downgradient wells shown on Figure 1 were deemed adequate to monitor the groundwater flow regime of Southeast 16.

3.3 Monitoring Well Casing

40 CFR 257.91(e) includes the following requirements for monitoring well construction:

- “Monitoring wells must be cased in a manner that maintains the integrity of the well borehole.
- The casing must be screened or perforated and packed with gravel or sand to enable collection of groundwater samples.

- The annular space above the sampling depth must be sealed to prevent contamination of samples and the groundwater."

The monitoring wells at CCS have polyvinyl chloride (PVC) casings to maintain the integrity of the monitoring well boreholes. The casings are screened within the uppermost water bearing unit and packed with sand to enable collection of groundwater samples within the unit. The annular space above the screened interval in each monitoring well is sealed with a bentonite seal and cement-bentonite grout seal.

4.0 REVISION HISTORY

A history of revisions to this document:

Revision 0 – Published October 12, 2017.

Revision 1 – Revised to reflect: Published March 8, 2019

1) Addition of new wells at the site (MW-DP2B, MW-16-0, MW-91-1, MW-91-2);

2) New CCR unit naming convention (Upstream Raise to Upstream Raise 92 and Ash Pond 91 to Upstream Raise 91); and

3) Division of Upstream Raise 91 and Upstream Raise 92 into separately monitored CCR units.

5.0 CLOSING AND CERTIFICATION

Based upon the review described in this report, the undersigned certifies that the groundwater monitoring system for the Drains Pond System, Upstream Raise 91, Upstream Raise 92, and Southeast 16 at Coal Creek Station has been designed and constructed to meet the requirements of 40 CFR 257.91.

Golder Associates Inc.

Todd Stong, P.E.
Associate and Senior Consultant

Erin L. Hunter, PhD
Project Engineer

ELH/TJS/ds

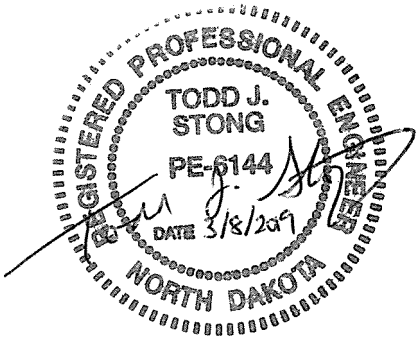

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Table

Table 1: Monitoring Network Well Summary

Facility	Location	Well ID	Date Constructed	TOC Elevation (ft amsl)	Ground Surface Elevation (ft amsl)	Screen Interval (ft bgs)	Top of Screen Elevation (ft amsl)	Bottom of Screen Elevation (ft amsl)	Sand Pack Interval (ft bgs)	Geologic Unit(s) Completed In
Drains Pond System	Upgradient	MW-DP3	4/3/2015	1,932.7	1,929.6	9.0-19.0	1,920.6	1,910.6	6.0-19.0	fill, coal, clay
		MW-DP5 [1]	11/18/2015	1,939.2	*1,935.0*	18.0-43.0	1,919.0	1,892.0	16.0-43.0	sandy lean clay, clayey sand
	Downgradient	MW-DP1 [2]	6/10/2014	1,913.6	1,911.1	25.0-45.0	1,886.1	1,866.1	21.0-45.0	silt with sand, silty sand
		MW-DP2	4/3/2015	1,898.1	1,894.9	7.0-17.0	1,887.9	1,877.9	5.0-17.0	sandy lean clay, clay sand
		MW-DP2B [3]	11/20/2018	1,898.6	1,895.6	12.0-22.0	1,883.6	1,873.6	10.0-22.0	sandy lean clay, sand with silt/gravel, silty sand
		MW-DP4	4/3/2015	1,917.4	1,914.2	19.0-29.0	1,895.2	1,885.2	17.0-29.0	sandy clay, sand with silt/gravel, clay, clayey sand
Upstream Raise 91	Upgradient	MW-75	7/19/1989	1,941.4	1,938.9	30.0-40.0	1,908.9	1,898.9	27.7-40	clayey silt, silty sand
		MW-91-2	11/6/2017	1,938.5	1,938.7	21.0-31.0	1,917.7	1,907.7	19.0-31.0	fat clay, coal
	Downgradient	MW-49	5/20/1988	1,905.9	1,903.6	9.85-19.85	1,893.8	1,883.8	4.85-19.85	sandy gravelly clay, sandy silt, shale (rock)
		MW-51	5/20/1988	1,896.9	1,895.5	8.8-18.8	1,886.7	1,876.7	3.8-18.8	sand with silt and gravel
		MW-91-1	11/6/2017	1,905.1	1,902.0	16.0-26.0	1,886.0	1,876.0	14.0-26.0	sand with silt and gravel, fat clay
Upstream Raise 92	Upgradient	MW-16-6	7/14/2015	1,917.2	1,913.9	4.0-14.0	1,909.9	1,899.9	3.0-14.0	sandy lean clay, coal, lean clay
		MW-16-7	7/14/2015	1,889.1	1,886.6	22.0-32.0	1,864.6	1,854.6	20.0-32.0	fat clay, clayey sand, sandy clay
	Downgradient	MW-10	11/2/1979	1,895.2	1,892.2	15-25	1,877.2	1,867.2	13-25	sand
		MW-16-0	12/8/2017	1,883.4	1,880.4	4.5-9.5	1,875.9	1,870.9	2.5-9.5	lean clay with sand
		MW-16-1	10/31/2007	1,879.5	1,876.1	6.5-11.5	1,869.6	1,864.6	4.5-11.5	silty sand
Southeast Section 16 Facility	Upgradient	MW-42	5/28/1986	1,881.6	1,878.8	9.4-14.4	1,869.4	1,864.4	9-14.4	silty sand, lean clay
		MW-72	7/18/1989	1,884.6	1,882.4	7.5-17.5	1,874.9	1,864.9	6.5-23.0	silty clay, silty sand
	Downgradient	MW-15	11/7/1979	1,877.3	1,874.3	10-20	1,864.3	1,854.3	9-20	sand, clay till
		MW-16-2	10/31/2007	1,880.6	1,877.8	7-12	1,870.8	1,865.8	5-12	sandy lean clay
		MW-16-3	10/31/2007	1,878.5	1,875.6	7-12	1,868.6	1,863.6	5-12	sandy lean clay
		MW-16-4	10/31/2007	1,877.5	1,874.6	7-17	1,867.6	1,857.6	5-17	sandy lean clay
		MW-16-5	10/31/2007	1,880.2	1,877.1	6.5-11.5	1,870.6	1,865.6	4.5-11.5	sand with silt and gravel

Notes:
TOC: top of casing
ft amsl: feet above mean sea level
ft bgs: feet below ground surface
1. For MW-DP5, the ground surface elevation is taken from the original bore log, but is inconsistent with the available survey for the top of casing.
2. For MW-DP1 only the top of casing elevation was provided. The PVC riser was assumed to be 2.5 ft above ground surface.
3. For MW-DP2B only the top of casing elevation was provided. The PVC riser was assumed to be 3.0 ft above ground surface.
Well construction measurements are from the original bore log, well data sheet, or well construction form.
For some wells, elevations have been updated with more recent survey information than the original driller's logs.

Figure



LEGEND

- UPGRADIENT MONITORING WELL
- DOWNGRADIENT MONITORING WELL - UPSTREAM RAISE 91
- DOWNGRADIENT MONITORING WELL - UPSTREAM RAISE 92
- DOWNGRADIENT MONITORING WELL - SOUTHEAST 16
- DOWNGRADIENT MONITORING WELL - DRAINS POND SYSTEM
- GENERAL DIRECTION OF GROUNDWATER FLOW
- 1930 — POTENTIOMETRIC SURFACE CONTOURS (SEE NOTE 2)

NOTE(S)

1. GROUNDWATER ELEVATIONS SHOWN WERE MEASURED OCTOBER 2018.
2. POTENTIOMETRIC SURFACE CONTOURS WERE CREATED USING WATER LEVEL INFORMATION FROM THE OCTOBER 2018 GROUNDWATER ELEVATIONS SHOWN, AS WELL AS SURVEYED SURFACE WATER EXPRESSIONS, ADDITIONAL SITE WELLS, AND PIEZOMETERS NOT SHOWN. CONTOUR INTERVALS ARE 5 FEET.
3. AERIAL IMAGERY OBTAINED FROM UNITED STATES DEPARTMENT OF AGRICULTURE, NATIONAL AERIAL IMAGERY PROGRAM, 2018.

N

0 300 600
1" = 300' FEET

GOLDER

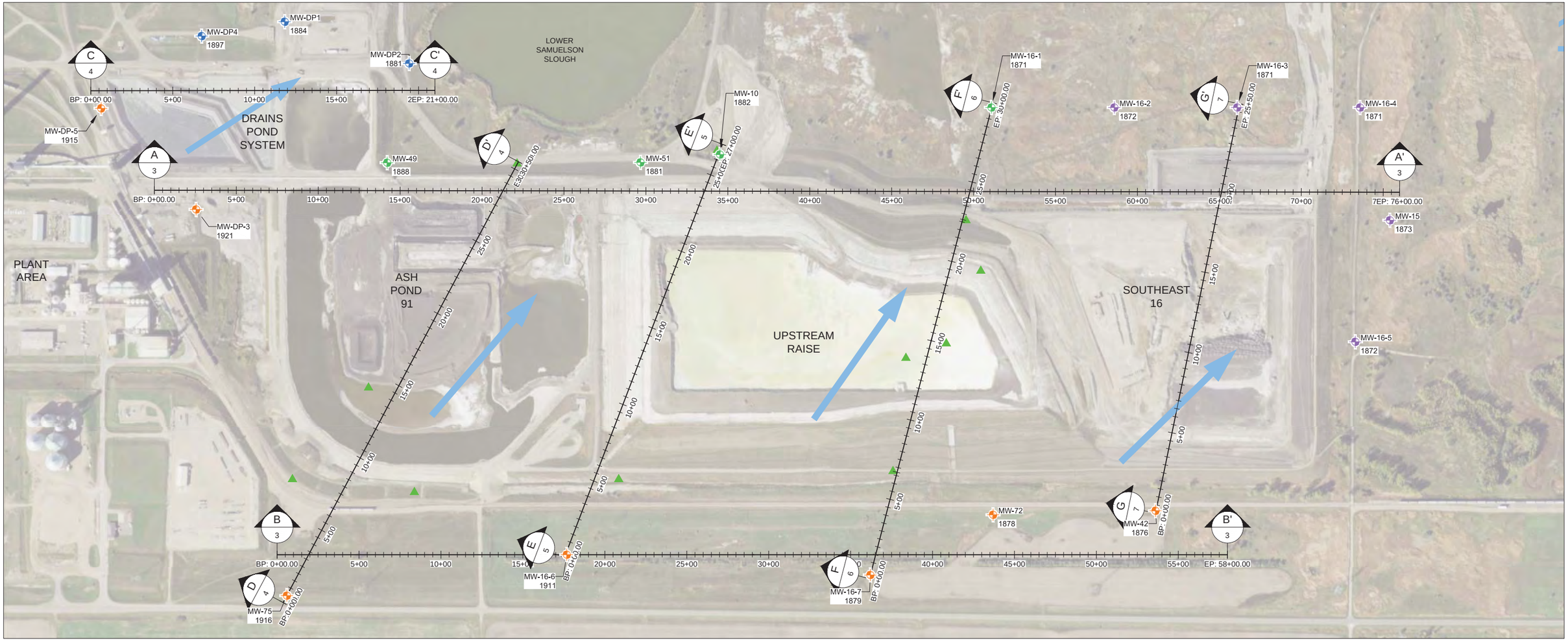
MONITORING WELL LOCATIONS
GREAT RIVER ENERGY - COAL CREEK STATION

FIGURE 1

Path: \\Denver\acad\GREAT RIVER ENERGY\COAL CREEK\99_PROJECTS\19115185\Facility Groundwater\ | File Name: 19115185_CCRNetworkCertRev1Fig1_27Feb19.dwg

APPENDIX A

Geologic Cross Sections



LEGEND

- MW-75 — UPGRADIENT MONITORING WELLS
- MW-DP1 — DOWNGRADIENT MONITORING WELLS - DRAINS POND SYSTEM
- MW-51 — DOWNGRADIENT MONITORING WELLS - ASH POND 91 AND UPSTREAM RAISE
- MW-16-3 — DOWNGRADIENT MONITORING WELLS - SOUTHEAST 16
- HISTORIC BOREHOLES
- GENERAL DIRECTION OF GROUNDWATER FLOW
- SECTION MARKER WITH FIGURE NUMBER

NOTES

1. GROUNDWATER ELEVATIONS SHOWN WERE MEASURED JUNE 2017.
2. AERIAL IMAGERY TAKEN IN 2015 (OBTAINED FROM THE USDA NATIONAL AGRICULTURE IMAGERY PROGRAM).

0 300 600
1" = 300' FEET

CROSS-SECTION LOCATIONS

Golder Associates

FIGURE 1

Path: \\Denver.golder.gds\projects\1772\308\S\1772255 GRE CCS\Water Quality\CCR Network Certification\Figures\ | File Name: 1772255_CCRNetwork_Aerial.dwg

UNIFIED SOIL CLASSIFICATION SYSTEM

- CH - HIGH PLASTICITY CLAY
- SW - WELL GRADED SAND
- CL-CH - LEAN-FAT CLAY
- CL - LOW PLASTICITY CLAY
- GP - POORLY GRADED GRAVEL
- ML - SANDY SILT
- SP - POORLY GRADED SAND
- ML-CL/CL-ML - SILTY LEAN CLAY/LEAN CLAY WITH SILT
- SP-SC - POORLY GRADED SAND WITH CLAYEY SAND
- SC - CLAYEY SAND
- GW- WELL GRADED GRAVEL
- SM-SC/SC-SM - SILTY SAND WITH CLAYEY SAND
- COAL
- OL- ORGANIC TOPSOIL
- COAL COMBUSTION RESIDUALS
- SM - SILTY SAND
- SP-SM - POORLY GRADED SAND WITH SILTY SAND
- CH-MH - CLAYEY SILT WITH SILTY FAT CLAY
- SM-ML/ML-SM - SILTY SAND WITH SANDY SILT/SANDY SILT WITH SILTY SAND
- ML-CH - SILTY CLAY/CLAY WITH SILT
- ROCK - SANDSTONE

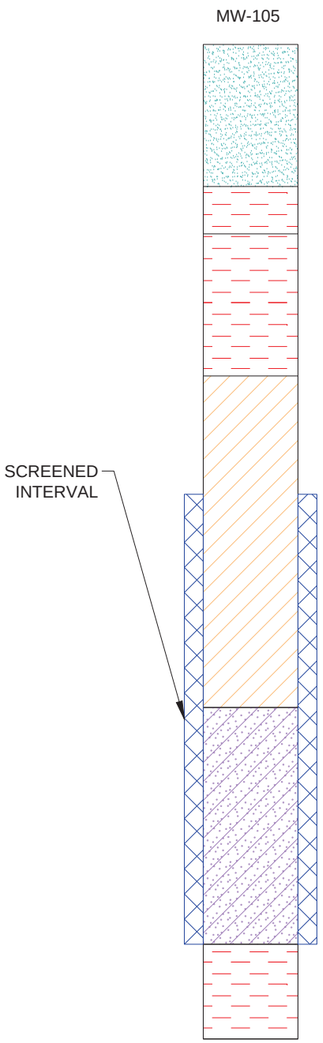
GEOLOGIC CLASSIFICATION

- OUTWASH - PRIMARILY SANDS AND GRAVELS
- CONFINING UNIT - PRIMARILY SILTS AND CLAYS
- TOPSOIL AND DISTURBED MATERIAL
- COAL COMBUSTION RESIDUALS

LINETYPES

- EXISTING GRADES
- APPROXIMATED GRADES
- TOP OF LINER
- ASSUMED MATERIAL BOUNDARY
- INFERRED MATERIAL BOUNDARY
- GROUNDWATER LEVELS (JUNE 2017)

TYPICAL WELL

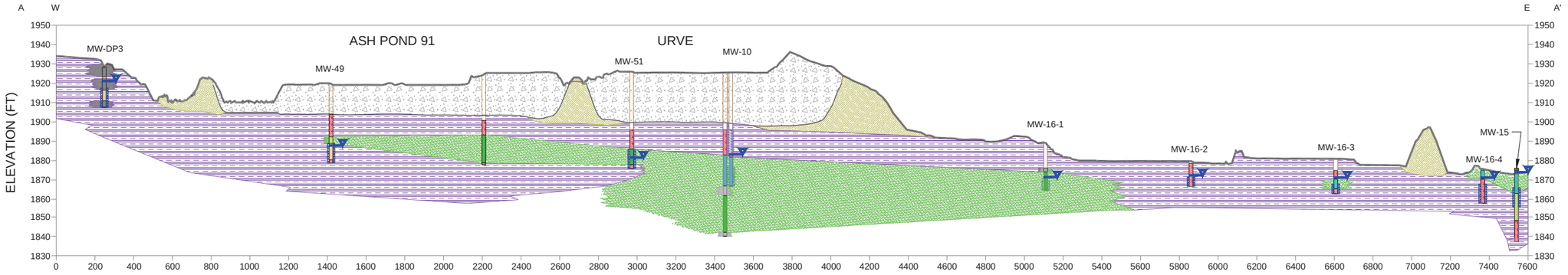


Golder Associates

LEGEND FOR CROSS-SECTIONS

FIGURE 2

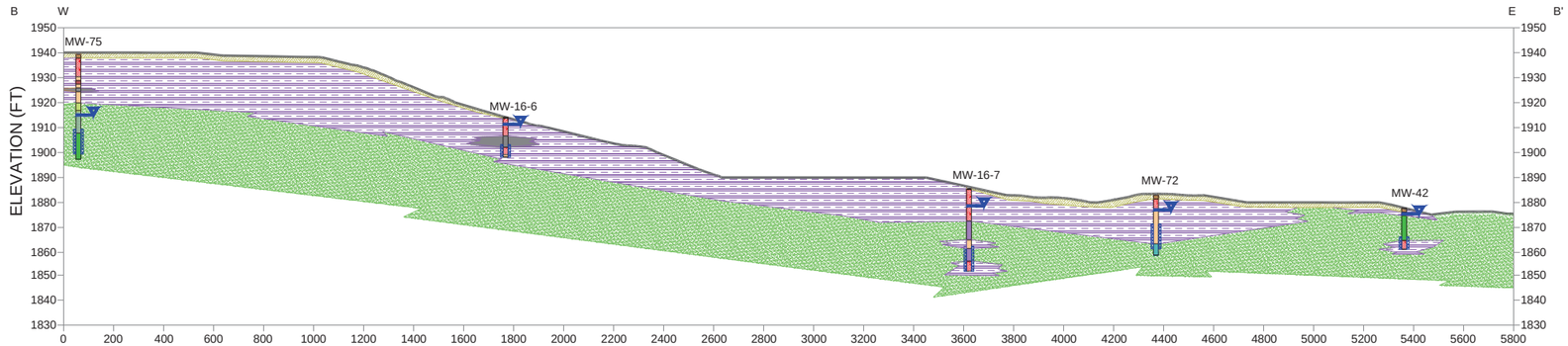
Path: \\Denver.golder.gds\projects\117JOB\S\1772255 GRE CCS\Water Quality\CCR Network Certification\Figures\ | File Name: 1772255_CCSCross-Sections.dwg



DISTANCE (FT)

NORTH DOWNGRADIENT

10x VERTICAL EXAGGERATION



DISTANCE (FT)

SOUTH UPGRADIENT

10x VERTICAL EXAGGERATION

NOTE(S)

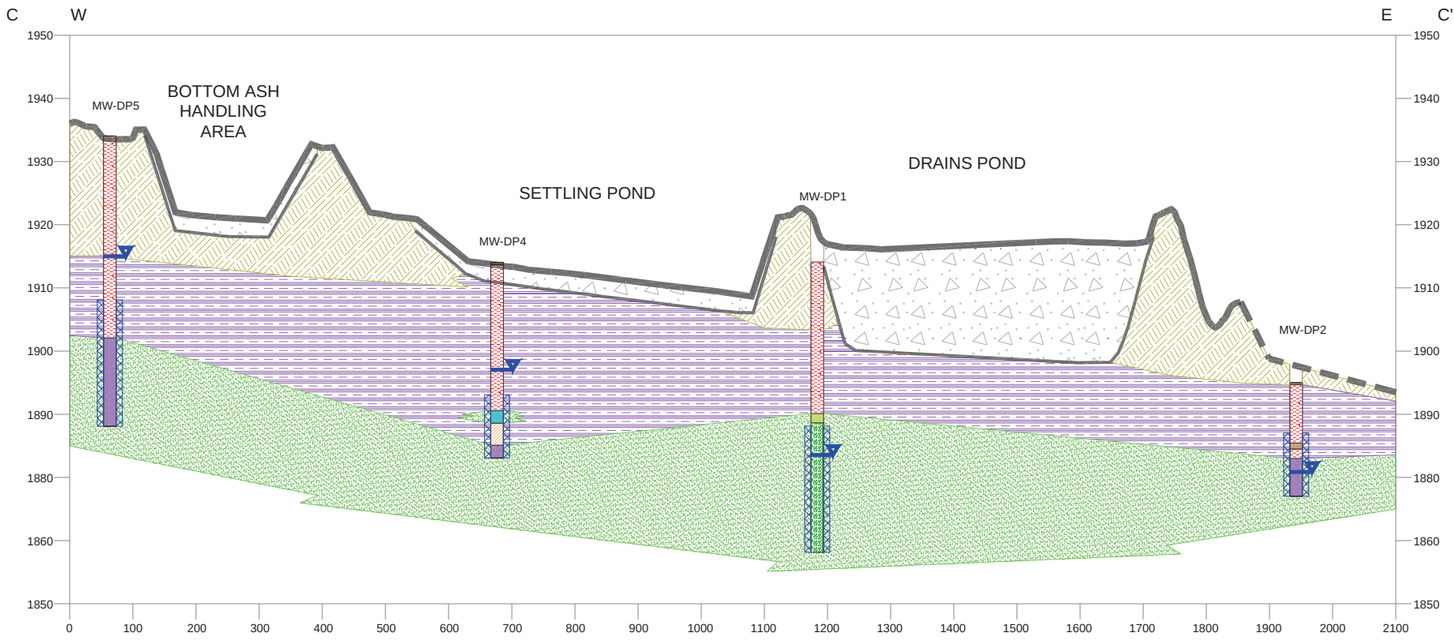
1. EXISTING GRADES ARE APPROXIMATE AND MAY NOT REFLECT ACTUAL GRADES WITHIN CCR UNITS DUE TO ACTIVE HANDLING OF MATERIALS.
2. MONITORING WELLS AND BORING LOGS HAVE BEEN PROJECTED ONTO THE GEOLOGIC SECTIONS AND MAY NOT MATCH PRECISELY WITH THE EXISTING GRADES.

CROSS-SECTION A-A' AND CROSS-SECTION B-B'

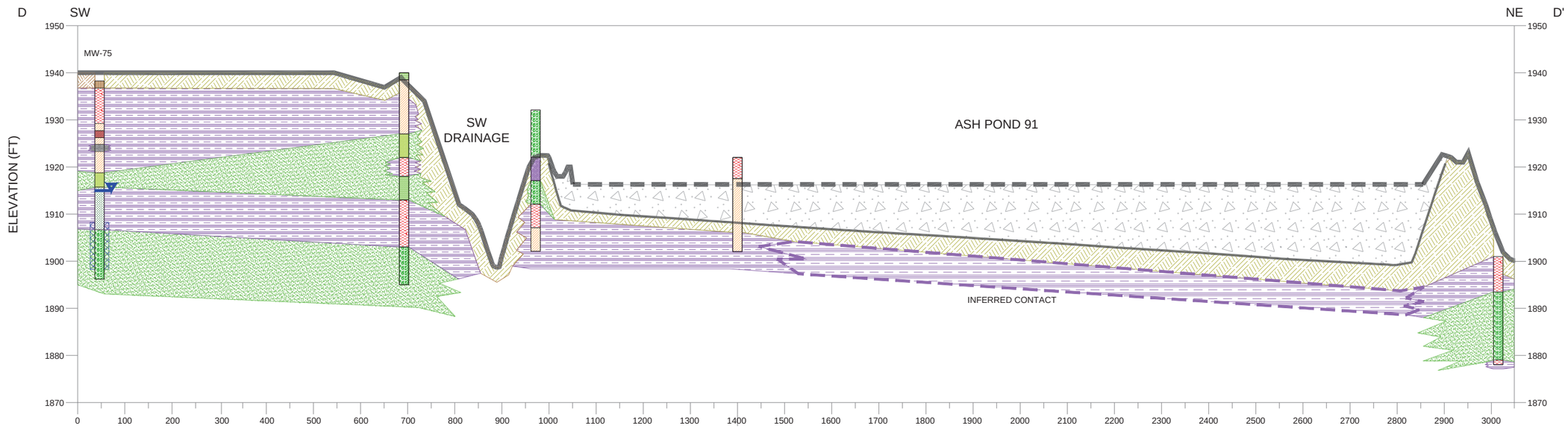
Golder Associates

FIGURE 3

Path: \\Denver.golder.gds\projects\17JOB\S\177255.GRE CCS\Water Quality\CCR Network Certification\Figures\ | File Name: 177255_CCSCross-Sections.dwg



DISTANCE (FT)
DRAINS POND SYSTEM
10x VERTICAL EXAGGERATION



DISTANCE (FT)
ASH POND 91
10x VERTICAL EXAGGERATION

NOTE(S)

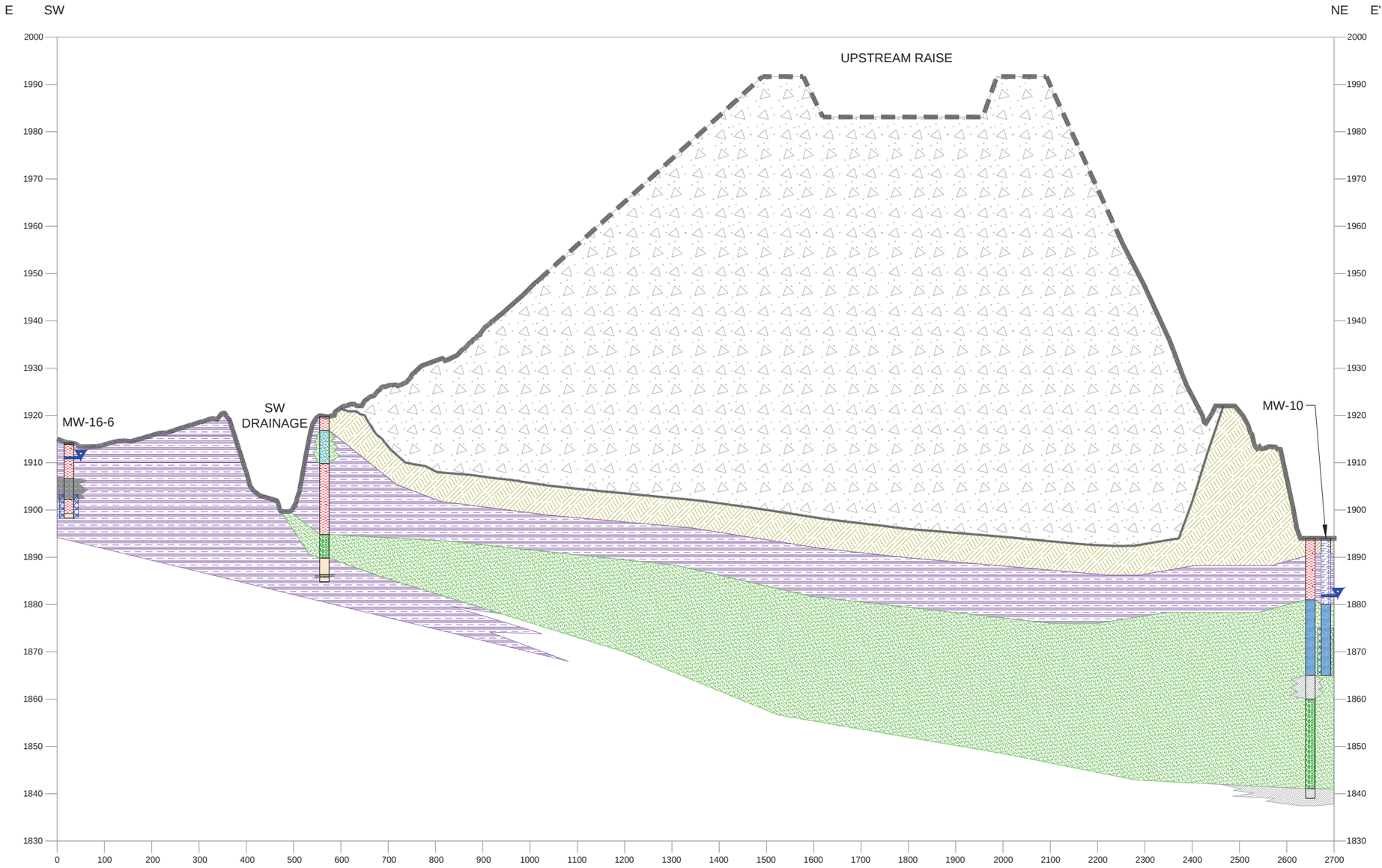
1. EXISTING GRADES ARE APPROXIMATE AND MAY NOT REFLECT ACTUAL GRADES WITHIN CCR UNITS DUE TO ACTIVE HANDLING OF MATERIALS.
2. MONITORING WELLS AND BORING LOGS HAVE BEEN PROJECTED ONTO THE GEOLOGIC SECTIONS AND MAY NOT MATCH PRECISELY WITH THE EXISTING GRADES.

CROSS-SECTION C-C' AND CROSS-SECTION D-D'

Golder Associates

FIGURE 4

Path: \\Denver.golder.gds\projects\17JOB\S1772255.GRE CCSWater Quality\CCR Network Certification\Figures\ | File Name: 1772255_CCSCross-Sections.dwg



DISTANCE (FT)

UPSTREAM RAISE

10x VERTICAL EXAGGERATION

NOTE(S)

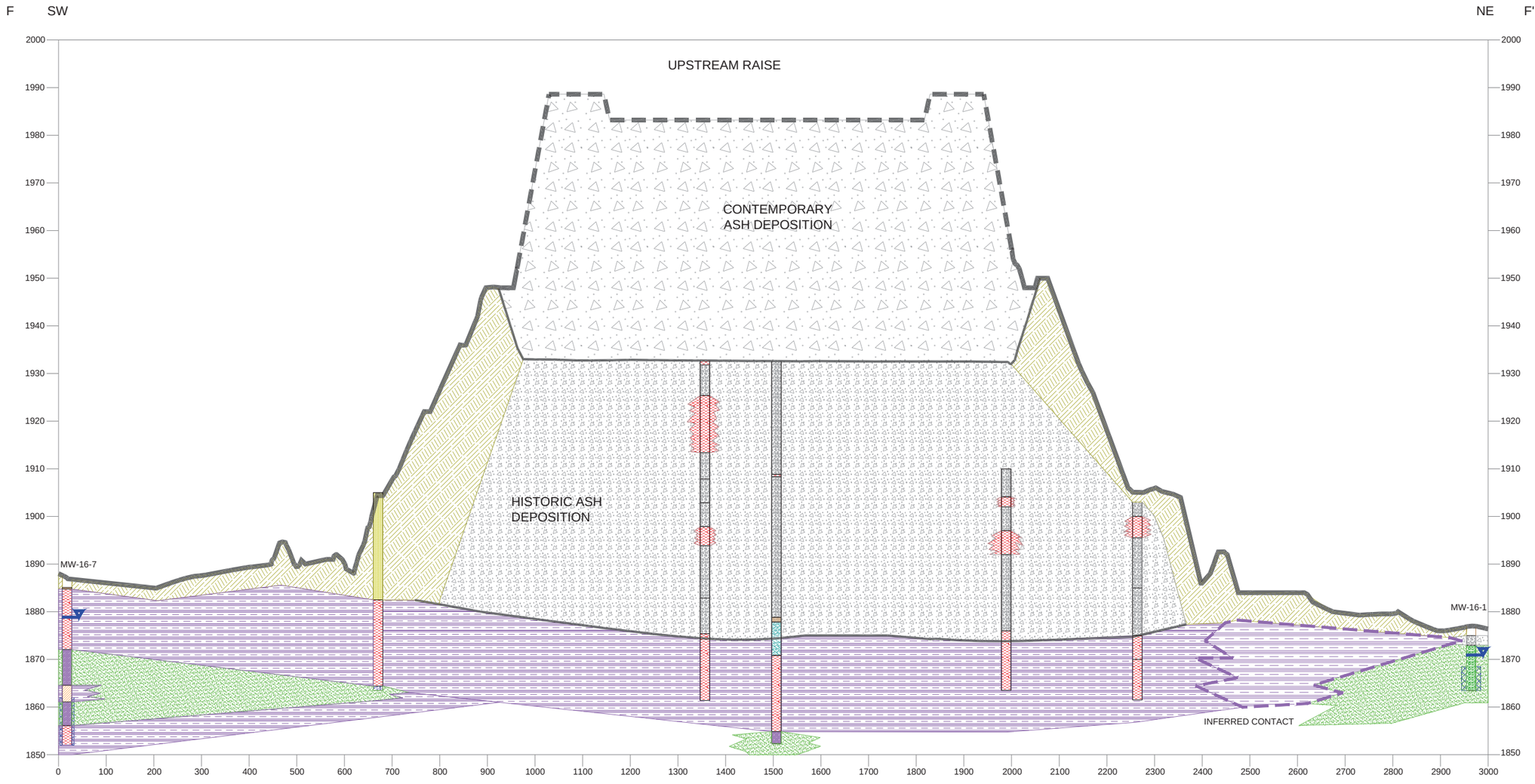
1. EXISTING GRADES ARE APPROXIMATE AND MAY NOT REFLECT ACTUAL GRADES WITHIN CCR UNITS DUE TO ACTIVE HANDLING OF MATERIALS.
2. MONITORING WELLS AND BORING LOGS HAVE BEEN PROJECTED ONTO THE GEOLOGIC SECTIONS AND MAY NOT MATCH PRECISELY WITH THE EXISTING GRADES.

CROSS-SECTION E-E'

Golder Associates

FIGURE 5

Path: \\Denver.golder.gds\projects\1772\JOB\S\1772255 GRE CCS\Water Quality\CCR Network Certification\Figures\ | File Name: 1772255_CCSCross-Sections.dwg



DISTANCE (FT)

UPSTREAM RAISE

10x VERTICAL EXAGGERATION

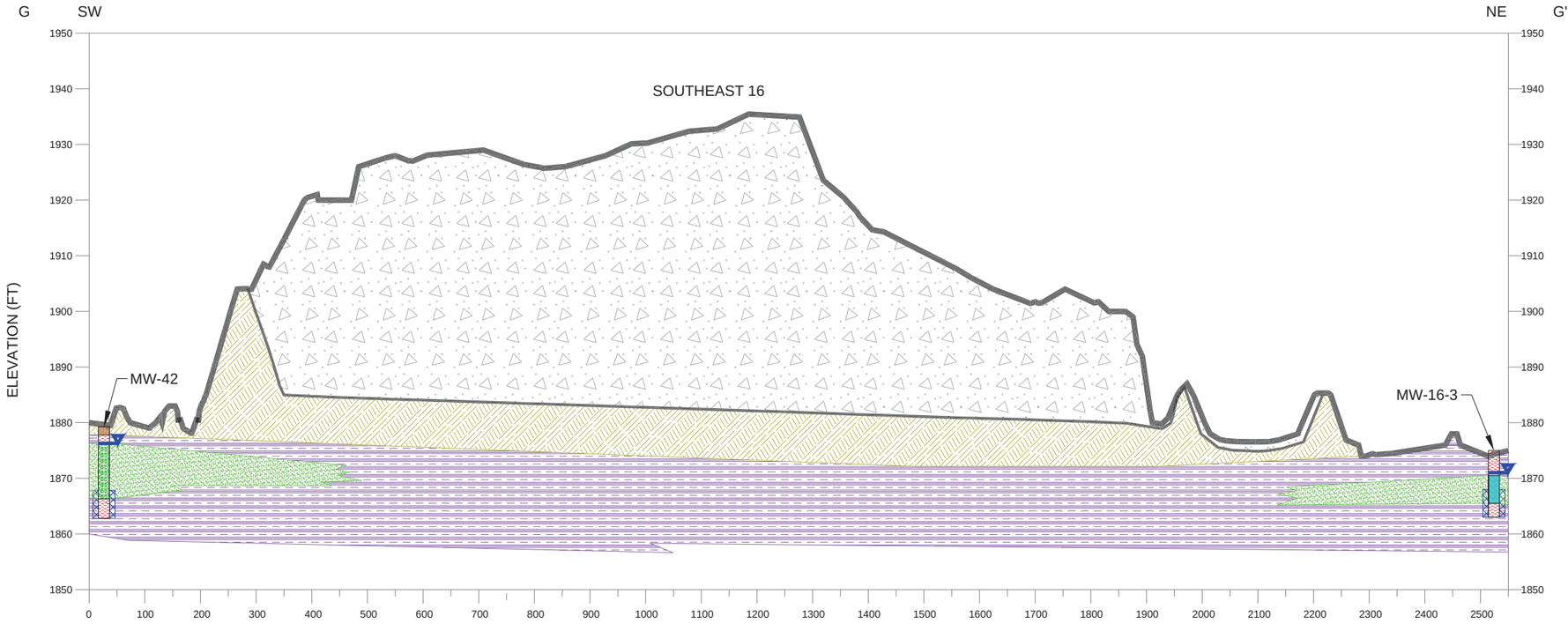
NOTE(S)

1. EXISTING GRADES ARE APPROXIMATE AND MAY NOT REFLECT ACTUAL GRADES WITHIN CCR UNITS DUE TO ACTIVE HANDLING OF MATERIALS.
2. MONITORING WELLS AND BORING LOGS HAVE BEEN PROJECTED ONTO THE GEOLOGIC SECTIONS AND MAY NOT MATCH PRECISELY WITH THE EXISTING GRADES.

Golder Associates

CROSS-SECTION F-F'

FIGURE 6



DISTANCE (FT)
SOUTHEAST 16
10x VERTICAL EXAGGERATION

NOTE(S)

1. EXISTING GRADES ARE APPROXIMATE AND MAY NOT REFLECT ACTUAL GRADES WITHIN CCR UNITS DUE TO ACTIVE HANDLING OF MATERIALS.
2. MONITORING WELLS AND BORING LOGS HAVE BEEN PROJECTED ONTO THE GEOLOGIC SECTIONS AND MAY NOT MATCH PRECISELY WITH THE EXISTING GRADES.

CROSS-SECTION G-G'

Golder Associates

FIGURE 7

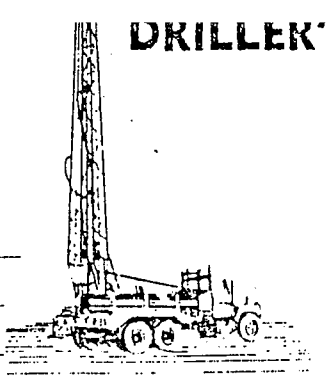
Path: \\Denver.golder.gds\projects\117JOB\S\1772\255 GRE CCS\Water Quality\CCR Network Certification\Figures\ | File Name: 1772255_CCSCross-Sections.dwg

APPENDIX B

Monitoring Well Boring Logs and Installation Information

WATER SUPPLY, INC.

BOX 1191
BISMARCK, N.D. 58501



DRILLER'S LOG

State Coordinates

N. 139,000
E. 1,843,300

sec. 16abc
Tp. 145
Rg. 82

Project: CPA
State: ND
County: McLean

Hole No. [redacted] MW-10
Hole Elev. North well of pair

Core Recovery (Thickness)	From	To	Sample Description	Comments
	0	14	Till, very silty and sandy, yellowish brown some gravel, larger gravel fraction from 11 - 14 ft.	
	14	29	Sand, Fine to very coarse, eccasional lenses with larger gravel content yellowish brown.	Started maring water at approximately 15 ft.
				Hole caved at 12 ft. washed pipe from 12 - 25 ft. where it would go no further
				Installed 18 ft. 2" PVC casing and 10 ft. 2" PVC screen. 3 ft. pipe above land surface screened interval 15 - 25 ft.
				Formation caved at approximately 15½ ft - Installed sand pack to 13 ft. cemented from 13 ft. to surface.

Footage Drilled w/Air
Footage Drilled w/Water
Amount Water Used

Measuring Point + 3.0 ft.
Water Level
Screened Interval 15 - 25 ft.

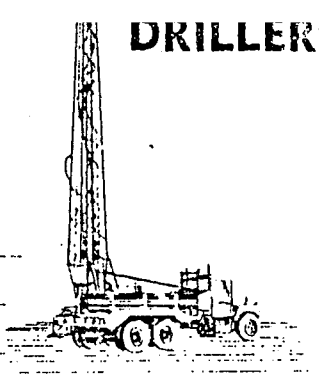
From To Hrs.
Co. Rep. on Job Title

Date 2 Nov. 1979 Driller Tom Brewster
Helpers: Joel Fricke

united printing

WATER SUPPLY, INC.

BOX 1191
BISMARCK, N.D. 58501



DRILLER'S LOG

State Coordinates

N. 138,500
E. 1,846,400

sec. 15cbb
Tp. 145
Rg. 82

Project: CPA

State: ND

County: McLean

Hole No. [redacted] MW-15

Hole Elev.

Core Recovery (Thickness)	From	To	Sample Description	Comments
	0	1	Top soil	
	1	13	Sand, fine to coarse, some fine to medium Gravel, poorly sorted, yellowish brown	
			Started making water at approximately 8 ft.	
	13	27	Till, light olive gray, very sandy and silty	
	27	38	Clay, light olive gray, moderately silty, very cohesive and plastic (Till?)	
			Backed up 2 ft. and drilled to 20 ft. - Formation was the same, but the hole did not make as much water as it was drilled.	
			Falkirk mining drill crew and CPA personnel were to set 13 ft. 2-inch PVC casing with 10 ft. of screen from 10-20 ft. MP- +3 ft. Sand pack to 9 ft. and place 1 bag cement.	

Footage Drilled w/Air

Footage Drilled w/Water

Amount Water Used

Measuring Point +3 ft.

Water Level

Screened Interval 10' - 20'

From To Hrs

Co. Rep. on Job Title

Date 7 Nov. 1979 Driller Tom Brewster

Helpers: Joel Fricke

BORING LOG NO. MW-16-0

PROJECT: Monitoring Well Installations

CLIENT: Golder Associates, Inc.
Lakewood, CO

SITE: GRE Coal Creek Station
McLean County, ND

LOCATION: See Exhibit A-2

Northing: 139015 Easting: 1843118

Surface Elev.: 1880.4 (Ft.)

DEPTH	ELEVATION (Ft.)	GRAPHIC LOG	INSTALLATION DETAILS
			PVC Cap
			PVC Riser
SANDY LEAN CLAY WITH GRAVEL (CL)			
1.5	1879		Bentonite
LEAN CLAY WITH SAND (CL), with gravel			
4.5	1876		Silica Sand
LEAN CLAY WITH SAND (CL)			
			PVC Screen
9.5	1871		PVC End Cap
Boring Terminated at 9.5 Feet			

DEPTH (Ft.): 5

WATER LEVEL OBSERVATIONS

SAMPLE TYPE

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3¼" ID Hollow Stem Auger 0-9½'

Abandonment Method:
Boring converted to monitoring well upon completion.

See Exhibit A-3 for description of field procedures.

See Appendix B for explanation of symbols and abbreviations.

Notes:

Northing, easting and elevation provided by Golder Associates, Inc. No sampling performed at the direction of a Golder Associates, Inc. representative on site.

WATER LEVEL OBSERVATIONS

None encountered

Terracon
1805 Hancock Dr PO Box 2084
Bismarck, ND

Boring Started: 12-08-2017	Boring Completed: 12-08-2017
Drill Rig: D-90	Driller: E. Mayer
Project No.: M2175093	Exhibit: A-6

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-WELL M2175093 MONITORING WELL I.GPJ TERRACON_DATATEMPLATE.GDT 12/13/17

MIDWEST TESTING LABORATORY

MONITORING WELL CONSTRUCTION DIAGRAM

PROJECT: Section 16 Monitoring Wells, Permit No. SP-033, Great River Energy, Underwood, ND

PROJECT NO: B8749

Monitoring Well No:	SP033-MW-1 (16-1)	**Ground Surface Elevation:**	1875.6
Date of Installation:	10-31-07	**Top of Riser Elevation:**	1879.0
Crew Chief:	Mike Roberts		

Protective Casing

Material:	Steel
Diameter x Length:	4" x 4" x 5'
Length Above Ground:	3½'
	2 bumper posts

Riser Pipe

Material:	Schedule 40 PVC
Diameter x Length:	2" x 10'
Length Above Existing Grade:	3.4'

Annular Space Backfill Material: Neat cement grout

Seal Above Screen

Material:	Bentonite chips
Thickness:	2'

Filter Sand

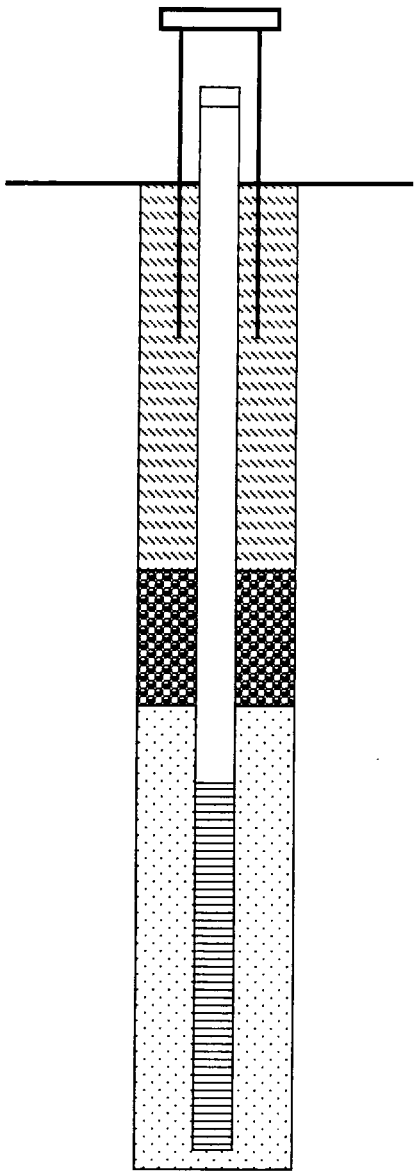
Material:	#10 Silica sand
Depth to Top of Filter Sand:	4½'
Depth to Bottom of Filter Sand:	11½'

Well Screen

Material:	Schedule 40 PVC
Diameter x Length:	2" x 5'
Slot No. or Size:	#10 Slot
Depth to Bottom of Screen:	11½' (1864.1)

Borehole

Diameter:	6¼"
Depth to Bottom of Borehole:	11½'
Method of Advancement:	Hollow stem auger



WATER LEVEL MEASUREMENTS BELOW TOP OF RISER PIPE

DATE	TIME	WATER LEVEL
11-2-07	8:45	9.0'

(1870)

State of North Dakota

BOARD OF WATER WELL CONTRACTORS

900 E. BOULEVARD • BISMARCK, NORTH DAKOTA 58505

MONITORING WELL REPORT

State law requires that this report be filed with the State Board of Water Well Contractors within 30 days after completion or abandonment of the well.

1. WELL OWNER

Name Great River Energy

Address 2875 3rd St SW

Underwood, ND 58576-9659

2. WELL LOCATION (SP033- MW-1) **(16-1)**

Address (if in city) State Plane Coordinates

N139,269, E1,844,016

County McLean

__ ¼ __ ¼ SW ¼ Sec. 16 Twp. 145 N. Rge. 82 W.

Lat. _____ Long.: _____

Altitude: _____

3. METHOD DRILLED

■ Auger Other ____

4. WELL CONSTRUCTION

Diameter of Hole 6 ¼ inches Depth 11½ feet

Riser: ■ PVC □ Other

■ Threaded □ Solvent □ Other

Riser rating SDR _____ Schedule 40

Diameter 2.0 inches

From +3.4 ft. to 6½ ft.

Was a well screen installed? ■ Yes □ No

Material Schedule 40 PVC Diameter 2.0 inches

Slot Size #10 set from 6½ feet to 11½ feet

Sand packed from 4½' to 11½'

Depth grouted from surface to 2½'

Grouting Material

Bentonite _____ Other x

If other explain: Neat cement grout

bentonite seal from 2½'-4½'

Well head completion:

24" above grade _____ Other x

If other, specify 4" x 4" x 5' steel cover

Was protective casing installed? ■ Yes No

Was well disinfected upon completion? □ Yes ■ No

5. WATER LEVEL

Static water level 5.6 feet below surface

If flowing: closed in pressure _____ psi or ft. above land surface

6. WELL LOG Depth (Ft.)

Formation	From	To
FLY ASH	0	2
SILTY SAND	2	11½

(Use separate sheet if necessary)

7. WAS THE HOLE PLUGGED OR ABANDONED?

□ Yes ■ No

If so, how? _____

8. REMARKS

2 - 4" x 4" x 6' timber bumper posts installed

9. DATE COMPLETED 11-5-07

10. CONTRACTOR CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

Midwest Testing Laboratory, Inc. 444

Monitoring Well Contractor Certificate No.

P.O. Box 2084, Bismarck, ND 58502-2084

Address

Signature Date

MIDWEST TESTING LABORATORY

MONITORING WELL CONSTRUCTION DIAGRAM

PROJECT: Section 16 Monitoring Wells, Permit No. SP-033, Great River Energy, Underwood, ND

PROJECT NO: B8749

Monitoring Well No:	SP033-MW-2 (16-2)	**Ground Surface Elevation:**	1877.7
Date of Installation:	10-31-07	**Top of Riser Elevation:**	1880.5
Crew Chief:	Mike Roberts		

Protective Casing

Material:	Steel
Diameter x Length:	4" x 4" x 5'
Length Above Ground:	3'
	2 bumper posts

Riser Pipe

Material:	Schedule 40 PVC
Diameter x Length:	2" x 10'
Length Above Existing Grade:	2.8'

Annular Space Backfill Material: Neat cement grout

Seal Above Screen

Material:	Bentonite chips
Thickness:	2'

Filter Sand

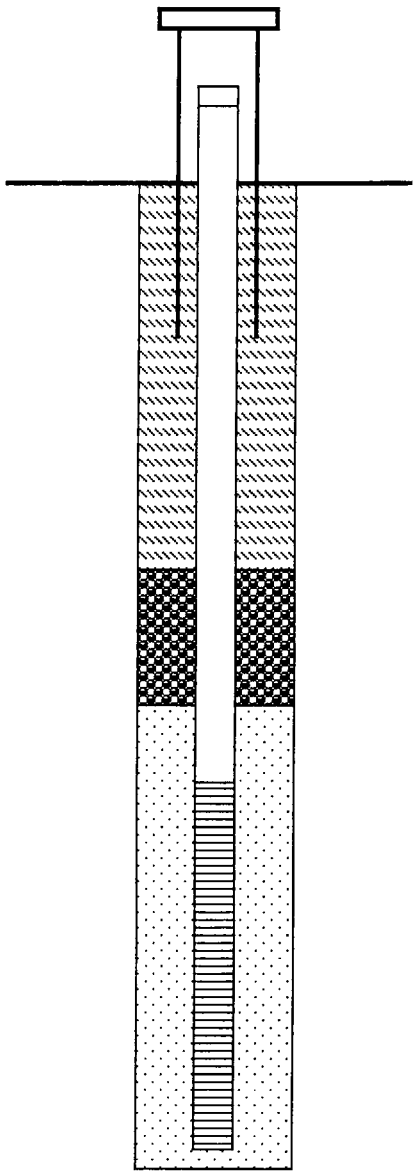
Material:	#10 Silica sand
Depth to Top of Filter Sand:	5'
Depth to Bottom of Filter Sand:	12'

Well Screen

Material:	Schedule 40 PVC
Diameter x Length:	2" x 5'
Slot No. or Size:	#10 Slot
Depth to Bottom of Screen:	12' (1865.7)

Borehole

Diameter:	6¼"
Depth to Bottom of Borehole:	12'
Method of Advancement:	Hollow stem auger



WATER LEVEL MEASUREMENTS BELOW TOP OF RISER PIPE

DATE	TIME	WATER LEVEL
11-2-07	8:25	10½'

(1870)

State of North Dakota

BOARD OF WATER WELL CONTRACTORS

900 E. BOULEVARD • BISMARCK, NORTH DAKOTA 58505

MONITORING WELL REPORT

State law requires that this report be filed with the State Board of Water Well Contractors within 30 days after completion or abandonment of the well.

1. WELL OWNER

Name Great River Energy

Address 2875 3rd St SW

Underwood, ND 58576-9659

2. WELL LOCATION (SP033- MW-2) **(16-2)**

Address (if in city) State Plane Coordinates

N139,269, E1,844,766

County McLean

__ ¼ __ ¼ SW ¼ Sec. 16 Twp. 145 N. Rge. 82 W.

Lat. _____ Long.: _____

Altitude: _____

3. METHOD DRILLED

■ Auger Other ____

4. WELL CONSTRUCTION

Diameter of Hole 6 ¼ inches Depth 12 feet

Riser: ■ PVC □ Other

■ Threaded □ Solvent □ Other

Riser rating SDR _____ Schedule 40

Diameter 2.0 inches

From +2.8 ft. to 7 ft.

Was a well screen installed? ■ Yes □ No

Material Schedule 40 PVC Diameter 2.0 inches

Slot Size #10 set from 7 feet to 12 feet

Sand packed from 5' to 12'

Depth grouted from surface to 3'

Grouting Material

Bentonite _____ Other x _____

If other explain: Neat cement grout

bentonite seal from 3'-5'

Well head completion:

24" above grade _____ Other x _____

If other, specify 4" x 4" x 5' steel cover

Was protective casing installed? ■ Yes No

Was well disinfected upon completion? □ Yes ■ No

5. WATER LEVEL

Static water level 7.7 feet below surface

If flowing: closed in pressure _____ psi or ft. above land surface

6. WELL LOG Depth (Ft.)

Formation	From	To
LEAN CLAY WITH SAND	0	4½
LEAN CLAY	4½	9
SANDY LEAN CLAY	9	12

(Use separate sheet if necessary)

7. WAS THE HOLE PLUGGED OR ABANDONED?

□ Yes ■ No

If so, how? _____

8. REMARKS

2 - 4" x 4" x 6' timber bumper posts installed

9. DATE COMPLETED 11-5-07

10. CONTRACTOR CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

Midwest Testing Laboratory, Inc. 444

Monitoring Well Contractor Certificate No.

P.O. Box 2084, Bismarck, ND 58502-2084

Address

Signature Date

MIDWEST TESTING LABORATORY

MONITORING WELL CONSTRUCTION DIAGRAM

PROJECT: Section 16 Monitoring Wells, Permit No. SP-033, Great River Energy, Underwood, ND

PROJECT NO: B8749

Monitoring Well No:	SP033-MW-3 (16-3)	**Ground Surface Elevation:**	1875.0
Date of Installation:	10-31-07	**Top of Riser Elevation:**	1877.9
Crew Chief:	Mike Roberts		

Protective Casing

Material:	Steel
Diameter x Length:	4" x 4" x 5'
Length Above Ground:	3'
	2 bumper posts

Riser Pipe

Material:	Schedule 40 PVC
Diameter x Length:	2" x 10'
Length Above Existing Grade:	2.9'

Annular Space Backfill Material: Neat cement grout

Seal Above Screen

Material:	Bentonite chips
Thickness:	2'

Filter Sand

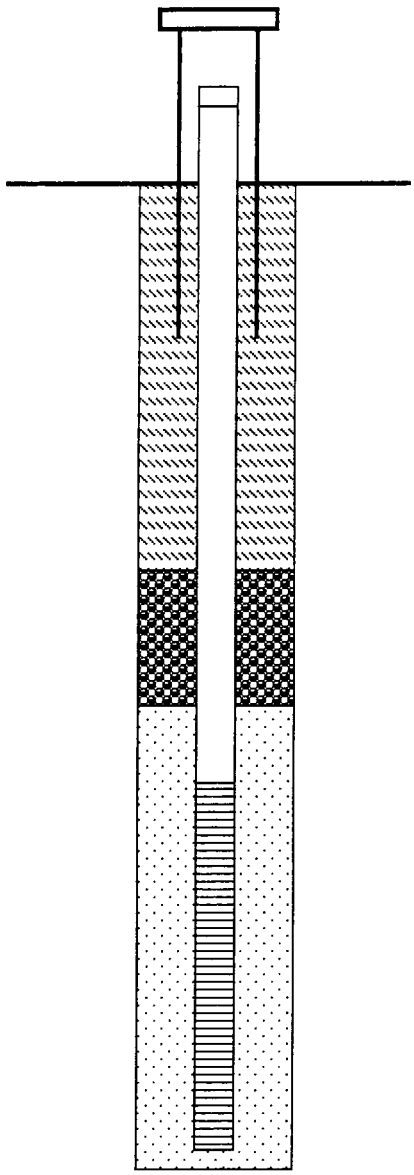
Material:	#10 Silica sand
Depth to Top of Filter Sand:	5'
Depth to Bottom of Filter Sand:	12'

Well Screen

Material:	Schedule 40 PVC
Diameter x Length:	2" x 5'
Slot No. or Size:	#10 Slot
Depth to Bottom of Screen:	12' (1863)

Borehole

Diameter:	6¼"
Depth to Bottom of Borehole:	12'
Method of Advancement:	Hollow stem auger



WATER LEVEL MEASUREMENTS BELOW TOP OF RISER PIPE

DATE	TIME	WATER LEVEL
11-2-07	9:05	8½'

(1869.4)

State of North Dakota

BOARD OF WATER WELL CONTRACTORS

900 E. BOULEVARD • BISMARCK, NORTH DAKOTA 58505

MONITORING WELL REPORT

State law requires that this report be filed with the State Board of Water Well Contractors within 30 days after completion or abandonment of the well.

1. WELL OWNER

Name Great River Energy

Address 2875 3rd St SW

Underwood, ND 58576-9659

2. WELL LOCATION (SP033- MW-3) **(16-3)**

Address (if in city) State Plane Coordinates

N139,269, E1,845,516

County McLean

__ ¼ __ ¼ SW ¼ Sec. 16 Twp. 145 N. Rge. 82 W.

Lat. _____ Long.: _____

Altitude: _____

3. METHOD DRILLED

■ Auger Other ____

4. WELL CONSTRUCTION

Diameter of Hole 6 ¼ inches Depth 12 feet

Riser: ■ PVC □ Other

■ Threaded □ Solvent □ Other

Riser rating SDR _____ Schedule 40

Diameter 2.0 inches

From +2.9 ft. to 7 ft.

Was a well screen installed? ■ Yes □ No

Material Schedule 40 PVC Diameter 2.0 inches

Slot Size #10 set from 7 feet to 12 feet

Sand packed from 5' to 12'

Depth grouted from surface to 3'

Grouting Material

Bentonite _____ Other x

If other explain: Neat cement grout

bentonite seal from 3'-5'

Well head completion:

24" above grade _____ Other x

If other, specify 4" x 4" x 5' steel cover

Was protective casing installed? ■ Yes No

Was well disinfected upon completion? □ Yes ■ No

5. WATER LEVEL

Static water level 5.6 feet below surface

If flowing: closed in pressure _____ psi or ft. above land surface

6. WELL LOG Depth (Ft.)

Formation	From	To
LEAN CLAY	0	4½
POORLY-GRADED SAND WITH SILT	4½	9½
SANDY LEAN CLAY	9½	12

(Use separate sheet if necessary)

7. WAS THE HOLE PLUGGED OR ABANDONED?

□ Yes ■ No

If so, how? _____

8. REMARKS

2 - 4" x 4" x 6' timber bumper posts installed

9. DATE COMPLETED 11-5-07

10. CONTRACTOR CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

Midwest Testing Laboratory, Inc. 444

Monitoring Well Contractor Certificate No.

P.O. Box 2084, Bismarck, ND 58502-2084

Address

Signature Date

MIDWEST TESTING LABORATORY

MONITORING WELL CONSTRUCTION DIAGRAM

PROJECT: Section 16 Monitoring Wells, Permit No. SP-033, Great River Energy, Underwood, ND

PROJECT NO: B8749

Monitoring Well No:	SP033-MW-4 (16-4)	**Ground Surface Elevation:**	1874.5
Date of Installation:	10-31-07	**Top of Riser Elevation:**	1877.4
Crew Chief:	Mike Roberts		

Protective Casing

Material:	Steel
Diameter x Length:	4" x 4" x 5'
Length Above Ground:	3'
	2 bumper posts

Riser Pipe

Material:	Schedule 40 PVC
Diameter x Length:	2" x 10'
Length Above Existing Grade:	2.9'

Annular Space Backfill Material: Neat cement grout

Seal Above Screen

Material:	Bentonite chips
Thickness:	2'

Filter Sand

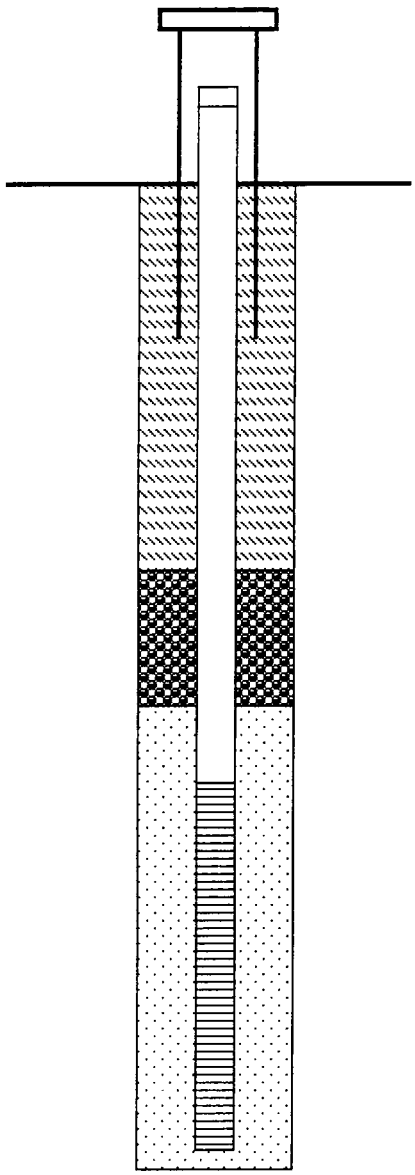
Material:	#10 Silica sand
Depth to Top of Filter Sand:	5'
Depth to Bottom of Filter Sand:	17'

Well Screen

Material:	Schedule 40 PVC
Diameter x Length:	2" x 5'
Slot No. or Size:	#10 Slot
Depth to Bottom of Screen:	17' (1857.5)

Borehole

Diameter:	6¼"
Depth to Bottom of Borehole:	17'
Method of Advancement:	Hollow stem auger



WATER LEVEL MEASUREMENTS BELOW TOP OF RISER PIPE

DATE	TIME	WATER LEVEL
11-2-07	8:55	13.9'

(1863.5)

State of North Dakota

BOARD OF WATER WELL CONTRACTORS

900 E. BOULEVARD • BISMARCK, NORTH DAKOTA 58505

MONITORING WELL REPORT

State law requires that this report be filed with the State Board of Water Well Contractors within 30 days after completion or abandonment of the well.

1. WELL OWNER

Name Great River Energy

Address 2875 3rd St SW

Underwood, ND 58576-9659

2. WELL LOCATION (SP033- MW-4) (16-4)

Address (if in city) State Plane Coordinates

N139,269, E1,846,266

County McLean

__ ¼ __ ¼ SW ¼ Sec. 16 Twp. 145 N. Rge. 82 W.

Lat. _____ Long.: _____

Altitude: _____

3. METHOD DRILLED

■ Auger Other ____

4. WELL CONSTRUCTION

Diameter of Hole 6 ¼ inches Depth 17 feet

Riser: ■ PVC □ Other

■ Threaded □ Solvent □ Other

Riser rating SDR _____ Schedule 40

Diameter 2.0 inches

From +2.9 ft. to 7 ft.

Was a well screen installed? ■ Yes □ No

Material Schedule 40 PVC Diameter 2.0 inches

Slot Size #10 set from 17 feet to 7 feet

Sand packed from 5' to 17'

Depth grouted from surface to 3'

Grouting Material

Bentonite _____ Other x _____

If other explain: Neat cement grout

bentonite seal from 3'-5'

Well head completion:

24" above grade _____ Other x

If other, specify 4" x 4" x 5' steel cover

Was protective casing installed? ■ Yes No

Was well disinfected upon completion? □ Yes ■ No

5. WATER LEVEL

Static water level 11 feet below surface

If flowing: closed in pressure _____ psi or ft. above land surface

6. WELL LOG

Formation	Depth (Ft.) From	To
POORLY-GRADED SAND WITH SILT & GRAVEL	0	4½
SANDY LEAN CLAY	4½	17

(Use separate sheet if necessary)

7. WAS THE HOLE PLUGGED OR ABANDONED?

□ Yes ■ No

If so, how? _____

8. REMARKS

2 - 4" x 4" x 6' timber bumper posts installed

9. DATE COMPLETED 11-5-07

10. CONTRACTOR CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

Midwest Testing Laboratory, Inc. 444

Monitoring Well Contractor Certificate No.

P.O. Box 2084, Bismarck, ND 58502-2084

Address

Signature Date

MIDWEST TESTING LABORATORY

MONITORING WELL CONSTRUCTION DIAGRAM

PROJECT: Section 16 Monitoring Wells, Permit No. SP-033, Great River Energy, Underwood, ND

PROJECT NO: B8749

Monitoring Well No:	SP033-MW-5 (16-5)	**Ground Surface Elevation:**	1876.5
Date of Installation:	10-31-07	**Top of Riser Elevation:**	1879.9
Crew Chief:	Mike Roberts		

Protective Casing

Material:	Steel
Diameter x Length:	4" x 4" x 5'
Length Above Ground:	3½'
	2 bumper posts

Riser Pipe

Material:	Schedule 40 PVC
Diameter x Length:	2" x 10'
Length Above Existing Grade:	3.4'

Annular Space Backfill Material: Neat cement grout

Seal Above Screen

Material:	Bentonite chips
Thickness:	2'

Filter Sand

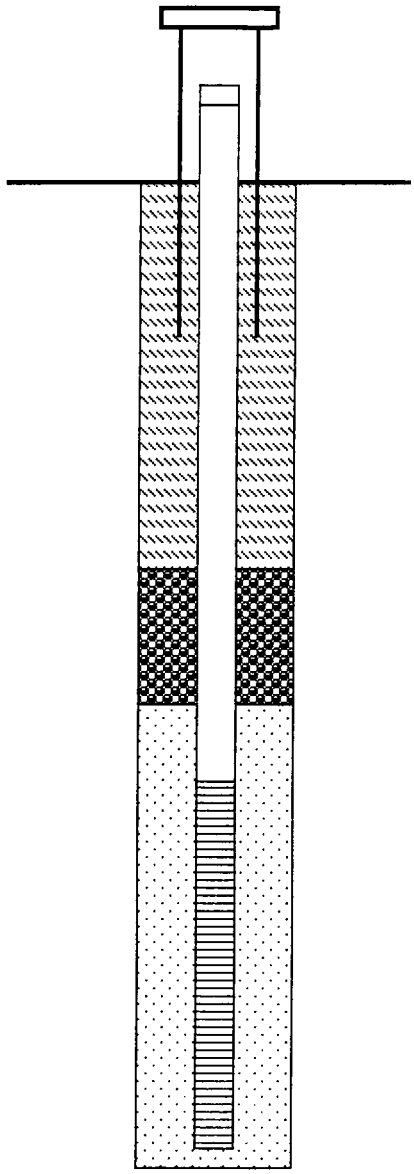
Material:	#10 Silica sand
Depth to Top of Filter Sand:	4½'
Depth to Bottom of Filter Sand:	11½'

Well Screen

Material:	Schedule 40 PVC
Diameter x Length:	2" x 5'
Slot No. or Size:	#10 Slot
Depth to Bottom of Screen:	11½' (1865)

Borehole

Diameter:	6¼"
Depth to Bottom of Borehole:	11½'
Method of Advancement:	Hollow stem auger



WATER LEVEL MEASUREMENTS BELOW TOP OF RISER PIPE

DATE	TIME	WATER LEVEL
11-2-07	8:20	10'

(1869.9)

State of North Dakota

BOARD OF WATER WELL CONTRACTORS

900 E. BOULEVARD • BISMARCK, NORTH DAKOTA 58505

*REVISED COPY 12/11/07

MONITORING WELL REPORT

State law requires that this report be filed with the State Board of Water Well Contractors within 30 days after completion or abandonment of the well.

1. WELL OWNER

Name Great River Energy

Address 2875 3rd St SW

Underwood, ND 58576-9659

2. WELL LOCATION (SP033- MW-5) (16-5)

Address (if in city) State Plane Coordinates

N137,839, E1,846,237

County McLean

__ ¼ __ ¼ SW ¼ Sec. 16 Twp. 145 N. Rge. 82 W.

Lat. _____ Long.: _____

Altitude: _____

3. METHOD DRILLED

■ Auger Other ____

4. WELL CONSTRUCTION

Diameter of Hole 6 ¼ inches Depth *11½ feet

Riser: ■ PVC □ Other

■ Threaded □ Solvent □ Other

Riser rating SDR _____ Schedule 40

Diameter 2.0 inches

From +3.4 ft. to 6½ ft.

Was a well screen installed? ■ Yes □ No

Material Schedule 40 PVC Diameter 2.0 inches

Slot Size #10 set from 6½ feet to 11½ feet

Sand packed from 4½' to 11½'

Depth grouted from surface to 2½'

Grouting Material Bentonite _____ Other x

If other explain: Neat cement grout

bentonite seal from 2½'-4½'

Well head completion:

24" above grade _____ Other x

If other, specify 4" x 4" x 5' steel cover

Was protective casing installed? ■ Yes No

Was well disinfected upon completion? □ Yes ■ No

5. WATER LEVEL

Static water level 6.6 feet below surface

If flowing: closed in pressure _____ psi or ft. above land surface

6. WELL LOG

Formation	Depth (Ft.) From	To
SANDY LEAN CLAY	0	2
POORLY-GRADED SAND WITH SILT & GRAVEL	2	11½

(Use separate sheet if necessary)

7. WAS THE HOLE PLUGGED OR ABANDONED?

□ Yes ■ No

If so, how? _____

8. REMARKS

2 - 4" x 4" x 6' timber bumper posts installed

9. DATE COMPLETED 11-5-07

10. CONTRACTOR CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

Midwest Testing Laboratory, Inc. 444

Monitoring Well Contractor Certificate No.

P.O. Box 2084, Bismarck, ND 58502-2084

Address

Signature 12-11-07

Date

BORING LOG NO. MW-16-6

PROJECT: Monitoring Well Installations

CLIENT: Golder Asssociates, Inc
Lakewood, Colorado

SITE: GRE - Coal Creek Station
McLean County, North Dakota

LOCATION: See Exhibit A-2

Latitude: 47.37249° Longitude: -101.14037°
Northing: 136540 Easting: 1841424

Surface Elev.: 1914 (Ft.)

DEPTH		ELEVATION (Ft.)
0.3	**TOPSOIL**, dark brown	1913.5
	SANDY LEAN CLAY (CL), trace gravel, brown, soft to medium stiff	
7.5		1906.5
	COAL, very dark brown, waterbearing	
12.0		1902
	LEAN CLAY (CL), gray, very stiff	
15.0		1899
16.0	**FAT CLAY (CH)**, dark brown, very stiff, silt laminations	1898
	Boring Terminated at 16 Feet	

INSTALLATION DETAILS: Steel Casing, PVC Riser, Grout, Bentonite, Silica Sand, PVC Screen, Sluff

DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS
	▽		2-2-2 N=4
			2-2-3 N=5
5			2-3-4 N=7
	▽		2-3-4 N=7
10			9-10-6 N=16
			7-9-11 N=20
15			7-9-13 N=22

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3¼" ID HSA 0-14½'

Abandonment Method:
Boring converted to monitoring well installation.

See Exhibit A-3 for description of field procedures.

See Appendix B for explanation of symbols and abbreviations.

Notes:

Elevation, Northing and Easting provided by client.
Latitude and Longitude measured by Terracon.
Sloping concrete collar at the surface.
Three steel bollards installed around well.
Well developed July 17. Pumped water until clear (0.5 hrs).

WATER LEVEL OBSERVATIONS

▽ *While drilling*
▽ *At completion of drilling*
▼ *After 70 hrs*

Terracon
1805 Hancock Drive
Bismarck, North Dakota

Boring Started: 7/14/2015 | Boring Completed: 7/14/2015
Drill Rig: D-90 | Driller: MR
Project No.: M2155060 | Exhibit: A-9

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-WELL M2155060.GPJ TERRACON2012.GDT 7/24/15

State of North Dakota

BOARD OF WATER WELL CONTRACTORS

900 E. BOULEVARD • BISMARCK, NORTH DAKOTA 58505

MONITORING WELL REPORT

State law requires that this report be filed with the State Board of Water Well Contractors within 30 days after completion or abandonment of the well.

1. WELL OWNER

Name Great River Energy

Address 2875 3rd St SW

Underwood, ND 58576-9659

2. WELL LOCATION **(Well MW-16-6)**

Address (if in city) (see attached drawing)

County McLean

SW ¼ SW¼ SW¼ Sec. 16 Twp. 145 N. Rge. 82 W

Lat: 47.37249 Long.: -101.14037

Ground Elevation: 1914

3. METHOD DRILLED

■ Auger Other ____

4. WELL CONSTRUCTION

Diameter of Hole 6.25 inches Depth 16 feet

Riser: ■ PVC □ Other

■ Threaded □ Solvent □ Other

Riser rating SDR _____ Schedule 40

Diameter 2.0 inches

From +2.75 ft. to 4 ft.

Was a well screen installed? ■ Yes □ No

Material Schedule 40 PVC Diameter 2.0 inches

Slot Size #10 set from 4 feet to 14 feet

Sand packed from 3 feet to 14 feet

Depth grouted from 1 foot to 3 feet

Grouting Material

Bentonite x Other _____

If other explain:

One foot thick concrete collar at the surface.

Sluff: 14 feet to 16 feet

Three steel bollards installed around well.

Well head completion:

24" above grade _____ Other x

If other, specify 4" x 4" x 5' square steel protective cover

Was protective casing installed? ■ Yes □ No

Was well disinfected upon completion? □ Yes ■ No

5. WATER LEVEL

Static water level 1 feet below surface

If flowing: closed in pressure _____ psi or ft. above land surface

6. WELL LOG Depth (Ft.)

Formation	From	To
SANDY LEAN CLAY	0	7.5
COAL	7.5	12
LEAN CLAY	12	15
FAT CLAY	15	16

(Use separate sheet if necessary)

7. WAS THE HOLE PLUGGED OR ABANDONED?

□ Yes ■ No

If so, how? _____

8. REMARKS

Water level monitoring only

9. DATE COMPLETED 7-17-15

10. CONTRACTOR CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

Terracon 444

Monitoring Well Contractor Certificate No.

PO Box 2084

Address

Bismarck, ND 58502-2084

Signature Date

7/27/15

BORING LOG NO. MW-16-7

PROJECT: Monitoring Well Installations

CLIENT: Golder Asssociates, Inc
Lakewood, Colorado

SITE: GRE - Coal Creek Station
McLean County, North Dakota

LOCATION: See Exhibit A-2

Latitude: 47.3722° Longitude: -101.13292°
Northing: 136540 Easting: 1843239

Surface Elev.: 1907 (Ft.)

DEPTH	ELEVATION (Ft.)	Description
0.3	1906.5	**TOPSOIL**, dark brown
		SANDY LEAN CLAY (CL), trace gravel, brown, stiff
13.0	1894	
		CLAYEY SAND (SC), grayish-brown, medium dense, fine-grained
20.5	1886.5	
		FAT CLAY (CH), light brown, very stiff, silt lamination
24.0	1883	
		CLAYEY SAND (SC), light brown, dense, fine-grained, waterbearing
29.0	1878	
		SANDY LEAN CLAY (CL), light brown, very stiff
33.0	1874	
		Boring Terminated at 33 Feet

INSTALLATION DETAILS: Steel Casing, PVC Riser, Grout, Bentonite, Silica Sand, PVC Screen, Sluff

DEPTH (Ft.)	FIELD TEST RESULTS
	4-5-7 N=12
	3-4-5 N=9
5	3-4-6 N=10
	3-3-5 N=8
10	3-4-5 N=9
	3-5-8 N=13
15	5-8-10 N=18
20	7-12-18 N=30
25	11-13-19 N=32
30	11-13-16 N=29

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3¼" ID HSA 0-33'

Abandonment Method:
Boring converted to monitoring well installation.

See Exhibit A-3 for description of field procedures.

See Appendix B for explanation of symbols and abbreviations.

Notes:

Elevation, Northing and Easting provided by client.
Latitude and Longitude measured by Terracon.
Sloping concrete collar at the surface.
Three steel bollards installed around well.
Well developed July 17. Pumped water until clear (0.5 hrs).

WATER LEVEL OBSERVATIONS

- *While drilling*
- *At completion of drilling*
- *After 68 hrs*

Terracon
1805 Hancock Drive
Bismarck, North Dakota

Boring Started: 7/14/2015	Boring Completed: 7/14/2015
Drill Rig: D-90	Driller: MR
Project No.: M2155060	Exhibit: A-10

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-WELL M2155060.GPJ TERRACON2012.GDT 7/24/15

State of North Dakota

BOARD OF WATER WELL CONTRACTORS

900 E. BOULEVARD • BISMARCK, NORTH DAKOTA 58505

MONITORING WELL REPORT

State law requires that this report be filed with the State Board of Water Well Contractors within 30 days after completion or abandonment of the well.

1. WELL OWNER

Name Great River Energy

Address 2875 3rd St SW

Underwood, ND 58576-9659

2. WELL LOCATION **(Well MW-16-7)**

Address (if in city) (see attached drawing)

County McLean

SE ¼ SE¼ SW¼ Sec. 16 Twp. 145 N. Rge. 82 W

Lat: 47.3722 Long.: -101.13292

Ground Elevation: 1907

3. METHOD DRILLED

■ Auger Other ____

4. WELL CONSTRUCTION

Diameter of Hole 6.25 inches Depth 33 feet

Riser: ■ PVC □ Other

■ Threaded □ Solvent □ Other

Riser rating SDR _____ Schedule 40

Diameter 2.0 inches

From +2.75 ft. to 22 ft.

Was a well screen installed? ■ Yes □ No

Material Schedule 40 PVC Diameter 2.0 inches

Slot Size #10 set from 22 feet to 32 feet

Sand packed from 20 feet to 32 feet

Depth grouted from 1 foot to 20 feet

Grouting Material

Bentonite x Other _____

If other explain:

One foot thick concrete collar at the surface.

Sluff: 32 feet to 33 feet

Three steel bollards installed around well.

Well head completion:

24" above grade _____ Other x

If other, specify 4" x 4" x 5' square steel protective cover

Was protective casing installed? ■ Yes □ No

Was well disinfected upon completion? □ Yes ■ No

5. WATER LEVEL

Static water level 24 feet below surface

If flowing: closed in pressure _____ psi or ft. above land surface

6. WELL LOG Depth (Ft.)

Formation	From	To
SANDY LEAN CLAY	0	13
CLAYEY SAND	13	20.5
FAT CLAY	20.5	24
CLAYEY SAND	24	29
SANDY LEAN CLAY	29	33

(Use separate sheet if necessary)

7. WAS THE HOLE PLUGGED OR ABANDONED?

□ Yes ■ No

If so, how? _____

8. REMARKS

Water level monitoring only

9. DATE COMPLETED 7-17-15

10. CONTRACTOR CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

Terracon 444

Monitoring Well Contractor Certificate No.

PO Box 2084

Address

Bismarck, ND 58502-2084

Signature Date 7/27/15

LOG OF TEST BORING

JOB NO 5200-86-256 VERTICAL SCALE 1" = 3' BORING NO 42

PROJECT MONITORING WELL CONSTRUCTION - COAL CREEK STATION - UNDERWOOD, NORTH DAKOTA

DEPTH IN FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ≈ 1885')	GEOLOGIC ORIGIN	N	WL	SAMPLE NO	SAMPLE TYPE	LAB TESTS W	D	LL/PL	Qu
	SANDY LEAN CLAY WITH A LITTLE GRAVEL, black, rather stiff (OL)	TOPSOIL	12		1	SB				
1½	SANDY LEAN CLAY WITH A LITTLE GRAVEL, brown (CL)	GLACIAL TILL		▼	2	FA				
3	SILTY SAND WITH GRAVEL, brown, wet, medium dense to loose (SM)	COARSE ALLUVIUM	15		3	SB				
			5		4	SB				
13	SANDY LEAN CLAY WITH A LITTLE GRAVEL, gray, rather stiff (CL)	GLACIAL TILL	9		5	SB				
16½	END OF BORING									

WATER LEVEL MEASUREMENTS

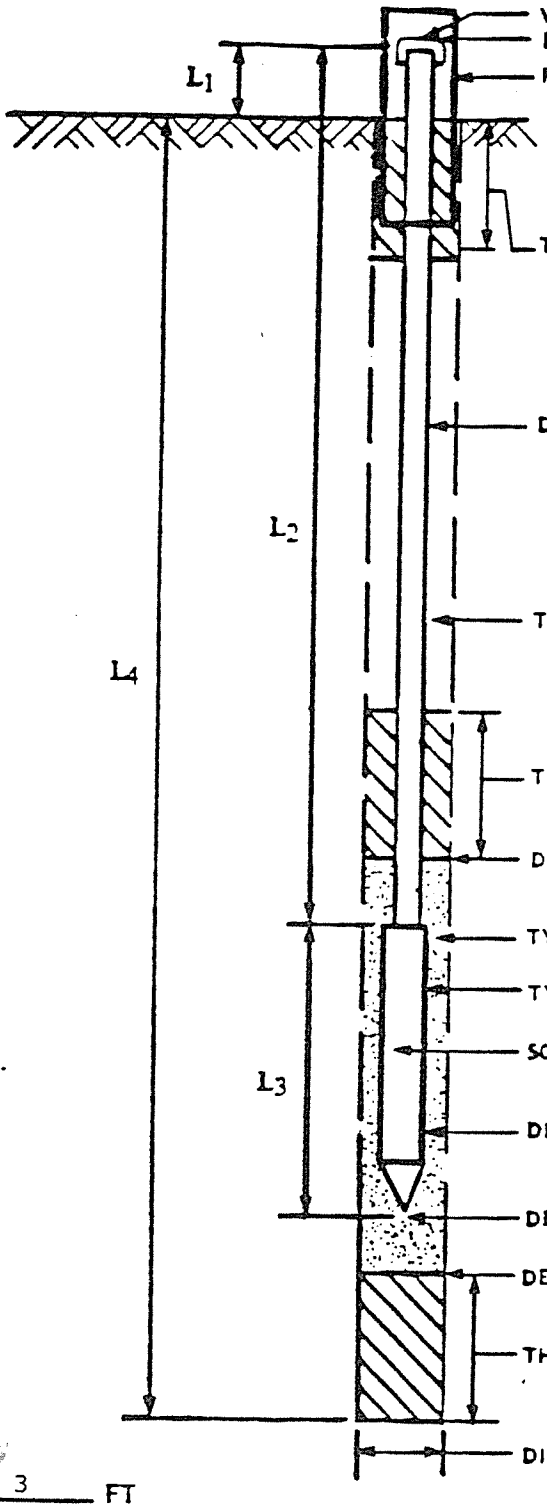
DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	BAILED DEPTHS	WATER LEVEL
5-28	3:34	6'	4½'	5'	to	4'
See monitoring well data sheets for additional water level information.					to	

START 5-28-86 COMPLETE 5-28-86

METHOD 3¼"HSA 0-15' @ 4:00

NO. 5200-86-256 PIEZOMETER NO. 42

GROUND ELEVATION AND DATUM ≈1885'



ELEVATION OF TOP OF RISER PIPE	≈1888'
Diameter and Type	6" Steel
Total Length	5'
Length Above Ground	3.3'
THICKNESS AND TYPE OF SEAL	Neat Cement Grout
DIAMETER AND TYPE OF RISER PIPE	Timco 2" Flush Threaded PVC Monitoring Well Pipe
TYPE OF BACKFILL AROUND RISER	Neat Cement Grout
THICKNESS AND TYPE OF SEAL	12" Bentonite
DEPTH TO TOP OF FILTER SAND	9'
TYPE OF FILTER AROUND SCREEN	Silica Filter Sand
TYPE OF PIEZOMETER	PVC
SCREEN GAUGE OR SIZE OF OPENINGS (SLOT NO.)	10 Slot
DIAMETER AND LENGTH OF SCREEN	2" x 5'
DEPTH TO BOTTOM OF PIEZOMETER	14.4'
DEPTH TO BOTTOM OF FILTER SAND	15'
THICKNESS AND TYPE OF SEAL	N/A
DIAMETER OF BOREHOLE	6

L_1 = 3 FT

L_2 = 12.4 FT

L_3 = 5 FT

L_4 = 16 FT

INSTALLATION COMPLETED:
Date 5-28-86 Time 4:15

PIEZOMETER WATER LEVEL MEASUREMENTS

DATE	TIME	BAILED DEPTHS	WATER LEVEL
5-28-86	4:25	-	2.6
6-4-86	PM7:25	2.9'-14'	2.9'
6-5-86	1:00	-	2.9'

LOG OF TEST BORING NO.: MW-49

CLIENT: Cooperative Power/United Power Association
PROJECT: Coal Creek Station
PROJECT NUMBER: 87C61
LOCATION: Underwood, ND

SURFACE ELEVATION: 1903.6
BORING DEPTH: 25.0 feet
DATE: 05/20/88

MSL ELEV	DEPTH FR LND SURF	SAMP DEPTH INTERVAL	TYPE	#	N	REC (in)	DESCRIPTION OF MATERIAL	CLASS	LABORATORY TESTS	DRILLING AND SAMPLING NOTES
1903.6	0	0.0 - 1.5	SS	1	12		Lean br. sandy, gravelly CLAY, tr. silt, firm - fill	CL	NA	
1898.6	5	5.0 - 6.5	SS	2	32		Same as above	CL	NA	
1893.6	10	10.0-11.5	SS	3	20		Same as above	CL	NA	
							Grey green sandy SILT with clay, damp, soft to firm	ML	NA	
1888.6	15	15.0-16.5	SS	4	13		Fat dk. grey CLAY (shale), damp, hard to very hard	CH	NA	
1883.6	20	20.0-21.5	SS	5	8		Same as above exc. siltier, wet, firm	CH	NA	
		23.5-25.0	SS	6	10		Lean grey/green sandy CLAY w/ silt	CL	NA	
1878.6	25									EOB @ 25.0 feet
1873.6	30									
1868.6	35									
1863.6	40									
1858.6	45									
1853.6	50									
1848.6	55									

DRILLING DATA

START DATE: 05/20/88
COMPLETION DATE: 05/20/88
LOGGED BY: KAD
DRILLING METHOD: 3 1/4" ID HSA SS Samples every 5 feet
DRILLING CONTRACTOR: Great Plains Engineering Laboratory

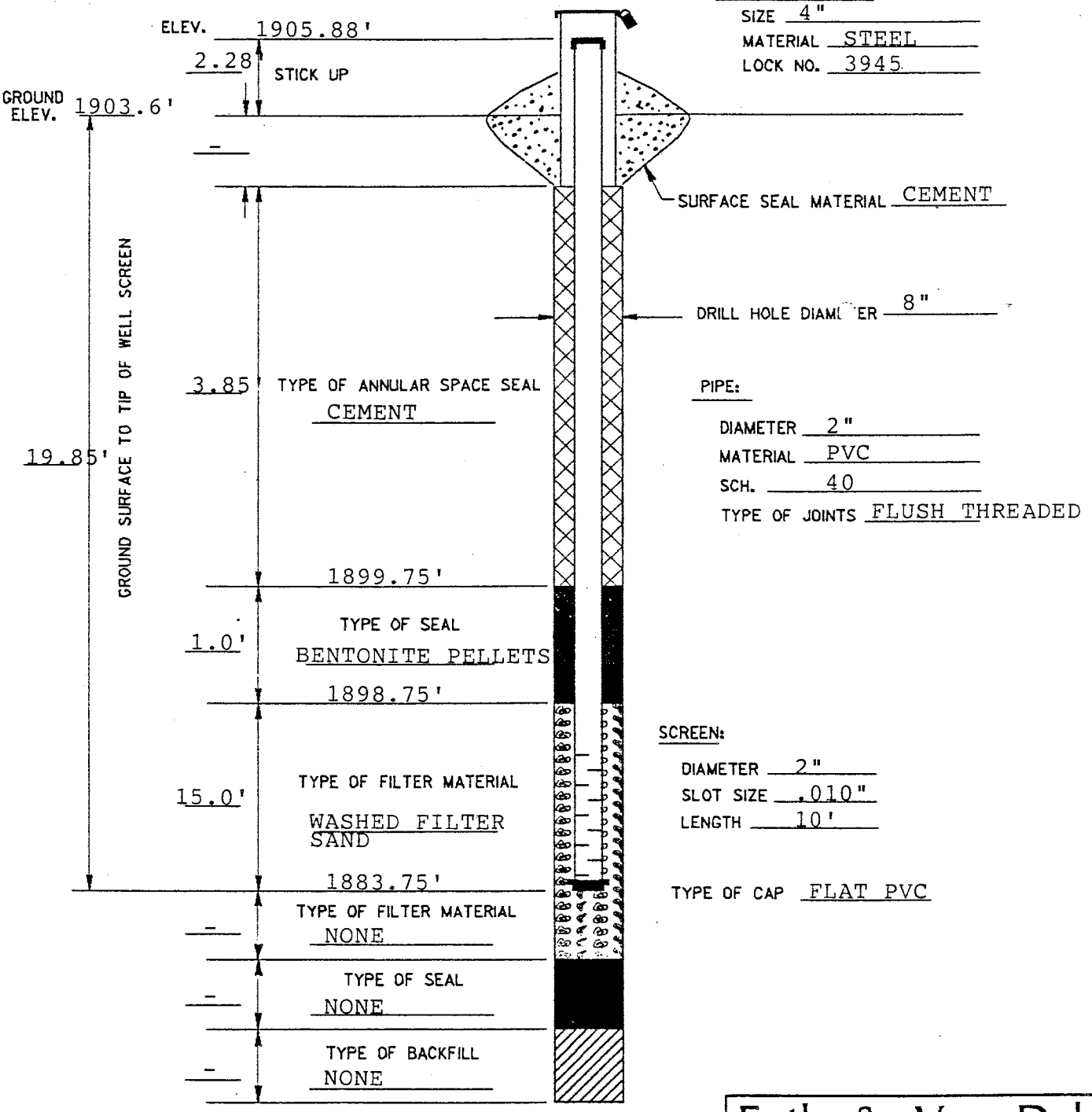
WATER LEVEL INFORMATION

DEPTH AT COMPLETION: 10.0 feet
LATER TIME/DEPTH: NA
LATER TIME/DEPTH: NA
CAVE IN DEPTH: NA
DRILLING LOSSES: NA

MONITORING WELL CONSTRUCTION DIAGRAM

WELL NO: MW-49
DATE INSTALLED: 05/20/88
DRILLER: GREAT PLAINS ENGINEERING LABORATORY
DRILLING METHOD: HOLLOW STEM AUGER

CLIENT: COOPERATIVE POWER/UNITED ASSOCIATION
PROJECT: COAL CREEK STATION
SCOPE I.D.: 87061
BY: KAD



Foth & Van Dyke
Geosciences & Environmental Management Division
Revised 3/88 By BJS
Drawn By MRS

LOG OF TEST BORING NO.: MW-51

CLIENT: Cooperative Power/United Power Association
PROJECT: Coal Creek Station
PROJECT NUMBER: 87C61
LOCATION: Underwood, ND

SURFACE ELEVATION: 1895.5
BORING DEPTH: 20.0 feet
DATE: 05/20/88

MSL ELEV	DEPTH FR LND SURF	SAMP DEPTH INTERVAL	TYPE	#	N	REC (in)	DESCRIPTION OF MATERIAL	CLASS	LABORATORY TESTS	DRILLING AND SAMPLING NOTES
1895.5	0	0.0 - 1.5	SS	1	15	18	Lean sandy CLAY with silt and org., med. dense - fill	CL	NA	
1890.5	5	5.0 - 6.5	SS	2	9	18	Same as above without roots plus tr. gravel, loose - fill	CL	NA	
1885.5	10	10.0-11.5	SS	3	16	18	Grey green silty f SAND, tr. clay, wet, med. dense	SM	NA	
1880.5	15	15.0-16.5	SS	4	10	18	Br. gravelly SAND with silt, tr. clay, very wet, loose	SM	NA	
		18.0-19.5	SS	5	16	10	Lean sandy CLAY with silt	CL	NA	
1875.5	20									EOB @ 20.0 feet
1870.5	25									
1865.5	30									
1860.5	35									
1855.5	40									
1850.5	45									
1845.5	50									
1840.5	55									

DRILLING DATA

START DATE: 05/20/88
COMPLETION DATE: 05/20/88
LOGGED BY: KAD
DRILLING METHOD: 3 1/4" ID HSA SS Samples every 5 feet
DRILLING CONTRACTOR: Midwest Testing

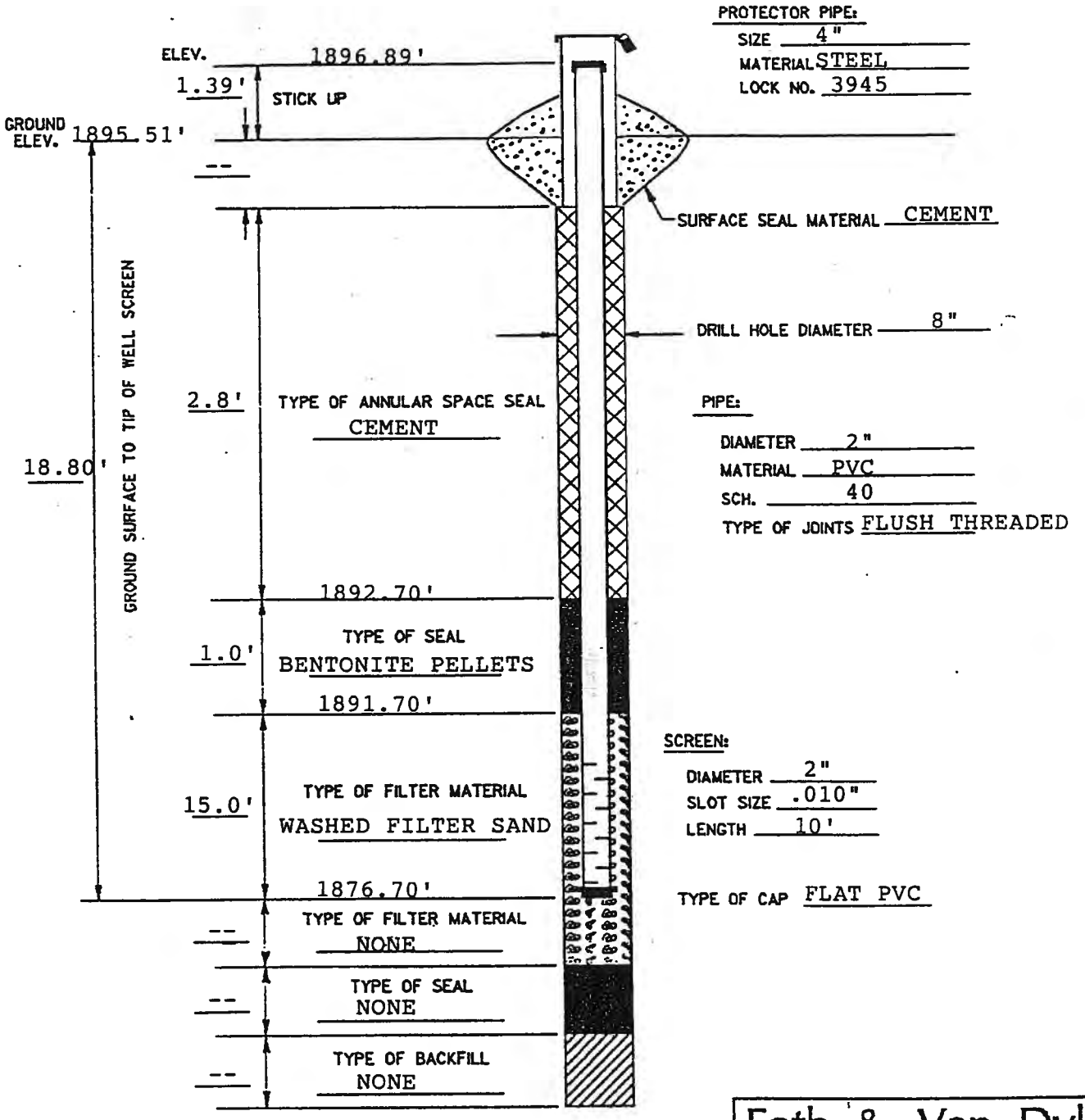
WATER LEVEL INFORMATION

DEPTH AT COMPLETION: 9.4 feet
LATER TIME/DEPTH: NA
LATER TIME/DEPTH: NA
CAVE IN DEPTH: NA
DRILLING LOSSES: NA

MONITORING WELL CONSTRUCTION DIAGRAM

WELL NO: MW-51
DATE INSTALLED: 5/20/88
DRILLER: MIDWEST TESTING
DRILLING METHOD: HOLLOW STEM AUGER

CLIENT: COOPERATIVE POWER/ UNITED POWER ASSOCIATION
PROJECT: COAL CREEK STATION
SCOPE I.D.: 87C61
BY: KAD



Foth & Van Dyke
Geosciences & Environmental Management Division
Revised 3/88 By BJS
Drawn By MRS .

FOTH & VAN DYKE

Client: Cooperative Power
Project: Coal Creek Station
Prepared by: AMC
Checked by: PAD

Scope I.D.: 89C16
Page: 1 of 2
Date: 8-30-89
Date: 9-1-89

REPORT - LOG OF TEST BORING

Start Date: 7-17-89
Completion Date: 7-17-89
Logged by: GKM

Test Boring No.: MW-72
Location: N 36783.6, E 44025.9
Boring Depth: 24.0
Surface Elevation: 1882.4

MSL ELEV	DEPTH FR LND SURF	SAMP DEPTH INTERVAL	TYPE	#	N	REC (ft)	DESCRIPTION OF MATERIAL	CLASS	LABORATORY TESTS	DRILLING AND SAMPLING NOTES
1882.4	--0	0.0 - 1.5	ss	1	18	0.5	Dk. brn SILT w/sand, gravel & clay, dense, rooted, organic, dry, (topsoil)	ML		6-8-10
1880.9	--1.5	1.5 - 3.0	ss	2	24	1.0	Grades down to gry brn to blk silty lean CLAY, tr. fn.-crs. sand, sli moist, dense	CL		10-11-13
1879.4	--3.0	3.0 - 4.5	ss	3	18	1.4	As above to 4.2'; yel-brn gravelly f-cg SAND w/silt & clay, limonite stain, med dense, sli moist	CL SW		5-8-10
1877.9	--4.5	4.5 - 6.0	ss	4	15	1.5	Mottled lt. tan & med gry silty lean CLAY w/med. sand; w/0.2' lt. gry brn clayey SAND lens; @ 5.4' olive gry clayey SILT w/tr. sand & grvl, m dense,stiff, sli moist	CL SC MH		4-5-10
1876.4	--6.0	6.0 - 7.5	ss	5	15	1.1	As above ranges to silty fat CLAY w/lt. gry mottling & tr. lignite frags, stiff, plastic, sli moist	MH CH		4-6-9
1874.9	--7.5	7.5 - 9.0	ss	6	13	1.0	As above	CH		3-6-7
1873.4	--9.0	9.0-10.5	ss	7	16	1.2	As above w/more sand & fn. gravel abundant iron staining, no mottling, sli moist to moist	CH		3-6-10
1871.9	--10.5	10.5-12.0	ss	8	20	1.5	As above w/some lt. gry mottling, very stiff, dense, plastic	CH		5-7-13
1870.4	--12.0	12.0-13.5	ss	9	16	1.5	As above, med. dense	CH		4-7-9
1868.9	--13.5	13.5-15.0	ss	10	14	1.5	As above	CH		3-6-8
1867.4	--15.0	15.0-16.5	ss	11	12	1.5	As above except moist & softer	CH		3-5-7
1865.9	--16.5									

DRILLING METHOD: HSA, I.D.= 3 3/4",O.D.= 7"
DRILLING CONTRACTOR: Braun

DEPTH TO WATER -
AT COMPLETION: 11.5'
LATER TIME/DEPTH: 7.5'

FOTH & VAN DYKE

Client: Cooperative Power
Project: Coal Creek Station
Prepared by: AMC
Checked by: PAD

Scope I.D.: 89C16
Page: 2 of 2
Date: 8-30-89
Date: 9-1-89

REPORT - LOG OF TEST BORING

Test Boring No.: MW-72
Location: N 36783.6, E 44025.9
Boring Depth: 24.0
Surface Elevation: 1882.4

Start Date: 7-17-89
Completion Date: 7-17-89
Logged by: GKM

MSL ELEV	DEPTH FR LND SURF	SAMP DEPTH INTERVAL	TYPE	#	N	REC (ft)	DESCRIPTION OF MATERIAL	CLASS	LABORATORY TESTS	DRILLING AND SAMPLING NOTES
1865.9	--16.5	16.5-18.0	ss	12	12	0	NSR (s.a.a., based on drilling character)	CH		3-5-7 Water @ 17.0', ss wet
1864.4	--18.0	18.0-19.5	ss	13	18	0	NSR (s.a.a., based on drilling character) med dense, water	CH		3-7-11 Add catcher @ 19.5'
1862.9	--19.5	19.5-21.0	ss	14	24	1.5	Gry brn f-mg SAND w/silt & tr. clay, noncohesive, water bearing to 20.3' yel gry brn f-m SAND, w/silt & clay, cohesive, dense	SP		4-9-15
1861.4	--21.0	21.0-22.5	ss	15	22	1.3	As above	SP		5-9-13
1859.9	--22.5	22.5-24.0	ss	16	46		Very dense, water bearing	SP		10-16-30
1858.4	--24.0						EOB @ 24.0'			
1856.9	--25.5									
1855.4	--27.0									
1853.9	--28.5									
1852.4	--30.0									
1850.9	--31.5									
1849.4	--33.0									

DRILLING METHOD: HSA, I.D.= 3 3/4", O.D.= 7"
DRILLING CONTRACTOR: Braun

DEPTH TO WATER -
AT COMPLETION: 11.5'
LATER TIME/DEPTH: 7.5'

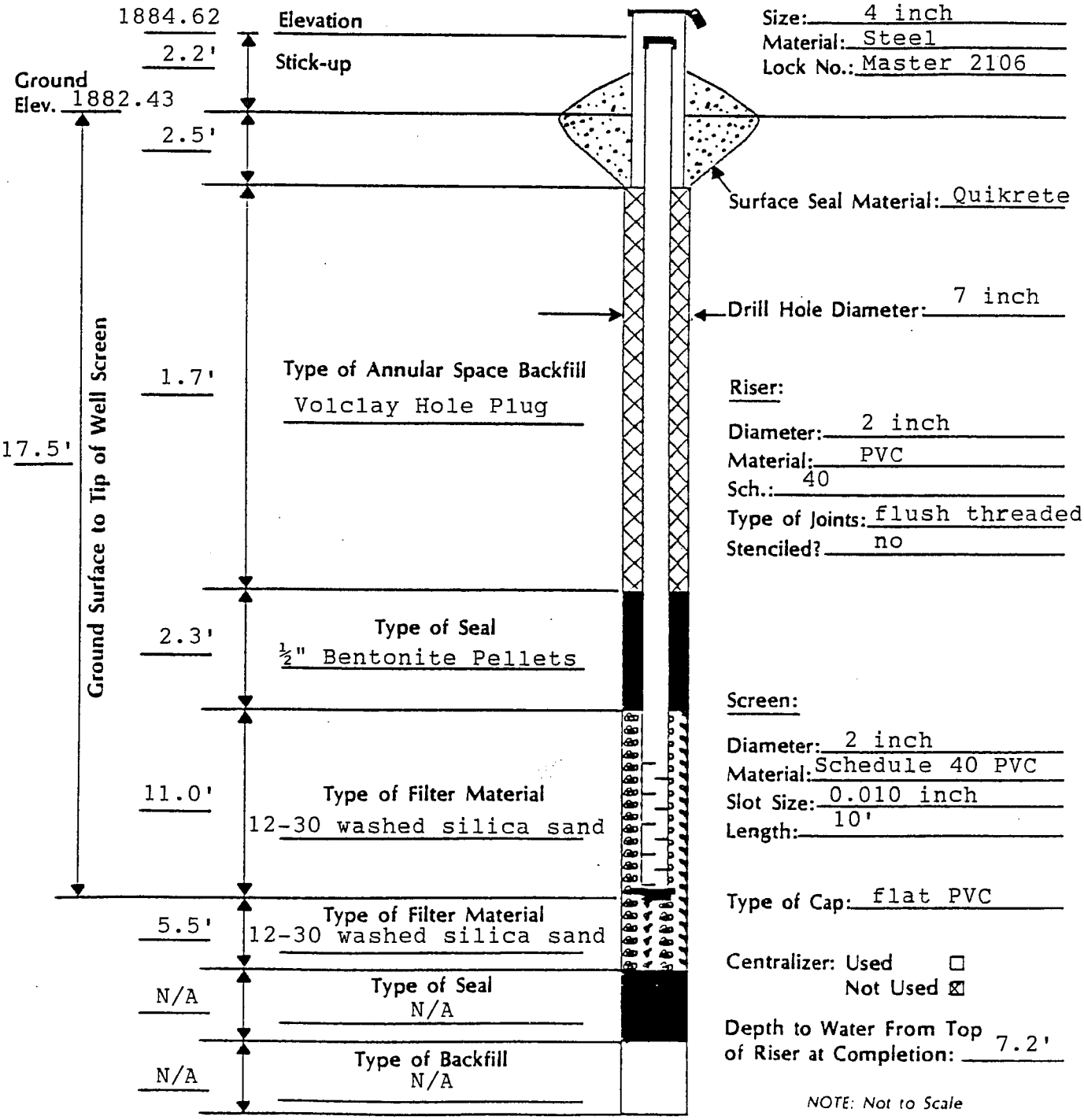
Foth & Van Dyke

Client: Cooperative Power — Scope I.D.: 89C16
Project: Coal Creek Station — Page: 1
Prepared by: GKM — Date: 7-18-89
Checked by: PAD — Date: 9-1-89

MONITORING WELL CONSTRUCTION DIAGRAM

Driller: Braun
Drilling Method: Hollow Stem Auger, I.D.=3 3/4", O.D.=7"
Coordinates: N 36783.6, E 44025.9

Well No: MW-72
Date Installed: 7-18-89



Protector Pipe:
Size: 4 inch
Material: Steel
Lock No.: Master 2106

Surface Seal Material: Quikrete

Drill Hole Diameter: 7 inch

Riser:
Diameter: 2 inch
Material: PVC
Sch.: 40
Type of Joints: flush threaded
Stenciled? no

Screen:
Diameter: 2 inch
Material: Schedule 40 PVC
Slot Size: 0.010 inch
Length: 10'

Type of Cap: flat PVC

Centralizer: Used ☐
Not Used ☒

Depth to Water From Top of Riser at Completion: 7.2'

NOTE: Not to Scale

* N/A = not applicable

FOTH & VAN DYKE	Client: Cooperative Power	Scope I.D.: 89C16
	Project: Coal Creek Station	Page: 1 of 3
	Prepared by: AMC	Date: 8-30-89
	Checked by: PAD	Date: 9-1-89

REPORT - LOG OF TEST BORING

Test Boring No.: MW-75
Start Date: 7-19-89 — Location: N 36290.0, E 39715.8
Completion Date: 7-19-89 — Boring Depth: 42.0
Logged by: GKM — Surface Elevation: 1938.9

MSL ELEV	DEPTH FR LND SURF	SAMP DEPTH INTERVAL	TYPE	#	N	REC (ft)	DESCRIPTION OF MATERIAL	CLASS	LABORATORY TESTS	DRILLING AND SAMPLING NOTES
1938.9	--0	0.0 - 1.5	ss	1	14	1.4	Dk brn sandy SILT, organic, roots w/occ. thin 1/4" to 1/2" lean lt. yel gry CLAY laminae, dry, med. dense, (topsoil)	ML		4-5-9
1937.4	--1.5	1.5 - 3.0	ss	2	18	1.2	Grades to dk. brn lean CLAY w/ silt, organic, rootsd, sli moist med. dense, stiff, sli plastic	CL		6-8-10
1935.9	--3.0	3.0 - 4.5	ss	3	23	1.4	As above; boulder @ 3.5'- hard drilling	CL		3-15-8
1934.4	--4.5	4.5 - 6.0	ss	4	22	1.4	Yel-gry brn silty CLAY (4.5' - 5.0'); yel brn gravelly f-c SAND, w/silt & tr clay (5.0-5.4), dry, mottled yel gry brn silty CLAY w/fn. sand, sli moist, med. dense	CL SW CL		10-9-13
1932.9	--6.0	6.0 - 7.5	ss	5	23	1.2	Bright yel brn lean silty CLAY, tr. sand, limonite stain, med. dense, sli moist, sli plastic	CL		5-9-14
1931.4	--7.5	7.5 - 9.0	ss	6	23	1.5	As above w/increasing sand to 8.5'; olive gry to dk gry fat CLAY, stiff, plastic, waxy feel, sli moist, med. dense	CL CH		6-12-11
1929.9	--9.0	9.0-10.5	ss	7	20	1.2	As above w/ irregular lenses of yel brn clayey SILT, w/tr. sand, sli moist, med. dense	CH ML		6-8-12
1928.4	--10.5	10.5-12.0	ss	8	29	1.4	Dk gry interbedded clayey SILT & silty fat CLAY (shale) sli moist, stiff, plastic, iron stained partings	CH-MH		5-11-18
1926.9	--12.0	12.0-13.5	ss	9	27	1.5	As above - mostly silty fat CLAY (shale), sli moist	CH		7-11-16
1925.4	--13.5	13.5-15.0	ss	10	11	0.9	As above to 14.5'; @ 14.5'- blk LIGNITE, punky, soft, moist w/few hard frags.	COAL		3-5-6
1923.9	--15.0	15.0-16.5	ss	11	22	1.5	As above to 15.5'; @ 15.5'- brn-gry fat CLAY (shale) w/limonite clay stringers grades downward to dk. gry clayey SILT, med. dense, sli moist, stiff	CH MH		5-6-16
1922.4	--16.5									

DRILLING METHOD: HSA, I.D.= 3 3/4", O.D.= 7"
DRILLING CONTRACTOR: Braun

DEPTH TO WATER -
AT COMPLETION: 36.3'
LATER TIME/DEPTH: 22.3' 14 hrs later

FOTH & VAN DYKE	Client: Cooperative Power Project: Coal Creek Station Prepared by: AMC Checked by: PAD	Scope I.D.: 89C16 Page: 2 of 3 Date: 8-30-89 Date: 9-1-89

REPORT - LOG OF TEST BORING

Start Date: 7-19-89
Completion Date: 7-19-89
Logged by: GKM

Test Boring No.: MW-75
Location: N 36290.0, E 39715.8
Boring Depth: 42.0
Surface Elevation: 1938.9

MSL ELEV	DEPTH FR LND SURF	SAMP DEPTH INTERVAL	TYPE	#	N	REC (ft)	DESCRIPTION OF MATERIAL	CLASS	LABORATORY TESTS	DRILLING AND SAMPLING NOTES
1922.4	--16.5	16.5-18.0	ss	12	37	1.5	As above except more silty fat CLAY (shale) content, v. stiff, plastic, sli moist, dense, massive, conchoidal partings, minor Fe stain	CH		12-16-21
1920.9	--18.0	18.0-19.5	ss	13	29	1.5	As above w/ tr. disseminated lignite	CH		8-13-16
1919.4	--19.5	19.5-21.0	ss	14	33	1.5	As above w/0.1' layer gry SILT w/limonite stain, w/minor clay thinly laminated, w/tr. fn. sand, cohesive, stiff, v. sli plastic, dense, sli moist	ML		8-12-21
1917.9	--21.0	21.0-22.5	ss	15	28	1.5	SILT as above to 21.7'except wet; @ 21.7'- dk. gry fat CLAY (shale) w/silt, moist, med. dense, massive, v. stiff	ML CH		8-11-17
1916.4	--22.5	22.5-24.0	ss	16	48	1.5	As above to 23.0'; @ 23.0'- lt. gry to yel gry SILT w/tr. clay, dense, cohesive, wet	CH ML		9-18-30
1914.9	--24.0	24.0-25.5	ss	17	29	1.5	Silt as above to 24.5', moist; @ 24.5'-dk. gry fat CLAY (shale), sli moist	ML CH		8-12-17
1913.4	--25.5	25.5-27.0	ss	18	34	1.5	Interbedded silty CLAY & clayey SILT, moist to sli moist	ML CH ML CH		8-13-21
1911.9	--27.0	27.0-28.5	ss	19	36	1.5	As above, interbedded silty CLAY & clayey SILT, clay is leaner than above, moist	ML CH ML CH		8-16-20
1910.4	--28.5	28.5-30.0	ss	20	22	1.5	As above 2-1" wet clayey SILT layers, uniform dk. gry color	ML CH ML CH		3-8-14
1908.9	--30.0	30.0-31.5	ss	21	42	1.5	As above to 30.7'; @ 30.7'-dk.gry fn silty SAND, w/soft clay, cohesive,wet, med dense, uniform, massive, well sorted (consolidated graywacke)	ML CH SM		13-17-25
1907.4	--31.5	31.5-33.0	ss	22	62	1.5	SAND as above, wet, dense	SM		11-17-45
1905.9	--33.0									

DRILLING METHOD: HSA, I.D.= 3 3/4", O.D.= 7"
DRILLING CONTRACTOR: Braun

DEPTH TO WATER -
AT COMPLETION: 36.3'
LATER TIME/DEPTH: 22.3' 14 hrs later

FOTH & VAN DYKE

Client: Cooperative Power
Project: Coal Creek Station
Prepared by: AMC
Checked by: PAD

Scope I.D.: 89C16
Page: 3 of 3
Date: 8-30-89
Date: 9-1-89

REPORT - LOG OF TEST BORING

Start Date: 7-19-89
Completion Date: 7-19-89
Logged by: GKM

Test Boring No.: MW-75
Location: N 36290.0, E 39715.8
Boring Depth: 42.0
Surface Elevation: 1938.9

MSL ELEV	DEPTH FR LND SURF	SAMP DEPTH INTERVAL	TYPE	#	N	REC (ft)	DESCRIPTION OF MATERIAL	CLASS	LABORATORY TESTS	DRILLING AND SAMPLING NOTES
1905.9	--33.0	33.0-34.5	ss	23	38	1.5	As above, wet (appears just under saturation, but may be saturated)	SM		12-17-21
1904.4	--34.5									
1902.9	--36.0	36.0-37.5	ss	24	47	1.5	As above	SM		13-20-27
1901.4	--37.5	37.5-39.0	ss	25	47	1.5	As above	SM		11-20-27
1899.9	--39.0	39.0-40.5	ss	26	47	1.5	As above	SM		17-20-27
1898.4	--40.5	40.5-42.0	ss	27	60	1.5	As above - very dense	SM		17-23-37 Pulled augers up 5' let sit 1 hr., water level @ 37.0
1896.9	--42.0						EOB @ 42.0'			
1895.4	--43.5									
1893.9	--45.0									
1892.4	--46.5									
1890.9	--48.0									
1889.4	--49.5									

DRILLING METHOD: HSA, I.D.= 3 3/4", O.D.= 7"
DRILLING CONTRACTOR: Braun

DEPTH TO WATER -
AT COMPLETION: 36.3'
LATER TIME/DEPTH: 22.3' 14 hrs later

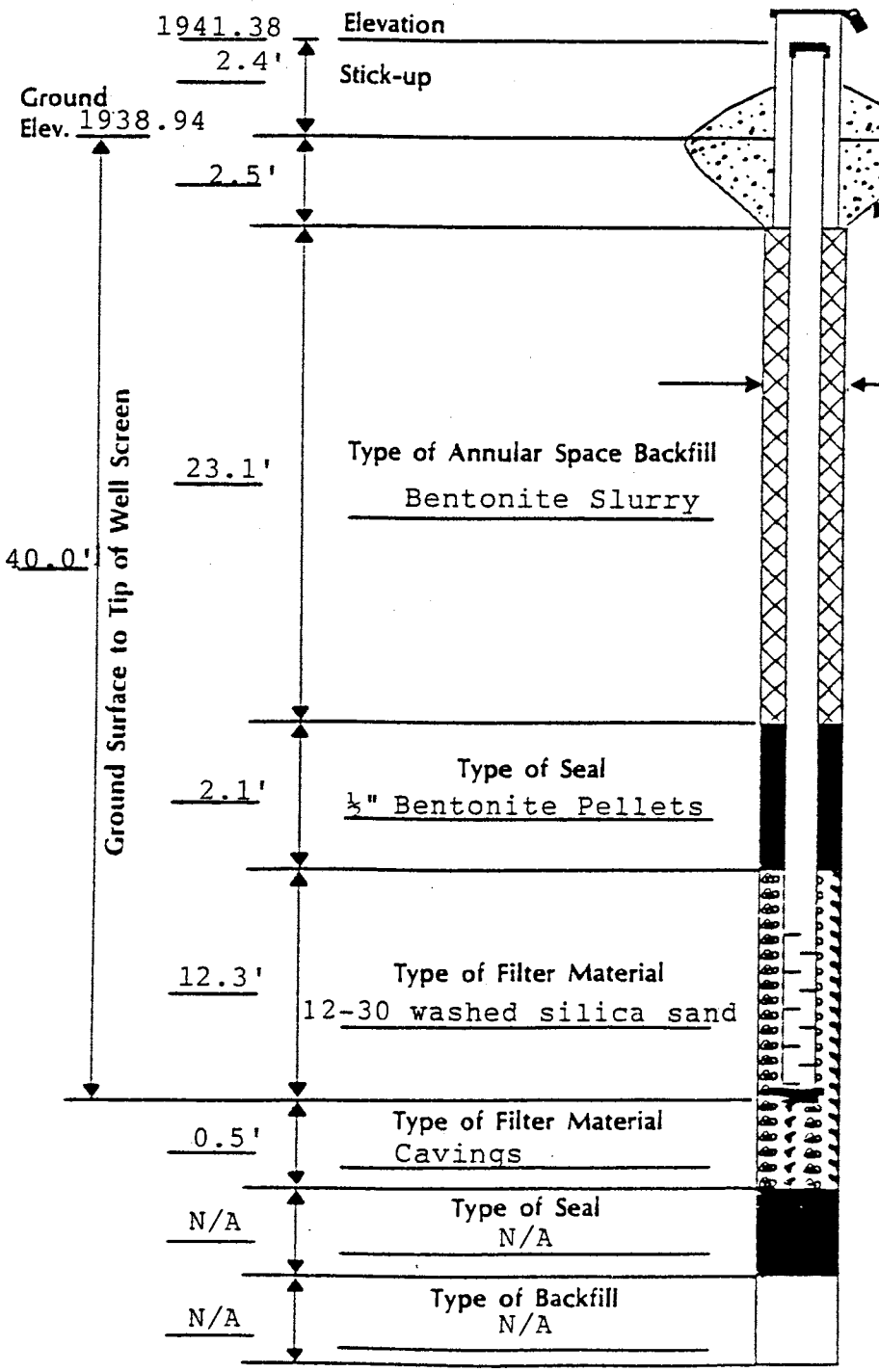
Foth & Van Dyke

Client: Cooperative Power — Scope I.D.: 89C16
Project: Coal Creek Station — Page: 1
Prepared by: GKM — Date: 7-19-89
Checked by: PAD — Date: 9-1-89

MONITORING WELL CONSTRUCTION DIAGRAM

Driller: Braun
Drilling Method: Hollow Stem Auger, I.D.=3 3/4", O.D.=7"
Coordinates: N 36290.0, E 39715.8

Well No: MW-75
Date Installed: 7-19-89 & 7-20-89



Protector Pipe:
Size: 4 inch
Material: Steel
Lock No.: Master 2106

Surface Seal Material: Quikrete

Drill Hole Diameter: 7 inch

Riser:
Diameter: 2 inch
Material: PVC
Sch.: 40
Type of Joints: flush threaded
Stenciled? no

Screen:
Diameter: 2 inch
Material: Schedule 40 PVC
Slot Size: 0.010 inch
Length: 10'

Type of Cap: flat PVC

Centralizer: Used ☐ Not Used ☒

Depth to Water From Top of Riser at Completion: 24.7'

NOTE: Not to Scale

* N/A = not applicable

BORING LOG NO. MW-91-1

PROJECT: Monitoring Well Installations

CLIENT: Golder Associates, Inc.
Lakewood, CO

SITE: GRE Coal Creek Station
McLean County, ND

LOCATION: See Exhibit A-2

Northing: 138918 Easting: 1841128

Surface Elev.: 1901.3 (Ft.)

DEPTH	ELEVATION (Ft.)	Description
0.3	1901	**FILL - TOPSOIL**, dark brown
1.5	1900	**FILL - CLAYEY SAND**, brown
		SANDY LEAN CLAY, brown
7.0	1894.5	**SANDY LEAN CLAY (CL)**, trace gravel, brown, medium stiff
10.5	1891	**POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM)**, fine to coarse grained, brown, loose to medium dense
25.0	1876.5	
26.0	1875.5	**FAT CLAY (CH)**, brownish-gray, very stiff, silt laminations
		Boring Terminated at 26 Feet

INSTALLATION DETAILS: PVC Cap, PVC Riser, Bentonite, Silica Sand, PVC Screen, PVC End Cap

DEPTH (Ft.)	SAMPLE TYPE	FIELD TEST RESULTS
		7-10-10 N=20
5		5-7-9 N=16
		2-3-3 N=6
10		3-4-4 N=8
		3-5-4 N=9
15		4-5-5 N=10
20		4-7-6 N=13
25		5-7-9 N=16

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3¼" ID Hollow Stem Auger 0-24½'

Abandonment Method:
Boring converted to monitoring well upon completion.

See Exhibit A-3 for description of field procedures.

See Appendix B for explanation of symbols and abbreviations.

Notes:
Northing, easting and elevation provided by Golder Associates, Inc.

WATER LEVEL OBSERVATIONS

None encountered

Terracon
1805 Hancock Dr PO Box 2084
Bismarck, ND

Boring Started: 11-06-2017 | Boring Completed: 11-06-2017

Drill Rig: D-90 | Driller: E. Mayer

Project No.: M2175093 | Exhibit: A-4

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-WELL M2175093 MONITORING WELL I.GPJ TERRACON_DATATEMPLATE.GDT 12/13/17

BORING LOG NO. MW-91-2

PROJECT: Monitoring Well Installations

CLIENT: Golder Associates, Inc.
Lakewood, CO

SITE: GRE Coal Creek Station
McLean County, ND

LOCATION: See Exhibit A-2

Northing: 137705 Easting: 1839142

Surface Elev.: 1939.1 (Ft.)

DEPTH	ELEVATION (Ft.)	Description
1.5	1937.5	**FILL - POORLY GRADED SAND WITH SILT AND GRAVEL**, dark brown
4.5	1934.5	**FILL - SANDY LEAN CLAY**, trace gravel, brown
5.5	1933.5	**ORIGINAL TOPSOIL (CL)**, dark brown, stiff
10.5	1928.5	**FAT CLAY (CH)**, brownish gray, stiff
15.5	1923.5	**COAL**, black waterbearing at 15'
18.0	1921	**FAT CLAY (CH)**, grayish-brown, stiff, silt laminations
29.0	1910	**FAT CLAY (CH)**, gray, hard, silt laminations
31.0	1908	**COAL**, black, waterbearing
		Boring Terminated at 31 Feet

INSTALLATION DETAILS: PVC Cap; Bentonite; PVC Riser; Silica Sand; PVC Screen; PVC End Cap

DEPTH (Ft.)	SAMPLE TYPE	FIELD TEST RESULTS
		3-4-6 N=10
5		3-4-5 N=9
		4-5-6 N=11
10		3-3-6 N=9
		3-3-3 N=6
15		3-4-4 N=8
20		15-22-21 N=43
25		8-13-19 N=32
30		32-51-49 N=100

WATER LEVEL OBSERVATIONS: ▽ While drilling

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3¼" ID Hollow Stem Auger 0-29½'

Abandonment Method:
Boring converted to monitoring well upon completion.

See Exhibit A-3 for description of field procedures.

See Appendix B for explanation of symbols and abbreviations.

Notes:
Northing, easting and elevation provided by Golder Associates, Inc.

Terracon
1805 Hancock Dr PO Box 2084
Bismarck, ND

Boring Started: 11-06-2017	Boring Completed: 11-06-2017
Drill Rig: D-90	Driller: E. Mayer
Project No.: M2175093	Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-WELL M2175093 MONITORING WELL I.GPJ TERRACON_DATATEMPLATE.GDT 12/13/17

BORING LOG NO. MW-DP1

PROJECT: Piezometers/Well Installations

CLIENT: Golder Associates Lakewood, Colorado

SITE: GRE - Coal Creek Station McLean County, North Dakota

LOCATION: See Exhibit A-2

Northing: 139810 Easting: 1839680

Surface Elev.: 1914 (Ft.)

DEPTH	ELEVATION (Ft.)	Description
0	1914	**FILL - LEAN CLAY WITH SAND (CL)**, brown
13.5	1900.5	**LEAN CLAY WITH SAND (CL)**, dark brown to brown, very stiff to stiff
24.0	1890	**SILT WITH SAND (ML)**, light brown
25.5	1888.5	

INSTALLATION DETAILS: Steel Casing; PVC Riser; Concrete; Bentonite; Silica sand

DEPTH (Ft.)	SAMPLE TYPE	FIELD TEST RESULTS
0		2-2-2 N=4
		3-3-5 N=8
5		5-7-11 N=18
		5-7-9 N=16
10		3-4-6 N=10
		3-6-12 N=18
15		5-6-10 N=16
20		4-5-8 N=13
25		3-4-5 N=9

WATER LEVEL OBSERVATIONS: Initially Encountered

WATER CONTENT (%); DRY UNIT WEIGHT (pcf); ATTERBERG LIMITS LL-PL-PI

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method: 3¼" ID HSA 0-44½'

Abandonment Method: Boring converted to monitoring well installation.

See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Notes:

Midwest Testing Laboratory, Inc. A Terracon Company

1805 Hancock Drive
Bismarck, North Dakota

Boring Started: 6/10/2014 | Boring Completed: 6/10/2014

Drill Rig: D-50 | Driller: MR

Project No.: M2145058 | Exhibit: A-8

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-WELL LOGS.GPJ TEMPLATE UPDATE 3-31-14.GPJ 6/19/14

BORING LOG NO. MW-DP1

PROJECT: Piezometers/Well Installations

CLIENT: Golder Associates Lakewood, Colorado

SITE: GRE - Coal Creek Station McLean County, North Dakota

LOCATION: See Exhibit A-2

Northing: 139810 Easting: 1839680 Surface Elev.: 1914 (Ft.)

GRAPHIC LOG	DEPTH	ELEVATION (Ft.)		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI
			SILTY SAND (SM), light brown, dense, fine to medium-grained, waterbearing *(continued)*							
			Silica sand							
			PVC Screen	30		X	11-16-21 N=37			
				35		X	10-16-21 N=37			
	39.5	1874.5								
			SILTY SAND (SM), gray, dense, fine to medium-grained, waterbearing	40		X	12-16-31 N=47			
			Sluff	45		X	12-16-21 N=37			
	46.0	1868	***Boring Terminated at 46 Feet***							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3¼" ID HSA 0-44½'

Abandonment Method:
Boring converted to monitoring well installation.

See Exhibit A-3 for description of field procedures.

See Appendix B for description of laboratory procedures and additional data (if any).

See Appendix C for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

▽ *Initially Encountered*

Midwest Testing LABORATORY, INC. A Terracon COMPANY
1805 Hancock Drive
Bismarck, North Dakota

Boring Started: 6/10/2014 Boring Completed: 6/10/2014

Drill Rig: D-50 Driller: MR

Project No.: M2145058 Exhibit: A-8

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-WELL LOGS.GPJ TEMPLATE UPDATE 3-31-14.GPJ 6/19/14

State of North Dakota

BOARD OF WATER WELL CONTRACTORS

900 E. BOULEVARD • BISMARCK, NORTH DAKOTA 58505

MONITORING WELL REPORT

State law requires that this report be filed with the State Board of Water Well Contractors within 30 days after completion or abandonment of the well.

1. WELL OWNER

Name Great River Energy

Address 2875 3rd St SW

Underwood, ND 58576-9659

2. WELL LOCATION **(Piezometer MW-DP1)**

Address (if in city) (see attached drawing)

County McLean

NW ¼ SE ¼ NE ¼ Sec. 17 Twp. 145 N. Rge. 82 W.

Lat. _____ Long: _____

Ground Elevation: 1914

3. METHOD DRILLED

■ Auger Other ____

4. WELL CONSTRUCTION

Diameter of Hole 8 inches Depth 46 feet

Riser: ■ PVC □ Other

■ Threaded □ Solvent □ Other

Riser rating SDR _____ Schedule 40

Diameter 2.0 inches

From +2 ft. to 25 ft.

Was a well screen installed? ■ Yes □ No

Material Schedule 40 PVC Diameter 2.0 inches

Slot Size #10 set from 25 feet to 45 feet

Sand packed from 21 feet to 45 feet

Depth grouted from 1 feet to 21 feet

Grouting Material

Bentonite x Other _____

If other explain:

One-foot thick concrete collar at the surface

Sluff: 45 feet to 46 feet

Well head completion:

24" above grade x Other _____

If other, specify 4" x 4" x 5' square steel protective cover

Was protective casing installed? ■ Yes □ No

Was well disinfected upon completion? □ Yes ■ No

5. WATER LEVEL

Static water level -- feet below surface

If flowing: closed in pressure _____ psi or ft. above land surface

6. WELL LOG Depth (Ft.)

Formation	From	To
CLAY	0	24
SILT WITH SAND	24	25.5
SILTY SAND	25.5	46

(Use separate sheet if necessary)

7. WAS THE HOLE PLUGGED OR ABANDONED?

□ Yes ■ No

If so, how? _____

8. REMARKS

Water level monitoring only

9. DATE COMPLETED 6-10-14

10. CONTRACTOR CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

Monitoring Well Contractor — Certificate No.

Midwest Testing Laboratory/Terracon — 444

Address

PO Box 2084, Bismarck, ND 58502-2084

Signature _____ Date 6/20/14

BORING LOG NO. MW-DP2

PROJECT: Piezometers/Well Installations

CLIENT: Golder Associates Inc
Lakewood, Colorado

SITE: GRE - Coal Creek Station
McLean County, North Dakota

LOCATION: See Exhibit A-2

Latitude: 47.380769° Longitude: -101.14442°
Northing: 139538 Easting: 1840462

Surface Elev.: 1895 (Ft.)

DEPTH	ELEVATION (Ft.)	Description
0.2	1895	**FILL - TOPSOIL**, dark brown
		FILL - SANDY LEAN CLAY, trace gravel, grayish-brown, frost to 6'
6.5	1888.5	
		FILL - SANDY LEAN CLAY, trace gravel, dark brown
9.5	1885.5	
10.5	1884.5	**ORIGINAL TOPSOIL**, dark brown
12.0	1883	**SANDY LEAN CLAY (CL)**, trace gravel, brown, stiff, waterbearing sand seam at 11½'
13.5	1881.5	**CLAYEY SAND (SC)**, light gray, dense, fine to medium-grained, waterbearing
		CLAYEY SAND (SC), trace gravel, brown, medium dense, fine to coarse grained, waterbearing
18.0	1877	***Boring Terminated at 18 Feet***

INSTALLATION DETAILS: Steel Casing, PVC Riser, Grout, Bentonite, Silica Sand, PVC Screen, Sluff

DEPTH (Ft.)	SAMPLE TYPE	FIELD TEST RESULTS
		3-5-6 N=11
5		5-6-10 N=16
		4-5-5 N=10
10		3-4-6 N=10
		3-11-23 N=34
15		9-8-7 N=15

WATER LEVEL OBSERVATIONS

WATER CONTENT (%)

ATTERBERG LIMITS: LL-PL-PI

PERCENT FINES

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3¼" Inside Diameter, Hollow Stem Auger 0-18'

Abandonment Method:
Boring converted to monitoring well installation.

See Exhibit A-3 for description of field procedures.

See Appendix B for explanation of symbols and abbreviations.

Notes:
Survey data provided by client.
Well developed on April 2. Pumped until water was clear.

WATER LEVEL OBSERVATIONS

▽ *Initially Encountered*

Terracon
1805 Hancock Drive
Bismarck, North Dakota

Boring Started: 4/1/2015 | Boring Completed: 4/1/2015

Drill Rig: D-90 | Driller: MR

Project No.: M2155021 | Exhibit: A-4

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-WELL M2155021.GPJ TERRACON2012.GDT 4/17/15

State of North Dakota

BOARD OF WATER WELL CONTRACTORS

900 E. BOULEVARD • BISMARCK, NORTH DAKOTA 58505

MONITORING WELL REPORT

State law requires that this report be filed with the State Board of Water Well Contractors within 30 days after completion or abandonment of the well.

1. WELL OWNER

Name: Great River Energy

Address: 2875 3rd St SW

Underwood, ND 58576-9659

2. WELL LOCATION **(Well MW-DP2)**

Address (if in city): (see attached drawing)

County: McLean

NE ¼ SE ¼ NE ¼ Sec. 17 Twp. 145 N. Rge. 82 W.

Lat: 47.380769 Long.: -101.144420

Ground Elevation: 1895

3. METHOD DRILLED

■ Auger Other ____

4. WELL CONSTRUCTION

Diameter of Hole 6.25 inches Depth 18 feet

Riser: ■ PVC □ Other

■ Threaded □ Solvent □ Other

Riser rating SDR _____ Schedule 40

Diameter 2.0 inches

From +2.75 ft. to 7 ft.

Was a well screen installed? ■ Yes □ No

Material Schedule 40 PVC Diameter 2.0 inches

Slot Size #10 set from 7 feet to 17 feet

Sand packed from 5 feet to 17 feet

Depth grouted from 1 foot to 5 feet

Grouting Material

Bentonite x Other _____

If other explain:

One foot thick concrete collar at the surface.

Sluff: 17 feet to 18 feet

Well head completion:

24" above grade _____ Other x

If other, specify 4" x 4" x 5' square steel protective cover

Was protective casing installed? ■ Yes □ No

Was well disinfected upon completion? □ Yes ■ No

5. WATER LEVEL

Static water level 15 feet below surface

If flowing: closed in pressure _____ psi or ft. above land surface

6. WELL LOG Depth (Ft.)

Formation	From	To
SANDY LEAN CLAY (FILL)	0	9.5
TOPSOIL	9.5	10.5
SANDY LEAN CLAY	10.5	12
CLAYEY SAND	12	18

(Use separate sheet if necessary)

7. WAS THE HOLE PLUGGED OR ABANDONED?

□ Yes ■ No

If so, how? _____

8. REMARKS

Water level monitoring only

9. DATE COMPLETED 4-3-15

10. CONTRACTOR CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

Terracon 444

Monitoring Well Contractor Certificate No.

PO Box 2084

Address

Bismarck, ND 58502-2084

Signature Date

4/13/15

BORING LOG NO. MW-DP2B

PROJECT: Monitoring Well Installation & Soil Testing

CLIENT: Golder Associates, Inc.
Lakewood, CO

SITE: Coal Creek Station
Underwood, ND

LOCATION See Exploration Plan
Latitude: 47.3806° Longitude: -101.1444°
Surface Elev.: 1895 (Ft.)

DEPTH	ELEVATION (Ft.)	Description
		FILL - SANDY LEAN CLAY, trace gravel, brown
		bulk sample obtained from 1 to 5'
		bulk sample obtained from 9 to 10'
9.5	1885.5	
10.5	1884.5	**ORIGINAL TOPSOIL**, dark brown
		SANDY LEAN CLAY (CL), trace gravel, brown, stiff
13.0	1882	bulk sample obtained from 11 to 12'
		POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), brown, medium dense, fine to coarse-grained
18.0	1877	
		SILTY SAND (SM), light brown, medium dense, fine-grained
25.0	1870	
		Boring Terminated at 25 Feet

INSTALLATION DETAILS: Pro Top, Concrete, PVC Riser, Bentonite, PVC Screen, Silica Sand, Sluff

DEPTH (Ft.)	SAMPLE TYPE	FIELD TEST RESULTS	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
5		7-8-12 N=20	42-16-26	62
10		3-6-9 N=15	39-17-22	59
15		11-14-8 N=22		
20		6-7-10 N=17		
25				

WATER LEVEL OBSERVATIONS; WATER CONTENT (%); DRY UNIT WEIGHT (pcf)

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3¼" I D, Hollow Stem Auger 0-19½'

Abandonment Method:
Boring converted to monitoring well with Type A Surface Completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevations were provided by others.

Notes:
Elevations provided by Golder Associates.
Latitude and Longitude obtained with a handheld GPS unit.

WATER LEVEL OBSERVATIONS

▽ *While drilling*

Reversed Auger Out

Terracon
1805 Hancock Dr, PO Box 2084
Bismarck, ND

Boring Started: 11-20-2018	Boring Completed: 11-20-2018
Drill Rig: D-90	Driller: EM
Project No.: M2185118	

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-WELL M2185118 MONITORING WELL I.GPJ TERRACON_DATATEMPLATE.GDT 11/29/18

BORING LOG NO. MW-DP3

PROJECT: Piezometers/Well Installations

CLIENT: Golder Associates Inc
Lakewood, Colorado

SITE: GRE - Coal Creek Station
McLean County, North Dakota

LOCATION: See Exhibit A-2

Latitude: 47.377698° Longitude: -101.149848°
Northing: 138647 Easting: 1839162

Surface Elev.: 1928 (Ft.)

DEPTH	ELEVATION (Ft.)	Description
0.0	1928	**FILL - COAL**, black
5.0	1923	
6.0	1922	**FILL - FAT CLAY**, gray
		FILL - COAL, dark brown
		waterbearing at 10½'
12.0	1916	
		FAT CLAY (CH), brownish-gray, stiff
17.5	1910.5	
		COAL, black, waterbearing
21.0	1907	
		Boring Terminated at 21 Feet

INSTALLATION DETAILS: Steel Casing, PVC Riser, Grout, Bentonite, Silica Sand, PVC Screen, Sluff

DEPTH (Ft.)	SAMPLE TYPE	FIELD TEST RESULTS
0		
		5-7-8 N=15
5		5-6-10 N=16
		3-2-3 N=5
10		2-1-2 N=3
		3-5-7 N=12
15		4-5-9 N=14
20		5-7-9 N=16

WATER LEVEL OBSERVATIONS: Initially Encountered

WATER CONTENT (%)

ATTERBERG LIMITS: LL-PL-PI

PERCENT FINES

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3¼" Inside Diameter, Hollow Stem Auger 0-19½'

Abandonment Method:
Boring converted to monitoring well installation.

See Exhibit A-3 for description of field procedures.

See Appendix B for explanation of symbols and abbreviations.

Notes:
Survey data provided by client.
Well developed on April 2. Pumped until water was clear.

Terracon
1805 Hancock Drive
Bismarck, North Dakota

Boring Started: 4/1/2015 | Boring Completed: 4/1/2015
Drill Rig: D-90 | Driller: MR
Project No.: M2155021 | Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-WELL M2155021.GPJ TERRACON2012.GDT 4/17/15

State of North Dakota

BOARD OF WATER WELL CONTRACTORS

900 E. BOULEVARD • BISMARCK, NORTH DAKOTA 58505

MONITORING WELL REPORT

State law requires that this report be filed with the State Board of Water Well Contractors within 30 days after completion or abandonment of the well.

1. WELL OWNER

Name Great River Energy

Address 2875 3rd St SW

Underwood, ND 58576-9659

2. WELL LOCATION **(Well MW-DP3)**

Address (if in city) (see attached drawing)

County McLean

NE ¼ NW ¼ SE ¼ Sec. 17 Twp. 145 N. Rge. 82 W.

Lat: 47.377698 Long.: -101.149848

Ground Elevation: 1928

3. METHOD DRILLED

■ Auger Other ____

4. WELL CONSTRUCTION

Diameter of Hole 6.25 inches Depth 21 feet

Riser: ■ PVC □ Other

■ Threaded □ Solvent □ Other

Riser rating SDR _____ Schedule 40

Diameter 2.0 inches

From +2.75 ft. to 9 ft.

Was a well screen installed? ■ Yes □ No

Material Schedule 40 PVC Diameter 2.0 inches

Slot Size #10 set from 9 feet to 19 feet

Sand packed from 6 feet to 19 feet

Depth grouted from 1 foot to 6 feet

Grouting Material

Bentonite x Other _____

If other explain:

One foot thick concrete collar at the surface.

Sluff: 19 feet to 21 feet

Well head completion:

24" above grade _____ Other x

If other, specify 4" x 4" x 5' square steel protective cover

Was protective casing installed? ■ Yes □ No

Was well disinfected upon completion? □ Yes ■ No

5. WATER LEVEL

Static water level 17 feet below surface

If flowing: closed in pressure _____ psi or ft. above land surface

6. WELL LOG Depth (Ft.)

Formation	From	To
COAL (FILL)	0	5
FAT CLAY (FILL)	5	6
COAL (FILL)	6	12
FAT CLAY	12	17.5
COAL	17.5	21

(Use separate sheet if necessary)

7. WAS THE HOLE PLUGGED OR ABANDONED?

□ Yes ■ No

If so, how? _____

8. REMARKS

Water level monitoring only

9. DATE COMPLETED 4-3-15

10. CONTRACTOR CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

Terracon 444

Monitoring Well Contractor Certificate No.

PO Box 2084

Address

Bismarck, ND 58502-2084

Signature Date 4/13/15

BORING LOG NO. MW-DP4

PROJECT: Piezometers/Well Installations

CLIENT: Golder Associates Inc
Lakewood, Colorado

SITE: GRE - Coal Creek Station
McLean County, North Dakota

LOCATION: See Exhibit A-2

Latitude: 47.381119° Longitude: -101.149657°
Northing: 134705 Easting: 1839196

Surface Elev.: 1914 (Ft.)

DEPTH	ELEVATION (Ft.)	
0.2	1914	**FILL - TOPSOIL**, dark brown
		LEAN CLAY WITH SAND (CL), trace gravel, grayish-brown, frost
4.0	1910	
		SANDY LEAN CLAY (CL), trace gravel, brown, medium stiff to stiff
23.5	1890.5	
25.5	1888.5	**POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM)**, brown, medium dense, fine to coarse-grained, waterbearing
		FAT CLAY (CH), gray
29.0	1885	
31.0	1883	**CLAYEY SAND (SC)**, gray, dense, fine-grained, waterbearing
		Boring Terminated at 31 Feet

DEPTH (Ft.)	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		5-7-6 N=13			
5		3-3-4 N=7			
		5-4-6 N=10			
10		3-4-6 N=10			
		4-5-8 N=13			
15		4-5-6 N=11			
20		3-4-5 N=9			
25		4-5-6 N=11			
30		12-17-20 N=37			

INSTALLATION DETAILS: Steel Casing, PVC Riser, Grout, Bentonite, Silica Sand, PVC Screen, Sluff

WATER LEVEL OBSERVATIONS

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3¼" Inside Diameter, Hollow Stem Auger 0-29½'

Abandonment Method:
Boring converted to monitoring well installation.

See Exhibit A-3 for description of field procedures.

See Appendix B for explanation of symbols and abbreviations.

Notes:
Survey data provided by client.
Well developed on April 2. Pumped until water was clear.

WATER LEVEL OBSERVATIONS

▽ *Initially Encountered*

Terracon
1805 Hancock Drive
Bismarck, North Dakota

Boring Started: 4/1/2015 | Boring Completed: 4/1/2015

Drill Rig: D-90 | Driller: MR

Project No.: M2155021 | Exhibit: A-6

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-WELL M2155021.GPJ TERRACON2012.GDT 4/17/15

State of North Dakota

BOARD OF WATER WELL CONTRACTORS

900 E. BOULEVARD • BISMARCK, NORTH DAKOTA 58505

MONITORING WELL REPORT

State law requires that this report be filed with the State Board of Water Well Contractors within 30 days after completion or abandonment of the well.

1. WELL OWNER

Name Great River Energy

Address 2875 3rd St SW

Underwood, ND 58576-9659

2. WELL LOCATION **(Well MW-DP4)**

Address (if in city) (see attached drawing)

County McLean

NE ¼ SW ¼ NE ¼ Sec. 17 Twp. 145 N. Rge. 82 W.

Lat: 47.381119 Long.: -101.149657

Ground Elevation: 1914

3. METHOD DRILLED

■ Auger Other ____

4. WELL CONSTRUCTION

Diameter of Hole 6.25 inches Depth 31 feet

Riser: ■ PVC □ Other

■ Threaded □ Solvent □ Other

Riser rating SDR _____ Schedule 40

Diameter 2.0 inches

From +2.75 ft. to 19 ft.

Was a well screen installed? ■ Yes □ No

Material Schedule 40 PVC Diameter 2.0 inches

Slot Size #10 set from 19 feet to 29 feet

Sand packed from 17 feet to 29 feet

Depth grouted from surface to 14 feet

Grouting Material

Bentonite _____ Other Neat cement

If other explain:

Bentonite seal: 14 feet to 17 feet

Sluff: 29 feet to 31 feet

Well head completion:

24" above grade _____ Other x

If other, specify 4" x 4" x 5' square steel protective cover

Was protective casing installed? ■ Yes □ No

Was well disinfected upon completion? □ Yes ■ No

5. WATER LEVEL

Static water level 19 feet below surface

If flowing: closed in pressure _____ psi or ft. above land surface

6. WELL LOG

Formation	From (Depth Ft.)	To (Depth Ft.)
LEAN CLAY WITH SAND	0	4
SANDY LEAN CLAY	4	23.5
SAND WITH SILT AND GRAVEL	23.5	25.5
FAT CLAY	25.5	29
CLAYEY SAND	29	31

(Use separate sheet if necessary)

7. WAS THE HOLE PLUGGED OR ABANDONED?

□ Yes ■ No

If so, how? _____

8. REMARKS

Water level monitoring only

9. DATE COMPLETED 4-3-15

10. CONTRACTOR CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

Terracon 444

Monitoring Well Contractor Certificate No.

PO Box 2084

Address

Bismarck, ND 58502-2084

Signature [signature] Date 4/13/15

BORING LOG NO. DP5

PROJECT: Monitoring Well Installation

CLIENT: Golder Associates, Inc.
Lakewood, Colorado

SITE: GRE - Coal Creek Station
McLean County, North Dakota

LOCATION: See Exhibit A-2

Latitude: 47.37992° Longitude: -101.15194°

Surface Elev.: 1935 (Ft.)

DEPTH	ELEVATION (Ft.)	Description
0.0	1935	**FILL - SANDY LEAN CLAY**, brown and black, coal inclusions
5.0	1930	**FILL - SANDY LEAN CLAY**, trace gravel, brown to dark brown
11.0	1924	**SANDY LEAN CLAY (CL)**, trace gravel, brown to grayish-brown, very stiff to stiff, silt laminations
32.0	1903	**CLAYEY SAND (SC)**, brownish-gray, medium dense to dense, fine-grained
46.0	1889	***Boring Terminated at 46 Feet***

INSTALLATION DETAILS: Steel Casing, PVC Riser, Bentonite, Silica Sand, PVC Screen, Sluff

DEPTH (Ft.)	FIELD TEST RESULTS
0	3-5-11 N=16
	7-8-8 N=16
5	5-7-8 N=15
	5-8-10 N=18
10	3-5-7 N=12
	3-6-7 N=13
15	5-7-9 N=16
20	3-5-6 N=11
25	3-5-6 N=11
30	5-5-8 N=13
35	5-8-10 N=18
40	10-16-23 N=39
45	11-17-27 N=44

WATER LEVEL OBSERVATIONS

SAMPLE TYPE

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3¼" ID HSA 0-44½'

Abandonment Method:
Boring converted to monitoring well installation.

See Exhibit A-3 for description of field procedures.

See Appendix B for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

- *While drilling*
- *On 11/18/2015*
- *On 11/19/2015*

Terracon
1805 Hancock Drive
Bismarck, North Dakota

Boring Started:

Boring Completed: 11/18/2015

Drill Rig: D-90

Driller: MR

Project No.: M2155090

Exhibit: A-4

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-WELL M2155090.GPJ TERRACON2012.GDT 12/2/15



golder.com

APPENDIX B-2

Stratigraphic Cross Sections



GOLDER

LEGEND:

⊕ MW BOREHOLE, MONITORING WELL, OR PIEZOMETER

REFERENCE(S):

1. THE SITE AERIAL IMAGE IS FROM THE UNITED STATES DEPARTMENT OF AGRICULTURE NATIONAL AGRICULTURE IMAGERY PROGRAM AND WAS ACQUIRED IN 2019. THE LOCATION OF THE AERIAL IMAGE IS APPROXIMATE.

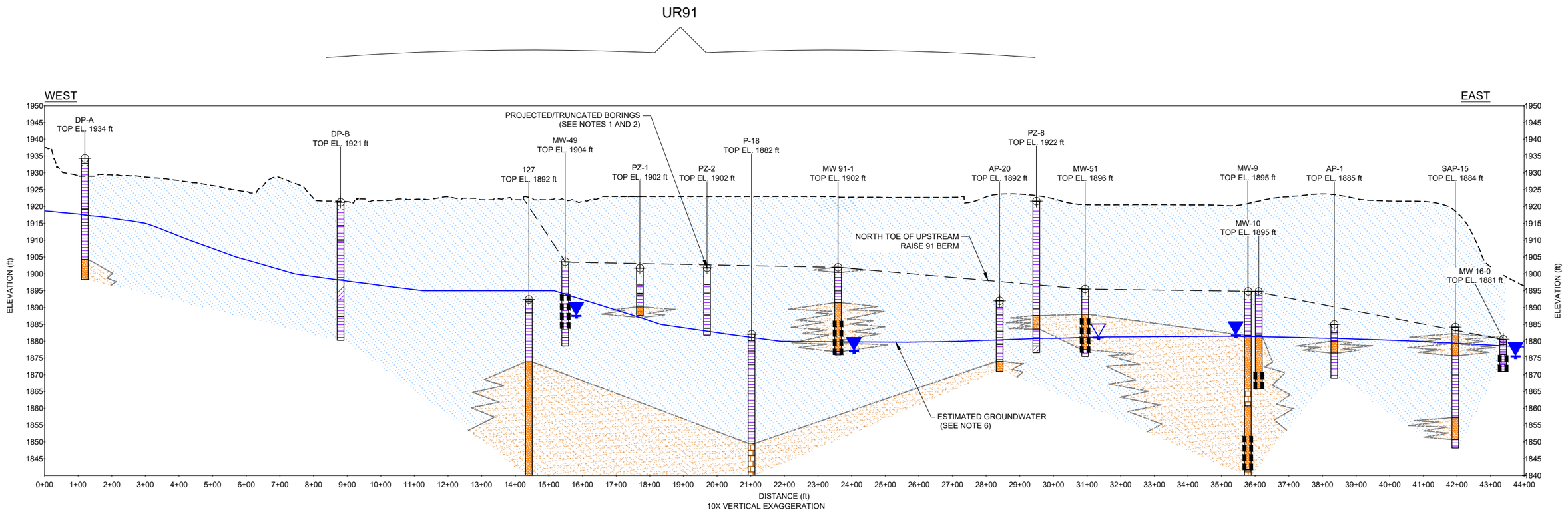
NOTE(S):

1. THE LOCATIONS OF BORINGS, WELLS, AND PIEZOMETERS ARE APPROXIMATE.

SITE OVERVIEW
LOCATION OF GEOLOGIC SECTIONS

FIGURE 1

Path: \\Denver\acad\GREAT RIVER ENERGY\COAL CREEK\99_PROJECTS\19138224\Soil Cross-Sections\ | File Name: Boring Plan_Wells.dwg



GEOLOGIC LEGEND

LOW PERMEABILITY MATERIALS

HIGH PERMEABILITY MATERIALS

OTHER

CLAY | CLAY LINER | SILT | SILTSTONE/ SHALE | SAND | SANDSTONE | COAL | CCR

CROSS SECTION LEGEND

- APPROXIMATE EXISTING GROUND (BASED ON SURVEY, SITE OBSERVATIONS, AND AERIAL IMAGERY)
- APPROXIMATE MATERIAL BOUNDARIES
- GROUNDWATER ELEVATION (NOTE 6)
- APPROXIMATE SCREEN INTERVAL

NOTES

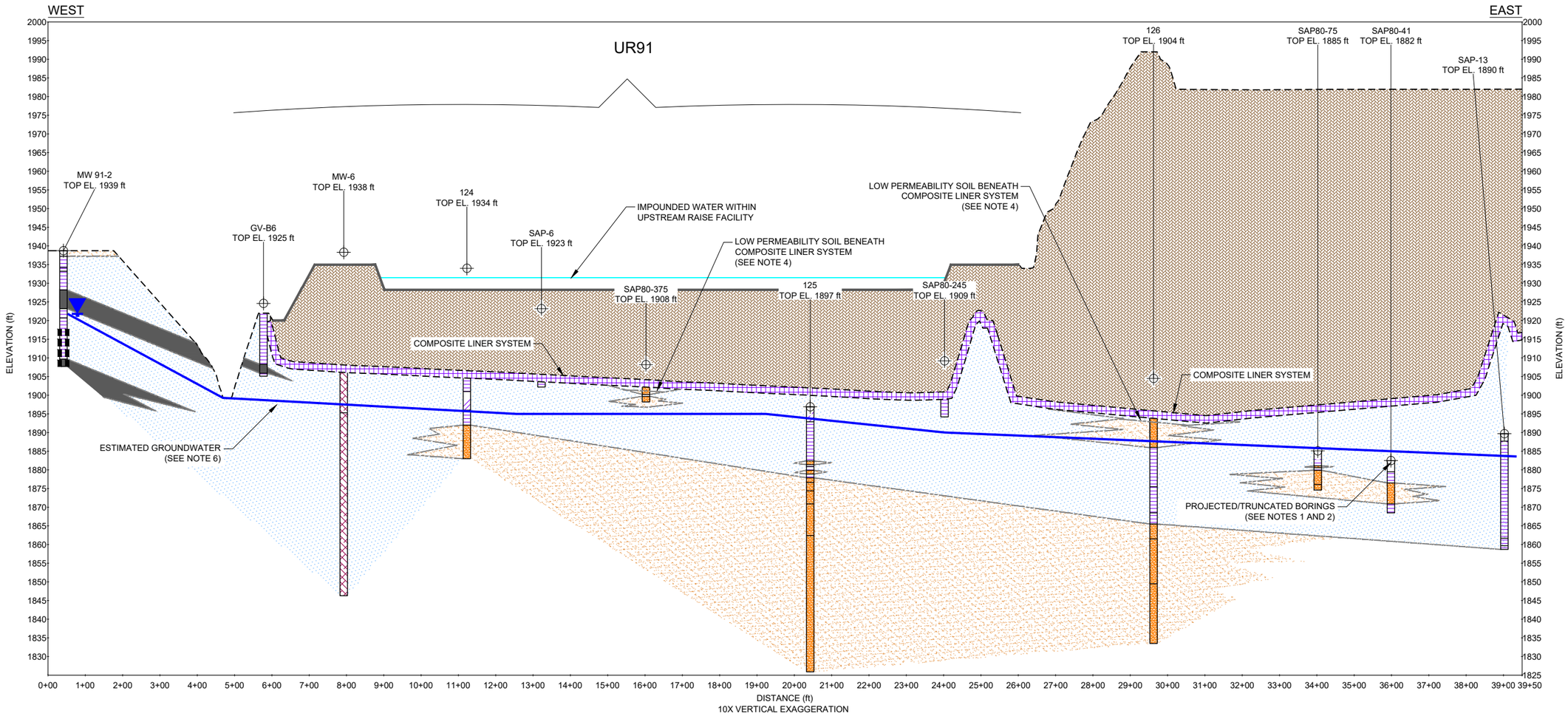
1. BORING INFORMATION IS BASED ON INFORMATION PROVIDED BY GREAT RIVER ENERGY. THE ELEVATIONS OF BORINGS ARE APPROXIMATE AND BORING INFORMATION HAS BEEN PROJECTED TO APPLICABLE SECTIONS.
2. HISTORICAL BORINGS MAY BE TRUNCATED AT THE TOP OF LINER OR CURRENT EXISTING GROUND SURFACE GRADES DUE TO CHANGES IN SITE GEOMETRY SINCE BORINGS WERE COMPLETED. BORINGS WITHIN LINED FACILITY BOUNDARIES ARE HISTORICAL AND WERE COMPLETED PRIOR TO COMPOSITE LINER CONSTRUCTION.
3. MATERIAL BOUNDARIES WERE DRAWN BASED ON BORING INFORMATION AND SITE OBSERVATIONS AND ARE SHOWN FOR INFORMATION ONLY.
4. INFORMATION FROM CONSTRUCTION QUALITY ASSURANCE DOCUMENTATION INDICATES THAT SOME LOCATIONS BELOW THE DESIGN SUBGRADE OF UPSTREAM RAISE 91 AND UPSTREAM RAISE 92 (INCLUDING SAND LENSES) WERE OVER-EXCAVATED AND BACKFILLED WITH LOW PERMEABILITY SOIL PRIOR TO CONSTRUCTION OF THE COMPOSITE LINER SYSTEM.
5. EXISTING GROUND, LINER GRADES, AND CCR GRADES ARE APPROXIMATE.
6. GROUNDWATER ELEVATIONS WERE MEASURED IN APRIL-MAY 2020 DURING THE Q2 2020 CCR RULE GROUNDWATER MONITORING EVENT.
7. GROUNDWATER FLOW IS GENERALLY PERPENDICULAR INTO THE SECTION (i.e INTO THE PAGE)

GOLDER

CROSS SECTION A
NORTH SIDE - UPSTREAM RAISE 91/92

FIGURE 2

Path: \\Denvelacad\GREAT RIVER ENERGY\COAL CREEK\99_PROJECTS\19136224\5-dl Cross-Sections\ | File Name: Boring Sections.dwg



GEOLOGIC LEGEND

LOW PERMEABILITY MATERIALS

CLAY | CLAY LINER | SILT | SILTSTONE/ SHALE

HIGH PERMEABILITY MATERIALS

SAND | SANDSTONE

OTHER

COAL | CCR

CROSS SECTION LEGEND

- APPROXIMATE EXISTING GROUND (BASED ON SURVEY, SITE OBSERVATIONS, AND AERIAL IMAGERY)
- APPROXIMATE MATERIAL BOUNDARIES
- GROUNDWATER ELEVATION (NOTE 6)
- APPROXIMATE SCREEN INTERVAL

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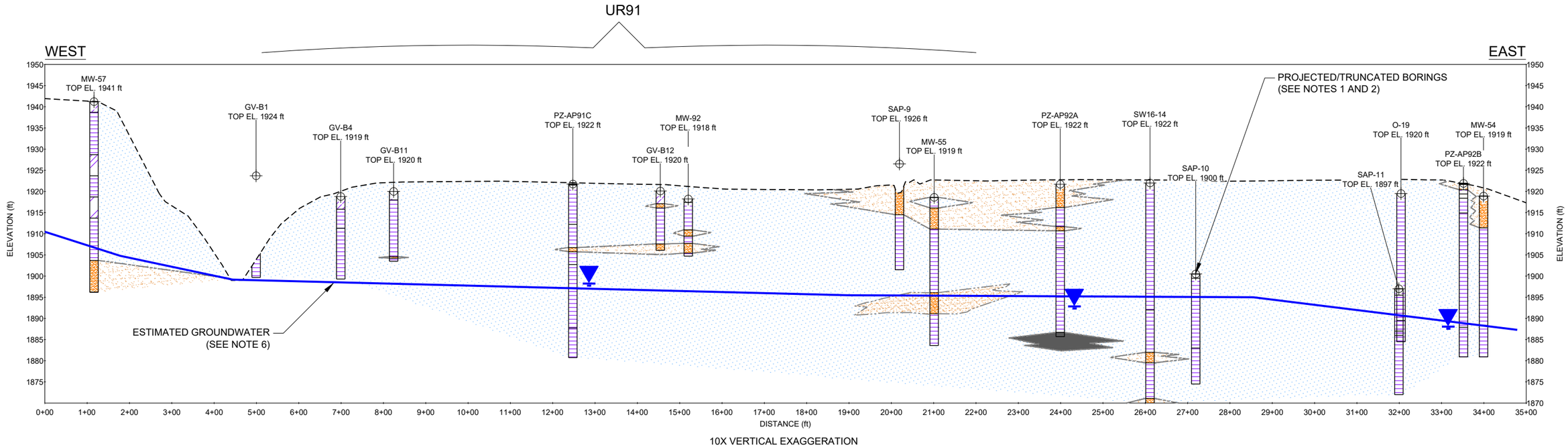
5. EXISTING GROUND, LINER GRADES, AND CCR GRADES ARE APPROXIMATE.
6. GROUNDWATER ELEVATIONS WERE MEASURED IN APRIL-MAY 2020 DURING THE Q2 2020 CCR RULE GROUNDWATER MONITORING EVENT.
7. GROUNDWATER FLOW IS GENERALLY PERPENDICULAR INTO THE SECTION (i.e INTO THE PAGE)

GOLDER

CROSS SECTION B
MIDDLE - UPSTREAM RAISE 91/92

FIGURE 3

Path: \\Denvelacad\GREAT RIVER ENERGY\COAL CREEK\99_PROJECTS\19136224\5-dl Cross-Sections\ | File Name: Boring Sections.dwg



10X VERTICAL EXAGGERATION

GEOLOGIC LEGEND

LOW PERMEABILITY MATERIALS

CLAY | CLAY LINER | SILT | SILTSTONE/ SHALE

HIGH PERMEABILITY MATERIALS

SAND | SANDSTONE

OTHER

COAL | CCR

CROSS SECTION LEGEND

APPROXIMATE EXISTING GROUND (BASED ON SURVEY, SITE OBSERVATIONS, AND AERIAL IMAGERY)

APPROXIMATE MATERIAL BOUNDARIES

GROUNDWATER ELEVATION (NOTE 6)

APPROXIMATE SCREEN INTERVAL

NOTES

1. BORING INFORMATION IS BASED ON INFORMATION PROVIDED BY GREAT RIVER ENERGY. THE ELEVATIONS OF BORINGS ARE APPROXIMATE AND BORING INFORMATION HAS BEEN PROJECTED TO APPLICABLE SECTIONS.
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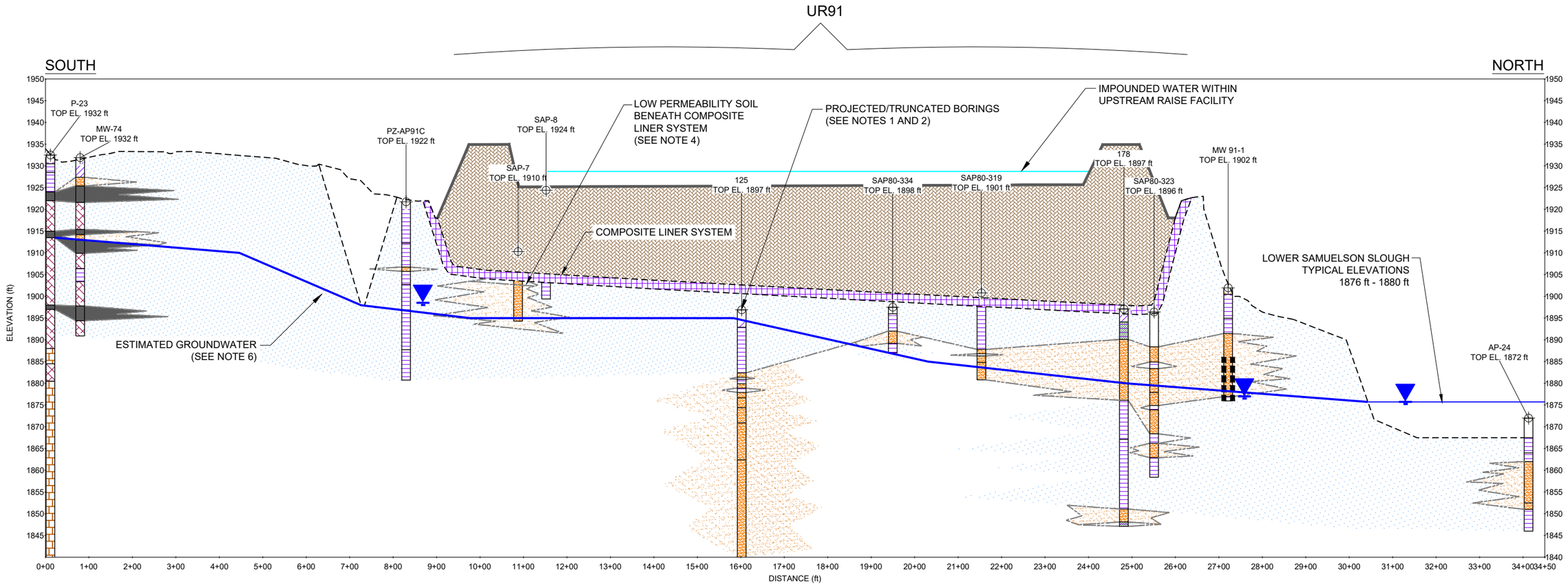
5. EXISTING GROUND, LINER GRADES, AND CCR GRADES ARE APPROXIMATE.
6. GROUNDWATER ELEVATIONS WERE MEASURED IN APRIL-MAY 2020 DURING THE Q2 2020 CCR RULE GROUNDWATER MONITORING EVENT.
7. GROUNDWATER FLOW IS GENERALLY PERPENDICULAR INTO THE SECTION (i.e INTO THE PAGE)

GOLDER

CROSS SECTION C
SOUTH SIDE - UPSTREAM RAISE 91/92

FIGURE 4

Path: \\Denvelacad\GREAT RIVER ENERGY\COAL CREEK\99_PROJECTS\19136224\5d Cross-Sections\ | File Name: Boring_Sections.dwg



10X VERTICAL EXAGGERATION

GEOLOGIC LEGEND

LOW PERMEABILITY MATERIALS

HIGH PERMEABILITY MATERIALS

OTHER

CLAY | CLAY LINER | SILT | SILTSTONE/ SHALE | SAND | SANDSTONE | COAL | CCR

CROSS SECTION LEGEND

- APPROXIMATE EXISTING GROUND (BASED ON SURVEY, SITE OBSERVATIONS, AND AERIAL IMAGERY)
- APPROXIMATE MATERIAL BOUNDARIES
- GROUNDWATER ELEVATION (NOTE 6)
- APPROXIMATE SCREEN INTERVAL

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5. EXISTING GROUND, LINER GRADES, AND CCR GRADES ARE APPROXIMATE.
6. GROUNDWATER ELEVATIONS WERE MEASURED IN APRIL-MAY 2020 DURING THE Q2 2020 CCR RULE GROUNDWATER MONITORING EVENT.
7. GROUNDWATER FLOW IS GENERALLY PARALLEL TO THE SECTION (SOUTH TO NORTH)

GOLDER

CROSS SECTION D
UPSTREAM RAISE 91

FIGURE 5

Path: \\Denver\facad\GREAT RIVER ENERGY\COAL CREEK\99_PROJECTS\19136224\Soil Cross-Sections\ | File Name: Boring Sections.dwg

APPENDIX B-3

Hydrogeological Analysis Annual Report, Coal Creek Station, Braun 1990

NDB90-045

HYDROGEOLOGICAL ANALYSIS ANNUAL REPORT

Coal Creek Station
McLean County, North Dakota

Cooperative Power
Eden Prairie, Minnesota

United Power Association
Elk River, Minnesota

December 21, 1990

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Table of Contents

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December 21, 1990

NDB90-045 ANNUAL HYDROGEOLOGICAL ANALYSIS REPORT
Coal Creek Station
McLean County, North Dakota

A. INTRODUCTION

This Annual Hydrogeological Analysis Report is submitted pursuant to the permit requirements set forth by the State of North Dakota Department of Health and Consolidated Laboratories (SDH) for the Coal Creek Station, McLean County, North Dakota.

This report includes data summary tables and graphs of selected available data as well as a narrative discussion of the water quality in the areas of the evaporation ponds and disposal ponds.

In addition, the interpretation of the 1989 Electromagnetic Survey (EM) as it correlates with the chemical samples is included. This is a requirement of the SDH as a provision for the site permit.

A site location map is shown in Figure 1; Figure 2 is a site map illustrating the location of monitoring points. Plate 1 displays an enlarged copy of the site map.

B. BACKGROUND

Background information was compiled out of the reports listed in the Reference section (F.).

The surficial geology consists of a sequence of glacial tills over sedimentary bedrock units. The till units range up to 30 feet thick. Beneath the till is an eroded surface of poorly consolidated sediments. In the south/southwest portion of the site, a shale and lignite unit is encountered as the first bedrock, which, in turn, overlies a sandstone unit.

Water level data for the site ~~is~~ are available dating back to the fourth quarter of 1979. A majority of the monitoring system was installed prior to 1986, when the monitoring system consisted of 39 wells. In 1986, eight additional groundwater monitoring wells were installed. In the spring of 1988 an

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obvious spatial correlation exists. This further supports the conclusion that EM values and contaminant levels are not correlated.

TABLE 6
GEOPHYSICAL VALUES VERSUS SULFATE LEVELS

WELL	EM CONDUCTIVITY (MHOS/METER)	SPECIFIC CONDUCTANCE (UMHOS/CM) AVERAGE VALUE	SULFATE (MG/L) AVERAGE VALUE
43	31.2	4300.00	2265.00
87	35.1	1290.00	389.00
25	36.6	0.00	0.00
24	36.6	0.00	0.00
23	36.6	2200.00	485.50
70	37.2	6400.00	3500.00
16	38.3	977.50	155.73
42	39.0	4500.00	2485.00
86	39.0	4000.00	2070.00
44	39.8	1695.00	493.51
45	39.8	1645.00	410.50
46	40.2	4275.00	2057.50
17	40.5	3040.00	3537.50
76	42.0	1360.00	510.00
55	46.1	3600.00	1860.00
72	46.2	1170.00	233.00
56	47.4	4200.00	1545.00
29	48.0	4400.00	3210.05
69	50.4	6300.00	3255.00
54	51.0	9480.00	12250.00

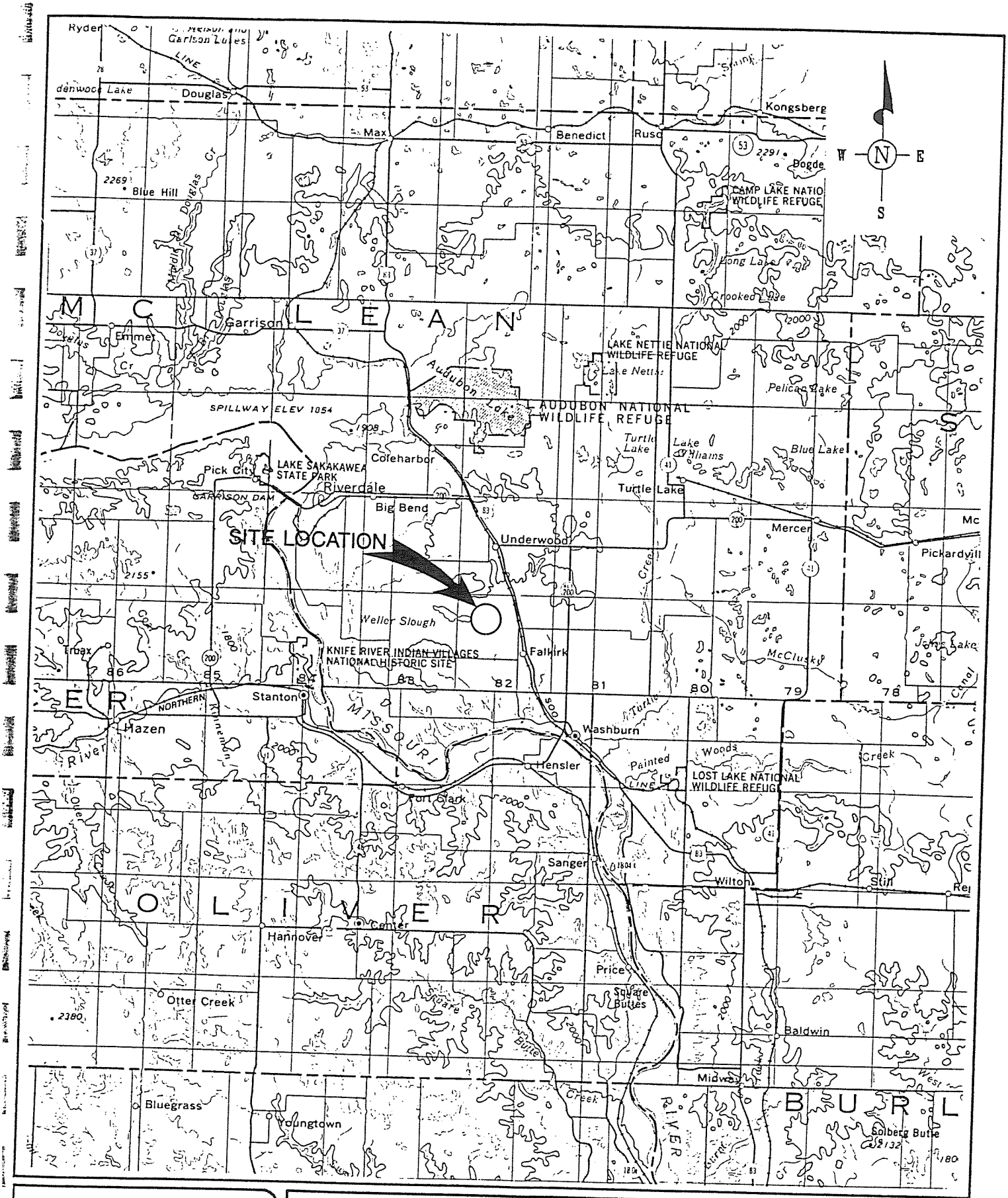
WELL	EM CONDUCTIVITY (MHOS/METER)	SPECIFIC CONDUCTANCE (UMHOS/CM) AVERAGE VALUE	SULFATE (MG/L) AVERAGE VALUE
21	52.2	1655.00	614.49
20	52.2	5450.00	2565.00
77	52.2	4100.00	1630.00
22	52.2	0.00	0.00
38	57.0	3150.00	1870.00
35	59.4	1230.00	183.50
36	59.4	1330.00	425.81
34	59.4	1385.00	230.00
57	60.0	1385.00	225.50
79	60.7	5500.00	2915.00
78	61.2	3000.00	1230.00
89	61.4	2700.00	1059.00
14	61.8	8800.00	5275.00
12	61.8	775.00	56.00
13	61.8	2450.00	536.50
15	62.4	8400.00	5415.00
58	66.0	2020.00	803.50
50	67.2	3650.00	1625.00
90	67.5	9100.00	4200.00
27	72.0	1650.00	287.50
28	72.0	1330.00	221.00
26	72.0	1445.00	221.00
51	72.0	5500.00	2977.00
9	76.2	2000.00	354.00

WELL	EM CONDUCTIVITY (MHOS/METER)	SPECIFIC CONDUCTANCE (UMHOS/CM) AVERAGE VALUE	SULFATE (MG/L) AVERAGE VALUE
10	76.2	7850.00	4990.00
31	77.7	6000.00	4320.00
32	77.7	5000.00	6290.00
30	77.7	2600.00	1050.00
80	87.1	2700.00	1100.00
33	88.2	1900.00	612.50
18	90.1	5000.00	3077.50
49	90.6	4400.00	2292.50
85	94.1	6600.00	2995.00
88	115.2	20000.00	14250.00

Surface water quality trends are shown on Figures 22-25. Upper and Lower Gradin Slough have been dry since the spring of 1989, but the historical data is presented on the graphs.

The monitoring system for the ash ponds went through a revision. Data previously presented by the monitoring point labeled "South Ash Pond" is now monitored by sites 126 and 127, East South Ash Pond and West South Ash Pond. Due to the change in monitoring points for the South Ash Pond, no new data is available for the 1989 monitoring period to compare with previous levels. The values are significantly lower than previously measured, but it is not know whether this is a reoccurring trend.

Sulfate and specific conductance levels have increased in Samuelson Slough over the 1989 monitoring period. These levels are significantly higher than previous values. Saylor Slough values remained at levels relative to previous measurements. Data was not available for Gradin Slough due to drought conditions.



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SITE LOCATION MAP
Hydrogeological Analysis Annual Report — 1989
Coal Creek Station
Underwood, North Dakota

DRAWN BY: KMR	DWG.No. NDB9045A	APP'D BY: LMH
	JOB I.D.# NDB9045E	PLOT SCALE 1:1

REVISED		SHEET
DATE	INT	1
12-13-90	KMR	OF 3
SCALE 1:500,000		FIGURE# 1

SITE PLAN/MONITORING WELL LOCATIONS

Hydrogeological Analysis Annual Report – 1989
Coal Creek Station
Underwood, North Dakota

DRAWN BY: KMR	DWG.No. NDB90045B
PLOT TIME:	JOB I.D.# NDB90045

APP'D BY: LMH
PLOT SCALE 1:2000

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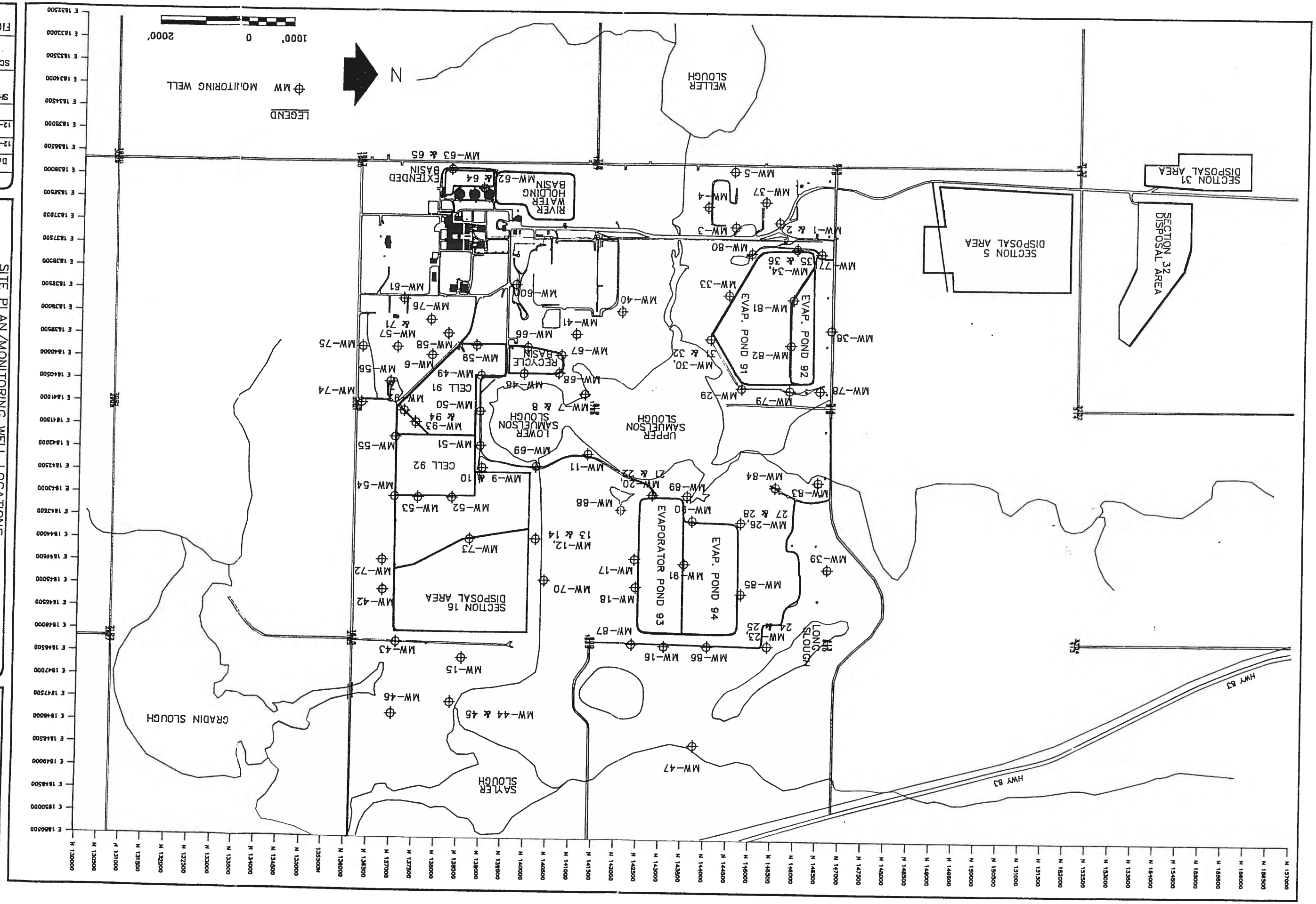
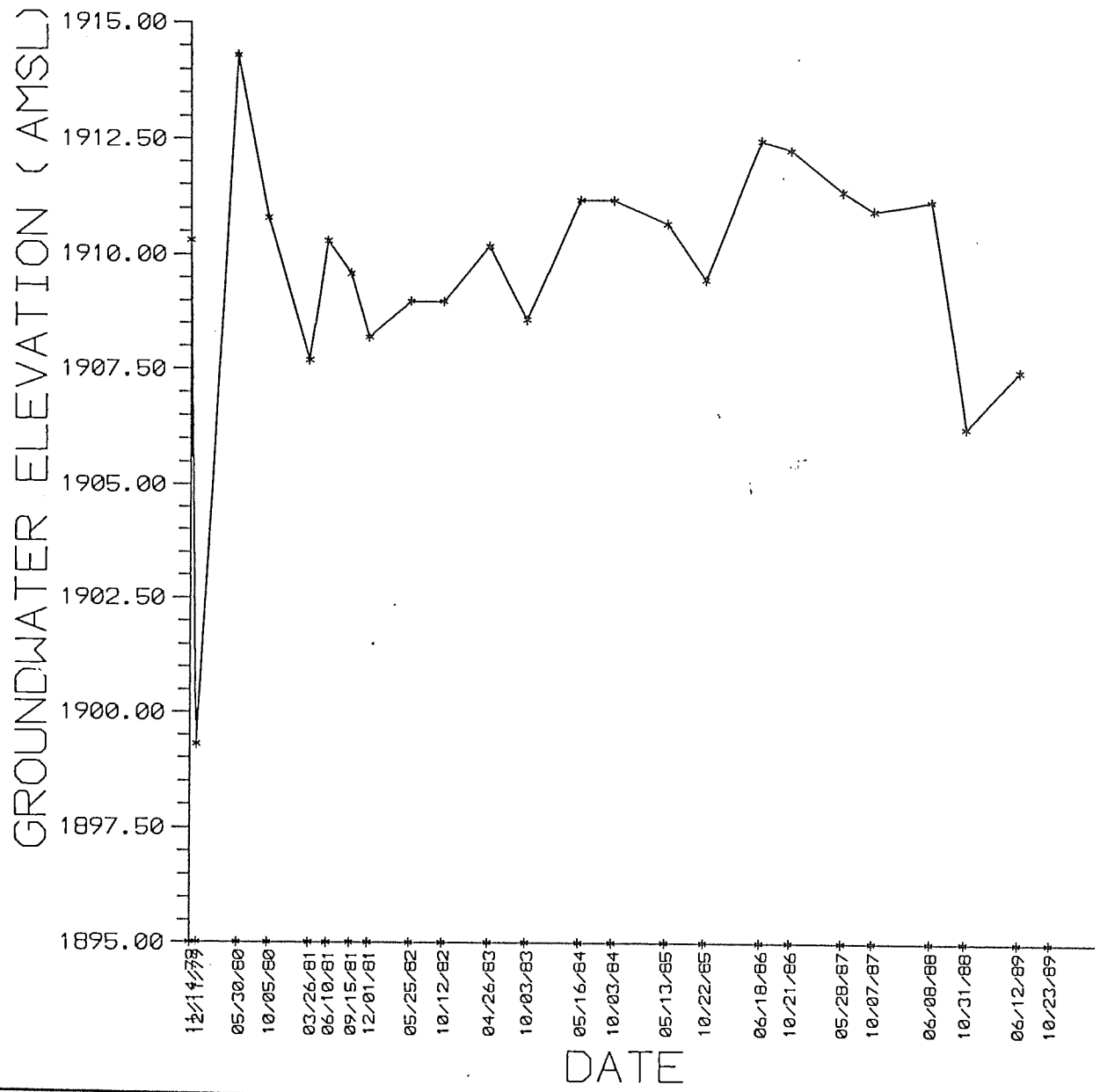
INCORPORATED

REVISED	
DATE	INT
12-12-90	SMT
12-13-90	KMR
SHEET OF	1 3
SCALE	1"=2000'
FIGURE#	2





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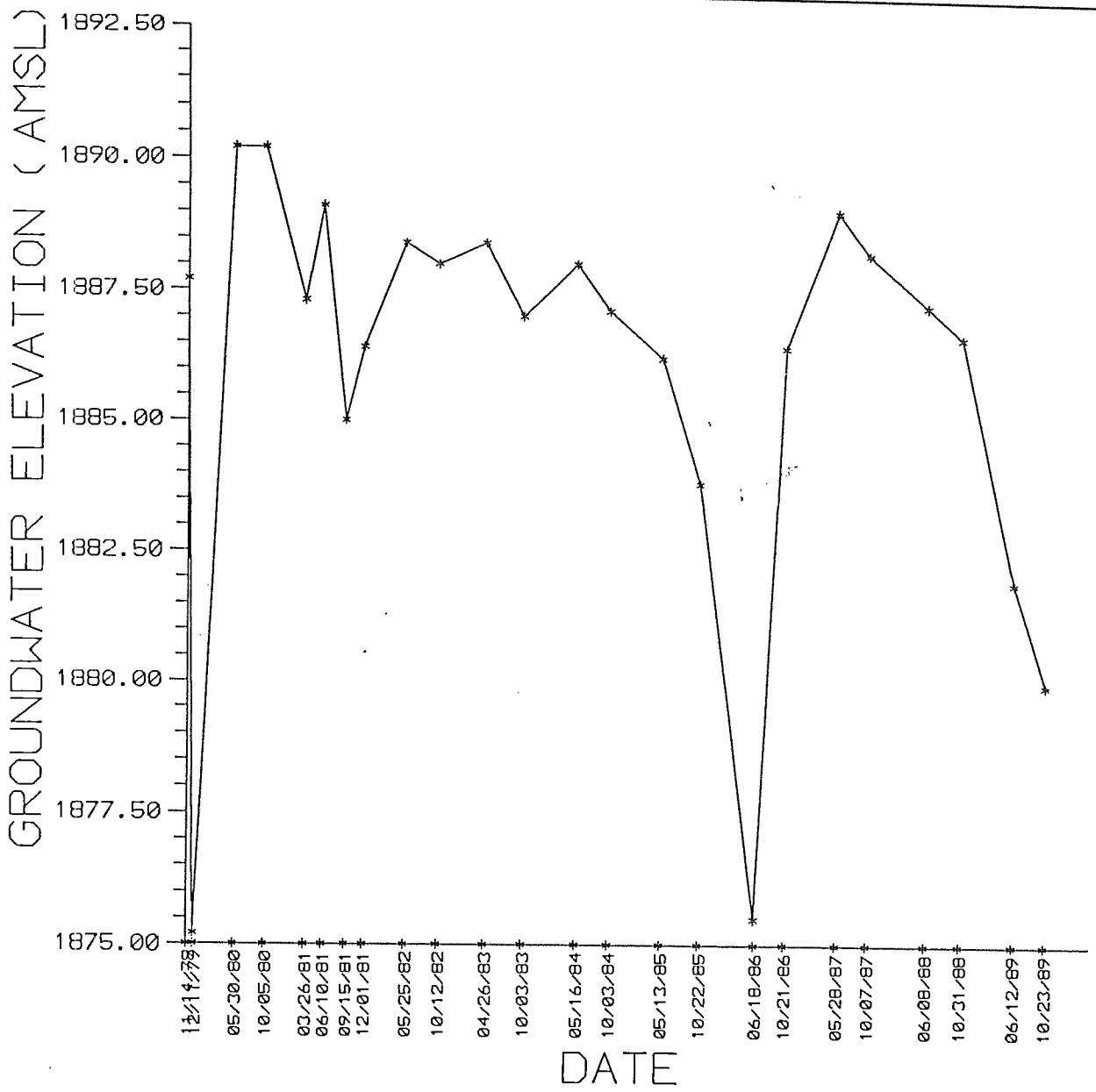
MW-6 HYDROGRAPH
Hydrogeographical Analysis Annual Report
Coal Creek Station
McLean County, North Dakota

DRAWN BY: LMH	DWG.No. NDB90-045	APP'D BY: LMH	
	JOB I.D.# NDB90-045	PLOT SCALE 1:1	

REVISED		SHEET
DATE	INT	
12-13-90	LMH	OF
SCALE NONE		FIGURE# 4



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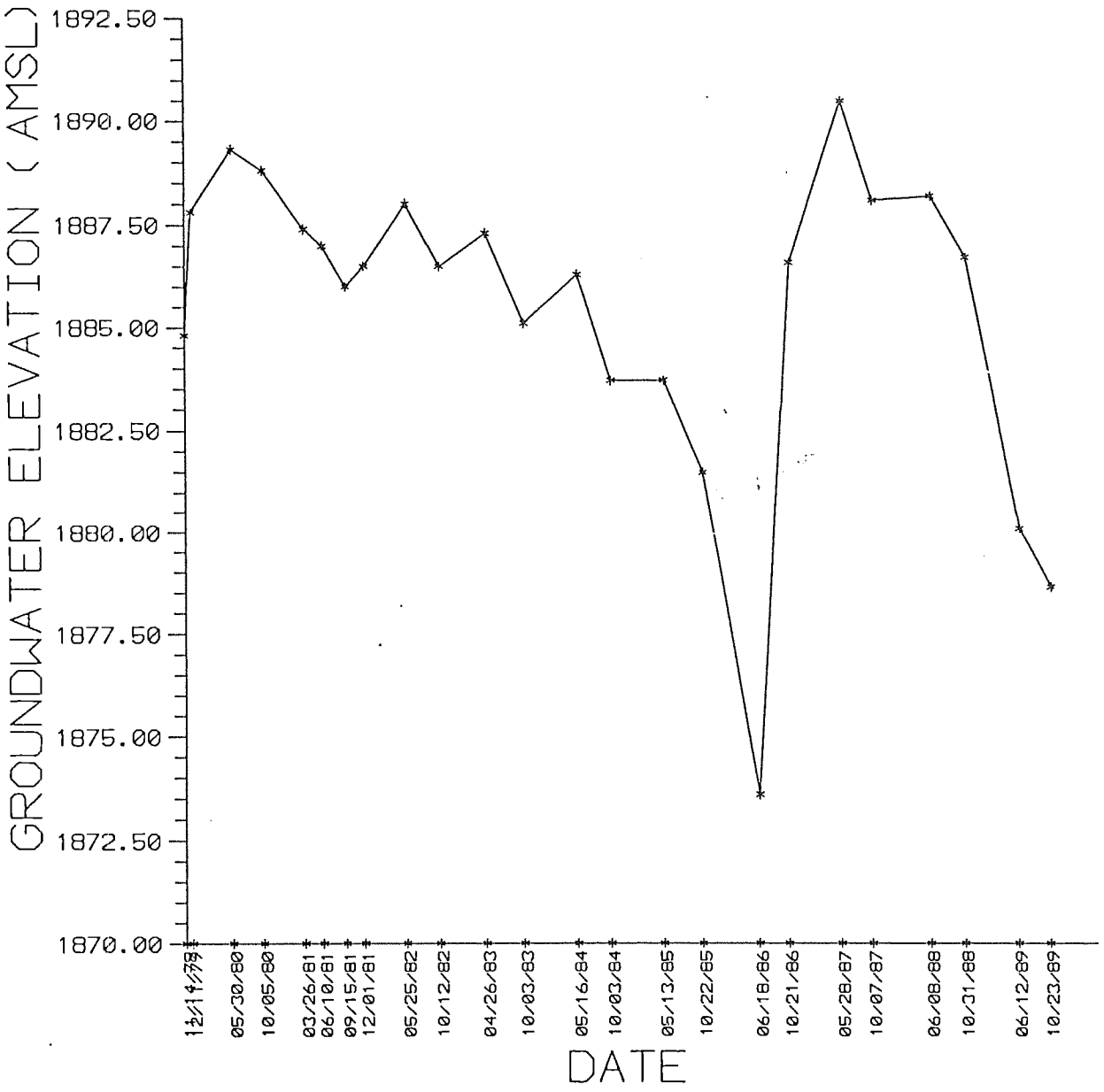
MW-9 HYDROGRAPH
Hydrogeographical Analysis Annual Report
Coal Creek Station
McLean County, North Dakota

DRAWN BY: LMH	DWG.No. NDB90-045	APP'D BY: LMH	
	JOB I.D.# NDB90-045	PLOT SCALE 1:1	

REVISED		SHEET
DATE	INT	
12-13-90	LMH	OF
SCALE NONE		FIGURE# 5



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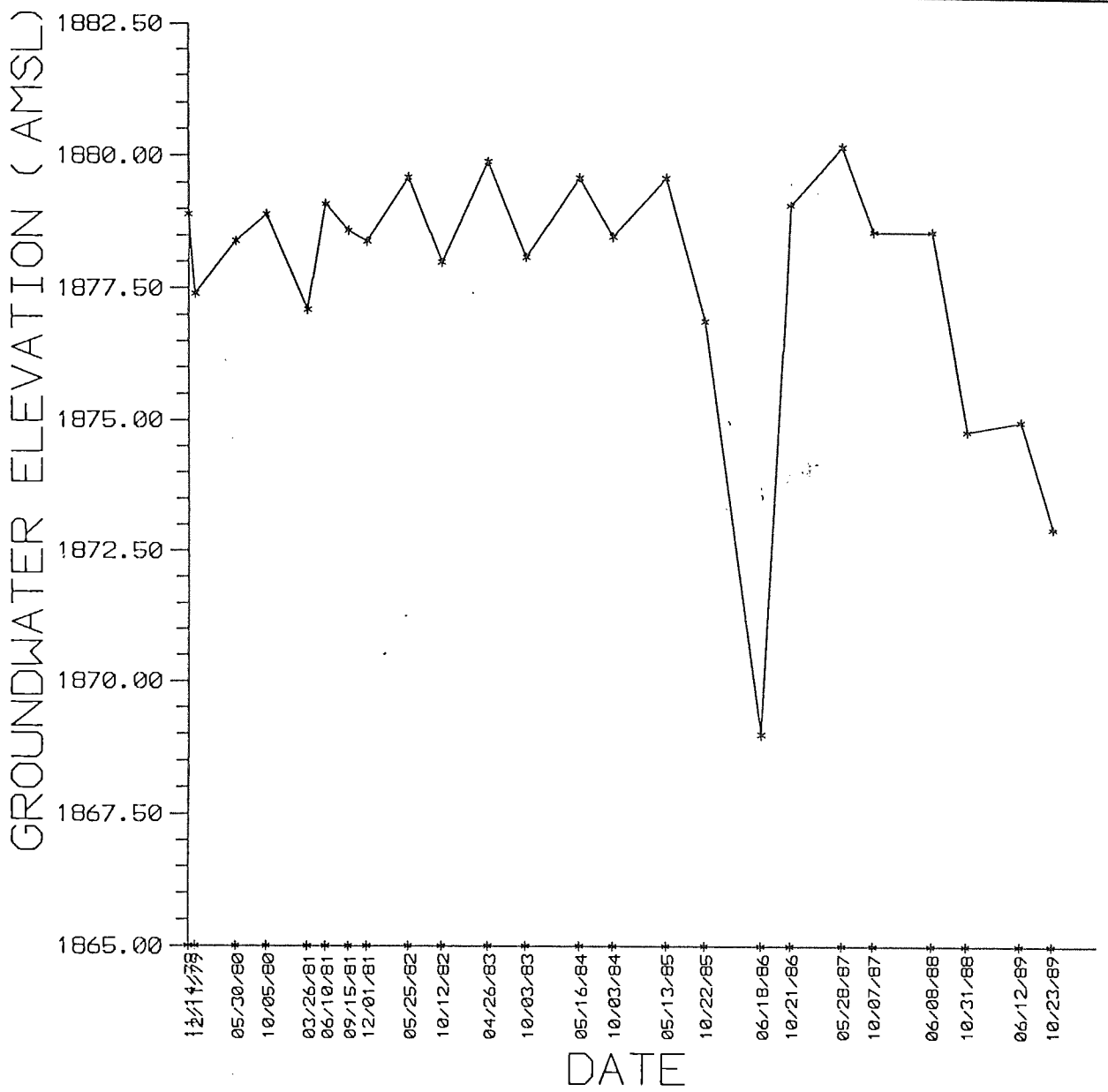
MW-10 HYDROGRAPH
Hydrogeographical Analysis Annual Report
Coal Creek Station
McLean County, North Dakota

DRAWN BY: LMH	DWG.No. NDB90-045	APP'D BY: LMH
	JOB I.D.# NDB90-045	PLOT SCALE 1:1

REVISED		SHEET
DATE	INT	
12-13-90	LMH	OF
SCALE NONE		FIGURE# 6



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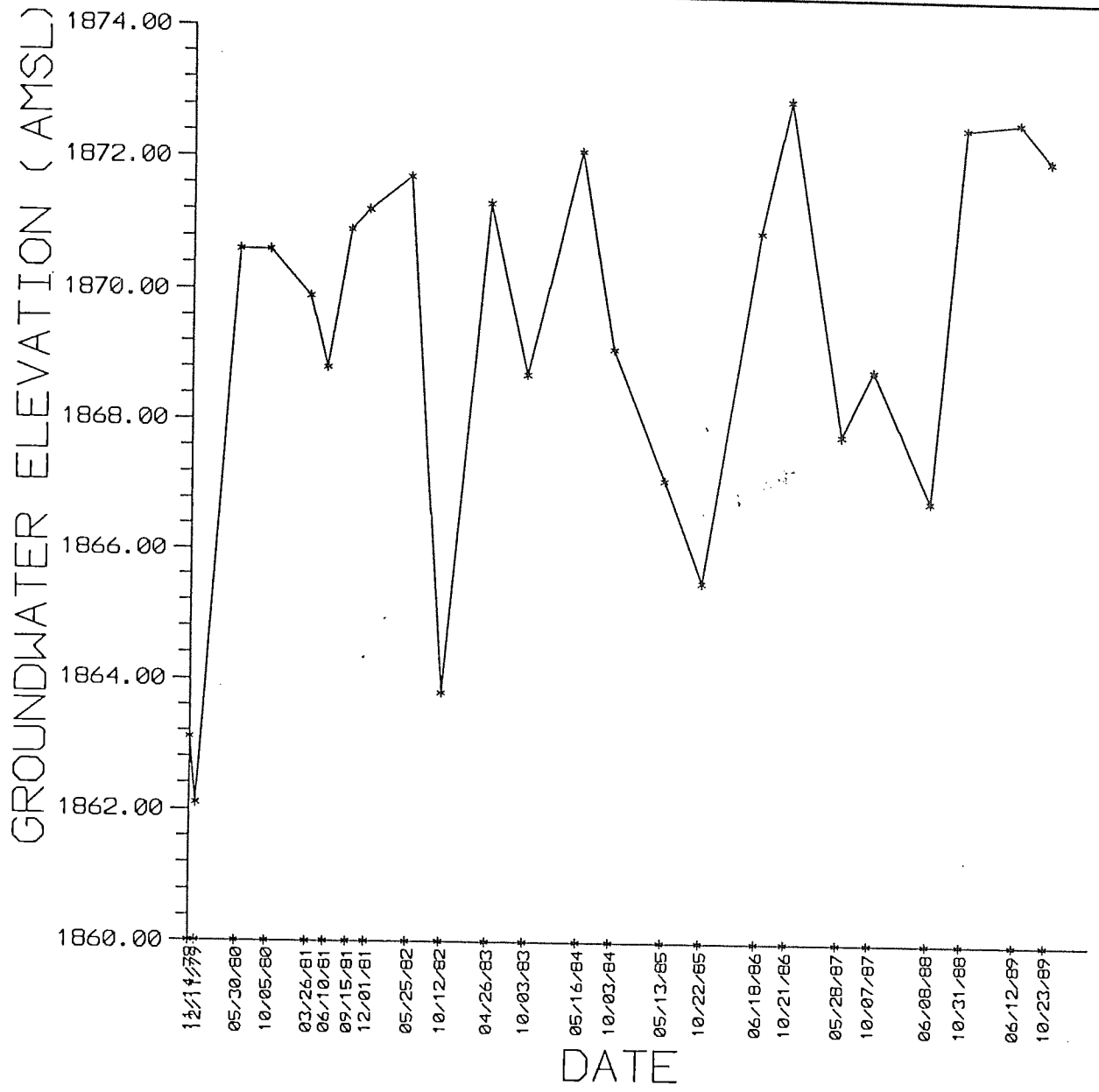
INCORPORATED

MW-11 HYDROGRAPH
Hydrogeographical Analysis Annual Report
Coal Creek Station
McLean County, North Dakota

DRAWN BY: LMH	DWG.No. NDB90-045	APP'D BY: LMH	
	JOB I.D.# NDB90-045	PLOT SCALE 1:1	

REVISED		SHEET
DATE	INT	
12-13-90	LMH	OF
SCALE NONE		FIGURE# 7



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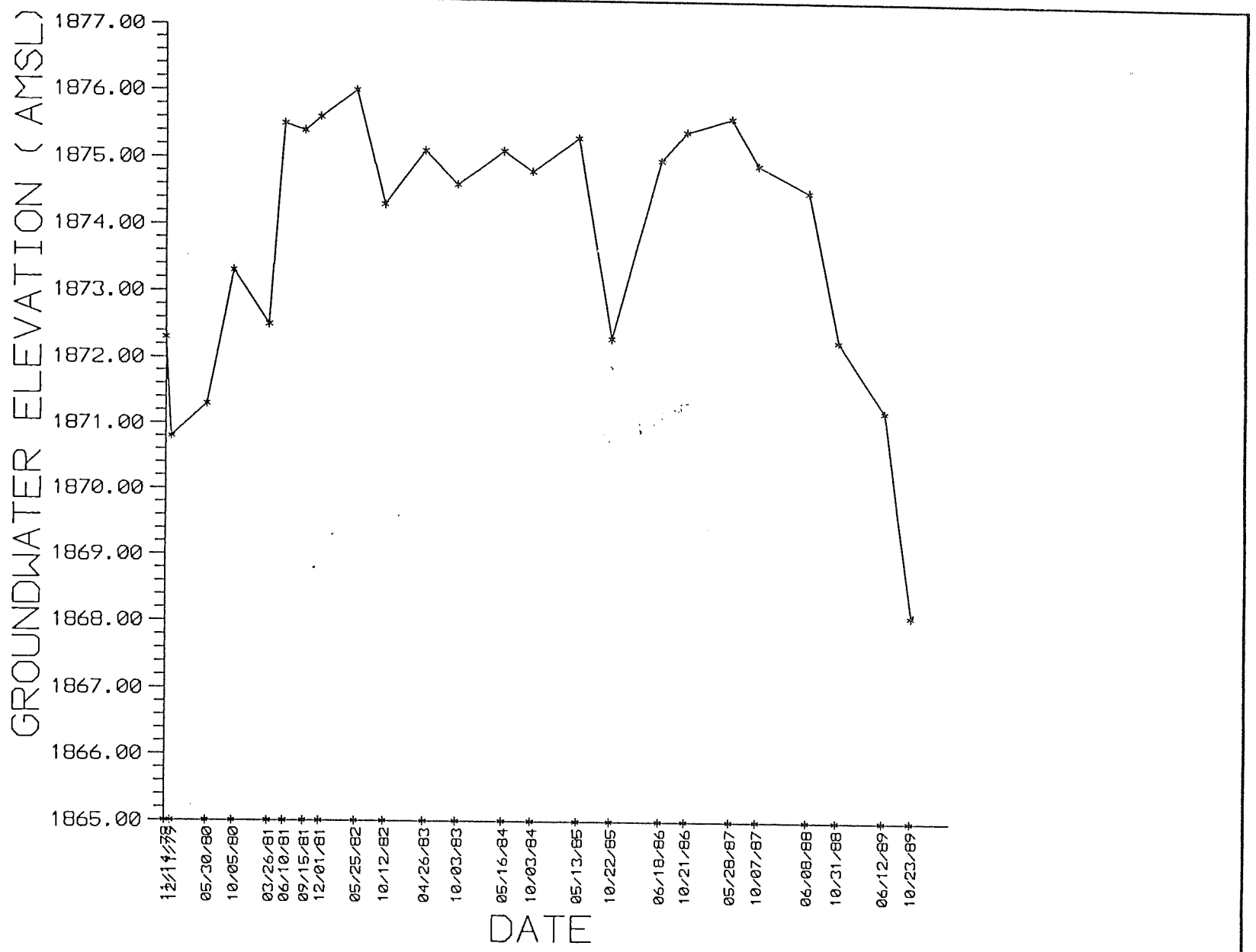
MW-13 HYDROGRAPH
Hydrogeographical Analysis Annual Report
Coal Creek Station
McLean County, North Dakota

DRAWN BY: LMH	DWG.No. NDB90-045	APP'D BY: LMH	
	JOB I.D.# NDB90-045	PLOT SCALE 1:1	

REVISED		SHEET
DATE	INT	
12-13-90	LMH	OF
SCALE NONE		FIGURE# 8



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MW-14 HYDROGRAPH
Hydrogeographical Analysis Annual Report
Coal Creek Station
McLean County, North Dakota

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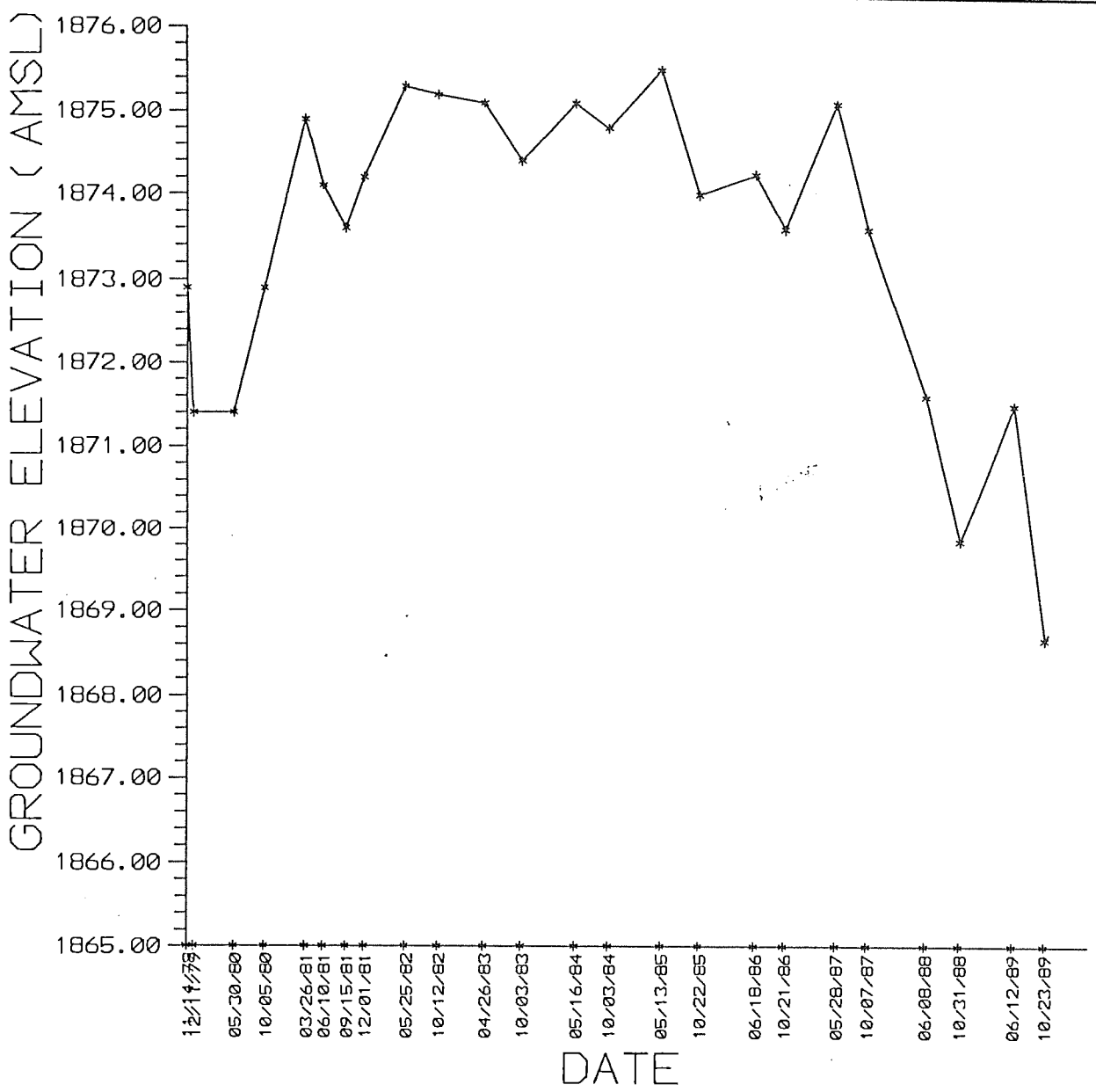
	JOB I.D.# NDB90-045	PLOT SCALE 1:1	

REVISED		SHEET
DATE	INT	
12-13-90	LMH	OF
SCALE NONE		FIGURE # 9



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MW-15 HYDROGRAPH
Hydrogeographical Analysis Annual Report
Coal Creek Station
McLean County, North Dakota

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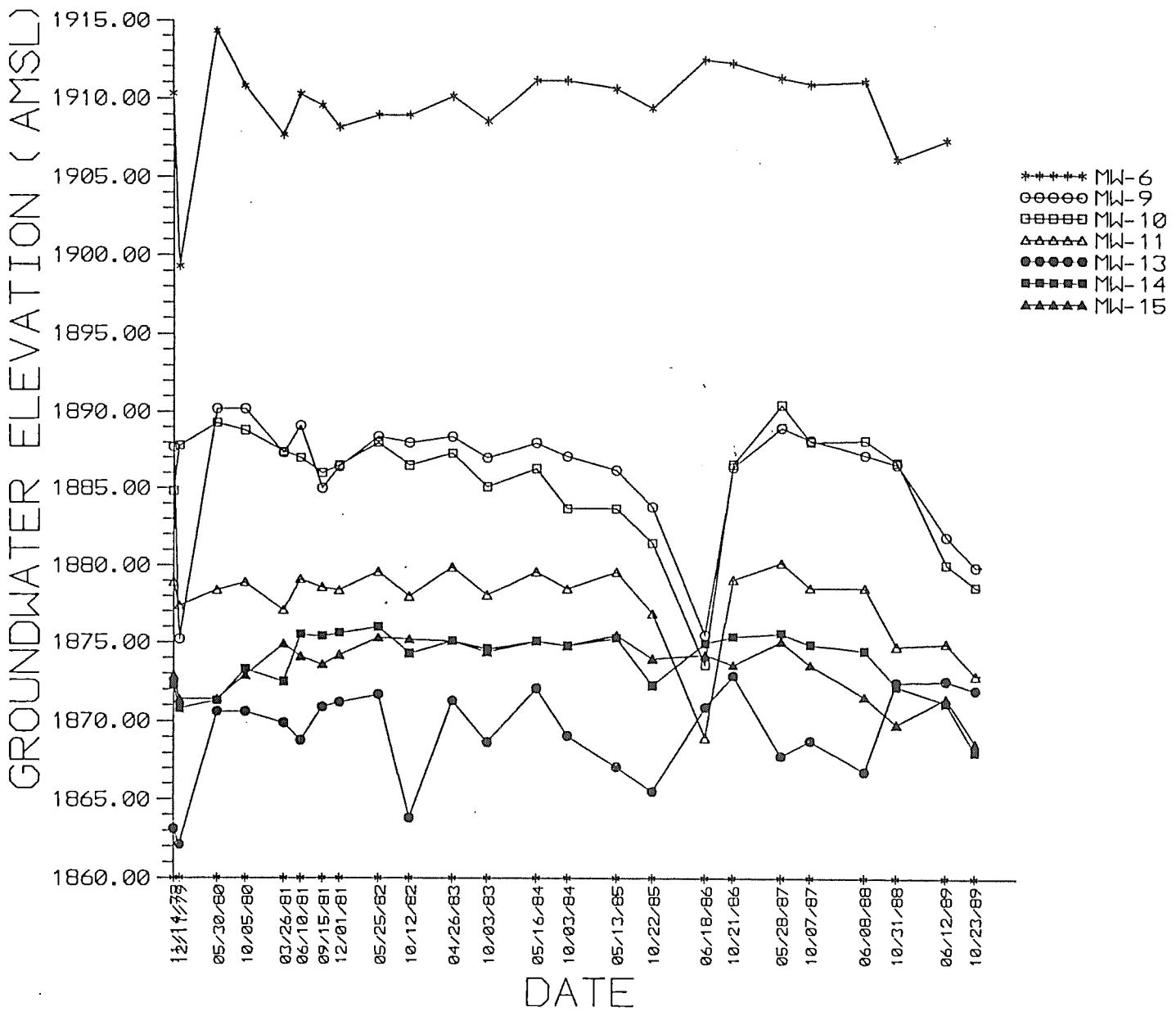
	JOB I.D.# NDB90-045	PLOT SCALE 1:1	

REVISED		SHEET
DATE	INT	
12-13-90	LMH	OF
SCALE NONE		FIGURE# 10



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ENVIRONMENTAL LABORATORIES
INCORPORATED

COMBINED HYDROGRAPHS, MW-6, MW-9, MW-10, MW-11, MW-13, MW-14 AND MW-15
Hydrogeographical Analysis Annual Report
Coal Creek Station
McLean County, North Dakota

DRAWN BY: LMH	DWG.No. NDB90-045	APP'D BY: LMH	
	JOB I.D.# NDB90-045	PLOT SCALE 1:1	

REVISED		SHEET
DATE	INT	
12-13-90	LMH	OF
SCALE NONE		FIGURE# 11

	SPECIFIC CONDUCTANCE umhos/cm			SULFATE, mg/l			BORON, mg/l		
60	4100.00	3100.00	-	1905.00	1230.00	-	2.20	2.80	-
61	2000.00	1570.00	-	407.00	598.00	-	0.47	0.57	-
62	5600.00	5700.00	-	2650.00	2870.00	-	0.32	0.50	-
63	2200.00	1860.00	-	344.00	520.00	-	0.22	0.37	-
64	6200.00	6400.00	-	3220.00	3240.00	-	1.10	0.20	-
65	4500.00	4600.00	-	2413.00	2340.00	-	0.13	1.20	-
66	3600.00	3100.00	-	1345.00	1140.00	-	1.70	1.60	-
67	4400.00	4300.00	-	1765.00	1870.00	-	0.31	0.35	-
68	7000.00	7800.00	-	3730.00	4130.00	-	1.90	28.00	-
69	-	6300.00	-	-	3255.00	-	-	0.54	-
70	-	6400.00	-	-	3500.00	-	-	23.00	-
71	-	1340.00	-	-	215.00	-	-	0.50	-
72	-	1170.00	-	-	233.00	-	-	0.18	-
73	-	5400.00	-	-	2562.69	-	-	3.20	-
74	-	4500.00	-	-	1550.00	-	-	0.95	-
75	-	1550.00	-	-	264.00	-	-	0.31	-
76	-	1360.00	-	-	510.00	-	-	0.44	-
77	-	4100.00	-	-	1630.00	-	-	0.34	-
78	-	3000.00	-	-	1230.00	-	-	0.31	-
79	-	5500.00	-	-	2915.00	-	-	0.36	-
80	-	2700.00	-	-	1100.00	-	-	1.30	-
81	-	6900.00	-	-	4098.50	-	-	19.00	-
82	-	6100.00	-	-	3340.00	-	-	20.00	-
83	-	1130.00	-	-	210.00	-	-	0.24	-
84	-	1010.00	-	-	230.00	-	-	0.18	-
85	-	6600.00	-	-	2995.00	-	-	0.31	-
86	-	4000.00	-	-	2070.00	-	-	0.29	-
87	-	1290.00	-	-	389.00	-	-	0.18	-
88	-	20000.00	-	-	14250.00	-	-	0.36	-
89	-	2700.00	-	-	1059.00	-	-	0.37	-
90	-	9100.00	-	-	4200.00	-	-	40.00	-

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	SPECIFIC CONDUCTANCE umhos/cm			SULFATE, mg/l			BORON, mg/l		
91	-	1370.00	-	-	275.00	-	-	0.64	-
92				-	-				
93	-	11400.00	-	-	6340.00	-	-	0.91	-
94	-	4000.00	-	-	1300.00	-	-	0.56	-

A comparison of the specific conductance versus sulfate was performed to determine if previous trends still exist. The data was sorted based on increasing sulfate concentrations. The results are shown on Figures 18 and 19. As can be seen, the linear relationship previously found for the compounds still exists, except for the highest concentration data points. Figure 19 excludes the highest data points for each monitoring session in the data set.

The correlation between boron levels and the sulfate levels, as shown on Figure 20, also indicates a linear relationship, but with a larger relative change in the boron concentrations as compared to the sulfate values.

The geophysical work presented in the November 15, 1989 report relates to the groundwater data presented for analysis. Table 6 lists the EM conductivity values and their corresponding well locations, sorted by increasing EM values.

The comparison of the EM data to the chemical results has previously been reported by Foth and Van Dyke to exhibit a linear relationship between EM and specific conductance and sulfate levels, based on a limited number of data points. This conclusion is not supported by the new data. As can be seen on Figure 21A, there appears to be no correlation between increasing EM values and the groundwater contaminant levels. In order to further evaluate whether this potential relationship exists, wells with EM values above 60 mmhos/meter (roughly the highest 50% of the readings) were plotted relative to potential contaminant source areas (Figure 21B). As can be seen, these wells are located both upgradient and downgradient of the evaporation ponds and disposal areas. Hence, no

additional 21 groundwater monitoring wells were installed. A total of 68 groundwater monitoring wells have now been constructed. This number does not include the observation wells and piezometers.

Previous data indicated the apparent groundwater flow directions are influenced by surface topography, with local influences from the surface impoundments. The generalized surface water flow path through the watershed passes consecutively through Weller Slough, Samuelson Slough, Sayler Slough, Gradin Slough and into the Coal Lake Coulee and/or Buffalo Creek drainage systems.

Previous vertical gradients measured within the groundwater flow system indicated that mounding was occurring beneath the surface impoundments. The hydrographs from the monitoring points in both deep and shallow wells have shown similar response to stresses on the flow system. Thus, it was concluded that deep and shallow groundwater act as a connected hydrological system.

Increases in specific conductance levels and sulfate concentrations have been observed over time in the groundwater. ~~This~~ esp data ~~was~~ were correlated with the geophysical data (electromagnetic survey) as presented in the March 1989 report prepared by Foth and Van Dyke. The comparison of the data as made by Foth and Van Dyke indicated that a linear relationship existed between the EM data and the specific conductivity values. Additionally, the specific conductivity values and the sulfate values showed a linear correlation.

C. GROUNDWATER ELEVATION INFORMATION

Table 1 below presents groundwater elevations available for the 1989 reporting period. Historical groundwater elevation data ~~is~~ are included in Appendix 1.

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TABLE 1
GROUNDWATER ELEVATION DATA
1989 REPORTING PERIOD

WELL	EAST	NORTH	GROUND ELEV.	WATER ELEV. 06/12/89	WATER ELEV. 10/23/89
1	1836915	145529	1899.60	1891.50	1891.40
2	1836917	145524	1899.50	1888.30	1889.49
3	1837028	144547	1892.10	1865.20	1877.86
4	1836591	143932	1886.10	1868.40	1873.44
5	1835849	144511	1892.50	1876.80	1876.52
6	1839890	137833	1938.30	1907.50	
7	1840721	141235	1881.80	1869.50	1868.05
8	1840720	141240	1881.80	1875.00	1871.83
9	1842358	138975	1894.70	1881.90	1879.94
10	1842359	138982	1894.80	1880.10	1878.66
11	1842038	141321	1885.90	1875.00	1872.94
12	1843919	140206	1879.10	1867.10	1866.01
13	1843915	140205	1879.60	1872.60	1872.02
14	1843911	140202	1879.30	1871.20	1868.08
15	1846448	138581	1876.90	1871.50	1868.67
16	1846248	143075	1885.10	1875.50	1874.70
17	1844340	142400	1881.70	1872.40	1873.17
18	1844959	142428	1876.10	1870.50	1869.41
19	This well does not exist				
20	1842920	142793	1884.80	1862.20	1873.71
21	1842923	142786	1884.50	1876.60	1877.71
22	1842923	142780	1884.30		
23	1846230	145380	1912.50	1889.70	1888.85
24	1846226	145384	1913.10		
25	1846222	145388	1913.30	Dry since installation	
26	1843510	144753	1890.90	1883.20	1881.98
27	1843515	144755	1891.50	1867.60	1880.25
28	1843520	144756	1892.00	1871.60	1871.36
29	1840563	144727	1896.40	1882.70	1881.96
30	1839490	144025	1893.90		1881.37
31	1839484	144024	1894.00	1879.70	1879.20
32	1839479	144023	1894.20	1883.40	
33	1838514	144417	1891.60	1890.10	1887.86
34	1837491	145923	1904.20	1897.90	1896.39
35	1837491	145929	1904.60	1898.30	1896.76

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WELL	EAST	NORTH	GROUND ELEV.	WATER ELEV. 06/12/89	WATER ELEV. 10/23/89
36	1837492	145933	1904.40	1897.20	1895.77
37	1836462	145219	1898.90	1888.20	1884.14
38	1839260	146700	1929.30	1917.40	1916.34
39	1844528	145682	1936.80		
40	1838890	142042	1891.50	1880.30	1877.98
41	1839395	141028	1894.70	1880.70	1879.54
42	1845060	136805	1878.80	1869.20	1867.65
43	1846197	137109	1877.80	1868.60	1865.82
44	1847513	138333	1875.60	1869.40	1866.61
45	1847504	138334	1875.70	1867.80	1866.74
46	1847775	138814	1878.30	1866.00	1865.96
47	1848419	143757	1885.90	1881.00	1879.08
48	1840278	139887	1919.00	1881.60	
49	1840328	138932	1903.60	1894.10	1893.43
50	1841117	138919	1901.10	1881.20	1880.96
51	1841874	138934	1895.50	1881.20	1879.69
52	1843018	138321	1918.10	1882.50	1883.19
53	1843018	137563	1918.40	1882.50	1884.48
54	1843000	137040	1918.90	1888.20	1887.04
55	1841702	137035	1918.60	1906.30	1902.85
56	1840484	136908	1932.90	1910.50	1908.95
57	1839717	137053	1941.20	1915.30	1912.36
58	1839406	138183	1929.20	1915.00	1910.56
59	1839660	138822	1919.10	1902.30	1900.40
60	1838320	139683	1930.90	1900.10	1899.93
61	1838658	137185	1959.80	1927.80	1927.42
62	1836221	138934	1950.20	1937.20	1937.34
63	1835820	138213	1955.10	1927.50	1927.38
64	1836224	138928	1950.40	1936.70	1937.70
65	1835818	138223	1955.60	1936.90	1936.60
66	1839694	139966	1918.60	1884.70	1882.08
67	1839865	140704	1918.70	1880.20	1877.59
68	1840260	140664	1919.00	1877.00	1875.23
69	1842321	140189	1887.67		1873.63
70	1844822	140400	1877.90		1865.99
71	1839713	137058	1941.69		1911.67
72	1844403	136784	1882.43		1871.28
73	1843924	138726	1898.11		1872.45
74	1840951	136280	1931.89		1905.94

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WELL	EAST	NORTH	GROUND ELEV.	WATER ELEV. 06/12/89	WATER ELEV. 10/23/89
75	1839716	136290	1938.94		1913.12
76	1839107	137793	1940.56		1925.63
77	1837593	146462	1917.25		1897.24
78	1840603	146474	1919.50		1906.02
79	1840605	145800	1905.10		1889.29
80	1837594	144924	1889.73		1882.05
81	1838603	145850	1929.90		1911.36
82	1839600	145809	1930.27		1916.20
83	1842622	146454	1892.73		1882.53
84	1842737	145511	1889.87		1877.07
85	1845089	144775	1901.33		1884.60
86	1846245	144036	1898.91		1884.93
87	1846212	142357	1878.52		1868.94
88	1843264	142076	1879.89		1870.41
89	1842944	143550	1881.60		1873.07
90	1843489	143674	1888.20		1879.34
91	1844443	143508	1901.09		1877.96
92	1841121	137219	1918.22	Temporary	
93	1841379	137479	1918.76		1906.72
94	1841384	137484	1918.65		1901.62

Groundwater contour maps are presented on Figures 3A and 3B. The flow patterns indicate that the surface topography and interactions between groundwater discharge and surface water are the major influences on the flow domain. Based on these figures, it appears groundwater flow is towards the sloughs where it discharges into the slough complex. Some of the groundwater is lost to evapotranspiration. Across the site flow moves to the east-southeast in the direction of Sayler Slough.

The hydrographs for selected wells (6, 9, 10, 11, 13, 14 and 15) are shown on Figures 4-10. A combined hydrograph presentation is shown on Figure 11. These wells were chosen because they had a substantial amount of historical data to which to evaluate recent water levels and they were also

additional 21 groundwater monitoring wells were installed. A total of 68 groundwater monitoring wells have now been constructed. This number does not include the observation wells and piezometers.

Previous data indicated the apparent groundwater flow directions are influenced by surface topography, with local influences from the surface impoundments. The generalized surface water flow path through the watershed passes consecutively through Weller Slough, Samuelson Slough, Sayler Slough, Gradin Slough and into the Coal Lake Coulee and/or Buffalo Creek drainage systems.

Previous vertical gradients measured within the groundwater flow system indicated that mounding was occurring beneath the surface impoundments. The hydrographs from the monitoring points in both deep and shallow wells have shown similar response to stresses on the flow system. Thus, it was concluded that deep and shallow groundwater act as a connected hydrological system.

Increases in specific conductance levels and sulfate concentrations have been observed over time in the groundwater. ~~This~~ ex data ~~was~~ were correlated with the geophysical data (electromagnetic survey) as presented in the March 1989 report prepared by Foth and Van Dyke. The comparison of the data as made by Foth and Van Dyke indicated that a linear relationship existed between the EM data and the specific conductivity values. Additionally, the specific conductivity values and the sulfate values showed a linear correlation.

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Table 1 below presents groundwater elevations available for the 1989 reporting period. Historical groundwater elevation data is/are included in Appendix 1.

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1989 REPORTING PERIOD

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3	1837028	144547	1892.10	1865.20	1877.86
4	1836591	143932	1886.10	1868.40	1873.44
5	1835849	144511	1892.50	1876.80	1876.52
6	1839890	137833	1938.30	1907.50	
7	1840721	141235	1881.80	1869.50	1868.05
8	1840720	141240	1881.80	1875.00	1871.83
9	1842358	138975	1894.70	1881.90	1879.94
10	1842359	138982	1894.80	1880.10	1878.66
11	1842038	141321	1885.90	1875.00	1872.94
12	1843919	140206	1879.10	1867.10	1866.01
13	1843915	140205	1879.60	1872.60	1872.02
14	1843911	140202	1879.30	1871.20	1868.08
15	1846448	138581	1876.90	1871.50	1868.67
16	1846248	143075	1885.10	1875.50	1874.70
17	1844340	142400	1881.70	1872.40	1873.17
18	1844959	142428	1876.10	1870.50	1869.41
19	This well does not exist				
20	1842920	142793	1884.80	1862.20	1873.71
21	1842923	142786	1884.50	1876.60	1877.71
22	1842923	142780	1884.30		
23	1846230	145380	1912.50	1889.70	1888.85
24	1846226	145384	1913.10		
25	1846222	145388	1913.30	Dry since installation	
26	1843510	144753	1890.90	1883.20	1881.98
27	1843515	144755	1891.50	1867.60	1880.25
28	1843520	144756	1892.00	1871.60	1871.36
29	1840563	144727	1896.40	1882.70	1881.96
30	1839490	144025	1893.90		1881.37
31	1839484	144024	1894.00	1879.70	1879.20
32	1839479	144023	1894.20	1883.40	
33	1838514	144417	1891.60	1890.10	1887.86
34	1837491	145923	1904.20	1897.90	1896.39
35	1837491	145929	1904.60	1898.30	1896.76

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WELL	EAST	NORTH	GROUND ELEV.	WATER ELEV. 06/12/89	WATER ELEV. 10/23/89
36	1837492	145933	1904.40	1897.20	1895.77
37	1836462	145219	1898.90	1888.20	1884.14
38	1839260	146700	1929.30	1917.40	1916.34
39	1844528	146682	1936.80		
40	1838890	142042	1891.50	1880.30	1877.98
41	1839395	141028	1894.70	1880.70	1879.54
42	1845060	136805	1878.80	1869.20	1867.65
43	1846197	137109	1877.80	1868.60	1865.82
44	1847513	138333	1875.60	1869.40	1866.61
45	1847504	138334	1875.70	1867.80	1866.74
46	1847775	138814	1878.30	1866.00	1865.96
47	1848419	143757	1885.90	1881.00	1879.08
48	1840278	139887	1919.00	1881.60	
49	1840328	138932	1903.60	1894.10	1893.43
50	1841117	138919	1901.10	1881.20	1880.96
51	1841874	138934	1895.50	1881.20	1879.69
52	1843018	138321	1918.10	1882.50	1883.19
53	1843018	137563	1918.40	1882.50	1884.48
54	1843000	137040	1918.90	1888.20	1887.04
55	1841702	137035	1918.60	1906.30	1902.85
56	1840484	136908	1932.90	1910.50	1908.95
57	1839717	137053	1941.20	1915.30	1912.36
58	1839406	138183	1929.20	1915.00	1910.56
59	1839660	138822	1919.10	1902.30	1900.40
60	1838320	139683	1930.90	1900.10	1899.93
61	1838658	137185	1959.80	1927.80	1927.42
62	1836221	138934	1950.20	1937.20	1937.34
63	1835820	138213	1955.10	1927.50	1927.38
64	1836224	138928	1950.40	1936.70	1937.70
65	1835818	138223	1955.60	1936.90	1936.60
66	1839694	139966	1918.60	1884.70	1882.08
67	1839865	140704	1918.70	1880.20	1877.59
68	1840260	140664	1919.00	1877.00	1875.23
69	1842321	140189	1887.67		1873.63
70	1844822	140400	1877.90		1865.99
71	1839713	137058	1941.69		1911.67
72	1844403	136784	1882.43		1871.28
73	1843924	138726	1898.11		1872.45
74	1840951	136280	1931.89		1905.94

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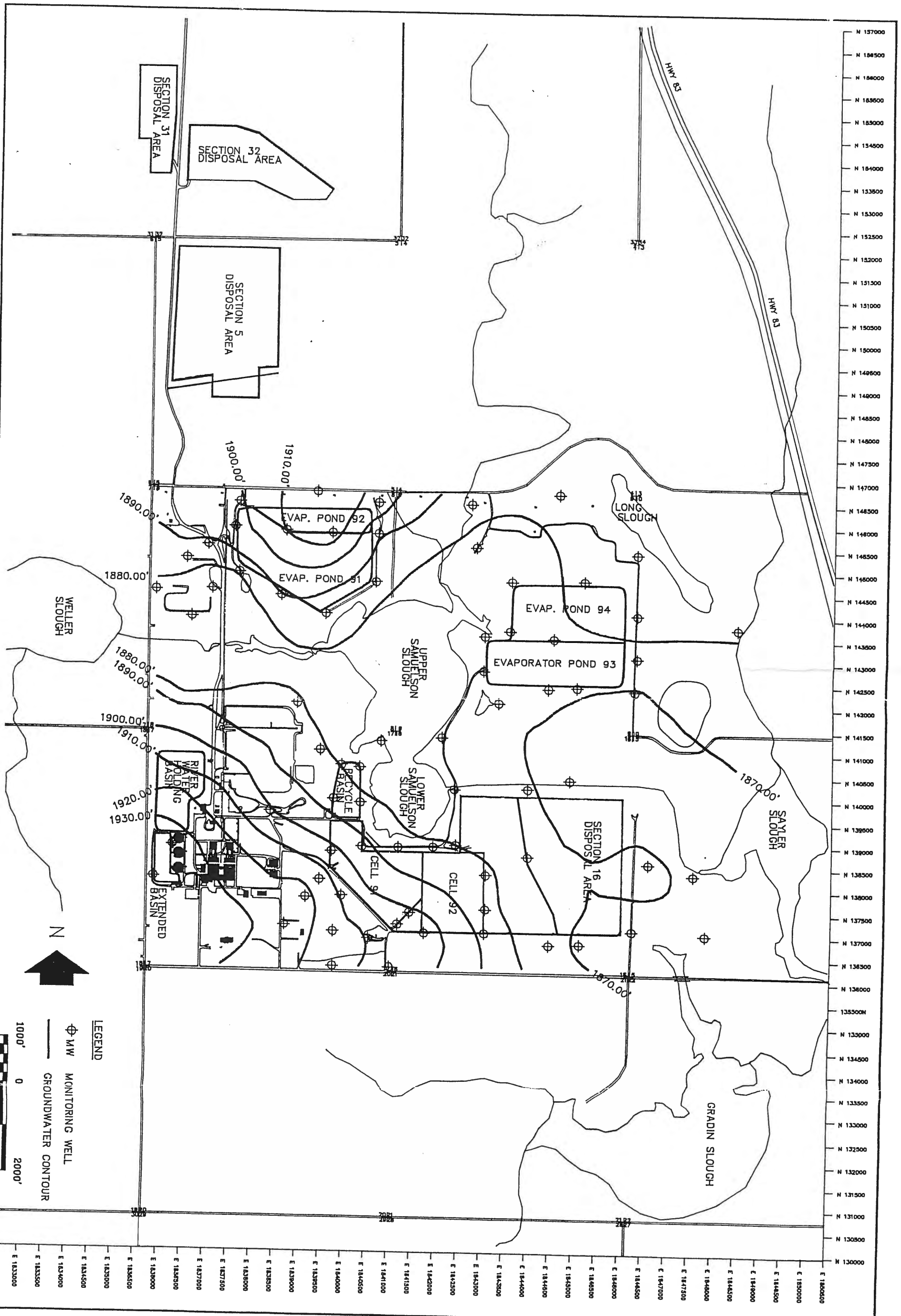
WELL	EAST	NORTH	GROUND ELEV.	WATER ELEV. 06/12/89	WATER ELEV. 10/23/89
75	1839716	136290	1938.94		1913.12
76	1839107	137793	1940.56		1925.63
77	1837593	146462	1917.25		1897.24
78	1840603	146474	1919.50		1906.02
79	1840605	145800	1905.10		1889.29
80	1837594	144924	1889.73		1882.05
81	1838603	145850	1929.90		1911.36
82	1839600	145809	1930.27		1916.20
83	1842622	146454	1892.73		1882.53
84	1842737	145511	1889.87		1877.07
85	1845089	144775	1901.33		1884.60
86	1846245	144036	1898.91		1884.93
87	1846212	142357	1878.52		1868.94
88	1843264	142076	1879.89		1870.41
89	1842944	143550	1881.60		1873.07
90	1843489	143674	1888.20		1879.34
91	1844443	143508	1901.09		1877.96
92	1841121	137219	1918.22	Temporary	
93	1841379	137479	1918.76		1906.72
94	1841384	137484	1918.65		1901.62

Groundwater contour maps are presented on Figures 3A and 3B. The flow patterns indicate that the surface topography and interactions between groundwater discharge and surface water are the major influences on the flow domain. Based on these figures, it appears groundwater flow is towards the sloughs where it discharges into the slough complex. Some of the groundwater is lost to evapotranspiration. Across the site flow moves to the east-southeast in the direction of Sayler Slough.

The hydrographs for selected wells (6, 9, 10, 11, 13, 14 and 15) are shown on Figures 4-10. A combined hydrograph presentation is shown on Figure 11. These wells were chosen because they had a substantial amount of historical data to which to evaluate recent water levels and they were also



REVISED		
DATE	INT	
12-12-90	SMT	
12-13-90	KMR	

SCALE 1"=2000'

SHEET 2 OF 3

FIGURE# 3A

GROUNDWATER CONTOUR MAP (JUNE 12, 1989)

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Coal Creek Station
Underwood, North Dakota

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PLOT TIME:	JOB I.D.# NDB90045	PLOT SCALE 1: 2000

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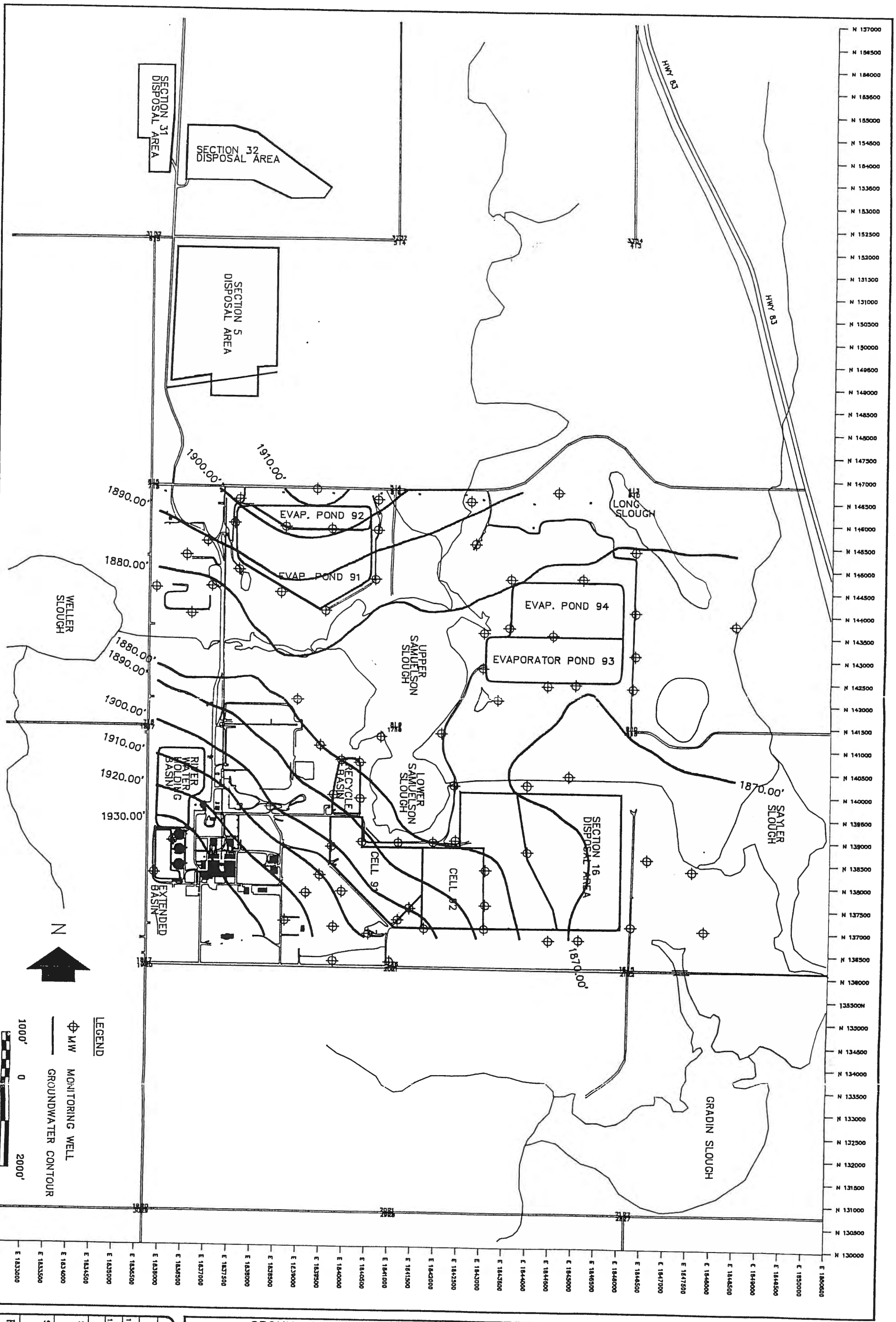

REVISED	DATE	INT
	12-12-90	SMT
	12-13-90	KMR

SHEET 3 OF 3

SCALE 1"=2000'

FIGURE# 3B

GROUNDWATER CONTOUR MAP (OCT. 23, 1989)

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Coal Creek Station
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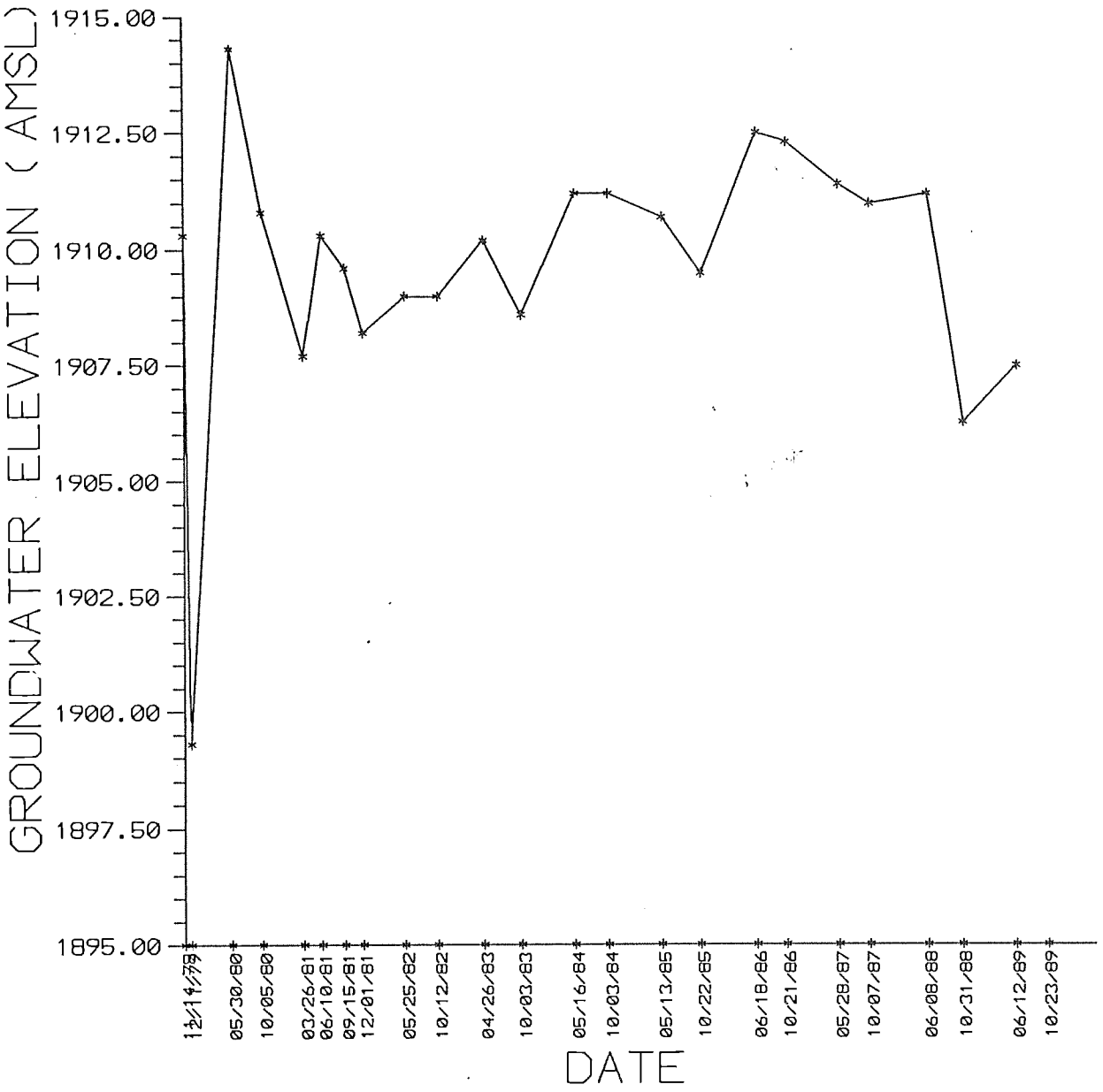

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MW-6 HYDROGRAPH
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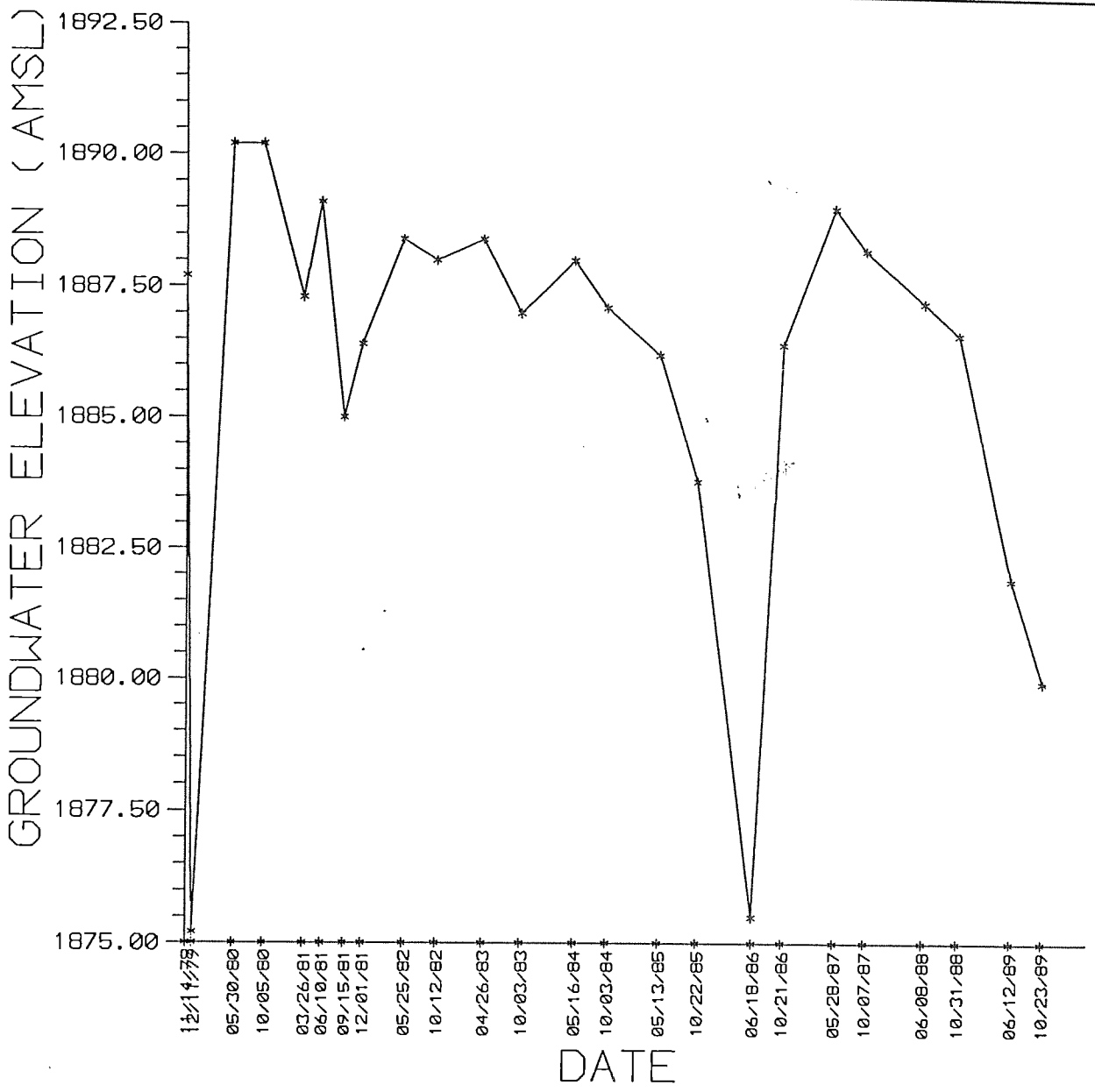
12-13-90	LMH	OF
SCALE NONE		FIGURE# 4



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MW-9 HYDROGRAPH
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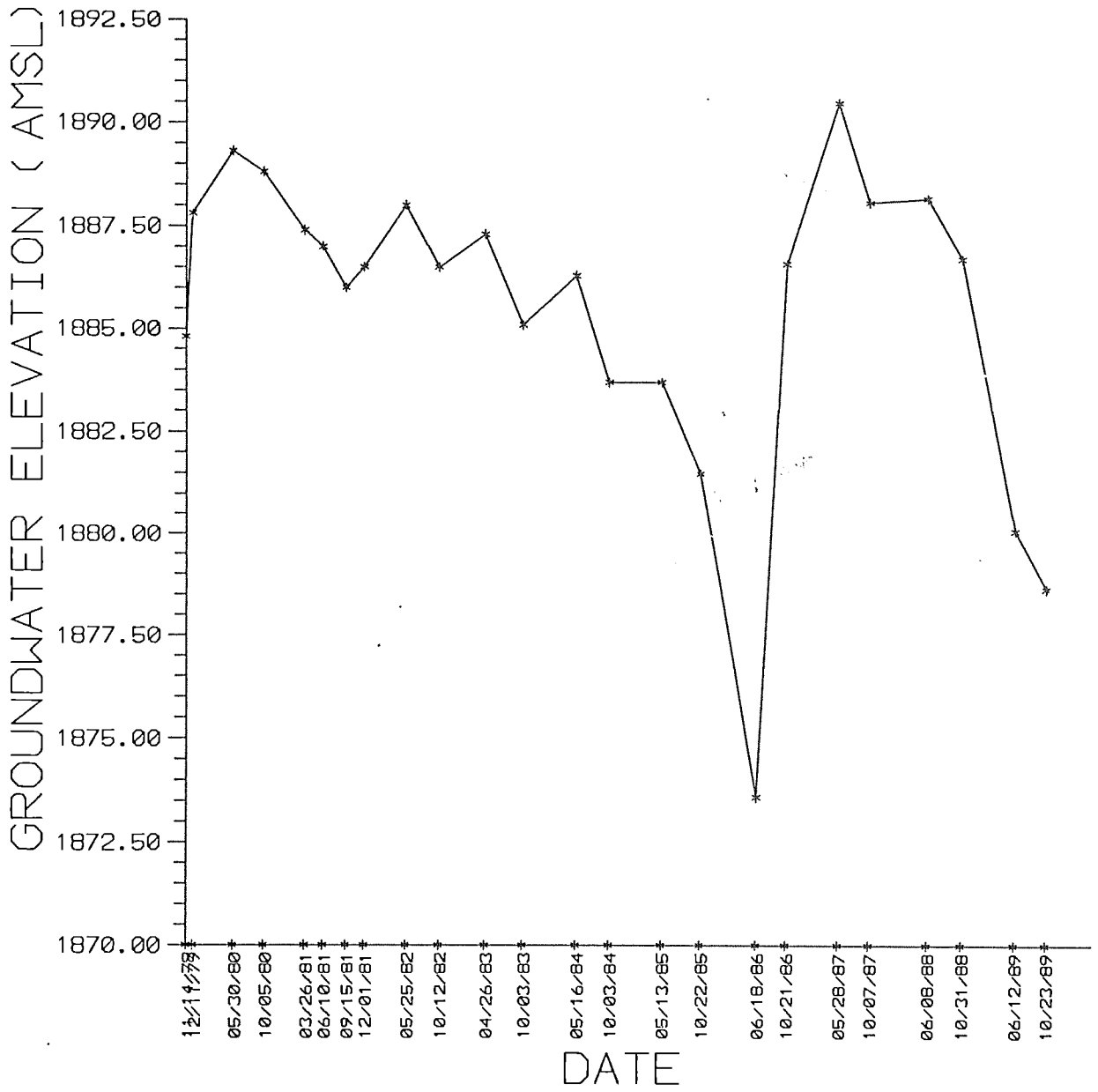
SCALE NONE		FIGURE# 5



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MW-10 HYDROGRAPH
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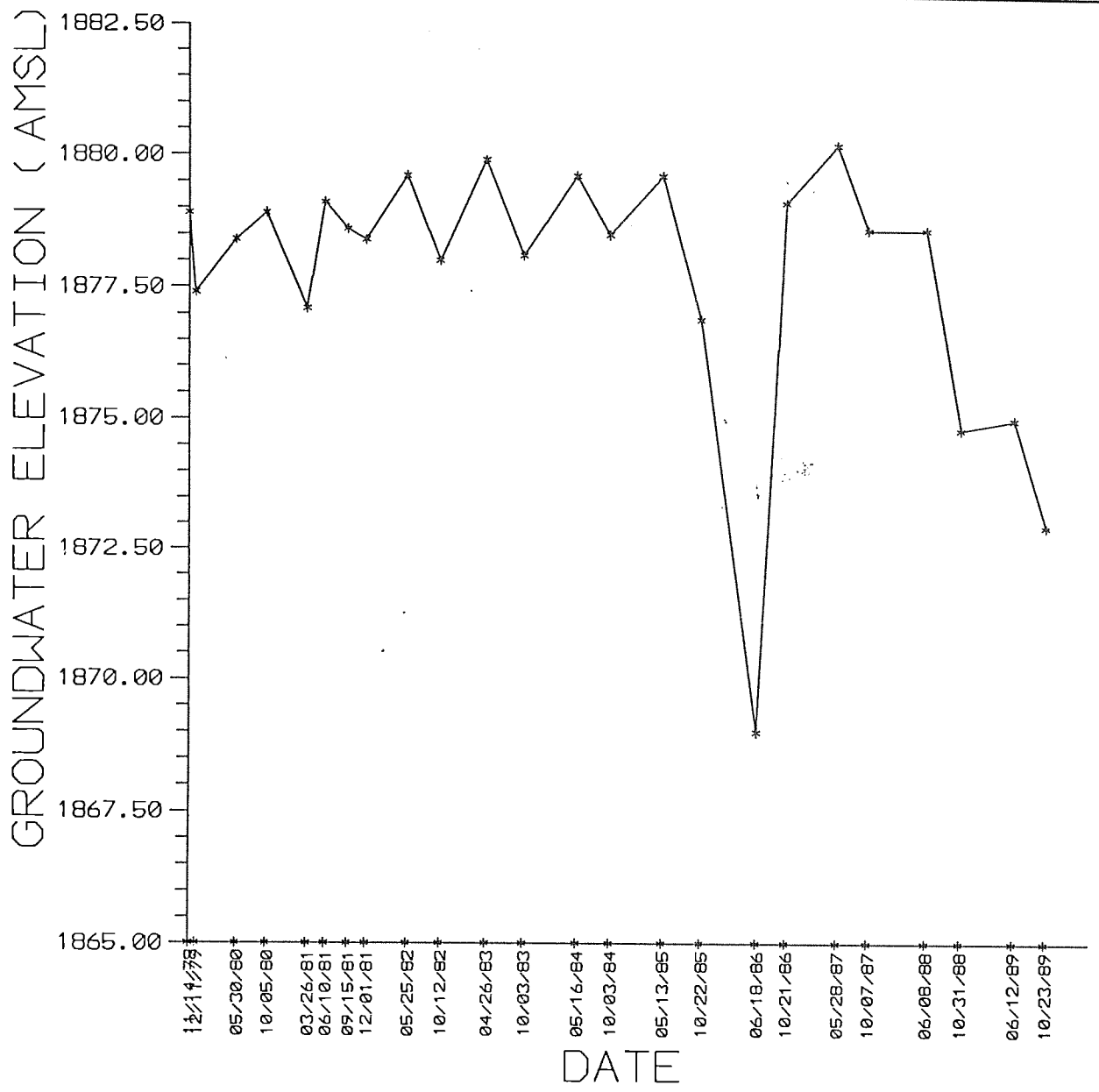
12-13-90	LMH	OF
SCALE NONE		FIGURE# 6



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MW-11 HYDROGRAPH
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Coal Creek Station
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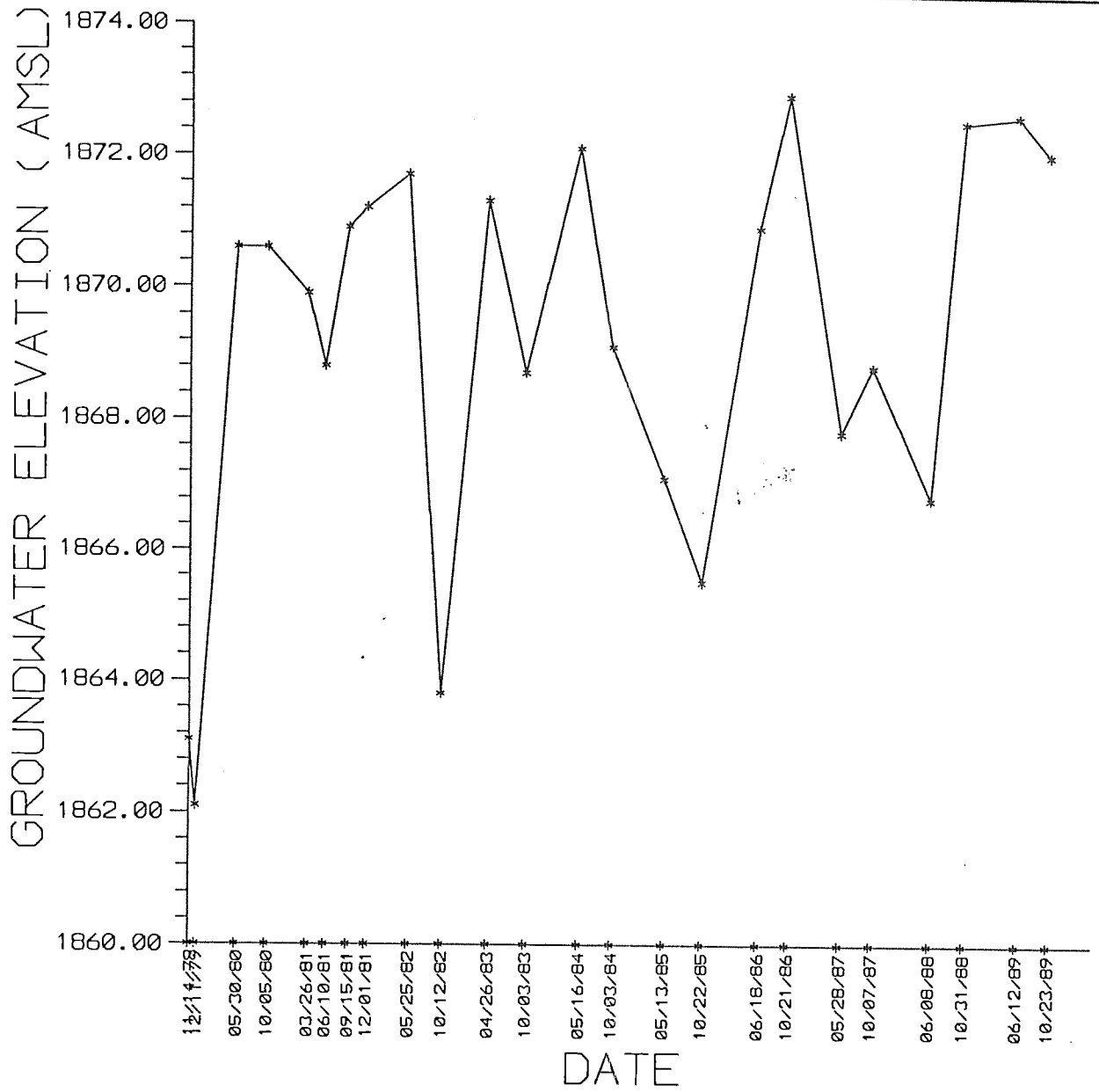
12-13-90	LMH	OF
SCALE NONE		FIGURE# 7



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MW-13 HYDROGRAPH
Hydrogeographical Analysis Annual Report
Coal Creek Station
McLean County, North Dakota

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	JOB I.D.# NDB90-045	PLOT SCALE 1:1

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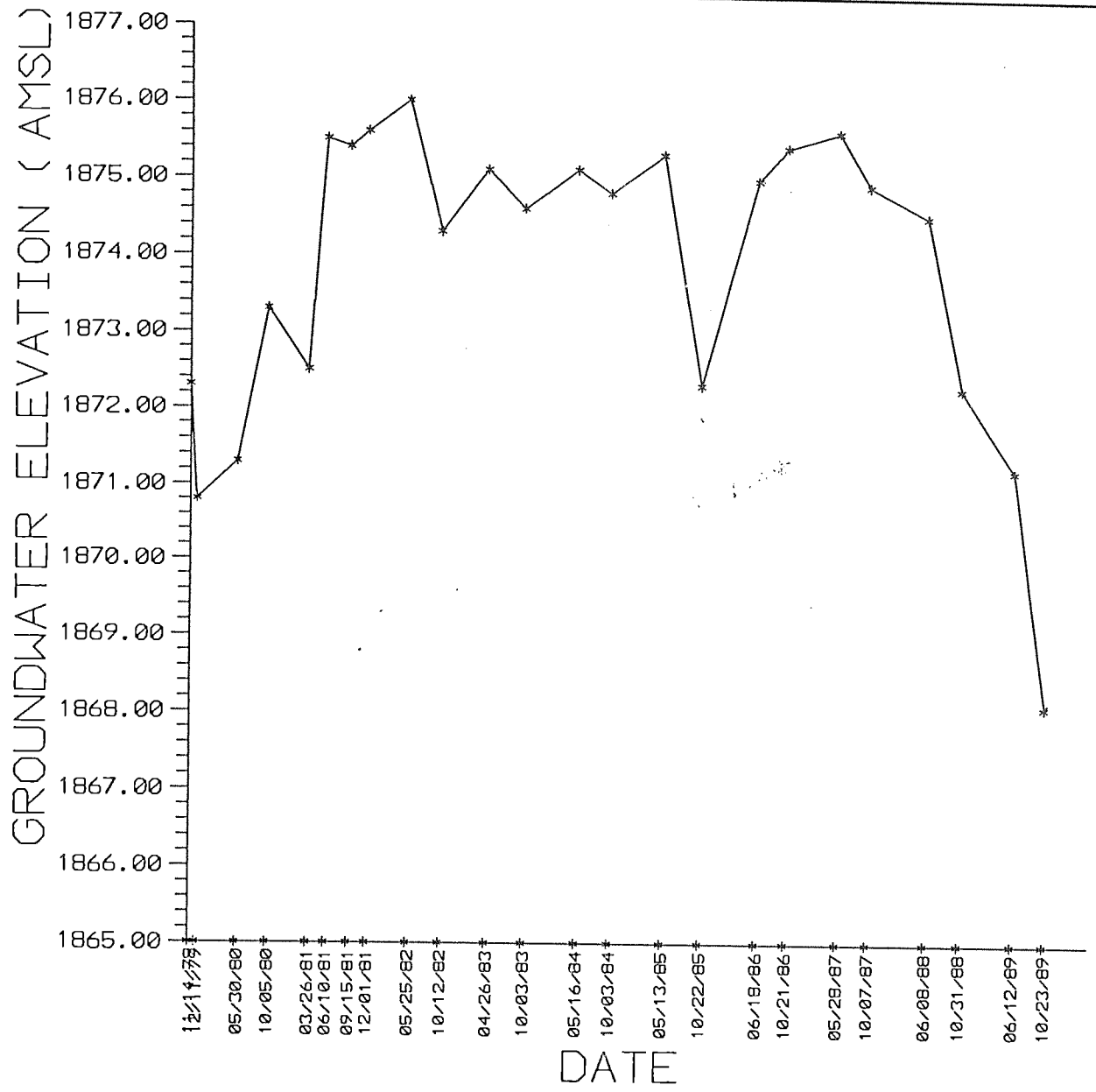
12-13-90	LMH	OF
SCALE NONE		FIGURE# 8



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MW-14 HYDROGRAPH
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Coal Creek Station
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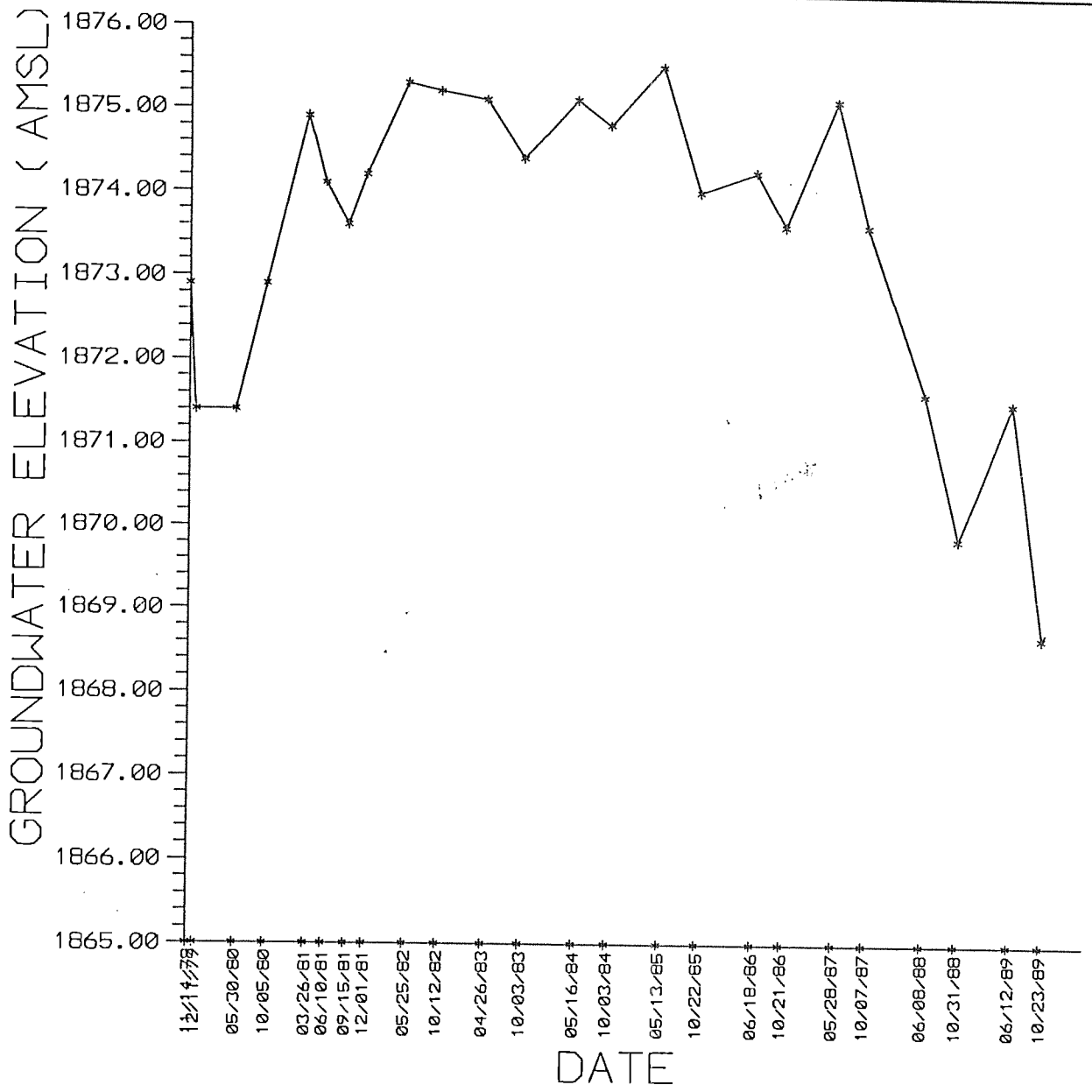
12-13-90	LMH	OF
SCALE NONE		FIGURE# 9



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MW-15 HYDROGRAPH
Hydrogeographical Analysis Annual Report
Coal Creek Station
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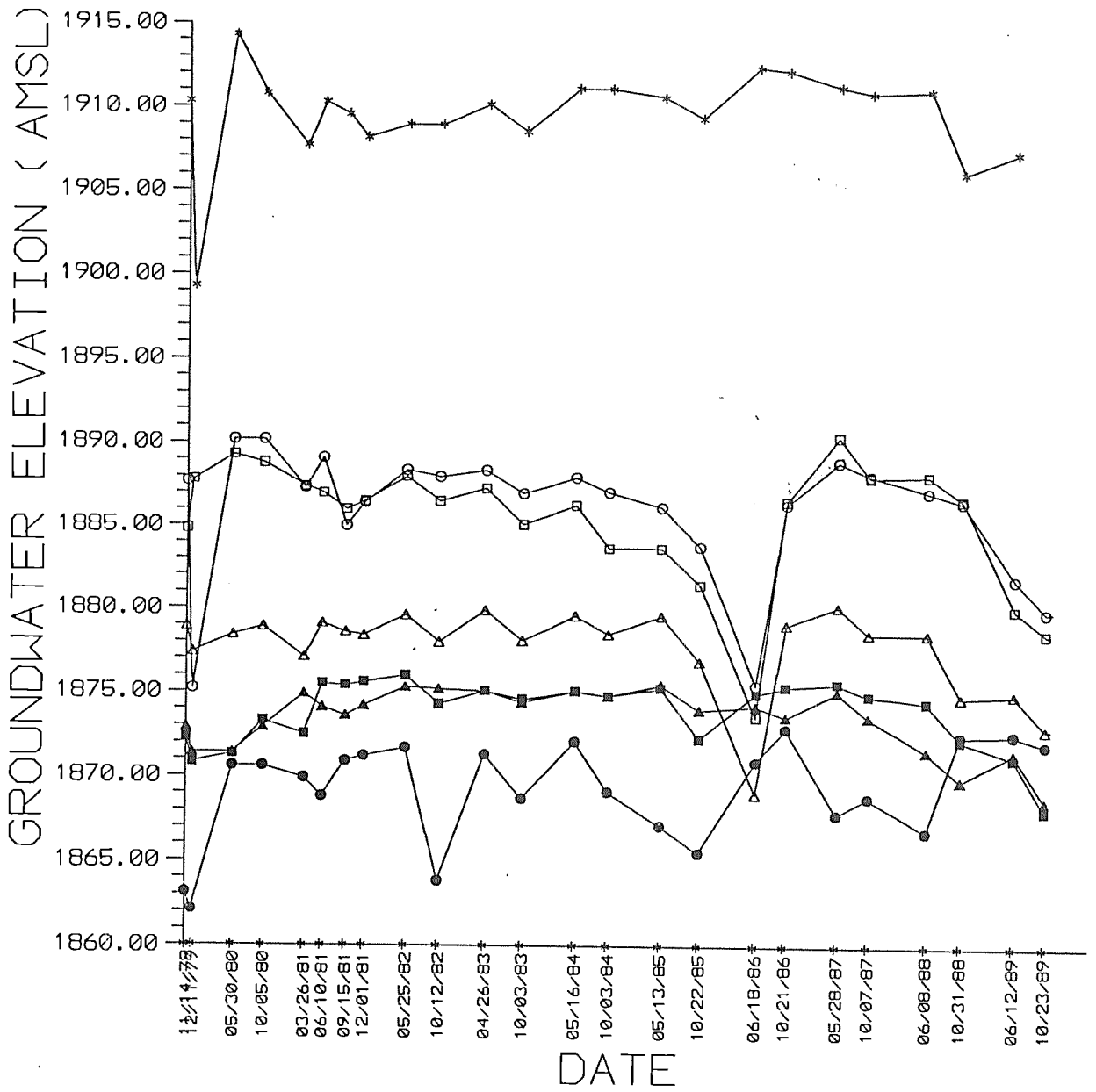
SCALE NONE		FIGURE# 10



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COMBINED HYDROGRAPHS, MW-6, MW-9, MW-10, MW-11, MW-13, MW-14 AND MW-15
Hydrogeographical Analysis Annual Report
Coal Creek Station
McLean County, North Dakota

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SCALE NONE		FIGURE# 11

specified in the permit application. Compared to previous years, water levels are appreciably lower based on trends displayed in Figure 11, with the exception of MW-13.

Vertical gradients are seen in the areas of the sloughs, ponds, disposal areas, and basins. Table 2 below lists the relative changes in water levels per unit vertical distance at the nested wells (the vertical gradients). These vertical gradients are consistent with previous observations. A negative sign in the table indicates a downward gradient. Upward vertical gradients are more common across the site which is to be expected in a groundwater discharge area such as the one these sloughs comprise.

TABLE 2
VERTICAL GRADIENTS

VERTICAL GRADIENTS 1989 MONITORING SESSION						
		06/12/89		10/23/89		
WELL	SHALLOW/ DEEP	WATER ELEV.	GRADIENT	WATER ELEV.	GRADIENT	COMMENTS
1	D	1891.50	0.08	1891.4	0.05	DISCHARGE, AS PREVIOUSLY SEEN
2	S	1888.30		1889.49		
7	D	1869.50	-0.11	1868.05	-0.08	RECHARGE, AS PREVIOUSLY SEEN
8	S	1875.00		1871.83		
9	D	1881.90	0.06	1879.94	0.05	DISCHARGE, AS PREVIOUSLY SEEN
10	S	1880.10		1878.66		
13	D	1872.60	0.04	1872.02	0.11	DISCHARGE, AS PREVIOUSLY SEEN
14	S	1871.20		1868.08		

VERTICAL GRADIENTS 1989 MONITORING SESSION						
		06/12/89		10/23/89		
WELL	SHALLOW/ DEEP	WATER ELEV.	GRADIENT	WATER ELEV.	GRADIENT	COMMENTS
20	D	1862.20		1873.71		NO DATA AVAILABLE FOR MW-22
22	S					
23	D	1889.70		1888.85		NO DATA AVAILABLE FOR MW-24
24	S					
26	D	1883.20	1.04	1881.98	-0.12	DISCHARGE, AS PREVIOUSLY SEEN
27	S	1867.60		1880.25		
30	D			1881.37		COMPLETE DATA NOT AVAILABLE
32	S	1883.40				
35	D	1898.30	0.07	1896.76	0.07	DISCHARGE, AS PREVIOUSLY SEEN
36	S	1897.20		1895.77		
44	S	1869.40	0.09	1866.61	-0.01	RECHARGE/DISCHARGE DEPENDING ON SEASON LIKELY INFLUENCE BY PROXIMITY TO SAYLER SLOUGH
45	D	1867.80		1866.74		
62	D	1937.20	0.03	1937.34	-0.02	DISCHARGE/RECHARGE DEPENDING ON SEASON LIKELY INFLUENCE BY PROXIMITY TO EXTENDED BASIN
64	S	1936.70		1937.7		

VERTICAL GRADIENTS 1989 MONITORING SESSION						
		06/12/89		10/23/89		
WELL	SHALLOW/ DEEP	WATER ELEV.	GRADIENT	WATER ELEV.	GRADIENT	COMMENTS
63	D	1927.50	-0.51	1927.38	-0.50	RECHARGE, AS PREVIOUSLY SEEN
65	S	1936.90		1936.6		

D. ANALYTICAL RESULTS

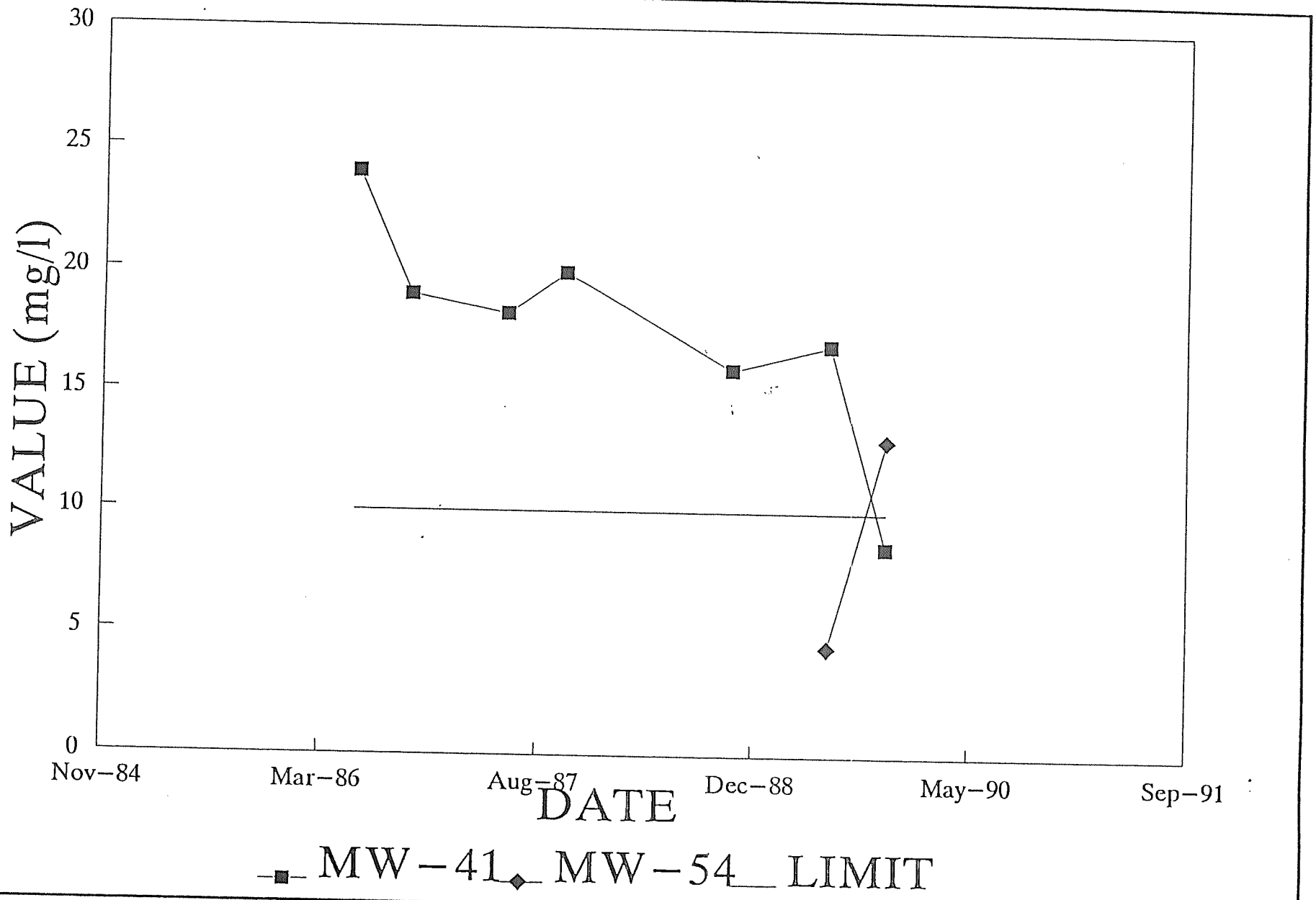
Groundwater was sampled in the second and fourth quarters of 1989. The table below lists the parameters for the sampling sessions. Complete groundwater sample laboratory results are presented in Appendix 2 along with historical data.

TABLE 3
SAMPLING PARAMETERS

pH-FIELD
pH-LABORATORY
SPECIFIC CONDUCTANCE
TOTAL DISSOLVED SOLIDS (mg/l)
TOTAL SUSPENDED SOLIDS (mg/l)
ALKALINITY CARBONATE, mg/l AS $CaCO_3$
ALKALINITY BICARBONATE, mg/l AS $CaCO_3$
ALKALINITY TOTAL, mg/l AS $CaCO_3$
NITRATE-N, mg/l
AMMONIA-N, mg/l
CALCIUM, mg/l
MAGNESIUM, mg/l
POTASSIUM, mg/l
SODIUM, mg/l
SULFATE, mg/l
METHYLENE BLUE ACTIVE SUBSTANCES, mg/l
CHLORIDE, mg/l
IRON, mg/l
ZINC, mg/l

MANGANESE, mg/l
COPPER, ug/l
SILVER, ug/l
STRONTIUM, mg/l
BORON, mg/l
BERYLLIUM, ug/l
NICKEL, ug/l
SELENIUM, ug/l
MERCURY, ug/l
ARSENIC, ug/l
BARIUM, mg/l
CADMIUM, ug/l
CHROMIUM-VI, ug/l
FLUORIDE, mg/l
LEAD, ug/l
MOLYBDENUM, mg/l
ALUMINUM, mg/l
FECAL COLIFORM BACTERIA, # COL/100 ml
CYANIDE, mg/l
PHENOL, ug/l
BIOCHEMICAL OXYGEN DEMAND, mg/l
CHEMICAL OXYGEN DEMAND, mg/l
TOTAL ORGANIC CARBON, mg/l
TEMPERATURE, DEGREES C
DISSOLVED OXYGEN, mg/l
WATER LEVEL, DEPTH BELOW GROUND SURFACE, FT.
TOTAL SULFUR, mg/l
TOTAL COLIFORM BACTERIA, # COL/100 ml

For the 1989 monitoring period three parameters exceeded the Federal Maximum Contaminant Levels (MCLs) promulgated under Safe Drinking Water Act. These compounds and their respective wells are listed below. Graphs of these compounds with historical data are shown in Figures 12-14.



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NITRATE LEVELS
Hydrogeographical Analysis Annual Report
Coal Creek Station
McLean County, North Dakota

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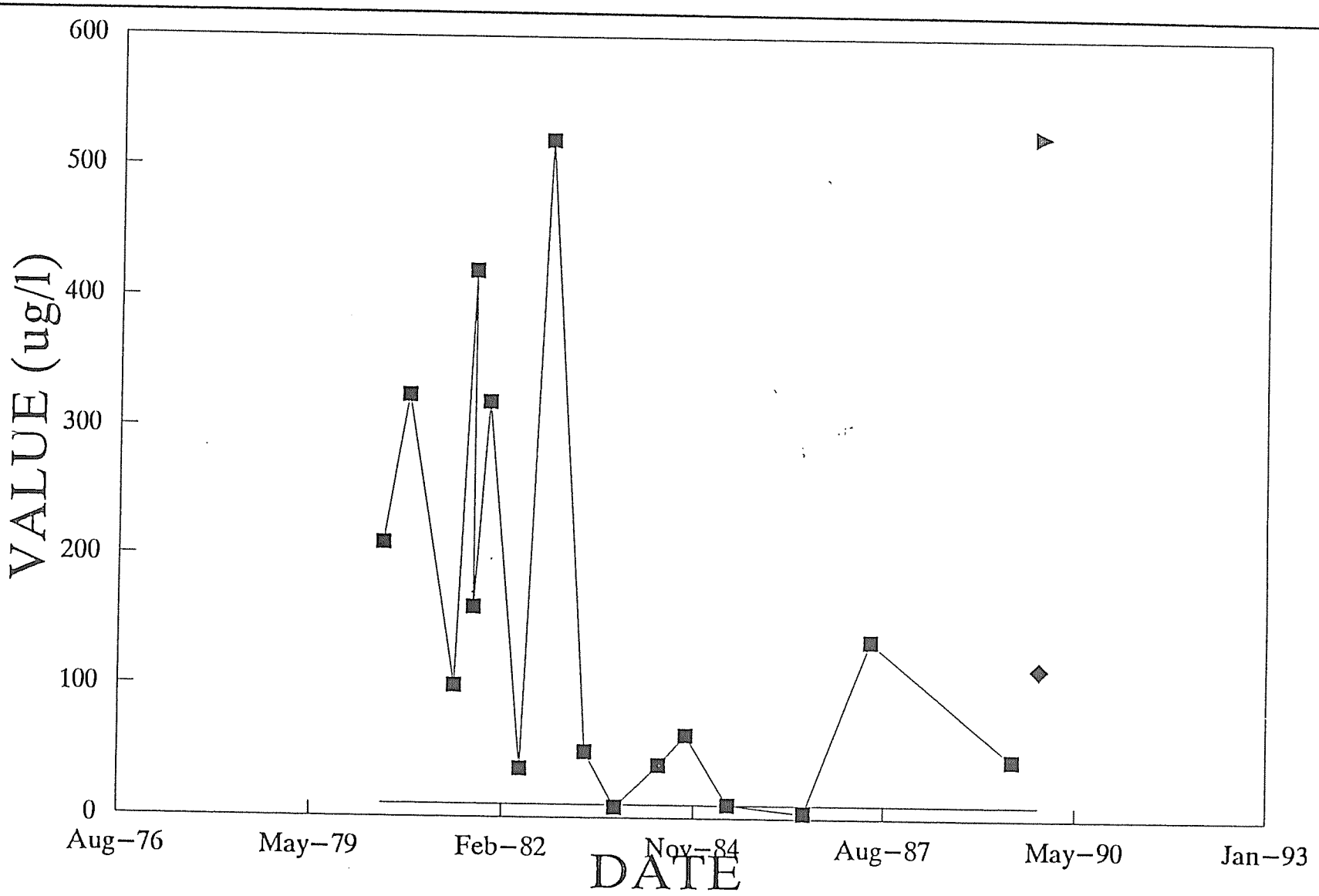
12–13–90	LMH	OF
SCALE NONE		FIGURE# 12



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SELENIUM LEVELS
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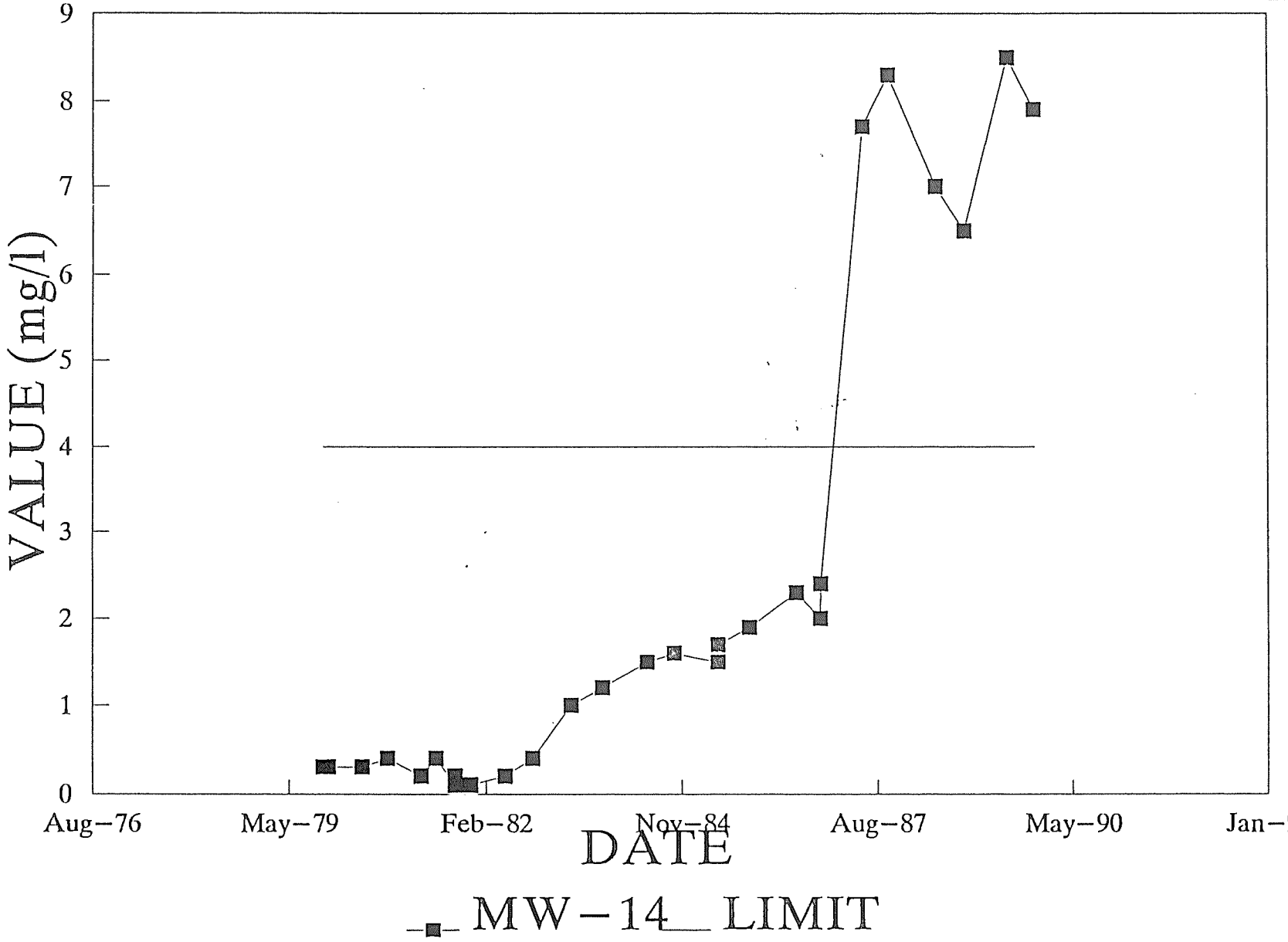
12-13-90	LMH	OF
SCALE NONE		FIGURE# 13



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FLUORIDE LEVELS
Hydrogeographical Analysis Annual Report
Coal Creek Station
McLean County, North Dakota

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12–13–90	LMH	OF
SCALE NONE		FIGURE# 14

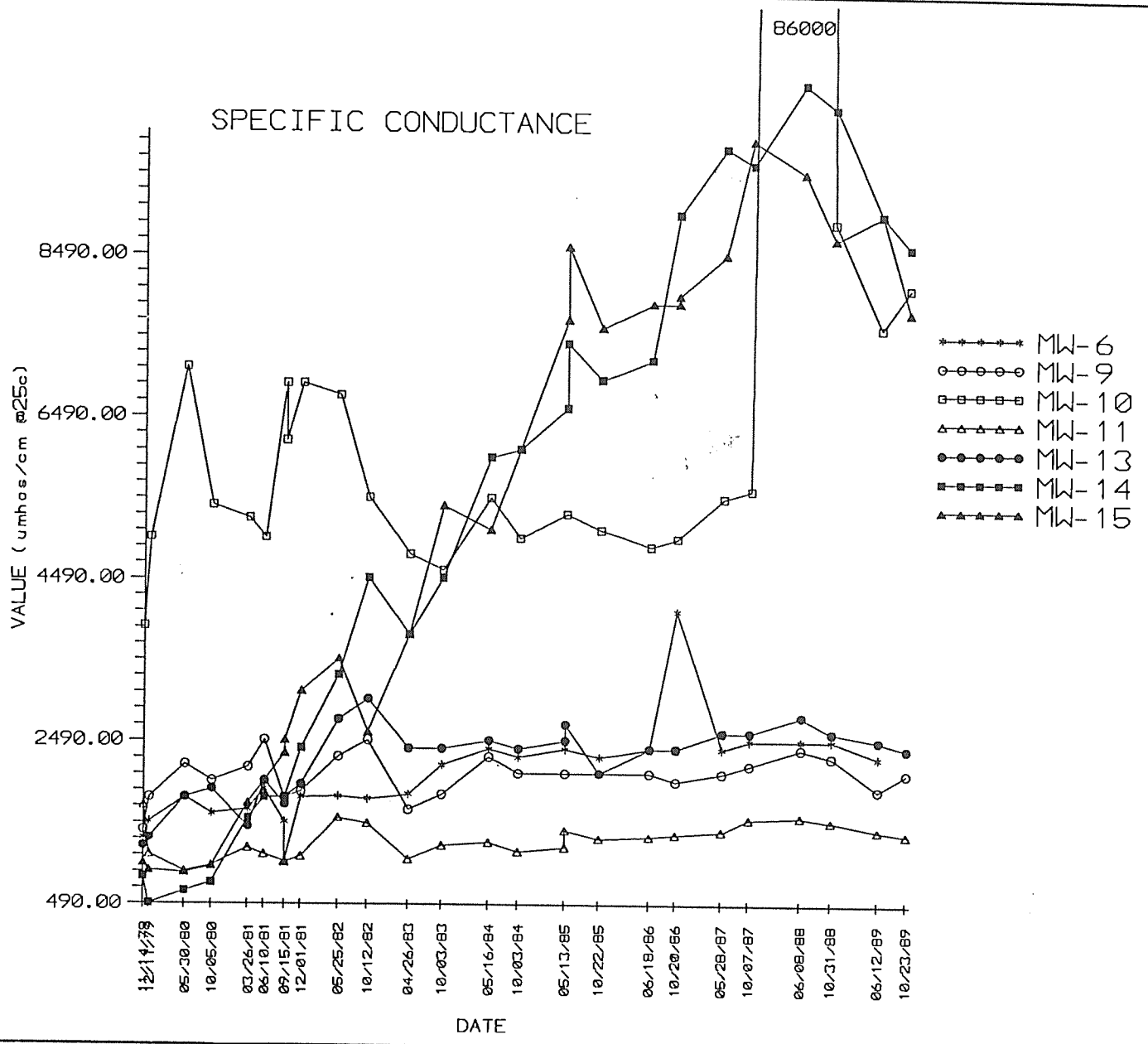
TABLE 4
EXCEEDANCE OF FEDERAL CRITERIA (MCLs)

Well	Compound	MCL	Units	Value	Date
MW-41	Nitrate	10	mg/l	17.00	06/89
MW-54	Nitrate	10	mg/l	13.00	10/89
MW-32	Selenium	10	ug/l	44.50	06/89
MW-77	Selenium	10	ug/l	114.00	10/89
MW-79	Selenium	10	ug/l	525.00	10/89
MW-85	Selenium	10	ug/l	12.00	10/89
MW-14	Fluoride	4	mg/l	8.50	06/89
MW-14	Fluoride	4	mg/l	7.90	10/89

Because nitrate and selenium levels have not shown an increase over time, levels above MCLs may be natural. Fluoride, on the other hand, has shown increases in some wells, although clearly not in most wells.

Although various parameters have been detected at the monitoring points, the discussion below focuses on the compounds that have been listed in previous reports as general indicator parameters for water quality (specific conductivity, sulfate and boron). Table 5 lists the data for specific conductivity, sulfate and boron for the 1989 sampling sessions. Graphs of the data are shown on Figures 15-17.

Figures 15, 16 and 17 consistently indicate increased concentrations over time in wells 10, 14 and 15. These are shallow wells in the immediate vicinity of the section 16 disposal area. Wells 6, 9, 11 and 13 are either deep wells, or shallow wells located an appreciable distance from the disposal area. These wells indicate much more consistent levels over time (i.e., limited, if any, impacts).



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SPECIFIC CONDUCTANCE
Hydrogeographical Analysis Annual Report
Coal Creek Station
McLean County, North Dakota

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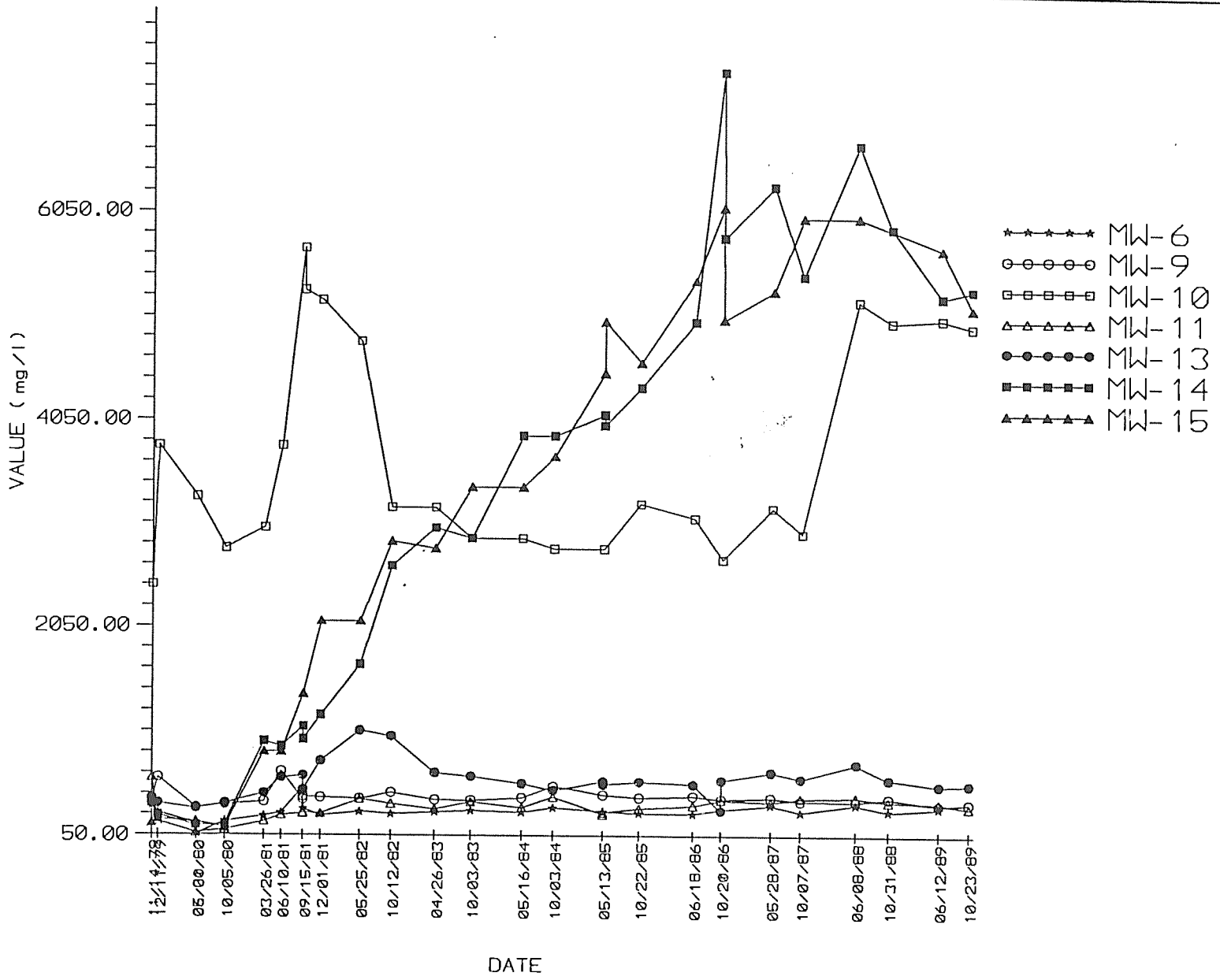
SCALE NONE		FIGURE# 15



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SULFATE CONCENTRATIONS
Hydrogeographical Analysis Annual Report
Coal Creek Station
McLean County, North Dakota

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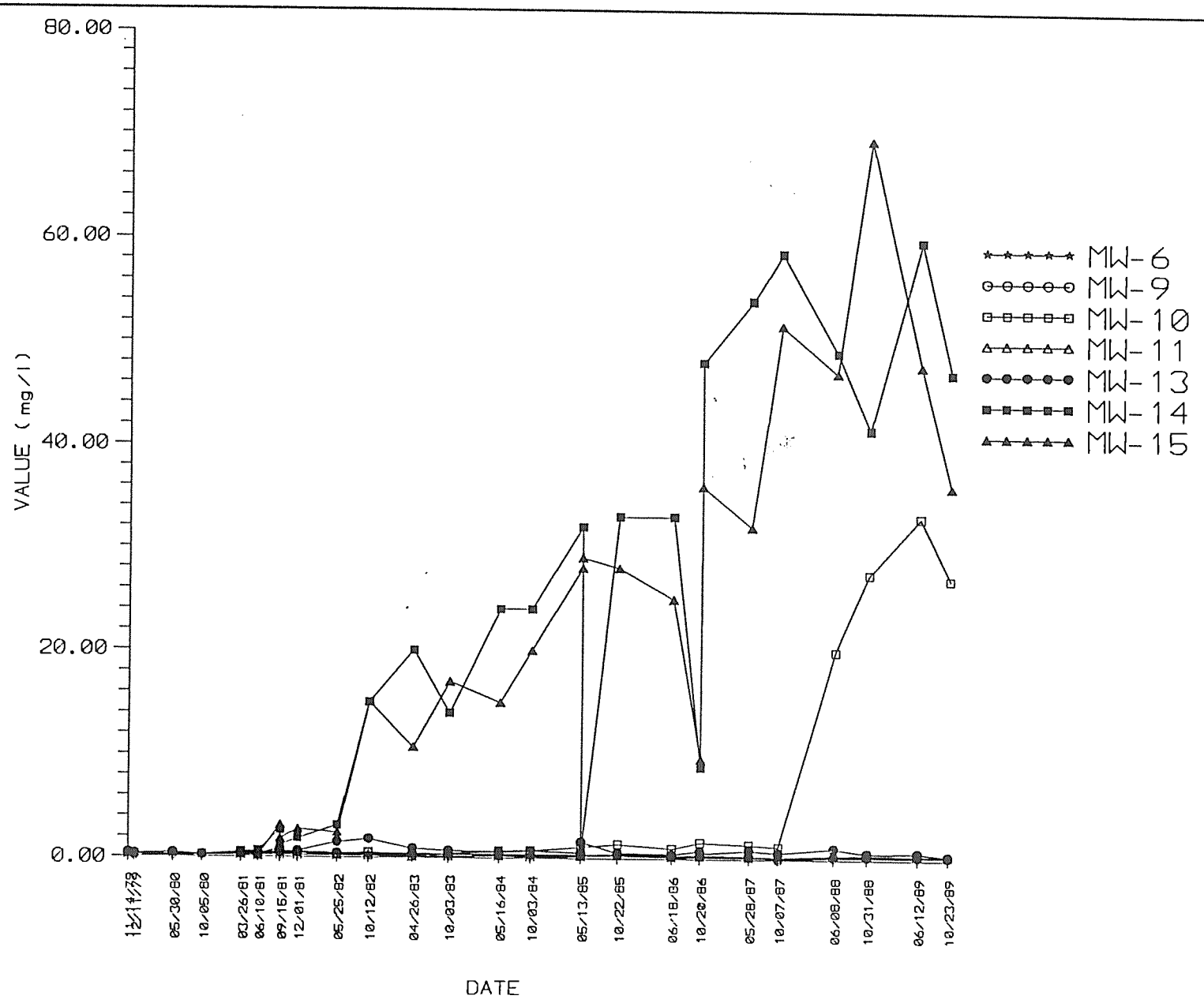
SCALE NONE		FIGURE# 16



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BORON CONCENTRATIONS
Hydrogeographical Analysis Annual Report
Coal Creek Station
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12-13-90	LMH	OF
SCALE NONE		FIGURE# 17

TABLE 5
SPECIFIC CONDUCTANCE, SULFATE AND BORON LEVELS

	SPECIFIC CONDUCTANCE umhos/cm			SULFATE, mg/l			BORON, mg/l		
WELL	06/12/89	10/23/89	10/24/89	06/12/89	10/23/89	10/24/89	06/12/89	10/23/89	10/24/89
1	1150.00	1170.00	-	229.00	216.86	-	0.90	0.81	-
2	1450.00	1780.00	-	393.00	540.00	-	0.22	0.28	-
3	8600.00	6600.00	-	4205.00	3515.00	-	0.65	0.52	-
4	7600.00	6500.00	-	3480.00	3400.00	-	1.14	0.75	-
5	6500.00	6500.00	-	3230.00	3908.00	-	0.23	0.30	-
6	2300.00	-	-	318.00	-	-	0.25	-	-
7	3100.00	3800.00	-	1700.00	1270.00	-	0.39	0.36	-
8	25400.00	27000.00	-	34500.00	50000.00	-	0.07	0.18	-
9	1900.00	2100.00	-	345.00	363.00	-	0.32	0.31	-
10	7600.00	8100.00	-	5030.00	4950.00	-	33.00	27.00	-
11	1400.00	1350.00	-	366.00	321.85	-	0.42	0.37	-
12	780.00	770.00	-	55.00	57.00	-	0.30	0.27	-
13	2500.00	2400.00	-	532.00	541.00	-	0.71	0.42	-
14	9000.00	8600.00	-	5240.00	5310.00	-	59.80	47.00	-
15	9000.00	7800.00	-	5700.00	5130.00	-	47.70	36.00	-
16	975.00	980.00	-	134.00	177.46	-	0.14	0.18	-
17	5400.00	680.00	-	2815.00	4260.00	-	1.35	2.90	-
18	5000.00	-	-	2700.00	3455.00	-	4.65	7.30	-
19			-	-	-	-	-	-	-
20	5400.00	5500.00	-	2345.00	2785.00	-	0.60	0.45	-
21	1700.00	1610.00	-	400.00	828.97	-	0.24	0.37	-
22	-	-	-	-	-	-	-	-	-
23	2000.00	2400.00	-	435.00	536.00	-	0.38	0.50	-
24	-	-	-	-	-	-	-	-	-
25			-			-	-	-	-
26	1450.00	1440.00	-	187.00	255.00	-	0.43	0.49	-
27	1650.00	1650.00	-	266.00	309.00	-	0.29	0.30	-
28	1300.00	1360.00	-	213.00	229.00	-	0.17	0.23	-

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	SPECIFIC CONDUCTANCE umhos/cm			SULFATE, mg/l			BORON, mg/l		
29	3700.00	5100.00	-	3200.00	3220.10	-	2.03	2.00	-
30	-	2600.00	-	-	1050.00	-	-	0.60	-
31	4600.00	7400.00	-	4265.00	4375.00	-	0.17	0.18	-
32	5000.00	-	-	6290.00	-	-	0.30	-	-
33	1500.00	2300.00	-	610.00	615.00	-	0.68	0.71	-
34	1200.00	1570.00	-	242.00	218.00	-	0.45	0.43	-
35	1100.00	1360.00	-	201.00	166.00	-	0.16	0.18	-
36	1200.00	1460.00	-	481.00	370.61	-	0.31	0.45	-
37	1050.00	1030.00	-	198.00	145.00	-	<1.00	0.06	-
38	3000.00	3300.00	-	2240.00	1500.00	-	0.56	0.56	-
39	-	-	-			-			-
40	5400.00	4900.00	-	2890.00	3370.00	-	0.22	0.25	-
41	5000.00	5100.00	-	2750.00	2410.00	-	0.14	0.34	-
42	4500.00	4500.00	-	2460.00	2510.00	-	12.40	11.00	-
43	4000.00	4600.00	-	2050.00	2480.00	-	12.40	16.00	-
44	2000.00	1390.00	-	661.00	326.02	-	3.11	1.20	-
45	1650.00	1640.00	-	406.00	415.00	-	0.55	0.50	-
46	4250.00	4300.00	-	1885.00	2230.00	-	0.62	0.72	-
47	1400.00	1030.00	-	151.00	188.32	-	0.25	0.47	-
48	7400.00	*	7900.00	4105.00	*	4536.00	24.20	*	27.00
49	4000.00	4800.00	-	2135.00	2450.00	-	1.84	2.80	-
50	3500.00	3800.00	-	1580.00	1670.00	-	0.64	0.70	-
51	5400.00	5600.00	-	2870.00	3084.00	-	3.74	4.90	-
52	9800.00	9500.00	-	5500.00	5750.00	-	0.40	0.48	-
53	6300.00	6100.00	-	3740.00	3490.00	-	0.32	0.42	-
54	17200.00	1760.00	-	12890.00	11610.00	-	0.27	0.33	-
55	3100.00	4100.00	-	1605.00	2115.00	-	2.93	2.30	-
56	3900.00	4500.00	-	1290.00	1800.00	-	0.70	0.70	-
57	1330.00	1440.00	-	210.00	241.00	-	0.26	0.31	-
58	1940.00	2100.00	-	684.00	923.00	-	0.27	0.40	-
59	2550.00	2550.00	-	761.00	744.00	-	1.03	1.20	-

	SPECIFIC CONDUCTANCE umhos/cm			SULFATE, mg/l			BORON, mg/l		
60	4100.00	3100.00	-	1905.00	1230.00	-	2.20	2.80	-
61	2000.00	1570.00	-	407.00	598.00	-	0.47	0.57	-
62	5600.00	5700.00	-	2650.00	2870.00	-	0.32	0.50	-
63	2200.00	1860.00	-	344.00	520.00	-	0.22	0.37	-
64	6200.00	6400.00	-	3220.00	3240.00	-	1.10	0.20	-
65	4500.00	4600.00	-	2413.00	2340.00	-	0.13	1.20	-
66	3600.00	3100.00	-	1345.00	1140.00	-	1.70	1.60	-
67	4400.00	4300.00	-	1765.00	1870.00	-	0.31	0.35	-
68	7000.00	7800.00	-	3730.00	4130.00	-	1.90	28.00	-
69	-	6300.00	-	-	3255.00	-	-	0.54	-
70	-	6400.00	-	-	3500.00	-	-	23.00	-
71	-	1340.00	-	-	215.00	-	-	0.50	-
72	-	1170.00	-	-	233.00	-	-	0.18	-
73	-	5400.00	-	-	2562.69	-	-	3.20	-
74	-	4500.00	-	-	1550.00	-	-	0.95	-
75	-	1550.00	-	-	264.00	-	-	0.31	-
76	-	1360.00	-	-	510.00	-	-	0.44	-
77	-	4100.00	-	-	1630.00	-	-	0.34	-
78	-	3000.00	-	-	1230.00	-	-	0.31	-
79	-	5500.00	-	-	2915.00	-	-	0.36	-
80	-	2700.00	-	-	1100.00	-	-	1.30	-
81	-	6900.00	-	-	4098.50	-	-	19.00	-
82	-	6100.00	-	-	3340.00	-	-	20.00	-
83	-	1130.00	-	-	210.00	-	-	0.24	-
84	-	1010.00	-	-	230.00	-	-	0.18	-
85	-	6600.00	-	-	2995.00	-	-	0.31	-
86	-	4000.00	-	-	2070.00	-	-	0.29	-
87	-	1290.00	-	-	389.00	-	-	0.18	-
88	-	20000.00	-	-	14250.00	-	-	0.36	-
89	-	2700.00	-	-	1059.00	-	-	0.37	-
90	-	9100.00	-	-	4200.00	-	-	40.00	-

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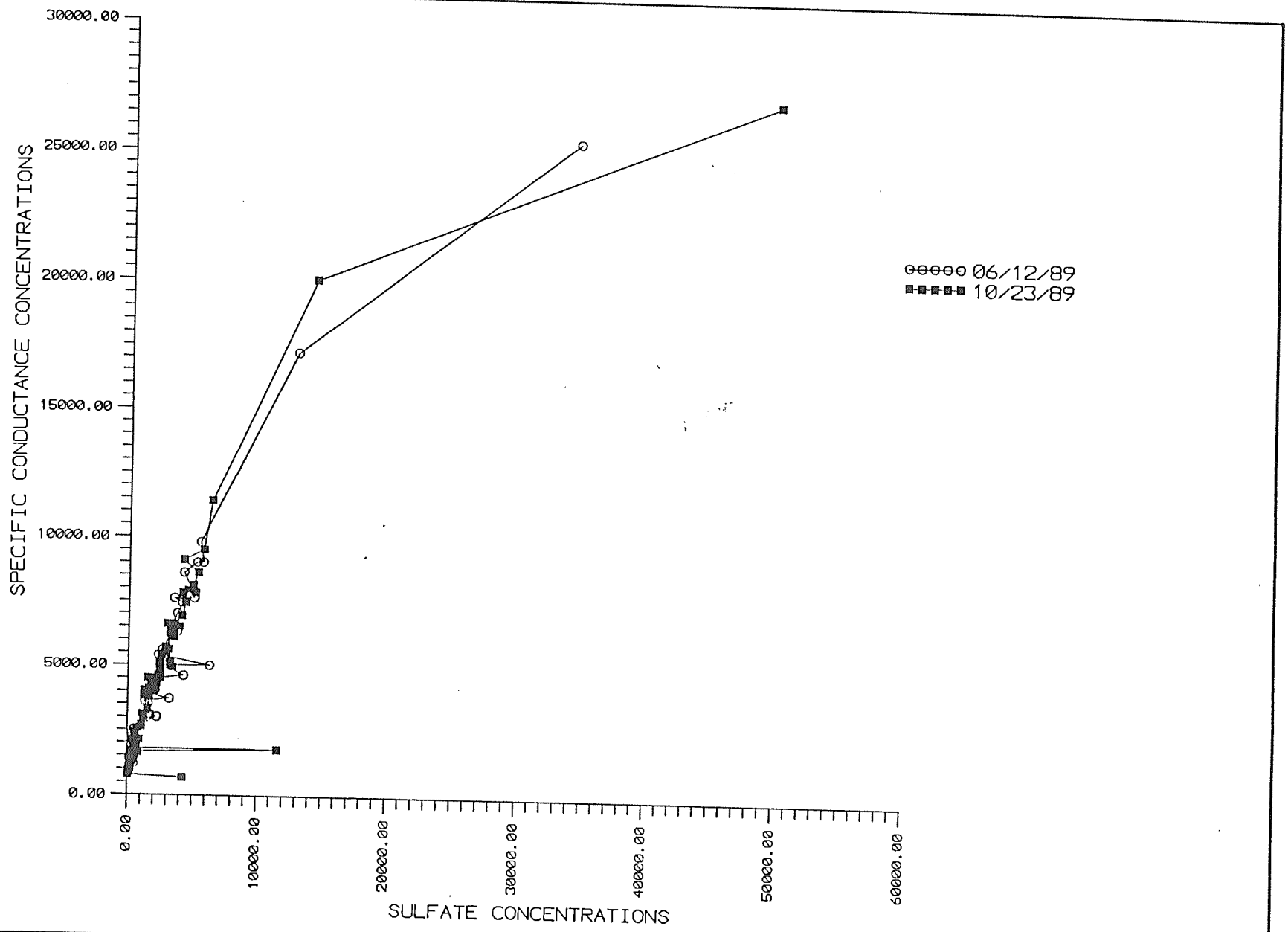
	SPECIFIC CONDUCTANCE umhos/cm			SULFATE, mg/l			BORON, mg/l		
91	-	1370.00	-	-	275.00	-	-	0.64	-
92				-	-				
93	-	11400.00	-	-	6340.00	-	-	0.91	-
94	-	4000.00	-	-	1300.00	-	-	0.56	-

A comparison of the specific conductance versus sulfate was performed to determine if previous trends still exist. The data was sorted based on increasing sulfate concentrations. The results are shown on Figures 18 and 19. As can be seen, the linear relationship previously found for the compounds still exists, except for the highest concentration data points. Figure 19 excludes the highest data points for each monitoring session in the data set.

The correlation between boron levels and the sulfate levels, as shown on Figure 20, also indicates a linear relationship, but with a larger relative change in the boron concentrations as compared to the sulfate values.

The geophysical work presented in the November 15, 1989 report relates to the groundwater data presented for analysis. Table 6 lists the EM conductivity values and their corresponding well locations, sorted by increasing EM values.

The comparison of the EM data to the chemical results has previously been reported by Foth and Van Dyke to exhibit a linear relationship between EM and specific conductance and sulfate levels, based on a limited number of data points. This conclusion is not supported by the new data. As can be seen on Figure 21A, there appears to be no correlation between increasing EM values and the groundwater contaminant levels. In order to further evaluate whether this potential relationship exists, wells with EM values above 60 mmhos/meter (roughly the highest 50% of the readings) were plotted relative to potential contaminant source areas (Figure 21B). As can be seen, these wells are located both upgradient and downgradient of the evaporation ponds and disposal areas. Hence, no



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SPECIFIC CONDUCTANCE VS. SULFATE FOR 1989 MONITORING SESSIONS
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McLean County, North Dakota

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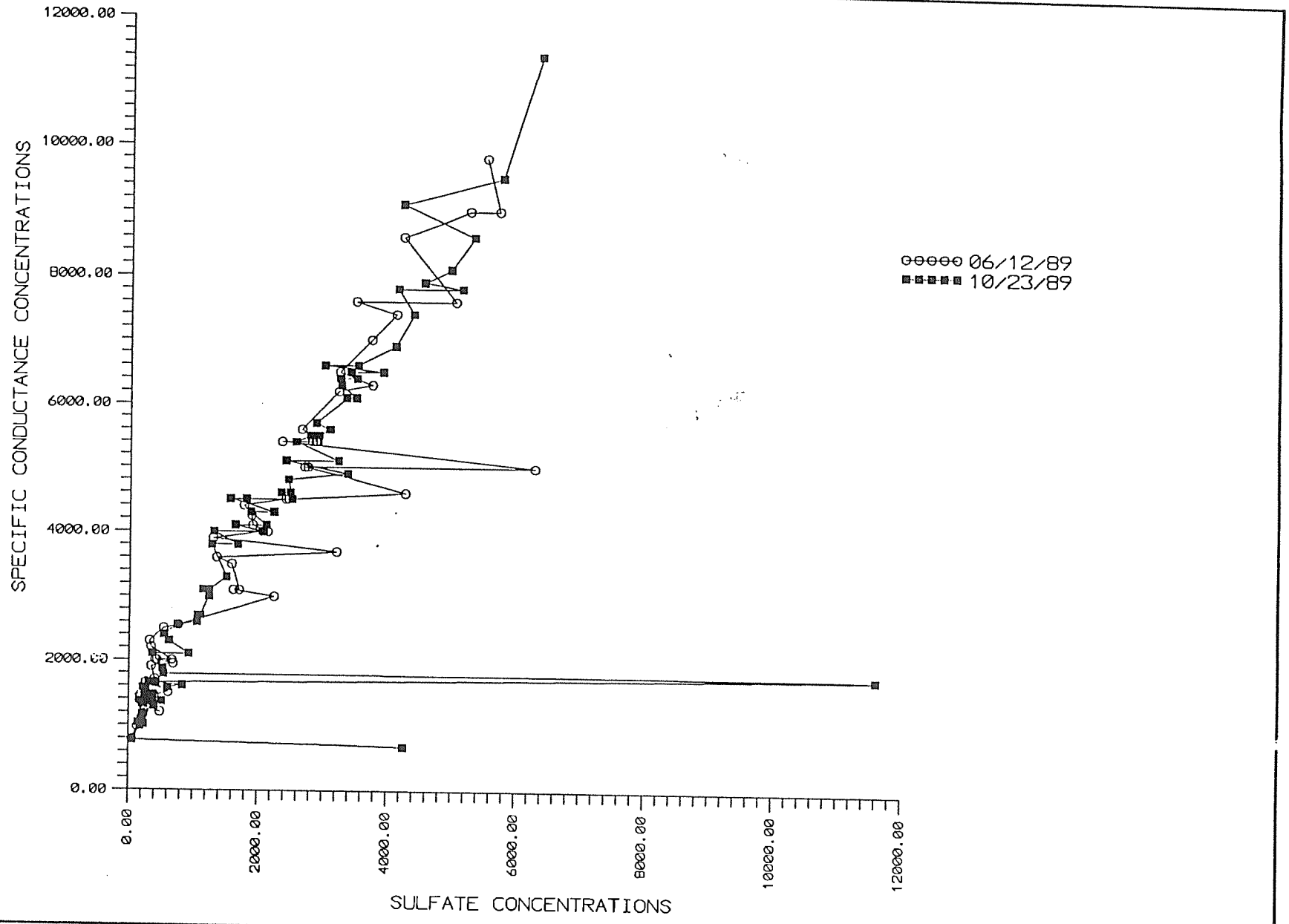
12-13-90	LMH	OF
SCALE NONE		FIGURE# 18



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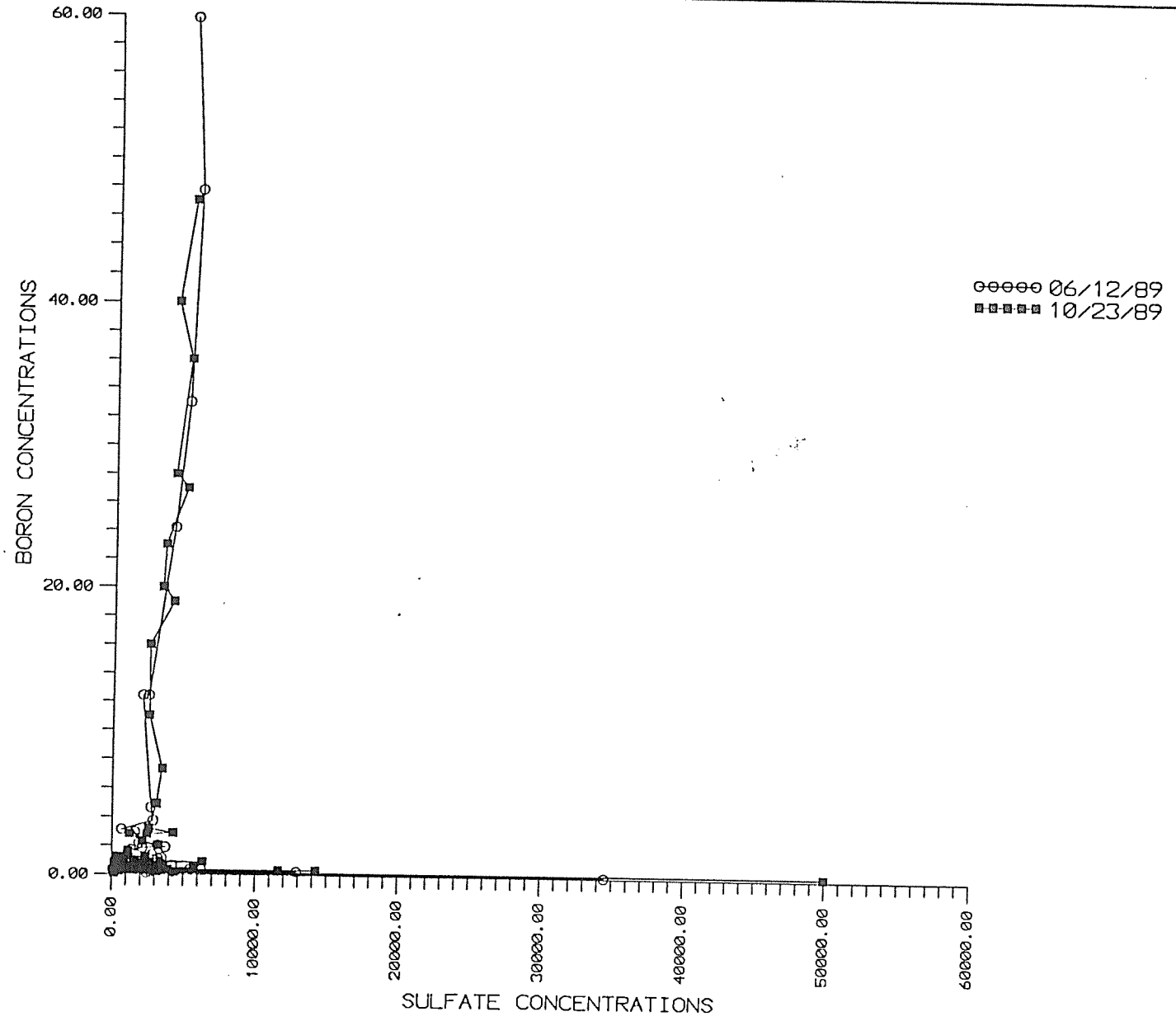
		OF
SCALE NONE		FIGURE# 19



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BORON VS. SULFATE FOR 1989 MONITORING SESSIONS

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McLean County, North Dakota

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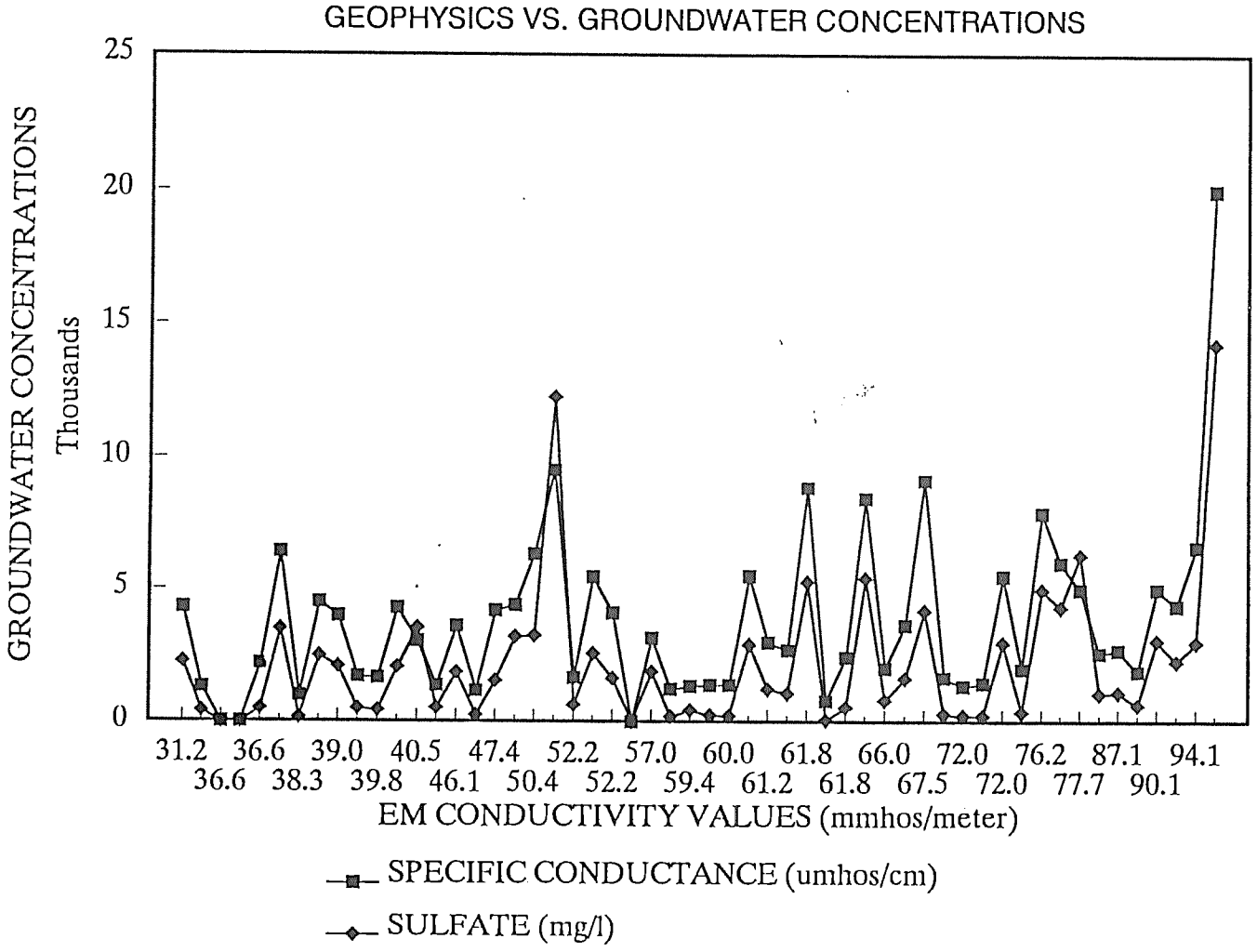
12-13-90	LMH	OF
SCALE NONE		FIGURE# 20



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GEOPHYSICS VS. GROUNDWATER CONCENTRATIONS
Hydrogeographical Analysis Annual Report
Coal Creek Station
McLean County, North Dakota

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DATE	INT	
12-13-90	LMH	OF
SCALE NONE		FIGURE #21A

SAMPLE LOCATION 49 = Monitoring Well # 49 -CCSPAGE 1

DATE	10/27/1988	06/06/1989	10/16/1989	
pH-Field	7.40	10.10	6.60	
pH-Laboratory	7.20	7.20	7.20	
Specific conductance, umhos/cm @ 25c	4700.00	4000.00	4800.00	
Total Dissolved Solids, mg/l	3500.00	3920.00	4150.00	
Total Suspended Solids, mg/l	*	*	*	
Alkalinity Carbonate, mg/l as CaCO3	*	*	*	
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	
Alkalinity Total, mg/l as CaCO3	590.00	767.00	601.00	
Nitrate-N, mg/l	*	0.02	<0.01	
Ammonia-N, mg/l	*	*	*	
Calcium, mg/l	260.00	309.00	330.00	
Magnesium, mg/l	290.00	315.00	355.00	
Potassium, mg/l	7.10	5.80	6.30	
Sodium, mg/l	460.00	400.00	430.00	
Sulfate, mg/l	1700.00	2135.00	2450.00	
Methylene Blue Active Substances, mg/l	*	*	*	
Chloride, mg/l	74.00	103.00	102.00	
Iron, mg/l	*	*	0.20	
Zinc, mg/l	*	*	*	
Manganese, mg/l	*	*	<0.10	
Copper, ug/l	*	*	*	
Silver, ug/l	*	*	*	
Strontium, mg/l	*	*	5.50	
Boron, mg/l	1.30	1.84	2.80	
Beryllium, ug/l	*	*	*	
Nickel, ug/l	*	*	*	
Selenium, ug/l	*	*	*	
Mercury, ug/l	*	*	*	
Arsenic, ug/l	*	*	*	
Barium, mg/l	*	*	*	
Cadmium, ug/l	*	*	*	
Chromium-VI, ug/l	*	*	*	
Fluoride, mg/l	0.20	0.10	0.20	
Lead, ug/l	*	*	*	
Molybdenum, mg/l	*	*	*	
Aluminum, mg/l	*	*	*	
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	
Cyanide, mg/l	*	*	*	
Phenol, ug/l	*	*	*	
Biochemical Oxygen Demand, mg/l	*	*	*	
Chemical Oxygen Demand, mg/l	*	*	*	
Total Organic Carbon, mg/l	*	*	*	
Temperature, Degrees C	*	17.00	*	
Dissolved Oxygen, mg/l	*	*	*	
Water Level depth below ground surface, ft.	13.05	9.50	* 3m 10cm	3m 11cm
Total Sulfur, mg/l	*	*	*	
Total Coliform Bacteria, # Col./100 ml	*	*	*	

8
C/8/90

SAMPLE LOCATION 50 = Monitoring Well # 50 -CCSPAGE 1

DATE	10/28/1988	06/06/1989	10/16/1989
pH-Field	7.30	10.00	6.70
pH-Laboratory	7.30	7.20	7.10
Specific conductance, umhos/cm @ 25c	4000.00	3500.00	3800.00
Total Dissolved Solids, mg/l	3140.00	2920.00	2980.00
Total Suspended Solids, mg/l	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*
Alkalinity Total, mg/l as CaCO3	540.00	634.00	486.00
Nitrate-N, mg/l	*	<0.01	<0.01
Ammonia-N, mg/l	*	*	*
Calcium, mg/l	220.00	211.00	290.00
Magnesium, mg/l	275.00	205.00	210.00
Potassium, mg/l	5.40	4.00	4.90
Sodium, mg/l	340.00	555.00	325.00
Sulfate, mg/l	1600.00	1580.00	1670.00
Methylene Blue Active Substances, mg/l	*	*	*
Chloride, mg/l	80.00	86.00	94.00
Iron, mg/l	*	*	<0.10
Zinc, mg/l	*	*	*
Manganese, mg/l	*	*	<0.10
Copper, ug/l	*	*	*
Silver, ug/l	*	*	*
Strontium, mg/l	*	*	4.00
Boron, mg/l	0.84	0.64	0.70
Beryllium, ug/l	*	*	*
Nickel, ug/l	*	*	*
Selenium, ug/l	*	*	*
Mercury, ug/l	*	*	*
Arsenic, ug/l	*	*	*
Barium, mg/l	*	*	*
Cadmium, ug/l	*	*	*
Chromium-VI, ug/l	*	*	*
Fluoride, mg/l	0.20	0.10	0.20
Lead, ug/l	*	*	*
Molybdenum, mg/l	*	*	*
Aluminum, mg/l	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*
Cyanide, mg/l	*	*	*
Phenol, ug/l	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*
Total Organic Carbon, mg/l	*	*	*
Temperature, Degrees C	*	12.70	*
Dissolved Oxygen, mg/l	*	*	*
Water Level depth below ground surface, ft.	19.10	19.90	* 6m 14cm
Total Sulfur, mg/l	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*

6/8/90

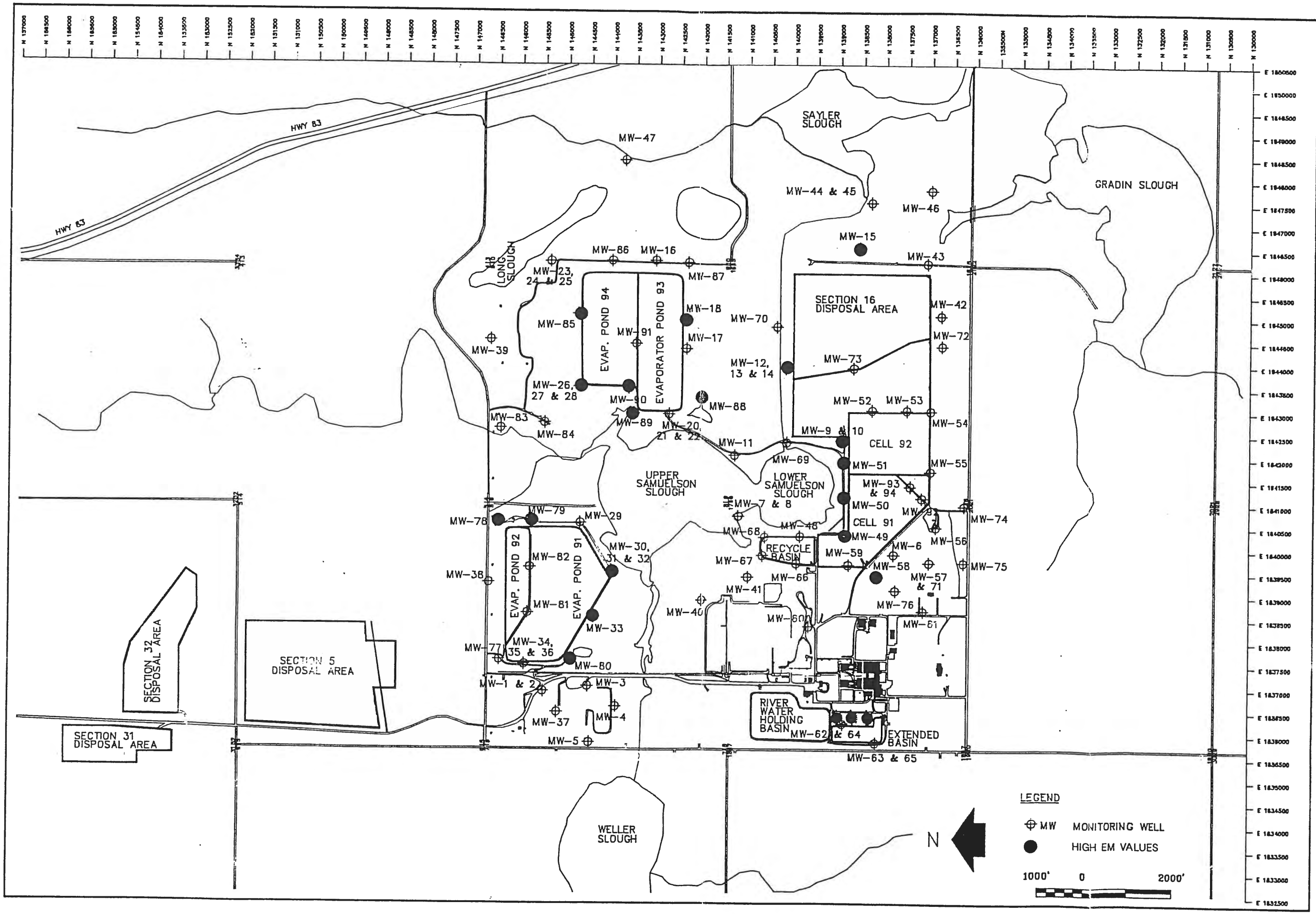
6m 20cm

SAMPLE LOCATION 51 = Monitoring Well # 51 -CCSPAGE 1

DATE	10/28/1988	06/06/1989	10/16/1989
pH-Field	7.90	7.80	7.70
pH-Laboratory	7.50	7.60	7.60
Specific conductance, umhos/cm @ 25c	6000.00	5400.00	5600.00
Total Dissolved Solids, mg/l	5060.00	4650.00	4980.00
Total Suspended Solids, mg/l	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*
Alkalinity Total, mg/l as CaCO3	298.00	442.00	290.00
Nitrate-N, mg/l	*	0.02	<0.01
Ammonia-N, mg/l	*	*	*
Calcium, mg/l	300.00	302.00	320.00
Magnesium, mg/l	350.00	315.00	325.00
Potassium, mg/l	6.00	6.10	6.40
Sodium, mg/l	654.00	620.00	685.00
Sulfate, mg/l	3100.00	2870.00	3084.00
Methylene Blue Active Substances, mg/l	*	*	*
Chloride, mg/l	135.00	134.00	137.00
Iron, mg/l	*	*	<0.10
Zinc, mg/l	*	*	*
Manganese, mg/l	*	*	<0.10
Copper, ug/l	*	*	*
Silver, ug/l	*	*	*
Strontium, mg/l	*	*	3.10
Boron, mg/l	4.00	3.74	4.90
Beryllium, ug/l	*	*	*
Nickel, ug/l	*	*	*
Selenium, ug/l	*	*	*
Mercury, ug/l	*	*	*
Arsenic, ug/l	*	*	*
Barium, mg/l	*	*	*
Cadmium, ug/l	*	*	*
Chromium-VI, ug/l	*	*	*
Fluoride, mg/l	0.40	0.20	0.40
Lead, ug/l	*	*	*
Molybdenum, mg/l	*	*	*
Aluminum, mg/l	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*
Cyanide, mg/l	*	*	*
Phenol, ug/l	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*
Total Organic Carbon, mg/l	*	*	*
Temperature, Degrees C	*	9.40	*
Dissolved Oxygen, mg/l	*	*	*
Water Level depth below ground surface, ft.	12.00	14.30	* 4m 82cm
Total Sulfur, mg/l	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*

6/8/90

5m 12cm



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SITE PLAN/MONITORING WELL LOCATIONS
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Underwood, North Dakota

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PLOT TIME:	JOB I.D.# NDB90045	PLOT SCALE 1:2000	

REVISED	
DATE	INT
12-12-90	SMT
12-13-90	KMR

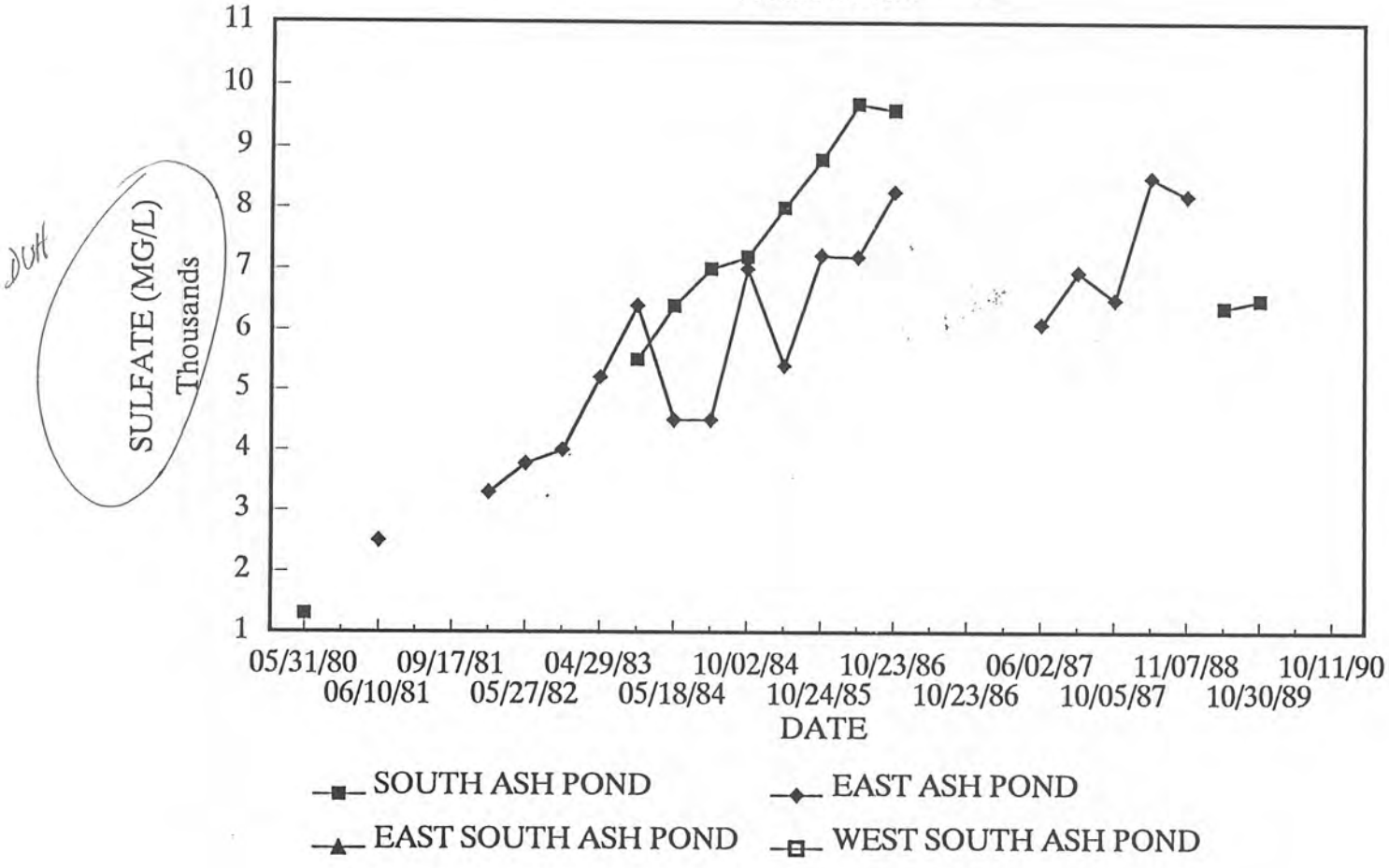
SHEET	OF
1	3

SCALE 1"=2000'

FIGURE# 21B

SURFACE WATER QUALITY

ASH PONDS



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Hydrogeographical Analysis Annual Report
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McLean County, North Dakota

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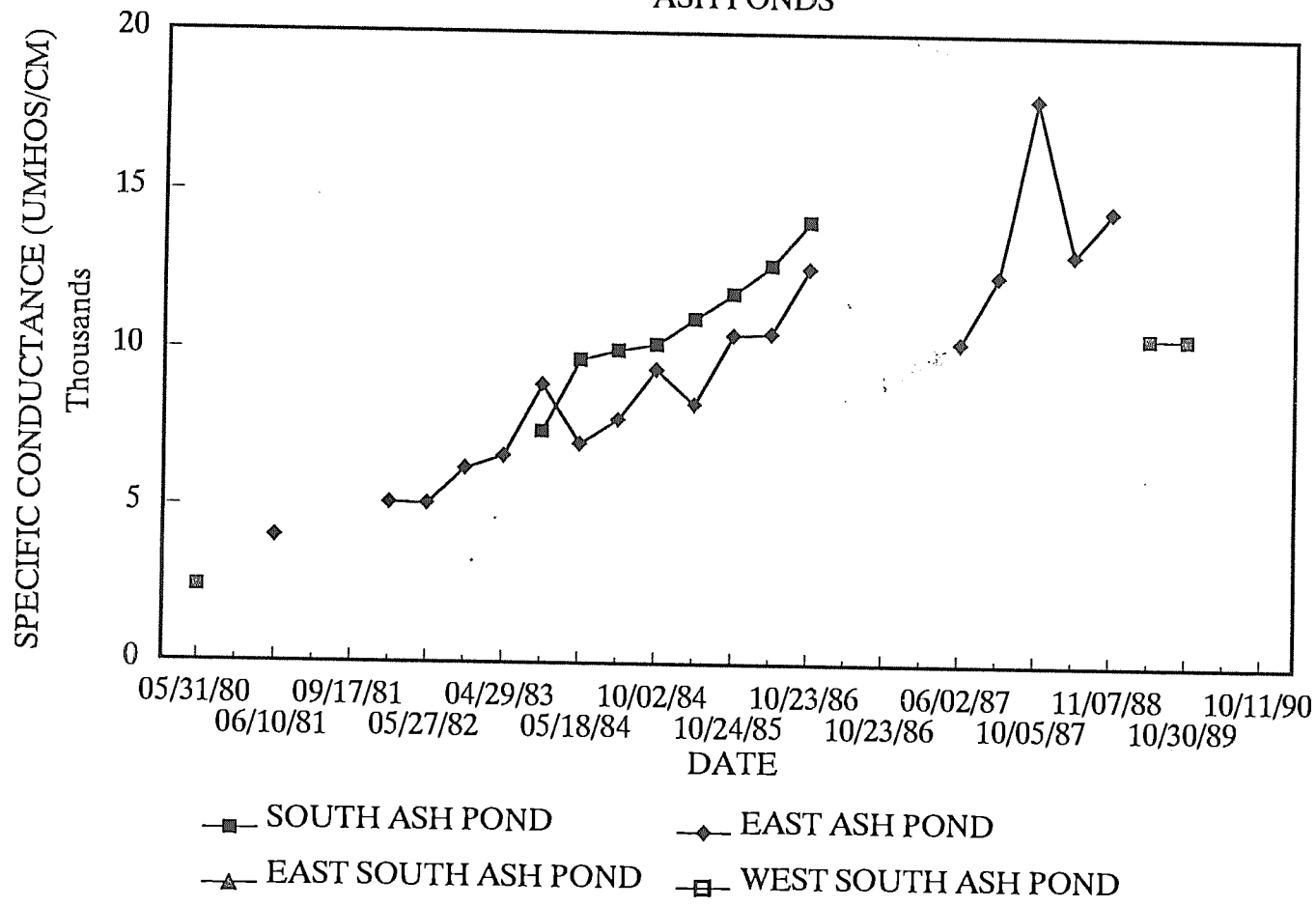
12-13-90	LMH	OF
SCALE NONE		FIGURE # 22

SURFACE WATER QUALITY

ASH PONDS



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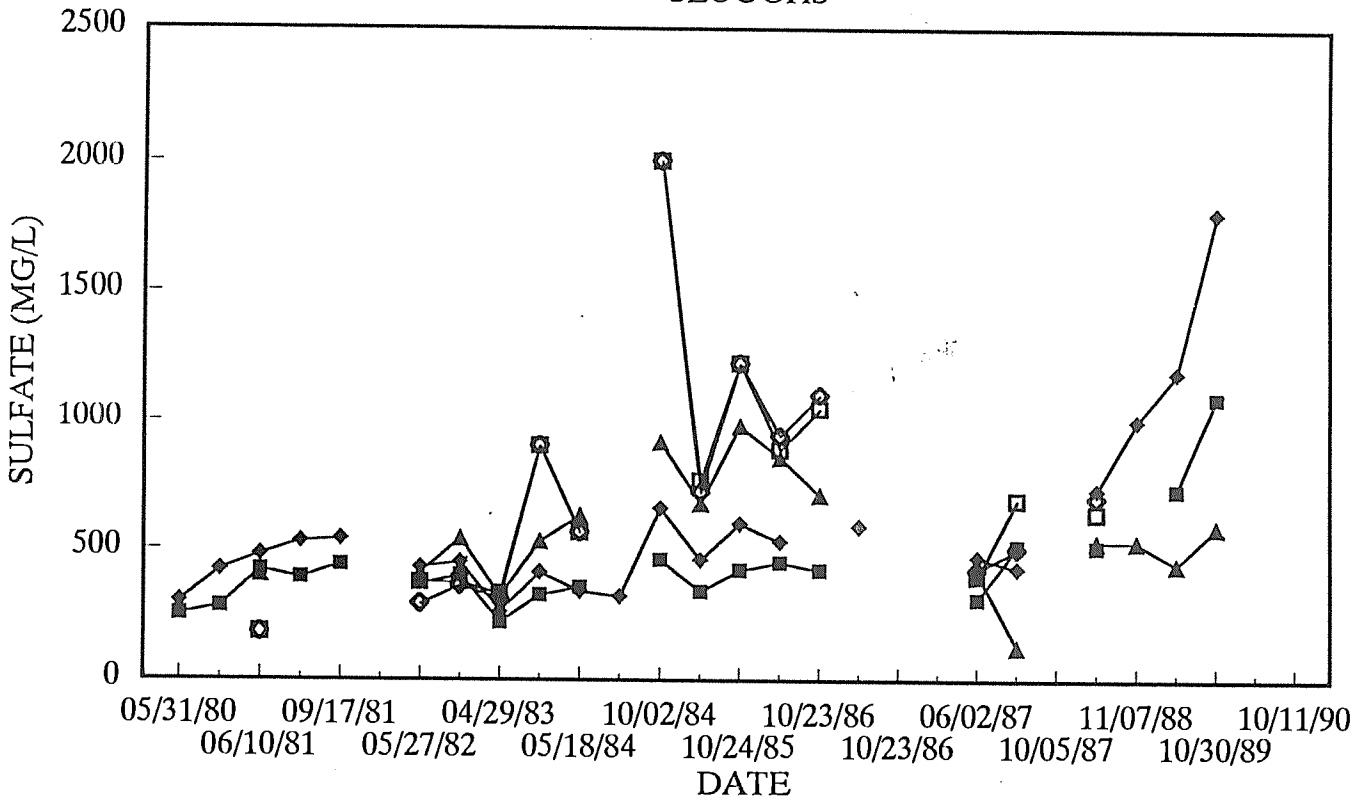
12-13-90	LMH	OF
SCALE NONE		FIGURE# 23

SURFACE WATER QUALITY

SLOUGHS



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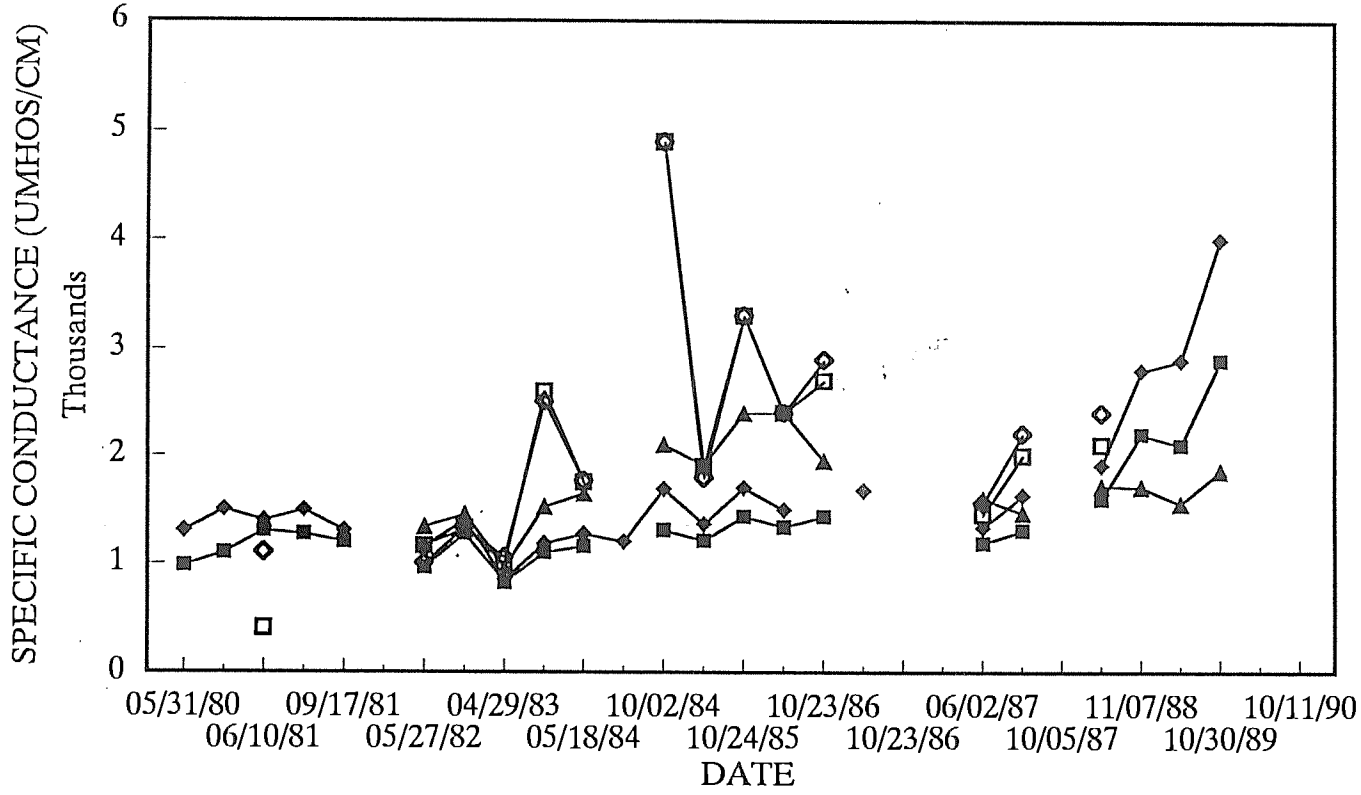
DATE	INT	
12-13-90	LMH	OF
SCALE NONE		FIGURE# 24

SURFACE WATER QUALITY

SLOUGHS



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12-13-90	LMH	OF
SCALE NONE		FIGURE# 25

E. DISCUSSION AND RECOMMENDATIONS

Water levels: Water elevations differ over the site by 75 feet (minimum of 1862.20, maximum of 1937.70). The locations of surface water and topography surface appear to control the groundwater flow. Water levels in a few wells have changed substantially (e.g., 3 to 5 feet) during the four months between measurements in 1989. Three wells showed increases of over 10 feet.

Contaminant Concentrations: In general, contaminant levels increased in the areas immediately down gradient of the surface impoundments and disposal areas.

Three compounds were detected above the MCL levels in the groundwater. These compounds were nitrate, selenium and fluoride.

The EM survey does not appear to conclusively correlate to contaminant levels. The results seen over the 1989 monitoring period may be influenced by drought conditions.

Surface Water: Water quality in Saylor Slough exhibited concentration levels similar to historical levels based on the general indicator parameters of sulfate and specific conductance. Levels of these parameters in Upper and Lower Samuelson Slough increased relative to historical levels. Drought conditions may have contributed, at least in part, to these increases in as much as these concentrations would be expected to increase as relatively more evapotranspiration occurs and less groundwater discharges.

The levels of sulfate and specific conductance in the South Ash Pond have decreased. Current data for the East Ash Pond is not available.

F. REFERENCES

Foth and Van Dyke, Hydrogeological Analysis for Coal Creek Station, McLean County, North Dakota, March, 1989.

Minnesota Geophysical Associates, Inc., Geophysical Survey Results at the Coal Creek Power Station, Underwood, North Dakota, November 15, 1989.

Minnesota Geophysical Associates, Inc., Geophysical Survey Results at the Falkirk Mine, Underwood, North Dakota, January 5, 1990.

G. GENERAL

Services performed by the geotechnical and environmental scientists for this project have been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently participating in this area under similar budget and time restraints. Other than this, no warranty, expressed or implied, is made.

H. SIGNATURES

The preceding report was prepared by the following:

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APPENDICES

APPENDIX 1

APPENDIX 1
GROUNDWATER ELEVATION BELOW GROUND SURFACE
HISTORICAL DATA

WELL	EAST	NORTH	GROUND ELEV.	29173 11/14/79 PACE	29200 12/11/79 PACE	29202 12/13/79 PACE	29371 05/30/80 PACE	29373 06/01/80 PACE	29499 10/05/80 PACE	29671 03/26/81 PACE	29747 06/10/81 PACE	29844 09/15/81	29844 09/15/81 PACE	29921 12/01/81	30096 05/25/82	30236 10/12/82	30432 04/26/83	30592 10/03/83	30818 05/16/84	30951 10/03/84	31180 05/13/85	31180 05/13/85	31342 10/22/85	31581 06/14/86	31705 10/20/86 BRAUN	31764 10/21/86	31925 05/24/87	32057 10/07/87	32055 10/05/87	32302 06/08/88	32447 10/31/88	32671 06/12/89	32804 10/23/89	33025 06/01/90
1	1836915	145529	1899.60	10.50	10.50	12.00	10.00	-	8.00	4.50	3.50	4.30	4.30	4.30	3.40	4.80	4.10	5.30	4.50	3.54	3.30	-	5.30	2.66	-	3.60	3.30	3.90	-	3.10	7.09	8.10	8.20	8.33
2	1836917	145524	1899.50	9.50	11.00	-	7.00	-	6.00	7.40	6.00	7.50	7.50	7.30	3.40	7.20	4.60	7.30	4.30	7.80	6.00	-	8.70	4.75	-	4.90	3.40	6.50	-	7.00	7.00	11.20	10.01	13.02
3	1837028	144547	1892.10	19.00	21.00	-	15.00	-	20.00	21.90	11.30	9.80	9.30	12.70	14.80	19.10	11.80	9.30	20.80	20.70	22.20	-	23.40	21.60	-	20.10	21.40	20.60	-	22.60	24.03	26.90	14.24	27.00
4	1836598	145932	1886.10	12.00	5.00	-	7.00	-	3.00	5.80	3.50	5.10	5.10	6.90	4.80	9.10	6.90	8.50	4.80	8.10	7.00	-	11.40	5.10	-	5.70	4.80	7.80	-	9.70	13.02	17.70	12.66	17.06
5	1835849	144511	1892.50	10.00	9.00	-	8.00	-	8.50	7.30	5.50	9.30	9.20	9.80	5.70	10.20	6.80	10.30	3.90	10.10	8.40	-	12.80	6.40	-	8.40	7.20	10.10	-	10.70	18.01	15.70	15.91	16.86
6	1839898	137833	1938.30	28.00	39.00	-	24.00	28.50	27.50	30.60	28.00	28.70	28.70	30.10	29.30	29.30	28.10	29.70	27.10	27.10	27.60	-	28.10	25.10	-	26.00	26.90	27.30	-	27.10	32.03	30.80	-	-
				1910.30	1899.30	1938.30	1914.30	1909.80	1910.80	1907.70	1910.30	1909.60	1909.60	1908.20	1909.00	1909.00	1910.20	1908.60	1911.20	1911.20	1910.70	1938.30	1909.50	1912.50	1938.30	1912.30	1911.40	1911.00	1938.30	1911.20	1906.27	1907.50	1938.30	1934.30
7	1840728	141235	1881.80	11.00	11.50	-	11.50	-	11.00	9.30	9.30	9.60	9.60	9.20	8.60	9.50	9.30	10.10	9.30	10.20	9.50	-	11.80	9.66	*	8.30	8.70	9.20	-	9.60	12.03	12.30	13.75	13.78
8	1840728	141240	1881.80	8.00	5.90	-	4.00	-	5.50	6.30	4.30	5.50	5.50	5.30	2.80	3.30	2.20	6.50	3.80	5.80	2.80	-	3.10	4.20	*	2.50	11.00	5.60	-	4.50	8.11	6.80	9.97	10.07
9	1842358	138975	1894.70	7.00	19.50	-	4.50	-	4.50	7.40	5.60	9.70	9.70	8.30	6.30	6.70	6.30	7.70	6.70	7.60	8.50	-	10.90	19.20	*	8.30	5.70	6.50	-	7.50	8.10	12.80	14.76	14.50
				1887.70	1875.20	1894.70	1890.20	1894.70	1890.20	1887.30	1889.10	1885.00	1885.00	1886.40	1888.40	1888.00	1888.40	1887.00	1888.00	1887.10	1886.20	1894.70	1883.80	1875.30	1894.70	1886.40	1889.60	1888.20	1894.70	1887.20	1886.60	1881.90	1879.94	1880.20
10	1842359	138982	1894.80	10.00	7.00	-	5.50	-	6.00	7.40	7.80	8.80	8.86	8.30	6.80	8.30	7.50	9.70	8.50	11.10	11.10	-	13.30	21.20	*	0.20	4.30	6.70	-	6.60	8.06	14.70	16.14	17.03
				1888.80	1887.80	1894.80	1889.30	1894.80	1888.80	1887.40	1887.00	1886.00	1886.00	1886.50	1888.80	1886.50	1887.30	1885.10	1886.30	1883.70	1883.70	1894.80	1881.50	1873.60	1894.80	1886.60	1880.30	1888.10	1894.80	1888.20	1886.74	1880.10	1878.66	1877.77
11	1842038	141321	1885.90	7.00	8.50	-	7.50	-	7.00	8.80	6.80	7.30	7.30	7.50	6.30	7.90	6.00	7.80	6.30	7.40	6.30	*	9.90	16.99	-	6.80	5.70	7.30	-	7.30	11.09	10.90	12.96	12.66
				1885.90	1885.90	1885.80	1885.90	1885.90	1885.90	1885.90	1885.90	1885.90	1885.90	1885.90	1885.90	1885.90	1885.90	1885.90	1885.90	1885.90	1885.90	1885.99	1885.90	1885.90	1885.90	1885.90	1885.90	1885.90	1885.90	1885.90	1885.90	1885.90	1885.90	1885.90
12	1843919	140206	1879.10	10.00	10.00	-	10.06	-	9.00	7.30	7.50	7.80	7.80	7.70	6.80	7.90	7.70	8.60	7.80	8.30	8.30	*	9.10	7.90	-	7.80	7.10	7.60	-	7.11	11.11	12.00	13.09	13.39
13	1843915	140205	1879.60	16.50	17.50	-	9.06	-	9.90	9.70	10.40	8.70	8.70	8.40	7.90	15.80	8.30	10.90	7.50	10.50	12.50	*	14.10	8.70	*	6.70	11.80	10.80	-	12.80	7.10	7.00	7.58	6.99
				1879.60	1879.60	1879.60	1879.60	1879.60	1879.60	1879.60	1879.60	1879.60	1879.60	1879.60	1879.60	1879.60	1879.60	1879.60	1879.60	1879.60	1879.60	1879.60	1879.60	1879.60	1879.60	1879.60	1879.60	1879.60	1879.60	1879.60	1879.60	1879.60	1879.60	1879.60
14	1843911	140202	1879.30	7.00	8.50	-	8.04	-	6.00	6.80	3.80	3.90	3.90	3.70	3.30	5.00	4.20	4.70	4.20	4.54	4.00	*	7.00	4.33	*	3.80	3.70	4.40	-	4.80	7.04	8.10	11.22	10.24
				1879.30	1879.30	1879.10	1879.30	1879.30	1879.30	1879.30	1879.30	1879.30	1879.30	1879.30	1879.30	1879.30	1879.30	1879.30	1879.30	1879.30	1879.30	1879.30	1879.30	1879.30	1879.30	1879.30	1879.30	1879.30	1879.30	1879.30	1879.30	1879.30	1879.30	1879.30
15	1846446	138581	1876.90	4.00	5.50	-	5.54	-	4.00	2.00	2.80	3.30	3.30	2.70	1.60	1.70	1.80	2.50	1.80	2.10	1.40	*	2.90	2.66	*	3.30	1.80	3.30	-	5.30	7.05	5.40	8.23	7.22
				1876.90	1876.90	1876.90	1876.90	1876.90	1876.90	1876.90	1876.90	1876.90	1876.90	1876.90	1876.90	1876.90	1876.90	1876.90	1876.90	1876.90	1876.20	1876.90	1876.90	1876.90	1876.90	1876.90	1876.90	1876.90	1876.90	1876.90	1876.90	1876.90	1876.90	1876.90
16	1846248	143075	1885.10	-	-	-	8.04	-	7.50	7.40	6.70	7.60	7.80	8.20	5.70	6.60	6.20	7.70	4.70	7.50	5.10	-	0.90	5.50	-	6.98	5.10	6.00	-	7.30	9.06	9.60	10.40	9.68
17	1844348	142400	1881.70	-	-	-	7.54	-	9.50	7.40	7.40	7.80	7.80	7.10	7.70	8.20	6.70	7.70	6.40	6.90	5.80	-	0.20	6.66	-	6.90	6.30	7.30	-	7.30	9.10	9.30	8.53	8.23
18	1844939	142428	1876.10	-	-	-	3.54	-	5.00	6.50	4.40	4.20	4.30	3.70	3.60	4.60	6.00	2.80	1.70	1.80	1.50	-	2.70	2.40	-	1.80	1.60	2.20	-	2.80	6.03	3.60	6.69	4.59
19				-	-	-			6.79	1877.71																			-					
20	1842920	142793	1884.80	-	-	-	6.54	-	6.50	7.90	7.50	7.20	7.20	7.30	6.20	9.70	8.30	8.70	6.00	8.30	7.80	-	9.90	7.10	-	6.80	6.60	8.30	-	9.60	11.01	22.60	11.09	14.30
21	1842923	142786	1884.50	-	-	-	6.59	-	6.00	4.90	5.50	6.30	6.30	6.30	6.30	6.20	5.10	6.40	5.00	5.90	5.00	-	7.70	5.70	-	5.90	5.10	6.30	-	5.11	8.06	7.90	6.79	8.53
22	1842923	142780	1884.30	-	-	-	6.50	-	5.50	4.70	5.20	6.10	6.10	6.00	5.10	5.54	5.10	6.20	5.10	5.70	4.90	-	7.80	5.75	-	5.50	5.00	6.90	-	5.10	9.07	-	-	9.51
23	1846239	145380	1912.50	-	-	-	22.00	-	23.00	19.90	20.00	20.30	20.30	20.50	18.80	20.10	18.30	19.50	18.30	19.30	19.10	-	21.30	18.66	-	18.80	17.80	18.10	-	19.50	22.06	22.80	23.65	24.31
24	1846226	145384	1913.10	-	-	-	19.50	-	<23.01	-	-	24.10	-	26.30	23.20	23.90	24.50	24.40	23.80	23.60	23.90	-	25.50	23.60	-	23.30	-	-	-	*	-	-	-	-
25	1846227	145388	1913.30	-	-	-			11.25	1880.25																			-					
26	1843510	144753	1890.90	-	-	-	7.00	-	7.54	6.30	6.50	7.20	7.20	6.70	6.00	6.30	5.50	6.10	5.30	5.40	5.40	-	8.90	5.25	-	5.00	4.80	5.20	-	5.70	8.02	7.70	8.92	8.23
27	1843515	144755	1891.50	-	-	-	9.30	-	8.50	8.00	9.30	9.20	9.20	8.60	8.30	9.50	7.80	10.70	6.80	9.90	8.90	-	11.60	8.75	-	7.50	9.10	9.10	-	10.80	11.09	23.90	11.25	10.73
28	1843520	144736	1892.00	-	-	-	10.50	-	9.50	10.90	12.80	11.00	11.00	10.20	10.90	12.30	10.80	7.30	8.30	11.20	10.40	-	12.60	9.60	-	7.80	8.80	10.70	-	10.80	12.03	20.40	20.64	13.02
29	1840543	144727	1896.40	-	-	-	10.00	-	9.00	4.30	3.00	4.70	4.70	3.50	2.00	2.50	1.80	3.60	4.20	7.50	7.80	-	12.70	8.50	-	10.00	9.00	9.90	-	10.80	3.09	13.70	14.44	13.45
30	1839498	144025	1893.90	-	-	-	17.00	-	18.00	13.00	15.00	10.50	10.50	10.50	14.30	19.30	27.60	26.80	25.80	24.90	26.40	-	29.50	21.50	-	19.30	22.20	24.50	-	20.20	24.10	-	12.53	20.88
31	1839484	144024	1894.00	-	-	-	8.04	-	8.00	5.30	4.80	11.80	11.80	6.30	4.60	6.70	4.50	8.30	5.40	9.90	7.40	-	12.50	7.10	-	9.90	6.90	8.80	-	8.50	13.05	14.30	14.80	15.32
32	1839479	144023	1894.20	-	-	-	8.50	-	9.00	5.70	6.00	8.30	8.30	8.30	5.10	7.40	5.10	8.90	6.00	10.30	7.40	-	12.90	7.50	-	9.40	7.10	-	-	8.80	12.07	10.80	-	14.44
33	1838514	144417	1891.60	-	-	-	1.00	-	*	1.10	*	*	*	*	<0.01	<0.10	*	<1.50	<3.8	<1.20	<2.70	-	2.30	0.01	-	0.40	<3.00	<3.00	-	0.40	2.03	1.50	3.74	3.90
34	1837491	145923	1904.20	-	-	-	8.00	-	3.00	0.30	3.00	0.80	0.80	0.30	0.50	1.60	2.10	4.20	2.80	1.10	0.80	-	2.80	0.60	-	1.80	0.80	1.30	-	2.50	7.03	6.30	7.81	7.68
35	1837491	145929	1904.60	-	-	-	5.00	-	3.00	0.20	3.00	1.30	1.30	0.80	0.30	1.10	1.10	4.30	3.10	2.50	1.50	-	2.90	1.66	-	2.30	1.00	2.20	-	3.00	7.07	6.30	7.84	7.58
36	1837492	145933	1904.40	-	-	-	8.00	-	5.00	0.10	0.50	1.90	1.90	1.80	0.80	0.80	1.00	4.50	3.00	3.80	2.00	-	3.60	3.10	-	2.50	1.50	3.20	-	4.00	8.02	7.20	8.63	7.78
37	1836642	145219	1898.90	-	-	-	-	-	-	8.20	5.70	9.10	9.10	9.50	7.90	10.10	14.70	20.10	4.70	8.90	4.70	-	8.90	6.30	-	6.70	5.60	6.70	-	7.40	10.03	10.70	14.76	12.14
38	1839268	146700	1929.30	-	-	-	11.00	-	10.00	9.30	9.00	10.40	10.40	10.90	7.80	9.10	8.10	9.70	5.60	7.80	6.40	-	9.60	6.10	-	7.30	5.40	7.80	-	9.60	12.08	11.90	12.96	13.48
39	1844528	146682	1936.80	-	-	-			15.16	1879.54	15.04																		-					
40	1838890	142042	1891.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.80	-	6.50	6.10	6.30	-	6.00	12.06	11.20	13.52	13.55
41	1839385	141028	1894.70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.80	-	9.20	8.20	9.60	-	9.60	14.02	14.00	13.16	13.06
42	1845068	136805	1878.80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.90	-	5.10	2.90	4.70	-	5.10	10.09	9.40	11.15	11.84
43	1846197	137109	1877.80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.30	-	5.70	2.40	3.30	-	5.90	11.05	9.20	11.98	11.41
44	1847513	138333	1875.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.80	-	3.10	3.20	3.80	-	3.10	7.10	6.20	8.99	7.74
45	1847504	138334	1875.70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.10	-	7.90	12.40	10.90	-	11.50	13.02	7.90	8.96	15.49
46	1847775	138814	1878.30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.60	-	7.30	6.70	6.70	*	6.30	11.09	12.30	12.34	13.29
47	1848419	143757	1883.90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.44	-	4.80	0.40	0.60	-	0.80	4.07	4.90	6.82	4.17
48	1840278	139887	1919.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	38.01	37.40	*	3.84
49	1840328	138932	1903.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.05	9.50	10.17	10.26
50	1841117	138919	1901.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19.10	19.90	20.14	20.34
51	1841874	138934	1895.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.00	14.30	13.81	16.80
52	1843018	138321	1918.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	31.00	35.60	34.91	36.15
53	1843018	137563	1918.40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33.07	35.90	33.92	36.65
54	1843080	137040	1918.90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30.01	30.70	31.86	32.74
55	1841702	137035	1918.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.10	12.30	15.75	17.36
56	1840484	136988	1932.90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23.09	22.40	23.95	24.70
57	1839717	137053	1941.20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27.04	25.90	28.84	28.58
58	1839486	138183	1929.20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.01	14.20	18.64	15.75
59	1839668	138822	1919.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.05	16.80	18.70	17.09
60	1838328	139683	1930.90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29.06	30.80	30.97	29.20
61	1838658	137185	1959.80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32.94	32.00	32.38	32.48
62	1836220	138934	1950.20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.10	13.00	12.86	13.19
63	1835830	138213	1933.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27.01	27.60	27.72	28.90
64	1836274	138928	1950.40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.04	13.70	12.70	12.83
65	1835818	138223	1955.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.08	18.70	19.00	19.36
66	1839694	139966	1918.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35.11	33.90	36.32	34.51
67	1839865	140704	1918.70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40.06	38.50	41.11	38.85
68	1840260	140664	1919.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43.30	42.00	43.77	43.14
69	1842320	140189	1887.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.04	13.12
70	1844822	140490	1877.90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.91	10.17
71	1839713	137058	1941.69	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30.02	29.76
72	1844408	136784	1882.43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.13	12.14
73	1843920	138726	1898.11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23.66	26.21
74	1840951	136280	1931.89	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25.95	26.44
75	1839716	136290	1938.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25.82	26.21
76	1839107	137793	1940.54	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.93	14.43
77	1837598	146462	1917.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.01	19.23
78	1840640	146474	1919.58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.48	13.39
79	1840845	145800	1905.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.81	15.62
80	1837594	144924	1889.73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.44	8.50
81	1838603	145850	1929.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.54	21.82
82	1839600	145809	1930.27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.07	18.93
83	1842612	146454	1892.73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.20	7.87
84	1842777	145511	1889.87	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.80	8.30
85	1845080	144775	1901.33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.73	18.08
86	1846245	144036	1898.91	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.98	14.76
87	1844212	142357	1878.52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.58	8.76
88	1843764	142076	1879.89	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.48	7.87
89	1842944	143558	1881.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.53	6.49
90	1843480	145074	1888.20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.86	7.38
91	1844443	143508	1901.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23.13	23.16
92	1841121	137219	1918.22						17.03	1941.42	14.54																		-					
93	1841379	137479	1918.76	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.04	14.04
94	1841384	137484	1918.65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17.03	16.54

APPENDIX 2

SAMPLE LOCATION 1 = Monitoring Well # 1 - CCSPAGE 1

DATE	11/14/1979 PACE	12/11/1979 PACE	12/13/1979 PACE	05/29/1980 PACE	10/05/1980 PACE	03/25/1981 PACE	06/10/1981 PACE	09/13/1981
pH-Field	7.10	7.20	7.50	7.10	7.30	7.90	7.40	7.20
pH-Laboratory	7.30	7.30	8.10	7.40	8.40	7.40	7.50	7.10
Specific conductance, umhos/cm @ 25c	1300.00	1190.00	1000.00	1200.00	1200.00	1210.00	1200.00	1010.00
Total Dissolved Solids, mg/l	916.00	948.00	894.00	750.00	774.00	820.00	790.00	730.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	10.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	350.00	380.00	390.00	420.00	470.00	400.00	430.00	429.00
Alkalinity Total, mg/l as CaCO3	350.00	380.00	390.00	420.00	480.00	400.00	430.00	429.00
Nitrate-N, mg/l	2.00	0.75	0.90	<0.33	<0.10	0.20	<0.10	0.13
Ammonia-N, mg/l	<0.20	<0.10	<0.10	<0.10	*	*	*	*
Calcium, mg/l	120.00	115.00	113.00	110.00	100.00	87.00	110.00	96.00
Magnesium, mg/l	74.00	110.00	120.00	63.00	44.00	53.00	73.00	54.00
Potassium, mg/l	5.40	4.40	5.60	4.00	3.90	3.90	3.50	5.00
Sodium, mg/l	72.00	48.00	48.00	80.00	78.00	80.00	85.00	85.00
Sulfate, mg/l	340.00	440.00	360.00	320.00	240.00	240.00	260.00	270.00
Methylene Blue Active Substances, mg/l	<0.10	<0.10	<0.10	<0.10	*	*	*	*
Chloride, mg/l	<10.00	<10.00	<10.00	<10.00	1.00	2.00	1.00	1.60
Iron, mg/l	6.40	1.60	1.40	2.80	1.60	<0.05	2.00	5.20
Zinc, mg/l	60.00	40.00	50.00	50.00	*	*	*	*
Manganese, mg/l	0.92	0.72	0.44	0.72	0.78	0.52	0.76	0.80
Copper, ug/l	<50.00	<50.00	<50.00	<50.00	*	*	*	*
Silver, ug/l	<40.00	<40.00	<40.00	<40.00	*	*	*	*
Strontium, mg/l	2.00	1.90	1.80	1.10	1.50	1.40	1.50	2.60
Boron, mg/l	0.50	0.40	0.40	0.20	0.60	0.80	0.60	1.50
Beryllium, ug/l	<20.00	<20.00	<20.00	<20.00	*	*	*	*
Nickel, ug/l	<50.00	<50.00	<50.00	50.00	*	*	*	*
Selenium, ug/l	1.00	<1.00	<1.00	<1.00	*	*	*	*
Mercury, ug/l	0.20	<0.40	<0.20	<0.10	*	*	*	*
Arsenic, ug/l	3.00	1.00	4.00	5.00	7.00	<1.00	5.00	10.70
Barium, mg/l	<0.20	<0.30	<0.30	0.50	*	*	*	*
Cadmium, ug/l	23.00	1.00	<1.00	<1.00	*	*	*	*
Chromium-VI, ug/l	5.00	35.00	5.00	<5.00	*	*	*	*
Fluoride, mg/l	0.40	0.20	0.20	0.30	0.80	0.40	0.40	0.10
Lead, ug/l	<10.00	10.00	10.00	10.00	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<1.00	<2.00	<2.00	<2.00	*	*	*	*
Cyanide, mg/l	0.04	<0.02	<0.02	0.03	*	*	*	*
Phenol, ug/l	2.00	6.00	<3.00	<2.00	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	10.50	10.50	12.00	10.00	8.00	4.50	3.50	4.30
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<1.00	<2.00	<2.00	<2.00	*	*	*	*

SAMPLE LOCATION 1 = Monitoring Well # 1 - CCSPAGE 2

DATE	09/13/1981 PACE	11/30/1981	05/24/1982	10/11/1982	04/25/1983	10/03/1983	05/14/1984	10/03/1984
pH-Field	7.20	6.90	7.40	7.60	6.60	7.00	8.10	6.80
pH-Laboratory	7.10	7.30	7.20	7.30	7.20	7.00	7.00	7.10
Specific conductance, umhos/cm @ 25c	1000.00	1070.00	1100.00	1900.00	960.00	1030.00	1170.00	1180.00
Total Dissolved Solids, mg/l	820.00	780.00	600.00	850.00	759.00	726.00	823.00	752.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<I.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	440.00	410.00	435.00	438.00	469.00	437.00	440.00	433.00
Alkalinity Total, mg/l as CaCO3	440.00	410.00	435.00	438.00	469.00	437.00	440.00	433.00
Nitrate-N, mg/l	<0.10	0.58	0.78	<0.05	0.05	0.18	0.09	0.10
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	110.00	120.00	122.00	127.00	120.00	103.00	120.00	116.00
Magnesium, mg/l	62.00	65.00	55.00	57.00	55.00	55.00	48.00	55.00
Potassium, mg/l	3.80	4.60	4.80	4.50	3.80	3.70	3.70	4.10
Sodium, mg/l	72.00	88.00	84.00	79.00	80.00	79.00	76.00	81.00
Sulfate, mg/l	270.00	275.00	260.00	270.00	240.00	180.00	245.00	260.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	1.00	1.10	1.10	2.30	1.20	1.40	1.20	4.10
Iron, mg/l	3.90	0.10	0.15	4.60	1.90	2.30	2.20	0.30
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	0.68	0.80	0.99	0.83	0.71	0.70	0.83	0.76
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	1.20	1.80	1.80	1.50	1.50	1.50	1.50	1.90
Boron, mg/l	0.70	0.90	0.90	0.90	0.80	0.90	0.84	0.94
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	7.00	<1.00	<1.00	10.00	12.00	12.00	14.00	3.00
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	*
Fluoride, mg/l	0.30	0.20	0.30	0.30	0.30	0.30	0.30	0.30
Lead, ug/l	*	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	4.30	4.30	3.40	4.80	4.10	5.30	4.50	3.50
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 1 = Monitoring Well # 1 - CCSPAGE 3

DATE	05/14/1985	10/21/1985	06/16/1986	10/15/1986	05/26/1987	10/06/1987	06/06/1988	10/19/1988
pH-Field	6.70	5.90	8.30	7.40	7.18	7.30	7.10	7.30
pH-Laboratory	7.00	7.10	7.20	7.20	7.30	7.30	7.20	7.20
Specific conductance, umhos/cm @ 25c	1140.00	1150.00	1180.00	1110.00	1140.00	1200.00	1210.00	1220.00
Total Dissolved Solids, mg/l	730.00	741.00	703.00	727.00	728.00	716.00	737.00	728.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	439.00	449.00	435.00	452.00	*	*	*	*
Alkalinity Total, mg/l as CaCO3	439.00	449.00	435.00	452.00	400.00	431.00	439.00	436.00
Nitrate-N, mg/l	0.08	0.28	<0.01	0.02	0.04	<0.01	*	*
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	114.00	106.00	91.00	85.00	106.00	103.00	95.00	102.00
Magnesium, mg/l	50.00	49.00	47.00	52.00	54.00	59.00	51.00	55.00
Potassium, mg/l	3.60	3.60	3.50	3.60	3.90	2.50	3.60	3.90
Sodium, mg/l	82.00	76.00	77.00	81.00	73.00	79.00	77.00	73.00
Sulfate, mg/l	210.00	210.00	200.00	210.00	260.00	212.70	230.00	230.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	1.00	1.10	1.40	1.70	1.90	1.80	2.00	2.20
Iron, mg/l	1.10	1.60	<0.10	0.70	0.20	<0.01	*	*
Zinc, mg/l	*	*	*	0.05	*	*	*	*
Manganese, mg/l	0.81	0.67	0.63	0.72	0.62	0.59	*	*
Copper, ug/l	*	*	*	<10.00	*	*	*	*
Silver, ug/l	*	*	*	<10.00	*	*	*	*
Strontium, mg/l	1.50	1.90	1.50	1.80	1.70	1.70	*	*
Boron, mg/l	0.43	0.92	0.86	0.85	0.82	0.87	0.85	0.81
Beryllium, ug/l	*	*	*	<10.00	*	*	*	*
Nickel, ug/l	*	*	*	130.00	<50.00	<50.00	*	*
Selenium, ug/l	*	*	*	<1.00	*	*	*	*
Mercury, ug/l	*	*	*	<1.00	*	*	*	*
Arsenic, ug/l	3.00	10.00	1.00	2.00	2.00	<1.00	*	*
Barium, mg/l	*	*	*	0.02	*	*	*	*
Cadmium, ug/l	*	*	*	<10.00	<10.00	<10.00	*	*
Chromium-VI, ug/l	*	*	*	<10.00	*	*	*	*
Fluoride, mg/l	0.30	0.20	0.30	0.30	0.40	0.34	0.40	0.30
Lead, ug/l	*	*	*	<1.00	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	0.12	<0.01	<0.01	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	13.30	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	3.30	5.30	2.66	3.60	3.30	3.00	3.10	7.09
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 1 = Monitoring Well # 1 - CCSPAGE 4

DATE	05/24/1989	10/09/1989
pH-Field	7.10	7.40
pH-Laboratory	7.10	6.90
Specific conductance, umhos/cm @ 25c	1150.00	1170.00
Total Dissolved Solids, mg/l	748.00	697.00
Total Suspended Solids, mg/l	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*
Alkalinity Total, mg/l as CaCO3	436.00	444.00
Nitrate-N, mg/l	<0.01	<0.01
Ammonia-N, mg/l	*	*
Calcium, mg/l	104.00	101.00
Magnesium, mg/l	53.00	55.00
Potassium, mg/l	3.90	4.00
Sodium, mg/l	73.00	82.00
Sulfate, mg/l	229.00	216.86
Methylene Blue Active Substances, mg/l	*	*
Chloride, mg/l	2.90	1.80
Iron, mg/l	*	2.30
Zinc, mg/l	*	*
Manganese, mg/l	*	0.65
Copper, ug/l	*	*
Silver, ug/l	*	*
Strontium, mg/l	*	2.00
Boron, mg/l	0.90	0.81
Beryllium, ug/l	*	*
Nickel, ug/l	*	*
Selenium, ug/l	*	*
Mercury, ug/l	*	*
Arsenic, ug/l	*	*
Barium, mg/l	*	*
Cadmium, ug/l	*	*
Chromium-VI, ug/l	*	*
Fluoride, mg/l	0.30	0.30
Lead, ug/l	*	*
Molybdenum, mg/l	*	*
Aluminum, mg/l	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*
Cyanide, mg/l	*	*
Phenol, ug/l	*	*
Biochemical Oxygen Demand, mg/l	*	*
Chemical Oxygen Demand, mg/l	*	*
Total Organic Carbon, mg/l	*	*
Temperature, Degrees C	11.30	*
Dissolved Oxygen, mg/l	*	*
Water Level depth below ground surface, ft.	8.10	*2m50cm 2m54cm
Total Sulfur, mg/l	*	*
Total Coliform Bacteria, # Col./100 ml	*	*

6/4/90

SAMPLE LOCATION 2 = Monitoring Well # 2 - CCSPAGE 1

DATE	11/13/1979 PACE	12/12/1979 PACE	05/29/1980 PACE	10/05/1980 PACE	03/25/1981 PACE	06/10/1981 PACE	09/13/1981	09/13/1981 PACE
pH-Field	7.30	7.20	7.00	7.40	8.20	7.60	7.30	7.30
pH-Laboratory	7.50	7.60	7.20	8.10	7.80	7.50	7.20	7.20
Specific conductance, umhos/cm @ 25c	1500.00	1000.00	670.00	860.00	910.00	950.00	820.00	800.00
Total Dissolved Solids, mg/l	912.00	834.00	676.00	464.00	592.00	690.00	1880.00	740.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	357.00	350.00	300.00	270.00	238.00	285.00	306.00	290.00
Alkalinity Total, mg/l as CaCO3	357.00	350.00	300.00	270.00	238.00	285.00	306.00	290.00
Nitrate-N, mg/l	2.30	0.80	3.20	3.20	4.80	3.20	2.80	2.80
Ammonia-N, mg/l	<0.20	<0.10	<0.10	*	*	*	*	*
Calcium, mg/l	168.00	154.00	128.00	110.00	97.00	130.00	157.00	125.00
Magnesium, mg/l	61.00	120.00	46.00	43.00	36.00	44.00	39.00	45.00
Potassium, mg/l	11.00	7.40	8.20	8.60	9.80	8.00	9.30	1.80
Sodium, mg/l	29.00	28.00	24.00	21.00	19.00	23.00	23.00	20.00
Sulfate, mg/l	320.00	420.00	290.00	190.00	220.00	260.00	250.00	250.00
Methylene Blue Active Substances, mg/l	<0.10	<0.10	<0.10	*	*	*	*	*
Chloride, mg/l	<10.00	<10.00	<10.00	3.00	4.00	2.00	2.50	2.00
Iron, mg/l	3.00	2.80	0.95	0.25	<0.05	<0.05	0.20	<0.05
Zinc, mg/l	30.00	10.00	30.00	*	*	*	*	*
Manganese, mg/l	1.60	2.00	0.64	0.20	<0.04	0.28	0.50	0.12
Copper, ug/l	50.00	<50.00	<50.00	*	*	*	*	*
Silver, ug/l	<40.00	<40.00	<40.00	*	*	*	*	*
Strontium, mg/l	1.50	1.40	0.50	0.85	0.65	0.70	1.20	0.15
Boron, mg/l	0.30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.10	<0.20
Beryllium, ug/l	<20.00	<20.00	<20.00	*	*	*	*	*
Nickel, ug/l	50.00	<50.00	50.00	*	*	*	*	*
Selenium, ug/l	<1.00	<1.00	<1.00	*	*	*	*	*
Mercury, ug/l	<0.20	0.70	<0.20	*	*	*	*	*
Arsenic, ug/l	2.00	1.00	1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Barium, mg/l	<0.20	<0.30	0.80	*	*	*	*	*
Cadmium, ug/l	2.00	<1.00	38.00	*	*	*	*	*
Chromium-VI, ug/l	5.00	40.00	<5.00	*	*	*	*	*
Fluoride, mg/l	0.30	0.20	0.20	0.60	0.30	0.30	0.10	0.30
Lead, ug/l	10.00	<10.00	10.00	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<1.00	<2.00	<2.00	*	*	*	*	*
Cyanide, mg/l	<0.02	<0.02	<0.02	*	*	*	*	*
Phenol, ug/l	2.00	3.00	<2.00	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	9.50	11.00	7.00	6.00	7.40	6.00	7.50	7.50
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<1.00	<2.00	<2.00	*	*	*	*	*

SAMPLE LOCATION 2 = Monitoring Well # 2 - CCSPAGE 2

DATE	11/30/1981	05/24/1982	10/11/1982	04/25/1983	10/03/1983	05/14/1984	10/03/1984	05/14/1985
pH-Field	7.20	7.40	7.20	6.70	7.00	7.40	6.60	6.60
pH-Laboratory	7.20	7.20	7.10	7.20	6.80	7.10	6.80	6.90
Specific conductance, umhos/cm @ 25c	1100.00	890.00	1100.00	800.00	1060.00	1000.00	1160.00	1010.00
Total Dissolved Solids, mg/l	810.00	390.00	710.00	622.00	798.00	714.00	963.00	689.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	350.00	311.00	358.00	323.00	374.00	297.00	442.00	307.00
Alkalinity Total, mg/l as CaCO3	350.00	311.00	358.00	323.00	374.00	297.00	442.00	308.00
Nitrate-N, mg/l	1.60	6.40	3.40	6.20	2.40	8.00	0.66	7.00
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	160.00	140.00	165.00	130.00	150.00	140.00	199.00	146.00
Magnesium, mg/l	57.00	41.00	45.00	39.00	46.00	36.00	59.00	39.00
Potassium, mg/l	9.80	9.50	9.00	8.10	6.70	8.10	8.00	7.40
Sodium, mg/l	26.00	20.00	22.00	18.00	21.00	17.00	24.00	20.00
Sulfate, mg/l	320.00	240.00	270.00	200.00	300.00	330.00	350.00	240.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	2.50	3.00	2.80	2.50	2.20	2.80	2.20	2.20
Iron, mg/l	<0.01	0.20	0.60	0.10	<0.10	0.10	<0.10	0.10
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	1.10	0.27	1.20	0.11	0.37	0.04	0.62	0.01
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	1.20	0.90	1.00	0.80	1.10	0.80	1.60	0.90
Boron, mg/l	0.20	0.20	0.20	0.10	0.27	0.15	0.32	0.20
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	<1.00	<1.00	<1.00	2.00	<1.00	<1.00
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	*
Fluoride, mg/l	0.10	0.30	0.30	0.30	0.20	0.20	0.20	0.20
Lead, ug/l	*	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	7.30	3.40	7.20	4.60	7.30	4.80	7.80	6.00
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 2 = Monitoring Well # 2 - CCSPAGE 3

DATE	10/21/1985	06/16/1986	10/15/1986	05/26/1987	10/06/1987	06/06/1988	10/19/1988	05/24/1989
pH-Field	6.10	8.60	7.33	7.16	7.20	7.70	7.20	5.90
pH-Laboratory	6.90	7.20	7.20	7.20	7.10	7.00	6.90	7.10
Specific conductance, umhos/cm @ 25c	1310.00	1040.00	1000.00	1080.00	1220.00	1205.00	1440.00	1450.00
Total Dissolved Solids, mg/l	953.00	715.00	705.00	756.00	820.00	819.00	947.00	977.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	446.00	300.00	308.00	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	446.00	300.00	308.00	287.00	351.00	332.00	429.00	415.00
Nitrate-N, mg/l	0.45	4.80	7.50	4.80	3.72	4.30	0.44	1.30
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	205.00	134.00	142.00	154.00	165.00	145.00	204.00	193.00
Magnesium, mg/l	52.00	41.00	44.00	46.00	52.00	44.00	60.00	55.00
Potassium, mg/l	7.10	6.60	8.20	7.30	6.30	6.70	7.30	7.50
Sodium, mg/l	24.00	18.00	15.00	14.00	17.00	18.00	21.00	20.00
Sulfate, mg/l	361.00	280.00	240.00	290.00	310.40	300.00	360.00	393.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	2.20	2.90	3.10	3.10	3.06	3.20	2.60	3.30
Iron, mg/l	<0.10	<0.10	<0.10	<0.10	<0.01	*	*	*
Zinc, mg/l	*	*	0.01	*	*	*	*	*
Manganese, mg/l	0.31	<0.01	<0.01	<0.01	0.02	*	*	*
Copper, ug/l	*	*	<10.00	*	*	*	*	*
Silver, ug/l	*	*	<10.00	*	*	*	*	*
Strontium, mg/l	1.30	1.00	1.10	1.10	1.20	*	*	*
Boron, mg/l	0.38	0.10	0.13	0.14	0.21	0.16	0.27	0.22
Beryllium, ug/l	*	*	<10.00	*	*	*	*	*
Nickel, ug/l	*	*	180.00	<50.00	<50.00	*	*	*
Selenium, ug/l	*	*	4.00	*	*	*	*	*
Mercury, ug/l	*	*	<1.00	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	<1.00	<1.00	<1.00	*	*	*
Barium, mg/l	*	*	0.03	*	*	*	*	*
Cadmium, ug/l	*	*	<10.00	<10.00	<10.00	*	*	*
Chromium-VI, ug/l	*	*	<10.00	*	*	*	*	*
Fluoride, mg/l	0.30	0.30	0.30	0.30	0.24	0.30	0.20	0.30
Lead, ug/l	*	*	<1.00	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	<0.01	<0.01	<0.01	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	11.60	*	*	10.20
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	8.70	4.75	4.90	3.40	6.50	7.00	7.00	11.20
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 2 = Monitoring Well # 2 - CCSPAGE 4

	10/09/1989	10/30/1989
pH-Field	6.70	7.00
pH-Laboratory	6.60	*
Specific conductance, umhos/cm @ 25c	*	1780.00
Total Dissolved Solids, mg/l	*	1096.00
Total Suspended Solids, mg/l	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*
Alkalinity Total, mg/l as CaCO3	*	419.00
Nitrate-N, mg/l	*	0.62
Ammonia-N, mg/l	*	*
Calcium, mg/l	*	260.00
Magnesium, mg/l	*	76.00
Potassium, mg/l	*	7.60
Sodium, mg/l	*	32.00
Sulfate, mg/l	*	540.00
Methylene Blue Active Substances, mg/l	*	*
Chloride, mg/l	*	2.50
Iron, mg/l	*	0.10
Zinc, mg/l	*	*
Manganese, mg/l	*	1.60
Copper, ug/l	*	*
Silver, ug/l	*	*
Strontium, mg/l	*	2.10
Boron, mg/l	*	0.28
Beryllium, ug/l	*	*
Nickel, ug/l	*	*
Selenium, ug/l	*	*
Mercury, ug/l	*	*
Arsenic, ug/l	*	*
Barium, mg/l	*	*
Cadmium, ug/l	*	*
Chromium-VI, ug/l	*	*
Fluoride, mg/l	*	0.30
Lead, ug/l	*	*
Molybdenum, mg/l	*	*
Aluminum, mg/l	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*
Cyanide, mg/l	*	*
Phenol, ug/l	*	*
Biochemical Oxygen Demand, mg/l	*	*
Chemical Oxygen Demand, mg/l	*	*
Total Organic Carbon, mg/l	*	*
Temperature, Degrees C	*	*
Dissolved Oxygen, mg/l	*	*
Water Level depth below ground surface, ft.	*	* 3n 95 3n 97m
Total Sulfur, mg/l	*	*
Total Coliform Bacteria, # Col./100 ml	*	*

6/4/90

SAMPLE LOCATION 3 = Monitoring Well # 3 - CCSPAGE 1

DATE	11/15/1979 PACE	12/13/1979 PACE	05/29/1980 PACE	10/05/1980 PACE	03/25/1981 PACE	06/10/1981 PACE	09/13/1981	09/13/1981 PACE
pH-Field	8.00	7.50	7.00	7.00	7.40	*	7.00	7.00
pH-Laboratory	7.90	7.90	7.10	7.70	7.20	*	6.90	6.90
Specific conductance, umhos/cm @ 25c	2000.00	5600.00	6200.00	6600.00	5490.00	*	5000.00	4500.00
Total Dissolved Solids, mg/l	1520.00	5180.00	5440.00	5360.00	5030.00	*	5520.00	5300.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	*	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	399.00	620.00	650.00	620.00	520.00	*	622.00	580.00
Alkalinity Total, mg/l as CaCO3	399.00	620.00	650.00	620.00	520.00	*	622.00	580.00
Nitrate-N, mg/l	0.60	0.50	<0.50	<0.11	0.20	*	0.40	<0.10
Ammonia-N, mg/l	<0.20	<0.10	<0.10	*	*	*	*	*
Calcium, mg/l	98.00	290.00	400.00	420.00	410.00	*	470.00	440.00
Magnesium, mg/l	91.00	460.00	220.00	250.00	230.00	*	255.00	200.00
Potassium, mg/l	10.00	16.00	24.00	19.00	20.00	*	24.20	18.00
Sodium, mg/l	340.00	810.00	750.00	860.00	770.00	*	880.00	750.00
Sulfate, mg/l	800.00	3600.00	3200.00	3100.00	3400.00	*	3350.00	3200.00
Methylene Blue Active Substances, mg/l	<0.10	<0.10	<0.10	*	*	*	*	*
Chloride, mg/l	<10.00	10.00	10.00	5.00	1.00	*	13.10	13.00
Iron, mg/l	0.90	0.75	4.90	4.50	3.10	*	6.90	4.10
Zinc, mg/l	16.00	60.00	50.00	*	*	*	*	*
Manganese, mg/l	0.56	3.30	3.70	5.30	3.30	*	3.20	4.90
Copper, ug/l	50.00	<50.00	<50.00	*	*	*	*	*
Silver, ug/l	<40.00	<40.00	<40.00	*	*	*	*	*
Strontium, mg/l	2.90	4.00	3.10	4.00	2.40	*	4.20	1.70
Boron, mg/l	0.40	0.40	0.50	0.40	0.40	*	1.20	0.50
Beryllium, ug/l	<20.00	<20.00	<20.00	*	*	*	*	*
Nickel, ug/l	50.00	50.00	10.00	*	*	*	*	*
Selenium, ug/l	<1.00	<1.00	<1.00	*	*	*	*	*
Mercury, ug/l	0.20	0.90	<0.10	*	*	*	*	*
Arsenic, ug/l	1.00	3.00	7.00	7.00	2.00	*	5.00	2.00
Barium, mg/l	<0.20	<0.30	1.50	*	*	*	*	*
Cadmium, ug/l	9.00	1.00	<1.00	*	*	*	*	*
Chromium-VI, ug/l	25.00	<5.00	<5.00	*	*	*	*	*
Fluoride, mg/l	0.30	0.10	0.30	0.50	0.40	*	<0.10	0.30
Lead, ug/l	60.00	10.00	10.00	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<2.00	<2.00	<2.00	*	*	*	*	*
Cyanide, mg/l	<0.02	<0.02	<0.02	*	*	*	*	*
Phenol, ug/l	5.00	6.00	<2.00	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	19.00	21.00	15.00	20.00	21.90	11.30	9.80	9.80
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<2.00	<2.00	<2.00	*	*	*	*	*

SAMPLE LOCATION 3 = Monitoring Well # 3 - CCSPAGE 2

DATE	11/30/1981	05/24/1982	10/11/1982	04/25/1983	10/03/1983	05/14/1984	10/03/1984	05/14/1985
pH-Field	6.90	7.30	6.90	6.80	7.20	6.80	6.90	6.70
pH-Laboratory	6.90	6.90	6.90	6.90	6.80	6.80	6.70	6.60
Specific conductance, umhos/cm @ 25c	6100.00	5900.00	7200.00	5900.00	6700.00	7100.00	6900.00	8300.00
Total Dissolved Solids, mg/l	5620.00	5410.00	6700.00	6070.00	6962.00	6620.00	6920.00	7130.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	600.00	675.00	790.00	790.00	764.00	730.00	671.00	887.00
Alkalinity Total, mg/l as CaCO3	600.00	675.00	790.00	790.00	764.00	730.00	671.00	887.00
Nitrate-N, mg/l	0.28	0.35	0.20	0.42	0.46	0.92	0.46	0.38
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	450.00	480.00	500.00	490.00	420.00	465.00	465.00	480.00
Magnesium, mg/l	280.00	280.00	360.00	310.00	385.00	278.00	260.00	350.00
Potassium, mg/l	22.00	20.00	22.00	20.00	20.00	19.00	20.00	21.00
Sodium, mg/l	860.00	810.00	1115.00	1000.00	1160.00	1050.00	1000.00	1300.00
Sulfate, mg/l	3400.00	3500.00	4070.00	3700.00	4100.00	3700.00	4100.00	4400.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	13.00	14.40	22.00	17.00	19.00	16.00	22.00	21.00
Iron, mg/l	6.40	0.40	17.00	2.00	6.90	2.00	0.30	3.60
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	5.30	5.60	4.10	3.60	2.60	4.60	4.10	2.90
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	3.60	3.50	3.50	3.20	3.60	3.50	4.00	4.10
Boron, mg/l	0.70	0.60	0.90	0.80	0.88	0.71	0.64	1.00
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	2.00	<1.00	24.00	3.00	<1.00	3.00	<1.00	8.00
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	*
Fluoride, mg/l	0.20	0.30	0.30	0.30	0.20	0.30	0.30	0.20
Lead, ug/l	*	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	12.70	14.80	19.80	11.80	9.50	20.80	20.70	22.20
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 3 = Monitoring Well # 3 - CCSPAGE 3

DATE	10/21/1985	06/16/1986	10/15/1986	05/26/1987	10/06/1987	06/06/1988	10/19/1988	05/25/1989
pH-Field	6.50	6.60	7.02	6.76	6.40	6.80	8.50	9.90
pH-Laboratory	6.80	6.80	6.80	6.90	6.90	6.80	6.80	8.00
Specific conductance, umhos/cm @ 25c	7200.00	7700.00	7500.00	7700.00	7900.00	8100.00	8600.00	8600.00
Total Dissolved Solids, mg/l	6280.00	6740.00	7200.00	7930.00	6603.00	6550.00	6790.00	6890.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	739.00	275.00	801.00	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	739.00	275.00	801.00	718.00	752.00	780.00	840.00	895.00
Nitrate-N, mg/l	0.35	0.50	0.58	0.17	0.85	*	*	0.14
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	470.00	410.00	210.00	454.00	445.00	390.00	510.00	463.00
Magnesium, mg/l	392.00	340.00	350.00	353.00	342.00	400.00	485.00	360.00
Potassium, mg/l	21.00	21.00	24.00	13.60	19.20	21.00	22.00	21.00
Sodium, mg/l	1450.00	1040.00	1400.00	1142.00	1090.00	1300.00	640.00	1100.00
Sulfate, mg/l	4500.00	4300.00	3900.00	4595.00	4236.20	4500.00	3900.00	4205.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	23.00	22.00	23.00	28.00	20.34	23.00	19.70	20.00
Iron, mg/l	7.20	1.40	6.20	1.00	1.32	*	*	*
Zinc, mg/l	*	*	<0.01	*	*	*	*	*
Manganese, mg/l	2.40	2.80	2.60	2.50	1.78	*	*	*
Copper, ug/l	*	*	10.00	*	*	*	*	*
Silver, ug/l	*	*	<10.00	*	*	*	*	*
Strontium, mg/l	4.40	3.80	5.00	4.10	4.10	*	*	*
Boron, mg/l	1.20	0.89	0.88	0.60	0.60	0.78	0.73	0.65
Beryllium, ug/l	*	*	<10.00	*	*	*	*	*
Nickel, ug/l	*	*	320.00	<50.00	<50.00	*	*	*
Selenium, ug/l	*	*	<1.00	*	*	*	*	*
Mercury, ug/l	*	*	<1.00	*	*	*	*	*
Arsenic, ug/l	18.00	<1.00	3.00	<1.00	<1.00	*	*	*
Barium, mg/l	*	*	<0.01	*	*	*	*	*
Cadmium, ug/l	*	*	<10.00	<10.00	<10.00	*	*	*
Chromium-VI, ug/l	*	*	<10.00	*	*	*	*	*
Fluoride, mg/l	0.20	0.30	0.20	0.20	0.27	0.30	0.10	0.30
Lead, ug/l	*	*	1.00	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	1.20	<0.01	<0.01	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	7.90	*	*	10.90
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	23.40	21.60	20.10	21.40	20.60	22.60	24.03	26.90
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 3 = Monitoring Well # 3 - CCSPAGE 4

	10/09/1989
pH-Field	6.30
pH-Laboratory	6.70
Specific conductance, umhos/cm @ 25c	6600.00
Total Dissolved Solids, mg/l	5840.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	*
Alkalinity Bicarbonate, mg/l as CaCO3	*
Alkalinity Total, mg/l as CaCO3	692.00
Nitrate-N, mg/l	0.79
Ammonia-N, mg/l	*
Calcium, mg/l	440.00
Magnesium, mg/l	300.00
Potassium, mg/l	20.00
Sodium, mg/l	995.00
Sulfate, mg/l	3515.00
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	15.00
Iron, mg/l	0.40
Zinc, mg/l	*
Manganese, mg/l	0.56
Copper, ug/l	*
Silver, ug/l	*
Strontium, mg/l	3.60
Boron, mg/l	0.52
Beryllium, ug/l	*
Nickel, ug/l	*
Selenium, ug/l	*
Mercury, ug/l	*
Arsenic, ug/l	*
Barium, mg/l	*
Cadmium, ug/l	*
Chromium-VI, ug/l	*
Fluoride, mg/l	0.30
Lead, ug/l	*
Molybdenum, mg/l	*
Aluminum, mg/l	*
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	*
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	* 4m 34cm
Total Sulfur, mg/l	*
Total Coliform Bacteria, # Col./100 ml	*

c/4/90

8m 23cm

SAMPLE LOCATION 4 = Monitoring Well # 4 - CCSPAGE 1

DATE	11/14/1979 PACE	12/11/1979 PACE	05/29/1980 PACE	10/05/1980 PACE	03/25/1981 PACE	06/10/1981 PACE	09/13/1981	09/13/1981 PACE
pH-Field	7.20	6.70	6.80	6.90	7.30	7.20	7.00	7.00
pH-Laboratory	7.40	7.80	7.10	7.40	7.20	7.30	6.90	6.90
Specific conductance, umhos/cm @ 25c	4200.00	5100.00	7000.00	6500.00	8140.00	5400.00	5100.00	4500.00
Total Dissolved Solids, mg/l	4120.00	4730.00	5460.00	5020.00	5350.00	5400.00	5880.00	5800.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	411.00	455.00	590.00	620.00	540.00	560.00	633.00	580.00
Alkalinity Total, mg/l as CaCO3	411.00	455.00	590.00	620.00	540.00	560.00	633.00	580.00
Nitrate-N, mg/l	0.50	<0.25	<0.10	<0.10	<0.10	<0.10	0.37	<0.10
Ammonia-N, mg/l	<0.20	<0.10	<0.10	*	*	*	*	*
Calcium, mg/l	346.00	248.00	400.00	410.00	450.00	450.00	430.00	450.00
Magnesium, mg/l	240.00	510.00	390.00	320.00	320.00	400.00	449.00	360.00
Potassium, mg/l	20.00	20.00	24.00	21.00	22.00	22.00	21.60	21.00
Sodium, mg/l	490.00	540.00	700.00	720.00	590.00	720.00	690.00	750.00
Sulfate, mg/l	2000.00	3300.00	3200.00	3300.00	3300.00	3800.00	3550.00	3300.00
Methylene Blue Active Substances, mg/l	<0.10	<0.10	0.05	*	*	*	*	*
Chloride, mg/l	20.00	30.00	31.00	16.00	2.00	38.00	38.20	37.00
Iron, mg/l	0.70	0.80	2.00	1.21	0.60	0.65	1.40	0.65
Zinc, mg/l	10.00	50.00	30.00	*	*	*	*	*
Manganese, mg/l	1.50	2.60	2.40	2.40	2.10	2.90	3.30	3.20
Copper, ug/l	50.00	<50.00	<50.00	*	*	*	*	*
Silver, ug/l	<40.00	<40.00	<40.00	*	*	*	*	*
Strontium, mg/l	4.80	6.00	4.40	5.00	3.60	3.90	5.40	3.80
Boron, mg/l	0.40	0.40	0.40	0.40	0.40	0.30	1.10	0.50
Beryllium, ug/l	<20.00	<20.00	<20.00	*	*	*	*	*
Nickel, ug/l	10.00	50.00	10.00	*	*	*	*	*
Selenium, ug/l	1.00	<1.00	<1.00	*	*	*	*	*
Mercury, ug/l	0.40	0.80	<0.10	*	*	*	*	*
Arsenic, ug/l	1.00	1.00	2.00	<1.00	1.00	<1.00	2.00	<1.00
Barium, mg/l	<0.20	<0.30	0.50	*	*	*	*	*
Cadmium, ug/l	1.00	1.00	<1.00	*	*	*	*	*
Chromium-VI, ug/l	10.00	20.00	<5.00	*	*	*	*	*
Fluoride, mg/l	0.30	0.20	0.30	0.40	0.40	0.30	<0.10	0.30
Lead, ug/l	60.00	10.00	20.00	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<1.00	<2.00	<2.00	*	*	*	*	*
Cyanide, mg/l	<0.02	<0.02	<0.02	*	*	*	*	*
Phenol, ug/l	<3.00	3.00	<2.00	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	12.00	5.00	7.00	3.00	5.80	3.50	5.10	5.10
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	2.00	<2.00	<2.00	*	*	*	*	*

SAMPLE LOCATION 4 = Monitoring Well # 4 - CCSPAGE 2

DATE	12/01/1981	05/24/1982	10/11/1982	04/25/1983	10/03/1983	05/14/1984	10/03/1984	05/14/1985
pH-Field	7.20	7.30	6.80	6.90	6.80	7.40	6.90	6.90
pH-Laboratory	6.90	6.90	6.90	6.90	6.80	7.10	6.70	6.80
Specific conductance, umhos/cm @ 25c	5600.00	5950.00	6500.00	5200.00	5600.00	4900.00	6000.00	4900.00
Total Dissolved Solids, mg/l	6050.00	5300.00	5610.00	5220.00	5269.00	4340.00	4920.00	4100.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	580.00	643.00	691.00	617.00	601.00	430.00	555.00	432.00
Alkalinity Total, mg/l as CaCO3	580.00	643.00	691.00	617.00	601.00	430.00	555.00	432.00
Nitrate-N, mg/l	0.84	0.55	0.10	0.42	0.35	0.31	0.39	0.25
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	460.00	440.00	500.00	450.00	405.00	350.00	440.00	360.00
Magnesium, mg/l	390.00	285.00	370.00	300.00	314.00	182.00	289.00	195.00
Potassium, mg/l	24.00	16.00	22.00	19.00	18.00	18.00	20.00	17.00
Sodium, mg/l	710.00	510.00	800.00	740.00	690.00	600.00	745.00	645.00
Sulfate, mg/l	3600.00	3600.00	3400.00	3100.00	3100.00	2600.00	3400.00	2500.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	36.00	36.00	39.00	37.00	37.00	31.00	35.00	31.00
Iron, mg/l	0.30	0.10	1.20	<0.10	<0.10	0.10	0.10	<0.10
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	3.70	2.50	3.30	2.00	1.90	1.80	2.10	1.40
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	*	3.90	4.40	3.90	3.60	3.20	4.90	3.00
Boron, mg/l	0.60	0.70	0.90	0.70	0.92	0.54	0.48	0.69
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	2.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	*
Fluoride, mg/l	0.20	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Lead, ug/l	*	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	6.90	4.80	9.80	6.90	8.50	4.80	8.80	7.00
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 4 = Monitoring Well # 4 - CCSPAGE 3

DATE	10/21/1985	06/16/1986	10/15/1986	05/26/1987	10/06/1987	06/06/1988	10/19/1988	05/25/1989
pH-Field	6.50	7.20	7.23	7.12	7.10	6.80	7.30	7.40
pH-Laboratory	6.80	6.90	7.00	7.10	7.10	6.80	6.80	6.80
Specific conductance, umhos/cm @ 25c	5600.00	5000.00	4700.00	4500.00	6020.00	6600.00	7200.00	7600.00
Total Dissolved Solids, mg/l	4890.00	4260.00	4010.00	3670.00	5086.00	5480.00	5740.00	6130.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	639.00	455.00	401.00	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	639.00	455.00	401.00	298.00	549.00	618.00	708.00	841.00
Nitrate-N, mg/l	0.45	0.10	0.36	0.29	0.17	*	*	<0.01
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	445.00	340.00	310.00	310.00	385.00	370.00	420.00	441.00
Magnesium, mg/l	312.00	230.00	200.00	107.00	268.00	310.00	354.00	390.00
Potassium, mg/l	19.00	18.00	21.00	18.10	19.30	18.00	20.00	21.00
Sodium, mg/l	845.00	580.00	650.00	650.00	674.00	800.00	820.00	965.00
Sulfate, mg/l	3060.00	2760.00	2500.00	2200.00	2989.80	3100.00	3600.00	3480.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	29.00	33.00	30.00	26.00	35.53	37.00	33.85	39.00
Iron, mg/l	<0.10	<0.10	<0.10	<0.10	<0.01	*	*	*
Zinc, mg/l	*	*	<0.01	*	*	*	*	*
Manganese, mg/l	2.00	1.40	1.10	0.92	1.21	*	*	*
Copper, ug/l	*	*	<10.00	*	*	*	*	*
Silver, ug/l	*	*	<10.00	*	*	*	*	*
Strontium, mg/l	4.60	3.70	3.60	3.20	4.30	*	*	*
Boron, mg/l	1.20	0.58	0.44	0.20	0.57	0.71	0.73	1.14
Beryllium, ug/l	*	*	<10.00	*	*	*	*	*
Nickel, ug/l	*	*	60.00	<50.00	<50.00	*	*	*
Selenium, ug/l	*	*	<1.00	*	*	*	*	*
Mercury, ug/l	*	*	<1.00	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	<1.00	<1.00	<1.00	*	*	*
Barium, mg/l	*	*	0.01	*	*	*	*	*
Cadmium, ug/l	*	*	<10.00	<10.00	<10.00	*	*	*
Chromium-VI, ug/l	*	*	<10.00	*	*	*	*	*
Fluoride, mg/l	0.20	0.20	0.30	0.20	0.20	0.20	0.20	0.20
Lead, ug/l	*	*	<1.00	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	<0.01	<0.01	<0.01	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	3.80	*	*	12.90
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	11.40	5.80	5.70	4.80	7.80	9.70	13.02	17.70
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 4 = Monitoring Well # 4 - CCSPAGE 4

	10/09/1989 .	
PH Field	6.30	
PH Laboratory	6.70	
Specific conductance, umhos/cm @ 25c	6500.00	
Total Dissolved Solids, mg/l	5950.00	
Total Suspended Solids, mg/l	*	
Alkalinity Carbonate, mg/l as CaCO3	*	
Alkalinity Bicarbonate, mg/l as CaCO3	*	
Alkalinity Total, mg/l as CaCO3	752.00	
Nitrate-N, mg/l	0.06	
Ammonia-N, mg/l	*	
Calcium, mg/l	470.00	
Magnesium, mg/l	375.00	
Potassium, mg/l	22.00	
Sodium, mg/l	885.00	
Sulfate, mg/l	3400.00	
Methylene Blue Active Substances, mg/l	*	
Chloride, mg/l	34.00	
Iron, mg/l	<0.10	
Zinc, mg/l	*	
Manganese, mg/l	2.70	
Copper, ug/l	*	
Silver, ug/l	*	
Strontium, mg/l	5.30	
Boron, mg/l	0.75	
Beryllium, ug/l	*	
Nickel, ug/l	*	
Selenium, ug/l	*	
Mercury, ug/l	*	
Arsenic, ug/l	*	
Barium, mg/l	*	
Cadmium, ug/l	*	
Chromium-VI, ug/l	*	
Fluoride, mg/l	0.20	
Lead, ug/l	*	
Molybdenum, mg/l	*	
Aluminum, mg/l	*	
Fecal Coliform Bacteria, # Col./100 ml	*	
Cyanide, mg/l	*	
Phenol, ug/l	*	
Biochemical Oxygen Demand, mg/l	*	
Chemical Oxygen Demand, mg/l	*	
Total Organic Carbon, mg/l	*	
Temperature, Degrees C	*	6/4/90
Dissolved Oxygen, mg/l	*	
Water Level depth below ground surface, ft.	* 3n 86 cm	5n 20 cm
Total Sulfur, mg/l	*	
Total Coliform Bacteria, # Col./100 ml	*	

SAMPLE LOCATION 5 = Monitoring Well # 5 - COSPAGE 1

DATE	11/13/1979 PACE	12/11/1979 PACE	05/29/1980 PACE	10/05/1980 PACE	03/25/1981 PACE	06/10/1981 PACE	09/13/1981	09/13/1981 PACE
pH-Field	7.10	7.10	6.70	6.80	6.70	7.30	7.00	7.00
pH-Laboratory	7.20	7.00	7.20	8.00	7.30	7.40	7.00	7.00
Specific conductance, umhos/cm @ 25c	5300.00	5100.00	7600.00	7100.00	5680.00	5500.00	4900.00	4500.00
Total Dissolved Solids, mg/l	4780.00	5060.00	5630.00	5610.00	5540.00	5800.00	5780.00	5600.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	376.00	380.00	410.00	450.00	387.00	413.00	440.00	430.00
Alkalinity Total, mg/l as CaCO3	376.00	380.00	410.00	450.00	387.00	413.00	440.00	430.00
Nitrate-N, mg/l	<0.50	<0.25	<0.30	0.30	0.40	0.10	0.27	<0.10
Ammonia-N, mg/l	<0.20	0.10	0.30	*	*	*	*	*
Calcium, mg/l	406.00	405.00	440.00	560.00	480.00	540.00	560.00	490.00
Magnesium, mg/l	230.00	560.00	390.00	450.00	320.00	430.00	350.00	330.00
Potassium, mg/l	19.00	21.00	22.00	26.00	24.00	23.00	27.00	22.00
Sodium, mg/l	640.00	600.00	640.00	770.00	650.00	730.00	650.00	690.00
Sulfate, mg/l	2800.00	3400.00	3200.00	4200.00	4000.00	4200.00	3730.00	3400.00
Methylene Blue Active Substances, mg/l	<0.10	<0.10	<0.05	*	*	*	*	*
Chloride, mg/l	<10.00	10.00	<10.00	4.00	1.00	5.00	5.30	5.00
Iron, mg/l	2.50	0.35	2.90	0.25	<0.05	0.25	<0.10	0.90
Zinc, mg/l	30.00	20.00	50.00	*	*	*	*	*
Manganese, mg/l	5.00	4.00	3.90	3.50	<0.04	4.10	4.70	4.30
Copper, ug/l	50.00	<50.00	<50.00	*	*	*	*	*
Silver, ug/l	<40.00	<40.00	<40.00	*	*	*	*	*
Strontium, mg/l	3.70	4.10	3.50	4.00	2.90	3.50	4.70	3.00
Boron, mg/l	0.30	0.20	0.20	0.20	0.30	0.20	0.70	0.50
Beryllium, ug/l	<20.00	<20.00	<20.00	*	*	*	*	*
Nickel, ug/l	50.00	50.00	100.00	*	*	*	*	*
Selenium, ug/l	1.00	10.00	2.00	*	*	*	*	*
Mercury, ug/l	<0.20	<0.20	<0.10	*	*	*	*	*
Arsenic, ug/l	3.00	1.00	2.00	<1.00	<1.00	<1.00	<1.00	<1.00
Barium, mg/l	<0.20	<0.30	0.50	*	*	*	*	*
Cadmium, ug/l	5.00	2.00	<1.00	*	*	*	*	*
Chromium-VI, ug/l	10.00	5.00	5.00	*	*	*	*	*
Fluoride, mg/l	0.30	0.20	0.30	0.40	0.40	0.40	0.10	0.40
Lead, ug/l	20.00	30.00	10.00	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<1.00	<2.00	<2.00	*	*	*	*	*
Cyanide, mg/l	<0.02	<0.02	0.05	*	*	*	*	*
Phenol, ug/l	<3.00	<3.00	<2.00	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	10.00	9.00	8.00	8.50	7.30	5.50	9.30	9.20
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<1.00	<2.00	<2.00	*	*	*	*	*

SAMPLE LOCATION 5 = Monitoring Well # 5 - CCSPAGE 2

DATE	12/01/1981	05/25/1982	10/11/1982	04/25/1983	10/03/1983	05/14/1984	10/03/1984	05/13/1985
pH-Field	7.20	6.90	7.00	6.80	6.90	7.20	7.10	7.10
pH-Laboratory	6.90	6.90	7.10	7.00	6.80	6.90	6.80	6.80
Specific conductance, umhos/cm @ 25c	5500.00	5350.00	6200.00	5600.00	5900.00	6200.00	6500.00	6000.00
Total Dissolved Solids, mg/l	5720.00	5110.00	5720.00	6380.00	5526.00	5980.00	5950.00	5600.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	410.00	432.00	430.00	464.00	427.00	409.00	416.00	412.00
Alkalinity Total, mg/l as CaCO3	410.00	432.00	430.00	464.00	427.00	409.00	416.00	412.00
Nitrate-N, mg/l	0.15	0.55	0.22	0.28	0.18	0.24	0.31	0.35
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	500.00	510.00	530.00	520.00	495.00	520.00	525.00	500.00
Magnesium, mg/l	340.00	345.00	370.00	350.00	330.00	288.00	310.00	290.00
Potassium, mg/l	23.00	22.00	22.00	19.00	19.00	19.00	21.00	18.00
Sodium, mg/l	660.00	630.00	720.00	700.00	645.00	680.00	715.00	675.00
Sulfate, mg/l	3400.00	3600.00	3690.00	4100.00	3500.00	3700.00	3600.00	3500.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	5.00	5.30	5.00	4.80	4.70	4.40	4.60	4.00
Iron, mg/l	<0.10	0.20	1.50	0.20	<0.10	0.40	0.20	0.10
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	6.50	1.90	5.40	3.30	4.60	1.80	5.50	0.50
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	4.10	3.90	3.90	3.30	2.90	3.30	4.30	3.10
Boron, mg/l	0.50	0.40	0.50	0.30	0.50	0.38	0.32	0.35
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	<1.00	<1.00	<1.00	1.00	<1.00	<1.00
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	*
Fluoride, mg/l	0.20	0.40	0.40	0.40	0.30	0.40	0.30	0.30
Lead, ug/l	*	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	9.80	5.70	10.20	6.80	10.30	3.90	10.80	8.40
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 5 = Monitoring Well # 5 - CCSPAGE 3

DATE	10/21/1985	06/17/1986	10/16/1986	05/27/1987	10/06/1987	06/07/1988	10/21/1988	05/26/1989
pH-Field	6.80	6.90	7.08	7.25	7.70	6.90	7.00	10.10
pH-Laboratory	6.90	6.90	6.90	7.00	7.00	7.00	6.80	6.80
Specific conductance, umhos/cm @ 25c	6200.00	6600.00	6200.00	6300.00	6600.00	6700.00	7400.00	6500.00
Total Dissolved Solids, mg/l	5640.00	6070.00	5970.00	5840.00	6032.00	5820.00	5950.00	5620.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	435.00	429.00	452.00	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	435.00	429.00	452.00	376.00	451.00	414.00	432.00	444.00
Nitrate-N, mg/l	0.35	0.26	0.02	0.27	0.13	*	*	0.11
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	545.00	480.00	380.00	490.00	502.00	435.00	580.00	459.00
Magnesium, mg/l	304.00	360.00	350.00	350.00	334.00	340.00	420.00	325.00
Potassium, mg/l	19.00	21.00	23.00	19.20	19.90	19.00	22.00	19.00
Sodium, mg/l	745.00	650.00	770.00	710.00	698.00	755.00	830.00	720.00
Sulfate, mg/l	3700.00	3800.00	3600.00	3400.00	3528.70	3700.00	3600.00	3230.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	5.50	5.00	5.90	5.10	7.02	6.80	5.30	5.50
Iron, mg/l	<0.10	<0.10	<0.10	<0.10	<0.01	*	*	*
Zinc, mg/l	*	*	<0.01	*	*	*	*	*
Manganese, mg/l	5.10	2.40	7.30	0.82	4.68	*	*	*
Copper, ug/l	*	*	10.00	*	*	*	*	*
Silver, ug/l	*	*	<10.00	*	*	*	*	*
Strontium, mg/l	3.20	3.70	4.00	3.60	3.80	*	*	*
Boron, mg/l	0.37	0.36	0.26	0.18	0.22	0.25	0.29	0.23
Beryllium, ug/l	*	*	<10.00	*	*	*	*	*
Nickel, ug/l	*	*	500.00	<50.00	<50.00	*	*	*
Selenium, ug/l	*	*	<1.00	*	*	*	*	*
Mercury, ug/l	*	*	<1.00	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	10.00	<1.00	<1.00	*	*	*
Barium, mg/l	*	*	<0.01	*	*	*	*	*
Cadmium, ug/l	*	*	20.00	<10.00	<10.00	*	*	*
Chromium-VI, ug/l	*	*	<10.00	*	*	*	*	*
Fluoride, mg/l	0.30	0.20	0.30	0.40	0.34	0.40	0.30	0.30
Lead, ug/l	*	*	<1.00	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	<0.01	<0.01	<0.01	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	11.20	*	*	12.80
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	12.80	6.40	8.40	7.20	10.10	10.70	18.01	15.70
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 5 = Monitoring Well # 5 - CCSPAGE 4

ıE	10/19/1989
pH-Field	7.40
pH-Laboratory	6.80
Specific conductance, umhos/cm @ 25c	6500.00
Total Dissolved Solids, mg/l	5900.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	*
Alkalinity Bicarbonate, mg/l as CaCO3	*
Alkalinity Total, mg/l as CaCO3	463.00
Nitrate-N, mg/l	0.10
Ammonia-N, mg/l	*
Calcium, mg/l	490.00
Magnesium, mg/l	350.00
Potassium, mg/l	22.00
Sodium, mg/l	775.00
Sulfate, mg/l	3908.00
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	5.41
Iron, mg/l	0.90
Zinc, mg/l	*
Manganese, mg/l	4.20
Copper, ug/l	*
Silver, ug/l	*
Strontium, mg/l	4.00
Boron, mg/l	0.30
Beryllium, ug/l	*
Nickel, ug/l	*
Selenium, ug/l	*
Mercury, ug/l	*
Arsenic, ug/l	*
Barium, mg/l	*
Cadmium, ug/l	*
Chromium-VI, ug/l	*
Fluoride, mg/l	0.20
Lead, ug/l	*
Molybdenum, mg/l	*
Aluminum, mg/l	*
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	*
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	* 4m 87m
Total Sulfur, mg/l	*
Total Coliform Bacteria, # Col./100 ml	*

6/5/90

5m 14m

SAMPLE LOCATION 6 = Destroyed - CCSPAGE 1

DATE	11/15/1979 PACE	12/12/1979 PACE	05/29/1980 PACE	06/01/1980 PACE	10/05/1980 PACE	03/25/1981 PACE	06/10/1981 PACE	09/15/1981
pH-Field	8.10	11.00	10.00	10.30	10.90	11.60	9.50	9.00
pH-Laboratory	8.00	11.30	10.20	10.10	10.10	10.90	9.10	9.00
Specific conductance, umhos/cm @ 25c	1300.00	1500.00	1800.00	1600.00	1600.00	1650.00	1900.00	1500.00
Total Dissolved Solids, mg/l	961.00	989.00	806.00	1060.00	842.00	906.00	1200.00	1070.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	608.00	400.00	466.00	280.00	42.00	136.00	134.00
Alkalinity Bicarbonate, mg/l as CaCO3	412.00	*	160.00	179.00	265.00	<1.00	610.00	606.00
Alkalinity Total, mg/l as CaCO3	412.00	614.00	560.00	645.00	545.00	433.00	750.00	740.00
Nitrate-N, mg/l	<0.50	<0.25	0.12	0.28	<0.10	0.10	<0.10	0.31
Ammonia-N, mg/l	<0.20	2.60	2.30	2.00	*	4.00	0.40	2.40
Calcium, mg/l	112.00	16.00	6.30	7.00	5.10	9.50	16.00	7.50
Magnesium, mg/l	55.00	4.60	2.80	3.00	1.70	6.10	6.00	4.50
Potassium, mg/l	9.00	14.00	5.70	5.70	5.70	5.60	3.60	5.10
Sodium, mg/l	130.00	240.00	325.00	355.00	310.00	270.00	440.00	453.00
Sulfate, mg/l	320.00	260.00	160.00	55.00	180.00	230.00	260.00	500.00
Methylene Blue Active Substances, mg/l	<0.10	<0.10	<0.05	0.14	*	*	*	*
Chloride, mg/l	<10.00	<10.00	<10.00	<10.00	8.00	4.00	3.00	4.60
Iron, mg/l	2.30	0.65	2.40	1.50	0.45	0.55	3.50	1.50
Zinc, mg/l	180.00	40.00	50.00	100.00	*	*	*	*
Manganese, mg/l	0.16	<0.04	0.04	0.04	<0.04	<0.04	0.12	0.10
Copper, ug/l	<50.00	<50.00	<50.00	50.00	*	*	*	*
Silver, ug/l	<40.00	<40.00	<40.00	<40.00	*	*	*	*
Strontium, mg/l	2.80	1.60	0.15	0.15	0.05	0.05	0.15	0.20
Boron, mg/l	0.30	<0.20	<0.20	<0.20	0.20	0.20	0.20	0.40
Beryllium, ug/l	<20.00	<20.00	<20.00	<20.00	*	*	*	*
Nickel, ug/l	50.00	<50.00	50.00	50.00	*	*	*	*
Selenium, ug/l	1.00	<1.00	<1.00	<1.00	*	*	*	*
Mercury, ug/l	1.00	<0.20	<0.10	<0.20	*	*	*	*
Arsenic, ug/l	4.00	<1.00	3.00	1.00	<1.00	<1.00	3.00	2.00
Barium, mg/l	<0.20	<0.30	0.30	<0.30	*	*	*	*
Cadmium, ug/l	6.00	<1.00	<1.00	<1.00	*	*	*	*
Chromium-VI, ug/l	15.00	<5.00	<5.00	5.00	*	*	*	*
Fluoride, mg/l	0.20	0.50	0.70	0.50	0.90	1.00	1.10	0.40
Lead, ug/l	30.00	10.00	20.00	20.00	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<2.00	<10.00	<2.00	<2.00	*	*	*	*
Cyanide, mg/l	<0.02	<0.02	<0.02	<0.02	*	*	*	*
Phenol, ug/l	6.00	3.00	<2.00	4.00	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	28.00	39.00	24.00	28.50	27.50	30.60	28.00	28.70
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<2.00	<10.00	<2.00	<2.00	*	*	*	*

SAMPLE LOCATION 6 = Destroyed - CCSPAGE 2

DATE	09/15/1981 PACE	12/03/1981	05/24/1982	10/12/1982	04/25/1983	10/03/1983	05/15/1984	10/03/1984
pH-Field	9.00	8.90	9.00	8.90	8.10	8.10	8.60	8.40
pH-Laboratory	9.00	8.80	8.80	8.80	8.40	8.20	8.20	8.10
Specific conductance, umhos/cm @ 25c	1000.00	1800.00	1810.00	1780.00	1840.00	2200.00	2400.00	2300.00
Total Dissolved Solids, mg/l	1100.00	1210.00	1020.00	1090.00	1620.00	1468.00	1510.00	1420.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	40.00	100.00	63.00	90.00	22.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	390.00	660.00	759.00	703.00	943.00	962.00	964.00	958.00
Alkalinity Total, mg/l as CaCO3	430.00	760.00	822.00	793.00	965.00	962.00	964.00	958.00
Nitrate-N, mg/l	<0.10	0.36	0.10	0.34	0.46	0.46	0.70	0.28
Ammonia-N, mg/l	2.20	1.20	1.30	1.40	0.71	10.20	0.90	0.40
Calcium, mg/l	6.30	9.50	13.00	15.00	7.70	7.00	11.00	7.80
Magnesium, mg/l	3.20	8.00	10.00	11.00	6.60	3.00	4.10	3.80
Potassium, mg/l	4.00	4.60	4.00	3.90	4.20	3.50	3.60	3.20
Sodium, mg/l	360.00	490.00	450.00	430.00	500.00	505.00	540.00	565.00
Sulfate, mg/l	300.00	240.00	270.00	250.00	270.00	285.00	270.00	315.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	5.00	3.40	3.20	3.90	2.60	2.50	2.80	2.90
Iron, mg/l	4.50	0.70	0.40	0.60	4.10	2.50	3.20	0.50
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	<0.04	<0.10	0.04	0.04	0.07	0.04	0.07	0.02
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	0.10	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Boron, mg/l	0.30	0.40	0.40	0.30	0.30	0.35	0.38	0.29
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	1.00	<1.00	<1.00	<1.00	2.00	<1.00
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	9.00	*
Fluoride, mg/l	0.70	0.70	0.90	0.80	0.80	0.70	0.80	0.70
Lead, ug/l	*	*	*	*	*	*	26.00	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	28.70	30.10	29.30	29.30	28.10	29.70	27.10	27.10
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 6 = Destroyed - CCSPAGE 3

DATE	05/13/1985	10/21/1985	06/18/1986	10/16/1986	05/28/1987	10/06/1987	06/07/1988	10/21/198
pH-Field	8.30	7.90	8.00	8.43	8.28	9.30	8.20	8.3(
pH-Laboratory	8.10	8.20	8.20	8.30	8.30	8.20	8.20	8.2(
Specific conductance, umhos/cm @ 25c	2400.00	2300.00	2400.00	4100.00	2400.00	2500.00	2500.00	2500.0(
Total Dissolved Solids, mg/l	1530.00	1410.00	1460.00	1470.00	1470.00	1456.00	1440.00	1370.0(
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	992.00	997.00	995.00	1000.00	*	*	*	*
Alkalinity Total, mg/l as CaCO3	992.00	997.00	995.00	1000.00	880.00	996.00	985.00	980.0(
Nitrate-N, mg/l	0.42	0.32	0.14	0.19	0.17	0.11	*	*
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	7.00	3.00	5.90	4.60	4.80	6.00	5.20	5.2(
Magnesium, mg/l	4.20	1.20	3.40	2.80	2.30	9.00	4.70	2.9(
Potassium, mg/l	3.30	1.30	1.30	3.20	3.00	0.80	0.70	3.0(
Sodium, mg/l	545.00	575.00	520.00	600.00	545.00	558.00	570.00	550.0(
Sulfate, mg/l	280.00	262.00	260.00	300.00	340.00	275.40	350.00	288.0(
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	2.10	2.80	4.10	4.40	4.30	5.32	4.30	4.6(
Iron, mg/l	1.70	1.40	1.00	0.70	0.70	0.38	*	*
Zinc, mg/l	*	*	*	<0.01	*	*	*	*
Manganese, mg/l	0.02	<0.01	0.02	0.01	<0.01	0.02	*	*
Copper, ug/l	*	*	*	<10.00	*	*	*	*
Silver, ug/l	*	*	*	<10.00	*	*	*	*
Strontium, mg/l	0.10	0.10	0.16	0.20	0.20	0.20	*	*
Boron, mg/l	0.37	0.34	0.24	0.31	0.26	0.22	0.27	0.27
Beryllium, ug/l	*	*	*	<10.00	*	*	*	*
Nickel, ug/l	*	*	*	180.00	<50.00	<50.00	*	*
Selenium, ug/l	*	*	*	<1.00	*	*	*	*
Mercury, ug/l	*	*	*	<1.00	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	<1.00	<1.00	1.00	<1.00	*	*
Barium, mg/l	<0.04	*	*	0.04	*	*	*	*
Cadmium, ug/l	*	*	*	<10.00	<10.00	<10.00	*	*
Chromium-VI, ug/l	<10.00	*	*	<10.00	*	*	*	*
Fluoride, mg/l	0.70	0.70	0.70	0.70	0.80	0.72	0.30	0.7(
Lead, ug/l	10.00	*	*	<1.00	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	0.14	1.43	0.69	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	8.90	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	27.60	28.80	25.80	26.00	26.90	27.30	27.10	32.0(
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

	05/30/1989
pH-Field	8.10
pH-Laboratory	8.20
Specific conductance, umhos/cm @ 25c	2300.00
Total Dissolved Solids, mg/l	1450.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	*
Alkalinity Bicarbonate, mg/l as CaCO3	*
Alkalinity Total, mg/l as CaCO3	964.00
Nitrate-N, mg/l	0.04
Ammonia-N, mg/l	*
Calcium, mg/l	7.40
Magnesium, mg/l	3.10
Potassium, mg/l	3.00
Sodium, mg/l	525.00
Sulfate, mg/l	318.00
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	5.00
Iron, mg/l	*
Zinc, mg/l	*
Manganese, mg/l	*
Copper, ug/l	*
Silver, ug/l	*
Strontium, mg/l	*
Boron, mg/l	0.25
Beryllium, ug/l	*
Nickel, ug/l	*
Selenium, ug/l	*
Mercury, ug/l	*
Arsenic, ug/l	*
Barium, mg/l	*
Cadmium, ug/l	*
Chromium-VI, ug/l	*
Fluoride, mg/l	0.70
Lead, ug/l	*
Molybdenum, mg/l	*
Aluminum, mg/l	*
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	12.90
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	30.80
Total Sulfur, mg/l	*
Total Coliform Bacteria, # Col./100 ml	*

SAMPLE LOCATION 7 = Monitoring Well # 7 - CCSPAGE 1

DATE	11/15/1979 PACE	12/12/1979 PACE	05/29/1980 PACE	10/05/1980 PACE	03/26/1981 PACE	06/10/1981 PACE	09/13/1981	09/13/1981 PACE
pH-Field	7.30	7.10	6.80	6.90	7.60	7.20	7.10	7.10
pH-Laboratory	7.20	7.60	7.20	7.40	7.30	7:40	6.80	6.80
Specific conductance, umhos/cm @ 25c	1800.00	1700.00	2600.00	2400.00	3000.00	4000.00	3390.00	4000.00
Total Dissolved Solids, mg/l	1360.00	1340.00	1450.00	1420.00	2570.00	2600.00	2785.00	3000.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	620.00	650.00	690.00	750.00	730.00	720.00	783.00	710.00
Alkalinity Total, mg/l as CaCO3	620.00	650.00	690.00	750.00	730.00	720.00	783.00	710.00
Nitrate-N, mg/l	<0.50	0.60	<0.30	0.20	<0.10	0.30	0.34	<0.10
Ammonia-N, mg/l	0.40	<0.10	0.30	*	*	*	*	*
Calcium, mg/l	176.00	178.00	185.00	170.00	230.00	280.00	291.00	270.00
Magnesium, mg/l	80.00	75.00	110.00	85.00	87.00	130.00	124.00	120.00
Potassium, mg/l	13.00	11.00	15.00	16.00	17.00	16.00	18.30	15.00
Sodium, mg/l	140.00	160.00	230.00	280.00	420.00	450.00	518.00	480.00
Sulfate, mg/l	400.00	560.00	580.00	650.00	1300.00	1400,00	1570.00	1700.00
Methylene Blue Active Substances, mg/l	<0.10	<0.10	<0.05	*	*	*	*	*
Chloride, mg/l	<10.00	<10.00	<10.00	<1.00	1.00	6.00	5.40	6.00
Iron, mg/l	2.90	3.20	1.70	0.10	2.10	<0.05	5.50	5.00
Zinc, mg/l	<10.00	20.00	80.00	*	*	*	*	*
Manganese, mg/l	0.92	0.80	0.68	0.64	0.48	0.48	0.50	0.48
Copper, ug/l	<50.00	<50.00	<50.00	*	*	*	*	*
Silver, ug/l	<40.00	<40.00	<40.00	*	*	*	*	*
Strontium, mg/l	2.30	2.20	2.20	2.80	4.00	3.30	5.72	4.00
Boron, mg/l	0.20	<0.20	<0.20	0.30	0.40	0.20	0.70	0.40
Beryllium, ug/l	<20.00	<20.00	<20.00	*	*	*	*	*
Nickel, ug/l	50.00	<50.00	50.00	*	*	*	*	*
Selenium, ug/l	<1.00	<1.00	<1.00	*	*	*	*	*
Mercury, ug/l	<0.20	<0.20	<0.10	*	*	*	*	*
Arsenic, ug/l	5.00	6.00	<1.00	<1.00	<1.00	<1.00	0.50	<1.00
Barium, mg/l	<0.20	<0.30	0.50	*	*	*	*	*
Cadmium, ug/l	5.00	1.00	<1.00	*	*	*	*	*
Chromium-VI, ug/l	10.00	<5.00	<5.00	*	*	*	*	*
Fluoride, mg/l	0.20	0.10	0.30	0.50	0.20	0.20	<0.10	0.20
Lead, ug/l	10.00	<10.00	10.00	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<10.00	<2.00	<2.00	*	*	*	*	*
Cyanide, mg/l	<0.02	<0.02	<0.02	*	*	*	*	*
Phenol, ug/l	<3.00	3.00	<2.00	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	11.00	11.50	11.50	11.00	9.30	9.30	9.60	9.60
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<2.00	<2.00	<2.00	*	*	*	*	*

SAMPLE LOCATION 7 = Monitoring Well # 7 - CCSPAGE 2

DATE	12/03/1981	05/24/1982	10/12/1982	04/25/1983	10/03/1983	05/16/1984	10/03/1984	05/13/1985
pH-Field	7.10	7.30	7.00	7.00	6.60	7.40	7.10	6.90
pH-Laboratory	6.90	7.00	6.90	7.00	6.80	6.90	6.70	6.80
Specific conductance, umhos/cm @ 25c	4000.00	3990.00	4100.00	2400.00	2100.00	2600.00	2600.00	2400.00
Total Dissolved Solids, mg/l	3250.00	3070.00	3100.00	1910.00	1500.00	1890.00	1900.00	1560.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	740.00	767.00	771.00	806.00	704.00	724.00	709.00	713.00
Alkalinity Total, mg/l as CaCO3	740.00	767.00	771.00	806.00	704.00	724.00	709.00	713.00
Nitrate-N, mg/l	0.13	1.00	<0.05	0.05	0.21	0.03	0.10	0.05
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	310.00	350.00	360.00	230.00	190.00	220.00	230.00	210.00
Magnesium, mg/l	125.00	125.00	110.00	78.00	69.00	66.00	79.00	65.00
Potassium, mg/l	19.00	18.00	17.00	14.00	12.00	13.00	15.00	13.00
Sodium, mg/l	580.00	560.00	560.00	320.00	240.00	305.00	330.00	255.00
Sulfate, mg/l	1490.00	1870.00	1720.00	800.00	655.00	725.00	880.00	550.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	5.00	5.70	6.10	5.10	5.00	4.80	5.60	5.30
Iron, mg/l	3.10	0.10	4.40	0.10	1.30	<0.10	1.00	0.10
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	0.50	0.57	0.50	0.57	0.59	0.69	0.64	0.62
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	5.10	5.10	4.00	2.60	2.10	2.50	3.30	2.10
Boron, mg/l	0.60	0.50	0.60	0.30	0.29	0.35	0.40	0.32
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	<1.00	<1.00	<1.00	2.00	<1.00	<1.00
Barium, mg/l	*	*	*	*	*	*	*	<0.04
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	<10.00
Fluoride, mg/l	<0.10	0.10	0.10	0.20	0.20	0.20	0.20	0.10
Lead, ug/l	*	*	*	*	*	*	*	<10.00
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	9.20	8.60	9.50	9.30	10.10	9.30	10.20	9.50
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 7 = Monitoring Well # 7 - CCSPAGE 3

DATE	10/21/1985	06/18/1986	10/20/1986 BRAUN	10/20/1986	05/28/1987	10/07/1987	06/08/1988	10/24/1988
pH-Field	6.50	6.70	*	6.93	7.15	7.20	6.90	6.40
pH-Laboratory	6.80	6.90	*	6.90	7.00	6.90	7.00	6.90
Specific conductance, umhos/cm @ 25c	2300.00	1940.00	1900.00	2200.00	2100.00	2600.00	2550.00	2400.00
Total Dissolved Solids, mg/l	2170.00	1380.00	*	1490.00	1430.00	1713.00	1660.00	1470.00
Total Suspended Solids, mg/l	*	*	5.00	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	724.00	717.00	720.00	724.00	*	*	*	*
Alkalinity Total, mg/l as CaCO3	724.00	717.00	720.00	724.00	736.00	704.00	713.00	705.00
Nitrate-N, mg/l	0.05	<0.01	0.02	<0.01	0.02	0.02	*	*
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	205.00	173.00	18.00	193.00	185.00	191.00	168.00	183.00
Magnesium, mg/l	63.00	67.00	49.00	78.00	68.00	76.00	68.00	75.00
Potassium, mg/l	13.00	11.00	14.00	14.00	13.20	12.40	12.00	14.00
Sodium, mg/l	240.00	202.00	220.00	260.00	210.00	272.00	280.00	240.00
Sulfate, mg/l	568.00	530.00	620.00	570.00	560.00	734.00	710.00	570.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	5.70	5.90	6.00	6.40	6.30	7.11	7.00	7.70
Iron, mg/l	1.40	<0.10	2.00	0.60	<0.10	0.57	*	*
Zinc, mg/l	*	*	*	<0.01	*	*	*	*
Manganese, mg/l	0.58	0.65	0.58	0.68	0.56	0.54	*	*
Copper, ug/l	*	*	*	<10.00	*	*	*	*
Silver, ug/l	*	*	*	<10.00	*	*	*	*
Strontium, mg/l	2.10	2.20	3.10	2.50	2.40	3.10	*	*
Boron, mg/l	0.38	0.21	0.42	0.26	0.23	0.28	0.25	0.28
Beryllium, ug/l	*	*	*	<10.00	*	*	*	*
Nickel, ug/l	*	*	*	50.00	<50.00	<50.00	*	*
Selenium, ug/l	*	*	*	<1.00	*	*	*	*
Mercury, ug/l	*	*	*	<1.00	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	<5.00	<1.00	<1.00	1.00	*	*
Barium, mg/l	*	*	*	0.01	*	*	*	*
Cadmium, ug/l	*	*	*	<10.00	<10.00	<10.00	*	*
Chromium-VI, ug/l	*	*	*	<10.00	*	*	*	*
Fluoride, mg/l	0.20	0.20	0.42	0.20	0.20	0.16	0.20	0.10
Lead, ug/l	*	*	*	<1.00	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	<0.90	0.09	<0.01	<0.01	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	10.60	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	11.80	9.66	*	8.30	8.70	9.20	9.60	12.03
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 7 = Monitoring Well # 7 - CCSPAGE 4

	06/01/1989	10/16/1989	
pH-Field	1.00	6.30	
pH-Laboratory	7.00	6.80	
Specific conductance, umhos/cm @ 25c	3100.00	3800.00	
Total Dissolved Solids, mg/l	3030.00	2550.00	
Total Suspended Solids, mg/l	*	*	
Alkalinity Carbonate, mg/l as CaCO3	*	*	
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	
Alkalinity Total, mg/l as CaCO3	710.00	732.00	
Nitrate-N, mg/l	<0.01	<0.01	
Ammonia-N, mg/l	*	*	
Calcium, mg/l	284.00	264.40	
Magnesium, mg/l	99.00	105.80	
Potassium, mg/l	15.00	16.00	
Sodium, mg/l	570.00	520.00	
Sulfate, mg/l	1700.00	1270.00	
Methylene Blue Active Substances, mg/l	*	*	
Chloride, mg/l	7.50	7.80	
Iron, mg/l	*	4.15	
Zinc, mg/l	*	*	
Manganese, mg/l	*	0.53	
Copper, ug/l	*	*	
Silver, ug/l	*	*	
Strontium, mg/l	*	4.32	
Boron, mg/l	0.39	0.36	
Beryllium, ug/l	*	*	
Nickel, ug/l	*	*	
Selenium, ug/l	*	*	
Mercury, ug/l	*	*	
Arsenic, ug/l	*	*	
Barium, mg/l	*	*	
Cadmium, ug/l	*	*	
Chromium-VI, ug/l	*	*	
Fluoride, mg/l	0.10	0.40	
Lead, ug/l	*	*	
Molybdenum, mg/l	*	*	
Aluminum, mg/l	*	*	
Fecal Coliform Bacteria, # Col./100 ml	*	*	
Cyanide, mg/l	*	*	
Phenol, ug/l	*	*	
Biochemical Oxygen Demand, mg/l	*	*	
Chemical Oxygen Demand, mg/l	*	*	
Total Organic Carbon, mg/l	*	*	
Temperature, Degrees C	*	*	6/5/90
Dissolved Oxygen, mg/l	*	*	
Water Level depth below ground surface, ft.	12.30	* 4m 19cm	4m 20cm
Total Sulfur, mg/l	*	*	
Total Coliform Bacteria, # Col./100 ml	*	*	

SAMPLE LOCATION 8 = Monitoring Well # 8 - CCSPAGE 1

DATE	11/15/1979 PACE	12/12/1979 PACE	05/29/1980 PACE	10/05/1980 PACE	03/26/1981 PACE	06/10/1981 PACE	09/13/1981	09/13/1981 PACE
pH-Field	7.30	7.30	7.00	7.20	7.80	7.40	7.20	7.20
pH-Laboratory	7.20	7.50	7.50	7.70	7.80	7.50	7.20	7.20
Specific conductance, umhos/cm @ 25c	18000.00	19000.00	51000.00	50000.00	59900.00	60000.00	40300.00	45000.00
Total Dissolved Solids, mg/l	19500.00	22200.00	48100.00	53600.00	64400.00	66000.00	72400.00	66000.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	690.00	780.00	1100.00	1290.00	1300.00	1200.00	1300.00	880.00
Alkalinity Total, mg/l as CaCO3	690.00	780.00	1100.00	1290.00	1300.00	1200.00	1300.00	880.00
Nitrate-N, mg/l	<0.50	<0.10	<0.05	<0.10	<0.10	<0.10	0.31	<0.10
Ammonia-N, mg/l	<0.20	0.10	0.90	*	*	*	*	*
Calcium, mg/l	417.00	328.00	400.00	420.00	400.00	450.00	500.00	310.00
Magnesium, mg/l	85.00	1600.00	4000.00	3600.00	3600.00	5800.00	4395.00	4200.00
Potassium, mg/l	8.00	40.00	72.00	85.00	130.00	86.00	78.20	80.00
Sodium, mg/l	230.00	5300.00	10000.00	13000.00	12500.00	14400.00	14000.00	14000.00
Sulfate, mg/l	12000.00	20000.00	32000.00	44000.00	38000.00	52000.00	50000.00	50000.00
Methylene Blue Active Substances, mg/l	<0.10	<0.10	0.09	*	*	*	*	*
Chloride, mg/l	10.00	10.00	10.00	<1.00	<1.00	5.00	6.10	<1.00
Iron, mg/l	0.35	0.30	2.90	2.00	1.60	1.20	4.50	7.50
Zinc, mg/l	80.00	110.00	100.00	*	*	*	*	*
Manganese, mg/l	0.32	3.20	7.20	11.00	4.00	9.60	3.80	7.70
Copper, ug/l	<50.00	50.00	150.00	*	*	*	*	*
Silver, ug/l	<40.00	<40.00	80.00	*	*	*	*	*
Strontium, mg/l	4.00	8.00	9.00	14.00	15.00	15.00	7.50	13.00
Boron, mg/l	0.20	0.20	0.30	0.20	0.30	0.10	<0.10	0.30
Beryllium, ug/l	20.00	<20.00	<20.00	*	*	*	*	*
Nickel, ug/l	50.00	250.00	500.00	*	*	*	*	*
Selenium, ug/l	2.00	1.00	<1.00	*	*	*	*	*
Mercury, ug/l	<0.20	<0.20	<0.10	*	*	*	*	*
Arsenic, ug/l	<1.00	1.00	9.00	<1.00	3.00	<1.00	3.00	3.00
Barium, mg/l	<0.20	<0.30	<0.30	*	*	*	*	*
Cadmium, ug/l	3.00	1.00	<1.00	*	*	*	*	*
Chromium-VI, ug/l	5.00	5.00	<5.00	*	*	*	*	*
Fluoride, mg/l	0.40	0.20	0.40	0.60	0.40	0.50	0.20	0.40
Lead, ug/l	20.00	10.00	20.00	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<2.00	<2.00	<2.00	*	*	*	*	*
Cyanide, mg/l	<0.02	<0.02	<0.02	*	*	*	*	*
Phenol, ug/l	3.00	3.00	10.00	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	8.00	5.00	4.00	5.50	6.30	4.30	5.50	5.50
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<2.00	20.00	<2.00	*	*	*	*	*

SAMPLE LOCATION 8 = Monitoring Well # 8 - CCSPAGE 2

DATE	12/03/1981	05/24/1982	10/12/1982	04/25/1983	10/03/1983	05/16/1984	10/03/1984	05/13/1985
pH-Field	7.30	7.50	7.20	7.60	6.90	7.20	7.60	7.30
pH-Laboratory	7.10	7.10	7.10	7.40	7.10	7.40	6.90	7.20
Specific conductance, umhos/cm @ 25c	37100.00	30000.00	33200.00	30000.00	33900.00	30100.00	35200.00	24000.00
Total Dissolved Solids, mg/l	70700.00	64200.00	66400.00	54800.00	64099.00	55100.00	64200.00	58600.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	1240.00	1096.00	1329.00	725.00	1270.00	539.00	1205.00	717.00
Alkalinity Total, mg/l as CaCO3	1240.00	1096.00	1329.00	728.00	1270.00	545.00	1205.00	717.00
Nitrate-N, mg/l	0.75	0.29	0.22	<0.05	0.08	0.65	0.21	0.28
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	470.00	470.00	510.00	465.00	440.00	365.00	465.00	425.00
Magnesium, mg/l	4800.00	3700.00	3960.00	2300.00	3600.00	1500.00	3800.00	2200.00
Potassium, mg/l	80.00	77.00	84.00	68.00	70.00	74.00	85.00	70.00
Sodium, mg/l	14400.00	14500.00	13300.00	13600.00	14000.00	14500.00	13200.00	14500.00
Sulfate, mg/l	47500.00	47250.00	43750.00	38700.00	46000.00	38000.00	47000.00	39000.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	3.70	4.70	5.20	3.60	6.20	3.50	5.70	3.80
Iron, mg/l	0.50	0.50	3.20	0.30	0.40	0.20	0.80	0.20
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	4.10	3.60	4.00	1.40	5.40	4.00	5.00	4.00
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	12.00	10.50	10.20	7.00	5.60	6.10	14.00	7.50
Boron, mg/l	0.60	0.10	0.40	0.60	1.00	0.41	0.27	0.37
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	2.00	<1.00	<1.00	2.00	<1.00	1.00
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	20.00
Fluoride, mg/l	0.30	0.40	0.30	0.40	0.30	0.40	0.30	0.30
Lead, ug/l	*	*	*	*	*	*	*	<10.00
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	5.30	2.80	3.30	2.20	6.50	3.80	5.80	2.00
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 8 = Monitoring Well # 8 - CCSPAGE 3

DATE	10/21/1985	06/18/1986	10/20/1986 BRAUN	10/20/1986	05/28/1987	10/07/1987	06/08/1988	10/24/1988
pH-Field	7.00	7.20	*	7.38	7.66	7.40	7.30	7.10
pH-Laboratory	7.00	7.20	*	7.30	7.40	7.20	7.30	7.00
Specific conductance, umhos/cm @ 25c	33200.00	32000.00	41000.00	20000.00	32100.00	34000.00	32000.00	34000.00
Total Dissolved Solids, mg/l	63200.00	60300.00	*	61300.00	56800.00	63547.00	59800.00	62100.00
Total Suspended Solids, mg/l	*	*	2.00	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	1160.00	789.00	760.00	793.00	*	*	*	*
Alkalinity Total, mg/l as CaCO3	1160.00	789.00	760.00	793.00	500.00	1041.00	843.00	1235.00
Nitrate-N, mg/l	0.20	0.45	0.58	0.42	0.37	0.10	*	*
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	410.00	590.00	19.00	310.00	380.00	472.00	370.00	440.00
Magnesium, mg/l	3448.00	2800.00	1400.00	2400.00	1600.00	2793.00	2400.00	4100.00
Potassium, mg/l	80.00	86.00	85.00	92.00	74.00	18.10	80.00	82.00
Sodium, mg/l	14070.00	13000.00	14000.00	17100.00	17000.00	15150.00	15000.00	13000.00
Sulfate, mg/l	41875.00	40000.00	32000.00	41000.00	58300.00	42902.00	41000.00	43000.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	5.60	6.60	3.50	8.90	8.80	12.03	13.00	<1.00
Iron, mg/l	0.30	<0.10	0.18	<0.10	<0.10	0.01	*	*
Zinc, mg/l	*	*	*	<0.01	*	*	*	*
Manganese, mg/l	4.00	4.70	1.70	5.30	2.20	4.15	*	*
Copper, ug/l	*	*	*	<10.00	*	*	*	*
Silver, ug/l	*	*	*	200.00	*	*	*	*
Strontium, mg/l	12.00	9.60	8.50	11.00	9.00	10.20	*	*
Boron, mg/l	0.31	0.16	0.54	0.13	0.04	0.13	0.11	0.28
Beryllium, ug/l	*	*	*	<10.00	*	*	*	*
Nickel, ug/l	*	*	*	1800.00	<50.00	<50.00	*	*
Selenium, ug/l	*	*	*	<1.00	*	*	*	*
Mercury, ug/l	*	*	*	<1.00	*	*	*	*
Arsenic, ug/l	<1.00	1.00	<5.00	<1.00	<1.00	<1.00	*	*
Barium, mg/l	*	*	*	<0.01	*	*	*	*
Cadmium, ug/l	*	*	*	100.00	<10.00	<10.00	<0.01	<10.00
Chromium-VI, ug/l	*	*	*	<10.00	*	*	*	*
Fluoride, mg/l	0.30	0.30	0.30	0.30	0.40	0.36	0.30	0.30
Lead, ug/l	*	*	*	<1.00	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	<0.90	<0.01	<0.01	<0.01	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	11.80	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	3.80	4.20	*	2.50	11.00	3.60	4.50	8.11
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 8 = Monitoring Well # 8 - CCSPAGE 4

	06/01/1989	10/16/1989
pH-Field	1.00	6.70
pH-Laboratory	7.70	7.20
Specific conductance, umhos/cm @ 25c	25400.00	27000.00
Total Dissolved Solids, mg/l	53600.00	61500.00
Total Suspended Solids, mg/l	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*
Alkalinity Total, mg/l as CaCO3	382.00	1105.00
Nitrate-N, mg/l	0.87	0.20
Ammonia-N, mg/l	*	*
Calcium, mg/l	265.00	470.00
Magnesium, mg/l	1200.00	3700.00
Potassium, mg/l	85.00	86.00
Sodium, mg/l	15800.00	15900.00
Sulfate, mg/l	34500.00	50000.00
Methylene Blue Active Substances, mg/l	*	*
Chloride, mg/l	8.50	<0.10
Iron, mg/l	*	0.40
Zinc, mg/l	*	*
Manganese, mg/l	*	5.60
Copper, ug/l	*	*
Silver, ug/l	*	*
Strontium, mg/l	*	13.00
Boron, mg/l	0.07	0.18
Beryllium, ug/l	*	*
Nickel, ug/l	*	*
Selenium, ug/l	*	*
Mercury, ug/l	*	*
Arsenic, ug/l	*	*
Barium, mg/l	*	*
Cadmium, ug/l	<10.00	<10.00
Chromium-VI, ug/l	*	*
Fluoride, mg/l	0.20	0.40
Lead, ug/l	*	*
Molybdenum, mg/l	*	*
Aluminum, mg/l	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*
Cyanide, mg/l	*	*
Phenol, ug/l	*	*
Biochemical Oxygen Demand, mg/l	*	*
Chemical Oxygen Demand, mg/l	*	*
Total Organic Carbon, mg/l	*	*
Temperature, Degrees C	*	*
Dissolved Oxygen, mg/l	*	*
Water Level depth below ground surface, ft.	6.80	* 3.04m
Total Sulfur, mg/l	*	*
Total Coliform Bacteria, # Col./100 ml	*	*

6/15/90

3.07m

SAMPLE LOCATION 9 = Monitoring Well # 9 - CCSPAGE 1

DATE	11/13/1979 PACE	12/12/1979 PACE	05/29/1980 PACE	10/05/1980 PACE	03/25/1981 PACE	06/10/1981 PACE	09/13/1981	09/13/1981 PACE
pH-Field	8.20	8.40	8.20	8.20	8.90	8.30	8.30	8.30
pH-Laboratory	8.30	8.70	8.30	8.30	8.50	8.40	8.20	8.20
Specific conductance, umhos/cm @ 25c	1400.00	1800.00	2200.00	2000.00	2170.00	2500.00	1780.00	1800.00
Total Dissolved Solids, mg/l	955.00	1390.00	1430.00	1160.00	1270.00	1600.00	1280.00	1300.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	44.00	<1.00	<1.00	28.00	18.00	<1.00	15.00
Alkalinity Bicarbonate, mg/l as CaCO3	320.00	466.00	640.00	700.00	610.00	660.00	713.00	705.00
Alkalinity Total, mg/l as CaCO3	320.00	510.00	640.00	700.00	640.00	680.00	713.00	720.00
Nitrate-N, mg/l	<0.50	<0.10	<0.05	<0.10	0.50	0.50	0.43	0.20
Ammonia-N, mg/l	<0.20	<0.10	<0.10	*	*	*	*	*
Calcium, mg/l	88.00	26.00	12.00	8.20	10.00	14.00	7.80	7.80
Magnesium, mg/l	58.00	32.00	7.70	8.90	6.50	29.00	9.00	7.90
Potassium, mg/l	6.00	5.80	4.20	4.70	4.50	4.10	4.80	3.30
Sodium, mg/l	120.00	420.00	400.00	450.00	440.00	550.00	500.00	500.00
Sulfate, mg/l	360.00	600.00	310.00	340.00	370.00	660.00	390.00	420.00
Methylene Blue Active Substances, mg/l	<0.10	<0.10	<0.05	*	*	*	*	*
Chloride, mg/l	10.00	10.00	<10.00	<1.00	1.00	3.00	2.80	4.00
Iron, mg/l	<0.05	2.20	2.30	0.35	0.05	0.05	<0.10	0.60
Zinc, mg/l	40.00	150.00	90.00	*	*	*	*	*
Manganese, mg/l	<0.04	0.08	0.08	0.08	<0.04	0.04	<0.10	0.04
Copper, ug/l	<50.00	<50.00	<50.00	*	*	*	*	*
Silver, ug/l	<40.00	<40.00	<40.00	*	*	*	*	*
Strontium, mg/l	2.60	0.40	0.20	0.20	0.10	0.15	0.20	0.10
Boron, mg/l	0.30	<0.20	0.20	0.20	0.40	0.40	0.50	0.40
Beryllium, ug/l	<20.00	<20.00	<20.00	*	*	*	*	*
Nickel, ug/l	<50.00	<50.00	50.00	*	*	*	*	*
Selenium, ug/l	<1.00	1.00	<1.00	*	*	*	*	*
Mercury, ug/l	<0.20	<0.20	<0.10	*	*	*	*	*
Arsenic, ug/l	<1.00	8.00	5.00	<1.00	<1.00	3.00	2.00	<1.00
Barium, mg/l	<0.20	<0.30	0.30	*	*	*	*	*
Cadmium, ug/l	5.00	<1.00	<1.00	*	*	*	*	*
Chromium-VI, ug/l	10.00	5.00	<5.00	*	*	*	*	*
Fluoride, mg/l	0.20	0.80	0.60	0.80	1.10	1.20	0.40	0.90
Lead, ug/l	20.00	20.00	30.00	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<1.00	<2.00	<2.00	*	*	*	*	*
Cyanide, mg/l	<0.02	<0.02	0.15	*	*	*	*	*
Phenol, ug/l	6.00	15.00	<2.00	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	7.00	19.50	4.50	4.50	7.40	5.60	9.70	9.70
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<1.00	<2.00	<2.00	*	*	*	*	*

SAMPLE LOCATION 9 = Monitoring Well # 9 - CCSPAGE 2

DATE	12/01/1981	05/25/1982	10/12/1982	04/26/1983	10/03/1983	05/16/1984	10/03/1984	05/13/1985
pH-Field	8.40	8.30	8.40	8.40	8.20	8.20	8.70	8.50
pH-Laboratory	8.20	8.30	8.40	8.40	8.20	8.20	8.10	8.10
Specific conductance, umhos/cm @ 25c	1870.00	2300.00	2500.00	1650.00	1840.00	2300.00	2100.00	2100.00
Total Dissolved Solids, mg/l	1300.00	1090.00	1220.00	1340.00	1387.00	1520.00	1320.00	1520.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	10.00	16.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	680.00	738.00	729.00	750.00	722.00	730.00	721.00	740.00
Alkalinity Total, mg/l as CaCO3	680.00	738.00	739.00	766.00	722.00	730.00	721.00	740.00
Nitrate-N, mg/l	0.46	0.74	<0.05	0.35	0.57	0.50	0.50	0.81
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	10.00	12.00	11.00	14.00	10.00	13.00	12.00	11.00
Magnesium, mg/l	8.00	10.00	6.00	8.80	6.00	5.40	7.60	5.80
Potassium, mg/l	4.10	4.20	3.60	4.70	4.10	3.80	4.10	3.80
Sodium, mg/l	490.00	470.00	470.00	490.00	465.00	550.00	505.00	420.00
Sulfate, mg/l	410.00	400.00	460.00	390.00	386.00	410.00	520.00	440.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	2.60	3.20	3.00	2.50	2.40	2.30	2.40	2.20
Iron, mg/l	<0.10	0.60	0.90	5.10	2.70	3.00	2.50	4.00
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	0.03	0.03	0.06	0.11	0.07	0.09	0.06	0.08
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.10
Boron, mg/l	0.50	0.40	0.40	0.40	0.34	0.36	0.35	0.37
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	1.00	<1.00	2.00	1.00	2.00	1.00	1.00
Barium, mg/l	*	*	*	*	*	*	*	<0.04
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	30.00
Fluoride, mg/l	0.80	0.90	0.80	1.00	0.90	0.90	0.90	0.80
Lead, ug/l	*	*	*	*	*	*	*	<10.00
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	8.30	6.30	6.70	6.30	7.70	6.70	7.60	8.50
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 9 = Monitoring Well # 9 - CCSPAGE 3

DATE	10/22/1985	06/18/1986	10/20/1986 BRAUN	10/20/1986	05/28/1987	10/07/1987	06/08/1988	10/28/1988
pH-Field	8.20	8.20	*	8.53	8.53	8.70	8.30	8.60
pH-Laboratory	8.30	8.30	*	8.40	8.40	8.30	8.40	8.40
Specific conductance, umhos/cm @ 25c	2100.00	2100.00	*	2000.00	2100.00	2200.00	2400.00	2300.00
Total Dissolved Solids, mg/l	1380.00	1500.00	*	1380.00	1380.00	1393.00	1380.00	1340.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	*	13.00	11.00	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	745.00	751.00	*	730.00	*	*	*	*
Alkalinity Total, mg/l as CaCO3	745.00	751.00	*	743.00	670.00	722.00	746.00	727.00
Nitrate-N, mg/l	0.12	0.29	*	0.06	0.21	0.31	*	*
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	10.00	10.00	*	7.80	7.20	9.00	7.10	7.70
Magnesium, mg/l	4.80	5.40	*	4.20	4.00	4.00	5.60	3.80
Potassium, mg/l	4.10	3.30	*	3.80	3.60	1.10	3.20	3.20
Sodium, mg/l	515.00	480.00	*	555.00	520.00	507.00	500.00	476.00
Sulfate, mg/l	415.00	430.00	*	400.00	415.00	384.80	380.00	410.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	2.60	6.50	*	4.70	4.60	7.41	6.30	5.10
Iron, mg/l	3.60	3.20	*	1.90	1.50	0.62	*	*
Zinc, mg/l	*	*	*	<0.01	*	*	*	*
Manganese, mg/l	0.08	0.08	*	0.06	0.12	0.01	*	*
Copper, ug/l	*	*	*	<10.00	*	*	*	*
Silver, ug/l	*	*	*	<10.00	*	*	*	*
Strontium, mg/l	0.20	0.20	*	0.20	0.20	<0.10	*	*
Boron, mg/l	0.40	0.28	*	0.33	0.29	0.05	0.27	0.31
Beryllium, ug/l	*	*	*	<10.00	*	*	*	*
Nickel, ug/l	*	*	*	60.00	<50.00	<50.00	*	*
Selenium, ug/l	*	*	*	<1.00	*	*	*	*
Mercury, ug/l	*	*	*	<1.00	*	*	*	*
Arsenic, ug/l	1.00	2.00	*	<1.00	10.00	2.00	*	*
Barium, mg/l	*	*	*	0.03	*	*	*	*
Cadmium, ug/l	*	*	*	30.00	<10.00	<10.00	*	*
Chromium-VI, ug/l	*	*	*	<10.00	*	*	*	*
Fluoride, mg/l	0.80	0.90	*	0.90	1.00	0.90	0.80	0.90
Lead, ug/l	*	*	*	<1.00	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	0.33	3.35	3.06	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	2.60	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	8.80	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	10.90	19.20	*	8.30	5.70	6.50	7.50	8.10
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 9 = Monitoring Well # 9 - CCSPAGE 4

	06/06/1989	10/16/1989	
Field	1.00	7.60	
Laboratory	8.40	8.20	
Specific conductance, umhos/cm @ 25c	1900.00	2100.00	
Total Dissolved Solids, mg/l	1340.00	1291.00	
Total Suspended Solids, mg/l	*	*	
Alkalinity Carbonate, mg/l as CaCO3	*	*	
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	
Alkalinity Total, mg/l as CaCO3	849.00	733.00	
Nitrate-N, mg/l	0.48	0.50	
Ammonia-N, mg/l	*	*	
Calcium, mg/l	8.40	8.60	
Magnesium, mg/l	2.60	5.00	
Potassium, mg/l	3.70	3.40	
Sodium, mg/l	495.00	500.00	
Sulfate, mg/l	345.00	363.00	
Methylene Blue Active Substances, mg/l	*	*	
Chloride, mg/l	5.30	4.30	
Iron, mg/l	*	1.00	
Zinc, mg/l	*	*	
Manganese, mg/l	*	0.01	
Copper, ug/l	*	*	
Silver, ug/l	*	*	
Strontium, mg/l	*	0.20	
Boron, mg/l	0.32	0.31	
Beryllium, ug/l	*	*	
Nickel, ug/l	*	*	
Selenium, ug/l	*	*	
Mercury, ug/l	*	*	
Arsenic, ug/l	*	*	
Barium, mg/l	*	*	
Cadmium, ug/l	*	*	
Chromium-VI, ug/l	*	*	
Fluoride, mg/l	0.80	0.80	
Lead, ug/l	*	*	
Molybdenum, mg/l	*	*	
Aluminum, mg/l	*	*	
Fecal Coliform Bacteria, # Col./100 ml	*	*	
Cyanide, mg/l	*	*	
Phenol, ug/l	*	*	
Biochemical Oxygen Demand, mg/l	*	*	
Chemical Oxygen Demand, mg/l	*	*	
Total Organic Carbon, mg/l	*	*	
Temperature, Degrees C	*	*	6/8/90
Dissolved Oxygen, mg/l	*	*	
Water Level depth below ground surface, ft.	12.80	*	4m 50cm 4m 42cm
Total Sulfur, mg/l	*	*	
Total Coliform Bacteria, # Col./100 ml	*	*	

SAMPLE LOCATION 10 = Monitoring Well # 10 -CCSPAGE 1

DATE	11/13/1979 PACE	12/11/1979 PACE	05/29/1980 PACE	10/05/1980 PACE	03/25/1981 PACE	06/10/1981 PACE	09/13/1981	09/13/1981 PACE
pH-Field	7.60	7.30	7.20	7.10	7.90	7.90	7.40	7.40
pH-Laboratory	7.70	7.70	7.50	7.50	7.50	7.70	7.30	7.30
Specific conductance, umhos/cm @ 25c	3900.00	5000.00	7100.00	5400.00	5240.00	5000.00	6900.00	6200.00
Total Dissolved Solids, mg/l	3910.00	4940.00	5520.00	4280.00	5140.00	5300.00	8930.00	8600.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	255.00	296.00	350.00	280.00	269.00	285.00	348.00	350.00
Alkalinity Total, mg/l as CaCO3	255.00	296.00	350.00	280.00	269.00	285.00	348.00	350.00
Nitrate-N, mg/l	8.60	5.80	<1.00	1.10	0.80	1.00	2.60	2.20
Ammonia-N, mg/l	<0.20	<0.10	<0.10	*	*	*	*	*
Calcium, mg/l	444.00	270.00	600.00	480.00	430.00	500.00	530.00	560.00
Magnesium, mg/l	670.00	830.00	375.00	300.00	300.00	380.00	600.00	580.00
Potassium, mg/l	8.40	9.60	13.00	13.00	15.00	13.00	22.80	19.00
Sodium, mg/l	150.00	580.00	410.00	440.00	600.00	550.00	830.00	960.00
Sulfate, mg/l	2450.00	3800.00	3300.00	2800.00	3000.00	3800.00	5700.00	5300.00
Methylene Blue Active Substances, mg/l	<0.10	<0.10	<0.10	*	*	*	*	*
Chloride, mg/l	30.00	38.00	26.00	32.00	35.00	43.00	43.60	47.00
Iron, mg/l	0.60	0.85	2.60	0.05	0.15	1.20	<0.10	0.55
Zinc, mg/l	170.00	30.00	40.00	*	*	*	*	*
Manganese, mg/l	0.04	0.04	0.08	0.04	0.04	<0.04	0.10	0.08
Copper, ug/l	50.00	<50.00	50.00	*	*	*	*	*
Silver, ug/l	<40.00	<40.00	<40.00	*	*	*	*	*
Strontium, mg/l	1.80	1.60	1.90	2.00	1.40	1.50	2.00	1.50
Boron, mg/l	<0.20	<0.20	<0.20	<0.20	<0.20	0.30	0.50	0.20
Beryllium, ug/l	<20.00	<20.00	<20.00	*	*	*	*	*
Nickel, ug/l	100.00	50.00	100.00	*	*	*	*	*
Selenium, ug/l	<1.00	<1.00	<1.00	*	*	*	*	*
Mercury, ug/l	0.30	<0.20	<0.10	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	3.00	<1.00	<1.00	2.00	<1.00	<1.00
Barium, mg/l	<0.20	<0.30	0.80	*	*	*	*	*
Cadmium, ug/l	2.00	2.00	<1.00	*	*	*	*	*
Chromium-VI, ug/l	5.00	<5.00	<5.00	*	*	*	*	*
Fluoride, mg/l	0.30	0.20	0.30	0.40	0.40	0.30	<0.10	0.20
Lead, ug/l	<10.00	<10.00	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<1.00	<2.00	<2.00	*	*	*	*	*
Cyanide, mg/l	<0.02	<0.02	<0.02	*	*	*	*	*
Phenol, ug/l	3.00	<3.00	<2.00	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	10.00	7.00	5.50	6.00	7.40	7.80	8.80	8.80
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	6.00	<2.00	<2.00	*	*	*	*	*

SAMPLE LOCATION 10 = Monitoring Well # 10 -CCSPAGE 2

DATE	12/01/1981	05/25/1982	10/12/1982	04/26/1983	10/03/1983	05/16/1984	10/03/1984	05/13/1985
pH-Field	7.70	7.60	7.50	7.70	7.60	7.50	7.70	7.40
pH-Laboratory	7.30	7.30	7.40	7.40	7.20	7.20	7.10	7.20
Specific conductance, umhos/cm @ 25c	6900.00	6750.00	5500.00	4800.00	4600.00	5500.00	5000.00	5300.00
Total Dissolved Solids, mg/l	7680.00	6648.00	5160.00	4960.00	4366.00	5200.00	4480.00	5030.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	310.00	372.00	372.00	375.00	290.00	336.00	316.00	292.00
Alkalinity Total, mg/l as CaCO3	310.00	372.00	372.00	375.00	290.00	336.00	317.00	292.00
Nitrate-N, mg/l	2.00	3.60	1.10	1.60	1.50	1.40	1.60	1.00
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	680.00	680.00	550.00	500.00	400.00	510.00	470.00	485.00
Magnesium, mg/l	490.00	440.00	360.00	310.00	292.00	145.00	292.00	310.00
Potassium, mg/l	18.00	87.00	14.00	11.00	11.00	9.70	10.00	9.70
Sodium, mg/l	740.00	720.00	525.00	580.00	430.00	470.00	445.00	500.00
Sulfate, mg/l	5200.00	4800.00	3200.00	3200.00	2900.00	2900.00	2800.00	2800.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	44.00	2.10	34.00	38.00	52.00	67.00	62.00	77.00
Iron, mg/l	<0.10	0.10	4.10	0.70	2.50	0.70	0.60	1.20
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	0.07	0.15	0.20	0.04	0.14	0.10	<0.01	<0.01
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	2.10	2.00	1.30	1.20	1.10	1.40	1.70	1.40
Boron, mg/l	0.40	0.30	0.50	0.20	0.41	0.72	0.74	1.10
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	2.00	1.00	1.00	2.00	<1.00	<1.00
Barium, mg/l	*	*	*	*	*	*	*	0.17
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	<10.00
Fluoride, mg/l	<0.10	0.20	0.20	0.20	0.20	0.20	0.30	0.20
Lead, ug/l	*	*	*	*	*	*	*	<10.00
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	8.30	6.80	8.30	7.50	9.70	8.50	11.10	11.10
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 10 = Monitoring Well # 10 -CCSPAGE 3

DATE	10/22/1985	06/18/1986	10/20/1986 BRAUN	10/20/1986	05/28/1987	10/07/1987	06/08/1988	10/28/1988
pH-Field	7.10	7.40	*	7.53	7.50	7.60	7.20	7.60
pH-Laboratory	7.30	7.40	*	7.40	7.40	7.40	7.30	7.20
Specific conductance, umhos/cm @ 25c	5100.00	4900.00	*	5000.00	5500.00	5600.00	86000.00	8900.00
Total Dissolved Solids, mg/l	4780.00	4870.00	*	4680.00	4850.00	4916.00	8060.00	8250.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	*	<1.00	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	304.00	282.00	*	292.00	*	*	*	*
Alkalinity Total, mg/l as CaCO3	304.00	282.00	*	292.00	269.00	308.00	317.00	291.00
Nitrate-N, mg/l	1.10	0.60	*	0.13	0.13	0.26	*	*
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	450.00	395.00	*	300.00	420.00	407.00	730.00	760.00
Magnesium, mg/l	302.00	370.00	*	320.00	370.00	331.00	605.00	630.00
Potassium, mg/l	9.70	8.90	*	10.00	9.50	10.60	12.00	15.00
Sodium, mg/l	545.00	510.00	*	530.00	540.00	503.00	680.00	675.00
Sulfate, mg/l	3240.00	3100.00	*	2700.00	3200.00	2950.80	5200.00	5000.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	90.00	105.00	*	50.00	47.00	97.74	310.00	350.00
Iron, mg/l	0.40	<0.10	*	0.20	<0.10	<0.01	*	*
Zinc, mg/l	*	*	*	<0.01	*	*	*	*
Manganese, mg/l	<0.01	0.03	*	0.01	<0.01	0.01	*	*
Copper, ug/l	*	*	*	<10.00	*	*	*	*
Silver, ug/l	*	*	*	<10.00	*	*	*	*
Strontium, mg/l	1.40	1.40	*	0.20	1.20	1.30	*	*
Boron, mg/l	1.40	1.00	*	1.60	1.40	1.21	20.00	27.50
Beryllium, ug/l	*	*	*	<10.00	*	*	*	*
Nickel, ug/l	*	*	*	180.00	<50.00	<50.00	*	*
Selenium, ug/l	*	*	*	<1.00	*	*	*	*
Mercury, ug/l	*	*	*	<1.00	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	*	2.00	105.00	<1.00	*	*
Barium, mg/l	*	*	*	0.02	*	*	*	*
Cadmium, ug/l	*	*	*	10.00	<10.00	<10.00	*	*
Chromium-VI, ug/l	*	*	*	<10.00	*	*	*	*
Fluoride, mg/l	0.20	0.30	*	0.30	0.30	0.21	0.20	0.20
Lead, ug/l	*	*	*	<1.00	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	0.01	0.01	<0.01	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	2.00	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	10.30	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	13.30	21.20	*	8.20	4.30	6.70	6.60	8.06
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 10 = Monitoring Well # 10 -CCSPAGE 4

DATE	06/06/1989	10/16/1989
pH-Field	1.00	6.80
pH-Laboratory	7.30	7.30
Specific conductance, umhos/cm @ 25c	7600.00	8100.00
Total Dissolved Solids, mg/l	8110.00	7790.00
Total Suspended Solids, mg/l	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*
Alkalinity Total, mg/l as CaCO3	480.00	302.00
Nitrate-N, mg/l	<0.01	0.10
Ammonia-N, mg/l	*	*
Calcium, mg/l	666.00	665.00
Magnesium, mg/l	605.00	650.00
Potassium, mg/l	14.00	15.00
Sodium, mg/l	720.00	760.00
Sulfate, mg/l	5030.00	4950.00
Methylene Blue Active Substances, mg/l	*	*
Chloride, mg/l	357.00	322.00
Iron, mg/l	*	8.90
Zinc, mg/l	*	*
Manganese, mg/l	*	0.53
Copper, ug/l	*	*
Silver, ug/l	*	*
Strontium, mg/l	*	2.00
Boron, mg/l	33.00	27.00
Beryllium, ug/l	*	*
Nickel, ug/l	*	*
Selenium, ug/l	*	*
Mercury, ug/l	*	*
Arsenic, ug/l	*	*
Barium, mg/l	*	*
Cadmium, ug/l	*	*
Chromium-VI, ug/l	*	*
Fluoride, mg/l	0.10	0.20
Lead, ug/l	*	*
Molybdenum, mg/l	*	*
Aluminum, mg/l	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*
Cyanide, mg/l	*	*
Phenol, ug/l	*	*
Biochemical Oxygen Demand, mg/l	*	*
Chemical Oxygen Demand, mg/l	*	*
Total Organic Carbon, mg/l	*	*
Temperature, Degrees C	*	*
Dissolved Oxygen, mg/l	*	*
Water Level depth below ground surface, ft.	14.70	* 4m 92cm 5m 19cm
Total Sulfur, mg/l	*	*
Total Coliform Bacteria, # Col./100 ml	*	*

6/8/90

SAMPLE LOCATION 11 = Monitoring Well # 11 -CCSPAGE 1

DATE	11/14/1979 PACE	12/11/1979 PACE	05/30/1980 PACE	10/05/1980 PACE	03/26/1981 PACE	06/10/1981 PACE	09/15/1981	09/15/1981 PACE
pH-Field	7.00	6.80	6.90	6.80	7.60	7.30	7.40	7.40
pH-Laboratory	7.20	7.50	7.10	7.00	6.80	7.30	7.10	7.10
Specific conductance, umhos/cm @ 25c	1700.00	1100.00	890.00	960.00	1180.00	1100.00	1010.00	1000.00
Total Dissolved Solids, mg/l	1340.00	722.00	654.00	636.00	870.00	820.00	540.00	780.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	393.00	480.00	410.00	430.00	448.00	436.00	402.00	430.00
Alkalinity Total, mg/l as CaCO3	393.00	480.00	410.00	430.00	448.00	436.00	402.00	430.00
Nitrate-N, mg/l	<0.50	<0.10	<0.10	<0.10	<0.10	<0.10	0.18	<0.10
Ammonia-N, mg/l	<0.20	<0.10	<0.10	*	*	*	*	*
Calcium, mg/l	175.00	96.00	92.00	81.00	90.00	120.00	99.00	125.00
Magnesium, mg/l	82.00	82.00	51.00	44.00	42.00	52.00	57.00	46.00
Potassium, mg/l	12.00	9.60	9.20	8.90	10.00	12.00	15.20	10.00
Sodium, mg/l	74.00	72.00	60.00	58.00	70.00	89.00	87.00	67.00
Sulfate, mg/l	600.00	180.00	70.00	100.00	180.00	240.00	257.00	260.00
Methylene Blue Active Substances, mg/l	<0.10	<0.10	<0.10	*	*	*	*	*
Chloride, mg/l	10.00	10.00	<10.00	7.00	7.00	9.00	11.00	10.00
Iron, mg/l	7.90	0.65	0.95	0.55	0.30	0.57	0.60	0.90
Zinc, mg/l	150.00	20.00	30.00	*	*	*	*	*
Manganese, mg/l	1.40	1.00	1.40	1.60	1.70	1.80	2.10	2.30
Copper, ug/l	50.00	<50.00	<50.00	*	*	*	*	*
Silver, ug/l	<40.00	<40.00	<40.00	*	*	*	*	*
Strontium, mg/l	0.75	0.60	0.30	0.50	0.50	0.40	0.60	0.35
Boron, mg/l	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.10	<0.20
Beryllium, ug/l	<20.00	<20.00	<200.00	*	*	*	*	*
Nickel, ug/l	50.00	<50.00	50.00	*	*	*	*	*
Selenium, ug/l	1.00	<1.00	<1.00	*	*	*	*	*
Mercury, ug/l	<0.20	<0.20	<0.10	*	*	*	*	*
Arsenic, ug/l	4.00	1.00	1.00	<1.00	<1.00	<1.00	1.00	<1.00
Barium, mg/l	<0.20	<0.30	0.80	*	*	*	*	*
Cadmium, ug/l	3.00	<1.00	<1.00	*	*	*	*	*
Chromium-VI, ug/l	10.00	<5.00	<5.00	*	*	*	*	*
Fluoride, mg/l	0.20	<0.10	0.20	0.20	0.10	0.20	<0.10	0.10
Lead, ug/l	30.00	<10.00	<10.00	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<1.00	<2.00	<2.00	*	*	*	*	*
Cyanide, mg/l	<0.02	<0.02	<0.02	*	*	*	*	*
Phenol, ug/l	3.00	3.00	<2.00	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	7.00	8.50	7.50	7.00	8.80	6.80	7.30	7.30
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<1.00	<2.00	<2.00	*	*	*	*	*

SAMPLE LOCATION 11 = Monitoring Well # 11 -CCSPAGE 2

DATE	12/01/1981	05/25/1982	10/12/1982	04/26/1983	10/03/1983	05/16/1984	10/03/1984	05/13/1985
pH-Field	7.20	7.10	7.10	7.10	7.00	7.50	7.30	7.30
pH-Laboratory	7.00	7.10	7.10	7.00	7.00	6.90	6.80	7.00
Specific conductance, umhos/cm @ 25c	1070.00	1550.00	1480.00	1040.00	1210.00	1250.00	1140.00	1190.00
Total Dissolved Solids, mg/l	720.00	720.00	810.00	726.00	910.00	872.00	858.00	774.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	390.00	416.00	388.00	415.00	356.00	391.00	365.00	403.00
Alkalinity Total, mg/l as CaCO3	390.00	416.00	388.00	415.00	358.00	391.00	365.00	403.00
Nitrate-N, mg/l	0.36	1.05	<0.05	0.18	0.12	0.09	0.21	0.08
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	100.00	160.00	140.00	130.00	120.00	119.00	119.00	106.00
Magnesium, mg/l	52.00	58.00	53.00	49.00	44.00	40.00	86.00	38.00
Potassium, mg/l	13.00	13.00	11.00	11.00	11.00	11.00	11.00	11.00
Sodium, mg/l	84.00	87.00	87.00	88.00	96.00	97.00	102.00	107.00
Sulfate, mg/l	255.00	390.00	350.00	300.00	370.00	315.00	420.00	250.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	10.00	11.00	13.00	12.00	13.00	12.00	12.00	11.00
Iron, mg/l	0.20	0.05	0.50	0.10	<0.10	0.20	0.10	<0.10
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	2.30	1.90	2.10	1.40	2.10	1.90	1.80	1.70
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	0.60	0.70	0.40	0.30	0.30	0.30	0.40	0.20
Boron, mg/l	0.20	0.20	0.20	0.10	0.13	0.20	0.16	0.20
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	1.00	<1.00	<1.00	<1.00	<1.00	1.00	<1.00	<1.00
Barium, mg/l	*	*	*	*	*	*	*	0.06
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	<10.00
Fluoride, mg/l	<0.10	<0.10	0.10	<0.10	0.10	0.20	0.20	0.10
Lead, ug/l	*	*	*	*	*	*	*	<10.00
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	7.50	6.30	7.90	6.00	7.80	6.30	7.40	6.30
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 11 = Monitoring Well # 11 -CCSPAGE 3

DATE	05/13/1985 PACE	10/22/1985	06/18/1986	10/21/1986	05/28/1987	10/07/1987	06/08/1988	10/31/1988
pH-Field	*	6.50	6.90	7.24	7.14	7.20	6.40	7.10
pH-Laboratory	*	7.00	7.00	7.20	7.10	7.20	7.00	7.10
Specific conductance, umhos/cm @ 25c	1400.00	1300.00	1320.00	1350.00	1390.00	1540.00	1570.00	1510.00
Total Dissolved Solids, mg/l	710.00	836.00	860.00	954.00	938.00	979.00	964.00	952.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	380.00	382.00	387.00	374.00	*	*	*	*
Alkalinity Total, mg/l as CaCO3	380.00	382.00	387.00	374.00	369.00	402.00	397.00	384.00
Nitrate-N, mg/l	*	0.32	0.13	0.03	0.07	0.07	*	*
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	110.00	105.00	105.00	111.00	108.00	109.00	110.00	112.00
Magnesium, mg/l	43.00	41.00	42.00	48.00	46.00	48.00	49.00	50.00
Potassium, mg/l	12.00	10.80	11.20	13.00	11.90	12.50	14.00	11.00
Sodium, mg/l	110.00	111.00	113.00	130.00	146.00	142.00	148.00	117.00
Sulfate, mg/l	270.00	311.00	340.00	390.00	375.00	410.90	420.00	380.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	12.00	12.00	12.00	14.00	12.00	13.32	13.00	13.26
Iron, mg/l	0.31	<0.10	<0.10	<0.10	<0.10	<0.01	*	*
Zinc, mg/l	*	*	*	<0.01	*	*	*	*
Manganese, mg/l	2.00	1.80	2.00	2.30	1.90	1.76	*	*
Copper, ug/l	*	*	*	<10.00	*	*	*	*
Silver, ug/l	*	*	*	<10.00	*	*	*	*
Strontium, mg/l	0.21	0.30	0.30	0.30	0.30	0.20	*	*
Boron, mg/l	0.30	0.29	0.17	0.23	0.18	0.20	0.41	0.44
Beryllium, ug/l	*	*	*	<10.00	*	*	*	*
Nickel, ug/l	*	*	*	30.00	<50.00	<50.00	*	*
Selenium, ug/l	*	*	*	<1.00	*	*	*	*
Mercury, ug/l	*	*	*	<1.00	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	<1.00	<1.00	6.00	1.00	*	*
Barium, mg/l	*	*	*	0.07	*	*	*	*
Cadmium, ug/l	*	*	*	20.00	<10.00	<10.00	*	*
Chromium-VI, ug/l	*	*	*	<10.00	*	*	*	*
Fluoride, mg/l	0.20	0.20	0.10	0.20	0.20	0.13	0.20	0.20
Lead, ug/l	*	*	*	<1.00	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	<0.01	<0.01	<0.01	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	11.30	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	9.00	16.90	6.80	5.70	7.30	7.30	11.09
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 11 = Monitoring Well # 11 -CCSPAGE 4

DATE	06/12/1989	10/23/1989
pH-Field	1.00	*
pH-Laboratory	6.90	6.80
Specific conductance, umhos/cm @ 25c	1400.00	1350.00
Total Dissolved Solids, mg/l	959.00	859.00
Total Suspended Solids, mg/l	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*
Alkalinity Total, mg/l as CaCO3	389.00	398.00
Nitrate-N, mg/l	0.01	<0.01
Ammonia-N, mg/l	*	*
Calcium, mg/l	102.00	100.00
Magnesium, mg/l	42.00	44.00
Potassium, mg/l	13.00	11.50
Sodium, mg/l	140.00	140.00
Sulfate, mg/l	366.00	321.85
Methylene Blue Active Substances, mg/l	*	*
Chloride, mg/l	14.00	13.54
Iron, mg/l	*	1.40
Zinc, mg/l	*	*
Manganese, mg/l	*	2.50
Copper, ug/l	*	*
Silver, ug/l	*	*
Strontium, mg/l	*	0.30
Boron, mg/l	0.42	0.37
Beryllium, ug/l	*	*
Nickel, ug/l	*	*
Selenium, ug/l	*	*
Mercury, ug/l	*	*
Arsenic, ug/l	*	*
Barium, mg/l	*	*
Cadmium, ug/l	*	*
Chromium-VI, ug/l	*	*
Fluoride, mg/l	0.10	0.20
Lead, ug/l	*	*
Molybdenum, mg/l	*	*
Aluminum, mg/l	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*
Cyanide, mg/l	*	*
Phenol, ug/l	*	*
Biochemical Oxygen Demand, mg/l	*	*
Chemical Oxygen Demand, mg/l	*	*
Total Organic Carbon, mg/l	*	*
Temperature, Degrees C	*	*
Dissolved Oxygen, mg/l	*	*
Water Level depth below ground surface, ft.	10.90	* 3m 95cm
Total Sulfur, mg/l	*	*
Total Coliform Bacteria, # Col./100 ml	*	*

6/8/90

3m 86cm

SAMPLE LOCATION 12 = Monitoring Well # 12 -CCSPAGE 1

DATE	11/14/1979 PACE	12/11/1979 PACE	05/30/1980 PACE	10/05/1980 PACE	03/26/1981 PACE	06/10/1981 PACE	09/15/1981	09/15/1981 PACE
pH-Field	7.80	7.20	7.40	7.70	7.50	7.80	7.70	7.70
pH-Laboratory	8.10	7.80	7.60	7.50	7.90	8.00	7.60	7.60
Specific conductance, umhos/cm @ 25c	720.00	710.00	740.00	790.00	780.00	750.00	660.00	600.00
Total Dissolved Solids, mg/l	477.00	472.00	538.00	402.00	474.00	480.00	405.00	350.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	354.00	380.00	390.00	390.00	388.00	388.00	386.00	380.00
Alkalinity Total, mg/l as CaCO3	354.00	380.00	390.00	390.00	388.00	388.00	386.00	380.00
Nitrate-N, mg/l	<0.50	<0.10	<0.10	<0.10	<0.10	<0.10	0.16	<0.10
Ammonia-N, mg/l	0.40	<0.10	<0.10	*	*	*	*	*
Calcium, mg/l	32.00	16.00	24.00	15.00	21.00	24.00	24.00	21.00
Magnesium, mg/l	10.00	16.00	15.00	16.00	12.00	18.00	11.00	12.00
Potassium, mg/l	3.20	4.60	5.10	5.00	5.20	4.70	6.80	4.60
Sodium, mg/l	100.00	130.00	135.00	160.00	140.00	140.00	149.00	140.00
Sulfate, mg/l	30.00	30.00	25.00	35.00	55.00	48.00	34.00	52.00
Methylene Blue Active Substances, mg/l	<0.10	<0.10	<0.10	*	*	*	*	*
Chloride, mg/l	<10.00	<10.00	<10.00	3.00	2.00	3.00	1.80	3.00
Iron, mg/l	0.20	1.40	1.80	0.15	0.15	1.40	0.10	0.85
Zinc, mg/l	190.00	20.00	60.00	*	*	*	*	*
Manganese, mg/l	0.08	0.16	0.28	0.32	0.24	0.28	0.30	0.28
Copper, ug/l	<50.00	<50.00	<50.00	*	*	*	*	*
Silver, ug/l	<40.00	<40.00	<40.00	*	*	*	*	*
Strontium, mg/l	0.40	0.45	0.30	0.20	0.30	0.25	0.40	0.20
Boron, mg/l	0.20	0.20	0.30	0.30	0.30	0.30	0.30	0.30
Beryllium, ug/l	<20.00	<20.00	<20.00	*	*	*	*	*
Nickel, ug/l	<50.00	<50.00	50.00	*	*	*	*	*
Selenium, ug/l	<1.00	<1.00	<1.00	*	*	*	*	*
Mercury, ug/l	<0.20	<0.20	0.70	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Barium, mg/l	<0.20	<0.30	<0.30	*	*	*	*	*
Cadmium, ug/l	2.00	<1.00	<1.00	*	*	*	*	*
Chromium-VI, ug/l	5.00	<5.00	<5.00	*	*	*	*	*
Fluoride, mg/l	0.30	0.20	0.20	0.40	0.30	0.40	0.10	0.20
Lead, ug/l	10.00	10.00	10.00	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<1.00	<2.00	<2.00	*	*	*	*	*
Cyanide, mg/l	<0.02	<0.02	0.02	*	*	*	*	*
Phenol, ug/l	3.00	<3.00	5.00	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	10.00	10.00	10.00	9.00	7.30	7.50	7.80	7.80
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<1.00	<2.00	<2.00	*	*	*	*	*

SAMPLE LOCATION 12 = Monitoring Well # 12 -CCSPAGE 2

DATE	12/01/1981	05/25/1982	10/12/1982	04/26/1983	10/04/1983	05/16/1984	10/04/1984	05/13/1985
pH-Field	7.70	7.50	7.60	7.40	8.10	7.60	6.90	7.50
pH-Laboratory	7.50	7.60	7.70	7.40	7.30	7.20	7.20	7.10
Specific conductance, umhos/cm @ 25c	720.00	810.00	810.00	640.00	700.00	780.00	750.00	740.00
Total Dissolved Solids, mg/l	480.00	320.00	400.00	385.00	494.00	504.00	450.00	460.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	380.00	387.00	389.00	415.00	390.00	391.00	375.00	385.00
Alkalinity Total, mg/l as CaCO3	380.00	387.00	389.00	415.00	390.00	391.00	378.00	385.00
Nitrate-N, mg/l	0.15	0.17	<0.05	0.05	0.08	0.09	0.03	0.08
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	24.00	31.00	28.00	24.00	24.00	28.00	25.00	26.00
Magnesium, mg/l	12.00	11.00	12.00	11.00	10.00	9.90	11.00	10.00
Potassium, mg/l	5.70	5.80	5.20	4.80	4.30	4.60	4.90	4.60
Sodium, mg/l	160.00	145.00	140.00	150.00	140.00	138.00	140.00	143.00
Sulfate, mg/l	48.00	46.00	41.00	36.00	36.00	40.00	32.00	45.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	1.80	2.10	2.00	1.80	1.80	1.50	1.80	1.70
Iron, mg/l	<0.01	0.10	0.60	0.60	0.10	0.50	0.20	0.30
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	0.30	<0.10	0.40	0.33	0.25	0.33	0.24	0.23
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	0.30	0.40	0.30	0.30	0.30	0.30	0.40	0.30
Boron, mg/l	0.40	0.40	0.30	0.30	0.32	0.29	0.34	0.31
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	<1.00	1.00	1.00	1.00	<1.00	<1.00
Barium, mg/l	*	*	*	*	*	*	*	0.06
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	10.00
Fluoride, mg/l	0.10	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Lead, ug/l	*	*	*	*	*	*	*	<10.00
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	7.70	6.80	7.90	7.70	8.60	7.80	8.30	8.30
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 12 = Monitoring Well # 12 -CCSPAGE 3

DATE	05/13/1985 PACE	10/22/1985	06/19/1986	10/21/1986	05/29/1987	10/07/1987	06/08/1988	10/31/1988
pH-Field	*	6.90	7.40	7.48	7.42	7.60	7.20	7.40
pH-Laboratory	*	7.30	7.40	7.50	7.40	7.40	7.40	7.40
Specific conductance, umhos/cm @ 25c	860.00	760.00	740.00	760.00	750.00	800.00	820.00	800.00
Total Dissolved Solids, mg/l	410.00	430.00	447.00	478.00	478.00	454.00	442.00	465.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	360.00	394.00	340.00	394.00	*	*	*	*
Alkalinity Total, mg/l as CaCO3	360.00	394.00	340.00	394.00	350.00	387.00	382.00	379.00
Nitrate-N, mg/l	*	0.05	0.08	<0.01	0.06	0.02	*	*
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	23.00	24.00	20.00	22.00	21.00	21.00	20.00	26.00
Magnesium, mg/l	11.00	9.10	9.60	11.00	10.00	11.00	12.00	11.70
Potassium, mg/l	5.20	4.50	3.50	4.90	4.50	3.80	4.30	5.20
Sodium, mg/l	140.00	136.00	122.00	150.00	144.00	140.00	143.00	137.00
Sulfate, mg/l	35.00	36.00	33.00	33.00	35.00	25.20	34.00	76.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	3.00	2.00	1.90	2.50	2.90	2.35	3.00	3.50
Iron, mg/l	0.50	0.30	<0.10	0.10	0.20	<0.01	*	*
Zinc, mg/l	*	*	*	<0.01	*	*	*	*
Manganese, mg/l	0.25	0.20	0.18	0.19	0.18	0.14	*	*
Copper, ug/l	*	*	*	10.00	*	*	*	*
Silver, ug/l	*	*	*	<10.00	*	*	*	*
Strontium, mg/l	0.18	0.30	0.35	0.40	0.40	0.30	*	*
Boron, mg/l	0.40	0.32	0.24	0.34	0.26	0.24	0.32	0.27
Beryllium, ug/l	*	*	*	<10.00	*	*	*	*
Nickel, ug/l	*	*	*	140.00	<50.00	<50.00	*	*
Selenium, ug/l	*	*	*	<1.00	*	*	*	*
Mercury, ug/l	*	*	*	<1.00	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	<1.00	<1.00	2.00	2.00	*	*
Barium, mg/l	*	*	*	0.04	*	*	*	*
Cadmium, ug/l	*	*	*	<10.00	<10.00	<10.00	*	*
Chromium-VI, ug/l	*	*	*	<10.00	*	*	*	*
Fluoride, mg/l	0.20	0.30	0.20	0.30	0.30	0.21	0.20	0.20
Lead, ug/l	*	*	*	<1.00	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	0.01	0.34	<0.01	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	3.50	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	9.80	7.90	7.80	7.10	7.60	7.11	11.11
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 12 = Monitoring Well # 12 -CCSPAGE 4

	06/14/1989	10/23/1989	
pH-Field	7.30	*	
pH-Laboratory	7.30	7.20	
Specific conductance, umhos/cm @ 25c	780.00	770.00	
Total Dissolved Solids, mg/l	474.00	462.00	
Total Suspended Solids, mg/l	*	*	
Alkalinity Carbonate, mg/l as CaCO3	*	*	
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	
Alkalinity Total, mg/l as CaCO3	378.00	375.00	
Nitrate-N, mg/l	0.05	<0.01	
Ammonia-N, mg/l	*	*	
Calcium, mg/l	21.00	22.00	
Magnesium, mg/l	9.30	10.80	
Potassium, mg/l	4.80	4.70	
Sodium, mg/l	140.00	155.00	
Sulfate, mg/l	55.00	57.00	
Methylene Blue Active Substances, mg/l	*	*	
Chloride, mg/l	3.30	2.80	
Iron, mg/l	*	0.33	
Zinc, mg/l	*	*	
Manganese, mg/l	*	0.19	
Copper, ug/l	*	*	
Silver, ug/l	*	*	
Strontium, mg/l	*	0.40	
Boron, mg/l	0.30	0.27	
Beryllium, ug/l	*	*	
Nickel, ug/l	*	*	
Selenium, ug/l	*	*	
Mercury, ug/l	*	*	
Arsenic, ug/l	*	*	
Barium, mg/l	*	*	
Cadmium, ug/l	*	*	
Chromium-VI, ug/l	*	*	
Fluoride, mg/l	0.20	0.30	
Lead, ug/l	*	*	
Molybdenum, mg/l	*	*	
Aluminum, mg/l	*	*	
Fecal Coliform Bacteria, # Col./100 ml	*	*	
Cyanide, mg/l	*	*	
Phenol, ug/l	*	*	
Biochemical Oxygen Demand, mg/l	*	*	
Chemical Oxygen Demand, mg/l	*	*	
Total Organic Carbon, mg/l	*	*	
Temperature, Degrees C	11.10	*	6/8/90
Dissolved Oxygen, mg/l	*	*	
Water Level depth below ground surface, ft.	12.00	* 3m 99cm	4m 08cm
Total Sulfur, mg/l	*	*	
Total Coliform Bacteria, # Col./100 ml	*	*	

SAMPLE LOCATION 13 = Monitoring Well # 13 -CCSPACE 1

DATE	11/14/1979 PACE	12/13/1979 PACE	05/30/1980 PACE	10/05/1980 PACE	03/26/1981 PACE	06/10/1981 PACE	09/15/1981	09/15/1981 PACE
pH-Field	8.00	8.50	7.80	7.80	8.60	8.10	8.10	8.10
pH-Laboratory	8.20	8.70	8.00	7.80	8.40	8.30	8.00	8.00
Specific conductance, umhos/cm @ 25c	1200.00	1300.00	1800.00	1900.00	1440.00	2000.00	1710.00	1800.00
Total Dissolved Solids, mg/l	985.00	1020.00	1250.00	1280.00	1170.00	1400.00	1430.00	1300.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	40.00	<1.00	<1.00	28.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	405.00	405.00	580.00	620.00	500.00	560.00	563.00	590.00
Alkalinity Total, mg/l as CaCO3	405.00	445.00	580.00	620.00	530.00	560.00	563.00	590.00
Nitrate-N, mg/l	<0.50	<0.10	<0.10	0.60	0.20	0.10	0.20	<0.10
Ammonia-N, mg/l	0.60	<0.10	<0.10	*	*	*	*	*
Calcium, mg/l	114.00	60.00	27.00	24.00	16.00	40.00	45.00	41.00
Magnesium, mg/l	56.00	64.00	15.00	13.00	13.00	28.00	15.00	14.00
Potassium, mg/l	8.00	6.80	6.20	6.50	13.00	9.50	12.80	9.30
Sodium, mg/l	110.00	200.00	370.00	410.00	420.00	440.00	490.00	450.00
Sulfate, mg/l	400.00	350.00	300.00	350.00	450.00	600.00	620.00	480.00
Methylene Blue Active Substances, mg/l	<0.10	<0.10	<0.10	*	*	*	*	*
Chloride, mg/l	10.00	10.00	<10.00	4.00	6.00	10.00	9.50	10.00
Iron, mg/l	1.80	0.45	0.45	0.20	0.10	1.50	0.30	<0.05
Zinc, mg/l	280.00	80.00	50.00	*	*	*	*	*
Manganese, mg/l	0.28	0.24	0.36	0.40	0.04	0.24	0.20	0.24
Copper, ug/l	50.00	<50.00	<50.00	*	*	*	*	*
Silver, ug/l	<40.00	<40.00	<40.00	*	*	*	*	*
Strontium, mg/l	2.60	1.90	0.50	0.45	0.50	0.65	0.95	0.45
Boron, mg/l	0.40	0.30	0.40	0.20	0.40	0.30	0.80	0.50
Beryllium, ug/l	<20.00	<20.00	<20.00	*	*	*	*	*
Nickel, ug/l	<50.00	<50.00	50.00	*	*	*	*	*
Selenium, ug/l	<1.00	<1.00	<1.00	*	*	*	*	*
Mercury, ug/l	0.20	<0.40	<0.10	*	*	*	*	*
Arsenic, ug/l	2.00	6.00	5.00	1.00	1.00	2.00	2.00	<1.00
Barium, mg/l	<0.20	<0.30	<0.30	*	*	*	*	*
Cadmium, ug/l	11.00	<1.00	<1.00	*	*	*	*	*
Chromium-VI, ug/l	15.00	<5.00	<5.00	*	*	*	*	*
Fluoride, mg/l	0.20	0.20	0.40	0.60	0.50	0.60	0.20	0.40
Lead, ug/l	40.00	30.00	20.00	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<1.00	<2.00	<2.00	*	*	*	*	*
Cyanide, mg/l	<0.02	<0.02	<0.02	*	*	*	*	*
Phenol, ug/l	30.00	6.00	<2.00	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	16.50	17.50	9.00	9.00	9.70	10.80	8.70	8.70
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	4.00	4.00	<2.00	*	*	*	*	*

SAMPLE LOCATION 13 = Monitoring Well # 13 -CCSPAGE 2

DATE	12/01/1981	05/25/1982	10/12/1982	04/26/1983	10/04/1983	05/16/1984	10/04/1984	05/13/1985
pH-Field	8.30	7.90	7.80	7.90	7.70	8.30	7.50	7.80
pH-Laboratory	8.10	7.80	7.80	7.90	7.70	7.80	7.70	7.60
Specific conductance, umhos/cm @ 25c	1960.00	2750.00	3000.00	2400.00	2400.00	2500.00	2400.00	2500.00
Total Dissolved Solids, mg/l	1480.00	1750.00	2020.00	1570.00	1629.00	1700.00	1500.00	1620.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	460.00	580.00	574.00	685.00	688.00	714.00	696.00	715.00
Alkalinity Total, mg/l as CaCO3	460.00	580.00	574.00	685.00	688.00	714.00	696.00	715.00
Nitrate-N, mg/l	0.55	0.40	<0.05	0.25	0.35	0.50	0.39	0.50
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	57.00	100.00	92.00	38.00	22.00	25.00	21.00	23.00
Magnesium, mg/l	22.00	55.00	50.00	18.00	9.00	7.70	8.80	8.00
Potassium, mg/l	16.00	7.70	7.20	6.00	5.70	5.70	6.20	5.90
Sodium, mg/l	420.00	490.00	560.00	550.00	535.00	525.00	565.00	530.00
Sulfate, mg/l	760.00	1050.00	1000.00	650.00	615.00	545.00	485.00	570.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	15.00	18.30	21.00	11.00	8.10	7.50	7.20	8.00
Iron, mg/l	0.01	0.10	0.90	1.00	1.30	2.50	1.60	2.60
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	0.06	0.25	0.23	0.14	0.15	0.15	0.16	0.18
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	1.20	0.90	0.70	0.50	0.40	0.40	0.50	0.40
Boron, mg/l	0.60	1.50	1.80	0.90	0.70	0.60	0.72	0.56
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	2.00	2.00	3.00	4.00	4.00	4.00	4.00
Barium, mg/l	*	*	*	*	*	*	*	<0.04
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	<10.00
Fluoride, mg/l	0.30	0.40	0.40	0.50	0.50	0.60	0.50	0.50
Lead, ug/l	*	*	*	*	*	*	*	<10.00
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	8.40	7.90	15.80	8.30	10.90	7.50	10.50	12.50
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 13 = Monitoring Well # 13 -CCSPAGE 3

DATE	05/13/1985 PACE	10/22/1985	06/19/1986	10/20/1986 BRAUN	10/20/1986	05/29/1987	10/07/1987	06/08/1988
pH-Field	*	7.50	7.80	*	8.03	7.97	8.20	7.70
pH-Laboratory	*	7.80	7.80	*	7.90	7.90	7.80	7.90
Specific conductance, umhos/cm @ 25c	2700.00	2100.00	2400.00	2400.00	3400.00	2600.00	2600.00	2800.00
Total Dissolved Solids, mg/l	1500.00	1530.00	1570.00	*	1620.00	1650.00	1637.00	1620.00
Total Suspended Solids, mg/l	*	*	*	5.00	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	680.00	721.00	710.00	690.00	723.00	*	*	*
Alkalinity Total, mg/l as CaCO3	680.00	721.00	710.00	690.00	723.00	629.00	703.00	682.00
Nitrate-N, mg/l	*	0.25	0.19	0.22	0.15	0.29	0.26	*
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	20.00	20.00	16.00	30.00	18.00	26.00	19.00	23.00
Magnesium, mg/l	8.20	7.10	6.50	7.70	7.10	26.00	9.00	12.00
Potassium, mg/l	7.20	6.20	4.60	22.00	6.30	6.40	3.40	5.80
Sodium, mg/l	550.00	570.00	510.00	250.00	564.00	570.00	550.00	570.00
Sulfate, mg/l	540.00	568.00	540.00	290.00	580.00	660.00	597.80	740.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	9.00	8.60	9.60	12.00	13.00	21.00	15.97	24.00
Iron, mg/l	3.10	2.40	1.60	2.90	1.20	1.00	0.91	*
Zinc, mg/l	*	*	*	*	<0.01	*	*	*
Manganese, mg/l	0.21	0.18	0.12	0.18	0.13	0.13	0.10	*
Copper, ug/l	*	*	*	*	10.00	*	*	*
Silver, ug/l	*	*	*	*	<10.00	*	*	*
Strontium, mg/l	0.19	0.40	0.40	0.62	0.50	0.60	0.40	*
Boron, mg/l	1.60	0.57	0.43	0.82	0.56	0.86	0.62	1.10
Beryllium, ug/l	*	*	*	*	<10.00	*	*	*
Nickel, ug/l	*	*	*	*	170.00	<50.00	<50.00	*
Selenium, ug/l	*	*	*	*	<1.00	*	*	*
Mercury, ug/l	*	*	*	*	<1.00	*	*	*
Arsenic, ug/l	4.00	5.00	3.00	<5.00	<1.00	6.00	2.00	*
Barium, mg/l	*	*	*	*	0.04	*	*	*
Cadmium, ug/l	*	*	*	*	20.00	<10.00	<10.00	*
Chromium-VI, ug/l	*	*	*	*	<10.00	*	*	*
Fluoride, mg/l	0.60	0.50	0.60	0.53	0.50	0.60	0.50	0.40
Lead, ug/l	*	*	*	*	<1.00	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	1.90	0.23	1.71	4.63	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	3.20	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	14.10	8.70	*	6.70	11.80	10.80	12.80
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

	10/31/1988	06/14/1989	10/23/1989	
pH-Field	8.00	7.80	*	
pH-Laboratory	7.90	8.00	7.80	
Specific conductance, umhos/cm @ 25c	2600.00	2500.00	2400.00	
Total Dissolved Solids, mg/l	1540.00	1620.00	1540.00	
Total Suspended Solids, mg/l	*	*	*	
Alkalinity Carbonate, mg/l as CaCO3	*	*	*	
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	
Alkalinity Total, mg/l as CaCO3	698.00	686.00	703.00	
Nitrate-N, mg/l	*	0.80	0.10	
Ammonia-N, mg/l	*	*	*	
Calcium, mg/l	20.00	8.90	17.00	
Magnesium, mg/l	9.00	6.50	7.00	
Potassium, mg/l	5.50	5.40	4.90	
Sodium, mg/l	520.00	490.00	575.00	
Sulfate, mg/l	590.00	532.00	541.00	
Methylene Blue Active Substances, mg/l	*	*	*	
Chloride, mg/l	14.90	15.98	9.20	
Iron, mg/l	*	*	0.60	
Zinc, mg/l	*	*	*	
Manganese, mg/l	*	*	0.12	
Copper, ug/l	*	*	*	
Silver, ug/l	*	*	*	
Strontium, mg/l	*	*	0.40	
Boron, mg/l	0.66	0.71	0.42	
Beryllium, ug/l	*	*	*	
Nickel, ug/l	*	*	*	
Selenium, ug/l	*	*	*	
Mercury, ug/l	*	*	*	
Arsenic, ug/l	*	*	*	
Barium, mg/l	*	*	*	
Cadmium, ug/l	*	*	*	
Chromium-VI, ug/l	*	*	*	
Fluoride, mg/l	0.40	0.50	0.50	
Lead, ug/l	*	*	*	
Molybdenum, mg/l	*	*	*	
Aluminum, mg/l	*	*	*	
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	
Cyanide, mg/l	*	*	*	
Phenol, ug/l	*	*	*	
Biochemical Oxygen Demand, mg/l	*	*	*	
Chemical Oxygen Demand, mg/l	*	*	*	
Total Organic Carbon, mg/l	*	*	*	
Temperature, Degrees C	*	12.90	*	6/8/90
Dissolved Oxygen, mg/l	*	*	*	
Water Level depth below ground surface, ft.	7.10	7.00	*2m31cm	2m13cm
Total Sulfur, mg/l	*	*	*	
Total Coliform Bacteria, # Col./100 ml	*	*	*	

SAMPLE LOCATION 14 = Monitoring Well # 14 -CCSPAGE 1

DATE	11/15/1979 PACE	12/11/1979 PACE	05/30/1980 PACE	10/05/1980 PACE	03/26/1981 PACE	06/10/1981 PACE	09/15/1981	09/15/1981 PACE
pH-Field	9.10	9.50	8.30	7.90	8.30	8.00	8.00	8.00
pH-Laboratory	9.20	9.70	8.10	7.60	7.90	8.00	7.80	7.80
Specific conductance, umhos/cm @ 25c	820.00	490.00	640.00	750.00	1540.00	1800.00	1790.00	1800.00
Total Dissolved Solids, mg/l	645.00	482.00	510.00	504.00	1610.00	1400.00	1880.00	1700.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	46.00	68.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	30.00	22.00	210.00	200.00	177.00	175.00	153.00	170.00
Alkalinity Total, mg/l as CaCO3	76.00	90.00	210.00	200.00	177.00	175.00	153.00	170.00
Nitrate-N, mg/l	<0.50	<0.25	<0.10	0.20	0.20	<0.10	0.23	<0.10
Ammonia-N, mg/l	0.20	<0.10	<0.10	*	*	*	*	*
Calcium, mg/l	39.00	23.00	36.00	34.00	150.00	160.00	200.00	190.00
Magnesium, mg/l	20.00	25.00	20.00	23.00	100.00	84.00	105.00	75.00
Potassium, mg/l	13.00	8.00	5.20	4.80	7.30	7.00	11.40	8.00
Sodium, mg/l	84.00	68.00	85.00	84.00	130.00	140.00	220.00	180.00
Sulfate, mg/l	350.00	240.00	140.00	150.00	950.00	900.00	1090.00	970.00
Methylene Blue Active Substances, mg/l	<0.10	<0.10	<0.10	*	*	*	*	*
Chloride, mg/l	<10.00	<10.00	<10.00	5.00	21.00	18.00	20.60	21.00
Iron, mg/l	1.60	2.00	6.50	0.35	<0.05	0.15	0.60	0.55
Zinc, mg/l	130.00	90.00	150.00	*	*	*	*	*
Manganese, mg/l	0.08	0.16	0.32	0.28	0.52	0.56	0.80	0.68
Copper, ug/l	<50.00	<50.00	<50.00	*	*	*	*	*
Silver, ug/l	<40.00	<40.00	<40.00	*	*	*	*	*
Strontium, mg/l	0.70	0.30	0.15	0.15	0.90	0.65	1.40	0.75
Boron, mg/l	0.20	0.20	<0.20	0.20	0.50	0.60	2.60	1.20
Beryllium, ug/l	<20.00	<20.00	<20.00	*	*	*	*	*
Nickel, ug/l	<50.00	<50.00	50.00	*	*	*	*	*
Selenium, ug/l	1.00	<1.00	<1.00	*	*	*	*	*
Mercury, ug/l	<0.20	0.70	0.40	*	*	*	*	*
Arsenic, ug/l	5.00	6.00	6.00	2.00	1.00	3.00	5.00	<1.00
Barium, mg/l	<0.20	<0.30	<0.30	*	*	*	*	*
Cadmium, ug/l	4.00	<1.00	<1.00	*	*	*	*	*
Chromium-VI, ug/l	15.00	<5.00	5.00	*	*	*	*	*
Fluoride, mg/l	0.30	0.30	0.30	0.40	0.20	0.40	0.10	0.20
Lead, ug/l	20.00	10.00	20.00	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<10.00	<2.00	<2.00	*	*	*	*	*
Cyanide, mg/l	<0.02	<0.02	0.04	*	*	*	*	*
Phenol, ug/l	24.00	6.00	3.00	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	7.00	8.50	8.00	6.00	5.80	3.80	3.90	3.90
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<2.00	<2.00	<2.00	*	*	*	*	*

SAMPLE LOCATION 14 = Monitoring Well # 14 -CCSPAGE 2

DATE	12/01/1981	05/25/1982	10/12/1982	04/26/1983	10/04/1983	05/16/1984	10/04/1984	05/13/1985
pH-Field	7.90	7.80	7.70	7.80	7.70	7.90	7.10	7.20
pH-Laboratory	7.60	7.50	7.60	7.50	7.30	7.30	7.20	7.10
Specific conductance, umhos/cm @ 25c	2400.00	3300.00	4500.00	3800.00	4500.00	6000.00	6100.00	6600.00
Total Dissolved Solids, mg/l	1930.00	2230.00	4090.00	4750.00	4504.00	6170.00	6120.00	6720.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	150.00	134.00	126.00	140.00	113.00	120.00	120.00	126.00
Alkalinity Total, mg/l as CaCO3	150.00	134.00	126.00	140.00	113.00	120.00	120.00	126.00
Nitrate-N, mg/l	0.25	0.31	<0.05	0.15	0.18	0.06	0.07	0.10
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	180.00	370.00	530.00	590.00	560.00	670.00	720.00	616.00
Magnesium, mg/l	115.00	180.00	250.00	280.00	253.00	298.00	330.00	325.00
Potassium, mg/l	11.00	12.00	14.00	12.00	12.00	12.00	16.00	12.00
Sodium, mg/l	210.00	250.00	342.00	380.00	350.00	475.00	495.00	465.00
Sulfate, mg/l	1200.00	1680.00	2630.00	3000.00	2900.00	3900.00	3900.00	4100.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	22.00	2.90	45.00	73.00	73.00	110.00	115.00	130.00
Iron, mg/l	<0.10	0.20	1.50	0.10	<0.10	0.10	0.30	<0.10
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	0.51	0.67	0.95	0.56	0.83	0.80	1.10	0.50
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	1.20	1.80	2.00	2.70	2.40	3.40	4.90	3.90
Boron, mg/l	1.80	3.10	15.00	20.00	14.00	24.00	24.00	32.00
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	1.00	2.00	10.00	1.00	1.00	1.00	1.00	<1.00
Barium, mg/l	*	*	*	*	*	*	*	0.19
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	<10.00
Fluoride, mg/l	0.10	0.20	0.40	1.00	1.20	1.50	1.60	1.50
Lead, ug/l	*	*	*	*	*	*	*	<10.00
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	3.70	3.30	5.00	4.20	4.70	4.20	4.50	4.00
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

DATE	05/13/1985 PACE	10/22/1985	06/19/1986	10/20/1986 BRAUN	10/20/1986	05/29/1987	10/07/1987	06/08/1988
pH-Field	*	7.00	7.30	*	7.44	7.40	7.70	7.40
pH-Laboratory	*	7.30	7.30	*	7.40	7.40	7.40	7.40
Specific conductance, umhos/cm @ 25c	7400.00	6950.00	7200.00	9000.00	9000.00	9800.00	9600.00	10600.00
Total Dissolved Solids, mg/l	6400.00	6980.00	7490.00	*	9820.00	10100.00	9270.00	10200.00
Total Suspended Solids, mg/l	*	*	*	5.00	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	130.00	146.00	149.00	160.00	174.00	*	*	*
Alkalinity Total, mg/l as CaCO3	130.00	146.00	149.00	160.00	174.00	150.00	177.00	163.00
Nitrate-N, mg/l	*	0.12	0.16	0.23	0.08	0.19	0.07	*
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	720.00	695.00	650.00	42.00	650.00	560.00	505.00	570.00
Magnesium, mg/l	410.00	416.00	560.00	510.00	810.00	1000.00	888.00	950.00
Potassium, mg/l	16.00	16.20	17.00	22.00	23.00	26.00	24.50	25.00
Sodium, mg/l	540.00	570.00	555.00	480.00	860.00	870.00	655.00	880.00
Sulfate, mg/l	4000.00	4360.00	5000.00	7400.00	5810.00	6300.00	5443.00	6700.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	140.00	155.00	190.00	310.00	250.00	310.00	286.47	350.00
Iron, mg/l	1.20	0.40	<0.10	0.96	0.40	<0.10	<0.01	*
Zinc, mg/l	*	*	*	*	<0.01	*	*	*
Manganese, mg/l	0.68	0.80	0.75	0.88	1.60	0.83	1.03	*
Copper, ug/l	*	*	*	*	20.00	*	*	*
Silver, ug/l	*	*	*	*	<10.00	*	*	*
Strontium, mg/l	4.40	4.50	6.00	9.00	7.30	6.40	5.50	*
Boron, mg/l	0.50	33.00	33.00	8.90	48.00	54.00	58.60	49.00
Beryllium, ug/l	*	*	*	*	<10.00	*	*	*
Nickel, ug/l	*	*	*	*	80.00	<50.00	<50.00	*
Selenium, ug/l	*	*	*	*	<1.00	*	*	*
Mercury, ug/l	*	*	*	*	<1.00	*	*	*
Arsenic, ug/l	3.00	3.00	<1.00	<5.00	<1.00	2.00	<1.00	*
Barium, mg/l	*	*	*	*	0.02	*	*	*
Cadmium, ug/l	*	*	*	*	40.00	<10.00	<10.00	*
Chromium-VI, ug/l	*	*	*	*	<10.00	*	*	*
Fluoride, mg/l	1.70	1.90	2.30	2.00	2.40	7.70	8.30	7.00
Lead, ug/l	*	*	*	*	<1.00	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	<0.90	0.02	<0.01	0.03	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	3.80	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	7.00	4.33	*	3.90	3.70	4.40	4.80
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

	10/31/1988	06/14/1989	10/23/1989	
pH-Field	7.60	7.50	*	
pH-Laboratory	7.40	7.60	7.40	
Specific conductance, umhos/cm @ 25c	10300.00	9000.00	8600.00	
Total Dissolved Solids, mg/l	9700.00	8920.00	8400.00	
Total Suspended Solids, mg/l	*	*	*	
Alkalinity Carbonate, mg/l as CaCO3	*	*	*	
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	
Alkalinity Total, mg/l as CaCO3	175.00	162.00	162.00	
Nitrate-N, mg/l	*	0.19	0.20	
Ammonia-N, mg/l	*	*	*	
Calcium, mg/l	550.00	420.00	465.00	
Magnesium, mg/l	860.00	740.00	785.00	
Potassium, mg/l	28.00	24.00	28.00	
Sodium, mg/l	815.00	785.00	825.00	
Sulfate, mg/l	5900.00	5240.00	5310.00	
Methylene Blue Active Substances, mg/l	*	*	*	
Chloride, mg/l	325.00	381.00	359.83	
Iron, mg/l	*	*	<0.10	
Zinc, mg/l	*	*	*	
Manganese, mg/l	*	*	1.20	
Copper, ug/l	*	*	*	
Silver, ug/l	*	*	*	
Strontium, mg/l	*	*	4.60	
Boron, mg/l	41.60	59.80	47.00	
Beryllium, ug/l	*	*	*	
Nickel, ug/l	*	*	*	
Selenium, ug/l	*	*	*	
Mercury, ug/l	*	*	*	
Arsenic, ug/l	*	*	*	
Barium, mg/l	*	*	*	
Cadmium, ug/l	*	*	*	
Chromium-VI, ug/l	*	*	*	
Fluoride, mg/l	6.50	8.50	7.90	
Lead, ug/l	*	*	*	
Molybdenum, mg/l	*	*	*	
Aluminum, mg/l	*	*	*	
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	
Cyanide, mg/l	*	*	*	
Phenol, ug/l	*	*	*	
Biochemical Oxygen Demand, mg/l	*	*	*	
Chemical Oxygen Demand, mg/l	*	*	*	
Total Organic Carbon, mg/l	*	*	*	
Temperature, Degrees C	*	11.30	*	6/8/90
Dissolved Oxygen, mg/l	*	*	*	
Water Level depth below ground surface, ft.	7.04	8.10	* 3m 42 cm	3m 12cm
Total Sulfur, mg/l	*	*	*	
Total Coliform Bacteria, # Col./100 ml	*	*	*	

SAMPLE LOCATION 15 = Monitoring Well # 15 -CCSPAGE 1

DATE	11/14/1979 PACE	12/11/1979 PACE	05/30/1980 PACE	10/05/1980 PACE	03/26/1981 PACE	06/10/1981 PACE	09/15/1981 PACE	09/15/1981 PACE
pH-Field	7.70	7.60	7.20	7.50	8.30	7.60	7.60	7.60
pH-Laboratory	8.10	8.30	7.70	7.40	7.60	7.80	7.60	7.60
Specific conductance, umhos/cm @ 25c	990.00	900.00	870.00	950.00	1730.00	2000.00	2340.00	2500.00
Total Dissolved Solids, mg/l	670.00	688.00	590.00	558.00	1760.00	1600.00	2430.00	2200.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	308.00	320.00	300.00	320.00	399.00	390.00	276.00	330.00
Alkalinity Total, mg/l as CaCO3	308.00	320.00	300.00	320.00	399.00	390.00	276.00	330.00
Nitrate-N, mg/l	15.00	24.00	11.00	6.40	7.20	4.90	1.70	1.00
Ammonia-N, mg/l	<0.20	<0.10	<0.10	*	*	*	*	*
Calcium, mg/l	74.00	69.00	64.00	72.00	160.00	190.00	265.00	260.00
Magnesium, mg/l	66.00	110.00	62.00	50.00	150.00	160.00	210.00	160.00
Potassium, mg/l	5.20	6.60	5.40	5.60	8.50	8.60	15.70	13.00
Sodium, mg/l	42.00	44.00	40.00	53.00	98.00	100.00	190.00	160.00
Sulfate, mg/l	160.00	200.00	180.00	120.00	850.00	850.00	1400.00	1400.00
Methylene Blue Active Substances, mg/l	<0.10	<0.10	<0.10	*	*	*	*	*
Chloride, mg/l	<10.00	<10.00	<10.00	3.00	6.00	12.00	30.80	32.00
Iron, mg/l	3.20	3.60	3.10	0.15	<0.05	20.00	2.80	1.00
Zinc, mg/l	60.00	30.00	<10.00	*	*	*	*	*
Manganese, mg/l	0.32	0.40	0.16	<0.04	<0.04	0.56	0.20	<0.04
Copper, ug/l	50.00	<50.00	<50.00	*	*	*	*	*
Silver, ug/l	40.00	<40.00	<40.00	*	*	*	*	*
Strontium, mg/l	0.65	0.70	0.30	0.40	1.10	1.00	2.30	1.30
Boron, mg/l	<0.20	<0.20	<0.20	<0.20	0.20	0.10	3.10	1.80
Beryllium, ug/l	<20.00	<20.00	<20.00	*	*	*	*	*
Nickel, ug/l	300.00	<50.00	50.00	*	*	*	*	*
Selenium, ug/l	<1.00	<1.00	<1.00	*	*	*	*	*
Mercury, ug/l	<0.20	0.50	0.20	*	*	*	*	*
Arsenic, ug/l	3.00	3.00	1.00	<1.00	<1.00	8.00	<1.00	<1.00
Barium, mg/l	0.40	<0.30	<0.30	*	*	*	*	*
Cadmium, ug/l	5.00	<1.00	<1.00	*	*	*	*	*
Chromium-VI, ug/l	5.00	<5.00	<5.00	*	*	*	*	*
Fluoride, mg/l	0.30	0.10	0.20	0.40	0.20	0.20	0.10	0.20
Lead, ug/l	20.00	10.00	10.00	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<1.00	<2.00	<2.00	*	*	*	*	*
Cyanide, mg/l	<0.02	<0.02	<0.02	*	*	*	*	*
Phenol, ug/l	6.00	<3.00	<2.00	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	4.00	5.50	5.50	4.00	2.00	2.80	3.30	3.30
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<1.00	<2.00	<2.00	*	*	*	*	*

ATE	12/03/1981	05/25/1982	10/13/1982	04/26/1983	10/04/1983	05/16/1984	10/04/1984	05/13/1985
H-Field	7.60	7.60	7.70	7.70	8.00	7.50	7.40	7.60
H-Laboratory	7.30	7.40	7.40	7.50	7.20	7.30	7.20	7.00
pecific conductance, umhos/cm @ 25c	3100.00	3500.00	2600.00	3800.00	5400.00	5100.00	6100.00	7700.00
otal Dissolved Solids, mg/l	2960.00	2700.00	4720.00	4190.00	5340.00	5060.00	5960.00	7820.00
otal Suspended Solids, mg/l	*	*	*	*	*	*	*	*
lkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
lkalinity Bicarbonate, mg/l as CaCO3	250.00	263.00	228.00	280.00	227.00	344.00	283.00	405.00
lkalinity Total, mg/l as CaCO3	250.00	263.00	228.00	280.00	227.00	344.00	283.00	405.00
itrate-N, mg/l	1.30	0.59	<0.05	0.32	0.18	0.03	0.10	0.08
mmonia-N, mg/l	*	*	*	*	*	*	*	*
alcium, mg/l	290.00	340.00	490.00	450.00	540.00	460.00	620.00	629.00
agnesium, mg/l	260.00	300.00	410.00	340.00	390.00	330.00	410.00	535.00
otassium, mg/l	16.00	13.00	19.00	14.00	20.00	15.00	21.00	18.00
odium, mg/l	220.00	200.00	320.00	320.00	365.00	410.00	390.00	565.00
ulfate, mg/l	2100.00	2100.00	2870.00	2800.00	3400.00	3400.00	3700.00	4500.00
ethylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
hloride, mg/l	37.00	40.40	77.00	69.00	95.00	102.00	140.00	210.00
ron, mg/l	0.10	0.20	1.30	<0.10	<0.10	<0.10	<0.10	0.10
inc, mg/l	*	*	*	*	*	*	*	*
anganese, mg/l	0.02	0.03	0.11	0.01	0.07	0.02	0.10	<0.01
opper, ug/l	*	*	*	*	*	*	*	*
ilver, ug/l	*	*	*	*	*	*	*	*
trontium, mg/l	1.90	1.90	2.30	2.10	2.80	2.30	4.00	3.20
oron, mg/l	2.70	2.40	15.00	10.70	17.00	15.00	20.00	28.00
eryllium, ug/l	*	*	*	*	*	*	*	*
ickel, ug/l	*	*	*	*	*	*	*	*
elenium, ug/l	*	*	*	*	*	*	*	*
ercury, ug/l	*	*	*	*	*	*	*	*
rsenic, ug/l	<1.00	<1.00	<1.00	1.00	<1.00	1.00	<1.00	<1.00
arium, mg/l	*	*	*	*	*	*	*	0.04
admium, ug/l	*	*	*	*	*	*	*	*
hromium-VI, ug/l	*	*	*	*	*	1.00	*	<10.00
luoride, mg/l	<0.10	0.10	0.10	0.10	0.20	0.30	0.30	0.20
ead, ug/l	*	*	*	*	*	14.00	*	<10.00
olybdenum, mg/l	*	*	*	*	*	*	*	*
luminum, mg/l	*	*	*	*	*	*	*	*
ecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
yanide, mg/l	*	*	*	*	*	*	*	*
henol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
hemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
otal Organic Carbon, mg/l	*	*	*	*	*	*	*	*
emperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	2.70	1.60	1.70	1.80	2.50	1.80	2.10	1.40
otal Sulfur, mg/l	*	*	*	*	*	*	*	*
otal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 15 = Monitoring Well # 15 -CCSPAGE 3

AIE	05/13/1985 PACE	10/22/1985	06/19/1986	10/20/1986 BRAUN	10/20/1986	05/29/1987	10/05/1987	10/05/1987 PACE
H-Field	*	6.80	7.00	*	7.31	7.25	7.10	*
H-Laboratory	*	7.10	7.00	*	7.20	7.20	7.50	*
pecific conductance, umhos/cm @ 25c	8600.00	7600.00	7900.00	7900.00	8000.00	8500.00	9900.00	9400.00
otal Dissolved Solids, mg/l	7800.00	7580.00	8040.00	*	8430.00	8460.00	9470.00	9700.00
otal Suspended Solids, mg/l	*	*	*	8.00	*	*	*	*
lkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	*	*	*
lkalinity Bicarbonate, mg/l as CaCO3	380.00	539.00	523.00	340.00	349.00	*	*	*
lkalinity Total, mg/l as CaCO3	380.00	539.00	523.00	340.00	349.00	343.00	372.00	330.00
itrate-N, mg/l	*	0.49	0.09	0.46	0.36	0.41	0.37	0.40
mmonia-N, mg/l	*	*	*	*	*	*	*	*
alcium, mg/l	720.00	695.00	645.00	12.00	*	650.00	664.00	500.00
agnesium, mg/l	700.00	620.00	725.00	540.00	690.00	740.00	889.00	850.00
otassium, mg/l	22.00	21.20	19.00	34.00	64.00	23.00	15.50	28.00
odium, mg/l	600.00	635.00	600.00	700.00	650.00	735.00	830.00	770.00
ulfate, mg/l	5000.00	4600.00	5400.00	6100.00	5020.00	5300.00	6000.70	5600.00
ethylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
nloride, mg/l	210.00	211.00	231.00	330.00	220.00	240.00	265.64	290.00
ron, mg/l	0.42	<0.10	<0.10	0.60	<0.10	<0.10	<0.01	0.07
inc, mg/l	*	*	*	*	<0.01	*	*	*
anganese, mg/l	0.04	<0.01	0.03	<0.03	<0.01	0.01	<0.01	0.03
opper, ug/l	*	*	*	*	20.00	*	*	*
ilver, ug/l	*	*	*	*	<10.00	*	*	*
trontium, mg/l	3.70	3.50	3.80	5.70	4.60	4.20	4.90	5.60
oron, mg/l	29.00	28.00	25.00	9.70	36.00	32.00	51.60	59.00
eryllium, ug/l	*	*	*	*	<10.00	*	*	*
ickel, ug/l	*	*	*	*	540.00	<50.00	<50.00	*
elenium, ug/l	*	*	*	*	<1.00	*	*	*
ercury, ug/l	*	*	*	*	<1.00	*	*	*
rsenic, ug/l	<1.00	<1.00	<1.00	<5.00	<1.00	<1.00	<1.00	*
arium, mg/l	*	*	*	*	0.02	*	*	*
admium, ug/l	*	*	*	*	<10.00	<10.00	<10.00	*
hromium-VI, ug/l	*	*	*	*	<10.00	*	*	*
luoride, mg/l	0.20	0.20	0.20	0.22	0.30	0.50	0.52	0.60
ead, ug/l	*	*	*	*	<1.00	*	*	*
olybdenum, mg/l	*	*	*	*	*	*	*	*
luminum, mg/l	*	*	*	<0.90	<0.01	<0.01	<0.01	*
ecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
yanide, mg/l	*	*	*	*	*	*	*	*
henol, ug/l	*	*	*	*	*	*	*	*
iochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
hemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
otal Organic Carbon, mg/l	*	*	*	*	*	*	*	*
emperature, Degrees C	*	*	*	*	*	*	11.30	*
issolved Oxygen, mg/l	*	*	*	*	*	*	*	*
ater Level depth below ground surface, ft.	*	2.90	2.66	*	3.30	1.80	3.30	*
otal Sulfur, mg/l	*	*	*	*	*	*	*	*
otal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 15 = Monitoring Well # 15 -CCSPAGE 4

ATE	06/09/1988	11/01/1988	06/12/1989	10/25/1989	
H-Field	7.40	7.50	1.00	7.20	
H-Laboratory	7.20	7.30	7.30	7.10	
pecific conductance, umhos/cm @ 25c	9500.00	8700.00	9000.00	7800.00	
otal Dissolved Solids, mg/l	9090.00	7810.00	9380.00	7792.00	
otal Suspended Solids, mg/l	*	*	*	*	
lkalinity Carbonate, mg/l as CaCO3	*	*	*	*	
lkalinity Bicarbonate, mg/l as CaCO3	*	*	*	*	
lkalinity Total, mg/l as CaCO3	350.00	356.00	358.00	350.00	
itrate-N, mg/l	*	*	0.46	0.04	
mmonia-N, mg/l	*	*	*	*	
alcium, mg/l	525.00	520.00	547.00	475.00	
agnesium, mg/l	840.00	690.00	765.00	725.00	
otassium, mg/l	24.00	25.00	24.00	25.00	
odium, mg/l	790.00	670.00	795.00	660.00	
ulfate, mg/l	6000.00	*	5700.00	5130.00	
ethylene Blue Active Substances, mg/l	*	*	*	*	
hloride, mg/l	250.00	250.00	277.00	285.00	
ron, mg/l	*	*	*	0.30	
inc, mg/l	*	*	*	*	
anganese, mg/l	*	*	*	0.10	
opper, ug/l	*	*	*	*	
ilver, ug/l	*	*	*	*	
trontium, mg/l	*	*	*	4.00	
oron, mg/l	47.00	39.50	47.70	36.00	
eryllium, ug/l	*	*	*	*	
ickel, ug/l	*	*	*	*	
elenium, ug/l	*	*	*	*	
ercury, ug/l	*	*	*	*	
rsenic, ug/l	*	*	*	*	
arium, mg/l	*	*	*	*	
admium, ug/l	*	*	*	*	
hromium-VI, ug/l	*	*	*	*	
luoride, mg/l	0.70	0.60	0.10	0.60	
ead, ug/l	*	*	*	*	
olybdenum, mg/l	*	*	*	*	
luminum, mg/l	*	*	*	*	
ecal Coliform Bacteria, # Col./100 ml	*	*	*	*	
yanide, mg/l	*	*	*	*	
henol, ug/l	*	*	*	*	
iochemical Oxygen Demand, mg/l	*	*	*	*	
hemical Oxygen Demand, mg/l	*	*	*	*	
otal Organic Carbon, mg/l	*	*	*	*	
emperature, Degrees C	*	*	*	*	
issolved Oxygen, mg/l	*	*	*	*	6/7/90
ater Level depth below ground surface, ft.	5.30	7.05	5.40	*2m51cm	2m22cm
otal Sulfur, mg/l	*	*	*	*	
otal Coliform Bacteria, # Col./100 ml	*	*	*	*	

SAMPLE LOCATION 16 = Monitoring Well # 16 -CCSPAGE 1

DATE	05/30/1980 PACE	10/05/1980 PACE	03/26/1981 PACE	06/10/1981 PACE	09/16/1981	09/16/1981 PACE	12/03/1981	05/25/1982
pH-Field	8.00	7.40	7.80	7.30	7.10	7.10	7.50	7.60
pH-Laboratory	8.00	7.10	7.40	7.90	7.20	7.20	7.20	7.40
Specific conductance, umhos/cm @ 25c	690.00	620.00	840.00	800.00	710.00	650.00	840.00	1020.00
Total Dissolved Solids, mg/l	494.00	530.00	558.00	500.00	2430.00	500.00	570.00	350.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	200.00	300.00	266.00	276.00	279.00	330.00	300.00	308.00
Alkalinity Total, mg/l as CaCO3	200.00	300.00	266.00	276.00	279.00	330.00	300.00	308.00
Nitrate-N, mg/l	0.10	0.50	0.50	0.80	0.78	0.50	0.85	2.35
Ammonia-N, mg/l	0.10	*	*	*	*	*	*	*
Calcium, mg/l	49.00	53.00	57.00	69.00	67.00	66.00	75.00	87.00
Magnesium, mg/l	28.00	33.00	31.00	40.00	39.00	39.00	45.00	37.00
Potassium, mg/l	6.10	3.40	4.00	3.30	6.00	4.50	5.10	4.50
Sodium, mg/l	55.00	63.00	66.00	71.00	68.00	55.00	77.00	68.00
Sulfate, mg/l	180.00	160.00	180.00	180.00	170.00	160.00	210.00	200.00
Methylene Blue Active Substances, mg/l	<0.10	*	*	*	*	*	*	*
Chloride, mg/l	<10.00	2.00	4.00	3.00	3.60	3.00	2.80	2.60
Iron, mg/l	1.50	0.55	0.05	0.20	1.00	<0.05	<0.01	0.10
Zinc, mg/l	30.00	*	*	*	*	*	*	*
Manganese, mg/l	0.28	0.40	0.12	0.12	0.40	0.32	0.43	0.03
Copper, ug/l	<50.00	*	*	*	*	*	*	*
Silver, ug/l	<40.00	*	*	*	*	*	*	*
Strontium, mg/l	0.20	0.20	0.35	0.25	0.60	0.20	0.50	0.40
Boron, mg/l	<0.20	<0.20	<0.20	<0.20	0.10	<0.20	0.20	0.20
Beryllium, ug/l	<20.00	*	*	*	*	*	*	*
Nickel, ug/l	50.00	*	*	*	*	*	*	*
Selenium, ug/l	<1.00	*	*	*	*	*	*	*
Mercury, ug/l	0.60	*	*	*	*	*	*	*
Arsenic, ug/l	2.00	5.00	<1.00	<1.00	2.00	1.00	<1.00	1.00
Barium, mg/l	<0.30	*	*	*	*	*	*	*
Cadmium, ug/l	<1.00	*	*	*	*	*	*	*
Chromium-VI, ug/l	<5.00	*	*	*	*	*	*	*
Fluoride, mg/l	0.40	0.60	0.80	1.00	0.30	0.60	0.60	0.70
Lead, ug/l	<10.00	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*
Cyanide, mg/l	<0.02	*	*	*	*	*	*	*
Phenol, ug/l	<2.00	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	8.00	7.50	7.40	6.70	7.80	7.80	8.20	5.70
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*

SAMPLE LOCATION 16 = Monitoring Well # 16 -CCSPAGE 2

ATE	10/13/1982	04/26/1983	10/04/1983	05/16/1984	10/04/1984	05/14/1985	10/22/1985	06/19/1986
H-Field	7.70	7.60	7.70	7.70	7.50	7.10	6.80	7.10
H-Laboratory	7.40	7.40	7.20	7.30	7.30	7.00	7.30	7.30
pecific conductance, umhos/cm @ 25c	900.00	730.00	850.00	930.00	960.00	910.00	930.00	1910.00
otal Dissolved Solids, mg/l	470.00	557.00	627.00	633.00	565.00	550.00	546.00	581.00
otal Suspended Solids, mg/l	*	*	*	*	*	*	*	*
lkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
lkalinity Bicarbonate, mg/l as CaCO3	292.00	318.00	314.00	323.00	326.00	335.00	345.00	340.00
lkalinity Total, mg/l as CaCO3	292.00	318.00	314.00	323.00	326.00	335.00	345.00	340.00
itrate-N, mg/l	1.10	1.40	0.97	2.50	0.62	2.20	0.61	2.20
mmonia-N, mg/l	*	*	*	*	*	*	*	*
alcium, mg/l	81.00	78.00	78.00	81.00	81.00	73.00	77.00	76.00
agnesium, mg/l	37.00	38.00	37.00	36.00	40.00	37.00	38.00	43.00
otassium, mg/l	4.10	3.90	3.80	3.70	4.60	3.20	4.30	3.10
odium, mg/l	61.00	67.00	67.00	61.00	67.00	57.00	67.00	62.00
ulfate, mg/l	190.00	180.00	145.00	190.00	190.00	150.00	167.00	170.00
ethylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
hloride, mg/l	2.80	2.30	2.30	2.60	2.70	0.26	2.60	2.00
ron, mg/l	0.20	0.10	<0.10	0.20	0.30	0.10	0.30	<0.10
inc, mg/l	*	*	*	*	*	*	*	*
anganese, mg/l	0.09	0.01	<0.01	0.02	0.02	0.01	0.02	0.02
opper, ug/l	*	*	*	*	*	*	*	*
ilver, ug/l	*	*	*	*	*	*	*	*
trontium, mg/l	0.40	0.40	0.40	0.40	0.50	0.30	0.40	0.40
oron, mg/l	0.20	0.10	0.14	0.14	0.18	0.17	0.17	0.11
eryllium, ug/l	*	*	*	*	*	*	*	*
ickel, ug/l	*	*	*	*	*	*	*	*
elenium, ug/l	*	*	*	*	*	*	*	*
ercury, ug/l	*	*	*	*	*	*	*	*
rsenic, ug/l	1.00	1.00	<1.00	1.00	<1.00	<1.00	<1.00	<1.00
arium, mg/l	*	*	*	*	*	*	*	*
admium, ug/l	*	*	*	*	*	*	*	*
hromium-VI, ug/l	*	*	*	*	*	*	*	*
luoride, mg/l	0.60	0.70	0.60	0.70	0.60	0.60	0.60	0.70
ead, ug/l	*	*	*	*	*	*	*	*
olybdenum, mg/l	*	*	*	*	*	*	*	*
luminum, mg/l	*	*	*	*	*	*	*	*
ecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
yanide, mg/l	*	*	*	*	*	*	*	*
henol, ug/l	*	*	*	*	*	*	*	*
iochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
hemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
otal Organic Carbon, mg/l	*	*	*	*	*	*	*	*
emperature, Degrees C	*	*	*	*	*	*	*	*
issolved Oxygen, mg/l	*	*	*	*	*	*	*	*
ater Level depth below ground surface, ft.	6.60	6.20	7.70	4.70	7.30	5.10	8.90	5.50
otal Sulfur, mg/l	*	*	*	*	*	*	*	*
otal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 16 = Monitoring Well # 16 -CCSPAGE 3

ATE	10/21/1986	06/01/1987	10/07/1987	06/13/1988	10/31/1988	06/15/1989	10/25/1989
H-Field	7.53	7.70	7.60	7.30	7.60	7.30	7.30
H-Laboratory	7.30	7.30	7.50	7.20	7.30	7.30	7.30
pecific conductance, umhos/cm @ 25c	900.00	940.00	1000.00	1000.00	1040.00	975.00	980.00
otal Dissolved Solids, mg/l	593.00	591.00	581.00	591.00	688.00	591.00	607.00
otal Suspended Solids, mg/l	*	*	*	*	*	*	*
lkalinity Carbonate, mg/l as CaCO3	<1.00	*	*	*	*	*	*
lkalinity Bicarbonate, mg/l as CaCO3	349.00	*	*	*	*	*	*
lkalinity Total, mg/l as CaCO3	349.00	308.00	352.00	346.00	348.00	340.00	337.00
itrate-N, mg/l	0.54	1.89	0.45	*	*	1.20	1.20
mmonia-N, mg/l	*	*	*	*	*	*	*
alcium, mg/l	70.00	80.00	75.00	74.00	91.00	77.00	73.30
agnesium, mg/l	47.00	43.00	46.00	42.00	69.00	40.00	44.90
otassium, mg/l	4.20	3.80	4.10	2.80	5.60	4.00	4.70
odium, mg/l	71.00	67.00	69.00	70.00	89.00	52.00	72.00
ulfate, mg/l	200.00	190.00	150.50	200.00	245.00	134.00	177.46
ethylene Blue Active Substances, mg/l	*	*	*	*	*	*	*
hloride, mg/l	3.00	3.10	3.04	3.40	6.80	3.80	3.21
ron, mg/l	<0.10	<0.10	<0.01	*	*	*	0.04
inc, mg/l	<0.01	*	*	*	*	*	*
anganese, mg/l	<0.01	<0.01	<0.01	*	*	*	0.12
opper, ug/l	<10.00	*	*	*	*	*	*
ilver, ug/l	<10.00	*	*	*	*	*	*
trontium, mg/l	0.50	0.50	0.40	*	*	*	0.46
oron, mg/l	0.14	0.11	0.10	0.13	1.80	0.14	0.18
eryllium, ug/l	<10.00	*	*	*	*	*	*
ickel, ug/l	10.00	<50.00	<50.00	*	*	*	*
elenium, ug/l	<1.00	*	*	*	*	*	*
ercury, ug/l	<1.00	*	*	*	*	*	*
rsenic, ug/l	<1.00	6.00	<1.00	*	*	*	*
arium, mg/l	0.04	*	*	*	*	*	*
admium, ug/l	<10.00	<10.00	<10.00	*	*	*	*
hromium-VI, ug/l	<10.00	*	*	*	*	*	*
luoride, mg/l	0.60	0.70	0.56	0.60	0.60	0.50	0.60
ead, ug/l	<1.00	*	*	*	*	*	*
olybdenum, mg/l	*	*	*	*	*	*	*
luminum, mg/l	<0.01	0.04	<0.01	*	*	*	*
ecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*
yanide, mg/l	*	*	*	*	*	*	*
henol, ug/l	*	*	*	*	*	*	*
iochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
hemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
otal Organic Carbon, mg/l	*	*	*	*	*	*	*
emperature, Degrees C	*	*	10.50	*	*	8.40	*
issolved Oxygen, mg/l	*	*	*	*	*	*	*
ater Level depth below ground surface, ft.	6.90	5.10	6.90	7.30	9.06	9.60	*
otal Sulfur, mg/l	*	*	*	*	*	*	*
otal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*

C1

3m 17m 2m 4

:E	05/30/1980 PACE	10/07/1980 PACE	03/26/1981 PACE	06/10/1981 PACE	09/15/1981	09/15/1981 PACE	12/01/1981	05/25/1982
-Field	7.80	7.30	8.20	7.40	7.70	7.70	7.60	7.50
-Laboratory	8.00	7.90	7.50	7.90	7.70	7.70	7.30	7.50
ecific conductance, umhos/cm @ 25c	740.00	700.00	700.00	700.00	640.00	600.00	730.00	760.00
al Dissolved Solids, mg/l	450.00	466.00	488.00	450.00	448.00	450.00	430.00	270.00
al Suspended Solids, mg/l	*	*	*	*	*	*	*	*
alinity Carbonate, mg/l as CaCO3	1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
alinity Bicarbonate, mg/l as CaCO3	260.00	240.00	249.00	252.00	255.00	288.00	360.00	290.00
alinity Total, mg/l as CaCO3	260.00	240.00	249.00	252.00	255.00	288.00	360.00	290.00
rate-N, mg/l	14.00	<0.10	0.10	1.20	0.23	<0.10	0.21	0.52
onia-N, mg/l	0.10	*	*	*	*	*	*	*
lcium, mg/l	46.00	75.00	83.00	87.00	83.00	80.00	76.00	154.00
gnesium, mg/l	65.00	37.00	33.00	44.00	39.00	36.00	41.00	50.00
assium, mg/l	1.50	2.30	2.70	2.30	4.40	3.90	3.90	5.00
dium, mg/l	29.00	31.00	30.00	30.00	32.00	25.00	31.00	32.00
lfate, mg/l	70.00	120.00	160.00	160.00	157.00	140.00	160.00	140.00
thylene Blue Active Substances, mg/l	0.10	*	*	*	*	*	*	*
loride, mg/l	10.00	3.00	3.00	3.00	2.50	3.00	3.80	2.70
on, mg/l	2.00	1.10	0.45	0.15	9.10	0.50	0.30	30.50
nc, mg/l	30.00	*	*	*	*	*	*	*
nganese, mg/l	0.12	0.28	0.52	0.20	0.40	0.40	0.33	1.20
pper, ug/l	50.00	*	*	*	*	*	*	*
lver, ug/l	40.00	*	*	*	*	*	*	*
rontium, mg/l	0.15	0.30	0.30	0.25	0.50	0.20	0.30	0.40
ron, mg/l	0.20	<0.20	<0.20	<0.20	0.10	<0.20	0.70	0.20
ryllium, ug/l	20.00	*	*	*	*	*	*	*
ckel, ug/l	50.00	*	*	*	*	*	*	*
lenium, ug/l	1.00	*	*	*	*	*	*	*
rcury, ug/l	0.60	*	*	*	*	*	*	*
senic, ug/l	2.00	5.00	<1.00	<1.00	3.50	3.00	1.00	7.00
rium, mg/l	0.30	0.30	*	*	*	*	*	*
dmium, ug/l	1.00	*	*	*	*	*	*	*
romium-VI, ug/l	5.00	*	*	*	*	*	*	*
uoride, mg/l	0.10	*	0.30	0.30	0.10	0.20	0.10	0.20
ad, ug/l	10.00	*	*	*	*	*	*	*
lybdenum, mg/l	*	*	*	*	*	*	*	*
minum, mg/l	*	*	*	*	*	*	*	*
tal Coliform Bacteria, # Col./100 ml	2.00	*	*	*	*	*	*	*
anide, mg/l	0.02	*	*	*	*	*	*	*
enol, ug/l	3.00	*	*	*	*	*	*	*
ochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
emical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
tal Organic Carbon, mg/l	*	*	*	*	*	*	*	*
mperature, Degrees C	*	*	*	*	*	*	*	*
ssolved Oxygen, mg/l	*	*	*	*	*	*	*	*
ter Level depth below ground surface, ft.	7.50	9.50	7.40	7.40	7.80	7.80	7.80	7.70
tal Sulfur, mg/l	*	*	*	*	*	*	*	*
tal Coliform Bacteria, # Col./100 ml	2.00	*	*	*	*	*	*	*

SAMPLE LOCATION 17 = Monitoring Well # 17 -COSPAGE 2

TE	10/13/1982	04/26/1983	10/04/1983	05/17/1984	10/04/1984	05/14/1985	10/22/1985	06/20/1986
-Field	7.80	7.50	8.00	8.20	7.30	7.00	6.80	7.00
-Laboratory	7.40	7.40	7.20	7.30	7.30	7.00	7.20	7.30
ecific conductance, umhos/cm @ 25c	730.00	630.00	710.00	790.00	830.00	1200.00	1580.00	2400.00
tal Dissolved Solids, mg/l	430.00	489.00	496.00	538.00	529.00	874.00	1240.00	1930.00
tal Suspended Solids, mg/l	*	*	*	*	*	*	*	*
kalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
kalinity Bicarbonate, mg/l as CaCO3	282.00	265.00	540.00	281.00	271.00	231.00	307.00	339.00
kalinity Total, mg/l as CaCO3	282.00	265.00	540.00	281.00	271.00	231.00	307.00	339.00
trate-N, mg/l	0.22	0.65	0.18	0.27	0.35	0.46	0.78	0.06
monia-N, mg/l	*	*	*	*	*	*	*	*
lcium, mg/l	91.00	85.00	84.00	86.00	92.00	109.00	193.00	315.00
gnesium, mg/l	35.00	37.00	34.00	32.00	38.00	42.00	82.00	135.00
tassium, mg/l	3.50	3.00	2.80	3.20	3.40	2.60	4.30	3.90
dium, mg/l	27.00	29.00	27.00	34.00	31.00	28.00	43.00	52.00
lfate, mg/l	160.00	160.00	174.00	165.00	195.00	220.00	576.00	1100.00
thylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
loride, mg/l	2.80	2.50	2.50	3.00	3.40	12.00	22.00	40.00
on, mg/l	0.90	0.70	0.20	2.80	<0.10	0.60	0.40	<0.10
nc, mg/l	*	*	*	*	*	*	*	*
nganese, mg/l	0.31	0.28	0.17	0.36	0.10	0.40	0.46	0.14
pper, ug/l	*	*	*	*	*	*	*	*
lver, ug/l	*	*	*	*	*	*	*	*
ontium, mg/l	0.30	0.30	0.30	0.30	0.40	0.40	0.60	0.90
on, mg/l	0.10	0.10	0.09	0.08	0.12	0.11	0.18	0.12
yllium, ug/l	*	*	*	*	*	*	*	*
ckel, ug/l	*	*	*	*	*	*	*	*
lenium, ug/l	*	*	*	*	*	*	*	*
rcury, ug/l	*	*	*	*	*	*	*	*
senic, ug/l	1.00	1.00	1.00	2.00	<1.00	1.00	2.00	<1.00
rium, mg/l	*	*	*	*	*	*	*	*
dmium, ug/l	*	*	*	*	*	*	*	*
romium-VI, ug/l	*	*	*	*	*	*	*	*
uoride, mg/l	0.20	0.20	0.20	0.30	0.20	0.20	0.20	0.20
ad, ug/l	*	*	*	*	*	*	*	*
lybdenum, mg/l	*	*	*	*	*	*	*	*
minum, mg/l	*	*	*	*	*	*	*	*
cal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
anide, mg/l	*	*	*	*	*	*	*	*
enol, ug/l	*	*	*	*	*	*	*	*
ochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
emical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
tal Organic Carbon, mg/l	*	*	*	*	*	*	*	*
mperature, Degrees C	*	*	*	*	*	*	*	*
ssolved Oxygen, mg/l	*	*	*	*	*	*	*	*
ter Level depth below ground surface, ft.	8.20	6.70	7.70	6.40	6.90	5.80	8.20	6.66
tal Sulfur, mg/l	*	*	*	*	*	*	*	*
tal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

ATE	10/21/1986	06/01/1987	10/05/1987	06/08/1988	10/31/1988	06/14/1989	10/25/1989
H-Field	7.27	7.16	7.00	6.80	7.20	6.80	7.00
H-Laboratory	7.20	7.00	6.90	7.00	7.00	6.90	6.80
pecific conductance, umhos/cm @ 25c	2900.00	3800.00	4100.00	4400.00	5000.00	5400.00	680.00
otal Dissolved Solids, mg/l	2580.00	3470.00	3501.00	3320.00	4410.00	5130.00	6890.00
otal Suspended Solids, mg/l	*	*	*	*	*	*	*
lkalinity Carbonate, mg/l as CaCO3	<1.00	*	*	*	*	*	*
lkalinity Bicarbonate, mg/l as CaCO3	359.00	*	*	*	*	*	*
lkalinity Total, mg/l as CaCO3	359.00	366.00	416.00	444.00	445.00	466.00	415.00
itrate-N, mg/l	0.07	0.24	0.08	*	*	0.07	0.02
mmonia-N, mg/l	*	*	*	*	*	*	*
alcium, mg/l	340.00	530.00	515.00	585.00	640.00	734.00	800.00
agnesium, mg/l	200.00	250.00	247.00	250.00	325.00	330.00	450.00
otassium, mg/l	6.20	6.80	7.40	7.30	11.00	11.00	17.00
odium, mg/l	60.00	94.00	108.00	134.00	189.00	275.00	405.00
ulfate, mg/l	1400.00	1900.00	1947.00	2200.00	2600.00	2915.00	4260.00
ethylene Blue Active Substances, mg/l	*	*	*	*	*	*	*
hloride, mg/l	53.00	72.00	73.47	87.00	98.00	127.00	216.00
ron, mg/l	0.10	0.50	0.80	*	*	*	11.20
inc, mg/l	<0.01	*	*	*	*	*	*
anganese, mg/l	1.10	1.00	1.09	*	*	*	2.30
opper, ug/l	10.00	*	*	*	*	*	*
ilver, ug/l	<10.00	*	*	*	*	*	*
trontium, mg/l	1.60	1.80	1.70	*	*	*	3.00
ron, mg/l	0.06	0.06	0.12	0.23	0.19	1.35	2.90
eryllium, ug/l	<10.00	*	*	*	*	*	*
ickel, ug/l	150.00	<50.00	<50.00	*	*	*	*
elenium, ug/l	<1.00	*	*	*	*	*	*
ercury, ug/l	<1.00	*	*	*	*	*	*
rsenic, ug/l	<1.00	<1.00	<1.00	*	*	*	*
arium, mg/l	0.04	*	*	*	*	*	*
admium, ug/l	10.00	<10.00	<10.00	*	*	*	*
romium-VI, ug/l	<10.00	*	*	*	*	*	*
luoride, mg/l	0.20	0.20	0.12	0.10	0.10	0.10	0.10
ead, ug/l	<1.00	*	*	*	*	*	*
olybdenum, mg/l	*	*	*	*	*	*	*
luminum, mg/l	<0.01	<0.01	<0.01	*	*	*	*
ecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*
yanide, mg/l	*	*	*	*	*	*	*
henol, ug/l	*	*	*	*	*	*	*
iochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
hemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
otal Organic Carbon, mg/l	*	*	*	*	*	*	*
emperature, Degrees C	*	*	10.20	*	*	15.40	*
issolved Oxygen, mg/l	*	*	*	*	*	*	*
ater Level depth below ground surface, ft.	6.90	6.30	7.30	7.30	9.10	9.30	~2m 60cm 2e5l~
otal Sulfur, mg/l	*	*	*	*	*	*	*
otal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*

c17/t

SAMPLE LOCATION 18 = Monitoring Well # 18 -CCSPAGE 1

DATE	05/30/1980 PACE	10/05/1980 PACE	03/26/1981 PACE	06/10/1981 PACE	09/15/1981	09/15/1981 PACE	12/01/1981	05/25/1982
pH-Field	7.20	7.30	8.20	7.40	7.50	7.50	7.80	7.50
pH-Laboratory	7.70	7.10	7.20	8.00	7.60	7.60	7.60	7.60
Specific conductance, umhos/cm @ 25c	850.00	870.00	810.00	800.00	760.00	680.00	820.00	860.00
Total Dissolved Solids, mg/l	532.00	526.00	542.00	590.00	440.00	490.00	450.00	390.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	670.00	410.00	326.00	342.00	338.00	345.00	340.00	343.00
Alkalinity Total, mg/l as CaCO3	670.00	410.00	326.00	342.00	338.00	345.00	340.00	343.00
Nitrate-N, mg/l	<0.10	<0.11	1.40	2.30	2.60	1.70	2.40	6.40
Ammonia-N, mg/l	<0.10	*	*	*	*	*	*	*
Calcium, mg/l	75.00	67.00	64.00	66.00	75.00	61.00	68.00	87.00
Magnesium, mg/l	54.00	40.00	31.00	40.00	37.00	34.00	40.00	34.00
Potassium, mg/l	2.40	2.30	3.00	2.70	4.90	3.70	4.90	4.20
Sodium, mg/l	65.00	77.00	67.00	72.00	81.00	68.00	80.00	73.00
Sulfate, mg/l	110.00	70.00	130.00	120.00	123.00	120.00	135.00	140.00
Methylene Blue Active Substances, mg/l	<0.10	*	*	*	*	*	*	*
Chloride, mg/l	10.00	5.00	4.00	4.00	4.60	5.00	4.70	4.00
Iron, mg/l	7.50	0.40	<0.05	0.35	0.20	0.45	0.55	0.30
Zinc, mg/l	50.00	*	*	*	*	*	*	*
Manganese, mg/l	1.80	2.40	0.60	1.20	1.20	1.20	1.05	0.44
Copper, ug/l	<50.00	*	*	*	*	*	*	*
Silver, ug/l	<40.00	*	*	*	*	*	*	*
Strontium, mg/l	0.25	0.40	0.35	0.35	0.60	0.25	0.45	0.50
Boron, mg/l	<0.20	0.20	<0.20	<0.20	<0.10	<0.20	<0.10	0.20
Beryllium, ug/l	<20.00	*	*	*	*	*	*	*
Nickel, ug/l	<50.00	*	*	*	*	*	*	*
Selenium, ug/l	<1.00	*	*	*	*	*	*	*
Mercury, ug/l	0.20	*	*	*	*	*	*	*
Arsenic, ug/l	9.00	8.00	<1.00	<1.00	1.00	<1.00	<1.00	<1.00
Barium, mg/l	<0.30	*	*	*	*	*	*	*
Cadmium, ug/l	<1.00	*	*	*	*	*	*	*
Chromium-VI, ug/l	<5.00	*	*	*	*	*	*	*
Fluoride, mg/l	0.40	0.80	0.60	0.70	0.20	0.40	0.40	0.40
Lead, ug/l	20.00	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*
Cyanide, mg/l	0.02	*	*	*	*	*	*	*
Phenol, ug/l	4.00	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	3.50	5.00	6.50	4.40	4.20	4.30	3.70	3.60
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*

ATE	10/13/1982	04/26/1983	10/04/1983	05/17/1984	10/04/1984	05/14/1985	10/22/1985	06/20/1986
H-Field	7.80	7.60	8.00	8.00	7.70	7.10	6.80	7.10
H-Laboratory	7.40	7.50	7.30	7.40	7.50	7.10	7.20	7.30
pecific conductance, umhos/cm @ 25c	800.00	740.00	850.00	1000.00	1140.00	1440.00	2400.00	2800.00
otal Dissolved Solids, mg/l	440.00	541.00	561.00	689.00	754.00	1060.00	1990.00	2190.00
otal Suspended Solids, mg/l	*	*	*	*	*	*	*	*
lkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
lkalinity Bicarbonate, mg/l as CaCO3	351.00	353.00	335.00	339.00	329.00	315.00	314.00	302.00
lkalinity Total, mg/l as CaCO3	351.00	353.00	335.00	339.00	329.00	315.00	314.00	302.00
itrate-N, mg/l	3.10	4.70	4.80	9.80	6.60	1.40	6.60	4.40
mmonia-N, mg/l	*	*	*	*	*	*	*	*
alcium, mg/l	90.00	83.00	85.00	99.00	114.00	159.00	325.00	340.00
agnesium, mg/l	31.00	37.00	34.00	36.00	44.00	61.00	144.00	160.00
otassium, mg/l	4.40	3.40	3.90	3.50	4.80	4.40	5.90	4.90
odium, mg/l	69.00	72.00	70.00	72.00	79.00	92.00	119.00	119.00
ulfate, mg/l	140.00	150.00	155.00	190.00	305.00	460.00	1250.00	1300.00
ethylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
hloride, mg/l	4.20	4.10	4.00	4.30	9.20	16.00	41.00	46.00
ron, mg/l	0.80	<0.10	<0.10	0.10	<0.10	<0.10	<0.10	<1.00
inc, mg/l	*	*	*	*	*	*	*	*
anganese, mg/l	1.40	0.49	0.93	0.35	1.20	0.04	1.90	0.18
opper, ug/l	*	*	*	*	*	*	*	*
ilver, ug/l	*	*	*	*	*	*	*	*
trontium, mg/l	0.40	0.40	0.40	0.50	0.70	0.80	1.70	1.60
oron, mg/l	0.10	0.10	0.11	0.09	0.13	0.17	0.23	0.21
eryllium, ug/l	*	*	*	*	*	*	*	*
ickel, ug/l	*	*	*	*	*	*	*	*
elenium, ug/l	*	*	*	*	*	*	*	*
ercury, ug/l	*	*	*	*	*	*	*	*
rsenic, ug/l	<1.00	1.00	<1.00	1.00	<1.00	<1.00	<1.00	<1.00
arium, mg/l	*	*	*	*	*	*	*	*
admium, ug/l	*	*	*	*	*	*	*	*
hromium-VI, ug/l	*	*	*	*	*	*	*	*
luoride, mg/l	0.40	0.50	0.40	0.40	0.40	0.30	0.30	0.30
ead, ug/l	*	*	*	*	*	*	*	*
olybdenum, mg/l	*	*	*	*	*	*	*	*
luminum, mg/l	*	*	*	*	*	*	*	*
ecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
yanide, mg/l	*	*	*	*	*	*	*	*
henol, ug/l	*	*	*	*	*	*	*	*
iochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
hemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
otal Organic Carbon, mg/l	*	*	*	*	*	*	*	*
emperature, Degrees C	*	*	*	*	*	*	*	*
issolved Oxygen, mg/l	*	*	*	*	*	*	*	*
ater Level depth below ground surface, ft.	4.60	6.00	2.80	1.70	1.80	1.50	2.70	2.40
otal Sulfur, mg/l	*	*	*	*	*	*	*	*
otal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 18 = Monitoring Well # 18 -CCSPAGE 3

ATE	10/21/1986	06/01/1987	10/05/1987	06/08/1988	10/31/1988	06/14/1989	10/25/1989
H-Field	7.34	7.45	7.10	7.10	7.60	7.20	7.20
H-Laboratory	7.20	7.20	7.00	7.20	7.20	7.20	7.10
pecific conductance, umhos/cm @ 25c	3500.00	4500.00	4700.00	5000.00	4090.00	5000.00	*
otal Dissolved Solids, mg/l	3320.00	3970.00	4234.00	4410.00	7700.00	4690.00	5390.00
otal Suspended Solids, mg/l	*	*	*	*	*	*	*
lkalinity Carbonate, mg/l as CaCO3	<1.00	*	*	*	*	*	*
lkalinity Bicarbonate, mg/l as CaCO3	302.00	*	*	*	*	*	*
lkalinity Total, mg/l as CaCO3	302.00	275.00	305.00	303.00	284.00	300.00	311.00
itrate-N, mg/l	4.90	4.70	4.15	3.40	2.70	2.10	1.40
mmonia-N, mg/l	*	*	*	*	*	*	*
alcium, mg/l	400.00	580.00	604.00	560.00	578.00	607.00	685.00
agnesium, mg/l	270.00	285.00	326.00	290.00	330.00	305.00	390.00
otassium, mg/l	7.70	7.20	8.60	6.50	8.70	7.20	10.20
odium, mg/l	165.00	220.00	189.00	210.00	210.00	210.00	300.00
ulfate, mg/l	2000.00	2800.00	2561.50	2800.00	2692.00	2700.00	3455.00
ethylene Blue Active Substances, mg/l	*	*	*	*	*	*	*
hloride, mg/l	24.00	89.00	92.98	99.00	94.00	110.00	130.00
Iron, mg/l	<0.10	<0.10	<0.01	*	*	*	<0.10
Zinc, mg/l	<0.01	*	*	*	*	*	*
Manganese, mg/l	2.60	0.23	1.84	*	*	*	1.80
Copper, ug/l	<10.00	*	*	*	*	*	*
Silver, ug/l	<10.00	*	*	*	*	*	*
Strontium, mg/l	2.60	2.80	3.00	*	*	*	3.40
Boron, mg/l	0.81	1.60	2.41	2.90	4.10	4.65	7.30
Beryllium, ug/l	<10.00	*	*	*	*	*	*
Nickel, ug/l	120.00	<50.00	<50.00	*	*	*	*
Selenium, ug/l	<1.00	*	*	*	*	*	*
Mercury, ug/l	<1.00	*	*	*	*	*	*
Arsenic, ug/l	3.00	<1.00	<1.00	*	*	*	*
Barium, mg/l	0.04	*	*	*	*	*	*
Cadmium, ug/l	<10.00	<10.00	<10.00	*	*	*	*
Chromium-VI, ug/l	<10.00	*	*	*	*	*	*
Fluoride, mg/l	0.30	0.30	0.27	0.20	0.20	0.20	0.30
Lead, ug/l	<1.00	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*
Aluminum, mg/l	<0.01	<0.01	<0.01	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	11.80	*	*	11.70	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	1.80	1.60	2.20	2.80	6.03	5.60	*2m04cm
Total Sulfur, mg/l	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*

6/7

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SAMPLE LOCATION 20 = Monitoring Well # 20 -CCSPAGE 1

DATE	05/30/1980 PACE	10/07/1980 PACE	03/26/1981 PACE	06/10/1981 PACE	09/15/1981	09/15/1981 PACE	12/01/1981	05/26/1982
pH-Field	6.90	7.00	7.50	7.10	7.20	7.20	7.00	6.90
pH-Laboratory	7.20	7.60	7.20	7.40	7.00	7.00	6.70	6.90
Specific conductance, umhos/cm @ 25c	3500.00	4200.00	4260.00	4200.00	3970.00	4500.00	4600.00	4400.00
Total Dissolved Solids, mg/l	2760.00	3420.00	4070.00	4400.00	4420.00	4200.00	4450.00	4110.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	240.00	340.00	419.00	484.00	488.00	470.00	460.00	490.00
Alkalinity Total, mg/l as CaCO3	240.00	340.00	419.00	484.00	488.00	470.00	460.00	490.00
Nitrate-N, mg/l	<0.10	<0.10	<0.10	<0.10	0.37	<0.10	1.20	1.28
Ammonia-N, mg/l	<0.10	*	*	*	*	*	*	*
Calcium, mg/l	175.00	340.00	460.00	490.00	420.00	460.00	470.00	500.00
Magnesium, mg/l	125.00	180.00	180.00	250.00	260.00	200.00	250.00	240.00
Potassium, mg/l	14.00	17.00	19.00	18.00	19.60	16.00	20.00	19.00
Sodium, mg/l	245.00	370.00	440.00	500.00	530.00	500.00	480.00	480.00
Sulfate, mg/l	1400.00	2100.00	2600.00	2600.00	2360.00	2600.00	2800.00	2400.00
Methylene Blue Active Substances, mg/l	<0.10	*	*	*	*	*	*	*
Chloride, mg/l	<10.00	9.00	10.00	11.00	9.80	10.00	11.00	9.70
Iron, mg/l	0.95	0.15	<0.05	0.65	2.50	2.50	0.98	0.20
Zinc, mg/l	40.00	*	*	*	*	*	*	*
Manganese, mg/l	1.30	2.90	3.70	4.80	3.00	5.60	6.20	6.20
Copper, ug/l	<50.00	*	*	*	*	*	*	*
Silver, ug/l	<40.00	*	*	*	*	*	*	*
Strontium, mg/l	1.70	3.00	3.20	3.00	4.80	2.90	4.10	4.00
Boron, mg/l	<0.20	0.20	0.30	0.30	0.70	0.40	0.40	0.50
Beryllium, ug/l	<20.00	*	*	*	*	*	*	*
Nickel, ug/l	50.00	*	*	*	*	*	*	*
Selenium, ug/l	<1.00	*	*	*	*	*	*	*
Mercury, ug/l	0.90	*	*	*	*	*	*	*
Arsenic, ug/l	1.00	<1.00	<1.00	<1.00	2.00	<1.00	<1.00	<1.00
Barium, mg/l	<0.30	*	*	*	*	*	*	*
Cadmium, ug/l	<1.00	*	*	*	*	*	*	*
Chromium-VI, ug/l	<5.00	*	*	*	*	*	*	*
Fluoride, mg/l	0.20	0.30	0.30	0.30	0.10	0.20	0.10	0.20
Lead, ug/l	30.00	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*
Cyanide, mg/l	<0.02	*	*	*	*	*	*	*
Phenol, ug/l	3.00	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	6.50	6.50	7.90	7.30	7.20	7.20	7.30	6.20
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*

SAMPLE LOCATION 20 = Monitoring Well # 20 -CCSPAGE 2

DATE	10/12/1982	04/26/1983	10/04/1983	05/17/1984	10/04/1984	05/14/1985	10/22/1985	06/20/1986
pH-Field	6.50	7.00	7.40	7.20	6.80	6.60	6.40	6.80
pH-Laboratory	6.90	6.80	6.70	6.70	6.80	6.60	6.70	6.70
Specific conductance, umhos/cm @ 25c	4600.00	4300.00	4500.00	4900.00	4900.00	4900.00	4900.00	4450.00
Total Dissolved Solids, mg/l	4150.00	4030.00	4167.00	4520.00	4280.00	4380.00	4370.00	4140.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	462.00	496.00	474.00	461.00	462.00	469.00	471.00	445.00
Alkalinity Total, mg/l as CaCO3	462.00	496.00	474.00	461.00	462.00	469.00	471.00	445.00
Nitrate-N, mg/l	0.10	0.21	0.21	0.38	0.58	0.89	1.40	0.80
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	520.00	470.00	500.00	480.00	510.00	490.00	500.00	365.00
Magnesium, mg/l	220.00	210.00	209.00	190.00	205.00	200.00	204.00	235.00
Potassium, mg/l	18.00	16.00	17.00	15.00	18.00	16.00	16.00	16.00
Sodium, mg/l	460.00	480.00	445.00	530.00	500.00	470.00	515.00	445.00
Sulfate, mg/l	2460.00	2600.00	2500.00	2700.00	2700.00	2600.00	2840.00	2600.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	11.00	10.00	9.60	9.50	10.00	9.20	10.00	10.00
Iron, mg/l	0.10	<0.10	<0.10	0.10	<0.10	<0.10	<0.10	<0.10
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	5.60	4.10	4.60	4.20	5.00	2.70	2.60	1.00
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	2.90	3.00	3.00	3.20	4.00	3.10	1.10	2.60
Boron, mg/l	0.60	0.40	0.40	0.40	0.49	0.56	0.58	0.37
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	*
Fluoride, mg/l	0.40	0.30	0.30	0.30	0.30	0.20	0.20	0.20
Lead, ug/l	*	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	9.70	8.30	8.70	6.00	8.30	7.80	9.90	7.10
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 20 = Monitoring Well # 20 -COSPAGE 3

DATE	10/21/1986	06/01/1987	10/07/1987	06/08/1988	10/31/1988	06/14/1989	10/23/1989
pH-Field	6.92	6.90	6.80	6.70	6.80	6.70	*
pH-Laboratory	6.70	6.80	6.90	6.70	6.80	6.90	6.70
Specific conductance, umhos/cm @ 25c	4700.00	5000.00	5100.00	5100.00	5010.00	5400.00	5500.00
Total Dissolved Solids, mg/l	4350.00	4360.00	4359.00	4340.00	4200.00	4370.00	4469.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	*	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	468.00	*	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	468.00	416.00	464.00	464.00	443.00	509.00	503.00
Nitrate-N, mg/l	0.86	0.86	0.85	*	*	0.68	0.70
Ammonia-N, mg/l	*	*	*	*	*	*	*
Calcium, mg/l	380.00	490.00	472.00	450.00	440.00	447.00	435.00
Magnesium, mg/l	220.00	200.00	209.00	210.00	220.00	215.00	230.00
Potassium, mg/l	17.00	17.00	16.30	16.00	16.00	17.00	18.00
Sodium, mg/l	480.00	500.00	471.00	485.00	475.00	445.00	560.00
Sulfate, mg/l	2100.00	2800.00	2693.00	2700.00	2400.00	2345.00	2785.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*
Chloride, mg/l	70.00	11.00	10.91	11.00	10.60	12.00	10.50
Iron, mg/l	<0.10	<0.10	<0.01	*	*	*	<0.10
Zinc, mg/l	0.02	*	*	*	*	*	*
Manganese, mg/l	1.30	0.26	1.51	*	*	*	1.10
Copper, ug/l	10.00	*	*	*	*	*	*
Silver, ug/l	<10.00	*	*	*	*	*	*
Strontium, mg/l	3.90	3.80	3.80	*	*	*	4.00
Boron, mg/l	0.33	0.32	0.31	0.29	0.37	0.60	0.45
Beryllium, ug/l	<10.00	*	*	*	*	*	*
Nickel, ug/l	30.00	<50.00	<50.00	*	*	*	*
Selenium, ug/l	<1.00	*	*	*	*	*	*
Mercury, ug/l	<1.00	*	*	*	*	*	*
Arsenic, ug/l	3.00	<1.00	<1.00	*	*	*	*
Barium, mg/l	<0.01	*	*	*	*	*	*
Cadmium, ug/l	10.00	<10.00	<10.00	*	*	*	*
Chromium-VI, ug/l	<10.00	*	*	*	*	*	*
Fluoride, mg/l	0.30	0.30	0.24	0.20	0.20	0.30	0.20
Lead, ug/l	<1.00	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*
Aluminum, mg/l	<0.01	<0.01	<0.01	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	11.20	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	6.80	6.60	8.30	9.60	11.01	22.60	*3m38cm dn3
Total Sulfur, mg/l	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*

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SAMPLE LOCATION 21 = Monitoring Well # 21 -CCSPAGE 1

DATE	05/30/1980 PACE	10/07/1980 PACE	03/26/1981 PACE	06/10/1981 PACE	09/15/1981	09/15/1981 PACE	12/01/1981	05/26/1982
pH-Field	7.20	7.50	7.80	7.50	7.90	7.90	7.60	7.60
pH-Laboratory	7.70	7.40	7.60	7.50	7.60	7.60	7.40	7.60
Specific conductance, umhos/cm @ 25c	1500.00	2000.00	2160.00	2000.00	1680.00	1500.00	1840.00	1550.00
Total Dissolved Solids, mg/l	1160.00	1500.00	1400.00	1600.00	625.00	1400.00	1440.00	1170.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	200.00	425.00	361.00	388.00	386.00	390.00	380.00	400.00
Alkalinity Total, mg/l as CaCO3	200.00	425.00	361.00	388.00	386.00	390.00	380.00	400.00
Nitrate-N, mg/l	<0.20	<0.10	5.60	4.80	7.20	5.60	4.30	6.10
Ammonia-N, mg/l	<0.10	*	*	*	*	*	*	*
Calcium, mg/l	98.00	120.00	120.00	160.00	126.00	120.00	135.00	130.00
Magnesium, mg/l	68.00	77.00	85.00	100.00	90.00	70.00	95.00	80.00
Potassium, mg/l	8.20	9.40	8.20	8.50	11.00	8.30	11.00	8.30
Sodium, mg/l	145.00	210.00	200.00	210.00	234.00	200.00	220.00	190.00
Sulfate, mg/l	500.00	800.00	710.00	850.00	655.00	670.00	760.00	720.00
Methylene Blue Active Substances, mg/l	<0.10	*	*	*	*	*	*	*
Chloride, mg/l	10.00	10.00	13.00	12.00	11.60	11.00	12.00	10.50
Iron, mg/l	0.85	0.50	<0.05	12.00	0.10	0.25	0.10	0.40
Zinc, mg/l	50.00	*	*	*	*	*	*	*
Manganese, mg/l	0.60	0.78	0.12	0.76	0.05	0.04	0.23	0.12
Copper, ug/l	<50.00	*	*	*	*	*	*	*
Silver, ug/l	<40.00	*	*	*	*	*	*	*
Strontium, mg/l	0.50	1.00	0.65	0.80	1.00	0.60	0.90	0.80
Boron, mg/l	<0.20	0.20	0.20	0.20	0.30	0.20	0.20	0.40
Beryllium, ug/l	<20.00	*	*	*	*	*	*	*
Nickel, ug/l	50.00	*	*	*	*	*	*	*
Selenium, ug/l	1.00	*	*	*	*	*	*	*
Mercury, ug/l	0.90	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	1.00	4.00	0.50	<1.00	<1.00	<1.00
Barium, mg/l	<0.30	*	*	*	*	*	*	*
Cadmium, ug/l	<1.00	*	*	*	*	*	*	*
Chromium-VI, ug/l	<5.00	*	*	*	*	*	*	*
Fluoride, mg/l	0.20	0.30	0.50	0.50	<0.10	0.30	0.30	0.30
Lead, ug/l	10.00	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*
Cyanide, mg/l	0.02	*	*	*	*	*	*	*
Phenol, ug/l	2.00	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	6.50	6.00	4.90	5.50	6.30	6.30	6.30	6.30
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*

SAMPLE LOCATION 21 = Monitoring Well # 21 -CCSPAGE 2

DATE	10/12/1982	04/26/1983	10/04/1983	05/17/1984	10/04/1984	05/14/1985	10/22/1985	06/20/1986
pH-Field	7.20	7.70	8.00	7.60	7.30	7.00	7.10	7.40
pH-Laboratory	7.50	7.60	7.40	7.50	7.50	7.10	7.50	7.50
Specific conductance, umhos/cm @ 25c	2100.00	1370.00	1530.00	1540.00	1670.00	1710.00	1710.00	1700.00
Total Dissolved Solids, mg/l	1270.00	1050.00	1103.00	1070.00	1110.00	1170.00	1160.00	1210.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	415.00	423.00	419.00	438.00	435.00	455.00	466.00	503.00
Alkalinity Total, mg/l as CaCO3	415.00	423.00	419.00	438.00	435.00	455.00	466.00	503.00
Nitrate-N, mg/l	4.50	4.20	3.40	3.30	2.40	3.60	3.70	3.20
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	140.00	110.00	111.00	102.00	106.00	121.00	112.00	114.00
Magnesium, mg/l	82.00	70.00	64.00	52.00	64.00	63.00	64.00	69.00
Potassium, mg/l	8.90	6.60	7.80	6.10	8.10	7.10	7.40	6.10
Sodium, mg/l	200.00	190.00	188.00	180.00	186.00	197.00	191.00	184.00
Sulfate, mg/l	620.00	480.00	465.00	385.00	400.00	490.00	512.00	520.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	12.00	11.00	11.00	11.00	11.00	9.90	9.90	8.80
Iron, mg/l	0.10	0.30	<0.10	0.20	<0.10	<0.10	<0.10	<0.10
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	0.15	0.03	0.04	0.02	0.02	0.08	<0.01	<0.01
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	0.70	0.70	0.60	0.50	0.70	0.70	0.70	0.60
Boron, mg/l	0.30	0.20	0.28	0.24	0.32	0.23	0.44	0.19
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	*
Fluoride, mg/l	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Lead, ug/l	*	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	6.20	5.10	6.40	5.00	5.90	5.00	7.70	5.70
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 21 = Monitoring Well # 21 -CCSPAGE 3

DATE	10/21/1986	06/01/1987	10/07/1987	06/08/1988	10/31/1988	06/14/1989	10/23/1989
pH-Field	7.67	7.83	7.70	7.50	7.60	7.50	*
pH-Laboratory	7.50	7.50	7.30	7.50	7.40	7.60	7.50
Specific conductance, umhos/cm @ 25c	1730.00	1750.00	1890.00	1790.00	2020.00	1700.00	1610.00
Total Dissolved Solids, mg/l	1200.00	1170.00	1198.00	1020.00	1360.00	1150.00	1670.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	*	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	522.00	*	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	522.00	486.00	544.00	526.00	482.00	494.00	477.00
Nitrate-N, mg/l	2.50	3.10	2.33	2.50	2.00	5.70	2.30
Ammonia-N, mg/l	*	*	*	*	*	*	*
Calcium, mg/l	95.00	110.00	105.00	99.00	103.00	98.00	132.00
Magnesium, mg/l	80.00	69.00	72.00	71.00	77.00	64.00	99.50
Potassium, mg/l	8.10	7.20	6.00	6.50	8.10	6.60	9.10
Sodium, mg/l	190.00	194.00	191.00	164.00	183.00	145.00	270.00
Sulfate, mg/l	490.00	480.00	470.00	435.00	580.00	400.00	828.97
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*
Chloride, mg/l	11.00	8.10	8.14	8.70	8.40	6.90	8.40
Iron, mg/l	<0.10	<0.10	<0.01	*	*	*	0.22
Zinc, mg/l	0.01	*	*	*	*	*	*
Manganese, mg/l	<0.01	<0.01	<0.01	*	*	*	0.70
Copper, ug/l	<10.00	*	*	*	*	*	*
Silver, ug/l	<10.00	*	*	*	*	*	*
Strontium, mg/l	0.80	0.70	0.70	*	*	*	0.99
Boron, mg/l	0.28	0.28	0.28	0.22	0.25	0.24	0.37
Beryllium, ug/l	<10.00	*	*	*	*	*	*
Nickel, ug/l	70.00	<50.00	<50.00	*	*	*	*
Selenium, ug/l	<1.00	*	*	*	*	*	*
Mercury, ug/l	<1.00	*	*	*	*	*	*
Arsenic, ug/l	<1.00	1.00	<1.00	*	*	*	*
Barium, mg/l	0.01	*	*	*	*	*	*
Cadmium, ug/l	<10.00	<10.00	<10.00	*	*	*	*
Chromium-VI, ug/l	<10.00	*	*	*	*	*	*
Fluoride, mg/l	0.50	0.40	0.36	0.30	0.30	0.30	0.30
Lead, ug/l	<1.00	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*
Aluminum, mg/l	0.06	<0.01	<0.01	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	11.90	*	*	10.40	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	5.90	5.10	6.30	5.11	8.06	7.90	*2m 7.1m 2m
Total Sulfur, mg/l	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*

SAMPLE LOCATION 22 = Monitoring Well # 22 -CCSPAGE 1

DATE	05/30/1980 PACE	10/07/1980 PACE	03/26/1981 PACE	06/10/1981 PACE	09/15/1981	09/15/1981 PACE	12/01/1981	05/26/1982
pH-Field	7.70	7.60	8.20	7.50	8.10	8.10	7.90	8.00
pH-Laboratory	8.00	8.00	8.00	8.20	8.00	8.00	7.80	7.90
Specific conductance, umhos/cm @ 25c	1200.00	1200.00	1375.00	1300.00	1150.00	1000.00	1240.00	1200.00
Total Dissolved Solids, mg/l	704.00	652.00	824.00	860.00	630.00	750.00	820.00	670.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	510.00	530.00	570.00	590.00	579.00	600.00	540.00	522.00
Alkalinity Total, mg/l as CaCO3	510.00	530.00	570.00	590.00	579.00	600.00	540.00	522.00
Nitrate-N, mg/l	0.38	1.00	1.00	1.20	2.30	1.70	1.70	2.20
Ammonia-N, mg/l	<0.10	*	*	*	*	*	*	*
Calcium, mg/l	35.00	32.00	37.00	47.00	42.00	44.00	50.00	77.00
Magnesium, mg/l	98.00	100.00	92.00	110.00	135.00	110.00	110.00	97.00
Potassium, mg/l	2.90	2.90	2.70	3.20	4.90	3.30	4.30	5.00
Sodium, mg/l	90.00	110.00	98.00	110.00	125.00	110.00	125.00	112.00
Sulfate, mg/l	180.00	110.00	180.00	180.00	165.00	190.00	260.00	245.00
Methylene Blue Active Substances, mg/l	<0.10	*	*	*	*	*	*	*
Chloride, mg/l	<10.00	9.00	5.00	11.00	10.80	10.00	12.00	10.00
Iron, mg/l	1.90	0.30	0.20	1.10	0.80	0.20	0.03	6.00
Zinc, mg/l	20.00	*	*	*	*	*	*	*
Manganese, mg/l	0.08	<0.04	0.08	0.48	0.01	<0.04	<0.01	0.77
Copper, ug/l	<50.00	*	*	*	*	*	*	*
Silver, ug/l	<40.00	*	*	*	*	*	*	*
Strontium, mg/l	0.20	0.30	0.30	0.25	0.50	0.25	0.30	0.40
Boron, mg/l	<0.20	0.20	0.20	0.20	0.60	0.30	0.20	0.50
Beryllium, ug/l	<20.00	*	*	*	*	*	*	*
Nickel, ug/l	50.00	*	*	*	*	*	*	*
Selenium, ug/l	1.00	*	*	*	*	*	*	*
Mercury, ug/l	<0.20	*	*	*	*	*	*	*
Arsenic, ug/l	1.00	<1.00	<1.00	2.00	1.00	<1.00	<1.00	1.00
Barium, mg/l	<0.30	*	*	*	*	*	*	*
Cadmium, ug/l	<1.00	*	*	*	*	*	*	*
Chromium-VI, ug/l	<5.00	*	*	*	*	*	*	*
Fluoride, mg/l	0.20	0.30	0.40	0.30	0.10	0.20	<0.10	0.20
Lead, ug/l	10.00	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*
Cyanide, mg/l	<0.02	*	*	*	*	*	*	*
Phenol, ug/l	2.00	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	6.50	5.50	4.70	5.20	6.10	6.10	6.00	5.10
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*

SAMPLE LOCATION 22 = Monitoring Well # 22 -CCSPAGE 2

DATE	10/12/1982	04/26/1983	10/04/1983	05/17/1984	10/04/1984	05/14/1985	10/22/1985	06/20/198
pH-Field	7.60	8.00	8.30	8.10	7.60	7.30	7.20	7.9(
pH-Laboratory	7.80	7.90	7.50	7.80	7.60	7.40	7.60	7.5(
Specific conductance, umhos/cm @ 25c	1400.00	1110.00	1360.00	1260.00	1560.00	1520.00	1690.00	1645.0(
Total Dissolved Solids, mg/l	740.00	736.00	991.00	965.00	1014.00	1090.00	1160.00	1180.0(
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.0(
Alkalinity Bicarbonate, mg/l as CaCO3	518.00	488.00	680.00	459.00	460.00	458.00	536.00	521.0(
Alkalinity Total, mg/l as CaCO3	518.00	488.00	680.00	459.00	460.00	458.00	537.00	521.0(
Nitrate-N, mg/l	2.80	1.60	3.70	2.80	2.80	3.90	4.30	3.5(
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	56.00	39.00	78.00	32.00	84.00	84.00	71.00	112.0(
Magnesium, mg/l	97.00	120.00	67.00	57.00	68.00	88.00	123.00	92.0(
Potassium, mg/l	4.40	2.40	6.40	1.90	7.10	4.80	4.60	6.0(
Sodium, mg/l	110.00	100.00	155.00	63.00	164.00	146.00	144.00	177.0(
Sulfate, mg/l	260.00	290.00	355.00	410.00	440.00	440.00	420.00	490.0(
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	11.00	11.00	11.00	9.50	10.00	8.70	8.10	7.3(
Iron, mg/l	0.20	0.40	0.20	0.40	0.80	0.60	0.10	<0.1(
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	0.02	0.02	<0.01	0.02	0.02	0.08	<0.01	<0.01
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	0.30	0.30	0.40	0.20	0.60	0.50	0.50	0.7
Boron, mg/l	0.30	0.20	0.32	0.29	0.35	0.26	0.29	0.2
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	1.00	1.00	<1.00	<1.00	1.00	<1.00	<1.0(
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	*
Fluoride, mg/l	0.30	0.10	0.40	0.30	0.40	0.30	0.30	0.3(
Lead, ug/l	*	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	5.50	5.10	6.20	5.10	5.70	4.90	7.80	5.7
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 22 = Monitoring Well # 22 -CCSPAGE 3

DATE	10/21/1986	06/01/1987	10/07/1987	06/08/1988	10/31/1988		
pH-Field	7.75	7.70	7.80	*	*		
pH-Laboratory	7.60	7.60	7.50	*	*		
Specific conductance, umhos/cm @ 25c	1700.00	1740.00	1780.00	*	*		
Total Dissolved Solids, mg/l	1220.00	1150.00	1093.00	*	*		
Total Suspended Solids, mg/l	*	*	*	*	*		
Alkalinity Carbonate, mg/l as CaCO3	<1.00	*	*	*	*		
Alkalinity Bicarbonate, mg/l as CaCO3	549.00	*	*	*	*		
Alkalinity Total, mg/l as CaCO3	549.00	586.00	604.00	*	*		
Nitrate-N, mg/l	3.20	3.20	3.73	*	*		
Ammonia-N, mg/l	*	*	*	*	*		
Calcium, mg/l	78.00	93.00	97.00	*	*		
Magnesium, mg/l	100.00	81.00	69.00	*	*		
Potassium, mg/l	7.00	6.10	5.90	*	*		
Sodium, mg/l	190.00	175.00	191.00	*	*		
Sulfate, mg/l	470.00	420.00	397.50	*	*		
Methylene Blue Active Substances, mg/l	*	*	*	*	*		
Chloride, mg/l	7.70	7.60	7.60	*	*		
Iron, mg/l	0.10	<0.10	<0.01	*	*		
Zinc, mg/l	0.01	*	*	*	*		
Manganese, mg/l	<0.01	<0.01	<0.01	*	*		
Copper, ug/l	10.00	*	*	*	*		
Silver, ug/l	<10.00	*	*	*	*		
Strontium, mg/l	0.70	0.60	0.70	*	*		
Boron, mg/l	0.32	0.29	0.31	*	*		
Beryllium, ug/l	<10.00	*	*	*	*		
Nickel, ug/l	120.00	<50.00	<50.00	*	*		
Selenium, ug/l	<1.00	*	*	*	*		
Mercury, ug/l	<1.00	*	*	*	*		
Arsenic, ug/l	<1.00	2.00	<1.00	*	*		
Barium, mg/l	0.03	*	*	*	*		
Cadmium, ug/l	<10.00	<10.00	<10.00	*	*		
Chromium-VI, ug/l	<10.00	*	*	*	*		
Fluoride, mg/l	0.40	0.30	0.35	*	*		
Lead, ug/l	<1.00	*	*	*	*		
Molybdenum, mg/l	*	*	*	*	*		
Aluminum, mg/l	0.06	<0.01	0.02	*	*		
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*		
Cyanide, mg/l	*	*	*	*	*		
Phenol, ug/l	*	*	*	*	*		
Biochemical Oxygen Demand, mg/l	*	*	*	*	*		
Chemical Oxygen Demand, mg/l	*	*	*	*	*		
Total Organic Carbon, mg/l	*	*	*	*	*		
Temperature, Degrees C	*	*	12.30	*	*	10/18/89	5/30/90
Dissolved Oxygen, mg/l	*	*	*	*	*		
Water Level depth below ground surface, ft.	5.50	5.00	6.90	5.10	9.07	3m01mm	2m90cm
Total Sulfur, mg/l	*	*	*	*	*		
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*		

SAMPLE LOCATION 23 = Monitoring Well # 23 -CCSPAGE 1

ATE	05/30/1980 PACE	10/07/1980 PACE	03/26/1981 PACE	06/10/1981 PACE	09/16/1981	09/16/1981 PACE	12/02/1981	05/26/1982
H-Field	6.80	6.90	7.40	7.30	7.20	7.20	7.10	6.90
H-Laboratory	7.30	7.30	7.10	7.50	7.00	7.00	6.90	7.00
pecific conductance, umhos/cm @ 25c	1900.00	2300.00	1650.00	2500.00	1810.00	1450.00	2200.00	1800.00
otal Dissolved Solids, mg/l	1310.00	1450.00	1560.00	1600.00	1260.00	1400.00	1530.00	1270.00
otal Suspended Solids, mg/l	*	*	*	*	*	*	*	*
lkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
lkalinity Bicarbonate, mg/l as CaCO3	420.00	600.00	780.00	790.00	775.00	740.00	780.00	783.00
lkalinity Total, mg/l as CaCO3	420.00	600.00	780.00	790.00	775.00	740.00	780.00	783.00
itrate-N, mg/l	<0.20	<0.11	<0.10	<0.10	<0.10	<0.10	0.03	0.23
mmonia-N, mg/l	<0.10	*	*	*	*	*	*	*
alcium, mg/l	104.00	150.00	130.00	160.00	145.00	130.00	150.00	140.00
agnesium, mg/l	63.00	66.00	53.00	72.00	69.00	47.00	65.00	55.00
otassium, mg/l	7.80	9.80	9.80	10.00	12.50	9.00	12.00	10.00
odium, mg/l	195.00	290.00	320.00	330.00	330.00	320.00	320.00	320.00
ulfate, mg/l	490.00	600.00	510.00	540.00	500.00	520.00	640.00	440.00
ethylene Blue Active Substances, mg/l	<0.10	*	*	*	*	*	*	*
hloride, mg/l	10.00	5.00	<1.00	2.00	10.20	11.00	10.00	7.20
ron, mg/l	1.40	1.60	0.90	4.60	0.90	1.10	0.90	0.10
inc, mg/l	50.00	*	*	*	*	*	*	*
anganese, mg/l	1.30	1.60	1.10	1.40	1.50	1.30	1.60	1.10
opper, ug/l	<50.00	*	*	*	*	*	*	*
ilver, ug/l	<40.00	*	*	*	*	*	*	*
trontium, mg/l	1.10	1.80	1.60	1.20	1.90	1.20	1.90	1.80
oron, mg/l	<0.20	0.20	0.40	0.30	0.70	0.50	1.00	0.50
eryllium, ug/l	<20.00	*	*	*	*	*	*	*
ickel, ug/l	100.00	*	*	*	*	*	*	*
elenium, ug/l	<1.00	*	*	*	*	*	*	*
ercury, ug/l	0.20	*	*	*	*	*	*	*
rsenic, ug/l	<1.00	2.00	2.00	5.00	2.00	<1.00	2.00	2.00
arium, mg/l	<0.30	*	*	*	*	*	*	*
admium, ug/l	<1.00	*	*	*	*	*	*	*
hromium-VI, ug/l	<5.00	*	*	*	*	*	*	*
luoride, mg/l	0.20	0.40	0.30	0.30	0.10	0.20	<0.10	0.20
ead, ug/l	20.00	*	*	*	*	*	*	*
olybdenum, mg/l	*	*	*	*	*	*	*	*
luminum, mg/l	*	*	*	*	*	*	*	*
ecal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*
yanide, mg/l	<0.02	*	*	*	*	*	*	*
henol, ug/l	<2.00	*	*	*	*	*	*	*
iochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
hemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
otal Organic Carbon, mg/l	*	*	*	*	*	*	*	*
emperature, Degrees C	*	*	*	*	*	*	*	*
issolved Oxygen, mg/l	*	*	*	*	*	*	*	*
ater Level depth below ground surface, ft.	22.00	23.00	19.90	20.00	20.30	20.30	20.50	18.80
otal Sulfur, mg/l	*	*	*	*	*	*	*	*
otal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*

SAMPLE LOCATION 23 = Monitoring Well # 23 -CCSPAGE 2

DATE	10/13/1982	04/27/1983	10/04/1983	05/17/1984	10/04/1984	05/14/1985	10/23/1985	06/20/1986
pH-Field	7.30	7.00	7.40	7.20	7.10	6.80	6.60	6.80
pH-Laboratory	6.90	7.00	6.80	6.90	6.90	6.90	6.90	6.90
Specific conductance, umhos/cm @ 25c	2100.00	1790.00	2200.00	2200.00	2300.00	2000.00	2300.00	1960.00
Total Dissolved Solids, mg/l	1430.00	1370.00	1905.00	1480.00	1460.00	1336.00	1380.00	1400.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	813.00	830.00	796.00	764.00	776.00	762.00	780.00	780.00
Alkalinity Total, mg/l as CaCO3	813.00	830.00	796.00	764.00	776.00	762.00	780.00	780.00
Nitrate-N, mg/l	0.10	0.08	0.05	0.09	0.10	0.35	0.05	0.13
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	170.00	140.00	147.00	126.00	134.00	124.00	129.00	124.00
Magnesium, mg/l	60.00	60.00	60.00	42.00	55.00	43.00	45.00	49.00
Potassium, mg/l	10.00	8.90	9.30	8.40	9.60	8.30	8.40	7.40
Sodium, mg/l	330.00	320.00	325.00	340.00	335.00	315.00	345.00	375.00
Sulfate, mg/l	510.00	520.00	510.00	465.00	530.00	390.00	446.00	450.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	9.60	8.70	9.90	6.30	9.20	6.00	7.90	7.90
Iron, mg/l	3.20	0.10	0.30	0.20	0.10	0.10	0.50	<0.10
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	1.50	1.20	1.30	0.97	1.40	0.84	0.92	0.92
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	1.70	1.80	1.50	1.50	1.90	1.20	1.50	1.70
Boron, mg/l	0.40	0.40	0.42	0.44	0.44	0.38	0.38	0.28
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	7.00	2.00	3.00	1.00	1.00	<1.00	<1.00	<1.00
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	*
Fluoride, mg/l	0.30	0.20	0.20	0.20	0.20	0.20	0.20	0.30
Lead, ug/l	*	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	20.10	18.30	19.50	18.30	19.30	19.10	21.30	18.66
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 23 = Monitoring Well # 23 -CCSPAGE 3

ATE	10/22/1986	06/02/1987	10/08/1987	06/13/1988	10/31/1988	06/15/1989	10/25/1989
H-Field	7.09	7.00	7.00	6.40	7.30	6.90	7.20
H-Laboratory	7.00	7.10	7.00	6.90	7.00	7.00	7.00
pecific conductance, umhos/cm @ 25c	2300.00	2200.00	2400.00	2300.00	2050.00	2000.00	2400.00
otal Dissolved Solids, mg/l	1510.00	1360.00	1377.00	1370.00	1420.00	1470.00	1560.00
otal Suspended Solids, mg/l	*	*	*	*	*	*	*
lkalinity Carbonate, mg/l as CaCO3	<1.00	*	*	*	*	*	*
lkalinity Bicarbonate, mg/l as CaCO3	797.00	*	*	*	*	*	*
lkalinity Total, mg/l as CaCO3	797.00	693.00	751.00	761.00	777.00	768.00	768.00
itrate-N, mg/l	<0.01	<0.01	0.03	*	*	0.02	0.15
mmonia-N, mg/l	*	*	*	*	*	*	*
alcium, mg/l	120.00	111.00	98.00	117.00	121.00	127.00	134.00
agnesium, mg/l	61.00	42.00	47.00	42.00	57.00	49.00	65.00
otassium, mg/l	9.00	8.60	6.00	8.90	9.10	8.70	10.00
odium, mg/l	330.00	310.00	299.00	310.00	335.00	280.00	335.00
ulfate, mg/l	550.00	440.00	402.90	430.00	500.00	435.00	536.00
ethylene Blue Active Substances, mg/l	*	*	*	*	*	*	*
hloride, mg/l	10.00	7.20	7.71	8.40	9.90	10.00	11.00
ron, mg/l	<0.10	<0.10	<0.01	*	*	*	<0.10
inc, mg/l	0.01	*	*	*	*	*	*
anganese, mg/l	1.40	0.73	0.82	*	*	*	1.10
opper, ug/l	<10.00	*	*	*	*	*	*
ilver, ug/l	<10.00	*	*	*	*	*	*
trontium, mg/l	2.10	1.60	1.60	*	*	*	1.90
oron, mg/l	0.38	0.38	0.38	0.35	0.34	0.38	0.50
eryllium, ug/l	<10.00	*	*	*	*	*	*
ickel, ug/l	70.00	<50.00	<50.00	*	*	*	*
elenium, ug/l	<1.00	*	*	*	*	*	*
ercury, ug/l	<1.00	*	*	*	*	*	*
rsenic, ug/l	<1.00	4.00	1.00	*	*	*	*
arium, mg/l	0.02	*	*	*	*	*	*
admium, ug/l	<10.00	<10.00	<10.00	*	*	*	*
hromium-VI, ug/l	<10.00	*	*	*	*	*	*
luoride, mg/l	0.20	0.20	0.17	0.20	0.20	0.20	0.20
ead, ug/l	<1.00	*	*	*	*	*	*
olybdenum, mg/l	*	*	*	*	*	*	*
luminum, mg/l	0.04	<0.01	<0.01	*	*	*	*
ecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*
yanide, mg/l	*	*	*	*	*	*	*
henol, ug/l	*	*	*	*	*	*	*
iochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
hemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
otal Organic Carbon, mg/l	*	*	*	*	*	*	*
emperature, Degrees C	*	*	8.40	*	*	9.70	*
issolved Oxygen, mg/l	*	*	*	*	*	*	*
ater Level depth below ground surface, ft.	18.80	17.80	18.10	19.50	22.06	22.80	*
otal Sulfur, mg/l	*	*	*	*	*	*	*
otal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*

6/11

Tm 21 cm Tm

SAMPLE LOCATION 24 = Destroyed -CCSPAGE 1

DATE	05/30/1980 PACE	10/07/1980 PACE	09/16/1981	12/02/1981	05/26/1982	10/13/1982	04/27/1983	10/04/1983
pH-Field	7.60	*	7.20	*	*	*	*	*
pH-Laboratory	7.80	*	*	*	*	*	*	*
Specific conductance, umhos/cm @ 25c	1400.00	*	*	*	*	*	*	*
Total Dissolved Solids, mg/l	880.00	*	*	*	*	*	*	*
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	*	*	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	220.00	*	*	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	220.00	*	*	*	*	*	*	*
Nitrate-N, mg/l	0.88	*	*	*	*	*	*	*
Ammonia-N, mg/l	<0.10	*	*	*	*	*	*	*
Calcium, mg/l	78.00	*	*	*	*	*	*	*
Magnesium, mg/l	45.00	*	*	*	*	*	*	*
Potassium, mg/l	5.20	*	*	*	*	*	*	*
Sodium, mg/l	120.00	*	*	*	*	*	*	*
Sulfate, mg/l	420.00	*	*	*	*	*	*	*
Methylene Blue Active Substances, mg/l	<0.10	*	*	*	*	*	*	*
Chloride, mg/l	10.00	*	*	*	*	*	*	*
Iron, mg/l	6.00	*	*	*	*	*	*	*
Zinc, mg/l	50.00	*	*	*	*	*	*	*
Manganese, mg/l	1.00	*	*	*	*	*	*	*
Copper, ug/l	<50.00	*	*	*	*	*	*	*
Silver, ug/l	<40.00	*	*	*	*	*	*	*
Strontium, mg/l	0.45	*	*	*	*	*	*	*
Boron, mg/l	<0.20	*	*	*	*	*	*	*
Beryllium, ug/l	<20.00	*	*	*	*	*	*	*
Nickel, ug/l	50.00	*	*	*	*	*	*	*
Selenium, ug/l	<1.00	*	*	*	*	*	*	*
Mercury, ug/l	0.60	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	*	*	*	*	*	*	*
Barium, mg/l	<0.80	*	*	*	*	*	*	*
Cadmium, ug/l	<1.00	*	*	*	*	*	*	*
Chromium-VI, ug/l	<5.00	*	*	*	*	*	*	*
Fluoride, mg/l	0.30	*	*	*	*	*	*	*
Lead, ug/l	20.00	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*
Cyanide, mg/l	<0.02	*	*	*	*	*	*	*
Phenol, ug/l	<2.00	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	19.50	<25.01	24.10	26.30	23.20	23.90	24.50	24.40
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*

SAMPLE LOCATION 24 = Destroyed -CCSPAGE 2

DATE	05/17/1984	10/04/1984	05/14/1985	10/23/1985	06/20/1986	10/22/1986	06/13/1988
pH-Field	*	*	*	*	*	*	*
pH-Laboratory	*	*	*	*	*	*	*
Specific conductance, umhos/cm @ 25c	*	*	*	*	*	*	*
Total Dissolved Solids, mg/l	*	*	*	*	*	*	*
Total Suspended Solids, mg/l	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	*	*	*	*	*	*	*
Nitrate-N, mg/l	*	*	*	*	*	*	*
Ammonia-N, mg/l	*	*	*	*	*	*	*
Calcium, mg/l	*	*	*	*	*	*	*
Magnesium, mg/l	*	*	*	*	*	*	22.00 17 C
Potassium, mg/l	*	*	*	*	*	*	*
Sodium, mg/l	*	*	*	*	*	*	*
Sulfate, mg/l	*	*	*	*	*	*	*
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*
Chloride, mg/l	*	*	*	*	*	*	*
Iron, mg/l	*	*	*	*	*	*	*
Zinc, mg/l	*	*	*	*	*	*	*
Manganese, mg/l	*	*	*	*	*	*	*
Copper, ug/l	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*
Strontium, mg/l	*	*	*	*	*	*	*
Boron, mg/l	*	*	*	*	*	*	*
Beryllium, ug/l	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*
Arsenic, ug/l	*	*	*	*	*	*	*
Barium, mg/l	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*
Fluoride, mg/l	*	*	*	*	*	*	*
Lead, ug/l	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	23.80	23.60	23.90	25.50	23.60	23.30	*
Total Sulfur, mg/l	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*

SAMPLE LOCATION 26 = Monitoring Well # 26 -CCSPAGE 1

ATE	05/30/1980 PACE	10/07/1980 PACE	03/26/1981 PACE	06/10/1981 PACE	09/16/1981	09/16/1981 PACE	12/02/1981	05/26/1982
H-Field	7.40	7.20	7.50	7.40	7.60	7.60	7.40	7.50
H-Laboratory	7.70	7.20	7.60	8.00	7.20	7.20	7.40	7.40
pecific conductance, umhos/cm @ 25c	1200.00	1400.00	1570.00	1500.00	1230.00	1200.00	1380.00	1430.00
otal Dissolved Solids, mg/l	734.00	818.00	988.00	970.00	940.00	910.00	890.00	830.00
otal Suspended Solids, mg/l	*	*	*	*	*	*	*	*
lkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
lkalinity Bicarbonate, mg/l as CaCO3	430.00	470.00	630.00	650.00	660.00	620.00	630.00	669.00
lkalinity Total, mg/l as CaCO3	430.00	470.00	630.00	650.00	660.00	620.00	630.00	669.00
itrate-N, mg/l	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	0.75	0.96
mmonia-N, mg/l	<0.10	*	*	*	*	*	*	*
alcium, mg/l	42.00	44.00	43.00	46.00	50.00	50.00	45.00	60.00
agnesium, mg/l	26.00	27.00	21.00	24.00	26.00	19.00	27.00	25.00
otassium, mg/l	5.70	6.30	6.40	6.00	8.10	5.80	8.00	7.20
odium, mg/l	200.00	230.00	270.00	290.00	293.00	290.00	300.00	290.00
ulfate, mg/l	110.00	180.00	200.00	200.00	210.00	180.00	170.00	190.00
ethylene Blue Active Substances, mg/l	<0.10	*	*	*	*	*	*	*
hloride, mg/l	<10.00	6.00	<1.00	2.00	3.80	3.00	2.60	2.50
ron, mg/l	0.85	0.45	0.60	1.10	9.50	2.30	0.47	0.40
inc, mg/l	70.00	*	*	*	*	*	*	*
anganese, mg/l	0.16	0.24	0.16	0.24	0.60	0.16	0.21	0.13
opper, ug/l	<50.00	*	*	*	*	*	*	*
ilver, ug/l	<40.00	*	*	*	*	*	*	*
trontium, mg/l	0.50	0.50	0.80	0.70	0.90	0.50	1.10	1.00
oron, mg/l	<0.20	0.30	0.40	0.30	1.00	0.40	0.70	0.70
eryllium, ug/l	<20.00	*	*	*	*	*	*	*
ickel, ug/l	50.00	*	*	*	*	*	*	*
elenium, ug/l	<1.00	*	*	*	*	*	*	*
ercury, ug/l	0.20	*	*	*	*	*	*	*
rsenic, ug/l	<1.00	2.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
arium, mg/l	<0.80	*	*	*	*	*	*	*
admium, ug/l	<1.00	*	*	*	*	*	*	*
hromium-VI, ug/l	<5.00	*	*	*	*	*	*	*
luoride, mg/l	0.30	0.50	0.40	0.30	0.10	0.20	0.20	0.20
ead, ug/l	10.00	*	*	*	*	*	*	*
olybdenum, mg/l	*	*	*	*	*	*	*	*
luminum, mg/l	*	*	*	*	*	*	*	*
ecal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*
yanide, mg/l	0.02	*	*	*	*	*	*	*
henol, ug/l	<3.00	*	*	*	*	*	*	*
iochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
hemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
otal Organic Carbon, mg/l	*	*	*	*	*	*	*	*
emperature, Degrees C	*	*	*	*	*	*	*	*
issolved Oxygen, mg/l	*	*	*	*	*	*	*	*
ater Level depth below ground surface, ft.	7.00	7.50	6.30	6.50	7.20	7.20	6.70	6.00
otal Sulfur, mg/l	*	*	*	*	*	*	*	*
otal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*

SAMPLE LOCATION 26 = Monitoring Well # 26 -CCSPAGE 2

ATE	10/13/1982	04/27/1983	10/04/1983	05/17/1984	10/04/1984	05/15/1985	10/23/1985	06/20/1986
H-Field	7.60	7.00	7.90	7.40	7.50	6.90	7.00	7.00
H-Laboratory	7.30	7.30	7.20	7.20	7.20	7.10	7.20	7.20
pecific conductance, umhos/cm @ 25c	1350.00	1240.00	1400.00	1500.00	1450.00	1450.00	1430.00	1430.00
otal Dissolved Solids, mg/l	800.00	874.00	984.00	1040.00	929.00	956.00	940.00	937.00
otal Suspended Solids, mg/l	*	*	*	*	*	*	*	*
lkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
lkalinity Bicarbonate, mg/l as CaCO3	659.00	685.00	656.00	667.00	639.00	656.00	659.00	633.00
lkalinity Total, mg/l as CaCO3	659.00	685.00	656.00	667.00	639.00	656.00	659.00	633.00
itrate-N, mg/l	0.63	0.21	0.21	0.27	0.31	0.21	0.16	0.08
mmonia-N, mg/l	*	*	*	*	*	*	*	*
alcium, mg/l	57.00	46.00	49.00	50.00	48.00	51.00	26.00	41.00
agnesium, mg/l	28.00	28.00	28.00	20.00	23.00	21.00	11.00	20.00
otassium, mg/l	6.50	6.10	5.90	6.00	6.50	5.80	3.30	4.70
odium, mg/l	280.00	290.00	260.00	290.00	285.00	295.00	320.00	280.00
ulfate, mg/l	190.00	185.00	180.00	175.00	215.00	190.00	168.00	180.00
ethylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
hloride, mg/l	2.70	2.30	2.30	1.80	2.00	2.00	2.10	2.80
ron, mg/l	0.70	1.20	0.60	1.10	0.80	0.90	0.50	0.10
inc, mg/l	*	*	*	*	*	*	*	*
anganese, mg/l	0.20	0.32	0.27	0.34	0.26	0.30	0.06	0.19
opper, ug/l	*	*	*	*	*	*	*	*
ilver, ug/l	*	*	*	*	*	*	*	*
trontium, mg/l	0.80	0.80	0.70	0.80	1.00	0.80	0.50	0.90
oron, mg/l	0.50	0.50	0.48	0.47	0.50	0.47	0.48	0.36
eryllium, ug/l	*	*	*	*	*	*	*	*
ickel, ug/l	*	*	*	*	*	*	*	*
elenium, ug/l	*	*	*	*	*	*	*	*
ercury, ug/l	*	*	*	*	*	*	*	*
rsenic, ug/l	<1.00	<1.00	1.00	2.00	<1.00	<1.00	<1.00	<1.00
arium, mg/l	*	*	*	*	*	*	*	*
admium, ug/l	*	*	*	*	*	*	*	*
hromium-VI, ug/l	*	*	*	*	*	*	*	*
luoride, mg/l	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
ead, ug/l	*	*	*	*	*	*	*	*
olybdenum, mg/l	*	*	*	*	*	*	*	*
luminum, mg/l	*	*	*	*	*	*	*	*
ecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
yanide, mg/l	*	*	*	*	*	*	*	*
henol, ug/l	*	*	*	*	*	*	*	*
iochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
hemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
otal Organic Carbon, mg/l	*	*	*	*	*	*	*	*
emperature, Degrees C	*	*	*	*	*	*	*	*
issolved Oxygen, mg/l	*	*	*	*	*	*	*	*
ater Level depth below ground surface, ft.	6.50	5.50	6.10	5.30	5.40	5.40	8.00	5.25
otal Sulfur, mg/l	*	*	*	*	*	*	*	*
otal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 26 = Monitoring Well # 26 -CCSPAGE 3

DATE	10/22/1986	06/01/1987	10/08/1987	06/13/1988	11/01/1988	06/15/1989	10/25/1989
pH-Field	7.42	7.37	7.40	7.30	7.60	7.30	7.30
pH-Laboratory	7.40	7.30	7.10	7.20	7.40	7.30	7.20
Specific conductance, umhos/cm @ 25c	1440.00	1800.00	1740.00	1600.00	1560.00	1450.00	1440.00
Total Dissolved Solids, mg/l	964.00	1170.00	1027.00	936.00	897.00	949.00	941.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	*	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	655.00	*	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	655.00	601.00	635.00	644.00	629.00	626.00	627.00
Nitrate-N, mg/l	0.19	0.07	0.03	*	*	0.17	0.05
Ammonia-N, mg/l	*	*	*	*	*	*	*
Calcium, mg/l	36.00	53.00	47.00	42.00	41.00	41.00	38.00
Magnesium, mg/l	24.00	24.00	24.00	19.00	22.00	19.00	20.00
Potassium, mg/l	6.00	6.70	4.30	4.90	6.00	5.70	6.20
Sodium, mg/l	287.00	340.00	307.00	310.00	290.00	260.00	285.00
Sulfate, mg/l	200.00	300.00	285.50	250.00	270.00	187.00	255.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*
Chloride, mg/l	3.40	7.10	3.97	4.30	3.00	4.50	5.00
Iron, mg/l	0.50	0.10	0.28	*	*	*	2.10
Zinc, mg/l	0.01	*	*	*	*	*	*
Manganese, mg/l	0.25	0.20	0.23	*	*	*	0.22
Copper, ug/l	<10.00	*	*	*	*	*	*
Silver, ug/l	<10.00	*	*	*	*	*	*
Strontium, mg/l	1.00	1.10	1.00	*	*	*	0.80
Boron, mg/l	0.47	0.44	0.44	0.46	0.50	0.43	0.49
Beryllium, ug/l	<10.00	*	*	*	*	*	*
Nickel, ug/l	<10.00	<50.00	<50.00	*	*	*	*
Selenium, ug/l	<1.00	*	*	*	*	*	*
Mercury, ug/l	<1.00	*	*	*	*	*	*
Arsenic, ug/l	<1.00	3.00	1.00	*	*	*	*
Barium, mg/l	0.03	*	*	*	*	*	*
Cadmium, ug/l	<10.00	<10.00	<10.00	*	*	*	*
Chromium-VI, ug/l	<10.00	*	*	*	*	*	*
Fluoride, mg/l	0.30	0.30	0.25	0.20	0.20	0.30	0.30
Lead, ug/l	<1.00	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*
Aluminum, mg/l	0.16	0.08	0.01	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	11.50	*	*	11.10	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	5.00	4.80	5.20	5.70	8.02	7.70	*2m72cm 2m5
Total Sulfur, mg/l	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*

SAMPLE LOCATION 27 = Monitoring Well # 27 -CCSPAGE 1

ATE	05/30/1980	10/07/1980	03/26/1981	06/10/1981	09/16/1981	09/16/1981	12/03/1981	05/26/1982
	PACE	PACE	PACE	PACE		PACE		
H-Field	8.60	7.70	7.80	7.90	7.90	7.90	7.50	7.80
H-Laboratory	7.30	8.10	8.10	8.10	7.40	7.40	7.40	7.50
pecific conductance, umhos/cm @ 25c	800.00	1100.00	1570.00	1600.00	1290.00	1300.00	1480.00	1200.00
otal Dissolved Solids, mg/l	436.00	778.00	902.00	970.00	940.00	950.00	990.00	910.00
otal Suspended Solids, mg/l	*	*	*	*	*	*	*	*
lkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
lkalinity Bicarbonate, mg/l as CaCO3	90.00	369.00	510.00	590.00	592.00	620.00	590.00	638.00
lkalinity Total, mg/l as CaCO3	90.00	369.00	510.00	590.00	592.00	620.00	590.00	638.00
itrate-N, mg/l	0.14	<0.10	<0.10	<0.10	0.16	<0.10	0.15	0.42
mmonia-N, mg/l	<0.10	*	*	*	*	*	*	*
alcium, mg/l	26.00	35.00	31.00	46.00	41.00	42.00	42.00	57.00
agnesium, mg/l	22.00	27.00	30.00	32.00	29.00	22.00	32.00	30.00
otassium, mg/l	3.90	4.80	5.70	5.40	7.30	4.90	6.30	6.10
odium, mg/l	100.00	180.00	240.00	310.00	325.00	300.00	310.00	310.00
ulfate, mg/l	180.00	340.00	270.00	290.00	250.00	280.00	270.00	260.00
ethylene Blue Active Substances, mg/l	<0.10	*	*	*	*	*	*	*
hloride, mg/l	<10.00	8.00	5.00	5.00	5.00	5.00	4.60	4.00
ron, mg/l	0.80	0.80	<0.05	0.75	0.80	0.05	0.02	<0.10
inc, mg/l	20.00	*	*	*	*	*	*	*
anganese, mg/l	<0.04	0.08	<0.04	0.12	0.20	0.16	0.39	0.10
opper, ug/l	<50.00	*	*	*	*	*	*	*
ilver, ug/l	<40.00	*	*	*	*	*	*	*
trontium, mg/l	0.30	0.50	0.70	0.62	0.90	0.45	0.90	1.00
oron, mg/l	<0.20	0.20	0.20	0.20	0.50	0.30	0.40	0.50
eryllium, ug/l	20.00	*	*	*	*	*	*	*
ickel, ug/l	50.00	*	*	*	*	*	*	*
elenium, ug/l	<1.00	*	*	*	*	*	*	*
ercury, ug/l	0.60	*	*	*	*	*	*	*
rsenic, ug/l	1.00	2.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
arium, mg/l	<0.30	*	*	*	*	*	*	*
admium, ug/l	<1.00	*	*	*	*	*	*	*
hromium-VI, ug/l	<5.00	*	*	*	*	*	*	*
luoride, mg/l	0.30	0.40	0.40	0.50	0.10	0.30	0.20	0.40
ead, ug/l	20.00	*	*	*	*	*	*	*
olybdenum, mg/l	*	*	*	*	*	*	*	*
luminum, mg/l	*	*	*	*	*	*	*	*
ecal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*
yanide, mg/l	<0.02	*	*	*	*	*	*	*
henol, ug/l	<3.00	*	*	*	*	*	*	*
iochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
hemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
otal Organic Carbon, mg/l	*	*	*	*	*	*	*	*
emperature, Degrees C	*	*	*	*	*	*	*	*
issolved Oxygen, mg/l	*	*	*	*	*	*	*	*
ater Level depth below ground surface, ft.	9.50	8.50	8.00	9.30	9.20	9.20	8.60	8.30
otal Sulfur, mg/l	*	*	*	*	*	*	*	*
otal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*

SAMPLE LOCATION 27 = Monitoring Well # 27 -CCSPAGE 2

DATE	10/13/1982	04/27/1983	10/04/1983	05/17/1984	10/04/1984	05/15/1985	10/23/1985	06/20/1986
pH-Field	7.70	7.40	8.00	7.40	7.70	7.10	7.10	7.10
pH-Laboratory	7.40	7.50	7.40	7.40	7.40	7.20	7.40	7.40
Specific conductance, umhos/cm @ 25c	1360.00	1290.00	1450.00	1570.00	1440.00	1560.00	1560.00	1560.00
Total Dissolved Solids, mg/l	820.00	899.00	1026.00	1060.00	998.00	1010.00	1010.00	1020.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	616.00	631.00	603.00	610.00	603.00	625.00	629.00	625.00
Alkalinity Total, mg/l as CaCO3	616.00	633.00	603.00	610.00	603.00	625.00	629.00	625.00
Nitrate-N, mg/l	0.05	0.05	0.05	0.16	0.10	0.21	0.28	0.25
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	52.00	46.00	48.00	49.00	48.00	51.00	47.00	43.00
Magnesium, mg/l	33.00	31.00	28.00	24.00	29.00	26.00	25.00	27.00
Potassium, mg/l	5.50	5.40	5.30	5.20	5.70	5.20	5.30	4.80
Sodium, mg/l	300.00	300.00	295.00	320.00	310.00	290.00	320.00	285.00
Sulfate, mg/l	270.00	260.00	250.00	270.00	310.00	270.00	273.00	270.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	4.10	4.10	3.70	4.10	0.20	3.80	4.00	4.50
Iron, mg/l	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	0.34	0.16	0.11	0.08	0.02	0.04	1.00	<0.01
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	0.80	1.00	0.80	0.90	1.00	0.80	0.90	0.90
Boron, mg/l	0.30	0.30	0.31	0.30	0.32	0.32	0.31	0.19
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	<1.00	1.00	<1.00	<1.00	<1.00	<1.00
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	*
Fluoride, mg/l	0.40	0.30	0.30	0.30	0.40	0.30	0.30	0.30
Lead, ug/l	*	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	9.50	7.80	10.70	6.80	9.90	8.90	11.60	8.75
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 27 = Monitoring Well # 27 -CCSPAGE 3

ATE	10/22/1986	06/01/1987	10/08/1987	06/13/1988	11/01/1988	06/15/1989	10/25/1989
H-Field	7.49	7.60	7.60	7.30	7.60	7.50	7.30
H-Laboratory	7.40	7.40	7.20	7.30	7.40	7.50	7.30
pecific conductance, umhos/cm @ 25c	1550.00	1610.00	1710.00	1730.00	1740.00	1650.00	1650.00
otal Dissolved Solids, mg/l	1030.00	1015.00	994.00	1020.00	1020.00	1070.00	1060.00
otal Suspended Solids, mg/l	*	*	*	*	*	*	*
lkalinity Carbonate, mg/l as CaCO3	<1.00	*	*	*	*	*	*
lkalinity Bicarbonate, mg/l as CaCO3	620.00	*	*	*	*	*	*
lkalinity Total, mg/l as CaCO3	620.00	559.00	593.00	612.00	603.00	613.00	624.00
itrate-N, mg/l	0.23	0.42	0.19	*	*	0.30	0.30
mmonia-N, mg/l	*	*	*	*	*	*	*
alcium, mg/l	38.00	40.00	42.00	41.00	41.00	40.00	40.00
agnesium, mg/l	31.00	24.00	29.00	26.00	29.00	24.00	28.00
otassium, mg/l	5.60	5.50	5.10	4.20	5.30	5.30	5.80
odium, mg/l	300.00	300.00	298.00	300.00	295.00	300.00	326.00
ulfate, mg/l	305.00	330.00	297.90	300.00	314.00	266.00	309.00
ethylene Blue Active Substances, mg/l	*	*	*	*	*	*	*
hloride, mg/l	5.10	5.50	4.89	5.80	5.30	5.70	5.70
ron, mg/l	<0.10	<0.10	<0.01	*	*	*	<0.10
inc, mg/l	0.01	*	*	*	*	*	*
anganese, mg/l	<0.01	<0.01	<0.01	*	*	*	0.12
opper, ug/l	10.00	*	*	*	*	*	*
ilver, ug/l	<10.00	*	*	*	*	*	*
trontium, mg/l	1.10	0.90	0.90	*	*	*	1.00
oron, mg/l	0.28	0.31	0.26	0.25	0.26	0.29	0.30
eryllium, ug/l	<10.00	*	*	*	*	*	*
ickel, ug/l	<10.00	<50.00	<50.00	*	*	*	*
elenium, ug/l	<1.00	*	*	*	*	*	*
ercury, ug/l	<1.00	*	*	*	*	*	*
rsenic, ug/l	<1.00	1.00	<1.00	*	*	*	*
arium, mg/l	0.01	*	*	*	*	*	*
admium, ug/l	<10.00	<10.00	<10.00	*	*	*	*
hromium-VI, ug/l	<10.00	*	*	*	*	*	*
luoride, mg/l	0.30	0.30	0.26	0.20	0.30	0.20	0.30
ead, ug/l	2.00	*	*	*	*	*	*
olybdenum, mg/l	*	*	*	*	*	*	*
luminum, mg/l	0.07	<0.01	0.02	*	*	*	*
ecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*
yanide, mg/l	*	*	*	*	*	*	*
henol, ug/l	*	*	*	*	*	*	*
iochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
hemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
otal Organic Carbon, mg/l	*	*	*	*	*	*	*
emperature, Degrees C	*	*	10.40	*	*	9.70	*
issolved Oxygen, mg/l	*	*	*	*	*	*	*
ater Level depth below ground surface, ft.	7.50	9.80	9.10	10.80	11.09	23.90	*3m 43cm 3m.
otal Sulfur, mg/l	*	*	*	*	*	*	*
otal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*

cll

SAMPLE LOCATION 28 = Monitoring Well # 28 -CCSPAGE 1

ATE	05/30/1980	10/07/1980	03/26/1981	06/10/1981	09/16/1981	09/16/1981	12/02/1981	05/26/1982
	PACE	PACE	PACE	PACE		PACE		
H-Field	7.70	7.60	7.90	7.80	7.80	7.80	7.40	7.90
H-Laboratory	7.00	7.70	7.50	8.10	7.40	7.40	7.30	7.60
pecific conductance, umhos/cm @ 25c	550.00	1000.00	1260.00	1300.00	1070.00	1000.00	1230.00	1200.00
otal Dissolved Solids, mg/l	320.00	482.00	786.00	880.00	748.00	810.00	750.00	760.00
otal Suspended Solids, mg/l	*	*	*	*	*	*	*	*
lkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
lkalinity Bicarbonate, mg/l as CaCO3	62.00	265.00	450.00	500.00	470.00	510.00	510.00	538.00
lkalinity Total, mg/l as CaCO3	62.00	265.00	450.00	500.00	470.00	510.00	510.00	538.00
itrate-N, mg/l	<0.20	<0.10	<0.10	0.30	0.37	<0.10	<0.01	0.25
mmonia-N, mg/l	<0.10	*	0.10	*	*	*	*	*
alcium, mg/l	28.00	31.00	39.00	59.00	55.00	43.00	47.00	62.00
agnesium, mg/l	22.00	26.00	34.00	45.00	34.00	33.00	35.00	40.00
otassium, mg/l	4.80	3.90	5.20	5.40	6.60	5.20	6.00	5.70
odium, mg/l	75.00	130.00	200.00	200.00	220.00	200.00	220.00	220.00
ulfate, mg/l	200.00	200.00	240.00	250.00	210.00	210.00	240.00	220.00
ethylene Blue Active Substances, mg/l	<0.10	*	*	*	*	*	*	*
hloride, mg/l	10.00	10.00	5.00	6.00	4.50	5.00	4.90	3.90
ron, mg/l	1.20	0.55	<0.05	23.00	0.40	0.30	0.04	0.10
inc, mg/l	10.00	*	*	*	*	*	*	*
anganese, mg/l	0.04	0.16	<0.04	0.68	0.20	0.12	0.25	0.02
opper, ug/l	<50.00	*	*	*	*	*	*	*
ilver, ug/l	<40.00	*	*	*	*	*	*	*
trontium, mg/l	0.25	0.40	0.70	0.55	0.80	0.50	0.90	1.00
oron, mg/l	<0.20	0.20	0.20	0.10	0.10	0.20	0.60	0.30
eryllium, ug/l	<20.00	*	*	*	*	*	*	*
ickel, ug/l	<50.00	*	*	*	*	*	*	*
elenium, ug/l	1.00	*	*	*	*	*	*	*
ercury, ug/l	<0.20	*	*	*	*	*	*	*
rsenic, ug/l	1.00	<1.00	1.00	10.00	1.50	<1.00	<1.00	<1.00
arium, mg/l	0.50	*	*	*	*	*	*	*
admium, ug/l	<1.00	*	*	*	*	*	*	*
hromium-VI, ug/l	<5.00	*	*	*	*	*	*	*
luoride, mg/l	0.30	0.40	0.40	0.40	0.10	0.30	0.20	0.40
ead, ug/l	20.00	*	*	*	*	*	*	*
olybdenum, mg/l	*	*	*	*	*	*	*	*
luminum, mg/l	*	*	*	*	*	*	*	*
ecal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*
yanide, mg/l	<0.02	*	*	*	*	*	*	*
henol, ug/l	<2.00	*	*	*	*	*	*	*
iochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
hemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
otal Organic Carbon, mg/l	*	*	*	*	*	*	*	*
emperature, Degrees C	*	*	*	*	*	*	*	*
issolved Oxygen, mg/l	*	*	*	*	*	*	*	*
ater Level depth below ground surface, ft.	10.50	9.50	10.00	12.80	11.00	11.00	10.20	10.00
otal Sulfur, mg/l	*	*	*	*	*	*	*	*
otal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*

SAMPLE LOCATION 28 = Monitoring Well # 28 -CCSPAGE 2

DATE	10/13/1982	04/27/1983	10/04/1983	05/17/1984	10/04/1984	05/15/1985	10/23/1985	06/20/1986
pH-Field	7.70	7.50	8.00	7.60	7.70	7.10	7.10	*
pH-Laboratory	7.40	7.50	7.30	7.40	7.40	7.20	7.40	7.50
Specific conductance, umhos/cm @ 25c	950.00	1100.00	1260.00	1340.00	1240.00	1310.00	1300.00	1270.00
Total Dissolved Solids, mg/l	700.00	769.00	887.00	882.00	820.00	835.00	826.00	805.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	532.00	555.00	538.00	532.00	519.00	534.00	533.00	521.00
Alkalinity Total, mg/l as CaCO3	532.00	555.00	538.00	532.00	519.00	534.00	533.00	521.00
Nitrate-N, mg/l	0.05	0.32	0.15	0.27	0.10	0.28	0.25	0.24
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	58.00	52.00	55.00	55.00	52.00	55.00	49.00	42.00
Magnesium, mg/l	33.00	38.00	35.00	31.00	35.00	32.00	31.00	31.00
Potassium, mg/l	5.20	4.80	5.20	4.70	5.30	4.70	4.80	2.80
Sodium, mg/l	200.00	220.00	200.00	225.00	230.00	225.00	240.00	230.00
Sulfate, mg/l	210.00	220.00	210.00	230.00	215.00	200.00	200.00	200.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	4.20	4.30	3.80	3.50	3.60	3.40	3.90	4.00
Iron, mg/l	<0.10	0.20	1.60	0.10	<0.10	<0.10	0.10	<0.10
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	0.12	0.03	0.09	<0.01	0.07	0.01	0.05	<0.01
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	0.80	0.80	0.80	0.80	1.00	0.80	0.80	0.90
Boron, mg/l	0.30	0.20	0.30	0.24	0.27	0.25	0.26	0.10
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	*
Fluoride, mg/l	0.30	0.30	0.20	0.30	0.30	0.30	0.20	0.20
Lead, ug/l	*	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	12.30	10.80	7.30	8.30	11.20	10.40	12.60	9.60
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 28 = Monitoring Well # 28 -CCSPAGE 3

DATE	10/22/1986	06/01/1987	10/08/1987	06/13/1988	11/01/1988	06/15/1989	10/25/1989
pH-Field	7.58	7.66	7.70	7.30	7.80	7.60	7.50
pH-Laboratory	7.40	7.50	7.30	7.40	7.50	8.30	7.80
Specific conductance, umhos/cm @ 25c	1300.00	1320.00	1430.00	1440.00	1410.00	1300.00	1360.00
Total Dissolved Solids, mg/l	836.00	825.00	784.00	806.00	755.00	805.00	843.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	*	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	542.00	*	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	542.00	468.00	523.00	534.00	519.00	516.00	509.00
Nitrate-N, mg/l	0.04	0.20	0.06	*	*	0.20	0.10
Ammonia-N, mg/l	*	*	*	*	*	*	*
Calcium, mg/l	42.00	47.00	45.00	47.00	43.00	44.00	46.00
Magnesium, mg/l	39.00	34.00	34.00	34.00	35.00	30.00	36.00
Potassium, mg/l	5.00	4.90	4.50	4.00	4.90	4.80	5.50
Sodium, mg/l	220.00	220.00	210.00	210.00	210.00	210.00	225.00
Sulfate, mg/l	220.00	245.00	219.10	220.00	240.00	213.00	229.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*
Chloride, mg/l	4.40	4.60	3.95	4.90	4.10	5.90	5.60
Iron, mg/l	<0.10	<0.10	<0.01	*	*	*	0.40
Zinc, mg/l	0.01	*	*	*	*	*	*
Manganese, mg/l	<0.01	<0.01	<0.01	*	*	*	<0.10
Copper, ug/l	<10.00	*	*	*	*	*	*
Silver, ug/l	<10.00	*	*	*	*	*	*
Strontium, mg/l	1.00	0.90	0.90	*	*	*	1.00
Boron, mg/l	0.21	0.20	0.21	0.16	0.19	0.17	0.23
Beryllium, ug/l	<10.00	*	*	*	*	*	*
Nickel, ug/l	<10.00	<50.00	<50.00	*	*	*	*
Selenium, ug/l	1.00	*	*	*	*	*	*
Mercury, ug/l	<1.00	*	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	<1.00	*	*	*	*
Barium, mg/l	0.01	*	*	*	*	*	*
Cadmium, ug/l	<10.00	<10.00	<10.00	*	*	*	*
Chromium-VI, ug/l	<10.00	*	*	*	*	*	*
Fluoride, mg/l	0.30	0.30	0.24	0.20	0.20	0.20	0.30
Lead, ug/l	<1.00	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*
Aluminum, mg/l	0.07	<0.01	<0.01	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	3.80	*	*	10.30	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	7.80	8.80	10.70	10.80	12.06	20.40	*On 29 Jan 3
Total Sulfur, mg/l	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*

SAMPLE LOCATION 29 = Monitoring Well # 29 -CCSPAGE 1

ATE	05/30/1980 PACE	10/07/1980 PACE	03/27/1981 PACE	06/10/1981 PACE	09/16/1981	09/16/1981 PACE	12/02/1981	05/26/1982
H-Field	8.00	7.50	7.60	7.70	7.40	7.40	7.40	7.60
H-Laboratory	8.40	7.50	7.20	7.50	7.30	7.30	7.20	7.40
pecific conductance, umhos/cm @ 25c	740.00	2100.00	7000.00	6000.00	7500.00	6500.00	7500.00	6300.00
otal Dissolved Solids, mg/l	496.00	342.00	7960.00	7300.00	10150.00	9800.00	8500.00	6970.00
otal Suspended Solids, mg/l	*	*	*	*	*	*	*	*
lkalinity Carbonate, mg/l as CaCO3	4.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
lkalinity Bicarbonate, mg/l as CaCO3	127.00	117.00	259.00	250.00	432.00	412.00	360.00	416.00
lkalinity Total, mg/l as CaCO3	131.00	117.00	259.00	250.00	432.00	412.00	360.00	416.00
itrate-N, mg/l	<0.20	<0.10	4.00	4.00	4.00	2.80	2.60	1.70
mmonia-N, mg/l	<0.10	*	*	*	*	*	*	*
alcium, mg/l	58.00	140.00	820.00	950.00	550.00	520.00	540.00	480.00
agnesium, mg/l	37.00	69.00	720.00	760.00	1250.00	1140.00	960.00	830.00
otassium, mg/l	33.00	15.00	15.00	9.80	14.60	12.00	12.00	9.20
odium, mg/l	23.00	16.00	180.00	230.00	590.00	550.00	465.00	450.00
ulfate, mg/l	110.00	160.00	5400.00	4800.00	6700.00	5900.00	5400.00	4400.00
ethylene Blue Active Substances, mg/l	<0.10	*	*	*	*	*	*	*
hloride, mg/l	<10.00	8.00	230.00	250.00	154.00	170.00	153.00	75.00
ron, mg/l	0.85	0.10	<0.05	0.10	1.50	<0.05	0.07	0.10
inc, mg/l	10.00	*	*	*	*	*	*	*
anganese, mg/l	0.12	0.04	0.44	0.08	0.40	0.04	0.05	0.05
opper, ug/l	<50.00	*	*	*	*	*	*	*
ilver, ug/l	<40.00	*	*	*	*	*	*	*
trontium, mg/l	0.25	0.80	2.40	2.10	3.20	4.20	4.20	3.80
oron, mg/l	<0.20	0.20	0.20	0.20	1.00	0.60	0.60	1.00
eryllium, ug/l	<20.00	*	*	*	*	*	*	*
ickel, ug/l	<50.00	*	*	*	*	*	*	*
elenium, ug/l	1.00	*	*	*	*	*	*	*
ercury, ug/l	<0.20	*	*	*	*	*	*	*
rsenic, ug/l	1.00	<1.00	<1.00	1.00	5.00	<1.00	1.00	<1.00
arium, mg/l	0.80	*	*	*	*	*	*	*
admium, ug/l	<1.00	*	*	*	*	*	*	*
hromium-VI, ug/l	<5.00	*	*	*	*	*	*	*
luoride, mg/l	0.20	0.30	0.40	0.40	0.40	0.80	0.50	1.00
ead, ug/l	<10.00	*	*	*	*	*	*	*
olybdenum, mg/l	*	*	*	*	*	*	*	*
luminum, mg/l	*	*	*	*	*	*	*	*
ecal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*
yanide, mg/l	<0.02	*	*	*	*	*	*	*
henol, ug/l	<2.00	*	*	*	*	*	*	*
iochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
hemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
otal Organic Carbon, mg/l	*	*	*	*	*	*	*	*
emperature, Degrees C	*	*	*	*	*	*	*	*
issolved Oxygen, mg/l	*	*	*	*	*	*	*	*
ater Level depth below ground surface, ft.	10.00	9.00	4.30	3.00	4.70	4.70	3.50	2.00
otal Sulfur, mg/l	*	*	*	*	*	*	*	*
otal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*

SAMPLE LOCATION 29 = Monitoring Well # 29 -CCSPAGE 2

DATE	10/13/1982	04/27/1983	10/05/1983	05/17/1984	10/05/1984	05/15/1985	10/23/1985	06/23/1986
pH-Field	7.90	7.60	7.50	7.60	7.10	7.10	7.20	7.60
pH-Laboratory	7.40	7.40	7.30	7.40	7.20	7.20	7.30	7.50
Specific conductance, umhos/cm @ 25c	6400.00	5000.00	5100.00	5200.00	5600.00	5400.00	5800.00	5100.00
Total Dissolved Solids, mg/l	6390.00	5580.00	5426.00	5190.00	5570.00	5550.00	5730.00	4980.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	396.00	358.00	319.00	305.00	313.00	321.00	334.00	345.00
Alkalinity Total, mg/l as CaCO3	396.00	358.00	319.00	305.00	316.00	321.00	336.00	345.00
Nitrate-N, mg/l	0.68	0.25	0.08	0.13	0.10	0.15	0.20	0.14
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	450.00	430.00	400.00	380.00	425.00	435.00	690.00	370.00
Magnesium, mg/l	700.00	580.00	534.00	428.00	460.00	480.00	555.00	465.00
Potassium, mg/l	8.50	7.00	7.00	6.40	7.70	6.30	7.00	4.60
Sodium, mg/l	420.00	360.00	360.00	340.00	345.00	330.00	370.00	325.00
Sulfate, mg/l	4180.00	3600.00	3300.00	3400.00	3100.00	3400.00	3800.00	3000.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	72.00	69.00	63.00	64.00	64.00	64.00	66.00	61.00
Iron, mg/l	0.70	<0.10	<0.10	0.30	<0.10	<0.10	0.10	<0.10
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	0.06	0.03	0.02	0.10	<0.01	0.02	<0.01	<0.01
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	3.00	2.90	2.70	2.60	3.50	2.60	3.50	3.00
Boron, mg/l	1.40	2.20	2.00	2.20	2.60	2.00	2.30	2.00
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	1.00	<1.00	<1.00	1.00	<1.00	<1.00	<1.00	<1.00
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	*
Fluoride, mg/l	0.80	0.70	0.60	0.60	0.60	0.60	0.50	0.60
Lead, ug/l	*	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	2.50	1.80	5.60	4.20	7.50	7.80	12.70	8.50
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 29 = Monitoring Well # 29 -CCSPAGE 3

ATE	10/23/1986	06/02/1987	10/09/1987	06/13/1988	11/07/1988	06/16/1989	10/30/1989
H-Field	7.52	7.50	7.60	7.30	7.50	7.30	6.90
H-Laboratory	7.30	7.00	7.30	7.20	7.40	7.30	7.10
pecific conductance, umhos/cm @ 25c	5600.00	5600.00	5900.00	6000.00	6000.00	3700.00	5100.00
otal Dissolved Solids, mg/l	5760.00	5380.00	4012.00	5410.00	5470.00	5250.00	4690.00
otal Suspended Solids, mg/l	*	*	*	*	*	*	*
lkalinity Carbonate, mg/l as CaCO3	<1.00	*	*	*	*	*	*
lkalinity Bicarbonate, mg/l as CaCO3	355.00	*	*	*	*	*	*
lkalinity Total, mg/l as CaCO3	355.00	311.00	326.00	344.00	354.00	352.00	354.00
itrate-N, mg/l	0.29	0.27	0.19	*	*	2.20	1.60
mmonia-N, mg/l	*	*	*	*	*	*	*
alcium, mg/l	410.00	410.00	422.00	450.00	450.00	439.00	395.00
agnesium, mg/l	550.00	540.00	606.00	505.00	570.00	500.00	490.00
otassium, mg/l	7.50	6.70	6.70	5.70	7.60	6.70	7.30
odium, mg/l	300.00	330.00	310.00	290.00	330.00	280.00	300.00
ulfate, mg/l	3600.00	3400.00	3279.50	3500.00	3400.00	3200.00	3220.10
ethylene Blue Active Substances, mg/l	*	*	*	*	*	*	*
hloride, mg/l	64.00	59.00	62.90	48.00	58.30	53.00	49.00
ron, mg/l	<0.10	<0.10	<0.01	*	*	*	<0.10
inc, mg/l	0.01	*	*	*	*	*	*
anganese, mg/l	<0.01	<0.01	0.01	*	*	*	<0.10
opper, ug/l	<10.00	*	*	*	*	*	*
ilver, ug/l	<10.00	*	*	*	*	*	*
trontium, mg/l	3.30	2.80	2.90	*	*	*	2.80
oron, mg/l	2.20	1.80	1.91	1.70	1.80	2.03	2.00
eryllium, ug/l	<10.00	*	*	*	*	*	*
ickel, ug/l	80.00	<50.00	<50.00	*	*	*	*
elenium, ug/l	25.00	*	*	*	*	*	*
ercury, ug/l	<1.00	*	*	*	*	*	*
rsenic, ug/l	<1.00	4.00	<1.00	*	*	*	*
arium, mg/l	0.02	*	*	*	*	*	*
admium, ug/l	<10.00	<10.00	<10.00	*	*	*	*
hromium-VI, ug/l	<10.00	*	*	*	*	*	*
luoride, mg/l	0.60	0.60	0.56	0.50	0.50	0.40	0.70
ead, ug/l	<1.00	*	*	*	*	*	*
olybdenum, mg/l	*	*	*	*	*	*	*
luminum, mg/l	0.08	<0.01	<0.01	*	*	*	*
ecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*
yanide, mg/l	*	*	*	*	*	*	*
henol, ug/l	*	*	*	*	*	*	*
iochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
hemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
otal Organic Carbon, mg/l	*	*	*	*	*	*	*
emperature, Degrees C	*	*	8.70	*	*	11.50	*
issolved Oxygen, mg/l	*	*	*	*	*	*	*
ater Level depth below ground surface, ft.	10.00	9.00	9.90	10.80	3.09	13.70	*4m 40cm
otal Sulfur, mg/l	*	*	*	*	*	*	*
otal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*

6111

4m 10

SAMPLE LOCATION 30 = Monitoring Well # 30 -CCSPAGE 1

DATE	05/30/1980 PACE	10/07/1980 PACE	03/27/1981 PACE	06/10/1981 PACE	09/16/1981	09/16/1981 PACE	12/02/1981	05/26/1982
PH-Field	7.30	7.00	6.90	7.50	7.10	7.10	7.10	7.40
PH-Laboratory	7.40	7.80	7.00	7.80	7.00	7.00	6.90	7.00
Specific conductance, umhos/cm @ 25c	400.00	2100.00	3270.00	3000.00	2380.00	2400.00	2800.00	2700.00
Total Dissolved Solids, mg/l	964.00	1620.00	2580.00	2600.00	2130.00	2300.00	2630.00	2160.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	220.00	350.00	520.00	520.00	523.00	510.00	510.00	416.00
Alkalinity Total, mg/l as CaCO3	220.00	350.00	520.00	520.00	523.00	510.00	510.00	416.00
Nitrate-N, mg/l	<0.20	<0.11	<0.10	<0.10	0.24	<0.10	0.03	0.37
Ammonia-N, mg/l	<0.10	*	*	*	*	*	*	*
Calcium, mg/l	72.00	160.00	320.00	330.00	360.00	300.00	300.00	340.00
Magnesium, mg/l	61.00	100.00	170.00	170.00	195.00	150.00	175.00	150.00
Potassium, mg/l	6.40	9.30	13.00	10.00	13.60	10.00	12.00	12.00
Sodium, mg/l	85.00	102.00	150.00	150.00	160.00	140.00	160.00	150.00
Sulfate, mg/l	420.00	860.00	1600.00	1400.00	1400.00	1200.00	1250.00	1180.00
Methylene Blue Active Substances, mg/l	<0.10	*	*	*	*	*	*	*
Chloride, mg/l	<10.00	14.00	21.00	24.00	22.10	24.00	24.00	21.10
Iron, mg/l	0.55	0.60	1.40	2.20	2.60	1.60	1.20	0.40
Zinc, mg/l	30.00	*	*	*	*	*	*	*
Manganese, mg/l	0.80	2.60	2.60	3.00	2.90	3.00	3.40	3.10
Copper, ug/l	<50.00	*	*	*	*	*	*	*
Silver, ug/l	<40.00	*	*	*	*	*	*	*
Strontium, mg/l	0.90	2.40	3.70	3.60	3.40	3.20	4.20	4.00
Boron, mg/l	0.30	0.50	0.60	0.40	1.20	0.90	0.80	0.90
Beryllium, ug/l	<20.00	*	*	*	*	*	*	*
Nickel, ug/l	<50.00	*	*	*	*	*	*	*
Selenium, ug/l	<1.00	*	*	*	*	*	*	*
Mercury, ug/l	<0.20	*	*	*	*	*	*	*
Arsenic, ug/l	1.00	2.00	1.00	2.00	3.00	1.00	1.00	<1.00
Barium, mg/l	1.00	*	*	*	*	*	*	*
Cadmium, ug/l	<1.00	*	*	*	*	*	*	*
Chromium-VI, ug/l	<5.00	*	*	*	*	*	*	*
Fluoride, mg/l	0.20	0.30	0.20	0.30	0.10	0.20	<0.10	0.30
Lead, ug/l	20.00	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*
Cyanide, mg/l	<0.02	*	*	*	*	*	*	*
Phenol, ug/l	<2.00	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	17.00	18.00	13.00	15.00	10.50	10.50	10.50	14.80
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*

DATE	10/13/1982	04/27/1983	10/05/1983	05/17/1984	10/05/1984	05/15/1985	10/23/1985	06/23/1986
pH-Field	7.50	7.10	7.00	7.30	6.50	6.80	6.70	7.00
pH-Laboratory	7.00	7.00	6.90	6.90	6.80	6.80	6.90	6.70
Specific conductance, umhos/cm @ 25c	2700.00	2500.00	2500.00	2800.00	2800.00	2800.00	2700.00	2600.00
Total Dissolved Solids, mg/l	2200.00	2130.00	2072.00	2300.00	2130.00	2210.00	2130.00	2150.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	532.00	555.00	522.00	474.00	507.00	526.00	525.00	516.00
Alkalinity Total, mg/l as CaCO3	532.00	555.00	522.00	474.00	507.00	526.00	525.00	516.00
Nitrate-N, mg/l	0.05	0.11	0.02	0.06	0.07	0.35	0.16	0.07
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	340.00	300.00	295.00	290.00	290.00	315.00	310.00	275.00
Magnesium, mg/l	160.00	160.00	155.00	138.00	150.00	140.00	134.00	150.00
Potassium, mg/l	11.00	11.00	9.90	9.90	11.00	9.50	9.10	7.60
Sodium, mg/l	150.00	150.00	146.00	150.00	145.00	148.00	142.00	135.00
Sulfate, mg/l	1230.00	1100.00	1000.00	1000.00	1200.00	1200.00	1055.00	1100.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	23.00	22.00	22.00	20.00	22.00	21.00	22.00	22.00
Iron, mg/l	0.80	0.20	<0.10	0.10	<0.10	<0.10	0.10	<0.10
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	2.70	2.30	2.20	2.80	2.50	2.30	2.30	2.10
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	3.20	3.30	3.10	3.50	4.20	3.30	3.40	3.80
Boron, mg/l	0.70	0.70	0.66	0.64	0.80	0.64	0.63	0.63
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	1.00	1.00	1.00	<1.00	<1.00	<1.00	<1.00
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	*
Fluoride, mg/l	0.30	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Lead, ug/l	*	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	19.30	27.60	26.80	25.80	24.90	26.40	29.50	21.50
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 30 = Monitoring Well # 30 -CCSPAGE 3

ATE	10/23/1986	06/02/1987	10/09/1987	06/14/1988	10/24/1988	10/30/1989
H-Field	7.00	7.20	7.30	7.00	6.30	7.10
H-Laboratory	7.00	7.00	7.00	6.90	6.90	7.10
pecific conductance, umhos/cm @ 25c	2600.00	2800.00	3000.00	2900.00	2700.00	2600.00
otal Dissolved Solids, mg/l	2180.00	2160.00	2137.00	2170.00	2020.00	1950.00
otal Suspended Solids, mg/l	*	*	*	*	*	*
lkalinity Carbonate, mg/l as CaCO3	<1.00	*	*	*	*	*
lkalinity Bicarbonate, mg/l as CaCO3	525.00	*	*	*	*	*
lkalinity Total, mg/l as CaCO3	525.00	473.00	499.00	522.00	507.00	468.00
itrate-N, mg/l	0.06	0.19	0.25	*	*	0.37
mmonia-N, mg/l	*	*	*	*	*	*
alcium, mg/l	300.00	280.00	277.00	380.00	280.00	240.00
agnesium, mg/l	170.00	79.00	168.00	135.00	150.00	145.00
otassium, mg/l	9.60	10.40	9.00	9.90	10.00	11.00
odium, mg/l	120.00	131.00	129.00	133.00	150.00	145.00
ulfate, mg/l	1100.00	1200.00	1081.10	1100.00	1000.00	1050.00
ethylene Blue Active Substances, mg/l	*	*	*	*	*	*
hloride, mg/l	24.00	23.00	23.10	23.00	23.00	24.38
ron, mg/l	<0.10	<0.10	<0.01	*	*	<0.10
inc, mg/l	0.03	*	*	*	*	*
anganese, mg/l	2.60	1.90	1.95	*	*	0.12
opper, ug/l	<10.00	*	*	*	*	*
ilver, ug/l	<10.00	*	*	*	*	*
trontium, mg/l	4.20	3.90	3.80	*	*	3.60
Boron, mg/l	0.62	0.52	0.60	0.58	0.55	0.60
eryllium, ug/l	<10.00	*	*	*	*	*
ickel, ug/l	<10.00	<50.00	<50.00	*	*	*
elenium, ug/l	<1.00	*	*	*	*	*
Mercury, ug/l	<1.00	*	*	*	*	*
Arsenic, ug/l	<1.00	3.00	<1.00	*	*	*
Barium, mg/l	0.01	*	*	*	*	*
Cadmium, ug/l	<10.00	<10.00	<10.00	*	*	*
Chromium-VI, ug/l	<10.00	*	*	*	*	*
Fluoride, mg/l	0.20	0.10	0.16	0.20	0.10	0.20
Lead, ug/l	4.00	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*
Aluminum, mg/l	0.14	<0.01	<0.01	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*
Temperature, Degrees C	*	*	6.60	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*
Water Level depth below ground surface, ft.	19.30	22.20	24.50	20.20	24.10	*3m 82m
Total Sulfur, mg/l	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*

6/12/90
6m 12 cm

SAMPLE LOCATION 31 = Monitoring Well # 31 -CCSPAGE 1

DATE	05/30/1980 PACE	10/07/1980 PACE	03/27/1981 PACE	06/10/1981 PACE	09/16/1981	09/16/1981 PACE	12/02/1981	05/26/1982
PH-Field	7.00	7.00	7.30	7.50	7.40	7.40	7.30	7.60
PH-Laboratory	7.30	7.30	7.20	7.90	7.20	7.20	7.00	7.20
Specific conductance, umhos/cm @ 25c	5700.00	6500.00	6270.00	6500.00	5500.00	5000.00	6500.00	3200.00
Total Dissolved Solids, mg/l	5340.00	5220.00	6150.00	6800.00	6500.00	6800.00	7120.00	5390.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	260.00	360.00	401.00	425.00	424.00	415.00	410.00	443.00
Alkalinity Total, mg/l as CaCO3	260.00	360.00	409.00	425.00	424.00	415.00	410.00	443.00
Nitrate-N, mg/l	<0.20	<0.11	0.80	4.90	4.90	3.40	3.60	5.65
Ammonia-N, mg/l	<0.10	*	*	*	*	*	*	*
Calcium, mg/l	420.00	490.00	560.00	590.00	458.00	560.00	530.00	560.00
Magnesium, mg/l	326.00	480.00	440.00	630.00	640.00	580.00	560.00	560.00
Potassium, mg/l	21.00	21.00	24.00	22.00	25.80	21.00	24.00	24.00
Sodium, mg/l	360.00	440.00	510.00	620.00	580.00	580.00	550.00	580.00
Sulfate, mg/l	3200.00	3400.00	3800.00	4600.00	4100.00	4600.00	3600.00	4000.00
Methylene Blue Active Substances, mg/l	<0.10	*	*	*	*	*	*	*
Chloride, mg/l	62.00	120.00	130.00	137.00	129.00	140.00	122.00	110.00
Iron, mg/l	0.55	0.50	<0.05	0.20	0.20	0.25	0.05	0.10
Zinc, mg/l	50.00	*	*	*	*	*	*	*
Manganese, mg/l	0.80	2.60	1.70	0.76	1.10	1.10	1.20	0.70
Copper, ug/l	<50.00	*	*	*	*	*	*	*
Silver, ug/l	<40.00	*	*	*	*	*	*	*
Strontium, mg/l	2.70	4.40	4.60	4.30	4.90	4.20	5.40	5.20
Boron, mg/l	0.20	<0.20	0.20	0.10	0.30	0.30	0.60	0.40
Beryllium, ug/l	<20.00	*	*	*	*	*	*	*
Nickel, ug/l	50.00	*	*	*	*	*	*	*
Selenium, ug/l	275.00	<25.00	470.00	78.00	290.00	140.00	290.00	70.00
Mercury, ug/l	<0.20	*	*	*	*	*	*	*
Arsenic, ug/l	1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Barium, mg/l	1.00	*	*	*	*	*	*	*
Cadmium, ug/l	<1.00	*	*	*	*	*	*	*
Chromium-VI, ug/l	<5.00	*	*	*	*	*	*	*
Fluoride, mg/l	0.20	0.50	0.40	0.40	0.10	0.30	0.20	0.50
Lead, ug/l	<10.00	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*
Cyanide, mg/l	<0.02	*	*	*	*	*	*	*
Phenol, ug/l	4.00	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	8.00	8.00	5.30	4.80	11.80	11.80	6.30	4.60
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*

ATE	10/13/1982	04/27/1983	10/05/1983	05/17/1984	10/05/1984	05/15/1985	10/23/1985	06/23/1986
H-Field	7.60	7.50	7.30	7.00	6.80	7.00	7.00	7.40
H-Laboratory	7.20	7.20	7.10	7.10	7.10	6.90	6.90	7.00
pecific conductance, umhos/cm @ 25c	6700.00	6400.00	7000.00	7600.00	9400.00	7100.00	7000.00	6800.00
otal Dissolved Solids, mg/l	12770.00	7060.00	7247.00	7620.00	7370.00	7100.00	7180.00	7040.00
otal Suspended Solids, mg/l	*	*	*	*	*	*	*	*
lkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
lkalinity Bicarbonate, mg/l as CaCO3	436.00	458.00	427.00	433.00	414.00	433.00	431.00	422.00
lkalinity Total, mg/l as CaCO3	436.00	458.00	427.00	433.00	414.00	433.00	431.00	422.00
itrate-N, mg/l	7.00	6.50	6.90	7.00	6.60	3.80	7.40	5.40
mmonia-N, mg/l	*	*	*	*	*	*	*	*
alcium, mg/l	600.00	560.00	520.00	510.00	525.00	540.00	525.00	430.00
agnesium, mg/l	600.00	660.00	654.00	600.00	630.00	535.00	560.00	530.00
otassium, mg/l	23.00	22.00	21.00	21.00	23.00	20.00	20.00	22.00
odium, mg/l	620.00	660.00	630.00	690.00	655.00	640.00	690.00	725.00
ulfate, mg/l	4620.00	4600.00	4700.00	4600.00	5000.00	4500.00	4340.00	4500.00
ethylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
hloride, mg/l	110.00	99.00	118.00	95.00	96.00	92.00	92.00	96.00
ron, mg/l	0.20	<0.10	<0.10	0.10	<0.10	0.10	0.10	<0.10
inc, mg/l	*	*	*	*	*	*	*	*
anganese, mg/l	0.48	0.04	0.20	<0.01	<0.01	0.07	<0.01	0.02
opper, ug/l	*	*	*	*	*	*	*	*
ilver, ug/l	*	*	*	*	*	*	*	*
trontium, mg/l	4.40	4.60	4.40	5.20	6.20	4.50	3.40	0.50
oron, mg/l	0.50	0.40	0.34	0.28	0.37	0.40	0.31	0.26
eryllium, ug/l	*	*	*	*	*	*	*	*
ickel, ug/l	*	*	*	*	*	*	*	*
elenium, ug/l	400.00	190.00	3.00	7.00	28.00	10.00	3.00	1.00
ercury, ug/l	*	*	*	*	*	*	*	*
rsenic, ug/l	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
arium, mg/l	*	*	*	*	*	*	*	*
admium, ug/l	*	*	*	*	*	*	*	*
hromium-VI, ug/l	*	*	*	*	*	*	*	*
luoride, mg/l	0.50	0.40	0.40	0.40	0.30	0.40	0.40	0.40
ead, ug/l	*	*	*	*	*	*	*	*
olybdenum, mg/l	*	*	*	*	*	*	*	*
luminum, mg/l	*	*	*	*	*	*	*	*
ecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
yanide, mg/l	*	*	*	*	*	*	*	*
henol, ug/l	*	*	*	*	*	*	*	*
iochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
hemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
otal Organic Carbon, mg/l	*	*	*	*	*	*	*	*
emperature, Degrees C	*	*	*	*	*	*	*	*
issolved Oxygen, mg/l	*	*	*	*	*	*	*	*
ater Level depth below ground surface, ft.	6.70	4.50	8.30	5.40	9.90	7.40	12.50	7.10
otal Sulfur, mg/l	*	*	*	*	*	*	*	*
otal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 31 = Monitoring Well # 31 -CCSPAGE 3

ATE	10/23/1986	06/02/1987	10/09/1987	06/14/1988	10/24/1988	06/16/1989	10/30/1989
H-Field	7.23	7.33	7.40	7.30	7.30	7.30	7.10
H-Laboratory	7.20	7.20	7.00	7.10	7.10	7.30	*
pecific conductance, umhos/cm @ 25c	7000.00	7500.00	7900.00	8000.00	7900.00	4600.00	7400.00
otal Dissolved Solids, mg/l	7170.00	7140.00	7081.00	7180.00	6820.00	7000.00	6510.00
otal Suspended Solids, mg/l	*	*	*	*	*	*	*
lkalinity Carbonate, mg/l as CaCO3	<1.00	*	*	*	*	*	*
lkalinity Bicarbonate, mg/l as CaCO3	426.00	*	*	*	*	*	*
lkalinity Total, mg/l as CaCO3	426.00	388.00	408.00	421.00	419.00	412.00	416.00
itrate-N, mg/l	5.30	5.20	5.01	4.20	4.10	3.90	3.10
mmonia-N, mg/l	*	*	*	*	*	*	*
alcium, mg/l	430.00	500.00	502.00	485.00	480.00	479.00	490.00
agnesium, mg/l	690.00	610.00	643.00	640.00	630.00	550.00	620.00
otassium, mg/l	11.00	22.00	22.50	21.00	23.00	20.00	24.00
odium, mg/l	620.00	650.00	610.00	630.00	660.00	580.00	650.00
ulfate, mg/l	4100.00	4400.00	4520.20	4500.00	4300.00	4265.00	4375.00
ethylene Blue Active Substances, mg/l	*	*	*	*	*	*	*
hloride, mg/l	90.00	85.00	54.90	74.00	59.00	60.00	74.00
ron, mg/l	<0.10	<0.10	<0.01	*	*	*	<0.10
inc, mg/l	0.06	*	*	*	*	*	*
anganese, mg/l	<0.01	<0.01	<0.01	*	*	*	<0.10
opper, ug/l	40.00	*	*	*	*	*	*
ilver, ug/l	<10.00	*	*	*	*	*	*
trontium, mg/l	6.10	5.30	5.30	*	*	*	5.00
oron, mg/l	0.20	0.19	0.24	0.16	0.18	0.17	0.18
eryllium, ug/l	<10.00	*	*	*	*	*	*
ickel, ug/l	260.00	<50.00	<50.00	*	*	*	*
elenium, ug/l	650.00	775.00	15.00	88.00	552.00	<1.00	*
ercury, ug/l	<1.00	*	*	*	*	*	*
rsenic, ug/l	<1.00	<1.00	<1.00	*	*	*	*
arium, mg/l	<0.01	*	*	*	*	*	*
admium, ug/l	<10.00	<10.00	<10.00	*	*	*	*
hromium-VI, ug/l	<10.00	*	*	*	*	*	*
luoride, mg/l	0.40	0.30	0.33	0.40	0.30	0.30	0.40
ead, ug/l	<1.00	*	*	*	*	*	*
olybdenum, mg/l	*	*	*	*	*	*	*
luminum, mg/l	0.32	<0.01	<0.01	*	*	*	*
ecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*
yanide, mg/l	*	*	*	*	*	*	*
henol, ug/l	*	*	*	*	*	*	*
iochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
hemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
otal Organic Carbon, mg/l	*	*	*	*	*	*	*
emperature, Degrees C	*	*	8.70	*	*	9.30	*
issolved Oxygen, mg/l	*	*	*	*	*	*	*
ater Level depth below ground surface, ft.	9.00	6.90	8.80	8.50	13.05	14.30	* 4n 5 on 4n 6
otal Sulfur, mg/l	*	*	*	*	*	*	*
otal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*

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SAMPLE LOCATION 32 = Monitoring Well # 32 -CCSPAGE 1

DATE	06/01/1980 PACE	10/07/1980 PACE	03/29/1981 PACE	06/10/1981 PACE	09/16/1981	09/16/1981 PACE	12/02/1981	05/26/1982
pH-Field	7.40	7.30	7.50	7.70	7.60	7.60	7.70	7.80
pH-Laboratory	7.40	7.90	7.50	7.90	7.60	7.60	7.20	7.50
Specific conductance, umhos/cm @ 25c	9400.00	15500.00	14520.00	14000.00	11100.00	11000.00	12200.00	10700.00
Total Dissolved Solids, mg/l	9420.00	16500.00	16100.00	16000.00	16400.00	12000.00	14900.00	12800.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	352.00	460.00	610.00	510.00	534.00	490.00	510.00	522.00
Alkalinity Total, mg/l as CaCO3	352.00	460.00	610.00	510.00	534.00	490.00	510.00	522.00
Nitrate-N, mg/l	7.50	5.30	32.00	26.00	3.00	21.00	16.00	17.60
Ammonia-N, mg/l	<0.10	*	*	*	*	*	*	*
Calcium, mg/l	375.00	400.00	360.00	380.00	390.00	380.00	410.00	430.00
Magnesium, mg/l	900.00	2100.00	2300.00	2100.00	1990.00	1800.00	1840.00	1480.00
Potassium, mg/l	19.00	33.00	27.00	28.00	28.10	28.00	25.00	22.00
Sodium, mg/l	880.00	1050.00	1400.00	1500.00	1420.00	1400.00	1240.00	1090.00
Sulfate, mg/l	5600.00	10000.00	12000.00	12000.00	10600.00	11000.00	10000.00	8800.00
Methylene Blue Active Substances, mg/l	<0.10	*	*	*	*	*	*	*
Chloride, mg/l	344.00	260.00	2.00	96.00	61.00	67.00	48.00	29.30
Iron, mg/l	6.00	0.35	<0.05	0.20	0.20	1.00	0.10	0.10
Zinc, mg/l	80.00	*	*	*	*	*	*	*
Manganese, mg/l	3.60	3.40	0.16	1.50	1.00	1.30	0.61	0.57
Copper, ug/l	<50.00	*	*	*	*	*	*	*
Silver, ug/l	<40.00	*	*	*	*	*	*	*
Strontium, mg/l	4.80	9.20	10.00	9.00	8.30	6.80	9.20	7.40
Boron, mg/l	<0.20	0.40	0.50	0.30	0.70	0.50	1.20	0.80
Beryllium, ug/l	<20.00	*	*	*	*	*	*	*
Nickel, ug/l	100.00	*	*	*	*	*	*	*
Selenium, ug/l	210.00	325.00	*	100.00	420.00	160.00	320.00	37.00
Mercury, ug/l	<0.20	*	*	*	*	*	*	*
Arsenic, ug/l	4.00	1.00	<1.00	2.00	2.00	<1.00	<1.00	<1.00
Barium, mg/l	0.50	*	*	*	*	*	*	*
Cadmium, ug/l	<1.00	*	*	*	*	*	*	*
Chromium-VI, ug/l	<5.00	*	*	*	*	*	*	*
Fluoride, mg/l	0.30	0.40	0.40	0.50	0.20	0.40	0.30	0.60
Lead, ug/l	20.00	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*
Cyanide, mg/l	<0.02	*	*	*	*	*	*	*
Phenol, ug/l	36.00	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	8.50	9.00	5.70	6.00	8.30	8.30	8.30	5.10
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*

SAMPLE LOCATION 32 = Monitoring Well # 32 -CCSPAGE 2

DATE	10/13/1982	04/27/1983	10/05/1983	05/17/1984	10/05/1984	05/15/1985	10/23/1985	06/23/198
pH-Field	7.80	8.00	7.60	7.30	7.10	7.30	*	7.6(
pH-Laboratory	7.60	7.50	7.40	7.30	7.20	7.20	*	7.2(
Specific conductance, umhos/cm @ 25c	9400.00	9000.00	10040.00	8100.00	2300.00	4300.00	*	8700.0(
Total Dissolved Solids, mg/l	16100.00	11600.00	11515.00	9610.00	10800.00	5500.00	*	7800.0(
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	*	<1.0(
Alkalinity Bicarbonate, mg/l as CaCO3	527.00	610.00	435.00	451.00	427.00	271.00	*	421.0(
Alkalinity Total, mg/l as CaCO3	527.00	610.00	435.00	451.00	427.00	271.00	*	421.0(
Nitrate-N, mg/l	9.10	9.70	9.80	5.80	7.10	0.57	*	1.8(
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	430.00	420.00	430.00	405.00	400.00	410.00	*	360.0(
Magnesium, mg/l	970.00	1307.00	1378.00	970.00	1300.00	380.00	*	870.0(
Potassium, mg/l	48.00	19.00	21.00	17.00	21.00	12.00	*	16.0(
Sodium, mg/l	740.00	1025.00	1050.00	915.00	915.00	325.00	*	720.0(
Sulfate, mg/l	7750.00	8200.00	8100.00	5600.00	7400.00	3200.00	*	5900.0(
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	31.00	27.00	28.00	23.00	24.00	14.00	*	20.0(
Iron, mg/l	1.10	0.30	<0.10	0.10	0.50	<0.10	*	<0.1(
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	0.21	0.33	0.39	0.30	0.29	0.02	*	<0.0]
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	4.30	6.10	6.50	5.90	8.00	2.10	*	0.5(
Boron, mg/l	1.00	0.60	0.61	0.43	0.35	0.44	*	0.5]
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	520.00	50.00	8.00	40.00	63.00	10.00	*	3.8(
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	2.00	<1.00	<1.00	1.00	<1.00	<1.00	*	<1.0(
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	*
Fluoride, mg/l	0.60	0.50	0.50	0.40	0.50	0.40	*	0.4(
Lead, ug/l	*	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	7.40	5.10	8.90	6.00	10.30	7.40	12.00	7.5(
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 32 = Monitoring Well # 32 -CCSPAGE 3

DATE	10/23/1986	06/02/1987	06/14/1988	10/24/1988	06/16/1989		
pH-Field	*	7.51	*	*	7.60		
pH-Laboratory	*	7.40	*	*	7.80		
Specific conductance, umhos/cm @ 25c	*	7100.00	*	*	5000.00		
Total Dissolved Solids, mg/l	*	7700.00	*	*	9430.00		
Total Suspended Solids, mg/l	*	*	*	*	*		
Alkalinity Carbonate, mg/l as CaCO3	*	*	*	*	*		
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	*	*		
Alkalinity Total, mg/l as CaCO3	*	372.00	*	*	530.00		
Nitrate-N, mg/l	*	1.30	*	*	0.67		
Ammonia-N, mg/l	*	*	*	*	*		
Calcium, mg/l	*	290.00	*	*	386.00		
Magnesium, mg/l	*	780.00	*	*	975.00		
Potassium, mg/l	*	15.60	*	*	16.00		
Sodium, mg/l	*	560.00	*	*	695.00		
Sulfate, mg/l	*	5000.00	*	*	6290.00		
Methylene Blue Active Substances, mg/l	*	*	*	*	*		
Chloride, mg/l	*	19.00	*	*	24.00		
Iron, mg/l	*	<0.10	*	*	*		
Zinc, mg/l	*	*	*	*	*		
Manganese, mg/l	*	0.03	*	*	*		
Copper, ug/l	*	*	*	*	*		
Silver, ug/l	*	*	*	*	*		
Strontium, mg/l	*	4.20	*	*	*		
Boron, mg/l	*	0.32	*	*	0.30		
Beryllium, ug/l	*	*	*	*	*		
Nickel, ug/l	*	<50.00	*	*	*		
Selenium, ug/l	*	135.00	*	*	44.50		
Mercury, ug/l	*	*	*	*	*		
Arsenic, ug/l	*	130.00	*	*	<1.00		
Barium, mg/l	*	*	*	*	*		
Cadmium, ug/l	*	<10.00	*	*	*		
Chromium-VI, ug/l	*	*	*	*	*		
Fluoride, mg/l	*	0.30	*	*	0.50		
Lead, ug/l	*	*	*	*	*		
Molybdenum, mg/l	*	*	*	*	*		
Aluminum, mg/l	*	0.06	*	*	*		
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*		
Cyanide, mg/l	*	*	*	*	*		
Phenol, ug/l	*	*	*	*	*		
Biochemical Oxygen Demand, mg/l	*	*	*	*	*		
Chemical Oxygen Demand, mg/l	*	*	*	*	*		
Total Organic Carbon, mg/l	*	*	*	*	*		
Temperature, Degrees C	*	*	*	*	10.10	10/24/89	6/12/90
Dissolved Oxygen, mg/l	*	*	*	*	*		
Water Level depth below ground surface, ft.	9.40	7.10	8.80	12.07	10.80	4m 17m	4m 40m
Total Sulfur, mg/l	*	*	*	*	*		
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*		

SAMPLE LOCATION 33 = Monitoring Well # 33 -CCSPAGE 1

ATE	06/01/1980	10/08/1980	03/27/1981	06/10/1981	09/17/1981	09/17/1981	12/03/1981	05/26/1982
	PACE	PACE	PACE	PACE		PACE		
H-Field	7.10	7.30	7.60	7.40	7.00	7.00	7.30	7.40
H-Laboratory	7.60	7.50	7.30	7.90	7.00	7.00	7.00	7.10
pecific conductance, umhos/cm @ 25c	2700.00	2300.00	2740.00	2500.00	1970.00	1900.00	2200.00	2800.00
otal Dissolved Solids, mg/l	1860.00	1940.00	1870.00	1600.00	1250.00	1500.00	1730.00	1390.00
otal Suspended Solids, mg/l	*	*	*	*	*	*	*	*
lkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
lkalinity Bicarbonate, mg/l as CaCO3	249.00	430.00	580.00	620.00	614.00	620.00	600.00	648.00
lkalinity Total, mg/l as CaCO3	249.00	430.00	580.00	620.00	614.00	620.00	600.00	648.00
itrate-N, mg/l	<0.20	<0.10	<0.10	<0.10	0.12	<0.10	0.13	0.20
mmonia-N, mg/l	<0.10	*	*	*	*	*	*	*
alcium, mg/l	190.00	140.00	170.00	160.00	170.00	150.00	150.00	184.00
agnesium, mg/l	150.00	140.00	140.00	140.00	145.00	140.00	145.00	150.00
otassium, mg/l	12.00	10.00	9.20	8.20	10.80	8.30	10.00	9.50
odium, mg/l	155.00	180.00	170.00	180.00	200.00	170.00	190.00	180.00
ulfate, mg/l	780.00	900.00	900.00	800.00	700.00	700.00	650.00	750.00
ethylene Blue Active Substances, mg/l	0.01	*	*	*	*	*	*	*
hloride, mg/l	<10.00	3.00	3.00	7.00	5.00	6.00	6.30	5.30
ron, mg/l	0.45	0.30	0.75	1.30	2.60	1.00	0.40	0.02
inc, mg/l	30.00	*	*	*	*	*	*	*
anganese, mg/l	1.00	0.72	0.80	0.60	0.80	0.68	0.75	0.78
opper, ug/l	<50.00	*	*	*	*	*	*	*
ilver, ug/l	<40.00	*	*	*	*	*	*	*
trontium, mg/l	2.00	2.50	2.40	2.00	2.30	1.80	2.70	2.60
oron, mg/l	0.40	0.50	0.60	0.50	0.50	0.50	0.80	0.80
eryllium, ug/l	<20.00	*	*	*	*	*	*	*
ickel, ug/l	50.00	*	*	*	*	*	*	*
elenium, ug/l	<1.00	*	*	*	*	*	*	*
ercury, ug/l	<0.20	*	*	*	*	*	*	*
rsenic, ug/l	5.00	5.00	7.00	13.00	14.00	21.00	6.00	3.00
arium, mg/l	<0.30	*	*	*	*	*	*	*
admium, ug/l	<1.00	*	*	*	*	*	*	*
hromium-VI, ug/l	20.00	*	*	*	*	*	*	*
luoride, mg/l	0.30	0.30	0.40	0.30	0.10	0.20	0.20	0.40
ead, ug/l	<10.00	*	*	*	*	*	*	*
olybdenum, mg/l	*	*	*	*	*	*	*	*
luminum, mg/l	*	*	*	*	*	*	*	*
ecal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*
yanide, mg/l	<0.02	*	*	*	*	*	*	*
henol, ug/l	<2.00	*	*	*	*	*	*	*
iochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
hemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
otal Organic Carbon, mg/l	*	*	*	*	*	*	*	*
emperature, Degrees C	*	*	*	*	*	*	*	*
issolved Oxygen, mg/l	*	*	*	*	*	*	*	*
ater Level depth below ground surface, ft.	1.00	*	1.10	*	*	*	*	<0.10
otal Sulfur, mg/l	*	*	*	*	*	*	*	*
otal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*

SAMPLE LOCATION 33 = Monitoring Well # 33 -CCSPAGE 2

DATE	10/13/1982	04/27/1983	10/05/1983	05/18/1984	10/05/1984	05/15/1985	10/23/1985	06/23/1986
pH-Field	7.50	7.40	7.30	7.30	6.90	7.00	6.90	7.20
pH-Laboratory	7.20	7.20	7.20	7.20	7.10	7.00	7.10	7.10
Specific conductance, umhos/cm @ 25c	2200.00	1810.00	1870.00	2300.00	1490.00	2100.00	2100.00	2100.00
Total Dissolved Solids, mg/l	1420.00	1460.00	1462.00	1560.00	1440.00	1450.00	1470.00	1460.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	616.00	660.00	622.00	641.00	600.00	623.00	620.00	621.00
Alkalinity Total, mg/l as CaCO3	616.00	660.00	622.00	641.00	600.00	623.00	620.00	621.00
Nitrate-N, mg/l	<0.05	0.11	0.05	<0.01	0.07	0.10	0.25	0.01
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	170.00	170.00	156.00	159.00	148.00	158.00	146.00	161.00
Magnesium, mg/l	130.00	140.00	92.00	112.00	119.00	115.00	88.00	133.00
Potassium, mg/l	8.90	8.50	8.10	8.00	8.60	7.90	3.10	6.60
Sodium, mg/l	170.00	180.00	173.00	167.00	165.00	166.00	134.00	156.00
Sulfate, mg/l	770.00	660.00	610.00	655.00	650.00	640.00	280.00	710.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	5.50	5.90	5.50	4.90	4.70	4.90	5.10	5.80
Iron, mg/l	0.30	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	0.58	0.57	7.90	0.60	0.38	0.48	0.16	0.42
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	1.90	2.20	2.00	2.10	2.50	1.90	0.80	2.40
Boron, mg/l	0.70	0.70	0.64	0.66	0.68	0.64	0.66	0.61
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	6.00	3.00	3.00	3.00	3.00	3.00	<1.00	3.00
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	*
Fluoride, mg/l	0.40	0.30	0.20	0.20	0.30	0.30	0.30	0.30
Lead, ug/l	*	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	<0.10	*	<1.50	<3.80	<1.20	<2.70	2.30	0.01
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 33 = Monitoring Well # 33 -CCSPAGE 3

DATE	10/23/1986	06/02/1987	10/09/1987	06/14/1988	11/07/1988	06/16/1989	10/30/1989
pH-Field	7.44	7.54	7.50	7.30	7.60	7.10	7.00
pH-Laboratory	7.30	7.20	7.00	7.20	7.40	7.20	7.10
Specific conductance, umhos/cm @ 25c	2200.00	2200.00	3300.00	2300.00	2200.00	1500.00	2300.00
Total Dissolved Solids, mg/l	1460.00	1450.00	1431.00	1440.00	1300.00	1450.00	1410.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	*	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	619.00	*	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	619.00	561.00	591.00	618.00	596.00	609.00	592.00
Nitrate-N, mg/l	0.53	0.08	0.57	*	*	0.09	<0.01
Ammonia-N, mg/l	*	*	*	*	*	*	*
Calcium, mg/l	121.00	148.00	142.00	137.00	133.00	147.00	135.10
Magnesium, mg/l	130.00	122.00	127.00	120.00	127.70	120.00	156.30
Potassium, mg/l	7.90	8.40	6.20	8.00	8.40	8.70	9.10
Sodium, mg/l	140.00	151.00	148.00	140.00	152.00	150.00	176.00
Sulfate, mg/l	595.00	530.00	511.20	610.00	600.00	610.00	615.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*
Chloride, mg/l	6.10	6.30	5.20	6.50	7.40	7.10	6.80
Iron, mg/l	<0.10	<0.10	0.01	*	*	*	1.07
Zinc, mg/l	0.03	*	*	*	*	*	*
Manganese, mg/l	0.33	0.34	0.31	*	*	*	0.45
Copper, ug/l	<10.00	*	*	*	*	*	*
Silver, ug/l	<10.00	*	*	*	*	*	*
Strontium, mg/l	2.50	2.50	2.30	*	*	*	2.42
Boron, mg/l	0.64	0.62	0.59	0.64	0.56	0.68	0.71
Beryllium, ug/l	<10.00	*	*	*	*	*	*
Nickel, ug/l	<10.00	<50.00	<50.00	*	*	*	*
Selenium, ug/l	<1.00	*	*	*	*	*	*
Mercury, ug/l	<1.00	*	*	*	*	*	*
Arsenic, ug/l	<1.00	1.00	4.00	*	*	*	*
Barium, mg/l	0.01	*	*	*	*	*	*
Cadmium, ug/l	<10.00	<10.00	<10.00	*	*	*	*
Chromium-VI, ug/l	<10.00	*	*	*	*	*	*
Fluoride, mg/l	0.40	0.20	0.26	0.30	0.20	0.30	0.30
Lead, ug/l	<1.00	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*
Aluminum, mg/l	0.14	0.01	<0.01	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	8.60	*	*	10.80	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	0.40	<3.00	<3.00	0.40	2.03	1.50	*
Total Sulfur, mg/l	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*

6/12/
1.14m 1.15

SAMPLE LOCATION 34 = Monitoring Well # 34 -CCSPAGE 1

DATE	06/01/1980	10/08/1980	03/26/1981	06/10/1981	09/17/1981	09/17/1981	12/02/1981	05/27/1982
	PACE	PACE	PACE	PACE		PACE		
pH-Field	7.10	7.00	7.60	7.40	7.00	7.00	7.30	7.10
pH-Laboratory	7.20	7.50	7.10	8.10	6.90	6.90	6.90	7.10
Specific conductance, umhos/cm @ 25c	1500.00	1700.00	1850.00	1300.00	1380.00	1200.00	1410.00	1420.00
Total Dissolved Solids, mg/l	1050.00	1100.00	1230.00	850.00	660.00	840.00	950.00	720.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	633.00	610.00	640.00	550.00	681.00	590.00	630.00	675.00
Alkalinity Total, mg/l as CaCO3	633.00	610.00	640.00	550.00	681.00	590.00	630.00	675.00
Nitrate-N, mg/l	1.00	<0.10	<0.10	<0.10	0.14	<0.10	0.06	0.14
Ammonia-N, mg/l	<0.10	*	*	*	*	*	*	*
Calcium, mg/l	140.00	130.00	130.00	130.00	160.00	130.00	130.00	160.00
Magnesium, mg/l	60.00	59.00	61.00	59.00	64.00	52.00	65.00	57.00
Potassium, mg/l	6.20	6.50	6.30	4.90	7.30	5.70	7.30	6.40
Sodium, mg/l	120.00	140.00	150.00	110.00	140.00	110.00	145.00	110.00
Sulfate, mg/l	130.00	220.00	380.00	220.00	250.00	220.00	240.00	210.00
Methylene Blue Active Substances, mg/l	<0.10	*	*	*	*	*	*	*
Chloride, mg/l	<10.00	<1.00	<1.00	2.00	1.10	3.00	3.10	2.10
Iron, mg/l	0.20	0.20	<0.05	0.20	1.10	<0.05	0.01	<0.10
Zinc, mg/l	30.00	*	*	*	*	*	*	*
Manganese, mg/l	0.80	0.82	0.76	0.64	0.90	0.76	0.74	1.00
Copper, ug/l	<50.00	*	*	*	*	*	*	*
Silver, ug/l	<40.00	*	*	*	*	*	*	*
Strontium, mg/l	1.50	2.00	2.00	1.30	1.25	1.50	2.30	2.00
Boron, mg/l	<0.20	0.30	0.40	0.30	0.70	0.40	0.60	0.20
Beryllium, ug/l	<20.00	*	*	*	*	*	*	*
Nickel, ug/l	50.00	*	*	*	*	*	*	*
Selenium, ug/l	<1.00	*	*	*	*	*	*	*
Mercury, ug/l	<0.20	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	<1.00	2.00	<1.00	<1.00	<1.00	<1.00
Barium, mg/l	<0.30	*	*	*	*	*	*	*
Cadmium, ug/l	<1.00	*	*	*	*	*	*	*
Chromium-VI, ug/l	<5.00	*	*	*	*	*	*	*
Fluoride, mg/l	0.20	0.20	0.20	0.10	<0.10	0.10	<0.10	0.20
Lead, ug/l	<10.00	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*
Cyanide, mg/l	<0.02	*	*	*	*	*	*	*
Phenol, ug/l	<2.00	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	8.00	3.00	0.30	3.00	0.80	0.80	0.80	0.50
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*

SAMPLE LOCATION 34 = Monitoring Well # 34 -CCSPAGE 2

DATE	10/14/1982	04/27/1983	10/05/1983	05/18/1984	10/05/1984	05/15/1985	10/23/1985	06/23/1986
pH-Field	7.10	7.30	7.00	7.40	7.20	6.90	6.80	7.00
pH-Laboratory	7.20	7.10	7.00	7.10	7.10	6.90	7.10	7.10
Specific Conductance, umhos/cm @ 25c	1410.00	1240.00	1510.00	1540.00	1260.00	1510.00	1540.00	1500.00
Total Dissolved Solids, mg/l	780.00	863.00	824.00	1030.00	1000.00	996.00	999.00	998.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity, Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity, Bicarbonate, mg/l as CaCO3	670.00	706.00	685.00	698.00	679.00	688.00	700.00	693.00
Alkalinity, Total, mg/l as CaCO3	670.00	706.00	685.00	698.00	679.00	688.00	700.00	693.00
Nitrate-N, mg/l	<0.05	0.11	0.02	<0.01	0.07	0.08	0.05	0.06
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	160.00	150.00	151.00	155.00	141.00	153.00	136.00	134.00
Magnesium, mg/l	60.00	57.00	54.00	50.00	53.00	53.00	48.00	56.00
Potassium, mg/l	6.50	5.80	6.20	5.90	6.70	5.90	6.00	3.80
Sodium, mg/l	110.00	130.00	145.00	140.00	161.00	152.00	154.00	144.00
Sulfate, mg/l	210.00	210.00	220.00	230.00	275.00	250.00	232.00	230.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	2.20	2.50	2.30	2.30	2.10	2.20	2.20	2.90
Iron, mg/l	0.30	0.10	0.20	0.10	0.10	<0.10	<0.10	<0.10
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	0.88	0.73	0.76	0.88	0.88	0.48	0.40	0.09
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	1.70	1.80	1.70	1.80	2.20	1.70	1.70	2.03
Boron, mg/l	0.30	0.40	0.42	0.42	0.54	0.44	0.46	0.34
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	*
Fluoride, mg/l	0.20	0.10	0.10	0.10	0.20	0.10	0.10	0.10
Lead, ug/l	*	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	1.60	2.10	4.20	2.80	1.10	0.80	2.80	0.60
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 34 = Monitoring Well # 34 -CCSPAGE 3

DATE	10/23/1986	06/02/1987	10/09/1987	06/14/1988	11/07/1988	06/16/1989	10/30/1989
pH-Field	7.33	7.36	7.20	7.20	7.30	7.10	7.00
pH-Laboratory	7.30	7.10	7.00	7.00	7.10	7.20	7.00
Specific conductance, umhos/cm @ 25c	1510.00	1560.00	1650.00	1660.00	1660.00	1200.00	1570.00
Total Dissolved Solids, mg/l	1000.00	987.00	987.00	2810.00	970.00	974.00	932.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	*	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	706.00	*	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	706.00	638.00	682.00	697.00	686.00	691.00	682.00
Nitrate-N, mg/l	<0.01	0.02	0.02	*	*	0.02	<0.01
Ammonia-N, mg/l	*	*	*	*	*	*	*
Calcium, mg/l	143.00	143.00	138.00	133.00	134.00	144.00	141.00
Magnesium, mg/l	57.00	50.00	57.00	55.00	57.00	54.00	62.00
Potassium, mg/l	5.90	6.00	4.30	5.90	6.50	6.30	6.20
Sodium, mg/l	157.00	150.00	137.00	151.00	143.00	150.00	144.00
Sulfate, mg/l	260.00	260.00	230.20	265.00	231.00	242.00	218.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*
Chloride, mg/l	2.90	2.80	<0.01	3.40	3.60	3.70	4.00
Iron, mg/l	<0.10	<0.10	<0.01	*	*	*	0.20
Zinc, mg/l	0.03	*	*	*	*	*	*
Manganese, mg/l	0.18	0.57	0.20	*	*	*	0.26
Copper, ug/l	20.00	*	*	*	*	*	*
Silver, ug/l	<10.00	*	*	*	*	*	*
Strontium, mg/l	2.20	2.10	2.00	*	*	*	2.00
Boron, mg/l	0.44	0.43	0.42	0.40	0.39	0.45	0.43
Beryllium, ug/l	<10.00	*	*	*	*	*	*
Nickel, ug/l	120.00	<50.00	<50.00	*	*	*	*
Selenium, ug/l	<1.00	*	*	*	*	*	*
Mercury, ug/l	<1.00	*	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	2.00	*	*	*	*
Barium, mg/l	0.04	*	*	*	*	*	*
Cadmium, ug/l	<10.00	<10.00	<10.00	*	*	*	*
Chromium-VI, ug/l	<10.00	*	*	*	*	*	*
Fluoride, mg/l	0.20	0.10	0.12	0.10	0.10	0.10	0.20
Lead, ug/l	<1.00	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*
Aluminum, mg/l	0.16	<0.01	<0.01	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	10.50	*	*	14.10	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	1.80	0.80	1.50	2.50	7.03	6.30	*2m38cm 2m3
Total Sulfur, mg/l	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*

SAMPLE LOCATION 35 = Monitoring Well # 35 -CCSPAGE 1

DATE	06/01/1980 PACE	10/08/1980 PACE	03/26/1981 PACE	06/10/1981 PACE	09/17/1981	09/17/1981 PACE	12/02/1981	05/27/1982
pH-Field	7.00	6.90	7.70	7.30	7.00	7.00	7.50	7.20
pH-Laboratory	7.20	7.80	7.10	7.10	6.90	6.90	6.80	7.10
Specific conductance, umhos/cm @ 25c	1100.00	990.00	1130.00	1100.00	1300.00	1100.00	1160.00	1250.00
Total Dissolved Solids, mg/l	666.00	594.00	876.00	880.00	680.00	930.00	980.00	690.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	440.00	430.00	480.00	434.00	477.00	380.00	430.00	500.00
Alkalinity Total, mg/l as CaCO3	440.00	430.00	480.00	434.00	477.00	380.00	430.00	500.00
Nitrate-N, mg/l	2.30	1.40	2.80	4.00	6.10	6.00	4.30	5.90
Ammonia-N, mg/l	<0.10	*	*	*	*	*	*	*
Calcium, mg/l	136.00	160.00	160.00	190.00	230.00	190.00	170.00	200.00
Magnesium, mg/l	50.00	46.00	54.00	54.00	67.00	54.00	62.00	57.00
Potassium, mg/l	2.50	2.40	5.20	2.40	4.00	3.10	4.20	3.60
Sodium, mg/l	3.50	4.30	6.00	4.30	6.60	5.10	8.30	9.00
Sulfate, mg/l	85.00	90.00	160.00	240.00	315.00	340.00	210.00	270.00
Methylene Blue Active Substances, mg/l	<0.10	*	*	*	*	*	*	*
Chloride, mg/l	<10.00	2.00	1.00	4.00	2.50	3.00	3.70	2.60
Iron, mg/l	<0.05	0.05	<0.05	0.10	4.80	0.06	0.02	<0.10
Zinc, mg/l	<10.00	*	*	*	*	*	*	*
Manganese, mg/l	<0.04	<0.04	<0.04	0.04	0.20	<0.04	<0.01	0.03
Copper, ug/l	<50.00	*	*	*	*	*	*	*
Silver, ug/l	<40.00	*	*	*	*	*	*	*
Strontium, mg/l	0.45	0.80	0.90	0.85	0.65	0.75	1.00	0.80
Boron, mg/l	<0.20	<0.20	<0.20	<0.20	<0.10	<0.20	0.30	0.40
Beryllium, ug/l	<20.00	*	*	*	*	*	*	*
Nickel, ug/l	50.00	*	*	*	*	*	*	*
Selenium, ug/l	<1.00	*	*	*	*	*	*	*
Mercury, ug/l	<0.20	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Barium, mg/l	1.00	*	*	*	*	*	*	*
Cadmium, ug/l	<1.00	*	*	*	*	*	*	*
Chromium-VI, ug/l	<5.00	*	*	*	*	*	*	*
Fluoride, mg/l	0.20	0.30	0.10	0.20	<0.10	0.20	<0.10	0.30
Lead, ug/l	<10.00	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*
Cyanide, mg/l	<0.02	*	*	*	*	*	*	*
Phenol, ug/l	<3.00	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	5.00	3.00	0.20	3.00	1.30	1.30	0.80	0.30
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*

SAMPLE LOCATION 35 = Monitoring Well # 35 -CCSPAGE 2

DATE	10/14/1982	04/27/1983	10/05/1983	05/18/1984	10/05/1984	05/15/1985	10/23/1985	06/23/1986
pH-Field	7.00	7.30	7.10	7.40	7.20	6.80	6.90	7.10
pH-Laboratory	7.10	7.10	7.00	7.00	7.00	6.80	7.10	7.20
Specific conductance, umhos/cm @ 25c	1540.00	1170.00	1350.00	1900.00	1420.00	1800.00	1500.00	1690.00
Total Dissolved Solids, mg/l	10740.00	943.00	1026.00	1580.00	1530.00	1480.00	1130.00	1160.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	460.00	456.00	453.00	422.00	407.00	423.00	452.00	509.00
Alkalinity Total, mg/l as CaCO3	460.00	456.00	453.00	422.00	407.00	423.00	452.00	509.00
Nitrate-N, mg/l	4.20	0.93	4.80	2.70	4.80	2.10	15.00	4.50
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	260.00	210.00	220.00	310.00	285.00	290.00	230.00	285.00
Magnesium, mg/l	76.00	66.00	67.00	80.00	90.00	82.00	62.00	67.00
Potassium, mg/l	3.80	3.30	3.50	4.10	4.60	4.10	3.90	1.20
Sodium, mg/l	10.00	9.60	14.00	19.00	25.00	28.00	29.00	21.00
Sulfate, mg/l	500.00	370.00	385.00	600.00	700.00	620.00	370.00	470.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	15.00	13.00	14.00	24.00	32.00	22.00	15.00	17.00
Iron, mg/l	0.40	0.10	<0.10	0.30	0.10	<0.10	<0.10	<0.10
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	0.04	0.01	0.01	0.02	0.02	0.02	<0.01	0.01
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	1.00	0.90	1.00	1.30	1.50	1.10	0.90	0.70
Boron, mg/l	0.10	0.10	0.08	0.08	0.13	0.22	0.40	0.50
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	*
Fluoride, mg/l	0.30	0.20	0.20	0.20	0.20	0.20	0.20	0.10
Lead, ug/l	*	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	1.10	1.10	4.50	3.10	2.50	1.50	2.90	1.66
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 35 = Monitoring Well # 35 -CCSPAGE 3

DATE	10/23/1986	06/02/1987	10/09/1987	06/14/1988	11/07/1988	06/16/1989	10/30/1989
pH-Field	7.44	7.32	7.60	7.30	7.30	7.20	6.90
pH-Laboratory	7.20	7.20	7.00	7.10	7.20	7.10	7.00
Specific conductance, umhos/cm @ 25c	1240.00	1300.00	1370.00	1410.00	1410.00	1100.00	1360.00
Total Dissolved Solids, mg/l	766.00	827.00	828.00	814.00	790.00	837.00	827.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	*	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	546.00	*	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	546.00	507.00	560.00	601.00	591.00	594.00	589.00
Nitrate-N, mg/l	4.50	1.70	1.07	0.91	1.20	1.30	1.30
Ammonia-N, mg/l	*	*	*	*	*	*	*
Calcium, mg/l	171.00	175.00	167.00	172.00	164.00	180.00	177.00
Magnesium, mg/l	56.00	49.00	56.00	54.00	59.00	54.00	64.00
Potassium, mg/l	3.60	4.20	3.20	1.40	4.50	4.50	4.40
Sodium, mg/l	36.00	36.00	37.00	39.00	42.00	38.00	49.00
Sulfate, mg/l	190.00	180.00	144.90	175.00	170.00	201.00	166.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*
Chloride, mg/l	6.30	3.80	1.60	3.20	3.40	3.50	3.80
Iron, mg/l	<0.10	<0.10	0.24	*	*	*	<0.10
Zinc, mg/l	0.03	*	*	*	*	*	*
Manganese, mg/l	<0.01	<0.01	<0.01	*	*	*	<0.10
Copper, ug/l	10.00	*	*	*	*	*	*
Silver, ug/l	<10.00	*	*	*	*	*	*
Strontium, mg/l	0.90	0.80	0.80	*	*	*	0.90
Boron, mg/l	0.42	0.25	0.25	0.18	0.16	0.16	0.18
Beryllium, ug/l	<10.00	*	*	*	*	*	*
Nickel, ug/l	120.00	<50.00	<50.00	*	*	*	*
Selenium, ug/l	6.00	*	*	*	*	*	*
Mercury, ug/l	<1.00	*	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	2.00	*	*	*	*
Barium, mg/l	0.03	*	*	*	*	*	*
Cadmium, ug/l	<10.00	<10.00	<10.00	*	*	*	*
Chromium-VI, ug/l	<10.00	*	*	*	*	*	*
Fluoride, mg/l	0.20	0.10	0.19	0.20	0.20	0.20	0.20
Lead, ug/l	2.00	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*
Aluminum, mg/l	0.18	<0.01	0.01	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	10.00	*	*	14.70	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	2.30	1.00	2.20	3.00	7.07	6.30	~~2m39cm~~ 2m3
Total Sulfur, mg/l	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*

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SAMPLE LOCATION 36 = Monitoring Well # 36 -CCSPAGE 1

DATE	06/01/1980	10/08/1980	03/26/1981	06/10/1981	09/17/1981	09/17/1981	12/02/1981	05/27/1982
	PACE	PACE	PACE	PACE		PACE		
pH-Field	7.30	7.00	8.00	7.70	7.20	7.20	7.50	7.40
pH-Laboratory	7.40	7.50	7.30	7.90	7.10	7.10	7.00	7.20
Specific conductance, umhos/cm @ 25c	770.00	740.00	970.00	1000.00	1360.00	1100.00	1300.00	1050.00
Total Dissolved Solids, mg/l	502.00	346.00	692.00	760.00	780.00	1000.00	1090.00	1480.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	336.00	340.00	232.00	313.00	308.00	320.00	290.00	306.00
Alkalinity Total, mg/l as CaCO3	336.00	340.00	232.00	313.00	308.00	320.00	290.00	306.00
Nitrate-N, mg/l	4.20	2.60	4.80	4.40	4.00	3.20	3.00	2.30
Ammonia-N, mg/l	<0.10	*	*	*	*	*	*	*
Calcium, mg/l	92.00	100.00	140.00	170.00	295.00	220.00	220.00	360.00
Magnesium, mg/l	28.00	33.00	30.00	42.00	56.00	61.00	55.00	70.00
Potassium, mg/l	2.20	1.30	1.60	1.10	2.30	1.90	2.50	2.50
Sodium, mg/l	16.00	3.10	2.60	2.60	4.30	3.60	6.40	15.00
Sulfate, mg/l	60.00	36.00	180.00	220.00	470.00	520.00	390.00	990.00
Methylene Blue Active Substances, mg/l	<0.10	*	*	*	*	*	*	*
Chloride, mg/l	<10.00	2.00	13.00	15.00	24.20	26.00	23.00	33.70
Iron, mg/l	0.45	0.05	<0.05	0.20	0.10	0.35	0.02	0.10
Zinc, mg/l	200.00	*	*	*	*	*	*	*
Manganese, mg/l	0.44	0.08	<0.04	0.04	<0.10	<0.06	<0.01	0.03
Copper, ug/l	<50.00	*	*	*	*	*	*	*
Silver, ug/l	<40.00	*	*	*	*	*	*	*
Strontium, mg/l	0.20	0.30	0.45	0.40	0.40	0.45	0.60	0.70
Boron, mg/l	<0.20	<0.20	<0.20	<0.20	<0.10	<0.20	0.10	0.40
Beryllium, ug/l	<20.00	*	*	*	*	*	*	*
Nickel, ug/l	50.00	*	*	*	*	*	*	*
Selenium, ug/l	6.00	*	*	*	*	*	*	*
Mercury, ug/l	<0.20	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Barium, mg/l	<0.30	*	*	*	*	*	*	*
Cadmium, ug/l	<1.00	*	*	*	*	*	*	*
Chromium-VI, ug/l	<5.00	*	*	*	*	*	*	*
Fluoride, mg/l	0.20	0.20	0.20	0.20	<0.10	0.10	<0.10	0.20
Lead, ug/l	<10.00	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*
Cyanide, mg/l	0.02	*	*	*	*	*	*	*
Phenol, ug/l	4.00	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	8.00	5.00	0.10	0.50	1.90	1.90	1.00	0.80
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*

SAMPLE LOCATION 36 = Monitoring Well # 36 -CCSPAGE 2

DATE	10/14/1982	04/27/1983	10/05/1983	05/18/1984	10/05/1984	05/15/1985	10/23/1985	06/23/1986
pH-Field	7.20	7.50	7.20	7.60	7.10	6.90	6.90	7.20
pH-Laboratory	7.20	7.20	7.00	7.10	7.00	6.90	7.10	7.20
Specific conductance, umhos/cm @ 25c	2300.00	1880.00	2800.00	2200.00	1690.00	2400.00	1870.00	1670.00
Total Dissolved Solids, mg/l	1710.00	1860.00	2391.00	1790.00	2180.00	1920.00	1600.00	915.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	298.00	291.00	300.00	391.00	304.00	325.00	362.00	333.00
Alkalinity Total, mg/l as CaCO3	298.00	291.00	300.00	391.00	304.00	325.00	362.00	333.00
Nitrate-N, mg/l	1.60	4.10	0.40	0.31	1.00	2.20	2.30	5.00
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	390.00	400.00	525.00	350.00	425.00	410.00	350.00	175.00
Magnesium, mg/l	85.00	92.00	117.00	73.00	97.00	79.00	68.00	59.00
Potassium, mg/l	3.30	2.50	3.90	5.40	4.10	3.10	3.00	1.40
Sodium, mg/l	27.00	22.00	40.00	36.00	33.00	33.00	17.00	33.00
Sulfate, mg/l	1030.00	1000.00	1400.00	825.00	1300.00	1000.00	835.00	440.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	41.00	43.00	52.00	25.00	44.00	34.00	30.00	15.00
Iron, mg/l	0.40	<0.10	1.70	0.10	0.10	0.10	<0.10	<0.10
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	0.12	0.02	0.57	0.02	0.05	0.02	<0.01	0.01
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	0.70	0.80	0.80	0.60	1.10	0.70	0.70	0.90
Boron, mg/l	0.50	0.40	0.70	0.28	0.68	0.44	0.32	0.38
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	*
Fluoride, mg/l	0.20	0.10	0.10	0.10	0.10	0.10	0.10	<0.10
Lead, ug/l	*	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	0.80	1.00	4.50	3.00	3.80	2.00	3.60	3.10
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 36 = Monitoring Well # 36 -CCSPAGE 3

DATE	10/23/1986	06/02/1987	10/09/1987	06/14/1988	11/07/1988	06/16/1989	10/30/1989
pH-Field	7.28	7.42	7.50	7.30	7.40	7.20	7.10
pH-Laboratory	7.20	7.20	7.00	7.20	7.20	7.20	7.20
Specific conductance, umhos/cm @ 25c	1730.00	1590.00	1740.00	1600.00	1570.00	1200.00	1460.00
Total Dissolved Solids, mg/l	1430.00	1160.00	1278.00	1080.00	1030.00	1220.00	956.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	*	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	388.00	*	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	388.00	407.00	400.00	460.00	454.00	456.00	439.00
Nitrate-N, mg/l	3.60	3.70	4.23	3.50	3.40	3.00	2.70
Ammonia-N, mg/l	*	*	*	*	*	*	*
Calcium, mg/l	240.00	260.00	275.00	240.00	220.00	257.00	225.00
Magnesium, mg/l	80.00	57.00	69.00	58.00	56.00	64.00	63.00
Potassium, mg/l	2.60	3.00	1.70	1.50	3.20	3.00	3.20
Sodium, mg/l	56.00	19.00	14.00	24.00	25.00	21.00	26.00
Sulfate, mg/l	665.00	470.00	539.50	400.00	325.00	481.00	370.61
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*
Chloride, mg/l	26.00	17.00	19.90	14.00	13.70	16.00	13.45
Iron, mg/l	<0.10	<0.10	<0.01	*	*	*	<0.10
Zinc, mg/l	0.03	*	*	*	*	*	*
Manganese, mg/l	<0.01	<0.01	<0.01	*	*	*	<0.10
Copper, ug/l	<10.00	*	*	*	*	*	*
Silver, ug/l	<10.00	*	*	*	*	*	*
Strontium, mg/l	0.80	0.60	0.60	*	*	*	0.50
Boron, mg/l	0.36	0.54	0.41	0.48	0.50	0.31	0.45
Beryllium, ug/l	<10.00	*	*	*	*	*	*
Nickel, ug/l	<10.00	<50.00	<50.00	*	*	*	*
Selenium, ug/l	1.00	*	*	*	*	*	*
Mercury, ug/l	<1.00	*	*	*	*	*	*
Arsenic, ug/l	<1.00	1.00	3.00	*	*	*	*
Barium, mg/l	0.03	*	*	*	*	*	*
Cadmium, ug/l	<10.00	<10.00	<10.00	*	*	*	*
Chromium-VI, ug/l	<10.00	*	*	*	*	*	*
Fluoride, mg/l	0.20	<0.10	0.13	0.10	0.10	0.10	0.10
Lead, ug/l	<1.00	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*
Aluminum, mg/l	0.14	<0.01	<0.01	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	10.70	*	*	10.90	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	2.50	1.50	3.20	4.00	8.02	7.20	2m63cm 2m3
Total Sulfur, mg/l	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*

c/12.

SAMPLE LOCATION 37 = Monitoring Well # 37 -CCSPAGE 1

DATE	03/27/1981 PACE	06/10/1981 PACE	09/13/1981	09/13/1981 PACE	11/30/1981	05/24/1982	10/11/1982	04/25/1983
pH-Field	7.80	7.70	7.60	7.70	7.40	7.40	7.20	7.20
pH-Laboratory	7.60	8.20	7.30	7.30	7.40	7.30	7.30	7.40
Specific conductance, umhos/cm @ 25c	940.00	850.00	770.00	680.00	870.00	820.00	1300.00	730.00
Total Dissolved Solids, mg/l	658.00	610.00	255.00	580.00	590.00	470.00	1290.00	438.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	100.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	346.00	370.00	473.00	280.00	360.00	364.00	388.00	361.00
Alkalinity Total, mg/l as CaCO3	346.00	370.00	473.00	380.00	360.00	364.00	388.00	361.00
Nitrate-N, mg/l	7.60	16.00	20.00	18.00	16.00	17.60	17.00	9.30
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	90.00	78.00	86.00	90.00	82.00	96.00	110.00	85.00
Magnesium, mg/l	47.00	65.00	58.00	63.00	62.00	55.00	59.00	56.00
Potassium, mg/l	6.80	5.70	8.40	5.10	8.70	7.10	7.90	5.90
Sodium, mg/l	18.00	11.00	14.00	8.00	15.00	15.00	12.00	12.00
Sulfate, mg/l	130.00	80.00	50.00	70.00	170.00	110.00	75.00	65.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	5.00	20.00	4.30	4.00	3.00	3.40	4.40	4.00
Iron, mg/l	<0.05	0.15	<0.10	0.70	<0.01	<0.10	0.79	0.10
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	0.36	0.28	0.20	0.08	0.14	0.06	0.46	0.03
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	0.55	0.55	0.50	0.30	0.75	0.60	0.60	0.50
Boron, mg/l	<0.20	<0.20	<0.10	<0.20	<0.10	0.30	0.10	0.10
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	750.00	<1.00	50.00	<1.00	30.00	7.00	23.00	12.00
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	*
Fluoride, mg/l	0.50	0.50	0.20	0.50	0.40	0.60	0.60	0.50
Lead, ug/l	*	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	8.20	5.70	9.10	9.10	9.50	7.90	10.10	14.70
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 37 = Monitoring Well # 37 -CCSPAGE 2

DATE	10/03/1983	05/14/1984	10/03/1984	05/14/1985	10/21/1985	06/16/1986	10/15/1986	05/26/1987
pH-Field	6.80	7.60	6.90	6.90	6.60	7.80	7.35	7.20
pH-Laboratory	7.00	7.20	6.90	7.00	7.20	7.20	7.20	7.30
Specific conductance, umhos/cm @ 25c	900.00	960.00	1040.00	900.00	930.00	910.00	940.00	930.00
Total Dissolved Solids, mg/l	533.00	714.00	566.00	552.00	560.00	527.00	587.00	568.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	*
Alkalinity Bicarbonate, mg/l as CaCO3	424.00	347.00	448.00	347.00	377.00	399.00	418.00	*
Alkalinity Total, mg/l as CaCO3	424.00	347.00	448.00	347.00	377.00	399.00	418.00	327.00
Nitrate-N, mg/l	2.20	11.00	11.50	3.20	12.00	14.80	15.00	12.80
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	132.00	104.00	109.00	95.00	106.00	89.00	95.00	98.00
Magnesium, mg/l	67.00	54.00	60.00	53.00	54.00	55.00	60.00	50.00
Potassium, mg/l	9.70	6.00	7.90	5.80	7.30	4.20	6.30	6.40
Sodium, mg/l	13.00	11.00	12.00	11.00	12.00	10.00	11.00	5.40
Sulfate, mg/l	78.00	145.00	100.00	94.00	79.00	88.00	87.00	125.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	3.00	3.40	3.30	3.40	2.80	3.20	3.50	3.50
Iron, mg/l	9.00	0.10	0.20	<0.10	0.20	<0.10	<0.10	<0.10
Zinc, mg/l	*	*	*	*	*	*	0.03	*
Manganese, mg/l	0.60	0.01	0.30	0.01	0.22	0.01	<0.01	<0.01
Copper, ug/l	*	*	*	*	*	*	10.00	*
Silver, ug/l	*	*	*	*	*	*	<10.00	*
Strontium, mg/l	0.60	0.60	0.90	0.60	0.70	0.70	0.70	0.70
Boron, mg/l	0.12	0.07	0.11	0.07	0.09	0.05	*	0.07
Beryllium, ug/l	*	*	*	*	*	*	<10.00	*
Nickel, ug/l	*	*	*	*	*	*	<10.00	<50.00
Selenium, ug/l	4.00	2.00	2.00	2.00	2.00	1.00	<1.00	3.00
Mercury, ug/l	*	*	*	*	*	*	<1.00	*
Arsenic, ug/l	1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Barium, mg/l	*	*	*	*	*	*	0.09	*
Cadmium, ug/l	*	*	*	*	*	*	<10.00	<10.00
Chromium-VI, ug/l	*	*	*	*	*	*	<10.00	*
Fluoride, mg/l	0.40	0.40	0.40	0.40	0.30	0.30	*	0.40
Lead, ug/l	*	*	*	*	*	*	<1.00	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	0.11	<0.0
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	20.10	4.70	8.90	4.70	8.90	6.30	6.70	5.6
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 37 = Monitoring Well # 37 -CCSPAGE 3

DATE	10/06/1987	06/06/1988	10/19/1988	05/24/1989	10/10/1989	
pH-Field	7.40	7.20	7.40	8.60	7.40	
pH-Laboratory	7.30	7.20	7.10	7.90	7.00	
Specific conductance, umhos/cm @ 25c	1020.00	1060.00	1090.00	1050.00	1030.00	
Total Dissolved Solids, mg/l	595.00	634.00	1770.00	663.00	587.00	
Total Suspended Solids, mg/l	*	*	*	*	*	
Alkalinity Carbonate, mg/l as CaCO3	*	*	*	*	*	
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	*	*	
Alkalinity Total, mg/l as CaCO3	368.00	371.00	407.00	397.00	405.00	
Nitrate-N, mg/l	11.85	8.80	9.80	8.10	8.70	
Ammonia-N, mg/l	*	*	*	*	*	
Calcium, mg/l	97.00	109.00	97.00	107.00	99.00	
Magnesium, mg/l	61.00	63.00	61.00	66.00	62.00	
Potassium, mg/l	6.10	6.50	7.20	7.30	7.60	
Sodium, mg/l	8.00	11.00	9.50	10.00	31.00	
Sulfate, mg/l	125.90	170.00	148.00	198.00	145.00	
Methylene Blue Active Substances, mg/l	*	*	*	*	*	
Chloride, mg/l	3.33	3.20	3.90	3.80	3.80	
Iron, mg/l	<0.01	*	*	*	<0.10	
Zinc, mg/l	*	*	*	*	*	
Manganese, mg/l	<0.01	*	*	*	<0.10	
Copper, ug/l	*	*	*	*	*	
Silver, ug/l	*	*	*	*	*	
Strontium, mg/l	0.70	*	*	*	0.80	
Boron, mg/l	0.06	0.03	0.02	<1.00	0.06	
Beryllium, ug/l	*	*	*	*	*	
Nickel, ug/l	<50.00	*	*	*	*	
Selenium, ug/l	13.00	<1.00	<1.00	<1.00	*	
Mercury, ug/l	*	*	*	*	*	
Arsenic, ug/l	1.00	*	*	*	*	
Barium, mg/l	*	*	*	*	*	
Cadmium, ug/l	<10.00	*	*	*	*	
Chromium-VI, ug/l	*	*	*	*	*	
Fluoride, mg/l	0.44	0.50	0.40	0.50	0.40	
Lead, ug/l	*	*	*	*	*	
Molybdenum, mg/l	*	*	*	*	*	
Aluminum, mg/l	<0.01	*	*	*	*	
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	
Cyanide, mg/l	*	*	*	*	*	
Phenol, ug/l	*	*	*	*	*	
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	
Chemical Oxygen Demand, mg/l	*	*	*	*	*	
Total Organic Carbon, mg/l	*	*	*	*	*	
Temperature, Degrees C	11.00	*	*	11.00	*	1/4/90
Dissolved Oxygen, mg/l	*	*	*	*	*	
Water Level depth below ground surface, ft.	6.70	7.40	10.03	10.70	*4m 50cm	3m 70cm
Total Sulfur, mg/l	*	*	*	*	*	
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	

SAMPLE LOCATION 38 = Monitoring Well # 38 -CCSPAGE 1

DATE	06/01/1980 PACE	10/08/1980 PACE	03/27/1981 PACE	06/10/1981 PACE	09/16/1981	09/16/1981 PACE	12/02/1981	05/26/1982
pH-Field	6.90	6.70	7.50	7.60	7.10	7.10	7.10	7.60
pH-Laboratory	7.00	7.20	7.20	7.80	7.10	7.10	6.70	7.20
Specific conductance, umhos/cm @ 25c	1300.00	1300.00	3030.00	4000.00	3020.00	3500.00	3000.00	3800.00
Total Dissolved Solids, mg/l	764.00	*	2120.00	3200.00	3090.00	3200.00	2430.00	2830.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	550.00	*	500.00	477.00	458.00	470.00	450.00	464.00
Alkalinity Total, mg/l as CaCO3	550.00	*	500.00	477.00	458.00	470.00	450.00	464.00
Nitrate-N, mg/l	<0.25	<0.10	0.40	0.90	0.54	0.30	0.10	0.55
Ammonia-N, mg/l	<0.10	*	*	*	*	*	*	*
Calcium, mg/l	90.00	48.00	220.00	340.00	320.00	350.00	240.00	440.00
Magnesium, mg/l	52.00	55.00	140.00	280.00	260.00	280.00	190.00	330.00
Potassium, mg/l	6.40	6.50	8.20	8.00	10.80	8.50	10.00	9.00
Sodium, mg/l	130.00	130.00	200.00	240.00	250.00	230.00	220.00	210.00
Sulfate, mg/l	100.00	*	1200.00	2100.00	2300.00	2000.00	1400.00	1980.00
Methylene Blue Active Substances, mg/l	<0.10	*	*	*	*	*	*	*
Chloride, mg/l	<10.00	12.00	5.00	4.00	4.10	4.00	5.80	3.80
Iron, mg/l	4.50	2.30	<0.05	0.10	2.50	0.70	0.18	0.30
Zinc, mg/l	<0.01	*	*	*	*	*	*	*
Manganese, mg/l	0.90	0.78	0.64	0.16	0.30	0.16	0.80	0.13
Copper, ug/l	<0.05	*	*	*	*	*	*	*
Silver, ug/l	<0.04	*	*	*	*	*	*	*
Strontium, mg/l	1.20	1.20	2.60	3.00	2.40	2.60	3.40	3.60
Boron, mg/l	0.40	0.60	0.70	0.50	1.20	1.00	0.60	0.80
Beryllium, ug/l	<0.02	*	*	*	*	*	*	*
Nickel, ug/l	<0.05	*	*	*	*	*	*	*
Selenium, ug/l	1.00	*	*	*	*	*	*	*
Mercury, ug/l	<0.20	*	*	*	*	*	*	*
Arsenic, ug/l	5.00	5.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Barium, mg/l	<0.30	*	*	*	*	*	*	*
Cadmium, ug/l	<1.00	*	*	*	*	*	*	*
Chromium-VI, ug/l	<5.00	*	*	*	*	*	*	*
Fluoride, mg/l	0.20	0.20	0.10	1.00	0.30	0.70	0.40	0.30
Lead, ug/l	0.01	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*
Cyanide, mg/l	<0.02	*	*	*	*	*	*	*
Phenol, ug/l	6.00	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	11.00	10.00	9.30	9.00	10.40	10.40	10.90	7.80
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*

SAMPLE LOCATION 38 = Monitoring Well # 38 -CCSPAGE 2

DATE	10/14/1982	04/27/1983	10/05/1983	05/18/1984	10/05/1984	05/15/1985	10/23/1985	06/23/1986
pH-Field	7.00	7.00	6.60	7.30	7.00	6.80	6.60	7.10
pH-Laboratory	7.00	7.00	6.90	7.00	6.90	6.80	6.90	7.20
Specific conductance, umhos/cm @ 25c	2200.00	1170.00	1280.00	3000.00	1400.00	3500.00	1400.00	3900.00
Total Dissolved Solids, mg/l	1290.00	807.00	792.00	3080.00	1380.00	3040.00	945.00	3620.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	510.00	580.00	538.00	469.00	505.00	468.00	538.00	433.00
Alkalinity Total, mg/l as CaCO3	510.00	580.00	538.00	469.00	505.00	468.00	539.00	433.00
Nitrate-N, mg/l	<0.05	0.11	0.08	0.79	0.21	0.89	0.16	0.98
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	210.00	120.00	135.00	440.00	195.00	490.00	137.00	510.00
Magnesium, mg/l	90.00	55.00	53.00	161.00	80.00	170.00	46.00	270.00
Potassium, mg/l	8.00	6.70	6.80	7.70	7.80	7.20	6.80	4.70
Sodium, mg/l	160.00	130.00	136.00	169.00	141.00	158.00	135.00	154.00
Sulfate, mg/l	800.00	260.00	260.00	1600.00	575.00	1800.00	290.00	2300.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	4.80	4.10	4.40	3.40	4.50	3.80	4.50	3.00
Iron, mg/l	3.00	0.20	0.30	0.30	0.20	0.10	0.30	<0.10
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	1.30	0.74	0.69	0.42	0.80	0.30	0.65	0.03
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	1.80	1.30	1.40	3.20	2.30	3.10	1.40	4.10
Boron, mg/l	0.60	0.50	0.50	0.59	0.63	0.55	0.44	0.57
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	2.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	*
Fluoride, mg/l	0.50	0.20	0.20	0.40	0.30	0.50	0.20	0.70
Lead, ug/l	*	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	9.10	8.10	9.70	5.60	7.80	6.40	9.60	6.10
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

DATE	10/23/1986	06/02/1987	10/08/1987	06/14/1988	11/07/1988	06/16/1989	10/30/1989	
pH-Field	7.04	7.23	6.80	6.80	7.30	7.10	7.00	
pH-Laboratory	7.00	7.00	6.90	7.10	7.10	7.20	7.00	
Specific conductance, umhos/cm @ 25c	2200.00	2400.00	4040.00	4300.00	4400.00	3000.00	3300.00	
Total Dissolved Solids, mg/l	1680.00	1850.00	3762.00	3540.00	3630.00	3870.00	2510.00	
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	
Alkalinity Carbonate, mg/l as CaCO3	<1.00	*	*	*	*	*	*	
Alkalinity Bicarbonate, mg/l as CaCO3	509.00	*	*	*	*	*	*	
Alkalinity Total, mg/l as CaCO3	509.00	454.00	438.00	445.00	426.00	432.00	450.00	
Nitrate-N, mg/l	0.05	0.05	0.56	*	*	0.37	<0.01	
Ammonia-N, mg/l	*	*	*	*	*	*	*	
Calcium, mg/l	220.00	280.00	505.00	590.00	510.00	536.00	360.00	
Magnesium, mg/l	100.00	125.00	261.00	240.00	250.00	290.00	180.00	
Potassium, mg/l	7.20	7.00	6.20	7.00	8.40	7.90	8.30	
Sodium, mg/l	150.00	133.00	138.00	138.00	166.00	170.00	183.00	
Sulfate, mg/l	800.00	880.00	2296.90	2200.00	*	2240.00	1500.00	
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	
Chloride, mg/l	5.20	6.00	2.87	3.80	4.10	4.70	6.40	
Iron, mg/l	<0.10	<0.10	<0.01	*	*	*	<0.10	
Zinc, mg/l	0.03	*	*	*	*	*	*	
Manganese, mg/l	0.47	0.18	0.01	*	*	*	0.27	
Copper, ug/l	<10.00	*	*	*	*	*	*	
Silver, ug/l	<10.00	*	*	*	*	*	*	
Strontium, mg/l	2.30	2.40	3.90	*	*	*	3.10	
Boron, mg/l	0.56	0.50	0.51	0.51	0.50	0.56	0.56	
Beryllium, ug/l	<10.00	*	*	*	*	*	*	
Nickel, ug/l	<10.00	<50.00	<50.00	*	*	*	*	
Selenium, ug/l	<1.00	*	*	*	*	*	*	
Mercury, ug/l	<1.00	*	*	*	*	*	*	
Arsenic, ug/l	<1.00	<1.00	<1.00	*	*	*	*	
Barium, mg/l	0.03	*	*	*	*	*	*	
Cadmium, ug/l	<10.00	<10.00	<10.00	*	*	*	*	
Chromium-VI, ug/l	<10.00	*	*	*	*	*	*	
Fluoride, mg/l	0.40	0.40	0.81	0.70	0.80	0.70	0.50	
Lead, ug/l	<1.00	*	*	*	*	*	*	
Molybdenum, mg/l	*	*	*	*	*	*	*	
Aluminum, mg/l	0.14	<0.01	<0.01	*	*	*	*	
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	
Cyanide, mg/l	*	*	*	*	*	*	*	
Phenol, ug/l	*	*	*	*	*	*	*	
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	
Temperature, Degrees C	*	*	3.20	*	*	12.50	*	c/11.
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	
Water Level depth below ground surface, ft.	7.30	5.40	7.80	9.60	12.08	11.90	*3m 95m	4m 11
Total Sulfur, mg/l	*	*	*	*	*	*	*	
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	

SAMPLE LOCATION 40 = Monitoring Well # 40 -CCSPAGE 1

DATE	06/16/1986	10/15/1986	05/26/1987	10/06/1987	06/07/1988	10/20/1988	05/26/1989	10/10/1989
pH-Field	7.00	7.57	7.41	7.60	7.30	7.30	9.60	7.50
pH-Laboratory	7.30	7.30	7.30	7.40	7.40	7.30	7.30	7.30
Specific conductance, umhos/cm @ 25c	3900.00	5500.00	5700.00	5050.00	5800.00	6100.00	5400.00	4900.00
Total Dissolved Solids, mg/l	3550.00	4630.00	4625.00	4855.00	4930.00	5130.00	5280.00	5390.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	*	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	361.00	424.00	*	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	361.00	424.00	382.00	444.00	415.00	408.00	402.00	418.00
Nitrate-N, mg/l	0.63	0.33	0.14	0.02	18.00	*	0.14	0.48
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	335.00	430.00	440.00	393.00	430.00	440.00	433.00	455.00
Magnesium, mg/l	265.00	400.00	385.00	363.00	345.00	410.00	365.00	375.00
Potassium, mg/l	3.10	10.40	9.20	5.50	7.80	13.00	12.00	14.00
Sodium, mg/l	285.00	410.00	500.00	377.00	450.00	564.00	485.00	570.00
Sulfate, mg/l	2200.00	2800.00	3000.00	2954.50	3100.00	3300.00	2890.00	3370.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	5.40	8.90	9.60	10.02	12.00	12.29	12.99	14.00
Iron, mg/l	<0.10	0.20	<0.10	<0.01	*	*	*	0.10
Zinc, mg/l	*	<0.01	*	*	*	*	*	*
Manganese, mg/l	0.01	1.10	0.31	0.09	*	*	*	0.16
Copper, ug/l	*	<10.00	*	*	*	*	*	*
Silver, ug/l	*	20.00	*	*	*	*	*	*
Strontium, mg/l	1.80	3.10	2.90	2.60	*	*	*	3.10
Boron, mg/l	0.61	0.42	0.34	0.55	0.27	0.23	0.22	0.25
Beryllium, ug/l	*	<10.00	*	*	*	*	*	*
Nickel, ug/l	*	<10.00	<50.00	<50.00	*	*	*	*
Selenium, ug/l	*	<1.00	*	*	*	*	*	*
Mercury, ug/l	*	<1.00	*	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	<1.00	<1.00	*	*	*	*
Barium, mg/l	*	0.03	*	*	*	*	*	*
Cadmium, ug/l	*	<10.00	<10.00	<10.00	*	*	*	*
Chromium-VI, ug/l	*	<10.00	*	*	*	*	*	*
Fluoride, mg/l	0.70	0.80	0.70	0.84	0.30	0.60	0.70	0.50
Lead, ug/l	*	<1.00	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	0.03	<0.01	<0.01	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	10.20	*	*	7.20	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	4.80	6.50	6.10	6.30	6.00	12.06	11.20	4m12
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

6/4/90

4m07m

SAMPLE LOCATION 43 = Monitoring Well # 43 -CCSPAGE 1

DATE	06/19/1986	10/16/1986	05/29/1987	10/05/1987	06/09/1988	11/01/1988	06/12/1989	10/20/1989
pH-Field	7.30	7.57	7.48	7.30	7.60	7.80	1.00	7.60
pH-Laboratory	7.60	7.40	7.40	7.40	7.40	7.40	7.50	7.40
Specific conductance, umhos/cm @ 25c	5400.00	6000.00	5500.00	6750.00	5050.00	6300.00	4000.00	4600.00
Total Dissolved Solids, mg/l	5460.00	6190.00	5445.00	6269.00	4676.00	5530.00	3600.00	4310.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	*	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	202.00	228.00	*	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	202.00	228.00	231.00	226.00	379.00	253.00	286.00	258.00
Nitrate-N, mg/l	0.28	0.35	0.05	<0.01	*	*	2.60	0.10
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	470.00	550.00	450.00	566.00	320.00	480.00	313.00	350.00
Magnesium, mg/l	510.00	640.00	560.00	635.00	550.00	485.00	350.00	360.00
Potassium, mg/l	11.00	17.00	13.00	13.50	7.60	12.00	9.10	12.00
Sodium, mg/l	245.00	350.00	240.00	320.00	190.00	320.00	190.00	306.00
Sulfate, mg/l	3400.00	3800.00	3500.00	4138.00	2800.00	3500.00	2050.00	2480.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	110.00	145.00	120.00	175.69	88.00	190.00	83.00	132.00
Iron, mg/l	<0.10	<0.10	<0.10	<0.01	*	*	*	<0.10
Zinc, mg/l	*	0.14	*	*	*	*	*	*
Manganese, mg/l	0.02	<0.01	<0.01	0.05	*	*	*	<0.10
Copper, ug/l	*	<10.00	*	*	*	*	*	*
Silver, ug/l	*	<10.00	*	*	*	*	*	*
Strontium, mg/l	1.60	0.10	0.70	1.30	*	*	*	1.00
Boron, mg/l	9.00	14.00	7.00	16.05	7.00	15.40	12.40	16.00
Beryllium, ug/l	*	<10.00	*	*	*	*	*	*
Nickel, ug/l	*	<10.00	<50.00	<50.00	*	*	*	*
Selenium, ug/l	*	<1.00	*	*	*	*	*	*
Mercury, ug/l	*	<1.00	*	*	*	*	*	*
Arsenic, ug/l	<1.00	2.00	<1.00	<1.00	*	*	*	*
Barium, mg/l	*	<0.01	*	*	*	*	*	*
Cadmium, ug/l	*	<10.00	<10.00	<10.00	*	*	*	*
Chromium-VI, ug/l	*	<10.00	*	*	*	*	*	*
Fluoride, mg/l	<0.10	0.10	0.10	0.12	0.10	0.40	0.10	0.20
Lead, ug/l	*	<1.00	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	0.80	<0.01	<0.01	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	10.00	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	4.30	5.70	2.40	5.30	5.90	11.05	9.20	3m 66
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

6/7/90

3m 54cm

SAMPLE LOCATION 44 = Monitoring Well # 44 -CCSPAGE 1

DATE	06/19/1986	10/21/1986	05/29/1987	10/08/1987	06/09/1988	10/24/1988	06/12/1989	10/20/1989
pH-Field	7.00	7.58	7.28	7.50	7.30	7.70	1.00	7.40
pH-Laboratory	7.40	7.40	7.40	7.10	7.20	7.10	7.20	7.20
Specific conductance, umhos/cm @ 25c	1030.00	1800.00	1210.00	1140.00	2600.00	2900.00	2000.00	1390.00
Total Dissolved Solids, mg/l	668.00	1250.00	790.00	679.00	1930.00	2620.00	1390.00	925.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	*	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	367.00	417.00	*	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	367.00	417.00	324.00	343.00	463.00	532.00	571.00	404.00
Nitrate-N, mg/l	0.12	<0.01	0.04	0.04	*	*	<0.01	<0.01
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	71.00	137.00	84.00	75.00	175.00	202.00	128.00	69.00
Magnesium, mg/l	35.00	75.00	44.00	34.00	96.00	145.00	94.00	49.00
Potassium, mg/l	6.10	11.00	7.30	7.50	11.00	16.00	13.00	10.10
Sodium, mg/l	97.00	190.00	119.00	100.00	180.00	260.00	245.00	145.00
Sulfate, mg/l	200.00	595.00	290.00	206.70	795.00	1300.00	661.00	326.02
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	6.50	21.00	9.90	7.00	29.52	43.00	25.17	14.00
Iron, mg/l	0.30	<0.10	0.10	0.45	*	*	*	0.18
Zinc, mg/l	*	0.14	*	*	*	*	*	*
Manganese, mg/l	0.11	<0.01	0.07	0.21	*	*	*	0.17
Copper, ug/l	*	<10.00	*	*	*	*	*	*
Silver, ug/l	*	<10.00	*	*	*	*	*	*
Strontium, mg/l	0.59	<0.01	*	0.50	*	*	*	0.62
Boron, mg/l	0.23	1.70	0.43	0.27	1.30	2.40	3.11	1.20
Beryllium, ug/l	*	<10.00	*	*	*	*	*	*
Nickel, ug/l	*	<10.00	<50.00	<50.00	*	*	*	*
Selenium, ug/l	*	<1.00	*	*	*	*	*	*
Mercury, ug/l	*	<1.00	*	*	*	*	*	*
Arsenic, ug/l	<1.00	1.00	<1.00	<1.00	*	*	*	*
Barium, mg/l	*	<0.01	*	*	*	*	*	*
Cadmium, ug/l	*	<10.00	<10.00	<10.00	*	*	*	*
Chromium-VI, ug/l	*	<10.00	*	*	*	*	*	*
Fluoride, mg/l	0.20	0.40	0.30	0.27	0.20	0.10	0.30	0.30
Lead, ug/l	*	<1.00	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	0.72	0.41	2.49	0.20	<0.10	0.08	0.11
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	11.30	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	3.80	3.80	3.20	3.80	3.10	7.10	6.20	2m7.
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

6/7/90

2m 36cm

SAMPLE LOCATION 45 = Monitoring Well # 45 -CCSPAGE 1

DATE	06/19/1986	10/21/1986	05/29/1987	10/08/1987	06/09/1988	10/24/1988	06/12/1989	10/20/1989
pH-Field	9.30	7.86	7.45	7.60	7.50	7.70	1.00	7.60
pH-Laboratory	9.60	7.70	7.40	7.20	7.40	7.30	7.50	7.40
Specific conductance, umhos/cm @ 25c	1690.00	1600.00	1660.00	1750.00	1750.00	1740.00	1650.00	1640.00
Total Dissolved Solids, mg/l	1140.00	1130.00	1135.00	1082.00	1110.00	1040.00	1120.00	1100.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	214.00	<1.00	*	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	196.00	455.00	*	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	410.00	455.00	416.00	459.00	460.00	452.00	448.00	451.00
Nitrate-N, mg/l	0.71	<0.01	0.03	0.02	*	*	0.56	<0.01
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	10.00	65.00	70.00	65.00	68.00	70.00	74.00	68.00
Magnesium, mg/l	24.00	25.00	23.00	21.00	20.00	23.00	22.00	21.00
Potassium, mg/l	57.00	54.00	8.00	7.60	6.80	7.60	8.00	8.20
Sodium, mg/l	305.00	310.00	270.00	260.00	280.00	270.00	275.00	290.00
Sulfate, mg/l	500.00	470.00	490.00	415.70	415.00	420.00	406.00	415.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	4.00	3.20	3.50	2.70	3.50	3.70	3.80	2.20
Iron, mg/l	<0.10	<0.10	<0.10	<0.01	*	*	*	<0.10
Zinc, mg/l	*	0.07	*	*	*	*	*	*
Manganese, mg/l	0.01	0.19	0.47	0.58	*	*	*	0.67
Copper, ug/l	*	<10.00	*	*	*	*	*	*
Silver, ug/l	*	10.00	*	*	*	*	*	*
Strontium, mg/l	0.70	0.50	0.70	0.60	*	*	*	0.60
Boron, mg/l	0.41	0.50	0.46	0.48	0.51	0.48	0.55	0.50
Beryllium, ug/l	*	<10.00	*	*	*	*	*	*
Nickel, ug/l	*	<10.00	<50.00	<50.00	*	*	*	*
Selenium, ug/l	*	<1.00	*	*	*	*	*	*
Mercury, ug/l	*	<1.00	*	*	*	*	*	*
Arsenic, ug/l	10.00	7.00	10.00	1.00	10.00	9.00	3.00	*
Barium, mg/l	*	0.01	*	*	*	*	*	*
Cadmium, ug/l	*	<10.00	<10.00	<10.00	*	*	*	*
Chromium-VI, ug/l	*	<10.00	*	*	*	*	*	*
Fluoride, mg/l	0.30	0.40	0.40	0.34	0.30	0.30	0.30	0.30
Lead, ug/l	*	<1.00	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	0.34	0.02	0.06	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	3.40	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	13.10	7.90	12.40	10.90	11.50	13.02	7.90	2m 73
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

6/7/90

4m 72cm

SAMPLE LOCATION 46 = Monitoring Well # 46 -CCSPAGE 1

DATE	06/19/1986	10/21/1986	05/27/1987	10/05/1987	10/05/1987 PACE	06/09/1988	11/01/1988	06/12/1989
pH-Field	7.30	6.97	6.85	6.70	*	6.90	6.40	1.00
pH-Laboratory	7.60	6.80	6.80	6.80	*	6.80	6.80	6.80
Specific conductance, umhos/cm @ 25c	4000.00	*	4400.00	4600.00	4500.00	4500.00	4600.00	4250.00
Total Dissolved Solids, mg/l	3460.00	3800.00	3850.00	3764.00	3800.00	3740.00	3520.00	3750.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	*	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	340.00	448.00	*	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	340.00	448.00	397.00	445.00	430.00	436.00	424.00	426.00
Nitrate-N, mg/l	0.12	<0.01	0.19	0.10	0.10	*	*	0.29
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	310.00	420.00	490.00	460.00	380.00	470.00	440.00	442.00
Magnesium, mg/l	150.00	160.00	188.00	170.00	160.00	160.00	170.00	165.00
Potassium, mg/l	108.00	21.00	18.00	20.10	17.00	18.00	17.00	19.00
Sodium, mg/l	410.00	360.00	370.00	362.00	350.00	380.00	320.00	380.00
Sulfate, mg/l	2200.00	2100.00	2100.00	2219.20	2400.00	2000.00	2200.00	1885.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	4.50	4.90	4.80	4.63	5.00	5.00	4.80	5.30
Iron, mg/l	<0.10	<0.10	<0.10	<0.01	0.09	*	*	*
Zinc, mg/l	*	0.02	*	*	*	*	*	*
Manganese, mg/l	1.80	4.50	4.70	4.71	3.50	*	*	*
Copper, ug/l	*	<10.00	*	*	*	*	*	*
Silver, ug/l	*	<10.00	*	*	*	*	*	*
Strontium, mg/l	4.40	3.30	3.00	2.90	3.00	*	*	*
Boron, mg/l	0.57	0.58	0.58	0.56	0.60	0.58	0.50	0.62
Beryllium, ug/l	*	<10.00	*	*	*	*	*	*
Nickel, ug/l	*	10.00	<50.00	<50.00	*	*	*	*
Selenium, ug/l	*	<1.00	*	*	*	*	*	*
Mercury, ug/l	*	<1.00	*	*	*	*	*	*
Arsenic, ug/l	<1.00	1.00	<1.00	<1.00	*	*	*	*
Barium, mg/l	*	0.02	*	*	*	*	*	*
Cadmium, ug/l	*	<10.00	<10.00	<10.00	*	*	*	*
Chromium-VI, ug/l	*	<10.00	*	*	*	*	*	*
Fluoride, mg/l	0.20	0.20	0.20	0.20	0.30	0.20	0.20	0.20
Lead, ug/l	*	<1.00	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	0.13	<0.01	<0.01	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	9.00	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	7.60	7.30	6.70	6.70	*	6.30	11.09	12.30
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 46 = Monitoring Well # 46 -CCSPAGE 2

DATE	10/20/1989
pH-Field	6.30
pH-Laboratory	6.80
Specific conductance, umhos/cm @ 25c	4300.00
Total Dissolved Solids, mg/l	3823.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	*
Alkalinity Bicarbonate, mg/l as CaCO3	*
Alkalinity Total, mg/l as CaCO3	420.00
Nitrate-N, mg/l	0.40
Ammonia-N, mg/l	*
Calcium, mg/l	470.00
Magnesium, mg/l	180.00
Potassium, mg/l	20.00
Sodium, mg/l	375.00
Sulfate, mg/l	2230.00
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	4.00
Iron, mg/l	0.10
Zinc, mg/l	*
Manganese, mg/l	3.70
Copper, ug/l	*
Silver, ug/l	*
Strontium, mg/l	3.00
Boron, mg/l	0.72
Beryllium, ug/l	*
Nickel, ug/l	*
Selenium, ug/l	*
Mercury, ug/l	*
Arsenic, ug/l	*
Barium, mg/l	*
Cadmium, ug/l	*
Chromium-VI, ug/l	*
Fluoride, mg/l	0.20
Lead, ug/l	*
Molybdenum, mg/l	*
Aluminum, mg/l	*
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	*
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	*3m 76 cm 4m 05 cm
Total Sulfur, mg/l	*
Total Coliform Bacteria, # Col./100 ml	*

5/30/90

SAMPLE LOCATION 47 = Monitoring Well # 47 -CCSPAGE 1

DATE	06/20/1986	10/22/1986	06/01/1987	10/08/1987	06/13/1988	11/01/1988	06/14/1989	10/25/1989
pH-Field	7.30	7.52	7.39	7.30	7.20	7.70	7.10	7.20
pH-Laboratory	7.60	7.50	7.20	7.00	7.10	7.40	7.30	7.20
Specific conductance, umhos/cm @ 25c	910.00	950.00	1000.00	1100.00	1110.00	1130.00	1400.00	1030.00
Total Dissolved Solids, mg/l	598.00	611.00	634.00	633.00	653.00	618.00	654.00	660.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	*	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	392.00	415.00	*	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	392.00	415.00	370.00	410.00	412.00	407.00	391.00	397.00
Nitrate-N, mg/l	0.18	<0.01	0.10	0.09	*	*	*	<0.01
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	89.00	82.00	106.00	110.00	130.00	117.00	111.00	119.90
Magnesium, mg/l	39.00	33.00	38.00	36.00	34.00	40.00	35.00	41.10
Potassium, mg/l	16.00	6.10	6.10	5.10	5.40	5.80	5.90	5.90
Sodium, mg/l	56.00	76.00	51.00	55.00	56.00	58.00	53.00	68.00
Sulfate, mg/l	150.00	165.00	190.00	179.70	200.00	215.00	151.00	188.32
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	2.90	2.70	3.60	2.91	4.00	3.80	*	3.44
Iron, mg/l	<0.10	<0.10	<0.10	<0.01	*	*	*	0.07
Zinc, mg/l	*	0.06	*	*	*	*	*	*
Manganese, mg/l	0.23	0.48	0.44	0.64	*	*	*	0.79
Copper, ug/l	*	<10.00	*	*	*	*	*	*
Silver, ug/l	*	<10.00	*	*	*	*	*	*
Strontium, mg/l	1.30	1.20	1.20	1.20	*	*	*	1.06
Boron, mg/l	0.23	0.25	0.24	0.23	0.23	0.29	0.25	0.47
Beryllium, ug/l	*	<10.00	*	*	*	*	*	*
Nickel, ug/l	*	<10.00	<50.00	<50.00	*	*	*	*
Selenium, ug/l	*	<1.00	*	*	*	*	*	*
Mercury, ug/l	*	<1.00	*	*	*	*	*	*
Arsenic, ug/l	3.00	2.00	4.00	3.00	*	*	*	*
Barium, mg/l	*	0.04	*	*	*	*	*	*
Cadmium, ug/l	*	<10.00	<10.00	<10.00	*	*	*	*
Chromium-VI, ug/l	*	<10.00	*	*	*	*	*	*
Fluoride, mg/l	0.20	0.20	0.20	0.19	0.20	0.20	0.20	0.20
Lead, ug/l	*	<1.00	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	0.39	<0.01	<0.01	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	3.90	*	*	12.40	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	1.66	4.00	0.40	0.60	0.80	4.07	4.90	2m08.
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

6/7/90

1m27m

SAMPLE LOCATION 48 = Monitoring Well # 48 -CCSPAGE 1

DATE	10/27/1988	06/01/1989	10/12/1989	10/24/1989
pH-Field	7.80	10.80	7.40	6.50
pH-Laboratory	7.40	7.40	7.40	*
Specific conductance, umhos/cm @ 25c	7200.00	7400.00	*	7900.00
Total Dissolved Solids, mg/l	25600.00	6630.00	*	7240.00
Total Suspended Solids, mg/l	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	*
Alkalinity Total, mg/l as CaCO3	344.00	347.00	*	354.00
Nitrate-N, mg/l	*	0.03	*	<0.01
Ammonia-N, mg/l	*	*	*	*
Calcium, mg/l	540.00	531.00	*	535.00
Magnesium, mg/l	560.00	535.00	*	670.00
Potassium, mg/l	10.00	10.00	*	12.00
Sodium, mg/l	580.00	610.00	*	645.00
Sulfate, mg/l	3700.00	4105.00	*	4536.00
Methylene Blue Active Substances, mg/l	*	*	*	*
Chloride, mg/l	180.00	227.00	*	243.97
Iron, mg/l	*	*	*	<0.10
Zinc, mg/l	*	*	*	*
Manganese, mg/l	*	*	*	0.96
Copper, ug/l	*	*	*	*
Silver, ug/l	*	*	*	*
Strontium, mg/l	*	*	*	7.50
Boron, mg/l	18.60	24.20	*	27.00
Beryllium, ug/l	*	*	*	*
Nickel, ug/l	*	*	*	*
Selenium, ug/l	*	*	*	*
Mercury, ug/l	*	*	*	*
Arsenic, ug/l	*	*	*	*
Barium, mg/l	*	*	*	*
Cadmium, ug/l	*	*	*	*
Chromium-VI, ug/l	*	*	*	*
Fluoride, mg/l	0.40	0.40	*	0.30
Lead, ug/l	*	*	*	*
Molybdenum, mg/l	*	*	*	*
Aluminum, mg/l	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*
Cyanide, mg/l	*	*	*	*
Phenol, ug/l	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*
Temperature, Degrees C	*	11.80	*	*
Dissolved Oxygen, mg/l	*	*	*	*
Water Level depth below ground surface, ft.	38.01	37.40	11m 78cm	*
Total Sulfur, mg/l	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*

6/5/90

11m 9/cm

SAMPLE LOCATION 49 = Monitoring Well # 49 -CCSPAGE 1

DATE	10/27/1988	06/06/1989	10/16/1989	
pH-Field	7.40	10.10	6.60	
pH-Laboratory	7.20	7.20	7.20	
Specific conductance, umhos/cm @ 25c	4700.00	4000.00	4800.00	
Total Dissolved Solids, mg/l	3500.00	3920.00	4150.00	
Total Suspended Solids, mg/l	*	*	*	
Alkalinity Carbonate, mg/l as CaCO3	*	*	*	
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	
Alkalinity Total, mg/l as CaCO3	590.00	767.00	601.00	
Nitrate-N, mg/l	*	0.02	<0.01	
Ammonia-N, mg/l	*	*	*	
Calcium, mg/l	260.00	309.00	330.00	
Magnesium, mg/l	290.00	315.00	355.00	
Potassium, mg/l	7.10	5.80	6.30	
Sodium, mg/l	460.00	400.00	430.00	
Sulfate, mg/l	1700.00	2135.00	2450.00	
Methylene Blue Active Substances, mg/l	*	*	*	
Chloride, mg/l	74.00	103.00	102.00	
Iron, mg/l	*	*	0.20	
Zinc, mg/l	*	*	*	
Manganese, mg/l	*	*	<0.10	
Copper, ug/l	*	*	*	
Silver, ug/l	*	*	*	
Strontium, mg/l	*	*	5.50	
Boron, mg/l	1.30	1.84	2.80	
Beryllium, ug/l	*	*	*	
Nickel, ug/l	*	*	*	
Selenium, ug/l	*	*	*	
Mercury, ug/l	*	*	*	
Arsenic, ug/l	*	*	*	
Barium, mg/l	*	*	*	
Cadmium, ug/l	*	*	*	
Chromium-VI, ug/l	*	*	*	
Fluoride, mg/l	0.20	0.10	0.20	
Lead, ug/l	*	*	*	
Molybdenum, mg/l	*	*	*	
Aluminum, mg/l	*	*	*	
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	
Cyanide, mg/l	*	*	*	
Phenol, ug/l	*	*	*	
Biochemical Oxygen Demand, mg/l	*	*	*	
Chemical Oxygen Demand, mg/l	*	*	*	
Total Organic Carbon, mg/l	*	*	*	
Temperature, Degrees C	*	17.00	*	
Dissolved Oxygen, mg/l	*	*	*	
Water Level depth below ground surface, ft.	13.05	9.50	* 3m/10cm	3m 11cm
Total Sulfur, mg/l	*	*	*	
Total Coliform Bacteria, # Col./100 ml	*	*	*	

8
6/8/90

SAMPLE LOCATION 50 = Monitoring Well # 50 -CCSPAGE 1

DATE	10/28/1988	06/06/1989	10/16/1989
pH-Field	7.30	10.00	6.70
pH-Laboratory	7.30	7.20	7.10
Specific conductance, umhos/cm @ 25c	4000.00	3500.00	3800.00
Total Dissolved Solids, mg/l	3140.00	2920.00	2980.00
Total Suspended Solids, mg/l	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*
Alkalinity Total, mg/l as CaCO3	540.00	634.00	486.00
Nitrate-N, mg/l	*	<0.01	<0.01
Ammonia-N, mg/l	*	*	*
Calcium, mg/l	220.00	211.00	290.00
Magnesium, mg/l	275.00	205.00	210.00
Potassium, mg/l	5.40	4.00	4.90
Sodium, mg/l	340.00	555.00	325.00
Sulfate, mg/l	1600.00	1580.00	1670.00
Methylene Blue Active Substances, mg/l	*	*	*
Chloride, mg/l	80.00	86.00	94.00
Iron, mg/l	*	*	<0.10
Zinc, mg/l	*	*	*
Manganese, mg/l	*	*	<0.10
Copper, ug/l	*	*	*
Silver, ug/l	*	*	*
Strontium, mg/l	*	*	4.00
Boron, mg/l	0.84	0.64	0.70
Beryllium, ug/l	*	*	*
Nickel, ug/l	*	*	*
Selenium, ug/l	*	*	*
Mercury, ug/l	*	*	*
Arsenic, ug/l	*	*	*
Barium, mg/l	*	*	*
Cadmium, ug/l	*	*	*
Chromium-VI, ug/l	*	*	*
Fluoride, mg/l	0.20	0.10	0.20
Lead, ug/l	*	*	*
Molybdenum, mg/l	*	*	*
Aluminum, mg/l	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*
Cyanide, mg/l	*	*	*
Phenol, ug/l	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*
Total Organic Carbon, mg/l	*	*	*
Temperature, Degrees C	*	12.70	*
Dissolved Oxygen, mg/l	*	*	*
Water Level depth below ground surface, ft.	19.10	19.90	* 6m 14cm
Total Sulfur, mg/l	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*

6/8/90

6m 20cm

SAMPLE LOCATION 51 = Monitoring Well # 51 -CCSPAGE 1

DATE	10/28/1988	06/06/1989	10/16/1989	
pH-Field	7.90	7.80	7.70	
pH-Laboratory	7.50	7.60	7.60	
Specific conductance, umhos/cm @ 25c	6000.00	5400.00	5600.00	
Total Dissolved Solids, mg/l	5060.00	4650.00	4980.00	
Total Suspended Solids, mg/l	*	*	*	
Alkalinity Carbonate, mg/l as CaCO3	*	*	*	
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	
Alkalinity Total, mg/l as CaCO3	298.00	442.00	290.00	
Nitrate-N, mg/l	*	0.02	<0.01	
Ammonia-N, mg/l	*	*	*	
Calcium, mg/l	300.00	302.00	320.00	
Magnesium, mg/l	350.00	315.00	325.00	
Potassium, mg/l	6.00	6.10	6.40	
Sodium, mg/l	654.00	620.00	685.00	
Sulfate, mg/l	3100.00	2870.00	3084.00	
Methylene Blue Active Substances, mg/l	*	*	*	
Chloride, mg/l	135.00	134.00	137.00	
Iron, mg/l	*	*	<0.10	
Zinc, mg/l	*	*	*	
Manganese, mg/l	*	*	<0.10	
Copper, ug/l	*	*	*	
Silver, ug/l	*	*	*	
Strontium, mg/l	*	*	3.10	
Boron, mg/l	4.00	3.74	4.90	
Beryllium, ug/l	*	*	*	
Nickel, ug/l	*	*	*	
Selenium, ug/l	*	*	*	
Mercury, ug/l	*	*	*	
Arsenic, ug/l	*	*	*	
Barium, mg/l	*	*	*	
Cadmium, ug/l	*	*	*	
Chromium-VI, ug/l	*	*	*	
Fluoride, mg/l	0.40	0.20	0.40	
Lead, ug/l	*	*	*	
Molybdenum, mg/l	*	*	*	
Aluminum, mg/l	*	*	*	
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	
Cyanide, mg/l	*	*	*	
Phenol, ug/l	*	*	*	
Biochemical Oxygen Demand, mg/l	*	*	*	
Chemical Oxygen Demand, mg/l	*	*	*	
Total Organic Carbon, mg/l	*	*	*	
Temperature, Degrees C	*	9.40	*	6/8/90
Dissolved Oxygen, mg/l	*	*	*	
Water Level depth below ground surface, ft.	12.00	14.30	* 4m 82cm	5m 12cm
Total Sulfur, mg/l	*	*	*	
Total Coliform Bacteria, # Col./100 ml	*	*	*	

SAMPLE LOCATION 52 = Monitoring Well # 52 -CCSPAGE 1

DATE	10/28/1988	06/08/1989	10/23/1989	
pH-Field	7.80	1.00	*	
pH-Laboratory	7.30	7.50	7.30	
Specific conductance, umhos/cm @ 25c	9600.00	9800.00	9500.00	
Total Dissolved Solids, mg/l	8620.00	8390.00	8580.00	
Total Suspended Solids, mg/l	*	*	*	
Alkalinity Carbonate, mg/l as CaCO3	*	*	*	
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	
Alkalinity Total, mg/l as CaCO3	557.00	624.00	579.00	
Nitrate-N, mg/l	*	0.10	0.20	
Ammonia-N, mg/l	*	*	*	
Calcium, mg/l	370.00	415.00	375.00	
Magnesium, mg/l	645.00	730.00	370.00	
Potassium, mg/l	7.20	6.90	9.40	
Sodium, mg/l	1200.00	1200.00	1609.00	
Sulfate, mg/l	5200.00	5500.00	5750.00	
Methylene Blue Active Substances, mg/l	*	*	*	
Chloride, mg/l	44.00	34.00	37.00	
Iron, mg/l	*	*	<0.10	
Zinc, mg/l	*	*	*	
Manganese, mg/l	*	*	4.30	
Copper, ug/l	*	*	*	
Silver, ug/l	*	*	*	
Strontium, mg/l	*	*	3.80	
Boron, mg/l	0.53	0.40	0.48	
Beryllium, ug/l	*	*	*	
Nickel, ug/l	*	*	*	
Selenium, ug/l	*	*	*	
Mercury, ug/l	*	*	*	
Arsenic, ug/l	*	*	*	
Barium, mg/l	*	*	*	
Cadmium, ug/l	*	*	*	
Chromium-VI, ug/l	*	*	*	
Fluoride, mg/l	0.40	0.30	0.30	
Lead, ug/l	*	*	*	
Molybdenum, mg/l	*	*	*	
Aluminum, mg/l	*	*	*	
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	
Cyanide, mg/l	*	*	*	
Phenol, ug/l	*	*	*	
Biochemical Oxygen Demand, mg/l	*	*	*	
Chemical Oxygen Demand, mg/l	*	*	*	
Total Organic Carbon, mg/l	*	*	*	
Temperature, Degrees C	*	*	*	
Dissolved Oxygen, mg/l	*	*	*	
Water Level depth below ground surface, ft.	31.00	35.60	* 10m 64cm	11m 02cm
Total Sulfur, mg/l	*	*	*	
Total Coliform Bacteria, # Col./100 ml	*	*	*	

11/6/90

SAMPLE LOCATION 53 = Monitoring Well # 53 -CCSPAGE 1

DATE	10/28/1988	06/08/1989	10/23/1989	
pH-Field	7.50	1.00	6.20	
pH-Laboratory	7.20	7.20	7.10	
Specific conductance, umhos/cm @ 25c	7000.00	6300.00	6100.00	
Total Dissolved Solids, mg/l	5920.00	5610.00	5540.00	
Total Suspended Solids, mg/l	*	*	*	
Alkalinity Carbonate, mg/l as CaCO3	*	*	*	
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	
Alkalinity Total, mg/l as CaCO3	599.00	669.00	560.00	
Nitrate-N, mg/l	*	<0.01	<0.01	
Ammonia-N, mg/l	*	*	*	
Calcium, mg/l	400.00	404.00	365.00	
Magnesium, mg/l	482.00	460.00	460.00	
Potassium, mg/l	8.40	6.60	12.00	
Sodium, mg/l	640.00	620.00	770.00	
Sulfate, mg/l	3600.00	3740.00	3490.00	
Methylene Blue Active Substances, mg/l	*	*	*	
Chloride, mg/l	42.00	43.00	45.00	
Iron, mg/l	*	*	0.70	
Zinc, mg/l	*	*	*	
Manganese, mg/l	*	*	3.50	
Copper, ug/l	*	*	*	
Silver, ug/l	*	*	*	
Strontium, mg/l	*	*	2.20	
Boron, mg/l	0.28	0.32	0.42	
Beryllium, ug/l	*	*	*	
Nickel, ug/l	*	*	*	
Selenium, ug/l	*	*	*	
Mercury, ug/l	*	*	*	
Arsenic, ug/l	*	*	*	
Barium, mg/l	*	*	*	
Cadmium, ug/l	*	*	*	
Chromium-VI, ug/l	*	*	*	
Fluoride, mg/l	0.40	0.30	0.30	
Lead, ug/l	*	*	*	
Molybdenum, mg/l	*	*	*	
Aluminum, mg/l	*	*	*	
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	
Cyanide, mg/l	*	*	*	
Phenol, ug/l	*	*	*	
Biochemical Oxygen Demand, mg/l	*	*	*	
Chemical Oxygen Demand, mg/l	*	*	*	
Total Organic Carbon, mg/l	*	*	*	
Temperature, Degrees C	*	*	*	6/6/90
Dissolved Oxygen, mg/l	*	*	*	
Water Level depth below ground surface, ft.	33.07	35.90	* 10m 34cm	11m 17cm
Total Sulfur, mg/l	*	*	*	
Total Coliform Bacteria, # Col./100 ml	*	*	*	

SAMPLE LOCATION 54 = Monitoring Well # 54 -CCSPAGE 1

DATE	10/24/1988	06/08/1989	10/23/1989	
pH-Field	7.50	1.00	6.20	
pH-Laboratory	7.50	7.60	7.60	
Specific conductance, umhos/cm @ 25c	18000.00	17200.00	1760.00	
Total Dissolved Solids, mg/l	16550.00	17800.00	16800.00	
Total Suspended Solids, mg/l	*	*	*	
Alkalinity Carbonate, mg/l as CaCO3	*	*	*	
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	
Alkalinity Total, mg/l as CaCO3	466.00	472.00	459.00	
Nitrate-N, mg/l	*	4.40	13.00	
Ammonia-N, mg/l	*	*	*	
Calcium, mg/l	450.00	457.00	395.00	
Magnesium, mg/l	1020.00	1090.00	1200.00	
Potassium, mg/l	30.00	32.00	30.00	
Sodium, mg/l	3100.00	3400.00	3100.00	
Sulfate, mg/l	10200.00	12890.00	11610.00	
Methylene Blue Active Substances, mg/l	*	*	*	
Chloride, mg/l	154.00	155.00	137.00	
Iron, mg/l	*	*	0.20	
Zinc, mg/l	*	*	*	
Manganese, mg/l	*	*	0.10	
Copper, ug/l	*	*	*	
Silver, ug/l	*	*	*	
Strontium, mg/l	*	*	7.30	
Boron, mg/l	0.33	0.27	0.33	
Beryllium, ug/l	*	*	*	
Nickel, ug/l	*	*	*	
Selenium, ug/l	*	*	*	
Mercury, ug/l	*	*	*	
Arsenic, ug/l	*	*	*	
Barium, mg/l	*	*	*	
Cadmium, ug/l	*	*	*	
Chromium-VI, ug/l	*	*	*	
Fluoride, mg/l	0.40	0.40	0.40	
Lead, ug/l	*	*	*	
Molybdenum, mg/l	*	*	*	
Aluminum, mg/l	*	*	*	
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	
Cyanide, mg/l	*	*	*	
Phenol, ug/l	*	*	*	
Biochemical Oxygen Demand, mg/l	*	*	*	
Chemical Oxygen Demand, mg/l	*	*	*	
Total Organic Carbon, mg/l	*	*	*	
Temperature, Degrees C	*	*	*	6/6/90
Dissolved Oxygen, mg/l	*	*	*	
Water Level depth below ground surface, ft.	30.01	30.70	* 9m 71cm	9m 98cm
Total Sulfur, mg/l	*	*	*	
Total Coliform Bacteria, # Col./100 ml	*	*	*	

SAMPLE LOCATION 55 = Monitoring Well # 55 -CCSPAGE 1

DATE	10/28/1988	06/08/1989	10/23/1989	
pH-Field	7.80	1.00	7.60	
pH-Laboratory	7.50	7.60	7.40	
Specific conductance, umhos/cm @ 25c	4400.00	3100.00	4100.00	
Total Dissolved Solids, mg/l	3660.00	2570.00	3470.00	
Total Suspended Solids, mg/l	*	*	*	
Alkalinity Carbonate, mg/l as CaCO3	*	*	*	
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	
Alkalinity Total, mg/l as CaCO3	390.00	239.00	348.00	
Nitrate-N, mg/l	*	1.80	9.00	
Ammonia-N, mg/l	*	*	*	
Calcium, mg/l	290.00	255.00	275.00	
Magnesium, mg/l	260.00	190.00	260.00	
Potassium, mg/l	9.60	6.40	9.10	
Sodium, mg/l	380.00	260.00	395.00	
Sulfate, mg/l	1900.00	1605.00	2115.00	
Methylene Blue Active Substances, mg/l	*	*	*	
Chloride, mg/l	23.00	34.80	32.00	
Iron, mg/l	*	*	<0.10	
Zinc, mg/l	*	*	*	
Manganese, mg/l	*	*	<0.10	
Copper, ug/l	*	*	*	
Silver, ug/l	*	*	*	
Strontium, mg/l	*	*	2.50	
Boron, mg/l	1.90	2.93	2.30	
Beryllium, ug/l	*	*	*	
Nickel, ug/l	*	*	*	
Selenium, ug/l	*	*	*	
Mercury, ug/l	*	*	*	
Arsenic, ug/l	*	*	*	
Barium, mg/l	*	*	*	
Cadmium, ug/l	*	*	*	
Chromium-VI, ug/l	*	*	*	
Fluoride, mg/l	0.30	0.30	0.20	
Lead, ug/l	*	*	*	
Molybdenum, mg/l	*	*	*	
Aluminum, mg/l	*	*	*	
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	
Cyanide, mg/l	*	*	*	
Phenol, ug/l	*	*	*	
Biochemical Oxygen Demand, mg/l	*	*	*	
Chemical Oxygen Demand, mg/l	*	*	*	
Total Organic Carbon, mg/l	*	*	*	
Temperature, Degrees C	*	*	*	6/6/90
Dissolved Oxygen, mg/l	*	*	*	
Water Level depth below ground surface, ft.	15.10	12.30	* 4m 80cm	5m 29cm
Total Sulfur, mg/l	*	*	*	
Total Coliform Bacteria, # Col./100 ml	*	*	*	

SAMPLE LOCATION 56 = Monitoring Well # 56 -CCSPAGE 1

DATE	11/07/1988	05/30/1989	10/19/1989	
pH-Field	7.40	7.60	7.40	
pH-Laboratory	7.10	7.10	7.10	
Specific conductance, umhos/cm @ 25c	5400.00	3900.00	4500.00	
Total Dissolved Solids, mg/l	3980.00	2720.00	3337.00	
Total Suspended Solids, mg/l	*	*	*	
Alkalinity Carbonate, mg/l as CaCO3	*	*	*	
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	
Alkalinity Total, mg/l as CaCO3	857.00	841.00	854.00	
Nitrate-N, mg/l	*	1.70	4.30	
Ammonia-N, mg/l	*	*	*	
Calcium, mg/l	290.00	183.00	210.00	
Magnesium, mg/l	210.00	125.00	185.00	
Potassium, mg/l	13.00	11.00	12.00	
Sodium, mg/l	685.00	540.00	685.00	
Sulfate, mg/l	2100.00	1290.00	1800.00	
Methylene Blue Active Substances, mg/l	*	*	*	
Chloride, mg/l	27.10	22.00	23.00	
Iron, mg/l	*	*	0.10	
Zinc, mg/l	*	*	*	
Manganese, mg/l	*	*	<0.10	
Copper, ug/l	*	*	*	
Silver, ug/l	*	*	*	
Strontium, mg/l	*	*	3.10	
Boron, mg/l	0.62	0.70	0.70	
Beryllium, ug/l	*	*	*	
Nickel, ug/l	*	*	*	
Selenium, ug/l	*	*	*	
Mercury, ug/l	*	*	*	
Arsenic, ug/l	*	*	*	
Barium, mg/l	*	*	*	
Cadmium, ug/l	*	*	*	
Chromium-VI, ug/l	*	*	*	
Fluoride, mg/l	0.30	0.20	0.20	
Lead, ug/l	*	*	*	
Molybdenum, mg/l	*	*	*	
Aluminum, mg/l	*	*	*	
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	
Cyanide, mg/l	*	*	*	
Phenol, ug/l	*	*	*	
Biochemical Oxygen Demand, mg/l	*	*	*	
Chemical Oxygen Demand, mg/l	*	*	*	
Total Organic Carbon, mg/l	*	*	*	
Temperature, Degrees C	*	8.50	*	6/6/90
Dissolved Oxygen, mg/l	*	*	*	
Water Level depth below ground surface, ft.	23.09	22.40	* 7m 30cm	7m 53 cm
Total Sulfur, mg/l	*	*	*	
Total Coliform Bacteria, # Col./100 ml	*	*	*	

SAMPLE LOCATION 57 = Monitoring Well # 57 -CCSPAGE 1

DATE	10/21/1988	05/30/1989	10/19/1989	
pH-Field	7.20	8.10	7.50	
pH-Laboratory	7.00	7.10	7.00	
Specific conductance, umhos/cm @ 25c	1560.00	1330.00	1440.00	
Total Dissolved Solids, mg/l	933.00	857.00	888.00	
Total Suspended Solids, mg/l	*	*	*	
Alkalinity Carbonate, mg/l as CaCO3	*	*	*	
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	
Alkalinity Total, mg/l as CaCO3	588.00	525.00	565.00	
Nitrate-N, mg/l	*	0.04	0.10	
Ammonia-N, mg/l	*	*	*	
Calcium, mg/l	78.00	77.00	70.30	
Magnesium, mg/l	35.00	28.00	31.40	
Potassium, mg/l	11.00	9.90	9.80	
Sodium, mg/l	230.00	180.00	220.00	
Sulfate, mg/l	405.00	210.00	241.00	
Methylene Blue Active Substances, mg/l	*	*	*	
Chloride, mg/l	3.70	3.00	1.20	
Iron, mg/l	*	*	0.28	
Zinc, mg/l	*	*	*	
Manganese, mg/l	*	*	0.19	
Copper, ug/l	*	*	*	
Silver, ug/l	*	*	*	
Strontium, mg/l	*	*	1.76	
Boron, mg/l	0.38	0.26	0.31	
Beryllium, ug/l	*	*	*	
Nickel, ug/l	*	*	*	
Selenium, ug/l	*	*	*	
Mercury, ug/l	*	*	*	
Arsenic, ug/l	*	*	*	
Barium, mg/l	*	*	*	
Cadmium, ug/l	*	*	*	
Chromium-VI, ug/l	*	*	*	
Fluoride, mg/l	<0.10	0.20	0.10	
Lead, ug/l	*	*	*	
Molybdenum, mg/l	*	*	*	
Aluminum, mg/l	*	*	*	
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	
Cyanide, mg/l	*	*	*	
Phenol, ug/l	*	*	*	
Biochemical Oxygen Demand, mg/l	*	*	*	
Chemical Oxygen Demand, mg/l	*	*	*	
Total Organic Carbon, mg/l	*	*	*	
Temperature, Degrees C	*	9.00	*	6/6/90
Dissolved Oxygen, mg/l	*	*	*	
Water Level depth below ground surface, ft.	27.04	25.90	* 8m 79cm	8m 71cm
Total Sulfur, mg/l	*	*	*	
Total Coliform Bacteria, # Col./100 ml	*	*	*	

SAMPLE LOCATION 58 = Monitoring Well # 58 -CCSPAGE 1

DATE	10/21/1988	05/30/1989	10/19/1989
pH-Field	7.10	8.50	7.40
pH-Laboratory	6.90	8.10	6.90
Specific conductance, umhos/cm @ 25c	2000.00	1940.00	2100.00
Total Dissolved Solids, mg/l	1400.00	1380.00	1680.00
Total Suspended Solids, mg/l	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*
Alkalinity Total, mg/l as CaCO3	329.00	376.00	324.00
Nitrate-N, mg/l	*	0.02	<0.01
Ammonia-N, mg/l	*	*	*
Calcium, mg/l	240.00	221.00	235.00
Magnesium, mg/l	96.00	89.00	110.00
Potassium, mg/l	5.70	5.00	5.80
Sodium, mg/l	92.00	82.00	102.00
Sulfate, mg/l	735.00	684.00	923.00
Methylene Blue Active Substances, mg/l	*	*	*
Chloride, mg/l	17.60	17.00	15.00
Iron, mg/l	*	*	<0.10
Zinc, mg/l	*	*	*
Manganese, mg/l	*	*	<0.10
Copper, ug/l	*	*	*
Silver, ug/l	*	*	*
Strontium, mg/l	*	*	3.00
Boron, mg/l	0.37	0.27	0.40
Beryllium, ug/l	*	*	*
Nickel, ug/l	*	*	*
Selenium, ug/l	*	*	*
Mercury, ug/l	*	*	*
Arsenic, ug/l	*	*	*
Barium, mg/l	*	*	*
Cadmium, ug/l	*	*	*
Chromium-VI, ug/l	*	*	*
Fluoride, mg/l	0.10	0.10	0.10
Lead, ug/l	*	*	*
Molybdenum, mg/l	*	*	*
Aluminum, mg/l	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*
Cyanide, mg/l	*	*	*
Phenol, ug/l	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*
Total Organic Carbon, mg/l	*	*	*
Temperature, Degrees C	*	10.30	*
Dissolved Oxygen, mg/l	*	*	*
Water Level depth below ground surface, ft.	18.01	14.20	* 5m 68 cm
Total Sulfur, mg/l	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*

6/6/90

4m 80cm

SAMPLE LOCATION 59 = Monitoring Well # 59 -CCSPAGE 1

DATE	10/21/1988	05/30/1989	10/19/1989	
pH-Field	7.20	8.60	7.60	
pH-Laboratory	7.10	7.20	7.20	
Specific conductance, umhos/cm @ 25c	2700.00	2550.00	2500.00	
Total Dissolved Solids, mg/l	1750.00	1800.00	1820.00	
Total Suspended Solids, mg/l	*	*	*	
Alkalinity Carbonate, mg/l as CaCO3	*	*	*	
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	
Alkalinity Total, mg/l as CaCO3	720.00	774.00	780.00	
Nitrate-N, mg/l	*	0.05	<0.01	
Ammonia-N, mg/l	*	*	*	
Calcium, mg/l	230.00	197.00	210.00	
Magnesium, mg/l	150.00	140.00	160.00	
Potassium, mg/l	4.30	4.10	4.30	
Sodium, mg/l	181.00	170.00	207.00	
Sulfate, mg/l	780.00	761.00	744.00	
Methylene Blue Active Substances, mg/l	*	*	*	
Chloride, mg/l	15.40	15.00	15.00	
Iron, mg/l	*	*	0.10	
Zinc, mg/l	*	*	*	
Manganese, mg/l	*	*	0.10	
Copper, ug/l	*	*	*	
Silver, ug/l	*	*	*	
Strontium, mg/l	*	*	3.60	
Boron, mg/l	0.99	1.03	1.20	
Beryllium, ug/l	*	*	*	
Nickel, ug/l	*	*	*	
Selenium, ug/l	*	*	*	
Mercury, ug/l	*	*	*	
Arsenic, ug/l	*	*	*	
Barium, mg/l	*	*	*	
Cadmium, ug/l	*	*	*	
Chromium-VI, ug/l	*	*	*	
Fluoride, mg/l	0.20	0.20	0.20	
Lead, ug/l	*	*	*	
Molybdenum, mg/l	*	*	*	
Aluminum, mg/l	*	*	*	
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	
Cyanide, mg/l	*	*	*	
Phenol, ug/l	*	*	*	
Biochemical Oxygen Demand, mg/l	*	*	*	
Chemical Oxygen Demand, mg/l	*	*	*	
Total Organic Carbon, mg/l	*	*	*	
Temperature, Degrees C	*	7.30	*	6/6/90
Dissolved Oxygen, mg/l	*	*	*	
Water Level depth below ground surface, ft.	20.05	16.80	* 5m 70cm	5m 21cm
Total Sulfur, mg/l	*	*	*	
Total Coliform Bacteria, # Col./100 ml	*	*	*	

SAMPLE LOCATION 60 = Monitoring Well # 60 -CCSPAGE 1

DATE	10/20/1988	06/01/1989	10/10/1989	
pH-Field	6.30	9.80	7.10	
pH-Laboratory	6.90	6.90	7.00	
Specific conductance, umhos/cm @ 25c	3600.00	4100.00	3100.00	
Total Dissolved Solids, mg/l	2860.00	3420.00	2410.00	
Total Suspended Solids, mg/l	*	*	*	
Alkalinity Carbonate, mg/l as CaCO3	*	*	*	
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	
Alkalinity Total, mg/l as CaCO3	375.00	304.00	390.00	
Nitrate-N, mg/l	*	2.10	6.95	
Ammonia-N, mg/l	*	*	*	
Calcium, mg/l	750.00	665.00	460.00	
Magnesium, mg/l	250.00	210.00	155.00	
Potassium, mg/l	6.00	5.50	6.60	
Sodium, mg/l	32.00	33.00	47.00	
Sulfate, mg/l	1800.00	1905.00	1230.00	
Methylene Blue Active Substances, mg/l	*	*	*	
Chloride, mg/l	70.80	90.00	57.00	
Iron, mg/l	*	*	<0.10	
Zinc, mg/l	*	*	*	
Manganese, mg/l	*	*	<0.10	
Copper, ug/l	*	*	*	
Silver, ug/l	*	*	*	
Strontium, mg/l	*	*	1.90	
Boron, mg/l	1.60	2.20	2.80	
Beryllium, ug/l	*	*	*	
Nickel, ug/l	*	*	*	
Selenium, ug/l	*	*	*	
Mercury, ug/l	*	*	*	
Arsenic, ug/l	*	*	*	
Barium, mg/l	*	*	*	
Cadmium, ug/l	*	*	*	
Chromium-VI, ug/l	*	*	*	
Fluoride, mg/l	0.40	0.20	0.40	
Lead, ug/l	*	*	*	
Molybdenum, mg/l	*	*	*	
Aluminum, mg/l	*	*	*	
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	
Cyanide, mg/l	*	*	*	
Phenol, ug/l	*	*	*	
Biochemical Oxygen Demand, mg/l	*	*	*	
Chemical Oxygen Demand, mg/l	*	*	*	
Total Organic Carbon, mg/l	*	*	*	
Temperature, Degrees C	*	17.00	*	6/5/90
Dissolved Oxygen, mg/l	*	*	*	
Water Level depth below ground surface, ft.	29.06	30.80	* 9m 44cm	8m 90cm
Total Sulfur, mg/l	*	*	*	
Total Coliform Bacteria, # Col./100 ml	*	*	*	

SAMPLE LOCATION 61 = Monitoring Well # 61 -CCSPAGE 1

DATE	11/01/1988	05/26/1989	10/19/1989	
pH-Field	5.90	9.50	6.80	
pH-Laboratory	6.40	6.40	6.40	
Specific conductance, umhos/cm @ 25c	1580.00	2000.00	1570.00	
Total Dissolved Solids, mg/l	1070.00	1010.00	1180.00	
Total Suspended Solids, mg/l	*	*	*	
Alkalinity Carbonate, mg/l as CaCO3	*	*	*	
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	
Alkalinity Total, mg/l as CaCO3	325.00	392.00	354.00	
Nitrate-N, mg/l	*	0.06	0.10	
Ammonia-N, mg/l	*	*	*	
Calcium, mg/l	148.00	163.00	165.10	
Magnesium, mg/l	61.00	67.00	94.60	
Potassium, mg/l	7.10	6.90	8.10	
Sodium, mg/l	74.00	87.00	106.00	
Sulfate, mg/l	260.00	407.00	598.00	
Methylene Blue Active Substances, mg/l	*	*	*	
Chloride, mg/l	7.60	8.20	11.00	
Iron, mg/l	*	*	6.84	
Zinc, mg/l	*	*	*	
Manganese, mg/l	*	*	0.72	
Copper, ug/l	*	*	*	
Silver, ug/l	*	*	*	
Strontium, mg/l	*	*	3.66	
Boron, mg/l	0.46	0.47	0.57	
Beryllium, ug/l	*	*	*	
Nickel, ug/l	*	*	*	
Selenium, ug/l	*	*	*	
Mercury, ug/l	*	*	*	
Arsenic, ug/l	*	*	*	
Barium, mg/l	*	*	*	
Cadmium, ug/l	*	*	*	
Chromium-VI, ug/l	*	*	*	
Fluoride, mg/l	0.10	0.10	0.10	
Lead, ug/l	*	*	*	
Molybdenum, mg/l	*	*	*	
Aluminum, mg/l	*	*	*	
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	
Cyanide, mg/l	*	*	*	
Phenol, ug/l	*	*	*	
Biochemical Oxygen Demand, mg/l	*	*	*	
Chemical Oxygen Demand, mg/l	*	*	*	
Total Organic Carbon, mg/l	*	*	*	
Temperature, Degrees C	*	13.00	*	6/5/90
Dissolved Oxygen, mg/l	*	*	*	
Water Level depth below ground surface, ft.	32.00	32.00	*9m87cm	9m90cm
Total Sulfur, mg/l	*	*	*	
Total Coliform Bacteria, # Col./100 ml	*	*	*	

SAMPLE LOCATION 62 = Monitoring Well # 62 -CCSPAGE 1

DATE	10/21/1988	06/01/1989	10/12/1989	
pH-Field	7.30	7.50	7.20	
pH-Laboratory	7.20	7.60	7.20	
Specific conductance, umhos/cm @ 25c	6100.00	5600.00	5700.00	
Total Dissolved Solids, mg/l	4630.00	4680.00	5000.00	
Total Suspended Solids, mg/l	*	*	*	
Alkalinity Carbonate, mg/l as CaCO3	*	*	*	
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	
Alkalinity Total, mg/l as CaCO3	263.00	274.00	259.00	
Nitrate-N, mg/l	*	0.11	0.10	
Ammonia-N, mg/l	*	*	*	
Calcium, mg/l	500.00	457.00	460.00	
Magnesium, mg/l	390.00	320.00	385.00	
Potassium, mg/l	20.00	15.00	20.00	
Sodium, mg/l	510.00	380.00	485.00	
Sulfate, mg/l	2800.00	2650.00	2870.00	
Methylene Blue Active Substances, mg/l	*	*	*	
Chloride, mg/l	220.00	231.00	236.00	
Iron, mg/l	*	*	0.20	
Zinc, mg/l	*	*	*	
Manganese, mg/l	*	*	<0.10	
Copper, ug/l	*	*	*	
Silver, ug/l	*	*	*	
Strontium, mg/l	*	*	4.10	
Boron, mg/l	0.28	0.32	0.50	
Beryllium, ug/l	*	*	*	
Nickel, ug/l	*	*	*	
Selenium, ug/l	*	*	*	
Mercury, ug/l	*	*	*	
Arsenic, ug/l	*	*	*	
Barium, mg/l	*	*	*	
Cadmium, ug/l	*	*	*	
Chromium-VI, ug/l	*	*	*	
Fluoride, mg/l	0.20	0.20	0.10	
Lead, ug/l	*	*	*	
Molybdenum, mg/l	*	*	*	
Aluminum, mg/l	*	*	*	
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	
Cyanide, mg/l	*	*	*	
Phenol, ug/l	*	*	*	
Biochemical Oxygen Demand, mg/l	*	*	*	
Chemical Oxygen Demand, mg/l	*	*	*	
Total Organic Carbon, mg/l	*	*	*	
Temperature, Degrees C	*	13.40	*	6/4/90
Dissolved Oxygen, mg/l	*	*	*	
Water Level depth below ground surface, ft.	12.10	13.00	* 3m 92 cm	4m 02 cm
Total Sulfur, mg/l	*	*	*	
Total Coliform Bacteria, # Col./100 ml	*	*	*	

SAMPLE LOCATION 63 = Monitoring Well # 63 -CCSPAGE 1

DATE	10/20/1988	06/01/1989	10/10/1989	
pH-Field	6.70	9.50	6.90	
pH-Laboratory	6.70	7.70	6.80	
Specific conductance, umhos/cm @ 25c	1740.00	2200.00	1860.00	
Total Dissolved Solids, mg/l	1030.00	1060.00	1334.00	
Total Suspended Solids, mg/l	*	*	*	
Alkalinity Carbonate, mg/l as CaCO3	*	*	*	
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	
Alkalinity Total, mg/l as CaCO3	573.00	519.00	564.00	
Nitrate-N, mg/l	*	0.42	0.10	
Ammonia-N, mg/l	*	*	*	
Calcium, mg/l	189.00	178.00	211.60	
Magnesium, mg/l	57.00	51.00	87.00	
Potassium, mg/l	13.00	12.00	13.00	
Sodium, mg/l	100.00	75.00	138.00	
Sulfate, mg/l	380.00	344.00	520.00	
Methylene Blue Active Substances, mg/l	*	*	*	
Chloride, mg/l	8.40	8.00	14.00	
Iron, mg/l	*	*	1.14	
Zinc, mg/l	*	*	*	
Manganese, mg/l	*	*	0.72	
Copper, ug/l	*	*	*	
Silver, ug/l	*	*	*	
Strontium, mg/l	*	*	3.64	
Boron, mg/l	0.30	0.22	0.37	
Beryllium, ug/l	*	*	*	
Nickel, ug/l	*	*	*	
Selenium, ug/l	*	*	*	
Mercury, ug/l	*	*	*	
Arsenic, ug/l	*	*	*	
Barium, mg/l	*	*	*	
Cadmium, ug/l	*	*	*	
Chromium-VI, ug/l	*	*	*	
Fluoride, mg/l	<0.10	0.10	*	
Lead, ug/l	*	*	*	
Molybdenum, mg/l	*	*	*	
Aluminum, mg/l	*	*	*	
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	
Cyanide, mg/l	*	*	*	
Phenol, ug/l	*	*	*	
Biochemical Oxygen Demand, mg/l	*	*	*	
Chemical Oxygen Demand, mg/l	*	*	*	
Total Organic Carbon, mg/l	*	*	*	
Temperature, Degrees C	*	16.20	*	
Dissolved Oxygen, mg/l	*	*	*	
Water Level depth below ground surface, ft.	27.01	27.60	* 8m 45cm	8m 81cm
Total Sulfur, mg/l	*	*	*	
Total Coliform Bacteria, # Col./100 ml	*	*	*	

6/4/90

SAMPLE LOCATION 64 = Monitoring Well # 64 -CCSPAGE 1

DATE	10/21/1988	06/01/1989	10/10/1989	
pH-Field	7.20	7.20	7.30	
pH-Laboratory	7.20	7.30	7.30	
Specific conductance, umhos/cm @ 25c	6100.00	6200.00	6400.00	
Total Dissolved Solids, mg/l	4890.00	5610.00	5790.00	
Total Suspended Solids, mg/l	*	*	*	
Alkalinity Carbonate, mg/l as CaCO3	*	*	*	
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	
Alkalinity Total, mg/l as CaCO3	444.00	482.00	473.00	
Nitrate-N, mg/l	*	0.08	<0.01	
Ammonia-N, mg/l	*	*	*	
Calcium, mg/l	400.00	465.00	430.00	
Magnesium, mg/l	450.00	460.00	430.00	
Potassium, mg/l	5.60	7.60	8.20	
Sodium, mg/l	460.00	460.00	630.00	
Sulfate, mg/l	2800.00	3220.00	3240.00	
Methylene Blue Active Substances, mg/l	*	*	*	
Chloride, mg/l	215.00	246.00	215.00	
Iron, mg/l	*	*	<0.10	
Zinc, mg/l	*	*	*	
Manganese, mg/l	*	*	0.42	
Copper, ug/l	*	*	*	
Silver, ug/l	*	*	*	
Strontium, mg/l	*	*	3.00	
Boron, mg/l	0.95	1.10	0.20	
Beryllium, ug/l	*	*	*	
Nickel, ug/l	*	*	*	
Selenium, ug/l	*	*	*	
Mercury, ug/l	*	*	*	
Arsenic, ug/l	*	*	*	
Barium, mg/l	*	*	*	
Cadmium, ug/l	*	*	*	
Chromium-VI, ug/l	*	*	*	
Fluoride, mg/l	0.90	0.90	1.00	
Lead, ug/l	*	*	*	
Molybdenum, mg/l	*	*	*	
Aluminum, mg/l	*	*	*	
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	
Cyanide, mg/l	*	*	*	
Phenol, ug/l	*	*	*	
Biochemical Oxygen Demand, mg/l	*	*	*	
Chemical Oxygen Demand, mg/l	*	*	*	
Total Organic Carbon, mg/l	*	*	*	
Temperature, Degrees C	*	12.90	*	6/14/90
Dissolved Oxygen, mg/l	*	*	*	
Water Level depth below ground surface, ft.	12.04	13.70	* 3m 87cm	3m 9/cm
Total Sulfur, mg/l	*	*	*	
Total Coliform Bacteria, # Col./100 ml	*	*	*	

SAMPLE LOCATION 65 = Monitoring Well # 65 -CCSPAGE 1

DATE	10/20/1988	06/01/1989	10/10/1989	
pH-Field	6.70	7.60	6.90	
pH-Laboratory	6.80	6.90	6.90	
Specific conductance, umhos/cm @ 25c	4000.00	4500.00	4600.00	
Total Dissolved Solids, mg/l	3190.00	4140.00	4240.00	
Total Suspended Solids, mg/l	*	*	*	
Alkalinity Carbonate, mg/l as CaCO3	*	*	*	
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	
Alkalinity Total, mg/l as CaCO3	518.00	455.00	426.00	
Nitrate-N, mg/l	*	0.72	0.41	
Ammonia-N, mg/l	*	*	*	
Calcium, mg/l	560.00	697.00	530.00	
Magnesium, mg/l	215.00	225.00	225.00	
Potassium, mg/l	17.00	15.00	16.00	
Sodium, mg/l	131.00	285.00	275.00	
Sulfate, mg/l	2000.00	2413.00	2340.00	
Methylene Blue Active Substances, mg/l	*	*	*	
Chloride, mg/l	76.00	136.00	133.00	
Iron, mg/l	*	*	<0.10	
Zinc, mg/l	*	*	*	
Manganese, mg/l	*	*	0.95	
Copper, ug/l	*	*	*	
Silver, ug/l	*	*	*	
Strontium, mg/l	*	*	4.50	
Boron, mg/l	0.27	0.13	1.20	
Beryllium, ug/l	*	*	*	
Nickel, ug/l	*	*	*	
Selenium, ug/l	*	*	*	
Mercury, ug/l	*	*	*	
Arsenic, ug/l	*	*	*	
Barium, mg/l	*	*	*	
Cadmium, ug/l	*	*	*	
Chromium-VI, ug/l	*	*	*	
Fluoride, mg/l	0.20	0.20	0.30	
Lead, ug/l	*	*	*	
Molybdenum, mg/l	*	*	*	
Aluminum, mg/l	*	*	*	
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	
Cyanide, mg/l	*	*	*	
Phenol, ug/l	*	*	*	
Biochemical Oxygen Demand, mg/l	*	*	*	
Chemical Oxygen Demand, mg/l	*	*	*	
Total Organic Carbon, mg/l	*	*	*	
Temperature, Degrees C	*	9.80	*	6/14/90
Dissolved Oxygen, mg/l	*	*	*	
Water Level depth below ground surface, ft.	18.08	18.70	* 5m 79cm	5m 90cm
Total Sulfur, mg/l	*	*	*	
Total Coliform Bacteria, # Col./100 ml	*	*	*	

SAMPLE LOCATION 66 = Monitoring Well # 66 -CCSPAGE 1

	10/27/1988	06/01/1989	10/12/1989	
	7.60	12.20	6.50	
	7.60	6.90	7.50	
atory				
conductance, umhos/cm @ 25c	3500.00	3600.00	3100.00	
ssolved Solids, mg/l	2480.00	2560.00	2158.00	
spended Solids, mg/l	*	*	*	
ty Carbonate, mg/l as CaCO3	*	*	*	
ty Bicarbonate, mg/l as CaCO3	*	*	*	
ty Total, mg/l as CaCO3	497.00	554.00	503.00	
N, mg/l	*	1.40	0.20	
N, mg/l	*	*	*	
mg/l	134.00	104.00	87.00	
m, mg/l	200.00	160.00	145.00	
m, mg/l	6.00	3.50	3.40	
mg/l	460.00	470.00	428.00	
mg/l	1300.00	1345.00	1140.00	
ne Blue Active Substances, mg/l	*	*	*	
, mg/l	29.81	29.00	28.00	
g/l	*	*	0.50	
g/l	*	*	*	
se, mg/l	*	*	<0.10	
ug/l	*	*	*	
ug/l	*	*	*	
um, mg/l	*	*	1.40	
mg/l	1.20	1.70	1.60	
um, ug/l	*	*	*	
ug/l	*	*	*	
m, ug/l	*	*	*	
, ug/l	*	*	*	
, ug/l	*	*	*	
mg/l	*	*	*	
, ug/l	*	*	*	
um-VI, ug/l	*	*	*	
ie, mg/l	0.40	0.20	0.30	
ug/l	*	*	*	
enum, mg/l	*	*	*	
um, mg/l	*	*	*	
Coliform Bacteria, # Col./100 ml	*	*	*	
e, mg/l	*	*	*	
, ug/l	*	*	*	
mical Oxygen Demand, mg/l	*	*	*	
al Oxygen Demand, mg/l	*	*	*	
Organic Carbon, mg/l	*	*	*	
ature, Degrees C	*	10.50	*	6/5/90
ved Oxygen, mg/l	*	*	*	
Level depth below ground surface, ft.	35.11	33.90	*	11m 13cm 10m 52cm
Sulfur, mg/l	*	*	*	
Coliform Bacteria, # Col./100 ml	*	*	*	

SAMPLE LOCATION 67 = Monitoring Well # 67 -CCSPAGE 1

DATE	10/27/1988	06/01/1989	10/12/1989
pH-Field	7.10	10.30	6.50
pH-Laboratory	7.00	7.00	7.00
Specific conductance, umhos/cm @ 25c	4600.00	4400.00	4300.00
Total Dissolved Solids, mg/l	3450.00	3270.00	3400.00
Total Suspended Solids, mg/l	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*
Alkalinity Total, mg/l as CaCO3	516.00	572.00	587.00
Nitrate-N, mg/l	*	0.18	0.10
Ammonia-N, mg/l	*	*	*
Calcium, mg/l	270.00	259.00	270.00
Magnesium, mg/l	200.00	165.00	210.00
Potassium, mg/l	10.00	9.70	9.60
Sodium, mg/l	474.00	490.00	515.00
Sulfate, mg/l	2000.00	1765.00	1870.00
Methylene Blue Active Substances, mg/l	*	*	*
Chloride, mg/l	26.00	31.00	32.00
Iron, mg/l	*	*	0.20
Zinc, mg/l	*	*	*
Manganese, mg/l	*	*	1.60
Copper, ug/l	*	*	*
Silver, ug/l	*	*	*
Strontium, mg/l	*	*	3.20
Boron, mg/l	0.39	0.31	0.35
Beryllium, ug/l	*	*	*
Nickel, ug/l	*	*	*
Selenium, ug/l	*	*	*
Mercury, ug/l	*	*	*
Arsenic, ug/l	*	*	*
Barium, mg/l	*	*	*
Cadmium, ug/l	*	*	*
Chromium-VI, ug/l	*	*	*
Fluoride, mg/l	0.20	0.10	0.20
Lead, ug/l	*	*	*
Molybdenum, mg/l	*	*	*
Aluminum, mg/l	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*
Cyanide, mg/l	*	*	*
Phenol, ug/l	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*
Total Organic Carbon, mg/l	*	*	*
Temperature, Degrees C	*	11.10	*
Dissolved Oxygen, mg/l	*	*	*
Water Level depth below ground surface, ft.	40.06	38.50	* 12m 53cm
Total Sulfur, mg/l	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*

6/5/90

11m 84cm

SAMPLE LOCATION 68 = Monitoring Well # 68 -CCSPAGE 1

DATE	10/27/1988	06/01/1989	10/12/1989
pH-Field	7.60	10.60	6.50
pH-Laboratory	7.40	7.40	7.40
Specific conductance, umhos/cm @ 25c	8100.00	7000.00	7800.00
Total Dissolved Solids, mg/l	7100.00	6110.00	7100.00
Total Suspended Solids, mg/l	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*
Alkalinity Total, mg/l as CaCO3	308.00	353.00	328.00
Nitrate-N, mg/l	*	0.08	<0.01
Ammonia-N, mg/l	*	*	*
Calcium, mg/l	560.00	478.00	550.00
Magnesium, mg/l	590.00	465.00	590.00
Potassium, mg/l	5.80	4.70	5.50
Sodium, mg/l	730.00	670.00	810.00
Sulfate, mg/l	4100.00	3730.00	4130.00
Methylene Blue Active Substances, mg/l	*	*	*
Chloride, mg/l	300.00	191.00	307.00
Iron, mg/l	*	*	<0.10
Zinc, mg/l	*	*	*
Manganese, mg/l	*	*	0.27
Copper, ug/l	*	*	*
Silver, ug/l	*	*	*
Strontium, mg/l	*	*	6.00
Boron, mg/l	26.40	1.90	28.00
Beryllium, ug/l	*	*	*
Nickel, ug/l	*	*	*
Selenium, ug/l	*	*	*
Mercury, ug/l	*	*	*
Arsenic, ug/l	*	*	*
Barium, mg/l	*	*	*
Cadmium, ug/l	*	*	*
Chromium-VI, ug/l	*	*	*
Fluoride, mg/l	0.20	0.20	*
Lead, ug/l	*	*	*
Molybdenum, mg/l	*	*	*
Aluminum, mg/l	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*
Cyanide, mg/l	*	*	*
Phenol, ug/l	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*
Total Organic Carbon, mg/l	*	*	*
Temperature, Degrees C	*	10.60	*
Dissolved Oxygen, mg/l	*	*	*
Water Level depth below ground surface, ft.	43.30	42.00	* 13m 34cm
Total Sulfur, mg/l	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*

6/5/90

13m 15cm

SAMPLE LOCATION 69 = Monitoring Well # 69 -CCSPAGE 1

DATE	10/23/1989
pH-Field	*
pH-Laboratory	7.60
Specific conductance, umhos/cm @ 25c	6300.00
Total Dissolved Solids, mg/l	503.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	*
Alkalinity Bicarbonate, mg/l as CaCO3	*
Alkalinity Total, mg/l as CaCO3	439.00
Nitrate-N, mg/l	1.00
Ammonia-N, mg/l	*
Calcium, mg/l	255.00
Magnesium, mg/l	380.00
Potassium, mg/l	14.00
Sodium, mg/l	895.00
Sulfate, mg/l	3255.00
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	8.60
Iron, mg/l	0.70
Zinc, mg/l	<0.10
Manganese, mg/l	<0.10
Copper, ug/l	<10.00
Silver, ug/l	<10.00
Strontium, mg/l	3.50
Boron, mg/l	0.54
Beryllium, ug/l	<10.00
Nickel, ug/l	<10.00
Selenium, ug/l	<1.00
Mercury, ug/l	<1.00
Arsenic, ug/l	<1.00
Barium, mg/l	0.04
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	<10.00
Fluoride, mg/l	0.40
Lead, ug/l	9.00
Molybdenum, mg/l	*
Aluminum, mg/l	*
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	*
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	* 4m 28cm
Total Sulfur, mg/l	1190.00
Total Coliform Bacteria, # Col./100 ml	*

6/8/90
4m 0cm

DATE	10/23/1989	
pH-Field	*	
pH-Laboratory	7.10	
Specific conductance, umhos/cm @ 25c	6400.00	
Total Dissolved Solids, mg/l	5600.00	
Total Suspended Solids, mg/l	*	
Alkalinity Carbonate, mg/l as CaCO3	*	
Alkalinity Bicarbonate, mg/l as CaCO3	*	
Alkalinity Total, mg/l as CaCO3	300.00	
Nitrate-N, mg/l	0.20	
Ammonia-N, mg/l	*	
Calcium, mg/l	575.00	
Magnesium, mg/l	400.00	
Potassium, mg/l	35.00	
Sodium, mg/l	625.00	
Sulfate, mg/l	3500.00	
Methylene Blue Active Substances, mg/l	*	
Chloride, mg/l	215.26	
Iron, mg/l	0.10	
Zinc, mg/l	<0.10	
Manganese, mg/l	0.10	
Copper, ug/l	<10.00	
Silver, ug/l	<10.00	
Strontium, mg/l	2.20	
Boron, mg/l	23.00	
Beryllium, ug/l	<10.00	
Nickel, ug/l	<10.00	
Selenium, ug/l	<1.00	
Mercury, ug/l	<1.00	
Arsenic, ug/l	1.00	
Barium, mg/l	0.05	
Cadmium, ug/l	<10.00	
Chromium-VI, ug/l	25.00	
Fluoride, mg/l	0.20	
Lead, ug/l	6.00	
Molybdenum, mg/l	*	
Aluminum, mg/l	*	
Fecal Coliform Bacteria, # Col./100 ml	*	
Cyanide, mg/l	*	
Phenol, ug/l	*	
Biochemical Oxygen Demand, mg/l	*	
Chemical Oxygen Demand, mg/l	*	
Total Organic Carbon, mg/l	*	
Temperature, Degrees C	*	6/8/90
Dissolved Oxygen, mg/l	*	
Water Level depth below ground surface, ft.	* 3m 63cm	3m 10cm
Total Sulfur, mg/l	72.00	
Total Coliform Bacteria, # Col./100 ml	*	

SAMPLE LOCATION 71 = Monitoring Well # 71 -CCSPAGE 1

DATE	10/19/1989
pH-Field	7.80
pH-Laboratory	7.20
Specific conductance, umhos/cm @ 25c	1340.00
Total Dissolved Solids, mg/l	818.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	*
Alkalinity Bicarbonate, mg/l as CaCO3	*
Alkalinity Total, mg/l as CaCO3	516.00
Nitrate-N, mg/l	<0.01
Ammonia-N, mg/l	*
Calcium, mg/l	91.20
Magnesium, mg/l	34.20
Potassium, mg/l	7.40
Sodium, mg/l	172.00
Sulfate, mg/l	215.00
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	1.00
Iron, mg/l	0.09
Zinc, mg/l	<0.10
Manganese, mg/l	0.62
Copper, ug/l	<10.00
Silver, ug/l	<10.00
Strontium, mg/l	1.69
Boron, mg/l	0.50
Beryllium, ug/l	<10.00
Nickel, ug/l	10.00
Selenium, ug/l	<1.00
Mercury, ug/l	<1.00
Arsenic, ug/l	1.00
Barium, mg/l	0.07
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	<10.00
Fluoride, mg/l	0.20
Lead, ug/l	<1.00
Molybdenum, mg/l	*
Aluminum, mg/l	*
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	* 6/6/90
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	* 9m 15cm 9m 07cm
Total Sulfur, mg/l	64.00
Total Coliform Bacteria, # Col./100 ml	*

SAMPLE LOCATION 72 = Monitoring Well # 72 -CCSPAGE 1

DATE	10/20/1989
pH-Field	7.50
pH-Laboratory	7.30
Specific conductance, umhos/cm @ 25c	1170.00
Total Dissolved Solids, mg/l	773.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	*
Alkalinity Bicarbonate, mg/l as CaCO3	*
Alkalinity Total, mg/l as CaCO3	394.00
Nitrate-N, mg/l	5.10
Ammonia-N, mg/l	*
Calcium, mg/l	135.00
Magnesium, mg/l	72.00
Potassium, mg/l	4.00
Sodium, mg/l	15.00
Sulfate, mg/l	233.00
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	5.00
Iron, mg/l	<0.10
Zinc, mg/l	<0.10
Manganese, mg/l	<0.10
Copper, ug/l	17.00
Silver, ug/l	<10.00
Strontium, mg/l	0.80
Boron, mg/l	0.18
Beryllium, ug/l	<10.00
Nickel, ug/l	<10.00
Selenium, ug/l	<1.00
Mercury, ug/l	<1.00
Arsenic, ug/l	<1.00
Barium, mg/l	0.11
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	<10.00
Fluoride, mg/l	0.30
Lead, ug/l	<1.00
Molybdenum, mg/l	*
Aluminum, mg/l	*
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	* 6/6/90
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	* 3m 40cm 3m 70cm
Total Sulfur, mg/l	83.00
Total Coliform Bacteria, # Col./100 ml	*

SAMPLE LOCATION 73 = Monitoring Well # 73 -CCSPAGE 1

DATE	10/23/1989
pH-Field	*
pH-Laboratory	7.60
Specific conductance, umhos/cm @ 25c	5400.00
Total Dissolved Solids, mg/l	4520.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	*
Alkalinity Bicarbonate, mg/l as CaCO3	*
Alkalinity Total, mg/l as CaCO3	288.00
Nitrate-N, mg/l	0.10
Ammonia-N, mg/l	*
Calcium, mg/l	285.00
Magnesium, mg/l	270.00
Potassium, mg/l	20.00
Sodium, mg/l	615.00
Sulfate, mg/l	2562.69
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	338.00
Iron, mg/l	<0.10
Zinc, mg/l	<0.10
Manganese, mg/l	0.38
Copper, ug/l	<10.00
Silver, ug/l	<10.00
Strontium, mg/l	3.00
Boron, mg/l	3.20
Beryllium, ug/l	<10.00
Nickel, ug/l	<10.00
Selenium, ug/l	<1.00
Mercury, ug/l	<1.00
Arsenic, ug/l	<1.00
Barium, mg/l	0.06
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	<10.00
Fluoride, mg/l	1.10
Lead, ug/l	7.00
Molybdenum, mg/l	*
Aluminum, mg/l	*
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	*
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	* 7m 82cm 7m 99cm
Total Sulfur, mg/l	866.00
Total Coliform Bacteria, # Col./100 ml	*

6/6/90

SAMPLE LOCATION 74 = Monitoring Well # 74 -CCSPAGE 1

DATE	10/19/1989
pH-Field	7.10
pH-Laboratory	7.00
Specific conductance, umhos/cm @ 25c	4500.00
Total Dissolved Solids, mg/l	3080.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	*
Alkalinity Bicarbonate, mg/l as CaCO3	*
Alkalinity Total, mg/l as CaCO3	734.00
Nitrate-N, mg/l	<0.01
Ammonia-N, mg/l	*
Calcium, mg/l	73.00
Magnesium, mg/l	42.00
Potassium, mg/l	10.00
Sodium, mg/l	980.00
Sulfate, mg/l	1550.00
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	23.00
Iron, mg/l	0.70
Zinc, mg/l	<0.10
Manganese, mg/l	0.30
Copper, ug/l	<10.00
Silver, ug/l	<10.00
Strontium, mg/l	2.50
Boron, mg/l	0.95
Beryllium, ug/l	<10.00
Nickel, ug/l	<10.00
Selenium, ug/l	<1.00
Mercury, ug/l	<1.00
Arsenic, ug/l	<1.00
Barium, mg/l	0.03
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	<10.00
Fluoride, mg/l	0.20
Lead, ug/l	11.00
Molybdenum, mg/l	*
Aluminum, mg/l	*
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	*
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	* 7m 9/cm 8m 06 cm
Total Sulfur, mg/l	529.00
Total Coliform Bacteria, # Col./100 ml	*

6/5/90

SAMPLE LOCATION 75 = Monitoring Well # 75 --CCSPAGE 1

DATE	10/19/1989
pH-Field	8.40
pH-Laboratory	8.10
Specific conductance, umhos/cm @ 25c	1550.00
Total Dissolved Solids, mg/l	1240.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	*
Alkalinity Bicarbonate, mg/l as CaCO3	*
Alkalinity Total, mg/l as CaCO3	737.00
Nitrate-N, mg/l	0.30
Ammonia-N, mg/l	*
Calcium, mg/l	13.00
Magnesium, mg/l	6.20
Potassium, mg/l	4.90
Sodium, mg/l	390.00
Sulfate, mg/l	264.00
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	11.00
Iron, mg/l	4.00
Zinc, mg/l	<0.10
Manganese, mg/l	<0.10
Copper, ug/l	40.00
Silver, ug/l	<10.00
Strontium, mg/l	0.30
Boron, mg/l	0.31
Beryllium, ug/l	<10.00
Nickel, ug/l	<10.00
Selenium, ug/l	<1.00
Mercury, ug/l	<1.00
Arsenic, ug/l	1.00
Barium, mg/l	0.15
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	<10.00
Fluoride, mg/l	0.30
Lead, ug/l	10.20
Molybdenum, mg/l	*
Aluminum, mg/l	*
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	*
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	* 7m 87cm
Total Sulfur, mg/l	32.00
Total Coliform Bacteria, # Col./100 ml	*

6/15/90

7m 99cm

SAMPLE LOCATION 76 = Monitoring Well # 76 -CCSPAGE 1

DATE	10/12/1989		
pH-Field	6.50		
pH-Laboratory	6.20		
Specific conductance, umhos/cm @ 25c	1360.00		
Total Dissolved Solids, mg/l	990.00		
Total Suspended Solids, mg/l	*		
Alkalinity Carbonate, mg/l as CaCO3	*		
Alkalinity Bicarbonate, mg/l as CaCO3	*		
Alkalinity Total, mg/l as CaCO3	195.00		
Nitrate-N, mg/l	0.10		
Ammonia-N, mg/l	*		
Calcium, mg/l	127.00		
Magnesium, mg/l	84.00		
Potassium, mg/l	4.90		
Sodium, mg/l	61.00		
Sulfate, mg/l	510.00		
Methylene Blue Active Substances, mg/l	*		
Chloride, mg/l	14.00		
Iron, mg/l	0.80		
Zinc, mg/l	<0.10		
Manganese, mg/l	0.50		
Copper, ug/l	14.00		
Silver, ug/l	<10.00		
Strontium, mg/l	2.80		
Boron, mg/l	0.44		
Beryllium, ug/l	<10.00		
Nickel, ug/l	<10.00		
Selenium, ug/l	<1.00		
Mercury, ug/l	<1.00		
Arsenic, ug/l	3.00		
Barium, mg/l	0.11		
Cadmium, ug/l	<10.00		
Chromium-VI, ug/l	<10.00		
Fluoride, mg/l	0.20		
Lead, ug/l	<1.00		
Molybdenum, mg/l	*		
Aluminum, mg/l	*		
Fecal Coliform Bacteria, # Col./100 ml	*		
Cyanide, mg/l	*		
Phenol, ug/l	*		
Biochemical Oxygen Demand, mg/l	*		
Chemical Oxygen Demand, mg/l	*		
Total Organic Carbon, mg/l	*		
Temperature, Degrees C	*		6/15/90
Dissolved Oxygen, mg/l	*		
Water Level depth below ground surface, ft.	*	4m 55cm	4m 46cm
Total Sulfur, mg/l	195.00		
Total Coliform Bacteria, # Col./100 ml	*		

SAMPLE LOCATION 77 = Monitoring Well # 77 -CCSPAGE 1

	10/30/1989
	7.30
ratory	7.40
conductance, umhos/cm @ 25c	4100.00
issolved Solids, mg/l	2900.00
spended Solids, mg/l	*
ity Carbonate, mg/l as CaCO3	*
ity Bicarbonate, mg/l as CaCO3	*
ity Total, mg/l as CaCO3	446.00
-N, mg/l	7.60
-N, mg/l	*
, mg/l	265.00
um, mg/l	140.00
um, mg/l	14.00
, mg/l	480.00
, mg/l	1630.00
ene Blue Active Substances, mg/l	*
de, mg/l	76.00
mg/l	<0.10
mg/l	<0.10
ese, mg/l	<0.10
, ug/l	21.00
, ug/l	<10.00
ium, mg/l	2.40
mg/l	0.34
ium, ug/l	<10.00
., ug/l	21.00
um, ug/l	114.00
y, ug/l	<1.00
c, ug/l	<1.00
, mg/l	0.04
m, ug/l	<10.00
ium-VI, ug/l	<10.00
ide, mg/l	0.20
ug/l	5.00
denum, mg/l	*
num, mg/l	*
Coliform Bacteria, # Col./100 ml	*
de, mg/l	*
l, ug/l	*
emical Oxygen Demand, mg/l	*
cal Oxygen Demand, mg/l	*
Organic Carbon, mg/l	*
erature, Degrees C	*
olved Oxygen, mg/l	*
Level depth below ground surface, ft.	* 6m 10cm
l Sulfur, mg/l	546.00
l Coliform Bacteria, # Col./100 ml	*

6/12/90

5m 86cm

SAMPLE LOCATION 78 = Monitoring Well # 78 -CCSPAGE 1

DATE	10/30/1989
pH-Field	7.00
pH-Laboratory	7.40
Specific conductance, umhos/cm @ 25c	3000.00
Total Dissolved Solids, mg/l	2150.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	*
Alkalinity Bicarbonate, mg/l as CaCO3	*
Alkalinity Total, mg/l as CaCO3	427.00
Nitrate-N, mg/l	0.55
Ammonia-N, mg/l	*
Calcium, mg/l	240.00
Magnesium, mg/l	175.00
Potassium, mg/l	8.70
Sodium, mg/l	220.00
Sulfate, mg/l	1230.00
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	21.00
Iron, mg/l	0.20
Zinc, mg/l	<0.10
Manganese, mg/l	0.44
Copper, ug/l	144.00
Silver, ug/l	<10.00
Strontium, mg/l	2.40
Boron, mg/l	0.31
Beryllium, ug/l	<10.00
Nickel, ug/l	<10.00
Selenium, ug/l	8.00
Mercury, ug/l	<1.00
Arsenic, ug/l	<1.00
Barium, mg/l	0.04
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	<10.00
Fluoride, mg/l	0.30
Lead, ug/l	4.00
Molybdenum, mg/l	*
Aluminum, mg/l	*
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	* 6/11/90
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	* 4m 11cm 4m 08cm
Total Sulfur, mg/l	420.00
Total Coliform Bacteria, # Col./100 ml	*

SAMPLE LOCATION 79 = Monitoring Well # 79 -CCSPAGE 1

DATE	10/30/1989
pH-Field	7.00
pH-Laboratory	7.30
Specific conductance, umhos/cm @ 25c	5500.00
Total Dissolved Solids, mg/l	4790.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	*
Alkalinity Bicarbonate, mg/l as CaCO3	*
Alkalinity Total, mg/l as CaCO3	432.00
Nitrate-N, mg/l	4.30
Ammonia-N, mg/l	*
Calcium, mg/l	585.00
Magnesium, mg/l	395.00
Potassium, mg/l	14.00
Sodium, mg/l	310.00
Sulfate, mg/l	2915.00
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	152.00
Iron, mg/l	<0.10
Zinc, mg/l	<0.10
Manganese, mg/l	<0.10
Copper, ug/l	<10.00
Silver, ug/l	<10.00
Strontium, mg/l	4.20
Boron, mg/l	0.36
Beryllium, ug/l	23.00
Nickel, ug/l	18.00
Selenium, ug/l	525.00
Mercury, ug/l	<1.00
Arsenic, ug/l	1.00
Barium, mg/l	0.06
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	<10.00
Fluoride, mg/l	0.30
Lead, ug/l	3.00
Molybdenum, mg/l	*
Aluminum, mg/l	*
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	* 6/11/90
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	* 4m 82 cm 4m 76 cm
Total Sulfur, mg/l	991.00
Total Coliform Bacteria, # Col./100 ml	*

DATE	10/30/1989
pH-Field	7.40
pH-Laboratory	7.20
Specific conductance, umhos/cm @ 25c	2700.00
Total Dissolved Solids, mg/l	1918.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	*
Alkalinity Bicarbonate, mg/l as CaCO3	*
Alkalinity Total, mg/l as CaCO3	396.00
Nitrate-N, mg/l	<0.01
Ammonia-N, mg/l	*
Calcium, mg/l	166.70
Magnesium, mg/l	174.70
Potassium, mg/l	6.50
Sodium, mg/l	169.00
Sulfate, mg/l	1100.00
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	*
Iron, mg/l	0.22
Zinc, mg/l	<0.10
Manganese, mg/l	0.06
Copper, ug/l	<10.00
Silver, ug/l	<10.00
Strontium, mg/l	1.41
Boron, mg/l	1.30
Beryllium, ug/l	<10.00
Nickel, ug/l	<10.00
Selenium, ug/l	<1.00
Mercury, ug/l	<1.00
Arsenic, ug/l	<1.00
Barium, mg/l	0.03
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	<10.00
Fluoride, mg/l	0.50
Lead, ug/l	3.50
Molybdenum, mg/l	*
Aluminum, mg/l	*
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	* 6/12/90
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	* 2m 34cm 2m 59cm
Total Sulfur, mg/l	359.00
Total Coliform Bacteria, # Col./100 ml	*

SAMPLE LOCATION 81 = Monitoring Well # 81 -CCSPAGE 1

DATE	10/30/1989
pH-Field	7.30
pH-Laboratory	7.40
Specific conductance, umhos/cm @ 25c	6900.00
Total Dissolved Solids, mg/l	6540.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	*
Alkalinity Bicarbonate, mg/l as CaCO3	*
Alkalinity Total, mg/l as CaCO3	494.00
Nitrate-N, mg/l	0.09
Ammonia-N, mg/l	*
Calcium, mg/l	300.00
Magnesium, mg/l	960.00
Potassium, mg/l	14.00
Sodium, mg/l	230.00
Sulfate, mg/l	4098.50
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	283.30
Iron, mg/l	<0.10
Zinc, mg/l	<0.10
Manganese, mg/l	1.20
Copper, ug/l	<10.00
Silver, ug/l	<10.00
Strontium, mg/l	4.20
Boron, mg/l	19.00
Beryllium, ug/l	<10.00
Nickel, ug/l	17.00
Selenium, ug/l	<1.00
Mercury, ug/l	<1.00
Arsenic, ug/l	<1.00
Barium, mg/l	0.05
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	<10.00
Fluoride, mg/l	0.20
Lead, ug/l	1.00
Molybdenum, mg/l	*
Aluminum, mg/l	*
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	* 6/12/90
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	* 5m 65cm 6m 65cm
Total Sulfur, mg/l	1600.00
Total Coliform Bacteria, # Col./100 ml	*

SAMPLE LOCATION 82 = Monitoring Well # 82 -CCSPAGE 1

DATE	10/30/1989
pH-Field	7.10
pH-Laboratory	7.20
Specific conductance, umhos/cm @ 25c	6100.00
Total Dissolved Solids, mg/l	5520.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	*
Alkalinity Bicarbonate, mg/l as CaCO3	*
Alkalinity Total, mg/l as CaCO3	451.00
Nitrate-N, mg/l	0.03
Ammonia-N, mg/l	*
Calcium, mg/l	565.00
Magnesium, mg/l	630.00
Potassium, mg/l	12.00
Sodium, mg/l	150.00
Sulfate, mg/l	3340.00
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	340.00
Iron, mg/l	0.10
Zinc, mg/l	<0.10
Manganese, mg/l	<0.10
Copper, ug/l	<10.00
Silver, ug/l	<10.00
Strontium, mg/l	4.10
Boron, mg/l	20.00
Beryllium, ug/l	<10.00
Nickel, ug/l	<10.00
Selenium, ug/l	<1.00
Mercury, ug/l	<1.00
Arsenic, ug/l	<1.00
Barium, mg/l	0.02
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	<10.00
Fluoride, mg/l	1.00
Lead, ug/l	1.00
Molybdenum, mg/l	*
Aluminum, mg/l	*
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	* C/12/90
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	* 4m 29cm 5m 77cm
Total Sulfur, mg/l	1230.00
Total Coliform Bacteria, # Col./100 ml	*

SAMPLE LOCATION 83 = Monitoring Well # 83 -CCSPAGE 1

DATE	10/25/1989
pH-Field	7.30
pH-Laboratory	6.60
Specific conductance, umhos/cm @ 25c	1130.00
Total Dissolved Solids, mg/l	631.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	*
Alkalinity Bicarbonate, mg/l as CaCO3	*
Alkalinity Total, mg/l as CaCO3	216.00
Nitrate-N, mg/l	0.91
Ammonia-N, mg/l	*
Calcium, mg/l	133.00
Magnesium, mg/l	67.00
Potassium, mg/l	4.30
Sodium, mg/l	41.00
Sulfate, mg/l	210.00
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	3.70
Iron, mg/l	0.10
Zinc, mg/l	<0.10
Manganese, mg/l	<0.10
Copper, ug/l	<10.00
Silver, ug/l	<10.00
Strontium, mg/l	1.50
Boron, mg/l	0.24
Beryllium, ug/l	<10.00
Nickel, ug/l	81.00
Selenium, ug/l	<1.00
Mercury, ug/l	<1.00
Arsenic, ug/l	<1.00
Barium, mg/l	0.09
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	<10.00
Fluoride, mg/l	0.20
Lead, ug/l	3.00
Molybdenum, mg/l	*
Aluminum, mg/l	*
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	*
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	* 3m 11cm 2m 40cm
Total Sulfur, mg/l	79.00
Total Coliform Bacteria, # Col./100 ml	*

6/11/90

SAMPLE LOCATION 84 = Monitoring Well # 84 -CCSPAGE 1

ATE	10/25/1989
H-Field	7.20
H-Laboratory	7.70
pecific conductance, umhos/cm @ 25c	1010.00
otal Dissolved Solids, mg/l	605.00
otal Suspended Solids, mg/l	*
lkalinity Carbonate, mg/l as CaCO3	*
lkalinity Bicarbonate, mg/l as CaCO3	*
lkalinity Total, mg/l as CaCO3	361.00
itrate-N, mg/l	0.33
mmonia-N, mg/l	*
alcium, mg/l	81.00
agnesium, mg/l	56.00
otassium, mg/l	4.90
odium, mg/l	74.00
ulfate, mg/l	230.00
ethylene Blue Active Substances, mg/l	*
hloride, mg/l	5.20
ron, mg/l	0.60
inc, mg/l	<0.10
anganese, mg/l	0.14
opper, ug/l	<10.00
ilver, ug/l	<10.00
trontium, mg/l	0.70
oron, mg/l	0.18
eryllium, ug/l	<10.00
ickel, ug/l	20.00
elenium, ug/l	<1.00
ercury, ug/l	<1.00
rsenic, ug/l	<1.00
arium, mg/l	0.10
admium, ug/l	<10.00
hromium-VI, ug/l	<10.00
luoride, mg/l	0.20
ead, ug/l	7.00
olybdenum, mg/l	*
luminum, mg/l	*
ecal Coliform Bacteria, # Col./100 ml	*
yanide, mg/l	*
henol, ug/l	*
iochemical Oxygen Demand, mg/l	*
hemical Oxygen Demand, mg/l	*
otal Organic Carbon, mg/l	*
emperature, Degrees C	*
issolved Oxygen, mg/l	*
ater Level depth below ground surface, ft.	* 3m 90cm 2m 53cm
otal Sulfur, mg/l	59.00
otal Coliform Bacteria, # Col./100 ml	*

6/11/90

SAMPLE LOCATION 85 = Monitoring Well # 85 -CCSPAGE 1

DATE	10/25/1989
pH-Field	7.30
pH-Laboratory	7.60
Specific conductance, umhos/cm @ 25c	6600.00
Total Dissolved Solids, mg/l	5238.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	*
Alkalinity Bicarbonate, mg/l as CaCO3	*
Alkalinity Total, mg/l as CaCO3	791.00
Nitrate-N, mg/l	0.37
Ammonia-N, mg/l	*
Calcium, mg/l	235.00
Magnesium, mg/l	160.00
Potassium, mg/l	17.00
Sodium, mg/l	1200.00
Sulfate, mg/l	2995.00
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	53.00
Iron, mg/l	0.30
Zinc, mg/l	<0.10
Manganese, mg/l	0.66
Copper, ug/l	<10.00
Silver, ug/l	<10.00
Strontium, mg/l	4.00
Boron, mg/l	0.31
Beryllium, ug/l	<10.00
Nickel, ug/l	10.00
Selenium, ug/l	12.00
Mercury, ug/l	<1.00
Arsenic, ug/l	<1.00
Barium, mg/l	0.03
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	<10.00
Fluoride, mg/l	0.20
Lead, ug/l	11.00
Molybdenum, mg/l	*
Aluminum, mg/l	*
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	*
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	* 5m 10cm 6/11/90 5m 5 1cm
Total Sulfur, mg/l	1000.00
Total Coliform Bacteria, # Col./100 ml	*

SAMPLE LOCATION 86 = Monitoring Well # 86 -CCSPAGE 1

DATE	10/25/1989
pH-Field	7.10
pH-Laboratory	7.50
Specific conductance, umhos/cm @ 25c	4000.00
Total Dissolved Solids, mg/l	*
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	*
Alkalinity Bicarbonate, mg/l as CaCO3	*
Alkalinity Total, mg/l as CaCO3	517.00
Nitrate-N, mg/l	5.60
Ammonia-N, mg/l	*
Calcium, mg/l	385.00
Magnesium, mg/l	240.00
Potassium, mg/l	14.00
Sodium, mg/l	279.00
Sulfate, mg/l	2070.00
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	8.98
Iron, mg/l	<0.10
Zinc, mg/l	<0.10
Manganese, mg/l	0.44
Copper, ug/l	<10.00
Silver, ug/l	<10.00
Strontium, mg/l	4.70
Boron, mg/l	0.29
Beryllium, ug/l	<10.00
Nickel, ug/l	<10.00
Selenium, ug/l	<1.00
Mercury, ug/l	<1.00
Arsenic, ug/l	<1.00
Barium, mg/l	0.04
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	<10.00
Fluoride, mg/l	0.30
Lead, ug/l	3.60
Molybdenum, mg/l	*
Aluminum, mg/l	*
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	*
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	* 4m 26cm
Total Sulfur, mg/l	708.00
Total Coliform Bacteria, # Col./100 ml	*

6/7/90
4m 50 cm

SAMPLE LOCATION 87 = Monitoring Well # 87 -CCSPAGE 1

ATE	10/25/1989
H-Field	7.70
H-Laboratory	7.90
pecific conductance, umhos/cm @ 25c	1290.00
otal Dissolved Solids, mg/l	832.00
otal Suspended Solids, mg/l	*
lkalinity Carbonate, mg/l as CaCO3	*
lkalinity Bicarbonate, mg/l as CaCO3	*
lkalinity Total, mg/l as CaCO3	360.00
itrate-N, mg/l	2.10
mmonia-N, mg/l	*
alcium, mg/l	50.50
agnesium, mg/l	66.30
otassium, mg/l	3.00
odium, mg/l	144.00
ulfate, mg/l	389.00
ethylene Blue Active Substances, mg/l	*
hloride, mg/l	7.20
ron, mg/l	0.07
inc, mg/l	<0.10
anganese, mg/l	<0.10
opper, ug/l	<10.00
ilver, ug/l	<10.00
trontium, mg/l	0.44
oron, mg/l	0.18
eryllium, ug/l	<10.00
ickel, ug/l	<10.00
elenium, ug/l	<1.00
ercury, ug/l	<1.00
rsenic, ug/l	<1.00
arium, mg/l	0.09
admium, ug/l	<10.00
hromium-VI, ug/l	<10.00
luoride, mg/l	0.50
ead, ug/l	1.00
olybdenum, mg/l	*
luminum, mg/l	*
ecal Coliform Bacteria, # Col./100 ml	*
yanide, mg/l	*
henol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
emperature, Degrees C	*
Dissolved Oxygen, mg/l	* 6/7/90
ater Level depth below ground surface, ft.	* 2m 92cm 2m 67cm
Total Sulfur, mg/l	117.00
otal Coliform Bacteria, # Col./100 ml	*

SAMPLE LOCATION 88 = Monitoring Well # 88 -CCSPAGE 1

ATE	10/25/1989
pH-Field	7.50
pH-Laboratory	7.60
pecific conductance, umhos/cm @ 25c	20000.00
Total Dissolved Solids, mg/l	20900.00
Total Suspended Solids, mg/l	*
lkalinity Carbonate, mg/l as CaCO3	*
lkalinity Bicarbonate, mg/l as CaCO3	*
Alkalinity Total, mg/l as CaCO3	575.00
Nitrate-N, mg/l	3.60
mmonia-N, mg/l	*
Calcium, mg/l	345.00
Magnesium, mg/l	1300.00
Potassium, mg/l	37.00
Sodium, mg/l	4100.00
Sulfate, mg/l	14250.00
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	8.20
Iron, mg/l	<0.10
Zinc, mg/l	<0.10
Manganese, mg/l	1.20
Copper, ug/l	<10.00
Silver, ug/l	<10.00
Strontium, mg/l	7.00
Boron, mg/l	0.36
Beryllium, ug/l	<10.00
Nickel, ug/l	14.00
Selenium, ug/l	<1.00
Mercury, ug/l	<1.00
Arsenic, ug/l	<1.00
Barium, mg/l	0.04
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	<10.00
Fluoride, mg/l	0.40
Lead, ug/l	13.00
Molybdenum, mg/l	*
Aluminum, mg/l	*
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	* 6/7/90
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	*2m 89cm 2m 40cm
Total Sulfur, mg/l	5300.00
Total Coliform Bacteria, # Col./100 ml	*

SAMPLE LOCATION 89 = Monitoring Well # 89 -CCSPAGE 1

DATE	10/25/1989
pH-Field	8.00
pH-Laboratory	7.80
Specific conductance, umhos/cm @ 25c	2700.00
Total Dissolved Solids, mg/l	1860.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	*
Alkalinity Bicarbonate, mg/l as CaCO3	*
Alkalinity Total, mg/l as CaCO3	521.00
Nitrate-N, mg/l	*
Ammonia-N, mg/l	*
Calcium, mg/l	66.00
Magnesium, mg/l	180.00
Potassium, mg/l	2.10
Sodium, mg/l	295.00
Sulfate, mg/l	1059.20
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	7.90
Iron, mg/l	0.40
Zinc, mg/l	<0.10
Manganese, mg/l	<0.10
Copper, ug/l	10.00
Silver, ug/l	<10.00
Strontium, mg/l	1.40
Boron, mg/l	0.37
Beryllium, ug/l	<10.00
Nickel, ug/l	37.00
Selenium, ug/l	<1.00
Mercury, ug/l	<1.00
Arsenic, ug/l	<1.00
Barium, mg/l	0.04
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	<10.00
Fluoride, mg/l	0.40
Lead, ug/l	4.00
Molybdenum, mg/l	*
Aluminum, mg/l	*
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	*
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	* 2m 60cm 2m 10cm
Total Sulfur, mg/l	334.00
Total Coliform Bacteria, # Col./100 ml	*

6/11/90

SAMPLE LOCATION 90 = Monitoring Well # 90 -CCSPAGE 1

DATE	10/25/1989
pH-Field	7.40
pH-Laboratory	7.60
Specific conductance, umhos/cm @ 25c	9100.00
Total Dissolved Solids, mg/l	9434.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	*
Alkalinity Bicarbonate, mg/l as CaCO3	*
Alkalinity Total, mg/l as CaCO3	391.00
Nitrate-N, mg/l	*
Ammonia-N, mg/l	*
Calcium, mg/l	395.00
Magnesium, mg/l	1200.00
Potassium, mg/l	12.00
Sodium, mg/l	740.00
Sulfate, mg/l	4200.00
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	347.00
Iron, mg/l	<0.10
Zinc, mg/l	<0.10
Manganese, mg/l	<0.10
Copper, ug/l	<10.00
Silver, ug/l	<10.00
Strontium, mg/l	2.30
Boron, mg/l	40.00
Beryllium, ug/l	<10.00
Nickel, ug/l	35.00
Selenium, ug/l	<1.00
Mercury, ug/l	<1.00
Arsenic, ug/l	<1.00
Barium, mg/l	0.02
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	<10.00
Fluoride, mg/l	0.20
Lead, ug/l	2.70
Molybdenum, mg/l	*
Aluminum, mg/l	*
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	*
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	* 2m 70cm 6/11/90 2m 25cm
Total Sulfur, mg/l	2460.00
Total Coliform Bacteria, # Col./100 ml	*

SAMPLE LOCATION 91 = Monitoring Well # 91 -CCSPAGE 1

DATE	10/25/1989
pH-Field	7.40
pH-Laboratory	7.70
Specific conductance, umhos/cm @ 25c	1370.00
Total Dissolved Solids, mg/l	848.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	*
Alkalinity Bicarbonate, mg/l as CaCO3	*
Alkalinity Total, mg/l as CaCO3	543.00
Nitrate-N, mg/l	*
Ammonia-N, mg/l	*
Calcium, mg/l	99.00
Magnesium, mg/l	41.00
Potassium, mg/l	6.90
Sodium, mg/l	159.00
Sulfate, mg/l	275.00
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	6.20
Iron, mg/l	0.20
Zinc, mg/l	<0.10
Manganese, mg/l	1.30
Copper, ug/l	12.00
Silver, ug/l	<10.00
Strontium, mg/l	0.60
Boron, mg/l	0.64
Beryllium, ug/l	<10.00
Nickel, ug/l	31.00
Selenium, ug/l	<1.00
Mercury, ug/l	<1.00
Arsenic, ug/l	1.00
Barium, mg/l	0.11
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	<10.00
Fluoride, mg/l	0.30
Lead, ug/l	<1.00
Molybdenum, mg/l	*
Aluminum, mg/l	*
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	*
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	* 7.05 cm 7.06 cm
Total Sulfur, mg/l	81.00
Total Coliform Bacteria, # Col./100 ml	*

6/11/90

DATE	10/19/1989
pH-Field	7.40
pH-Laboratory	7.60
Specific conductance, umhos/cm @ 25c	11400.00
Total Dissolved Solids, mg/l	10085.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	*
Alkalinity Bicarbonate, mg/l as CaCO3	*
Alkalinity Total, mg/l as CaCO3	542.00
Nitrate-N, mg/l	0.20
Ammonia-N, mg/l	*
Calcium, mg/l	315.00
Magnesium, mg/l	495.00
Potassium, mg/l	16.00
Sodium, mg/l	2100.00
Sulfate, mg/l	6340.00
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	29.00
Iron, mg/l	<0.10
Zinc, mg/l	<0.10
Manganese, mg/l	0.47
Copper, ug/l	<10.00
Silver, ug/l	<10.00
Strontium, mg/l	5.00
Boron, mg/l	0.91
Beryllium, ug/l	<10.00
Nickel, ug/l	32.00
Selenium, ug/l	<1.00
Mercury, ug/l	<1.00
Arsenic, ug/l	<1.00
Barium, mg/l	0.04
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	<10.00
Fluoride, mg/l	0.60
Lead, ug/l	11.00
Molybdenum, mg/l	*
Aluminum, mg/l	*
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	*
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	* 3m 67cm 5/30/90 4m 28cm
Total Sulfur, mg/l	2440.00
Total Coliform Bacteria, # Col./100 ml	*

SAMPLE LOCATION 94 = Monitoring Well # 94 -CCSPAGE 1

DATE	10/19/1989		
pH-Field	7.80		
pH-Laboratory	7.40		
Specific conductance, umhos/cm @ 25c	4000.00		
Total Dissolved Solids, mg/l	*		
Total Suspended Solids, mg/l	*		
Alkalinity Carbonate, mg/l as CaCO3	*		
Alkalinity Bicarbonate, mg/l as CaCO3	*		
Alkalinity Total, mg/l as CaCO3	734.00		
Nitrate-N, mg/l	<0.01		
Ammonia-N, mg/l	*		
Calcium, mg/l	120.00		
Magnesium, mg/l	68.00		
Potassium, mg/l	14.00		
Sodium, mg/l	770.00		
Sulfate, mg/l	1300.00		
Methylene Blue Active Substances, mg/l	*		
Chloride, mg/l	23.00		
Iron, mg/l	0.10		
Zinc, mg/l	<0.10		
Manganese, mg/l	0.76		
Copper, ug/l	<10.00		
Silver, ug/l	<10.00		
Strontium, mg/l	1.60		
Boron, mg/l	0.56		
Beryllium, ug/l	<10.00		
Nickel, ug/l	23.00		
Selenium, ug/l	<1.00		
Mercury, ug/l	<1.00		
Arsenic, ug/l	<1.00		
Barium, mg/l	0.03		
Cadmium, ug/l	<10.00		
Chromium-VI, ug/l	21.00		
Fluoride, mg/l	0.30		
Lead, ug/l	8.00		
Molybdenum, mg/l	*		
Aluminum, mg/l	*		
Fecal Coliform Bacteria, # Col./100 ml	*		
Cyanide, mg/l	*		
Phenol, ug/l	*		
Biochemical Oxygen Demand, mg/l	*		
Chemical Oxygen Demand, mg/l	*		
Total Organic Carbon, mg/l	*		
Temperature, Degrees C	*		6/6/90
Dissolved Oxygen, mg/l	*		
Water Level depth below ground surface, ft.	*5m 19cm		5m 04cm
Total Sulfur, mg/l	478.00		
Total Coliform Bacteria, # Col./100 ml	*		

APPENDIX 3

SAMPLE LOCATION 122 = Pelkie Mine Discharge PAGE 1

DATE	06/20/1986	10/23/1986	10/23/1986	06/02/1987	10/05/1987	10/01/1988
			MWTL			
pH-Field	7.70	8.24	*	8.05	8.00	*
pH-Laboratory	8.00	8.00	*	7.90	7.80	*
Specific conductance, umhos/cm @ 25c	1250.00	970.00	*	1260.00	1330.00	*
Total Dissolved Solids, mg/l	800.00	558.00	*	768.00	775.00	*
Total Suspended Solids, mg/l	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	440.00	365.00	*	*	*	*
Alkalinity Total, mg/l as CaCO3	440.00	365.00	*	478.00	478.00	*
Nitrate-N, mg/l	0.44	<0.01	*	0.05	0.04	*
Ammonia-N, mg/l	*	*	*	*	*	*
Calcium, mg/l	70.00	58.00	*	86.00	107.00	*
Magnesium, mg/l	52.00	48.00	*	57.00	63.00	*
Potassium, mg/l	2.30	7.60	*	3.80	5.20	*
Sodium, mg/l	139.00	92.00	*	110.00	82.00	*
Sulfate, mg/l	270.00	150.00	*	200.00	346.10	*
Methylene Blue Active Substances, mg/l	*	*	<0.50	*	*	*
Chloride, mg/l	2.70	3.90	*	2.80	7.11	*
Iron, mg/l	<0.10	0.10	*	<0.10	<0.02	*
Zinc, mg/l	*	<0.01	*	*	*	*
Manganese, mg/l	0.11	<0.01	*	0.14	0.19	*
Copper, ug/l	*	<10.00	*	*	*	*
Silver, ug/l	*	20.00	*	*	*	*
Strontium, mg/l	1.10	1.00	*	1.20	1.70	*
Boron, mg/l	0.37	0.25	*	0.29	0.35	*
Beryllium, ug/l	*	<10.00	*	*	*	*
Nickel, ug/l	*	<10.00	*	<50.00	<50.00	*
Selenium, ug/l	*	<1.00	*	*	*	*
Mercury, ug/l	*	<1.00	*	*	*	*
Arsenic, ug/l	2.00	2.00	*	5.00	2.00	*
Barium, mg/l	*	0.06	*	*	*	*
Cadmium, ug/l	*	<10.00	*	<10.00	<10.00	*
Chromium-VI, ug/l	*	<10.00	*	*	*	*
Fluoride, mg/l	0.30	0.20	*	0.20	0.13	*
Lead, ug/l	*	<1.00	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*
Aluminum, mg/l	*	0.01	*	<0.01	<0.01	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	<10.00	*	*	*
Cyanide, mg/l	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	7.50	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	
Total Sulfur, mg/l	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	>10.00	*	*	*

SAMPLE LOCATION 124 = Coal Lake Coulee DischargPAGE 1

DATE	06/20/1982	11/23/1983	10/25/1984 MWTL	06/01/1987	10/08/1987	06/13/1988	11/01/1988	06/07/1989
pH-Field	7.40	8.32	*	8.12	8.30	8.80	8.10	7.64
pH-Laboratory	8.40	8.20	*	7.90	8.00	7.90	7.80	7.81
Specific conductance, umhos/cm @ 25c	1185.00	930.00	*	830.00	960.00	760.00	1230.00	940.00
Total Dissolved Solids, mg/l	831.00	603.00	*	491.00	557.00	422.00	701.00	601.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	*	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	564.00	376.00	*	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	564.00	376.00	*	261.00	324.00	314.00	403.00	351.00
Nitrate-N, mg/l	<0.01	<0.01	*	0.02	<0.01	*	*	*
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	106.00	96.00	*	77.00	78.00	67.00	106.00	81.00
Magnesium, mg/l	77.00	60.00	*	57.00	52.00	38.00	*	57.00
Potassium, mg/l	1.90	5.50	*	4.00	5.40	3.50	5.70	5.30
Sodium, mg/l	60.00	46.00	*	28.00	44.00	25.00	56.00	51.30
Sulfate, mg/l	170.00	130.00	*	143.00	156.00	92.00	530.00	151.00
Methylene Blue Active Substances, mg/l	*	*	<0.50	*	*	*	*	*
Chloride, mg/l	2.80	7.50	*	5.80	7.21	4.30	6.50	*
Iron, mg/l	0.20	<0.10	*	<0.10	<0.01	*	*	*
Zinc, mg/l	*	<0.01	*	*	*	*	*	*
Manganese, mg/l	0.94	<0.01	*	0.02	<0.01	*	*	*
Copper, ug/l	*	<10.00	*	*	*	*	*	*
Silver, ug/l	*	<10.00	*	*	*	*	*	*
Strontium, mg/l	2.20	1.70	*	1.50	1.80	*	*	*
Boron, mg/l	*	0.16	*	0.16	0.22	0.13	0.20	0.14
Beryllium, ug/l	*	<10.00	*	*	*	*	*	*
Nickel, ug/l	*	<10.00	*	<50.00	<50.00	*	*	*
Selenium, ug/l	*	<1.00	*	*	*	*	*	*
Mercury, ug/l	*	<1.00	*	*	*	*	*	*
Arsenic, ug/l	4.00	1.00	*	3.00	2.00	*	*	*
Barium, mg/l	*	0.07	*	*	*	*	*	*
Cadmium, ug/l	*	<10.00	*	<10.00	<10.00	*	*	*
Chromium-VI, ug/l	*	<10.00	*	*	*	*	*	*
Fluoride, mg/l	0.20	0.20	*	0.20	0.12	0.10	0.10	0.20
Lead, ug/l	*	<1.00	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	<0.01	*	0.01	<0.01	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	16.00	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	6.80	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	>57.00	*	*	*	*	*

SAMPLE LOCATION 125 = Seepage South of LEEF PAGE 1

DATE	08/01/1987	10/05/1987	10/05/1987	11/01/1988
		PAGE		
pH-Field	7.99	7.40	*	*
pH-Laboratory	7.90	7.80	*	*
Specific conductance, umhos/cm @ 25c	2300.00	4500.00	4600.00	*
Total Dissolved Solids, mg/l	1550.00	3523.00	3600.00	*
Total Suspended Solids, mg/l	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	*
Alkalinity Total, mg/l as CaCO3	325.00	476.00	450.00	*
Nitrate-N, mg/l	0.04	0.02	*	*
Ammonia-N, mg/l	*	*	*	*
Calcium, mg/l	105.00	200.00	180.00	*
Magnesium, mg/l	124.00	355.00	280.00	*
Potassium, mg/l	12.00	20.00	20.00	*
Sodium, mg/l	188.00	369.00	350.00	*
Sulfate, mg/l	845.00	2096.10	2100.00	*
Methylene Blue Active Substances, mg/l	*	*	*	*
Chloride, mg/l	31.00	91.75	99.00	*
Iron, mg/l	<0.10	<0.01	0.05	*
Zinc, mg/l	*	*	*	*
Manganese, mg/l	0.48	0.34	0.21	*
Copper, ug/l	*	*	*	*
Silver, ug/l	*	*	*	*
Strontium, mg/l	1.20	2.20	2.20	*
Boron, mg/l	3.20	8.90	5.00	*
Beryllium, ug/l	*	*	*	*
Nickel, ug/l	<50.00	<50.00	*	*
Selenium, ug/l	*	*	*	*
Mercury, ug/l	*	*	*	*
Arsenic, ug/l	3.00	<1.00	3.20	*
Barium, mg/l	*	*	*	*
Cadmium, ug/l	<10.00	<10.00	*	*
Chromium-VI, ug/l	*	*	*	*
Fluoride, mg/l	0.20	0.96	1.00	*
Lead, ug/l	*	*	*	*
Molybdenum, mg/l	*	*	*	*
Aluminum, mg/l	<0.01	<0.01	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*
Cyanide, mg/l	*	*	*	*
Phenol, ug/l	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*
Temperature, Degrees C	*	8.40	*	*
Dissolved Oxygen, mg/l	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	
Total Sulfur, mg/l	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*

DATE	06/06/1990	10/09/1990
pH-Field	8.20	8.83
pH-Laboratory	8.30	*
Specific conductance, umhos/cm @ 25c	9000.00	*
Total Dissolved Solids, mg/l	8307.00	*
Total Suspended Solids, mg/l	*	*
Alkalinity Carbonate, mg/l as CaCO2	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*
Alkalinity Total, mg/l as CaCO3	152.00	*
Nitrate-N, mg/l	*	*
Ammonia-N, mg/l	*	*
Calcium, mg/l	570.00	*
Magnesium, mg/l	180.00	*
Potassium, mg/l	72.00	*
Sodium, mg/l	1100.00	*
Sulfate, mg/l	4480.00	*
Methylene Blue Active Substances, mg/l	*	*
Chloride, mg/l	390.00	*
Iron, mg/l	*	*
Zinc, mg/l	*	*
Manganese, mg/l	*	*
Copper, ug/l	*	*
Silver, ug/l	*	*
Strontium, mg/l	*	*
Boron, mg/l	11.00	*
Beryllium, ug/l	*	*
Nickel, ug/l	*	*
Selenium, ug/l	*	*
Mercury, ug/l	*	*
Arsenic, ug/l	31.00	*
Barium, mg/l	*	*
Cadmium, ug/l	*	*
Chromium-VI, ug/l	*	*
Fluoride, mg/l	10.00	*
Lead, ug/l	*	*
Molybdenum, mg/l	*	*
Aluminum, mg/l	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*
Cyanide, mg/l	*	*
Phenol, ug/l	*	*
Biochemical Oxygen Demand, mg/l	*	*
Chemical Oxygen Demand, mg/l	*	*
Total Organic Carbon, mg/l	*	*
Temperature, Degrees C	*	*
Dissolved Oxygen, mg/l	*	*
Water Level depth below ground surface, ft.	*	*
Total Sulfur, mg/l	*	*
Total Coliform Bacteria, # Col./100 ml	*	*

DATE	06/06/1990	10/09/1990
pH-Field	3.80	3.54
pH-Laboratory	8.50	*
Specific conductance, umhos/cm @ 25c	7700.00	*
Total Dissolved Solids, mg/l	5891.00	*
Total Suspended Solids, mg/l	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*
Alkalinity Total, mg/l as CaCO3	120.00	*
Nitrate-N, mg/l	*	*
Ammonia-N, mg/l	*	*
Calcium, mg/l	605.00	*
Magnesium, mg/l	230.00	*
Potassium, mg/l	60.00	*
Sodium, mg/l	920.00	*
Sulfate, mg/l	3780.00	*
Methylene Blue Active Substances, mg/l	*	*
Chloride, mg/l	245.00	*
Iron, mg/l	*	*
Zinc, mg/l	*	*
Manganese, mg/l	*	*
Copper, ug/l	*	*
Silver, ug/l	*	*
Strontium, mg/l	*	*
Boron, mg/l	5.90	*
Beryllium, ug/l	*	*
Nickel, ug/l	*	*
Selenium, ug/l	*	*
Mercury, ug/l	*	*
Arsenic, ug/l	9.00	*
Barium, mg/l	*	*
Cadmium, ug/l	*	*
Chromium-VI, ug/l	*	*
Fluoride, mg/l	9.00	*
Lead, ug/l	*	*
Molybdenum, mg/l	*	*
Aluminum, mg/l	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*
Cyanide, mg/l	*	*
Phenol, ug/l	*	*
Biochemical Oxygen Demand, mg/l	*	*
Chemical Oxygen Demand, mg/l	*	*
Total Organic Carbon, mg/l	*	*
Temperature, Degrees C	*	*
Dissolved Oxygen, mg/l	*	*
Water Level depth below ground surface, Ft.	*	*
Total Sulfur, ug/l	*	*
Total Coliform Bacteria, # Col./100 ml	*	*

DATE	08/31/1987
pH-Field	7.60
pH-Laboratory	7.40
Specific conductance, umhos/cm @ 25c	360.00
Total Dissolved Solids, mg/l	258.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	92.00
Alkalinity Total, mg/l as CaCO3	92.00
Nitrate-N, mg/l	0.96
Ammonia-N, mg/l	*
Calcium, mg/l	17.00
Magnesium, mg/l	11.00
Potassium, mg/l	16.30
Sodium, mg/l	36.00
Sulfate, mg/l	*
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	3.20
Iron, mg/l	0.11
Zinc, mg/l	*
Manganese, mg/l	0.08
Copper, ug/l	<10.00
Silver, ug/l	*
Strontium, mg/l	0.18
Boron, mg/l	0.15
Beryllium, ug/l	<10.00
Nickel, ug/l	*
Selenium, ug/l	<1.00
Mercury, ug/l	*
Arsenic, ug/l	<1.00
Barium, mg/l	*
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	*
Fluoride, mg/l	<0.10
Lead, ug/l	*
Molybdenum, mg/l	*
Aluminum, mg/l	0.22
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	*
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	*
Total Sulfur, mg/l	*
Total Coliform Bacteria, # Col./100 ml	*

SAMPLE LOCATION 402 = West Samuelson Inlet PART

DATE	08/31/1987
pH-Field	7.70
pH-Laboratory	7.20
Specific conductance, umhos/cm @ 25c	370.00
Total Dissolved Solids, mg/l	247.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	86.00
Alkalinity Total, mg/l as CaCO3	86.00
Nitrate-N, mg/l	1.01
Ammonia-N, mg/l	*
Calcium, mg/l	16.00
Magnesium, mg/l	11.00
Potassium, mg/l	13.60
Sodium, mg/l	38.00
Sulfate, mg/l	*
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	2.80
Iron, mg/l	0.36
Zinc, mg/l	*
Manganese, mg/l	0.05
Copper, ug/l	<10.00
Silver, ug/l	*
Strontium, mg/l	0.16
Boron, mg/l	0.15
Beryllium, ug/l	<10.00
Nickel, ug/l	*
Selenium, ug/l	<1.00
Mercury, ug/l	*
Arsenic, ug/l	<1.00
Barium, mg/l	*
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	*
Fluoride, mg/l	<0.10
Lead, ug/l	*
Molybdenum, mg/l	*
Aluminum, mg/l	0.52
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	*
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	*
Total Sulfur, mg/l	*
Total Coliform Bacteria, # Col./100 ml	*

DATE	03/31/1987
pH-Field	7.60
pH-Laboratory	7.60
Specific conductance, umhos/cm @ 25c	950.00
Total Dissolved Solids, mg/l	623.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	289.00
Alkalinity Total, mg/l as CaCO3	289.00
Nitrate-N, mg/l	0.32
Ammonia-N, mg/l	*
Calcium, mg/l	45.00
Magnesium, mg/l	31.00
Potassium, mg/l	5.90
Sodium, mg/l	132.00
Sulfate, mg/l	*
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	3.10
Iron, mg/l	0.17
Zinc, mg/l	*
Manganese, mg/l	0.02
Copper, ug/l	<10.00
Silver, ug/l	*
Strontium, mg/l	0.71
Boron, mg/l	0.31
Beryllium, ug/l	<10.00
Nickel, ug/l	*
Selenium, ug/l	<1.00
Mercury, ug/l	*
Arsenic, ug/l	<1.00
Barium, mg/l	*
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	*
Fluoride, mg/l	<0.10
Lead, ug/l	*
Molybdenum, mg/l	*
Aluminum, mg/l	0.27
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	*
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	*
Total Sulfur, mg/l	*
Total Coliform Bacteria, # Col./100 ml	*

SAMPLE LOCATION A07 = Upper Gradin Slough InletPAGE 1

DATE	03/31/1987
pH Field	8.30
pH-Laboratory	8.30
Specific conductance, umhos/cm @ 25c	770.00
Total Dissolved Solids, mg/l	519.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	183.00
Alkalinity Total, mg/l as CaCO3	183.00
Nitrate-N, mg/l	0.62
Ammonia-N, mg/l	*
Calcium, mg/l	41.00
Magnesium, mg/l	34.00
Potassium, mg/l	9.90
Sodium, mg/l	73.00
Sulfate, mg/l	*
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	10.50
Iron, mg/l	0.06
Zinc, mg/l	*
Manganese, mg/l	0.04
Copper, ug/l	<10.00
Silver, ug/l	*
Strontium, mg/l	0.49
Boron, mg/l	0.65
Beryllium, ug/l	<10.00
Nickel, ug/l	*
Selenium, ug/l	<1.00
Mercury, ug/l	*
Arsenic, ug/l	<1.00
Barium, mg/l	*
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	*
Fluoride, mg/l	0.12
Lead, ug/l	*
Molybdenum, mg/l	*
Aluminum, mg/l	0.20
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	*
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	*
Total Sulfur, mg/l	*
Total Coliform Bacteria, # Col./100 ml	*

APPENDIX 3

SAMPLE LOCATION 122 = Palmirk Mine Discharge PAGE 1

DATE	06/20/1986	10/23/1986	10/23/1986 MVTL	06/02/1987	10/08/1987	11/01/1988
pH-Field	7.70	8.24	*	8.05	9.00	*
pH-Laboratory	8.00	8.00	*	7.90	7.80	*
Specific conductance, umhos/cm @ 25c	1250.00	870.00	*	1260.00	1330.00	*
Total Dissolved Solids, mg/l	660.00	558.00	*	768.00	775.00	*
Total Suspended Solids, mg/l	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	440.00	365.00	*	*	*	*
Alkalinity Total, mg/l as CaCO3	440.00	365.00	*	478.00	473.00	*
Nitrate-N, mg/l	0.44	<0.01	*	0.05	0.04	*
Ammonia-N, mg/l	*	*	*	*	*	*
Calcium, mg/l	70.00	53.00	*	86.00	107.00	*
Magnesium, mg/l	52.00	48.00	*	57.00	63.00	*
Potassium, mg/l	2.30	7.60	*	3.80	5.20	*
Sodium, mg/l	139.00	92.00	*	110.00	82.00	*
Sulfate, mg/l	270.00	150.00	*	200.00	346.10	*
Methylene Blue Active Substances, mg/l	*	*	<0.50	*	*	*
Chloride, mg/l	2.70	3.90	*	2.80	7.11	*
Iron, mg/l	<0.10	0.10	*	<0.10	<0.01	*
Zinc, mg/l	*	<0.01	*	*	*	*
Manganese, mg/l	0.11	<0.01	*	0.14	0.19	*
Copper, ug/l	*	<10.00	*	*	*	*
Silver, ug/l	*	20.00	*	*	*	*
Strontium, mg/l	1.10	1.00	*	1.20	1.70	*
Boron, mg/l	0.37	0.25	*	0.29	0.35	*
Beryllium, ug/l	*	<10.00	*	*	*	*
Nickel, ug/l	*	<10.00	*	<50.00	<50.00	*
Selenium, ug/l	*	<1.00	*	*	*	*
Mercury, ug/l	*	<1.00	*	*	*	*
Arsenic, ug/l	2.00	2.00	*	5.00	2.00	*
Barium, mg/l	*	0.06	*	*	*	*
Cadmium, ug/l	*	<10.00	*	<10.00	<10.00	*
Chromium-VI, ug/l	*	<10.00	*	*	*	*
Fluoride, mg/l	0.30	0.20	*	0.20	0.13	*
Lead, ug/l	*	<1.00	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*
Aluminum, mg/l	*	0.01	*	<0.01	<0.01	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	<10.00	*	*	*
Cyanide, mg/l	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	7.50	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	
Total Sulfur, mg/l	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	>10.00	*	*	*

SAMPLE LOCATION 124 = Coal Lake Coulee Discharg

DATE	06/20/1962	10/22/1986	10/22/1986 MVTL	06/01/1987	10/08/1987	06/13/1988	11/01/1988	06/07/1990
pH-Field	7.40	8.32	*	8.12	8.30	8.80	8.10	7.64
pH-Laboratory	8.40	8.20	*	7.90	8.00	7.90	7.80	7.80
Specific conductance, umhos/cm @ 25c	1185.00	930.00	*	830.00	960.00	760.00	1280.00	940.00
Total Dissolved Solids, mg/l	831.00	609.00	*	491.00	567.00	482.00	701.00	601.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	*	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	564.00	376.00	*	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	564.00	376.00	*	261.00	324.00	314.00	403.00	351.00
Nitrate-N, mg/l	<0.01	<0.01	*	0.02	<0.01	*	*	*
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	106.00	96.00	*	77.00	73.00	67.00	106.00	81.00
Magnesium, mg/l	77.00	60.00	*	52.00	52.00	38.00	*	57.00
Potassium, mg/l	1.90	5.60	*	4.00	5.40	2.50	5.70	5.30
Sodium, mg/l	60.00	46.00	*	28.00	44.00	25.00	56.00	51.30
Sulfate, mg/l	170.00	130.00	*	143.00	133.00	92.00	520.00	151.00
Methylene Blue Active Substances, mg/l	*	*	<0.50	*	*	*	*	*
Chloride, mg/l	2.80	7.50	*	5.80	7.21	4.30	6.50	*
Iron, mg/l	0.20	<0.10	*	<0.10	<0.01	*	*	*
Zinc, mg/l	*	<0.01	*	*	*	*	*	*
Manganese, mg/l	0.94	<0.01	*	0.02	<0.01	*	*	*
Copper, ug/l	*	<10.00	*	*	*	*	*	*
Silver, ug/l	*	<10.00	*	*	*	*	*	*
Strontium, mg/l	2.20	1.70	*	1.50	1.80	*	*	*
Boron, mg/l	*	0.16	*	0.16	0.22	0.13	0.20	0.14
Beryllium, ug/l	*	<10.00	*	*	*	*	*	*
Nickel, ug/l	*	<10.00	*	<50.00	<50.00	*	*	*
Selenium, ug/l	*	<1.00	*	*	*	*	*	*
Mercury, ug/l	*	<1.00	*	*	*	*	*	*
Arsenic, ug/l	4.00	1.00	*	3.00	2.00	*	*	*
Barium, mg/l	*	0.07	*	*	*	*	*	*
Cadmium, ug/l	*	<10.00	*	<10.00	<10.00	*	*	*
Chromium-VI, ug/l	*	<10.00	*	*	*	*	*	*
Fluoride, mg/l	0.20	0.20	*	0.20	0.12	0.10	0.10	0.20
Lead, ug/l	*	<1.00	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	<0.01	*	0.01	<0.01	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	16.00	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	6.30	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	>57.00	*	*	*	*	*

DATE	06/01/1987	10/05/1987	10/05/1987	11/01/1988
	PACE			
pH-Field	7.99	7.40	*	*
pH-Laboratory	7.90	7.80	*	*
Specific conductance, umhos/cm @ 25c	2300.00	4500.00	4600.00	*
Total Dissolved Solids, mg/l	1550.00	3523.00	3600.00	*
Total Suspended Solids, mg/l	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	*
Alkalinity Total, mg/l as CaCO3	325.00	476.00	450.00	*
Nitrate-N, mg/l	0.04	0.02	*	*
Ammonia-N, mg/l	*	*	*	*
Calcium, mg/l	105.00	300.00	180.00	*
Magnesium, mg/l	124.00	355.00	280.00	*
Potassium, mg/l	12.00	20.00	20.00	*
Sodium, mg/l	168.00	369.00	350.00	*
Sulfate, mg/l	845.00	2096.10	2100.00	*
Methylene Blue Active Substances, mg/l	*	*	*	*
Chloride, mg/l	31.00	91.75	99.00	*
Iron, mg/l	<0.10	<0.01	0.06	*
Zinc, mg/l	*	*	*	*
Manganese, mg/l	0.48	0.34	0.21	*
Copper, ug/l	*	*	*	*
Silver, ug/l	*	*	*	*
Strontium, mg/l	1.20	2.20	2.20	*
Boron, mg/l	3.20	8.90	5.00	*
Beryllium, ug/l	*	*	*	*
Nickel, ug/l	<50.00	<50.00	*	*
Selenium, ug/l	*	*	*	*
Mercury, ug/l	*	*	*	*
Arsenic, ug/l	3.00	<1.00	3.20	*
Barium, mg/l	*	*	*	*
Cadmium, ug/l	<10.00	<10.00	*	*
Chromium-VI, ug/l	*	*	*	*
Fluoride, mg/l	0.20	0.36	1.00	*
Lead, ug/l	*	*	*	*
Molybdenum, mg/l	*	*	*	*
Aluminum, mg/l	<0.01	<0.01	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*
Cyanide, mg/l	*	*	*	*
Phenol, ug/l	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*
Temperature, Degrees C	*	8.40	*	*
Dissolved Oxygen, mg/l	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	
Total Sulfur, mg/l	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*

SAMPLE LOCATION 136 = East South Ash Pond PAGE 1

DATE	06/06/1990	10/09/1990
pH-Field	8.20	8.32
pH-Laboratory	8.30	*
Specific conductance, umhos/cm @ 25c	9000.00	*
Total Dissolved Solids, mg/l	6207.00	*
Total Suspended Solids, mg/l	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*
Alkalinity Total, mg/l as CaCO3	162.00	*
Nitrate-N, mg/l	*	*
Ammonia-N, mg/l	*	*
Calcium, mg/l	570.00	*
Magnesium, mg/l	130.00	*
Potassium, mg/l	72.00	*
Sodium, mg/l	1100.00	*
Sulfate, mg/l	4480.00	*
Methylene Blue Active Substances, mg/l	*	*
Chloride, mg/l	390.00	*
Iron, mg/l	*	*
Zinc, mg/l	*	*
Manganese, mg/l	*	*
Copper, ug/l	*	*
Silver, ug/l	*	*
Strontium, mg/l	*	*
Boron, mg/l	11.00	*
Beryllium, ug/l	*	*
Nickel, ug/l	*	*
Selenium, ug/l	*	*
Mercury, ug/l	*	*
Arsenic, ug/l	31.00	*
Barium, mg/l	*	*
Cadmium, ug/l	*	*
Chromium-VI, ug/l	*	*
Fluoride, mg/l	10.00	*
Lead, ug/l	*	*
Molybdenum, mg/l	*	*
Aluminum, mg/l	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*
Cyanide, mg/l	*	*
Phenol, ug/l	*	*
Biochemical Oxygen Demand, mg/l	*	*
Chemical Oxygen Demand, mg/l	*	*
Total Organic Carbon, mg/l	*	*
Temperature, Degrees C	*	*
Dissolved Oxygen, mg/l	*	*
Water Level depth below ground surface, ft.	*	*
Total Sulfur, mg/l	*	*
Total Coliform Bacteria, # Col./100 ml	*	*

DATE	06/06/1990	10/09/1990
pH-Field	3.30	3.51
pH-Laboratory	8.50	*
Specific conductance, umhos/cm @ 25c	7700.00	*
Total Dissolved Solids, mg/l	8891.00	*
Total Suspended Solids, mg/l	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*
Alkalinity Total, mg/l as CaCO3	129.00	*
Nitrate-N, mg/l	*	*
Ammonia-N, mg/l	*	*
Calcium, mg/l	605.00	*
Magnesium, mg/l	330.00	*
Potassium, mg/l	60.00	*
Sodium, mg/l	920.00	*
Sulfate, mg/l	3780.00	*
Methylene Blue Active Substances, mg/l	*	*
Chloride, mg/l	346.00	*
Iron, mg/l	*	*
Zinc, mg/l	*	*
Manganese, mg/l	*	*
Copper, ug/l	*	*
Silver, ug/l	*	*
Strontium, mg/l	*	*
Boron, mg/l	5.90	*
Beryllium, ug/l	*	*
Nickel, ug/l	*	*
Selenium, ug/l	*	*
Mercury, ug/l	*	*
Arsenic, ug/l	8.00	*
Barium, mg/l	*	*
Cadmium, ug/l	*	*
Chromium-VI, ug/l	*	*
Fluoride, mg/l	9.00	*
Lead, ug/l	*	*
Molybdenum, mg/l	*	*
Aluminum, mg/l	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*
Cyanide, mg/l	*	*
Phenol, ug/l	*	*
Biochemical Oxygen Demand, mg/l	*	*
Chemical Oxygen Demand, mg/l	*	*
Total Organic Carbon, mg/l	*	*
Temperature, Degrees C	*	*
Dissolved Oxygen, mg/l	*	*
Water Level depth below ground surface, ft.	*	*
Total Sulfur, mg/l	*	*
Total Coliform Bacteria, # Col./100 ml	*	*

DATE	08/31/1987
pH-Field	7.60
pH-Laboratory	7.40
Specific conductance, umhos/cm @ 25c	300.00
Total Dissolved Solids, mg/l	258.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	92.00
Alkalinity Total, mg/l as CaCO3	92.00
Nitrate-N, mg/l	0.96
Ammonia-N, mg/l	*
Calcium, mg/l	17.00
Magnesium, mg/l	11.00
Potassium, mg/l	16.30
Sodium, mg/l	36.00
Sulfate, mg/l	*
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	3.20
Iron, mg/l	0.11
Zinc, mg/l	*
Manganese, mg/l	0.08
Copper, ug/l	<10.00
Silver, ug/l	*
Strontium, mg/l	0.18
Boron, mg/l	0.15
Beryllium, ug/l	<10.00
Nickel, ug/l	*
Selenium, ug/l	<1.00
Mercury, ug/l	*
Arsenic, ug/l	<1.00
Barium, mg/l	*
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	*
Fluoride, mg/l	<0.10
Lead, ug/l	*
Molybdenum, mg/l	*
Aluminum, mg/l	0.28
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	*
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	*
Total Sulfur, mg/l	*
Total Coliform Bacteria, # Col./100 ml	*

DATE	03/31/1987
pH-Field	7.60
pH-Laboratory	7.80
Specific conductance, umhos/cm @ 25c	410.00
Total Dissolved Solids, mg/l	263.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	122.00
Alkalinity Total, mg/l as CaCO3	122.00
Nitrate-N, mg/l	0.84
Ammonia-N, mg/l	*
Calcium, mg/l	35.00
Magnesium, mg/l	16.00
Potassium, mg/l	9.70
Sodium, mg/l	28.00
Sulfate, mg/l	*
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	4.90
Iron, mg/l	0.19
Zinc, mg/l	*
Manganese, mg/l	0.07
Copper, ug/l	<10.00
Silver, ug/l	*
Strontium, mg/l	0.34
Boron, mg/l	0.17
Beryllium, ug/l	<10.00
Nickel, ug/l	*
Selenium, ug/l	<1.00
Mercury, ug/l	*
Arsenic, ug/l	<1.00
Barium, mg/l	*
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	*
Fluoride, mg/l	<0.10
Lead, ug/l	*
Molybdenum, mg/l	*
Aluminum, mg/l	0.31
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	*
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	*
Total Sulfur, mg/l	*
Total Coliform Bacteria, # Col./100 ml	*

SAMPLE LOCATION 402 = West Samuelson Inlet PAGE

DATE	08/31/1987
pH-Field	7.70
pH-Laboratory	7.20
Specific conductance, umhos/cm @ 25c	370.00
Total Dissolved Solids, mg/l	247.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	86.00
Alkalinity Total, mg/l as CaCO3	86.00
Nitrate-N, mg/l	1.01
Ammonia-N, mg/l	*
Calcium, mg/l	16.00
Magnesium, mg/l	11.00
Potassium, mg/l	13.80
Sodium, mg/l	38.00
Sulfate, mg/l	*
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	2.80
Iron, mg/l	0.36
Zinc, mg/l	*
Manganese, mg/l	0.05
Copper, ug/l	<10.00
Silver, ug/l	*
Strontium, mg/l	0.16
Boron, mg/l	0.15
Beryllium, ug/l	<10.00
Nickel, ug/l	*
Selenium, ug/l	<1.00
Mercury, ug/l	*
Arsenic, ug/l	<1.00
Barium, mg/l	*
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	*
Fluoride, mg/l	<0.10
Lead, ug/l	*
Molybdenum, mg/l	*
Aluminum, mg/l	0.52
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	*
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	*
Total Sulfur, mg/l	*
Total Coliform Bacteria, # Col./100 ml	*

DATE	03/31/1987
pH-Field	7.60
pH-Laboratory	7.60
Specific conductance, umhos/cm @ 25c	950.00
Total Dissolved Solids, mg/l	623.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	289.00
Alkalinity Total, mg/l as CaCO3	289.00
Nitrate-N, mg/l	0.32
Ammonia-N, mg/l	*
Calcium, mg/l	45.00
Magnesium, mg/l	31.00
Potassium, mg/l	5.90
Sodium, mg/l	122.00
Sulfate, mg/l	*
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	3.10
Iron, mg/l	0.17
Zinc, mg/l	*
Manganese, mg/l	0.02
Copper, ug/l	<10.00
Silver, ug/l	*
Strontium, mg/l	0.71
Boron, mg/l	0.31
Beryllium, ug/l	<10.00
Nickel, ug/l	*
Selenium, ug/l	<1.00
Mercury, ug/l	*
Arsenic, ug/l	<1.00
Barium, mg/l	*
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	*
Fluoride, mg/l	<0.10
Lead, ug/l	*
Molybdenum, mg/l	*
Aluminum, mg/l	0.27
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	*
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	*
Total Sulfur, mg/l	*
Total Coliform Bacteria, # Col./100 ml	*

SAMPLE LOCATION 101 = Upper Samuelson Slough

DATE	05/31/1980 PAGE	10/06/1980 PAGE	06/10/1981 PAGE	09/17/1981	09/17/1981 PAGE	05/27/1982	10/14/1982	04/29/1983
pH-Field	8.70	8.20	8.90	8.90	8.90	8.50	8.50	8.50
pH-Laboratory	8.50	8.30	8.50	8.50	8.50	8.40	8.50	8.40
Specific conductance, umhos/cm @ 25c	980.00	1100.00	1300.00	1270.00	1300.00	960.00	1270.00	820.00
Total Dissolved Solids, mg/l	784.00	740.00	950.00	950.00	890.00	410.00	950.00	601.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	16.00	<1.00	14.00	32.00	20.00	<1.00	32.00	1.00
Alkalinity Bicarbonate, mg/l as CaCO3	291.00	230.00	227.00	271.00	300.00	266.00	271.00	295.00
Alkalinity Total, mg/l as CaCO3	307.00	230.00	290.00	303.00	320.00	266.00	303.00	296.00
Nitrate-N, mg/l	<0.25	<0.10	<0.10	<0.10	<0.10	0.11	<0.10	0.28
Ammonia-N, mg/l	<0.10	*	*	*	*	*	*	*
Calcium, mg/l	70.00	60.00	76.00	77.00	72.00	71.00	77.00	62.00
Magnesium, mg/l	50.00	50.00	57.00	69.00	65.00	40.00	69.00	39.00
Potassium, mg/l	1.50	16.00	16.00	19.90	18.00	15.00	20.00	11.00
Sodium, mg/l	100.00	110.00	140.00	180.00	150.00	110.00	180.00	96.00
Sulfate, mg/l	350.00	380.00	420.00	390.00	440.00	365.00	400.00	220.00
Methylene Blue Active Substances, mg/l	0.19	*	*	*	*	*	*	*
Chloride, mg/l	<10.00	11.00	12.00	14.70	13.00	10.50	14.70	8.70
Iron, mg/l	0.05	0.05	0.10	0.50	0.14	<0.10	0.50	<0.10
Zinc, mg/l	20.00	*	*	*	*	*	*	*
Manganese, mg/l	0.08	0.04	0.08	0.20	0.20	0.08	0.20	0.09
Copper, ug/l	<50.00	*	*	*	*	*	*	*
Silver, ug/l	<40.00	*	*	*	*	*	*	*
Strontium, mg/l	0.45	0.40	0.60	0.50	0.40	0.50	0.50	0.50
Boron, mg/l	<0.20	0.40	0.20	0.80	0.30	0.50	0.50	0.30
Beryllium, ug/l	<20.00	*	*	*	*	*	*	*
Nickel, ug/l	<50.00	*	*	*	*	*	*	*
Selenium, ug/l	1.00	*	*	*	*	*	*	*
Mercury, ug/l	<0.20	*	*	*	*	*	*	*
Arsenic, ug/l	3.00	3.00	2.00	7.00	9.00	<1.00	7.00	1.00
Barium, mg/l	<0.30	*	*	*	*	*	*	*
Cadmium, ug/l	<1.00	*	*	*	*	*	*	*
Chromium-VI, ug/l	<5.00	*	*	*	*	*	*	*
Fluoride, mg/l	0.20	0.30	0.40	0.20	0.50	0.30	0.20	0.20
Lead, ug/l	<0.01	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacterie, # Col./100 ml	4.30	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	21.00	12.50	*	*	*	*	*	*
Dissolved Oxygen, mg/l	9.00	6.80	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*

DATE	10/05/1983	05/18/1994	10/02/1984	05/17/1985	10/24/1985	06/23/1986	10/23/1986	10/23/1986 MVTL
pH-Field	8.40	8.50	8.50	8.40	8.40	8.40	8.80	*
pH-Laboratory	8.30	8.60	8.50	8.50	8.50	8.40	8.60	*
Specific conductance, umhos/cm @ 25c	1100.00	1150.00	1310.00	1210.00	1430.00	1340.00	1430.00	*
Total Dissolved Solids, mg/l	757.00	803.00	959.00	860.00	989.00	929.00	1030.00	*
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	5.00	16.00	14.00	7.00	22.00	11.00	24.00	*
Alkalinity Bicarbonate, mg/l as CaCO3	348.00	294.00	314.00	350.00	349.00	308.00	343.00	*
Alkalinity Total, mg/l as CaCO3	353.00	310.00	328.00	357.00	371.00	319.00	367.00	*
Nitrate-N, mg/l	0.30	0.03	0.21	0.15	0.05	0.22	<0.01	*
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	79.00	80.00	83.00	86.00	75.00	55.00	64.00	*
Magnesium, mg/l	52.00	45.00	58.00	53.00	58.00	66.00	62.00	*
Potassium, mg/l	14.00	10.00	13.00	9.70	11.00	10.00	11.00	*
Sodium, mg/l	119.00	117.00	134.00	125.00	151.00	156.00	146.00	*
Sulfate, mg/l	325.00	355.00	460.00	340.00	420.00	450.00	420.00	*
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	<0.50
Chloride, mg/l	11.00	11.00	12.00	9.80	11.00	11.00	12.70	*
Iron, mg/l	0.40	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	*
Zinc, mg/l	*	*	*	*	*	*	<0.01	*
Manganese, mg/l	0.05	<0.01	0.02	0.03	<0.01	<0.01	<0.01	*
Copper, ug/l	*	*	*	*	*	*	<10.00	*
Silver, ug/l	*	*	*	*	*	*	<10.00	*
Strontium, mg/l	0.70	0.70	1.00	0.80	0.90	0.90	1.10	*
Boron, mg/l	0.41	0.44	0.55	0.50	0.57	0.57	0.70	*
Beryllium, ug/l	*	*	*	*	*	*	<10.00	*
Nickel, ug/l	*	*	*	*	*	*	<10.00	*
Selenium, ug/l	*	*	*	*	*	*	<1.00	*
Mercury, ug/l	*	*	*	*	*	*	<1.00	*
Arsenic, ug/l	4.00	3.00	6.00	6.00	5.00	4.00	<1.00	*
Barium, mg/l	*	*	*	*	*	*	0.10	*
Cadmium, ug/l	*	*	*	*	*	*	<10.00	*
Chromium-VI, ug/l	*	*	*	*	*	*	<10.00	*
Fluoride, mg/l	0.20	0.20	0.40	0.20	0.30	0.20	0.30	*
Lead, ug/l	*	*	*	*	*	*	<1.00	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	<0.01	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	<10.00
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	>23.00

DATE	06/03/1987	10/09/1987	06/14/1988	11/07/1988	06/20/1989	10/30/1989	06/12/1990
pH-Field	9.04	9.10	8.30	8.70	8.10	8.40	8.59
pH-Laboratory	8.90	8.90	8.90	8.50	8.10	8.50	8.65
Specific conductance, umhos/cm @ 25c	1190.00	1310.00	1600.00	2200.00	2100.00	2900.00	3000.00
Total Dissolved Solids, mg/l	779.00	820.00	1010.00	1350.00	1410.00	1920.00	2230.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	51.00	*	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	248.00	279.00	330.00	393.00	379.00	506.00	531.00
Nitrate-N, mg/l	<0.01	0.03	*	*	<0.01	0.01	*
Ammonia-N, mg/l	*	*	*	*	*	*	*
Calcium, mg/l	52.00	45.00	45.00	64.00	51.00	85.40	111.00
Magnesium, mg/l	52.00	72.00	72.00	88.00	90.00	134.90	166.00
Potassium, mg/l	12.00	12.80	13.00	14.00	16.00	21.00	22.00
Sodium, mg/l	126.00	178.00	178.00	230.00	259.00	342.00	418.40
Sulfate, mg/l	310.00	513.00	510.00	*	731.00	1090.00	1170.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*
Chloride, mg/l	8.60	14.90	17.00	21.40	25.00	32.00	32.00
Iron, mg/l	<0.10	0.03	*	*	*	0.05	*
Zinc, mg/l	*	*	*	*	*	*	*
Manganese, mg/l	0.06	0.04	*	*	*	0.02	*
Copper, ug/l	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*
Strontium, mg/l	0.90	0.90	*	*	*	1.47	*
Boron, mg/l	0.42	0.76	0.76	0.80	1.10	1.20	1.30
Beryllium, ug/l	*	*	*	*	*	*	*
Nickel, ug/l	<50.00	<50.00	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*
Arsenic, ug/l	8.00	10.00	*	*	*	*	*
Barium, mg/l	*	*	*	*	*	*	*
Cadmium, ug/l	<10.00	<10.00	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*
Fluoride, mg/l	0.20	0.25	0.20	0.20	0.20	0.30	0.20
Lead, ug/l	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*
Aluminum, mg/l	0.03	<0.01	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*
Temperature, Degrees C	*	6.20	*	*	21.00	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*

SAMPLE LOCATION 102 = Lower Samuelson Slough PAGE 1

DATE	05/31/1980 PAGE	10/06/1980 PAGE	06/10/1981 PAGE	09/17/1981	09/17/1981	05/28/1982	10/14/1982	04/29/1983
pH-Field	9.00	8.10	9.00	8.10	8.10	8.40	8.30	8.00
pH-Laboratory	8.20	8.40	8.60	7.70	7.70	8.30	8.30	8.30
Specific conductance, umhos/cm @ 25c	1300.00	1500.00	1400.00	1490.00	1300.00	1160.00	1400.00	850.00
Total Dissolved Solids, mg/l	1040.00	900.00	1100.00	1100.00	1100.00	570.00	920.00	651.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	58.00	10.00	22.00	<1.00	<1.00	<1.00	<1.00	1.00
Alkalinity Bicarbonate, mg/l as CaCO3	342.00	290.00	293.00	351.00	360.00	285.00	351.00	285.00
Alkalinity Total, mg/l as CaCO3	400.00	300.00	315.00	351.00	360.00	285.00	351.00	286.00
Nitrate-N, mg/l	<0.20	0.40	<0.10	<0.10	<0.10	0.12	0.47	0.28
Ammonia-N, mg/l	<0.10	*	*	*	*	*	*	*
Calcium, mg/l	55.00	51.00	78.00	86.00	72.30	76.00	87.00	64.00
Magnesium, mg/l	60.00	59.00	60.00	86.00	75.00	45.00	58.00	42.00
Potassium, mg/l	15.00	18.00	16.00	20.80	17.00	16.00	16.00	11.00
Sodium, mg/l	160.00	190.00	160.00	215.00	180.00	130.00	150.00	100.00
Sulfate, mg/l	300.00	420.00	480.00	530.00	540.00	430.00	450.00	360.00
Methylene Blue Active Substances, mg/l	0.10	*	*	*	*	*	*	*
Chloride, mg/l	10.00	14.00	15.00	16.80	16.00	10.50	14.00	9.30
Iron, mg/l	<0.05	<0.50	<0.05	0.80	0.16	0.01	0.20	<0.10
Zinc, mg/l	20.00	*	*	*	*	*	*	*
Manganese, mg/l	0.04	0.08	0.12	0.40	0.32	0.12	0.14	0.05
Copper, ug/l	<50.00	*	*	*	*	*	*	*
Silver, ug/l	<40.00	*	*	*	*	*	*	*
Strontium, mg/l	0.60	0.30	0.65	0.60	0.50	0.60	0.60	0.50
Boron, mg/l	<0.20	0.30	0.20	0.60	0.50	0.40	0.30	0.30
Beryllium, ug/l	<20.00	*	*	*	*	*	*	*
Nickel, ug/l	<50.00	*	*	*	*	*	*	*
Selenium, ug/l	1.00	*	*	*	*	*	*	*
Mercury, ug/l	<0.20	*	*	*	*	*	*	*
Arsenic, ug/l	2.00	2.00	<1.00	3.00	2.00	4.00	5.00	2.00
Barium, mg/l	<0.30	*	*	*	*	*	*	*
Cadmium, ug/l	<1.00	*	*	*	*	*	*	*
Chromium-VI, ug/l	<5.00	*	*	*	*	*	*	*
Fluoride, mg/l	0.30	0.40	0.40	0.10	0.30	0.30	0.30	0.20
Lead, ug/l	<0.01	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	21.00	12.50	*	*	*	*	*	*
Dissolved Oxygen, mg/l	9.80	8.70	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*

DATE	10/06/1983	05/15/1984	05/15/1984	10/01/1984	05/16/1985	10/24/1985	06/18/1986	10/20/1986
			PACE					BRAUN
pH-Field	9.00	9.00	*	8.60	8.60	8.40	8.60	*
pH-Laboratory	8.50	8.50	*	8.50	8.60	8.40	8.80	*
Specific conductance, umhos/cm @ 25c	1180.00	1270.00	1200.00	1690.00	1360.00	1700.00	1495.00	*
Total Dissolved Solids, mg/l	821.00	894.00	740.00	1180.00	965.00	1200.00	1040.00	*
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	42.00	26.00	<1.00	15.00	10.00	17.00	44.00	*
Alkalinity Bicarbonate, mg/l as CaCO3	240.00	282.00	295.00	312.00	337.00	344.00	283.00	*
Alkalinity Total, mg/l as CaCO3	282.00	310.00	295.00	327.00	347.00	363.00	327.00	*
Nitrate-N, mg/l	0.28	0.20	*	0.31	0.25	0.10	0.28	*
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	51.00	82.00	77.00	92.00	90.00	89.00	53.00	*
Magnesium, mg/l	59.00	50.00	58.00	75.00	61.00	72.00	73.00	*
Potassium, mg/l	14.00	10.00	12.00	14.00	10.00	11.00	11.00	*
Sodium, mg/l	148.00	131.00	130.00	171.00	144.00	189.00	175.00	*
Sulfate, mg/l	410.00	340.00	320.00	660.00	460.00	600.00	530.00	*
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	12.00	13.00	10.00	17.00	12.00	17.00	14.00	*
Iron, mg/l	<0.10	0.10	0.20	<0.10	<0.10	<0.10	<0.10	*
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	<0.01	0.05	0.06	0.04	0.04	<0.01	<0.01	*
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	0.60	0.70	0.70	1.10	0.80	0.90	0.90	*
Boron, mg/l	0.46	0.50	0.60	0.76	0.41	0.89	0.77	*
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	<1.00	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	4.00	3.00	4.00	5.00	5.00	3.00	4.00	*
Barium, mg/l	*	*	0.20	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	<1.00	<1.00	*	*	*	*	*
Fluoride, mg/l	0.20	0.20	0.30	0.30	0.20	0.30	0.20	*
Lead, ug/l	*	4.00	<1.00	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	1.20
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

DATE	10/20/1986	10/20/1986 MVTL	05/28/1987	10/07/1987	05/08/1988	10/28/1988	06/19/1989	10/12/1989
pH-Field	8.84	*	8.98	9.20	8.70	8.30	8.60	6.50
pH-Laboratory	8.70	*	8.90	8.80	8.50	8.60	8.70	8.50
Specific conductance, umhos/cm @ 25c	1680.00	*	1330.00	1630.00	1910.00	2800.00	2900.00	4000.00
Total Dissolved Solids, mg/l	1240.00	*	897.00	1075.00	1270.00	1920.00	2020.00	2920.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	39.00	*	38.00	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	343.00	*	*	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	381.00	*	274.00	308.00	333.00	422.00	351.00	380.00
Nitrate-N, mg/l	<0.01	*	0.03	0.01	*	*	<0.01	<0.01
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	77.00	*	56.00	50.00	62.00	74.00	64.00	103.00
Magnesium, mg/l	90.00	*	61.00	77.00	88.00	135.00	140.00	220.00
Potassium, mg/l	20.20	*	11.00	12.90	14.00	18.00	16.00	23.00
Sodium, mg/l	210.00	*	139.00	170.00	220.00	330.00	345.00	545.00
Sulfate, mg/l	590.00	*	470.00	428.80	730.00	1000.00	1190.00	1800.00
Methylene Blue Active Substances, mg/l	*	<0.50	*	*	*	*	*	*
Chloride, mg/l	19.00	*	12.00	19.51	24.00	39.89	44.00	62.85
Iron, mg/l	<0.10	*	<0.10	<0.01	*	*	*	<0.10
Zinc, mg/l	<0.01	*	*	*	*	*	*	*
Manganese, mg/l	<0.01	*	<0.01	<0.01	*	*	*	<0.10
Copper, ug/l	<10.00	*	*	*	*	*	*	*
Silver, ug/l	<10.00	*	*	*	*	*	*	*
Strontium, mg/l	1.20	*	0.90	0.90	*	*	*	1.90
Boron, mg/l	1.00	*	0.61	1.04	1.40	2.10	2.40	3.30
Beryllium, ug/l	<10.00	*	*	*	*	*	*	*
Nickel, ug/l	<10.00	*	<50.00	<50.00	*	*	*	*
Selenium, ug/l	<1.00	*	*	*	*	*	*	*
Mercury, ug/l	<1.00	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	*	1.00	1.00	*	*	*	*
Barium, mg/l	0.08	*	*	*	*	*	*	*
Cadmium, ug/l	<10.00	*	<10.00	<10.00	*	*	*	*
Chromium-VI, ug/l	<10.00	*	*	*	*	*	*	*
Fluoride, mg/l	0.20	*	0.30	0.21	0.20	0.40	0.20	0.20
Lead, ug/l	<1.00	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	<0.01	*	<0.01	<0.01	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	<10.00	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	8.90	*	*	23.30	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	>4.00	*	*	*	*	*	*

DATE	06/05/1990	10/11/1990
pH-Field	8.49	8.78
pH-Laboratory	8.55	*
Specific conductance, umhos/cm @ 25c	4500.00	*
Total Dissolved Solids, mg/l	3460.00	*
Total Suspended Solids, mg/l	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*
Alkalinity Total, mg/l as CaCO3	355.00	*
Nitrate-N, mg/l	*	*
Ammonia-N, mg/l	*	*
Calcium, mg/l	109.00	*
Magnesium, mg/l	285.00	*
Potassium, mg/l	23.00	*
Sodium, mg/l	670.00	*
Sulfate, mg/l	2200.00	*
Methylene Blue Active Substances, mg/l	*	*
Chloride, mg/l	89.00	*
Iron, mg/l	*	*
Zinc, mg/l	*	*
Manganese, mg/l	*	*
Copper, ug/l	*	*
Silver, ug/l	*	*
Strontium, mg/l	*	*
Boron, mg/l	3.70	*
Beryllium, ug/l	*	*
Nickel, ug/l	*	*
Selenium, ug/l	*	*
Mercury, ug/l	*	*
Arsenic, ug/l	*	*
Barium, mg/l	*	*
Cadmium, ug/l	*	*
Chromium-VI, ug/l	*	*
Fluoride, mg/l	0.20	*
Lead, ug/l	*	*
Molybdenum, mg/l	*	*
Aluminum, mg/l	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*
Cyanide, mg/l	*	*
Phenol, ug/l	*	*
Biochemical Oxygen Demand, mg/l	*	*
Chemical Oxygen Demand, mg/l	*	*
Total Organic Carbon, mg/l	*	*
Temperature, Degrees C	*	*
Dissolved Oxygen, mg/l	*	*
Water Level depth below ground surface, ft.	*	*
Total Sulfur, mg/l	*	*
Total Coliform Bacteria, # Col./100 ml	*	*

SAMPLE LOCATION 103 = East Weller Slough PAGE 1

DATE	06/01/1980 PACE	10/06/1980 PACE	06/10/1981 PACE	09/17/1981	09/17/1981 PACE	05/27/1982	10/14/1982	04/28/1983
pH-Field	8.40	8.20	8.50	9.80	9.30	7.20	8.20	8.20
pH-Laboratory	8.40	8.60	8.50	8.40	8.40	7.70	8.20	8.30
Specific conductance, umhos/cm @ 25c	750.00	650.00	720.00	1270.00	700.00	530.00	750.00	550.00
Total Dissolved Solids, mg/l	604.00	232.00	670.00	660.00	600.00	160.00	640.00	352.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	8.00	10.00	14.00	11.00	30.00	<1.00	<1.00	2.00
Alkalinity Bicarbonate, mg/l as CaCO3	361.00	270.00	336.00	442.00	460.00	213.00	356.00	273.00
Alkalinity Total, mg/l as CaCO3	369.00	280.00	350.00	453.00	490.00	213.00	356.00	274.00
Nitrate-N, mg/l	<0.20	<0.10	<0.10	<0.10	<0.10	<0.10	0.26	0.28
Ammonia-N, mg/l	<0.10	*	*	*	*	*	*	*
Calcium, mg/l	32.00	31.00	40.00	34.00	31.00	35.00	45.00	33.00
Magnesium, mg/l	24.00	18.00	23.00	31.00	25.00	14.00	23.00	17.00
Potassium, mg/l	17.00	13.00	15.00	19.60	17.00	12.00	15.00	11.00
Sodium, mg/l	90.00	82.00	90.00	170.00	140.00	67.00	98.00	90.00
Sulfate, mg/l	35.00	55.00	70.00	59.00	73.00	130.00	81.00	110.00
Methylene Blue Active Substances, mg/l	<0.10	*	*	*	*	*	*	*
Chloride, mg/l	<10.00	<1.00	4.00	4.50	3.00	3.00	3.40	3.20
Iron, mg/l	0.15	0.10	0.10	1.30	0.90	0.10	0.10	0.20
Zinc, mg/l	20.00	*	*	*	*	*	*	*
Manganese, mg/l	0.12	<0.04	<0.04	0.20	<0.04	0.12	0.03	0.02
Copper, ug/l	<50.00	*	*	*	*	*	*	*
Silver, ug/l	<40.00	*	*	*	*	*	*	*
Strontium, mg/l	0.30	0.25	0.30	0.25	0.25	0.30	0.30	0.20
Boron, mg/l	<0.20	<0.20	<0.20	0.50	<0.20	0.20	0.20	0.20
Beryllium, ug/l	<20.00	*	*	*	*	*	*	*
Nickel, ug/l	<50.00	*	*	*	*	*	*	*
Selenium, ug/l	<1.00	*	*	*	*	*	*	*
Mercury, ug/l	0.40	*	*	*	*	*	*	*
Arsenic, ug/l	2.00	2.00	3.00	2.00	3.00	2.00	<1.00	<1.00
Barium, mg/l	<0.30	*	*	*	*	*	*	*
Cadmium, ug/l	<1.00	*	*	*	*	*	*	*
Chromium-VI, ug/l	<5.00	*	*	*	*	*	*	*
Fluoride, mg/l	0.20	0.30	0.20	0.10	0.20	0.10	0.20	0.10
Lead, ug/l	<0.01	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	4.00	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	17.00	14.50	*	*	*	*	*	*
Dissolved Oxygen, mg/l	7.40	10.00	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*

DATE	10/06/1983	05/21/1984	10/02/1984	05/16/1985	06/17/1986	05/27/1987
pH-Field	9.30	8.40	9.00	8.70	10.20	8.15
pH-Laboratory	9.20	8.30	9.00	8.60	9.70	8.00
Specific conductance, umhos/cm @ 25c	1430.00	1230.00	3400.00	1790.00	1790.00	680.00
Total Dissolved Solids, mg/l	1183.00	872.00	2580.00	1310.00	1340.00	440.00
Total Suspended Solids, mg/l	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	206.00	<1.00	125.00	28.00	90.00	*
Alkalinity Bicarbonate, mg/l as CaCO3	495.00	328.00	736.00	408.00	46.00	*
Alkalinity Total, mg/l as CaCO3	701.00	328.00	861.00	436.00	136.00	182.00
Nitrate-N, mg/l	1.50	0.50	<0.01	0.05	0.30	0.03
Ammonia-N, mg/l	*	*	*	*	*	*
Calcium, mg/l	29.00	64.00	56.00	73.00	41.00	33.00
Magnesium, mg/l	21.00	32.00	64.00	52.00	68.00	20.00
Potassium, mg/l	18.00	25.00	34.00	36.00	22.00	18.00
Sodium, mg/l	310.00	164.00	650.00	275.00	220.00	67.00
Sulfate, mg/l	195.00	345.00	950.00	570.00	810.00	170.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*
Chloride, mg/l	13.00	11.00	43.00	18.00	10.00	4.60
Iron, mg/l	0.60	0.10	0.20	0.50	<0.10	<0.10
Zinc, mg/l	*	*	*	*	*	*
Manganese, mg/l	0.08	0.03	0.05	0.10	<0.01	0.01
Copper, ug/l	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*
Strontium, mg/l	0.30	0.50	0.70	0.60	0.65	0.40
Boron, mg/l	0.27	0.27	0.35	0.37	0.43	0.11
Beryllium, ug/l	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	<50.00
Selenium, ug/l	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*
Arsenic, ug/l	8.00	3.00	5.00	4.00	4.00	<1.00
Barium, mg/l	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	<10.00
Chromium-VI, ug/l	*	*	*	*	*	*
Fluoride, mg/l	0.40	0.20	0.40	0.20	0.20	0.20
Lead, ug/l	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	<0.01
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*

SAMPLE LOCATION 104 = River Water Basin (RWB) PAGE 1

DATE	05/31/1980 PAGE	06/10/1981 PAGE	05/28/1982	10/15/1982	04/29/1983	10/06/1983	05/14/1984 PAGE	05/15/1984
pH-Field	8.60	8.60	8.60	8.50	8.40	8.50	*	8.40
pH-Laboratory	8.40	8.40	8.60	8.30	8.50	8.30	*	8.50
Specific conductance, umhos/cm @ 25c	770.00	700.00	580.00	715.00	550.00	610.00	720.00	670.00
Total Dissolved Solids, mg/l	602.00	540.00	120.00	440.00	408.00	498.00	294.00	440.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	1.00	4.00	<1.00	<1.00	2.00	<1.00	<1.00	5.00
Alkalinity Bicarbonate, mg/l as CaCO3	153.00	149.00	150.00	159.00	160.00	150.00	169.00	136.00
Alkalinity Total, mg/l as CaCO3	154.00	153.00	150.00	159.00	162.00	150.00	169.00	141.00
Nitrate-N, mg/l	0.20	<0.10	<0.10	0.08	0.08	0.05	*	0.06
Ammonia-N, mg/l	<0.10	*	*	*	*	*	*	*
Calcium, mg/l	48.00	54.00	66.00	62.00	52.00	57.00	45.00	53.00
Magnesium, mg/l	30.00	29.00	21.00	23.00	20.00	21.00	20.00	20.00
Potassium, mg/l	3.40	2.80	3.80	3.70	3.40	3.20	3.80	3.00
Sodium, mg/l	65.00	70.00	62.00	59.00	60.00	62.00	60.00	58.00
Sulfate, mg/l	215.00	240.00	200.00	210.00	160.00	195.00	160.00	180.00
Methylene Blue Active Substances, mg/l	<0.10	*	*	*	*	*	<0.05	*
Chloride, mg/l	10.00	10.00	9.00	10.00	8.50	9.40	9.00	9.90
Iron, mg/l	0.05	<0.05	<0.10	0.10	<0.10	<0.10	0.35	0.30
Zinc, mg/l	10.00	*	*	*	*	*	*	*
Manganese, mg/l	<0.04	<0.04	0.01	0.02	0.01	<0.01	<0.04	0.04
Copper, ug/l	<50.00	*	*	*	*	*	<0.20	*
Silver, ug/l	<40.00	*	*	*	*	*	<0.20	*
Strontium, mg/l	0.30	0.45	0.40	0.40	0.90	0.40	0.38	0.50
Boron, mg/l	<0.20	<0.20	0.20	0.20	0.10	0.13	<0.20	0.13
Beryllium, ug/l	<20.00	*	*	*	*	*	<0.20	*
Nickel, ug/l	<50.00	*	*	*	*	*	*	*
Selenium, ug/l	<1.00	*	*	*	*	*	<1.00	4.00
Mercury, ug/l	0.20	*	*	*	*	*	*	*
Arsenic, ug/l	1.00	1.00	2.00	<1.00	1.00	2.00	1.00	2.00
Barium, mg/l	<0.30	*	*	*	*	*	0.20	*
Cadmium, ug/l	<1.00	*	*	*	*	*	<0.10	*
Chromium-VI, ug/l	<5.00	*	*	*	*	*	<1.00	*
Fluoride, mg/l	0.30	5.20	0.70	0.60	0.40	0.50	0.80	0.40
Lead, ug/l	<0.01	*	*	*	*	*	1.00	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	2.00	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	17.00	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	9.90	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	28.00	*	*	*	*	*	*	*

DATE	10/01/1984	05/17/1985	10/24/1985	06/16/1986	10/16/1986	10/16/1986 MVTL	05/27/1987	10/06/1987
pH-Field	8.30	8.10	8.20	7.60	3.47	*	8.61	8.70
pH-Laboratory	8.40	8.40	8.40	8.30	8.40	*	8.40	8.30
Specific conductance, umhos/cm @ 25c	690.00	670.00	670.00	670.00	640.00	*	660.00	710.00
Total Dissolved Solids, mg/l	446.00	418.00	438.00	426.00	425.00	*	397.00	426.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	5.00	*
Alkalinity Carbonate, mg/l as CaCO3	5.00	<1.00	2.00	2.00	4.00	*	6.00	*
Alkalinity Bicarbonate, mg/l as CaCO3	152.00	158.00	160.00	162.00	162.00	*	*	*
Alkalinity Total, mg/l as CaCO3	157.00	158.00	162.00	164.00	166.00	*	168.00	166.00
Nitrate-N, mg/l	0.07	0.05	<0.01	0.08	0.07	*	0.01	<0.01
Ammonia-N, mg/l	*	*	*	*	*	2.58	*	*
Calcium, mg/l	58.00	57.00	52.00	50.00	57.00	*	51.00	49.00
Magnesium, mg/l	21.00	19.00	19.00	21.00	23.00	*	20.00	21.00
Potassium, mg/l	3.70	3.20	3.20	3.00	3.60	*	3.70	3.30
Sodium, mg/l	59.00	59.00	56.00	54.00	50.00	*	56.00	56.00
Sulfate, mg/l	180.00	150.00	167.00	170.00	170.00	*	130.00	181.30
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	10.00	9.00	9.20	10.00	10.30	*	9.70	10.73
Iron, mg/l	<0.10	<0.10	<0.10	<0.10	<0.10	*	<0.10	<0.01
Zinc, mg/l	*	*	*	*	<0.01	*	*	*
Manganese, mg/l	1.00	<0.01	<0.01	<0.01	<0.01	*	0.05	<0.01
Copper, ug/l	*	*	*	*	<10.00	*	*	*
Silver, ug/l	*	*	*	*	10.00	*	*	*
Strontium, mg/l	0.60	0.50	0.40	0.54	0.60	*	0.50	0.50
Boron, mg/l	0.18	0.14	0.13	0.10	0.18	*	0.06	0.09
Beryllium, ug/l	*	*	*	*	<10.00	*	*	*
Nickel, ug/l	*	*	*	*	<10.00	*	<50.00	<50.00
Selenium, ug/l	*	*	*	*	<1.00	*	*	*
Mercury, ug/l	*	*	*	*	<1.00	*	*	*
Arsenic, ug/l	1.00	2.00	2.00	2.00	1.00	*	<1.00	<1.00
Barium, mg/l	*	*	*	*	0.04	*	*	*
Cadmium, ug/l	*	*	*	*	<10.00	*	<10.00	<10.00
Chromium-VI, ug/l	*	*	*	*	<10.00	*	*	*
Fluoride, mg/l	0.60	0.50	0.40	0.50	0.60	*	0.50	0.55
Lead, ug/l	*	*	*	*	<1.00	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	<0.01	*	<0.01	<0.01
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	1.00	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	59.90	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	2.60	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	11.6
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

DATE	05/07/1988	10/20/1988	06/19/1989	10/12/1989	06/04/1990	10/02/1990
pH-Field	8.30	8.70	9.50	8.70	7.68	8.10
pH-Laboratory	8.40	8.50	8.50	8.40	8.50	*
Specific conductance, umhos/cm @ 25c	760.00	720.00	770.00	760.00	690.00	*
Total Dissolved Solids, mg/l	458.00	468.00	471.00	456.00	446.00	*
Total Suspended Solids, mg/l	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	162.00	175.00	166.00	166.00	152.00	*
Nitrate-N, mg/l	*	*	<0.01	0.10	*	*
Ammonia-N, mg/l	*	*	*	*	*	*
Calcium, mg/l	49.00	56.00	51.00	55.00	58.00	*
Magnesium, mg/l	22.00	*	22.00	25.00	24.00	*
Potassium, mg/l	3.60	3.80	3.60	3.90	3.40	*
Sodium, mg/l	62.00	68.00	66.00	67.00	58.00	*
Sulfate, mg/l	200.00	200.00	206.00	195.66	174.00	*
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*
Chloride, mg/l	11.76	13.50	12.00	12.00	10.00	*
Iron, mg/l	*	*	*	<0.10	*	*
Zinc, mg/l	*	*	*	*	*	*
Manganese, mg/l	*	*	*	<0.10	*	*
Copper, ug/l	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*
Strontium, mg/l	*	*	*	0.60	*	*
Boron, mg/l	0.08	0.12	0.15	0.13	<0.10	*
Beryllium, ug/l	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*
Arsenic, ug/l	*	*	*	*	*	*
Barium, mg/l	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*
Fluoride, mg/l	0.50	0.50	0.01	0.50	0.53	*
Lead, ug/l	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*
Temperature, Degrees C	*	*	16.20	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*

SAMPLE LOCATION 105 = Upper N. Evap Pond (UNEP)PAGE 1

DATE	05/31/1980 PAGE	06/10/1981 PAGE	05/27/1982	10/14/1982	04/28/1983	10/05/1983	05/18/1984	10/02/1984
pH-Field	7.60	8.00	9.40	8.20	8.70	8.80	8.30	8.40
pH-Laboratory	7.80	8.10	9.20	8.10	8.50	8.70	8.50	8.30
Specific conductance, umhos/cm @ 25c	2600.00	4000.00	3500.00	3800.00	4000.00	4100.00	8500.00	8500.00
Total Dissolved Solids, mg/l	2210.00	2900.00	2730.00	3420.00	4020.00	3740.00	9180.00	9150.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	10.00	26.00	83.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	89.00	88.00	92.00	53.00	103.00	50.00	222.00	255.00
Alkalinity Total, mg/l as CaCO3	89.00	88.00	92.00	53.00	113.00	76.00	305.00	255.00
Nitrate-N, mg/l	<0.20	<0.10	0.32	0.05	0.15	0.06	<0.01	0.50
Ammonia-N, mg/l	0.10	*	*	*	*	*	*	*
Calcium, mg/l	265.00	420.00	370.00	490.00	400.00	420.00	600.00	615.00
Magnesium, mg/l	86.00	110.00	150.00	120.00	300.00	220.00	750.00	680.00
Potassium, mg/l	15.00	16.00	17.00	18.00	17.00	21.00	31.00	34.00
Sodium, mg/l	215.00	300.00	290.00	350.00	340.00	405.00	700.00	655.00
Sulfate, mg/l	1400.00	2100.00	2200.00	2090.00	2600.00	2500.00	5700.00	5200.00
Methylene Blue Active Substances, mg/l	0.10	*	*	*	*	*	*	*
Chloride, mg/l	42.00	60.00	55.10	68.00	74.00	75.00	180.00	190.00
Iron, mg/l	0.10	0.20	<0.10	0.10	<0.10	<0.10	0.10	<0.10
Zinc, mg/l	50.00	*	*	*	*	*	*	*
Manganese, mg/l	0.12	0.12	0.17	0.04	0.05	0.07	0.40	0.50
Copper, ug/l	<50.00	*	*	*	*	*	*	*
Silver, ug/l	<40.00	*	*	*	*	*	*	*
Strontium, mg/l	1.70	2.70	2.80	2.90	4.50	3.80	4.10	10.00
Boron, mg/l	1.40	2.60	2.80	2.90	20.00	5.80	44.00	47.00
Beryllium, ug/l	<20.00	*	*	*	*	*	*	*
Nickel, ug/l	50.00	*	*	*	*	*	*	*
Selenium, ug/l	3.00	*	*	*	*	*	*	*
Mercury, ug/l	0.20	*	*	*	*	*	*	*
Arsenic, ug/l	4.00	8.00	<1.00	<1.00	10.00	3.00	220.00	150.00
Barium, mg/l	<0.30	*	*	*	*	*	*	*
Cadmium, ug/l	<1.00	*	*	*	*	*	*	*
Chromium-VI, ug/l	<5.00	*	*	*	*	*	*	*
Fluoride, mg/l	1.50	2.10	2.10	2.10	4.30	1.60	8.90	10.00
Lead, ug/l	<0.01	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	20.00	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	5.80	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	2.00	*	*	*	*	*	*	*

DATE	05/16/1983	10/24/1983	06/23/1986	10/23/1986	06/02/1987	10/09/1987	06/14/1988	10/24/1988
pH-Field	8.40	8.60	8.80	9.50	8.77	9.20	8.70	8.60
pH-Laboratory	8.20	8.30	8.50	8.40	8.60	8.30	8.60	8.50
Specific conductance, umhos/cm @ 25c	9100.00	9300.00	10600.00	11000.00	10500.00	1200.00	12600.00	14800.00
Total Dissolved Solids, mg/l	8780.00	9900.00	11900.00	12500.00	11300.00	12050.00	12700.00	15600.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	110.00	46.00	113.00	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	247.00	267.00	234.00	273.00	*	*	*	*
Alkalinity Total, mg/l as CaCO3	247.00	267.00	344.00	319.00	229.00	320.00	413.00	468.00
Nitrate-N, mg/l	0.08	0.35	0.11	0.29	0.04	0.15	0.03	0.32
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	580.00	595.00	580.00	540.00	550.00	602.00	540.00	600.00
Magnesium, mg/l	715.00	910.00	1100.00	1200.00	1100.00	747.00	1300.00	1400.00
Potassium, mg/l	32.00	34.00	41.00	44.00	46.00	52.90	56.00	78.00
Sodium, mg/l	640.00	745.00	860.00	810.00	960.00	1125.00	1000.00	1100.00
Sulfate, mg/l	5500.00	6540.00	7500.00	7500.00	6400.00	4975.30	7700.00	9300.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	180.00	200.00	315.00	330.00	320.00	339.20	370.00	490.00
Iron, mg/l	<0.10	<0.10	<0.10	<0.10	<0.10	<0.01	*	*
Zinc, mg/l	*	*	*	<0.01	*	*	*	*
Manganese, mg/l	0.10	<0.01	0.47	0.04	0.26	0.05	*	*
Copper, ug/l	*	*	*	<10.00	*	*	*	*
Silver, ug/l	*	*	*	<10.00	*	*	*	*
Strontium, mg/l	7.80	8.00	8.00	8.40	6.80	7.50	*	*
Boron, mg/l	40.00	48.00	64.00	54.00	58.00	66.75	76.00	70.20
Beryllium, ug/l	*	*	*	20.00	*	*	*	*
Nickel, ug/l	*	*	*	<10.00	<50.00	<50.00	*	*
Selenium, ug/l	*	*	*	<1.00	*	*	*	*
Mercury, ug/l	*	*	*	<1.00	*	*	*	*
Arsenic, ug/l	125.00	195.00	115.00	25.00	135.00	16.00	180.00	200.00
Barium, mg/l	*	*	*	0.06	*	*	*	*
Cadmium, ug/l	*	*	*	<10.00	<10.00	<10.00	*	*
Chromium-VI, ug/l	*	*	*	<10.00	*	*	*	*
Fluoride, mg/l	8.30	9.30	15.00	14.00	14.00	14.50	12.00	22.00
Lead, ug/l	*	*	*	<1.00	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	<0.01	<0.01	<0.01	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	8.60	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

DATE	06/30/1989	10/30/1989	06/12/1990
pH-Field	8.50	8.20	8.37
pH-Laboratory	8.50	8.30	8.30
Specific conductance, umhos/cm @ 25c	11100.00	1240.00	11700.00
Total Dissolved Solids, mg/l	11200.00	12000.00	11900.00
Total Suspended Solids, mg/l	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*
Alkalinity Total, mg/l as CaCO3	352.00	318.00	295.00
Nitrate-N, mg/l	<0.01	<0.01	*
Ammonia-N, mg/l	*	*	*
Calcium, mg/l	575.00	725.00	670.00
Magnesium, mg/l	980.00	1200.00	1100.00
Potassium, mg/l	57.00	70.00	75.00
Sodium, mg/l	1000.00	1300.00	1400.00
Sulfate, mg/l	6470.00	8135.00	7190.00
Methylene Blue Active Substances, mg/l	*	*	*
Chloride, mg/l	347.00	444.00	450.00
Iron, mg/l	*	<0.10	*
Zinc, mg/l	*	*	*
Manganese, mg/l	*	<0.10	*
Copper, ug/l	*	*	*
Silver, ug/l	*	*	*
Strontium, mg/l	*	7.10	*
Boron, mg/l	56.30	58.00	39.00
Beryllium, ug/l	*	*	*
Nickel, ug/l	*	*	*
Selenium, ug/l	*	*	*
Mercury, ug/l	*	*	*
Arsenic, ug/l	85.00	*	61.00
Barium, mg/l	*	*	*
Cadmium, ug/l	*	*	*
Chromium-VI, ug/l	*	*	*
Fluoride, mg/l	8.60	16.00	15.00
Lead, ug/l	*	*	*
Molybdenum, mg/l	*	*	*
Aluminum, mg/l	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*
Cyanide, mg/l	*	*	*
Phenol, ug/l	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*
Total Organic Carbon, mg/l	*	*	*
Temperature, Degrees C	21.00	*	*
Dissolved Oxygen, mg/l	*	*	*
Water Level depth below ground surface, ft.	*	*	*
Total Sulfur, mg/l	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*

SAMPLE LOCATION 106 = South Ash Pond (SAP) PAGE 1

DATE	05/31/1980 PAGE	10/05/1983	05/15/1984	05/15/1984 PAGE	10/01/1984	05/17/1985	10/24/1985	06/18/1986
pH-Field	9.90	8.80	8.30	*	8.70	8.90	8.70	8.70
pH-Laboratory	7.90	8.60	8.50	*	8.50	8.90	8.60	8.80
Specific conductance, umhos/cm @ 25c	2400.00	7400.00	9700.00	10000.00	10200.00	11000.00	11800.00	12700.00
Total Dissolved Solids, mg/l	2220.00	8477.00	10600.00	*	11200.00	13100.00	14300.00	15200.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	52.00	89.00	*	89.00	212.00	196.00	302.00
Alkalinity Bicarbonate, mg/l as CaCO3	56.00	127.00	271.00	*	217.00	302.00	231.00	157.00
Alkalinity Total, mg/l as CaCO3	56.00	179.00	360.00	329.00	306.00	514.00	427.00	459.00
Nitrate-N, mg/l	<0.20	0.28	0.20	*	0.10	0.46	0.49	0.28
Ammonia-N, mg/l	<0.10	*	*	*	*	*	*	*
Calcium, mg/l	286.00	660.00	645.00	710.00	710.00	710.00	695.00	500.00
Magnesium, mg/l	78.00	671.00	920.00	1100.00	1000.00	1200.00	1290.00	1700.00
Potassium, mg/l	14.00	32.00	36.00	42.00	42.00	44.00	46.00	51.00
Sodium, mg/l	200.00	630.00	785.00	750.00	760.00	835.00	1050.00	1025.00
Sulfate, mg/l	1300.00	5500.00	6400.00	7000.00	7200.00	8000.00	8800.00	9700.00
Methylene Blue Active Substances, mg/l	<0.10	*	*	*	*	*	*	*
Chloride, mg/l	31.00	149.00	165.00	190.00	235.00	330.00	385.00	430.00
Iron, mg/l	0.10	<0.10	1.30	3.70	<0.10	0.10	<0.10	<0.10
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	*	0.03	0.40	0.30	0.50	0.40	0.50	0.50
Copper, ug/l	<0.10	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	2.00	12.00	9.70	6.40	11.00	5.00	5.20	5.80
Boron, mg/l	1.90	41.00	56.00	60.00	58.00	64.00	74.00	97.00
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	4.00	*	*	95.00	*	*	*	*
Mercury, ug/l	0.40	*	*	*	*	*	*	*
Arsenic, ug/l	5.00	60.00	275.00	200.00	160.00	130.00	101.00	170.00
Barium, mg/l	<0.30	*	*	0.50	*	*	*	*
Cadmium, ug/l	<1.01	*	*	*	*	*	*	*
Chromium-VI, ug/l	5.00	*	19.00	*	*	*	*	*
Fluoride, mg/l	0.10	6.80	11.00	12.80	13.00	20.00	18.00	20.00
Lead, ug/l	*	*	34.00	0.30	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*

DATE	10/16/1986 MVTL	10/16/1986	01/19/1989	10/16/1989
pH-Field	8.93	*	8.50	7.60
pH-Laboratory	8.80	*	8.50	8.40
Specific conductance, umhos/cm @ 25c	14100.00	*	10500.00	10500.00
Total Dissolved Solids, mg/l	17300.00	*	10700.00	10000.00
Total Suspended Solids, mg/l	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	368.00	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	152.00	*	*	*
Alkalinity Total, mg/l as CaCO3	520.00	*	286.00	236.00
Nitrate-N, mg/l	<0.01	*	<0.01	<0.01
Ammonia-N, mg/l	*	2.90	*	*
Calcium, mg/l	535.00	*	650.00	735.00
Magnesium, mg/l	1800.00	*	770.00	585.00
Potassium, mg/l	56.00	*	61.00	78.00
Sodium, mg/l	1300.00	*	1000.00	1300.00
Sulfate, mg/l	9600.00	*	6375.00	6503.00
Methylene Blue Active Substances, mg/l	*	*	*	*
Chloride, mg/l	490.00	*	334.00	401.00
Iron, mg/l	<0.10	*	*	<0.10
Zinc, mg/l	<0.01	*	*	*
Manganese, mg/l	0.55	*	*	0.12
Copper, ug/l	<10.00	*	*	*
Silver, ug/l	<10.00	*	*	*
Strontium, mg/l	9.40	*	*	5.80
Boron, mg/l	89.00	*	40.80	28.00
Beryllium, ug/l	50.00	*	*	*
Nickel, ug/l	<10.00	*	*	*
Selenium, ug/l	<1.00	*	*	*
Mercury, ug/l	<1.00	*	*	*
Arsenic, ug/l	95.00	*	80.00	*
Barium, mg/l	0.05	*	*	*
Cadmium, ug/l	<10.00	*	*	*
Chromium-VI, ug/l	<10.00	*	*	*
Fluoride, mg/l	20.00	*	14.00	11.00
Lead, ug/l	<1.00	*	*	*
Molybdenum, mg/l	*	*	*	*
Aluminum, mg/l	<0.01	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*
Cyanide, mg/l	*	*	*	*
Phenol, ug/l	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	3.00	*	*
Chemical Oxygen Demand, mg/l	*	90.40	*	*
Total Organic Carbon, mg/l	*	20.00	*	*
Temperature, Degrees C	*	*	21.70	*
Dissolved Oxygen, mg/l	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*
Total Sulfur, mg/l	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*

SAMPLE LOCATION 107 = Extended Basin (Cooling) PAGE 1

DATE	05/21/1980 PAGE	06/10/1981 PAGE	05/23/1982	10/15/1982	04/29/1983	10/06/1983	05/21/1984	10/01/1984
pH-Field	7.40	8.30	8.10	8.30	8.30	8.50	8.30	8.50
pH-Laboratory	7.20	8.50	8.20	8.20	8.20	8.40	8.20	8.50
Specific conductance, umhos/cm @ 25c	3700.00	4500.00	5070.00	5400.00	5600.00	6800.00	4100.00	4500.00
Total Dissolved Solids, mg/l	3070.00	3400.00	4570.00	4680.00	5740.00	6231.00	3400.00	3560.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	14.00	<1.00	<1.00	<1.00	2.00	<1.00	17.00
Alkalinity Bicarbonate, mg/l as CaCO3	31.00	155.00	100.00	136.00	208.00	262.00	146.00	171.00
Alkalinity Total, mg/l as CaCO3	31.00	169.00	100.00	136.00	208.00	264.00	146.00	188.00
Nitrate-N, mg/l	0.38	0.10	1.34	0.55	2.00	1.20	0.54	0.83
Ammonia-N, mg/l	<0.10	*	*	*	*	*	*	*
Calcium, mg/l	296.00	360.00	570.00	550.00	690.00	650.00	380.00	415.00
Magnesium, mg/l	150.00	170.00	240.00	240.00	250.00	275.00	125.00	165.00
Potassium, mg/l	24.00	22.00	19.00	32.00	42.00	42.00	12.00	28.00
Sodium, mg/l	385.00	420.00	600.00	560.00	720.00	770.00	430.00	430.00
Sulfate, mg/l	1900.00	2300.00	3250.00	2880.00	3600.00	3300.00	2000.00	1800.00
Methylene Blue Active Substances, mg/l	0.10	*	*	*	*	*	*	*
Chloride, mg/l	73.00	126.00	174.00	175.00	170.00	309.00	145.00	235.00
Iron, mg/l	1.00	1.00	0.10	0.60	<0.10	<0.10	0.20	<0.10
Zinc, mg/l	60.00	*	*	*	*	*	*	*
Manganese, mg/l	0.12	0.08	0.05	0.07	0.03	0.01	<0.01	0.10
Copper, ug/l	<50.00	*	*	*	*	*	*	*
Silver, ug/l	<40.00	*	*	*	*	*	*	*
Strontium, mg/l	2.40	2.30	5.10	4.40	4.80	5.40	2.90	4.00
Boron, mg/l	0.50	0.50	1.20	4.00	2.00	3.50	2.10	3.50
Beryllium, ug/l	<20.00	*	*	*	*	*	*	*
Nickel, ug/l	50.00	*	*	*	*	*	*	*
Selenium, ug/l	<1.00	*	*	*	*	*	*	*
Mercury, ug/l	0.70	*	*	*	*	*	*	*
Arsenic, ug/l	35.00	18.00	17.00	23.00	20.00	26.00	21.00	18.00
Barium, mg/l	<0.30	*	*	*	*	*	*	*
Cadmium, ug/l	<1.00	*	*	*	*	*	*	*
Chromium-VI, ug/l	<5.00	*	*	*	*	*	*	*
Fluoride, mg/l	2.10	3.70	6.00	5.10	5.20	5.60	2.90	3.00
Lead, ug/l	<10.00	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	<2.00	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	26.00	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	8.00	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	10.00	*	*	*	*	*	*	*

DATE	05/17/1985	10/24/1985	06/16/1986	10/22/1986	05/27/1987	10/06/1987	06/07/1988	10/20/1988
pH-Field	8.30	8.40	7.20	8.74	8.59	8.80	8.20	8.50
pH-Laboratory	8.40	8.30	8.40	8.60	8.50	8.50	8.30	8.50
Specific conductance, umhos/cm @ 25c	5100.00	4700.00	5100.00	7300.00	5000.00	6600.00	6900.00	8400.00
Total Dissolved Solids, mg/l	5450.00	3990.00	4500.00	6910.00	4100.00	5269.00	5620.00	5380.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	18.00	80.00	24.00	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	280.00	211.00	284.00	399.00	*	*	*	*
Alkalinity Total, mg/l as CaCO3	250.00	211.00	302.00	479.00	232.00	372.00	230.00	295.00
Nitrate-N, mg/l	0.57	0.35	0.42	0.70	0.61	0.33	*	*
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	625.00	415.00	475.00	680.00	430.00	551.00	550.00	630.00
Magnesium, mg/l	235.00	170.00	205.00	340.00	172.00	247.00	230.00	255.00
Potassium, mg/l	36.00	24.00	32.00	54.00	33.00	42.70	42.00	46.00
Sodium, mg/l	645.00	470.00	530.00	620.00	550.00	800.00	710.00	805.00
Sulfate, mg/l	3100.00	2080.00	2600.00	3800.00	2500.00	3944.40	3400.00	3300.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	290.00	230.00	235.00	330.00	240.00	324.35	300.00	220.00
Iron, mg/l	0.10	<0.10	<0.10	<0.10	<0.10	<0.01	*	*
Zinc, mg/l	*	*	*	<0.01	*	*	*	*
Manganese, mg/l	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	*	*
Copper, ug/l	*	*	*	<10.00	*	*	*	*
Silver, ug/l	*	*	*	<10.00	*	*	*	*
Strontium, mg/l	4.60	3.20	4.40	8.00	4.30	5.40	*	*
Boron, mg/l	1.90	2.30	1.10	2.80	0.96	1.26	1.40	1.30
Beryllium, ug/l	*	*	*	<10.00	*	*	*	*
Nickel, ug/l	*	*	*	<10.00	<50.00	<50.00	*	*
Selenium, ug/l	*	*	*	<1.00	*	*	*	*
Mercury, ug/l	*	*	*	3.00	*	*	*	*
Arsenic, ug/l	23.00	20.00	17.00	11.00	16.00	22.00	*	*
Barium, mg/l	*	*	*	0.16	*	*	*	*
Cadmium, ug/l	*	*	*	<10.00	<10.00	<10.00	*	*
Chromium-VI, ug/l	*	*	*	<10.00	*	*	*	*
Fluoride, mg/l	5.40	4.40	5.00	6.40	4.00	5.10	5.00	5.10
Lead, ug/l	*	*	*	<1.00	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	<0.01	<0.01	<0.01	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	13.60	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

DATE	06/19/1989	10/12/1989	06/04/1990	10/02/1990
pH-Field	8.40	8.40	7.86	8.56
pH-Laboratory	8.50	8.50	8.40	*
Specific conductance, umhos/cm @ 25c	6600.00	6900.00	6900.00	*
Total Dissolved Solids, mg/l	5750.00	6150.00	6140.00	*
Total Suspended Solids, mg/l	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	*
Alkalinity Total, mg/l as CaCO3	288.00	315.00	247.00	*
Nitrate-N, mg/l	0.21	0.40	*	*
Ammonia-N, mg/l	*	*	*	*
Calcium, mg/l	549.00	585.00	595.00	*
Magnesium, mg/l	235.00	280.00	285.00	*
Potassium, mg/l	42.00	47.00	46.00	*
Sodium, mg/l	708.00	830.00	800.00	*
Sulfate, mg/l	3300.00	3500.00	3380.00	*
Methylene Blue Active Substances, mg/l	*	*	*	*
Chloride, mg/l	245.00	261.00	279.00	*
Iron, mg/l	*	<0.10	*	*
Zinc, mg/l	*	*	*	*
Manganese, mg/l	*	<0.10	*	*
Copper, ug/l	*	*	*	*
Silver, ug/l	*	*	*	*
Strontium, mg/l	*	5.70	*	*
Boron, mg/l	1.60	1.60	1.40	*
Beryllium, ug/l	*	*	*	*
Nickel, ug/l	*	*	*	*
Selenium, ug/l	*	*	*	*
Mercury, ug/l	*	*	*	*
Arsenic, ug/l	*	*	*	*
Barium, mg/l	*	*	*	*
Cadmium, ug/l	*	*	*	*
Chromium-VI, ug/l	*	*	*	*
Fluoride, mg/l	5.40	5.70	6.30	*
Lead, ug/l	*	*	*	*
Molybdenum, mg/l	*	*	*	*
Aluminum, mg/l	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*
Cyanide, mg/l	*	*	*	*
Phenol, ug/l	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*
Temperature, Degrees C	25.80	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*
Total Sulfur, mg/l	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*

SAMPLE LOCATION 108 = Recycle Basin (Holding) PAGE 1

DATE	05/31/1981 PAGE	09/10/1981 PAGE	05/28/1982	10/15/1982	04/26/1983	10/06/1983	05/15/1984	05/15/1984 PAGE
pH-Field	8.60	9.10	8.10	8.60	9.10	8.60	8.60	*
pH-Laboratory	7.80	8.40	8.60	8.50	8.70	8.40	8.40	8.4
Specific conductance, umhos/cm @ 25c	2600.00	4000.00	5060.00	6450.00	6400.00	8200.00	9200.00	9800.00
Total Dissolved Solids, mg/l	2400.00	3400.00	5090.00	6450.00	7500.00	9464.00	10400.00	9400.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	8.00	<1.00	32.00	98.00	<1.00	63.00	*
Alkalinity Bicarbonate, mg/l as CaCO3	62.00	86.00	137.00	127.00	163.00	253.00	271.00	*
Alkalinity Total, mg/l as CaCO3	62.00	94.00	137.00	159.00	261.00	253.00	334.00	316.00
Nitrate-N, mg/l	0.20	<0.10	1.45	0.18	0.50	0.30	0.16	*
Ammonia-N, mg/l	0.10	*	*	*	*	*	*	*
Calcium, mg/l	215.00	490.00	590.00	650.00	600.00	755.00	640.00	660.00
Magnesium, mg/l	80.00	180.00	390.00	470.00	630.00	874.00	835.00	980.00
Potassium, mg/l	14.00	19.00	28.00	30.00	28.00	31.00	34.00	40.00
Sodium, mg/l	220.00	280.00	420.00	500.00	530.00	635.00	760.00	720.00
Sulfate, mg/l	1100.00	2400.00	3650.00	4150.00	4200.00	6500.00	6000.00	6000.00
Methylene Blue Active Substances, mg/l	<0.10	*	*	*	*	*	*	*
Chloride, mg/l	42.00	59.00	87.00	122.00	130.00	179.00	186.00	190.00
Iron, mg/l	0.10	0.20	0.10	0.30	<0.10	<0.10	0.30	0.39
Zinc, mg/l	10.00	*	*	*	*	*	*	*
Manganese, mg/l	0.04	0.04	0.06	0.08	0.03	0.11	0.40	0.22
Copper, ug/l	50.00	*	*	*	*	*	*	*
Silver, ug/l	40.00	*	*	*	*	*	*	*
Strontium, mg/l	2.00	4.20	8.40	6.00	7.60	12.00	10.90	10.00
Boron, mg/l	1.90	6.60	8.80	25.00	35.00	46.00	50.00	58.00
Beryllium, ug/l	20.00	*	*	*	*	*	*	*
Nickel, ug/l	50.00	*	*	*	*	*	*	*
Selenium, ug/l	2.00	*	*	*	*	*	*	100.00
Mercury, ug/l	0.20	*	*	*	*	*	*	*
Arsenic, ug/l	12.00	19.00	39.00	80.00	110.00	160.00	385.00	160.00
Barium, mg/l	0.30	*	*	*	*	*	*	0.90
Cadmium, ug/l	1.00	*	*	*	*	*	*	*
Chromium-VI, ug/l	5.00	*	*	*	*	*	13.00	29.00
Fluoride, mg/l	1.40	2.70	6.00	5.80	9.30	9.30	10.00	11.60
Lead, ug/l	10.00	*	*	*	*	*	33.00	0.30
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	2.00	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxyger Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	2.00	*	*	*	*	*	*	*

DATE	10/01/1984	05/17/1985	10/24/1985	06/18/1986	10/22/1986	05/28/1987	10/07/1987	06/08/1988
pH-Field	8.60	8.80	8.70	8.70	8.81	9.83	8.60	8.30
pH-Laboratory	8.50	8.80	8.60	8.70	8.60	8.80	8.30	8.60
Specific conductance, umhos/cm @ 25c	9300.00	10700.00	11900.00	12100.00	11500.00	9900.00	11500.00	12000.00
Total Dissolved Solids, mg/l	10100.00	12400.00	13500.00	14500.00	12960.00	10300.00	11536.00	12000.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	67.00	166.00	157.00	235.00	181.00	170.00	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	208.00	223.00	257.00	187.00	258.00	*	*	*
Alkalinity Total, mg/l as CaCO3	275.00	389.00	414.00	422.00	449.00	319.00	316.00	376.00
Nitrate-N, mg/l	0.07	0.21	0.25	0.48	<0.01	0.14	<0.01	*
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	720.00	700.00	722.00	515.00	600.00	520.00	461.00	540.00
Magnesium, mg/l	960.00	1200.00	1232.00	1400.00	1280.00	950.00	709.00	1200.00
Potassium, mg/l	38.00	42.00	44.00	49.00	62.00	46.00	52.20	50.00
Sodium, mg/l	675.00	800.00	1040.00	995.00	990.00	550.00	940.00	960.00
Sulfate, mg/l	6600.00	7100.00	8800.00	8700.00	7040.00	5600.00	5402.80	7400.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	230.00	340.00	380.00	395.00	135.00	320.00	414.39	390.00
Iron, mg/l	<0.10	0.10	<0.10	<0.10	<0.10	<0.10	<0.01	*
Zinc, mg/l	*	*	*	*	<0.01	*	*	*
Manganese, mg/l	0.50	0.40	0.60	0.48	0.30	0.18	0.15	*
Copper, ug/l	*	*	*	*	50.00	*	*	*
Silver, ug/l	*	*	*	*	<10.00	*	*	*
Strontium, mg/l	10.00	2.70	5.20	6.80	8.90	6.30	6.60	*
Boron, mg/l	53.00	59.00	69.00	97.00	85.00	60.00	64.50	58.00
Beryllium, ug/l	*	*	*	*	<10.00	*	*	*
Nickel, ug/l	*	*	*	*	<10.00	<50.00	<50.00	*
Selenium, ug/l	*	*	*	*	<1.00	*	*	*
Mercury, ug/l	*	*	*	*	<1.00	*	*	*
Arsenic, ug/l	100.00	130.00	116.00	164.00	70.00	140.00	80.00	160.00
Barium, mg/l	*	*	*	*	0.02	*	*	*
Cadmium, ug/l	*	*	*	*	<10.00	<10.00	<10.00	*
Chromium-VI, ug/l	*	*	*	*	<10.00	*	*	*
Fluoride, mg/l	12.00	20.00	18.00	19.00	18.00	16.00	12.00	12.00
Lead, ug/l	*	*	*	*	<1.00	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	<0.01	0.04	<0.01	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	11.50	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

DATE	10/27/1988	06/19/1989	10/12/1989	06/05/1990	10/02/1990
pH-Field	8.40	8.40	6.50	7.64	8.23
pH-Laboratory	8.40	8.40	8.30	7.90	*
Specific conductance, umhos/cm @ 25c	13400.00	9900.00	10100.00	7300.00	*
Total Dissolved Solids, mg/l	13100.00	9680.00	9970.00	6590.00	*
Total Suspended Solids, mg/l	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	382.00	277.00	226.00	114.00	*
Nitrate-N, mg/l	*	<0.01	<0.01	*	*
Ammonia-N, mg/l	*	*	*	*	*
Calcium, mg/l	620.00	576.00	700.00	565.00	*
Magnesium, mg/l	1300.00	755.00	730.00	315.00	*
Potassium, mg/l	29.00	52.00	74.00	60.00	*
Sodium, mg/l	1290.00	926.00	1200.00	845.00	*
Sulfate, mg/l	7400.00	6185.00	5880.00	3510.00	*
Methylene Blue Active Substances, mg/l	*	*	*	*	*
Chloride, mg/l	400.00	313.00	371.00	311.00	*
Iron, mg/l	*	*	<0.10	*	*
Zinc, mg/l	*	*	*	*	*
Manganese, mg/l	*	*	<0.10	*	*
Copper, ug/l	*	*	*	*	*
Silver, ug/l	*	*	*	*	*
Strontium, mg/l	*	*	5.60	*	*
Boron, mg/l	57.50	35.00	27.00	4.20	*
Beryllium, ug/l	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*
Arsenic, ug/l	250.00	65.00	*	7.00	*
Barium, mg/l	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*
Fluoride, mg/l	17.00	13.00	11.00	8.50	*
Lead, ug/l	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*
Temperature, Degrees C	*	21.80	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*

SAMPLE LOCATION 110 = Fly Ash Runoff Basin PAGE 1

DATE	06/01/1980 PACE	05/23/1982	10/13/1982	04/29/1983	05/21/1984	05/17/1985	06/16/1986	10/15/1986
pH-Field	8.70	9.00	8.60	8.10	8.50	8.30	8.00	8.47
pH-Laboratory	8.30	9.00	8.40	8.40	8.30	8.50	9.20	8.00
Specific conductance, umhos/cm @ 25c	4300.00	790.00	1500.00	650.00	1240.00	1600.00	2300.00	3100.00
Total Dissolved Solids, mg/l	3480.00	370.00	1040.00	445.00	914.00	1260.00	1740.00	2570.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.01	10.00	<1.00	1.00	<1.00	<1.00	30.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	187.00	111.00	5.00	128.00	96.00	84.00	38.00	139.00
Alkalinity Total, mg/l as CaCO3	187.00	121.00	5.00	129.00	96.00	84.00	68.00	139.00
Nitrate-N, mg/l	0.20	<0.10	0.05	0.18	0.09	0.26	0.03	0.02
Ammonia-N, mg/l	0.11	*	*	*	*	*	*	*
Calcium, mg/l	140.00	66.00	100.00	52.00	101.00	130.00	158.00	200.00
Magnesium, mg/l	215.00	31.00	66.00	32.00	47.00	61.00	64.00	170.00
Potassium, mg/l	1.50	10.00	8.20	7.80	6.60	8.90	5.70	13.00
Sodium, mg/l	530.00	69.00	140.00	67.00	104.00	149.00	149.00	350.00
Sulfate, mg/l	1800.00	200.00	780.00	300.00	600.00	845.00	860.00	1700.00
Methylene Blue Active Substances, mg/l	0.10	*	*	*	*	*	*	*
Chloride, mg/l	31.00	5.40	11.00	10.00	6.10	9.70	15.00	25.00
Iron, mg/l	0.10	<0.10	0.20	<0.10	<0.10	0.10	<0.10	0.30
Zinc, mg/l	*	*	*	*	*	*	*	<0.01
Manganese, mg/l	0.10	0.03	0.04	0.01	0.02	0.04	0.01	1.50
Copper, ug/l	*	*	*	*	*	*	*	<10.00
Silver, ug/l	*	*	*	*	*	*	*	10.00
Strontium, mg/l	1.70	0.30	0.70	0.30	0.60	0.90	0.80	1.80
Boron, mg/l	0.20	0.20	0.20	0.10	0.13	0.22	0.15	0.25
Beryllium, ug/l	*	*	*	*	*	*	*	<10.00
Nickel, ug/l	*	*	*	*	*	*	*	<10.00
Selenium, ug/l	1.00	*	*	*	*	*	*	<1.00
Mercury, ug/l	0.20	*	*	*	*	*	*	<1.00
Arsenic, ug/l	1.00	2.00	<1.00	<1.00	1.00	2.00	2.00	1.00
Barium, mg/l	0.30	*	*	*	*	*	*	0.03
Cadmium, ug/l	1.00	*	*	*	*	*	*	<10.00
Chromium-VI, ug/l	5.00	*	*	*	*	*	*	<10.00
Fluoride, mg/l	0.50	0.20	0.20	0.10	0.20	0.20	0.30	0.30
Lead, ug/l	0.10	*	*	*	*	*	*	<1.00
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	0.04
Fecal Coliform Bacteria, # Col./100 ml	14.00	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	16.00	*	*	*	*	*	*	*

DATE	05/26/1987
pH-Field	8.38
pH-Laboratory	8.40
Specific conductance, umhos/cm @ 25c	1500.00
Total Dissolved Solids, mg/l	1020.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	6.00
Alkalinity Bicarbonate, mg/l as CaCO3	*
Alkalinity Total, mg/l as CaCO3	134.00
Nitrate-N, mg/l	0.02
Ammonia-N, mg/l	*
Calcium, mg/l	79.00
Magnesium, mg/l	62.00
Potassium, mg/l	9.80
Sodium, mg/l	148.00
Sulfate, mg/l	670.00
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	12.00
Iron, mg/l	<0.10
Zinc, mg/l	*
Manganese, mg/l	0.02
Copper, ug/l	*
Silver, ug/l	*
Strontium, mg/l	0.80
Boron, mg/l	0.13
Beryllium, ug/l	*
Nickel, ug/l	<50.00
Selenium, ug/l	*
Mercury, ug/l	*
Arsenic, ug/l	6.00
Barium, mg/l	*
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	*
Fluoride, mg/l	0.20
Lead, ug/l	*
Molybdenum, mg/l	*
Aluminum, mg/l	<0.01
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	*
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	*
Total Sulfur, mg/l	*
Total Coliform Bacteria, # Col./100 ml	*

DATE	05/09/1982	10/15/1982	04/29/1983	05/21/1984	03/17/1985	06/16/1986	10/16/1986	05/26/1987
pH-Field	8.00	7.80	8.00	8.00	7.60	7.20	7.51	7.30
pH-Laboratory	8.00	7.40	7.90	7.90	8.00	7.60	7.60	7.50
Specific conductance, umhos/cm @ 25c	810.00	1560.00	640.00	1430.00	1400.00	2500.00	1300.00	1490.00
Total Dissolved Solids, mg/l	580.00	1150.00	529.00	1170.00	1140.00	2170.00	1100.00	1100.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	*
Alkalinity Bicarbonate, mg/l as CaCO3	82.00	40.00	62.00	68.00	31.00	37.00	55.00	*
Alkalinity Total, mg/l as CaCO3	82.00	40.00	62.00	68.00	31.00	37.00	55.00	60.00
Nitrate-N, mg/l	<0.10	0.34	0.29	0.20	0.03	0.03	0.02	<0.01
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	95.00	162.00	73.00	153.00	151.00	178.00	131.00	135.00
Magnesium, mg/l	35.00	76.00	33.00	63.00	68.00	40.00	66.00	69.00
Potassium, mg/l	5.60	5.90	3.30	5.40	5.20	1.80	6.50	5.70
Sodium, mg/l	41.00	67.00	35.00	68.00	65.00	68.00	70.00	81.00
Sulfate, mg/l	410.00	860.00	300.00	690.00	730.00	730.00	660.00	789.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	1.40	3.00	1.40	1.70	2.40	2.20	3.50	1.80
Iron, mg/l	<0.10	0.10	<0.10	<0.10	0.10	<0.10	0.10	<0.10
Zinc, mg/l	*	*	*	*	*	*	<0.01	*
Manganese, mg/l	0.02	0.07	0.01	<0.01	0.06	<0.01	<0.01	0.06
Copper, ug/l	*	*	*	*	*	*	<10.00	*
Silver, ug/l	*	*	*	*	*	*	10.00	*
Strontium, mg/l	1.00	1.80	0.90	1.80	1.80	2.30	2.00	2.00
Boron, mg/l	1.00	1.40	0.70	1.40	0.41	0.68	1.70	1.20
Beryllium, ug/l	*	*	*	*	*	*	<10.00	*
Nickel, ug/l	*	*	*	*	*	*	<10.00	<50.00
Selenium, ug/l	*	*	*	*	*	*	<1.00	*
Mercury, ug/l	*	*	*	*	*	*	<1.00	*
Arsenic, ug/l	1.00	<1.00	<1.00	<1.00	2.00	<1.00	3.00	<1.00
Barium, mg/l	*	*	*	*	*	*	0.05	*
Cadmium, ug/l	*	*	*	*	*	*	<10.00	<10.00
Chromium-VI, ug/l	*	*	*	*	*	*	<10.00	*
Fluoride, mg/l	0.20	<0.10	0.10	0.10	0.10	0.10	0.10	0.10
Lead, ug/l	*	*	*	*	*	*	<1.00	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	0.01	0.02
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 112 = East Ash Pond (EAP) PAGE 1

DATE	06/10/1981 PACE	12/04/1981	05/28/1982	10/15/1982	04/29/1983	10/06/1983	05/15/1984	05/21/1984 PACE
pH-Field	9.70	9.10	9.20	8.70	9.10	8.70	8.50	*
pH-Laboratory	8.60	8.30	8.80	8.60	8.50	8.50	8.40	8.4
Specific conductance, umhos/cm @ 25c	4000.00	5100.00	5070.00	6200.00	6600.00	8900.00	7000.00	7800.00
Total Dissolved Solids, mg/l	3600.00	5360.00	5330.00	6220.00	8040.00	10112.00	7200.00	6500.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	18.00	60.00	37.00	42.00	134.00	42.00	31.00	*
Alkalinity Bicarbonate, mg/l as CaCO3	72.00	55.00	100.00	75.00	141.00	216.00	141.00	*
Alkalinity Total, mg/l as CaCO3	90.00	115.00	137.00	117.00	275.00	258.00	172.00	164.00
Nitrate-N, mg/l	<0.10	0.15	1.70	0.08	0.25	0.28	0.06	*
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	500.00	590.00	580.00	740.00	720.00	700.00	465.00	410.00
Magnesium, mg/l	200.00	320.00	410.00	410.00	730.00	941.00	535.00	620.00
Potassium, mg/l	18.00	24.00	28.00	26.00	28.00	34.00	32.00	38.00
Sodium, mg/l	260.00	370.00	560.00	470.00	550.00	650.00	665.00	620.00
Sulfate, mg/l	2500.00	3300.00	3780.00	4000.00	5200.00	6400.00	4500.00	4500.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	53.00	80.00	95.40	104.00	130.00	170.00	145.00	130.00
Iron, mg/l	0.10	0.04	0.10	0.30	<0.10	<0.10	0.20	0.20
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	0.04	0.07	0.09	0.05	0.03	0.16	<0.01	0.05
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	4.70	9.70	8.00	8.20	7.80	12.00	8.70	9.30
Boron, mg/l	8.20	12.40	25.00	22.00	28.00	49.00	37.00	42.00
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	16.00
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	16.00	18.00	50.00	12.00	150.00	21.00	34.00	32.00
Barium, mg/l	*	*	*	*	*	*	*	0.70
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	3.00	4.00
Fluoride, mg/l	2.90	3.50	4.90	5.10	8.30	10.00	5.60	6.40
Lead, ug/l	*	*	*	*	*	*	24.00	200.00
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

DATE	10/01/1984	05/16/1985	10/21/1985	06/18/1986	10/16/1986	10/16/1986 MVTL	05/28/1987	10/05/1987
pH-Field	8.60	8.60	8.50	8.60	8.23	*	8.96	8.70
pH-Laboratory	8.50	8.50	8.30	8.60	8.70	*	8.80	8.80
Specific conductance, umhos/cm @ 25c	9400.00	8300.00	10500.00	10550.00	12500.00	*	10300.00	12400.00
Total Dissolved Solids, mg/l	10100.00	9760.00	11000.00	11600.00	14800.00	*	10900.00	12646.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	50.00	*
Alkalinity Carbonate, mg/l as CaCO3	65.00	<1.00	33.00	148.00	269.00	*	231.00	*
Alkalinity Bicarbonate, mg/l as CaCO3	164.00	235.00	239.00	170.00	216.00	*	*	*
Alkalinity Total, mg/l as CaCO3	229.00	235.00	272.00	318.00	485.00	*	357.00	384.00
Nitrate-N, mg/l	0.14	0.15	0.12	0.02	0.63	*	0.15	<0.01
Ammonia-N, mg/l	*	*	*	*	*	2.25	*	*
Calcium, mg/l	660.00	460.00	490.00	490.00	530.00	*	575.00	622.00
Magnesium, mg/l	880.00	765.00	1005.00	1030.00	1660.00	*	1100.00	1171.00
Potassium, mg/l	48.00	39.00	50.00	58.00	68.00	*	47.00	63.60
Sodium, mg/l	805.00	780.00	1000.00	990.00	1100.00	*	860.00	1070.00
Sulfate, mg/l	7000.00	5400.00	7220.00	7200.00	8250.00	*	6100.00	6956.30
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	215.00	190.00	250.00	300.00	390.00	*	340.00	426.98
Iron, mg/l	<0.10	0.10	<0.10	<0.10	<0.10	*	<0.10	<0.01
Zinc, mg/l	*	*	*	*	<0.01	*	*	*
Manganese, mg/l	<0.01	0.10	<0.01	0.08	0.35	*	0.22	0.13
Copper, ug/l	*	*	*	*	<10.00	*	*	*
Silver, ug/l	*	*	*	*	<10.00	*	*	*
Strontium, mg/l	14.00	13.60	11.00	12.00	8.50	*	6.60	7.70
Boron, mg/l	53.00	47.00	66.00	74.00	86.00	*	66.00	76.75
Beryllium, ug/l	*	*	*	*	50.00	*	*	*
Nickel, ug/l	*	*	*	*	<10.00	*	<50.00	<50.00
Selenium, ug/l	*	*	*	*	<1.00	*	*	*
Mercury, ug/l	*	*	*	*	<1.00	*	*	*
Arsenic, ug/l	81.00	40.00	15.00	61.00	35.00	*	125.00	200.00
Barium, mg/l	*	*	*	*	0.05	*	*	*
Cadmium, ug/l	*	*	*	*	<10.00	*	<10.00	<10.00
Chromium-VI, ug/l	*	*	*	*	<10.00	*	*	*
Fluoride, mg/l	9.00	8.20	9.00	11.00	21.00	*	16.00	12.90
Lead, ug/l	*	*	*	*	<1.00	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	<0.01	*	*	<0.01
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	7.00	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	72.40	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	15.00	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	10.60
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

DATE	10/05/1987 PACE	06/07/1988	10/28/1988
pH-Field	*	9.40	8.30
pH-Laboratory	*	8.50	8.50
Specific conductance, umhos/cm @ 25c	18000.00	13100.00	14500.00
Total Dissolved Solids, mg/l	12500.00	13400.00	15200.00
Total Suspended Solids, mg/l	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*
Alkalinity Total, mg/l as CaCO3	350.00	422.00	426.00
Nitrate-N, mg/l	*	*	*
Ammonia-N, mg/l	*	*	*
Calcium, mg/l	470.00	600.00	650.00
Magnesium, mg/l	1200.00	1400.00	1500.00
Potassium, mg/l	62.00	58.00	80.00
Sodium, mg/l	1000.00	1100.00	1300.00
Sulfate, mg/l	6500.00	8500.00	8200.00
Methylene Blue Active Substances, mg/l	*	*	*
Chloride, mg/l	420.00	430.00	440.00
Iron, mg/l	0.08	*	*
Zinc, mg/l	*	*	*
Manganese, mg/l	0.10	*	*
Copper, ug/l	*	*	*
Silver, ug/l	*	*	*
Strontium, mg/l	8.40	*	*
Boron, mg/l	87.00	70.00	68.50
Beryllium, ug/l	*	*	*
Nickel, ug/l	*	*	*
Selenium, ug/l	*	*	*
Mercury, ug/l	*	*	*
Arsenic, ug/l	130.00	200.00	150.00
Barium, mg/l	*	*	*
Cadmium, ug/l	*	*	*
Chromium-VI, ug/l	*	*	*
Fluoride, mg/l	16.00	11.00	20.00
Lead, ug/l	*	*	*
Molybdenum, mg/l	*	*	*
Aluminum, mg/l	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*
Cyanide, mg/l	*	*	*
Phenol, ug/l	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*
Total Organic Carbon, mg/l	*	*	*
Temperature, Degrees C	*	*	*
Dissolved Oxygen, mg/l	*	*	*
Water Level depth below ground surface, ft.	*	*	*
Total Sulfur, mg/l	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*

DATE	05/27/1982	10/14/1982	04/28/1983	10/05/1983	05/16/1984	10/02/1984	05/16/1985	10/24/1985
pH-Field	8.40	8.40	9.20	9.20	8.40	8.20	8.40	8.40
pH-Laboratory	8.20	8.10	8.10	9.10	8.30	8.10	8.30	8.30
Specific conductance, umhos/cm @ 25c	3400.00	3650.00	2900.00	3900.00	1400.00	5050.00	1810.00	2700.00
Total Dissolved Solids, mg/l	2690.00	3010.00	2520.00	3439.00	1100.00	4680.00	1480.00	2160.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	42.00	<1.00	<1.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	137.00	85.00	137.00	29.00	120.00	140.00	160.00	123.00
Alkalinity Total, mg/l as CaCO3	137.00	85.00	137.00	74.00	120.00	140.00	160.00	123.00
Nitrate-N, mg/l	0.20	0.05	0.32	0.12	<0.01	0.39	0.32	0.12
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	450.00	380.00	310.00	370.00	136.00	415.00	185.00	206.00
Magnesium, mg/l	110.00	170.00	140.00	198.00	55.00	350.00	95.00	136.00
Potassium, mg/l	17.00	19.00	15.00	19.00	8.60	26.00	12.00	30.00
Sodium, mg/l	310.00	320.00	280.00	375.00	89.00	395.00	115.00	197.00
Sulfate, mg/l	3000.00	2000.00	1700.00	2300.00	640.00	2300.00	970.00	1365.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	53.10	64.00	50.00	68.00	14.00	100.00	24.00	39.00
Iron, mg/l	<0.10	0.10	0.10	<0.10	0.10	0.10	0.10	<0.10
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	0.10	0.04	0.03	0.10	0.05	0.50	0.04	0.02
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	3.00	2.70	2.30	3.30	0.90	1.00	1.30	1.50
Boron, mg/l	3.40	3.80	4.00	6.00	1.40	6.00	2.60	6.90
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	2.00	<1.00	<1.00	4.00	<1.00	3.00	2.00	1.00
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	*
Fluoride, mg/l	2.00	1.50	1.10	1.30	0.40	3.00	0.90	1.20
Lead, ug/l	*	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

DATE	06/28/1983	10/28/1983	06/02/1987	10/08/1987	06/14/1988	11/07/1988	06/20/1989
pH-Field	9.30	8.74	8.72	8.60	8.80	8.70	8.20
pH-Laboratory	9.20	8.50	7.90	8.10	8.70	8.40	8.10
Specific conductance, umhos/cm @ 25c	1600.00	1940.00	1130.00	1310.00	1810.00	3100.00	2900.00
Total Dissolved Solids, mg/l	1240.00	1480.00	757.00	840.00	1230.00	2230.00	2130.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	35.00	9.00	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	35.00	105.00	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	70.00	114.00	169.00	168.00	260.00	235.00	254.00
Nitrate-N, mg/l	<0.01	<0.01	<0.01	0.02	*	*	<0.01
Ammonia-N, mg/l	*	*	*	*	*	*	*
Calcium, mg/l	94.00	113.00	83.00	77.00	110.00	165.00	155.00
Magnesium, mg/l	97.00	97.00	55.00	68.00	89.00	175.00	155.00
Potassium, mg/l	12.00	11.90	10.50	12.30	17.00	23.00	25.00
Sodium, mg/l	114.00	125.00	60.00	81.00	124.00	245.00	236.00
Sulfate, mg/l	810.00	890.00	330.00	454.40	660.00	1400.00	1255.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*
Chloride, mg/l	28.00	23.00	12.00	12.70	24.00	42.70	40.00
Iron, mg/l	<0.10	<0.10	<0.10	0.31	*	*	*
Zinc, mg/l	*	<0.01	*	*	*	*	*
Manganese, mg/l	<0.01	0.01	<0.01	0.05	*	*	*
Copper, ug/l	*	<10.00	*	*	*	*	*
Silver, ug/l	*	<0.01	*	*	*	*	*
Strontium, mg/l	1.02	1.02	0.70	0.80	*	*	*
Boron, mg/l	2.20	2.40	0.95	1.16	2.00	2.80	4.10
Beryllium, ug/l	*	10.00	*	*	*	*	*
Nickel, ug/l	*	<10.00	<50.00	<50.00	*	*	*
Selenium, ug/l	*	<1.00	*	*	*	*	*
Mercury, ug/l	*	<1.00	*	*	*	*	*
Arsenic, ug/l	3.00	<1.00	6.00	9.00	5.00	<1.00	4.00
Barium, mg/l	*	0.04	*	*	*	*	*
Cadmium, ug/l	*	<10.00	<10.00	<10.00	*	*	*
Chromium-VI, ug/l	*	<10.00	*	*	*	*	*
Fluoride, mg/l	0.60	0.90	0.30	0.66	0.70	0.80	1.00
Lead, ug/l	*	<1.00	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*
Aluminum, mg/l	*	<0.01	<0.01	0.08	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	6.10	*	*	21.40
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*

DATE	10/24/1985	06/30/1986	10/22/1986	10/23/1986	06/02/1987	10/09/1987	01/14/1988	11/07/1988
				MWTL				
pH-Field	8.20	8.90	8.27	*	8.74	8.70	8.40	8.50
pH-Laboratory	8.20	8.80	8.20	*	8.60	8.10	8.30	8.30
Specific conductance, umhos/cm @ 25c	2100.00	1900.00	1960.00	*	1720.00	2500.00	4400.00	5300.00
Total Dissolved Solids, mg/l	1720.00	1530.00	1620.00	*	1340.00	1982.00	3270.00	4930.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	16.00	<1.00	*	12.00	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	176.00	76.00	191.00	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	176.00	92.00	191.00	*	145.00	227.00	247.00	364.00
Nitrate-N, mg/l	0.20	<0.01	<0.01	*	<0.01	0.04	*	*
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	176.00	128.00	164.00	*	*	181.00	270.00	350.00
Magnesium, mg/l	126.00	127.00	130.00	*	100.00	145.00	270.00	400.00
Potassium, mg/l	7.00	5.60	6.40	*	6.50	7.20	9.00	14.00
Sodium, mg/l	187.00	155.00	149.00	*	108.00	170.00	315.00	458.00
Sulfate, mg/l	1250.00	1100.00	960.00	*	690.00	1057.80	2100.00	2800.00
Methylene Blue Active Substances, mg/l	*	*	*	<0.50	*	*	*	*
Chloride, mg/l	21.00	16.00	17.00	*	13.00	19.50	37.00	47.94
Iron, mg/l	<0.10	<0.10	<0.10	*	<0.10	0.74	*	*
Zinc, mg/l	*	*	<0.01	*	*	*	*	*
Manganese, mg/l	<0.01	0.01	0.18	*	<0.01	0.49	*	*
Copper, ug/l	*	*	<10.00	*	*	*	*	*
Silver, ug/l	*	*	<10.00	*	*	*	*	*
Strontium, mg/l	1.20	1.40	1.50	*	1.10	1.70	*	*
Boron, mg/l	1.10	0.88	1.10	*	0.56	1.02	1.40	2.00
Beryllium, ug/l	*	*	<10.00	*	*	*	*	*
Nickel, ug/l	*	*	<10.00	*	<50.00	<50.00	*	*
Selenium, ug/l	*	*	<1.00	*	*	*	*	*
Mercury, ug/l	*	*	<1.00	*	*	*	*	*
Arsenic, ug/l	<1.00	1.00	<1.00	*	1.00	<1.00	*	*
Barium, mg/l	*	*	0.06	*	*	*	*	*
Cadmium, ug/l	*	*	<10.00	*	<10.00	<10.00	*	*
Chromium-VI, ug/l	*	*	<10.00	*	*	*	*	*
Fluoride, mg/l	0.30	0.20	0.30	*	0.20	0.37	0.40	0.40
Lead, ug/l	*	*	<1.00	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	<0.01	*	<0.01	0.06	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	<10.00	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	5.60	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	>1.00	*	*	*	*

DATE	06/20/1989	10/30/1989	06/12/1990
pH-Field	8.40	8.10	8.44
pH-Laboratory	8.40	8.10	8.26
Specific conductance, umhos/cm @ 25c	4100.00	6400.00	4500.00
Total Dissolved Solids, mg/l	3440.00	5520.00	4008.00
Total Suspended Solids, mg/l	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*
Alkalinity Total, mg/l as CaCO3	196.00	186.00	143.00
Nitrate-N, mg/l	<0.01	<0.01	*
Ammonia-N, mg/l	*	*	*
Calcium, mg/l	*	360.00	240.00
Magnesium, mg/l	*	490.00	340.00
Potassium, mg/l	11.00	17.00	12.00
Sodium, mg/l	335.00	605.00	405.00
Sulfate, mg/l	2130.00	4100.00	2445.00
Methylene Blue Active Substances, mg/l	*	*	*
Chloride, mg/l	38.00	54.00	44.00
Iron, mg/l	*	<0.10	*
Zinc, mg/l	*	*	*
Manganese, mg/l	*	<0.10	*
Copper, ug/l	*	*	*
Silver, ug/l	*	*	*
Strontium, mg/l	*	3.40	*
Boron, mg/l	1.50	2.50	1.60
Beryllium, ug/l	*	*	*
Nickel, ug/l	*	*	*
Selenium, ug/l	*	*	*
Mercury, ug/l	*	*	*
Arsenic, ug/l	*	*	*
Barium, mg/l	*	*	*
Cadmium, ug/l	*	*	*
Chromium-VI, ug/l	*	*	*
Fluoride, mg/l	0.40	0.50	0.30
Lead, ug/l	*	*	*
Molybdenum, mg/l	*	*	*
Aluminum, mg/l	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*
Cyanide, mg/l	*	*	*
Phenol, ug/l	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*
Total Organic Carbon, mg/l	*	*	*
Temperature, Degrees C	21.50	*	*
Dissolved Oxygen, mg/l	*	*	*
Water Level depth below ground surface, ft.	*	*	*
Total Sulfur, mg/l	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*

DATE	08/31/1987
pH Field	8.30
pH-Laboratory	8.20
Specific conductance, umhos/cm @ 25c	770.00
Total Dissolved Solids, mg/l	519.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	183.00
Alkalinity Total, mg/l as CaCO3	183.00
Nitrate-N, mg/l	0.62
Ammonia-N, mg/l	*
Calcium, mg/l	41.00
Magnesium, mg/l	34.00
Potassium, mg/l	9.90
Sodium, mg/l	73.00
Sulfate, mg/l	*
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	10.50
Iron, mg/l	0.06
Zinc, mg/l	*
Manganese, mg/l	0.04
Copper, ug/l	<10.00
Silver, ug/l	*
Strontium, mg/l	0.49
Boron, mg/l	0.65
Beryllium, ug/l	<10.00
Nickel, ug/l	*
Selenium, ug/l	<1.00
Mercury, ug/l	*
Arsenic, ug/l	<1.00
Barium, mg/l	*
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	*
Fluoride, mg/l	0.12
Lead, ug/l	*
Molybdenum, mg/l	*
Aluminum, mg/l	0.20
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, ug/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	*
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	*
Total Sulfur, mg/l	*
Total Coliform Bacteria, # Col./100 ml	*

SAMPLE LOCATION 114 = Lower E. Evap Pond (LEEP)PAGE 1

DATE	04/29/1983	10/06/1983	05/18/1984	10/01/1984	05/16/1985	10/24/1985	05/20/1986	10/16/1986
pH-Field	8.90	8.50	8.40	8.40	8.40	8.50	8.40	8.67
pH-Laboratory	8.70	8.40	8.30	8.30	8.30	8.30	8.40	8.50
Specific conductance, umhos/cm @ 25c	4400.00	5900.00	5500.00	6400.00	7500.00	9800.00	9500.00	11300.00
Total Dissolved Solids, mg/l	4360.00	6126.00	5100.00	6530.00	7500.00	10200.00	10000.00	12400.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	38.00	5.00	<1.00	<1.00	<1.00	15.00	46.00	79.00
Alkalinity Bicarbonate, mg/l as CaCO3	70.00	103.00	117.00	174.00	180.00	196.00	213.00	184.00
Alkalinity Total, mg/l as CaCO3	108.00	108.00	117.00	174.00	180.00	211.00	259.00	263.00
Nitrate-N, mg/l	0.97	0.15	<0.02	0.14	0.21	0.12	0.23	0.01
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	450.00	580.00	435.00	625.00	450.00	565.00	445.00	570.00
Magnesium, mg/l	290.00	363.00	275.00	680.00	400.00	770.00	818.00	1200.00
Potassium, mg/l	21.00	33.00	28.00	42.00	39.00	48.00	57.00	67.00
Sodium, mg/l	420.00	580.00	570.00	745.00	685.00	1035.00	1050.00	1200.00
Sulfate, mg/l	2800.00	3600.00	3400.00	5200.00	3500.00	6700.00	6500.00	7300.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	87.00	119.00	108.00	180.00	180.00	230.00	250.00	315.00
Iron, mg/l	<0.10	<0.10	<0.10	<0.10	0.10	<0.10	<0.10	<0.10
Zinc, mg/l	*	*	*	*	*	*	*	<0.01
Manganese, mg/l	0.02	0.20	<0.01	<0.01	0.07	<0.01	<0.01	<0.01
Copper, ug/l	*	*	*	*	*	*	*	<10.00
Silver, ug/l	*	*	*	*	*	*	*	<10.00
Strontium, mg/l	5.00	7.80	5.80	12.00	7.60	10.00	11.00	12.00
Boron, mg/l	16.40	21.00	18.00	40.00	32.00	49.00	49.00	71.00
Beryllium, ug/l	*	*	*	*	*	*	*	20.00
Nickel, ug/l	*	*	*	*	*	*	*	<10.00
Selenium, ug/l	*	*	*	*	*	*	*	<1.00
Mercury, ug/l	*	*	*	*	*	*	*	<1.00
Arsenic, ug/l	13.00	3.00	3.00	30.00	12.00	16.00	14.00	<1.00
Barium, mg/l	*	*	*	*	*	*	*	0.04
Cadmium, ug/l	*	*	*	*	*	*	*	<10.00
Chromium-VI, ug/l	*	*	*	*	*	*	*	<10.00
Fluoride, mg/l	3.40	3.30	2.40	6.00	5.80	6.50	7.20	9.50
Lead, ug/l	*	*	*	*	*	*	*	<1.00
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	<0.01
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

DATE	10/16/1986	06/01/1987	10/05/1987	10/05/1987	06/08/1988	10/31/1988	06/19/1989	10/23/1989
MVTL				PACE				
pH-Field	*	8.60	8.80	*	8.30	8.70	8.60	*
pH-Laboratory	*	8.60	8.90	*	8.50	8.40	8.60	8.30
Specific conductance, umhos/cm @ 25c	*	10900.00	14400.00	21000.00	14400.00	19800.00	13300.00	16600.00
Total Dissolved Solids, mg/l	*	11200.00	14800.00	15200.00	14800.00	19800.00	14500.00	13900.00
Total Suspended Solids, mg/l	*	28.00	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	94.00	*	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	*	245.00	326.00	270.00	391.00	544.00	406.00	466.00
Nitrate-N, mg/l	*	<0.01	<0.01	*	*	*	<0.01	0.30
Ammonia-N, mg/l	2.58	*	*	*	*	*	*	*
Calcium, mg/l	*	490.00	612.00	440.00	550.00	590.00	572.00	630.00
Magnesium, mg/l	*	1100.00	1369.00	1400.00	1500.00	2300.00	1400.00	2000.00
Potassium, mg/l	*	55.00	75.90	74.00	72.00	105.00	72.00	100.00
Sodium, mg/l	*	670.00	1420.00	1200.00	1300.00	1900.00	1270.00	1900.00
Sulfate, mg/l	*	6500.00	10054.00	9300.00	9400.00	13000.00	8350.00	12200.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	*	310.00	399.04	440.00	460.00	600.00	430.00	624.74
Iron, mg/l	*	<0.10	<0.01	0.11	*	*	*	<0.10
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	*	<0.01	0.01	0.05	*	*	*	<0.10
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	*	9.60	13.40	13.00	*	*	*	9.60
Boron, mg/l	*	57.00	76.00	89.00	86.00	118.00	78.30	108.00
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	<50.00	<50.00	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	*	5.00	11.00	54.00	65.00	30.00	130.00	*
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	<10.00	<10.00	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	*
Fluoride, mg/l	*	11.00	10.80	14.00	11.00	16.00	17.00	15.00
Lead, ug/l	*	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	<0.01	<0.01	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	1.00	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	69.80	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	17.00	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	3.60	*	*	*	21.80	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

DATE	06/11/1990	10/09/1990
pH-Field	8.50	8.47
pH-Laboratory	8.30	*
Specific conductance, umhos/cm @ 25c	14800.00	*
Total Dissolved Solids, mg/l	15700.00	*
Total Suspended Solids, mg/l	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*
Alkalinity Total, mg/l as CaCO3	401.00	*
Nitrate-N, mg/l	*	*
Ammonia-N, mg/l	*	*
Calcium, mg/l	490.00	*
Magnesium, mg/l	1700.00	*
Potassium, mg/l	90.00	*
Sodium, mg/l	1700.00	*
Sulfate, mg/l	9350.00	*
Methylene Blue Active Substances, mg/l	*	*
Chloride, mg/l	562.00	*
Iron, mg/l	*	*
Zinc, mg/l	*	*
Manganese, mg/l	*	*
Copper, ug/l	*	*
Silver, ug/l	*	*
Strontium, mg/l	*	*
Boron, mg/l	15.00	*
Beryllium, ug/l	*	*
Nickel, ug/l	*	*
Selenium, ug/l	*	*
Mercury, ug/l	*	*
Arsenic, ug/l	16.00	*
Barium, mg/l	*	*
Cadmium, ug/l	*	*
Chromium-VI, ug/l	*	*
Fluoride, mg/l	18.00	*
Lead, ug/l	*	*
Molybdenum, mg/l	*	*
Aluminum, mg/l	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*
Cyanide, mg/l	*	*
Phenol, ug/l	*	*
Biochemical Oxygen Demand, mg/l	*	*
Chemical Oxygen Demand, mg/l	*	*
Total Organic Carbon, mg/l	*	*
Temperature, Degrees C	*	*
Dissolved Oxygen, mg/l	*	*
Water Level depth below ground surface, ft.	*	*
Total Sulfur, mg/l	*	*
Total Coliform Bacteria, # Col./100 ml	*	*

SAMPLE LOCATION 115 = Saylor Slough PAGE 1

DATE	06/10/1981	05/27/1982	10/15/1982	04/28/1983	10/06/1983	05/19/1984	10/02/1984	05/16/1985
	PACE							
pH-Field	8.70	8.60	8.60	8.30	8.70	8.60	9.10	8.00
pH-Laboratory	8.50	8.20	8.50	8.30	8.50	8.60	9.00	8.20
Specific conductance, umhos/cm @ 25c	1400.00	1340.00	1450.00	960.00	1520.00	1650.00	2100.00	1910.00
Total Dissolved Solids, mg/l	1000.00	600.00	960.00	681.00	1152.00	1210.00	1560.00	1430.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	18.00	<1.00	<1.00	4.00	32.00	21.00	63.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	409.00	322.00	287.00	311.00	342.00	326.00	235.00	374.00
Alkalinity Total, mg/l as CaCO3	427.00	322.00	287.00	315.00	377.00	347.00	298.00	374.00
Nitrate-N, mg/l	<0.10	0.21	0.34	0.50	0.38	0.13	0.50	0.38
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	60.00	83.00	55.00	55.00	53.00	93.00	53.00	110.00
Magnesium, mg/l	78.00	62.00	75.00	52.00	87.00	70.00	110.00	98.00
Potassium, mg/l	19.00	17.00	18.00	12.00	19.00	11.00	20.00	14.00
Sodium, mg/l	130.00	140.00	170.00	120.00	194.00	186.00	280.00	205.00
Sulfate, mg/l	400.00	410.00	540.00	320.00	530.00	630.00	915.00	680.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	12.00	12.20	16.00	10.00	17.00	14.00	25.00	24.00
Iron, mg/l	0.30	0.10	0.30	<0.10	<0.10	<0.10	<0.10	<0.10
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	0.08	0.15	0.06	0.02	0.02	0.02	0.02	0.06
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	0.84	0.70	0.50	0.60	0.80	0.80	0.70	1.10
Boron, mg/l	0.20	0.60	0.50	0.50	1.00	1.20	2.00	0.28
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	3.00	1.00	1.00	3.00	4.00	6.00	3.00
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	*
Fluoride, mg/l	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Lead, ug/l	*	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

DATE	10/24/1985	06/19/1986	10/21/1986	10/21/1986 NVTL	05/27/1987	10/08/1987	06/09/1988	11/01/1988
pH-Field	8.50	8.50	8.60	*	8.61	8.80	8.40	8.80
pH-Laboratory	8.60	8.80	8.60	*	8.50	8.60	8.40	8.50
Specific conductance, umhos/cm @ 25c	2400.00	2400.00	1950.00	*	1600.00	1470.00	1720.00	1710.00
Total Dissolved Solids, mg/l	1780.00	*	1450.00	*	1100.00	921.00	1140.00	1080.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	35.00	61.00	30.00	*	18.00	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	355.00	386.00	390.00	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	390.00	447.00	420.00	*	377.00	347.00	390.00	384.00
Nitrate-N, mg/l	<0.01	0.20	<0.01	*	0.01	0.01	*	*
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	86.00	97.00	84.00	*	88.00	17.00	76.00	63.00
Magnesium, mg/l	127.00	130.00	132.00	*	88.00	57.00	100.00	110.00
Potassium, mg/l	18.00	14.00	15.10	*	12.00	7.80	11.00	13.00
Sodium, mg/l	385.00	245.00	212.00	*	145.00	83.00	124.00	143.00
Sulfate, mg/l	980.00	855.00	710.00	*	410.00	127.00	530.00	530.00
Methylene Blue Active Substances, mg/l	*	*	*	<0.50	*	*	*	*
Chloride, mg/l	33.00	28.00	26.00	*	20.00	16.38	25.09	24.30
Iron, mg/l	<0.10	<0.10	<0.10	*	<0.10	<0.01	*	*
Zinc, mg/l	*	*	<0.01	*	*	*	*	*
Manganese, mg/l	0.02	0.03	<0.01	*	<0.01	0.01	*	*
Copper, ug/l	*	*	<10.00	*	*	*	*	*
Silver, ug/l	*	*	<10.00	*	*	*	*	*
Strontium, mg/l	1.00	1.40	1.70	*	1.30	1.10	*	*
Boron, mg/l	2.90	3.00	2.30	*	1.90	1.03	2.30	1.80
Beryllium, ug/l	*	*	<10.00	*	*	*	*	*
Nickel, ug/l	*	*	<10.00	*	<50.00	<50.00	*	*
Selenium, ug/l	*	*	<1.00	*	*	*	*	*
Mercury, ug/l	*	*	<1.00	*	*	*	*	*
Arsenic, ug/l	1.00	2.00	<1.00	*	2.00	1.00	2.00	<1.00
Barium, mg/l	*	*	0.07	*	*	*	*	*
Cadmium, ug/l	*	*	<10.00	*	<10.00	<10.00	*	*
Chromium-VI, ug/l	*	*	<10.00	*	*	*	*	*
Fluoride, mg/l	0.10	0.20	0.20	*	0.30	0.17	0.30	*
Lead, ug/l	*	*	<1.00	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	<0.01	*	<0.01	<0.01	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	<10.00	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	3.30	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	1.00	*	*	*	*

DATE	06/19/1989	10/30/1989	06/07/1990	10/04/1990
pH-Field	8.60	8.40	8.33	9.67
pH-Laboratory	8.30	8.70	8.47	*
Specific conductance, umhos/cm @ 25c	1560.00	1860.00	1610.00	*
Total Dissolved Solids, mg/l	1070.00	1290.00	1050.00	*
Total Suspended Solids, mg/l	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*	*
Alkalinity Total, mg/l as CaCO3	434.00	449.00	425.00	*
Nitrate-N, mg/l	<0.01	<0.01	*	*
Ammonia-N, mg/l	*	*	*	*
Calcium, mg/l	64.00	42.90	52.50	*
Magnesium, mg/l	95.00	140.00	113.80	*
Potassium, mg/l	14.00	20.00	16.71	*
Sodium, mg/l	123.00	194.00	143.00	*
Sulfate, mg/l	444.00	587.00	451.00	*
Methylene Blue Active Substances, mg/l	*	*	*	*
Chloride, mg/l	20.00	28.00	23.00	*
Iron, mg/l	*	<0.10	*	*
Zinc, mg/l	*	*	*	*
Manganese, mg/l	*	<0.10	*	*
Copper, ug/l	*	*	*	*
Silver, ug/l	*	*	*	*
Strontium, mg/l	*	1.11	*	*
Boron, mg/l	1.50	2.20	1.30	*
Beryllium, ug/l	*	*	*	*
Nickel, ug/l	*	*	*	*
Selenium, ug/l	*	*	*	*
Mercury, ug/l	*	*	*	*
Arsenic, ug/l	6.00	*	1.00	*
Barium, mg/l	*	*	*	*
Cadmium, ug/l	*	*	*	*
Chromium-VI, ug/l	*	*	*	*
Fluoride, mg/l	0.20	0.20	0.13	*
Lead, ug/l	*	*	*	*
Molybdenum, mg/l	*	*	*	*
Aluminum, mg/l	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*
Cyanide, mg/l	*	*	*	*
Phenol, ug/l	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*
Temperature, Degrees C	24.00	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*
Total Sulfur, mg/l	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*

DATE	10/24/1985	06/17/1986	10/22/1986	10/22/1986 MVTL	05/27/1987	10/08/1987	06/09/1988
pH-Field	8.60	8.30	3.73	*	7.93	8.00	8.60
pH-Laboratory	8.60	9.10	8.60	*	7.80	8.50	8.60
Specific conductance, umhos/cm @ 25c	3500.00	2400.00	2700.00	*	1450.00	2000.00	2100.00
Total Dissolved Solids, mg/l	2520.00	1650.00	2020.00	*	968.00	1318.00	1360.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	52.00	<1.00	48.00	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	545.00	437.00	475.00	*	*	*	*
Alkalinity Total, mg/l as CaCO3	597.00	437.00	518.00	*	254.00	371.00	443.00
Nitrate-N, mg/l	<0.01	0.03	<0.01	*	0.02	0.01	*
Ammonia-N, mg/l	*	*	*	*	*	*	*
Calcium, mg/l	80.00	83.00	156.00	*	55.00	60.00	73.00
Magnesium, mg/l	162.00	130.00	160.00	*	68.00	112.00	110.00
Potassium, mg/l	17.00	15.00	28.00	*	12.00	16.80	15.00
Sodium, mg/l	455.00	270.00	340.00	*	130.00	208.00	182.00
Sulfate, mg/l	1225.00	885.00	1047.00	*	395.00	691.40	640.00
Methylene Blue Active Substances, mg/l	*	*	*	<0.50	*	*	*
Chloride, mg/l	58.00	29.00	42.00	*	17.00	25.81	28.00
Iron, mg/l	<0.10	0.10	<0.10	*	<0.10	0.05	*
Zinc, mg/l	*	*	<0.01	*	*	*	*
Manganese, mg/l	0.02	0.23	<0.01	*	0.16	0.03	*
Copper, ug/l	*	*	<10.00	*	*	*	*
Silver, ug/l	*	*	<10.00	*	*	*	*
Strontium, mg/l	1.00	1.30	1.30	*	0.80	1.10	*
Boron, mg/l	2.80	2.80	3.00	*	1.22	3.08	2.60
Beryllium, ug/l	*	*	<10.00	*	*	*	*
Nickel, ug/l	*	*	<10.00	*	<50.00	<50.00	*
Selenium, ug/l	*	*	<1.00	*	*	*	*
Mercury, ug/l	*	*	<1.00	*	*	*	*
Arsenic, ug/l	1.00	3.00	<1.00	*	2.00	2.00	2.00
Barium, mg/l	*	*	0.05	*	*	*	*
Cadmium, ug/l	*	*	<10.00	*	<10.00	<10.00	*
Chromium-VI, ug/l	*	*	<10.00	*	*	*	*
Fluoride, mg/l	0.20	0.20	0.30	*	0.20	0.22	0.30
Lead, ug/l	*	*	<1.00	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	<0.01	*	<0.01	<0.01	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	15.00	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	3.10	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	>16.00	*	*	*

SAMPLE LOCATION 116 = Upper Gradin Slough PAGE 1

DATE	06/10/1981	05/27/1982	10/15/1982	04/28/1983	10/06/1983	05/21/1984	10/02/1984	05/16/1985
	PAGE							
pH-Field	9.00	8.10	8.30	8.00	8.70	8.50	8.60	8.40
pH-Laboratory	8.70	7.90	8.20	8.10	8.50	8.50	8.60	8.30
Specific conductance, umhos/cm @ 25c	400.00	1160.00	1300.00	990.00	2600.00	1750.00	4900.00	1900.00
Total Dissolved Solids, mg/l	770.00	660.00	857.00	714.00	2125.00	1270.00	3780.00	1410.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	40.00	<1.00	<1.00	<1.00	64.00	21.00	56.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	411.00	300.00	351.00	323.00	684.00	339.00	789.00	361.00
Alkalinity Total, mg/l as CaCO3	451.00	300.00	351.00	323.00	748.00	360.00	845.00	361.00
Nitrate-N, mg/l	<0.10	<0.10	0.87	0.28	<0.05	0.31	0.07	1.90
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	42.00	74.00	54.00	66.00	48.00	92.00	106.00	99.00
Magnesium, mg/l	61.00	57.00	62.00	55.00	123.00	80.00	220.00	98.00
Potassium, mg/l	22.00	18.00	21.00	13.00	41.00	17.00	55.00	15.00
Sodium, mg/l	130.00	130.00	140.00	120.00	455.00	198.00	710.00	220.00
Sulfate, mg/l	180.00	370.00	370.00	330.00	900.00	565.00	2000.00	765.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	11.00	11.80	14.00	11.00	45.00	19.00	79.00	20.00
Iron, mg/l	0.10	<0.10	0.20	<0.10	0.10	<0.10	<0.10	<0.10
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	0.12	0.19	0.07	0.09	0.11	<0.01	0.20	0.06
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	0.40	0.60	0.40	0.50	0.60	0.70	1.60	1.00
Boron, mg/l	<0.20	0.50	0.40	0.50	0.85	1.40	2.20	2.90
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	2.00	2.00	<1.00	2.00	4.00	3.00	3.00	3.00
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	*
Fluoride, mg/l	0.50	0.20	0.10	0.20	0.20	0.20	0.40	0.20
Lead, ug/l	*	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

SAMPLE LOCATION 117 = Lower Gradin Slough PAGE 1

DATE	06/10/1981 PACE	05/27/1982	10/15/1982	04/28/1983	10/05/1983	05/21/1984	10/02/1984	05/16/1985
pH-Field	9.10	8.30	8.30	7.70	8.80	8.40	8.70	8.70
pH-Laboratory	8.80	8.20	8.20	8.30	8.60	8.40	8.60	8.50
Specific conductance, umhos/cm @ 25c	1100.00	1000.00	1330.00	1050.00	2500.00	1760.00	4900.00	1790.00
Total Dissolved Solids, mg/l	790.00	430.00	940.00	699.00	2025.00	1280.00	3770.00	1330.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	56.00	<1.00	<1.00	6.00	74.00	5.00	67.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	393.00	290.00	346.00	315.00	672.00	360.00	779.00	315.00
Alkalinity Total, mg/l as CaCO3	449.00	290.00	346.00	321.00	746.00	365.00	846.00	315.00
Nitrate-N, mg/l	<0.10	0.25	0.60	0.32	1.30	0.27	0.07	0.57
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	45.00	63.00	53.00	64.00	47.00	93.00	104.00	79.00
Magnesium, mg/l	49.00	48.00	62.00	54.00	121.00	80.00	220.00	93.00
Potassium, mg/l	22.00	18.00	21.00	14.00	42.00	17.00	53.00	15.00
Sodium, mg/l	120.00	110.00	140.00	120.00	450.00	194.00	710.00	205.00
Sulfate, mg/l	180.00	290.00	360.00	310.00	900.00	565.00	2000.00	720.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	11.00	10.40	15.00	11.00	45.00	19.00	78.00	24.00
Iron, mg/l	0.10	0.10	0.30	0.20	0.10	0.10	<0.10	<0.10
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	0.08	0.06	0.07	0.03	0.06	0.10	0.20	0.08
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	0.40	0.50	0.40	0.60	0.50	0.80	1.50	0.80
Boron, mg/l	<0.20	0.40	0.40	0.50	0.85	1.60	6.00	3.80
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	4.00	2.00	<1.00	<1.00	3.00	3.00	3.00	2.00
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	*
Fluoride, mg/l	0.30	0.20	0.20	0.10	0.20	0.20	0.30	0.20
Lead, ug/l	*	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

DATE	10/24/1985	06/17/1996	10/22/1986	10/22/1986 MVEL	05/27/1987	10/13/1987	06/09/1988
pH-Field	8.60	8.70	8.75	*	8.61	9.00	8.70
pH-Laboratory	8.60	8.40	8.60	*	8.40	9.00	8.70
Specific conductance, umhos/cm @ 25c	3300.00	2400.00	2900.00	*	1560.00	2200.00	2400.00
Total Dissolved Solids, mg/l	2497.00	1810.00	2170.00	*	1100.00	1454.00	1500.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	44.00	12.00	45.00	*	12.00	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	554.00	393.00	501.00	*	*	*	*
Alkalinity Total, mg/l as CaCO3	598.00	406.00	546.00	*	309.00	383.00	508.00
Nitrate-N, mg/l	<0.01	<0.01	<0.01	*	0.04	0.02	*
Ammonia-N, mg/l	*	*	*	*	*	*	*
Calcium, mg/l	73.00	53.00	80.00	*	68.00	48.00	66.00
Magnesium, mg/l	161.00	102.00	180.00	*	81.00	106.00	120.00
Potassium, mg/l	32.00	14.00	30.00	*	14.00	10.20	21.00
Sodium, mg/l	450.00	244.00	350.00	*	153.00	205.00	210.00
Sulfate, mg/l	1225.00	940.00	1100.00	*	420.00	502.40	700.00
Methylene Blue Active Substances, mg/l	*	*	*	<0.50	*	*	*
Chloride, mg/l	58.00	31.00	45.00	*	20.00	28.01	32.00
Iron, mg/l	<0.10	<0.10	<0.10	*	<0.10	<0.01	*
Zinc, mg/l	*	*	<0.01	*	*	*	*
Manganese, mg/l	<0.01	0.05	0.02	*	<0.01	0.02	*
Copper, ug/l	*	*	<10.00	*	*	*	*
Silver, ug/l	*	*	<10.00	*	*	*	*
Strontium, mg/l	0.90	0.90	1.30	*	1.00	0.50	*
Boron, mg/l	2.80	2.00	3.40	*	1.70	1.25	2.60
Beryllium, ug/l	*	*	<10.00	*	*	*	*
Nickel, ug/l	*	*	<10.00	*	<50.00	<50.00	*
Selenium, ug/l	*	*	<1.00	*	*	*	*
Mercury, ug/l	*	*	<1.00	*	*	*	*
Arsenic, ug/l	2.00	2.00	<1.00	*	5.00	<1.00	4.00
Barium, mg/l	*	*	0.05	*	*	*	*
Cadmium, ug/l	*	*	<10.00	*	<10.00	<10.00	*
Chromium-VI, ug/l	*	*	<10.00	*	*	*	*
Fluoride, mg/l	0.20	0.20	0.20	*	0.20	0.22	0.30
Lead, ug/l	*	*	<1.00	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	<0.01	*	0.04	<0.01	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	<10.00	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	3.20	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	>2.00	*	*	*

DATE	12/04/1981	05/27/1982	10/14/1982	04/28/1983	10/05/1983	05/18/1984	10/02/1984	05/16/1985
pH-Field	9.40	9.40	9.30	8.50	8.40	8.50	9.30	9.20
pH-Laboratory	8.00	8.20	7.90	8.40	8.10	8.60	8.10	8.10
Specific conductance, umhos/cm @ 25c	3600.00	1720.00	1660.00	1970.00	2800.00	790.00	2300.00	1070.00
Total Dissolved Solids, mg/l	3280.00	1060.00	1360.00	1820.00	2241.00	532.00	1800.00	770.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	44.00	<1.00	3.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	180.00	145.00	144.00	215.00	116.00	86.00	114.00	116.00
Alkalinity Total, mg/l as CaCO3	180.00	145.00	144.00	259.00	116.00	89.00	114.00	116.00
Nitrate-N, mg/l	0.18	0.20	0.15	0.25	0.21	0.16	0.24	0.42
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	290.00	160.00	160.00	200.00	195.00	68.00	144.00	95.00
Magnesium, mg/l	290.00	110.00	115.00	160.00	204.00	30.00	130.00	52.00
Potassium, mg/l	12.00	7.20	5.90	5.60	7.60	4.10	15.00	4.70
Sodium, mg/l	250.00	100.00	100.00	150.00	218.00	47.00	168.00	67.00
Sulfate, mg/l	2100.00	850.00	1080.00	1200.00	1600.00	310.00	1200.00	490.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	25.00	10.00	12.00	18.00	23.00	4.20	18.00	7.20
Iron, mg/l	0.02	0.10	0.50	<0.10	<0.10	0.10	<0.10	0.20
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	0.13	0.29	0.20	0.67	0.18	<0.01	0.04	0.12
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	2.30	1.10	1.10	1.30	1.80	0.50	1.60	0.70
Boron, mg/l	0.60	0.40	0.50	0.50	0.80	0.42	1.10	0.50
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	<1.00	<1.00	1.00	2.00	<1.00	1.00
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	*
Fluoride, mg/l	0.30	0.20	0.20	0.20	0.30	0.20	0.50	0.20
Lead, ug/l	*	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

DATE	10/24/1985	06/23/1986	10/23/1986	10/23/1986 MVTL	06/02/1987	10/09/1987	05/14/1988	11/07/1988
pH-Field	8.20	8.90	8.27	*	8.74	8.70	8.40	8.50
pH-Laboratory	8.20	8.80	8.20	*	8.60	9.10	8.30	8.30
Specific conductance, umhos/cm @ 25c	2100.00	1900.00	1960.00	*	1720.00	2500.00	4400.00	5800.00
Total Dissolved Solids, mg/l	1920.00	1530.00	1630.00	*	1340.00	1892.00	3370.00	4930.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	16.00	<1.00	*	12.00	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	176.00	76.00	191.00	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	176.00	92.00	191.00	*	145.00	227.00	247.00	264.00
Nitrate-N, mg/l	0.20	<0.01	<0.01	*	<0.01	0.04	*	*
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	176.00	128.00	164.00	*	*	181.00	270.00	350.00
Magnesium, mg/l	126.00	127.00	130.00	*	100.00	145.00	270.00	400.00
Potassium, mg/l	7.00	5.60	6.40	*	6.50	7.20	9.00	14.00
Sodium, mg/l	187.00	135.00	149.00	*	108.00	170.00	315.00	458.00
Sulfate, mg/l	1250.00	1100.00	960.00	*	690.00	1057.80	2100.00	2800.00
Methylene Blue Active Substances, mg/l	*	*	*	<0.50	*	*	*	*
Chloride, mg/l	21.00	16.00	17.00	*	13.00	19.60	37.00	47.94
Iron, mg/l	<0.10	<0.10	<0.10	*	<0.10	0.74	*	*
Zinc, mg/l	*	*	<0.01	*	*	*	*	*
Manganese, mg/l	<0.01	0.01	0.18	*	<0.01	0.49	*	*
Copper, ug/l	*	*	<10.00	*	*	*	*	*
Silver, ug/l	*	*	<10.00	*	*	*	*	*
Strontium, mg/l	1.20	1.40	1.50	*	1.10	1.79	*	*
Boron, mg/l	1.10	0.88	1.10	*	0.56	1.02	1.40	2.00
Beryllium, ug/l	*	*	<10.00	*	*	*	*	*
Nickel, ug/l	*	*	<10.00	*	<50.00	<50.00	*	*
Selenium, ug/l	*	*	<1.00	*	*	*	*	*
Mercury, ug/l	*	*	<1.00	*	*	*	*	*
Arsenic, ug/l	<1.00	1.00	<1.00	*	1.00	<1.00	*	*
Barium, mg/l	*	*	0.06	*	*	*	*	*
Cadmium, ug/l	*	*	<10.00	*	<10.00	<10.00	*	*
Chromium-VI, ug/l	*	*	<10.00	*	*	*	*	*
Fluoride, mg/l	0.30	0.20	0.30	*	0.20	0.37	0.40	0.40
Lead, ug/l	*	*	<1.00	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	<0.01	*	<0.01	0.06	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	<10.00	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	5.60	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	>1.00	*	*	*	*

DATE	06/20/1988	10/30/1989	06/12/1990
pH-Field	8.40	8.10	8.44
pH-Laboratory	9.40	8.10	9.26
Specific conductance, umhos/cm @ 25c	4100.00	6400.00	4500.00
Total Dissolved Solids, mg/l	3440.00	5520.00	4003.00
Total Suspended Solids, mg/l	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*	*
Alkalinity Total, mg/l as CaCO3	196.00	186.00	143.00
Nitrate-N, mg/l	<0.01	<0.01	*
Ammonia-N, mg/l	*	*	*
Calcium, mg/l	*	360.00	240.00
Magnesium, mg/l	*	490.00	340.00
Potassium, mg/l	11.00	17.00	12.00
Sodium, mg/l	335.00	605.00	405.00
Sulfate, mg/l	2130.00	4100.00	2445.00
Methylene Blue Active Substances, mg/l	*	*	*
Chloride, mg/l	38.00	54.00	44.00
Iron, mg/l	*	<0.10	*
Zinc, mg/l	*	*	*
Manganese, mg/l	*	<0.10	*
Copper, ug/l	*	*	*
Silver, ug/l	*	*	*
Strontium, mg/l	*	3.40	*
Boron, mg/l	1.50	2.50	1.60
Beryllium, ug/l	*	*	*
Nickel, ug/l	*	*	*
Selenium, ug/l	*	*	*
Mercury, ug/l	*	*	*
Arsenic, ug/l	*	*	*
Barium, mg/l	*	*	*
Cadmium, ug/l	*	*	*
Chromium-VI, ug/l	*	*	*
Fluoride, mg/l	0.40	0.50	0.30
Lead, ug/l	*	*	*
Molybdenum, mg/l	*	*	*
Aluminum, mg/l	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*
Cyanide, mg/l	*	*	*
Phenol, ug/l	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*
Total Organic Carbon, mg/l	*	*	*
Temperature, Degrees C	21.90	*	*
Dissolved Oxygen, mg/l	*	*	*
Water Level depth below ground surface, ft.	*	*	*
Total Sulfur, mg/l	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*

SAMPLE LOCATION 119 = East Ash Pond Seepage PAGE 1

DATE	12/04/1981	05/28/1982	10/15/1982	04/29/1983	10/06/1983	05/15/1984	05/15/1984 PACE	10/01/1984
pH-Field	7.80	8.10	7.60	8.30	8.00	8.10	*	8.00
pH-Laboratory	7.50	8.80	7.50	9.10	7.70	7.60	*	9.00
Specific conductance, umhos/cm @ 25:	4600.00	5100.00	5600.00	4400.00	6000.00	6100.00	6600.00	8100.00
Total Dissolved Solids, mg/l	4630.00	5230.00	5400.00	4510.00	5994.00	5930.00	5500.00	8440.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	27.00	<1.00	<1.00	<1.00	<1.00	*	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	190.00	100.00	213.00	294.00	227.00	232.00	*	266.00
Alkalinity Total, mg/l as CaCO3	190.00	137.00	213.00	294.00	227.00	232.00	215.00	266.00
Nitrate-N, mg/l	0.10	1.65	0.34	0.18	0.08	0.09	*	0.14
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	510.00	580.00	630.00	520.00	555.00	570.00	610.00	630.00
Magnesium, mg/l	290.00	410.00	360.00	300.00	407.00	340.00	410.00	650.00
Potassium, mg/l	25.00	28.00	20.00	15.00	22.00	19.00	24.00	3.20
Sodium, mg/l	330.00	560.00	440.00	390.00	525.00	510.00	500.00	810.00
Sulfate, mg/l	2800.00	3780.00	3340.00	2800.00	4000.00	3500.00	3600.00	5200.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	66.00	95.40	92.00	74.00	111.00	121.00	110.00	205.00
Iron, mg/l	0.04	0.10	0.10	<0.10	<0.10	0.10	0.20	<0.10
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	0.02	0.09	0.16	0.11	0.10	0.30	0.30	<0.01
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	3.80	8.00	4.00	2.50	4.40	4.20	4.50	7.50
Boron, mg/l	7.40	25.00	20.00	14.00	17.00	20.00	20.00	35.00
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	<1.00	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	2.00	<1.00	1.00	1.00	2.00	2.00	2.00
Barium, mg/l	*	*	*	*	*	*	0.70	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	1.00	<1.00	*
Fluoride, mg/l	0.40	5.40	1.20	0.70	1.00	1.00	1.20	1.50
Lead, ug/l	*	*	*	*	*	16.00	0.20	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

DATE	05/16/1985	10/24/1985	06/19/1986	10/21/1986	05/19/1987	10/05/1987	06/09/1988
pH-Field	8.10	8.10	8.00	8.10	8.00	8.30	8.20
pH-Laboratory	8.00	8.00	8.20	8.00	8.10	7.90	8.10
Specific conductance, umhos/cm @ 25c	6000.00	8600.00	6700.00	8900.00	7800.00	11800.00	10000.00
Total Dissolved Solids, mg/l	6050.00	8410.00	6710.00	8250.00	7370.00	11503.00	9190.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	246.00	279.00	233.00	258.00	*	*	*
Alkalinity Total, mg/l as CaCO3	246.00	279.00	233.00	258.00	260.00	314.00	448.00
Nitrate-N, mg/l	0.38	0.20	0.18	<0.01	0.01	<0.01	*
Ammonia-N, mg/l	*	*	*	*	*	*	*
Calcium, mg/l	475.00	570.00	395.00	550.00	425.00	567.00	470.00
Magnesium, mg/l	400.00	590.00	565.00	870.00	640.00	1067.00	770.00
Potassium, mg/l	19.00	22.00	21.00	33.00	22.00	36.50	36.00
Sodium, mg/l	560.00	850.00	615.00	830.00	750.00	744.00	950.00
Sulfate, mg/l	3600.00	5240.00	4300.00	5700.00	4200.00	7403.30	5000.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*
Chloride, mg/l	130.00	220.00	165.00	230.00	200.00	339.21	260.00
Iron, mg/l	0.10	<0.10	<0.10	<0.10	<0.10	<0.01	*
Zinc, mg/l	*	*	*	<0.01	*	*	*
Manganese, mg/l	0.10	0.10	0.04	0.04	<0.01	<0.01	*
Copper, ug/l	*	*	*	<10.00	*	*	*
Silver, ug/l	*	*	*	<10.00	*	*	*
Strontium, mg/l	3.50	4.60	4.50	6.10	4.70	7.20	*
Boron, mg/l	21.50	37.00	33.00	42.00	33.00	54.70	39.00
Beryllium, ug/l	*	*	*	20.00	*	*	*
Nickel, ug/l	*	*	*	<10.00	<50.00	<50.00	*
Selenium, ug/l	*	*	*	<1.00	*	*	*
Mercury, ug/l	*	*	*	<1.00	*	*	*
Arsenic, ug/l	2.00	2.00	2.00	<1.00	<1.00	<1.00	<1.00
Barium, mg/l	*	*	*	0.02	*	*	*
Cadmium, ug/l	*	*	*	<10.00	<10.00	<10.00	*
Chromium-VI, ug/l	*	*	*	<10.00	*	*	*
Fluoride, mg/l	1.00	1.00	1.40	1.20	1.40	1.50	1.40
Lead, ug/l	*	*	*	<1.00	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	<0.01	0.03	<0.01	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	8.80	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*

SAMPLE LOCATION 404 = Samuelson Slough Outlet PAGE 1

DATE	03/31/1987
pH-Field	7.60
pH-Laboratory	7.80
Specific conductance, umhos/cm @ 25c	410.00
Total Dissolved Solids, mg/l	262.00
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	122.00
Alkalinity Total, mg/l as CaCO3	122.00
Nitrate-N, mg/l	0.84
Ammonia-N, mg/l	*
Calcium, mg/l	35.00
Magnesium, mg/l	16.00
Potassium, mg/l	9.70
Sodium, mg/l	28.00
Sulfate, mg/l	*
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	4.90
Iron, mg/l	0.19
Zinc, mg/l	*
Manganese, mg/l	0.07
Copper, ug/l	<10.00
Silver, ug/l	*
Strontium, mg/l	0.34
Boron, mg/l	0.17
Beryllium, ug/l	<10.00
Nickel, ug/l	*
Selenium, ug/l	<1.00
Mercury, ug/l	*
Arsenic, ug/l	<1.00
Barium, mg/l	*
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	*
Fluoride, mg/l	<0.10
Lead, ug/l	*
Molybdenum, mg/l	*
Aluminum, mg/l	0.31
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	*
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	*
Total Sulfur, mg/l	*
Total Coliform Bacteria, # Col./100 ml	*

SAMPLE LOCATION 120 = Legal Drain West

DATE	10/24/1985	06/19/1986	10/21/1986	10/21/1986 MVIL	05/28/1987	10/07/1987	11/01/1988
pH-Field	*	8.00	8.76	*	9.00	9.20	*
pH-Laboratory	8.59	8.00	8.60	*	8.90	8.80	*
Specific conductance, umhos/cm @ 25c	1660.00	1500.00	1680.00	*	1320.00	1600.00	*
Total Dissolved Solids, mg/l	1170.00	1060.00	1240.00	*	908.00	1063.00	*
Total Suspended Solids, mg/l	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	19.00	<1.00	30.00	*	40.00	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	345.00	323.00	350.00	*	*	*	*
Alkalinity Total, mg/l as CaCO3	364.00	323.00	380.00	*	273.00	310.00	*
Nitrate-N, mg/l	0.20	0.23	<0.01	*	0.04	0.01	*
Ammonia-N, mg/l	*	*	*	*	*	*	*
Calcium, mg/l	84.00	52.00	63.00	*	56.00	48.00	*
Magnesium, mg/l	74.00	72.00	78.00	*	65.00	90.00	*
Potassium, mg/l	11.00	10.40	13.00	*	11.00	12.20	*
Sodium, mg/l	181.00	172.00	161.00	*	142.00	210.00	*
Sulfate, mg/l	*	530.00	580.00	*	475.00	583.40	*
Methylene Blue Active Substances, mg/l	*	*	*	<0.50	*	*	*
Chloride, mg/l	18.00	14.00	19.00	*	13.00	19.33	*
Iron, mg/l	<0.10	0.10	<0.10	*	<0.10	<0.01	*
Zinc, mg/l	*	*	<0.01	*	*	*	*
Manganese, mg/l	0.01	0.34	<0.01	*	<0.01	0.01	*
Copper, ug/l	*	*	<10.00	*	*	*	*
Silver, ug/l	*	*	<10.00	*	*	*	*
Strontium, mg/l	0.90	0.92	1.10	*	0.90	0.90	*
Boron, mg/l	0.86	0.73	1.00	*	0.68	0.85	*
Beryllium, ug/l	*	*	<10.00	*	*	*	*
Nickel, ug/l	*	*	<10.00	*	<50.00	<50.00	*
Selenium, ug/l	*	*	<1.00	*	*	*	*
Mercury, ug/l	*	*	<1.00	*	*	*	*
Arsenic, ug/l	5.00	2.00	3.00	*	5.00	7.00	*
Barium, mg/l	*	*	0.07	*	*	*	*
Cadmium, ug/l	*	*	<10.00	*	<10.00	<10.00	*
Chromium-VI, ug/l	*	*	<10.00	*	*	*	*
Fluoride, mg/l	*	0.20	0.30	*	0.30	0.20	*
Lead, ug/l	*	*	<1.00	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	0.01	*	0.01	<0.01	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	<10.00	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	8.50	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	
Total Sulfur, mg/l	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	13.00	*	*	*

SAMPLE LOCATION 121 = Legal Drain North

DATE	10/24/1985	06/19/1986	10/21/1986	10/31/1986 MVTL	05/29/1987	10/07/1987	11/01/1989
pH-Field	*	7.30	7.80	*	8.41	7.50	*
pH-Laboratory	8.20	7.40	7.70	*	8.40	7.30	*
Specific conductance, umhos/cm @ 25c	1780.00	2600.00	4200.00	*	1590.00	10100.00	*
Total Dissolved Solids, mg/l	1340.00	2050.00	3770.00	*	1100.00	9658.00	*
Total Suspended Solids, mg/l	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	*	8.00	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	343.00	353.00	346.00	*	*	*	*
Alkalinity Total, mg/l as CaCO3	343.00	353.00	346.00	*	269.00	258.00	*
Nitrate-N, mg/l	0.25	0.20	<0.01	*	0.08	0.44	*
Ammonia-N, mg/l	*	*	*	*	*	*	*
Calcium, mg/l	98.00	140.00	260.00	*	66.00	503.00	*
Magnesium, mg/l	83.00	140.00	295.00	*	84.00	952.00	*
Potassium, mg/l	11.00	9.20	16.60	*	11.00	13.90	*
Sodium, mg/l	189.00	230.00	310.00	*	144.00	850.00	*
Sulfate, mg/l	*	1100.00	2200.00	*	490.00	5986.80	*
Methylene Blue Active Substances, mg/l	*	*	*	<0.50	*	*	*
Chloride, mg/l	19.00	33.00	100.00	*	19.00	349.29	*
Iron, mg/l	<0.10	0.20	<0.10	*	<0.10	0.05	*
Zinc, mg/l	*	*	<0.01	*	*	*	*
Manganese, mg/l	0.02	2.00	0.19	*	<0.01	0.75	*
Copper, ug/l	*	*	<10.00	*	*	*	*
Silver, ug/l	*	*	10.00	*	*	*	*
Strontium, mg/l	1.00	1.40	2.00	*	0.90	4.60	*
Boron, mg/l	1.50	6.00	1.40	*	1.70	46.10	*
Beryllium, ug/l	*	*	<10.00	*	*	*	*
Nickel, ug/l	*	*	<10.00	*	<50.00	<50.00	*
Selenium, ug/l	*	*	<1.00	*	*	*	*
Mercury, ug/l	*	*	<1.00	*	*	*	*
Arsenic, ug/l	4.00	3.00	<1.00	*	5.00	<1.00	*
Barium, mg/l	*	*	0.05	*	*	*	*
Cadmium, ug/l	*	*	<10.00	*	<10.00	<10.00	*
Chromium-VI, ug/l	*	*	<10.00	*	*	*	*
Fluoride, mg/l	*	0.60	0.80	*	0.30	6.40	*
Lead, ug/l	*	*	<1.00	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	0.02	*	<0.01	<0.01	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	78.00	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	5.80	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	
Total Sulfur, mg/l	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	>1.00	*	*	*

SAMPLE LOCATION 122 = Legal Drain East PAGE 1

DATE	10/04/1985	06/13/1986	10/21/1986	10/21/1986 MVTL	05/29/1987	10/08/1987	06/06/1988	11/01/1988
pH-Field	*	7.60	7.87	*	7.74	7.70	7.80	*
pH-Laboratory	7.90	7.90	7.60	*	7.60	7.40	7.90	*
Specific conductance, umhos/cm @ 25c	7800.00	2500.00	2400.00	*	2400.00	4040.00	2100.00	*
Total Dissolved Solids, mg/l	7390.00	1870.00	1710.00	*	1600.00	3346.00	1430.00	*
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	406.00	408.00	469.00	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	406.00	408.00	469.00	*	302.00	477.00	427.00	*
Nitrate-N, mg/l	0.28	0.15	<0.01	*	0.02	0.02	*	*
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	445.00	106.00	85.00	*	109.00	184.00	76.00	*
Magnesium, mg/l	590.00	140.00	140.00	*	113.00	299.00	130.00	*
Potassium, mg/l	22.00	12.00	38.00	*	12.00	11.20	14.00	*
Sodium, mg/l	715.00	265.00	260.00	*	194.00	388.00	175.00	*
Sulfate, mg/l	*	1000.00	785.00	*	710.00	1824.30	690.00	*
Methylene Blue Active Substances, mg/l	*	*	*	<0.50	*	*	*	*
Chloride, mg/l	175.00	33.00	68.00	*	31.00	85.56	34.00	*
Iron, mg/l	<0.10	<0.10	<0.10	*	<0.10	0.02	*	*
Zinc, mg/l	*	*	<0.01	*	*	*	*	*
Manganese, mg/l	0.02	0.34	0.61	*	0.10	1.26	*	*
Copper, ug/l	*	*	<10.00	*	*	*	*	*
Silver, ug/l	*	*	0.01	*	*	*	*	*
Strontium, mg/l	3.60	1.30	1.30	*	1.20	1.80	*	*
Boron, mg/l	33.00	4.00	2.80	*	3.60	9.22	3.30	*
Beryllium, ug/l	*	*	<10.00	*	*	*	*	*
Nickel, ug/l	*	*	<10.00	*	<50.00	<50.00	*	*
Selenium, ug/l	*	*	<1.00	*	*	*	*	*
Mercury, ug/l	*	*	<1.00	*	*	*	*	*
Arsenic, ug/l	2.00	2.00	<1.00	*	3.00	<1.00	1.00	*
Barium, mg/l	*	*	0.04	*	*	*	*	*
Cadmium, ug/l	*	*	<10.00	*	<10.00	<10.00	*	*
Chromium-VI, ug/l	*	*	<10.00	*	*	*	*	*
Fluoride, mg/l	*	0.30	0.30	*	0.40	0.38	0.30	*
Lead, ug/l	*	*	<1.00	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	0.02	*	<0.01	<0.01	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	<10.00	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	7.60	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	>1.00	*	*	*	*

DATE	06/29/1989	06/07/1990
pH-Field	7.60	7.39
pH-Laboratory	7.70	7.60
Specific conductance, umhos/cm @ 25c	1750.00	1780.00
Total Dissolved Solids, mg/l	1150.00	1230.00
Total Suspended Solids, mg/l	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*
Alkalinity Total, mg/l as CaCO3	462.00	456.00
Nitrate-N, mg/l	0.03	*
Ammonia-N, mg/l	*	*
Calcium, mg/l	58.00	67.00
Magnesium, mg/l	105.00	135.00
Potassium, mg/l	14.00	24.00
Sodium, mg/l	156.00	160.00
Sulfate, mg/l	530.00	478.00
Methylene Blue Active Substances, mg/l	*	*
Chloride, mg/l	19.00	35.00
Iron, mg/l	*	*
Zinc, mg/l	*	*
Manganese, mg/l	*	*
Copper, ug/l	*	*
Silver, ug/l	*	*
Strontium, mg/l	*	*
Boron, mg/l	1.80	1.40
Beryllium, ug/l	*	*
Nickel, ug/l	*	*
Selenium, ug/l	*	*
Mercury, ug/l	*	*
Arsenic, ug/l	4.00	2.00
Barium, mg/l	*	*
Cadmium, ug/l	*	*
Chromium-VI, ug/l	*	*
Fluoride, mg/l	0.20	0.20
Lead, ug/l	*	*
Molybdenum, mg/l	*	*
Aluminum, mg/l	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*
Cyanide, mg/l	*	*
Phenol, ug/l	*	*
Biochemical Oxygen Demand, mg/l	*	*
Chemical Oxygen Demand, mg/l	*	*
Total Organic Carbon, mg/l	*	*
Temperature, Degrees C	20.40	*
Dissolved Oxygen, mg/l	*	*
Water Level depth below ground surface, ft.	*	*
Total Sulfur, mg/l	*	*
Total Coliform Bacteria, # Col./100 ml	*	*

SAMPLE LOCATION 119 = Mine Surge Pond PAGE 1

DATE	12/04/1981	05/27/1982	10/14/1982	04/28/1983	10/05/1983	05/15/1984	10/02/1984	05/16/1985
pH-Field	9.40	9.40	9.30	8.50	9.40	8.50	9.30	9.30
pH-Laboratory	8.00	8.20	7.90	8.40	8.10	8.60	8.10	8.10
Specific conductance, umhos/cm @ 25c	3600.00	1720.00	1660.00	1970.00	2900.00	790.00	2300.00	1070.00
Total Dissolved Solids, mg/l	3280.00	1060.00	1360.00	1820.00	2241.00	532.00	1800.00	770.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	44.00	<1.00	3.00	<1.00	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	180.00	145.00	144.00	215.00	116.00	86.00	114.00	116.00
Alkalinity Total, mg/l as CaCO3	180.00	145.00	144.00	259.00	116.00	89.00	114.00	116.00
Nitrate-N, mg/l	0.18	0.20	0.15	0.25	0.21	0.16	0.24	0.42
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	290.00	160.00	160.00	200.00	195.00	68.00	144.00	95.00
Magnesium, mg/l	290.00	110.00	115.00	160.00	204.00	30.00	130.00	52.00
Potassium, mg/l	12.00	7.20	5.90	5.60	7.60	4.10	15.00	4.70
Sodium, mg/l	250.00	100.00	100.00	150.00	218.00	47.00	168.00	67.00
Sulfate, mg/l	2100.00	850.00	1080.00	1200.00	1600.00	310.00	1200.00	490.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	25.00	10.00	12.00	18.00	23.00	4.20	18.00	7.20
Iron, mg/l	0.02	0.10	0.50	<0.10	<0.10	0.10	<0.10	0.20
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	0.13	0.29	0.20	0.67	0.18	<0.01	0.04	0.12
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	2.30	1.10	1.10	1.30	1.80	0.50	1.60	0.70
Boron, mg/l	0.60	0.40	0.50	0.50	0.80	0.42	1.10	0.50
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	*	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	<1.00	<1.00	<1.00	1.00	2.00	<1.00	1.00
Barium, mg/l	*	*	*	*	*	*	*	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	*	*	*
Fluoride, mg/l	0.30	0.20	0.20	0.20	0.30	0.20	0.50	0.20
Lead, ug/l	*	*	*	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

DATE	05/16/1985	10/24/1985	06/19/1986	10/21/1986	05/13/1987	10/05/1987	06/09/1988
pH-Field	8.10	8.10	8.00	8.10	8.00	8.30	8.20
pH-Laboratory	8.00	8.00	8.20	8.00	8.10	7.90	8.10
Specific conductance, umhos/cm @ 25c	6000.00	8300.00	6700.00	9900.00	7800.00	11800.00	10000.00
Total Dissolved Solids, mg/l	6050.00	8410.00	6710.00	9280.00	7370.00	11503.00	9190.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	<1.00	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	246.00	279.00	233.00	258.00	*	*	*
Alkalinity Total, mg/l as CaCO3	246.00	279.00	233.00	258.00	260.00	314.00	448.00
Nitrate-N, mg/l	0.38	0.20	0.18	<0.01	0.01	<0.01	*
Ammonia-N, mg/l	*	*	*	*	*	*	*
Calcium, mg/l	475.00	570.00	395.00	550.00	425.00	567.00	470.00
Magnesium, mg/l	400.00	550.00	565.00	870.00	640.00	1067.00	770.00
Potassium, mg/l	19.00	22.00	21.00	33.00	22.00	36.80	36.00
Sodium, mg/l	560.00	850.00	615.00	830.00	750.00	744.00	950.00
Sulfate, mg/l	3600.00	5240.00	4300.00	5700.00	4200.00	7403.20	5000.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*
Chloride, mg/l	130.00	220.00	165.00	230.00	200.00	388.21	250.00
Iron, mg/l	0.10	<0.10	<0.10	<0.10	<0.10	<0.01	*
Zinc, mg/l	*	*	*	<0.01	*	*	*
Manganese, mg/l	0.10	0.10	0.04	0.04	<0.01	<0.01	*
Copper, ug/l	*	*	*	<10.00	*	*	*
Silver, ug/l	*	*	*	<10.00	*	*	*
Strontium, mg/l	3.50	4.60	4.50	6.10	4.70	7.20	*
Boron, mg/l	21.50	37.00	33.00	42.00	33.00	54.70	39.00
Beryllium, ug/l	*	*	*	20.00	*	*	*
Nickel, ug/l	*	*	*	<10.00	<50.00	<50.00	*
Selenium, ug/l	*	*	*	<1.00	*	*	*
Mercury, ug/l	*	*	*	<1.00	*	*	*
Arsenic, ug/l	2.00	2.00	2.00	<1.00	<1.00	<1.00	<1.00
Barium, mg/l	*	*	*	0.02	*	*	*
Cadmium, ug/l	*	*	*	<10.00	<10.00	<10.00	*
Chromium-VI, ug/l	*	*	*	<10.00	*	*	*
Fluoride, mg/l	1.00	1.00	1.40	1.20	1.40	1.50	1.40
Lead, ug/l	*	*	*	<1.00	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	<0.01	0.03	<0.01	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	8.90	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*

SAMPLE LOCATION 120 = Legal Drain West

DATE	10/24/1985	06/19/1986	10/21/1986	10/21/1986 MVIL	05/18/1987	10/07/1987	11/01/1988
pH-Field	*	8.00	8.76	*	9.00	9.20	*
pH-Laboratory	9.50	8.00	9.60	*	8.90	8.37	*
Specific conductance, umhos/cm @ 25c	1660.00	1500.00	1680.00	*	1320.00	1600.00	*
Total Dissolved Solids, mg/l	1170.00	1060.00	1240.00	*	902.00	1063.00	*
Total Suspended Solids, mg/l	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	19.00	<1.00	30.00	*	40.00	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	345.00	323.00	350.00	*	*	*	*
Alkalinity Total, mg/l as CaCO3	364.00	323.00	380.00	*	273.00	310.00	*
Nitrate-N, mg/l	0.20	0.23	<0.01	*	0.04	0.01	*
Ammonia-N, mg/l	*	*	*	*	*	*	*
Calcium, mg/l	84.00	52.00	63.00	*	56.00	48.00	*
Magnesium, mg/l	74.00	72.00	73.00	*	65.00	80.00	*
Potassium, mg/l	11.00	10.40	13.00	*	11.00	12.20	*
Sodium, mg/l	181.00	172.00	161.00	*	142.00	210.00	*
Sulfate, mg/l	*	530.00	580.00	*	475.00	583.40	*
Methylene Blue Active Substances, mg/l	*	*	*	<0.50	*	*	*
Chloride, mg/l	18.00	14.00	19.00	*	13.00	19.33	*
Iron, mg/l	<0.10	0.10	<0.10	*	<0.10	<0.01	*
Zinc, mg/l	*	*	<0.01	*	*	*	*
Manganese, mg/l	0.01	0.94	<0.01	*	<0.01	0.01	*
Copper, ug/l	*	*	<10.00	*	*	*	*
Silver, ug/l	*	*	<10.00	*	*	*	*
Strontium, mg/l	0.90	0.92	1.10	*	0.90	0.90	*
Boron, mg/l	0.86	0.73	1.00	*	0.68	0.95	*
Beryllium, ug/l	*	*	<10.00	*	*	*	*
Nickel, ug/l	*	*	<10.00	*	<50.00	<50.00	*
Selenium, ug/l	*	*	<1.00	*	*	*	*
Mercury, ug/l	*	*	<1.00	*	*	*	*
Arsenic, ug/l	5.00	2.00	3.00	*	5.00	7.00	*
Barium, mg/l	*	*	0.07	*	*	*	*
Cadmium, ug/l	*	*	<10.00	*	<10.00	<10.00	*
Chromium-VI, ug/l	*	*	<10.00	*	*	*	*
Fluoride, mg/l	*	0.20	0.30	*	0.50	0.20	*
Lead, ug/l	*	*	<1.00	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	0.01	*	0.01	<0.01	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	<10.00	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	8.50	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	
Total Sulfur, mg/l	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	13.00	*	*	*

SAMPLE LOCATION 121 = Legal Drain North PAGE 1

DATE	10/24/1985	06/19/1986	10/21/1986	10/01/1986 MVTL	05/26/1987	10/07/1987	11/01/1989
pH-Field	*	7.30	7.80	*	8.41	7.50	*
pH-Laboratory	8.20	7.40	7.70	*	8.40	7.30	*
Specific conductance, umhos/cm @ 25c	1780.00	2600.00	4200.00	*	1590.00	10100.00	*
Total Dissolved Solids, mg/l	1340.00	2050.00	3770.00	*	1100.00	9656.00	*
Total Suspended Solids, mg/l	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	*	8.00	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	343.00	353.00	346.00	*	*	*	*
Alkalinity Total, mg/l as CaCO3	343.00	353.00	346.00	*	269.00	259.00	*
Nitrate-N, mg/l	0.25	0.20	<0.01	*	0.09	0.44	*
Ammonia-N, mg/l	*	*	*	*	*	*	*
Calcium, mg/l	98.00	140.00	360.00	*	66.00	503.00	*
Magnesium, mg/l	58.00	140.00	295.00	*	84.00	952.00	*
Potassium, mg/l	11.00	9.20	16.60	*	11.00	13.90	*
Sodium, mg/l	199.00	280.00	310.00	*	144.00	850.00	*
Sulfate, mg/l	*	1100.00	2200.00	*	490.00	5386.50	*
Methylene Blue Active Substances, mg/l	*	*	*	<0.50	*	*	*
Chloride, mg/l	19.00	33.00	100.00	*	19.00	349.20	*
Iron, mg/l	<0.10	0.20	<0.10	*	<0.10	0.05	*
Zinc, mg/l	*	*	<0.01	*	*	*	*
Manganese, mg/l	0.02	2.00	0.15	*	<0.01	0.75	*
Copper, ug/l	*	*	<10.00	*	*	*	*
Silver, ug/l	*	*	10.00	*	*	*	*
Strontium, mg/l	1.00	1.40	2.00	*	0.80	4.60	*
Boron, mg/l	1.50	6.00	1.40	*	1.70	46.10	*
Beryllium, ug/l	*	*	<10.00	*	*	*	*
Nickel, ug/l	*	*	<10.00	*	<50.00	<50.00	*
Selenium, ug/l	*	*	<1.00	*	*	*	*
Mercury, ug/l	*	*	<1.00	*	*	*	*
Arsenic, ug/l	4.00	3.00	<1.00	*	5.00	<1.00	*
Barium, mg/l	*	*	0.05	*	*	*	*
Cadmium, ug/l	*	*	<10.00	*	<10.00	<10.00	*
Chromium-VI, ug/l	*	*	<10.00	*	*	*	*
Fluoride, mg/l	*	0.60	0.80	*	0.30	6.40	*
Lead, ug/l	*	*	<1.00	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	0.02	*	<0.01	<0.01	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	78.00	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	5.80	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	
Total Sulfur, mg/l	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	>1.00	*	*	*

DATE	06/29/1989	06/07/1990
pH-Field	7.60	7.39
pH-Laboratory	7.70	7.60
Specific conductance, umhos/cm @ 25c	1750.00	1750.00
Total Dissolved Solids, mg/l	1150.00	1230.00
Total Suspended Solids, mg/l	*	*
Alkalinity Carbonate, mg/l as CaCO3	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	*	*
Alkalinity Total, mg/l as CaCO3	482.00	456.00
Nitrate-N, mg/l	0.03	*
Ammonia-N, mg/l	*	*
Calcium, mg/l	58.00	67.00
Magnesium, mg/l	105.00	135.00
Potassium, mg/l	14.00	24.00
Sodium, mg/l	156.00	160.00
Sulfate, mg/l	520.00	478.00
Methylene Blue Active Substances, mg/l	*	*
Chloride, mg/l	19.00	35.00
Iron, mg/l	*	*
Zinc, mg/l	*	*
Manganese, mg/l	*	*
Copper, ug/l	*	*
Silver, ug/l	*	*
Strontium, mg/l	*	*
Boron, mg/l	1.80	1.40
Beryllium, ug/l	*	*
Nickel, ug/l	*	*
Selenium, ug/l	*	*
Mercury, ug/l	*	*
Arsenic, ug/l	4.00	2.00
Barium, mg/l	*	*
Cadmium, ug/l	*	*
Chromium-VI, ug/l	*	*
Fluoride, mg/l	0.20	0.20
Lead, ug/l	*	*
Molybdenum, mg/l	*	*
Aluminum, mg/l	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*
Cyanide, mg/l	*	*
Phenol, ug/l	*	*
Biochemical Oxygen Demand, mg/l	*	*
Chemical Oxygen Demand, mg/l	*	*
Total Organic Carbon, mg/l	*	*
Temperature, Degrees C	20.40	*
Dissolved Oxygen, mg/l	*	*
Water Level depth below ground surface, ft.	*	*
Total Sulfur, mg/l	*	*
Total Coliform Bacteria, # Col./100 ml	*	*

SAMPLE LOCATION 123 = Legal Brair Seed PAGE 1

DATE	10/04/1985	05/19/1986	10/21/1986	10/21/1986 MVEL	05/29/1987	10/08/1987	06/05/1988	11/01/1988
pH-Field	*	7.60	7.87	*	7.74	7.70	7.80	*
pH-Laboratory	7.90	7.90	7.60	*	7.80	7.40	7.90	*
Specific conductance, umhos/cm @ 25c	7800.00	3500.00	2400.00	*	2400.00	4040.00	2100.00	*
Total Dissolved Solids, mg/l	7390.00	1870.00	1710.00	*	1400.00	3346.00	1430.00	*
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	<1.00	<1.00	*	*	*	*	*
Alkalinity Bicarbonate, mg/l as CaCO3	406.00	408.00	469.00	*	*	*	*	*
Alkalinity Total, mg/l as CaCO3	406.00	408.00	469.00	*	302.00	477.00	427.00	*
Nitrate-N, mg/l	0.29	0.15	<0.01	*	0.02	0.02	*	*
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	445.00	106.00	85.00	*	109.00	184.00	76.00	*
Magnesium, mg/l	590.00	140.00	140.00	*	113.00	289.00	130.00	*
Potassium, mg/l	22.00	12.00	38.00	*	12.00	11.30	14.00	*
Sodium, mg/l	715.00	265.00	260.00	*	194.00	388.00	173.00	*
Sulfate, mg/l	*	1000.00	785.00	*	710.00	1824.20	690.00	*
Methylene Blue Active Substances, mg/l	*	*	*	<0.50	*	*	*	*
Chloride, mg/l	175.00	93.00	68.00	*	91.00	85.56	34.00	*
Iron, mg/l	<0.10	<0.10	<0.10	*	<0.10	0.02	*	*
Zinc, mg/l	*	*	<0.01	*	*	*	*	*
Manganese, mg/l	0.02	0.34	0.61	*	0.10	1.26	*	*
Copper, ug/l	*	*	<10.00	*	*	*	*	*
Silver, ug/l	*	*	0.01	*	*	*	*	*
Strontium, mg/l	3.60	1.30	1.30	*	1.20	1.80	*	*
Boron, mg/l	38.00	4.00	2.80	*	3.60	9.22	3.30	*
Beryllium, ug/l	*	*	<10.00	*	*	*	*	*
Nickel, ug/l	*	*	<10.00	*	<50.00	<50.00	*	*
Selenium, ug/l	*	*	<1.00	*	*	*	*	*
Mercury, ug/l	*	*	<1.00	*	*	*	*	*
Arsenic, ug/l	2.00	2.00	<1.00	*	3.00	<1.00	1.00	*
Barium, mg/l	*	*	0.04	*	*	*	*	*
Cadmium, ug/l	*	*	<10.00	*	<10.00	<10.00	*	*
Chromium-VI, ug/l	*	*	<10.00	*	*	*	*	*
Fluoride, mg/l	*	0.30	0.30	*	0.40	0.39	0.30	*
Lead, ug/l	*	*	<1.00	*	*	*	*	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	0.02	*	<0.01	<0.01	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	<10.00	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	7.60	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	>1.00	*	*	*	*

SAMPLE LOCATION 119 = East Ash Pond Seepage PAGE 1

DATE	12/04/1981	05/28/1982	10/15/1982	04/28/1983	10/06/1983	05/15/1984	05/15/1984 PACE	10/01/1984
pH-Field	7.80	8.10	7.60	8.30	8.00	8.10	*	8.00
pH-Laboratory	7.50	8.00	7.50	8.10	7.70	7.60	*	8.00
Specific conductance, umhos/cm @ 25:	4600.00	5100.00	5600.00	4600.00	6000.00	6100.00	6600.00	8100.00
Total Dissolved Solids, mg/l	4650.00	5230.00	5400.00	4510.00	5994.00	5980.00	5500.00	8440.00
Total Suspended Solids, mg/l	*	*	*	*	*	*	*	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00	27.00	<1.00	<1.00	<1.00	<1.00	*	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	190.00	100.00	213.00	294.00	227.00	222.00	*	266.00
Alkalinity Total, mg/l as CaCO3	190.00	137.00	213.00	294.00	227.00	222.00	215.00	266.00
Nitrate-N, mg/l	0.10	1.65	0.34	0.18	0.08	0.09	*	0.14
Ammonia-N, mg/l	*	*	*	*	*	*	*	*
Calcium, mg/l	510.00	580.00	620.00	520.00	555.00	570.00	610.00	630.00
Magnesium, mg/l	290.00	410.00	360.00	300.00	407.00	340.00	410.00	630.00
Potassium, mg/l	25.00	28.00	20.00	15.00	22.00	19.00	24.00	3.20
Sodium, mg/l	320.00	560.00	440.00	390.00	525.00	510.00	500.00	810.00
Sulfate, mg/l	2800.00	3780.00	3340.00	2600.00	4000.00	3500.00	3600.00	5200.00
Methylene Blue Active Substances, mg/l	*	*	*	*	*	*	*	*
Chloride, mg/l	66.00	95.40	92.00	74.00	111.00	121.00	110.00	205.00
Iron, mg/l	0.04	0.10	0.10	<0.10	<0.10	0.10	0.20	<0.10
Zinc, mg/l	*	*	*	*	*	*	*	*
Manganese, mg/l	0.02	0.09	0.16	0.11	0.10	0.30	0.30	<0.01
Copper, ug/l	*	*	*	*	*	*	*	*
Silver, ug/l	*	*	*	*	*	*	*	*
Strontium, mg/l	3.90	8.00	4.00	2.90	4.40	4.20	4.50	7.50
Boron, mg/l	7.40	25.00	20.00	14.00	17.00	20.00	20.00	35.00
Beryllium, ug/l	*	*	*	*	*	*	*	*
Nickel, ug/l	*	*	*	*	*	*	*	*
Selenium, ug/l	*	*	*	*	*	*	<1.00	*
Mercury, ug/l	*	*	*	*	*	*	*	*
Arsenic, ug/l	<1.00	2.00	<1.00	1.00	1.00	2.00	2.00	2.00
Barium, mg/l	*	*	*	*	*	*	0.70	*
Cadmium, ug/l	*	*	*	*	*	*	*	*
Chromium-VI, ug/l	*	*	*	*	*	1.00	<1.00	*
Fluoride, mg/l	0.40	5.40	1.20	0.70	1.00	1.00	1.30	1.50
Lead, ug/l	*	*	*	*	*	16.00	0.20	*
Molybdenum, mg/l	*	*	*	*	*	*	*	*
Aluminum, mg/l	*	*	*	*	*	*	*	*
Fecal Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*
Cyanide, mg/l	*	*	*	*	*	*	*	*
Phenol, ug/l	*	*	*	*	*	*	*	*
Biochemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Chemical Oxygen Demand, mg/l	*	*	*	*	*	*	*	*
Total Organic Carbon, mg/l	*	*	*	*	*	*	*	*
Temperature, Degrees C	*	*	*	*	*	*	*	*
Dissolved Oxygen, mg/l	*	*	*	*	*	*	*	*
Water Level depth below ground surface, ft.	*	*	*	*	*	*	*	*
Total Sulfur, mg/l	*	*	*	*	*	*	*	*
Total Coliform Bacteria, # Col./100 ml	*	*	*	*	*	*	*	*

DATE	03/31/1987
pH-Field	*
pH-Laboratory	*
Specific conductance, umhos/cm @ 25c	*
Total Dissolved Solids, mg/l	*
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	*
Alkalinity Total, mg/l as CaCO3	*
Nitrate-N, mg/l	*
Ammonia-N, mg/l	*
Calcium, mg/l	46.00
Magnesium, mg/l	19.00
Potassium, mg/l	5.90
Sodium, mg/l	38.00
Sulfate, mg/l	*
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	*
Iron, mg/l	2.60
Zinc, mg/l	*
Manganese, mg/l	*
Copper, ug/l	<10.00
Silver, ug/l	*
Strontium, mg/l	0.39
Boron, mg/l	0.19
Beryllium, ug/l	<10.00
Nickel, ug/l	*
Selenium, ug/l	<1.00
Mercury, ug/l	*
Arsenic, ug/l	<1.00
Barium, mg/l	*
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	*
Fluoride, mg/l	*
Lead, ug/l	*
Molybdenum, mg/l	*
Aluminum, mg/l	2.90
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	*
Dissolved Oxygen, mg/l	*
Water Level Depth below ground surface, ft.	*
Total Sulfur, mg/l	*
Total Coliform Bacteria, # Col./100 ml	*

DATE	03/31/1987
pH-Field	*
pH-Laboratory	*
Specific conductance, umhos/cm @ 25c	*
Total Dissolved Solids, mg/l	*
Total Suspended Solids, mg/l	*
Alkalinity Carbonate, mg/l as CaCO3	<1.00
Alkalinity Bicarbonate, mg/l as CaCO3	*
Alkalinity Total, mg/l as CaCO3	*
Nitrate-N, mg/l	*
Ammonia-N, mg/l	*
Calcium, mg/l	46.00
Magnesium, mg/l	19.00
Potassium, mg/l	5.90
Sodium, mg/l	28.00
Sulfate, mg/l	*
Methylene Blue Active Substances, mg/l	*
Chloride, mg/l	*
Iron, mg/l	2.60
Zinc, mg/l	*
Manganese, mg/l	*
Copper, ug/l	<10.00
Silver, ug/l	*
Strontium, mg/l	0.39
Boron, mg/l	0.19
Beryllium, ug/l	<10.00
Nickel, ug/l	*
Selenium, ug/l	<1.00
Mercury, ug/l	*
Arsenic, ug/l	<1.00
Barium, mg/l	*
Cadmium, ug/l	<10.00
Chromium-VI, ug/l	*
Fluoride, mg/l	*
Lead, ug/l	*
Molybdenum, mg/l	*
Aluminum, mg/l	2.90
Fecal Coliform Bacteria, # Col./100 ml	*
Cyanide, mg/l	*
Phenol, ug/l	*
Biochemical Oxygen Demand, mg/l	*
Chemical Oxygen Demand, mg/l	*
Total Organic Carbon, mg/l	*
Temperature, Degrees C	*
Dissolved Oxygen, mg/l	*
Water Level depth below ground surface, ft.	*
Total Sulfur, mg/l	*
Total Coliform Bacteria, # Col./100 ml	*

APPENDIX B-4

Application to Renew Permit SU-033, Coal Creek Station, CPA/UPA 1989

APPLICATION TO RENEW PERMIT TO OPERATE A SPECIAL USE DISPOSAL SITE
NORTH DAKOTA STATE DEPARTMENT OF HEALTH AND CONSOLIDATED LABORATORIES
SFN 8396 (7/87)

DATE OF APPLICATION: 2/3/89

SEE INSTRUCTIONS ON BACK OF APPLICATION

APPLICANT'S NAME: Cooperative Power and United Power Association				PERMIT NUMBER: SU-033
ADDRESS: 14615 Lone Oak Road, Eden Prairie, MN 55344-2287				TELEPHONE NUMBER: 612/937-8599
PROPERTY OWNER: Same as Above	ADDRESS: Same as Above			TELEPHONE NUMBER:
PERSON WHO PREPARED APPLICATION: William Kaul	ADDRESS: Same as Above			TELEPHONE NUMBER:
LEGAL DESCRIPTION OF SITE	SECTION: 16	TOWNSHIP: 145N	RANGE: 82W	COUNTY: McLean
NUMBER OF ACRES IN DISPOSAL SITE: 220	ACRES NOT DEVELOPED:	EXPECTED LIFETIME OF SITE: 20 YR	PROPOSED FUTURE USE OF SITE: None	
AREA TO BE SERVED BY THIS SITE: Coal Creek Station			POPULATION IN THAT AREA:	
TYPE OF COVER MATERIALS "X" APPLICABLE ITEMS	X CLAY ___ SANDY ___ LOAM ___ OTHER (SPECIFY)			

TYPES OF REFUSE MATERIAL TO BE DEPOSITED AT SITE ("X" APPLICABLE ITEMS)

☐ PUTRESCIBLE WASTE (GARBAGE)	☑ FGD SLUDGE	☐ PESTICIDE CANS
☐ CONSTRUCTION WASTE	☐ OIL FIELD WASTES	☐ BRUSH AND TREE TRIMMINGS
☒ FLY ASH	☐ NONHAZARDOUS INDUSTRIAL WASTES	☐ TIRES
☒ BOTTOM ASH	☐ OTHER (SPECIFY)	

TYPES OF EQUIPMENT USED AT SITE

SPECIAL SITE REQUIREMENTS

YES	NO	THE FOLLOWING TO BE ANSWERED FOR ALL SITES
X		DOES YOUR FACILITY HAVE A SYNTHETIC/CLAY LINER
X		IS THE LINER BEING MAINTAINED
X		DO YOU HAVE ADEQUATE MATERIAL FOR FUTURE LINER CONSTRUCTION
X		DO YOU HAVE A GROUNDWATER/SURFACE WATER MONITORING PROGRAM IN PLACE AT THE DISPOSAL SITE

HOW FREQUENTLY ARE SAMPLES COLLECTED FROM MONITORING POINTS? Semiannually	WHAT IS YOUR ANNUAL COLLECTION SCHEDULE?
NAME OF LANDFILL EQUIPMENT OPERATOR: John Weeda, Plant Manager	TELEPHONE NUMBER: 701/442-3211

If not already completed, the permittee shall record, a notarized affidavit with the County Registrar of Deeds to place a notation in the County's tract system specifying that this solid waste management site, as specified in the legal description, is permitted to accept solid wastes for disposal. This affidavit shall specify that another affidavit must be recorded upon the facility's final closure.

Upon closure, a second affidavit shall be recorded specifying any final details regarding the types of wastes disposed of at the site, as well as any final details regarding the site's location, construction, management, etc. The Department must be provided a copy of both affidavits certified by the Registrar of Deeds in the county in which the disposal site is located. These certified copies must be forwarded to the Department within thirty (30) days of their recorded dates or if notification has been formally completed prior to completion of this permit renewal application, a certified copy of said notification shall be fowarded with the completed application.

I certify that the information in this application is true, correct and complete to the best of my knowledge.

Willi Kaul
SIGNATURE OF PERSON COMPLETING APPLICATION

Willi Kaul
SIGNATURE OF APPLICANT

(over)

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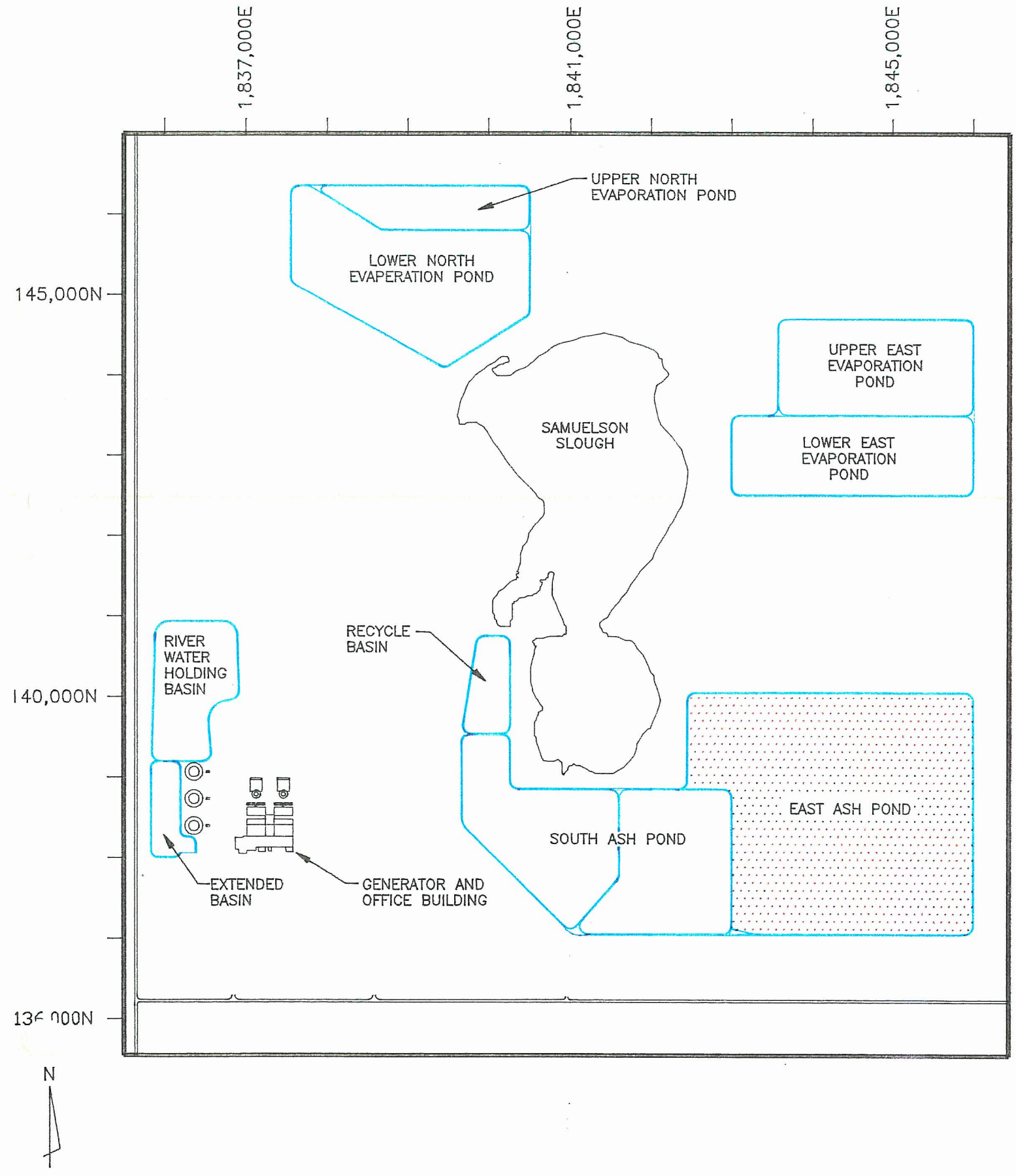
INTRODUCTION

This application is for a special use disposal permit for an already permitted facility (SU-033) at Coal Creek Station (CCS), a 1000 MW electric generating plant located near Underwood, North Dakota. Permit SU-033 expired in July, 1985, but was extended indefinitely by letter from the North Dakota State Department of Health (Department) dated August 20, 1985, pending further review by the Department. The facility in question is called the east ash pond (EAP) and has been used on and off since 1980 as a wet impoundment for the disposal of the by-products of combustion at CCS, namely bottom ash and flue gas desulfurization (FGD) sludge. (See Figure 1.)

Due to a combination of factors, including a high groundwater table, unfavorable geology, and an inadequate clay liner, the EAP has been taken out of service pending significant modifications, both in its construction and operation, which are the subject of this application.

Also subject to permit SU-033 is a separate, but adjacent facility called the south ash pond (SAP). Since these two facilities will no longer be used in the manner for which they were originally permitted (wet impoundments, permanent storage), and since they are each being redesigned and upgraded for different purposes, (EAP — dry, permanent disposal; SAP — wet, temporary disposal) it is proposed herein that separate permits be issued for these facilities. This application, however, will address only the EAP.

FIGURE 1
LOCATION MAP
COAL CREEK STATION



The SAP will be addressed in a subsequent application. However, in order to understand the overall plan for handling wastes in the future at CCS, it should be noted here for the benefit of reviewing agencies that the SAP has been emptied, partitioned and will be used in the future as a temporary storage or holding pond. One side will alternate as an active wet impoundment, receiving sludge and bottom ash from the plant, while the other side is dewatered prior to the wastes being hauled to the EAP or subsequent permanent disposal area. Currently, the western section of the SAP is receiving wastes from the plant.

The proposed modifications in the EAP include a significant addition of clay and spoils materials to most of the bottom which will serve to raise it to a level of at least five feet above the water table and which should also serve to provide a permeability coefficient in the liner of at least 1×10^{-7} cm/sec. The only exception is the southwest corner of the EAP which is partially filled with ash and sludge. This section of the EAP has favorable geology and the cost of removing the waste materials would be excessive. Therefore, it is proposed that it be dewatered and covered to control runoff and infiltration, prior to continued use as a dry landfill.

Based on a thorough study of all aspects of the situation, these physical and operational changes should minimize or eliminate further degradation of the groundwater. In fact, once these modifications are made, there should be a steady improvement in the groundwater quality in the area.

I. WASTE CHARACTERISTICS

A. Quantities (Foth & Van Dyke, 1987; Black & Veatch, 1988)

The solid wastes generated at CCS include fly ash, bottom ash and FGD sludge. Fly ash constitutes about 55 to 65 percent of the total ash produced during combustion. Over 99 percent of the fly ash produced during combustion is captured in the electrostatic precipitators for disposal. Historically, a large portion of the collected fly ash has been used as a reagent in the FGD system. Also, large quantities of fly ash have been sold for use in concrete. Fly ash which is not used as FGD reagent or sold, has been trucked off site and disposed of in specially designed pits located in mined areas north of the plant.

The remaining 35 to 45 percent of the ash forms into bottom ash or boiler slag. This material is sluiced together with the FGD sludge to the wet impoundments.

In 1988, CCS burned 6.8 million tons of lignite and operated at a plant capacity factor of about 85 percent. The following quantities of wastes were produced.

Material	Cubic Yards-1988	Cubic Yards/Day
Fly Ash	222,443	609
Bottom Ash	384,775	1054
FGD Sludge	522,694	1432
Total	1,129,912	3095

It should be noted here that a total volume of fly ash of 522,409 cubic yards was produced at CCS in 1988; however, of that volume 216,752 cubic yards were used as a FGD reagent and are included in the above FGD sludge numbers. Also not included in the fly ash quantities listed in the above table are 83,215 cubic yards that were sold. The volumes of bottom ash and FGD sludge are "wet" volumes assuming 25 percent and 50 percent moisture, respectively.

Since 1988 was a record year in terms of the quantity of lignite burned, and since an 85 percent plant capacity factor is near the maximum practical limit of operation for CCS, the volumes given here can be considered to be near the maximum amount of waste that can be generated at CCS in a year.

B. Physical Characteristics (Foth & Van Dyke, 1987; Black & Veatch, 1989)

Ash is the inorganic residue remaining either as fly ash or bottom ash after the lignite is burned. It originates chiefly from the mineral matter that was present in the unburned coal. Ash composition is a function of the type of coal burned, the combustion method and the emission control devices used. Typically, ash constitutes about 11 percent of the lignite by weight.

Bottom ash consists of angular particles with a porous surface texture that is normally gray to black in color. Boiler slag is composed of black angular particles having a glossy appearance. Table 1 contains an elemental analysis of CCS bottom ash.

TABLE 1

Elemental Analyses of CCS Bottom Ash
(ppm by weight)

Sample I.D.	A	B	C	D	E	F
pH	12.0	12.0	11.9	12.0	12.0	12.1
Organic-N	0.055	0.048	0.038	0.062	0.064	0.043
(NO_3+NO_2)-N	0.5	0.5	0.5	0.5	0.5	0.5
Sulfate	1970	3780	1140	2660	3430	3850
Calcium	17810	19650	11910	20950	20120	15780
Magnesium	407	475	306	432	471	347
Potassium	221	272	255	188	218	169
Sodium	132	141	121	137	134	119
Iron	286	289	157	246	365	239
Copper	0.04	0.05	0.03	0.01	0.01	0.03
Cadmium	0.01	0.01	0.01	0.01	0.01	0.01
Chromium	0.03	0.03	0.05	0.04	0.04	0.02
Nickel	0.12	0.12	0.08	0.03	0.16	0.03
Lead	0.59	0.67	0.39	0.57	0.58	0.35
Zinc	0.02	0.02	0.11	0.02	0.02	0.02

NOTE: These samples were taken from one 55-gallon barrel of bottom ash collected for analysis. Bottom ash is not analyzed on a regular basis.

Fly ash produced at CCS is comprised of very fine particles, the majority of which are glassy spheres, with the remainder being crystalline matter and carbon. A minerological analysis of the fly ash reveals that its principal chemical constituents are silica (SiO_2), lime (CaO), and alumina (Al_2O_3). See Table 2 for the complete analysis. Table 3 contains a trace element analysis of CCS fly ash conducted in 1979 (sample 3) and 1980 (samples 1 and 2).

The FGD system at CCS is a combination lime/fly ash system. This system is capable of using lime only or a combination of lime and fly ash as a reagent. A thorough study of these wastes was conducted in November 1987 by Foth & Van Dyke, a geosciences consulting firm. The materials, located in the SAP and subsequently hauled to a permanent disposal site north of CCS, were visually classified in a laboratory according to the relative proportions of the major components: fly ash, bottom ash and FGD sludge. This was done in order to determine whether a reasonable correlation existed between the physical and chemical properties of the ponded materials. Six types were identified.

Type 1 Bottom ash with less than 20 percent fly ash and/or FGD sludge.

Type 2 Bottom ash with 20-50 percent fly ash and/or FGD sludge.

Type 2T Bottom ash with 20-50 percent fly ash and/or FGD sludge — thixotropic.

TABLE 2

Typical CCS Fly Ash Analysis

Constituent	Average* Percent
SiO_2	46.6
Al_2O_3	16.0
Fe_2O_3	7.8
CaO	19.4
MgO	5.7
SO_3	1.5
P_2O_5	0.33
Na_2O	0.89
K_2O	1.7
TiO_2	0.62
Total	100.54
Acid Insoluable Residue	45.05
Available Alkalinity**	2.94

* Arithmetic average of two analyses from Twin City Testing.

** Arithmetic average of 44 analyses performed by Cooperative Power between 1986 and 1988.

Source: Black & Veatch, 1989

TABLE 3

Trace Element Analyses of CCS Fly Ash
(ppm by weight)

	Sample #1	Sample #2	Sample #3
Uranium	11	11	—
Lead	34	45	100
Thallium	<28	<28	—
Mercury	0.20	0.10	<0.1
Barium	3089	3634	7500
Tellurium	<20	<20	—
Antimony	10.2	8.0	—
Phosphorus (%)	0.12	0.13	—
Cadmium	<8	<8	<2.5
Silver	<6	<6	2.2
Molybdenum	28	26	—
Strontium	4470	5552	4200
Bromine	<5	<5	—
Selenium	7.8	7.4	2.4
Arsenic	106.9	102.5	100
Germanium	<15	<15	—
Zinc	74	70	60
Copper	67	64	65
Nickel	31	31	1000
Manganese	573	530	—
Chromium	53	63	55
Vanadium	159	140	0.40
Fluorine	220	220	—
Boron	1078	1095	210
Beryllium	4.9	4.9	7.5

Type 2S Bottom ash with 20-50 percent fly ash and/or FGD sludge — soft.

Type 3 Material with greater than 50 percent fly ash and/or FGD sludge.

Type 3T Material with greater than 50 percent fly ash and/or FGD sludge — thixotropic.

Approximately one-third (33 percent) of the material in the SAP was judged to be relatively clean bottom ash or Type 1 material. Another one-fifth (20 percent) of the material was estimated to be Type 2 material. Type 3 material made up the remaining 47 percent of the sediments. Approximately 15 percent of the Type 2 material and approximately 50 percent of the Type 3 material was thixotropic.

C. Chemical Characteristics (Foth & Van Dyke, 1987)

As a part of the above study, 88 samples were analyzed for various chemical parameters. The total included 87 samples from borings and one fresh FGD sludge sample. All of the samples were analyzed for total and leachable arsenic, cadmium and boron. Sulfate, chloride and pH were measured in the leachate solutions of these samples. Eight selected samples were also analyzed for total and leachable magnesium, sodium, calcium, potassium and lead. Fluoride, total dissolved solids and specific conductivity were also measured in the leachate solutions of the select samples. Digestion and analyses for the total constituents

were conducted following Standard Methods. Leaching analyses were performed according to ASTM Method D 3987-81 as requested by the Department. All of the analyses were performed in the Foth & Van Dyke Chemistry Laboratory in Green Bay, Wisconsin. A complete report is on file at the Department.

The results of these analyses indicate that the values of total and leachable cadmium and leachable selenium were below the detection limits of the methods employed. All but four of the total selenium values were below the detection limit and the four that were measured were at detection limit values. All but four of the leachable arsenic values were below the detection limit, and the four with measurable values had concentrations that were only slightly above the detection limit. These data indicate that, although metals are present in the samples, the metals do not leach out of the ash material under conditions found in the pond.

The pH of the leachate solutions was remarkably consistent from sample to sample. Fly ash reacts with water, leading to immediate dissolution of the alkalis and the alkaline earths from their oxide forms within the ash grains, subsequently forming hydrated ions. These reactions result in the high pH which is observed in the ash pond. The average pH value is approximately 10.2 units. An elevated pH level in a reaction stable environment, such as the SAP, tends to minimize leachability of the metals that are present.

FGD sludge reacts with the water in the pond releasing considerable quantities of sulfate and calcium. The principal components of FGD sludge are generally calcium sulfate and calcium carbonate. Upon reacting with water in the ash pond, the calcium sulfate becomes hydrated forming the mineral phase gypsum. The presence of the FGD sludge in the basin has a limiting effect on the leaching of materials from the fly and bottom ashes, since the high concentrations of sulfate tend to inhibit the dissolution of the ash. In addition, the high sulfate makes the calcium sulfate minerals less soluble than they would otherwise be due to the common ion effect.

Total boron concentrations varied between samples, and when these values were grouped according to the type of material analyzed, differences in the mean values between the groups were observed. As shown on Table 4 the Type 1 materials have the highest total boron (317 mg/kg) and the Type 3T have the lowest total boron concentrations (220 mg/kg). T-test comparisons between the mean values indicated that the differences between the groups is significant. Probabilities that significant differences exist between Type 1 and Type 2's are 99 percent, between Type 2's and Type 3 are 81 percent, and between Type 3 and Type 3T are 92 percent.

Leachable boron concentrations vary widely between samples. There were no significant differences between the means of the grouped data. However, leachable boron exhibits a distributional pattern for the highest concentrations. Those samples collected near the southern and

TABLE 4

Mean Concentrations

Material	No. Samples	Total Boron (mg/kg)	Total Arsenic (mg/kg)	Leachable Chloride (mg/l)	Leachable Sulfate (mg/l)
Type 1	22	317 ± 62	45.4 ± 18.8	17.4 ± 11.4	1346 ± 547
Type 2, 2S and 2T	22	264 ± 71	57.1 ± 21.6	27.8 ± 16.5	1750 ± 153
Type 3	18	240 ± 42	80.7 ± 21.0	29.1 ± 19.7	1695 ± 433
Type 3T	25	220 ± 31	94.2 ± 19.1	36.5 ± 22.8	1806 ± 259

Comparison of Statistical Probability by Material Type:

1:2	99%	>93% among all types	1:2 98%	1:2/3 99%
2:3	81%		2:3 No diff.	2:3 No diff.
3:3T	92%		3:3T 83%	3:3T No diff.

Source: Foth and Van Dyke, 1987

western borders of the pond and many of those collected at, or near, the base of the accumulated sediments contained relatively high concentrations.

Total arsenic concentrations when grouped by material type showed considerable differences in mean values as shown in Table 4. Type 1 materials have the lowest total arsenic concentrations (45.4 mg/kg) and Type 3T the highest (94.2 mg/kg). T-tests performed on the total arsenic calculations revealed that there is a 93 percent, or greater, probability that the differences between the mean values is significant.

Leachable chloride concentrations differed between samples. Mean values of the concentrations grouped according to type of material leached are shown in Table 4. Type 1 materials have the lowest leachable chloride concentrations (17.4 mg/kg) and the Type 3T have the highest (36.5 mg/kg). T-tests performed on the means indicate that there is no significant difference between the Type 2's and the Type 3 means. There is a 98 percent probability that the difference between the Type 1 and the Type 2's is significant, and a 83 percent probability that the differences between the Type 3 and the Type 3T are significant.

Leachable sulfate concentrations, when grouped according to type of material leached, have somewhat differing mean concentrations as shown in Table 4. There are no significant differences in the mean leachable concentrations among Type 2 (1,750 mg/l), Type 3 (1,695 mg/l) and Type 3T (1,806 mg/l) materials. A significant difference (99 percent probability) does exist between the mean concentrations in Type 1 material (1,346 mg/l), which are the lowest, and the other materials.

Selected ash samples and fresh FGD sludge were analyzed for total and leachable alkalis, alkaline earths and lead. Leachable fluoride, total dissolved solids and specific conductivity were also measured. The results are presented in Tables 5 and 6.

The data show that the pond sample at location 458-1 is physically and chemically similar to the fresh FGD sludge. However, the ash contained lower leachable fluoride, total dissolved solids and had lower leachate conductivities than the fresh FGD sludge. There were no differences in total lead concentrations between the ponded ash materials and the fresh sludge. Leachable lead concentrations were below the detection limit for all samples.

The total and leachable sodium concentrations were lower in the ponded samples than in the fresh sludge. The total magnesium concentrations were approximately the same in all of the materials, but the leachable magnesium concentrations were much lower in the sediments than in the sludge. Total calcium and potassium concentrations in the sediments were lower than the sludge, but leachable calcium was greater and leachable potassium much greater in the sediments than in the sludge. High levels of calcium are typical for wastes derived from the combustion of Western lignite and sub-bituminous coals.

Western ashes commonly develop significant strength after several months of burial, especially if the burial is in an unsaturated site. This is due to the cementitious nature of these high calcium materials. The materials in the cement are likely to include hydrous calcium sulfate,

TABLE 5

Total and Leachable Concentration of Magnesium, Sodium, Calcium and Potassium

Location	Material (Type)	pH (Standard Units)	Total Magnesium (mg/kg)	Leach Magnesium (mg/l)	Total Sodium (mg/kg)	Leach Sodium (mg/l)	Total Calcium (mg/kg)	Leach Calcium (mg/l)	Total Potassium (mg/kg)	Leach Potassi (mg/l)
90-1	1	11.0	17,000	0.96	1,800	93	69,000	630	2,300	26
90-12	2	10.3	16,000	0.69	2,700	150	81,000	600	2,200	120
90-18	3	10.8	15,000	0.46	3,000	150	130,000	580	4,000	90
252-3	2	10.7	20,000	0.76	4,000	170	121,000	700	2,200	120
252-12	2	10.4	14,000	0.70	1,700	150	150,000	580	3,400	75
318-15	3T	10.3	11,000	0.56	2,300	150	160,000	680	2,500	50
458-1	3	8.2	17,000	118	4,000	150	120,000	550	2,700	15
Scrubber Sludge (9/25/87)	3	9.3	16,000	310	7,200	210	150,000	340	3,200	13

Source: Foth and Van Dyke, 1987

TABLE 6

Total and Leachable Lead, Leachable Fluoride and pH Data

Location	Material (Type)	pH (Standard Units)	Leach Fluoride (mg/l)	Total Lead (mg/kg)	Leach Lead (mg/l
90–1	1	11.0	1.9	2.1	<0.50
90–12	2	10.3	1.1	6.3	<0.50
90–18	3	10.8	1.5	7.3	<0.50
252–3	2	10.7	1.7	4.5	<0.50
252–12	2	10.4	2.0	6.1	<0.50
318–15	3T	10.3	1.8	5.2	<0.50
458–1	3	8.2	6.3	8.8	<0.50
Scrubber Sludge (9/25/87)	3	9.3	13	6.1	<0.50

Source: Foth and Van Dyke, 1987

calcium and magnesium carbonates and hydrous iron oxides. Fly ash tends to be pozzolanic, a special type of self-cementation. During this process, hydrous aluminosilicates form, especially the mineral ettringite. The leaching potential of these materials greatly decreases once cementitious reactions have occurred. Some of the sediment samples from the pond were found to be partially cemented.

In summary, bottom ash and FGD sludge generally exhibit similar potential for leaching. Boron and sulfates exhibit the greatest leachability potential of the parameters tested. Arsenic, selenium, cadmium and lead are bound up in the ash materials and are immobilized because of the high pH level, which is evenly distributed throughout most of the ash material.

The analysis of these materials is provided as representative of the physical and chemical characteristics of the materials to be deposited in the EAP in the future. It should be noted, however, that some variations are possible — both in the quantities and the chemical characteristics of the various wastes produced — depending on the amount of fly ash that is used as a reagent in the FGD system. The range of quantities of fly ash used as a reagent can vary from zero to as much as 40 percent of the fly ash produced at CCS. It is further contemplated that dry fly ash may also be deposited in the EAP in the event that it is not used as a reagent, or sold or trucked to the mine pit disposal area. Thus, this application specifically includes fly ash as a waste intended for disposal in the EAP.

II. LOCATION INFORMATION

Coal Creek Station is located in on a 2560 acre site in McLean County, North Dakota. A composite U.S.G.S. Quadrangle map showing its location has been developed and enclosed as Figure 2. The EAP is located in section 16, Township 145N, Range 82W. An aerial photograph showing the EAP and the SAP is included in this application as Figure 3. A detailed site map is included as Figure 4.

Since the EAP is an already permitted solid waste disposal site, no change in local zoning is anticipated.

Permit C

Permit B

Permit 40

Underwood

Falkirk Mining Company

Coal Creek Station

#1

#2

#3

#4

#5

UPA 230KV

WAPA 230KV

UPA-CPA 400 KV-DC

Pipeline

Intake

Coal Lake

Coulee

Creek

Buffalo

WELLER SLOUGH

Ambient Air Quality Monitoring Station

MISSOURI RIVER

MC LEAN CO
OLIVER CO

LEWIS AND CLARK GAME MANAGEMENT AREA

WASHBURN MUNICIPAL AIRPORT

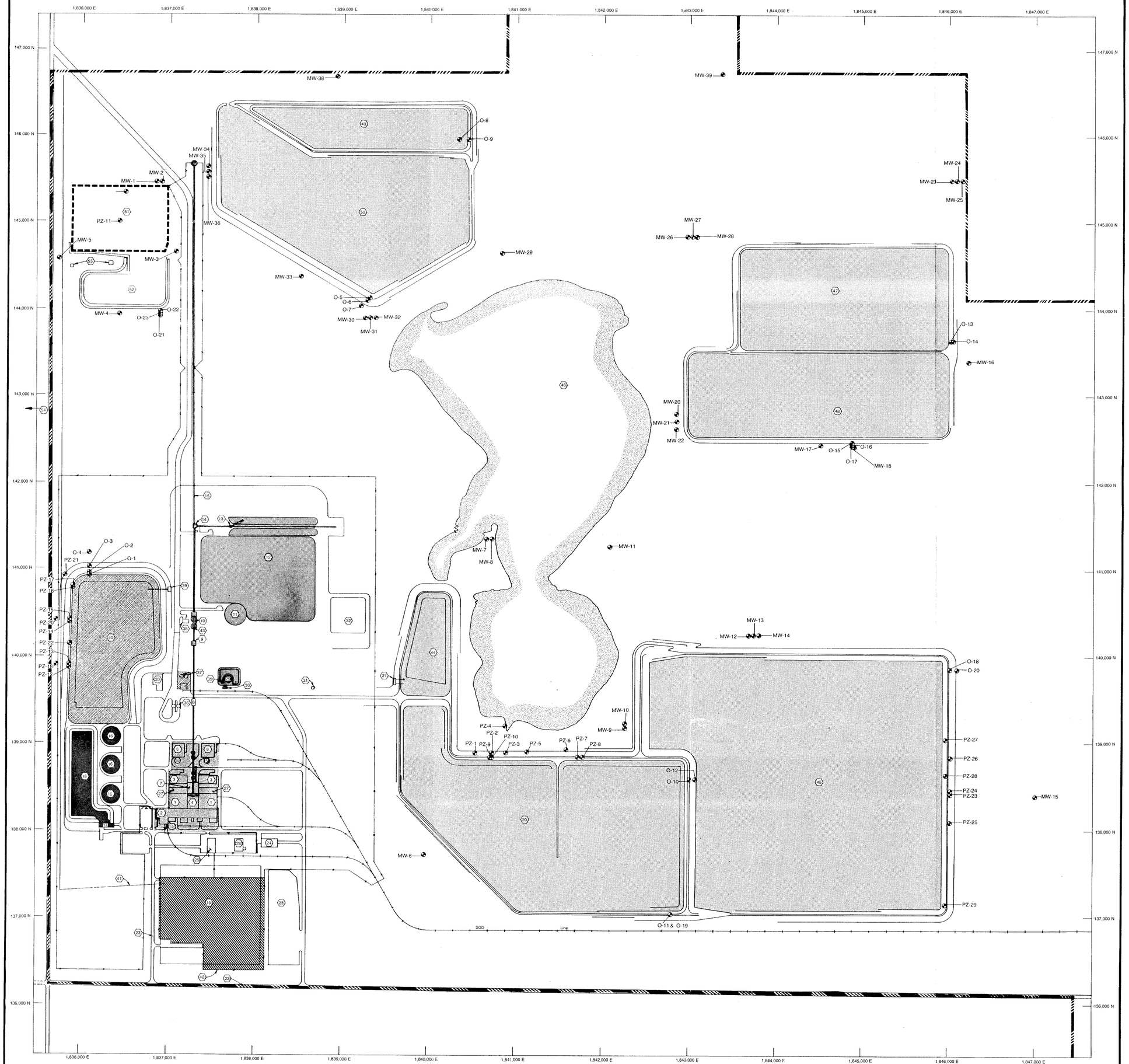
Figure 2



Figure 3

Cooperative Power Association
Environmental Affairs Department

Site of Coal Creek Station
Underwood, North Dakota



Plant Systems

- Fuel system
- Cooling water system
- Waste water system
- Service water system
- DC substation
- Main plant
- PZ-3 / 0-3 — Piezometer well
- MW-3 — Monitoring well
- Property line

Facilities

1 Generation Building
2 General Services Building
3 Precipitator Building
4 Control Area
5 Chimney
6 Scrubber Building
7 Auxiliary Boiler Area
8 Crusher Building
9 Yard Silo Base Building
10 Lignite Yard Silos
11 Emergency Stockout Pile
12 Inactive Lignite Storage
13 Stacker-Reclaimer and Active Storage
14 Transfer Building
15 Conveyor 901
16 Cooling Towers
17 Circulating Water Pumphouse
18 Extended Basin (SW-7)
19 AC-DC Substation
20 South Ash Pond (SW-6)
21 Recycle Pumphouse
22 Main Site Access Road
23 Main Plant Access Road
24 Warehouse
25 Construction Office
26 Crew Building
27 Fan Area
28 Construction Parking Lot
29 Fuel Oil Storage Tank
30 Fuel Oil Pumphouse
31 Sewage Treatment Plant
32 Lignite Storage Runoff Basin (SW-11)
33 Maintenance Garage
34 Water Treatment Building
35 No. 2 Fuel Oil Storage Tank
36 Fly Ash Silos
37 Service Water Storage Tanks
38 Fire Booster Pumphouse
39 Makeup Water Pumphouse
40 River Water Basin (SW-4)
41 69 KV Transmission Line
42 Security Fencing
43 Lignite Yard Silo Penthouse
44 Holding Pond (SW-8)
45 East Ash Pond (SW-12)
46 Samuelson Slough North (SW-1), South (SW-2)
47 East Upper Evaporation Pond (SW-9)
48 East Lower Evaporation Pond
49 North Upper Evaporation Pond (SW-5)
50 North Lower Evaporation Pond
51 Fly Ash Disposal Area
52 Fly Ash Runoff Basin (SW-10)
53 Well Pump Building
54 Weller's Slough (SW-3)

N

400 200 0 400 800
feet

Figure 4

May 1981

III. GENERAL GEOLOGY AND HYDROLOGY

A. Geology — Overview (BARR Engineering, 1982)

Coal Creek Station is located in an area underlain by the Fort Union Group of sedimentary rocks. These are poorly consolidated silts, clays and sands interbedded in the upper non-marine units with mineable lignite. The only marine formation that subcrops in the area and the oldest is the Cannonball formation. Figure 5 shows the locations of regional cross sections. Figure 6 shows the Cannonball formation. It and the overlying Slope formation are encountered only at the base of deep bedrock valleys. The Slope formation is similar to the upper two nonmarine units, the Bullion Creek and Sentinel Butte formations. The nonmarine sands and the fractured lignites of this sequence are water bearing.

Bedrock topography is thought to reflect preglacial drainage when the Missouri River flowed toward Hudson Bay. The original patterns have been modified, however, due to the tremendous effect of the glaciers on the directions of streamflow.

Bedrock is buried by the Coleharbor formation, an unconsolidated unit of glacial drift. These sediments, which completely fill many bedrock valleys, consist of sandy, silty, clay tills, sand and gravel outwash, and silt and clay lake deposits. In a few places the Coleharbor formation is overlain by the Oahe formation which is primarily made up of recent alluvium.

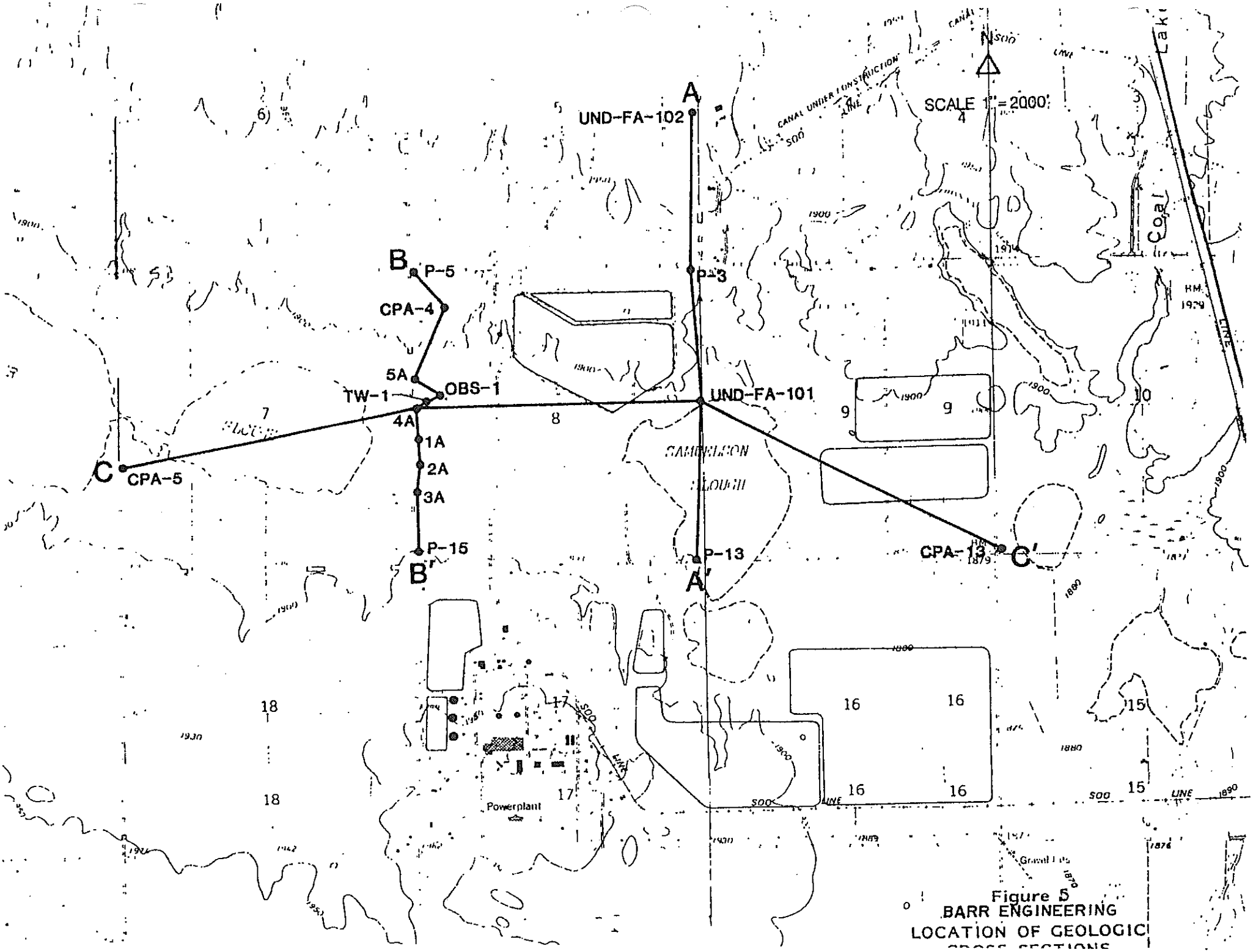


Figure 5
BARR ENGINEERING
LOCATION OF GEOLOGIC

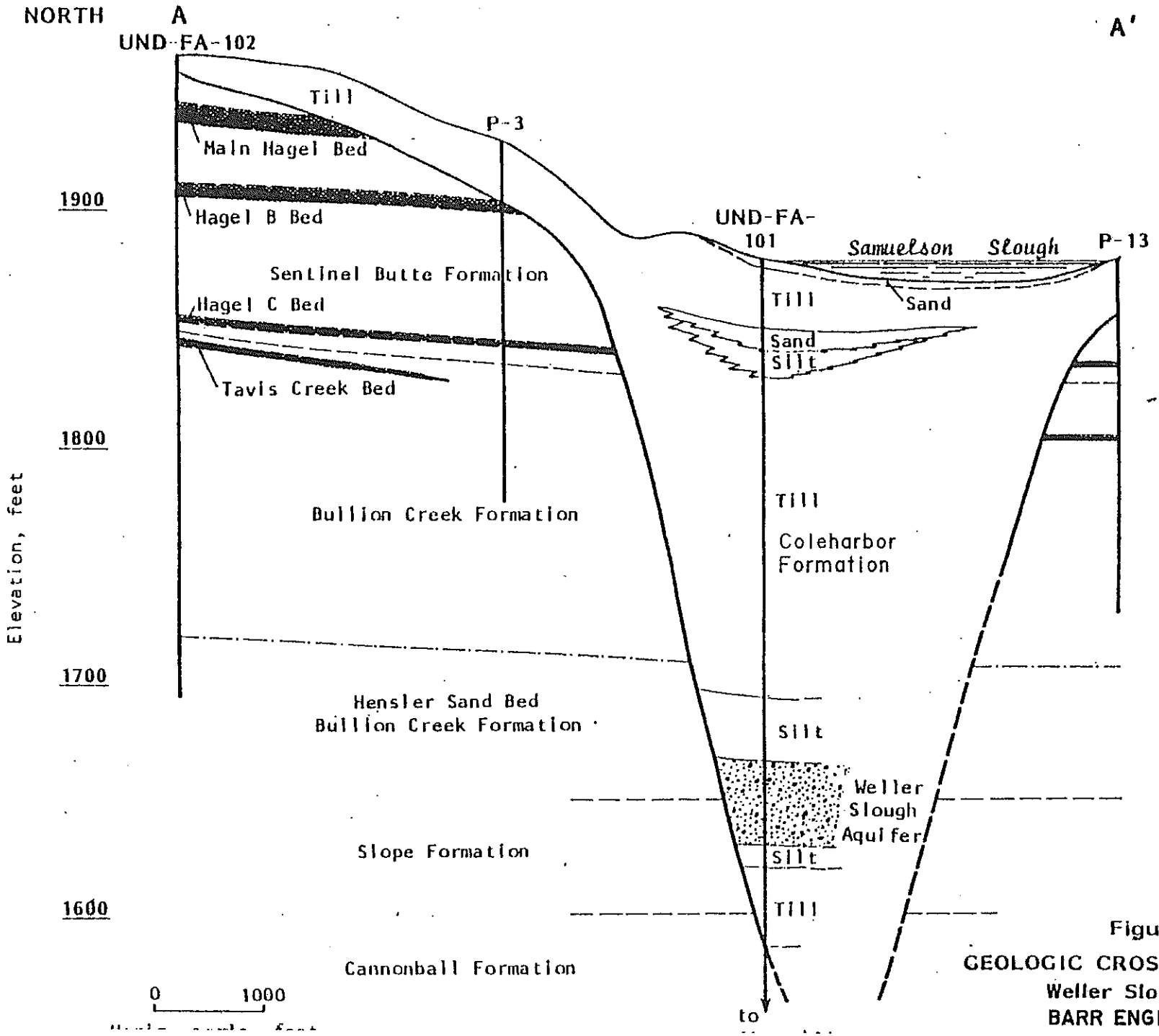


Figure 6

GEOLOGIC CROSS SECTION A-A'

Weller Slough Valley

BARR ENGINEERING

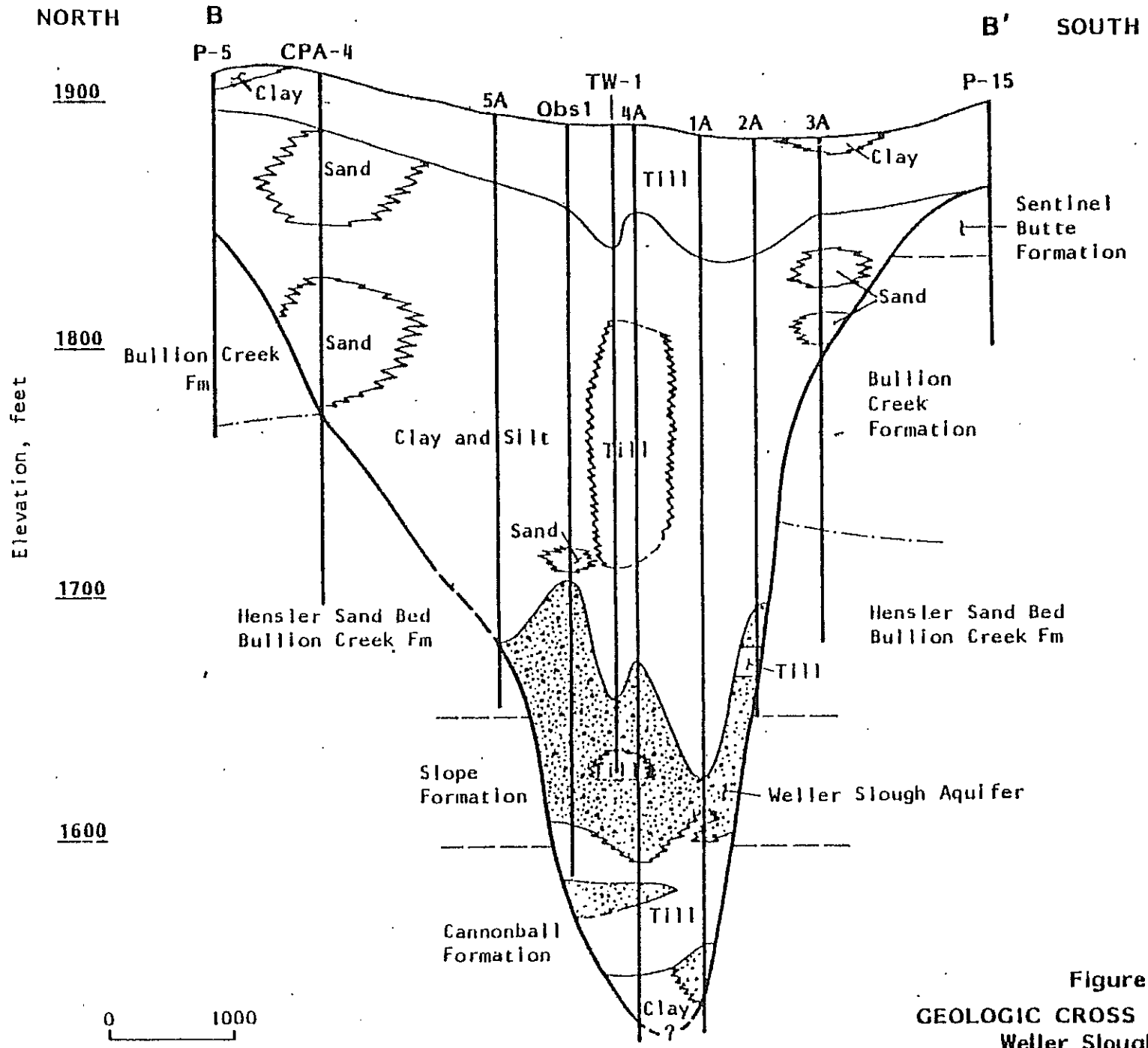


Figure 7

GEOLOGIC CROSS SECTION B-B'

Weller Slough Valley

BARR ENGINEERING

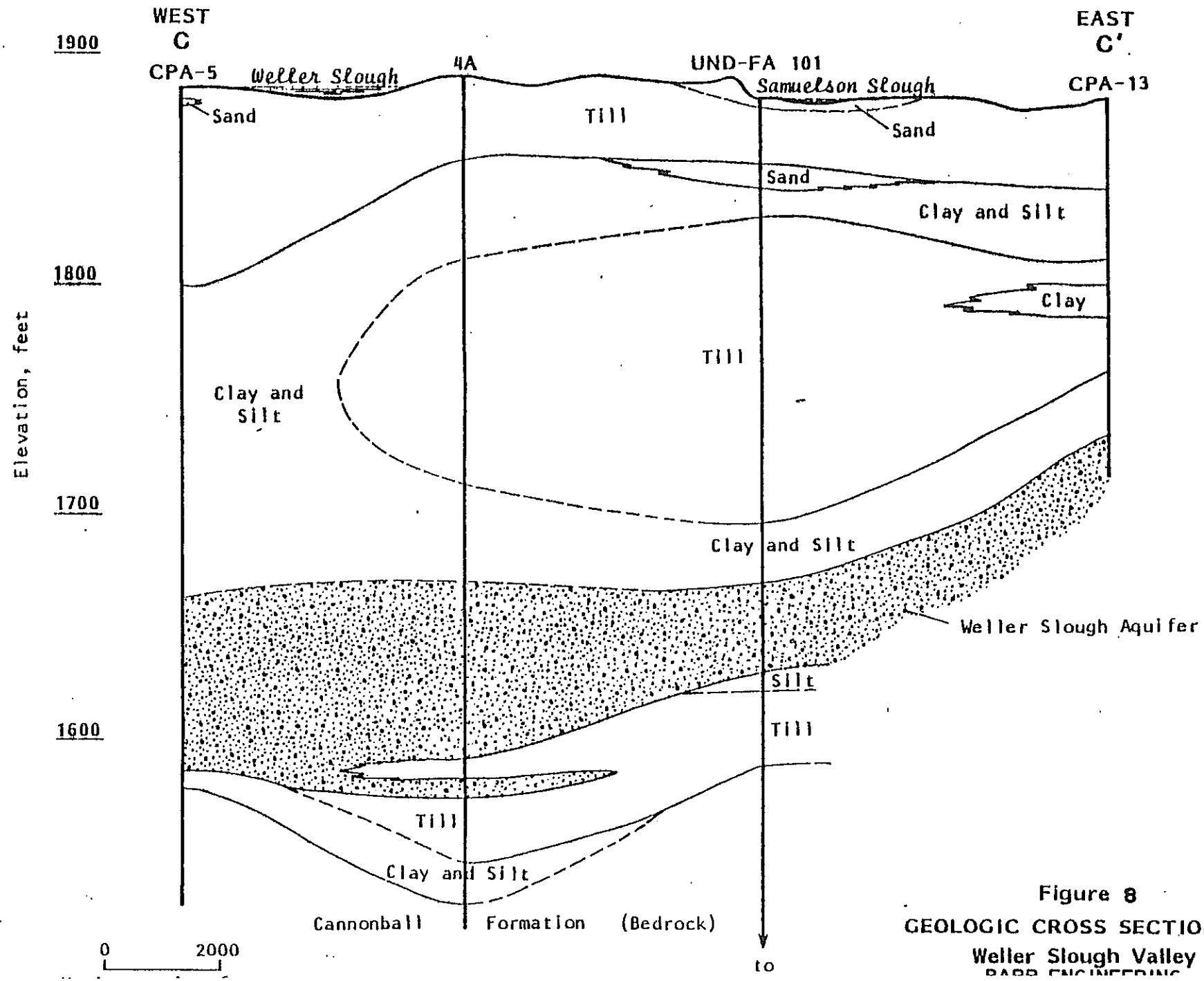


Figure 8

GEOLOGIC CROSS SECTION C-C'

Weller Slough Valley

BARR ENGINEERING

B. Geology — Site (BARR Engineering, 1982)

The CCS occupies sections 8, 9, 16, and 17 of Township 145N, Range 82W. The underlying Cannonball formation is estimated to be 270 feet thick. Its contact with the Slope formation is probably around elevation 1600. The Slope here is approximately 50 feet thick. The overlying Bullion Creek is 150 to 190 feet thick. Its contact with the Sentinel Butte formation is at elevation 1840. The Sentinel Butte outcrops in the southwest quarter of section 17.

The bedrock topography is dominated across the site by a deep valley. The floor of this valley, referred to as the Weller Slough Valley, may slope toward a now-buried channel of the Knife River, east of Washburn.

The Weller Slough Valley is over 365 feet deep and filled with sediments of the Coleharbor formation. There are three tills interbedded with lake deposits and a thick sand and gravel sequence. The latter comprises the Weller Slough aquifer. It is over 100 feet thick in places and is located near the base of the valley. (See Figures 6-8.)

Some sediments of the Oahe formation are located in a linear deposit oriented north-south through sections 9 and 16. The fine alluvium around Samuelson and Weller Sloughs is also included in this formation.

C. Hydrogeology — General (BARR Engineering, 1982)

Work done in the Falkirk Mine area has shown that within bedrock, groundwater flow is predominantly vertically downwards through the claystone and siltstone beds that act as aquitards. In the more permeable lignite and sand beds, groundwater is thought to flow horizontally toward the Weller Slough and Coal Lake Coulee channels. The Cannonball formation is considered the regional confining stratum, separating the shallower aquifers from the deep bedrock aquifers.

The sands of the Sentinel Butte and Bullion Creek formations are reported to have permeabilities on the order of 10^{-4} cm/sec. The average permeability of the lignite beds in the Sentinel Butte formation is on the same order. The clay and silt aquitards have a mean permeability of 10^{-6} cm/sec.

The tills exhibit a wide range of permeabilities also. Unfractured till shows a range from 10^{-7} to 10^{-8} cm/sec. The permeability of fractured till may be as great as 10^{-4} cm/sec. The sand and gravel units in the valley are reported to have a mean permeability of 10^{-3} cm/sec.

D. Weller Slough Aquifer

The thickness of the Weller Slough aquifer varies from 28 to more than 109 feet in the vicinity of CCS. As mentioned above, confined conditions in the aquifer indicate that the glacial till overlying the aquifer is significantly less permeable than the aquifer sands and

gravels. Because the overlying strata are relatively impermeable, it is likely that significant recharge to the Weller Slough aquifer is from bedrock units thought to be discharging at the valley wall interface. Specifically, the Hensler sand and Bullion Creek formation and the entire Slope formation are in direct contact with the sand and gravel units of the Weller Slough aquifer. It has been reported that the Hensler sand may be a regional groundwater sink; however, groundwater movement from the Weller Slough aquifer to the Hensler sand would be unlikely.

Precipitation may infiltrate the upper till soils under certain conditions. However, after evaporation, most of the water is thought to accumulate as runoff to the sloughs. Leakage from the sloughs does not seem to contribute significantly to the recharge of the Weller Slough aquifer. (Groenewald, et. al. 1979)

E. Hydrology

The surface water of interest in the area of CCS includes Samuelson Slough, Weller Slough, Saylor Slough, Gradin Slough and the Legal Drain system. These wetlands and the legal drain represent the confluence of three regional water sheds; one which drains into Weller Slough, one which drains into Samuelson Slough, and the Coal Lake Coulee which drains into Saylor Slough. In addition, the Falkirk Mining Company has been pumping large quantities of mine pit water into the Legal Drain which flows to Samuelson Slough. Weller Slough flows into Samuelson

Slough, and Samuelson Slough, in turn, flows into Saylor Slough. Saylor Slough flows to Gradin Slough, which flows to the Missouri River, six miles south of CCS.

These wetlands are also influenced by the upper level aquifer. This is discussed in some detail in the next section.

IV. SITE SPECIFIC GEOLOGY AND HYDROLOGY

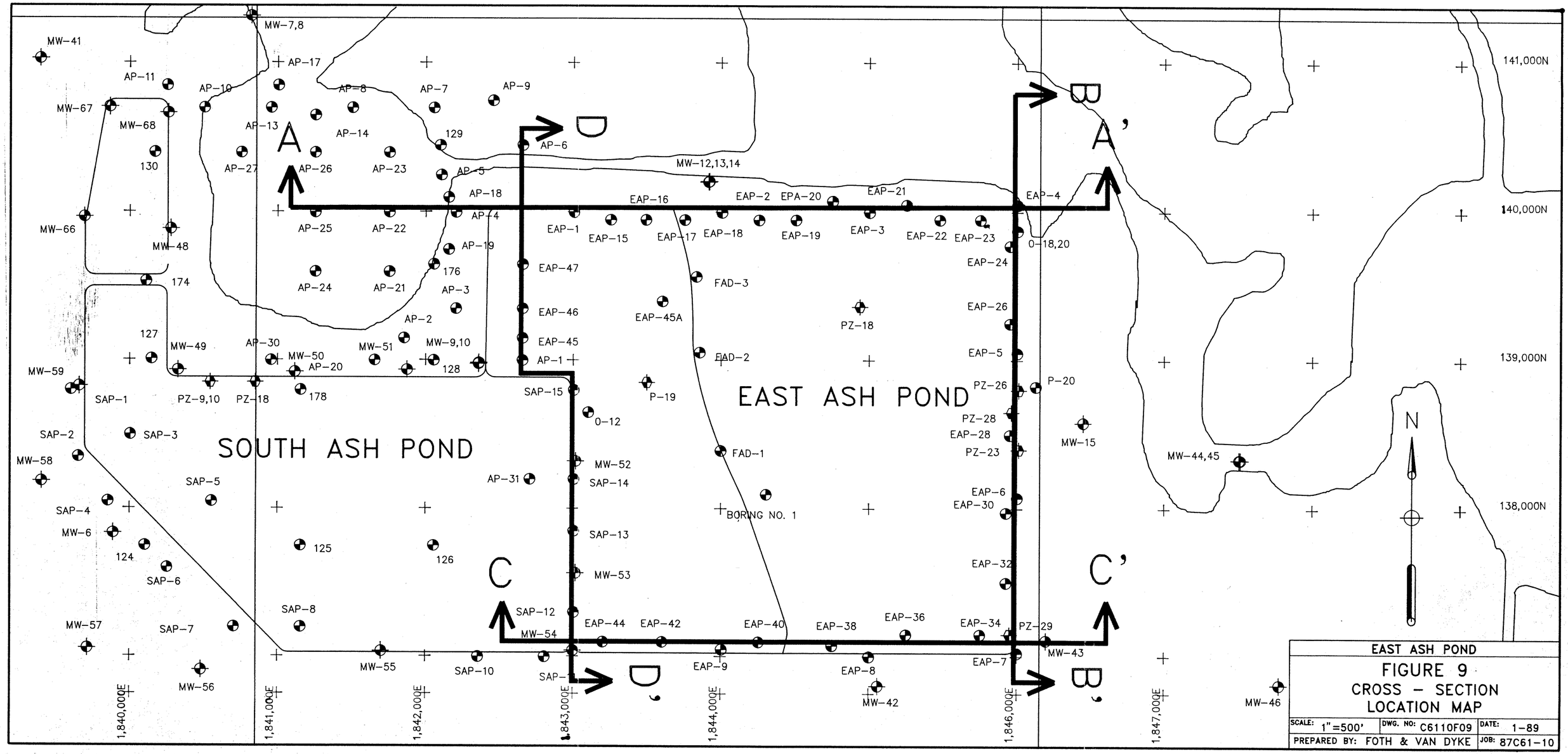
Detailed hydrogeological studies have recently been conducted by Foth & Van Dyke to augment previous efforts to better understand the conditions at the CCS site and to provide a basis for the mitigation of the current groundwater conditions. The results of these studies and analysis are presented in this section.

Site Geology

The site geology indicates near-surface silty clay and sandy clay till with interbedded sand lenses. The Oahe formation, mentioned above in the general discussion of the area geology, is the uppermost unit and is found in some parts of CCS. The surficial deposits of this formation are, by definition, the result of post-glacial drainage patterns. It is reported to be fine to coarse alluvium in a linear deposit going north-south through the middle of sections 9 and 16. This relatively high permeability unit is believed to be beneath parts of the EAP.

The next lower unit is the Napoleon drift of early Wisconsin age. This uppermost glacial unit is typically 15-20 feet of cohesive silty, sandy, lignitic till which is yellow to brown. The gray pre-Wisconsin Mercer drift is deposited below the Napoleon drift.

The subsurface geology in the vicinity of the EAP can best be shown with geological cross sections. The locations of the cross sections are shown on Figure 9. Geological cross sections A-A', B-B', C-C' and D-D' are provided as Figures 10, 11, 12 and 13, respectively.



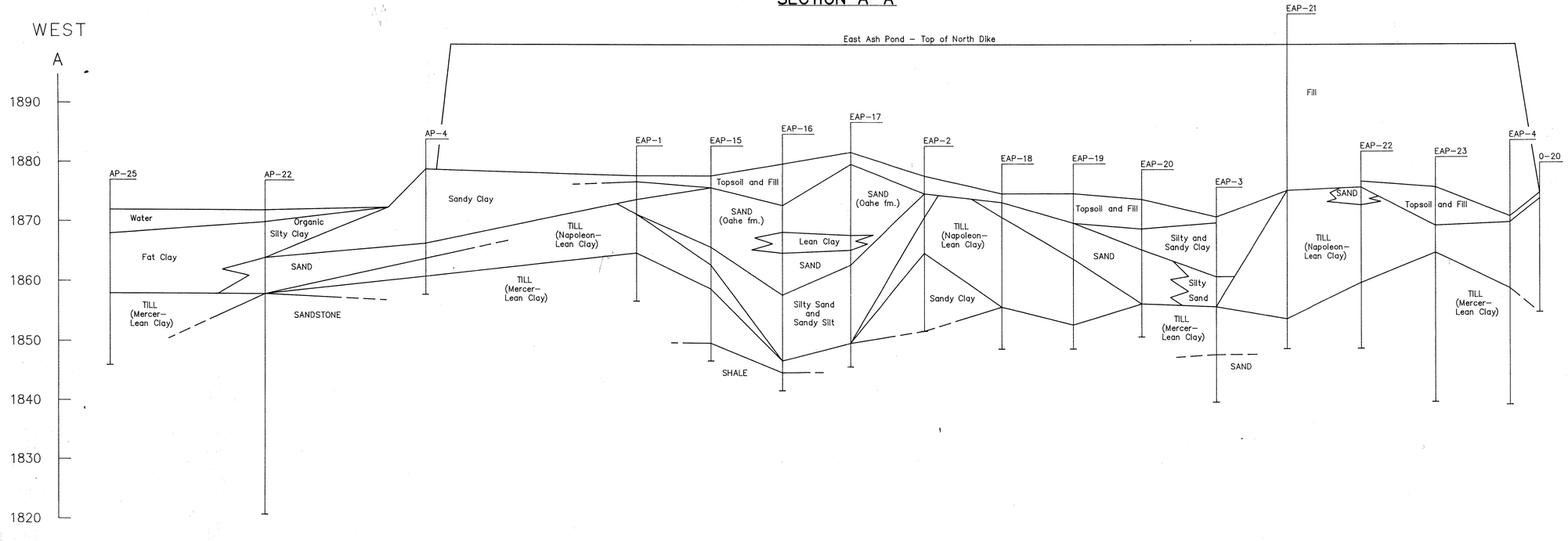
EAST ASH POND

FIGURE 9

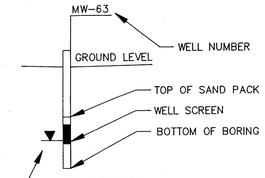
CROSS - SECTION LOCATION MAP

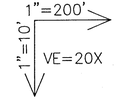
SCALE: 1"=500'	DWG. NO: C6110F09	DATE: 1-89
PREPARED BY: FOTH & VAN DYKE		JOB: 87C61-10

SECTION A–A'



WELL CONSTRUCTION INFORMATION



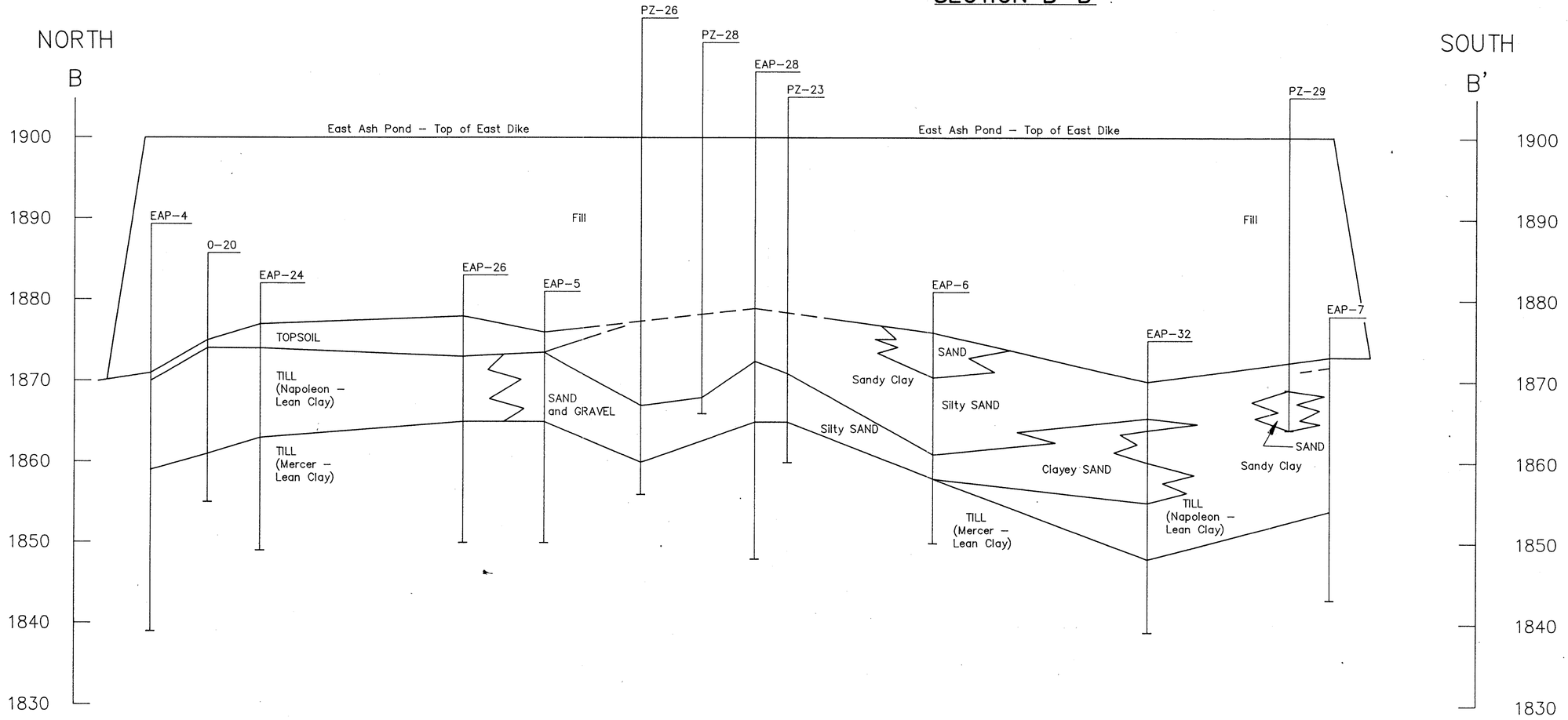


EAST ASH POND

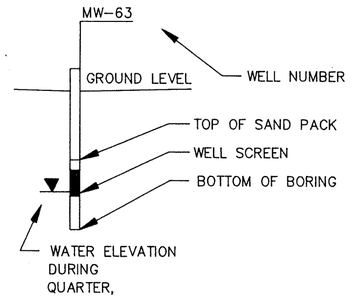
FIGURE 10
GEOLOGICAL CROSS–SECTION A–A'

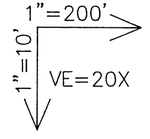
SCALE:	DWG. NO: C6110F10	DATE: 1–89
PREPARED BY: FOTH & VAN DYKE		JOB 87C61–10

SECTION B–B'



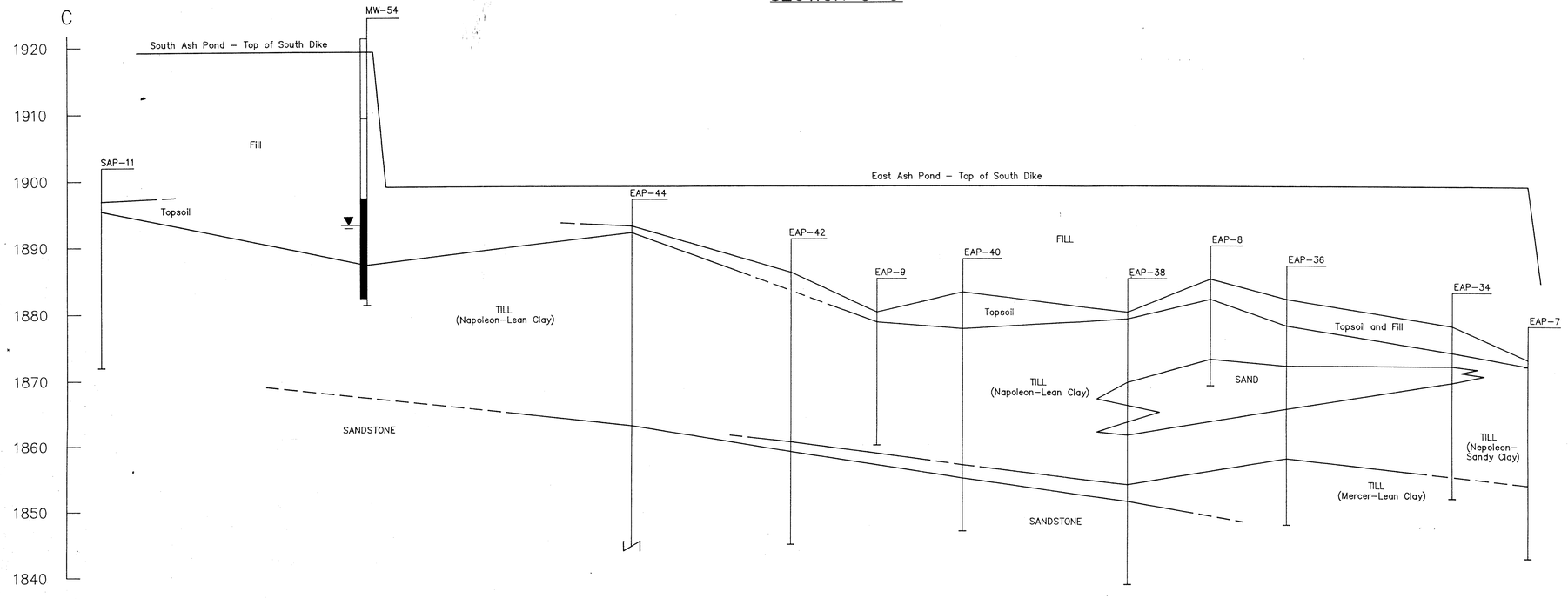
WELL CONSTRUCTION INFORMATION

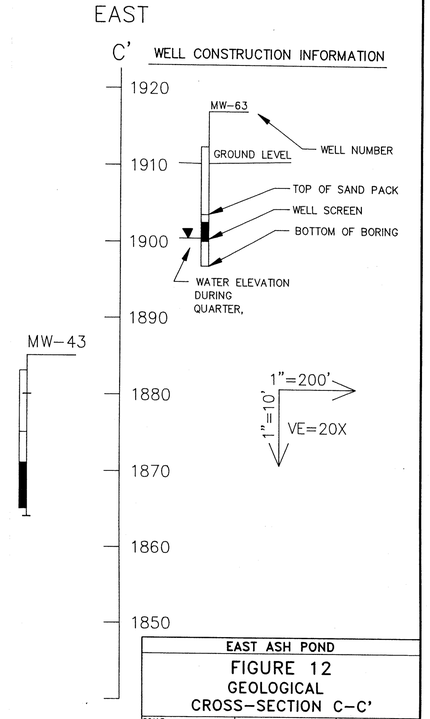




EAST ASH POND			
FIGURE 11 GEOLOGICAL CROSS–SECTION B–B'			
SCALE:	DWG. NO: C6110F11	DATE: 1–89	
PREPARED BY: FOTH & VAN DYKE		JOB: 87C61–10	

SECTION C–C'





EAST ASH POND

FIGURE 12

GEOLOGICAL

CROSS–SECTION C–C'

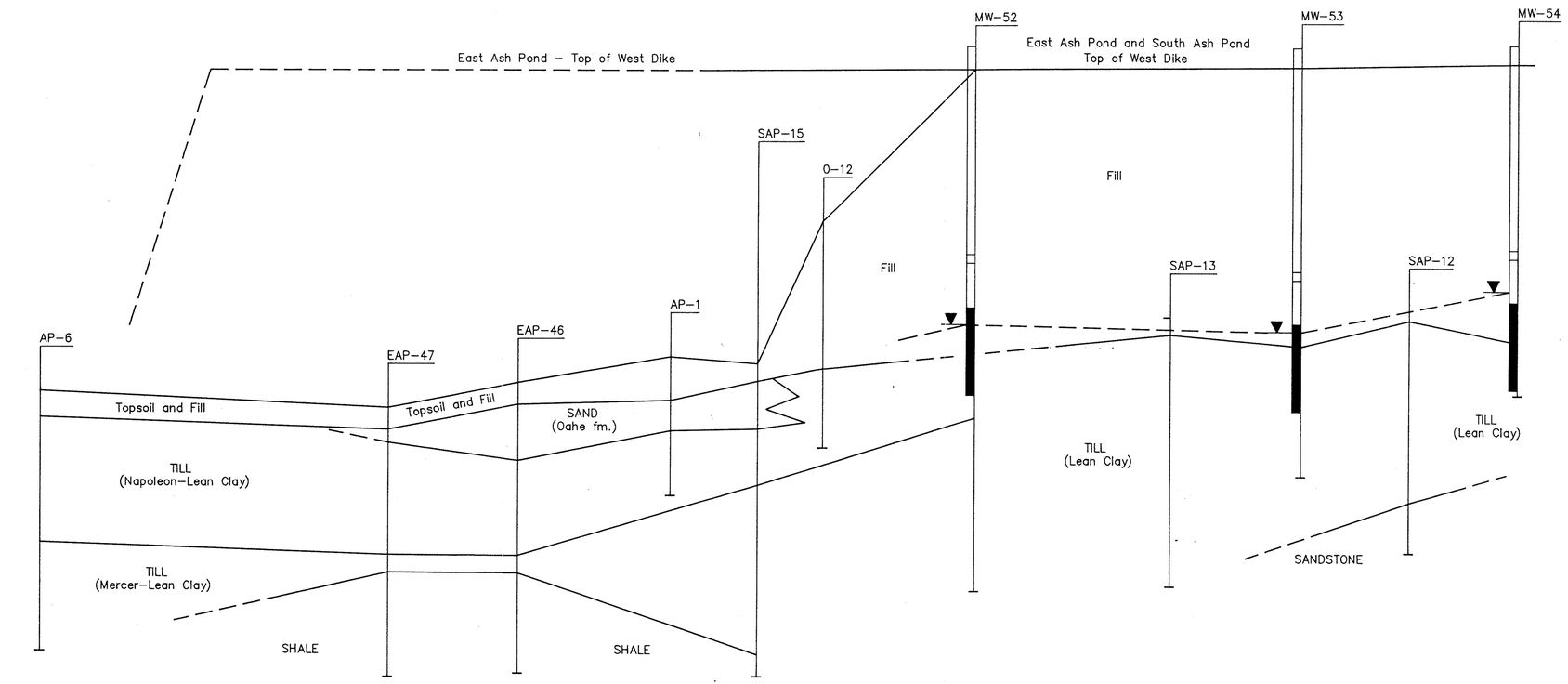
SCALE:	DWG. NO: C6110F12	DATE: 1–89
PREPARED BY: FOTH & VAN DYKE		JOB: 87C61–10

SECTION D–D'

NORTH

D

1920
1910
1900
1890
1880
1870
1860
1850

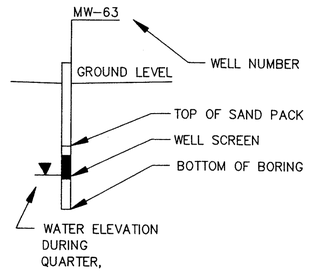


SOUTH

D'

1920
1910
1900
1890
1880
1870
1860
1850

WELL CONSTRUCTION INFORMATION



1"=200'

1"=10'

VE=20X

EAST ASH POND

FIGURE 13

GEOLOGICAL CROSS–SECTION D–D'

SCALE:	DWG. NO: C6110F13	DATE: 1–89
PREPARED BY: FOTH & VAN DYKE		JOB: 87C61–10

Cross section A-A' (along the north dike) shows an extensive sand lens within the Napoleon glacial unit. A significant sand-filled erosional feature also cuts through both the Napoleon and Mercer glacial units which is interpreted to be the Oahe formation. Cross sections B-B' and C-C', along the east and south dikes, respectively, also show extensive sand lenses within the clayey till. A less extensive sand lens is shown on cross section D-D' along the west dike separating the EAP and the SAP. The sand lenses are highly permeable avenues for horizontal movement of water.

Sand seams of an inch or more in thickness have also been reported in the clayey till. The soil boring methods which have been used, flight augers and/or split spoon sampling at 5-foot intervals, do not allow mapping of these thin sand layers. The sand seams can, however, provide significant horizontal migration paths for water.

The geology of the area provides several mechanisms for potential vertical seepage through the bottom of the EAP. They are: 1) fractured till; 2) exposed sand; 3) loss through bottom soils of moderate permeability, and 4) seepage through test borings which have been improperly abandoned. All of these conditions present mechanisms for vertical migration of water through the pond bottom.

Fractured till is known to exist in the area of CCS and is a significant mechanism for vertical water movement. The effectiveness of this phenomenon may have been modified, however, during liner repair work in the spring of 1980. The project involved re-working some of the bottom

materials and placing additional clayey materials in other areas. Vertical fractures in the till can provide significant conduits for water to move from the pond downward into the highly permeable sand seams and lenses which are present beneath the EAP.

Exposed sand has been reported in the bottom of the EAP, most notably during the summer of 1979. This permeable material would allow access to more extensive sand lenses within the till. Records from 1980 show that approximately 118 acres of the EAP were judged to have inadequate clay for a liner. Liner modifications were made that same year to cover the exposed sand areas.

More than 200 shallow grid borings and more than two dozen deep borings have been drilled through the bottom of the EAP. Records of abandonment of the holes by deliberate and extensive filling and compaction are unknown. Many of the borings may have been partially sealed near the surface during liner modifications in the spring of 1980. The liner work is believed to have covered approximately 118 acres of the pond, which leaves the remainder of the 220 acre pond with potentially exposed improperly abandoned bore holes. The bore holes, if not filled with material of a permeability equal to or less than the native material, can provide a significant vertical pathway for water movement.

The significance of the above-listed potential vertical seepage mechanisms can be recognized in relation to a near-surface sand thickness map, Figure 14. The Sand Isopach Map shows the thickness of sandy material found near the surface of the pond bottom. The map

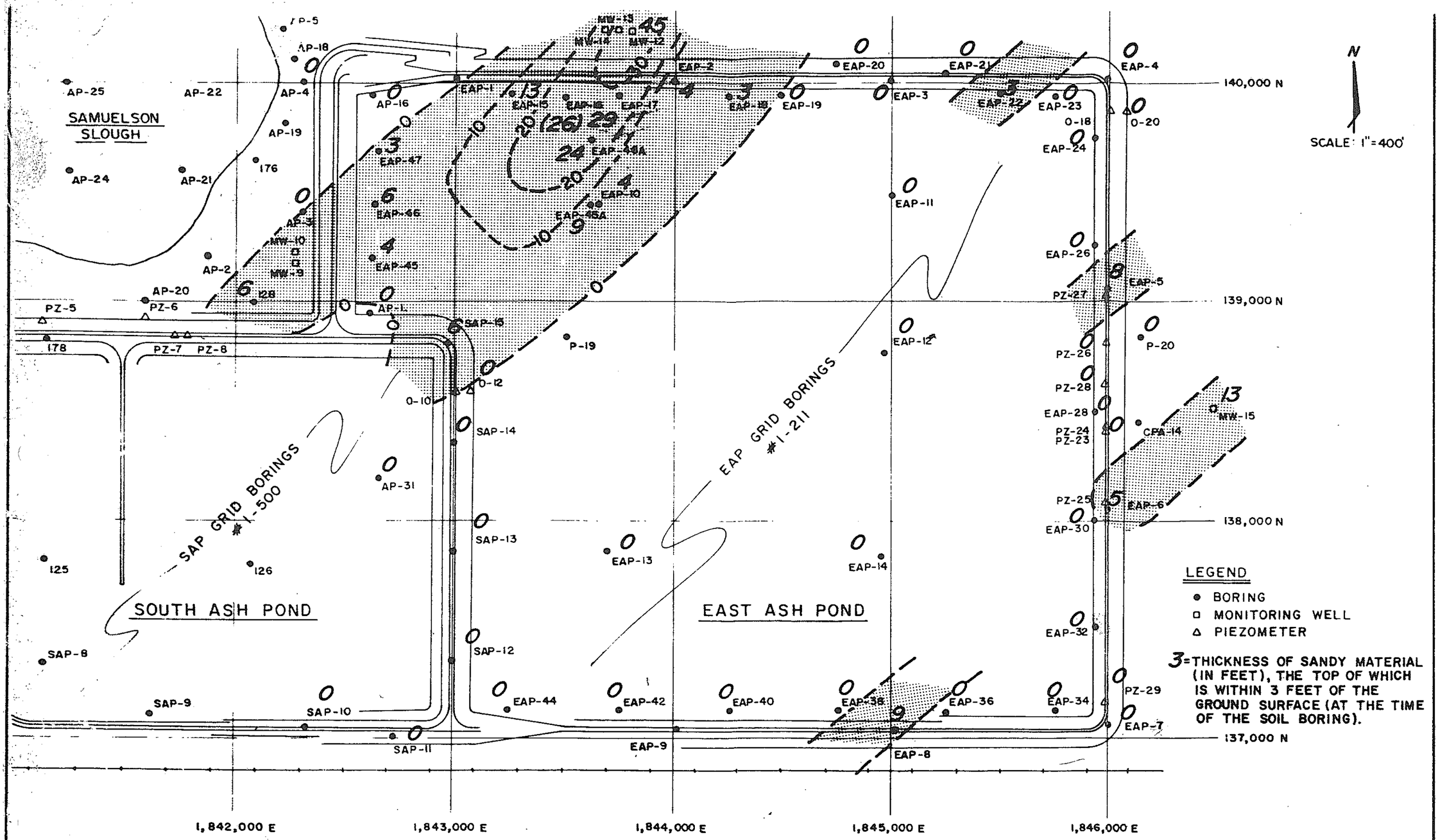


Figure 14

EAST ASH POND STUDY	E.A. HICKOK & ASSOCIATES HYDROLOGISTS - ENGINEERS MINNEAPOLIS - MINNESOTA	MAY 1985
SAND ISOPACH MAP		6

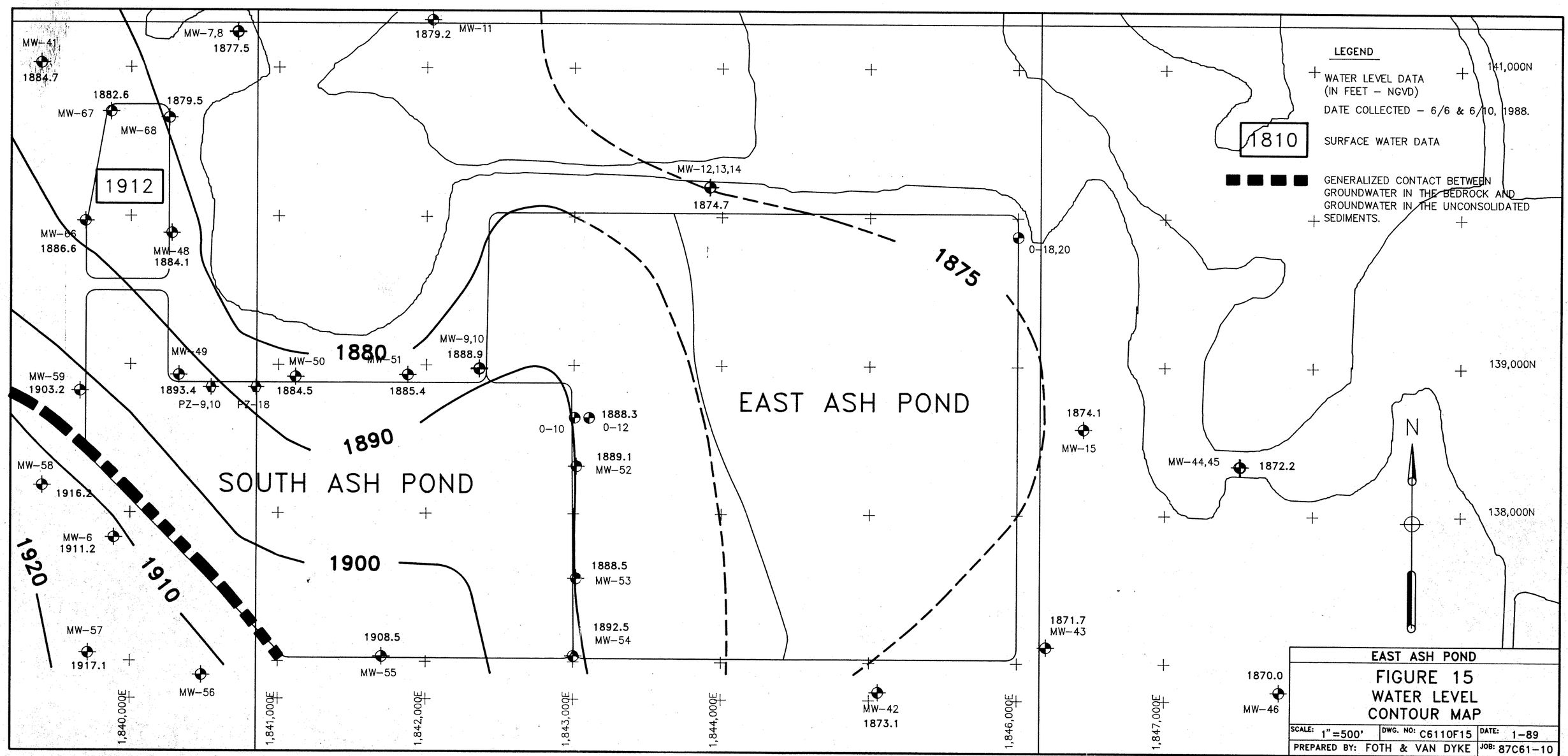
locates sand deposits which are within three feet of the bottom of the pond (at the time of drilling). This map illustrates that minimal vertical seepage depth is necessary to intersect significant sand lenses and sand seams capable of providing horizontal water migration beyond the EAP dikes.

The largest sand lens, probably the Oahe formation, is located in the northwestern part of the EAP. Significant sand lenses are also recognized beneath the east and south dikes. Other unrecognized sand lenses and sand seams may be present throughout the EAP.

B. Hydrogeology and Groundwater Flow Pattern

According to recent studies conducted by Foth & Van Dyke, regional groundwater flow in the vicinity of CCS is a subtle expression of the ground surface topography which is influenced by the configuration of the eroded bedrock. A water level contour map is presented as Figure 15. The groundwater contours approximate the bedrock contours shown on Figure 16, except where locally affected by other factors, such as mounding beneath ponds. The water in the uplands is within the poorly consolidated bedrock while the groundwater in the lowlands is found in the glacial till. An approximation of the point of transition between bedrock and glacial till regimes is shown on Figure 15.

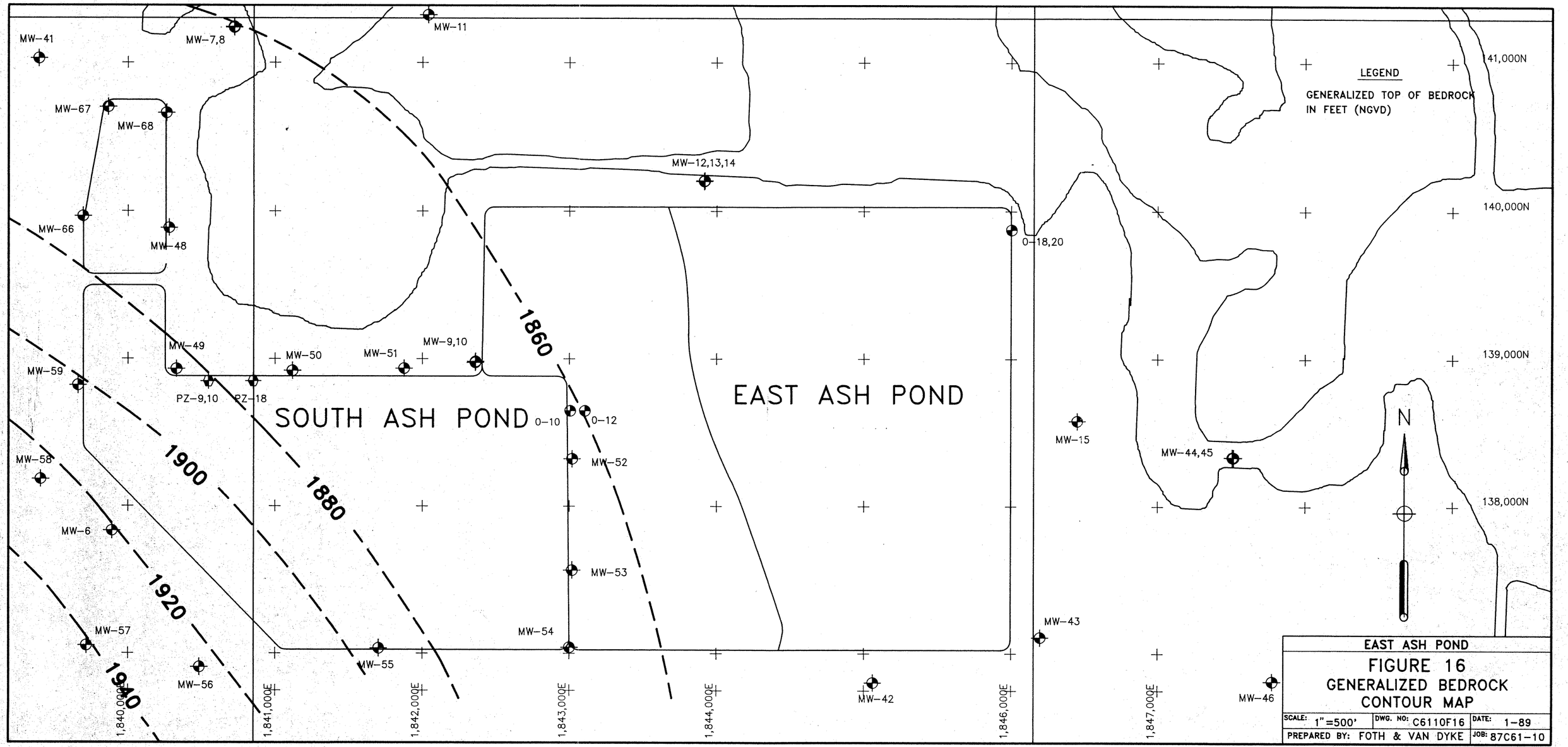
Groundwater travels from elevated recharge areas toward several stream valleys and lowlands which ultimately discharge into the Missouri River.



EAST ASH POND

FIGURE 15
WATER LEVEL CONTOUR MAP

SCALE: 1"=500'	DWG. NO: C6110F15	DATE: 1-89	
PREPARED BY: FOTH & VAN DYKE		JOB: 87C61-10	


MW-41
MW-7,8
MW-11
MW-67
MW-68
MW-12,13,14
MW-66
MW-48
0-18,20
MW-49
MW-50
MW-51
MW-9,10
MW-59
PZ-9,10
PZ-18
SOUTH ASH POND
0-10
0-12
EAST ASH POND
MW-52
MW-58
MW-6
MW-53
MW-57
MW-54
MW-55
MW-56
MW-42
MW-15
MW-44,45
MW-43
MW-46
1860
1880
1900
1920
1940
1,840,000E
1,841,000E
1,842,000E
1,843,000E
1,844,000E
1,846,000E
1,847,000E
141,000N
140,000N
139,000N
138,000N
N
LEGEND
GENERALIZED TOP OF BEDROCK
IN FEET (NGVD)
EAST ASH POND
FIGURE 16
GENERALIZED BEDROCK
CONTOUR MAP
SCALE: 1"=500'
DWG. NO: C6110F16
DATE: 1-89
PREPARED BY: FOTH & VAN DYKE
JOB: 87C61-10

The Missouri River is located six miles south of the CCS ash disposal ponds. Flow direction is altered locally by mining and waste disposal activities.

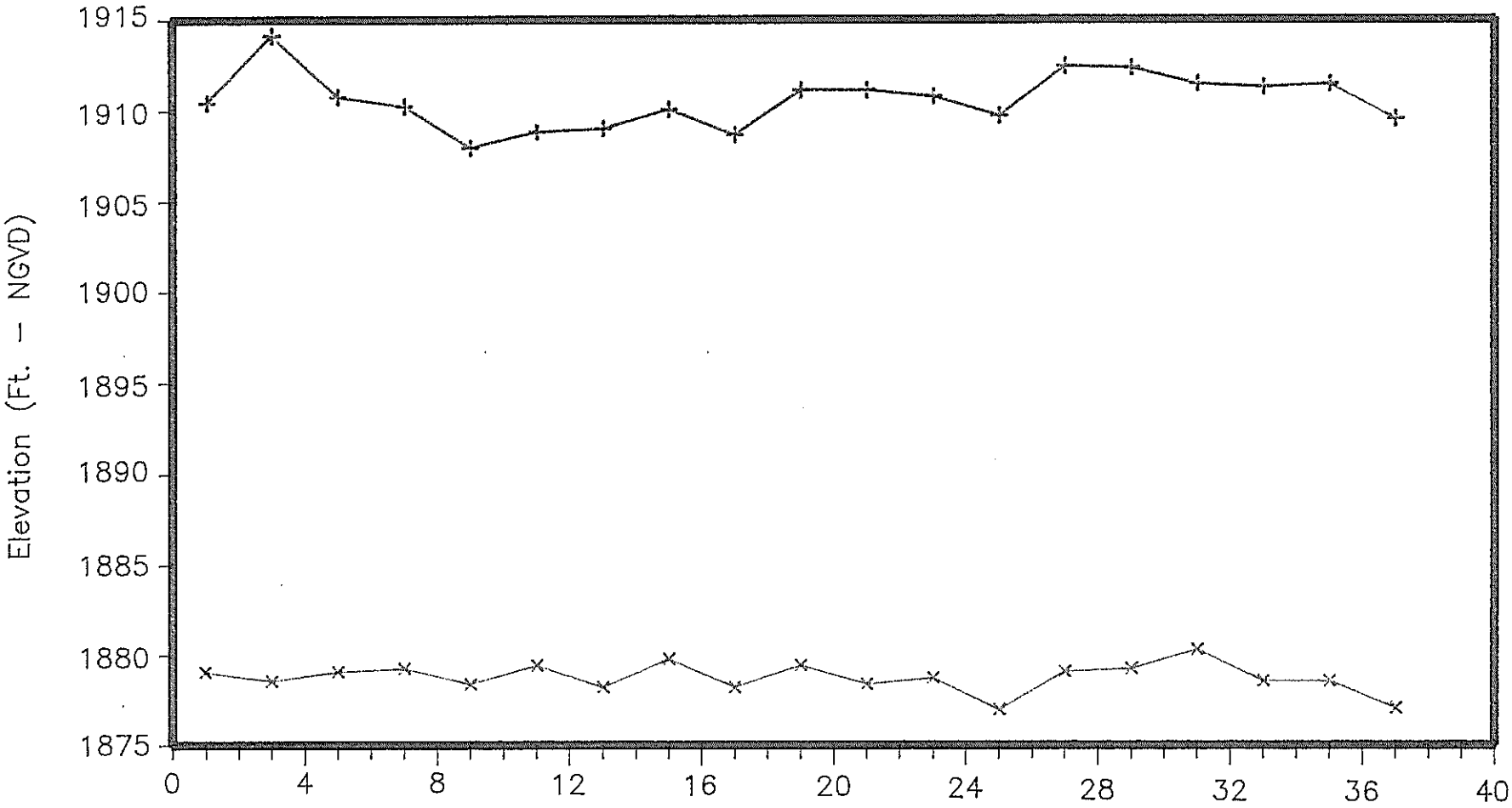
The groundwater flow pattern in the vicinity of CCS follows the wetland and legal drain system. The flow pattern passes through Weller Slough, Samuelson Slough, Saylor Slough, Gradin Slough and continues into the Coal Lake Coulee and/or the Buffalo Creek drainage systems.

As stated above, local influences can modify the regional groundwater flow pattern. A localized influence can be seen on Figure 15 near the EAP, probably associated with the northwest quadrant of the EAP.

The hydrograph shown in Figure 17 shows that the water level in the upland well (MW 6) has a higher elevation than the lowland well (MW 11), as expected. The hydrograph also shows a good correlation in the fluctuation data of the two wells. This indicates that the two wells, and the two aquifers, act as a connected hydrological system. Groundwater levels in the aquifers have generally remained the same during the nine years of plant operation, with the exception of normal seasonal variations, within a range of about four feet.

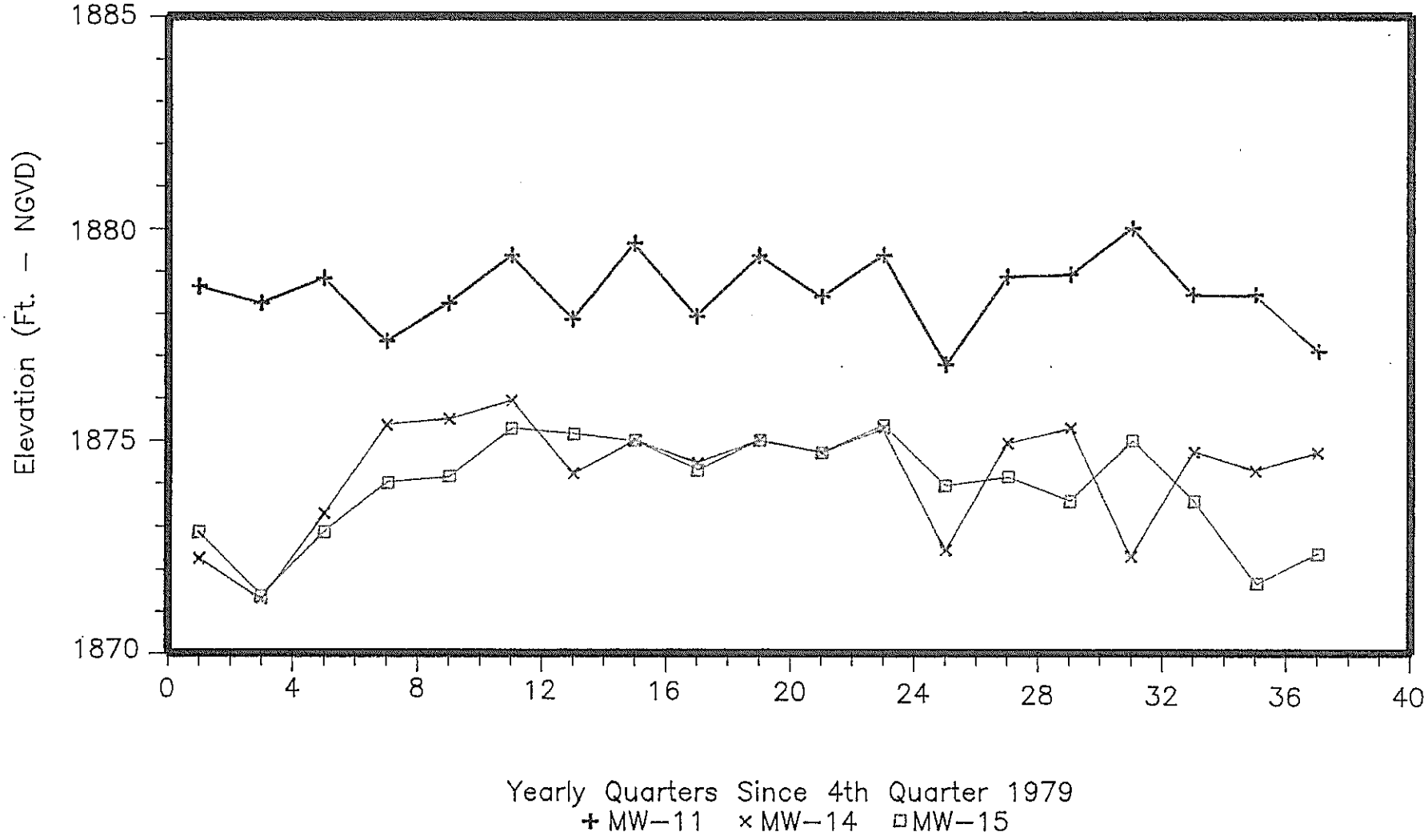
However, water level fluctuations in monitoring wells near constructed ponds are influenced by the ponds. Figure 18 is a hydrograph for MW 11, MW 14 and MW 15. MW 14 is located north of the EAP in an area that is impacted by water level fluctuations in the SAP and EAP. MW 15 is located east of the EAP where it has been locally influenced by loading in the EAP and generally influenced by site wide water level changes. See Figure 19 for monitoring well locations.

FIGURE 17
HYDROGRAPHS: MW-6, MW-11
Coal Creek Station

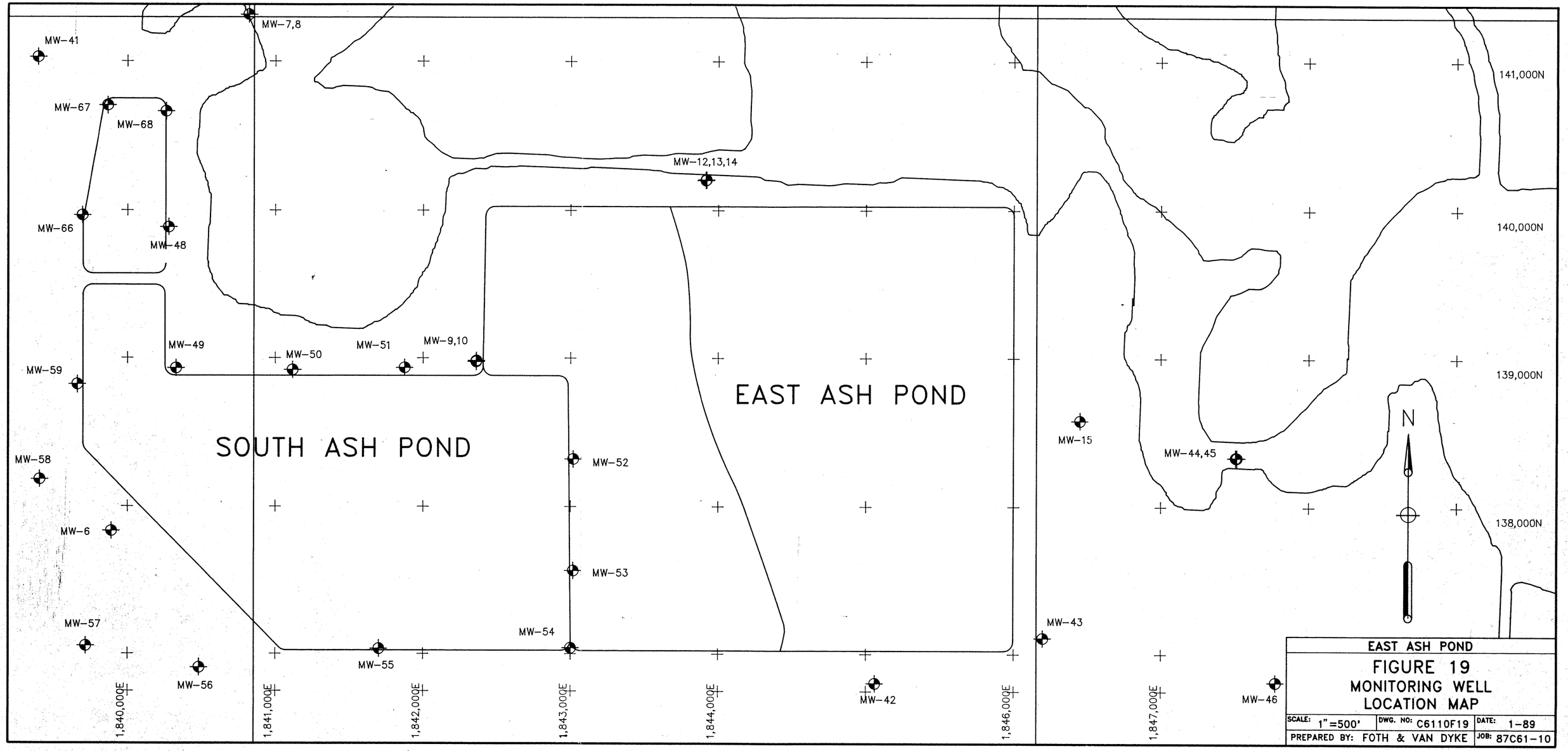


FOTH & VAN DYKE

FIGURE 18
HYDROGRAPHS: MW-11, MW-14, MW-15
Coal Creek Station



FOTH & VAN DYKE


MW-41
MW-7,8
MW-67
MW-68
MW-12,13,14
MW-66
MW-48
MW-49
MW-50
MW-51
MW-9,10
MW-59
SOUTH ASH POND
EAST ASH POND
MW-58
MW-52
MW-6
MW-53
MW-57
MW-54
MW-55
MW-56
MW-42
MW-15
MW-44,45
MW-43
MW-46
141,000N
140,000N
139,000N
138,000N
1,840,000E
1,841,000E
1,842,000E
1,843,000E
1,844,000E
1,846,000E
1,847,000E
N
EAST ASH POND
FIGURE 19
MONITORING WELL
LOCATION MAP
SCALE: 1"=500'
DWG. NO: C6110F19
DATE: 1-89
PREPARED BY: FOTH & VAN DYKE
JOB: 87C61-10

Fluctuations in the water level which do not correlate with the regional pattern can be explained by comparison with pond usage, as summarized in Table 7. The hydrograph for MW 11 is provided as a "normal" groundwater fluctuation pattern. Pond induced impacts to groundwater monitoring wells include a lag between the pond activity and a correlative response in the groundwater system at the well.

MW 14 shows a significant water level increase when SAP loading began. Water levels partially decreased when the SAP was taken out of service and the EAP operation began. MW 14 has continued to show elevated water levels with some fluctuations as cycled use of the ponds has taken place. MW 15 had shown a general increase of water levels since plant operation began and it has continued as a part of site wide water level impacts. Water level at MW 14 has decreased along with the regional ground water level in relation to recent drought conditions.

C. Groundwater Quality

A network of groundwater monitoring wells has been in existence at the CCS site since 1979, with sampling and analysis generally occurring twice a year. This monitoring program has documented significant sulfate contamination, and to a lesser extent, boron contamination, in the upper level aquifer in the vicinity of the EAP and SAP. Metals present in the ash and sludge appear to get tied up chemically and have not been found in significant quantities outside of the impoundments. (For more discussion of the chemistry of the sludge and ash, see Section I.) While there are not enough monitoring well locations to distinguish

TABLE 7

Pond Usage Summary
Coal Creek Station

Date	Activity
Spring 1979	- CCS Unit 1 commenced operations. - South Ash Pond was placed in service.
Summer 1979	- Excessive seepage was observed from the South Ash Pond.
July 1980	- East Ash Pond was placed in service.
Summer 1981	- South Ash Pond was repaired.
Spring 1982	- South Ash Pond was returned to service.
Summer 1987	- South Ash Pond was taken out of service. - West portion of the East Ash Pond was placed in service.
Fall 1988	- West portion of the East Ash Pond was taken out of service. - West portion of the South Ash Pond was placed in service.

between the effects of the EAP and the SAP, other evidence, especially site geology, is indicative of the EAP's major role in this contamination. It is this contamination that has led to the design and operational modifications proposed in this application.

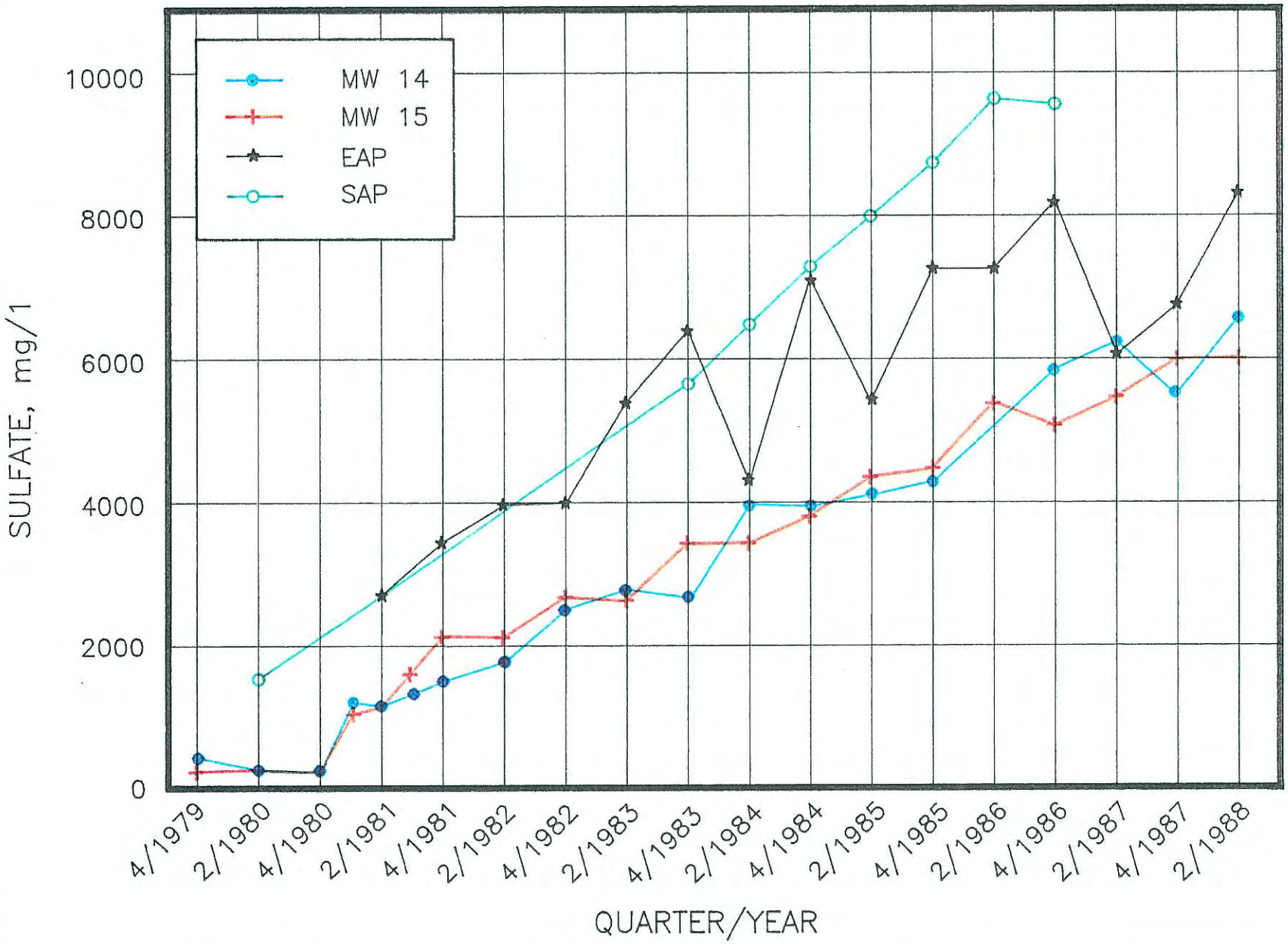
Data from the groundwater monitoring program is reported to the Department annually and therefore is not included in this application; however, several trend charts are provided as a summary of the data and to illustrate the conditions of the groundwater in the vicinity of the EAP.

Generally, sulfate is the parameter that is most directly associated with excess pond seepage. Water quality trend chart 1 (Chart 1) shows an historical picture of sulfate concentrations in both the EAP and the SAP, as well as in the two shallow wells located near the EAP. There is a distinct correlation between the EAP and SAP, and the groundwater, with a steady upward trend in the sulfate concentrations, now at a level in the range of 6,000 to 7,000 mg/l, in the groundwater. This compares to 1979 sulfate levels in the groundwater of less than 500 mg/l.

Boron trends at the same locations are shown on Chart 2. Basically, it's the same trend as with sulfate; however, the concentrations are a couple of orders of magnitude less. Chart 3 shows arsenic concentrations, again for the same locations. The results here show that arsenic gets tied up chemically before reaching the shallow aquifer adjacent to the impoundments. Historical data is available for the complete parameter list at the Department. The parameter list is shown as Table 8.

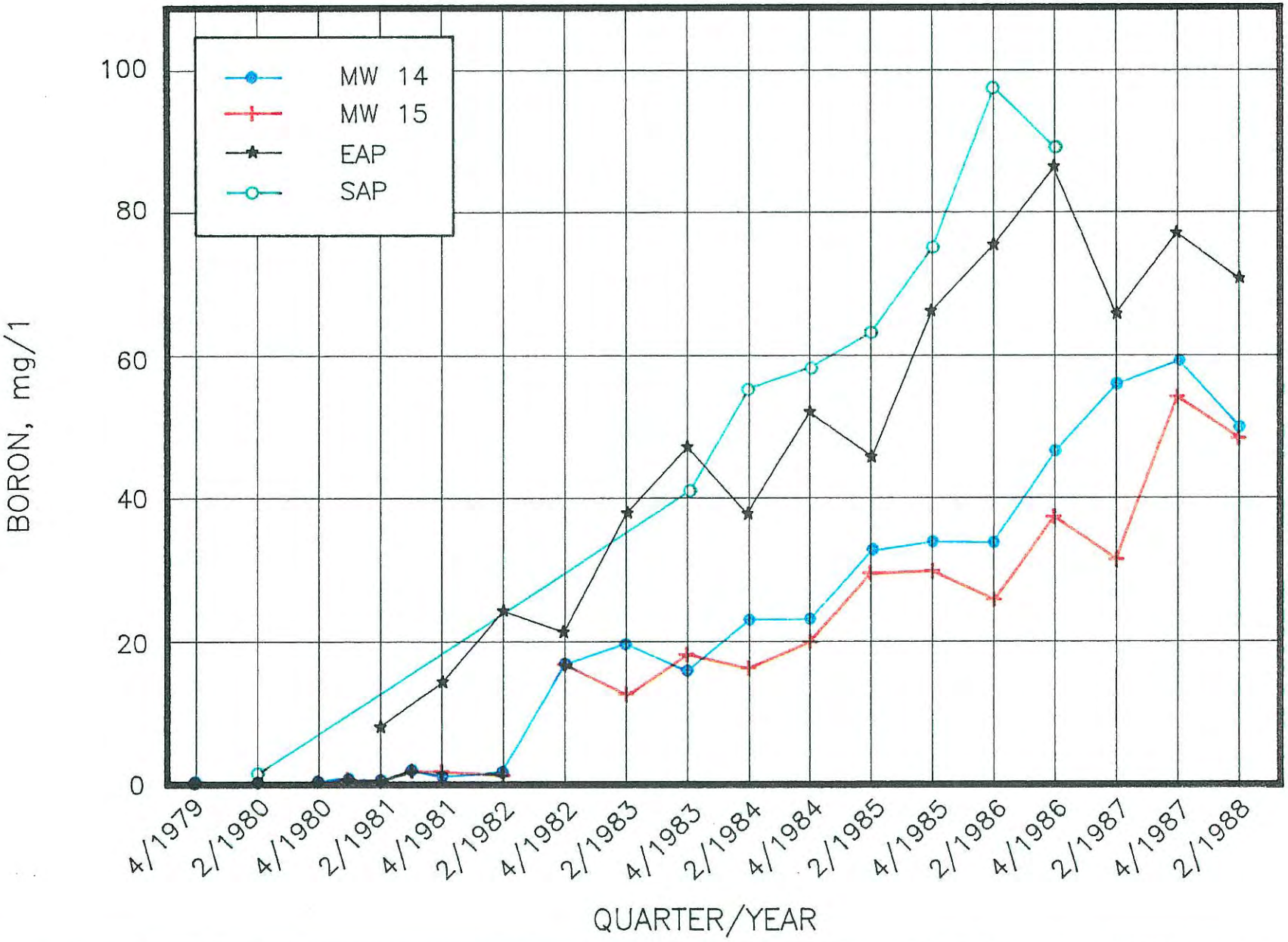
Water Quality Trend Chart 1

Graphed by KAUL
Cooperative Power



Water Quality Trend Chart 2

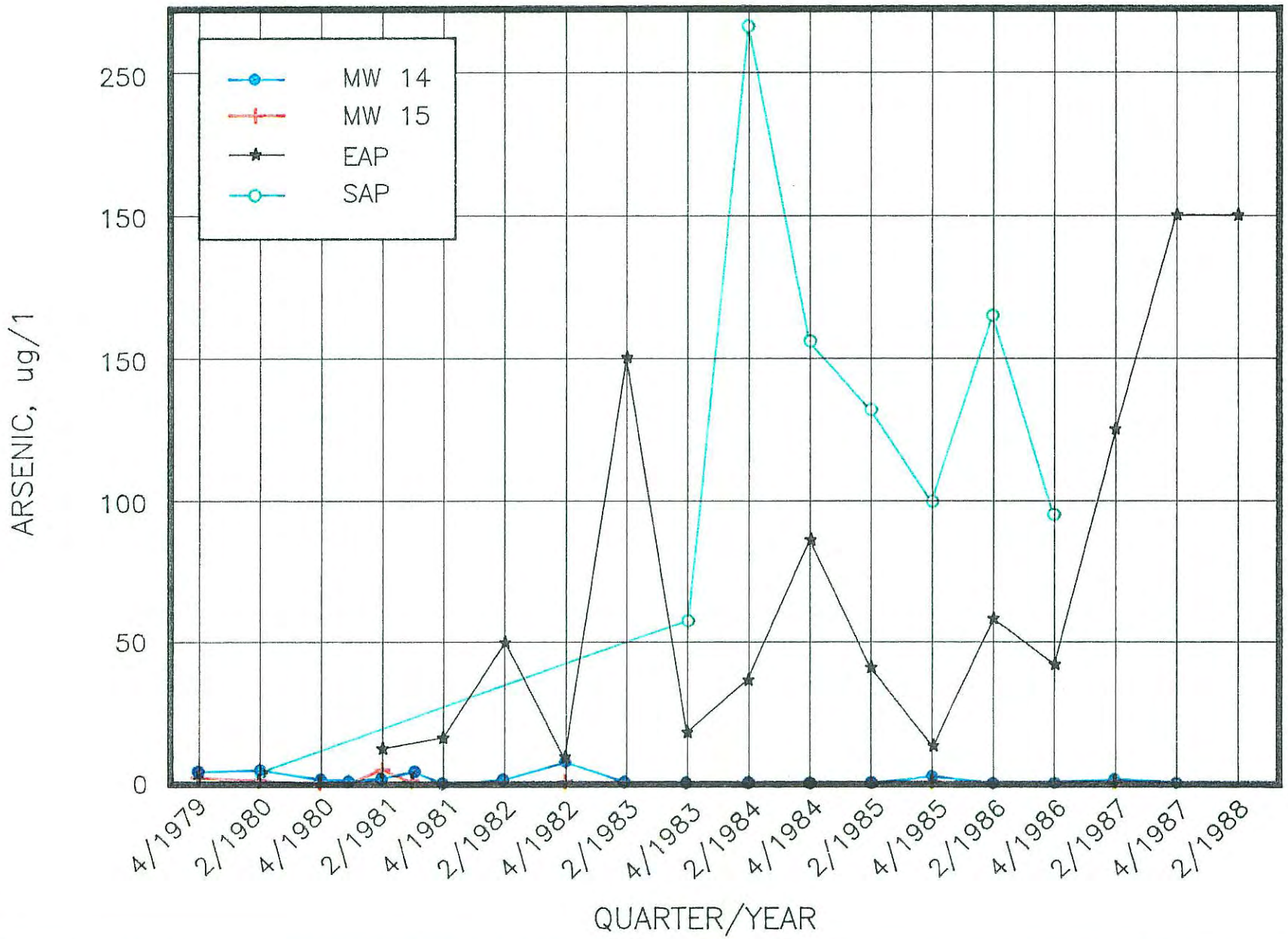
Graphed by KAUL
Cooperative Power



Water Quality Trend Chart 3

Graphed by KAUL

Cooperative Power



Water Quality Trend Chart 4

Graphed by KAUL
Cooperative Power

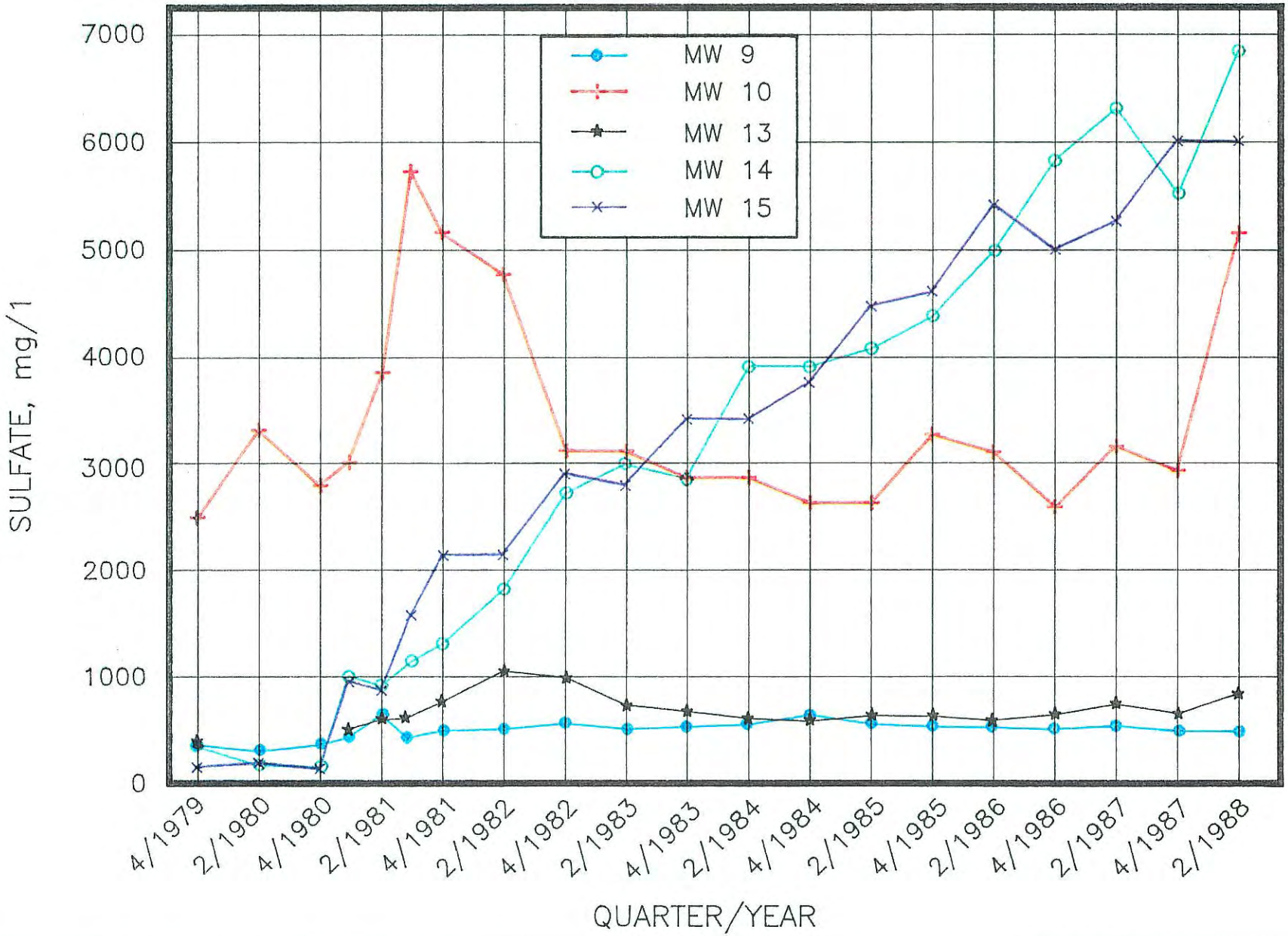


TABLE 8

CCS Water Quality Monitoring
Parameter List

Parameter		Description
PH-FLD	*	pH-Field
PH-LAB	*	pH-Laboratory
SC	*	Specific conductance, umhos/cm @ 25c
TDS	*	Total Dissolved Solids, mg/l
TSS		Total Suspended Solids, mg/l
C-ALK		Alkalinity Carbonate, mg/l as $CaCO_3$
B-ALK		Alkalinity Bicarbonate, mg/l as $CaCo_3$
T-ALK	*	Alkalinity Total, mg/l as $CaCo_3$
NO_3-N		Nitrate-N, mg/l
NH_3-N		Ammonia-N, mg/l
CA	*	Calcium, mg/l
MG	*	Magnesium, mg/l
K	*	Potassium, mg/l
NA	*	Sodium, mg/l
SO_4	*	Sulfate, mg/l
MBAS		Methylene Blue Active Substances, mg/l
CL	*	Chloride, mg/l
FE	*	Iron, mg/l
ZN		Zinc, mg/l
MN	*	Manganese, mg/l
CU		Copper, ug/l
AG		Silver, ug/l
SR	*	Strontium, mg/l
B	*	Boron, mg/l
BE		Beryllium, ug/l
NI		Nickel, ug/l
SE		Selenium, ug/l
HG		Mercury, ug/l
AS	*	Arsenic, ug/l
BA		Barium, mg/l
CD		Cadmium, ug/l
CR		Chromium-VI, ug/l
F	*	Fluoride, mg/l
PB		Lead, ug/l
MD		Molybdenum, mg/l
AL		Aluminum, mg/l
F-COLI		Fecal Coliform Bacteria, # Col./100 ml
CN		Cyanide, mg/l
PHENOL		Phenol, ug/l
BOD		Biochemical Oxygen Demand, mg/l
COD		Chemical Oxygen Demand, mg/l
TOC		Total Organic Carbon, mg/l
TEMP		Temperature, Degrees C
DIS-02		Dissolved Oxygen, mg/l
LEVEL	*	Water Level depth below ground surface, ft.
T-COLI		Total Coliform Bacteria, # Col./100 ml

* Indicates parameters analyzed for at each sampling period, all locations. All other parameters are done periodically or only at selected locations.

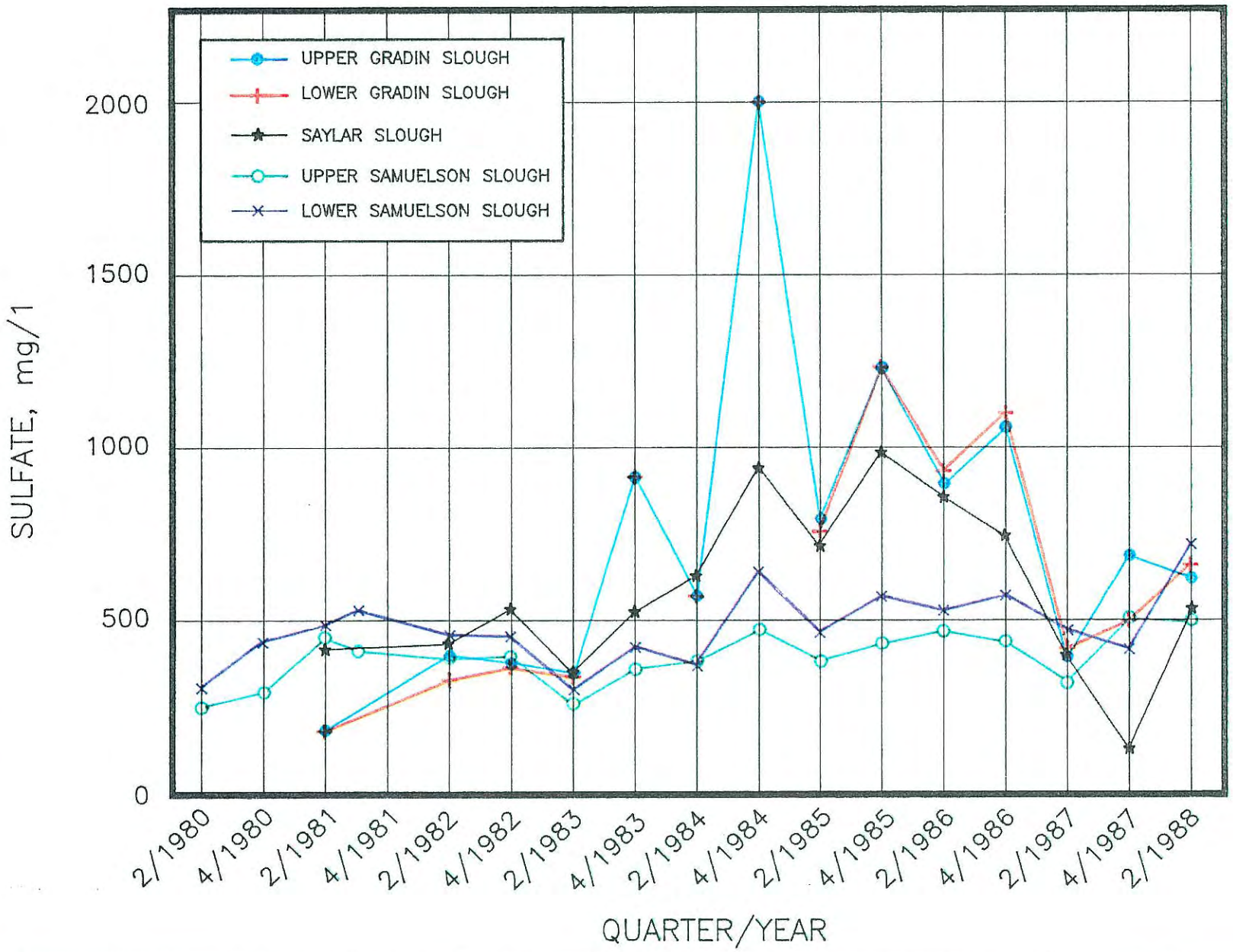
Using sulfate as an indicator, Chart 4 shows that the deep wells in the vicinity of the EAP, MW 9 (screened interval 43 to 53 feet below the surface) and MW 13 (screened interval 45 to 55 feet below the surface), have remained mostly unaffected by the wet impoundments, with a slight perturbation in the early 1980's when the EAP was in service. This is consistent with vertical gradients developed by Foth & Van Dyke which show the EAP area to be mainly a groundwater to surface water discharge area with some influence from the impoundments.

D. Surface Water Quality

Surface water in the vicinity of the EAP is connected hydrologically to the shallow aquifer and thus is affected by contamination of the shallow aquifer. Chart 5 shows historical data for the parameter sulfate, for five sampling locations at three local wetlands. The upward trend in the early 1980's likely shows influence from the EAP and SAP. The trend reverses, however, toward the end of the period, indicative of management practices aimed at minimizing the amount of seepage. These practices included relining the SAP and taking the EAP out of service; and when it was necessary to place the EAP back in service, partitioning it so that only about a half of the impoundment was actually used.

Water Quality Trend Chart 5

Graphed by KAUL
Cooperative Power



V. CONSTRUCTION PLANS AND SPECIFICATIONS

A. Overview

The major design consideration that went into this project was to achieve the minimization or elimination of leachate flowing into the groundwater table. This is to be accomplished in the following ways for all parts of the EAP except the southwest section. The wastes already in the southwestern section of the EAP will be dewatered and subjected to specifications 3-5 below.

1. Elevating the bottom of the disposal area to a minimum of five feet above the water table.

2. Placing five feet of clay on the bottom with a permeability of less than 1×10^{-7} cm/sec.

3. Controlling runoff.

4. Sloping and capping the facility to eliminate infiltration, and thus, any medium for groundwater contamination.

5. Maintaining the closed facility to prevent erosion of the cap.

Not only will the above design considerations minimize leachate that reaches the groundwater table, they will also allow for significant long-term improvement in local groundwater quality.

B. Existing Conditions

A set of construction plans are included with this application. Drawing A-2 shows the existing contours of the EAP area. A partitioning dike separates the EAP roughly into two halves. The west portion of the EAP has recently been taken out of service and is partially full of ash and sludge. Water in the western part has been pumped to other impoundments in order to reduce the hydraulic head and attendant seepage through the bottom of that part of the EAP.

Approximately one-half of the way up the partitioning dike is another, shallower dike which runs across the "neck" of the western portion of the EAP. It is indicated as a "berm" on Drawing A-2. The purpose of this dike was to contain the solids in the southern part of that half of the impoundment and to allow excess water to flow to a pumping station located at the northern end of the impoundment. Thus, most of the solids in the western portion of the EAP are in the southern reaches.

The eastern portion of the EAP has been out of service since 1982. Water that has accumulated in this part of the EAP is periodically pumped to other impoundments.

C. Construction Plans

The proposed design for the EAP calls for the staged development of six waste disposal cells in the EAP. See Drawing A-3 for the sequence of cells proposed for filling the disposal area.

As stated above, the Sequence No. 1 area (southwest corner) is already partially filled. Because the geology in the Sequence No. 1 area is favorable, and because the cost of moving and disposing of this substantial volume of material is very high, estimated to be about $10 million, it is proposed that those materials remain in the EAP. In other words, it is neither practical nor necessary to remove those wastes. However, the wastes in place will be thoroughly dewatered and capped to control runoff and infiltration.

Foth and Van Dyke has estimated the pond bottom to be two feet or less above current groundwater table in the southwest section of the EAP. It is predicted, however, that the water table will drop now that the EAP is out of service and dewatered. This should provide some thickness of unsaturated soil between the water table and the disposed wastes. With a properly sloped final cap of impervious materials, there should be no infiltration or medium for further contamination of groundwater.

Construction to prepare the EAP to receive wastes would begin in the northwest section, where any ash materials will be removed to the Filling Sequence No. 1. area and 12 inches of suitable materials be placed over the wastes and compacted to allow drainage in a northeasterly direction as shown in Drawing A-4.

Additional site construction is required to prepare the EAP to accept wastes. The EAP bottom, exclusive of the southwest corner, will be shaped prior to placement of a clay liner to allow drainage in both a northeasterly and southeasterly direction as shown on Drawing A-4.

Placement of the clay liner will be to the approximate elevations shown on Drawing A-5. Details of the construction of the clay liner and side slopes are shown on Drawing A-3.

The clay material to be placed should be tested to ensure it meets the desired gradation, plasticity and permeability as shown in Table 9. This clay should be compacted to achieve a degree of compaction of 95 percent of Standard Proctor. The maximum thickness of a compacted lift should not exceed eight inches.

The following clay source testing program is planned to determine source suitability for clay soils meeting the specifications of Table 9.

- Grain size distribution to the .002 millimeter particle size and Atterberg limit testing on samples collected at a rate of one sample for each 10,000 cubic yards of proposed in-place clay.

- Moisture density curves using the 95 percent of Standard Proctor method on samples collected at a rate of one sample for each 20,000 cubic yards of proposed in-place clay.

- One test evaluating the relationship between compaction and hydraulic conductivity shall be developed for each borrow source. This shall be accomplished by testing the sample corresponding to each point established on the Proctor curve for hydraulic conductivity.

Sidewall clay placement should also follow the specifications listed in Table 9.

The clay liner sidewall shall be constructed to a minimum thickness of two feet measured perpendicular to the liner.

Clay liner sidewalls shall be constructed by placing clay in compacted lifts of one foot maximum thickness. The completed liner soils shall have a maximum coefficient of permeability of 1×10^{-7} cm/sec.

Sufficient testing shall be completed on representative clay samples prior to construction to verify the performance of the clay liner based on proposed construction specifications and techniques.

During construction, a quality control program shall be implemented to ensure that the clay liner will function as designed. Table 10 outlines a recommended quality control program for clay liner placement along the side slopes. This program shall be used as a minimum guide in selecting a project quality control program. At a minimum, the final quality control program selected shall be based on the quality of the clay, clay test performance, construction equipment, and construction techniques.

Quality control testing during placement of clay soils on the base of the disposal area should follow the program presented in Table 10, with two exceptions: 1) density tests should be performed on a 200-foot grid pattern on each eight-inch layer of compacted clay soil, and 2) undisturbed laboratory permeability tests should be performed at a frequency of one-per-two-acres per eight-inch compacted lift.

TABLE 9

Clay Soil Specification

Liquid limit	>/= 30
Plasticity index	>/= 15
P200 content	>/= 50%
Clay size fraction	>/= 25%
Compaction	>/= 95% Standard Proctor density
Permeability	</= 1 x 10^{-7} cm/sec

Clay soil shall be free from organic material, boulders, cobbles, excessive amounts of gravel (greater than 3/4") and other deleterious substances.

The total volume of clay necessary for the base lining and the sidewalls of the disposal area is estimated at 1,615,000 cubic yards.

Estimated quantities of clay necessary for the base lining and sidewalls of the individual programmed disposal sequences are:

Sequence No. 2	565,000 cubic yards
Sequence No. 4	702,000 cubic yards
Sequence No. 6	348,000 cubic yards

The above volumes of clay include a 30 percent shrinkage factor.

TABLE 10

Recommended Clay Sidewall Placement Quality Control Program

Test	Frequency
Density	1 per 100 lineal feet of clay sidewall per 12-inch compacted lift
Standard Proctor	1 per each distinct clay type (1 per 20,000 cubic yards minimum)
Atterberg Limits	1 per 10,000 cubic yards
Grain Size	1 per 10,000 cubic yards
Undisturbed Permeability	1 per 500 lineal feet per 10 feet of clay sidewall placement measured vertically

Additional testing shall be completed as needed to assure quality construction.

VI. GROUNDWATER MONITORING

A groundwater monitoring program has been in place at this site since 1979. Several new groundwater wells were added to the monitoring network in 1986 to get more data from the area east, and downstream, of the EAP. As a part of an examination of the hydrology in the vicinity of the SAP, more monitoring wells, still, were added in 1988, this time surrounding the SAP. Figure 19 shows the locations of the wells in the vicinity of the impoundments. Parameters and frequency of sampling have already been established by the Department. The groundwater monitoring program should document steadily improving quality of the local groundwater.

VII. OPERATION AND MANAGEMENT METHODS

A. Site Sequencing

A proposed phasing sequence of the disposal area is illustrated on Drawing Nos. A-6 through A-11. Six filling sequences will be used to provide for a systematic filling sequence; No. 1 from the southwest side of the southwest section of the EAP to the northeast, and No. 2 from the southwest side of the EAP to the north. The third sequence will be over portions of the first two phases as illustrated on Drawing No. A-8. The remaining disposal sequences will be as diagramed on Drawing No. A-3.

The filling sequences are designed to bring portions of the disposal area to final grade as soon as possible. The sequencing also routes surface water drainage away from the working area as described in the next section. The drainage of Sequence Nos. 1 and 2 areas is routed to the northeast corner of the respective disposal cells to allow for removal by pumping as required.

Any contact water will be collected and periodically pumped to the east evaporation pond or south ash pond.

Approximately 22,821,000 cubic yards of air space is available in the EAP disposal area. Filling Sequences Nos. 1, 2 and 3 contain 1,543,000 cubic yards, 3,651,400 cubic yards and 1,114,000 cubic yards of capacity, respectively.

Subsequent sequences available air space are estimated at:

Sequence No. 4	4,383,000 cubic yards
Sequence No. 5	4,151,000 cubic yards
Sequence No. 6	7,979,000 cubic yards

B. Site Filling

Site filling will progress in phases as shown on the drawings and as described in the previous section. The filling of each phase shall consist of a series of lifts. Each lift will be approximately ten feet thick to provide increased compaction. Each lift in the Sequence No. 1 operation shall be sloped to the northeast to route surface water drainage away from the active fill area. Subsequent sequences will route surface water drainage away from active fill areas as shown on Drawing No. A-5.

Access to the fill area for disposal will be provided by access roads entering the disposal area from both the north and the south. The road shall be routed over the compacted fill to the active fill area. The road shall be extended vertically as ash disposal progresses in order to provide ingress and egress for the duration of site filling. Access road grades shall not exceed 10 percent. The access road shall be maintained to provide access to the active fill area during all weather conditions. Access road construction shall consist of materials to provide easy maneuverability of vehicles. The road materials will reduce windblown dust during dry weather conditions and excessive rutting during wet weather conditions.

VIII. RECORD OF SOLID WASTE DISPOSAL ACTIVITY WITH THE COUNTY REGISTER OF DEEDS

A notarized affidavit specifying that this solid waste disposal site is permitted to accept solid wastes for disposal will be filed with the County Registrar of Deeds once the Department issues the permit. Said affidavit shall specify that another affidavit will be filed with the County Registrar of Deeds once the disposal operation is completed and the site is closed. The second affidavit will specify the types of wastes disposed at the facility and other pertinent details. The Department shall be provided with copies of these affidavits.

IX. SITE CLOSURE

A. Short Term Care

Final site grades are shown on Drawing A-11. A 12 percent maximum final slope is proposed, based on previous slope stability experience with ash disposal and discussions with the Department.

As each phase reaches capacity, the final cover shall be constructed on those slopes which reach cover elevations. The function of the final cover is to limit infiltration, route surface water off the disposal area and provide sufficient soil cover for vegetative growth. The final cover will consist of two feet of compacted clay, six feet of spoils material compacted to 90 percent Standard Proctor, 1.5 feet of subsoil, and six inches of topsoil. A detail of the final cover construction is included on Drawing A-3.

An interim cover of six-inch minimum thickness will be placed on those fill slopes that will be regraded during subsequent filling sequences.

Construction of the two-foot-thick clay layer of final cover shall be completed in accordance with specifications outlined in Table 11. Clay for the final cover shall be placed in compacted lifts of eight-inch maximum thickness.

The spoils material, subsoil and topsoil provide frost protection for the clay layer. The soils also provide a medium for vegetative growth.

TABLE 11

Recommended Clay Cover Placement Quality Control Program

Test	Frequency
Density	200-foot grid pattern per 8-inch compacted lift
Standard Proctor	A minimum of 1-per-10,000 cubic yards and 1 each for each major soil type utilized
Atterberg limits	400-foot grid pattern per 8-inch lift
Grain Size	400-foot grid pattern per lift
Undisturbed Permeability	1-per-5-acres per 8-inch lift

All final cover areas and adjacent areas disturbed by construction shall be topsoiled, seeded, fertilized and mulched. Topsoil shall be analyzed to obtain appropriate fertilizer recommendations. Fertilizer, seed, and mulch shall be applied as recommended to provide vegetative cover compatible with regional vegetation.

Table 12 presents final cover construction quantities. At the completion of closure activities, permanent fencing shall be placed around the disposal perimeter. The purpose of the fencing is to limit site access to maintenance and inspection vehicles only. The fencing shall be adequate to prohibit livestock and any unauthorized vehicles from entering the disposal area. A locking gate or gates shall be installed to provide access for maintenance and inspection vehicles.

B. Long Term Care

Following site closure, the disposal area will be inspected at least twice a year for five years.

During each inspection the following items shall be observed.

1. Soil cover. Topsoil, subsoil, and clay cover soils shall be inspected for erosion, differential settlement, vegetation stability and any indication of vegetative stress.

2. Drainage control facilities. Drainage swales shall be inspected for erosion or blockage.

TABLE 12

Estimated Soil Quantities for Final Cover Construction

Total Site

Construction Item	Quantity
2 ft. clay layer*	886,600 cubic yards
6 ft. spoils layer	2,127,000 cubic yards
1.5 ft. subsoil layer	532,000 cubic yards
6 in. topsoil layer	178,000 cubic yards

Estimated Soil Quantities by Sequence Areas

Construction Item	Sequence No. 1	2	3	4	5	6
2 ft. clay layer (cubic yards)*	104,000	89,700	58,500	166,400	304,200	163,800
6 ft. spoils layer (cubic yards)	248,000	226,000	135,000	416,000	704,000	398,000
1.5 ft. subsoil layer (cubic yards)	62,000	56,500	34,000	104,000	176,000	99,500
6 inches topsoil layer (cubic yards)	21,000	19,000	11,000	35,000	59,000	33,000

*Clay volume includes a 30 percent shrinkage factor

3. Land surface care. Surface maintenance after closure includes maintaining proper cover soil and vegetation on the site, and the inspection and repair of surface water control structures and monitoring devices.

4. Runoff control. Surface water drainage swales which control surface water runoff should be inspected for erosion and blockage and maintained as needed.

5. Erosion care. Rapidly growing grasses are to be planted on the closed landfill to minimize erosion. Erosion damage to vegetated cover soils could occur due to differential settlement or severe weather conditions. Eroded soils and/or damaged vegetative cover will be replaced if necessary.

6. Settlement. Differential settlement may occur in closed areas, requiring some maintenance. Areas shall be inspected semi-annually for locations that have settled, causing surface water to pond or erosion to occur. These locations are to be regraded and reseeded as soon as possible.

WRK/dkc

2/6/89

APPENDIX B-5

Coal Creek Station 1993 Water Quality Monitoring Report, ERSD/CPA 1993


COOPERATIVE
POWER

COAL CREEK STATION

1993

WATER QUALITY MONITORING REPORT

Submitted to:

NORTH DAKOTA STATE DEPARTMENT OF HEALTH

AND CONSOLIDATED LABORATORIES

Division of Waste Management
PO Box 5520
Bismarck, ND 58505-5520

Prepared by:

Environmental and Regulatory Services Division
Cooperative Power Association
for

Cooperative Power Association and United Power Association

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INTRODUCTION

This evaluation of 1993 water quality data for Coal Creek Station (CCS) was prepared in accordance with conditions outlined in CCS special waste disposal permits SU-033, SU-091, SU-095, and SU-118.

Objectives of the report are to:

- Present groundwater and surface water data collected at CCS during 1993.
- Discuss short-term and long-term water quality trends at CCS.
- Provide a statistical analysis of the water quality data in accordance with the 1993 North Dakota State Department of Health (NDSDH) "Guidelines for Statistical Analysis of Ground Water Monitoring Data from Solid Waste Facilities".

The text portion of the report includes a review of water quality data collected during the reporting period, a brief summary of the statistical analyses conducted on the data, results of the analyses, and a discussion of the significance of the results in relation to water quality guidelines.

In previous years, the text included a site overview that described the activity and status of each special use site. For the 1993 reporting period, this information was submitted under separate cover as an annual report for solid waste management facilities as required by NDAC 33-20-04.1-04.3 (see Appendix A).

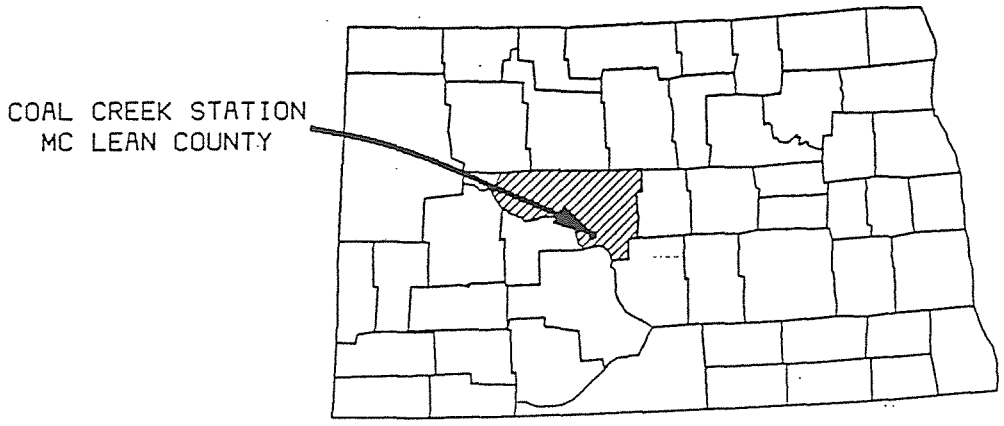
SITE BACKGROUND

Coal Creek Station is a coal-fired power plant near Underwood, North Dakota (Figure 1) that produces ash as a byproduct of the combustion process. The ash is a solid waste that typically has been placed in several storage ponds at the facility. A ground water monitoring network (Figure 2, Appendix B) has been in-place, and periodically upgraded, since the plant began operation in 1979. At one point the monitoring network at CCS and at the adjacent Falkirk Mine solid waste facilities included 158 ground water monitoring wells and 27 surface water monitoring locations.

Annual water quality monitoring reports have been formally submitted to the NDSDH since 1989. These reports have included plots of selected data that were visually analyzed for trends. In late 1991/early 1992, a comprehensive evaluation of the water quality monitoring program was undertaken. CP believed a more streamlined program was warranted with the impending completion of the pond lining project and that such a program could track representative and significant data.

The revised program, approved by NDSDH in March 1992, includes 65 reportable monitoring locations and 6 reportable lab parameters (from 47 lab parameters previously). Six water quality parameters (arsenic, boron, chloride, selenium, strontium, and sulfate) associated with ash were recognized in the 1991/1992 data evaluation as being potentially significant and representative of water quality changes. Although there are no regulatory requirements associated with groundwater or surface water monitoring at CCS, the data are compared to the following standards :

Parameter	Standard	Source
Arsenic	0.05 mg/l	SDWA Primary Drinking Water Standard
Boron	0.75 mg/l	North Dakota Class I Stream Standard
Chloride	250 mg/l	SDWA Secondary Drinking Water Standard
Selenium	0.01 mg/l	SDWA Primary Drinking Water Standard
Strontium	0.05 mg/l	Arsenic Standard
Sulfate	250 mg/l	SDWA Secondary Drinking Water Standard



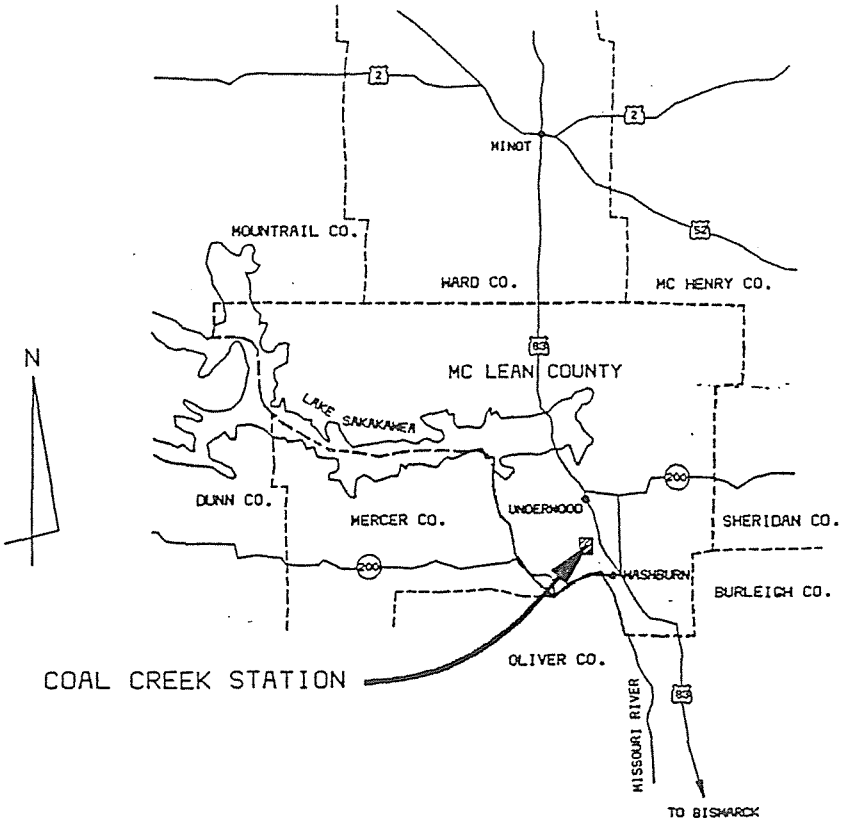


FIGURE 1. Site Location Map

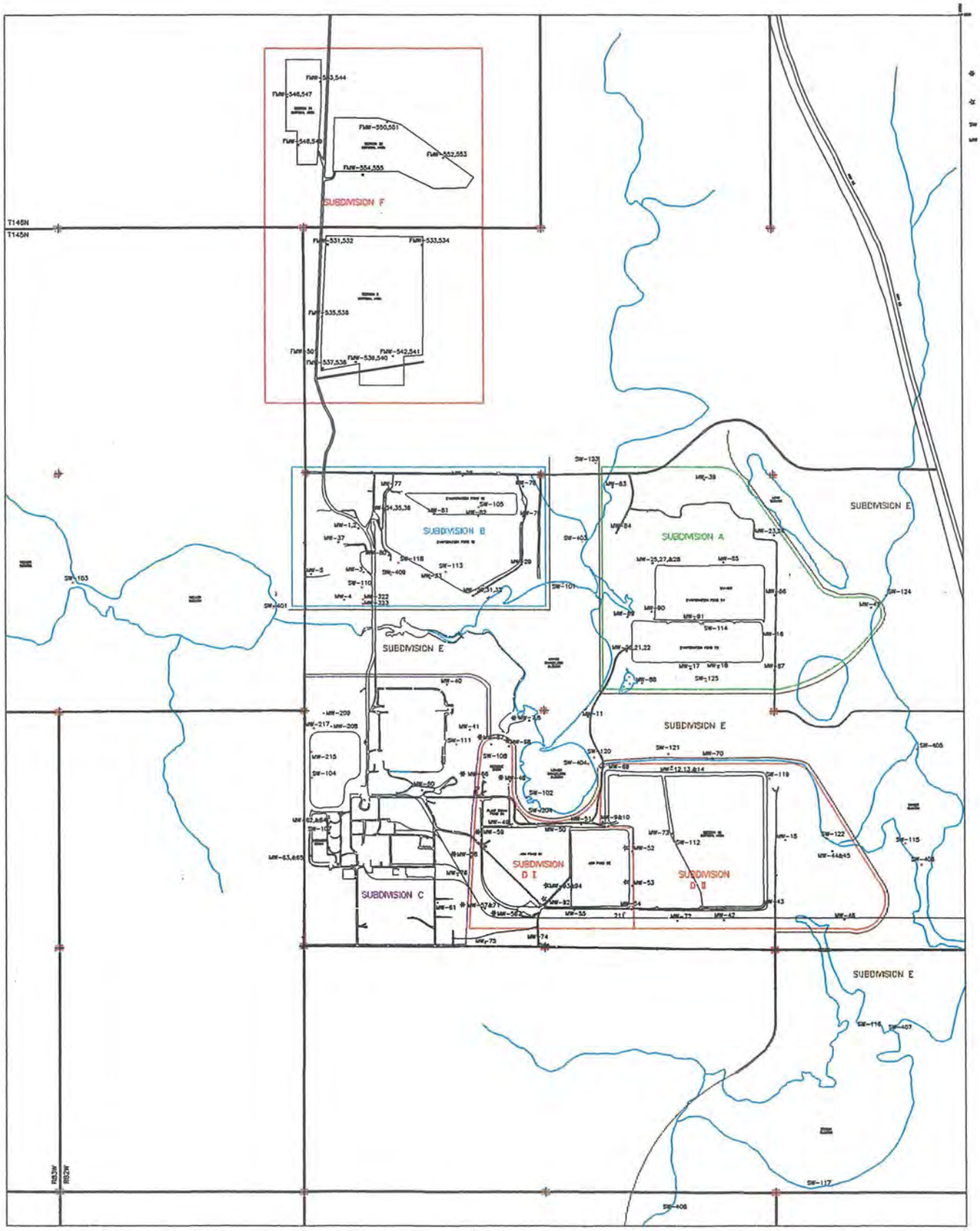


FIGURE 2. Water Quality Monitoring Locations and Subdivisions

These are referred to throughout this report as water quality guidelines, but are for comparative purposes only.

Additional data (field parameters, laboratory parameters, and water levels) are collected for internal use. The statistical evaluation reported in this document has been conducted using the modified monitoring locations and the six parameters listed above. A summary of the 1993 water quality monitoring program is provided in Appendix C.

Water quality trends at CCS have been influenced by operational activities such as variable pond usage and repairs to the ponds. A summary of pond usage at the site is provided as Table 1. Water quality data at the adjacent Falkirk Mine have been influenced by mining and subsequent development of engineered landfills.

METHODS

Water quality data collected at CCS are generally divided into seven areas or "subdivisions" (Figure 2), and for each subdivision, this report:

- Discusses how historical monitoring data and other information were used to select a statistical method;
- Discusses the assumptions used in selecting and evaluating the statistical tests;
- Describes the methods and explains formulas, calculations, or tables used;
- Discusses error rates, where applicable; and
- Explains the implications of the statistical test results.

The water quality analysis for 1993 is confined to the six reportable parameters: arsenic, boron, chloride, selenium, strontium, and sulfate. Arsenic is addressed separately because it behaves similarly in all subdivisions. In 1993, arsenic was not detected above the water quality guideline of 0.05 mg/l at any of the monitoring locations. Selenium was only detected above the water quality guideline of 0.01 mg/l at a total of eight monitoring locations (three of which were marginal exceedances), and is only discussed in those subdivisions where the exceedances occurred.

Throughout the statistical analysis portion of this report the word "significant" is used extensively. In this context, the meaning of "significant" is with regard to the results of a statistical test being "statistically significant". The results of a statistical test can be "significant", even though the values being examined are not above established water quality guidelines.

Statistical analysis of water quality data provides an unbiased validation of previously reported trends using standard procedures. The analysis has been conducted in compliance with the new NDSDH requirements, including application of control chart and tolerance interval methods. A discussion of statistical methods used is provided in Appendix D.

Previous evaluations of the water quality data have shown that the CCS ash ponds and evaporation ponds have adversely affected local water quality (*Water Quality Trends, Coal Creek Station and Falkirk Mine Disposal Area*, Dames & Moore, November 1991). The extent and magnitude of the impacts were influenced by varied uses of the ponds and by operational needs. Based on these findings, extensive repairs have been completed to mitigate water quality conditions. Pond repairs began in 1987 and were completed in 1993. The influence of these repairs on apparent downgradient ground water quality is discussed throughout this report, where applicable.

TABLE 1

POND USAGE SUMMARY (by Year)
COAL CREEK STATION, NORTH DAKOTA

POND	SUB-DIVISION	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93
Production Ponds																
River Water Basin	C	I	I	I	I	I	R	I	I	I	I	I	I	I	I	I
Extended Basin	C	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
Recycle Basin	DI	I	I	I	I	I	I	I	I	I	I	I	I	I	I	O
South Ash Pond System																
South Ash Pond	DI	I	O	R	I	I	I	I	O	O	-	-	-	-	-	-
Ash Pond 91	DI	-	-	-	-	-	-	-	-	-	O	I	I	D	R	I
Ash Pond 92	DI	-	-	-	-	-	-	-	-	-	O	R	I	I	I	I
East Ash Pond	DII	O	I	I	I	I	O	O	I	I	I	O	O	O	O	O
North Evaporation Ponds																
Evaporation Pond 91	B	-	I	I	I	I	O	O	O	O	O	O	R	I	I	I
Evaporation Pond 92	B	-	I	I	I	I	I	I	I	I	I	I	O	R	I	I
East Evaporation Ponds																
Evaporation Pond 93	A	-	O	O	R	I	I	I	I	I	I	I	I	D	R	I
Evaporation Pond 94	A	-	O	O	O	O	O	O	O	O	O	O	O	R	I	I

Notes: I = In Service O = Out of Service D = Dewatering R = Repair

CCS water quality data have been plotted for reference and show that operational changes do affect water quality conditions. Water quality data for all monitoring locations examined in this report are provided in time trend plots for each subdivision. Additional trend plots, with associated statistical test results overlain on the plots, are provided in Appendix E. For all 1993 trend plots, average values were used if there was more than one data point in that year for a particular parameter.

DISCUSSION

SUBDIVISION A

This subdivision is located in the northeast section of the plant site (Figure 3) and encompasses portions along Long Slough, Evaporation Ponds #93 and #94, and the northeastern edge of Samuelson Slough. The water quality sampling locations (with completion depths below ground surface for monitoring wells) monitoring this subdivision and reported herein are as follows:

Ground Water

Upgradient	Downgradient	Additional
MW-23 (40 ft)	MW-17 (20 ft)	MW-16(23ft) Downgradient]
MW-24 (25 ft)	MW-18 (16 ft)	MW-20(31.5ft)[Downgradient]
MW-83 (19.5 ft)	MW-87 (10.5 ft)	MW-21 (19 ft) [Downgradient]
	MW-22 (10 ft)	MW-90 (9 ft) [Downgradient]
		MW-91(34.5 ft) [Downgradient]

Surface Water

SW-109
SW-114

A summary of the historical usage of Ponds #93 and #94 in this subdivision is provided in Table 1. Pond #93 was removed from service in December of 1991, lined during the summer of 1992 and placed back in service in November of 1992. Pond #94 was repaired in 1991 and has been in service since 1992.

Qualitative Discussion of Historical Water Quality Data

Time series data plots of the reportable parameter concentrations for the planned water quality monitoring locations in Subdivision A are provided in this section. Table 2 provides a summary of the most recent measured concentrations for Subdivision A in comparison to the water quality guidelines.

Most of the wells and reportable parameters have a period of record extending from 1980 to the present, although the records for wells MW-83 and MW-87 begin in 1989. The following sections provide qualitative descriptions of water quality in the subdivision, based on an examination of water quality trends for the various monitoring wells and knowledge of the historical usage of the evaporation ponds within this subdivision.

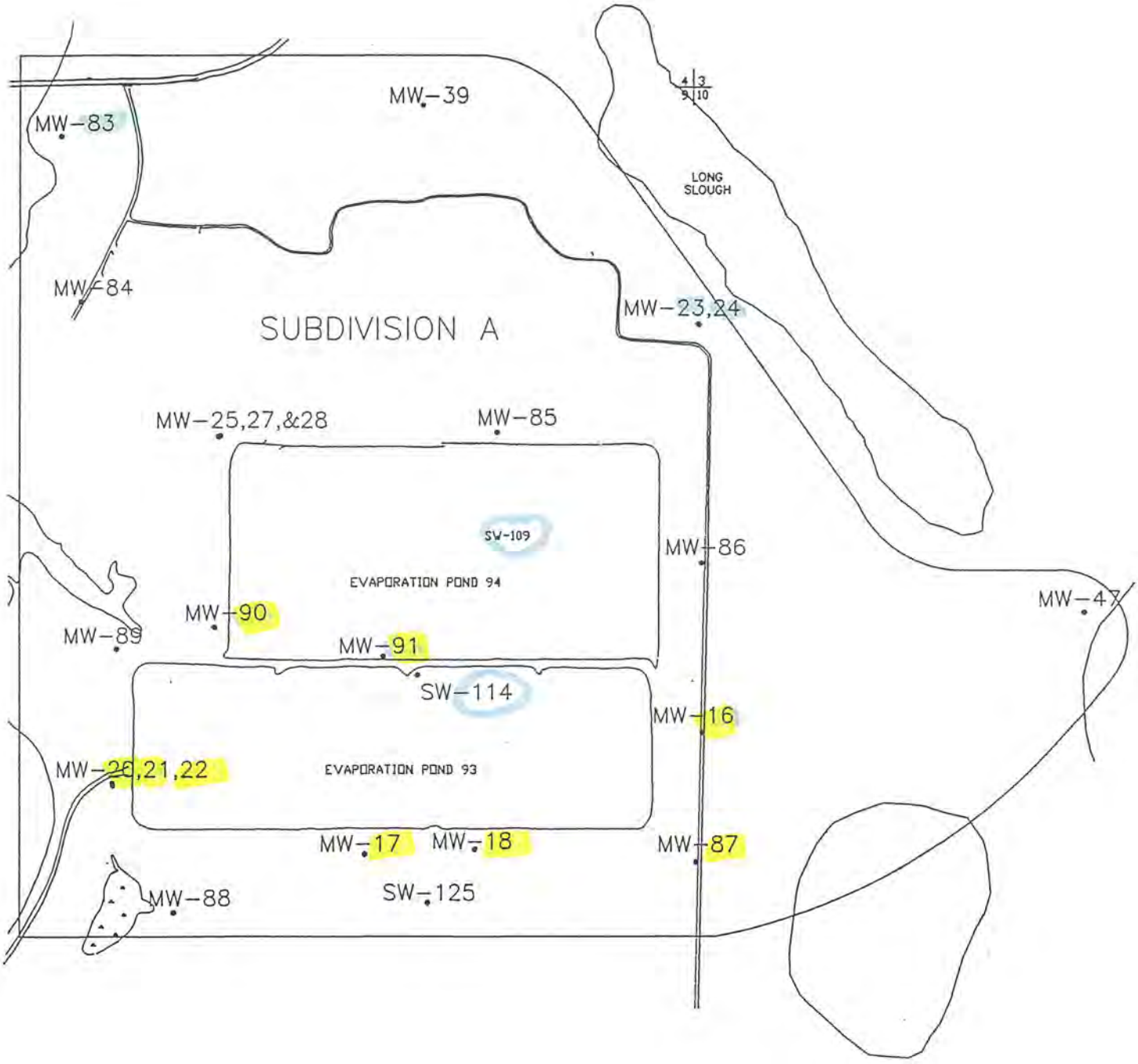


FIGURE 3. Subdivision A Water Quality Monitoring Locations

TABLE 2

WATER QUALITY SUMMARY - SUBDIVISION A
1993 SAMPLING RESULTS AND WATER QUALITY GUIDELINES

		PARAMETER											
		Arsenic		Boron		Chloride		Selenium		Strontium		Sulfate	
WELL	POSITION	Latest Results	WQ[1] Guide	Latest Results	WQ Guide	Latest Results	WQ Guide	Latest Results	WQ Guide	Latest Results	WQ Guide	Latest Results	WQ Guide
MW-16	Downgradient (Additional)	0.0009	0.05	0.169	0.75	3.83	250	< 0.001	0.01	0.58	0.05	286	250
MW-17	Downgradient	< 0.0001	0.05	49.47	0.75	438.1	250	< 0.001	0.01	1.73	0.05	6,336	250
MW-18	Downgradient	< 0.0001	0.05	43.34	0.75	474.92	250	< 0.001	0.01	3.2	0.05	6,282	250
MW-20	Downgradient (Additional)	< 0.0001	0.05	43.8	0.75	14.46	250	< 0.001	0.01	4.1	0.05	2,944	250
MW-21	Downgradient (Additional)	< 0.0001	0.05	0.457	0.75	28.11	250	< 0.001	0.01	0.79	0.05	742	250
MW-22	Downgradient	0.0005	0.05	0.659	0.75	5.54	250	NA	0.01	0.34	0.05	302	250
MW-23	Upgradient	< 0.0001	0.05	0.485	0.75	15.18	250	< 0.001	0.01	1.95	0.05	617	250
MW-24	Upgradient	NA	0.05	NA	0.75	NA	250	NA	0.01	NA	0.05	NA	250
MW-83	Upgradient	< 0.0001	0.05	0.121	0.75	4.99	250	< 0.001	0.01	1.93	0.05	313	250
MW-87	Downgradient	0.0008	0.05	0.518	0.75	6.67	250	< 0.001	0.01	0.29	0.05	131	250
MW-90	Downgradient (Additional)	< 0.0001	0.05	27.95	0.75	194.16	250	< 0.001	0.01	1.22	0.05	2,603	250
MW-91	Downgradient (Additional)	NA	0.05	NA	0.75	NA	250	NA	0.01	NA	0.05	NA	250
SW-109	Pond #94	< 0.0001	0.05	33.21	0.75	477.54	250	< 0.001	0.01	8.16	0.05	5,534	250
SW-114	Pond #93	0.0009	0.05	18.66	0.75	386.47	250	< 0.001	0.01	7.49	0.05	3,922	250

Notes: All concentrations are presented in units of milligrams per liter.
Shaded values indicate latest results which exceed the water quality guidelines.
NA = Not Analyzed
[1] WQ Guide = Water Quality Guideline

Upgradient Wells

Upgradient wells MW-23, MW-24 and MW-83 (Figures 4 and 5) document ambient conditions and show no obvious trends during the period of record, other than a slight increase in chloride concentrations at well MW-23 over time. Wells MW-24 and MW-83 are shallow wells and well MW-23 is a deeper well paired with MW-24. With the exception of strontium and sulfate, concentrations of all reportable parameters have remained below the water quality guidelines in the upgradient wells during the period of record. Strontium concentrations have exceeded the water quality guideline of 0.05 mg/l, and sulfate concentrations have generally exceeded the water quality guideline of 250 mg/l at the upgradient wells. It will become apparent throughout this report that the strontium water quality guideline of 0.05 mg/l is probably below the background concentration of this parameter across the site. The strontium water quality guideline, as currently stated, is generally not achievable at this site due to natural background concentrations.

Downgradient Wells

Downgradient wells MW-17, MW-18, MW-22, and MW-87 (Figures 6 and 7), all of which are shallow, have exhibited variable responses over time, depending upon the specific parameter and well location being examined. For example, wells MW-17 and MW-18, which are at the downgradient (southern) edge of Pond #93, have exhibited similar responses for boron, chloride, strontium, and sulfate. In each case, these constituents were at consistently low concentrations until at least 1983, after which time steady increases in concentration were observed for varying lengths of time. Arsenic and selenium concentrations have not shown similar increases over time at any of the downgradient wells.

At well MW-17, concentrations of boron, chloride and sulfate appeared to peak in approximately 1991, with fairly constant or slowly declining concentrations since that time. The concentrations of strontium at well MW-17 appear to have peaked in approximately 1989, with a steady decline since then. These same parameters have exhibited similar responses at well MW-18, with the exception that recent declines in boron, chloride and sulfate are not as apparent as at well MW-17. Concentrations of chloride have generally exceeded the water quality guideline of 250 mg/l at wells MW-17 and MW-18 since approximately 1990. Concentrations of sulfate have generally exceeded the water quality guideline of 250 mg/l at these wells since approximately 1986. Boron exceeded the water quality guideline of 0.75 mg/l at wells MW-17 and MW-18 in 1993.

Well MW-87, situated downgradient to sidegradient (southeast corner) of Pond #93, has a short period of record (1989 to the present). Sulfate has typically exceeded the water quality guideline during the period of record. However, the concentrations of sulfate have been below the guideline since 1992.

Well MW-22, situated downgradient to sidegradient (west edge) of Pond #93, has only been sampled twice in recent years (1987 and 1993). Sulfate has exceeded the water quality guideline of 250 mg/l in both years (398 and 302 mg/l in 1987 and 1993, respectively).

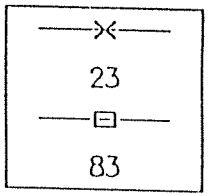
Strontium has been consistently detected above the water quality guideline at all downgradient wells in this subdivision.

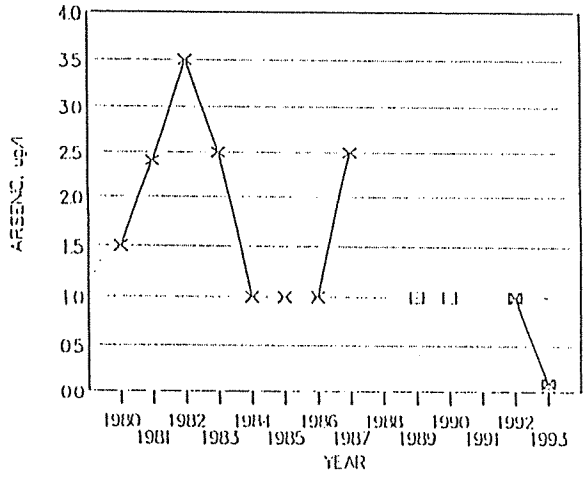
Additional Wells

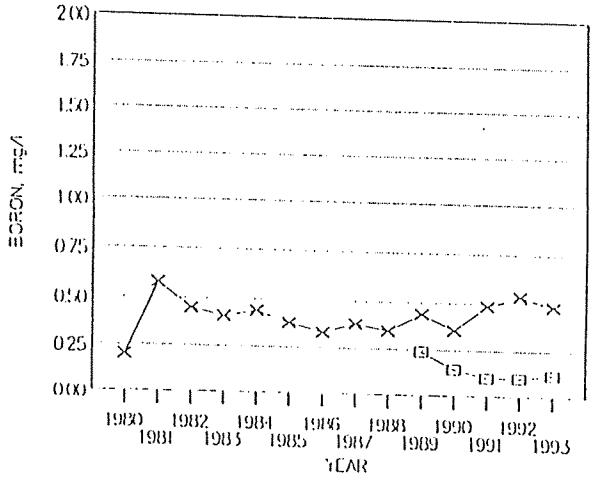
Additional wells MW-16, MW-20, MW-21, MW-90, and MW-91 (Figures 8 and 9) in this subdivision are all downgradient or sidegradient to the evaporation ponds. As with the downgradient wells discussed above, these wells have exhibited variable responses, depending upon the specific parameter and well locations. Wells MW-16, MW-20 and MW-21, which have the longest periods of record (1980 to the present), have consistently exhibited non-detectable or low concentrations for all reportable parameters except sulfate. Sulfate has consistently been detected at concentrations above the water quality guideline of 250 mg/l at wells

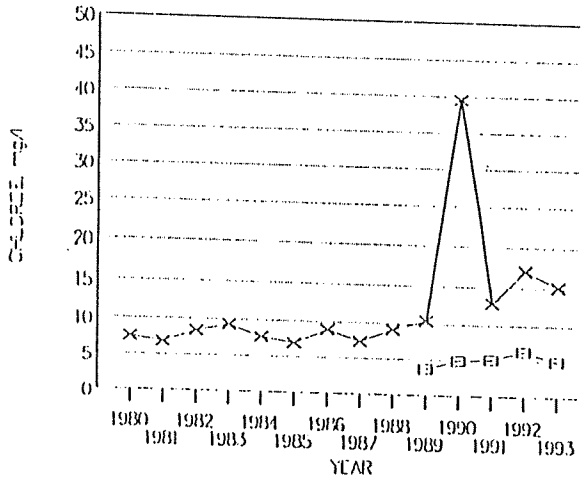
FIGURE 4. # WATER QUALITY TREND CHARTS

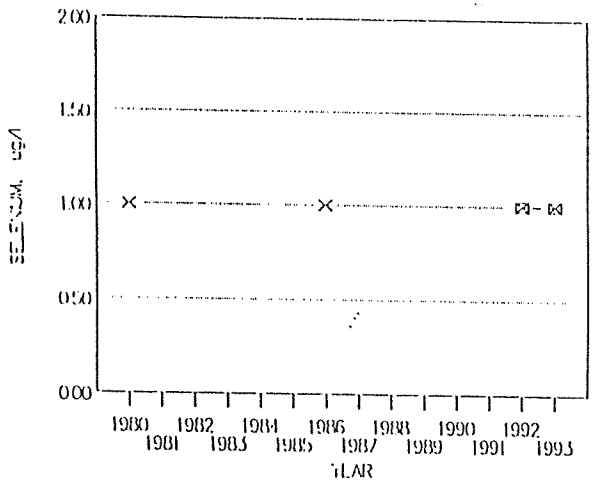
SUBDIVISION A UPGRADIENT WELLS

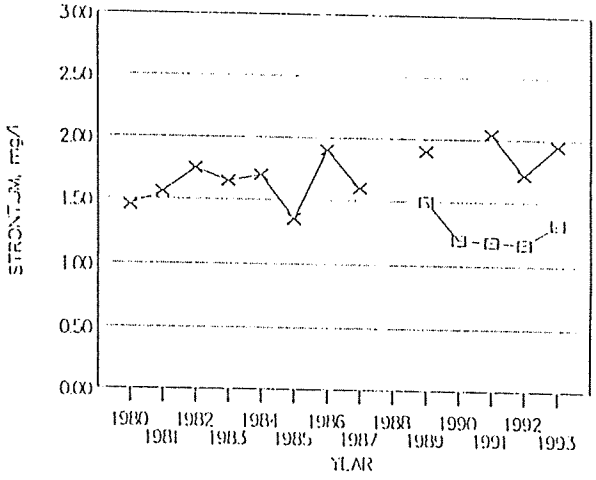












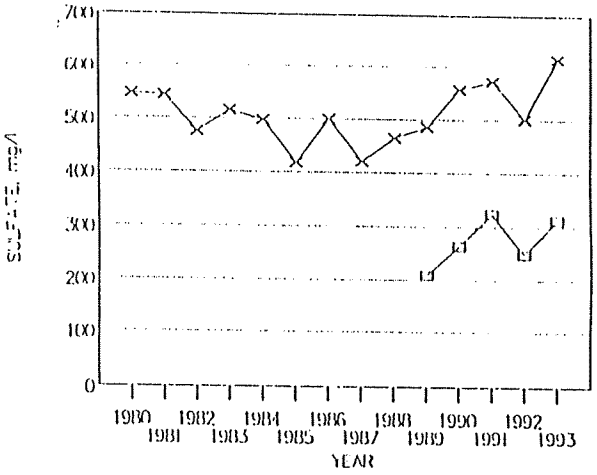
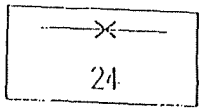
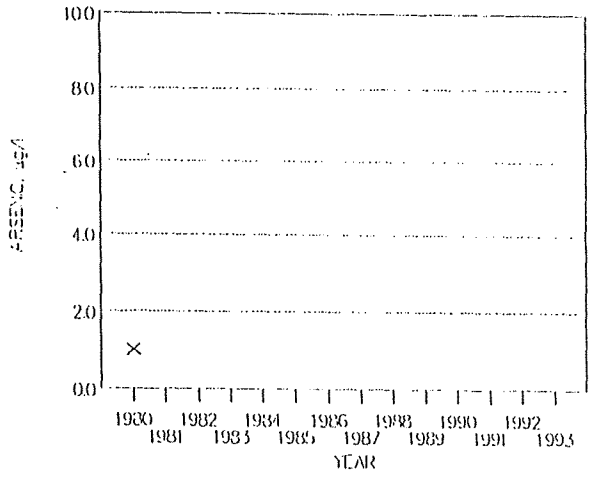
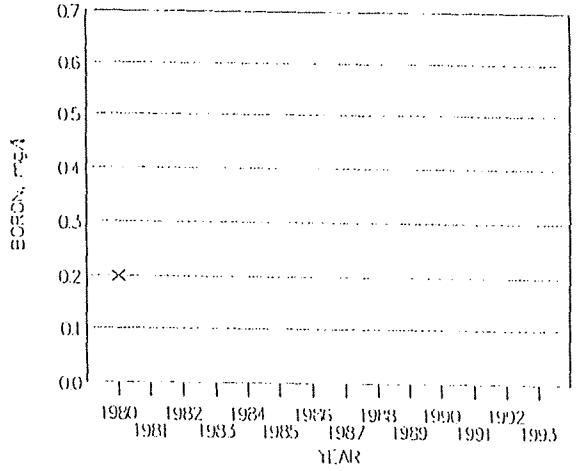


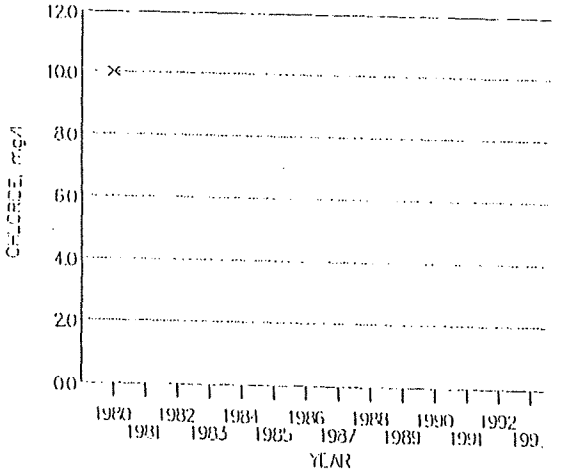
FIGURE 5. WATER QUALITY TREND CHARTS

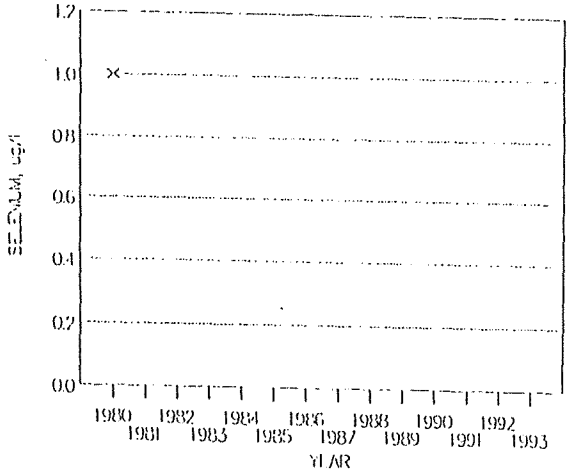
SUBDIVISION A UPGRADIENT WELLS

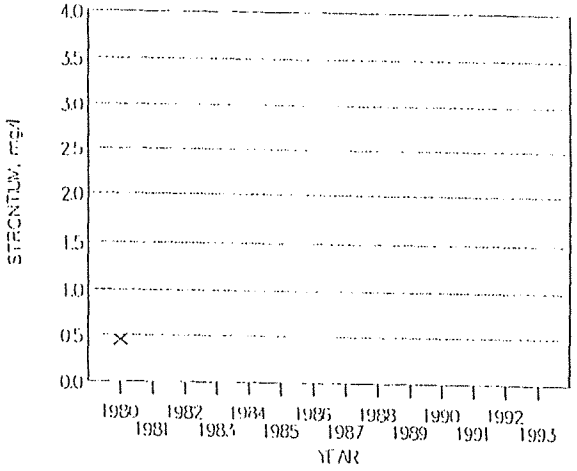












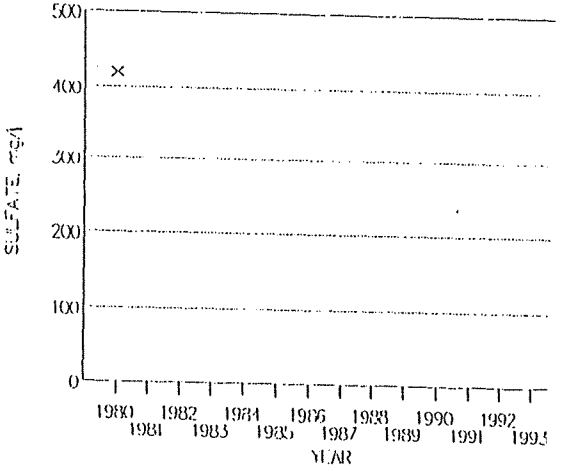
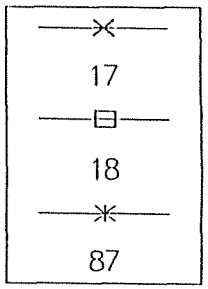
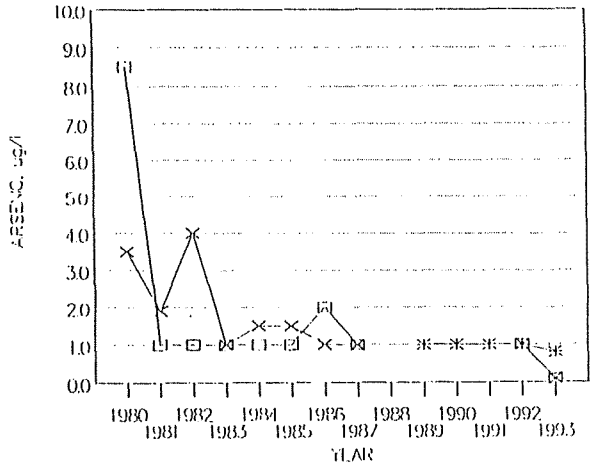
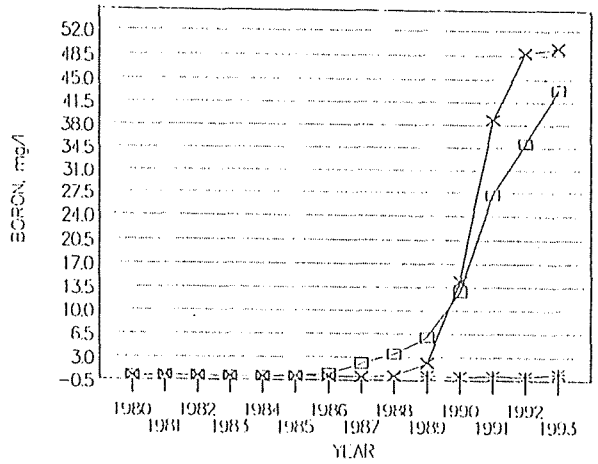


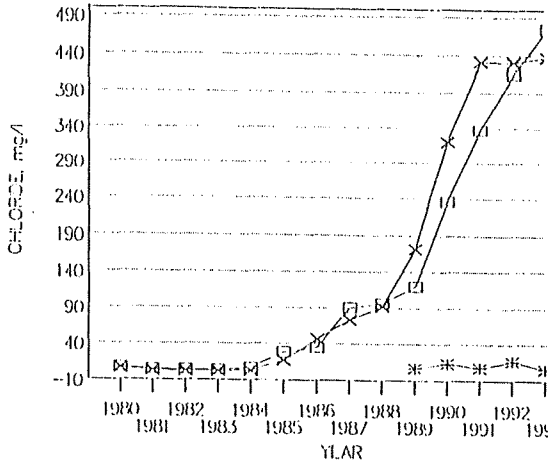
FIGURE 6. # WATER QUALITY TREND CHARTS

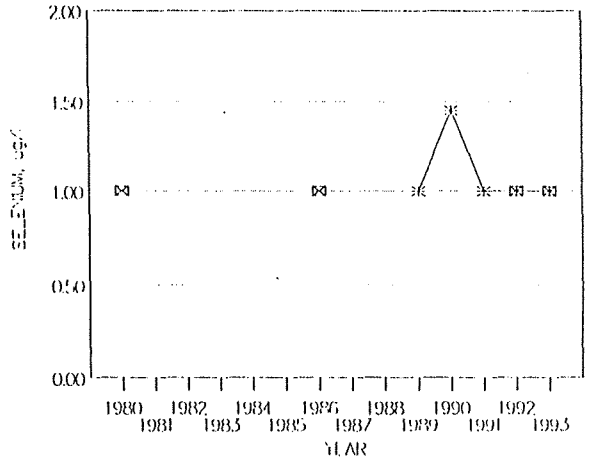
SUBDIVISION A DOWNGRADIENT WELLS

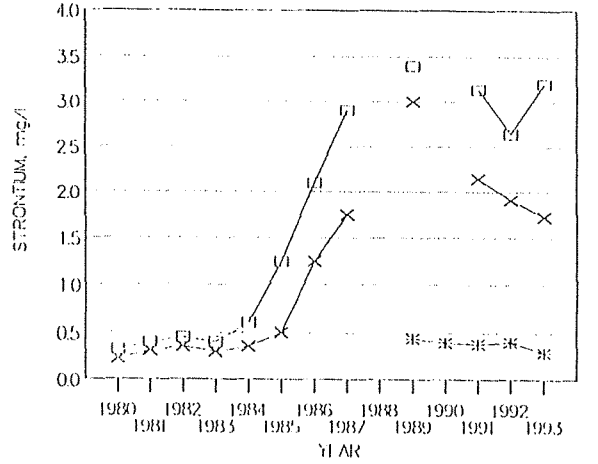












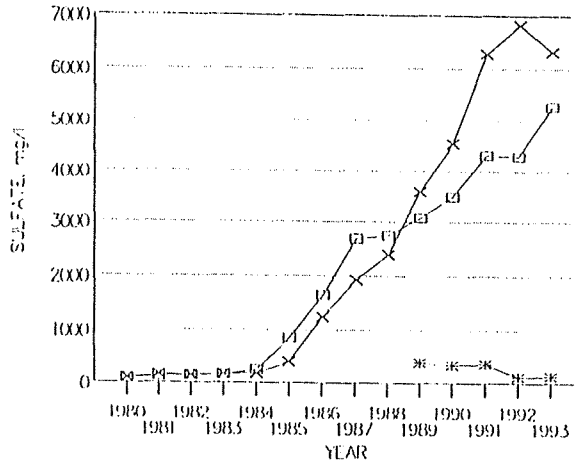
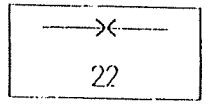
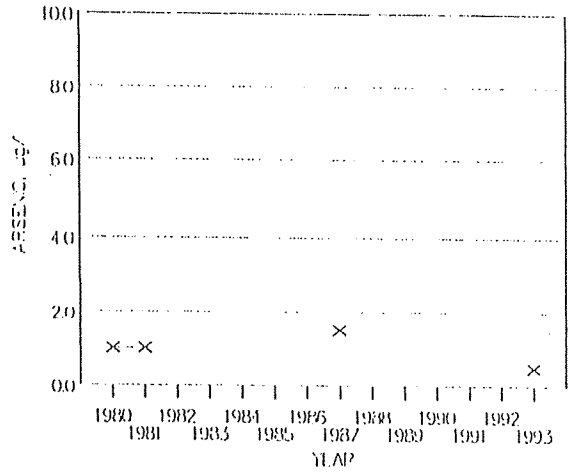
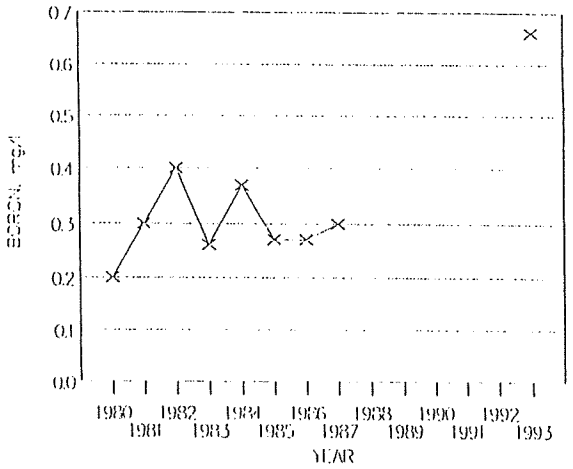


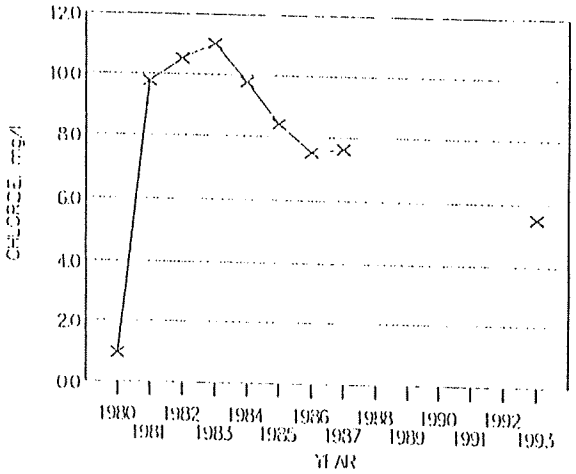
FIGURE 7. WATER QUALITY TREND CHARTS

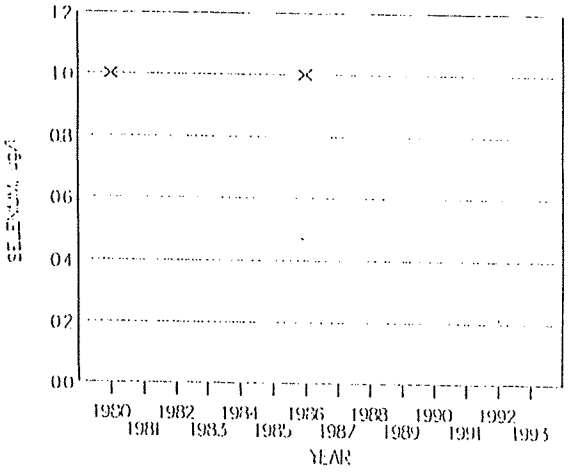
SUBDIVISION A DOWNGRADIENT WELLS

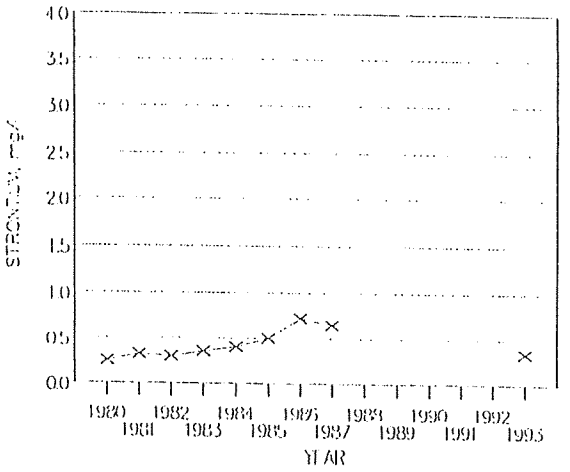












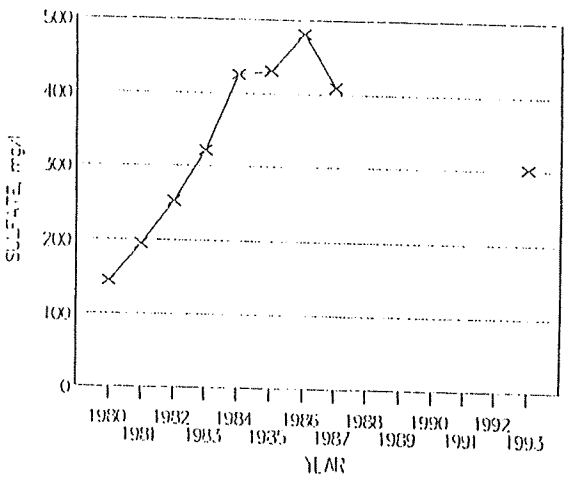
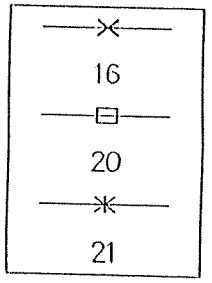
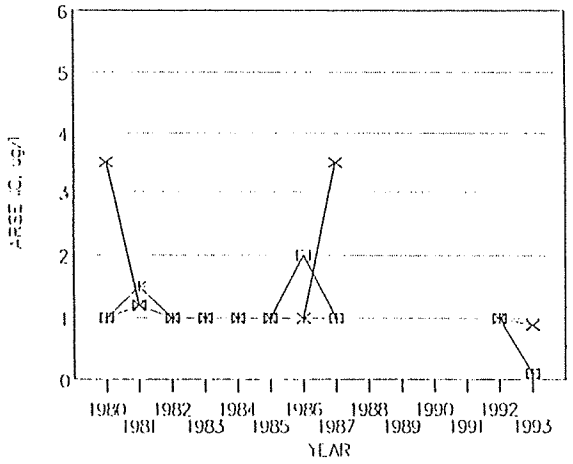
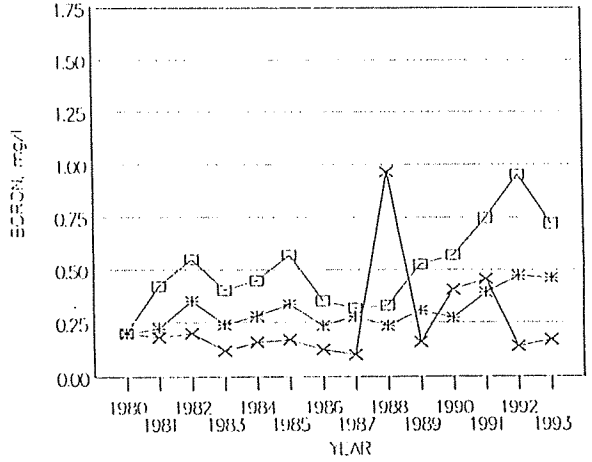
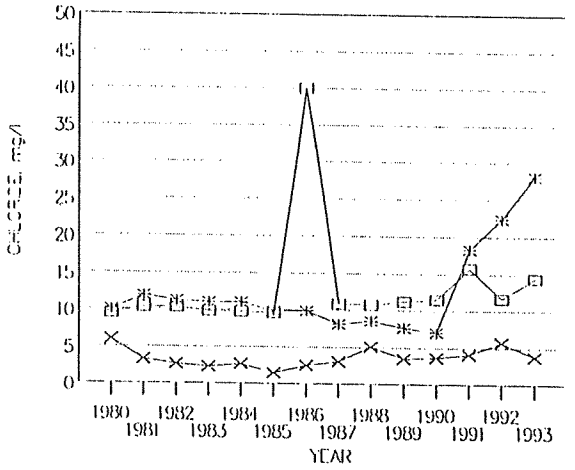


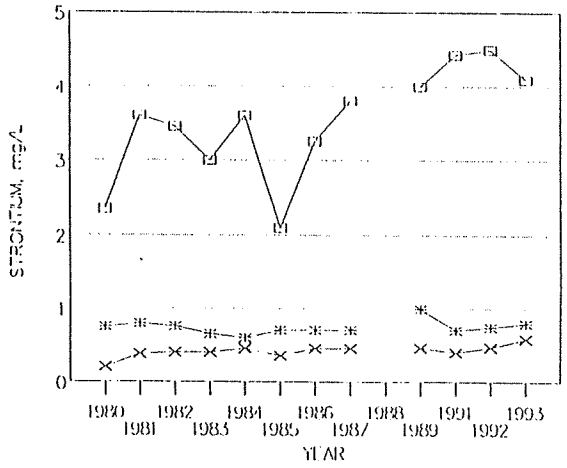
FIGURE 8. WATER QUALITY TREND CHARTS SUBDIVISION A ADDITIONAL WELLS











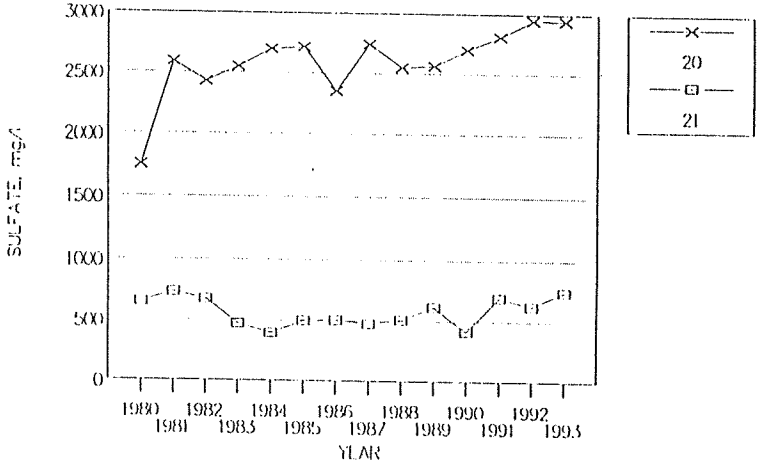
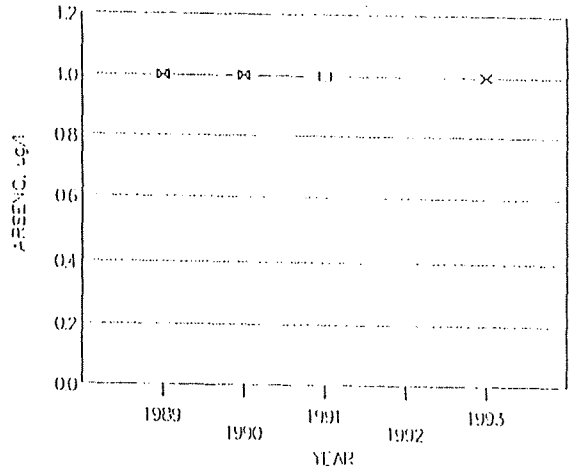
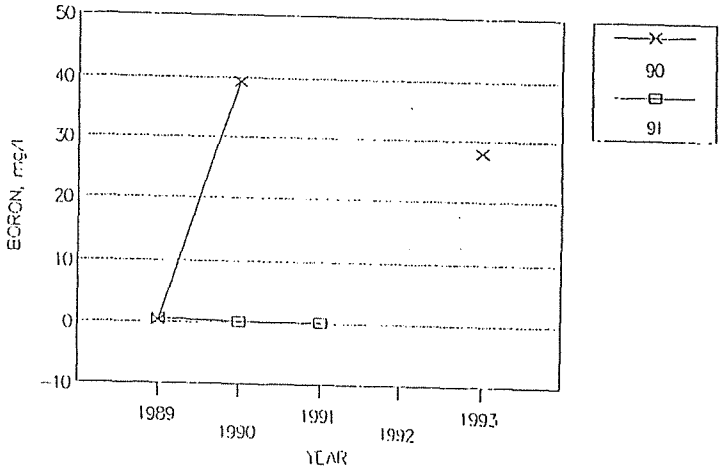
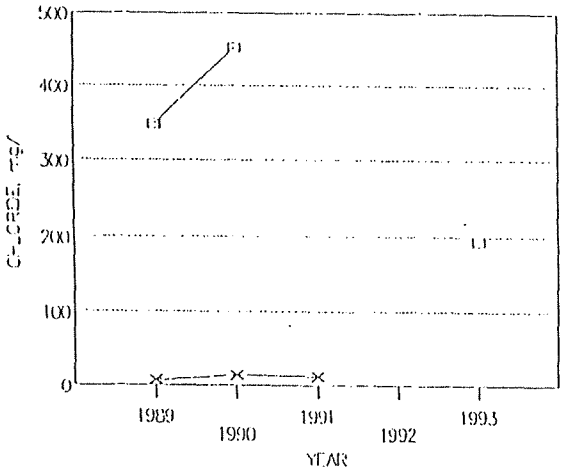


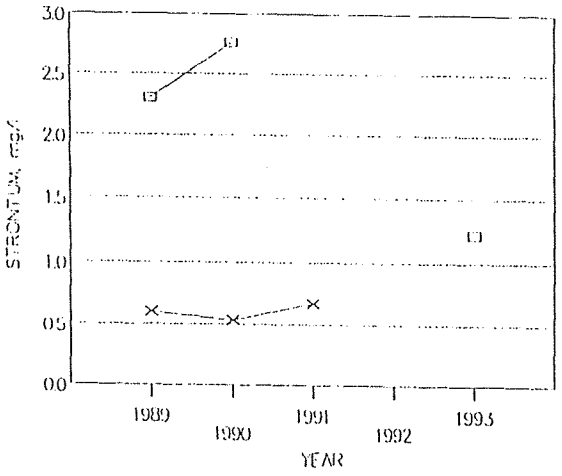
FIGURE 9. WATER QUALITY TREND CHARTS

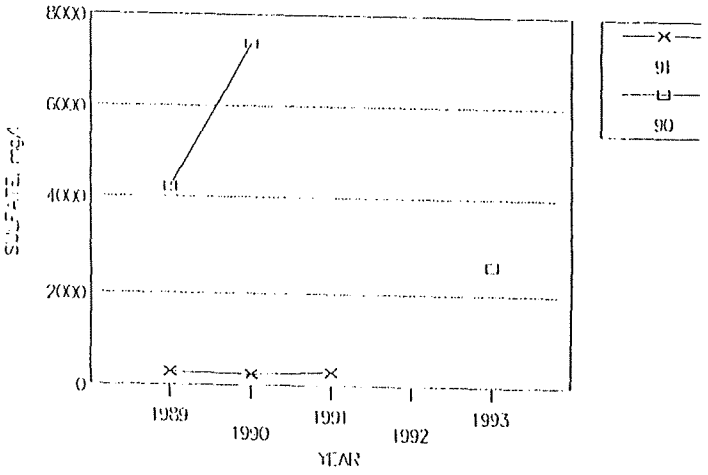
SUBDIVISION A ADDITIONAL WELLS











MW-20 and MW-21 throughout the period of record. These two wells, along with downgradient well MW-22, form a nest of three wells completed at different depths, near the western edge of Pond #93. The sulfate concentration has typically been highest in the deepest well (MW-20) of this nest, with the concentrations exhibiting a very slow increase over time.

Additional downgradient wells MW-90 and MW-91 have shorter periods of record, starting in 1989. Well MW-90 is a shallow well near the southwest corner of Pond #94 and well MW-91 is a deeper well at the downgradient edge of Pond #94. At well MW-91, sulfate has only marginally exceeded the water quality guideline of 250 mg/l during the short period of record. Well MW-91 has not been sampled since 1991. At well MW-90, both chloride and sulfate concentrations have exceeded the respective water quality guidelines; however, the 1993 sample results exhibit significantly reduced concentrations of both parameters (with chloride falling below the water quality guideline) compared to earlier in the period of record.

Surface Water

Water samples have been collected from the evaporation ponds to document operational conditions and to evaluate potential impacts to ground water near the ponds (Figure 10). Data from surface water location SW-109 are limited because Evaporation Pond #94 was not used until 1992. Data from SW-114 (from Evaporation Pond #93) are more extensive since the pond has been used since 1983. Pond water quality data, compared to ground water quality criteria, indicate elevated concentrations of boron, chloride and sulfate. Concentrations of these parameters showed a steady increase until the early 1990s, when both ponds were taken out of service and repaired.

Influence of Pond Repairs

While it is apparent that there have been ground water impacts at several of the downgradient wells in Subdivision A, it appears that the repairs at Ponds #93 and #94 have started to influence the concentrations of several of the parameters. In particular, this is evidenced by the response at well MW-17 at the downgradient edge of Pond #93, which has shown a steady decline in boron, chloride and sulfate concentrations since 1991. Additional downgradient well MW-90 also showed a reduction in chloride and sulfate concentrations in the 1993 sample.

Statistical Analysis

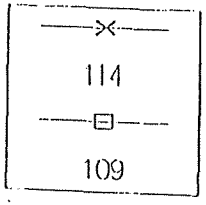
Use of Historical Monitoring Data

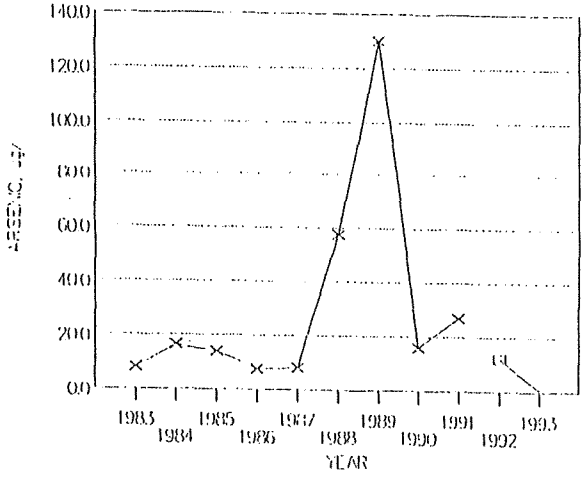
The discussion above, along with examination of the water quality data plots for this subdivision, provide a basis for evaluating water quality conditions at the monitoring locations. Additional data plots in Appendix E include various exploratory statistical methods to assist in determining the applicability of statistical analyses to the data.

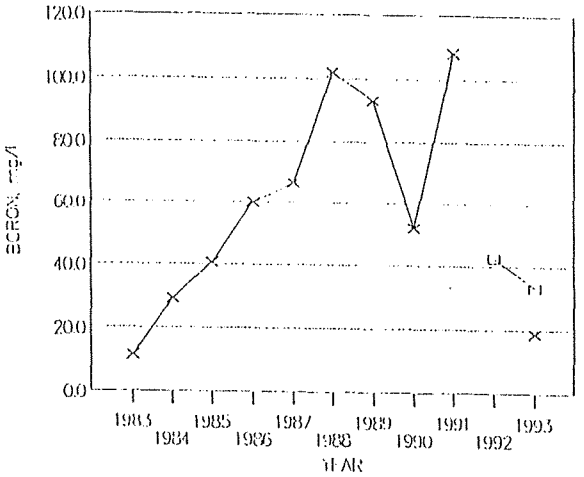
It is apparent from the water quality data plots that several of the downgradient wells have exhibited water quality impacts during the period of record. Although such impacts are apparent for several of the reportable parameters (boron, chloride, strontium, and sulfate), the concentrations are not necessarily above water quality guidelines (e.g. increased concentrations of boron and strontium at wells MW-17 and MW-18 are still below the guidelines).

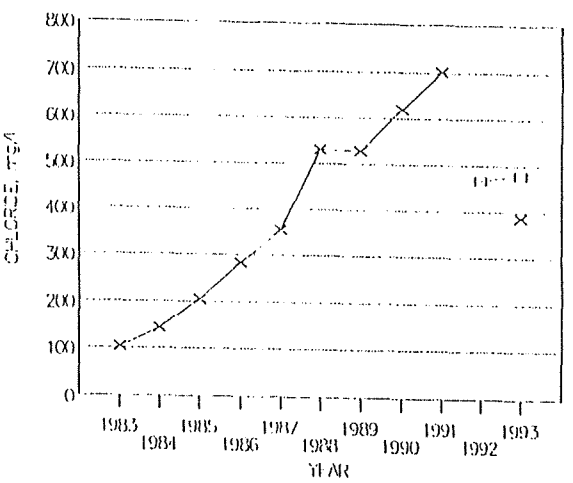
Because there have been obvious impacts to ground water, there is no use in conducting an ongoing comparison between downgradient and upgradient wells. Rather, current conditions at various locations will be examined and methods employed to detect changes in the future. Water quality data from the early period of record prior to the appearance of ground water impacts will be used to represent the non-impacted conditions at each location.

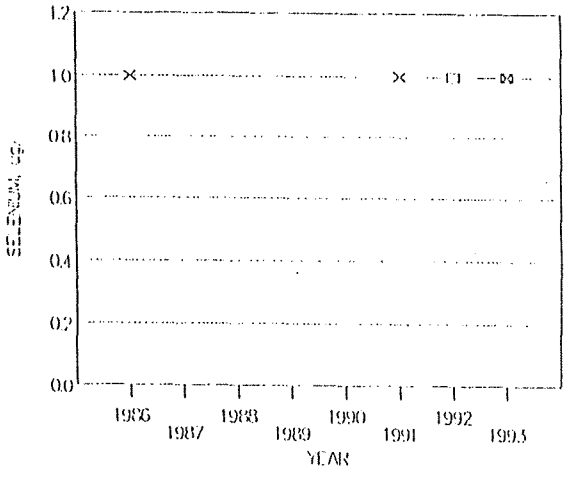
FIGURE 10. WATER QUALITY TREND CHARTS
SUBDIVISION A SURFACE WATERS

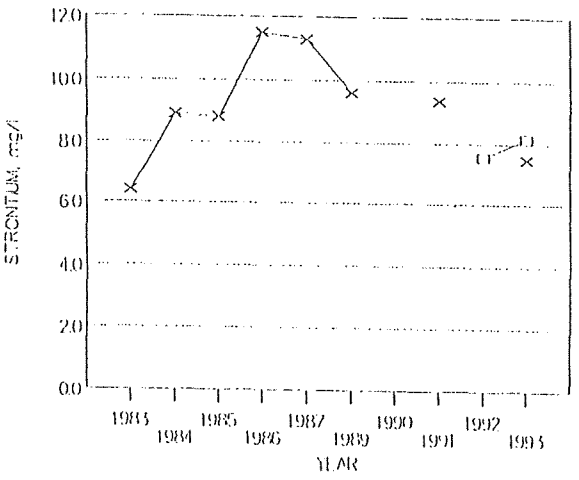


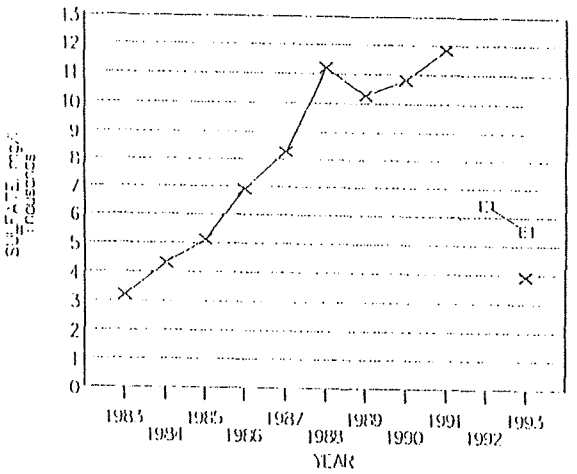












Selection of a Statistical Test

Two approaches are potentially useful to CP in continuing to assess ground water quality conditions in Subdivision A. One approach is to continue monitoring changes in downgradient levels of the reportable parameters. This is best performed with time series graphics, which CP already produces and submits to NDSDH each year, in accordance with permit requirements. The other approach is to compare values in every well with values during the early portion of the period of record, before effects in ground water were observed at several of the downgradient wells.

One appropriate method to compare ongoing monitoring values with historical values is to develop a *one-sided upper tolerance limit* from the historical data. Specific details regarding implementation of the tolerance limit method are provided in Section 3 of Appendix D. A summary of the method, including application of the method to the data in this subdivision, is provided below.

A tolerance limit uses sample data to place an outer limit (an upper limit in the case of a one-sided test) on the concentrations that can be expected to represent non-impacted conditions. This implies that there is a threshold concentration outside of which a measured value is assumed to no longer be within the typical range of historical (in this case, assumed to be non-impacted) data concentrations. In a ground water monitoring situation, a one-sided upper tolerance limit places an upper bound on a high percentile of the data. This means that, if this upper bound is exceeded, the measured value is tentatively assumed to represent a ground water impact. The upper bound is generally selected such that between 90% and 99% of the data record representing non-impacted conditions should continue to fall below the threshold value over time. This percentile is often referred to as the *coverage*. USEPA regulations and guidance documents for RCRA ground water monitoring recommend (but do not require) coverage of 95%. Therefore, a 95% coverage value is utilized herein.

In addition to the coverage, as defined above, the tolerance limit requires that a certain *confidence level* be specified. The confidence level defines the certainty with which the statistical method is likely to properly identify an exceedance of a threshold value. In the tolerance limit example, if a confidence level of 90% is utilized with 95% coverage, the implication is that there is 90% certainty that a maximum of 5% of future measured concentrations will exceed the calculated tolerance limit, even if there are no ground water impacts.

In application of the tolerance limit method herein, a 95% confidence level will be utilized, along with the 95% coverage value. As with the coverage value, USEPA regulations and guidance documents for RCRA ground water monitoring recommend (but do not require) a confidence level of 95%. For RCRA monitoring applications, the confidence is not allowed to exceed 95%.

A tolerance limit is a useful screening method that may be used for examining future measured concentrations in ground water samples. Concentrations of a parameter that exceed the tolerance limit developed from historical data in one well should be considered significantly high values. The calculated tolerance limit will not change in time, because it is developed from historical data and is not normally updated using new data.

Methods and Calculations

The tolerance limits utilized in this analysis are computed with upper one-sided 95% coverage and 95% confidence levels. The tolerance limits are computed by adding a multiple, K, of the historical standard deviation to the historical mean. The value of K depends on the coverage, the confidence, and the number of historical values used. Section 3 of Appendix D develops the theory and provides typical values of K. The period used to develop the historical mean and standard deviation for each monitoring well extends from 1979 through 1983, the approximate period prior to when ground water impacts appeared to be evident.

For Subdivision A, all four parameters -- boron, chloride, strontium, and sulfate -- were measured 11 times in each well during 1979 through 1983, with the following exceptions. Wells MW-83 (upgradient), MW-87 (downgradient), MW-90 (downgradient), and MW-91 (downgradient) were not installed during the period from 1979 through 1983. For these four wells, only four to six measurements of each reportable parameter are available, with all measurements obtained after 1983, during a period when water quality changes were occurring at the downgradient wells. Therefore, until more data are obtained (to evaluate recent trends), it would not be appropriate to develop tolerance limits for these four wells. Tolerance limits were not developed for well MW-24 (upgradient), which has a limited number of measurements, ending in 1980.

Table 3 summarizes the resulting tolerance limits calculated for the monitoring wells with sufficiently long historical periods of record. Tolerance limits were not calculated for arsenic or selenium due to the large number of non-detects during the period of record. The value of the statistical parameter, K, for 11 historical values is 2.815 (see Section 3 in Appendix D). All values are in units of mg/l.

Error Rates

An upper bound, such as a one-sided upper tolerance limit, can be arbitrarily high. To limit it, one should elect to accept some risk that the upper bound be too low. This risk implies that there is a chance that a measured concentration appears to indicate an impact to ground water, when in fact, the concentration is within a statistically acceptable range. The risk acceptable to most regulatory authorities, including the USEPA (as required in 40 CFR 264.97 *et seq.*, for example) is 5%. This is the value we have used to compute upper tolerance limits. Because 24 tolerance limits have been independently computed, the expected number of limits that underestimate the true 95th percentile is 5% of 24, or 1.2. Most of these tolerance limits therefore overestimate the 95th percentiles.

Only 5% of subsequent data would be expected to exceed the 95th percentile of a distribution, provided that conditions did not change. Therefore, one future value exceeding a tolerance limit could be the result of that 5% chance. However, when several results in succession exceed a tolerance limit, or more than 5% in the subsequent monitoring history exceed the historical tolerance limit, a statistically significant change in conditions has likely occurred.

Discussion

The upgradient well, MW-23, has some of the highest tolerance limits. This is not unusual, because ground water conditions vary by location. Historically, in this 1979 to 1983 period, well MW-23 tended to exhibit slightly higher boron and chloride concentrations than the other wells in this subdivision. Likewise, additional downgradient wells MW-20 and MW-21 exhibited higher sulfate concentrations during that period of time, compared to other wells in the subdivision.

Recent concentrations at the upgradient well (MW-23) tend to fall beneath their tolerance limits. Results for all four parameters are consistently above the tolerance limits in the downgradient wells (MW-17, MW-18, and MW-22).

TABLE 3

STATISTICAL ANALYSIS SUMMARY - SUBDIVISION A
1993 SAMPLING RESULTS AND CALCULATED TOLERANCE LIMITS

		PARAMETER							
		Boron		Chloride		Strontium		Sulfate	
WELL	POSITION	Latest Results	Tolerance Limit	Latest Results	Tolerance Limit	Latest Results	Tolerance Limit	Latest Results	Tolerance Limit
MW-16	Downgradient (Additional)	0.169	0.26	3.83	5.49	0.58	0.72	286	230
MW-17	Downgradient	49.47	0.69	438.1	9.66	1.73	0.56	6,336	227
MW-18	Downgradient	43.34	0.25	474.92	9.79	3.2	0.68	5,282	192
MW-20	Downgradient (Additional)	43.8	0.87	14.46	14.35	4.1	5.52	2,944	3,465
MW-21	Downgradient (Additional)	0.457	0.46	28.11	13.91	0.79	1.22	742	1,024
MW-22	Downgradient	0.659		5.54		0.34		302	
MW-23	Upgradient	0.485	1.13	15.18	17.76	1.95	2.43	617	677

Notes: All concentrations are presented in units of milligrams per liter.
Shaded values indicate latest results which exceed the calculated tolerance limits.

SUBDIVISION B

This subdivision, located in the northwest section of the plant site (Figure 11), encompasses a portion of the fly ash runoff basin and Evaporation Ponds #91 and #92. The fly ash runoff basin was constructed to collect runoff from a temporary fly ash disposal site that was never completed, hence the pond serves no purpose. Water quality sampling locations (with completion depths below ground surface for monitoring wells) monitoring this subdivision and reported herein are as follows:

Ground Water

Upgradient	Downgradient	Additional
MW-38 (25 ft)	MW-29 (28 ft)	MW-30(42.5 ft) [Downgradient]
	MW-32 (13 ft)	MW-31 (25 ft) [Downgradient]
	MW-80 (18 ft)	MW-79 (21 ft) [Downgradient]
		MW-81 (30 ft) [Downgradient]
		MW-82 (27 ft) [Downgradient]

Surface Water

SW-105
SW-110
SW-113
SW-118

A summary of the historical usage of Ponds #91 and #92 in this subdivision is provided in Table 1. Pond #91 was out of service from 1984 through 1989, relined during the summer of 1990, and placed back in service in November 1990. Pond #92 was out of service in 1990, repaired in 1991, and has been in service since 1992.

Qualitative Discussion of Historical Water Quality Data

Time series data plots of the reportable parameter concentrations for the planned water quality monitoring locations in Subdivision B are provided in this section. Table 4 provides a summary of the most recent measured concentrations for Subdivision B in comparison to the water quality guidelines.

Wells MW-29 through MW-32 and MW-38 have a period of record extending from 1980 to the present, whereas wells MW-79 through MW-82 have only been sampled since 1989. The following sections provide qualitative descriptions of water quality in the subdivision, based on an examination of water quality trends for the various monitoring wells and knowledge of the historical usage of the evaporation ponds within this subdivision.

Upgradient Wells

Upgradient well MW-38 (Figure 12) documents ambient conditions and shows no obvious trends during the period of record, with the exception of a temporary increase in chloride concentrations between 1988 and 1992. During the period of increasing chloride concentrations the water quality guideline of 250 mg/l was never exceeded (maximum chloride concentration was 12 mg/l in 1992). Although no trends in strontium or sulfate concentrations are evident at well MW-38, these two parameters have generally exceeded the respective water quality guidelines of 0.05 mg/l and 250 mg/l throughout most of the period of record at this well.

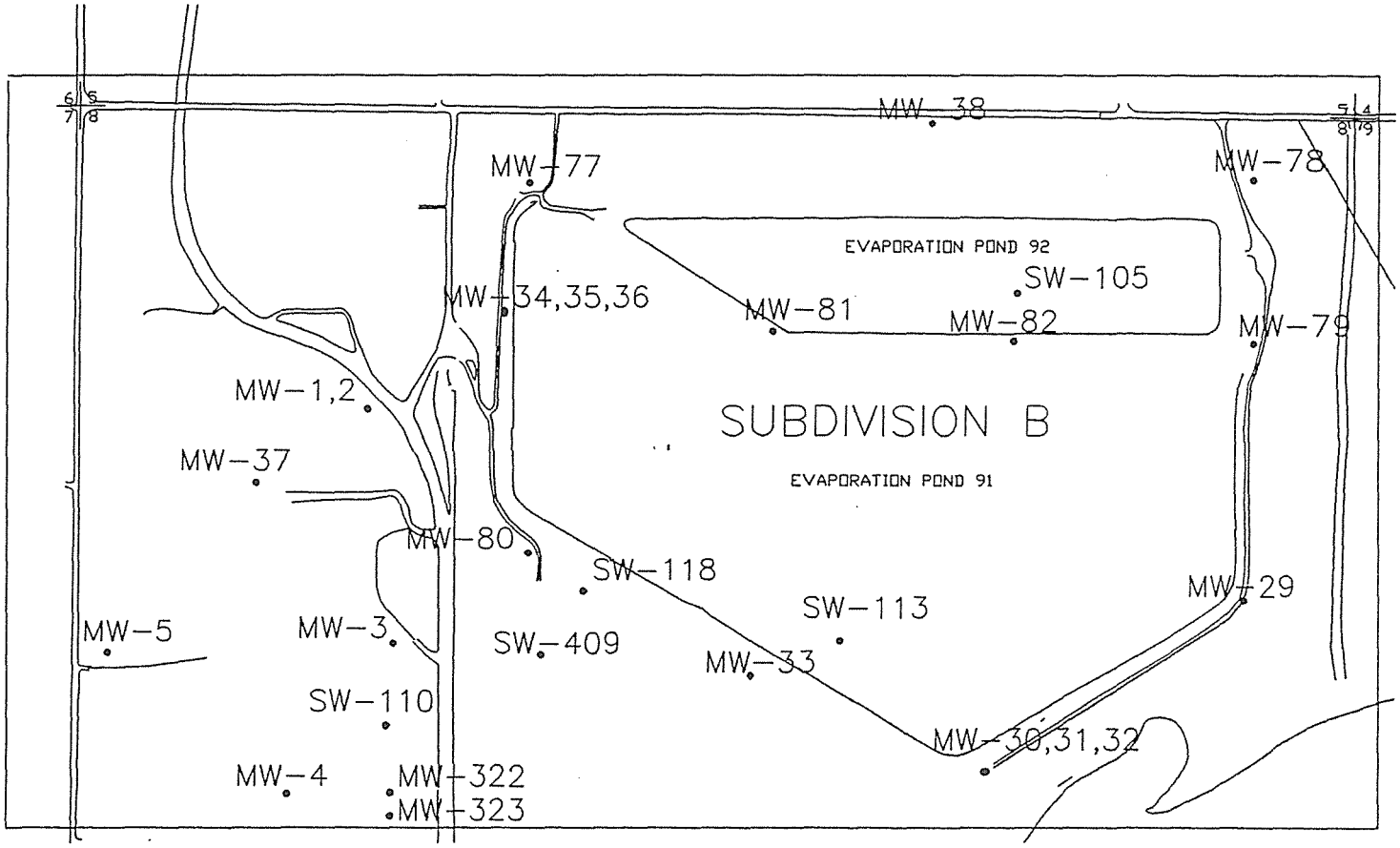


FIGURE 11. Subdivision B Water Quality Monitoring Locations

TABLE 4

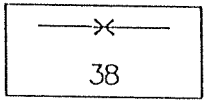
WATER QUALITY SUMMARY - SUBDIVISION B
1993 SAMPLING RESULTS AND WATER QUALITY GUIDELINES

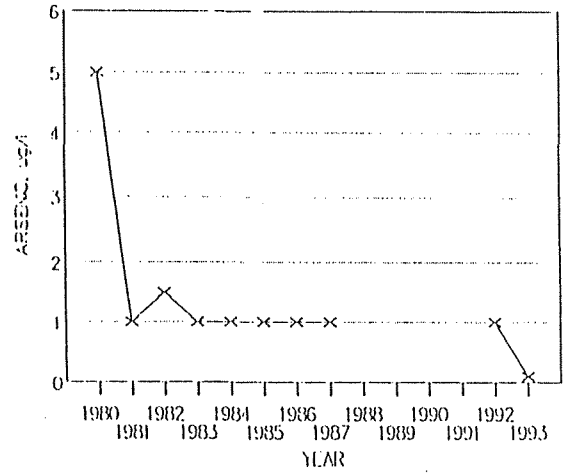
		PARAMETER											
		Arsenic		Boron		Chloride		Selenium		Strontium		Sulfate	
WELL	POSITION	Latest Results	WQ[1] Guide	Latest Results	WQ Guide	Latest Results	WQ Guide	Latest Results	WQ Guide	Latest Results	WQ Guide	Latest Results	WQ Guide
MW-29	Downgradient	< 0.0001	0.05	2.143	0.75	43.04	250	0.027	0.01	2.33	0.05	2,607	250
MW-30	Downgradient (Additional)	< 0.0001	0.05	0.71	0.75	24.49	250	< 0.001	0.01	3.99	0.05	1,111	250
MW-31	Downgradient (Additional)	< 0.0001	0.05	0.275	0.75	81.67	250	0.488	0.01	4.36	0.05	3,717	250
MW-32	Downgradient	< 0.0001	0.05	0.494	0.75	20.63	250	0.252	0.01	4.62	0.05	4,337	250
MW-38	Upgradient	< 0.0001	0.05	0.46	0.75	3.16	250	< 0.001	0.01	1.93	0.05	1,073	250
MW-79	Downgradient (Additional)	< 0.0001	0.05	1.891	0.75	196.11	250	0.405	0.01	4.22	0.05	2,908	250
MW-80	Downgradient	< 0.0001	0.05	1.505	0.75	26.89	250	< 0.001	0.01	1.86	0.05	1,717	250
MW-81	Downgradient (Additional)	NA	0.05	NA	0.75	NA	250	NA	0.01	NA	0.05	NA	250
MW-82	Downgradient (Additional)	NA	0.05	NA	0.75	NA	250	NA	0.01	NA	0.05	NA	250
SW-105	Pond #92	0.0088	0.05	11.46	0.75	371.22	250	< 0.001	0.01	6.72	0.05	4,240	250
SW-110	Fly Ash Runoff Basin	NA	0.05	NA	0.75	NA	250	NA	0.01	NA	0.05	NA	250
SW-113	Pond #91	0.0083	0.05	15.53	0.75	422.14	250	< 0.001	0.01	6.8	0.05	4,915	250
SW-118	Mine Surge Pond	0.0019	0.05	0.204	0.75	3.24	250	< 0.001	0.01	0.32	0.05	153	250

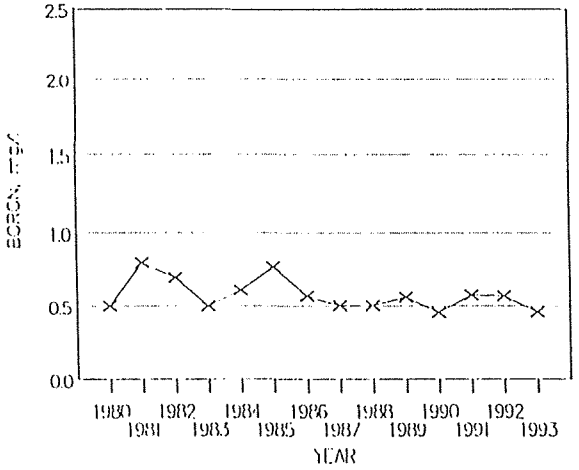
Notes: All concentrations are presented in units of milligrams per liter.
Shaded values indicate latest results which exceed the water quality guidelines.
NA = Not Analyzed
[1] WQ Guide = Water Quality Guideline

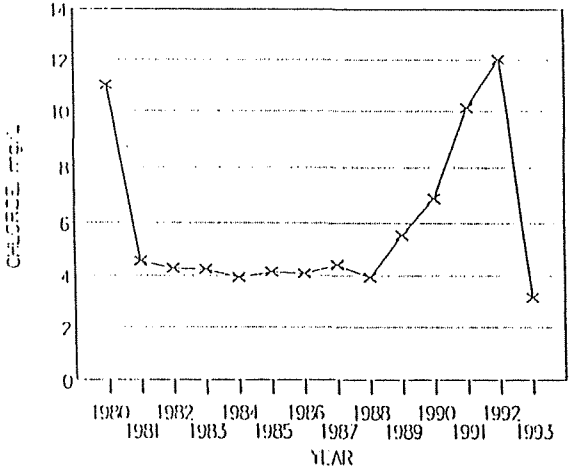
FIGURE 12. WATER QUALITY TREND CHARTS

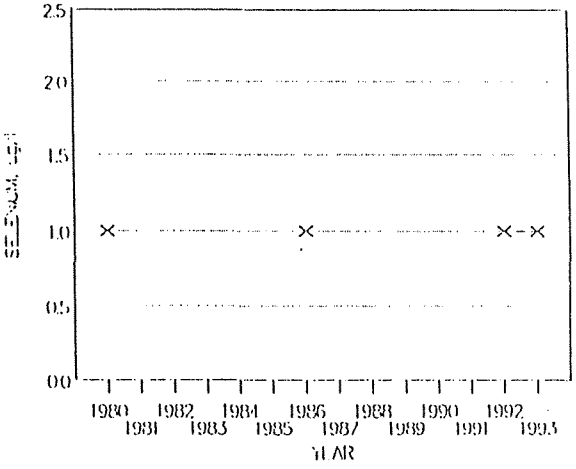
SUBDIVISION B UPGRADIENT WELLS

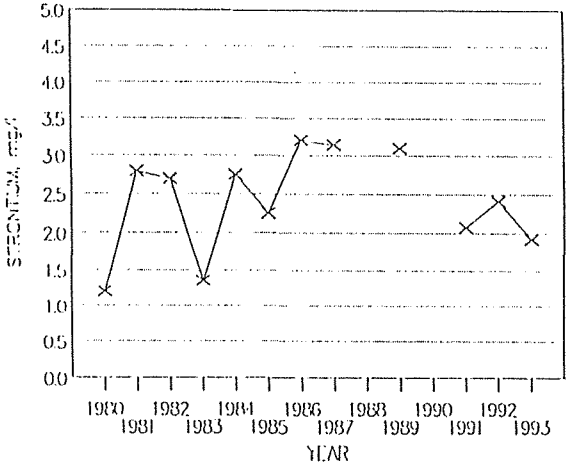


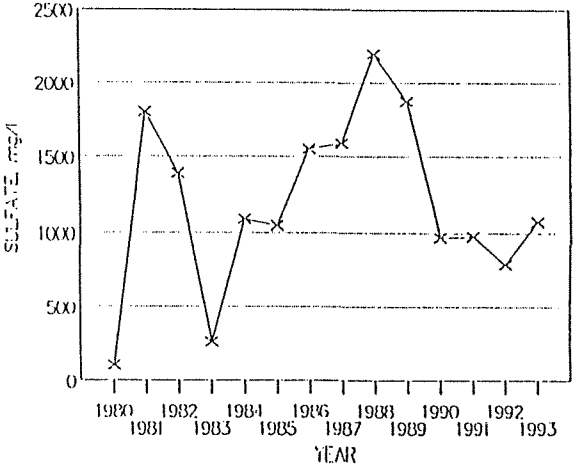












Downgradient Wells

Downgradient wells MW-29 (Figure 13) and MW-32, which have the longest periods of record and are situated along the southeastern edge of Pond #91, have exhibited similar water quality responses over time. For example, several of the reportable parameters (including chloride, strontium and sulfate) exhibited a rapid upward spike in concentration in 1981, followed by a rapid (1- to 2-year) decline to levels that have been consistently observed since then. The boron concentration at well MW-32 has exhibited a similar trend, with the exception that the peak concentration occurred approximately one year later than for the other parameters. The boron concentration at well MW-29 also exhibited a similar trend, but the increasing concentrations occurred over a 2- to 3-year period through 1984, and have declined slowly since then. Downgradient well MW-80 (Figure 13), which has only been sampled since 1989 and is situated at the southwestern corner of Pond #91, exhibited a decrease in concentrations of chloride, strontium and sulfate in 1993, following approximately 3 years of increasing concentrations.

Boron has exceeded the water quality guideline of 0.75 mg/l at downgradient wells MW-29 and MW-80 for the past several years. Strontium and sulfate concentrations have generally exceeded their respective water quality guidelines of 0.05 mg/l and 250 mg/l throughout most of the period of record at all three downgradient wells (MW-29, MW-32 and MW-80). Selenium exceeded the water quality guideline of 0.01 mg/l at wells MW-29 and MW-32 in 1993.

Additional Wells

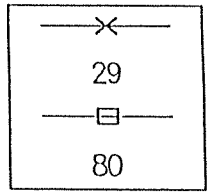
Additional wells MW-30, MW-31, MW-79, MW-81, and MW-82 (Figures 14, 15 and 16) in this subdivision are all downgradient or sidegradient to the evaporation ponds. As with the downgradient wells discussed above, the additional wells have exhibited variable responses, depending upon the specific parameter and well locations. Additional wells MW-30 (deep) and MW-31 (mid-depth) are nested with downgradient well MW-32 (shallow), discussed above. Wells MW-30 and MW-31 exhibited a response similar to MW-32, including a rapid spike in boron, chloride, strontium, and sulfate during 1980 and 1981. A rapid decline in boron and sulfate concentrations over time is evident at well MW-30, with a more slow decline in boron, chloride and sulfate at well MW-31. Selenium has not been detected at additional downgradient well MW-30 during intermittent sampling since 1980, but has been detected consistently at MW-31. Strontium concentrations have remained at a fairly consistent level at both wells since the initial increase in the early 1980s. The overall water quality response at the nest of wells (MW-30, MW-31 and MW-32) can be summarized as follows: (1) the most obvious impact (highest concentrations) occurred at the shallowest well (MW-32), with steadily decreasing concentrations with depth (MW-31 and MW-30); (2) followed by decreases in concentrations that occurred most rapidly in the shallowest well.

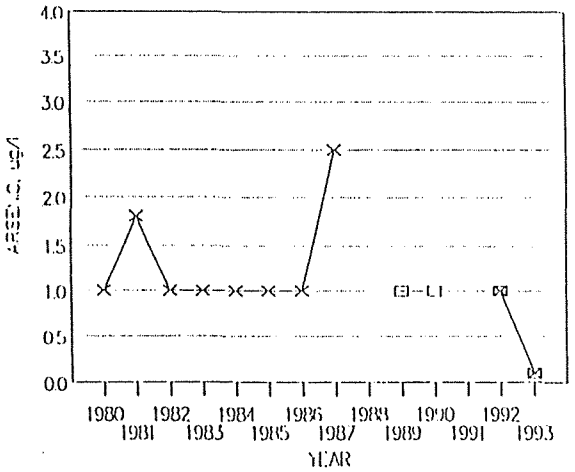
Additional downgradient wells MW-79, MW-81 and MW-82 have shorter periods of record, starting in 1989. All three wells are completed at approximately the same depth (21 to 30 feet below grade) and are situated along the downgradient edge of Pond #92. Only well MW-79 was sampled in 1993. Boron, selenium, strontium and sulfate all exceeded their respective water quality guidelines at well MW-79.

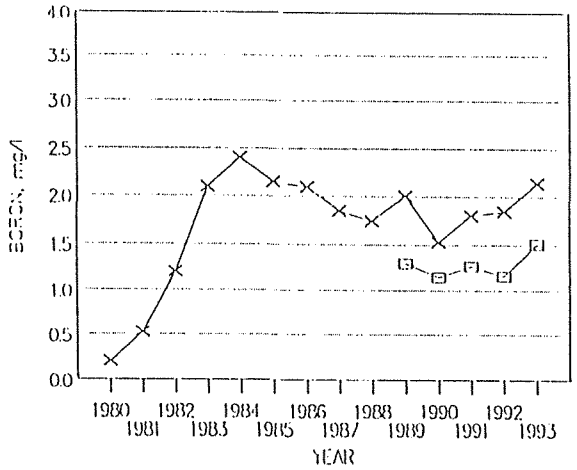
Selenium concentrations have consistently been above the water quality guideline of 0.010 mg/l for the past several years at well MW-31 (mid-depth), but have not been detected at the deeper well (MW-30) of the nest. Concentrations of strontium and sulfate have consistently exceeded their respective water quality guidelines of 0.05 mg/l and 250 mg/l at both the mid-depth (MW-31) and deep (MW-30) wells of the nest.

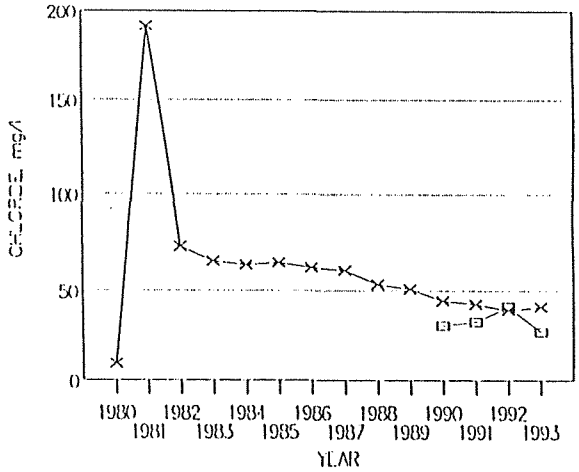
FIGURE 13. WATER QUALITY TREND CHARTS

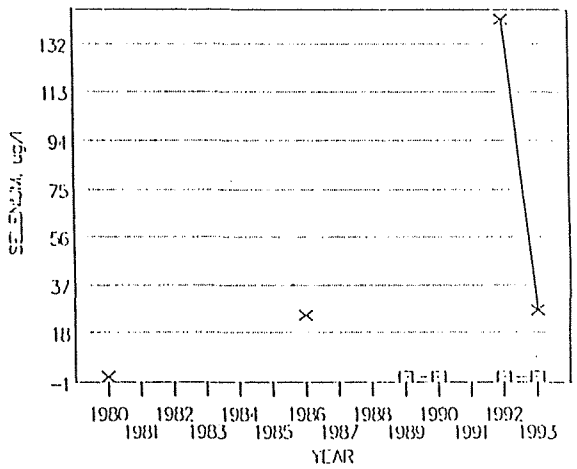
SUBDIVISION B DOWNGRADIENT WELLS

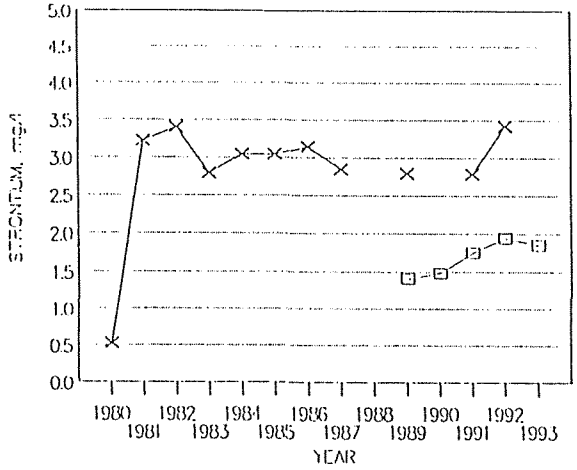












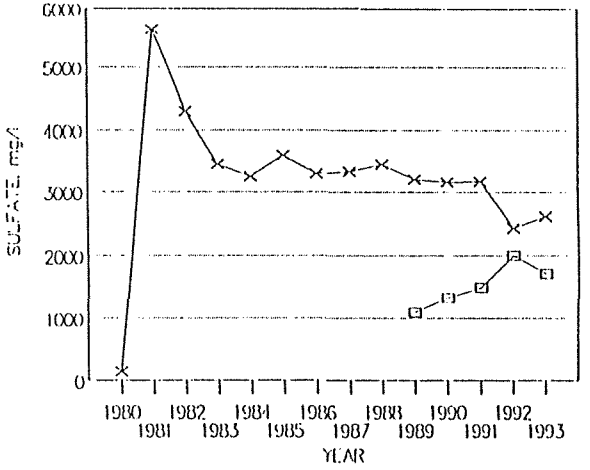
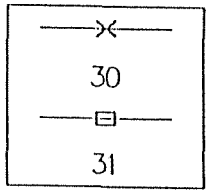
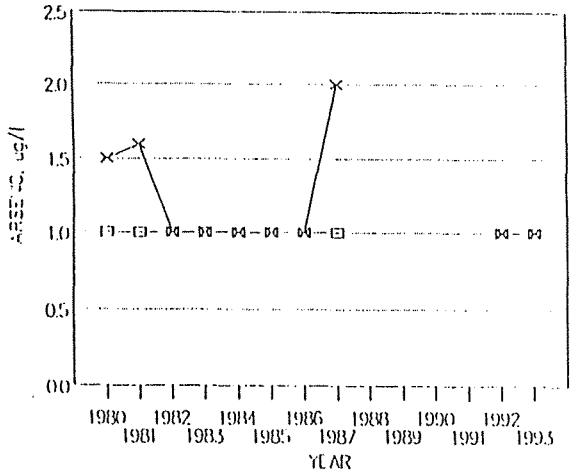
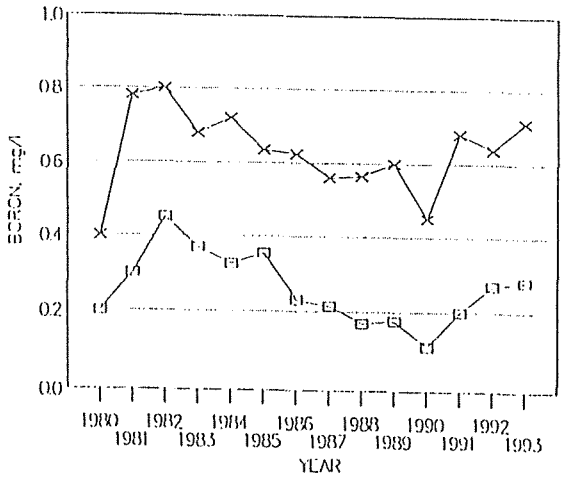


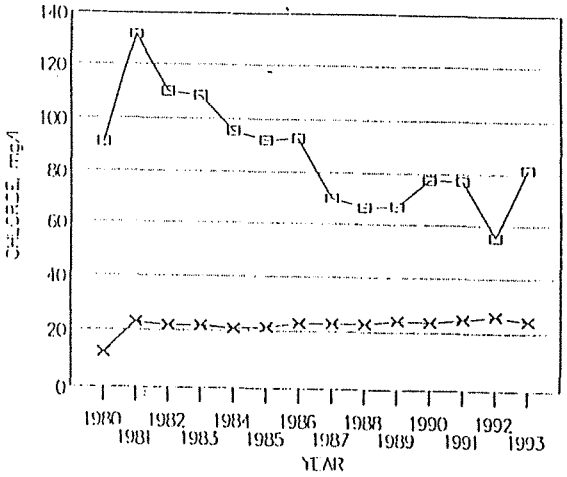
FIGURE 14. WATER QUALITY TREND CHARTS

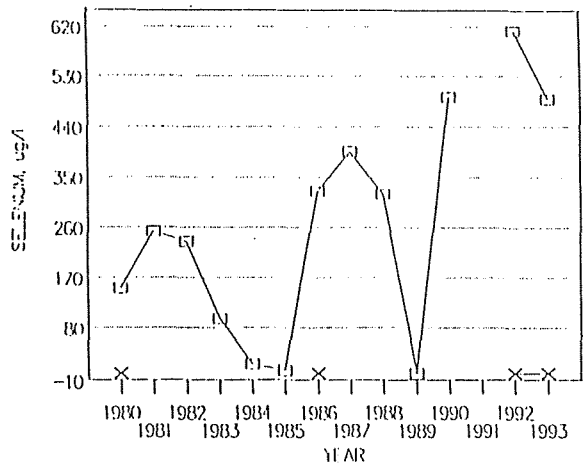
SUBDIVISION B ADDITIONAL WELLS

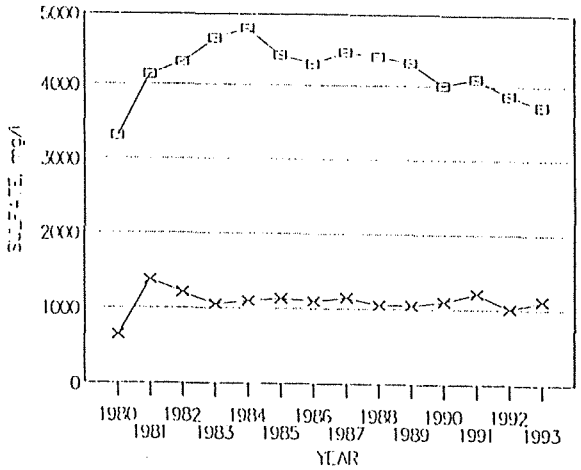












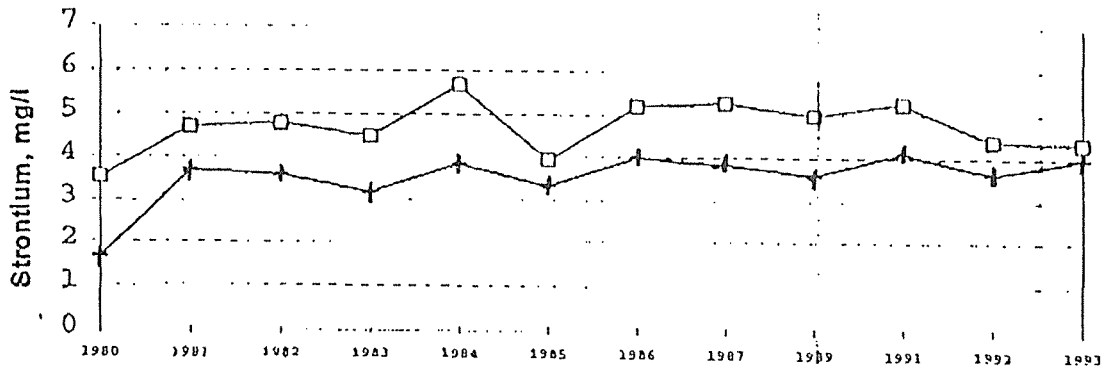
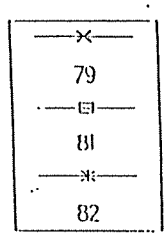
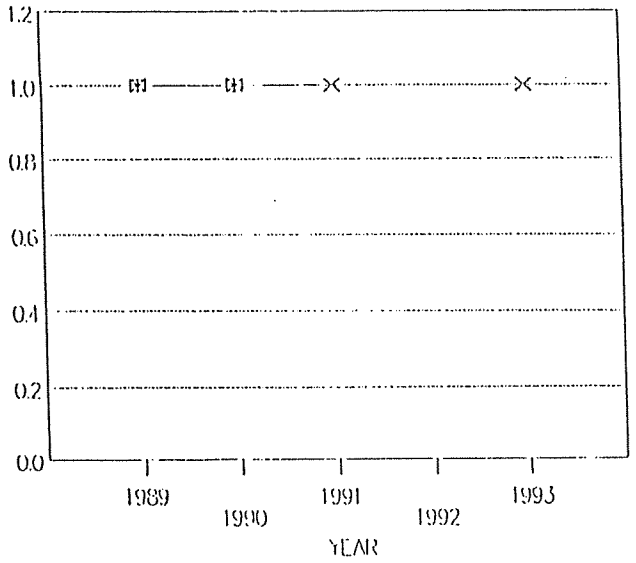
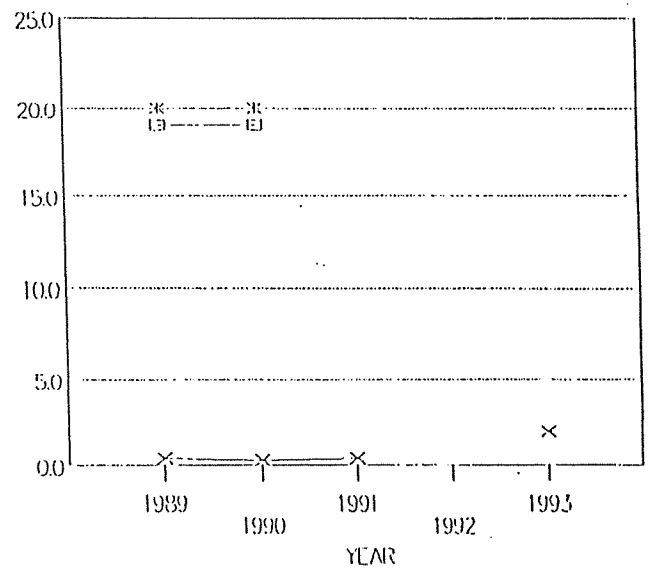


FIGURE 15. WATER QUALITY TREND CHARTS

SUBDIVISION B ADDITIONAL WELLS







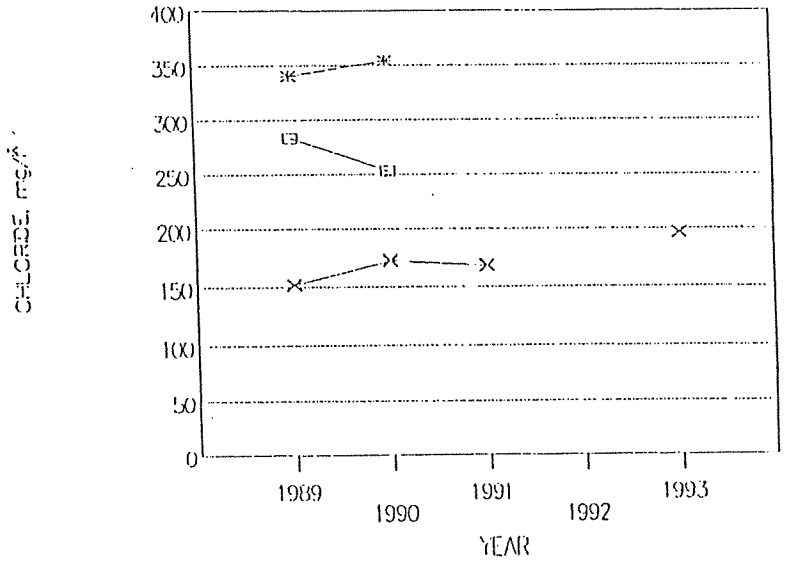
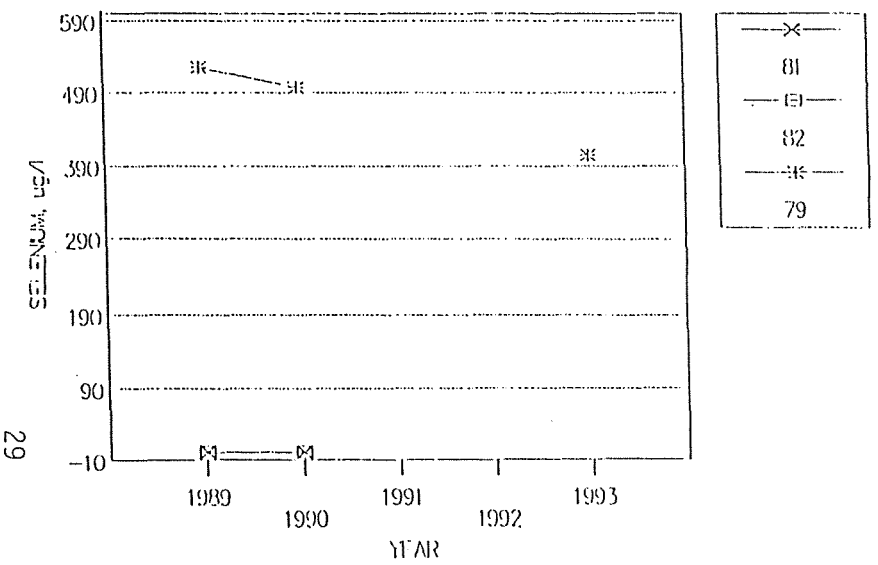
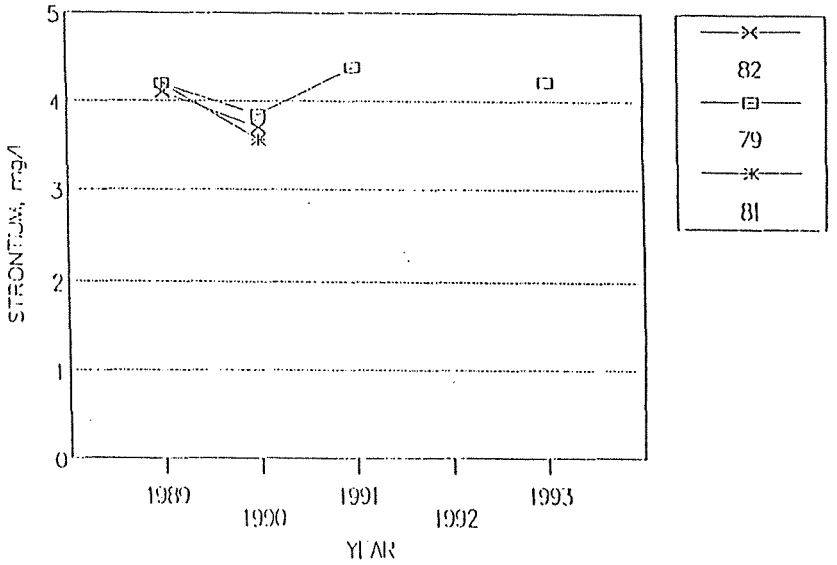
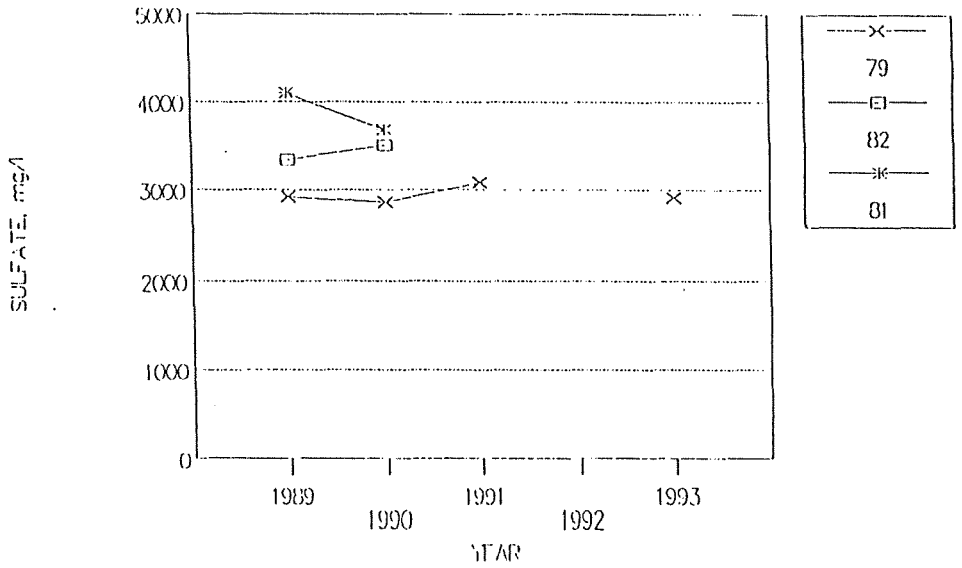


FIGURE 16. WATER QUALITY TREND CHARTS

SUBDIVISION B ADDITIONAL WELLS







Surface Water

Water quality trend charts for surface waters in Subdivision B are shown in Figures 17 and 18. Evaporation Pond #92 has been in service from 1980 to the present, except for repair activities in 1990 and 1991. Water quality data from surface water sampling location SW-105 has shown elevated concentrations of boron, chloride, strontium, and sulfate. Concentrations are dependent upon operational activities.

Evaporation Pond #91 was used from 1980 to 1983, repaired in 1990, and has been in use from 1990 to the present. During 1984 to 1989, a small area (a few acres) of water was present on the south end of the pond, from which samples were collected. The water was primarily ground water leakage from Evaporation Pond #92, and an occasional limited discharge of process water. Elevated concentrations of boron, chloride, strontium, and sulfate have been detected at this location. The concentrations reflect a moderate level of concentrations during initial pond usage in the early 1980s. Concentrations decreased in the mid- to late-1980s due to a mixture of ambient ground water and leakage from Evaporation Pond #92. Increased concentrations in the early 1990s resulted from renewed use of the pond for handling process water.

The mine surge pond (surface water sampling location SW-118) is used by Falkirk Mining Company. Concentrations are near or below ground water quality criteria.

Location SW-110 was intended to monitor conditions at the Fly Ash Runoff Basin. This area was never developed for this purpose. The concentrations are near or below ground water quality criteria and reflect ambient conditions.

Influence of Pond Repairs

Increased concentrations of several of the parameters (as discussed above) occurred soon after Ponds #91 and #92 were placed into service in 1980. In general, the parameter concentrations have been declining or remaining steady since the early- to mid-1980s. The declining concentrations do not appear to correspond to repair of the evaporation ponds. However, the trends may be masked by a lag time for the constituents to dissipate from beneath the large pond (Pond #91), which was out of service from 1984 to 1989, as well as continued use of the smaller pond (Pond #92) until 1990.

Statistical Analysis

Use of Historical Monitoring Data

The discussion above, along with examination of the water quality data plots for this subdivision, provide a basis for evaluating the water quality conditions at the monitoring locations. Additional data plots in Appendix E include various exploratory statistical methods to assist in determining the applicability of statistical analyses to the data.

In the downgradient and additional wells, many parameters exhibited a rapid upward spike in concentration in 1981, followed by a quick (two-year) decay to levels consistently observed since then. For some parameters (e.g. chloride in downgradient well MW-29 and additional downgradient well MW-31, and sulfate in downgradient well MW-32), this decay has continued. In either circumstance, more power to characterize recent data will be achieved by removing the pre-1983 data from the data set.

FIGURE 17. WATER QUALITY TREND CHARTS

SUBDIVISION B SURFACE WATERS

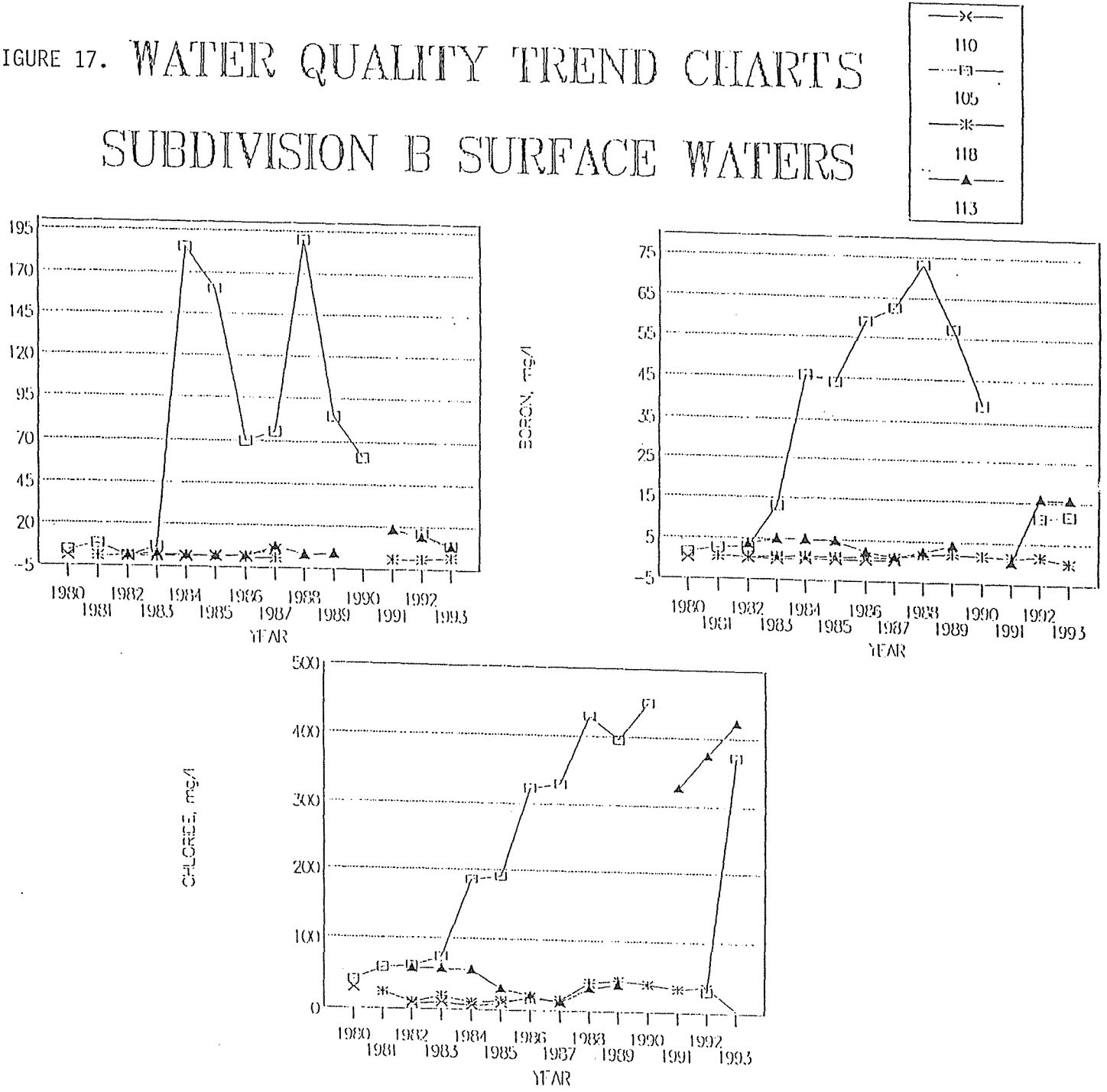
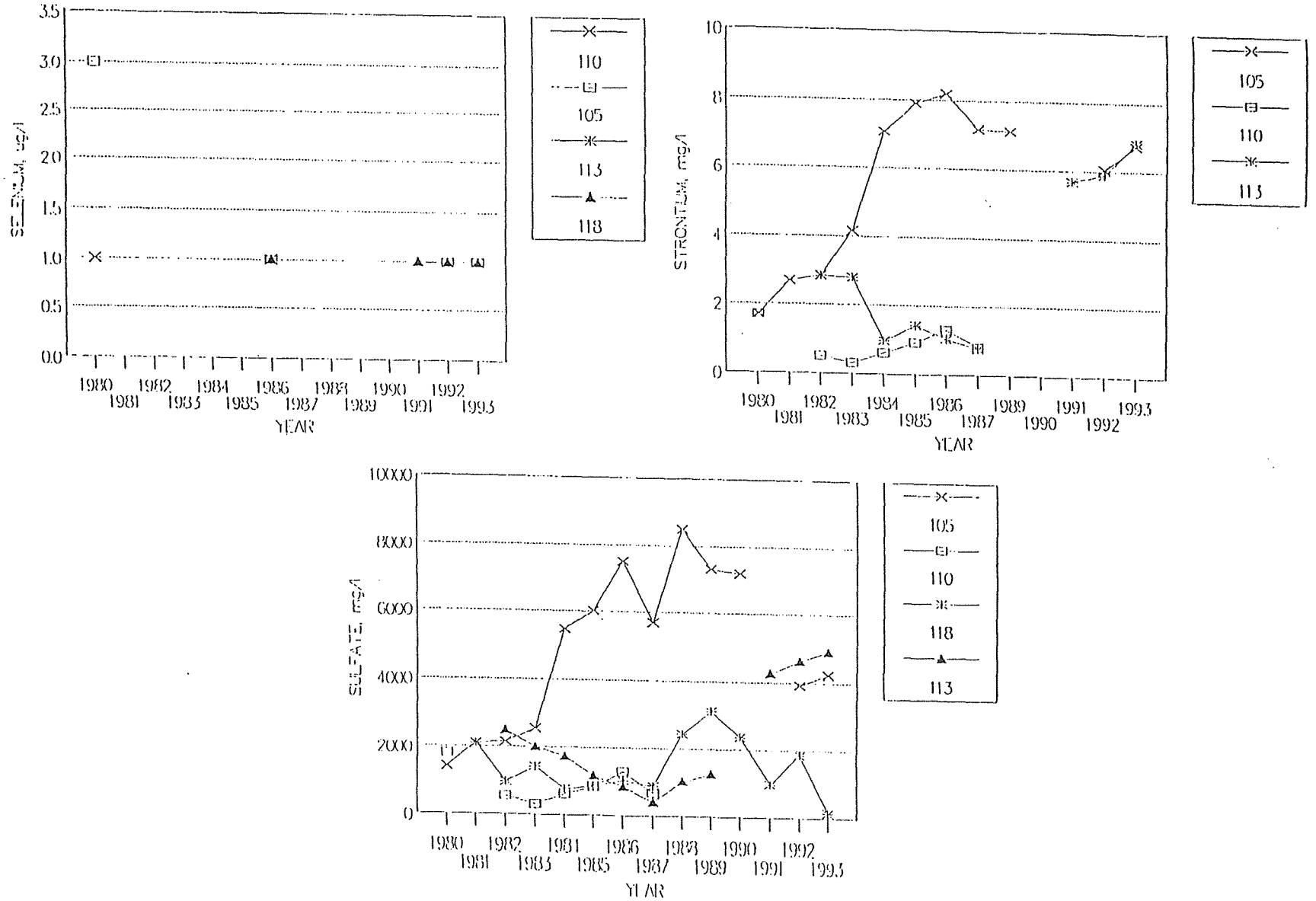


FIGURE 18. WATER QUALITY TREND CHARTS

SUBDIVISION B SURFACE WATERS



Selection of a Statistical Test

With one exception, monitoring histories (unique combinations of well and parameter) are either stable or changing at a regular rate from 1983 through 1993. The exception is boron in downgradient well MW-29, which increased sharply (about an order of magnitude) from a near-background baseline between 1982 and 1984, and has slowly oscillated since then. The statistical graphics plots provided in Appendix E, consisting of control charts (for the stable histories) and regression lines (for the trending histories) incorporate appropriate statistical tests. Specific details regarding implementation of the regression line and control chart methods are provided in Sections 1 and 2 of Appendix D, respectively.

The control charts monitor histories for sudden sharp deviations or low-level long term deviations from historical conditions specific to each well and parameter. The charts provide a visual means of detecting deviations from a "state of control", implying changes from the long-term stable condition. The regression lines quantify the trend rates and implicitly project future values. Deviations can be identified visually from the time series plus trend line plots.

Methods and Calculations

Section 1 of Appendix D describes the calculations for determining regression lines. The method developed by the EPA for RCRA ground water monitoring is recommended for control charts. Section 2 of Appendix D describes the calculations for this method.

Error Rates

A history with no real trend can sometimes appear to trend because of coincidentally trending random variations in the observations. The recommended regression method will falsely identify such a trend less than 1% of the time.

Error rates for control charts are measured by expected lengths of runs of in-control points. For a truly stable history, this run length should be long. For a trending history, this run length should be as short as possible. The EPA fine-tuned the recommended method to achieve expected in-control run lengths of several hundred (monitoring periods) for stable histories and expected in-control run lengths between 4 and 8 periods for trending histories.

Discussion

Although it is meaningful to compare parameter concentrations between upgradient and downgradient wells, such a comparison could be deceptive. For the stable histories--and this is most of them in this subdivision--the long term averages and standard deviations adequately characterize ground water quality. After a long period of monitoring, so much data will be available that almost infinitesimal differences in long term average will be statistically significant--but unimportant, from a hydrogeological perspective. Moreover, the qualitative comparison of data across upgradient wells reveals considerable spatial variation in natural ground water quality. Therefore, even in pristine conditions, comparisons of any two wells will usually yield significant differences.

The changes in boron in downgradient well MW-29 follow a pattern not revealed by any other monitoring history in this subdivision. Although regression indicates a long term trend, this is not to be trusted because the shape of the trend does not approximate a straight line--most of it occurred during the first three years of a fourteen year monitoring history.

Selenium is consistently detected in downgradient well MW-32 and additional downgradient well MW-31. Its statistical distribution is skewed. Examining the results after a cube-root or logarithmic transformation identifies three distinct time frames: before 1983, between 1983 and mid-1986 inclusive, and after mid-1986. During the earliest period, results in both wells were similar, ranging from non-detect (<1 mg/l) to 520 mg/l. Suddenly, concentrations in both wells fell consistently into the range from 3 to 63 mg/l during the middle period. In the latest period, concentrations appear lower in well MW-32 while they have been highly variable in well MW-31, reaching 775 mg/l.

There is no clear relationship between the time periods exhibited by the data and the operating history of this subdivision. As with boron in downgradient well MW-29, these changes have been so complex and pronounced that perhaps the best way to test the results is again by plotting the time series graphics to observe each new result in its historical context.

SUBDIVISION C

This subdivision, located in the southwest section of the plant site (Figure 19) includes the Coal Pile Runoff Basin, River Water Holding Basin, Extended Basin, Generation Buildings, and borders the western edge of South Ash Pond Cell #91. The water quality sampling locations (with completion depths below ground surface for monitoring wells) monitoring this subdivision and reported herein are as follows:

Ground Water

Upgradient	Downgradient	Additional
~~MW-58 (22.5 ft)~~	MW-62 (43.3 ft)	MW-63(42.4 ft) [Downgradient]
MW-61 (44.1 ft)	MW-64 (24.6 ft)	MW-65 (24 ft) [Downgradient]
MW-76 (19.5 ft)		

The local ground water flow direction in this subdivision is toward the northeast. However, due to expected radial ground water flow conditions away from the Extended Basin, additional wells MW-63 and MW-65 are also considered to be hydraulically downgradient.

Surface Water

SW-104
SW-107

A summary of the historical usage of the River Water Holding Basin and the Extended Basin in this subdivision is provided in Table 1. The River Water Basin and the Extended Basin have both been in service since 1979. Repairs were made to the River Water Basin in 1984.

Qualitative Discussion of Historical Water Quality Data

Time series data plots of the reportable parameter concentrations for the planned water quality monitoring locations in Subdivision C are provided in this section. Table 5 provides a summary of the most recent measured concentrations for Subdivision C in comparison to the water quality guidelines.

Monitoring of all wells in this subdivision except upgradient well MW-76 began in late 1988. Well MW-76 has been monitored from 1989 to 1991. The following sections provide qualitative descriptions of water quality in the subdivision, based on an examination of water quality trends for the various monitoring wells and knowledge of the historical usage of the evaporation ponds within this subdivision.

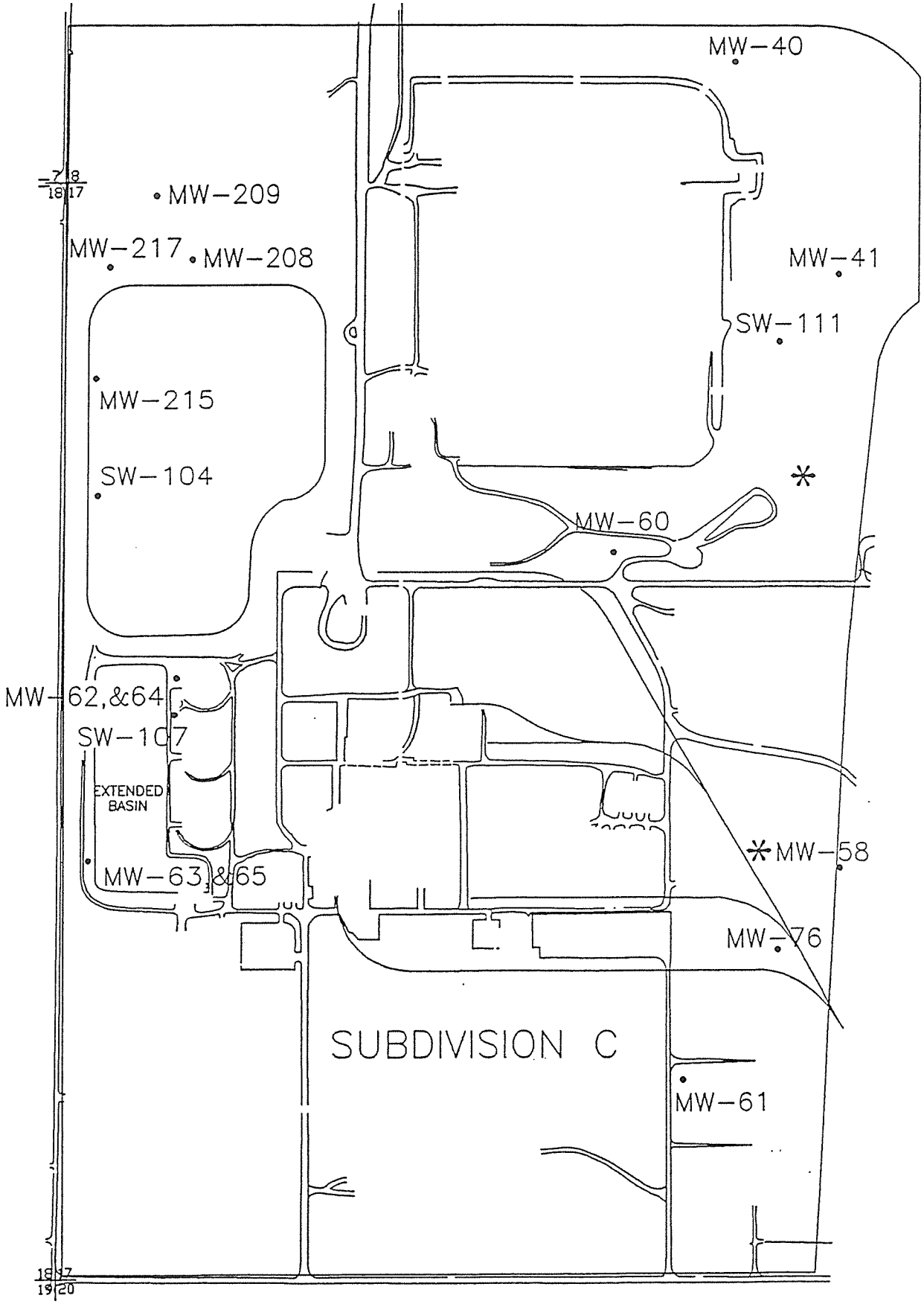


FIGURE 19. Subdivision C Water Quality Monitoring Locations

TABLE 5

WATER QUALITY SUMMARY - SUBDIVISION C
1993 SAMPLING RESULTS AND WATER QUALITY GUIDELINES

		PARAMETER											
		Arsenic		Boron		Chloride		Selenium		Strontium		Sulfate	
WELL	POSITION	Latest Results	WQ[1] Guide	Latest Results	WQ Guide	Latest Results	WQ Guide	Latest Results	WQ Guide	Latest Results	WQ Guide	Latest Results	WQ Guide
MW-58	Upgradient	NA	0.05	NA	0.75	NA	250	NA	0.01	NA	0.05	NA	250
MW-61	Upgradient	< 0.001	0.05	0.62	0.75	10.2	250	< 0.001	0.01	3.27	0.05	708	250
MW-62	Downgradient	< 0.001	0.05	0.77	0.75	236.5	250	< 0.001	0.01	3.49	0.05	3,172	250
MW-63	Downgradient (Additional)	< 0.001	0.05	0.46	0.75	71.9	250	< 0.001	0.01	7.61	0.05	1,473	250
MW-64	Downgradient	< 0.001	0.05	1.24	0.75	189.5	250	< 0.001	0.01	3.6	0.05	3,481	250
MW-65	Downgradient (Additional)	< 0.001	0.05	0.32	0.75	69.4	250	0.0125	0.01	3.67	0.05	1,848	250
MW-76	Upgradient	NA	0.05	NA	0.75	NA	250	NA	0.01	NA	0.05	NA	250
SW-104	River Water Holding Basin	< 0.001	0.05	0.16	0.75	9.37	250	< 0.001	0.01	0.43	0.05	158	250
SW-107	Extended Basin	0.0094	0.05	1.44	0.75	223.48	250	< 0.001	0.01	6.59	0.05	3,597	250

Notes: All concentrations are presented in units of milligrams per liter.
Shaded values indicate latest results which exceed the water quality guidelines.
NA = Not Analyzed
[1] WQ Guide = Water Quality Guideline

Upgradient Wells

Upgradient wells MW-58, MW-61 and MW-76 (Figures 20 and 21) document ambient conditions and show no obvious trends in the reportable parameters during the period of record. Strontium and sulfate have been consistently above their respective water quality guidelines of 0.05 mg/l and 250 mg/l at the upgradient wells throughout the period of record. Well MW-58 was not sampled in 1993 (it will be out of service in 1994) and MW-76 was sampled only for field parameters, as noted in the 1993 monitoring plan.

Downgradient Wells

Downgradient wells MW-62 (deep) and MW-64 (shallow), shown in Figure 22, comprise a nest situated near the northeastern corner of the Extended Basin. The shallow well (MW-64) has typically exhibited higher concentrations of the reportable parameters than the deep well (MW-62). For most reportable parameters these two downgradient wells have exhibited significantly higher concentrations than the upgradient wells (MW-58, MW-61 and MW-76) in this subdivision.

Boron has typically exceeded the water quality guideline of 0.75 mg/l at the shallow downgradient well (MW-64), although decreasing concentrations have been noted in the last three years. Boron concentrations in the deeper downgradient well (MW-62) have exhibited an increasing trend, with the most recent measurement (0.77 mg/l in August 1993) slightly exceeding the water quality guideline. The most recent chloride measurements have been below the water quality guideline of 250 mg/l at both downgradient wells. The limited number of samples analyzed for strontium (three at both wells) do not exhibit a trend; however, all samples have exceeded the water quality guideline of 0.05 mg/l. Sulfate concentrations have typically exceeded the water quality guideline of 250 mg/l at the nested downgradient wells (MW-62 and MW-64), with somewhat higher concentrations in the shallower well (MW-64).

Additional Wells

Additional wells MW-63 and MW-65 (Figure 23) in this subdivision are considered hydraulically downgradient of the Extended Basin, since radial ground water flow is expected from the basin. Wells MW-63 (deep) and MW-65 (shallow) form a well nest at this location. These additional wells exhibit similar responses to nested downgradient wells MW-62 and MW-64 discussed above, except that the concentrations of most reportable parameters are lower at wells MW-63 and MW-65. In recent years, the only reportable parameters which have been higher at these latter wells are strontium (wells MW-63 and MW-65) and selenium (well MW-65 only). The shallow well (MW-65) has typically exhibited higher concentrations of the reportable parameters than the deep well (MW-63).

Strontium and sulfate concentrations have exceeded the respective water quality guidelines of 0.05 mg/l and 250 mg/l at the additional downgradient wells (MW-63 and MW-65) throughout the short period of record. In addition, the selenium concentration of .125 mg/l measured in 1993 at shallow well MW-65 slightly exceeded the water quality guideline of 0.01 mg/l for that parameter.

Surface Water

Surface water location SW-104 (Figure 24) is collected from the River Water Holding Basin (RWHB). All parameters are below the ground water quality guidelines. The source of this water is the Missouri River, which is the initial water source for the generating plant.

The Extended Basin (SW-107 - Figure 24) exhibits elevated concentrations of the tested parameters, especially sulfate. The parameters in this process water become concentrated as the water passes through the evaporative cooling system.

FIGURE 20. WATER QUALITY TREND CHARTS

SUBDIVISION C UPGRADIENT WELLS

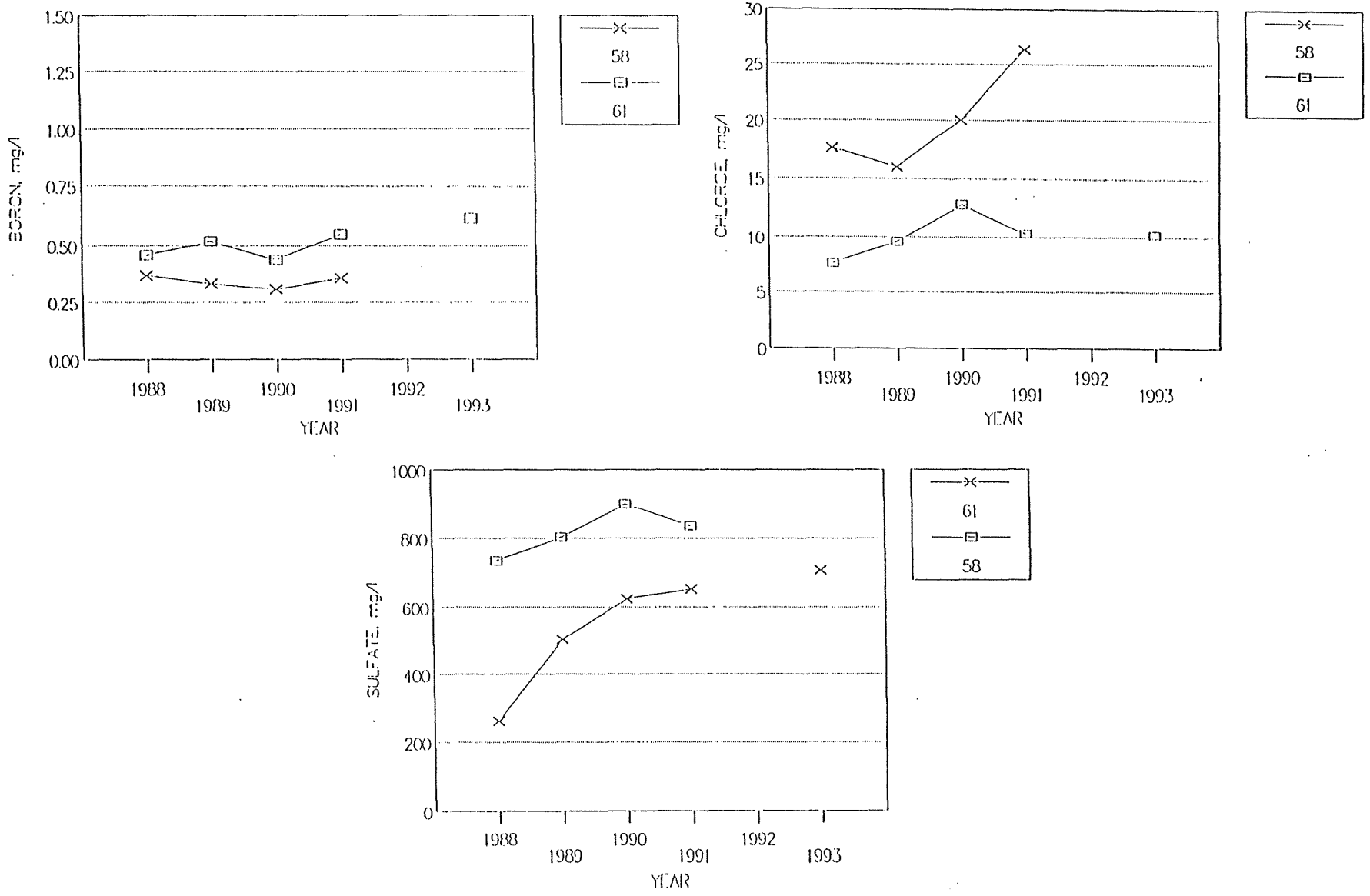
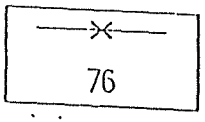
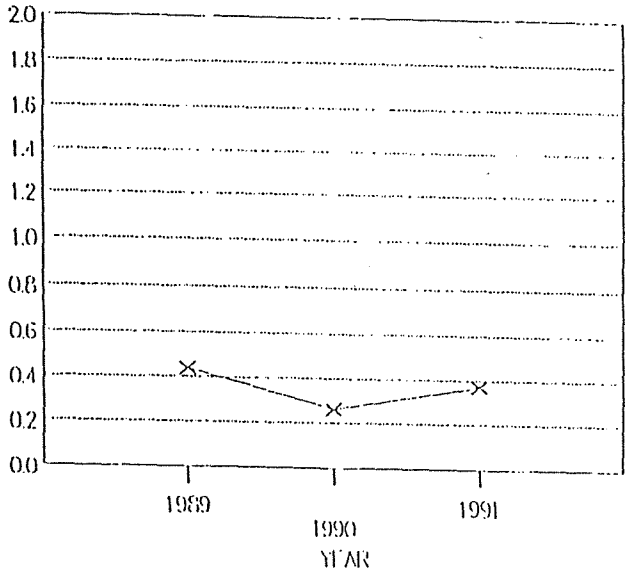
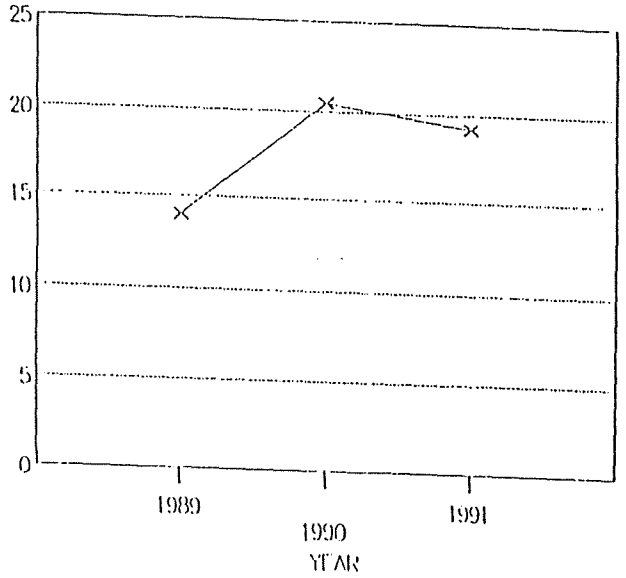


FIGURE 21. WATER QUALITY TREND CHARTS

SUBDIVISION C UPGRADIENT WELLS







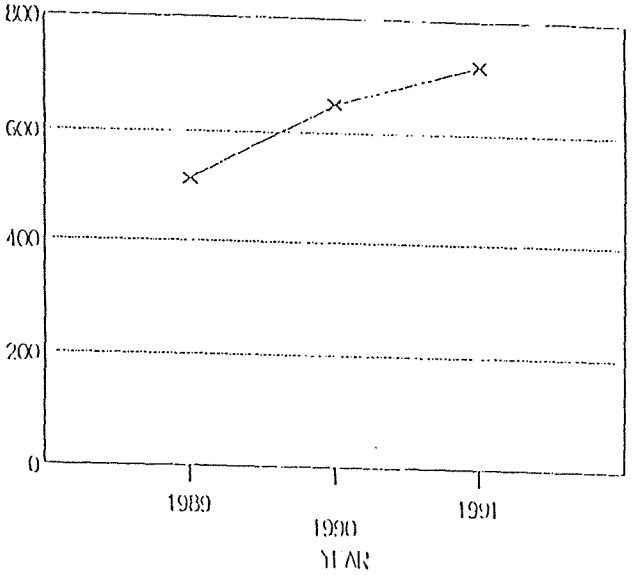
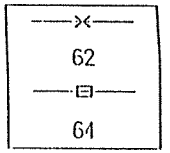
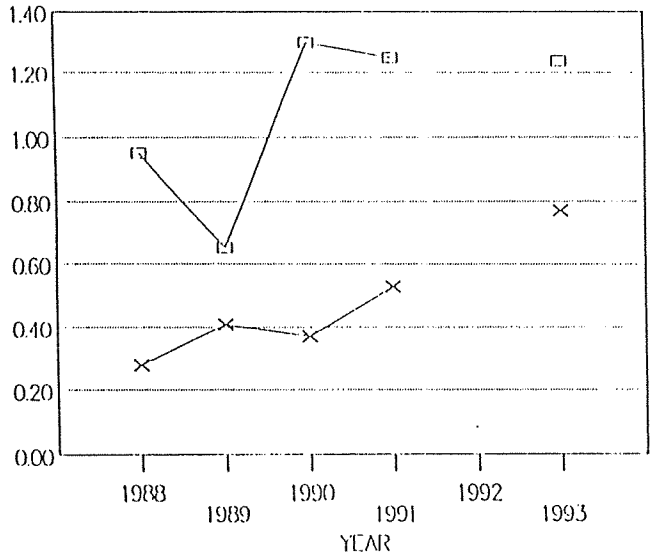
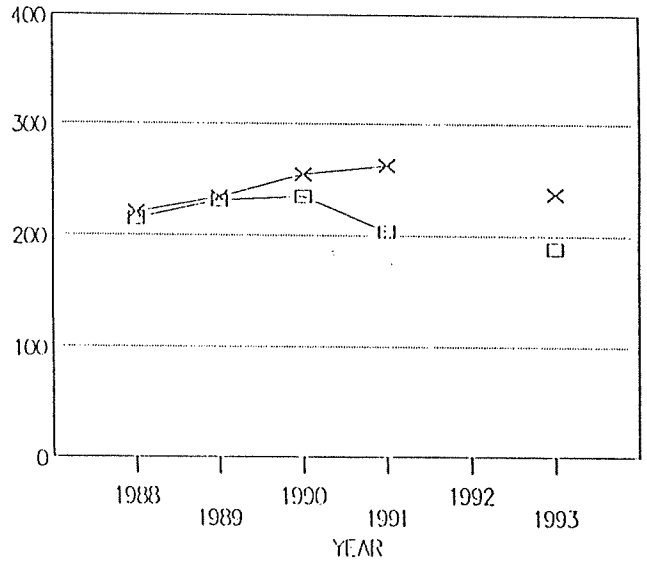


FIGURE 22. WATER QUALITY TREND CHARTS

SUBDIVISION C DOWNGRADIENT WELLS







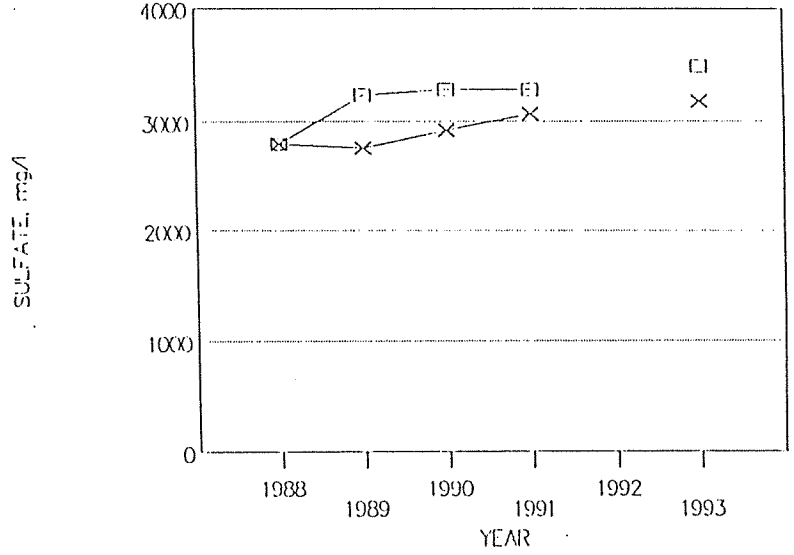
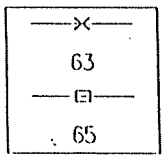
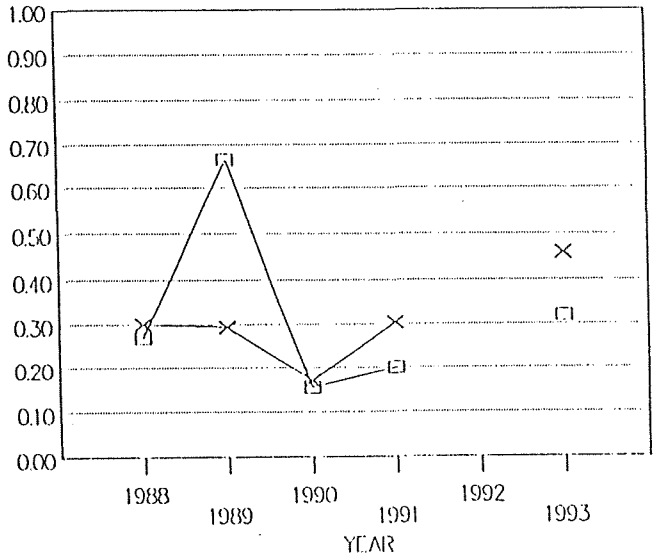
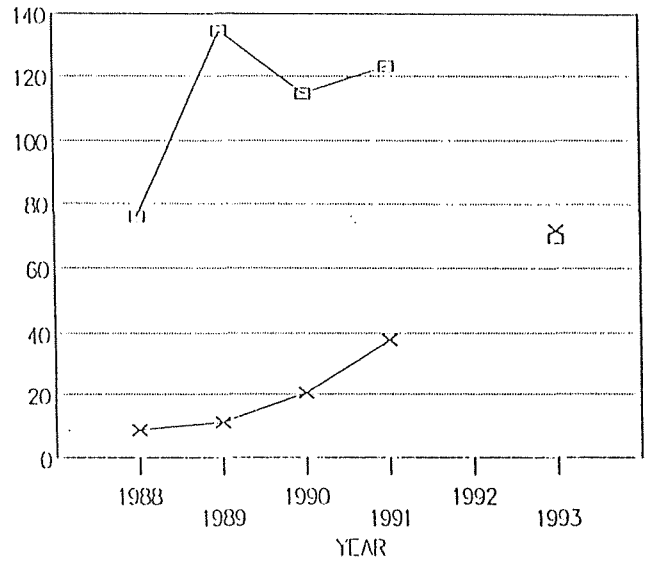


FIGURE 23. WATER QUALITY TREND CHARTS

SUBDIVISION C ADDITIONAL WELLS







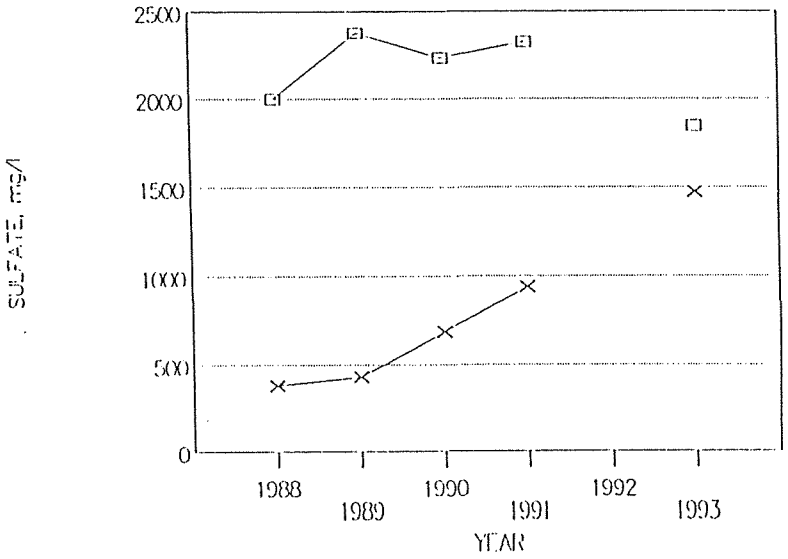
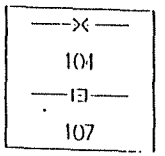
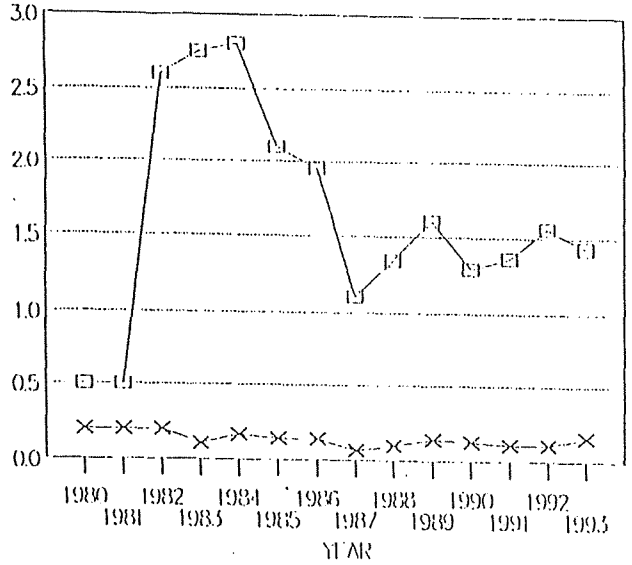
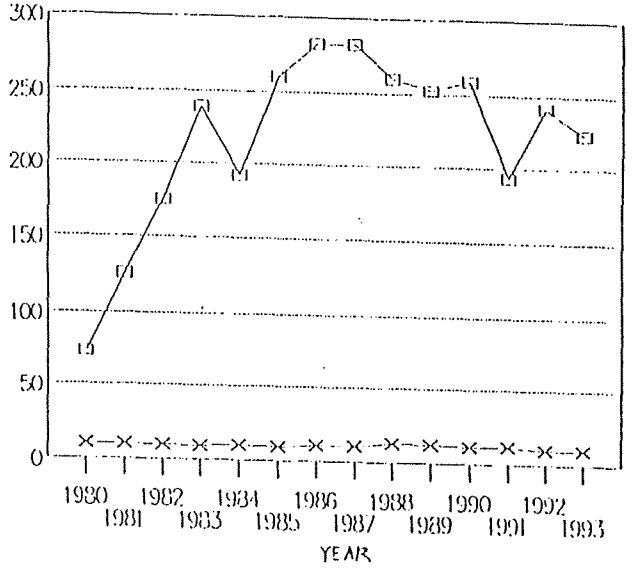


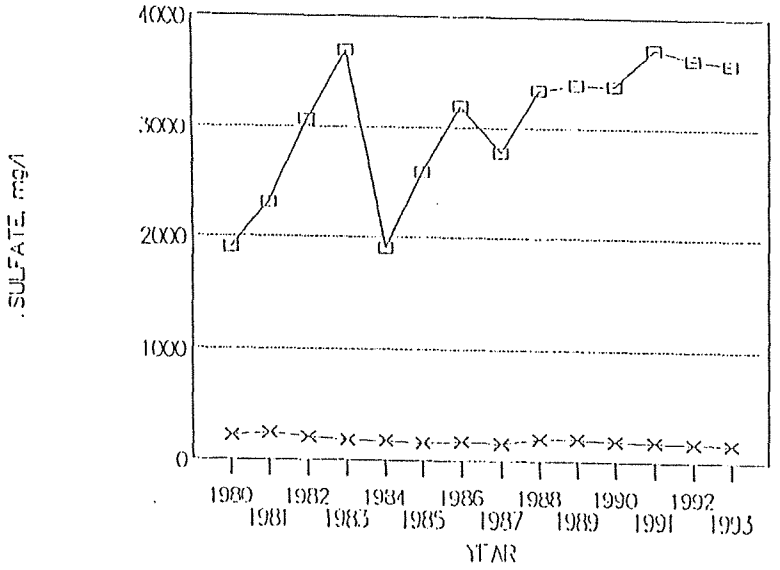
FIGURE 24. WATER QUALITY TREND CHARTS

SUBDIVISION C SURFACE WATERS









Influence of Pond Repairs

The period of record for the monitoring wells began in 1988 in the vicinity of the Extended Basin. The repair of the RWHB in 1984 had limited influence on the monitoring wells around the Extended Basin because the RWHB is downgradient of the Extended Basin.

Statistical Analysis

Use of Historical Monitoring Data

The discussion above, along with examination of the water quality data plots for this subdivision, provide a basis for evaluating the water quality conditions at the monitoring locations. Additional data plots in Appendix E include various exploratory statistical methods to assist in determining the applicability of statistical analyses to the data.

Up to eight observations are available in the monitoring histories for the wells in Subdivision C. For many of the downgradient wells, this is a sufficient number to identify statistically significant regular trends. It is not enough to begin control charts; as Section 2 of Appendix D states, the first eight monitoring periods are used as a "learning period" to establish historical means and standard deviations.

Selection of a Statistical Test

All downgradient and additional wells either have significantly higher concentrations of most reportable parameters (except strontium) than the upgradient wells, or they exhibit significant increases in concentration. A good method to establish this (in the absence of significant trends) would be Analysis of Variance (ANOVA), assuming that the data were normally distributed. However, there is evidence of significant trends in the deeper downgradient wells (MW-62 and MW-63), and concentrations of sulfate and chloride in the shallow downgradient wells (MW-64 and MW-65) are so much higher than in upgradient wells MW-58, MW-61 and MW-76, that it is pointless to conduct this formal test. The strontium concentrations are not significantly different among wells because only three measurements are available at each well. Finally, although boron concentrations in well MW-64 are significantly higher than upgradient concentrations, in well MW-65 they appear to be significantly lower than upgradient concentrations.

For these reasons, together with the reasons provided in the discussion of Subdivision B, ground water monitoring data in this subdivision should be analyzed on an intra-well basis using control charts and linear regression.

Methods and Calculations

See the previous discussion for Subdivision B and Sections 1 and 2 of Appendix D.

Error Rates

See the previous discussion for Subdivision B.

Discussion

Concentrations tend to be slightly, but significantly, different between the two upgradient wells. The appropriate test to establish this would be a paired t-test. However, the results are evident in the statistical graphics plots provided in Appendix E, because the distributions of the data often do not overlap between the

two wells at all. Thus, chloride and sulfate have significantly higher concentrations in well MW-58; boron has significantly higher concentrations in well MW-61; strontium has not been observed enough times in either well to discriminate average concentrations; and arsenic and selenium have not been measured in well MW-58 at all. This information, nevertheless, is quantitative evidence of the natural variability of ground water quality conditions in upgradient wells at this facility.

Arsenic and selenium have rarely been measured, but are essentially undetected. Additional sampling during fall of 1994 will help evaluate the validity of the 1993 selenium detection of approximately .013 mg/l in additional downgradient well MW-65.

SUBDIVISION DI

This subdivision, located in the south central portion of the plant site (Figure 25), encompasses South Ash Pond Cells #91 and #92, and wells south and west of the ash pond. All other wells in this subdivision are located on the dike. Water quality sampling locations (with completion depths below ground surface for monitoring wells) in this subdivision and reported herein are as follows:

Ground Water

Upgradient	Downgradient	Additional
MW-57 (32.7 ft)	MW-10 (25 ft)	MW-9 (53 ft) [Downgradient]
MW-71 (45.5 ft)	MW-49 (19.9 ft)	MW-55 (18.5 ft) [Upgradient]
MW-74 (41 ft)	MW-50 (22.9 ft)	
	MW-54 (37.4 ft)	

Local ground water flow direction in this subdivision is toward the northeast; however, radial flow conditions may be occurring in the immediate vicinity of the ash pond cells.

Surface Water

SW-108
SW-126
SW-127

A summary of the historical usage of Ash Pond #91 and Ash Pond #92 is provided in Table 1. The former South Ash Pond (which included the entire area of Ash Pond #91, Ash Pond #92 and Plant Drain Pond #91) was placed into service in 1979 when the plant began operation. Visual evidence of leakage was observed on the north side of the South Ash Pond within a short time. The pond was taken out of service in 1980 and initially repaired in 1981. The East Ash Pond (current Section 16 Disposal Area) was put into service to replace the South Ash Pond during repairs. Ash Pond #91 was in service in 1989 and 1990, was dewatered during 1991, repaired during 1992, and placed back in service in 1993. Ash Pond #92 was repaired in 1989 and placed back in service in 1990.

In the mid-1980s it was determined that subsurface leakage was occurring from both the South Ash Pond and the East Ash Pond. The East Ash Pond was used while Ash Pond #92 (east half of the former South Ash Pond) was being constructed. The East Ash Pond (now the Section 16 Disposal Area, east of Ash Pond #92) is only used for dry ash storage, because of excessive leakage during use as a wet impoundment (the ash storage area is in the southwestern portion of the Section 16 Disposal Area, where lower permeability soils are present and where there is a greater separation between the ash and the ground water).

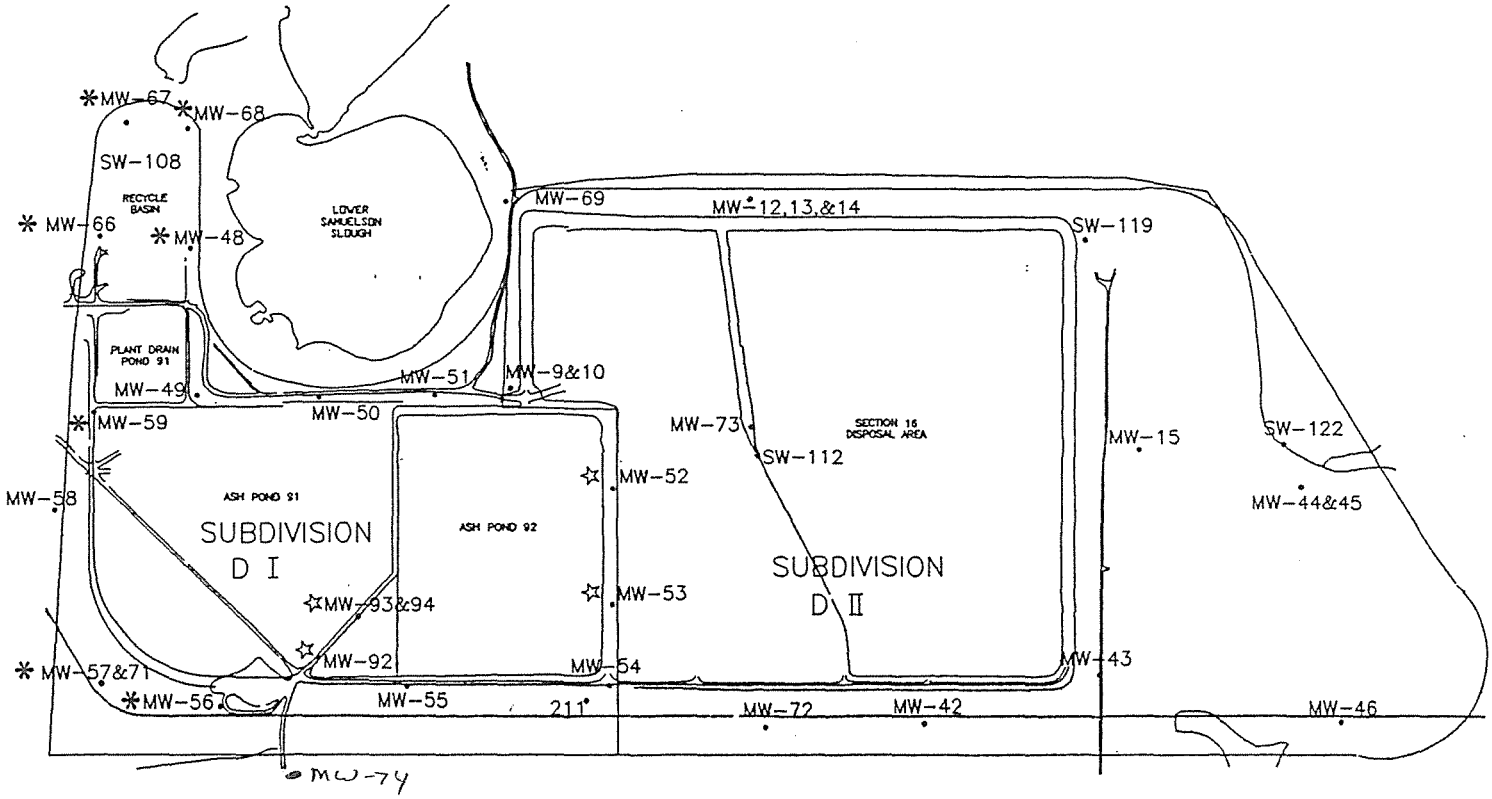


FIGURE 25. Subdivisions DI and DII Water Quality Monitoring Locations

The significance of the information provided above is that the monitoring wells around these ponds have been impacted from different directions (radial ground water flow from the various intermittently active ponds) at different times. This makes trend analysis of historical data a difficult task. These conditions apply to analysis of both Subdivisions DI and DII (discussed in the next section).

Qualitative Discussion of Historical Water Quality Data

Time series data plots of the reportable parameter concentrations for the planned water quality monitoring locations in Subdivision DI are provided in this section. Table 6 provides a summary of the most recent measured concentrations for Subdivision DI in comparison to the water quality guidelines.

Monitoring of all wells in this subdivision except downgradient well MW-10 and additional downgradient well MW-9 began in late 1988. Wells MW-9 and MW-10 have been monitored since 1979. The following sections provide qualitative descriptions of water quality in the subdivision, based on an examination of water quality trends for the various monitoring wells and knowledge of the historical usage of the evaporation ponds within this subdivision.

Upgradient Wells

Upgradient wells MW-57, MW-71 and MW-74 (Figure 26) document ambient conditions and show no obvious trends in the reportable parameters during the period of record. Wells MW-57 (shallow) and MW-71 (deep) are nested at the same location, with MW-71 completed approximately 13 feet below MW-57. Well MW-74 is completed at a depth of 41 feet.

Strontium has consistently been above the water quality guideline of 0.05 mg/l at all three of the upgradient wells throughout the brief period of record. Sulfate has consistently been above the water quality guideline of 250 mg/l at upgradient well MW-74 during the period of record.

Downgradient Wells

Downgradient wells in this subdivision include MW-10, MW-40, MW-50 , and MW-54 (Figures 27 and 28). Monitoring well MW-10 provides the most lengthy period of record for the downgradient wells in this subdivision. Elevated concentrations of chloride and sulfate were evident at well MW-10 almost immediately after the South Ash Pond was placed into service in 1979. Sulfate concentrations have remained elevated, but relatively constant. Chloride concentrations increased sharply at MW-10 in 1988. Boron concentrations in MW-10 show a similar trend to chloride, but with a delayed initial concentration increase. Decreasing concentrations of boron, chloride and sulfate suggest that pond repairs, which began in 1989, may be influencing the ground water quality.

Downgradient wells MW-49 and MW-50, which are directly downgradient of the ash ponds, have generally exhibited similar ground water quality responses. These two wells have exhibited slowly increasing concentrations of boron and chloride, and fairly stable concentrations of strontium and sulfate during the period of record. Well MW-54, which is somewhat more lateral (though still considered downgradient) to the ash ponds, has exhibited more stable concentrations of these four parameters, although the chloride, strontium and sulfate concentrations have consistently been higher than at wells MW-49 and MW-50, which are more directly downgradient of Ash Pond #91. In addition, an elevated concentration of selenium was detected at well MW-54 in 1993, but has essentially not been detected at the other upgradient or downgradient wells in recent years.

TABLE 6

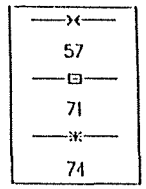
WATER QUALITY SUMMARY - SUBDIVISION DI
1993 SAMPLING RESULTS AND WATER QUALITY GUIDELINES

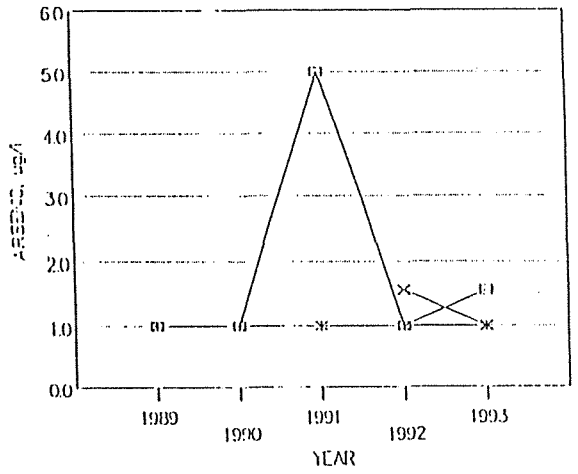
		PARAMETER											
		Arsenic		Boron		Chloride		Selenium		Strontium		Sulfate	
WELL	POSITION	Latest Results	WQ[1] Guide	Latest Results	WQ Guide	Latest Results	WQ Guide	Latest Results	WQ Guide	Latest Results	WQ Guide	Latest Results	WQ Guide
MW-9	Downgradient (Additional)	< 0.001	0.05	0.62	0.75	4.89	250	< 0.001	0.01	0.2	0.05	352	250
MW-10	Downgradient	< 0.001	0.05	25.1	0.75	199.65	250	< 0.001	0.01	1.63	0.05	3,050	250
MW-49	Downgradient	< 0.001	0.05	3.93	0.75	73.31	250	< 0.001	0.01	6.42	0.05	2,525	250
MW-50	Downgradient	< 0.001	0.05	3.74	0.75	125.45	250	< 0.001	0.01	2.44	0.05	1,824	250
MW-54	Downgradient	< 0.001	0.05	0.51	0.75	153.2	250	1.111	0.01	6.37	0.05	10,063	250
MW-55	Upgradient (Additional)	< 0.001	0.05	0.85	0.75	19.3	250	0.0107	0.01	1.92	0.05	1,196	250
MW-57	Upgradient	< 0.001	0.05	0.4	0.75	2.65	250	< 0.001	0.01	1.49	0.05	244	250
MW-71	Upgradient	0.0016	0.05	0.39	0.75	2.10	250	< 0.001	0.01	1.47	0.05	211	250
MW-74	Upgradient	< 0.001	0.05	1.07	0.75	16.66	250	< 0.001	0.01	3.44	0.05	1,896	250
SW-108	Recycle Pond	0.0043	0.05	11	0.75	283.13	250	< 0.001	0.01	6.82	0.05	4,495	250
SW-126	South Ash Pond #91	0.0461	0.05	15.8	0.75	473.08	250	< 0.001	0.01	7.24	0.05	5,053	250
SW-127	South Ash Pond #92	NA	0.05	NA	0.75	NA	250	NA	0.01	NA	0.05	NA	250

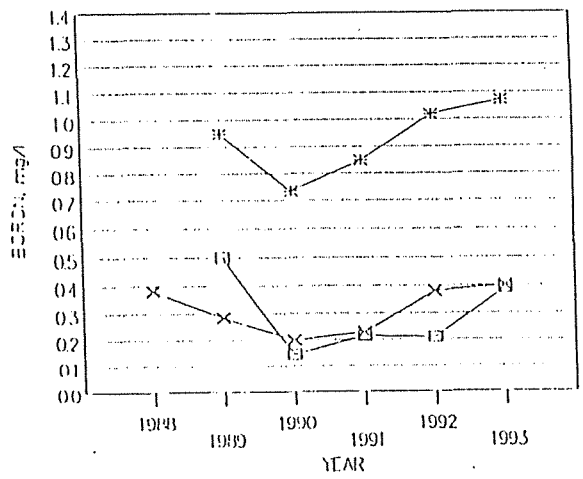
Notes: All concentrations are presented in units of milligrams per liter.
Shaded values indicate latest results which exceed the water quality guidelines.
NA = Not Analyzed
[1] WQ Guide = Water Quality Guideline

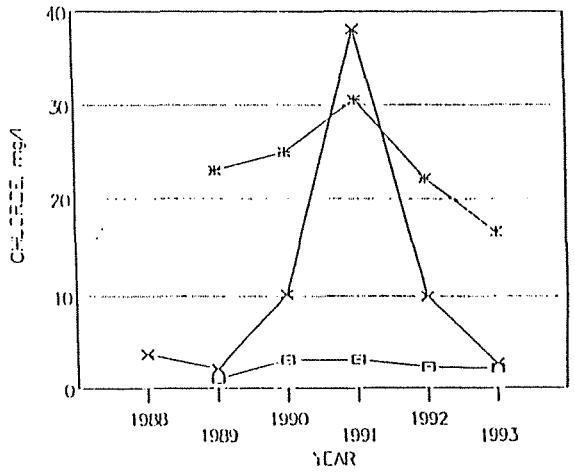
FIGURE 26. # WATER QUALITY TREND CHARTS

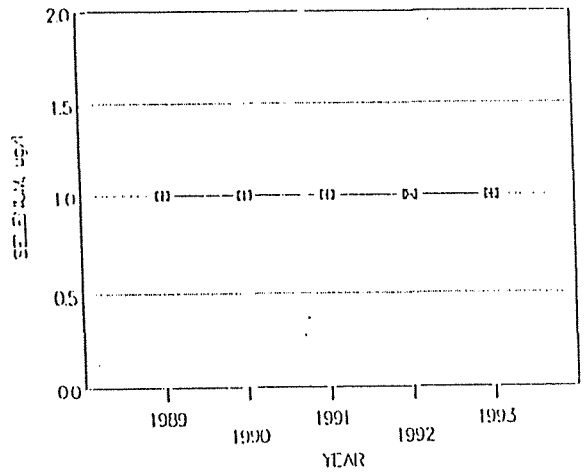
SUBDIVISION DI UPGRADIENT WELLS

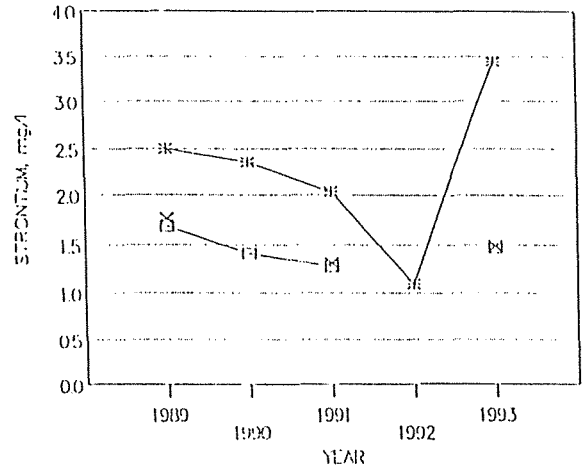












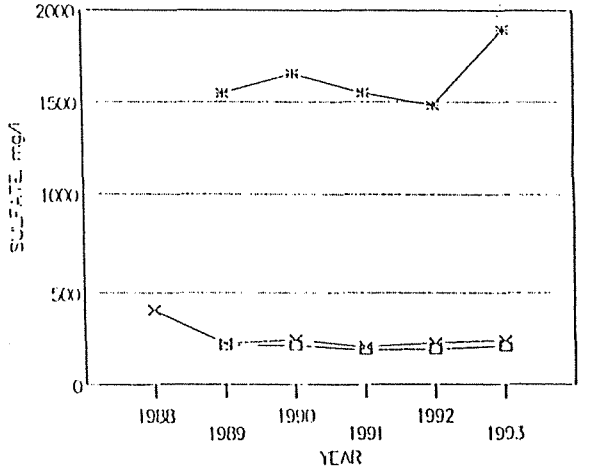
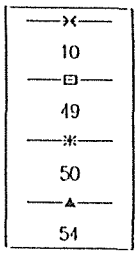
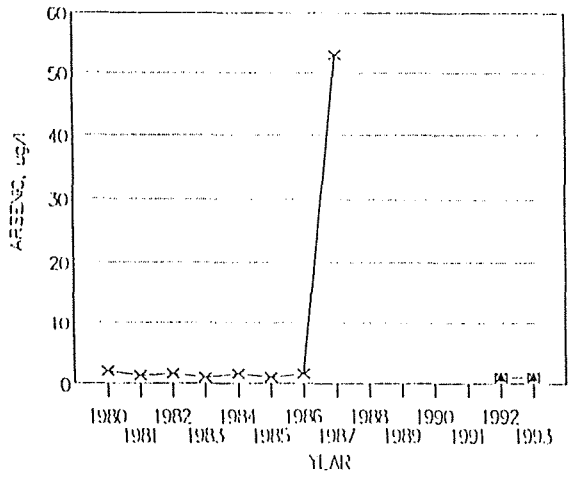
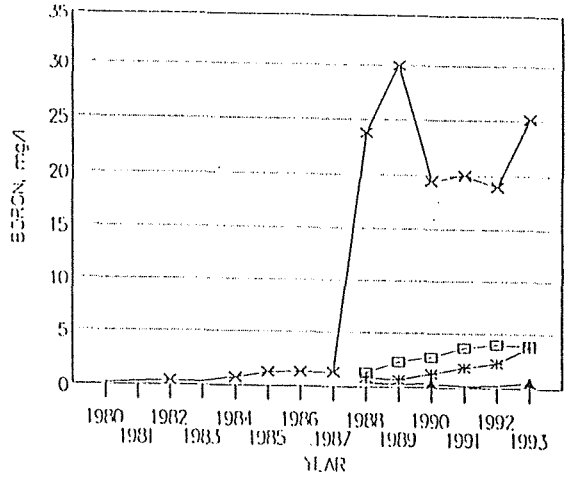


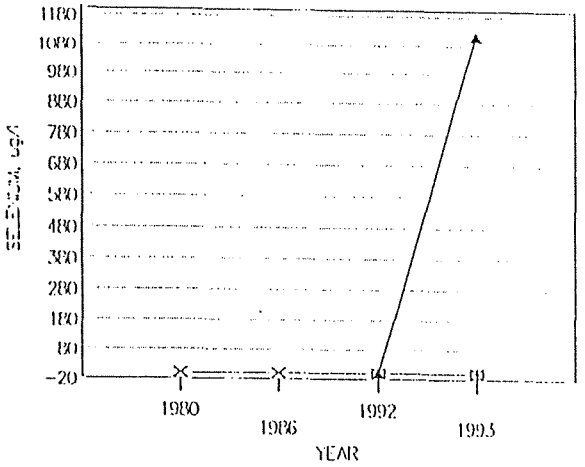
FIGURE 27. WATER QUALITY TREND CHARTS

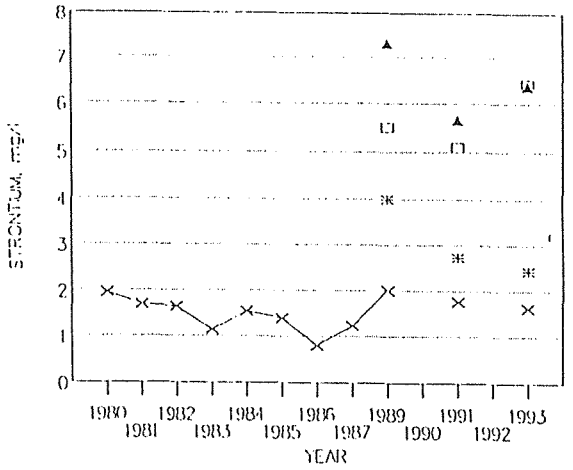
SUBDIVISION DI DOWNGRADIENT WELLS











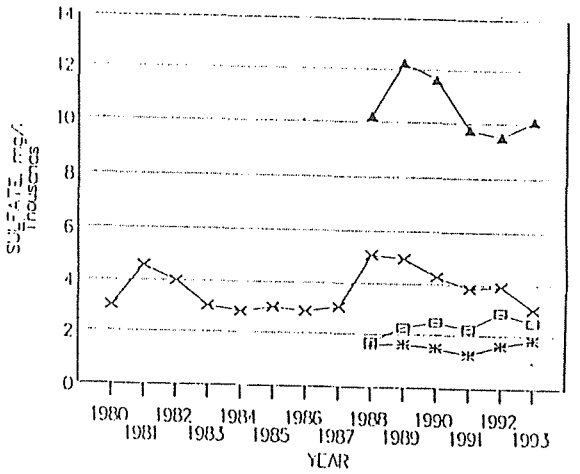
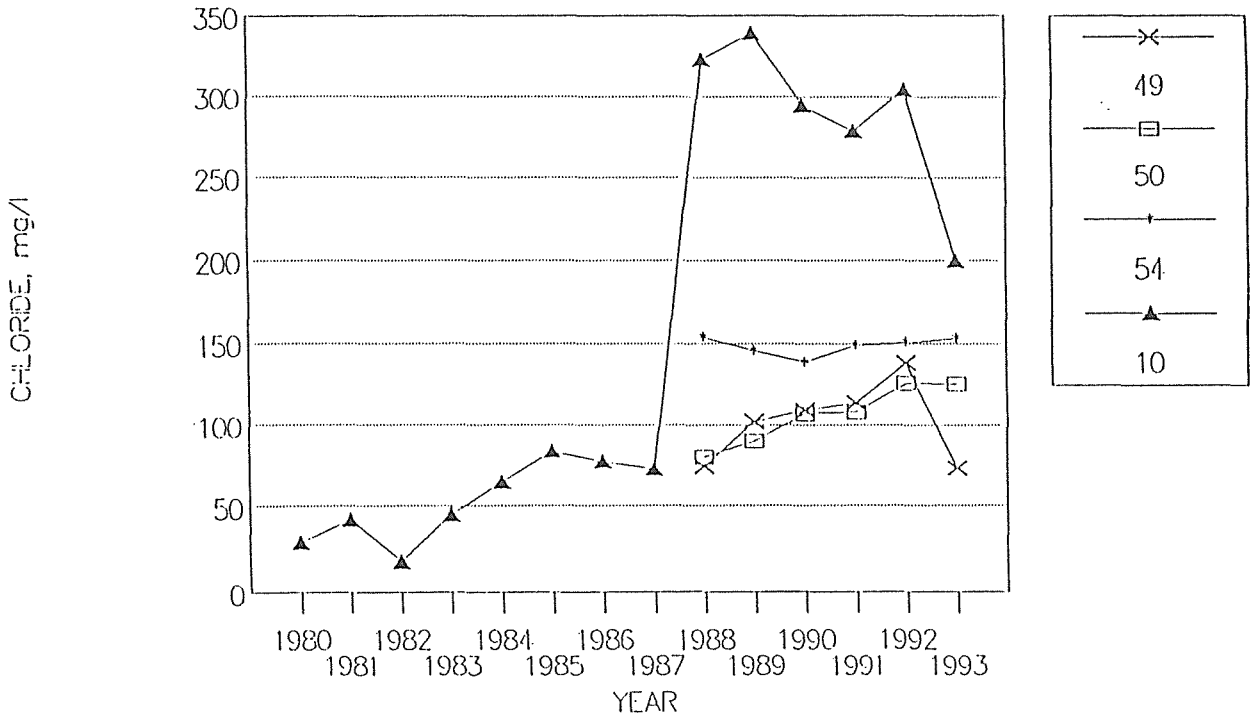


FIGURE 28. WATER QUALITY TREND CHART

SUBDIVISION DI DOWNGRADIENT WELLS



Boron has typically exceeded the water quality guideline of 0.75 mg/l at downgradient wells MW-10, MW-49 and MW-50. The chloride guideline of 250 mg/l has only been exceeded at well MW-10. The elevated selenium concentration (1.11 mg/l) at well MW-54 in August 1993 is the only exceedance in this subdivision of the water quality guideline (0.01 mg/l) for this parameter. Strontium concentrations exceed the water quality guideline of 0.05 mg/l at all downgradient monitoring wells. Sulfate concentrations exceed the water quality guideline of 250 mg/l at all downgradient monitoring wells, with well MW-54 exhibiting the highest concentrations.

Additional Wells

Additional well MW-9 (Figure 29), which is the deeper well (completed at 53 feet) nested with downgradient well MW-10 (completed at 25 feet), is obviously a downgradient well in this subdivision. Additional well MW-55 (Figure 29), completed at 18.5 feet, is generally considered upgradient based on it's location relative to the northeasterly ground water flow direction in the subdivision. However, well MW-55 could also be considered downgradient, because of likely susceptibility to localized radial ground water flow from Ash Ponds #91 and #92.

Well MW-9 exhibits very stable water quality trends over it's lengthy period of record. This indicates that there is very little or no influence of the pond operations at this depth (53 feet) of the aquifer, although the shallow well (MW-10) nested at this location exhibited obvious impacts. Although no impacts appear to be evident at well MW-9, boron and sulfate concentrations are consistently close to their respective water quality guidelines of 0.75 mg/l and 250 mg/l. This indicates that the typical background (although well MW-9 is downgradient) concentrations may approximate the water quality guidelines for boron and sulfate. In addition, the strontium concentrations at well MW-9 are consistently above the water quality guideline of 0.05 mg/l. This may indicate that the typical background concentration of strontium may exceed the water quality guideline.

Exceedances of the strontium and sulfate water quality guidelines during the brief period of record are more apparent at additional upgradient well MW-55. However, as indicated above, well MW-55 may be influenced by radial flow away from the ash ponds.

Surface Water

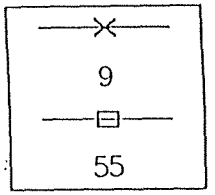
Surface water monitoring locations in this subdivision include SW-108, SW-126, and SW-127 (Figures 30 and 31). The Recycle Pond (SW-108) has been permanently removed from service and will no longer be monitored. South Ash Pond #91 (SW-126) and South Ash Pond #92 (SW-127) have been reconstructed and will continue to be monitored. The two ash ponds receive ash from the plant using a water sluicing method. Part of the water is recycled for reuse and part of the water is piped to the evaporation ponds. The water quality concentrations in these ponds are dependent upon operational conditions.

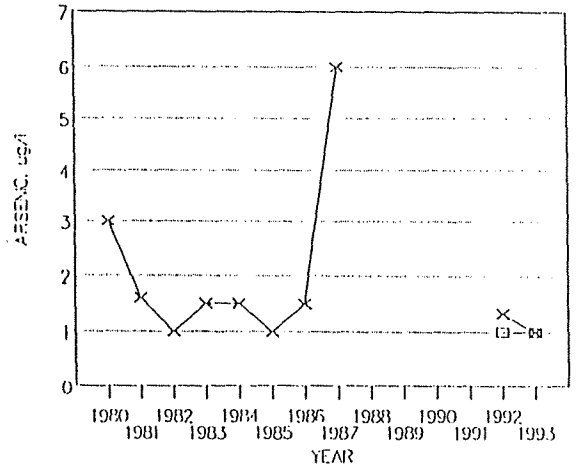
Influence of Pond Repairs

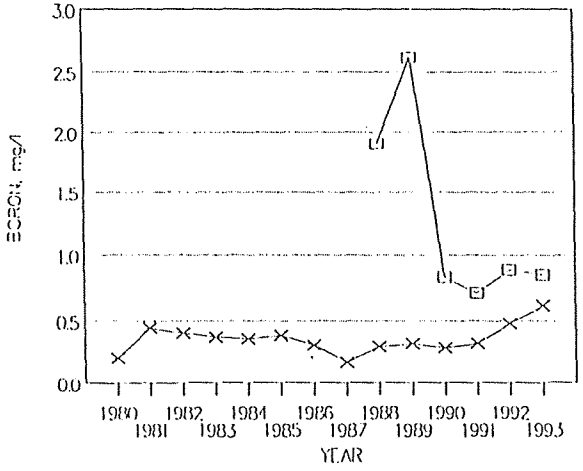
As indicated above, the complex operational history of the various ponds within this subdivision, combined with the generally brief period of record for most of the wells, makes it difficult to observe the specific influence of pond repairs on ground water quality. However, decreasing concentrations of boron, chloride and sulfate, following significant increases in these parameters, suggest that pond repairs, which began in 1989, may be influencing the ground water quality.

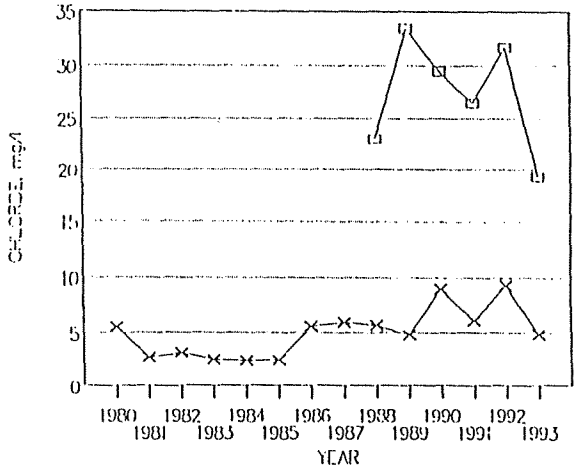
FIGURE 29. WATER QUALITY TREND CHARTS

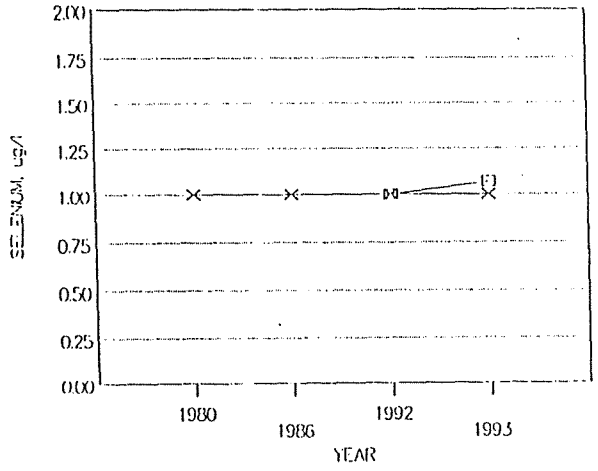
SUBDIVISION DI ADDITIONAL WELLS

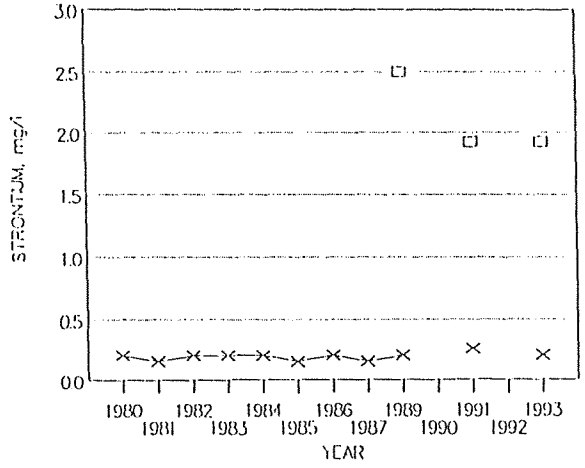












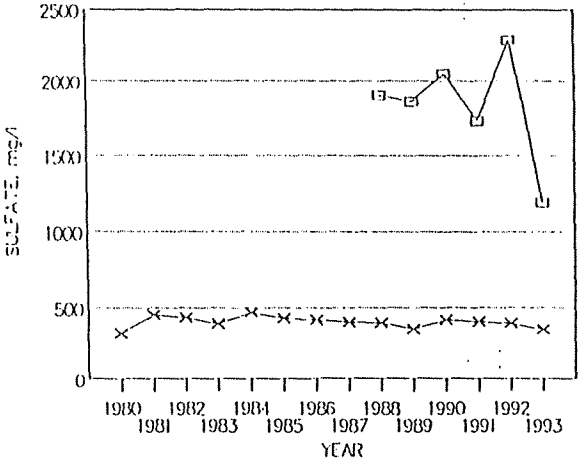
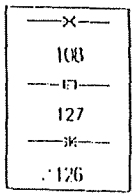
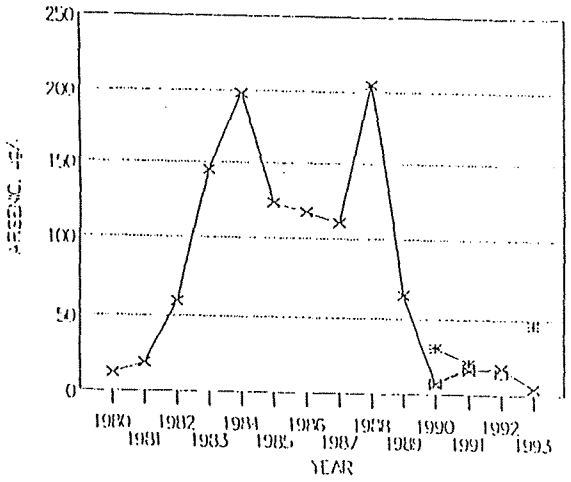
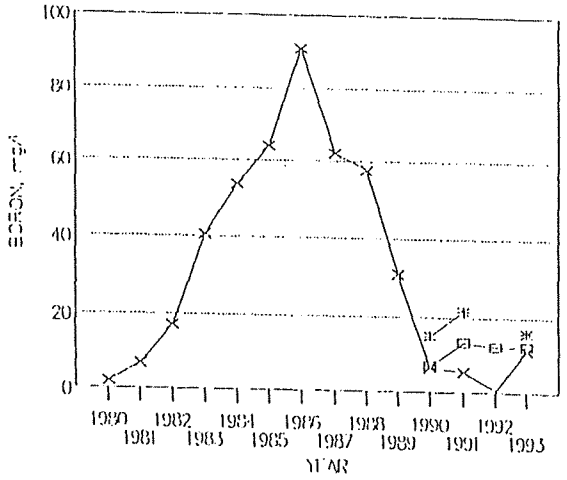


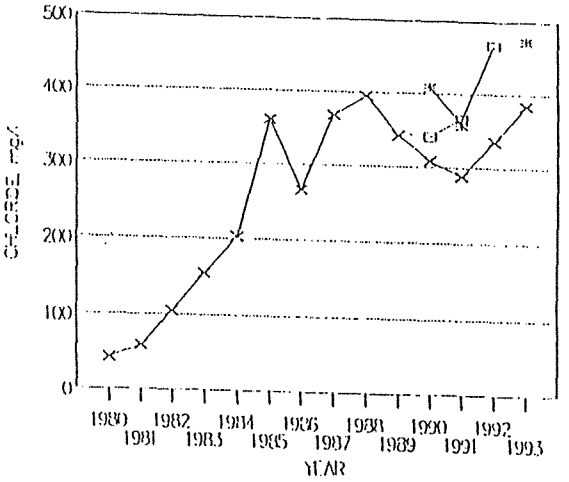
FIGURE 30. WATER QUALITY TREND CHARTS

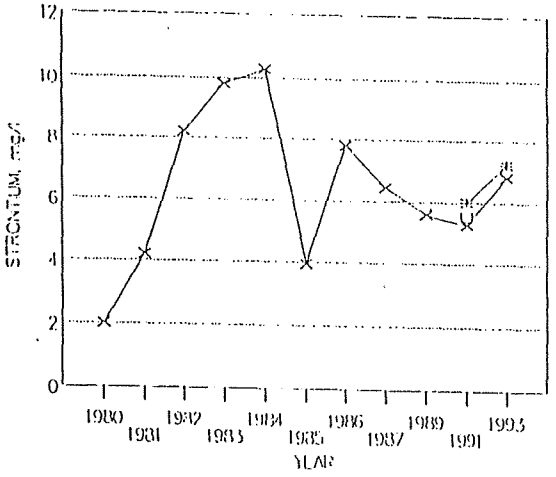
SUBDIVISION DI SURFACE WATERS











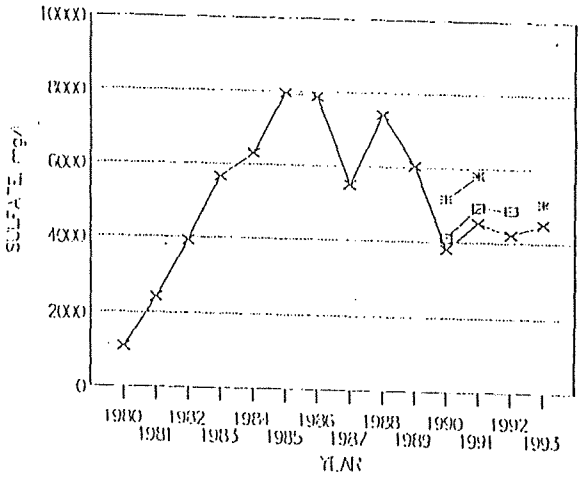
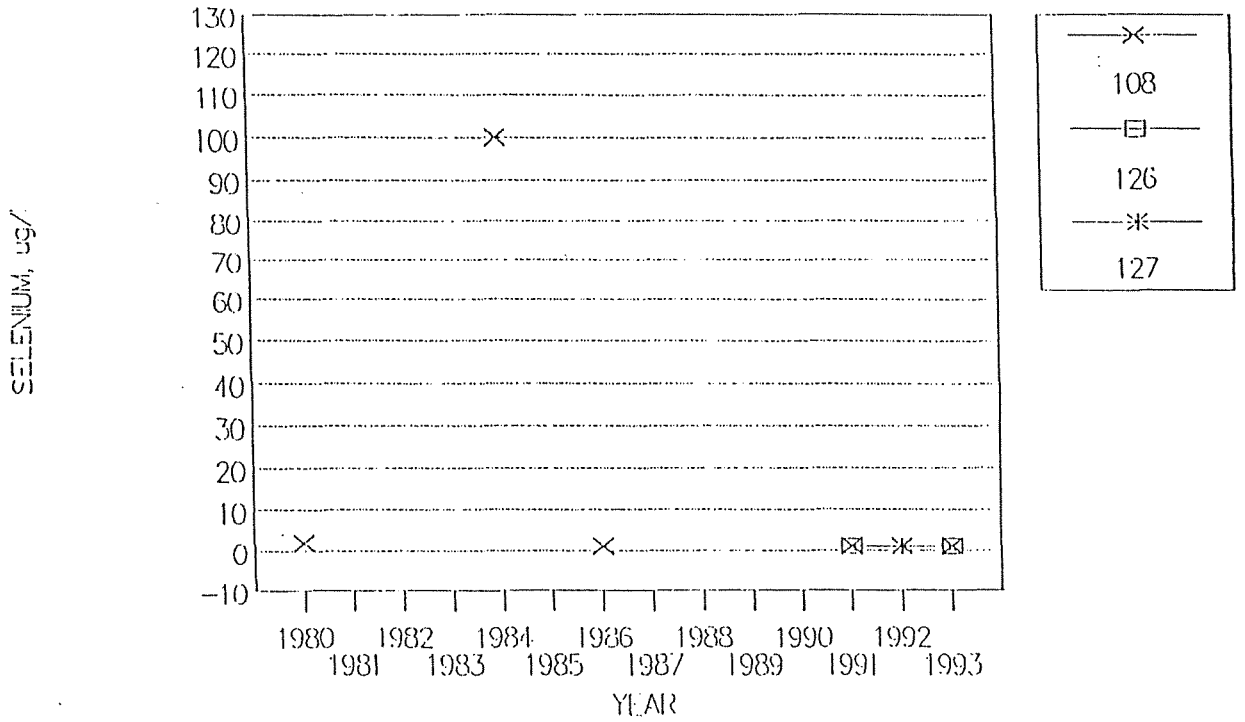


FIGURE 31. WATER QUALITY TREND CHART

SUBDIVISION DI SURFACE WATERS



Statistical Analysis

Use of Historical Monitoring Data

The discussion above, along with examination of the water quality data plots for this subdivision, provide a basis for evaluating the water quality conditions at the monitoring locations. Additional data plots in Appendix E include various exploratory statistical methods to assist in determining the applicability of statistical analyses to the data.

As described previously, ground water conditions within this subdivision and Subdivision DII should exhibit complex behavior because of many possible impacts from surrounding areas and changes in usage of the various ponds over time.

Selection of a Statistical Test

Selection of a statistical test to analyze the data in this subdivision is based on the following objectives:

- Identification of recent trends
- Verification of the stability of conditions in upgradient wells
- Characterization of changes in conditions at downgradient wells MW-9 and MW-10
- Comparison of average concentrations in wells having a short period of record with concentrations in upgradient wells

The least-squares regression, as described in Section 1 of Appendix D, is useful in identifying recent trends. As shown in the statistical graphics plots in Appendix E, the regression identifies significant upward linear trends in boron and chloride concentrations at downgradient wells MW-49 and MW-50 using the nine semiannual results spanning the period of record from late 1987 through 1992. The same technique, by failing to identify any significant trends in any of the four upgradient wells, serves to verify the stability of upgradient conditions.

Some changes in downgradient well MW-10 are readily apparent in the time-series plots. Concentrations of boron and chloride increased by an order of magnitude during the first half of 1988. At the same time, sulfate concentrations increased, but remained within the control chart interval ("in control") for sulfate at this well, as indicated in the statistical graphics plot in Appendix E. Concentrations of boron, chloride and sulfate peaked in 1989 at well MW-10 and have been slowly decreasing since. Ongoing statistical tests of recent conditions should, therefore, use data beginning in 1990, but no earlier.

Concentrations of reportable parameters in additional downgradient well MW-9 (deep well nested with shallow well MW-10) have generally been comparable to, or lower than, those in upgradient wells. The control charts begun in 1980 are an appropriate method to continue testing results at this well.

To compare downgradient concentrations with upgradient concentrations, the spatial variability of conditions in upgradient wells must be accounted for. To do this tolerance or prediction intervals were developed for the mean concentrations of the reportable parameters. This technique, described below, was applied separately to each reportable parameter. It uses the variation of average concentrations among the upgradient wells to project limits on average concentrations which can be expected in other wells. The average concentrations at the downgradient wells are then compared to these limits. Downgradient wells with average concentrations outside these limits should be considered significantly changed. This method overcomes the difficulty of having no historical background for the downgradient wells to characterize conditions before the ground water may have been affected by the facility.

Methods and Calculations

Section 3 of Appendix D describes the calculations for tolerance limits and how tolerance limits are applied to screen average concentrations at downgradient wells. Tolerance limits were not calculated for arsenic or selenium due to the large number of non-detects during the period of record. All values are in units of mg/l.

Error Rates

Error rates for the procedures recommended here are discussed in the Appendices. See also the error rates section in the Subdivision A analysis.

Discussion

A tolerance limit developed from a small (sample size [N] less than 10) number of upgradient wells will be three or more standard deviations above the average concentrations observed in the wells. This often leads to extraordinarily high limits which are not useful for screening additional wells when small changes in concentration must be detected. However, in the event that the average concentration at a downgradient well exceeds an upgradient-based tolerance limit, then one can be confident that conditions at that well are significantly elevated.

Portions of the following discussion are applicable to Subdivisions DI and DII, since Subdivision DII utilizes the same upgradient wells as Subdivision DI. For application of the tolerance limit method to Subdivisions DI and DII several choices of upgradient well combinations are available. Three wells (MW-57, MW-71 and MW-74) are designated as upgradient for Subdivision DI. The same three wells are designated as upgradient for Subdivision DII. One additional well (MW-55) is considered upgradient in Subdivision DI, and one additional well (MW-72) is considered upgradient in Subdivision DII.

To illustrate the effect of choice of upgradient wells, we have computed tolerance limits based on three such choices:

- 3 Wells: Upgradient wells MW-57, MW-71, and MW-74 (all from Subdivision DI)
- 4 Wells: Upgradient wells MW-57, MW-71, MW-74; Additional well MW-55 (all from Subdivision DI)
- 5 Wells: Upgradient wells MW-57, MW-71, MW-74; Additional wells MW-55 and MW-72 (includes additional upgradient well MW-72 from Subdivision DII)

Table 7 presents the calculated tolerance limits for the four reportable parameters consistently detected in wells within Subdivisions DI and DII.

Tolerance limits generally decrease with increasing numbers of upgradient wells, because the uncertainty in the spatial distribution of average concentrations decreases. Tolerance limits based on five upgradient wells provide an effective screening procedure for identifying changes in ground water quality conditions. The following observations and interpretations can be made by examining the water quality trend charts and comparing approximate average concentrations at monitoring locations to the tolerance limits based on a sample size of five calculated above.

TABLE 7

CALCULATED TOLERANCE LEVELS - SUBDIVISIONS DI AND DII

Parameter	Mean (mg/l)	Standard Deviation (mg/l)	Sample Size	ANOVA P-Value	Tolerance Limit (mg/l)
Boron	0.44	0.76	3	0.00 %	6.26
Boron	0.70	1.47	4	0.08 %	8.28
Boron	0.57	1.44	5	0.01 %	6.61
Chloride	14.3	28.3	3	9.03 %	230.6
Chloride	17.9	31.0	4	1.03 %	177.1
Chloride	15.7	29.1	5	0.44 %	137.8
Strontium	1.70	1.09	3	0.02 %	10.06
Strontium	1.80	0.97	4	0.02 %	6.77
Strontium	1.58	1.35	5	0.00 %	7.23
Sulfate	681	1,854	3	0.00 %	14,874
Sulfate	976	2,311	4	0.00 %	12,863
Sulfate	827	2,138	5	0.00 %	9,814

Notes: Mean is the mean value of the average background concentrations. Standard Deviation is the standard deviation of the average background concentrations. Sample size is the number of upgradient wells used. ANOVA P-Value is the Analysis of Variance P-Value used to estimate the average concentrations and standard deviation of the averages; the very low values confirm the significance of the assumption of spatial variability. Tolerance Limit is the one-sided upper 95%-coverage, 95%-confidence tolerance limit.

- The sudden increases in boron and chloride concentrations at downgradient well MW-10 in 1988 have resulted in average concentrations computed since that time that are above the calculated tolerance limits for those parameters.

- Average strontium concentrations in downgradient well MW-54 are about 6.5 mg/l, which is below the calculated tolerance limit of 7.23 mg/l.

- Average sulfate concentrations in downgradient well MW-54 exceed the sulfate tolerance limit; however, the last four sample measurements have oscillated above and below the tolerance limit.

- Average chloride concentrations in downgradient well MW-54 exceed the chloride tolerance limit; however, the individual sample measurements have oscillated marginally above and below the tolerance limit throughout the period of record.

- Average concentrations of boron, chloride, strontium, and sulfate in downgradient wells MW-49 and MW-50 do not exceed their respective tolerance limits.

Conclusions which can be drawn from the statistical analysis are:

- Downgradient well MW-54 has been adversely impacted by chloride and sulfate, and probably by strontium.

- Downgradient wells MW-49 and MW-50 may not have been impacted, but are showing indications (based on the significant regression slopes for boron and chloride indicated on the plots in Appendix E) of long-term, low-level adverse effects.

SUBDIVISION DII

This subdivision, located in the southeast section of the site (Figure 25), encompasses the Section 16 Disposal Area. There are no separate upgradient wells specified for this subdivision because of its location with respect to Subdivision DI. The upgradient wells used for Subdivision DI are also used as upgradient wells for this subdivision. Water quality sampling locations (with completion depths below ground surface for monitoring wells) in this subdivision and reported herein are as follows:

Ground Water

Upgradient	**Downgradient**	**Additional**
MW-57 (32.7 ft)	MW-14 (20 ft)	MW-12 (78 ft) [Downgradient]
MW-71 (45.5 ft)	MW-15 (20 ft)	MW-13 (55 ft) [Downgradient]
MW-74 (41 ft)	MW-42 (14.4 ft)	MW-72 (24 ft) [Upgradient]
	MW-43 (14.6 ft)	MW-73 (28 ft) [Downgradient]

Local ground water flow direction in this subdivision is generally toward the east, with possibly, some localized northeast and southeasterly flow components in the eastern portion of the Section 16 Disposal Area.

Surface Water

None

The discussion in the previous section, regarding usage of the Subdivision DI ash ponds and the Subdivision DII Section 16 Disposal Area, applies to this subdivision. The test selection, methods, and error rates remain the same.

Qualitative Discussion of Historical Water Quality Data

Time series data plots of the reportable parameter concentrations for the planned water quality monitoring locations in Subdivision DII are provided in this section. Table 8 provides a summary of the most recent measured concentrations for Subdivision DII in comparison to the water quality guidelines.

Downgradient wells MW-14 and MW-15 and additional wells MW-12 and MW-13 have been monitored since 1979. The other wells in the subdivision have generally been monitored since either 1986 or 1988. The following sections provide qualitative descriptions of water quality in the subdivision, based on an examination of water quality trends for the various monitoring wells and knowledge of the historical usage of the evaporation ponds within this subdivision.

Upgradient Wells

Because Subdivisions DI and DII utilize the same upgradient wells (MW-57, MW-71 and MW-74 - Figure 26), the discussion of upgradient wells in this subdivision is identical to the discussion in the previous section for Subdivision DI.

Upgradient wells MW-57, MW-71 and MW-74 document ambient conditions and show no obvious trends in the reportable parameters during the period of record. Wells MW-57 (shallow) and MW-71 (deep) are nested at the same location, with MW-71 completed approximately 13 feet below MW-57. Well MW-74 is completed at a depth of 41 feet.

Strontium has consistently been above the water quality guideline of 0.05 mg/l at all three of the upgradient wells throughout the brief period of record. Sulfate has consistently been above the water quality guideline of 250 mg/l at upgradient well MW-74 during the period of record.

Downgradient Wells

Downgradient wells in this subdivision include MW-14, MW-15, MW-42, and MW-43 (Figure 32). Monitoring wells MW-14 and MW-15, which are both shallow, provide the most lengthy period of record for the downgradient wells in this subdivision. Concentrations of boron, chloride, strontium, and sulfate began increasing at both of these wells during the period from 1980 to 1982. Obvious increases continued through the period 1986 to 1991, depending upon the specific well and parameter. At the other downgradient wells (MW-42 and MW-43), which are also both shallow, the concentrations of all reportable parameters have remained fairly consistent during the period of record, with the exception of sulfate at well MW-43, which has exhibited a general decrease since 1986.

Boron has typically exceeded the water quality guideline of 0.75 mg/l at all four downgradient wells in this subdivision. The chloride guideline of 250 mg/l has historically only been exceeded at wells MW-14 and MW-15; however, in recent years the concentrations have been declining, such that chloride at well MW-15 was below the guideline during 1993. Strontium concentrations exceed the water quality guideline of 0.05 mg/l at all downgradient monitoring wells, but have generally been decreasing at wells MW-14 and MW-15 since approximately 1986. Sulfate concentrations exceed the water quality guideline of 250 mg/l at all downgradient monitoring wells, but have generally been decreasing in recent years at wells MW-14, MW-15 and MW-43.

TABLE 8

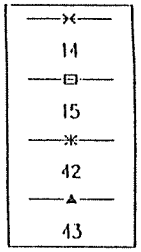
WATER QUALITY SUMMARY - SUBDIVISION DII
1993 SAMPLING RESULTS AND WATER QUALITY GUIDELINES

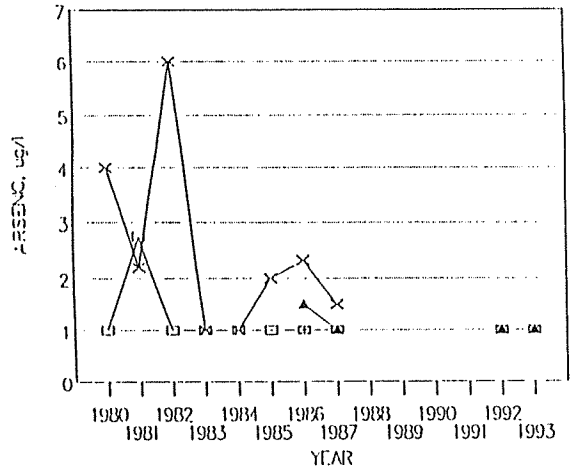
		PARAMETER											
		Arsenic		Boron		Chloride		Selenium		Strontium		Sulfate	
WELL	POSITION	Latest Results	WQ[1] Guide	Latest Results	WQ Guide	Latest Results	WQ Guide	Latest Results	WQ Guide	Latest Results	WQ Guide	Latest Results	WQ Guide
MW-12	Downgradient (Additional)	< 0.001	0.05	0.5	0.75	1.78	250	< 0.001	0.01	0.11	0.05	38	250
MW-13	Downgradient (Additional)	< 0.001	0.05	0.64	0.75	8.28	250	< 0.001	0.01	0.2	0.05	489	250
MW-14	Downgradient	< 0.001	0.05	49.8	0.75	309.93	250	< 0.001	0.01	4.04	0.05	4,800	250
MW-15	Downgradient	< 0.001	0.05	47.7	0.75	151.93	250	< 0.001	0.01	2.98	0.05	4,127	250
MW-42	Downgradient	< 0.001	0.05	10.3	0.75	56.07	250	< 0.001	0.01	1.52	0.05	1,489	250
MW-43	Downgradient	< 0.001	0.05	3.24	0.75	20.45	250	< 0.001	0.01	0.49	0.05	1,375	250
MW-57	Upgradient	< 0.001	0.05	0.4	0.75	2.65	250	< 0.001	0.01	1.49	0.05	244	250
MW-71	Upgradient	0.0016	0.05	0.39	0.75	2.10	250	< 0.001	0.01	1.47	0.05	211	250
MW-72	Upgradient (Additional)	< 0.001	0.05	0.18	0.75	10.53	250	< 0.001	0.01	0.71	0.05	247	250
MW-73	Downgradient (Additional)	< 0.001	0.05	4.16	0.75	396.62	250	< 0.001	0.01	3.98	0.05	2,859	250
MW-74	Upgradient	< 0.001	0.05	1.07	0.75	16.66	250	< 0.001	0.01	3.44	0.05	1,896	250

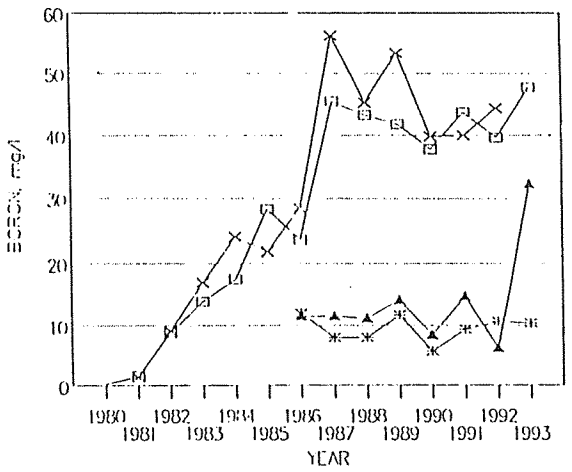
Notes: All concentrations are presented in units of milligrams per liter.
Shaded values indicate latest results which exceed the water quality guidelines.
NA = Not Analyzed
[1] WQ Guide = Water Quality Guideline

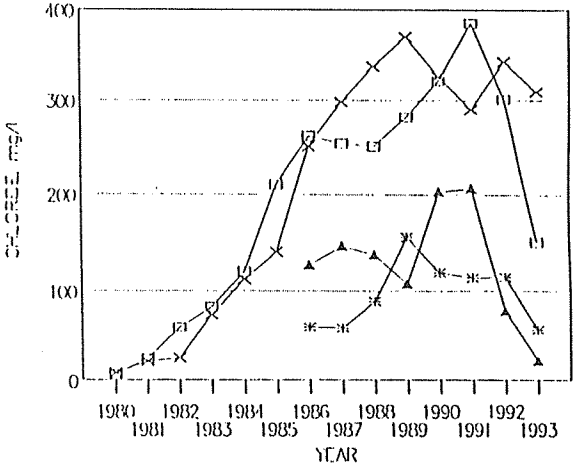
FIGURE 32. WATER QUALITY TREND CHARTS

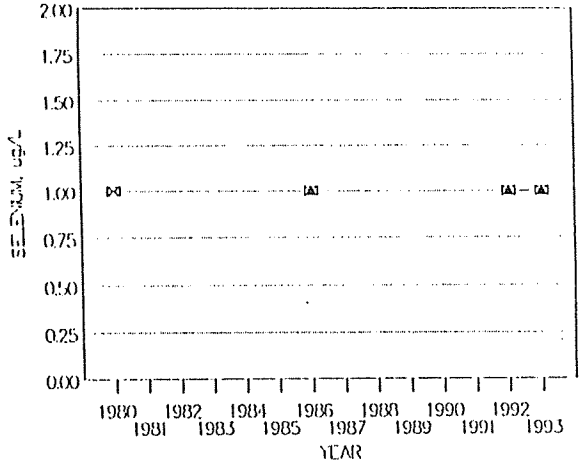
SUBDIVISION DII DOWNGRADIENT WELLS

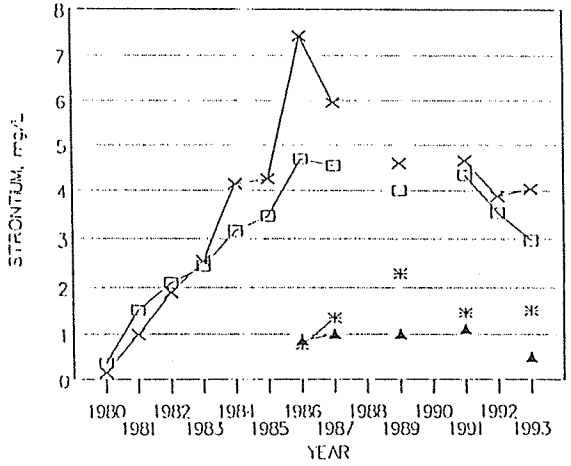


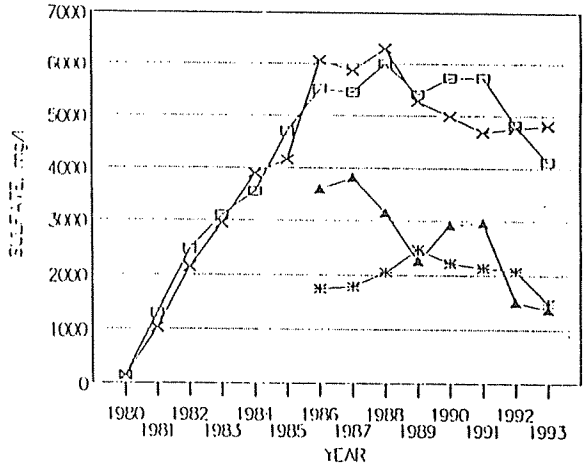












Additional Wells

Additional wells in this subdivision include MW-12, MW-13, MW-72, and MW-73 (Figure 33). Additional wells MW-12 (completed at 78 feet) and MW-13 (completed at 55 feet), are deep wells nested with downgradient well MW-14 (completed at 20 feet). Additional well MW-72 (completed at 24 feet) is considered upgradient based on it's location relative to the easterly ground water flow direction in the subdivision. Additional well MW-73 is downgradient, based upon it's location on a dike in the middle of the Section 16 disposal area.

Additional downgradient wells MW-12 and MW-13 exhibit stable water quality trends over their lengthy periods of record, with the deeper well (MW-12) showing the greatest stability. This indicates that there is very little or no influence of the pond operations at the depth (78 feet) of completion of well MW-12, although the shallow well (MW-14) nested at this location exhibited obvious impacts. Additional upgradient well MW-72 has also exhibited stable concentrations during it's short period of record. Additional downgradient well MW-73, which is completed shallow, has exhibited elevated boron, chloride, strontium, and sulfate concentrations during it's short period of record.

Additional deep downgradient well MW-12 does not appear to exhibit impacts due to site operations; however, the strontium concentrations at that well are consistently above the water quality guideline of 0.05 mg/l. This may indicate that the typical background concentration of strontium may exceed the water quality guideline. Strontium and sulfate exceeded their respective water quality guidelines of 0.05 mg/l and 250 mg/l at the mid-depth downgradient well, MW-13, which is nested with MW-12 and MW-14. Additional upgradient well MW-72 has exceeded the water quality guideline for strontium throughout it's short period of record. Additional downgradient well MW-73 exceeds the water quality guidelines for boron, chloride, strontium, and sulfate.

Influence of Pond Repairs

As indicated previously in the discussion of Subdivision DI, the complex operational history of the various ponds within this subdivision and adjacent Subdivision DI, combined with the generally brief period of record for most of the wells, makes it difficult to observe the specific influence of pond repairs on ground water quality.

Statistical Analysis

Use of Historical Monitoring Data

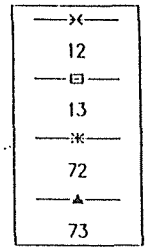
The discussion above, along with examination of the water quality data plots for this subdivision, provide a basis for evaluating the water quality conditions at the monitoring locations. Additional data plots in Appendix E include various exploratory statistical methods to assist in determining the applicability of statistical analyses to the data.

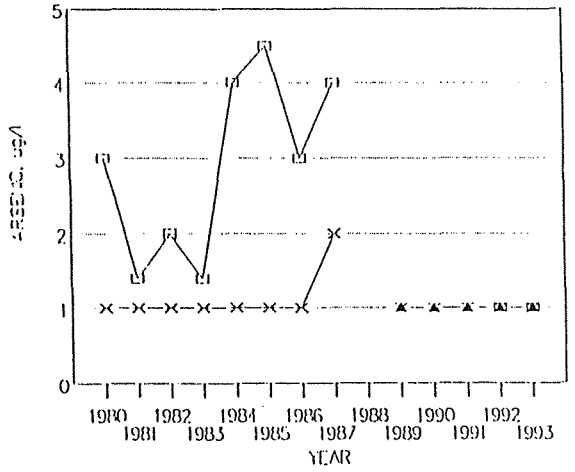
As described previously, ground water conditions within this subdivision and Subdivision DI should exhibit complex behavior because of many possible impacts from surrounding areas and changes in usage of the various ponds over time.

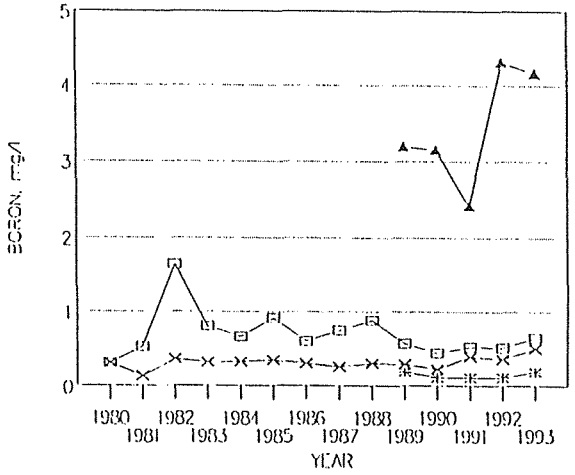
Selection of a Statistical Test

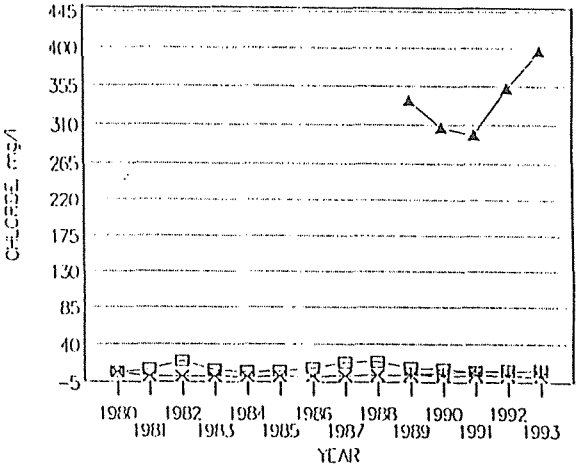
See Subdivision DI for a discussion of the appropriate statistical tests for this subdivision.

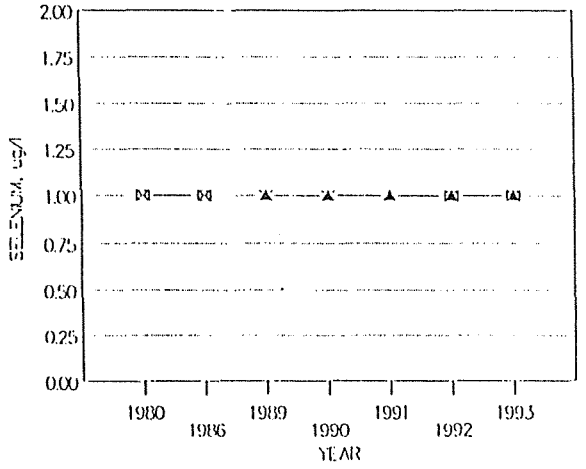
FIGURE 33. WATER QUALITY TREND CHARTS
SUBDIVISION DII ADDITIONAL WELLS

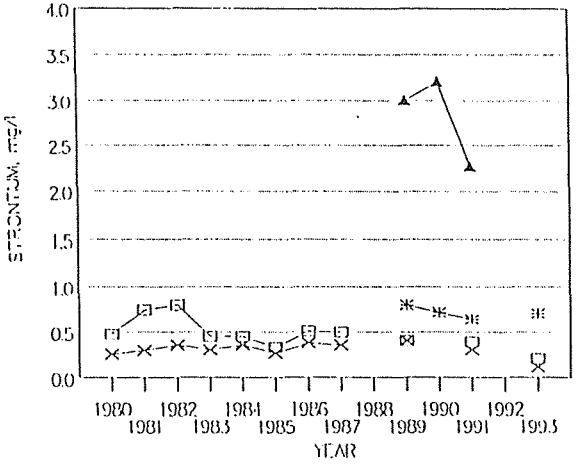


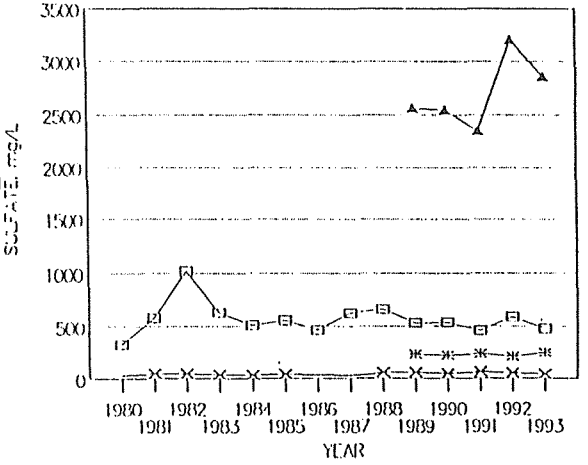












Methods and Calculations

Table 7 in the previous section (Subdivision DI) provides a summary of the calculated tolerance limits applicable to Subdivisions DI and DII. Section 3 of Appendix D describes the calculations for tolerance limits and how tolerance limits are applied to screen average concentrations at downgradient wells. Tolerance limits were not calculated for arsenic or selenium due to the large number of non-detects during the period of record. All values are in units of mg/l.

Error Rates

Error rates for the procedures recommended here are discussed in the Appendices and in the error rates section in the Subdivision A analysis.

Discussion

In general, much of the discussion regarding application of tolerance limits to Subdivision DI and DII data, provided in the previous section, is applicable here. Downgradient wells MW-14 and MW-15 in this subdivision are analogous to well MW-10 in Subdivision DI. Between late 1980 and mid-1986 wells MW-14 and MW-15 exhibited consistent linear increases in concentrations of boron, chloride, strontium, and sulfate (see trend charts). Since 1986, these concentrations have slightly decreased or remained approximately steady.

Relative to wells MW-14 and MW-15, conditions in downgradient wells MW-42 and MW-43 appear stable and low. However, compared to the history of concentrations in the upgradient wells, concentrations of boron, chloride and sulfate in these wells have been significantly more variable. There are many tests of difference in variability. One rule of thumb is that a ratio of 3:1 or greater in standard deviations is significant. Using the range of data as a simple, surrogate measure of variability, one can see ratios of 5:1 or 10:1 in ranges, parameter by parameter, when comparing downgradient wells MW-42 or MW-43 with data in upgradient wells MW-57, MW-71 or MW-74.

It is unclear how significantly increased variability relates to impacts to ground water quality. However, using the tolerance limits for Subdivisions DI and DII developed in the previous section, it can be seen that average boron concentrations in downgradient wells MW-42 and MW-43 of about 10 mg/l (Figure 32) exceed the calculated tolerance limit of 6.61 mg/l. Therefore, some impact has probably occurred, however, the tendency toward lower values in 1992 and 1993 is a sign of possible improvement.

Finally, average chloride concentrations in additional downgradient well MW-73 (Figure 33) exceed the tolerance limit of 138 mg/l. Average concentrations of the other reportable parameters at this well fall within the tolerance limits calculated from the upgradient wells.

SUBDIVISION E

This subdivision spreads over the entire site and at some points beyond the site (Figure 34). No upgradient or downgradient wells have been designated in this area because they could be influenced by more than one source. Water quality sampling locations (with completion depths below ground surface for monitoring wells) in this subdivision and reported herein are as follows:

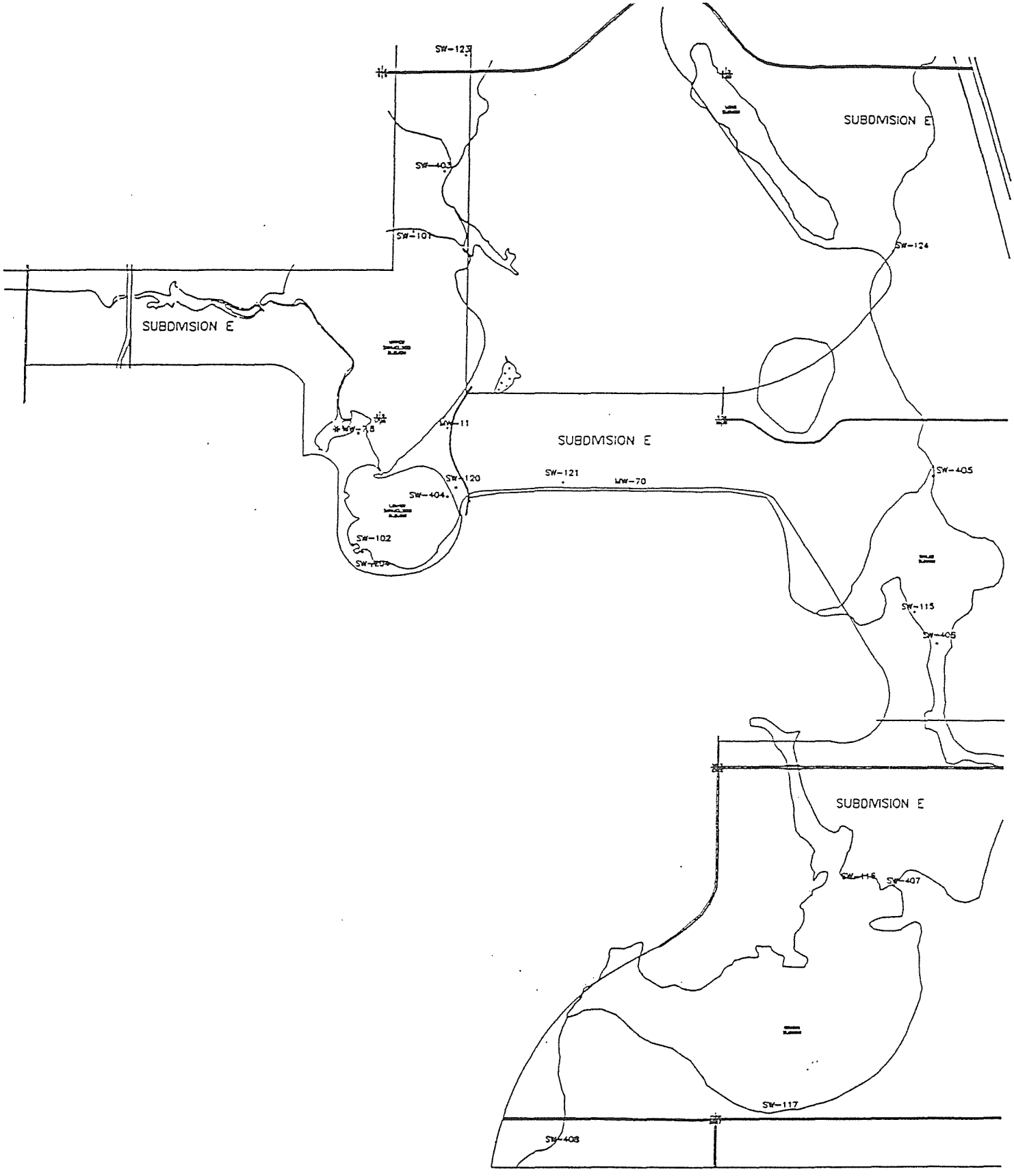


FIGURE 34. Subdivision E Water Quality Monitoring Locations

Ground Water

Upgradient	Downgradient	Additional
None	None	MW-7 (68 ft) MW-8 (20 ft)

Ground water flow direction in this subdivision is variable because the subdivision extends over the entire site.

Surface Water

SW-101
SW-102
SW-103
SW-115
SW-117
SW-123

Wells and sampling locations in this subdivision are associated with the surface water system, which is the shallow ground water discharge point. Ground water from Subdivisions A and B flows southerly toward the surface water bodies. Ground water from Subdivisions C and DI flows northerly toward the same surface water bodies. Ground water from Subdivision DII flows north and east. Additionally, the surface water flows from west to east across most of the site until moving southerly on the east side of the Section 16 Disposal Area.

Qualitative Discussion of Historical Water Quality Data

Time series data plots of the reportable parameter concentrations for the planned water quality monitoring locations in Subdivision E are provided in this section. Table 9 provides a summary of the most recent measured concentrations for Subdivision E in comparison to the water quality guidelines.

Ground Water

Wells associated with this subdivision are additional wells MW-7 (completed at 68 feet) and MW-8 (completed at 20 feet), which form a nested pair (Figure 35). They are situated near the south end of Upper Samuelson Slough, northeast of the Recycle Basin. These wells have a period of record extending from 1979.

Shallow well MW-8 is of special interest because of persistent anomalous elevated concentrations of sulfate (approximately 30,000 to 60,000 mg/l) during the entire period of record. The adjacent nested well (MW-7), which is completed at 68 feet, does not show a similar response. It is thought that the high sulfate concentrations at well MW-8 may be, at least partially, related to a scrubber slurry release which occurred during start-up in 1979. While boron, chloride and strontium concentrations have been quite variable at shallow well MW-8 during most of the period of record, the only constituents which currently exceed the water quality guidelines are strontium at wells MW-7 and MW-8 and sulfate at well MW-8.

Monitoring wells MW-7 and MW-8 were removed in June 1993 in conjunction with reconstruction of Ash Pond #91 and abandonment of the Recycle Basin.

TABLE 9

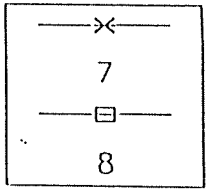
WATER QUALITY SUMMARY - SUBDIVISION E
1993 SAMPLING RESULTS AND WATER QUALITY GUIDELINES

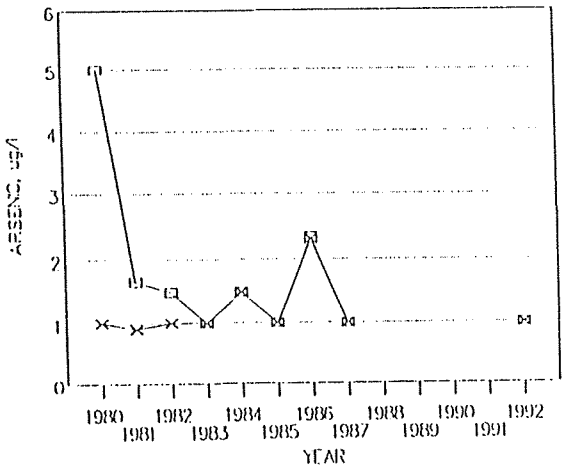
		PARAMETER											
		Arsenic		Boron		Chloride		Selenium		Strontium		Sulfate	
WELL	POSITION	Latest Results	WQ[1] Guide	Latest Results	WQ Guide	Latest Results	WQ Guide	Latest Results	WQ Guide	Latest Results	WQ Guide	Latest Results	WQ Guide
MW-7	Additional	NA	0.05	0.3	0.75	7.19	250	< 0.001	0.01	1.6	0.05	185	250
MW-8	Additional	NA	0.05	0.12	0.75	32.76	250	0.0008	0.01	8.41	0.05	39,807	250
SW-101	Upper Samuelson Slough	0.0047	0.05	1.11	0.75	16.02	250	< 0.001	0.01	0.98	0.05	642	250
SW-102	Lower Samuelson Slough	0.0033	0.05	3.76	0.75	80.67	250	< 0.001	0.01	1.75	0.05	1,742	250
SW-103	East Weller Slough	0.0027	0.05	0.30	0.75	3.03	250	< 0.001	0.01	0.18	0.05	6	250
SW-115	Saylor Slough	< 0.0001	0.05	0.69	0.75	7.04	250	< 0.001	0.01	1.03	0.05	204	250
SW-117	Gradin Slough	0.0014	0.05	0.59	0.75	6	250	< 0.001	0.01	0.51	0.05	61	250
SW-123	Falkirk Mine Drainage	0.0045	0.05	0.27	0.75	7.0	250	< 0.001	0.01	0.59	0.05	84	250

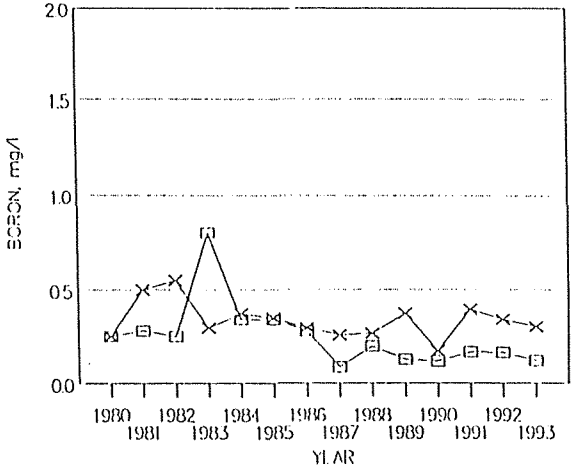
Notes: All concentrations are presented in units of milligrams per liter.
Shaded values indicate latest results which exceed the water quality guidelines.
NA = Not Analyzed
[1] WQ Guide = Water Quality Guideline

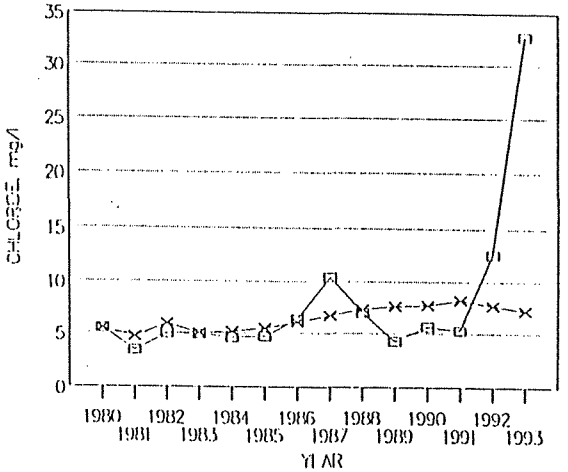
FIGURE 35. WATER QUALITY TREND CHARTS

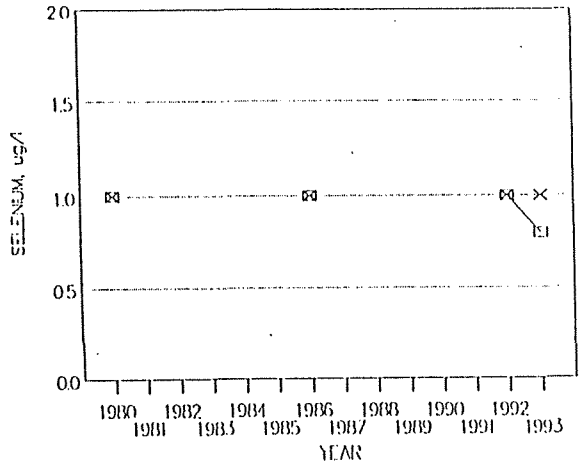
SUBDIVISION E ADDITIONAL WELLS

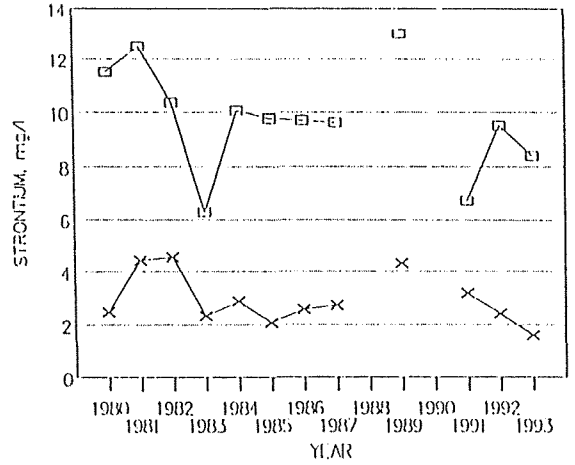


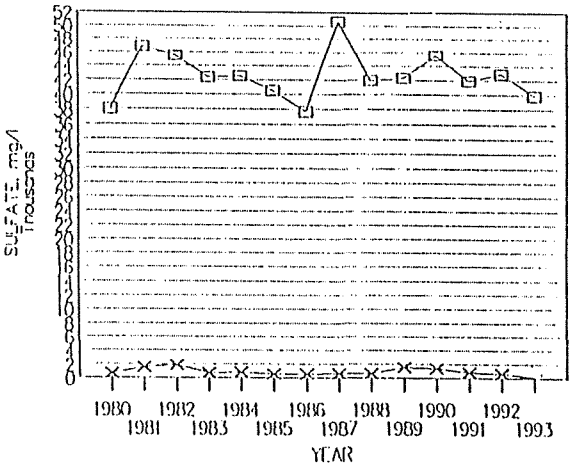












Surface Water

As described above, the surface water system generally moves from west to east and then southerly. The sequence of sampling locations, from upstream to downstream, is as follows:

Upstream	SW-103 East Weller Slough
	SW-123 Falkirk Mine Drainage
	SW-101 Upper Samuelson Slough
	SW-102 Lower Samuelson Slough
	SW-115 Saylor Slough
Downstream	SW-117 Gradin Slough

Water quality data plots for these locations are provided in Figures 36 and 37. Elevated concentrations are observed for boron, chloride, strontium, and sulfate. Arsenic and selenium are either not detected or are significantly below their respective water quality guidelines.

Concentrations in the surface waters are affected by pond leakage into the ground water which discharges into the surface water bodies. Concentrations are generally less upstream than downstream. Increased concentrations in the early-1980s as SW-115 and SW-117 are probably a result of the use of the former East Ash Pond and the former South Ash Pond, both of which are now known to have leaked. Influence from the evaporation ponds was not yet apparent during this early operational period. The rapid concentration increase in the early 1990s, especially at SW-101, is probably the cumulative effect of leakage from the four evaporation ponds in the area. The concentrations have shown a dramatic decrease since pond repairs have been made (allowing for lag time of ground water flow from the vicinity of the evaporation ponds to the Upper Samuelson Slough). In general, the elevated concentrations (especially of chloride and sulfate) have decreased since the mid-1990s because of operational changes and the extensive pond repair program.

Statistical Analysis

Use of Historical Monitoring Data

The discussion above, along with examination of the water quality data plots for this subdivision included in this section, provide a basis for evaluating the water quality conditions at the monitoring locations. Additional data plots in Appendix E include various exploratory statistical methods to assist in determining the applicability of statistical analyses to the data.

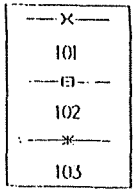
Significant variability in boron and chloride concentrations is apparent in additional well MW-8; however, the concentrations of both parameters are typically below the water quality guidelines. This variability is taken into account in applying the statistical method for this subdivision.

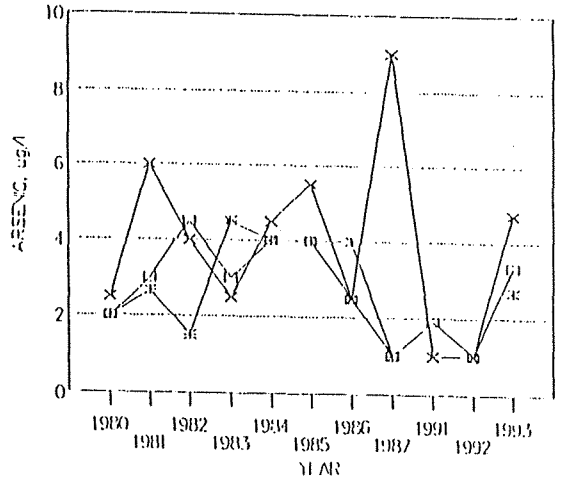
Selection of a Statistical Test

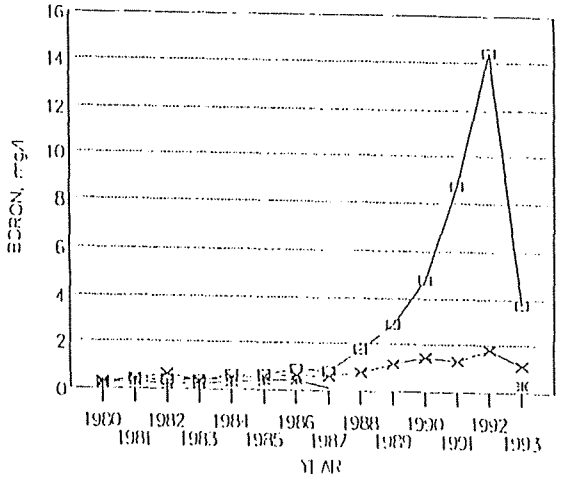
Because no upgradient wells exist in this subdivision for comparison, statistical tests must be intra-well in nature. The histories of the reportable parameters at each well are stable over time, so that use of control charts is an appropriate statistical method for this subdivision.

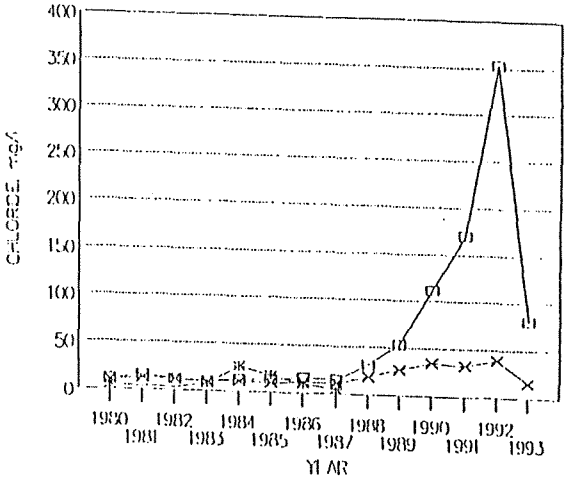
FIGURE 36. WATER QUALITY TREND CHARTS

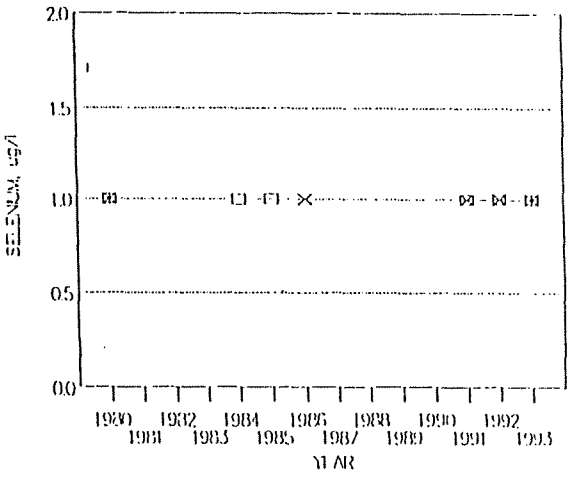
SUBDIVISION E SURFACE WATERS

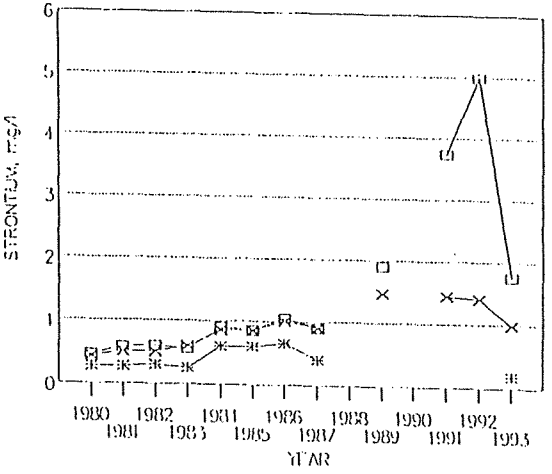












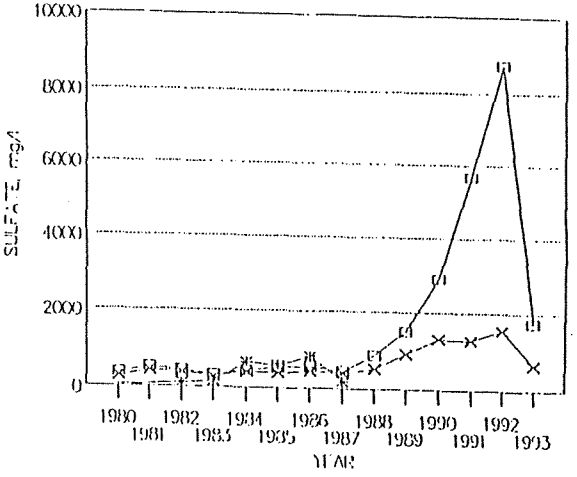
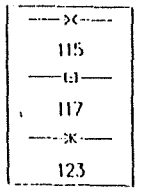
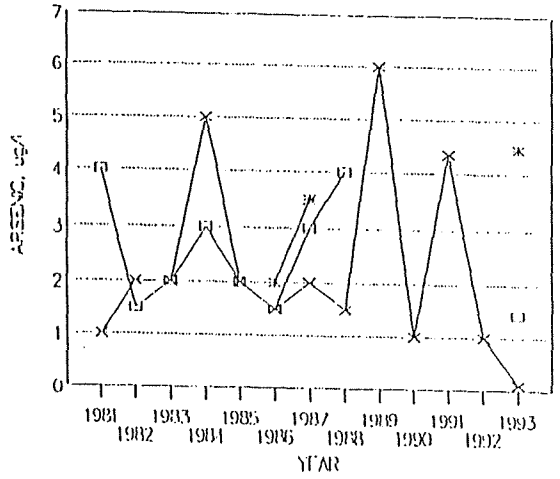
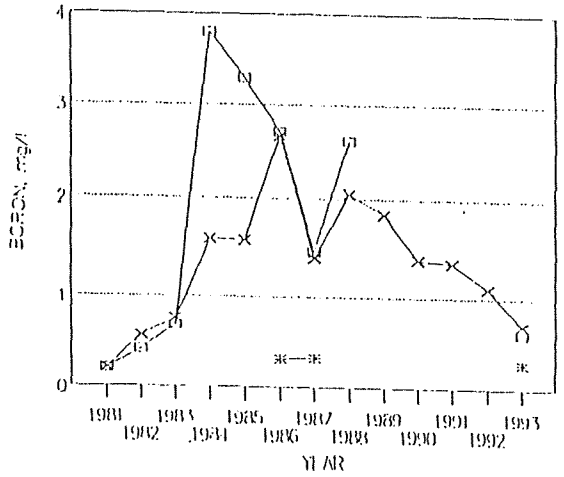


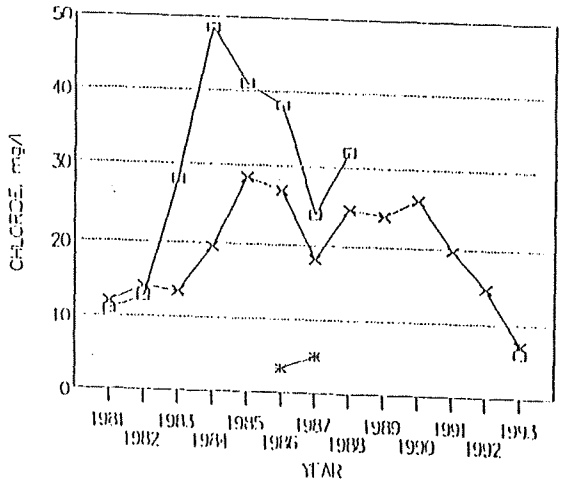
FIGURE 37. WATER QUALITY TREND CHARTS

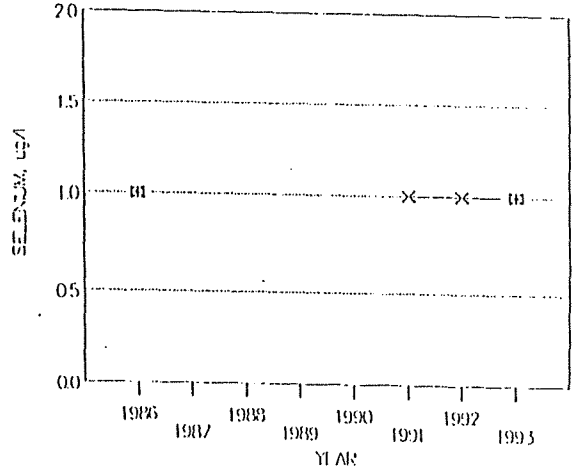
SUBDIVISION E SURFACE WATERS

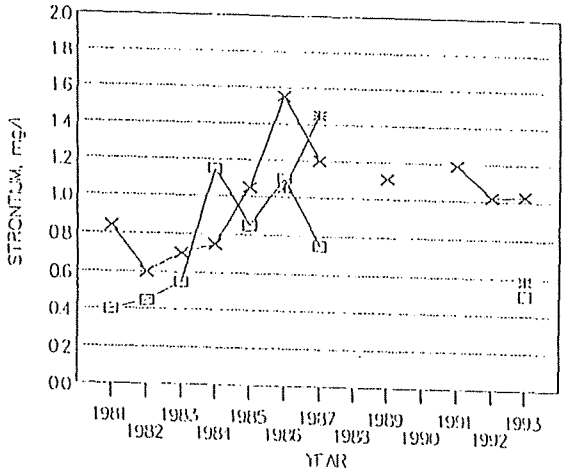


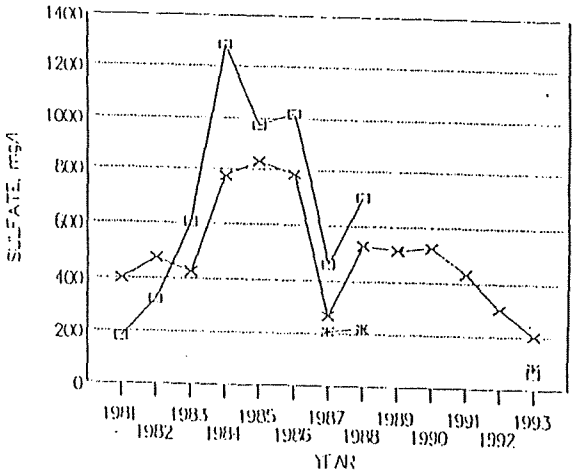












Methods and Calculations

Section 2 of Appendix D discusses control charting methods and calculations. Because the control chart method requires that the sample data be normally distributed, the variability of the parameter concentrations was assessed prior to application of the method. A probability plot of boron concentrations in well MW-8 indicated that the data are lognormally distributed (i.e., a logarithmic transformation of the data produces a normal distribution of the transformed data). Therefore, control charts for boron at well MW-8 should be based on the logarithms of the concentrations.

Error Rates

Section 2 of Appendix D discusses error rates for control charts.

Discussion

Control charts developed for boron, chloride, strontium, and sulfate at addition wells MW-7 and MW-8 are provided on the figures included in Appendix E. Examination of the control charts indicates that the latest (1993) value of chloride at well MW-8 is outside of the control limits: the running mean is about 5 mg/l, the upper control limit is about 20 mg/l, and this recent measurement is over 32 mg/l. Apart from a high arsenic concentration in 1980, this is the only anomalous value among all the Subdivision E data. Even though the recent elevated chloride value is outside the control limits, the value is far below the water quality guideline of 250 mg/l.

Data in well MW-8 appear to exhibit seasonality. This is difficult to characterize and quantify because monitoring is only semiannual to annual. However, the regular pattern of up and down variations which is exhibited to varying degrees by several reportable parameters (e.g., boron, chloride and sulfate) during their histories is typical of seasonality. This behavior is not unusual for surface water monitoring data or for measurements of conditions strongly affected by surface water, such as at shallow well MW-8. The sizes of the fluctuations relative to average concentrations tend to be small; so they can be considered "noise" in the data.

SUBDIVISION F - SECTIONS 5, 31 AND 32 DISPOSAL AREAS

These three disposal areas are located approximately one mile north of Evaporation Ponds #91 and #92 (Figure 38). The disposal areas in Subdivision F are not used for liquids. These areas are engineered landfills for dewatered ash that has been removed from the former South Ash Pond and from current Ash Ponds #91 and #92. The sites were clay lined before ash was placed into these areas. Water quality sampling locations (with completion depths below ground surface for monitoring wells) in this subdivision are as follows:

Section 5:

Ground Water

Upgradient	**Downgradient**	**Additional**
MW-531 (113.8 ft)	MW-535 (109.7 ft)	None
MW-533 (107.7 ft)	MW-536 (89.9 ft)	
MW-534 (92.1 ft)	MW-537 (71.3 ft)	
	MW-538 (50 ft)	
	MW-539 (57.7 ft)	
	MW-540 (41.6 ft)	
	MW-541 (74.3 ft)	
	MW-542 (47.6 ft)	

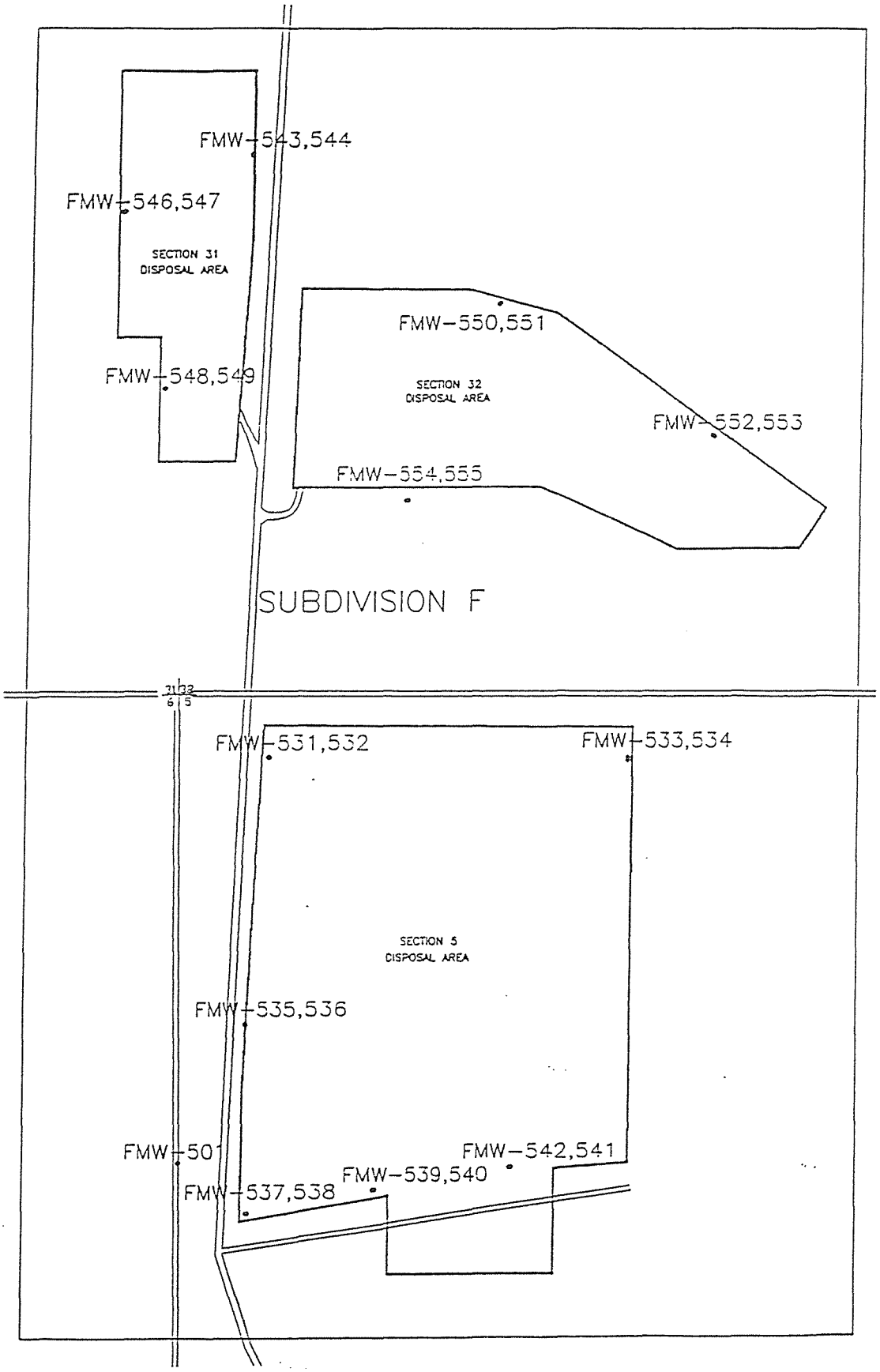


FIGURE 38. Subdivision F Water Quality Monitoring Locations

Surface Water

SW-601
SW-602

Section 31:

Ground Water

Upgradient	Downgradient	Additional
MW-543 (68.1 ft)	MW-546 (79.6 ft)	None
MW-544 (26.8 ft)	MW-547 (38.5 ft)	
	MW-548 (61.4 ft)	
	MW-549 (33.8 ft)	

Surface Water

None

Section 32:

Ground Water

Upgradient	Downgradient	Additional
MW-550 (62.9 ft)	MW-554 (78.1 ft)	None
MW-551 (35.2 ft)	MW-555 (47.1 ft)	
MW-552 (69.8 ft)		
MW-553 (56.2 ft)		

Surface Water

None

Qualitative Discussion of Historical Water Quality Data

Tables 10, 11 and 12 provide a summary of the most recent measured concentrations for Subdivision F (Sections 5, 31, and 32, respectively) in comparison to the water quality guidelines. Water quality trend charts are provided in Figures 39-47.

The Subdivision F disposal areas are in locations that were previously mined for coal. Water quality conditions more likely represent equilibration of post-mining effects rather than impacts from ash disposal. This is especially true at upgradient locations MW-544 and MW-551 (upgradient for Sections 31 and 32, respectively) where weathered "punky" coal was encountered in the Falkirk Mine Area. Elevated constituent concentrations in the Falkirk Mine Area are suspected of being related to contact of the ground water with naturally-occurring weathered coal.

Monitoring wells at each of the three disposal sites are completed in two units at each location. The wells monitor ground water found at approximately the same elevation as the ash and also the first water-bearing unit below the ash disposal facility.

TABLE 10

WATER QUALITY SUMMARY - SUBDIVISION F: SECTION 5
1993 SAMPLING RESULTS AND WATER QUALITY GUIDELINES

		PARAMETER											
		Arsenic		Boron		Chloride		Selenium		Strontium		Sulfate	
WELL	POSITION	Latest Results	WQ[1] Guide	Latest Results	WQ Guide	Latest Results	WQ Guide	Latest Results	WQ Guide	Latest Results	WQ Guide	Latest Results	WQ Guide
MW-531	Upgradient	0.00011	0.05	0.46	0.75	3.52	250	< 0.001	0.01	0.46	0.05	245	250
MW-533	Upgradient	< 0.001	0.05	0.71	0.75	3.16	250	< 0.001	0.01	1.68	0.05	223	250
MW-534	Upgradient	0.0021	0.05	0.62	0.75	6.59	250	< 0.001	0.01	2.87	0.05	580	250
MW-535	Downgradient	< 0.001	0.05	0.41	0.75	5.16	250	< 0.001	0.01	0.25	0.05	314	250
MW-536	Downgradient	< 0.001	0.05	0.71	0.75	6.28	250	< 0.001	0.01	4.8	0.05	1107	250
MW-537	Downgradient	< 0.001	0.05	0.55	0.75	4.31	250	< 0.001	0.01	1.25	0.05	430	250
MW-538	Downgradient	< 0.001	0.05	0.4	0.75	2.18	250	< 0.001	0.01	2.25	0.05	138	250
MW-539	Downgradient	< 0.001	0.05	0.64	0.75	4.75	250	< 0.001	0.01	1.95	0.05	234	250
MW-540	Downgradient	< 0.001	0.05	0.95	0.75	4.5	250	< 0.001	0.01	4.32	0.05	338	250
MW-541	Downgradient	0.0016	0.05	0.41	0.75	16.78	250	< 0.001	0.01	0.67	0.05	706	250
MW-542	Downgradient	< 0.001	0.05	0.75	0.75	4.75	250	< 0.001	0.01	2.8	0.05	975	250
SW-601		0.0017	0.05	7.26	0.75	4.75	250	0.0064	0.01	0.95	0.05	256	250
SW-602		< 0.001	0.05	0.22	0.75	2.6	250	< 0.001	0.01	0.28	0.05	71	250

Notes: All concentrations are presented in units of milligrams per liter.
Shaded values indicate latest results which exceed the water quality guidelines.
NA = Not Analyzed
[1] WQ Guide = Water Quality Guideline

TABLE 11

WATER QUALITY SUMMARY - SUBDIVISION F: SECTION 31
1993 SAMPLING RESULTS AND WATER QUALITY GUIDELINES

		PARAMETER											
		Arsenic		Boron		Chloride		Selenium		Strontium		Sulfate	
WELL	POSITION	Latest Results	WQ[1] Guide	Latest Results	WQ Guide	Latest Results	WQ Guide	Latest Results	WQ Guide	Latest Results	WQ Guide	Latest Results	WQ Guide
MW-543	Upgradient	< 0.001	0.05	0.44	0.75	3.82	250	< 0.001	0.01	0.7	0.05	299	250
MW-544	Upgradient	< 0.001	0.05	5.92	0.75	70.78	250	0.105	0.01	4.54	0.05	3,188	250
MW-546	Downgradient	< 0.001	0.05	0.5	0.75	5.13	250	< 0.001	0.01	0.47	0.05	201	250
MW-547	Downgradient	< 0.001	0.05	0.49	0.75	26.34	250	< 0.001	0.01	2.58	0.05	903	250
MW-548	Downgradient	< 0.001	0.05	0.55	0.75	3.04	250	< 0.001	0.01	2.8	0.05	459	250
MW-549	Downgradient	< 0.001	0.05	0.24	0.75	2.16	250	< 0.001	0.01	0.97	0.05	175	250

Notes: All concentrations are presented in units of milligrams per liter.
Shaded values indicate latest results which exceed the water quality guidelines.
NA = Not Analyzed
[1] WQ Guide = Water Quality Guideline

TABLE 12

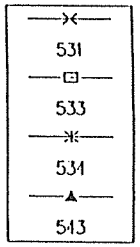
WATER QUALITY SUMMARY - SUBDIVISION F: SECTION 32
1993 SAMPLING RESULTS AND WATER QUALITY GUIDELINES

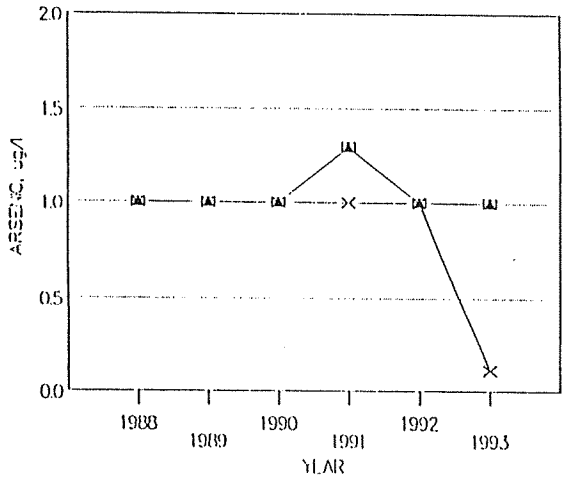
		PARAMETER											
		Arsenic		Boron		Chloride		Selenium		Strontium		Sulfate	
WELL	POSITION	Latest Results	WQ[1] Guide	Latest Results	WQ Guide	Latest Results	WQ Guide	Latest Results	WQ Guide	Latest Results	WQ Guide	Latest Results	WQ Guide
MW-550	Upgradient	< 0.001	0.05	0.38	0.75	2.89	250	< 0.001	0.01	1.07	0.05	126	250
MW-551	Upgradient	< 0.001	0.05	0.22	0.75	44.72	250	< 0.001	0.01	5.34	0.05	1,179	250
MW-552	Upgradient	< 0.001	0.05	0.6	0.75	4.5	250	< 0.001	0.01	2.37	0.05	361	250
MW-553	Upgradient	< 0.001	0.05	0.95	0.75	4.48	250	< 0.001	0.01	3.38	0.05	624	250
MW-554	Downgradient	< 0.001	0.05	0.34	0.75	5.14	250	< 0.001	0.01	2.89	0.05	325	250
MW-555	Downgradient	< 0.001	0.05	0.64	0.75	4.83	250	< 0.001	0.01	8.15	0.05	1,764	250

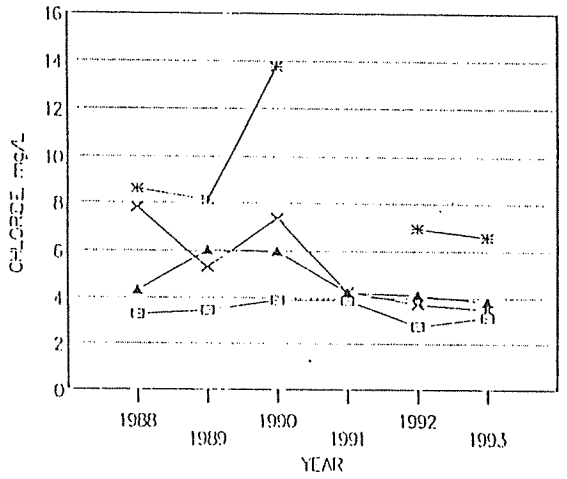
Notes: All concentrations are presented in units of milligrams per liter.
Shaded values indicate latest results which exceed the water quality guidelines.
NA = Not Analyzed
[1] WQ Guide = Water Quality Guideline

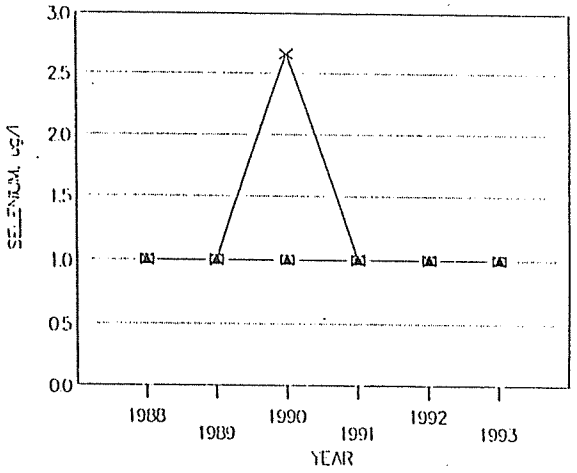
FIGURE 39. WATER QUALITY TREND CHARTS

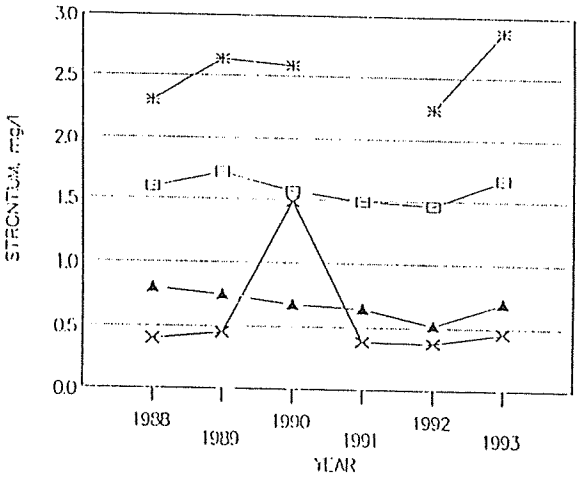
SUBDIVISION F UPGRADIENT WELLS











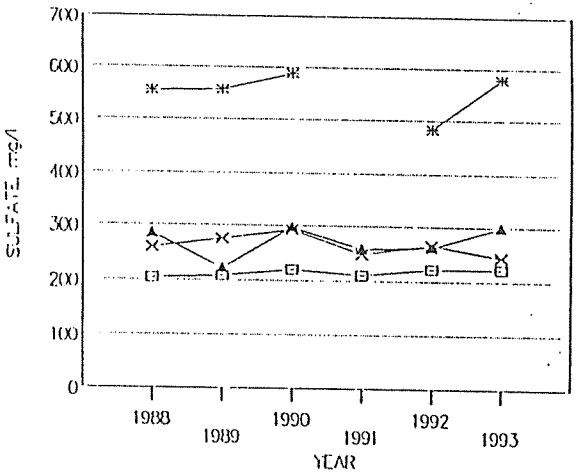
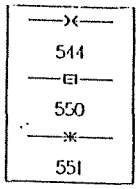
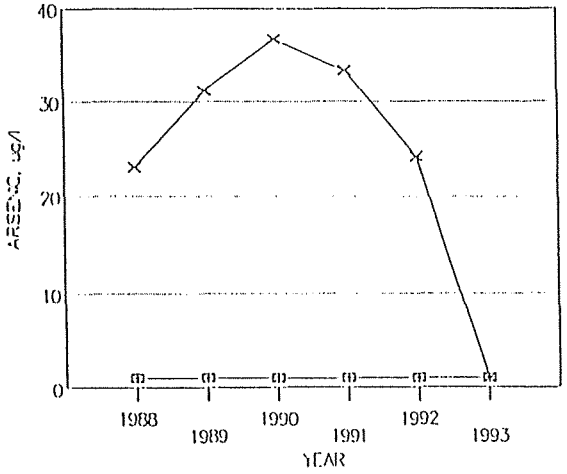
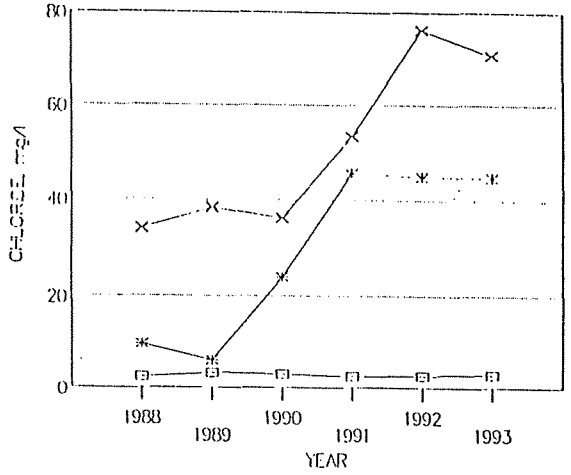


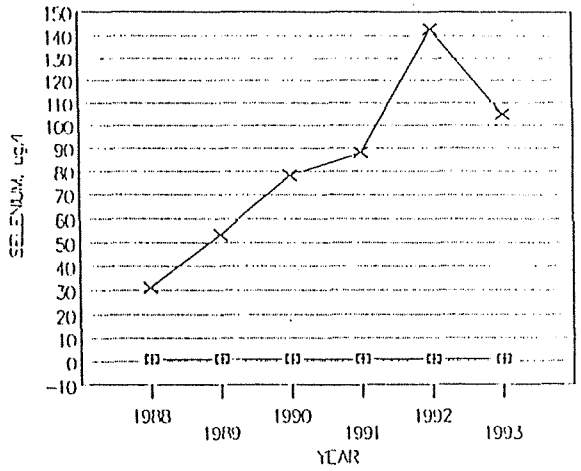
FIGURE 40. WATER QUALITY TREND CHARTS

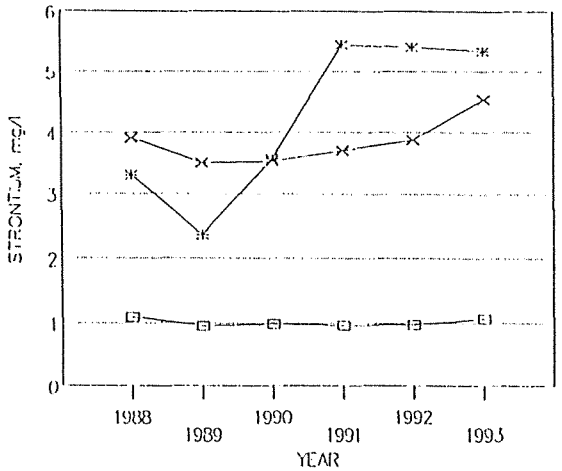
SUBDIVISION F UPGRADIENT WELLS











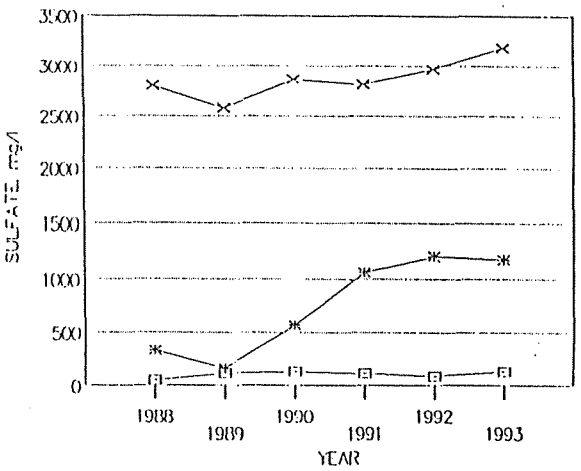
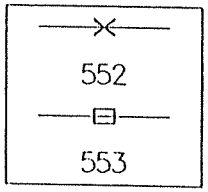
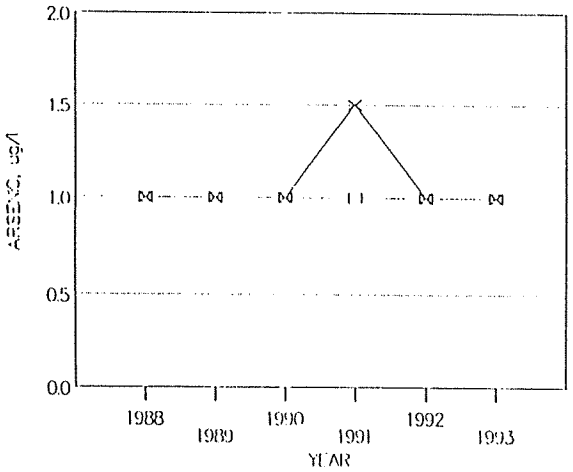
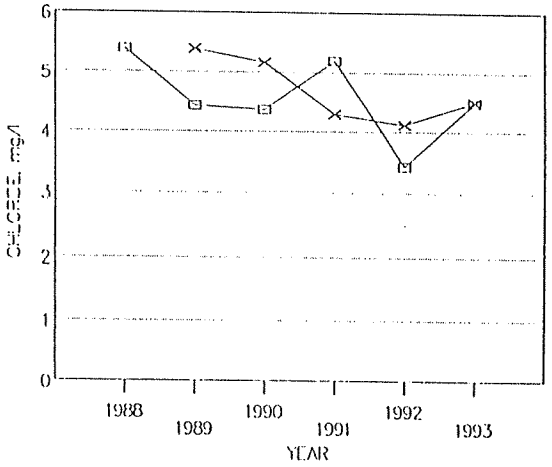


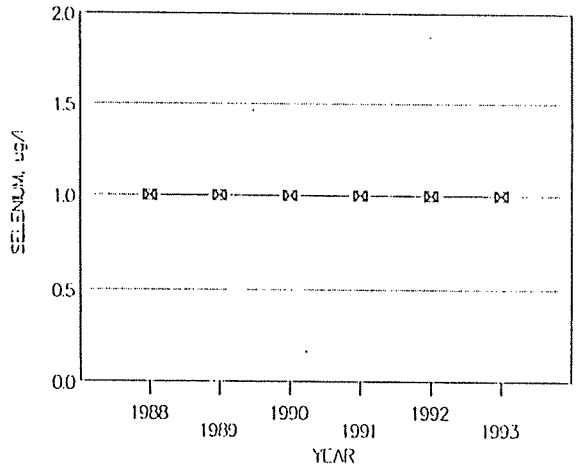
FIGURE 41. WATER QUALITY TREND CHARTS

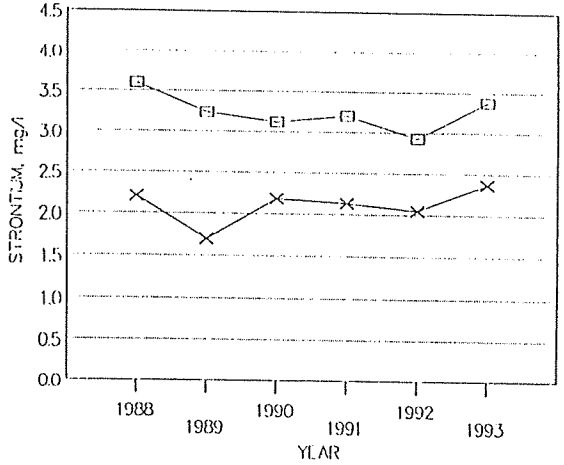
SUBDIVISION F UPGRADIENT WELLS











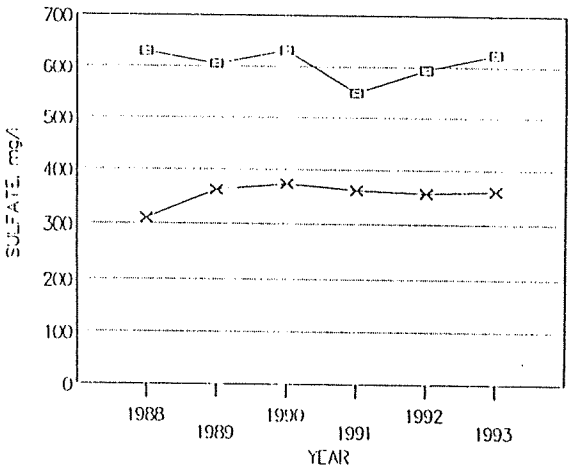
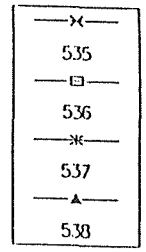
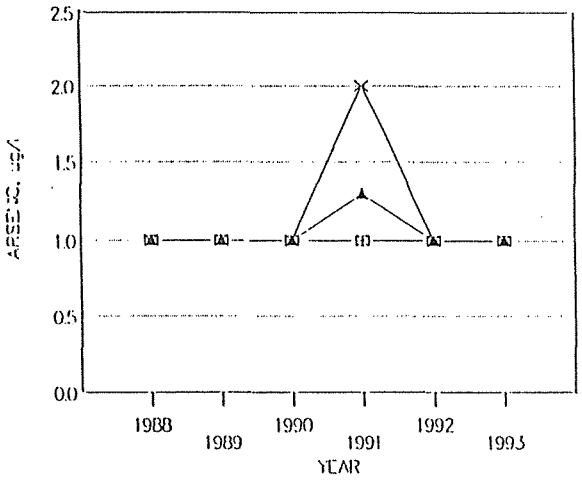
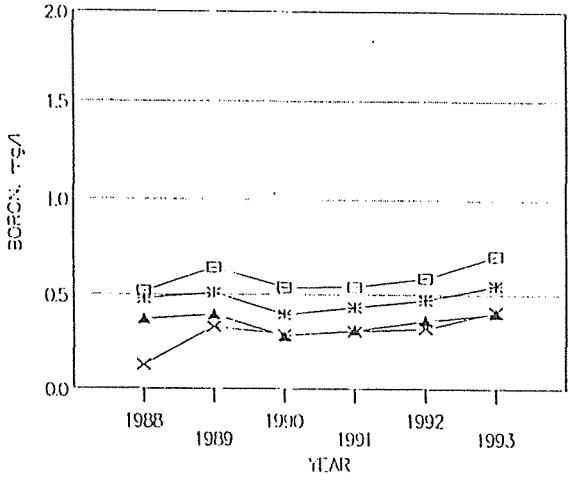


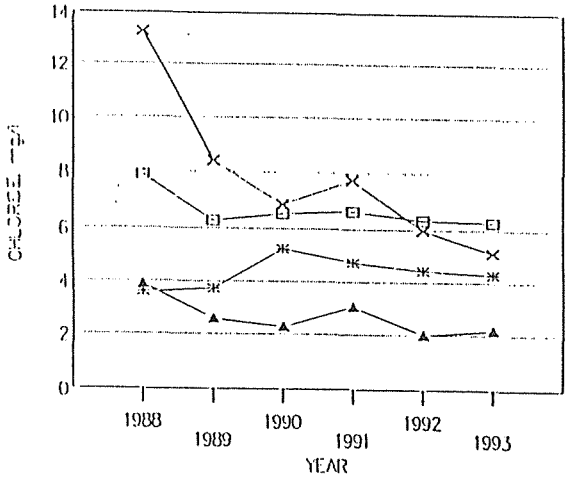
FIGURE 42. WATER QUALITY TREND CHARTS

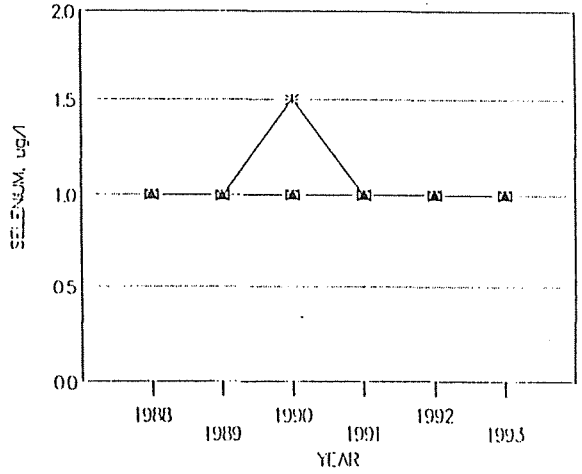
SUBDIVISION F DOWNGRADIENT WELLS

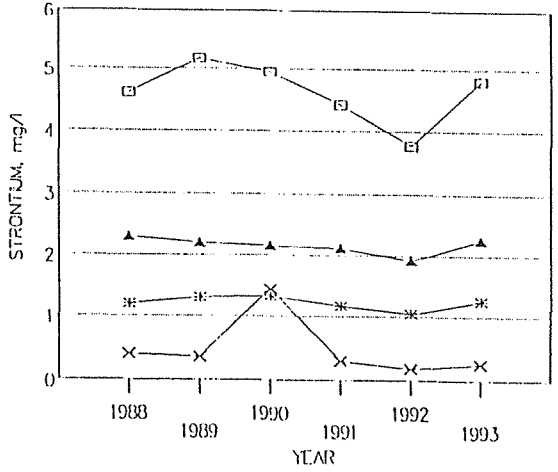












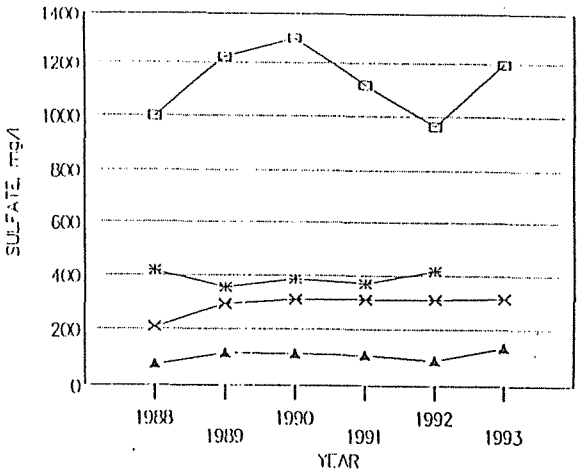


FIGURE 43. WATER QUALITY TREND CHARTS

SUBDIVISION F DOWNGRADIENT WELLS

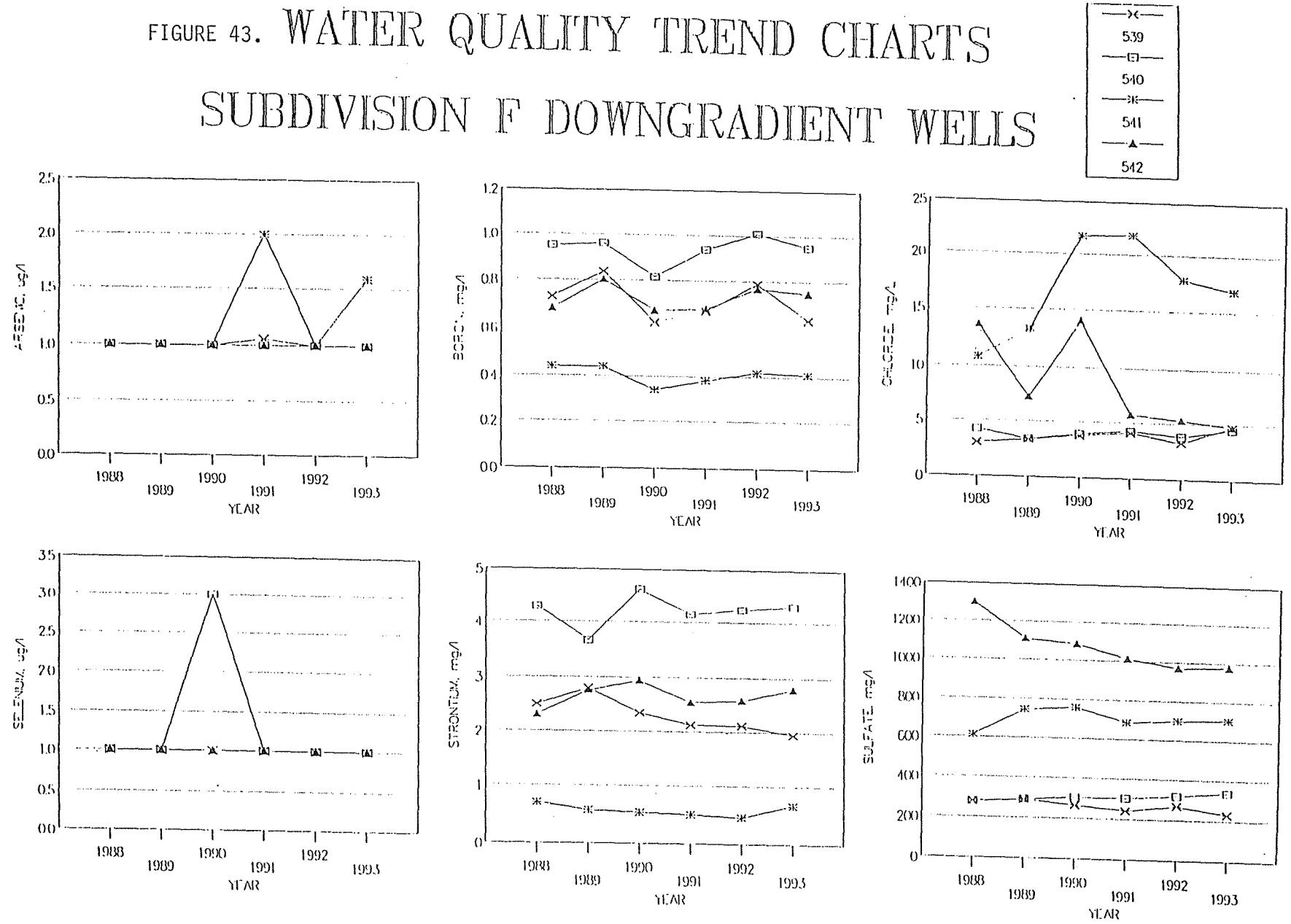
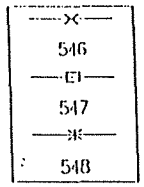
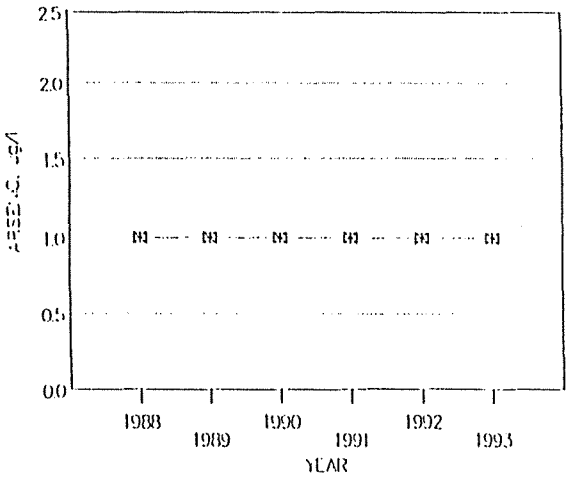
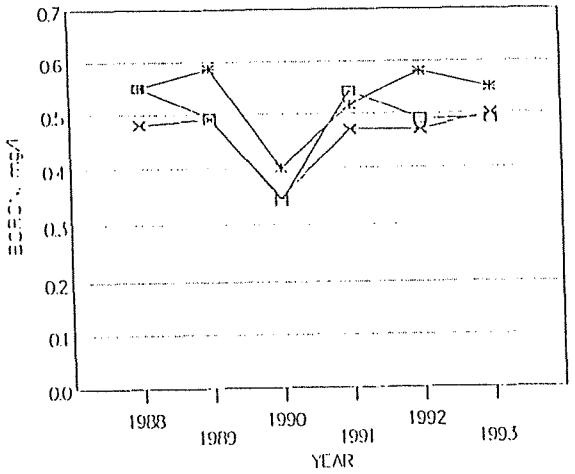


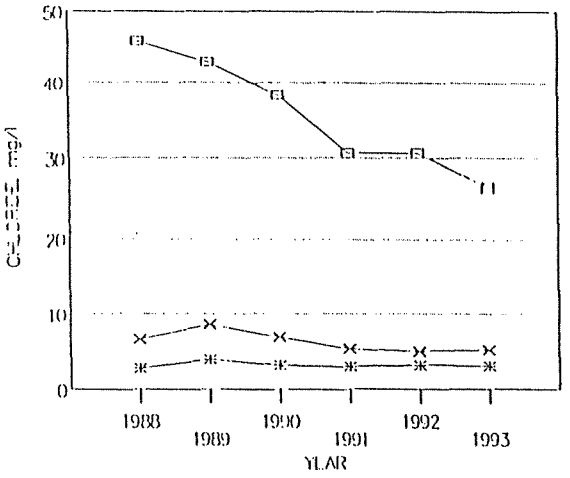
FIGURE 44. WATER QUALITY TREND CHARTS

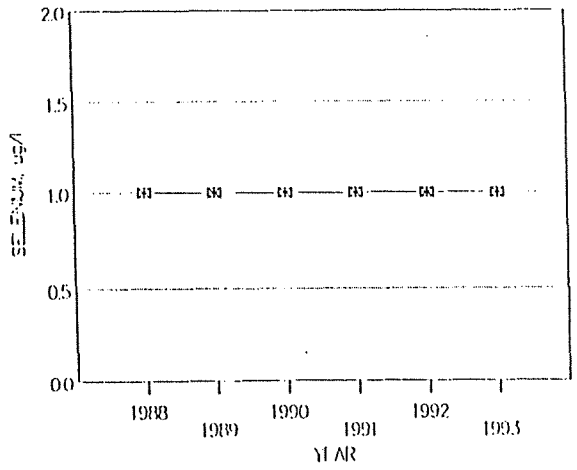
SUBDIVISION F DOWNGRADIENT WELLS

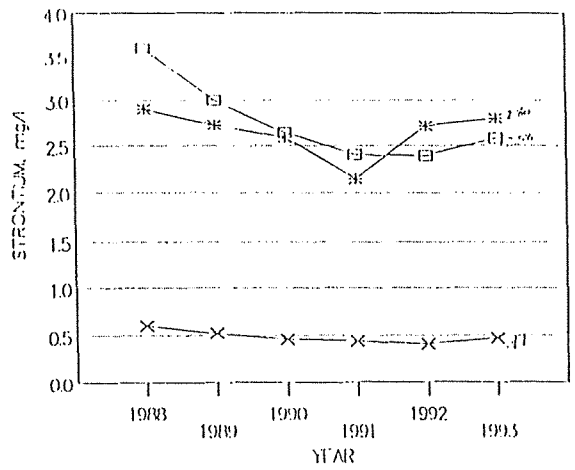












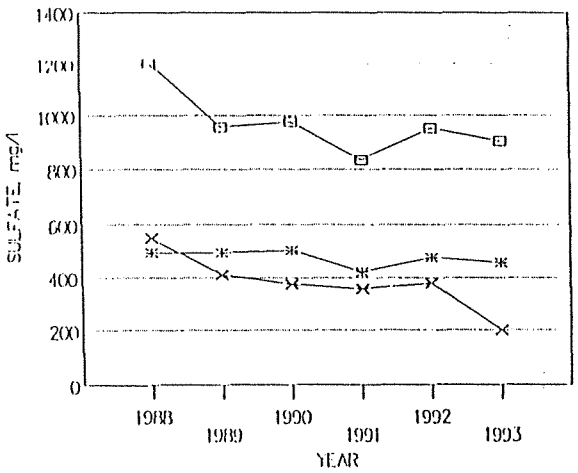
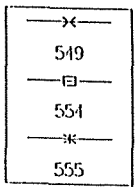
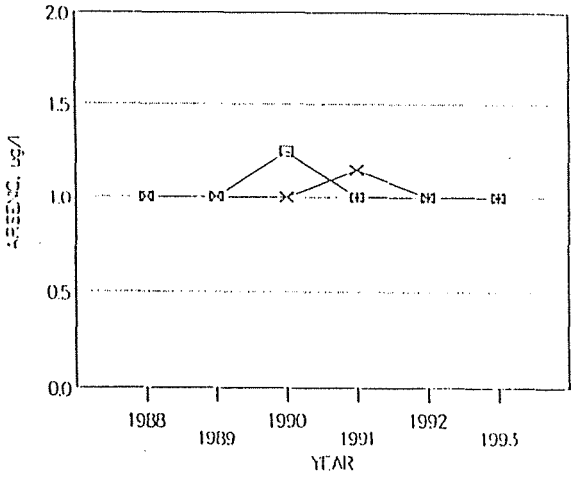
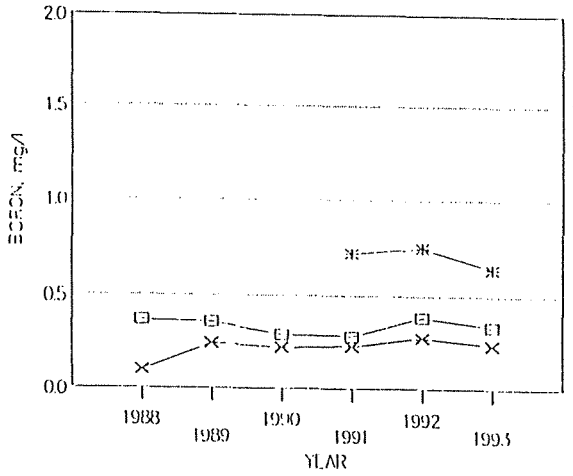


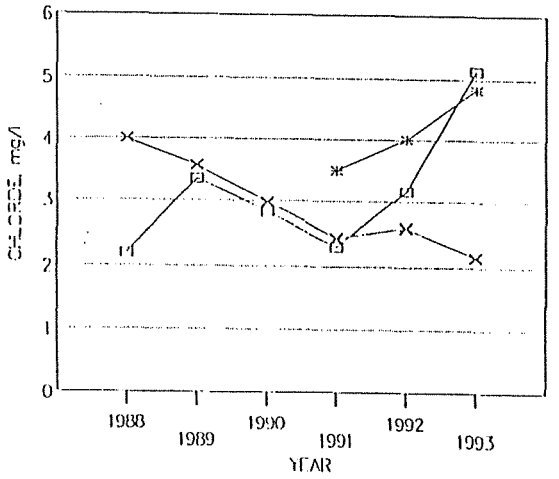
FIGURE 45. WATER QUALITY TREND CHARTS

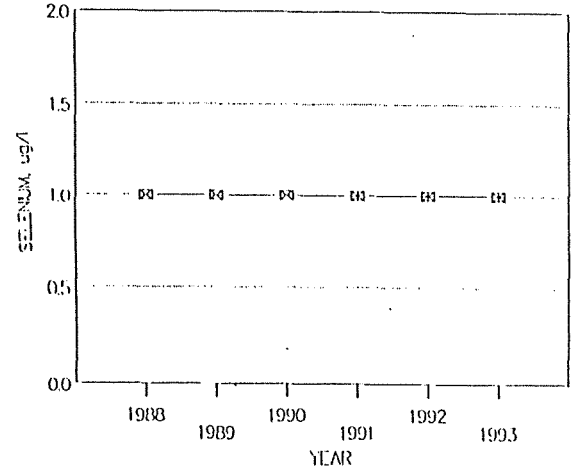
SUBDIVISION F DOWNGRADIENT WELLS

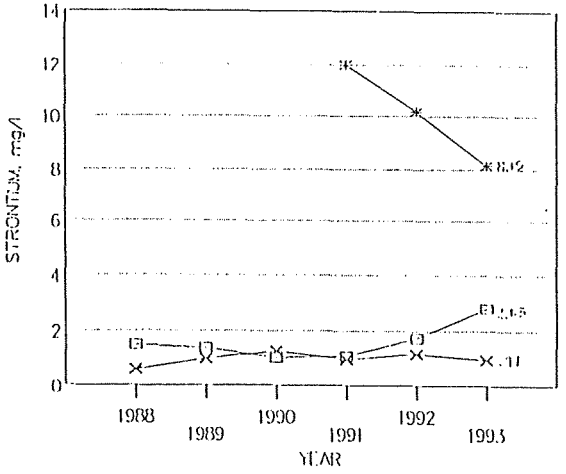












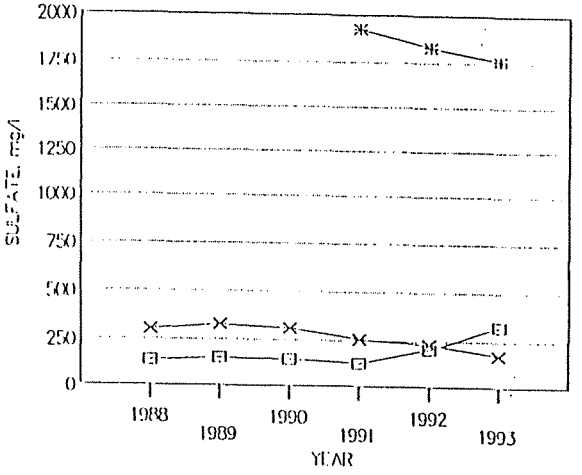
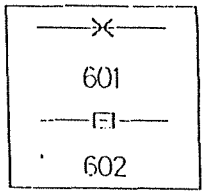
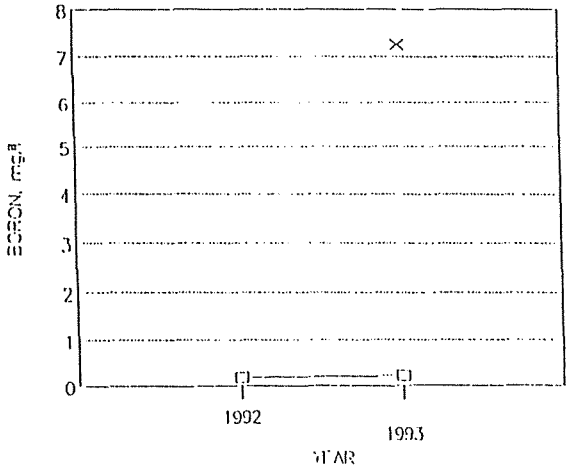
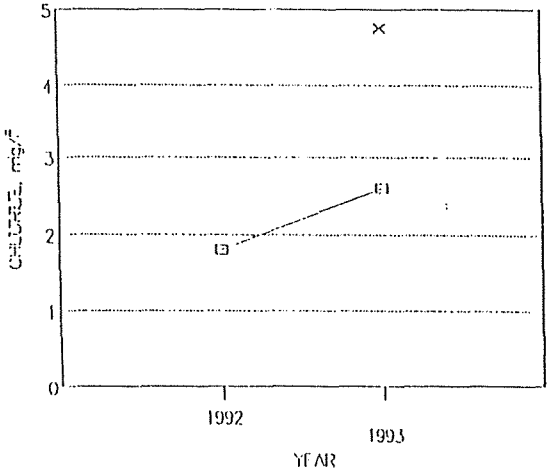


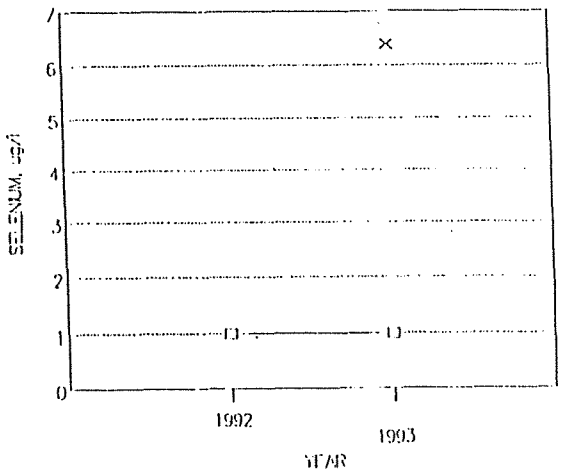
FIGURE 46. WATER QUALITY TREND CHARTS

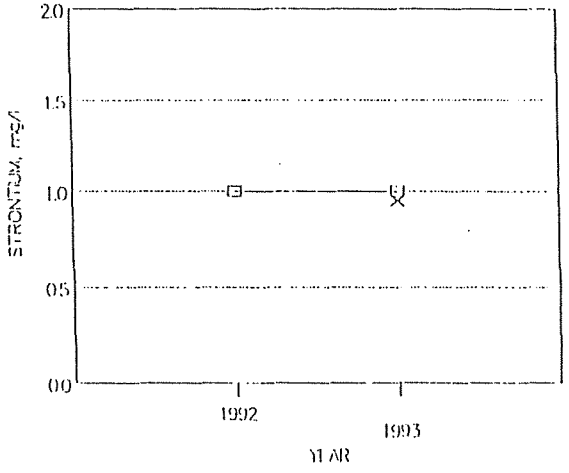
SUBDIVISION F SURFACE WATERS











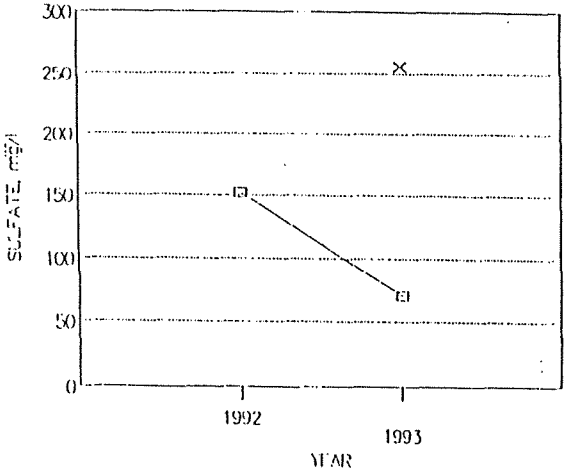
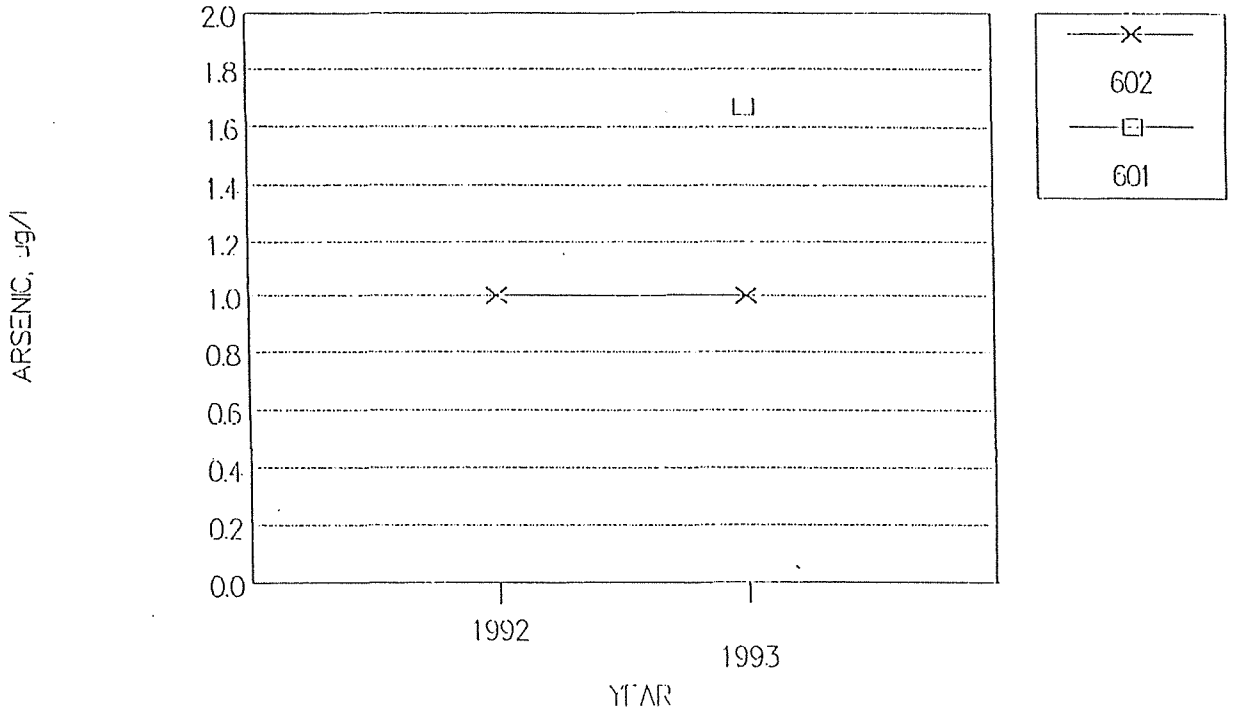


FIGURE 47. WATER QUALITY TREND CHART

SUBDIVISION F SURFACE WATERS



In general, parameter concentrations are stable for all monitoring wells other than MW-544 and MW-551. Increasing concentrations of chloride, selenium and sulfate at well MW-544, and chloride, strontium and sulfate at well MW-551, are considered to be due to the "punky" coal area, as outlined above. Although increasing, the concentrations of chloride at well MW-544 are well below the water quality guidelines. Selenium exceeded the water quality guideline of 0.010 mg/l at well MW-544 during 1993. The concentrations of chloride at well MW-551 are also well below the water quality guideline.

Statistical Analysis

Use of Historical Monitoring Data

The discussion above, along with examination of the water quality data plots for this subdivision, provide a basis for evaluating the water quality conditions at the monitoring locations. Additional data plots in Appendix E include various exploratory statistical methods to assist in determining the applicability of statistical analyses to the data.

The available data begin in late 1988 and were obtained almost quarterly, with some recent gaps. All data appear usable. The monitoring histories are not long enough to exhibit distinct changes in the long term.

Selection of a Statistical Test

Some monitoring histories exhibit sharp, consistent increasing trends (see trend charts), while others appear stable. Among the trending histories are several obtained at wells considered upgradient (e.g., chloride, selenium and sulfate at well MW-544 in Section 31, and chloride, strontium and sulfate at well MW-551 in Section 32). Because of this, comparisons in concentrations between upgradient wells and downgradient wells should not yet be attempted. Intra-well comparisons--control charts and regression--are appropriate.

Methods and Calculations

Sections 1 and 2 of Appendix D discuss regression and control chart methods, respectively.

Error Rates

Sections 1 and 2 of Appendix D discuss the error rates associated with regression and control chart methods. The probability of incorrectly identifying a trend using regression, for a history that merely exhibits trend induced by random variability, is 1%.

Discussion

The results of the trend and control chart tests included in Appendix E characterize each well according to whether it exhibits one or more significantly increasing trends among its reportable parameters. Table 13 summarizes the results of examining the regressions and control charts provided in Appendix E. Reference to the presence of trends is indicated as "yes" or "no", with "yes" indicated for trends which are readily apparent and of sufficient magnitude.

Upgradient wells MW-544 (Section 31) and MW-551 (Section 32) exhibit strong changes. In well MW-544, chloride concentrations doubled between 1991 and 1993; selenium concentrations tripled between 1989 and 1993; and sulfate concentrations increased 20% between 1989 and 1993. All were statistically significant trends. Of these three trending parameters, selenium and sulfate have exceeded their respective water quality guidelines of 0.010 mg/l and 250 mg/l, respectively. Although not exhibiting trending behavior, boron and strontium also exceed their respective water quality guidelines of 0.75 mg/l and 0.05 mg/l.

TABLE 13

RESULTS OF TREND ANALYSIS FOR REPORTABLE PARAMETERS
SUBDIVISION F

Well	Well Location	Trends Present (Direction)	Parameter
Section 5			
531	Upgradient	No	
533	Upgradient	No	
534	Upgradient	No	
535 - 542	Downgradient	No	
Section 31			
543	Upgradient	No	
544	Upgradient	Yes (Increase)	chloride, selenium, sulfate
546	Upgradient	Yes (Decrease)	sulfate
547	Downgradient	Yes (Decrease)	chloride, strontium
548	Downgradient	No	
549	Downgradient	Yes (Decrease)	sulfate
Section 32			
550	Upgradient	No	
551	Upgradient	Yes (Increase)	chloride, strontium, sulfate
552	Upgradient	No	
553	Upgradient	No	
554	Downgradient	No	
555	Downgradient	Insufficient Data	

In upgradient well MW-551 (Section 32), chloride concentrations quintupled between 1989 and 1993; strontium concentrations doubled between 1990 and 1993; and sulfate concentrations increased almost an order of magnitude between 1990 and 1993. Of these trending parameters, strontium and sulfate have exceeded their respective water quality guidelines.

Because of this evidence of change, suppose that wells 544 and 551 are dropped from the list of upgradient wells. Assume that the remaining upgradient wells truly represent upgradient conditions. From the average concentrations of each parameter at these seven remaining wells tolerance limits can be developed for screening the averages at other wells in the subdivision, following the same approach as utilized in the Subdivision DI analysis. Table 14 presents the tolerance limits for the four reportable parameters consistently detected in wells within Subdivision F.

TABLE 14

TOLERANCE LIMITS - SUBDIVISION F

Parameter	Mean (mg/l)	Standard Deviation (mg/l)	Sample Size	ANOVA P-Value	Tolerance Limit (mg/l)
Boron	0.552	0.665	7	< 1.0E-6 %	2.81
Chloride	5.19	7.16	7	< 1.0E-6 %	29.5
Strontium	1.67	3.60	7	< 1.0E-6 %	13.9
Sulfate	342	622	7	< 1.0E-6 %	2,456

Notes: Mean is the mean value of the average background concentrations. Standard Deviation is the standard deviation of the average background concentrations. Sample size is the number of upgradient wells used. ANOVA P-Value is the Analysis of Variance P-Value used to estimate the average concentrations and standard deviation of the averages; the very low values confirm the significance of the assumption of spatial variability. Tolerance Limit is the one-sided upper 95%-coverage, 95%-confidence tolerance limit.

Table 15 provides a summary of monitoring locations and parameters for which recent average concentrations exceed their tolerance limits as calculated above.

TABLE 15

TOLERANCE LIMITS EXCEEDANCES - SUBDIVISION F

Well	Well Location	Parameter	Approximate Average Concentration (mg/l)	Tolerance Limit (mg/l)
Section 5 None				
Section 31				
544	Upgradient	Boron	6	2.81
544	Upgradient	Chloride	75	29.5
544	Upgradient	Sulfate	2,800	2,456
547	Downgradient	Chloride	30	29.5
Section 32				
551	Up	Chloride	45	29.5

Additionally, chloride concentrations in well MW-541 are close to the tolerance limit. Individual concentrations sometimes exceed the calculated tolerance limit. However, the tolerance limit approach as utilized for this subdivision, applies to the average parameter concentrations at the monitoring location only.

The table above indicates that wells MW-544, MW-547, and MW-551 exhibit statistically significant evidence of adverse impacts to ground water. However, as indicated previously, the "impacts" are generally suspected of being related to ground water contact with weathered coal, and not due to the ash disposal.

ARSENIC

Arsenic has been consistently (50% or more of the time) detected at very few monitoring locations. Table 16 summarizes the monitoring well locations at which arsenic has been consistently detected.

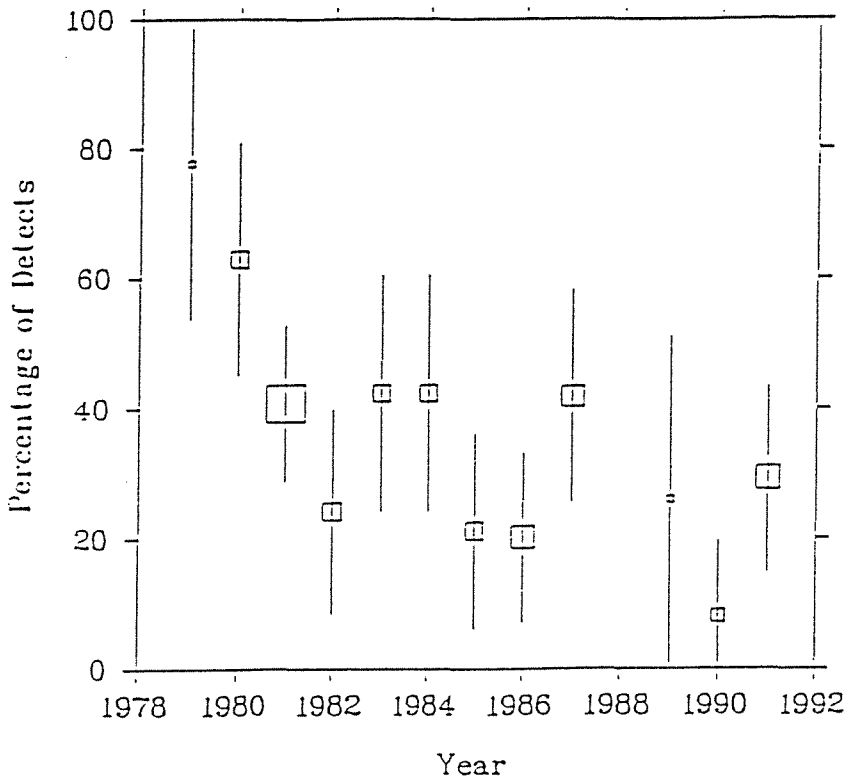
TABLE 16

CONSISTENT DETECTIONS OF ARSENIC - CCS MONITORING WELLS

Well	Well Location	Detection Period	Approximate Range of Concentrations (mg/l)
Subdivision DII			
MW-14	Downgradient	1979 - 1987	0.001 - 0.010
MW-13	Downgradient (Additional)	1979 - 1987	0.001 - 0.006
Subdivision E			
MW-8	Additional	1979 - 1987	0.001 - 0.009
Subdivision F			
MW-544	Upgradient	1989 - 1992	0.020 - 0.050

Recent observations have typically been non-detects, and can be taken as evidence that conditions have changed, but the number of observations are insufficient to quantify the extent or consistency of the change.

Overall, evidence is that arsenic concentrations in ground water have improved (decreased). This can be demonstrated by examining the detection frequency over time. The following plot, in "high-low-close" format, shows how the detection frequency in subdivisions A through DII has varied through 1991.



A summary of arsenic detection is shown for each year. A square is positioned at the observed detection frequency, P. The dimensions of the square are directly proportional to the number of arsenic measurements, N. The line extending above and below the square is an approximate confidence interval. Its half-length is three times the Normal-theory approximate estimator of the standard error, (P*(1-P)/N). Because N*P and N*(1-P) are typically in the 10 to 90 range, this approximation is good, and the confidence levels are about 99.5+%. Therefore, non-overlapping ranges are strong evidence of significant differences in detection frequency.

Initially (1979-81) there is a strong and significant trend toward lower detection frequencies. During the last ten-year period a moderate trend toward a lower percentage of detects is evident. Although biases due to undersampling of wells could have been introduced, the preponderance of non-detects in 1992 and 93 (not shown)--almost 0% detection--continues the trend.

Because recent arsenic observations are almost entirely non-detects, an adequate monitoring method is to carefully examine any new quantified value above historical detection limits.

SUMMARY AND RECOMMENDATIONS

STATISTICAL ANALYSES

- Linear regression to test for long-term trends and control charting to monitor and evaluate stable histories are the statistical methods of choice for most of the subdivisions.

- In Subdivisions D and F, where several upgradient wells are available for comparison, tolerance limits developed from upgradient historical averages serve as an adequate screening approach for ground water impact at other wells. Tables 7 and 14 summarize these tolerance limits.

- Some historical data should not be included when developing regression lines, control charts, or tolerance limits, because ground water conditions have changed during distinct, observable periods possibly tied to facility activities. This is particularly true for Subdivisions A and B. The specific time periods have been noted.

- Future arsenic and selenium results should be considered significant when quantifiable above historical detection limits. At certain wells with historically quantifiable concentrations of these parameters, such as MW-544, the intra-well techniques recommended for the other reportable parameters (regression and control charting) should be applied.

- In general, these data are not complicated by violation of statistical assumptions, such as non-normal distribution, changes of variability, seasonality, large proportion of non-detects (except for arsenic and selenium) and correlation over time. Where these assumptions are violated, such as the seasonality observed in well MW-8, their violation is unimportant or can be handled with a simple and appropriate technique, such as transforming the data by taking logarithms of the values. These cases have been noted in the text.

OPERATIONS AND MONITORING

- Water quality trends suggest that the extensive pond repair program has made a favorable impact on ground water and surface water.

- Continued monitoring is necessary to fully evaluate long-term water quality trends.

- Based on the findings of this evaluation, the monitoring locations can be modified as shown on Table 17. Sixteen locations are recommended to be deleted from the monitoring program. Another fourteen locations should be re-evaluated for possible deletion after an additional monitoring period of two years.

- Based on the findings of this evaluation, boron, chloride and sulfate are the most indicative parameters for tracking water quality trends and should continue to be used in the monitoring program. Arsenic, selenium and strontium are less indicative and should be dropped from the list of required reporting parameters.

TABLE 17

WATER QUALITY MONITORING LOCATION RECOMMENDATIONS

Subdivision	Continue to Monitor	Monitor for 2 Years and then Re-Evaluate	Delete from Program **
A	MW-23, 24, 83 SW-109, 114	MW-17, 18, 22, 90, 91	MW-16, 20, 21, 87
B	MW-29, 32, 38, 80 SW-105, 113	MW-30, 31, 79, 81, 82	SW-110, 118
C	MW-61, 62, 63, 64, 65 SW-104, 107		MW-61, 76
DI	MW-10, 49, 50, 74 SW-126, 127	MW-9, 54, 55	MW-57, 71 SW-108
DII	MW-14, 15, 43, 73, 74*	MW-72	MW-12, 3, 42, 57*, 71*
E	SW-101, 102, 103, 115, 117, 123		MW-7, 8
F-5	All		
F-31	All		
F-32	All		

Notes:

** Continue to measure water levels in these wells

* Wells noted with asterisk are the same wells shown in Subdivision DI.

APPENDIX A

1993 SOLID WASTE MANAGEMENT FACILITY ANNUAL REPORT

SOLID WASTE MANAGEMENT FACILITY ANNUAL REPORT

FOR

COOPERATIVE POWER ASSOCIATION

COAL CREEK STATION
PO BOX 780
UNDERWOOD, ND 58576

JANUARY 1, 1993 TO DECEMBER 31, 1993

SPECIAL WASTE DISPOSAL SITES ACTIVITY AND STATUS

PERMIT SU-033 Section 16 Disposal Area

The section 16 disposal area includes the Section 16 disposal site, Ash Pond Cells #91 and 92, the Recycle Pond, and the Plant Drains Pond (Figure 1).

Section 16 Disposal Site
In 1993, a total of approximately 21 tons of C & D material were placed in this site. Approximately 170 tons of asbestos material from the demolition of Cooling Tower #93 were placed in the SW 1/4 of the construction waste landfill portion of the disposal area.

Ash Pond Cell #91
This pond cell was out of service for most of the year for installation of the HDP liner. Approximately 77,330 tons of fly ash were hauled to this pond for use in the liner construction.

Ash Pond Cell #92
This pond cell was in service the entire year. Approximately 288,413 tons of bottom ash and 87,947 tons of scrubber slurry were piped to this site in 1993.

Recycle Pond
The Recycle Pond was in service through all of 1993. It will be taken out of service in 1994 when the new Plant Drains Pond is fully operational.

Plant Drains Pond
The Plant Drains Pond was constructed in 1993 to replace the Recycle Pond. This pond went into service in October 1993. Both the Plant Drains Pond and the Recycle Pond remained in service the rest of the year due to operational needs to get the water to the evaporation ponds.

PERMIT SU-091 Section 5 Disposal Area

This disposal site was filled to capacity in 1988. The site was temporarily capped with two feet of clay and seeded in 1990. Future expansion of the site is planned to the north and south. Final reclamation will not be done until the entire disposal site has been used.

PERMIT SU-095 Sections 31 and 32 Disposal Sites

Section 31 Disposal Site
This site was filled to capacity in 1992 and taken out of service in 1993. In the summer of 1993, final reclamation was completed in accordance with NDAC 33-20-04.1.

Section 32 Disposal Site
This disposal site was placed in service in 1993 and was active throughout the year. Approximately 389,180 tons of fly ash were disposed at this site in 1993. Approximately 54 tons of asbestos material from the demolition of Cooling Tower #93 was placed in the NW 1/4 of the disposal area.

PERMIT SU-118 Evaporation Ponds #91-94

Evaporation Pond #91
This pond was relined in the summer of 1990 and became operational in November 1990. It was in continuous service in 1993.

Evaporation Pond #92
This pond was relined during the summer of 1991 and became operational in December 1991. It was in continuous service in 1993.

Evaporation Pond #93
This pond was relined during the summer of 1992 and became operational in November 1992. It was in continuous service in 1993.

Evaporation Pond #94
This pond was relined late in 1991 and put into service in February of 1992. It was in continuous service in 1993.

APPENDIX B

SITE MAP - WATER QUALITY MONITORING LOCATIONS

LEGEND

SW	SURFACE WATER (REPORTABLE)
MW	MONITORING WELL (REPORTABLE)
SW MW	INTERNAL MONITORING
☆	MONITORING WELLS ABANDONED IN PLACE
SW	400 SERIES
PZ	PIEZOMETERS
*	EXISTING MONITORING WELLS REMOVED FROM SERVICE AND CAPPED
FMW	FALKIRK MINE WELL

T146N
T145N
R83W
R82W

SUBDIVISION F
SUBDIVISION A
SUBDIVISION B
SUBDIVISION C
SUBDIVISION D I
SUBDIVISION D II
SUBDIVISION E

SECTION 31 DISPOSAL AREA
SECTION 32 DISPOSAL AREA
SECTION 5 DISPOSAL AREA
SECTION 16 DISPOSAL AREA
EVAPORATION POND 92
EVAPORATION POND 91
EVAPORATION POND 94
EVAPORATION POND 93
PLANT DRAIN POND 91
EXTENDED BASIN
ASH POND 91
ASH POND 92
LONG SLOUGH
WELLER SLOUGH
UPPER SAMUELSON SLOUGH
LOWER SAMUELSON SLOUGH
SAYLER SLOUGH
GRADIN SLOUGH
HWY 83

FMW-543,544 FMW-546,547 SW-601 FMW-550,551 FMW-548,549 FMW-552,553 FMW-554,555
FMW-531,532 FMW-533,534 FMW-535,536 FMW-501 FMW-542,541 FMW-539,540 FMW-537,538 SW-602
MW-38 MW-77 MW-78 SW-105 MW-34,35,36 MW-81 MW-82 MW-79 MW-1,2 MW-37 MW-80 SW-118 SW-113 MW-29 MW-5 MW-3 SW-409 MW-33 SW-110 MW-30,31,32 MW-4 MW-322 MW-323
SW-123 MW-83 MW-39 MW-84 SW-403 MW-23,24 MW-26,27,&28 MW-85 SW-109 MW-86 SW-124 MW-47 MW-90 MW-89 MW-91 SW-114 MW-16 MW-20,21,22 MW-17 MW-18 MW-87 MW-88 SW-125
SW-103 SW-401 SW-101
MW-40 MW-209 PZ-217 MW-208 MW-41 SW-111 MW-67 MW-68 MW-7,8 MW-11 SW-120 SW-121 MW-70 SW-404 MW-69 MW-12,13,&14 SW-119 SW-405
PZ-215 SW-104 MW-66 MW-48 MW-60 SW-102 PZ-204 MW-51 MW-9&10 MW-73 SW-112 MW-15 SW-122 MW-44&45 SW-115 SW-406
MW-62,&64 SW-107 MW-49 MW-50 MW-59 MW-52 MW-63,&65 MW-58 MW-76 MW-93&94 MW-53 MW-92 MW-54 MW-43
MW-61 MW-57&71 MW-56 MW-55 PZ-211 MW-72 MW-42 MW-46 MW-75 MW-74
SW-116 SW-407 SW-117 SW-408

WATER QUALITY MONITORING LOCATIONS
COAL CREEK STATION, UNDERWOOD, NORTH DAKOTA
SEPTEMBER, 1995

COOPERATIVE POWER

LEGEND

SW SURFACE WATER (REPORTABLE)

MW MONITORING WELL (REPORTABLE)

SW MW INTERNAL MONITORING

☆ MONITORING WELLS ABANDONED IN PLACE

T146N

T145N

R83W

R82W

SUBDIVISION A

SUBDIVISION B

SUBDIVISION C

SUBDIVISION D I

SUBDIVISION D II

SUBDIVISION E

SUBDIVISION F

SECTION 31 DISPOSAL AREA

SECTION 32 DISPOSAL AREA

SECTION 5 DISPOSAL AREA

SECTION 16 DISPOSAL AREA

EVAPORATION POND 91

EVAPORATION POND 92

EVAPORATION POND 93

EVAPORATION POND 94

ASH POND 91

ASH POND 92

PLANT DRAIN POND 91

EXTENDED BASIN

LONG SLOUGH

UPPER SAMUELSON SLOUGH

LOWER SAMUELSON SLOUGH

WELLER SLOUGH

SAYLER SLOUGH

GRADIN SLOUGH

HWY 83

FMW-543,544 FMW-546,547 FMW-550,551 FMW-548,549 SW-601 FMW-552,553 FMW-554,555

FMW-531,532 FMW-533,534 FMW-535,536 FMW-542,541 FMW-539,540 FMW-537,538 SW-602

MW-38 MW-77 MW-78 MW-34,35,36 MW-81 MW-82 SW-105 MW-79 MW-1,2 MW-37 MW-80 SW-118 SW-113 MW-29 MW-5 MW-3 MW-33 SW-110 MW-30,31,32 MW-4 MW-322 MW-323 SW-101

MW-39 MW-83 MW-84 MW-23,24 MW-26,27,&28 MW-85 SW-109 MW-86 MW-90 MW-89 MW-91 SW-114 MW-16 MW-20,21,22 MW-17 MW-18 MW-87 MW-88 SW-125 SW-124 MW-47

MW-40 MW-209 MW-208 MW-41 SW-111 SW-104 MW-60 MW-62,&64 SW-107 MW-63,&65 MW-76 MW-61 MW-75 MW-74 MW-11 SW-120 SW-121 MW-70 MW-69 MW-12,13,&14 SW-119 SW-102 MW-49 MW-50 MW-51 MW-9&10 MW-59 SW-127 MW-52 SW-126 MW-53 MW-93&94 MW-92 MW-54 MW-55 MW-73 SW-112 MW-15 SW-122 MW-44&45 SW-115 MW-72 MW-42 MW-43 MW-46 SW-116 SW-117 SW-123 SW-103

WATER QUALITY MONITORING LOCATIONS
COAL CREEK STATION, UNDERWOOD, NORTH DAKOTA
SEPTEMBER, 1995

COOPERATIVE POWER

APPENDIX C

1993 WATER QUALITY MONITORING PROGRAM

COAL CREEK STATION
WATER QUALITY MONITORING PROGRAM
SPRING 1993

Coal Creek Station's groundwater and surface water sampling program to be performed between March 15 - April 14, 1993.

Wells to be monitored for field parameters:

* Subdivision DI Wells: 9-10, 48-57, 59, 66-68, 71, 74-75, 208-209
* Subdivision DII Wells: 12-15, 42-46, 69, 72-73
* Subdivision C Wells: 40-41, 58, 60-65, 76
* Subdivision E Wells: 7-8, 11, 70

Surface waters to be monitored for field parameters:

* Subdivision DI Surface Waters: 108, 126-127
* Subdivision C Surface Waters: 104, 107
* Subdivision E Surface Waters: 101-103, 115, 117, 123

FIELD DATA TO BE COLLECTED:

* Sample Period
* Date Prepumped
* Volume Prepumped
* Date Sampled
* Weather Conditions
* Water Level Depth Below Top of Well Casing
* Temperature, pH, Specific Conductance
* Sample Collection Technique (Bailer or Bladder Pump)
* Additional Comments

Copies of the field data sheets are to be submitted to the Environmental Specialist by May 1, 1993.

COAL CREEK STATION
WATER QUALITY MONITORING PROGRAM
SUMMER 1993

Coal Creek Station's groundwater and surface water sampling program to be performed between May 15 - September 14, 1993.

Subdivision F; May 15 to June 14.

Wells to be Monitored for Field and Lab Parameters:
* Subdivision F: 543-544, 546-547, 548-549, 550-555, 531-542
Surface Waters to be Monitored for Field and Lab Parameters:
* Subdivision F: 601-602

Subdivision A & B; June 15 to July 14.

Wells to be Monitored for Field and Lab Parameters:
* Subdivision A: 16-18, 20-24, 83, 87, 90-91
* Subdivision B: 29-32, 38, 79-82

Wells to be Monitored for Field Parameters Only:
* Subdivision A: 26-28, 39, 47, 84-86, 88-89
* Subdivision B: 1-5, 33-37, 77-78, 322-323

Surface Waters to be Monitored for Field and Lab Parameters:
* Subdivision A: 109, 114
* Subdivision B: 105, 113, 118

Subdivision E; July 15 to August 14.

Wells to be Monitored for Field and Lab Parameters:
* Subdivision E: 7-8

Well to be Monitored for Field Parameters Only:
* Subdivision E: 11, 70

Surface Water to Monitored for Field and Lab Parameters:
* Subdivision E: 101-103, 115, 117, 123

Subdivision DI, DII, and C; August 15 to September 14.

Wells to be Monitored for Field and Lab Parameters:
* Subdivision DI: 9-10, 49-55, 57, 71, 74
* Subdivision DII: 12-15, 42-43, 72-73
* Subdivision C: 60-65

Wells to be Monitored for Field Parameters Only:
* Subdivision DI: 48, 56, 59, 66-68, 75, 208-209
* Subdivision DII: 44-46, 69
* Subdivision C: 40-41, 58, 76

Surface Waters to be Monitored for Field and Lab Parameters:
* Subdivision DI: 108, 126-127
* Subdivision C: 104, 107

COAL CREEK STATION
WATER QUALITY MONITORING PROGRAM
SUMMER 1993 (Continued)

FIELD DATA TO BE COLLECTED DURING EACH COLLECTION PERIOD:

* Sample Period
* Date Prepumped
* Volume Prepumped
* Date Sampled
* Weather Conditions
* Water Level Depth Below Top of Well Casing
* Temperature, pH, specific Conductance
* Sample Collection Technique (Bailer or Bladder Pump)
* Additional Comments

Copies of the field data sheets are to be submitted to the Environmental Specialist within 14 days after the end of each sample period.

LABORATORY PARAMETERS TO BE ANALYZED:

* Reportable Parameters: SO4, Cl, As, B, Se, Sr

* Internal Parameters: Na, K, Mg, Ca, ALK (Total, Bicarbonate & Carbonate), pH-lab, Specific Conductance

* Special Internal Analysis:

Monitoring Wells: 543-544, 548-549, 552-555, 533-534, 537-538, 14-15, 74

Parameters: Ag, Ba, Be, Cu, Cd, Cr, F, Hg, Ni, NO3-N, Pb, Zn

YEARLY QA SPLIT TO CONTRACT LABORATORY:

To be Collected With Subdivision E Samples

Monitoring Wells: 7, 8, 11, 70
Surface Water: 101

* Specific Conductance, pH, SO4, Cl, As, B, Se, Sr

COAL CREEK STATION
WATER QUALITY MONITORING PROGRAM
FALL 1993

Coal Creek Station's groundwater and surface water sampling program to be performed between October 15 - November 14, 1993.

Wells to be monitored for field parameters:

* Subdivision F: 543-544, 546-549, 550-555, 531-542
* Subdivision A: 16-18, 20-24, 26-28, 39, 47, 83-91
* Subdivision B: 1-5, 29-38, 77-82, 322-323
* Subdivision E: 7-8, 11, 70

Surface waters to be monitored for field parameters:

* Subdivision F: 601-602
* Subdivision A: 109, 114
* Subdivision B: 105, 113, 118
* Subdivision E: 101-103, 115, 117, 123

FIELD DATA TO BE COLLECTED:

* Sample Period
* Date Prepumped
* Volume Prepumped
* Date Sampled
* Weather Conditions
* Water Level Depth Below Top of Well Casing
* Temperature, pH, Specific Conductance
* Sample Collection Technique (Bailer or Bladder Pump)
* Additional Comments

Copies of the field data sheets are to be submitted to the Environmental Specialist by December 1, 1993.

COOPERATIVE POWER

1993

JANUARY

SUN	MON	TUE	WED	THU	FRI	SAT
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

FEBRUARY

SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28						

MARCH

SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

FIELD PARAMETERS
SUBDIVISION DI, DII, C & E.

4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

MAY

SUN	MON	TUE	WED	THU	FRI	SAT
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23						29
30	31					

FIELD & LAB PARAMETERS
SUBDIVISION F.

JUNE

		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27						

FIELD & LAB PARAMETERS
SUBDIVISION A & B

JULY

				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25						31

FIELD & LAB PARAMETERS
SUBDIVISION E.

AUGUST

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
2						
29	30	31				

FIELD & LAB PARAMETERS
SUBDIVISION DI, DII, & C.

SEPTEMBER

			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

OCTOBER

					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

FIELD PARAMETERS
SUBDIVISION F, A, B, & E.

NOVEMBER

	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

DECEMBER

			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

APPENDIX D

STATISTICAL ANALYSIS METHODS UTILIZED

STATISTICAL ANALYSIS METHODS UTILIZED

1.0 ORDINARY LEAST SQUARES (REGRESSION)

Description of Technique

Over time, data obtained by analyzing samples at each monitoring well constitute a series (T_i, X_i) in time, where:

T_i is the time the ith sample was obtained, i = 1, 2, ..., N
X_i is the value of the analyte at time T_i
The T_i are ordered by increasing time: $T_1 < T_2 < ... < T_N$

Ordinary Least Squares (OLS) assumes that some preset mathematical transform, $Y_i(X_i)$, is a linear function of time plus an independent random component:

$$Y_i = aT_i + b + e$$

The (unknown) numbers a and b are parameters of the model. The random variable e models deviations of the dependent values Y_i from linearity. Values of e for different times and different wells are supposed independent, identically distributed, of mean 0, and finite (but unknown) constant variance. The validity of these assumptions--independence, identical distribution, zero mean, and constant variance--can be assessed during the process of estimating the model parameters.

The EPA guidance and its 1992 update, *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Addendum to Interim Final Guidance,* recommend and discuss only a logarithmic transformation of the data (although others are allowable under the regulations). Hence, in the following description, the alternatives considered are either $Y_i = X_i$ or $Y_i = \log(X_i)$, where log() is the natural logarithm. The description also provides a basis for determining whether to apply the logarithm transformation or not.

The OLS estimators of a and b are (Draper and Smith, *Applied Regression Analysis,* Second edition, section 1.2)):

$\hat{a}$	$= S_{TY}/S_{TT}$	[Estimated slope]
$\hat{b}$	$= \bar{Y} - \hat{a}\bar{T}$	[Estimated intercept]
$\bar{Y}$	$= S_Y/N$	[Mean dependent value]
$\bar{T}$	$= S_T/N$	[Mean independent value]
S_{TY} = Sum of all $(T_i - \bar{T}) * (Y_i - \bar{Y})$		[Sum of products]
S_{YY} = Sum of all $(Y_i - \bar{Y}) * (Y_i - \bar{Y})$		[Sum of squares]
S_Y = Sum of all Y_i		
S_T = Sum of all T_i		

The values of the Y_i predicted by the model are therefore:

$$\hat{Y}_i = \hat{a} T_i + \hat{b}$$

and the *residuals* are the differences between the actual values and the predicted values:

$$R_i = Y_i - \hat{Y}_i$$

The variance of e is estimated by s^2:

$$s^2 = S_{RR}/(N-2)$$

$$S_{RR} = \text{Sum of all } (R_i - \bar{R}) * (R_i - \bar{R}) = R_i * R_i$$

Application

1. The data should be graphed as a time series plot with the horizontal axis showing time and the vertical showing concentration (or its logarithm). If the historical tendency is not approximately linear or log-linear, only the most recent data should be retained for this test. As many data as possible, proceeding back in time from the present, should be retained while maintaining an almost-linear or log-linear pattern.

2. If evidence of seasonality or other periodic behavior is evident, this should first be removed or incorporated into the OLS model (by including a categorical season as a second independent variable). The reportable parameters have not exhibited important seasonal fluctuations. Therefore, the details of these procedures are not described here because of their increased complication and relative unimportance. If seasonality is removed from the data, the seasonal effects should be reported.

3. The value of X to use for any non-detects should at first be half the detection limit. If the results of the subsequent trend analysis would depend on the numerical treatment of non-detects, then a non-parametric assessment of trend should be applied in place of the remaining steps. Sen's estimator as described in Gilbert, *Statistical Methods for Environmental Pollution Monitoring*, should be used.

4. At each well (both upgradient and downgradient), both OLS models ($Y_i = X_i$ and $Y_i = \log(X_i)$) should be fit to the data. The one whose residuals appear distributed most like a Normal distribution, as tested using techniques discussed in Section 1.1 of the Addendum to the EPA guidance, should be the one selected.

5. A two-sided confidence interval around the slope, b, should be constructed assuming the distribution of the e is approximately Normal. The endpoints of this interval are given by

$$\hat{a} \pm t(n-2, 1-0.005)s/\sqrt{S_{TT}}$$

where t(n-2, 1-0.005)is the 100(1-0.005) percentage point of the Student t-distribution with (n-2) degrees of freedom. (Typically percentage points are given in the table below.) Assuming the model is correct, this procedure will cover the true value 99% of the time that it is applied.

6. For each well where the value 0 lies within the confidence interval for the slope constructed in step 5, the concentrations will be considered (recently) stable. For the other wells, the concentrations will be considered significantly increasing (decreasing), depending on whether the estimated slope $\hat{a}$ is positive (negative). This result--stable, increasing, or decreasing--should be reported for each well.

7. The validity of the model should be assessed using techniques described in the EPA guidance, its Addendum, and in standard texts (such as Draper and Smith). These techniques will include statistical and/or graphical tests for independence, identical distribution, and constant variance of the residuals. However, lack of validity should be used to qualify the result reported in step 6, but not to change it.

2.0 CONTROL CHARTS

Description of Technique

Control charts graphically portray the average value of analyte concentrations attained in past sampling. They also establish limits above and below this average value, limits based on the variability of previous results. The limits are placed sufficiently far from the average so as to reduce the probability that a chance deviation in a subsequent analytical result would fall beyond the limits. Therefore, obtaining a result beyond the limits will be evidence of a change. Yet, the limits are placed close enough to the average for the control chart technique to correctly and quickly identify changes when they occur.

The probability model for control charting is similar to that for ordinary least squares. The terminology established in the description of OLS will be used here. The model is:

$$Y_i = b + e$$

with the same assumptions on e. The absence of the aT_i term means that analyte concentrations are supposed stable over time. Therefore, control charting supplements the OLS analysis: control charts can be developed only for those monitoring histories deemed not to be significantly trending.

The control chart technique to be used is that developed and recommended by the EPA monograph, *Evaluation of Control Chart Methodologies for RCRA Waste Sites.* Although not an expression of official EPA views, this monograph is a primary reference for the EPA guidance. This technique is the classical Shewhart-CUSUM method, but it varies from traditional applications by setting control limits at distances more appropriate for ground water monitoring data.

The Shewhart method is the technique described in the introductory paragraph to this section. It's specification requires two data to be decided before the technique can be applied:

1. The distance of the control limits from the mean is a multiple, U, of the standard deviation. The value of U must be provided.

2. A procedure for deciding which historical data to use for estimating the mean and standard deviation must be provided.

In particular, at the onset of monitoring no historical data are available. Therefore results must be gathered until enough are available to estimate the mean and standard deviation. During this period a control chart cannot be produced. The number of sampling rounds required is called the *learning period.*

The one-sided CUSUM (for CUmulative SUMmation) method computes a sum, S, for each result:

$$S_i = \max \{0, Y_i - k + S_{i-1}\},$$

where k is a parameter of the CUSUM method. When S_i exceeds a preset value h, the series is considered out of control and a statistically significant increase is noted. The value of S_i is then reset to 0. The values of k and h must be provided for a complete description of this scheme.

To make this into a two-sided procedure, the one-sided procedure is simultaneously applied to the negatives of the Y_i. Thus,

$$S_i' = \max \{0, -Y_i - k + S_{i-1}'\}$$

is also computed and compared to the CUSUM threshold h.

Specifying the CUSUM chart in addition to the Shewhart chart, therefore, requires two additional data to be specified.

3. The value of k must be provided.

4. The value of h must be provided.

The method described in the EPA monograph is:

> "...U=4.5, h=5, and k=1 for the first 12 sampling periods [rounds] after the eight period learning stage, and then U is reduced to 4.0, k is reduced to 0.75, and these two parameters are held at these values for all subsequent periods. Adjustments in sample means and sample standard deviations are made after sampling periods 4, 8, 12, 20, and 32, following the learning stage."

Application

1. Control charting should be attempted for all histories not showing a significant linear or loglinear trend as established by OLS regression.

2. Valid results from control charts require that data be approximately Normally distributed. Therefore, data should be tested for Normality using techniques discussed in the Addendum to the EPA guidance. If neither the data nor their logarithms appear normally distributed, testing at a 99% level, then control charts should not be applied.

3. Non-detects should at first be replaced by one-half the detection limits. Control charts should not be developed if more than 25% of the data are non-detects.

4. The combined Shewhart-CUSUM scheme described in the EPA monograph should be applied. It should be shown graphically as a time-series plot of the data upon which the running means and control limits are superimposed. The CUSUM chart should be separately plotted on a parallel time axis. Any out of control points should be highlighted.

3.0 TOLERANCE LIMITS

Description of Technique

As in the discussion of OLS estimators (Section 1.0), the data for a given reportable parameter at a given well, after a possible transformation, will be designated Y_i, i = 1, 2,..., N. A one-sided upper tolerance limit is computed assuming that the distribution of the Y_i is Normal (which is why a transformation of the original data must be considered). The limit is the sum of the mean and a multiple, K, of the standard deviation of the data.

The following definitions are utilized:

$TL = \bar{Y} + K * s$ [Upper tolerance limit]

$\bar{Y} = S_Y/N$ [Mean dependent value]

$s^2 = S_{YY}/(N-1)$

S_{YY} = Sum of all $(Y_i - \bar{Y}) * (Y_i - \bar{Y})$ [Sum of squares]

S_Y = Sum of all Y_i

The value K depends on the coverage and confidence of the tolerance limit, as well as on the number of data, N. Hahn and Meeker in *Statistical Intervals* (Wiley, 1991) provide tables of K for typical coverages and confidence levels. The USEPA, in its regulations and guidance documents for RCRA ground water monitoring, recommends (but does not require) coverage and confidence of 95%. For RCRA monitoring applications, the confidence is not allowed to exceed 95%. The following stable is a portion of Hahn & Meeker's Table A.12c, *Factors... for Calculating Normal Distribution One-Sided 100(1-α)% Tolerance Bounds:*

	p=0.950 (coverage)
N	1-α = 0.950 (confidence)
2	26.260
3	7.656
4	5.144
5	4.203
6	3.708
7	3.399
8	3.187
9	3.031
10	2.911
15	2.566
20	2.396
50	2.065
240	1.819
∞	1.645

Applications

Using historical monitoring data to establish an upper limit for future results

In this application, a time period representing baseline (historical or unimpacted) conditions is selected for a single well. The analyses collected for one parameter comprise the data for developing the tolerance limit. These data should:

- Be uncorrelated over time
- Exhibit stability (no significant long-term trend and no significant changes in variability with time)
- Exhibit no seasonal fluctuations (if they do, the seasonal component can first be estimated and removed)
- Be approximately normally distributed

The tolerance limit, TL, computed using the formula in Section 3 of this appendix, is a limit against which all future values from this well can be compared. Any future result exceeding this limit has a 95% chance (the confidence) of lying above the lowest 95% (the coverage) of all values projected from the baseline period. This is a strong indication that the result is unusually high. Two such results in succession, or a longer period with a high proportion of such results, both indicate that a statistically significant change has occurred in ground water conditions near this well.

Using background average concentrations to establish an upper limit on average concentrations at any other well

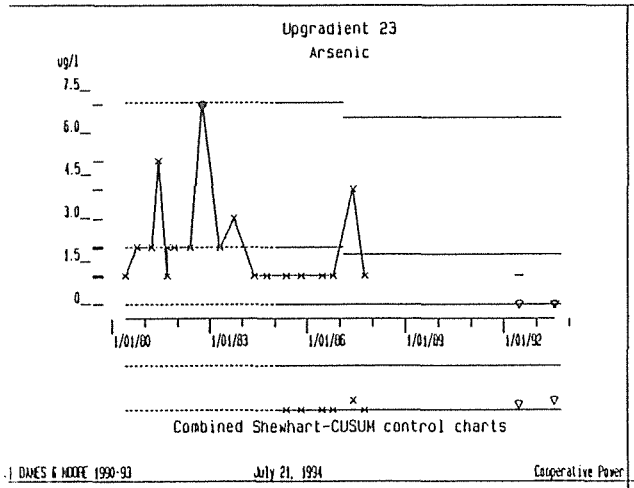
In this application, a collection of upgradient or background wells is selected as representative of the hydrogeologic unit being monitored by additional wells. For a given parameter, the data in this application become average concentration at each well. The number of data, N, equals the number of wells. Therefore, at least two, and preferably more (given the large value of K for N=2 in the table in Section 3 of this appendix) upgradient wells are needed for this procedure.

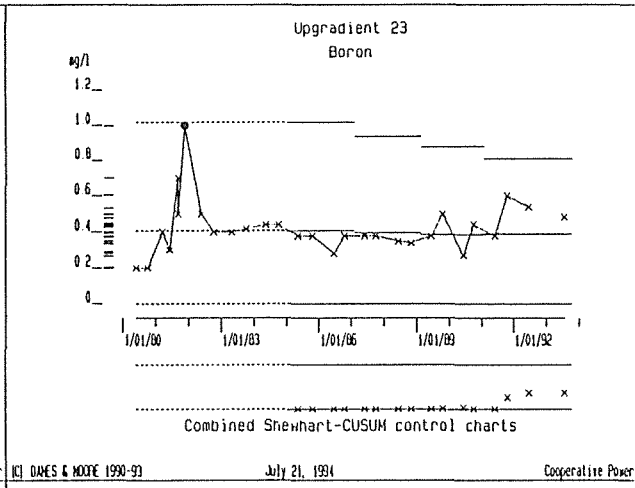
This application of tolerance limits is an approximation, because the variability of any average depends on the number of observations contributing to that average. An improved way to estimate the average concentrations and the standard deviation of the averages is with Analysis of Variance (which still produces only approximate results). However, with long, consistent monitoring histories in the background and the comparison wells, the difference in procedures is of little consequence, and the approximation is a good one.

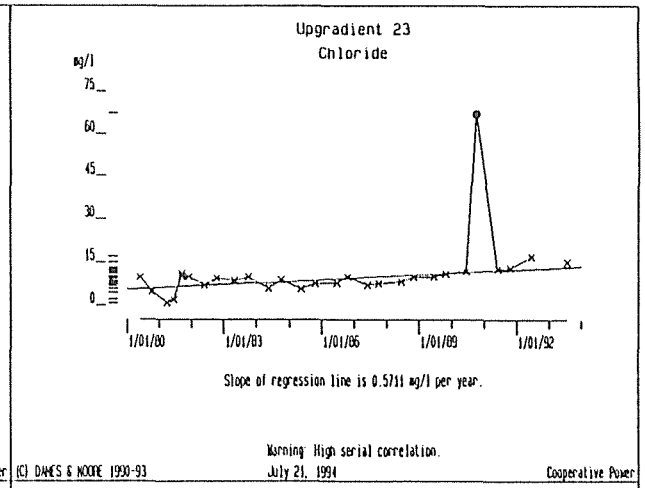
The tolerance limit computed from the average concentrations at upgradient wells serves to screen average concentrations (not individual concentrations) at any other wells. An average concentration above the tolerance limit is statistically significant evidence that ground water near a monitoring well is different than the ground water monitored by the background wells, and that the difference is not due to natural spatial fluctuations in ground water quality alone.

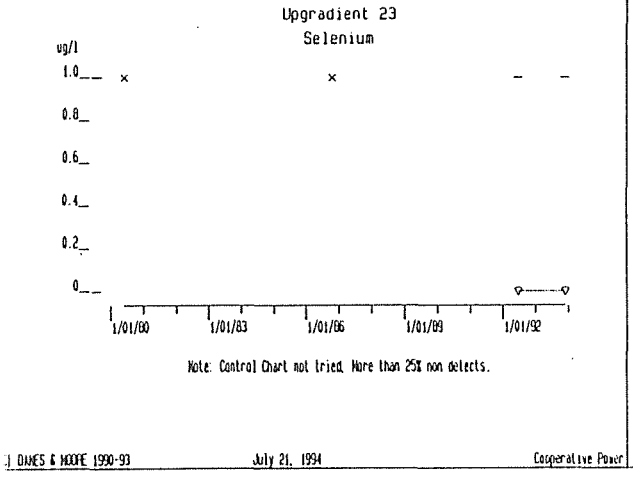
APPENDIX E

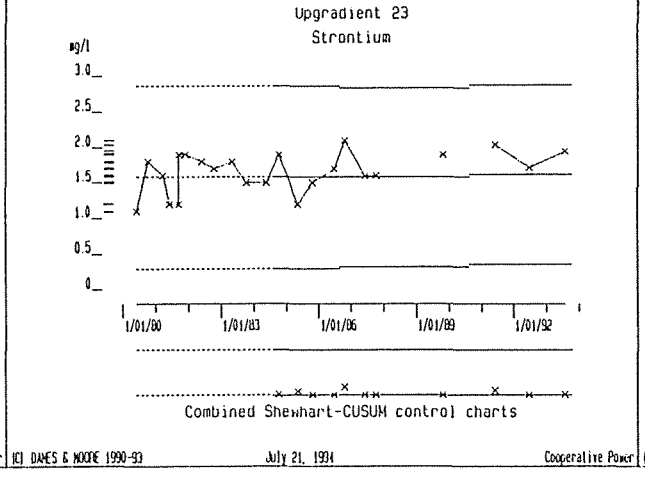
WATER QUALITY TREND CHARTS AND ASSOCIATED STATISTICAL TESTS

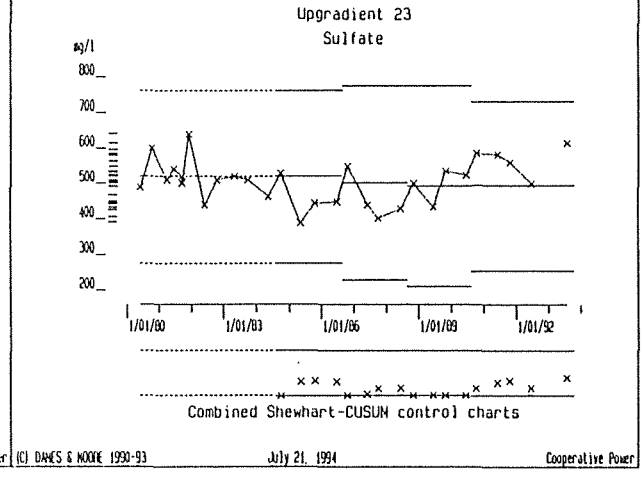

Upgradient 23
Arsenic
ug/l
7.5
6.0
4.5
3.0
1.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts

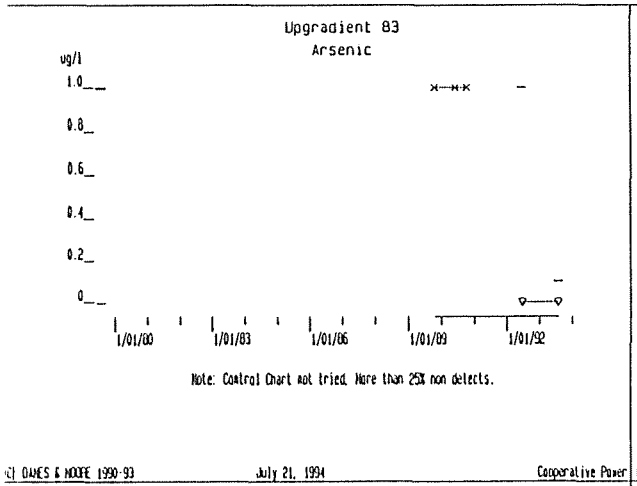

Upgradient 23
Boron
ug/l
1.2
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts

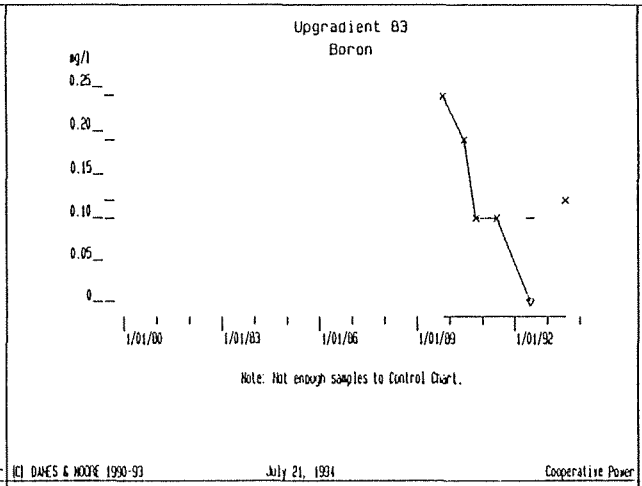

Upgradient 23
Chloride
ug/l
75
60
45
30
15
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 0.5711 ug/l per year.
Warning: High serial correlation.

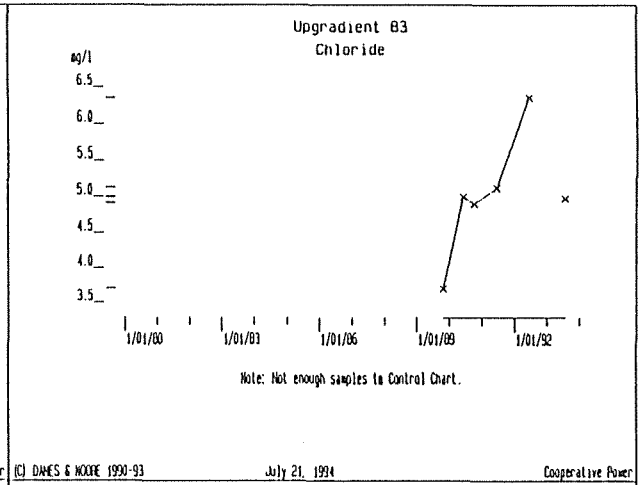

Upgradient 23
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.

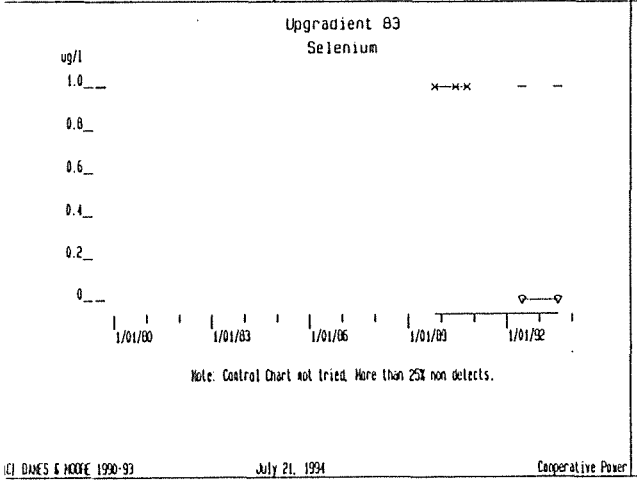

Upgradient 23
Strontium
ug/l
3.0
2.5
2.0
1.5
1.0
0.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts

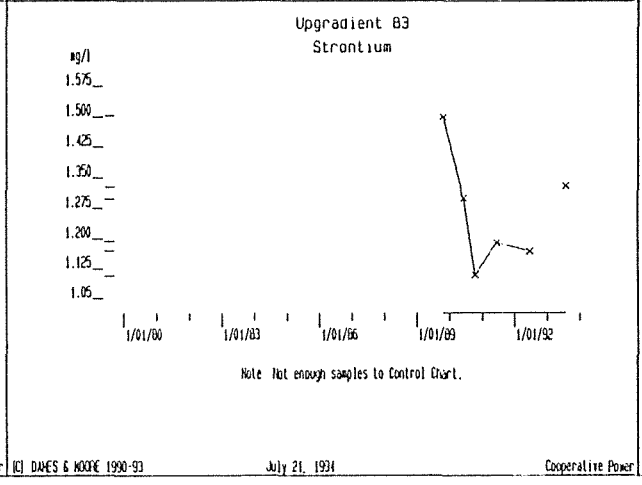

Upgradient 23
Sulfate
ug/l
800
700
600
500
400
300
200
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts

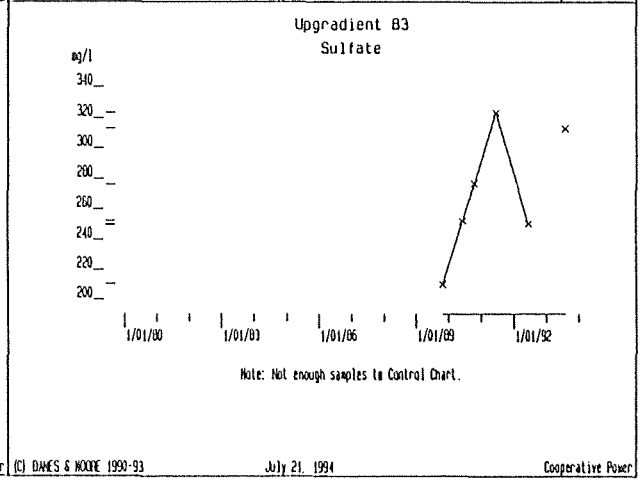

Upgradient 83
Arsenic
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

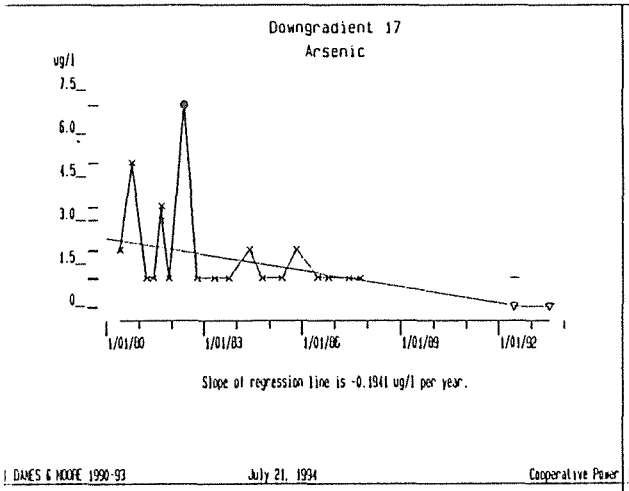

Upgradient 83
Boron
mg/l
0.25
0.20
0.15
0.10
0.05
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

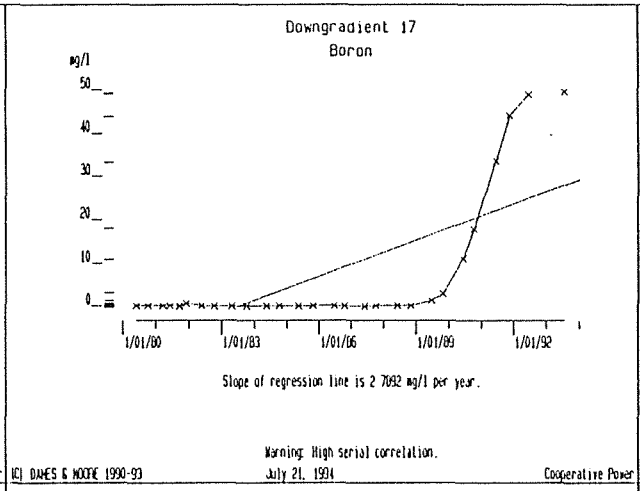

Upgradient 83
Chloride
mg/l
6.5
6.0
5.5
5.0
4.5
4.0
3.5
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

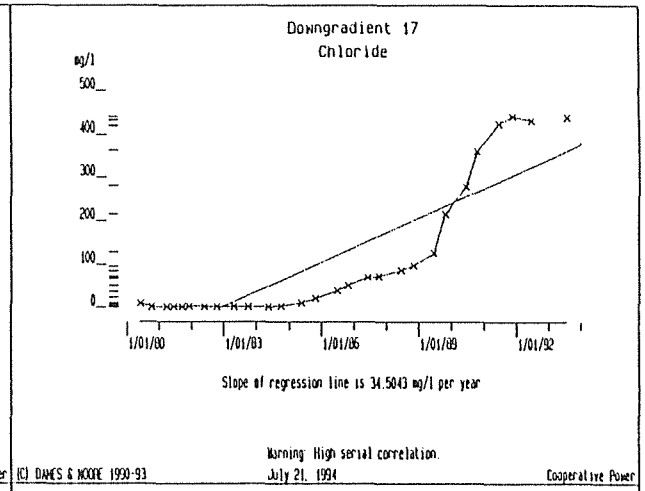

Upgradient 83
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

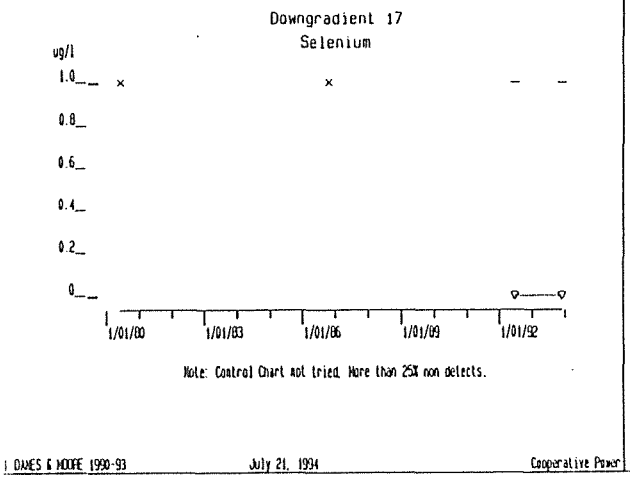

Upgradient 83
Strontium
mg/l
1.575
1.500
1.425
1.350
1.275
1.200
1.125
1.05
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

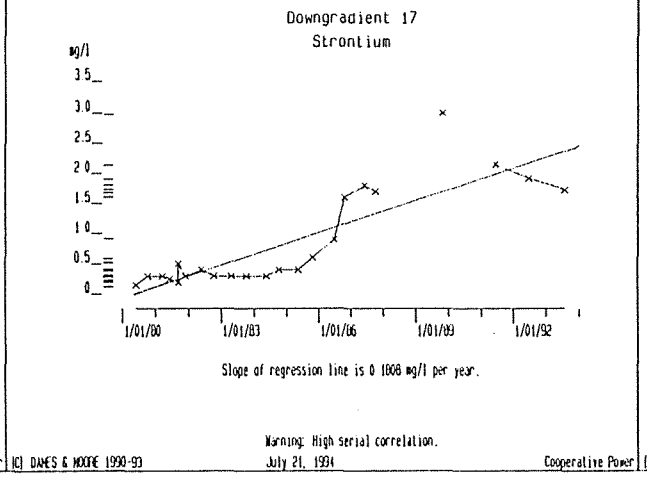

Upgradient 83
Sulfate
mg/l
340
320
300
280
260
240
220
200
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

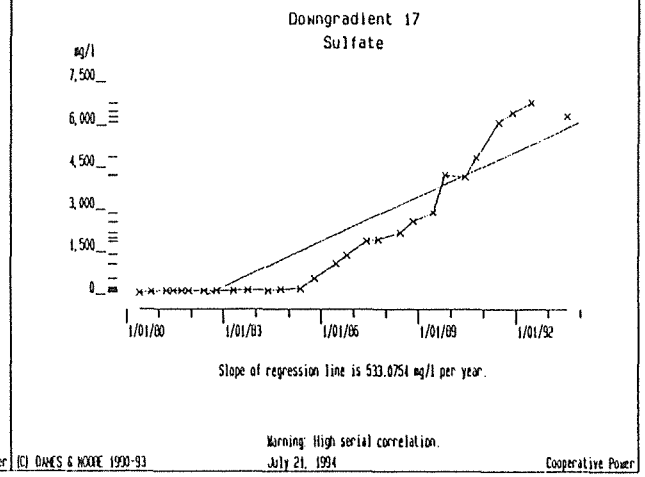

Downgradient 17
Arsenic
ug/l
7.5
6.0
4.5
3.0
1.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.1941 ug/l per year.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

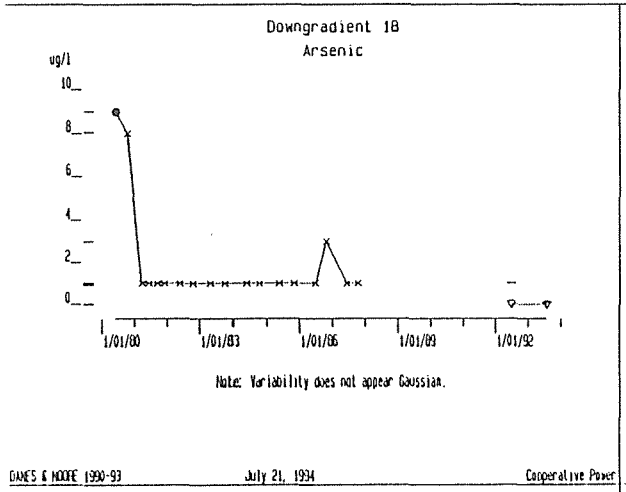

Downgradient 17
Boron
mg/l
50
40
30
20
10
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 2.7092 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

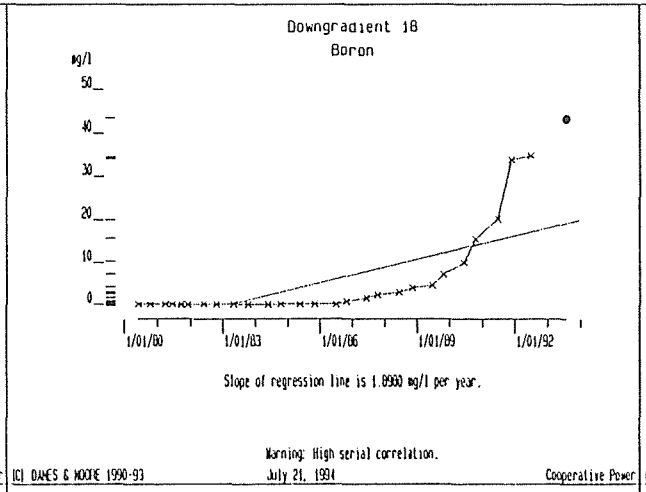

Downgradient 17
Chloride
mg/l
500
400
300
200
100
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 34.5043 mg/l per year
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

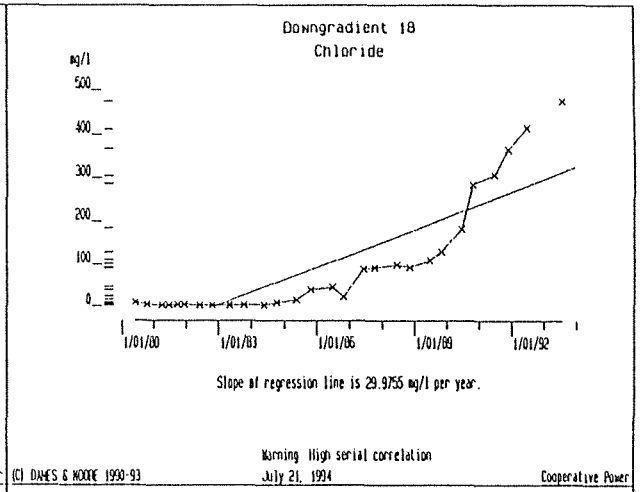

Downgradient 17
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

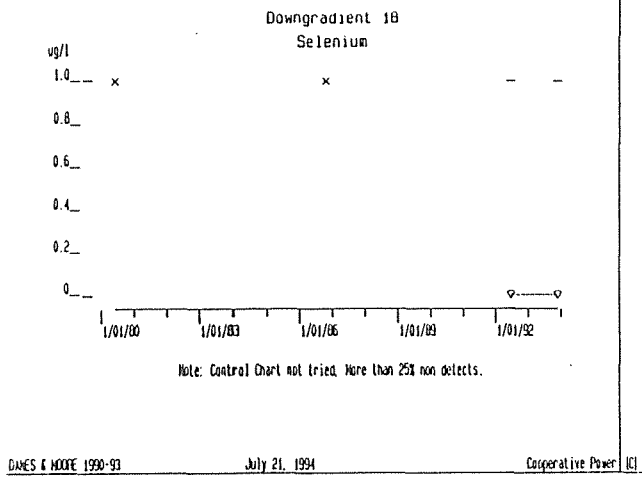

Downgradient 17
Strontium
mg/l
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 0.1008 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

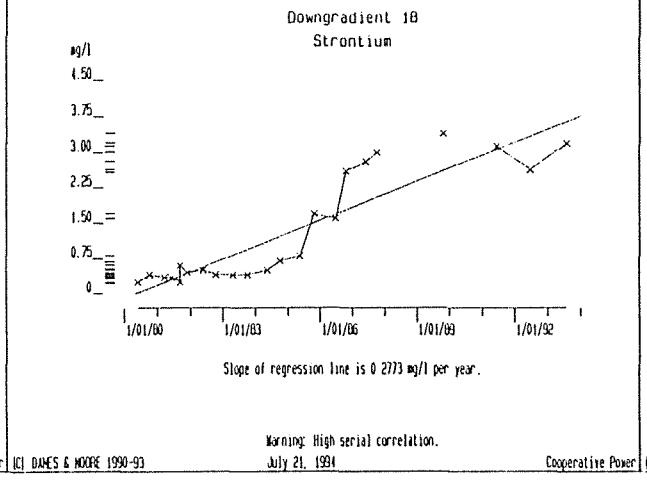

Downgradient 17
Sulfate
mg/l
7,500
6,000
4,500
3,000
1,500
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 533.0754 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

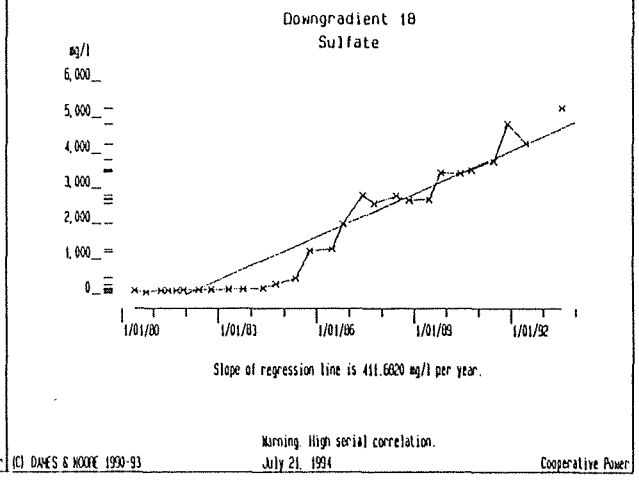

Downgradient 18
Arsenic
ug/l
10
8
6
4
2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Variability does not appear Gaussian.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

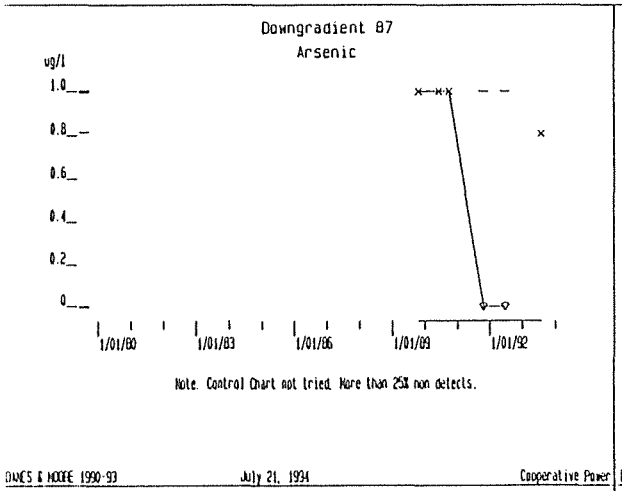

Downgradient 18
Boron
mg/l
50
40
30
20
10
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 1.8990 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

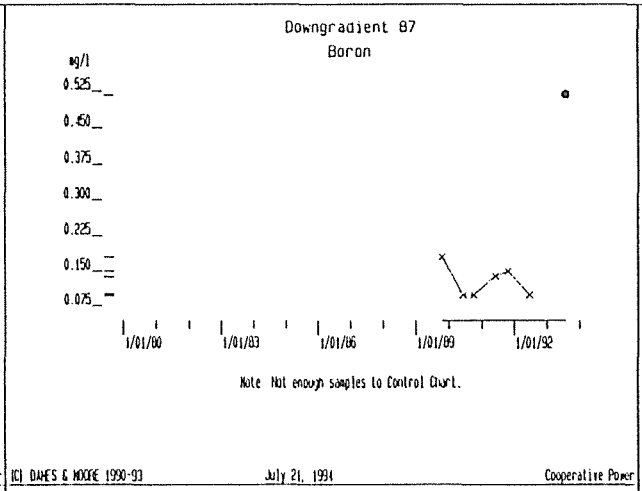

Downgradient 18
Chloride
mg/l
500
400
300
200
100
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 29.9755 mg/l per year.
Warning: High serial correlation
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

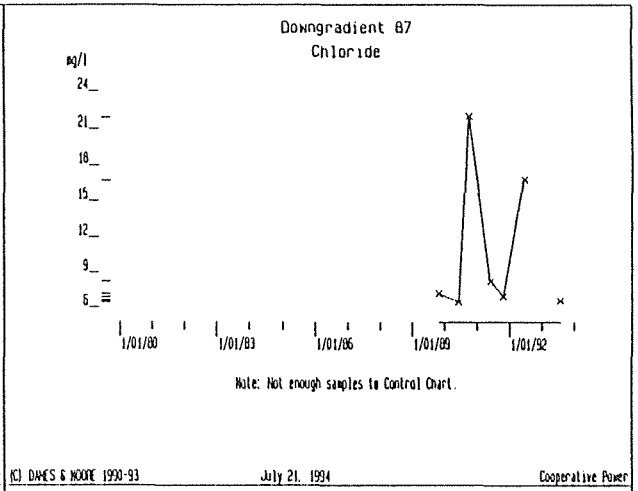

Downgradient 18
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

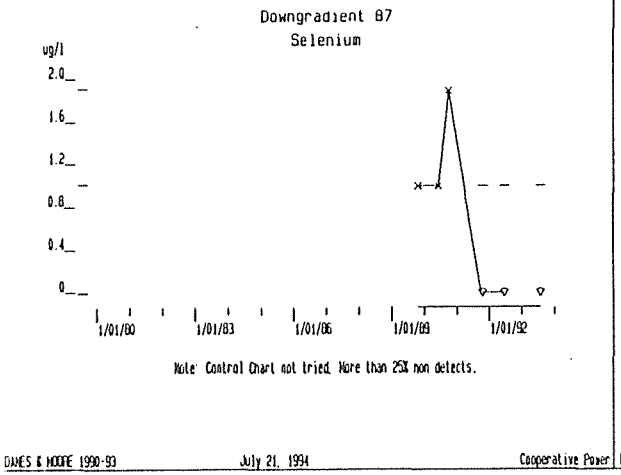

Downgradient 18
Strontium
mg/l
4.50
3.75
3.00
2.25
1.50
0.75
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 0.2773 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

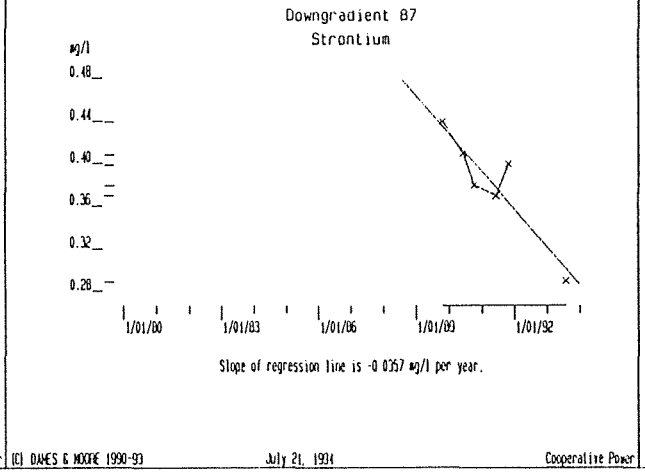

Downgradient 18
Sulfate
mg/l
6,000
5,000
4,000
3,000
2,000
1,000
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 411.6620 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

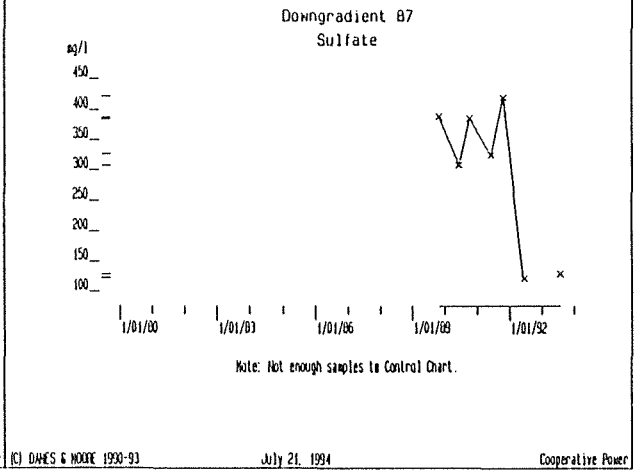

Downgradient 87
Arsenic
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note. Control Chart not tried. More than 25% non detects.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

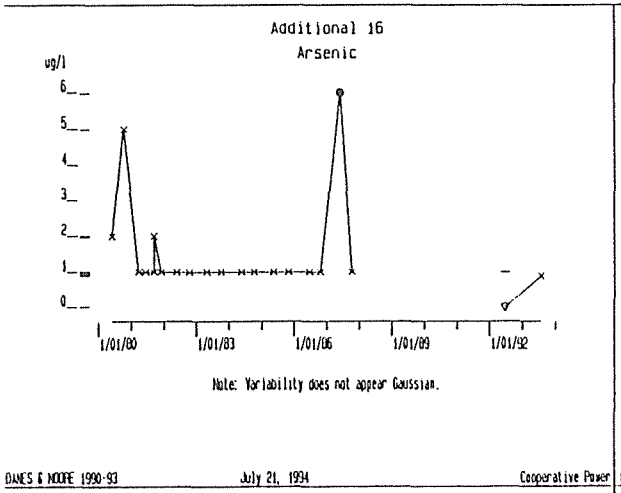

Downgradient 87
Boron
mg/l
0.525
0.450
0.375
0.300
0.225
0.150
0.075
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note. Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

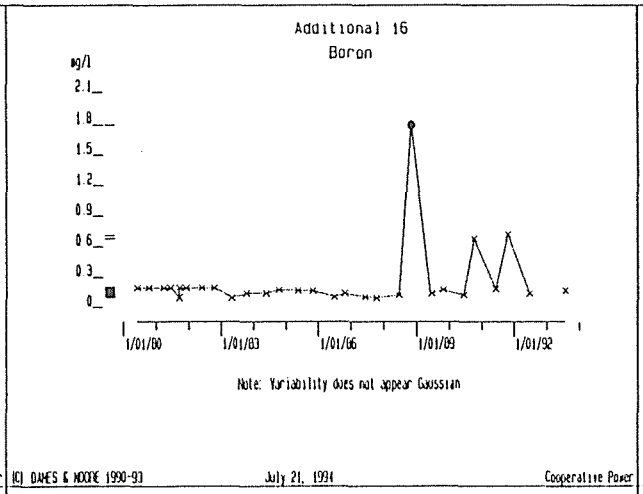

Downgradient 87
Chloride
mg/l
24
21
18
15
12
9
6
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

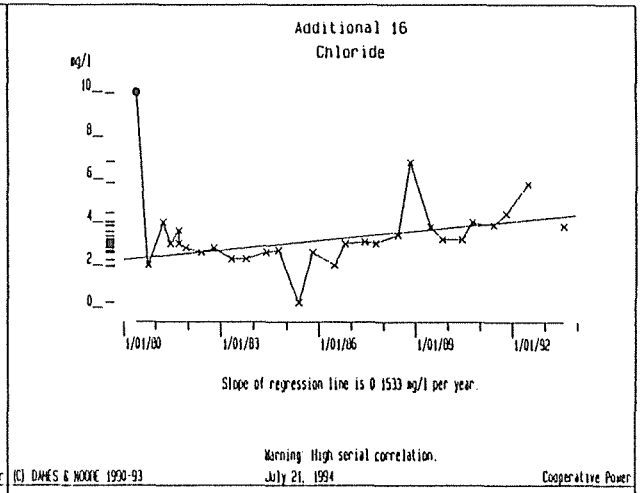

Downgradient 87
Selenium
ug/l
2.0
1.6
1.2
0.8
0.4
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

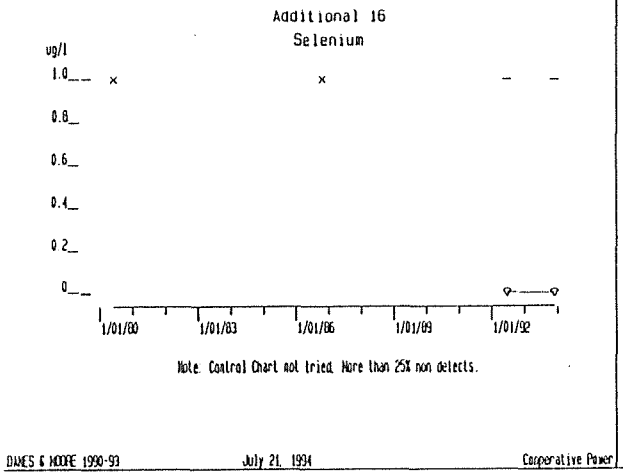

Downgradient 87
Strontium
mg/l
0.48
0.44
0.40
0.36
0.32
0.28
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.0357 mg/l per year.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

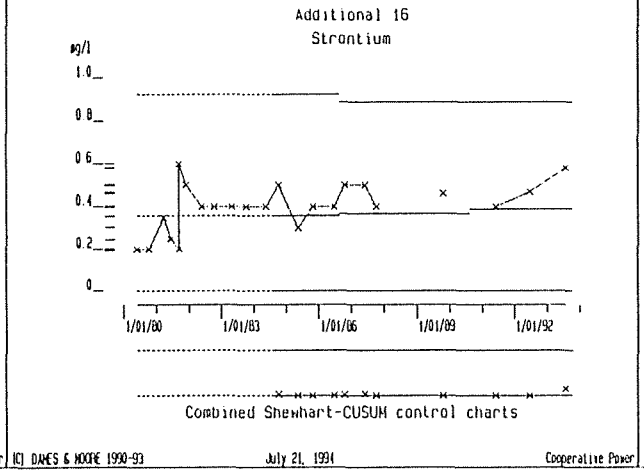

Downgradient 87
Sulfate
mg/l
450
400
350
300
250
200
150
100
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

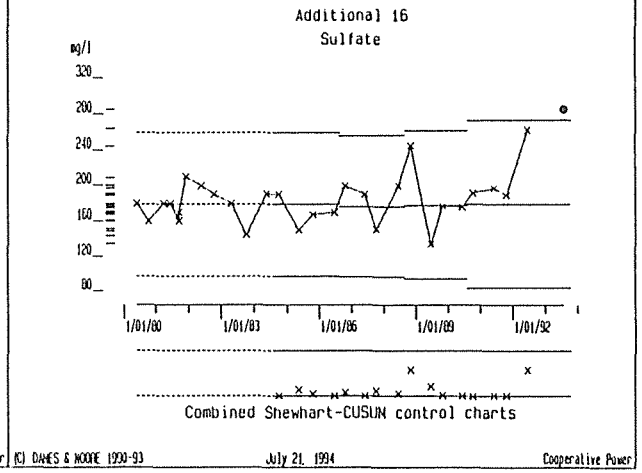

Additional 16
Arsenic
ug/l
6
5
4
3
2
1
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Variability does not appear Gaussian.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

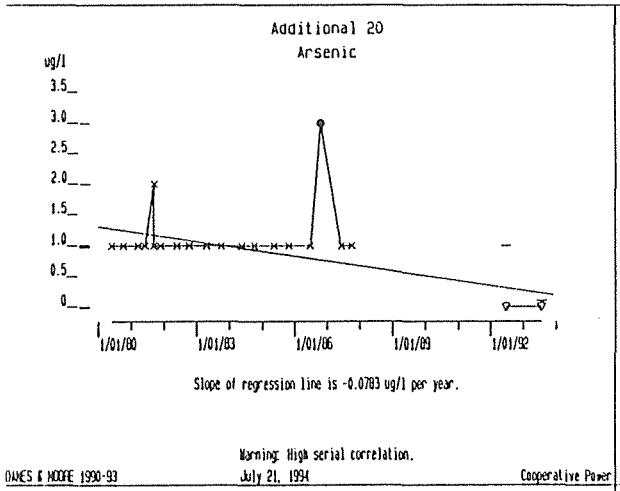

Additional 16
Boron
ug/l
2.1
1.8
1.5
1.2
0.9
0.6
0.3
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Variability does not appear Gaussian
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

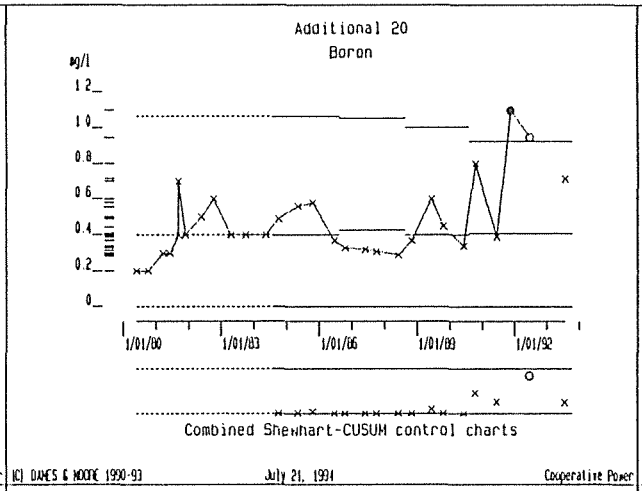

Additional 16
Chloride
mg/l
10
8
6
4
2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 0 1533 mg/l per year.
Warning High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

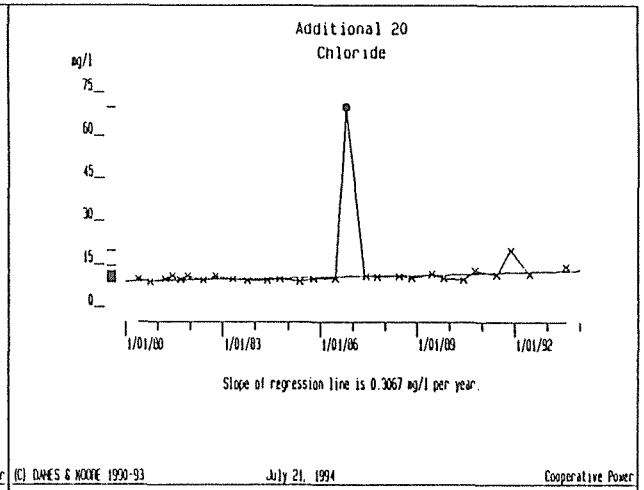

Additional 16
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note. Control Chart not tried. More than 25% non detects.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

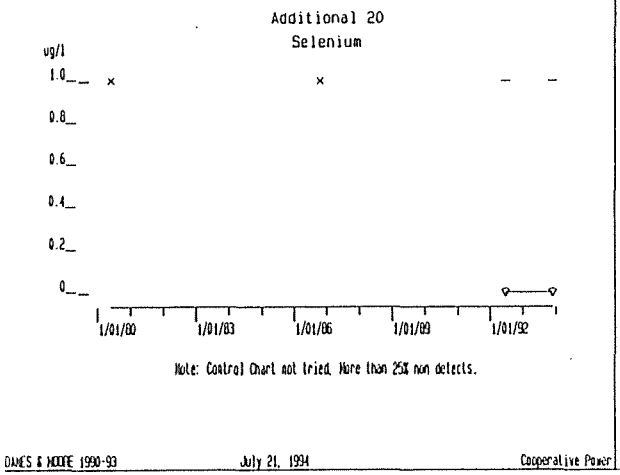

Additional 16
Strontium
mg/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

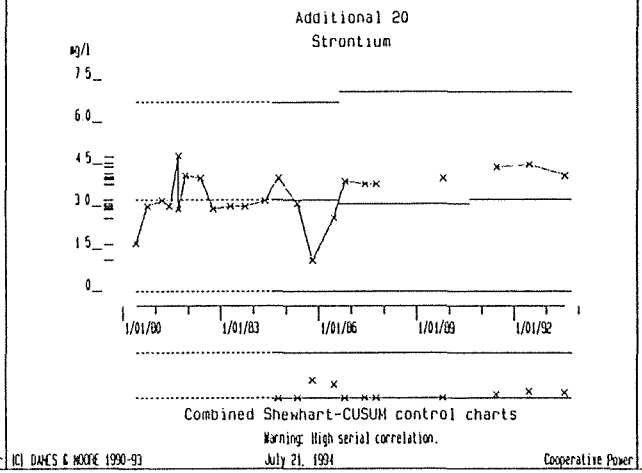

Additional 16
Sulfate
mg/l
320
280
240
200
160
120
80
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

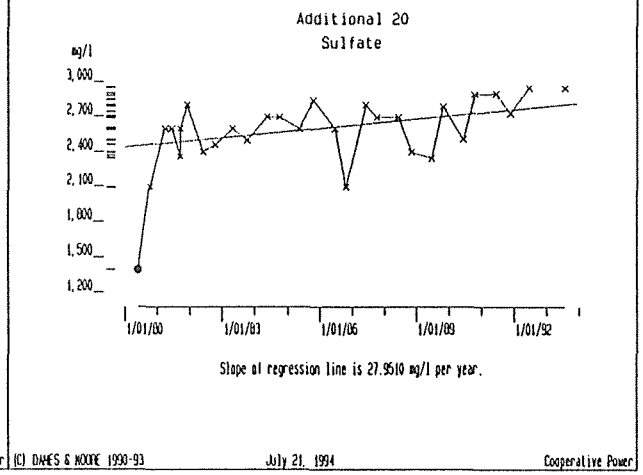

Additional 20
Arsenic
ug/l
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.0783 ug/l per year.
Warning: High serial correlation.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

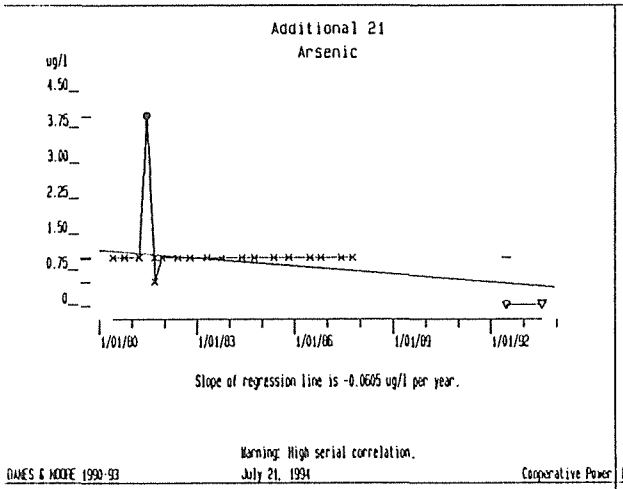

Additional 20
Boron
mg/l
1.2
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

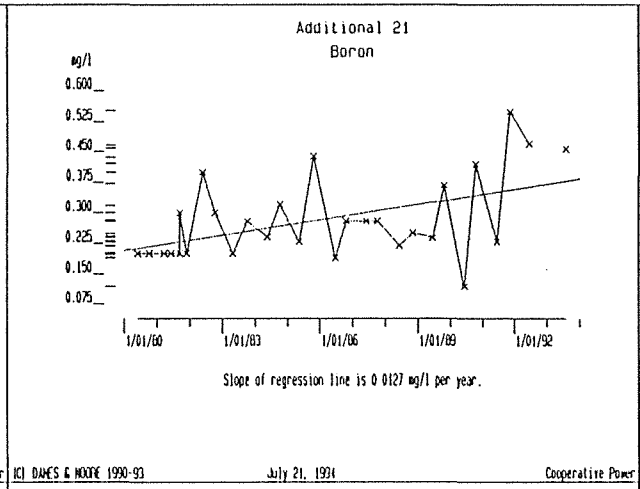

Additional 20
Chloride
mg/l
75
60
45
30
15
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 0.3067 mg/l per year.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

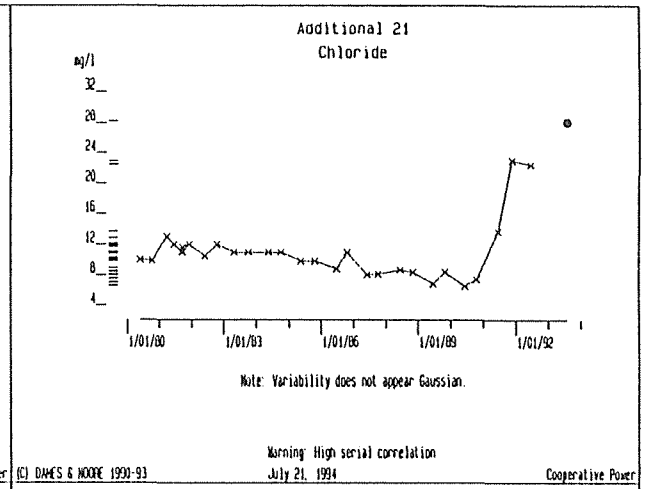

Additional 20
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

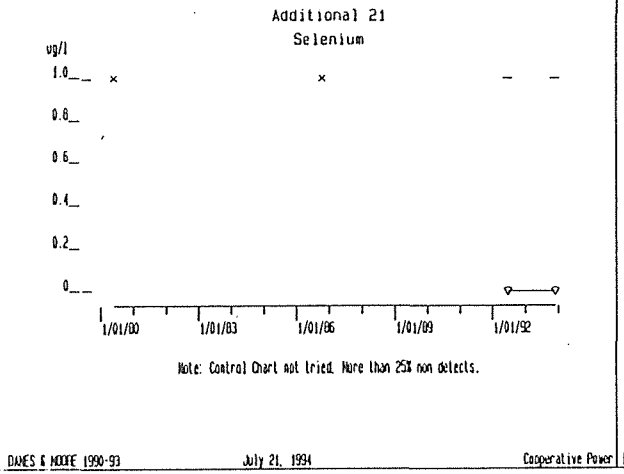

Additional 20
Strontium
mg/l
7.5
6.0
4.5
3.0
1.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

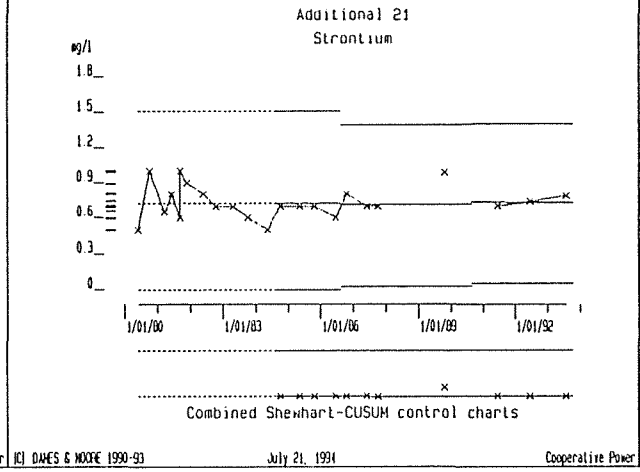

Additional 20
Sulfate
mg/l
3,000
2,700
2,400
2,100
1,800
1,500
1,200
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 27.9510 mg/l per year.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

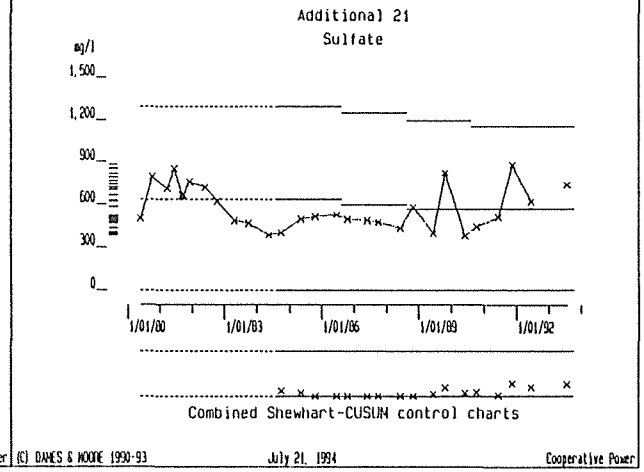

Additional 21
Arsenic
ug/l
4.50
3.75
3.00
2.25
1.50
0.75
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.0605 ug/l per year.
Warning: High serial correlation.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

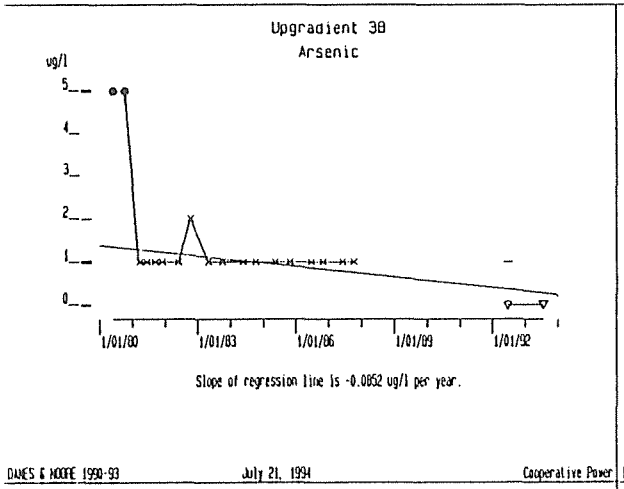

Additional 21
Boron
mg/l
0.600
0.525
0.450
0.375
0.300
0.225
0.150
0.075
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 0 0127 mg/l per year.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

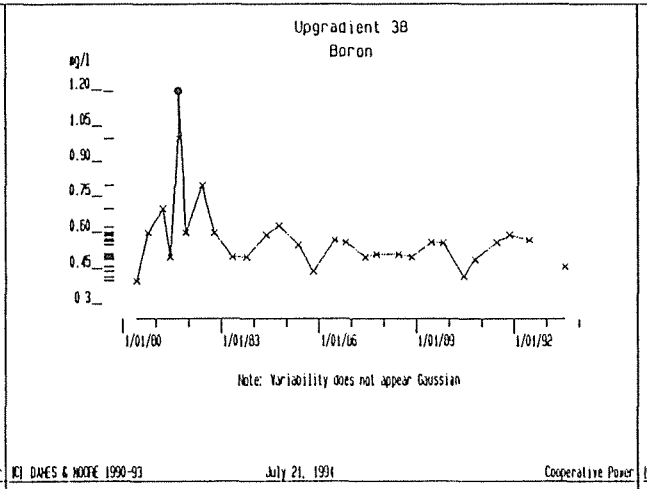

Additional 21
Chloride
mg/l
32
28
24
20
16
12
8
4
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Variability does not appear Gaussian.
Warning: High serial correlation
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

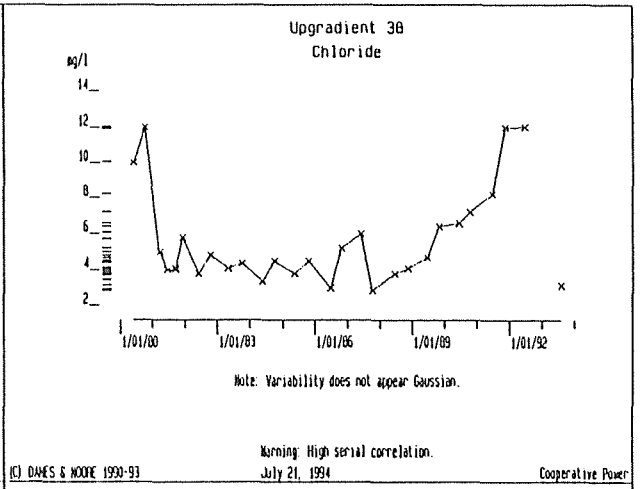

Additional 21
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

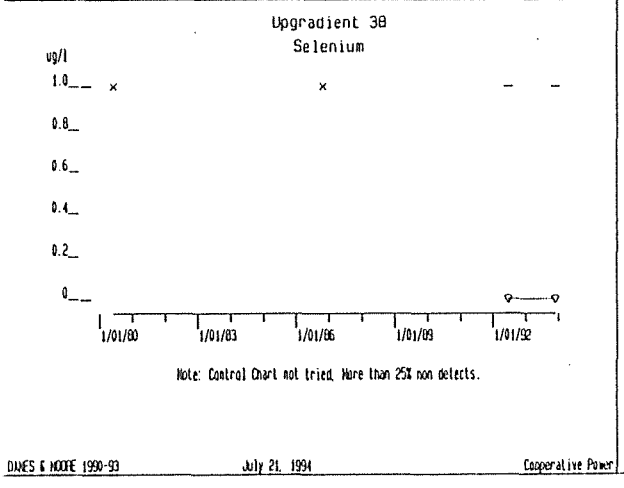

Additional 21
Strontium
mg/l
1.8
1.5
1.2
0.9
0.6
0.3
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

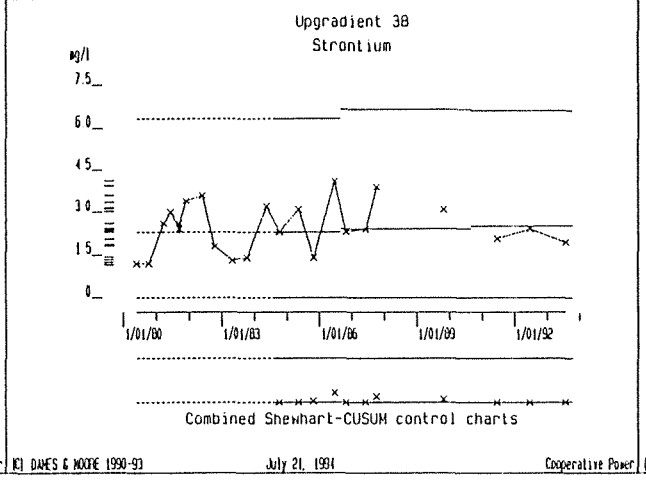

Additional 21
Sulfate
mg/l
1,500
1,200
900
600
300
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

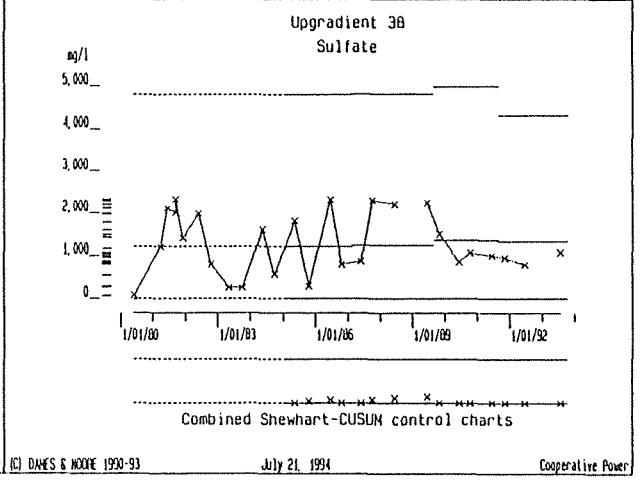

Upgradient 38
Arsenic
ug/l
5
4
3
2
1
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.0852 ug/l per year.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

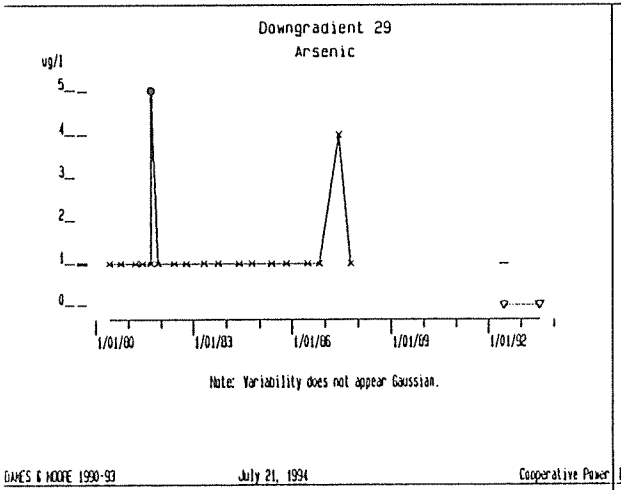

Upgradient 38
Boron
ug/l
1.20
1.05
0.90
0.75
0.60
0.45
0.3
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Variability does not appear Gaussian
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

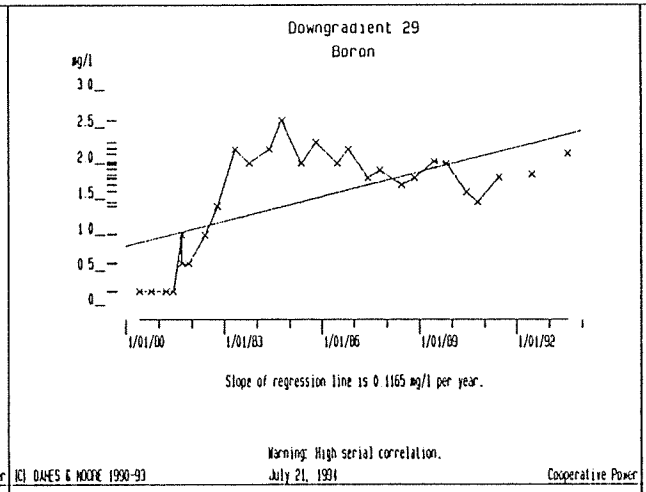

Upgradient 38
Chloride
ug/l
14
12
10
8
6
4
2
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Variability does not appear Gaussian.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

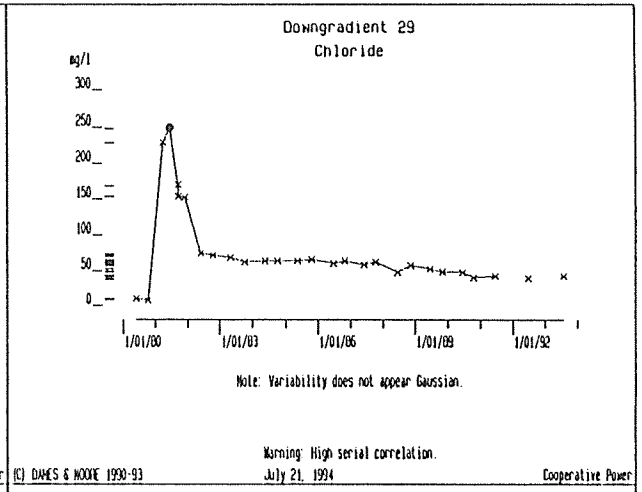

Upgradient 38
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

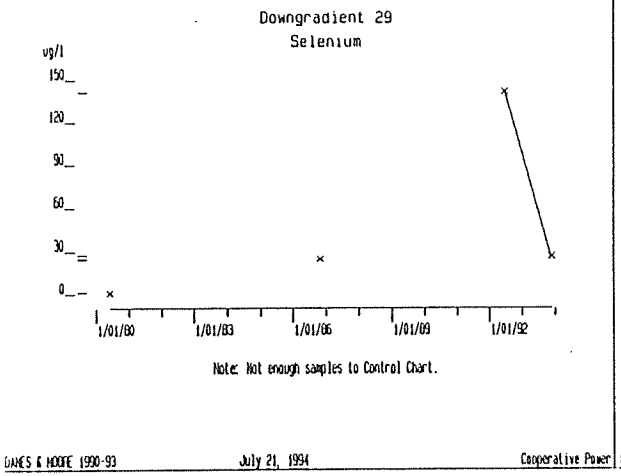

Upgradient 38
Strontium
ug/l
7.5
6.0
4.5
3.0
1.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

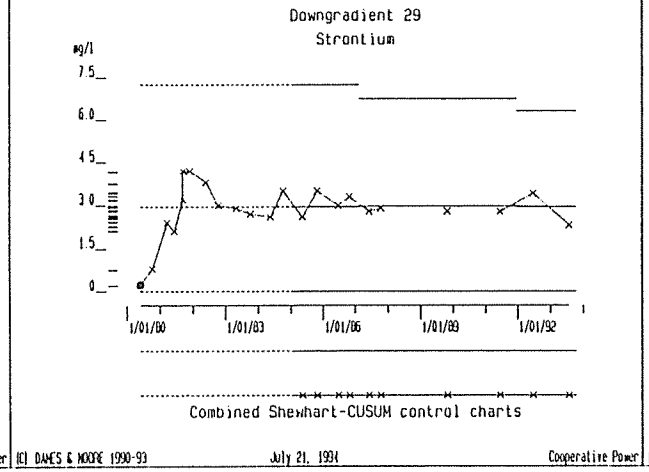

Upgradient 38
Sulfate
ug/l
5,000
4,000
3,000
2,000
1,000
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

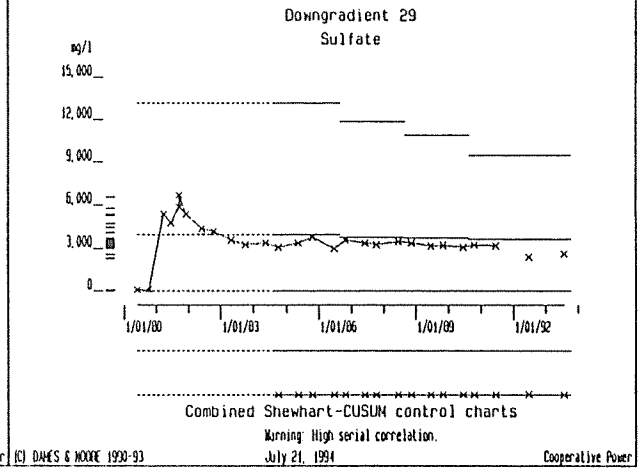

Downgradient 29
Arsenic
ug/l
5
4
3
2
1
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Variability does not appear Gaussian.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

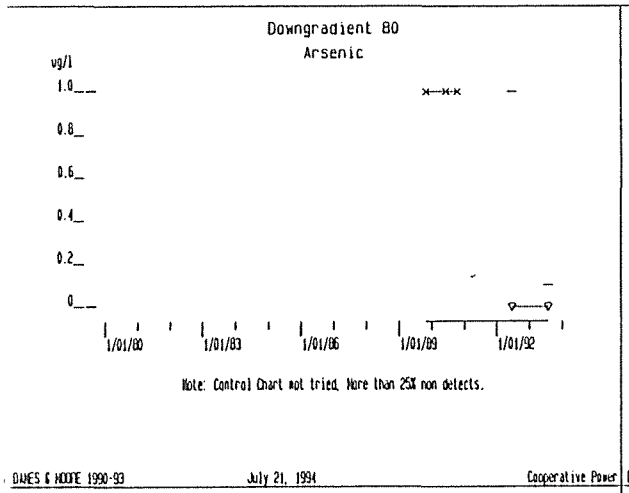

Downgradient 29
Boron
mg/l
3.0
2.5
2.0
1.5
1.0
0.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 0.1165 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

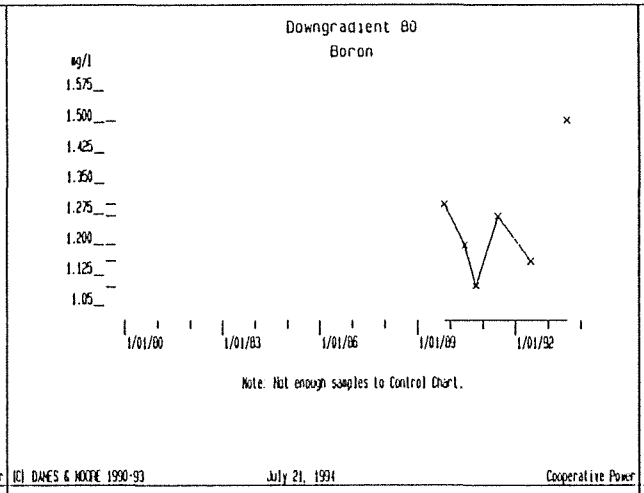

Downgradient 29
Chloride
mg/l
300
250
200
150
100
50
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Variability does not appear Gaussian.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

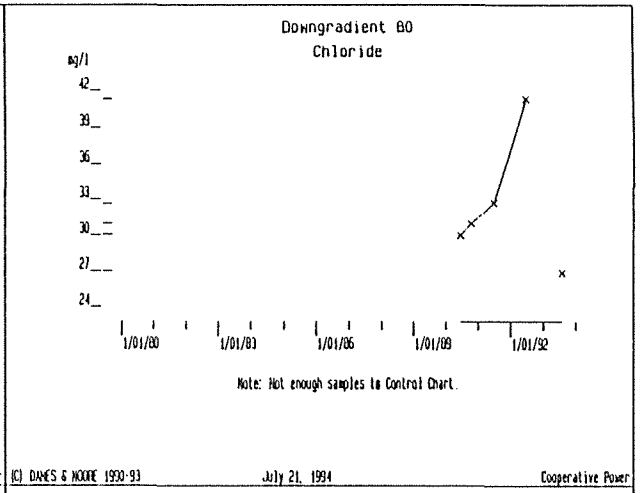

Downgradient 29
Selenium
ug/l
150
120
90
60
30
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

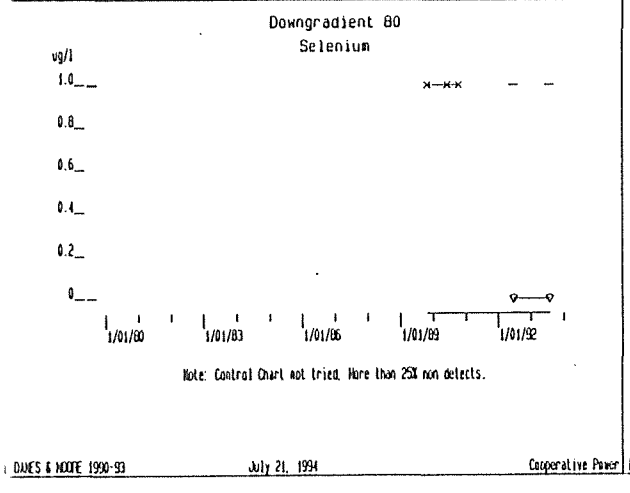

Downgradient 29
Strontium
mg/l
7.5
6.0
4.5
3.0
1.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

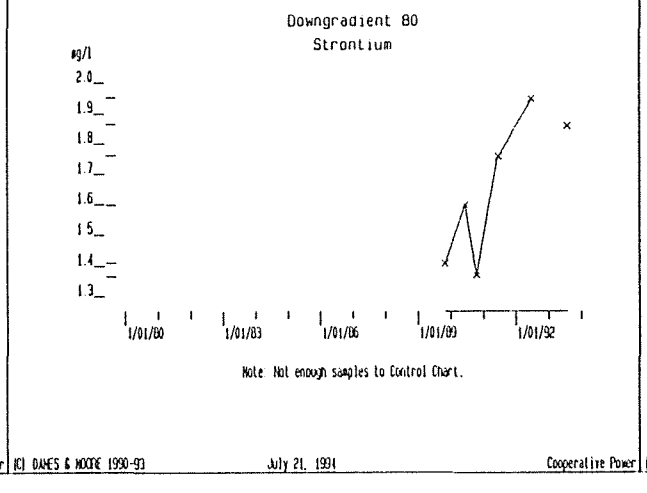

Downgradient 29
Sulfate
mg/l
15,000
12,000
9,000
6,000
3,000
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

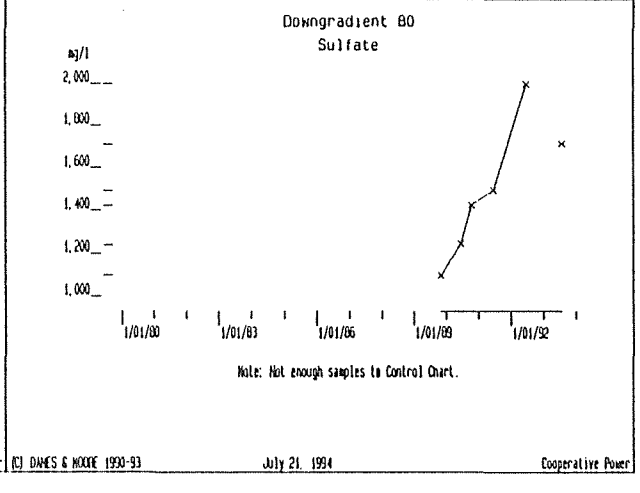

Downgradient 80
Arsenic
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

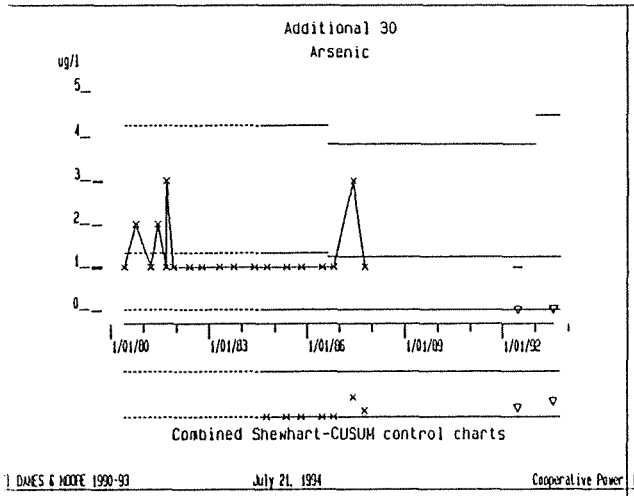

Downgradient 80
Boron
mg/l
1.575
1.500
1.425
1.350
1.275
1.200
1.125
1.05
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

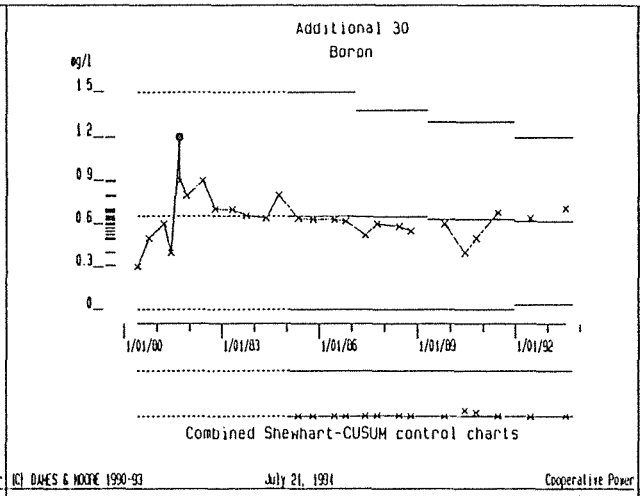

Downgradient 80
Chloride
mg/l
42
39
36
33
30
27
24
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

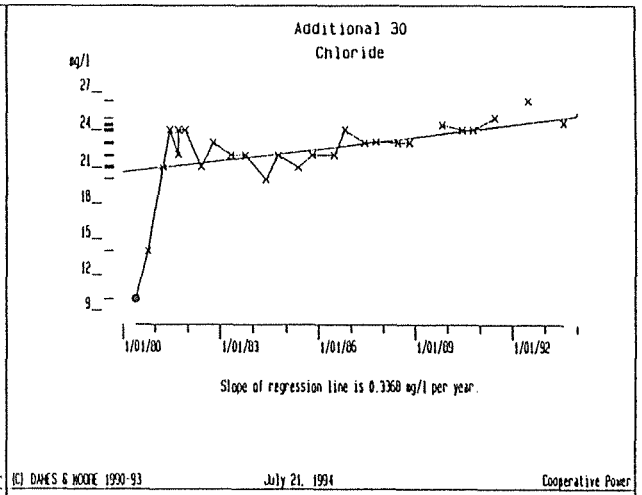

Downgradient 80
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

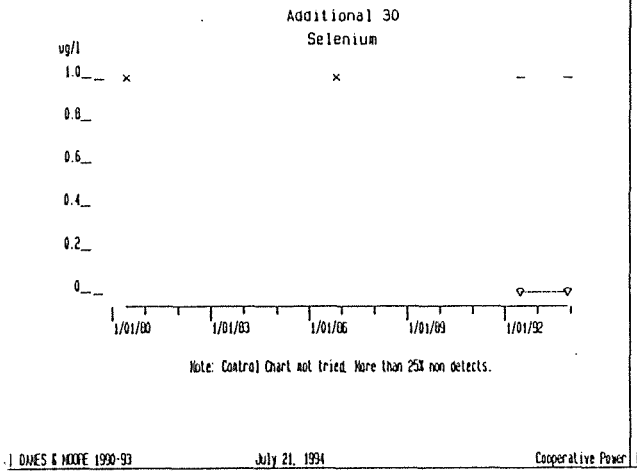

Downgradient 80
Strontium
mg/l
2.0
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

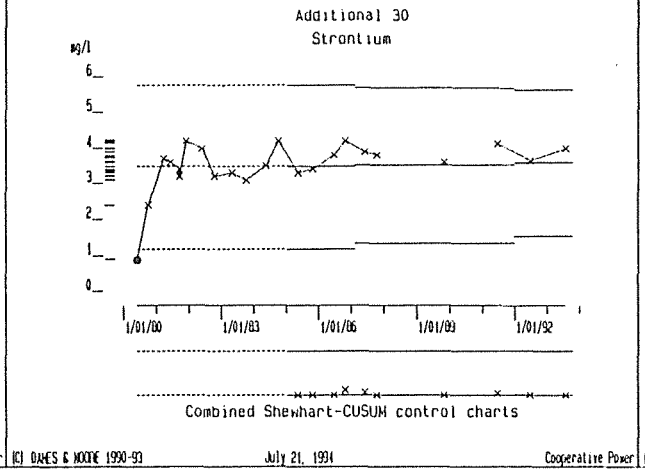

Downgradient 80
Sulfate
mg/l
2,000
1,800
1,600
1,400
1,200
1,000
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

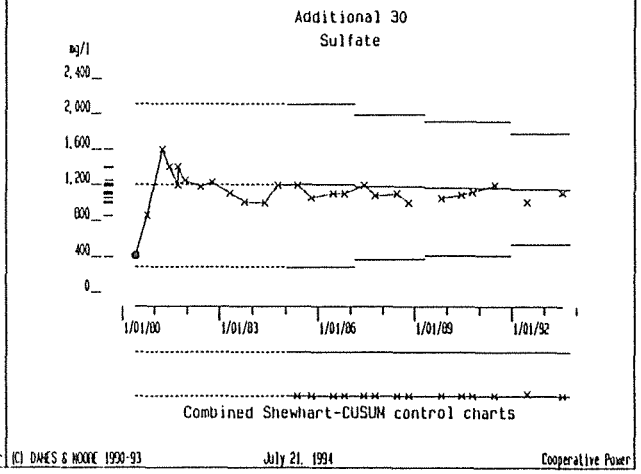

Additional 30
Arsenic
ug/l
5
4
3
2
1
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts

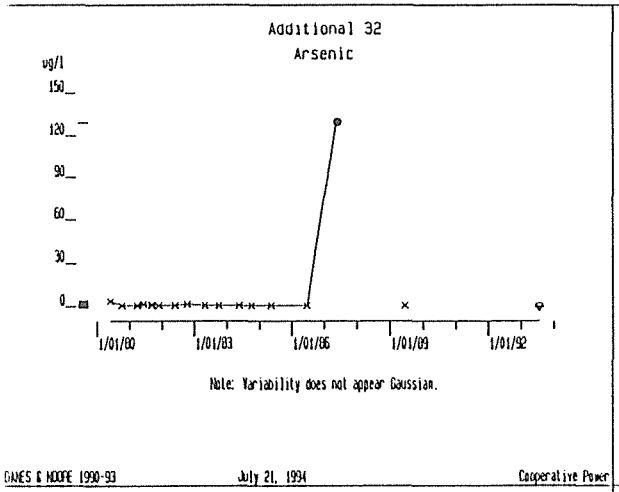

Additional 30
Boron
mg/l
1.5
1.2
0.9
0.6
0.3
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts

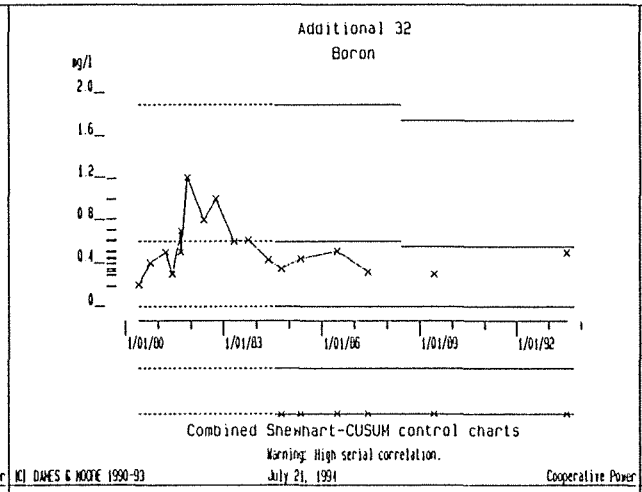

Additional 30
Chloride
mg/l
27
24
21
18
15
12
9
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 0.3368 mg/l per year.

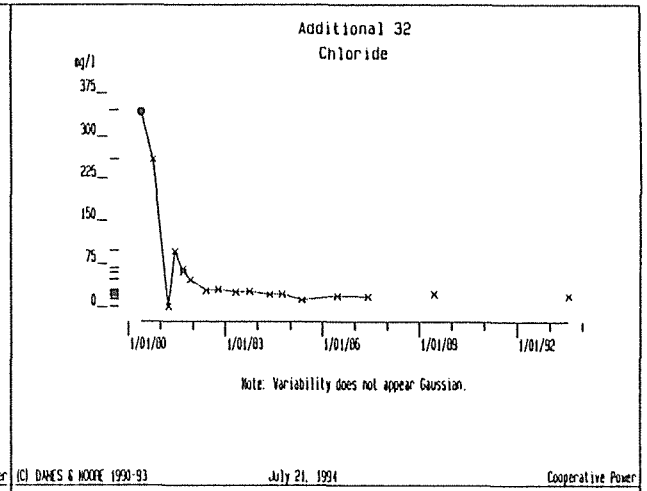

Additional 30
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.

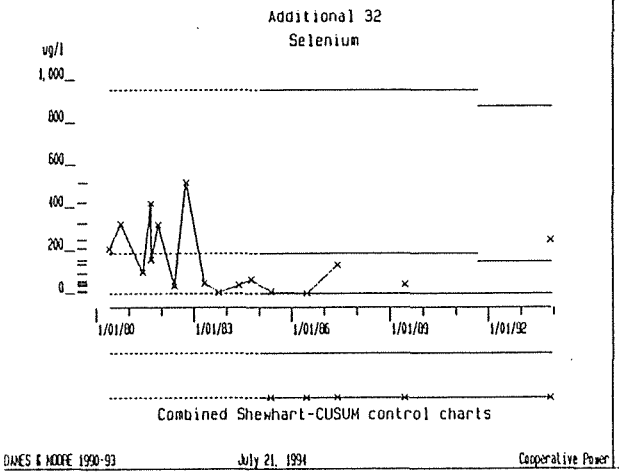

Additional 30
Strontium
mg/l
6
5
4
3
2
1
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts

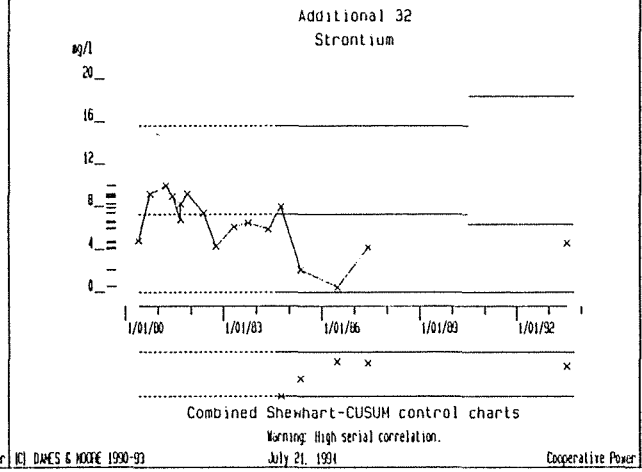

Additional 30
Sulfate
mg/l
2,400
2,000
1,600
1,200
800
400
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts

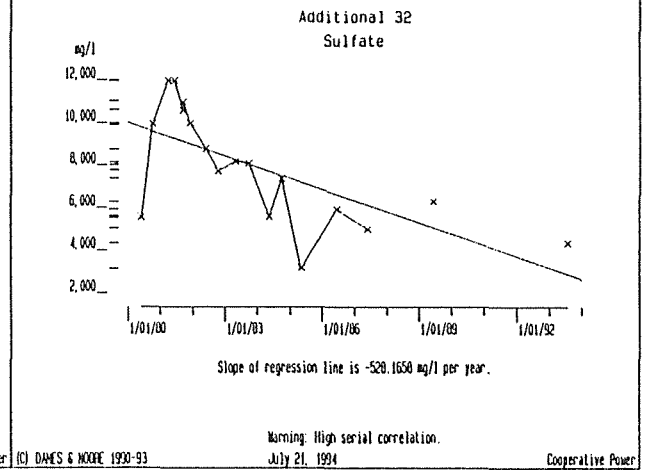

Additional 32
Arsenic
ug/l
150
120
90
60
30
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Variability does not appear Gaussian.
DANES & MOORE 1990-93
July 21, 1994
Cooperative Power

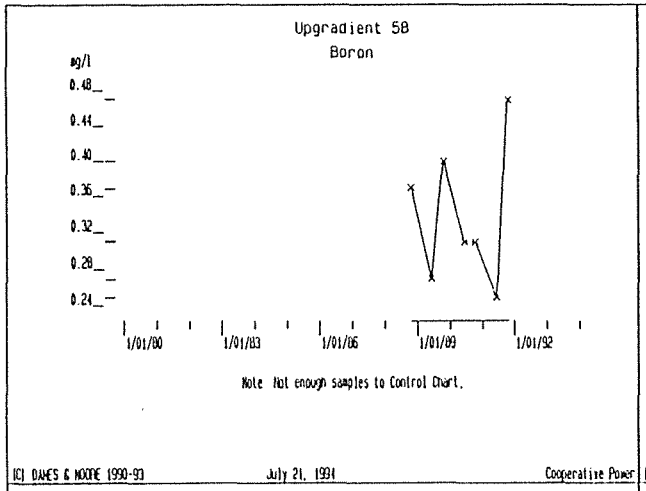

Additional 32
Boron
mg/l
2.0
1.6
1.2
0.8
0.4
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DANES & MOORE 1990-93
July 21, 1994
Cooperative Power

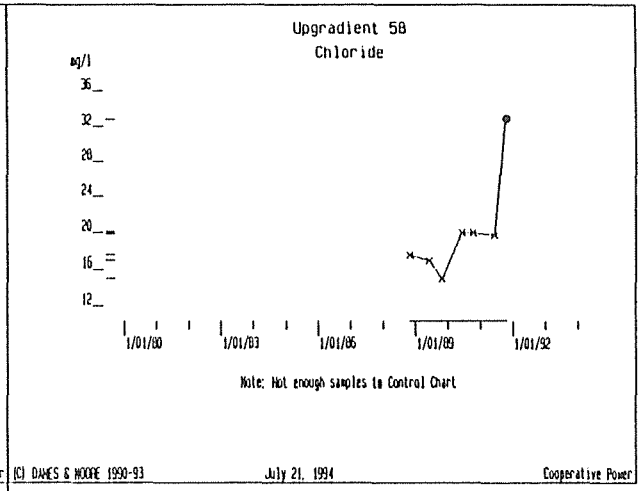

Additional 32
Chloride
mg/l
375
300
225
150
75
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Variability does not appear Gaussian.
(C) DANES & MOORE 1990-93
July 21, 1994
Cooperative Power

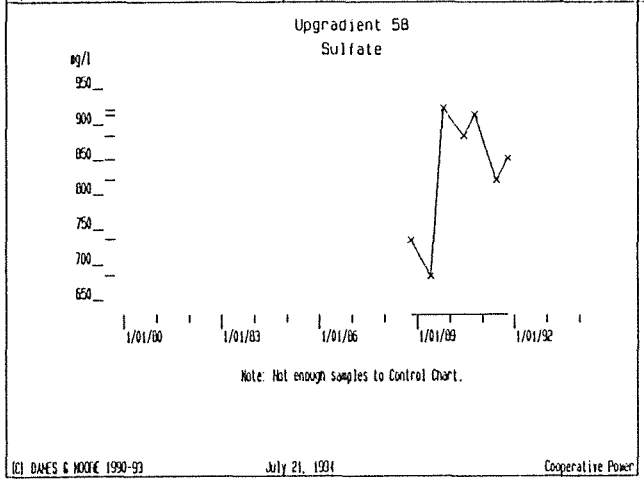

Additional 32
Selenium
ug/l
1,000
800
600
400
200
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
DANES & MOORE 1990-93
July 21, 1994
Cooperative Power

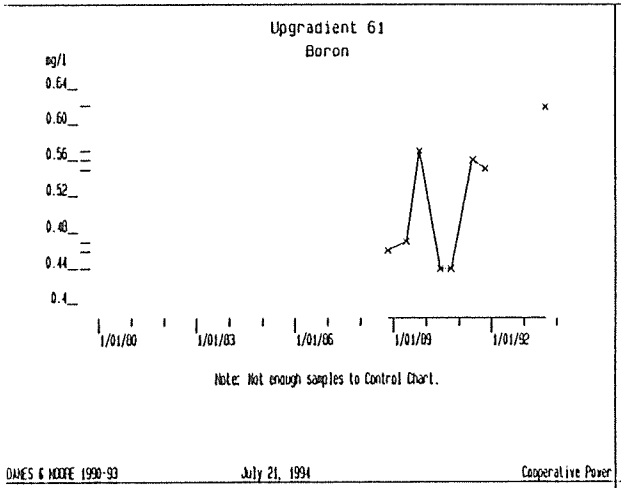

Additional 32
Strontium
mg/l
20
16
12
8
4
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DANES & MOORE 1990-93
July 21, 1994
Cooperative Power

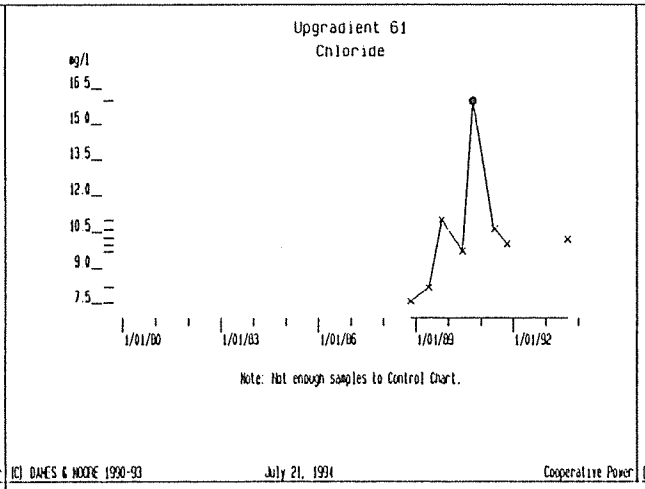

Additional 32
Sulfate
mg/l
12,000
10,000
8,000
6,000
4,000
2,000
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -528.1650 mg/l per year.
Warning: High serial correlation.
(C) DANES & MOORE 1990-93
July 21, 1994
Cooperative Power

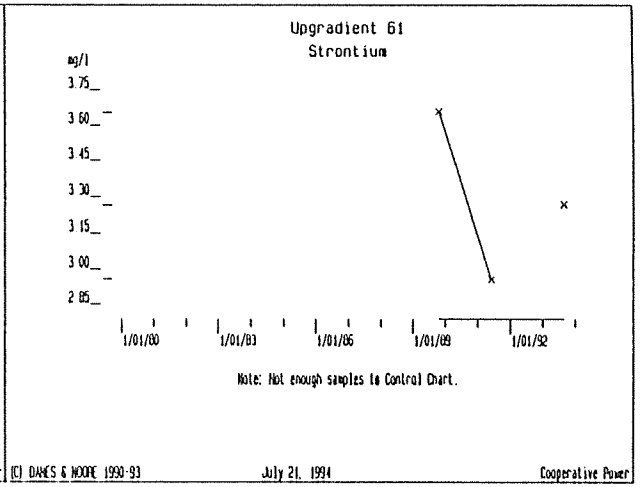

Upgradient 58
Boron
mg/l
0.48
0.44
0.40
0.36
0.32
0.28
0.24
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

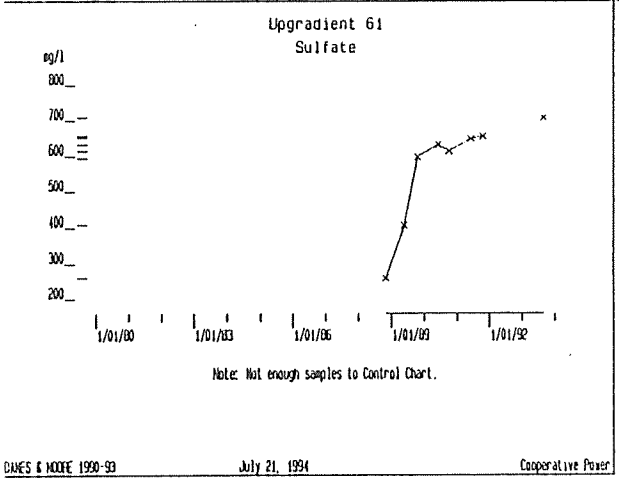

Upgradient 58
Chloride
mg/l
36
32
28
24
20
16
12
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

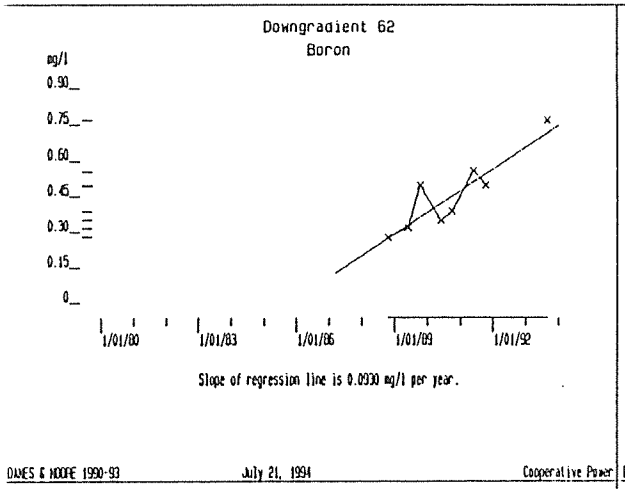

Upgradient 58
Sulfate
mg/l
950
900
850
800
750
700
650
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

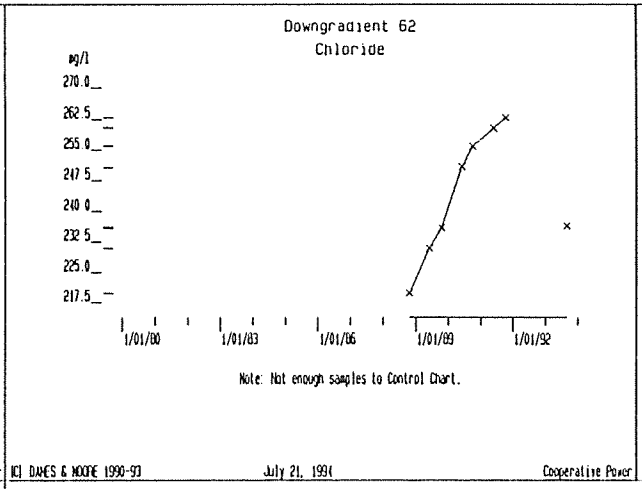

Upgradient 61
Boron
mg/l
0.64
0.60
0.56
0.52
0.48
0.44
0.4
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

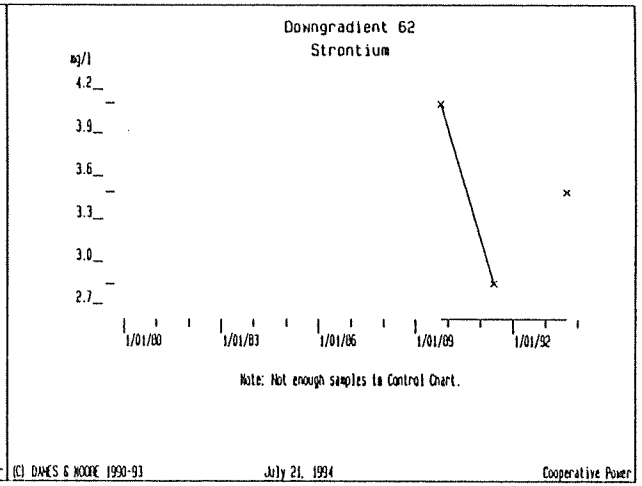

Upgradient 61
Chloride
mg/l
16.5
15.0
13.5
12.0
10.5
9.0
7.5
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

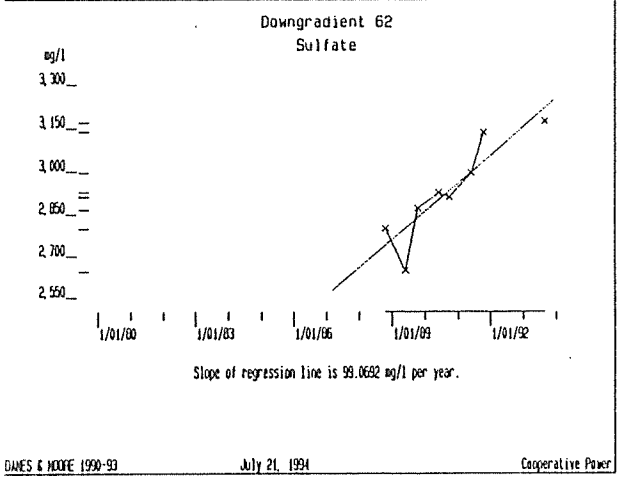

Upgradient 61
Strontium
mg/l
3.75
3.60
3.45
3.30
3.15
3.00
2.85
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

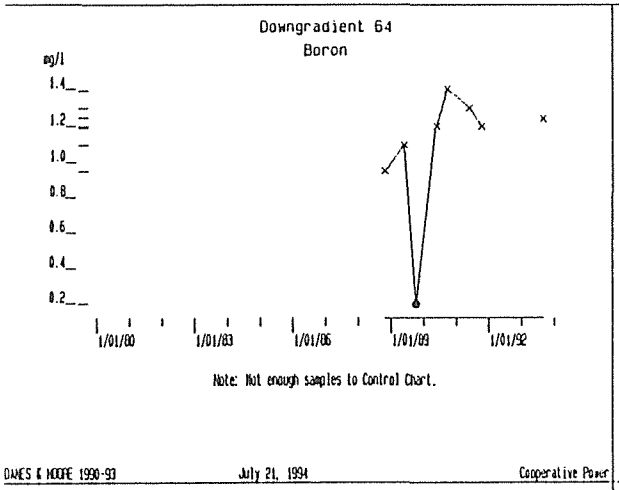

Upgradient 61
Sulfate
mg/l
800
700
600
500
400
300
200
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

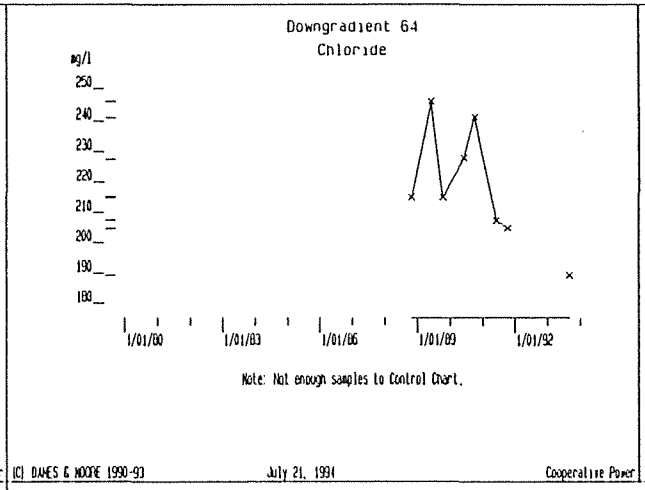

Downgradient 62
Boron
mg/l
0.90
0.75
0.60
0.45
0.30
0.15
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 0.0930 mg/l per year.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

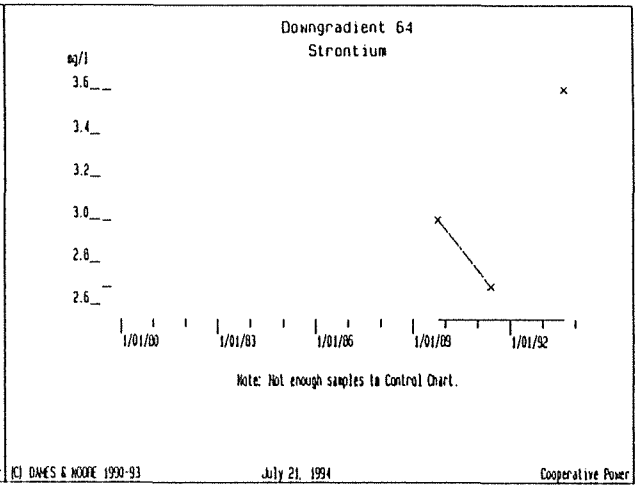

Downgradient 62
Chloride
mg/l
270.0
262.5
255.0
247.5
240.0
232.5
225.0
217.5
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

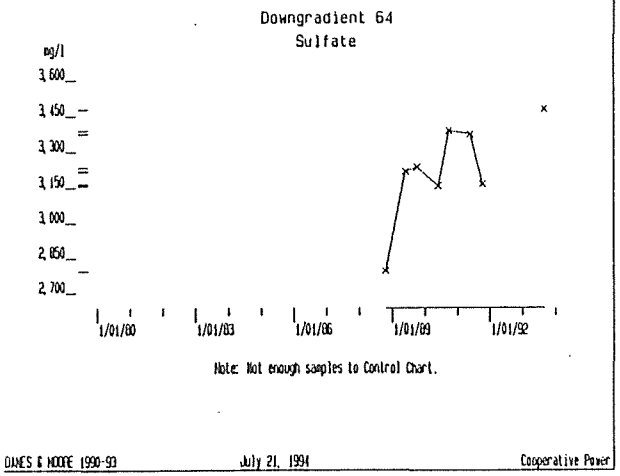

Downgradient 62
Strontium
mg/l
4.2
3.9
3.6
3.3
3.0
2.7
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

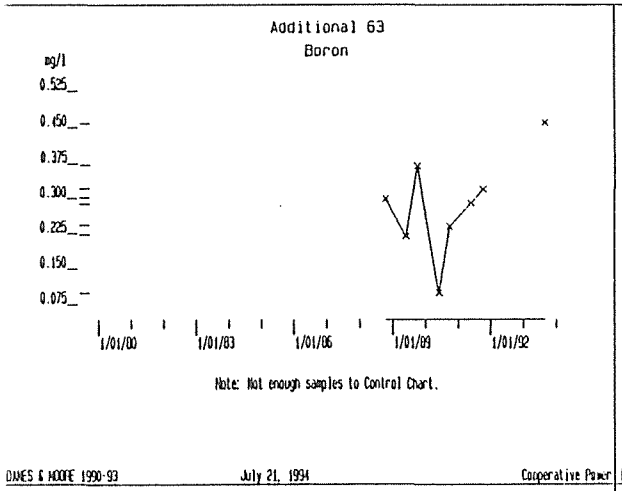

Downgradient 62
Sulfate
mg/l
3,300
3,150
3,000
2,850
2,700
2,550
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 99.0692 mg/l per year.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

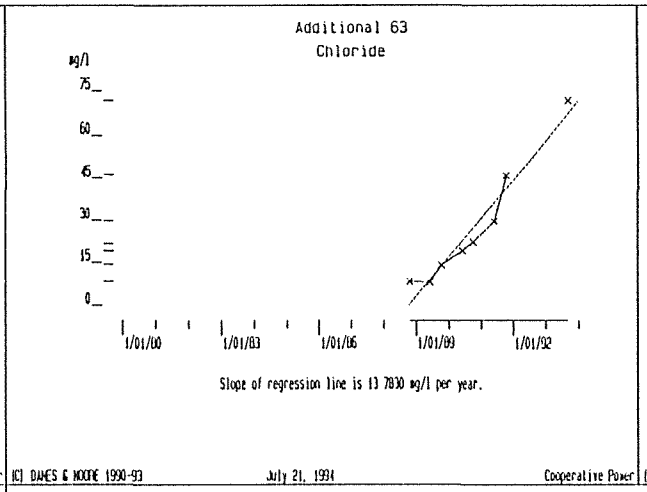

Downgradient 64
Boron
mg/l
1.4
1.2
1.0
0.8
0.6
0.4
0.2
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

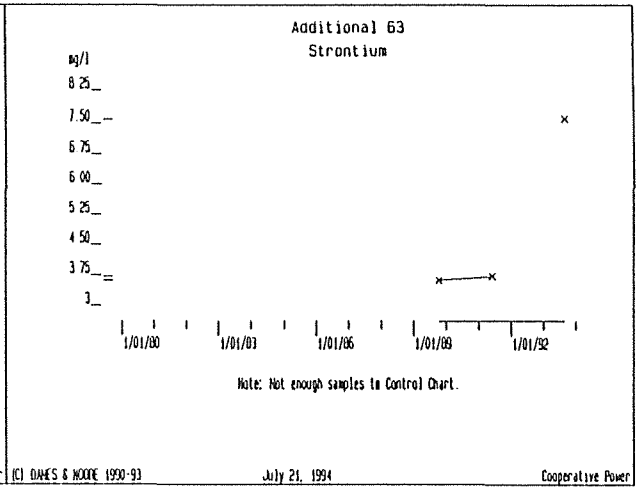

Downgradient 64
Chloride
mg/l
250
240
230
220
210
200
190
180
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

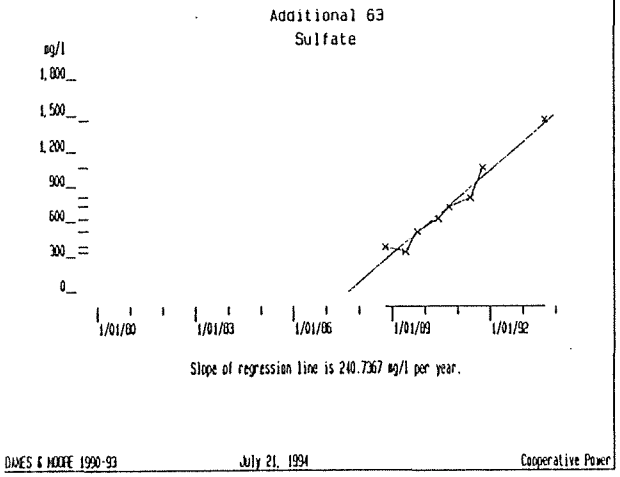

Downgradient 64
Strontium
mg/l
3.6
3.4
3.2
3.0
2.8
2.6
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

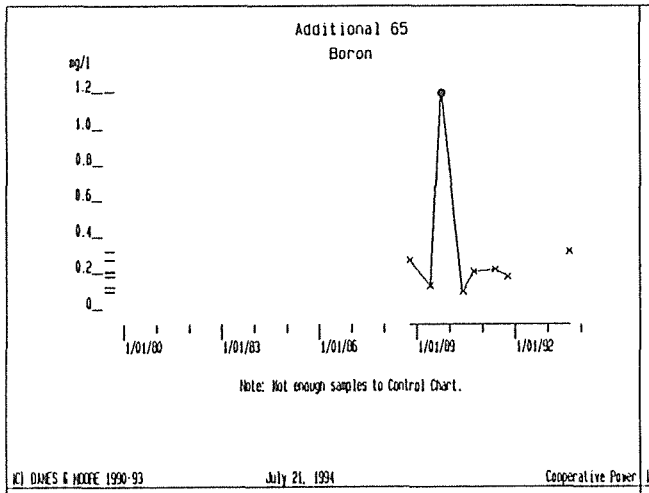

Downgradient 64
Sulfate
mg/l
3,600
3,450
3,300
3,150
3,000
2,850
2,700
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

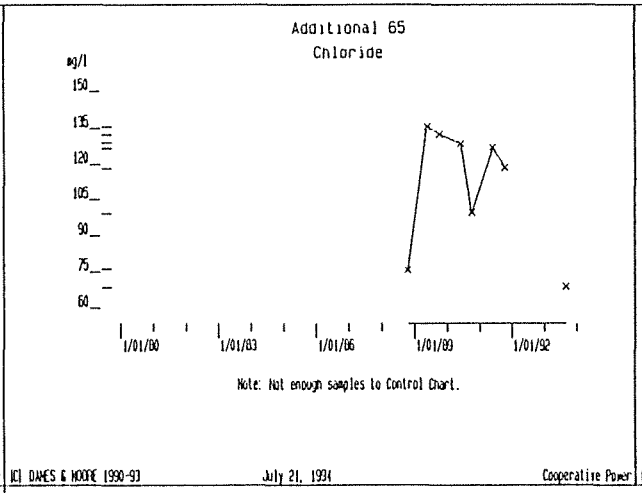

Additional 63
Boron
mg/l
0.525
0.450
0.375
0.300
0.225
0.150
0.075
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

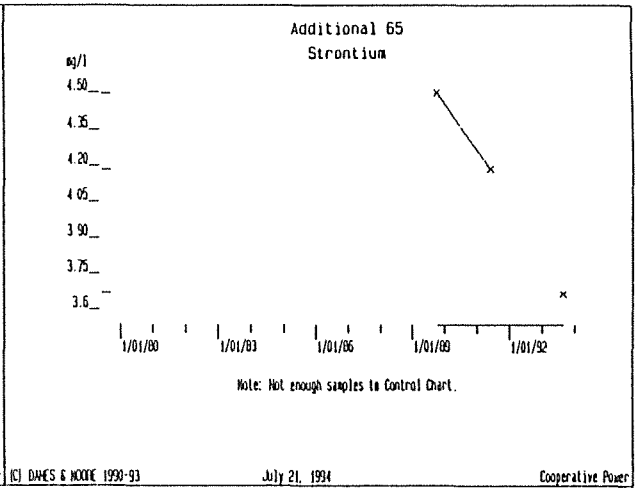

Additional 63
Chloride
mg/l
75
60
45
30
15
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 13.7830 mg/l per year.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

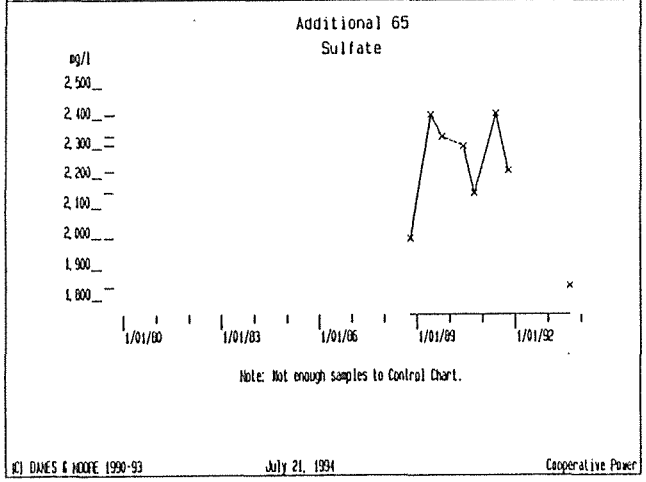

Additional 63
Strontium
mg/l
8.25
7.50
6.75
6.00
5.25
4.50
3.75
3
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

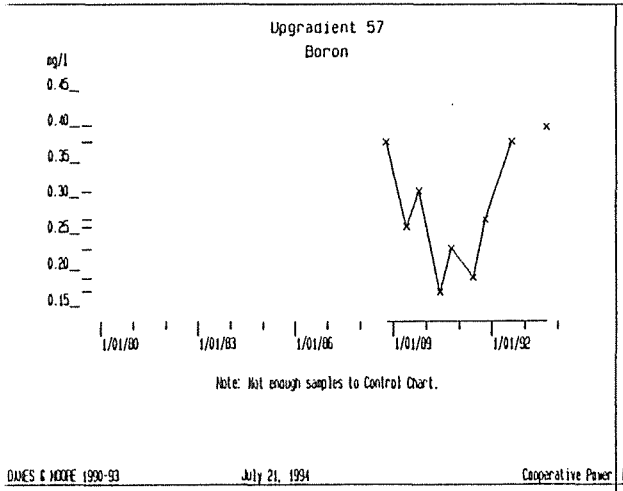

Additional 63
Sulfate
mg/l
1,800
1,500
1,200
900
600
300
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 240.7367 mg/l per year.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

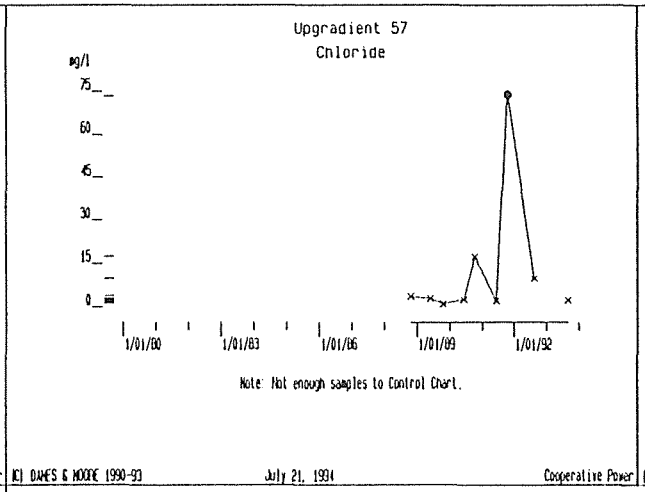

Additional 65
Boron
mg/l
1.2
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

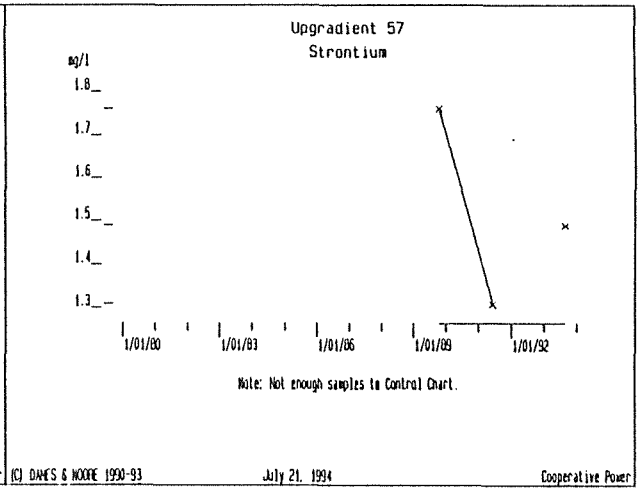

Additional 65
Chloride
mg/l
150
135
120
105
90
75
60
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

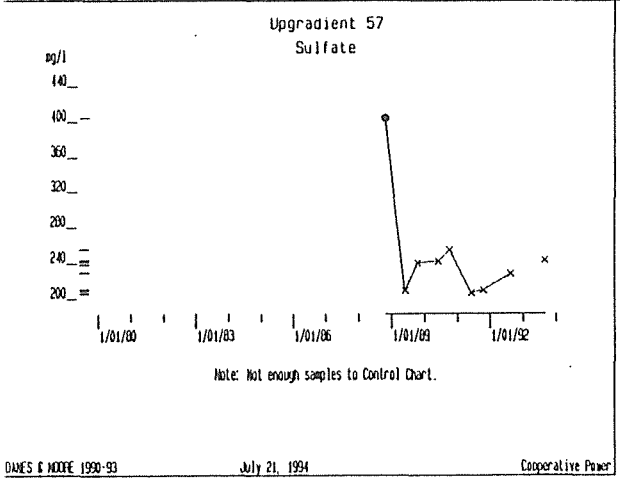

Additional 65
Strontium
mg/l
4.50
4.35
4.20
4.05
3.90
3.75
3.6
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

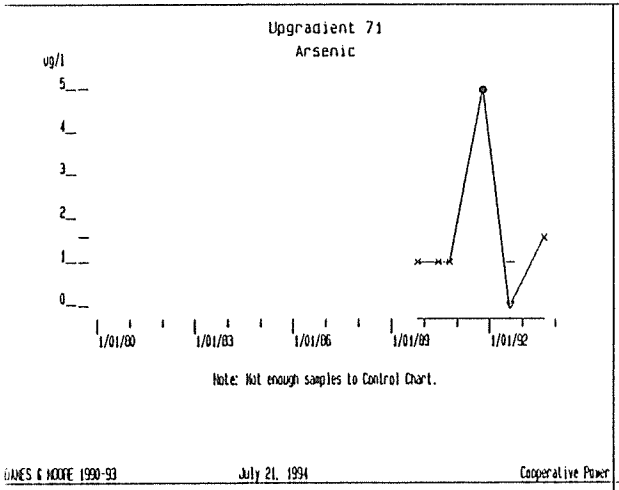

Additional 65
Sulfate
mg/l
2,500
2,400
2,300
2,200
2,100
2,000
1,900
1,800
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

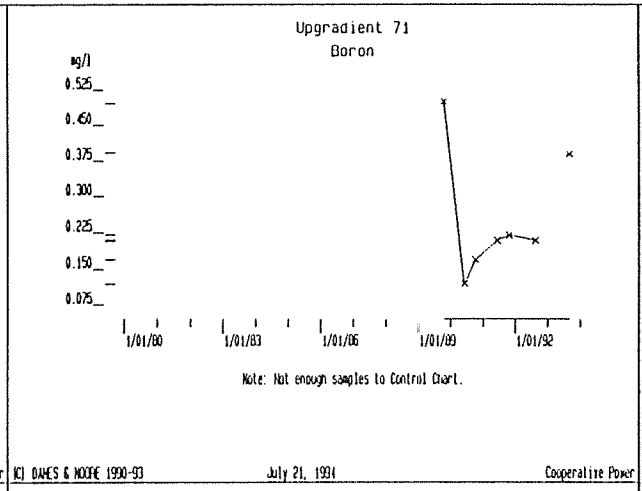

Upgradient 57
Boron
mg/l
0.45
0.40
0.35
0.30
0.25
0.20
0.15
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

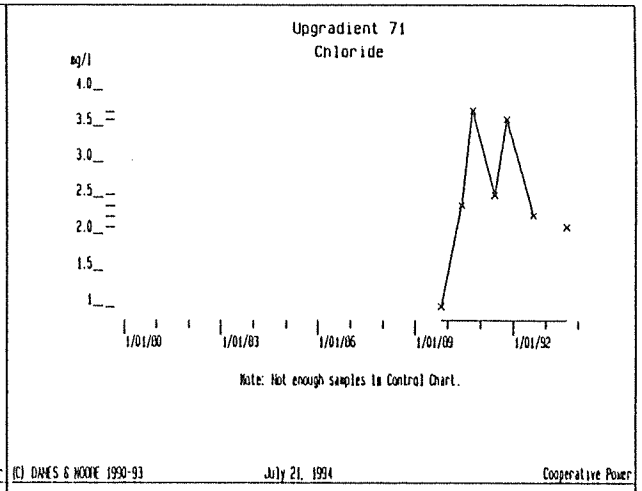

Upgradient 57
Chloride
mg/l
75
60
45
30
15
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

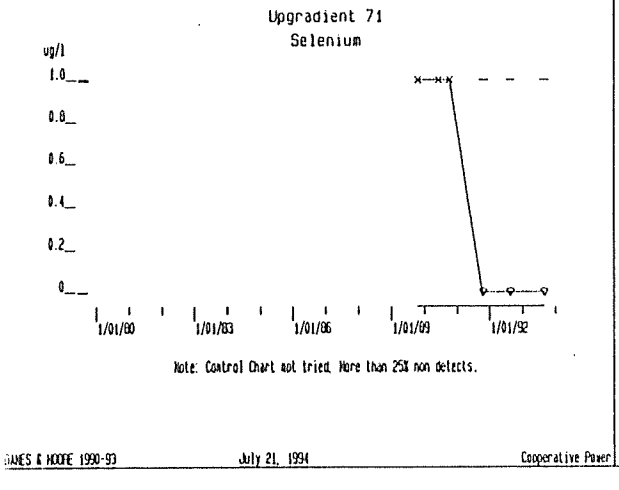

Upgradient 57
Strontium
mg/l
1.8
1.7
1.6
1.5
1.4
1.3
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

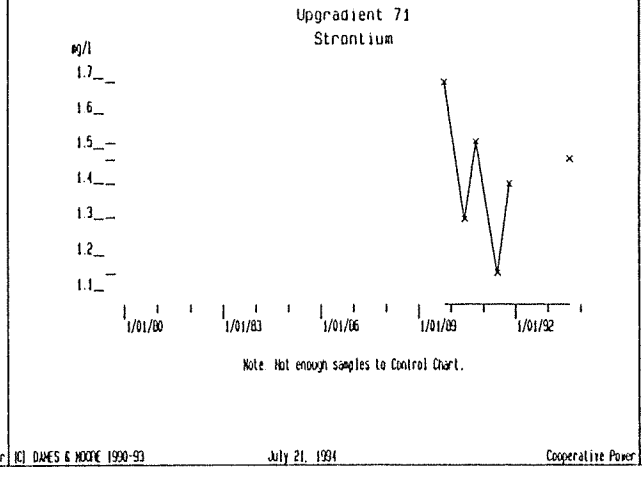

Upgradient 57
Sulfate
mg/l
440
400
360
320
280
240
200
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

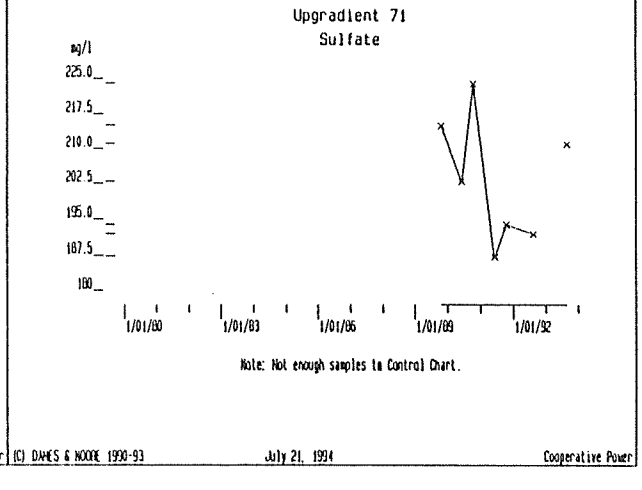

Upgradient 71
Arsenic
ug/l
5
4
3
2
1
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.

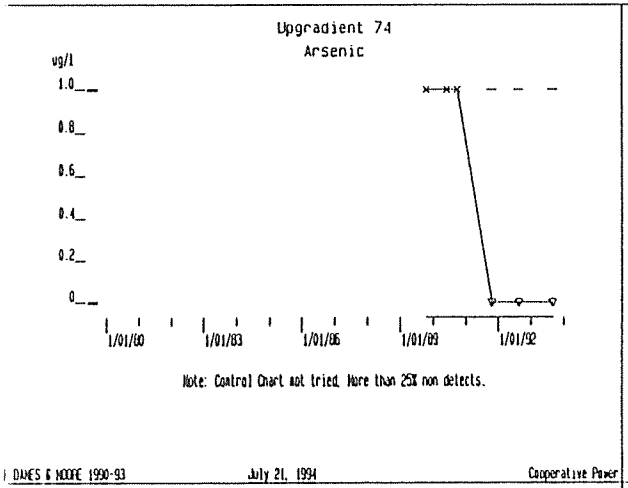

Upgradient 71
Boron
ug/l
0.525
0.450
0.375
0.300
0.225
0.150
0.075
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.

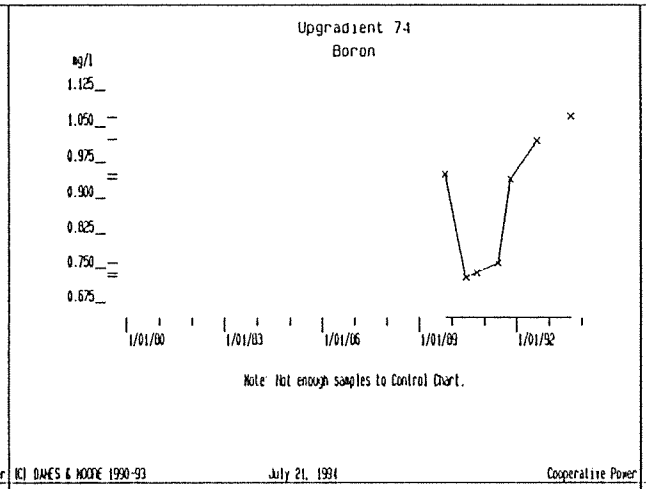

Upgradient 71
Chloride
ug/l
4.0
3.5
3.0
2.5
2.0
1.5
1
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.

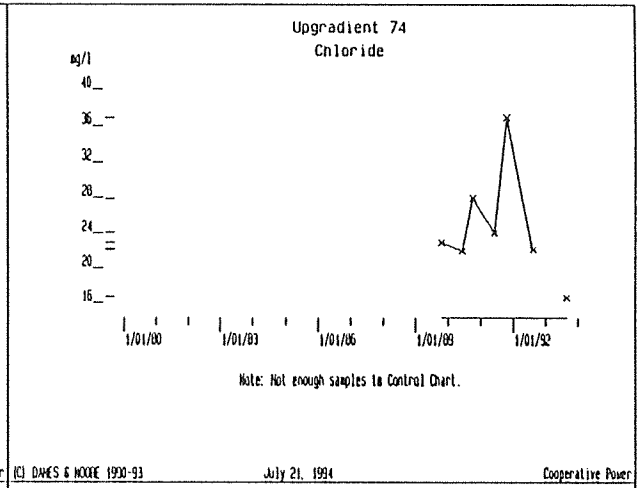

Upgradient 71
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.

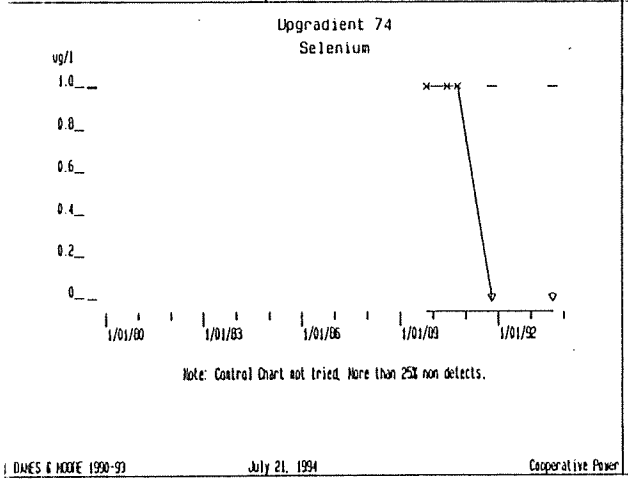

Upgradient 71
Strontium
ug/l
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.

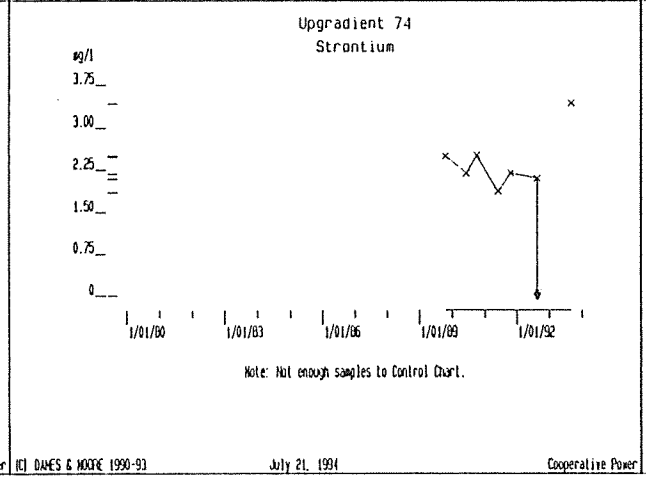

Upgradient 71
Sulfate
ug/l
225.0
217.5
210.0
202.5
195.0
187.5
180
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.

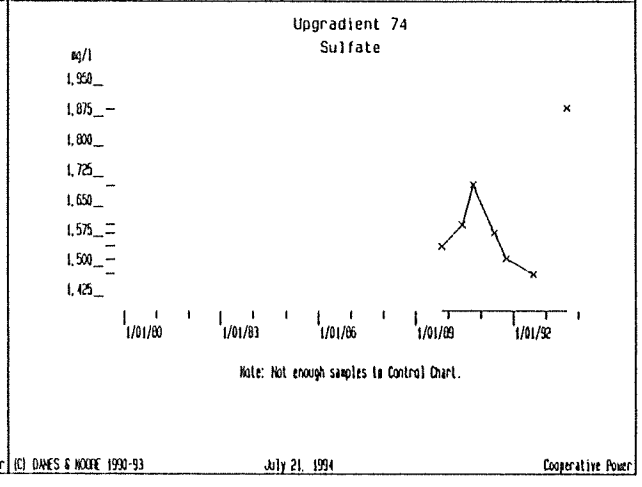

Upgradient 7-4
Arsenic
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

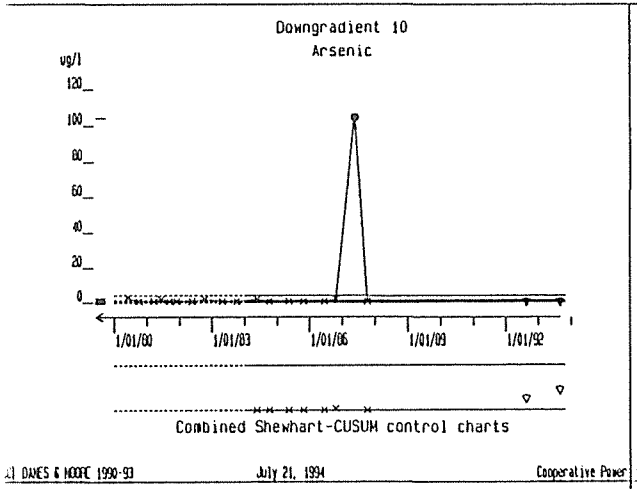

Upgradient 7-4
Boron
mg/l
1.125
1.050
0.975
0.900
0.825
0.750
0.675
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power


Upgradient 7-4
Chloride
mg/l
40
36
32
28
24
20
16
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

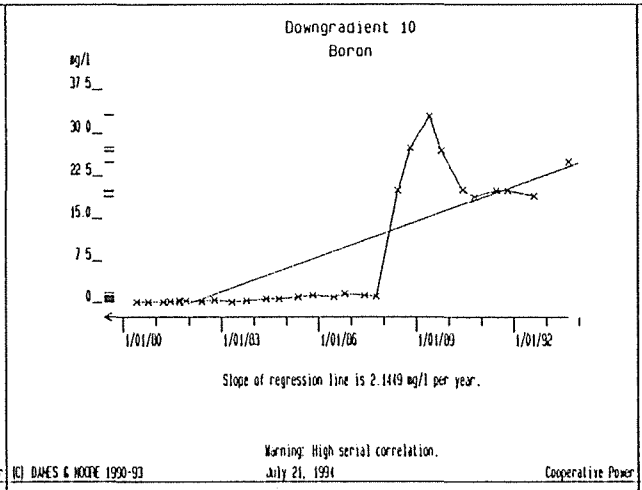

Upgradient 7-4
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power


Upgradient 7-4
Strontium
mg/l
3.75
3.00
2.25
1.50
0.75
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

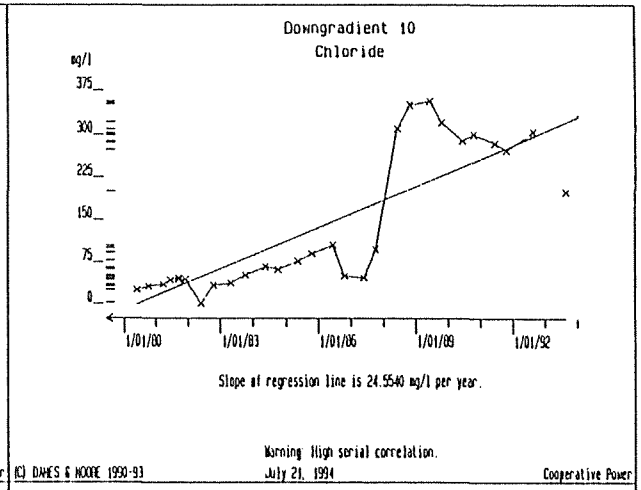

Upgradient 7-4
Sulfate
mg/l
1,950
1,875
1,800
1,725
1,650
1,575
1,500
1,425
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power



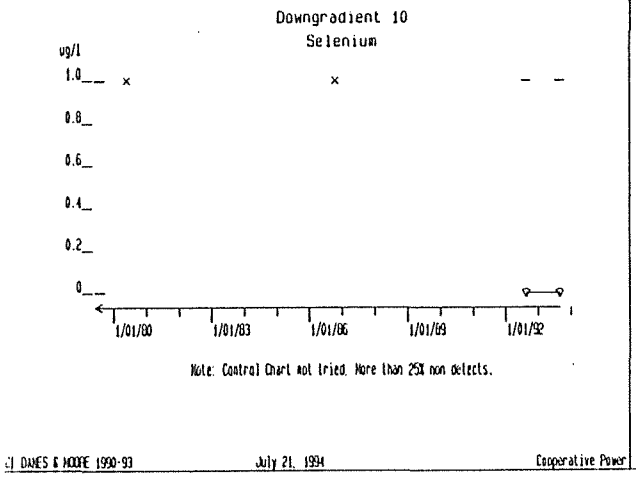
(C) DAMES & MOORE 1990-93 July 21, 1994 Cooperative Power



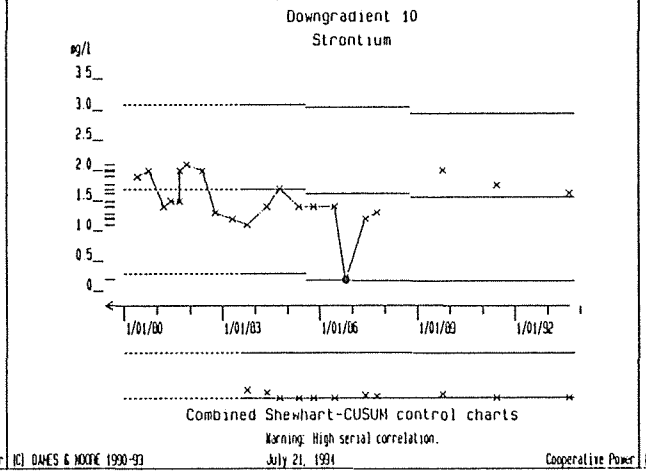
(C) DAMES & MOORE 1990-93 July 21, 1994 Cooperative Power



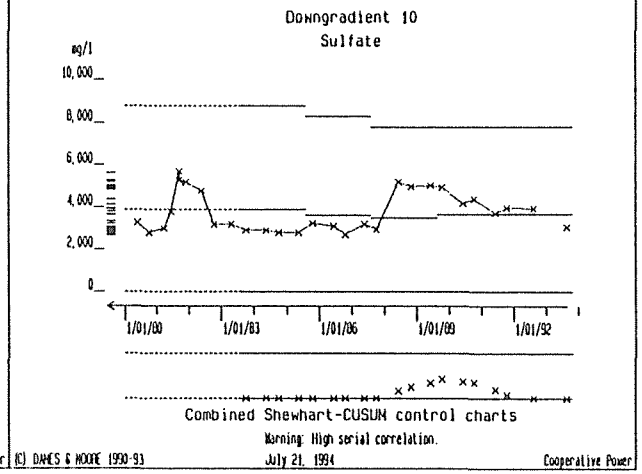
(C) DAMES & MOORE 1990-93 July 21, 1994 Cooperative Power



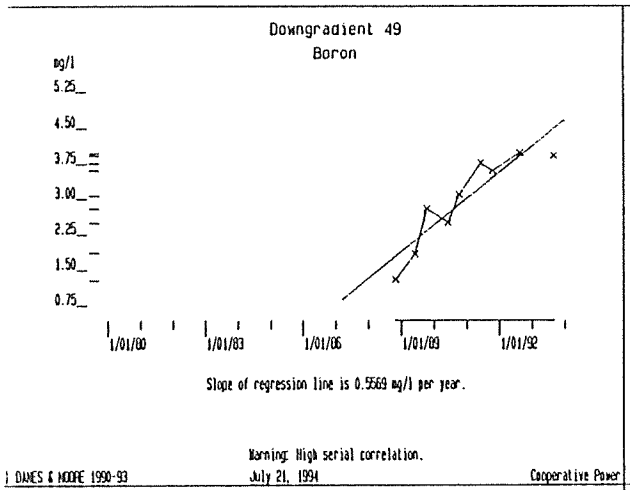
(C) DAMES & MOORE 1990-93 July 21, 1994 Cooperative Power

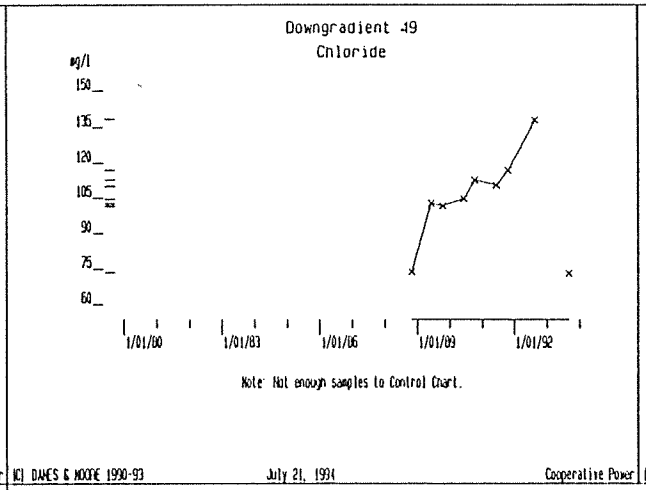


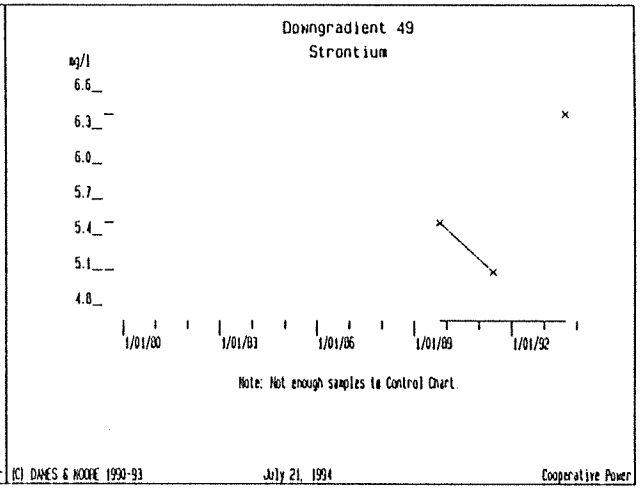
(C) DAMES & MOORE 1990-93 July 21, 1994 Cooperative Power

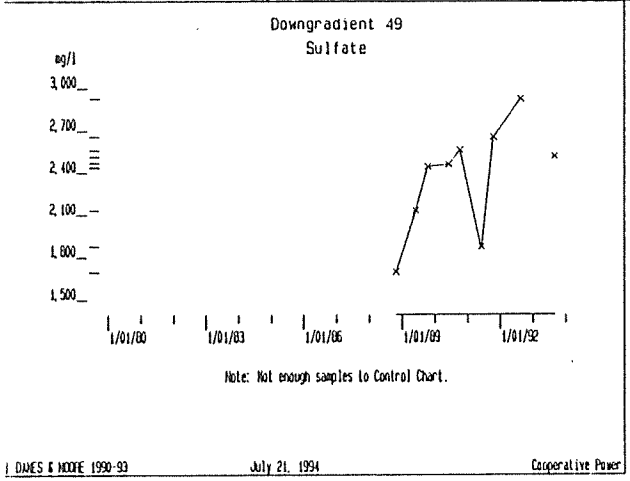


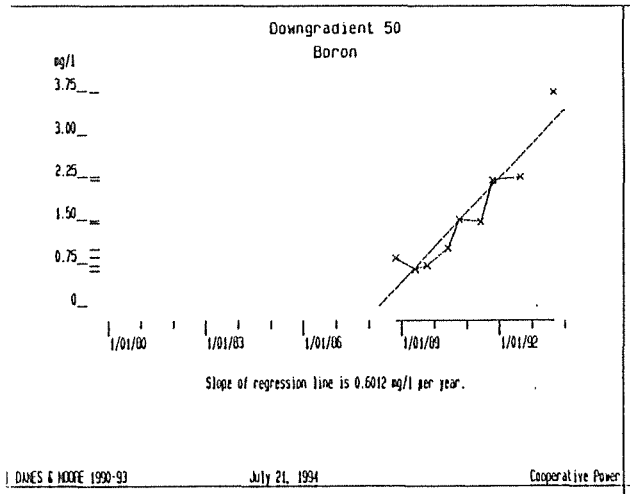
(C) DAMES & MOORE 1990-93 July 21, 1994 Cooperative Power

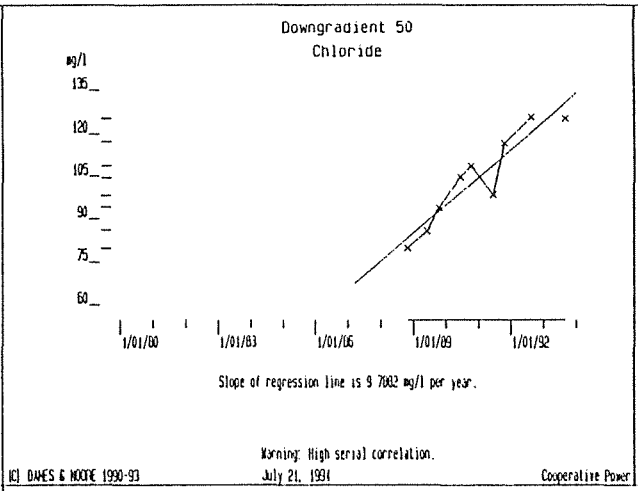

Downgradient 49
Boron
mg/l
5.25
4.50
3.75
3.00
2.25
1.50
0.75
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 0.5569 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

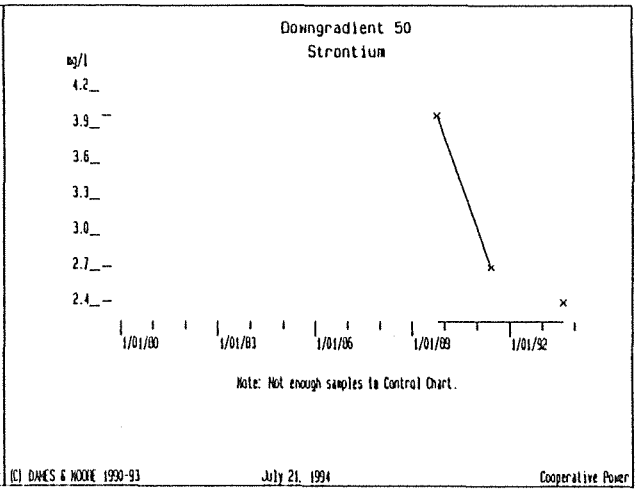

Downgradient 49
Chloride
mg/l
150
135
120
105
90
75
60
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

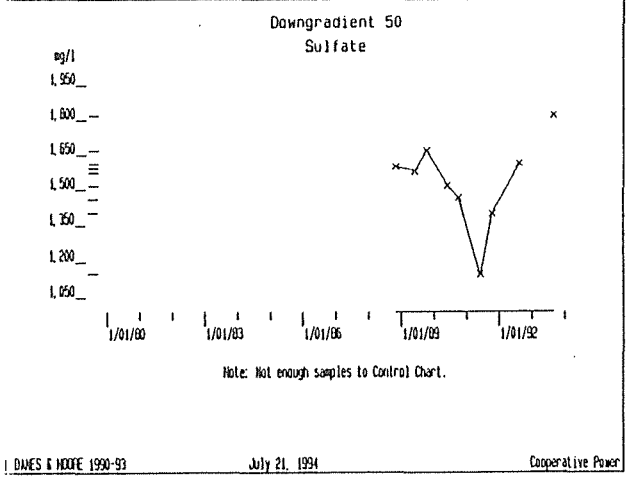

Downgradient 49
Strontium
mg/l
6.6
6.3
6.0
5.7
5.4
5.1
4.8
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

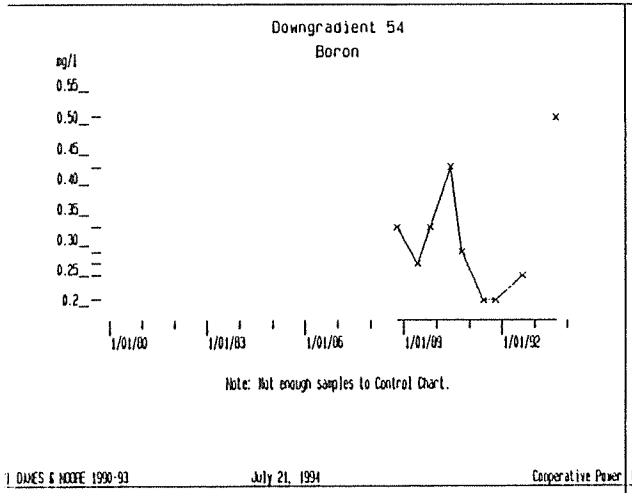

Downgradient 49
Sulfate
mg/l
3,000
2,700
2,400
2,100
1,800
1,500
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

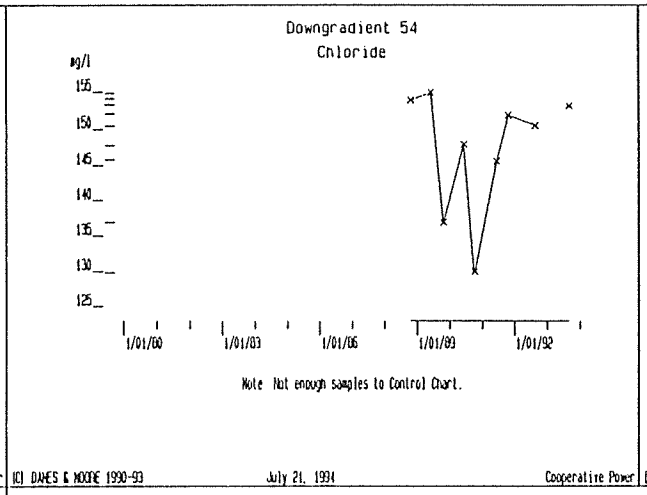

Downgradient 50
Boron
mg/l
3.75
3.00
2.25
1.50
0.75
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 0.6012 mg/l per year.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

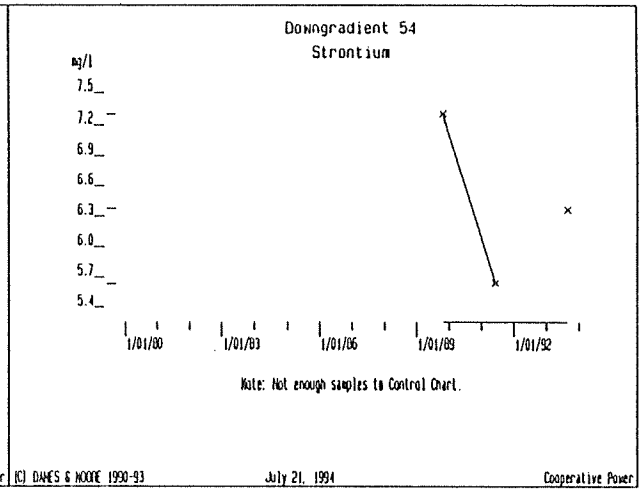

Downgradient 50
Chloride
mg/l
135
120
105
90
75
60
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 9.7082 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

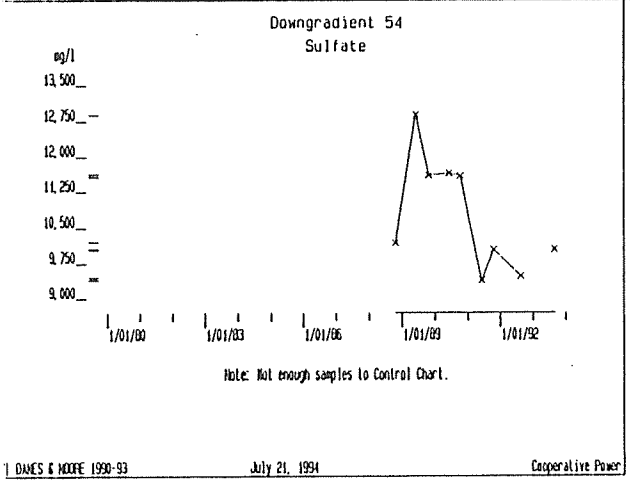

Downgradient 50
Strontium
mg/l
4.2
3.9
3.6
3.3
3.0
2.7
2.4
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

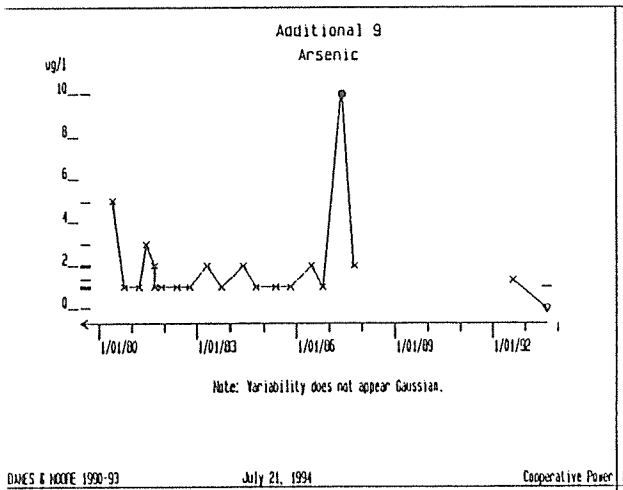

Downgradient 50
Sulfate
mg/l
1,950
1,800
1,650
1,500
1,350
1,200
1,050
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

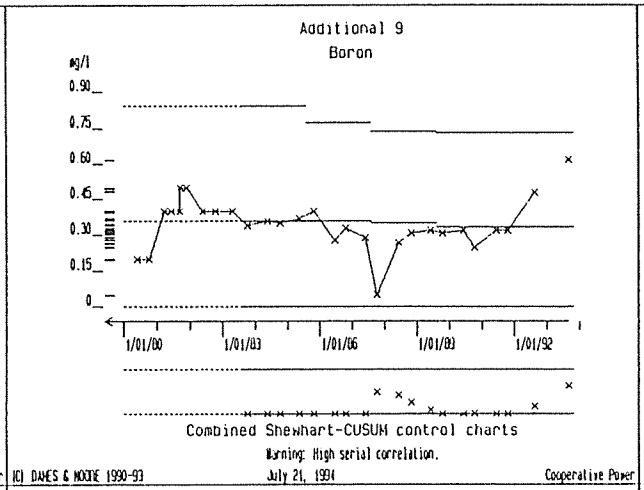

Downgradient 54
Boron
mg/l
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.2
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

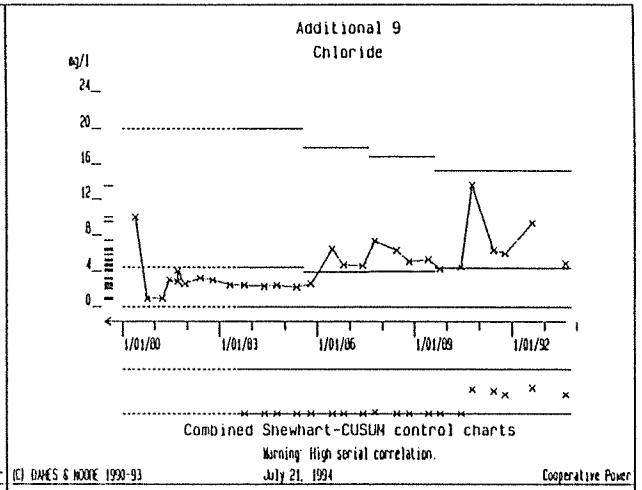

Downgradient 54
Chloride
mg/l
155
150
145
140
135
130
125
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

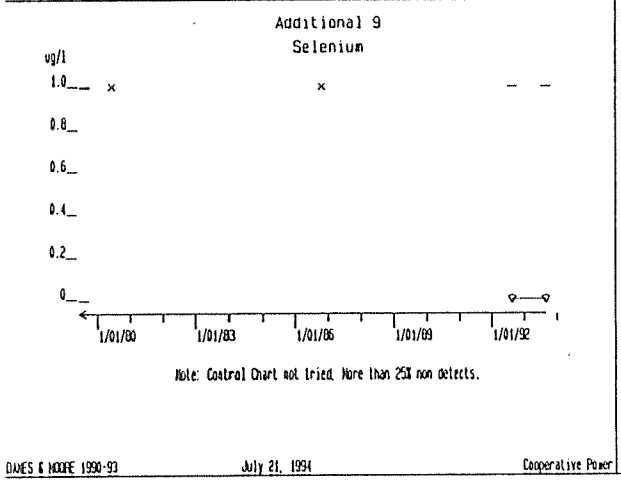

Downgradient 54
Strontium
mg/l
7.5
7.2
6.9
6.6
6.3
6.0
5.7
5.4
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

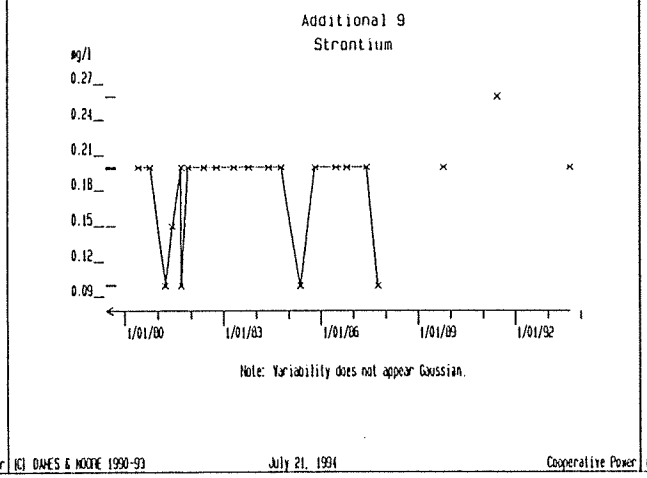

Downgradient 54
Sulfate
mg/l
13,500
12,750
12,000
11,250
10,500
9,750
9,000
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

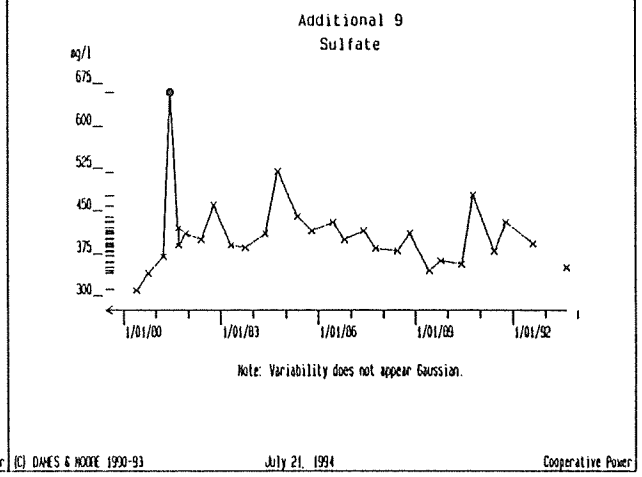

Additional 9
Arsenic
ug/l
10
8
6
4
2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Variability does not appear Gaussian.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

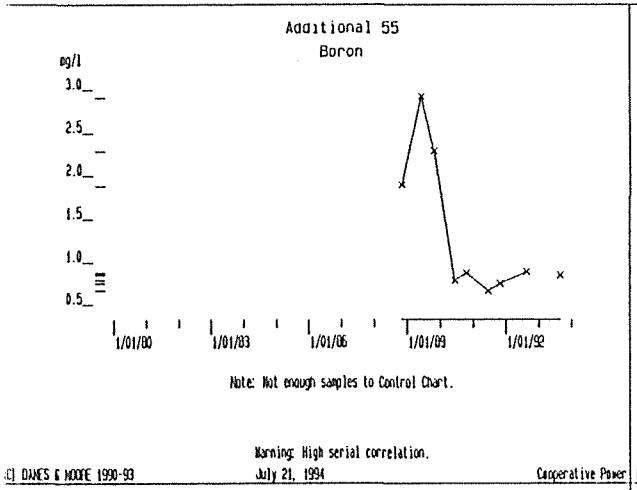

Additional 9
Boron
ug/l
0.90
0.75
0.60
0.45
0.30
0.15
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

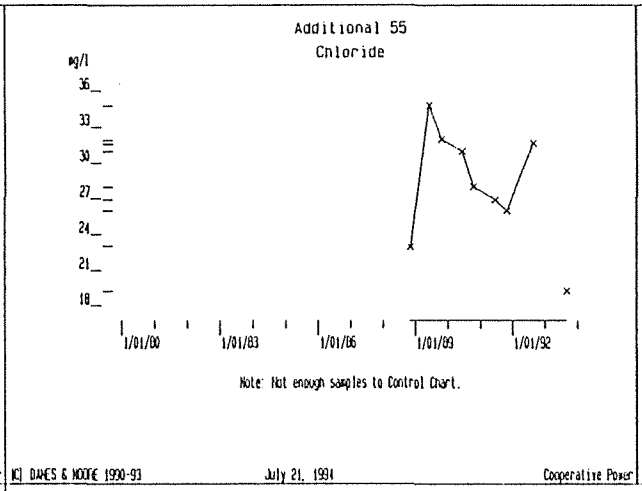

Additional 9
Chloride
ug/l
24
20
16
12
8
4
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

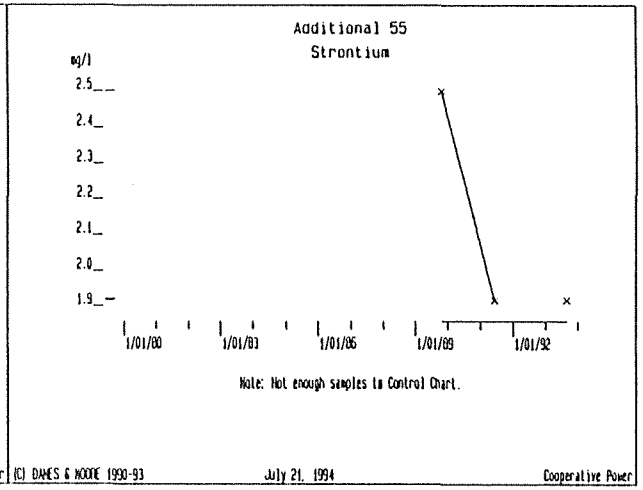

Additional 9
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

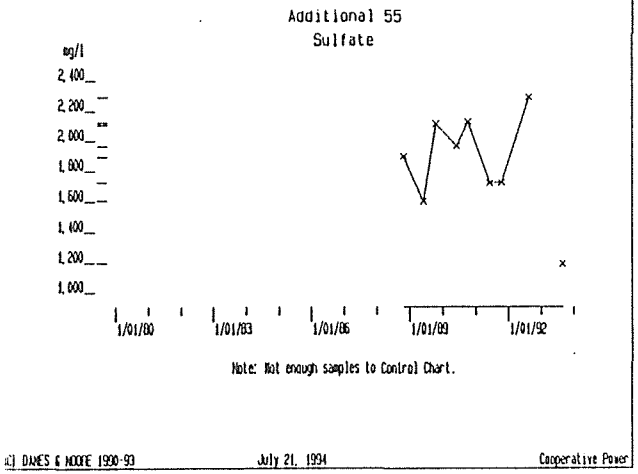

Additional 9
Strontium
ug/l
0.27
0.24
0.21
0.18
0.15
0.12
0.09
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Variability does not appear Gaussian.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

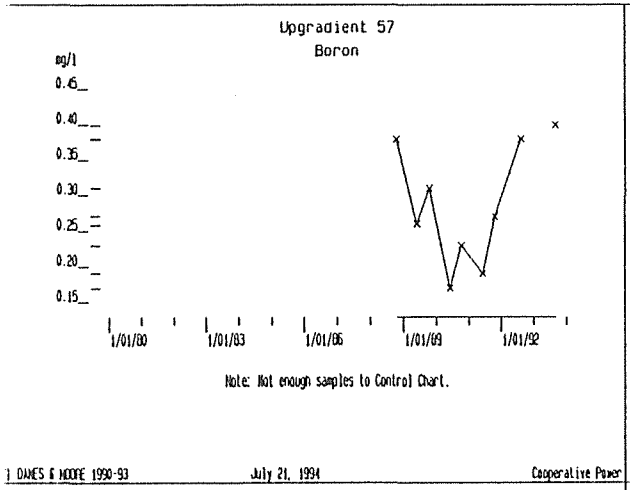

Additional 9
Sulfate
ug/l
675
600
525
450
375
300
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Variability does not appear Gaussian.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

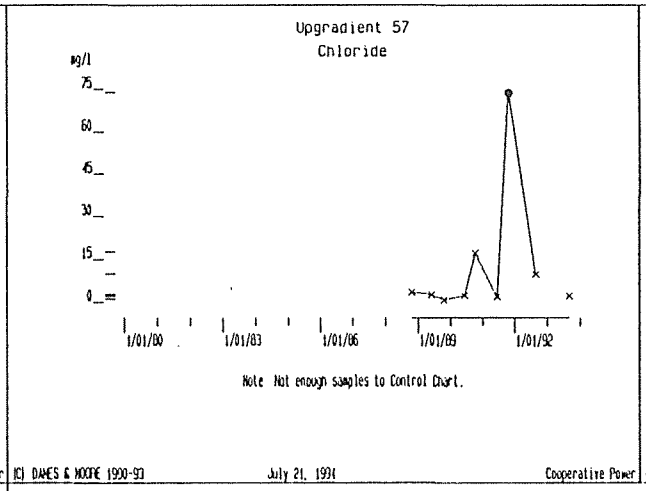

Additional 55
Boron
mg/l
3.0
2.5
2.0
1.5
1.0
0.5
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

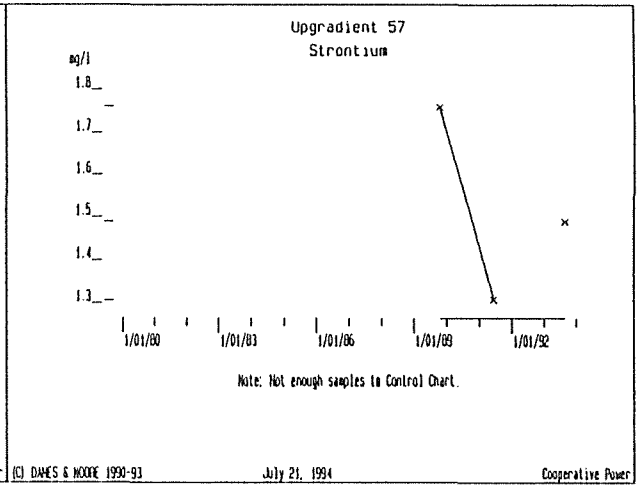

Additional 55
Chloride
mg/l
36
33
30
27
24
21
18
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

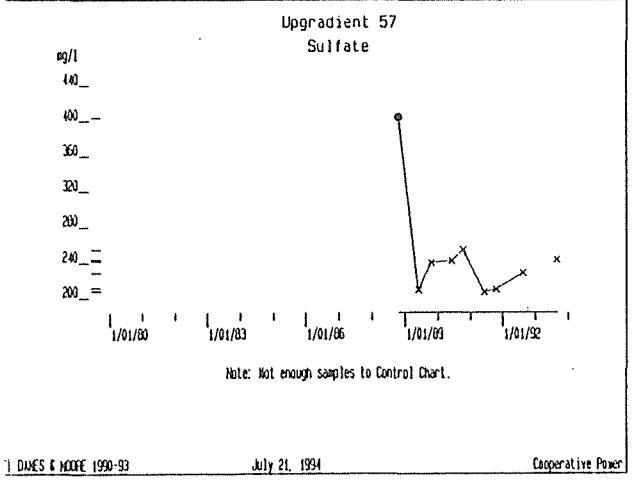

Additional 55
Strontium
mg/l
2.5
2.4
2.3
2.2
2.1
2.0
1.9
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

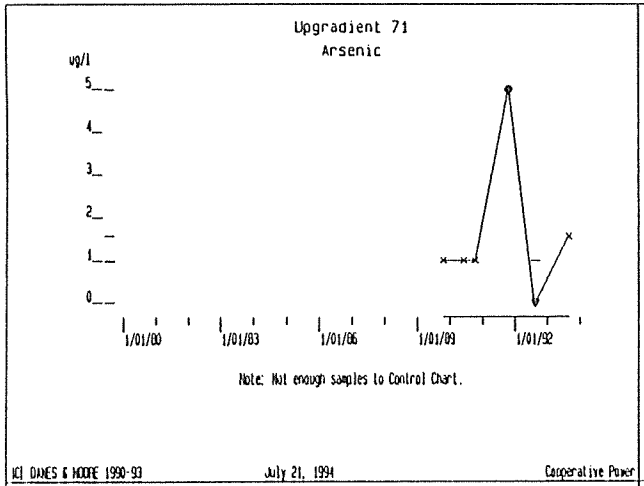

Additional 55
Sulfate
mg/l
2,400
2,200
2,000
1,800
1,600
1,400
1,200
1,000
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

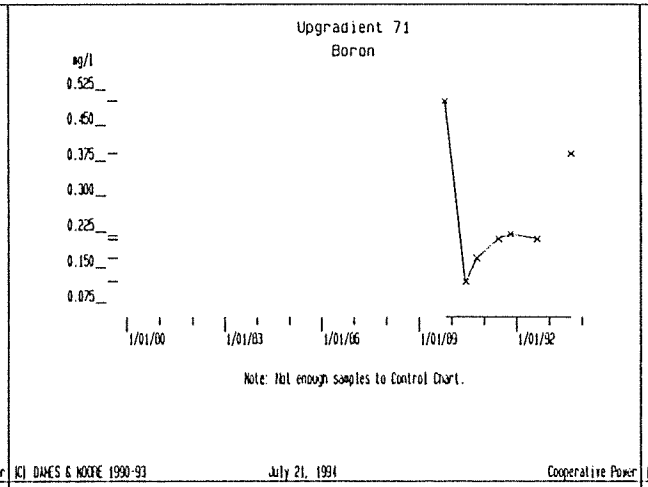

Upgradient 57
Boron
mg/l
0.45
0.40
0.35
0.30
0.25
0.20
0.15
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
] DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

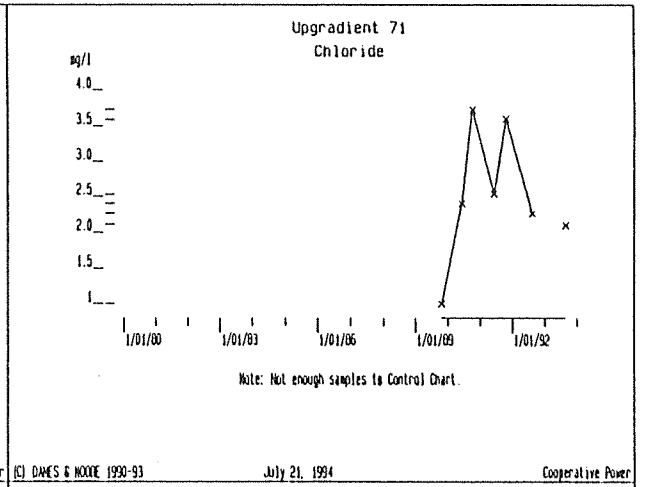

Upgradient 57
Chloride
mg/l
75
60
45
30
15
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

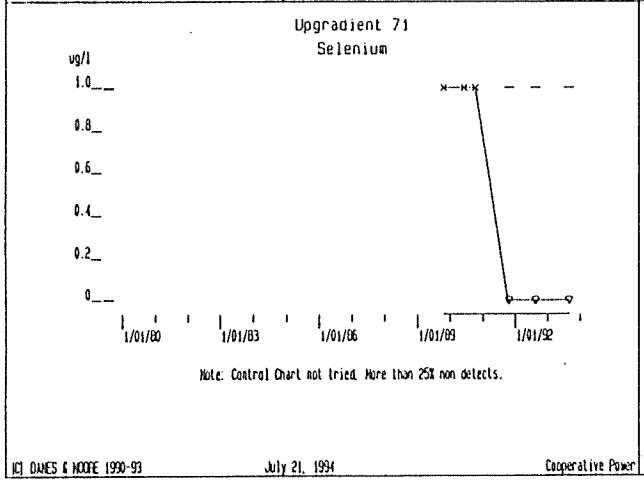

Upgradient 57
Strontium
mg/l
1.8
1.7
1.6
1.5
1.4
1.3
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

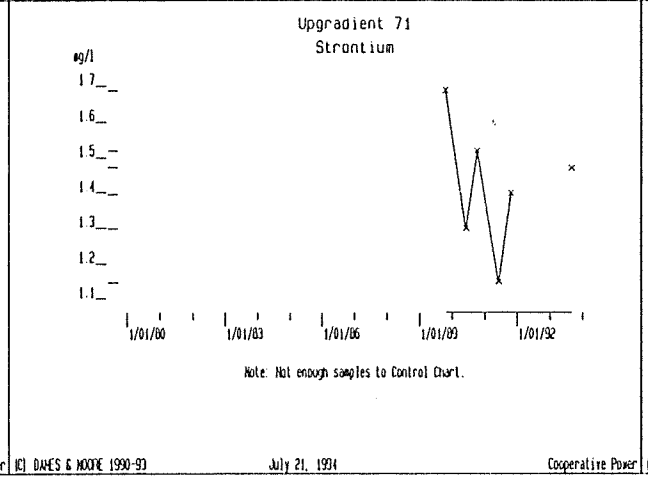

Upgradient 57
Sulfate
mg/l
440
400
360
320
280
240
200
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
] DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

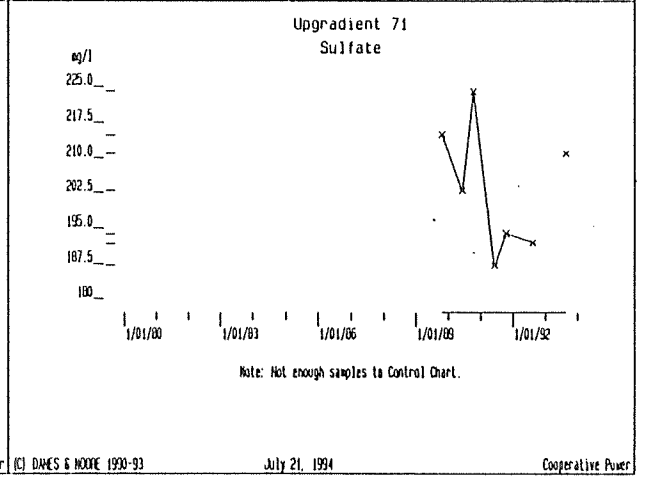

Upgradient 71
Arsenic
ug/l
5
4
3
2
1
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

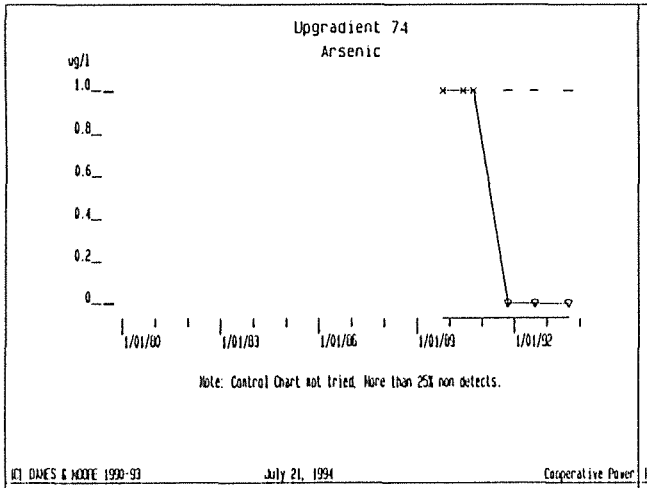

Upgradient 71
Boron
ug/l
0.525
0.450
0.375
0.300
0.225
0.150
0.075
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

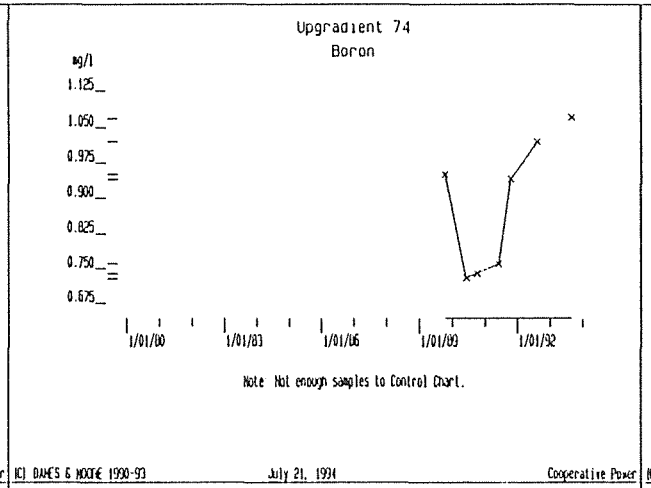

Upgradient 71
Chloride
ug/l
4.0
3.5
3.0
2.5
2.0
1.5
1
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

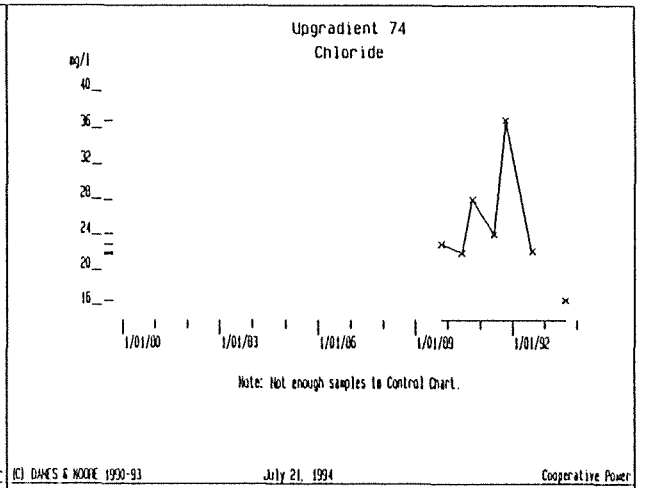

Upgradient 71
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

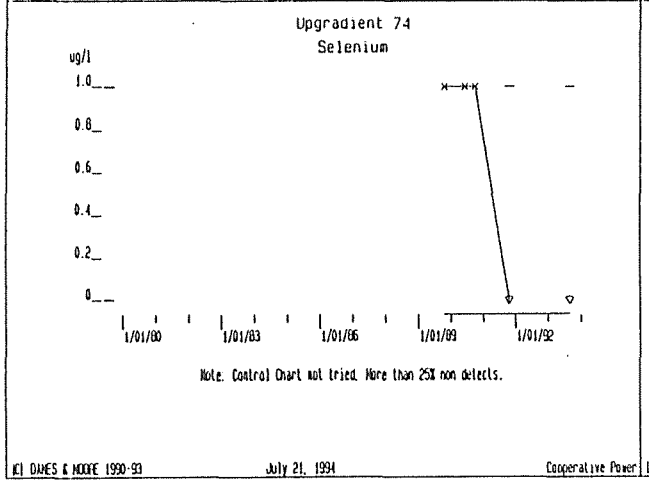

Upgradient 71
Strontium
ug/l
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

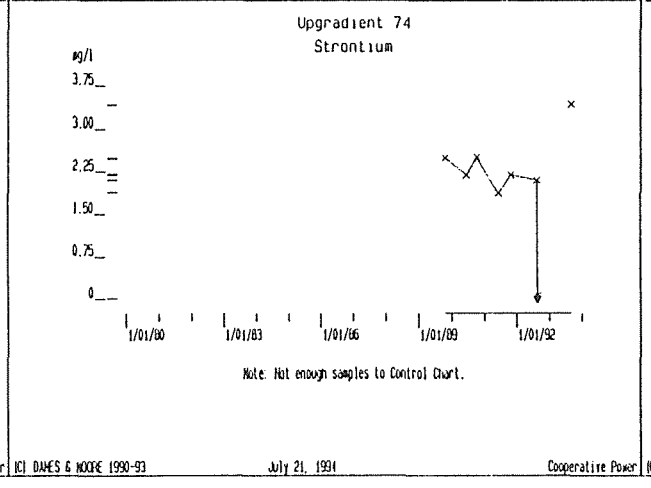

Upgradient 71
Sulfate
ug/l
225.0
217.5
210.0
202.5
195.0
187.5
180
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

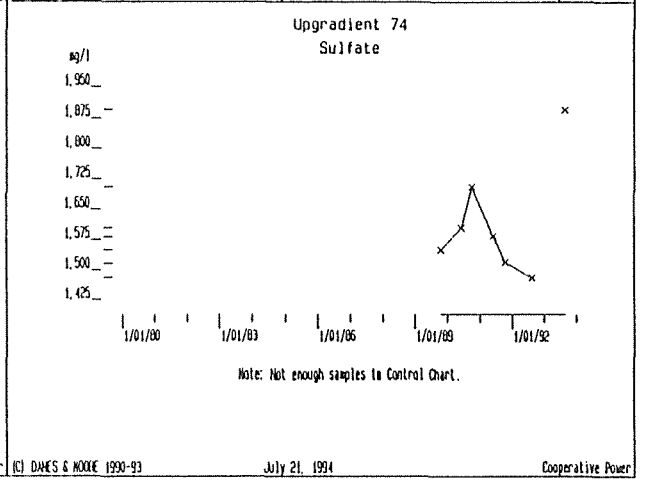

Upgradient 74
Arsenic
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

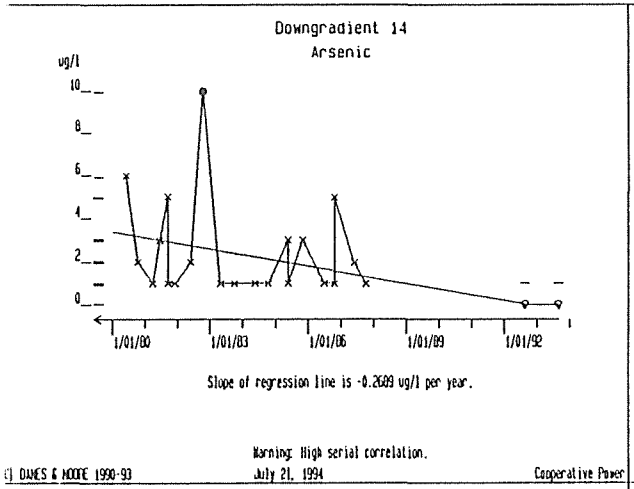

Upgradient 74
Boron
mg/l
1.125
1.050
0.975
0.900
0.825
0.750
0.675
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

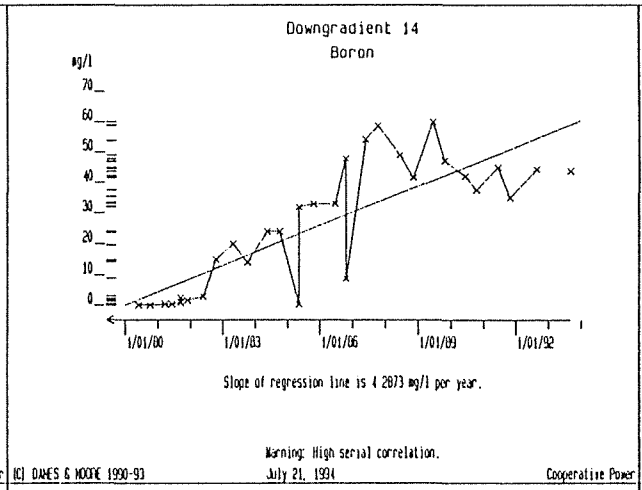

Upgradient 74
Chloride
mg/l
40
36
32
28
24
20
16
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

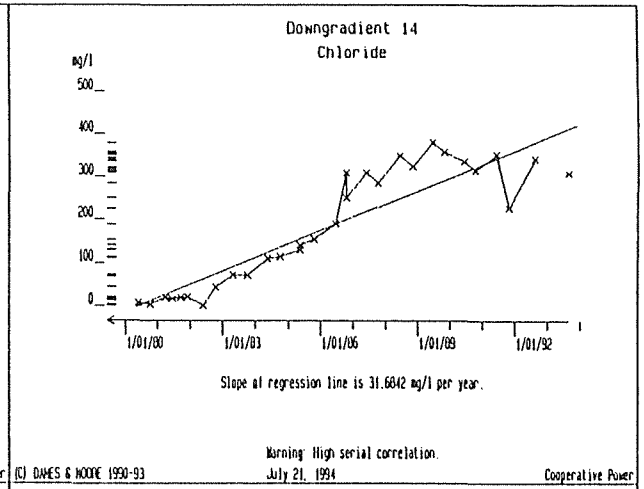

Upgradient 74
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

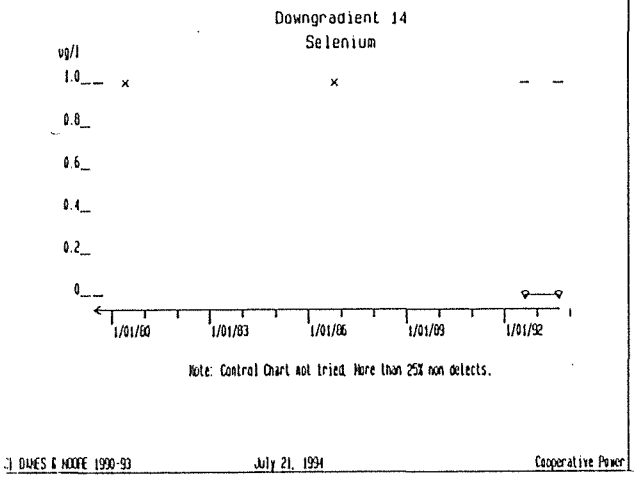

Upgradient 74
Strontium
mg/l
3.75
3.00
2.25
1.50
0.75
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

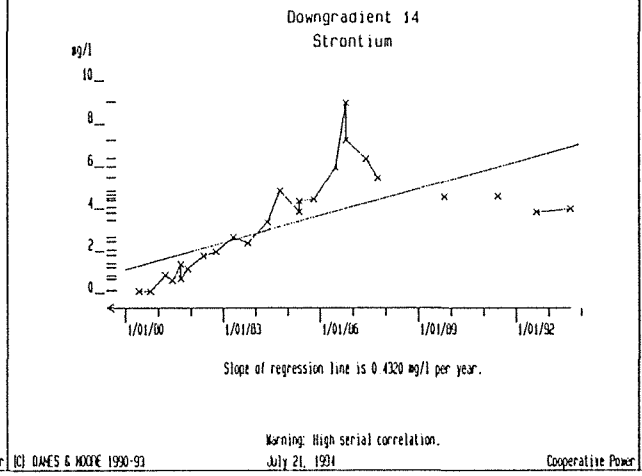

Upgradient 74
Sulfate
mg/l
1,950
1,875
1,800
1,725
1,650
1,575
1,500
1,425
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

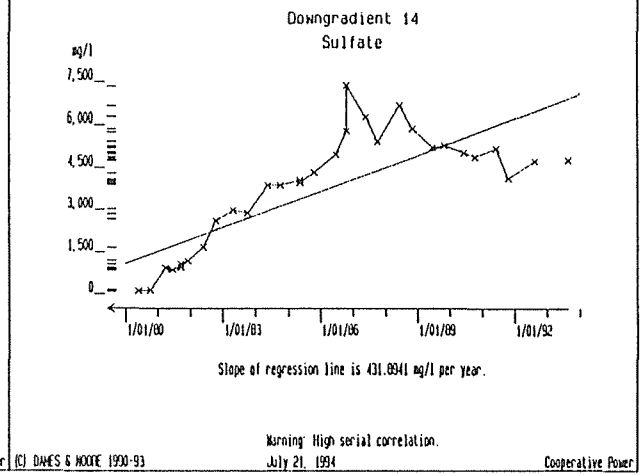

Downgradient 14
Arsenic
ug/l
10
8
6
4
2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.2609 ug/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

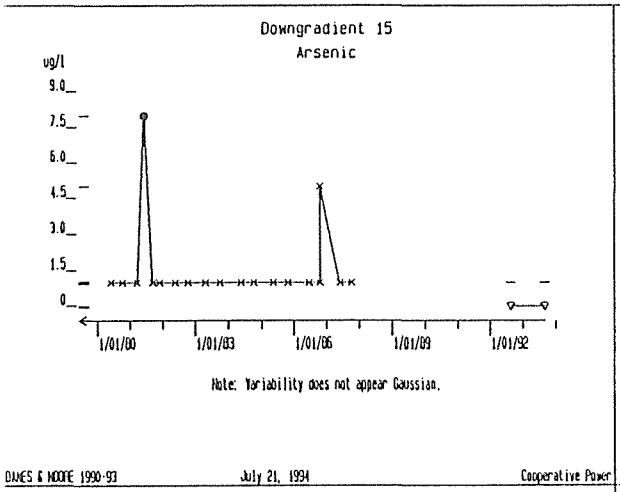

Downgradient 14
Boron
mg/l
70
60
50
40
30
20
10
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 4.2873 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

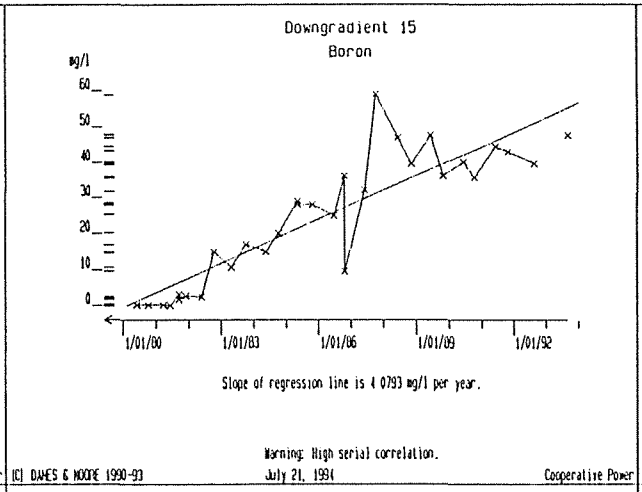

Downgradient 14
Chloride
mg/l
500
400
300
200
100
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 31.6842 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

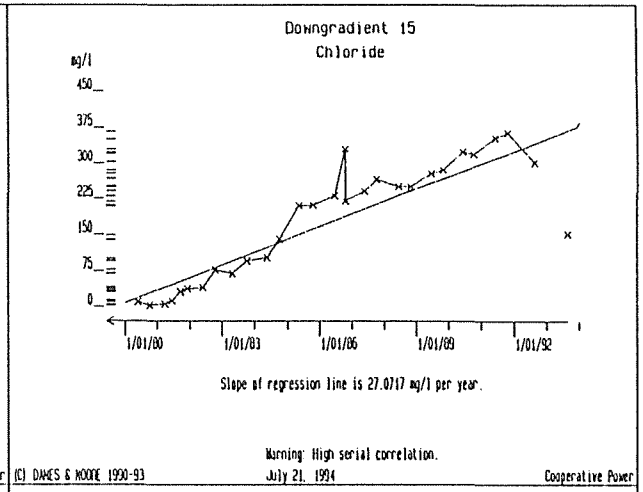

Downgradient 14
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

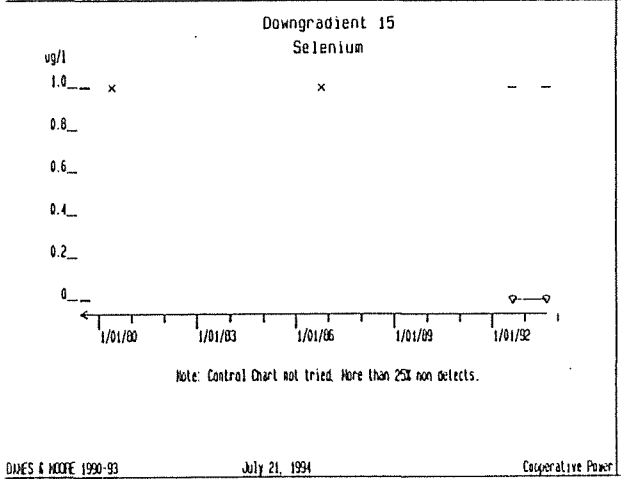

Downgradient 14
Strontium
mg/l
10
8
6
4
2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 0.4320 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

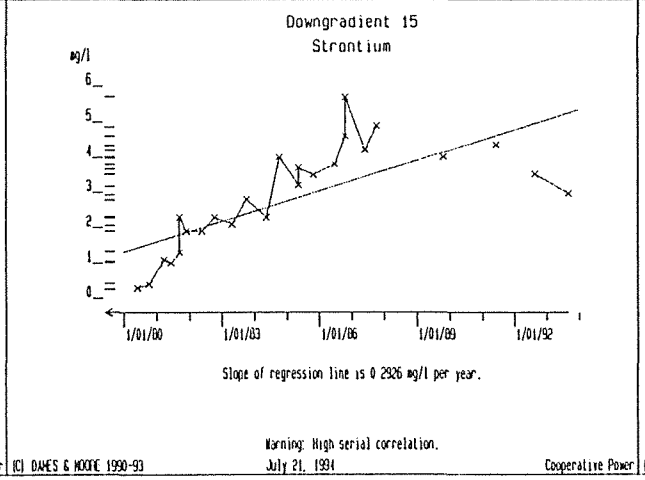

Downgradient 14
Sulfate
mg/l
7,500
6,000
4,500
3,000
1,500
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 431.8941 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

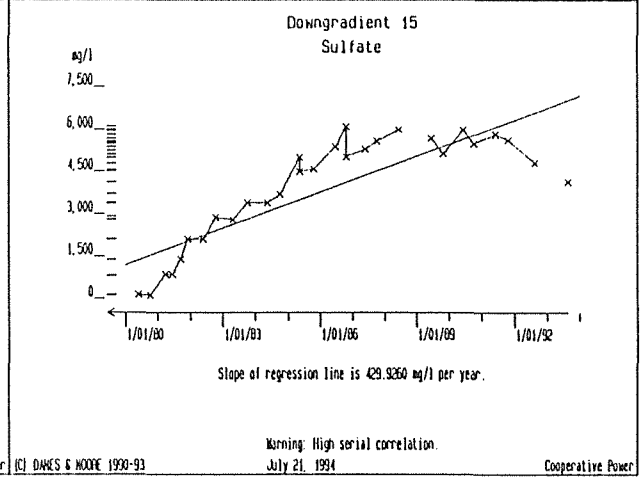

Downgradient 15
Arsenic
ug/l
9.0
7.5
6.0
4.5
3.0
1.5
0
1/01/00
1/01/03
1/01/06
1/01/09
1/01/92
Note: Variability does not appear Gaussian.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

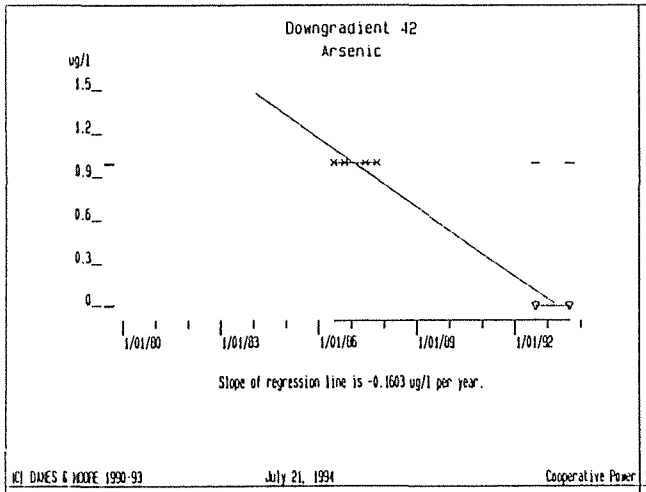

Downgradient 15
Boron
mg/l
60
50
40
30
20
10
0
1/01/00
1/01/03
1/01/06
1/01/09
1/01/92
Slope of regression line is 4 0793 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

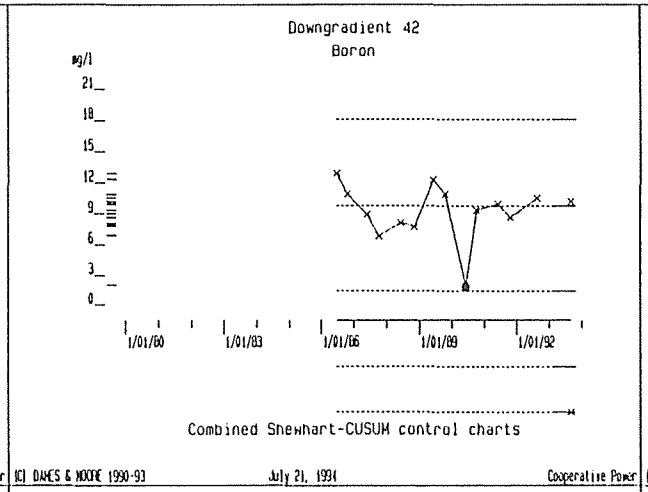

Downgradient 15
Chloride
mg/l
450
375
300
225
150
75
0
1/01/00
1/01/03
1/01/06
1/01/09
1/01/92
Slope of regression line is 27.0717 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

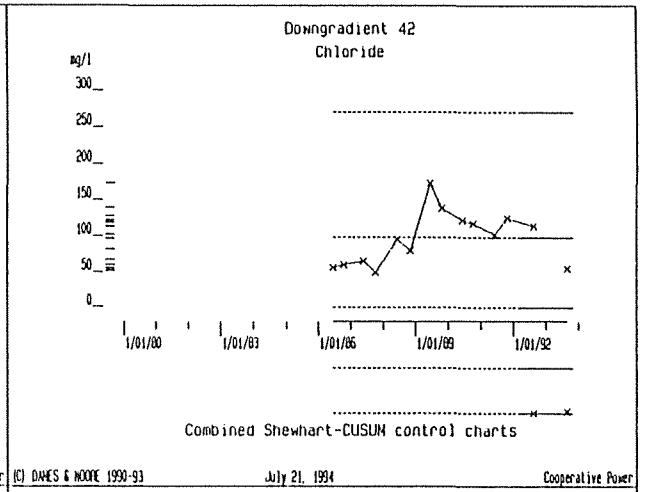

Downgradient 15
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/00
1/01/03
1/01/06
1/01/09
1/01/92
Note: Control Chart not tried. More than 25% non detects.
DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

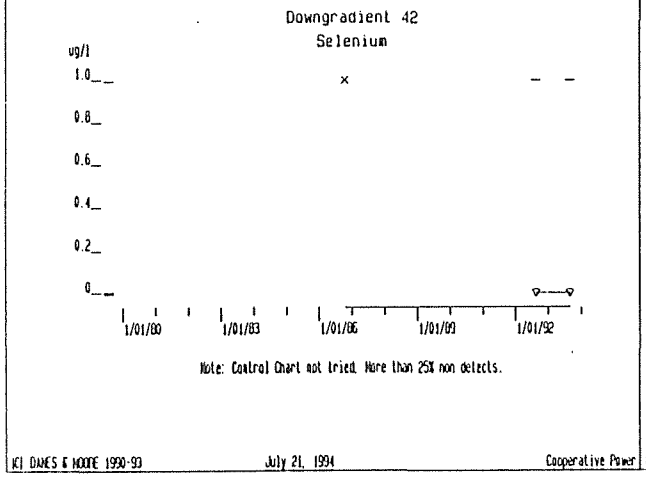

Downgradient 15
Strontium
mg/l
6
5
4
3
2
1
0
1/01/00
1/01/03
1/01/06
1/01/09
1/01/92
Slope of regression line is 0 2926 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

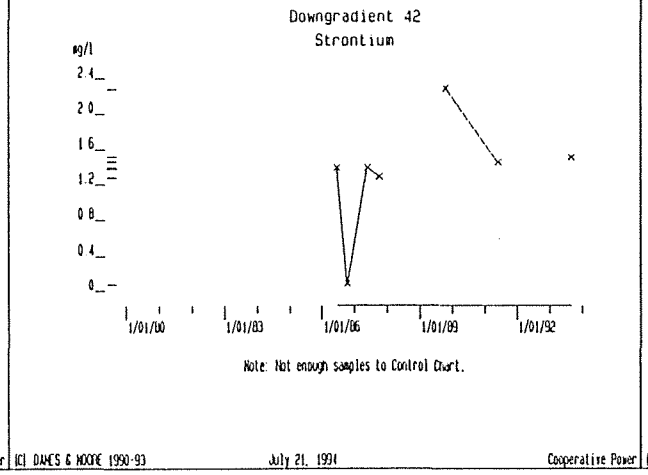

Downgradient 15
Sulfate
mg/l
7,500
6,000
4,500
3,000
1,500
0
1/01/00
1/01/03
1/01/06
1/01/09
1/01/92
Slope of regression line is 429.9260 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

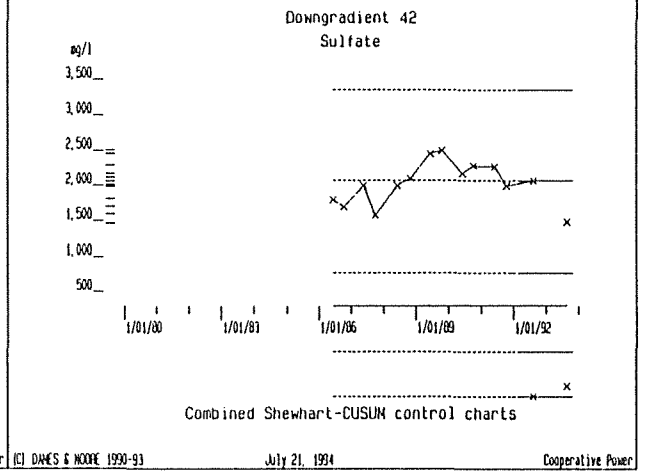

Downgradient 42
Arsenic
ug/l
1.5
1.2
0.9
0.6
0.3
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.1603 ug/l per year.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

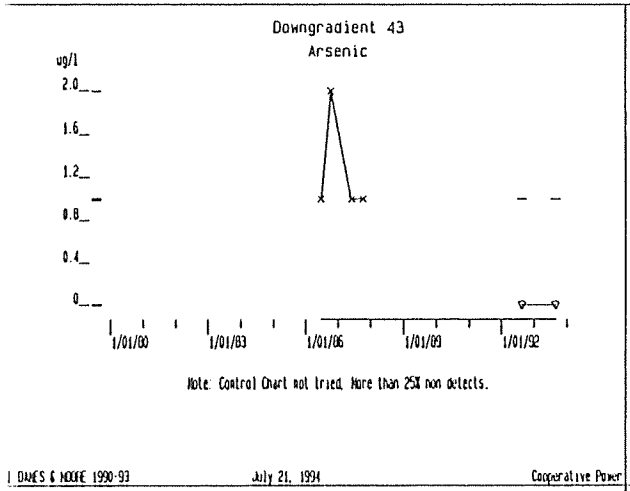

Downgradient 42
Boron
ug/l
21
18
15
12
9
6
3
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

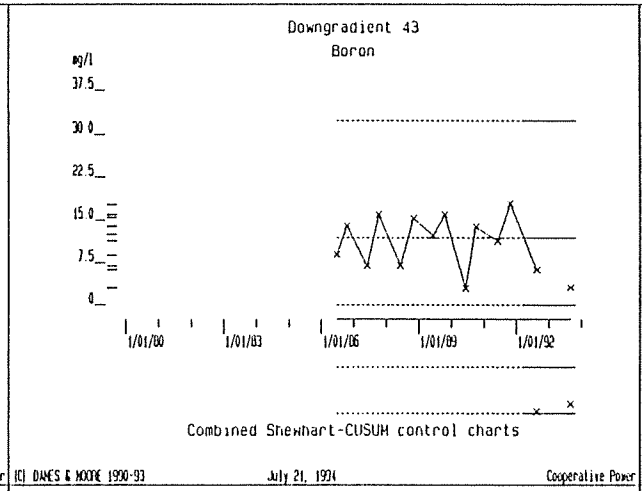

Downgradient 42
Chloride
ug/l
300
250
200
150
100
50
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

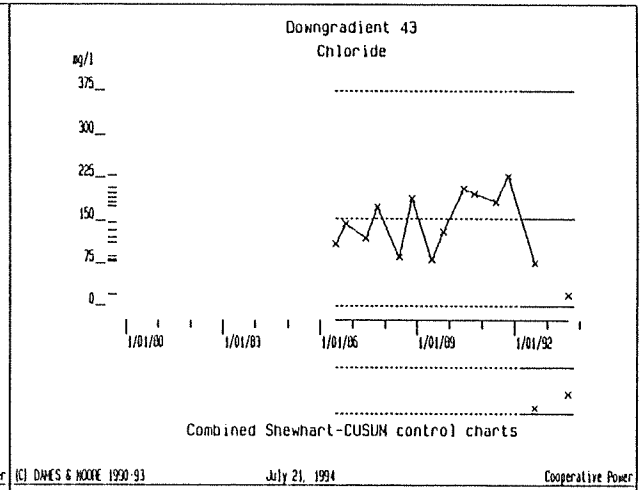

Downgradient 42
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

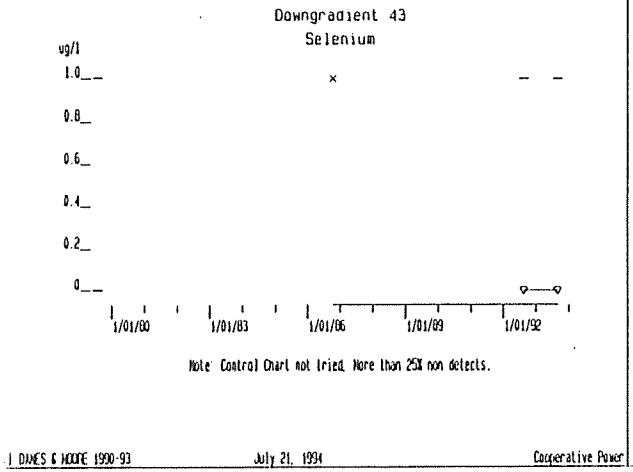

Downgradient 42
Strontium
ug/l
2.4
2.0
1.6
1.2
0.8
0.4
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

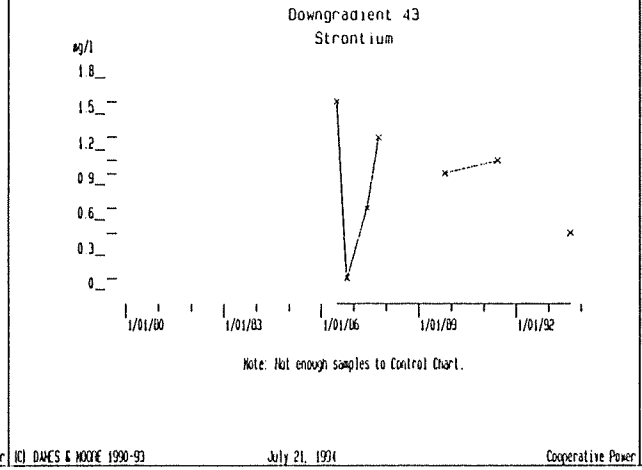

Downgradient 42
Sulfate
ug/l
3,500
3,000
2,500
2,000
1,500
1,000
500
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

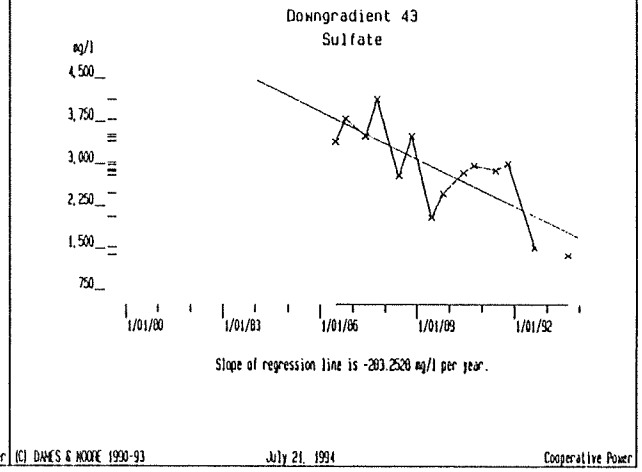

Downgradient 43
Arsenic
ug/l
2.0
1.6
1.2
0.8
0.4
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

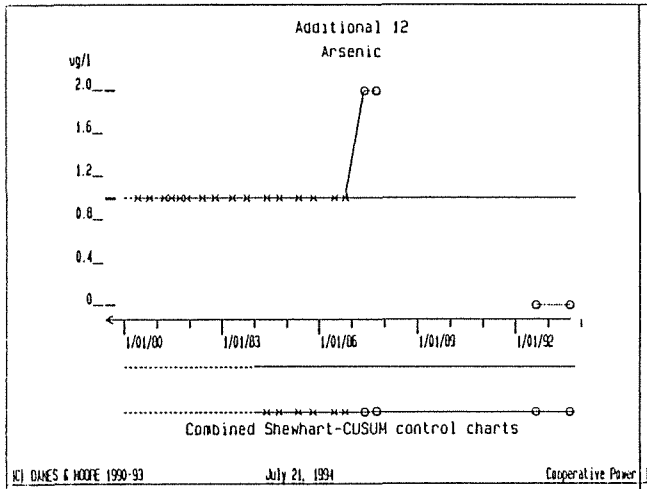

Downgradient 43
Boron
mg/l
37.5
30.0
22.5
15.0
7.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

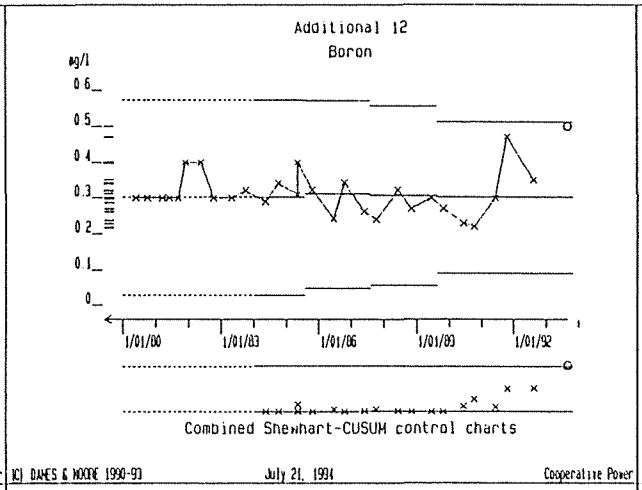

Downgradient 43
Chloride
mg/l
375
300
225
150
75
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

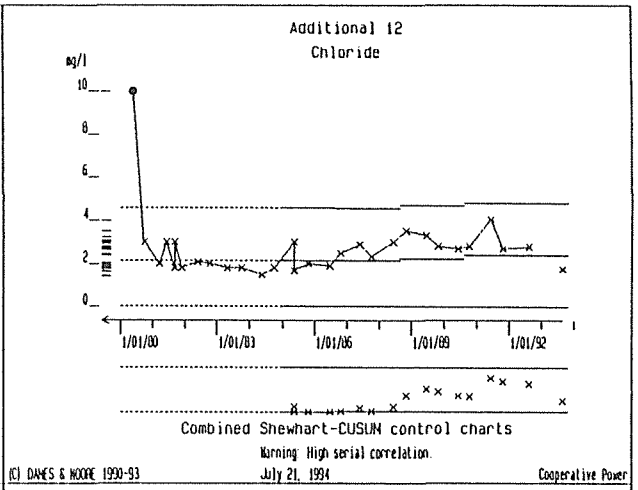

Downgradient 43
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

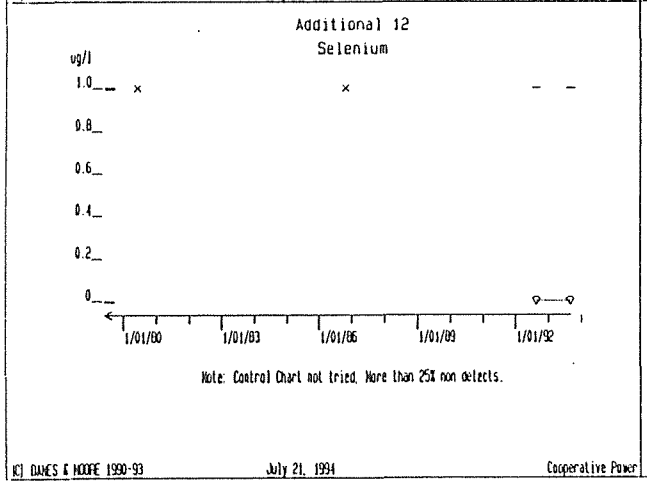

Downgradient 43
Strontium
mg/l
1.8
1.5
1.2
0.9
0.6
0.3
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

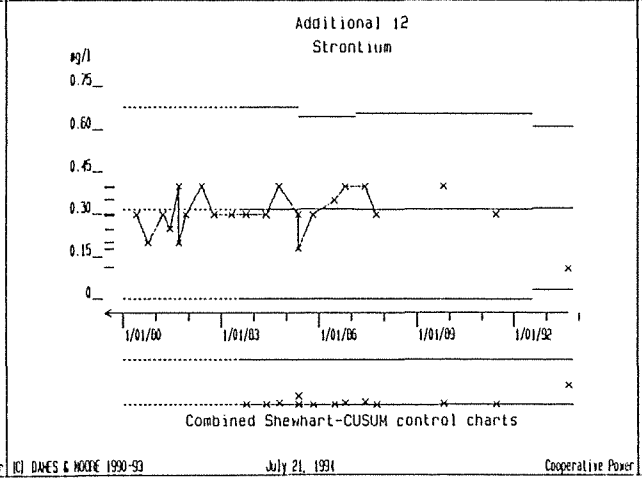

Downgradient 43
Sulfate
mg/l
4,500
3,750
3,000
2,250
1,500
750
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -283.2520 mg/l per year.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

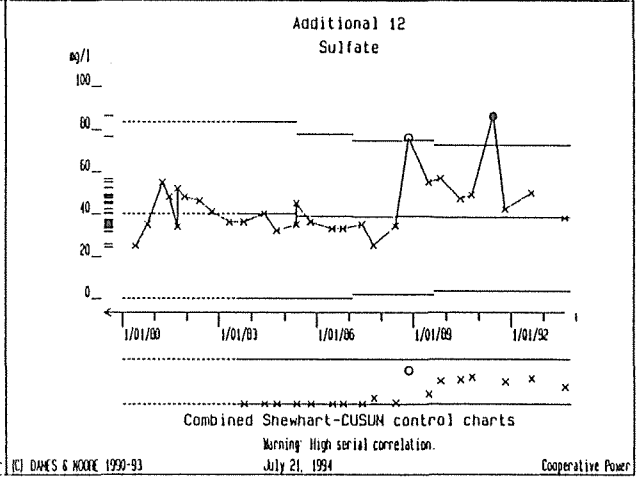

Additional 12
Arsenic
ug/l
2.0
1.6
1.2
0.8
0.4
0
1/01/00
1/01/03
1/01/06
1/01/09
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

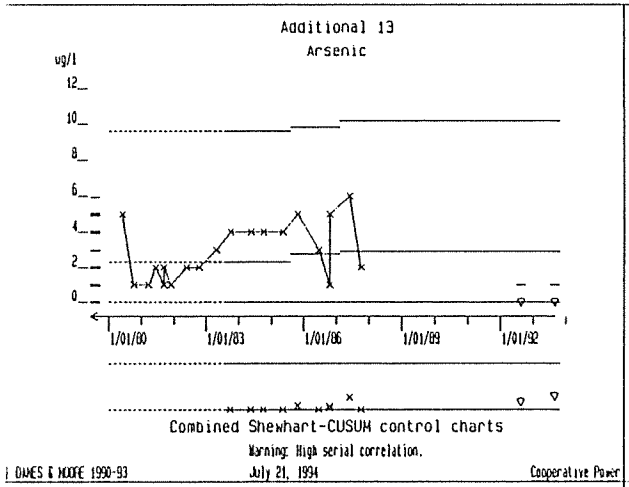

Additional 12
Boron
mg/l
0.6
0.5
0.4
0.3
0.2
0.1
0
1/01/00
1/01/03
1/01/06
1/01/09
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

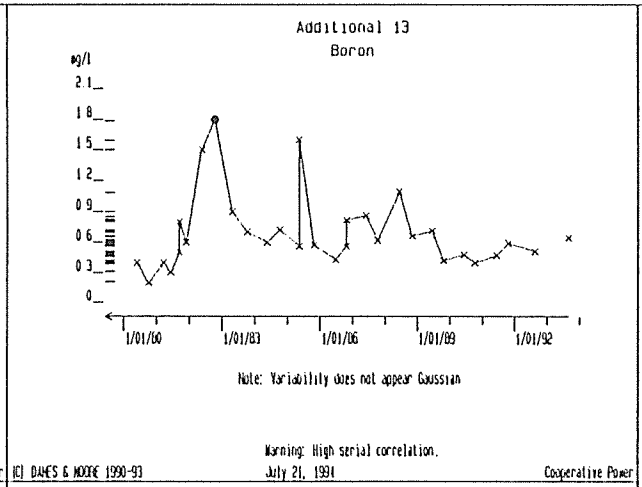

Additional 12
Chloride
mg/l
10
8
6
4
2
0
1/01/00
1/01/03
1/01/06
1/01/09
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

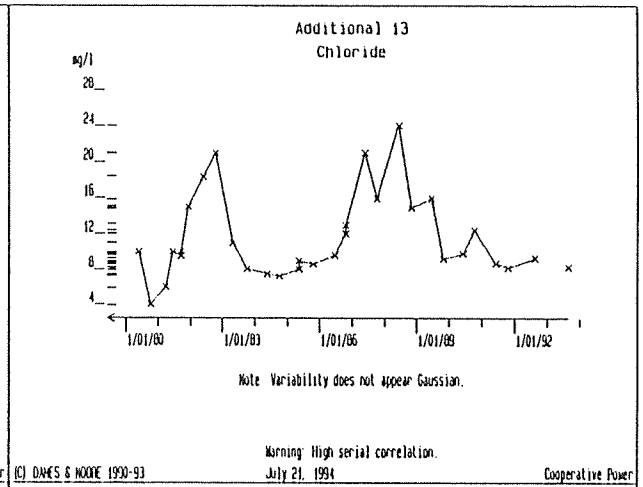

Additional 12
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/00
1/01/03
1/01/06
1/01/09
1/01/92
Note: Control Chart not tried, More than 25% non detects.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

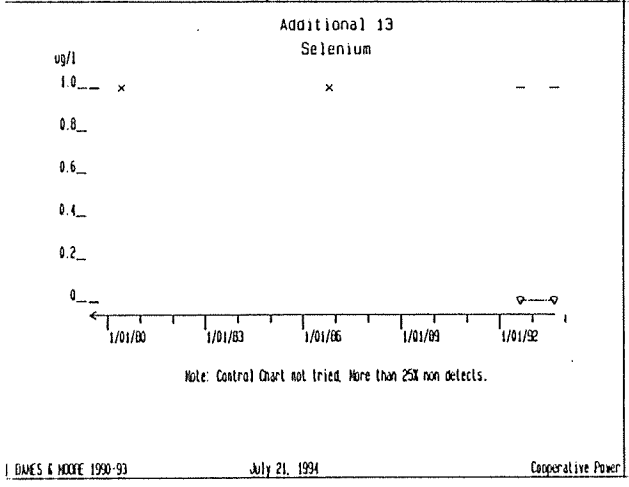

Additional 12
Strontium
mg/l
0.75
0.60
0.45
0.30
0.15
0
1/01/00
1/01/03
1/01/06
1/01/09
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

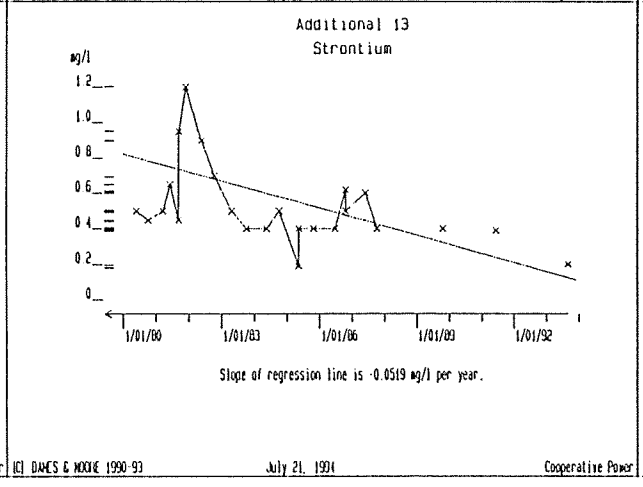

Additional 12
Sulfate
mg/l
100
80
60
40
20
0
1/01/00
1/01/03
1/01/06
1/01/09
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

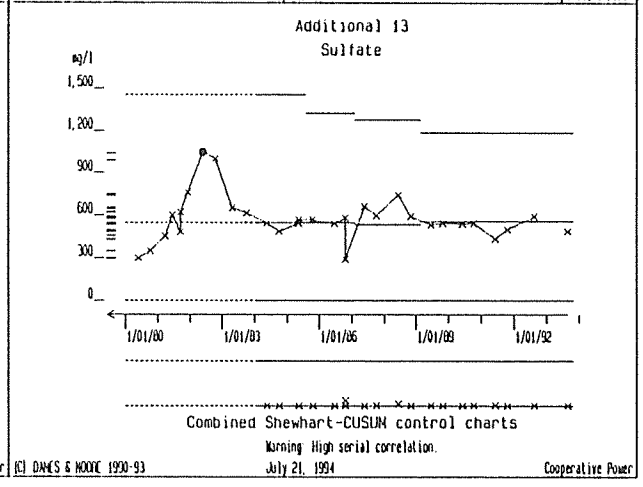

Additional 13
Arsenic
ug/l
12
10
8
6
4
2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

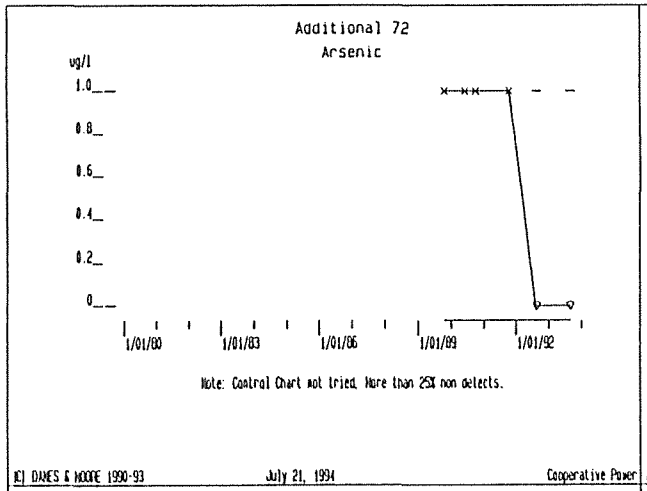

Additional 13
Boron
mg/l
2.1
1.8
1.5
1.2
0.9
0.6
0.3
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Variability does not appear Gaussian
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

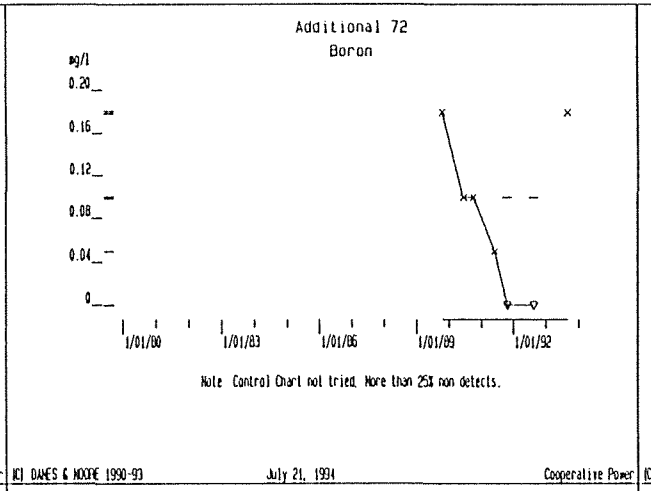

Additional 13
Chloride
mg/l
28
24
20
16
12
8
4
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note Variability does not appear Gaussian.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

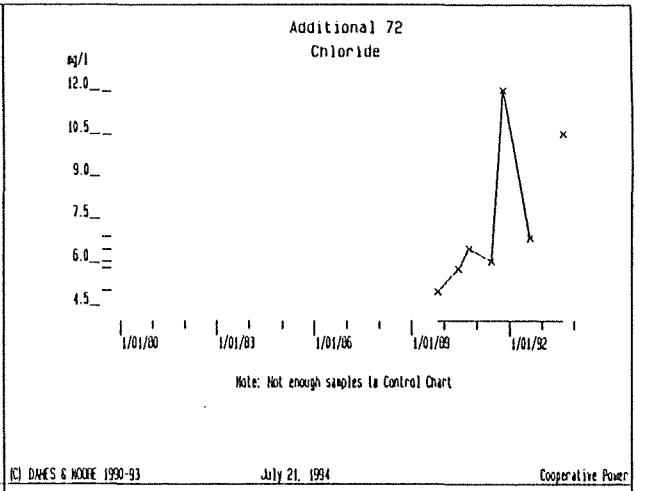

Additional 13
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

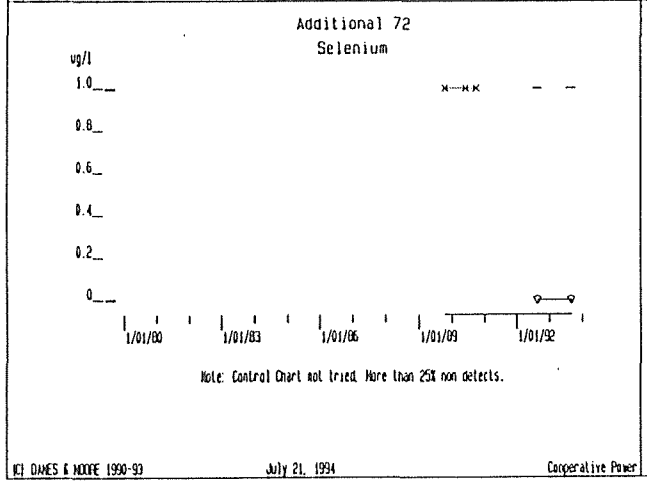

Additional 13
Strontium
mg/l
1.2
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.0519 mg/l per year.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

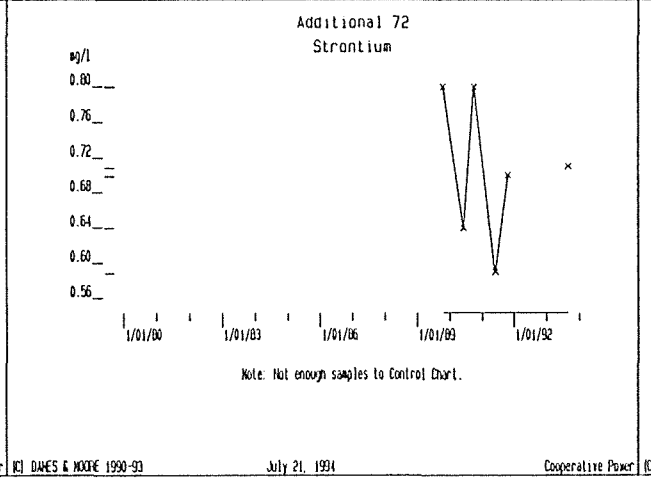

Additional 13
Sulfate
mg/l
1,500
1,200
900
600
300
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

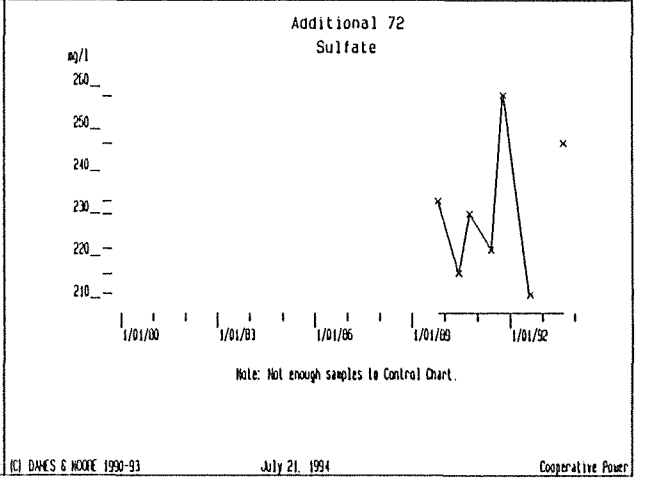

Additional 72
Arsenic
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

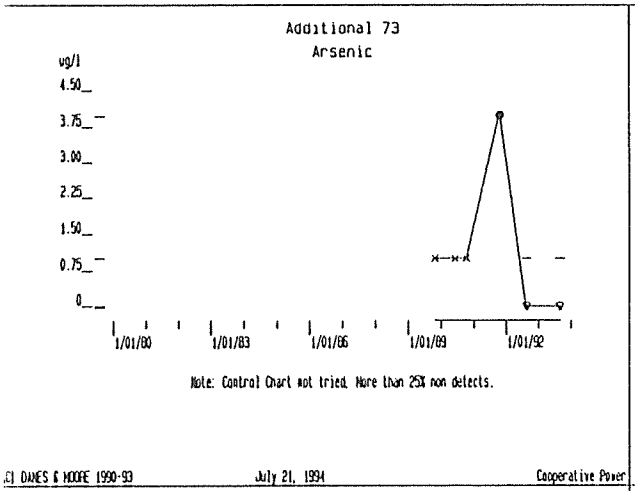

Additional 72
Boron
ug/l
0.20
0.16
0.12
0.08
0.04
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

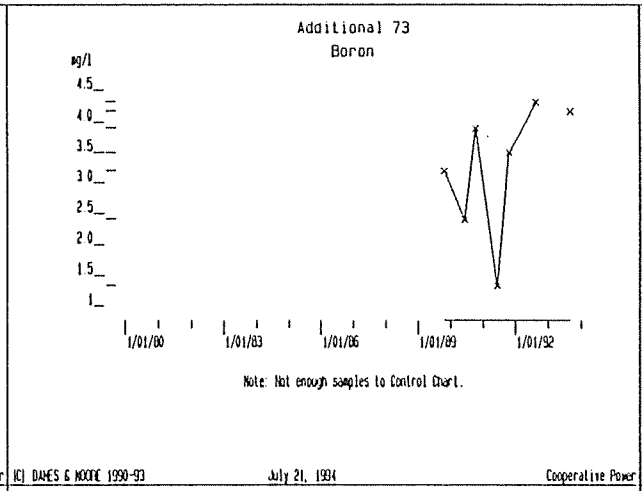

Additional 72
Chloride
ug/l
12.0
10.5
9.0
7.5
6.0
4.5
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

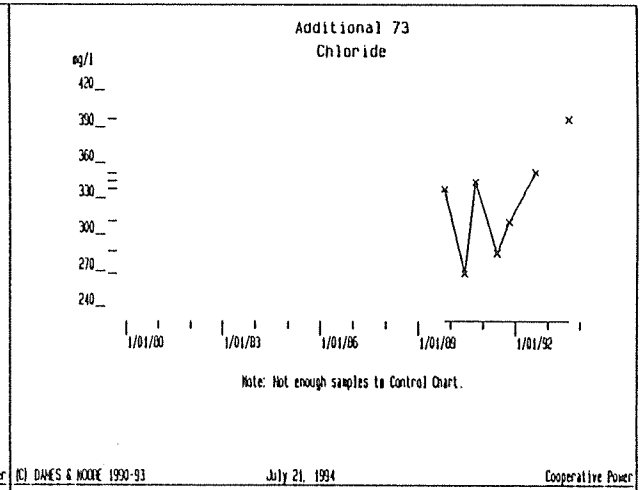

Additional 72
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

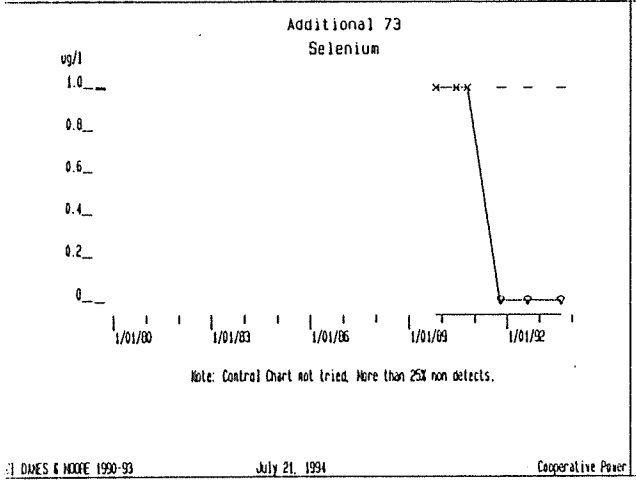

Additional 72
Strontium
ug/l
0.80
0.76
0.72
0.68
0.64
0.60
0.56
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

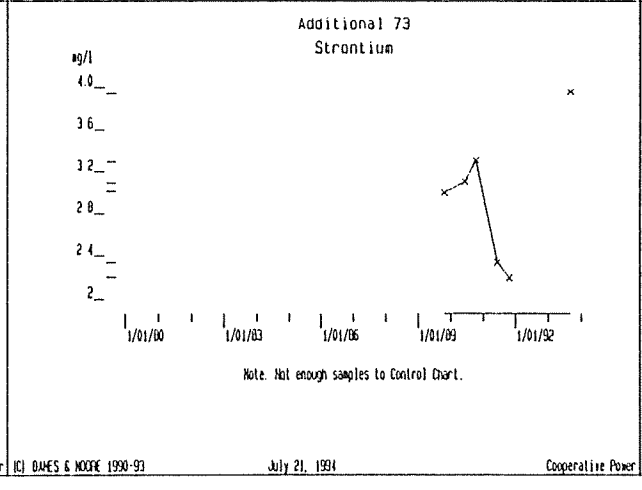

Additional 72
Sulfate
ug/l
260
250
240
230
220
210
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

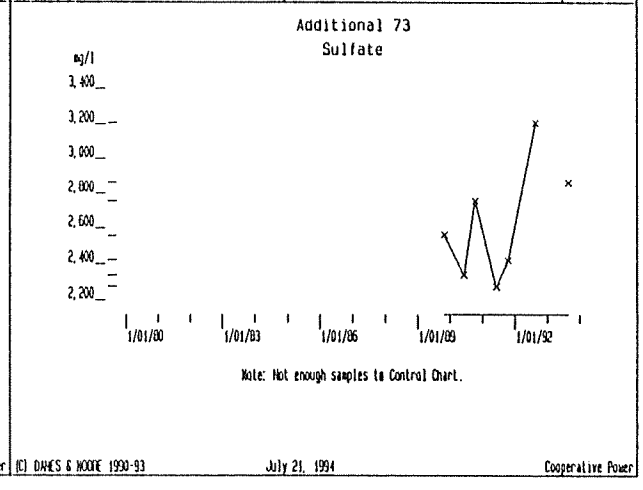

Additional 73
Arsenic
ug/l
4.50
3.75
3.00
2.25
1.50
0.75
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

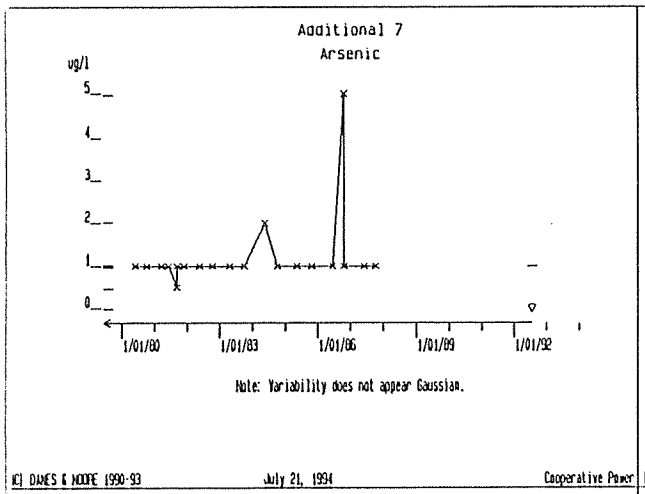

Additional 73
Boron
ug/l
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

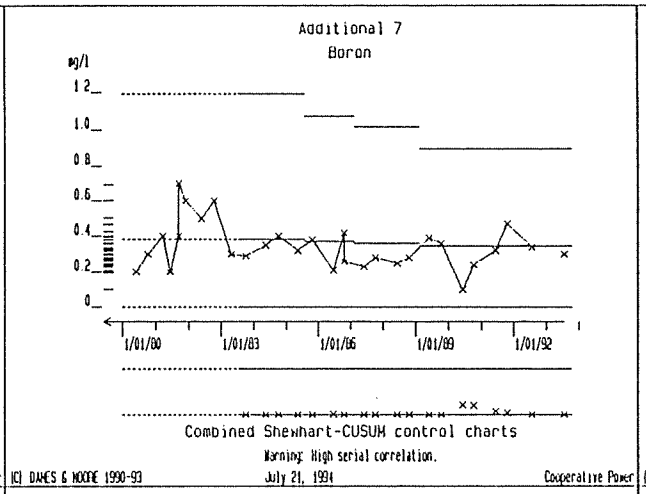

Additional 73
Chloride
ug/l
420
390
360
330
300
270
240
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

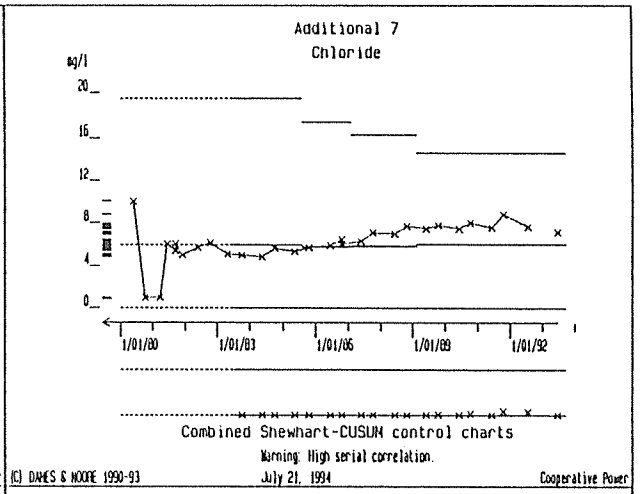

Additional 73
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

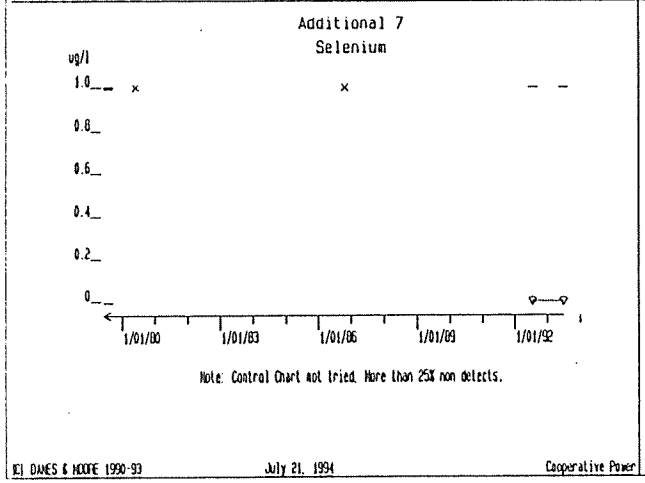

Additional 73
Strontium
ug/l
4.0
3.6
3.2
2.8
2.4
2
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

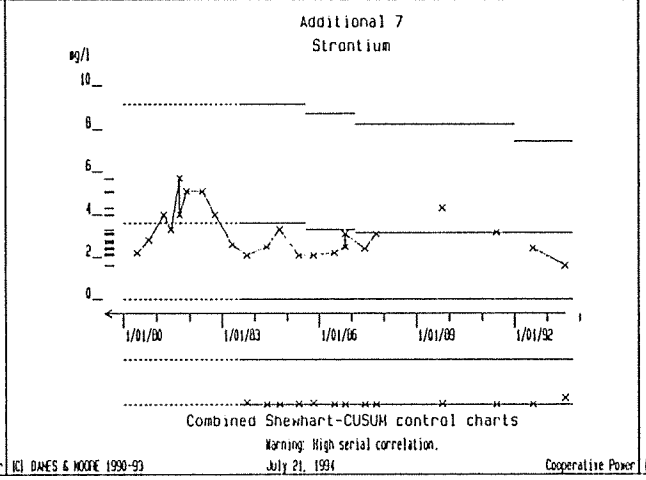

Additional 73
Sulfate
ug/l
3,400
3,200
3,000
2,800
2,600
2,400
2,200
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

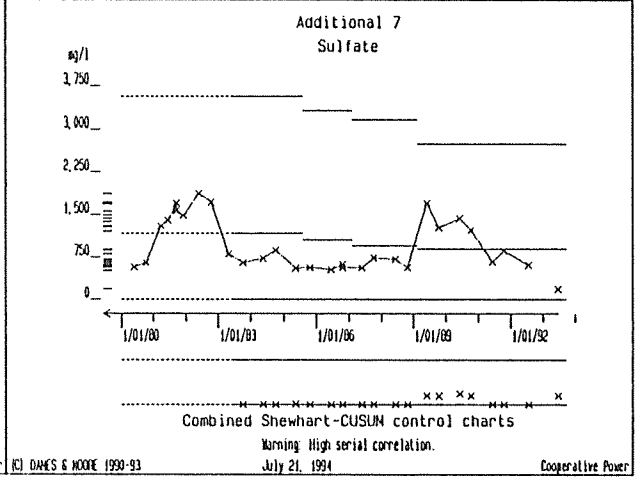

Additional 7
Arsenic
ug/l
5
4
3
2
1
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Variability does not appear Gaussian.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

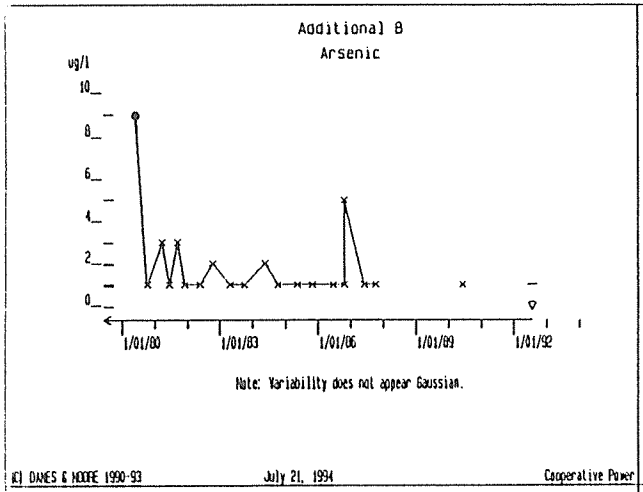

Additional 7
Boron
mg/l
1.2
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

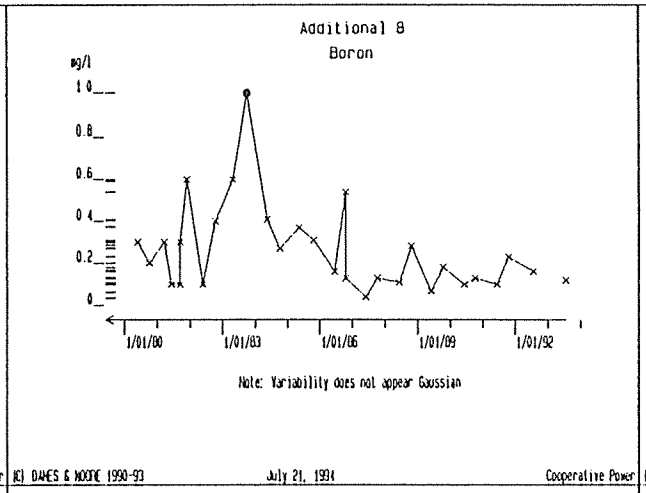

Additional 7
Chloride
mg/l
20
16
12
8
4
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

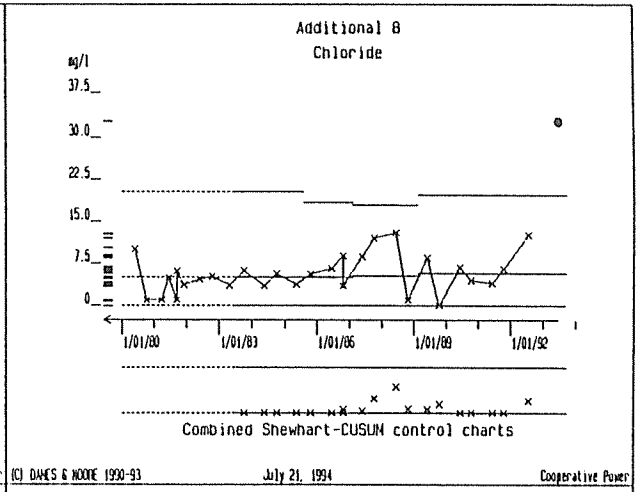

Additional 7
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

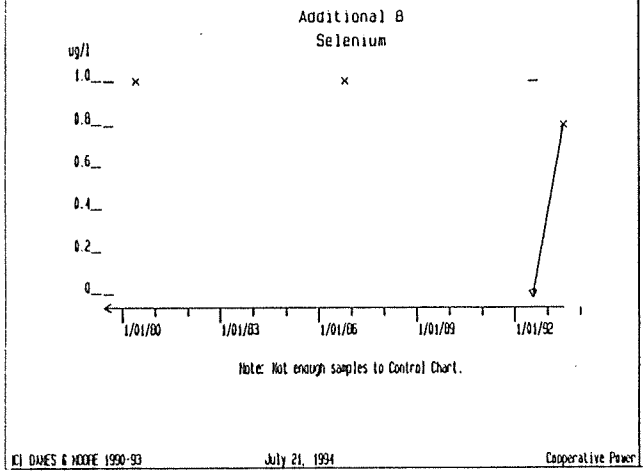

Additional 7
Strontium
mg/l
10
8
6
4
2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

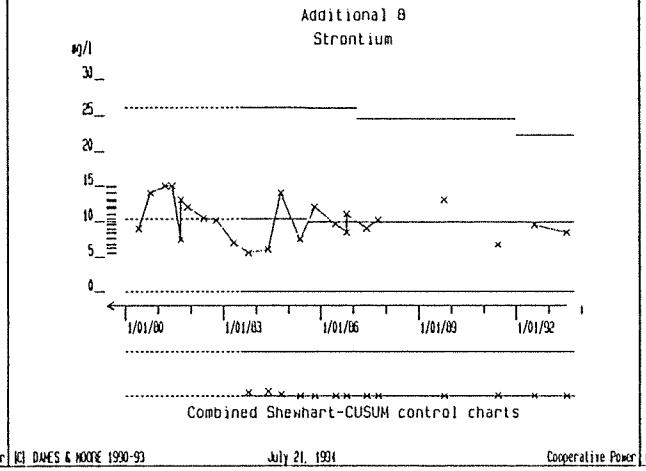

Additional 7
Sulfate
mg/l
3,750
3,000
2,250
1,500
750
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

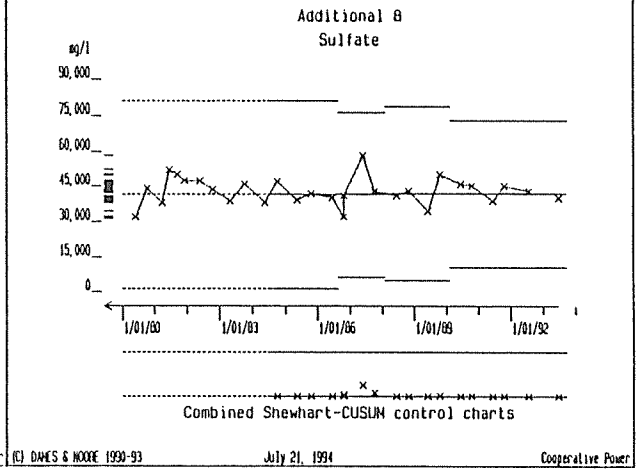

Additional 8
Arsenic
ug/l
10
8
6
4
2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Variability does not appear Gaussian.
(C) DANES & MOORE 1990-93
July 21, 1994
Cooperative Power

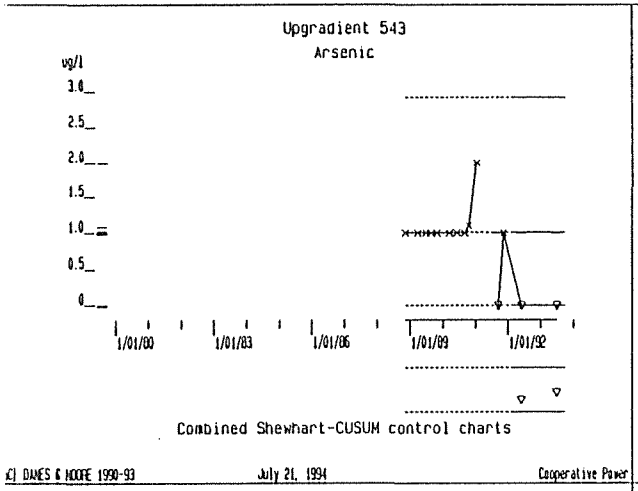

Additional 8
Boron
mg/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Variability does not appear Gaussian
(C) DANES & MOORE 1990-93
July 21, 1994
Cooperative Power

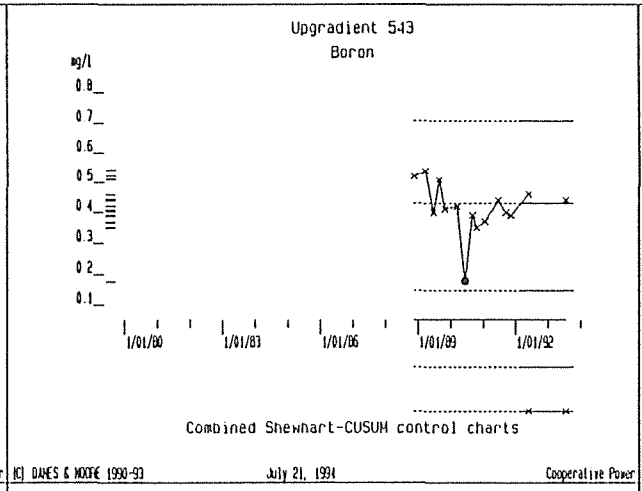

Additional 8
Chloride
mg/l
37.5
30.0
22.5
15.0
7.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DANES & MOORE 1990-93
July 21, 1994
Cooperative Power

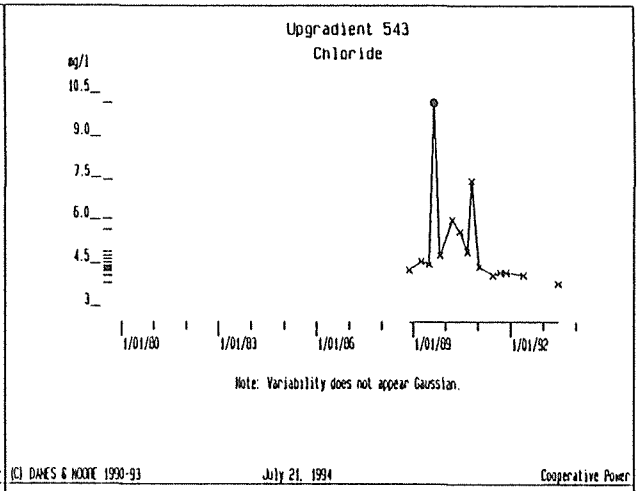

Additional 8
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DANES & MOORE 1990-93
July 21, 1994
Cooperative Power

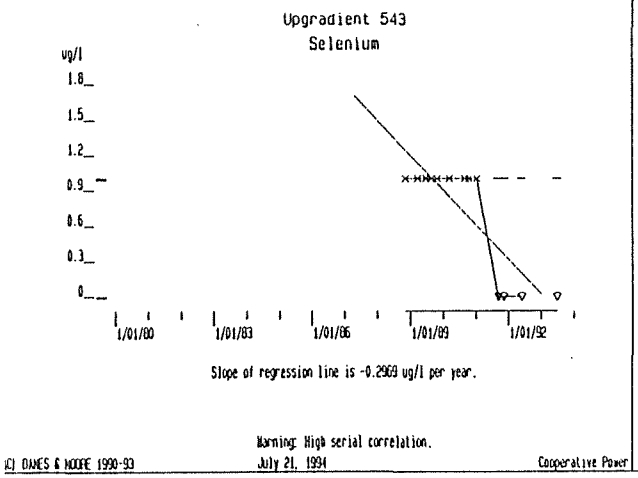

Additional 8
Strontium
mg/l
30
25
20
15
10
5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DANES & MOORE 1990-93
July 21, 1994
Cooperative Power

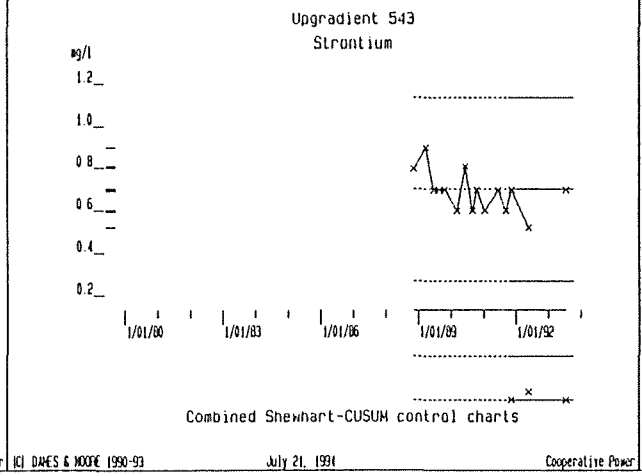

Additional 8
Sulfate
mg/l
90,000
75,000
60,000
45,000
30,000
15,000
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DANES & MOORE 1990-93
July 21, 1994
Cooperative Power

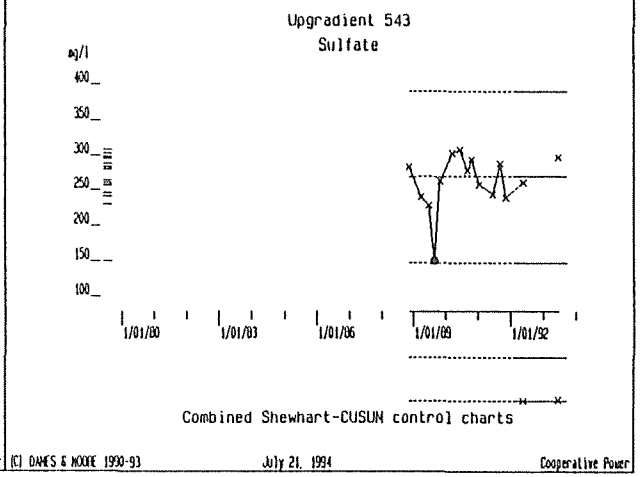

Upgradient 543
Arsenic
ug/l
3.0
2.5
2.0
1.5
1.0
0.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

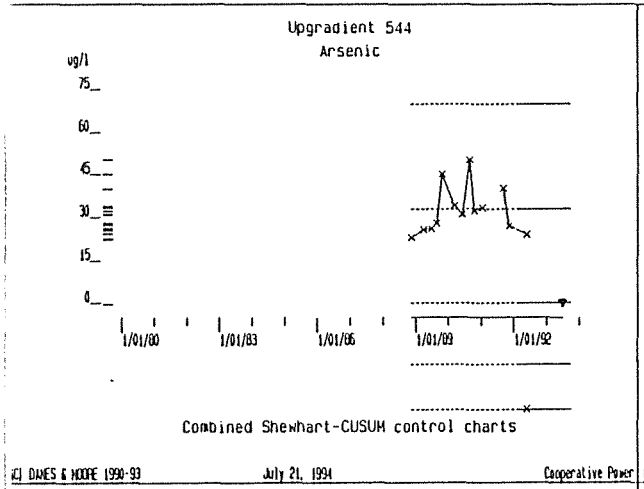

Upgradient 543
Boron
mg/l
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

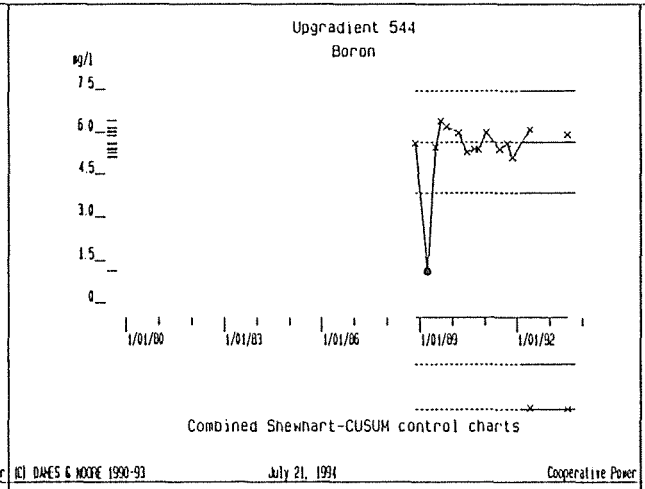

Upgradient 543
Chloride
mg/l
10.5
9.0
7.5
6.0
4.5
3
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Variability does not appear Gaussian.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

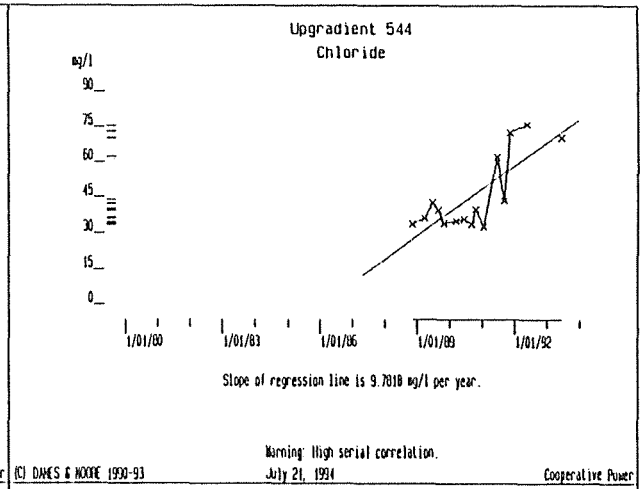

Upgradient 543
Selenium
ug/l
1.8
1.5
1.2
0.9
0.6
0.3
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.2969 ug/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

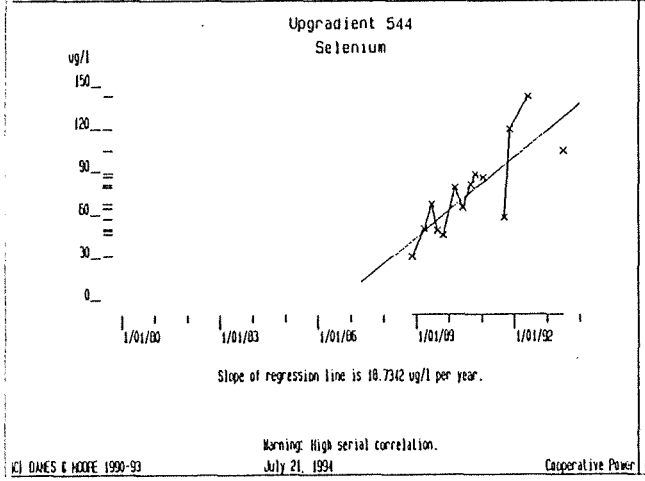

Upgradient 543
Strontium
mg/l
1.2
1.0
0.8
0.6
0.4
0.2
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

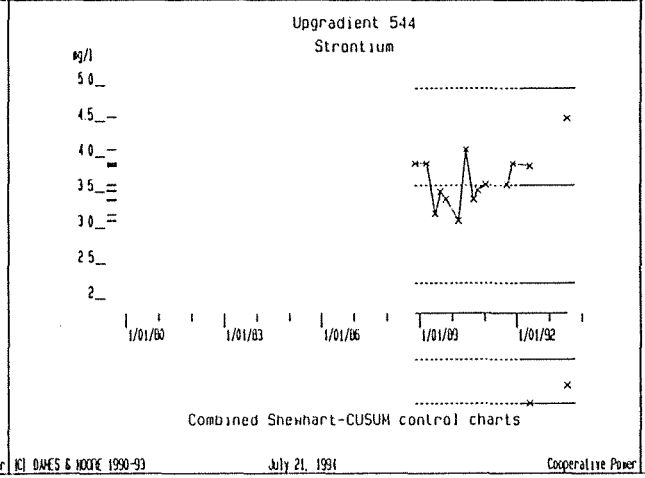

Upgradient 543
Sulfate
mg/l
400
350
300
250
200
150
100
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

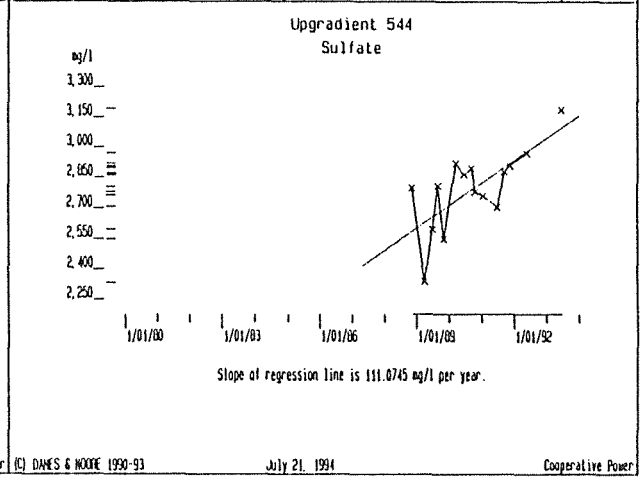

Upgradient 544
Arsenic
ug/l
75
60
45
30
15
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

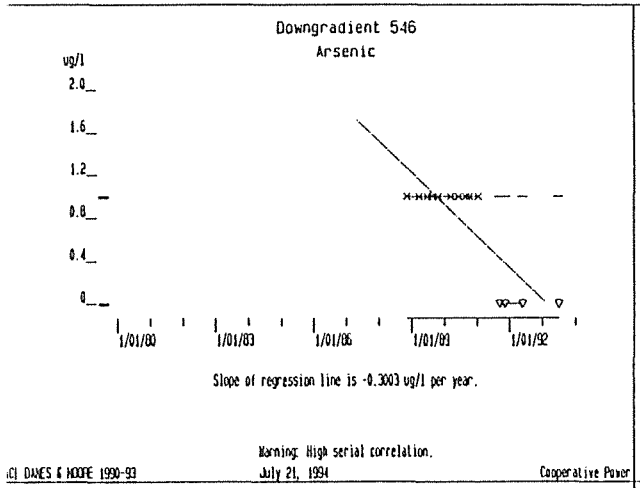

Upgradient 544
Boron
mg/l
7.5
6.0
4.5
3.0
1.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

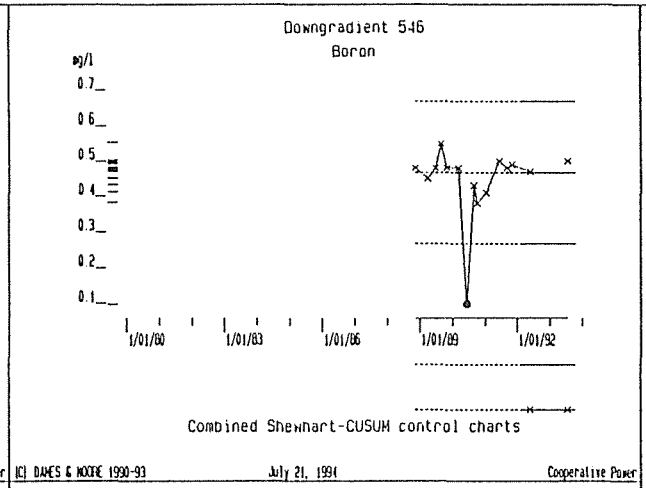

Upgradient 544
Chloride
mg/l
90
75
60
45
30
15
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 9.7818 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

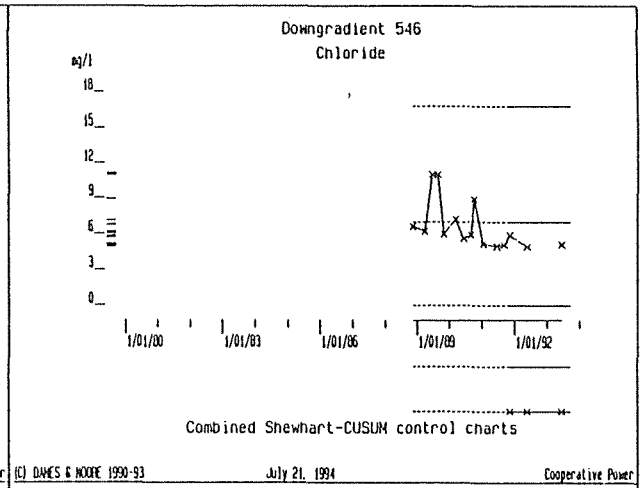

Upgradient 544
Selenium
ug/l
150
120
90
60
30
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 18.7342 ug/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

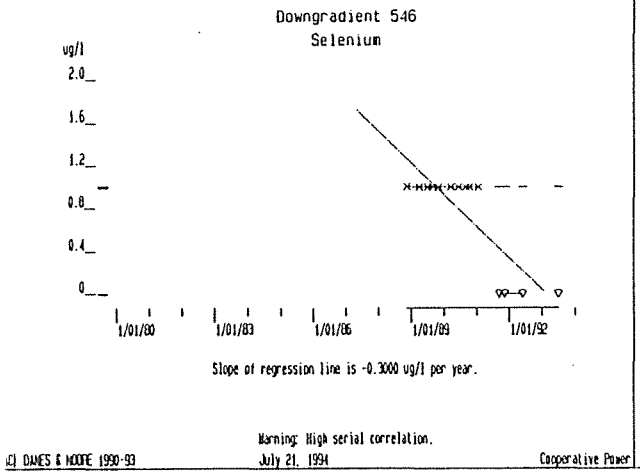

Upgradient 544
Strontium
mg/l
5.0
4.5
4.0
3.5
3.0
2.5
2
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

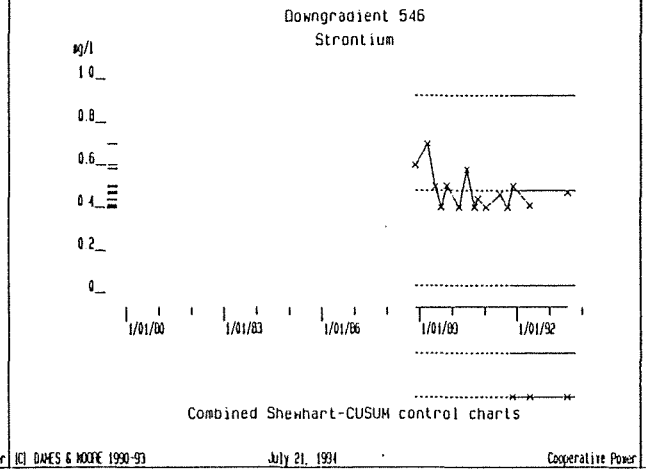

Upgradient 544
Sulfate
mg/l
3,300
3,150
3,000
2,850
2,700
2,550
2,400
2,250
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 111.0745 mg/l per year.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

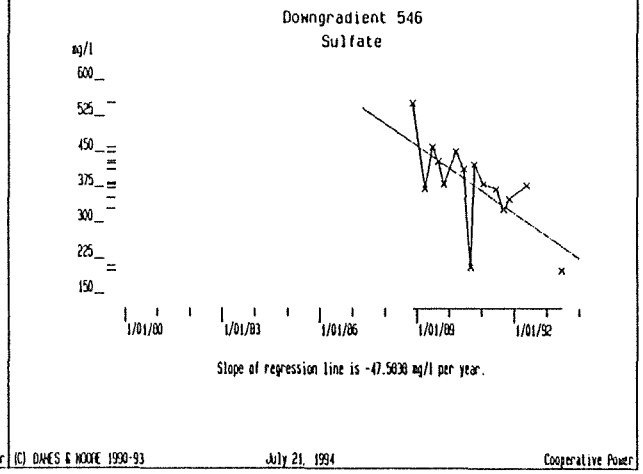

Downgradient 546
Arsenic
ug/l
2.0
1.6
1.2
0.8
0.4
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.3003 ug/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

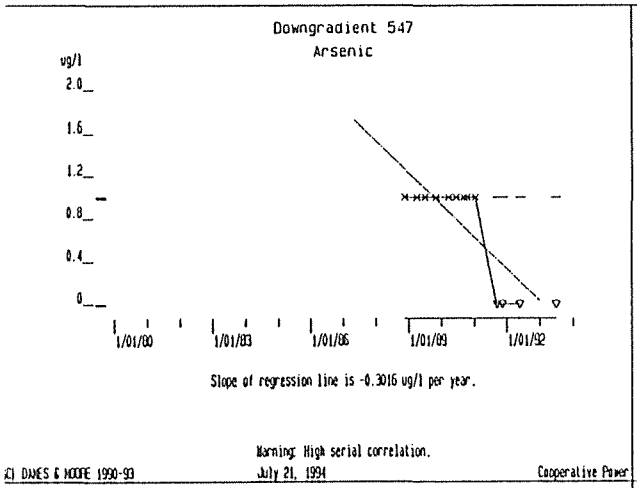

Downgradient 546
Boron
mg/l
0.7
0.6
0.5
0.4
0.3
0.2
0.1
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

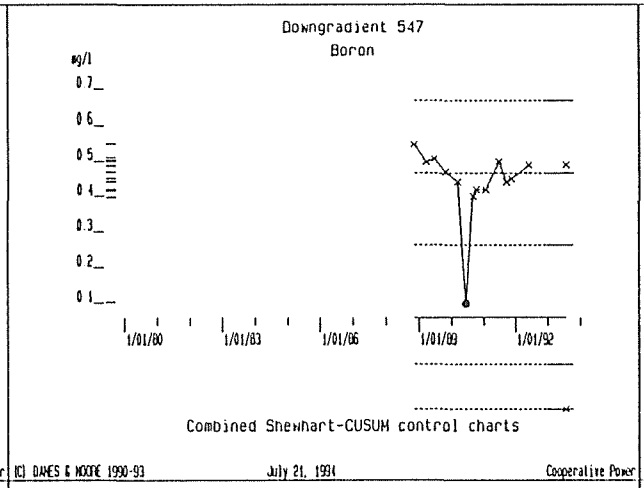

Downgradient 546
Chloride
mg/l
18
15
12
9
6
3
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

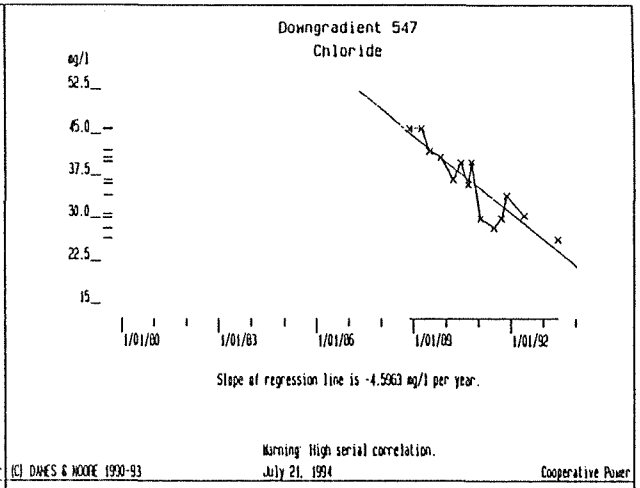

Downgradient 546
Selenium
ug/l
2.0
1.6
1.2
0.8
0.4
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.3000 ug/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

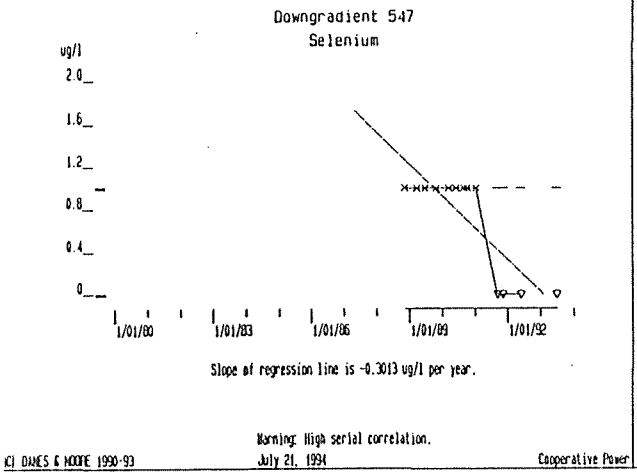

Downgradient 546
Strontium
mg/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

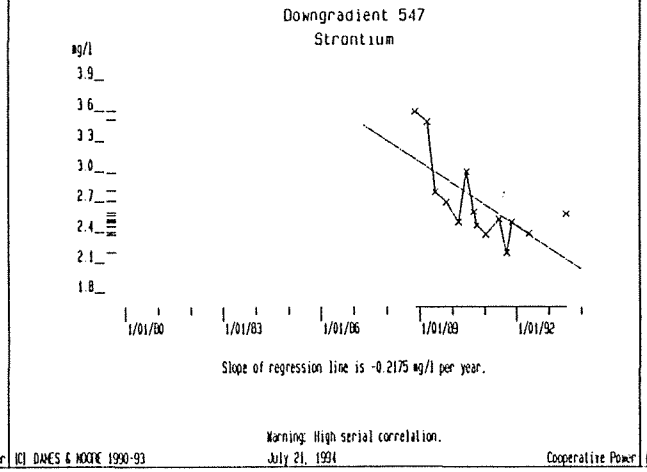

Downgradient 546
Sulfate
mg/l
600
525
450
375
300
225
150
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -47.5838 mg/l per year.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

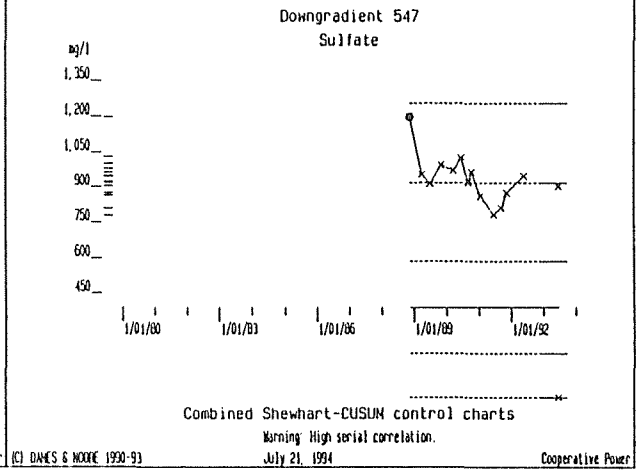

Downgradient 547
Arsenic
ug/l
2.0
1.6
1.2
0.8
0.4
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.3016 ug/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

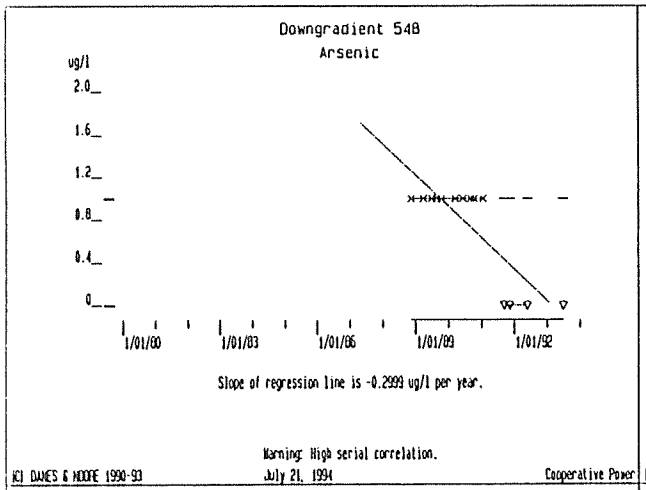

Downgradient 547
Boron
mg/l
0.7
0.6
0.5
0.4
0.3
0.2
0.1
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

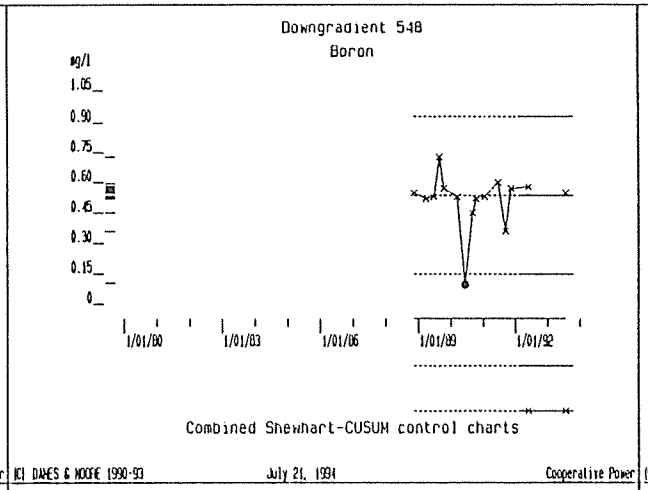

Downgradient 547
Chloride
mg/l
52.5
45.0
37.5
30.0
22.5
15
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -4.5963 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

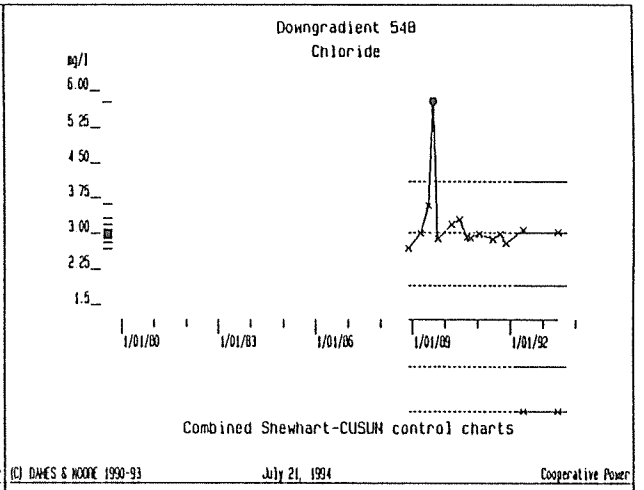

Downgradient 547
Selenium
ug/l
2.0
1.6
1.2
0.8
0.4
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.3013 ug/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

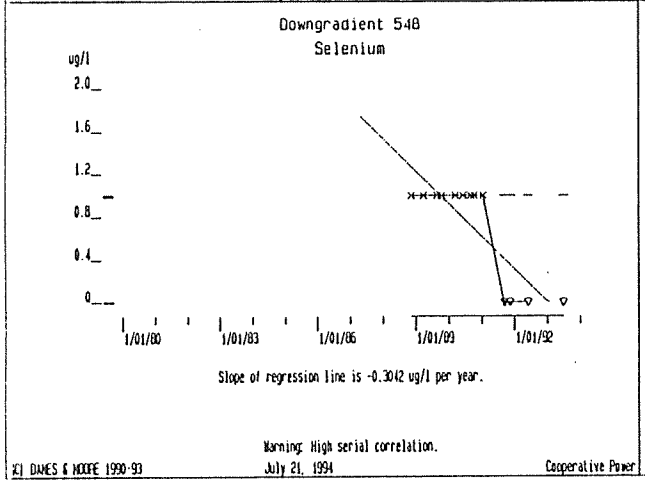

Downgradient 547
Strontium
mg/l
3.9
3.6
3.3
3.0
2.7
2.4
2.1
1.8
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.2175 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

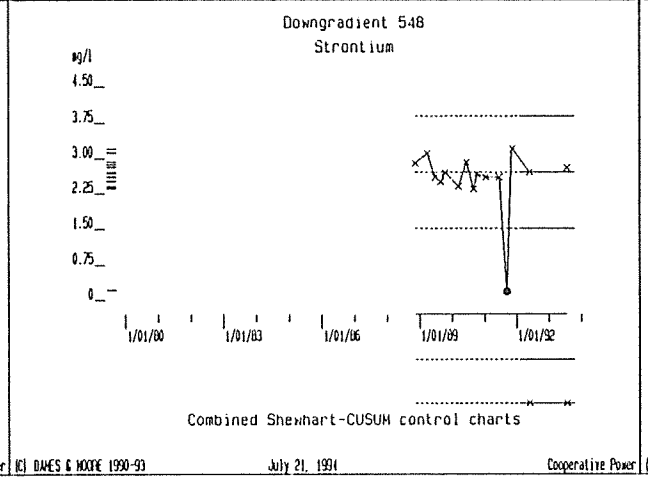

Downgradient 547
Sulfate
mg/l
1,350
1,200
1,050
900
750
600
450
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

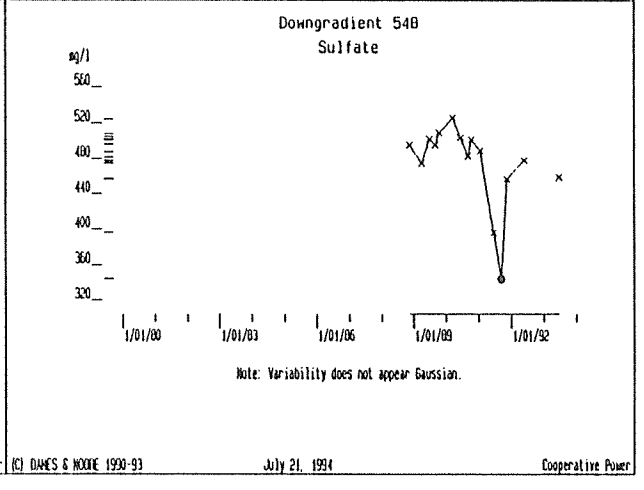

Downgradient 548
Arsenic
ug/l
2.0
1.6
1.2
0.8
0.4
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.2999 ug/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

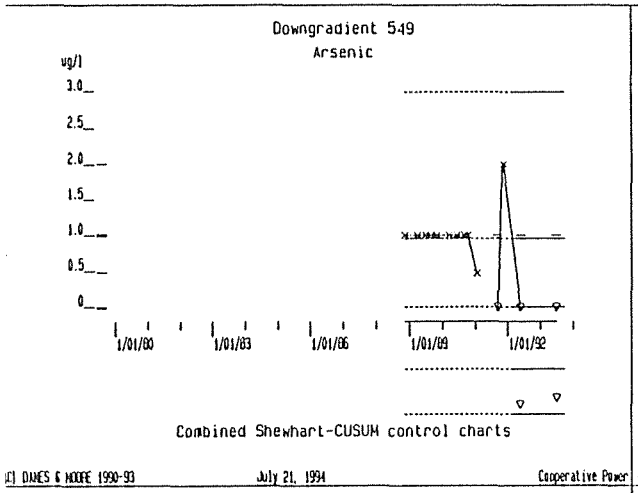

Downgradient 548
Boron
ug/l
1.05
0.90
0.75
0.60
0.45
0.30
0.15
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

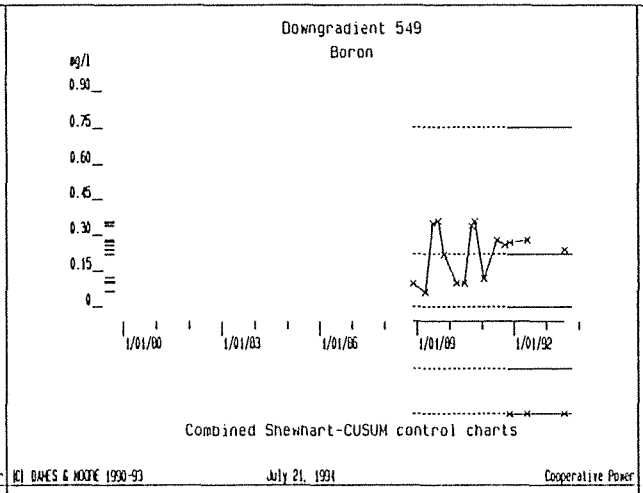

Downgradient 548
Chloride
ug/l
6.00
5.25
4.50
3.75
3.00
2.25
1.5
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

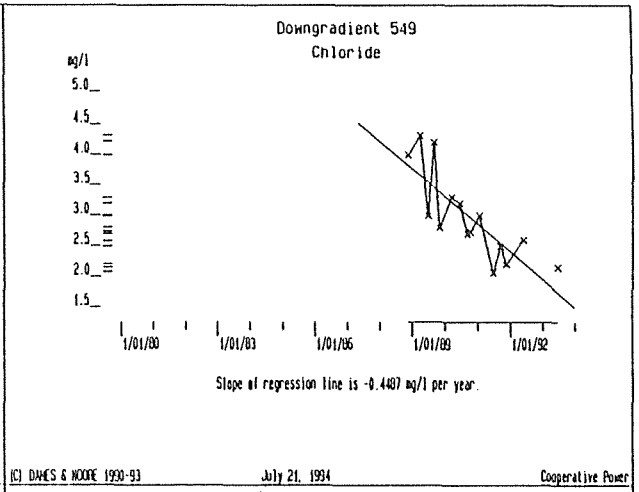

Downgradient 548
Selenium
ug/l
2.0
1.6
1.2
0.8
0.4
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.3042 ug/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

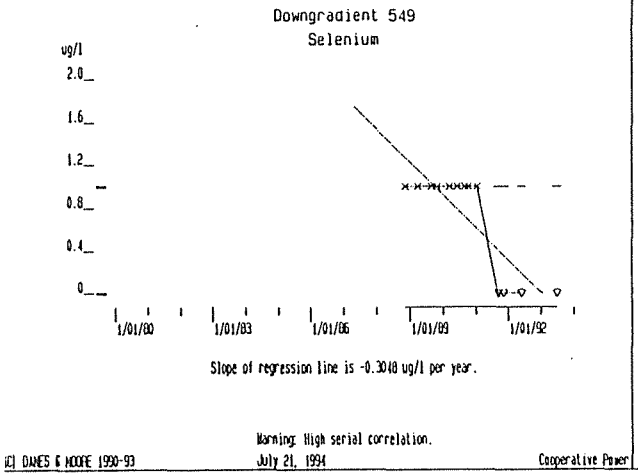

Downgradient 548
Strontium
ug/l
4.50
3.75
3.00
2.25
1.50
0.75
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

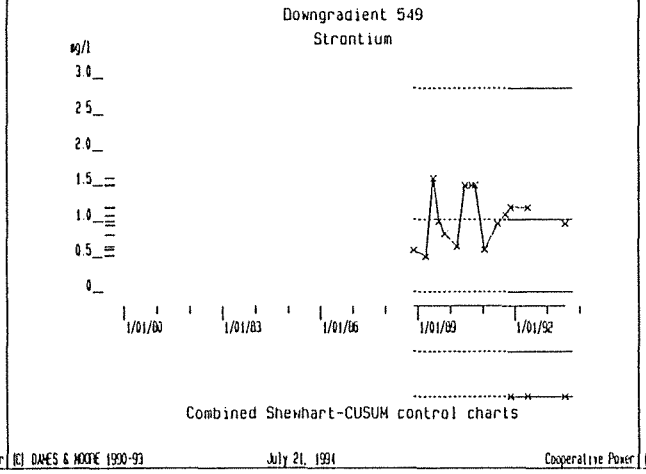

Downgradient 548
Sulfate
ug/l
560
520
480
440
400
360
320
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Variability does not appear Gaussian.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

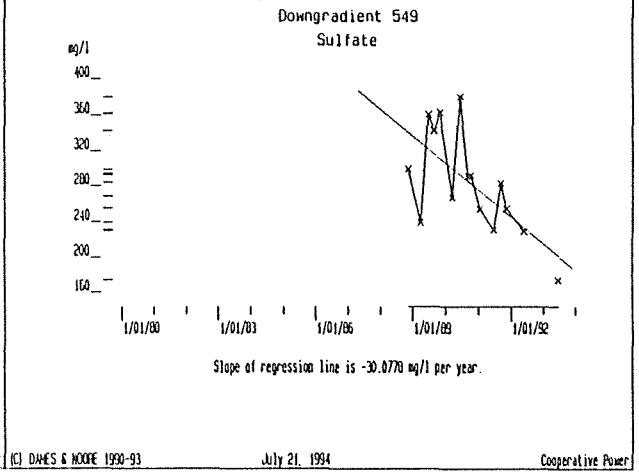

Downgradient 549
Arsenic
ug/l
3.0
2.5
2.0
1.5
1.0
0.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAVIES & MOORE 1990-93
July 21, 1994
Cooperative Power

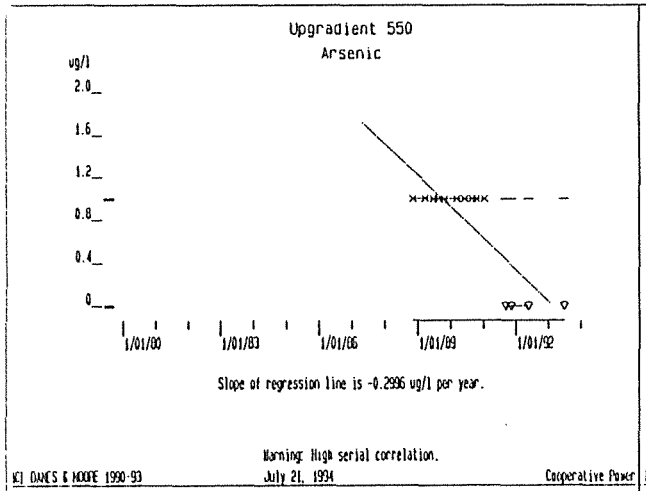

Downgradient 549
Boron
mg/l
0.90
0.75
0.60
0.45
0.30
0.15
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAVIES & MOORE 1990-93
July 21, 1994
Cooperative Power

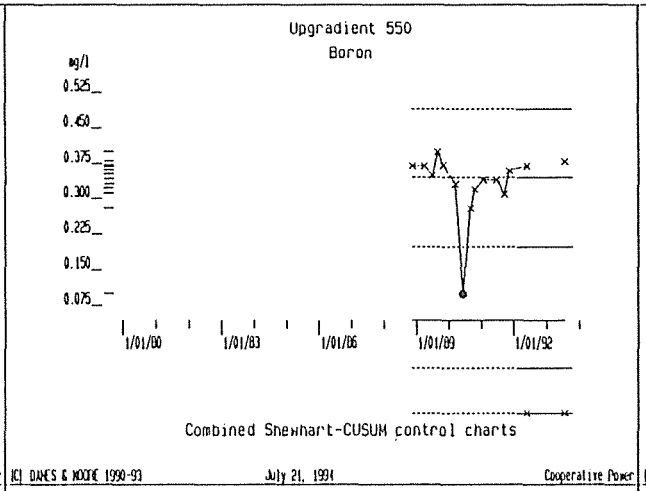

Downgradient 549
Chloride
mg/l
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.4487 mg/l per year.
(C) DAVIES & MOORE 1990-93
July 21, 1994
Cooperative Power

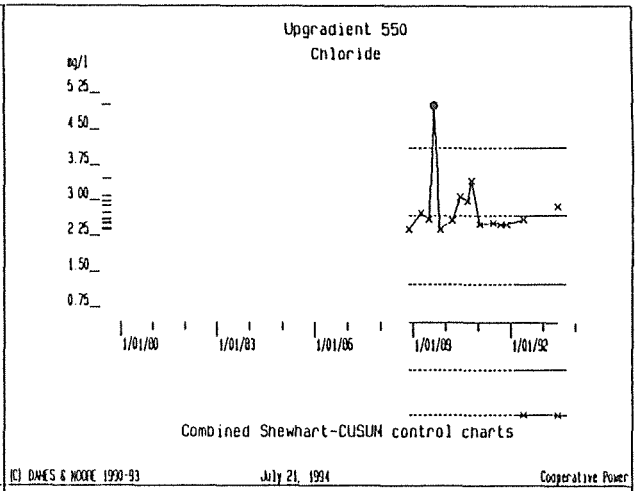

Downgradient 549
Selenium
ug/l
2.0
1.6
1.2
0.8
0.4
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.3048 ug/l per year.
Warning: High serial correlation.
(C) DAVIES & MOORE 1990-93
July 21, 1994
Cooperative Power

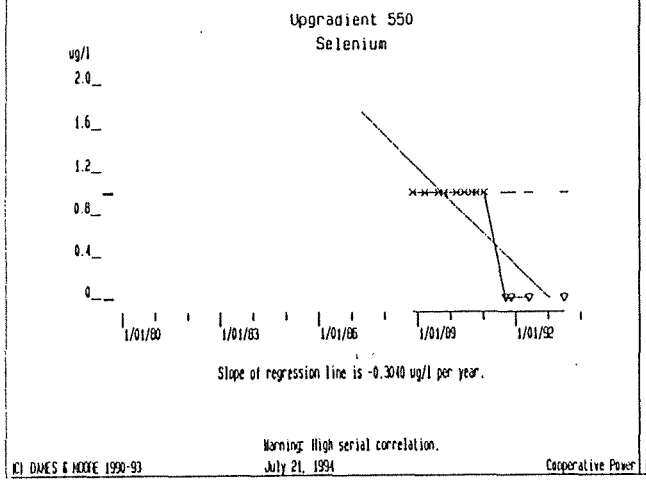

Downgradient 549
Strontium
mg/l
3.0
2.5
2.0
1.5
1.0
0.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAVIES & MOORE 1990-93
July 21, 1994
Cooperative Power

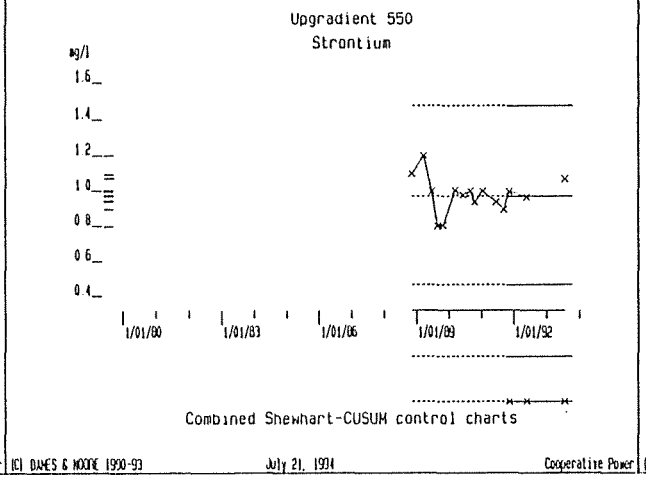

Downgradient 549
Sulfate
mg/l
400
360
320
280
240
200
160
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -30.0778 mg/l per year.
(C) DAVIES & MOORE 1990-93
July 21, 1994
Cooperative Power

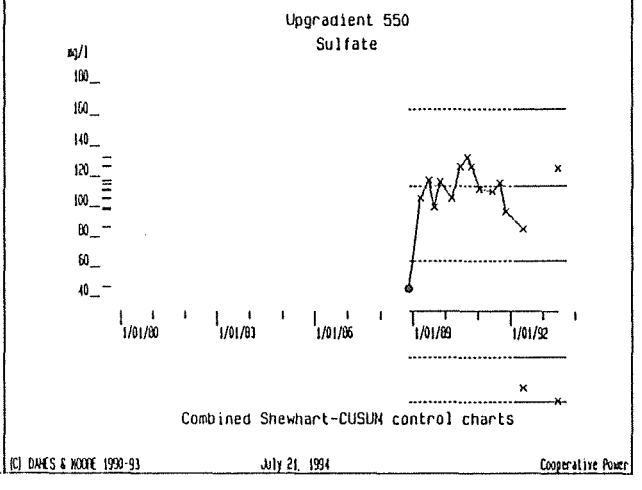

Upgradient 550
Arsenic
ug/l
2.0
1.6
1.2
0.8
0.4
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.2896 ug/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

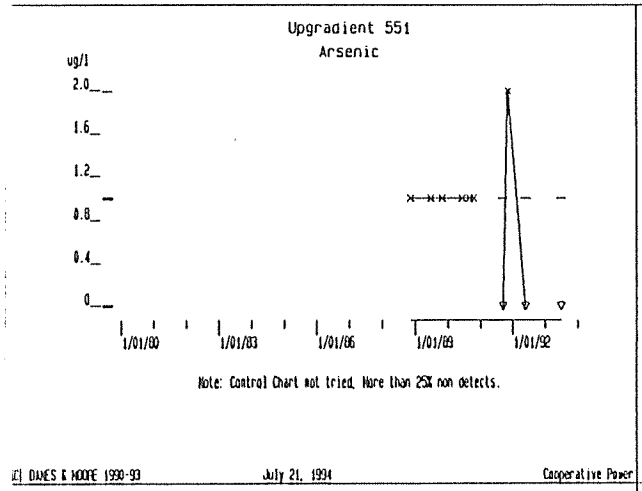

Upgradient 550
Boron
ug/l
0.525
0.450
0.375
0.300
0.225
0.150
0.075
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

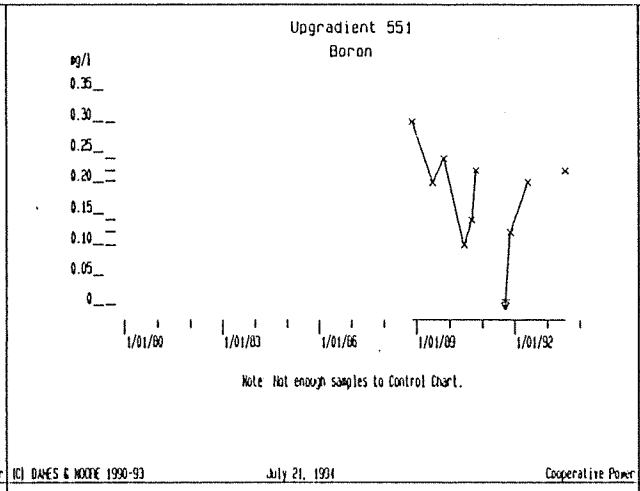

Upgradient 550
Chloride
ug/l
5.25
4.50
3.75
3.00
2.25
1.50
0.75
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

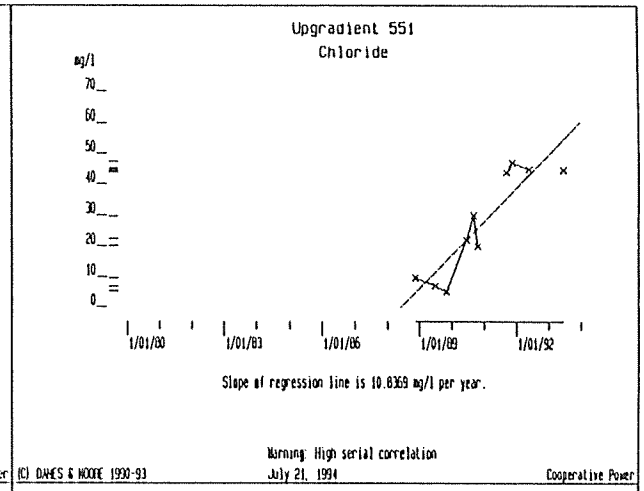

Upgradient 550
Selenium
ug/l
2.0
1.6
1.2
0.8
0.4
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.3040 ug/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

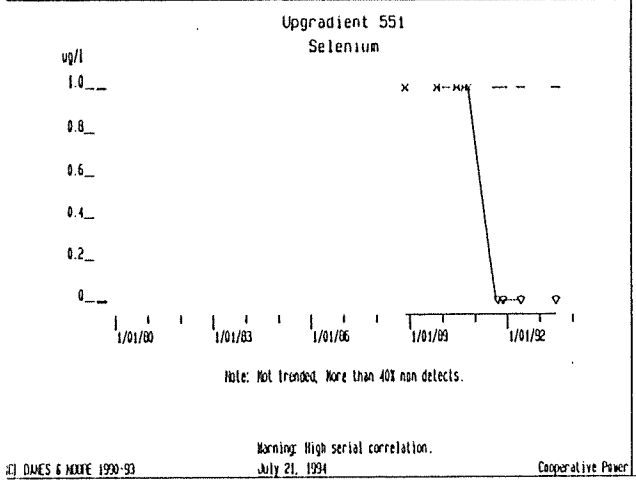

Upgradient 550
Strontium
ug/l
1.6
1.4
1.2
1.0
0.8
0.6
0.4
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

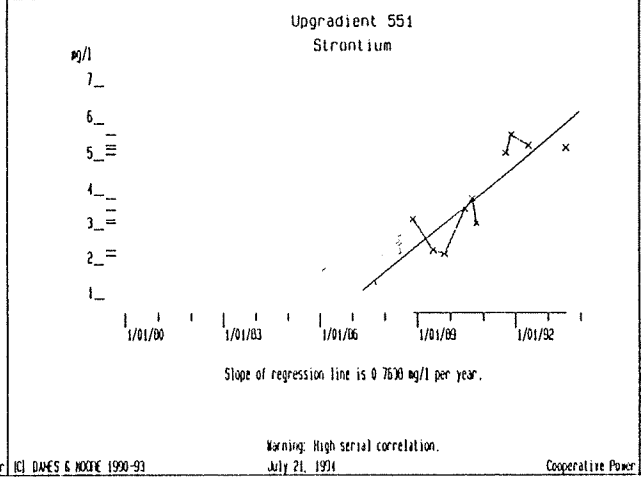

Upgradient 550
Sulfate
ug/l
180
160
140
120
100
80
60
40
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

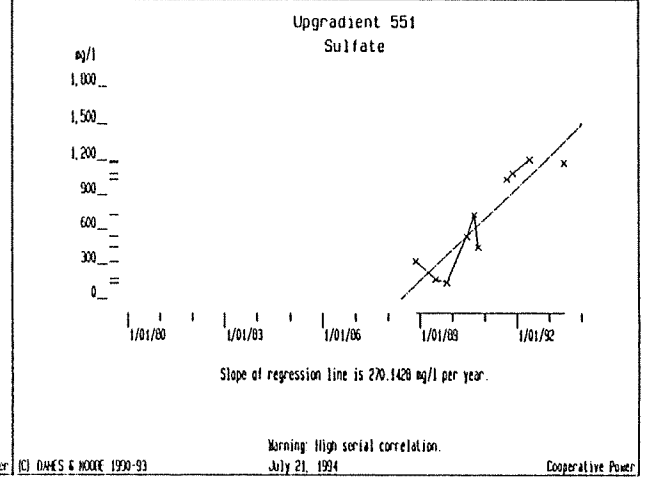

Upgradient 551
Arsenic
ug/l
2.0
1.6
1.2
0.8
0.4
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried, More than 25% non detects.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

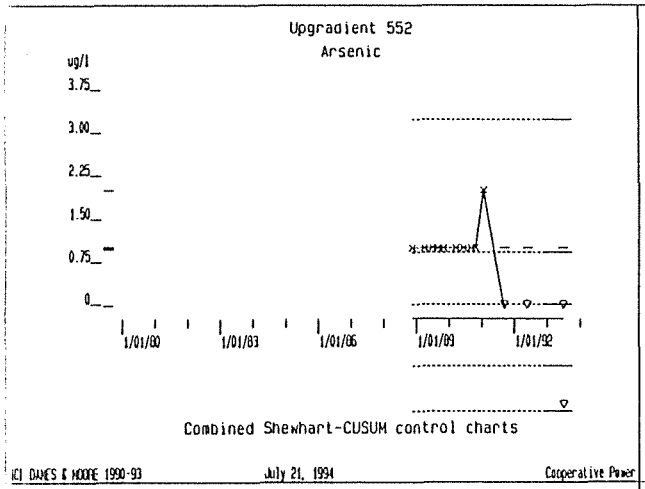

Upgradient 551
Boron
mg/l
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

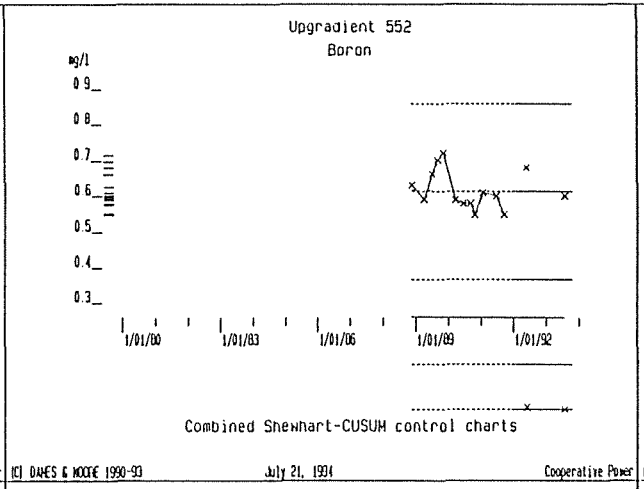

Upgradient 551
Chloride
mg/l
70
60
50
40
30
20
10
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 10.8369 mg/l per year.
Warning: High serial correlation
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

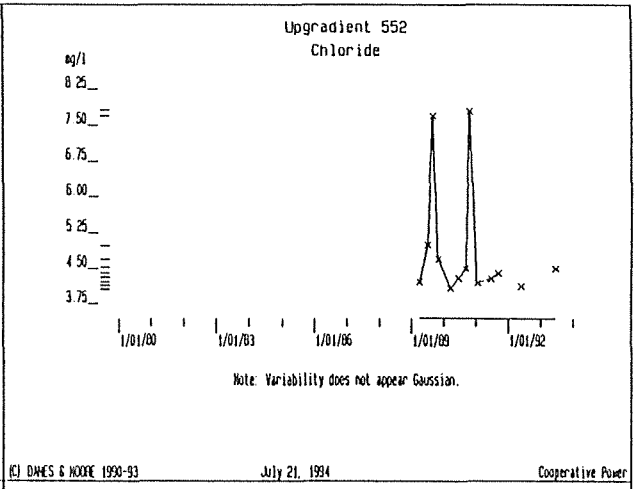

Upgradient 551
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not trended, More than 40% non detects.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

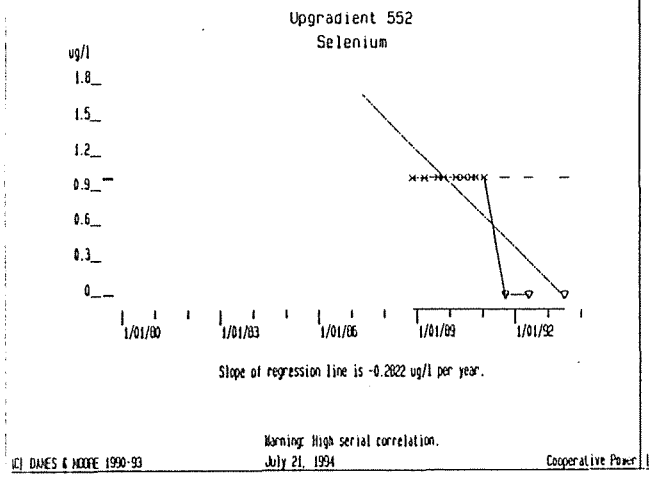

Upgradient 551
Strontium
mg/l
7
6
5
4
3
2
1
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 0.7630 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

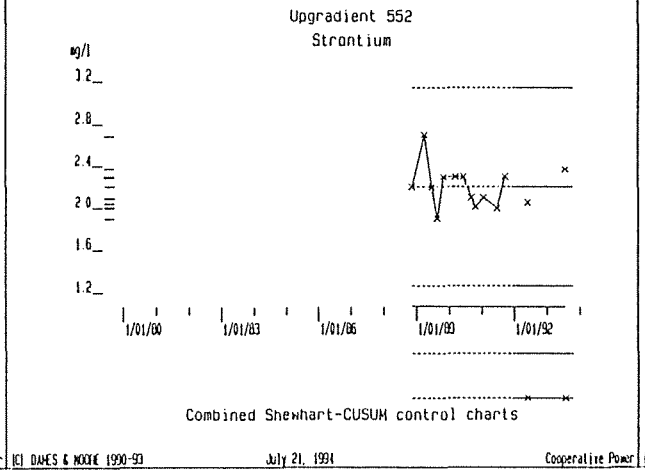

Upgradient 551
Sulfate
mg/l
1,800
1,500
1,200
900
600
300
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 270.1428 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

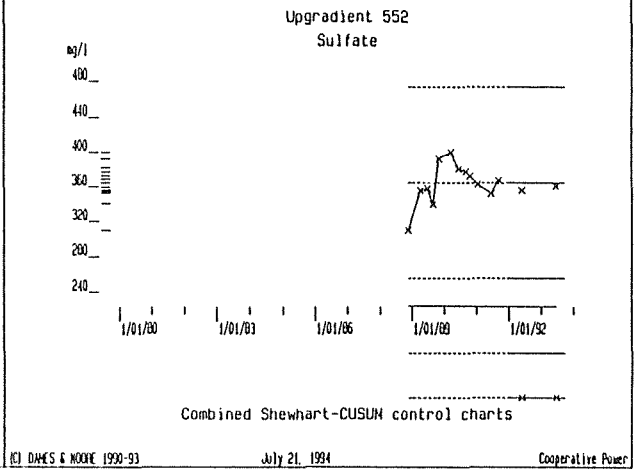

Upgradient 552
Arsenic
ug/l
3.75
3.00
2.25
1.50
0.75
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

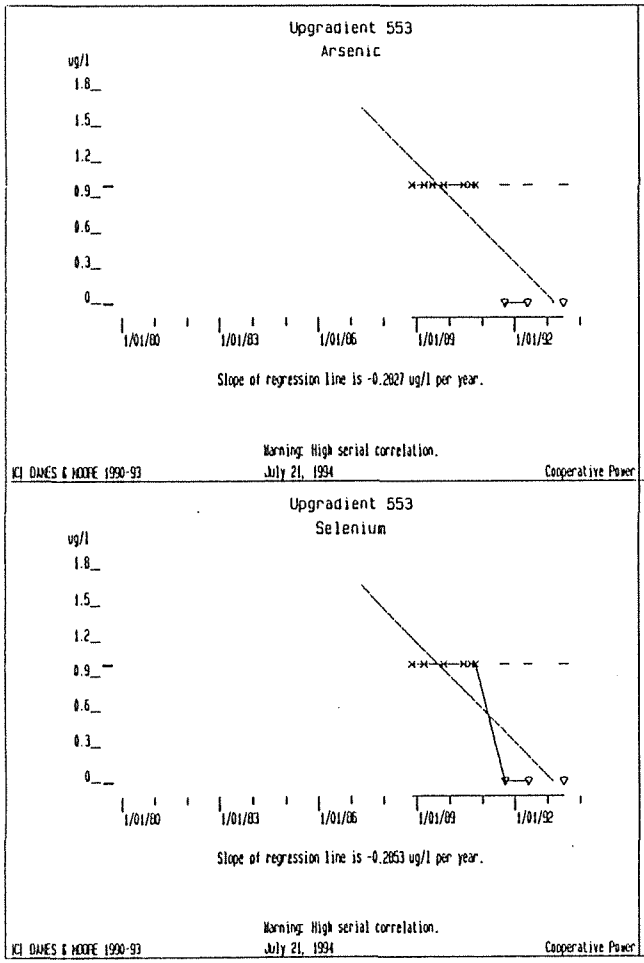

Upgradient 552
Boron
mg/l
0.9
0.8
0.7
0.6
0.5
0.4
0.3
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

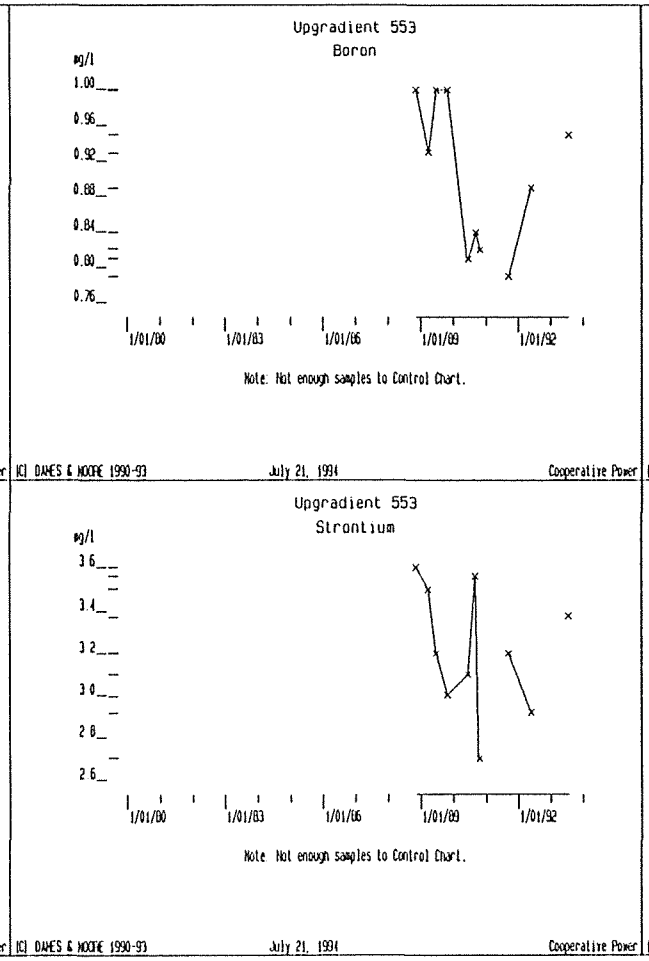

Upgradient 552
Chloride
mg/l
8.25
7.50
6.75
6.00
5.25
4.50
3.75
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Variability does not appear Gaussian.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

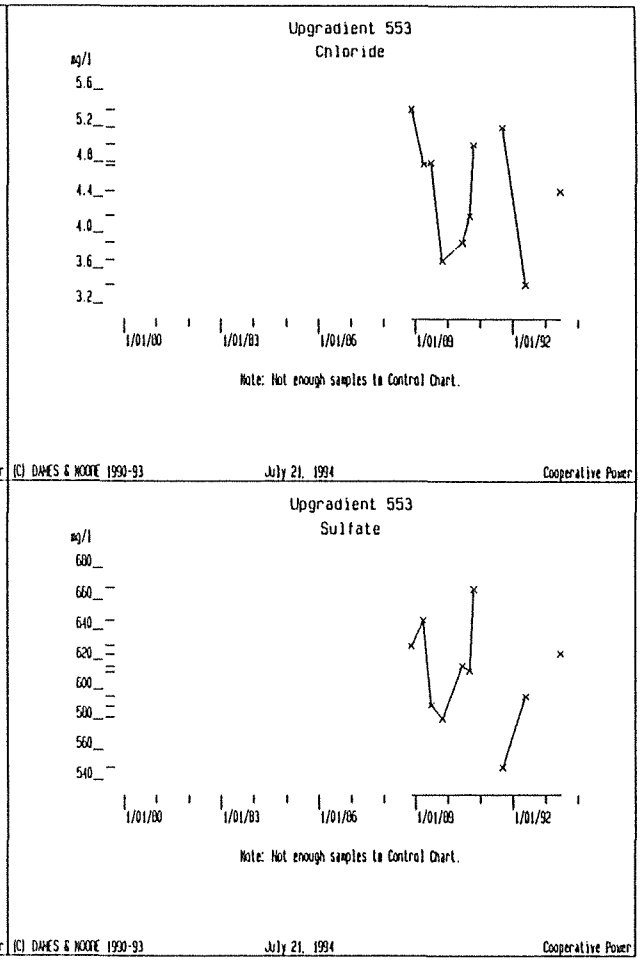

Upgradient 552
Selenium
ug/l
1.8
1.5
1.2
0.9
0.6
0.3
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.2622 ug/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power


Upgradient 552
Strontium
mg/l
3.2
2.8
2.4
2.0
1.6
1.2
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power


Upgradient 552
Sulfate
mg/l
480
440
400
360
320
280
240
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power


Upgradient 553
Arsenic
ug/l
1.8
1.5
1.2
0.9
0.6
0.3
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.2827 ug/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

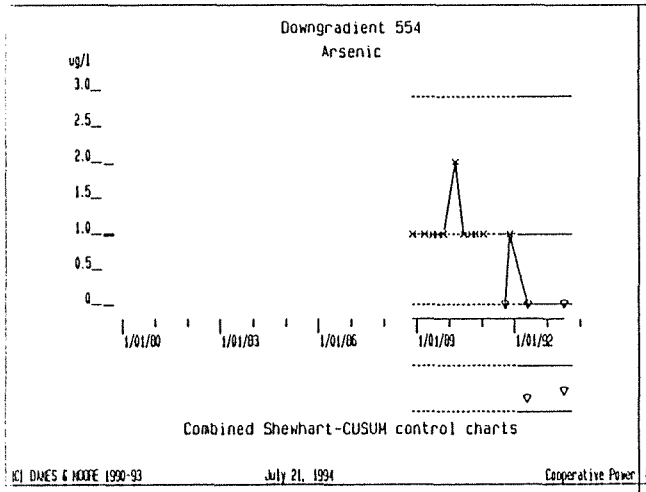

Upgradient 553
Boron
mg/l
1.00
0.96
0.92
0.88
0.84
0.80
0.76
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

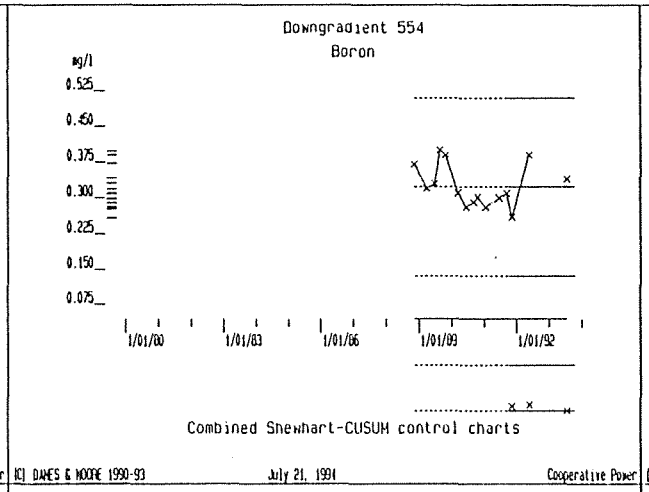

Upgradient 553
Chloride
mg/l
5.6
5.2
4.8
4.4
4.0
3.6
3.2
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

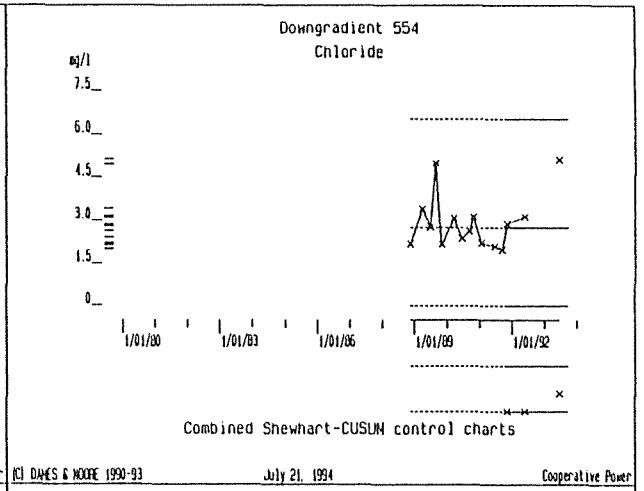
Upgradient 553
Selenium
ug/l
1.8
1.5
1.2
0.9
0.6
0.3
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.2653 ug/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

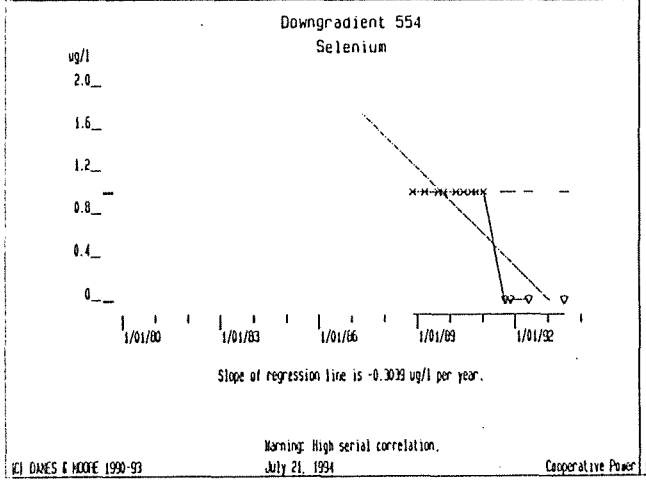
Upgradient 553
Strontium
mg/l
3.6
3.4
3.2
3.0
2.8
2.6
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

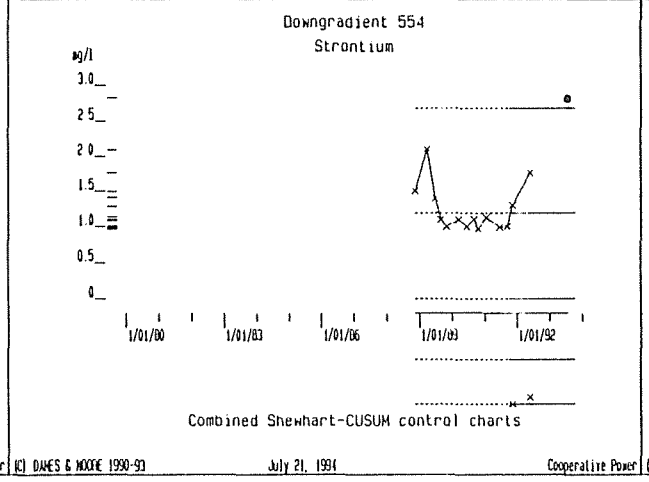
Upgradient 553
Sulfate
mg/l
680
660
640
620
600
580
560
540
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

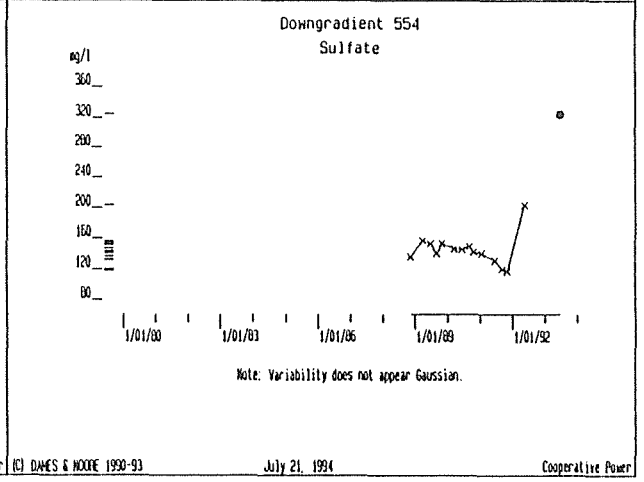

Downgradient 554
Arsenic
ug/l
3.0
2.5
2.0
1.5
1.0
0.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

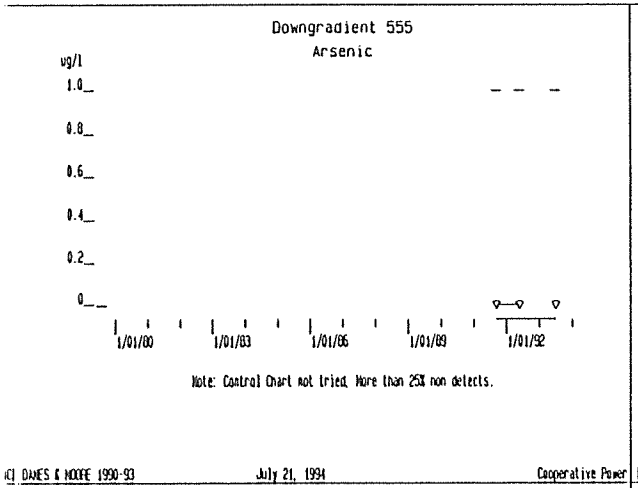

Downgradient 554
Boron
ug/l
0.525
0.450
0.375
0.300
0.225
0.150
0.075
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

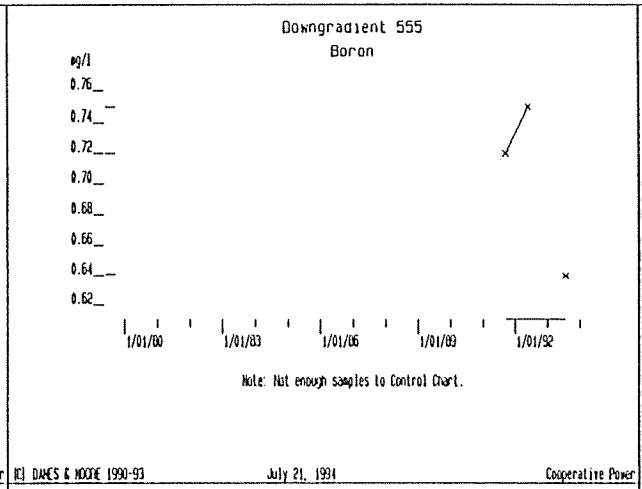

Downgradient 554
Chloride
ug/l
7.5
6.0
4.5
3.0
1.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

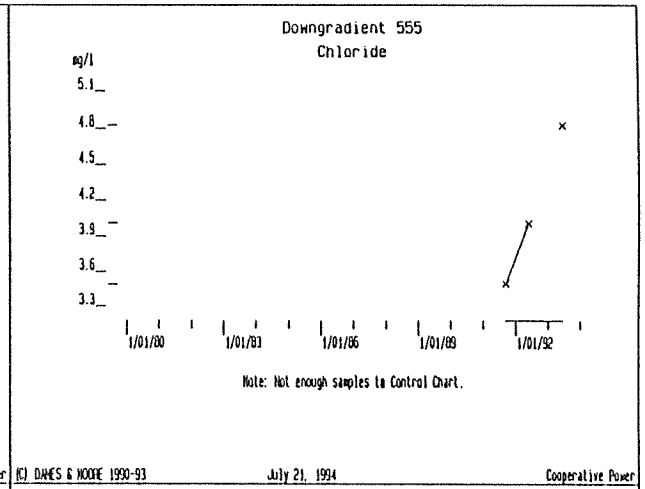

Downgradient 554
Selenium
ug/l
2.0
1.6
1.2
0.8
0.4
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.3099 ug/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

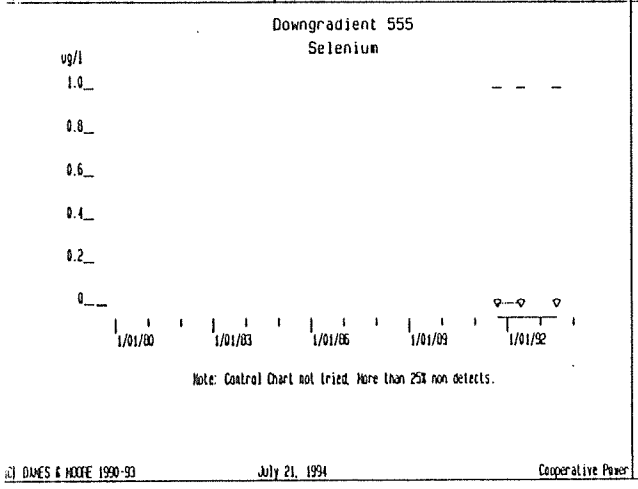

Downgradient 554
Strontium
ug/l
3.0
2.5
2.0
1.5
1.0
0.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

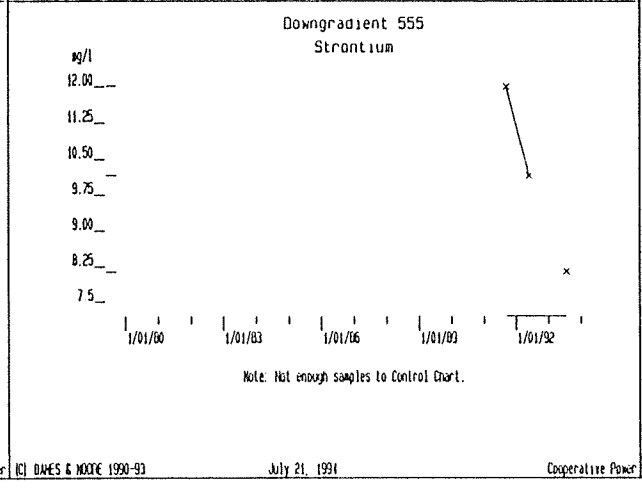

Downgradient 554
Sulfate
ug/l
360
320
280
240
200
160
120
80
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Variability does not appear Gaussian.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

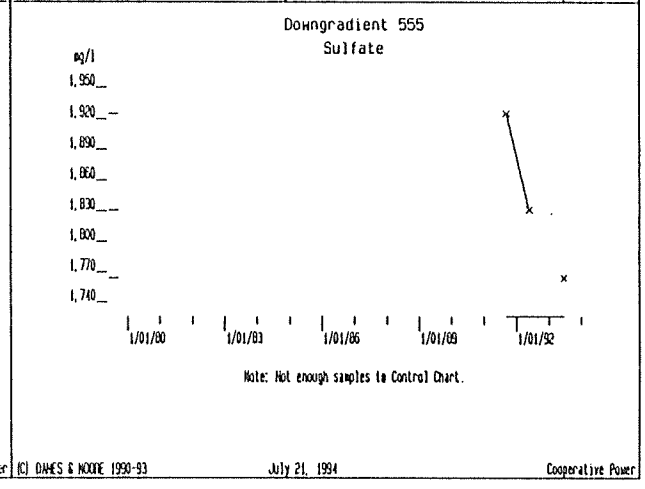

Downgradient 555
Arsenic
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

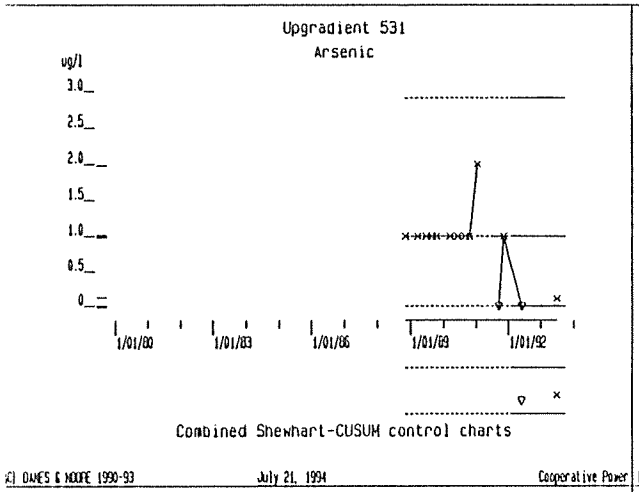

Downgradient 555
Boron
mg/l
0.76
0.74
0.72
0.70
0.68
0.66
0.64
0.62
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power

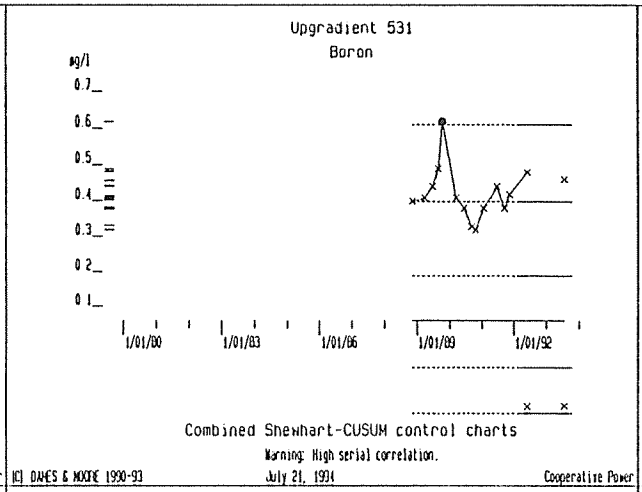

Downgradient 555
Chloride
mg/l
5.1
4.8
4.5
4.2
3.9
3.6
3.3
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power


Downgradient 555
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power


Downgradient 555
Strontium
mg/l
12.00
11.25
10.50
9.75
9.00
8.25
7.5
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power


Downgradient 555
Sulfate
mg/l
1,950
1,920
1,890
1,860
1,830
1,800
1,770
1,740
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power


Upgradient 531
Arsenic
ug/l
3.0
2.5
2.0
1.5
1.0
0.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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Boron
ug/l
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0.5
0.4
0.3
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0.1
1/01/80
1/01/83
1/01/86
1/01/89
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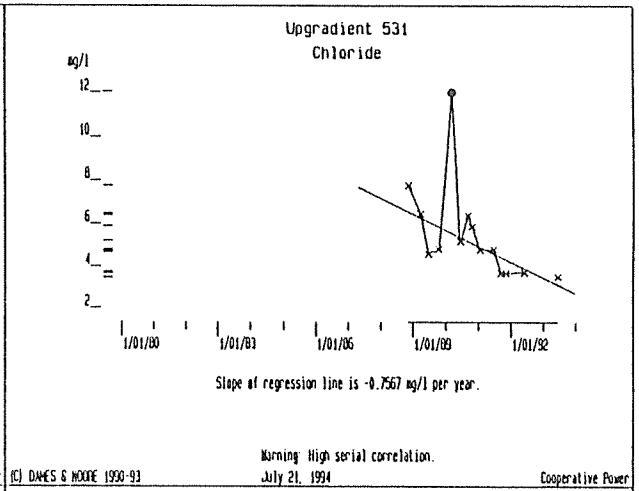
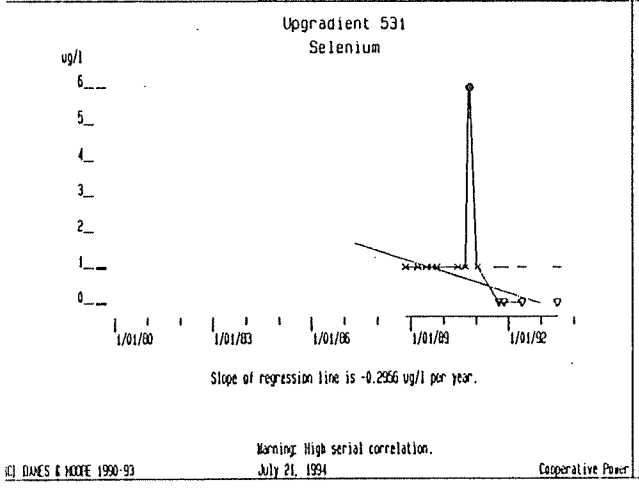
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power


Upgradient 531
Chloride
ug/l
12
10
8
6
4
2
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.7567 ug/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power


Upgradient 531
Selenium
ug/l
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5
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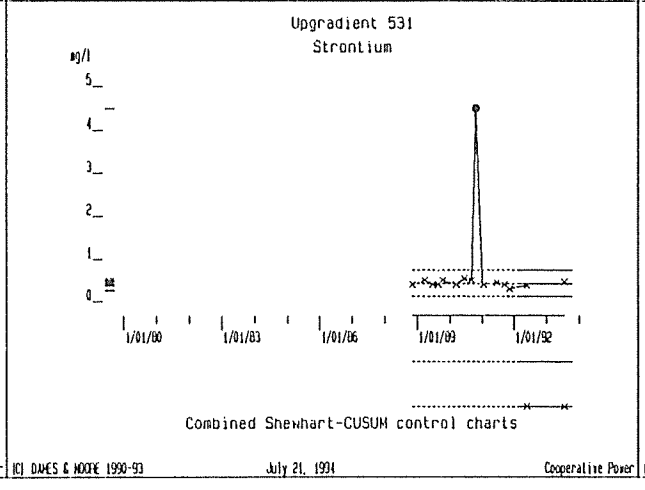
3
2
1
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.2956 ug/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power


Upgradient 531
Strontium
ug/l
5
4
3
2
1
0
1/01/80
1/01/83
1/01/86
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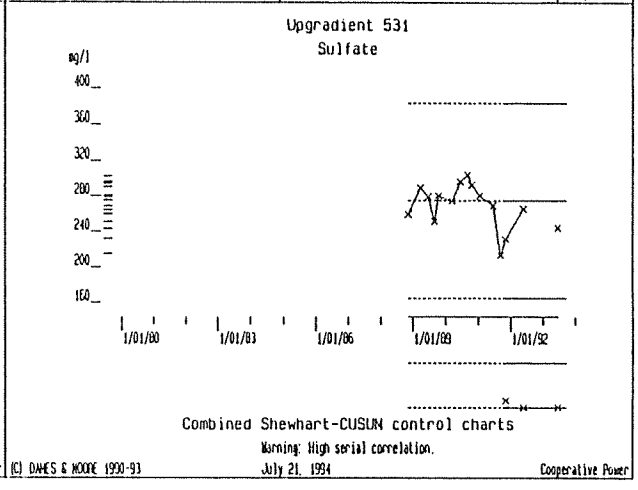
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power


Upgradient 531
Sulfate
ug/l
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360
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280
240
200
160
1/01/80
1/01/83
1/01/86
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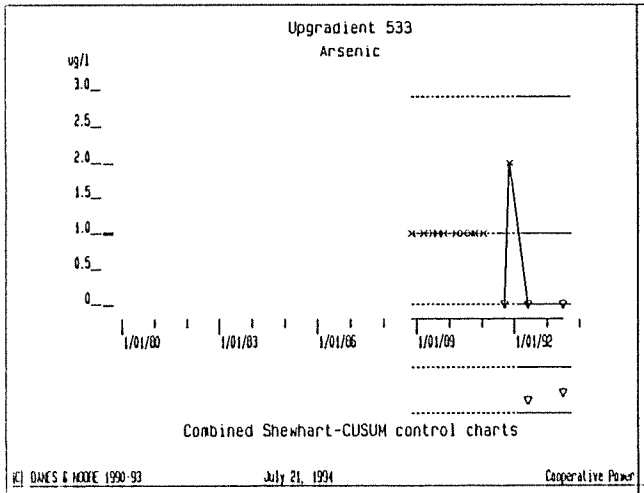
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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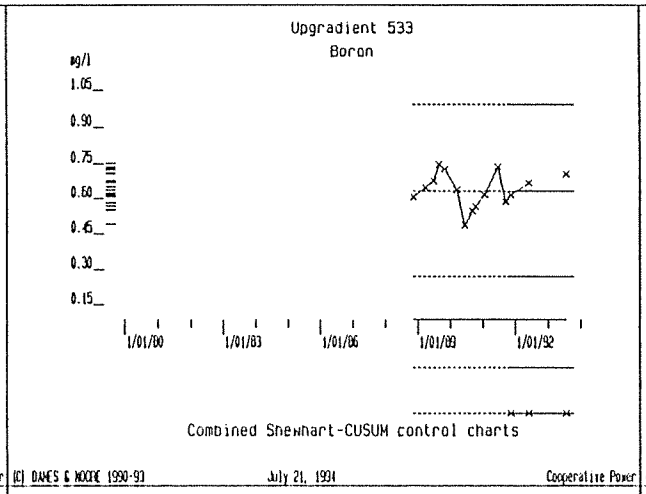
Arsenic
ug/l
3.0
2.5
2.0
1.5
1.0
0.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAVIES & MOORE 1990-93
July 21, 1994
Cooperative Power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Boron
mg/l
1.05
0.90
0.75
0.60
0.45
0.30
0.15
1/01/80
1/01/83
1/01/86
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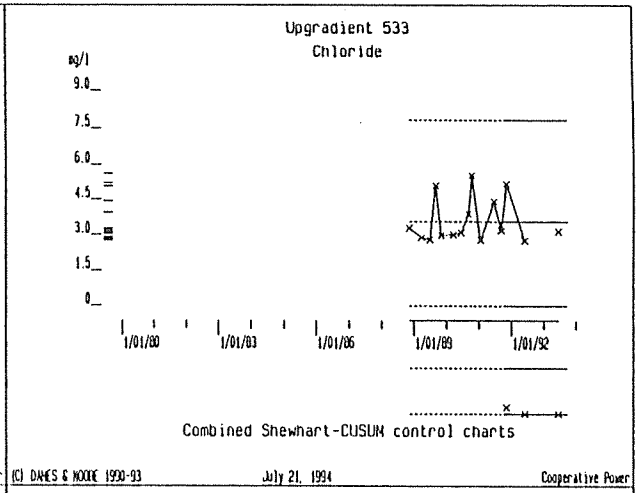
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAVIES & MOORE 1990-93
July 21, 1994
Cooperative Power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Chloride
mg/l
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7.5
6.0
4.5
3.0
1.5
0
1/01/80
1/01/83
1/01/86
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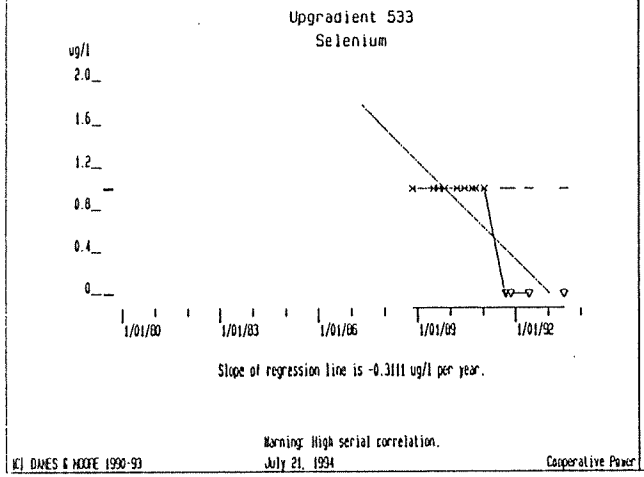
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAVIES & MOORE 1990-93
July 21, 1994
Cooperative Power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Selenium
ug/l
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1.6
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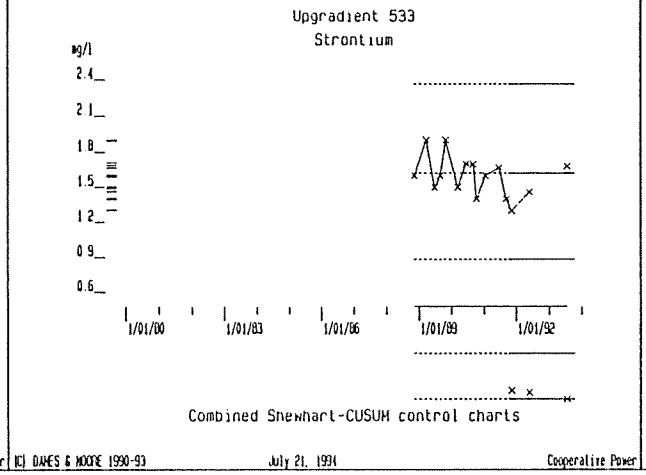
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.3111 ug/l per year.
Warning: High serial correlation.
(C) DAVIES & MOORE 1990-93
July 21, 1994
Cooperative Power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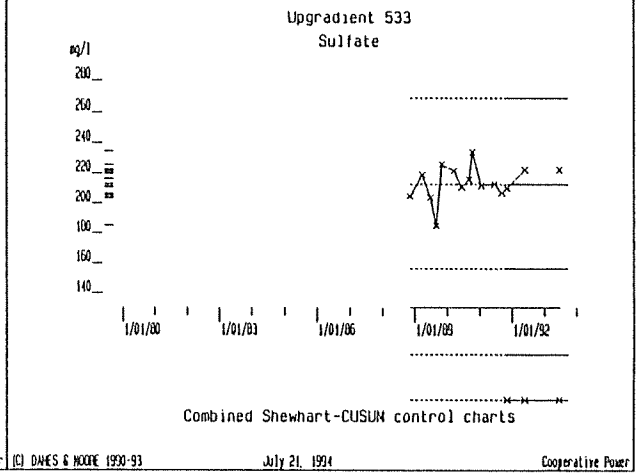
Strontium
mg/l
2.4
2.1
1.8
1.5
1.2
0.9
0.6
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAVIES & MOORE 1990-93
July 21, 1994
Cooperative Power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Sulfate
mg/l
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140
1/01/80
1/01/83
1/01/86
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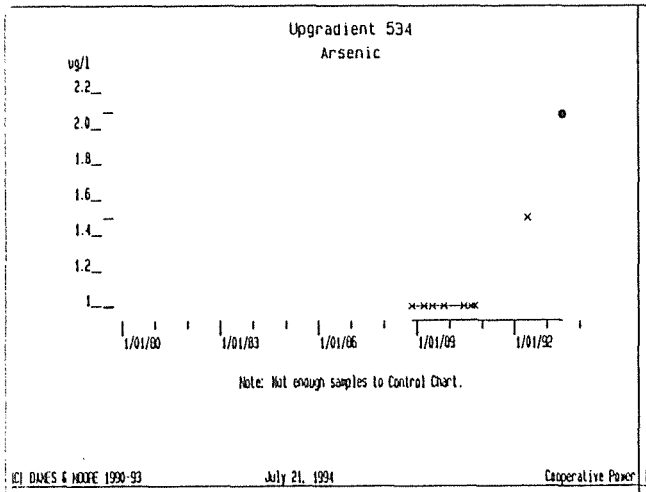
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAVIES & MOORE 1990-93
July 21, 1994
Cooperative Power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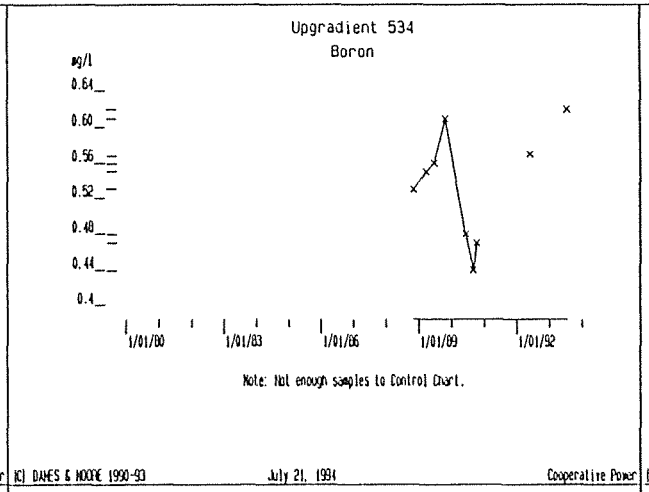
Arsenic
ug/l
2.2
2.0
1.8
1.6
1.4
1.2
1
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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Boron
ug/l
0.64
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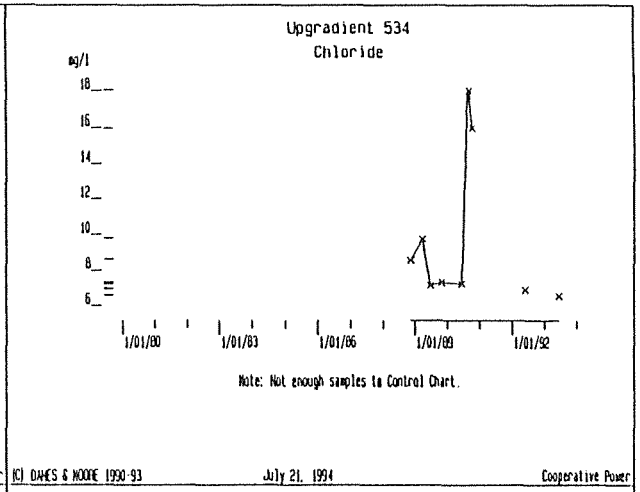
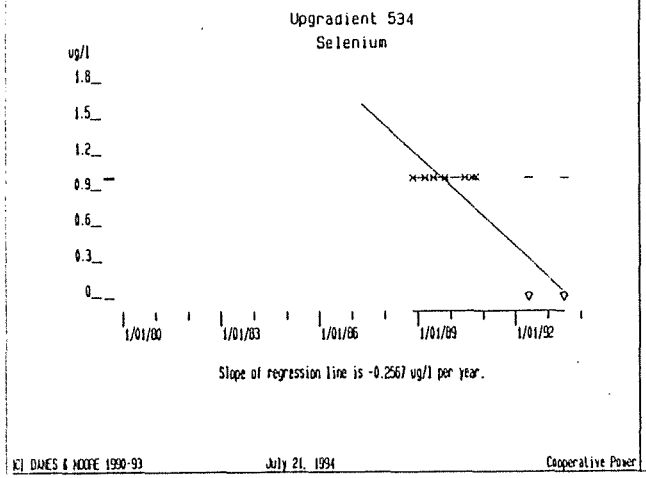
0.56
0.52
0.48
0.44
0.4
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power


Upgradient 534
Chloride
ug/l
18
16
14
12
10
8
6
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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ug/l
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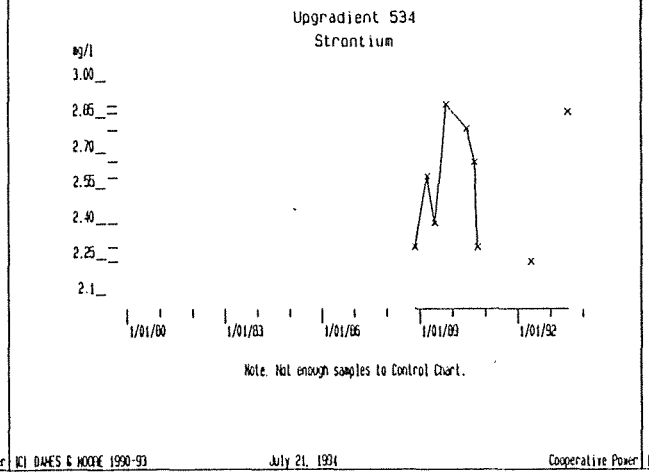
1.5
1.2
0.9
0.6
0.3
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.2567 ug/l per year.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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Strontium
ug/l
3.00
2.85
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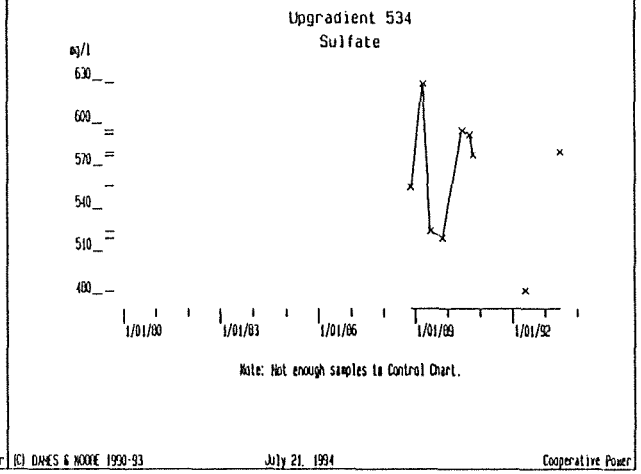
2.55
2.40
2.25
2.1
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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Sulfate
ug/l
630
600
570
540
510
480
1/01/80
1/01/83
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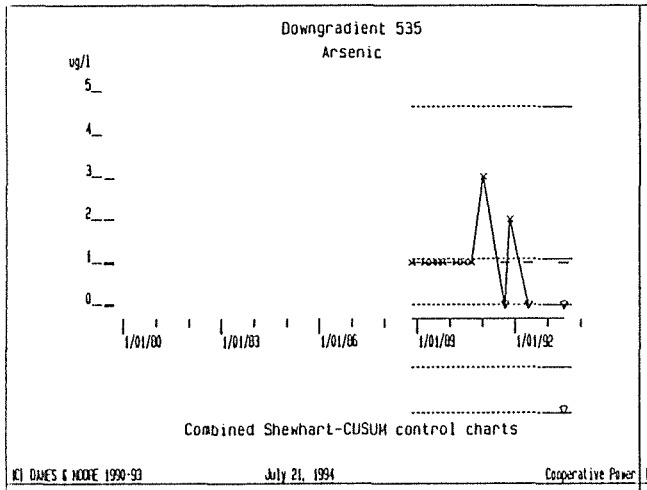
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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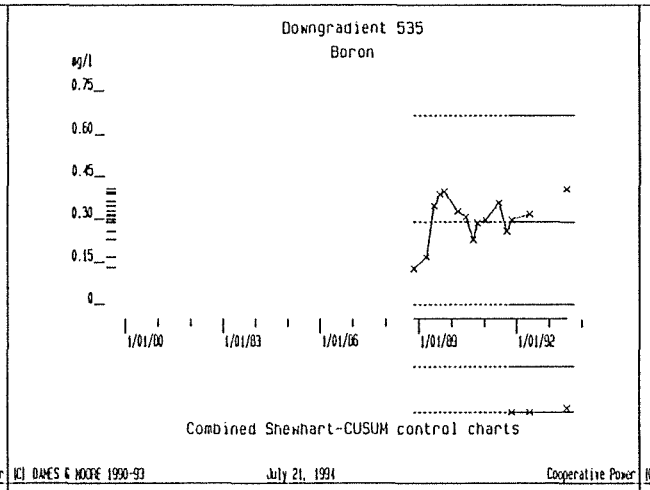
Arsenic
ug/l
5
4
3
2
1
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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Boron
ug/l
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0.45
0.30
0.15
0
1/01/80
1/01/83
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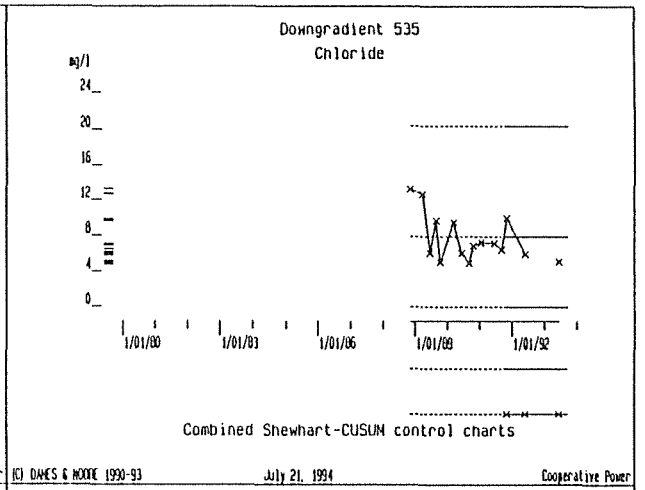
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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Chloride
ug/l
24
20
16
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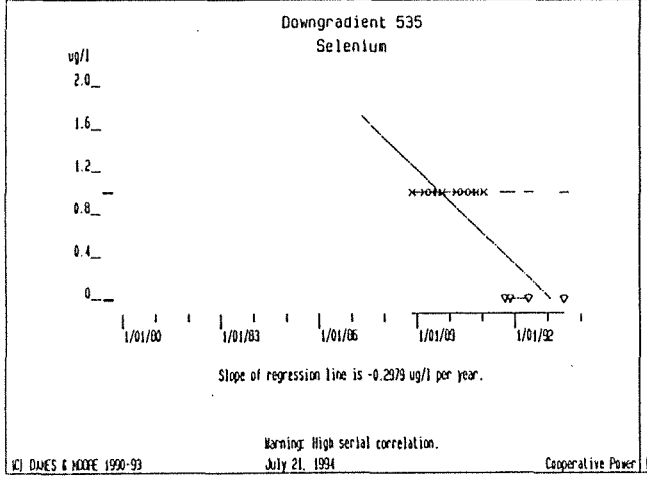
8
4
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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Selenium
ug/l
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1.6
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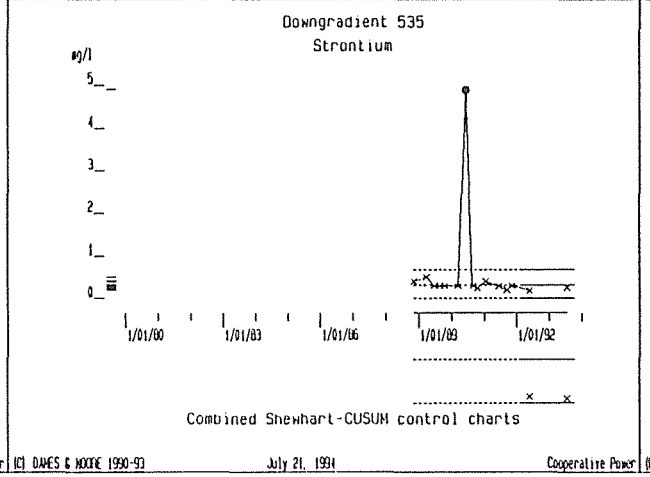
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.2979 ug/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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Strontium
ug/l
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4
3
2
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1/01/80
1/01/83
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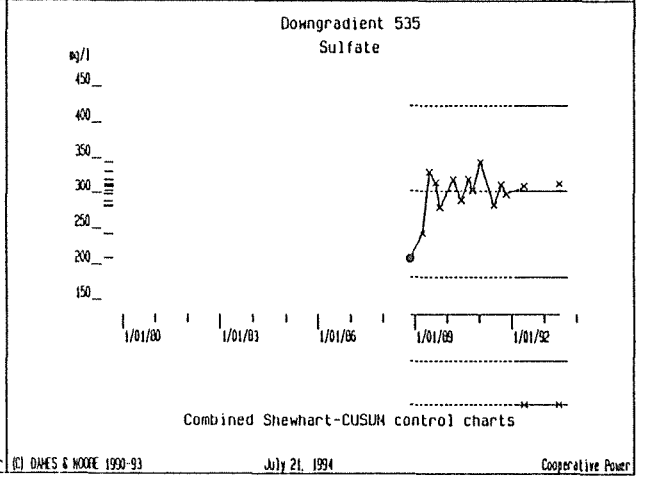
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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Sulfate
ug/l
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300
250
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150
1/01/80
1/01/83
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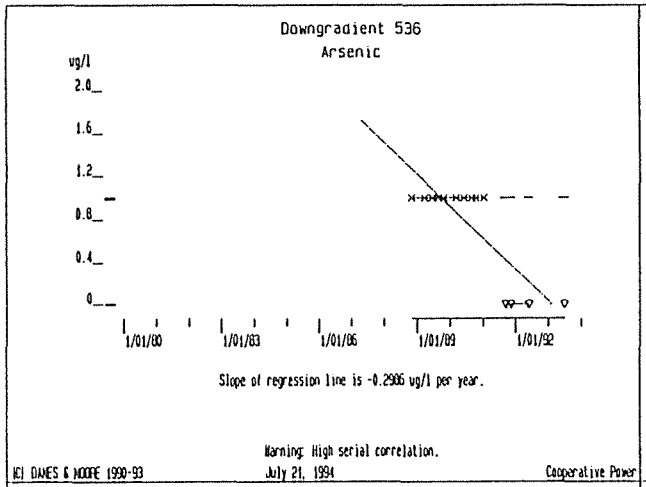
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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Arsenic
ug/l
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1/01/80
1/01/83
1/01/86
1/01/89
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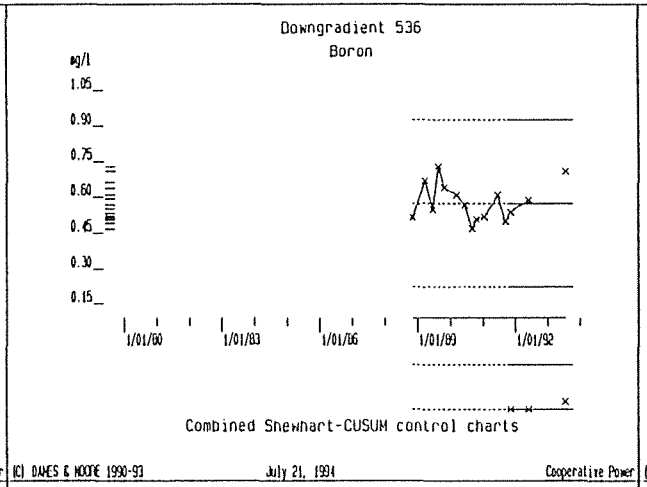
Slope of regression line is -0.2986 ug/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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ug/l
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1/01/80
1/01/83
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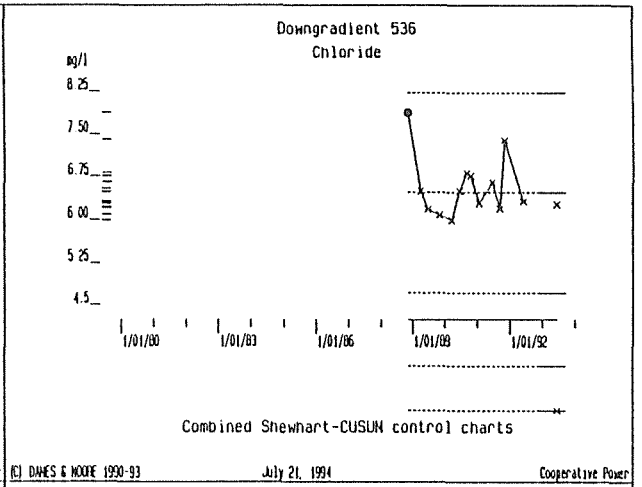
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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Chloride
ug/l
8.25
7.50
6.75
6.00
5.25
4.5
1/01/80
1/01/83
1/01/86
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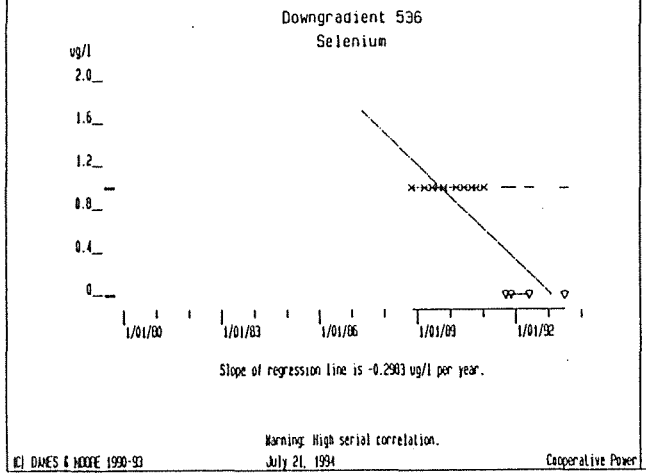
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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Selenium
ug/l
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1.6
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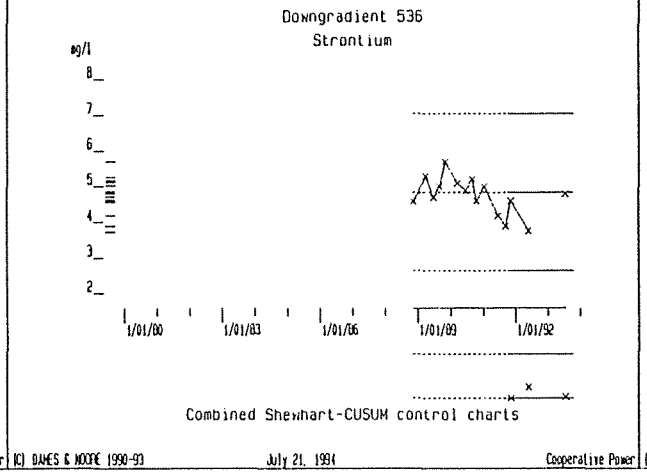
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.2983 ug/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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Strontium
ug/l
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5
4
3
2
1/01/80
1/01/83
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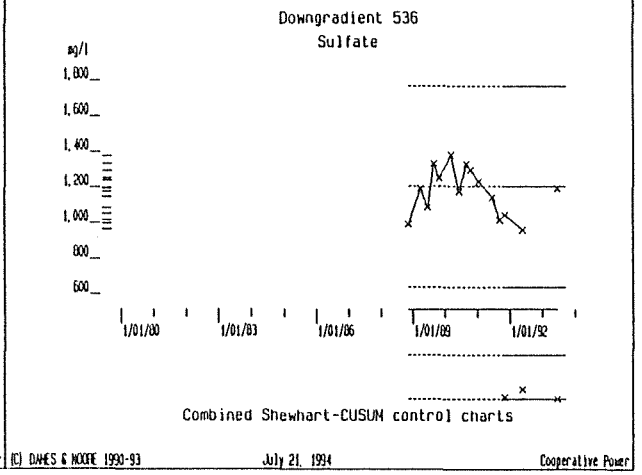
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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ug/l
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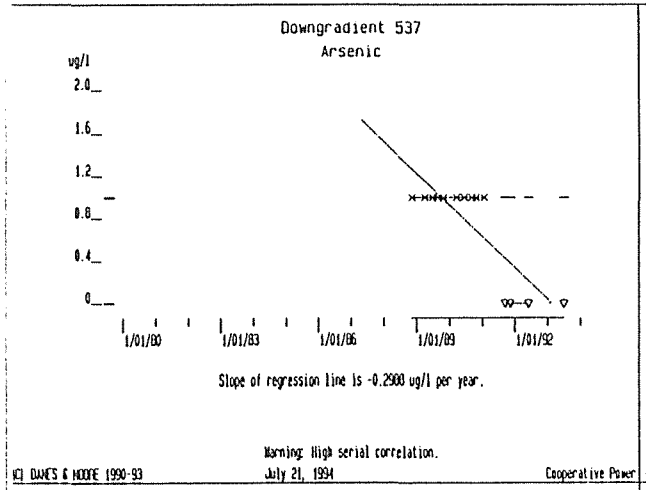
1,200
1,000
800
600
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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Arsenic
ug/l
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1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
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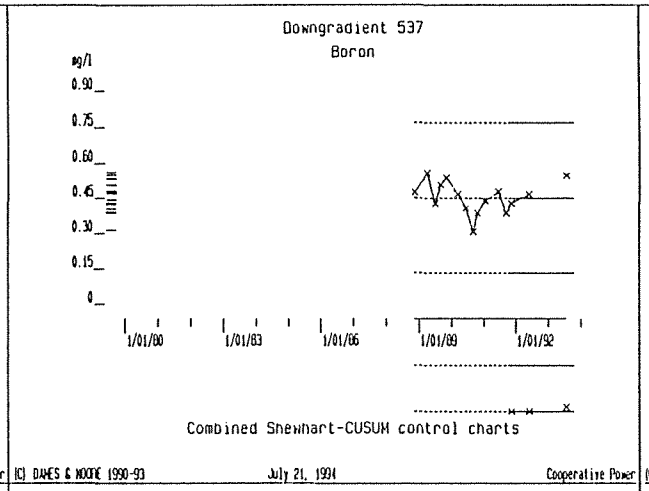
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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ug/l
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1/01/80
1/01/83
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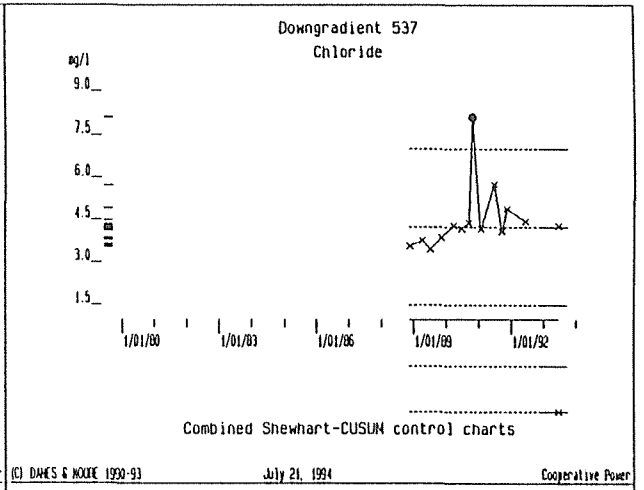
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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Chloride
ug/l
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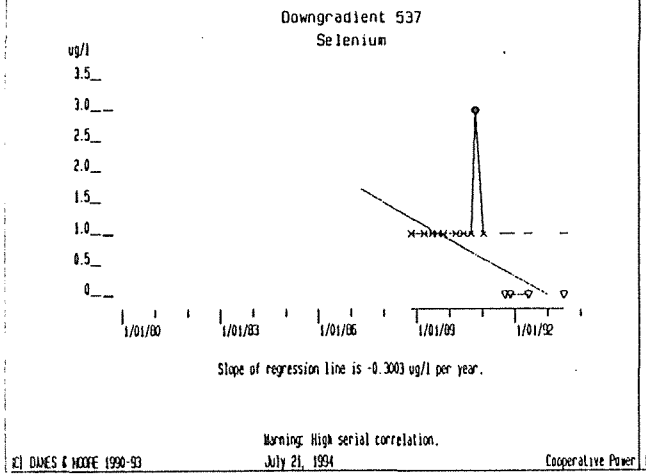
7.5
6.0
4.5
3.0
1.5
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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Selenium
ug/l
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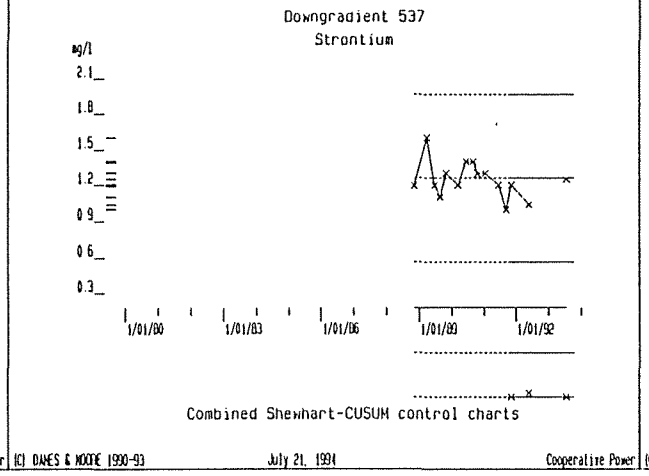
2.5
2.0
1.5
1.0
0.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.3003 ug/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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ug/l
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1.5
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0.3
1/01/80
1/01/83
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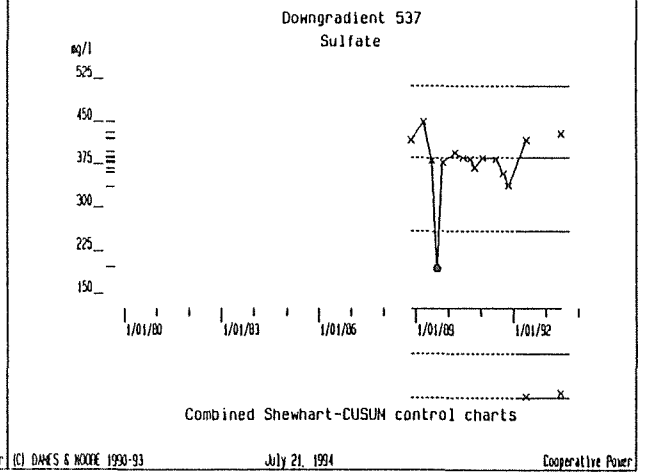
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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Sulfate
ug/l
525
450
375
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225
150
1/01/80
1/01/83
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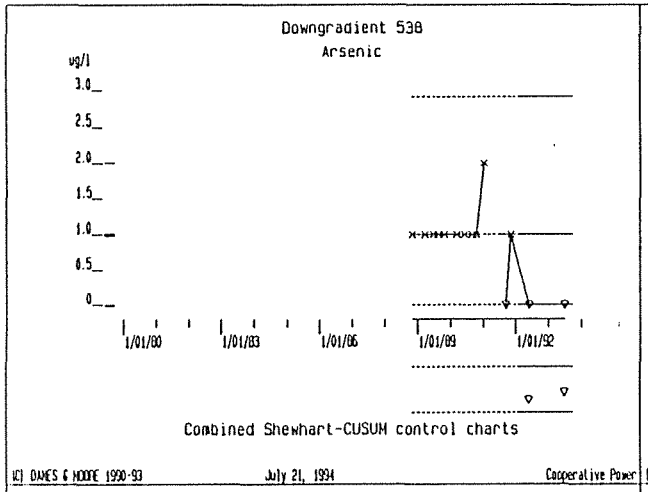
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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ug/l
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1.0
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1/01/80
1/01/83
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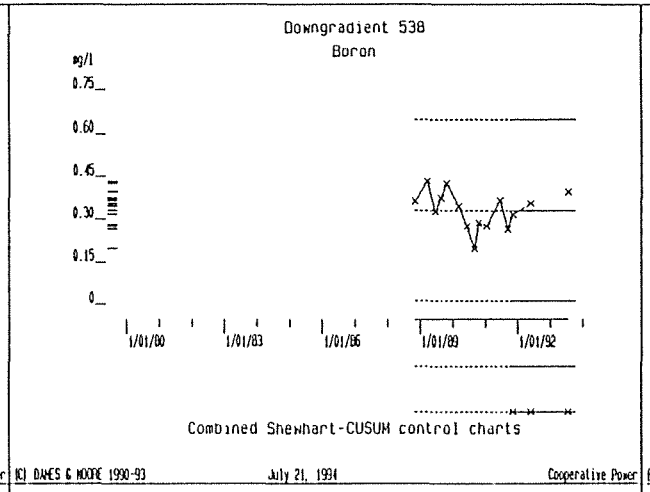
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAVES & MOORE 1990-93
July 21, 1994
Cooperative Power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ug/l
0.75
0.60
0.45
0.30
0.15
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1/01/83
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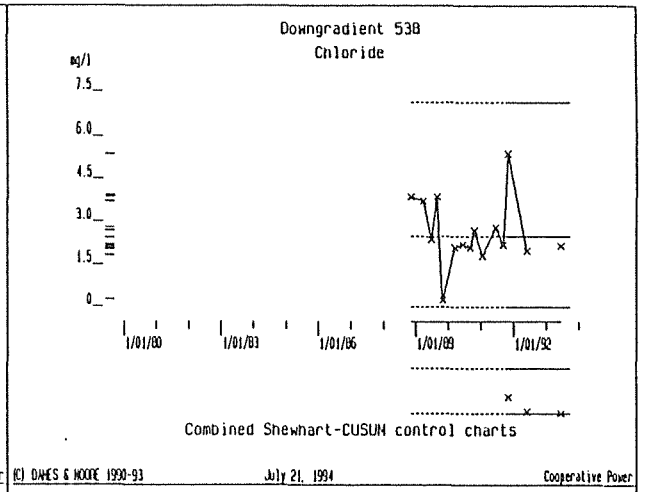
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAVES & MOORE 1990-93
July 21, 1994
Cooperative Power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Chloride
ug/l
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6.0
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3.0
1.5
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1/01/80
1/01/83
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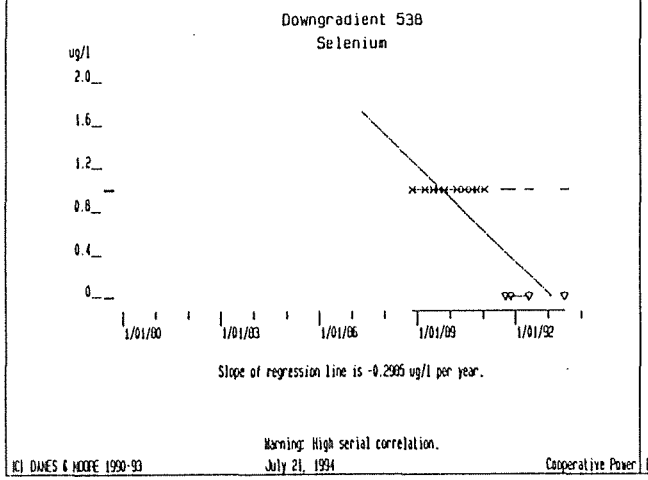
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAVES & MOORE 1990-93
July 21, 1994
Cooperative Power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Selenium
ug/l
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1.6
1.2
0.8
0.4
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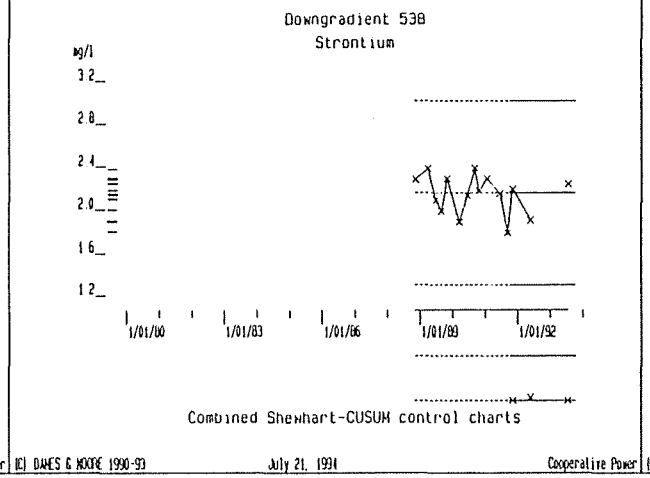
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.2995 ug/l per year.
Warning: High serial correlation.
(C) DAVES & MOORE 1990-93
July 21, 1994
Cooperative Power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Strontium
ug/l
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2.4
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1.6
1.2
1/01/80
1/01/83
1/01/86
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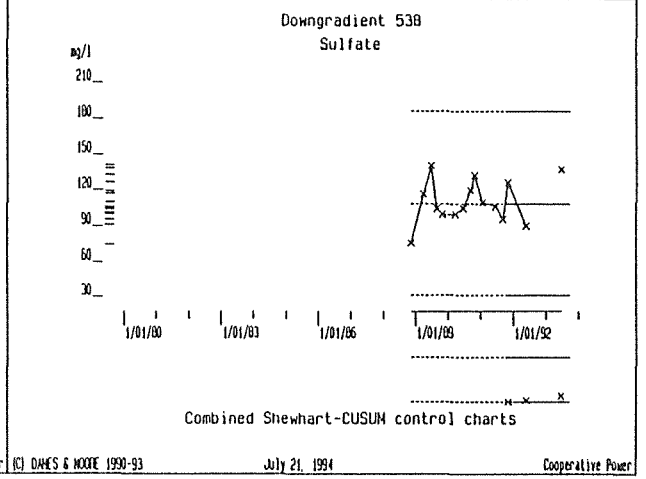
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAVES & MOORE 1990-93
July 21, 1994
Cooperative Power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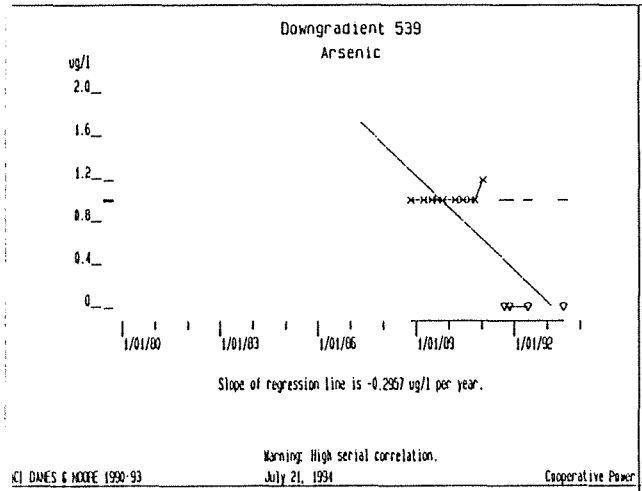
Sulfate
ug/l
210
180
150
120
90
60
30
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAVES & MOORE 1990-93
July 21, 1994
Cooperative Power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Arsenic
ug/l
2.0
1.6
1.2
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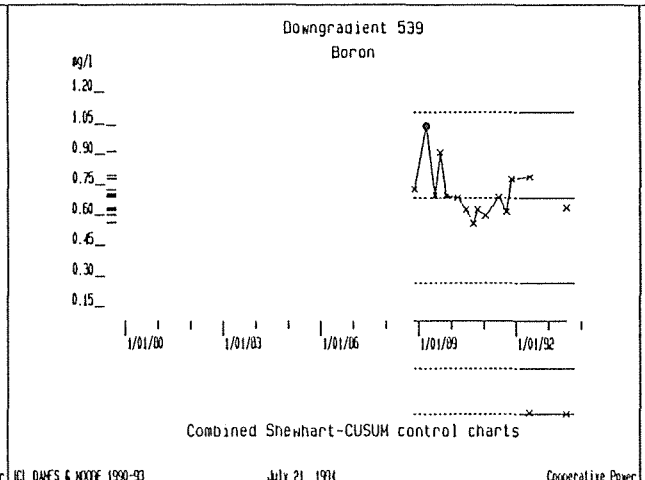
0.4
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.2957 ug/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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Boron
ug/l
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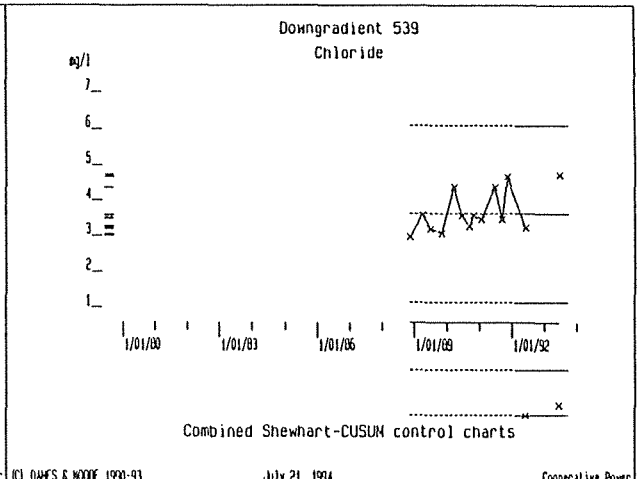
1.05
0.90
0.75
0.60
0.45
0.30
0.15
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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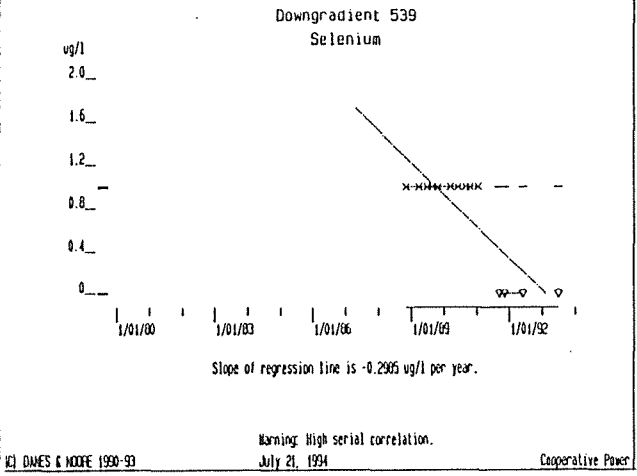
Chloride
ug/l
7
6
5
4
3
2
1
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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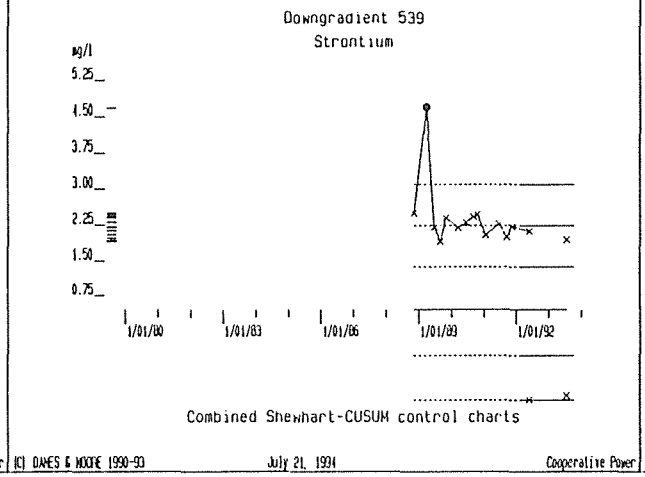
Selenium
ug/l
2.0
1.6
1.2
0.8
0.4
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.2905 ug/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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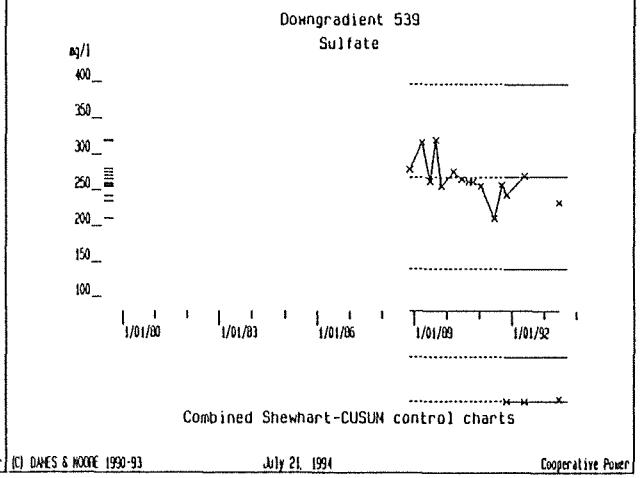
Strontium
ug/l
5.25
4.50
3.75
3.00
2.25
1.50
0.75
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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Sulfate
ug/l
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350
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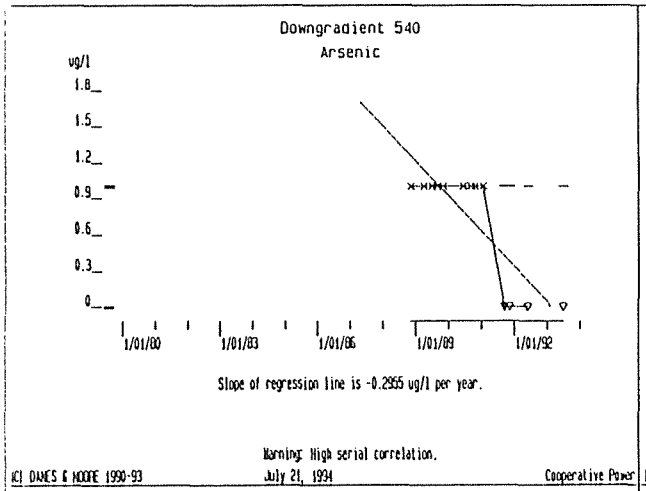
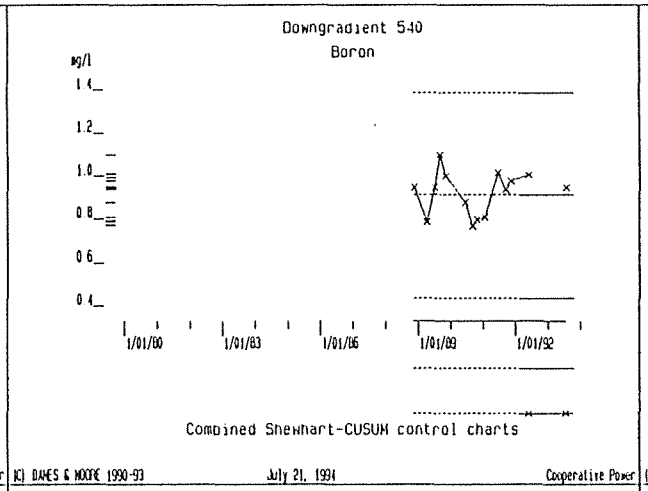
250
200
150
100
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power


Downgradient 540
Arsenic
ug/l
1.8
1.5
1.2
0.9
0.6
0.3
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.2955 ug/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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Boron
mg/l
1.4
1.2
1.0
0.8
0.6
0.4
1/01/80
1/01/83
1/01/86
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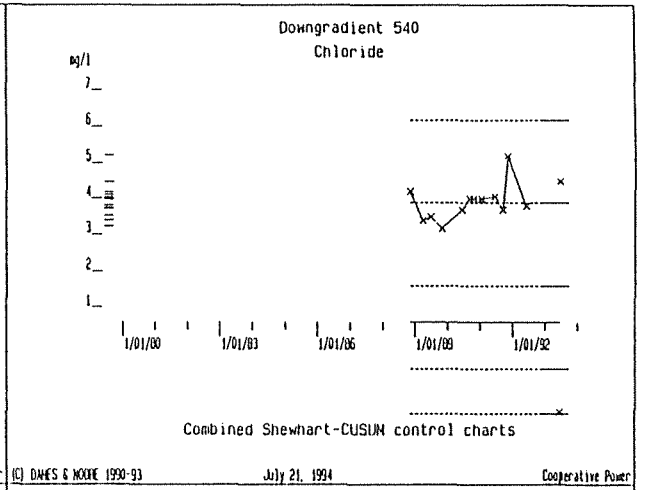
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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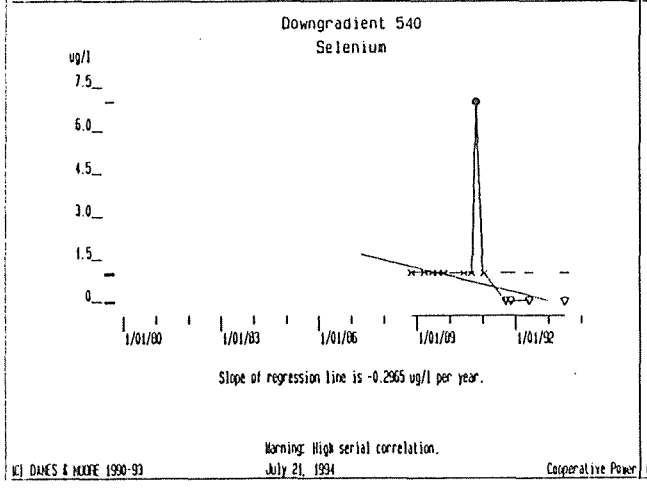
Chloride
mg/l
7
6
5
4
3
2
1
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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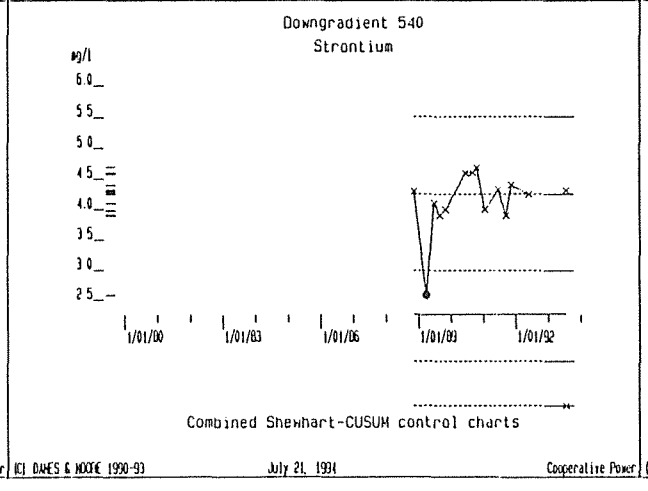
Selenium
ug/l
7.5
6.0
4.5
3.0
1.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.2965 ug/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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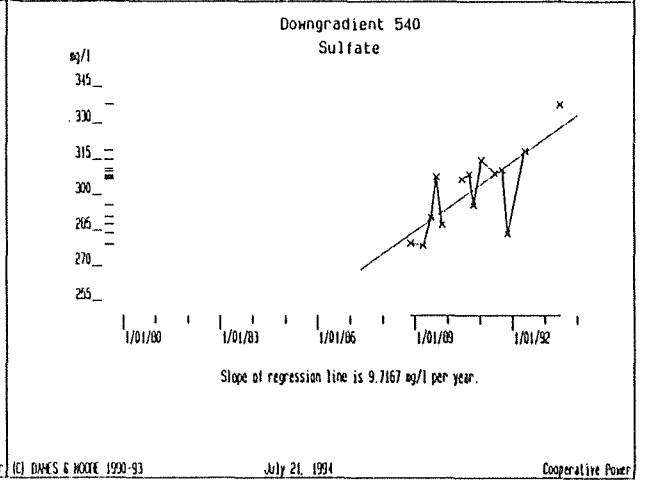
Strontium
mg/l
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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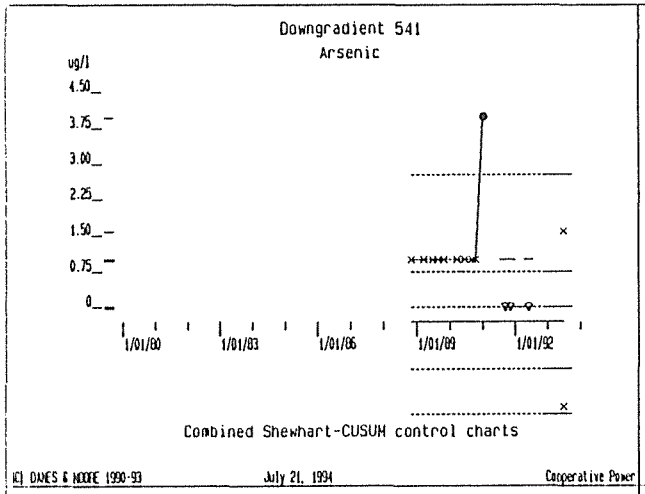
Sulfate
mg/l
345
330
315
300
285
270
255
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 9.7167 mg/l per year.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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Arsenic
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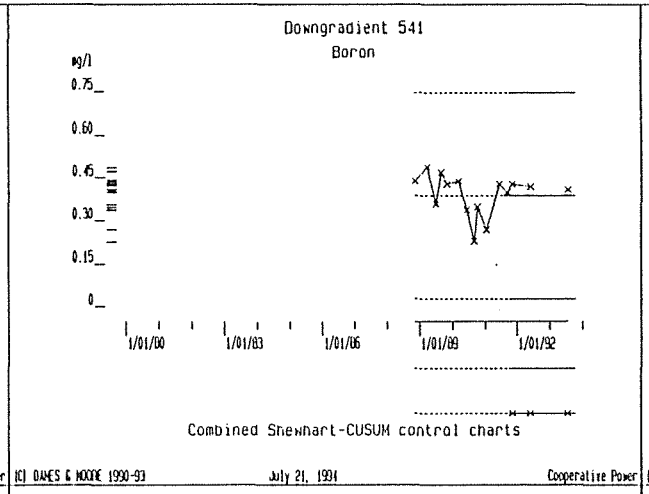
3.75
3.00
2.25
1.50
0.75
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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Boron
mg/l
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0.30
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1/01/80
1/01/83
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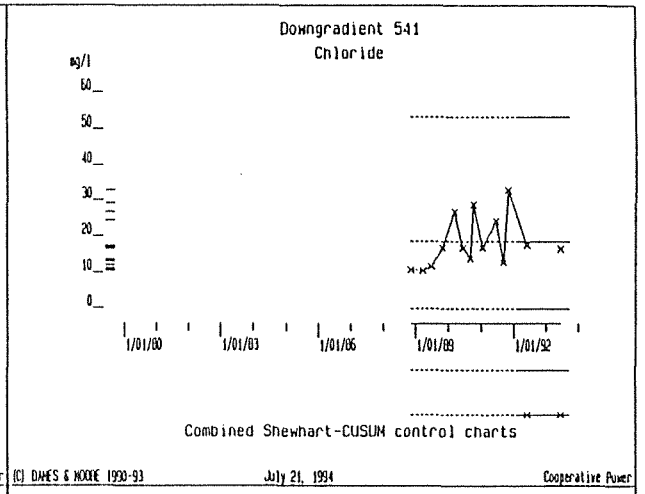
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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Chloride
mg/l
60
50
40
30
20
10
0
1/01/80
1/01/83
1/01/86
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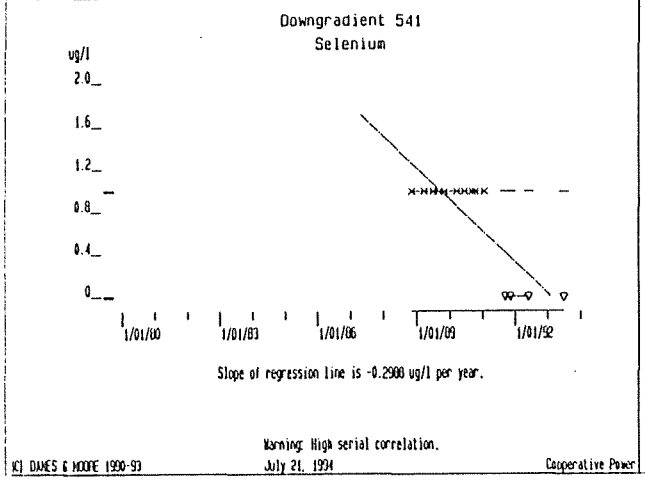
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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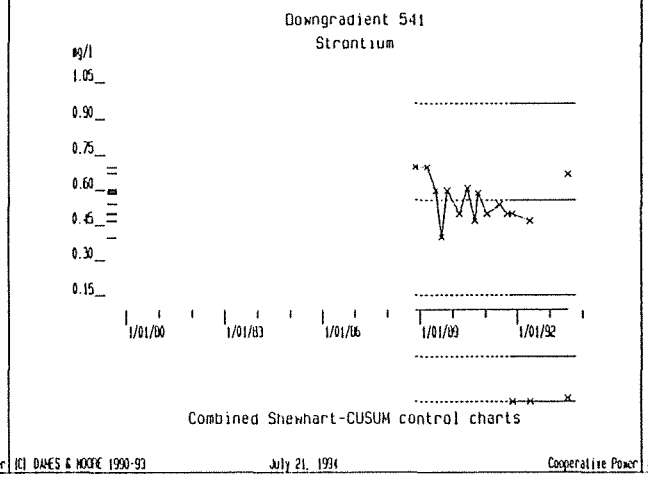
Selenium
ug/l
2.0
1.6
1.2
0.8
0.4
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.2900 ug/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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Strontium
mg/l
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0.90
0.75
0.60
0.45
0.30
0.15
1/01/80
1/01/83
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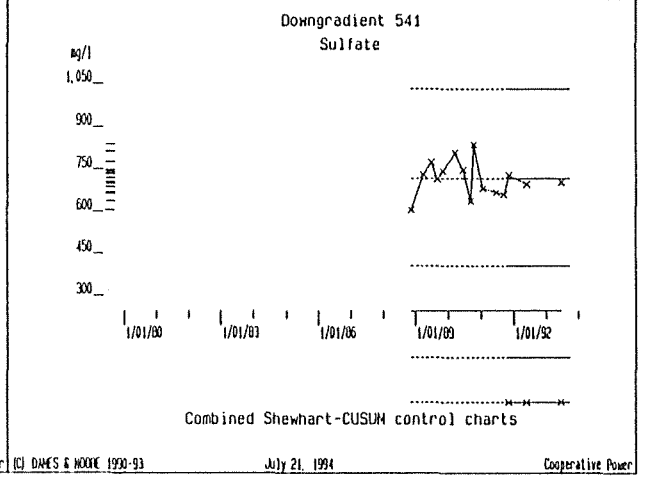
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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Sulfate
mg/l
1,050
900
750
600
450
300
1/01/80
1/01/83
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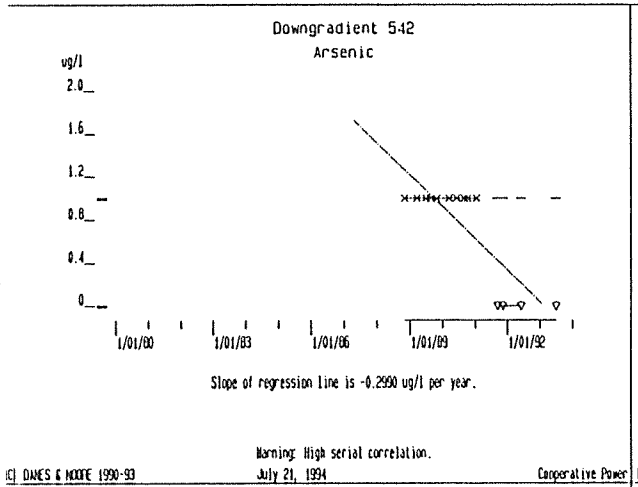
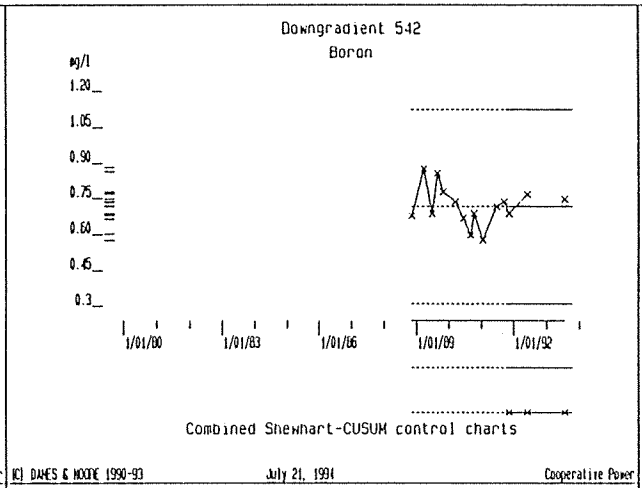
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power


Downgradient 542
Arsenic
ug/l
2.0
1.6
1.2
0.8
0.4
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.2990 ug/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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Boron
mg/l
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1.05
0.90
0.75
0.60
0.45
0.3
1/01/80
1/01/83
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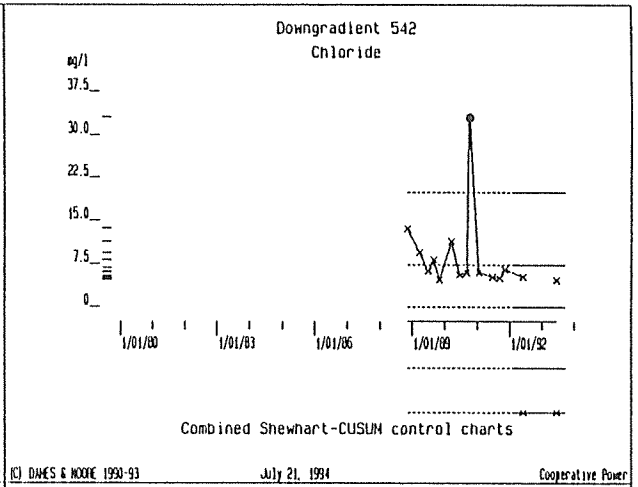
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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Chloride
mg/l
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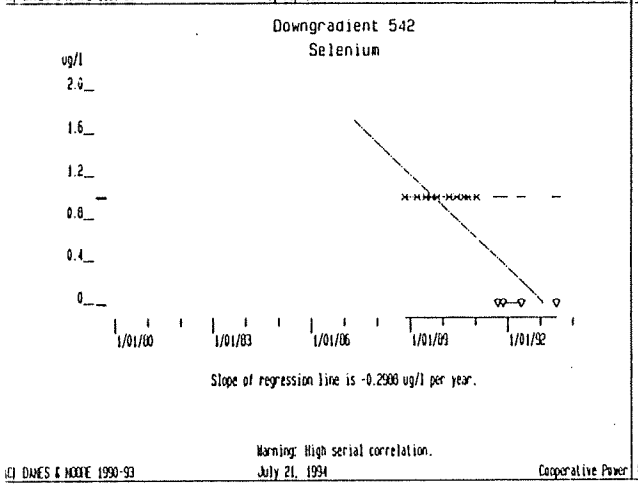
22.5
15.0
7.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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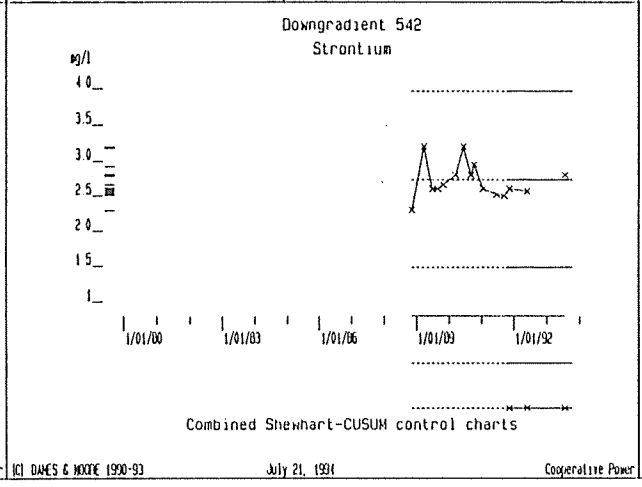
Selenium
ug/l
2.0
1.6
1.2
0.8
0.4
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.2908 ug/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power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Strontium
mg/l
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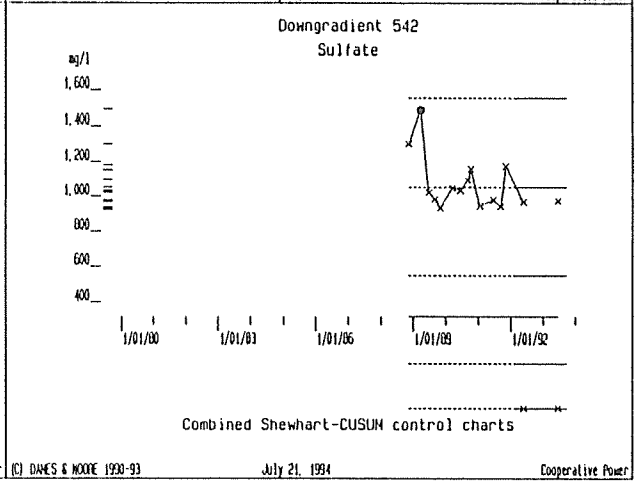
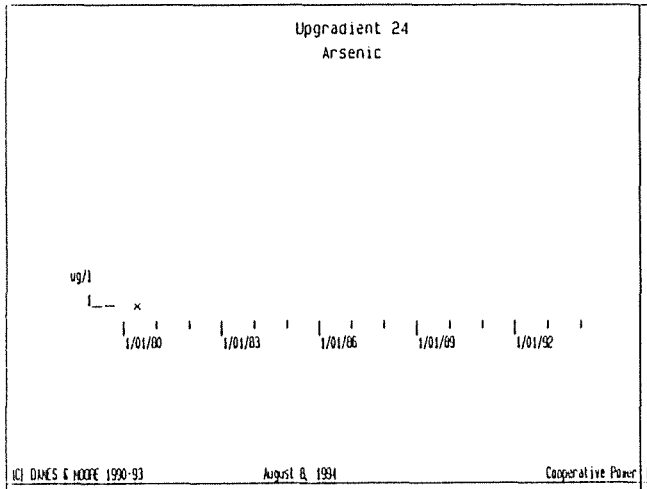
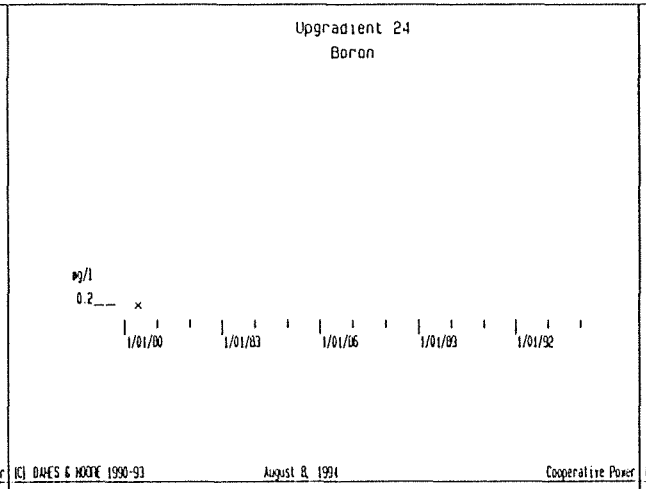
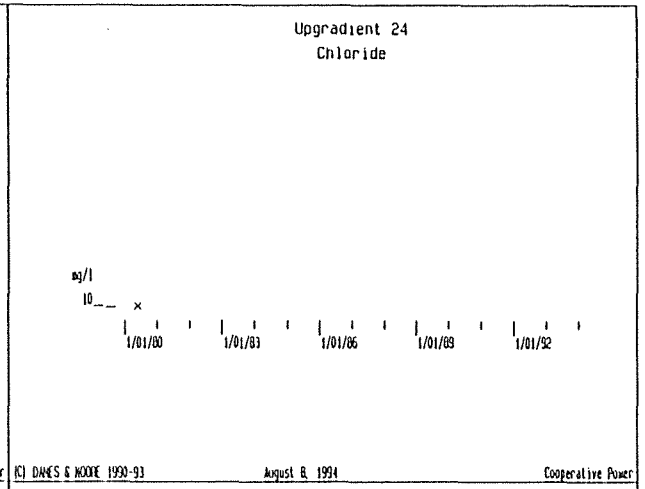
3.0
2.5
2.0
1.5
1
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power


Downgradient 542
Sulfate
mg/l
1,600
1,400
1,200
1,000
800
600
400
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
July 21, 1994
Cooperative Power


Upgradient 24
Arsenic
ug/l
1
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power


Upgradient 24
Boron
mg/l
0.2
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power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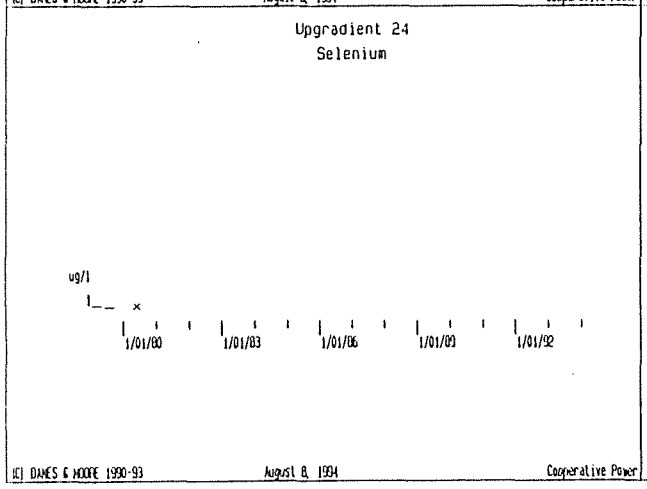
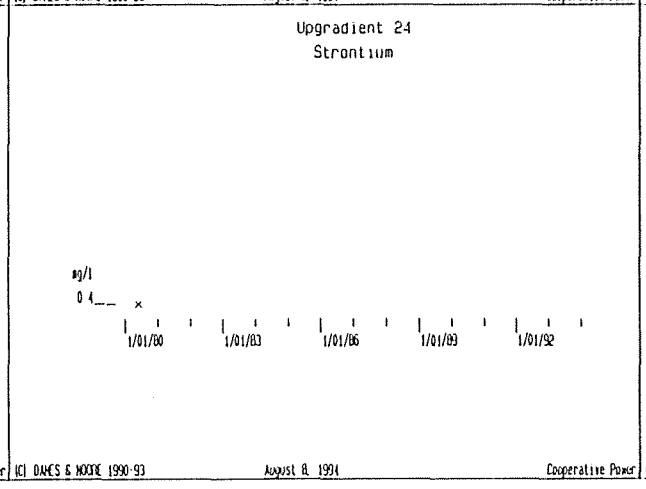
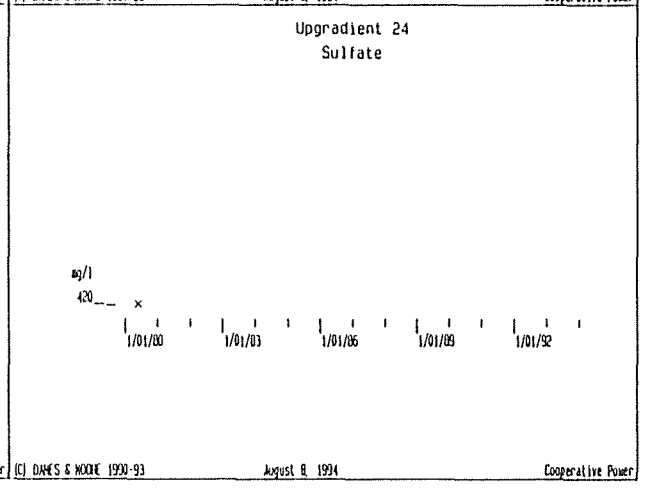
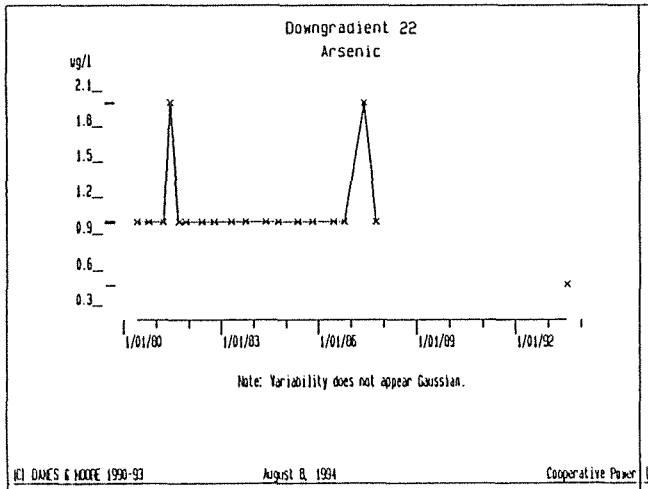
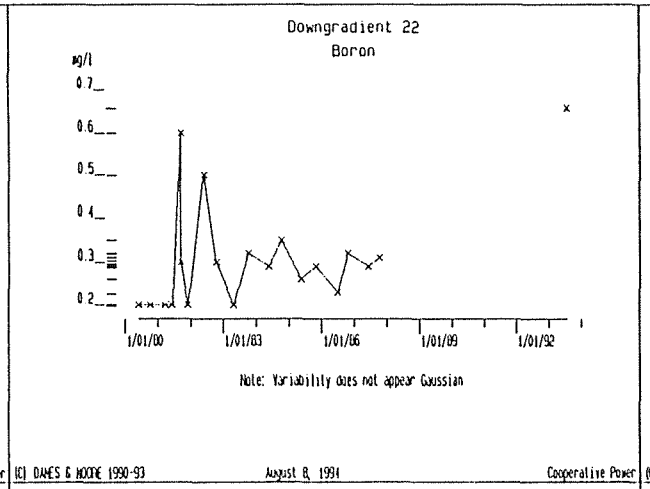
Chloride
mg/l
10
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

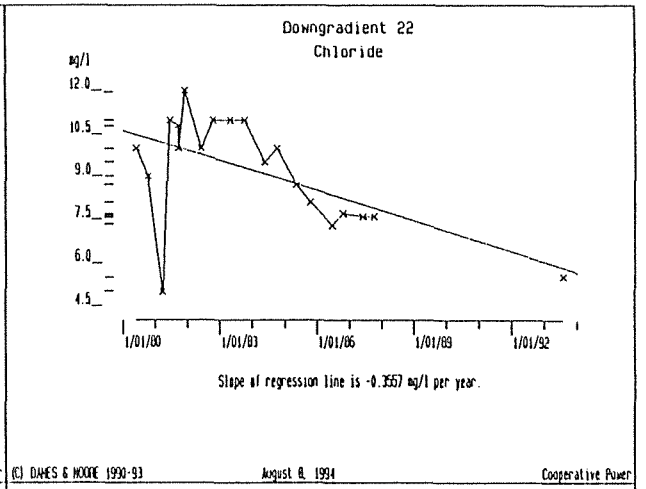

Upgradient 24
Selenium
ug/l
1
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

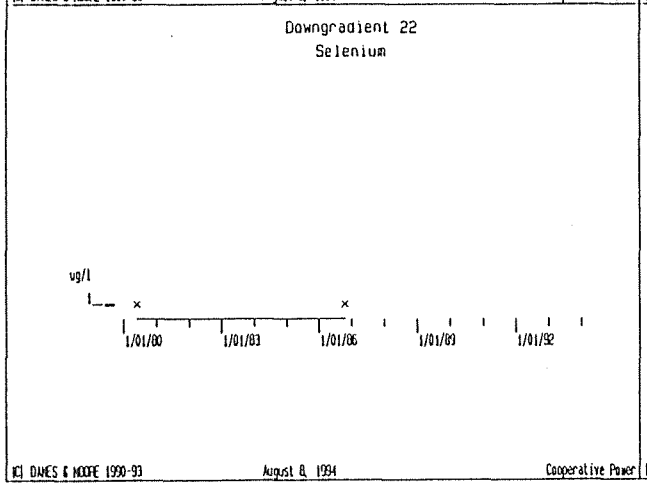

Upgradient 24
Strontium
mg/l
0.4
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

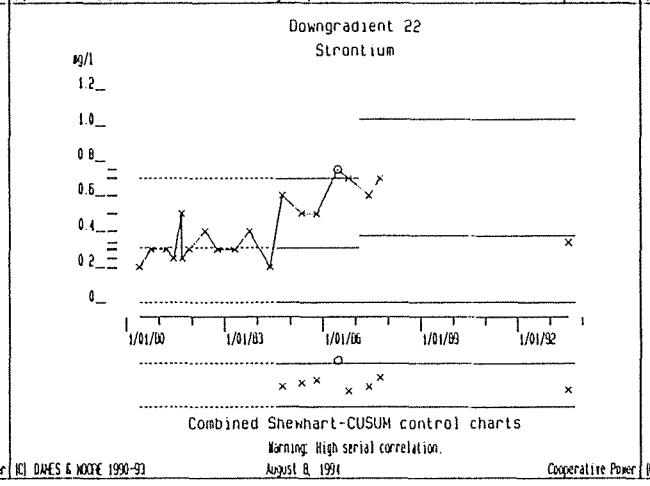

Upgradient 24
Sulfate
mg/l
420
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

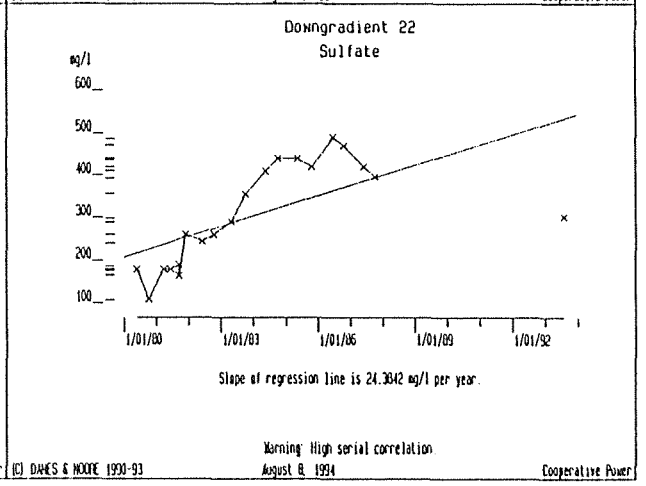

Downgradient 22
Arsenic
ug/l
2.1
1.8
1.5
1.2
0.9
0.6
0.3
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Variability does not appear Gaussian.
(C) DAVIES & MOORE 1990-93
August 8, 1994
Cooperative Power

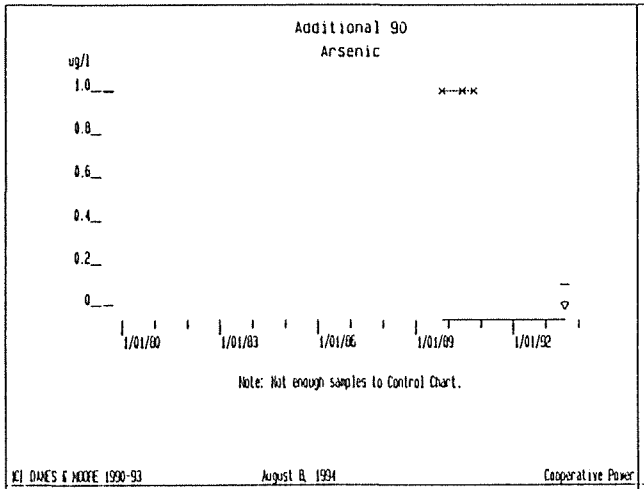

Downgradient 22
Boron
ug/l
0.7
0.6
0.5
0.4
0.3
0.2
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Variability does not appear Gaussian
(C) DAVIES & MOORE 1990-93
August 8, 1994
Cooperative Power

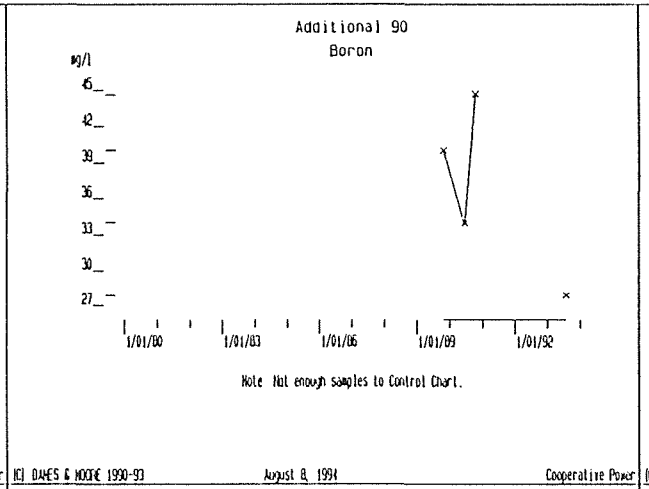

Downgradient 22
Chloride
mg/l
12.0
10.5
9.0
7.5
6.0
4.5
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.3557 mg/l per year.
(C) DAVIES & MOORE 1990-93
August 8, 1994
Cooperative Power

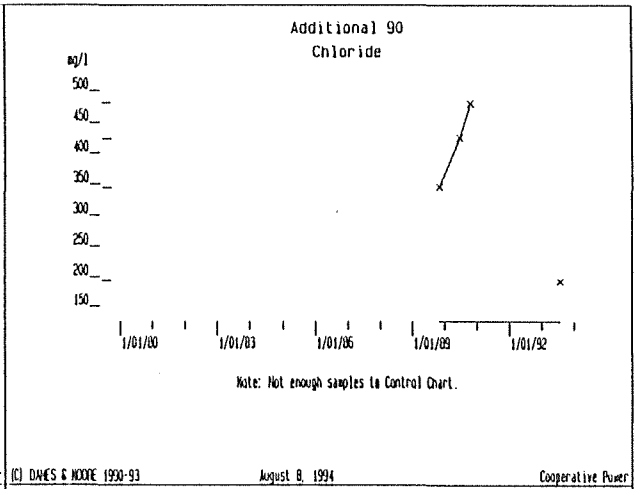

Downgradient 22
Selenium
ug/l
1
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAVIES & MOORE 1990-93
August 8, 1994
Cooperative Power

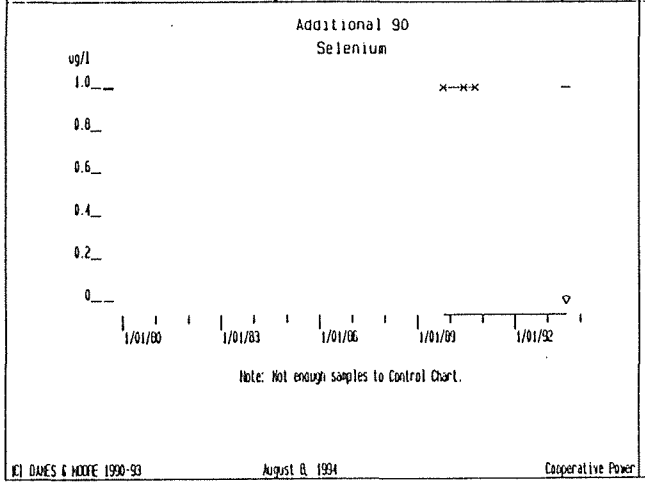

Downgradient 22
Strontium
mg/l
1.2
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DAVIES & MOORE 1990-93
August 8, 1994
Cooperative Power

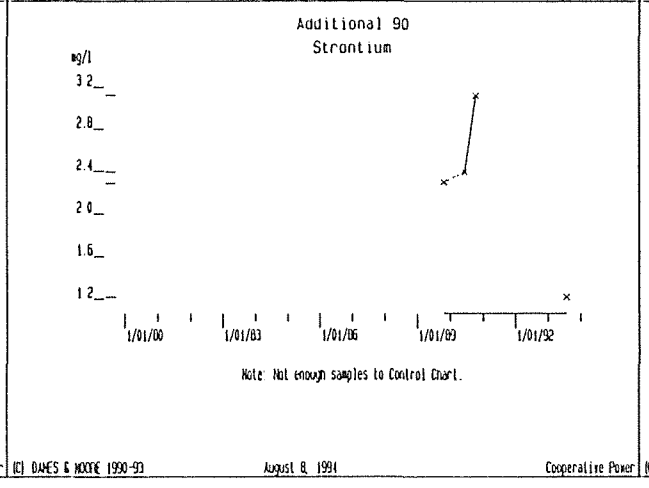

Downgradient 22
Sulfate
mg/l
600
500
400
300
200
100
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 24.3842 mg/l per year.
Warning: High serial correlation
(C) DAVIES & MOORE 1990-93
August 8, 1994
Cooperative Power

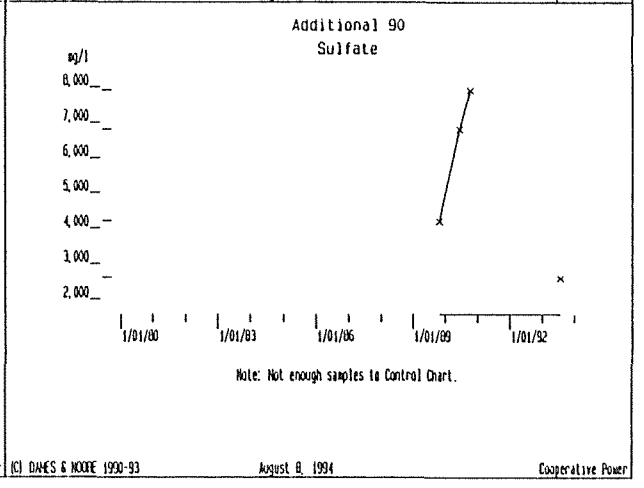

Additional 90
Arsenic
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

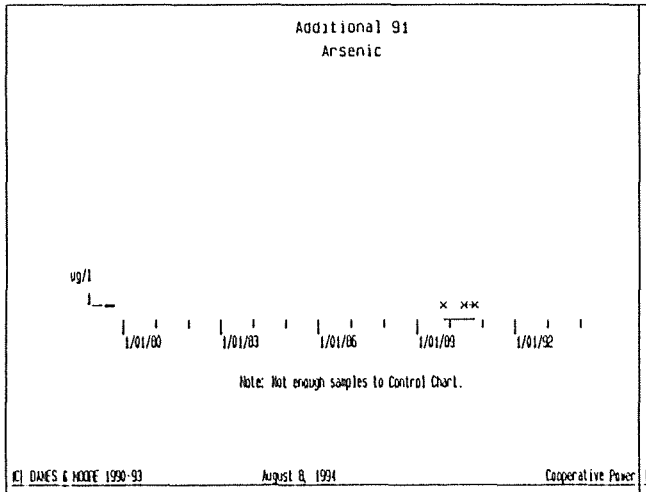

Additional 90
Boron
mg/l
45
42
39
36
33
30
27
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

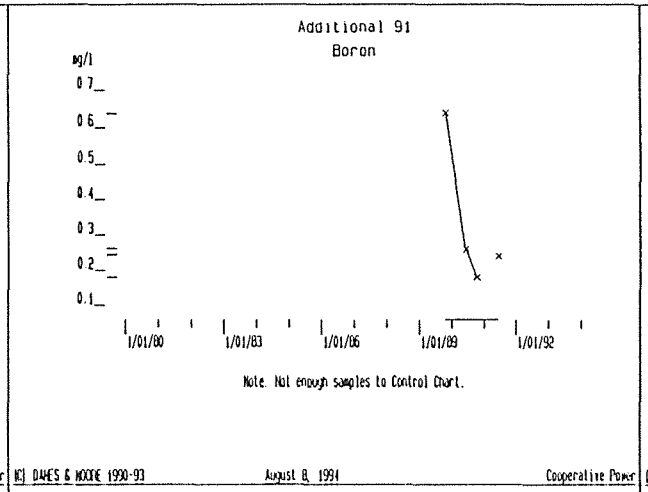

Additional 90
Chloride
mg/l
500
450
400
350
300
250
200
150
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

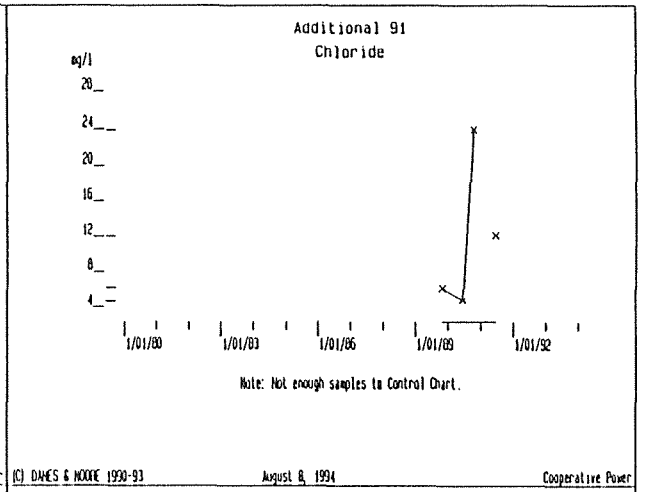

Additional 90
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

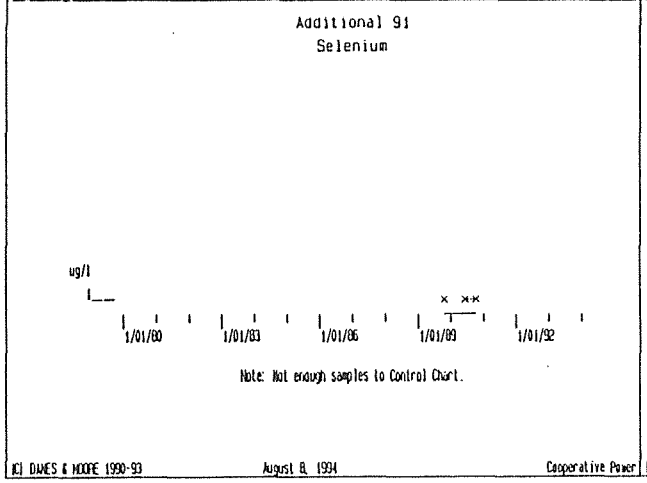

Additional 90
Strontium
mg/l
3.2
2.8
2.4
2.0
1.6
1.2
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

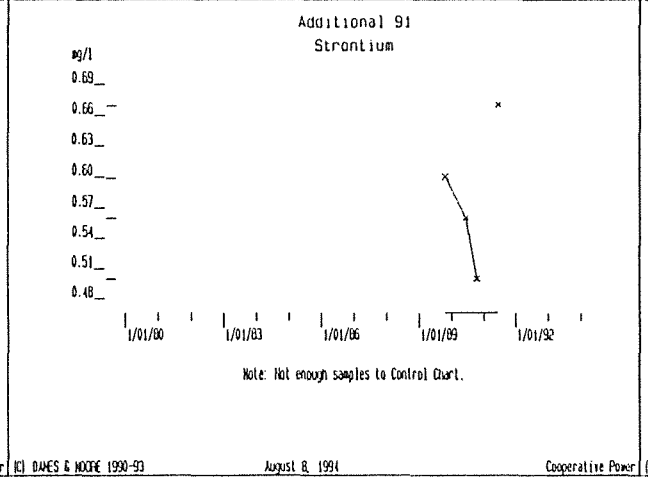

Additional 90
Sulfate
mg/l
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

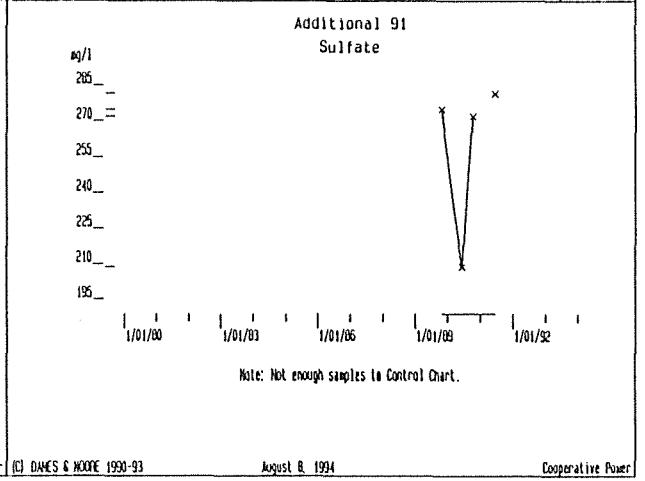

Additional 91
Arsenic
ug/l
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

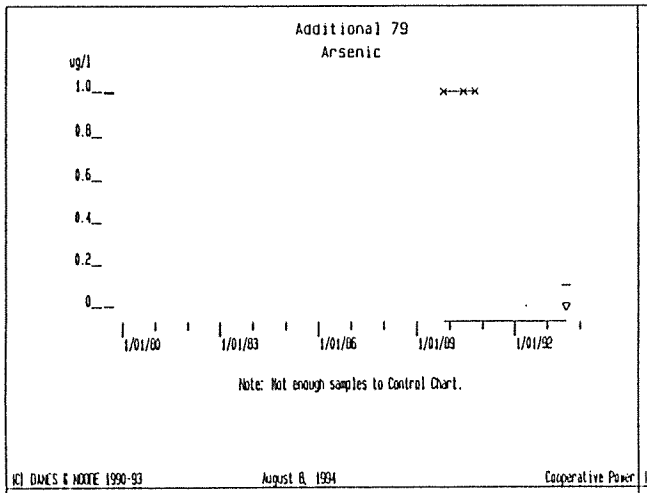

Additional 91
Boron
ug/l
0.7
0.6
0.5
0.4
0.3
0.2
0.1
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

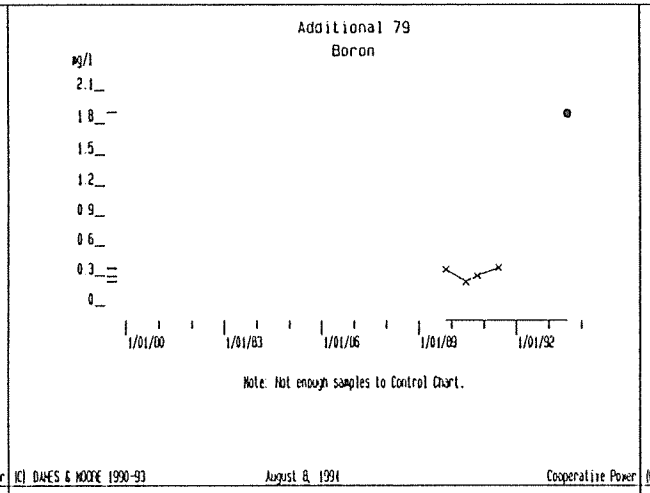

Additional 91
Chloride
ug/l
28
24
20
16
12
8
4
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

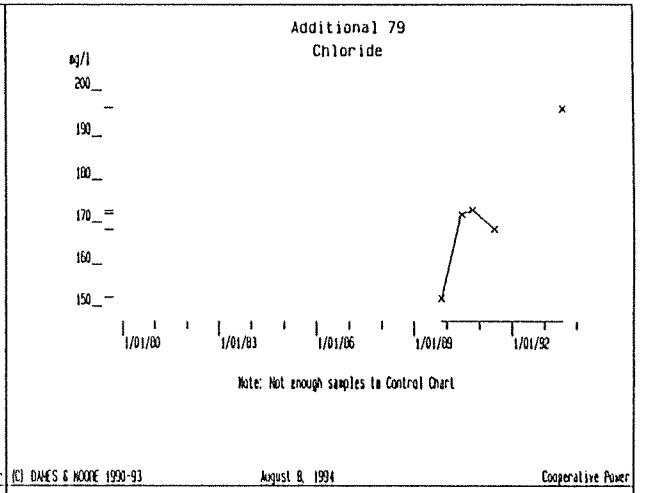

Additional 91
Selenium
ug/l
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

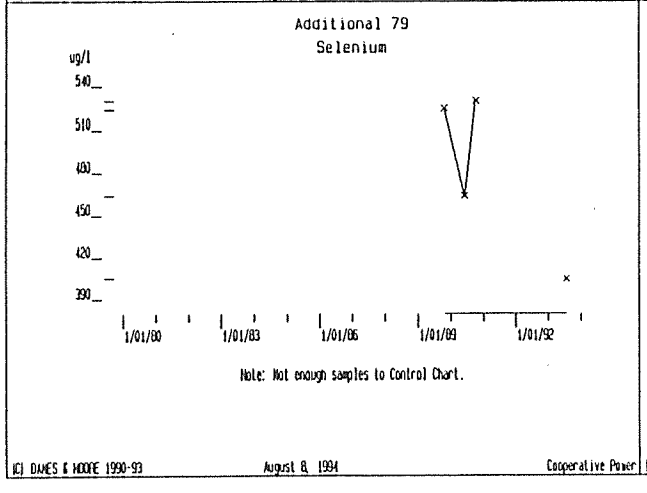

Additional 91
Strontium
ug/l
0.69
0.66
0.63
0.60
0.57
0.54
0.51
0.48
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

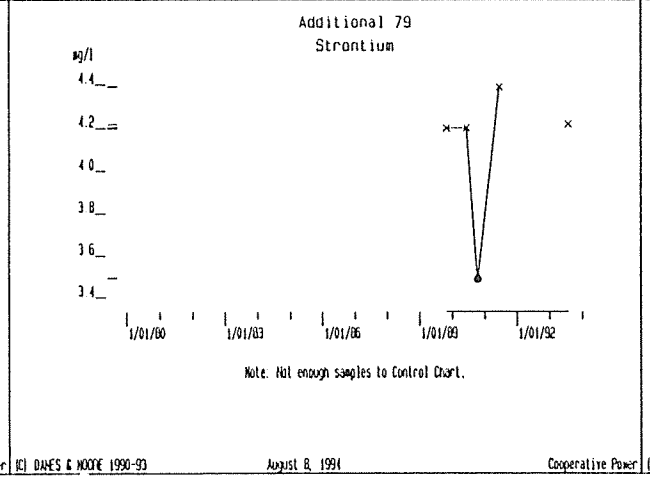

Additional 91
Sulfate
ug/l
285
270
255
240
225
210
195
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

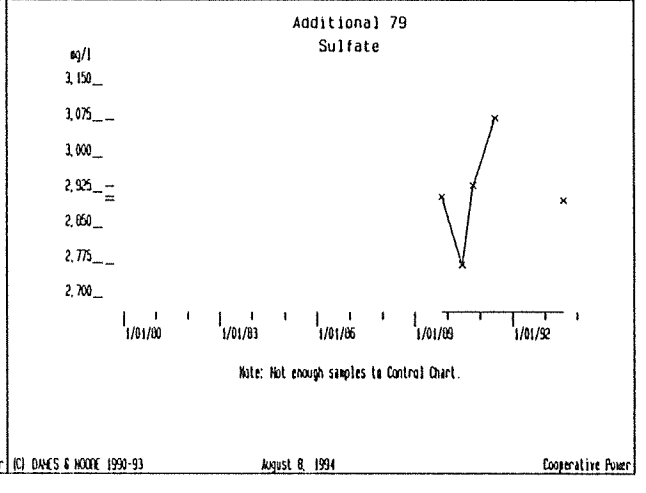

Additional 79
Arsenic
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

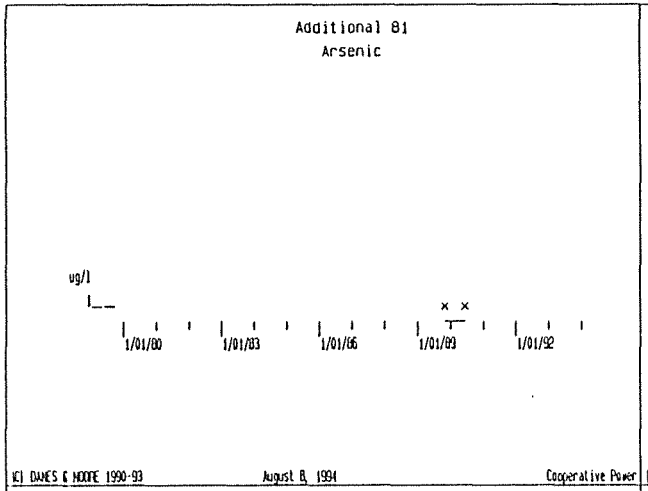

Additional 79
Boron
ug/l
2.1
1.8
1.5
1.2
0.9
0.6
0.3
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

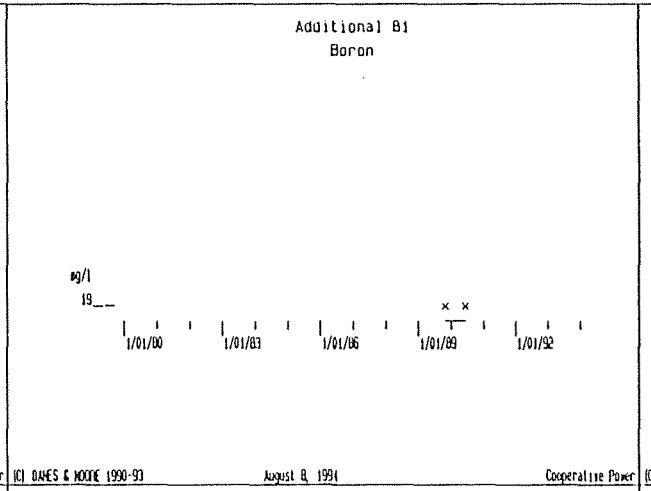

Additional 79
Chloride
ug/l
200
190
180
170
160
150
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

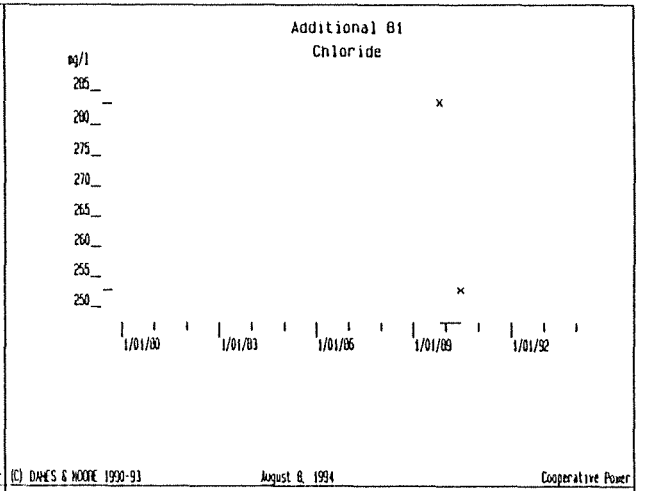

Additional 79
Selenium
ug/l
540
510
480
450
420
390
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

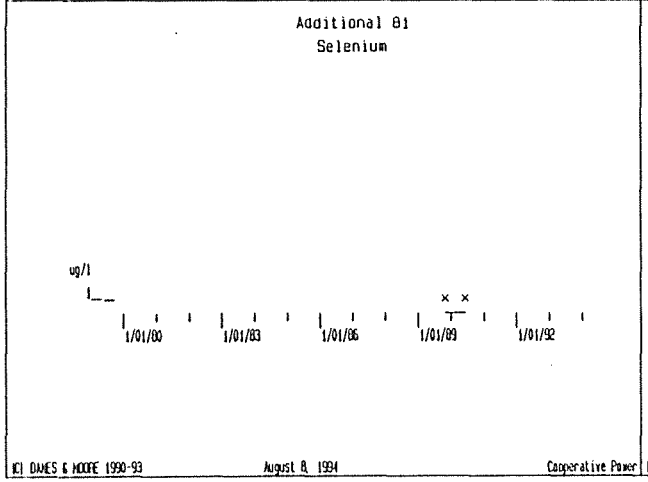

Additional 79
Strontium
ug/l
4.4
4.2
4.0
3.8
3.6
3.4
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

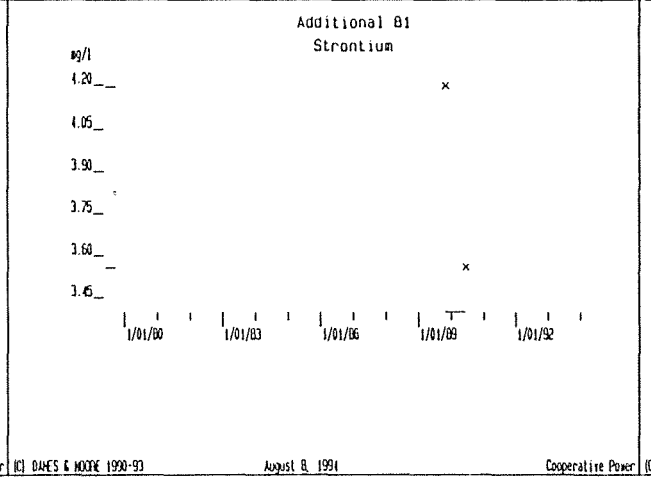

Additional 79
Sulfate
ug/l
3,150
3,075
3,000
2,925
2,850
2,775
2,700
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

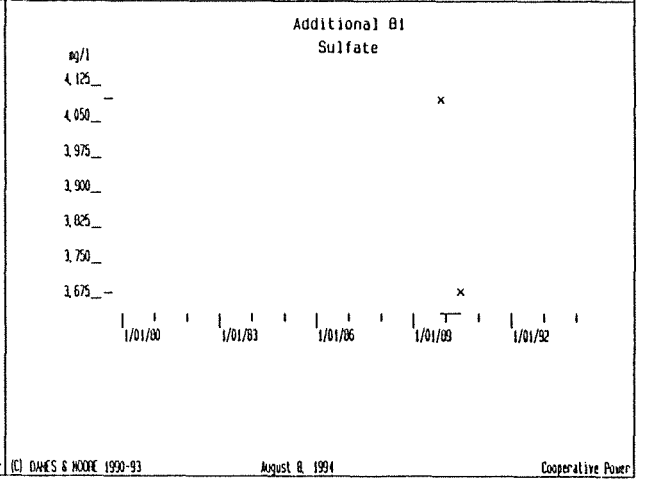

Additional B1
Arsenic
ug/l
1
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

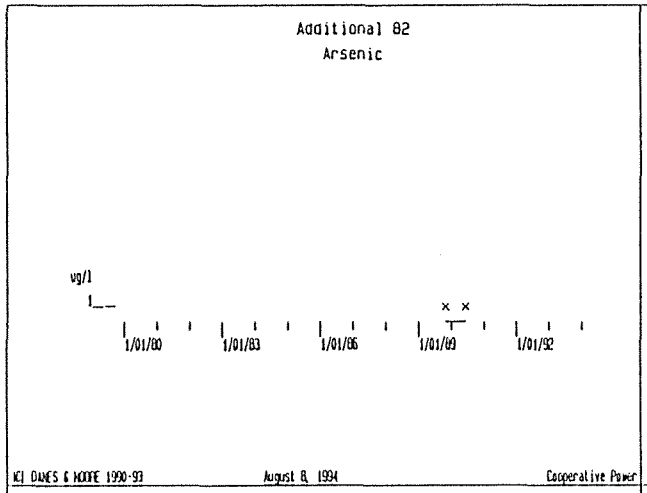

Additional B1
Boron
ug/l
19
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

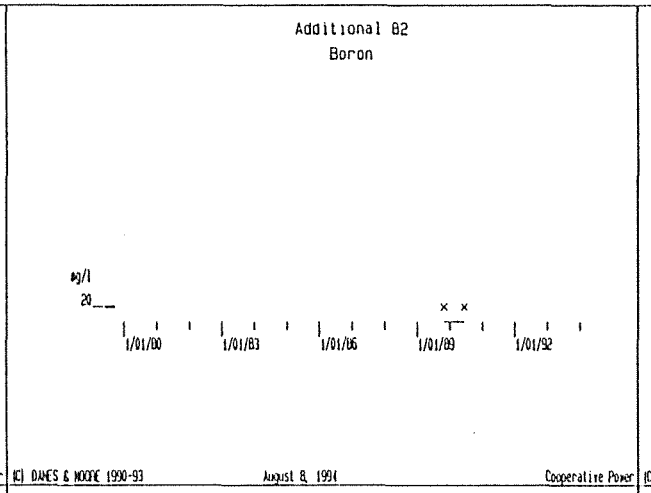

Additional B1
Chloride
ug/l
285
280
275
270
265
260
255
250
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

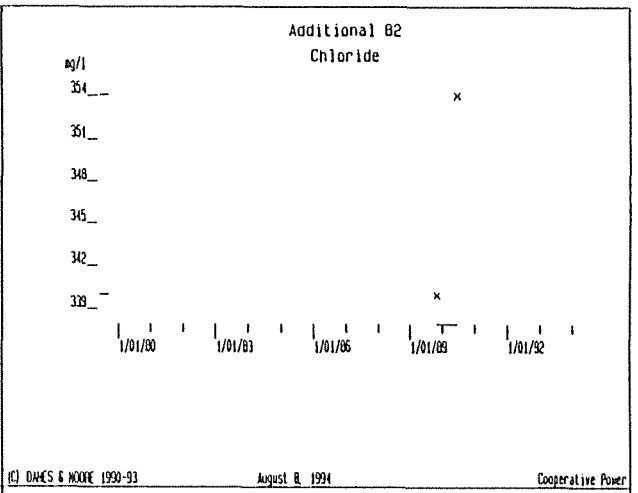

Additional B1
Selenium
ug/l
1
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

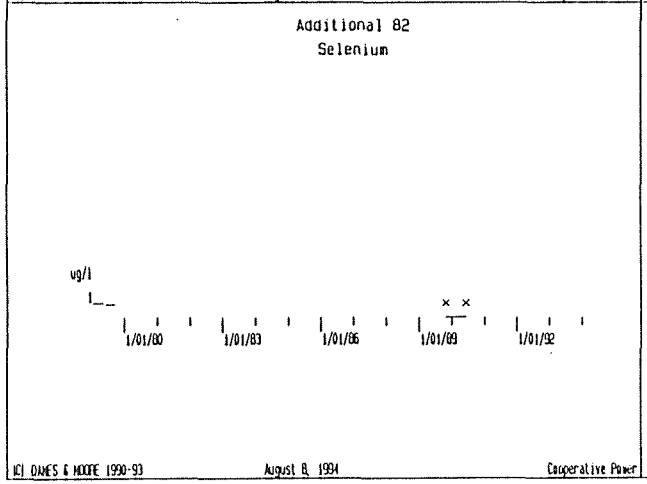

Additional B1
Strontium
ug/l
4.20
4.05
3.90
3.75
3.60
3.45
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

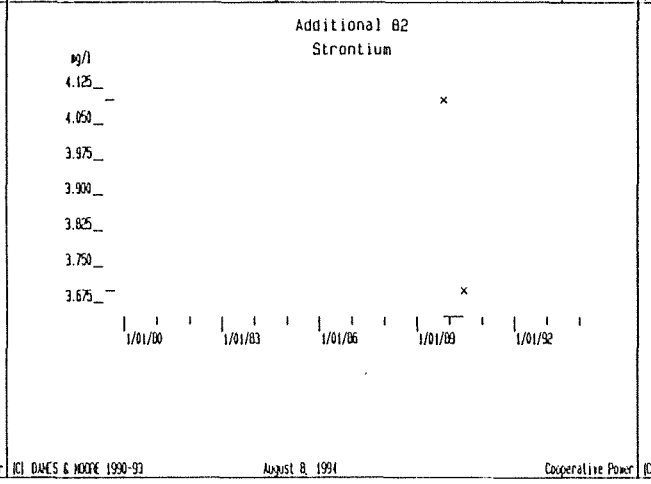

Additional B1
Sulfate
ug/l
4,125
4,050
3,975
3,900
3,825
3,750
3,675
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

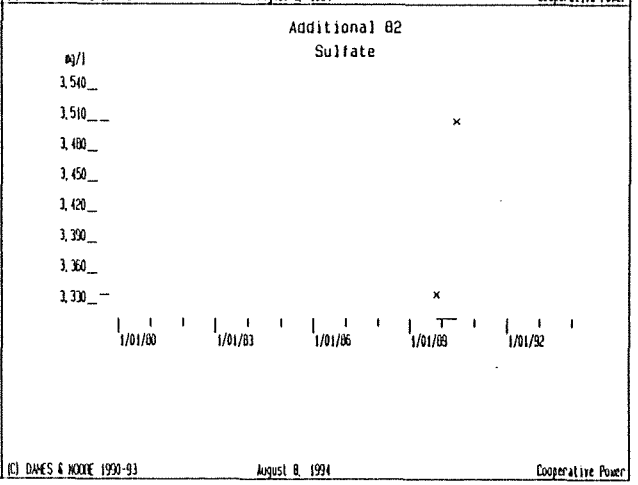

Additional 82
Arsenic
ug/l
1
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

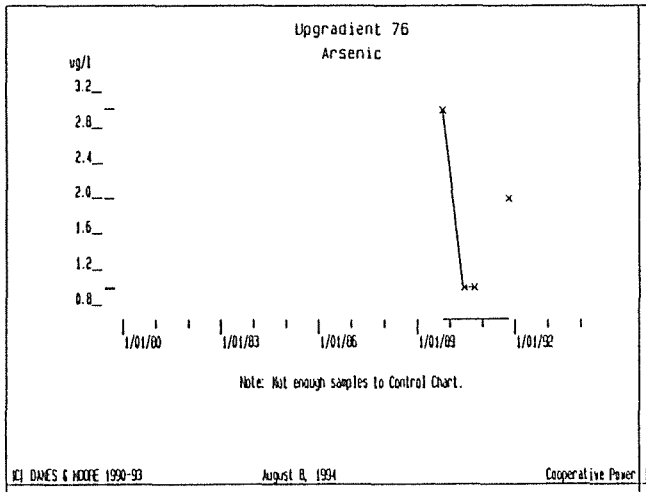

Additional 82
Boron
ug/l
20
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

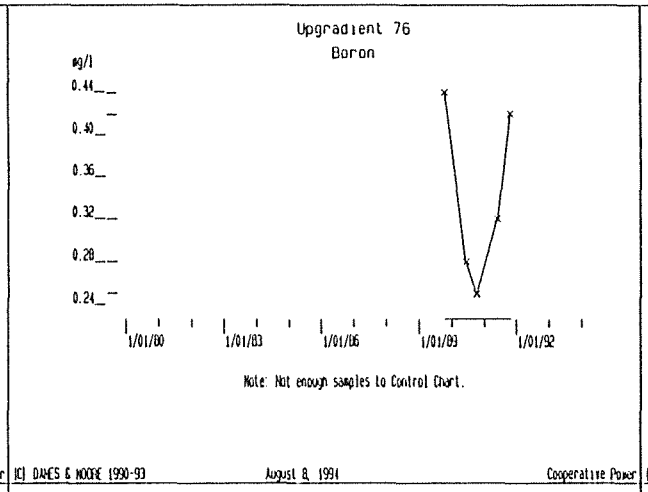

Additional 82
Chloride
mg/l
354
351
348
345
342
339
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

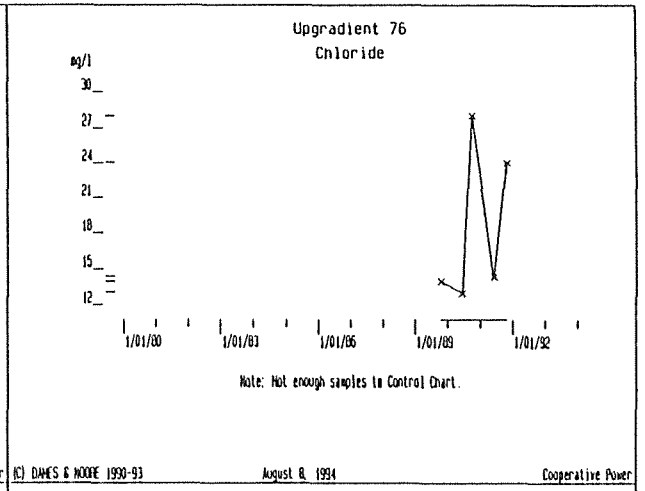

Additional 82
Selenium
ug/l
1
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

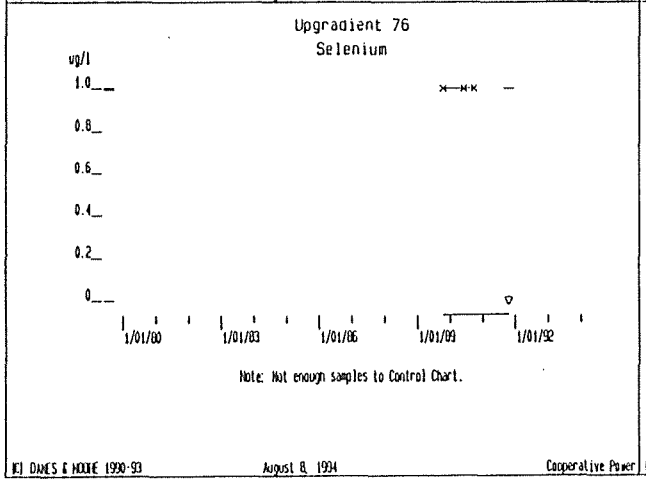

Additional 82
Strontium
mg/l
4.125
4.050
3.975
3.900
3.825
3.750
3.675
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

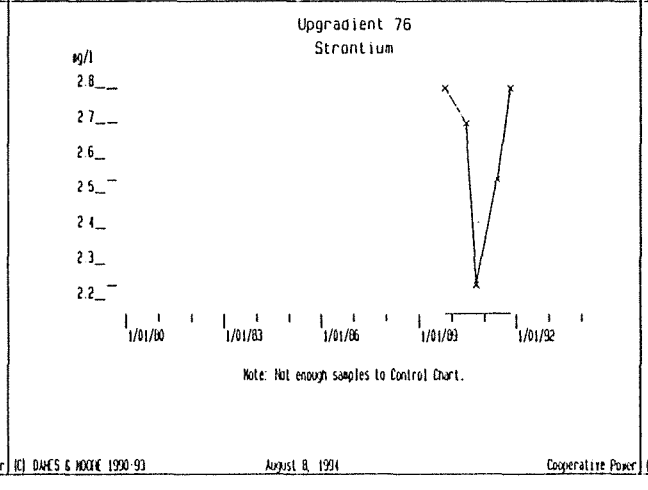

Additional 82
Sulfate
mg/l
3,540
3,510
3,480
3,450
3,420
3,390
3,360
3,330
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

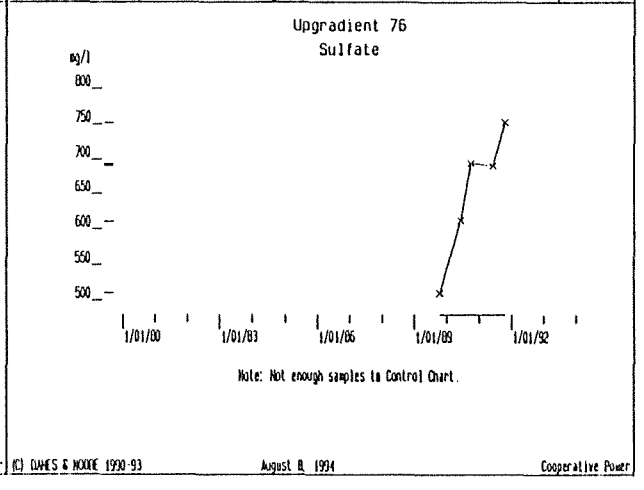

Upgradient 76
Arsenic
ug/l
3.2
2.8
2.4
2.0
1.6
1.2
0.8
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

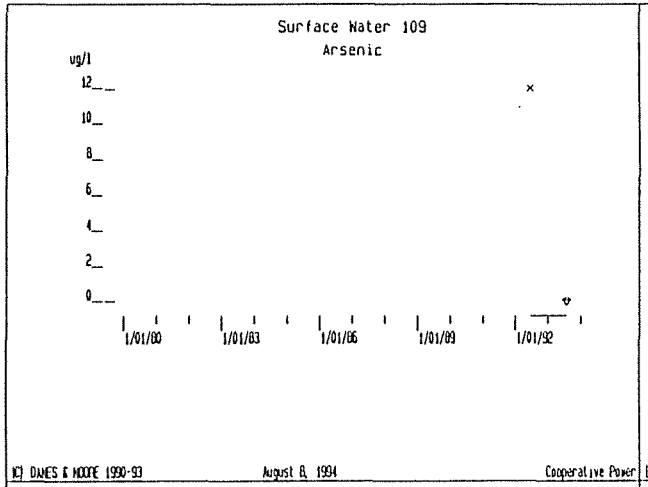

Upgradient 76
Boron
mg/l
0.44
0.40
0.36
0.32
0.28
0.24
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

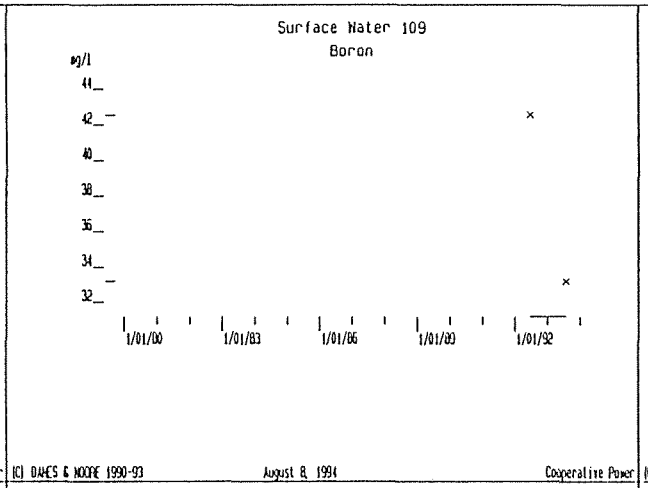

Upgradient 76
Chloride
mg/l
30
27
24
21
18
15
12
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

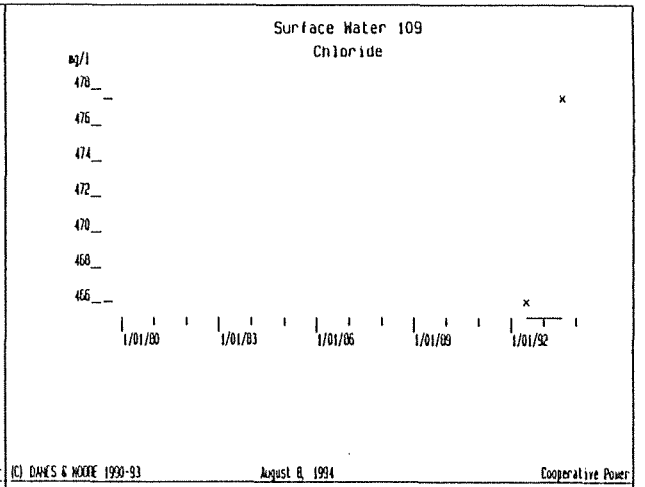

Upgradient 76
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

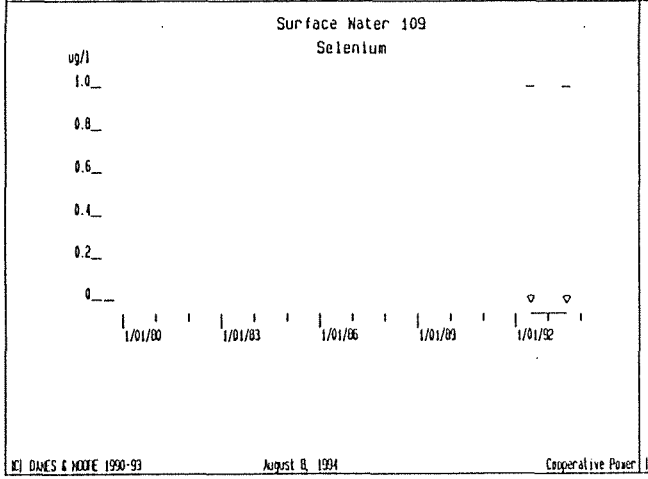

Upgradient 76
Strontium
mg/l
2.8
2.7
2.6
2.5
2.4
2.3
2.2
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

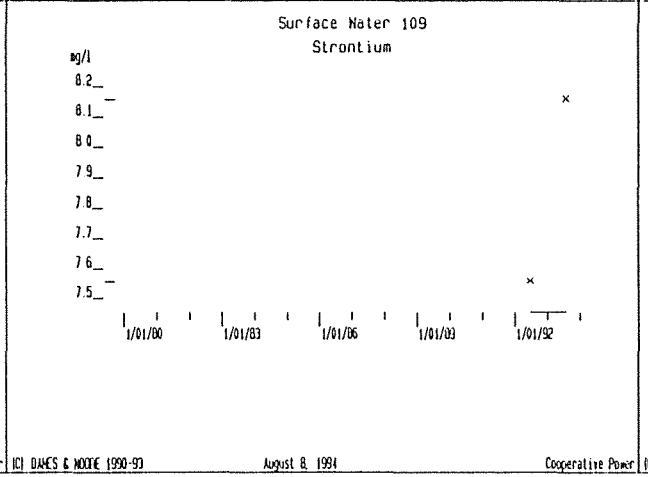

Upgradient 76
Sulfate
mg/l
800
750
700
650
600
550
500
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

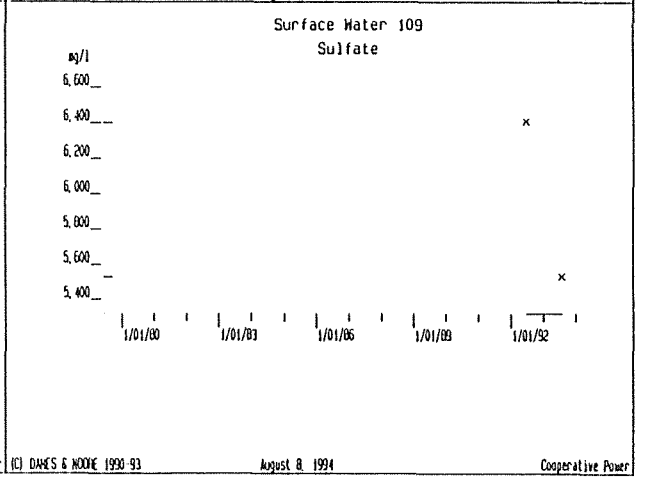

Surface Water 109
Arsenic
ug/l
12
10
8
6
4
2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

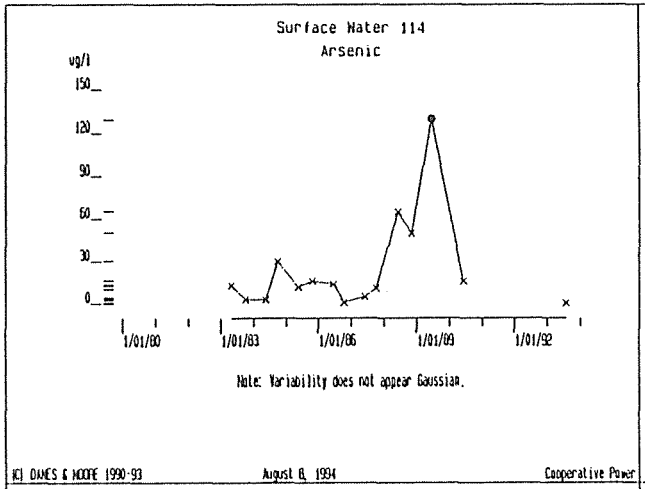

Surface Water 109
Boron
mg/l
44
42
40
38
36
34
32
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

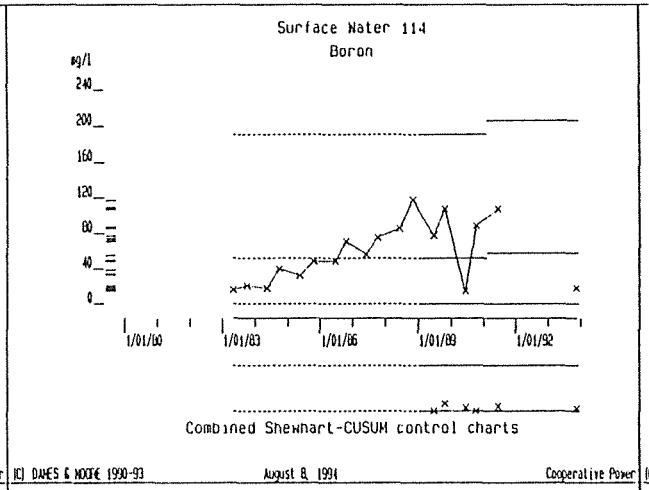

Surface Water 109
Chloride
mg/l
478
476
474
472
470
468
466
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

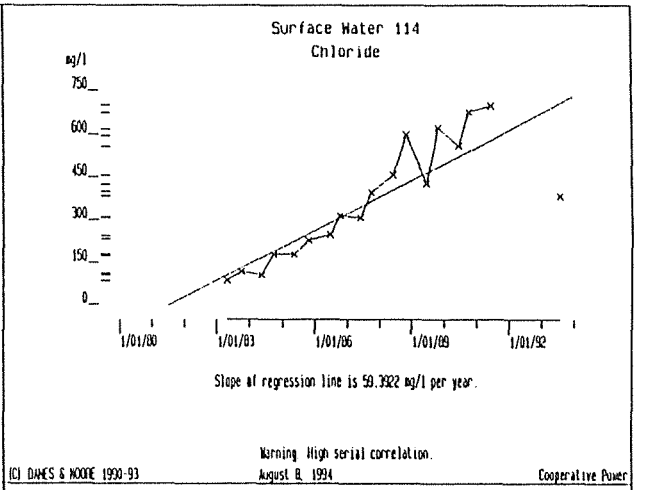

Surface Water 109
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

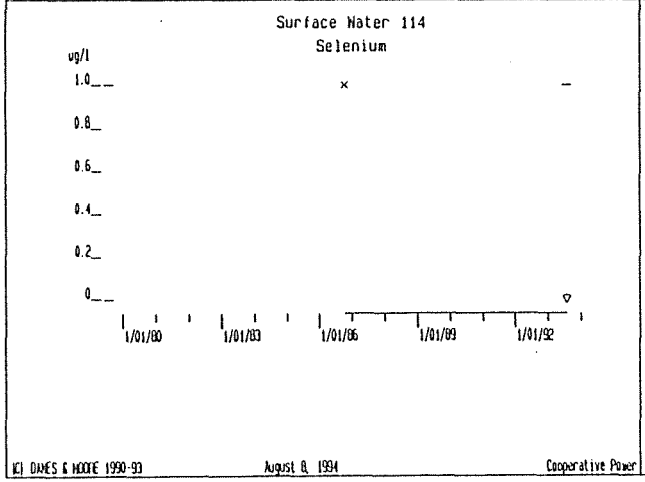

Surface Water 109
Strontium
mg/l
8.2
8.1
8.0
7.9
7.8
7.7
7.6
7.5
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

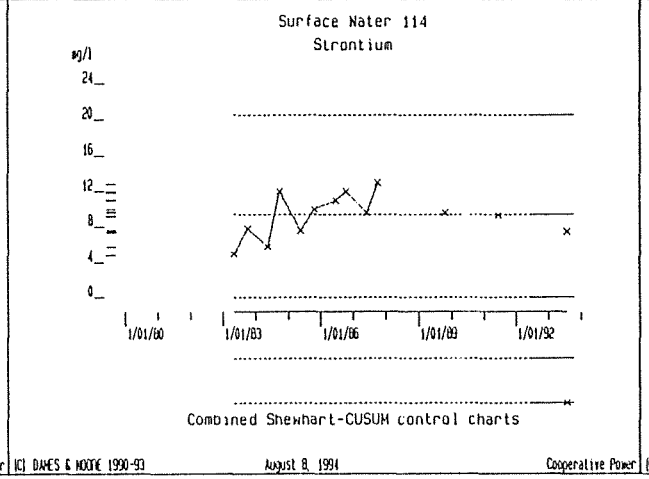

Surface Water 109
Sulfate
mg/l
6,600
6,400
6,200
6,000
5,800
5,600
5,400
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

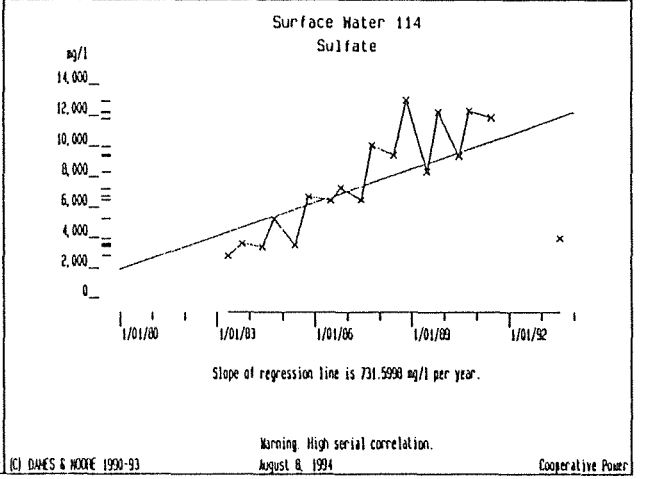

Surface Water 114
Arsenic
ug/l
150
120
90
60
30
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Variability does not appear Gaussian.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

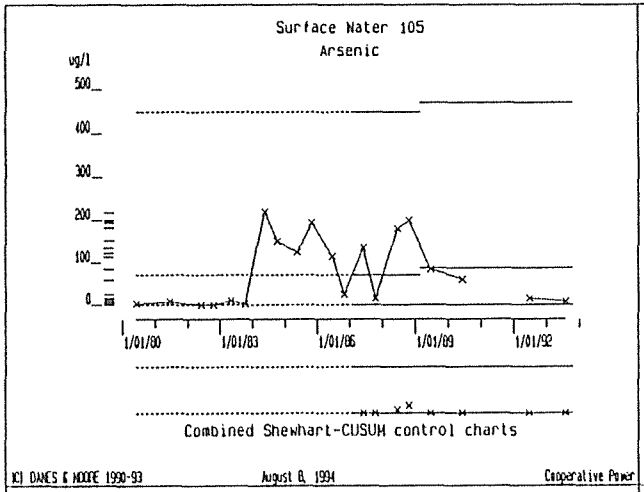

Surface Water 114
Boron
ug/l
240
200
160
120
80
40
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power


Surface Water 114
Chloride
mg/l
750
600
450
300
150
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 59.3922 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

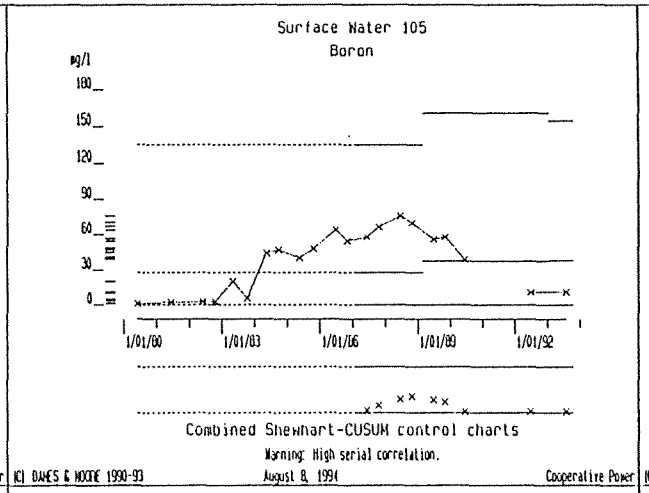

Surface Water 114
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power


Surface Water 114
Strontium
mg/l
24
20
16
12
8
4
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

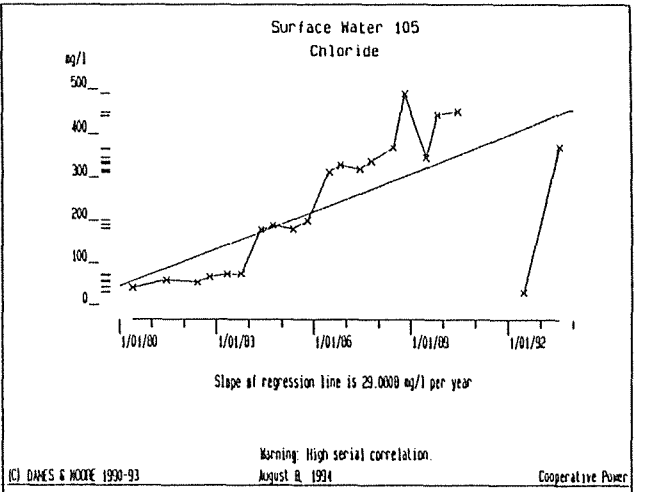

Surface Water 114
Sulfate
mg/l
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 731.5998 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power



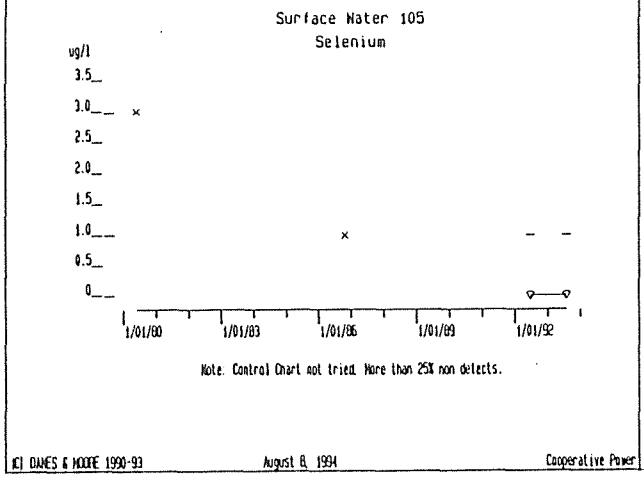
(C) DAMES & MOORE 1990-93 August 8, 1994 Cooperative Power



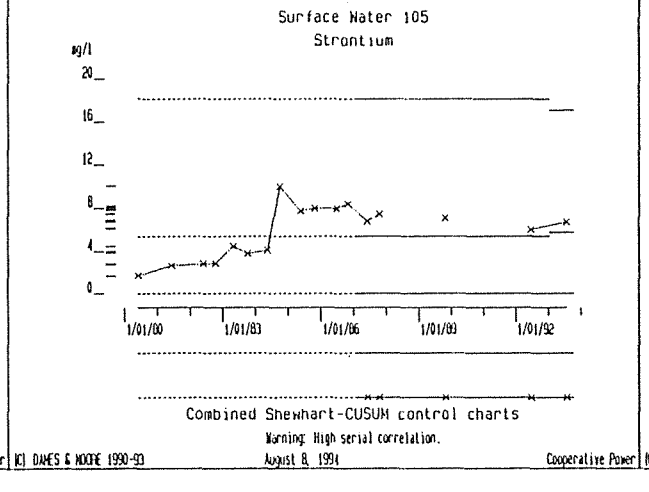
(C) DAMES & MOORE 1990-93 August 8, 1994 Cooperative Power



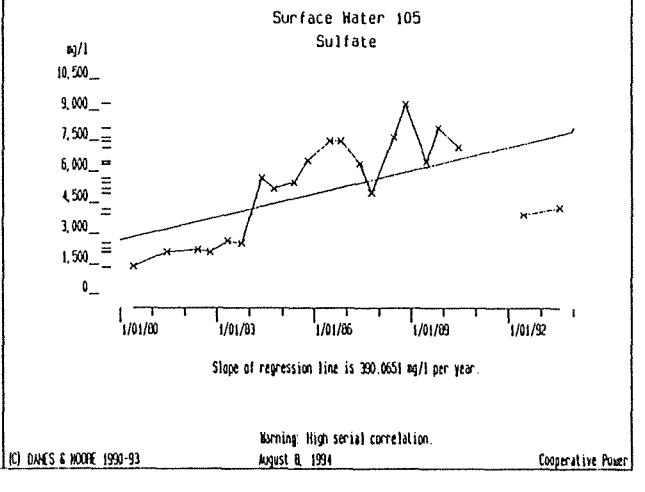
(C) DAMES & MOORE 1990-93 August 8, 1994 Cooperative Power



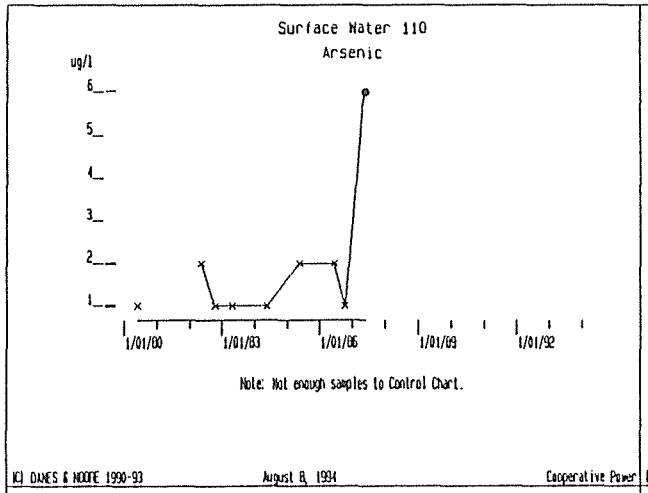
(C) DAMES & MOORE 1990-93 August 8, 1994 Cooperative Power

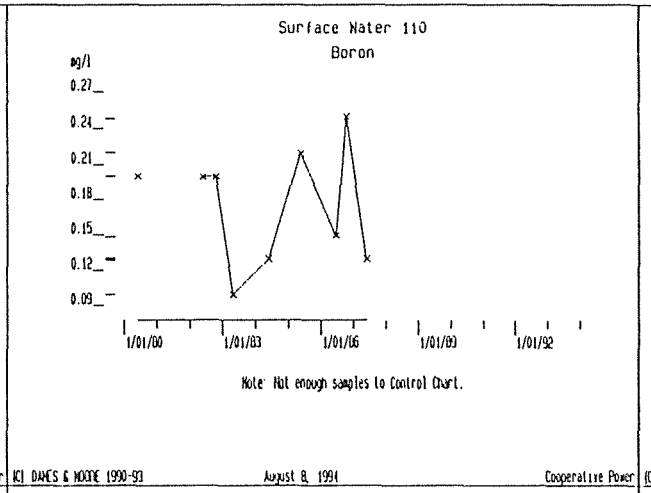


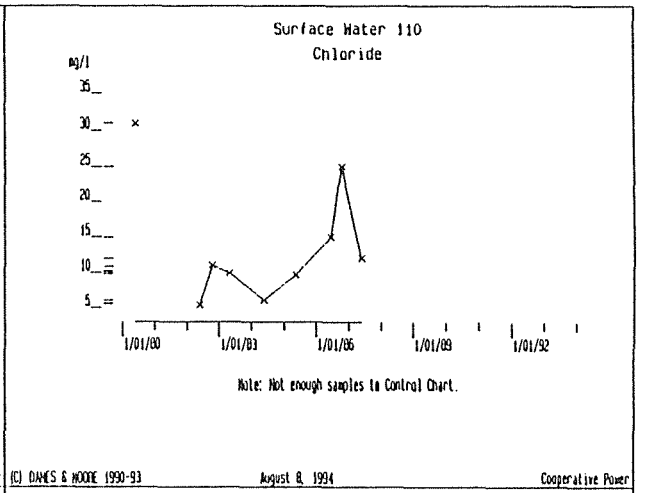
(C) DAMES & MOORE 1990-93 August 8, 1994 Cooperative Power

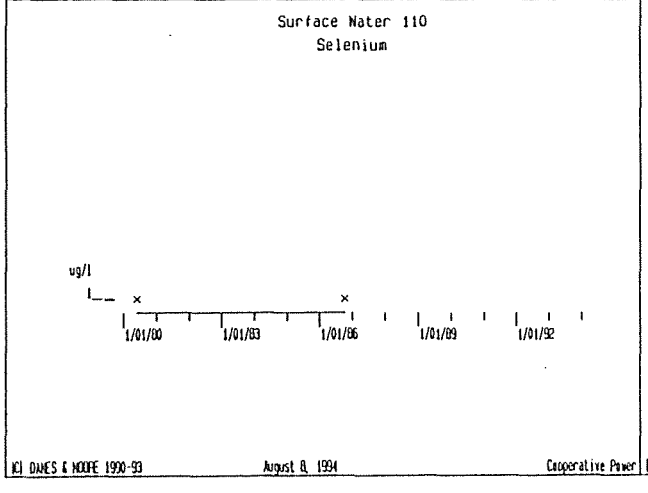


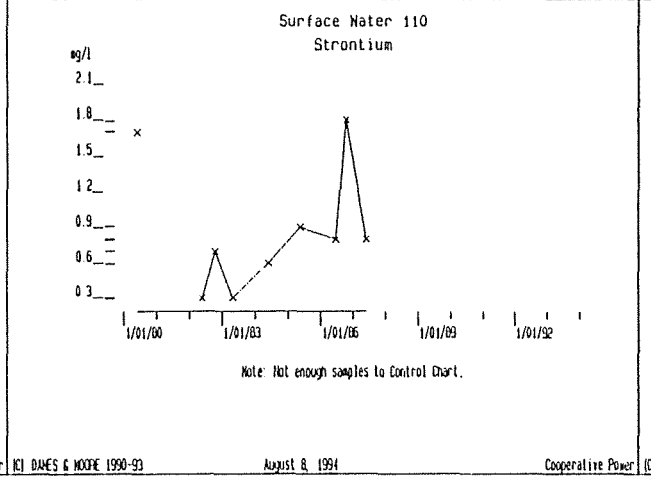
(C) DAMES & MOORE 1990-93 August 8, 1994 Cooperative Power

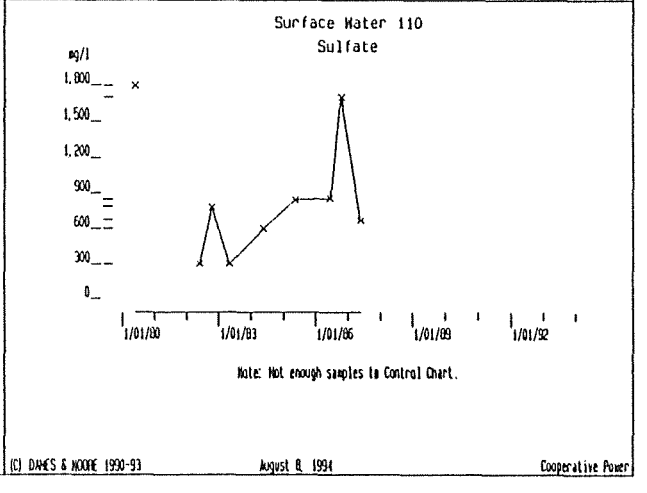

Surface Water 110
Arsenic
ug/l
6
5
4
3
2
1
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

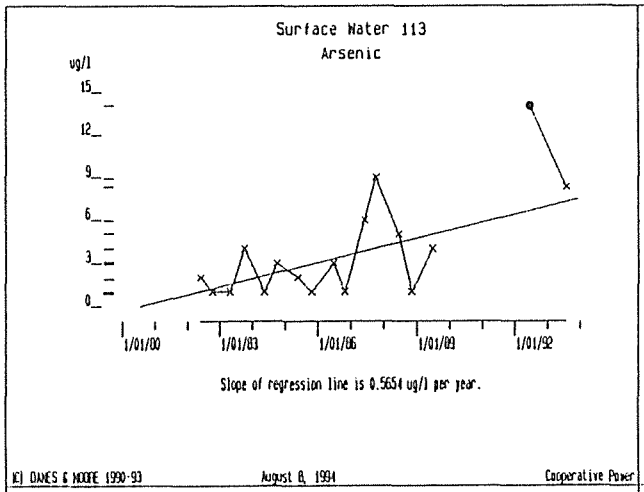

Surface Water 110
Boron
mg/l
0.27
0.24
0.21
0.18
0.15
0.12
0.09
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

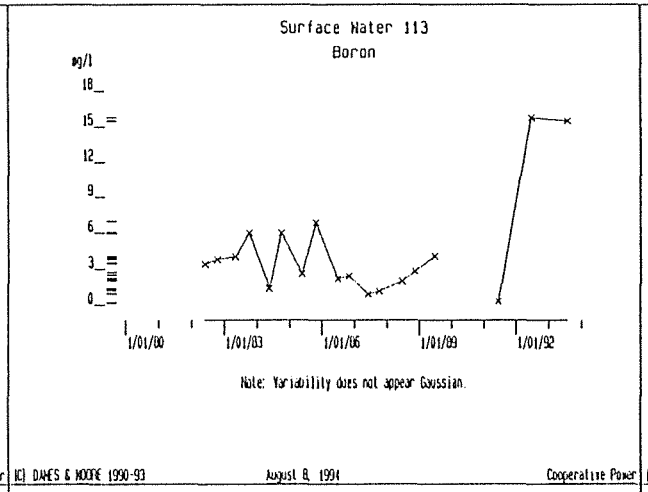

Surface Water 110
Chloride
mg/l
35
30
25
20
15
10
5
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

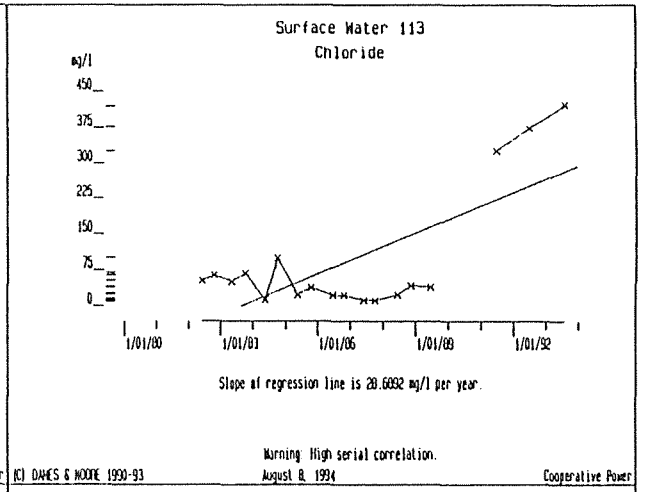

Surface Water 110
Selenium
ug/l
1
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

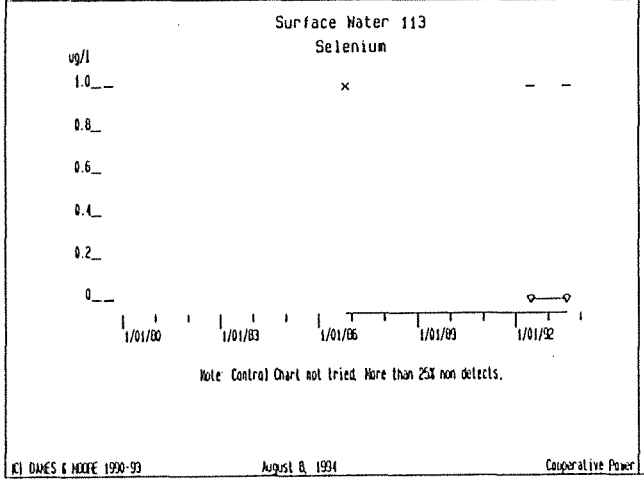

Surface Water 110
Strontium
mg/l
2.1
1.8
1.5
1.2
0.9
0.6
0.3
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

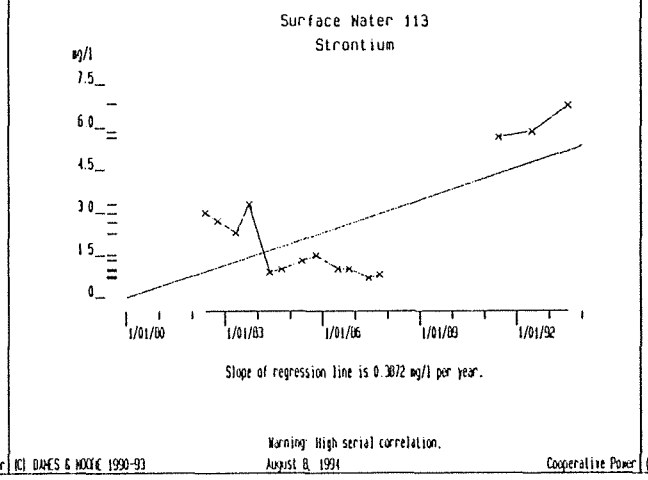

Surface Water 110
Sulfate
mg/l
1,800
1,500
1,200
900
600
300
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

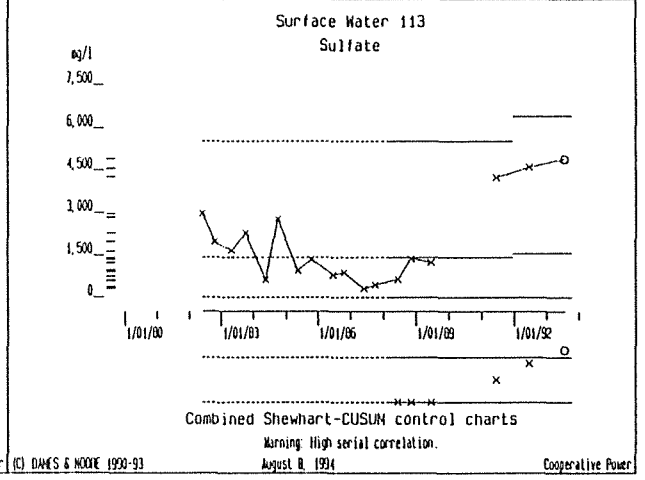

Surface Water 113
Arsenic
ug/l
15
12
9
6
3
0
1/01/00
1/01/03
1/01/06
1/01/09
1/01/92
Slope of regression line is 0.5654 ug/l per year.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

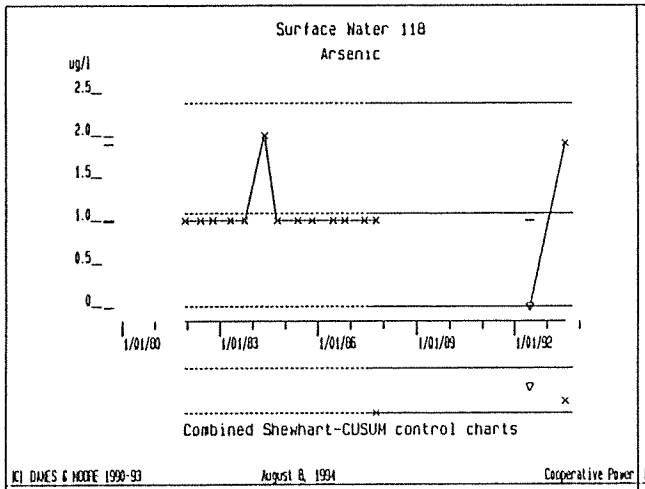

Surface Water 113
Boron
mg/l
18
15
12
9
6
3
0
1/01/00
1/01/03
1/01/06
1/01/09
1/01/92
Note: Variability does not appear Gaussian.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

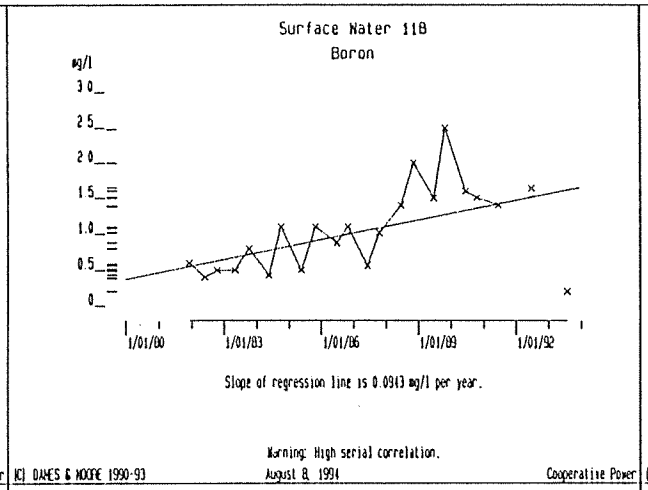

Surface Water 113
Chloride
mg/l
450
375
300
225
150
75
0
1/01/00
1/01/03
1/01/06
1/01/09
1/01/92
Slope of regression line is 20.6092 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

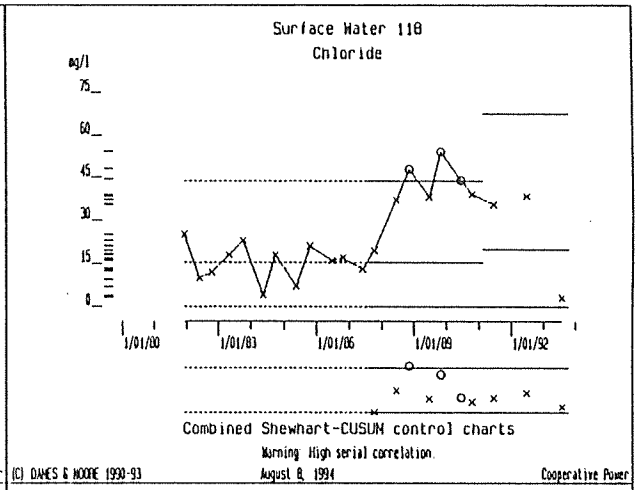

Surface Water 113
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/00
1/01/03
1/01/06
1/01/09
1/01/92
Note: Control Chart not tried. More than 25% non detects.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

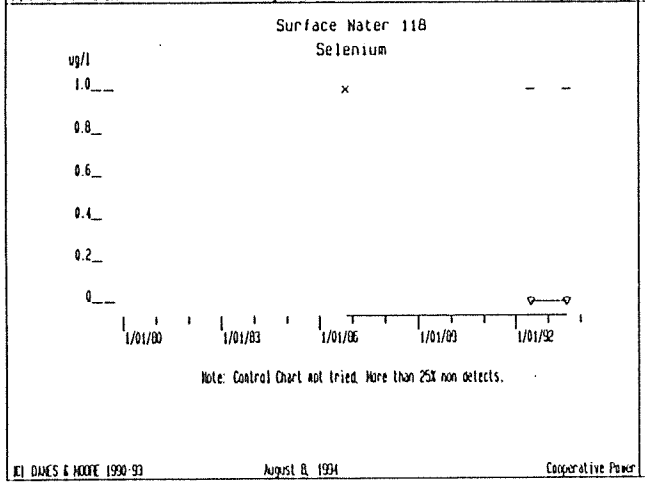

Surface Water 113
Strontium
mg/l
7.5
6.0
4.5
3.0
1.5
0
1/01/00
1/01/03
1/01/06
1/01/09
1/01/92
Slope of regression line is 0.3872 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

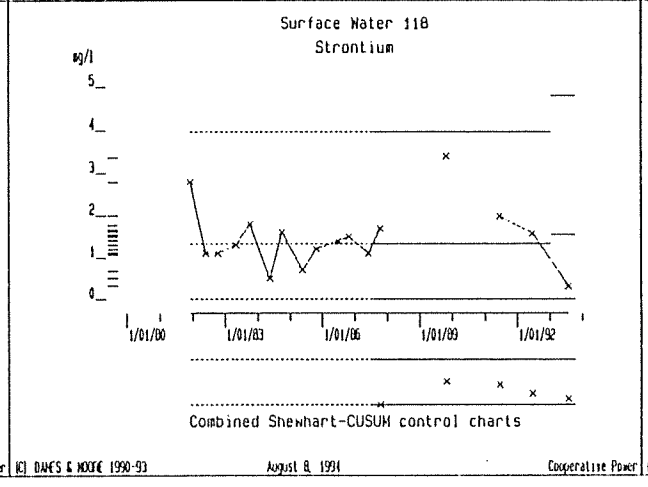

Surface Water 113
Sulfate
mg/l
7,500
6,000
4,500
3,000
1,500
0
1/01/00
1/01/03
1/01/06
1/01/09
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

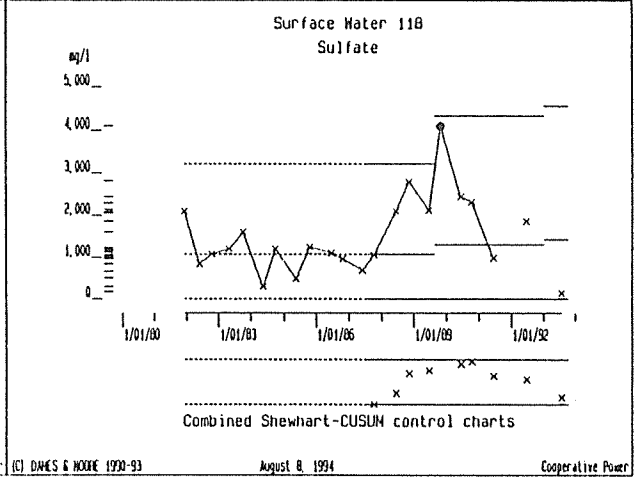

Surface Water 118
Arsenic
ug/l
2.5
2.0
1.5
1.0
0.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

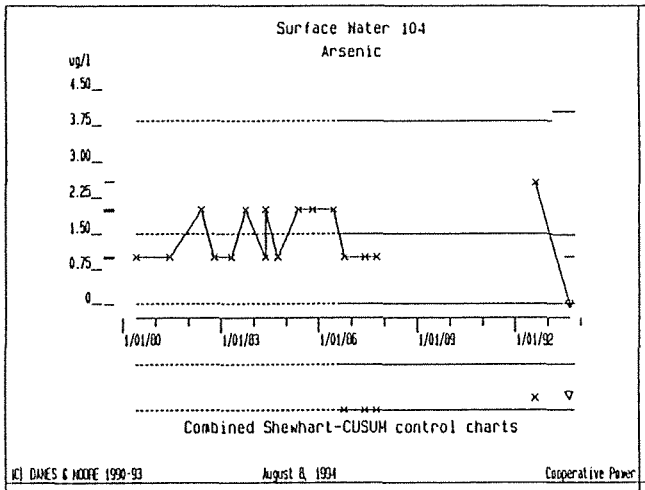

Surface Water 118
Boron
mg/l
3.0
2.5
2.0
1.5
1.0
0.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 0.0943 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

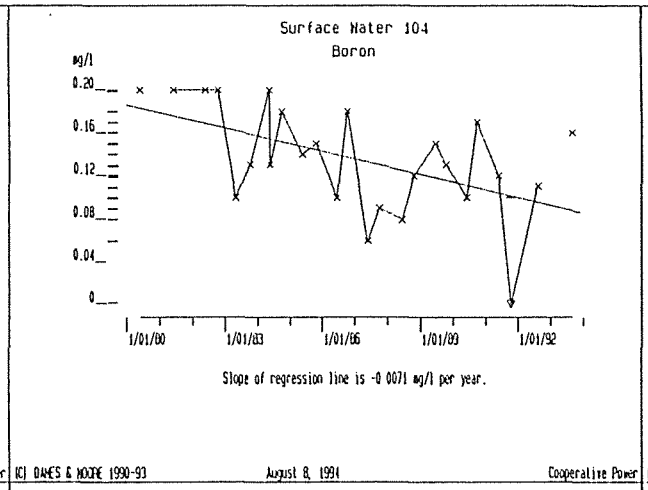

Surface Water 118
Chloride
mg/l
75
60
45
30
15
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

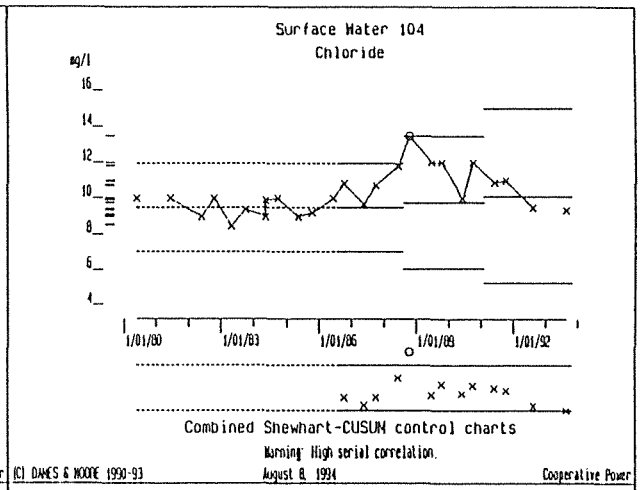

Surface Water 118
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

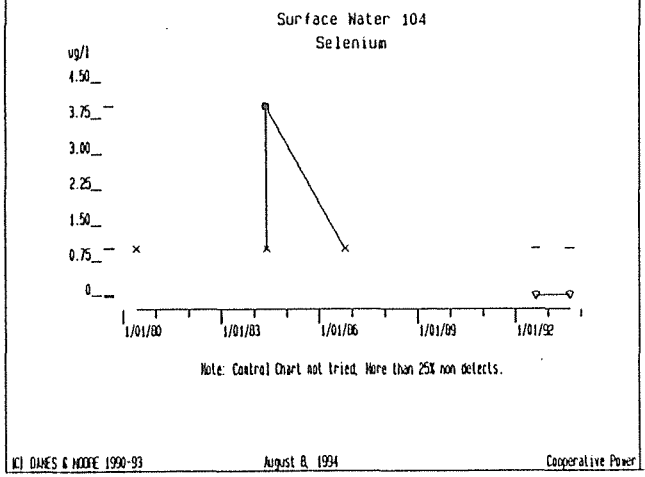

Surface Water 118
Strontium
mg/l
5
4
3
2
1
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

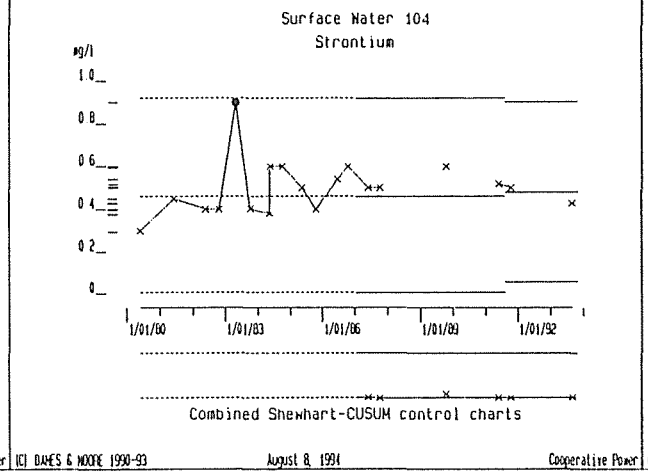

Surface Water 118
Sulfate
mg/l
5,000
4,000
3,000
2,000
1,000
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

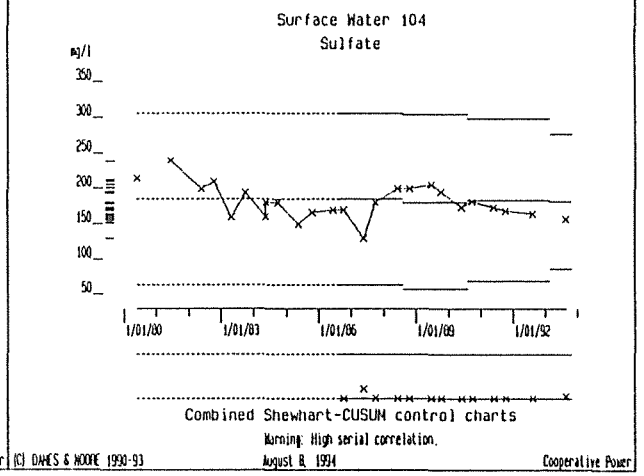

Surface Water 104
Arsenic
ug/l
4.50
3.75
3.00
2.25
1.50
0.75
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

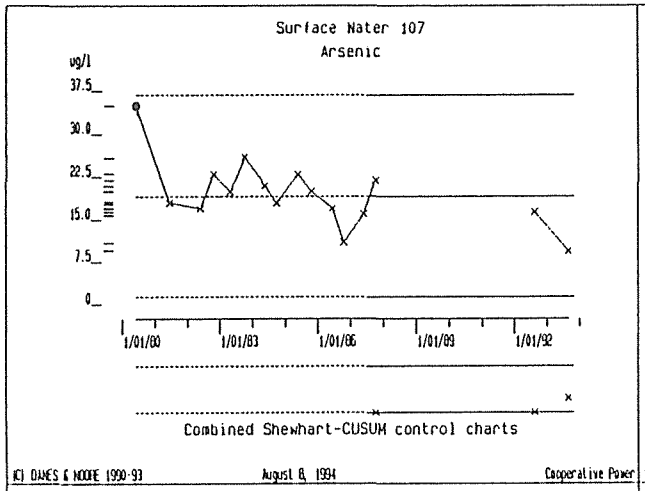

Surface Water 104
Boron
mg/l
0.20
0.16
0.12
0.08
0.04
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0 0071 mg/l per year.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

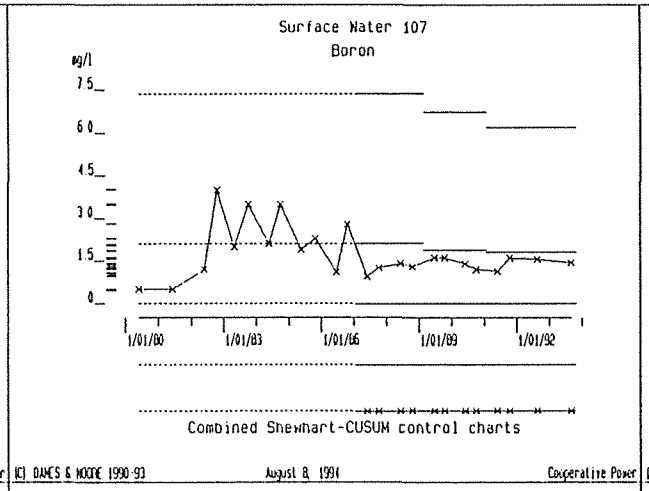

Surface Water 104
Chloride
mg/l
16
14
12
10
8
6
4
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

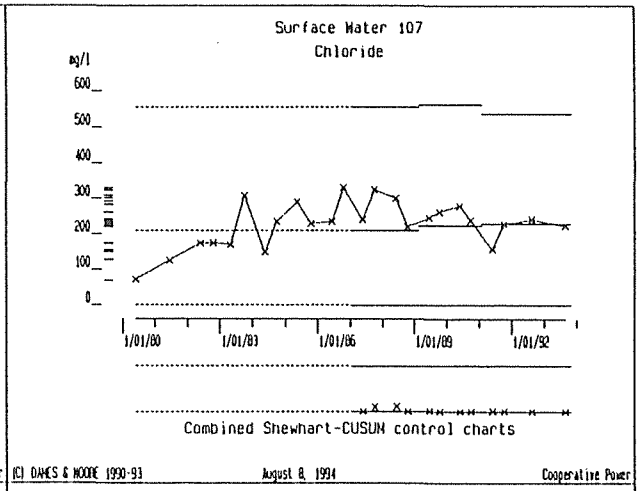

Surface Water 104
Selenium
ug/l
4.50
3.75
3.00
2.25
1.50
0.75
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

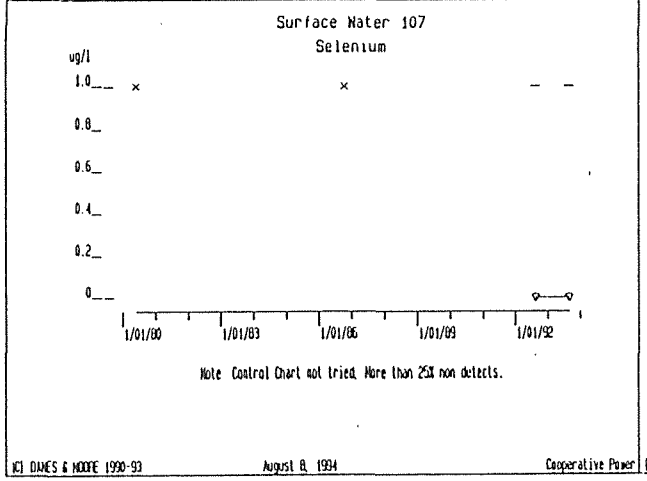

Surface Water 104
Strontium
mg/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

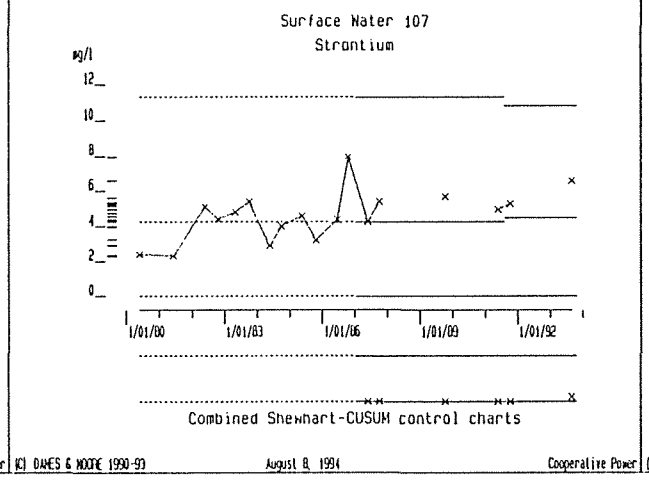

Surface Water 104
Sulfate
mg/l
350
300
250
200
150
100
50
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

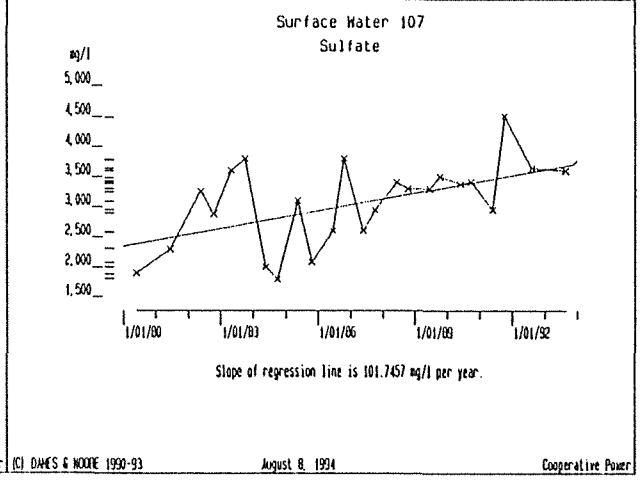

Surface Water 107
Arsenic
ug/l
37.5
30.0
22.5
15.0
7.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

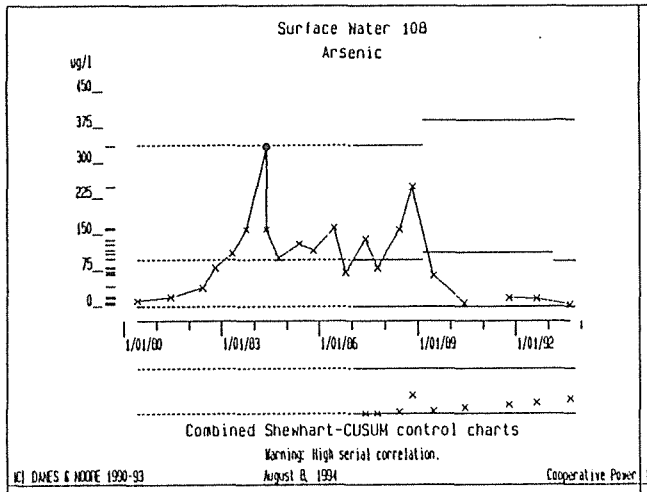

Surface Water 107
Boron
mg/l
7.5
6.0
4.5
3.0
1.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

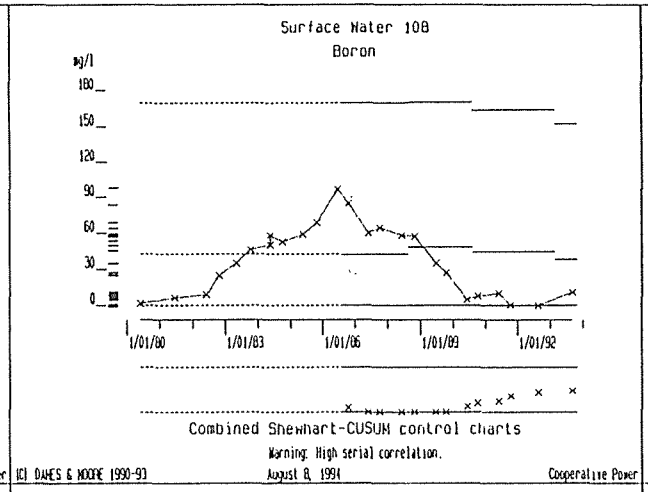

Surface Water 107
Chloride
mg/l
600
500
400
300
200
100
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

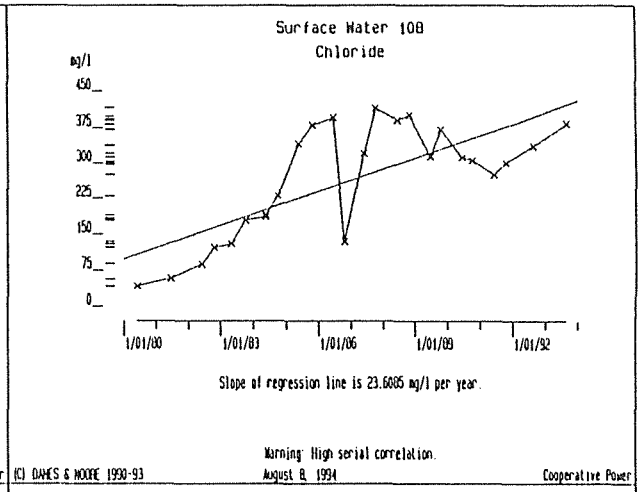

Surface Water 107
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note Control Chart not tried. More than 25% non detects.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

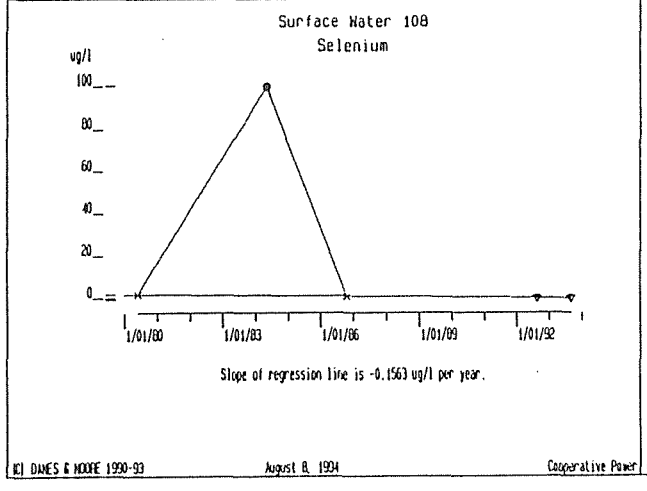

Surface Water 107
Strontium
mg/l
12
10
8
6
4
2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

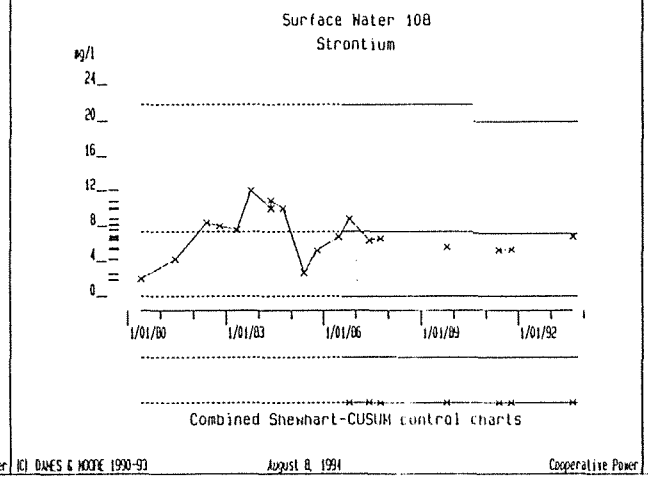

Surface Water 107
Sulfate
mg/l
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 101.7457 mg/l per year.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

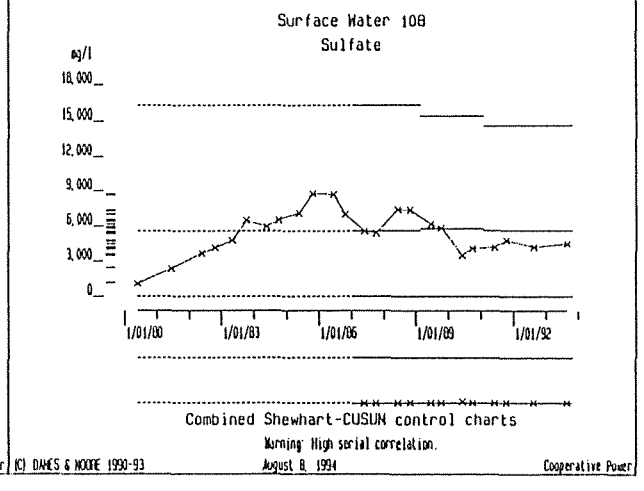

Surface Water 108
Arsenic
ug/l
450
375
300
225
150
75
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

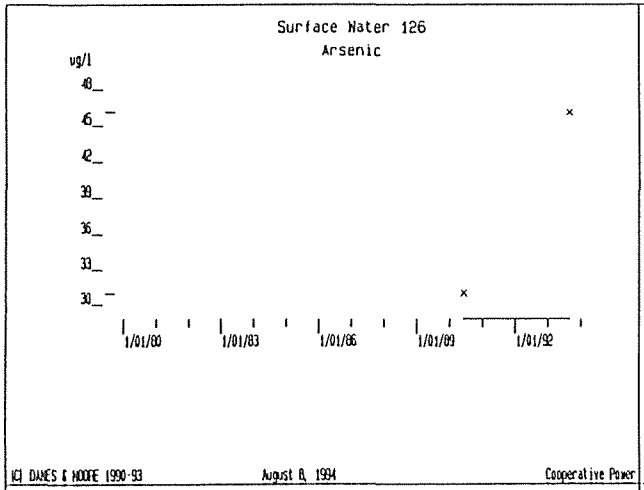

Surface Water 108
Boron
mg/l
180
150
120
90
60
30
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

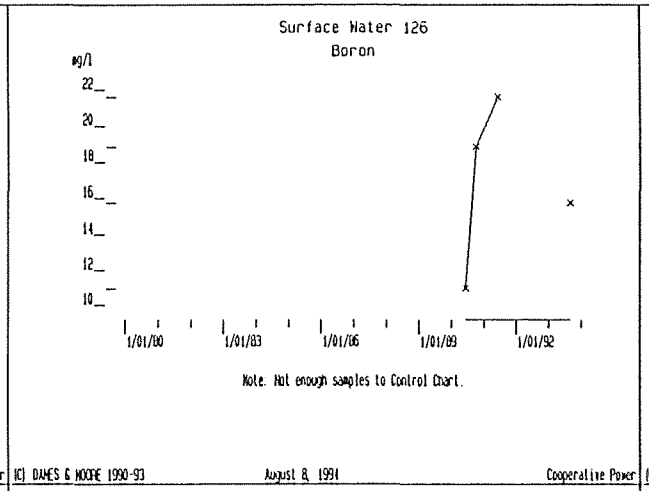

Surface Water 108
Chloride
mg/l
450
375
300
225
150
75
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 23.6885 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

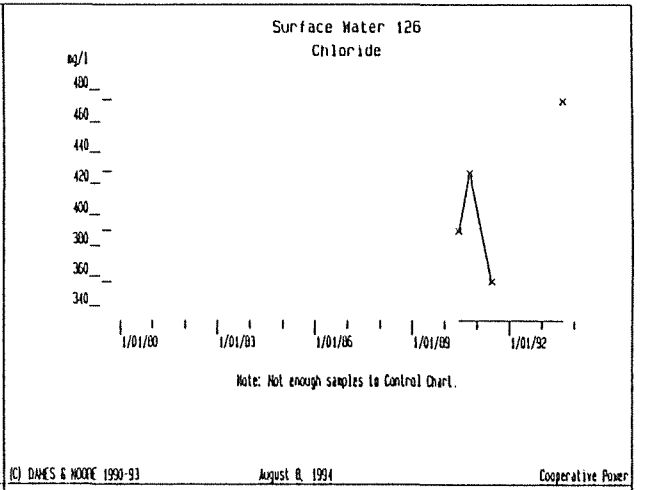

Surface Water 108
Selenium
ug/l
100
80
60
40
20
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is -0.1563 ug/l per year.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

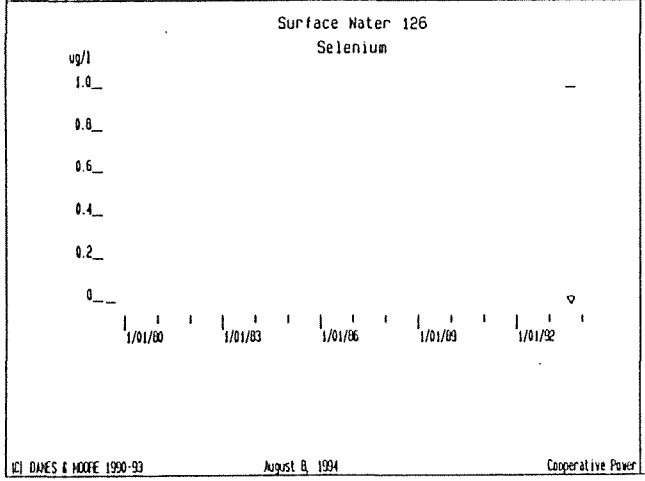

Surface Water 108
Strontium
mg/l
24
20
16
12
8
4
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

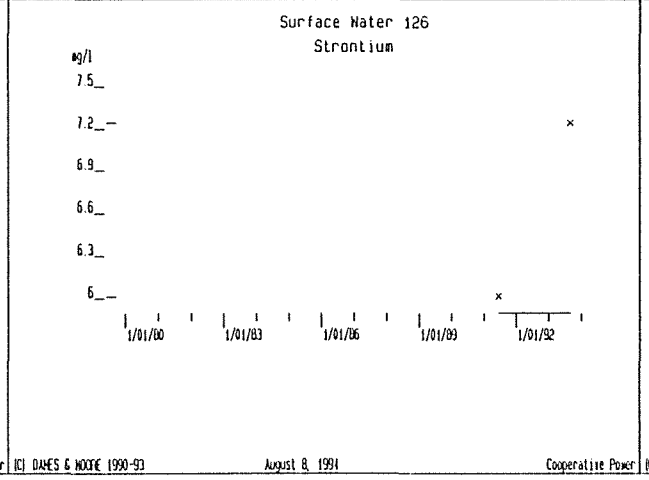

Surface Water 108
Sulfate
mg/l
18,000
15,000
12,000
9,000
6,000
3,000
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

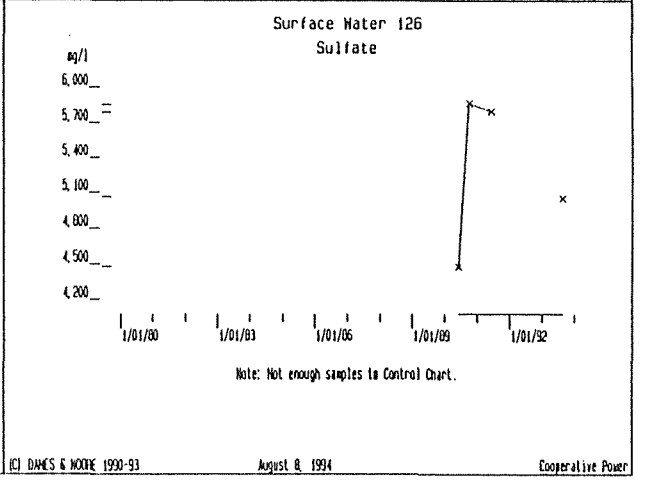

Surface Water 126
Arsenic
ug/l
48
45
42
39
36
33
30
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

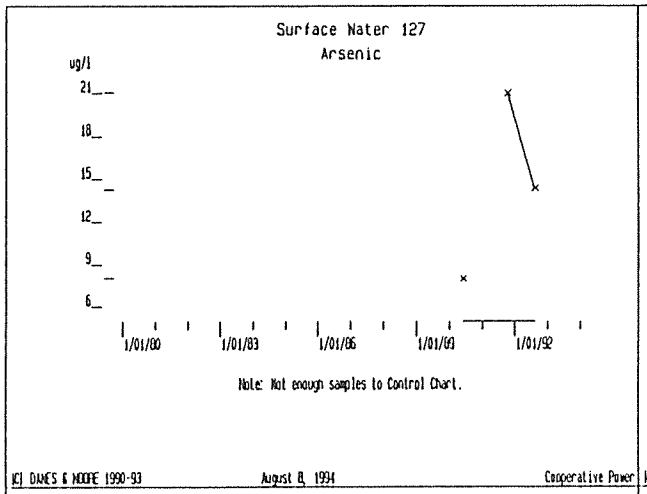

Surface Water 126
Boron
ug/l
22
20
18
16
14
12
10
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

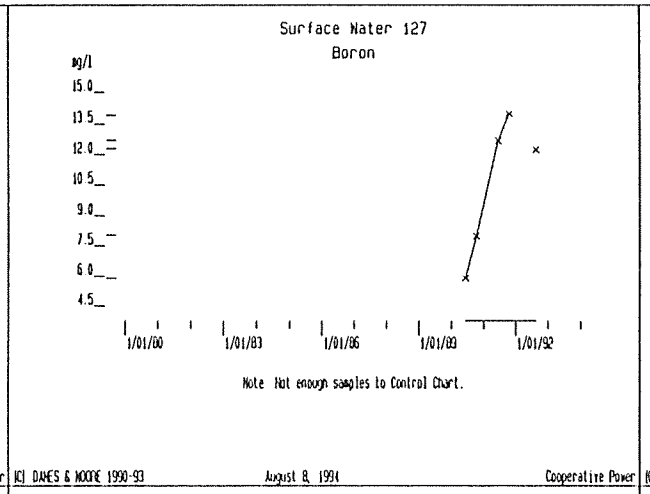

Surface Water 126
Chloride
ug/l
480
460
440
420
400
380
360
340
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

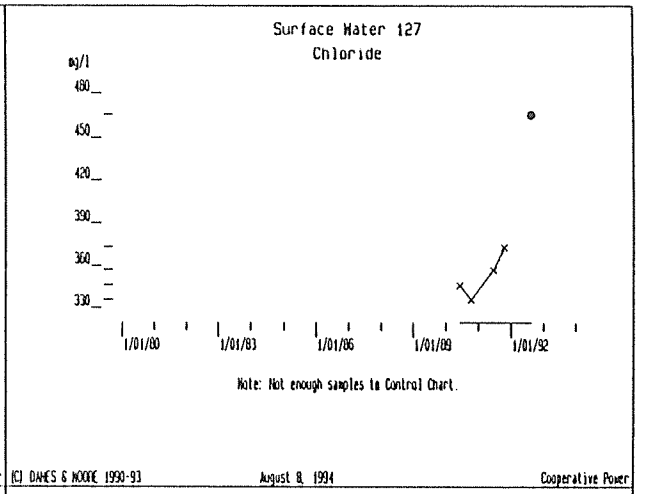

Surface Water 126
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

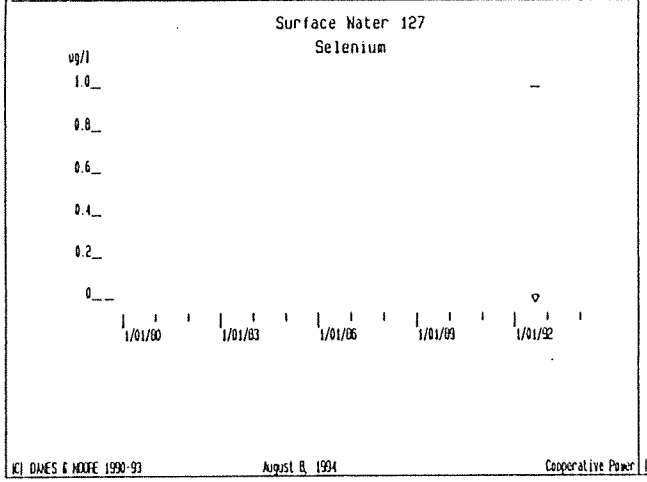

Surface Water 126
Strontium
ug/l
7.5
7.2
6.9
6.6
6.3
6
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

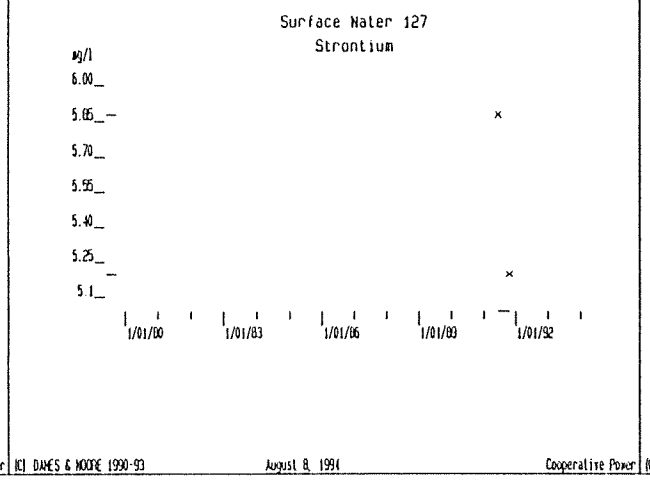

Surface Water 126
Sulfate
ug/l
6,000
5,700
5,400
5,100
4,800
4,500
4,200
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

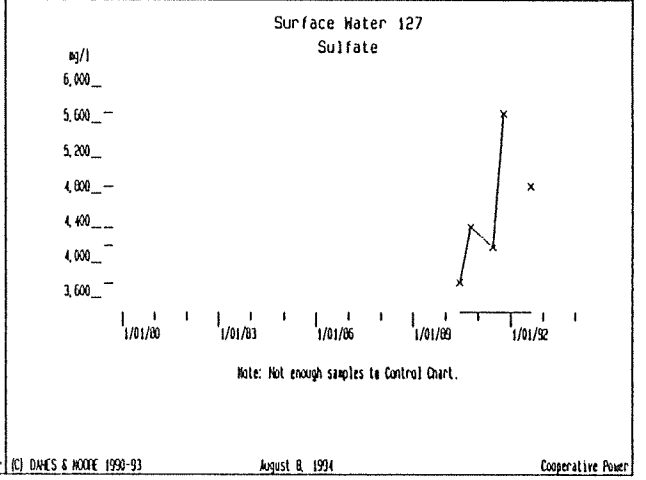

Surface Water 127
Arsenic
ug/l
21
18
15
12
9
6
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

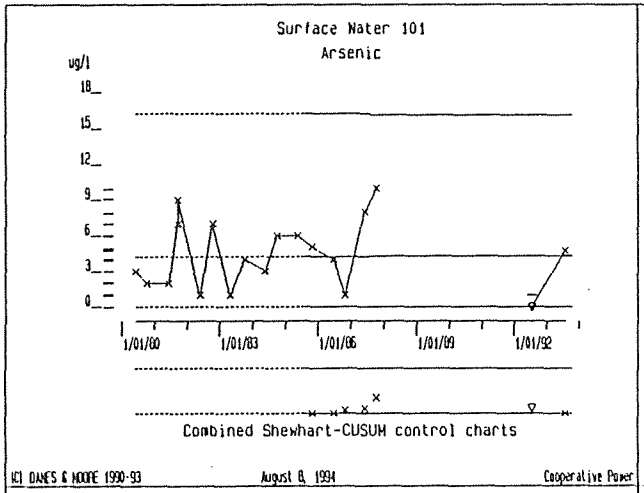

Surface Water 127
Boron
mg/l
15.0
13.5
12.0
10.5
9.0
7.5
6.0
4.5
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

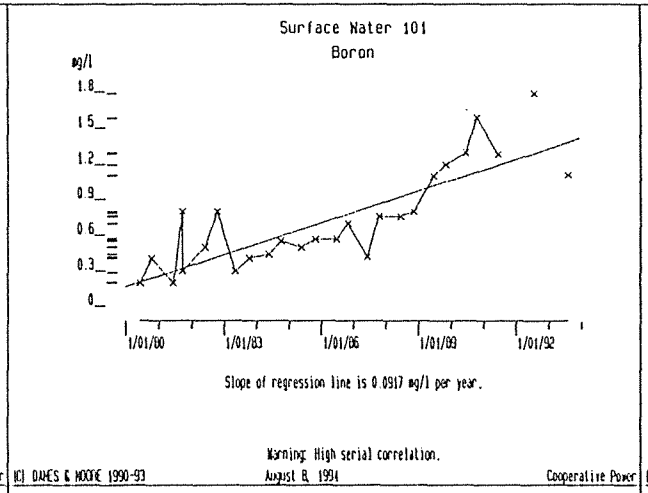

Surface Water 127
Chloride
mg/l
480
450
420
390
360
330
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

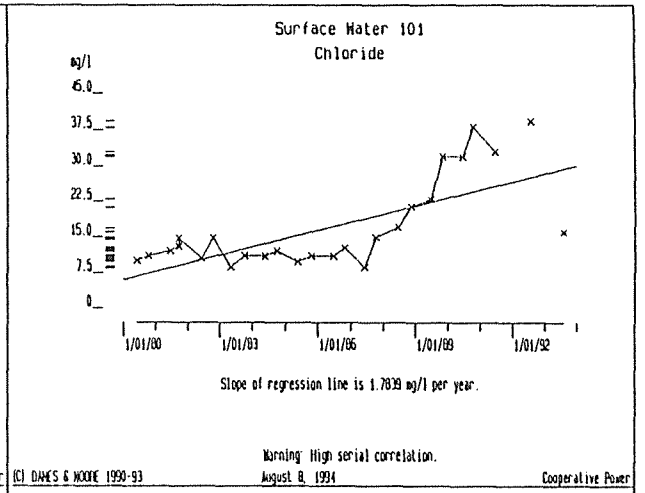

Surface Water 127
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

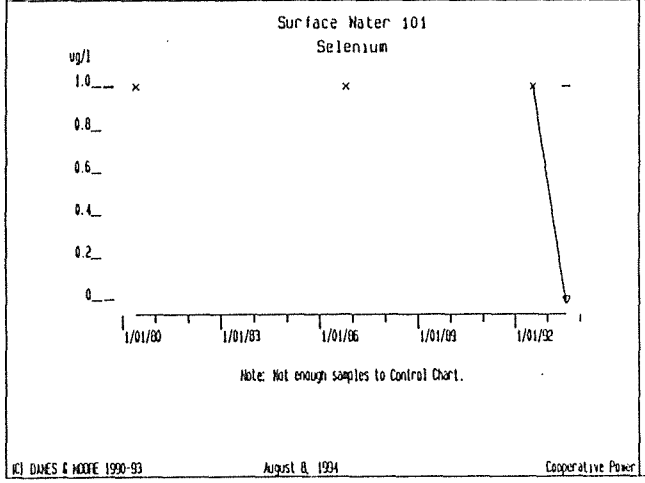

Surface Water 127
Strontium
mg/l
6.00
5.85
5.70
5.55
5.40
5.25
5.1
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

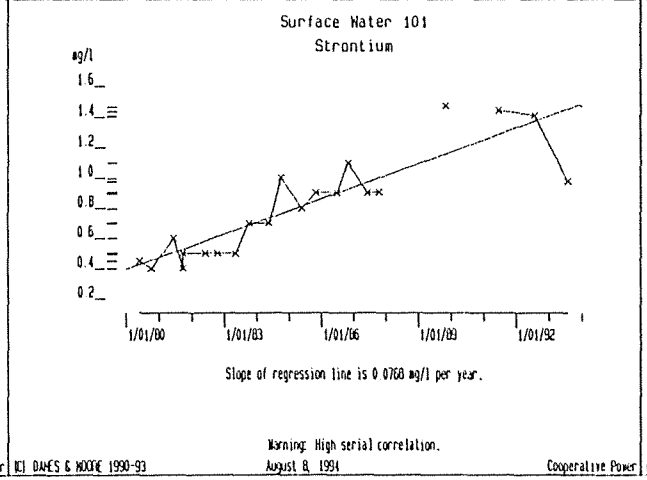

Surface Water 127
Sulfate
mg/l
6,000
5,600
5,200
4,800
4,400
4,000
3,600
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

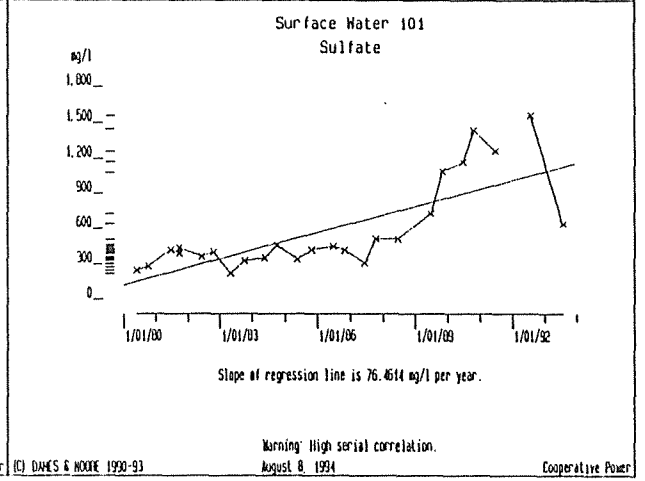

Surface Water 101
Arsenic
ug/l
18
15
12
9
6
3
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

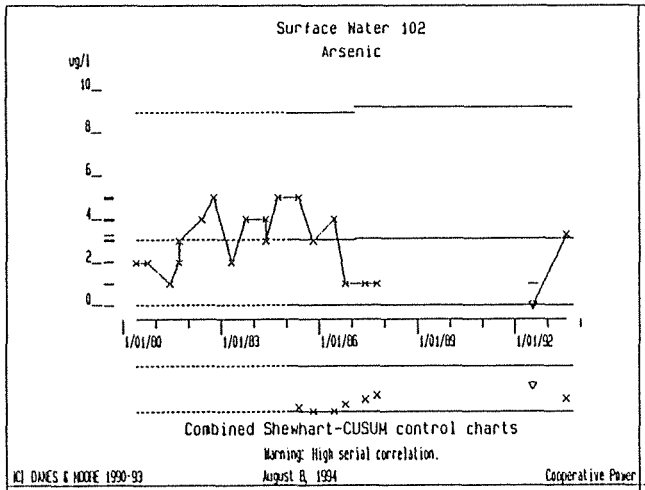

Surface Water 101
Boron
mg/l
1.8
1.5
1.2
0.9
0.6
0.3
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 0.0917 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

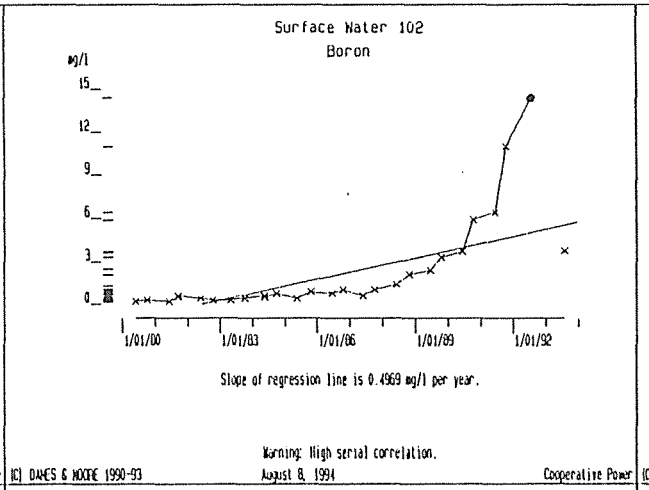

Surface Water 101
Chloride
mg/l
45.0
37.5
30.0
22.5
15.0
7.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 1.7839 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

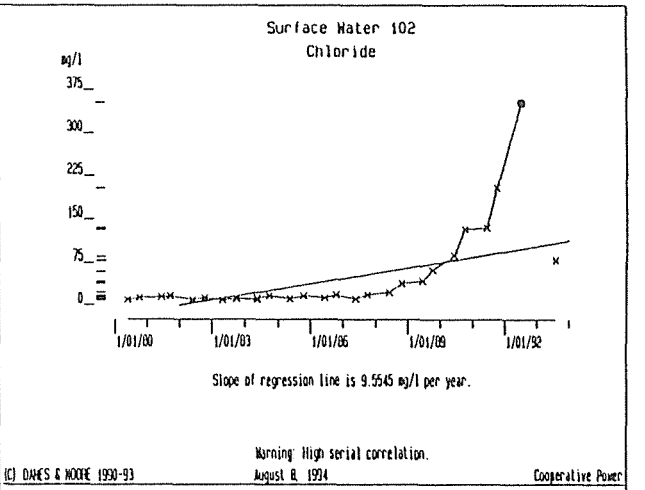

Surface Water 101
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

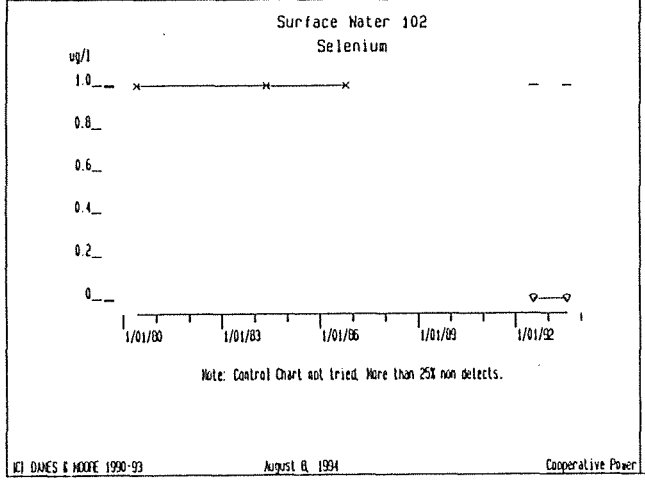

Surface Water 101
Strontium
mg/l
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 0.0768 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

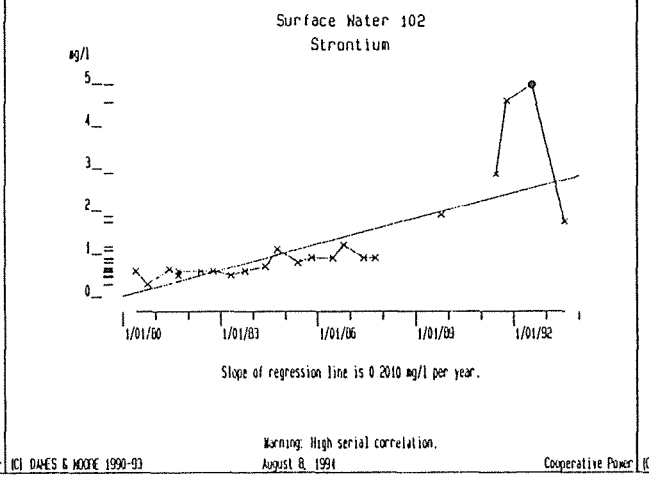

Surface Water 101
Sulfate
mg/l
1,800
1,500
1,200
900
600
300
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 76.4614 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

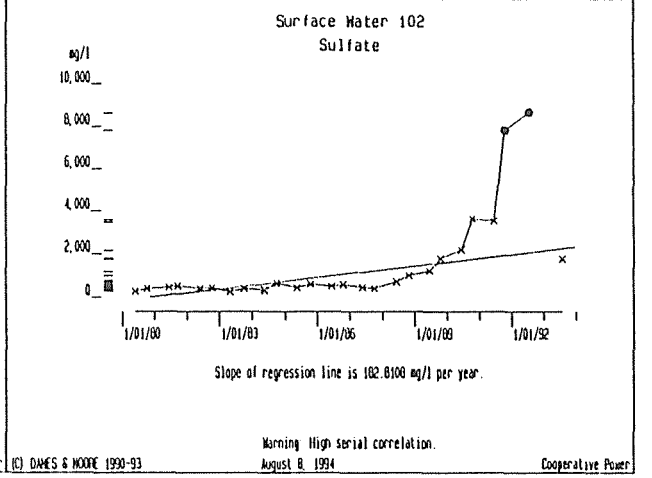

Surface Water 102
Arsenic
ug/l
10
8
6
4
2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

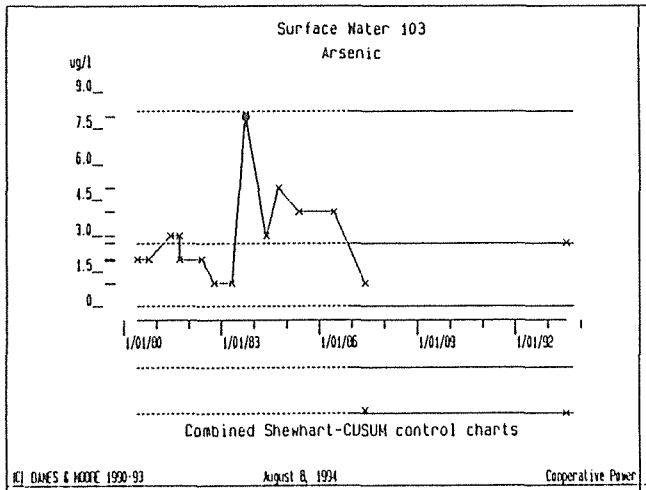

Surface Water 102
Boron
mg/l
15
12
9
6
3
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 0.4969 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

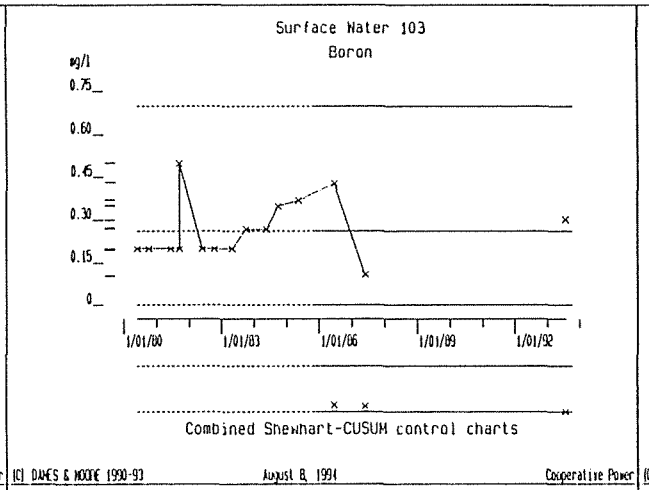

Surface Water 102
Chloride
mg/l
375
300
225
150
75
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 9.5545 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

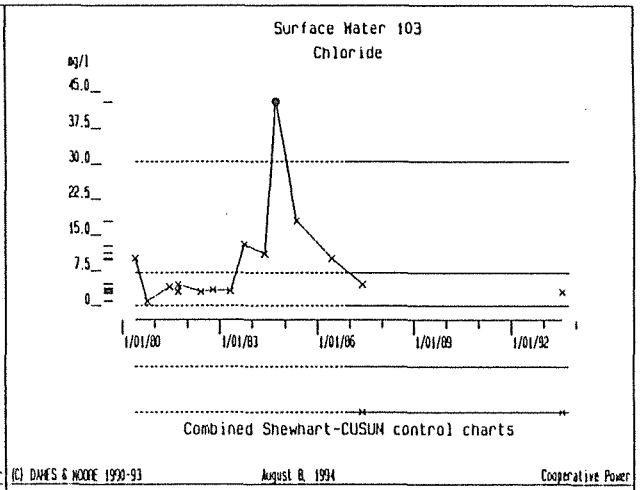

Surface Water 102
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

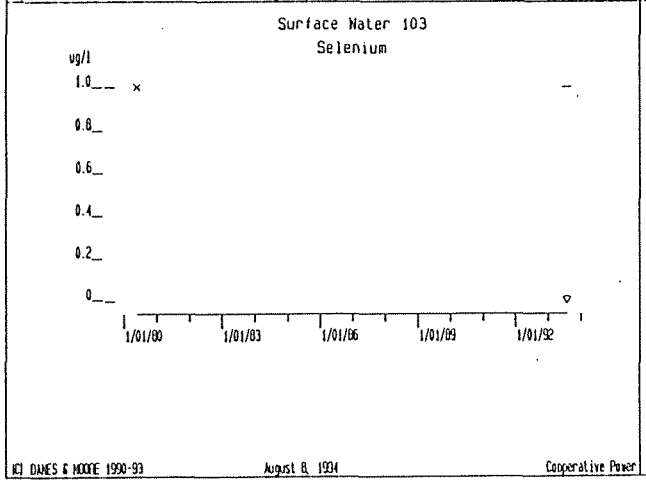

Surface Water 102
Strontium
mg/l
5
4
3
2
1
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 0.2010 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

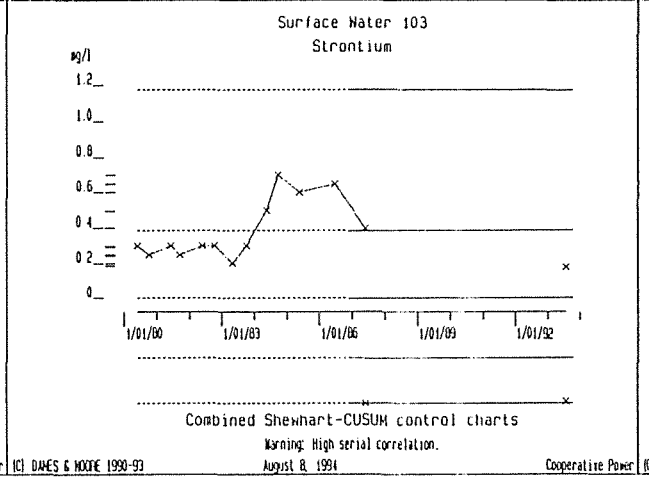

Surface Water 102
Sulfate
mg/l
10,000
8,000
6,000
4,000
2,000
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Slope of regression line is 182.8100 mg/l per year.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

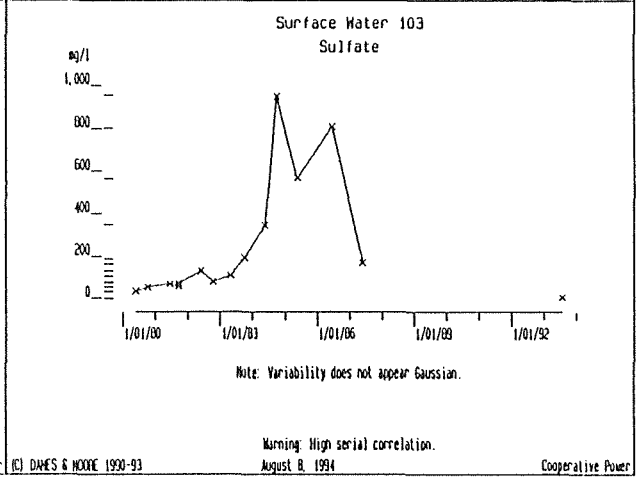

Surface Water 103
Arsenic
ug/l
9.0
7.5
6.0
4.5
3.0
1.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

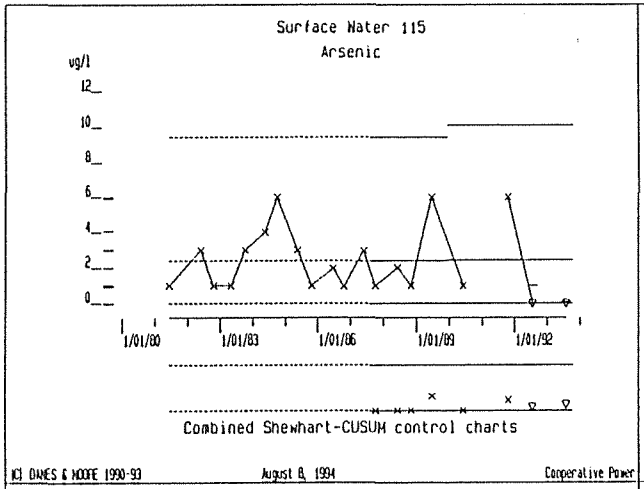

Surface Water 103
Boron
ug/l
0.75
0.60
0.45
0.30
0.15
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

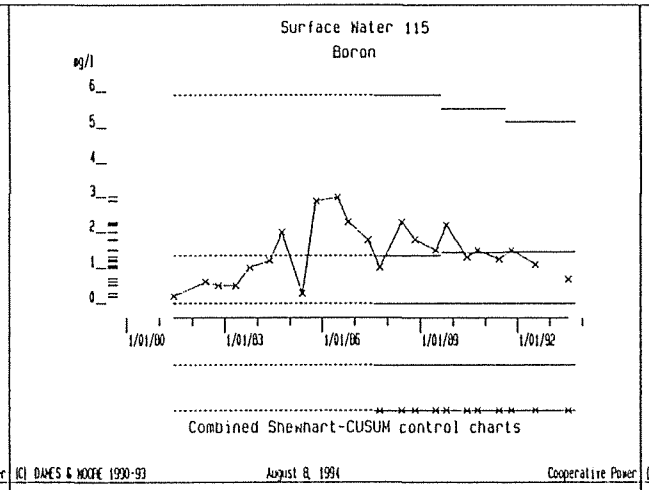

Surface Water 103
Chloride
ug/l
45.0
37.5
30.0
22.5
15.0
7.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

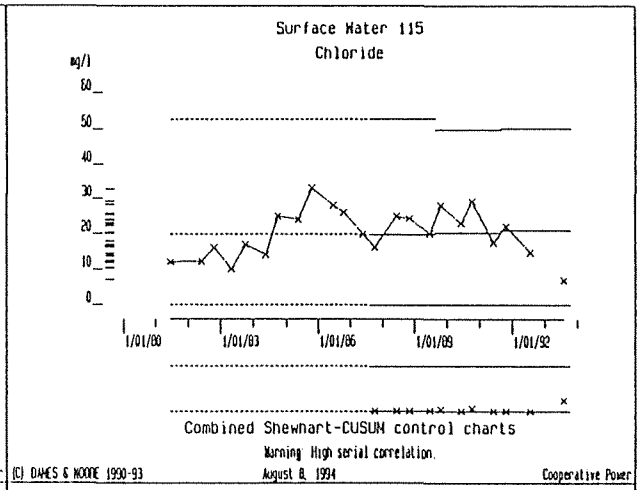

Surface Water 103
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

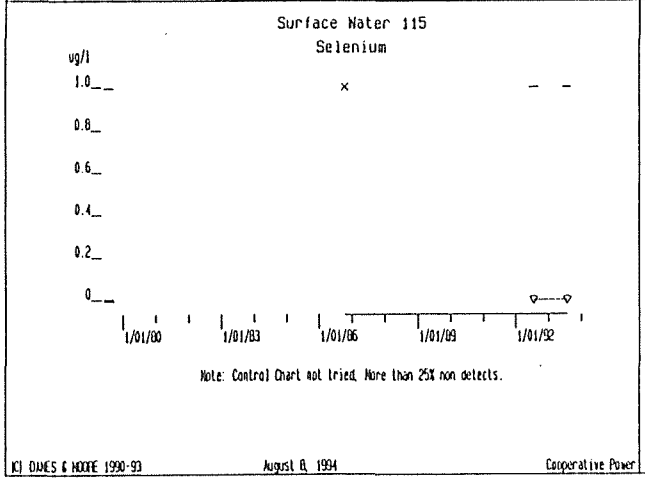

Surface Water 103
Strontium
ug/l
1.2
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

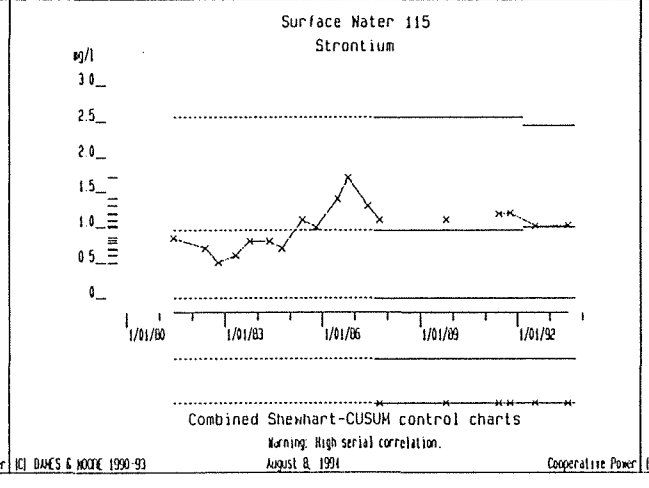

Surface Water 103
Sulfate
ug/l
1,000
800
600
400
200
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Variability does not appear Gaussian.
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

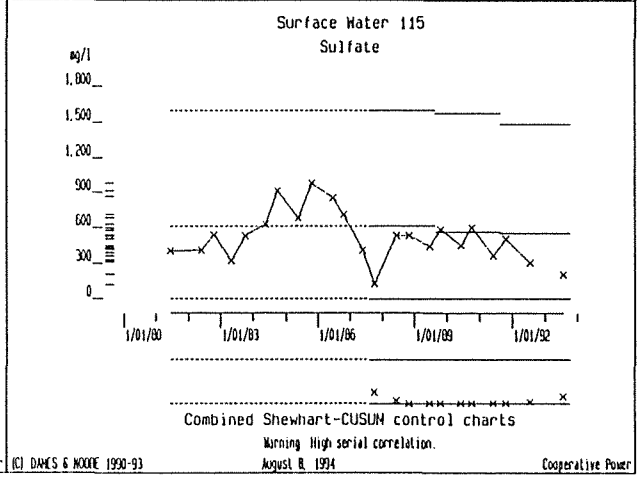

Surface Water 115
Arsenic
ug/l
12
10
8
6
4
2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

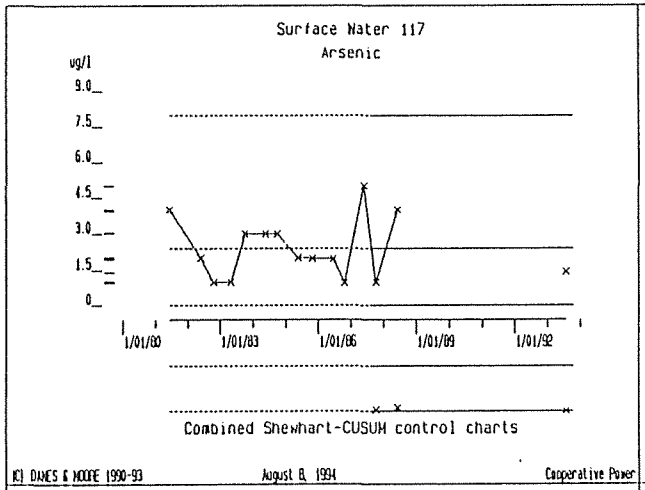

Surface Water 115
Boron
ug/l
6
5
4
3
2
1
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

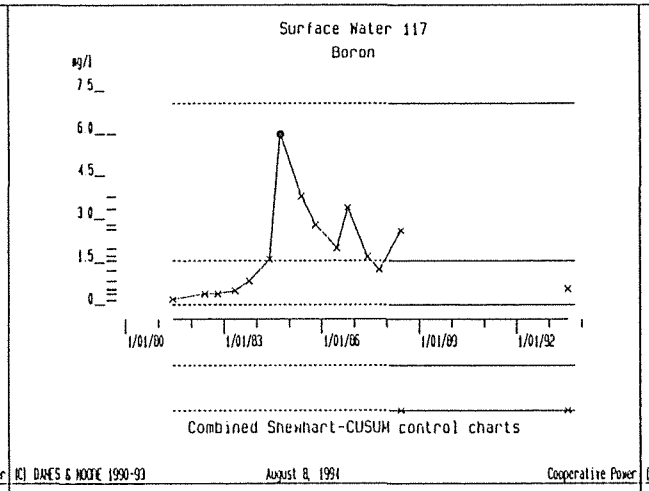

Surface Water 115
Chloride
ug/l
60
50
40
30
20
10
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

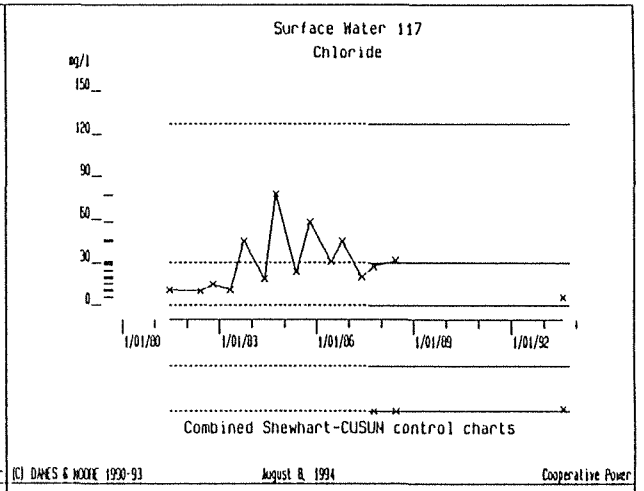

Surface Water 115
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Control Chart not tried. More than 25% non detects.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

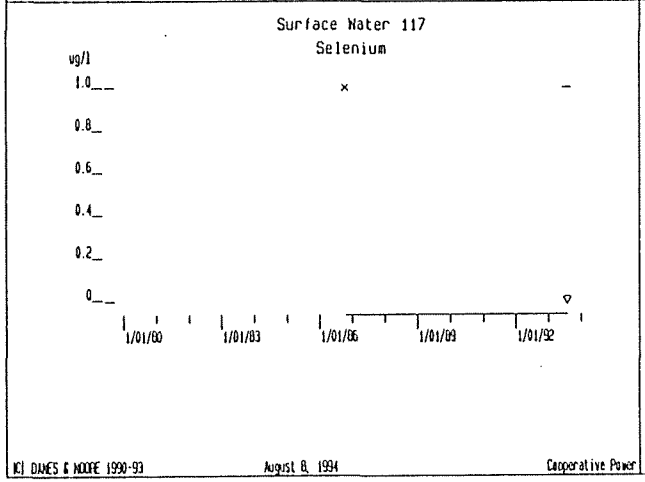

Surface Water 115
Strontium
ug/l
3.0
2.5
2.0
1.5
1.0
0.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

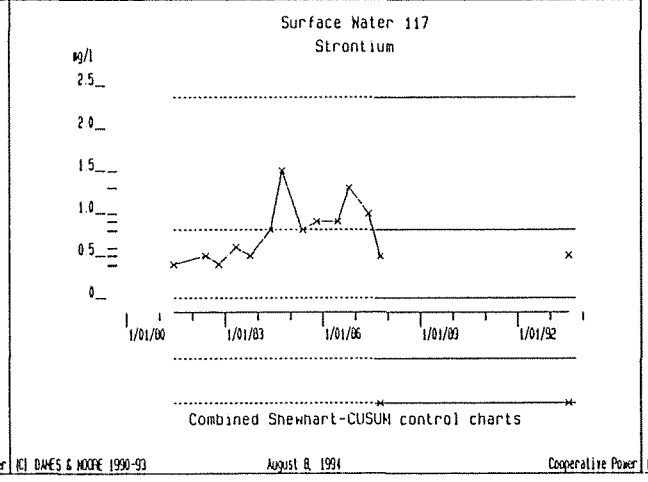

Surface Water 115
Sulfate
ug/l
1,800
1,500
1,200
900
600
300
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
Warning: High serial correlation.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

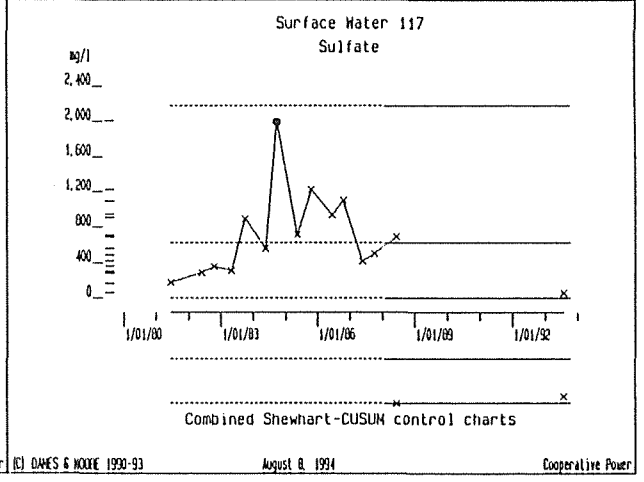

Surface Water 117
Arsenic
ug/l
9.0
7.5
6.0
4.5
3.0
1.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAVIES & MOORE 1990-93
August 8, 1994
Cooperative Power

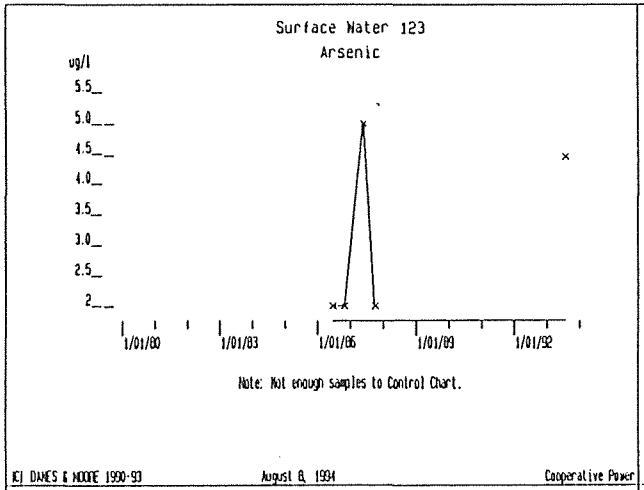

Surface Water 117
Boron
ug/l
7.5
6.0
4.5
3.0
1.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAVIES & MOORE 1990-93
August 8, 1994
Cooperative Power

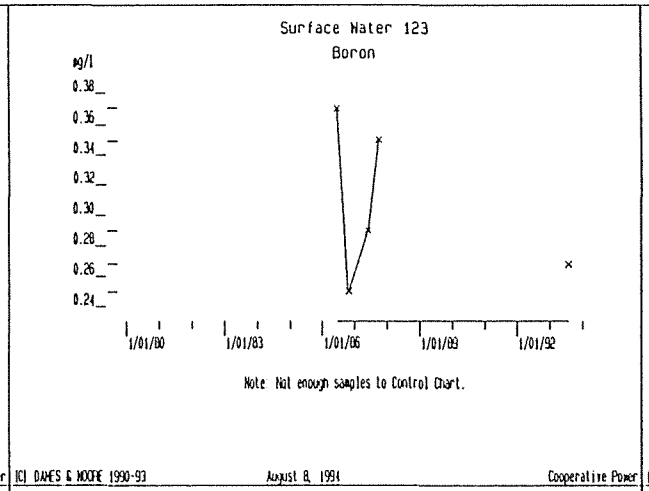

Surface Water 117
Chloride
mg/l
150
120
90
60
30
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAVIES & MOORE 1990-93
August 8, 1994
Cooperative Power

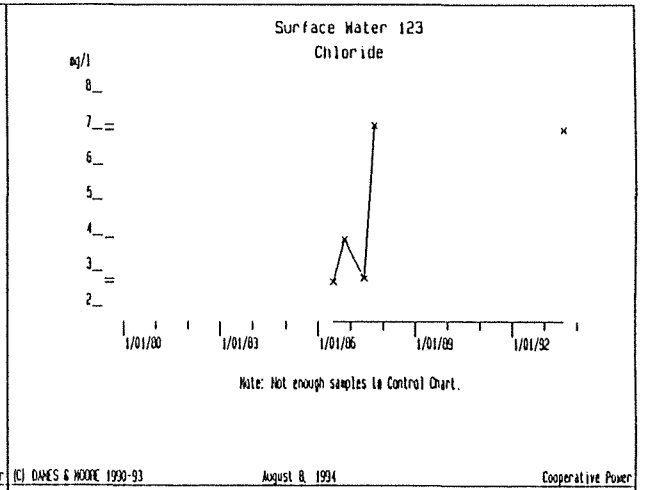

Surface Water 117
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAVIES & MOORE 1990-93
August 8, 1994
Cooperative Power

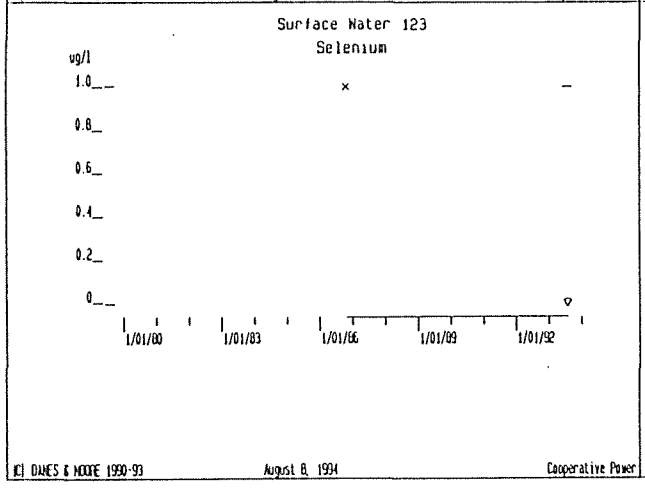

Surface Water 117
Strontium
mg/l
2.5
2.0
1.5
1.0
0.5
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAVIES & MOORE 1990-93
August 8, 1994
Cooperative Power

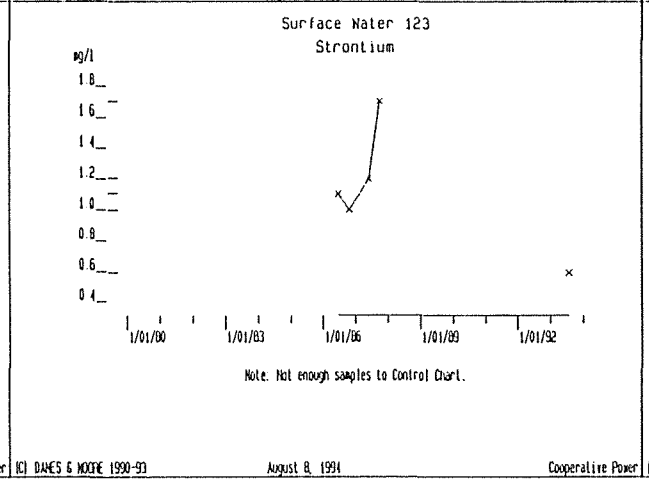

Surface Water 117
Sulfate
mg/l
2,400
2,000
1,600
1,200
800
400
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Combined Shewhart-CUSUM control charts
(C) DAVIES & MOORE 1990-93
August 8, 1994
Cooperative Power

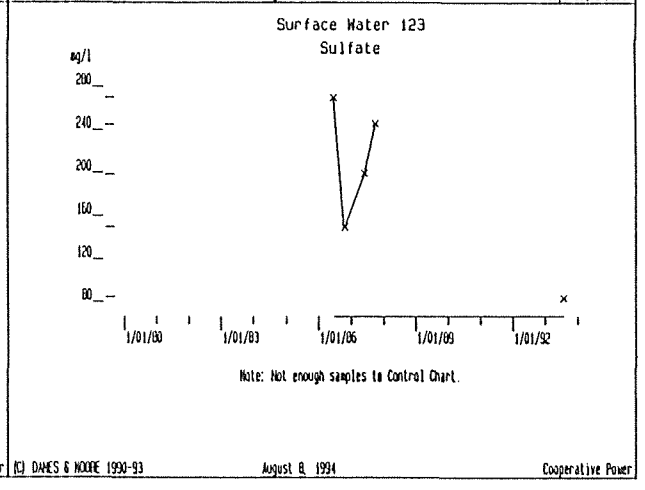

Surface Water 123
Arsenic
ug/l
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

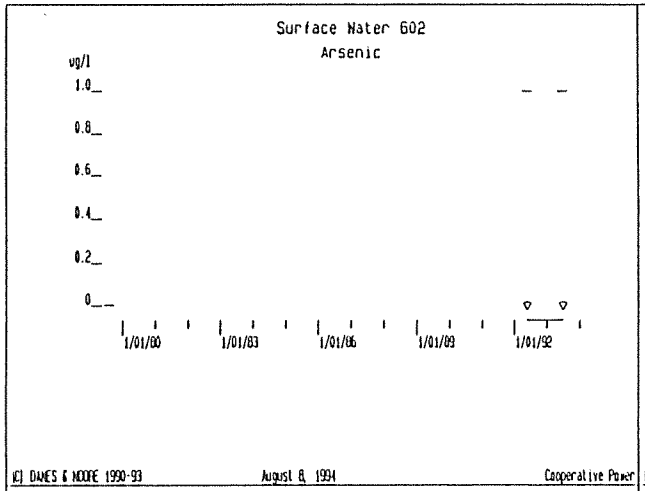

Surface Water 123
Boron
ug/l
0.38
0.36
0.34
0.32
0.30
0.28
0.26
0.24
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

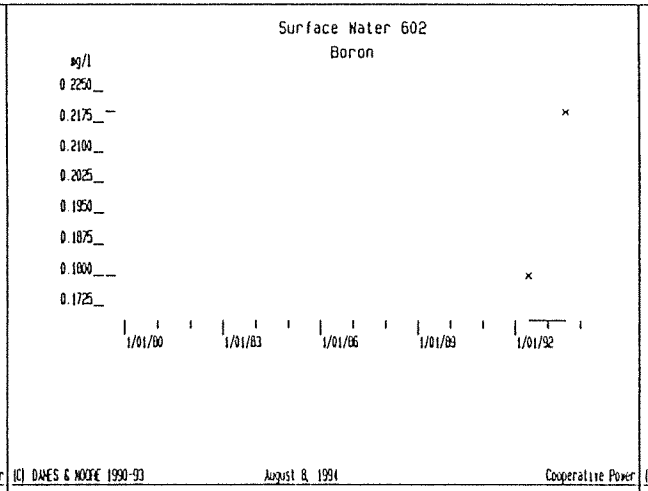

Surface Water 123
Chloride
mg/l
8
7
6
5
4
3
2
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

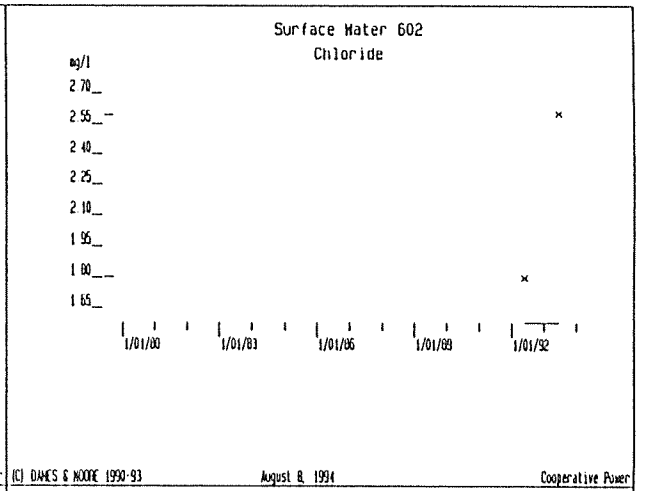

Surface Water 123
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

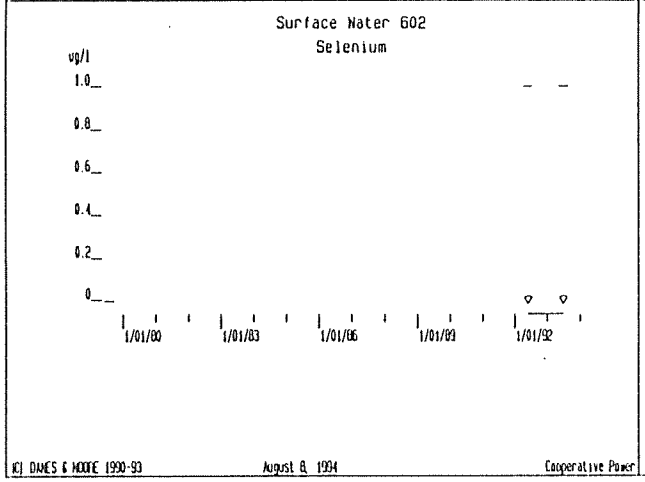

Surface Water 123
Strontium
mg/l
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

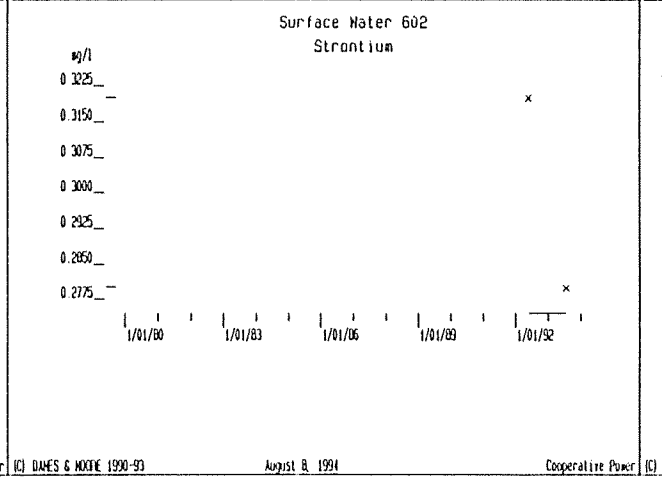

Surface Water 123
Sulfate
mg/l
280
240
200
160
120
80
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
Note: Not enough samples to Control Chart.
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

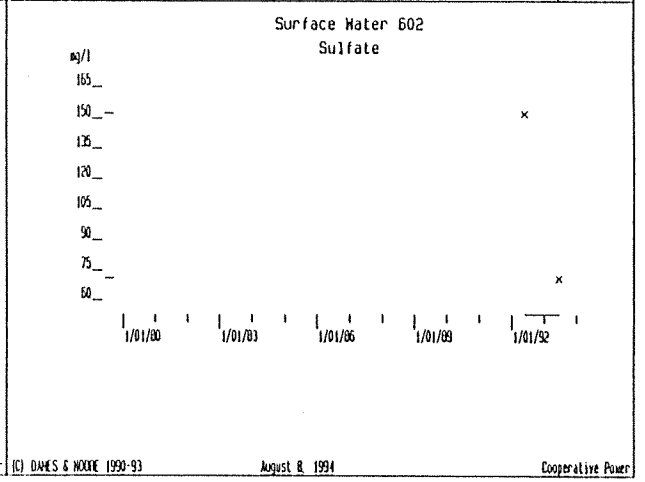

Surface Water 602
Arsenic
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

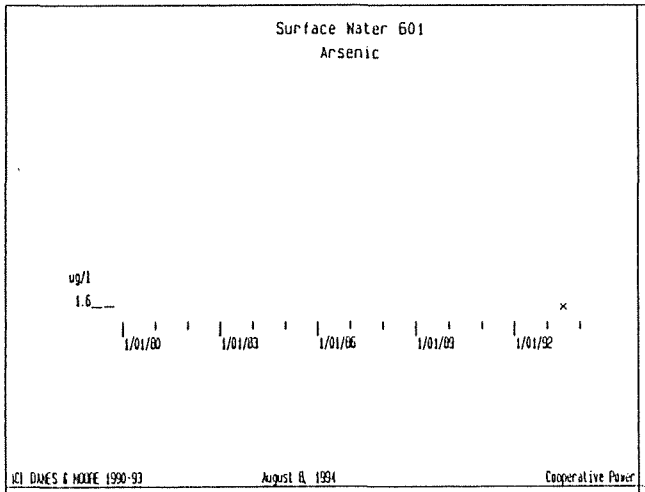

Surface Water 602
Boron
mg/l
0.2250
0.2175
0.2100
0.2025
0.1950
0.1875
0.1800
0.1725
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

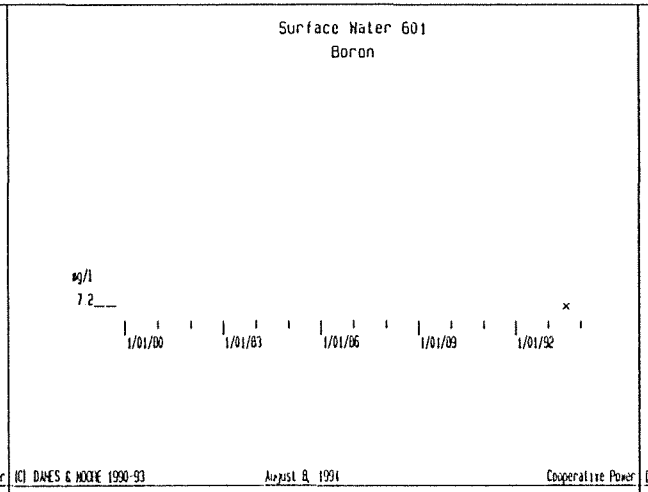

Surface Water 602
Chloride
mg/l
2.70
2.55
2.40
2.25
2.10
1.95
1.80
1.65
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

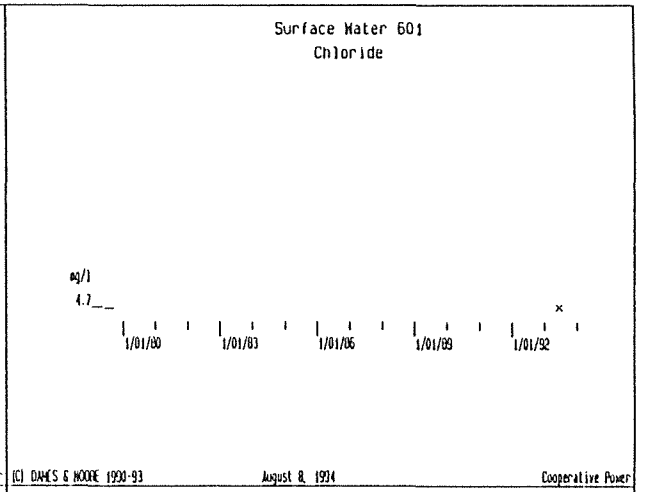

Surface Water 602
Selenium
ug/l
1.0
0.8
0.6
0.4
0.2
0
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

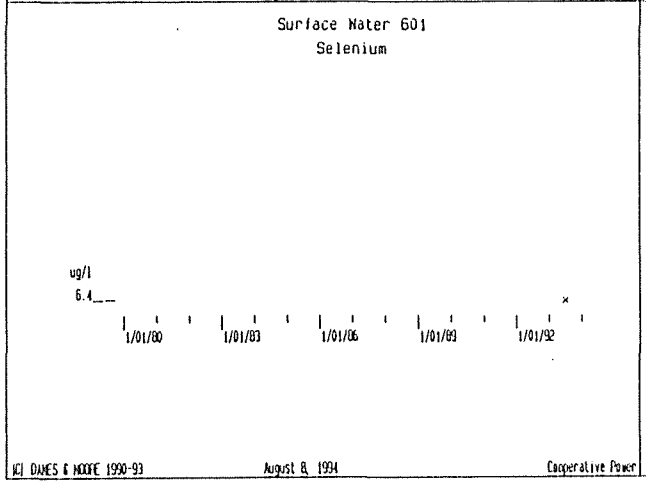

Surface Water 602
Strontium
mg/l
0.3225
0.3150
0.3075
0.3000
0.2925
0.2850
0.2775
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

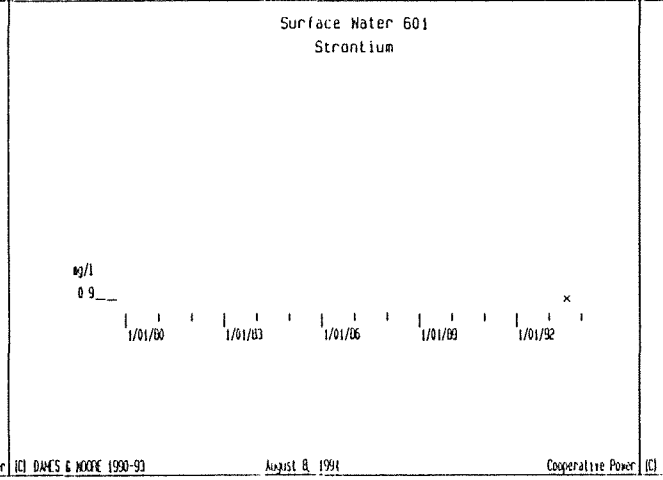

Surface Water 602
Sulfate
mg/l
165
150
135
120
105
90
75
60
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

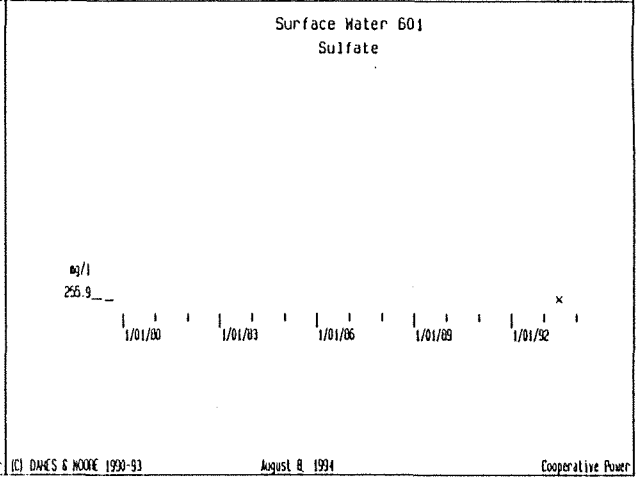

Surface Water 601
Arsenic
ug/l
1.6__
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power


Surface Water 601
Boron
mg/l
7.2__
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power


Surface Water 601
Chloride
mg/l
4.7__
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power


Surface Water 601
Selenium
ug/l
6.4__
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power


Surface Water 601
Strontium
mg/l
0.9__
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power


Surface Water 601
Sulfate
mg/l
255.9__
1/01/80
1/01/83
1/01/86
1/01/89
1/01/92
(C) DAMES & MOORE 1990-93
August 8, 1994
Cooperative Power

APPENDIX F

COAL CREEK STATION WELL CONSTRUCTION SUMMARY

Coal Creek Station Well Construction Summary Date: 8-94

Well No.	Depth (ft.) From Ground Surface	Top of Inner Casing (ft.)	Construction Date	Active or Out of Service	Comments:
1	70.0	1902.1	10-27-79	Active	
2	30.0	1902.5	10-27-79	Active	
3	32.5	1895.6	10-30-79	Active	
4	32.0	1889.1	10-30-79	Active	
5	30.0	1898.2	10-30-79	Active	
6	92.0	1941.1 ???	11-07-79	Out of Service	'91-92?
7	68.0	1884.8	10-28-79	Out of Service	'93
8	20.0	1884.8	10-28-79	Out of Service	'93
9	33.0 ???	1897.7 ???	10-28-79	Active Needs	New Elevation
10	23.0 ???	1897.8 ???	11-02-79	Active Needs	???
11	35.0	1888.9	11-02-79	Active	
12	78.0	1882.1	10-28-79	Active	
13	55.0	1882.6	10-28-79	Active	
14	20.0	1882.3	10-28-79	Active	
15	20.0	1879.9	11-07-79	Active	
16	23.0	1887.1	04-17-80	Active	
17	20.0	1883.7	04-23-80	Active	
18	16.0	1879.1	11-19-79	Active	
19	This well never existed				
20	31.5	1888.3	04-23-80	Active	
21	19.0	1885.5	04-23-80	Active	
22	10.0	1886.3	04-23-80	Active	
23	40.0	1914.5	04-21-80	Active	
24	25.0	1915.6	04-21-80	Active	
25	13.5	1916.8	04-21-80	Out of Service	'92
26	48.0	1892.6	04-22-80	Active	
27	33.0	1893.5	04-22-80	Active	
28	23.0	1894.0	04-22-80	Active	
29	28.0	1989.4	04-18-80	Active	
30	42.5	1896.4	04-18-80	Active	
31	25.0	1897.5	04-18-80	Active	
32	13.0	1896.2	04-18-80	Active	
33	33.0	1893.6	04-18-80	Active	
34	54.0	1906.2	04-17-80	Active	
35	33.0	1906.6	04-17-80	Active	

Well Construction Summary (Page 2)

Well No.	Depth (ft.) From Ground Surface	Top of Inner Casing (ft.)	Construction Date	Active or Out of Service	Comments:
36	18.0	1905.9	04-17-80	Active	
37	20.0	1900.9	04-21-80	Active	
38	25.0	1931.3	04-21-80	Active	
39	28.7	1938.1	04-22-80	Active	
40	14.5	1894.5	05-29-86	Active	
41	19.3	1897.8	05-29-86	Active	
43	14.6 ???	1880.7	05-28-86	Out of Service	???
44	14.7	1878.6	05-30-86	Active	
45	34.8	1878.8	05-30-86	Active	
46	29.7	1881.1	05-28-86	Active	
47	34.9	1889.0	05-29-86	Active	
48	42.8	1920.8	05-26-88	Out of Service	'94
49	19.9	1905.9	05-20-88	Active	
50	22.9	1902.6	05-20-88	Active	
51	18.8	1896.9	05-20-88	Active	
52	37.4	1920.7	05-20-88	Out of Service	Buried
53	39.5	1920.6 ???	05-20-88	Out of Service	Buried
54	37.4	1921.0	05-23-88	Active	
55	18.5	1921.5	05-23-88	Active	
56	29.2	1934.9	05-23-88	Out of Service	'94
57	32.7	1943.3	05-26-88	Out of Service	'94
58	22.5	1931.8	05-26-88	Out of Service	'94
59	25.9	1921.8	05-26-88	Out of Service	Well Run Over
60	41.9	1933.1	05-26-88	Active	
61	44.1	1962.0	05-27-88	Active	
62	43.3	1952.5	05-27-88	Active	
63	42.4	1957.6	05-27-88	Active	
64	24.6	1952.8	05-27-88	Active	
65	24.0	1958.3	05-27-88	Active	
66	37.3	1921.1	05-26-88	Out of Service	'94
67	41.6	1921.7	05-26-88	Out of Service	
68	43.7	1921.3	05-26-88	Out of Service	'94
69	18.0			Active	
70	12.0			Active	

Well Construction Summary (Page 3)

Well No.	Depth (ft.) From Ground Surface	Top of Inner Casing (ft.)	Construction Date	Active or Out of Service	Comments:
71				Out of Service	'94
72	24.0			Active	
73	28.0			Out of Service	Casing east ???
74	41.0			Active	
75	42.0			Active	
76	19.5			Active	
77	36.0			Active	
78	24.0			Active	
79	21.0			Active	
80	18.0			Active	
81	30.0			Active	
82	27.0			Active	
83	19.5			Active	
84	15.0			Active	
85	30.0			Active	
86	33.0			Active	
87	10.5			Active	
88	16.5			Active	
89	13.5			Active	
90	9.0			Active	
91	34.5			Out of Service	Casting Bent
92	13.5			Out of Service	Buried
93	21.0			Out of Service	Buried
94	34.5			Out of Service	Buried
531	113.8	1988.9	05-24-88	Active	
532	69.7	1989.1	05-24-88	Active	
533	107.7	2008.9	05-24-88	Active	
534	92.1	2009.9	05-25-88	Active	
535	109.7	1978.9	05-25-88	Active	
536	89.9	1978.9	05-25-88	Active	
537	71.3	1954.3	05-25-88	Active	
538	50.8	1954.2	05-25-88	Active	
539	57.7	1959.9	05-18-88	Active	

Well Construction Summary (Page 4)

Well No.	Depth (ft.) From Ground Surface	Top of Inner Casing (ft.)	Construction Date	Active or Out of Service	Comments:
540	41.6	1960.0	05-18-88	Active	
541	74.3	1936.9	05-18-88	Active	
542	47.6	1964.0	05-18-88	Active	
543	68.1	1985.5	05-17-88	Active	
544	26.8	1985.3	05-17-88	Active	
545	53.0	1986.8	05-19-88	Out of Service	
546	79.6	1969.6	05-17-88	Active	
547	38.5	1969.7	05-17-88	Active	
548	61.4	1966.1	05-17-88	Active	
549	33.8	1965.9	05-17-88	Active	
550	62.9	1982.9	05-19-88	Active	
551	35.2	1983.1	05-19-88	Active	
552	69.8	1992.0	05-19-88	Active	
553	56.2	1991.0	05-19-88	Active	
554	78.1	1974.0	05-19-88	Active	
555	47.1	1974.4	05-19-88	Active	
PZ-1	12.5	1901.7		Out of Service	'93
PZ-2	18.5	1901.8		Out of Service	'93
PZ-3	21.5	1899.8		Out of Service	'93
PZ-4	23.0	1883.7		Active	
PZ-5	21.5	1900.5		Out of Service	'92
PZ-6	11.0	1895.6		Out of Service	'92
PZ-7	24.5	1921.6		Out of Service	'92
PZ-8	43.5	1921.6		Out of Service	'92
PZ-9	24.0	1920.0		Out of Service	'92
PZ-10	44.0	1920.8		Out of Service	'93
PZ-11	20.0	1897.4		Out of Service	'93
PZ-12	29.6	1950.0	06-12-80	Out of Service	'92
PZ-13	49.5	1950.0	06-12-80	Out of Service	'92
PZ-14	34.5	1950.0	06-12-80	Out of Service	'92
PZ-15	55.3	1949.7	06-12-80	~~Out of Service~~ Inactive	~~'92~~
PZ-16	41.0	1950.0	06-12-80	Out of Service	'92
PZ-17	57.7	1950.0	06-12-80	~~Out of Service~~ Inactive	~~'92~~

Well Construction Summary (Page 5)

Well No.	Depth (ft.) From Ground Surface	Top of Inner Casing (ft.)	Construction Date	Active or Out of Service	Comments:
PZ-18	25.0	1915.0	06-12-80	Out of Service	'92
PZ-19					Unable to Find
PZ-20	23.0	1908.6	06-12-80	Out of Service	'92
PZ-21	24.0	1905.0	06-12-80	Out of Service	'92
PZ-22	55.0	1886.0	06-12-80	Out of Service	'92
PZ-23	16.0	1883.5			
PZ-24					
PZ-25					
PZ-26					
PZ-27					
PZ-28					
PZ-29					
PZ-36					
O-1				Out of Service	'92
O-2				Out of Service	'92
O-3				Out of Service	'92
O-4				Out of Service	'92
O-5				Out of Service	'92
O-6				Out of Service	'92
O-7				Out of Service	'92
O-8				Out of Service	'92
O-9				Out of Service	'92
O-11				Out of Service	'92
O-12				Out of Service	'92
0-13				Out of Service	'92
O-14				Out of Service	'92
O-15				Out of Service	'92
O-16				Out of Service	'92
O-17				Out of Service	'92
O-18				Out of Service	'92
O-19					
O-20					
O-21				Active	Renamed 321

Well No.	Depth (ft.) From Ground Surface	Top of Inner Casing (ft.)	Construction Date	Active or Out of Service	Comments:
O-22				Active	Renamed 322
O-23				Out of Service	'92
O-24				Out of Service	'92
O-25				Out of Service	'92
O-26				Out of Service	'92
O-27				Out of Service	'92
O-28				Out of Service	'92
O-29				Out of Service	'92
HPZ-1	28.0	1916.9	10-25-83	Out of Service	'89
HPZ-2	25.0	1911.4	10-26-83	Out of Service	'89
HPZ-3	23.0	1905.8	10-26-83	Out of Service	'92
HPZ-4	23.0	1905.2	10-26-83	Out of Service	'92
HPZ-5	23.5	1908.4	10-27-83	Out of Service	'92
HPZ-6	17.5	1904.6	10-27-83	Out of Service	'92
HPZ-7	19.5	1898.9	10-27-83	Out of Service	'92
HPZ-8	14.2	1906.2 ??	10-28-83	New Location	???
HPZ-9	14.5	1902.3	10-28-83	Active	Renamed 209
PB-30	30.0	1914.0	10-29-81	Out of Service	'92
PB-36	70.7	1954.0	01-14-82	Out of Service	'92
PB-36a					
PB-37	69.0	1953.0	01-20-82	Out of Service	'92
PB-38	87.0	1952.0	01-21-82	Out of Service	'92
203					
204				May also be labeled PZ-4	
208				Also labeled HPZ-8	
209				Also labeled HPZ-9	
211				Also labeled PZ-11	
215				Also labeled PZ-15	
217				Also labeled PZ-17	
312				Out of Service	
P-15					

Well No.	Depth (ft.) From Ground Surface	Top of Inner Casing (ft.)	Construction Date	Active or Out of Service	Comments:
O-22				Active	Renamed 322
O-23				Out of Service	'92
O-24				Out of Service	'92
O-25				Out of Service	'92
O-26				Out of Service	'92
O-27				Out of Service	'92
O-28				Out of Service	'92
O-29				Out of Service	'92
HPZ-1	28.0	1916.9	10-25-83	Out of Service	'89
HPZ-2	25.0	1911.4	10-26-83	Out of Service	'89
HPZ-3	23.0	1905.8	10-26-83	Out of Service	'92
HPZ-4	23.0	1905.2	10-26-83	Out of Service	'92
HPZ-5	23.5	1908.4	10-27-83	Out of Service	'92
HPZ-6	17.5	1904.6	10-27-83	Out of Service	'92
HPZ-7	19.5	1898.9	10-27-83	Out of Service	'92
HPZ-8	14.2	1906.2 ??	10-28-83	New Location	???
HPZ-9	14.5	1902.3	10-28-83	Active	Renamed 209
PB-30	30.0	1914.0	10-29-81	Out of Service	'92
PB-36	70.7	1954.0	01-14-82	Out of Service	'92
PB-36a					
PB-37	69.0	1953.0	01-20-82	Out of Service	'92
PB-38	87.0	1952.0	01-21-82	Out of Service	'92
203					
204				May also be labeled PZ-4	
208				Also labeled HPZ-8	
209				Also labeled HPZ-9	
211				Also labeled PZ-11	
215				Also labeled PZ-15	
217				Also labeled PZ-17	
312				Out of Service	
P-15					

Well No.	Depth (ft.) From Ground Surface	Top of Inner Casing (ft.)	Construction Date	Active or Out of Service	Comments:
PZ-36					
SW-106				Out of Service	Renamed 126 & 127
SW-108				Out of Service	'94

There are two sets of 208 and 209. HPZ-8 and 9 were named 208 and 209, only familiar with this set.

APPENDIX G

1993 WATER QUALITY DATA SET
(ON COMPUTER DISK)

APPENDIX B-6

Revised Water Quality Monitoring Plan, Dames & Moore 1991

REVISED
WATER QUALITY MONITORING PLAN
COAL CREEK STATION

FOR COOPERATIVE POWER ASSOCIATION
DECEMBER 1991

DAMES & MOORE

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1.0 INTRODUCTION

This report provides an evaluation of the Water Quality Monitoring Program at Coal Creek Station and at selected locations at the adjacent Falkirk Mine. These facilities are located in McLean County near Underwood, North Dakota (Figure 1). This document is based on our work plan dated June 27, 1991 and is performed in accordance with our Master Service Agreement with Cooperative Power Association (#548113) dated March 15, 1991.

The primary purpose of this study is to review and revise the current water quality monitoring plan to be more cost effective and reflective of current needs. This intent is based on a database consisting of thirteen years of water quality data and completion of thirty-one site-specific hydrogeology and related reports. The product of this evaluation is a revised Water Quality Monitoring Plan (WQMP), given in Section 6.0 of this report.

2.0 BACKGROUND

Coal Creek Station (CCS) is a two unit 1100 MW coal fired power plant. Coal is supplied exclusively by the Falkirk mine which is immediately north of Coal Creek Station. A generalized map of the site is presented as Figure 2.

Initial subsurface exploration at the proposed CCS site began in 1974. Unit No. 1 began operation in 1979 and Unit No. 2 came was completed in 1980. Water which is used during plant operations is dissipated from a series of evaporation ponds. Solids (primarily ash, with some lime sludge) are deposited in ash ponds at Coal Creek Station and at three engineered solid waste disposal areas at the Falkirk mine. The ground water monitoring program is in place to monitor impacts to ground water and surface water that may be associated with power plant activities. The data that have been collected are in compliance with North Dakota State Department of Health (NDSDH) requirements and are submitted annually to NDSDH.

Ground water and surface water data have been collected from around and within natural and engineered ponds since 1979. Engineered ponds at Coal Creek Station include Evaporation Pond 91 (formerly Lower North Evaporation Pond, LNEP) , Evaporation Pond 92 (former Upper North Evaporation Pond, UNEP), Evaporation Pond 93 (former Lower East Evaporation Pond, LEEP), Evaporation Pond 94 (former Upper East Evaporation Pond, UEEP), Ash Pond 91 (former West Half South Ash Pond, W/SAP), Ash Pond 92 (former East Half South Ash Pond, E/SAP), Section 16 Disposal Area (former East Ash Pond, EAP), River Water Holding Basin, Extended Basin, and Recycle Basin. The engineered areas at Falkirk mine include Section 5 Disposal Area, Section 31 Disposal Area, and Section 32 Disposal Area.

3.0 KNOWN HYDROGEOLOGICAL CONDITIONS

More than 30 reports have been completed to evaluate hydrogeological conditions. The documents are separated between Coal Creek Station and Falkirk mine because of different geology, different use, and different investigative histories. The reports are listed in Appendices A and B (Coal Creek Station and Falkirk Mine, respectively) with brief summaries of the activities and/or findings from each of the investigations.

The results of the investigations have provided a comprehensive hydrogeological understanding of the area. A summary of known hydrogeological conditions is given in the following sections.

3.1 Coal Creek Station

Ground water data have been collected from more than 100 ground water monitoring wells. The surface water data have been collected from approximately 20 natural ponds, sloughs, and waterways and approximately 20 engineered ponds, disposal areas, and related discharges. More than five hundred soil borings have been drilled at Coal Creek Station. These borings, which range from 4 to 400 feet deep, have been used for engineering and hydrogeological purposes. A summary of known hydrogeological conditions at Coal Creek Station is listed below.

3.1.1 Geology

The geology of Coal Creek Station has been established from findings of the completed reports. A generalized geological cross-section is provided as Figure 3. The unconsolidated surficial deposits are of the Coleharbor formation consisting of stratified and unstratified glacial drift. It appears that the drift is the result of three glacial advances. The near-surface materials are silty clay and sandy clay till with interbedded sand lenses. Bedrock is located along the north and south side of Coal Creek Station as the flanks of the west-to-east drainage network of wetlands and legal drain system.

3.1.2 Ground Water Flow

Regional ground water flow in the vicinity of CCS is a subtle expression of the ground surface topography, which is influenced by the configuration of the eroded bedrock. The ground water flow is generally toward the wetlands in the central part of the site, except where locally affected by other factors, such as mounding beneath ponds. The ground water in the uplands is within the poorly consolidated bedrock, while the ground water in the lowlands is found in the glacial till.

3.1.3 Water Quality Impacts

Determination of the extent and magnitude of water quality impacts has been based on data from ground water and surface water monitoring locations. Recent electromagnetic survey information has also been useful. The findings indicate that there are several sources of water quality impacts (ponds). Contamination from the sources has been found to be widespread throughout the ground water flow system at the site.

3.2 Falkirk Mine

The hydrogeological setting of the Falkirk Mine area has been determined as part of the coal exploration and mining activities. The three ash disposal areas at the Falkirk Mine are located in areas that have been previously mined. There are 24 ground water monitoring wells at the Falkirk mine directly related to the ash disposal areas. Data from other nearby wells have also been used to evaluate hydrogeological conditions in additional areas of the Falkirk mine ash disposal areas. A summary of known hydrogeological conditions at Coal Creek Station is listed below.

3.2.1 Geology

The geology of the Falkirk Mine Disposal Area has been established from findings of the completed reports. A generalized geological cross-section is provided as Figure 4. Unconsolidated glacial till overlies the economically significant lignite beds of the Sentinel Butte formation. The Sentinel Butte formation is primarily composed of poorly consolidated carbonaceous shales, locally know as bedrock clays, and lignite beds. The Hagel A and Hagel B coal seams are considered to be local aquifers. A poorly cemented silty sandstone locally known as the Sheet Sand, also an aquifer, underlies the clay parting beneath the Hagel B Coal Bed. The Ash Disposal Areas are engineered facilities within the mined out area.

3.2.2 Ground Water Flow

Ground water flow in the Hagel B and the Sheet Sand is toward the south-southwest toward the Weller Slough Complex. The Hagel A aquifer has been breached and is dry and/or discharges to the next lower aquifer, depending upon the extent of mining activities. The geology, and therefore the ground water flow pattern, is disturbed in the vicinity of the disposal areas. The Hagel B aquifer is most likely to be impacted by releases from the ash disposal area since it is located at the base of the mined excavation and at the same elevation as the base of the ash disposal area. The Sheet Sand has been monitored because it is the next aquifer below the base of the disposal facility.

3.3.3 Water Quality Impacts

Ground water quality in this area is highly variable and difficult to monitor. The water quality is affected by exposure to weathered low quality coal associated with the erosional features and from mine tailings. Therefore it is difficult to establish comparative conditions with which to evaluate potential adverse water quality impacts associated with the disposal areas. Furthermore, ash impacts are expected to be minimal because of the clay lining of the engineered disposal areas.

4.0 WATER QUALITY DATABASE

The water quality and water level database which began in 1979, has 13 years of data, 206 sampling locations, data for 47 parameters, and contains 44,196 data points. The current WQMP includes 158 sampling locations and data for 35 parameters. A goal of this data evaluation is to reduce the number of sampling locations and number of parameters that are needed to adequately monitor representative ground water and surface water conditions at the site.

The following sections discuss (a) the monitoring programs that have generated these data and (b) a summarized description of the collected data.

4.1 Monitoring Program

The Coal Creek Station power plant was built as a "zero discharge facility". This concept means that water loss from the ponds was expected to be by evaporation, not by surface water discharge or ground water seepage. A network of ground water and surface water monitoring locations has been developed to monitor the effectiveness of this concept. The monitoring locations are listed in Appendix C. The existing Coal Creek Station ground water and surface water monitoring locations are shown on Figure 5 and 6, respectively.

A network of 15 wells were initially installed around the plant to monitor ground water conditions. Three surface water sample locations were initiated in 1980. Water samples from these locations were analyzed for 13 parameters. The monitoring locations expanded as additional investigations were conducted. A summary of the data locations and the date of first data collection event is given on Table 1.

In November 1985 a formalized Water Quality Monitoring Plan (WQMP) was developed for Coal Creek Station. The purpose of the WQMP was to establish monitoring locations and water quality parameters to evaluate potential impacts to the wetlands and shallow ground water in the area which may be associated with a facility. This plan proposed additional ground water and surface water monitoring

locations. The plan was implemented in 1986. It was recommended that three field parameters (field temperature, field pH, and field conductivity) and four laboratory parameters (sulfate, chloride, boron, and arsenic) be analyzed two times per year during the second and fourth quarters. It was also recommended that water level measurements be taken quarterly at all wells and surface water locations. The plan acknowledged that additional supplemental monitoring locations may be needed in the future depending upon the findings of the proposed monitoring program.

The Falkirk mine developed a concurrent monitoring program, however this program was designed to primarly support mining exploration and production. Wells installed by Falkirk and others were placed throughout the mine area.

Beginning in 1982 three ash disposal areas were designed and constructed for Coal Creek Station at the Falkirk mine (Section 5 Disposal Area, Section 31 Disposal Area, and Section 32 Disposal Area). A total of 24 ground water monitoring wells were installed in 1988. The monitoring wells are the basis of an established ground water monitoring plan developed in 1988 (Figure 7). Additional exploration monitoring wells in the immediate area of the disposal sites continue to be monitored by Falkirk.

The current WQMP has expanded to include Coal Creek Station and Falkirk mine monitoring locations. The current plan includes 123 monitoring wells, 26 surface water locations, 9 precipitation runoff monitoring locations, 35 parameters, and a monitoring schedule that varies from four times per year to every five years. The permitted Water Quality Monitoring Plan is presented in Appendix D.

Summaries of the WQMP are presented in tabular form for ease of review. The Sample Frequency for CCS Ground Water, CCS Surface Water, CCS Precipitation Runoff, and FM Ground Water are shown on Tables 2 - 5, respectively. The tables show the number of locations sampled during each quarter and during special events (every 5 years and/or runoff events). The tables are organized for each sampling group by physical tests, metal analysis, and inorganic tests respectively.

Table 6 shows a Comparison of Analytical Parameters that are tested from each of the sampling location groups. The list of analytical parameters differs for each sampling location group.

4.2 Data Summary

The water quality database contains numerous data points, some of which are not included in the WQMP. Data not included are primarily from limited sampling events and temporary or destroyed monitoring locations. Data that are included in the WQMP are summarized for representative locations in the tables below.

Representative sampling locations at Coal Creek Station are given in Table 7. The Coal Creek Station data are separated by Physical Tests, Inorganic Tests, and Metal Analysis in Tables 8 - 10, respectively. Minimum and maximum reported values are shown for each parameter.

Representative sampling locations at the Falkirk Mine are given in Table 11. The Falkirk Mine data are separated by Physical Tests, Inorganic Tests, and Metal Analysis in Tables 12 - 14, respectively. Minimum and maximum reported values are shown for each parameter.

Additional data not shown on these tables are the electromagnetic surveys that have been conducted annually since 1988. These data had been collected from a permanently established pattern around the Coal Creek Station ponds and the Falkirk Mine disposal areas. These data are referenced in Appendices A and B.

5.0 RECOMMENDED PLAN MODIFICATIONS

Water quality data have been collected for thirteen years from some of the monitoring locations. The discussion pertains to both Coal Creek Station and the Falkirk Mine Disposal Area. The general conclusions are the same, although the Falkirk data are less extensive. This section will discuss the (a) analytical parameters, (b) sampling locations, and (3) sampling frequency.

5.1 Analytical Parameters

A pattern can be seen from the thirteen-year water quality database. Some of the parameters have shown little or no change throughout the monitoring history, and some parameters respond in a pattern that is similar to others.

Analysis of the data is partially limited because of reporting and analytical procedures. The Method Detection Levels (MDLs) have changed throughout the history of the monitoring program. This situation makes trend analysis possible only in general terms. It also appears that anomalous data values have been left in the database, probably because of the reported difficulty to edit the VAX information.

The analytical parameters are organized into groups for this discussion. The groups are physical tests, metal analysis and inorganic tests. The data are further arranged as upgradient, ponds (surface water), downgradient (ground water), and downgradient (surface water). The sequence provides a generalized view of water quality changes associated with power plant activities.

5.1.1 Physical Tests

The nine physical tests performed for the current WQMP are shown on Table 6.

The field parameters (temperature, pH, and conductivity) are important indicator parameters. These parameters are used to evaluate if the collected water sample is representative of in-situ conditions and as an indicator of general water quality conditions.

The field temperature varies depending on the time of year and the depth of the well. Temperature ranges have been recorded from 2.0 to 26.0 degrees C. This temperature range is not unusual for these conditions. Temperature should be recorded as part of well sampling protocol but does not need to be presented as a primary WQMP indicator.

Field pH is especially useful to evaluate the potential mobility of metals in the soil and ground water. Metals are generally stable (immobile) when the pH is greater than 5.0, as is the case at this site. A typical range of pH in ground water is from 6.5 to 8.5. Laboratory pH is used to support the findings in the field and to document sample conditions in preparation for analysis.

Specific conductance is a measure of the waters ability to conduct an electrical current. The specific conductivity varies almost directly with the amount of dissolved minerals in the water. There is a strong correlation between total dissolved solids and specific conductance. For this reason, specific conductance and total dissolved solids (TDS) are useful indicators of water quality conditions. Total suspended solids (TSS) can be useful in evaluating natural surface water conditions. However, limited TSS data at this site and the presence of other surface water quality indicator parameters does not warrant inclusion of TSS in the WQMP.

Sewage from CCS is partially treated and then discharged to the Recycle Basin. Typical sewage indicator parameters are methylene blue active substances (MBAS), fecal coliform, and total coliform. The data, however, do not show a change in concentrations at the site. The only exception appears to be one sample in the River Water Holding Basin which shows non-fecal coliform which is probably related to the raw river water in the basin.

Based on the relationships discussed above, it is recommended that field pH, lab pH, specific conductance, and TDS be included in the revised WQMP. TSS, MBAS, fecal coliform, and total coliform are not necessary to monitor water quality trends at CCS or at the Falkirk disposal areas.

5.1.2 Metal Analysis

The 21 metal analyses performed for the current WQMP are shown on Table 6.

Metals that are expected to be present from coal ash are arsenic, boron, selenium, and strontium. These parameters show changes in concentrations and indicate that an impact to water quality has occurred. These parameters should continue to be monitored as part of the WQMP.

Barium, chromium, lead, and mercury are metals with established EPA maximum contaminant levels (MCL). These parameters, however, show relatively minor changes in concentration and are generally below the MCL for each parameter. It is recommended that these parameters be analyzed periodically (annually), but not reported as part of the permitted WQMP. The rationale is that if the primary indicator metals (arsenic, boron, selenium, and strontium) can be tracked and controlled, then the other metals will also be implicitly tracked and controlled without actually testing for them.

Aluminum, beryllium, cadmium, copper, molybdenum, nickel, and silver show relatively little changes in concentration, some of which is masked by the reported MDLs rather than measured concentrations. It is recommended that these parameters be analyzed periodically (annually), but not reported as part of the permitted WQMP. The rationale is that if the primary indicator metals (arsenic, boron, selenium, and strontium) can be tracked and controlled, then the other metals will also be implicitly tracked and controlled without actually testing for them.

Sodium, potassium, magnesium, manganese, and calcium are used internally for evaluating cation/anion balances. These parameters, however, do not need to be reported as part of the WQMP. The trends associated with these parameters are tracked by other parameters, notably TDS and specific conductance.

5.1.3 Inorganic Tests

The 10 inorganic tests performed for the current WQMP are shown on Table 6.

Sulfate and chloride are useful inorganic parameters for tracking ground water movement. Sulfate is released from the coal ash and is a recognizable ground water and surface water contaminant associated with power plant operations. Chloride is a very mobile parameter that indicates the probable maximum extent of other potential contaminants. Both of the parameters are found in elevated concentrations downgradient of the ponds and should be included in the WQMP.

Elevated fluoride and nitrate concentrations are reported. It is recommended that these parameters be analyzed periodically, but not reported as part of the WQMP. The basis for this statement is that other

mobile parameters are available for tracking and that at least the nitrate is not likely to be directly related to ash waste.

It is recommended that phenol, ammonia, total sulfur, biological oxygen demand (BOD), chemical oxygen demand (COD), and total organic carbon (TOC) not be tested or included in the WQMP. These parameters have a limited database, show uncertain trends, and can be indirectly evaluated by other parameters.

Bicarbonate alkalinity, carbonate alkalinity, and total alkalinity are used internally for evaluating cation/anion balances. These parameters, however, do not need to be reported as part of the WQMP. The trends associated with these parameters are tracked by other parameters, notably TDS and specific conductance.

5.1.4 Electromagnetics

An annual electromagnetic (EM) survey has been conducted since 1988 at Coal Creek Station and since 1989 at the FMDA. The principle of the geophysical technique is to measure the conductivity of the earth and its contents, including the ground water, so that a water quality pattern can be mapped. This survey was undertaken because the knowledge of the extent and magnitude of contamination was limited.

The EM survey has been useful to document the relationship between sulfate (a mobile and recognizable contaminant) and specific conductivity (a field measurement) versus electromagnetic values (electrical conductivity). The EM results at CCS supported the geological interpretation of areas of pond leakage and showed a widespread area of water quality impacts. EM was less successful in the FMDA because of (1) the geological complexities associated with mine operations and (2) the fact that the FMDA are clay lined engineered facilities that are not expected to allow recognizable leakage. Therefore it is recommended that EM surveys be discontinued in the FMDA.

EM work should be continued at CCS on a limited basis. EM data have been used as an indicator of water quality impacts between and beyond the monitoring well network. A baseline of EM values has been established which provides geological and water quality information. It is proposed that EM be used periodically to confirm the widespread effectiveness of the current and planned pond remediation program. Likely times for further EM surveys is Fall 1992 and Fall 1994. The 1992 program is intended to show the effects of repair at the completed ponds. This program will be compared with water quality data to verify correlation of water quality changes in the monitoring wells. The 1994 program is intended to document conditions after all of the ponds have been repaired. After 1994 it is anticipated that the

effectiveness of the pond remediation program can be evaluated based on selected monitoring wells and samples from the slough system.

The EM survey positions should be documented and maintained, however, for possible future use. For example, a suspected pond leak that is not well documented by the monitoring well network could be more accurately located by conducting an EM survey around the pond. This data could be compared to existing baseline data.

A summary of recommended parameter disposition is provided on Table 15. This list may be modified based on future data interpretation.

5.2 Sampling Locations

The number of sampling locations has increased throughout the site history. Most of the locations have remained in the monitoring network. A few have been deleted because (1) the monitoring well has been destroyed, (2) the surface water locations has dried up, and/or (3) special need locations, such as wells around the RWHB, are no longer needed. The current WQMP has 158 identified monitoring locations and many other locations that are not currently being monitored.

The current ground water and surface water locations are adequate to effectively monitor known water quality conditions. No new locations are anticipated. It is recommended that useful data points be maintained for current and future use. A list of key CCS ground water monitoring locations is provided on Table 16. It is recommended that other locations, such as the wells around the RWHB, be properly abandoned and removed (see Table 17). Damaged and/or redundant wells should also be repaired or abandoned.

Precipitation runoff sampling was conducted only in 1987. It is recommended that this requirement be formally deleted from the WQMP. However, the sampling locations will be maintained on inactive status in the event that future monitoring may be required.

A list of the known monitoring locations is presented in Tables 18, 19, and 20 for CCS-Ground Water, CCS-Surface Water, and FM-Ground Water, respectively. The tables identify the proposed disposition of each monitoring location.

5.3 Sampling Frequency

Sampling frequency has varied during the history of the power plant based on special needs. A more formal frequency was established with the 1986 WQMP and has continued with the current WQMP.

Now that a 13 year pattern of water quality trends has been established the frequency of sampling can be modified. An abbreviated program can be used to maintain documentation of the trends rather than a more intensive data collection program used primarily to establish a baseline of information. Completed and planned pond repairs have also minimized the need for extensive sampling.

It is proposed that the ground water and surface water sampling points be monitored for field parameters two times per year (2/yr) and that the laboratory parameters be analyzed one time per year (1/yr.) The sampling events should take place during consistently designated quarters each year. Sampling at CCS and FM may be conducted during different quarters, if desired. Table 21 illustrates this proposed schedule.

6.0 SUMMARY

This document provides an evaluation of the current Water Quality Monitoring Plan (WQMP) in terms of (a) analytical parameters, (b) sampling locations, and (c) sampling frequency. The primary purpose of this study is to provide a WQMP that is more cost effective and reflective of current needs. The evaluation is summarized below.

1. Known Conditions - An evaluation of the WQMP is appropriate and the recommendations are representative because of the following factors.

- Hydrogeological conditions (geology, water levels, and water flow direction) are well documented.

- An extensive network of monitoring locations is in place to document water quality conditions.

- Water quality and water level data have been collected at this site for 13 years.

2. Analytical Parameters - The list of reported analytical parameters has been reduced from 35 to 9 and is presented on Table 21. The revised list includes 3 physical tests, 4 metals, and 2 inorganic parameters.

The selected, reportable indicator parameters are generally easy to measure, mobile, and representative of general water quality conditions. The other water quality parameters that have been deleted from the primary list of parameters may be analyzed for internal reasons, such as QA/QC procedures, but are not necessary to be part of the formal reported WQMP. The identified indicator parameters are adequate to determine water quality conditions and to monitor additional actions, if necessary.

3. Sampling Locations - The current ground water and surface water locations are adequate to effectively monitor known water quality conditions. The list of the monitoring locations is reduced from 158 to 126. The program includes 95 CCS ground water locations, 7 CCS surface water locations, and 24 FM ground water locations, which are provided on Tables 22, 23, and 24, respectively.

This evaluation proposes that the monitoring network be continued and properly maintained. Unused, damaged, and/or redundant wells should be repaired or abandoned, as appropriate. No new locations are anticipated.

4. Sampling Frequency - A goal of this evaluation is to provide representative data that is reported in a timely manner and meets the needs of CCS and NDSDH. Because of the extensive existing data base, this goal can continue to be met with a modified sampling frequency schedule.

The proposed sampling frequency program includes sampling the Coal Creek Station (CCS) locations during a quarter that is different from sampling activities at the Falkirk Mine (FM) Disposal Areas. Furthermore, laboratory analysis of samples from CCS and FM will be one time per year, instead of two times per year. Field parameters will be recorded two times per year, instead of four times per year. The precipitation runoff sampling program is proposed to be deleted.

5. EM Survey - Electromagnetic (EM) surveys have been used to establish baseline geophysical conditions. This technique is useful to indirectly document water quality conditions.

It is recommended that the EM survey be performed at CCS in 1992 and 1994 to document the effects of the pond repair program. Additional EM surveys are not anticipated unless warranted by a specific need.

It is recommended that the EM program be discontinued in the Falkirk Mine Disposal Area. The data are inconclusive in this area because of geological complexities associated with mine operations. Furthermore, the clay lined engineered facilities are not expected to allow recognizable leakage.

7.0 REVISED WATER QUALITY MONITORING PLAN

The monitoring network and resultant data have increased during the past 13 years and have developed into a situation that is difficult to manage. Site operations and regulatory requirements have also changed. The revised WQMP has been developed to (1) meet the current site needs, (2) provide a cost-effective and representative monitoring program, and (3) establish a manageable database which can

be easily used by CCS ans NDSDH to track water quality changes. It is also intended that the revised WQMP be flexible and responsive to future needs.

The elements of the Revised Water Quality Monitoring Plan are outlined below.

- Ground Water Monitoring Locations - FM (Figure 7)

- Ground Water Monitoring Locations - CCS (Figure 8)

- Surface Water Monitoring Locations - CCS (Figure 9)

- Parameters and Frequency (Table 21)

- Sampling Locations (Tables 22, 23, & 24)

TABLE 1
SAMPLING LOCATION SEQUENCE
CCS WQMP

LOCATION	NUMBER	SAMPLING DATES												
		79	80	81	82	83	84	85	86	87	88	89	90	91
CCS Monitoring Wells														
001-005, 007-015	14	X	X	X	X	X	X	X	X	X	X	X	X	X
016-018, 020-024, 026-038	21		X	X	X	X	X	X	X	X	X	X	X	X
040-048	9								X	X	X	X	X	X
049-068	20										X	X	X	X
069-094	26											X	X	X
FM Monitoring Wells														
501, 523-525	4										X	X	X	X
531-555	24										X	X	X	X
CCS Surface Water Drainage														
101-103	3		X	X	X	X	X	X	X	X	X	X	X	X
115-118	4			X	X	X	X	X	X	X	X	X	X	X
120-122	3							X	X	X	X	X	X	X
123-124	2								X	X	X	X	X	X

X = In Service

TABLE 1 (continued)

LOCATION	NUMBER	SAMPLING DATES												
		79	80	81	82	83	84	85	86	87	88	89	90	91
CCS Ponds														
104-105, 107-108	5		X	X	X	X	X	X	X	X	X	X	X	X
109	1													
110	1		X	X	X	X	X	X	X	X				
111	1				X	X	X	X	X	X				
112, 119	2			X	X	X	X	X	X	X	X			
113	1				X	X	X	X	X	X	X	X	X	X
114	1					X	X	X	X	X	X	X	X	X
125	1									X				
126, 127	2												X	X

X = In Service

TABLE 2
SAMPLING FREQUENCY - CCS GROUND WATER

PARAMETER	PARAMETER NUMBER	Q1*	Q2	Q3	Q4	SPECIAL
INORGANIC TESTS						
Alkal Bicarbon	05					26
Alkal Carbonat	09					26
Alkal Total	40		26		26	26
Chloride	12		26		26	26
Fluoride	18		26		26	26
Nitrate-N	31		26		26	26
Phenol	35					1
Sulfate	38		26		26	26
Total Sulfur	42					26
METALS ANALYSIS						
Aluminum	02				1	94
Arsenic	03		94		96	94
Barium	06					94
Beryllium	07					94
Boron	04		94		94	
Cadmium	11		94		95	94
Calcium	10		94		94	
Iron	20		94		94	94
Lead	32					94
Magnesium	26		94		94	
Manganese	27		94		94	94
Mercury	21					94
Nickel	30					94
Potassium	22		94		94	
Selenium	37		94		97	94
Silver	01					94
Sodium	28		94		94	
Strontium	39		94		94	94
Zinc	47					94
PHYSICAL TESTS						
Spec conduct	36		94		94	94
Temperature	44		94		94	94
Tot Dis Solids	43		94		94	94
pH-Field	33		94		94	94
pH-Lab	34		94		94	94

* NOTE: THIS TABLE GIVES THE NUMBER OF SAMPLING POINTS FOR EACH PARAMETER DURING EACH QUARTERLY SAMPLING EVENT

TABLE 3
SAMPLING FREQUENCY - CCS SURFACE WATER

PARAMETER	PARAMETER NUMBER	Q1*	Q2	Q3	Q4	SPECIAL
INORGANIC TESTS						
Alkal Bicarbon	05					26
Alkal Carbonat	09					26
Alkal Total	40		26		26	26
Ammonia-N	29					5
BOD	08					5
COD	14					5
Chloride	12		26		26	26
Fluoride	18		26		26	26
Nitrate-N	31		26		26	26
Phenol	35					1
Sulfate	38		26		26	26
Tot Org Carbon	45					5
Total Sulfur	42					26
METALS ANALYSIS						
Aluminum	02					26
Arsenic	03		15		15	26
Barium	06					26
Beryllium	07					26
Boron	04		26		26	26
Cadmium	11					26
Calcium	10		26		26	26
Chromium-VI	15					26
Copper	16					26
Iron	20					26
Lead	32					26
Magnesium	26		26		26	26
Manganese	27					26
Mercury	21					26
Molybdenum	25					26
Nickel	30					26
Potassium	22		26		26	26
Selenium	37					26
Silver	01					26
Sodium	28		26		26	26
Strontium	39					26
Zinc	47					26

* NOTE: THIS TABLE GIVES THE NUMBER OF SAMPLING POINTS FOR EACH PARAMETER DURING EACH QUARTERLY SAMPLING EVENT

TABLE 3
SAMPLING FREQUENCY - CCS SURFACE WATER

PARAMETER	PARAMETER NUMBER	Q1*	Q2	Q3	Q4	SPECIAL
PHYSICAL TESTS						
Fec Coli Bact	19					12
Methylene Blue	24					12
Spec conduct	36		26		26	26
Temperature	44		26		26	26
Tot Coli Bact	41					12
Tot Dis Solids	43		26		26	26
Tot Sus Solids	46					5
pH-Field	33		26		26	26
pH-Lab	34		26		26	26

* NOTE: THIS TABLE GIVES THE NUMBER OF SAMPLING POINTS FOR EACH PARAMETER DURING EACH QUARTERLY SAMPLING EVENT

TABLE 4
SAMPLING FREQUENCY - CCS PRECIPITATION RUNOFF

PARAMETER	PARAMETER NUMBER	Q1*	Q2	Q3	Q4	SPECIAL
INORGANIC TESTS						
Alkal Total	40					9
Chloride	12					9
Fluoride	18					9
Nitrate-N	31					9
Sulfate	38					9
Total Sulfur	42					9
METALS ANALYSIS						
Arsenic	03					9
Boron	04					9
Cadmium	11					9
Calcium	10					9
Iron	20					9
Magnesium	26					9
Manganese	27					9
Potassium	22					9
Selenium	37					9
Sodium	28					9
Strontium	39					9
PHYSICAL TESTS						
Spec conduct	36					9
Temperature	44					9
Tot Dis Solids	43					9
Tot Sus Solids	46					9
pH-Field	33					9
pH-Lab	34					9

* NOTE: THIS TABLE GIVES THE NUMBER OF SAMPLING POINTS FOR EACH PARAMETER DURING EACH QUARTERLY SAMPLING EVENT

TABLE 5
SAMPLING FREQUENCY - FM GROUND WATER

PARAMETER	PARAMETER NUMBER	Q1*	Q2	Q3	Q4	SPECIAL
INORGANIC TESTS						
Alkal Bicarbon	05					29
Alkal Carbonat	09					29
Alkal Total	40	29	29	29	29	29
Chloride	12	29	29	29	29	29
Fluoride	18	29	29	29	29	29
Nitrate-N	31	29	29	29	29	29
Sulfate	38	29	29	29	29	29
Total Sulfur	42	29	29	29	29	29
METALS ANALYSIS						
Aluminum	02					29
Arsenic	03	29	29	29	29	29
Barium	06					29
Beryllium	07					29
Boron	04	29	29	29	29	29
Cadmium	11	29	29	29	29	29
Calcium	10	29	29	29	29	29
Chromium-VI	15					29
Copper	16					29
Iron	20	29	29	29	29	29
Lead	32					29
Magnesium	26	29	29	29	29	29
Manganese	27	29	29	29	29	29
Mercury	21					29
Molybdenum	25					29
Nickel	30					29
Potassium	22	29	29	29	29	29
Selenium	37	29	29	29	29	29
Silver	01					29
Sodium	28	29	29	29	29	29
Strontium	39	29	29	29	29	29
Zinc	47					29
PHYSICAL TESTS						
Spec conduct	36	29	29	29	29	
Temperature	44	29	29	29	29	
Tot Dis Solids	43	29	29	29	29	
pH-Field	33	29	29	29	29	
pH-Lab	34	29	29	29	29	

* NOTE: THIS TABLE GIVES THE NUMBER OF SAMPLING POINTS FOR EACH PARAMETER DURING EACH QUARTERLY SAMPLING EVENT

TABLE 6
COMPARISON OF ANALYTICAL PARAMETERS

PARAMETER NAME	PARAMETER ABBREV.	CCS GW	FM GW	CCS SW	CCS PRECIP.
PHYSICAL TESTS					
Fec Coli Bact	F-COLI			X	
Tot Coli Bact	T-COLI			X	
Methylene Blue	MBAS			X	
Spec conduct	SC	X	X	X	X
Tot Dis Solids	TDS	X	X	X	X
Tot Sus Solids	TSS			X	X
Temperature	TEMP	X	X	X	X
pH-Field	PH-FLD	X	X	X	X
pH-Lab	PH-LAB	X	X	X	X
INORGANIC TESTS					
Alkal Bicarbon	B-ALK	X	X	X	
Alkal Carbonat	C-ALK	X	X	X	
Alkal Total	T-ALK	X	X	X	X
BOD	BOD			X	
COD	COD			X	
Tot Org Carbon	TOC			X	
Chloride	CL	X	X	X	X
Fluoride	F	X	X	X	X
Phenol	PHENOL	X		X	
Ammonia-N	NH3-N			X	
Nitrate-N	NO3-N	X	X	X	X
Sulfate	SO4	X	X	X	X
Total Sulfur	T-SULF	X	X	X	X

TABLE 6 (continued)

PARAMETER NAME	PARAMETER ABBREV.	CCS GW	FM GW	CCS SW	CCS PRECIP.
METAL ANALYSIS					
Aluminum	AL	X	X	X	
Arsenic	AS	X	X	X	X
Barium	BA	X	X	X	
Beryllium	BE	X	X	X	
Boron	B	X	X	X	X
Cadmium	CD	X	X	X	X
Calcium	CA	X	X	X	X
Chromium-VI	CR		X	X	
Copper	CU		X	X	
Iron	FE	X	X	X	X
Lead	PB	X	X	X	
Magnesium	MG	X	X	X	X
Manganese	MN	X	X	X	X
Mercury	HG	X	X	X	
Molybdenum	MD		X	X	
Nickel	NI	X	X	X	
Potassium	K	X	X	X	X
Selenium	SE	X	X	X	X
Silver	AG	X	X	X	
Sodium	NA	X	X	X	X
Strontium	SR	X	X	X	X
Zinc	ZN	X	X	X	

TABLE 7
REPRESENTATIVE SAMPLE LOCATIONS
COAL CREEK STATION

ABBREV.	DESCRIPTION	SAMPLE LOCATION
-- Upgradient --		
U-N	Ground Water - North Upgradient	023, 024, 025, 038, 047, 083, 084
U-S	Ground Water - South Upgradient	057, 058, 061, 071, 074, 075, 076
RWHB	Surface Water - River Water Holding Basin	104
-- Ponds (Surface Water) --		
RB	Recycle Basin	108
EB	Extended Basin	107
SAP	South Ash Pond	106, 126, 127
LNEP	Lower North Evaporation Pond	113
LEEP	Lower East Evaporation Pond	114
-- Downgradient (Ground Water) --		
D-RB	Recycle Basin	148, 066, 067, 068
D-EB	Extended Basin	062, 064,
D-SAP	South Ash Pond	010, 049, 050, 051, 052, 053, 054
D-EAP	East Ash Pond	014, 015, 042, 043
D-LNEP	Lower North Evaporation Pond	029, 032, 033, 080
D-LEEP	Lower East Evaporation Pond	017, 018, 022, 087, 088
-- Downgradient (Surface Water) --		
EWS	East Weller Slough	103
USS	Upper Samuelson Slough	101
LSS	Lower Samuelson Slough	102
SS	Saylor Slough	115
LGS	Lower Gradin Slough	117

TABLE 8
PHYSICAL TESTS - CCS

LOCATION	TEMP (°C)		pH (SU) **=6.5 - 8.5		SPEC. COND. (um/cm)		TDS (mg/l) **=500 mg/l	
U-N	3.2	12.5	6.4	7.7	1010	5600	598	4690
U-S	9.0	13.0	5.9	9.5	1290	4500	817	3180
RWHB	11.6	18.2	7.6	8.7	550	780	294	602
RB	11.5	21.8	6.5	9.1	2600	13,400	2400	14,500
EB	13.6	26.0	7.2	8.8	3700	8400	3070	6910
SAP	7.2	21.7	7.3	8.9	2400	14,100	6890	17,300
LNEP	6.1	21.4	8.1	9.3	1120	7400	757	4680
LEEP	3.6	21.8	8.3	8.9	4400	21,000	4360	19,900
D-RB	10.5	11.1	6.5	12.2	3050	8500	2158	7510
D-EB	9.8	16.2	6.6	9.5	1740	6450	1030	5790
D-SAP	9.4	17.0	6.6	10.1	4000	86,000	2830	17,900
D-EAP	3.8	12.2	7.0	9.5	490	10,600	482	10,200
D-LNEP	8.6	11.5	6.7	8.0	740	15,500	342	16,500
D-LEEP	10.2	15.4	6.6	8.3	600	20,000	270	21,300
EWS	14.5	17.0	7.2	10.2	530	3400	160	2580
USS	6.2	21.0	8.2	9.1	820	3450	410	2500
LSS	2.0	23.3	6.5	9.2	850	7200	570	5780
SS	3.2	24.6	8.2	9.7	960	2400	681	1780
LGS	3.2	3.2	7.7	9.1	1000	4900	430	3770

Location nomenclature is provided on Table 7.

Minimum and maximum reported values are shown for each parameter.
** Maximum Contaminant Level
* Secondary Standard

TABLE 8 (continued)
PHYSICAL TESTS - CCS

LOCATION	MBAS (mg/l)		FECAL COLIFORM (#/100ml)		TOTAL COLIFORM (#/100ml)		TSS (mg/l)	
U-N	0.1	.01	2	2	2	2	-	-
U-S	-	-	2	10	-	-	-	-
RWHB	0.05	0.10	2	2	28	28	5	5
RB	0.1	0.1	2	2	2	2	-	-
EB	0.1	0.1	2	2	2	2	-	-
SAP	0.1	0.1	2	2	2	2	-	-
LNEP	-	-	-	-	-	-	-	-
LEEP	-	-	-	-	-	-	28	28
D-RB	-	-	-	-	-	-	-	-
D-EB	-	-	-	-	-	-	-	-
D-SAP	0.1	0.1	1	2	2	6	-	-
D-EAP	0.1	0.1	1	10	2	6	-	-
D-LNEP	0.1	0.1	2	2	2	2	-	-
D-LEEP	0.1	0.1	2	2	2	2	-	-
EWS	0.1	0.1	4	4	2	2	-	-
USS	0.1	0.5	4	10	2	3	-	-
LSS	-	-	2	10	2	4	-	-
SS	0.5	0.5	10	10	1	1	-	-
LGS	0.5	0.5	10	10	2	2	-	-

Location nomenclature is provided on Table 7.

Minimum and maximum reported values are shown for each parameter.
** Maximum Contaminant Level
* Secondary Standard

TABLE 9
INORGANIC TESTS - CCS

LOCATION	CHLORIDE (mg/l) *=250 mg/l		SULFATE (mg/l) *=250 mg/l		FLUORIDE (mg/l) *=2.0 mg/l		NITRATE (mg/l) **10.0 mg/l	
U-N	1	67	100	2500	0.1	1.0	0.01	1.19
U-S	1	36	181	1705	0.1	0.7	0.01	1.90
RWHB	8	14	130	240	0.1	0.8	0.01	0.10
RB	42	414	1100	8800	1.4	20.0	0.01	1.45
EB	73	324	1900	3800	2.1	6.4	0.01	2.00
SAP	149	490	1300	9700	0.1	20.0	0.01	0.49
LNEP	12	327	330	4260	0.3	3.0	0.01	0.39
LEEP	87	701	2800	13,000	2.4	20.7	0.01	0.97
D-RB	26	357	254	5111	0.1	0.6	0.01	2.01
D-EB	8	260	344	3391	0.1	1.5	0.01	0.97
D-SAP	2	357	1150	12,890	0.1	0.5	0.01	16.3
D-EAP	3	281	120	7400	0.1	8.5	0.01	24.0
D-LNEP	2	344	110	12,000	0.1	1.0	0.01	32.0
D-LEEP	2	423	70	14,648	0.1	0.8	0.02	14.0
EWS	1	43	35	950	0.1	0.4	0.01	1.50
USS	9	38	220	1440	0.2	0.5	0.01	0.30
LSS	9	137	260	3614	0.1	0.4	0.01	0.47
SS	10	29	320	980	0.1	0.3	0.01	0.50
LGS	10	58	180	2000	0.1	0.3	0.01	1.20

Location nomenclature is provided on Table 7.

Minimum and maximum reported values are shown for each parameter.
** Maximum Contaminant Level
* Secondary Standard

TABLE 9 (continued)
INORGANIC TESTS - CCS

LOCATION	PHENOL (ug/l)		TOTAL SULFUR (mg/l)		BOD (mg/l)		COD (mg/l)		TOC (mg/l)	
U-N	2	6	60	74	-	-	-	-	-	-
U-S	-	-	31	582	-	-	-	-	-	-
RWHB	-	-	-	-	-	-	60	60	-	-
RB	-	-	-	-	-	-	-	-	-	-
EB	-	-	-	-	-	-	-	-	-	-
SAP	-	-	-	-	3.0	3.0	90	90	20	20
LNEP	-	-	-	-	-	-	-	-	-	-
LEEP	-	-	-	-	1.0	1.0	70	70	17	17
D-RB	-	-	-	-	-	-	-	-	-	-
D-EB	2	3	-	-	-	-	-	-	-	-
D-SAP	-	-	-	-	-	-	-	-	-	-
D-EAP	2	24	-	-	-	-	-	-	-	-
D-LNEP	2	36	359	505	-	-	-	-	-	-
D-LEEP	2	4	-	-	-	-	-	-	-	-
EWS	-	-	-	-	-	-	-	-	-	-
USS	-	-	-	-	-	-	-	-	-	-
LSS	1	1	-	-	-	-	-	-	-	-
SS	-	-	-	-	-	-	-	-	-	-
LGS	-	-	-	-	-	-	-	-	-	-

Location nomenclature is provided on Table 7.

Minimum and maximum reported values are shown for each parameter.
** Maximum Contaminant Level
* Secondary Standard

TABLE 9 (continued)
INORGANIC TESTS - CCS

LOCATION	BICARBONATE ALKALINITY (mg/l)		CARBONATE ALKALINITY (mg/l)		TOTAL ALKALINITY (mg/l)		AMMONIA (mg/l)	
U-N	392	977	1	1	220	977	0.1	0.1
U-S	157	712	-	-	157	740	-	-
RWHB	149	169	1	6	150	175	0.1	2.6
RB	62	258	1	235	62	449	0.1	0.1
EB	31	399	1	80	31	479	-	-
SAP	152	302	52	368	179	514	0.1	2.9
LNEP	35	160	1	42	70	260	2.6	2.6
LEEP	70	361	1	114	108	544	-	-
D-RB	361	503	-	-	337	587	-	-
D-EB	335	526	-	-	259	573	-	-
D-SAP	255	1059	1	1	255	1059	0.1	0.2
D-EAP	113	539	1	1	76	539	-	-
D-LNEP	117	660	1	4	117	660	0.1	0.1
D-LEEP	231	680	1	1	231	680	0.1	0.1
EWS	46	736	1	206	136	861	0.1	0.1
USS	227	489	1	51	230	531	0.1	0.1
LSS	240	522	1	44	274	459	0.1	0.1
SS	235	409	1	63	287	449	-	-
LGS	290	779	1	74	321	846	-	-

Location nomenclature is provided on Table 7.

Minimum and maximum reported values are shown for each parameter.
** Maximum Contaminant Level
* Secondary Standard

TABLE 10
METAL ANALYSIS - CCS

LOCATION	ARSENIC (ug/l) **=50 ug/l		BORON (ug/l)		SELENIUM (ug/l) **=10 ug/l		STRONTIUM (mg/l)	
U-N	1	7	0.01	1.2	1	1	0.3	4.1
U-S	1	3	0.10	1.0	1	1	.02	3.8
RWHB	1	2	0.06	0.20	1	4	0.3	0.9
RB	7	335	1.9	97	1	100	2.0	12.0
EB	11	35	0.50	4.0	-	-	2.3	8.0
SAP	5	275	1.9	97	1	95	2.0	12.0
LNEP	1	9	0.35	6.9	1	1	0.7	5.7
LEEP	1	130	16.4	118	1	1	5.0	13.4
D-RB	-	-	0.04	39.7	-	-	1.4	7.5
D-EB	-	-	0.10	1.4	-	-	2.7	4.5
D-SAP	1	2	0.20	33	1	1	0.2	7.3
D-EAP	1	10	0.10	59.8	1	1	0.1	9.0
D-LNEP	1	21	0.20	2.6	1	520	0.2	10.0
D-LEEP	1	9	0.06	33.6	1	2	0.2	7.2
EWS	1	8	0.11	0.43	1	1	0.2	0.7
USS	1	10	0.01	1.59	1	1	0.4	1.5
LSS	1	5	0.20	6.4	1	1	0.3	2.9
SS	1	6	0.20	3.0	1	1	0.5	1.7
LGS	1	5	0.20	6.0	1	1	0.4	1.5

Location nomenclature is provided on Table 7.

Minimum and maximum reported values are shown for each parameter.
** Maximum Contaminant Level
* Secondary Standard

TABLE 10 (continued)
METAL ANALYSIS - CCS

LOCATION	BARIUM (mg/l) **=1.0mg/l		CHROMIUM (ug/l) **=50 ug/l		LEAD (ug/l) **=50 ug/l		MERCURY (ug/l) **=2.0 ug/l		ZINC (mg/l) *=5.0 mg/l	
U-N	0.02	0.80	1	10	1	12	0.2	2.2	0.06	0.06
U-S	0.03	0.15	1	10	1	11	0.3	1.4	0.10	1.10
RWHB	0.06	0.30	1	10	1	1	0.2	1.0	0.01	10
RB	0.02	0.90	1	29	1	33	0.2	1.0	0.01	10
EB	0.10	0.30	1	10	1	10	0.7	3.0	0.01	60
SAP	0.05	0.50	5	19	1	34	0.4	1.0	0.01	0.01
LNEP	0.04	0.09	7	10	55	351	1.0	1.0	0.01	0.01
LEEP	0.04	0.05	1	10	1	1	1.0	1.0	0.01	0.01
D-RB	0.01	0.04	1	2	-	-	0.1	1.1	-	-
D-EB	0.01	0.06	1	1	-	-	0.4	0.9	-	-
D-SAP	0.02	0.80	1	10	1	10	0.1	1.0	0.01	40
D-EAP	0.01	0.40	1	15	1	20	0.1	1.2	0.01	150
D-LNEP	0.01	0.80	1	20	1	20	0.2	1.8	0.01	80
D-LEEP	0.01	0.30	1	10	1	20	0.1	3.0	0.01	50
EWS	0.30	0.30	5	5	1	1	0.4	0.4	20	20
USS	0.10	0.30	1	10	1	1	0.6	1.0	0.01	20
LSS	0.08	0.30	1	10	1	4	0.2	1.0	0.01	20
SS	0.07	0.08	1	10	1	1	1.0	1.0	0.01	0.01
LGS	0.05	0.05	10	10	1	1	1.0	1.0	0.01	0.01

Location nomenclature is provided on Table 7.

Minimum and maximum reported values are shown for each parameter.
** Maximum Contaminant Level
* Secondary Standard

TABLE 10 (continued)
METAL ANALYSIS - CCS

LOCATION	ALUMINUM (mg/l) *=0.2 mg/l		BERYLLIUM (ug/l)		CADMIUM (ug/l) **=10 ug/l		COPPER (ug/l) *=1.0 ug/l		NICKEL (ug/l)		SILVER (ug/l) *=100 ug/l	
U-N	0.01	X	0.01	20	1	15	0.1	50	0.1	100	0.1	4
U-S	-	-	0.01	10	10	10	1.0	40	1.0	19	10	10
RWHB	0.01	0.01	0.01	20	1	10			1.0	50	0.2	40
RB	0.01	0.04	0.01	20	1	10	3.3	50	1.0	50	10	40
EB	0.01	0.01	0.01	20	10	10	1.0	50	1.0	50	10	40
SAP	0.01	0.01	50	50	1	10	0.1	10	10	10	10	10
LNEP	0.01	0.08	0.01	10	10	10	6.8	10	1.0	50	0.1	0.1
LEEP	0.01	0.01	0.01	20	10	10	3.4	10	3.9	50	10	10
D-RB	-	-	0.01	0.01	-	-	1.0	3.8	1.0	1.0	-	-
D-EB	-	-	0.01	0.01	-	-	1.0	9.5	1.0	7.8	-	-
D-SAP	0.01	0.01	0.01		1	10	1.0	50	1.0	180	10	40
D-EAP	0.01	0.90	0.01	20	1	40	1.0	50	1.0	80	10	40
D-LNEP	0.01	0.14	0.01	20	1	10	1.0	50	1.0	100	10	40
D-LEEP	0.01	0.06	0.01	20	1	10	1.0	50	1.0	120	10	40
EWS	0.01	0.01	20	20	1	10	50	50	50	50	40	40
USS	0.01	0.03	0.01	20	1	10	2.5	50	1.0	50	10	40
LSS	0.01	0.01	0.01	20	1	10	2.3	50	3.8	50	10	40
SS	0.01	0.01	0.01	10	10	10	1.0	10	1.0	50	10	10
LGS	0.01	0.04	10	10	10	10	10	10	10	50	10	10

Location nomenclature is provided on Table 7.

Minimum and maximum reported values are shown for each parameter.
** Maximum Contaminant Level
* Secondary Standard

TABLE 10 (continued)
METAL ANALYSIS - CCS

LOCATION	SODIUM (mg/l)		POTASSIUM (mg/l)		MAGNESIUM (mg/l)		MANGANESE (mg/l)		CALCIUM (mg/l)	
U-N	36	375	3.4	16	22	490	0.01	1.60	47	590
U-S	440	1010	4.1	16	4.8	118	0.10	1.11	10	255
RWHB	50	70	2.8	3.9	19	30	0.01	1.00	48	66
RB	220	1200	14	74	80	1400	0.01	0.60	215	755
EB	385	830	12	47	125	300	0.01	0.12	296	690
SAP	200	1300	14	78	78	1800	0.03	0.55	286	735
LNEP	60	395	8.6	75			0.01	0.50	77	535
LEEP	420	2150	21	124	290	2300	0.01	0.27	435	645
D-RB	347	830	2.9	12	135	780	0.01	1.60	87	630
D-EB	69	700	5.6	20	51	460	0.06	0.95	178	697
D-SAP	150	3400	4.0	87	145	1200	0.01	4.30	220	760
D-EAP	40	900	3.0	64	20	1000	0.01	1.60	12	720
D-LNEP	16	1500	3.1	48	37	2300	0.01	7.90	58	950
D-LEEP	25	4300	1.5	37	31	1400	0.01	2.60	32	800
EWS	67	650	11	36	14	64	0.01	0.20	10	73
USS	96	512	1.5	26	39	180	0.01	0.20	10	111
LSS	100	1040	10	40	42	455	0.01	0.40	51	153
SS	83	285	7.8	20	52	132	0.01	0.15	10	110
LGS	110	450	14	53	48	220	0.01	0.20	45	104

Location nomenclature is provided on Table 7.

Minimum and maximum reported values are shown for each parameter.
** Maximum Contaminant Level
* Secondary Standard

TABLE 11
REPRESENTATIVE SAMPLE LOCATIONS
FALKIRK MINE

ABBREV	DESCRIPTION	SAMPLE LOCATION
	- Section 5 Disposal Area -	
5-HB	Hagel B	531, 533, 535, 537, 539, 541
5-SS	Sheet Sand	532, 534, 536, 538, 540, 542
	- Section 31 Disposal Area -	
31-HB	Hagel B	543, 545, 546, 548
31-SS	Sheet Sand	544, 547, 549
	- Section 32 Disposal Area -	
32-HB	Hagel B	550, 552, 554
32-SS	Sheet Sand	551, 553, 555

TABLE 12
PHYSICAL TESTS - FM

LOCATION	TEMP (°C)		pH (SU)		SPEC. COND. (um/cm)	
5-HB	10.3	17.3	6.4	11.3	476	4300
31-HB	14.3	17.3	6.8	8.2	2100	3000
32-HB	11.7	14.2	4.8	7.3	1440	1980
5-SS	10.3	11.5	6.3	7.4	521	4500
31-SS	12.1	15.2	4.4	7.1	1310	4300
32-SS	11.8	12.4	6.7	7.0	1350	2500

LOCATION	TED (mg/l) *500 mg/l		BICARBONATE ALKALINITY (mg/l)		TOTAL ALKALINITY (mg/l)	
5-HB	391	2900	44	1770	617	1499
31-HB	1390	1840	782	1203	750	1192
32-HB	887	1280	729	824	608	848
5-SS	849	2906	592	1260	701	1274
31-SS	802	4790	16	770	1	769
32-SS	845	1760	-	-	524	808

Location nomenclature is provided on Table 11.

Minimum and maximum reported values are shown for each parameter.
** Maximum Contaminant Level
* Secondary Standard

TABLE 13
INORGANIC TESTS - FM

LOCATION	CHLORIDE (mg/l) *250 mg/l		SULFATE (mg/l) *250 mg/l		FLUORIDE (mg/l) *2.0 mg/l		NITRATE (mg/l) *10.0 mg/l		TOTAL SULFUR (mg/l)	
5-HB	2.8	29.0	185	840	0.09	0.50	0.01	1.3	57	256
31-HB	2.7	11.0	152	526	0.09	0.50	0.01	3.6	66	185
32-HB	2.1	7.8	131	400	0.07	0.35	0.01	0.4	22	144
5-SS	0.3	33.0	76	1490	0.08	0.80	0.01	3.8	22	489
31-SS	2.1	62.6	232	2920	0.09	0.20	2.2	38.4	81	957
32-SS	3.7	30.0	143	730	0.08	0.16	0.01	2.0	43	248

Location nomenclature is provided on Table 11.

Minimum and maximum reported values are shown for each parameter.
** Maximum Contaminant Level
* Secondary Standard

TABLE 14
METAL ANALYSIS - FM

LOCATION	ARSENIC (u/l) *50 ug/l		BORON (ug/l)		SELENIUM (ug/l) *10 ug/l		STRONTIUM (mg/l)	
5-HB	1.0	4.0	0.13	1.04	1.0	6.0	0.2	4.9
31-HB	1.0	2.0	0.10	0.73	1.0	1.0	0.4	3.1
32-HB	1.0	2.0	0.10	0.72	1.0	1.0	0.8	2.7
5-SS	1.0	2.0	0.20	1.10	1.0	7.0	1.9	5.7
31-SS	0.5	50.0	0.06	6.40	31	88	0.5	4.1
32-SS	1.0	1.0	0.10	1.00	1.0	1.0	2.3	3.6

Location nomenclature is provided on Table 11.

Minimum and maximum reported values are shown for each parameter.
** Maximum Contaminant Level
* Secondary Standard

TABLE 14 (continued)
METAL ANALYSIS - FM

LOCATION	BARIUM (mg/l) *1.0 mg/l		CHROMIUM (ug/l) *50 ug/l		LEAD (ug/l) *50 ug/l	
5-HB	0.02	0.50	1	50	1.0	11.0
31-HB	0.03	0.19	1	50	1.0	6.0
32-HB	0.04	0.14	1	50	1.0	1.5
5-SS	0.03	0.10	1	50	1.0	6.2
31-SS	0.03	0.40	1	50	1.0	5.0
32-SS	0.05	0.17	10	50	1.0	1.0

LOCATION	MERCURY (ug/l) *2.0 ug/l		ZINC (mg/l) *5.0 mg/l		IRON (mg/l)	
5-HB	0.30	1.0	0.10	0.10	0.1	3.2
31-HB	0.07	1.0	0.01	0.10	0.1	2.3
32-HB	1.0	1.0	0.10	0.10	0.1	1.0
5-SS	0.11	1.2	0.10	0.10	0.1	1.8
31-SS	0.01	1.0	0.10	0.14	0.1	1.0
32-SS	1.0	1.0	0.10	0.10	0.1	1.0

Location nomenclature is provided on Table 11.

Minimum and maximum reported values are shown for each parameter.
** Maximum Contaminant Level
* Secondary Standard

TABLE 14 (continued)
METAL ANALYSIS - FM

LOCATION	BERYLLIUM (ug/l)		CADMIUM (ug/l) *10 ug/l		COPPER (ug/l) *1.0 ug/l		NICKEL (ug/l)		SILVER (ug/l) *100 ug/l	
5-HB	0.01	50	10	23	1	75	1	60	10	10
31-HB	0.01	50	10	10	1	50	1	63	10	23
32-HB	0.01	50	10	21	1	50	1	50	10	25
5-SS	0.01	50	10	32	1	50	1	50	10	10
31-SS	0.01	50	10	10	1	72	1	91	10	29
32-SS	10	50	10	10	10	50	10	74	10	19

Location nomenclature is provided on Table 11.

Minimum and maximum reported values are shown for each parameter.
** Maximum Contaminant Level
* Secondary Standard

TABLE 14 (continued)
METAL ANALYSIS - FM

LOCATION	SODIUM (mg/l)		POTASSIUM (mg/l)		MAGNESSIUM (mg/l)		MANGANESE (mg/l)		CALCIUM (mg/l)	
5-HB	78	1031	6.1	22.0	2.7	76	0.01	0.70	11	209
31-HB	315	695	6.0	28.0	8	84	0.08	0.16	20	155
32-HB	136	313	6.8	26.0	21	64	0.06	1.10	56	230
5-SS	67	778	7.1	21.0	35	96	0.14	0.95	104	225
31-SS	27	144	7.1	16.0	23	395	0.01	3.50	139	565
32-SS	38	138	8.6	13.0	70	176	0.10	1.00	164	350

Location nomenclature is provided on Table 11.

Minimum and maximum reported values are shown for each parameter.
** Maximum Contaminant Level
* Secondary Standard

Table 18 (continued)

Location	Description	Continue	Discontinue
027	Monitoring Well #27	X	
028	Monitoring Well #28	X	
029	Monitoring Well #29	X	
030	Monitoring Well #30	X	
031	Monitoring Well #31	X	
032	Monitoring Well #32	X	
033	Monitoring Well #33	X	
034	Monitoring Well #34	X	
035	Monitoring Well #35	X	
036	Monitoring Well #36	X	
037	Monitoring Well #37	X	
038	Monitoring Well #38	X	
039	Monitoring Well #39	X	
040	Monitoring Well #40	X	
041	Monitoring Well #41	X	
042	Monitoring Well #42	X	
043	Monitoring Well #43	X	
044	Monitoring Well #44	X	
045	Monitoring Well #45	X	
046	Monitoring Well #46	X	
047	Monitoring Well #47	X	
048	Monitoring Well #48	X (2)	
049	Monitoring Well #49	X	
050	Monitoring Well #50	X	
051	Monitoring Well #51	X	
052	Monitoring Well #52	X	
053	Monitoring Well #53	X	
054	Monitoring Well #54	X	

Table 18 (continued)

Location	Description	Continue	Discontinue
055	Monitoring Well #55	X	
056	Monitoring Well #56	X	
057	Monitoring Well #57	X	
058	Monitoring Well #58	X	
059	Monitoring Well #59	X	
060	Monitoring Well #60	X	
061	Monitoring Well #61	X	
062	Monitoring Well #62	X	
063	Monitoring Well #63	X	
064	Monitoring Well #64	X	
065	Monitoring Well #65	X	
066	Monitoring Well #66	X (2)	
067	Monitoring Well #67	X (2)	
068	Monitoring Well #68	X (2)	
069	Monitoring Well #69	X	
070	Monitoring Well #70	X	
071	Monitoring Well #71	X	
072	Monitoring Well #72	X	
073	Monitoring Well #73	X (3)	
074	Monitoring Well #74	X	
075	Monitoring Well #75	X	
076	Monitoring Well #76	X	
077	Monitoring Well #77	X	
078	Monitoring Well #78	X	
079	Monitoring Well #79	X	
080	Monitoring Well #80	X	
081	Monitoring Well #81	X	
082	Monitoring Well #82	X	

Table 18 (continued)

Location	Description	Continue	Discontinue
083	Monitoring Well #83	X	
084	Monitoring Well #84	X	
085	Monitoring Well #85	X	
086	Monitoring Well #86	X	
087	Monitoring Well #87	X	
088	Monitoring Well #88	X	
089	Monitoring Well #89	X	
090	Monitoring Well #90	X	
091	Monitoring Well #91	X	
092	Monitoring Well #92	X	
093	Monitoring Well #93	X	
094	Monitoring Well #94	X	
204	Piezometer #4		X
208	H-Piezometer #8	X	
209	H-Piezometer #9	X	
211	Piezometer #11		X
215	Piezometer #15		X
217	Piezometer #17		X
312	Observation Well #12		X (1)
322	Observation Well #22		X
323	Observation Well #23		X

(1) Destroyed
(2) To be discontinued after the Recycle Basin is taken out of service.
(3) To be discontinued as Section 16 Disposal Area is filled.

Table 19
Summary of Sampling Locations

Coal Creek Station - Surface Water

Location	Description	Continue	Discontinue
101	Upper Samuelson Slough	X	
102	Lower Samuelson Slough	X	
103	East Weller Slough	X	
104	River Water Basin (RWB)	X	
105	Upper N. Evap Pond (UNEP)	X	
106	South Ash Pond (SAP)		X
107	Extended Basin (Cooling)	X	
108	Recycle Basin (Holding)	X	
109	Upper E. Evap Pond	X	
110	Fly Ash Runoff Basin		X
111	Coal Pile Runoff Basin		X
112	East Ash Pond (EAP)		X
113	Lower N. Evap Pond (LNEP)	X	
114	Lower E. Evap Pond (LEEP)	X	
115	Saylor Slough	X	
116	Upper Gradin Slough		X
117	Lower Gradin Slough	X	
118	Mine Surge Pond	X	
119	East Ash Pond Seepage		X
120	Legal Drain West		X
121	Legal Drain North		X
122	Legal Drain East		X
123	Falkirk Mine Discharge	X	

Table 19 (continued)

Location	Description	Continue	Discontinue
124	Coal Lake Coulee Discharge		X
125	Seepage South of LEEP		X
126	East South Ash Pond	X	
127	West South Ash Pond	X	
401	Weller Slough Outlet		X
402	West Samuelson Inlet		X
403	North Samuelson Inlet		X
404	Samuelson Slough Outlet		X
405	Sayler Slough Inlet		X
406	Sayler Slough Outlet		X
407	Upper Gradin Slough Inlet		X
408	Lower Gradin Outlet		X
409	Falkirk Pond 8-03		X

Table 20
Summary of Sampling Locations

Falkirk Mine - Ground Water

Location	Description	Continue	Discontinue
501	FMW #1 = FMC # 92-1		X
502	FMW#2=FMC#104-1 (Steel)		X
503	FMW # 3 = FMC # 104-2		X
504	FMW#4=FMC#108-1 (Steel)		X
505	FMW#5=FMC#108-2 (Steel)		X
506	FMW # 6 = FMC # RP-1		X
507	FMW # 7 = FMC # RP-2		X
508	FMW # 8 = FMC # RP-5		X
509	FMW # 9 = FMC # RP-10		X
510	FMW # 10 = FMC # RP-11		X
511	FMW # 11 = FMC # RP-12		X
512	FMW # 12 = FMC # RP-13		X
513	FMW #13 = FMC # RP-14		X
514	FMW #14 = FMC # RP-15		X
515	FMW #15 = FMC # RP-16		X
516	FMW #16 =FMC # RP-17		X
517	FMW #17 = FMC # RP-18A		X
518	FMW #18 = FMC # RP-19		X
519	FMC #RP-20A - PIPE BENT		X
520	FMC #RP-20B - PIPE BENT		X
521	FMW # 21 = FMC # RP-20C		X
522	FMW # 22 = FMC # RP-21		X
523	FMW # 23 = FMC # RP-22A		X
524	FMW # 24 = FMC # RP-22B		X
525	FMW # 25 =FMC # RP-22C		X
526	FMW # 26 = FMC # 104-3		X
527	FMW # 27 = FMC # RP-18B		X

Table 20 (continued)

Location	Description	Continue	Discontinue
528	FMW # 28 = FMC # RP-19-1		X
529	FMW # 29 = FMC # RP-19-2		X
530	FMW # 30 = FMC # RP-19-3		X
531	FMW # 31 = FVD # 88-1A	X	
532	FMW # 32 = FVD # 88-1B	X	
533	FMW # 33 = FVD # 88-2A	X	
534	FMW # 34 = FVD # 88-2B	X	
535	FMW # 35 = FVD # 88-3A	X	
536	FMW # 36 = FVD # 88-3B	X	
537	FMW # 37 = FVD # 88-4A	X	
538	FMW # 38 = FVD # 88-4B	X	
539	FMW # 39 = FVD # 88-5A	X	
540	FMW # 40 = FVD # 88-5B	X	
541	FMW # 41 = FVD # 88-6A	X	
542	FMW # 42 = FVD # 88-6B	X	
543	FMW # 43 = FVD # 88-7A	X	
544	FMW # 44 = FVD # 88-7B	X	
545	FMW # 45 = FVD # 88-7R		X(Replaced by 543)
546	FMW # 46 = FVD # 88-8A	X	
547	FMW # 47 = FVD # 88-8B	X	
548	FMW # 48 = FVD # 88-9A	X	
549	FMW # 49 = FVD # 88-9B	X	
550	FMW # 50 = FVD # 88-10A	X	
551	FMW # 51 = FVD # 88-10B	X	
552	FMW # 52 = FVD # 88-11A	X	
553	FMW # 53 - FVD # 88-11B	X	
554	FMW # 54 = FVD # 88-12A	X	
555	FMW # 55 = FVD # 88-12B	X	

Table 22
Revised WQMP Sampling Locations

Coal Creek Station - Ground Water

Location	Description	Field Parameters	Laboratory Parameters
001	Monitoring Well #1	X	
002	Monitoring Well #2	X	
003	Monitoring Well #3	X	
004	Monitoriung Well #4	X	
005	Monitoring Well #5	X	
007	Monitoring Well #7	X	X
008	Monitoring Well #8	X	X
009	Monitoring Well #9	X	X
010	Monitoring Well #10	X	X
011	Monitoring Well #11	X	
012	Monitoring Well #12	X	X
013	Monitoring Well #13	X	X
014	Monitoring Well #14	X	X
015	Monitoring Well #15	X	X
016	Monitoring Well #16	X	X
017	Monitoring Well #17	X	X
018	Monitoring Well #18	X	X
020	Monitoring Well #20	X	X
021	Monitoring Well #21	X	X
022	Monitoring Well #22	X	X
023	Monitoring Well #23	X	X
024	Monitoring Well #24	X	X
026	Monitoring Well #26	X	
027	Monitoring Well #27	X	

Table 22 (continued)

Location	Description	Field Parameters	Laboratory Parameters
028	Monitoring Well #28	X	
029	Monitoring Well #29	X	X
030	Monitoring Well #30	X	X
031	Monitoring Well #31	X	X
032	Monitoring Well #32	X	X
033	Monitoring Well #33	X	
034	Monitoring Well #34	X	
035	Monitoring Well #35	X	
036	Monitoring Well #36	X	
037	Monitoring Well #37	X	
038	Monitoring Well #38	X	X
039	Monitoring Well #39	X	
040	Monitoring Well #40	X	
041	Monitoring Well #41	X	
042	Monitoring Well #42	X	X
043	Monitoring Well #43	X	X
044	Monitoring Well #44	X	
045	Monitoring Well #45	X	
046	Monitoring Well #46	X	
047	Monitoring Well #47	X	
048	Monitoring Well #48	X	
049	Monitoring Well #49	X	X
050	Monitoring Well #50	X	X
051	Monitoring Well #51	X	X
052	Monitoring Well #52	X	X
053	Monitoring Well #53	X	X
054	Monitoring Well #54	X	X

Table 22 (continued)

Location	Description	Field Parameters	Laboratory Parameters
055	Monitoring Well #55	X	X
056	Monitoring Well #56	X	
057	Monitoring Well #57	X	X
058	Monitoring Well #58	X	
059	Monitoring Well #59	X	
060	Monitoring Well #60	X	X
061	Monitoring Well #61	X	X
062	Monitoring Well #62	X	X
063	Monitoring Well #63	X	X
064	Monitoring Well #64	X	X
065	Monitoring Well #65	X	X
066	Monitoring Well #66	X	
067	Monitoring Well #67	X	
068	Monitoring Well #68	X	
069	Monitoring Well #69	X	
070	Monitoring Well #70	X	
071	Monitoring Well #71	X	X
072	Monitoring Well #72	X	X
073	Monitoring Well #73	X	X
074	Monitoring Well #74	X	X
075	Monitoring Well #75	X	
076	Monitoring Well #76	X	
077	Monitoring Well #77	X	
078	Monitoring Well #78	X	
079	Monitoring Well #79	X	X
080	Monitoring Well #80	X	X

Table 22 (continued)

Location	Description	Field Parameters	Laboratory Parameters
081	Monitoring Well #81	X	X
082	Monitoring Well #82	X	X
083	Monitoring Well #83	X	X
084	Monitoring Well #84	X	
085	Monitoring Well #85	X	
086	Monitoring Well #86	X	
087	Monitoring Well #87	X	X
088	Monitoring Well #88	X	
089	Monitoring Well #89	X	
090	Monitoring Well #90	X	X
091	Monitoring Well #91	X	X
092	Monitoring Well #92	X	
093	Monitoring Well #93	X	
094	Monitoring Well #94	X	
208	PZ-8	X	
209	PZ - 9	X	

Table 23
Revised WQMP Sampling Locations

Coal Creek Station - Surface Water

Location	Description	Field Parameters	Laboratory Parameters
101	Upper Samuelson Slough	X	X
102	Lower Samuelson Slough	X	X
103	East Weller Slough	X	X
115	Saylor Slough	X	X
117	Lower Gradin Slough	X	X
118	Mine Surge Pond	X	X
123	Falkirk Mine Discharge	X	X

Table 24
Revised WQMP Sampling Locations

Falkirk Mine Disposal Areas - Ground Water

Location	Description	Field Parameter	Lab Parameter
531	FMW # 31 = FVD # 88-1A	X	X
532	FMW # 32 = FVD # 88-1B	X	X
533	FMW # 33 = FVD # 88-2A	X	X
534	FMW # 34 = FVD # 88-2B	X	X
535	FMW # 35 = FVD # 88-3A	X	X
536	FMW # 36 = FVD # 88-3B	X	X
537	FMW # 37 = FVD # 88-4A	X	X
538	FMW # 38 = FVD # 88-4B	X	X
539	FMW # 39 = FVD # 88-5A	X	X
540	FMW # 40 = FVD # 88-5B	X	X
541	FMW # 41 = FVD # 88-6A	X	X
542	FMW # 42 = FVD # 88-6B	X	X
543	FMW # 43 = FVD # 88-7A	X	X
544	FMW # 44 = FVD # 88-7B	X	X
545	FMW # 45 = FVD # 88-7R	X	X
546	FMW # 46 = FVD # 88-8A	X	X
547	FMW # 47 = FVD # 88-8B	X	X
548	FMW # 48 = FVD # 88-9A	X	X
549	FMW # 49 = FVD # 88-9B	X	X
550	FMW # 50 = FVD # 88-10A	X	X
551	FMW # 51 = FVD # 88-10B	X	X
552	FMW # 52 = FVD # 88-11A	X	X
553	FMW # 53 - FVD # 88-11B	X	X
554	FMW # 54 = FVD # 88-12A	X	X
555	FMW # 55 = FVD # 88-12B	X	X

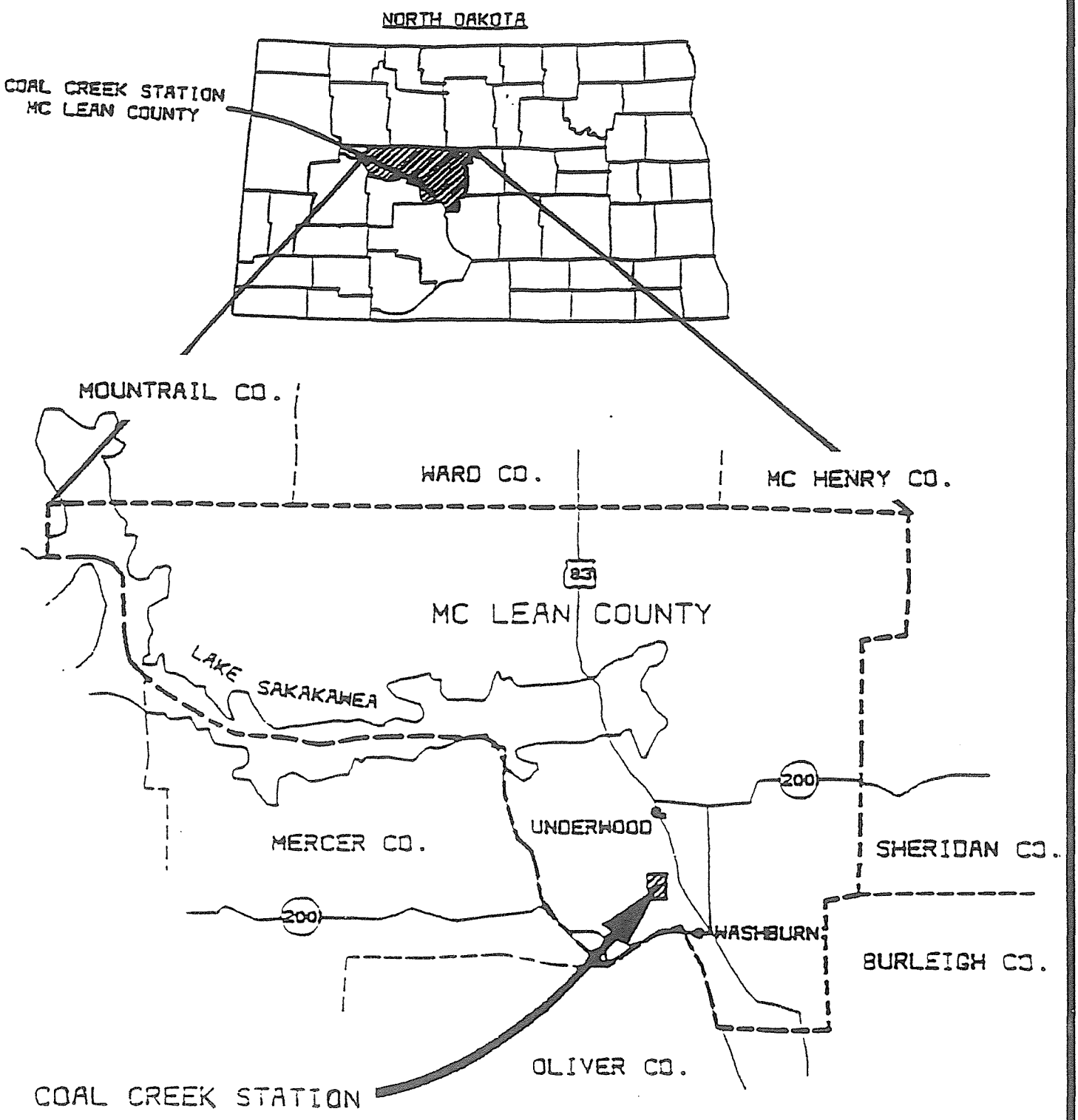


FIGURE 1

REGIONAL LOCATION MAP

COOPERATIVE POWER ASSOCIATION

DECEMBER 1991	DAMES & MOORE

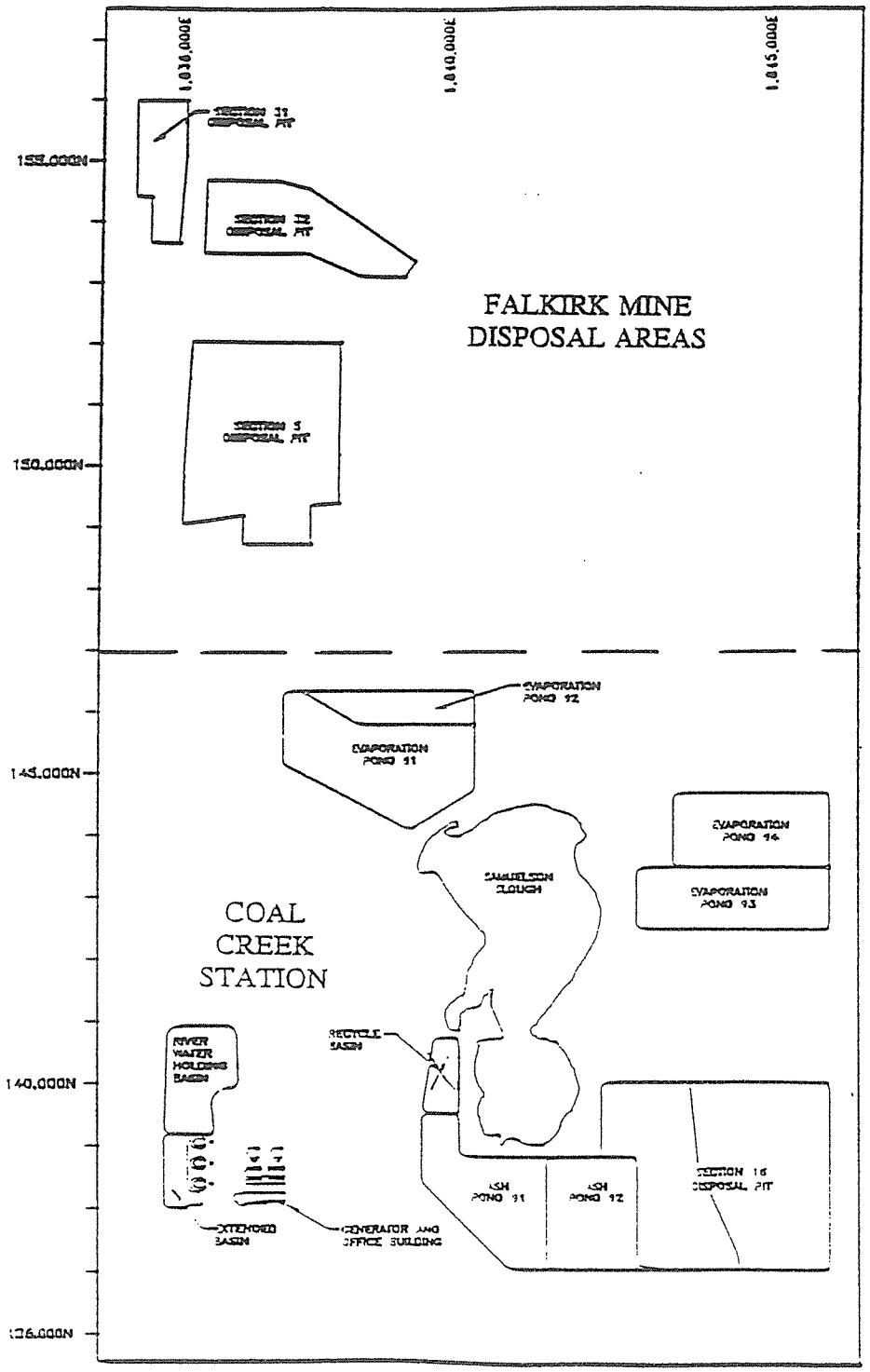


FIGURE 2

GENERALIZED SITE MAP

COOPERATIVE POWER ASSOCIATION

DECEMBER 1991	DAMES & MOORE

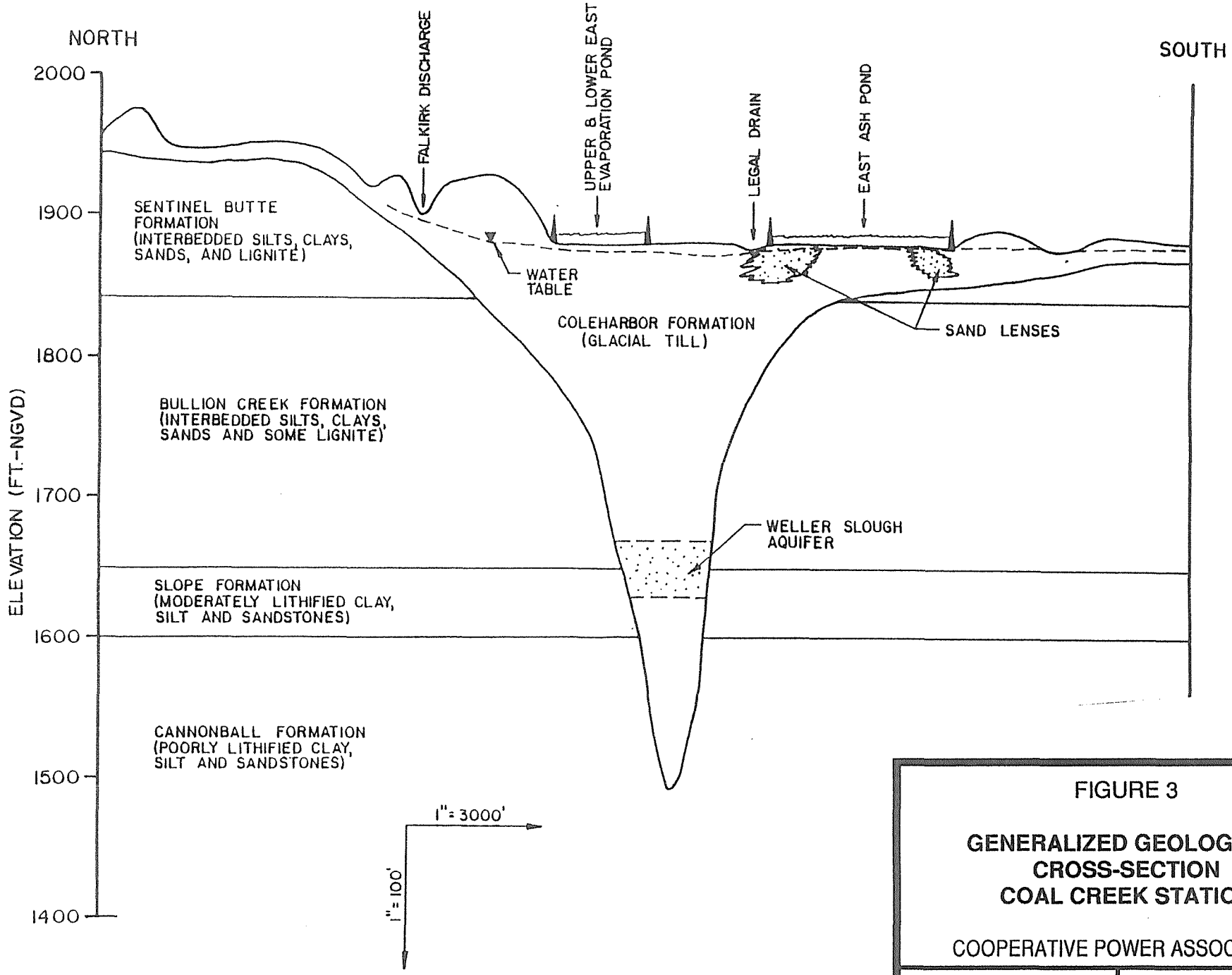
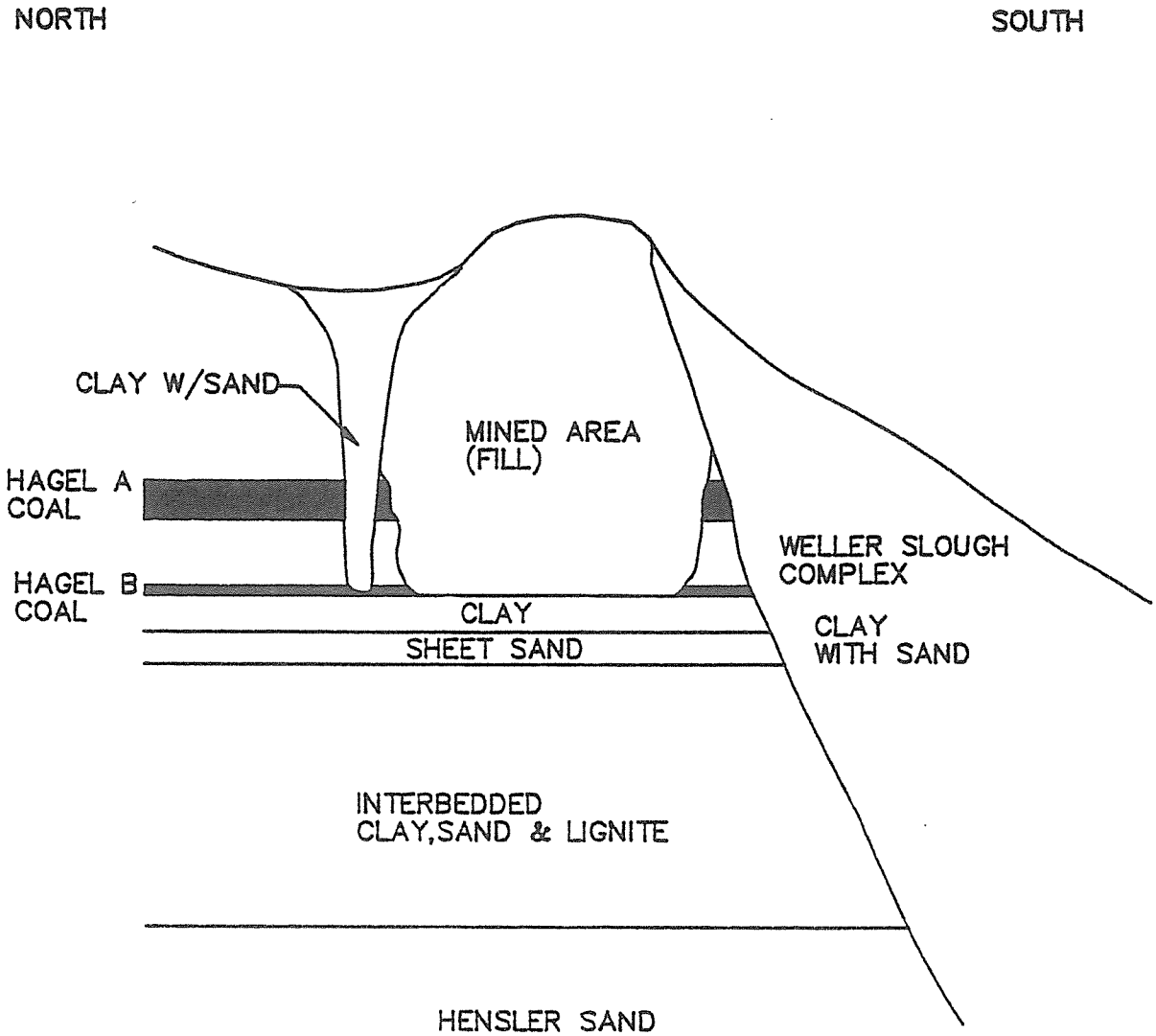


FIGURE 3

GENERALIZED GEOLOGICAL CROSS-SECTION COAL CREEK STATION

COOPERATIVE POWER ASSOCIATION

OCTOBER 1991	DAMES & MOORE



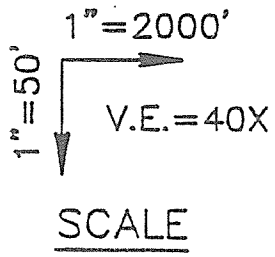


FIGURE 4

GENERALIZED GEOLOGICAL CROSS-SECTION FALKIRK MINE

COOPERATIVE POWER ASSOCIATION

OCTOBER 1991 | **DAMES & MOORE**

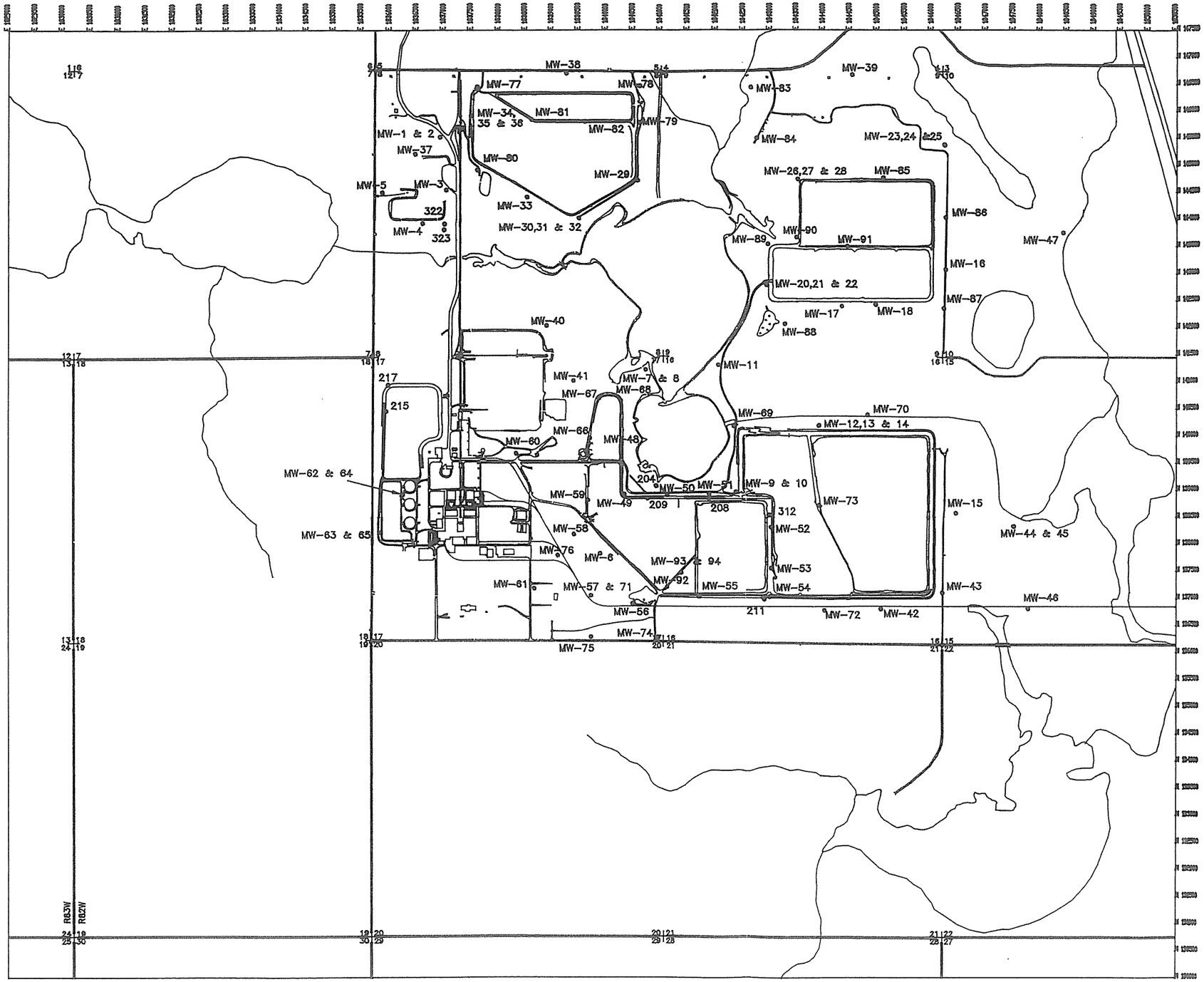


FIGURE 5

COAL CREEK STATION

EXISTING GROUND WATER MONITORING LOCATIONS

DECEMBER 1991	DAMES & MOORE

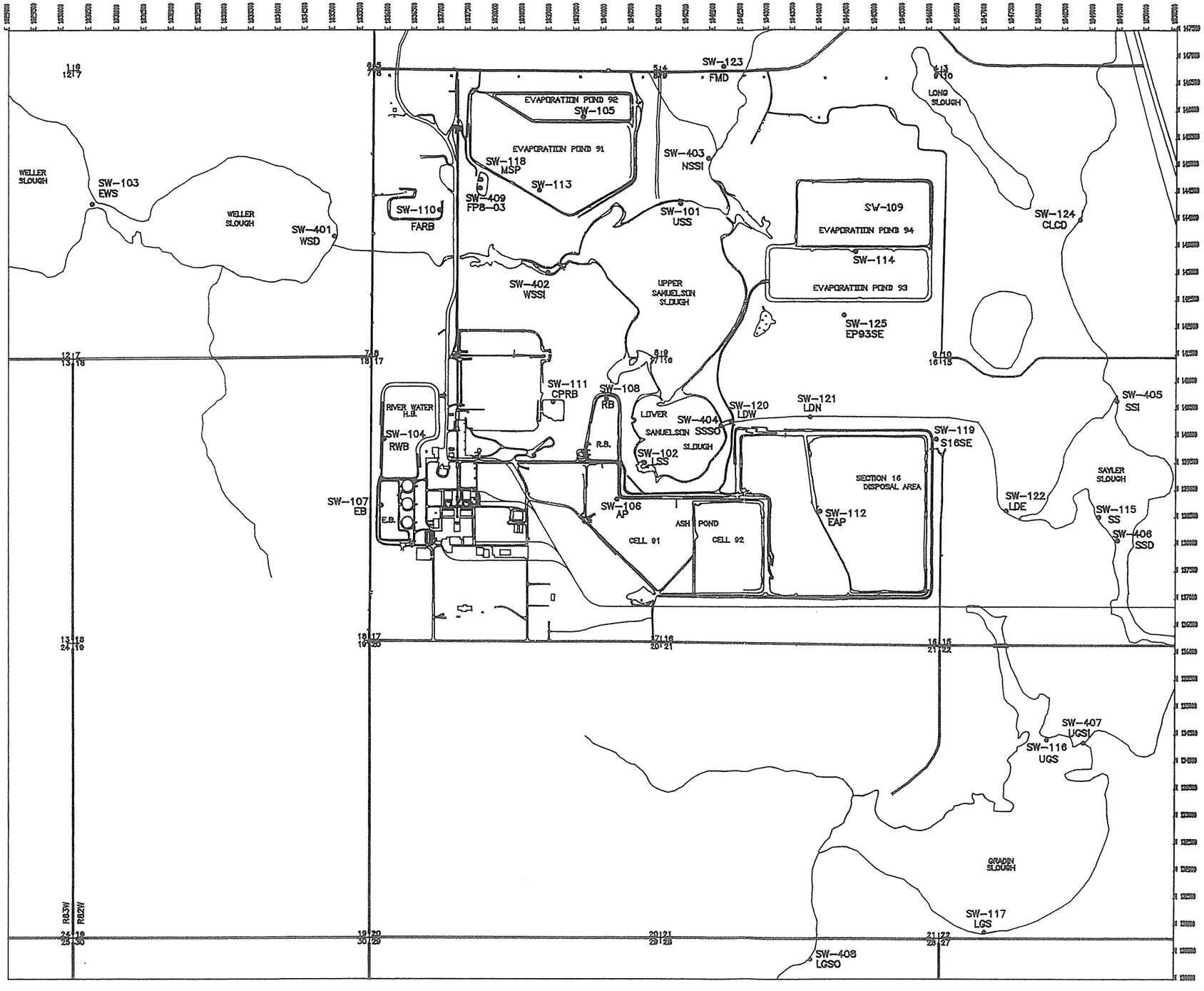
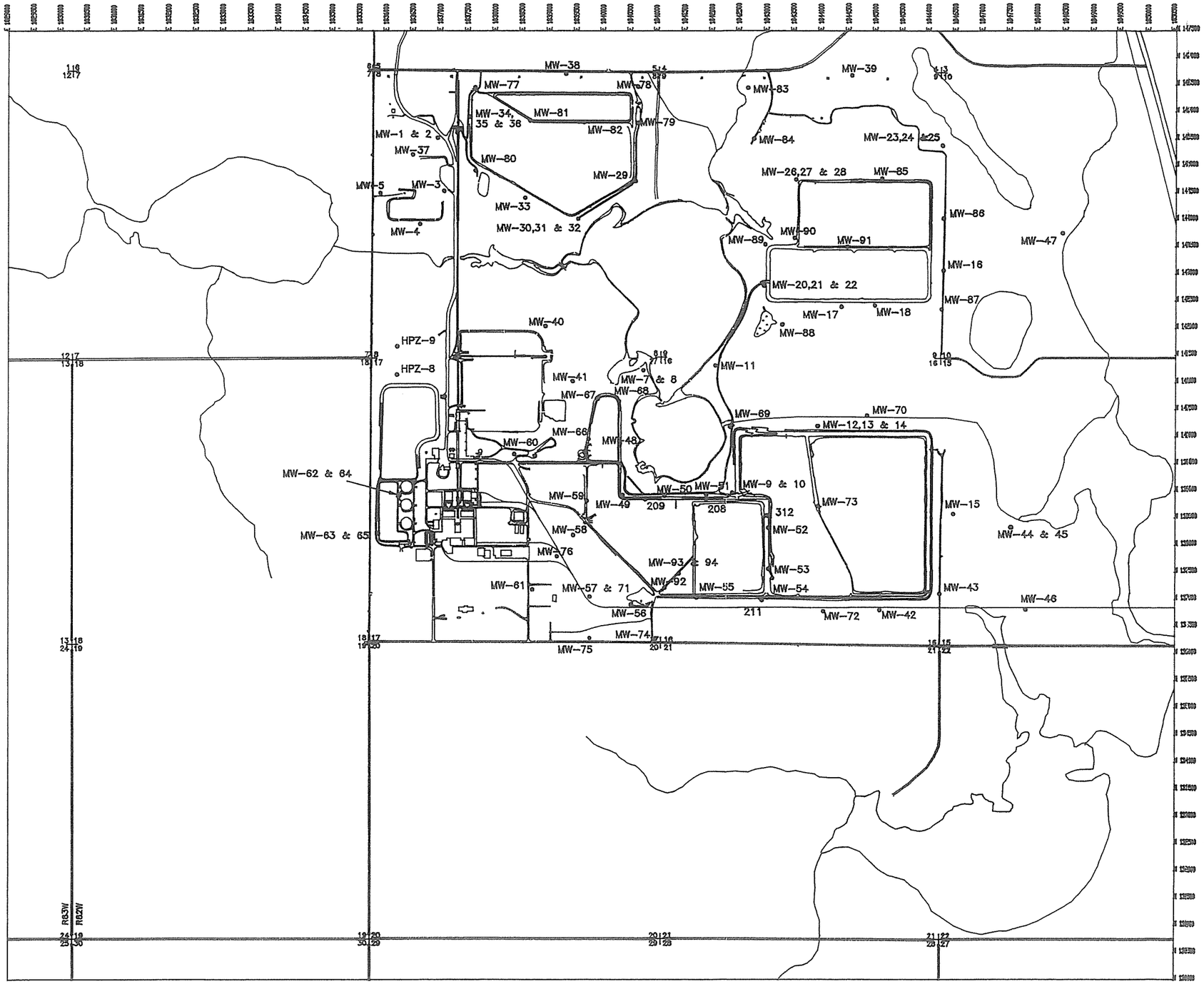


FIGURE 6

COAL CREEK STATION

EXISTING SURFACE WATER MONITORING LOCATIONS

DECEMBER 1991	DAMES & MOORE



0 1000 2000

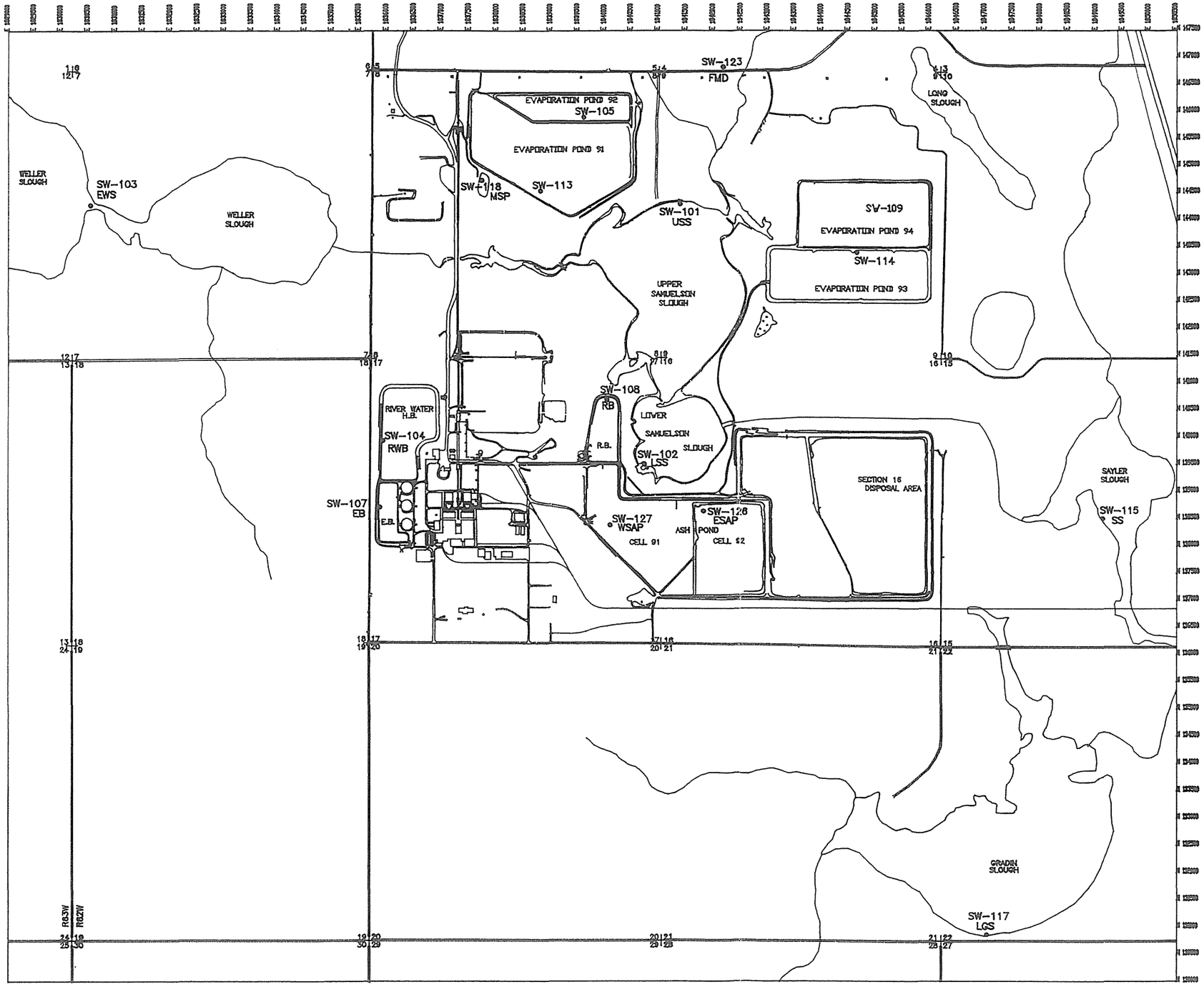
1 INCH EQUALS 2000 FEET

FIGURE 8

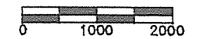
COAL CREEK STATION

REVISED GROUND WATER MONITORING LOCATIONS

DECEMBER 1991	DAMES & MOORE







1 INCH EQUALS 2000 FEET

FIGURE 9

COAL CREEK STATION

REVISED SURFACE WATER MONITORING LOCATIONS

DECEMBER 1991	DAMES & MOORE

Appendix A
Coal Creek Station Investigative Reports

Sprg 1974 "Subsurface Investigation, Cooperative Power Association Coal Creek Station, Units 1 and 2, Exploratory Borings and Tests, Spring 1974" by Soil Exploration under the direction of Black and Veatch Consulting Engineers.

A total of 24 soil borings were completed to: 1) determine the extent of lignite deposits; 2) investigate and describe geology of the site; and 3) obtain data pertaining to engineering properties of soil and rock materials at the site.

Jan 1975 "Geotechnical Investigation Coal Creek Station," Vol. I & II by McClelland Engineers, Inc. for Black and Veatch Consulting Engineers 1975.

A total of 87 borings were completed to obtain geotechnical data for design and construction of an adequate and economical foundation for the power plant and associated facilities. The investigation included borings, obtaining soil samples for field and laboratory tests, installing piezometers and performing geotechnical analysis.

Jun 1975 "Test Borings for Well Construction," June 2, 1975 by Soil Exploration under the direction of Black and Veatch Consulting Engineers.

Seven test borings were completed to help locate potential aquifers and to determine depths to the Fort Union Formation. Report includes geophysical data performed by GeoScience Associates.

Sep 1977 Soil Investigation - "Ash Pond and Evaporation Pond Geotechnical Data," September 16, 1977, Soil Exploration under the direction of Black and Veatch Consulting Engineers.

A total of 72 soil borings were completed, 42 in the North Evaporation Pond and 31 in the East Ash Pond area, to obtain geotechnical data. Six of the borings were completed as piezometers at the East Ash Pond. Additional laboratory tests were run on selected soil samples from both areas.

Mar 1978 "South Ash Pond Geotechnical Data," March 3, 1978 by Soil Exploration under the direction of Black and Veatch Consulting Engineers.

A total of 15 soil borings were completed in the area of the proposed South Ash Pond. A series of geotechnical laboratory tests were performed on selected soil samples. Laboratory tests included permeability tests, Relative Density tests (modified proctor), sieve analysis, atterburg limits, triaxial test series and stress-stain curves.

Jan 1979 "Geotechnical Exploration Program, East Ash Pond and East Evaporation Pond, Coal Creek Station," January 16, 1979 by Soil Exploration under the direction of Black and Veatch Consulting Engineers.

A total of 27 soil borings were completed to determine geotechnical properties of soils in the areas of the proposed East Ash Pond and the proposed East Evaporation Pond.

May 1980 "East Ash Pond Liner Investigation" Coal Creek Station, May 19, 1980 by Black and Veatch Consulting Engineers.

A series of hand augers borings were performed at 200 foot intervals to determine the adequacy of the pond seal. Sand lenses were found to exist, hence effective ways to seal the pond were proposed. Supplementary borings were also completed along the inside perimeter of the dikes.

Oct 1980 "Piezometer Location Chart & Well Installation Observation & Locations for 10 through 23," October 14, 1980 by Soil Exploration under the direction of Black & Veatch Consulting Engineers.

No text. Charts, 6 construction diagrams, locations and boring logs for Piezometers 0-1 thru 0-23.

1980 "South Ash Pond Geotechnical Report" ~1980 by Black and Veatch Consulting Engineers.

Data was collected to determine the cause of seepage along the east and south dikes of the South Ash Pond. The study showed indications of seepage along the north, east and south dikes of the pond originating from within the pond.

Jan 1981 "Review of the South and East Ash Pond and the East Evaporation Pond," January, 1981 by Barr Engineering.

Seepage was observed in the South and East Ash Ponds and was evaluated by Barr Engineering. The East Evaporation Pond had not yet been filled but was predicated to seep if not modified. Alternatives for reduction of seepage was given for all three ponds.

Jun 1981 "Hydrogeologic Evaluation of Leakage From Ash and Evaporation Ponds at Coal Creek," June 1981 by Barr Engineering.

Conclusions were that there was a very high probability of significant seepage from the East Ash and East Evaporation Ponds. They proposed that additional studies be done on the ponds.

Jul 1981 "Geology & Hydrogeology of the East Evaporation Pond, Coal Creek Electrical Generating Station," July 8, 1981 by Stephen R. Moran of Barr Engineering.

A total of 18 soil borings and 22 test pits were completed in the East Evaporation Ponds. They found conditions in the south basin and at least half of the north basin would that warrant lining, with a low permeability clay liner. (Three options were given.)

Sep 1981 "Investigation for Clay Liner Materials East Evaporation Pond," September 1981, by Barr Engineering (For Cooperative Power Association and United Power Association).

An area north of the East Evaporation Ponds was investigated for importing clay material. An adequate amount of clay material was found or surmised to exist north and west of the pond for construction of the pond liner.

Apr 1982 "Coal Creek Station Surface Water Study," April 1982 by Barr Engineering.

The purpose of this study was to provide information regarding seepage from various ponds at Coal Creek. They estimated the amount and quality of the seepage that may occur from the North and East Evaporation Ponds, East and South Ash Ponds, and the River Extended Basins.

Jun 1982 "Coal Creek Station Surface Water Study", by Barr Engineering

June 1982 " Coal Creek Station Hydrogeologic Study", by Barr Engineering

Jun 1982 "Investigation for Clay Liner Materials, River Water Holding Basin," June 1982, by Barr Engineering.

Four borrow areas were examined for potential use for clay liner material. Three of the four areas were recommended as useful areas for clay liner material.

Jan 1984 "River Water Holding Basin Evaluation, Coal Creek Station," January, 1984, by Eugene A. Hickok and Associates.

The installation of 9 piezometers, 5 soil borings and analysis of available water level data was conducted to investigate boils observed along the west side of the River Water Holding Basin dike. The problem was defined and corrective action was recommended.

May 1985 "East Ash Pond Data Review," May 1985 by Eugene A. Hickok and Associates.

The East Ash Pond seepage rate was estimated at 2.2 million gallons per day. Geological conditions allow vertical seepage through the bottom of the pond and the east dike of the pond.

Aug 1985 "East Ash Pond Seepage Investigation," August 1985 by Eugene A. Hickok and Associates.

The study showed: 1) overall permeability of the East Ash Pond exceeds the criteria seepage rate; 2) the northerly one-third of the pond has a higher average permeability than the southerly two-thirds; and 3) repairing the pond would be necessary to meet seepage criteria.

Nov 1985 "Water Quality Monitoring Plan, Coal Creek Station for Cooperative Power Association and United Power Association," November, 1985 by Eugene A. Hickok and Associates.

The Water Quality Monitoring Plan established monitoring locations to evaluate potential water quality impacts to the wetlands and shallow ground water.

Jun 1986 "Monitoring Well Installation and Test Borings," June 27, 1986 by Twin City Testing.

A total of eight ground water monitoring wells were installed to supplement the existing wells in the area of the South and East Ash Ponds. The wells are designated MW-40 thru MW-47.

Jul 1986 "Evaluation of Pond Bottom Conditions Southwest and West Portions of the East Ash Pond, Coal Creek Station," July, 1986 by Eugene A. Hickok and Associates.

Conclusions were made that the low area was excavated replacing clay-rich material with an unknown material having limited compaction. Permeability tests in fill area are not representative of the pond bottom soil conditions.

Dec 1988 "Geophysical Survey Results at Coal Creek Station",
December 20, 1988, by Minnesota Geophysical Associates, Inc.

Mar 1989 "Hydrogeological Analysis for Coal Creek Station," March, 1989 by Foth & Van Dyke.

A total 21 monitoring wells and seven borings were completed to: 1) evaluate hydrogeological characteristics for the design considerations of the South Ash Pond; 2) evaluate the potential need for remediation at the Recycle Basin; and 3) define a potential clay rich borrow area southwest of the South Ash Pond.

Oct 1989 "Drilling Data - Summer 1989, Cooperative Power Association and United Power Association," October 1989, by Foth & Van Dyke.

A total of 141 soil borings and 26 monitoring wells were completed to provide information in or around the North Evaporation Ponds, East Evaporation Ponds and the South Ash Pond. Borings were completed on the pond bottoms and dikes

for the North and East Evaporation Ponds and Southwest of the South Ash Pond. Monitoring wells were completed throughout the site.

Nov 1989 "Geophysical Survey Results at Coal Creek Power Station," November 15, 1989 by Minnesota Geophysical Associates, Inc.

The survey measured the change in conductivity since the baseline survey was performed in November 1988. It established new baseline data around the North and East Evaporation Ponds and to the west of the South Ash Pond. The data will be used to determine the possible extent, direction and pattern of containment migration in the area.

Nov 1990 "Geophysical Survey Results, Coal Creek Station and Falkirk Mine," November 1990, by Geosphere Midwest.

A geophysical survey consisting of a series of electromagnetic induction profiles was conducted to detect variations in levels of ground water contamination adjacent to the South and East Ash Ponds, the North and East Evaporation Ponds and three ash pits associated with the Falkirk mine. This study showed a small, uniform decrease in apparent conductivities over the entire area, probably due to increased rainfall in 1990 over 1989. No other conclusions could be drawn from this study.

Dec 1990 "On-Site Borrow Investigation," December 13, 1990 by Braun Engineering.

A total of five soil borings were completed in the area of section 8 to determine its suitability as a borrow location for clay lining of ponds. A suitable lean clay was encountered at all locations, however impurities such as trace sand, gravel or lignite were also present.

Dec 1990 "Hydrogeological Analysis Annual Report," December 21, 1990 by Braun Engineering.

This report includes data summary tables and graphs of selected available data as well as a narrative discussion of water quality, in the areas of the evaporation and disposal ponds, to meet permit requirements set by the State of North Dakota.

Dec 1990 "Hydrogeological Analysis, East Evaporation Ponds Coal Creek Station," December 21, 1990 by Braun Environmental Laboratories.

This Hydrogeologic Analysis evaluated geological and hydrogeological data to develop geologic cross-sections to determine a design elevation for the pond bottom.

- "Ground Water Resources Near Max, McLean and Ward Counties, North Dakota, N.D. Ground Water Studies No. 45" by the U.S. Geological Survey, N.D. State Water Commission and N.D. Geological Survey.

A 64 square mile area was investigated for geologic reconnaissance, test drilling, well inventory and collection of water samples for chemical analysis.

- "North Dakota State Department of Health, Bacteriological Water Analysis." Unknown date and author.

A summary of nearby and on-site production wells water analysis report and bacteriological water analysis report.

- Application to Renew Permit to Operate Special Use Disposal Site, Coal Creek Station, Permit #SU-033.

Mar 1988 Liner Evaluation South Ash Pond and East Ash Pond Coal Creek Station, McLean County, North Dakota. March, 1988.

Dec 1989 Hydrogeological Analysis for the North Evaporation Ponds, Coal Creek Station, McLean County, North Dakota. December, 1989.

Nov 1987 South Ash Pond Evaluation, Coal Creek Station. November, 1987.

Appendix B
Falkirk Mine Investigative Reports

Apr 1979 "Falkirk Mine Underwood, North Dakota Report of Regional Ground Water Modeling Studies, Section XI-F, Amendment to Permit 40" by Peter J. Riordan P.E. Consulting Engineer and Ground water Hydrologist, April 1979.

The study indicated that the proposed mining operations would have minimal to no impact on ground water quantity in the town of Underwood. Also, no long-term impacts on the regional flow system are foreseen.

Nov 1985 "Water Quality Monitoring Plan, Coal Creek Station for Cooperative Power Association and United Power Association," November, 1985 by Eugene A. Hickok and Associates.

The Water Quality Monitoring Plan established monitoring locations to evaluate potential water quality impacts to the wetlands and shallow ground water.

Jan 1990 "Geophysical Survey Results at the Falkirk Mine," January 5, 1990 by Minnesota Geophysical Associates, Inc.

Areas of high conductivity were detected, possibly due to sulfate contamination. Baseline EM data were established so future surveys could measure changes in contamination levels. EM conductivity data were obtained at 12 monitoring well locations, allowing correlation between geophysical and well sample data.

Nov 1990 "Geophysical Survey Results, Coal Creek Station and Falkirk Mine," November 1990, by Geosphere Midwest.

A geophysical survey consisting of a series of electromagnetic induction profiles was conducted to detect variations in levels of ground water contamination adjacent to the South and East Ash Ponds, the North and East Evaporation Ponds and three ash pits associated with the Falkirk mine. This study showed a small, uniform decrease in apparent conductivities over the entire area, probably due to increased rainfall in 1990 over 1989. No other conclusions could be drawn from this study.

- "Ground Water Resources Near Max, McLean and Ward Counties, North Dakota, N.D. Ground Water Studies No. 45" by the U.S. Geological Survey, N.D. State Water Commission and N.D. Geological Survey.

  A 64 square mile area was investigated for geologic reconnaissance, test drilling, well inventory and collection of water samples for chemical analysis.

- "North Dakota State Department of Health, Bacteriological Water Analysis." Unknown date and author.

  A summary of nearby and on-site production wells water analysis report and bacteriological water analysis report.

- Application to Renew Permit to Operate Special Use Disposal Site, Coal Creek Station, Permit #SU-033.

- Groundwater Monitoring Plan Section 31/32 Disposal Area, Coal Creek Station, McLean County, North Dakota. December, 1988

- Groundwater Monitoring Plan Section 5 Disposal Area, Coal Creek Station, McLean County, North Dakota. February, 1988

- Drilling Data - Summer 1989, Coal Creek Station, McLean County, North Dakota. October, 1989

COAL CREEK STATION LOCATION REPORT

LOCATION	WELL NAME
000	Field Blank Data <=1985
001	Monitoring Well # 1 - CCS
002	Monitoring Well # 2 - CCS
003	Monitoring Well # 3 - CCS
004	Monitoring Well # 4 - CCS
005	Monitoring Well # 5 - CCS
006	Destroyed - CCS
007	Monitoring Well # 7 - CCS
008	Monitoring Well # 8 - CCS
009	Monitoring Well # 9 - CCS
010	Monitoring Well # 10 -CCS
011	Monitoring Well # 11 -CCS
012	Monitoring Well # 12 -CCS
013	Monitoring Well # 13 -CCS
014	Monitoring Well # 14 -CCS
015	Monitoring Well # 15 -CCS
016	Monitoring Well # 16 -CCS
017	Monitoring Well # 17 -CCS
018	Monitoring Well # 18 -CCS
019	Destroyed -CCS
020	Monitoring Well # 20 -CCS
021	Monitoring Well # 21 -CCS
022	Monitoring Well # 22 -CCS
023	Monitoring Well # 23 -CCS
024	Monitoring Well # 24 -CCS
025	Destroyed
026	Monitoring Well # 26 -CCS
027	Monitoring Well # 27 -CCS
028	Monitoring Well # 28 -CCS
029	Monitoring Well # 29 -CCS
030	Monitoring Well # 30 -CCS
031	Monitoring Well # 31 -CCS
032	Monitoring Well # 32 -CCS
033	Monitoring Well # 33 -CCS
034	Monitoring Well # 34 -CCS
035	Monitoring Well # 35 -CCS
036	Monitoring Well # 36 -CCS
037	Monitoring Well # 37 -CCS
038	Monitoring Well # 38 -CCS
039	Monitoring Well # 39 -CCS
040	Monitoring Well # 40 -CCS
041	Monitoring Well # 41 -CCS
042	Monitoring Well # 42 -CCS
043	Monitoring Well # 43 -CCS
044	Monitoring Well # 44 -CCS

COAL CREEK STATION LOCATION REPORT

LOCATION	WELL NAME
045	Monitoring Well # 45 -CCS
046	Monitoring Well # 46 -CCS
047	Monitoring Well # 47 -CCS
048	Monitoring Well # 48 -CCS
049	Monitoring Well # 49 -CCS
050	Monitoring Well # 50 -CCS
051	Monitoring Well # 51 -CCS
052	Monitoring Well # 52 -CCS
053	Monitoring Well # 53 -CCS
054	Monitoring Well # 54 -CCS
055	Monitoring Well # 55 -CCS
056	Monitoring Well # 56 -CCS
057	Monitoring Well # 57 -CCS
058	Monitoring Well # 58 -CCS
059	Monitoring Well # 59 -CCS
060	Monitoring Well # 60 -CCS
061	Monitoring Well # 61 -CCS
062	Monitoring Well # 62 -CCS
063	Monitoring Well # 63 -CCS
064	Monitoring Well # 64 -CCS
065	Monitoring Well # 65 -CCS
066	Monitoring Well # 66 -CCS
067	Monitoring Well # 67 -CCS
068	Monitoring Well # 68 -CCS
069	Monitoring Well # 69 -CCS
070	Monitoring Well # 70 -CCS
071	Monitoring Well # 71 -CCS
072	Monitoring Well # 72 -CCS
073	Monitoring Well # 73 -CCS
074	Monitoring Well # 74 -CCS
075	Monitoring Well # 75 -CCS
076	Monitoring Well # 76 -CCS
077	Monitoring Well # 77 -CCS
078	Monitoring Well # 78 -CCS
079	Monitoring Well # 79 -CCS
080	Monitoring Well # 80 -CCS
081	Monitoring Well # 81 -CCS
082	Monitoring Well # 82 -CCS
083	Monitoring Well # 83 -CCS
084	Monitoring Well # 84 -CCS
085	Monitoring Well # 85 -CCS
086	Monitoring Well # 86 -CCS
087	Monitoring Well # 87 -CCS
088	Monitoring Well # 88 -CCS
089	Monitoring Well # 89 -CCS
090	Monitoring Well # 90 -CCS

COAL CREEK STATION LOCATION REPORT

LOCATION	WELL NAME
091	Monitoring Well # 91 -CCS
092	Monitoring Well # 92 -CCS
093	Monitoring Well # 93 -CCS
094	Monitoring Well # 94 -CCS
101	Upper Samuelson Slough
102	Lower Samuelson Slough
103	East Weller Slough
104	River Water Basin (RWB)
105	Upper N. Evap Pond (UNEP)
106	South Ash Pond (SAP)
107	Extended Basin (Cooling)
108	Recycle Basin (Holding)
109	Upper E. Evap Pond (UEEP)
110	Fly Ash Runoff Basin
111	Coal Pile Runoff Basin
112	East Ash Pond (EAP)
113	Lower N. Evap Pond (LNEP)
114	Lower E. Evap Pond (LEEP)
115	Saylor Slough
116	Upper Gradin Slough
117	Lower Gradin Slough
118	Mine Surge Pond
119	East Ash Pond Seepage
120	Legal Drain West
121	Legal Drain North
122	Legal Drain East
123	Falkirk Mine Discharge
124	Coal Lake Coulee Discharg
125	Seepage South of LEEP
126	East South Ash Pond
127	West South Ash Pond
204	Piezometer # 4
208	H-Piezometer # 8
209	H-Piezometer # 9
211	Piezometer # 11
215	Piezometer # 15
217	Piezometer # 17
312	Destroyed
322	Observation Well # 22
323	Observation Well # 23
401	Weller Slough Outlet
402	West Samuelson Inlet
403	North Samuelson Inlet
404	Samuelson Slough Outlet
405	Sayler Slough Inlet
406	Sayler Slough Outlet

COAL CREEK STATION LOCATION REPORT

LOCATION	WELL NAME
407	Upper Gradin Slough Inlet
408	Lower Gradin Outlet
409	Falkirk Pond 8-03
501	FMW # 1 = FMC # 92-1
502	FMW#2=FMC#104-1 (Steel)
503	FMW # 3 = FMC # 104-2
504	FMW#4=FMC#108-1 (Steel)
505	FMW#5=FMC#108-2 (Steel)
506	FMW # 6 = FMC # RP-1
507	FMW # 7 = FMC # RP-2
508	FMW # 8 = FMC # RP-5
509	FMW # 9 = FMC # RP-10
510	FMW # 10 = FMC # RP-11
511	FMW # 11 = FMC # RP-12
512	FMW # 12 = FMC # RP-13
513	FMW #13 = FMC # RP-14
514	FMW #14 = FMC # RP-15
515	FMW #15 = FMC # RP-16
516	FMW #16 = FMC # RP-17
517	FMW #17 = FMC # RP-18A
518	FMW #18 = FMC # RP-19
519	FMC #RP-20A - PIPE BENT
520	FMC #RP-20B - PIPE BENT
521	FMW # 21 = FMC # RP-20C
522	FMW # 22 = FMC # RP-21
523	FMW # 23 = FMC # RP-22A
524	FMW # 24 = FMC # RP-22B
525	FMW # 25 = FMC # RP-22C
526	FMW # 26 = FMC # 104-3
527	FMW # 27 = FMC # RP-18B
528	FMW # 28 = FMC # 19-1
529	FMW # 29 = FMC # 19-2
530	FMW # 30 = FMC # 19-3
531	FMW # 31 = FVD # 88-1A
532	FMW # 32 = FVD # 88-1B
533	FMW # 33 = FVD # 88-2A
534	FMW # 34 = FVD # 88-2B
535	FMW # 35 = FVD # 88-3A
536	FMW # 36 = FVD # 88-3B
537	FMW # 37 = FVD # 88-4A
538	FMW # 38 = FVD # 88-4B
539	FMW # 39 = FVD # 88-5A
540	FMW # 40 = FVD # 88-5B
541	FMW # 41 = FVD # 88-6A
542	FMW # 42 = FVD # 88-6B
543	FMW # 43 = FVD # 88-7A

COAL CREEK STATION LOCATION REPORT

LOCATION	WELL NAME
544	FMW # 44 = FVD # 88-7B
545	DESTROYED 88-7R
546	FMW # 46 = FVD # 88-8A
547	FMW # 47 = FVD # 88-8B
548	FMW # 48 = FVD # 88-9A
549	FMW # 49 = FVD # 88-9B
550	FMW # 50 = FVD # 88-10A
551	FMW # 51 = FVD # 88-10B
552	FMW # 52 = FVD # 88-11A
553	FMW # 53 = FVD # 88-11B
554	FMW # 54 = FVD # 88-12A
555	FMW # 55 = FVD # 88-12B
901	Field Blank # 1
902	Field Blank # 2
903	Field Blank # 3
904	Field Blank # 4
905	Field Blank # 5
906	Field Blank # 6
907	Field Blank # 7
908	Field Blank # 8
909	Field Blank # 9
910	Field Blank # 10
911	Field Blank # 11

COAL CREEK STATION
WATER QUALITY MONITORING PROGRAM
FIRST QUARTER 1991

Coal Creek Station's groundwater and surface water sampling program to be performed during the first quarter of 1991.

GROUNDWATER SAMPLING PROGRAM

Wells to be sampled:

* Section 5 Disposal Area wells: 501, 523-525, 531-542.
* Section 31 Disposal Area wells: 543-544, 546-549.
* Section 32 Disposal Area wells: 550-555.

Surface waters to be sampled:

* Surface waters 601-602.

Field data to be collected:

* Sample period.
* Date pre-pumped.
* Volume pre-pumped.
* Date sampled.
* Water level depth below ground surface.
* Weather conditions.
* Sample ph, temperature, and specific conductance.
* Sample collection technique, (Bailer or Bladder Pump).
* Additional comments.

Laboratory Analysis for all samples:

* Physical tests: ph, specific conductance, TDS.
* Metal analysis: Mg,K,Na,Ca,B,Fe,Mn,Sr,Se,As,Cd.
* Inorganic tests: Total Alk,SO4,NO3-N,Total S,F,Cl.

SNOW-MELT SAMPLING PROGRAM

In the event of significant snowfall/rainfall and run-off the following samples should be taken.

Locations to be sampled:

* Sample location: 401 - 409.

Field data to be collected:

* Sample period.
* Date sampled.
* Weather Conditions.
* Sample ph, temperature, specific conductance.
* Additional comments.

Laboratory analysis for all samples:

* Physical tests: ph, specific conductance, TDS, TSS.
* Metal analysis: Mg, K, Na, Ca, B, Fe, Mn, Sr, Se, As, Cd.
* Inorganic tests: Total Alk, SO4, NO3-N, Total S, F, Cl.

COAL CREEK STATION
WATER QUALITY MONITORING PROGRAM
SECOND QUARTER 1991

Coal Creek Station's groundwater and surface water sampling program to be performed during the second quarter of 1991.

GROUNDWATER AND SURFACE WATER SAMPLING PROGRAM

Wells to be sampled:

* Section 5 Disposal Area wells: 501, 523-525, 531-542.
* Section 31 Disposal Area wells: 543-544, 546-549.
* Section 32 Disposal Area wells: 550-555.
* CCS monitoring wells 1-94
* HPZ wells 8 and 9
* Observation well 023

Surface waters to be sampled:

* Surface waters 101-105, 107-127, 601-602.

Field data to be collected:

* Sample period.
* Date pre-pumped.
* Volume pre-pumped.
* Date sampled.
* Water level depth below ground surface.
* Weather conditions.
* Sample ph, temperature, and specific conductance.
* Sample collection technique, (Bailer or Bladder Pump).
* Additional comments.

Laboratory Analysis for all samples:

* Physical tests: ph, specific conductance, TDS.
* Metal analysis: Mg,K,Na,Ca,B,.
* Inorganic tests: Total Alk,SO4,F,Cl.

Additional analysis:

* Fe: MW 69-94, 501, 523-525, 531-542, 543-549, 550-555.
* Mn: MW 69-94. 501, 523-525, 531-542, 543-549, 550-555.
* Sr: MW 69-94, 501, 523-525, 531-542, 543-549, 550-555.
* Se: MW 31, 32, 37, 69-94, 501, 523-525, 531-542, 543-549, 550-555,
* As: MW 32, 45, 69-94, 501, 523-525, 531-542, 543-549, 550-555, SW 105, 108, 112-117, 119-122, 125-127.
* Cd: MW 8, 69-94, 501, 523-525, 531-542, 543-549, 550-555.
* Total S: MW 69-94, 501, 523-525, 531-542, 543-549, 550-555.
* NO3-N: MW 69-94, 501, 523-525, 531-542, 543-549, 550-555, SW 101-105, 107-127.
* Al: MW 44.

COAL CREEK STATION
WATER QUALITY MONITORING PROGRAM
THIRD QUARTER 1991

Coal Creek Station's groundwater and surface water sampling program to be performed during the third quarter of 1991.

GROUNDWATER SAMPLING PROGRAM

Wells to be sampled:

* Section 5 Disposal Area wells: 501, 523-525, 531-542.
* Section 31 Disposal Area wells: 543-544, 546-549.
* Section 32 Disposal Area wells: 550-555.

Surface waters to be sampled:

* Surface waters 601-602.

Field data to be collected:

* Sample period.
* Date pre-pumped.
* Volume pre-pumped.
* Date sampled.
* Water level depth below ground surface.
* Weather conditions.
* Sample ph, temperature, and specific conductance.
* Sample collection technique, (Bailer or Bladder Pump).
* Additional comments.

Laboratory Analysis for all samples:

* Physical tests: ph, specific conductance, TDS.
* Metal analysis: Mg,K,Na,Ca,B,Fe,Mn,Sr,Se,As,Cd.
* Inorganic tests: Total Alk,SO4,NO3-N,Total S,F,Cl.

COAL CREEK STATION
WATER QUALITY MONITORING PROGRAM
FOURTH QUARTER 1991

Coal Creek Station's groundwater and surface water sampling program to be performed during the fourth quarter of 1991.

GROUNDWATER AND SURFACE WATER SAMPLING PROGRAM

Wells to be sampled:

* Section 5 Disposal Area wells: 501, 523-525, 531-542.
* Section 31 Disposal Area wells: 543-544, 546-549.
* Section 32 Disposal Area wells: 550-555.
* CCS monitoring wells 1-94
* HPZ wells 8 and 9
* Observation well 023

Surface waters to be sampled:

* Surface waters 101-105, 107-127, 601-602.

Field data to be collected:

* Sample period.
* Date pre-pumped.
* Volume pre-pumped.
* Date sampled.
* Water level depth below ground surface.
* Weather conditions.
* Sample ph, temperature, and specific conductance.
* Sample collection technique, (Bailer or Bladder Pump).
* Additional comments.

Laboratory Analysis for all samples:

* Physical tests: ph, specific conductance, TDS.
* Metal analysis: Mg,K,Na,Ca,B,.
* Inorganic tests: Total Alk,SO4,F,Cl.

Additional analysis:

* Fe: MW 69-94, 501, 523-525, 531-542, 543-549, 550-555.
* Mn: MW 69-94. 501, 523-525, 531-542, 543-549, 550-555.
* Sr: MW 69-94, 501, 523-525, 531-542, 543-549, 550-555.
* Se: MW 31, 32, 37, 69-94, 501, 523-525, 531-542, 543-549, 550-555,
* As: MW 32, 45, 69-94, 501, 523-525, 531-542, 543-549, 550-555, SW 105, 108, 112-117, 119-122, 125-127.
* Cd: MW 8, 69-94, 501, 523-525, 531-542, 543-549, 550-555.
* Total S: MW 69-94, 501, 523-525, 531-542, 543-549, 550-555.
* NO3-N: MW 69-94, 501, 523-525, 531-542, 543-549, 550-555, SW 101-105, 107-127.
* Al: MW 44.

Yearly QA Split to Contract Lab

Monitoring wells 7,8,13,14,15.

* Specific Conductance, TDS.
* Mg, K, Ca, B.
* Alk (Total, Carbonate, Bicarbonate), SO4, F, Cl.
* NO3-N, Fe, Mn, Sr, As, Al.

COAL CREEK STATION
WATER QUALITY MONITORING PROGRAM
FIVE YEAR SAMPLE SCHEDULE

Coal Creek Station's groundwater and surface water sampling program to be performed during the _____ quarter of 19__.

GROUNDWATER AND SURFACE WATER SAMPLING PROGRAM

Wells to be sampled:

* Section 5 Disposal Area wells: 501, 523-525, 531-542.
* Section 31 Disposal Area wells: 543-544, 546-549.
* Section 32 Disposal Area wells: 550-555.
* CCS monitoring wells 1-5,7-18, 20-24, 26-94.
* HPZ wells 8 and 9
* Observation well 023

Surface waters to be sampled:

* Surface waters 101-105, 107-127, 601-602.

Field data to be collected:

* Sample period.
* Date pre-pumped.
* Volume pre-pumped.
* Date sampled.
* Water level depth below ground surface.
* Weather conditions.
* Sample ph, temperature, and specific conductance.
* Sample collection technique, (Bailer or Bladder Pump).
* Additional comments.

Laboratory Analysis for all samples:

* Physical tests: ph, specific conductance, TDS.
* Metal analysis: Mg,K,Na,Ca,B,.
* Inorganic tests: Alk(Total,Carbonate,& Bicarbonate),SO4,F,Cl.

Additional analysis for all Wells and Surface Waters:

* NO3, Fe, Zn, Mn, Cu, Ag, Sr, Be, Ni, Se, Hg, As, Ba, Cd, Cr, Pb, Mo, Al, Total S.

Additional Special Analysis for Surface Waters 104,113,114,126,127:

* TSS

Contract Lab Analysis

Surface waters 101-103, 115-118, 120-124:

* MBAS, Total Coliform, Fecal Coliform.

Surface waters 104,113,114,126,127:

* BOD, COD, TOC, NH3-N.

Surface water 102, Monitoring wells 9 & 10.

* Phenol

Yearly QA Split to Contract Lab

Monitoring wells 7,8,13,14,15.

* Specific Conductance, TDS.
* Mg, K, Na, Ca, B.
* Alk (Total, Carbonate, Bicarbonate), SO4, F, Cl.
* NO3-N, Fe, Mn, Sr, As, Al, Ba, Mo, Pb, Cr-Total, Se, Cd, Ni.

APPENDIX B-7

Monitoring Well Logs

LOG OF TEST BORING NO.: MW-49

CLIENT: Cooperative Power/United Power Association
PROJECT: Coal Creek Station
PROJECT NUMBER: 87C61
LOCATION: Underwood, ND

SURFACE ELEVATION: 1903.6
BORING DEPTH: 25.0 feet
DATE: 05/20/88

MSL ELEV	DEPTH FR LND SURF	SAMP DEPTH INTERVAL	TYPE	#	N	REC (in)	DESCRIPTION OF MATERIAL	CLASS	LABORATORY TESTS	DRILLING AND SAMPLING NOTES
1903.6	0	0.0 - 1.5	SS	1	12		Lean br. sandy, gravelly CLAY, tr. silt, firm - fill	CL	NA	
1898.6	5	5.0 - 6.5	SS	2	32		Same as above	CL	NA	
1893.6	10	10.0-11.5	SS	3	20		Same as above	CL	NA	
							Grey green sandy SILT with clay, damp, soft to firm	ML	NA	
1888.6	15	15.0-16.5	SS	4	13		Fat dk. grey CLAY (shale), damp, hard to very hard	CH	NA	
1883.6	20	20.0-21.5	SS	5	8		Same as above exc. siltier, wet, firm	CH	NA	
		23.5-25.0	SS	6	10		Lean grey/green sandy CLAY w/ silt	CL	NA	
1878.6	25									EOB @ 25.0 feet
1873.6	30									
1868.6	35									
1863.6	40									
1858.6	45									
1853.6	50									
1848.6	55									

DRILLING DATA

START DATE: 05/20/88
COMPLETION DATE: 05/20/88
LOGGED BY: KAD
DRILLING METHOD: 3 1/4" ID HSA SS Samples every 5 feet
DRILLING CONTRACTOR: Great Plains Engineering Laboratory

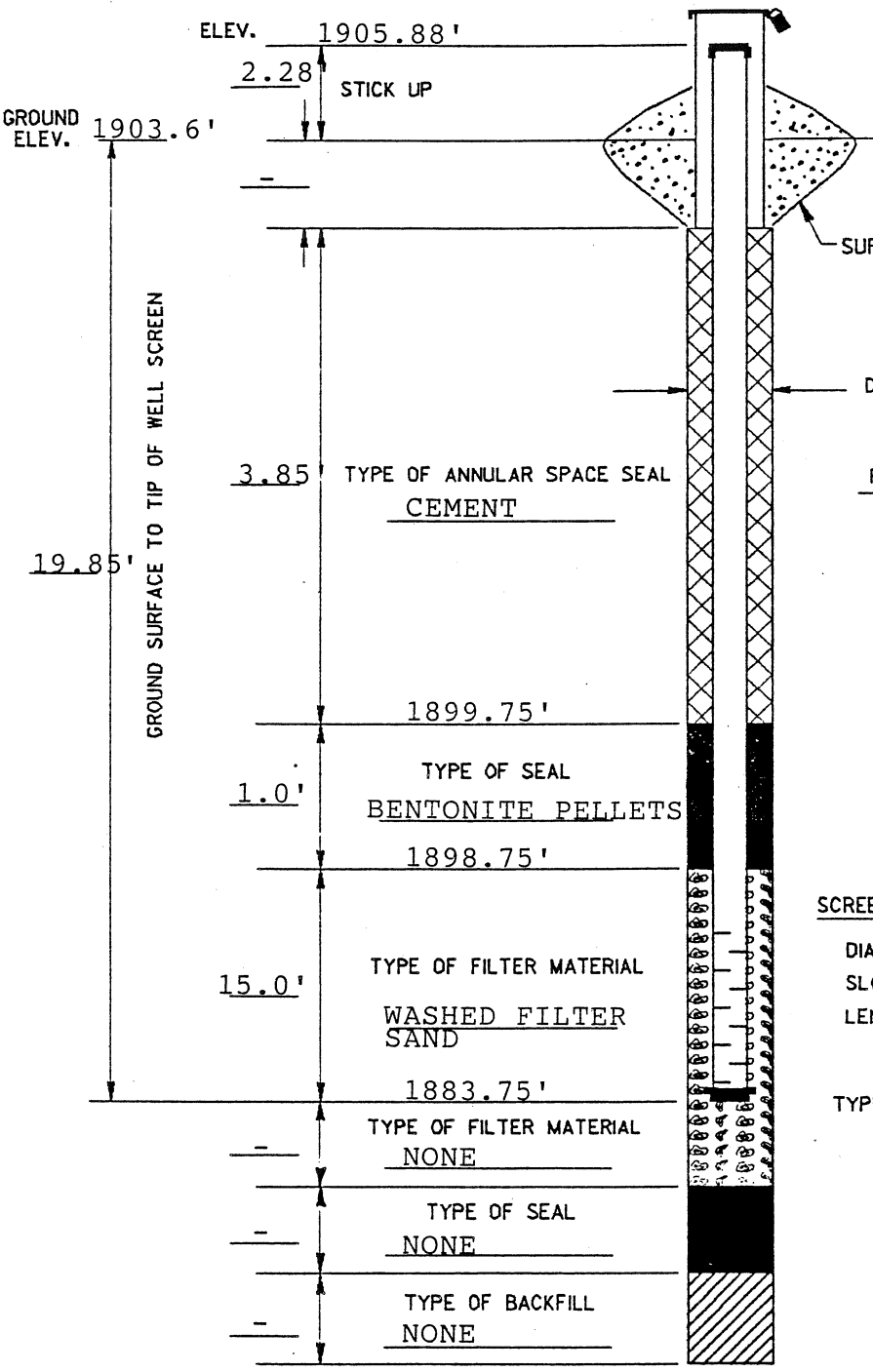
WATER LEVEL INFORMATION

DEPTH AT COMPLETION: 10.0 feet
LATER TIME/DEPTH: NA
LATER TIME/DEPTH: NA
CAVE IN DEPTH: NA
DRILLING LOSSES: NA

MONITORING WELL CONSTRUCTION DIAGRAM

WELL NO: MW-49
DATE INSTALLED: 05/20/88
DRILLER: GREAT PLAINS ENGINEERING LABORATORY
DRILLING METHOD: HOLLOW STEM AUGER

CLIENT: COOPERATIVE POWER/UNITED ASSOCIATION
PROJECT: COAL CREEK STATION
SCOPE I.D.: 87061
BY: KAD



PROTECTOR PIPE:
SIZE 4"
MATERIAL STEEL
LOCK NO. 3945

SURFACE SEAL MATERIAL CEMENT

DRILL HOLE DIAMETER 8"

PIPE:
DIAMETER 2"
MATERIAL PVC
SCH. 40
TYPE OF JOINTS FLUSH THREADED

SCREEN:
DIAMETER 2"
SLOT SIZE .010"
LENGTH 10'

TYPE OF CAP FLAT PVC

Foth & Van Dyke
Geosciences & Environmental Management Division
Revised 3/88 By BJS
Drawn By MRS

LOG OF TEST BORING NO.: MW-51

CLIENT: Cooperative Power/United Power Association
PROJECT: Coal Creek Station
PROJECT NUMBER: 87C61
LOCATION: Underwood, ND

SURFACE ELEVATION: 1895.5
BORING DEPTH: 20.0 feet
DATE: 05/20/88

MSL ELEV	DEPTH FR LND SURF	SAMP DEPTH INTERVAL	TYPE	#	N	REC (in)	DESCRIPTION OF MATERIAL	CLASS	LABORATORY TESTS	DRILLING AND SAMPLING NOTES
1895.5	0	0.0 - 1.5	SS	1	15	18	Lean sandy CLAY with silt and org., med. dense - fill	CL	NA	
1890.5	5	5.0 - 6.5	SS	2	9	18	Same as above without roots plus tr. gravel, loose - fill	CL	NA	
1885.5	10	10.0-11.5	SS	3	16	18	Grey green silty f SAND, tr. clay, wet, med. dense	SM	NA	
1880.5	15	15.0-16.5	SS	4	10	18	Br. gravelly SAND with silt, tr. clay, very wet, loose	SM	NA	
		18.0-19.5	SS	5	16	10	Lean sandy CLAY with silt	CL	NA	
1875.5	20									EOB @ 20.0 feet
1870.5	25									
1865.5	30									
1860.5	35									
1855.5	40									
1850.5	45									
1845.5	50									
1840.5	55									

DRILLING DATA

START DATE: 05/20/88
COMPLETION DATE: 05/20/88
LOGGED BY: KAD
DRILLING METHOD: 3 1/4" ID HSA SS Samples every 5 feet
DRILLING CONTRACTOR: Midwest Testing

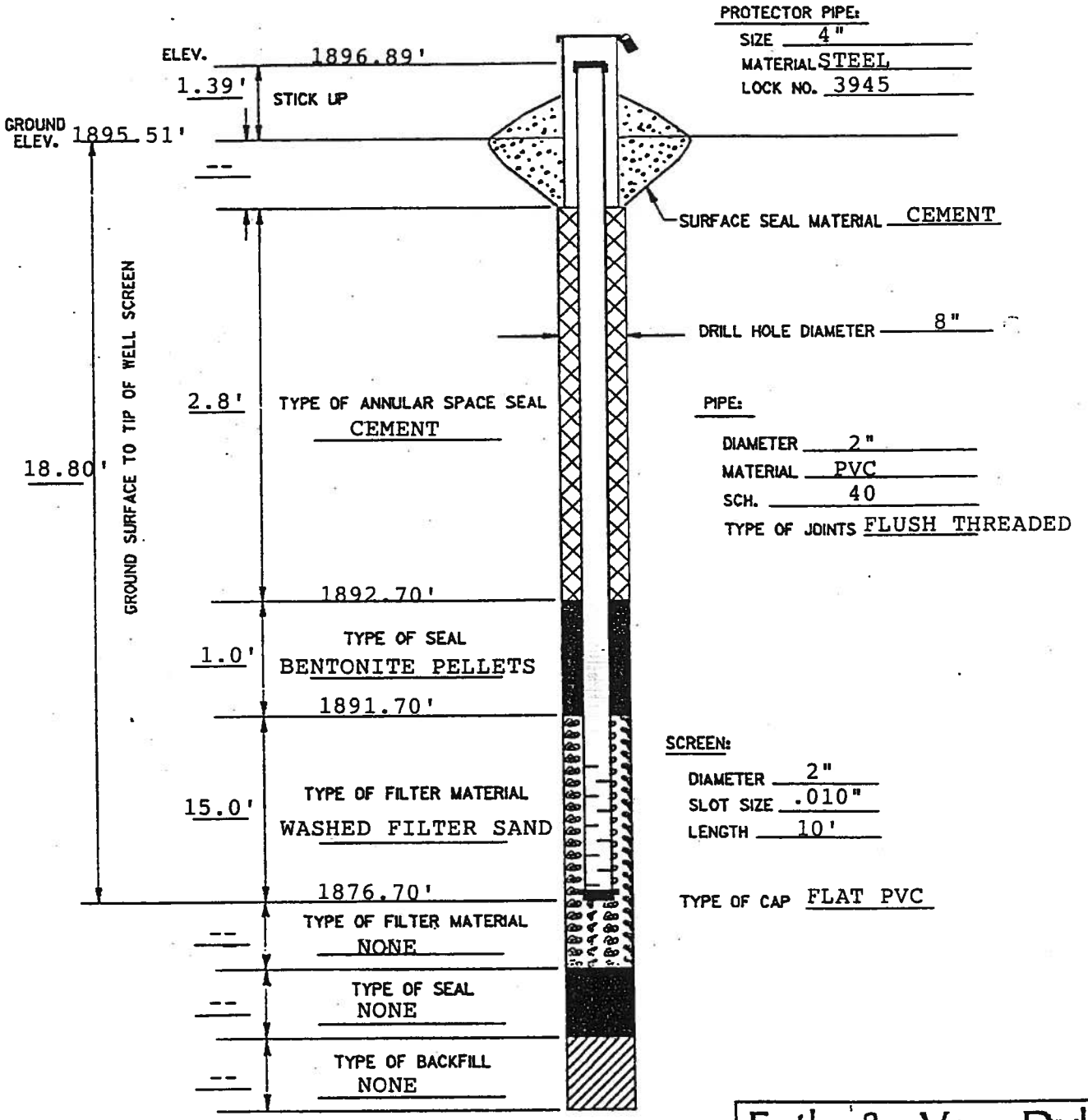
WATER LEVEL INFORMATION

DEPTH AT COMPLETION: 9.4 feet
LATER TIME/DEPTH: NA
LATER TIME/DEPTH: NA
CAVE IN DEPTH: NA
DRILLING LOSSES: NA

MONITORING WELL CONSTRUCTION DIAGRAM

WELL NO: MW-51
DATE INSTALLED: 5/20/88
DRILLER: MIDWEST TESTING
DRILLING METHOD: HOLLOW STEM AUGER

CLIENT: COOPERATIVE POWER/ UNITED POWER ASSOCIATION
PROJECT: COAL CREEK STATION
SCOPE I.D.: 87C61
BY: KAD



Foth & Van Dyke
Geosciences & Environmental Management Division
Revised 3/88 By BJS
Drawn By MRS .

FOTH & VAN DYKE	Client: Cooperative Power	Scope I.D.: 89C16
	Project: Coal Creek Station	Page: 1 of 3
	Prepared by: AMC	Date: 8-30-89
	Checked by: PAD	Date: 9-1-89

REPORT - LOG OF TEST BORING

Test Boring No.: MW-75
Start Date: 7-19-89 — Location: N 36290.0, E 39715.8
Completion Date: 7-19-89 — Boring Depth: 42.0
Logged by: GKM — Surface Elevation: 1938.9

MSL ELEV	DEPTH FR LND SURF	SAMP DEPTH INTERVAL	TYPE	#	N	REC (ft)	DESCRIPTION OF MATERIAL	CLASS	LABORATORY TESTS	DRILLING AND SAMPLING NOTES
1938.9	--0	0.0 - 1.5	ss	1	14	1.4	Dk brn sandy SILT, organic, roots w/occ. thin 1/4" to 1/2" lean lt. yel gry CLAY laminae, dry, med. dense, (topsoil)	ML		4-5-9
1937.4	--1.5	1.5 - 3.0	ss	2	18	1.2	Grades to dk. brn lean CLAY w/ silt, organic, rooted, sli moist med. dense, stiff, sli plastic	CL		6-8-10
1935.9	--3.0	3.0 - 4.5	ss	3	23	1.4	As above; boulder @ 3.5'- hard drilling	CL		3-15-8
1934.4	--4.5	4.5 - 6.0	ss	4	22	1.4	Yel-gry brn silty CLAY (4.5' - 5.0'); yel brn gravelly f-c SAND, w/silt & tr clay (5.0-5.4), dry, mottled yel gry brn silty CLAY w/fn. sand, sli moist, med. dense	CL SW CL		10-9-13
1932.9	--6.0	6.0 - 7.5	ss	5	23	1.2	Bright yel brn lean silty CLAY, tr. sand, limonite stain, med. dense, sli moist, sli plastic	CL		5-9-14
1931.4	--7.5	7.5 - 9.0	ss	6	23	1.5	As above w/increasing sand to 8.5'; olive gry to dk gry fat CLAY, stiff, plastic, waxy feel, sli moist, med. dense	CL CH		6-12-11
1929.9	--9.0	9.0-10.5	ss	7	20	1.2	As above w/ irregular lenses of yel brn clayey SILT, w/tr. sand, sli moist, med. dense	CH ML		6-8-12
1928.4	--10.5	10.5-12.0	ss	8	29	1.4	Dk gry interbedded clayey SILT & silty fat CLAY (shale) sli moist, stiff, plastic, iron stained partings	CH-MH		5-11-18
1926.9	--12.0	12.0-13.5	ss	9	27	1.5	As above - mostly silty fat CLAY (shale), sli moist	CH		7-11-16
1925.4	--13.5	13.5-15.0	ss	10	11	0.9	As above to 14.5'; @ 14.5'- blk LIGNITE, punky, soft, moist w/few hard frags.	COAL		3-5-6
1923.9	--15.0	15.0-16.5	ss	11	22	1.5	As above to 15.5'; @ 15.5'- brn-gry fat CLAY (shale) w/limonite clay stringers grades downward to dk. gry clayey SILT, med. dense, sli moist, stiff	CH MH		5-6-16
1922.4	--16.5									

DRILLING METHOD: HSA, I.D.= 3 3/4", O.D.= 7"
DRILLING CONTRACTOR: Braun

DEPTH TO WATER -
AT COMPLETION: 36.3'
LATER TIME/DEPTH: 22.3' 14 hrs later

FOTH & VAN DYKE

Client: Cooperative Power
Project: Coal Creek Station
Prepared by: AMC
Checked by: PAD

Scope I.D.: 89C16
Page: 2 of 3
Date: 8-30-89
Date: 9-1-89

REPORT - LOG OF TEST BORING

Start Date: 7-19-89
Completion Date: 7-19-89
Logged by: GKM

Test Boring No.: MW-75
Location: N 36290.0, E 39715.8
Boring Depth: 42.0
Surface Elevation: 1938.9

MSL ELEV	DEPTH FR LND SURF	SAMP DEPTH INTERVAL	TYPE	#	N	REC (ft)	DESCRIPTION OF MATERIAL	CLASS	LABORATORY TESTS	DRILLING AND SAMPLING NOTES
1922.4	--16.5	16.5-18.0	ss	12	37	1.5	As above except more silty fat CLAY (shale) content, v. stiff, plastic, sli moist, dense, massive, conchoidal partings, minor Fe stain	CH		12-16-21
1920.9	--18.0	18.0-19.5	ss	13	29	1.5	As above w/ tr. disseminated lignite	CH		8-13-16
1919.4	--19.5	19.5-21.0	ss	14	33	1.5	As above w/0.1' layer gry SILT w/limonite stain, w/minor clay thinly laminated, w/tr. fn. sand, cohesive, stiff, v. sli plastic, dense, sli moist	ML		8-12-21
1917.9	--21.0	21.0-22.5	ss	15	28	1.5	SILT as above to 21.7'except wet; @ 21.7'- dk. gry fat CLAY (shale) w/silt, moist, med. dense, massive, v. stiff	ML CH		8-11-17
1916.4	--22.5	22.5-24.0	ss	16	48	1.5	As above to 23.0'; @ 23.0'- lt. gry to yel gry SILT w/tr. clay, dense, cohesive, wet	CH ML		9-18-30
1914.9	--24.0	24.0-25.5	ss	17	29	1.5	Silt as above to 24.5', moist; @ 24.5'-dk. gry fat CLAY (shale), sli moist	ML CH		8-12-17
1913.4	--25.5	25.5-27.0	ss	18	34	1.5	Interbedded silty CLAY & clayey SILT, moist to sli moist	ML CH ML CH		8-13-21
1911.9	--27.0	27.0-28.5	ss	19	36	1.5	As above, interbedded silty CLAY & clayey SILT, clay is leaner than above, moist	ML CH ML CH		8-16-20
1910.4	--28.5	28.5-30.0	ss	20	22	1.5	As above 2-1" wet clayey SILT layers, uniform dk. gry color	ML CH ML CH		3-8-14
1908.9	--30.0	30.0-31.5	ss	21	42	1.5	As above to 30.7'; @ 30.7'-dk.gry fn silty SAND, w/soft clay, cohesive,wet, med dense, uniform, massive, well sorted (consolidated graywacke)	ML CH SM		13-17-25
1907.4	--31.5	31.5-33.0	ss	22	62	1.5	SAND as above, wet, dense	SM		11-17-45
1905.9	--33.0									

DRILLING METHOD: HSA, I.D.= 3 3/4", O.D.= 7"
DRILLING CONTRACTOR: Braun

DEPTH TO WATER -
AT COMPLETION: 36.3'
LATER TIME/DEPTH: 22.3' 14 hrs later

FOTH & VAN DYKE	Client: Cooperative Power Project: Coal Creek Station Prepared by: AMC Checked by: PAD	Scope I.D.: 89C16 Page: 3 of 3 Date: 8-30-89 Date: 9-1-89

REPORT - LOG OF TEST BORING

Start Date: 7-19-89
Completion Date: 7-19-89
Logged by: GKM

Test Boring No.: MW-75
Location: N 36290.0, E 39715.8
Boring Depth: 42.0
Surface Elevation: 1938.9

MSL ELEV	DEPTH FR LND SURF	SAMP DEPTH INTERVAL	TYPE	#	N	REC (ft)	DESCRIPTION OF MATERIAL	CLASS	LABORATORY TESTS	DRILLING AND SAMPLING NOTES
1905.9	--33.0	33.0-34.5	ss	23	38	1.5	As above, wet (appears just under saturation, but may be saturated)	SM		12-17-21
1904.4	--34.5									
1902.9	--36.0	36.0-37.5	ss	24	47	1.5	As above	SM		13-20-27
1901.4	--37.5	37.5-39.0	ss	25	47	1.5	As above	SM		11-20-27
1899.9	--39.0	39.0-40.5	ss	26	47	1.5	As above	SM		17-20-27
1898.4	--40.5	40.5-42.0	ss	27	60	1.5	As above - very dense	SM		17-23-37 Pulled augers up 5' let sit 1 hr., water level @ 37.0
1896.9	--42.0						EOB @ 42.0'			
1895.4	--43.5									
1893.9	--45.0									
1892.4	--46.5									
1890.9	--48.0									
1889.4	--49.5									

DRILLING METHOD: HSA, I.D.= 3 3/4", O.D.= 7"
DRILLING CONTRACTOR: Braun

DEPTH TO WATER -
AT COMPLETION: 36.3'
LATER TIME/DEPTH: 22.3' 14 hrs later

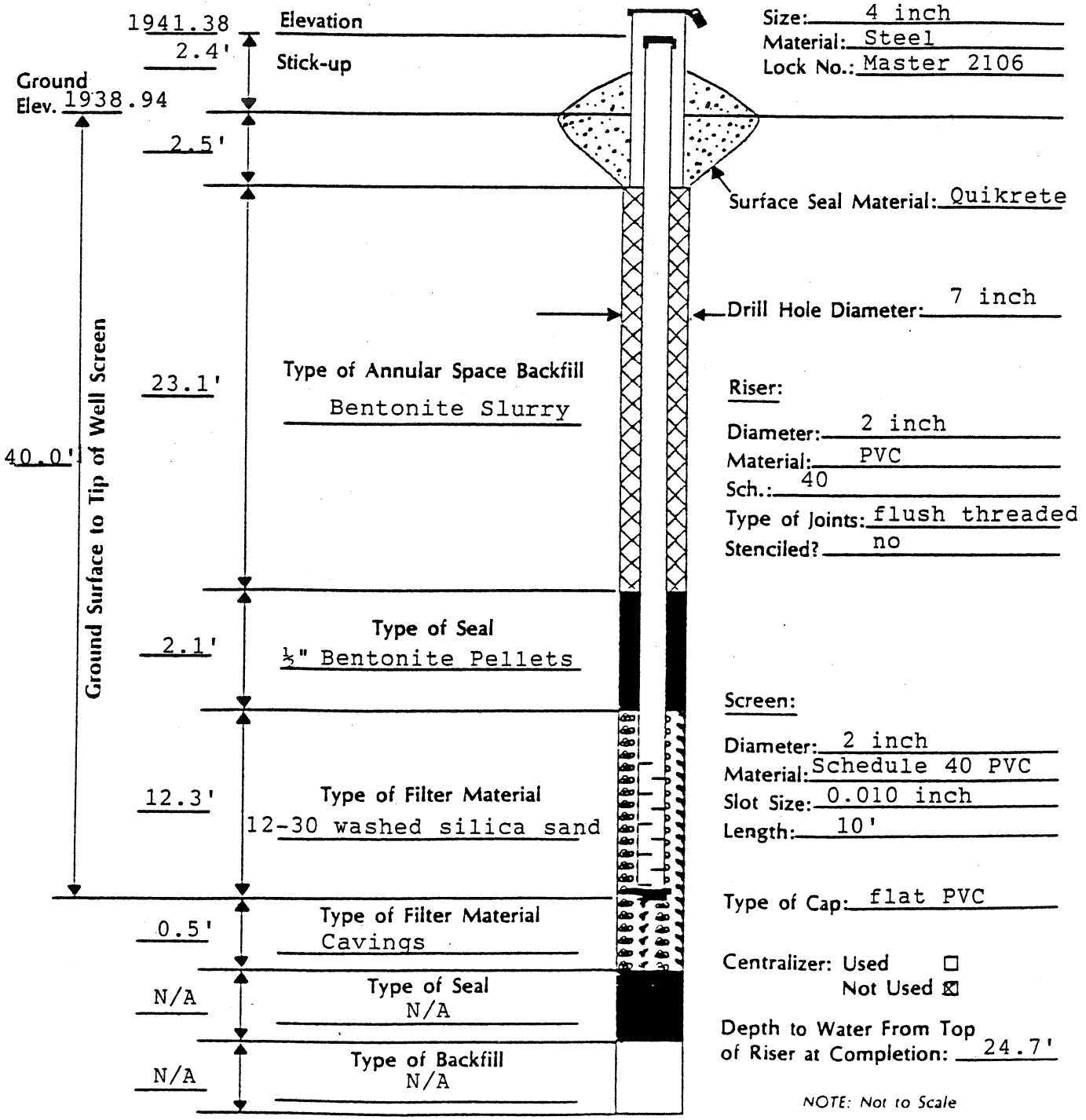
Foth & Van Dyke

Client: Cooperative Power — Scope I.D.: 89C16
Project: Coal Creek Station — Page: 1
Prepared by: GKM — Date: 7-19-89
Checked by: PAD — Date: 9-1-89

MONITORING WELL CONSTRUCTION DIAGRAM

Driller: Braun
Drilling Method: Hollow Stem Auger, I.D.=3 3/4", O.D.=7"
Coordinates: N 36290.0, E 39715.8

Well No: MW-75
Date Installed: 7-19-89 & 7-20-89



Protector Pipe:
Size: 4 inch
Material: Steel
Lock No.: Master 2106

Surface Seal Material: Quikrete

Drill Hole Diameter: 7 inch

Riser:
Diameter: 2 inch
Material: PVC
Sch.: 40
Type of Joints: flush threaded
Stenciled? no

Screen:
Diameter: 2 inch
Material: Schedule 40 PVC
Slot Size: 0.010 inch
Length: 10'

Type of Cap: flat PVC

Centralizer: Used ☐ Not Used ☒

Depth to Water From Top of Riser at Completion: 24.7'

NOTE: Not to Scale

* N/A = not applicable

BORING LOG NO. MW-91-1

PROJECT: Monitoring Well Installations

CLIENT: Golder Associates, Inc.
Lakewood, CO

SITE: GRE Coal Creek Station
McLean County, ND

LOCATION: See Exhibit A-2

Northing: 138918 Easting: 1841128

Surface Elev.: 1901.3 (Ft.)

DEPTH		ELEVATION (Ft.)
0.3	**FILL - TOPSOIL**, dark brown	1901
1.5	**FILL - CLAYEY SAND**, brown	1900
	SANDY LEAN CLAY, brown	
7.0		1894.5
	SANDY LEAN CLAY (CL), trace gravel, brown, medium stiff	
10.5		1891
	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), fine to coarse grained, brown, loose to medium dense	
25.0		1876.5
26.0	**FAT CLAY (CH)**, brownish-gray, very stiff, silt laminations	1875.5
	Boring Terminated at 26 Feet	

INSTALLATION DETAILS: PVC Cap; PVC Riser; Bentonite; Silica Sand; PVC Screen; PVC End Cap

DEPTH (Ft.)	SAMPLE TYPE	FIELD TEST RESULTS
		7-10-10 N=20
5		5-7-9 N=16
		2-3-3 N=6
10		3-4-4 N=8
		3-5-4 N=9
15		4-5-5 N=10
20		4-7-6 N=13
25		5-7-9 N=16

WATER LEVEL OBSERVATIONS

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3¼" ID Hollow Stem Auger 0-24½'

Abandonment Method:
Boring converted to monitoring well upon completion.

See Exhibit A-3 for description of field procedures.

See Appendix B for explanation of symbols and abbreviations.

Notes:
Northing, easting and elevation provided by Golder Associates, Inc.

WATER LEVEL OBSERVATIONS

None encountered

Terracon
1805 Hancock Dr PO Box 2084
Bismarck, ND

Boring Started: 11-06-2017 | Boring Completed: 11-06-2017

Drill Rig: D-90 | Driller: E. Mayer

Project No.: M2175093 | Exhibit: A-4

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-WELL M2175093 MONITORING WELL I.GPJ TERRACON_DATATEMPLATE.GDT 12/13/17

BORING LOG NO. MW-91-2

PROJECT: Monitoring Well Installations

CLIENT: Golder Associates, Inc.
Lakewood, CO

SITE: GRE Coal Creek Station
McLean County, ND

LOCATION: See Exhibit A-2

Northing: 137705 Easting: 1839142

Surface Elev.: 1939.1 (Ft.)

DEPTH	ELEVATION (Ft.)	Description
1.5	1937.5	**FILL - POORLY GRADED SAND WITH SILT AND GRAVEL**, dark brown
4.5	1934.5	**FILL - SANDY LEAN CLAY**, trace gravel, brown
5.5	1933.5	**ORIGINAL TOPSOIL (CL)**, dark brown, stiff
10.5	1928.5	**FAT CLAY (CH)**, brownish gray, stiff
15.5	1923.5	**COAL**, black waterbearing at 15'
18.0	1921	**FAT CLAY (CH)**, grayish-brown, stiff, silt laminations
29.0	1910	**FAT CLAY (CH)**, gray, hard, silt laminations
31.0	1908	**COAL**, black, waterbearing
		Boring Terminated at 31 Feet

INSTALLATION DETAILS: PVC Cap; Bentonite; PVC Riser; Silica Sand; PVC Screen; PVC End Cap

DEPTH (Ft.)	SAMPLE TYPE	FIELD TEST RESULTS
		3-4-6 N=10
5		3-4-5 N=9
		4-5-6 N=11
10		3-3-6 N=9
		3-3-3 N=6
15		3-4-4 N=8
20		15-22-21 N=43
25		8-13-19 N=32
30		32-51-49 N=100

WATER LEVEL OBSERVATIONS: ▽ While drilling

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3¼" ID Hollow Stem Auger 0-29½'

Abandonment Method:
Boring converted to monitoring well upon completion.

See Exhibit A-3 for description of field procedures.

See Appendix B for explanation of symbols and abbreviations.

Notes:
Northing, easting and elevation provided by Golder Associates, Inc.

Terracon
1805 Hancock Dr PO Box 2084
Bismarck, ND

Boring Started: 11-06-2017	Boring Completed: 11-06-2017
Drill Rig: D-90	Driller: E. Mayer
Project No.: M2175093	Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-WELL M2175093 MONITORING WELL I.GPJ TERRACON_DATATEMPLATE.GDT 12/13/17

BORING LOG NO. MW-16-6

PROJECT: Monitoring Well Installations

CLIENT: Golder Asssociates, Inc
Lakewood, Colorado

SITE: GRE - Coal Creek Station
McLean County, North Dakota

LOCATION: See Exhibit A-2

Latitude: 47.37249° Longitude: -101.14037°
Northing: 136540 Easting: 1841424

Surface Elev.: 1914 (Ft.)

DEPTH		ELEVATION (Ft.)
0.3	**TOPSOIL**, dark brown	1913.5
	SANDY LEAN CLAY (CL), trace gravel, brown, soft to medium stiff	
7.5		1906.5
	COAL, very dark brown, waterbearing	
12.0		1902
	LEAN CLAY (CL), gray, very stiff	
15.0		1899
16.0	**FAT CLAY (CH)**, dark brown, very stiff, silt laminations	1898
	Boring Terminated at 16 Feet	

INSTALLATION DETAILS: Steel Casing, PVC Riser, Grout, Bentonite, Silica Sand, PVC Screen, Sluff

DEPTH (Ft.)	FIELD TEST RESULTS
	2-2-2 N=4
	2-2-3 N=5
5	2-3-4 N=7
	2-3-4 N=7
10	9-10-6 N=16
	7-9-11 N=20
15	7-9-13 N=22

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3¼" ID HSA 0-14½'

Abandonment Method:
Boring converted to monitoring well installation.

See Exhibit A-3 for description of field procedures.

See Appendix B for explanation of symbols and abbreviations.

Notes:

Elevation, Northing and Easting provided by client.
Latitude and Longitude measured by Terracon.
Sloping concrete collar at the surface.
Three steel bollards installed around well.
Well developed July 17. Pumped water until clear (0.5 hrs).

WATER LEVEL OBSERVATIONS

- *While drilling*
- *At completion of drilling*
- *After 70 hrs*

Terracon
1805 Hancock Drive
Bismarck, North Dakota

Boring Started: 7/14/2015	Boring Completed: 7/14/2015
Drill Rig: D-90	Driller: MR
Project No.: M2155060	Exhibit: A-9

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-WELL M2155060.GPJ TERRACON2012.GDT 7/24/15

State of North Dakota

BOARD OF WATER WELL CONTRACTORS

900 E. BOULEVARD • BISMARCK, NORTH DAKOTA 58505

MONITORING WELL REPORT

State law requires that this report be filed with the State Board of Water Well Contractors within 30 days after completion or abandonment of the well.

1. WELL OWNER

Name Great River Energy

Address 2875 3rd St SW

Underwood, ND 58576-9659

2. WELL LOCATION **(Well MW-16-6)**

Address (if in city) (see attached drawing)

County McLean

SW ¼ SW¼ SW¼ Sec. 16 Twp. 145 N. Rge. 82 W

Lat: 47.37249 Long.: -101.14037

Ground Elevation: 1914

3. METHOD DRILLED

■ Auger Other ____

4. WELL CONSTRUCTION

Diameter of Hole 6.25 inches Depth 16 feet

Riser: ■ PVC □ Other

■ Threaded □ Solvent □ Other

Riser rating SDR _____ Schedule 40

Diameter 2.0 inches

From +2.75 ft. to 4 ft.

Was a well screen installed? ■ Yes □ No

Material Schedule 40 PVC Diameter 2.0 inches

Slot Size #10 set from 4 feet to 14 feet

Sand packed from 3 feet to 14 feet

Depth grouted from 1 foot to 3 feet

Grouting Material

Bentonite x Other _____

If other explain:

One foot thick concrete collar at the surface.

Sluff: 14 feet to 16 feet

Three steel bollards installed around well.

Well head completion:

24" above grade _____ Other x

If other, specify 4" x 4" x 5' square steel protective cover

Was protective casing installed? ■ Yes □ No

Was well disinfected upon completion? □ Yes ■ No

5. WATER LEVEL

Static water level 1 feet below surface

If flowing: closed in pressure _____ psi or ft. above land surface

6. WELL LOG Depth (Ft.)

Formation	From	To
SANDY LEAN CLAY	0	7.5
COAL	7.5	12
LEAN CLAY	12	15
FAT CLAY	15	16

(Use separate sheet if necessary)

7. WAS THE HOLE PLUGGED OR ABANDONED?

□ Yes ■ No

If so, how? _____

8. REMARKS

Water level monitoring only

9. DATE COMPLETED 7-17-15

10. CONTRACTOR CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

Terracon 444

Monitoring Well Contractor Certificate No.

PO Box 2084

Address

Bismarck, ND 58502-2084

Signature Date

7/27/15

BORING LOG NO. MW-DP3

PROJECT: Piezometers/Well Installations

CLIENT: Golder Associates Inc
Lakewood, Colorado

SITE: GRE - Coal Creek Station
McLean County, North Dakota

LOCATION: See Exhibit A-2

Latitude: 47.377698° Longitude: -101.149848°
Northing: 138647 Easting: 1839162

Surface Elev.: 1928 (Ft.)

DEPTH	ELEVATION (Ft.)	Description
0.0	1928	**FILL - COAL**, black
5.0	1923	
6.0	1922	**FILL - FAT CLAY**, gray
		FILL - COAL, dark brown
		waterbearing at 10½'
12.0	1916	
		FAT CLAY (CH), brownish-gray, stiff
17.5	1910.5	
		COAL, black, waterbearing
21.0	1907	
		Boring Terminated at 21 Feet

INSTALLATION DETAILS: Steel Casing, PVC Riser, Grout, Bentonite, Silica Sand, PVC Screen, Sluff

DEPTH (Ft.)	SAMPLE TYPE	FIELD TEST RESULTS
0		
		5-7-8 N=15
5		5-6-10 N=16
		3-2-3 N=5
10		2-1-2 N=3
		3-5-7 N=12
15		4-5-9 N=14
20		5-7-9 N=16

WATER LEVEL OBSERVATIONS: Initially Encountered

WATER CONTENT (%)

ATTERBERG LIMITS: LL-PL-PI

PERCENT FINES

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
3¼" Inside Diameter, Hollow Stem Auger 0-19½'

Abandonment Method:
Boring converted to monitoring well installation.

See Exhibit A-3 for description of field procedures.

See Appendix B for explanation of symbols and abbreviations.

Notes:
Survey data provided by client.
Well developed on April 2. Pumped until water was clear.

Terracon
1805 Hancock Drive
Bismarck, North Dakota

Boring Started: 4/1/2015 | Boring Completed: 4/1/2015
Drill Rig: D-90 | Driller: MR
Project No.: M2155021 | Exhibit: A-5

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-WELL M2155021.GPJ TERRACON2012.GDT 4/17/15

State of North Dakota

BOARD OF WATER WELL CONTRACTORS

900 E. BOULEVARD • BISMARCK, NORTH DAKOTA 58505

MONITORING WELL REPORT

State law requires that this report be filed with the State Board of Water Well Contractors within 30 days after completion or abandonment of the well.

1. WELL OWNER

Name: Great River Energy

Address: 2875 3rd St SW

Underwood, ND 58576-9659

2. WELL LOCATION **(Well MW-DP3)**

Address (if in city): (see attached drawing)

County: McLean

NE ¼ NW ¼ SE ¼ Sec. 17 Twp. 145 N. Rge. 82 W.

Lat: 47.377698 Long.: -101.149848

Ground Elevation: 1928

3. METHOD DRILLED

■ Auger Other ____

4. WELL CONSTRUCTION

Diameter of Hole 6.25 inches Depth 21 feet

Riser: ■ PVC □ Other

■ Threaded □ Solvent □ Other

Riser rating SDR _____ Schedule 40

Diameter 2.0 inches

From +2.75 ft. to 9 ft.

Was a well screen installed? ■ Yes □ No

Material Schedule 40 PVC Diameter 2.0 inches

Slot Size #10 set from 9 feet to 19 feet

Sand packed from 6 feet to 19 feet

Depth grouted from 1 foot to 6 feet

Grouting Material

Bentonite x Other _____

If other explain:

One foot thick concrete collar at the surface.

Sluff: 19 feet to 21 feet

Well head completion:

24" above grade _____ Other x

If other, specify 4" x 4" x 5' square steel protective cover

Was protective casing installed? ■ Yes □ No

Was well disinfected upon completion? □ Yes ■ No

5. WATER LEVEL

Static water level 17 feet below surface

If flowing: closed in pressure _____ psi or ft. above land surface

6. WELL LOG Depth (Ft.)

Formation	From	To
COAL (FILL)	0	5
FAT CLAY (FILL)	5	6
COAL (FILL)	6	12
FAT CLAY	12	17.5
COAL	17.5	21

(Use separate sheet if necessary)

7. WAS THE HOLE PLUGGED OR ABANDONED?

□ Yes ■ No

If so, how? _____

8. REMARKS

Water level monitoring only

9. DATE COMPLETED 4-3-15

10. CONTRACTOR CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

Terracon 444

Monitoring Well Contractor Certificate No.

PO Box 2084

Address

Bismarck, ND 58502-2084

Signature [signature] Date 4/13/15

APPENDIX C

Groundwater Monitoring Program

APPENDIX C-1

Monitoring Well Constituent Concentration Tables

Table 1: Upstream Raise 91 Monitoring Well Summary

Facility	Location	Well ID	Date Constructed	TOC Elevation (ft AMSL)	Ground Surface Elevation (ft AMSL)	Completion Depth (ft)	Drilled Depth (ft)	Screen Interval (ft bgs)	Top of Screen Elevation (ft AMSL)	Bottom of Screen Elevation (ft AMSL)	Sand Pack Interval (ft bgs)	Geologic Unit(s) Completed In
Upstream Raise 91	Upgradient	MW-DP3	4/3/2015	1,932.7	1,929.6	19.0	21.0	9.0-19.0	1,920.6	1,910.6	6.0-19.0	Fill, Coal, Fat Clay
		MW-91-2	11/6/2017	1,938.5	1,938.7	31.0	31.0	21.0-31.0	1,917.7	1,907.7	19.0-31.0	Fat Clay, Coal
		MW-75	7/19/1989	1,941.4	1,938.9	40.0	40.5	30.0-40.0	1,908.9	1,898.9	27.7-40	Clayey Silt, Silty Sand
		MW-16-6	7/14/2015	1,917.2	1,913.9	13.0	16.0	4.0-14.0	1,909.9	1,899.9	3.0-14.0	Sandy Lean Clay, Coal, Lean Clay
	Downgradient	MW-49	5/20/1988	1,905.9	1,903.6	19.9	25.0	9.85-19.85	1,893.8	1,883.8	4.85-19.85	Sandy Gravelly Clay, Sandy Silt, Fat Clay (Shale)
		MW-51	5/20/1988	1,896.9	1,895.5	18.8	20.0	8.8-18.8	1,886.7	1,876.7	3.8-18.8	Silty and Gravelly Sand, Lean Clay
		MW-91-1	11/6/2017	1,905.1	1,902.0	26.0	26.0	16.0-26.0	1,886.0	1,876.0	14.0-26.0	Sand with Silt and Gravel, Fat Clay

Notes:
TOC: top of casing
ft AMSL: feet above mean sea level
ft bgs: feet below ground surface
Well construction measurements are from the original borehole log, well data sheet, or well construction form.
For some wells, elevations have been updated with more recent survey information than the original driller's logs.

Table 2: Sample Results Summary Table - MW-DP3

		MW-DP3																	
		Baseline Period									Additional Baseline Data			Detection Monitoring					
	Units	15-Sep-15	4-Nov-15	8-Mar-16	14-Jun-16	2-Aug-16	26-Oct-16	15-Feb-17	2-May-17	13-Jun-17	18-Oct-18	5-Jun-19	7-Apr-20	16-Oct-17	7-Jun-18	18-Oct-18	5-Jun-19	9-Oct-19	7-Apr-20
Water Elevation	ft AMSL	1922.4	1921.9	1920.8	1922.2	1922.0	1921.5	1921.4	1921.6	1921.2	1921.0	1925.5	1921.3	1920.9	1920.8	1921.0	1925.5	1925.0	1921.3
Appendix III Parameters																			
Boron	mg/L	0.80	0.70	0.61	0.61	0.57	0.63	0.67	0.60	0.55	---	---	---	0.61	0.63	0.62	0.62	0.53	0.64
Calcium	mg/L	295	279	253	241	237	249	250	245	261	---	---	---	246	230	220	260	210	240
Chloride	mg/L	13.6	19.8	11.7	9.7	8.6	9.3	13.1	13.3	11.1	---	---	---	10.6	12	13	13	< 15 U	13
Fluoride	mg/L	0.11	0.13	0.11	0.11	0.11	0.12	0.13	0.13	0.12	---	---	---	< 0.10	< 0.50	< 0.10	< 0.10 U	< 0.10 U	0.11
pH, Field	s.u.	6.26	6.28	6.35	6.19	6.28	6.38	6.4	6.45	6.36	---	---	---	6.31	6.37	6.31	6.22	6.40	6.33
Sulfate	mg/L	1270	1260	1340	1320	1230	1290	1140	1050	1090	---	---	---	1080	1200	1200	1200	1200	1200
Total Dissolved Solids	mg/L	2350	2350	2310	2260	2330	2210	2170	2240	2260	---	---	---	2100	2300	2300	2200	2200	2400
Appendix IV Parameters																			
Antimony	mg/L	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.0020 U	< 0.0020 U	< 0.0020 U ^	---	---	---	---	---	---
Arsenic	mg/L	0.0126	0.0061	0.0031	< 0.002 U	< 0.002 U	< 0.002 U	0.0044	< 0.002 U	< 0.002 U	< 0.0050 U	< 0.0050 U	< 0.0050 U	---	---	---	---	---	---
Barium	mg/L	0.68	0.3926	0.0633	0.0588	0.0552	0.0488	0.179	0.0589	0.0572	0.057	0.045	0.062 ^	---	---	---	---	---	---
Beryllium	mg/L	0.0029	< 0.0005 U	< 0.001 U ^	< 0.0005 U	< 0.0005 U	< 0.0005 U	0.0006	< 0.0005 U	< 0.0005 U	< 0.0010 U	< 0.0050 U ^	< 0.0010 U	---	---	---	---	---	---
Cadmium	mg/L	0.0014	0.001	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	0.001	< 0.0005 U	< 0.0005 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	---	---	---	---	---	---
Chromium	mg/L	< 0.01 U ^	0.0278	< 0.01 U ^	< 0.002 U	< 0.002 U	< 0.002 U	0.012	< 0.002 U	< 0.002 U	< 0.0020 U	< 0.0020 U	< 0.0020 U ^	---	---	---	---	---	---
Cobalt	mg/L	0.022	0.0119	0.0022	< 0.002 U	< 0.002 U	< 0.002 U	0.0053	0.0034	0.0028	0.0037	0.0021	0.0028	---	---	---	---	---	---
Fluoride	mg/L	0.11	0.13	0.11	0.11	0.11	0.12	0.13	0.13	0.12	< 0.10 U	< 0.10 U	0.11	---	---	---	---	---	---
Lead	mg/L	0.037	0.0154	0.001	0.0008	0.0008	0.0015	0.0099	0.0013	0.001	< 0.0010 U	< 0.0010 U	0.0012	---	---	---	---	---	---
Lithium	mg/L	0.23	0.2	0.18	0.18	0.16	0.16	0.2	0.17	0.17	0.16	0.16	0.16	---	---	---	---	---	---
Mercury	mg/L	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	---	---	---	---	---	---
Molybdenum	mg/L	< 0.01 U ^	< 0.005 U ^	< 0.01 U ^	< 0.025 U ^	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	---	---	---	---	---	---
Radium 226	pCi/L	< 1 U	1.3 ± 0.2	< 1 U	0.8 ± 0.1	1.1 ± 0.2	0.8 ± 0.2	1.0 ± 0.2	1.4 ± 0.2	0.5 ± 0.1	0.761 ± 0.186	0.468 ± 0.146	0.600 ± 0.203	---	---	---	---	---	---
Radium 228	pCi/L	< 2 U	< 2 U	< 2 U	< 1 U	< 1 U	< 2 U	< 2 U	< 2 U	< 2 U	0.924 ± 0.381	0.958 ± 0.391	0.609 ± 0.373	---	---	---	---	---	---
Radium 226 and 228 combined	pCi/L	< 2 U	< 2 U	< 2 U	< 1 U	1.1 ± 0.2	< 2 U	< 2 U	< 2 U	< 2 U	1.68 ± 0.424	1.43 ± 0.405	1.21 ± 0.425	---	---	---	---	---	---
Selenium	mg/L	< 0.002 U	0.0023	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.01 U ^	< 0.01 U ^	< 0.005 U ^	< 0.0050 U	< 0.0050 U	< 0.0050 U	---	---	---	---	---	---
Thallium	mg/L	< 0.0005 U	< 0.0005 U	< 0.001 U ^	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	---	---	---	---	---	---

Legend:
--, not analyzed
ft AMSL, feet above mean sea level
mg/L, milligrams per liter
s.u., standard units for pH
pCi/L, picocuries per liter

Laboratory Provided Qualifiers:
^ (samples prior to June 2018) = Reporting limit elevated due to instrument performance at the lower limit of quantification (LLOQ).
U (general chemistry) = Not detected above the shown practical quantitation limit
U (radiochemistry) = Result is less than the sample detection limit (varies by sample)
^ (samples after June 2018) = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC is outside acceptance limits.

Notes:
Samples collected prior to June 2018 were analyzed by Minnesota Valley Testing Laboratories, with radiochemical analysis subcontracted to Intermountain Laboratories.
Samples collected from June 2018 to present were analyzed by Eurofins TestAmerica Laboratories.
In changing analytical laboratories, some differences have been noted in analytical methodologies and associated reporting limits. Methods used are EPA-approved.
Non-detects have been listed at the reported practical quantitation limit.
Metal results represent the total concentration (i.e. samples have not been filtered).
Precision was not recorded for samples with radiological concentrations below the reporting limit by Intermountain Laboratories for Radium-226 samples reported using SM 7500 Ra-B or Radium-228 samples reported using the Georgia Tech method.
Radium-226 and -228 combined has been reported as the calculated sum of Radium-226 and Radium-228 results, or the reporting limit for non-detect results.

Table 3: Sample Results Summary Table - MW-91-2

		MW-91-2															
		Baseline Period									Additional Baseline Data			Detection Monitoring			
	Units	**18-Jan-18**	**14-Feb-18**	**23-Apr-18**	**17-May-18**	**12-Jun-18**	**18-Jul-18**	**13-Aug-18**	**13-Sep-18**	**16-Oct-18**	**6-Jun-19**	**13-Sep-19**	**7-Apr-20**	**6-Jun-19**	**13-Sep-19**	**14-Oct-19**	**7-Apr-20**
Water Elevation	ft AMSL	1921.3	1921.3	1921.4	1921.4	1922.0	1922.8	1922.2	1921.8	1922.0	1926.2	1923.7	1922.5	1926.2	1923.7	1926.0	1922.5
Appendix III Parameters																	
Boron	mg/L	0.41	0.44	0.41	0.45	0.41	0.37	0.37	0.4	0.39	---	---	---	2.7	0.38	0.35	0.24
Calcium	mg/L	289	284	261	281	280	250	250	250	250	---	---	---	220	270	240	160
Chloride	mg/L	14.5	16.8	16.5	15.6	14	16	15	15	14	---	---	---	75	15	13	11
Fluoride	mg/L	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.50 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	---	---	---	0.26	< 0.10 U	< 0.10 U	0.11
pH, Field	s.u.	6.16	6.23	6.43	6.05	6.18	6.13	6.22	6.18	6.21	---	---	---	6.09	6.11	6.15	6.52
Sulfate	mg/L	1180	1010	985	938	1100	1100	1200	1100	1100	---	---	---	1100	1100	920	510
Total Dissolved Solids	mg/L	1900	1890	1810	1950	2000	2000	1900	960	1900	---	---	---	2200	2000	1700	1100
Appendix IV Parameters																	
Antimony	mg/L	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U ^	---	---	---	---
Arsenic	mg/L	0.0022	0.0039	0.0022	< 0.0020 U	< 0.0050 U	< 0.0050 U	< 0.0050 U	< 0.0050 U	< 0.0050 U	< 0.0050 U	< 0.0050 U	< 0.0050 U	---	---	---	---
Barium	mg/L	0.0978	0.128	0.091	0.0633	0.05	0.058	0.053	0.058	0.076	0.047	0.048	0.16	---	---	---	---
Beryllium	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0010 U	< 0.0050	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0050 U ^	< 0.0010 U	< 0.0010 U	---	---	---	---
Cadmium	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	---	---	---	---
Chromium	mg/L	0.0043	0.0064	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	---	---	---	---
Cobalt	mg/L	0.002	0.0025	< 0.0020 U	< 0.0020 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	0.0013	< 0.0010 U	< 0.0010 U	---	---	---	---
Fluoride	mg/L	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.50 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	0.26	< 0.10 U	0.11	---	---	---	---
Lead	mg/L	0.0023	0.0034	0.0012	< 0.0005 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	---	---	---	---
Lithium	mg/L	0.10	0.12	0.10	0.12	0.097	0.092	0.097	0.10	0.094	0.15	0.11	0.035	---	---	---	---
Mercury	mg/L	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	---	---	---	---
Molybdenum	mg/L	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	0.0041	< 0.0020 U	0.0043	---	---	---	---
Radium-226	pCi/L	0.4 ± 0.1	1.0 ± 0.2	1.1 ± 0.2	1.5 ± 0.2	0.502 ± 0.267	0.779 ± 0.181	0.779 ± 0.181	0.807 ± 0.139	0.796 ± 0.371	0.145 U ± 0.111	0.566 ± 0.155	0.398 ± 0.192	---	---	---	---
Radium-228	pCi/L	< 1 U	< 2 U	< 2 U	< 2 U	0.156 U ± 0.314	0.105 U ± 0.305	0.473 ± 0.307	0.272 U ± 0.297	0.238 U ± 0.403	0.440 U ± 0.307	0.451 U ± 0.341	-0.134 U ± 0.341	---	---	---	---
Radium-226 and -228 combined	pCi/L	< 1 U	< 2 U	< 2 U	< 2 U	0.659 ± 0.412	0.884 ± 0.355	1.25 ± 0.356	1.08 ± 0.328	1.03 ± 0.548	0.584 ± 0.326	1.02 ± 0.375	0.264 U ± 0.391	---	---	---	---
Selenium	mg/L	< 0.0050 U ^	< 0.0050 U	< 0.0050 U	< 0.010 U ^	< 0.0050 U	< 0.025	< 0.0050 U	< 0.0050 U	< 0.0050 U	< 0.0050 U	< 0.0050 U	< 0.0050 U	---	---	---	---
Thallium	mg/L	< 0.0005 U	< 0.0010 U ^	< 0.0005 U	< 0.0005 U	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010 U	< 0.0010 U	< 0.0010 U	---	---	---	---

Legend:
--, not analyzed
ft AMSL, feet above mean sea level
mg/L, milligrams per liter
s.u., standard units for pH
pCi/L, picocuries per liter

Laboratory Provided Qualifiers:
^ (samples prior to June 2018) = Reporting limit elevated due to instrument performance at the lower limit of quantification (LLOQ).
U (general chemistry) = Not detected above the shown practical quantitation limit
U (radiochemistry) = Result is less than the sample detection limit (varies by sample)
^ (samples after June 2018) = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC is outside acceptance limits.

Notes:
Samples collected prior to June 2018 were analyzed by Minnesota Valley Testing Laboratories, with radiochemical analysis subcontracted to Intermountain Laboratories.
Samples collected from June 2018 to present were analyzed by Eurofins TestAmerica Laboratories.
In changing analytical laboratories, some differences have been noted in analytical methodologies and associated reporting limits. Methods used are EPA-approved.
Non-detects have been listed at the reported practical quantitation limit.
Metal results represent the total concentration (i.e. samples have not been filtered).
Precision was not recorded for samples with radiological concentrations below the reporting limit by Intermountain Laboratories for Radium-226 samples reported using SM 7500 Ra-B or Radium-228 samples reported using the Georgia Tech method.
Radium-226 and -228 combined has been reported as the calculated sum of Radium-226 and Radium-228 results, or the reporting limit for non-detect results.
An additional sample was collected at MW-91-2 in September 2019, after the June 2019 sample was found to have been switched with the sample from MW-91-1. Analytical results from both events are provided for informational purposes.

Table 4: Sample Results Summary Table - MW-75

		MW-75																	
		Baseline Period									Additional Baseline Data		Detection Monitoring						
	Units	**16-Sep-15**	**5-Nov-15**	**8-Mar-16**	**15-Jun-16**	**2-Aug-16**	**31-Oct-16**	**12-Feb-17**	**2-May-17**	**13-Jun-17**	**6-Jun-19**	**7-Apr-20**	**16-Oct-17**	**6-Jun-18**	**16-Oct-18**	**6-Jun-19**	**14-Oct-19**	**7-Apr-20**
Water Elevation	ft AMSL	1916.5	1916.0	1914.8	1914.9	1914.8	1915.0	1914.1	1916.2	1915.6	1912.7	1915.2	1914.0	1913.2	1913.0	1912.7	1914.0	1915.2
Appendix III Parameters																			
Boron	mg/L	0.26	0.21	0.21	0.17	0.23	0.21	0.18	0.20	0.18	---	---	0.23	0.22	0.21	0.20	0.20	0.20
Calcium	mg/L	9.0	6.0	6.3	6.2	5.8	5.6	6.0	4.9	5.4	---	---	4.9	4.9	5.1	5.3	5.3	4.7
Chloride	mg/L	2.2	1.9	1.9	1.5	1.2	1.5	1.3	1.5	1.8	---	---	1.1	< 3.0 U	< 3.0 U	< 3.0 U	1.1	< 3.0 U
Fluoride	mg/L	0.45	0.45	0.49	0.52	0.48	0.48	0.55	0.48	0.47	---	---	0.50	< 0.50 U	0.45	0.56	0.46	0.45
pH, Field	s.u.	7.98	7.93	8.12	8.04	8.07	8.10	8.18	8.16	8.15	---	---	8.07	8.19	8.23	8.12	8.22	8.11
Sulfate	mg/L	80.1	69.9	79.6	68.7	74.2	72.8	74.1	70.8	75.1	---	---	56.5	73	75	72	71	73
Total Dissolved Solids	mg/L	841	857	820	823	849	811	837	811	870	---	---	2630	840	900	810	880	860
Appendix IV Parameters																			
Antimony	mg/L	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.0020 U	< 0.0020 U ^	---	---	---	---	---	---
Arsenic	mg/L	< 0.0026 U ^	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.005 U ^	< 0.002 U	< 0.002 U	< 0.002 U	< 0.0050 U	< 0.0050 U	---	---	---	---	---	---
Barium	mg/L	0.0478	0.0371	0.0369	0.0349	0.0363	0.0356	0.0338	0.0312	0.0365	0.035	0.036	---	---	---	---	---	---
Beryllium	mg/L	< 0.0005 U	< 0.0005 U	< 0.001 U ^	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0050 U ^	< 0.0010 U	---	---	---	---	---	---
Cadmium	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	0.0008	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0010 U	< 0.0010 U	---	---	---	---	---	---
Chromium	mg/L	< 0.01 ^	< 0.005 ^	< 0.01 ^	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	---	---	---	---	---	---
Cobalt	mg/L	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0010 U	< 0.0010 U	---	---	---	---	---	---
Fluoride	mg/L	0.45	0.45	0.49	0.52	0.48	0.48	0.55	0.48	0.47	0.56	0.45	---	---	---	---	---	---
Lead	mg/L	0.0012	< 0.005 U ^	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.002 ^	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0010 U	< 0.0010 U	---	---	---	---	---	---
Lithium	mg/L	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	0.085	0.077	---	---	---	---	---	---
Mercury	mg/L	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	---	---	---	---	---	---
Molybdenum	mg/L	0.0041	< 0.005 ^	< 0.01 ^	< 0.025 ^	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	---	---	---	---	---	---
Radium-226	pCi/L	< 1 U	< 1 U	< 1 U	< 0.2 U	< 0.2 U	< 0.2 U	0.3 ± 0.1	0.2 ± 0.1	0.3 ± 0.1	-0.0233 U ± 0.104	0.119 U ± 0.0958	---	---	---	---	---	---
Radium-228	pCi/L	< 2 U	< 2 U	< 2 U	< 2 U	3.4 ± 3.0	< 2 U	< 2 U	< 2 U	< 2 U	0.231 U ± 0.253	0.145 U ± 0.246	---	---	---	---	---	---
Radium-226 and -228 combined	pCi/L	< 2 U	< 2 U	< 2 U	< 2 U	3.4 ± 3.0	< 2 U	< 2 U	< 2 U	< 2 U	0.208 U ± 0.274	0.264 U ± 0.264	---	---	---	---	---	---
Selenium	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.01 ^	< 0.01 ^	< 0.005 ^	< 0.0050 U	< 0.0050 U	---	---	---	---	---	---
Thallium	mg/L	< 0.0005 U	< 0.0005 U	< 0.001 ^	< 0.0005 U	< 0.0005 U	0.0007	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0010 U	< 0.0010 U	---	---	---	---	---	---

Legend:
--, not analyzed
ft AMSL, feet above mean sea level
mg/L, milligrams per liter
s.u., standard units for pH
pCi/L, picocuries per liter

Laboratory Provided Qualifiers:
^ (samples prior to June 2018) = Reporting limit elevated due to instrument performance at the lower limit of quantification (LLOQ).
U (general chemistry) = Not detected above the shown practical quantitation limit
U (radiochemistry) = Result is less than the sample detection limit (varies by sample)
^ (samples after June 2018) = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC is outside acceptance limits.

Notes:
Samples collected prior to June 2018 were analyzed by Minnesota Valley Testing Laboratories, with radiochemical analysis subcontracted to Intermountain Laboratories.
Samples collected from June 2018 to present were analyzed by Eurofins TestAmerica Laboratories.
In changing analytical laboratories, some differences have been noted in analytical methodologies and associated reporting limits. Methods used are EPA-approved.
Non-detects have been listed at the reported practical quantitation limit.
Metal results represent the total concentration (i.e. samples have not been filtered).
Precision was not recorded for samples with radiological concentrations below the reporting limit by Intermountain Laboratories for Radium-226 samples reported using SM 7500 Ra-B or Radium-228 samples reported using the Georgia Tech method.
Radium-226 and -228 combined has been reported as the calculated sum of Radium-226 and Radium-228 results, or the reporting limit for non-detect results.

Table 5: Sample Results Summary Table - MW-16-6

		MW-16-6															
		Baseline Period									Additional Baseline Data		Detection Monitoring				
	Units	**4-Nov-15**	**17-Mar-16**	**22-Jun-16**	**5-Aug-16**	**1-Nov-16**	**15-Feb-17**	**1-May-17**	**15-Jun-17**	**26-Jul-17**	**6-Jun-19**	**8-Apr-20**	**16-Oct-17**	**6-Jun-18**	**16-Oct-18**	**6-Jun-19**	**14-Oct-19**	**8-Apr-20**
Water Elevation	ft AMSL	1912.0	1911.2	1912.0	1911.6	1911.3	1910.9	1912.1	1911.6	1911.2	1910.4	1912.4	1910.7	1910.8	1910.2	1910.4	1912.0	1912.4
Appendix III Parameters																		
Boron	mg/L	5.31	4.3	4.69	4.63	5.4	4.49	3.98	3.98	4.7	---	---	5.76	4.3	4.6	3.9	5.2	4.8
Calcium	mg/L	550	492	505	505	540	570	490	505	550	---	---	545	480	500	500	530	540
Chloride	mg/L	42.4	40.8	35.5	35.1	41.9	41.8	42.1	42.2	44.6	---	---	43.7	38	35	37	45	35 H
Fluoride	mg/L	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	---	---	< 0.10	0.81 H	< 0.10	< 0.10 U	< 0.10 U	< 0.10 U
pH, Field	s.u.	5.71	5.76	5.72	5.69	5.67	5.68	5.77	5.75	5.77	---	---	5.73	5.76	5.83	5.68	5.94	5.78
Sulfate	mg/L	3460	3390	4250	3860	3380	3870	2940	3360	3810	---	---	3350	3600	3800	3600	3900	3400
Total Dissolved Solids	mg/L	5600	5680	5500	5540	5370	5650	5600	5600	5920	---	---	5810	5900	6100	5900	6400	6000
Appendix IV Parameters																		
Antimony	mg/L	0.0011	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.0020 U	< 0.0020 U	---	---	---	---	---	---
Arsenic	mg/L	0.0037	< 0.01 U ^	< 0.002 U	< 0.002 U	< 0.005 U ^	0.0021	< 0.002 U	< 0.002 U	< 0.002 U	< 0.0050 U	< 0.0050 U	---	---	---	---	---	---
Barium	mg/L	0.0612	0.2041	0.0421	0.04	0.0346	0.051	0.0272	0.0296	0.0272	0.028	0.04	---	---	---	---	---	---
Beryllium	mg/L	< 0.0005 U	< 0.0005 U	< 0.001 ^	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0050 U ^	< 0.0010 U	---	---	---	---	---	---
Cadmium	mg/L	< 0.0005 U	< 0.0005 U	< 0.001 ^	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0010 U	< 0.0010 U	---	---	---	---	---	---
Chromium	mg/L	< 0.005 U ^	0.0116	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.0020 U	< 0.0020 U	---	---	---	---	---	---
Cobalt	mg/L	0.0025	0.0036	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	0.0018	0.0024	---	---	---	---	---	---
Fluoride	mg/L	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	---	---	---	---	---	---
Lead	mg/L	0.0009	0.0035	< 0.001 U ^	< 0.0005 U	< 0.001 ^	0.0006	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0010 U	< 0.0010 U	---	---	---	---	---	---
Lithium	mg/L	0.54	0.62	0.57	0.57	0.58	0.64	0.54	0.58	0.6	0.59	0.55	---	---	---	---	---	---
Mercury	mg/L	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	---	---	---	---	---	---
Molybdenum	mg/L	0.0058	< 0.005 U ^	< 0.025 U ^	0.0037	0.0029	0.0022	0.0022	< 0.005 U ^	0.0025	< 0.0020 U	0.0023	---	---	---	---	---	---
Radium 226	pCi/L	< 1 U	2.0 ± 0.4	< 0.4 U	0.4 ± 0.1	< 0.2 U	< 0.2 U	< 0.2 U	< 0.2 U	0.2 ± 0.1	0.00155 U ± 0.126	0.0779 U ± 0.104	---	---	---	---	---	---
Radium 228	pCi/L	< 2 U	< 2 U	3.6 ± 2.8	< 1 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	0.332 U ± 0.364	0.532 U ± 0.455	---	---	---	---	---	---
Radium 226 and 228 combined	pCi/L	< 2 U	2.0 ± 0.4	3.6 ± 2.8	< 1 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	0.334 U ± 0.385	0.610 U ± 0.467	---	---	---	---	---	---
Selenium	mg/L	0.0319	0.0278	< 0.025 U ^	0.0208	0.0143	0.0128	< 0.01 U ^	0.0138	0.0155	< 0.0050 U	< 0.0050 U	---	---	---	---	---	---
Thallium	mg/L	0.0005	< 0.0005 U	< 0.001 U ^	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0010 U	< 0.0010 U	---	---	---	---	---	---

Legend:
--, not analyzed
ft AMSL, feet above mean sea level
mg/L, milligrams per liter
s.u., standard units for pH
pCi/L, picocuries per liter

Laboratory Provided Qualifiers:
^ (samples prior to June 2018) = Reporting limit elevated due to instrument performance at the lower limit of quantification (LLOQ).
U (general chemistry) = Not detected above the shown practical quantitation limit
U (radiochemistry) = Result is less than the sample detection limit (varies by sample)
^ (samples after June 2018) = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC is outside acceptance limits.
H = Sample was prepped or analyzed beyond the specified holding time.

Notes:
Samples collected prior to June 2018 were analyzed by Minnesota Valley Testing Laboratories, with radiochemical analysis subcontracted to Intermountain Laboratories.
Samples collected from June 2018 to present were analyzed by Eurofins TestAmerica Laboratories.
In changing analytical laboratories, some differences have been noted in analytical methodologies and associated reporting limits. Methods used are EPA-approved.
Non-detects have been listed at the reported practical quantitation limit.
Metal results represent the total concentration (i.e. samples have not been filtered).
Precision was not recorded for samples with radiological concentrations below the reporting limit by Intermountain Laboratories for Radium-226 samples reported using SM 7500 Ra-B or Radium-228 samples reported using the Georgia Tech method.
Radium-226 and -228 combined has been reported as the calculated sum of Radium-226 and Radium-228 results, or the reporting limit for non-detect results.

Table 6: Sample Results Summary Table - MW-49

		MW-49																
		Baseline Period									Additional Baseline Data		Detection Monitoring					
	Units	16-Sep-15	4-Nov-15	8-Mar-16	15-Jun-16	2-Aug-16	31-Oct-16	14-Feb-17	2-May-17	12-Jun-17	6-Jun-19	8-Apr-20	16-Oct-17	11-Jun-18	18-Jul-18	16-Oct-18	6-Jun-19	15-Oct-19	8-Apr-20
Water Elevation	ft AMSL	1888.0	1888.0	1887.9	1887.7	1887.6	1887.8	1887.6	1888.5	1888.0	1888.1	1888.4	1887.7	1888.1	1887.9	1887.5	1888.1	1888.8	1888.4
Appendix III Parameters																			
Boron	mg/L	5.40	5.20	4.80	4.74	4.89	5.17	4.94	4.47	4.48	---	---	5.12	5.0	---	4.4	4.2	4.6	4.7
Calcium	mg/L	207	201	207	196	190	187	207	190	207	---	---	195	200	---	180	200	200	210
Chloride	mg/L	60.8	60.3	62.0	67.1	62.5	64.3	65.1	61.4	59.2	---	---	62.3	68	---	72	70	71	60
Fluoride	mg/L	0.18	0.19	0.18	0.18	0.18	0.18	0.20	0.18	0.18	---	---	0.22	0.16 H	0.14	0.15	0.19	0.16	0.16
pH, Field	s.u.	6.94	6.90	6.99	6.95	7.03	7.05	7.31	7.10	7.06	---	---	6.99	7.05	7.08	7.08	6.89	7.02	7.01
Sulfate	mg/L	1340	1280	1110	1300	1390	1340	1170	992	1260	---	---	1240	1400	---	1400	1300	1400	1300
Total Dissolved Solids	mg/L	2700	2680	2650	2560	2620	2600	2610	2630	2650	---	---	2700	2800	---	2800	2600	2800	2700
Appendix IV Parameters																			
Antimony	mg/L	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.0020 U	< 0.0020 U	---	---	---	---	---	---	---
Arsenic	mg/L	0.0037	0.0023	0.0028	0.0025	0.0025	< 0.005 U ^	0.0027	0.0022	0.0023	< 0.0050 U	< 0.0050 U	---	---	---	---	---	---	---
Barium	mg/L	0.0292	0.0262	0.0266	0.0234	0.0262	0.0268	0.0262	0.0264	0.0256	0.027	0.024 F1	---	---	---	---	---	---	---
Beryllium	mg/L	< 0.0005 U	< 0.0005 U	< 0.001 U ^	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0050 U ^	< 0.0010 U	---	---	---	---	---	---	---
Cadmium	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0010 U	< 0.0010 U	---	---	---	---	---	---	---
Chromium	mg/L	< 0.01 U ^	< 0.005 U ^	< 0.01 U ^	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.0020 U	< 0.0020 U	---	---	---	---	---	---	---
Cobalt	mg/L	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.0010 U	< 0.0010 U	---	---	---	---	---	---	---
Fluoride	mg/L	0.18	0.19	0.18	0.18	0.18	0.18	0.2	0.18	0.18	0.19	0.16	---	---	---	---	---	---	---
Lead	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.002 ^	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0010 U	< 0.0010 U	---	---	---	---	---	---	---
Lithium	mg/L	0.23	0.22	0.24	0.21	0.2	0.2	0.26	0.22	0.21	0.23	0.21	---	---	---	---	---	---	---
Mercury	mg/L	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	---	---	---	---	---	---	---
Molybdenum	mg/L	0.0102	< 0.005 ^	< 0.01 ^	< 0.025 ^	0.0021	< 0.002	0.0023	0.0024	0.0022	< 0.0020 U	0.0022	---	---	---	---	---	---	---
Radium-226	pCi/L	< 1 U	< 1 U	< 1 U	< 0.2 U	< 0.2 U	< 0.2 U	0.2 ± 0.1	0.3 ± 0.1	< 0.2 U	0.000 U ± 0.0914	0.0855 U ± 0.0857	---	---	---	---	---	---	---
Radium-228	pCi/L	< 2 U	< 2 U	< 2 U	< 2 U	< 1 U	< 2 U	< 2 U	< 2 U	< 2 U	0.313 U ± 0.300	0.309 U ± 0.266	---	---	---	---	---	---	---
Radium-226 and -228 combined	pCi/L	< 2 U	< 2 U	< 2 U	< 2 U	< 1 U	< 2 U	< 2 U	< 2 U	< 2 U	0.313 U ± 0.314	0.394 U ± 0.279	---	---	---	---	---	---	---
Selenium	mg/L	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.01 U ^	< 0.01 U ^	< 0.005 U ^	< 0.0050 U	< 0.0050 U	---	---	---	---	---	---	---
Thallium	mg/L	< 0.0005 U	< 0.0005 U	< 0.001 U ^	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0010 U	< 0.0010 U F1	---	---	---	---	---	---	---

Legend:
--, not analyzed
ft AMSL, feet above mean sea level
mg/L, milligrams per liter
s.u., standard units for pH
pCi/L, picocuries per liter

Laboratory Provided Qualifiers:
^ (samples prior to June 2018) = Reporting limit elevated due to instrument performance at the lower limit of quantification (LLOQ).
U (general chemistry) = Not detected above the shown practical quantitation limit
U (radiochemistry) = Result is less than the sample detection limit (varies by sample)
^ (samples after June 2018) = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC is outside acceptance limits.
H = Sample was prepped or analyzed beyond the specified holding time.
F1 = MS and.or MSD recovery exceeded applicable control limits. Sample results are still considered acceptable.

Notes:
Samples collected prior to June 2018 were analyzed by Minnesota Valley Testing Laboratories, with radiochemical analysis subcontracted to Intermountain Laboratories.
Samples collected from June 2018 to present were analyzed by Eurofins TestAmerica Laboratories.
In changing analytical laboratories, some differences have been noted in analytical methodologies and associated reporting limits. Methods used are EPA-approved.
Non-detects have been listed at the reported practical quantitation limit.
Metal results represent the total concentration (i.e. samples have not been filtered).
Precision was not recorded for samples with radiological concentrations below the reporting limit by Intermountain Laboratories for Radium-226 samples reported using SM 7500 Ra-B or Radium-228 samples reported using the Georgia Tech method.
Radium-226 and -228 combined has been reported as the calculated sum of Radium-226 and Radium-228 results, or the reporting limit for non-detect results.

Table 7: Sample Results Summary Table - MW-51

		MW-51																
		Baseline Period									Additional Baseline Data		Detection Monitoring					
	Units	**16-Sep-15**	**4-Nov-15**	**8-Mar-16**	**15-Jun-16**	**2-Aug-16**	**31-Oct-16**	**14-Feb-17**	**2-May-17**	**12-Jun-17**	**6-Jun-19**	**8-Apr-20**	**16-Oct-17**	**11-Jun-18**	**16-Oct-18**	**6-Jun-19**	**15-Oct-19**	**8-Apr-20**
Water Elevation	ft AMSL	1880.2	1879.8	1879.3	1880.0	1879.7	1879.3	1878.9	1881.5	1880.9	1879.3	1881.4	1879.3	1879.3	1878.8	1879.3	1884.1	1881.4
Appendix III Parameters																		
Boron	mg/L	3.76	3.35	3.02	3.62	2.84	3.51	5.65	3.26	3.19	---	---	3.56	3.1	2.8	3.9	7.9	5.4
Calcium	mg/L	311	301	296	300	275	268	369	210	215	---	---	240	220	220	280	420	270
Chloride	mg/L	70	67.8	72.9	76.2	71.7	73.8	145	45.7	39.8	---	---	49.6	61	60	87	80	54 H
Fluoride	mg/L	0.34	0.37	0.35	0.36	0.34	0.38	0.5	0.36	0.36	---	---	0.36	0.28 H	0.29	0.39	0.43	0.28
pH, Field	s.u.	6.92	6.88	7.05	6.95	6.98	7.06	7.31	7.11	7.04	---	---	6.98	7.09	7.26	7.08	6.91	6.99
Sulfate	mg/L	3380	3020	3230	3120	3280	3150	4430	2130	2430	---	---	2770	3300	3000	3100	3600	2600
Total Dissolved Solids	mg/L	5430	5470	5380	5060	5060	5230	6220	4500	4280	---	---	4830	5200	5300	5300	6200	4800
Appendix IV Parameters																		
Antimony	mg/L	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.0020 U	< 0.0020 U	---	---	---	---	---	---
Arsenic	mg/L	0.003	< 0.002 U	0.0021	< 0.002 U	< 0.002 U	< 0.005 U ^	< 0.002 U	< 0.002 U	< 0.002 U	< 0.0050 U	< 0.0050 U	---	---	---	---	---	---
Barium	mg/L	0.0312	0.0287	0.0229	0.0215	0.0247	0.0247	0.0281	0.0166	0.0163	0.023	0.016	---	---	---	---	---	---
Beryllium	mg/L	< 0.0005 U	< 0.0005 U	< 0.001 ^	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0050 U ^	< 0.0010 U	---	---	---	---	---	---
Cadmium	mg/L	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0010 U	< 0.0010 U	---	---	---	---	---	---
Chromium	mg/L	< 0.01 U ^	< 0.005 U ^	< 0.01 U ^	< 0.002 U	< 0.002 U	0.0021	< 0.002 U	< 0.002 U	< 0.002 U	< 0.0020 U	< 0.0020 U	---	---	---	---	---	---
Cobalt	mg/L	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.0010 U	< 0.0010 U	---	---	---	---	---	---
Fluoride	mg/L	0.34	0.37	0.35	0.36	0.34	0.38	0.5	0.36	0.36	0.39	0.28	---	---	---	---	---	---
Lead	mg/L	< 0.0005 U	< 0.0005 U	0.0008	< 0.0005 U	< 0.0005 U	< 0.002 U ^	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0010 U	< 0.0010 U	---	---	---	---	---	---
Lithium	mg/L	0.57	< 0.50 U	< 0.50 U @	0.47	0.44	0.51	0.46	< 0.50 U @	0.39	0.47	0.47	---	---	---	---	---	---
Mercury	mg/L	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	---	---	---	---	---	---
Molybdenum	mg/L	0.0069	0.006	< 0.01 U ^	< 0.025 U ^	0.0057	0.0066	0.0081	0.0041	0.0045	0.0081	0.0032	---	---	---	---	---	---
Radium-226	pCi/L	< 1 U	< 1 U	< 1 U	< 0.2 U	0.2 ± 0.1	< 0.2 U	0.3 ± 0.1	< 0.2 U	< 0.2 U	0.0895 U ± 0.0794	0.000811 U ± 0.0659	---	---	---	---	---	---
Radium-228	pCi/L	< 2 U	< 2 U	< 2 U	< 2 U	< 1 U	< 2 U	< 2 U	< 2 U	< 2 U	0.620 ± 0.264	-0.0410 U ± 0.318	---	---	---	---	---	---
Radium-226 and -228 combined	pCi/L	< 2 U	< 2 U	< 2 U	< 2 U	< 1 U	< 2 U	< 2 U	< 2 U	< 2 U	0.709 ± 0.276	-0.0402 U ± 0.325	---	---	---	---	---	---
Selenium	mg/L	0.0196	0.0197	0.0169	0.0151	0.0166	0.0124	0.017	0.018	0.0191	0.015	0.012	---	---	---	---	---	---
Thallium	mg/L	< 0.0005 U	< 0.0005 U	< 0.001 ^	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0010 U	< 0.0010 U	---	---	---	---	---	---

Legend:
--, not analyzed
ft AMSL, feet above mean sea level
mg/L, milligrams per liter
s.u., standard units for pH
pCi/L, picocuries per liter

Laboratory Provided Qualifiers:
^ (samples prior to June 2018) = Reporting limit elevated due to instrument performance at the lower limit of quantification (LLOQ).
@ = Analyte required a dilution due to sample matrix, resulting in an elevated RL.
U (general chemistry) = Not detected above the shown practical quantitation limit
U (radiochemistry) = Result is less than the sample detection limit (varies by sample)
^ (samples after June 2018) = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC is outside acceptance limits.
H = Sample was prepped or analyzed beyond the specified holding time.

Notes:
Samples collected prior to June 2018 were analyzed by Minnesota Valley Testing Laboratories, with radiochemical analysis subcontracted to Intermountain Laboratories.
Samples collected from June 2018 to present were analyzed by Eurofins TestAmerica Laboratories.
In changing analytical laboratories, some differences have been noted in analytical methodologies and associated reporting limits. Methods used are EPA-approved.
Non-detects have been listed at the reported practical quantitation limit.
Metal results represent the total concentration (i.e. samples have not been filtered).
Precision was not recorded for samples with radiological concentrations below the reporting limit by Intermountain Laboratories for Radium-226 samples reported using SM 7500 Ra-B or Radium-228 samples reported using the Georgia Tech method.
Radium-226 and -228 combined has been reported as the calculated sum of Radium-226 and Radium-228 results, or the reporting limit for non-detect results.

Table 8: Sample Results Summary Table - MW-91-1

		MW-91-1																
		Baseline Period										Additional Baseline Data			Detection Monitoring			
	Units	**17-Jan-18**	**14-Feb-18**	**20-Mar-18**	**23-Apr-18**	**17-May-18**	**12-Jun-18**	**18-Jul-18**	**13-Aug-18**	**13-Sep-18**	**17-Oct-18**	**6-Jun-19**	**13-Sep-19**	**8-Apr-20**	**6-Jun-19**	**13-Sep-19**	**15-Oct-19**	**8-Apr-20**
Water Elevation	ft AMSL	1875.4	1875.6	1875.5	1875.8	1876.0	1876.0	1875.9	1875.7	1875.5	1875.4	1876.5	1876.3	1877.1	1876.5	1876.3	1876.8	1877.1
Appendix III Parameters																		
Boron	mg/L	2.87	3.12	3.19	3.06	3.3	3.1	2.8	2.9	2.9	2.8	---	---	---	0.35	2.9	2.7	3.0
Calcium	mg/L	354	245	261	214	218	210	190	200	200	210	---	---	---	270	230	220	230
Chloride	mg/L	78.4	75.2	69.2	72.5	76.2	76	71	73	72	78	---	---	---	16	85	79	66
Fluoride	mg/L	0.28	0.27	0.23	0.25	0.21	< 0.50 U	0.19	0.19	0.18	0.23	---	---	---	< 0.10 U	0.2	0.21	0.22
pH, Field	s.u.	7.04	6.93	6.87	6.99	6.83	6.98	6.98	7.03	6.97	6.96	---	---	---	6.82	6.97	6.94	6.93
Sulfate	mg/L	1180	1200	1010	1200	983	1200	1200	1300	1200	1200	---	---	---	1200	1300	1100	1100
Total Dissolved Solids	mg/L	2240	2240	2300	2300	2250	2400	2300	2300	2300	2300	---	---	---	2000	2300 H	2400	2300
Appendix IV Parameters																		
Antimony	mg/L	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	---	---	---	---
Arsenic	mg/L	0.0299	0.0126	0.0115	0.0023	< 0.0020 U	< 0.0050 U	< 0.0050 U	< 0.0050 U	< 0.0050 U	< 0.0050 U	< 0.0050 U	< 0.0050 U	< 0.0050 U	---	---	---	---
Barium	mg/L	0.66	0.286	0.3026	0.0704	0.0537	0.044	0.048	0.099	0.15	0.083	0.064	0.048	0.04	---	---	---	---
Beryllium	mg/L	0.0029	0.0013	0.0011	< 0.0005 U	< 0.0005 U	< 0.0010 U	< 0.0050 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0050 U ^	< 0.0010 U	< 0.0010 U	---	---	---	---
Cadmium	mg/L	0.0015	0.0006	0.0007	< 0.0005 U	< 0.0005 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	---	---	---	---
Chromium	mg/L	0.0816	0.0304	0.0301	0.0037	< 0.0020 U	< 0.0020 U	< 0.0020 U	0.009	0.013	0.0053	< 0.0020 U	< 0.0020 U	< 0.0020 U	---	---	---	---
Cobalt	mg/L	0.0284	0.0109	0.0117	0.0021	< 0.0020 U	0.0011	0.0012	0.0027	0.0043	0.0021	< 0.0010 U	0.0019	0.0011	---	---	---	---
Fluoride	mg/L	0.28	0.27	0.23	0.25	0.21	< 0.50 U	0.19	0.19	0.18	0.23	< 0.10 U	0.20	0.22	---	---	---	---
Lead	mg/L	0.0327	0.0131	0.015	0.001	< 0.0005 U	< 0.0010 U	< 0.0010 U	0.0035	0.0057	0.0021	< 0.0010 U	< 0.0010 U	< 0.0010 U	---	---	---	---
Lithium	mg/L	0.18	0.15	0.14	0.13	0.16	0.13	0.12	0.13	0.14	0.14	0.10	0.14	0.13	---	---	---	---
Mercury	mg/L	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	---	---	---	---
Molybdenum	mg/L	0.0091	0.0102	0.0063	0.0079	0.0053	0.0038	0.0047	0.0035	0.0037	0.0042	< 0.0020 U	0.0047	0.0045	---	---	---	---
Radium-226	pCi/L	< 0.2	0.4 ± 0.1	< 1	< 0.4	0.8 ± 0.2	0.0439 U ± 0.138	0.203 ± 0.0856	0.628 ± 0.199	0.767 ± 0.221	0.354 ± 0.146	0.551 ± 0.225	0.0217 U ± 0.0582	0.114 U ± 0.109	---	---	---	---
Radium-228	pCi/L	< 1	< 2	< 2	< 2	< 2	0.381 U ± 0.270	0.237 U ± 0.281	0.513 U ± 0.550	0.495 U ± 0.559	0.258 U ± 0.310	0.543 U ± 0.379	0.383 U ± 0.320	0.502 U ± 0.337	---	---	---	---
Radium-226 and -228 combined	pCi/L	< 1	< 2	< 2	< 2	< 2	0.425 ± 0.419	0.441 U ± 0.294	1.14 ± 0.585	1.26 ± 0.601	0.612 ± 0.343	1.09 ± 0.441	0.405 U ± 0.325	0.616 ± 0.354	---	---	---	---
Selenium	mg/L	0.0052	< 0.0050 U	0.0119	< 0.0050 U	< 0.010 ^	< 0.0050 U	< 0.025 U	< 0.0050 U	< 0.0050 U	< 0.0050 U	< 0.0050 U	0.011	0.0069	---	---	---	---
Thallium	mg/L	0.0013	< 0.0010 U ^	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	---	---	---	---

Legend:
--, not analyzed
ft AMSL, feet above mean sea level
mg/L, milligrams per liter
s.u., standard units for pH
pCi/L, picocuries per liter

Laboratory Provided Qualifiers:
^ (samples prior to June 2018) = Reporting limit elevated due to instrument performance at the lower limit of quantification (LLOQ).
U (general chemistry) = Not detected above the shown practical quantitation limit
U (radiochemistry) = Result is less than the sample detection limit (varies by sample)
^ (samples after June 2018) = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC is outside acceptance limits.
H = Sample was prepped or analyzed beyond the specified holding time.

Notes:
Samples collected prior to June 2018 were analyzed by Minnesota Valley Testing Laboratories, with radiochemical analysis subcontracted to Intermountain Laboratories.
Samples collected from June 2018 to present were analyzed by Eurofins TestAmerica Laboratories.
In changing analytical laboratories, some differences have been noted in analytical methodologies and associated reporting limits. Methods used are EPA-approved.
Non-detects have been listed at the reported practical quantitation limit.
Metal results represent the total concentration (i.e. samples have not been filtered).
Precision was not recorded for samples with radiological concentrations below the reporting limit by Intermountain Laboratories for Radium-226 samples reported using SM 7500 Ra-B or Radium-228 samples reported using the Georgia Tech method.
Radium-226 and -228 combined has been reported as the calculated sum of Radium-226 and Radium-228 results, or the reporting limit for non-detect results.
An additional sample was collected at MW-91-1 in September 2019, after the June 2019 sample was found to have been switched with the sample from MW-91-2. Analytical results from both events are provided for informational purposes.

APPENDIX C-2

Groundwater Statistical Method Certification

REPORT

Coal Combustion Residuals Groundwater Statistical Method Certification, Revision 1

Great River Energy - Coal Creek Station

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March 8, 2019



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1.0 INTRODUCTION

Golder Associates Inc. (Golder) has prepared this revision to the Coal Combustion Residuals (CCR) Groundwater Statistical Method Certification Report on behalf of Great River Energy (GRE) to certify that the statistical methodology to be employed at GRE's Coal Creek Station (CCS) is appropriate and meets the requirements of 40 CFR 257.93 (f) and (g).

1.1 Purpose

The CCR rule establishes specific requirements for statistical analysis of groundwater monitoring networks in 40 CFR 257.93 (Groundwater sampling and analysis requirements). Per part (f) of § 257.93, owners or operators of CCR units must select a statistical method to evaluate groundwater monitoring data for the constituents specified in Appendix III and Appendix IV of the rule. This report serves as the documentation of the required certification of the selected statistical methodology, in accordance with 40 CFR 257.93(f)(6).

This document may be periodically revised based on a review of changes to guidance documents provided by the United States Environmental Protection Agency (USEPA) or other governing entities, as well as revisions to the language of the rule itself.

1.2 Site Background

Coal Creek Station is located in McLean County, approximately 10 miles northwest of Washburn, North Dakota. CCS has four CCR facilities regulated under the CCR rule. The CCR units include the following:

- Drains Pond System CCR Surface Impoundment (Drains Pond System)
- Upstream Raise 91 CCR Surface Impoundment (Upstream Raise 91)
- Upstream Raise 92 CCR Surface Impoundment (Upstream Raise 92)
- Southeast Section 16 CCR Landfill (Southeast 16)

1.3 Constituents

Baseline samples (a minimum of eight) are collected for each well within the system and analyzed for both Appendix III and Appendix IV constituent lists associated with the CCR rule (Table 1). Additionally, the following field parameters are recorded: pH, specific conductivity, turbidity, and temperature. Following collection of baseline samples, semi-annual detection monitoring samples will be analyzed for the Appendix III constituent list and field parameters. If assessment monitoring is required, samples will be analyzed for the Appendix IV constituent list in accordance with CCR rule requirements. During the baseline period and all subsequent samples collected as part of the CCR sampling program, metals will be analyzed as total recoverable metals, i.e., samples will not be filtered.

The statistical analyses described in the following sections will be performed for each of the Appendix III constituents listed in Table 1 during detection monitoring, and for the Appendix IV constituents in the event of assessment monitoring. Apart from field pH, statistical analysis will not be conducted on field constituents (specific conductivity, turbidity, and temperature). There is a high potential for false positive results with field measurements due to sample collection inconsistency (e.g., changes in field conditions and sampling personnel), equipment calibration variability, and other causes of measurement variability.

Table 1: CCR Constituent Lists

Appendix III Constituents	Appendix IV Constituents
Boron	Antimony
Calcium	Arsenic
Chloride	Barium
Fluoride	Beryllium
pH (Field)	Cadmium
Sulfate	Chromium
Total Dissolved Solids (TDS)	Cobalt
	Fluoride
	Lead
	Lithium
	Molybdenum
	Radium-226 and -228 Combined
	Selenium
	Thallium

2.0 STATISTICAL METHODOLOGY

The purpose of groundwater monitoring in conjunction with the CCR rule is to determine if the regulated CCR Units are impacting groundwater. To determine if an impact has occurred, recent groundwater data from each well will undergo statistical analysis. The statistical methodology outlined within this document was selected in accordance with 40 CFR 257.93 of the CCR rule and the *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (Unified Guidance, USEPA 2009). Additional consideration was given to recommendations prepared by the Electric Power Research Institute (EPRI 2015).

Baseline diagnostic tests will be conducted using baseline samples collected at each well. Statistical analysis will be conducted using Sanitas (Sanitas Technologies 2014) or similar statistical analysis software.

During detection monitoring, comparative statistical analysis will be performed after each monitoring event to identify whether concentrations are potentially statistically significant in comparison to baseline values. The results will be reported annually. If assessment monitoring is conducted, comparative statistical analysis will be conducted following the collection of the specified number of confirmation samples.

The baseline data for all constituents, as determined by the monitoring program, will be reviewed periodically (approximately every 2 to 3 years based on a semi-annual sampling frequency during detection monitoring) to determine if recent results that are not statistically significant in comparison to baseline values can be incorporated into an updated baseline period (specifics of the baseline update procedure are discussed in depth in Section 2.2.6).

2.1 Intra-Well Methodology

Intra-well (comparing compliance data to baseline data within a single well) statistics are identified as an appropriate method for groundwater monitoring at CCS. This method is based on the following factors outlined in the Unified Guidance (USEPA 2009).

- Per the Unified Guidance: “Intra-well methodology allows establishment of reasonable baseline period for future tests in historically impacted wells. Additionally, measurements occur solely between the baseline period and compliance period of testing within a single well.”
  - Past CCR depositional facilities are known to have impacted the subsurface hydrology. Those facilities have been removed and new facilities with engineered lining systems constructed. The use of intra-well statistics allows future potential changes in water chemistry to be more readily tracked in relation to current CCR facilities at CCS.
- Per the Unified Guidance: “Confounding results stemming from spatial variability can be eliminated.”
  - Due to the heterogeneity of the glacial geology at CCS, spatial variability is displayed throughout the groundwater monitoring network. Use of intra-well statistics allows comparisons to be made on a per well basis, which avoids comparisons being made in differing geologic/geochemical conditions.

2.2 Methodology for Baseline Diagnostic Tests

2.2.1 Initial Data Review and Non-detect Handling

Initially, data will be plotted on time-series graphs to assess the temporal variability of the data and to visually screen for potential outliers. Temporal variability can be caused by seasonality, changes to the monitored system, changes to the analytical method, recalibration of instruments, and anomalies in the sampling method (USEPA 2009).

Non-detect values (ND) are results where the constituent is not detected at a concentration above the Practical Quantitation Limit (PQL). The PQL is the lowest concentration that can be reliably measured within the specified limits of precision and accuracy during routine laboratory operating conditions. ND values will be managed following the approach recommended by the Unified Guidance (USEPA 2009):

- For sample populations with < 15% ND, direct substitution of the NDS with ½ the PQL.
- For sample populations with 15% < ND ≤ 50%, the Kaplan-Meier approach will be used to estimate the mean and standard deviation of the population.
- For sample populations with > 50% ND, non-parametric approaches will be used to assess the data, with direct substitution of the NDs with the PQL.

2.2.2 Data Distribution

Parametric statistical tests are based on the assumption that the data are normally-distributed or can be transformed to a normal distribution. The distribution of the data will be tested for normality using the Shapiro-Wilk normality test with at 95 percent confidence level (or the Shapiro-Francia test when there are more than 50 results within the dataset). Each constituent from each well will be analyzed separately. Datasets found to be non-normal will be tested for other distributions using the 'Ladder of Powers' described by the Unified Guidance and transformed accordingly. Following transformation, parametric statistical methods will be performed on the normally or transform-normally distributed data. Non-parametric statistics will be used for datasets that do not show normal or transform-normal distributions, or for populations with greater than 50% ND.

2.2.3 Outlier Analysis

In accordance with the Unified Guidance, data points will be identified as outliers if the value was an "extreme, unusual-looking measurement" and "inconsistent with the distribution of the remaining measurements." The Unified Guidance recommends testing for outliers within baseline data, but cautions against removal of outliers, unless a likely error or specific discrepancy can be identified, such as recordkeeping errors, unusual procedures or conditions during sampling or at the laboratory, inconsistent sample turbidity, or values significantly outside the range of other results. In accordance with the Unified Guidance, apparent outliers will be periodically revisited even if initially removed, due to the propensity of groundwater chemistry to change over time.

Outliers will be evaluated and identified through visual inspection and the USEPA-recommended Dixon's Test for statistical outliers (or Rosner's Test when there are greater than 25 samples). Dixon's and Rosner's Tests assume that all data values, except the suspected outlier, are normally distributed or can be transformed to fit a normal distribution. Consequently, visual inspection of concentrations over time is important in screening for outliers. The effect of removing outliers from the baseline data will usually be to lower statistical limit (due to a reduction in the standard deviation of the dataset), resulting in a more conservative statistical limit and improving the odds of detecting increasing concentration levels.

Outliers will be managed as follows:

- Any suspected outliers identified through statistical analysis or visual methods will be reviewed (i.e., through evaluation of the associated analytical report, laboratory narrative, associated laboratory quality assurance/quality control information, and/or field notes) before removal from the dataset to determine if any systematic or systemic errors were responsible for the noted anomalous readings. Rejected data points will not be included in the baseline dataset.
- The rationale for the removal of any outliers will be documented. The majority of outliers will likely be isolated values that can be attributed to inconsistent sampling or analytical chemistry methodology resulting in laboratory contamination or other anomalies.
- If an outlier is removed, the normality test (Section 2.2.2) will be re-run to determine if the dataset is normally-distributed or transform-normal without the outlier.

2.2.4 Trend Analysis

Most statistical tests assume concentrations do not demonstrate temporal correlation. The Sen's Slope methodology is an intra-well statistical analysis of increases or decreases in measured concentrations over time measured by calculating the slope of the linear relationship of concentration levels and time. Sen's Slope Methodology is paired with the Mann-Kendall test to determine the statistical significance of the calculated Sen's

Slope. The methodology involves examining all possible pairs of measurements in the dataset and scoring each pair to determine if a trend exists. The test will be conducted using a target confidence level of 99 percent.

If temporal trends are identified within the dataset, the data will be adjusted to account for the trends, the time period used for the baseline statistics will be reassessed, and/or an alternative statistical method will be used to establish a limit. In the case of downward trends, no adjustments may be considered appropriate and a particular constituent may not be considered for statistical analysis until further data is collected.

2.2.5 Seasonality

Seasonal temporal variability can mask changes in groundwater chemistry. Time-series plots will be observed for visual signs of seasonality, and once enough data has been collected within the program, the data will be evaluated for seasonal variations using the seasonal Mann-Kendall trend test. The Mann-Kendall test is an intra-well evaluation performed individually for each constituent at each well and requires at least 3 occurrences of each prospective season with results to calculate the statistic. Datasets that are found to have seasonality will be de-seasonalized for subsequent statistical analysis.

2.2.6 Updating the Baseline Period

The Unified Guidance recommends updating the baseline period every two to three years when sampling frequency is semi-annual, or every four to eight collected samples. A baseline update will include a review of any revisions to federal and state regulations and USEPA statistical guidance documents that may have been promulgated since the previous baseline statistical analysis. The baseline period for a specific constituent will not be updated if verified statistically significant increases (SSIs) have been identified for that constituent, unless a demonstration has been made that the SSI is not related to a release from the facility.

Prior to inclusions of more recent data in an updated baseline period, a Wilcoxon Rank-Sum test will be conducted. The Wilcoxon Rank-Sum test, also referred to as the Mann-Whitney test, determines if measurements from one population are statistically significantly higher or lower than another population. The test is non-parametric, namely the data being tested are not assumed to fit a specific distribution, such as a normal distribution. When the baseline period is updated in the future, the Wilcoxon Rank-Sum test will be used to compare data from the current baseline period with the more recent data that are intended to be reclassified and included in the updated baseline period. The test will be conducted at a 95 percent confidence level. If the two datasets are drawn from the same population, then the results of the test support updating the prior baseline data set with the recent data. After the new data are incorporated into the dataset, the baseline diagnostic tests outlined in Section 2.2 will be conducted.

If the Wilcoxon Rank-Sum test detects a significant difference between two sample populations, additional data review will be necessary. The data will be reviewed to determine whether a gradual trend or other change not stemming from a release from the facility has occurred that was not detected during comparative statistical analysis. At the time of the baseline update, some earlier baseline data might need to be removed from the updated baseline period. Removal of earlier baseline data ensures that future statistical analysis is based on current groundwater conditions, rather than on outdated measurements of groundwater chemistry. Alternatively, outliers identified in the previous baseline period (as described in Section 2.2.3) will be re-incorporated into the dataset and reevaluated as potential outliers during the baseline update, unless the outlier(s) were removed due to sampling, laboratory, or other determinant error.

3.0 DETECTION MONITORING

3.1 Statistical Limits

Either a parametric or non-parametric method will be used to generate the baseline statistical limit for each constituent. The statistical method may vary between constituents and will be selected based on the percent of ND values in the baseline period and the baseline data distribution for each constituent at each well, in accordance with the Unified Guidance (USEPA 2009).

For those constituent-well pairs where concentrations of a given analyte are normally or transform-normally distributed and have equal to or greater than 50% detections, Shewhart-CUSUM control charts will be used. The Unified Guidance notes that Shewhart-CUSUM control charts use two separate evaluation procedures. The Shewhart portion is similar to a parametric prediction limit, comparing compliance measurements to a baseline limit. The CUSUM (cumulative summation) portion of the test analyzes new measurements against prior compliance measurements. The mean ($\bar{x}$) and standard deviation (s) of the baseline dataset are used to calculate the limit, by the following equation:

$$\bar{x}_{BG} + hs_{BG}$$

Per the Unified Guidance, h is the standardized control limit.

Where the concentrations of a given constituent-well pair are not normally or transform-normally distributed, or contain less than or equal to 50% detections, a non-parametric prediction limit will be used. The non-parametric limit will be assigned as the highest detected value (excluding outliers) or the highest PQL, whichever is greater.

In the case of increasing trends within the baseline period, the data will be adjusted to account for the trends where a source other than the facility can be identified and/or and alternative statistical method will be used to establish a limit. In the case of downward trends, no adjustments may be considered appropriate and a constituent-well pair may not be considered for statistical analysis until further data is collected; therefore, the trend test will serve as the alternative method for constituents with decreasing trend until the trend stabilizes.

3.2 Comparative Statistical Analysis

Comparative statistical analysis will be conducted following each detection monitoring event. For both Shewhart-CUSUM limits and non-parametric prediction limits, the comparative statistical analysis will consist of a comparison of detection monitoring results (the recent analytical results for each monitoring event performed after the baseline data period) to the statistical limit calculated from the baseline data.

The following definitions will be used in discussion of the comparative statistical analysis:

- Elevated CUSUM – an elevated CUSUM occurs when the CUSUM is greater than the Shewhart-CUSUM limit established by the baseline statistical analysis, but the analytical result does not exceed the Shewhart-CUSUM limit. An elevated CUSUM is an indication that concentrations are gradually increasing and that analytical results may exceed the Shewhart-CUSUM limit in the future.
- Potential Exceedance – is defined as an initial elevated CUSUM or an initial analytical result that exceeds the Shewhart-CUSUM limit or non-parametric statistical limit established by the baseline statistical analysis. Confirmatory resampling will determine if the potential exceedance is a false-positive or a verified statistically significant increase (SSI). Non-detect results that exceed either the Shewhart-CUSUM limit or the non-parametric statistical limit are not considered potential exceedances.

- False-positive – is defined as an analytical result that exceeds the statistical limit that can clearly be attributed to laboratory error, changes in analytical precision, or is invalidated through confirmatory re-sampling. False-positives are not used in calculation of any subsequent CUSUMs.
- Confirmatory re-sampling – is designated as the next scheduled sampling event.
- Verified SSI – is interpreted as two consecutive statistically significant increases (the original sample and the confirmatory re-sample for analytical results, or two consecutive elevated CUSUMs) for the same constituent at the same well.

The detection monitoring program has been developed to identify potential SSIs over baseline values for the Appendix III constituents. This determination will be made within 90 days of receiving the finalized laboratory analytical report(s) for each sampling event and completion of data quality review as necessary to address questions concerning the validity of sampling methods or laboratory analyses. A potential exceedance will not be considered a verified SSI until confirmatory re-sampling is performed. Confirmatory re-sampling will occur during the next regularly scheduled sampling event.

3.3 Alternative Source Demonstrations and Assessment Monitoring

If a verified SSI is identified in a downgradient well for an Appendix III constituent as part of the detection monitoring program, GRE will establish an assessment monitoring program meeting the requirements of 40 CFR 257.95 of the CCR rule. Alternatively, GRE may demonstrate that a source other than the regulated CCR facilities caused the verified SSI, or that the verified SSI was a result of an error in sampling, analysis, statistical evaluation, or natural variability in the groundwater quality that failed to be captured during baseline data collection (40 CFR 257.94(e)(2)). A report documenting the alternative source demonstration (ASD) will be certified by a Professional Engineer registered in the state of North Dakota. A copy of the report will be placed in the Site's Operating Record within 90 days of the SSI determination. If a successful demonstration is made and documented, GRE will continue with the detection monitoring program. If, after 90 days, a successful ASD is not made, GRE will initiate an assessment monitoring program as described in Section 4.0 with the first sample being collected within 90 days, per the requirements of 40 CFR 257.95.

4.0 ASSESSMENT MONITORING

An assessment monitoring program will be initiated in the event of a verified SSI of an Appendix III constituent in a downgradient well, unless a successful demonstration is made that an alternative source affected the groundwater chemistry, or that the verified SSI was a result of an error in sampling, analysis, statistical evaluation, or natural variability in the groundwater quality that was not captured during the baseline data collection period.

The statistical comparisons used in assessment monitoring require baseline analyses to be completed prior to comparative statistics. Baseline statistics for assessment monitoring mirror those for detection monitoring and are discussed in further detail in Section 2.2.

4.1 Establishment of Groundwater Protection Standards

The assessment monitoring program will comply with 40 CFR 257.95. Within 90 days of triggering the assessment monitoring program, GRE will sample and analyze each well for the Appendix IV constituents listed in Table 1. Groundwater protection standards (GWPS) will be established for each Appendix IV constituent. Per the CCR rule (40 CFR 257.95(h)), the GWPS must fall within one of the following categories:

- For constituents for which a maximum contaminant level (MCL) has been established by the USEPA (40 CFR 141.62 and 141.66), the MCL for that constituent will be the GWPS, per 40 CFR 257.95(h)(1).
- For the following constituents, the following alternative limits apply, per 40 CFR 257.95(h)(2):
  - Cobalt – 0.006 mg/L
  - Lead – 0.015 mg/L
  - Lithium – 0.04 mg/L
  - Molybdenum – 0.1 mg/L
- For constituents where the baseline level is higher than the levels identified in 40 CFR 257.91(h)(1) and 40 CFR 257.91(h)(2), the baseline level will be the GWPS per 40 CFR 257.95(h)(3).

For those constituents where the baseline level is higher than the MCL or levels designated in 40 CFR 257.91(h)(2), the GWPS will be determined through statistical methods. For those constituents with a normal or transform-normal distribution, prediction limits for future means will be developed. For constituents that are non-normal or have a high percentage of non-detects, prediction limits for future medians will be developed. For both types, the GWPS is considered a one-sided upper prediction interval calculated from the background data for specified number of future comparisons.

4.2 Comparative Statistics

To determine if Appendix IV constituents have statistically exceeded the associated GWPS, the approaches discussed in the following sections will be used.

4.2.1 Maximum Contaminant Level (MCL) and Specified Limits Based GWPS

For those constituents with MCLs and limits specified in 40 CFR 257.91(h)(2), a confidence interval approach will be used. Per recommendations provided by the Unified Guidance and detailed by EPRI (2015), a confidence interval statistically defines the upper and lower bound (the upper and lower confidence limit) of the true mean associated with a groundwater population. The Unified Guidance recommends confidence intervals for assessment monitoring. Confidence intervals identify SSIs through comparison against a fixed standard, namely the GWPS defined as the MCL or the limits specified in 40 CFR 257.91(h)(2).

To calculate a confidence interval, at least four samples (the initial sample and three resamples) are required. A confidence interval will only be considered statistically above the associated GWPS if both the upper and lower confidence limits exceed the GWPS.

4.2.2 Baseline Based GWPS

For those constituents with a GWPS based on baseline concentrations, a prediction interval approach will be used. The Unified Guidance recommends prediction intervals for a future mean for data that follow a normal or transform-normal distribution, and prediction intervals for future median for data with high percentages of non-detects or non-normally distributed data.

When using prediction intervals for a GWPS, a one-sided prediction interval is calculated using baseline datasets based on a specified number of future comparisons. For parametric comparisons, four measurements are averaged to compare to the GWPS, with statistical significance occurring when the mean is greater than the

GWPS. For non-parametric comparisons, the median of three measurements is compared to the GWPS, with statistical significance occurring when the calculated comparative median is greater than the GWPS.

4.3 Returning to Detection Monitoring, Assessment Monitoring ASD, and Assessment of Corrective Measurements

If the concentrations of constituents listed in Appendix III and Appendix IV of the rule are shown to be at or below baseline values for two consecutive sampling events, GRE will return to detection monitoring. If the concentrations of any of the Appendix III and Appendix IV constituents are above baseline values, but the Appendix IV constituents are below the established GWPS, GRE will continue with assessment monitoring. If one or more Appendix IV constituents are detected at statistically significant levels above the established GWPS, GRE will place a notification of the exceedance in the Site Operating Record and follow the course of action outlined in 40 CFR 257.95(g) of the CCR rule.

As an alternative, GRE may demonstrate that a source other than the regulated CCR facilities caused the SSI, or that the SSI was a result of an error in sampling, analysis, statistical evaluation, or natural variability int the groundwater quality that failed to be captured during baseline data collection (40 CFR 257.95(g)(3)(ii)). A report documenting the ASD will be certified by a Professional Engineer registered in the state of North Dakota. A copy of the report will be placed in the Site's Operating Record within 90 days of the SSI determination. If a successful demonstration is made and documented, the owner or operator must continue monitoring in accordance with the assessment monitoring program pursuant to 40 CFR 257.95, and may return to detection monitoring if the constituents in Appendix III and Appendix IV are at or below background. If, within 90 days, a successful ASD has not been made, GRE will initiate an assessment of corrective measures (ACM) in accordance with 40 CFR 257.96. The ACM will be completed within 90 days, unless a demonstration is made for additional time to complete the assessment. This demonstration will be certified by a Professional Engineer registered in the state of North Dakota.

5.0 REVISION HISTORY

A history of revisions to this document:

Revision 0 – Published October 12, 2017.

Revision 1 – Revised to reflect: Published March 8, 2019

1) Updates to the CCR rule published in the Federal Register on July 30, 2018;

2) New CCR unit naming convention (Upstream Raise to Upstream Raise 92 and Ash Pond 91 to Upstream Raise 91); and

3) Removal of calendar dates associated with the initial collection of background samples to not conflict with baseline sample collection dates for any future wells added to the program.

6.0 CERTIFICATION

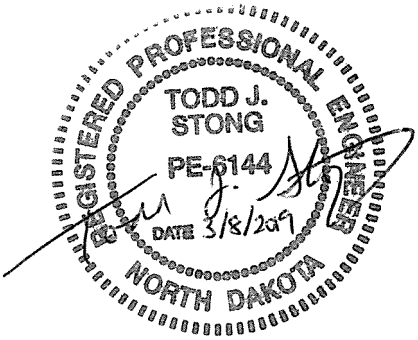
Based upon the review described in this report, the undersigned certifies that the statistical methodology presented herein is appropriate for evaluating groundwater monitoring data associated with the regulated CCR facilities at CCS and meets the requirements of 40 CFR 257.93.

Golder Associates Inc.

Todd Stong, P.E.
Associate and Senior Consultant

Erin L. Hunter, PhD
Project Engineer

ELH/TJS/ds



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APPENDIX C-3

Analysis of Variance – Upgradient Wells

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Non-Parametric ANOVA

Constituent: Boron, Total Analysis Run 11/17/2020 9:56 AM
Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020

For observations made between 9/15/2015 and 4/8/2020, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 52.39

Tabulated Chi-Squared value = 7.815 with 3 degrees of freedom at the 5% significance level.

There were 11 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 52.33
Adjusted Kruskal-Wallis statistic (H') = 52.39

Non-Parametric ANOVA

Constituent: Boron, Total (mg/L) Analysis Run 11/17/2020 9:56 AM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020

	MW-DP3 (bg)	MW-75 (bg)	MW-16-6 (bg)	MW-91-2 (bg)
9/15/2015	0.8			
9/16/2015		0.26		
11/4/2015	0.7		5.31	
11/5/2015		0.21		
3/8/2016	0.61	0.21		
3/17/2016			4.3	
6/14/2016	0.61			
6/15/2016		0.17		
6/22/2016			4.69	
8/2/2016	0.57	0.23		
8/5/2016			4.63	
10/26/2016	0.63			
10/31/2016		0.21		
11/1/2016			5.4	
2/13/2017		0.18		
2/15/2017	0.67		4.49	
5/1/2017			3.98	
5/2/2017	0.6	0.2		
6/13/2017	0.55	0.18		
6/15/2017			3.98	
7/26/2017			4.7	
10/16/2017	0.61	0.23	5.76	
1/18/2018				0.41
2/14/2018				0.44
4/23/2018				0.41
5/17/2018				0.45
6/6/2018		0.22	4.3	
6/7/2018	0.63			
6/12/2018				0.41
7/18/2018				0.37
8/13/2018				0.37
9/13/2018				0.4
10/16/2018		0.21	4.6	0.39
10/18/2018	0.62			
6/5/2019	0.62			
6/6/2019		0.2	3.9	
9/13/2019				0.38
10/9/2019	0.53			
10/14/2019		0.2	5.2	0.35
4/7/2020	0.64	0.2		0.24
4/8/2020			4.8	

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Non-Parametric ANOVA

Constituent: Calcium, Total Analysis Run 11/17/2020 9:56 AM
Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020

For observations made between 9/15/2015 and 4/8/2020, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 48.71

Tabulated Chi-Squared value = 7.815 with 3 degrees of freedom at the 5% significance level.

There were 10 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 48.65
Adjusted Kruskal-Wallis statistic (H') = 48.71

Non-Parametric ANOVA

Constituent: Calcium, Total (mg/L) Analysis Run 11/17/2020 9:56 AM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020

	MW-DP3 (bg)	MW-75 (bg)	MW-16-6 (bg)	MW-91-2 (bg)
9/15/2015	295			
9/16/2015		9		
11/4/2015	279		550	
11/5/2015		6		
3/8/2016	253	6.3		
3/17/2016			492	
6/14/2016	241			
6/15/2016		6.2		
6/22/2016			505	
8/2/2016	237	5.8		
8/5/2016			505	
10/26/2016	249			
10/31/2016		5.6		
11/1/2016			540	
2/13/2017		6		
2/15/2017	250		570	
5/1/2017			490	
5/2/2017	245	4.9		
6/13/2017	261	5.4		
6/15/2017			505	
7/26/2017			550	
10/16/2017	246	4.9	545	
1/18/2018				289
2/14/2018				284
4/23/2018				261
5/17/2018				281
6/6/2018		4.9	480	
6/7/2018	230			
6/12/2018				280
7/18/2018				250
8/13/2018				250
9/13/2018				250
10/16/2018		5.1	500	250
10/18/2018	220			
6/5/2019	260			
6/6/2019		5.3	500	
9/13/2019				270
10/9/2019	210			
10/14/2019		5.3	530	240
4/7/2020	240	4.7		160
4/8/2020			540	

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Parametric ANOVA

Constituent: Chloride Analysis Run 11/17/2020 9:56 AM
Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020

For observations made between 9/15/2015 and 4/8/2020 the parametric analysis of variance test (after square root transformation) indicates VARIATION at the 5% significance level. Because the calculated F statistic is greater than the tabulated F statistic, the hypothesis of a single homogeneous population is rejected.

Calculated F statistic = 717.4

Tabulated F statistic = 2.788 with 3 and 53 degrees of freedom at the 5% significance level.

ONE-WAY PARAMETRIC ANOVA TABLE

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Groups	185	3	61.68	717.4
Error Within Groups	4.556	53	0.08597	
Total	189.6	56		

The Shapiro Francia normality test on the residuals passed after square root transformation. Alpha = 0.05, calculated = 0.9621, critical = 0.961. Levene's Equality of Variance test passed. Calculated = 1.254, tabulated = 2.788.

Parametric ANOVA

Constituent: Chloride (mg/L) Analysis Run 11/17/2020 9:56 AM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020

	MW-16-6 (bg)	MW-75 (bg)	MW-DP3 (bg)	MW-91-2 (bg)
9/15/2015			13.6	
9/16/2015		2.2		
11/4/2015	42.4		19.8	
11/5/2015		1.9		
3/8/2016		1.9	11.7	
3/17/2016	40.8			
6/14/2016			9.7	
6/15/2016		1.5		
6/22/2016	35.5			
8/2/2016		1.2	8.6	
8/5/2016	35.1			
10/26/2016			9.3	
10/31/2016		1.5		
11/1/2016	41.9			
2/13/2017		1.3		
2/15/2017	41.8		13.1	
5/1/2017	42.1			
5/2/2017		1.5	13.3	
6/13/2017		1.8	11.1	
6/15/2017	42.2			
7/26/2017	44.6			
10/16/2017	43.7	1.1	10.6	
1/18/2018				14.5
2/14/2018				16.8
4/23/2018				16.5
5/17/2018				15.6
6/6/2018	38	<3		
6/7/2018			12	
6/12/2018				14
7/18/2018				16
8/13/2018				15
9/13/2018				15
10/16/2018	35	<3		14
10/18/2018			13	
6/5/2019			13	
6/6/2019	37	<3		
9/13/2019				15
10/9/2019			<15	
10/14/2019	45	1.1		13
4/7/2020		<3	13	11
4/8/2020	35 (H)			

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Non-Parametric ANOVA

Constituent: Fluoride Analysis Run 11/17/2020 9:56 AM
Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020

For observations made between 9/15/2015 and 4/8/2020, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 34.72

Tabulated Chi-Squared value = 7.815 with 3 degrees of freedom at the 5% significance level.

There were 7 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 30.54
Adjusted Kruskal-Wallis statistic (H') = 34.72

Non-Parametric ANOVA

Constituent: Fluoride (mg/L) Analysis Run 11/17/2020 9:56 AM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020

	MW-DP3 (bg)	MW-75 (bg)	MW-16-6 (bg)	MW-91-2 (bg)
9/15/2015	0.11			
9/16/2015		0.45		
11/4/2015	0.13		<0.1	
11/5/2015		0.45		
3/8/2016	0.11	0.49		
3/17/2016			<0.1	
6/14/2016	0.11			
6/15/2016		0.52		
6/22/2016			<0.1	
8/2/2016	0.11	0.48		
8/5/2016			<0.1	
10/26/2016	0.12			
10/31/2016		0.48		
11/1/2016			<0.1	
2/13/2017		0.55		
2/15/2017	0.13		<0.1	
5/1/2017			<0.1	
5/2/2017	0.13	0.48		
6/13/2017	0.12	0.47		
6/15/2017			<0.1	
7/26/2017			<0.1	
10/16/2017	<0.1	0.5	<0.1	
1/18/2018				<0.1
2/14/2018				<0.1
4/23/2018				<0.1
5/17/2018				<0.1
6/6/2018		<0.5	0.81 (H)	
6/7/2018	<0.5			
6/12/2018				<0.5
7/18/2018				<0.1
8/13/2018				<0.1
9/13/2018				<0.1
10/16/2018		0.45	<0.1	<0.1
10/18/2018	<0.1			
6/5/2019	<0.1			
6/6/2019		0.56	<0.1	
9/13/2019				<0.1 (D)
10/9/2019	<0.1 (D)			
10/14/2019		0.46 (D)	<0.1 (D)	<0.1 (D)
4/7/2020	0.11	0.45		0.11
4/8/2020			<0.1	

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Non-Parametric ANOVA

Constituent: pH, Field-Measured Analysis Run 11/17/2020 9:56 AM
Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020

For observations made between 9/15/2015 and 4/8/2020, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 49.78

Tabulated Chi-Squared value = 7.815 with 3 degrees of freedom at the 5% significance level.

There were 10 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 49.76
Adjusted Kruskal-Wallis statistic (H') = 49.78

Non-Parametric ANOVA

Constituent: pH, Field-Measured (pH_units) Analysis Run 11/17/2020 9:56 AM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020

	MW-DP3 (bg)	MW-75 (bg)	MW-16-6 (bg)	MW-91-2 (bg)
9/15/2015	6.26			
9/16/2015		7.98		
11/4/2015	6.28		5.71	
11/5/2015		7.93		
3/8/2016	6.35	8.12		
3/17/2016			5.76	
6/14/2016	6.19			
6/15/2016		8.04		
6/22/2016			5.72	
8/2/2016	6.28	8.07		
8/5/2016			5.69	
10/26/2016	6.38			
10/31/2016		8.1		
11/1/2016			5.67	
2/13/2017		8.18		
2/15/2017	6.4		5.68	
5/1/2017			5.77	
5/2/2017	6.45	8.16		
6/13/2017	6.36	8.15		
6/15/2017			5.75	
7/26/2017			5.77	
10/16/2017	6.31	8.07	5.73	
1/18/2018				6.16
2/14/2018				6.23
4/23/2018				6.43
5/17/2018				6.05
6/6/2018		8.19	5.76	
6/7/2018	6.37			
6/12/2018				6.18
7/18/2018				6.13
8/13/2018				6.22
9/13/2018				6.18
10/16/2018		8.23	5.83	6.21
10/18/2018	6.31			
6/5/2019	6.22 (Y)			
6/6/2019		8.12 (Y)	5.68 (Y)	
9/13/2019				6.11
10/9/2019	6.4			
10/14/2019		8.22	5.94	6.15
4/7/2020	6.33	8.11		6.52
4/8/2020			5.78	

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Non-Parametric ANOVA

Constituent: Sulfate Analysis Run 11/17/2020 9:56 AM
Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020

For observations made between 9/15/2015 and 4/8/2020, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 50.38

Tabulated Chi-Squared value = 7.815 with 3 degrees of freedom at the 5% significance level.

There were 4 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 50.29
Adjusted Kruskal-Wallis statistic (H') = 50.38

Non-Parametric ANOVA

Constituent: Sulfate (mg/L) Analysis Run 11/17/2020 9:56 AM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020

	MW-DP3 (bg)	MW-75 (bg)	MW-16-6 (bg)	MW-91-2 (bg)
9/15/2015	1270			
9/16/2015		80.1		
11/4/2015	1260		3460	
11/5/2015		69.9		
3/8/2016	1340	79.6		
3/17/2016			3390	
6/14/2016	1320			
6/15/2016		68.7		
6/22/2016			4250	
8/2/2016	1230	74.2		
8/5/2016			3860	
10/26/2016	1290			
10/31/2016		72.8		
11/1/2016			3380	
2/13/2017		74.1		
2/15/2017	1140		3870	
5/1/2017			2940	
5/2/2017	1050	70.8		
6/13/2017	1090	75.1		
6/15/2017			3360	
7/26/2017			3810	
10/16/2017	1080	56.5	3350	
1/18/2018				1180
2/14/2018				1010
4/23/2018				985
5/17/2018				938
6/6/2018		73	3600	
6/7/2018	1200			
6/12/2018				1100
7/18/2018				1100
8/13/2018				1200
9/13/2018				1100
10/16/2018		75	3800	1100
10/18/2018	1200			
6/5/2019	1200			
6/6/2019		72	3600	
9/13/2019				1100
10/9/2019	1200			
10/14/2019		71	3900	920
4/7/2020	1200	73		510
4/8/2020			3400	

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Non-Parametric ANOVA

Constituent: Total Dissolved Solids Analysis Run 11/17/2020 9:56 AM
Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020

For observations made between 9/15/2015 and 4/8/2020, the non-parametric analysis of variance test indicates a DIFFERENCE between the medians of the groups tested at the 5% significance level. Because the calculated Kruskal-Wallis statistic is greater than the Chi-squared value, we conclude that at least one group has a significantly different median concentration of this constituent when compared to another group.

Calculated Kruskal-Wallis statistic = 48.62

Tabulated Chi-Squared value = 7.815 with 3 degrees of freedom at the 5% significance level.

There were 9 groups of ties in the data, consequently the Kruskal-Wallis statistic (H) was adjusted. The adjusted statistic (H') was utilized to determine if the medians were equal.
Kruskal-Wallis statistic (H) = 48.59
Adjusted Kruskal-Wallis statistic (H') = 48.62

Non-Parametric ANOVA

Constituent: Total Dissolved Solids (mg/L) Analysis Run 11/17/2020 9:56 AM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020

	MW-DP3 (bg)	MW-75 (bg)	MW-16-6 (bg)	MW-91-2 (bg)
9/15/2015	2350			
9/16/2015		841		
11/4/2015	2350		5600	
11/5/2015		857		
3/8/2016	2310	820		
3/17/2016			5680	
6/14/2016	2260			
6/15/2016		823		
6/22/2016			5500	
8/2/2016	2330	849		
8/5/2016			5540	
10/26/2016	2210			
10/31/2016		811		
11/1/2016			5370	
2/13/2017		837		
2/15/2017	2170		5650	
5/1/2017			5600	
5/2/2017	2240	811		
6/13/2017	2260	870		
6/15/2017			5600	
7/26/2017			5920	
10/16/2017	2100	2630	5810	
1/18/2018				1900
2/14/2018				1890
4/23/2018				1810
5/17/2018				1950
6/6/2018		840	5900	
6/7/2018	2300			
6/12/2018				2000
7/18/2018				2000
8/13/2018				1900
9/13/2018				960
10/16/2018		900	6100	1900
10/18/2018	2300			
6/5/2019	2200			
6/6/2019		810	5900	
9/13/2019				2000
10/9/2019	2200			
10/14/2019		880	6400	1700
4/7/2020	2400	860		1100
4/8/2020			6000	

APPENDIX C-4

Annual Groundwater Report – 2019

REPORT

Annual Groundwater Report – 2019

Great River Energy – Coal Creek Station

Submitted to:

Great River Energy

Coal Creek Station, 2875 Third Street SW, Underwood, North Dakota 58576

Submitted by:

Golder Associates Inc.

7245 West Alaska Drive, Suite 200, Lakewood, Colorado 80226

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19115185D

January 29, 2020



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FIGURES

Figure 1: Monitoring Well Locations – June (Q2) 2019 Groundwater Conditions
Figure 2: Monitoring Well Locations – October (Q4) 2019 Groundwater Conditions

1.0 REPORT SUMMARY

This report presents the results from groundwater monitoring events that occurred at Great River Energy's Coal Creek Station in 2019 to meet the requirements of the Coal Combustion Residuals (CCR) rule (40 Code of Federal Regulations 257.90 through 257.98). The facilities entered 2019 under a detection monitoring program and remain in a detection monitoring program at the conclusion of 2019. The following items of statistical significance were identified in 2019 for the comparative statistical analysis of the fourth quarter (Q4) 2018 and second quarter (Q2) 2019 detection monitoring events:

- Verified Statistically Significant Increases (SSIs): No verified SSIs were identified during either the Q4 2018 or Q2 2019 detection monitoring events.
- Potential Exceedances and False-Positives:
  - The potential exceedance identified in Q2 2018 for fluoride at MW-16-6 was found to be a false-positive through confirmatory re-sampling during the Q4 2018 sampling event.
  - Four potential exceedances were identified in Q4 2018: fluoride at MW-DP5 and MW-42 and total dissolved solids (TDS) at MW-49 and MW-16-2. All four potential exceedances were determined to be false-positives through confirmatory re-sampling during the Q2 2019 sampling event.
  - Seven potential exceedances were identified in Q2 2019: chloride at MW-DP4, MW-49, MW-16-1, MW-42, and MW-72, TDS at MW-16-6, and sulfate at MW-16-1. Three of the seven potential exceedances identified were associated with upgradient wells. Confirmatory re-sampling for these samples will be completed following comparative statistical analysis for the Q4 2019 sampling event.

As described in the Coal Combustion Residuals Groundwater Monitoring System Certification, Revision 1 (Golder 2019a) and the Coal Combustion Residuals Groundwater Monitoring Statistical Methods Certification, Revision 1 (Golder 2019b), the groundwater monitoring and analytical procedures meet the general requirements of the CCR rule, and modifications to the monitoring networks and sampling program are not recommended at this time.

2.0 INTRODUCTION

Golder Associates, Inc. (Golder) has prepared this report of the 2019 groundwater sampling and comparative statistical analysis for Great River Energy's (GRE) Coal Creek Station (CCS) to meet the requirements of the Coal Combustion Residuals (CCR) rule's sections on groundwater monitoring and corrective action, 40 Code of Federal Regulations (CFR) 257.90 through 257.98.

2.1 Purpose

The CCR rule established specific requirements for reporting of actions related to groundwater monitoring and corrective actions in 40 CFR 257.90. In accordance with part (e) of 40 CFR 257.90, owners and operators of CCR units must prepare an annual groundwater monitoring and corrective action report.

2.2 Site Background

GRE's Coal Creek Station is a coal-fired electric generation facility located in McLean County, North Dakota, approximately 10 miles northwest of Washburn, North Dakota. CCRs are managed in composite-lined surface water impoundment cells and dry waste facilities regulated and permitted by the North Dakota Department of Environmental Quality (NDDEQ) in accordance with North Dakota Administrative Code Article 33-20, Solid Waste Management and Land Protection.

Coal Creek Station has four CCR facilities that are within the purview of the United States Environmental Protection Agency (USEPA) CCR rule:

- Drains Pond System CCR Surface Impoundment (Drains Pond System)
- Upstream Raise 91 CCR Surface Impoundment (Upstream Raise 91)
- Upstream Raise 92 CCR Surface Impoundment (Upstream Raise 92)
- Southeast Section 16 CCR Landfill (Southeast 16)

Each CCR facility is monitored by a separate monitoring network, in accordance with Revision 1 to the Coal Combustion Residuals Groundwater Monitoring System Certification (Golder 2019a). Locations of the facilities, groundwater monitoring network units, and groundwater monitoring wells are shown in Figure 1 and Figure 2.

3.0 GROUNDWATER MONTIORING NETWORK PROGRAM STATUS

The CCR groundwater monitoring system at CCS consists of 23 monitoring locations (eight upgradient and fifteen downgradient wells). The monitoring locations are shown in Figure 1 and 2 and listed in Table 1. Additional information on the groundwater monitoring system can be found in the Coal Combustion Residuals Groundwater Monitoring System Certification, Revision 1 (Golder 2019a). Each CCR facility is part of a monitoring network consisting of at least one upgradient and three downgradient monitoring wells.

- The Drains Pond System has two upgradient and four downgradient monitoring wells
- Upstream Raise 91 has two upgradient and three downgradient monitoring wells
- Upstream Raise 92 has two upgradient and three downgradient monitoring wells
- Southeast 16 has two upgradient and five downgradient monitoring wells

3.1 Completed Key Actions in 2019

The following key actions were completed in 2019:

- The 2018 annual CCR groundwater monitoring and corrective action report was completed and placed within the operating record and on the publicly accessible CCR website (Golder 2019c).
- Revision 1 of the Coal Combustion Residuals Groundwater Monitoring System Certification (Golder 2019a) was placed within the operating record and on the publicly accessible CCR website.
- Revision 1 of the Coal Combustion Residuals Groundwater Monitoring Statistical Methods Certification (Golder 2019b) was placed within the operating record and on the publicly accessible CCR website.
- Detection monitoring samples were collected in June (Q2) and October (Q4) 2019 at the majority of program wells and analyzed for the Appendix III constituent list associated with the CCR rule. Additionally, samples were collected from program wells for the Appendix IV constituent list associated with the CCR rule for additional baseline data.
- Comparative statistical analysis was completed for the Q4 2018 and Q2 2019 detection monitoring samples which were collected in October 2018 and June 2019, respectively, within 90 days of receipt of the final analytical results.

- Baseline statistical analysis was completed for the Appendix III constituents for MW-91-2, MW-91-1, and MW-16-0 following collection of a minimum of eight baseline samples during 2018.
- An additional Quarter 3 (Q3) 2019 sample was collected in September 2019 for Appendix III constituents as part of detection monitoring, as well as the Appendix IV constituent list for additional baseline data, for MW-91-1 and MW-91-2 (see Section 3.3 for further discussion).
- Six baseline samples were collected between June and December 2019 for well MW-DP2B, associated with the Drains Pond System, following well installation in November 2018. The December 2019 sampling analytical results have not yet been received at the time of this reporting and will be presented in the 2020 annual report. Baseline samples will continue to be collected at MW-DP2B through 2020, until a minimum of eight samples have been collected.

3.2 Installation and Decommissioning of Wells

No wells were installed or decommissioned from the CCR monitoring well networks in 2019.

3.3 Problems and Resolutions

As in 2018, no samples were able to be collected from MW-DP2 during 2019. Well MW-DP2 will continue to be monitored as part of the CCR monitoring program and samples will be collected when enough water is present within the well. Baseline samples continue to be collected at MW-DP2B (installed November 2018), which has been incorporated into the Drains Pond System monitoring program to adequately monitor the Drains Pond System.

On the laboratory reports for the Q2 2019 detection monitoring sampling event, Eurofins TestAmerica, the analytical laboratory contracted by GRE, noted that hold-time issues were encountered during analysis of chloride and sulfate. Discussions between GRE and Eurofins TestAmerica identified that the issues were primarily due to internal miscommunication at the laboratory. Each affected parameter-well pair is marked with an H qualifier on the associated results tables (Table 2 through Table 47). Further, for a subset of the analyzed samples from the Q2 2019 detection monitoring sampling event, TDS was detected in the associated method blank at a level exceeding the reporting limit. The associated sample results were not re-extracted and/or reanalyzed because the associated sample results were greater than 10 times the concentration found in the method blank. Each affected parameter-well pair is marked with a B qualifier on the associated tables (Table 2 through Table 47). The TDS values with B-qualified results are consistent with previous sampling results.

A potential issue was identified for MW-91-1 and MW-91-2 during the Q2 2019 sampling event, in which the sample bottles appear to have been switched due to a labeling error. An additional sample was collected from both MW-91-1 and MW-91-2 during Q3 2019 that confirmed a switch in samples had occurred during the Q2 2019 event. Analytical results for both the Q2 and Q3 2019 samples are shown on the sample results summary tables for informational purposes (Table 8 for MW-91-2 and Table 10 for MW-91-1), while comparative statistics have only been conducted on the Q3 results (Table 31 for MW-91-2 and Table 33 for MW-91-1).

3.4 Key Activities for 2020

The following key actions are anticipated to be completed in 2020:

- The 2019 annual CCR groundwater monitoring and corrective action report will be completed and placed within the operating record and on the publicly accessible CCR website.
- Prior to completing the comparative statistical analysis for the Q4 2019 detection monitoring sampling event, the baseline period used to establish the statistical limits for each well-parameter pair will be updated following the steps defined in Revision 1 of the Coal Combustion Residuals Groundwater Monitoring Statistical Methods Certification (Golder 2019b) and in accordance with recommendations found within the USEPA's Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance (USEPA 2009). Baseline periods will not be updated for well-parameter pairs where potential exceedances were identified for the Q2 2019 sampling event, as well as for locations where less than four samples have been collected since the end of their current baseline periods. Comparative statistical analysis for the Q4 2019 event will be conducted using the statistical limits from the updated baseline periods.
- Comparative statistics will be completed for the Q4 2019 detection monitoring samples within 90 days of receipt of the final analytical results.
- Detection monitoring sampling events will occur in Q2 and Q4 2020, and will consist of sampling, data review, and comparative statistics. Comparative statistics for both the Q2 2020 and Q4 2020 detection monitoring samples will be completed within 90 days of receipt of the final analytical results.
- Further baseline samples (to obtain a minimum of eight) will be collected for well MW-DP2B and will be analyzed for both the Appendix III and Appendix IV constituent list as indicated in the CCR rule.

4.0 GROUNDWATER MONITORING ANALYTICAL PROGRAM STATUS

Analytical activities associated with the groundwater monitoring program are described below.

4.1 Collected Samples

For most wells, detection monitoring samples were collected by GRE staff in June (Q2) 2019 and October (Q4) 2019. Precise dates vary between locations and can be found in Table 2 through Table 24. Six baseline samples were collected for MW-DP2B by GRE Staff between June 2019 and December 2019. Further, samples were collected for the Appendix IV constituent list for additional baseline data in Q2 2019 for wells within the CCR rule well networks. Additional samples were collected for Appendix III and Appendix IV constituents at MW-91-1 and MW-91-2 in September 2019. Results for the various samples collected throughout 2019 are summarized in Table 2 through Table 24.

Samples were collected using low-flow methodology with dedicated bladder pumps installed at each monitoring well. The sampling procedures and analytical testing methods were conducted in accordance with USEPA-accepted procedures.

4.1.1 Groundwater Elevation and Flow Rate

Depths to groundwater were measured in each well during each sampling event prior to purging. Groundwater elevations can be found in Table 2 through Table 24. Groundwater elevations and interpolated groundwater contours from the Q2 2019 detection monitoring event are shown on Figure 1. Groundwater elevations and interpolated groundwater contours form the Q4 2019 detection monitoring event are shown in Figure 2. Based on

both the Q2 (June) 2019 and Q4 (October) 2019 groundwater elevations and contours, the shallow groundwater at the CCR facilities generally follows surface topography, flowing to the east and north. The dates for groundwater information shown in the figures generally display site seasonal variability in groundwater levels between the spring/summer and fall/winter.

The groundwater flow rate across each facility was estimated with the equation $V_s = k \times i/n_e$, where:

- V_s is the groundwater flow rate, in feet per day (ft/day)
- k is the hydraulic conductivity, estimated from slug testing results from system wells, in ft/day
- i is the hydraulic gradient, calculated based on groundwater elevations for each monitoring event, in feet per feet (ft/ft)
- n_e is the effective porosity, estimated to be 0.1 for intact glacial till, which can vary from 0.06 to 0.16 and is reflective of site soils (Duffield 2007)

The range of groundwater flow rates calculated for each unit during the Q2 2019 and Q4 2019 detection monitoring sampling events are shown below. Groundwater flow rates are presented based on a range of measured hydraulic conductivity values for each unit, also shown below.

- Drains Pond (range of k values: 0.35 ft/day to 21.60 ft/day):
  - Q2 2019: 0.09 – 5.34 ft/day
  - Q4 2019: 0.08 – 5.27 ft/day
- Upstream Raise 91 (range of k values: 0.35 ft/day to 12.96 ft/day):
  - Q2 2019: 0.03 – 1.27 ft/day
  - Q4 2019: 0.03 – 1.14 ft/day
- Upstream Raise 92 (range of k values: 0.35 ft/day to 12.96 ft/day):
  - Q2 2019: 0.04 – 1.54 ft/day
  - Q4 2019: 0.04 – 1.56 ft/day
- Southeast 16 (range of k values: 1.51 ft/day to 2.59 ft/day):
  - Q2 2019: 0.02 – 0.04 ft/day
  - Q4 2019: 0.03 – 0.06 ft/day

4.2 Monitoring Data (Analytical Results)

Analytical results for samples collected in 2019 for monitoring wells within the networks are shown in Table 2 through Table 24.

4.3 Comparative Statistical Analysis

The comparative statistical analysis for the Q4 2018 and Q2 2019 detection monitoring events is summarized below, with the results presented in Table 25 through Table 47. Comparative statistical analysis for the Q4 2019 detection monitoring event will occur within 90 days of data review following receipt of the analytical data. Based on the timing of receipt of the analytical results for the Q4 2019 detection monitoring sample, comparative statistical analysis for the Q4 2019 event will be completed during the first quarter (Q1) of 2020. A full description of the steps taken for comparative statistical analyses can be found in of the Coal Combustion Residuals Groundwater Statistical Method Certification, Revision 1, Great River Energy – Coal Creek Station, available on the publicly accessible CCR website (Golder 2019b).

Comparative statistical analysis is conducted following each detection monitoring event, consisting of the Appendix III parameters (USEPA 2015). For both Shewhart-CUSUM limits and non-parametric prediction limits (NPPL), the comparative statistical analysis consists of a comparison of detection monitoring results collected during the period of interest (the compliance period) to the statistical limit calculated from the baseline period. For constituent-well pairs with increasing trends identified during the baseline period, an alternative trend test, such as that described by the Electric Power Research Institute (EPRI 2015) has been used to determine statistical significance. For constituent-well pairs with decreasing trends identified during the baseline period, a Sen's Slope trend test was used to assess the results. A detailed discussion of the methodology used for comparative statistical analysis is discussed in the Coal Combustion Residuals Groundwater Monitoring Statistical Methods Certification, Revision 1 (Golder 2019b).

4.3.1 Definitions

The following definitions will be used in discussion of the comparative statistical analysis:

- Elevated CUSUM – an elevated CUSUM occurs when the CUSUM is greater than the Shewhart-CUSUM limit established by the baseline statistical analysis, but the analytical result does not exceed the Shewhart-CUSUM limit. An elevated CUSUM is an indication that concentrations are gradually increasing and that analytical results may exceed the Shewhart-CUSUM limit in the future. For elevated CUSUMs in the case of two-tailed analysis (field-measured pH), the CUSUM value may also be below the lower Shewhart-CUSUM limit established by the baseline statistical analysis.
- Potential Exceedance – is defined as an initial elevated CUSUM or an initial analytical result that exceeds the Shewhart-CUSUM limit or non-parametric statistical limit established by the baseline statistical analysis. Confirmatory resampling will determine if the potential exceedance is a false-positive or a verified statistically significant increase (SSI). Non-detect results that exceed either the Shewhart-CUSUM limit or the non-parametric statistical limit are not considered potential exceedances.
- False-positive – is defined as an analytical result that exceeds the statistical limit that can clearly be attributed to laboratory error, changes in analytical precision, or is invalidated through confirmatory re-sampling. False-positives are not used in calculation of any subsequent CUSUMs.
- Confirmatory re-sampling – is designated as the next scheduled sampling event.
- Verified SSI – is interpreted as two consecutive exceedances (the original sample and the confirmatory re-sample for analytical results, or two consecutive elevated CUSUMs) for the same constituent at the same well.

4.3.2 Potential Exceedances

The following potential exceedances were identified during comparative statistical analysis for the Q4 2018 detection monitoring event:

- MW-DP5 (Upgradient, Drains Pond System) – Fluoride
- MW-49 (Downgradient, Upstream Raise 91) –TDS
- MW-42 (Upgradient, Southeast Section 16) – Fluoride
- MW-16-2 (Downgradient, Southeast Section 16) – TDS

Confirmatory re-sampling for these constituent-well pairs occurred during the Q2 2019 detection monitoring sampling event, with results discussed in the following sections.

The following potential exceedances were identified during comparative statistical analysis for the Q2 2019 detection monitoring event:

- MW-DP4 (Downgradient, Drains Pond System) – Chloride
- MW-49 (Downgradient, Upstream Raise 91) – Chloride Elevated CUSUM
- MW-16-6 (Upgradient, Upstream Raise 92) – TDS Elevated CUSUM
- MW-16-1 (Downgradient, Upstream Raise 92) – Sulfate Elevated CUSUM
- MW-16-1 (Downgradient, Upstream Raise 92) – Chloride Elevated CUSUM
- MW-42 (Upgradient, Southeast Section 16) – Chloride Elevated CUSUM
- MW-72 (Upgradient, Southeast Section 16) – Chloride

Confirmatory re-sampling for these constituent-well pairs occurred during the Q4 2019 detection monitoring event. Comparative statistics for the Q4 2019 detection monitoring event will be completed within 90 days of data review for the final analytical results.

4.3.3 False-Positives

The following false-positive was identified for the Q2 2018 detection monitoring event following confirmatory resampling during Q4 2018:

- MW-16-6 (Upgradient, Upstream Raise 92) – Fluoride

The following false-positives were identified for the Q4 2018 detection monitoring event following confirmatory re-sampling during Q2 2019:

- MW-DP5 (Upgradient, Drains Pond System) – Fluoride
- MW-49 (Downgradient, Upstream Raise 91) – TDS
- MW-42 (Upgradient, Southeast Section 16) – Fluoride
- MW-16-2 (Downgradient, Southeast Section 16) – TDS

4.3.4 Verified SSIs

No verified SSIs were identified during either the Q4 2018 or Q2 2019 detection monitoring events.

4.3.5 Trending Data

During establishment of baseline statistical periods, a few wells at the site were found to have trending data, preventing establishment of a statistical limit using data solely from the baseline sampling period. A description of the methods used for determining statistical significance at these wells follows.

4.3.5.1 Increasing Trends in Baseline Data

- MW-72 (Upgradient, Southeast Section 16 Facility), TDS: As an upgradient location, the facility was determined not to be the source of the increasing TDS trend at MW-72. For comparative statistics, an alternative trend test, namely that described in the EPRI guidance (2015), was used for both the Q4 2018 and Q2 2019 comparative statistics. The Q4 2018 and Q2 2019 detection monitoring data are not considered to be statistically significant. Following collection of further data, the TDS data for this location will be reassessed to determine if a baseline period can be established based on non-trending data.

4.3.5.2 Decreasing Trends in Baseline Data

- MW-91-2 (Upgradient, Upstream Raise 91), Calcium: A decreasing trend was identified during baseline statistical assessment for MW-91-2. No statistical limit was established at that time. With inclusion of the Q3 2019 result, the complete data set continues to have a statistically significant downward trend, based on Sen's Slope analysis. Following collection of further data, data for the well will be reassessed to determine if the trend continues to be present or if a baseline period can be set based on non-trending data.

5.0 PROGRAM TRANSITIONS

Beginning in Q4 2017, the groundwater monitoring programs at CCS transitioned from the baseline period to detection monitoring for the majority of program wells. During the baseline period, at least eight independent samples from each well within the program were collected and analyzed for the constituents listed in Appendix III and Appendix IV of the rule prior to October 17, 2017, as specified in 40 CFR 257.94(b). The first detection monitoring samples were collected in Q4 2017.

5.1 Detection Monitoring

The site is currently in detection monitoring. Samples for the detection monitoring program are collected on a semi-annual basis, beginning with the samples collected in Q4 2017. GRE plans to collect semi-annual samples for the detection monitoring program in Q2 and Q4 of 2020.

5.2 Assessment Monitoring

Results of the comparative statistical analysis through Q2 2019 at CCS do not trigger the need to implement assessment monitoring as described in 40 CFR 257.95. As such, no alternative source demonstrations have been made and there are no actions that are required as part of the assessment monitoring program.

5.3 Corrective Measures and Assessment

Results to date from the CCR groundwater monitoring program at CCS do not trigger the need to assess or implement corrective measures. Since the CCR groundwater monitoring program does not require corrective measures, an assessment of corrective measures, as described in 40 CFR 257.96, has not been initiated and no actions are required.

6.0 CLOSING

This report presents the analytical results from the Q2 2019 and Q4 2019 detection monitoring events of the CCR groundwater monitoring program at CCS. Comparative statistics for the Q4 2018 and Q2 2019 detection monitoring events are also included. Comparative statistics for the Q4 2019 detection monitoring event conducted in October 2019 will occur within 90 days of finalizing data review (during Q1 2020). The groundwater monitoring and analytical procedures implemented meet the requirements of the CCR rule and are consistent with the approach described in Revision 1 to the Groundwater Monitoring System Certification (Golder 2019a) and Revision 1 to the Groundwater Monitoring Statistical Methods Certification (Golder 2019b). Comparative statistics presented within this report support remaining in detection monitoring, and do not trigger assessment monitoring nor an assessment of corrective measures.

Signature Page

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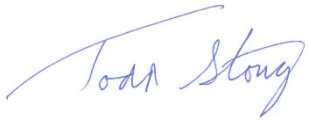

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Tables

Table 1: Monitoring Network Well Summary

Facility	Location	Well ID	Date Constructed	TOC Elevation (ft AMSL)	Ground Surface Elevation (ft AMSL)	Completion Depth (ft)	Drilled Depth (ft)	Screen Interval (ft bgs)	Top of Screen Elevation (ft AMSL)	Bottom of Screen Elevation (ft AMSL)	Sand Pack Interval (ft bgs)	Geologic Unit(s) Completed In
Drains Pond System	Upgradient	MW-DP3	4/3/2015	1,932.7	1,929.6	19.0	21.0	9.0-19.0	1,920.6	1,910.6	6.0-19.0	fill, coal, clay
		MW-DP5 [1]	11/18/2015	1,939.2	1,935.0	--	--	18.0-43.0	1,919.0	1,892.0	16.0-43.0	sandy lean clay, clayey sand
	Downgradient	MW-DP1 [2]	6/10/2014	1,913.6	1,911.1	45.0	46.0	25.0-45.0	1,886.1	1,866.1	21.0-45.0	silt with sand, silty sand
		MW-DP2	4/3/2015	1,898.1	1,894.9	17.0	18.0	7.0-17.0	1,887.9	1,877.9	5.0-17.0	sandy lean clay, clay sand
		MW-DP2B [3]	11/20/2018	1,898.6	1,895.6			12.0-22.0	1,883.6	1,873.6	10.0-22.0	sandy lean clay, sand with silt/gravel, silty sand
		MW-DP4	4/3/2015	1,917.4	1,914.2	29.0	31.0	19.0-29.0	1,895.2	1,885.2	17.0-29.0	sandy clay, sand with silt/gravel, clay, clayey sand
Upstream Raise 91	Upgradient	MW-75	7/19/1989	1,941.4	1,938.9	40.0	40.5	30.0-40.0	1,908.9	1,898.9	27.7-40	clayey silt, silty sand
		MW-91-2	11/6/2017	1,938.5	1,938.7	31.0	31.0	21.0-31.0	1,917.7	1,907.7	19.0-31.0	fat clay, coal
	Downgradient	MW-49	5/20/1988	1,905.9	1,903.6	19.9	25.0	9.85-19.85	1,893.8	1,883.8	4.85-19.85	sandy gravelly clay, sandy silt, shale (rock)
		MW-51	5/20/1988	1,896.9	1,895.5	18.8	20.0	8.8-18.8	1,886.7	1,876.7	3.8-18.8	sand with silt and gravel
		MW-91-1	11/6/2017	1,905.1	1,902.0	26.0	26.0	16.0-26.0	1,886.0	1,876.0	14.0-26.0	sand with silt and gravel, fat clay
Upstream Raise 92	Upgradient	MW-16-6	7/14/2015	1,917.2	1,913.9	13.0	16.0	4.0-14.0	1,909.9	1,899.9	3.0-14.0	sandy lean clay, coal, lean clay
		MW-16-7	7/14/2015	1,889.1	1,886.6	32.0	33.0	22.0-32.0	1,864.6	1,854.6	20.0-32.0	fat clay, clayey sand, sandy clay
	Downgradient	MW-10	11/2/1979	1,895.2	1,892.2	25.0	29.0	15-25	1,877.2	1,867.2	13-25	sand
		MW-16-0	12/8/2017	1,883.4	1,880.4	9.5	9.5	4.5-9.5	1,875.9	1,870.9	2.5-9.5	lean clay with sand
		MW-16-1	10/31/2007	1,879.5	1,876.1	11.5	16.0	6.5-11.5	1,869.6	1,864.6	4.5-11.5	silty sand
Southeast Section 16 Facility	Upgradient	MW-42	5/28/1986	1,881.6	1,878.8	14.4	21.5	9.4-14.4	1,869.4	1,864.4	9-14.4	silty sand, lean clay
		MW-72	7/18/1989	1,884.6	1,882.4	23.0	24.0	7.5-17.5	1,874.9	1,864.9	6.5-23.0	silty clay, silty sand
	Downgradient	MW-15	11/7/1979	1,877.3	1,874.3	20.0	38.0	10-20	1,864.3	1,854.3	9-20	sand, clay till
		MW-16-2	10/31/2007	1,880.6	1,877.8	12.0	16.0	7-12	1,870.8	1,865.8	5-12	sandy lean clay
		MW-16-3	10/31/2007	1,878.5	1,875.6	12.0	16.0	7-12	1,868.6	1,863.6	5-12	sandy lean clay
		MW-16-4	10/31/2007	1,877.5	1,874.6	17.0	16.0	7-17	1,867.6	1,857.6	5-17	sandy lean clay
		MW-16-5	10/31/2007	1,880.2	1,877.1	11.5	16.0	6.5-11.5	1,870.6	1,865.6	4.5-11.5	sand with silt and gravel

Notes:
TOC: top of casing
ft AMSL: feet above mean sea level
ft bgs: feet below ground surface
1. For MW-DP5, the ground surface elevation is taken from the original borehole log, but is inconsistent with the available survey for the top of casing.
2. For MW-DP1 only the top of casing elevation was provided. The PVC riser is assumed to be 2.5 ft above ground surface.
3. For MW-DP2B only the top of casing elevation was provided. The PVC riser is assumed to be 3.0 ft above ground surface.
Well construction measurements are from the original borehole log, well data sheet, or well construction form.
For some wells, elevations have been updated with more recent survey information than the original driller's logs.

Table 2: Sample Results Summary Table - MW-DP3

		MW-DP3		
		Additional Baseline Data	Detection Monitoring	
	Units	5-Jun-19	5-Jun-19	9-Oct-19
Water Elevation	ft AMSL	1925.5	1925.5	1925.0
Appendix III Parameters				
Boron	mg/L	---	0.62	0.53
Calcium	mg/L	---	260	210
Chloride	mg/L	---	13	< 15 U
Fluoride	mg/L	---	< 0.10 U	< 0.10 U
pH, Field	s.u.	---	6.22	6.40
Sulfate	mg/L	---	1200	1200
Total Dissolved Solids	mg/L	---	2200	2200
Appendix IV Parameters				
Antimony	mg/L	< 0.0020 U	---	---
Arsenic	mg/L	< 0.0050 U	---	---
Barium	mg/L	0.045	---	---
Beryllium	mg/L	< 0.0050 U ^	---	---
Cadmium	mg/L	< 0.0010 U	---	---
Chromium	mg/L	< 0.0020 U	---	---
Cobalt	mg/L	0.0021	---	---
Fluoride	mg/L	< 0.10 U	---	---
Lead	mg/L	< 0.0010 U	---	---
Lithium	mg/L	0.16	---	---
Mercury	mg/L	< 0.0002 U	---	---
Molybdenum	mg/L	< 0.0020 U	---	---
Radium 226	pCi/L	0.468 ± 0.146	---	---
Radium 228	pCi/L	0.958 ± 0.391	---	---
Radium 226 and 228 combined	pCi/L	1.43 ± 0.405	---	---
Selenium	mg/L	< 0.0050 U	---	---
Thallium	mg/L	< 0.0010 U	---	---

Legend:
--, not analyzed
ft AMSL, feet above mean sea level
mg/L, milligrams per liter
s.u., standard units for pH
pCi/L, picocuries per liter

Notes:
Non-detects have been listed at the reported practical quantitation limit.
Metal results represent the total concentration (i.e. samples have not been filtered).

Laboratory Provided Qualifiers:
U = Not detected above the shown practical quantitation limit
^ = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC is outside acceptance limits.

Table 3: Sample Results Summary Table - MW-DP5

		MW-DP5		
		Additional Baseline Data	Detection Monitoring	
	Units	5-Jun-19	5-Jun-19	9-Oct-19
Water Elevation	ft AMSL	1912.2	1912.2	1914.0
Appendix III Parameters				
Boron	mg/L	---	< 0.10 U	0.11
Calcium	mg/L	---	280	270
Chloride	mg/L	---	69	66
Fluoride	mg/L	---	0.19	0.16
pH, Field	s.u.	---	7.06	7.16
Sulfate	mg/L	---	3400	3300
Total Dissolved Solids	mg/L	---	5300	5200
Appendix IV Parameters				
Antimony	mg/L	< 0.0020 U	---	---
Arsenic	mg/L	< 0.0050 U	---	---
Barium	mg/L	0.010	---	---
Beryllium	mg/L	< 0.0050 U ^	---	---
Cadmium	mg/L	< 0.0010 U	---	---
Chromium	mg/L	< 0.0020 U	---	---
Cobalt	mg/L	< 0.0010 U	---	---
Fluoride	mg/L	0.19	---	---
Lead	mg/L	< 0.0010 U	---	---
Lithium	mg/L	0.47	---	---
Mercury	mg/L	< 0.0002 U	---	---
Molybdenum	mg/L	< 0.0020 U	---	---
Radium 226	pCi/L	0.0714 U ± 0.0762	---	---
Radium 228	pCi/L	0.477 ± 0.271	---	---
Radium 226 and 228 combined	pCi/L	0.549 ± 0.282	---	---
Selenium	mg/L	0.23	---	---
Thallium	mg/L	< 0.0010 U	---	---

Legend:

--, not analyzed

ft AMSL, feet above mean sea level

mg/L, milligrams per liter

s.u., standard units for pH

pCi/L, picocuries per liter

Notes:

Non-detects have been listed at the reported practical quantitation limit.

Metal results represent the total concentration (i.e. samples have not been filtered).

Laboratory Provided Qualifiers:

U = Not detected above the shown practical quantitation limit

U (Radiochem) = Result is less than the sample detection limit (varies by sample)

^ = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC is outside acceptance limits.

Table 4: Sample Results Summary Table - MW-DP1

		MW-DP1		
		Additional Baseline Data	Detection Monitoring	
	Units	5-Jun-19	5-Jun-19	14-Oct-19
Water Elevation	ft AMSL	1883.6	1883.6	1883.7
Appendix III Parameters				
Boron	mg/L	---	0.73	0.71
Calcium	mg/L	---	62	51
Chloride	mg/L	---	4.7	1.6
Fluoride	mg/L	---	0.27	0.25
pH, Field	s.u.	---	7.33	7.47
Sulfate	mg/L	---	550	470
Total Dissolved Solids	mg/L	---	1400	1300
Appendix IV Parameters				
Antimony	mg/L	< 0.0020 U	---	---
Arsenic	mg/L	< 0.0050 U	---	---
Barium	mg/L	0.019	---	---
Beryllium	mg/L	< 0.0050 U ^	---	---
Cadmium	mg/L	< 0.0010 U	---	---
Chromium	mg/L	< 0.0020 U	---	---
Cobalt	mg/L	< 0.0010 U	---	---
Fluoride	mg/L	0.27	---	---
Lead	mg/L	< 0.0010 U	---	---
Lithium	mg/L	0.14	---	---
Mercury	mg/L	< 0.0002 U	---	---
Molybdenum	mg/L	< 0.0020 U	---	---
Radium 226	pCi/L	0.206 ± 0.110	---	---
Radium 228	pCi/L	0.334 U ± 0.325	---	---
Radium 226 and 228 combined	pCi/L	0.540 ± 0.343	---	---
Selenium	mg/L	< 0.0050 U	---	---
Thallium	mg/L	< 0.0010 U	---	---

Legend:

--, not analyzed

ft AMSL, feet above mean sea level

mg/L, milligrams per liter

s.u., standard units for pH

pCi/L, picocuries per liter

Notes:

Non-detects have been listed at the reported practical quantitation limit.

Metal results represent the total concentration (i.e. samples have not been filtered).

Laboratory Provided Qualifiers:

U = Not detected above the shown practical quantitation limit

U (Radiochem) = Result is less than the sample detection limit (varies by sample)

^ = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC is outside acceptance limits.

Table 5: Sample Results Summary Table - MW-DP2

		MW-DP2	
		Detection Monitoring	
	Units	**6-Jun-19**	**14-Oct-19**
Water Elevation	ft AMSL	***	***
Appendix III Parameters			
Boron	mg/L	---	---
Calcium	mg/L	---	---
Chloride	mg/L	---	---
Fluoride	mg/L	---	---
pH, Field	s.u.	---	---
Sulfate	mg/L	---	---
Total Dissolved Solids	mg/L	---	---
Appendix IV Parameters			
Antimony	mg/L	---	---
Arsenic	mg/L	---	---
Barium	mg/L	---	---
Beryllium	mg/L	---	---
Cadmium	mg/L	---	---
Chromium	mg/L	---	---
Cobalt	mg/L	---	---
Fluoride	mg/L	---	---
Lead	mg/L	---	---
Lithium	mg/L	---	---
Mercury	mg/L	---	---
Molybdenum	mg/L	---	---
Radium 226	pCi/L	---	---
Radium 228	pCi/L	---	---
Radium 226 and 228 combined	pCi/L	---	---
Selenium	mg/L	---	---
Thallium	mg/L	---	---

Legend:

--, not analyzed

ft AMSL, feet above mean sea level

mg/L, milligrams per liter

s.u., standard units for pH

pCi/L, picocuries per liter

Notes:

*** - Samples were not collected at MW-DP2 in 2018 or 2019 because the well was dry.

Table 6: Sample Results Summary Table - MW-DP2B

		MW-DP2B					
		Baseline Period					
	Units	**12-Jun-19**	**29-Jul-19**	**28-Aug-19**	**9-Oct-19**	**20-Nov-19**	**18-Dec-19**
Water Elevation	ft AMSL	1880.2	1879.7	1879.6	1880.4	1880.6	1880.6
Appendix III Parameters							
Boron	mg/L	2.2 F1	2.2	2.1	2.3	2.6	***
Calcium	mg/L	260	250	250	240	260	***
Chloride	mg/L	71 H	70	67	67	61	***
Fluoride	mg/L	0.87	0.88	0.79	0.78	0.84	***
pH, Field	s.u.	6.90	6.93	6.86	6.87	6.91	6.83
Sulfate	mg/L	2100 H	2000	2000	2000	1900	***
Total Dissolved Solids	mg/L	3600	3800 H	3800	3500	3700 E	***
Appendix IV Parameters							
Antimony	mg/L	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	< 0.0020 U	***
Arsenic	mg/L	< 0.0050 U	< 0.0020 U	< 0.0050 U	< 0.0050 U	< 0.0050 U	***
Barium	mg/L	0.042	0.026	0.027	0.027	0.027	***
Beryllium	mg/L	< 0.0050 U	< 0.0020 U	< 0.0010 U	< 0.0010 U	< 0.0010 U ^	***
Cadmium	mg/L	< 0.0050 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	***
Chromium	mg/L	< 0.0020 U	0.0042	< 0.0020 U	< 0.0020 U	< 0.0020 U	***
Cobalt	mg/L	0.0043	0.0033	0.0037	0.0036	0.0034	***
Fluoride	mg/L	0.87	0.88	0.79	0.78	0.84	***
Lead	mg/L	< 0.0010 U	< 0.0020 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	***
Lithium	mg/L	0.27	0.28	0.26	0.26 ^	0.28	***
Mercury	mg/L	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	***
Molybdenum	mg/L	0.0035	0.0021	< 0.0020	0.0021	0.0023	***
Radium 226	pCi/L	-0.0916 U ± 0.179	-0.0322 U ± 0.144	0.0480 U ± 0.0852	0.0327 U ± 0.0725	0.0628 U ± 0.0593	***
Radium 228	pCi/L	0.0700 U F ± 0.233	0.128 U ± 0.195	0.338 U ± 0.296	0.0173 U ± 0.303	0.442 U ± 0.312	***
Radium 226 and 228 combined	pCi/L	-0.0216 U ± 0.294	0.0953 U ± 0.242	0.386 U ± 0.308	0.0500 U ± 0.312	0.505 ± 0.318	***
Selenium	mg/L	< 0.0050 U	< 0.0020 U	< 0.0050 U	< 0.0050 U	< 0.0050 U	***
Thallium	mg/L	< 0.0010 U	< 0.0020 U	< 0.0010 U	< 0.0010 U	< 0.0010 U	***

Legend:

--, not analyzed

ft AMSL, feet above mean sea level

mg/L, milligrams per liter

s.u., standard units for pH

pCi/L, picocuries per liter

Notes:

Non-detects have been listed at the reported practical quantitation limit.

Metal results represent the total concentration (i.e. samples have not been filtered).

*** To date, analytical results for the December 2019 sample have not yet been received, and will be presented in the 2020 annual report.

Laboratory Provided Qualifiers:

U = Not detected above the shown practical quantitation limit

F1 = MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

H = Sample was prepped or analyzed beyond the specified holding time.

E = Result exceeded calibration range. Analyte was re-analyzed out of hold time with similar analytical result.

U (Radiochem) = Result is less than the sample detection limit (varies by sample)

F (Radiochem) = MS/MSD Recovery and/or RPD exceeds the control limits.

^ = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC is outside acceptance limits.

Table 7: Sample Results Summary Table - MW-DP4

		MW-DP4		
		Additional Baseline Data	Detection Monitoring	
	Units	6-Jun-19	6-Jun-19	14-Oct-19
Water Elevation	ft AMSL	1894.6	1894.6	1898.7
Appendix III Parameters				
Boron	mg/L	---	0.48	0.66
Calcium	mg/L	---	220	210
Chloride	mg/L	---	74	30
Fluoride	mg/L	---	0.18	0.25
pH, Field	s.u.	---	7.07	7.21
Sulfate	mg/L	---	2400	2600
Total Dissolved Solids	mg/L	---	4100	4300
Appendix IV Parameters				
Antimony	mg/L	< 0.0020 U	---	---
Arsenic	mg/L	< 0.0050 U	---	---
Barium	mg/L	0.019	---	---
Beryllium	mg/L	< 0.0050 U ^	---	---
Cadmium	mg/L	< 0.0010 U	---	---
Chromium	mg/L	< 0.0020 U	---	---
Cobalt	mg/L	< 0.0010 U	---	---
Fluoride	mg/L	0.18	---	---
Lead	mg/L	< 0.0010 U	---	---
Lithium	mg/L	0.33	---	---
Mercury	mg/L	< 0.0002 U	---	---
Molybdenum	mg/L	< 0.0020 U	---	---
Radium 226	pCi/L	0.0288 U ± 0.105	---	---
Radium 228	pCi/L	0.251 U ± 0.244	---	---
Radium 226 and 228 combined	pCi/L	0.279 U ± 0.266	---	---
Selenium	mg/L	0.18	---	---
Thallium	mg/L	< 0.0010 U	---	---

Legend:

--, not analyzed

ft AMSL, feet above mean sea level

mg/L, milligrams per liter

s.u., standard units for pH

pCi/L, picocuries per liter

Notes:

Non-detects have been listed at the reported practical quantitation limit.

Metal results represent the total concentration (i.e. samples have not been filtered).

Laboratory Provided Qualifiers:

U = Not detected above the shown practical quantitation limit

U (Radiochem) = Result is less than the sample detection limit (varies by sample)

^ = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC is outside acceptance limits.

Table 8: Sample Results Summary Table - MW-91-2

		MW-91-2				
		Additional Baseline Data		Detection Monitoring		
	Units	6-Jun-19	13-Sep-19	6-Jun-19	13-Sep-19	14-Oct-19
Water Elevation	ft AMSL	1926.2	1923.7	1926.2	1923.7	1926.0
Appendix III Parameters						
Boron	mg/L	---	---	2.7	0.38	0.35
Calcium	mg/L	---	---	220	270	240
Chloride	mg/L	---	---	75	15	13
Fluoride	mg/L	---	---	0.26	< 0.10 U	< 0.10 U
pH, Field	s.u.	---	---	6.09	6.11	6.15
Sulfate	mg/L	---	---	1100	1100	920
Total Dissolved Solids	mg/L	---	---	2200	2000	1700
Appendix IV Parameters						
Antimony	mg/L	< 0.0020 U	< 0.0020 U	---	---	---
Arsenic	mg/L	< 0.0050 U	< 0.0050 U	---	---	---
Barium	mg/L	0.047	0.048	---	---	---
Beryllium	mg/L	< 0.0050 U ^	< 0.0010 U	---	---	---
Cadmium	mg/L	< 0.0010 U	< 0.0010 U	---	---	---
Chromium	mg/L	< 0.0020 U	< 0.0020 U	---	---	---
Cobalt	mg/L	0.0013	< 0.0010 U	---	---	---
Fluoride	mg/L	0.26	< 0.10 U	---	---	---
Lead	mg/L	< 0.0010 U	< 0.0010 U	---	---	---
Lithium	mg/L	0.15	0.11	---	---	---
Mercury	mg/L	< 0.0002 U	< 0.0002 U	---	---	---
Molybdenum	mg/L	0.0041	< 0.0020 U	---	---	---
Radium 226	pCi/L	0.145 U ± 0.111	0.566 ± 0.155	---	---	---
Radium 228	pCi/L	0.440 U ± 0.307	0.451 U ± 0.341	---	---	---
Radium 226 and 228 combined	pCi/L	0.584 ± 0.326	1.02 ± 0.375	---	---	---
Selenium	mg/L	< 0.0050 U	< 0.0050 U	---	---	---
Thallium	mg/L	< 0.0010 U	< 0.0010 U	---	---	---

Legend:

--, not analyzed

ft AMSL, feet above mean sea level

mg/L, milligrams per liter

s.u., standard units for pH

pCi/L, picocuries per liter

Notes:

Non-detects have been listed at the reported practical quantitation limit.

Metal results represent the total concentration (i.e. samples have not been filtered).

An additional sample was collected at MW-91-2 in September 2019, after the June 2019 sample was found to have been switched with the sample from MW-91-1. Analytical results from both events are provided for informational purposes.

Laboratory Provided Qualifiers:

U = Not detected above the shown practical quantitation limit

U (Radiochem) = Result is less than the sample detection limit (varies by sample)

^ = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC is outside acceptance limits.

Table 9: Sample Results Summary Table - MW-75

		MW-75		
		Additional Baseline Data	Detection Monitoring	
	Units	6-Jun-19	6-Jun-19	14-Oct-19
Water Elevation	ft AMSL	1912.7	1912.7	1914.0
Appendix III Parameters				
Boron	mg/L	---	0.2	0.2
Calcium	mg/L	---	5.3	5.3
Chloride	mg/L	---	< 3.0 U	1.1
Fluoride	mg/L	---	0.56	0.46
pH, Field	s.u.	---	8.12	8.22
pH, Lab	s.u.	---	8.3	8.4
Sulfate	mg/L	---	72	71
Total Dissolved Solids	mg/L	---	810	880
Appendix IV Parameters				
Antimony	mg/L	< 0.0020 U	---	---
Arsenic	mg/L	< 0.0050 U	---	---
Barium	mg/L	0.035	---	---
Beryllium	mg/L	< 0.0050 U ^	---	---
Cadmium	mg/L	< 0.0010 U	---	---
Chromium	mg/L	< 0.0020 U	---	---
Cobalt	mg/L	< 0.0010 U	---	---
Fluoride	mg/L	0.56	---	---
Lead	mg/L	< 0.0010 U	---	---
Lithium	mg/L	0.085	---	---
Mercury	mg/L	< 0.0002 U	---	---
Molybdenum	mg/L	< 0.002 U	---	---
Radium 226	pCi/L	-0.0233 U ± 0.104	---	---
Radium 228	pCi/L	0.231 U ± 0.253	---	---
Radium 226 and 228 combined	pCi/L	0.208 U ± 0.274	---	---
Selenium	mg/L	< 0.0050 U	---	---
Thallium	mg/L	< 0.0010 U	---	---

Legend:

--, not analyzed

ft AMSL, feet above mean sea level

mg/L, milligrams per liter

s.u., standard units for pH

pCi/L, picocuries per liter

Notes:

Non-detects have been listed at the reported practical quantitation limit.

Metal results represent the total concentration (i.e. samples have not been filtered).

Laboratory Provided Qualifiers:

U = Not detected above the shown practical quantitation limit

U (Radiochem) = Result is less than the sample detection limit (varies by sample)

^ = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC is outside acceptance limits.

Table 10: Sample Results Summary Table - MW-91-1

		MW-91-1				
		Additional Baseline Data		Detection Monitoring		
	Units	6-Jun-19	13-Sep-19	6-Jun-19	13-Sep-19	15-Oct-19
Water Elevation	ft AMSL	1876.5	1876.3	1876.5	1876.3	1876.8
Appendix III Parameters						
Boron	mg/L	---	---	0.35	2.9	2.7
Calcium	mg/L	---	---	270	230	220
Chloride	mg/L	---	---	16	85	79
Fluoride	mg/L	---	---	< 0.10 U	0.2	0.21
pH, Field	s.u.	---	---	6.82	6.97	6.94
Sulfate	mg/L	---	---	1200	1300	1100
Total Dissolved Solids	mg/L	---	---	2000	2300 H	2400
Appendix IV Parameters						
Antimony	mg/L	< 0.0020 U	< 0.0020 U	---	---	---
Arsenic	mg/L	< 0.0050 U	< 0.0050 U	---	---	---
Barium	mg/L	0.064	0.048	---	---	---
Beryllium	mg/L	< 0.0050 U ^	< 0.0010 U	---	---	---
Cadmium	mg/L	< 0.0010 U	< 0.0010 U	---	---	---
Chromium	mg/L	< 0.0020 U	< 0.0020 U	---	---	---
Cobalt	mg/L	< 0.0010 U	0.0019	---	---	---
Fluoride	mg/L	< 0.10 U	0.20	---	---	---
Lead	mg/L	< 0.0010 U	< 0.0010 U	---	---	---
Lithium	mg/L	0.10	0.14	---	---	---
Mercury	mg/L	< 0.0002 U	< 0.0002 U	---	---	---
Molybdenum	mg/L	< 0.0020 U	0.0047	---	---	---
Radium 226	pCi/L	0.551 ± 0.225	0.0217 U ± 0.0582	---	---	---
Radium 228	pCi/L	0.543 U ± 0.379	0.383 U ± 0.320	---	---	---
Radium 226 and 228 combined	pCi/L	1.09 ± 0.441	0.405 U ± 0.325	---	---	---
Selenium	mg/L	< 0.0050 U	0.011	---	---	---
Thallium	mg/L	< 0.0010 U	< 0.0010 U	---	---	---

Legend:

--, not analyzed

ft AMSL, feet above mean sea level

mg/L, milligrams per liter

s.u., standard units for pH

pCi/L, picocuries per liter

Notes:

Non-detects have been listed at the reported practical quantitation limit.

Metal results represent the total concentration (i.e. samples have not been filtered).

An additional sample was collected at MW-91-1 in September 2019, after the June 2019 sample was found to have been switched with the sample from MW-91-2. Analytical results from both events are provided for informational purposes.

Laboratory Provided Qualifiers:

U = Not detected above the shown practical quantitation limit

U (Radiochem) = Result is less than the sample detection limit (varies by sample)

H = Sample was prepped or analyzed beyond the specified holding time.

^ = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC is outside acceptance limits.

Table 11: Sample Results Summary Table - MW-49

		MW-49		
		Additional Baseline Data	Detection Monitoring	
	Units	6-Jun-19	6-Jun-19	15-Oct-19
Water Elevation	ft AMSL	1888.1	1888.1	1888.8
Appendix III Parameters				
Boron	mg/L	---	4.2	4.6
Calcium	mg/L	---	200	200
Chloride	mg/L	---	70	71
Fluoride	mg/L	---	0.19	0.16
pH, Field	s.u.	---	6.89	7.02
Sulfate	mg/L	---	1300	1400
Total Dissolved Solids	mg/L	---	2600	2800
Appendix IV Parameters				
Antimony	mg/L	< 0.0020 U	---	---
Arsenic	mg/L	< 0.0050 U	---	---
Barium	mg/L	0.027	---	---
Beryllium	mg/L	< 0.0050 U ^	---	---
Cadmium	mg/L	< 0.0010 U	---	---
Chromium	mg/L	< 0.0020 U	---	---
Cobalt	mg/L	< 0.0010 U	---	---
Fluoride	mg/L	0.19	---	---
Lead	mg/L	< 0.0010 U	---	---
Lithium	mg/L	0.23	---	---
Mercury	mg/L	< 0.0002 U	---	---
Molybdenum	mg/L	< 0.0020 U	---	---
Radium 226	pCi/L	0.000 U ± 0.0914	---	---
Radium 228	pCi/L	0.313 U ± 0.300	---	---
Radium 226 and 228 combined	pCi/L	0.313 U ± 0.314	---	---
Selenium	mg/L	< 0.0050 U	---	---
Thallium	mg/L	< 0.0010 U	---	---

Legend:

--, not analyzed

ft AMSL, feet above mean sea level

mg/L, milligrams per liter

s.u., standard units for pH

pCi/L, picocuries per liter

Notes:

Non-detects have been listed at the reported practical quantitation limit.

Metal results represent the total concentration (i.e. samples have not been filtered).

Laboratory Provided Qualifiers:

U = Not detected above the shown practical quantitation limit

U (Radiochem) = Result is less than the sample detection limit (varies by sample)

^ = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC is outside acceptance limits.

Table 12: Sample Results Summary Table - MW-51

		MW-51		
		Additional Baseline Data	Detection Monitoring	
	Units	6-Jun-19	6-Jun-19	15-Oct-19
Water Elevation	ft AMSL	1879.3	1879.3	1884.1
Appendix III Parameters				
Boron	mg/L	---	3.9	7.9
Calcium	mg/L	---	280	420
Chloride	mg/L	---	87	80
Fluoride	mg/L	---	0.39	0.43
pH, Field	s.u.	---	7.08	6.91
Sulfate	mg/L	---	3100	3600
Total Dissolved Solids	mg/L	---	5300	6200
Appendix IV Parameters				
Antimony	mg/L	< 0.0020 U	---	---
Arsenic	mg/L	< 0.0050 U	---	---
Barium	mg/L	0.023	---	---
Beryllium	mg/L	< 0.0050 U ^	---	---
Cadmium	mg/L	< 0.0010 U	---	---
Chromium	mg/L	< 0.0020 U	---	---
Cobalt	mg/L	< 0.0010 U	---	---
Fluoride	mg/L	0.39	---	---
Lead	mg/L	< 0.0010 U	---	---
Lithium	mg/L	0.47	---	---
Mercury	mg/L	< 0.0002 U	---	---
Molybdenum	mg/L	0.0081	---	---
Radium 226	pCi/L	0.0895 U ± 0.0794	---	---
Radium 228	pCi/L	0.620 ± 0.264	---	---
Radium 226 and 228 combined	pCi/L	0.709 ± 0.276	---	---
Selenium	mg/L	0.015	---	---
Thallium	mg/L	< 0.0010 U	---	---

Legend:

--, not analyzed

ft AMSL, feet above mean sea level

mg/L, milligrams per liter

s.u., standard units for pH

pCi/L, picocuries per liter

Notes:

Non-detects have been listed at the reported practical quantitation limit.

Metal results represent the total concentration (i.e. samples have not been filtered).

Laboratory Provided Qualifiers:

U = Not detected above the shown practical quantitation limit

U (Radiochem) = Result is less than the sample detection limit (varies by sample)

^ = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC is outside acceptance limits.

Table 13: Sample Results Summary Table - MW-16-6

		MW-16-6		
		Additional Baseline Data	Detection Monitoring	
	Units	6-Jun-19	6-Jun-19	14-Oct-19
Water Elevation	ft AMSL	1910.4	1910.4	1912.0
Appendix III Parameters				
Boron	mg/L	---	3.9	5.2
Calcium	mg/L	---	500	530
Chloride	mg/L	---	37	45
Fluoride	mg/L	---	< 0.10 U	< 0.10 U
pH, Field	s.u.	---	5.68	5.94
pH, Lab	s.u.	---	6.4	6.6
Sulfate	mg/L	---	3600	3900
Total Dissolved Solids	mg/L	---	5900	6400
Appendix IV Parameters				
Antimony	mg/L	< 0.0020 U	---	---
Arsenic	mg/L	< 0.0050 U	---	---
Barium	mg/L	0.028	---	---
Beryllium	mg/L	< 0.0050 U ^	---	---
Cadmium	mg/L	< 0.0010 U	---	---
Chromium	mg/L	< 0.0020 U	---	---
Cobalt	mg/L	0.0018	---	---
Fluoride	mg/L	< 0.10 U	---	---
Lead	mg/L	< 0.0010 U	---	---
Lithium	mg/L	0.59	---	---
Mercury	mg/L	< 0.0002 U	---	---
Molybdenum	mg/L	< 0.0020 U	---	---
Radium 226	pCi/L	0.00155 U ± 0.126	---	---
Radium 228	pCi/L	0.332 U ± 0.364	---	---
Radium 226 and 228 combined	pCi/L	0.334 U ± 0.385	---	---
Selenium	mg/L	< 0.0050 U	---	---
Thallium	mg/L	< 0.0010 U	---	---

Legend:

--, not analyzed

ft AMSL, feet above mean sea level

mg/L, milligrams per liter

s.u., standard units for pH

pCi/L, picocuries per liter

Notes:

Non-detects have been listed at the reported practical quantitation limit.

Metal results represent the total concentration (i.e. samples have not been filtered).

Laboratory Provided Qualifiers:

U = Not detected above the shown practical quantitation limit

U (Radiochem) = Result is less than the sample detection limit (varies by sample)

^ = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC is outside acceptance limits.

Table 14: Sample Results Summary Table - MW-16-7

		MW-16-7		
		Additional Baseline Data	Detection Monitoring	
	Units	10-Jun-19	10-Jun-19	15-Oct-19
Water Elevation	ft AMSL	1877.4	1877.4	1881.6
Appendix III Parameters				
Boron	mg/L	---	< 0.10 U	< 0.10 U
Calcium	mg/L	---	330	310
Chloride	mg/L	---	77 H	77
Fluoride	mg/L	---	< 0.10 U	< 0.10 U
pH, Field	s.u.	---	6.91	6.98
Sulfate	mg/L	---	2600 H	2400
Total Dissolved Solids	mg/L	---	4100 B	4000
Appendix IV Parameters				
Antimony	mg/L	< 0.0020 U	---	---
Arsenic	mg/L	< 0.0050 U	---	---
Barium	mg/L	0.014	---	---
Beryllium	mg/L	< 0.0010 U ^ *	---	---
Cadmium	mg/L	< 0.0010 U	---	---
Chromium	mg/L	< 0.0020 U	---	---
Cobalt	mg/L	< 0.0010 U	---	---
Fluoride	mg/L	< 0.10 U	---	---
Lead	mg/L	< 0.0010 U	---	---
Lithium	mg/L	0.43	---	---
Mercury	mg/L	< 0.0002 U	---	---
Molybdenum	mg/L	< 0.0020 U	---	---
Radium 226	pCi/L	0.276 U ± 0.216	---	---
Radium 228	pCi/L	0.468 F ± 0.251	---	---
Radium 226 and 228 combined	pCi/L	0.743 ± 0.331	---	---
Selenium	mg/L	0.16	---	---
Thallium	mg/L	< 0.0010 U	---	---

Legend:

--, not analyzed

ft AMSL, feet above mean sea level

mg/L, milligrams per liter

s.u., standard units for pH

pCi/L, picocuries per liter

Notes:

Non-detects have been listed at the reported practical quantitation limit.

Metal results represent the total concentration (i.e. samples have not been filtered).

Laboratory Provided Qualifiers:

U = Not detected above the shown practical quantitation limit

H = Sample was prepped or analyzed beyond the specified holding time.

B = Compound was found in the blank and sample.

U (Radiochem) = Result is less than the sample detection limit (varies by sample)

F (Radiochem) = MS/MSD Recovery and/or RPD exceeds the control limits.

* = LCS or LCSD is outside acceptance limits.

^ = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC is outside acceptance limits.

Table 15: Sample Results Summary Table - MW-10

		MW-10		
		Additional Baseline Data	Detection Monitoring	
	Units	10-Jun-19	10-Jun-19	15-Oct-19
Water Elevation	ft AMSL	1880.7	1880.7	1882.0
Appendix III Parameters				
Boron	mg/L	---	2.0	6.4
Calcium	mg/L	---	220	200
Chloride	mg/L	---	19 H	17
Fluoride	mg/L	---	0.19	0.47
pH, Field	s.u.	---	6.91	7.49
Sulfate	mg/L	---	810 H	1300
Total Dissolved Solids	mg/L	---	1900 B	2400
Appendix IV Parameters				
Antimony	mg/L	< 0.0020 U	---	---
Arsenic	mg/L	< 0.0050 U	---	---
Barium	mg/L	0.025	---	---
Beryllium	mg/L	< 0.0010 U ^ *	---	---
Cadmium	mg/L	< 0.0010 U	---	---
Chromium	mg/L	< 0.0020 U	---	---
Cobalt	mg/L	< 0.0010 U	---	---
Fluoride	mg/L	0.19	---	---
Lead	mg/L	< 0.0010 U	---	---
Lithium	mg/L	0.18	---	---
Mercury	mg/L	< 0.0002 U	---	---
Molybdenum	mg/L	< 0.0020 U	---	---
Radium 226	pCi/L	0.0115 U ± 0.0966	---	---
Radium 228	pCi/L	0.487 ± 0.280	---	---
Radium 226 and 228 combined	pCi/L	0.498 ± 0.296	---	---
Selenium	mg/L	< 0.0050 U	---	---
Thallium	mg/L	< 0.0010 U	---	---

Legend:

--, not analyzed

ft AMSL, feet above mean sea level

mg/L, milligrams per liter

s.u., standard units for pH

pCi/L, picocuries per liter

Notes:

Non-detects have been listed at the reported practical quantitation limit.

Metal results represent the total concentration (i.e. samples have not been filtered).

Laboratory Provided Qualifiers:

U = Not detected above the shown practical quantitation limit

H = Sample was prepped or analyzed beyond the specified holding time.

B = Compound was found in the blank and sample.

U (Radiochem) = Result is less than the sample detection limit (varies by sample)

* = LCS or LCSD is outside acceptance limits.

^ = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC is outside acceptance limits.

Table 16: Sample Results Summary Table - MW-16-0

		MW-16-0		
		Additional Baseline Data	Detection Monitoring	
	Units	10-Jun-19	10-Jun-19	14-Oct-19
Water Elevation	ft AMSL	1874.7	1874.7	1875.9
Appendix III Parameters				
Boron	mg/L	---	6.7	15
Calcium	mg/L	---	370	450
Chloride	mg/L	---	31 H	24
Fluoride	mg/L	---	0.22	0.19
pH, Field	s.u.	---	7.42	7.28
Sulfate	mg/L	---	2600 H	2700
Total Dissolved Solids	mg/L	---	3900 B	4400
Appendix IV Parameters				
Antimony	mg/L	< 0.0020 U	---	---
Arsenic	mg/L	< 0.0050 U	---	---
Barium	mg/L	0.022	---	---
Beryllium	mg/L	< 0.0010 U ^ *	---	---
Cadmium	mg/L	< 0.0010 U	---	---
Chromium	mg/L	< 0.0020 U	---	---
Cobalt	mg/L	< 0.0010 U	---	---
Fluoride	mg/L	0.22	---	---
Lead	mg/L	< 0.0010 U	---	---
Lithium	mg/L	0.096	---	---
Mercury	mg/L	< 0.0002 U	---	---
Molybdenum	mg/L	0.012	---	---
Radium 226	pCi/L	-0.0226 U ± 0.0719	---	---
Radium 228	pCi/L	0.174 U ± 0.239	---	---
Radium 226 and 228 combined	pCi/L	0.151 U ± 0.250	---	---
Selenium	mg/L	0.032	---	---
Thallium	mg/L	< 0.0010 U	---	---

Legend:

--, not analyzed

ft AMSL, feet above mean sea level

mg/L, milligrams per liter

s.u., standard units for pH

pCi/L, picocuries per liter

Notes:

Non-detects have been listed at the reported practical quantitation limit.

Metal results represent the total concentration (i.e. samples have not been filtered).

Laboratory Provided Qualifiers:

U = Not detected above the shown practical quantitation limit

H = Sample was prepped or analyzed beyond the specified holding time.

B = Compound was found in the blank and sample.

U (Radiochem) = Result is less than the sample detection limit (varies by sample)

* = LCS or LCSD is outside acceptance limits.

^ = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC is outside acceptance limits.

Table 17: Sample Results Summary Table - MW-16-1

		MW-16-1		
		Additional Baseline Data	Detection Monitoring	
	Units	10-Jun-19	10-Jun-19	15-Oct-19
Water Elevation	ft AMSL	1872.0	1872.0	1874.0
Appendix III Parameters				
Boron	mg/L	---	13	12
Calcium	mg/L	---	560	410
Chloride	mg/L	---	370 H	64
Fluoride	mg/L	---	0.21	0.77
pH, Field	s.u.	---	7.16	7.60
Sulfate	mg/L	---	3700 H	2400
Total Dissolved Solids	mg/L	---	5400 B	3900
Appendix IV Parameters				
Antimony	mg/L	< 0.0020 U	---	---
Arsenic	mg/L	< 0.0050 U	---	---
Barium	mg/L	0.015	---	---
Beryllium	mg/L	< 0.0050 U	---	---
Cadmium	mg/L	< 0.0010 U	---	---
Chromium	mg/L	< 0.0020 U	---	---
Cobalt	mg/L	< 0.0010 U	---	---
Fluoride	mg/L	0.21	---	---
Lead	mg/L	< 0.0010 U	---	---
Lithium	mg/L	0.093	---	---
Mercury	mg/L	< 0.0002 U	---	---
Molybdenum	mg/L	0.028	---	---
Radium 226	pCi/L	0.0561 U ± 0.248	---	---
Radium 228	pCi/L	0.568 F ± 0.271	---	---
Radium 226 and 228 combined	pCi/L	0.624 ± 0.367	---	---
Selenium	mg/L	0.062	---	---
Thallium	mg/L	< 0.0010 U	---	---

Legend:

--, not analyzed

ft AMSL, feet above mean sea level

mg/L, milligrams per liter

s.u., standard units for pH

pCi/L, picocuries per liter

Notes:

Non-detects have been listed at the reported practical quantitation limit.

Metal results represent the total concentration (i.e. samples have not been f

Laboratory Provided Qualifiers:

U = Not detected above the shown practical quantitation limit

H = Sample was prepped or analyzed beyond the specified holding time.

B = Compound was found in the blank and sample.

U (Radiochem) = Result is less than the sample detection limit (varies by sample)

F (Radiochem) = MS/MSD Recovery and/or RPD exceeds the control limits.

Table 18: Sample Results Summary Table - MW-72

		MW-72		
		Additional Baseline Data	Detection Monitoring	
	Units	10-Jun-19	10-Jun-19	15-Oct-19
Water Elevation	ft AMSL	1879.0	1879.0	1882.0
Appendix III Parameters				
Boron	mg/L	---	0.12	0.15
Calcium	mg/L	---	720	690
Chloride	mg/L	---	36 H	33
Fluoride	mg/L	---	0.18	0.17
pH, Field	s.u.	---	6.76	6.77
Sulfate	mg/L	---	3400 H	3100
Total Dissolved Solids	mg/L	---	5200 B	5000
Appendix IV Parameters				
Antimony	mg/L	< 0.0020 U	---	---
Arsenic	mg/L	< 0.0050 U	---	---
Barium	mg/L	0.018	---	---
Beryllium	mg/L	< 0.0010 U ^ *	---	---
Cadmium	mg/L	< 0.0010 U ^ *	---	---
Chromium	mg/L	< 0.0020 U	---	---
Cobalt	mg/L	< 0.0010 U	---	---
Fluoride	mg/L	0.18	---	---
Lead	mg/L	< 0.0010 U	---	---
Lithium	mg/L	0.19	---	---
Mercury	mg/L	< 0.0002 U	---	---
Molybdenum	mg/L	0.0028	---	---
Radium 226	pCi/L	0.0973 U ± 0.0887	---	---
Radium 228	pCi/L	0.348 U ± 0.282	---	---
Radium 226 and 228 combined	pCi/L	0.445 U ± 0.296	---	---
Selenium	mg/L	0.017	---	---
Thallium	mg/L	< 0.0010 U	---	---

Legend:

--, not analyzed

ft AMSL, feet above mean sea level

mg/L, milligrams per liter

s.u., standard units for pH

pCi/L, picocuries per liter

Notes:

Non-detects have been listed at the reported practical quantitation limit.

Metal results represent the total concentration (i.e. samples have not been filtered).

Laboratory Provided Qualifiers:

U = Not detected above the shown practical quantitation limit

H = Sample was prepped or analyzed beyond the specified holding time.

B = Compound was found in the blank and sample.

U (Radiochem) = Result is less than the sample detection limit (varies by sample)

* = LCS or LCSD is outside acceptance limits.

^ = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC is outside acceptance limits.

Table 19: Sample Results Summary Table - MW-42

		MW-42		
		Additional Baseline Data	Detection Monitoring	
	Units	10-Jun-19	10-Jun-19	16-Oct-19
Water Elevation	ft AMSL	1876.2	1876.2	1876.7
Appendix III Parameters				
Boron	mg/L	---	0.78	0.98
Calcium	mg/L	---	230	220
Chloride	mg/L	---	27 H	22
Fluoride	mg/L	---	0.26	0.27
pH, Field	s.u.	---	7.41	7.31
Sulfate	mg/L	---	1400 H	1100
Total Dissolved Solids	mg/L	---	2300 B	2200
Appendix IV Parameters				
Antimony	mg/L	< 0.0020 U	---	---
Arsenic	mg/L	< 0.0050 U	---	---
Barium	mg/L	0.044	---	---
Beryllium	mg/L	< 0.0010 U ^ *	---	---
Cadmium	mg/L	< 0.0010 U	---	---
Chromium	mg/L	< 0.0020 U	---	---
Cobalt	mg/L	< 0.0010 U	---	---
Fluoride	mg/L	0.26	---	---
Lead	mg/L	< 0.0010 U	---	---
Lithium	mg/L	0.14	---	---
Mercury	mg/L	< 0.0002 U	---	---
Molybdenum	mg/L	0.0044	---	---
Radium 226	pCi/L	-0.00344 U ± 0.0483	---	---
Radium 228	pCi/L	0.634 ± 0.279	---	---
Radium 226 and 228 combined	pCi/L	0.630 ± 0.283	---	---
Selenium	mg/L	< 0.0050 U	---	---
Thallium	mg/L	< 0.0010 U	---	---

Legend:

--, not analyzed

ft AMSL, feet above mean sea level

mg/L, milligrams per liter

s.u., standard units for pH

pCi/L, picocuries per liter

Notes:

Non-detects have been listed at the reported practical quantitation limit.

Metal results represent the total concentration (i.e. samples have not been filtered).

Laboratory Provided Qualifiers:

U = Not detected above the shown practical quantitation limit

H = Sample was prepped or analyzed beyond the specified holding time.

B = Compound was found in the blank and sample.

U (Radiochem) = Result is less than the sample detection limit (varies by sample)

* = LCS or LCSD is outside acceptance limits.

^ = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC is outside acceptance limits.

Table 20: Sample Results Summary Table - MW-16-2

		MW-16-2		
		Additional Baseline Data	Detection Monitoring	
	Units	11-Jun-19	11-Jun-19	21-Oct-19
Water Elevation	ft AMSL	1872.4	1872.4	1874.3
Appendix III Parameters				
Boron	mg/L	---	8.2	10
Calcium	mg/L	---	360	390
Chloride	mg/L	---	180 H	190
Fluoride	mg/L	---	0.66	0.55
pH, Field	s.u.	---	7.23	7.16
Sulfate	mg/L	---	2200 H	2200
Total Dissolved Solids	mg/L	---	3500	4200
Appendix IV Parameters				
Antimony	mg/L	< 0.0020 U	---	---
Arsenic	mg/L	< 0.0050 U	---	---
Barium	mg/L	0.014	---	---
Beryllium	mg/L	< 0.0050 U *	---	---
Cadmium	mg/L	< 0.0010 U	---	---
Chromium	mg/L	< 0.0020 U	---	---
Cobalt	mg/L	< 0.0010 U	---	---
Fluoride	mg/L	0.66	---	---
Lead	mg/L	< 0.0010 U	---	---
Lithium	mg/L	0.12	---	---
Mercury	mg/L	< 0.0002 U	---	---
Molybdenum	mg/L	0.0020	---	---
Radium 226	pCi/L	-0.178 U ± 0.184	---	---
Radium 228	pCi/L	0.0550 U F ± 0.260	---	---
Radium 226 and 228 combined	pCi/L	-0.123 U ± 0.319	---	---
Selenium	mg/L	0.0066	---	---
Thallium	mg/L	< 0.0010 U	---	---

Legend:

--, not analyzed

ft AMSL, feet above mean sea level

mg/L, milligrams per liter

s.u., standard units for pH

pCi/L, picocuries per liter

Notes:

Non-detects have been listed at the reported practical quantitation limit.

Metal results represent the total concentration (i.e. samples have not been filtered).

Laboratory Provided Qualifiers:

U = Not detected above the shown practical quantitation limit

H = Sample was prepped or analyzed beyond the specified holding time.

U (Radiochem) = Result is less than the sample detection limit (varies by sample)

F (Radiochem) = MS/MSD Recovery and/or RPD exceeds the control limits.

* = LCS or LCSD is outside acceptance limits.

Table 21: Sample Results Summary Table - MW-16-3

		MW-16-3		
		Additional Baseline Data	Detection Monitoring	
	Units	11-Jun-19	11-Jun-19	21-Oct-19
Water Elevation	ft AMSL	1872.0	1872.0	1873.5
Appendix III Parameters				
Boron	mg/L	---	16	19
Calcium	mg/L	---	420	400
Chloride	mg/L	---	720 H	600
Fluoride	mg/L	---	1.4	1.3
pH, Field	s.u.	---	7.06	7.14
Sulfate	mg/L	---	5400 H	5200
Total Dissolved Solids	mg/L	---	8600	9200
Appendix IV Parameters				
Antimony	mg/L	< 0.0020 U	---	---
Arsenic	mg/L	< 0.0050 U	---	---
Barium	mg/L	0.018	---	---
Beryllium	mg/L	< 0.0050 U *	---	---
Cadmium	mg/L	< 0.0010 U	---	---
Chromium	mg/L	< 0.0020 U	---	---
Cobalt	mg/L	< 0.0010 U	---	---
Fluoride	mg/L	1.4	---	---
Lead	mg/L	< 0.0010 U	---	---
Lithium	mg/L	0.35	---	---
Mercury	mg/L	< 0.0002 U	---	---
Molybdenum	mg/L	< 0.0020 U	---	---
Radium 226	pCi/L	-0.131 U ± 0.118	---	---
Radium 228	pCi/L	0.193 U F ± 0.214	---	---
Radium 226 and 228 combined	pCi/L	0.0616 U ± 0.244	---	---
Selenium	mg/L	< 0.0050 U	---	---
Thallium	mg/L	< 0.0010 U	---	---

Legend:

--, not analyzed

ft AMSL, feet above mean sea level

mg/L, milligrams per liter

s.u., standard units for pH

pCi/L, picocuries per liter

Notes:

Non-detects have been listed at the reported practical quantitation limit.

Metal results represent the total concentration (i.e. samples have not been filtered).

Laboratory Provided Qualifiers:

U = Not detected above the shown practical quantitation limit

H = Sample was prepped or analyzed beyond the specified holding time.

U (Radiochem) = Result is less than the sample detection limit (varies by sample)

F (Radiochem) = MS/MSD Recovery and/or RPD exceeds the control limits.

* = LCS or LCSD is outside acceptance limits.

Table 22: Sample Results Summary Table - MW-16-4

		MW-16-4		
		Additional Baseline Data	Detection Monitoring	
	Units	11-Jun-19	11-Jun-19	16-Oct-19
Water Elevation	ft AMSL	1871.6	1871.6	1873.1
Appendix III Parameters				
Boron	mg/L	---	0.47	0.53
Calcium	mg/L	---	410	360
Chloride	mg/L	---	44 H	36
Fluoride	mg/L	---	0.26	0.27
pH, Field	s.u.	---	6.86	6.89
Sulfate	mg/L	---	3500 H	3900
Total Dissolved Solids	mg/L	---	4800	5400
Appendix IV Parameters				
Antimony	mg/L	< 0.0020 U	---	---
Arsenic	mg/L	< 0.0050 U	---	---
Barium	mg/L	0.0061	---	---
Beryllium	mg/L	< 0.0050 U *	---	---
Cadmium	mg/L	< 0.0010 U	---	---
Chromium	mg/L	< 0.0020 U	---	---
Cobalt	mg/L	< 0.0010 U	---	---
Fluoride	mg/L	0.26	---	---
Lead	mg/L	< 0.0010 U	---	---
Lithium	mg/L	0.66	---	---
Mercury	mg/L	< 0.0002 U	---	---
Molybdenum	mg/L	0.0035	---	---
Radium 226	pCi/L	0.0583 U ± 0.156	---	---
Radium 228	pCi/L	0.0777 U F ± 0.243	---	---
Radium 226 and 228 combined	pCi/L	0.136 U ± 0.289	---	---
Selenium	mg/L	< 0.0050 U ^	---	---
Thallium	mg/L	< 0.0010 U	---	---

Legend:

--, not analyzed

ft AMSL, feet above mean sea level

mg/L, milligrams per liter

s.u., standard units for pH

pCi/L, picocuries per liter

Notes:

Non-detects have been listed at the reported practical quantitation limit.

Metal results represent the total concentration (i.e. samples have not been filtered).

Laboratory Provided Qualifiers:

U = Not detected above the shown practical quantitation limit

H = Sample was prepped or analyzed beyond the specified holding time, per request.

U (Radiochem) = Result is less than the sample detection limit (varies by sample)

F (Radiochem) = MS/MSD Recovery and/pr RPD exceeds the control limits.

* = LCS or LCSD is outside acceptance limits.

^ = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC is outside acceptance limits.

Table 23: Sample Results Summary Table - MW-15

		MW-15		
		Additional Baseline Data	Detection Monitoring	
	Units	11-Jun-19	11-Jun-19	16-Oct-19
Water Elevation	ft AMSL	1874.0	1874.0	1875.4
Appendix III Parameters				
Boron	mg/L	---	24	27
Calcium	mg/L	---	420	420
Chloride	mg/L	---	340 H	260
Fluoride	mg/L	---	0.49	0.44
pH, Field	s.u.	---	7.16	7.08
Sulfate	mg/L	---	3900 H	3800
Total Dissolved Solids	mg/L	---	6600	4900
Appendix IV Parameters				
Antimony	mg/L	< 0.0020 U	---	---
Arsenic	mg/L	< 0.0050 U	---	---
Barium	mg/L	0.018	---	---
Beryllium	mg/L	< 0.0050 U *	---	---
Cadmium	mg/L	< 0.0010 U	---	---
Chromium	mg/L	< 0.0020 U	---	---
Cobalt	mg/L	< 0.0010 U	---	---
Fluoride	mg/L	0.49	---	---
Lead	mg/L	< 0.0010 U	---	---
Lithium	mg/L	0.33	---	---
Mercury	mg/L	< 0.0002 U	---	---
Molybdenum	mg/L	< 0.0020 U	---	---
Radium 226	pCi/L	0.154 U ± 0.198	---	---
Radium 228	pCi/L	0.116 U F ± 0.290	---	---
Radium 226 and 228 combined	pCi/L	0.270 U ± 0.351	---	---
Selenium	mg/L	< 0.0050 U ^	---	---
Thallium	mg/L	< 0.0010 U	---	---

Legend:

--, not analyzed

ft AMSL, feet above mean sea level

mg/L, milligrams per liter

s.u., standard units for pH

pCi/L, picocuries per liter

Notes:

Non-detects have been listed at the reported practical quantitation limit.

Metal results represent the total concentration (i.e. samples have not been filtered).

Laboratory Provided Qualifiers:

U = Not detected above the shown practical quantitation limit

H = Sample was prepped or analyzed beyond the specified holding time, per request.

U (Radiochem) = Result is less than the sample detection limit (varies by sample)

F (Radiochem) = MS/MSD Recovery and/or RPD exceeds the control limits.

* = LCS or LCSD is outside acceptance limits.

^ = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC is outside acceptance limits.

Table 24: Sample Results Summary Table - MW-16-5

		MW-16-5		
		Additional Baseline Data	Detection Monitoring	
	Units	11-Jun-19	11-Jun-19	16-Oct-19
Water Elevation	ft AMSL	1871.4	1871.4	1873.5
Appendix III Parameters				
Boron	mg/L	---	9.2	12
Calcium	mg/L	---	320	340
Chloride	mg/L	---	170 H	120
Fluoride	mg/L	---	0.81	0.71
pH, Field	s.u.	---	7.29	7.25
Sulfate	mg/L	---	2200 H	2500
Total Dissolved Solids	mg/L	---	3600	4000
Appendix IV Parameters				
Antimony	mg/L	< 0.0020 U	---	---
Arsenic	mg/L	< 0.0050 U	---	---
Barium	mg/L	0.016	---	---
Beryllium	mg/L	< 0.0010 U ^ *	---	---
Cadmium	mg/L	< 0.0010 U	---	---
Chromium	mg/L	< 0.0020 U	---	---
Cobalt	mg/L	< 0.0010 U	---	---
Fluoride	mg/L	0.81	---	---
Lead	mg/L	< 0.0010 U	---	---
Lithium	mg/L	0.18	---	---
Mercury	mg/L	< 0.0002 U	---	---
Molybdenum	mg/L	< 0.0020 U	---	---
Radium 226	pCi/L	-0.0596 U ± 0.216	---	---
Radium 228	pCi/L	0.766 F ± 0.333	---	---
Radium 226 and 228 combined	pCi/L	0.707 ± 0.397	---	---
Selenium	mg/L	< 0.0050 U	---	---
Thallium	mg/L	< 0.0010 U	---	---

Legend:

--, not analyzed

ft AMSL, feet above mean sea level

mg/L, milligrams per liter

s.u., standard units for pH

pCi/L, picocuries per liter

Notes:

Non-detects have been listed at the reported practical quantitation limit.

Metal results represent the total concentration (i.e. samples have not been filtered).

Laboratory Provided Qualifiers:

U = Not detected above the shown practical quantitation limit

H = Sample was prepped or analyzed beyond the specified holding time.

U (Radiochem) = Result is less than the sample detection limit (varies by sample)

F (Radiochem) = MS/MSD Recovery and/or RPD exceeds the control limits.

^ = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC is outside acceptance limits.

* = LCS or LCSD is outside acceptance limits.

Table 25: Comparative Statistics - MW-DP3

		Statistical Method	Statistical Limit	Detection Monitoring Result	CUSUM Value	Within Compliance?	Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**18-Oct-18**			**5-Jun-19**		
Boron, Total	mg/L	CUSUM	0.98	0.62	0.64	Yes	0.62	0.64	Yes
Calcium, Total	mg/L	CUSUM	342	220	257	Yes	260	257	Yes
Chloride	mg/L	CUSUM	27.4	13.0	12.2	Yes	13.0	12.2	Yes
Fluoride	mg/L	NP-PL	0.13	< 0.10 U	---	Yes	< 0.10 U	---	Yes
pH, Field-Measured	s.u.	CUSUM	5.96, 6.69	6.31	6.33, 6.33	Yes	6.22	6.30, 6.33	Yes
Sulfate	mg/L	CUSUM	1687	1200	1221	Yes	1200	1221	Yes
Total Dissolved Solids	mg/L	CUSUM	2562	2300	2276	Yes	2200	2276	Yes

Notes:

mg/L, milligrams per liter

s.u., standard units for pH

NP-PL: Non-Parametric Prediction Limit

CUSUM: Parametric Shewhart-CUSUM Control Chart

U: Not detected above the shown practical quantitation limit.

Table 26: Comparative Statistics - MW-DP5

		Statistical Method	Statistical Limit	Detection Monitoring Result	CUSUM Value	Within Compliance?	Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**18-Oct-18**			**5-Jun-19**		
Boron, Total	mg/L	NP-PL	0.50	0.10	---	Yes	< 0.10 U	---	Yes
Calcium, Total	mg/L	CUSUM	386	250	303	Yes	280	303	Yes
Chloride	mg/L	CUSUM	94.6	67.0	80.5	Yes	69.0	80.5	Yes
Fluoride	mg/L	CUSUM	0.30	0.31	0.30	No (False Positive)	0.19	0.24	Yes
pH, Field-Measured	s.u.	CUSUM	6.89, 7.46	7.14	7.17, 7.17	Yes	7.06	7.12, 7.17	Yes
Sulfate	mg/L	CUSUM	5676	3400	3472	Yes	3400	3472	Yes
Total Dissolved Solids	mg/L	CUSUM	5762	5600	5505	Yes	5300	5417	Yes

Notes:

mg/L, milligrams per liter

s.u., standard units for pH

NP-PL: Non-Parametric Prediction Limit

CUSUM: Parametric Shewhart-CUSUM Control Chart

U: Not detected above the shown practical quantitation limit.

Table 27: Comparative Statistics - MW-DP1

		Statistical Method	Statistical Limit	Detection Monitoring Result	CUSUM Value	Within Compliance?	Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**22-Oct-18**			**5-Jun-19**		
Boron, Total	mg/L	CUSUM	2.86	0.76	0.90	Yes	0.73	0.90	Yes
Calcium, Total	mg/L	CUSUM	761	62	148	Yes	62	148	Yes
Chloride	mg/L	CUSUM	77	< 3.0 U	10	Yes	4.7	10	Yes
Fluoride	mg/L	CUSUM	0.34	0.27	0.28	Yes	0.27	0.28	Yes
pH, Field-Measured	s.u.	CUSUM	6.99, 7.67	7.45	7.33, 7.41	Yes	7.33	7.33, 7.34	Yes
Sulfate	mg/L	CUSUM	2233	490	674	Yes	550	674	Yes
Total Dissolved Solids	mg/L	CUSUM	3321	1300	1534	Yes	1400	1534	Yes

Notes:

mg/L, milligrams per liter

s.u., standard units for pH

NP-PL: Non-Parametric Prediction Limit

CUSUM: Parametric Shewhart-CUSUM Control Chart

U: Not detected above the shown practical quantitation limit.

Table 28: Comparative Statistics - MW-DP2

		Statistical Method	Statistical Limit	Detection Monitoring Result	CUSUM Value	Within Compliance?	Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**22-Oct-18**			**12-Jun-19**		
Boron, Total	mg/L	CUSUM	3.59	***	---	---	***	---	---
Calcium, Total	mg/L	CUSUM	357	***	---	---	***	---	---
Chloride	mg/L	CUSUM	87	***	---	---	***	---	---
Fluoride	mg/L	Decreasing Trend	NLS	***	---	---	***	---	---
pH, Field-Measured	s.u.	CUSUM	6.63, 7.12	***	---	---	***	---	---
Sulfate	mg/L	CUSUM	1949	***	---	---	***	---	---
Total Dissolved Solids	mg/L	Increasing Trend	NLS	***	---	---	***	---	---

Notes:

mg/L, milligrams per liter

s.u., standard units for pH

CUSUM: Parametric Shewhart-CUSUM Control Chart

Trend: Trends were identified in the background period. See text for discussion of significance.

NLS: No limit set due to trending data in the baseline period. A trend test is used to assess statistical significance of compliance results.

*** - Samples were not collected at MW-DP2 in 2018 or 2019 because the well was dry.

Table 29: Comparative Statistics - MW-DP2B

		Statistical Method	Statistical Limit	Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**					
Boron, Total	mg/L	***	---	---	---	---
Calcium, Total	mg/L	***	---	---	---	---
Chloride	mg/L	***	---	---	---	---
Fluoride	mg/L	***	---	---	---	---
pH, Field-Measured	s.u.	***	---	---	---	---
Sulfate	mg/L	***	---	---	---	---
Total Dissolved Solids	mg/L	***	---	---	---	---

Notes:

mg/L, milligrams per liter

s.u., standard units for pH

NP-PL: Non-Parametric Prediction Limit

CUSUM: Parametric Shewhart-CUSUM Control Chart

*** No statistical limits have been set, as baseline data is still be collected.

Q2 2019 was the first baseline sampling event for MW-DP2B, following well installation in November 2018. To date, only baseline samples have been collected at MW-DP2B.

Table 30: Comparative Statistics - MW-DP4

		Statistical Method	Statistical Limit	Detection Monitoring Result	CUSUM Value	Within Compliance?	Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**22-Oct-18**			**6-Jun-19**		
Boron, Total	mg/L	CUSUM	0.60	0.40	0.46	Yes	0.48	0.60	Yes
Calcium, Total	mg/L	NP-PL	325	270	---	Yes	220	---	Yes
Chloride	mg/L	CUSUM	70	65	60	Yes	74	83	No (Potential Exceedance)
Fluoride	mg/L	CUSUM	0.23	0.14	0.20	Yes	0.18	0.16	Yes
pH, Field-Measured	s.u.	CUSUM	6.70, 7.29	7.10	7.00, 7.08	Yes	7.07	7.00, 7.09	Yes
Sulfate	mg/L	CUSUM	3296	2800	3058	Yes	2400	2799	Yes
Total Dissolved Solids	mg/L	CUSUM	5354	4800	4944	Yes	4100	4667	Yes

Notes:

mg/L, milligrams per liter

s.u., standard units for pH

NP-PL: Non-Parametric Prediction Limit

CUSUM: Parametric Shewhart-CUSUM Control Chart

Table 31: Comparative Statistics - MW-91-2

		Statistical Method	Statistical Limit	Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**13-Sep-19**		
Boron, Total	mg/L	CUSUM	0.53	0.38	0.4056	Yes
Calcium, Total	mg/L	Decreasing Trend	NLS	270	---	---
Chloride	mg/L	CUSUM	19.9	15	15.27	Yes
Fluoride	mg/L	NP-PL	0.50	< 0.10 U	---	Yes
pH, Field-Measured	s.u.	CUSUM	5.74, 6.66	6.11	6.20, 6.20	Yes
Sulfate	mg/L	CUSUM	1469	1100	1079	Yes
Total Dissolved Solids	mg/L	CUSUM	2203	2000	1937	Yes

Notes:

mg/L, milligrams per liter

s.u., standard units for pH

NP-PL: Non-Parametric Prediction Limit

CUSUM: Parametric Shewhart-CUSUM Control Chart

NLS: No limit set due to trending data in the baseline period. A trend test is used to assess statistical significance of compliance results.

U: Not detected above the shown practical quantitation limit.

Q3 2019 was the first comparative statistical event for MW-91-2.

Table 32: Comparative Statistics - MW-75

		Statistical Method	Statistical Limit	Detection Monitoring Result	CUSUM Value	Within Compliance?	Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**16-Oct-18**			**6-Jun-19**		
Boron, Total	mg/L	CUSUM	0.33	0.21	0.21	Yes	0.2	0.21	Yes
Calcium, Total	mg/L	NP-PL	9.0	5.1	---	Yes	5.3	---	Yes
Chloride	mg/L	CUSUM	3.1	< 3.0 U	1.6	Yes	< 3.0 U	1.6	Yes
Fluoride	mg/L	CUSUM	0.63	0.45	0.49	Yes	0.56	0.53	Yes
pH, Field-Measured	s.u.	CUSUM	7.70, 8.46	8.23	8.08, 8.17	Yes	8.12	8.08, 8.12	Yes
Sulfate	mg/L	CUSUM	92	75	74	Yes	72	74	Yes
Total Dissolved Solids	mg/L	CUSUM	929	900	879	Yes	810	835	Yes

Notes:

mg/L, milligrams per liter

s.u., standard units for pH

NP-PL: Non-Parametric Prediction Limit

CUSUM: Parametric Shewhart-CUSUM Control Chart

U: Not detected above the shown practical quantitation limit.

Table 33: Comparative Statistics - MW-91-1

		Statistical Method	Statistical Limit	Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**13-Sep-19**		
Boron, Total	mg/L	CUSUM	3.79	2.9	3.00	Yes
Calcium, Total	mg/L	CUSUM	319	230	216	Yes
Chloride	mg/L	CUSUM	88.0	85.0	81.9	Yes
Fluoride	mg/L	CUSUM	0.39	0.20	0.23	Yes
pH, Field-Measured	s.u.	CUSUM	6.66, 7.25	6.97	6.96, 6.96	Yes
Sulfate	mg/L	NP-PL	1300	1300	---	Yes
Total Dissolved Solids	mg/L	NP-PL	2400	2300 H	---	Yes

Notes:

mg/L, milligrams per liter

s.u., standard units for pH

NP-PL: Non-Parametric Prediction Limit

CUSUM: Parametric Shewhart-CUSUM Control Chart

H: Sample was prepped or analyzed beyond the specified holding time.

Q3 2019 was the first comparative statistical event for MW-91-1.

Table 34: Comparative Statistics - MW-49

		Statistical Method	Statistical Limit	Detection Monitoring Result	CUSUM Value	Within Compliance?	Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**16-Oct-18**			**6-Jun-19**		
Boron, Total	mg/L	CUSUM	6.3	4.4	4.9	Yes	4.2	4.9	Yes
Calcium, Total	mg/L	NP-PL	207	180	---	Yes	200	---	Yes
Chloride	mg/L	CUSUM	74	72	72	Yes	70	77	No (Potential Exceedance)
Fluoride	mg/L	NPPL	0.20	0.15	---	Yes	0.19	---	Yes
pH, Field-Measured	s.u.	CUSUM	6.67, 7.36	7.08	7.02, 7.02	Yes	6.89	6.97, 7.02	Yes
Sulfate	mg/L	CUSUM	1819	1400	1301	Yes	1300	1242	Yes
Total Dissolved Solids	mg/L	CUSUM	2824	2800	2906	No (False Positive)	2600	2706	Yes

Notes:

mg/L, milligrams per liter

s.u., standard units for pH

NP-PL: Non-Parametric Prediction Limit

CUSUM: Parametric Shewhart-CUSUM Control Chart

Table 35: Comparative Statistics - MW-51

		Statistical Method	Statistical Limit	Detection Monitoring Result	CUSUM Value	Within Compliance?	Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**16-Oct-18**			**6-Jun-19**		
Boron, Total	mg/L	NP-PL	5.7	2.8	---	Yes	3.9	---	Yes
Calcium, Total	mg/L	CUSUM	503	220	283	Yes	280	283	Yes
Chloride	mg/L	CUSUM	267	60	71	Yes	87	71	Yes
Fluoride	mg/L	NP-PL	0.50	0.29	---	Yes	0.39	---	Yes
pH, Field-Measured	s.u.	CUSUM	6.46, 7.61	7.26	7.03, 7.13	Yes	7.08	7.03 ,7.05	Yes
Sulfate	mg/L	CUSUM	6015	3000	3130	Yes	3100	3130	Yes
Total Dissolved Solids	mg/L	CUSUM	7733	5300	5181	Yes	5300	5181	Yes

Notes:

mg/L, milligrams per liter

s.u., standard units for pH

NP-PL: Non-Parametric Prediction Limit

CUSUM: Parametric Shewhart-CUSUM Control Chart

Table 36: Comparative Statistics - MW-16-6

		Statistical Method	Statistical Limit	Detection Monitoring Result	CUSUM Value	Within Compliance?	Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**16-Oct-18**			**6-Jun-19**		
Boron, Total	mg/L	CUSUM	6.9	4.6	4.6	Yes	3.9	4.6	Yes
Calcium, Total	mg/L	CUSUM	656	500	523	Yes	500	523	Yes
Chloride	mg/L	CUSUM	50	35	41	Yes	37	41	Yes
Fluoride	mg/L	NP-PL	0.10	< 0.10 U	---	Yes	< 0.10 U	---	Yes
pH, Field-Measured	s.u.	CUSUM	5.55, 5.90	5.83	5.72, 5.79	Yes	5.68	5.72, 5.72	Yes
Sulfate	mg/L	CUSUM	5342	3800	3591	Yes	3600	3591	Yes
Total Dissolved Solids	mg/L	CUSUM	6277	6100	6150	Yes	5900	6294	No (Potential Exceedance)

Notes:

mg/L, milligrams per liter

s.u., standard units for pH

NP-PL: Non-Parametric Prediction Limit

CUSUM: Parametric Shewhart-CUSUM Control Chart

U: Not detected above the shown practical quantitation limit.

Table 37: Comparative Statistics - MW-16-7

		Statistical Method	Statistical Limit	Detection Monitoring Result	CUSUM Value	Within Compliance?	Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**16-Oct-18**			**10-Jun-19**		
Boron, Total	mg/L	NP-PL	0.11	< 0.10 U	---	Yes	< 0.10 U	---	Yes
Calcium, Total	mg/L	CUSUM	515	300	357	Yes	330	357	Yes
Chloride	mg/L	CUSUM	96	78	85	Yes	77 H	81	Yes
Fluoride	mg/L	CUSUM	0.15	< 0.10 U	0.11	Yes	< 0.10 U	0.11	Yes
pH, Field-Measured	s.u.	CUSUM	6.58, 7.17	6.98	6.87, 7.00	Yes	6.91	6.87, 6.97	Yes
Sulfate	mg/L	CUSUM	3300	2500	2381	Yes	2600 H	2396	Yes
Total Dissolved Solids	mg/L	CUSUM	4711	4100	4117	Yes	4100 B	4104	Yes

Notes:

mg/L, milligrams per liter

s.u., standard units for pH

NP-PL: Non-Parametric Prediction Limit

CUSUM: Parametric Shewhart-CUSUM Control Chart

U: Not detected above the shown practical quantitation limit.

H: Analyzed outside of holding time

B: Compound was found in the blank and the sample

Table 38: Comparative Statistics - MW-10

		Statistical Method	Statistical Limit	Detection Monitoring Result	CUSUM Value	Within Compliance?	Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**16-Oct-18**			**10-Jun-19**		
Boron, Total	mg/L	CUSUM	3.8	2.2	2.2	Yes	2.0	2.2	Yes
Calcium, Total	mg/L	CUSUM	364	210	260	Yes	220	260	Yes
Chloride	mg/L	CUSUM	25	18	18	Yes	19 H	19	Yes
Fluoride	mg/L	CUSUM	0.27	0.17	0.21	Yes	0.19	0.21	Yes
pH, Field-Measured	s.u.	CUSUM	6.51, 7.13	6.92	6.82, 6.85	Yes	6.91	6.82, 6.88	Yes
Sulfate	mg/L	CUSUM	1531	820	970.9	Yes	810 H	971	Yes
Total Dissolved Solids	mg/L	CUSUM	3304	2000	2212	Yes	1900 B	2212	Yes

Notes:

mg/L, milligrams per liter

s.u., standard units for pH

CUSUM: Parametric Shewhart-CUSUM Control Chart

H: Analyzed outside of holding time

B: Compound was found in the blank and the sample

Table 39: Comparative Statistics - MW-16-0

		Statistical Method	Statistical Limit	Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**10-Jun-19**		
Boron, Total	mg/L	CUSUM	10.1	6.7	7.1	Yes
Calcium, Total	mg/L	CUSUM	581	370	412	Yes
Chloride	mg/L	CUSUM	46.7	31 H	36.3	Yes
Fluoride	mg/L	CUSUM	0.31	0.22	0.21	Yes
pH, Field-Measured	s.u.	CUSUM	6.89, 7.62	7.42	7.25, 7.34	Yes
Sulfate	mg/L	CUSUM	3290	2600 H	2516	Yes
Total Dissolved Solids	mg/L	CUSUM	4616	3900 B	4184	Yes

Notes:

mg/L, milligrams per liter

s.u., standard units for pH

NP-PL: Non-Parametric Prediction Limit

CUSUM: Parametric Shewhart-CUSUM Control Chart

H: Analyzed outside of holding time

B: Compound was found in the blank and the sample

Q2 2019 was the first comparative statistical event for MW-16-0.

Table 40: Comparative Statistics - MW-16-1

		Statistical Method	Statistical Limit	Detection Monitoring Result	CUSUM Value	Within Compliance?	Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**16-Oct-18**			**10-Jun-19**		
Boron, Total	mg/L	CUSUM	22	13	18	Yes	13	19	Yes
Calcium, Total	mg/L	CUSUM	779	590	561	Yes	560	547	Yes
Chloride	mg/L	CUSUM	342	340	321	Yes	370 H	417	No (Potential Exceedance)
Fluoride	mg/L	CUSUM	0.65	0.16	0.30	Yes	0.21	0.30	Yes
pH, Field-Measured	s.u.	CUSUM	6.85, 7.40	7.16	7.12, 7.12	Yes	7.16	7.12, 7.12	Yes
Sulfate	mg/L	CUSUM	3996	3200	3464	Yes	3700 H	4123	No (Potential Exceedance)
Total Dissolved Solids	mg/L	CUSUM	6615	5200	5306	Yes	5400 B	5932	Yes

Notes:

mg/L, milligrams per liter

s.u., standard units for pH

CUSUM: Parametric Shewhart-CUSUM Control Chart

H: Analyzed outside of holding time

B: Compound was found in the blank and the sample

Table 41: Comparative Statistics - MW-72

		Statistical Method	Statistical Limit	Detection Monitoring Result	CUSUM Value	Within Compliance?	Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**17-Oct-18**			**6-Jun-19**		
Boron, Total	mg/L	CUSUM	0.24	0.13	0.19	Yes	0.12	0.12	Yes
Calcium, Total	mg/L	CUSUM	970	670	813	Yes	720	813	Yes
Chloride	mg/L	CUSUM	35	32	32	Yes	36 H	39	No (Potential Exceedance)
Fluoride	mg/L	CUSUM	0.32	0.19	0.24	Yes	0.18	0.24	Yes
pH, Field-Measured	s.u.	CUSUM	6.39, 7.06	6.74	6.73, 6.73	Yes	6.76	6.73, 6.73	Yes
Sulfate	mg/L	CUSUM	4035	3100	3074	Yes	3400 H	3186	Yes
Total Dissolved Solids	mg/L	Increasing Trend	NLS	5300	---	Yes	5200 B	---	Yes

Notes:

mg/L, milligrams per liter

s.u., standard units for pH

CUSUM: Parametric Shewhart-CUSUM Control Chart

NLS: No limit set due to trending data in the baseline period. A trend test is used to assess statistical significance of compliance results.

NLS: No limit set due to trending data.

H: Analyzed outside of holding time

B: Compound was found in the blank and the sample

Table 42: Comparative Statistics - MW-42

		Statistical Method	Statistical Limit	Detection Monitoring Result	CUSUM Value	Within Compliance?	Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**17-Oct-18**			**10-Jun-19**		
Boron, Total	mg/L	CUSUM	2.49	0.93	1.09	Yes	0.78	1.09	Yes
Calcium, Total	mg/L	CUSUM	371	210	252	Yes	230	252	Yes
Chloride	mg/L	CUSUM	28	24	22	Yes	27 H	28	No (Potential Exceedance)
Fluoride	mg/L	CUSUM	0.42	1	0.97	No (False Positive)	0.26	0.30	Yes
pH, Field-Measured	s.u.	CUSUM	6.85, 7.72	7.33	7.29, 7.29	Yes	7.41	7.29, 7.31	Yes
Sulfate	mg/L	CUSUM	2441	1400	1422	Yes	1400 H	1422	Yes
Total Dissolved Solids	mg/L	CUSUM	3463	2400	2423	Yes	2300 B	2423	Yes

Notes:

mg/L, milligrams per liter

s.u., standard units for pH

CUSUM: Parametric Shewhart-CUSUM Control Chart

H: Analyzed outside of holding time

B: Compound was found in the blank and the sample

Table 43: Comparative Statistics - MW-16-2

		Statistical Method	Statistical Limit	Detection Monitoring Result	CUSUM Value	Within Compliance?	Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**18-Oct-18**			**11-Jun-19**		
Boron, Total	mg/L	CUSUM	14.0	8.1	10.3	Yes	8.2	10.3	Yes
Calcium, Total	mg/L	CUSUM	660	370	427	Yes	360	427	Yes
Chloride	mg/L	NP-PL	197	190	---	Yes	180 H	---	Yes
Fluoride	mg/L	CUSUM	1.28	0.43	0.64	Yes	0.66	0.64	Yes
pH, Field-Measured	s.u.	CUSUM	6.74, 7.49	7.12	7.12, 7.12	Yes	7.23	7.12, 7.15	Yes
Sulfate	mg/L	CUSUM	3488	2400	2328	Yes	2200 H	2328	Yes
Total Dissolved Solids	mg/L	NP-PL	4030	4100	---	No (False Positive)	3500	---	Yes

Notes:

mg/L, milligrams per liter

s.u., standard units for pH

NP-PL: Non-Parametric Prediction Limit

CUSUM: Parametric Shewhart-CUSUM Control Chart

H: Analyzed outside of holding time

Table 44: Comparative Statistics - MW-16-3

		Statistical Method	Statistical Limit	Detection Monitoring Result	CUSUM Value	Within Compliance?	Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**18-Oct-18**			**11-Jun-19**		
Boron, Total	mg/L	CUSUM	25	15	18	Yes	16	18	Yes
Calcium, Total	mg/L	NP-PL	535	370	---	Yes	420	---	Yes
Chloride	mg/L	CUSUM	908	620	642	Yes	720 H	706	Yes
Fluoride	mg/L	CUSUM	2.08	1.30	1.58	Yes	1.40	1.58	Yes
pH, Field-Measured	s.u.	CUSUM	6.75, 7.38	7.09	7.06, 7.06	Yes	7.06	7.06, 7.06	Yes
Sulfate	mg/L	CUSUM	7686	5400	5311	Yes	5400 H	5118	Yes
Total Dissolved Solids	mg/L	CUSUM	11583	9200	10009	Yes	8600	9078	Yes

Notes:

mg/L, milligrams per liter

s.u., standard units for pH

NP-PL: Non-Parametric Prediction Limit

CUSUM: Parametric Shewhart-CUSUM Control Chart

H: Analyzed outside of holding time

Table 45: Comparative Statistics - MW-16-4

		Statistical Method	Statistical Limit	Detection Monitoring Result	CUSUM Value	Within Compliance?	Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**18-Oct-18**			**11-Jun-19**		
Boron, Total	mg/L	CUSUM	1.25	0.47	0.58	Yes	0.47	0.58	Yes
Calcium, Total	mg/L	CUSUM	751	380	417	Yes	410	417	Yes
Chloride	mg/L	CUSUM	54	34	34	Yes	44 H	40	Yes
Fluoride	mg/L	CUSUM	0.40	0.30	0.33	Yes	0.26	0.33	Yes
pH, Field-Measured	s.u.	CUSUM	6.15, 7.57	6.8	6.86, 6.86	Yes	6.86	6.86, 6.86	Yes
Sulfate	mg/L	CUSUM	4475	3400	3271	Yes	3500 H	3271	Yes
Total Dissolved Solids	mg/L	CUSUM	6409	5300	4899	Yes	4800	4796	Yes

Notes:

mg/L, milligrams per liter

s.u., standard units for pH

NP-PL: Non-Parametric Prediction Limit

CUSUM: Parametric Shewhart-CUSUM Control Chart

H: Analyzed outside of holding time

Table 46: Comparative Statistics - MW-15

		Statistical Method	Statistical Limit	Detection Monitoring Result	CUSUM Value	Within Compliance?	Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**17-Oct-18**			**11-Jun-19**		
Boron, Total	mg/L	CUSUM	35	23	27	Yes	24	27	Yes
Calcium, Total	mg/L	CUSUM	561	390	452	Yes	420	452	Yes
Chloride	mg/L	CUSUM	405	260	278	Yes	340 H	312	Yes
Fluoride	mg/L	CUSUM	0.78	0.46	0.58	Yes	0.49	0.58	Yes
pH, Field-Measured	s.u.	CUSUM	6.64, 7.46	7.10	7.05, 7.05	Yes	7.16	7.05, 7.07	Yes
Sulfate	mg/L	CUSUM	5055	4000	3866	Yes	3900 H	3866	Yes
Total Dissolved Solids	mg/L	CUSUM	7189	6700	7023	Yes	6600	7117	Yes

Notes:

mg/L, milligrams per liter

s.u., standard units for pH

CUSUM: Parametric Shewhart-CUSUM Control Chart

H: Analyzed outside of holding time

Table 47: Comparative Statistics - MW-16-5

		Statistical Method	Statistical Limit	Detection Monitoring Result	CUSUM Value	Within Compliance?	Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**18-Oct-18**			**11-Jun-19**		
Boron, Total	mg/L	CUSUM	23.9	13	14	Yes	9.2	14.1	Yes
Calcium, Total	mg/L	NP-PL	477	310	---	Yes	320	---	Yes
Chloride	mg/L	CUSUM	179	120	130	Yes	170 H	159	Yes
Fluoride	mg/L	CUSUM	1.14	0.85	0.86	Yes	0.81	0.86	Yes
pH, Field-Measured	s.u.	CUSUM	6.74, 7.55	7.15	7.14, 7.14	Yes	7.29	7.14, 7.20	Yes
Sulfate	mg/L	CUSUM	3203	2400	2970	Yes	2200 H	2770	Yes
Total Dissolved Solids	mg/L	CUSUM	4472	3900	3712	Yes	3600	3626	Yes

Notes:

mg/L, milligrams per liter

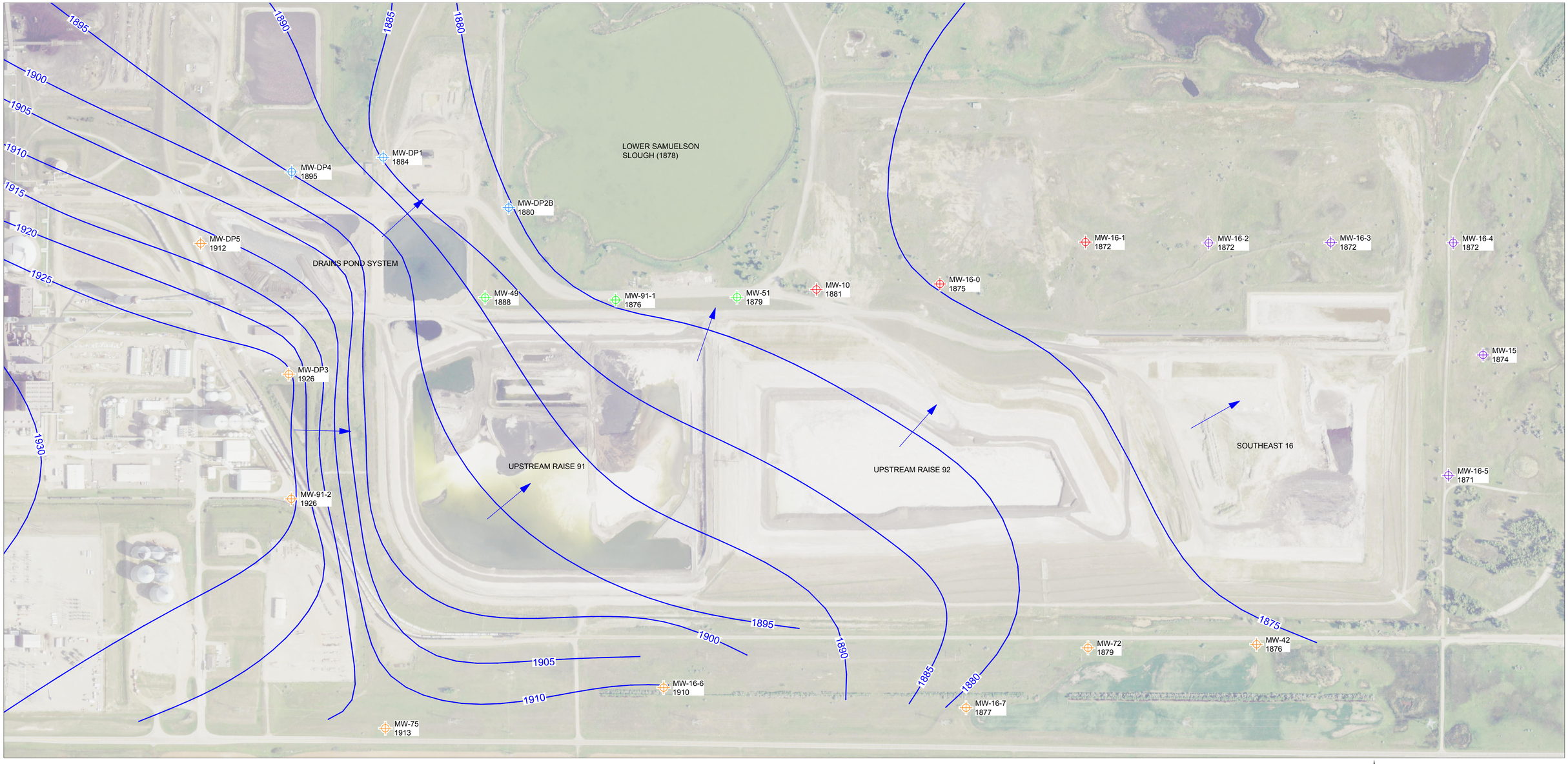
s.u., standard units for pH

NP-PL: Non-Parametric Prediction Limit

CUSUM: Parametric Shewhart-CUSUM Control Chart

H: Analyzed outside of holding time

Figures



LEGEND

- UPGRADIENT MONITORING WELL
- DOWNGRADIENT MONITORING WELL - DRAINS POND SYSTEM
- DOWNGRADIENT MONITORING WELL - UPSTREAM RAISE 91
- DOWNGRADIENT MONITORING WELL - UPSTREAM RAISE 92
- DOWNGRADIENT MONITORING WELL - SOUTHEAST 16
- GENERAL DIRECTION OF GROUNDWATER FLOW
- 1930 — POTENTIOMETRIC SURFACE CONTOURS (SEE NOTE 2)

NOTE(S)

1. GROUNDWATER ELEVATIONS SHOWN WERE MEASURED MAY AND JUNE 2019.
2. POTENTIOMETRIC SURFACE CONTOURS WERE CREATED USING WATER LEVEL INFORMATION FROM THE MAY AND JUNE 2019 GROUNDWATER ELEVATIONS SHOWN, AS WELL AS SURVEYED SURFACE WATER EXPRESSIONS, ADDITIONAL SITE WELLS, AND PIEZOMETERS NOT SHOWN. CONTOUR INTERVALS ARE 5 FEET.
3. AERIAL IMAGERY OBTAINED FROM UNITED STATES DEPARTMENT OF AGRICULTURE, NATIONAL AGRICULTURE IMAGERY PROGRAM, 2018.

N

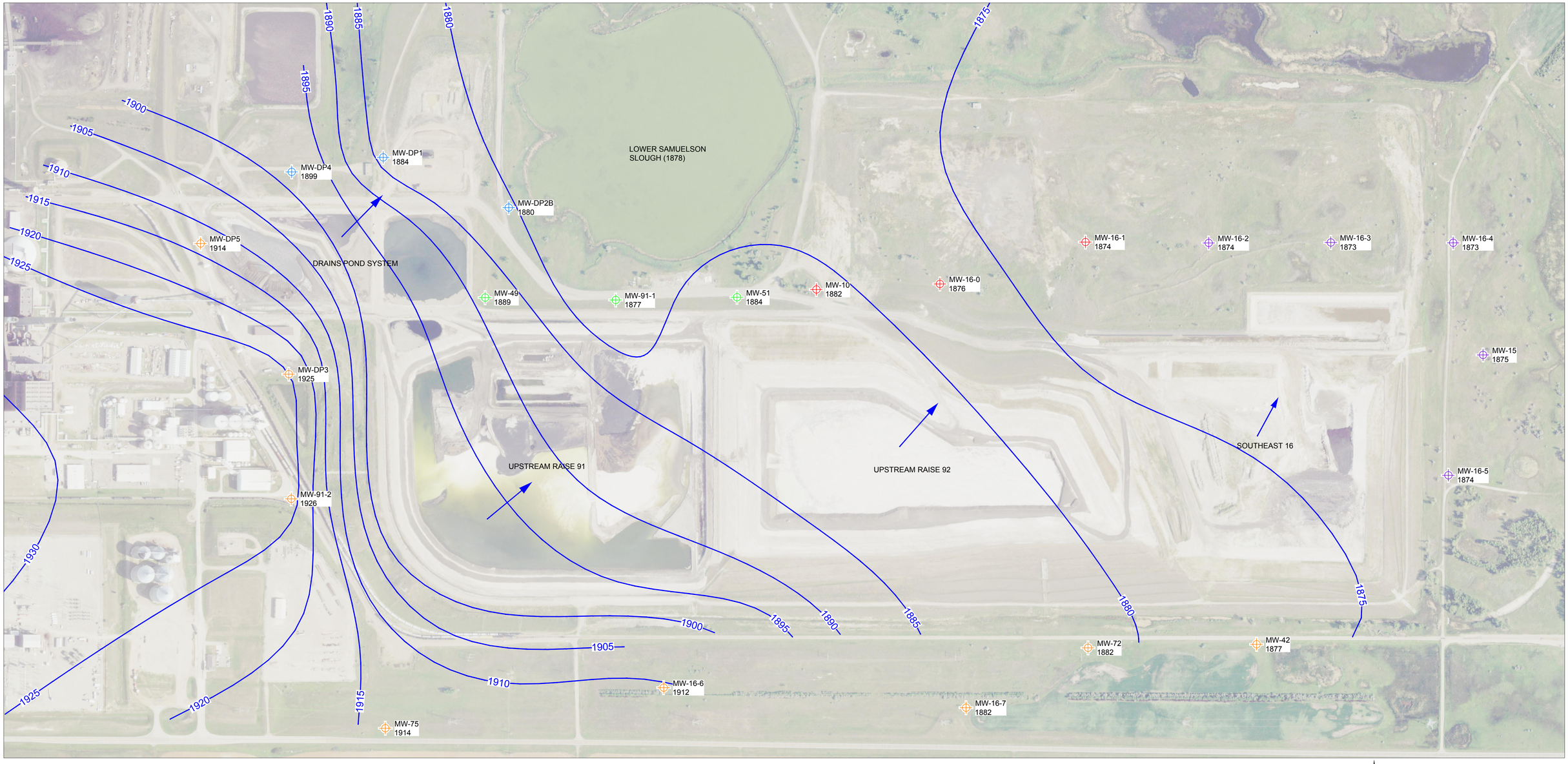
0 300 600
1" = 300' FEET

GOLDER

MONITORING WELL LOCATIONS AND MAY-JUNE 2019 GROUNDWATER CONDITIONS
GREAT RIVER ENERGY - COAL CREEK STATION

FIGURE 1

Path: \\Denver\acad\GREAT RIVER ENERGY\COAL CREEK\09_PROJECTS\19115185\Facility Groundwater\ | File Name: Figure 1_MayJune 2019 MW Network.dwg



LEGEND

- UPGRADIENT MONITORING WELL
- DOWNGRADIENT MONITORING WELL - DRAINS POND SYSTEM
- DOWNGRADIENT MONITORING WELL - UPSTREAM RAISE 91
- DOWNGRADIENT MONITORING WELL - UPSTREAM RAISE 92
- DOWNGRADIENT MONITORING WELL - SOUTHEAST 16
- GENERAL DIRECTION OF GROUNDWATER FLOW
- 1930 — POTENTIOMETRIC SURFACE CONTOURS (SEE NOTE 2)

NOTE(S)

1. GROUNDWATER ELEVATIONS SHOWN WERE MEASURED OCTOBER 2019.
2. POTENTIOMETRIC SURFACE CONTOURS WERE CREATED USING WATER LEVEL INFORMATION FROM THE OCTOBER 2019 GROUNDWATER ELEVATIONS SHOWN, AS WELL AS SURVEYED SURFACE WATER EXPRESSIONS, ADDITIONAL SITE WELLS, AND PIEZOMETERS NOT SHOWN. CONTOUR INTERVALS IS 5 FEET.
3. AERIAL IMAGERY OBTAINED FROM UNITED STATES DEPARTMENT OF AGRICULTURE, NATIONAL AGRICULTURE IMAGERY PROGRAM, 2018.

N

0 300 600
1" = 300' FEET

GOLDER

MONITORING WELL LOCATIONS
OCTOBER 2019 GROUNDWATER CONDITIONS
GREAT RIVER ENERGY - COAL CREEK STATION

FIGURE 2

Path: \\Denver\acad\GREAT RIVER ENERGY\COAL CREEK\09_PROJECTS\1911516\5\Facility Groundwater\ | File Name: Figure 2_October 2019 MW Network.dwg



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APPENDIX C-5

Comparative Statistics – Q4 2019 and Q2 2020 Detection Monitoring

Table 1: MW-DP3 (Upgradient) Comparative Statistics

		Statistical Method	Statistical Limit	Q4 2019 Detection Monitoring Result	CUSUM Value	Within Compliance?	Q2 2020 Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**9-Oct-19**			**7-Apr-20**		
Boron, Total	mg/L	CUSUM	0.90	0.53	0.63	Yes	0.64	0.63	Yes
Calcium, Total	mg/L	CUSUM	330	210	251	Yes	240	251	Yes
Chloride	mg/L	CUSUM	25	< 15 U	12	Yes	13	12	Yes
Fluoride	mg/L	CUSUM	0.14	< 0.10 U	0.11	Yes	0.11	0.11	Yes
pH, Field-Measured	s.u.	CUSUM	6.02, 6.62	6.4	6.32, 6.33	Yes	6.33	6.32, 6.32	Yes
Sulfate	mg/L	CUSUM	1577	1200	1205	Yes	1200	1205	Yes
Total Dissolved Solids	mg/L	CUSUM	2559	2200	2260	Yes	2400	2325	Yes

Notes:
mg/L, milligrams per liter
s.u., standard units for pH
CUSUM: Parametric Shewhart-CUSUM Control Chart
U: Not detected at the shown reporting limit

Table 2: MW-91-2 (Upgradient) Comparative Statistics

		Statistical Method	Statistical Limit	Q4 2019 Detection Monitoring Result	CUSUM Value	Within Compliance?	Q2 2020 Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**14-Oct-19**			**7-Apr-20**		
Boron, Total	mg/L	CUSUM	0.53	0.35	0.41	Yes	0.24	0.41	Yes
Calcium, Total	mg/L	Decreasing Trend	NLS	240	---	---	160	---	---
Chloride	mg/L	CUSUM	20	13	15	Yes	11	15	Yes
Fluoride	mg/L	NP-PL	0.50	< 0.10 U	---	Yes	0.11	---	Yes
pH, Field-Measured	s.u.	CUSUM	5.74, 6.66	6.15	6.20, 6.20	Yes	6.52	6.20, 6.42	Yes
Sulfate	mg/L	CUSUM	1469	920	1079	Yes	510	1079	Yes
Total Dissolved Solids	mg/L	CUSUM	2203	1700	1919	Yes	1100	1919	Yes

Notes:
mg/L, milligrams per liter
s.u., standard units for pH
NP-PL: Non-Parametric Prediction Limit
CUSUM: Parametric Shewhart-CUSUM Control Chart
Trend: Trends were identified in the background period. See text for discussion of significance.
NLS: No limit set due to trending data.
U: Not detected at the shown reporting limit

Table 3: MW-75 (Upgradient) Comparative Statistics

		Statistical Method	Statistical Limit	Q4 2019 Detection Monitoring Result	CUSUM Value	Within Compliance?	Q2 2020 Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**14-Oct-19**			**7-Apr-20**		
Boron, Total	mg/L	CUSUM	0.30	0.20	0.21	Yes	0.20	0.21	Yes
Calcium, Total	mg/L	CUSUM	7.6	5.3	5.5	Yes	4.7	5.5	Yes
Chloride	mg/L	CUSUM	3.2	1.1	1.5	Yes	< 3.0 U	2.5	Yes
Fluoride	mg/L	CUSUM	0.64	0.46	0.49	Yes	0.45	0.49	Yes
pH, Field-Measured	s.u.	CUSUM	7.76, 8.44	8.22	8.10, 8.14	Yes	8.11	8.10, 8.10	Yes
Sulfate	mg/L	CUSUM	92	71	73	Yes	73	73	Yes
Total Dissolved Solids	mg/L	CUSUM	948	880	853	Yes	860	847	Yes

Notes:
mg/L, milligrams per liter
s.u., standard units for pH
CUSUM: Parametric Shewhart-CUSUM Control Chart
U: Not detected at the shown reporting limit

Table 4: MW-16-6 (Upgradient) Comparative Statistics

		Statistical Method	Statistical Limit	Q4 2019 Detection Monitoring Result	CUSUM Value	Within Compliance?	Q2 2020 Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**14-Oct-19**			**8-Apr-20**		
Boron, Total	mg/L	CUSUM	6.9	5.2	4.6	Yes	4.8	4.6	Yes
Calcium, Total	mg/L	CUSUM	634	530	518	Yes	540	518	Yes
Chloride	mg/L	CUSUM	54	45	42	Yes	35 H	40	Yes
Fluoride	mg/L	NP-PL	0.10	< 0.10 U	---	Yes	< 0.10 U	---	Yes
pH, Field-Measured	s.u.	CUSUM	5.55, 5.92	5.94	5.73, 5.89	No - Potential Exceedance	5.78	5.73, 5.90	Yes - Prior Result Was a False Positive
Sulfate	mg/L	CUSUM	4913	3900	3590	Yes	3400	3590	Yes
Total Dissolved Solids	mg/L	CUSUM	6277	6400	6939	No - Verified Exceedance	6000	7184	No - Previously Verified SSI

Notes:
mg/L, milligrams per liter
s.u., standard units for pH
NP-PL: Non-Parametric Prediction Limit
CUSUM: Parametric Shewhart-CUSUM Control Chart
H: Analyzed outside of holding time
U: Not detected at the shown reporting limit

Table 5: MW-49 (Downgradient) Comparative Statistics

		Statistical Method	Statistical Limit	Q4 2019 Detection Monitoring Result	CUSUM Value	Within Compliance?	Q2 2020 Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**15-Oct-19**			**8-Apr-20**		
Boron, Total	mg/L	CUSUM	6.3	4.6	4.8	Yes	4.7	4.8	Yes
Calcium, Total	mg/L	CUSUM	233	200	198	Yes	210	201	Yes
Chloride	mg/L	CUSUM	74	71	83	No - Verified SSI	60	85	No - Previously Verified SSI
Fluoride	mg/L	CUSUM	0.26	0.16	0.18	Yes	0.16	0.18	Yes
pH, Field-Measured	s.u.	CUSUM	6.71, 7.32	7.02	7.01, 7.01	Yes	7.01	7.01, 7.01	Yes
Sulfate	mg/L	CUSUM	1752	1400	1280	Yes	1300	1271	Yes
Total Dissolved Solids	mg/L	CUSUM	2956	2800	2726	Yes	2700	2691	Yes

Notes:
mg/L, milligrams per liter
s.u., standard units for pH
CUSUM: Parametric Shewhart-CUSUM Control Chart

Table 6: MW-91-1 (Downgradient) Comparative Statistics

		Statistical Method	Statistical Limit	Q4 2019 Detection Monitoring Result	CUSUM Value	Within Compliance?	Q2 2020 Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**15-Oct-19**			**8-Apr-20**		
Boron, Total	mg/L	CUSUM	3.8	2.7	3.0	Yes	3.0	3.0	Yes
Calcium, Total	mg/L	CUSUM	319	220	216	Yes	230	216	Yes
Chloride	mg/L	CUSUM	88	79	84	Yes	66	74	Yes
Fluoride	mg/L	CUSUM	0.39	0.21	0.23	Yes	0.22	0.23	Yes
pH, Field-Measured	s.u.	CUSUM	6.66, 7.25	6.94	6.96, 6.96	Yes	6.93	6.96, 6.96	Yes
Sulfate	mg/L	NP-PL	1300	1100	---	Yes	1100	---	Yes
Total Dissolved Solids	mg/L	NP-PL	2400	2400	---	Yes	2300	---	Yes

Notes:
mg/L, milligrams per liter
s.u., standard units for pH
NP-PL: Non-Parametric Prediction Limit
CUSUM: Parametric Shewhart-CUSUM Control Chart

Table 7: MW-51 (Downgradient) Comparative Statistics

		Statistical Method	Statistical Limit	Q4 2019 Detection Monitoring Result	CUSUM Value	Within Compliance?	Q2 2020 Detection Monitoring Result	CUSUM Value	Within Compliance?
Appendix III Analytes	**Units**			**15-Oct-19**			**8-Apr-20**		
Boron, Total	mg/L	NP-PL	5.7	7.9	---	No - Potential Exceedance	5.4	---	Yes - Prior Result Was a False Positive
Calcium, Total	mg/L	CUSUM	458	420	373	Yes	270	326	Yes
Chloride	mg/L	CUSUM	195	80	69	Yes	54 H	69	Yes
Fluoride	mg/L	CUSUM	0.60	0.43	0.38	Yes	0.28	0.36	Yes
pH, Field-Measured	s.u.	CUSUM	6.56, 7.55	6.91	7.03, 7.06	Yes	6.99	7.06, 7.06	Yes
Sulfate	mg/L	CUSUM	5249	3600	3103	Yes	2600	3103	Yes
Total Dissolved Solids	mg/L	CUSUM	7079	6200	5724	Yes	4800	5174	Yes

Notes:
mg/L, milligrams per liter
s.u., standard units for pH
NP-PL: Non-Parametric Prediction Limit
CUSUM: Parametric Shewhart-CUSUM Control Chart
H: Analyzed outside of holding time

APPENDIX C-6

Alternative Source Demonstration – Q4 2019 – MW49 Chloride

GOLDER

REPORT

Alternative Source Demonstration for Chloride in Monitoring Well MW-49

Great River Energy - Coal Creek Station

Submitted to:

Great River Energy
Coal Creek Station
2875 Third Street SW
Underwood, North Dakota

Submitted by:

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19136224

May 13, 2020



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1.0 INTRODUCTION

On behalf of Great River Energy (GRE), Golder Associates Inc. (Golder) performed a statistical evaluation of groundwater monitoring results from the fourth quarter (Q4) 2019 groundwater detection monitoring event at Coal Creek Station's Upstream Raise 91 coal combustion residual (CCR) surface impoundment. The statistical evaluation was performed as described in the Coal Combustion Residuals Groundwater Statistical Method Certification for Coal Creek Station, Revision 1 (Golder 2019b), in accordance with applicable provisions of 40 Code of Federal Regulations (CFR) Part 257, "Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule" (CCR rule), as amended.

Statistical analyses of the Appendix III detection monitoring data for chloride in groundwater at the downgradient monitoring well MW-49 indicated a potential exceedance of the statistical limit based on the parametric Shewhart-CUSUM (Cumulative Summation) control chart analysis of the second quarter (Q2) 2019 sampling results. This potential exceedance was subsequently verified as evidence of a statistically significant increase (SSI) following the Q4 2019 detection monitoring sampling event. Although determination of a verified SSI generally indicates that the groundwater monitoring program should transition from detection monitoring to assessment monitoring, 40 CFR Part 257.94(e)(2) allows the owner or operator (i.e., GRE) 90 days from the date of determining a verified SSI (February 13, 2020) to demonstrate a source other than the regulated CCR facility caused the SSI or that the SSI was a result of an error in sampling, analysis, or statistical evaluation or natural variability in groundwater quality that was not fully captured during the baseline data collection.

Golder's review of the hydrological and geologic conditions at the site and the sampling and analytical procedures indicates the SSI is not an indication of impacts from the CCR unit. To assess potential chloride sources, including the statistical analysis and the natural variability of chloride concentrations in groundwater, a desktop study of previously collected CCR-impacted water from the facility, nearby surface water, and groundwater samples was conducted. Based upon this review and in accordance with provisions of the CCR Rule, Golder has prepared this Alternative Source Demonstration (ASD) for chloride at MW-49 and the Upstream Raise 91 CCR surface impoundment.

This ASD conforms to the requirements of 40 CFR Part 257.94(e)(2) and provides the basis for concluding that the verified SSI for chloride at MW-49 is not an indication of a release from Upstream Raise 91. The following sections provide a summary of Upstream Raise 91, sampling procedures and analytical methods, analytical and geochemical assessment results, and lines of evidence demonstrating an alternative source is responsible for the chloride SSI.

2.0 BACKGROUND

2.1 Site Background

GRE's Coal Creek Station (CCS) is a coal-fired electric generation facility located in McLean County, approximately 10 miles northwest of Washburn, North Dakota. CCRs are managed in composite-lined surface water impoundment cells and dry waste facilities regulated and permitted by the North Dakota Department of Environmental Quality (NDDEQ) in accordance with North Dakota Administrative Code (NDAC) Article 33-20, Solid Waste Management and Land Protection.

Coal Creek Station has four CCR facilities that are within the purview of the EPA CCR rule. This ASD only applies to the Upstream Raise 91 CCR surface impoundment. Upstream Raise 91 is located in the south-central portion of the plant site, east of the Coal Creek Station plant buildings (Figure 1).

2.2 Site Geology

Coal Creek Station and McLean County are situated at the eastern-most extent of the Williston Basin, a structural and sedimentary basin (USGS 1999). The region is characterized by the presence of glacial drift, reaching thicknesses of several hundred feet and overlying the Sentinel Butte Member, the source of commercially mined coal in the direct vicinity of Coal Creek Station (Falkirk 1979). The Sentinel Butte Member is the highest strata of the Paleocene Fort Union Formation, overlying the Tongue River, Ludlow, and Cannonball Members (USGS 1999). The Sentinel Butte Member is marked by drab-gray units, demarcating the separation from the lower Tongue River Member.

The site geology of CCS includes unconsolidated surficial deposits of the Coleharbor formation, consisting of stratified and unstratified glacial drift. The near-surface materials are silty clay and sandy clay till with interbedded lenses (CPA/UPA 1989).

2.3 Site Hydrogeology

Regional groundwater flow of the uppermost water-bearing unit in the vicinity of CCS is a subtle expression of the surface topography, which is influenced by the configuration of the eroded bedrock. Based on available groundwater elevation data, the shallow groundwater at the CCR facilities at Coal Creek Station generally follows surface topography, flowing east and north towards Lower Samuelson Slough and Sayler Slough. Available groundwater elevation data indicate that groundwater in the area of Upstream Raise 91 generally flows from the southwest to northeast, diagonally across the footprint of the facility, towards Lower Samuelson Slough.

Hydraulic conductivities in the area of Upstream Raise 91 range from 0.35 feet per day (ft/day) to 12.96 ft/day, with calculated groundwater flow rates during Q4 2019 ranging from 0.04 to 1.56 ft/day.

2.4 Groundwater Monitoring Network

The groundwater monitoring network for Upstream Raise 91 was developed with consideration for the size, disposal and operational history, anticipated flow direction, and location of adjoining facilities. Based on these factors, a monitoring well network consisting of two upgradient and three downgradient monitoring wells is used for monitoring the unit under the CCR rule.

The two upgradient monitoring wells (MW-75, MW-91-2) included in the groundwater monitoring network for Upstream Raise 91 are used to represent upgradient water quality flowing towards the unit from the west and south, including the potential for variability. The three downgradient wells (MW-49, MW-51, MW-91-1) are spaced along the northern edge of the facility. Upstream Raise 91 directly abuts Upstream Raise 92 on its eastern edge, preventing installation of monitoring wells along the eastern side of Upstream Raise 91 without jeopardizing the integrity of the liner system. The Upstream Raise 91 network wells are presented in Figure 1. Other monitoring locations used to support this ASD are also presented in Figure 1 and are discussed further in Section 5.0.

2.5 Groundwater Conditions

Between September 2015 and June 2017, GRE collected nine independent baseline groundwater samples from MW-75, MW-49, and MW-51, as required by 40 CFR Part 257.94, for use within the CCR rule monitoring program. Baseline samples were collected from MW-91-2 and MW-91-1 between January 2018 and October 2018, following installation of the wells in late 2017. Prior to installation of MW-91-2 and MW-91-1 and completion of the baseline monitoring at the wells, Upstream Raise 91 and Upstream Raise 92 were monitored jointly under a monitoring network consisting of the wells in both units (Golder 2019a). The results of the CCR baseline monitoring were used

to develop appropriate statistical limits for each constituent at each monitoring well, based on site and parameter specific conditions (Golder 2019b). Following completion of the baseline monitoring events at each well, GRE began collecting groundwater samples on a semi-annual basis to support the detection monitoring program. Groundwater samples for detection monitoring are collected at each upgradient and downgradient monitoring well and analyzed for 40 CFR Part 257 Appendix III constituents. During the detection monitoring program, groundwater analysis results are compared to the calculated statistical limits to determine whether groundwater quality remains consistent or if changes are noted.

Chloride concentrations in groundwater at MW-49 during the baseline monitoring period ranged between 59.2 and 67.1 milligrams per liter (mg/L) in the nine baseline samples collected as part of the CCR rule monitoring program. The Shewhart-CUSUM statistical limit for the well-constituent pair was set at 73.9 mg/L.

Following collection of the baseline monitoring events, GRE began collecting groundwater samples on a semiannual basis in October 2017 to support the detection monitoring program. Groundwater samples for detection monitoring were collected at wells within the monitoring well network and analyzed for 40 CFR Part 257 Appendix III constituents. During the detection monitoring program, results from groundwater analysis are compared to the statistical limits calculated from the baseline monitoring results to determine whether groundwater quality remains consistent, or if changes in groundwater quality are a result of statistically significant increases (SSIs) stemming from the monitored unit.

The Q2 2019 detection monitoring event reported a chloride concentration of 70.0 mg/L at MW-49, with a calculated CUSUM value of 77.4 mg/L, exceeding the statistical limit. Verification resampling was conducted during the Q4 2019 detection monitoring event, confirming the SSI for chloride at MW-49 with a chloride concentration of 71.0 mg/L and a calculated CUSUM value of 83.8 mg/L.

2.6 Sampling and Laboratory Testing Procedures

As part of the ASD, a review was conducted of the sampling and laboratory testing procedures used throughout baseline monitoring and detection monitoring to date, along with the collected results. A review of the statistical assessment methods and associated results found the procedures followed during baseline and detection monitoring to be consistent with the stated procedures listed in the published Groundwater Statistical Methods Certification (Golder 2019b). Calculated limits were found to be consistent with the chosen statistical procedures and recommended methodology found within the Unified Guidance (USEPA 2009).

In review of the analytical results a shift in the MW-49 chloride concentrations was noted between data collected prior to June 2018 and data collected after June 2018. This shift was evaluated with a Wilcoxon Rank-Sum test which showed statistical significance at the 95% confidence level (Figure 2). The Wilcoxon Rank-Sum test determines if measurements from one population are significantly different than measurements from another population. This test is non-parametric, meaning that the data are not assumed to fit a specific distribution, such as a normal distribution.

Beginning in June 2018 (Q2 2018, the second semi-annual detection monitoring event), GRE switched sampling staff. The potential impacts of this change are evaluated in Section 3.0. Also beginning in June 2018 (Q2 2018, the second semi-annual detection monitoring event), GRE switched analytical laboratories from Minnesota Valley Testing Laboratory (Bismarck, North Dakota) to Eurofins TestAmerica (Denver Laboratory in Arvada, Colorado). Concurrent with the laboratory switch, differences were noted between the testing methodologies used for chloride by the two laboratories. An evaluation of the methods and their associated differences is discussed in Section 4.1.

3.0 POTENTIAL SAMPLING CAUSES

Between September 2015 and May 2018, sampling of the CCR rule wells and other wells and surface water sampling locations at Coal Creek Station was conducted by outside contractors from the Bismarck, North Dakota location of the Minnesota Valley Testing Laboratory (MVTL). Beginning with the samples collected in June 2018, sampling has been conducted in-house by GRE employees. Low-flow pumps and sampling methods have been used to collect groundwater samples throughout the monitoring program for the CCR rule, following manufacturer recommendations (Geotech 2015) and USEPA guidance (USEPA Region I 2017). Although using the same sampling methods, there is a potential for minor differences in sampling technique between sampling personnel. The timing of the change in sampling personnel coincides with both the June 2018 shift in chloride concentrations described in Section 2.5 and the change in laboratories noted in Section 2.6.

4.0 POTENTIAL LABORATORY SOURCES

4.1 Changes in Testing Methodology

Prior to June 2018, GRE contracted MVTL as their analytical testing laboratory for the monitoring program for the CCR rule. For analysis of chloride, MVTL used a variation of the SM4500-Cl- method (published variations of the method are labeled SM4500-Cl- A through SM4500-Cl- I; Standard Methods Online 2018). In the most recent sampling prior to the analytical laboratory switch, MVTL used method SM4500-Cl- E, Chloride by Automated Ferricyanide Method. Instrumentation for the method is an automated spectrophotometer, as the method is a colorimetric means of measuring chloride in water. All variations of SM4500-Cl are only applicable for testing chloride and are not indicated for use for other analytes.

Under typical use of the method, the applicable concentration range is 1 to 200 mg/L of chloride, which can be extended to higher and lower concentrations by dilution, adjustment of sample size, and other typical testing adjustments (USGS 2002a). The typical chloride reporting limit provided by MVTL was 1.0 mg/L. Although not reported within MVTL's laboratory information management system at the time of testing, dilutions to the sample results are likely to have occurred, given the range in chloride concentrations reported using the method between 2015 and 2018 (1.1 to 697 mg/L across all CCS samples collected as part of the monitoring program for the CCR rule).

Beginning with the June 2018 sampling events for the CCR rule groundwater monitoring program, GRE contracted Eurofins TestAmerica (TestAmerica) as their analytical testing laboratory. For analysis of chloride, TestAmerica has used method SW9056A, the Determination of Inorganic Anions by Ion Chromatography (USEPA 2007). Ion chromatography identifies and separates different ions based on their affinity to an ion exchanging resin which is packed in a flow-through column. The separated ions elute off the column at different times, characteristic to the ion size and charge, and are measured using an electrical conductivity meter, generating a series of peaks as the different ions leave the column (Figure 3). Relative to a baseline level of conductivity, the area of each peak is proportional to the ion's concentration in the sample. The peak area is compared to the peak areas generated by known concentrations in calibration standards to derive a sample concentration. In the case of method SW9056A, the specified analytical column (i.e., the ion exchanger), is required to be suitable for analyzing for chloride, fluoride, bromide, nitrate, nitrite, phosphate, and sulfate.

The typical chloride reporting limit provided by TestAmerica at the Denver Laboratory was 3.0 mg/L. Dilutions have varied across samples, ranging from 1x dilution factors (i.e., no dilution and a reporting limit of 3.0 mg/L) to 50x dilution factors (with a corresponding reporting limit of 150 mg/L). Due to the capacity of the method for testing multiple anions, indiscriminate dilution intended to account for high concentrations of one anion, particularly in accounting for samples with higher sulfate concentrations as found at CCS, can negatively impact outcomes for the

other anions measured by the method, resulting in non-detect results with excessive dilutions. This aspect is particularly salient due to the base application of the method, as loading of the ion exchange column within the ion chromatograph should not exceed concentrations of approximately 500 parts per million (ppm; equivalent to 500 mg/L) of total anions within the sample when the sample to be tested is undiluted (USGS 2002b).

In comparing the methodologies used by the two laboratories, a few specific differences are apparent. First, the two methods analyze for chloride using fundamentally different mechanisms. Method SM4500-Cl^- E uses spectrophotometry, which measures how much a chemical of interest absorbs light by passing a light source through a sample. Differentiation of chemical compounds is based on the principle that each compound will absorb light over a specific range of wavelengths (Standard Methods Online 2018; USGS 2002a). Method SW9056A uses ion chromatography, quantifying the species of interest based on their affinity for an ion exchanger (USEPA 2007; USGS 2002b). Due to the difference in mechanisms between the methods, samples that are analyzed by the two methods would be anticipated to show slightly different results, even if tested portions are drawn from the same sample.

Second, larger differences between quantified results could be anticipated in samples with complex matrices, particularly those with large concentrations of other anions measured through the SW9056A methodology. Although the ion exchangers used within ion chromatography are specific to each method, the column specified by SW9056A is intended to account for the affinity of the complete list of analytes specified by the method in sequential order (USEPA 2007). In samples at CCS, concentrations of sulfate alone, as the final sequential anion within the method, often exceed the total anion loading of the methodology prior to dilution of samples. As the concentrations of chloride are less than those of sulfate within samples from CCS based on previously collected information and geochemical water-typing, masking of the intended analyte by other anions intended for quantification could skew results. Appropriate calibration across multiple concentration ranges is intended to prevent this issue. However, based on past included laboratory qualifiers and explanations within laboratory narratives, pinpointing a group of ranges across samples can prove difficult.

One further difference between the results from the two laboratories are the number of significant digits reported within sample results. Results for chloride using method SM4500-Cl^- E from MVTL were reported with 3 significant digits, while TestAmerica reports results for chloride using method SW9056A using only 2 significant digits. This difference in precision between the two laboratories may be subtle given the concentrations of chloride across samples, but could result in a difference in population medians, signifying a shift in concentrations with no cause from the facility. Similar differences are noted in the number of significant digits reported for boron, calcium, sulfate, and total dissolved solids between reporting from the two analytical laboratories.

4.2 Ion Chromatography

In addition to comparing differences between the chloride methods, Golder reviewed TestAmerica's SW9056A standard operating protocols and reviewed the ion chromatography data output data to look for practices that have the potential to bias chloride concentrations high.

The quality of ion chromatography measurements is dependent on consistently processing data in the conversion of peak area to concentration. For examples, the following aspects should be handled consistently:

- The time window used to calculate the area under a peak;
- The method for determining baseline conductivity; and
- The approach for dealing with minor peaks that elute from the column at the same time as an analyte of interest.

These data processing calculations are automatically performed by the instrument software and can result in minor differences between samples and standards. While TestAmerica checks ion chromatograph data to confirm that the instrument software is functioning consistently, there is a range of variability in the software data processing practices that is tolerated and the decision on whether to manually adjust the software-calculated concentrations by manually selecting peaks is the responsibility of TestAmerica personnel.

Golder's review of the TestAmerica ion chromatography data identified several data processing practices that have the potential to bias high chloride concentrations (Figure 4). These include:

- Using a longer integration time for samples than calibration standards;
- Selecting a lower baseline in samples relative to calibration standards; and
- Including minor shoulder peaks in sample chloride peaks when they were excluded from calibration standard chloride peaks.

These practices were implemented in the processing of the ion chromatographs for the MW-49 samples collected between 6/11/2018 and 10/16/2018 and have the potential to bias high the chloride concentrations by up to 4.2%. Golder discussed the data processing practices with TestAmerica after an internal review, and TestAmerica deemed the practices as within the range of acceptable variability and a revision to the originally reported values was not warranted (D. Bieniulis, personal communication, May 8, 2020). While up to a 4.2% difference is relatively small, this difference could account for part of the June 2018 shift in MW-49 chloride concentrations described in Section 2.5 and result in a false identification of an SSI.

5.0 POTENTIAL SITE CHLORIDE SOURCES

To assess the potential sources for a change in chloride concentrations at MW-49, Golder reviewed recent site changes upgradient of Upstream Raise 91, as well as previously collected data from the CCR rule program and other site monitoring data that are collected under other programs. The following sections summarize the supplemental assessment activities.

5.1 Site Changes and Potential Impacts

The following sections discuss site changes and potential impacts associated with those changes over the last 40 years. Site changes may have affected constituent concentrations entering the groundwater system or the hydrologic and hydrogeologic conditions (water balance) of the site.

5.1.1 Construction History and Liner System

Upstream Raise 91 was constructed on the historic footprint of the South Ash Pond, which was built in the late 1970s on a foundation of re-compacted site soils (glacial tills) and put into service in 1979. In 1981, the South Ash Pond was taken out of service to reconstruct the clay liner and was put back into service from 1982 until 1987, at which point CCR materials were removed and the geometry of the South Ash Pond footprint was modified. Monitoring wells MW-49, MW-51, and MW-75 were installed near Upstream Raise 91 in 1988 and chloride has been analyzed since that time on an approximately semi-annual basis as part of the NDDEQ monitoring program.

Chloride concentrations in MW-49 increased significantly shortly after monitoring began in the late 1980s due to likely impacts from the South Ash Pond. In 1993, Upstream Raise 91 was deepened and a new composite liner consisting of a 2-foot thick compacted clay liner underlying a 40-mil high-density polyethylene (HDPE) geomembrane was completed. Beginning in 1996, chloride concentrations started a downward trend, decreasing

by approximately 50% over the next 10-year period (approximately from a high of 170 mg/L to 85 mg/L), likely a result of construction of the composite liner system. Overall, chloride concentrations decreased approximately 60% from 1996 to 2020 (approximately from a high of 170 mg/L to 70 mg/L).

5.1.2 Duck Pond and Drains Pond System Construction

Beginning in 2015, the drainages on the west and northwest sides of Upstream Raise 91 were modified to allow for construction of an expansion to the Drains Pond System. As a part of this construction, modifications to the existing drainage upgradient of Upstream Raise 91 were required and the composite-lined west and center cells of the Drains Pond System were constructed.

Historically, the Duck Pond area was a low-lying area west of Upstream Raise 91. The depth of water contained in this area was generally 12 feet (water surface elevation approximately 1911 feet) and the Duck Pond had a surface area of approximately three acres. As the water level increased, overflow passed through culvert piping to the north under what is now the center cell of the Drains Pond System. As part of the construction in 2015, the Duck Pond was dewatered, the area was graded, and culverts were installed to drain surface water south and east around the south side of Upstream Raise 91.

5.2 Data Sources

To determine if recent site changes upgradient of Upstream Raise 91 have impacted water quality in MW-49, the sampling locations and dates for groundwater, surface water and contact water results were reviewed for each potential source provided below (see Figure 1 for locations).

5.2.1 Upstream Raise 91

Data collected between September 2015 and March 2020[1] for the CCR rule monitoring program were considered in the evaluation. As part of the monitoring program, field personnel collected groundwater samples from the following monitoring wells:

- Upgradient to Upstream Raise 91: MW-75 and MW-91-2
- Downgradient from Upstream Raise 91: MW-49, MW-51, and MW-91-1

Additionally, results for a November 2018 sample of ash contact water collected from the Upstream Raise 91 sump (Sump-UR91) were available for the evaluation.

5.2.2 Drains Pond System (East Cell)

Data collected between September 2015 and March 2020 for the CCR rule monitoring program were considered in the evaluation. As part of the monitoring program, field personnel collected groundwater samples from the following monitoring wells:

- Upgradient to the Drains Pond System: MW-DP3 and MW-DP5
- Downgradient from the Drains Pond System: MW-DP1, MW-DP2, MW-DP2B, and MW-DP4

Additionally, results for 18 samples collected between 2014 and 2019 of ash contact water collected from the surface of the east cell of the Drains Pond System (Drains Pond, SW-DP101) were used in the evaluation.

[1] June 2019 samples from MW-91-1 and MW-91-2 not used because of a suspected quality control issue

5.2.3 Upgradient Plant Cooling Water

Groundwater potentially influenced by upgradient plant cooling water is monitored at the following locations:

- Upgradient to the powerplant: MW-96
- Downgradient from the Extended Basin: MW-62, MW-63, and MW-65
- EEG Wells: MW-17-1, MW-17-2, MW-17-3, MW-17-4, and MW-17-5 (these wells were installed to monitor a leak in the fuel line to the Emergency Engine Generator)

For the plant wells, results from samples collected between October 1988 and October 2019 were considered for this evaluation. The EEG wells were installed in the fourth quarter of 2017, and results included in this evaluation were for samples collected between January 2018 and October 2019.

Additionally, results for samples collected between October 1988 and June 2019 of surface water collected from the Extended Basin (SW-107) were used in the evaluation.

5.3 Evaluation of Potential Sources

Figure 5 displays a map of the locations and observed chloride concentrations (both October 2019 concentration and the range of chloride values observed in baseline and detection monitoring) for the monitoring wells and surface water sources described in Section 5.2. As shown in Figure 1, groundwater generally flows from the west to the east. To assist with the identification of potential chloride sources to MW-49, Figure 6 compares the ranges of chloride concentrations for the monitoring wells and surface water sources on the site with a box and whisker plot. Figure 7 displays a cross plot of the sulfate to chloride ratio versus the calcium to chloride ratio as a method of comparing different water qualities across the site. Piper plots were not employed due to inconsistently having the full suite of cations and anions analytical results for the different potential chloride sources at the site.

Several potential sources can contribute chloride to local groundwater at CCS, including outflows of plant cooling water from the Extended Basin, seepage from the Drains Pond System, and seepage from Upstream Raise 91. These three potential sources of chloride to groundwater are described in this section.

5.3.1 Upstream Raise 91

The chloride concentration measured in the sample from the Upstream Raise 91 sump (790 mg/L) does indicate that seepage (if occurring) from Upstream Raise 91 could increase the chloride concentrations in MW-49. The presence of the liner system at Upstream Raise 91 (a 2-foot thick compacted clay liner with a hydraulic conductivity of $1x10^{-7}$ cm/sec or less underlying a 40-mil HDPE geomembrane) reduces the likelihood of seepage to groundwater. Figure 7 indicates that contact water in the Upstream Raise 91 sump has lower calcium to chloride ratios and lower sulfate to chloride ratios than water observed at MW-49. If seepage from Upstream Raise 91 was impacting groundwater at MW-49 a shift in both of these ratios in the most recent samples from MW-49 towards those observed in the Upstream Raise 91 sump would be expected.

5.3.2 Drains Pond

Given the physical proximity of the east cell of the Drains Pond System (Drains Pond) to MW-49 and the elevated chloride concentrations observed in the surface water of the Drains Pond (125 to 827 mg/L), seepage (if occurring) from the Drains Pond could have the potential to elevate chloride concentrations at MW-49. The presence of the liner system at the Drains Pond (a 2-foot thick compacted clay liner with a hydraulic conductivity of $1x10^{-7}$ cm/sec or less underlying a 40-mil HDPE geomembrane) reduces the likelihood of seepage to groundwater. Contact water in the

Drains Pond has lower calcium to chloride ratios than water observed in MW-49 (Figure 7). If seepage from the Drains Pond was impacting groundwater at MW-49 a shift in the calcium to chloride ratios in the most recent samples from MW-49 towards those observed in the Drains Pond would be expected.

5.3.3 Upgradient Plant Cooling Water

To the west of Upstream Raise 91 and Coal Creek Station, water used for plant cooling is stored in the Extended Basin, which holds approximately 60 million gallons and is clay lined. This water originates from the Missouri River, but is cycled up to 15 times through the cooling towers. As the water is cycled, heat from the powerplant drives evaporation, which concentrates the constituents in the Extended Basin. Between 1988 and 2019, chloride concentrations in the Extended Basin ranged between 158 and 300 mg/L.

Nearby monitoring wells (MW-62, MW-63, and MW-65) located upgradient of the powerplant and immediately adjacent to the Extended Basin also have elevated chloride concentrations ranging from 8.0 to 290 mg/L indicating that water from the Extended Basin is impacting groundwater chloride concentrations. The elevated concentrations from the Extended Basin show considerable increase relative to MW-96, a background well for the plant that is side-gradient to the Extended Basin. Chloride concentrations at MW-96 range between 4.2 and 7.8 mg/L.

The water from the Extended Basin also appears to be impacting wells further downgradient. The concentrations observed along the flow path from the Extended Basin towards MW-49 include:

- The EEG wells located east of the Extended Basin have chloride concentrations ranging from between 58 and 130 mg/L.
- Well MW-DP5 downgradient from the plant and upgradient of the Drains Pond, has chloride concentrations between 66.0 and 84.8 mg/L. Well MW-DP3 also upgradient of the Drains Pond has chloride concentrations between 8.6 and 19.8 mg/L.
- Wells MW-91-2 and MW-75 upgradient of Upstream Raise 91 and side gradient to the Extended Basin have chloride concentrations between 1.1 and 16.8 mg/L.

Variations in screened lithology and preferential flow paths in the glacial till may explain why some wells downgradient of the Extended Basin show elevated chloride concentrations while other wells (MW-DP3, MW-91-2, and MW-75) have chloride concentrations more similar to MW-96.

Figure 7 demonstrates that surface waters from the Extended Basin may be influencing ion ratios in groundwater samples from monitoring wells upgradient of Upstream Raise 91, including MW-62, MW-63, MW-65, MW-17-2, and MW-17-5, and monitoring wells downgradient of Upstream Raise 91, including MW-49 and MW-91-1.

The recent removal of the Duck Pond and regrading of the area directly upgradient of the Drains Pond potentially altered the hydrological flow paths to MW-49 and increased the proportion of water with elevated chloride from the Extended Basin monitored at MW-49. In addition to the changing flow paths, the removal of the Duck Pond also eliminated infiltration of water from the Duck Pond to groundwater, which may have provided a dilution effect to groundwater concentrations upgradient of MW-49.

6.0 EVIDENCE OF AN ALTERNATIVE SOURCE

Based on the review of sampling sources, laboratory sources and potential alternate site sources of chloride presented in this report, primary lines of evidence and conclusions drawn from the evidence used to support this ASD are provided in Table 1.

Table 1: Primary and Supporting Lines of Evidence from ASD Analysis

Key Line of Evidence	Supporting Evidence	Description
Change in Field Personnel	Changed to site personnel from MVTL	Although using the same sampling methods, there is a potential for minor differences in sampling technique between sampling personnel. The timing of the change in sampling personnel coincides with the June 2018 shift in chloride concentrations.
Change in Laboratory and Methodology	Changed to TestAmerica from MVTL	The timing of the change in laboratory coincides with the June 2018 shift in chloride concentrations.
	Change from potentiometric method (SRM 4500-CL) to ion chromatography method (SRM 9056A)	Prior to June 2018, MVTL used method SM4500-Cl- E to measure chloride concentrations. Starting in June 2018, TestAmerica analyzed chloride concentrations by SW9056A. These methods have different mechanisms, detection limits, and matrix effects. The timing of the change in methodology coincides with the June 2018 shift in chloride concentrations.
Laboratory Artifact Biasing High Sample Concentrations	Ion chromatographs reflecting different data processing practices between some calibration standards and samples	Golder's review of the TestAmerica ion chromatography data identified several data processing practices (integration time length, baseline selection, and treatment of minor peaks) that have the potential to bias high chloride concentrations (Figure 4).
Groundwater Geochemistry	Relative ion abundances in groundwater differs from Upstream Raise 91 sump water and Drains Pond surface water	The water quality signature of groundwater samples collected from downgradient well MW-49 are not consistent with the signature of potential seepage from Upstream Raise 91. As presented in the Figure 7, differences in calcium-chloride and sulfate-chloride ratios are distinctly different between the ash-impacted waters and the downgradient groundwater samples, including from MW-49.

Key Line of Evidence	Supporting Evidence	Description
Local Sources of Chloride	Elevated chloride concentrations in the Extended Basin and other wells downgradient of the Extended Basin	Figure 6 suggests that chloride concentrations in the plant cooling water (Extended Basin) are impacting groundwater chloride concentrations in wells downgradient from the Extended Basin. Similarities in the ion ratios between water samples collected from MW-49 , the Extended Basin, and wells immediately downgradient of the Extended Basin (Figure 7) suggest that the Extended Basin may be a potential source for elevated chloride at MW-49.
	Hydrogeology	The removal of the Duck Pond in 2015 and regrading of the area directly upgradient of the Drains Pond potentially altered the hydrological flow paths, resulting in higher chloride concentrations at MW-49. This would be due to an increase in the proportion of groundwater potentially impacted by the Extended Basin and the removal of the more dilute water infiltrating from the Duck Pond.

7.0 CONCLUSION

In accordance with 40 CFR 257.95(g)(3), this ASD has been prepared in response to the identification of a verified SSI for chloride at monitoring well MW-49 following the Q4 2019 sampling event for Upstream Raise 91 at Coal Creek Station.

Based on review of historical analytical results and testing procedures, recent changes to chloride concentrations in groundwater at MW-49 are likely not a result of seepage from Upstream Raise 91 but can be attributed to laboratory artifacts and variability in the upgradient groundwater sources. Therefore, no further action (i.e., a transition to Assessment Monitoring) is warranted, and Upstream Raise 91 will remain in detection monitoring.

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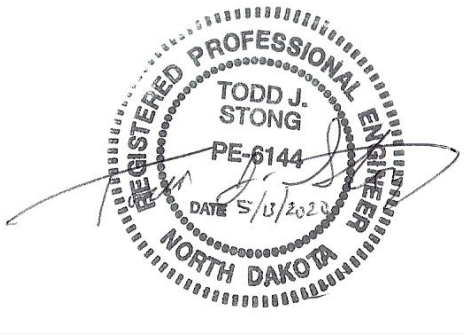

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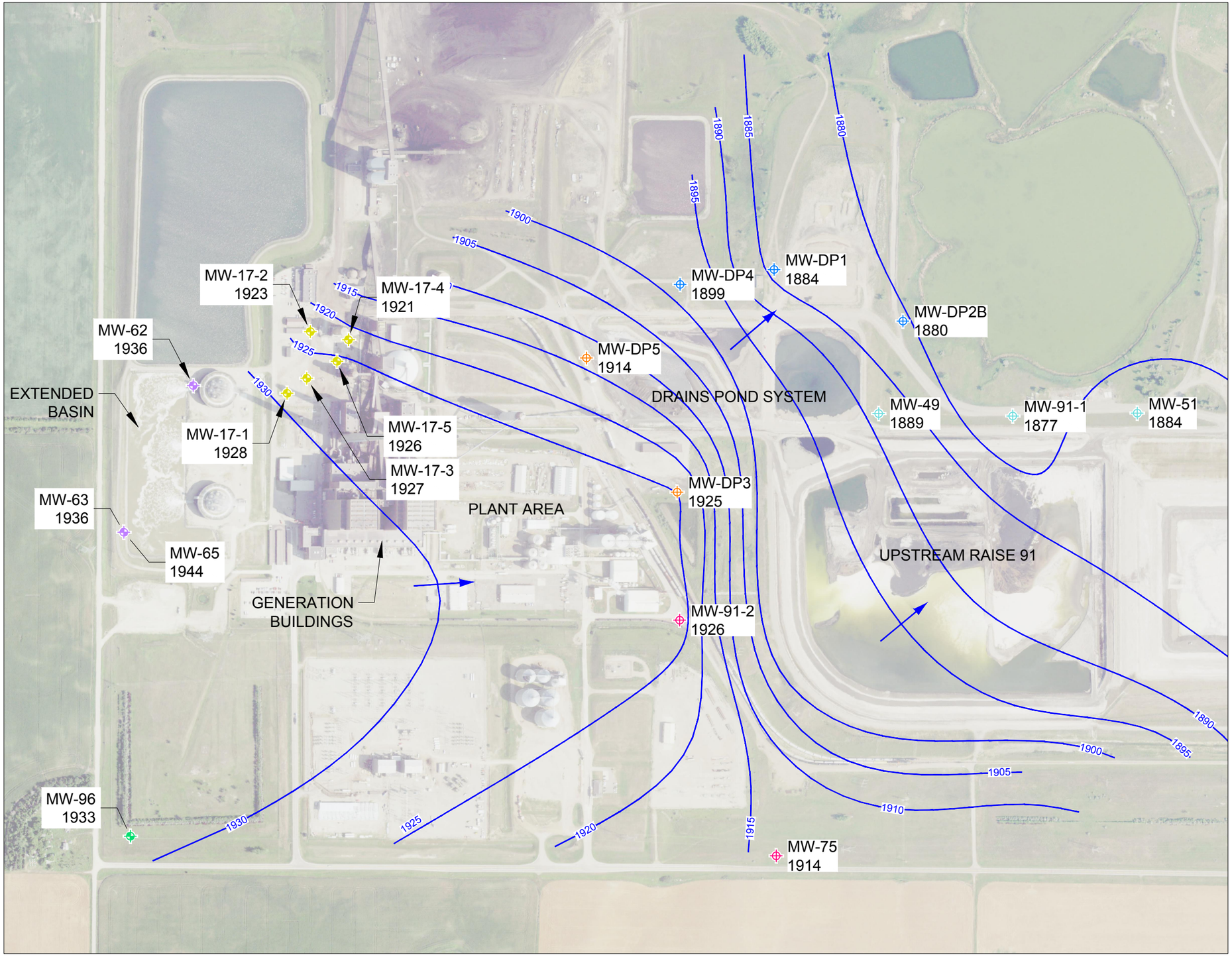
FIGURES



LEGEND

- NDDEQ PLANT AREA UPGRADIENT WELL
- NDDEQ PLANT AREA DOWNGRADIENT WELL
- EEG PROGRAM WELL
- DRAINS POND SYSTEM UPGRADIENT WELL
- DRAINS POND SYSTEM DOWNGRADIENT WELL
- UPSTREAM RAISE 91 UPGRADIENT WELL
- UPSTREAM RAISE 91 DOWNGRADIENT WELL
- GENERAL DIRECTION OF GROUNDWATER FLOW
- 1930 — POTENTIOMETRIC SURFACE CONTOURS

NOTE(S)

1. GROUNDWATER ELEVATIONS WERE MEASURED OCTOBER 2019, ELEVATION FEET ABOVE MEAN SEA LEVEL.
2. POTENTIOMETRIC SURFACE CONTOURS WERE CREATED FROM WATER LEVEL INFORMATION FROM THE OCTOBER 2019 GROUNDWATER ELEVATIONS SHOWN, AS WELL AS SURVEYED SURFACE WATER EXPRESSIONS, ADDITIONAL SITE WELLS, AND PIEZOMETERS NOT SHOWN. CONTOUR INTERVAL IS 5 FEET.
3. AERIAL IMAGERY OBTAINED FROM UNITED STATES DEPARTMENT OF AGRICULTURE, NATIONAL AGRICULTURE IMAGERY PROGRAM, 2018.

0 300 600
1" = 600' FEET

GOLDER

ALTERNATIVE SOURCE DEMONSTRATION
OCTOBER 2019 GROUNDWATER CONTOURS AND SAMPLING LOCATIONS

FIGURE 1

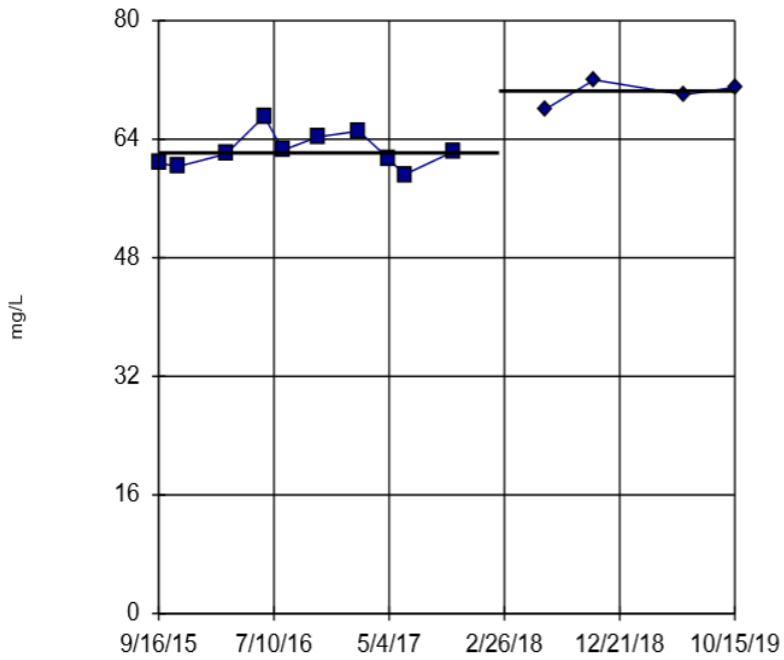
Path: \\Denver\acad\GREAT RIVER ENERGY\COAL CREEK\99_PROJECTS\19136224\Facility Water Quality\ | File Name: 19136224C_MW49ASD_GWContours.dwg

PATH: https://golderassociates.sharepoint.com/sites/120551/Project Files/5 Technical Work/5 - Water Quality/ASD - Q4 2019 MW-49 | FILE NAME: Figures2 &4-7.xlsx

Sanitas™ v.9.6.25 Sanitas software licensed to Golder Associates. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-49



MW-49 background

MW-49 compliance

background median = 62.15 **MVTL**

compliance median = 70.5 **TestAmerica**

z = 2.758

Alpha	Table	Sig.
0.1	1.282	Yes
0.05	1.645	Yes
0.025	1.96	Yes
0.01	2.326	Yes

Constituent: Chloride Analysis Run 2/14/2020 2:31 PM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q42019

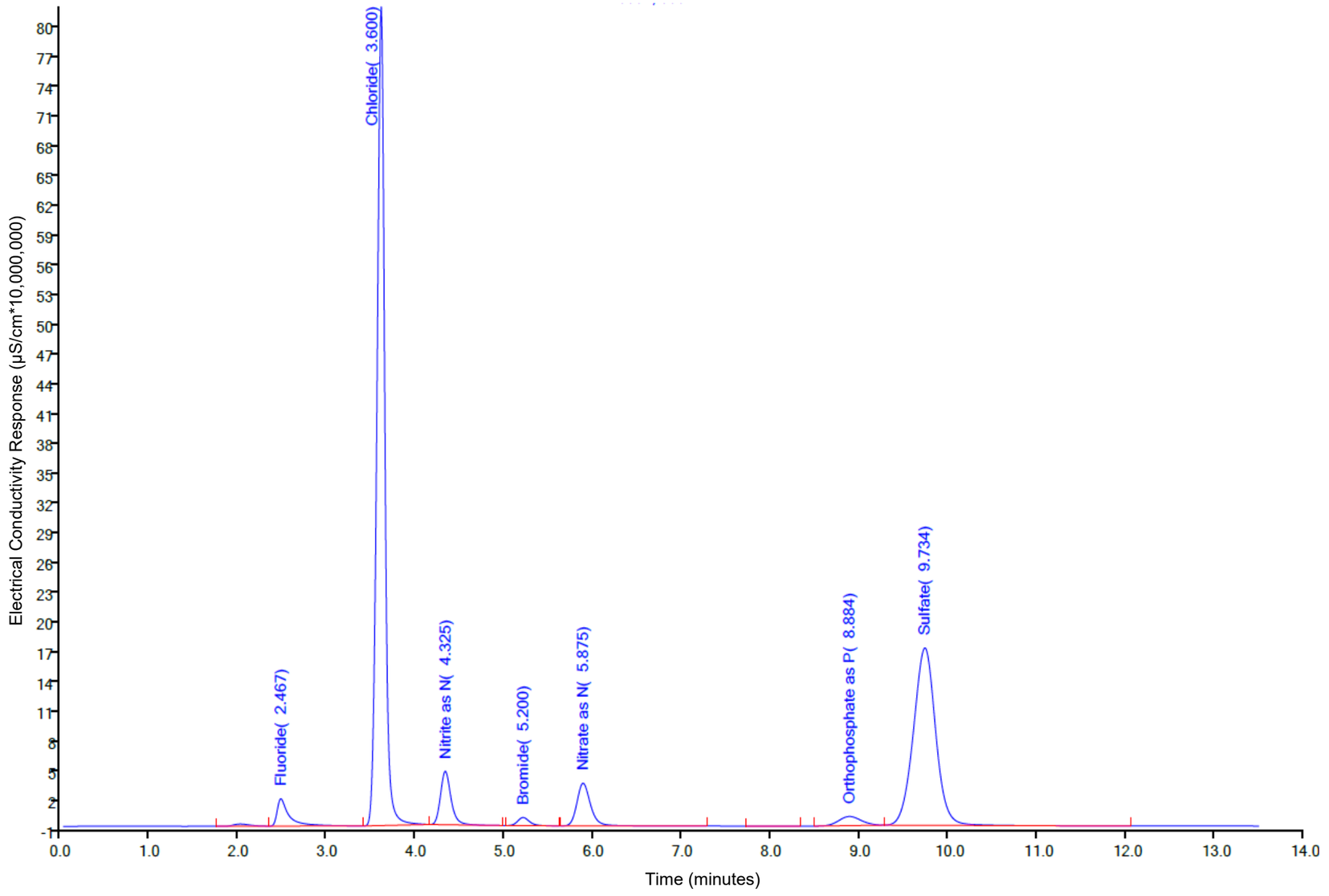
CLIENT
Great River Energy Coal Creek Station

PROJECT
GRE CCS 2020 Consulting

CONSULTANT
GOLDER

TITLE
Wilcoxon Rank-Sum Test for MW-49 Chloride Concentrations

PROJECT NO.	PHASE	REV.	FIGURE
19136224C	3	A	2



CLIENT
Great River Energy Coal Creek Station

PROJECT
GRE CCS 2020 Consulting

CONSULTANT
GOLDER

TITLE
Example of Ion Chromatograph Data

PROJECT NO.	PHASE	REV.	FIGURE
19136224C	3	A	3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
1 in
0

Software Data Processing

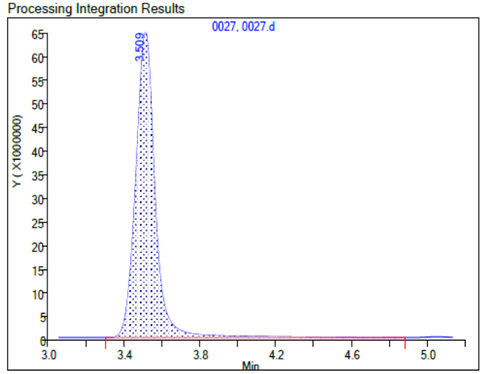
Manual Processing

Example #1:

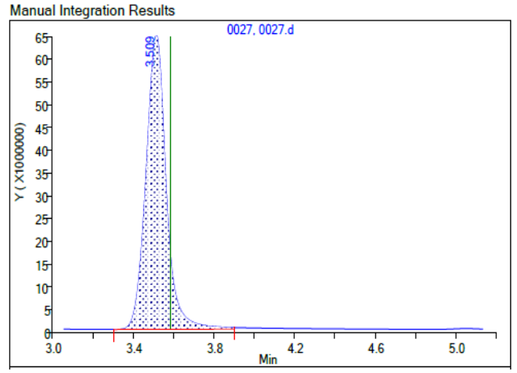
Shortened peak integration time to match calibration standards

Manual processing would decrease chloride concentration by 1.8%

RT: 3.51
Area: 457407359
Amount: 71.627674
Amount Units: ug/ml



RT: 3.51
Area: 449145333
Amount: 70.344660
Amount Units: ug/ml

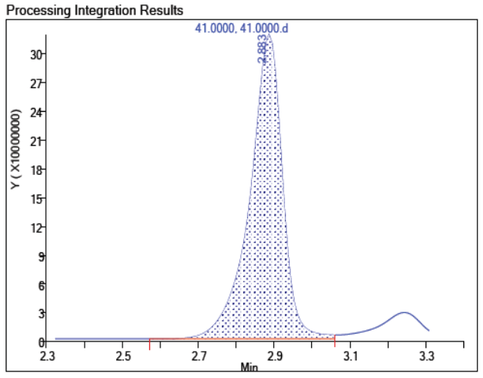


Example #2:

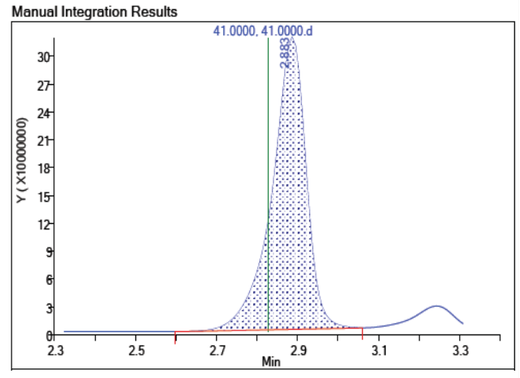
Right side of baseline brought up to minimum signal valley (not below valley), consistent with calibration standards

Manual Processing would decrease chloride concentration by 2.8%

RT: 2.88
Area: 1882027750
Amount: 107.4024
Amount Units: ug/ml



RT: 2.88
Area: 1830626225
Amount: 104.4716
Amount Units: ug/ml

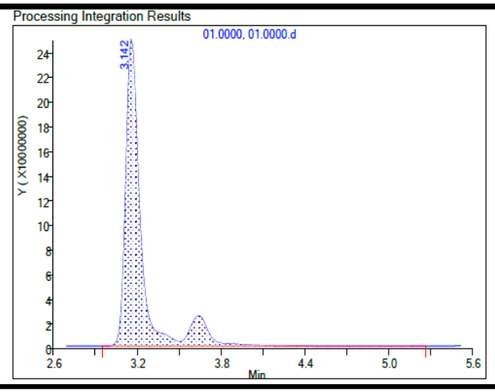


Example #3:

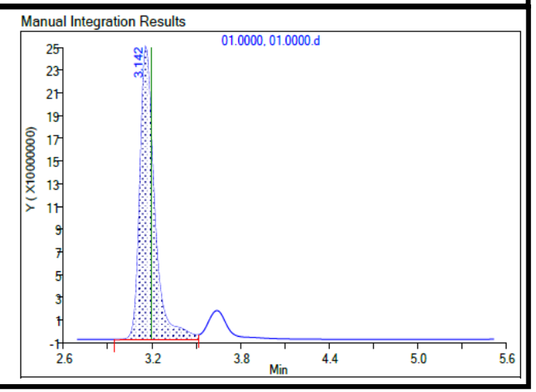
Minor peak to the right of chloride peak not included in area of chloride peak, consistent with calibration standards

Manual Processing would decrease chloride concentration by 4.2%

RT: 3.14
Area: 1753223086
Amount: 98.471277
Amount Units: ug/ml



RT: 3.14
Area: 1683282689
Amount: 94.545083
Amount Units: ug/ml



CLIENT
Great River Energy Coal Creek Station

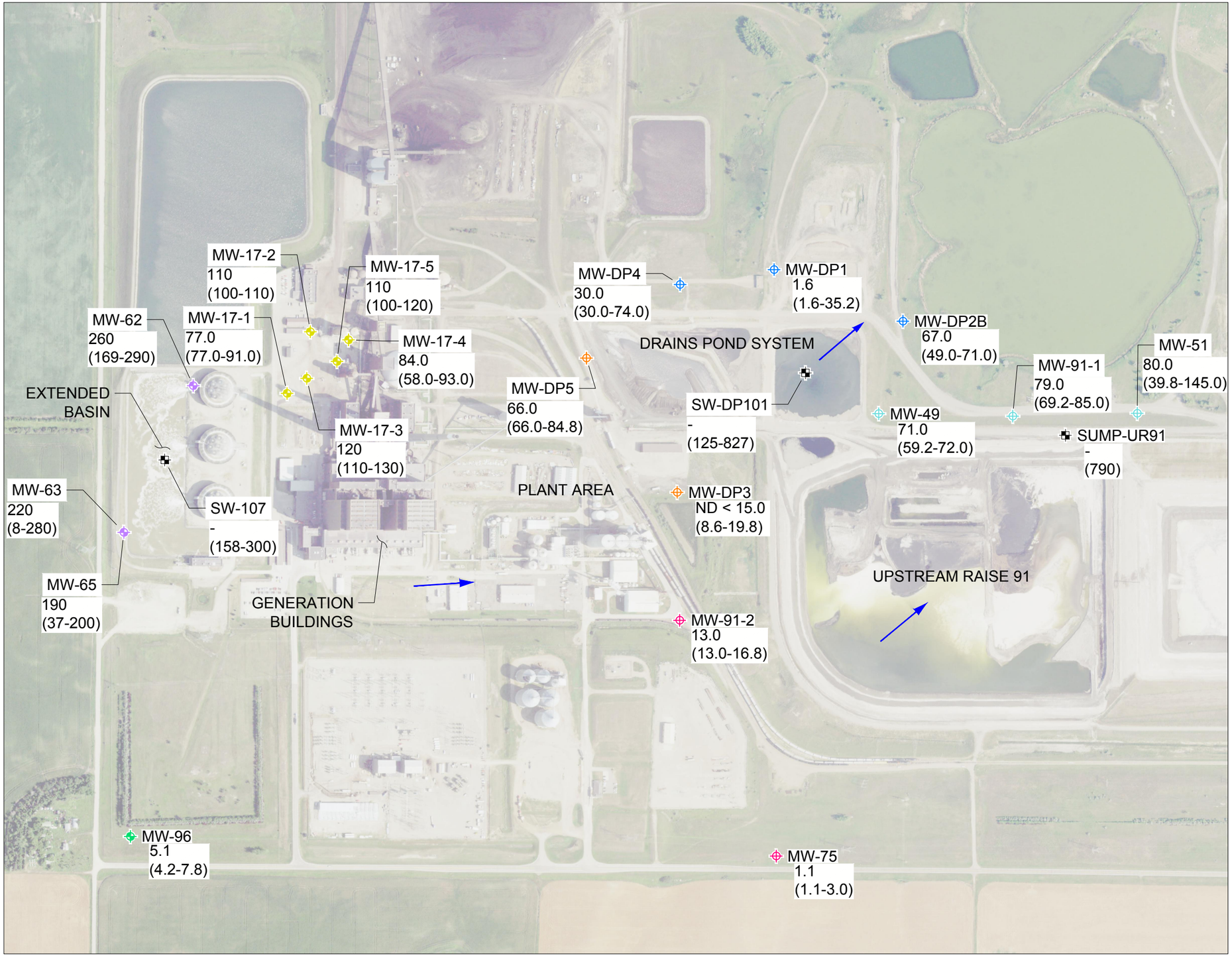
PROJECT
GRE CCS 2020 Consulting

CONSULTANT
GOLDER

TITLE
Comparison of Ion Chromatograph Software Data Process versus Manual Adjustments

PROJECT NO.	PHASE	REV.	FIGURE
19136224C	3	A	4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
1 in
0



LEGEND

- NDDEQ PLANT AREA UPGRADIENT WELL
- NDDEQ PLANT AREA DOWNGRADIENT WELL
- EEG PROGRAM WELL
- DRAINS POND SYSTEM UPGRADIENT WELL
- DRAINS POND SYSTEM DOWNGRADIENT WELL
- UPSTREAM RAISE 91 UPGRADIENT WELL
- UPSTREAM RAISE 91 DOWNGRADIENT WELL
- OTHER SAMPLING LOCATION
- GENERAL DIRECTION OF GROUNDWATER FLOW

71.0 — OCTOBER 2019 CHLORIDE CONCENTRATION (mg/L)

(59.2-72.0) — RANGE IN CHLORIDE CONCENTRATIONS, (mg/L)

NOTE(S)

1. AERIAL IMAGERY OBTAINED FROM UNITED STATES DEPARTMENT OF AGRICULTURE, NATIONAL AGRICULTURE IMAGERY PROGRAM, 2018.
2. SAMPLES FROM MW-DP5, MW-DP3, MW-DP2B, MW-DP1, MW-DP4, MW-91-2, MW-75, MW-49, MW-91-1, AND MW-51 WERE COLLECTED BETWEEN SEPTEMBER 2015 AND MARCH 2020. JUNE 2019 SAMPLES FROM MW-91-1 AND MW-91-2 WERE NOT USED BECAUSE OF SUSPECTED QUALITY CONTROL ISSUE.
3. SAMPLES FROM SW-DP101 WERE COLLECTED BETWEEN 2014 AND JUNE 2019. NO SAMPLE WAS COLLECTED FROM SW-DP101 IN OCTOBER 2019.
4. SAMPLE FROM SUMP-UR91 WAS COLLECTED FROM NOVEMBER 2018. THE RANGE SHOWN FOR SUMP-UR91 REPRESENTS THE SINGLE CHLORIDE SAMPLE COLLECTED FROM THE LOCATION. NO SAMPLE WAS COLLECTED FROM SUMP-UR91 IN OCTOBER 2019.
5. SAMPLES FROM MW-17-1, MW-17-2, MW-17-3, MW-17-4, AND MW-17-5 WERE COLLECTED BETWEEN JANUARY 2018 AND OCTOBER 2019.
6. SAMPLES FROM MW-96, MW-62, MW-63, AND MW-65 WERE COLLECTED BETWEEN OCTOBER 1988 AND OCTOBER 2019.
7. SAMPLES WERE COLLECTED FROM SW-107 BETWEEN OCTOBER 1988 AND JUNE 2019. NO SAMPLE WAS COLLECTED FROM SW-107 IN OCTOBER 2019.

0 300 600
1" = 600' FEET

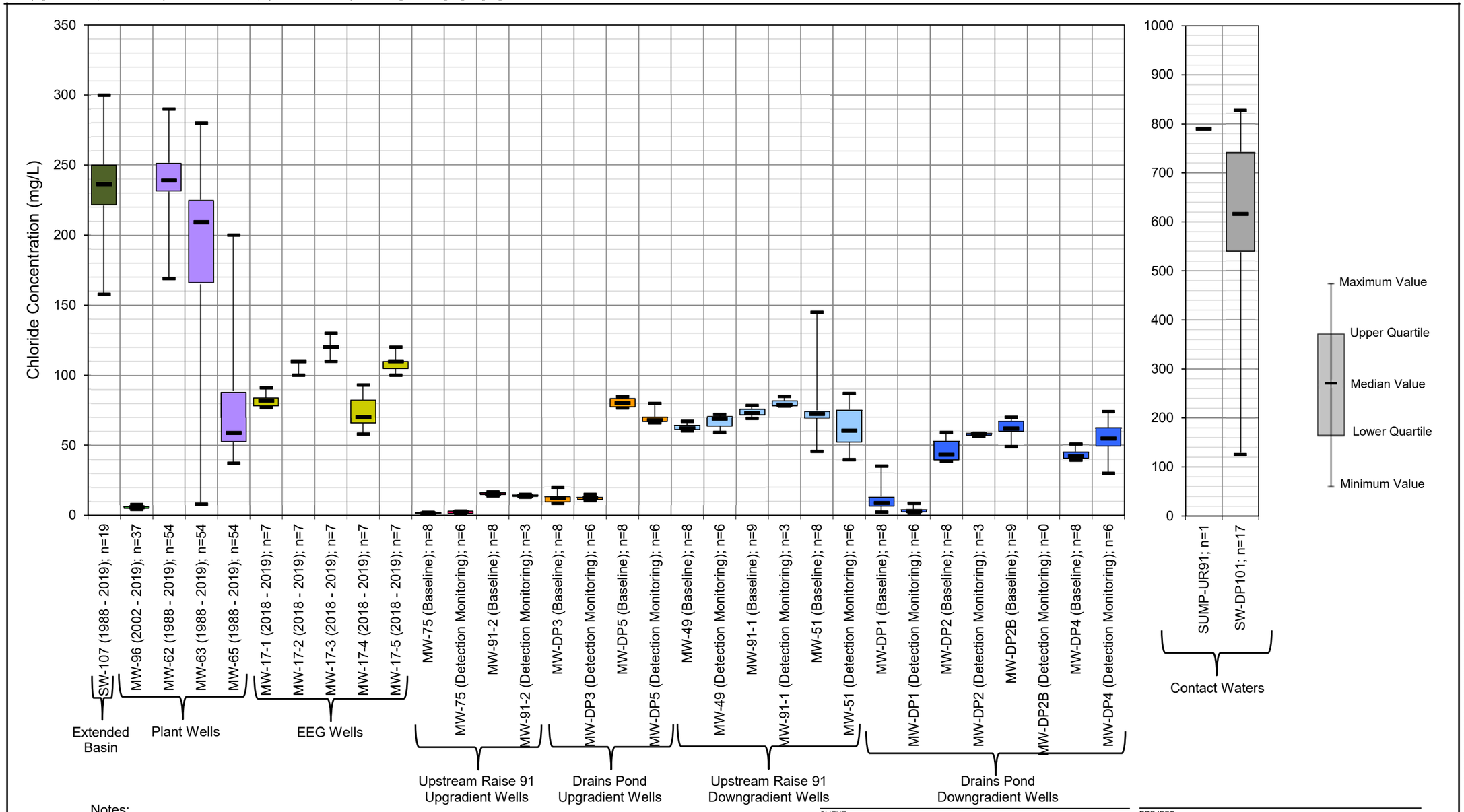
GOLDER

ALTERNATIVE SOURCE DEMONSTRATION
CHLORIDE CONCENTRATIONS

FIGURE 5

Path: \\Denver\acad\GREAT RIVER ENERGY\COAL CREEK\99_PROJECT\S\19138224F acility Water Quality\ | File Name: 19138224C_MW49ASD_CIConcs.dwg

PATH: https://golderassociates.sharepoint.com/sites/120551/Project Files/5 Technical Work/5 - Water Quality/Box and Whisker Plots/DRAFT | FILE NAME: CCS_Box and Whisker_UR91_all background_v3.xlsm



Notes:
Non-Detect replaced with the detection limit

June 2019 samples from MW-91-1 and MW-91-2 not used because of a suspected quality control issue.

CLIENT
Great River Energy Coal Creek Station

PROJECT
Alternate Source Demonstration

CONSULTANT
GOLDER

TITLE
Box and Whisker Plot for Chloride

PROJECT NO.	PHASE	REV.	FIGURE
19136224	3	A	6

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
1 in
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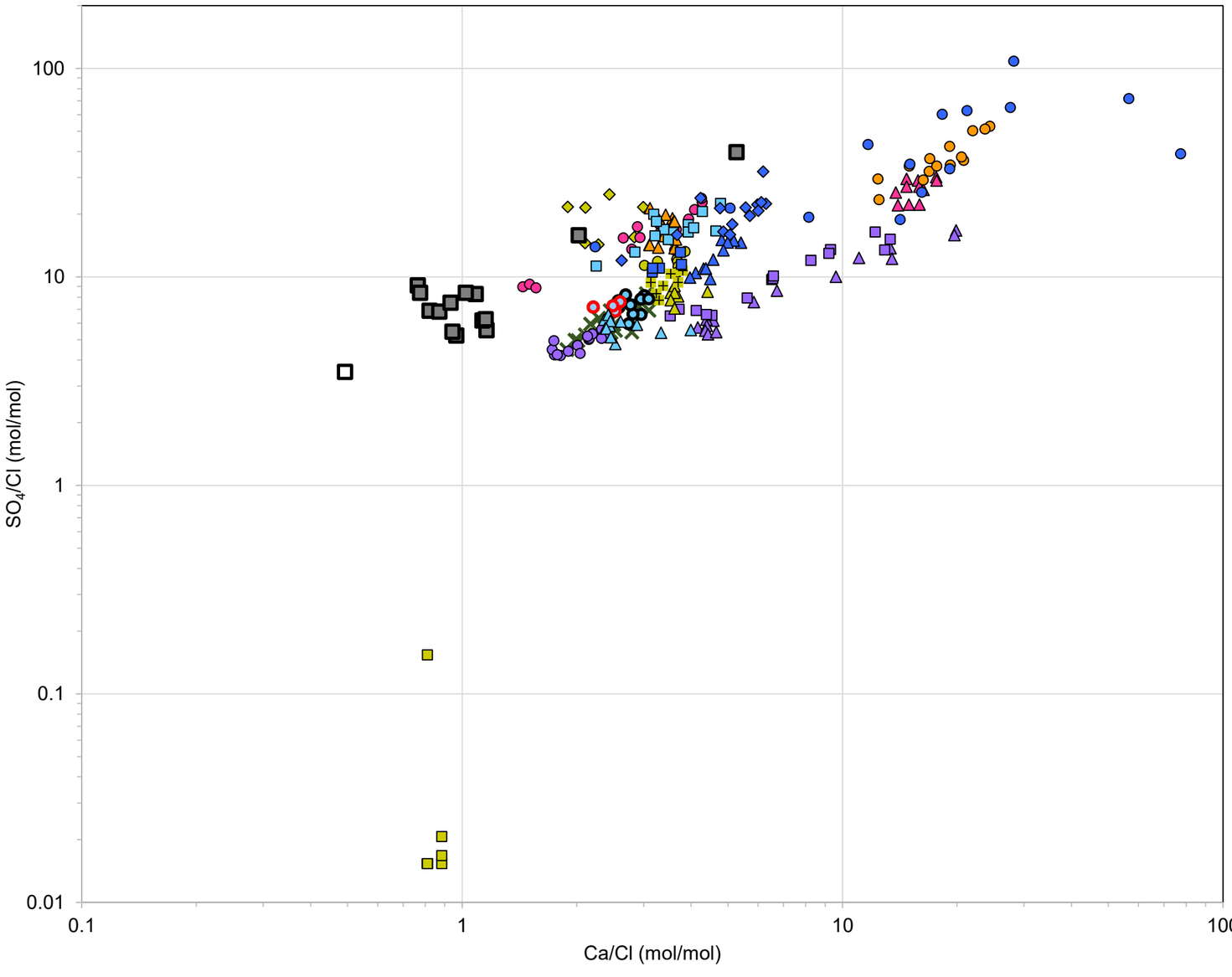

- SW-107 (Extended Basin)
- MW-62 (Downgradient Plant Well)
- MW-63 (Downgradient Plant Well)
- MW-65 (Downgradient Plant Well)
- MW-17-1 (EEG Well)
- MW-17-2 (EEG Well)
- MW-17-3 (EEG Well)
- MW-17-4 (EEG Well)
- MW-17-5 (EEG Well)
- MW-75 (UR91 Upgradient)
- MW-91-2 (UR91 Upgradient)
- MW-DP3 (Drains Pond Upgradient)
- MW-DP5 (Drains Pond Upgradient)
- MW-49 (UR91 Downgradient)
- MW-49 (2018 - 2019)
- MW-91-1 (UR91 Downgradient)
- MW-51 (UR91 Downgradient)
- MW-DP1 (Drains Pond Downgradient)
- MW-DP2 (Drains Pond Downgradient)
- MW-DP2B (Drains Pond Downgradient)
- MW-DP4 (Drains Pond Downgradient)
- SW-DP101 (Drains Pond Contact Water)
- Sump-UR91 (UR91 Contact Water)

Notes:
Non-Detect replaced with the detection limit

June 2019 samples from MW-91-1 and MW-91-2 not used because of a suspected quality control issue.

CLIENT
Great River Energy Coal Creek Station

PROJECT
GRE CCS 2020 Consulting

CONSULTANT
GOLDER

TITLE
Sulfate-Chloride versus Calcium-Chloride Ratio

PROJECT NO.	PHASE	REV.	FIGURE
19136224C	3	A	7

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
1 in
0



golder.com

APPENDIX C-7

Alternative Source Demonstration – Q2 2020 – MW49 Chloride

REPORT

Alternative Source Demonstration for Chloride in Monitoring Well MW-49

Great River Energy - Coal Creek Station

Submitted to:

Great River Energy

Coal Creek Station
2875 Third Street SW
Underwood, North Dakota

Submitted by:

Golder Associates Inc.
7245 W Alaska Drive, Suite 200,
Lakewood, Colorado, USA 80226

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19136224C-7-R-0

October 27, 2020



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1.0 INTRODUCTION

On behalf of Great River Energy (GRE), Golder Associates Inc. (Golder) performed a statistical evaluation of groundwater monitoring results from the second quarter (Q2) 2020 groundwater detection monitoring event at Coal Creek Station's Upstream Raise 91 coal combustion residual (CCR) surface impoundment. The statistical evaluation was performed as described in the Coal Combustion Residuals Groundwater Statistical Method Certification for Coal Creek Station, Revision 1 (Golder 2019b), in accordance with applicable provisions of 40 Code of Federal Regulations (CFR) Part 257, "Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule" (CCR rule), as amended.

Statistical analyses of the Appendix III detection monitoring data for chloride in groundwater at the downgradient monitoring well MW-49 indicated a potential exceedance of the statistical limit based on the parametric Shewhart-CUSUM (Cumulative Summation) control chart analysis of the Q2 2019 sampling results. This potential exceedance was subsequently verified as a statistically significant increase (SSI) following the fourth quarter (Q4) 2019 detection monitoring sampling event. The Q2 2020 detection monitoring result for chloride at MW-49 was also a verified SSI. Although determination of a verified SSI generally indicates that the groundwater monitoring program should transition from detection monitoring to assessment monitoring, 40 CFR Part 257.94(e)(2) allows the owner or operator (i.e., GRE) 90 days from the date of determining a verified SSI (July 29, 2020) to demonstrate a source other than the regulated CCR facility caused the SSI or that the SSI was a result of an error in sampling, analysis, or statistical evaluation or natural variability in groundwater quality that was not fully captured during the baseline data collection.

Golder's review of the hydrological and geologic conditions at the site and the sampling and analytical procedures indicates the SSI is not an indication of impacts from the CCR unit. A desktop study of previously collected CCR-impacted water from the facility, nearby surface water, and groundwater samples was conducted to assess potential chloride sources. As a part of this work, potential error in the statistical analysis, laboratory methods, and the natural variability of chloride concentrations in groundwater were evaluated. Based upon this review and in accordance with provisions of the CCR Rule, Golder has prepared this Alternative Source Demonstration (ASD) for chloride at MW-49 and the Upstream Raise 91 CCR surface impoundment. An ASD was initially developed following the Q4 2019 verified SSI (Golder 2020) and was reviewed for ongoing applicability and updated where necessary.

This ASD conforms to the requirements of 40 CFR Part 257.94(e)(2) and provides the basis for concluding that the verified SSI for chloride at MW-49 is not an indication of a release from Upstream Raise 91. The following sections provide a summary of Upstream Raise 91, sampling procedures and analytical methods, analytical and geochemical assessment results, and lines of evidence demonstrating an alternative source for the increased chloride concentrations at MW-49.

2.0 BACKGROUND

2.1 Site Background

GRE's Coal Creek Station (CCS) is a coal-fired electric generation facility located in McLean County, approximately 10 miles northwest of Washburn, North Dakota. CCRs are managed in composite-lined surface water impoundment cells and dry landfills regulated and permitted by the North Dakota Department of Environmental Quality (NDDEQ) in accordance with North Dakota Administrative Code (NDAC) Article 33-20, Solid Waste Management and Land Protection.

Coal Creek Station has four CCR facilities that are within the purview of the EPA CCR rule. This ASD only applies to the Upstream Raise 91 CCR surface impoundment. Upstream Raise 91 is located in the south-central portion of the plant site, east of the Coal Creek Station plant buildings (Figure 1).

2.2 Site Geology

Coal Creek Station and McLean County are situated at the eastern-most extent of the Williston Basin, a structural and sedimentary basin (USGS 1999). The region is characterized by the presence of glacial drift, reaching thicknesses of several hundred feet and overlying the Sentinel Butte Member, the source of commercially mined coal in the direct vicinity of Coal Creek Station (Falkirk 1979). The Sentinel Butte Member is the highest strata of the Paleocene Fort Union Formation, overlying the Tongue River, Ludlow, and Cannonball Members (USGS 1999). The Sentinel Butte Member is marked by drab-gray units, demarcating the separation from the lower Tongue River Member.

The site geology of CCS includes unconsolidated surficial deposits of the Coleharbor formation, consisting of stratified and unstratified glacial drift. The near-surface materials are silty clay and sandy clay till with interbedded lenses (CPA/UPA 1989).

2.3 Site Hydrogeology

Regional groundwater flow of the uppermost water-bearing unit in the vicinity of CCS is a subtle expression of the surface topography, which is influenced by the configuration of the eroded bedrock. Based on available groundwater elevation data, the shallow groundwater at the CCR facilities at Coal Creek Station generally follows surface topography, flowing east and north towards Lower Samuelson Slough and Sayler Slough. Available groundwater elevation data indicate that groundwater in the area of Upstream Raise 91 generally flows from the southwest to northeast, diagonally across the footprint of the facility, towards Lower Samuelson Slough.

Hydraulic conductivities in the area of Upstream Raise 91 range from 0.35 feet per day (ft/day) to 12.96 ft/day, with calculated groundwater flow rates during Q2 2020 ranging from 0.03 to 1.28 ft/day.

2.4 Groundwater Monitoring Network

The groundwater monitoring network for Upstream Raise 91 was developed with consideration for the size, disposal and operational history, anticipated flow direction, and location of adjoining facilities. Based on these factors, a monitoring well network consisting of two upgradient and three downgradient monitoring wells is used for monitoring the unit under the CCR rule.

The two upgradient monitoring wells (MW-75, MW-91-2) included in the groundwater monitoring network for Upstream Raise 91 are used to represent upgradient water quality flowing towards the unit from the west and south, including the potential for variability. The three downgradient wells (MW-49, MW-51, MW-91-1) are spaced along the northern edge of the facility. Upstream Raise 91 directly abuts Upstream Raise 92 on its eastern edge, preventing installation of monitoring wells along the eastern side of Upstream Raise 91 without jeopardizing the integrity of the liner system. The Upstream Raise 91 network wells are presented in Figure 1. Other monitoring locations used to support this ASD are also presented in Figure 1 and are discussed further in Section 5.0.

2.5 Groundwater Conditions

Between September 2015 and June 2017, GRE collected nine independent baseline groundwater samples from MW-75, MW-49, and MW-51, as required by 40 CFR Part 257.94, for use within the CCR rule monitoring program. Baseline samples were collected from MW-91-2 and MW-91-1 between January 2018 and

October 2018, following installation of the wells in late 2017. Prior to installation of MW-91-2 and MW-91-1 and completion of the baseline monitoring at the wells, Upstream Raise 91 and Upstream Raise 92 were monitored jointly under a monitoring network consisting of the wells near both units (Golder 2019a). The results of the CCR baseline monitoring were used to develop appropriate statistical limits for each constituent at each monitoring well, based on site and parameter specific conditions (Golder 2019b).

Following completion of the baseline monitoring events at each well, GRE began collecting groundwater samples on a semi-annual basis to support the detection monitoring program. Groundwater samples for detection monitoring are collected at each upgradient and downgradient monitoring well and analyzed for 40 CFR Part 257 Appendix III constituents. During the detection monitoring program, results from groundwater analysis are compared to the statistical limits calculated from the baseline monitoring results to determine whether groundwater quality remains consistent, or if changes in groundwater quality are observed.

Chloride concentrations in groundwater at MW-49 during the baseline monitoring period ranged between 59.2 and 67.1 milligrams per liter (mg/L) in the nine baseline samples collected as part of the CCR rule monitoring program. The Shewhart-CUSUM statistical limit for the well-constituent pair was set at 73.9 mg/L.

The Q2 2019 detection monitoring event reported a chloride concentration of 70.0 mg/L at MW-49, with a calculated CUSUM value of 77.4 mg/L, exceeding the statistical limit. Verification resampling was conducted during the Q4 2019 detection monitoring event, confirming the SSI for chloride at MW-49 with a chloride concentration of 71.0 mg/L and a calculated CUSUM value of 83.8 mg/L. The Q2 2020 chloride result at MW-49 was also a verified SSI (based on calculated CUSUM value) with a chloride concentration of 60.0 mg/L, which is in the range of baseline values, but the calculated CUSUM value of 85.3 mg/L was greater than the statistical limit.

2.6 Sampling and Laboratory Testing Procedures

As part of the ASD, a review was conducted of the sampling and laboratory testing procedures used throughout baseline monitoring and detection monitoring to date, along with the collected results. A review of the statistical assessment methods and associated results found the procedures followed during baseline and detection monitoring to be consistent with the stated procedures listed in the published Groundwater Statistical Methods Certification (Golder 2019b). Calculated limits were found to be consistent with the chosen statistical procedures and recommended methodology found within the Unified Guidance (USEPA 2009).

In review of the analytical results, a shift in the MW-49 chloride concentrations was noted between data collected prior to June 2018 and data collected after June 2018. This shift was evaluated with a Wilcoxon Rank-Sum test which showed statistical significance at the 95% confidence level (Figure 2). The Wilcoxon Rank-Sum test determines if measurements from one population are significantly different than measurements from another population. This test is non-parametric, meaning that the data are not assumed to fit a specific distribution, such as a normal distribution.

Beginning in June 2018 (Q2 2018, the second semi-annual detection monitoring event), GRE switched sampling staff. The potential impacts of this change are evaluated in Section 3.0. Also beginning in June 2018 (Q2 2018, the second semi-annual detection monitoring event), GRE switched analytical laboratories from Minnesota Valley Testing Laboratory (Bismarck, North Dakota) to Eurofins TestAmerica (Denver Laboratory in Arvada, Colorado). There are differences between the testing methodologies used for chloride by the two laboratories. An evaluation of the methods and their associated differences is discussed in Section 4.1.

3.0 POTENTIAL SAMPLING CAUSES

Between September 2015 and May 2018, sampling of the CCR rule wells and other wells and surface water sampling locations at Coal Creek Station was conducted by outside contractors from the Bismarck, North Dakota location of the Minnesota Valley Testing Laboratory (MVTL). Beginning with the samples collected in June 2018, sampling has been conducted in-house by GRE employees. Low-flow pumps and sampling methods have been used to collect groundwater samples throughout the monitoring program for the CCR rule, following manufacturer recommendations (Geotech 2015) and USEPA guidance (USEPA Region I 2017). Although using the same sampling methods, there is a potential for minor differences in sampling technique between sampling personnel. The timing of the change in sampling personnel coincides with both the June 2018 shift in chloride concentrations described in Section 2.5 and the change in laboratories noted in Section 2.6.

4.0 POTENTIAL LABORATORY SOURCES

4.1 Changes in Testing Methodology

Prior to June 2018, GRE contracted MVTL as their analytical testing laboratory for the monitoring program for the CCR rule. For analysis of chloride, MVTL used a variation of the SM4500-Cl- method (published variations of the method are labeled SM4500-Cl- A through SM4500-Cl- I; Standard Methods Online 2018). In the most recent sampling prior to the analytical laboratory switch, MVTL used method SM4500-Cl- E, Chloride by Automated Ferricyanide Method. Instrumentation for the method is an automated spectrophotometer, as the method is a colorimetric means of measuring chloride in water. All variations of SM4500-Cl are only applicable for testing chloride and are not indicated for use for other analytes.

Under typical use of the method, the applicable concentration range is 1 to 200 mg/L of chloride, which can be extended to higher and lower concentrations by dilution, adjustment of sample size, and other typical testing adjustments (USGS 2002a). The typical chloride reporting limit provided by MVTL was 1.0 mg/L. Although not reported within MVTL's laboratory information management system at the time of testing, dilutions to the sample results are likely to have occurred, given the range in chloride concentrations reported using the method between 2015 and 2018 (1.1 to 697 mg/L across all CCS samples collected as part of the monitoring program for the CCR rule).

Beginning with the June 2018 sampling events for the CCR rule groundwater monitoring program, GRE contracted Eurofins TestAmerica (TestAmerica) as their analytical testing laboratory. For analysis of chloride, TestAmerica has used method SW9056A, the Determination of Inorganic Anions by Ion Chromatography (USEPA 2007). Ion chromatography identifies and separates different ions based on their affinity to an ion exchanging resin which is packed in a flow-through column. The separated ions elute off the column at different times, characteristic to the ion size and charge, and are measured using an electrical conductivity meter, generating a series of peaks as the different ions leave the column (Figure 3). Relative to a baseline level of conductivity, the area of each peak is proportional to the ion's concentration in the sample. The peak area is compared to the peak areas generated by known concentrations in calibration standards to derive a sample concentration. In the case of method SW9056A, the specified analytical column (i.e., the ion exchanger), is required to be suitable for analyzing for chloride, fluoride, bromide, nitrate, nitrite, phosphate, and sulfate.

The typical chloride reporting limit provided by TestAmerica at the Denver Laboratory was 3.0 mg/L. Dilutions have varied across samples, ranging from 1x dilution factors (i.e., no dilution and a reporting limit of 3.0 mg/L) to 50x dilution factors (with a corresponding reporting limit of 150 mg/L). Due to the capacity of the method for testing multiple anions, indiscriminate dilution intended to account for high concentrations of one anion,

particularly in accounting for samples with higher sulfate concentrations as found at CCS, can negatively impact outcomes for the other anions measured by the method, resulting in non-detect results with excessive dilutions. This aspect is particularly salient due to the base application of the method, as loading of the ion exchange column within the ion chromatograph should not exceed concentrations of approximately 500 parts per million ([ppm]; equivalent to 500 mg/L) of total anions within the sample when the sample to be tested is undiluted (USGS 2002b).

In comparing the methodologies used by the two laboratories, a few specific differences are apparent. First, the two methods analyze for chloride using fundamentally different mechanisms. Method SM4500-Cl- E uses spectrophotometry, which measures how much a chemical of interest absorbs light by passing a light source through a sample. Differentiation of chemical compounds is based on the principle that each compound will absorb light over a specific range of wavelengths (Standard Methods Online 2018; USGS 2002a). Method SW9056A uses ion chromatography, quantifying the species of interest based on their affinity for an ion exchanger (USEPA 2007; USGS 2002b). Due to the difference in mechanisms between the methods, samples that are analyzed by the two methods would be anticipated to show slightly different results, even if tested portions are drawn from the same sample.

Second, larger differences between quantified results could be anticipated in samples with complex matrices, particularly those with large concentrations of other anions measured through the SW9056A methodology. Although the ion exchangers used within ion chromatography are specific to each method, the column specified by SW9056A is intended to account for the affinity of the complete list of analytes specified by the method in sequential order (USEPA 2007). In samples at CCS, concentrations of sulfate alone, as the final sequential anion within the method, often exceed the total anion loading of the methodology prior to dilution of samples. As the concentrations of chloride are less than those of sulfate within samples from CCS based on previously collected information and geochemical water-typing, masking of the intended analyte by other anions intended for quantification could skew results. Appropriate calibration across multiple concentration ranges is intended to prevent this issue. However, based on past included laboratory qualifiers and explanations within laboratory narratives, pinpointing a group of ranges across samples can prove difficult.

One further difference between the results from the two laboratories are the number of significant digits reported within sample results. Results for chloride using method SM4500-Cl- E from MVTL were reported with three significant digits, while TestAmerica reports results for chloride using method SW9056A using only two significant digits. This difference in precision between the two laboratories may be subtle given the concentrations of chloride across samples, but could result in a difference in population medians, signifying a shift in concentrations with no cause from the facility. Similar differences are noted in the number of significant digits reported for boron, calcium, sulfate, and total dissolved solids between reporting from the two analytical laboratories.

4.2 Ion Chromatography

In addition to comparing differences between the chloride methods, Golder reviewed TestAmerica's SW9056A standard operating protocols and reviewed the ion chromatography data output data to look for practices that have the potential to bias chloride concentrations high.

The quality of ion chromatography measurements is dependent on consistently processing data in the conversion of peak area to concentration. For example, the following aspects should be handled consistently:

- The time window used to calculate the area under a peak,

- The method for determining baseline conductivity,
- The approach for dealing with minor peaks that elute from the column at the same time as an analyte of interest.

These data processing calculations are automatically performed by the instrument software and can result in minor differences between samples and standards. While TestAmerica checks ion chromatograph data to confirm that the instrument software is functioning consistently, there is a range of variability in the software data processing practices that is tolerated and the decision on whether to manually adjust the software-calculated concentrations by manually selecting peaks is the responsibility of TestAmerica personnel.

Golder's review of the TestAmerica ion chromatography data identified several data processing practices that have the potential to bias high chloride concentrations (Figure 4). These include:

- Using a longer integration time for samples than calibration standards,
- Selecting a lower baseline in samples relative to calibration standards, and
- Including minor shoulder peaks in sample chloride peaks when they were excluded from calibration standard chloride peaks.

These practices were implemented in the processing of the ion chromatographs for the MW-49 samples collected between June 11, 2018 and October 15, 2019 and have the potential to bias high the chloride concentrations by up to 4.2%. Golder discussed the data processing practices with TestAmerica after an internal review, and TestAmerica deemed the practices as within the range of acceptable variability and a revision to the originally reported values was not warranted (D. Bieniulis, personal communication, May 8, 2020). While up to a 4.2% difference is relatively small, this difference could account for part of the June 2018 shift in MW-49 chloride concentrations described in Section 2.5 and result in identification of an SSI.

5.0 POTENTIAL SITE CHLORIDE SOURCES

To assess the potential sources for a change in chloride concentrations at MW-49, Golder reviewed recent site changes upgradient of Upstream Raise 91, as well as previously collected data from the CCR rule program and other site monitoring data that are collected under other programs. The following sections summarize the supplemental assessment activities.

5.1 Site Changes and Potential Impacts

The following sections discuss site changes and potential impacts associated with those changes over the last 40 years. Site changes may have affected constituent concentrations entering the groundwater system or the hydrologic and hydrogeologic conditions (water balance) of the site.

5.1.1 Construction History and Liner System

Upstream Raise 91 was constructed on the historic footprint of the South Ash Pond, which was built in the late 1970s on a foundation of re-compacted site soils (glacial tills) and put into service in 1979. In 1981, the South Ash Pond was taken out of service to reconstruct the clay liner and was put back into service from 1982 until 1987, at which point CCR materials were removed and the geometry of the South Ash Pond footprint was modified. Monitoring wells MW-49, MW-51, and MW-75 were installed near Upstream Raise 91 in 1988 and chloride has been analyzed since that time on an approximately semi-annual basis as part of the NDDEQ monitoring program.

Chloride concentrations in MW-49 increased significantly shortly after monitoring began in the late 1980s due to likely impacts from the South Ash Pond. In 1993, Upstream Raise 91 was deepened and a new composite liner consisting of a 2-foot thick compacted clay liner underlying a 40-mil high-density polyethylene (HDPE) geomembrane was completed. Beginning in 1996, chloride concentrations started a downward trend, decreasing by approximately 50% over the next 10-year period (approximately from a high of 170 mg/L to 85 mg/L), likely a result of construction of the composite liner system. Overall, chloride concentrations decreased approximately 60% from 1996 to 2020 (from a high of approximately 170 mg/L to 70 mg/L).

5.1.2 Duck Pond and Drains Pond System Construction

Beginning in 2015, the drainages on the west and northwest sides of Upstream Raise 91 were modified to allow for construction of an expansion to the Drains Pond System. As a part of this construction, modifications to the existing drainage upgradient of Upstream Raise 91 were required and the composite-lined west and center cells of the Drains Pond System were constructed.

Historically, the Duck Pond area was a low-lying area west of Upstream Raise 91. The depth of water contained in this area was generally 12 feet (water surface elevation approximately 1911 feet) and the Duck Pond had a surface area of approximately three acres. As the water level increased, overflow passed through culvert piping to the north under what is now the center cell of the Drains Pond System. As part of the construction in 2015, the Duck Pond was dewatered, the area was graded, and culverts were installed to drain surface water south and east around the south side of Upstream Raise 91.

5.2 Data Sources

To determine if recent site changes upgradient of Upstream Raise 91 have impacted water quality in MW-49, the sampling locations and dates for groundwater, surface water, and contact water results were reviewed for each potential source provided below (see Figure 1 for locations).

5.2.1 Upstream Raise 91

Data collected between September 2015 and April 2020[1] for the CCR rule monitoring program were considered in the evaluation. As part of the monitoring program, field personnel collected groundwater samples from the following monitoring wells:

- Upgradient to Upstream Raise 91: MW-75 and MW-91-2
- Downgradient from Upstream Raise 91: MW-49, MW-51, and MW-91-1

Additionally, results for a November 2018 sample of ash contact water collected from the Upstream Raise 91 sump (Sump-UR91) were available for the evaluation.

5.2.2 Drains Pond System

Data collected between September 2015 and April 2020 for the CCR rule monitoring program were considered in the evaluation. As part of the monitoring program, field personnel collected groundwater samples from the following monitoring wells:

- Upgradient to the Drains Pond System: MW-DP3 and MW-DP5

[1] June 2019 samples from MW-91-1 and MW-91-2 not used because of a suspected quality control issue

- Downgradient from the Drains Pond System: MW-DP1, MW-DP2, MW-DP2B, and MW-DP4

Additionally, results for 18 samples collected between 2014 and 2019 of ash contact water collected from the surface of the east cell of the Drains Pond System (Drains Pond, SW-DP101) were used in the evaluation.

5.2.3 Upgradient Plant Cooling Water

Groundwater potentially influenced by upgradient plant cooling water is monitored at the following locations:

- Upgradient to the powerplant: MW-96
- Downgradient from the Extended Basin: MW-62, MW-63, and MW-65
- EEG Wells: MW-17-1, MW-17-2, MW-17-3, MW-17-4, and MW-17-5 (these wells were installed to monitor a historical leak in the fuel line to the Emergency Engine Generator)

For the plant wells, results from samples collected between October 1988 and April 2020 were considered for this evaluation. The EEG wells were installed in the fourth quarter of 2017, and results included in this evaluation were for samples collected between January 2018 and May 2020.

Additionally, results for samples collected between October 1988 and April 2020 of surface water collected from the Extended Basin (SW-107) were used in the evaluation.

5.3 Evaluation of Potential Sources

Figure 5 displays a map of the locations and observed chloride concentrations (both October 2019 concentration and the range of chloride values observed in baseline and detection monitoring) for the monitoring wells and surface water sources described in Section 5.2. As shown in Figure 1, groundwater generally flows from the southwest to the northeast. To assist with the identification of potential chloride sources to MW-49, Figure 6 compares the ranges of chloride concentrations for the monitoring wells and surface water sources on the site with a box and whisker plot. Figure 7 displays a scatter plot of the sulfate to chloride ratio versus the calcium to chloride ratio as a method of comparing water qualities across the site. Piper plots were not utilized due to the lack of consistently having the full suite of cations and anions for the different potential chloride sources at the site.

Several potential sources can influence chloride concentrations in groundwater at CCS, including infiltration of plant cooling water via the Extended Basin, seepage from the Drains Pond System, and seepage from Upstream Raise 91. These three potential sources of chloride are described below. The data suggests that the increase in chloride concentration at MW-49 chloride is due to a change in the hydrological flow regime caused by the 2015 removal of the Duck Pond. This change likely increased the proportion of water with elevated chloride from the Extended Basin, affecting chloride concentrations at MW-49 that resulted in the SSIs.

5.3.1 Upstream Raise 91

The chloride concentration measured in the sample from the Upstream Raise 91 sump (790 mg/L) is higher than groundwater concentrations and indicates that seepage (if occurring) from Upstream Raise 91 could increase the chloride concentrations in MW-49. The presence of the liner system at Upstream Raise 91 (a 2-foot thick compacted clay liner with a hydraulic conductivity of $1x10^{-7}$ centimeters/second or less underlying a 40-mil HDPE geomembrane) reduces the likelihood of seepage to groundwater. Figure 7 indicates that contact water in the Upstream Raise 91 sump has lower calcium to chloride ratios and lower sulfate to chloride ratios than water observed at MW-49. If seepage from Upstream Raise 91 was impacting groundwater at MW-49, a shift in both of

these ratios in samples identified as SSIs from MW-49 (Q4 2018 through Q2 2020) towards those observed from the Upstream Raise 91 sump would be expected. A shift towards the Upstream Raise 91 sump signature was not observed on Figure 7 for the samples identified as SSIs.

5.3.2 Drains Pond System

Given the physical proximity of the east cell of the Drains Pond System to MW-49 and the elevated chloride concentrations observed in the surface water of the east cell of the Drains Pond System (125 to 827 mg/L), seepage (if occurring) from the east cell of the Drains Pond System could have the potential to elevate chloride concentrations at MW-49. The presence of the liner system of the east cell of the Drains Pond System (a 2-foot thick compacted clay liner with a hydraulic conductivity of $1x10^{-7}$ centimeters/second or less underlying a 40-mil HDPE geomembrane) reduces the likelihood of seepage to groundwater. Contact water in the east cell of the Drains Pond System has lower calcium to chloride ratios than water observed in MW-49 (Figure 7). If seepage from the Drains Pond System was impacting groundwater at MW-49 a shift in the calcium to chloride ratios in the samples identified as SSIs from MW-49 (Q4 2018 through Q2 2020) towards those observed from the east cell of the Drains Pond System would be expected. A shift towards the Drains Pond System signature was not observed on Figure 7 for the samples identified as SSIs.

5.3.3 Upgradient Plant Cooling Water

To the west of Upstream Raise 91 and Coal Creek Station, water used for plant cooling is contained in the Extended Basin, which holds approximately 60 million gallons and is clay lined. The Extended Basin water originates from the Missouri River, but is cycled up to 15 times through the cooling towers. As the water is cycled, heat from the powerplant drives evaporation, which concentrates the constituents in the Extended Basin. Between 1988 and 2019, chloride concentrations in the Extended Basin ranged between 158 and 300 mg/L.

Nearby monitoring wells (MW-62, MW-63, and MW-65) located upgradient of the powerplant and immediately adjacent to the Extended Basin also have elevated chloride concentrations ranging from 8.0 to 290 mg/L indicating that water from the Extended Basin is impacting groundwater chloride concentrations. The elevated concentrations from the Extended Basin show considerable increase relative to MW-96, a background well for the plant that is side-gradient to the Extended Basin. Chloride concentrations at MW-96 range between 4.2 and 7.8 mg/L.

The water from the Extended Basin also appears to be impacting wells further downgradient. The concentrations observed along the flow path from the Extended Basin towards MW-49 include:

- The EEG wells located east of the Extended Basin have chloride concentrations ranging between 58 and 130 mg/L.
- Well MW-DP5 downgradient from the plant and upgradient of the Drains Pond System, has chloride concentrations ranging between 66.0 and 84.8 mg/L. Well MW-DP3 also upgradient of the Drains Pond has chloride concentrations ranging between 8.6 and 19.8 mg/L.
- Wells MW-91-2 and MW-75 upgradient of Upstream Raise 91 and side gradient to the Extended Basin have chloride concentrations between 1.1 and 16.8 mg/L.

Variations in screened lithology and preferential flow paths in the glacial till may explain why some wells downgradient of the Extended Basin show elevated chloride concentrations while other wells (MW-DP3, MW 91-2, and MW-75) have chloride concentrations more similar to MW-96.

Figure 7 demonstrates that surface waters from the Extended Basin may be influencing ion ratios in groundwater samples from monitoring wells upgradient of Upstream Raise 91, including MW-62, MW-63, MW-65, MW-17-2, and MW-17-5, and monitoring wells downgradient of Upstream Raise 91, including MW-49 and MW-91-1.

The recent removal of the Duck Pond and regrading of the area directly upgradient of the Drains Pond System potentially altered the hydrological flow paths to MW-49 and increased the proportion of water with elevated chloride from the Extended Basin relative to other groundwater sources monitored at MW-49. In addition to the changing flow paths, the removal of the Duck Pond also eliminated infiltration of water from the Duck Pond to groundwater, which may have provided a dilution effect on groundwater concentrations upgradient of MW-49.

6.0 EVIDENCE OF AN ALTERNATIVE SOURCE

Primary lines of evidence and conclusions drawn from the evidence used to support this ASD are provided in Table 1. In summary, the chloride SSI in MW-49 is not likely and indication of a release from Upstream Raise 91. Instead the change in chloride concentration is potentially a reflection of sampling and laboratory changes and/or changes in the groundwater flow regime related to the removal of the Duck pond that have increased the proportion of water with elevated chloride from the Extended Basin relative to other groundwater sources monitored at MW-49.

Table 1: Primary and Supporting Lines of Evidence from ASD Analysis

Key Line of Evidence	Supporting Evidence	Description
Change in Field Personnel	Changed to site personnel from MVTL	Although using the same sampling methods, there is a potential for minor differences in sampling technique between sampling personnel. The timing of the change in sampling personnel coincides with the June 2018 shift in chloride concentrations.
Change in Laboratory and Methodology	Changed to TestAmerica from MVTL	The timing of the change in laboratory coincides with the June 2018 shift in chloride concentrations.
	Change from potentiometric method (SRM 4500-CL) to ion chromatography method (SRM 9056A)	Prior to June 2018, MVTL used method SM4500-Cl- E to measure chloride concentrations. Starting in June 2018, TestAmerica analyzed chloride concentrations by SW9056A. These methods have different mechanisms, detection limits, and matrix effects. The timing of the change in methodology coincides with the June 2018 shift in chloride concentrations.
Laboratory Artifact Biasing High Sample Concentrations	Ion chromatographs reflecting different data processing practices between some calibration standards and samples	Golder's review of the TestAmerica ion chromatography data identified several data processing practices (integration time length, baseline selection, and treatment of minor peaks) that have the potential to bias high chloride concentrations (Figure 4).

Key Line of Evidence	Supporting Evidence	Description
Groundwater Geochemistry	Relative ion abundances in groundwater differs from Upstream Raise 91 sump water and surface water collected from the east cell of the Drains Pond system	The water quality signature of groundwater samples collected from downgradient well MW-49 are not consistent with the signature of potential seepage from Upstream Raise 91. As presented in the Figure 7, differences in calcium-chloride and sulfate-chloride ratios are distinctly different between the ash-impacted waters and the downgradient groundwater samples, including from MW-49.
Local Sources of Chloride	Elevated chloride concentrations in the Extended Basin and other wells downgradient of the Extended Basin	Figure 6 suggests that chloride concentrations in the plant cooling water (Extended Basin) are impacting groundwater chloride concentrations in wells downgradient from the Extended Basin. Similarities in the ion ratios between water samples collected from MW-49, the Extended Basin, and wells immediately downgradient of the Extended Basin (Figure 7) suggest that the Extended Basin may be a potential source of elevated chloride at MW-49.
	Hydrogeology	The removal of the Duck Pond in 2015 and regrading of the area directly upgradient of the Drains Pond System potentially altered the hydrological flow paths, resulting in higher chloride concentrations at MW-49. This would be due to an increase in the proportion of groundwater potentially impacted by the Extended Basin and the removal of the more dilute water infiltrating from the Duck Pond.

7.0 CONCLUSION

In accordance with 40 CFR 257.95(g)(3), this ASD has been prepared in response to the identification of a verified SSI for chloride at monitoring well MW-49 following the Q2 2020 sampling event for Upstream Raise 91 at Coal Creek Station.

Based on review of historical analytical results and testing procedures, recent changes to chloride concentrations in groundwater at MW-49 are likely not a result of seepage from Upstream Raise 91. There are two potential alternative sources, laboratory and sampling artifacts and variability in the upgradient groundwater sources. Therefore, no further action (i.e., a transition to Assessment Monitoring) is warranted, and Upstream Raise 91 will remain in detection monitoring.

8.0 REFERENCES

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Signature Page

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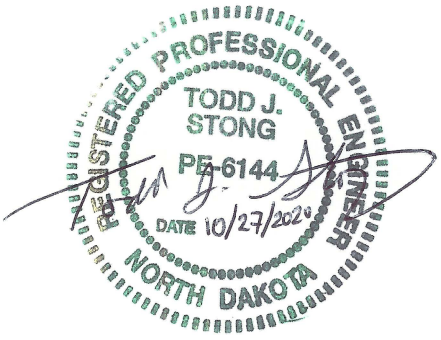

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Figures

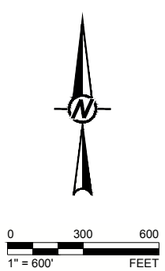


LEGEND

- NDDEQ PLANT AREA UPGRADIENT WELL
- NDDEQ PLANT AREA DOWNGRADIENT WELL
- EEG PROGRAM WELL
- DRAINS POND SYSTEM UPGRADIENT WELL
- DRAINS POND SYSTEM DOWNGRADIENT WELL
- UPSTREAM RAISE 91 UPGRADIENT WELL
- UPSTREAM RAISE 91 DOWNGRADIENT WELL
- GENERAL DIRECTION OF GROUNDWATER FLOW
- 1930 — POTENTIOMETRIC SURFACE CONTOURS
- UPSTREAM RAISE 91 BOUNDARY

NOTE(S)

1. GROUNDWATER ELEVATIONS WERE MEASURED APRIL-MAY 2020, ELEVATION FEET ABOVE MEAN SEA LEVEL.
2. POTENTIOMETRIC SURFACE CONTOURS WERE CREATED FROM WATER LEVEL INFORMATION FROM THE APRIL-MAY 2020 GROUNDWATER ELEVATIONS SHOWN, AS WELL AS SURVEYED SURFACE WATER EXPRESSIONS, ADDITIONAL SITE WELLS, AND PIEZOMETERS NOT SHOWN. CONTOUR INTERVAL IS 5 FEET.
3. AERIAL IMAGERY OBTAINED FROM UNITED STATES DEPARTMENT OF AGRICULTURE, NATIONAL AGRICULTURE IMAGERY PROGRAM, 2019.



CLIENT
GREAT RIVER ENERGY
COAL CREEK STATION

CONSULTANT
GOLDER

YYYY-MM-DD	2020-10-27
DESIGNED	DVS
PREPARED	DVS
REVIEWED	CCS
APPROVED	TJS

PROJECT
ALTERNATIVE SOURCE DEMONSTRATION

TITLE
APRIL - MAY 2020 GROUNDWATER CONTOURS AND SAMPLING LOCATIONS

PROJECT NO.	PHASE	REV.	FIGURE
19136224C	3	0	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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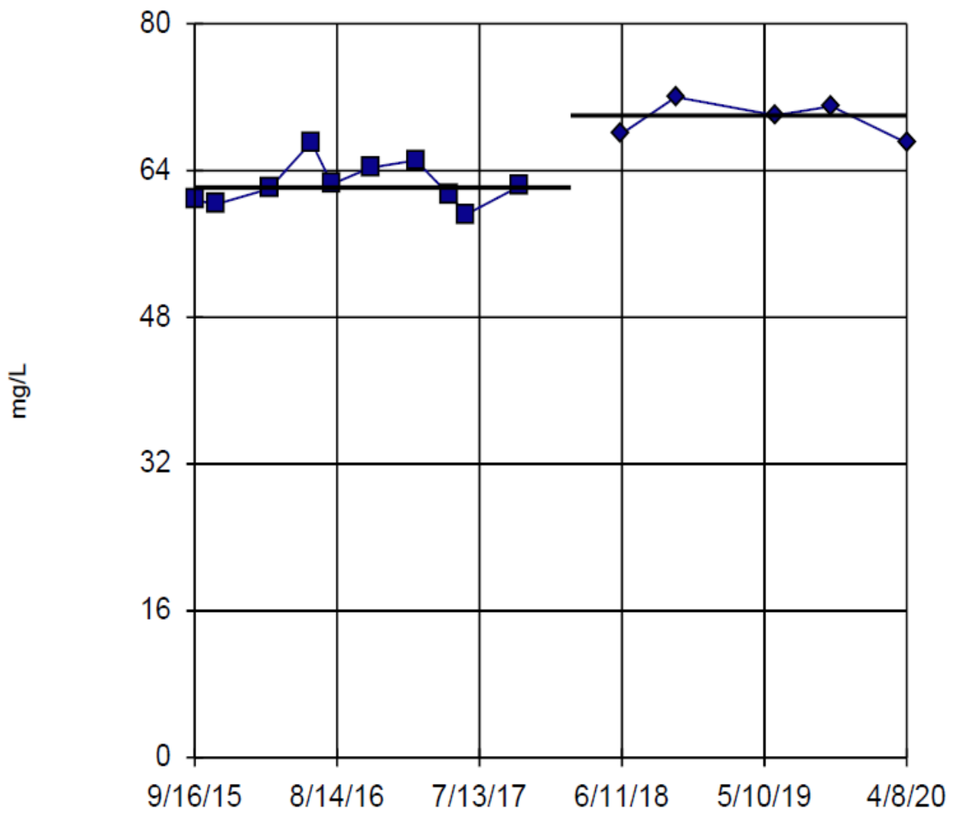
Sanitas™ v.9.6.26 Sanitas software licensed to Golder Associates. UG

Mann-Whitney (Wilcoxon Rank Sum)

MW-49



MW-49 background

MW-49 compliance

background median = 62.15 **MVTL**

compliance median = 70 **TestAmerica**

Z = 2.878

Alpha	Table	Sig.
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0.05	1.645	Yes
0.025	1.96	Yes
0.01	2.326	Yes

Constituent: Chloride Analysis Run 9/28/2020 2:55 PM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020

CLIENT
Great River Energy Coal Creek Station

PROJECT
Alternate Source Demonstration

CONSULTANT
GOLDER

TITLE
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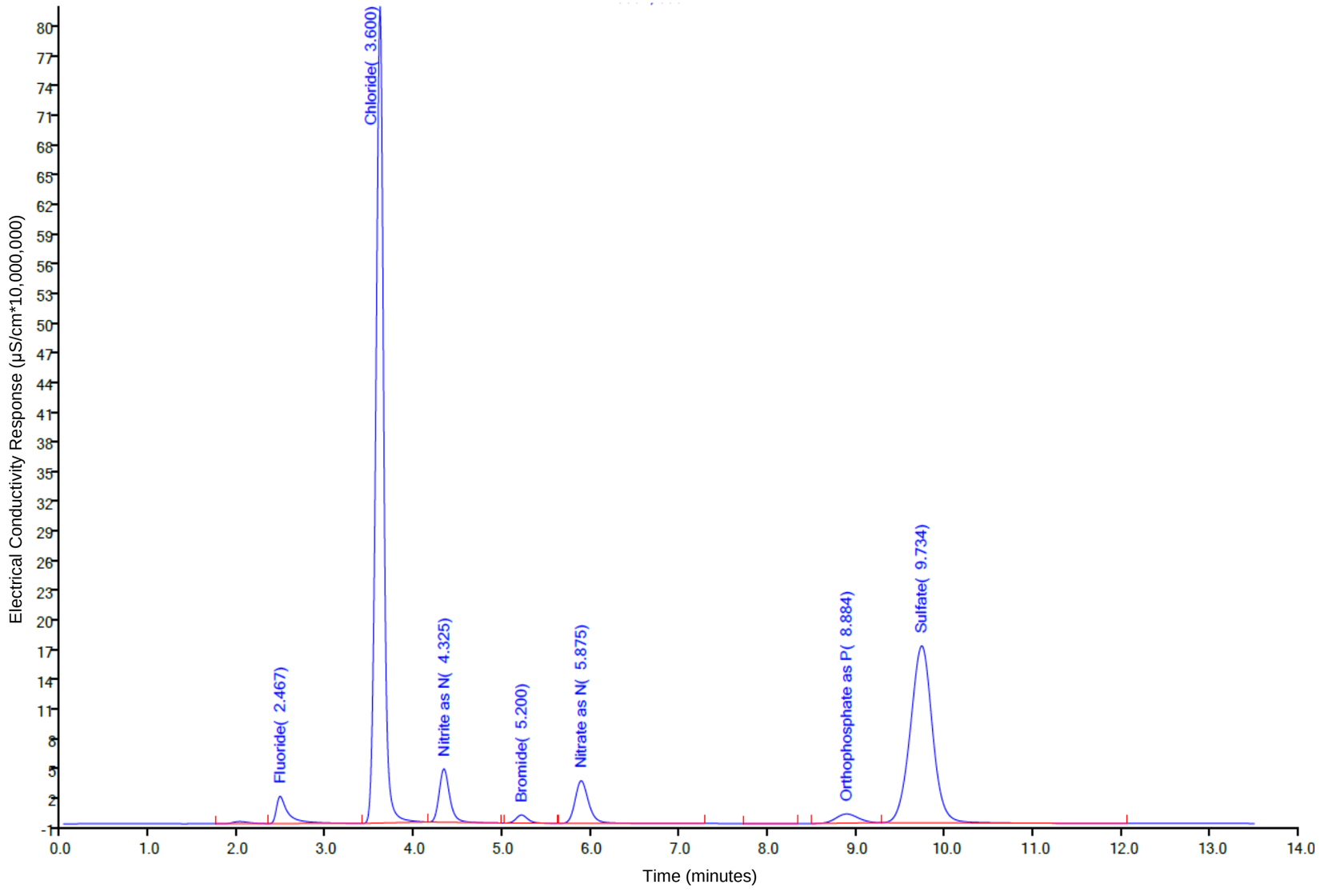


CLIENT
Great River Energy Coal Creek Station

PROJECT
Alternate Source Demonstration

CONSULTANT
GOLDER

TITLE
Example of Ion Chromatograph Data

PROJECT NO.	PHASE	REV.	FIGURE
19136224C	3	0	3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
1 in
0

Software Data Processing

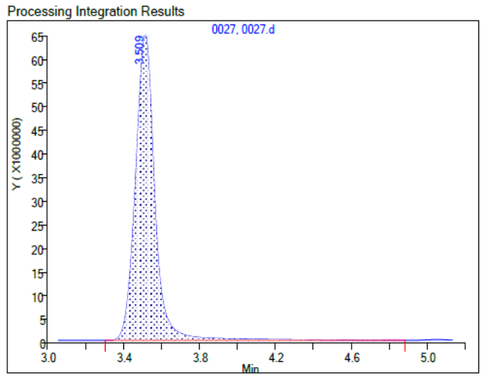
Manual Processing

Example #1:

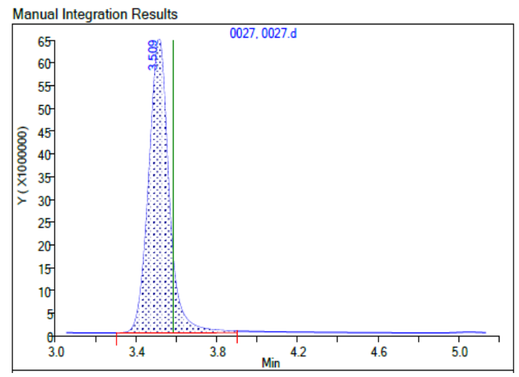
Shortened peak integration time to match calibration standards

Manual processing would decrease chloride concentration by 1.8%

RT: 3.51
Area: 457407359
Amount: 71.627674
Amount Units: ug/ml



RT: 3.51
Area: 449145333
Amount: 70.344660
Amount Units: ug/ml

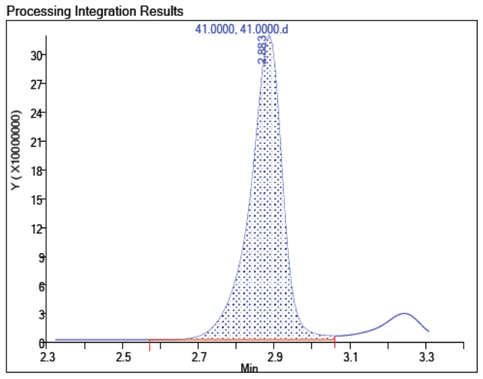


Example #2:

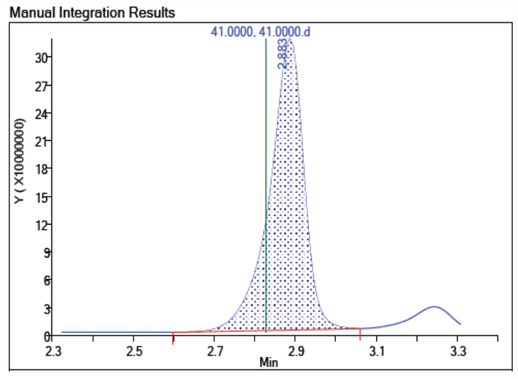
Right side of baseline brought up to minimum signal valley (not below valley), consistent with calibration standards

Manual Processing would decrease chloride concentration by 2.8%

RT: 2.88
Area: 1882027750
Amount: 107.4024
Amount Units: ug/ml



RT: 2.88
Area: 1830626225
Amount: 104.4716
Amount Units: ug/ml

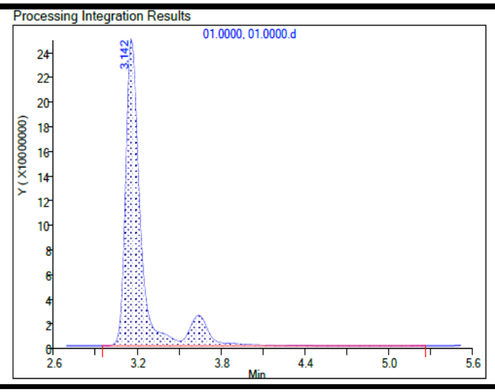


Example #3:

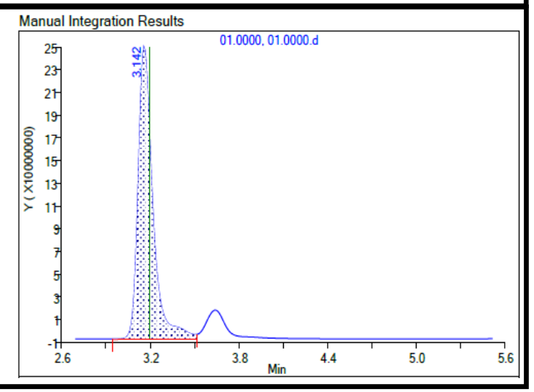
Minor peak to the right of chloride peak not included in area of chloride peak, consistent with calibration standards

Manual Processing would decrease chloride concentration by 4.2%

RT: 3.14
Area: 1753223086
Amount: 98.471277
Amount Units: ug/ml



RT: 3.14
Area: 1683282689
Amount: 94.545083
Amount Units: ug/ml



CLIENT
Great River Energy Coal Creek Station

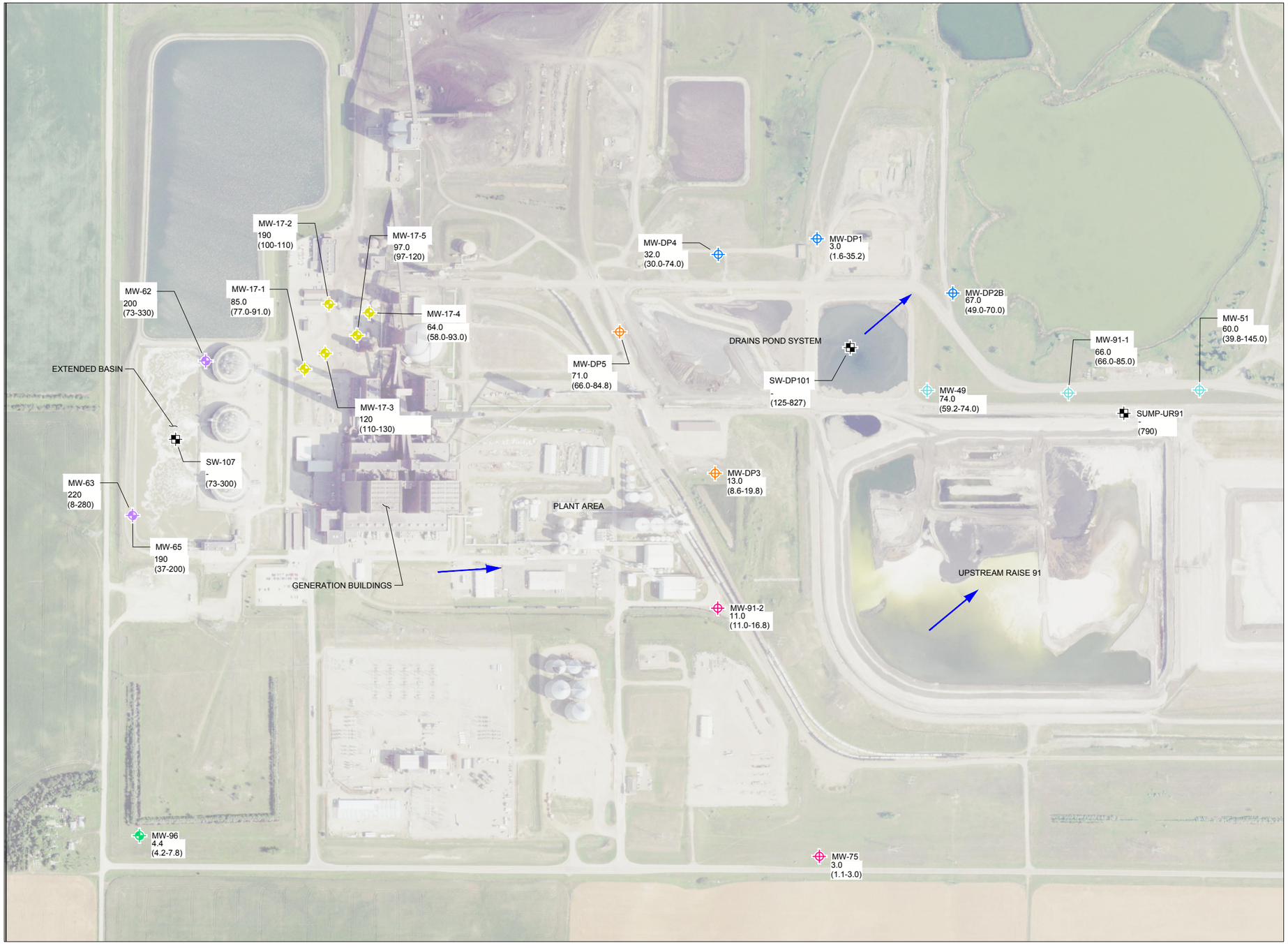
PROJECT
Alternate Source Demonstration

CONSULTANT
GOLDER

TITLE
Comparison of Ion Chromatograph Software Data Process versus Manual Adjustments

PROJECT NO.	PHASE	REV.	FIGURE
19136224C	3	0	4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
1 in
0



LEGEND

- NDDEQ PLANT AREA UPGRADIENT WELL
- NDDEQ PLANT AREA DOWNGRADIENT WELL
- EEG PROGRAM WELL
- DRAINS POND SYSTEM UPGRADIENT WELL
- DRAINS POND SYSTEM DOWNGRADIENT WELL
- UPSTREAM RAISE 91 UPGRADIENT WELL
- UPSTREAM RAISE 91 DOWNGRADIENT WELL
- OTHER SAMPLING LOCATION
- GENERAL DIRECTION OF GROUNDWATER FLOW
- 71.0 APRIL-MAY 2020 CHLORIDE CONCENTRATION (mg/L)
- (59.2-72.0) RANGE IN CHLORIDE CONCENTRATIONS, (mg/L)

NOTE(S)

1. AERIAL IMAGERY OBTAINED FROM UNITED STATES DEPARTMENT OF AGRICULTURE, NATIONAL AGRICULTURE IMAGERY PROGRAM, 2018.
2. SAMPLES FROM MW-DP5, MW-DP3, MW-DP2B, MW-DP1, MW-DP4, MW-91-2, MW-75, MW-49, MW-91-1, AND MW-51 WERE COLLECTED BETWEEN SEPTEMBER 2015 AND APRIL 2020. JUNE 2019 SAMPLES FROM MW-91-1 AND MW-91-2 WERE NOT USED BECAUSE OF SUSPECTED QUALITY CONTROL ISSUE.
3. SAMPLES FROM SW-DP101 WERE COLLECTED BETWEEN 2014 AND APRIL 2020.
4. SAMPLE FROM SUMP-UR91 WAS COLLECTED FROM NOVEMBER 2018. THE RANGE SHOWN FOR SUMP-UR91 REPRESENTS THE SINGLE CHLORIDE SAMPLE COLLECTED FROM THE LOCATION.
5. SAMPLES FROM MW-17-1, MW-17-2, MW-17-3, MW-17-4, AND MW-17-5 WERE COLLECTED BETWEEN JANUARY 2018 AND MAY 2020.
6. SAMPLES FROM MW-96, MW-62, MW-63, AND MW-65 WERE COLLECTED BETWEEN OCTOBER 1988 AND APRIL 2020.
7. SAMPLES WERE COLLECTED FROM SW-107 BETWEEN OCTOBER 1988 AND APRIL 2020.

N

0 300 600
1" = 600' FEET

CLIENT
GREAT RIVER ENERGY
COAL CREEK STATION

PROJECT
ALTERNATIVE SOURCE DEMONSTRATION

CONSULTANT
GOLDER

YYYY-MM-DD	2020-10-27
DESIGNED	DVS
PREPARED	DVS
REVIEWED	CCS
APPROVED	TJS

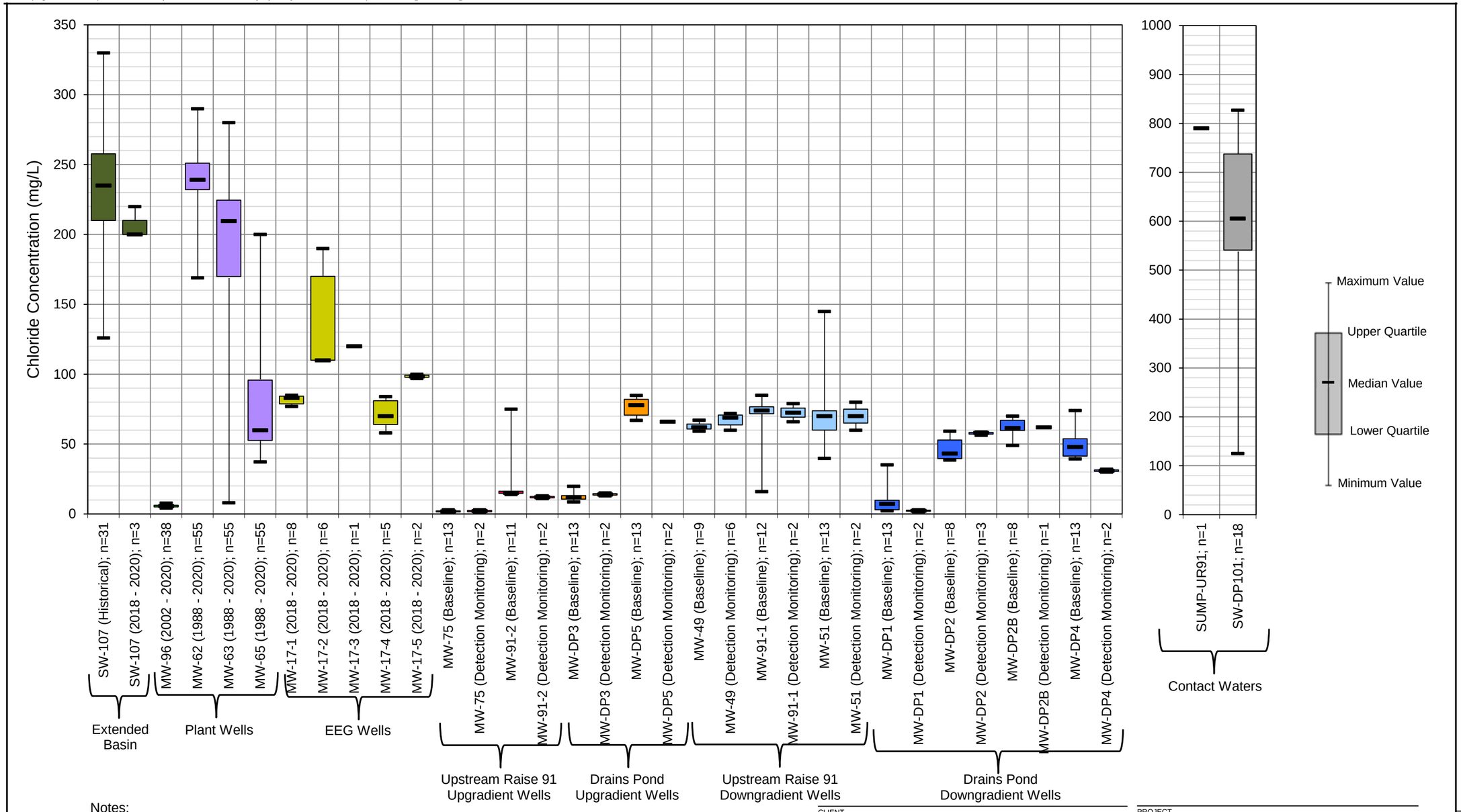
TITLE
CHLORIDE CONCENTRATIONS

PROJECT NO.	PHASE	REV.	FIGURE
19136224C	3	0	5

Path: \\Denver\acad\GREAT RIVER ENERGY\COAL CREEK\99_PROJECTS\19136224\Facility Water Quality\ | File Name: 19136224C_MW49ASD_ClConcs_Q220.dwg | Last Edited By: dvsmith Date: 2020-10-27 Time:11:45:57 AM | Printed By: DVSmith Date: 2020-10-27 Time:11:46:22 AM

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

PATH: https://golderassociates.sharepoint.com/sites/120551/Project Files/5 Technical Work/5 - Water Quality/ASD - Q2 2020/MW-49 Chloride ASD | FILE NAME: CCS_Box and Whisker_Cl.xlsm



Notes:
Non-Detect replaced with the detection limit

June 2019 samples from MW-91-1 and MW-91-2 not used because of a suspected quality control issue.

CLIENT
Great River Energy Coal Creek Station

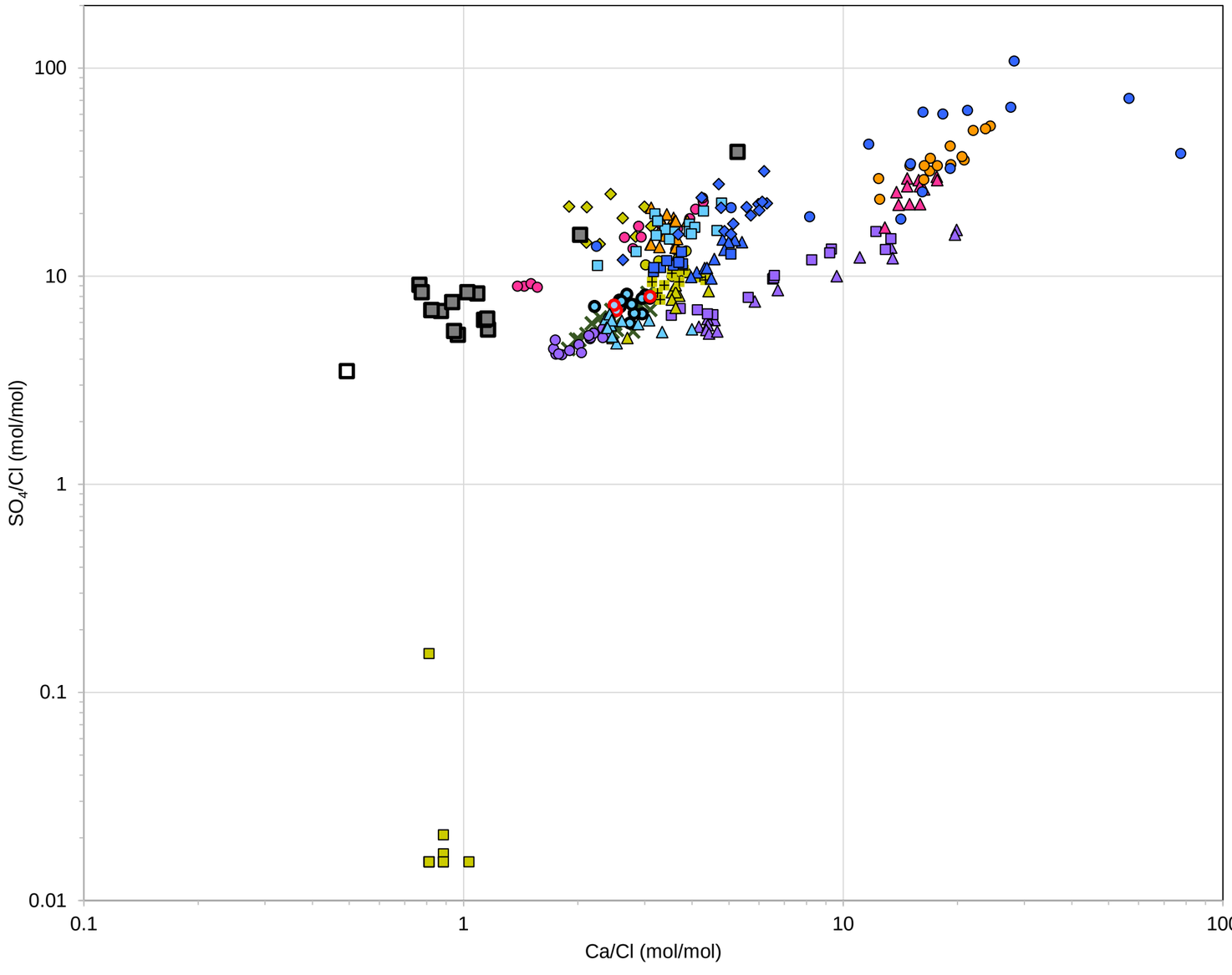
PROJECT
Alternate Source Demonstration

CONSULTANT
GOLDER

TITLE
Box and Whisker Plot for Chloride

PROJECT NO.	PHASE	REV.	FIGURE
19136224C	3	0	6

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
1 in
0



- SW-107 (Extended Basin)
- MW-62 (Downgradient Plant Well)
- MW-63 (Downgradient Plant Well)
- MW-65 (Downgradient Plant Well)
- MW-17-1 (EEG Well)
- MW-17-2 (EEG Well)
- MW-17-3 (EEG Well)
- MW-17-4 (EEG Well)
- MW-17-5 (EEG Well)
- MW-75 (UR91 Upgradient)
- MW-91-2 (UR91 Upgradient)
- MW-DP3 (Drains Pond Upgradient)
- MW-DP5 (Drains Pond Upgradient)
- MW-49 (UR91 Downgradient)
- MW-49 (Q2 2019 - Q2 2020; SSIs)
- MW-91-1 (UR91 Downgradient)
- MW-51 (UR91 Downgradient)
- MW-DP1 (Drains Pond Downgradient)
- MW-DP2 (Drains Pond Downgradient)
- MW-DP2B (Drains Pond Downgradient)
- MW-DP4 (Drains Pond Downgradient)
- SW-DP101 (Drains Pond Contact Water)
- Sump-UR91 (UR91 Contact Water)

Notes:
Non-Detect replaced with the detection limit

June 2019 samples from MW-91-1 and MW-91-2 not used because of a suspected quality control issue.

CLIENT
Great River Energy Coal Creek Station

PROJECT
Alternate Source Demonstration

CONSULTANT
GOLDER

TITLE
Sulfate-Chloride versus Calcium-Chloride Ratio

PROJECT NO.	PHASE	REV.	FIGURE
19136224C	3	0	7

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
1 in
0



golder.com

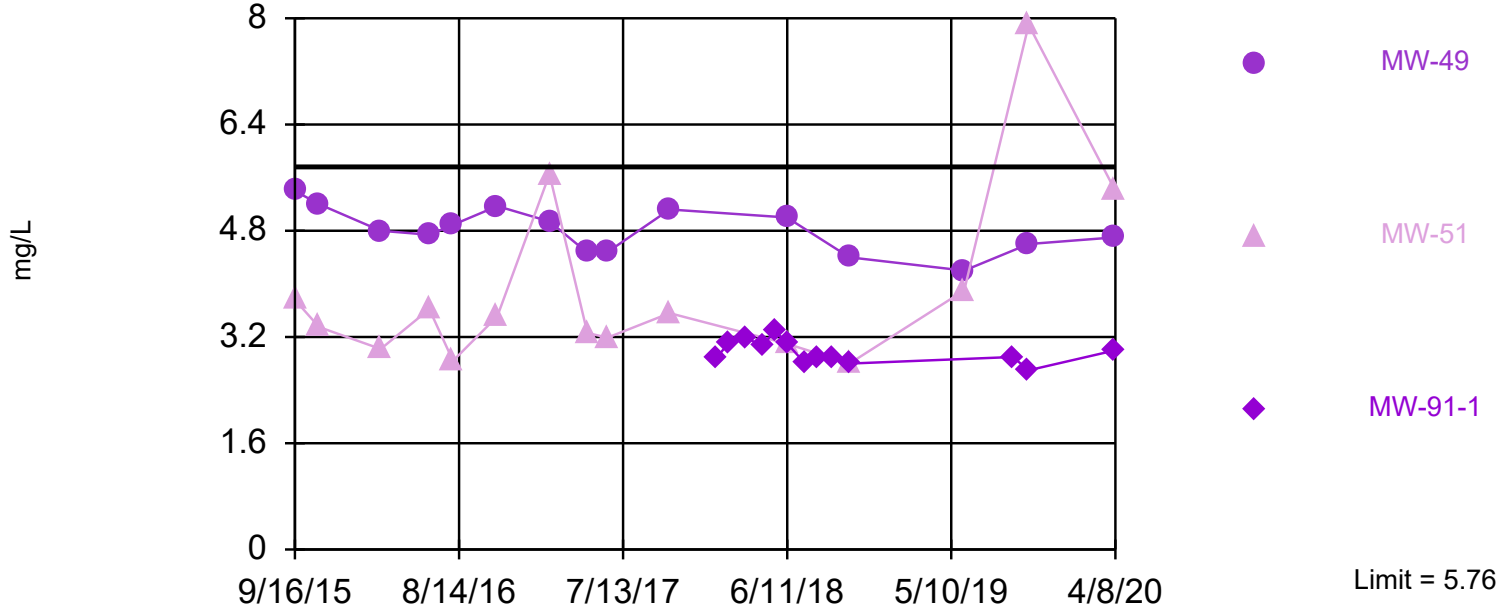
APPENDIX C-8

Inter-well Detection Monitoring Comparative Statistics Plots

Within Limit

Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.05 alpha level. Limit is highest of 57 background values. Annual per-constituent alpha = 0.003546. Individual comparison alpha = 0.0005918 (1 of 2). Comparing 3 points to limit.

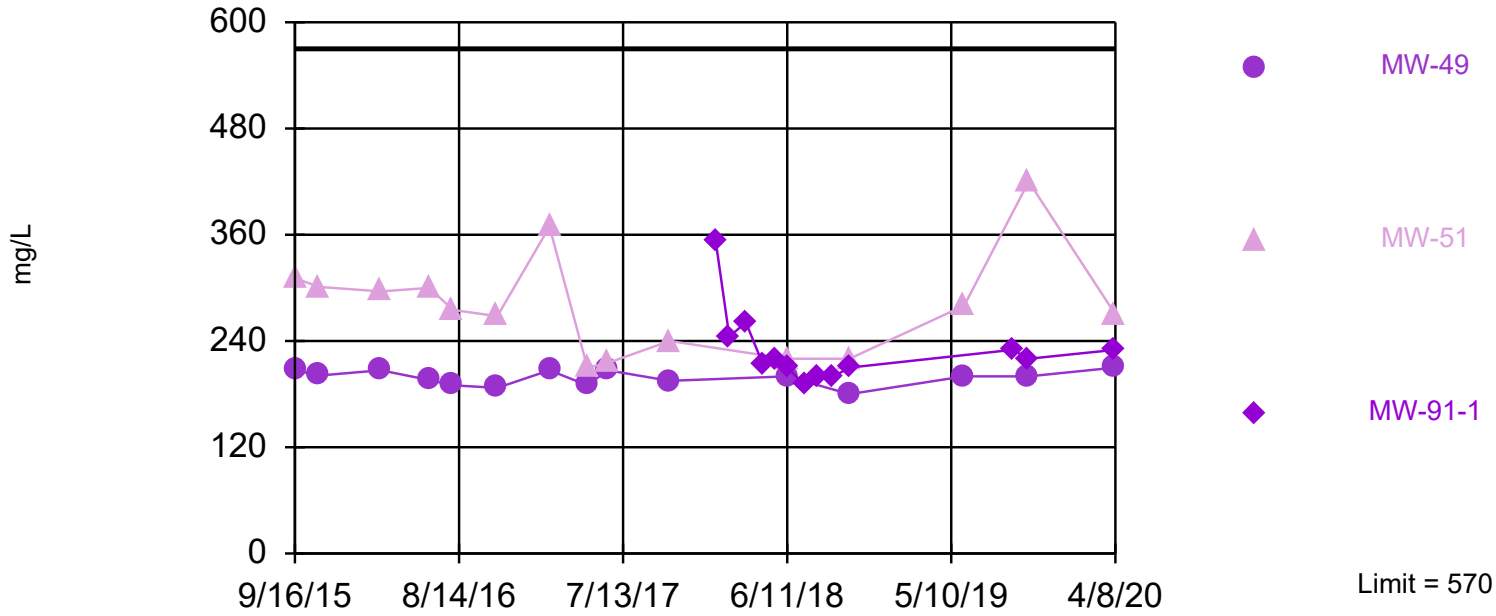
Constituent: Boron, Total Analysis Run 11/18/2020 11:48 AM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020

Within Limit

Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.05 alpha level. Limit is highest of 57 background values. Annual per-constituent alpha = 0.003546. Individual comparison alpha = 0.0005918 (1 of 2). Comparing 3 points to limit.

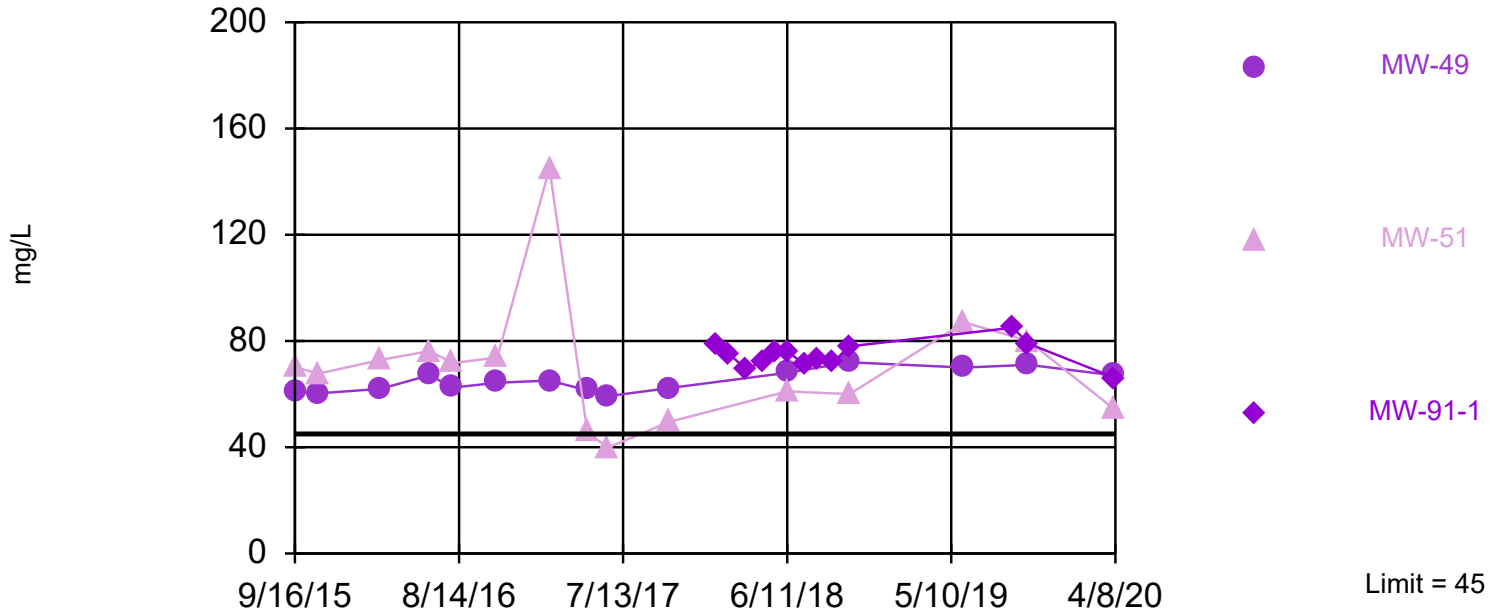
Constituent: Calcium, Total Analysis Run 11/18/2020 11:48 AM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020

Exceeds Limit: MW-49, MW-51, MW-91-1

Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.05 alpha level. Limit is highest of 57 background values. 8.772% NDs. Annual per-constituent alpha = 0.003546. Individual comparison alpha = 0.0005918 (1 of 2). Comparing 3 points to limit.

Constituent: Chloride Analysis Run 11/18/2020 11:48 AM

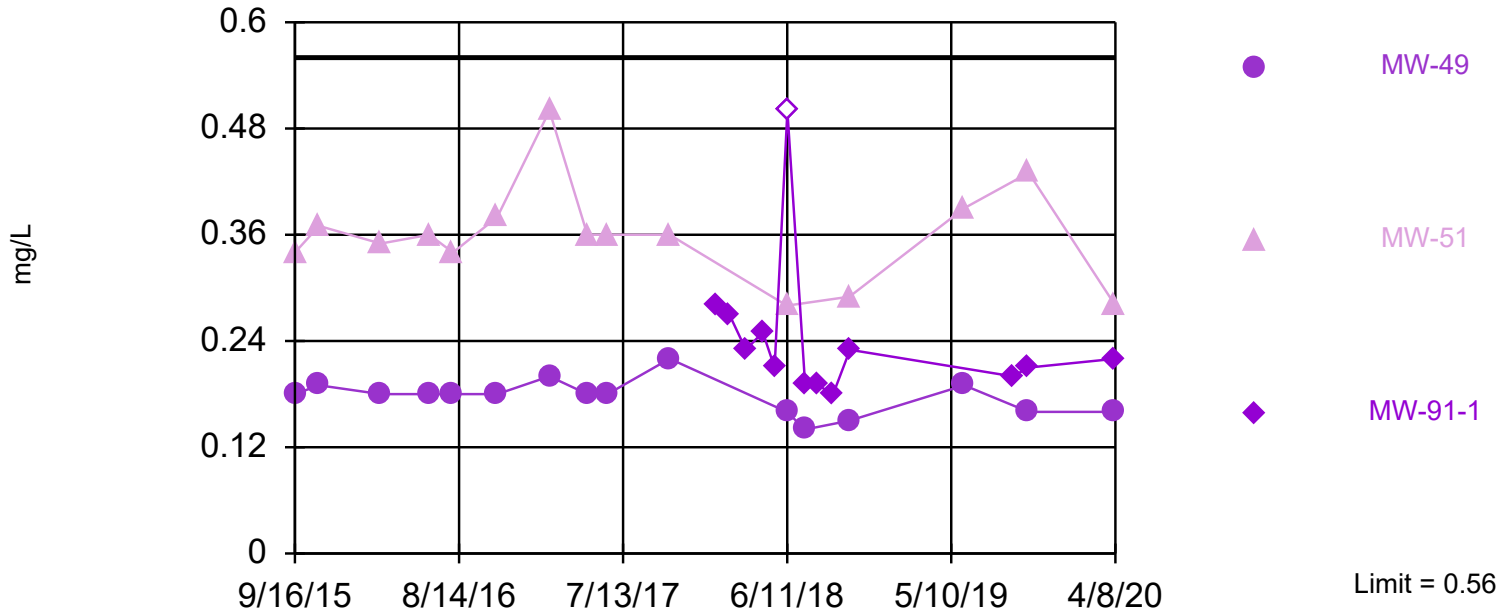
Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020

Sanitas™ v.9.6.27 Sanitas software licensed to Golder Associates. UG
Hollow symbols indicate censored values.

Within Limit

Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 56 background values. 55.36% NDs. Annual per-constituent alpha = 0.003678. Individual comparison alpha = 0.000614 (1 of 2). Comparing 3 points to limit.

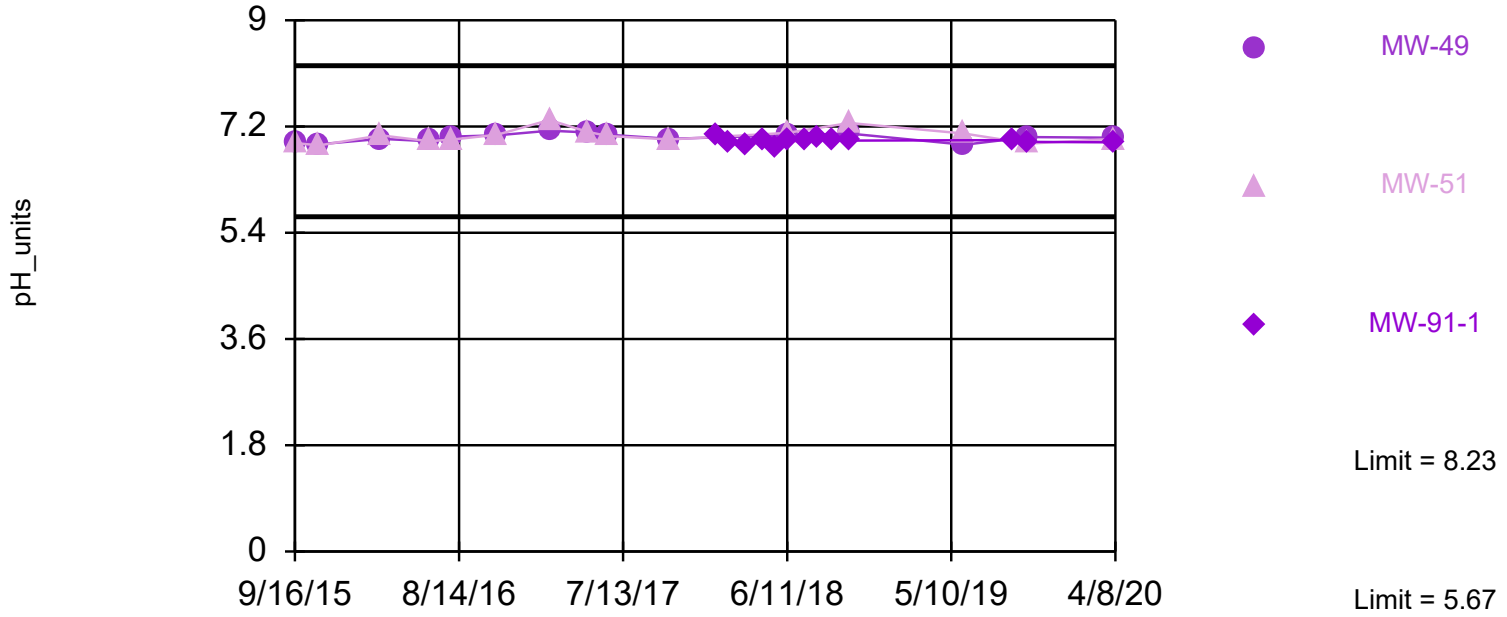
Constituent: Fluoride Analysis Run 11/19/2020 1:45 PM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020

Within Limits

Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.05 alpha level. Limits are highest and lowest of 57 background values. Annual per-constituent alpha = 0.007092. Individual comparison alpha = 0.001184 (1 of 2). Comparing 3 points to limit.

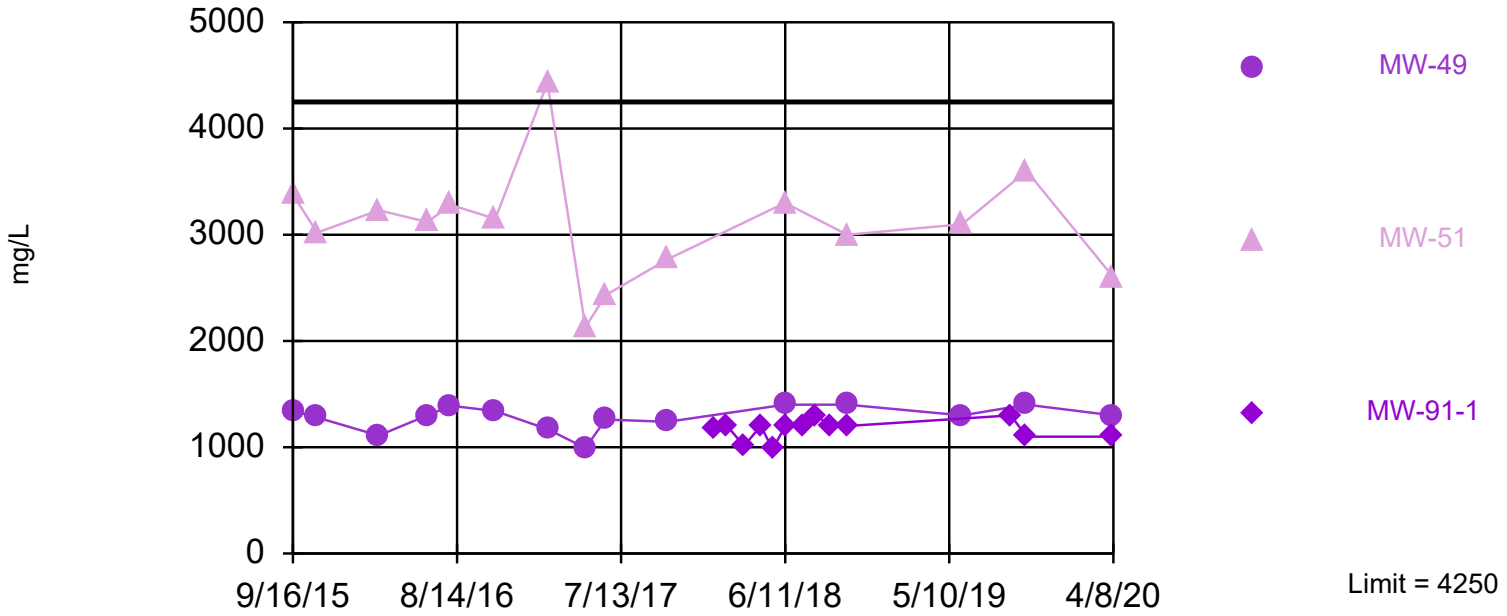
Constituent: pH, Field-Measured Analysis Run 11/18/2020 11:48 AM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020

Within Limit

Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.05 alpha level. Limit is highest of 57 background values. Annual per-constituent alpha = 0.003546. Individual comparison alpha = 0.0005918 (1 of 2). Comparing 3 points to limit.

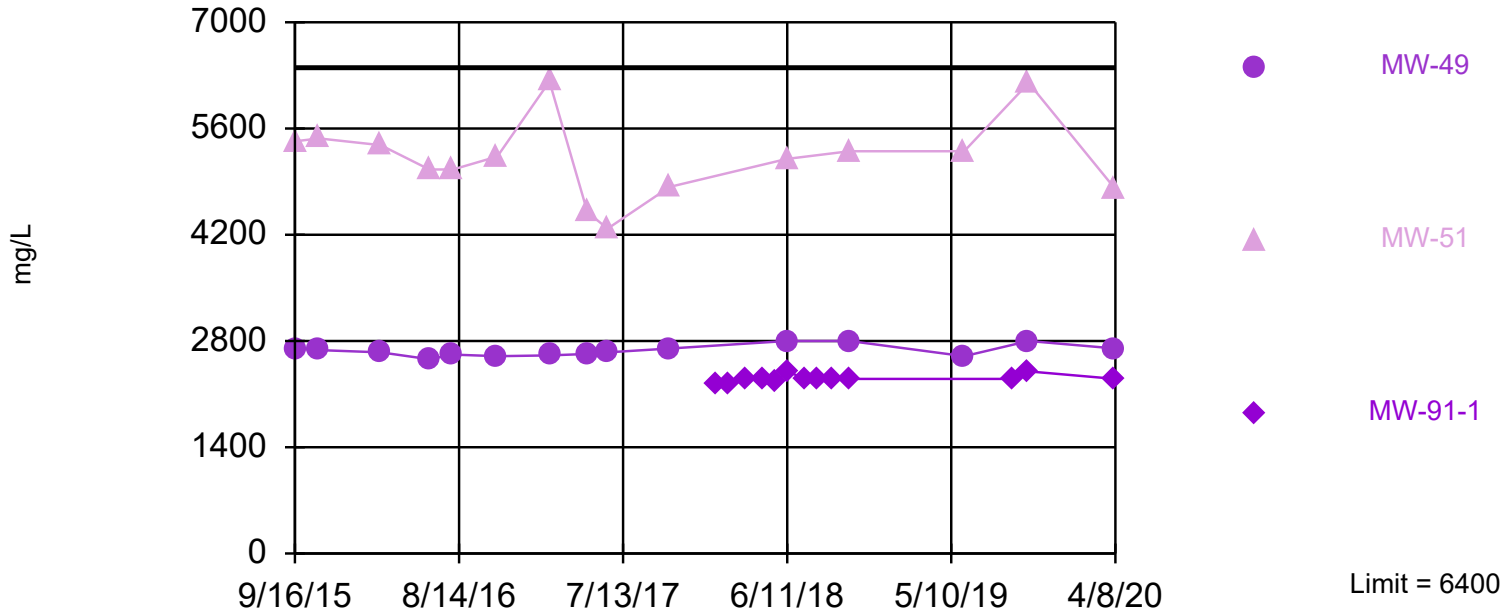
Constituent: Sulfate Analysis Run 11/18/2020 11:48 AM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020

Within Limit

Prediction Limit

Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.05 alpha level. Limit is highest of 57 background values. Annual per-constituent alpha = 0.003546. Individual comparison alpha = 0.0005918 (1 of 2). Comparing 3 points to limit.

Constituent: Total Dissolved Solids Analysis Run 11/18/2020 11:48 AM

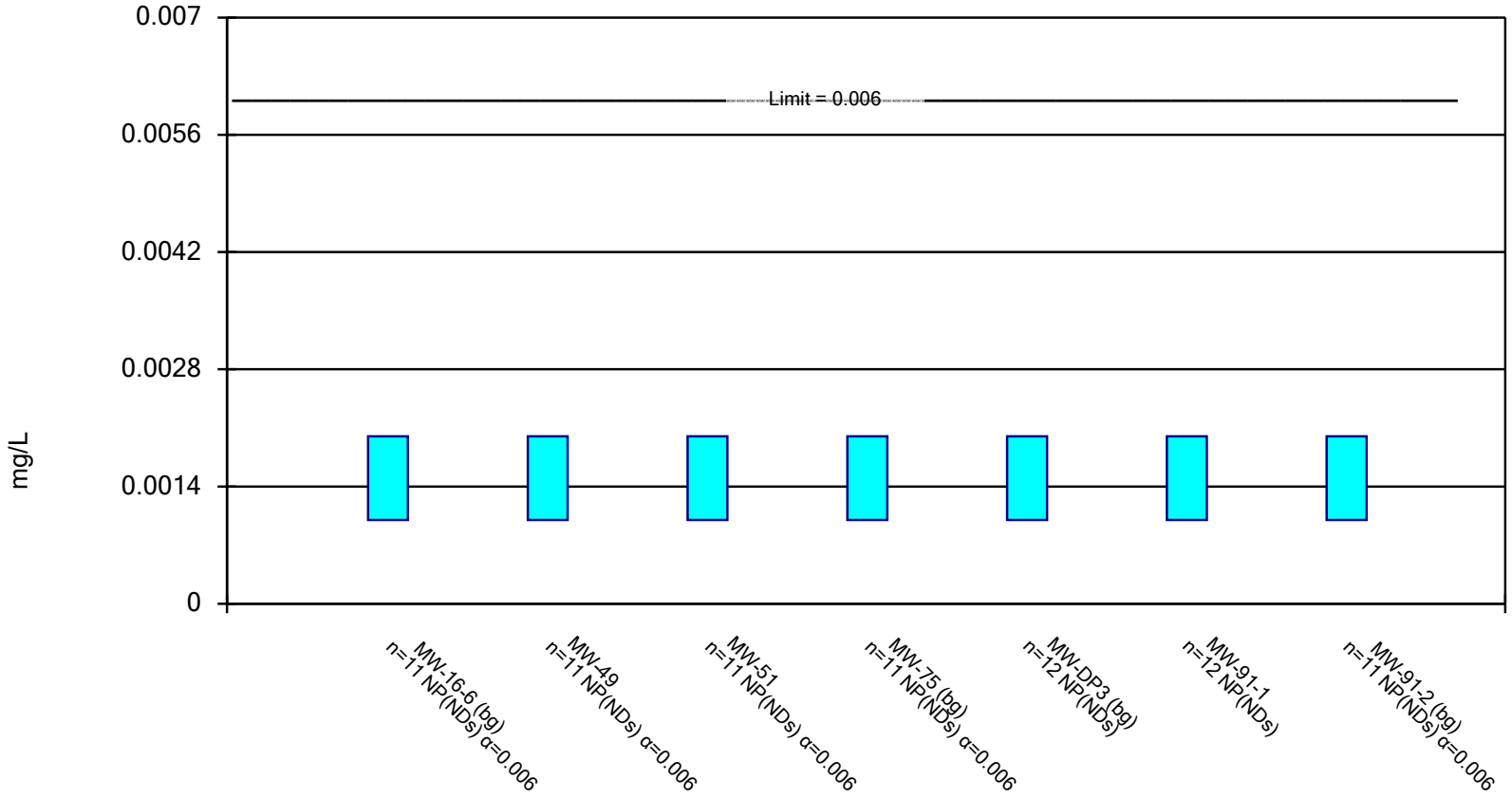
Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020

APPENDIX C-9

Preliminary Appendix IV Confidence Interval Plots

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.

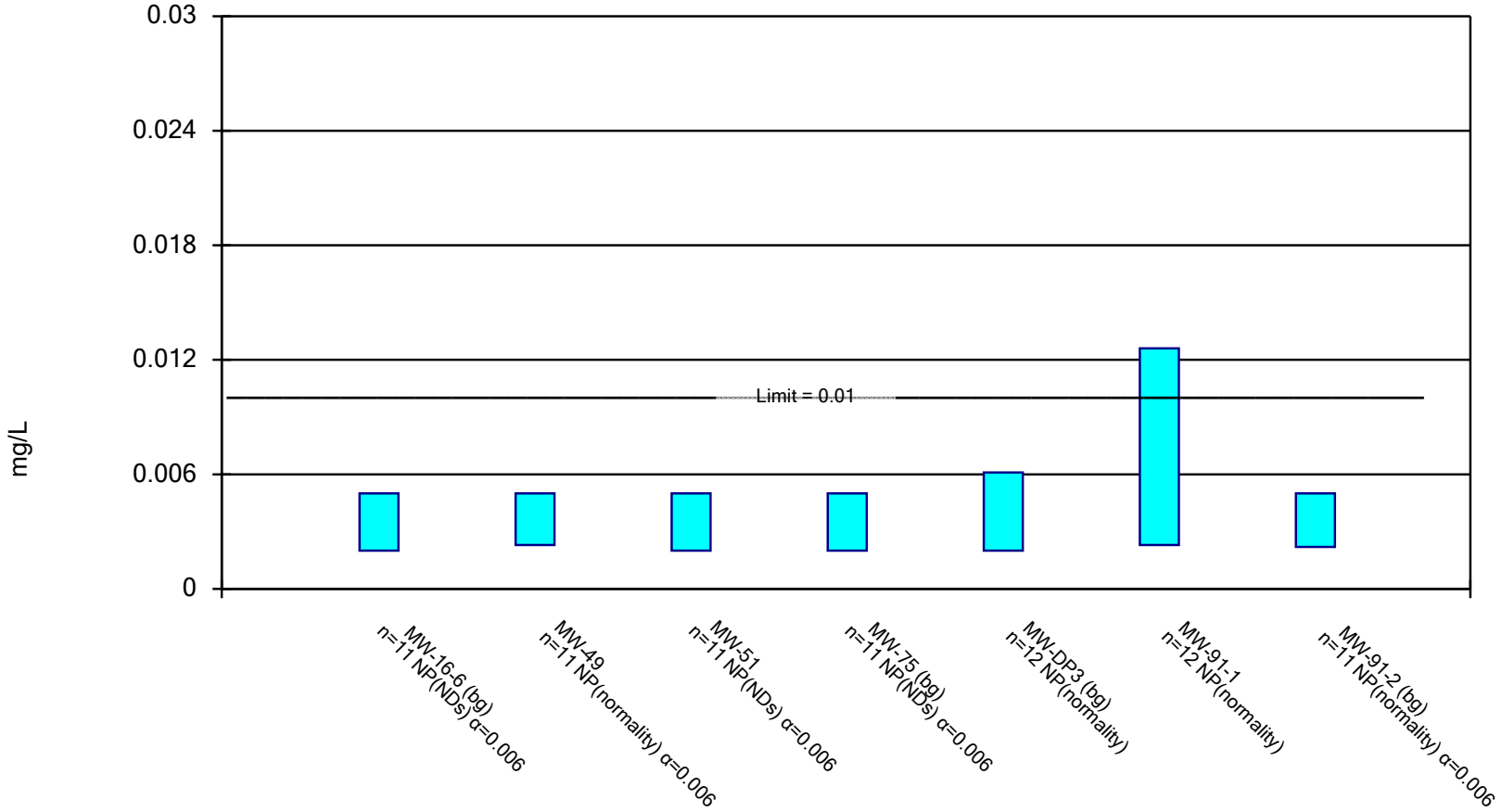


Constituent: Antimony, Total Analysis Run 11/19/2020 4:58 PM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020-AppIVAnalysis.mdb

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.

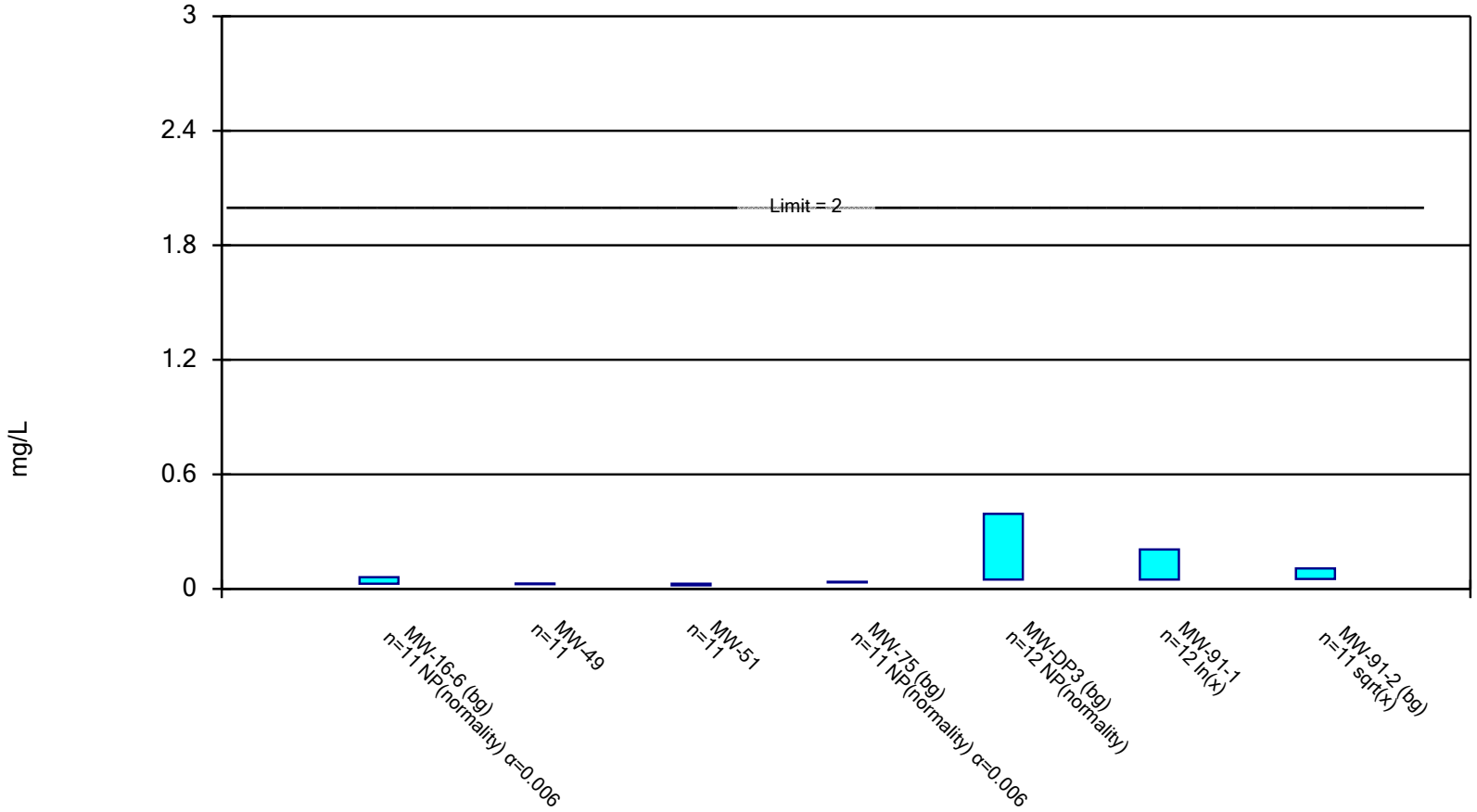


Constituent: Arsenic, Total Analysis Run 11/19/2020 4:58 PM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020-AppIVAnalysis.mdb

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

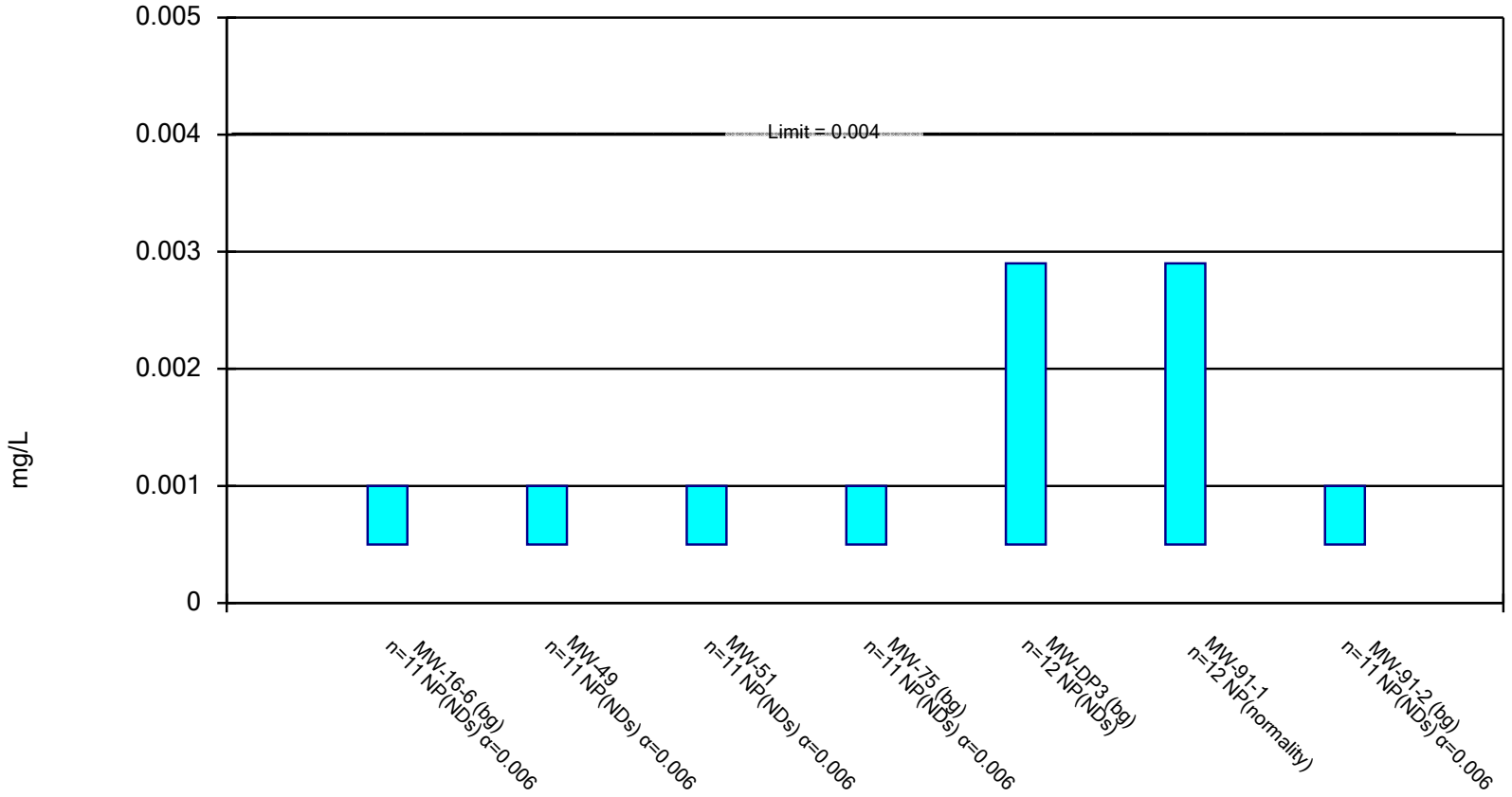


Constituent: Barium, Total Analysis Run 11/19/2020 4:58 PM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020-AppIVAnalysis.mdb

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.

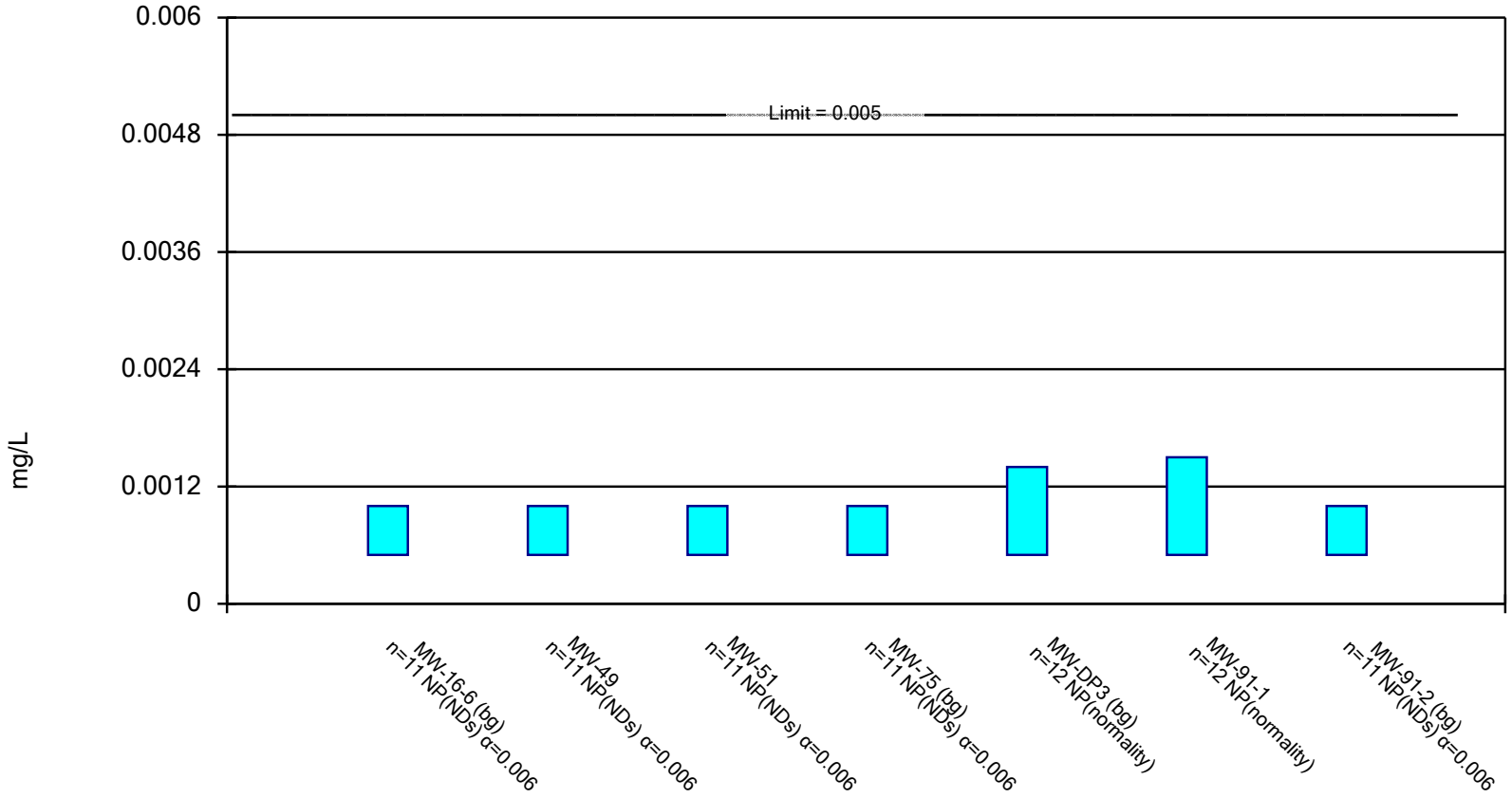


Constituent: Beryllium, Total Analysis Run 11/19/2020 4:58 PM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020-AppIVAnalysis.mdb

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.

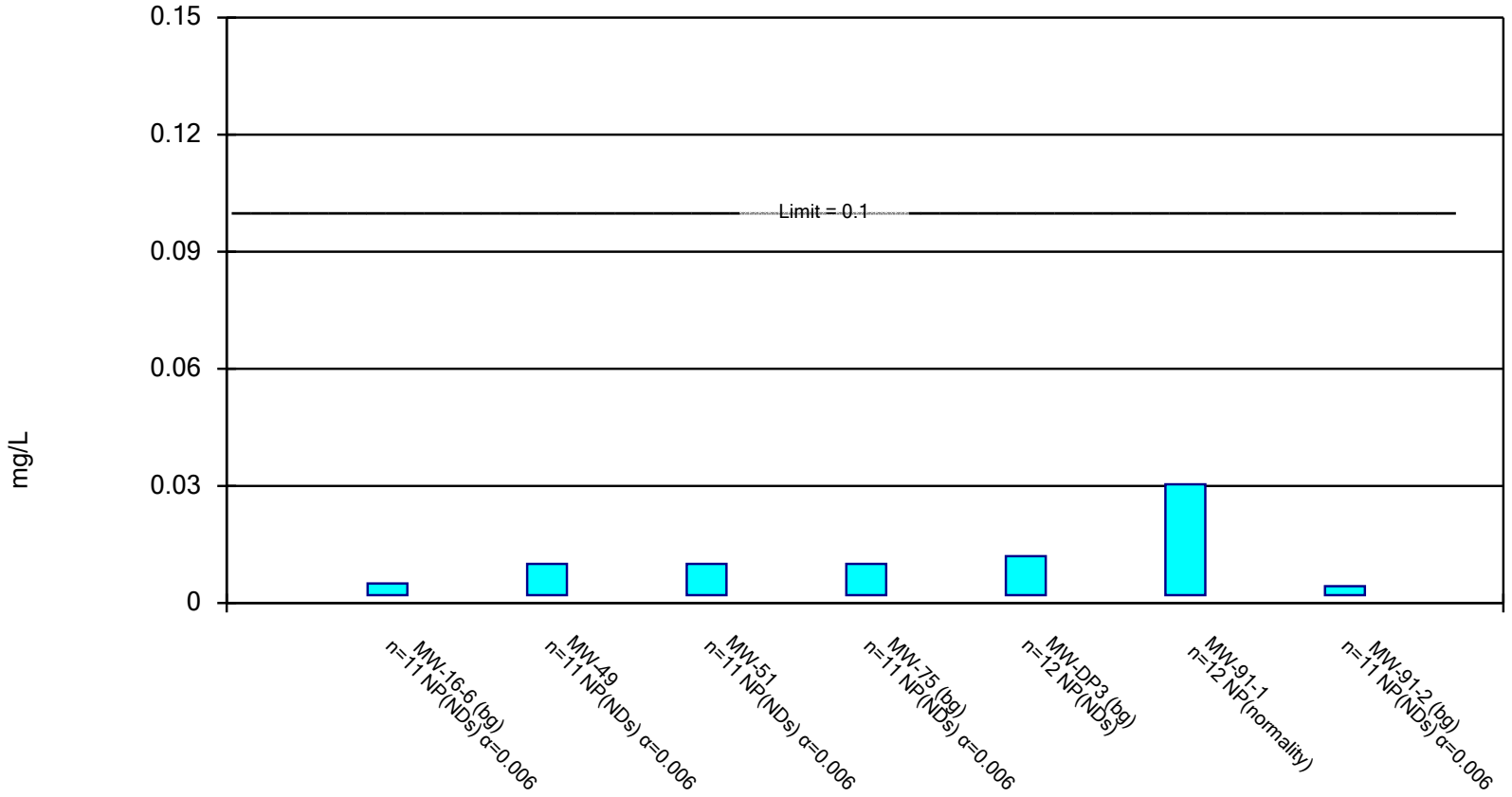


Constituent: Cadmium, Total Analysis Run 11/19/2020 4:58 PM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020-AppIVAnalysis.mdb

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.

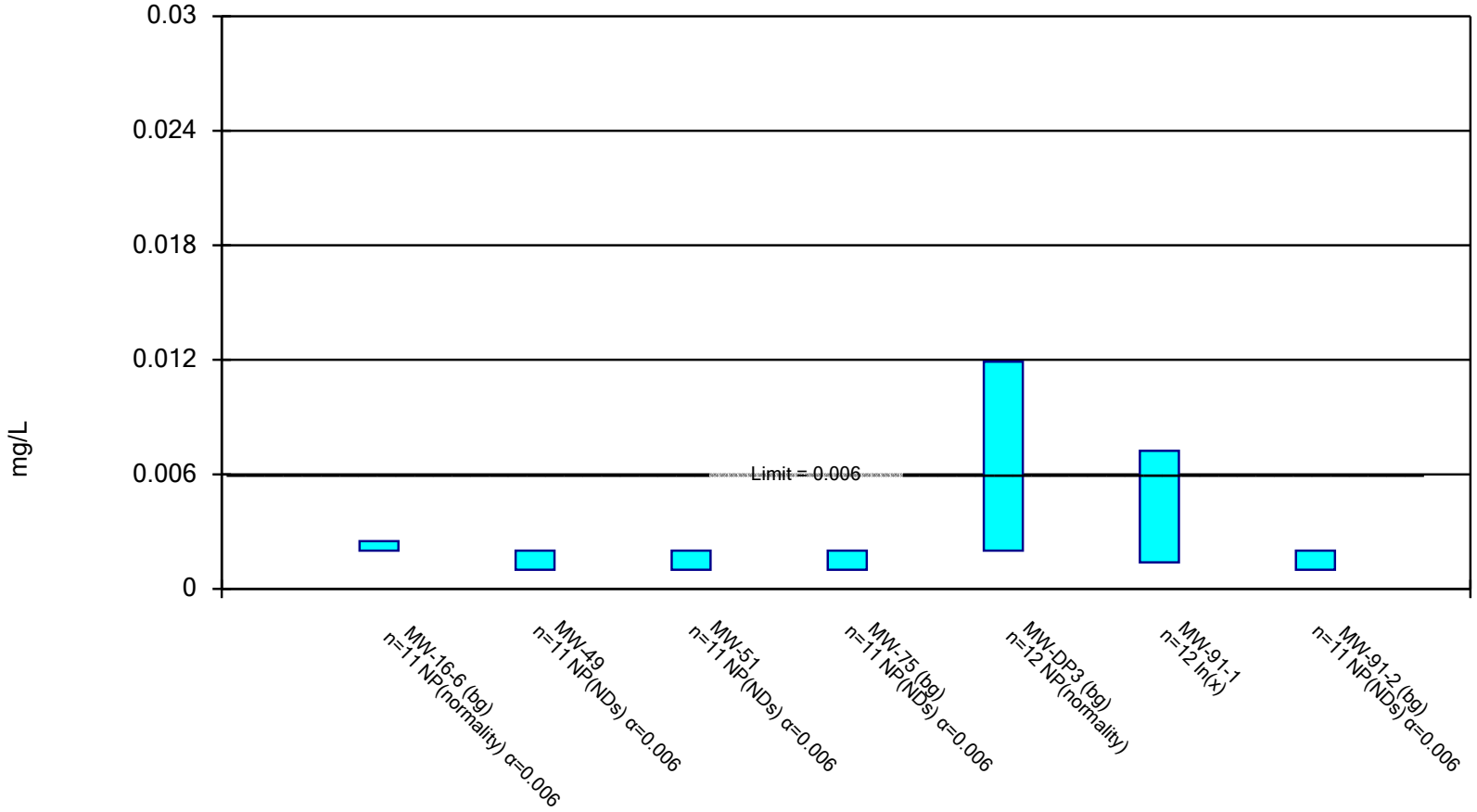


Constituent: Chromium, Total Analysis Run 11/19/2020 4:58 PM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020-AppIVAnalysis.mdb

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

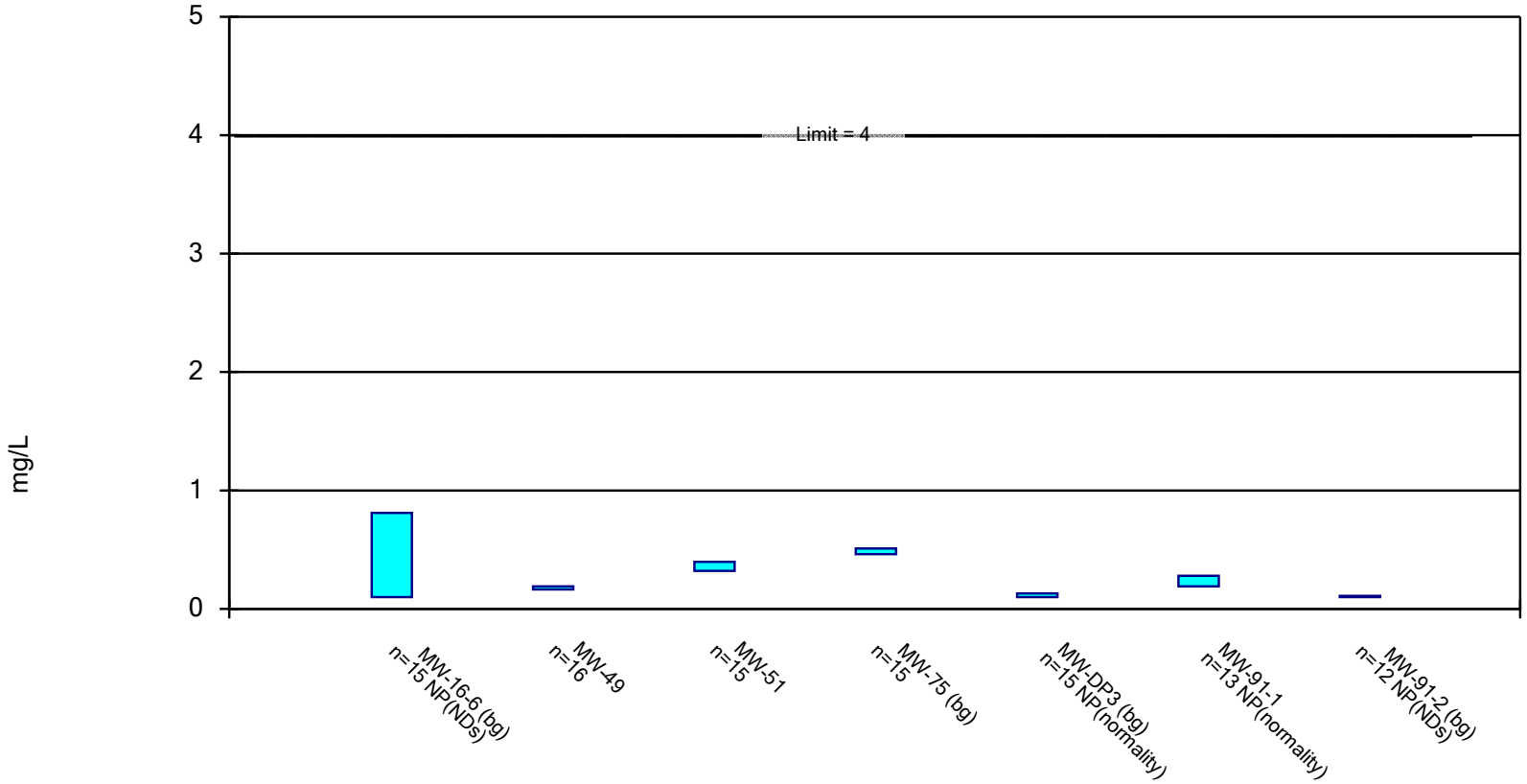


Constituent: Cobalt, Total Analysis Run 11/19/2020 4:58 PM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020-AppIVAnalysis.mdb

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

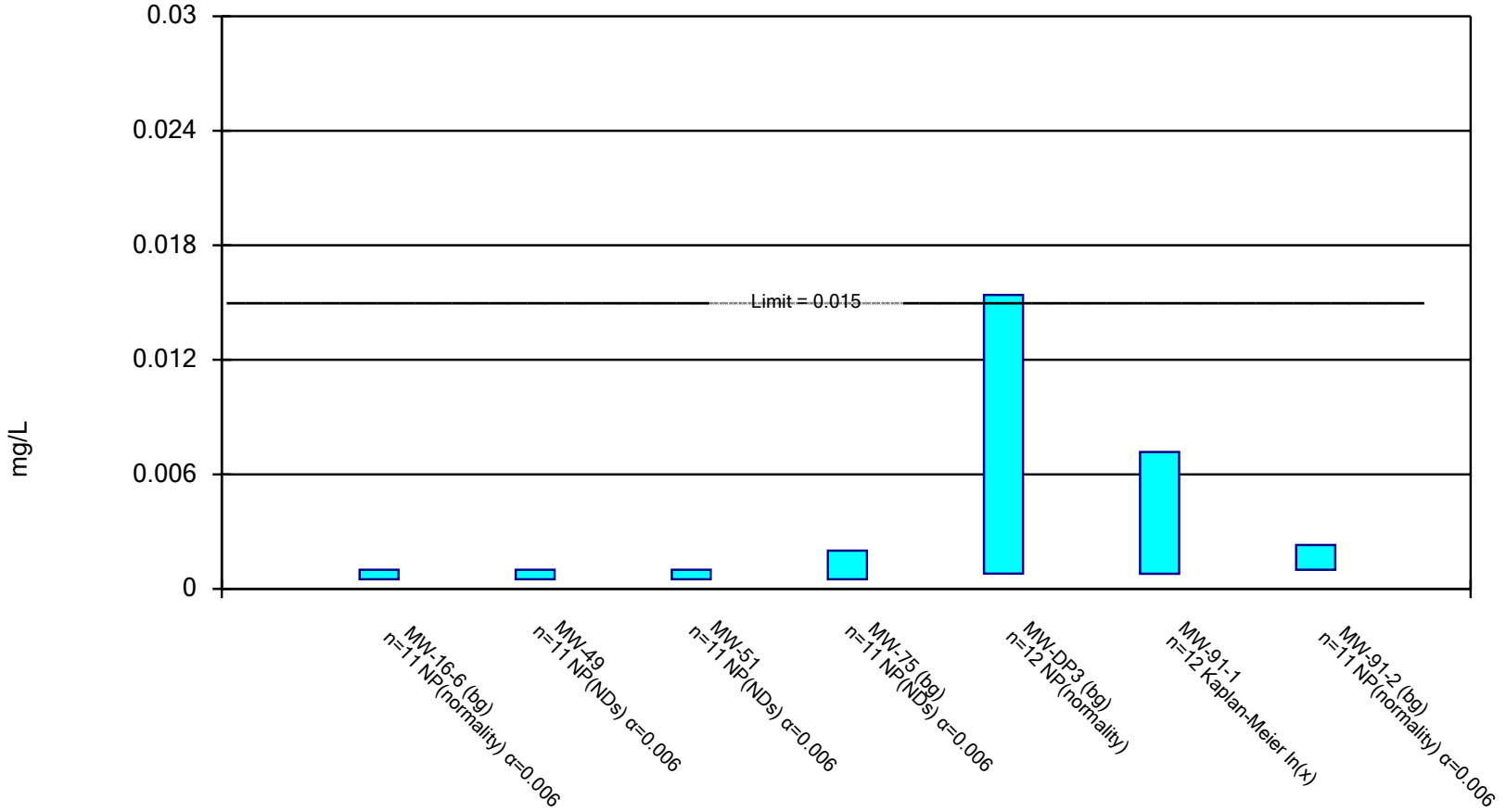


Constituent: Fluoride Analysis Run 11/19/2020 4:58 PM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020-AppIVAnalysis.mdb

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

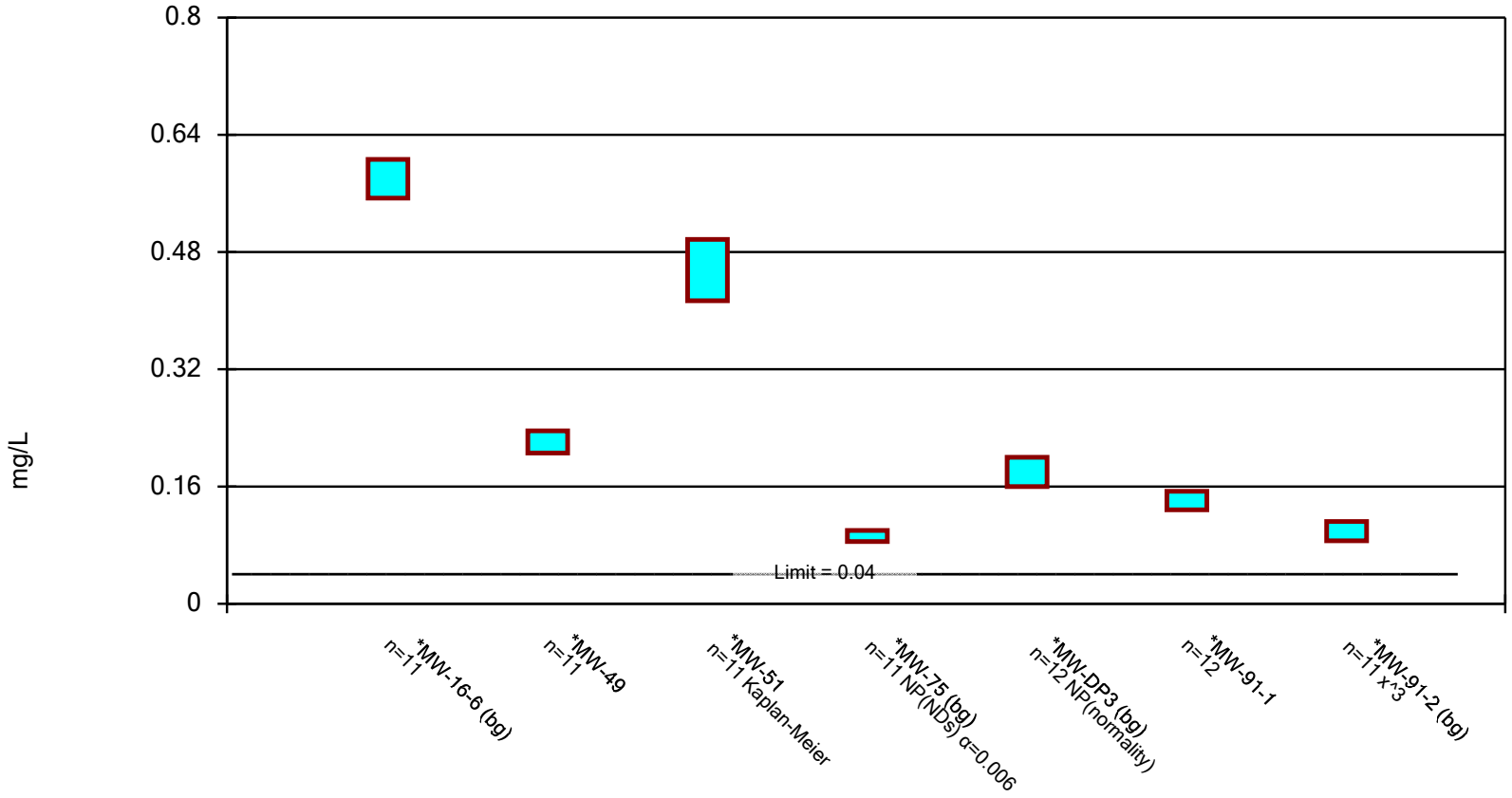


Constituent: Lead, Total Analysis Run 11/19/2020 4:58 PM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020-AppIVAnalysis.mdb

Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lithium, Total Analysis Run 11/19/2020 4:58 PM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020-AppIVAnalysis.mdb

Non-Parametric Confidence Interval

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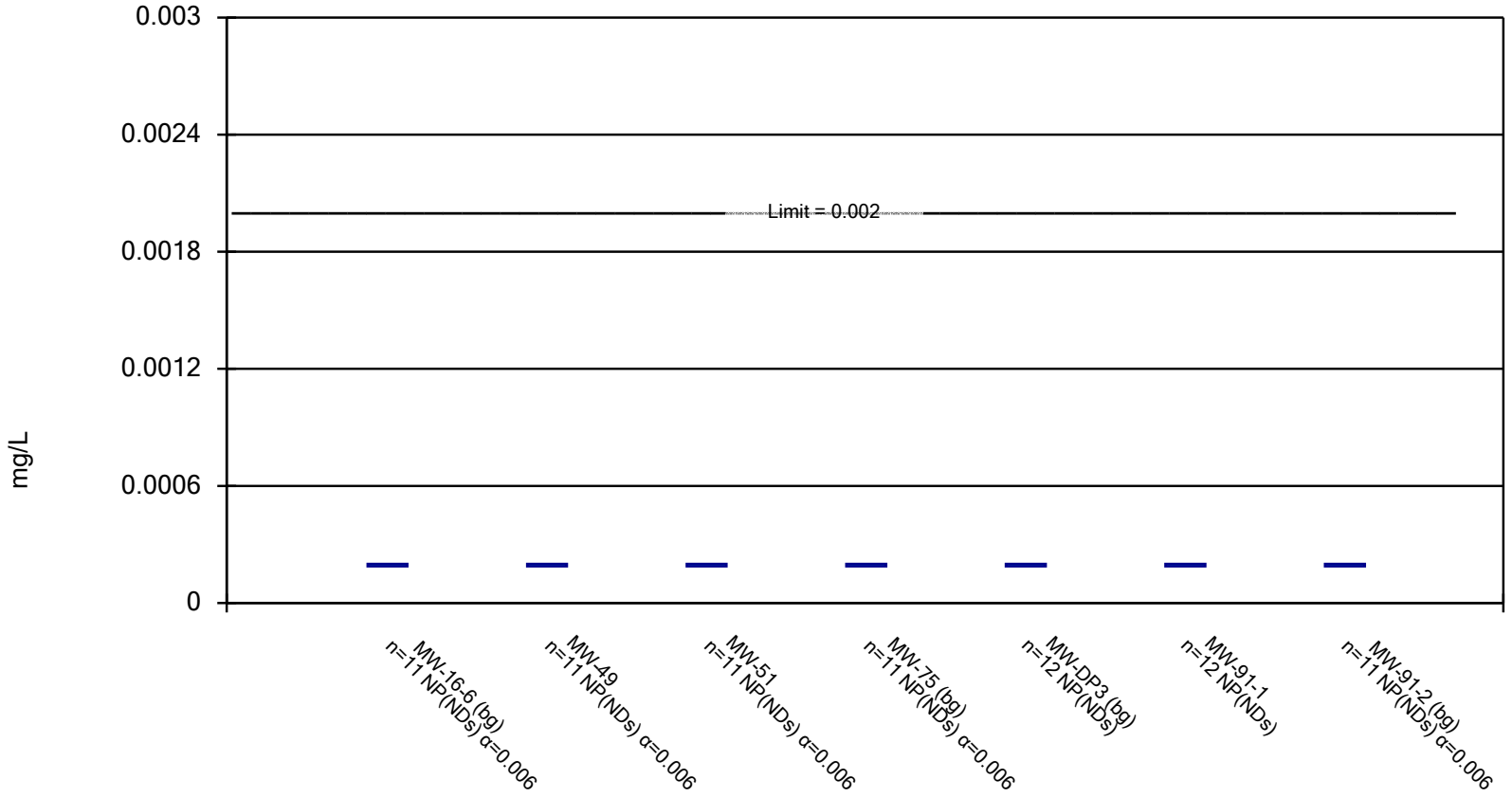
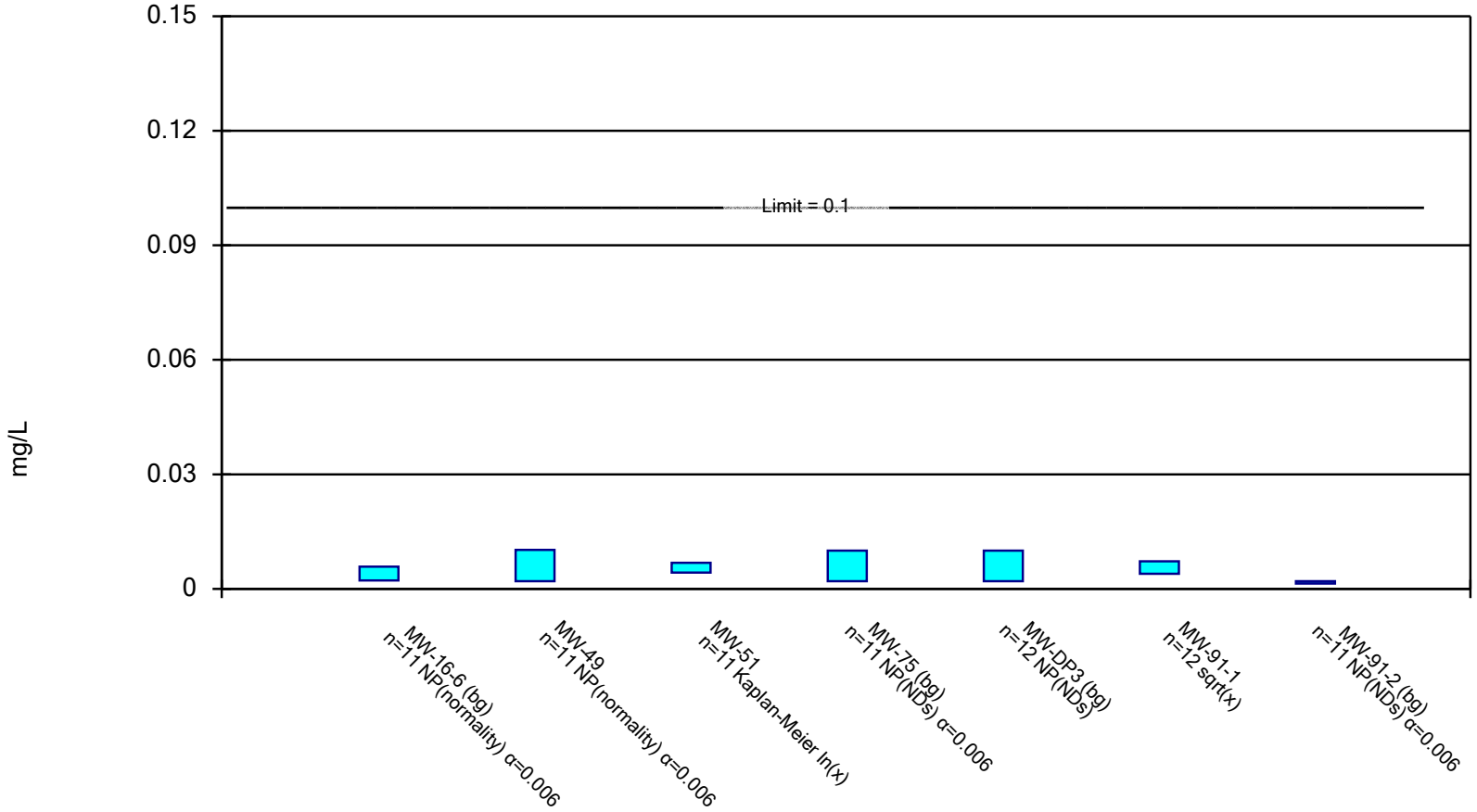


Constituent: Mercury, Total Analysis Run 11/19/2020 4:58 PM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020-AppIVAnalysis.mdb

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

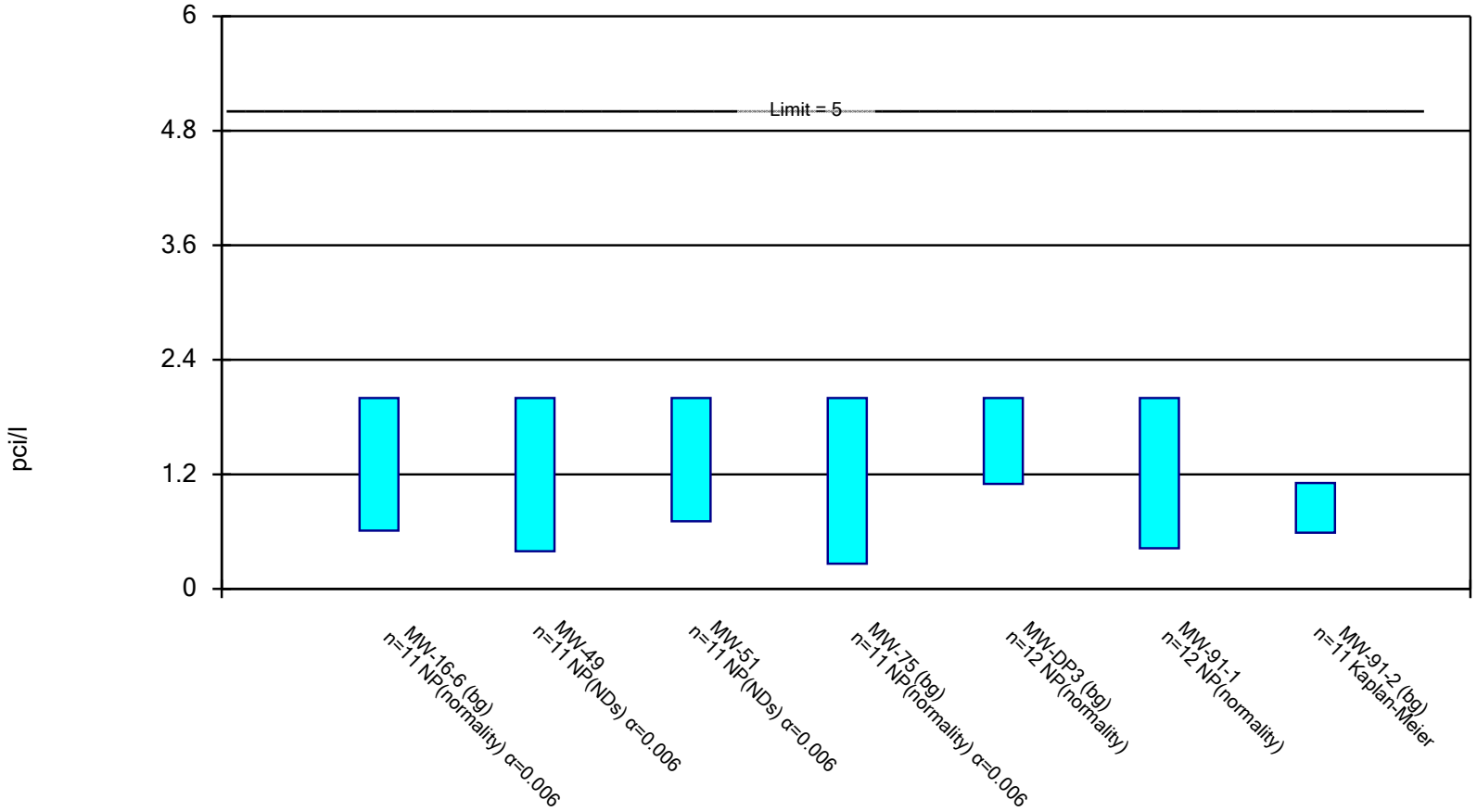


Constituent: Molybdenum, Total Analysis Run 11/19/2020 4:58 PM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020-AppIVAnalysis.mdb

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

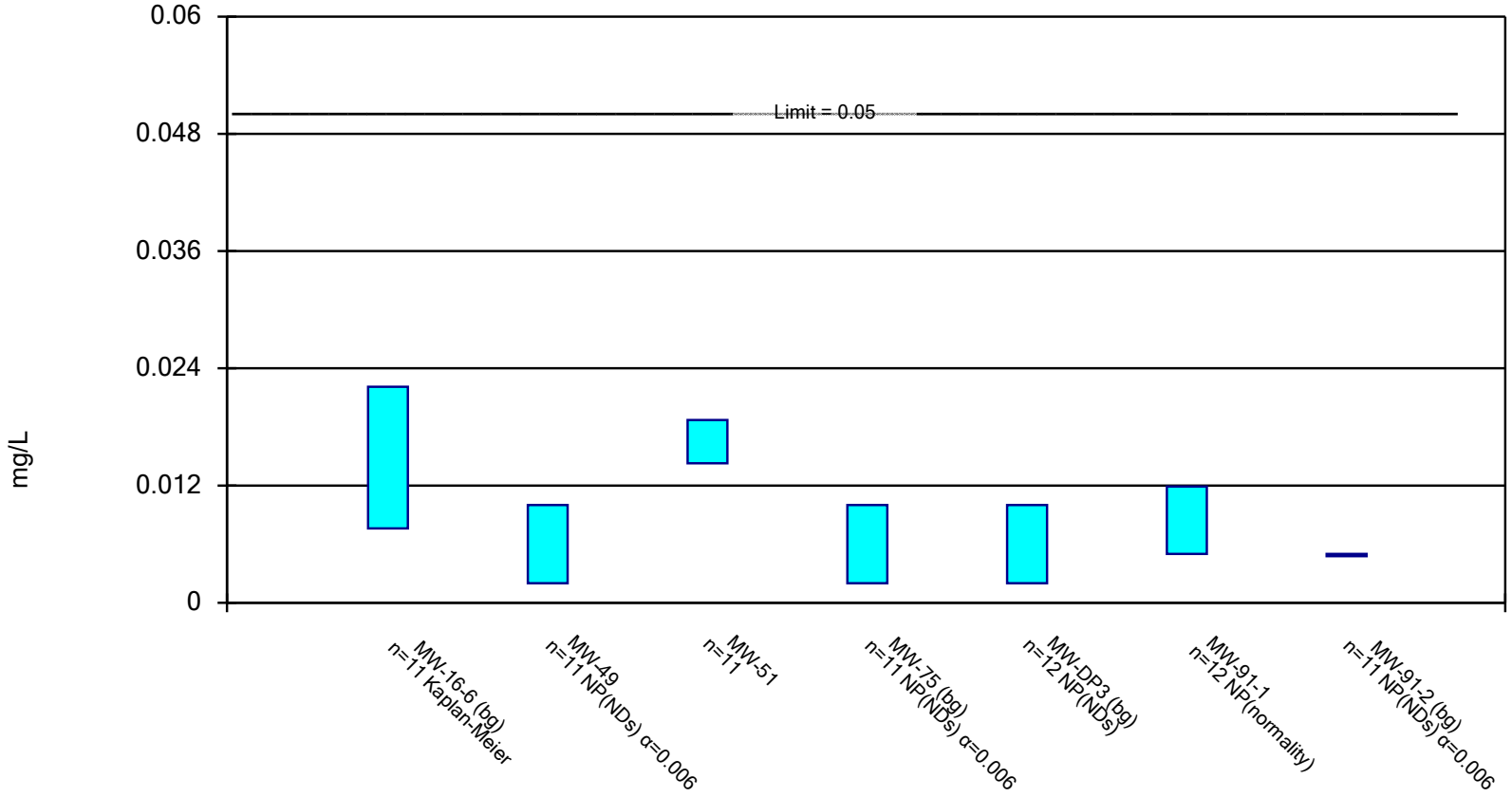


Constituent: Radium 226 + Radium 228, Combined Analysis Run 11/19/2020 4:58 PM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020-AppIVAnalysis.mdb

Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk, alpha based on n.

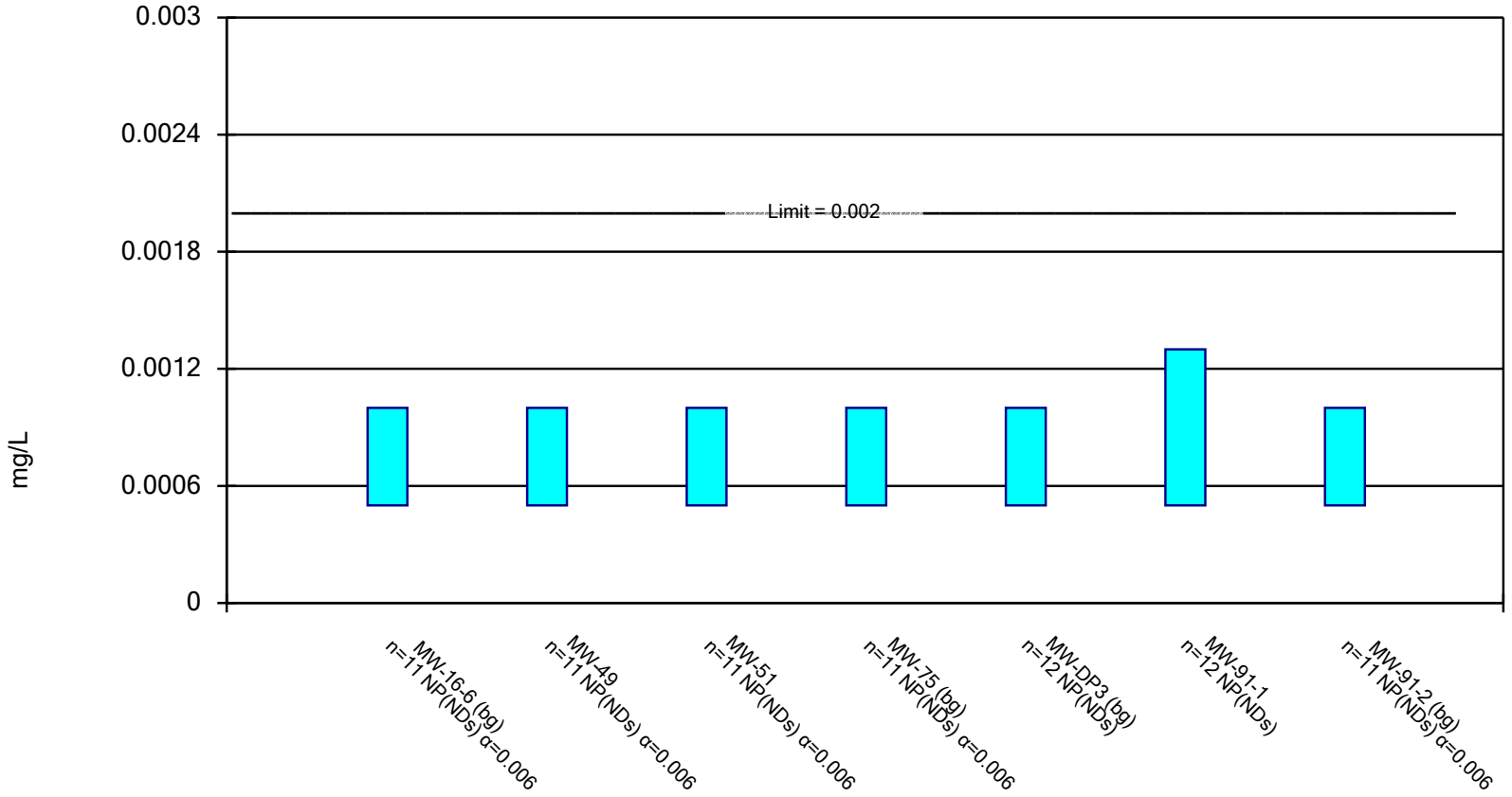


Constituent: Selenium, Total Analysis Run 11/19/2020 4:58 PM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020-AppIVAnalysis.mdb

Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted.



Constituent: Thallium, Total Analysis Run 11/19/2020 4:58 PM

Coal Creek Station Client: Golder Associates Data: analytic results_CCS-CCR_Q22020-AppIVAnalysis.mdb

APPENDIX D

Liner Design Specifications and CQA Documentation

APPENDIX D-1

Final Construction Report, Evaporation Pond 93 and Ash Pond 91

COOPERATIVE POWER ASSOCIATION

14615 Lone Oak Road
Eden Prairie, MN 55344-2287
PH:(612) 937-8599

COAL CREEK STATION

FINAL CONSTRUCTION REPORT

EVAPORATION POND 93
AND ASH POND 91

FINAL CONSTRUCTION REPORT

EVAPORATION POND 93

AND

ASH POND 91

WORK ORDER: 92G213

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	1.2 Project Information	5
	1.3 Purpose and Scope	5
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	2.1 Clay Borrow	6
	2.2 HDPE Conformance Samples	6
3.0	SITE EARTHWORK CONSTRUCTION	6
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ATTACHMENTS

Braun Intertec

Borrow Investigation, Densities, In-Situ Moistures, Proctors and Permeabilities
Evaporation Pond 93

Hydrometers and Atterbergs
Evaporation Pond 93

Miscellaneous Tests
Ash Pond 91

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LIST OF DRAWINGS

92G213 -1 through -

To verify that construction was completed in substantial compliance with the requirements of the North Dakota State Department of Health Guidelines, the following items are incorporated into this report:

* Soil test results.
* Grades of each material used during construction.
* Nuclear density test results.
* Record drawings.
* Synthetic liner field test results.
* Destructive test results.
* Material acceptance sheets.

2.0 SOURCE SAMPLING PRIOR TO CONSTRUCTION

2.1 Clay Borrow

The brown clay liner material which was used in the lower portion of the clay liner was taken from the following areas: east of EP93, north of AP91, south of AP91 and north of the Section 16 Disposal Facility. The gray clay liner material which was used in the upper portion of the clay liner and also on the sideslopes was taken from the permit K area of the Falkirk Mine and is an interburden material found in the mining operation.

All of the borrow areas were sampled and the results of preliminary tests can be found in the BET report attached. All of the tested clay samples met or exceeded the project specifications.

2.2.HDPE Conformance Samples

The 40 mil HDPE liner was sampled prior to deployment to assure that it met the specifications for the project. The results of these tests can be found in Volume I, Appendices B & D for EP93 and Appendix D for AP91 GCS report attached. All of the conformance samples met or exceeded the project specifications.

3.0 SITE EARTHWORK CONSTRUCTION

3.1 Excavation and Backfill to Subbase

The site was constructed to the grades and locations as indicated on the attached as-built drawings for the ponds.

The design of the ponds called for 1,005,000 cu. yd. of cut and 895,400 cu. yd. of fill to obtain the proper subgrade elevations as indicated on the as-built drawings. All fill material not available within the pond was borrowed from the brown clay borrow area.

The fill was hauled by scrapers and placed in 12-inch compacted lifts. Compaction to 93 percent of the standard Proctor density (ASTM D698) was achieved. Subbase soil test results are contained in the BET Report and are labeled as SG in the "Key" column.

Final subbase construction and rough surveying was facilitated by control hubs set on the base of the pond by IE. The earthwork contractor used an electronic laser positioned over the control hub to maintain the proper grade. When fine grading the subbase, a target was mounted on the blade of a Cat grader to achieve subbase grades. After the final grades were achieved, IE used a total station instrument to document the subbase grades. A 50-foot grid was used. As-built drawings show the elevations along the documentation lines.

4.0 CLAY LINER AND SIDEWALL CONSTRUCTION

4.1 General

1,240,400 cu. yd. of clay was used for the pond liner and was obtained from the borrow area as discussed earlier in Section 2.1. This lining material is referred to as brown or gray clay. 1,162,300 cu. yd. of liner-quality brown clay as used and 78,100 cu. yd. of gray clay was used from borrow areas. "Gray" clay from the Falkirk Mine was hauled to the construction area by loading coal trucks with clay. It was stockpiled and then hauled by scrapers and placed and compacted. Brown clay from the borrow areas was hauled in with scrapers by D. H. Blattner & Sons, Avon, Minnesota.

The "gray" clay in its natural state was very close to optimum moisture or just slightly wetter. The "brown" clay was also at or above optimum after being hauled and moisture conditioning for both clays was necessary at times to meet project specifications.

4.2 Construction Methods

The method of placement included spreading the clay to a depth of six to seven inches, watering the clay soil, dozing it, and watering again as required. The dozer would both level the clay lift and break down the clay clumps. An offset disc was pulled over the leveled lift, further breaking down clay clumps and breaking up the small pieces of coal in the gray clay. After the clay lift was properly conditioned, the clay layer was compacted using various compaction equipment. The majority of the clay soil was compacted using a Cat 825 self-propelled sheepsfoot compactor. Compaction was also achieved by deliberately staggered travel routes of the loaded and unloaded scrapers.

The sidewall was lined with clay. Lining a sideslope could have been accomplished by a variety of methods. However, the best method to achieve density was to place the clay in horizontal lifts. Twelve-foot wide lifts were used to allow sufficient room for the heavy equipment to operate.

The clay placement procedure for the sideslopes was as follows. Trucks and scrapers hauled the clay to the site. The clay was spread using bulldozers. Water was added as needed to keep the moisture at or above optimum. A disc was used constantly to work the added water into the soil, and to break up clay and coal clumps. Compaction was achieved with a Cat 825 self-propelled sheepsfoot compactor.

4.3 Clay Liner and Sidewall Thickness

The berms and bottom of clay liner grades were surveyed to facilitate the documentation of clay depth. When the clay liner and sidewall construction was completed, a survey of top of clay was made. For both subbase and top of clay grades, the same coordinates were used. The survey information, as presented in the as-built drawings indicates a two-foot minimum thickness of liner for the pond bottom as well as the sidewalls.

4.4 Discussion and Summary of Clay Liner Soil Testing

Based upon the specified testing frequency and the quantity and area of clay to be placed, a Construction Quality Assurance Manual (CQAM) was developed prior to construction in accordance with item i of the Solid Waste Management Permit. The CQAM was used by field soil technicians from BET, as a guide during construction. Clay liner samples on both the pond bottom and sidewalls were obtained according to the testing program.

A clay specification with the following minimum requirements for clay liner material was included in the design:

1. P200 content of 50 percent or greater.

2. Coefficient of permeability less than or equal to $1x10^{-7}$ cm/sec.

3. Liquid limit greater than or equal to 30 percent.

4. Plasticity index greater than or equal to 15 percent.

5. Compaction of 95 percent of standard Proctor density (ASTM D698) or greater.

6. Moisture content to be optimum plus 2% to optimum plus 4% compared to the optimum moisture content (ASTM D698)

The clay liner laboratory soil test results are summarized and listed in the BET Report attached.

Construction of the clay base liner and sidewall liner progressed by placing and compacting lifts of clay to a maximum compacted thickness of six inches. Four individuals lifts were required on the pond bottom and numerous lifts were required on the sideslopes to achieve a total liner thickness of two feet.

Field density tests by nuclear method were performed on an approximate 200-foot by 200-foot grid pattern for each six-inch lift of base liner. One test per each six-inch lift was also taken at a linear spacing of 200 feet on the sidewalls. An offset grid pattern system was used when testing the second six-inch lift. By this method, each lift was being tested, but not at the same coordinate location.

Moisture checks and density checks using the sand cone method (ASTM D1556) were conducted at numerous locations where nuclear method was used. This was done in order to verify the meter readings. By conducting density measurements with the use of the sand cone and moisture measurement by oven drying at the same location, we were able to determine the difference between the nuclear meter readings and actual densities (measured by the sand cone method). A moisture bias was derived as a result of these studies. The bias was then placed into the nuclear meter. The bias was checked daily by conducting several sand cones tests and moisture content measurements.

Compaction of the clay liner and sidewalls to a minimum of 95 percent of standard Proctor density was used as an in-field standard to achieve the required permeability of 1 x 10^{-7} cm/sec or less. The BET Report attached contains the density test results. Under the "Key" column, 1st lift, 2nd lift and 3rd lift are for brown clay. The 4th lift and SS (Side Slope) are for the brown and gray clay depending on the availability of gray clay.

Compaction (standard Proctor) curves were developed for the clay liner samples. The samples consisted of both "brown" and "gray" clay. The maximum densities for the "brown" clay ranged from 95 pcf to 114 pcf, while the optimum moisture contents had a range of 14 percent to 27 percent. For "gray" clay the maximum densities ranged from 98 pcf to 102 pcf and the range of the optimum moisture content was 16 percent to 24 percent. Appropriate values, based on the soil types, were used for determining the degree of compaction and for checking placement moisture specifications during construction.

659 bulk samples were collected from the borrow areas, liner and sidewalls as construction progressed. 435 shelby tube samples were also obtained for permeability testing. The soil testing completed on each Shelby tube included moisture content, unit weight, and permeability. Atterberg Limits tests and grain size analyses were performed on the bulk samples.

Approximately 2364 field density tests were taken on the subgrade, pond bottom and side slopes. Field density test results showed a range of 90% to 100%+ for the subgrade which meets the 90% specified. Field density tests for the clay liner showed a range of 95% to 100%+ which exceeds the 95% specified. All density tests which failed had the area reworked and retested.

The test results show that under the Unified Soil Classification System (U.S.C.S) "brown" clay liner is classified as a CL - Sandy Lean Clay Brown. The "gray" clay is classified as a CH - Fat Gray.

Field permeability test results from the clay showed a range in permeabilities from 1 x 10^{-7} cm/sec to 4.8 x 10^{-9} cm/sec which complies with project specifications of 1.0 x 10^{-7} cm/sec or less. The majority of the permeabilities were found to be in the 10^{-8} range, indicating a good tight liner. All failing permeability tests were retested on a second sample and if that passed then the test was assumed to be within specification. If both tests failed the area was reworked and retested.

5.0 GAS TRENCH

A trench measuring two feet wide by three feet deep was excavated around the perimeter of the site. The location of the trench is shown on the drawings. The trench was backfilled using pit-run sand gravel mixture having a permeability of 1.0 x 10^{-3} cm/sec or less. A perforated four-inch diameter PVC pipe was also placed in the trench and is shown on the drawings. Any gas which may potentially become trapped below the synthetic liner will follow the liner and enter into the trench filled with sand gravel mixture. It is further expected that the gas will then migrate through the gravel to the pipes and escape into the atmosphere.

6.0 SYNTHETIC LINER PLACEMENT

On August 5, 1992, the installation of the liner commenced in EP93 and on July 20, 1993, in AP91. The material used was a 40 mil high-density polyethylene (HDPE) geomembrane supplied and installed by Gundle Lining Systems, Inc., Houston, Texas. The Quality Assurance program as described in the project specification was monitored by GCS. The data was collected and are attached in Volumes for Geomembrane Installation attached.

6.1 Transportation, Delivery and Storage

The rolls of HDPE measured approximately 34.5 feet wide by 650 feet long and were individually wrapped for protection from the environment. The rolls were transported to the site by trucks. Upon arrival at the construction area, D. H. Blattner was responsible for the unloading of the HDPE. Each roll was logged and roll certifications verified. (Appendix C). The rolls were stored on the ground east of the construction area. They were stacked two to three rolls high. Each roll had lifting straps which remained with that roll until deployment.

6.2 Earthwork

The earthwork (clay liner) was performed by D. H. Blattner and Sons from Avon, Minnesota as described in Section 4.0. Any repairs to the clay liner were done by D. H. Blattner and Sons, as needed. Gundle issued written acceptance of the earthwork prior to placement of any HDPE. (Appendix E).

6.3 Anchor Trench

The anchor trench was excavated as needed for liner placement using a Cat grader, excavating to the line, grade and width as shown on the documentation drawings. The corners were rounded to avoid sharp bends in the geomembrane. The HDPE was placed into the trench and backfilled with compacted clay soil, as soon as possible.

6.4 Geomembrane Installation

Every sheet of HDPE bounded by four welds, or welds and the anchor trench is referred to as a panel. A total of 365 panels for AP91 and 243 panels for EP93 were placed during the lining process (Figure 1 for EP 93 and Figures 1 & 2 for AP91). A front end loader was used to haul rolls of the geomembrane from the storage area to the area of placement. The deployment of rolls was from the northwest to the southeast in EP93 and from southwest to northeast in AP91. This was done in order to take advantage of the natural slope of the pond bottom in case of rain. The membranes were inspected during the deployment for defects and/or damage. All damaged membranes were replaced. All defects, such as holes, were repaired.

The overlap of each panel was four inches. The deployed panels were pulled out and placed such that the four inches were present prior to any seaming. The four-inch overlap was the standard used for all seaming (hot shoe seam or the extrusion seam). There were no factory seams on any of the delivered rolls.

The majority of the seaming was done by a double hot shoe welder. This weld consisted of electrically heated elements which were passed between the two sheets of HDPE. Immediately following the melting, roller pressure was applied effecting a homogeneous bond. The continuous air channel formed between the two welded seams was used for pressure testing. The welding rate and the wedge temperature were monitored continuously. Appendix I, contains fusion welding summaries. Some extrusion weld seams were used and consisted of extruding at the edge of the two sheets which were welded together, keeping a four-inch overlap. The extrusion weld was also monitored for temperature. This welding method was used for repairs, corners, seams and patches. Appendix J, contains extrusion welding summaries.

Trial welds were conducted on each of the types of welds prior to construction seaming. Trial welds were conducted at the start of the work day, the early p.m., and generally after the work day. Appendix H contains all the quality assurance test data for trial welds.

6.5 Seam Testing

All seams, patches and repairs were tested by non-destructive testing. Destructive tests were performed on seams at a rate in excess of the minimum specified number.

6.5.1 Destructive Testing

The destructive test required a 48-inch long by 18-inch wide piece of HPDE with the seam centered lengthwise. The sample was cut into three pieces of equal length and distributed. The first piece was kept by Gundle. The second piece was sent to BET, who conducted shear and peel strength tests on the seam (Appendix K for EP93 and Appendix L for AP91). The third piece was archived by CPA.

A total of approximately 230 destructive test samples from AP91 and 201 from AEP93 were tested by BET. The number of samples were determined by the following considerations:

* One sample for every 500 foot of seam.

* One sample for each seamer.

* Change in weather conditions.

* Change in placement conditions (i.e., floor, toe, slope).

* Any suspect areas.

All seams from which destructive samples were taken passed the project specifications regarding shear and peel strength.

6.5.2 Non-Destructive Testing

Two methods were used during construction in order to test a seam in place. The primary method was air pressure testing, while vacuum box testing also used.

The air pressure testing method can be conducted only on a double hot shoe weld. As stated before, the double hot shoe leaves an air channel between the two shoe welds. The seam was sealed at both ends prior to testing. A needle with a pressure gauge was inserted into the air channel. Air was pumped into the air channel until the pressure gauge read at least 30 psi. This pressure was held for five minutes. If the pressure dropped 4 psi or would not stabilize, the area was retested by shortening the seam length and retesting until that length of seam passed. Repairs were then performed on the failed areas using the extrusion welder, and retested by the vacuum box method. Air test results are found in Appendix L.

The vacuum box testing methods were conducted on the extrusion welds. The extrusion welder was used for the sole purpose of seaming corners, tight areas, repairs and patches. As stated before, the extruder places extrudate while seaming.

The vacuum box is basically a rigid box with a transparent viewing window. A vacuum line from a vacuum pump powered by an electric motor is connected to the box through a gauge. The seams were prepared for tests by trimming away excess material which interfered with the seal between the box and the geomembrane. A soap-water solution was then applied to the seam. The box was placed over the wetted seam. The control valve was then energized such that 5 psi was readable on the gauge. For approximately 15 seconds, the seam was viewed for any air bubbles. If a bubble appeared, the seam was marked, repaired and retested. If the seam showed no bubbles in the viewing window, the box was moved forward to the adjacent location such that the whole length of the seam was tested. Before the box was allowed to move forward, the quality assurance inspector verified the test.

6.6 Repairs

All sample locations and damaged areas were logged and repaired. These repairs were then tested and signed off. Appendix J for EP93 and K for AP91, contain the repair summaries.

7.0 SAND BLANKET INSTALLATION

The sand blanket above the geomembrane was designed as a protective cover. The sand used for construction was processed from areas on the CCS site belonging to CPA and UPA. Gravel Products of Minot, North Dakota arrived in July of 1992 and 1993 and began screening existing soils. They screened the materials required to finish the project. They processed sand and pit-run sand gravel mixture, for the gas trench.

The sand blanket material was hauled into the pond from the processed stockpiles by trucks using a heavy equipment entrance ramp. The sand was dumped and pushed onto the geomembrane. Care was taken by the truck operators such that no damage to the geomembrane would occur.

As the sand was pushed onto the geomembrane, care was taken so that wrinkles and creases would not occur. Initial sand placement was done with a Cat dozer following the rotating laser light. Fine grading was done using a Cat grader with the same laser. Sand placement on the sideslope was done from the bottom and pushed up the slope.

The sand blanket was surveyed by IE to document the grades. As-built drawings show all the top of sand blanket grades.

Samples of the sand were analyzed for grain size and hydraulic conductivity. A total of 8 grain size analyses were conducted. The results are summarized in the BET report.

8.0 GEOTEXTILE FABRICS

Geotextile fabric was placed above the sand blanket on the pond sideslopes in EP93 and on both the sideslopes and bottom of AP91.

The non-woven fabric used on the sideslopes was Amoco style 4553. This material also arrived in approximate lengths of 400 feet long by 22 feet wide. The seams were single stitched according to the manufacturer's recommendations. The material had a 15-foot run-out at the top of berms, extending down the slope and ending at the toe. A woven geotextile was used on the bottom of AP91 manufactured by Amoco. It was placed in a manner similar to that of the non-woven.

9.0 OPERATIONAL GRADES

This section describes the additional activities conducted prior to filling.

9.1 Berm Raising

As stated in Section 3.0, the berms were leveled to the elevations shown on the plans prior to cutting for the anchor trench of the geomembrane liner. With the geomembrane liner placed and the anchor trench backfilled, sand was placed over the run-out area. A sand wedge was placed over the top of the geomembrane starting at approximately eight inches at the edge of the berm. The non-woven geotextile was then placed with clay above to secure it. Clay material was placed until the elevation was reached.

9.2 Sidewall Armor

In order to take advantage of the fly ash abundantly available at the site, the area on the dikes below the water level was covered with fly ash. The fly ash was hauled into pond bottom by CPA's ash trucks. The fly ash had water added in order to haul it to the construction area. It was end dumped at the toe of slope and pushed upward. The depth of fly ash was to be at least two feet. Care was taken in pushing the fly ash upward so as not to tear the non-woven geotextile. IE marked the elevation line on the geotextile fabric. This constant elevation was used to end the fly ash placement on the sideslopes.

At the toe of the slope a 25-foot wide by two-foot thick fly ash strip was constructed to provide increased stability of the membrane cover material on the slope. IE documented the locations of ash placement.

9.3 Riprap

DHB supplied and placed the riprap on the sideslopes. A two-foot layer was placed on the sideslopes. The constant elevation line was used for the start of riprap placement and ended at the top of the berm. The riprap was lowered into place with a backhoe moving on the top of berms. Care was taken so the non-woven fabric would not be torn.

All riprap placed was hauled in from a storage area west of AP91 or from the dikes of the abandoned recycle pond.

9.4 Bottom Ash

The final layer of material on the pond bottom was bottom ash. The purpose of this layer was for protection only, and served no other purpose. The material was hauled from ash pond 92 and placed using trucks. The material was leveled out using a Cat bulldozer and fine graded as discussed for the sand blanket placement, Section 7.0.

9.5 Drainage System

A drainage system consisting of perforated pipes leading to sump in the northeast corner was installed in AP91. This piping system was surrounded by a drainage system consisting of course rock and a fabric blanket. The purpose of the system is to allow for dewatering of the ash prior to hauling to a disposal facility.

9.6 Pond Capacity

The tables below show the capacity of the ponds for various water levels. EP93 has a maximum capacity of 221 million gallons and AP91 has a maximum capacity of 244 million gallons with 2 feet of freeboard at the operating level.

Capacity for EP93

Elev.	C.Y.	Gallons
1892	318,251	64,274,000
1893	409,008	82,603,200
1894	502,304	101,445,400
1895	597,863	120,744,000
1896	695,286	140,420,000
1897	793,627	160,281,000
1898	892,319	180,210,000
1899	987,021	199,340,000
1900	1,094,504	221,050,000

Capacity for AP91

Elev.	C.Y.	Gallons
1914	777,495	157,022,900
1915	857,643	173,209,600
1916	970,931	196,089,200
1917	1,084,216	218,968,000
1918	1,205,686	243,500,000
1919	1,314,680	265,513,000
1920	1,425,895	287,970,000

10.0 CONCLUSIONS

Based on CPA, BET and GCS observations, IE surveys, record drawings, soil test data, and geomembrane QA/QC test data, it is our opinion that the construction of Evaporation Pond 93 & Ash Pond 91 Liners has been done in substantial compliance with the Project Construction Quality Assurance Manual and the requirements of the Solid Waste Management Permit.

ATTACHMENTS

BRAUN[SM]
INTERTEC

Summary of 1993 Test Results
EP #93
Cooperative Power Association

Coal Creek Station
Underwood, North Dakota

Borrow Investigation
Densities, In-Situ Moistures
Proctors
Permeabilities

Scanned 2/27/19

Project Number BFAX-92-017C

Braun Intertec Engineering, Inc.
April 2, 1993

Engineers and Scientists
Serving the Built and
Natural Environments

Table of Contents

1. Borrow Investigation
2. Densities, In-Situ Moistures and Gradations
3. Proctors
4. Permeabilities
5. Hydrometers and Atterbergs

List of Abbreviations

BA - Bottom Ash
CLB - Clay Liner Bottom
CLS - Clay Liner Slope
DC - Dike Core
DE - Dike Embankment
FA - Fly Ash
MC - Moisture Content
NM - Nuclear Meter
R - Retest
SB - Sand Blanket
SC - Sand Cone
SG - Subgrade
ST - Shelby Tube
TP - Test Pit

BORROW INVESTIGATION

BRAUN INTERTEC

Braun Intertec Engineering, Inc.
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: June 1, 1992

PROJECT: BFDX-92-017A
Borrow Investigation

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Boring Number	PB-2
Sample Number	134-1
Location	50950N, 41622E
Type of Sample	Bag
Depth/Elevation	48-58/1980
Soil Classification (ASTM D 2487)	CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	90.8
Optimum Moisture Content (%)	27.4

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Remolded
Dry Density (pcf)	86.3
Percent of Max. Density	95
Moisture Content (%)	28
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	4.7×10^{-8}

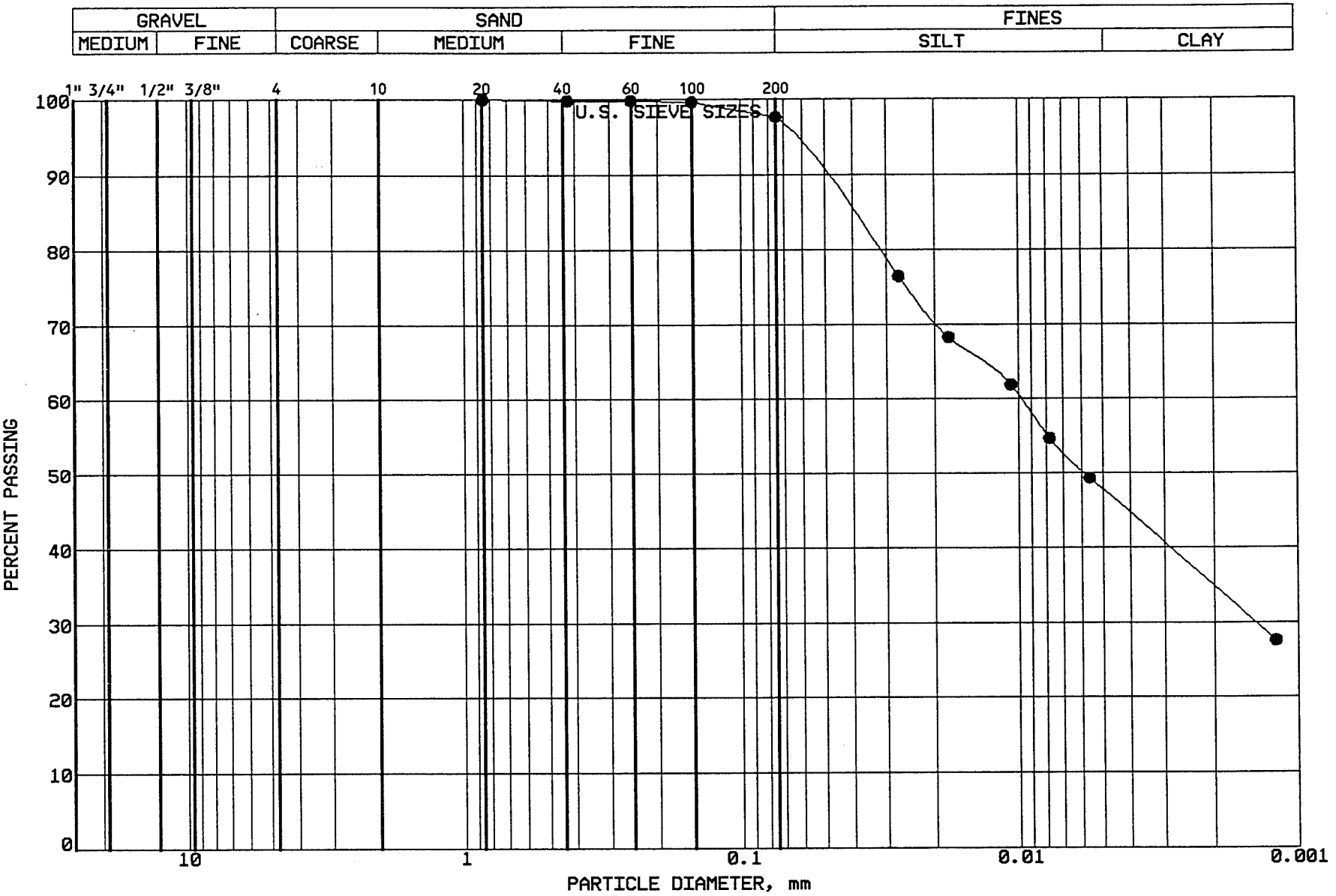
REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-pb-2

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

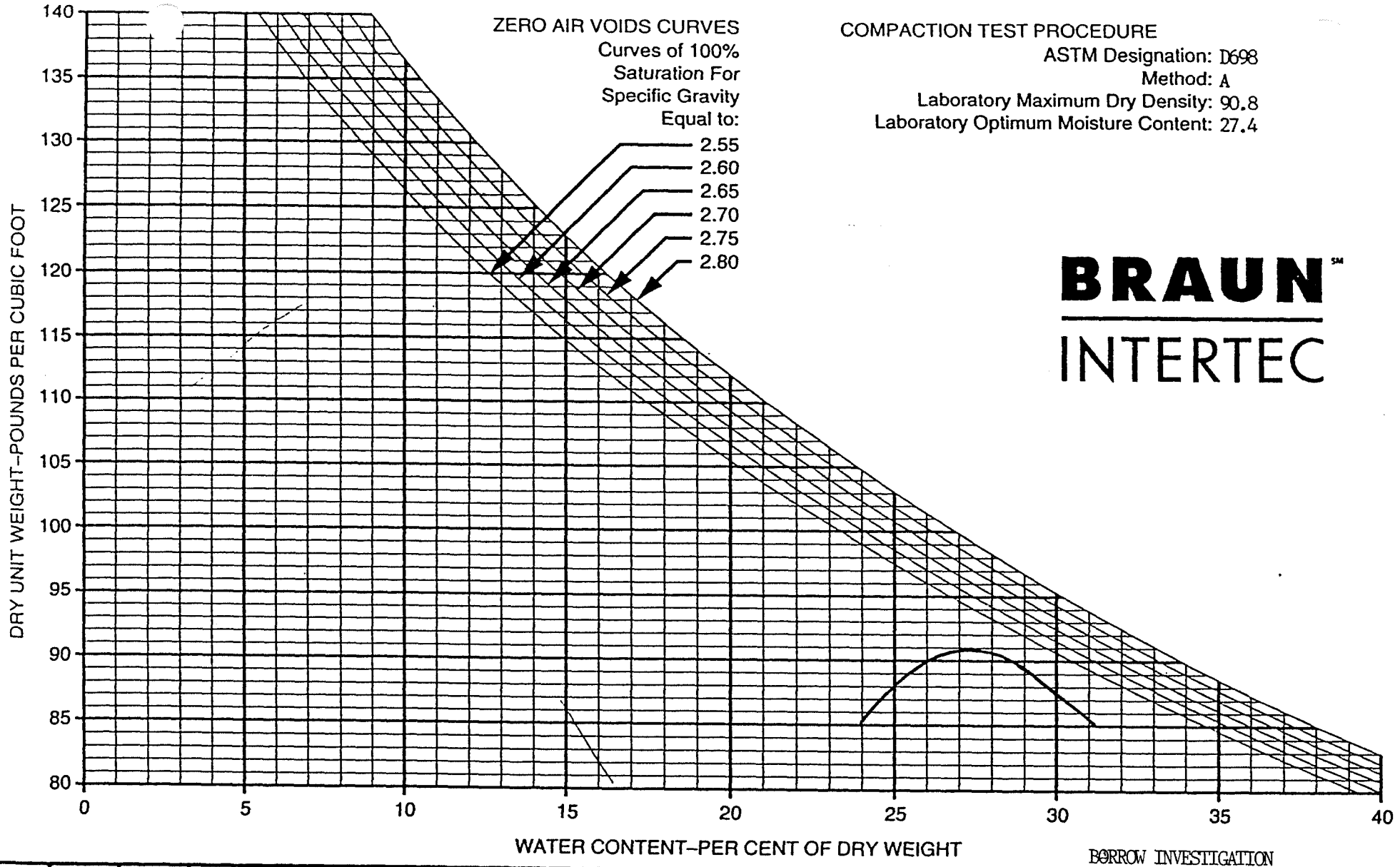
PROJECT: BFDX-92-017A
EP #93 (Borrow Investigation)
Coal Creek Station
Underwood, North Dakota

LOCATION: N 50950N, E40622.0
SAMPLE: 134 TUBE #: PB-2
ELEVATION: 48-58'

GRAVEL	0.0 %
SAND	2.4 %
SILT	49.9 %
CLAY	47.7 %
P 200	97.6 %

SOIL PROPERTIES

LL: 61.0%
PL: 24.0%
PI: 37.0%
CLASS: CH FAT CLAY, dark gray



COMPACTION TEST PROCEDURE
ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 90.8
Laboratory Optimum Moisture Content: 27.4

BRAUN INTERTEC

BORROW INVESTIGATION

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
PB-2	134-1	48-58	24	37	61	CH - FAT CLAY, dark gray

50950N 40622E

COMPACTION TEST

DRAWN BY: DDM
CHECKED BY:
DATE: 5-13-92

JOB NO. BFDX-92-017A

PLATE

BRAUN INTERTEC

Braun Intertec Engineering, Inc.
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: June 1, 1992

PROJECT: BFDX-92-017A
Borrow Investigation

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Boring Number	PB-3
Sample Number	CC 135-2
Location	50940N, 40925E
Type of Sample	Bag
Depth/Elevation	47'-58'
Soil Classification (ASTM D 2487)	SP

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	105.5
Optimum Moisture Content (%)	19.0

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Remolded
Dry Density (pcf)	101
Percent of Max. Density	95.7
Moisture Content (%)	19.9%
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	7.7×10^{-7}*

REMARKS:

* Perm fails to meet project specifications.

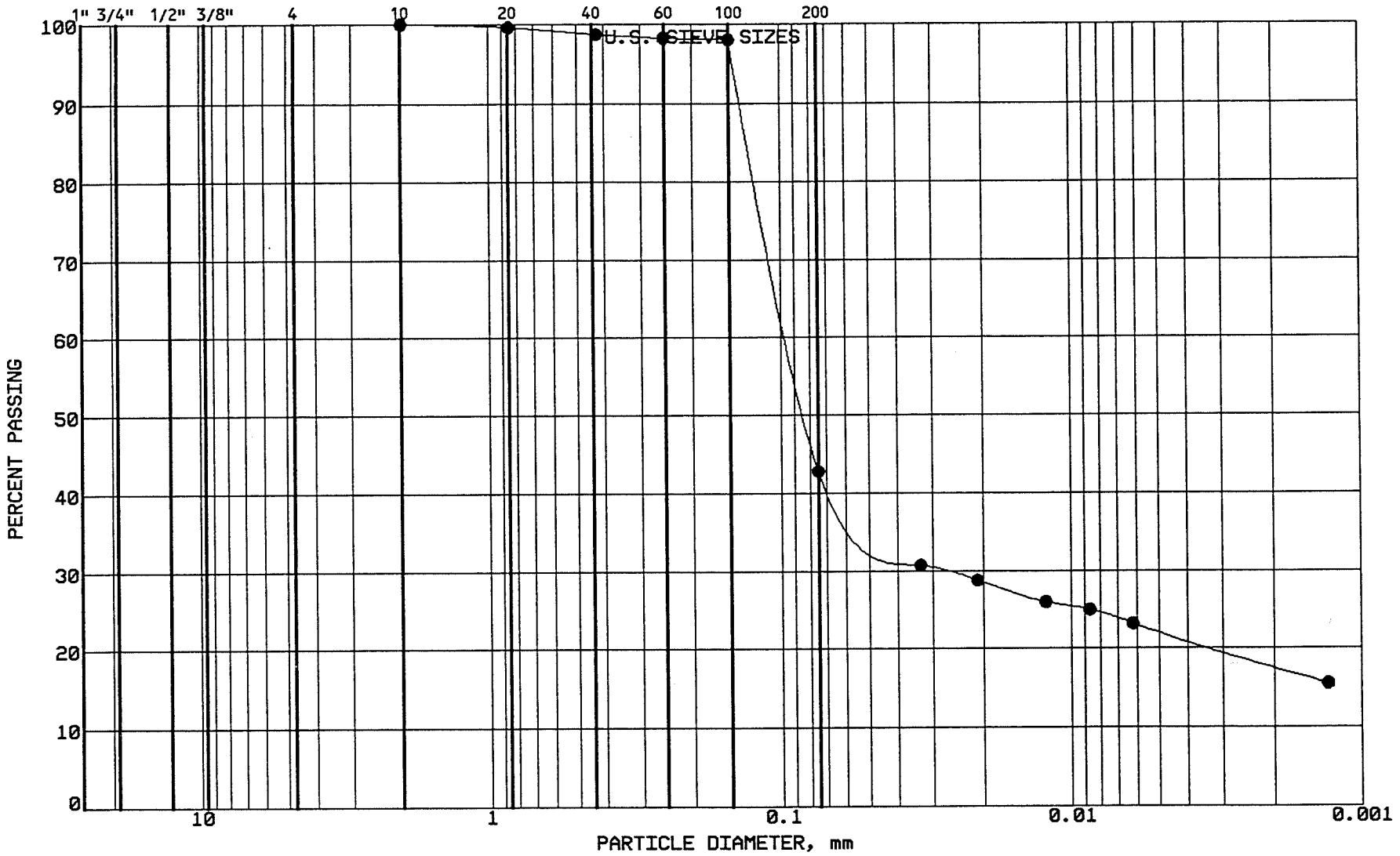
BRAUN INTERTEC ENGINEERING, INC.

Gerald E. Dauer, C.E.T.
Operations Manager

P-pb-3

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

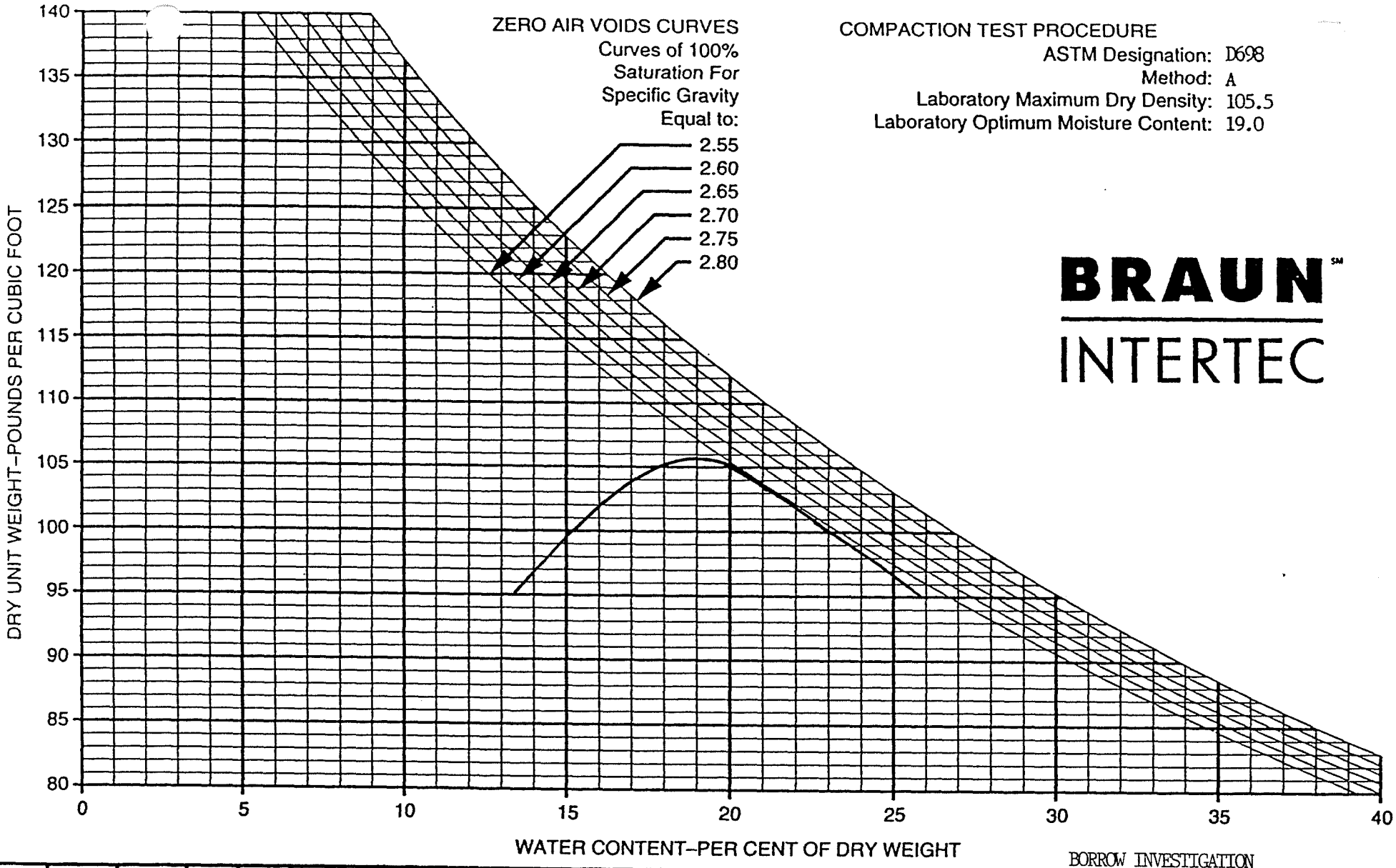
PROJECT: BFDX-92-017A
EP #93 (Borrow Investigation)
Coal Creek Station
Underwood, North Dakota

LOCATION: N 50940N, E40925.0
SAMPLE: 135-2 TUBE #: PB-3
ELEVATION: 47-58'

GRAVEL	0.0 %
SAND	57.2 %
SILT	20.6 %
CLAY	22.2 %
P 200	42.8 %

SOIL PROPERTIES

LL: NP%
PL: NP%
PI: NP%
CLASS: SP FINE SAND, ol gr



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 105.5
Laboratory Optimum Moisture Content: 19.0

BRAUN INTERTEC

BORROW INVESTIGATION

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
PB-3	135-2	47-58	NP	NP	NP	SP - POORLY GRADED SAND, fine grained, olive gray

50940N 40925E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-017A

PLATE

BRAUN INTERTEC

Braun Intertec Engineering, Inc.
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: June 1, 1992

PROJECT: BFDX-92-017A
Borrow Investigation

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Boring Number	PB-8
Sample Number	100
Location	50972N, 41918E
Type of Sample	Bag
Depth/Elevation	38-48/1965
Soil Classification (ASTM D 2487)	CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	104
Optimum Moisture Content (%)	21

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Remolded
Dry Density (pcf)	98.5
Percent of Max. Density	94.7
Moisture Content (%)	21
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	8.1×10^{-8}

REMARKS:

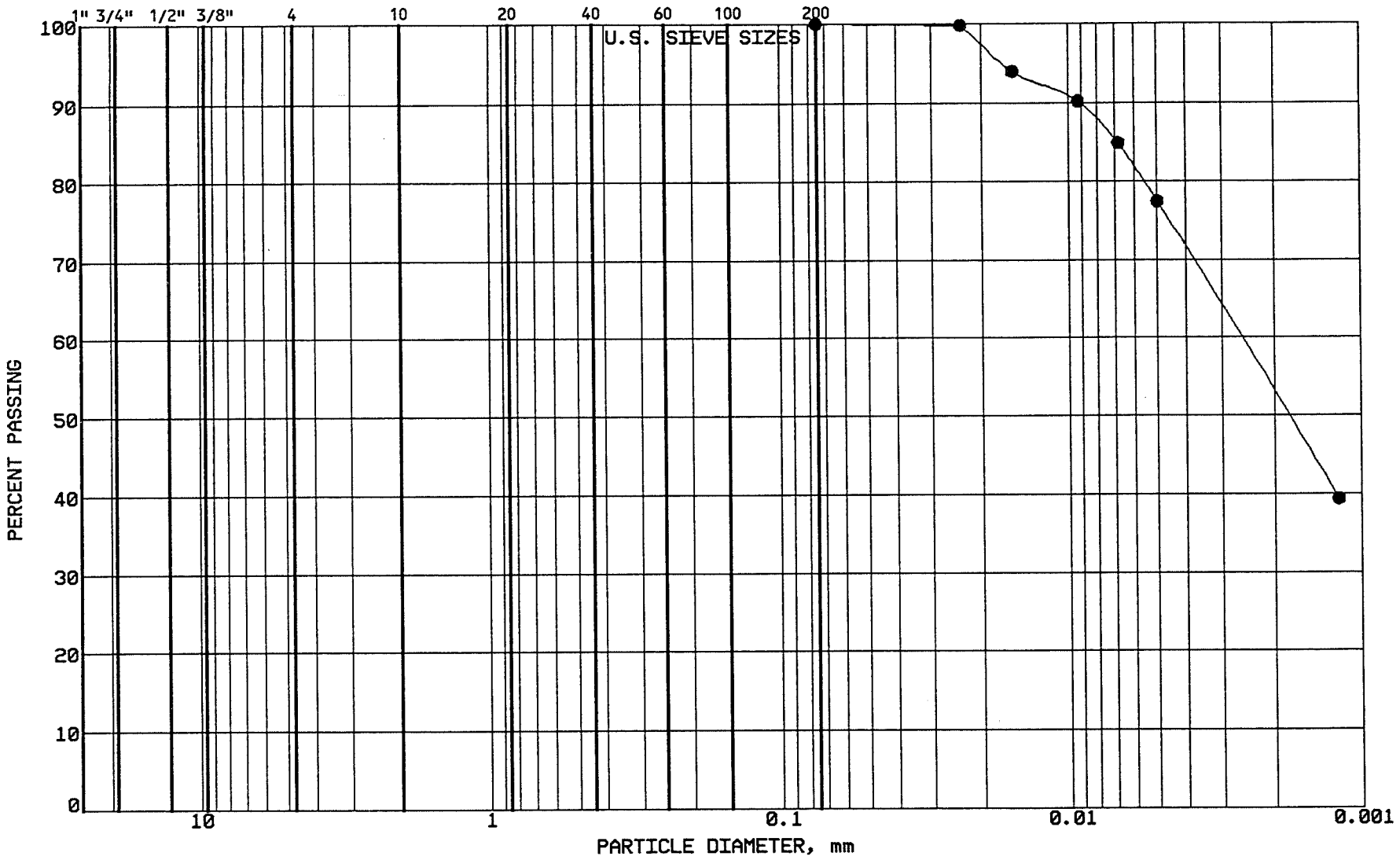
BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-pb8

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

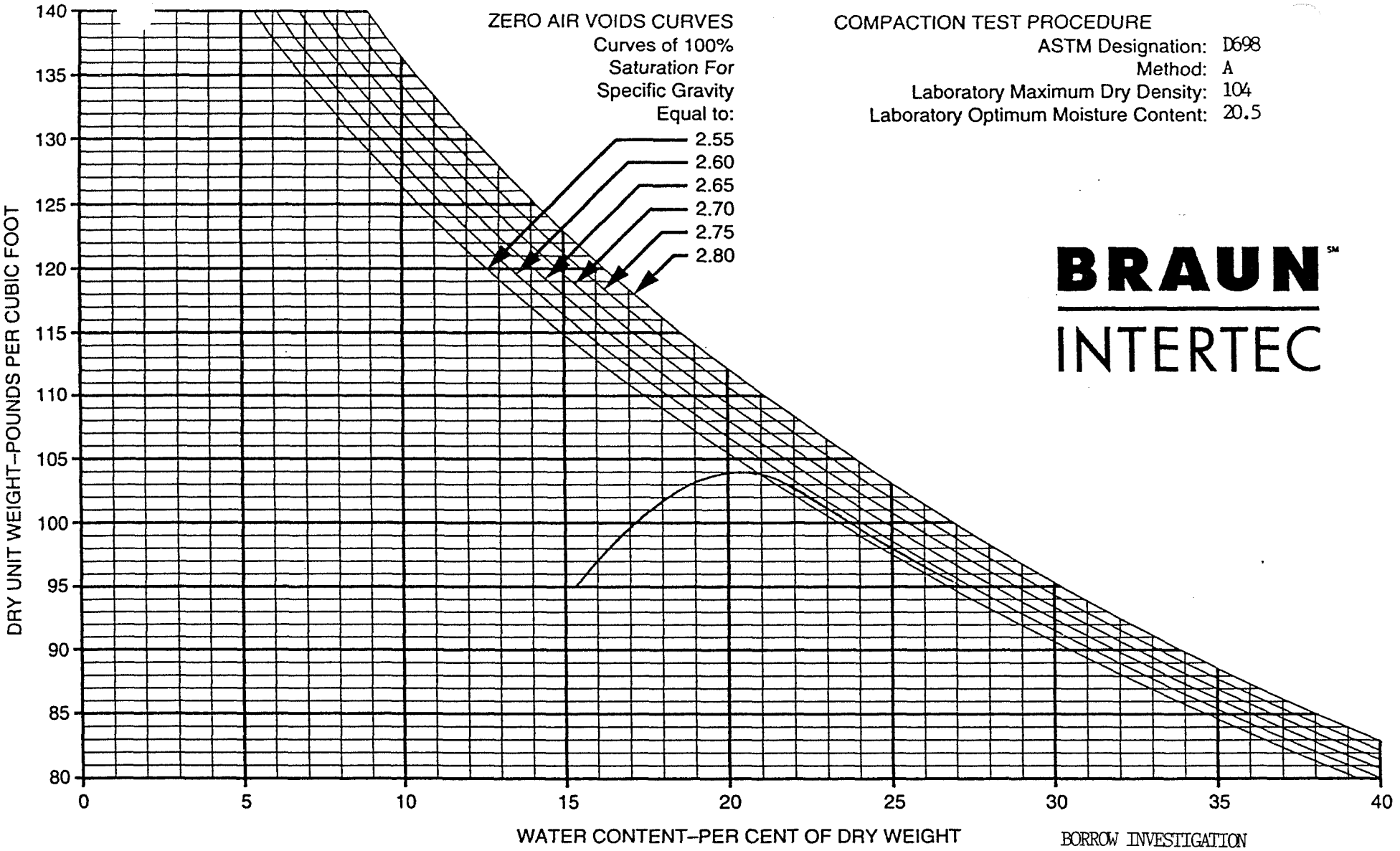
PROJECT: BFDX-92-017A
EP #93 (Borrow Investigation)
Coal Creek Station
Underwood, North Dakota

LOCATION: N 50972N, E41918.0
SAMPLE: 150 TUBE #: PB-8
ELEVATION: 38-48'

GRAVEL	0.0 %
SAND	0.0 %
SILT	22.6 %
CLAY	77.4 %
P 200	100.0 %

SOIL PROPERTIES

LL: 61.0%
PL: 23.0%
PI: 38.0%
CLASS: CH FAT CLAY, dk gr



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 104
Laboratory Optimum Moisture Content: 20.5

BRAUN INTERTEC

BORROW INVESTIGATION

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
PB-8	158	38-42	23	38	61	CH - FAT CLAY, dark gray

50972N 41918E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-017A

PLATE

BRAUN INTERTEC

Braun Intertec Engineering, Inc.
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

ATTERBERG LIMITS

Date: June 5, 1992

Project: BFDX-92-017A
EP #93 (Borrow Investigation)
Coal Creek Station

Reported to:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Copies to: Mr. Jim Martin

Location:	50934N, 41226E
Boring No.:	PB-5
Sample No.:	149
Depth:	53 - 54
Liquid Limit:	38
Plastic Limit:	23
Plastic Index:	15

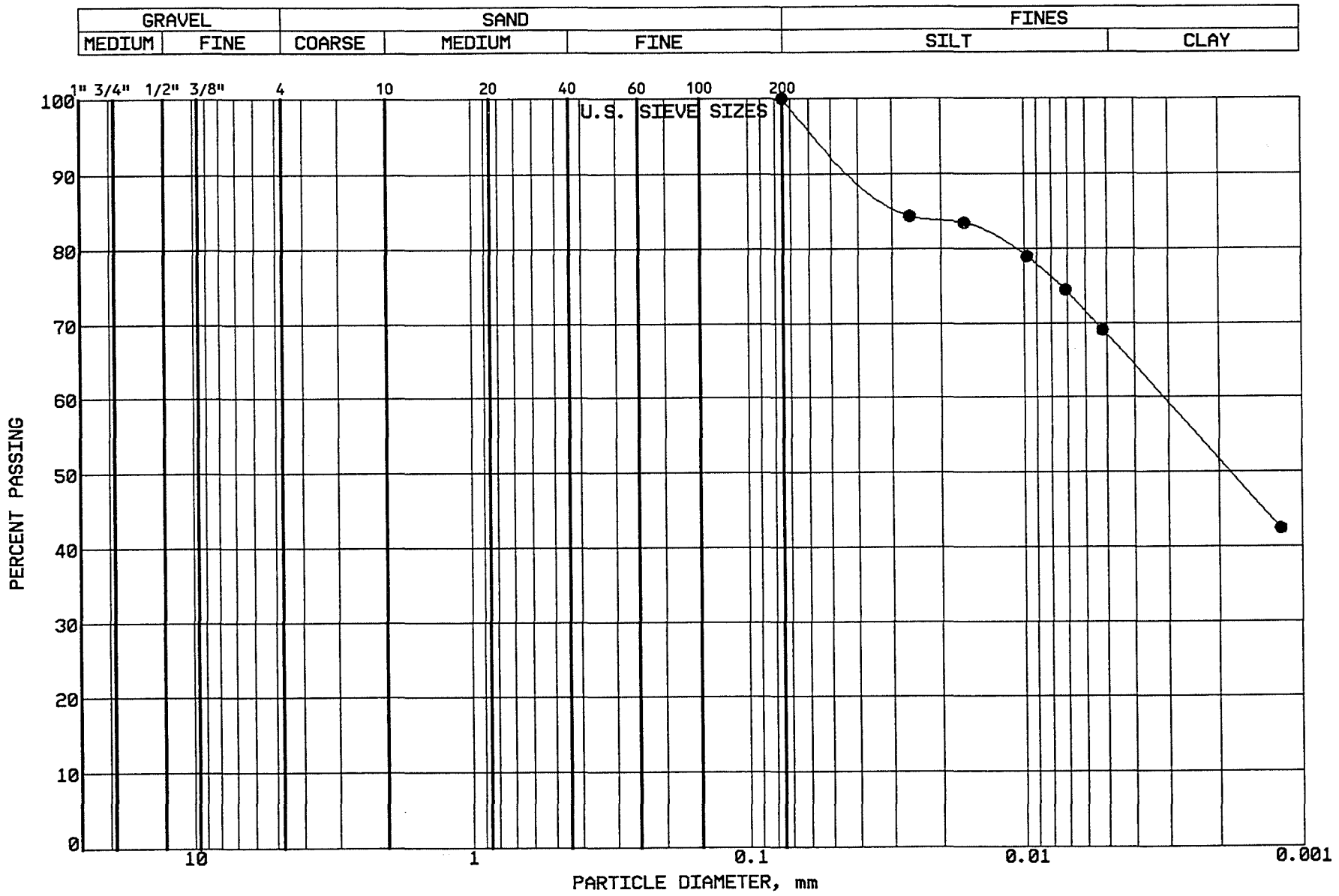
REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

cv2/36

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-017A

EP #93 (Borrow Investigation)
Coal Creek Station
Underwood, North Dakota

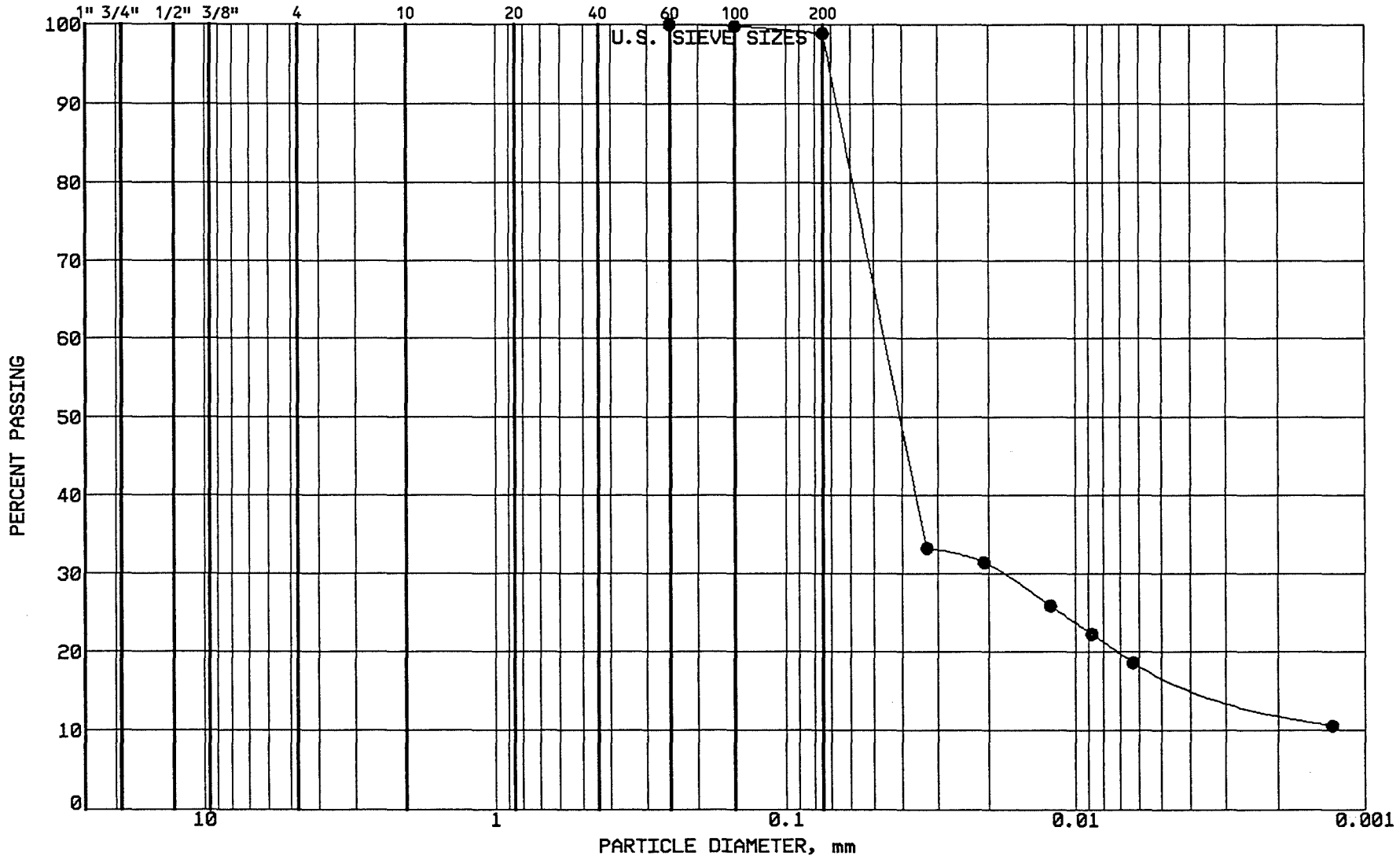
LOCATION: N 50936N, E40774.0
SAMPLE: 148 TUBE #: PB-4
ELEVATION: 52-54'

GRAVEL	0.0 %
SAND	0.0 %
SILT	31.7 %
CLAY	68.3 %
P 200	100.0 %

SOIL PROPERTIES

LL: 70.0%
PL: 19.0%
PI: 51.0%
CLASS: CH FAT CLAY, dk gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017A
EP #93 (Borrow Investigation)
Coal Creek Station
Underwood, North Dakota

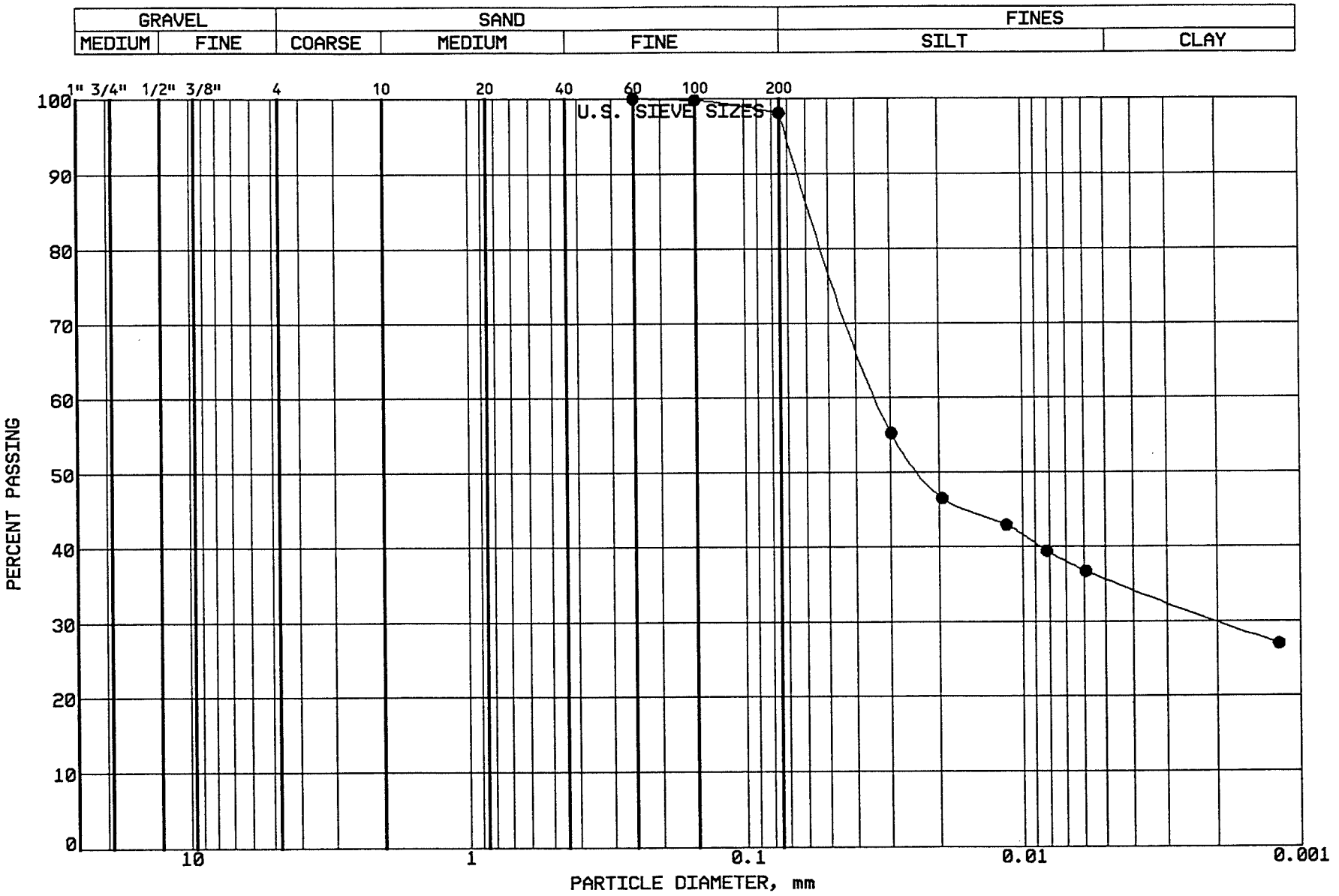
LOCATION: N 50946N, E41427.0
SAMPLE: 158 TUBE #: PB-6
ELEVATION: 54-55'

GRAVEL	0.0 %
SAND	1.1 %
SILT	81.4 %
CLAY	17.5 %
P 200	98.9 %

SOIL PROPERTIES

LL: 51.0%
PL: 15.0%
PI: 36.0%
CLASS: CH FAT CLAY, dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017A
EP #93 (Borrow Investigation)
Coal Creek Station
Underwood, North Dakota

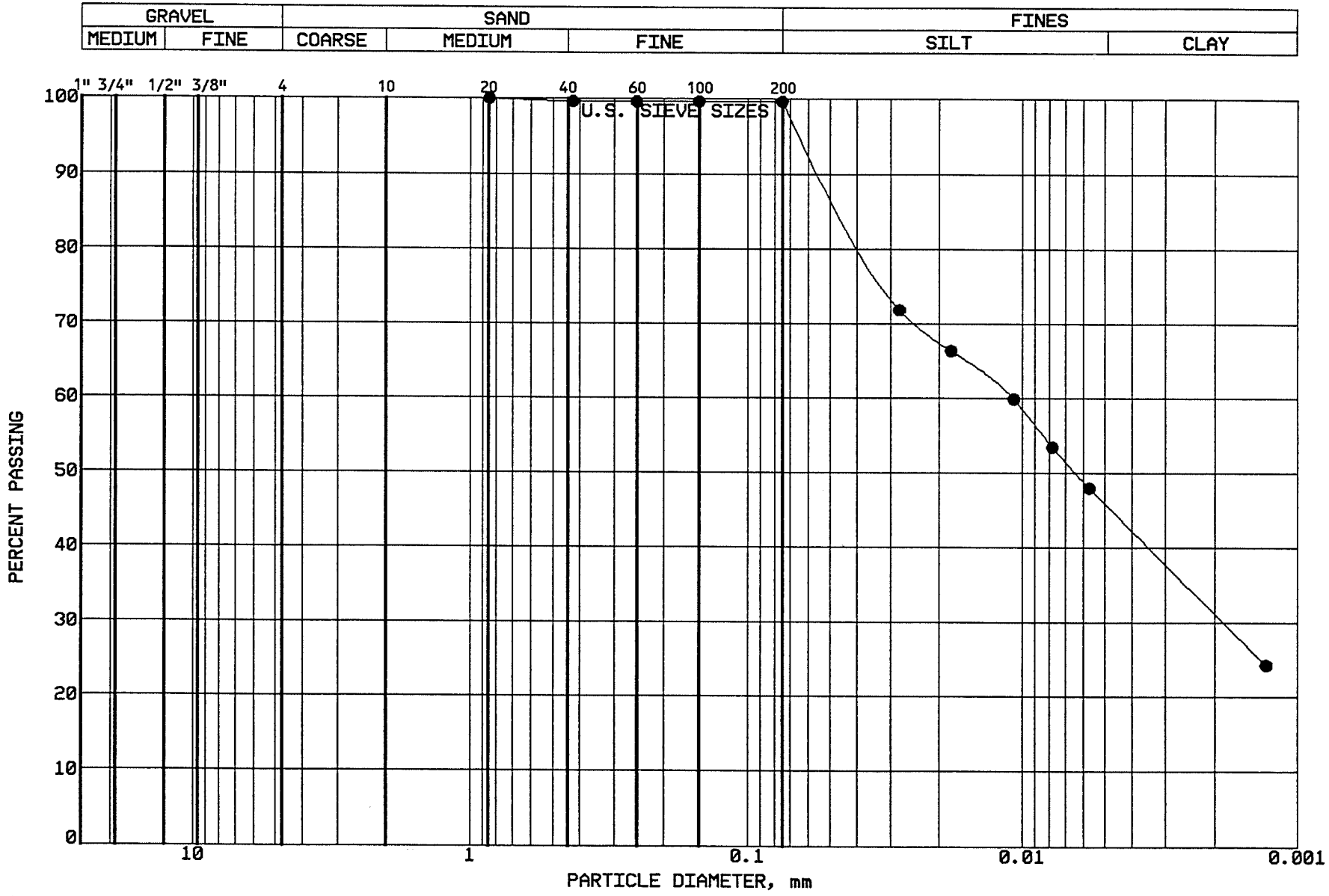
LOCATION: N 50946N, E41427.0
SAMPLE: 159 TUBE #: PB-6
ELEVATION: 58-59'

GRAVEL	0.0 %
SAND	1.9 %
SILT	62.4 %
CLAY	35.7 %
P 200	98.1 %

SOIL PROPERTIES

LL: 42.0%
PL: 15.0%
PI: 27.0%
CLASS: CL LEAN CLAY, dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017A
EP #93 (Borrow Investigation)
Coal Creek Station
Underwood, North Dakota

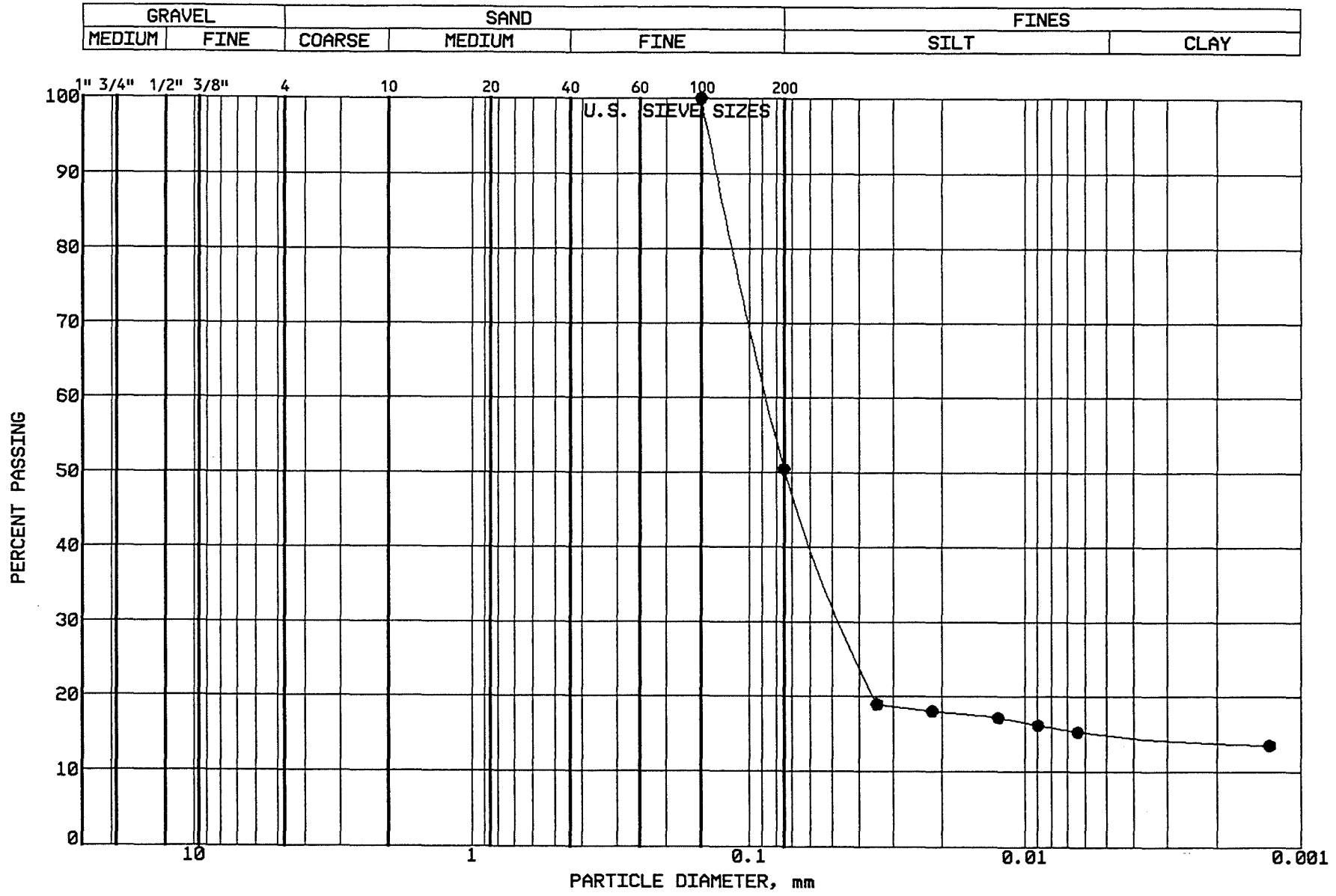
LOCATION: N 50966N, E41707.0
SAMPLE: 160 TUBE #: PB-7
ELEVATION: 50-51'

GRAVEL	0.0 %
SAND	0.4 %
SILT	53.7 %
CLAY	45.9 %
P 200	99.6 %

SOIL PROPERTIES

LL: 58.0%
PL: 20.0%
PI: 38.0%
CLASS: CH FAT CLAY, dk gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017A
EP #93 (Borrow Investigation)
Coal Creek Station
Underwood, North Dakota

LOCATION: N 50939N, E41067.0
SAMPLE: 161 TUBE #: PB-9
ELEVATION: 47-49'

GRAVEL	0.0 %
SAND	49.5 %
SILT	35.5 %
CLAY	15.0 %
P 200	50.5 %

SOIL PROPERTIES

LL: 34.0%
PL: 28.0%
PI: 6.0%
CLASS: CL SANDY LEAN CLAY, dk gr br

LOG OF BORING

PROJECT: **BFDX-92-017A**

EP #93 (Borrow Investigation)
Coal Creek Station
Underwood, North Dakota

BORING: **PB-1**

LOCATION: **50953N, 40414E**

DATE: **4/23/92**

SCALE: **1" = 4'**

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D 2488)	BPF	WL	Tests or Notes
1981.5	0.0	CL	SANDY LEAN CLAY, trace of Gravel, brown, moist.			
1974.0	7.5	CL	SANDY LEAN CLAY, trace of Gravel, dark brown, moist.			
1969.0	12.5	CL	SANDY LEAN CLAY, trace of Gravel, brown, moist.			
1959.0	22.5	CL	LEAN CLAY with SAND, trace of Gravel, a little Lignite, dark brown, moist.			
1954.0	27.5	CL	SANDY LEAN CLAY, trace of Gravel, dark brown, moist.			

LOG OF BORING

PROJECT: **BFDX-92-017A**

EP #93 (Borrow Investigation)
Coal Creek Station
Underwood, North Dakota

BORING: **PB-1 (cont.)**

LOCATION: **50953N, 40414E**

DATE: **4/23/92** SCALE: **1" = 4'**

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D 2488)	BPF	WL	Tests or Notes
1940.0	41.5					
1938.5	43.0		LIGNITE			
1933.5	48.0	CH	FAT CLAY, gray to dark gray, moist.			
1932.5	49.0	SM	SILTY SAND, seams of Clay, gray, moist.			
1929.5	52.0	CH	FAT CLAY, gray, moist.			
1925.5	56.0	CL	SANDY LEAN CLAY, gray, moist.			
1922.5	59.0	CH	LEAN CLAY, gray, moist.			
1921.5	60.0	CH	FAT CLAY, gray, moist.			
1921.0	60.5		LIGNITE			
1920.0	61.5	CH	FAT CLAY, gray, moist.			
1918.5	63.0	CL	LEAN CLAY, gray, moist.			
		CH	FAT CLAY, gray, moist.			

LOG OF BORING

PROJECT: **BFDX-92-017A**

EP #93 (Borrow Investigation)
Coal Creek Station
Underwood, North Dakota

BORING: **PB-1 (cont.)**

LOCATION: **50953N, 40414E**

DATE: **4/23/92** SCALE: **1" = 4'**

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D 2488)	BPF	WL	Tests or Notes
1916.5	65.0					
1915.5	66.0		LIGNITE			
			END OF BORING			

LOG OF BORING

PROJECT: **BFDX-92-017A**

EP #93 (Borrow Investigation)
Coal Creek Station
Underwood, North Dakota

BORING: **PB-2**

LOCATION: **50950N, 40622E**

DATE: **4/23/92**

SCALE: **1" = 4'**

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D 2488)	BPF	WL	Tests or Notes
1980.0	0.0	CL	SANDY LEAN CLAY, trace of Gravel, brown, moist.			
1972.5	7.5	CH	FAT CLAY, trace of Gravel, brown, moist.			
1967.5	12.5	CL	LEAN CLAY with SAND, trace of Gravel, brown, moist.			
1958.5	21.5	SM	SILTY SAND, fine grained, cemented, brown, rather dry.			
1957.0	23.0	CL	SANDY LEAN CLAY, brown, moist.			

LOG OF BORING

PROJECT: **BFDX-92-017A**

EP #93 (Borrow Investigation)
Coal Creek Station
Underwood, North Dakota

BORING: **PB-2 (cont.)**

LOCATION: **50950N, 40622E**

DATE: **4/23/92** SCALE: **1" = 4'**

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D 2488)	BPF	WL	Tests or Notes
1947.0	33.0					
		CL	SANDY LEAN CLAY, gray, moist.			
1944.5	35.5					
			LIGNITE			
1934.5	45.5					
		CH	FAT CLAY, gray, moist.			
1932.0	48.0					
		CH	FAT CLAY, dark gray to dark brown, moist. MC = 23.3%, Perm 4.7x10-8 LL = 61, PI = 37			
1922.0	58.0					
		SM	SILTY SAND, fine grained, seams and layers of Fat Clay, dark brown, moist.			
1918.5	61.5					
1918.0	62.0	CH	FAT CLAY, dark brown, moist.			
1917.0	63.0	SM	SILTY SAND, fine grained, seams of Fat Clay, dark gray, moist.			

LOG OF BORING

PROJECT: **BFDX-92-017A**

EP #93 (Borrow Investigation)
Coal Creek Station
Underwood, North Dakota

BORING: **PB-2 (cont.)**

LOCATION: **50950N, 40622E**

DATE: **4/23/92**

SCALE: **1" = 4'**

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D 2488)	BPF	WL	Tests or Notes
			END OF BORING			

LOG OF BORING

PROJECT: **BFDX-92-017A**

EP #93 (Borrow Investigation)
Coal Creek Station
Underwood, North Dakota

BORING: **PB-3**

LOCATION: **50940N, 40925E**

DATE: **4/24/92**

SCALE: **1" = 4'**

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D 2488)	BPF	WL	Tests or Notes
1977.4	0.0	CL	SANDY LEAN CLAY, trace of Gravel, brown, moist.			
1954.9	22.5	ML	SANDY SILT, light gray, rather dry to moist.			
1949.9	27.5	CL	SANDY LEAN CLAY, gray, moist.			

LOG OF BORING

PROJECT: **BFDX-92-017A**

EP #93 (Borrow Investigation)
Coal Creek Station
Underwood, North Dakota

BORING: **PB-3 (cont.)**

LOCATION: **50940N, 40925E**

DATE: **4/24/92** SCALE: **1" = 4'**

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D 2488)	BPF	WL	Tests or Notes
1943.9	33.5					
			LIGNITE			
1934.9	42.5					
		CH	FAT CLAY, gray, moist.			
1931.4	46.0					
		SM	SILTY SAND, fine grained, gray, moist. MC = 16.5% Granular non-plastic Perm 7.7x10-7			
1914.4	63.0					
			END OF BORING			

LOG OF BORING

PROJECT: **BFDX-92-017A**

EP #93 (Borrow Investigation)
Coal Creek Station
Underwood, North Dakota

BORING: **PB-3 (cont.)**

LOCATION: **50940N, 40925E**

DATE: **4/24/92**

SCALE: **1" = 4'**

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D 2488)	BPF	WL	Tests or Notes
			Water not observed while drilling. Water not observed to cave-in depth of 6.0' immediately after withdrawal of auger.			

LOG OF BORING

PROJECT: **BFDX-92-017A**

EP #93 (Borrow Investigation)
Coal Creek Station
Underwood, North Dakota

BORING: **PB-4**

LOCATION: **50936N, 40774E**

DATE: **4/24/92**

SCALE: **1" = 4'**

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D 2488)	BPF	WL	Tests or Notes
1979.7	0.0	CH	FAT CLAY with SAND, trace of Gravel, brown to dark brown, wet to moist.			
1957.2	22.5	CH	FAT CLAY, some Lignite, cobbles at the 26' depth, dark gray, moist.			
1952.2	27.5	CH	FAT CLAY with SAND, trace of Gravel, gray, moist.			
1948.7	31.0	CL	SANDY LEAN CLAY, trace of Gravel, gray,			

LOG OF BORING

PROJECT: BFDX-92-017A

EP #93 (Borrow Investigation)
Coal Creek Station
Underwood, North Dakota

BORING: PB-4 (cont.)

LOCATION: 50936N, 40774E

DATE: 4/24/92

SCALE: 1" = 4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D 2488)	BPF	WL	Tests or Notes
			brown.			
1944.2	35.5		LIGNITE			
1934.2	45.5	CH	FAT CLAY, gray to dark gray, moist.			
1927.7	52.0	CH	FAT CLAY MC = 22%			
1925.7	54.0	CH	LL = 70, PI = 51			
1916.7	63.0		LIGNITE			
1916.2	63.5					

LOG OF BORING

PROJECT: **BFDX-92-017A**

EP #93 (Borrow Investigation)
Coal Creek Station
Underwood, North Dakota

BORING: **PB-4 (cont.)**

LOCATION: **50936N, 40774E**

DATE: **4/24/92**

SCALE: **1" = 4'**

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D 2488)	BPF	WL	Tests or Notes
			END OF BORING			

LOG OF BORING

PROJECT: **BFDX-92-017A**

EP #93 (Borrow Investigation)
Coal Creek Station
Underwood, North Dakota

BORING: **PB-5**

LOCATION: **50934N, 41226E**

DATE: **4/25/92**

SCALE: **1" = 4'**

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D 2488)	BPF	WL	Tests or Notes
1976.6	0.0	CH	FAT CLAY with SAND, trace of Gravel, light brown, rather dry.			
1971.1	5.5	CH	FAT CLAY with SAND, trace of Gravel, brown to dark brown, moist.			
1945.6	31.0		LIGNITE			

LOG OF BORING

PROJECT: **BFDX-92-017A**

EP #93 (Borrow Investigation)
Coal Creek Station
Underwood, North Dakota

BORING: **PB-5 (cont.)**

LOCATION: **50934N, 41226E**

DATE: **4/25/92** SCALE: **1" = 4'**

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D 2488)	BPF	WL	Tests or Notes
1935.6	41.0					
1934.6	42.0	CH	FAT CLAY, gray, moist.			
1933.1	43.5	SC	CLAYEY SAND, fine grained, gray, moist.			
1926.1	50.5	CH	FAT CLAY, trace of Lignite, gray, moist.			
1925.1	51.5	CL	LEAN CLAY, gray, moist.			
1923.6	53.0	CH	FAT CLAY, gray, moist.			
1922.6	54.0	CL	LEAN CLAY, gray, moist.			
		CH	LL = 38, PI = 15 FAT CLAY, gray, moist.			
1912.6	64.0					

LOG OF BORING

PROJECT: BFDX-92-017A EP #93 (Borrow Investigation) Coal Creek Station Underwood, North Dakota	BORING: PB-5 (cont.) LOCATION: 50934N, 41226E DATE: 4/25/92 SCALE: 1" = 4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D 2488)	BPF	WL	Tests or Notes
			END OF BORING Water not observed while drilling. Water not observed to cave-in depth of 5.9' immediately after withdrawal of auger. Boring then backfilled.			

LOG OF BORING

PROJECT: **BFDX-92-017A**

EP #93 (Borrow Investigation)
Coal Creek Station
Underwood, North Dakota

BORING: **PB-6**

LOCATION: **50946N, 41427E**

DATE: **4/25/92**

SCALE: **1" = 4'**

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D 2488)	BPF	WL	Tests or Notes
1976.5	0.0	CL	SANDY LEAN CLAY, trace to a little Gravel, brown, moist.			
1963.5	13.0					
1962.5	14.0	GP	GRAVEL			
		CH	FAT CLAY, brown, moist.			
1952.5	24.0					
		SC	CLAYEY SAND, fine grained, brown, moist.			
1949.5	27.0					
			LIGNITE			

LOG OF BORING

PROJECT: **BFDX-92-017A**

EP #93 (Borrow Investigation)
Coal Creek Station
Underwood, North Dakota

BORING: **PB-6 (cont.)**

LOCATION: **50946N, 41427E**

DATE: **4/25/92** SCALE: **1" = 4'**

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D 2488)	BPF	WL	Tests or Notes
1938.5	38.0					
		CH	FAT CLAY, dark gray, moist.			
1936.5	40.0					
1935.5	41.0	ML	SANDY SILT, light gray, moist.			
		CH	FAT CLAY, light gray, moist.			
1934.0	42.5					
1933.5	43.0	CH	FAT CLAY, dark brown, moist.			
		CH	FAT CLAY, dark gray, moist.			
1931.0	45.5					
		CH	FAT CLAY, lenses of Silt, light gray, moist. LL = 51, PI = 36			
1918.5	58.0					
1917.5	59.0	CL	LEAN CLAY, light gray, moist. LL = 42, PI = 27			
		CH	FAT CLAY, gray, moist.			
1915.0	61.5					
1914.0	62.5	CH	FAT CLAY, 1" layer Lignite, dark brown, moist.			
1913.5	63.0	CL	LEAN CLAY, light gray, moist.			

LOG OF BORING

PROJECT: BFDX-92-017A EP #93 (Borrow Investigation) Coal Creek Station Underwood, North Dakota	BORING: PB-6 (cont.) LOCATION: 50946N, 41427E DATE: 4/25/92 SCALE: 1" = 4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D 2488)	BPF	WL	Tests or Notes
			END OF BORING Water not observed while drilling. Water observed at cave-in depth of 6.0' immediately after withdrawal of auger. Boring then backfilled.			

LOG OF BORING

PROJECT: **BFDX-92-017A**

EP #93 (Borrow Investigation)
Coal Creek Station
Underwood, North Dakota

BORING: **PB-7**

LOCATION: **50966N, 41707E**

DATE: **4/27/92** SCALE: **1" = 4'**

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D 2488)	BPF	WL	Tests or Notes
1971.7	0.0	CL	SANDY LEAN CLAY, trace to a little Gravel, brown, moist.			
1959.7	12.0	CL	SANDY LEAN CLAY, lenses and seams of Sand, trace of gravel, brown, moist.			
1949.2	22.5	SC	CLAYEY SAND, fine grained, light brown, moist.			
1940.2	31.5					

LOG OF BORING

PROJECT: **BFDX-92-017A**

EP #93 (Borrow Investigation)
Coal Creek Station
Underwood, North Dakota

BORING: **PB-7 (cont.)**

LOCATION: **50966N, 41707E**

DATE: **4/27/92** SCALE: **1" = 4'**

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D 2488)	BPF	WL	Tests or Notes
			LIGNITE			
1933.7	38.0					
		CH	FAT CLAY, 1" layer of Lignite at the 38 1/2' depth, dark gray, moist.			
1928.7	43.0					
1927.7	44.0	CL	SANDY LEAN CLAY, gray, moist			
1927.2	44.5	CH	FAT CLAY, gray, moist.			
1926.2	45.5	CL	SANDY LEAN CLAY, gray, moist.			
1925.7	46.0	CH	FAT CLAY, gray, moist.			
1925.2	46.5	CL	SANDY LEAN CLAY, gray, moist.			
		CH	FAT CLAY, dark gray, moist. LL = 58, PI = 38			
1917.7	54.0					
1917.2	54.5	CL	SANDY LEAN CLAY, gray, moist.			
1916.2	55.5	CH	FAT CLAY, light gray, moist.			
1915.2	56.5	CH	FAT CLAY, dark brown, moist.			
		CL	SANDY LEAN CLAY, gray, moist to wet.			
1912.2	59.5					
1910.7	61.0	CH	FAT CLAY, dark brown, moist to wet.			
			LIGNITE			
1908.7	63.0					
			END OF BORING			

LOG OF BORING

PROJECT: BFDX-92-017A EP #93 (Borrow Investigation) Coal Creek Station Underwood, North Dakota	BORING: PB-7 (cont.) LOCATION: 50966N, 41707E DATE: 4/27/92 SCALE: 1" = 4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D 2488)	BPF	WL	Tests or Notes
			Water observed at 58' while drilling. Boring then backfilled.			

LOG OF BORING

PROJECT: **BFDX-92-017A**

EP #93 (Borrow Investigation)
Coal Creek Station
Underwood, North Dakota

BORING: **PB-8**

LOCATION: **50972N, 41918E**

DATE: **4/28/92**

SCALE: **1" = 4'**

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D 2488)	BPF	WL	Tests or Notes
1965.0	0.0	CL	SANDY LEAN CLAY, seams of Sand, dark brown, moist.			
1962.5	2.5	CL	SANDY LEAN CLAY, trace of Gravel, light brown to brown, moist.			
1943.5	21.5	CL	LEAN CLAY with SAND, olive brown, moist.			
1939.0	26.0		LIGNITE			
1933.0	32.0					

LOG OF BORING

PROJECT: BFDX-92-017A EP #93 (Borrow Investigation) Coal Creek Station Underwood, North Dakota	BORING: PB-8 (cont.) LOCATION: 50972N, 41918E DATE: 4/28/92 SCALE: 1" = 4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D 2488)	BPF	WL	Tests or Notes
		CH	FAT CLAY, few layers of Lean Clay, gray to dark brown, moist.			
			Perm 1.9x10-8 MC = 23.2% LL = 61, PI = 38			
1912.0	53.0		END OF BORING			
			Water down 32' with 38' of hollow-stem auger in the ground.			
			Water not observed immeidately after withdrawal of auger.			

LOG OF BORING

PROJECT: BFDX-92-017A EP #93 (Borrow Investigation) Coal Creek Station Underwood, North Dakota	BORING: PB-9
	LOCATION: 50939N, 41067E
	DATE: 4/28/92 — SCALE: 1" = 4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D 2488)	BPF	WL	Tests or Notes
1976.7	0.0	CL	SANDY LEAN CLAY, trace of Gravel, dark brown, moist.			
1974.2	2.5	CH	FAT CLAY, lenses of Sand, trace of Gravel, brown, moist.			
1969.2	7.5	CL	SANDY LEAN CLAY, trace of Gravel, brown, moist.			
1959.2	17.5	CH	FAT CLAY, brown, moist.			
1953.7	23.0	CL	SANDY LEAN CLAY, light brown, moist.			
1944.7	32.0					

LOG OF BORING

PROJECT: **BFDX-92-017A**

EP #93 (Borrow Investigation)
Coal Creek Station
Underwood, North Dakota

BORING: **PB-9 (cont.)**

LOCATION: **50939N, 41067E**

DATE: **4/28/92** SCALE: **1" = 4'**

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM Symbol	Description of Materials (ASTM D 2488)	BPF	WL	Tests or Notes
			LIGNITE			
1934.2	42.5					
1932.7	44.0	CH	FAT CLAY, gray, moist.			
		SC	CLAYEY SAND, fine grained, seams of Fat Clay, gray, moist. LL = 34, PI = 6			
			Moisture Content = 18.9%			
1918.7	58.0					
			END OF BORING Water observed at 47 1/2' while drilling. Boring then backfilled.			

DENSITIES, IN-SITU MOISTURES AND GRADATIONS

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-021A	01	43441N, 45803E	6	1,885.4	CC-7	139.3	15.1	123.0	100+	SG	CC-6	MC	05/14/92	NM
	02	43441N, 45505E	6	1,886.0	CC-7	123.0	10.8	112.9	96.6	SG	CC-7, PROCTOR	MC	05/14/92	NM
	03	43444N, 45308E	6	1,886.3	CC-53	131.2	20.0	111.1	100+	SG	CC-8	MC	05/14/92	NM
	04	43444N, 45100E	6	1,885.4	CC-53	130.2	23.7	106.9	97.1	SG	CC-9	MC	05/14/92	NM
	05	43443N, 44904E	6	1,884.9	CC-10	128.9	19.0	110.0	96.9	SG	CC-10, PROCTOR	MC	05/14/92	NM
	06	43336N, 45928E	6	1,885.0	CC-53	131.4	20.2	111.0	100+	SG	CC-11	MC	05/14/92	NM
	07	43149N, 45932E	6	1,884.5	CC-53	130.7	19.6	111.0	100+	SG	CC-12	MC	05/14/92	NM
	08	42955N, 45931E	6	1,883.3	CC-53	128.8	21.2	107.9	97.7	SG	CC-13	MC	05/14/92	NM
	09	42767N, 45928E	6	1,882.2	CC-53	129.6	21.1	108.7	98.3	SG	CC-14	MC	05/14/92	NM
	10	42603N, 45921E	6	1,880.8	CC-53	127.7	20.3	107.8	97.5	SG	CC-15	MC	05/14/92	NM
	11	43446N, 45591E	6	1,887.3	CC-53	132.6	20.9	111.4	100+	SG		MC	05/14/92	NM
	12	43447N, 45384E	6	1,887.0	CC-53	132.7	20.4	111.9	100+	SG		MC	05/14/92	NM
	13	43446N, 45189E	6	1,886.6	CC-53	129.0	21.6	107.7	97.4	SG		MC	05/14/92	NM
	14	43446N, 45000E	6	1,886.0	CC-53	131.2	19.7	111.3	100+	SG		MC	05/14/92	NM

Count: 14

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-022A	01	43445N, 45697E	6	1,887.2	CC-53	130.1	20.7	108.6	98.2	CLS		MC	05/15/92	NM
	02	43448N, 45495E	6	1,887.6	CC-53	130.4	18.4	110.9	100+	CLS	CC-16, PROCTOR	MC	05/15/92	NM
	03	43447N, 45292E	6	1,887.6	CC-53	131.7	18.6	111.9	100+	CLS		MC	05/15/92	NM
	04	43450N, 45098E	6	1,886.9	CC-53	128.1	19.7	107.8	97.6	CLS		MC	05/15/92	NM
	05	43451N, 44900E	6	1,888.1	CC-53	128.8	18.1	109.9	99.5	CLS		MC	05/15/92	NM
	06	43400N, 45941E	6	1,887.0	CC-53	129.7	20.8	108.2	98	SG		MC	05/15/92	NM
	07	43206N, 45938E	6	1,885.3	CC-53	129.0	20.7	107.6	97.4	SG		MC	05/15/92	NM
	08	43000N, 45933E	6	1,884.8	CC-53	129.6	19.5	109.2	98.8	SG		MC	05/15/92	NM
	09	42799N, 45932E	6	1,883.2	CC-53	130.9	17.5	112.2	100+	SG		MC	05/15/92	NM
	10	42604N, 45927E	6	1,882.0	CC-53	130.8	20.4	108.5	98.2	SG	CC-17	MC	05/15/92	NM
	11	43455N, 45815E	6	1,888.7	CC-53	129.6	20.5	108.3	98	CLS		MC	05/15/92	NM
	12	43446N, 45611E	6	1,888.2	CC-53	130.5	19.9	109.6	99.2	CLS		MC	05/15/92	NM
	13	43451N, 45409E	6	1,888.6	CC-53	130.6	18.8	110.7	100+	CLS		MC	05/15/92	NM
	14	43452N, 45209E	6	1,888.2	CC-53	133.2	19.7	112.1	100+	CLS		MC	05/15/92	NM
	15	43454N, 45009E	6	1,887.9	CC-53	131.7	20.8	109.8	99.4	CLS		MC	05/15/92	NM
	16	43388N, 45945E	6	1,887.3	CC-53	130.3	18.0	111.2	100+	CLS		MC	05/15/92	NM
	17	43210N, 45940E	6	1,886.0	CC-53	130.1	19.8	109.4	99	CLS		MC	05/15/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-022A	18	43009N, 45935E	6	1,885.2	CC-53	130.5	20.4	109.2	98.9	CLS	CC-18, PROCTOR	MC	05/15/92	NM
	19	42806N, 45934E	6	1,884.2	CC-53	134.8	17.4	110.0	100+	CLS		MC	05/15/92	NM
	20	42600N, 45930E	6	1,883.2	CC-53	132.1	18.9	111.9	100+	CLS		MC	05/15/92	NM
	21	43452N, 45965E	6	1,889.4	CC-53	127.3	21.6	105.4	95.4	CLS		MC	05/15/92	NM
	22	43451N, 45499E	6	1,889.1	CC-53	130.3	21.5	108.0	97.7	CLS		MC	05/15/92	NM
	23	43453N, 45297E	6	1,888.9	CC-53	129.9	20.7	108.4	98.1	CLS		MC	05/15/92	NM
	24	43455N, 45101E	6	1,888.4	CC-53	129.4	20.5	108.2	97.9	CLS		MC	05/15/92	NM
	25	43456N, 44895E	6	1,889.5	CC-53	130.7	19.2	110.4	100	CLS		MC	05/15/92	NM
	26	43451N, 45835E	6	1,889.6	CC-53	129.7	18.3	110.4	100	CLS	CC-19, ST.1	MC	05/15/92	NM
	27	43451N, 45698E	6	1,889.5	CC-53	129.4	19.8	108.8	98.4	CLS		MC	05/15/92	NM
	28	43452N, 45495E	6	1,889.4	CC-53	128.2	18.7	108.8	98.4	CLS		MC	05/15/92	NM
	29	43451N, 45298E	6	1,889.2	CC-53	130.0	18.9	110.1	99.6	CLS		MC	05/15/92	NM
	30	43455N, 45103E	6	1,888.9	CC-53	130.5	22.1	107.6	97.4	CLS		MC	05/15/92	NM
	31	43457N, 44902E	6	1,889.8	CC-53	128.6	15.9	111.8	100+	CLS	CC-20, ST.2	MC	05/15/92	NM
	32	43207N, 45941E	6	1,886.4	CC-53	129.5	22.5	106.5	96.4	CLS	CC-21, ST.3	MC	05/15/92	NM
	33	43003N, 45939E	6	1,885.7	CC-53	127.9	19.2	108.1	97.8	CLS		MC	05/15/92	NM
	34	42808N, 45936E	6	1,884.6	CC-53	128.0	19.3	108.1	97.8	CLS		MC	05/15/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS

BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-022A	35	42604N, 45932E	6	1,883.6	CC-53	128.7	20.8	107.3	97.1	CLS		MC	05/15/92	NM
	36	43453N, 45705E	6	1,889.7	CC-53	129.4	17.8	110.7	100+	CLS		MC	05/15/92	NM
	37	43453N, 45597E	6	1,890.0	CC-53	128.6	21.7	106.4	96.3	CLS		MC	05/15/92	NM
	38	43454N, 45396E	6	1,889.9	CC-53	131.5	18.4	111.9	100+	CLS		MC	05/15/92	NM
	39	43457N, 45203E	6	1,889.1	CC-53	130.4	18.0	111.3	100+	CLS		MC	05/15/92	NM
	40	43457N, 44992E	6	1,889.6	CC-53	127.8	18.8	108.4	98.1	CLS		MC	05/15/92	NM
	41	43454N, 45874E	6	1,890.0	CC-53	131.1	17.2	112.7	100+	CLS		MC	05/15/92	NM
	42	43454N, 45701E	6	1,890.4	CC-53	130.4	20.1	109.4	99	CLS		MC	05/15/92	NM
	43	43455N, 45507E	6	1,890.8	CC-53	129.7	18.1	110.6	100+	CLS		MC	05/15/92	NM
	44	43457N, 45303E	6	1,890.7	CC-53	129.4	19.7	108.9	98.6	CLS		MC	05/15/92	NM
	45	43460N, 45102E	6	1,890.3	CC-53	128.5	17.4	110.3	99.8	CLS		MC	05/15/92	NM
	46	43458N, 44904E	6	1,890.6	CC-53	124.7	17.7	107.0	96.8	CLS		MC	05/15/92	NM
	47	43322N, 45945E	6	1,887.1	CC-53	132.3	19.3	111.7	100+	CLS		MC	05/15/92	NM
	48	43093N, 45938E	6	1,886.4	CC-53	131.6	17.7	112.6	100+	CLS		MC	05/15/92	NM
	49	42887N, 45941E	6	1,885.7	CC-53	132.8	17.7	113.7	100+	CLS		MC	05/15/92	NM
	50	42705N, 45936E	6	1,883.9	CC-53	126.6	21.4	105.0	95	CLS		MC	05/15/92	NM
	51	43457N, 45805E	6	1,891.3	CC-53	129.3	18.8	109.6	99.2	CLS		MC	05/15/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-022A	52	43454N, 45591E	6	1,891.3	CC-53	130.4	18.2	111.1	100+	CLS		MC	05/15/92	NM
	53	43458N, 45394E	6	1,890.9	CC-53	128.3	20.3	107.4	97.2	CLS		MC	05/15/92	NM
	54	43460N, 45194E	6	1,890.5	CC-53	129.7	20.0	108.9	98.6	CLS		MC	05/15/92	NM
	55	43462N, 44993E	6	1,891.0	CC-53	129.3	20.4	108.2	97.9	CLS	SAND CONE	MC	05/15/92	NM,SC
	56	43389N, 45950E	6	1,888.6	CC-53	130.4	19.1	110.3	99.8	CLS		MC	05/15/92	NM
	57	43208N, 45941E	6	1,887.4	CC-53	131.2	19.5	110.6	100	CLS		MC	05/15/92	NM
	58	43005N, 45940E	6	1,886.8	CC-53	134.4	17.3	114.4	100+	CLS		MC	05/15/92	NM
	59	43808N, 45938E	6	1,885.5	CC-53	130.6	20.7	109.0	98.7	CLS		MC	05/15/92	NM
	60	42603N, 45931E	6	1,884.4	CC-53	130.9	20.7	109.2	98.8	CLS		MC	05/15/92	NM
	61	43457N, 45697E	6	1,891.7	CC-53	132.1	17.9	112.9	100+	CLS		MC	05/15/92	NM
	62	43458N, 45501E	6	1,891.8	CC-53	128.0	18.7	108.6	98.3	CLS		MC	05/15/92	NM
	63	43459N, 45301E	6	1,891.7	CC-53	132.3	20.5	110.6	100+	CLS		MC	05/15/92	NM
	64	43461N, 45100E	6	1,891.2	CC-53	129.8	17.9	110.9	100+	CLS		MC	05/15/92	NM
	65	43459N, 44900E	6	1,891.5	CC-53	131.0	20.0	110.0	99.5	CLS		MC	05/15/92	NM
	66	43316N, 45945E	6	1,888.0	CC-53	130.1	18.2	110.9	100+	CLS		MC	05/15/92	NM
	67	43103N, 45941E	6	1,887.6	CC-53	127.6	21.2	106.0	95.9	CLS		MC	05/15/92	NM
	68	42896N, 45938E	6	1,886.6	CC-53	127.1	20.3	106.4	96.3	CLS		MC	05/15/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS

BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-022A	69	42703N, 45936E	6	1,885.0	CC-53	129.1	20.0	108.4	98.1	CLS		MC	05/15/92	NM

Count: 69

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-0248	01	43396N, 45946E	6	1,889.6	CC-53	130.4	17.5	111.8	100+	CLS		MC	05/18/92	NM
	02	43204N, 45944E	6	1,887.7	CC-53	129.7	19.8	109.0	98.7	CLS		MC	05/18/92	NM
	03	43003N, 45944E	6	1,888.0	CC-53	130.4	21.4	108.3	98	CLS		MC	05/18/92	NM
	04	42809N, 45941E	6	1,886.3	CC-53	132.1	19.8	111.1	100+	CLS	CC-22, ST.4	MC	05/18/92	NM
	05	42608N, 45935E	6	1,884.8	CC-53	129.4	18.7	109.8	99.3	CLS		MC	05/18/92	NM
	06	43458N, 45846E	6	1,891.2	CC-53	133.6	19.4	112.7	100+	CLS		MC	05/18/92	NM
	07	43456N, 45696E	6	1,892.0	CC-53	125.0	13.9	110.6	?	CLS	MOISTURE FAILS, MATERIAL REMOVED	MC	05/18/92	NM
	08	43458N, 45493E	6	1,892.0	CC-53	130.4	18.3	110.1	99.6	CLS		MC	05/18/92	NM
	09	43456N, 45297E	6	1,892.2	CC-53	133.4	16.3	114.0	100+	CLS		MC	05/18/92	NM
	10	43457N, 45107E	6	1,891.7	CC-53	134.4	17.0	114.0	100+	CLS		MC	05/18/92	NM
	11	43458N, 44898E	6	1,891.7	CC-53	132.1	17.6	112.2	100+	CLS		MC	05/18/92	NM
	12	43292N, 45946E	6	1,888.5	CC-53	130.2	20.5	108.8	98.5	CLS		MC	05/18/92	NM
	13	43103N, 45940E	6	1,888.1	CC-53	128.3	18.3	109.2	98.8	CLS	CC-23, ST.5	MC	05/18/92	NM
	14	42902N, 45939E	6	1,887.5	CC-53	131.6	18.8	111.6	100+	CLS		MC	05/18/92	NM
	15	42698N, 45939E	6	1,886.1	CC-24	135.1	17.5	114.8	100+	CLS	CC-24, PROCTOR	MC	05/18/92	NM
	16	43463N, 45791E	6	1,892.7	CC-53	133.7	18.0	113.2	100+	CLS		MC	05/18/92	NM
	17	43464N, 45598E	6	1,892.0	CC-53	132.6	18.1	113.1	100+	CLS		MC	05/18/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-024B	18	43467N, 45400E	6	1,892.5	CC-53	132.9	18.0	113.5	100+	CLS	CC-25, ST.6	MC	05/18/92	NM
	19	43467N, 45197E	6	1,892.0	CC-53	132.1	19.8	111.1	100+	CLS		MC	05/18/92	NM
	20	43468N, 44994E	6	1,892.3	CC-53	131.3	18.7	111.4	100+	CLS		MC	05/18/92	NM
	21	43396N, 45948E	6	1,890.6	CC-53	127.3	17.5	108.2	97.9	CLS	CC-26, ST.7	MC	05/18/92	NM
	22	43205N, 45945E	6	1,888.6	CC-53	129.0	21.4	106.1	96.0	CLS		MC	05/18/92	NM
	23	43008N, 45944E	6	1,889.0	CC-53	131.5	20.7	108.8	98.4	CLS		MC	05/18/92	NM
	24	42806N, 45842E	6	1,887.6	CC-53	135.8	21.2	111.9	100+	CLS		MC	05/18/92	NM
	25	43603N, 45937E	6	1,890.0	CC-53	130.7	22.0	107.0	96.8	CLS		MC	05/18/92	NM
	26	43461N, 45873E	6	1,891.2	CC-53	132.1	18.7	111.2	100+	CLS		MC	05/18/92	NM
	27	43460N, 45699E	6	1,892.8	CC-53	129.9	21.4	106.9	96.7	CLS	CC-27, ST.8	MC	05/18/92	NM
	28	43465N, 45509E	6	1,893.3	CC-53	129.7	20.4	107.2	97.0	CLS		MC	05/18/92	NM
	29	43467N, 45299E	6	1,892.7	CC-53	131.5	22.1	107.6	97.4	CLS		MC	05/18/92	NM
	30	43463N, 45101E	6	1,892.8	CC-53	132.2	20.3	109.8	99.4	CLS	CC-28, ST.9	MC	05/18/92	NM

Count: 30

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-024	31	43467N, 44903E	6	1,893.1	CC-53	128.0	22.6	106.3	96.2	CLS		RM	05/18/92	NM
	32	43296N, 45949E	6	1,889.8	CC-53	130.4	20.9	107.7	97.5	CLS		RM	05/18/92	NM
	33	43098N, 45947E	6	1,889.5	CC-53	129.6	22.2	105.9	95.8	CLS		RM	05/18/92	NM
	34	42895N, 45945E	6	1,889.1	CC-53	129.1	21.7	106.1	96.0	CLS		RM	05/18/92	NM
	35	42700N, 45947E	6	1,887.7	CC-53	129.3	21.8	106.0	95.9	CLS		RM	05/18/92	NM
	36	43464N, 45801E	6	1,893.2	CC-53	130.2	17.9	110.3	99.8	CLS		RM	05/18/92	NM
	37	43466N, 45598E	6	1,893.3	CC-53	125.9	19.8	105.0	95.0	CLS		RM	05/18/92	NM
	38	43469N, 45391E	6	1,893.2	CC-53	129.5	20.1	107.7	97.5	CLS		RM	05/18/92	NM
	39	43466N, 45194E	6	1,893.0	CC-53	125.8	19.3	105.4	95.4	CLS		RM	05/18/92	NM
	40	43469N, 44996E	6	1,893.3	CC-53	127.0	20.6	105.3	95.3	CLS		RM	05/18/92	NM
	41	43392N, 45951E	6	1,891.3	CC-53	127.4	20.9	105.3	95.3	CLS		RM	05/18/92	NM
	42	43200N, 45948E	6	1,890.3	CC-53	129.3	19.1	108.4	98.1	CLS		RM	05/18/92	NM
	43	42999N, 45948E	6	1,890.4	CC-53	131.7	18.8	110.7	100+	CLS		RM	05/18/92	NM
	44	42799N, 45945E	6	1,888.0	CC-53	131.4	19.2	110.1	99.6	CLS		RM	05/18/92	NM
	45	43459N, 45900E	6	1,892.2	CC-53	126.6	19.0	106.4	96.3	CLS		RM	05/18/92	NM
	46	43468N, 45698E	6	1,893.9	CC-53	128.8	17.7	109.3	98.9	CLS		RM	05/18/92	NM
	47	43467N, 45497E	6	1,894.7	CC-53	126.2	19.6	105.4	95.4	CLS		RM	05/18/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-024	48	43466N, 45302E	6	1,894.0	CC-53	128.4	21.3	105.8	95.7	CLS		RM	05/18/92	NM
	49	43467N, 45094E	6	1,893.8	CC-53	126.5	20.1	105.3	95.3	CLS		RM	05/18/92	NM

Count: 19

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-025A	01	43298N, 45952E	6	1,891.3	CC-53	128.0	19.5	107.1	96.9	CLS		RM	05/19/92	NM
	02	43099N, 45948E	6	1,890.7	CC-53	123.9	19.7	103.4	93.6	CLS	PASSED BY #3, 92-25B	RM	05/19/92	NM
	03	43391N, 45953E	6	1,892.8	CC-53	128.3	21.3	105.8	95.7	CLS		RM	05/19/92	NM
	04	43200N, 45953E	6	1,891.5	CC-53	124.5	18.8	104.7	94.7	CLS	SAND CONE	RM	05/19/92	NM,SC
	05	43470N, 45858E	6	1,894.3	CC-1	128.2	21.2	105.8	95.4	CLS		RM	05/19/92	NM
	06	43473N, 45700E	6	1,895.1	CC-1	127.3	19.6	106.4	95.9	CLS		RM	05/19/92	NM
	07	43472N, 45501E	6	1,895.0	CC-1	128.8	20.5	106.8	96.3	CLS		RM	05/19/92	NM
	08	43475N, 45300E	6	1,895.0	CC-1	129.2	19.4	108.2	97.6	CLS		RM	05/19/92	NM
	09	43475N, 45104E	6	1,894.6	CC-1	128.2	21.4	105.6	95.2	CLS		RM	05/19/92	NM
	10	43472N, 44902E	6	1,895.3	CC-1	129.9	20.1	108.1	97.5	CLS		RM	05/19/92	NM
	11	42892N, 45951E	6	1,891.7	CC-1	127.5	24.4	102.4	92.3	CLS	MOISTURE FAILS	RM	05/19/92	NM
	12	42695N, 45947E	6	1,890.0	CC-1	125.0	24.1	100.6	90.7	CLS	MOISTURE FAILS	RM	05/19/92	NM
	13	RETEST OF #11	6	1,891.7	CC-1	126.5	22.1	103.5	93.3	CLS	DENSITY FAILS	RM	05/19/92	NM
	14	RETEST OF #12	6	1,890.0	CC-1	127.1	22.7	103.5	93.4	CLS	DENSITY FAILS	RM	05/19/92	NM
	15	43472N, 45794E	6	1,895.4	CC-1	130.0	20.9	107.9	96.9	CLS		RM	05/19/92	NM
	16	43474N, 45594E	6	1,895.3	CC-1	129.3	20.4	107.4	96.8	CLS		RM	05/19/92	NM
	17	43475N, 45392E	6	1,895.5	CC-1	130.6	19.8	109.9	98.3	CLS		RM	05/19/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-025A	18	43476N, 45192E	6	1,895.2	CC-1	129.6	19.4	109.3	98.5	CLS	CC-30, ST.10	RM	05/19/92	NM
	19	43454N, 43526E	6	1,885.2	CC-53	125.6	22.1	102.9	93.1	SG	CC-31	RM	05/19/92	NM
	20	43440N, 43727E	6	1,884.8	CC-53	122.2	22.3	99.8	90.3	SG	CC-32	RM	05/19/92	NM
	21	43436N, 43913E	6	1,884.6	CC-53	124.9	21.4	102.9	93.1	SG	CC-33	RM	05/19/92	NM
	22	43437N, 44150E	6	1,885.0	CC-53	127.9	18.7	107.6	97.4	SG	CC-34	RM	05/19/92	NM
	23	RETEST OF 11 & 13	6	1,891.7	CC-1	128.5	17.6	109.1	98.7	CLS		RM	05/19/92	NM
	24	RETEST OF 12 & 14	6	1,890.0	CC-1	128.2	19.7	107.1	97.3	CLS		RM	05/19/92	NM

Count: 24

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS

BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-025B	01	42897N, 45949E	6	1,890.5	CC-53	132.8	16.3	114.1	100+	CLS		MC	05/19/92	NM
	02	42702N, 45946E	6	1,889.1	CC-53	127.7	19.9	107.3	97.1	CLS		MC	05/19/92	NM
	03	RETEST OF #2, REPORT 92-25A	6	1,890.7	CC-53	131.3	18.6	111.4	100+	CLS		MC	05/19/92	NM
	04	43468N, 45802E	6	1,894.5	CC-53	130.6	21.4	108.3	98	CLS		MC	05/19/92	NM
	05	43471N, 45600E	6	1,894.5	CC-53	128.0	20.5	107.0	96.9	CLS		MC	05/19/92	NM
	06	43473N, 45395E	6	1,895.5	CC-53	130.5	20.1	109.4	99	CLS		MC	05/19/92	NM
	07	43474N, 45197E	6	1,894.3	CC-53	130.8	17.2	112.4	100+	CLS		MC	05/19/92	NM
	08	43473N, 44993E	6	1,894.4	CC-53	130.2	18.8	110.4	99.9	CLS		MC	05/19/92	NM
	09	43004N, 45951E	6	1,891.5	CC-1	121.5	20.7	101.4	91.4	CLS	DENSITY FAILS	MC	05/19/92	NM
	10	RETEST OF #9	6	1,891.5	CC-1	129.9	20.4	107.8	97.2	CLS		MC	05/19/92	NM
	11	42804N, 45951E	6	1,890.0	CC-1	131.8	18.3	112.2	100+	CLS	CC-29, PROCTOR	MC	05/19/92	NM
	12	42609N, 45943E	6	1,888.1	CC-1	129.9	19.2	109.8	99	CLS		MC	05/19/92	NM
	13	43298N, 45955E	6	1,892.7	CC-1	129.8	18.0	110.8	99.9	CLS		MC	05/19/92	NM
	14	43097N, 45955E	6	1,891.6	CC-1	129.6	19.8	109.0	98.3	CLS	SAND CONE	MC	05/19/92	NM,SC
	15	43474N, 44989E	6	1,895.4	CC-1	128.4	17.0	110.6	99.8	CLS		MC	05/19/92	NM

Count: 15

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-026A	01	43457N, 43604E	6	1,886.0	CC-53	127.1	22.1	104.0	94.1	SG	CC-35	RM	05/20/92	NM
	02	43452N, 43815E	6	1,885.5	CC-53	127.2	23.6	102.8	93.0	SG	CC-36	RM	05/20/92	NM
	03	43449N, 44027E	6	1,885.5	CC-53	122.1	21.7	100.2	90.6	SG	CC-37	RM	05/20/92	NM
	04	43452N, 44268E	6	1,886.7	CC-53	124.1	22.6	101.2	91.6	SG	CC-38	RM	05/20/92	NM
	05	43453N, 44500E	6	1,886.8	CC-53	123.2	22.6	100.4	90.9	SG	CC-39	RM	05/20/92	NM
	06	43444N, 44689E	6	1,886.5	CC-53	123.7	22.1	101.2	91.6	SG	CC-40	RM	05/20/92	NM
	07	43450N, 43503E	6	1,886.7	CC-53	123.6	17.8	104.9	94.9	SG		RM	05/20/92	NM
	08	43454N, 43698E	6	1,886.7	CC-53	124.3	20.5	103.0	93.2	SG		RM	05/20/92	NM
	09	43390N, 45956E	6	1,894.1	CC-1	130.7	21.5	107.6	97.0	CLS		RM	05/20/92	NM
	10	43183N, 45951E	6	1,893.1	CC-1	128.9	17.4	109.7	98.9	CLS		RM	05/20/92	NM
	11	43100N, 45955E	6	1,893.1	CC-1	127.2	16.4	109.1	98.4	CLS		RM	05/20/92	NM
	12	43446N, 44095E	6	1,886.5	CC-53	122.3	19.9	101.9	91.9	SG		RM	05/20/92	NM
	13	43296N, 45958E	6	1,894.4	CC-1	128.7	20.4	106.8	96.3	CLS		RM	05/20/92	NM
	14	43100N, 45956E	6	1,893.7	CC-1	130.4	17.8	110.6	99.7	CLS		RM	05/20/92	NM
	15	42691N, 45954E	6	1,891.4	CC-1	126.9	18.0	107.4	96.9	CLS	SAND CONE	RM	05/20/92	NM,SC
	16	43463N, 43502E	6	1,888.9	CC-1	127.6	20.9	105.4	95.0	SG	CC-44	RM	05/20/92	NM
	17	43459N, 43701E	6	1,889.1	CC-1	125.8	19.8	104.9	94.6	SG	CC-45	RM	05/20/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS

BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-026A	18	43455N, 43899E	6	1,888.5	CC-1	125.7	16.6	107.7	97.1	SG	CC-46	RM	05/20/92	NM
	19	43457N, 44086E	6	1,888.5	CC-1	127.7	17.6	108.5	97.8	SG	CC-47	RM	05/20/92	NM
	20	43459N, 44280E	6	1,889.0	CC-1	121.9	19.5	101.9	91.9	SG	CC-48	RM	05/20/92	NM
	21	43457N, 44503E	6	1,889.1	CC-1	122.9	18.5	103.6	93.4	SG	CC-49	RM	05/20/92	NM

Count: 21

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-0268	01	43800N, 45953E	6	1,894.8	CC-53	133.1	19.7	112.0	100+	CLS	CC-41, ST.11	MC	05/20/92	NM
	02	43445N, 45700E	6	1,887.1	CC-53	129.5	17.2	110.4	99.9	SG		MC	05/20/92	NM
	03	43452N, 44507E	6	1,887.5	CC-53	130.5	18.3	111.1	100	SG		MC	05/20/92	NM
	04	43454N, 44302E	6	1,887.6	CC-53	120.2	15.2	108.0	97.7	SG		MC	05/20/92	NM
	05	42896N, 45954E	6	1,893.2	CC-53	132.3	20.0	111.0	100+	CLS	CC-42, ST.12	MC	05/20/92	NM

Count: 5

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-027A	01	43462N, 43602E	6	1,889.9	CC-53	124.5	18.9	104.6	94.6	CLS		RM	05/21/92	NM
	02	43459N, 43791E	6	1,889.7	CC-53	133.5	16.9	114.1	100+	CLS		RM	05/21/92	NM
	03	43458N, 44003E	6	1,889.4	CC-53	130.8	19.4	109.4	99.0	CLS		RM	05/21/92	NM
	04	43459N, 44193E	6	1,889.7	CC-53	125.9	17.9	106.7	96.5	CLS		RM	05/21/92	NM
	05	43462N, 44402E	6	1,889.5	CC-53	126.7	19.4	106.0	95.9	CLS		RM	05/21/92	NM
	06	43458N, 44594E	6	1,890.0	CC-53	130.2	17.2	111.0	100+	CLS		RM	05/21/92	NM
	07	43400N, 45958E	6	1,895.4	CC-53	125.3	18.3	105.8	95.4	CLS		RM	05/21/92	NM
	08	43216N, 45960E	6	1,894.8	CC-53	128.4	19.9	107.1	96.6	CLS	SAND CONE	RM	05/21/92	NM,SC
	09	43001N, 45956E	6	1,894.1	CC-53	127.0	18.0	107.5	96.9	CLS		RM	05/21/92	NM
	10	42795N, 45957E	6	1,893.6	CC-53	131.5	20.3	109.2	98.8	CLS		RM	05/21/92	NM
	11	42613N, 45955E	6	1,894.5	CC-53	128.4	23.2	104.1	94.2	CLS	MOISTURE FAILS	RM	05/21/92	NM
	11A	RETEST OF #11	6	1,894.5	CC-53	126.4	16.4	108.5	98.2	CLS		RM	05/21/92	NM
	12	43469N, 43505E	6	1,890.3	CC-53	127.7	18.9	107.3	97.1	CLS		RM	05/21/92	NM
	13	43464N, 43705E	6	1,890.7	CC-53	131.0	20.2	108.9	98.5	CLS		RM	05/21/92	NM
	14	43463N, 43896E	6	1,890.6	CC-53	128.5	21.2	105.9	95.8	CLS	CC-50, ST.13	RM	05/21/92	NM
	15	43462N, 44097E	6	1,890.6	CC-53	128.1	17.9	108.5	98.2	CLS		RM	05/21/92	NM
	16	43465N, 44296E	6	1,890.8	CC-53	131.8	18.1	111.5	100+	CLS	SAND CONE	RM	05/21/92	NM,SC

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-027A	17	43465N, 44495E	6	1,891.2	CC-53	130.9	19.4	109.5	99.1	CLS	CC-51, ST.14	RM	05/21/92	NM
	18	43461N, 44695E	6	1,890.6	CC-53	126.4	17.1	107.8	97.6	CLS		RM	05/21/92	NM
	19	43466N, 43596E	6	1,891.9	CC-53	129.7	20.5	107.6	97.3	CLS		RM	05/21/92	NM
	20	43464N, 43994E	6	1,891.2	CC-53	130.6	21.6	107.3	97.1	CLS		RM	05/21/92	NM
	21	43463N, 44188E	6	1,891.6	CC-53	128.8	21.1	106.2	96.1	CLS		RM	05/21/92	NM
	22	43466N, 44396E	6	1,892.1	CC-53	128.6	16.5	110.3	99.8	CLS		RM	05/21/92	NM
	23	43464N, 44597E	6	1,892.1	CC-53	127.9	17.1	109.1	98.8	CLS		RM	05/21/92	NM
	24	43462N, 44762E	6	1,890.5	CC-53	127.8	21.6	105.0	95.0	CLS	CC-52, PROCTOR	RM	05/21/92	NM
	25	43397N, 45973E	6	1,896.8	CC-53	131.0	21.3	108.0	97.7	CLS		RM	05/21/92	NM
	26	43213N, 45971E	6	1,895.8	CC-53	131.4	19.0	110.3	99.8	CLS		RM	05/21/92	NM
	27	42999N, 45965E	6	1,894.9	CC-53	129.7	18.8	109.0	98.6	CLS		RM	05/21/92	NM
	28	42800N, 45960E	6	1,894.4	CC-53	134.1	18.5	113.0	100+	CLS		RM	05/21/92	NM
	29	42615N, 45960E	6	1,892.3	CC-53	132.3	18.4	111.6	100+	CLS		RM	05/21/92	NM
	30	43467N, 43507E	6	1,891.6	CC-53	131.3	17.7	111.4	100+	CLS		RM	05/21/92	NM
	31	43462N, 43699E	6	1,892.3	CC-53	129.4	18.2	109.3	99.0	CLS		RM	05/21/92	NM
	32	43465N, 43902E	6	1,892.1	CC-53	129.6	20.4	107.5	97.2	CLS		RM	05/21/92	NM
	33	43463N, 44100E	6	1,892.3	CC-53	132.9	19.1	111.5	100+	CLS		RM	05/21/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-027A	34	43463N, 44298E	6	1,892.4	CC-53	129.5	20.6	107.4	97.2	CLS		RM	05/21/92	NM
	35	43465N, 44506E	6	1,892.5	CC-53	127.2	20.4	105.5	95.5	CLS		RM	05/21/92	NM
	36	43467N, 44702E	6	1,892.1	CC-53	132.7	18.1	112.2	100+	CLS		RM	05/21/92	NM

Count: 37

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS

BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-027B	01	43474N, 44899E	6	1,897.2	CC-53	127.2	13.7	111.7	100	CLS	MOISTURE FAILS	MC	05/21/92	NM
	02	43478N, 45099E	6	1,896.1	CC-53	123.9	12.2	110.3	99.8	CLS	MOISTURE FAILS	MC	05/21/92	NM
	03	43478N, 45301E	6	1,896.2	CC-53	131.2	14.1	114.0	100	CLS	MOISTURE FAILS	MC	05/21/92	NM
	04	43474N, 45500E	6	1,896.0	CC-53	128.2	13.6	112.7	100	CLS	MOISTURE FAILS	MC	05/21/92	NM
	05	43474N, 45696E	6	1,893.9	CC-53	129.2	17.2	110.1	99.6	CLS		MC	05/21/92	NM
	06	43472N, 45893E	6	1,895.2	CC-53	130.8	14.6	114.0	100	CLS	MOISTURE FAILS	MC	05/21/92	NM
	07	RETEST OF #6	6	1,895.2	CC-53	132.2	16.7	113.1	100+	CLS		MC	05/21/92	NM
	08	RETEST OF #4	6	1,896.0	CC-53	130.7	17.2	111.4	100+	CLS		MC	05/21/92	NM
	09	RETEST OF #3	6	1,896.2	CC-53	130.2	16.3	111.8	100+	CLS		MC	05/21/92	NM
	10	RETEST OF #2	6	1,896.1	CC-53	130.4	16.4	111.9	100+	CLS		MC	05/21/92	NM
	11	RETEST OF #1	6	1,897.2	CC-53	128.2	16.0	110.4	99.9	CLS		MC	05/21/92	NM

Count: 11

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-028A	01	43477N, 45794E	6	1,896.7	CC-53	127.6	23.4	103.3	93.5	CLS		RM	05/22/92	NM
	02	43477N, 45607E	6	1,896.5	CC-53	130.7	20.0	108.2	98.4	CLS		RM	05/22/92	NM
	03	43478N, 45405E	6	1,897.0	CC-53	128.9	19.8	107.5	97.3	CLS		RM	05/22/92	NM
	04	43480N, 43205E	6	1,897.2	CC-53	128.6	19.3	107.7	97.5	CLS		RM	05/22/92	NM
	05	43468N, 43597E	6	1,892.9	CC-53	128.7	19.7	107.4	97.2	CLS		RM	05/22/92	NM
	06	43466N, 43803E	6	1,893.4	CC-53	129.1	15.7	111.4	100+	CLS		RM	05/22/92	NM
	07	43462N, 44000E	6	1,893.1	CC-53	129.4	15.3	112.7	100+	CLS		RM	05/22/92	NM
	08	43470N, 44194E	6	1,893.3	CC-53	131.3	19.9	109.4	99.0	CLS		RM	05/22/92	NM
	09	43470N, 44398E	6	1,893.6	CC-53	125.1	18.4	105.5	95.4	CLS		RM	05/22/92	NM
	10	43469N, 44596E	6	1,893.8	CC-53	126.4	17.1	107.8	97.5	CLS		RM	05/22/92	NM
	11	43748N, 45904E	6	1,896.8	CC-53	128.5	20.1	106.9	96.7	CLS		RM	05/22/92	NM
	12	43477N, 45698E	6	1,897.6	CC-53	129.9	20.6	107.6	97.4	CLS		RM	05/22/92	NM
	13	43479N, 45501E	6	1,897.4	CC-53	128.2	17.8	108.7	98.3	CLS		RM	05/22/92	NM
	14	43470N, 43508E	6	1,892.2	CC-53	129.4	18.4	109.2	98.8	CLS		RM	05/22/92	NM
	15	43472N, 43704E	6	1,894.2	CC-53	129.1	22.2	105.5	95.4	CLS	CC-56, ST.17	RM	05/22/92	NM
	16	43471N, 43894E	6	1,894.4	CC-53	131.1	18.0	111.0	100+	CLS		RM,AC	05/22/92	NM
	17	43471N, 44100E	6	1,894.5	CC-53	130.3	16.2	113.0	100+	CLS		RM,AC	05/22/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-028A	18	43476N, 44900E	6	1,898.3	CC-53	126.4	20.8	105.4	95.4	CLS		RM,AC	05/22/92	NM
	19	43482N, 45103E	6	1,898.4	CC-53	127.8	18.6	108.5	98.2	CLS		RM,AC	05/22/92	NM
	20	43481N, 45299E	6	1,898.4	CC-53	128.4	17.5	110.1	99.6	CLS		RM,AC	05/22/92	NM
	21	43479N, 45509E	6	1,897.9	CC-53	124.9	16.9	107.6	97.4	CLS		RM,AC	05/22/92	NM
	22	43470N, 45899E	6	1,896.4	CC-53	124.7	19.2	105.4	95.4	CLS		RM,AC	05/22/92	NM
	23	43475N, 43598E	6	1,894.7	CC-53	125.7	18.3	107.0	96.8	CLS		RM,AC	05/22/92	NM
	24	43473N, 43797E	6	1,895.6	CC-53	128.3	20.7	107.1	96.9	CLS		RM,AC	05/22/92	NM
	25	43475N, 43999E	6	1,895.6	CC-53	129.8	19.9	109.0	98.7	CLS		RM,AC	05/22/92	NM
	26	43475N, 44198E	6	1,895.5	CC-53	131.8	19.1	111.5	100+	CLS		RM,AC	05/22/92	NM
	27	43473N, 44394E	6	1,895.7	CC-53	130.3	20.0	109.4	99.0	CLS		RM,AC	05/22/92	NM
	28	43470N, 44597E	6	1,895.2	CC-53	129.0	20.0	108.3	98.0	CLS		RM,AC	05/22/92	NM
	29	43468N, 44766E	6	1,894.7	CC-53	131.4	19.1	111.1	100+	CLS		RM,AC	05/22/92	NM
	30	43482N, 45916E	6	1,898.4	CC-53	131.8	19.6	111.0	100+	CLS		RM,AC	05/22/92	NM
	31	43479N, 45779E	6	1,898.9	CC-53	129.8	20.5	108.5	98.2	CLS		RM,AC	05/22/92	NM
	32	43479N, 45565E	6	1,898.9	CC-53	128.1	19.8	107.7	97.4	CLS		RM,AC	05/22/92	NM
	33	43481N, 45373E	6	1,898.7	CC-53	124.9	17.2	107.4	97.2	CLS		RM,AC	05/22/92	NM
	34	43482N, 45164E	6	1,898.4	CC-53	126.0	17.8	107.7	97.5	CLS		RM,AC	05/22/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-028A	35	43483N, 45956E	6	1,899.3	CC-53	126.3	19.6	106.5	96.3	CLS		RM,AC	05/22/92	NM
	36	43480N, 43598E	6	1,895.6	CC-53	126.5	18.2	107.7	97.4	CLS		RM,AC	05/22/92	NM
	37	43474N, 43797E	6	1,896.3	CC-53	131.8	20.1	110.5	100.0	CLS		RM,AC	05/22/92	NM
	38	43474N, 43996E	6	1,896.3	CC-53	129.1	17.8	110.4	99.9	CLS		RM,AC	05/22/92	NM
	39	43477N, 44191E	6	1,895.5	CC-53	128.7	19.0	108.2	97.9	CLS		RM,AC	05/22/92	NM
	40	43474N, 44399E	6	1,896.1	CC-53	130.0	18.1	110.9	100+	CLS		RM,AC	05/22/92	NM
	41	43473N, 44601E	6	1,896.2	CC-53	131.2	15.3	114.6	100+	CLS		RM,AC	05/22/92	NM
	42	43470N, 44787E	6	1,893.3	CC-53	128.6	18.0	109.8	99.3	CLS		RM,AC	05/22/92	NM

Count: 42

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-028B	01	43471N, 44998E	6	1,896.8	CC-53	129.0	21.1	107.3	97.1	CLS	SAND CONE	MC	05/22/92	NM,SC
	02	43465N, 44738E	6	1,903.6	CC-53	132.5	17.3	113.8	100+	CLS	CC-53, ST.15	MC	05/22/92	NM
	03	43481N, 44906E	6	1,898.1	CC-53	132.9	17.0	114.4	100+	CLS		MC	05/22/92	NM
	04	43483N, 45164E	6	1,898.1	CC-53	129.7	18.9	109.9	99.4	CLS	CC-55, PROCTOR	MC	05/22/92	NM
	05	43482N, 45299E	6	1,897.7	CC-53	132.6	17.6	113.6	100+	CLS	CC-54, ST.16	MC	05/22/92	NM
	06	43473N, 44298E	6	1,894.5	CC-10	132.9	17.5	113.9	100+	CLS	CC-57, PROCTOR	MC	05/22/92	NM
	07	43473N, 44495E	6	1,894.6	CC-53	133.4	19.2	112.7	100+	CLS		MC	05/22/92	NM
	08	43470N, 44694E	6	1,894.3	CC-53	134.0	20.1	112.4	100+	CLS		MC	05/22/92	NM

Count: 8

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-029A	01	43417N, 45970E	6	1,897.7	CC-53	128.9	14.6	111.5	100+	CLS	MOISTURE FAILS	AC	05/26/92	NM
	02	43212N, 45966E	6	1,896.4	CC-53	129.4	14.9	111.7	100+	CLS	SAND CONE	AC	05/26/92	NM,SC
	03	43481N, 43511E	6	1,894.7	CC-53	126.8	15.9	109.4	99.4	CLS		AC	05/26/92	NM
	04	43481N, 43701E	6	1,897.3	CC-53	128.2	16.1	110.5	100+	CLS		AC	05/26/92	NM
	05	43480N, 43896E	6	1,897.8	CC-53	127.4	13.4	112.3	100+	CLS		AC	05/26/92	NM
	06	RETEST OF #1	6	1,897.7	CC-53	125.9	18.1	106.6	96.4	CLS		AC	05/26/92	NM
	07	RETEST OF #2	6	1,896.4	CC-53	124.1	16.7	106.3	96.2	CLS		AC	05/26/92	NM
	08	43319N, 45976E	6	1,897.6	CC-53	126.1	17.0	107.7	97.4	CLS		AC	05/26/92	NM
	09	43112N, 45973E	6	1,896.6	CC-53	124.3	20.0	103.6	94.2	CLS		AC	05/26/92	NM
	10	42900N, 45969E	6	1,896.0	CC-53	125.7	20.4	104.5	94.6	CLS	SAND CONE	AC	05/26/92	NM,SC
	11	42707N, 45963E	6	1,895.5	CC-53	126.6	16.2	109.0	98.6	CLS		AC	05/26/92	NM
	12	43404N, 45976E	6	1,898.7	CC-53	125.6	18.4	106.0	95.9	CLS		AC	05/26/92	NM
	13	43202N, 45974E	6	1,897.8	CC-53	127.4	18.4	107.5	97.3	CLS		AC	05/26/92	NM
	14	43484N, 43996E	6	1,898.3	CC-53	125.0	18.6	105.4	95.4	CLS	CC-60, ST.18	AC	05/26/92	NM
	15	43484N, 44191E	6	1,898.1	CC-53	125.3	16.2	107.9	97.6	CLS		AC	05/26/92	NM
	16	43482N, 44394E	6	1,897.4	CC-53	130.5	17.9	110.7	100+	CLS		AC	05/26/92	NM
	17	43371N, 45980E	6	1,899.1	CC-53	127.1	20.7	105.3	95.3	CLS		AC	05/26/92	NM
	18	43204N, 45978E	6	1,897.8	CC-53	129.1	18.3	109.2	98.8	CLS		AC	05/26/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-029A	19	43002N, 45966E	6	1,896.9	CC-53	125.8	19.6	105.1	95.1	CLS		AC	05/26/92	NM
	20	42805N, 45977E	6	1,897.1	CC-53	128.0	20.5	106.2	96.1	CLS		AC	05/26/92	NM
	21	42609N, 45960E	6	1,894.7	CC-53	126.3	18.6	106.5	96.4	CLS		AC	05/26/92	NM

Count: 21

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-029B	01	43002N, 45962E	6	1,895.6	CC-53	134.1	13.1	115.0	100+	CLS	MOISTURE FAILS	MC	05/26/92	NM
	02	42798N, 45964E	6	1,895.4	CC-53	131.4	14.4	112.8	100+	CLS	MOISTURE FAILS	MC	05/26/92	NM
	03	42597N, 45965E	6	1,893.3	CC-53	131.2	16.4	114.9	100+	CLS		MC	05/26/92	NM
	04	43479N, 44099E	6	1,897.1	CC-53	132.5	16.8	114.3	100+	CLS		MC	05/26/92	NM
	05	43480N, 44299E	6	1,897.3	CC-53	130.6	17.2	112.3	100+	CLS		MC	05/26/92	NM
	06	43481N, 44502E	6	1,896.8	CC-53	130.0	20.2	108.9	98.6	CLS	CC-58, PROCTOR	MC	05/26/92	NM
	07	43478N, 44699E	6	1,896.6	CC-53	123.6	17.8	105.7	95.7	CLS		MC	05/26/92	NM
	08	RETEST OF #1	6	1,895.6	CC-53	133.5	15.7	115.0	100+	CLS		MC	05/26/92	NM
	09	RETEST OF #2	6	1,895.4	CC-53	133.3	17.2	113.6	100+	CLS		MC	05/26/92	NM
	10	43003N, 45973E	6	1,896.8	CC-53	130.6	16.8	112.6	100+	CLS		MC	05/26/92	NM
	11	42799N, 45963E	6	1,896.2	CC-53	132.4	19.8	111.3	100+	CLS	SAND CONE	MC	05/26/92	NM,SC
	12	42602N, 45965E	6	1,895.3	CC-53	129.3	20.9	107.7	97.5	CLS	CC-59, PROCTOR	MC	05/26/92	NM
	13	43481N, 43576E	6	1,896.7	CC-53	130.5	21.6	107.2	97	CLS		MC	05/26/92	NM
	14	43481N, 43797E	6	1,898.2	CC-53	129.6	21.0	107.9	97.7	CLS		MC	05/26/92	NM
	15	43482N, 44594E	6	1,897.4	CC-53	128.5	21.4	106.6	96.4	CLS		MC	05/26/92	NM
	16	43480N, 44805E	6	1,896.7	CC-53	130.5	18.9	110.6	100	CLS		MC	05/26/92	NM

Count: 16

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-031A	01	42413N, 45978E	6	1,899.9	CC-53	124.0	17.8	105.3	95.3	CLS		AC	05/28/92	NM
	02	43212N, 45977E	6	1,898.5	CC-53	128.0	16.7	112.4	100+	CLS		AC	05/28/92	NM
	03	42800N, 45975E	6	1,897.1	CC-53	125.1	18.5	105.6	95.6	CLS		AC	05/28/92	NM
	04	42596N, 45962E	6	1,896.0	CC-53	131.1	17.5	111.6	100+	CLS		AC	05/28/92	NM
	05	43481N, 43632E	6	1,898.2	CC-53	126.8	18.2	107.2	97.0	CLS		AC	05/28/92	NM
	06	43480N, 43803E	6	1,898.6	CC-53	128.4	19.1	107.8	97.5	CLS		AC	05/28/92	NM
	07	43480N, 44003E	6	1,898.4	CC-53	125.5	19.0	105.4	95.4	CLS		AC	05/28/92	NM
	08	43482N, 44598E	6	1,897.8	CC-53	127.8	18.2	108.1	97.8	CLS		AC	05/28/92	NM
	09	43481N, 44824E	6	1,897.5	CC-53	128.3	19.6	107.3	97.1	CLS		AC	05/28/92	NM
	10	42900N, 45976E	6	1,898.2	CC-53	127.8	18.4	107.9	97.6	CLS		AC	05/28/92	NM
	11	43479N, 43899E	6	1,898.7	CC-53	126.0	17.1	107.7	97.5	CLS		AC	05/28/92	NM
	12	43483N, 44099E	6	1,899.0	CC-53	127.2	17.1	108.6	98.3	CLS		AC	05/28/92	NM
	13	43483N, 44303E	6	1,898.7	CC-53	125.6	18.3	106.1	96.0	CLS		AC	05/28/92	NM
	14	43479N, 44509E	6	1,898.4	CC-53	126.0	18.2	106.6	96.5	CLS		AC	05/28/92	NM
	15	42898N, 45974E	6	1,898.9	CC-53	128.0	17.0	109.4	99.0	CLS		AC	05/28/92	NM
	16	42676N, 45978E	6	1,898.2	CC-53	124.9	18.8	105.1	95.1	CLS		AC	05/28/92	NM
	17	43484N, 44752E	6	1,899.1	CC-53	126.8	18.5	107.1	96.9	CLS	CC-64, PROCTOR, SAND CONE	AC	05/28/92	NM,SC

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-031B	01	42998N, 45973E	6	1,897.5	CC-53	135.2	17.8	115.6	100+	CLS	CC-61, ST.19	MC	05/28/92	NM
	02	43479N, 44198E	6	1,898.2	CC-53	129.8	18.8	110.1	99.7	CLS	CC-62, ST.20	MC	05/28/92	NM
	03	43482N, 44401E	6	1,898.1	CC-53	134.5	18.2	114.6	100+	CLS	CC-63. ST.21	MC	05/28/92	NM

Count: 3

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-032A	01	42585N, 45200E	6	1,878.7	CC-53	125.0	16.8	108.0	97.7	SG	CC-65, SAND CONE	AC	05/29/92	NM,SC

Count: 1

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-033A	01	42603N, 45691E	6	1,876.8	CC-53	126.7	16.7	108.6	98.3	SG	SAND CONE, CC-66	AC	05/30/92	NM,SC
	02	42598N, 45863E	6	1,879.1	CC-53	124.1	16.4	106.6	96.4	SG		AC	05/30/92	NM
	03	42581N, 45175E	6	1,879.5	CC-53	130.3	19.6	108.7	98.4	SG		AC	05/30/92	NM
	04	42588N, 45304E	6	1,879.9	CC-53	129.4	19.4	107.5	97.3	SG	CC-67	AC	05/30/92	NM
	05	42598N, 45479E	6	1,879.8	CC-53	125.8	19.7	105.1	95.1	SG		AC	05/30/92	NM
	06	42604N, 45595E	6	1,879.6	CC-53	131.1	16.7	112.3	100+	SG		AC	05/30/92	NM
	07	42599N, 45799E	6	1,878.1	CC-53	124.4	19.5	102.0	92.3	SG	CC-68	AC	05/30/92	NM
	08	42591N, 45166E	6	1,880.0	CC-53	126.8	18.3	107.2	97.0	SG	CC-69	AC	05/30/92	NM
	09	42591N, 45306E	6	1,880.3	CC-53	131.2	17.8	111.4	100+	SG	CC-70	AC	05/30/92	NM
	10	42599N, 45498E	6	1,880.3	CC-53	126.0	18.1	106.7	96.6	SG	CC-71	AC	05/30/92	NM
	11	42600N, 45698E	6	1,878.9	CC-53	125.2	18.1	106.0	95.9	SG	CC-72	AC	05/30/92	NM
	12	42601N, 45869E	6	1,879.9	CC-53	124.7	18.7	105.1	95.1	SG		AC	05/30/92	NM
	13	42600N, 45658E	6	1,879.7	CC-53	128.1	19.2	107.4	97.2	SG	CC-73	AC	05/30/92	NM
	14	42597N, 45826E	6	1,880.2	CC-53	126.6	16.7	108.5	98.2	SG	CC-74	AC	05/30/92	NM
	15	42602N, 45608E	6	1,880.4	CC-53	125.2	15.2	108.7	98.4	SG	CC-75	AC	05/30/92	NM
	16	42594N, 45796E	6	1,880.9	CC-53	129.2	20.2	107.5	97.3	SG	CC-76	AC	05/30/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-034A	01	N42582 E45197	6	1,880.7	CC-53	128.6	20.9	106.3	96.2	SG	CC-77	AC	06/01/92	NM
	02	N42582 E44393	6	1,880.9	CC-53	125.1	17.6	106.4	96.3	SG	CC-78	AC	06/01/92	NM
	03	N42584 E45601	6	1,881.0	CC-53	129.2	19.1	108.4	98.1	SG	CC-79	AC	06/01/92	NM
	04	N42580 E45801	6	1,881.6	CC-53	126.9	19.6	106.1	96.0	SG	CC-80	AC	06/01/92	NM
	05	N42581 E45237	6	1,881.4	CC-53	127.7	18.0	108.2	97.9	CLS	CC-81 ST.22	AC	06/01/92	NM
	06	N42581 E45357	6	1,881.7	CC-53	128.6	16.9	110.0	99.5	CLS	CC-82 ST.23	AC	06/01/92	NM
	07	N42582 E45500	6	1,881.8	CC-53	130.5	18.4	110.2	99.7	CLS		AC	06/01/92	NM
	08	N42580 E45696	6	1,882.3	CC-53	125.5	15.5	108.6	98.3	CLS		AC	06/01/92	NM
	09	N42582 E45877	6	1,881.7	CC-53	127.0	20.2	105.1	95.1	CLS		AC	06/01/92	NM
	10	N42575 E45200	6	1,882.1	CC-53	126.8	20.6	105.1	95.1	CLS		AC	06/01/92	NM
	11	N42573 E45398	6	1,882.0	CC-53	128.0	19.1	107.5	97.3	CLS		AC	06/01/92	NM
	12	N42577 E45603	6	1,883.0	CC-53	130.6	18.0	110.6	100+	CLS	CC-83 ST.24	AC	06/01/92	NM
	13	N42574 E45803	6	1,882.9	CC-53	128.3	16.6	110.1	99.6	CLS		AC	06/01/92	NM
	14	N42575 E45394	6	1,882.5	CC-53	128.6	20.9	106.4	96.3	CLS		AC	06/01/92	NM
	15	N42574 E45600	6	1,883.6	CC-53	127.3	21.3	104.8	94.8	CLS		AC	06/01/92	NM
	16	N42575 E45801	6	1,883.5	CC-53	128.2	21.4	105.6	95.6	CLS	CC-84 ST.25	AC	06/01/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-035A	01	N42588 E44608	6	1,879.1	CC-53	132.0	16.2	115.5	100+	SG	CC-85	AC	06/02/92	NM
	02	N42599 E44791	6	1,876.0	CC-53	123.3	16.1	106.1	96.0	SG	CC-86	AC	06/02/92	NM
	03	N42596 E45000	6	1,878.3	CC-53	125.7	20.3	104.5	94.6	SG	CC-87	AC	06/02/92	NM
	04	N42591 E44688	6	1,878.8	CC-53	127.7	18.4	107.8	97.5	SG	CC-88 SAND CONE	AC	06/02/92	NM, SC
	05	N42594 E44892	6	1,878.5	CC-53	129.1	17.5	110.8	100+	SG	CC-89	AC	06/02/92	NM
	06	N42583 E45084	6	1,878.9	CC-53	127.3	20.4	105.3	95.2	SG	CC-90	AC	06/02/92	NM
	07	N42585 E44701	6	1,879.4	CC-53	128.1	20.9	106.0	95.0	SG	CC-91	AC	06/02/92	NM
	08	N42587 E44895	6	1,879.1	CC-53	132.8	18.6	111.5	100+	SG	CC-92	AC	06/02/92	NM
	09	N42586 E45062	6	1,879.8	CC-53	123.3	20.6	102.2	92.5	SG	CC-93	AC	06/02/92	NM
	10	N42582 E44703	6	1,880.2	CC-53	137.6	17.3	112.4	100+	SG	CC-94	AC	06/02/92	NM
	11	N42585 E44887	6	1,880.0	CC-53	125.2	20.5	103.1	93.3	SG	CC-95	AC	06/02/92	NM
	12	N42583 E45052	6	1,880.0	CC-53	127.6	17.8	108.3	98.0	SG	CC-96	AC	06/02/92	NM
	13	N42585 E44691	6	1,881.2	CC-53	126.0	20.0	105.0	95.0	SG	CC-97	AC	06/02/92	NM
	14	N42588 E44899	6	1,880.9	CC-53	127.1	19.8	106.1	96.0	SG	CC-98 SAND CONE	AC	06/02/92	NM, SC
	15	N42583 E45077	6	1,880.3	CC-53	129.4	20.1	107.7	97.5	SG	CC-99	AC	06/02/92	NM
	16	N42572 E44694	6	1,882.0	CC-53	126.6	17.0	108.2	97.9	CLS		AC	06/02/92	NM
	17	N42572 E44896	6	1,881.9	CC-53	129.1	19.1	108.4	98.1	CLS	SAND CONE	AC	06/02/92	NM, SC

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-035A	18	N42575 E45495	6	1,881.4	CC-53	128.0	20.5	106.2	96.1	CLS		AC	06/02/92	NM
	19	N42572 E44705	6	1,882.4	CC-53	125.4	17.8	106.4	96.3	CLS		AC	06/02/92	NM
	20	N42573 E44899	6	1,882.7	CC-53	128.1	20.7	106.1	96.0	CLS		AC	06/02/92	NM
	21	N42571 E45097	6	1,882.1	CC-53	128.2	20.2	106.7	96.6	CLS		AC	06/02/92	NM

Count: 21

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-036A	01	N42568 E45297	6	1,883.2	CC-53	127.3	20.1	106.0	95.9	CLS		AC	06/03/92	NM
	02	N42567 E45501	6	1,883.7	CC-53	131.0	20.3	108.8	98.5	CLS		AC	06/03/92	NM
	03	N42566 E45696	6	1,884.0	CC-53	127.8	18.7	107.6	97.4	CLS		AC	06/03/92	NM
	04	N42566 E45844	6	1,887.7	CC-53	126.8	20.2	105.5	95.5	CLS		AC	06/03/92	NM
	05	N42565 E44804	6	1,883.7	CC-53	128.4	17.6	109.2	98.9	CLS	SAND CONE	AC	06/03/92	NM,SC
	06	N42570 E45002	6	1,883.9	CC-53	127.5	20.6	105.7	95.6	CLS		AC	06/03/92	NM
	07	N42568 E45201	6	1,883.9	CC-53	130.5	20.8	109.7	99.3	CLS		AC	06/03/92	NM
	08	N42579 E44510	6	1,876.7	CC-7	136.2	9.2	124.7	100+	SG	CC-104	AC	06/03/92	NM
	09	N42577 E44517	6	1,877.8	CC-7	123.5	11.4	110.9	94.9	SG	CC-105, CC-106 PROCTOR	AC	06/03/92	NM
	10	N42581 E44506	6	1,878.7	CC-7	119.2	9.2	109.2	93.5	SG	CC-107	AC	06/03/92	NM
	11	N42566 E45424	6	1,884.3	CC-53	126.2	19.6	105.4	95.3	CLS		AC	06/03/92	NM
	12	N42563 E45625	6	1,885.2	CC-53	127.5	20.6	105.8	95.7	CLS		AC	06/03/92	NM
	13	N42565 E45833	6	1,885.5	CC-53	126.8	20.4	105.3	95.3	CLS		AC	06/03/92	NM
	14	N42568 E45220	6	1,884.7	CC-53	128.7	21.0	106.4	96.3	CLS		AC	06/03/92	NM
	15	N42562 E45225	6	1,885.2	CC-53	127.0	20.3	106.7	96.6	CLS		AC	06/03/92	NM
	16	N42563 E45414	6	1,885.2	CC-53	126.7	20.0	105.6	95.6	CLS	SAND CONE	AC	06/03/92	NM, SC
	17	N42563 E45632	6	1,885.7	CC-53	128.1	19.6	107.1	96.9	CLS		AC	06/03/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS

BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-036A	18	N42562 E45824	6	1,886.1	CC-53	129.8	20.9	108.9	98.5	CLS		AC	06/03/92	NM

Count: 18

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-036B	01	N42572 E44697	6	1,882.4	CC-53	134.9	15.6	117.6	100+	CLS		MC	06/03/92	NM
	02	N42570 E44898	6	1,883.1	CC-53	131.0	20.4	109.6	99.2	CLS	CC-100 ST.26	MC	06/03/92	NM
	03	N42568 E45099	6	1,883.0	CC-53	131.9	19.6	110.2	99.7	CLS	CC-101 PROCTOR	MC	06/03/92	NM
	04	N42567 E45399	6	1,883.8	CC-53	130.0	20.8	108.4	98.1	CLS	CC-103 RETEST ST.23	MC	06/03/92	NM
	05	N42567 E45504	6	1,884.7	CC-53	130.4	21.5	108.1	97.8	CLS	CC-102 ST.27	MC	06/03/92	NM
	06	N42569 E45810	6	1,884.6	CC-53	128.8	19.7	108.4	98.1	CLS	CC-109 PROCTOR	MC	06/03/92	NM
	07	N42566 E44714	6	1,884.1	CC-53	132.1	19.0	111.8	100+	CLS	CC-108 ST.28	MC	06/03/92	NM
	08	N42567 E45016	6	1,884.7	CC-53	129.5	18.8	108.9	98.5	CLS	SAND CONE	MC	06/03/92	NM, SC
	09	N42567 E44825	6	1,884.9	CC-53	127.7	19.8	107.4	97.2	CLS		MC	06/03/92	NM
	10	N42564 E45020	6	1,885.4	CC-53	129.1	19.6	108.7	98.4	CLS		MC	06/03/92	NM

Count: 10

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-037A	01	N42579 E44565	6	1,879.6	CC-53	127.8	18.6	107.7	97.5	SG	CC-110	AC	06/04/92	NM
	02	N42581 E44406	6	1,880.1	CC-53	125.1	20.0	104.2	94.3	SG	CC-111	AC	06/04/92	NM
	03	N42577 E44221	6	1,880.1	CC-53	127.8	19.6	106.8	96.6	SG	CC-112 SAND CONE	AC	06/04/92	NM,SC
	04	N42578 E44603	6	1,880.2	CC-53	129.5	17.3	110.4	99.9	SG	CC-113	AC	06/04/92	NM
	05	N42579 E44407	6	1,881.4	CC-53	131.0	18.3	111.5	100+	SG	CC-114	AC	06/04/92	NM
	06	N42574 E44202	6	1,882.6	CC-53	127.6	19.6	107.5	97.3	SG	CC-115	AC	06/04/92	NM
	07	N42561 E44800	6	1,885.2	CC-53	127.0	16.1	110.2	99.7	CLS		AC	06/04/92	NM
	08	N42561 E45006	6	1,886.0	CC-53	130.7	21.5	108.3	98.0	CLS		AC	06/04/92	NM
	09	N42562 E45206	6	1,885.7	CC-53	128.3	18.5	109.1	98.8	CLS		AC	06/04/92	NM
	10	N42564 E45395	6	1,885.4	CC-53	130.9	19.1	110.7	100+	CLS		AC	06/04/92	NM
	11	N42566 E45603	6	1,886.2	CC-53	126.8	21.0	105.5	95.5	CLS		AC	06/04/92	NM
	12	N42562 E45811	6	1,886.3	CC-53	128.0	21.7	105.9	95.8	CLS		AC	06/04/92	NM
	13	N42577 E44594	6	1,881.4	CC-53	128.4	21.0	106.9	96.8	CLS		AC	06/04/92	NM
	14	N42579 E44403	6	1,882.6	CC-53	126.1	20.3	105.6	95.6	CLS		AC	06/04/92	NM
	15	N42578 E44208	6	1,882.7	CC-53	126.9	18.6	107.8	97.6	CLS		AC	06/04/92	NM
	16	N42563 E44702	6	1,883.9	CC-53	131.3	20.7	109.6	99.2	CLS		AC	06/04/92	NM
	17	N42559 E44901	6	1,886.2	CC-53	131.9	18.5	112.1	100+	CLS		AC	06/04/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-037A	18	N42562 E45104	6	1,886.2	CC-53	133.7	19.6	112.6	100+	CLS	SAND CONE	AC	06/04/92	NM,SC
	19	N42562 E45300	6	1,886.2	CC-53	126.9	21.5	105.2	95.2	CLS		AC	06/04/92	NM
	20	N42561 E45505	6	1,886.3	CC-53	124.9	19.7	105.1	95.1	CLS		AC	06/04/92	NM
	21	N42559 E45702	6	1,886.9	CC-53	130.9	20.0	109.9	99.4	CLS		AC	06/04/92	NM
	22	N42573 E44402	6	1,883.6	CC-53	131.4	17.9	112.3	100+	CLS		AC	06/04/92	NM
	23	N42571 E44567	6	1,881.9	CC-53	125.6	19.2	106.1	96	CLS		AC	06/04/92	NM
	24	N42567 E44211	6	1,884.2	CC-53	127.3	16.3	109.8	99.4	CLS		AC	06/04/92	NM
	25	N42572 E44401	6	1,884.3	CC-53	129.5	18.5	110.1	99.6	CLS		AC	06/04/92	NM
	26	N42570 E44599	6	1,882.2	CC-53	129.6	19.2	109.5	99.1	CLS		AC	06/04/92	NM
	27	N42558 E44828	6	1,886.4	CC-53	127.9	21.5	106.0	96	CLS		AC	06/04/92	NM
	28	N42560 E45031	6	1,886.9	CC-53	127.6	21.2	105.1	95.1	CLS		AC	06/04/92	NM
	29	N42560 E45224	6	1,887.0	CC-53	131.6	20.4	110.1	99.7	CLS		AC	06/04/92	NM
	30	N42560 E45618	6	1,887.3	CC-53	127.9	19.3	108.0	97.7	CLS		AC	06/04/92	NM
	31	N42557 E45828	6	1,887.6	CC-53	126.3	20.6	105.5	95.5	CLS		AC	06/04/92	NM
	32	N42572 E44207	6	1,884.3	CC-53	130.5	16.2	113.1	100+	CLS		AC	06/04/92	NM
	33	N42570 E44392	6	1,885.0	CC-53	129.2	20.6	107.9	97.7	CLS	CC-117 ST.30	AC	06/04/92	NM
	34	N42571 E44593	6	1,883.2	CC-53	129.7	21.5	107.5	97.3	CLS		AC	06/04/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS

BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-037A	35	N42558 E44797	6	1,886.8	CC-53	127.0	20.4	106.2	96.1	CLS		AC	06/04/92	NM
	36	N42557 E45001	6	1,887.6	CC-53	126.1	20.1	104.9	95	CLS		AC	06/04/92	NM
	37	N42557 E45205	6	1,887.5	CC-53	129.9	20.3	108.8	98.4	CLS		AC	06/04/92	NM
	38	N42559 E45396	6	1,886.9	CC-53	128.5	21.0	107.0	96.8	CLS		AC	06/04/92	NM
	39	N42557 E45601	6	1,887.9	CC-53	132.9	20.5	111.1	100+	CLS		AC	06/04/92	NM
	40	N42557 E45805	6	1,887.8	CC-53	127.4	19.4	107.5	97.3	CLS		AC	06/04/92	NM

Count: 40

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-037B	01	N42562 E45867	6	1,886.8	CC-53	127.1	21.5	104.6	94.6	CLS		MC	06/04/92	NM
	02	N42574 E44195	6	1,883.5	CC-53	127.2	20.8	105.3	95.3	CLS	CC-116 ST.29	MC	06/04/92	NM
	03	N42561 E45422	6	1,886.8	CC-53	127.8	20.0	106.5	96.4	CLS	SAND CONE	MC	06/04/92	NM,SC
	04	N42575 E44205	6	1,885.6	CC-53	126.3	19.7	105.5	95.5	CLS		MC	06/04/92	NM
	05	N42569 E44403	6	1,885.7	CC-53	129.7	18.4	109.5	99.1	CLS		MC	06/04/92	NM
	06	N42567 E44600	6	1,884.1	CC-53	126.9	18.9	107.1	97	CLS	CC-118 PROCTOR	MC	06/04/92	NM

Count: 6

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SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-038A	01	N42564 E44224	6	1,885.5	CC-53	125.9	19.2	105.5	95.5	CLS		AC	06/05/92	NM
	02	N42559 E44405	6	1,885.7	CC-53	125.7	18.4	106.0	95.9	CLS		AC	06/05/92	NM
	03	N42560 E45499	6	1,888.1	CC-53	130.0	18.7	109.4	99.0	CLS		AC	06/05/92	NM
	04	N42555 E45698	6	1,888.6	CC-53	129.5	19.9	107.9	97.7	CLS		AC	06/05/92	NM
	05	N42561 E45861	6	1,888.2	CC-53	131.0	17.3	112.5	100+	CLS		AC	06/05/92	NM
	06	N42561 E44268	6	1,885.9	CC-53	125.3	18.6	105.7	95.6	CLS		AC	06/05/92	NM
	07	N42566 E44498	6	1,885.6	CC-53	128.7	15.8	111.2	100+	CLS		AC	06/05/92	NM
	08	N42564 E44698	6	1,886.2	CC-53	127.6	20.1	106.3	96.2	CLS	SAND CONE	AC	06/05/92	NM,SC
	09	N42559 E44294	6	1,887.5	CC-53	121.0	12.9	107.1	96.9	CLS		AC	06/05/92	NM
	10	N42557 E44491	6	1,886.4	CC-53	126.6	20.1	105.4	95.4	CLS		AC	06/05/92	NM
	11	N42557 E44602	6	1,887.1	CC-53	128.9	20.4	107.1	96.9	CLS	ST.32 CC-125 PROCTOR	AC	06/05/92	NM

Count: 11

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-038B	01	N42559 E44695	6	1,885.5	CC-53	128.1	20.9	107.7	97.5	CLS		MC	06/05/92	NM
	02	N42552 E44908	6	1,888.2	CC-53	128.5	20.3	108.7	98.3	CLS		MC	06/05/92	NM
	03	N42556 E45102	6	1,887.8	CC-53	127.2	20.9	107.0	96.8	CLS		MC	06/05/92	NM
	04	N42562 E45302	6	1,887.7	CC-53	126.3	19.9	107.1	97	CLS		MC	06/05/92	NM
	05	N42554 E44899	6	1,889.1	CC-53	127.8	19.6	107.6	97.4	CLS		MC	06/05/92	NM
	06	N42555 E45102	6	1,888.7	CC-53	129.5	18.6	110.0	99.5	CLS	CC-119 ST.31	MC	06/05/92	NM
	07	N42559 E45296	6	1,888.4	CC-53	133.9	20.0	112.4	100+	CLS		MC	06/05/92	NM
	08	N42556 E45502	6	1,888.4	CC-53	130.5	19.0	110.5	100	CLS		MC	06/05/92	NM
	09	N42559 E45700	6	1,888.9	CC-53	129.4	20.1	108.5	98.2	CLS		MC	06/05/92	NM
	10	N42536 E45874	6	1,889.0	CC-53	130.4	21.4	108.2	97.9	CLS		MC	06/05/92	NM
	11	N43369 E43522	6	1,884.3	CC-53				N/I	SG	FAILS, LIFT NOT BONDED	MC	06/05/92	
	12	N43369 E43694	6	1,883.8	CC-53				N/I	SG	FAILS, LIFT NOT BONDED	MC	06/05/92	
	13	N43365 E43899	6	1,885.5	CC-53				N/I	SG	FAILS, LIFT NOT BONDED	MC	06/05/92	
	14	N43364 E44104	6	1,883.8	CC-53				N/I	SG	FAILS, LIFT NOT BONDED	MC	06/05/92	
	15	N43367 E44314	6	1,882.8	CC-53	130.2	12.0	117.2	100+	SG	MOISTURE FAILS	MC	06/05/92	NM
	16	RETEST OF 11	6	1,884.3	CC-53	125.9	18.4	106.2	96.1	SG	CC-121	MC	06/05/92	NM
	17	RETEST OF 12	6	1,883.8	CC-53	136.2	17.2	116.1	100+	SG	CC-122	MC	06/05/92	NM
	18	RETEST OF 13	6	1,885.5	CC-53	135.7	18.3	114.6	100+	SG	CC-123	MC	06/05/92	NM
	19	RETEST OF 14	6	1,883.8	CC-53	129.8	15.8	112.0	100+	SG	CC-125	MC	06/05/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-038B	20	RETEST OF 15	6	1,882.8	CC-53	119.3	15.7	103.0	93.2	SG	CC-120	MC	06/05/92	NM
	21	N42549 E44894	6	1,889.4	CC-53	131.7	21.4	108.4	98.1	CLS		MC	06/05/92	NM
	22	N42547 E45095	6	1,889.5	CC-53	133.0	22.2	108.7	98.4	CLS		MC	06/05/92	NM
	23	N42551 E45297	6	1,888.9	CC-53	133.6	20.7	110.6	100	CLS		MC	06/05/92	NM
	24	N42561 E45502	6	1,889.0	CC-53	132.0	15.7	114.9	100+	CLS		MC	06/05/92	NM
	25	N42550 E45688	6	1,889.6	CC-53	135.6	18.0	114.8	100+	CLS		MC	06/05/92	NM
	26	N42551 E45865	6	1,889.7	CC-53	131.0	17.3	111.5	100+	CLS	SAND CONE	MC	06/05/92	NM, SC
	27	N42560 E44321	6	1,888.5	CC-53	130.9	18.8	110.1	99.7	CLS		MC	06/05/92	NM
	28	N42562 E44512	6	1,887.4	CC-53	131.4	19.0	110.3	99.8	CLS		MC	06/05/92	NM
	29	N42559 E44717	6	1,888.2	CC-53	133.1	19.2	111.5	100+	CLS		MC	06/05/92	NM
	30	N42556 E44923	6	1,890.2	CC-53	132.1	14.8	114.9	100+	CLS	MOISTURE FAILS	MC	06/05/92	NM
	31	N42557 E45227	6	1,890.1	CC-53	122.8	14.4	105.4	95.4	CLS	MOISTURE FAILS	MC	06/05/92	NM
	32	N42552 E45573	6	1,889.6	CC-53	132.1	10.1		N/A	CLS	NOT BONDED, MC FAILS	MC	06/05/92	NM
	33	N42550 E45707	6	1,890.4	CC-53	132.1	18.3	111.5	100+	CLS		MC	06/05/92	NM

Count: 33

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-039A	01	RETEST #30, REPORT 92-38B	6	1,890.2	CC-53	128.3	19.9	107.0	96.8	CLS		AC	06/06/92	NM
	02	RETEST #31, REPORT 92-38B	6	1,890.1	CC-53	128.7	18.4	111.4	100+	CLS		AC	06/06/92	NM
	03	RETEST #32, REPORT 92-38B	6	1,889.6	CC-53	126.8	20.4	105.4	95.3	CLS		AC	06/06/92	NM
	04	N42553 E44999	6	1,890.7	CC-53	125.3	20.2	105.1	95.1	CLS		AC	06/06/92	NM
	05	N42553 E44806	6	1,889.3	CC-53	127.5	19.3	107.8	97.5	CLS		AC	06/06/92	NM
	06	N42561 E44602	6	1,888.1	CC-53	128.7	20.7	107.4	97.2	CLS		AC	06/06/92	NM
	07	N42558 E44402	6	1,888.8	CC-53	126.5	19.6	106.6	96.5	CLS	SAND CONE	AC	06/06/92	NM,SC
	08	N42544 E44995	6	1,891.5	CC-53	127.7	21.6	105.0	95.0	CLS		AC	06/06/92	NM
	09	N42546 E45192	6	1,891.1	CC-53	128.4	19.7	108.2	97.9	CLS		AC	06/06/92	NM
	10	N42546 E45381	6	1,890.5	CC-53	126.2	20.1	105.1	95.1	CLS		AC	06/06/92	NM
	11	N42548 E45588	6	1,890.4	CC-53	128.0	20.1	106.5	96.4	CLS		AC	06/06/92	NM
	12	N42546 E45783	6	1,890.7	CC-53	127.4	20.3	106.7	96.6	CLS		AC	06/06/92	NM
	13	N42547 E44893	6	1,891.7	CC-53	127.8	19.6	106.8	96.6	CLS		AC	06/06/92	NM
	14	N42547 E44701	6	1,890.8	CC-53	127.2	19.5	106.5	96.4	CLS		AC	06/06/92	NM
	15	N42557 E44516	6	1,889.9	CC-53	130.1	18.6	110.6	100+	CLS		AC	06/06/92	NM
	16	N42558	6	1,889.8	CC-53	128.9	21.4	106.2	96.1	CLS		AC	06/06/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS

BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-039A	16	E44303												

Count: 16

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-0398	01	N42561 E44310	6	1,889.0	CC-53	133.5	20.0	110.8	100+	CLS		MC	06/06/92	NM
	02	N42551 E44565	6	1,889.0	CC-53	133.6	20.5	110.7	100+	CLS	SAND CONE	MC	06/06/92	NM, SC
	03	N42546 E44733	6	1,890.1	CC-53	129.1	19.0	109.3	98.9	CLS		MC	06/06/92	NM
	04	N43316 E43595	6	1,883.8	CC-53	131.1	18.2	110.8	100+	SG	CC-126	MC	06/06/92	NM
	05	N43315 E43797	6	1,883.9	CC-53	129.3	17.0	110.4	99.9	SG	CC-127 PROCTOR	MC	06/06/92	NM
	06	N43318 E44010	6	1,883.3	CC-53	126.0	20.1	104.8	94.9	SG	CC-128	MC	06/06/92	NM
	07	N43315 E44206	6	1,885.5	CC-53	122.4	18.2	103.4	93.6	SG	CC-129	MC	06/06/92	NM
	08	N43318 E44378	6	1,884.2	CC-53	115.7	17.1	100.0	90.5	SG	CC-130	MC	06/06/92	NM

Count: 8

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-040A	01	N42552 E44295	6	1,889.9	CC-53	130.0	18.9	109.3	98.9	CLS		AC	06/08/92	NM
	02	N42545 E44496	6	1,890.5	CC-53	126.5	19.2	106.1	96.0	CLS		AC	06/08/92	NM
	03	N42546 E44694	6	1,891.2	CC-53	128.0	20.3	106.4	96.3	CLS		AC	06/08/92	NM
	04	N42541 E44897	6	1,892.4	CC-53	128.1	21.2	105.7	95.6	CLS		AC	06/08/92	NM
	05	N42544 E45096	6	1,892.6	CC-53	127.8	20.4	106.2	96.1	CLS		AC	06/08/92	NM
	06	N42542 E45401	6	1,891.1	CC-53	126.8	16.2	109.1	98.7	CLS		AC	06/08/92	NM
	07	N42552 E45592	6	1,891.0	CC-53	127.1	20.7	105.7	95.6	CLS		AC	06/08/92	NM
	08	N42547 E45798	6	1,891.4	CC-53	125.9	17.2	107.4	97.2	CLS		AC	06/08/92	NM
	09	N42549 E44324	6	1,891.2	CC-53	129.7	17.4	111.5	100+	CLS		AC	06/08/92	NM
	10	N42544 E44573	6	1,891.7	CC-53	128.3	20.1	106.8	96.6	CLS		AC	06/08/92	NM
	11	N42542 E44777	6	1,892.5	CC-53	128.1	19.9	106.8	96.6	CLS		AC	06/08/92	NM
	12	N42540 E44975	6	1,893.3	CC-53	129.7	18.7	109.2	98.8	CLS	CC-131, ST.33	AC	06/08/92	NM
	13	N42546 E45192	6	1,893.0	CC-53	125.3	18.3	105.9	95.8	CLS	SAND CONE PROCTOR	AC	06/08/92	NM,SC
	14	N42553 E45492	6	1,891.8	CC-53	127.1	18.4	107.4	97.2	CLS		AC	06/08/92	NM
	15	N42554 E45692	6	1,892.1	CC-53	126.3	19.7	105.5	95.5	CLS		AC	06/08/92	NM
	16	N42548 E45865	6	1,892.1	CC-53	127.5	20.8	105.6	95.6	CLS		AC	06/08/92	NM
	17	N42544 E45402	6	1,892.6	CC-53	125.1	19.7	105.3	95.3	CLS		AC	06/08/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-040A	18	N42546 E44599	6	1,892.1	CC-53	126.6	19.8	106.6	96.5	CLS		AC	06/08/92	NM
	19	N42541 E44804	6	1,893.3	CC-53	127.8	20.1	106.3	96.2	CLS		AC	06/08/92	NM
	20	N42544 E45010	6	1,893.9	CC-53	127.3	21.1	105.1	95.1	CLS		AC	06/08/92	NM
	21	N42544 E45197	6	1,893.8	CC-53	127.5	20.4	105.9	95.8	CLS		AC	06/08/92	NM
	22	N42547 E45395	6	1,893.4	CC-53	127.4	20.0	106.2	96.1	CLS		AC	06/08/92	NM
	23	N42549 E45594	6	1,892.4	CC-53	128.3	20.3	106.6	96.5	CLS		AC	06/08/92	NM
	24	N42544 E45804	6	1,892.6	CC-53	126.7	20.1	105.5	95.5	CLS		AC	06/08/92	NM
	25	N42551 E44412	6	1,893.3	CC-53	127.8	21.3	105.4	95.4	CLS		AC	06/08/92	NM
	26	N42554 E44611	6	1,893.8	CC-53	125.4	18.1	106.2	96.1	CLS		AC	06/08/92	NM
	27	N42544 E44802	6	1,894.1	CC-53	127.3	20.1	106.0	95.9	CLS		AC	06/08/92	NM
	28	N42540 E44997	6	1,894.7	CC-53	123.6	17.6	105.0	95.0	CLS		AC	06/08/92	NM
	29	N42543 E45193	6	1,894.5	CC-53	126.0	17.9	106.9	96.7	CLS		AC	06/08/92	NM
	30	N42545 E45389	6	1,894.1	CC-53	124.9	18.7	105.2	95.2	CLS		AC	06/08/92	NM
	31	N42546 E45596	6	1,893.4	CC-53	133.7	18.9	112.4	100+	CLS		AC	06/08/92	NM
	32	N42546 E45796	6	1,893.2	CC-53	128.9	19.5	107.8	97.6	CLS		AC	06/08/92	NM

Count: 32

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS

BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-040B	01	N43263 E44294	6	1,885.5	CC-53	129.5	18.3	109.3	98.9	SG	CC-132	MC	06/08/92	NM
	02	N43252 E44096	6	1,884.2	CC-53	129.8	18.7	109.2	98.8	SG	CC-133	MC	06/08/92	NM
	03	N43262 E43891	6	1,883.1	CC-53	128.3	18.1	108.5	98.2	SG	CC-134	MC	06/08/92	NM
	04	N43263 E43697	6	1,883.5	CC-53	132.9	18.8	111.7	100+	SG	CC-135 SAND CONE	MC	06/08/92	NM,SC

Count: 4

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-041A	01	N42541 E44407	6	1,894.2	CC-53	127.2	20.9	105.2	95.2	CLS		AC	06/09/92	NM
	02	N42538 E44600	6	1,895.0	CC-53	127.1	19.5	106.4	96.3	CLS		AC	06/09/92	NM
	03	N42536 E44803	6	1,895.1	CC-53	129.6	19.8	108.2	97.9	CLS		AC	06/09/92	NM
	04	N42535 E44996	6	1,895.7	CC-53	129.2	22.1	105.9	95.8	CLS		AC	06/09/92	NM
	05	N42538 E45197	6	1,895.2	CC-53	125.0	15.7	108.1	97.8	CLS		AC	06/09/92	NM
	06	N42545 E45395	6	1,894.8	CC-53	126.8	20.4	105.3	95.3	CLS	SAND CONE	AC	06/09/92	NM,SC
	07	N42542 E45599	6	1,894.1	CC-53	127.4	19.4	106.7	96.6	CLS		AC	06/09/92	NM
	08	N42544 E45804	6	1,893.7	CC-53	127.1	20.0	106.3	96.2	CLS		AC	06/09/92	NM
	09	N42542 E44390	6	1,894.7	CC-53	126.3	20.9	104.4	94.5	CLS		AC	06/09/92	NM
	10	N42536 E44588	6	1,895.6	CC-53	124.4	21.4	102.5	92.7	CLS		AC	06/09/92	NM
	11	RETEST #9	6	1,894.7	CC-53	127.3	20.4	105.7	95.6	CLS		AC	06/09/92	NM
	12	RETEST #10	6	1,895.6	CC-53	127.3	20.2	105.8	95.7	CLS		AC	06/09/92	NM
	13	N42534 E44800	6	1,896.1	CC-53	126.1	17.1	107.6	97.4	CLS		AC	06/09/92	NM
	14	N42533 E45003	6	1,896.3	CC-53	126.8	20.4	105.6	95.6	CLS		AC	06/09/92	NM
	15	N42538 E45202	6	1,896.1	CC-53	127.2	20.6	105.5	95.5	CLS		AC	06/09/92	NM
	16	N42540 E45391	6	1,895.7	CC-53	128.1	21.8	105.2	95.2	CLS		AC	06/09/92	NM
	17	N42541 E45698	6	1,894.6	CC-53	122.9	16.9	105.1	95.1	CLS		AC	06/09/92	NM
	18	N42541 E45883	6	1,894.1	CC-53	126.7	21.5	105.3	95.3	CLS		AC	06/09/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-041A	19	N42540 E44420	6	1,895.8	CC-53	127.3	21.0	105.2	95.2	CLS		AC	06/09/92	NM
	20	N42529 E44625	6	1,896.3	CC-53	127.3	19.3	106.7	96.5	CLS		AC	06/09/92	NM
	21	N42530 E44823	6	1,896.6	CC-53	127.8	20.6	106.0	95.9	CLS		AC	06/09/92	NM
	22	N42532 E45017	6	1,897.1	CC-53	128.4	18.4	108.4	98.1	CLS		AC	06/09/92	NM
	23	N42536 E45227	6	1,896.8	CC-53	128.4	19.8	107.2	97.0	CLS		AC	06/09/92	NM
	24	N42540 E45408	6	1,896.2	CC-53	129.3	20.6	105.2	95.2	CLS		AC	06/09/92	NM
	25	N42545 E45607	6	1,895.7	CC-53	130.1	16.6	111.6	100+	CLS		AC	06/09/92	NM
	26	N42539 E45816	6	1,895.1	CC-53	126.9	20.3	105.6	95.5	CLS		AC	06/09/92	NM
	27	N42540 E44372	6	1,895.7	CC-53	127.5	19.5	106.7	96.5	CLS		AC	06/09/92	NM
	28	N42534 E44567	6	1,897.4	CC-53	126.8	19.1	106.4	96.3	CLS		AC	06/09/92	NM
	29	N42528 E44974	6	1,897.0	CC-53	127.8	21.1	105.8	95.7	CLS		AC	06/09/92	NM
	30	N42537 E45273	6	1,898.0	CC-53	129.3	21.2	106.7	96.5	CLS		AC	06/09/92	NM
	31	N42539 E45485	6	1,897.0	CC-53	127.4	21.3	105.0	95.0	CLS		AC	06/09/92	NM
	32	N42541 E45660	6	1,896.5	CC-53	127.1	20.4	105.6	95.5	CLS		AC	06/09/92	NM
	33	N42543 E45872	6	1,896.5	CC-53	126.8	20.8	105.9	95.8	CLS		AC	06/09/92	NM

Count: 33

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-041B	01	N43247 E43567	6	1,884.7	CC-53	130.1	20.5	108.7	98.3	SG	SAND CONE	MC	06/09/92	NM,SC
	02	N43249 E43749	6	1,884.4	CC-53	129.5	17.7	110.8	100+	SG		MC	06/09/92	NM
	03	N43251 E43907	6	1,884.0	CC-53	128.2	19.1	108.4	98.1	SG		MC	06/09/92	NM
	04	N43248 E44601	6	1,884.6	CC-53	131.0	17.6	111.3	100+	SG	CC-137 PROCTOR	MC	06/09/92	NM
	05	N43249 E44204	6	1,885.5	CC-53	131.7	19.1	111.4	100+	SG		MC	06/09/92	NM
	06	N43405 E44371	6	1,888.1	CC-53	128.0	19.9	107.5	97.2	SG	CC-139	MC	06/09/92	NM
	07	N43402 E44203	6	1,888.2	CC-53	132.9	19.1	112.4	100+	SG	CC-140	MC	06/09/92	NM
	08	N43402 E44003	6	1,887.8	CC-10	129.3	18.4	109.1	95.8	SG	CC-141	MC	06/09/92	NM
	09	N43398 E43798	6	1,888.1	CC-53	126.6	21.8	103.8	93.9	SG	CC-142	MC	06/09/92	NM
	10	N43394 E43593	6	1,888.0	CC-53	125.0	22.0	102.3	92.6	SG	CC-143	MC	06/09/92	NM

Count: 10

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS

BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-042A	01	N42535 E44396	6	1,896.8	CC-53	129.8	16.9	110.4	99.9	CLS		AC	06/10/92	NM
	02	N42529 E44555	6	1,898.0	CC-53	124.3	19.3	105.1	95.1	CLS		AC	06/10/92	NM
	03	N42529 E44799	6	1,898.4	CC-53	127.1	18.0	108.6	98.2	CLS		AC	06/10/92	NM
	04	N42523 E44996	6	1,898.6	CC-53	127.0	17.3	109.2	98.8	CLS		AC	06/10/92	NM
	05	N42536 E45194	6	1,898.5	CC-53	128.1	16.6	111.7	100+	CLS	SAND CONE	AC	06/10/92	NM,SC
	06	N42536 E45393	6	1,898.0	CC-53	127.6	16.3	111.0	100+	CLS		AC	06/10/92	NM
	07	N42532 E45602	6	1,897.1	CC-53	126.3	19.3	106.7	96.6	CLS		AC	06/10/92	NM
	08	N42529 E45816	6	1,897.0	CC-53	128.0	20.7	106.9	96.7	CLS		AC	06/10/92	NM
	09	N42534 E44399	6	1,898.0	CC-53	127.3	21.1	107.3	97.1	CLS		AC	06/10/92	NM
	10	N42526 E44589	6	1,899.0	CC-53	129.2	20.0	107.6	97.4	CLS		AC	06/10/92	NM
	11	N42528 E44795	6	1,899.3	CC-53	127.6	20.5	105.9	95.8	CLS		AC	06/10/92	NM
	12	N42521 E44994	6	1,899.3	CC-53	127.6	21.1	105.3	95.3	CLS		AC	06/10/92	NM
	13	N42531 E45193	6	1,899.3	CC-53	127.1	20.9	105.1	95.1	CLS		AC	06/10/92	NM
	14	N42533 E45399	6	1,899.1	CC-53	128.0	21.0	105.7	95.6	CLS		AC	06/10/92	NM
	15	N42535 E45590	6	1,898.3	CC-53	125.5	19.0	105.4	95.4	CLS		AC	06/10/92	NM
	16	N42536 E45797	6	1,897.8	CC-53	131.2	19.6	109.6	99.2	CLS		AC	06/10/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-043A	01	N43089 E43073	6	1,881.5	CC-53	127.5	21.1	105.3	95.3	SG	CC-144	AC	06/11/92	NM
	02	N43256 E43072	6	1,882.3	CC-53	126.4	21.5	103.2	93.4	SG	CC-145	AC	06/11/92	NM
	03	N43426 E43107	6	1,881.6	CC-53	125.8	21.6	103.4	93.6	SG	CC-146	AC	06/11/92	NM
	04	N43435 E43284	6	1,881.9	CC-53	127.6	21.3	105.2	95.2	SG	CC-147	AC	06/11/92	NM
	05	N43093 E43089	6	1,882.0	CC-53	126.2	21.3	104.0	94.1	SG	CC-148	AC	06/11/92	NM
	06	N43249 E43090	6	1,882.6	CC-53	127.7	21.3	105.3	95.3	SG	CC-149	AC	06/11/92	NM
	07	N43405 E43105	6	1,882.0	CC-53	127.9	19.9	106.6	96.5	SG	CC-150	AC	06/11/92	NM
	08	N43410 E43303	6	1,882.9	CC-53	128.3	21.8	105.3	95.3	SG	CC-151, SAND CONE	AC	06/11/92	NM, SC
	09	N43139 E43090	6	1,883.0	CC-53	126.3	21.5	103.9	94.0	SG	CC-152	AC	06/11/92	NM
	10	N43350 E43092	6	1,883.3	CC-53	126.7	21.3	103.3	93.4	SG	CC-153	AC	06/11/92	NM
	11	N43414 E43192	6	1,882.7	CC-53	124.6	18.7	105.0	95.0	SG	CC-154	AC	06/11/92	NM
	12	N43412 E43348	6	1,883.9	CC-53	124.2	18.9	104.4	94.5	SG	CC-155	AC	06/11/92	NM
	13	N43108 E43070	6	1,883.6	CC-53	126.5	21.2	104.3	94.4	SG	CC-156	AC	06/11/92	NM
	14	N43284 E43067	6	1,884.7	CC-53	124.7	21.7	102.4	92.7	SG	CC-157	AC	06/11/92	NM
	15	N43432 E43107	6	1,883.8	CC-53	122.6	17.6	104.2	94.3	SG	CC-158	AC	06/11/92	NM
	16	N43440 E43295	6	1,884.7	CC-53	126.7	21.3	103.3	93.5	SG	CC-159	AC	06/11/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-043B	01	N43378 E44345	6	1,887.1	CC-53	123.5	13.9	108.3	98	SG	MC FAILS	MC	06/10/92	NM
	02	N43374 E44189	6	1,887.4	CC-53	129.3	13.3	114.0	100	1	MC FAILS	MC	06/10/92	NM
	03	N43374 E43967	6	1,887.4	CC-53	132.0	18.2	111.5	100	1		MC	06/10/92	NM
	04	N43375 E43689	6	1,887.9	CC-53	127.4	12.7	112.9	100	1	MC FAILS	MC	06/10/92	NM
	05	N43376 E43529	6	1,887.4	CC-53	126.9	18.8	106.7	96.6	SG		MC	06/10/92	NM
	06	RETEST OF #4	6	1,887.9	CC-53	128.3	17.9	108.7	98.4	1		MC	06/10/92	NM
	07	RETEST OF #2	6	1,887.4	CC-53	129.7	14.4	113.2	100+	1	MC FAILS LIFTS NOT BONDED	MC	06/10/92	NM
	08	RETEST OF #1	6	1,887.1	CC-53	131.5	17.8	109.4	99	SG		MC	06/10/92	NM
	09	RETEST OF 2 & 7	6	1,887.4	CC-53	122.4	15.9	105.5	95.5	1		MC	06/10/92	NM

Count: 9

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-044A	01	N43101 E43094	6	1,884.1	CC-53	127.3	21.3	103.3	93.5	SG	CC-161	AC	06/12/92	NM
	02	N43278 E43088	6	1,885.8	CC-53	128.7	19.0	108.1	97.8	SG	CC-162	AC	06/12/92	NM
	03	N43418 E43119	6	1,884.8	CC-53	127.6	21.7	102.8	93.0	SG	CC-163	AC	06/12/92	NM
	04	N43418 E43298	6	1,884.9	CC-53	128.2	22.1	104.1	94.2	SG	CC-164	AC	06/12/92	NM
	05	N42610 E45324	6	1,876.5	CC-53	127.1	15.5	112.9	100+	SG	CC-165	AC	06/12/92	NM
	06	N42610 E45103	6	1,876.1	CC-53	125.3	18.1	106.1	96.0	SG	CC-166	AC	06/12/92	NM
	07	N42611 E44903	6	1,877.1	CC-53	121.3	15.1	100.1	90.6	SG	CC-167	AC	06/12/92	NM
	08	N42642 E44998	6	1,877.3	CC-7	123.7	12.0	110.6	94.7	SG	CC-168	AC	06/12/92	NM
	09	N42641 E45203	6	1,877.2	CC-7	122.5	11.7	105.4	90.2	SG	CC-169	AC	06/12/92	NM
	10	N43105 E43074	6	1,885.0	CC-53	126.6	21.9	103.0	93.2	SG	CC-171	AC	06/12/92	NM
	11	N43290 E43068	6	1,886.5	CC-53	126.0	21.4	104.0	94.1	SG	CC-172	AC	06/12/92	NM
	12	N43435 E43110	6	1,886.1	CC-53	127.7	21.3	105.3	95.3	SG	CC-173 SAND CONE	AC	06/12/92	NM, SC
	13	N43444 E43289	6	1,886.6	CC-53	125.8	20.9	104.1	94.2	SG	CC-174	AC	06/12/92	NM

Count: 13

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-044B	01	N43284 E44368	6	1,886.5	CC-53	134.1	19.7	112.8	100	SG	SG-CC-160	MC	06/12/92	NM
	02	N43289 E44140	6	1,887.2	CC-53	130.8	19.9	109.9	99.4	1	CLB-CC-170 PROCTOR	MC	06/12/92	NM
	03	N43291 E43928	6	1,886.8	CC-53	134.5	15.1	114.1	100+	1		MC	06/12/92	NM
	04	N43293 E43754	6	1,887.1	CC-53	128.8	16.3	110.6	100	1		MC	06/12/92	NM
	05	N43302 E43603	6	1,887.4	CC-53	126.1	18.6	106.2	96.1	2		MC	06/12/92	NM
	06	N43369 E44345	6	1,887.6	CC-53	134.0	19.4	112.0	100+	2	CLB-CC-175 ST.34	MC	06/12/92	NM
	07	N43357 E44117	6	1,888.2	CC-53	133.6	17.4	114.0	100+	2	CLB-CC-176 ST.35	MC	06/12/92	NM
	08	N43365 E43919	6	1,888.3	CC-53	129.8	18.8	110.1	99.6	2	CLB-CC-177 ST.36	MC	06/12/92	NM
	09	N43365 E43731	6	1,888.6	CC-53	133.3	17.6	114.2	100+	2	CLB-CC-178 ST.37	MC	06/12/92	NM
	10	N43361 E43562	6	1,888.4	CC-53	134.0	17.2	113.0	100+	2	CLB-CC-179 ST.38	MC	06/12/92	NMI

Count: 10

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-051A	01	N42939 E43077	6	1,880.6	CC-53	127.7	19.4	107.7	97.5	SG	CC-185	WS	06/23/92	NM
	02	N42787 E43071	6	1,881.3	CC-53	132.0	19.8	111.0	100+	SG	CC-186 PROCTOR	WS	06/23/92	NM
	03	N42659 E43091	6	1,880.6	CC-53	123.0	19.1	104.0	94.2	SG	CC-187	WS	06/23/92	NM
	04	N42596 E43222	6	1,879.0	CC-53	134.5	20.3	112.6	100+	SG	CC-188	WS	06/23/92	NM
	05	N42599 E43757	6	1,880.3	CC-53	130.1	18.7	110.4	99.9	SG	CC-189	WS	06/23/92	NM
	06	N42593 E43587	6	1,881.0	CC-53	130.7	17.9	111.7	100+	SG	CC-190	WS	06/23/92	NM

Count: 6

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-051B	01	N43281 E43568	6	1,887.9	CC-53	125.2	18.6	105.5	95.5	4	CLB-CC-180 ST.39	MC	06/23/92	NM
	02	N43289 E43760	6	1,888.1	CC-53	127.9	18.6	107.9	97.6	4	CLB-CC-181 ST.40	MC	06/23/92	NM
	03	N43295 E43957	6	1,887.9	CC-53	128.2	20.2	106.7	96.6	4	CLB-CC-182 ST.41 PROCTOR	MC	06/23/92	NM
	04	N43303 E44153	6	1,888.0	CC-53	127.0	21.3	104.7	94.8	4	CLB-CC-183 ST.42	MC	06/23/92	NM
	05	N43312 E44364	6	1,887.7	CC-53	129.4	17.0	110.6	100+	4	CLB-CC-184 ST.43	MC	06/23/92	NM

Count: 5

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-052A	01	N42572 E44096	6	1,883.9	CC-53	131.9	16.4	114.2	100+	SG	CC-196	WS	06/24/92	NM
	02	N43579 E43940	6	1,882.3	CC-53	133.8	16.6	115.6	100+	SG	CC-197	WS	06/24/92	NM
	03	N43580 E43761	6	1,881.2	CC-53	112.5	15.5	100.1	90.6	SG	CC-198	WS	06/24/92	NM
	04	N42569 E43587	6	1,882.7	CC-53	135.6	18.0	115.8	100+	SG	CC-199	WS	06/24/92	NM
	05	N42566 E43398	6	1,883.2	CC-53	131.0	17.6	112.2	100+	SG	CC-200	WS	06/24/92	NM
	06	N42567 E43209	6	1,882.7	CC-53	129.5	18.8	108.9	98.5	SG	CC-201 SAND CONE	WS	06/24/92	NM, SC
	07	N42654 E43063	6	1,883.3	CC-53	130.5	20.9	108.7	98.3	SG	CC-202	WS	06/24/92	NM
	08	N42829 E43068	6	1,881.7	CC-53	130.8	17.6	111.1	100+	SG	CC-203	WS	06/24/92	NM
	09	N43003 D43076	6	1,881.9	CC-53	131.3	15.5	114.5	100+	SG	CC-204	WS	06/24/92	NM
	10	N42627 E45777	6	1,877.3	CC-138	131.0	10.7	119.3	91	SG	CC-205	WS	06/24/92	NM
	11	N42632 E45602	6	1,877.7	CC-138	139.0	9.2	128.3	97.9	SG	CC-206	WS	06/24/92	NM
	12	N42629 E45400	6	1,877.7	CC-138	131.9	9.3	121.6	92.8	SG	CC-207	WS	06/24/92	NM
	13	N42622 E45207	6	1,878.4	CC-138	139.7	9.9	128.1	97.8	SG	CC-208	WS	06/24/92	NM
	14	N42623 E45004	6	1,878.1	CC-138	134.6	8.2	125.4	95.7	SG	CC-209 PROCTOR	WS	06/24/92	NM
	15	N42626 E44815	6	1,877.4	CC-138	146.0	8.1	137.6	100+	SG		WS	06/24/92	NM
	16	N42576 E43396	6	1,883.6	CC-53	130.1	18.5	110.6	100+	SG	CC-210	WS	06/24/92	NM
	17	N42573 E43199	6	1,883.3	CC-53	131.4	18.3	111.9	100+	SG	CC-211	WS	06/24/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-052A	18	N42628 E43070	6	1,884.1	CC-53	132.5	17.9	114.2	100+	SG	CC-212	WS	06/24/92	NM
	19	N42801 E43068	6	1,883.1	CC-53	132.3	18.3	112.7	100+	SG	CC-213	WS	06/24/92	NM
	20	N42995 E43070	6	1,883.1	CC-53	134.1	16.8	115.7	100+	SG	CC-214	WS	06/24/92	NM
	21	N42561 E44218	6	1,887.0	CC-53	135.5	16.4	117.3	100+	CLS		WS	06/24/92	NM
	22	N42568 E44096	6	1,884.7	CC-53	134.5	16.8	116.0	100+	CLS		WS	06/24/92	NM
	23	N42571 E43407	6	1,884.5	CC-53	137.3	17.3	117.9	100+	CLS		WS	06/24/92	NM
	24	N42573 E43198	6	1,884.7	CC-53	134.6	17.9	115.0	100+	CLS		WS	06/24/92	NM

Count: 24

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-052B	01	N43124 E43539	6	1,880.5	CC-53	129.2	19.5	109.0	98.6	SG	CC-191	MC	06/24/92	NM
	02	N43124 E43714	6	1,880.5	CC-53	127.2	20.0	106.9	96.8	SG	CC-192	MC	06/24/92	NM
	03	N43124 E43993	6	1,882.0	CC-138	130.7	10.3	119.6	91.3	SG	CC-193	MC	06/24/92	NM
	04	N43113 E44226	6	1,881.5	CC-138	126.1	7.5	118.4	90.4	SG	CC-194	MC	06/24/92	NM
	05	N43111 E44503	6	1,879.6	CC-53	127.0	18.9	107.7	97.4	SG	CC-195 SAND CONE	MC	06/24/92	NM, SC
	06	N42562 E43483	6	1,884.2	CC-53	129.0	21.3	106.1	96	CLB		MC	06/24/92	NM
	07	N42569 E43698	6	1,883.2	CC-53	122.3	19.2	102.6	92.8	CLB	DENSITY FAILED	MC	06/24/92	NM
	08	N42575 E43890	6	1,882.7	CC-53	124.7	23.8	100.7	91.2	CLB	MC & DENSITY FAILED	MC	06/24/92	NM
	09	RETEST OF #7	6	1,883.2	CC-53	130.8	18.5	110.4	99.9	CLB		MC	06/24/92	NM
	10	RETEST OF #8	6	1,882.7	CC-53	128.0	22.2	104.7	95	CLB		MC	06/24/92	NM
	11	N42896 E43070	6	1,883.1	CC-53	129.3	20.9	107.0	96.8	SG	CC-215	MC	06/24/92	NM
	12	N42697 E43067	6	1,884.0	CC-53	129.6	18.6	109.3	98.9	CLS		MC	06/24/92	NM

Count: 12

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS

BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-053A	01	N42564 E43297	6	1,885.5	CC-53	132.8	18.4	113.0	100+	CLS	CC-221 ST.44	WS	06/25/92	NM
	02	N42572 E43123	6	1,885.3	CC-53	133.6	19.0	113.1	100+	CLS		WS	06/25/92	NM
	03	N42696 E43064	6	1,884.9	CC-53	132.7	17.1	114.2	100+	CLS	CC-222 ST.45	WS	06/25/92	NM
	04	N42896 E43068	6	1,884.3	CC-53	130.2	18.1	111.1	100+	CLS		WS	06/25/92	NM
	05	N43101 E43074	6	1,885.3	CC-53	133.6	16.9	115.1	100+	CLS		WS	06/25/92	NM
	06	N42567 E43404	6	1,885.1	CC-53	130.7	19.2	110.4	99.5	CLS		WS	06/25/92	NM
	07	N42571 E43595	6	1,884.6	CC-53	130.0	19.1	109.9	99.5	CLS		WS	06/25/92	NM
	08	N42573 E43789	6	1,883.4	CC-53	130.0	20.7	109.8	99.5	CLS	CC-223 ST.45 SAND CONE	WS	06/25/92	NM,SC
	09	N42572 E43997	6	1,884.7	CC-53	131.5	21.4	109.1	98.7	CLS		WS	06/25/92	NM
	10	N42567 E44186	6	1,886.4	CC-53	128.7	17.1	110.7	100+	CLS		WS	06/25/92	NM
	11	N43194 E43055	6	1,887.3	CC-53	125.6	17.8	107.4	97.2	CLS		WS	06/25/92	NM
	12	N43392 E43054	6	1,887.3	CC-53	132.9	16.9	114.5	100+	CLS		WS	06/25/92	NM
	13	N43446 E43191	6	1,887.2	CC-53	129.8	17.6	111.2	100	CLS		WS	06/25/92	NM
	14	N43442 E43339	6	1,886.9	CC-53	134.2	17.9	114.7	100+	CLS		WS	06/25/92	NM
	15	N42569 E43321	6	1,886.3	CC-53	130.8	18.2	111.5	100+	CLS		WS	06/25/92	NM
	16	N42572 E43142	6	1,886.2	CC-53	126.0	16.3	109.1	98.7	CLS		WS	06/25/92	NM
	17	N42714 E43063	6	1,885.1	CC-53	125.6	16.4	108.7	98.4	CLS		WS	06/25/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-053A	18	N42912 E43064	6	1,885.1	CC-53	131.1	16.1	113.8	100+	CLS		WS	06/25/92	NM
	19	N43182 E43746	6	1,883.2	CC-53	130.3	18.5	109.8	99.3	SG	CC-224	WS	06/25/92	NM
	20	N43182 E43933	6	1,883.4	CC-53	132.9	16.9	114.5	100+	SG	CC-225	WS	06/25/92	NM
	21	N43186 E44132	6	1,883.1	CC-53	130.3	20.1	109.3	98.9	SG	CC-226	WS	06/25/92	NM
	22	N43194 E44404	6	1,882.4	CC-53	133.1	19.2	112.5	100+	SG	CC-227	WS	06/25/92	NM
	23	N43064 E44393	6	1,880.2	CC-53	128.0	19.4	108.0	97.7	SG	CC-228	WS	06/25/92	NM
	24	N43068 E44168	6	1,882.3	CC-53	131.6	18.2	112.2	100+	SG	CC-229	WS	06/25/92	NM
	25	N43070 E43926	6	1,883.8	CC-53	131.9	18.3	112.3	100+	SG	CC-230	WS	06/25/92	NM
	26	N43074 E43743	6	1,882.7	CC-53	129.7	18.7	110.1	99.6	SG	CC-231	WS	06/25/92	NM
	27	N43071 E43577	6	1,881.9	CC-53	134.1	18.2	114.3	100+	SG	CC-232	WS	06/25/92	NM
	28	N42570 E43776	6	1,885.1	CC-53	130.3	18.9	110.4	99.9	CLS		WS	06/25/92	NM
	29	N42567 E43591	6	1,885.6	CC-53	131.3	18.0	111.2	100+	CLS		WS	06/25/92	NM
	30	N42560 E43400	6	1,885.8	CC-53	129.4	18.7	109.8	99.4	CLS		WS	06/25/92	NM
	31	N43564 E43303	6	1,887.1	CC-53	132.2	20.4	110.6	100	CLS		WS	06/25/92	NM
	32	N42572 E43128	6	1,887.3	CC-53	133.2	19.9	111.9	100+	CLS		WS	06/25/92	NM
	33	N42700 E43057	6	1,887.1	CC-53	130.2	19.1	110.1	99.6	CLS		WS	06/25/92	NM
	34	N42892 E43060	6	1,886.0	CC-53	131.1	19.0	111.0	100+	CLS		WS	06/25/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS

BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-053A	35	N43048 E43058	6	1,887.4	CC-53	132.3	17.1	113.8	100+	CLS		WS	06/25/92	NM
	36	N43016 E43053	6	1,888.7	CC-53	129.1	19.4	108.9	98.6	CLS		WS	06/25/92	NM
	37	N43301 E43055	6	1,889.6	CC-53	138.3	17.1	119.0	100+	CLS		WS	06/25/92	NM
	38	N43453 E43111	6	1,889.1	CC-53	134.5	18.9	113.9	100+	CLS		WS	06/25/92	NM
	39	N43453 E43333	6	1,889.2	CC-53	132.8	19.2	112.2	100+	CLS		WS	06/25/92	NM

Count: 39

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS

BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-053B	01	N43206 E44416	6	1,882.2	CC-53	129.3	22.2	105.8	95.8	SG	CC-216	MC	06/25/92	NM
	02	N43207 E44159	6	1,883.1	CC-53	130.4	21.1	107.6	97.4	SG	CC-217	MC	06/25/92	NM
	03	N43208 E43979	6	1,883.0	CC-53	124.9	21.7	102.6	92.9	SG	CC-218 SAND CONE	MC	06/25/92	NM, SC
	04	N43208 E43790	6	1,882.6	CC-53	125.4	22.1	102.8	93	SG	CC-219 PROCTOR	MC	06/25/92	NM
	05	N43205 E43555	6	1,881.8	CC-53	128.6	19.3	107.8	97.5	SG	CC-220	MC	06/25/92	NM
	06	N42537 E44178	6	1,887.6	CC-53	126.8	19.4	106.1	96	CLS	CC-283 ST.47	MC	06/25/92	NM
	07	N42596 E43986	6	1,885.6	CC-53	127.2	21.3	104.9	95	CLS		MC	06/25/92	NM
	08	N43121 E43056	6	1,888.1	CC-53	127.9	19.9	106.6	96.5	CLS		MC	06/25/92	NM
	09	N43259 E43052	6	1,888.5	CC-53	126.9	21.7	105.0	95	CLS		MC	06/25/92	NM
	10	N43390 E43052	6	1,888.4	CC-53	129.4	21.0	106.9	96.7	CLS		MC	06/25/92	NM
	11	N43452 E43181	6	1,888.1	CC-53	128.1	20.6	106.2	96.1	CLS		MC	06/25/92	NM
	12	N43449 E43341	6	1,887.7	CC-53	127.5	20.0	106.3	96.2	CLS		MC	06/25/92	NM
	13	N42562 E44199	6	1,889.1	CC-53	126.3	19.3	105.9	95.9	CLS	CC-234 PROCTOR	MC	06/25/92	NM
	14	N42570 E44004	6	1,886.8	CC-53	127.0	19.9	105.9	95.8	CLS		MC	06/25/92	NM
	15	N42571 E43799	6	1,886.0	CC-53	126.3	21.5	105.5	95.5	CLS		MC	06/25/92	NM
	16	N42570 E43599	6	1,886.3	CC-53	126.5	21.9	105.0	95	CLS		MC	06/25/92	NM
	17	N42566 E43415	6	1,887.0	CC-53	128.0	22.1	104.9	95	CLS		MC	06/25/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-054A	01	N42562 E43142	6	1,888.4	CC-53	127.6	17.4	108.7	98.4	CLS		JA	06/26/92	NM
	02	N42559 E43307	6	1,888.0	CC-53	130.5	18.6	110.0	99.6	CLS		JA	06/26/92	NM
	03	N42560 E43504	6	1,887.6	CC-53	130.4	18.7	109.9	99.5	CLS		JA	06/26/92	NM
	04	N42563 E43692	6	1,886.7	CC-53	128.0	18.1	108.4	98.1	CLS		JA	06/26/92	NM
	05	N43197 E43046	6	1,890.2	CC-53	131.2	19.1	110.2	99.7	CLS		JA	06/26/92	NM
	06	N43433 E43057	6	1,890.5	CC-53	132.7	19.1	111.4	100+	CLS		JA	06/26/92	NM
	07	N43459 E43206	6	1,889.7	CC-53	133.9	19.3	112.2	100+	CLS	CC-241 ST.48	JA	06/26/92	NM
	08	N43453 E43358	6	1,889.9	CC-53	133.5	19.3	111.9	100+	CLS		JA	06/26/92	NM
	09	N42563 E43132	6	1,888.6	CC-53	129.6	18.1	109.7	99.3	CLS		JA	06/26/92	NM
	10	N42558 E43296	6	1,888.5	CC-53	129.4	19.5	108.3	98.0	CLS		JA	06/26/92	NM
	11	N42559 E43494	6	1,888.5	CC-53	130.5	19.0	109.7	99.2	CLS	SAND CONE	JA	06/26/92	NM, SC
	12	N42634 E43044	6	1,889.3	CC-53	126.0	17.3	107.4	97.2	CLS		JA	06/26/92	NM
	13	N42887 E43047	6	1,889.1	CC-53	132.8	19.4	111.2	100+	CLS		JA	06/26/92	NM
	14	N43082 E43042	6	1,890.5	CC-53	131.5	19.1	110.4	99.9	CLS		JA	06/26/92	NM

Count: 14

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-054B	01	N43093 E43054	6	1,888.8	CC-53	129.3	23.4	104.0	94	CLS		MC	06/26/92	NM
	02	N42893 E43058	6	1,887.5	CC-53	126.2	19.5	105.6	95.6	CLS		MC	06/26/92	NM
	03	N42631 E43061	6	1,887.8	CC-53	127.9	20.4	106.2	96.1	CLS		MC	06/26/92	NM
	04	N43210 E44406	6	1,883.7	CC-53	127.4	20.3	105.9	95.9	SG	CC-235	MC	06/26/92	NM
	05	N43210 E44168	6	1,884.7	CC-53	128.5	19.0	108.0	97.7	SG	CC-236	MC	06/26/92	NM
	06	N43210 E43977	6	1,884.7	CC-53	127.2	22.3	104.0	94.1	SG	CC-237	MC	06/26/92	NM
	07	N43209 E43749	6	1,884.5	CC-53	128.5	16.0	110.8	100+	SG	CC-238	MC	06/26/92	NM
	08	N43207 E43574	6	1,884.1	CC-53	129.3	20.0	107.8	97.5	SG	CC-239 SAND CONE	MC	06/26/92	NM, SC
	09	N42559 E44112	6	1,888.5	CC-53	129.8	20.9	107.4	97.2	CLS		MC	06/26/92	NM
	10	N42565 E43901	6	1,886.0	CC-53	127.6	21.0	105.2	95.2	CLS		MC	06/26/92	NM
	11	N42564 E43299	6	1,888.8	CC-53	127.9	22.2	105.2	95.2	CLS	CC-240 ST.44R	MC	06/26/92	NM
	12	N42796 E43056	6	1,888.5	CC-53	129.7	21.7	106.6	96.5	CLS		MC	06/26/92	NM
	13	N42997 E43053	6	1,889.1	CC-53	127.8	21.7	105.1	95.1	CLS		MC	06/26/92	NM
	14	N42560 E43699	6	1,887.5	CC-53	127.4	18.8	107.3	97.1	CLS		MC	06/26/92	NM
	15	N42562 E43900	6	1,887.7	CC-53	127.5	19.3	106.9	96.7	CLS		MC	06/26/92	NM
	16	N42555 E44104	6	1,889.5	CC-53	126.1	19.7	105.0	95	CLS		MC	06/26/92	NM
	17	N43279 E43037	6	1,891.5	CC-53	129.5	19.2	108.7	98.4	CLS	CC-242 ST.49	MC	06/26/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-054B	18	N43457 E43093	6	1,891.3	CC-53	127.4	19.7	106.4	96.3	CLS		MC	06/26/92	NM
	19	N43456 E43316	6	1,891.4	CC-53	127.5	20.0	106.2	96.1	CLS		MC	06/26/92	NM

Count: 19

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-055A	01	N42552 E43188	6	1,889.6	CC-53	129.9	20.3	108.0	97.7	CLS		JA	06/27/92	NM
	02	N42548 E43386	6	1,889.4	CC-53	131.7	18.3	111.3	100+	CLS		JA	06/27/92	NM
	03	N42545 E43587	6	1,889.7	CC-53	132.8	20.7	110.0	99.6	CLS	ST.20 CC-243	JA	06/27/92	NM
	04	N42630 E43057	6	1,890.3	CC-53	131.0	18.5	110.5	100	CLS		JA	06/27/92	NM
	05	N42802 E43050	6	1,890.6	CC-53	126.9	20.2	105.6	95.5	CLS		JA	06/27/92	NM
	06	N43000 E43049	6	1,891.2	CC-53	130.2	18.7	109.7	99.3	CLS	ST.51 CC-244	JA	06/27/92	NM
	07	N43199 E43043	6	1,892.1	CC-53	130.1	18.3	110.0	99.5	CLS		JA	06/27/92	NM
	08	N43409 E43043	6	1,892.5	CC-53	130.9	19.5	109.5	99.1	CLS		JA	06/27/92	NM
	09	N43464 E43201	6	1,892.5	CC-53	132.0	20.3	109.7	99.3	CLS	SAND CONE	JA	06/27/92	NM,SC
	10	N43462 E43361	6	1,892.3	CC-53	130.3	19.7	108.9	98.5	CLS		JA	06/27/92	NM
	11	N42547 E44214	6	1,892.0	CC-53	131.2	19.1	110.2	99.7	CLS		JA	06/27/92	NM
	12	N42556 E44018	6	1,890.5	CC-53	129.3	20.2	107.6	97.3	CLS		JA	06/27/92	NM
	13	N42559 E43817	6	1,889.6	CC-53	131.2	19.1	110.1	99.6	CLS		JA	06/27/92	NM
	14	N42557 E43623	6	1,890.0	CC-53	130.5	18.1	110.5	100.0	CLS		JA	06/27/92	NM
	15	N42554 E43217	6	1,890.3	CC-53	130.9	18.5	110.5	100	CLS		JA	06/27/92	NM
	16	N42607 E43061	6	1,890.5	CC-53	126.7	18.4	107.0	96.8	CLS		JA	06/27/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-055B	01	N42544 E43787	6	1,888.6	CC-53	128.7	19.3	107.9	97.6	CLS		MC	06/27/92	NM
	02	N42540 E43985	6	1,889.0	CC-53	126.5	20.5	105.0	95	CLS		MC	06/27/92	NM
	03	N42528 E44184	6	1,891.7	CC-53	127.0	21.2	105.0	95	CLS		MC	06/27/92	NM

Count: 3

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-056A	01	N43466 E43310	6	1,894.6	CC-53	124.5	16.0	107.3	97.1	CLS		AC	06/29/92	NM
	02	N43465 E43103	6	1,894.4	CC-53	129.5	20.2	107.8	97.6	CLS		AC	06/29/92	NM
	03	N43300 E43041	6	1,894.8	CC-53	129.9	20.5	107.8	97.6	CLS		AC	06/29/92	NM
	04	N43096 E43047	6	1,893.1	CC-53	125.8	19.9	104.9	95.0	CLS		AC	06/29/92	NM
	05	N42898 E43052	6	1,893.1	CC-53	129.7	18.6	109.4	99.0	CLS		AC	06/29/92	NM
	06	N42698 E43049	6	1,892.6	CC-53	127.8	21.6	105.1	95.1	CLS		AC	06/29/92	NM
	07	N42564 E43100	6	1,891.7	CC-53	126.8	20.7	105.1	95.1	CLS		AC	06/29/92	NM
	08	N42553 E43307	6	1,891.5	CC-53	128.3	21.7	105.3	95.3	CLS		AC	06/29/92	NM
	09	N42553 E43510	6	1,891.8	CC-53	127.3	22.1	105.0	95.0	CLS		AC	06/29/92	NM
	10	N42556 E43700	6	1,890.9	CC-53	126.6	15.9	110.3	99.8	CLS	SAND CONE	AC	06/29/92	NM,SC
	11	N42785 E43206	6	1,872.8	CC-7	124.5	18.2	109.6	93.8	SG	SG-CC-245	AC	06/29/92	NM
	12	N42663 E43213	6	1,873.8	CC-7	125.6	17.8	106.6	91.3	SG	SG-CC-246	AC	06/29/92	NM

Count: 12

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-059B	01	N42887 E45668	6	1,880.9	CC-138	131.8	7.3	122.7	93.6	SG	CC-250	MC	07/02/92	NM
	02	N43084 E45662	6	1,881.7	CC-1	129.9	17.5	110.4	99.5	SG	CC-251	MC	07/02/92	NM
	03	N43244 E45659	6	1,883.1	CC-1	127.1	18.3	107.3	97.1	SG	CC-252 PROCTOR	MC	07/02/92	NM

Count: 3

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-060A	01	N42891 E43337	6	1,879.5	CC-7	129.3	19.8	107.9	92.4	SG	CC-253	AC	07/03/92	NM
	02	N42712 E43334	6	1,879.6	CC-7	129.8	13.4	114.4	97.9	SG	CC-254	AC	07/03/92	NM
	03	N42700 E43110	6	1,881.6	CC-7	127.5	20.2	106.0	90.7	SG	CC-255	AC	07/03/92	NM
	04	N42899 E43114	6	1,880.4	CC-7	118.2	11.3	106.2	90.9	SG	CC-256	AC	07/03/92	NM
	05	N43321 E43176	6	1,882.1	CC-7	126.7	11.1	114.1	97.7	SG	CC-257	AC	07/03/92	NM
	06	N43103 E43185	6	1,881.0	CC-7	126.2	15.2	109.5	93.7	SG	CC-258	AC	07/03/92	NM
	07	N43799 E43355	6	1,882.6	CC-7	123.7	14.9	105.3	90.2	SG	CC-259	AC	07/03/92	NM
	08	N42703 E43152	6	1,881.3	CC-7	123.2	14.3	105.4	90.2	SG	CC-260	AC	07/03/92	NM
	09	N42903 E43152	6	1,880.9	CC-1	118.7	12.5	105.5	95.1	SG	CC-261	AC	07/03/92	NM
	10	N43094 E43144	6	1,881.3	CC-1	125.4	16.9	107.2	96.7	SG	CC-262 PROCTOR	AC	07/03/92	NM,SC
	11	N43299 E43146	6	1,882.7	CC-1	131.8	16.5	113.2	100+	SG	CC-263 SAND CONE	AC	07/03/92	NM
	12	N43306 E45854	6	1,885.5	CC-1	125.9	22.7	102.6	92.8	SG	CC-264	AC	07/03/92	NM
	13	N43193 E45852	6	1,884.2	CC-1	129.4	21.2	106.7	96.6	SG	CC-265 PROCTOR	AC	07/03/92	NM
	14	N43079 E45850	6	1,883.9	CC-1	124.1	21.1	102.4	92.7	SG	CC-266	AC	07/03/92	NM
	15	N42961 E45848	6	1,883.0	CC-1	122.8	14.8	107.0	96,8	SG	CC-267	AC	07/03/92	NM

Count: 15

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-061B	01	N43296 E44492	6	1,883.2	CC-1	117.0	14.8	103.0	92.8	SG	CC-268	MC	07/06/92	NM
	02	N43136 E45485	6	1,882.5	CC-7	131.1	18.1	110.9	94.9	SG	CC-269	MC	07/06/92	NM
	03	N42990 E45477	6	1,882.5	CC-138	135.1	8.6	124.2	94.8	SG	CC-270	MC	07/06/92	NM

Count: 3

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-061C	01	N43383 E45495	6	1,885.1	CC-1	128.1	19.2	107.4	97.1	SG	CC-271	AC	07/06/92	NM
	02	N43275 E45496	6	1,884.5	CC-1	126.9	21.9	104.1	94.2	SG	CC-272	AC	07/06/92	NM
	03	N43139 E45493	6	1,883.8	CC-1	126.7	21.0	104.7	94.8	SG	CC-273	AC	07/06/92	NM
	04	N42981 E45471	6	1,882.7	CC-1	122.6	20.5	101.7	92.0	SG	CC-274	AC	07/06/92	NM
	05	N43355 E45626	6	1,885.9	CC-1	132.7	13.3	117.1	100+	SG	CC-275	AC	07/06/92	NM
	06	N43266 E45619	6	1,885.1	CC-1	130.1	16.9	112.0	100+	SG	CC-276	AC	07/06/92	NM
	07	N43144 E45615	6	1,884.5	CC-1	121.9	16.2	105.1	94.8	SG	CC-277	AC	07/06/92	NM
	08	N42984 E45607	6	1,883.0	CC-1	123.7	16.6	106.1	95.7	SG	CC-278	AC	07/06/92	NM
	09	N43367 E43182	6	1,884.3	CC-7	118.8	15.0	105.2	90.1	SG	CC-279	AC	07/06/92	NM
	10	N43273 E43175	6	1,883.9	CC-7	131.2	9.5	119.8	100+	SG	CC-280	AC	07/06/92	NM
	11	N43089 E43164	6	1,882.8	CC-7	130.6	16.2	112.4	96.8	SG	CC-281	AC	07/06/92	NM
	12	N43289 E43347	6	1,884.0	CC-7	127.5	14.7	111.2	100+	SG	CC-282	AC	07/06/92	NM
	13	N43207 E43348	6	1,883.7	CC-7	114.3	11.3	102.7	92.6	SG	CC-283	AC	07/06/92	NM
	14	N43076 E43343	6	1,884.7	CC-7	114.8	10.5	103.9	93.7	SG	CC-284	AC	07/06/92	NM

Count: 14

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-062A	01	N43323 E45922	6	1,886.3	CC-1	130.9	20.1	108.9	98.2	1		JA	07/07/92	NM
	02	N43192 E45918	6	1,885.1	CC-1	130.1	22.2	106.3	95.8	1	FAILED M.C.	JA	07/07/92	NM
	03	N43057 E45913	6	1,884.7	CC-1	127.7	23.4	103.4	93.3	1	FAILED D.D	JA	07/07/92	NM
	04	N42925 E45914	6	1,883.3	CC-1	128.4	25.2	102.4	92.3	SG	FAILED M.C.	JA	07/07/92	NM
	05	N43410 E45704	6	1,886.7	CC-1	134.3	17.8	113.9	102.7	1		JA	07/07/92	NM
	06	N43259 E45697	6	1,885.7	CC-1	127.1	20.2	105.6	95.2	1		JA	07/07/92	NM
	07	N43177 E45696	6	1,884.7	CC-3	128.6	21.9	105.4	97.6	1	SAND CONE	JA	07/07/92	NM,SC
	08	N42958 E45695	6	1,883.7	CC-3	124.2	22.1	101.6	94.1	SG	CC-285	JA	07/07/92	NM
	09	N42843 E45695	6	1,881.2	CC-3	128.8	21.4	106.0	98.1	SG	CC-286	JA	07/07/92	NM
	10	RETEST FOR #2	6	1,885.1	CC-1	129.1	19.1	108.3	97.7	1		JA	07/07/92	NM
	11	RETEST FOR #3	6	1,884.7	CC-1	128.0	21.1	105.6	95.2	1		JA	07/07/92	NM
	12	RETEST FOR #4	6	1,883.3	CC-1	130.7	18.7	110.0	99.1	SG	SG-CC-288	JA	07/07/92	NM
	13	N43404 E45571	6	1,887.3	CC-1	130.3	18.1	110.2	99.4	2	CLB-CC-289 ST.52	JA	07/07/92	NM
	14	N43260 E45565	6	1,886.2	CC-1	131.2	18.7	110.4	99.5	2	CLB-CC-290 ST.53	JA	07/07/92	NM
	15	N43123 E45563	6	1,885.3	CC-1	131.8	20.3	109.4	98.6	2	CLB-CC-291 ST.54	JA	07/07/92	NM
	16	N42948 E45563	6	1,883.7	CC-1	127.0	25.3	101.2	91.2	SG	CC-292 PROCTOR	JA	07/07/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-062C	01	N43384 E43117	6	1,885.3	CC-3	123.8	17.0	105.8	98.0	SG	CC-293	AC	07/07/92	NM
	02	N43242 E43124	6	1,885.0	CC-3	119.8	20.2	99.7	92.3	SG	CC-294	AC	07/07/92	NM
	03	N43056 E43123	6	1,884.4	CC-3	114.2	17.0	97.6	90.4	SG	CC-295	AC	07/07/92	NM
	04	N43245 E43320	6	1,884.8	CC-3	121.2	17.5	103.2	95.6	SG	CC-296	AC	07/07/92	NM
	05	N43172 E43312	6	1,884.7	CC-3	125.6	18.4	106.1	98.2	SG	CC-297 SAND CONE	AC	07/07/92	NM,SC
	06	N43354 E43324	6	1,885.4	CC-3	127.5	19.1	107.1	99.2	SG	CC-298	AC	07/07/92	NM
	07	N43405 E43134	6	1,886.3	CC-3	118.4	9.7	107.9	99.9	SG	CC-299 MC FAILS	AC	07/07/92	NM
	08	N43282 E43134	6	1,885.8	CC-3	117.6	13.5	103.6	95.9	SG	CC-300 MC FAILS	AC	07/07/92	NM
	09	N43078 E43133	6	1,884.8	CC-3	118.3	15.3	102.5	94.9	SG	CC-301	AC	07/07/92	NM
	10	N42797 E43132	6	1,882.5	CC-3	116.8	12.5	103.8	96.1	SG	CC-302 MC FAILS	AC	07/07/92	NM

Count: 10

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-063A	01	N43356 E45895	6	1,887.0	CC-1	129.9	18.3	109.7	98.9	2	ST.55 CLB-CC-303	JA	07/08/92	NM
	02	N43219 E45897	6	1,886.1	CC-1	128.3	17.5	109.1	98.4	2	ST.56 CLB-CC-304	JA	07/08/92	NM
	03	N43057 E45891	6	1,884.9	CC-1	126.9	19.3	106.2	95.8	2	ST.57 CLB-CC-305	JA	07/08/92	NM
	04	N42904 E45881	6	1,883.2	CC-1	120.2	20.8	99.5	89.7	1	FAILED DENSITY & MC	JA	07/08/92	NM
	05	RETEST FOR #4	6	1,883.2	CC-1	127.5	20.6	105.6	95.2	1		JA	07/08/92	NM
	06	N42902 E45613	6	1,883.7	CC-3	129.4	21.5	106.4	98.5	3		JA	07/08/92	NM
	07	N43042 E45614	6	1,885.2	CC-1	130.0	19.3	108.8	98.1	3		JA	07/08/92	NM
	08	N43204 E45616	6	1,886.3	CC-3	126.7	20.8	104.8	97.0	3		JA	07/08/92	NM
	09	N43346 E45620	6	1,887.1	CC-3	126.2	19.8	105.2	97.4	3		JA	07/08/92	NM
	10	N43381 E45824	6	1,887.3	CC-1	130.8	18.3	110.4	99.6	3	SAND CONE	JA	07/08/92	NM,SC
	11	N43251 E45826	6	1,886.6	CC-1	130.3	19.6	108.8	98.1	3		JA	07/08/92	NM
	12	N43091 E45823	6	1,885.4	CC-1	129.1	18.1	109.2	98.5	3		JA	07/08/92	NM
	13	N42912 E45821	6	1,883.5	CC-1	129.0	16.4	110.7	99.8	3		JA	07/08/92	NM

Count: 13

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-063B	01	RETEST OF #7 REPORT 92-62C	6	1,886.3	CC-3	126.1	18.0	106.7	98.8	SG	CC-306	MC	07/08/92	NM
	02	RETEST OF #8 REPORT 92-62C	6	1,885.8	CC-3	125.7	18.4	106.0	98.1	SG	CC-307	MC	07/08/92	NM
	03	RETEST OF #9 REPORT 92-62C	6	1,884.8	CC-3	126.4	19.1	106.0	98.2	SG	CC-308	MC	07/08/92	NM
	04	RETEST OF #10 REPORT 92-62C	6	1,882.5	CC-3	131.8	16.6	108.0	100+	SG	CC-309	MC	07/08/92	NM

Count: 4

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-063C	01	N43357 E45467	6	1,886.0	CC-3	124.5	21.0	102.9	95.3	SG	CC-310	AC	07/08/92	NM
	02	N43194 E45463	6	1,885.1	CC-3	127.5	21.3	105.1	97.3	SG	CC-311 SAND CONE	AC	07/08/92	NM,SC
	03	N43014 E45457	6	1,884.4	CC-3	123.7	22.8	100.7	93.2	SG	CC-312	AC	07/08/92	NM
	04	N43397 E43336	6	1,886.5	CC-3	124.3	16.0	107.1	99.2	SG	CC-313	AC	07/08/92	NM
	05	N43197 E43339	6	1,885.2	CC-3	123.1	20.4	102.2	94.6	SG	CC-314	AC	07/08/92	NM
	06	N43000 E43342	6	1,884.8	CC-3	124.3	18.6	104.8	97.0	SG	CC-315	AC	07/08/92	NM
	07	N42800 E43340	6	1,881.0	CC-3	124.8	21.3	102.8	95.2	SG	CC-316	AC	07/08/92	NM
	08	N42619 E43348	6	1,881.7	CC-3	127.0	15.9	109.6	100+	SG	CC-317	AC	07/08/92	NM

Count: 8

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INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-064A	01	N43470 E43286	6	1,894.6	CC-1	125.1	18.5	105.6	95.2	CLS		JA	07/09/92	NM
	02	N43468 E43104	6	1,894.0	CC-1	126.0	18.8	105.9	95.5	CLS		JA	07/09/92	NM
	03	N43325 E43038	6	1,894.1	CC-1	128.6	17.9	108.9	98.2	CLS		JA	07/09/92	NM
	04	N43128 E43041	6	1,893.8	CC-1	126.9	19.7	105.9	95.5	CLS		JA	07/09/92	NM
	05	N42964 E43048	6	1,892.8	CC-3	124.8	20.2	103.8	96.1	CLS		JA	07/09/92	NM
	06	N42803 E43050	6	1,892.4	CC-1	127.6	15.6	110.4	99.5	CLS		JA	07/09/92	NM
	07	N42623 E43050	6	1,892.7	CC-1	129.8	19.2	108.8	98.1	CLS		JA	07/09/92	NM
	08	N42550 E43195	6	1,892.3	CC-1	130.5	20.2	108.6	97.9	CLS		JA	07/09/92	NM
	09	N42548 E43365	6	1,892.6	CC-1	127.3	20.2	105.8	95.4	CLS		JA	07/09/92	NM
	10	N42553 E43561	6	1,892.3	CC-3	128.4	20.8	106.2	98.3	CLS		JA	07/09/92	NM
	11	N42555 E43776	6	1,891.1	CC-1	129.8	20.0	108.0	97.4	CLS		JA	07/09/92	NM
	12	N42557 E43981	6	1,891.1	CC-1	128.2	19.9	106.8	96.3	CLS		JA	07/09/92	NM
	13	N42549 E44191	6	1,892.8	CC-1	128.8	16.7	110.2	99.3	CLS		JA	07/09/92	NM
	14	N43469 E43370	6	1,894.5	CC-1	130.9	20.4	108.6	98.0	CLS		JA	07/09/92	NM
	15	N43472 E43183	6	1,894.9	CC-1	129.5	19.9	107.9	97.3	CLS		JA	07/09/92	NM
	16	N43386 E43036	6	1,894.9	CC-1	129.2	19.7	107.8	97.2	CLS		JA	07/09/92	NM
	17	N43230 E43039	6	1,894.9	CC-1	127.8	20.4	106.0	95.5	CLS		JA	07/09/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-064A	18	N43042 E43043	6	1,894.7	CC-1	132.1	18.9	111.0	100.1	CLS		JA	07/09/92	NM
	19	N42898 E43044	6	1,893.8	CC-3	127.8	21.2	105.4	97.6	CLS		JA	07/09/92	NM
	20	N42723 E43044	6	1,893.3	CC-3	129.3	21.4	106.4	98.5	CLS		JA	07/09/92	NM
	21	N42549 E43144	6	1,893.4	CC-3	128.5	21.7	105.6	97.8	CLS		JA	07/09/92	NM
	22	N42546 E43347	6	1,893.8	CC-3	126.0	24.2	101.3	93.8	CLS	FAILED	JA	07/09/92	NM
	23	RETEST FOR #22	6	1,893.8	CC-3	126.5	21.5	104.1	96.4	CLS		JA	07/09/92	NM
	24	N42546 E43596	6	1,893.2	CC-3	128.4	22.0	105.1	97.3	CLS	FAILED MC	JA	07/09/92	NM
	25	RETEST FOR #24	6	1,893.2	CC-3	127.6	21.4	105.1	97.3	CLS		JA	07/09/92	NM
	26	N42551 E43797	6	1,891.9	CC-3	125.9	21.7	103.3	95.6	CLS		JA	07/09/92	NM
	27	N42550 E43998	6	1,892.2	CC-3	127.4	20.3	105.8	98.0	CLS		JA	07/09/92	NM
	28	N42546 E44200	6	1,893.9	CC-3	125.0	21.5	102.9	95.3	CLS		JA	07/09/92	NM
	29	N43481 E43533	6	1,897.4	CC-3	126.8	18.0	107.3	99.3	CLS		JA	07/09/92	NM
	30	N43473 E43337	6	1,895.6	CC-3	127.1	20.2	105.6	97.8	CLS		JA	07/09/92	NM
	31	N43473 E43185	6	1,895.7	CC-3	126.7	20.2	105.4	97.6	CLS	CC-326 ST.66	JA	07/09/92	NM
	32	N43445 E43052	6	1,894.8	CC-3	132.2	21.3	108.9	100.0	CLS		JA	07/09/92	NM
	33	N43264 E43033	6	1,895.8	CC-3	126.4	21.1	104.4	96.6	CLS		JA	07/09/92	NM
	34	N43083 E43038	6	1,896.1	CC-3	126.0	20.3	104.6	96.9	CLS		JA	07/09/92	NM

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SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-064A	35	N42890 E43041	6	1,895.1	CC-2	125.5	21.5	103.3	97.0	CLS		JA	07/09/92	NM
	36	N42729 E43039	6	1,894.3	CC-2	124.5	21.1	102.8	95.2	CLS		JA	07/09/92	NM
	37	N42566 E43083	6	1,894.0	CC-2	126.4	22.7	103.0	96.7	CLS		JA	07/09/92	NM
	38	N42543 E43278	6	1,894.3	CC-2	124.8	21.5	102.6	96.3	CLS		JA	07/09/92	NM
	39	N42545 E43502	6	1,894.0	CC-2	124.6	19.7	104.0	97.7	CLS		JA	07/09/92	NM
	40	N42547 E43701	6	1,893.3	CC-2	127.3	23.7	102.9	96.6	CLS		JA	07/09/92	NM
	41	N42551 E43902	6	1,892.8	CC-2	126.5	24.7	101.4	95.3	CLS		JA	07/09/92	NM
	42	N42549 E44110	6	1,893.7	CC-2	125.8	22.2	102.8	96.5	CLS		JA	07/09/92	NM

Count: 42

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SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-064C	01	N43369 E45859	6	1,888.1	CC-1	134.1	16.3	115.3	100+	4	CLB-CC-318 ST.58	MC	07/09/92	NM
	02	N43223 E45860	6	1,887.2	CC-1	134.5	18.0	114.0	100+	4	CLB-CC-319 ST.59	MC	07/09/92	NM
	03	N43079 E45859	6	1,886.3	CC-1	130.7	19.7	109.2	98.5	4	CLB-CC-320 ST.60 PROCTOR	MC	07/09/92	NM
	04	N42926 E45852	6	1,885.3	CC-1	129.5	19.9	108.0	97.4	4	CLB-CC-321 ST.61	MC	07/09/92	NM
	05	N42894 E45626	6	1,884.9	CC-1	133.0	17.3	113.4	100+	4	CLB-CC-322 ST.62	MC	07/09/92	NM
	06	N43059 E45625	6	1,886.1	CC-1	131.5	18.6	110.9	100	4	CLB-CC-323 ST.63	MC	07/09/92	NM
	07	N43206 E45622	6	1,887.0	CC-1	129.4	20.9	107.0	96.5	4	CLB-CC-324 ST.64	MC	07/09/92	NM
	08	N43349 E45619	6	1,888.0	CC-1	133.0	17.9	113.8	100+	4	CLB-CC-325 ST.65	MC	07/09/92	NM

Count: 8

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-067C	01	N43024 E43597	6	1,880.9	CC-3	123.7	14.4	107.5	99.5	SG	CC-327	AC	07/14/92	NM
	02	N43019 E43712	6	1,882.3	CC-3	121.3	13.7	104.4	96.7	SG	CC-328	AC	07/14/92	NM
	03	N42832 E43725	6	1,881.2	CC-3	124.7	17.3	106.3	98.4	SG	CC-329 SAND CONE	AC	07/14/92	NM,SC
	04	N42809 E43558	6	1,882.8	CC-3	122.1	21.0	101.0	93.5	SG	CC-330	AC	07/14/92	NM

Count: 4

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-068A	01	N43478 E43366	6	1,897.1	CC-3	125.8	21.0	103.8	96.1	CLS		JA	07/15/92	NM
	02	N43479 E43142	6	1,896.9	CC-3	126.2	20.5	104.7	97.0	CLS		JA	07/15/92	NM
	03	N43359 E43031	6	1,896.5	CC-3	121.3	17.9	102.9	95.3	CLS		JA	07/15/92	NM
	04	N42543 E43574	6	1,894.7	CC-3	125.7	21.9	103.1	95.5	CLS		JA	07/15/92	NM
	05	N42545 E43761	6	1,893.7	CC-2	125.2	22.7	102.0	95.8	CLS		JA	07/15/92	NM
	06	N42546 E43969	6	1,893.6	CC-2	125.7	22.5	102.5	96.2	CLS		JA	07/15/92	NM
	07	N42542 E44198	6	1,894.0	CC-2	125.9	22.6	102.6	96.3	CLS		JA	07/15/92	NM
	08	N43484 E43493	6	1,897.9	CC-2	124.3	22.6	101.3	95.1	CLS		JA	07/15/92	NM
	09	N43479 E43348	6	1,898.0	CC-1	129.6	18.4	109.3	98.8	CLS		JA	07/15/92	NM
	10	N43480 E43169	6	1,897.6	CC-3	124.6	20.0	103.7	96.0	CLS		JA	07/15/92	NM
	11	N43364 E43030	6	1,896.7	CC-3	126.9	18.2	107.2	99.2	CLS		JA	07/15/92	NM
	12	N43172 E43030	6	1,896.9	CC-3	128.4	20.9	106.1	98.3	CLS		JA	07/15/92	NM
	13	N42954 E43035	6	1,896.4	CC-3	129.4	21.4	106.6	98.7	CLS		JA	07/15/92	NM
	14	N42751 E43037	6	1,895.3	CC-3	125.8	21.8	103.2	95.5	CLS		JA	07/15/92	NM
	15	N42767 E43034	6	1,896.0	CC-2	124.4	22.9	101.2	95.0	CLS		JA	07/15/92	NM
	16	N42581 E43056	6	1,896.0	CC-2	125.7	23.0	102.1	95.9	CLS		JA	07/15/92	NM
	17	N42537 E43285	6	1,894.9	CC-2	124.4	22.5	101.6	95.4	CLS		JA	07/15/92	NM

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SUMMARY OF DENSITY TESTS

BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-068A	18	N42541 E43527	6	1,895.6	CC-2	125.8	22.0	103.0	96.8	CLS	SAND CONE	JA	07/15/92	NM,SC
	19	N42544 E43751	6	1,894.7	CC-3	126.5	19.5	105.7	97.8	CLS		JA	07/15/92	NM
	20	N43542 E43894	6	1,894.6	CC-1	129.0	19.2	108.1	97.4	CLS		JA	07/15/92	NM
	21	N42543 E44066	6	1,895.2	CC-3	125.9	20.3	104.5	96.8	CLS		JA	07/15/92	NM
	22	N43390 E43030	6	1,897.9	CC-2	124.8	23.2	101.3	95.1	CLS		JA	07/15/92	NM
	23	N43162 E43028	6	1,898.2	CC-2	123.8	22.1	101.4	95.2	CLS		JA	07/15/92	NM
	24	N42950 E43031	6	1,897.5	CC-2	127.9	23.4	103.5	97.1	CLS		JA	07/15/92	NM
	25	N42757 E43031	6	1,896.4	CC-2	126.2	23.7	101.9	95.7	CLS		JA	07/15/92	NM
	26	N42596 E43045	6	1,896.3	CC-2	126.8	23.3	102.8	96.3	CLS	CC-333 PROCTOR	JA	07/15/92	NM
	27	N42535 E43223	6	1,896.3	CC-2	126.3	22.4	103.2	96.9	CLS		JA	07/15/92	NM
	28	N42537 E43407	6	1,896.6	CC-2	125.3	23.9	101.1	95.0	CLS		JA	07/15/92	NM
	29	N42540 E43647	6	1,895.8	CC-2	124.9	22.6	101.9	95.7	CLS		JA	07/15/92	NM
	30	N42542 E43851	6	1,895.3	CC-2	127.7	21.8	104.8	98.4	CLS		JA	07/15/92	NM
	31	N42543 E44055	6	1,895.6	CC-2	124.5	20.8	103.1	95.4	CLS		JA	07/15/92	NM
	32	N42538 E44222	6	1,895.2	CC-2	127.7	22.2	104.5	98.1	CLS		JA	07/15/92	NM
	33	N43484 E43221	6	1,899.1	CC-3	126.8	20.4	105.2	97.4	CLS		JA	07/15/92	NM
	34	N43458 E43054	6	1,898.9	CC-2	125.0	22.9	101.7	95.5	CLS		JA	07/15/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-068A	35	N42531 E43222	6	1,897.7	CC-2	125.3	22.8	101.9	95.7	CLS		JA	07/15/92	NM
	36	N42533 E43425	6	1,898.4	CC-2	127.6	21.7	104.7	98.3	CLS		JA	07/15/92	NM
	37	N42541 E43742	6	1,897.2	CC-2	125.9	20.3	104.5	98.1	CLS		JA	07/15/92	NM
	38	N42536 E43920	6	1,896.8	CC-2	124.4	21.8	102.0	95.8	CLS		JA	07/15/92	NM
	39	N42537 E44096	6	1,897.3	CC-2	125.7	22.4	102.6	96.3	CLS		JA	07/15/92	NM
	40	N43692 E43028	6	1,899.2	CC-2	125.9	23.2	102.1	95.9	CLS		JA	07/15/92	NM
	41	N43539 E43121	6	1,899.1	CC-2	126.3	22.1	103.3	97.0	CLS		JA	07/15/92	NM
	42	N42529 E43327	6	1,899.0	CC-2	125.2	21.6	102.8	96.5	CLS		JA	07/15/92	NM
	43	N42542 E44277	6	1,895.5	CC-2	119.8	23.5	96.9	91.0	CLS		JA	07/15/92	NM
	44	RETEST FOR #43	6	1,895.5	CC-2	124.4	23.2	101.0	94.8	CLS		JA	07/15/92	NM
	45	N42534 E43776	6	1,899.0	CC-2	124.6	23.0	101.2	95.0	CLS		JA	07/15/92	NM
	46	N42531 E43949	6	1,898.9	CC-2	123.1	21.4	101.3	95.1	CLS		JA	07/15/92	NM
	47	N42529 E44127	6	1,899.3	CC-2	124.7	22.5	101.7	95.5	CLS		JA	07/15/92	NM
	48	N42535 E44276	6	1,897.4	CC-2	125.6	23.0	102.0	95.8	CLS		JA	07/15/92	NM

Count: 48

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SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-0688	01	N43175 E43031	6	1,896.8	CC-7	126.7	18.9	106.4	91	CLS	FAIL-MATERIAL REMOVED	MC	07/15/92	NM
	02	N42962 E43036	6	1,895.8	CC-1	129.6	17.3	110.4	99.6	CLS		MC	07/15/92	NM
	03	N42753 E43038	6	1,895.0	CC-3	126.3	21.3	104.0	96.3	CLS	CC-331 PROCTOR	MC	07/15/92	NM
	04	N42559 E43083	6	1,894.9	CC-3	125.9	19.5	105.2	97.4	CLS		MC	07/15/92	NM
	05	N42540 E43320	6	1,894.9	CC-3	125.7	20.8	103.9	96.2	CLS	SAND CONE	MC	07/15/92	NM,SC
	06	N42550 E43102	6	1,895.7	CC-2	126.2	22.6	102.8	96.5	CLS		MC	07/15/92	NM
	07	N42540 E43299	6	1,895.4	CC-2	126.3	23.6	102.0	95.7	CLS		MC	07/15/92	NM
	08	N42543 E43611	6	1,894.9	CC-2	124.8	22.0	102.5	96.2	CLS		MC	07/15/92	NM
	09	N42543 E43829	6	1,894.4	CC-3	127.4	20.3	105.8	97.9	CLS		MC	07/15/92	NM
	10	N42544 E44081	6	1,894.5	CC-3	127.5	22.1	104.3	96.6	CLS		MC	07/15/92	NM
	11	N42541 E44218	6	1,894.5	CC-3	126.7	22.0	103.7	96	CLS		MC	07/15/92	NM
	12	N43486 E43483	6	1,898.6	CC-3	130.2	20.0	108.4	100+	CLS		MC	07/15/92	NM
	13	N43484 E43311	6	1,898.7	CC-3	128.7	21.6	105.7	97.9	CLS		MC	07/15/92	NM
	14	N43483 E43135	6	1,897.7	CC-3	125.4	21.6	103.0	95.4	CLS		MC	07/15/92	NM
	15	N43332 E43028	6	1,897.5	CC-3	128.7	19.9	107.2	99.2	CLS		MC	07/15/92	NM
	16	N43140 E43030	6	1,897.6	CC-1	129.2	19.5	108.0	97.4	CLS		MC	07/15/92	NM
	17	N42945 E43032	6	1,897.0	CC-1	127.4	18.1	107.7	97.1	CLS	CC-332 ST.67	MC	07/15/92	NM

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SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-068B	18	N43385 E43380	6	1,899.0	CC-1	131.9	16.6	113.0	100+	CLS		MC	07/15/92	NM
	19	N43482 E43363	6	1,898.9	CC-1	130.7	16.5	112.1	100+	CLS		MC	07/15/92	NM
	20	N43485 E43193	6	1,899.0	CC-3	129.4	20.1	107.6	99.6	CLS		MC	07/15/92	NM
	21	N43286 E43023	6	1,898.9	CC-3	127.6	21.8	104.6	96.8	CLS		MC	07/15/92	NM
	22	N43085 E43027	6	1,898.7	CC-3	128.7	21.7	105.6	97.8	CLS		MC	07/15/92	NM
	23	N42911 E43030	6	1,898.1	CC-2	125.7	22.6	102.5	96.1	CLS		MC	07/15/92	NM
	24	N42731 E43032	6	1,897.3	CC-2	125.9	20.1	104.7	98.3	CLS		MC	07/15/92	NM
	25	N42549 E43093	6	1,897.1	CC-3	128.3	20.3	106.5	98.6	CLS		MC	07/15/92	NM
	26	N42536 E43292	6	1,896.8	CC-3	128.5	18.9	108.9	100+	CLS		MC	07/15/92	NM
	27	N42537 E43533	6	1,896.7	CC-3	125.7	21.5	103.3	95.7	CLS		MC	07/15/92	NM
	28	N42541 E43737	6	1,896.2	CC-3	126.5	20.8	104.6	96.9	CLS		MC	07/15/92	NM
	29	N42541 E43918	6	1,895.8	CC-3	129.1	19.8	107.6	99.6	CLS		MC	07/15/92	NM
	30	N42542 E44075	6	1,895.9	CC-2	120.6	22.5	98.3	92.3	CLS		MC	07/15/92	NM
	31	RETEST OF #30	6	1,895.9	CC-2	126.2	21.2	104.0	97.7	CLS		MC	07/15/92	NM
	32	N42959 E43029	6	1,899.1	CC-3	128.1	20.9	105.8	97.9	CLS		MC	07/15/92	NM
	33	N42769 E43029	6	1,898.4	CC-3	130.2	19.7	108.6	100+	CLS		MC	07/15/92	NM
	34	N42587 E43046	6	1,897.8	CC-3	129.4	20.9	106.9	99	CLS		MC	07/15/92	NM

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SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-068B	35	N42581 E43528	6	1,898.9	CC-3	128.1	21.3	105.5	97.6	CLS		MC	07/15/92	NM
	36	N43534 E43752	6	1,898.4	CC-3	126.0	21.4	103.7	96	CLS		MC	07/15/92	NM
	37	N42534 E43936	6	1,898.0	CC-1	130.3	20.6	107.9	97.3	CLS		MC	07/15/92	NM
	38	N42536 E44102	6	1,898.3	CC-3	127.3	21.4	104.7	96.9	CLS		MC	07/15/92	NM

Count: 38

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-068C	01	N42908 E43259	6	1,881.6	CC-2	119.2	23.0	96.9	91.0	SG	CC-334	AC	07/15/92	NM
	02	N42764 E43255	6	1,881.1	CC-2	121.8	24.6	97.7	91.7	SG	CC-335	AC	07/15/92	NM
	03	N42880 E43219	6	1,883.2	CC-2	119.5	22.0	96.3	90.4	SG	CC-336	AC	07/15/92	NM
	04	N43355 E43222	6	1,887.2	CC-2	127.8	20.2	106.3	99.8	SG	CC-337	AC	07/15/92	NM
	05	N43151 E43223	6	1,886.0	CC-2	124.3	23.5	99.3	93.2	SG	CC-338	AC	07/15/92	NM
	06	N42948 E43222	6	1,884.4	CC-2	123.8	20.8	102.5	96.2	SG	CC-339	AC	07/15/92	NM
	07	N42754 E43203	6	1,883.2	CC-2	124.9	20.2	103.9	97.6	SG	CC-340	AC	07/15/92	NM
	08	N43321 E43409	6	1,886.0	CC-2	120.6	24.3	99.2	93.1	SG	CC-341	AC	07/15/92	NM
	09	N43145 E43415	6	1,886.3	CC-2	121.3	24.0	99.4	93.3	SG	CC-342	AC	07/15/92	NM
	10	N42931 E43411	6	1,883.9	CC-2	123.2	18.4	104.1	97.7	SG	CC-343	AC	07/15/92	NM
	11	N42740 E43415	6	1,883.2	CC-2	122.7	22.3	100.3	94.2	SG	CC-344	AC	07/15/92	NM

Count: 11

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-069A	01	N43153 E43537	6	1,883.2	CC-2	124.4	21.3	102.4	96.1	SG	CC-345	JA	07/16/92	NM
	02	N43012 E43527	6	1,882.7	CC-2	122.3	20.8	101.1	94.9	SG	CC-346	JA	07/16/92	NM
	03	N42852 E43523	6	1,882.5	CC-2	117.1	21.9	95.9	90.0	SG	CC-347	JA	07/16/92	NM
	04	N42703 E43520	6	1,882.8	CC-2	122.2	23.9	98.5	92.5	SG	CC-348	JA	07/16/92	NM
	05	N42710 E43651	6	1,881.4	CC-2	122.6	22.5	100.0	93.9	SG	CC-349	JA	07/16/92	NM
	06	N42856 E43644	6	1,881.2	CC-3	123.1	18.9	103.4	95.8	SG	CC-350	JA	07/16/92	NM
	07	N43014 E43642	6	1,882.1	CC-2	125.7	23.9	101.3	95.1	SG	CC-351	JA	07/16/92	NM
	08	N43362 E43118	6	1,887.7	CC-2	124.2	21.6	102.0	95.8	1		JA	07/16/92	NM
	09	N43197 E43121	6	1,887.1	CC-2	131.0	23.1	105.0	98.5	1	SAND CONE	JA	07/16/92	NM,SC
	10	N43106 E43123	6	1,885.8	CC-2	130.0	24.4	104.5	98.1	1		JA	07/16/92	NM
	11	N42822 E43127	6	1,884.6	CC-2	133.0	23.9	103.8	97.5	1		JA	07/16/92	NM
	12	N42632 E43128	6	1,884.0	CC-2	125.5	20.3	104.2	97.8	1ST		JA	07/16/92	NM
	13	N43368 E43322	6	1,887.7	CC-305	127.7	20.9	105.5	95.1	1ST		JA	07/16/92	NM
	14	N43187 E43326	6	1,886.6	CC-305	128.5	22.4	105.9	95.5	1ST		JA	07/16/92	NM
	15	N43005 E43330	6	1,885.5	CC-305	127.9	21.7	105.5	95.1	1ST		JA	07/16/92	NM
	16	N42805 E43334	6	1,883.6	CC-305	128.2	21.1	105.7	95.3	1ST		JA	07/16/92	NM
	17	N42641 E43342	6	1,883.0	CC-1	131.4	16.1	113.0	100+	1ST		JA	07/16/92	NM

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SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-069C	01	N43410 E43158	6	1,888.6	CC-2	125.4	22.5	102.4	96.2	1		AC	07/16/92	NM
	02	N43222 E43151	6	1,887.4	CC-2	124.1	21.5	102.1	95.9	2	CLB-CC-352 ST.68	AC	07/16/92	NM
	03	N43034 E43156	6	1,886.2	CC-2	123.9	21.7	101.9	95.7	2	CLB-CC-353 ST.69	AC	07/16/92	NM
	04	N42841 E43162	6	1,884.8	CC-2	126.9	23.3	102.9	96.6	1	SAND CONE	AC	07/16/92	NM,SC
	05	N42653 E43162	6	1,883.6	CC-2	121.7	22.8	102.0	95.8	1		AC	07/16/92	NM
	06	N43370 E43337	6	1,888.2	CC-2	124.6	21.7	102.3	96	1		AC	07/16/92	NM
	07	N43174 E43326	6	1,887.0	CC-2	124.3	22.6	101.4	95.2	2	CLB-CC-354 ST.70	AC	07/16/92	NM
	08	N42969 E43325	6	1,885.7	CC-2	122.5	23.2	102.5	96.2	2	CLB-CC-355 ST.71	AC	07/16/92	NM
	09	N42780 E43328	6	1,884.3	CC-2	123.9	22.3	101.3	95.1	1		AC	07/16/92	NM
	10	N42612 E43330	6	1,883.1	CC-2	126.7	19.5	106.0	99.5	1		AC	07/16/92	NM

Count: 10

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SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-070A	01	N43483 E43381	6	1,899.6	CC-305	128.4	21.3	105.7	95.3	CLS		JA	07/17/92	NM
	02	N43485 E43176	6	1,899.8	CC-3	124.6	20.9	102.9	95.3	CLS		JA	07/17/92	NM
	03	N43391 E43026	6	1,899.2	CC-305	130.6	19.9	108.8	98.1	CLS		JA	07/17/92	NM
	04	N43173 E43026	6	1,899.5	CC-3	124.8	21.4	102.8	95.2	CLS		JA	07/17/92	NM
	05	N42916 E43026	6	1,899.6	CC-305	128.2	21.2	105.8	95.4	CLS		JA	07/17/92	NM
	06	N42700 E43023	6	1,899.7	CC-305	130.0	21.2	107.1	96.6	CLS		JA	07/17/92	NM
	07	N42526 E43216	6	1,899.6	CC-305	131.6	19.7	109.8	99.0	CLS		JA	07/17/92	NM
	08	N42527 E43436	6	1,899.6	CC-305	127.5	20.9	105.5	95.1	CLS		JA	07/17/92	NM
	09	N42529 E43658	6	1,899.5	CC-305	128.8	20.3	106.9	96.5	CLS		JA	07/17/92	NM
	10	N42529 E43872	6	1,899.4	CC-305	130.5	19.5	109.1	98.4	CLS		JA	07/17/92	NM
	11	N42529 E44102	6	1,899.4	CC-305	130.7	20.5	108.3	97.7	CLS		JA	07/17/92	NM
	12	N42532 E44346	6	1,899.4	CC-305	130.6	20.0	108.8	98.1	CLS		JA	07/17/92	NM
	13	N42529 E44558	6	1,899.5	CC-305	129.4	20.7	107.1	96.6	CLS		JA	07/17/92	NM
	14	N42527 E44737	6	1,899.6	CC-305	130.8	19.6	109.2	98.5	CLS		JA	07/17/92	NM
	15	N42527 E44911	6	1,899.3	CC-10	132.3	18.6	111.4	98.1	CLS		JA	07/17/92	NM
	16	N42526 E45123	6	1,899.7	CC-10	133.5	15.1	115.8	102.0	CLS		JA	07/17/92	NM
	17	N42528 E45288	6	1,899.6	CC-10	134.8	15.6	116.5	102.6	CLS		JA	07/17/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-070A	18	N42528 E45476	6	1,899.3	CC-10				N/A	CLS	LIFTS NOT BONDED	JA	07/17/92	NM
	19	N42529 E45653	6	1,899.4	CC-305	124.7	17.2	106.3	95.9	CLS		JA	07/17/92	NM
	20	N42527 E45814	6	1,899.5	CC-305	128.8	20.6	106.7	96.2	CLS		JA	07/17/92	NM
	21	N42622 E45978	6	1,899.3	CC-10	130.5	15.6	112.8	99.4	CLS		JA	07/17/92	NM
	22	N42792 E45978	6	1,899.4	CC-305	129.8	20.0	108.0	97.4	CLS		JA	07/17/92	NM
	23	N42971 E45976	6	1,899.2	CC-10	133.7	15.5	115.6	101.9	CLS		JA	07/17/92	NM
	24	N43139 E45977	6	1,899.3	CC-10				N/A	CLS	LIFTS NOT BONDED	JA	07/17/92	NM
	25	N43306 E45977	6	1,899.5	CC-10				N/A	CLS	LIFTS NOT BONDED	JA	07/17/92	NM
	26	N43480 E45902	6	1,899.4	CC-305	130.6	20.8	108.0	97.4	CLS		JA	07/17/92	NM
	27	N43480 E45719	6	1,899.5	CC-10	133.4	19.6	111.4	98.1	CLS		JA	07/17/92	NM
	28	N43481 E45484	6	1,899.6	CC-305	129.2	20.6	107.0	96.5	CLS		JA	07/17/92	NM
	29	N43481 E45272	6	1,899.5	CC-305	131.3	21.3	108.1	97.5	CLS		JA	07/17/92	NM
	30	N43485 E43072	6	1,894.6	CC-10	133.3	15.8	115.0	101.3	CLS		JA	07/17/92	NM
	31	N43482 E44872	6	1,899.9	CC-305	128.2	21.4	105.5	96.1	CLS		JA	07/17/92	NM
	32	N43482 E44702	6	1,899.9	CC-305				N/A	CLS	LIFTS NOT BONDED	JA	07/17/92	NM
	33	N43481 E44468	6	1,899.8	CC-305	127.4	20.5	105.7	95.3	CLS		JA	07/17/92	NM
	34	N43483 E44326	6	1,899.7	CC-305	128.0	21.3	105.5	95.2	CLS		JA	07/17/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-070A	35	N43483 E44094	6	1,899.8	CC-305	128.3	21.0	105.9	95.5	CLS		JA	07/17/92	NM
	36	N43482 E43931	6	1,899.4	CC-305	131.0	20.6	108.5	97.8	CLS		JA	07/17/92	NM
	37	N43481 E43785	6	1,899.6	CC-305	128.4	21.8	105.4	95.1	CLS		JA	07/17/92	NM
	38	N43487 E43551	6	1,899.5	CC-305	127.4	20.4	105.7	95.3	CLS		JA	07/17/92	NM
	39	N42610 E43031	6	1,900.1	CC-2	124.8	22.8	101.5	95.3	CLS		JA	07/17/92	NM
	40	N42528 E43203	6	1,899.9	CC-305	127.8	21.1	105.4	95.0	CLS		JA	07/17/92	NM
	41	N42529 E43456	6	1,900.0	CC-305	129.0	20.5	106.9	96.4	CLS		JA	07/17/92	NM
	42	N43532 E43670	6	1,900.0	CC-305	127.7	20.8	105.6	95.3	CLS		JA	07/17/92	NM
	43	N42531 E43873	6	1,900.1	CC-305	130.0	20.7	107.6	97.0	CLS		JA	07/17/92	NM
	44	N42531 E44072	6	1,900.1	CC-305	128.6	21.2	106.0	95.5	CLS		JA	07/17/92	NM
	45	N42529 E44244	6	1,899.9	CC-305	126.9	20.0	105.7	95.4	CLS		JA	07/17/92	NM
	46	N42532 E44402	6	1,898.9	CC-305	128.8	22.3	105.2	95.0	CLS		JA	07/17/92	NM
	47	N42526 E44628	6	1,900.0	CC-305	128.4	20.9	106.1	95.6	CLS		JA	07/17/92	NM
	48	N42527 E44849	6	1,900.1	CC-305	129.7	20.2	107.8	97.2	CLS		JA	07/17/92	NM
	49	N42528 E45051	6	1,900.1	CC-305	129.2	20.9	106.7	96.2	CLS		JA	07/17/92	NM
	50	N42530 E45274	6	1,900.0	CC-305	129.0	22.2	105.4	95.0	CLS		JA	07/17/92	NM
	51	N42530 E45461	6	1,900.0	CC-305	131.8	21.4	108.4	97.7	CLS		JA	07/17/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-070A	52	N43482 E44879	6	1,900.1	CC-305	127.5	20.7	105.5	95.1	CLS		JA	07/17/92	NM
	53	N43482 E44380	6	1,899.9	CC-305	128.2	21.7	105.3	95.0	CLS		JA	07/17/92	NM
	54	N43482 E43921	6	1,900.0	CC-305	129.3	21.7	106.1	95.6	CLS		JA	07/17/92	NM

Count: 54

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-070B	01	N43480 E43365	6	1,900.0	CC-305	130.0	20.8	107.5	96.9	CLS		MC	07/17/92	NM
	02	N43483 E43127	6	1,900.0	CC-305	129.1	19.6	107.8	97.2	CLS	SAND CONE	MC	07/17/92	NM,SC
	03	N43294 E43022	6	1,900.0	CC-305	130.4	22.1	106.7	96.2	CLS		MC	07/17/92	NM
	04	N43060 E43024	6	1,900.0	CC-305	129.8	20.9	107.2	96.7	CLS		MC	07/17/92	NM
	05	N42835 E43023	6	1,900.1	CC-3	127.0	21.9	104.1	96.4	CLS		MC	07/17/92	NM
	06	N42529 E45680	6	1,900.2	CC-3	127.4	21.4	104.8	97	CLS	CC-356	MC	07/17/92	NM
	07	N42529 E45876	6	1,900.0	CC-3	128.1	21.5	105.3	97.5	CLS		MC	07/17/92	NM
	08	N42736 E45981	6	1,900.0	CC-305	131.0	21.2	108.0	97.4	CLS		MC	07/17/92	NM
	09	N42957 E45981	6	1,899.9	CC-305	129.0	20.2	107.2	96.7	CLS		MC	07/17/92	NM
	10	N43138 E45985	6	1,900.0	CC-305	129.1	22.0	105.7	95.3	CLS		MC	07/17/92	NM
	11	N43334 E45980	6	1,900.0	CC-305	131.1	18.4	110.7	99.8	CLS		MC	07/17/92	NM
	12	N43485 E45889	6	1,900.2	CC-305	128.2	21.6	105.3	95	CLS		MC	07/17/92	NM
	13	N43483 E45581	6	1,900.1	CC-305	129.1	20.3	107.2	96.7	CLS	CC-357 PROCTOR	MC	07/17/92	NM
	14	N43483 E45248	6	1,900.1	CC-3	126.4	23.3	102.5	95	CLS		MC	07/17/92	NM

Count: 14

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS

BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-070C	01	N43377 E43486	6	1,887.9	CC-2	123.2	19.9	102.6	96.3	3		AC	07/17/92	NM
	02	N43172 E43489	6	1,886.1	CC-2	124.0	20.9	102.6	96.3	3		AC	07/17/92	NM
	03	N42974 E43493	6	1,885.4	CC-2	122.8	22.0	101.4	95.2	3		AC	07/17/92	NM
	04	N42790 E43498	6	1,883.8	CC-2	123.2	22.9	101.7	95.5	3	SAND CONE	AC	07/17/92	NM
	05	N42606 E43499	6	1,882.2	CC-2	122.7	23.2	101.6	95.4	3		AC	07/17/92	NM
	06	N43144 E43662	6	1,884.3	CC-2	121.4	22.1	99.5	93.4	SG	CC-358	AC	07/17/92	NM
	07	N43005 E43663	6	1,882.7	CC-2	122.3	21.5	99.3	93.2	SG	CC-359	AC	07/17/92	NM
	08	N42835 E43665	6	1,882.4	CC-2	121.2	18.2	102.6	96.3	SG	CC-360	AC	07/17/92	NM
	09	N42653 E43665	6	1,880.2	CC-2	122.8	22.9	99.9	93.8	SG	CC-361	AC	07/17/92	NM
	10	N43375 E43087	6	1,888.9	CC-2	119.6	23.5	96.8	90.9	3	FAILS	AC	07/17/92	NM
	11	N43211 E43096	6	1,888.1	CC-2	122.0	20.5	101.5	95.3	3		AC	07/17/92	NM
	12	N43021 E43100	6	1,886.3	CC-2	121.0	23.9	97.7	91.7	3	FAILS	AC	07/17/92	NM
	13	N42814 E43105	6	1,885.3	CC-2	119.4	23.7	96.5	90.6	3	FAILS	AC	07/17/92	NM
	14	N42626 E43109	6	1,885.0	CC-2	121.9	21.6	101.2	95.0	3		AC	07/17/92	NM
	15	N43424 E43274	6	1,888.9	CC-2	122.7	21.5	101.3	95.1	3		AC	07/17/92	NM
	16	N43239 E43279	6	1,888.2	CC-2	122.9	21.2	101.7	95.5	3		AC	07/17/92	NM
	17	N43039 E43285	6	1,886.8	CC-2	116.0	22.9	94.4	88.6	3	FAILS	AC	07/17/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS

BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-070C	18	N42845 E43288	6	1,885.3	CC-2	122.9	21.4	101.7	95.5	3		AC	07/17/92	NM
	19	N42626 E43297	6	1,883.4	CC-2	122.4	20.9	101.4	95.2	3		AC	07/17/92	NM
	20	RETEST #10	6	1,888.9	CC-2	122.6	19.4	102.7	96.4	3		AC	07/17/92	NM
	21	RETEST #12	6	1,886.3	CC-2	122.7	21.5	101.3	95.1	3		AC	07/17/92	NM
	22	RETEST #13	6	1,885.3	CC-2	123.5	22.3	101.5	95.3	3		AC	07/17/92	NM
	23	RETEST #17	6	1,886.8	CC-2	123.7	21.1	101.5	95.3	3		AC	07/17/92	NM

Count: 23

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-071A	01	N43390 E43346	6	1,889.0	CC-3	125.8	21.4	103.6	95.9	2	CLB-CC-362 ST.72	JA	07/18/92	NM
	02	N42898 E43352	6	1,885.4	CC-3	128.1	20.2	106.5	98.7	3	CLB-CC-363 ST.73	JA	07/18/92	NM
	03	N42638 E43364	6	1,883.7	CC-3	127.7	23.6	103.3	95.7	2	CLB-CC-364 ST.74	JA	07/18/92	NM
	04	N42639 E43183	6	1,883.7	CC-3	128.1	23.8	103.5	95.8	2	CLB-CC-365 ST.75	JA	07/18/92	NM
	05	N42886 E43175	6	1,885.9	CC-3	129.7	22.0	106.3	98.4	3	CLB-CC-366 ST.76	JA	07/18/92	NM
	06	N43390 E43164	6	1,889.1	CC-3	128.4	22.9	104.5	96.7	2	CLB-CC-367 ST.77	JA	07/18/92	NM
	07	N43399 E43469	6	1,888.8	CC-3	126.9	22.6	103.5	95.8	3		JA	07/18/92	NM
	08	N43211 E43468	6	1,887.7	CC-3	128.3	23.2	104.1	96.4	3		JA	07/18/92	NM
	09	N43046 E43471	6	1,886.3	CC-3	129.7	23.0	105.4	97.6	3	SAND CONE	JA	07/18/92	NM,SC
	10	N42890 E43474	6	1,885.6	CC-3	128.4	20.9	106.2	98.3	3		JA	07/18/92	NM
	11	N42744 E43480	6	1,884.3	CC-3	126.4	22.0	103.6	95.9	3		JA	07/18/92	NM
	12	N42611 E43486	6	1,883.0	CC-3	129.1	20.5	107.1	99.2	1		JA	07/18/92	NM

Count: 12

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-072A	01	N43150 E43714	6	1,885.4	CC-305	129.2	21.7	106.2	95.7	SG	CC-368	JA	07/20/92	NM
	02	N42968 E43712	6	1,884.1	CC-305	127.5	22.2	104.3	94.1	SG	CC-369	JA	07/20/92	NM
	03	N42789 E43709	6	1,882.9	CC-305	129.1	22.8	105.1	94.8	SG	CC-370	JA	07/20/92	NM
	04	N42621 E43708	6	1,881.5	CC-305	126.2	23.1	102.5	92.4	SG	CC-371	JA	07/20/92	NM
	05	N43421 E43132	6	1,890.2	CC-3	128.8	20.3	107.1	99.2	4TH	CLB-CC-372 ST.78	JA	07/20/92	NM
	06	N43218 E43138	6	1,888.2	CC-3	127.2	21.9	104.3	96.6	4TH	CLB-CC-373 ST.79	JA	07/20/92	NM
	07	N43014 E43143	6	1,886.9	CC-3	127.3	21.3	104.8	97.0	4TH	CLB-CC-374 ST.80	JA	07/20/92	NM
	08	N43012 E43274	6	1,887.1	CC-3	127.7	21.6	104.9	97.1	4TH	CLB-CC-375 ST.81	JA	07/20/92	NM
	09	N43219 E43271	6	1,888.5	CC-3	129.4	21.6	106.4	98.5	4TH	CLB-CC-376 ST.82 PROCTOR	JA	07/20/92	NM
	10	N43416 E43265	6	1,890.0	CC-305	130.6	19.5	109.3	98.6	4TH	CLB-CC-377 ST.83	JA	07/20/92	NM
	11	N43415 E43440	6	1,890.0	CC-305	128.7	21.5	105.8	95.4	4TH	CLB-CC-378 ST.84	JA	07/20/92	NM
	12	N43210 E43443	6	1,887.8	CC-305	128.5	21.0	106.2	95.8	4TH	CLB-CC-379 ST.85	JA	07/20/92	NM
	13	N43016 E43445	6	1,887.0	CC-305	128.3	20.1	106.8	96.3	4TH	CLB-CC-380 ST.86 PROCTOR	JA	07/20/92	NM
	14	N43158 E43964	6	1,885.1	CC-305	127.0	22.7	103.5	93.3	SG	CC-381	JA	07/20/92	NM
	15	N42965 E43957	6	1,883.8	CC-305	129.2	22.3	105.6	95.3	SG	CC-382	JA	07/20/92	NM
	16	N42737 E43947	6	1,882.3	CC-305	130.1	20.8	107.7	97.1	SG	CC-383	JA	07/20/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS

BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-072C	01	N43206 E43582	6	1,886.3	CC-305	126.9	20.6	106.2	95.8	#1		AC	07/20/92	NM
	02	N43018 E43579	6	1,884.5	CC-305	125.5	21.7	105.7	95.3	#1		AC	07/20/92	NM
	03	N42822 E43570	6	1,883.9	CC-305	125.9	20.9	106.6	96.1	#1		AC	07/20/92	NM
	04	N42625 E43568	6	1,882.7	CC-305	124.0	21.7	106.2	95.8	#1		AC	07/20/92	NM
	05	N43172 E43755	6	1,886.1	CC-305	122.1	19.4	105.6	95.2	#1		AC	07/20/92	NM
	06	N42985 E43751	6	1,884.8	CC-305	122.4	21.9	105.8	95.4	#1	SANDCONE	AC	07/20/92	NM,SC
	07	N42794 E43749	6	1,883.6	CC-305	121.9	19.6	105.9	95.5	#1		AC	07/20/92	NM
	08	N42604 E43741	6	1,882.0	CC-305	122.7	21.4	105.5	95.1	#1		AC	07/20/92	NM

Count: 8

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS

BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-073A	01	N43198 E44006	6	1,886.3	CC-305	129.3	21.6	106.3	95.9	1		JA		NM
	02	N43021 E44002	6	1,884.3	CC-305	131.3	20.3	109.1	98.4	1		JA		NM
	03	N42858 E43999	6	1,883.7	CC-305	131.8	20.1	109.7	99.0	1		JA		NM
	04	N42674 E43999	6	1,882.5	CC-305	129.4	20.3	107.6	97.0	1		JA		NM
	05	N42898 E43135	6	1,886.7	CC-305	131.2	21.7	107.8	97.2	4	CLB-CC-384 ST.87	JA		NM
	06	N42647 E43139	6	1,885.3	CC-305	129.2	22.2	105.7	95.3	4	CLB-CC-385 ST.88	JA		NM
	07	N42799 E43230	6	1,887.2	CC-305	129.3	22.2	105.8	95.4	4	CLB-CC-386 ST.89	JA		NM
	08	N42665 E43234	6	1,885.4	CC-305	129.0	18.6	108.8	98.1	4	CLB-CC-387 ST.90 PROCTOR	JA		NM

Count: 8

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-073C	01	N43178 E43556	6	1,887.1	CC-305	120.8	23.3	98.0	88.4	2	FAILED	AC	07/28/92	NM
	02	N42999 E43548	6	1,885.7	CC-305	122.3	22.5	99.8	90.0	2	FAILED	AC	07/28/92	NM
	03	N42818 E43542	6	1,885.0	CC-305	121.8	22.5	99.4	89.6	2	FAILED	AC	07/28/92	NM
	04	N42639 E43544	6	1,883.8	CC-305	123.3	23.3	100.0	90.2	2	SAND CONE FAILED	AC	07/28/92	NM,SC

Count: 4

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-074A	01	RETEST #1 REP #92-73C	6	1,887.1	CC-305	130.5	20.7	108.1	97.5	2	CLB-CC-390 ST.93	JA	07/22/92	NM
	02	RETEST #2 REP #92-73C	6	1,885.7	CC-305	130.8	22.0	107.1	96.6	2	CLB-CC-391 ST.94	JA	07/22/92	NM
	03	RETEST #3 REP #92-73C	6	1,885.0	CC-331	127.5	22.7	103.9	96.2	2	CLB-CC-392 ST.95	JA	07/22/92	NM
	04	RETEST #4 REP #92-73C	6	1,883.8	CC-305	129.8	23.1	105.4	95.1	2	CLB-CC-393 ST.96	JA	07/22/92	NM
	05	N42647 E43759	6	1,883.2	CC-331	126.3	23.1	102.6	95	2	CLB-CC-394 ST.97	JA	07/22/92	NM
	06	N42806 E43771	6	1,884.3	CC-331	127.6	22.7	104.0	96.3	2	CLB-CC-395 ST.98	JA	07/22/92	NM
	07	N42976 E43782	6	1,885.5	CC-305	130.2	22.3	106.5	96.0	2	CLB-CC-396 ST.99	JA	07/22/92	NM
	08	N43152 E43796	6	1,886.5	CC-305	128.5	21.9	105.4	95.0	2	CLB-CC-397 ST.100	JA	07/22/92	NM
	09	N43190 E43970	6	1,886.9	CC-305	130.4	22.2	106.7	96.2	2	CLB-CC-398 ST.101 SAND CONE	JA	07/22/92	NM,SC
	10	N43044 E43962	6	1,885.7	CC-305	132.7	20.5	110.1	99.3	2	CLB-CC-399 ST.102	JA	07/22/92	NM
	11	N42861 E43951	6	1,884.5	CC-305	130.7	21.5	107.6	97.0	2	CLB-CC-400 ST.103 PROCTOR	JA	07/22/92	NM
	12	N42672 E43943	6	1,883.5	CC-305	129.9	22.0	106.5	96.0	2	CLB-CC-401 ST.104	JA	07/22/92	NM
	13	N43188 E43535	6	1,887.1	CC-305	129.8	20.9	107.4	96.8	3		JA	07/22/92	NM
	14	N43013 E43525	6	1,886.3	CC-331	129.0	22.4	105.4	97.6	3		JA	07/22/92	NM
	15	N43843 E43518	6	1,885.1	CC-331	129.4	23.4	104.9	97.1	3		JA	07/22/92	NM
	16	N42645 E43516	6	1,883.9	CC-305	131.9	20.1	109.8	99.0	3		JA	07/22/92	NM
	17	N43168 E43750	6	1,887.1	CC-305	129.4	21.6	106.4	96.0	3		JA	07/22/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-074A	18	N43004 E43737	6	1,885.9	CC-305	129.9	21.2	107.2	96.6	3		JA	07/22/92	NM
	19	N42833 E43727	6	1,884.9	CC-305	128.8	22.0	105.6	95.2	3		JA	07/22/92	NM
	20	N42666 E43716	6	1,883.9	CC-305	130.2	21.9	106.8	96.3	3		JA	07/22/92	NM

Count: 20

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-0748	01	N42980 E43438	6	1,886.9	CC-305	128.9	19.9	108.3	97.6	4	CLB-CC-388 ST.91	MC	07/22/92	NM
	02	N42686 E43440	6	1,885.6	CC-305	128.5	19.3	108.5	97.8	4	CLB-CC-389 ST.92	MC	07/22/92	NM

Count: 2

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-074C	01	N43204 E43945	6	1,887.4	CC-305	127.8	20.5	106.0	95.6	3		AC	07/22/92	NM
	02	N43006 E43929	6	1,885.8	CC-305	127.8	18.2	105.6	95.2	3		AC	07/22/92	NM
	03	N42804 E43916	6	1,884.3	CC-305	127.4	20.4	105.8	95.4	3	SAND CONE	AC	07/22/92	NM,SC
	04	N42601 E43906	6	1,882.9	CC-305	124.5	16.8	106.6	96.1	3		AC	07/22/92	NM
	05	N43026 E44164	6	1,883.8	CC-3	127.3	18.2	107.6	99.6	SG	CC-402	AC	07/22/92	NM
	06	N42846 E44156	6	1,882.8	CC-7	131.4	8.6	121.0	100+	SG	CC-403	AC	07/22/92	NM
	07	N42665 E44146	6	1,881.9	CC-7	134.2	7.0	125.4	100+	SG	CC-404	AC	07/22/92	NM
	08	N43064 E44314	6	1,883.5	CC-7	123.4	15.5	106.9	91.5	SG	CC-405	AC	07/22/92	NM
	09	N42864 E44312	6	1,882.5	CC-7	130.8	12.3	116.5	99.7	SG	CC-406	AC	07/22/92	NM
	10	N42668 E44306	6	1,881.4	CC-7	128.1	13.1	113.2	96.9	SG	CC-407	AC	07/22/92	NM

Count: 10

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-075C	01	N43405 E44568	6	1,885.1	CC-331	121.8	7.4	113.4	100+	SG	CC-409	AC	07/23/92	NM
	02	N43405 E44751	6	1,883.7	CC-331	121.0	19.7	101.0	93.5	SG	CC-410	AC	07/23/92	NM
	03	N43407 E44938	6	1,883.8	CC-331	124.5	22.3	101.8	94.3	SG	CC-411	AC	07/23/92	NM
	04	N43405 E45128	6	1,883.4	CC-331	122.3	22.4	99.9	92.5	SG	CC-412 PROCTOR	AC	07/23/92	NM
	05	N43417 E45323	6	1,885.0	CC-331	123.1	22.1	100.8	93.9	SG	CC-413	AC	07/23/92	NM
	06	N43410 E45498	6	1,886.9	CC-331	126.5	14.5	110.5	100+	SG	CC-414	AC	07/23/92	NM
	07	N43131 E44539	6	1,881.2	CC-3	131.6	15.2	114.2	100+	SG	CC-415	AC	07/23/92	NM
	08	N42948 E44534	6	1,880.1	CC-3	127.1	18.1	107.6	99.6	SG	CC-416	AC	07/23/92	NM
	09	N42763 E44529	6	1,879.6	CC-3	128.6	17.9	109.1	100+	SG	CC-417	AC	07/23/92	NM

Count: 9

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-076A	01	N43209 E44104	6	1,887.9	CC-305	134.7	18.4	113.8	100+	4	CLB-CC-418 ST.105 PROCTOR	JA		NM
	02	N43211 E43842	6	1,888.1	CC-305	133.1	19.1	111.8	100+	4	CLB-CC-419 ST.106	JA		NM
	03	N43209 E43558	6	1,888.2	CC-305	128.9	21.2	106.4	95.9	4	CLB-CC-420 ST.107	JA		NM
	04	N43428 E43490	6	1,889.0	CC-305	131.2	18.1	111.1	100.0	CLB	12" WATER LINE	JA		NM
	05	N43495 E43502	6	1,896.5	CC-305	132.2	17.2	112.8	100+	CLS	12" WATER LINE	JA		NM
	06	N43095 E43600	6	1,886.6	CC-331	127.2	22.5	103.8	96.1	4	CLB-CC-421 ST.108	JA		NM
	07	N42788 E43589	6	1,885.6	CC-305	131.0	20.2	109.0	98.3	4	CLB-CC-422 ST.109	JA		NM
	08	N42623 E43589	6	1,884.4	CC-305	130.4	20.6	108.1	97.5	4	CLB-CC-423 ST.110	JA		NM

Count: 8

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-078A	01	N43004 E43838	6	1,886.9	CC-305	129.6	22.2	106.1	95.6	4	CLB-CC-424 ST.111	JA	07/27/92	NM
	02	N42820 E43832	6	1,886.1	CC-305	128.8	21.5	106.0	95.6	4	CLB-CC-425 ST.112	JA	07/27/92	NM
	03	N42632 E43828	6	1,885.0	CC-305	131.8	20.2	109.7	98.9	4	CLB-CC-426 ST.113	JA	07/27/92	NM
	04	N42660 E44784	6	1,877.7	CC-305	128.7	20.5	106.8	96.3	SG	SG-CC-427	JA	07/27/92	NM
	05	N42664 E44991	6	1,877.5	CC-305	127.0	21.0	105.0	94.6	SG	SG-CC-428	JA	07/27/92	NM
	06	N42995 E44045	6	1,886.5	CC-305	130.9	20.7	108.5	97.8	4	CLB-CC-429 ST.114	JA	07/27/92	NM
	07	N42809 E44038	6	1,885.6	CC-305	129.4	21.1	106.9	96.4	4	CLB-CC-430 ST.115	JA	07/27/92	NM
	08	N42647 E44023	6	1,884.3	CC-331	125.8	22.3	102.9	95.2	4	CLB-CC-431 ST.116	JA	07/27/92	NM

Count: 8

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-078C	01	N43202 E44232	6	1,885.6	CC-331	126.8	19.8	105.8	98.0	SG	CC-432	AC	07/27/92	NM
	02	N43024 E44217	6	1,884.6	CC-331	127.6	18.1	108.0	100	SG	CC-433	AC	07/27/92	NM
	03	N42815 E44206	6	1,883.2	CC-331	126.0	20.1	104.9	97.1	SG	CC-434	AC	07/27/92	NM
	04	N42637 E44207	6	1,882.1	CC-331	125.5	15.8	108.4	100+	SG	CC-435	AC	07/27/92	NM
	05	N43200 E44398	6	1,884.7	CC-331	124.8	20.2	103.8	96.1	SG	CC-436 SAND CONE	AC	07/27/92	NM,SC
	06	N43018 E44381	6	1,882.6	CC-331	126.3	25.3	100.8	93.3	SG	CC-437	AC	07/27/92	NM
	07	N42842 E44369	6	1,882.0	CC-331	125.5	24.3	101.0	93.5	SG	CC-438	AC	07/27/92	NM
	08	N42661 E44366	6	1,881.5	CC-331	125.3	23.1	101.8	94.3	SG	CC-439	AC	07/27/92	NM
	09	N43396 E44605	6	1,885.2	CC-331	133.6	15.4	115.7	100+	SG	CC-440	AC	07/27/92	NM
	10	N43210 E44587	6	1,881.9	CC-331	121.8	16.0	105.0	97.2	SG	CC-441	AC	07/27/92	NM
	11	N43025 E44577	6	1,880.3	CC-331	128.1	19.1	107.6	99.6	SG	CC-442	AC	07/27/92	NM
	12	N42836 E44567	6	1,880.4	CC-331	128.9	19.0	108.5	100+	SG	CC-443	AC	07/27/92	NM
	13	N42647 E44556	6	1,879.6	CC-331	122.4	21.5	100.8	93.3	SG	CC-444	AC	07/27/92	NM

Count: 13

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-079A	01	N42679 E44147	6	1,882.8	CC-305	130.6	22.3	106.8	96.3	SG	SG-CC-445	JA	07/28/92	NM
	02	N42820 E44152	6	1,883.8	CC-305	131.5	20.4	109.2	98.5	SG	SG-CC-446	JA	07/28/92	NM
	03	N42967 E44162	6	1,884.7	CC-305	132.1	19.1	110.9	100	1		JA	07/28/92	NM
	04	N43098 E44176	6	1,885.7	CC-305	129.4	22.2	105.6	95.5	1		JA	07/28/92	NM
	05	N43224 E44184	6	1,886.9	CC-305	131.9	19.2	110.7	99.8	2		JA	07/28/92	NM

Count: 5

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-079C	01	N43179 E44375	6	1,885.7	CC-331	126.2	17.4	109.4	100+	SG	CC-447	AC	07/28/92	NM
	02	N42990 E44344	6	1,884.6	CC-331	125.5	17.1	107.1	99.2	SG	CC-448	AC	07/28/92	NM
	03	N42801 E44320	6	1,883.9	CC-331	124.5	23.9	100.0	93.1	SG	CC-449	AC	07/28/92	NM
	04	N42610 E44307	6	1,882.4	CC-331	129.2	19.7	108.0	100	SG	CC-450	AC	07/28/92	NM
	05	N43415 E44564	6	1,885.9	CC-331	132.0	16.2	113.6	100+	SG	CC-451	AC	07/28/92	NM
	06	N43250 E44543	6	1,884.9	CC-331	124.1	23.3	99.8	92.4	SG	CC-452	AC	07/28/92	NM
	07	N43078 E44526	6	1,883.6	CC-331	124.8	24.4	100.3	92.9	SG	CC-453	AC	07/28/92	NM
	08	N42908 E44514	6	1,882.5	CC-331	122.0	23.6	98.7	91.4	SG	CC-454	AC	07/28/92	NM
	09	N42699 E44502	6	1,881.3	CC-331	122.4	25.1	97.9	90.6	SG	CC-455	AC	07/28/92	NM

Count: 9

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-080A	01	N43192 E44386	6	1,885.9	CC-305	128.6	21.6	105.8	95.4	SG	SG-CC-456	JA	07/29/92	NM
	02	N43039 E44377	6	1,884.9	CC-305	131.1	21.7	107.7	97.1	SG	SG-CC-457	JA	07/29/92	NM
	03	N42846 E44371	6	1,883.5	CC-305	129.7	17.7	110.2	99.4	SG	SG-CC-458	JA	07/29/92	NM
	04	N42670 E44366	6	1,882.6	CC-305	129.5	22.5	105.7	95.3	SG	SG-CC-459	JA	07/29/92	NM
	05	N43405 E44591	6	1,887.0	CC-305	130.9	21.1	108.1	97.5	SG	SG-CC-460	JA	07/29/92	NM
	06	N43225 E44572	6	1,885.6	CC-305	127.0	22.7	103.5	93.3	SG	SG-CC-461	JA	07/29/92	NM
	07	N43047 E44555	6	1,884.4	CC-305	127.6	23.6	103.5	93.3	SG	SG-CC-462	JA	07/29/92	NM
	08	N42875 E44540	6	1,883.2	CC-305	127.0	21.1	104.9	94.6	SG	SG-CC-463	JA	07/29/92	NM
	09	N42685 E44531	6	1,881.9	CC-305	129.4	23.2	105.0	94.7	SG	SG-CC-464	JA	07/29/92	NM

Count: 9

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-080C	01	N43375 E44677	6	1,885.3	CC-331	120.9	21.2	99.8	92.4	SG	CC-467	AC	07/29/92	NM
	02	N43187 E44668	6	1,883.9	CC-331	121.9	20.7	101.0	93.5	SG	CC-468	AC	07/29/92	NM
	03	N43000 E44658	6	1,883.1	CC-331	127.9	18.4	108.0	100	SG	CC-469	AC	07/29/92	NM
	04	N42811 E44655	6	1,882.2	CC-331	121.4	19.7	101.4	93.9	SG	CC-470	AC	07/29/92	NM
	05	N42621 E44653	6	1,879.0	CC-331	125.0	20.7	103.5	95.8	SG	CC-471	AC	07/29/92	NM

Count: 5

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-081A	01	N43384 E44492	6	1,887.3	CC-1	126.2	21.9	103.5	95.5	1ST	FAIL M.C.	JA	07/30/92	NM
	02	N43212 E44480	6	1,886.1	CC-1	128.3	20.2	106.7	96.2	1ST		JA	07/30/92	NM
	03	N43054 E44471	6	1,884.9	CC-1	128.0	21.4	105.4	95.1	1ST	FAIL	JA	07/30/92	NM
	04	N42889 E44457	6	1,883.7	CC-1	127.4	23.1	103.5	93.3	1ST	FAIL	JA	07/30/92	NM
	05	N42689 E44462	6	1,882.6	CC-1	128.3	23.6	103.8	93.6	1ST	FAIL	JA	07/30/92	NM
	06	N43220 E44847	6	1,883.8	CC-305	127.9	21.7	105.1	94.8	SG	SG-CC-472	JA	07/30/92	NM
	07	N43067 E44838	6	1,883.4	CC-305	123.6	22.3	101.0	91.1	SG	SG-CC-473	JA	07/30/92	NM
	08	N42885 E44821	6	1,881.3	CC-305	123.7	20.0	103.1	93.0	SG	SG-CC-474	JA	07/30/92	NM
	09	N42690 E44811	6	1,879.5	CC-305	123.5	22.6	100.7	90.8	SG	SG-CC-475	JA	07/30/92	NM
	10	N43197 E44212	6	1,886.5	CC-305	130.9	20.8	108.4	97.7	2ND	CLB-CC-476, ST.117	JA	07/30/92	NM
	11	N43014 E44197	6	1,885.6	CC-305	127.9	21.3	105.4	95.1	2ND	CLB-CC-477, ST.118	JA	07/30/92	NM
	12	N42839 E44187	6	1,884.2	CC-305	128.9	21.5	106.1	95.7	2ND	CLB-CC-478, ST.119	JA	07/30/92	NM
	13	N42641 E44174	6	1,883.4	CC-305	131.8	19.4	110.4	99.5	2ND	CLB-CC-479, ST.120	JA	07/30/92	NM
	14	N43389 E44699	6	1,886.3	CC-305	126.9	24.2	102.2	92.1	SG	SG-CC-480, FAIL	JA	07/30/92	NM
	15	N43214 E44690	6	1,885.2	CC-305	125.4	25.3	100.1	90.2	SG	SG-CC-481, FAIL	JA	07/30/92	NM
	16	N43030 E44683	6	1,884.2	CC-305	127.2	22.9	103.5	93.3	SG	SG-CC-482	JA	07/30/92	NM
	17	N42858 E44682	6	1,883.4	CC-305	127.1	23.5	102.9	92.8	SG	SG-CC-483 FAIL	JA	07/30/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-081A	18	N42639 E44681	6	1,881.5	CC-305	126.9	23.2	103.0	92.9	SG	SG-CC-484 FAIL	JA	07/30/92	NM

Count: 18

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-081C	01	RETEST #1	6	1,887.3	CC-1	126.1	18.3	105.7	95.3	1ST		AC	07/30/92	NM
		REP 92-81A												
	02	RETEST #3	6	1,884.9	CC-1	126.6	19.2	106.2	95.8	1ST		AC	07/30/92	NM
		REP 92-81A												
	03	RETEST #4	6	1,883.7	CC-1	126.3	19.7	105.5	95.1	1ST		AC	07/30/92	NM
		REP 92-81A												
	04	RETEST #5	6	1,882.6	CC-1	126.8	20.3	105.4	95.0	1ST	SAND CONE	AC	07/30/92	NM,SC
		REP 92-81A												
	05	N43204	6	1,886.7	CC-331	123.2	19.2	103.3	95.5	2ND		AC	07/30/92	NM
		E44389												
	06	N43026	6	1,885.3	CC-331	120.3	23.7	97.3	90.9	2ND	FAIL	AC	07/30/92	NM
		E44385												
	07	N42847	6	1,884.6	CC-331	121.0	23.1	98.3	91.0	2ND	FAIL	AC	07/30/92	NM
		E44376												
	08	N42660	6	1,883.5	CC-331	123.1	22.9	100.1	92.7	2ND	FAIL	AC	07/30/92	NM
		E44371												

Count: 8

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-082A	01	N42634 E44796	6	1,880.8	CC-305	130.1	23.8	105.1	94.8	SG	SG-CC-485	JA	07/31/92	NM
	02	N42811 E44792	6	1,882.2	CC-305	125.5	25.4	100.1	90.2	SG	SG-CC-486	JA	07/31/92	NM
	03	N42992 E44794	6	1,883.2	CC-305	129.8	22.7	105.8	95.4	SG	SG-CC-487	JA	07/31/92	NM
	04	RETEST #5, REP #92-81C	6	1,886.7	CC-305	127.8	19.2	107.2	96.7	2ND	ST.121 CLB-CC-488	JA	07/31/92	NM
	05	RETEST #6, REP #92-81C	6	1,885.3	CC-331	129.4	22.9	105.3	97.5	2ND	ST.122 CLB-CC-489	JA	07/31/92	NM
	06	RETEST #7, REP #92-81C	6	1,884.6	CC-305	128.5	20.5	106.6	96.2	2ND	ST.123 CLB-CC-490	JA	07/31/92	NM
	07	RETEST #8, REP #92-81C	6	1,883.5	CC-305	130.6	20.2	108.7	98.0	2ND	ST.124 CLB-CC-491	JA	07/31/92	NM

Count: 7

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS

BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-082C	01	N43366 E44611	6	1,887.2	CC-305	124.7	22.8	101.5	91.5	2ND	FAIL	AC	07/31/92	NM
	02	N43215 E44608	6	1,886.1	CC-305	123.0	22.5	100.4	90.5	2ND	FAIL	AC	07/31/92	NM
	03	N43043 E44601	6	1,884.1	CC-305	122.8	24.6	98.6	88.9	2ND	FAIL	AC	07/31/92	NM
	04	N42870 E44596	6	1,882.8	CC-305	123.8	22.1	101.9	91.4	2ND	FAIL	AC	07/31/92	NM
	05	N42686 E44593	6	1,881.3	CC-305	123.1	20.1	102.8	92.4	2ND	FAIL	AC	07/31/92	NM
	06	N43189 E44209	6	1,886.9	CC-305	123.4	25.4	98.3	90.0	3RD	FAIL	AC	07/31/92	NM
	07	N43033 E44201	6	1,886.1	CC-305	115.9	23.4	93.9	84.7	3RD	FAIL	AC	07/31/92	NM
	08	N42878 E44192	6	1,885.4	CC-305	123.3	20.7	102.2	92.2	3RD	FAIL SAND CONE	AC	07/31/92	NM,SC
	09	N42670 E44186	6	1,884.2	CC-305	120.0	23.7	98.0	87.5	3RD	FAIL	AC	07/31/92	NM
	10	RETEST #1	6	1,887.2	CC-305	125.6	18.6	105.9	95.5	2ND	ST-125 CC-492	AC	07/31/92	NM
	11	RETEST #2	6	1,886.1	CC-305	125.1	18.0	106.0	95.6	2ND	ST-126 CC-493	AC	07/31/92	NM
	12	RETEST #3	6	1,884.1	CC-305	128.4	20.7	106.4	95.9	2ND	ST-127 CC-494	AC	07/31/92	NM
	13	RETEST #4	6	1,882.8	CC-305	131.2	21.5	108.8	97.4	2ND	ST-128 CC-495	AC	07/31/92	NM
	14	RETEST #5	6	1,881.3	CC-305	124.6	17.8	105.8	95.4	2ND	ST-129 CC-496 PROCTOR	AC	07/31/92	NM
	15	RETEST #6	6	1,886.9	CC-305	129.2	17.6	109.9	99.1	2ND	ST-130 CC-497	AC	07/31/92	NM
	16	RETEST #7	6	1,886.1	CC-305	127.0	21.9	105.8	95.4	3RD	ST-131 CC-498	AC	07/31/92	NM
	17	RETEST #8	6	1,885.4	CC-305	125.1	18.0	106.0	95.6	3RD	ST-132 CC-499	AC	07/31/92	NM
	18	RETEST #9	6	1,884.2	CC-305	126.9	18.3	107.2	96.7	3RD	ST-133 CC-500	AC	07/31/92	NM
	19	N43219 E44358	6	1,887.0	CC-305	125.7	19.2	105.5	95.1	3RD		AC	07/31/92	NM
	20	N43038 E44341	6	1,886.2	CC-305	119.6	23.2	97.0	87.5	3RD	FAIL	AC	07/31/92	NM
	21	N42845 E44351	6	1,885.0	CC-305	123.6	21.4	101.8	91.8	3RD	FAIL	AC	07/31/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS

BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-082C	22	N42642 E44351	6	1,884.1	CC-305	120.4	17.5	102.4	92.3	3RD	FAIL	AC	07/31/92	NM
	23	N43394 E44558	6	1,888.1	CC-305	126.5	18.8	106.5	96.0	3RD		AC	07/31/92	NM
	24	N43214 E44552	6	1,887.1	CC-305	123.6	21.6	101.6	91.6	3RD	FAIL	AC	07/31/92	NM
	25	N43030 E44533	6	1,886.0	CC-305	124.6	23.0	101.3	91.3	3RD	FAIL	AC	07/31/92	NM
	26	N42849 E44532	6	1,885.2	CC-305	120.8	22.1	98.9	89.2	3RD	FAIL	AC	07/31/92	NM
	27	N42658 E44527	6	1,883.9	CC-305	120.9	25.6	96.2	86.7	3RD	FAIL	AC	07/31/92	NM
	28	RETEST #19	6	1,887.0	CC-305	124.5	19.8	103.9	93.7	3RD	FAIL	AC	07/31/92	NM
	29	RETEST #20	6	1,886.2	CC-305	121.4	21.4	100.1	90.3	3RD	FAIL	AC	07/31/92	NM
	30	RETEST #21	6	1,885.0	CC-305	118.5	20.7	98.1	88.5	3RD	FAIL	AC	07/31/92	NM
	31	RETEST #22	6	1,884.1	CC-305	121.3	20.4	100.8	90.9	3RD	FAIL	AC	07/31/92	NM

Count: 31

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-083A	01	RETEST FOR #3 REP #92-82A	6	1,883.2	CC-305	130.2	20.9	107.7	97.1	SG	SG-CC-501	JA	08/01/92	NM
	02	RETEST FOR #2 REP #92-82A	6	1,882.2	CC-305	125.1	21.2	103.2	93.1	SG	SG-CC-502	JA	08/01/92	NM
	03	RETEST FOR #1 REP #92-82A	6	1,880.8	CC-305	129.3	22.2	105.8	95.4	SG	SG-CC-503	JA	08/01/92	NM
	04	N43235 E45071	6	1,881.1	CC-305	131.6	20.8	108.9	98.2	SG	SG-CC-504	JA	08/01/92	NM
	05	N43036 E45080	6	1,880.0	CC-305	127.1	21.3	104.8	94.5	SG	SG-CC-505	JA	08/01/92	NM
	06	N42871 E45084	6	1,878.5	CC-305	129.0	21.2	106.4	96.0	SG	SG-CC-506	JA	08/01/92	NM
	07	N42662 E45083	6	1,878.8	CC-305	124.3	20.0	103.6	93.4	SG	SG-CC-507	JA	08/01/92	NM

Count: 7

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-0838	01	RETEST OF 19&28 REP 92-82C	6	1,887.0	CC-305	125.9	20.7	104.3	94.1	3	FAILED	MC	08/01/92	NM
	02	RETEST OF 20&29 REP 92-82C	6	1,886.2	CC-305	123.6	25.2	99.3	89.5	3	MC-24.5 FAILED	MC	08/01/92	NM
	03	RETEST OF 21&30 REP 92-82C	6	1,885.0	CC-305	125.8	22.2	103.0	92.9	3	FAILED	MC	08/01/92	NM
	04	RETEST OF 22&31 REP 92-82C	6	1,884.1	CC-305	126.7	23.1	102.6	92.5	3	MC = 23.5 FAILED	MC	08/01/92	NM
	05	RETEST OF 23 REP 92-82C	6	1,888.1	CC-305	124.4	22.2	102.6	92.5	3	MC = 21.3 FAILED	MC	08/01/92	NM
	06	RETEST OF 24 REP 92-82C	6	1,887.1	CC-305	126.0	21.9	103.4	93.2	3	FAILED	MC	08/01/92	NM
	07	RETEST OF 25 REP 92-82C	6	1,886.0	CC-305	124.9	22.0	102.4	92.4	3	FAILED	MC	08/01/92	NM
	08	RETEST OF 26 REP 92-82C	6	1,885.2	CC-305	124.3	22.9	102.9	92.8	3	MC = 20.8 FAILED	MC	08/01/92	NM
	09	RETEST OF 27 REP 92-82C	6	1,883.9	CC-305	123.9	23.6	100.3	90.5	3	FAILED	MC	08/01/92	NM
	10	RETEST OF #14 REP 92-81A	6	1,886.3	CC-305	123.0	21.3	101.5	91.5	SG		MC	08/01/92	NM
	11	RETEST OF #15 REP 92-81A	6	1,885.2	CC-305	123.8	22.9	100.7	90.8	SG		MC	08/01/92	NM
	12	RETEST OF #16 REP 92-81A	6	1,884.2	CC-305	123.2	23.2	99.3	90	SG		MC	08/01/92	NM
	13	RETEST OF #17 REP 92-81A	6	1,883.4	CC-305	124.0	21.5	102.1	92.1	SG		MC	08/01/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-083B	14	RETEST OF #18 REP 92-81A	6	1,881.5	CC-305	126.3	18.2	106.9	96.4	SG		MC	08/01/92	NM

Count: 14

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-083C	01	RETEST OF #19 REP 92-82C	6	1,887.0	CC-305	122.6	14.9	106.8	96.3	3RD		AC	08/01/92	NM
	02	RETEST OF #20 REP 92-82C	6	1,886.2	CC-305	125.3	18.8	105.5	95.1	3RD		AC	08/01/92	NM
	03	RETEST OF #21 REP 92-82C	6	1,885.0	CC-305	124.8	17.6	106.1	95.7	3RD		AC	08/01/92	NM
	04	RETEST OF #22 REP 92-82C	6	1,884.1	CC-305	125.9	18.1	106.6	96.1	3RD		AC	08/01/92	NM
	05	RETEST OF #24 REP 92-82C	6	1,887.1	CC-305	126.6	18.2	107.1	96.6	3RD		AC	08/01/92	NM
	06	RETEST OF #25 REP 92-82C	6	1,886.0	CC-305	127.1	19.9	106.0	95.6	3RD		AC	08/01/92	NM
	07	RETEST OF #26 REP 92-82C	6	1,885.2	CC-305	126.4	19.8	105.5	95.1	3RD		AC	08/01/92	NM
	08	RETEST OF #27 REP 92-82C	6	1,883.9	CC-305	128.1	20.5	106.3	95.9	3RD		AC	08/01/92	NM
	09	RETEST OF #23 REP 92-82C	6	1,888.1	CC-305	129.2	19.2	108.4	97.7	3RD		AC	08/01/92	NM

Count: 9

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS

BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-084A	01	N43334 E44455	6	1,888.3	CC-305	128.7	21.4	106.0	95.6	4TH	CLB-CC-510 ST.134	JA	08/03/92	NM
	02	N43320 E44627	6	1,888.4	CC-305	128.5	20.1	107.0	96.5	4TH	CLB-CC-511 ST.135	JA	08/03/92	NM
	03	N43177 E44198	6	1,887.5	CC-305	128.6	22.0	105.4	95.0	4TH	RE FOR ST.130 CLB-CC-512 ST.136	JA	08/03/92	NM
	04	N43160 E44381	6	1,887.4	CC-305	129.1	21.9	105.9	95.5	4TH	CLB-CC-513 ST.137	JA	08/03/92	NM
	05	N43147 E44599	6	1,887.1	CC-305	127.9	21.3	105.4	95.1	4TH	CLB-CC-514 ST.138	JA	08/03/92	NM
	06	N43000 E44163	6	1,886.6	CC-305	128.9	22.3	105.4	95.0	4TH	CLB-CC-515 ST.139	JA	08/03/92	NM
	07	N42997 E44333	6	1,886.6	CC-331	125.3	22.6	102.6	95.0	4TH	CLB-CC-516 ST.140	JA	08/03/92	NM
	08	N42994 E44588	6	1,886.2	CC-305	128.2	21.1	105.8	95.4	4TH	CLB-CC-517 ST.141	JA	08/03/92	NM
	09	N43074 E45132	6	1,879.2	CC-305	130.6	21.8	107.2	96.7	SG	SG-CC-518	JA	08/03/92	NM
	10	N42894 E45131	6	1,879.0	CC-305	125.5	21.9	103.0	92.8	SG	SG-CC-519	JA	08/03/92	NM
	11	N42675 E45127	6	1,878.4	CC-305	127.6	21.2	105.3	95.0	SG	SG-CC-520	JA	08/03/92	NM

Count: 11

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-084C	01	N43396 E44893	6	1,886.5	CC-305	123.8	23.2	100.5	90.6	SG	SG-CC-521	AC	08/03/92	NM
	02	N43193 E44879	6	1,886.5	CC-305	122.9	22.9	100.0	90.2	SG	SG-CC-522	AC	08/03/92	NM
	03	N43005 E44868	6	1,884.7	CC-305	123.1	21.6	101.3	91.3	SG	SG-CC-523 SAND CONE	AC	08/03/92	NM,SC
	04	N42796 E44853	6	1,885.3	CC-305	122.0	22.1	99.9	90.1	SG	SG-CC-524	AC	08/03/92	NM
	05	N42605 E44853	6	1,881.3	CC-305	121.0	18.8	101.8	91.8	SG	SG-CC-525	AC	08/03/92	NM
	06	N42880 E44211	6	1,885.8	CC-305	122.5	25.2	97.9	88.3	4TH	FAILED	AC	08/03/92	NM
	07	N42864 E44424	6	1,885.9	CC-305	120.6	24.6	96.8	87.3	4TH	FAILED	AC	08/03/92	NM
	08	N43405 E43031	6	1,885.1	CC-3	121.4	17.8	103.0	95.4	SG	SG-CC-526	AC	08/03/92	NM
	09	N43218 E45014	6	1,883.4	CC-3	120.9	23.5	97.9	90.6	SG	SG-CC-527	AC	08/03/92	NM
	10	N43024 E44993	6	1,882.3	CC-3	121.3	22.8	98.7	91.4	SG	SG-CC-528	AC	08/03/92	NM
	11	N42833 E44975	6	1,880.9	CC-3	126.5	22.0	103.2	95.6	SG	SG-CC-529	AC	08/03/92	NM
	12	N42636 E44957	6	1,880.3	CC-3	125.0	22.3	102.2	94.6	SG	SG-CC-530	AC	08/03/92	NM

Count: 12

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-085A	01	RETEST OF 1 REPORT 92-85B	6	1,885.8	CC-331	127.3	22.8	103.7	96.0	4TH	CLB-CC-532 ST.142	JA	08/04/92	NM
	02	RETEST OF 2 REPORT 92-85B	6	1,885.9	CC-331	130.2	22.7	106.1	98.3	4TH	CLB-CC-533 ST.143	JA	08/04/92	NM
	03	N42861 E44565	6	1,885.3	CC-331	128.4	22.4	104.9	97.1	4TH	CLB-CC-534 ST.144	JA	08/04/92	NM
	04	N43389 E45040	6	1,884.9	CC-138	133.6	13.0	118.2	90.2	SG	SG-CC-538	JA	08/04/92	NM
	05	N43196 E45030	6	1,883.7	CC-7	124.6	18.1	105.5	90.3	SG	SG-CC-539	JA	08/04/92	NM
	06	N43102 E43016	6	1,882.9	CC-7	129.1	13.9	113.3	97.0	SG	SG-CC-540	JA	08/04/92	NM
	07	N43832 E45002	6	1,882.1	CC-138	129.0	7.9	119.6	91.3	SG	SG-CC-541	JA	08/04/92	NM
	08	N42633 E44991	6	1,880.9	CC-7	124.0	17.1	105.9	90.7	SG	SG-CC-542	JA	08/04/92	NM

Count: 8

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-085B	01	RETEST 6 REPORT 92-84C	6	1,885.8	CC-331	122.5	24.8	98.1	90.8	4	FAILS	MC	08/04/92	NM
	02	RETEST 7 REPORT 92-84C	6	1,885.9	CC-331	125.9	23.1	102.3	94.7	4	FAILS	MC	08/04/92	NM
	03	N42678 E44526	6	1,884.5	CC-331	124.5	22.0	102.6	95	4	CLB-CC-535, ST.145	MC	08/04/92	NM
	04	N42672 E44343	6	1,884.9	CC-331	129.5	21.5	106.6	98.7	4	CLB-CC-536, ST.146	MC	08/04/92	NM
	05	N42671 E44163	6	1,885.0	CC-331	123.7	22.1	102.8	95.2	4	CLB-CC-537, ST.147	MC	08/04/92	NM

Count: 5

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS

BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-085C	01	N43409 E44734	6	1,886.8	CC-331	127.9	20.4	106.2	98.3	1ST		AC	08/04/92	NM
	02	N43206 E44717	6	1,885.7	CC-331	124.2	22.6	101.3	93.8	1ST	FAILED	AC	08/04/92	NM
	03	N43006 E44699	6	1,884.8	CC-331	123.1	18.7	103.7	96.0	1ST		AC	08/04/92	NM
	04	N42808 E44679	6	1,883.8	CC-331	124.2	23.2	100.8	93.3	1ST	FAILED	AC	08/04/92	NM
	05	N42608 E44665	6	1,882.5	CC-331	123.9	21.8	101.7	94.2	1ST	FAILED	AC	08/04/92	NM
	06	RETEST #1	6	1,886.8	CC-331	128.1	21.7	105.3	97.5	1ST		AC	08/04/92	NM
	07	RETEST #2	6	1,885.7	CC-331	121.8	17.7	103.5	95.8	1ST		AC	08/04/92	NM
	08	RETEST #3	6	1,884.8	CC-331	126.0	20.1	104.9	97.1	1ST		AC	08/04/92	NM
	09	RETEST #4	6	1,883.8	CC-331	122.8	18.0	104.1	96.4	1ST		AC	08/04/92	NM
	10	RETEST #5	6	1,882.5	CC-331	121.3	18.0	102.8	95.2	1ST		AC	08/04/92	NM
	11	N43424 E44788	6	1,886.8	CC-331	125.1	21.5	102.9	95.3	2ND		AC	08/04/92	NM
	12	N43235 E44766	6	1,886.4	CC-331	126.9	18.7	106.9	99.0	2ND		AC	08/04/92	NM
	13	N43044 E44718	6	1,885.4	CC-331	127.5	22.0	104.5	96.8	2ND		AC	08/04/92	NM
	14	N42851 E44730	6	1,884.1	CC-331	120.9	22.4	98.8	91.5	2ND	FAILED	AC	08/04/92	NM
	15	N42651 E44727	6	1,882.8	CC-331	126.3	20.4	103.0	97.2	2ND		AC	08/04/92	NM

Count: 15

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-086A	01	N43373 E44781	6	1,887.5	CC-305	127.9	24.2	103.0	92.9	2ND	FAIL	JA	08/05/92	NM
	02	N43224 E44756	6	1,886.5	CC-305	130.7	23.2	106.1	95.7	2ND	FAIL	JA	08/05/92	NM
	03	N43067 E44738	6	1,885.9	CC-305	128.1	24.6	102.8	92.7	2ND	FAIL	JA	08/05/92	NM
	04	N42916 E44728	6	1,884.8	CC-305	130.2	20.2	108.3	97.7	2ND		JA	08/05/92	NM
	05	N42763 E44720	6	1,883.5	CC-305	128.8	22.8	104.9	94.6	2ND	FAIL	JA	08/05/92	NM
	06	N42662 E44716	6	1,882.9	CC-305	127.9	21.9	104.9	94.6	2ND	FAIL	JA	08/05/92	NM
	07	N43406 E44713	6	1,888.3	CC-305	133.6	21.1	110.3	99.5	3RD		JA	08/05/92	NM
	08	N43227 E44694	6	1,887.2	CC-305	130.4	20.8	107.9	97.3	3RD		JA	08/05/92	NM
	09	N43061 E44678	6	1,886.3	CC-331	129.5	23.6	104.8	97.0	3RD		JA	08/05/92	NM
	10	N42877 E44665	6	1,885.4	CC-305	128.7	20.7	106.6	96.1	3RD		JA	08/05/92	NM
	11	N42707 E44653	6	1,883.6	CC-331	127.8	22.0	104.8	97.0	3RD		JA	08/05/92	NM
	12	N42643 E45037	6	1,881.0	CC-7	134.6	17.2	114.8	98.3	SG	SG-CC-544	JA	08/05/92	NM
	13	N42861 E45055	6	1,882.1	CC-7	130.7	12.7	116.0	99.3	SG	SG-CC-545	JA	08/05/92	NM
	14	N43062 E45072	6	1,883.3	CC-331	123.7	22.0	101.4	93.9	SG	SG-CC-546	JA	08/05/92	NM
	15	N43235 E45092	6	1,884.7	CC-331	125.2	23.5	101.4	93.9	SG	PROCTOR SG-CC-547	JA	08/05/92	NM
	16	N43392 E45113	6	1,885.8	CC-305	131.5	21.0	108.7	98	SG	SG-CC-548	JA	08/05/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS

BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-086C	01	RETEST #1 REP #92-86A	6	1,887.5	CC-331	126.0	19.7	105.3	97.5	2ND	CLB-CCC-549 ST.148	AC	08/05/92	NM
	02	RETEST #2 REP #92-86A	6	1,886.5	CC-331	124.1	19.8	103.5	95.8	2ND	CLB-CCC-550 ST.149	AC	08/05/92	NM
	03	RETEST #3 REP #92-86A	6	1,885.9	CC-331	124.9	17.6	106.3	98.4	2ND	CLB-CCC-551 ST.150	AC	08/05/92	NM
	04	RETEST #4 REP #92-86A	6	1,884.8	CC-331	128.0	19.5	107.1	99.2	2ND	CLB-CCC-552 ST.151 PROCTOR	AC	08/05/92	NM
	05	RETEST #5 REP #92-86A	6	1,883.5	CC-331	120.9	19.2	104.5	96.8	2ND	CLB-CCC-553 ST.152	AC	08/05/92	NM
	06	N43404 E44873	6	1,888.1	CC-331	123.0	22.8	100.2	92.8	3RD	FAIL	AC	08/05/92	NM
	07	N43245 E44849	6	1,887.0	CC-331	127.8	20.5	106.0	98.1	3RD		AC	08/05/92	NM
	08	N43026 E44838	6	1,885.7	CC-331	120.3	25.8	95.6	88.5	3RD	FAIL	AC	08/05/92	NM
	09	N42827 E44825	6	1,884.1	CC-331	125.4	20.9	103.7	96.0	3RD		AC	08/05/92	NM
	10	N42604 E44819	6	1,882.7	CC-331	121.8	17.7	103.5	95.8	3RD		AC	08/05/92	NM

Count: 10

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS

BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-087A	01	N43399 E44972	6	1,887.2	CC-305	132.3	20.7	109.5	98.9	1ST		JA	08/06/92	NM
	02	N43210 E44969	6	1,886.0	CC-305	129.5	21.8	106.3	95.9	1ST		JA	08/06/92	NM
	03	N43025 E44966	6	1,884.3	CC-305	130.8	20.9	108.2	97.6	1ST		JA	08/06/92	NM
	04	N42854 E44962	6	1,883.7	CC-305	131.3	20.0	109.4	98.7	1ST		JA	08/06/92	NM
	05	N42642 E44961	6	1,882.0	CC-305	130.7	21.4	107.7	97.1	1ST		JA	08/06/92	NM
	06	N42845 E45864	6	1,882.8	CC-331	127.7	21.8	104.8	97.1	SG	SG-CC-559	JA	08/06/92	NM
	07	N42656 E43798	6	1,881.5	CC-331	128.2	23.3	104.0	96.3	SG	SG-CC-560	JA	08/06/92	NM

Count: 7

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-087B	01	N43397 E45067	6	1,886.4	CC-305	132.1	21.6	108.6	97.9	SG	CC-554 PROCTOR	MC	08/06/92	NM
	02	N43218 E45048	6	1,885.4	CC-305	130.8	21.7	107.5	96.9	SG	CC-555	MC	08/06/92	NM
	03	N43058 E45031	6	1,884.6	CC-305	128.2	23.9	103.5	93.3	SG	CC-556	MC	08/06/92	NM
	04	N42878 E45017	6	1,883.4	CC-10	132.7	20.0	110.6	97.1	SG	CC-557	MC	08/06/92	NM
	05	N42643 E45003	6	1,881.5	CC-10	128.3	19.0	107.8	94.7	SG	CC-558	MC	08/06/92	NM

Count: 5

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-087C	01	N42729 E45733	6	1,880.0	CC-305	123.2	25.4	98.2	88.5	SG	FAIL CC-561	AC	08/06/92	NM
	02	N42650 E45638	6	1,878.6	CC-305	118.5	25.6	94.4	85.1	SG	FAIL CC-562	AC	08/06/92	NM
	03	N42796 E45580	6	1,879.6	CC-305	122.2	21.6	100.5	90.6	SG	CC-563	AC	08/06/92	NM
	04	N42668 E45431	6	1,878.4	CC-305	122.2	23.8	98.7	89.0	SG	FAIL CC-564	AC	08/06/92	NM
	05	N43331 E45354	6	1,884.9	CC-305	122.3	27.4	95.9	86.5	SG	FAIL CC-565	AC	08/06/92	NM
	06	N43141 E45328	6	1,882.5	CC-305	121.4	25.9	96.4	86.9	SG	FAIL CC-566	AC	08/06/92	NM
	07	N42957 E45302	6	1,879.2	CC-305	120.8	26.1	95.9	86.5	SG	FAIL CC-567	AC	08/06/92	NM
	08	N42765 E45275	6	1,879.1	CC-305	120.1	26.8	94.6	85.3	SG	FAIL CC-568	AC	08/06/92	NM
	09	N42629 E45274	6	1,879.2	CC-305	121.9	28.7	96.9	87.4	SG	FAIL CC-569	AC	08/06/92	NM

Count: 9

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-088A	01	N42837 E45844	6	1,883.4	CC-331	126.0	22.1	103.2	95.6	1ST		JA	08/07/92	NM
	02	N42672 E45844	6	1,882.1	CC-331	127.0	21.1	105.0	97.2	1ST		JA	08/07/92	NM
	03	N43385 E45006	6	1,887.5	CC-331	127.1	22.8	103.5	95.8	2ND	CLB-CC-573 ST.156	JA	08/07/92	NM
	04	N43211 E45009	6	1,886.3	CC-331	129.1	22.1	105.7	97.9	2ND	CLB-CC-574 ST.157	JA	08/07/92	NM
	05	N43012 E45005	6	1,885.0	CC-305	130.8	21.6	107.6	97.0	2ND	CLB-CC-575 ST.158	JA	08/07/92	NM
	06	N42816 E44997	6	1,883.7	CC-331	129.0	22.6	105.2	97.4	2ND	CLB-CC-576 ST.159	JA	08/07/92	NM
	07	N42638 E44996	6	1,882.2	CC-305	127.8	21.3	105.4	95.0	2ND	CLB-CC-577 ST.160	JA	08/07/92	NM

Count: 7

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-0888	01	N43326 E45526	6	1,886.7	CC-305	127.0	18.3	107.4	96.8	2ND	CLB-CC-570 ST.153	MC	08/07/92	NM
	02	N43163 E45516	6	1,885.9	CC-305	132.8	17.4	113.1	100+	2ND	CLB-CC-571 ST.154	MC	08/07/92	NM
	03	N42962 E45509	6	1,884.4	CC-305	127.8	17.6	108.6	98	2ND	CLB-CC-572 ST.155	MC	08/07/92	NM

Count: 3

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-088C	01	N43394 E45462	6	1,888.0	CC-305	122.5	23.2	101.3	91.3	3RD	FAILS	AC	08/07/92	NM
	02	N43218 E45451	6	1,886.7	CC-305	123.8	23.0	100.7	90.8	3RD	FAIL SAND CONE	AC	08/07/92	NM,SC
	03	N42998 E45464	6	1,885.1	CC-305	123.4	24.1	99.4	89.6	3RD	FAIL	AC	08/07/92	NM
	04	RETEST #5 REP#92-97C	6	1,884.9	CC-305	122.2	21.4	100.7	90.8	SG		AC	08/07/92	NM
	05	RETEST #6 REP#92-97C	6	1,882.5	CC-305	124.5	21.6	102.4	92.3	SG		AC	08/07/92	NM
	06	RETEST #7 REP#92-97C	6	1,879.2	CC-305	122.4	22.5	99.9	90.1	SG		AC	08/07/92	NM
	07	RETEST #8 REP#92-97C	6	1,879.1	CC-305	123.0	21.9	100.9	91.0	SG		AC	08/07/92	NM
	08	RETEST #9 REP#92-97C	6	1,879.2	CC-305	122.2	22.5	99.8	90.0	SG		AC	08/07/92	NM
	09	RETEST #1	6	1,888.0	CC-305	125.8	23.4	101.9	91.9	3RD	FAILS	AC	08/07/92	NM
	10	RETEST #2	6	1,886.7	CC-305	121.0	23.7	97.8	88.2	3RD	FAILS	AC	08/07/92	NM
	11	RETEST #3	6	1,885.1	CC-305	122.3	24.8	98.0	88.4	3RD	FAILS	AC	08/07/92	NM
	12	RETEST #6 REP #92-86	6	1,888.1	CC-305	121.3	24.9	97.1	97.5	3RD	FAILS	AC	08/07/92	NM
	13	RETEST #7 REP #92-86C	6	1,887.0	CC-305	122.9	23.8	99.2	89.4	3RD	FAILS	AC	08/07/92	NM
	14	RETEST #8 REP #92-86C	6	1,885.7	CC-305	123.2	24.4	99.0	89.3	3RD	FAILS	AC	08/07/92	NM
	15	N43378 E45155	6	1,887.7	CC-305	120.8	24.3	97.2	87.6	2ND	FAILS	AC	08/07/92	NM
	16	N43224 E45138	6	1,886.6	CC-305	120.4	23.5	97.5	87.9	2ND	FAILS	AC	08/07/92	NM
	17	N43067 E45123	6	1,885.7	CC-305	121.6	23.5	98.4	88.7	2ND	FAILS	AC	08/07/92	NM
	18	N42902 E45107	6	1,884.5	CC-305	126.5	22.1	103.6	93.4	2ND	FAILS	AC	08/07/92	NM
	19	N42723	6	1,883.3	CC-305	123.5	22.4	100.9	91.0	2ND	FAILS	AC	08/07/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-088C	19	E45092												

Count: 19

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-089A	01	RETEST #15 REP#92-88C	6	1,887.7	CC-331	128.2	22.8	104.4	96.7	2ND	CLB-CC-578 ST.161	JA	08/08/92	NM
	02	RETEST #16 REP#92-88C	6	1,886.6	CC-331	124.4	22.8	102.9	95.2	2ND	CLB-CC-579 ST.162	JA	08/08/92	NM
	03	RETEST #17 REP#92-88C	6	1,885.7	CC-305	130.0	20.1	108.2	97.6	2ND	CLB-CC-580 ST.163	JA	08/08/92	NM
	04	RETEST #18 REP#92-88C	6	1,884.5	CC-305	127.7	20.4	106.1	95.7	2ND	CLB-CC-581 ST.164	JA	08/08/92	NM
	05	RETEST #19 REP#92-88C	6	1,883.3	CC-331	130.1	23.2	105.6	97.8	2ND	CLB-CC-582 ST.165	JA	08/08/92	NM
	06	RETEST #1&9 REP#92-88C	6	1,888.0	CC-331	127.8	22.8	104.1	96.4	3RD		JA	08/08/92	NM
	07	RETEST #2&10 REP#92-88C	6	1,886.7	CC-305	130.8	21.2	107.9	97.3	3RD		JA	08/08/92	NM
	08	RETEST #3&11 REP#92-88C	6	1,885.1	CC-331	130.7	23.6	105.7	97.9	3RD		JA	08/08/92	NM
	09	N42650 E45030	6	1,883.0	CC-331	126.7	22.7	103.3	95.6	3RD		JA	08/08/92	NM
	10	N42855 E45030	6	1,884.7	CC-331	127.4	22.5	104.0	96.3	3RD		JA	08/08/92	NM
	11	N43043 E45028	6	1,886.1	CC-305	130.5	20.2	108.6	97.9	3RD		JA	08/08/92	NM
	12	N43239 E45023	6	1,887.3	CC-305	128.7	21.9	105.6	95.2	3RD		JA	08/08/92	NM
	13	N43391 E45019	6	1,888.1	CC-305	130.1	20.4	108.1	97.4	3RD		JA	08/08/92	NM
	14	N42846 E45840	6	1,883.8	CC-331	129.8	22.6	105.9	98.0	2	CLB-CC-583 ST.166	JA	08/08/92	NM
	15	N42666 E45833	6	1,882.6	CC-331	130.3	22.7	106.2	98.3	2	CLB-CC-584 ST.167	JA	08/08/92	NM

Count: 15

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-090A	01	RETEST #6 REP#92-86C	6	1,888.1	CC-305	127.7	18.7	107.6	97.0	3RD		JA	08/10/92	NM
	02	RETEST #7 REP#92-86C	6	1,887.0	CC-305	130.3	19.4	109.1	98.4	3RD		JA	08/10/92	NM
	03	RETEST #8 REP#92-86C	6	1,885.7	CC-305	127.9	20.6	106.1	95.6	3RD		JA	08/10/92	NM
	04	N43393 E45206	6	1,888.3	CC-305	131.8	19.9	109.9	99.1	3RD		JA	08/10/92	NM
	05	N43227 E45193	6	1,886.9	CC-305	130.4	21.5	107.3	96.8	3RD		JA	08/10/92	NM
	06	N43015 E45171	6	1,885.5	CC-331	128.2	21.0	106.0	98.1	3RD		JA	08/10/92	NM
	07	N42831 E45154	6	1,884.1	CC-331	127.1	22.4	103.8	96.1	3RD		JA	08/10/92	NM
	08	N42640 E45137	6	1,882.7	CC-305	132.5	20.7	109.8	99.0	3RD		JA	08/10/92	NM
	09	RETEST #1 REP#92-87C	6	1,880.0	CC-305	128.1	18.3	108.3	97.7	SG	SG-CC-585	JA	08/10/92	NM
	10	RETEST #3 REP#92-87C	6	1,879.6	CC-305	126.6	21.7	104.0	93.8	SG	SG-CC-586	JA	08/10/92	NM
	11	RETEST #4 REP#92-87C	6	1,878.4	CC-305	129.9	18.3	109.8	99.0	SG	SG-CC-587	JA	08/10/92	NM
	12	N43397 E45113	6	1,888.9	CC-331	129.6	22.7	105.6	97.8	4TH	CLB-CC-588 ST-168	JA	08/10/92	NM
	13	N43401 E44906	6	1,889.0	CC-331	128.5	22.4	105.0	97.2	4TH	CLB-CC-589 ST-169	JA	08/10/92	NM
	14	N43406 E44696	6	1,889.0	CC-331	126.9	22.1	103.9	96.2	4TH	CLB-CC-590 ST-170	JA	08/10/92	NM
	15	N43196 E44683	6	1,887.5	CC-331	127.3	21.1	105.1	97.3	4TH	CLB-CC-591 ST-171	JA	08/10/92	NM
	16	N43190 E44889	6	1,887.3	CC-331	119.1	21.9	97.7	90.5	4TH	FAIL	JA	08/10/92	NM
	17	N43191 E45104	6	1,887.4	CC-331	127.3	22.0	104.3	96.6	4TH	CLB-CC-592 ST.172	JA	08/10/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-090A	18	N43346 E45349	6	1,886.0	CC-305	132.8	20.6	110.1	99.3	SG	SG-CC-594	JA	08/10/92	NM
	19	N43107 E45345	6	1,882.8	CC-7	125.6	8.6	115.7	99.1	SG	SG-CC-595	JA	08/10/92	NM
	20	N42953 E45334	6	1,880.4	CC-7	124.1	14.8	108.1	92.6	SG	SG-CC-596	JA	08/10/92	NM
	21	N42774 E45318	6	1,879.0	CC-7	128.1	13.6	112.8	96.6	SG	SG-CC-597	JA	08/10/92	NM
	22	N42610 E45300	6	1,879.1	CC-138	139.2	8.4	128.4	98.0	SG	SG-CC-598	JA	08/10/92	NM
	23	N42646 E45907	6	1,883.5	CC-305	126.9	19.7	105.9	95.5	3RD		JA	08/10/92	NM
	24	N42837 E45907	6	1,884.4	CC-305	125.4	19.0	105.4	95.0	3RD		JA	08/10/92	NM
	25	RETEST #16	6	1,887.3	CC-331	125.0	23.5	101.2	93.7	3RD	FAIL	JA	08/10/92	NM

Count: 25

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-091A	01	N42999 E44687	6	1,886.3	CC-305	129.5	20.2	107.7	97.1	4TH	PROCTOR CLB-CC-579 ST.173	JA	08/11/92	NM
	02	N42995 E44904	6	1,886.1	CC-331	127.8	22.3	104.5	96.8	4TH	CLB-CC-600 ST.174	JA	08/11/92	NM
	03	N42991 E45086	6	1,886.0	CC-418	125.9	22.4	102.9	96.1	4TH	CLB-CC-601 ST.175	JA	08/11/92	NM
	04	RETEST #16&25 REPORT 92-90A	6	1,887.3	CC-305	131.3	19.6	109.8	99.0	4TH	CLB-CC-602 ST.176	JA	08/11/92	NM
	05	N42821 E44667	6	1,885.5	CC-305	128.1	19.6	107.1	96.6	4TH	CLB-CC-603 ST.177	JA	08/11/92	NM
	06	N42810 E44866	6	1,885.6	CC-331	127.7	22.6	104.2	96.4	4TH	CLB-CC-604 ST.178	JA	08/11/92	NM
	07	N42799 E45045	6	1,885.4	CC-305	129.6	21.4	106.8	96.3	4TH	CLB-CC-605 ST.179	JA	08/11/92	NM
	08	N42664 E45383	6	1,878.2	CC-305	130.8	20.9	108.2	97.6	SG	SG-CC-606	JA	08/11/92	NM
	09	N42640 E45581	6	1,879.1	CC-138	134.2	8.8	123.3	94.2	SG	SG-CC-607	JA	08/11/92	NM
	10	N42822 E45593	6	1,880.7	CC-138	133.7	11.7	119.7	91.4	SG	SG-CC-608	JA	08/11/92	NM
	11	N42833 E45401	6	1,878.7	CC-138	129.1	7.8	119.8	91.4	SG	SG-CC-609	JA	08/11/92	NM
	12	N42608 E45072	6	1,883.8	CC-305	128.6	21.9	105.5	95.1	4	CLB-CC-610 ST.180	JA	08/11/92	NM
	13	N42611 E44886	6	1,884.0	CC-305	129.2	23.0	105.0	94.7	4	CLB-CC-611 ST.181	JA	08/11/92	NM
	14	N42612 E44652	6	1,884.0	CC-305	128.2	18.4	108.3	97.6	4	CLB-CC-612 ST.182	JA	08/11/92	NM
	15	N43326 E45337	6	1,884.9	CC-7	131.0	12.0	117.0	100.2	SG	SG-CC-613	JA	08/11/92	NM
	16	N43142 E43318	6	1,883.4	CC-138	133.1	9.1	122.0	93.1	SG	SG-CC-614	JA	08/11/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-091A	17	N42966 E43303	6	1,882.0	CC-138	131.8	7.6	122.5	93.5	SG	SG-CC-615	JA	08/11/92	NM
	18	N42775 E43294	6	1,880.7	CC-7	120.8	8.4	111.4	95.4	SG	SG-CC-616	JA	08/11/92	NM
	19	N42627 E45284	6	1,880.2	CC-7	113.5	7.0	106.1	90.8	SG	SG-CC-617	JA	08/11/92	NM
	20	N42854 E45492	6	1,881.2	CC-138	136.2	9.4	124.3	94.9	SG	SG-CC-618	JA	08/11/92	NM
	21	N42648 E45486	6	1,880.5	CC-305	119.9	17.0	102.5	92.9	SG	SG-CC-619	JA	08/11/92	NM

Count: 21

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-092A	01	N42804 E45729	6	1,882.6	CC-138	133.5	9.7	121.6	92.8	SG	SG-CC-620	JA	08/12/92	NM
	02	N42634 E45703	6	1,881.0	CC-7	123.1	9.2	112.7	96.5	SG	SG-CC-621	JA	08/12/92	NM
	03	N42668 E45211	6	1,881.1	CC-305	124.1	19.2	104.1	93.9	SG	SG-CC-622	JA	08/12/92	NM
	04	N42855 E45228	6	1,881.4	CC-305	124.7	18.3	105.4	95.0	SG	SG-CC-623	JA	08/12/92	NM
	05	N43036 E45250	6	1,882.8	CC-305	121.1	15.3	105.0	94.7	SG	SG-CC-624	JA	08/12/92	NM
	06	N43195 E45272	6	1,884.8	CC-305	121.4	18.2	102.6	92.5	SG	SG-CC-625	JA	08/12/92	NM
	07	N43340 E45303	6	1,886.2	CC-305	127.1	21.4	104.7	94.4	SG	SG-CC-626	JA	08/12/92	NM
	08	N42893 E45429	6	1,882.0	CC-305	130.1	21.7	106.9	96.4	SG	SG-CC-628	JA	08/12/92	NM
	09	N42634 E45405	6	1,880.0	CC-305	125.6	20.2	104.5	94.2	SG	SG-CC-629	JA	08/12/92	NM
	10	N42620 E45667	6	1,881.6	CC-331	124.0	20.5	102.9	95.3	SG	SG-CC-630	JA	08/12/92	NM
	11	N42800 E45679	6	1,882.3	CC-305	129.1	18.2	109.2	98.5	SG	SG-CC-631	JA	08/12/92	NM
	12	N43187 E43332	6	1,884.9	CC-305	127.2	19.8	106.2	95.7	SG	SG-CC-633	JA	08/12/92	NM
	13	N42994 E45333	6	1,883.9	CC-305	128.6	19.8	107.3	96.8	SG	SG-CC-634	JA	08/12/92	NM
	14	N42806 E43302	6	1,882.9	CC-305	125.0	20.6	103.6	93.5	SG	SG-CC-635	JA	08/12/92	NM
	15	N42643 E45279	6	1,882.0	CC-305	125.0	20.8	103.5	93.3	SG	SG-CC-636	JA	08/12/92	NM
	16	N42854 E45526	6	1,883.2	CC-305	128.0	18.3	108.2	97.6	SG	SG-CC-637	JA	08/12/92	NM
	17	N42641 E45504	6	1,881.8	CC-305	130.1	18.2	110.1	99.2	SG	SG-CC-638	JA	08/12/92	NM

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-092A	18	N42740 E45424	6	1,882.8	CC-305	132.0	18.9	111.0	100+	SG	SG-CC-639	JA	08/12/92	NM
	19	N43325 E45317	6	1,886.1	CC-305	132.5	18.6	111.7	100+	1ST		JA	08/12/92	NM
	20	N43139 E45298	6	1,885.3	CC-305	128.8	18.9	108.3	97.7	1ST		JA	08/12/92	NM
	21	N42943 E45279	6	1,884.2	CC-305	131.3	20.9	108.6	97.9	1ST		JA	08/12/92	NM
	22	N42771 E45264	6	1,883.6	CC-305	125.4	18.7	105.6	95.3	1ST		JA	08/12/92	NM
	23	N42625 E45254	6	1,882.6	CC-305	128.3	19.3	107.5	97.0	1ST		JA	08/12/92	NM

Count: 23

BRAUN INTERTEC

SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-093A	01	N42915 E45407	6	1,884.0	CC-305	131.1	19.9	109.3	98.6	1ST		JA	08/13/92	NM
	02	N42662 E45389	6	1,882.7	CC-305	128.3	20.3	106.7	96.2	1ST		JA	08/13/92	NM
	03	N42647 E45664	6	1,882.7	CC-305	129.4	18.1	109.6	98.8	1ST		JA	08/13/92	NM
	04	N42812 E45677	6	1,883.5	CC-305	125.1	17.2	106.7	96.2	1ST		JA	08/13/92	NM
	05	N43343 E45338	6	1,887.5	CC-305	126.6	19.0	106.4	95.9	2ND	CLB-CC-641 ST.183	JA	08/13/92	NM
	06	N43160 E45327	6	1,885.8	CC-305	128.4	19.4	107.5	97.0	2ND	CLB-CC-642 ST.184	JA	08/13/92	NM
	07	N42969 E45315	6	1,884.7	CC-305	128.3	21.4	105.7	95.3	2ND	CLB-CC-643 ST.185	JA	08/13/92	NM
	08	N42780 E45305	6	1,883.5	CC-305	130.0	22.5	106.1	95.7	2ND	CLB-CC-644 ST.186 PROCTOR	JA	08/13/92	NM
	09	N42616 E45297	6	1,882.4	CC-305	132.0	21.5	108.6	98.0	2ND	CLB-CC-645 ST.187	JA	08/13/92	NM
	10	N42871 E45536	6	1,884.3	CC-305	132.7	21.5	109.1	98.4	2ND	CLB-CC-646 ST.188	JA	08/13/92	NM
	11	N42638 E45527	6	1,883.0	CC -305	132.6	21.7	109.0	98.2	2ND	CLB-CC-647 ST.189	JA	08/13/92	NM
	12	N43358 E45398	6	1,887.2	CC-305	131.0	16.5	112.4	100+	3RD		JA	08/13/92	NM
	13	N43153 E45375	6	1,886.2	CC-331	129.1	22.5	105.4	97.6	3RD		JA	08/13/92	NM
	14	N42974 E45351	6	1,885.3	CC-331	128.2	22.7	104.5	96.7	3RD		JA	08/13/92	NM
	15	N42796 E45339	6	1,884.6	CC-331	127.7	21.7	104.9	97.2	3RD		JA	08/13/92	NM
	16	N42619 E45321	6	1,883.4	CC-331	127.8	24.3	102.8	95.2	3RD		JA	08/13/92	NM
	17	N42896 E45516	6	1,885.0	CC-305	129.5	20.9	107.5	96.9	3RD		JA	08/13/92	NM

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SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-093A	18	N42628 E45491	6	1,883.6	CC-331	128.2	22.7	104.5	96.7	3RD		JA	08/13/92	NM
	19	N42628 E45737	6	1,883.2	CC-331	127.9	21.2	105.5	97.7	3RD		JA	08/13/92	NM
	20	N42816 E45740	6	1,884.2	CC-305	130.5	21.0	107.9	97.3	3RD		JA	08/13/92	NM

Count: 20

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SUMMARY OF DENSITY TESTS
BFDX-92-017C Coal Creek Station EP #93

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD
92-094A	01	N43408 E45272	6	1,888.8	CC-305	128.7	20.5	105.9	95.5	4	CLB-CC-648 ST.190	JA/MC	08/14/92	NM
	02	N43213 E45253	6	1,887.4	CC-305	129.3	23.0	105.1	95	4	CLB-CC-649 ST.191	JA/MC	08/14/92	NM
	03	N43040 E45238	6	1,886.4	CC-305	127.2	20.9	105.1	95	4	CLB-CC-650 ST.192	JA/MC	08/14/92	NM
	04	N43410 E45475	6	1,888.5	CC-305	131.0	19.0	110.0	99.3	4	CLB-CC-651 ST.193	JA/MC	08/14/92	NM
	05	N43202 E45458	6	1,887.4	CC-305	129.2	21.7	106.2	95.7	4	CLB-CC-652 ST.194	JA/MC	08/14/92	NM
	06	N43031 E45443	6	1,886.5	CC-305	128.9	20.5	107.0	96.5	4	CLB-CC-653 ST.195	JA/MC	08/14/92	NM
	07	N42807 E45749	6	1,885.0	CC-305	128.4	21.6	105.6	95.2	4	CLB-CC-655 ST.196	JA/MC	08/14/92	NM
	08	N42663 E45746	6	1,883.7	CC-305	128.5	18.3	108.6	98.0	4	CLB-CC-655 ST.197	JA/MC	08/14/92	NM
	09	N42607 E45611	6	1,883.2	CC-305	130.2	20.8	107.8	97.2	4	CLB-CC-656 ST.198	JA/MC	08/14/92	NM
	10	N42796 E45598	6	1,885.2	CC-305	127.2	19.7	106.3	95.8	4	CLB-CC-657 ST.199	JA/MC	08/14/92	NM
	11	N42690 E45405	6	1,884.2	CC-305	130.5	20.1	108.7	98.0	4	CLB-CC-658 ST.200	JA/MC	08/14/92	NM
	12	N42687 E45202	6	1,884.2	CC-305	131.3	18.9	110.4	99.6	4	PROCTOR CLB-CC-659 ST.201	JA/MC	08/14/92	NM
	13	N42856 E45410	6	1,885.5	CC-305	130.2	21.1	107.5	96.9	4	CLB-CC-660 ST.202	JA/MC	08/14/92	NM
	14	N42849 E45212	6	1,885.3	CC-305	131.9	19.4	110.5	99.6	4	CLB-CC-661 ST.203	JA/MC	08/14/92	NM

Count: 14

BRAUN INTERTEC

Cooperative Power Association
BFDX-92-017C
EP #93

Subgrade In-Situ
Moisture Contents

CC-6 - 20.3	CC-48 - 20.9	CC-90 - 21.6	CC-124 - 15.8*
CC-8 - 18.9	CC-49 - 17.4	CC-91 - 20.1	CC-126 - 18.2*
CC-9 - 20.7	CC-65 - 20.8	CC-92 - 21.1	CC-127 - 17*
CC-11 - 22.9	CC-66 - 17.7	CC-93 - 19.8	CC-128 - 20.1*
CC-12 - 21.4	CC-67 - 18.5	CC-94 - 19.6	CC-129 - 18.2*
CC-13 - 21.4	CC-68 - 18.8	CC-95 - 22	CC-130 - 17.1*
CC-14 - 23.3	CC-69 - 18.5	CC-96 - 19.1	CC-132 - 18.3*
CC-15 - 20.6	CC-70 - 18.4	CC-97 - 20.9	CC-133 - 18.7*
CC-17 - 22.3	CC-71 - 21.8	CC-98 - 21.4	CC-134 - 18.1*
CC-31 - 21	CC-72 - 20.8	CC-99 - 18.2	CC-135 - 18.8*
CC-32 - 21	CC-73 - 17.5	CC-104 - 9.2*	CC-137 - 17.6*
CC-33 - 21	CC-74 - 19.1	CC-106 - 11.4*	CC-139 - 19.9*
CC-34 - 19	CC-75 - 18.9	CC-107 - 9.2*	CC-140 - 19.1*
CC-35 - 20	CC-76 - 18.7	CC-110 - 18.6*	CC-141 - 18.4*
CC-36 - 20	CC-77 - 19.9	CC-111 - 20*	CC-142 - 23.1
CC-37 - 23	CC-78 - 20.1	CC-112 - 19.6*	CC-143 - 24.2
CC-38 - 23	CC-79 - 19	CC-113 - 17.3*	CC-144 - 20.5
CC 39 - 20	CC-80 - 18.7	CC-114 - 18.3*	CC-145 - 21.6
CC-40 - 20.1	CC-85 - 16.8	CC-115 - 19.6*	CC-146 - 21.4
CC-44 - 19	CC-86 - 19.4	CC-120 - 15.7*	CC-147 - 19.4
CC-45 - 19.9	CC-87 - 21.1	CC-121 - 18.4*	CC-148 - 21.8
CC-46 - 16.4	CC-88 - 21.2	CC-122 - 17.2*	CC-149 - 18.3
CC-47 - 17.4	CC-89 - 19.7	CC-123 - 18.3*	CC-150 - 19.6

* - Moistures obtained from moisture-density gauge.

BRAUN
INTERTEC

Subgrade In-Situ
Moisture Contents

CC-151 - 19	CC-187 - 22.8	CC-212 - 20.1	CC-250 - 10.5
CC-152 - 18.9	CC-188 - 18.4	CC-213 - 17.4	CC-251 - 20.6
CC-153 - 19.1	CC-189 - 18.6	CC-214 - 18.6	CC-252 - 21
CC-154 - 20.1	CC-190 - 19.4	CC-215 - 20.7	CC-253 - 18.1
CC-155 - 20.3	CC-191 - 18.6	CC-216 - 22.5	CC-254 - 13
CC-156 - 19.4	CC-192 - 19.2	CC-217 - 20	CC-255 - 18.7
CC-157 - 4.4	CC-193 - 7.4	CC-218 - 19.5	CC-256 - 10.9
CC-158 - 17.3	CC-194 - 4.6	CC-219 - 20.4	CC-257 - 10.8
CC-159 - 21.3	CC-195 - 20.5	CC-220 - 19.3	CC-258 - 5.9
CC-160 - 20.7	CC-196 - 20	CC-224 - 16.9	CC-259 - 16.3
CC-161 - 20	CC-197 - 18.4	CC-225 - 18.1	CC-260 - 10.6
CC-162 - 17.1	CC-198 - 19	CC-226 - 18.4	CC-261 - 14.5
CC-163 - 19.9	CC-199 - 18.8	CC-227 - 17.7	CC-262 - 16.6
CC-164 - 18.8	CC-200 - 20.1	CC-228 - 17.6	CC-263 - 13.2
CC-165 - 16.9	CC-201 -20.2	CC-229 - 19.6	CC-264 - 18.7
CC-166 - 8.7	CC-202 - 21.1	CC-230 - 18.6	CC-265 - 20.4
CC-167 - 14.1	CC-203 - 19.6	CC-231 - 17.1	CC-266 - 19.2
CC-168 - 8.0	CC-204 - 18.7	CC-232 - 19.2	CC-267 - 16.1
CC-169 - 6.8	CC-205 - 8.8	CC-235 - 21.1	CC-268 - 13.7
CC-171 - 19.4	CC-206 - 10.5	CC-236 - 19.2	CC-269 - 20
CC-172 - 18.5	CC-207 - 5.6	CC-237 - 21	CC-270 - 17.2
CC-173 - 17.5	CC-208 - 6.7	CC-238 - 17.2	CC-271 - 18.4
CC-174 - 20	CC-209 - 6.2	CC-239 - 20	CC-272 - 17.7
CC-185 - 22.6	CC-210 - 19.3	CC-245 - 17.4	CC-273 - 18.8
CC-186 - 17.2	CC-211 - 19.9	CC-246 - 15.7	CC-274 - 18.4

* - Moistures obtained from moisture-density gauge.

BRAUN
INTERTEC

Subgrade In-Situ Moisture Contents

CC-275 - 12.8	CC-307 - 18.4	CC-344 - 22.1	CC-409 - 7.8
CC-276 - 12.9	CC-308 - 18.9	CC-345 - 20.8	CC-410 - 24.1
CC-277 - 12.1	CC-309 - 18.3	CC-346 - 20.2	CC-411 - 14.6
CC-278 - 16.9	CC-310 - 17.5	CC-347 - 23	CC-412 - 22.9
CC-279 - 13.4	CC-311 - 21.4	CC-348 - 24.2	CC-413 - 21.7
CC-280 - 9.0	CC-312 - 19.6	CC-349 - 22.5	CC-414 - 14.3
CC-281 - 9.8	CC-313 - 16.8	CC-350 - 21.3	CC-415 - 14
CC-282 - 13.6	CC-314 - 19.8	CC-351 - 23	CC-416 - 10.7
CC-283 - 8.3	CC-315 - 19.9	CC-358 - 19.2	CC-417 - 15
CC-284 - 11.8	CC-316 - 21.6	CC-359 - 21.4	CC-427 - 21.3
CC-285 - 21.2	CC-317 - 19.8	CC-360 - 22.3	CC-428 - 21.7
CC-286 - 21.6	CC-327 - 17.9	CC-361 - 22	CC-432 - 19.4
CC-288 - 17.8	CC-328 - 6.5	CC-368 - 22.6	CC-433 - 19.9
CC-292 - 25.3*	CC-329 - 15.6	CC-369 - 23.4	CC-434 - 18.4
CC-293 - 16.2	CC-330 - 17	CC-370 - 22.8	CC-435 - 15.1
CC-294 - 18.4	CC-334 - 21.4	CC-371 - 20.3	CC-436 - 21.5
CC-295 - 15.6	CC-335 - 21.8	CC-381 - 22.7*	CC-437 - 24.4
CC-296 - 18.1	CC-336 - 21.6	CC-382 - 22.3*	CC-438 - 21.6
CC-297 - 18.1	CC-337 - 20.2	CC-383 - 20.8*	CC-439 - 21.5
CC-298 - 18.7	CC-338 - 18.4	CC-402 - 10.3	CC-440 - 16.2
CC-299 - 13.7	CC-339 - 18.9	CC-403 - 14.5	CC-441 - 17.5
CC-300 - 9.6	CC-340 - 20.8	CC-404 - 16.3	CC-442 - 17.3
CC-301 - 11.3	CC-341 - 21.4	CC-405 - 17.5	CC-443 - 19.4
CC-302 - 9	CC-342 - 23	CC-406 - 18	CC-444 - 16.2
CC-306 - 15.8	CC-343 - 22.2	CC-407 - 13.8	CC-445 - 23.1

* - Moistures obtained from moisture-density gauge.

BRAUN INTERTEC

Subgrade In-Situ Moisture Contents

CC-446 - 19.9	CC-473 - 22.9	CC-525 - 17.9	CC-563 - 21.6*
CC-447 - 19.2	CC-474 - 22.4	CC-526 - 16.1	CC-564 - 23.8*
CC-448 - 19.4	CC-475 - 24	CC-527 - 19.5	CC-565 - 25.3
CC-449 - 23.3	CC-480 - 24.2*	CC-528 - 17.5	CC-566 - 24.5
CC-450 - 18.9	CC-481 - 25.3*	CC-529 - 20	CC-567 - 26.1*
CC-451 - 17.9	CC-482 - 22.9*	CC-530 - 21.7	CC-568 - 26.8*
CC-452 - 23.4	CC-483 - 23.5*	CC-538 - 12.7	CC-569 - 28.7*
CC-453 - 23.5	CC-484 - 23.2*	CC-539 - 20.4	CC-585 - 18.3*
CC-454 - 23.4	CC-485 - 23.8*	CC-540 - 12.8	CC-586 - 21.7*
CC-455 - 24.2	CC-486 - 25.4*	CC-541 - 8.5	CC-587 - 18.3*
CC-456 - 21.7	CC-487 - 22.7*	CC-542 - 14.4	CC-594 - 21.6
CC-457 - 21.9	CC-501 - 22.9	CC-544 - 16.5	CC-595 - 4.1
CC-458 - 17.3	CC-502 - 23.9	CC-545 - 14.6	CC-596 - 13.7
CC-459 - 23.6	CC-503 - 22	CC-546 - 21.9	CC-597 - 13.1
CC-460 - 22.6	CC-504 - 22.9	CC-547 - 23.2	CC-598 - 6.2
CC-461 - 23	CC-505 - 21	CC-548 - 20.3	CC-606 - 20.9*
CC-462 - 22.9	CC-506 - 20.8	CC-554 - 22.2	CC-607 - 8.7
CC-463 - 25.2	CC-507 - 20.3	CC-555 - 22.5	CC-608 - 15.7
CC-464 - 24	CC-518 - 23.4	CC-556 - 23.2	CC-609 - 8.1
CC-467 - 24.1	CC-519 - 24.1	CC-557 - 20.8	CC-613 - 16.7
CC-468 - 23.8	CC-520 - 21.9	CC-558 - 16.2	CC-614 - 10.5
CC-469 - 23.6	CC-521 - 19.7	CC-559 - 21.5	CC-615 - 5.3
CC-470 - 23.7	CC-522 - 19	CC-560 - 23.6	CC-616 - 7.9
CC-471 - 23.4	CC-523 - 17.4	CC-561 - 24.7	CC-617 - 6.9
CC-472 - 20.4	CC-524 - 16.3	CC-562 - 22.8	CC-618 - 8.3

* - Moistures obtained from moisture-density gauge.

CC-619 - 17*
CC-620 - 13.2
CC-621 - 9.2*
CC-622 - 17.8
CC-623 - 17.9
CC-624 - 17
CC-625 - 15.9
CC-626 - 18.4
CC-628 - 19
CC-629 - 17
CC-630 - 18.3
CC-631 - 18.7
CC-633 - 25.4
CC-634 - 17.9
CC-635 - 20.7
CC-636 - 20.4
CC-637 - 19
CC-638 - 15.5
CC-639 - 17.4

* - Moistures obtained from moisture-density gauge.

BRAUN INTERTEC

Braun Intertec Engineering, Inc.
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

LABORATORY TESTS OF AGGREGATE

Date: October 8, 1992

Project No: BFDX-92-017C

Reported to: Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Copies to: Jim Martin

SAMPLE DATA:

Sample No:	SG-CC-138	**Location:**	43000N 46400E
Sampled By:	N/I		
Date Sampled:	6/9/92		
Proposed Use:	Subgrade	**Date Received:**	6/9/92

SIEVE ANALYSIS	% PASSING	SPECIFICATIONS
4"	100	-
3"	97	-
2"	87	-
1"	73	-
3/4"	68	-
1/2"	62	-
3/8"	57	-
#4	50	-
#10	40	-

PROPERTIES:

Shale & Soft Rock %:	-
L.A. Abrasion:	-
Plasticity Index:	-
Fractured Faces:	-

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

cv2/93

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

Braun Intertec Engineering, Inc.
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

LABORATORY TESTS OF AGGREGATE

Date: January 29, 1993

Project No: BFDX-92-017C
EP #93

Reported to: Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Copies to: Jim Martin

SAMPLE DATA:

Sample No: SB-CC-663
Sampled By: MC
Date Sampled: 9/1/92
Proposed Use: D-3 Sand Blanket

Location: 43300N, 43500E
Date Received: 8/31/92

SIEVE ANALYSIS	% PASSING	SPECIFICATIONS
3/4"	100	100
#4	93	90-100
#10	74	45-90
#20	54	-
#40	34	15-45
#50	21	-
#100	14	-
#200	10.7	0-15

PROPERTIES:

Shale & Soft Rock %:	-
L.A. Abrasion:	-
Plasticity Index:	-
Fractured Faces:	-

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

cv2/60

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

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913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

LABORATORY TESTS OF AGGREGATE

Date: January 29, 1993

Project No: BFDX-92-017C
EP #93

Reported to: Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Copies to: Jim Martin

SAMPLE DATA:

Sample No: SB-CC-664
Sampled By: MC
Date Sampled: 9/1/92
Proposed Use: D-3 Sand Blanket

Location: 42800N, 43500E
Date Received: 8/31/92

SIEVE ANALYSIS	% PASSING	SPECIFICATIONS
3/4"	100	100
#4	93	90-100
#10	76	45-90
#20	57	-
#40	37	15-45
#50	23	-
#100	14	-
#200	11.3	0-15

PROPERTIES:

Shale & Soft Rock %:	-
L.A. Abrasion:	-
Plasticity Index:	-
Fractured Faces:	-

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

cv2/61

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

Braun Intertec Engineering, Inc.
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

WATER CONTENT

Date: February 1, 1993

Project: BFDX-92-017C
EP #93

Reported to:

cc: Mr. Jim Martin

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Priarie, MN 55344-2287

			Specification
Location	W. Dike Slope	W. Dike Slope	
Sample No.	FA-CC-665	FA-CC-666	
Date Tested	9/16/92	9/16/92	
Water Content (%)	12.5	12.6	Min. 12

REMARKS:

FA = Fly Ash

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

gla/cv/m-9

BRAUN INTERTEC

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Engineers and Scientists Serving the Built and Natural Environments

LABORATORY TESTS OF AGGREGATE

Date: January 29, 1993

Project No: BFDX-92-017C
EP #93

Reported to: Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Copies to: Jim Martin

SAMPLE DATA:

Sample No:	SB-CC-667	**Location:**	EP #93
Sampled By:	MC		43300N 44500E
Date Sampled:	9/17/92		
Proposed Use:	Sand Blanket	**Date Received:**	9/25/92

SIEVE ANALYSIS	% PASSING	SPECIFICATIONS
1/2"	100	100
3/8"	99	-
#4	87	90-100
#10	65	45-90
#16	52	-
#40	27	15-45
#50	19	-
#100	9.2	-
#200	5.1	0-15

PROPERTIES:

Shale & Soft Rock %:	-
L.A. Abrasion:	-
Plasticity Index:	-
Fractured Faces:	-

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

cv2/85

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

Braun Intertec Engineering, Inc.
913 South 18th Street
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Bismarck, North Dakota 58502-2379
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Engineers and Scientists Serving the Built and Natural Environments

LABORATORY TESTS OF AGGREGATE

Date: January 29, 1993

Project No: BFDX-92-017C
EP #93

Reported to: Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Copies to: Jim Martin

SAMPLE DATA:

Sample No:	SB-CC-668	**Location:**	EP #93
Sampled By:	MC		43000N 44000E
Date Sampled:	9/17/92		
Proposed Use:	Sand Blanket	**Date Received:**	9/25/92

SIEVE ANALYSIS	**% PASSING**	**SPECIFICATIONS**
3/4"	-	100
3/8"	100	-
#4	93	90-100
#10	73	45-90
#16	60	-
#40	33	15-45
#50	34	-
#100	12	-
#200	9.4	0-15

PROPERTIES:

Shale & Soft Rock %:	-
L.A. Abrasion:	-
Plasticity Index:	-
Fractured Faces:	-

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

cv2/84

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

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913 South 18th Street
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Bismarck, North Dakota 58502-2379
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Engineers and Scientists Serving the Built and Natural Environments

LABORATORY TESTS OF AGGREGATE

Date: January 29, 1993

Project No: BFDX-92-017C
EP #93

Reported to: Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Copies to: Jim Martin

SAMPLE DATA:

Sample No:	CC-669	**Location:**	EP #93
Sampled By:	MC		42900N 45500E
Date Sampled:	9/28/92		
Proposed Use:	Sand Blanket	**Date Received:**	9/28/92

SIEVE ANALYSIS	% PASSING	SPECIFICATIONS
3/4"	100	100
#4	96	90-100
#8	84	-
#10	82	45-90
#20	67	-
#40	50	-
#50	41	15-45
#100	24	-
#200	17	0-15

PROPERTIES:

Shale & Soft Rock %:	-
L.A. Abrasion:	-
Plasticity Index:	-
Fractured Faces:	-

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

cv2/83

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

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701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

LABORATORY TESTS OF AGGREGATE

Date: January 29, 1993

Project No: BFDX-92-017C
EP #93

Reported to: Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Copies to: Jim Martin

SAMPLE DATA:

Sample No: CC-670
Sampled By: MC
Date Sampled: 9/28/92
Proposed Use: Sand Blanket

Location: EP #93
42800N 44600E

Date Received: 9/28/92

SIEVE ANALYSIS	% PASSING	SPECIFICATIONS
3/4"	100	100
#4	94	90-100
#8	82	-
#10	79	45-90
#20	65	-
#40	53	-
#50	47	15-45
#100	34	-
#200	27	0-15

PROPERTIES:

Shale & Soft Rock %:	-
L.A. Abrasion:	-
Plasticity Index:	-
Fractured Faces:	-

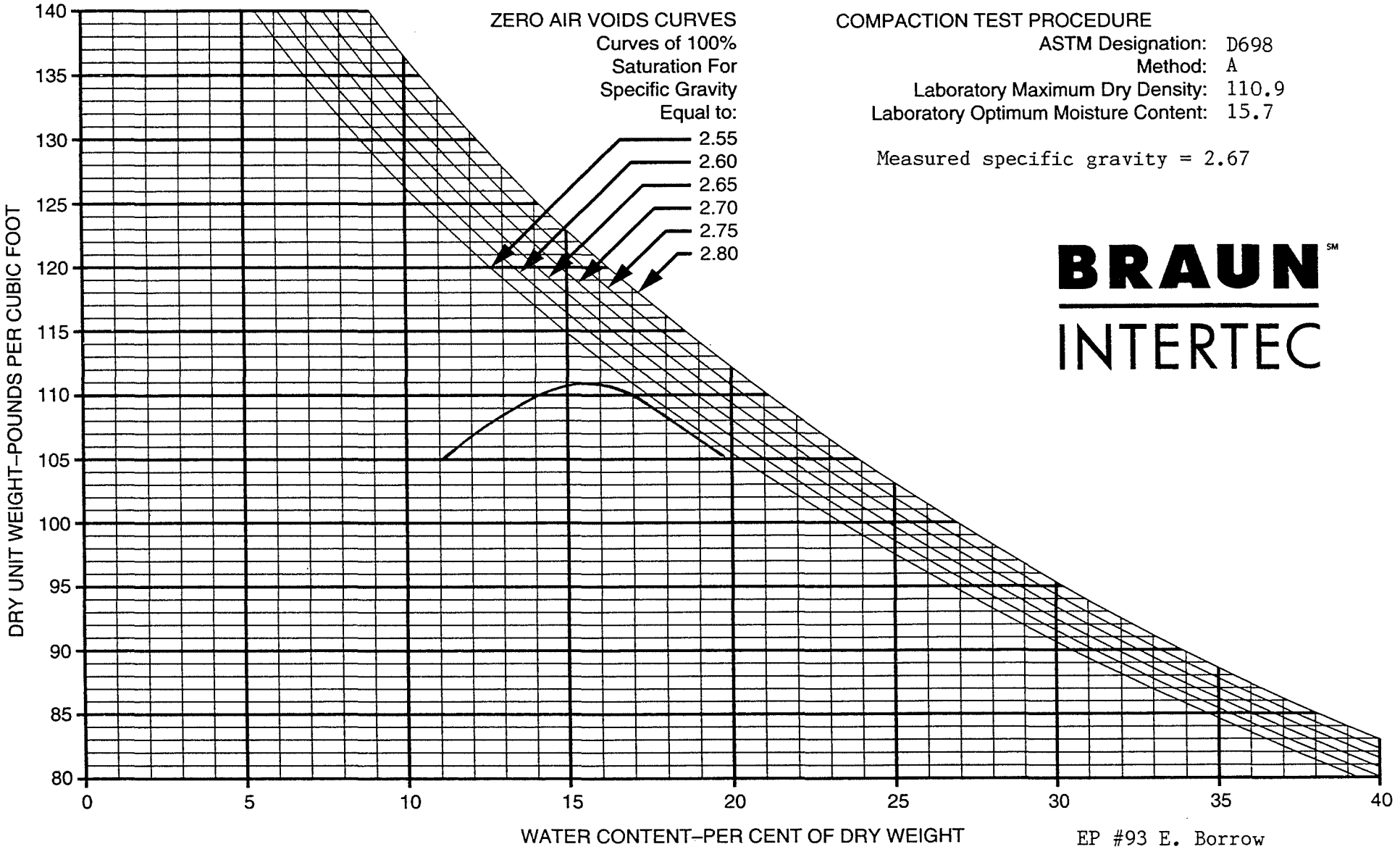
REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

cv2/82

Gerald L. Dauer, C.E.T.
Operations Manager

PROCTORS



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 110.9
Laboratory Optimum Moisture Content: 15.7

Measured specific gravity = 2.67

BRAUN INTERTEC

EP #93 E. Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-2	CC-1	1-10	15	22	37	Sandy Lean Clay, olive brown (CL)

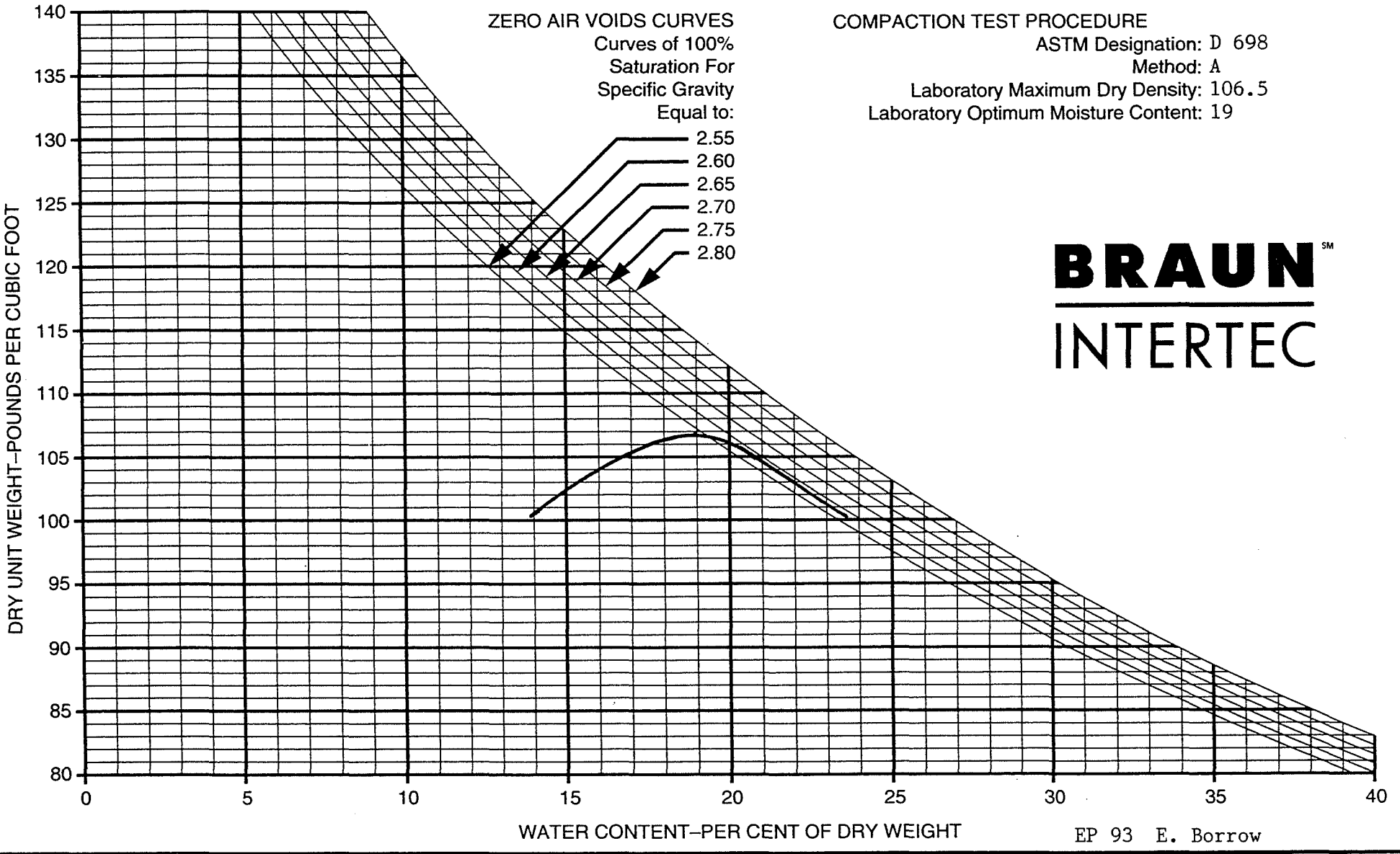
43482N 46606E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE: 5-18-92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 106.5
Laboratory Optimum Moisture Content: 19

BRAUN INTERTEC

EP 93 E. Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-2	CC-2	1-10	16	26	42	Sandy Lean Clay (CL), olive brown

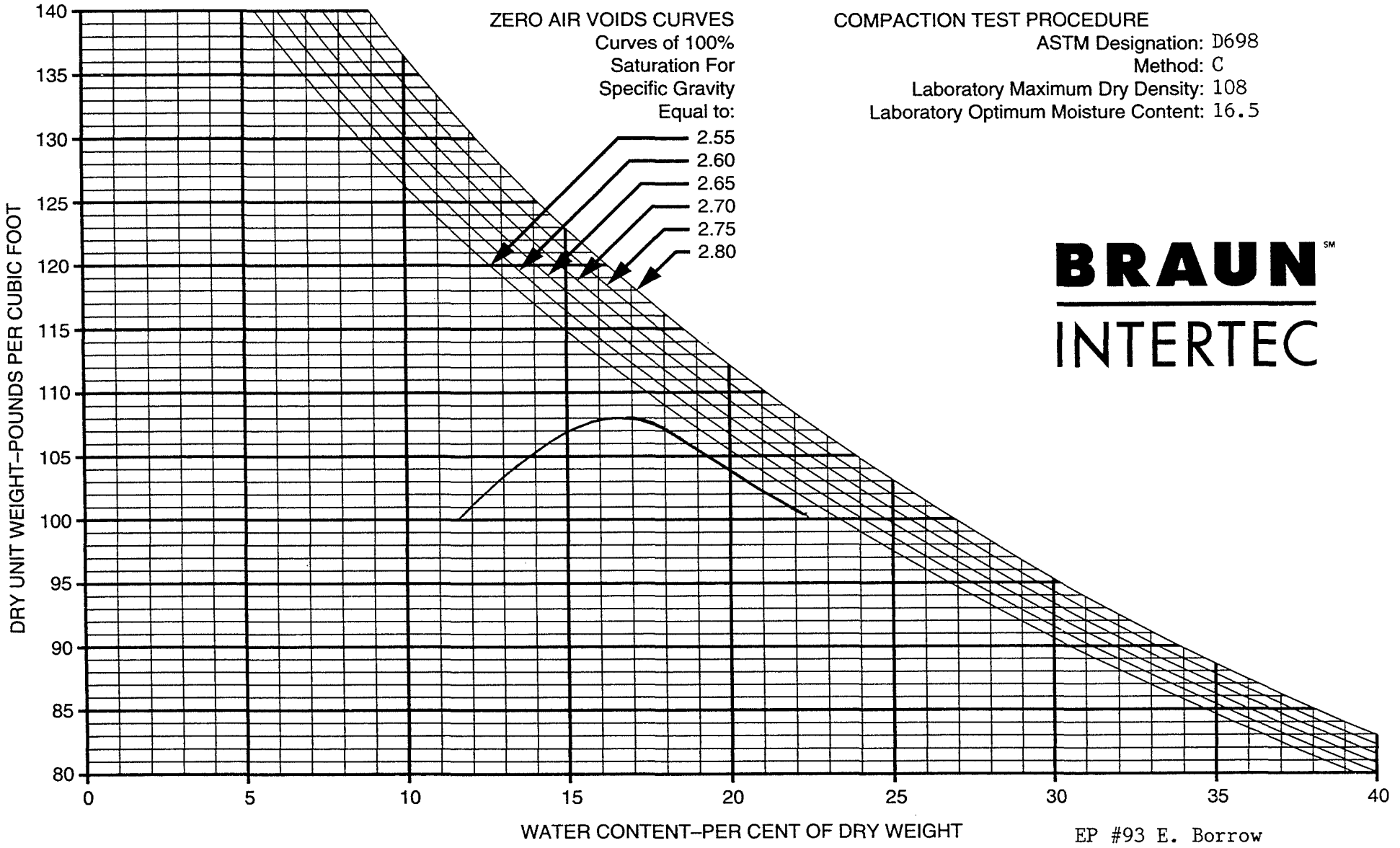
43482N 46606E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D698
Method: C
Laboratory Maximum Dry Density: 108
Laboratory Optimum Moisture Content: 16.5

BRAUN INTERTEC

EP #93 E. Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-3	CC-3	1-10'	15	24	39	Sandy Lean Clay, olive brown (CL)

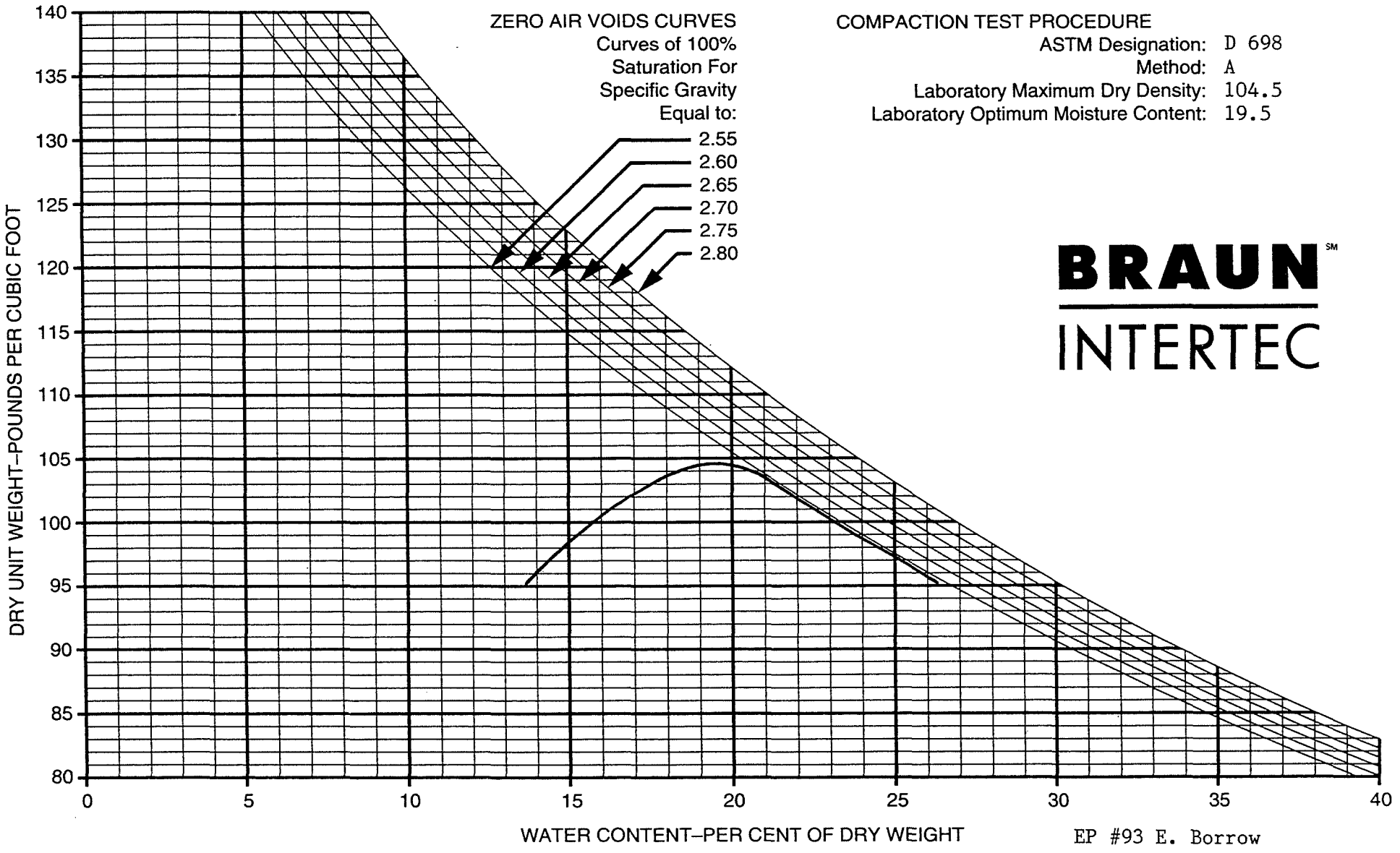
43251N 46633E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 104.5
Laboratory Optimum Moisture Content: 19.5

BRAUN INTERTEC

EP #93 E. Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-3	CC-4	1-10'	16	25	41	Sandy Lean Clay (CL), olive brown

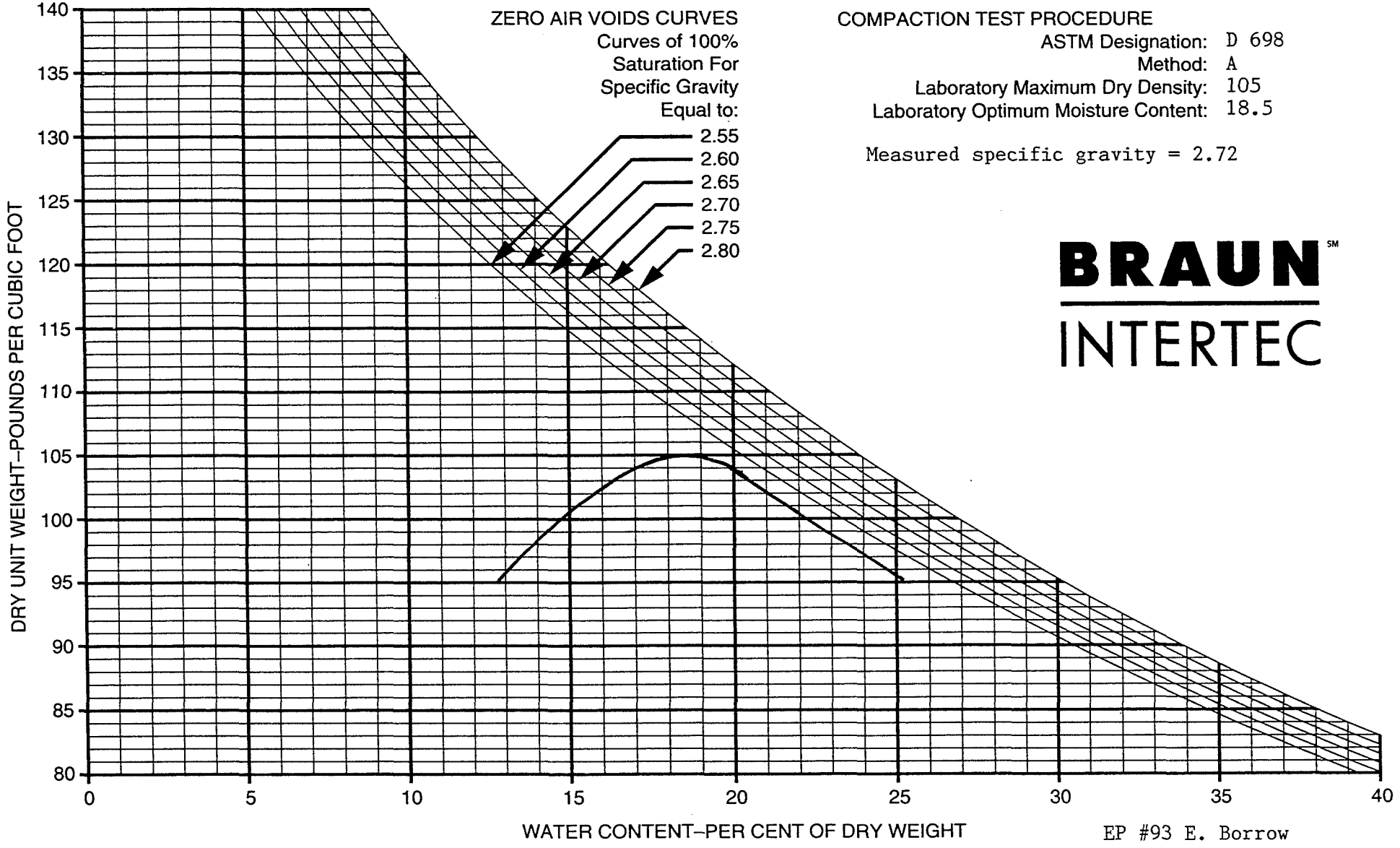
43251N 46633E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE: 5/27/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 105
Laboratory Optimum Moisture Content: 18.5

Measured specific gravity = 2.72

BRAUN INTERTEC

EP #93 E. Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-4	CC-5	1-10'	16	23	39	Sandy Lean Clay (CL), grayish brown

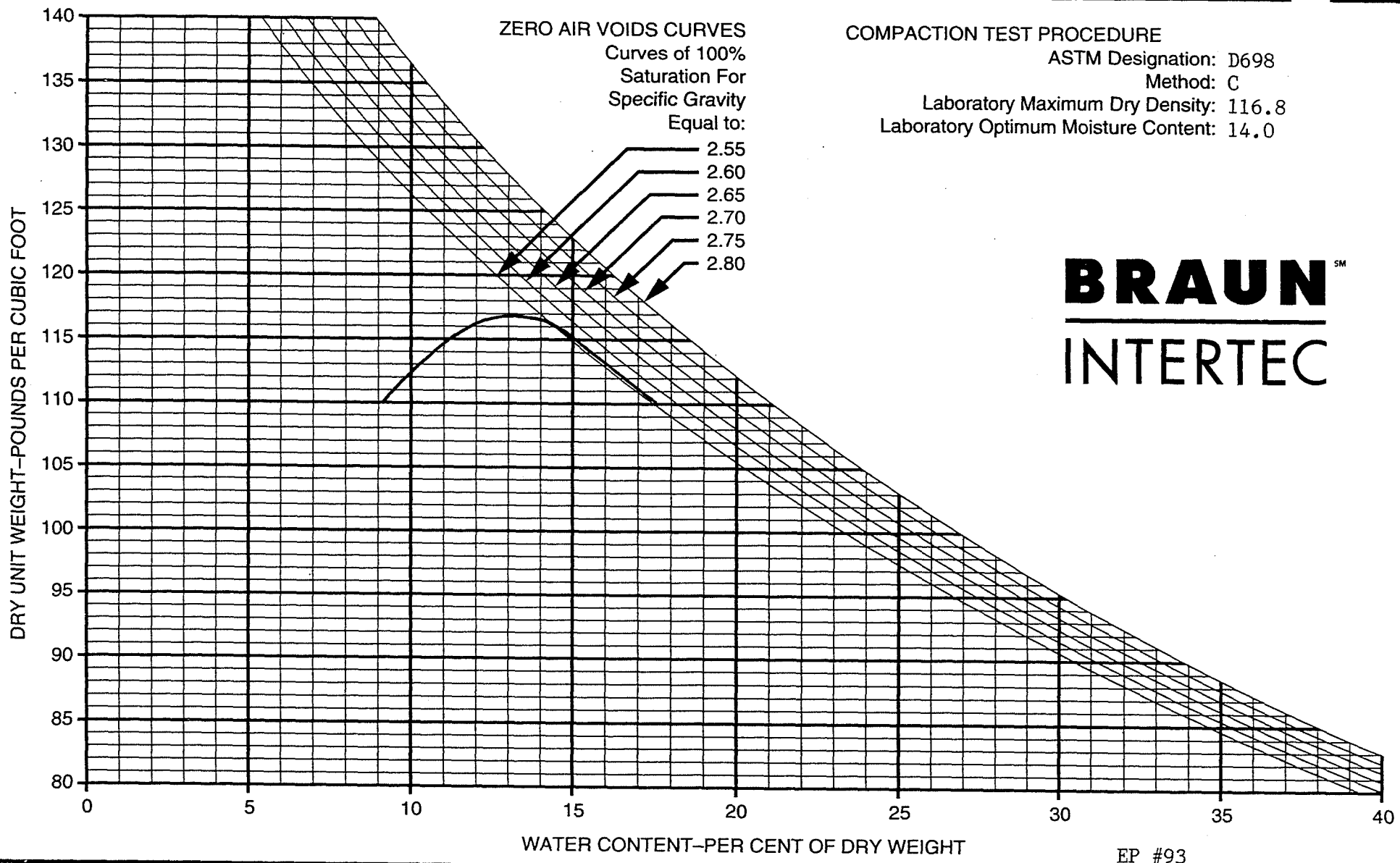
43205N 46390E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE: 5/28/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: C
Laboratory Maximum Dry Density: 116.8
Laboratory Optimum Moisture Content: 14.0

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	SG-CC-7	1886.0	NP	NP	NP	Poorly Graded Sand with Gravel, (SP), light olive gray

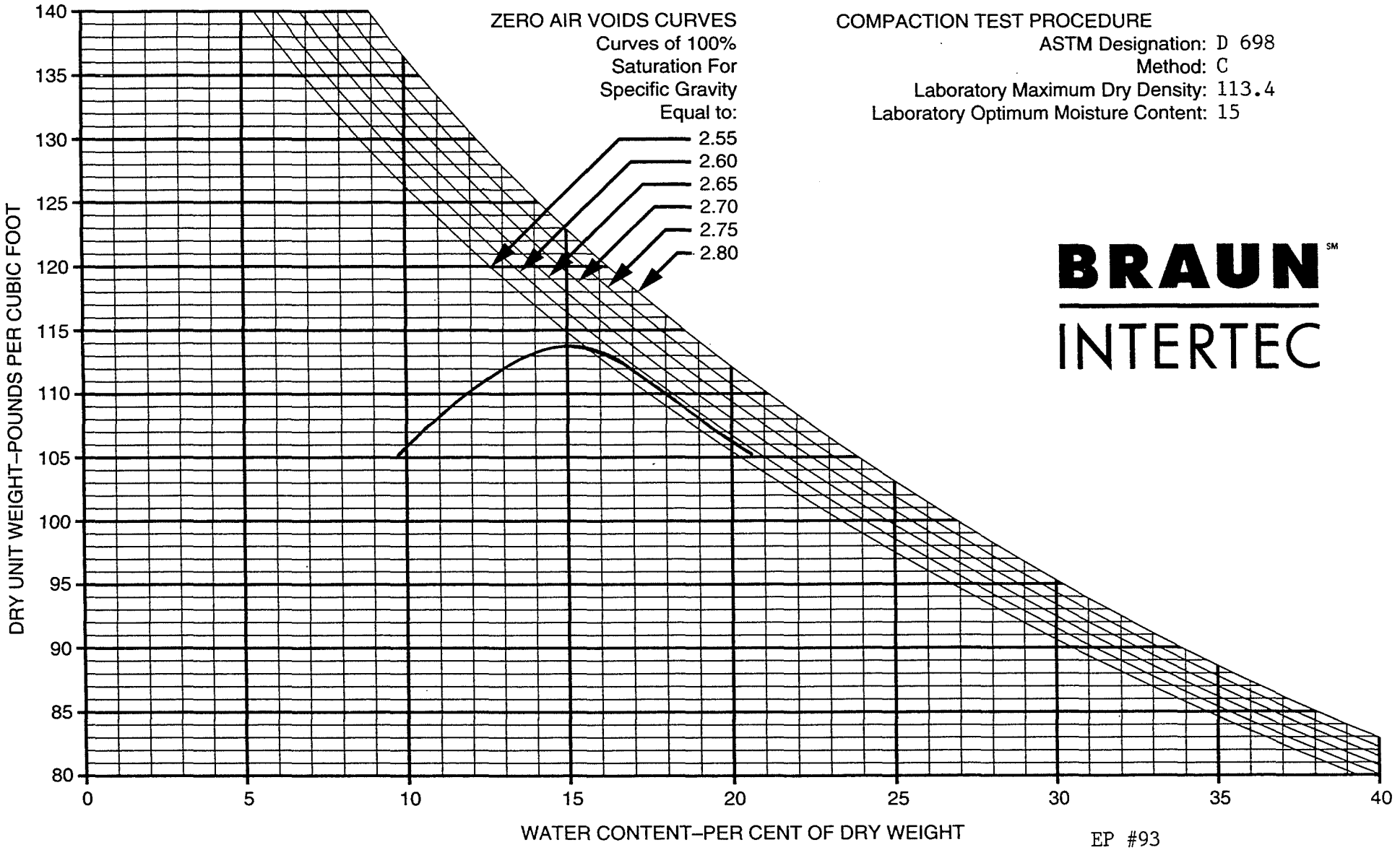
43442N 45505E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 6/2/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: C
Laboratory Maximum Dry Density: 113.4
Laboratory Optimum Moisture Content: 15

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	SG-CC-10	1884.9	17	19	36	Sandy Lean Clay (CL), very dark gray

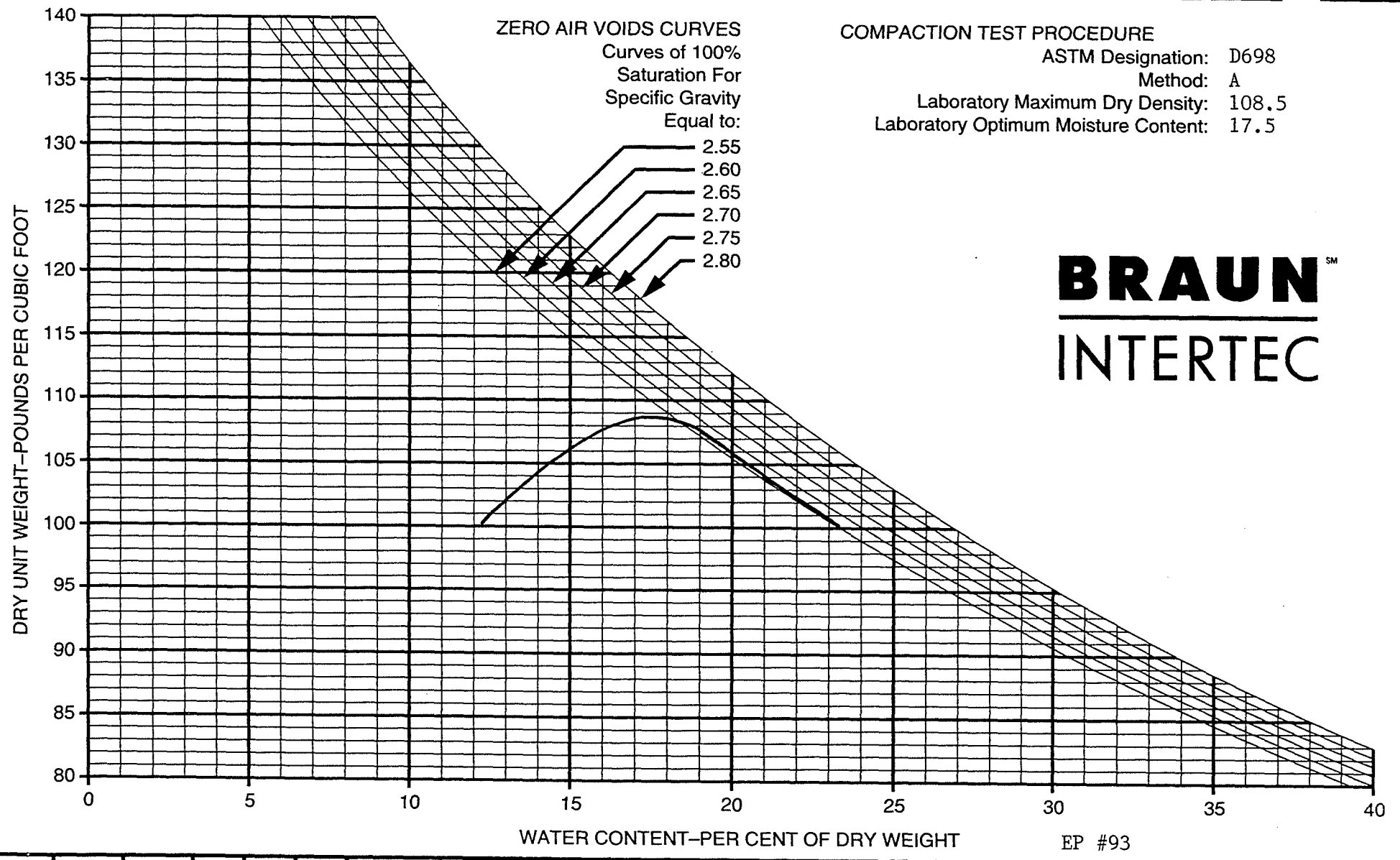
43443N 44904E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE: 5/26/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 108.5
Laboratory Optimum Moisture Content: 17.5

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CC-16	1887.6	14	27	41	Sandy Lean Clay (CL), dark grayish-brown

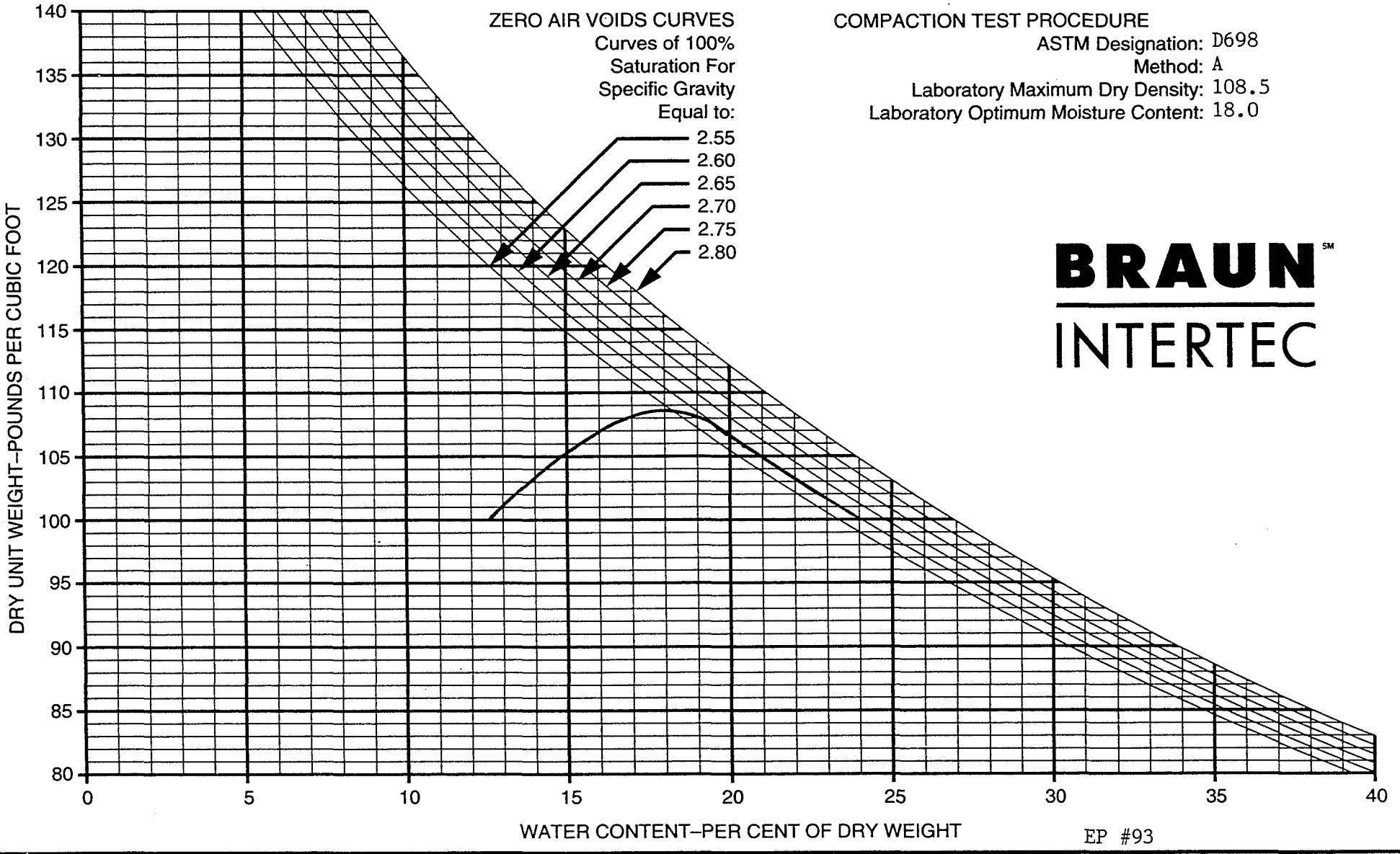
43448N, 45495E

COMPACTION TEST

DRAWN BY: DM
CHECKED BY:
DATE: 5/27/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 108.5
Laboratory Optimum Moisture Content: 18.0

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CC-18	1885.2	15	26	41	Sandy Lean Clay (CL), dark grayish-brown

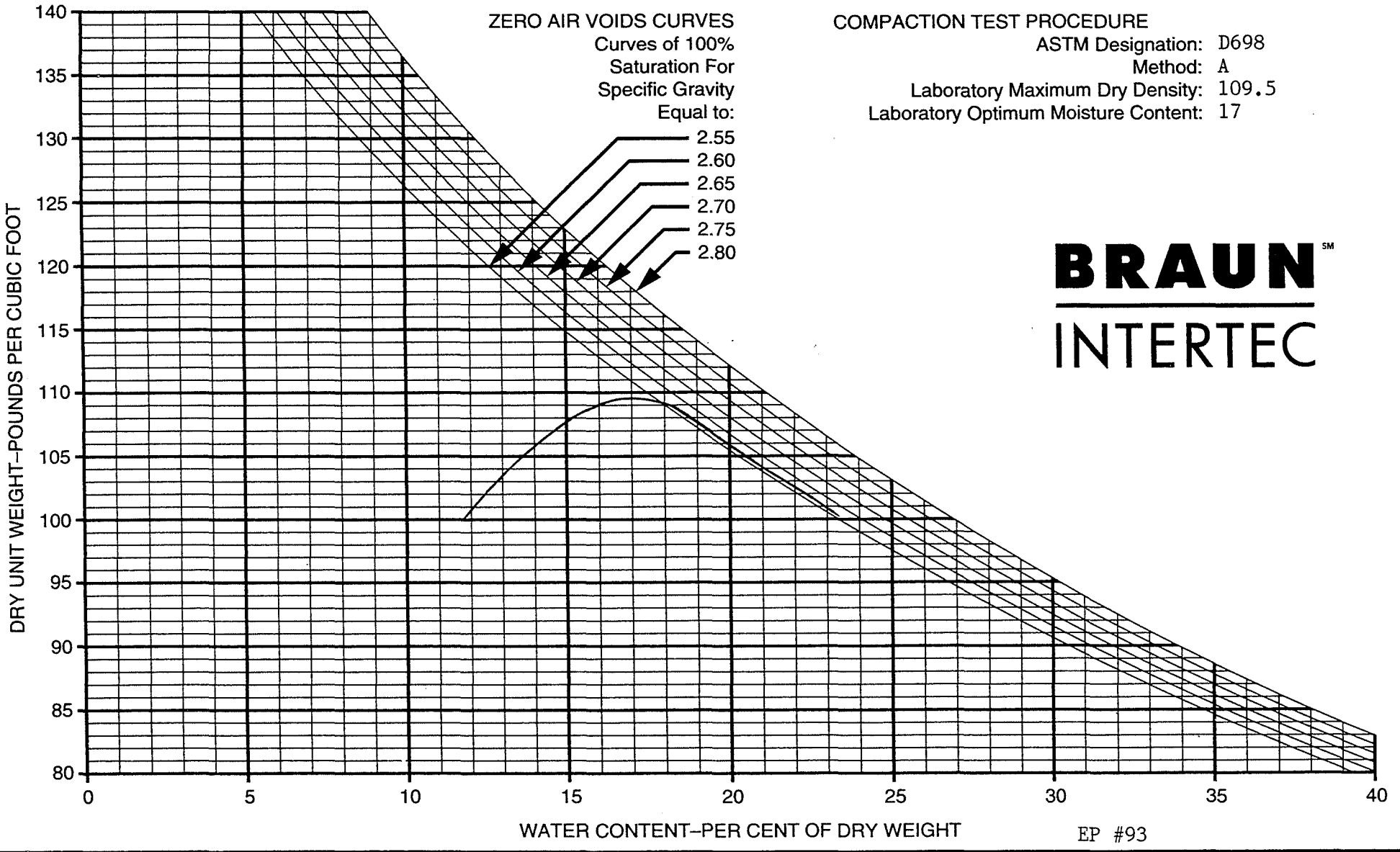
43009N, 45935E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 5/27/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 109.5
Laboratory Optimum Moisture Content: 17

BRAUN INTERTEC℠

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CC-24	1886.1	16	25	41	Sandy Lean Clay (CL), olive brown

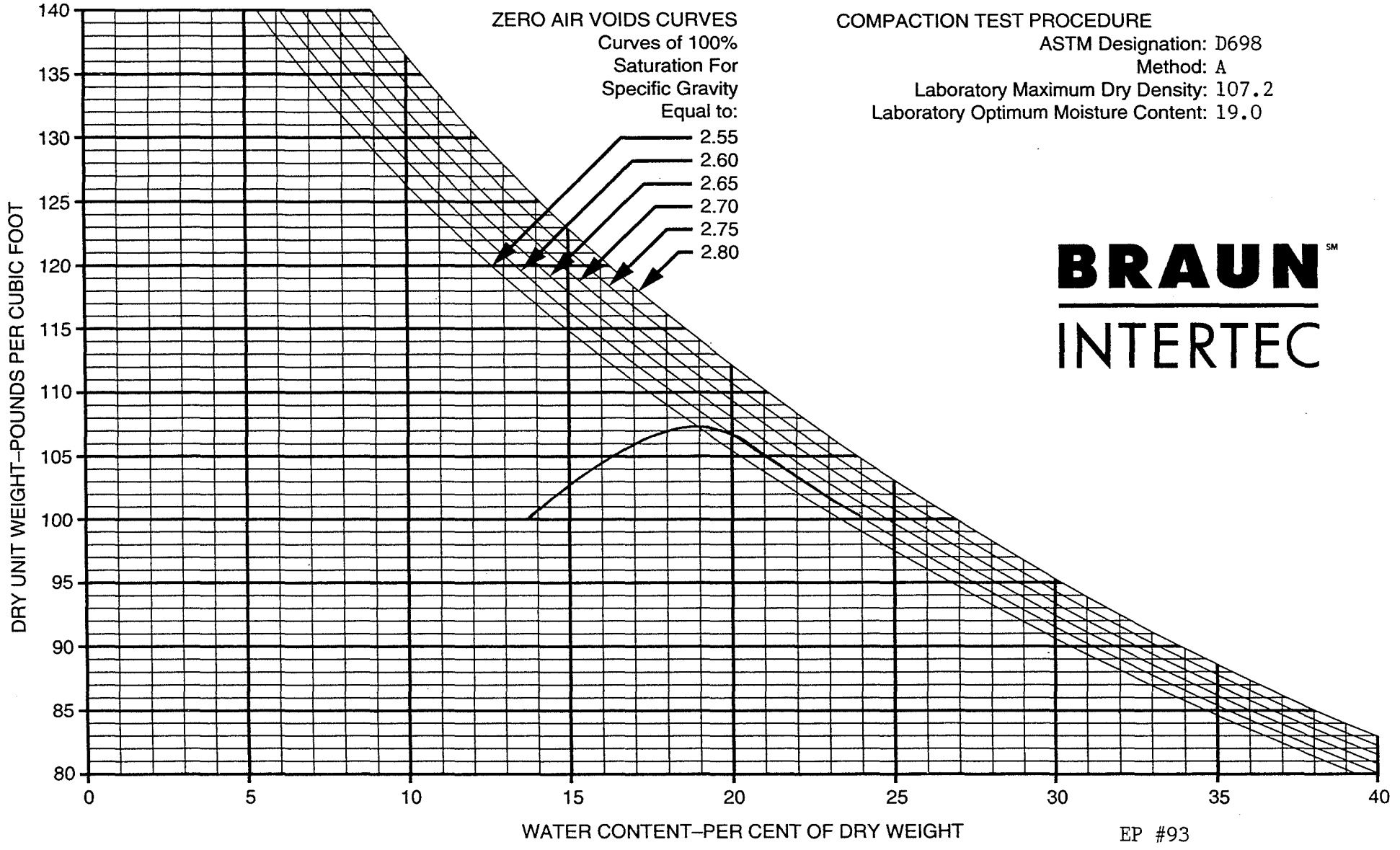
42698N, 45939E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 5/28/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 107.2
Laboratory Optimum Moisture Content: 19.0

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLS-CC-29	1890.0	15	26	41	Sandy Lean Clay (CL), dark gray brown

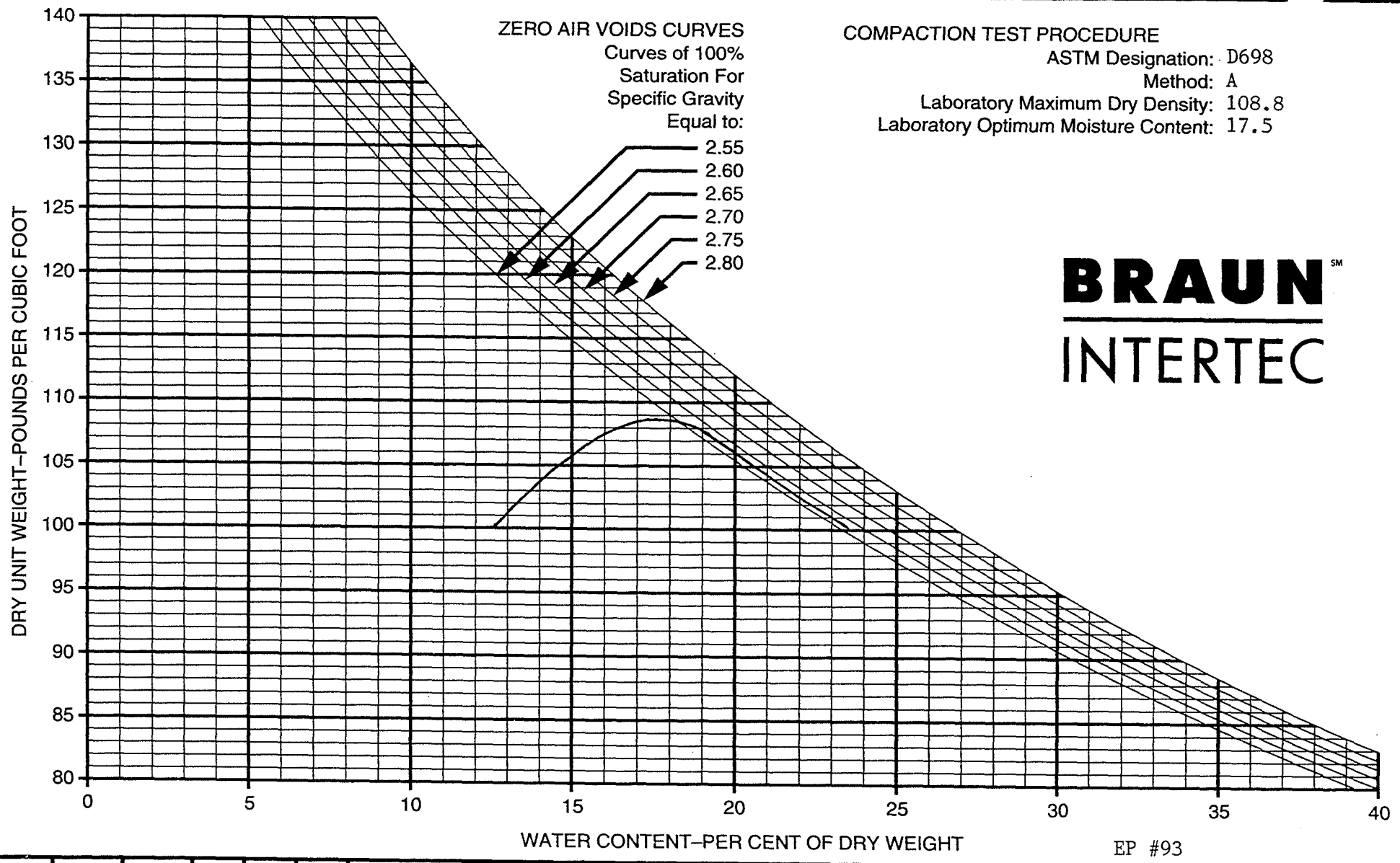
42804N 45951E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE: 5/28/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 108.8
Laboratory Optimum Moisture Content: 17.5

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CC-43	1887.0	14	27	41	Sandy Lean Clay (CL), dark grayish-brown

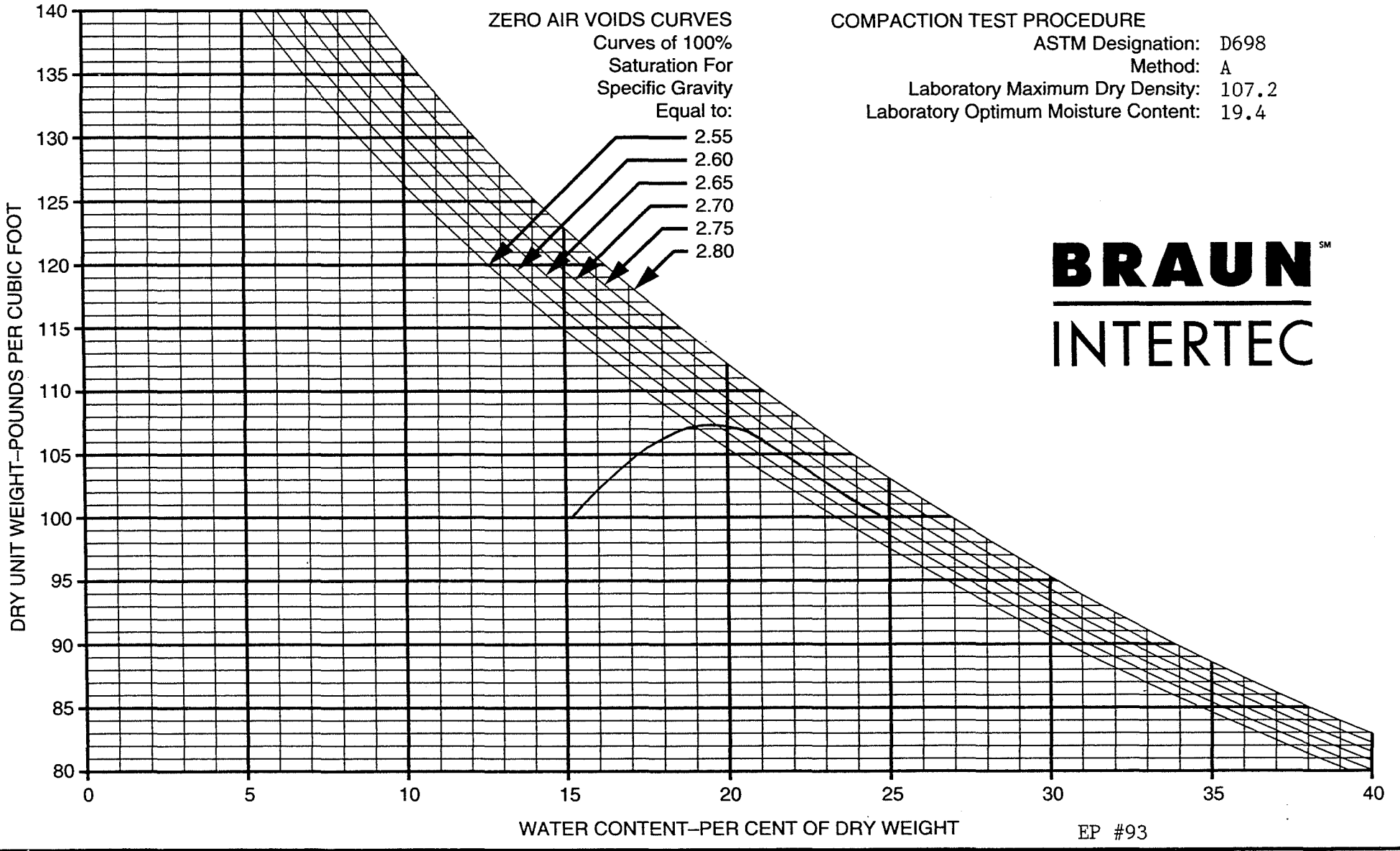
43400N, 43500E

COMPACTION TEST

DRAWN BY: AC
CHECKED BY:
DATE: 6/15/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 107.2
Laboratory Optimum Moisture Content: 19.4

BRAUN SM
INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CC-52	1890.5	14	26	40	Sandy lean Clay CL dark grayish-brown

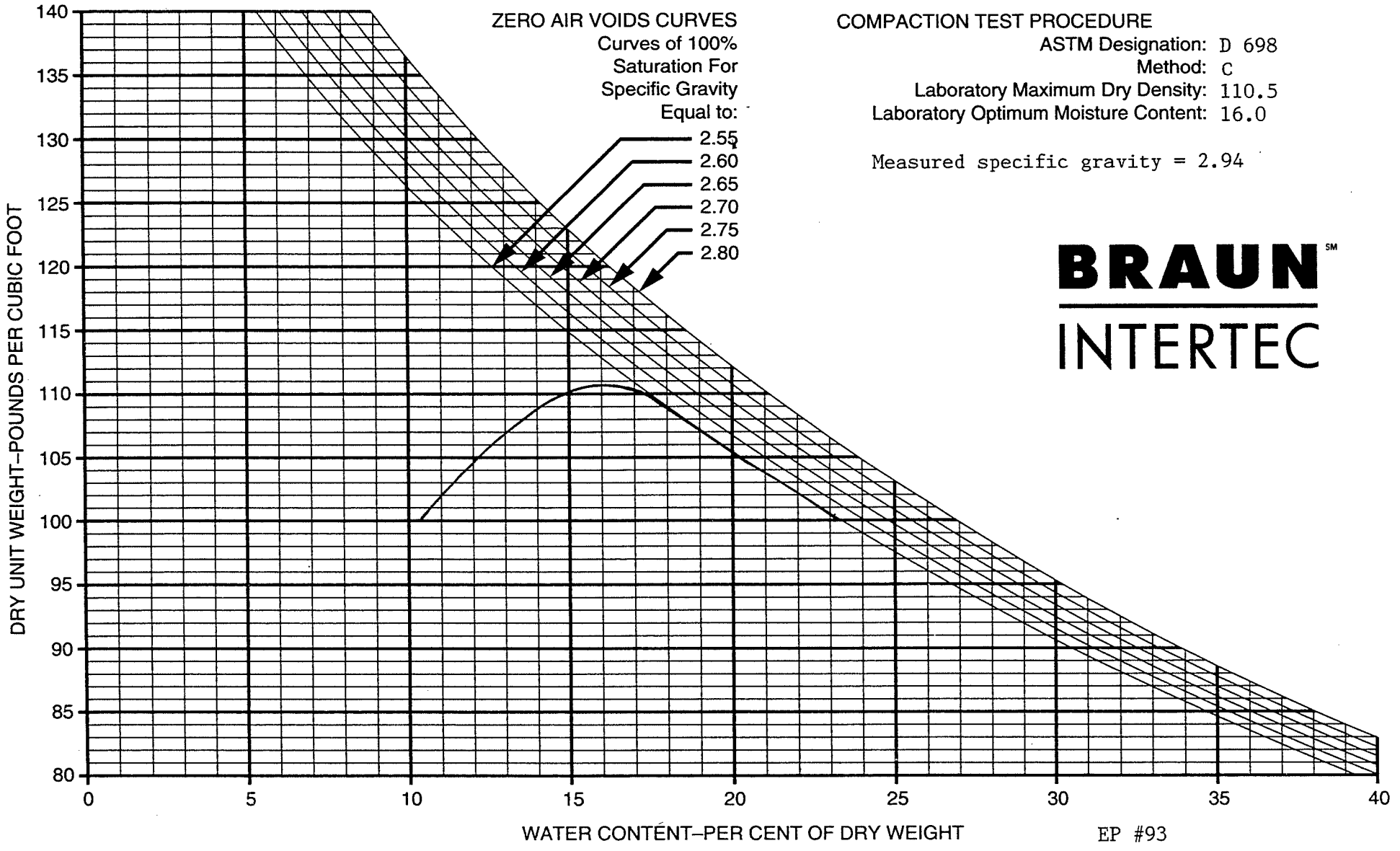
43462N, 44762E

COMPACTION TEST

DRAWN BY: AC
CHECKED BY:
DATE: 6/16/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: C
Laboratory Maximum Dry Density: 110.5
Laboratory Optimum Moisture Content: 16.0

Measured specific gravity = 2.94

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLS-CC-55	1898.1	14	27	41	Sandy Lean Clay (CL), dark gray brown

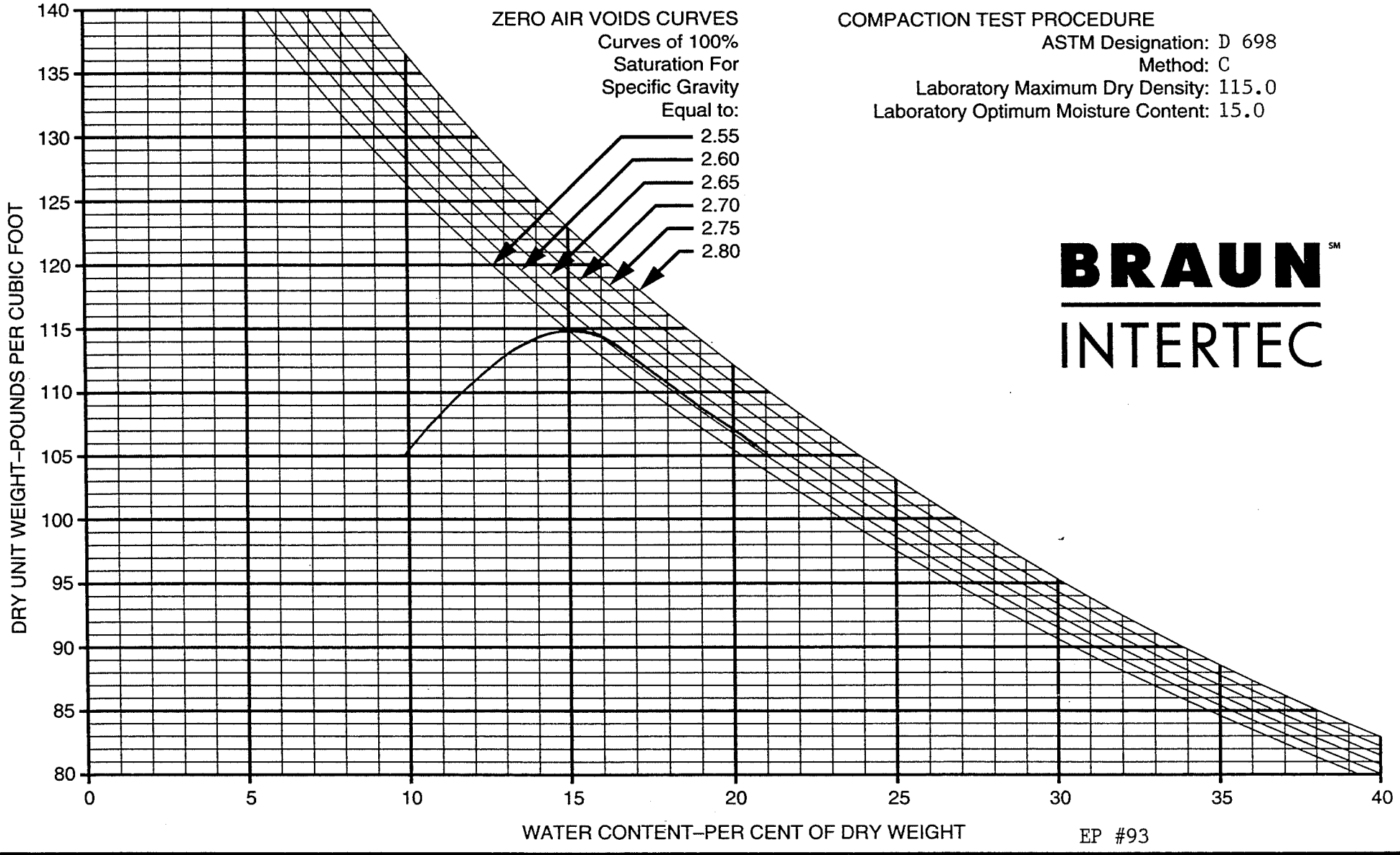
43484N 45104E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 6/15/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: C
Laboratory Maximum Dry Density: 115.0
Laboratory Optimum Moisture Content: 15.0

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLS-CC-57	1894.5	14	25	39	Sandy Lean Clay (CL), olive

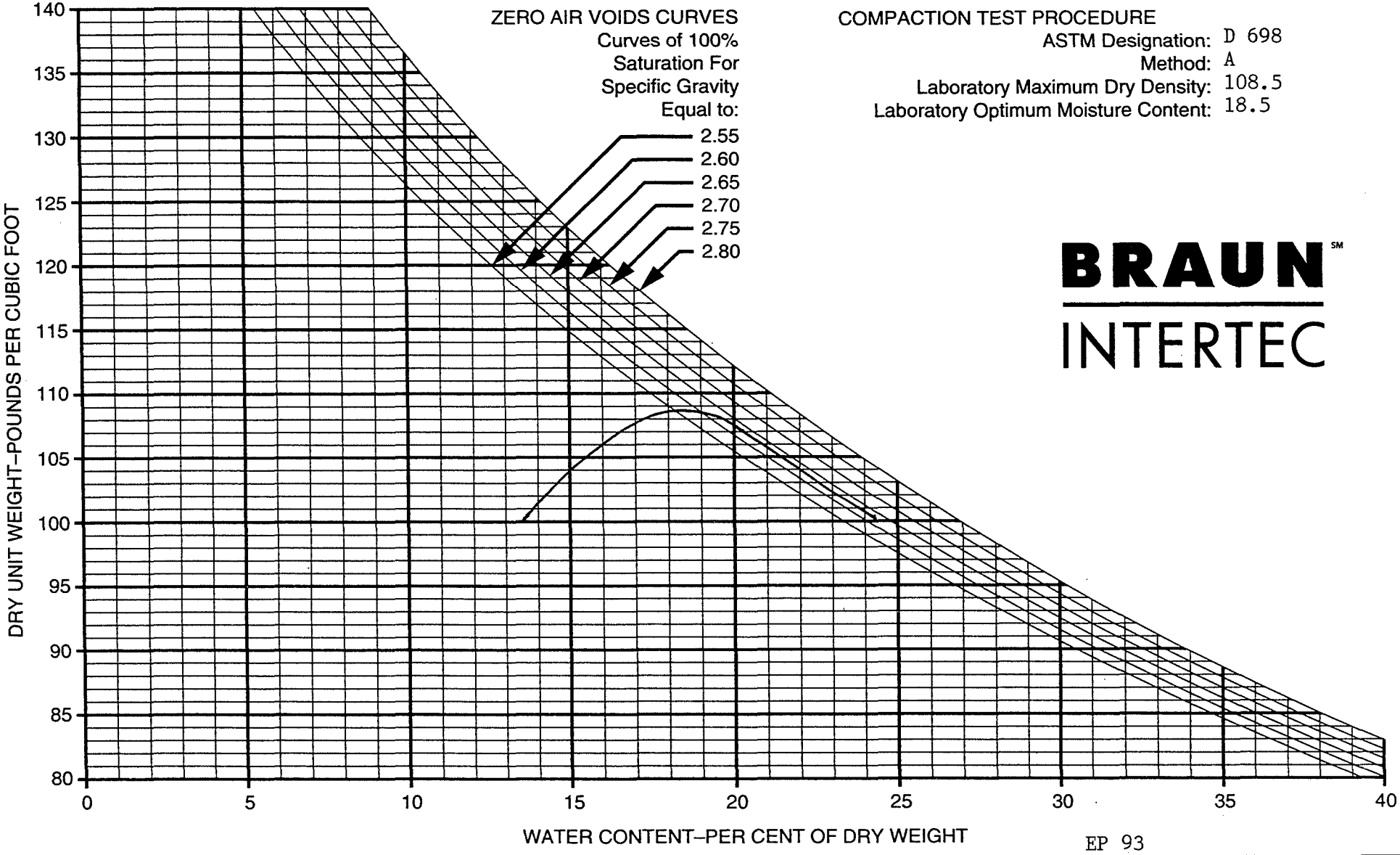
43473N 44298E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 6/5/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 108.5
Laboratory Optimum Moisture Content: 18.5

BRAUN INTERTEC

EP 93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLS-CC-58	1896.8	15	26	41	Sandy Lean Clay (CL), dark gray brown

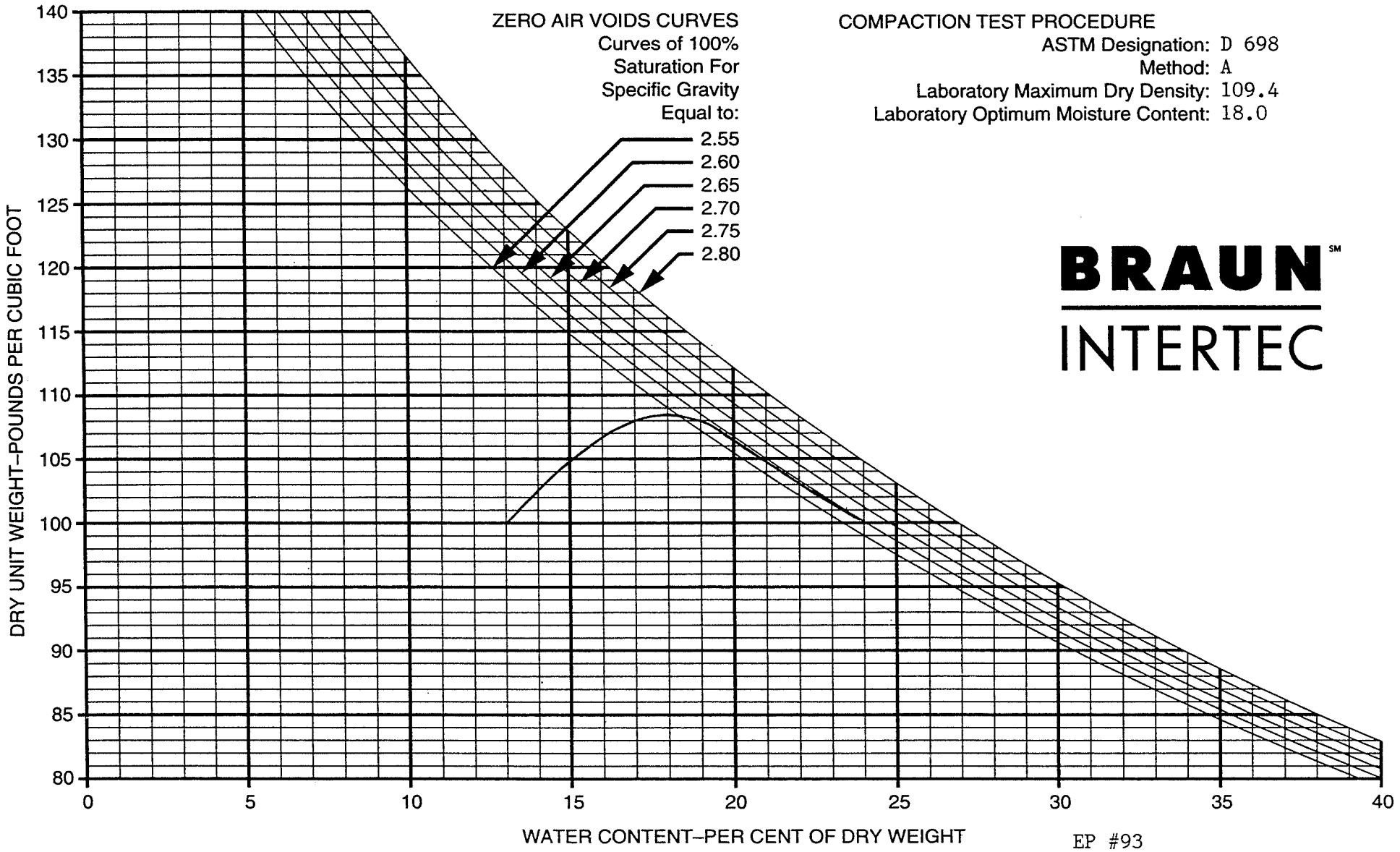
43481N 44501E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 6/16/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 109.4
Laboratory Optimum Moisture Content: 18.0

BRAUN℠ INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLS-CC-59	1895.3	14	27	41	Sandy Lean Clay (CL), dark gray brown

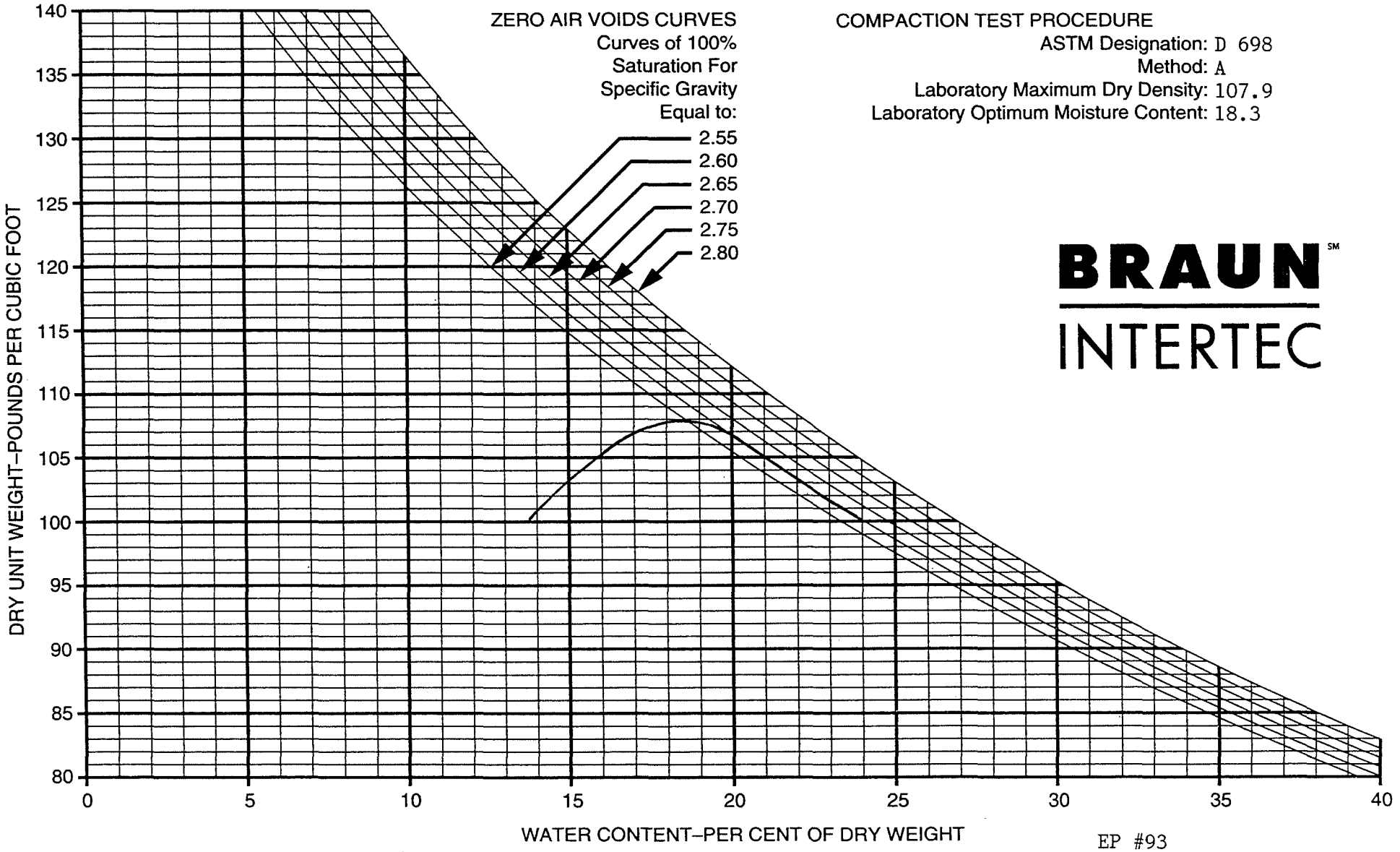
42602N 45965E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 6/15/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 107.9
Laboratory Optimum Moisture Content: 18.3

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLS-CC-64	1899.1	15	28	43	Sandy Lean Clay (CL), dark gray brown

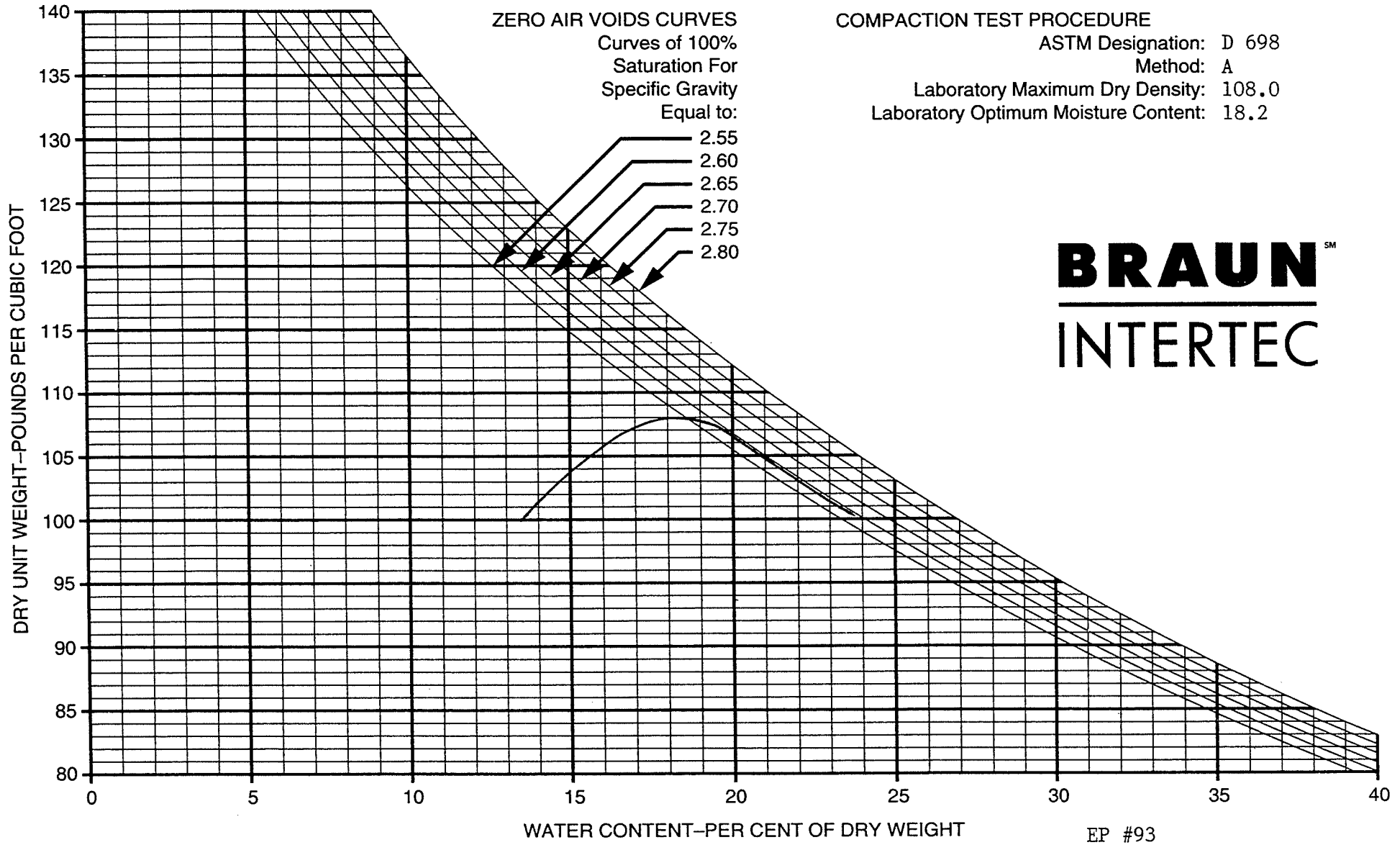
43484N 44752E

COMPACTION TEST

DRAWN BY: AC
CHECKED BY:
DATE: 6/16/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 108.0
Laboratory Optimum Moisture Content: 18.2

BRAUN INTERTEC SM

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CLS-CC -101	1883	15	25	40	Sandy Lean Clay (CL), dark grayish brown

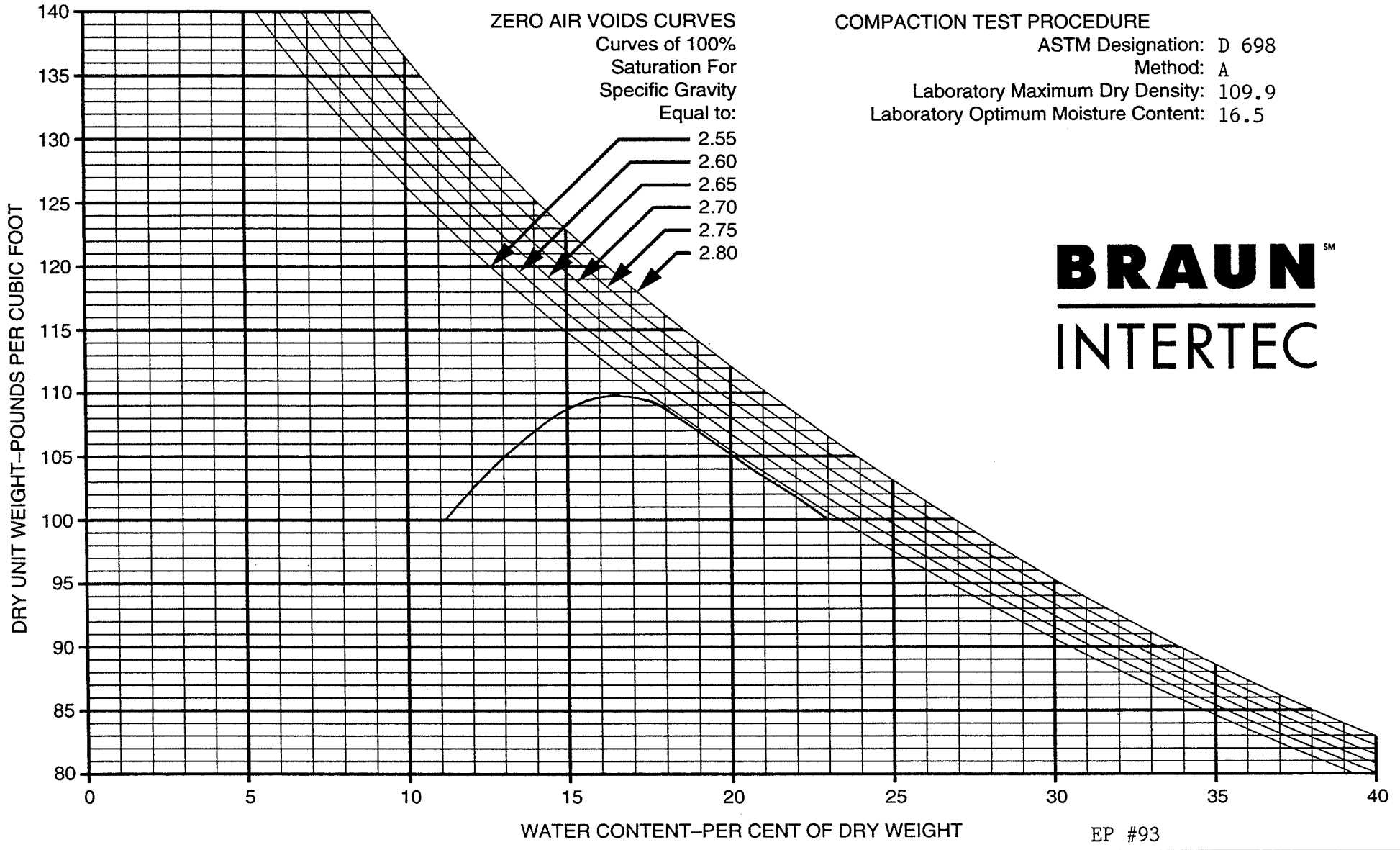
42568N 45099E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 6/17/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 109.9
Laboratory Optimum Moisture Content: 16.5

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
Retest of ST.23	CLS-CC -103	1881.8	15	27	42	Sandy Lean Clay (CL), dark grayish brown

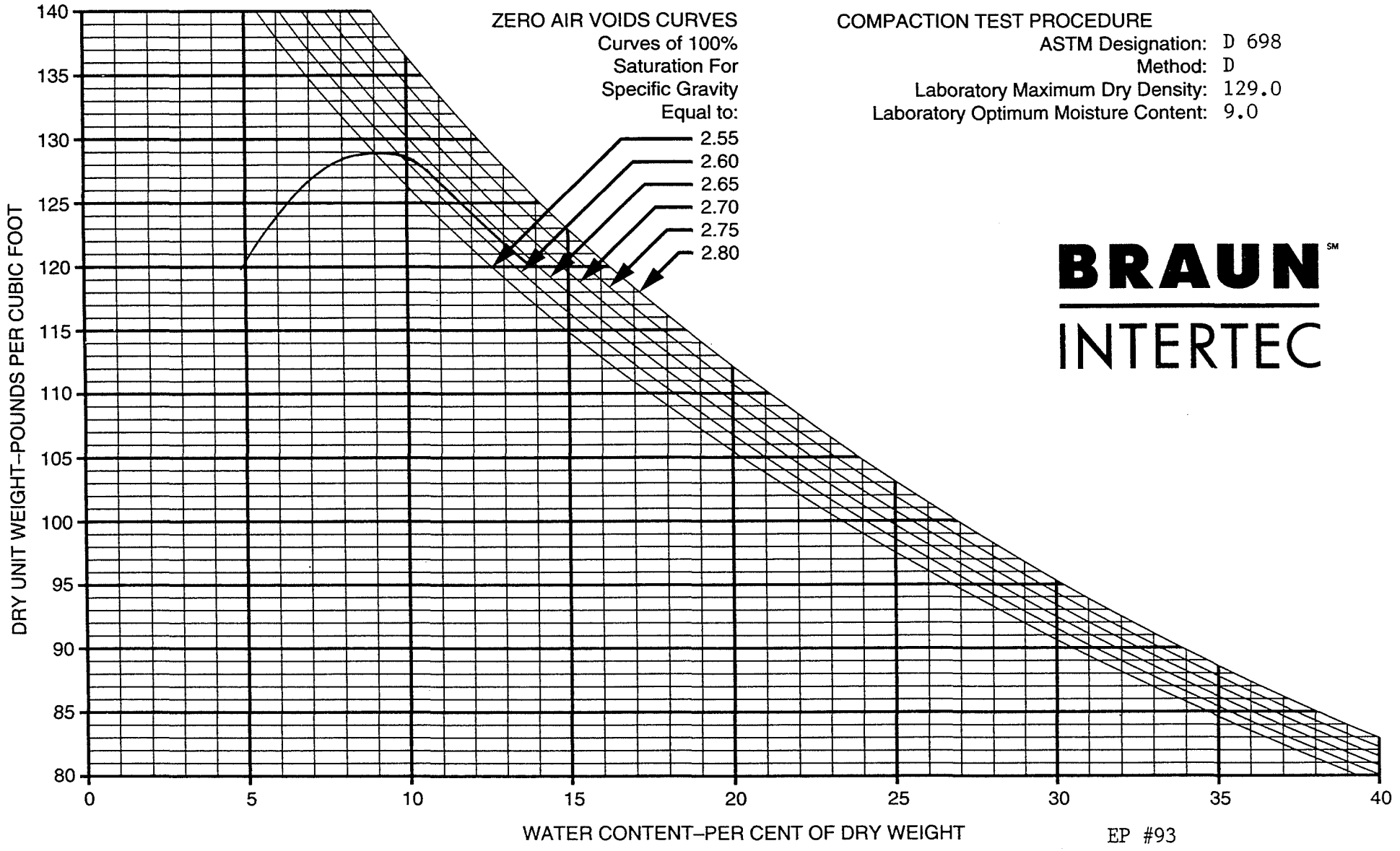
42567N 45399E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 6/16/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: D
Laboratory Maximum Dry Density: 129.0
Laboratory Optimum Moisture Content: 9.0

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	SG-CC-105	1877.8	NP	NP	NP	Poorly Graded Sand with Gravel (SP-SM)

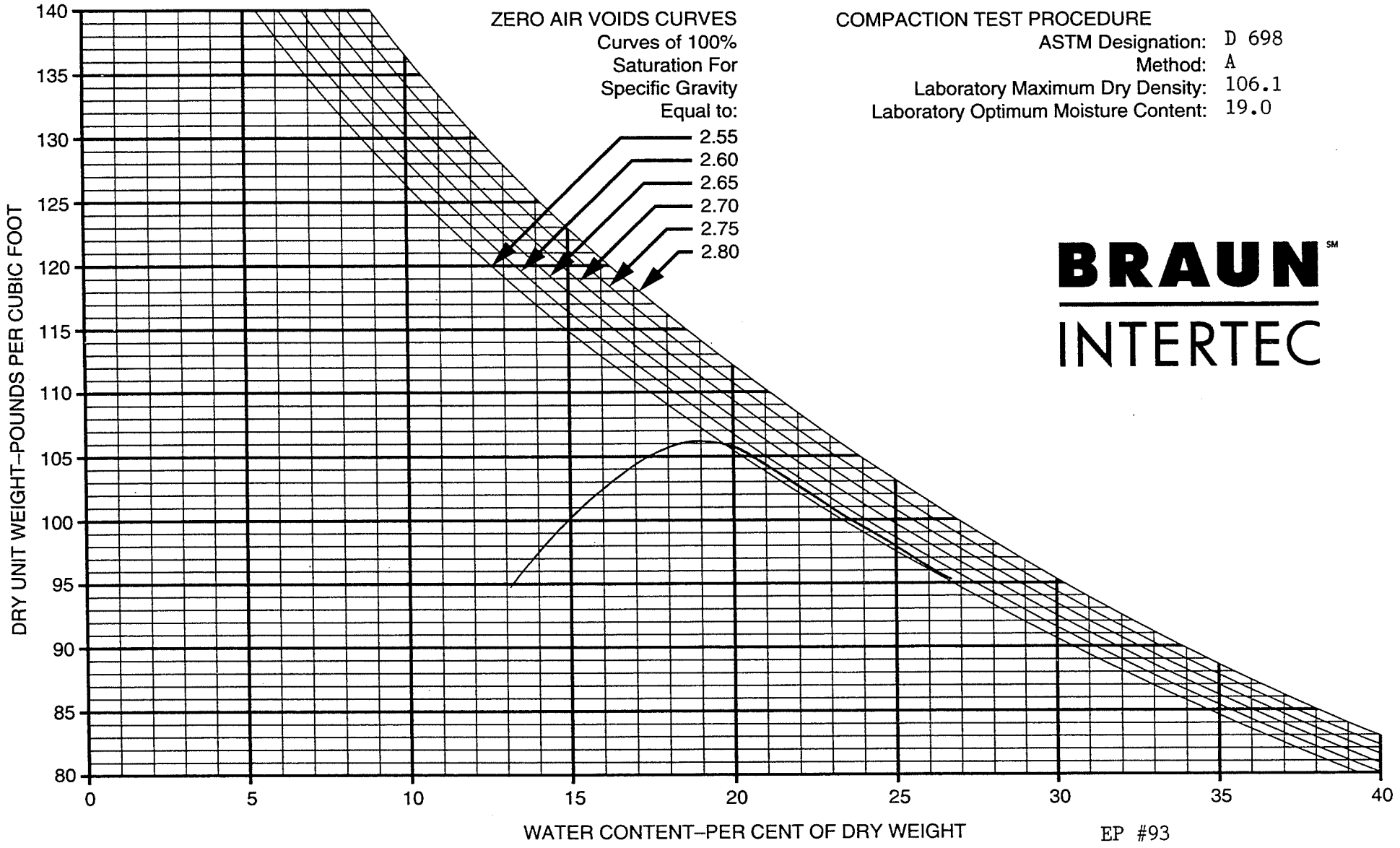
42577N 44517E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 6/19/92

JOB NO. BFDx-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 106.1
Laboratory Optimum Moisture Content: 19.0

BRAUN SM
INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLS-CC -109	1884.6	15	26	41	Sandy Lean Clay (CL), dark grayish brown

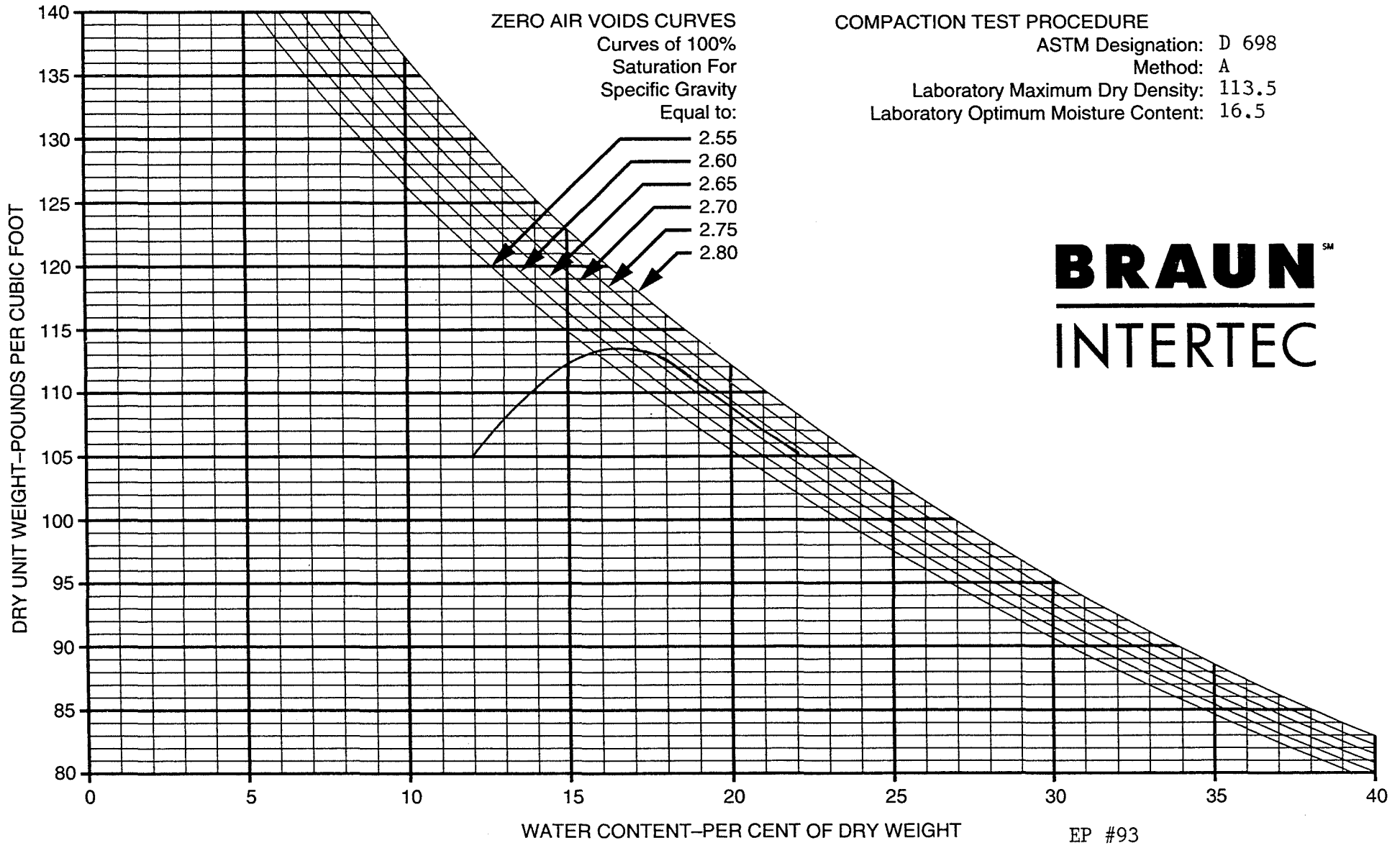
42569N 45810E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 6/24/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 113.5
Laboratory Optimum Moisture Content: 16.5

BRAUN SM
INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	SG-CC-115	1882.6	15	26	41	Sandy Lean Clay (CL), dark grayish brown

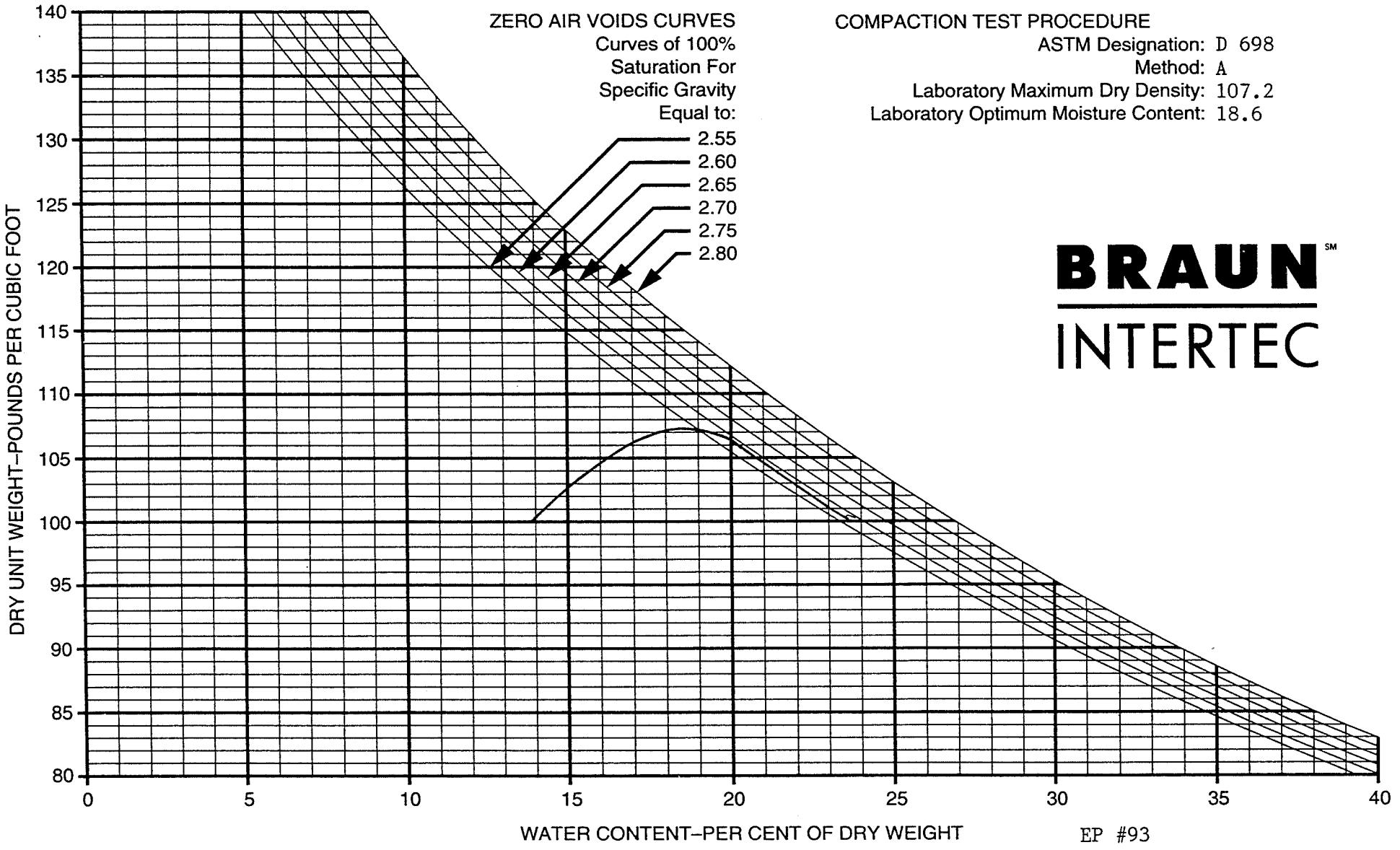
42574N 44202E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 6/29/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 107.2
Laboratory Optimum Moisture Content: 18.6

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLS-CC -118	1884.1	15	25	40	Sandy Lean Clay (CL), dark grayish brown

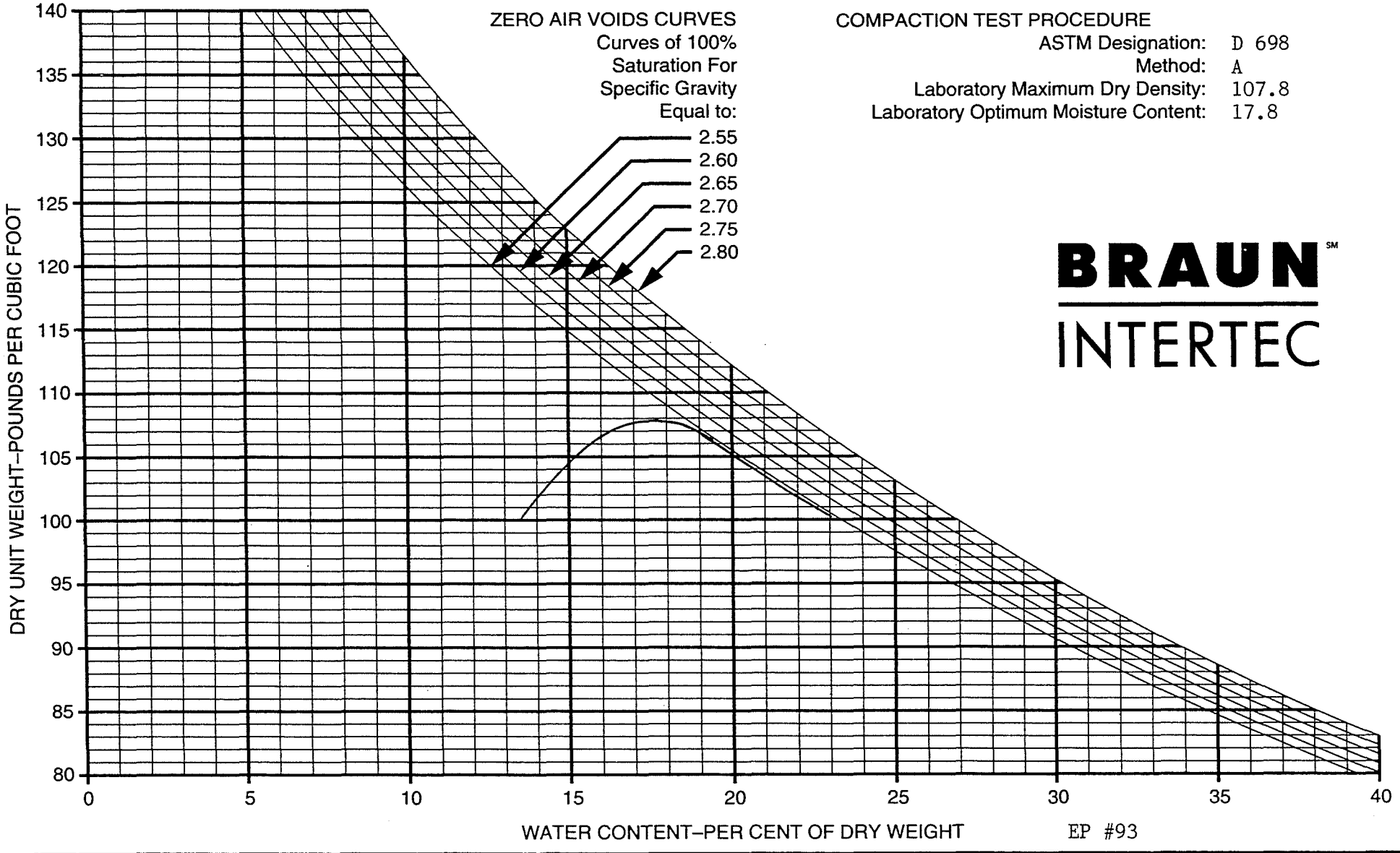
42567N 44600E

COMPACTION TEST

DRAWN BY: AC
CHECKED BY:
DATE: 6/17/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation:	D 698
Method:	A
Laboratory Maximum Dry Density:	107.8
Laboratory Optimum Moisture Content:	17.8

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST.32	CLS-CC -125	1887.1	15	25	40	Sandy Lean Clay (CL), dark grayish brown

42557N, 44692E

COMPACTION TEST

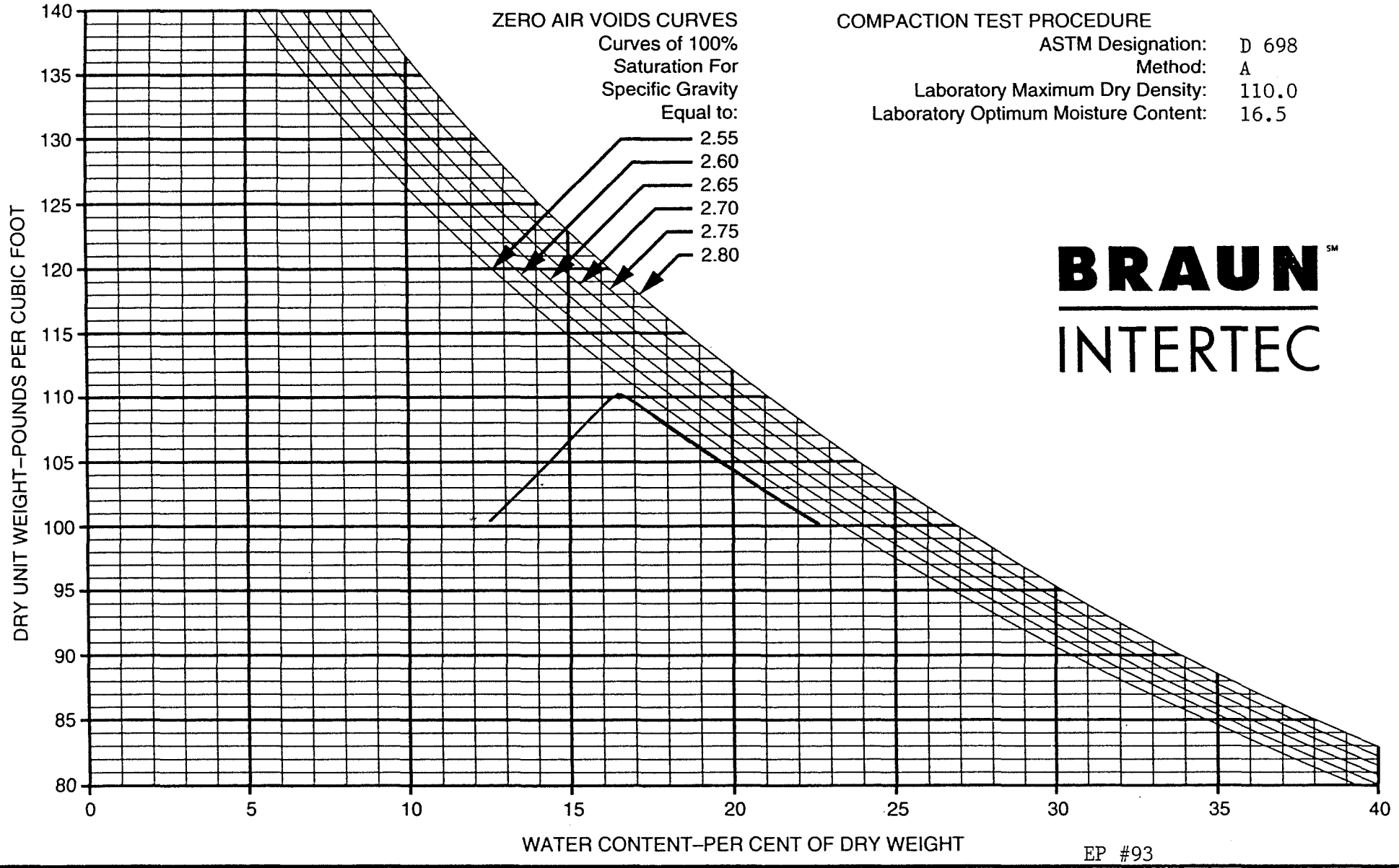
DRAWN BY: DS

CHECKED BY:

DATE: 6/29/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation:	D 698
Method:	A
Laboratory Maximum Dry Density:	110.0
Laboratory Optimum Moisture Content:	16.5

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	SG-OC-127	1883.9	15	25	40	Sandy Lean Clay (CL), dark gray brown

43315N 44010E

COMPACTION TEST

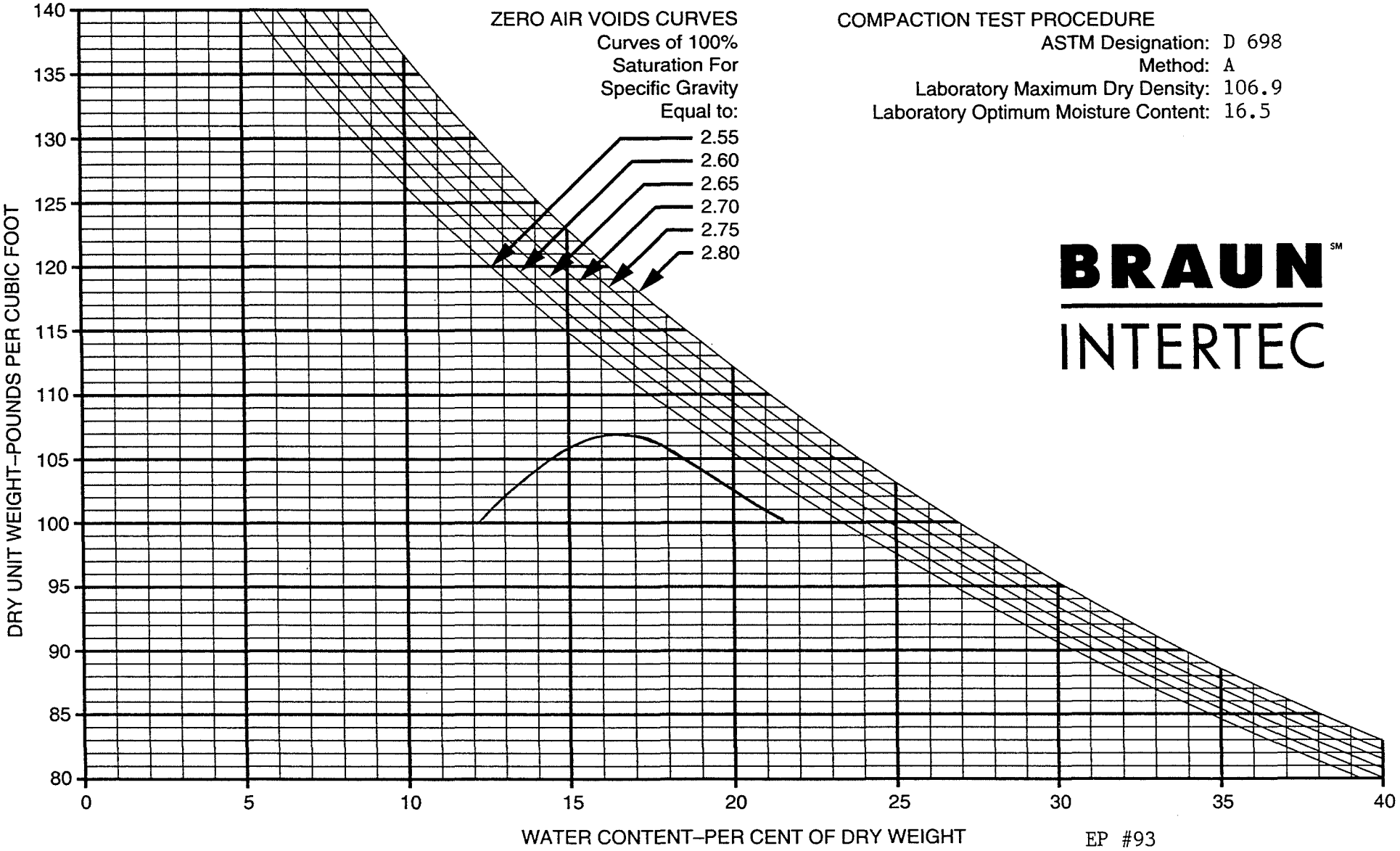
DRAWN BY: JA

CHECKED BY:

DATE: 6/23/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 106.9
Laboratory Optimum Moisture Content: 16.5

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLS-CC -136	1893	15	26	41	Sandy Lean Clay (CL), dark grayish brown

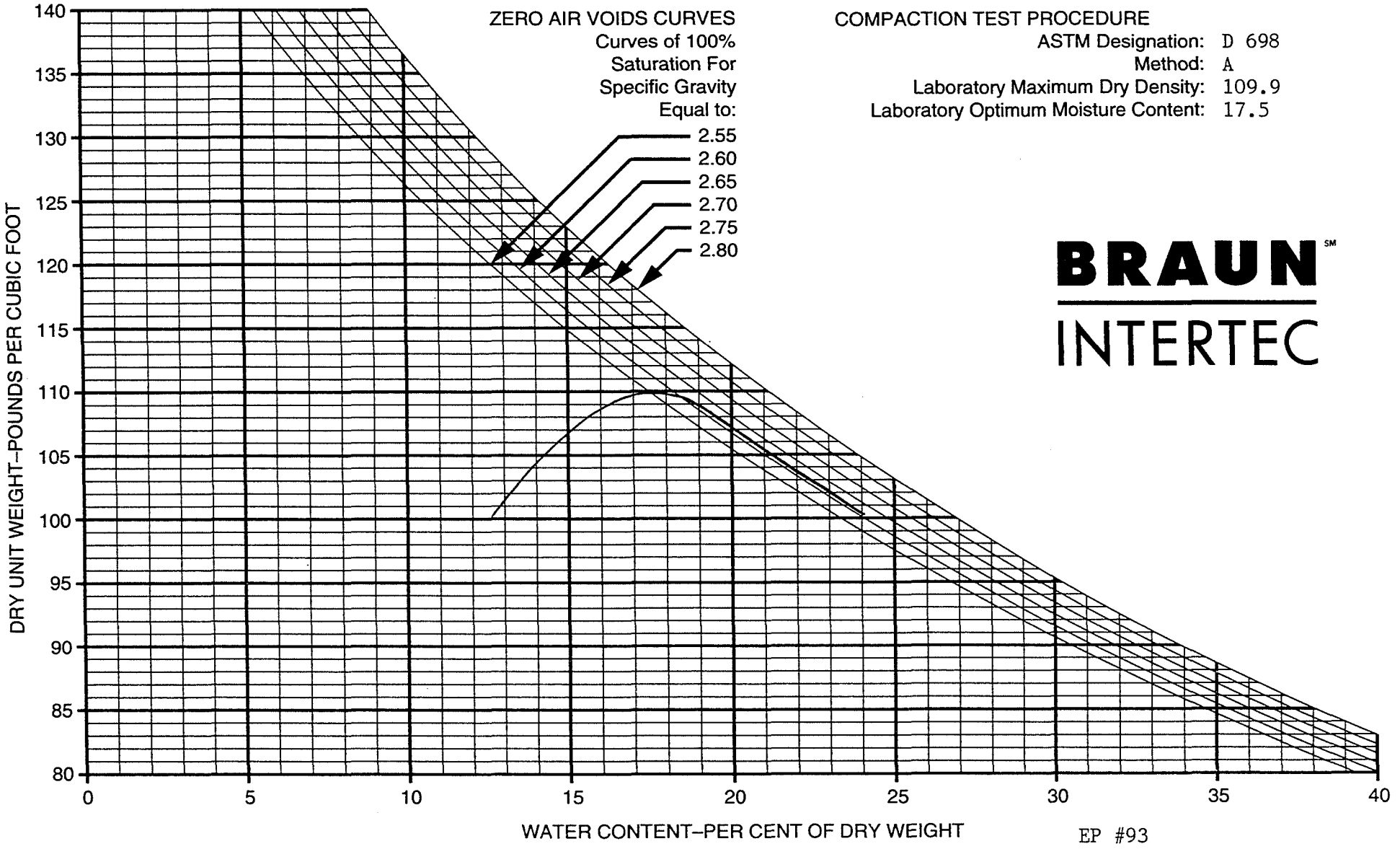
42546N 45192E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 6/16/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 109.9
Laboratory Optimum Moisture Content: 17.5

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	SG-CC-137	18846	15	27	42	Sandy Lean Clay (CL) dark grayish brown

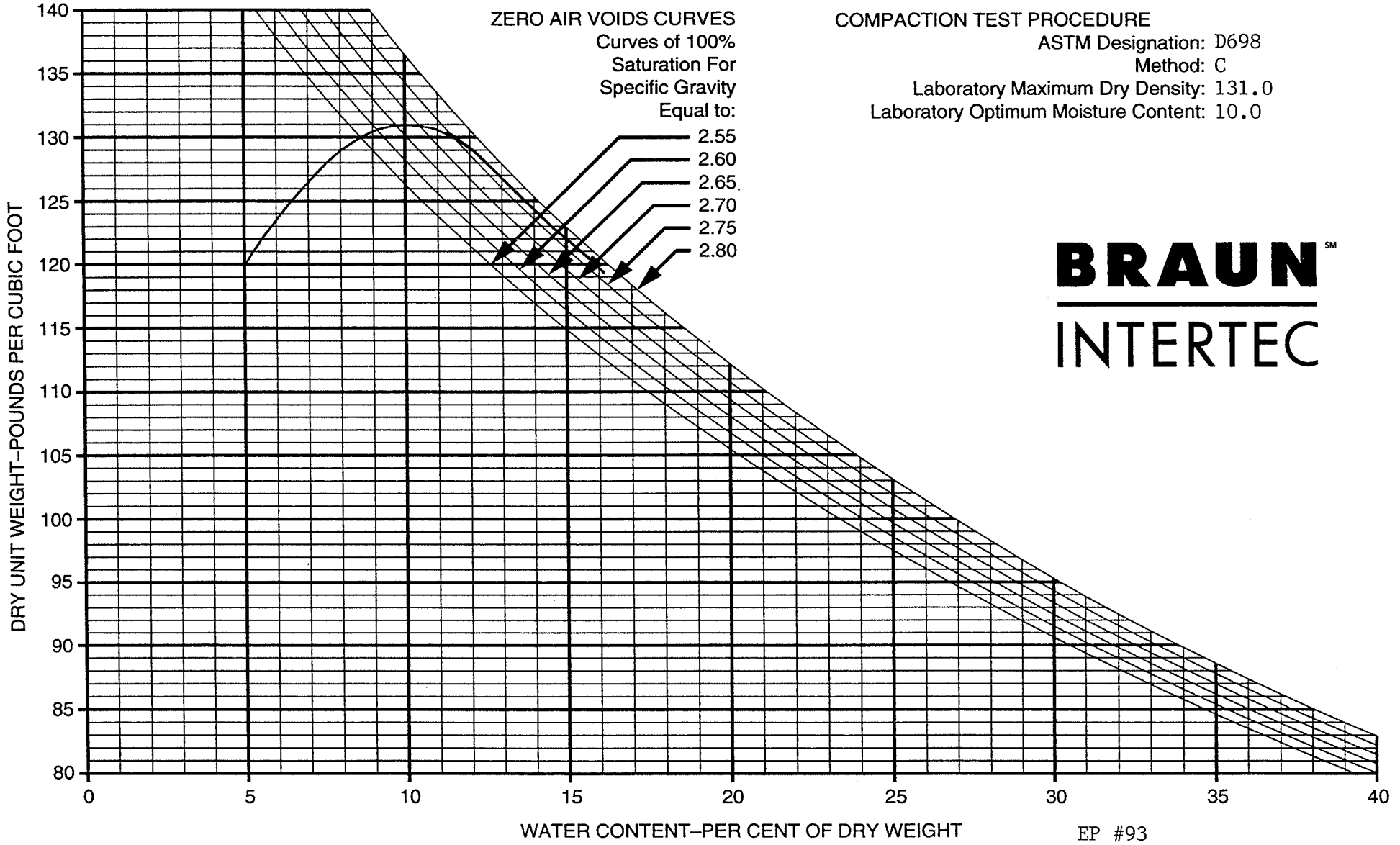
43248N 44061E

COMPACTION TEST

DRAWN BY: AC
CHECKED BY:
DATE: 6/23/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D698
Method: C
Laboratory Maximum Dry Density: 131.0
Laboratory Optimum Moisture Content: 10.0

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	SG-CC-138	N/A	19	2	21	Poorly Graded Gravel with Silt and Sand (GP-GM), strong brown.

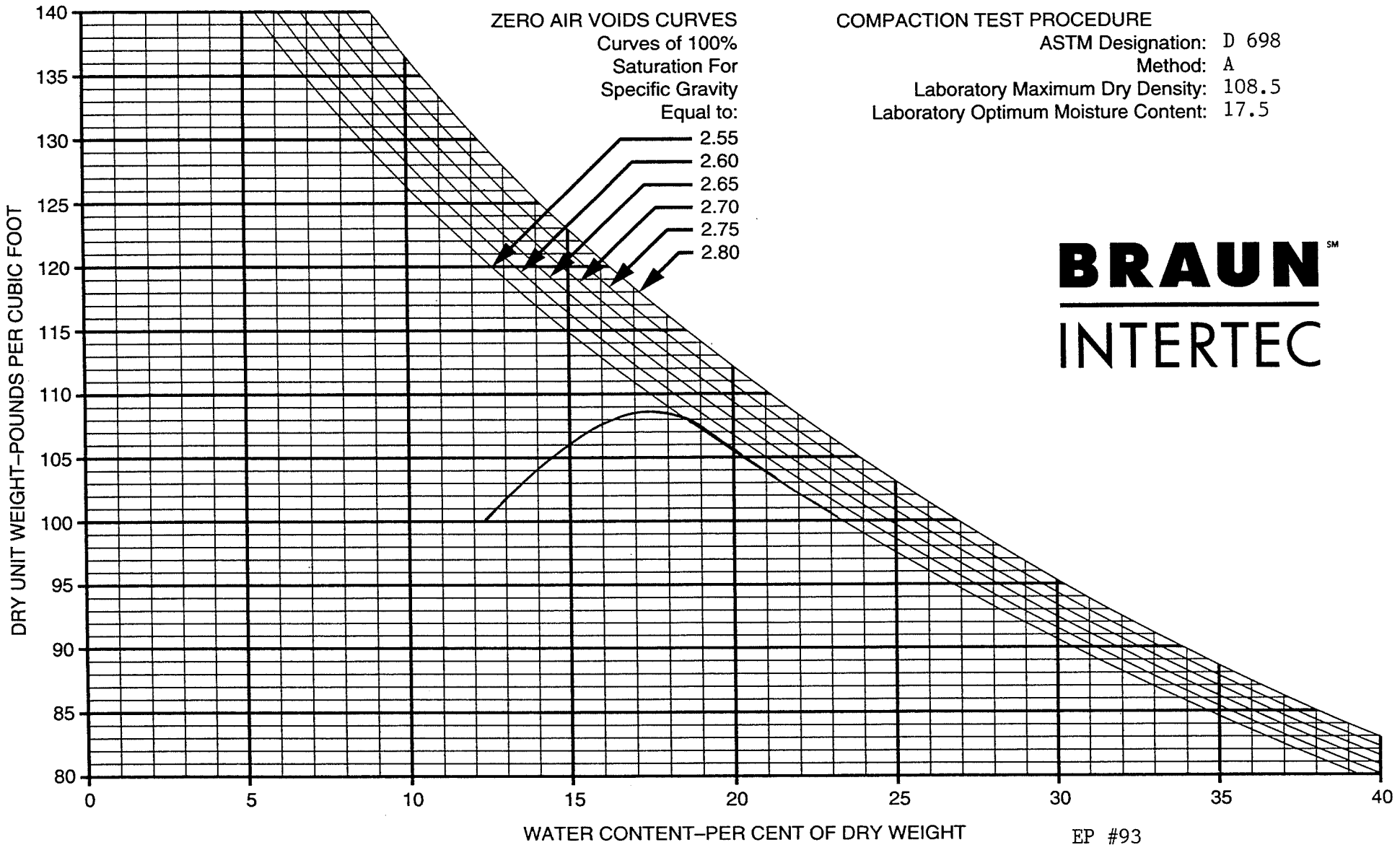
43000N 46400E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 6/16/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 108.5
Laboratory Optimum Moisture Content: 17.5

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	SG-CC--170	1887.2	15	27	42	Sandy Lean Clay (CL), dark grayish brown

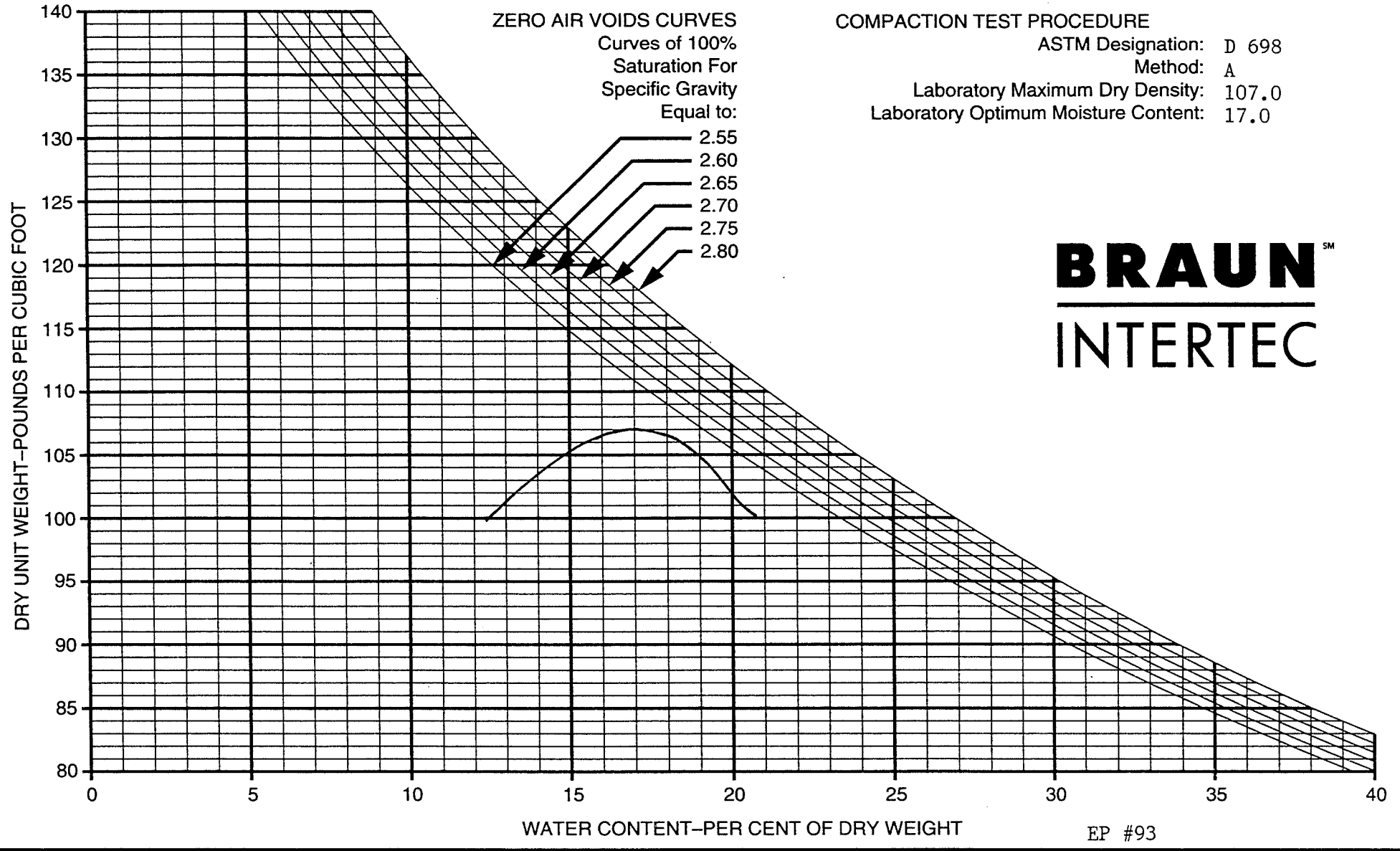
43289N 44140E

COMPACTION TEST

DRAWN BY: DS
CHECKED BY:
DATE: 6/29/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation:	D 698
Method:	A
Laboratory Maximum Dry Density:	107.0
Laboratory Optimum Moisture Content:	17.0

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLB-CC -182	1887.9	16	25	41	Sandy Lean Clay (CL), dark gray brown

E43295N 43957E

COMPACTION TEST

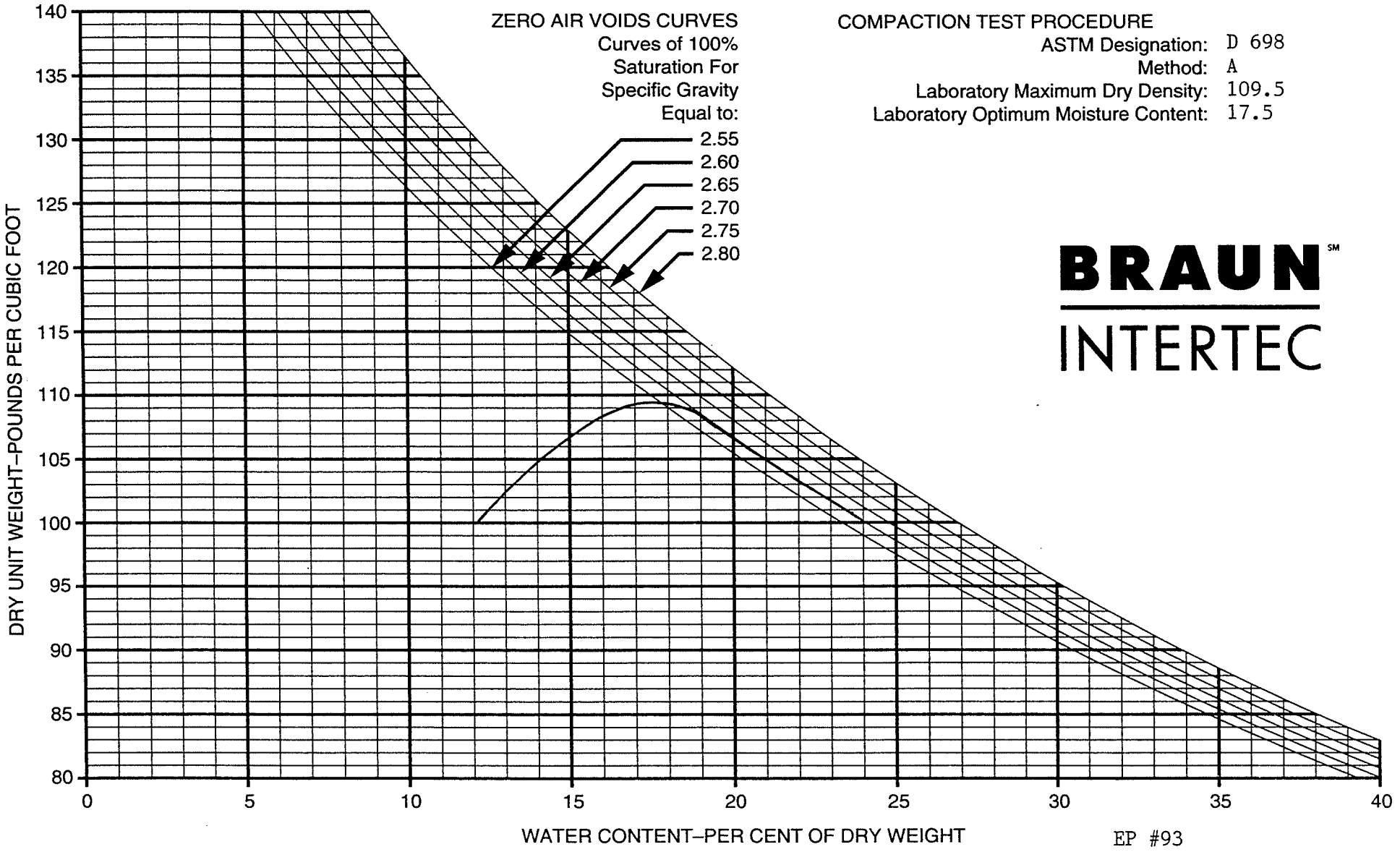
DRAWN BY: JA

CHECKED BY:

DATE: 7/23/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 109.5
Laboratory Optimum Moisture Content: 17.5

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	SG-CC -186	1881.3	15	28	43	Sandy Lean Clay (CL), dark grayish brown

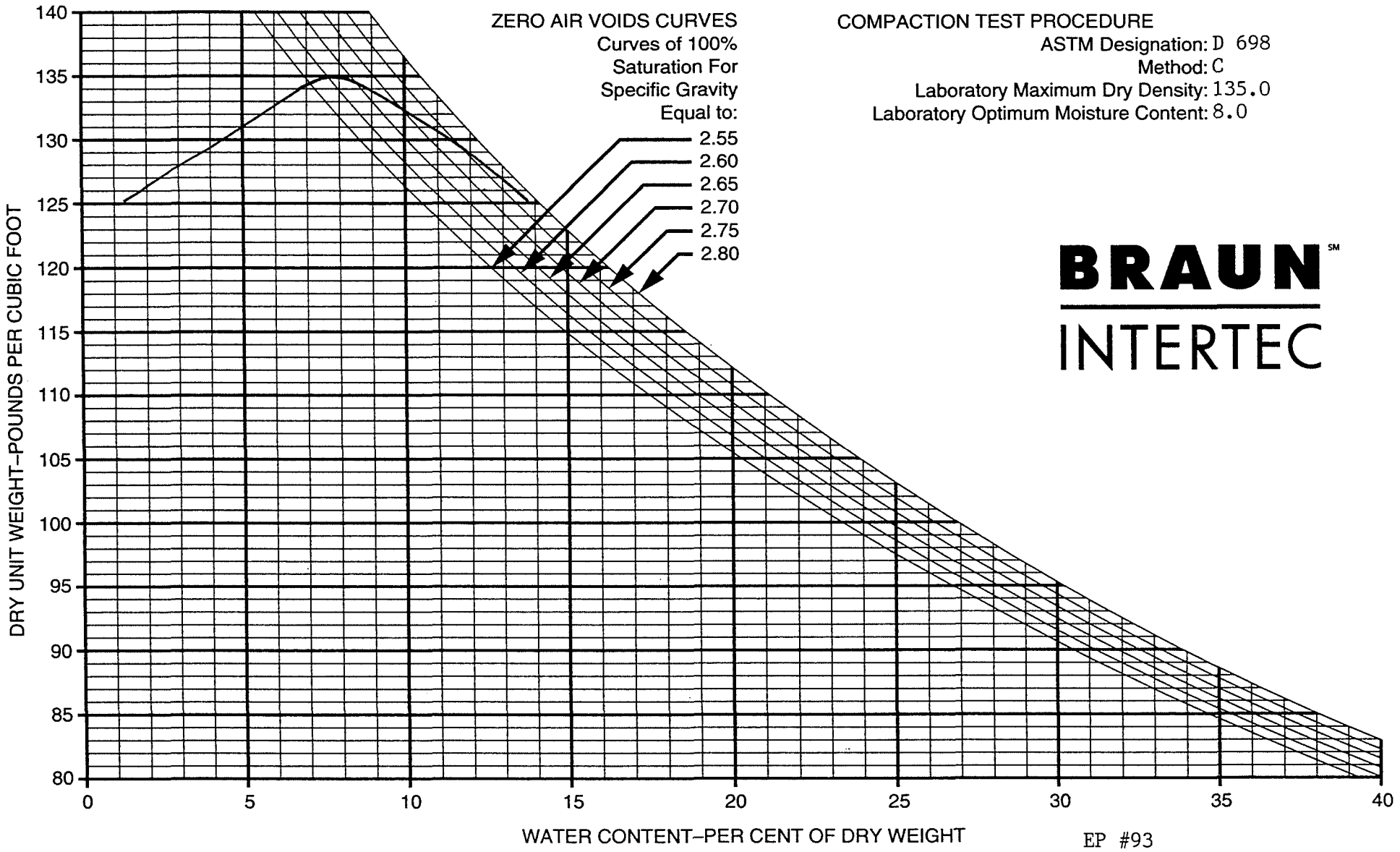
42787N 43071E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 7/27/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: C
Laboratory Maximum Dry Density: 135.0
Laboratory Optimum Moisture Content: 8.0

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	SG-CC-209	1878.1	17	4	21	Silty, Clayey Sand (SC-SM), gray brown

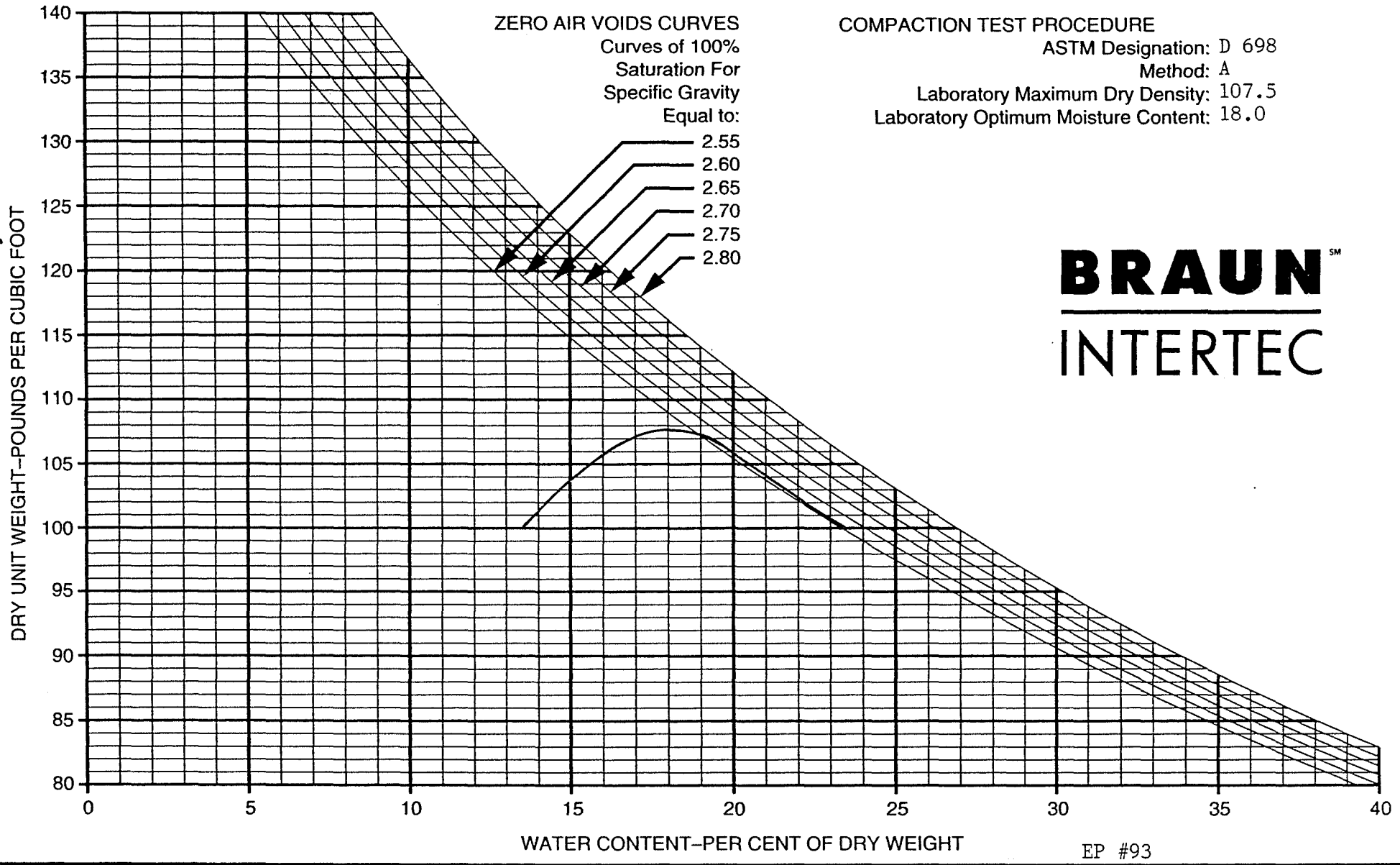
42623N 45004E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 8/4/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 107.5
Laboratory Optimum Moisture Content: 18.0

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	SG-CC-219	1882.6	17	26	43	Sandy Lean Clay (CL), grayish-brown

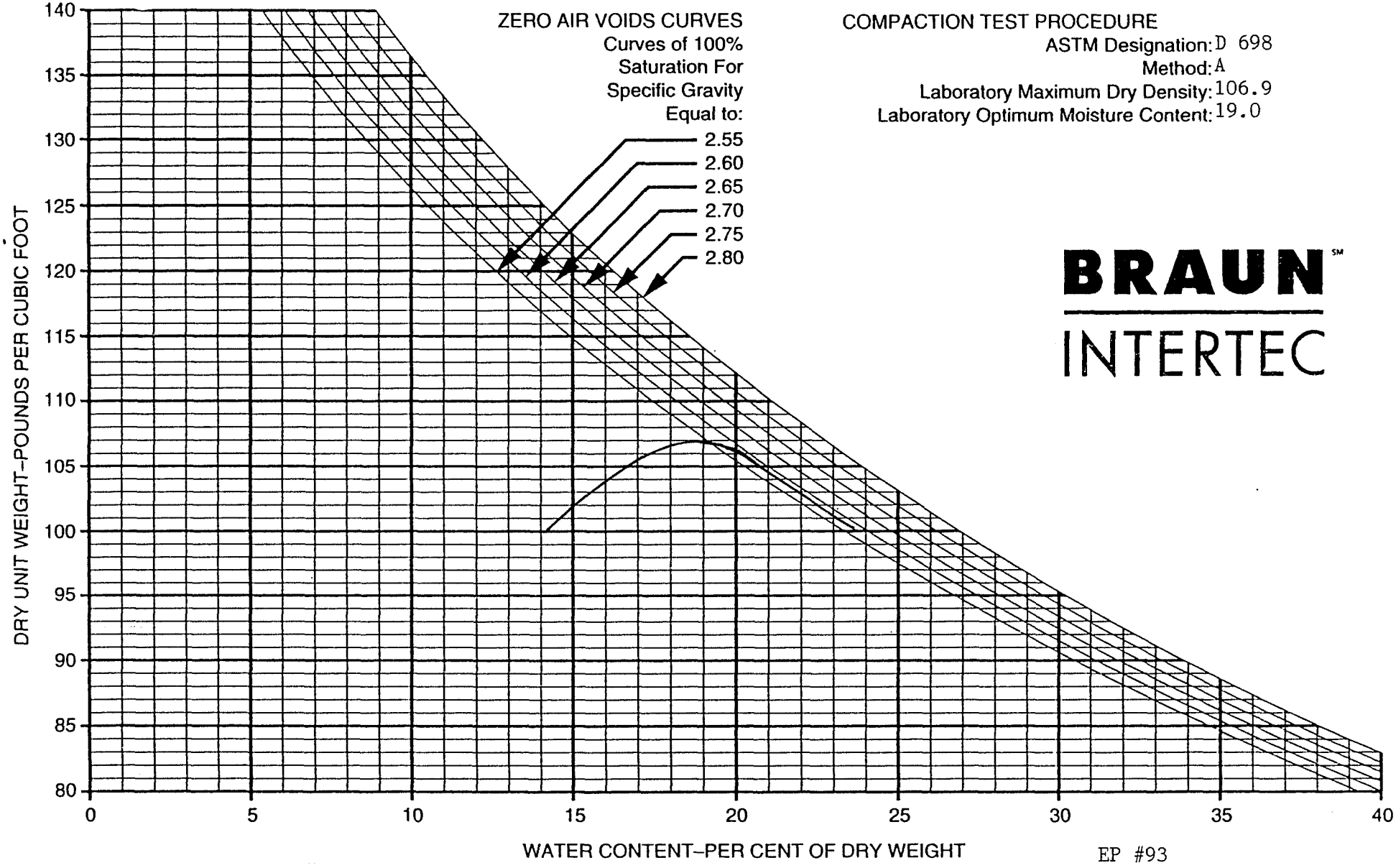
43208N 43790E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 7/10/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 106.9
Laboratory Optimum Moisture Content: 19.0

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLS-00 -234	1889.1	16	26	42	Sandy Lean Clay (CL), dark grayish-brown

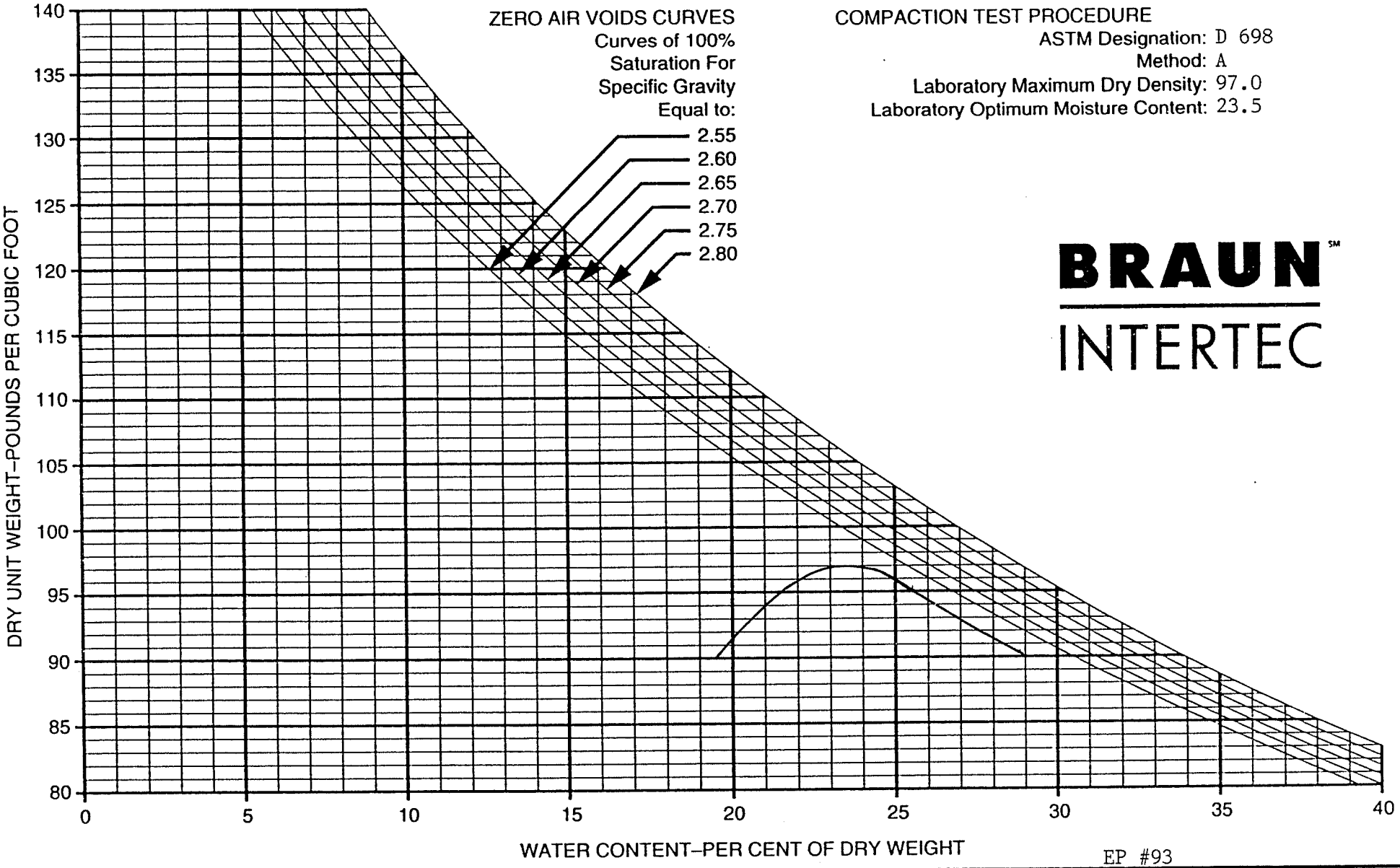
42562N 44199E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 7/16/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 97.0
Laboratory Optimum Moisture Content: 23.5

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLB-CC -247		20	35	55	Fat Clay (CH), very dark grayish-brown

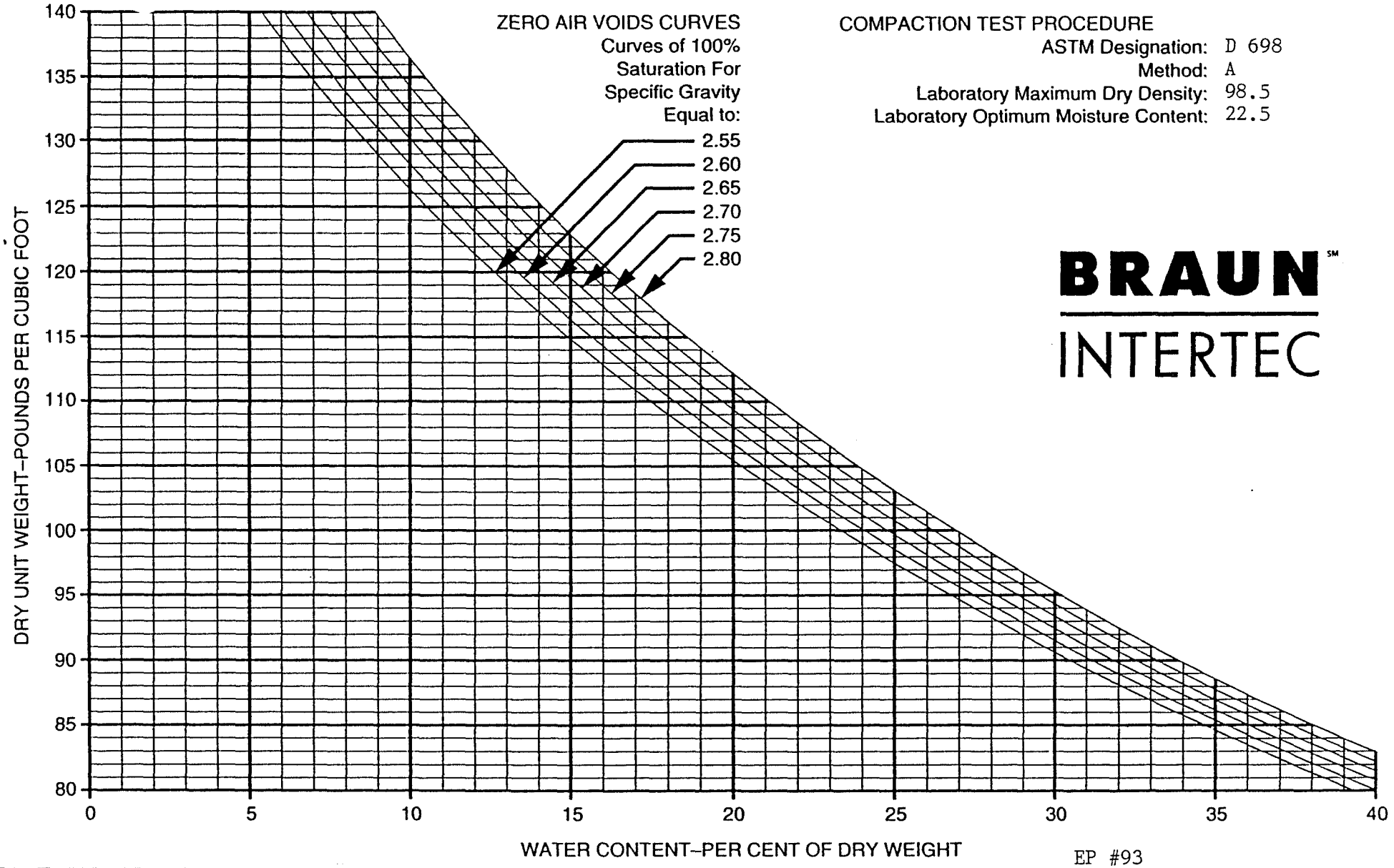
NW stockpile, east end

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 7/27/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 98.5
Laboratory Optimum Moisture Content: 22.5

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLB-CC -248		19	35	54	Fat Clay (CH), very dark gray

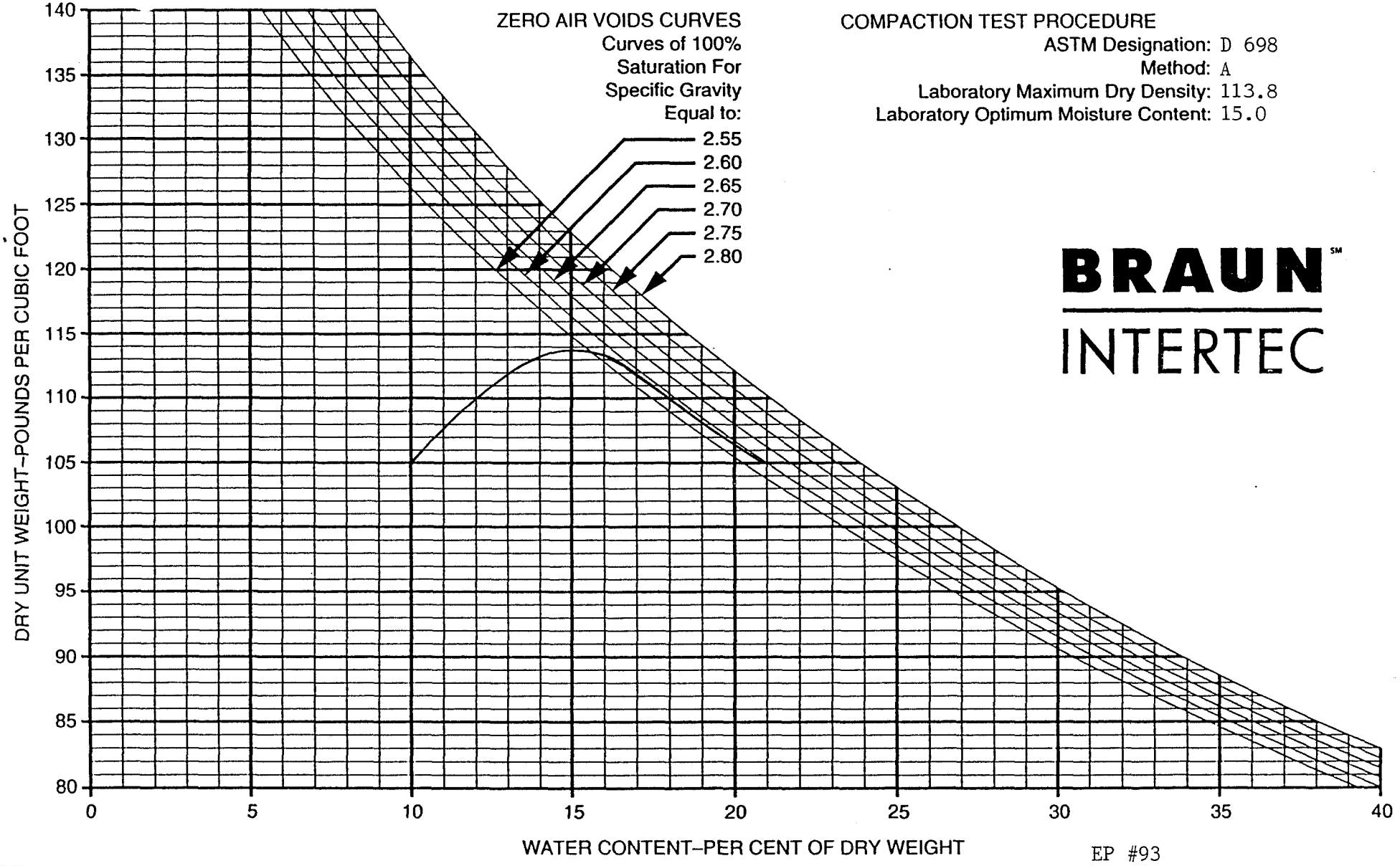
NW stockpile, east end

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 7/13/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 113.8
Laboratory Optimum Moisture Content: 15.0

BRAUN SM
INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLB-CC -249	1873	15	24	39	Sandy Lean Clay (CL), olive brown

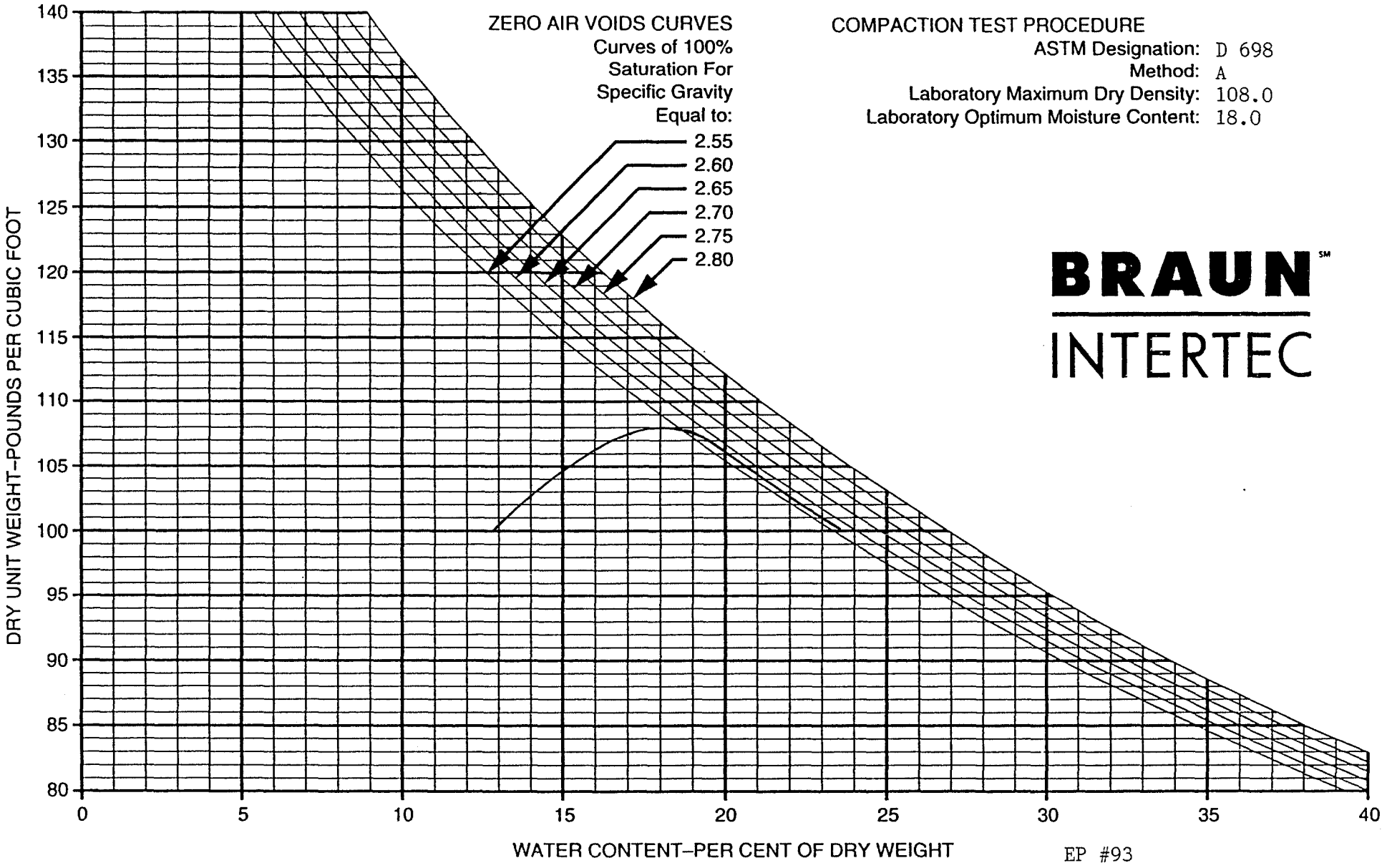
42800N 43200E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 7/15/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 108.0
Laboratory Optimum Moisture Content: 18.0

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	SG-CC-252	1883.1	17	22	39	Sandy Lean Clay (CL), olive brown

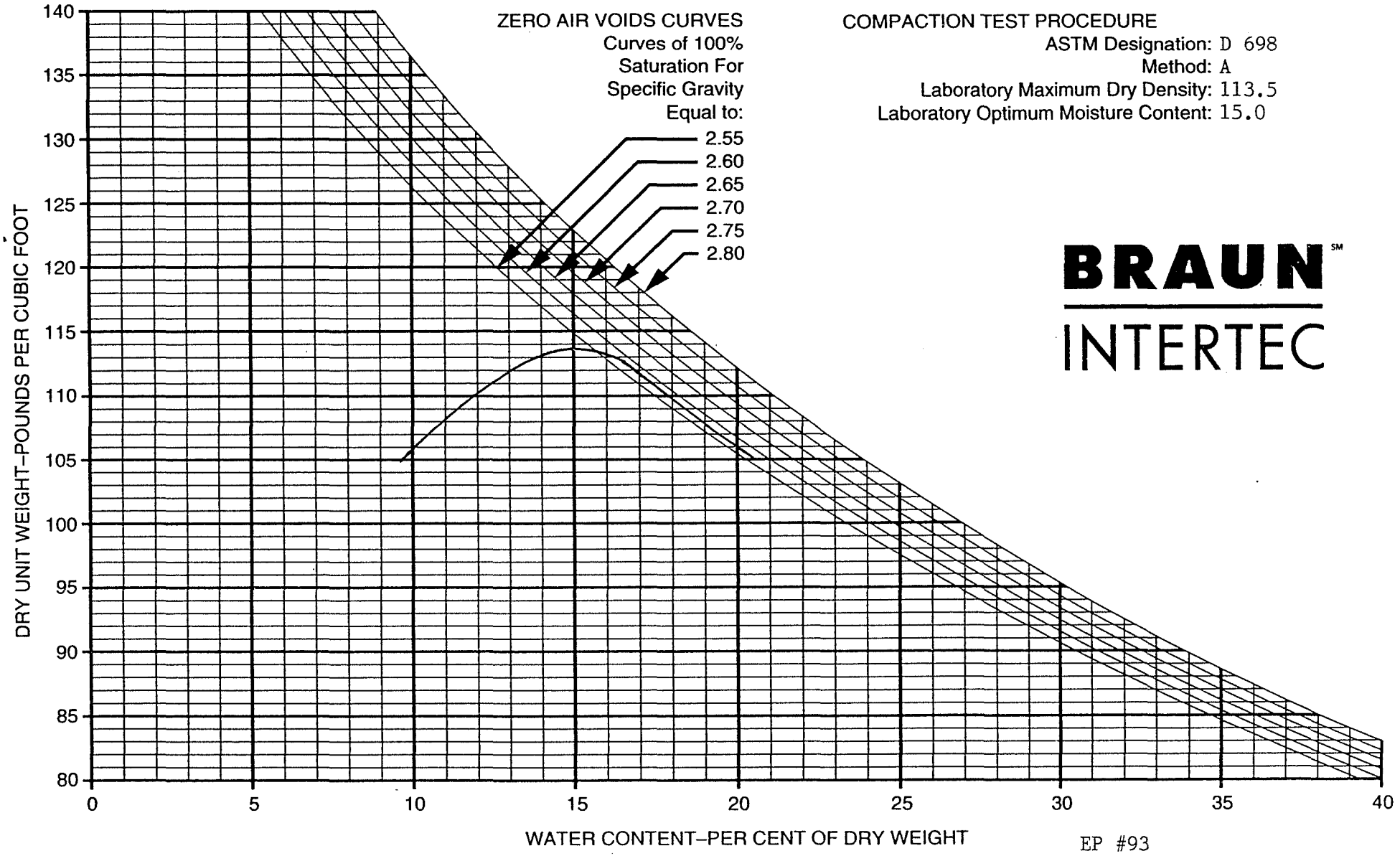
43244N 45659E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 8/5/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 113.5
Laboratory Optimum Moisture Content: 15.0

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	SG-CC-262	1881.3	15	23	38	Sandy Lean Clay (CL), olive brown

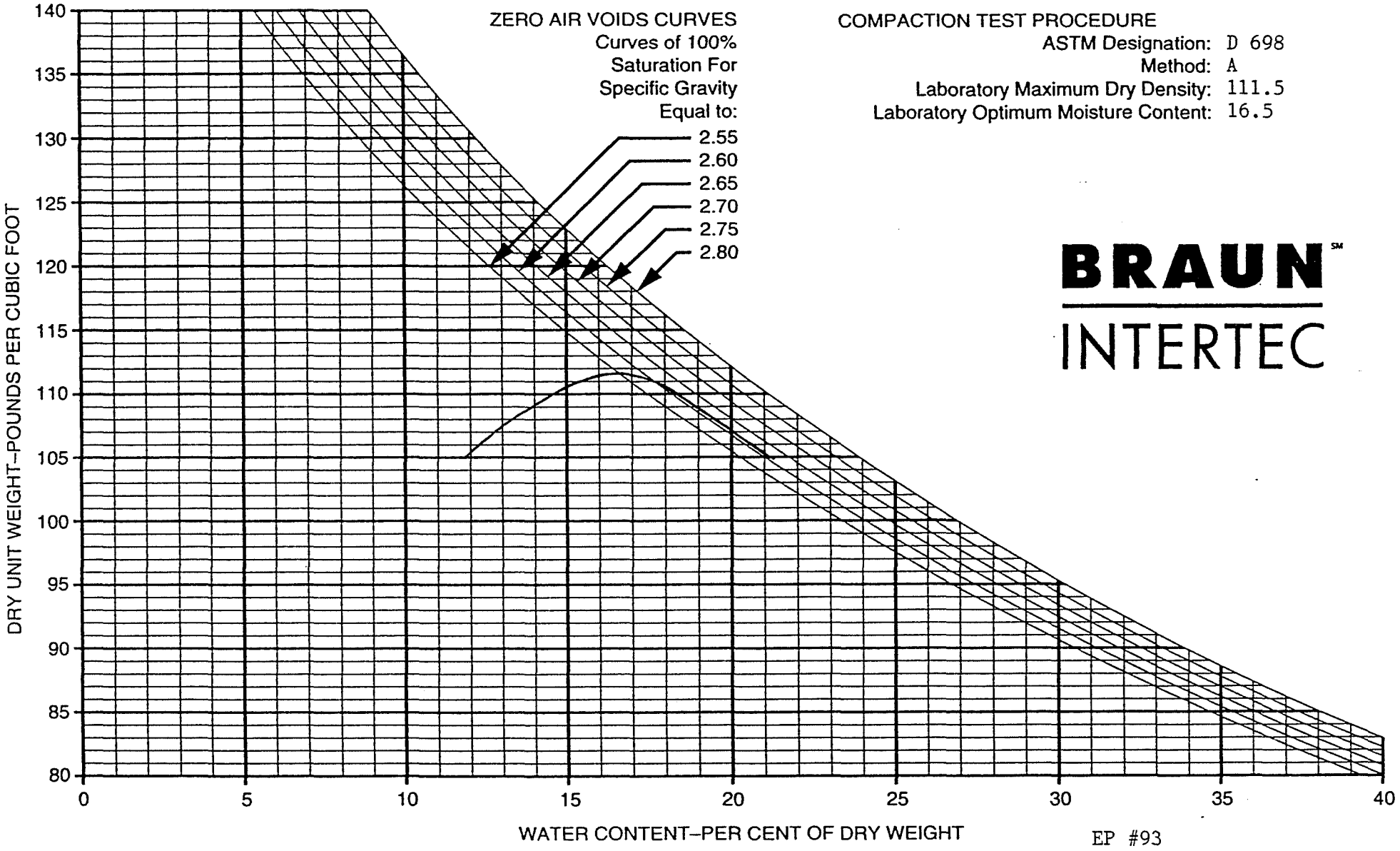
43094N 43144E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 7/24/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 111.5
Laboratory Optimum Moisture Content: 16.5

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	SG-CC-265	1884.2	14	25	39	Sandy Lean Clay (CL), olive brown

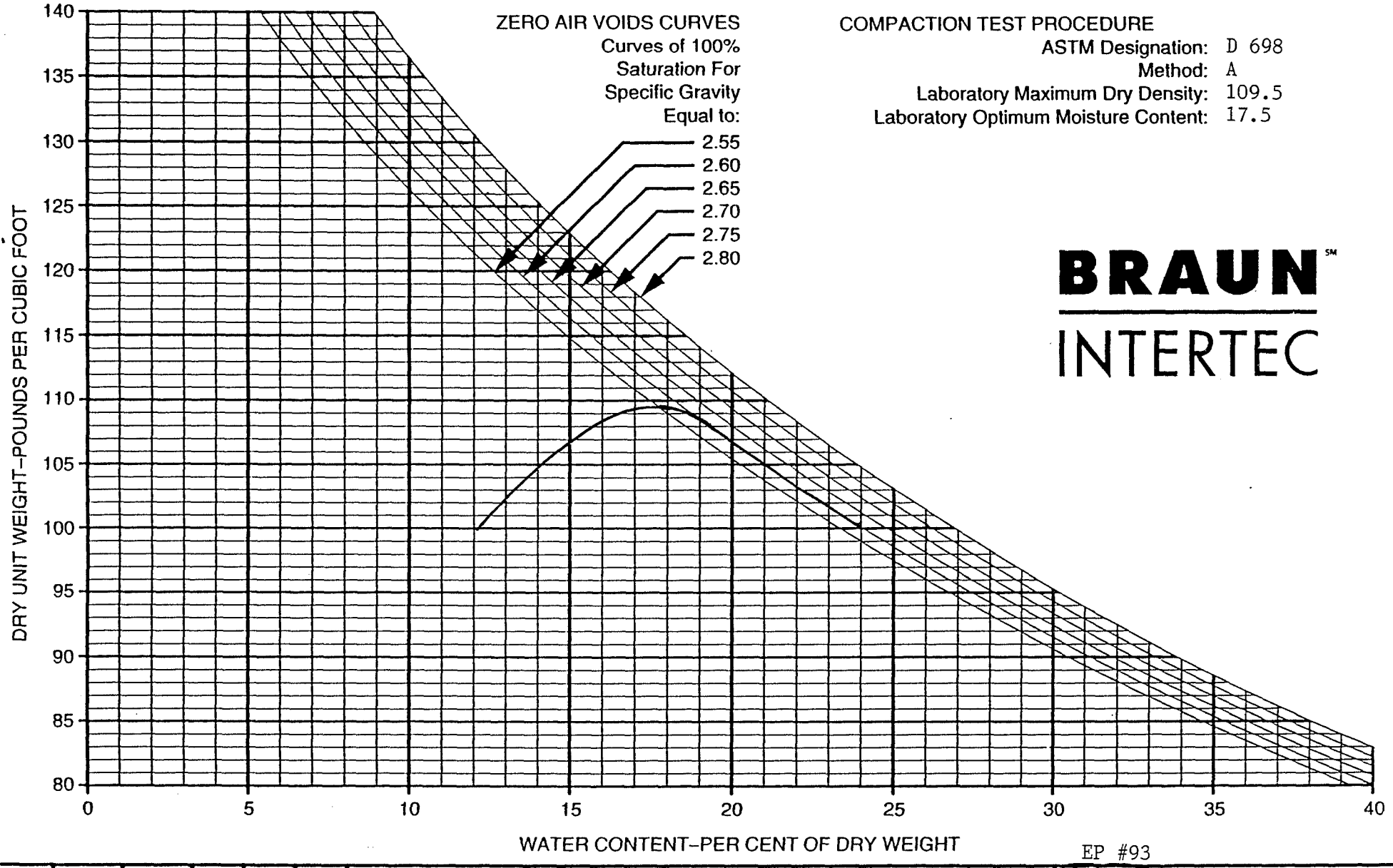
43193N 45852E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 8/5/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 109.5
Laboratory Optimum Moisture Content: 17.5

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	SG-CC-292	1883.7	15	25	40	Sandy Lean Clay (CL), grayish-brown

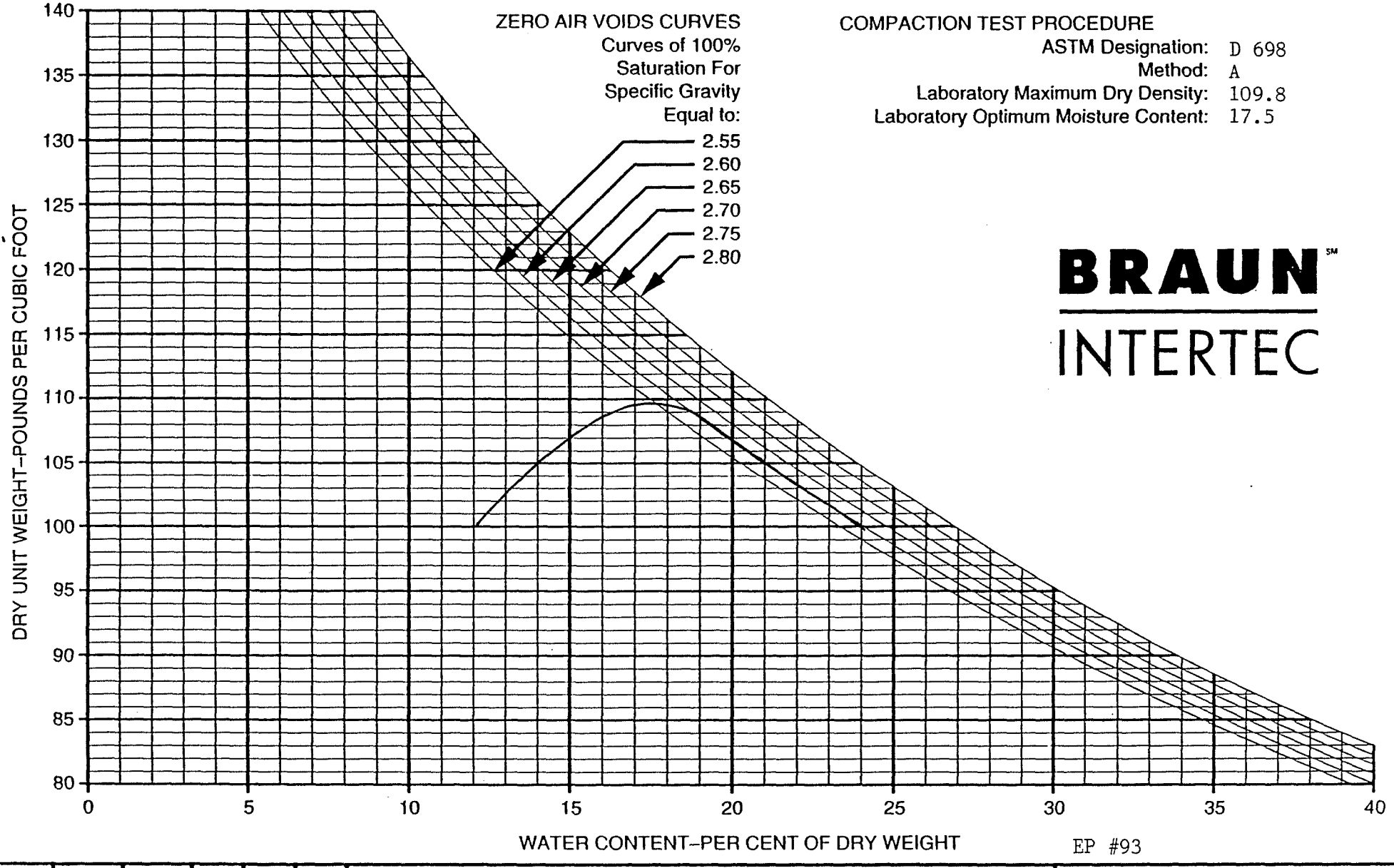
42948N 45563E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 7/24/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 109.8
Laboratory Optimum Moisture Content: 17.5

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	SG-CC-305	1884.9	13	26	39	Sandy Lean Clay (CL), olive brown

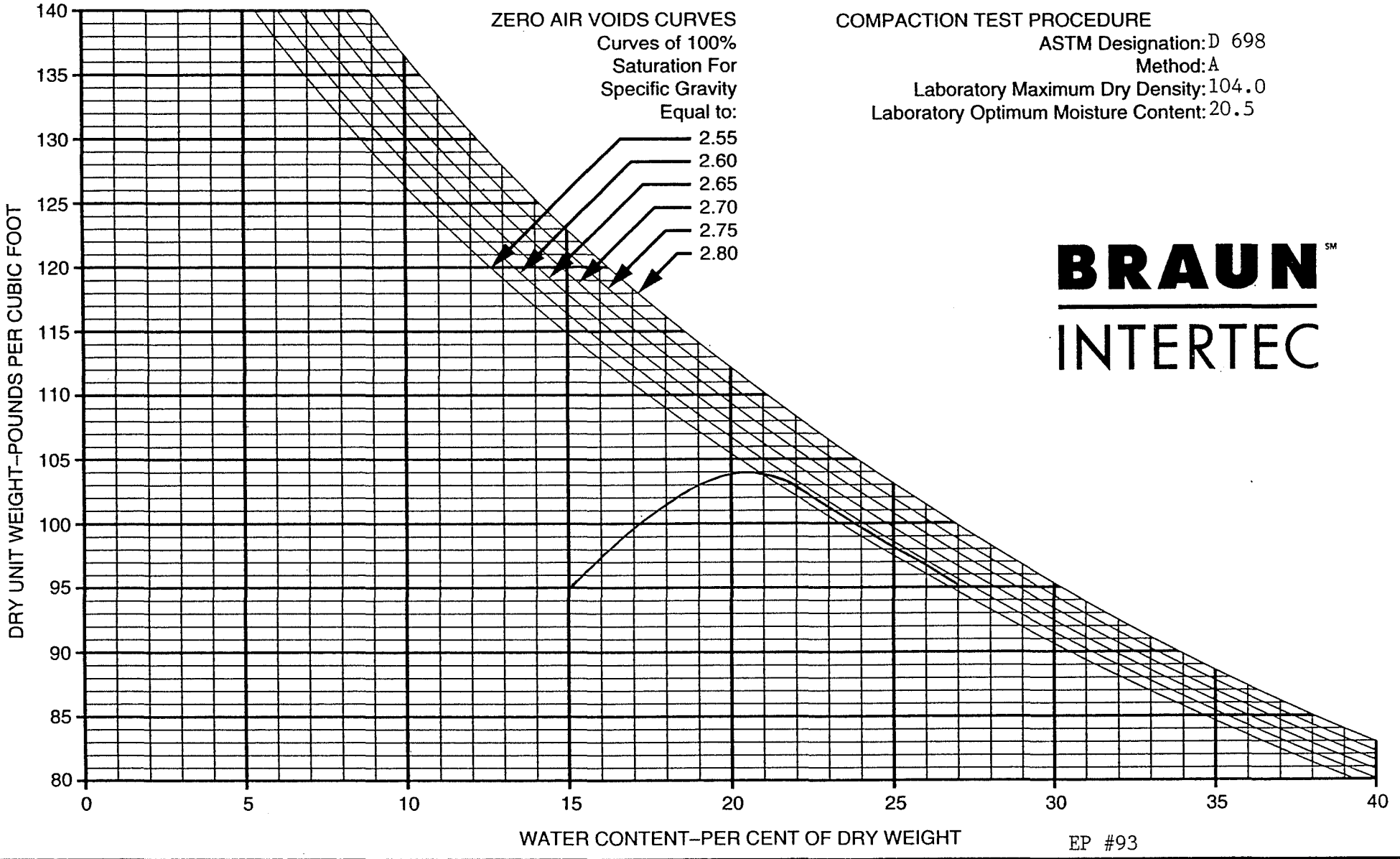
43057N 45891E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 7/15/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 104.0
Laboratory Optimum Moisture Content: 20.5

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	SG-CC-320	1886.3	15	29	44	Sandy Lean Clay (CL), grayish-brown

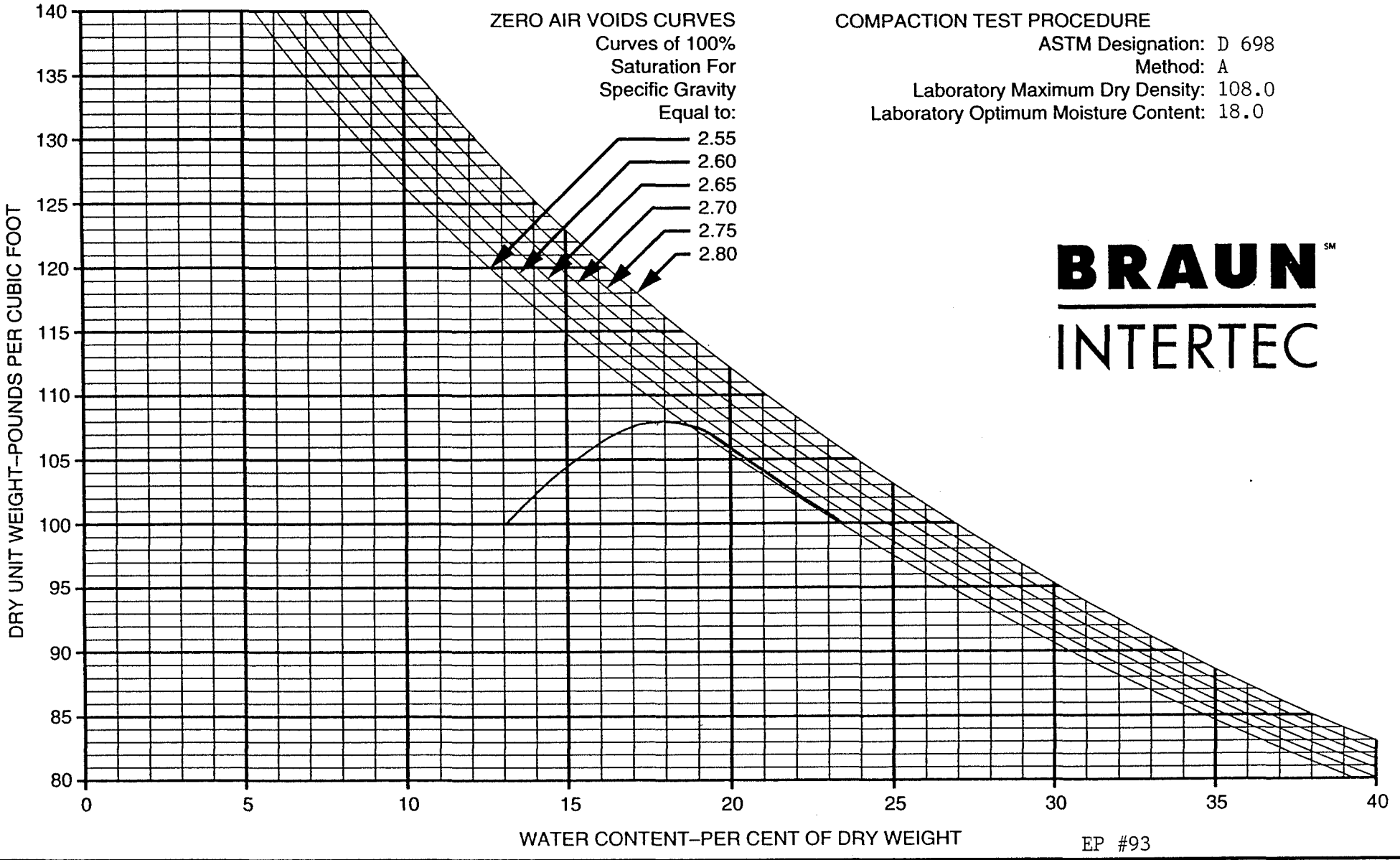
43079N 45859E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 8/5/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 108.0
Laboratory Optimum Moisture Content: 18.0

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLS-CC-331	1895	17	23	40	Sandy Lean Clay (CL), olive brown

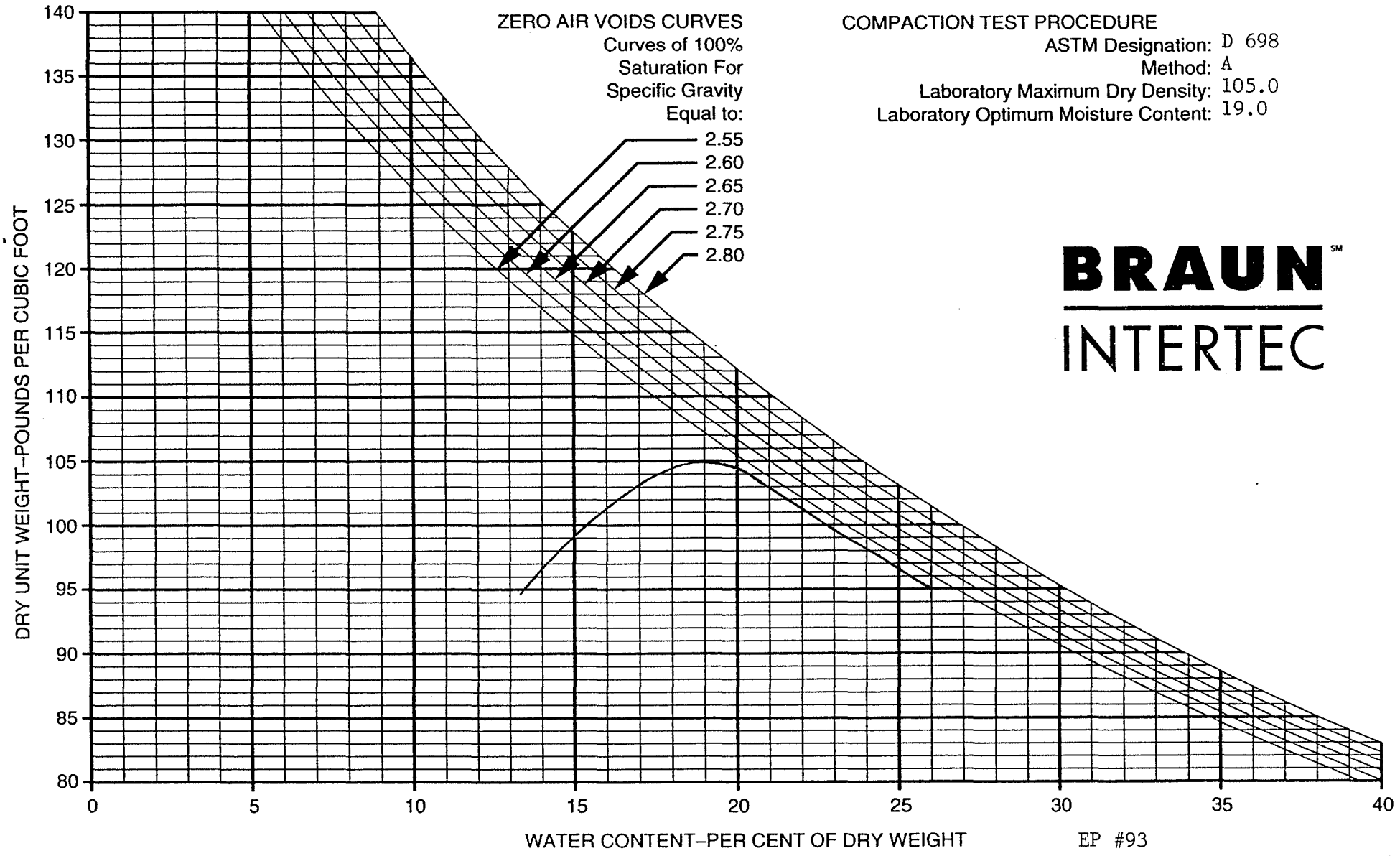
42753N 43038E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 7/22/92

JOB NO. BFDX-92-017C

PLATE



BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLS-CC -333	1896.3	18	26	44	Sandy Lean Clay (CL), olive brown

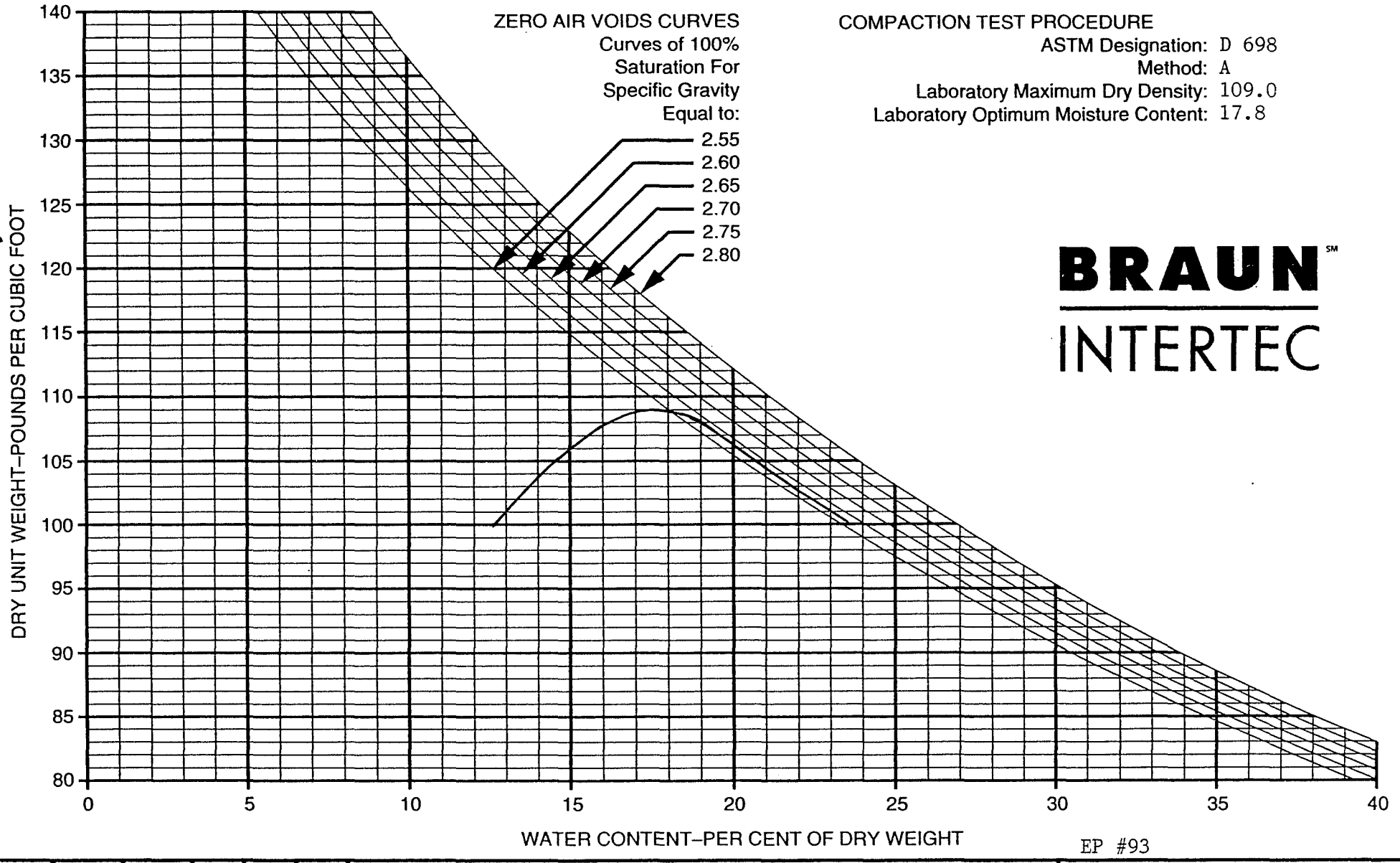
42596N 43045E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 7/22/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 109.0
Laboratory Optimum Moisture Content: 17.8

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	SG-CC-340	1883.2	16	25	41	Sandy Lean Clay (CL), olive brown

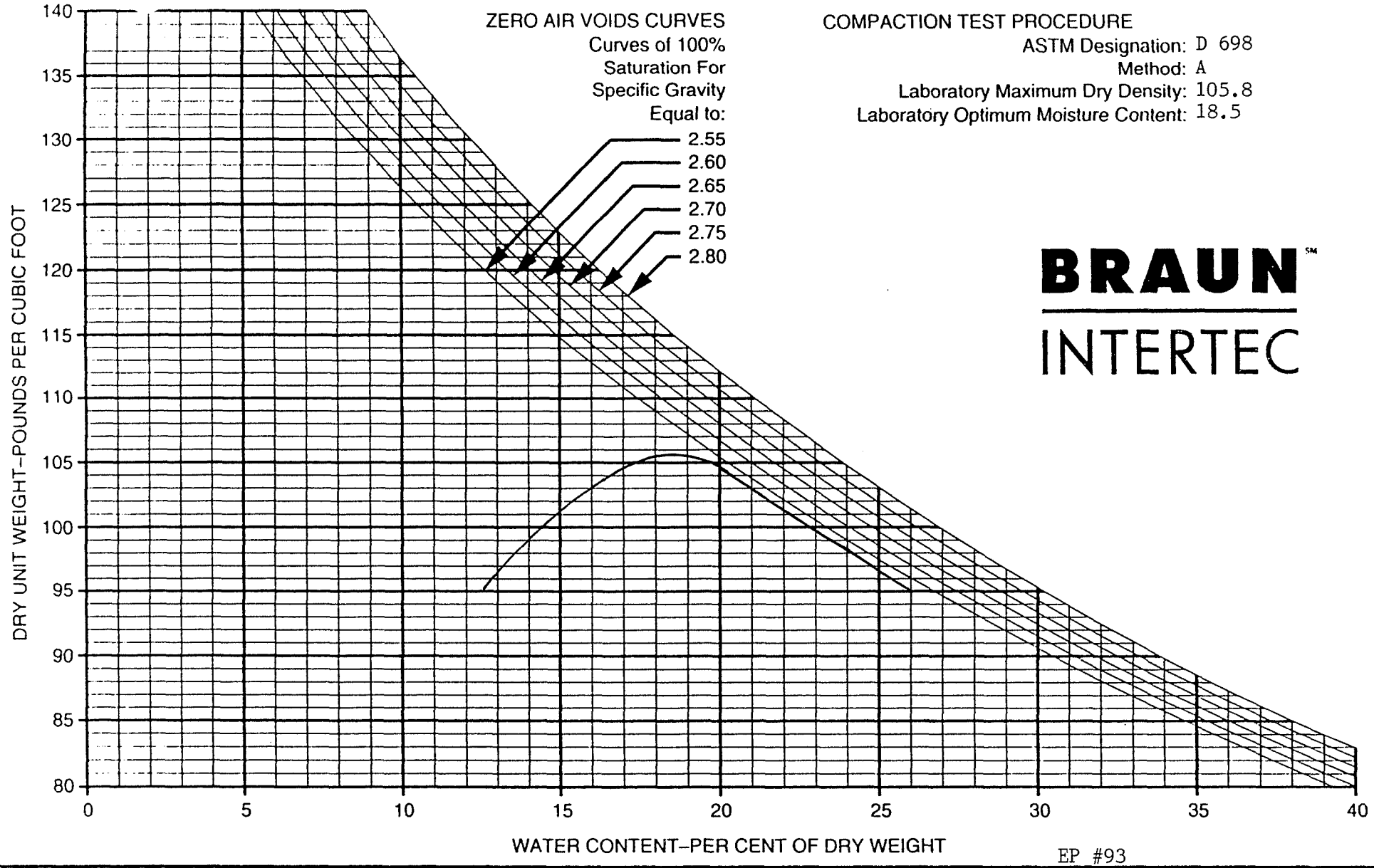
42754N 43203E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 8/5/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 105.8
Laboratory Optimum Moisture Content: 18.5

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLS-OC-356	1900.2	15	29	44	Sandy Lean Clay (CL), olive brown

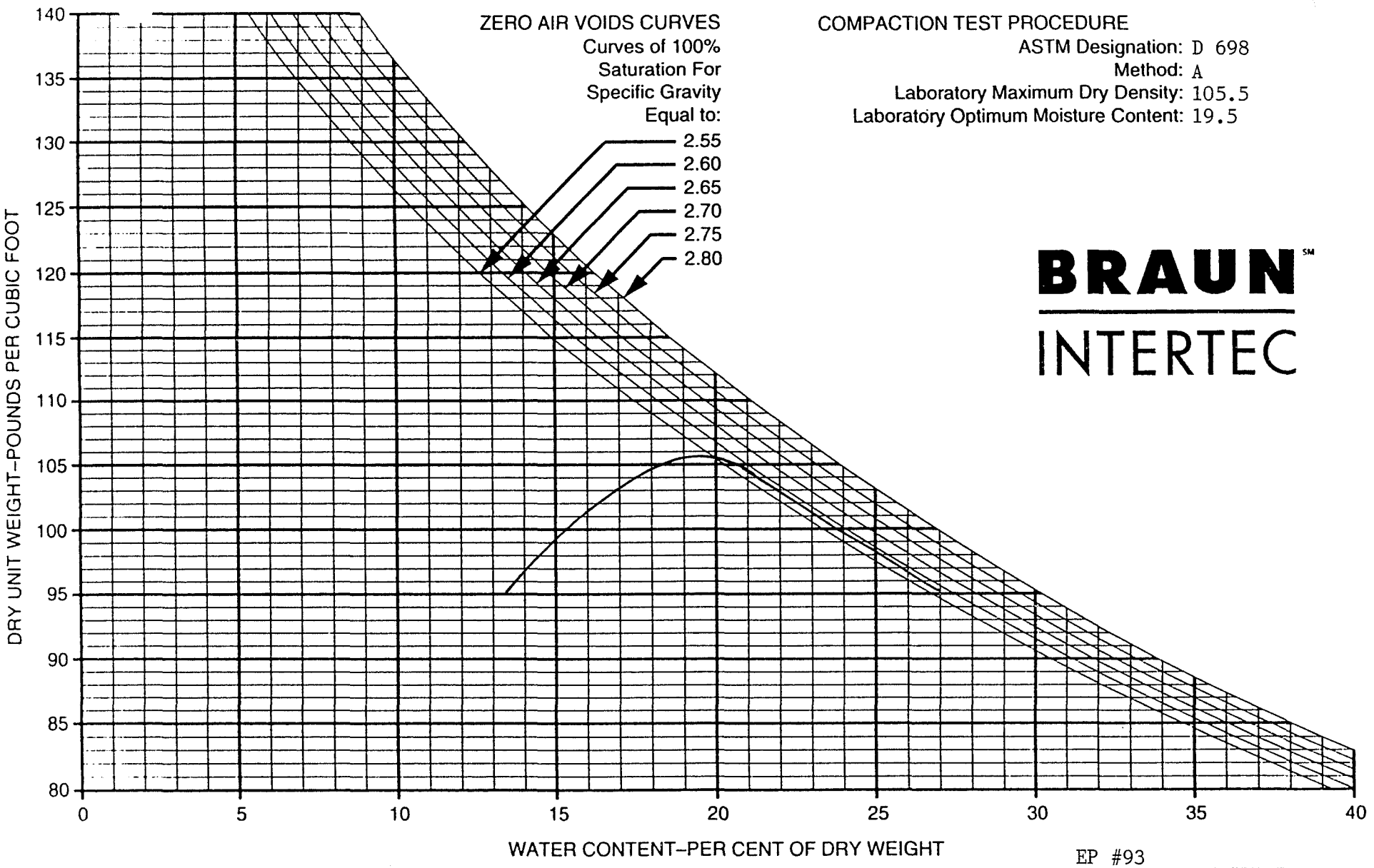
42529N 45680E

COMPACTION TEST

DRAWN BY:
CHECKED BY: JA
DATE: 8/10/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698

Method: A

Laboratory Maximum Dry Density: 105.5

Laboratory Optimum Moisture Content: 19.5

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLS-CC-357	1900.1	14	30	44	Sandy Lean Clay (CL), olive brown

43483N 45581E

COMPACTION TEST

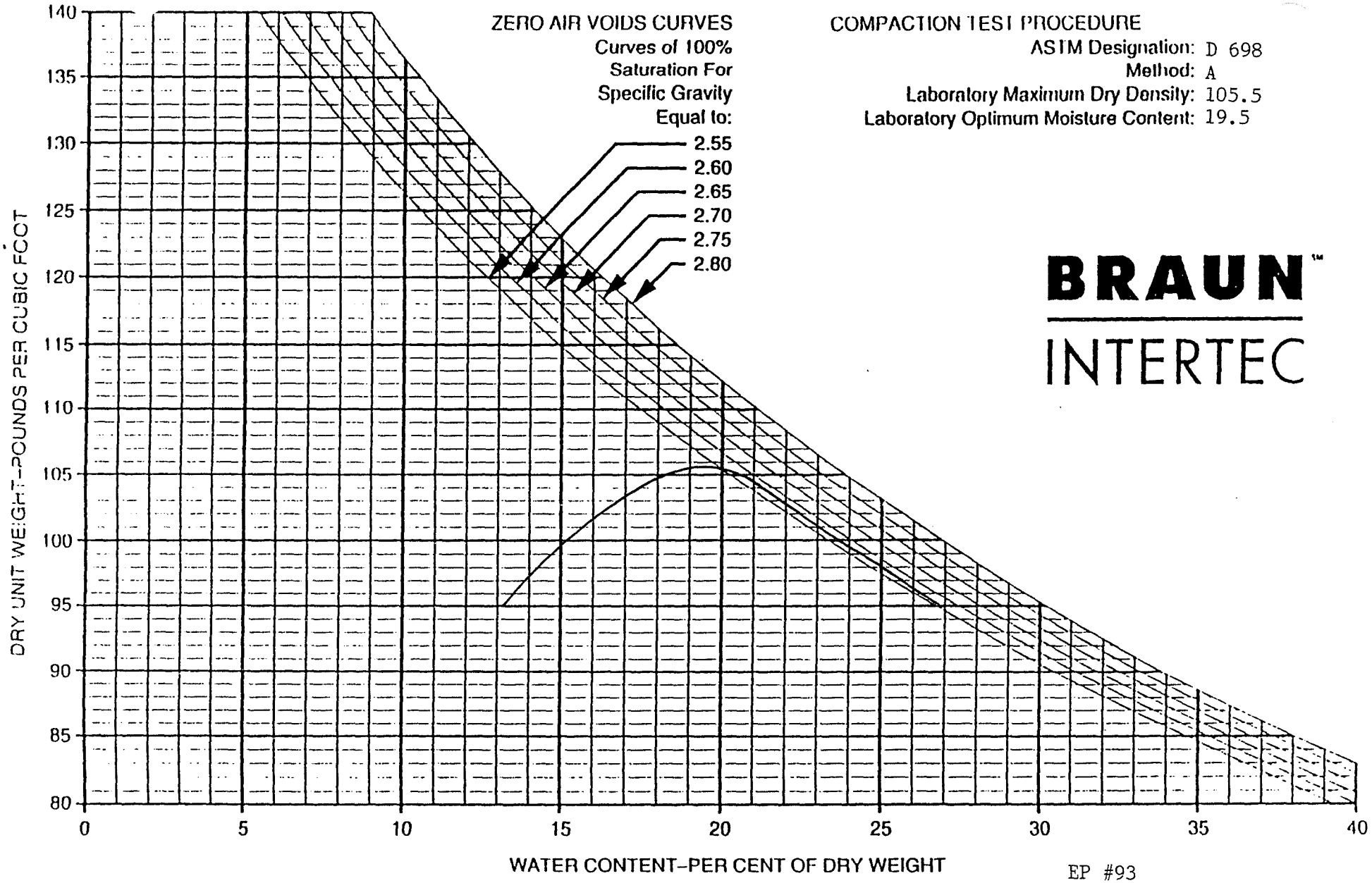
DRAWN BY: JA

CHECKED BY:

DATE: 8/13/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 105.5
Laboratory Optimum Moisture Content: 19.5

BRAUN™
INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST-82	CLB-CC-376	1888.5	16	28	44	Sandy Lean Clay (CL), olive brown

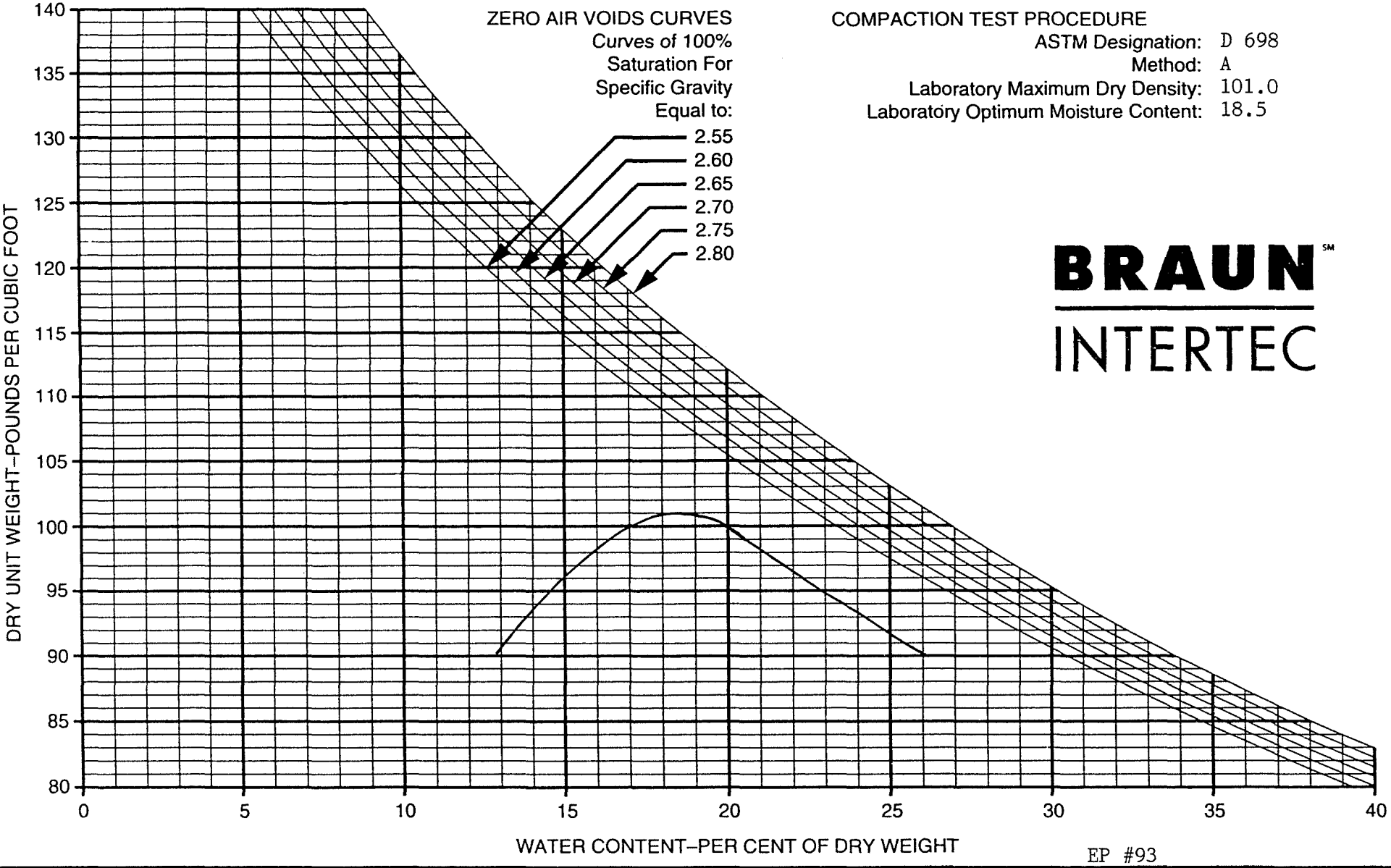
43219N 43271E

COMPACTION TEST

DRAWN BY: AC
CHECKED BY:
DATE: 8/13/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 101.0
Laboratory Optimum Moisture Content: 18.5

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST-86	CLB-CC -380	1887	15	30	45	Sandy Lean Clay (CL), olive brown

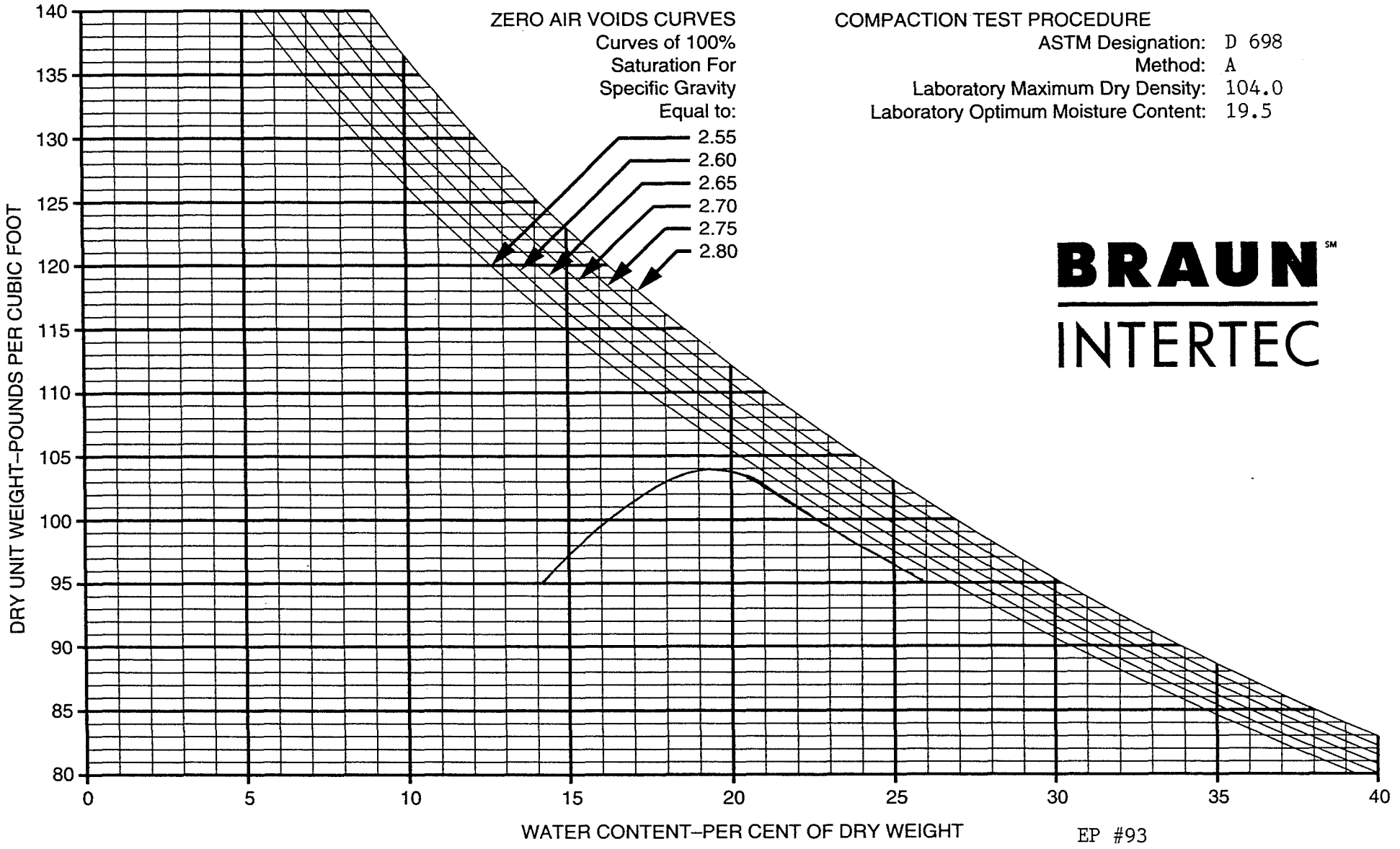
43016N 43445E

COMPACTION TEST

DRAWN BY: AC
CHECKED BY:
DATE: 8/19/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 104.0
Laboratory Optimum Moisture Content: 19.5

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST.90	CLB-CC -387	1885.4	16	28	44	Sandy Lean Clay (CL), olive brown

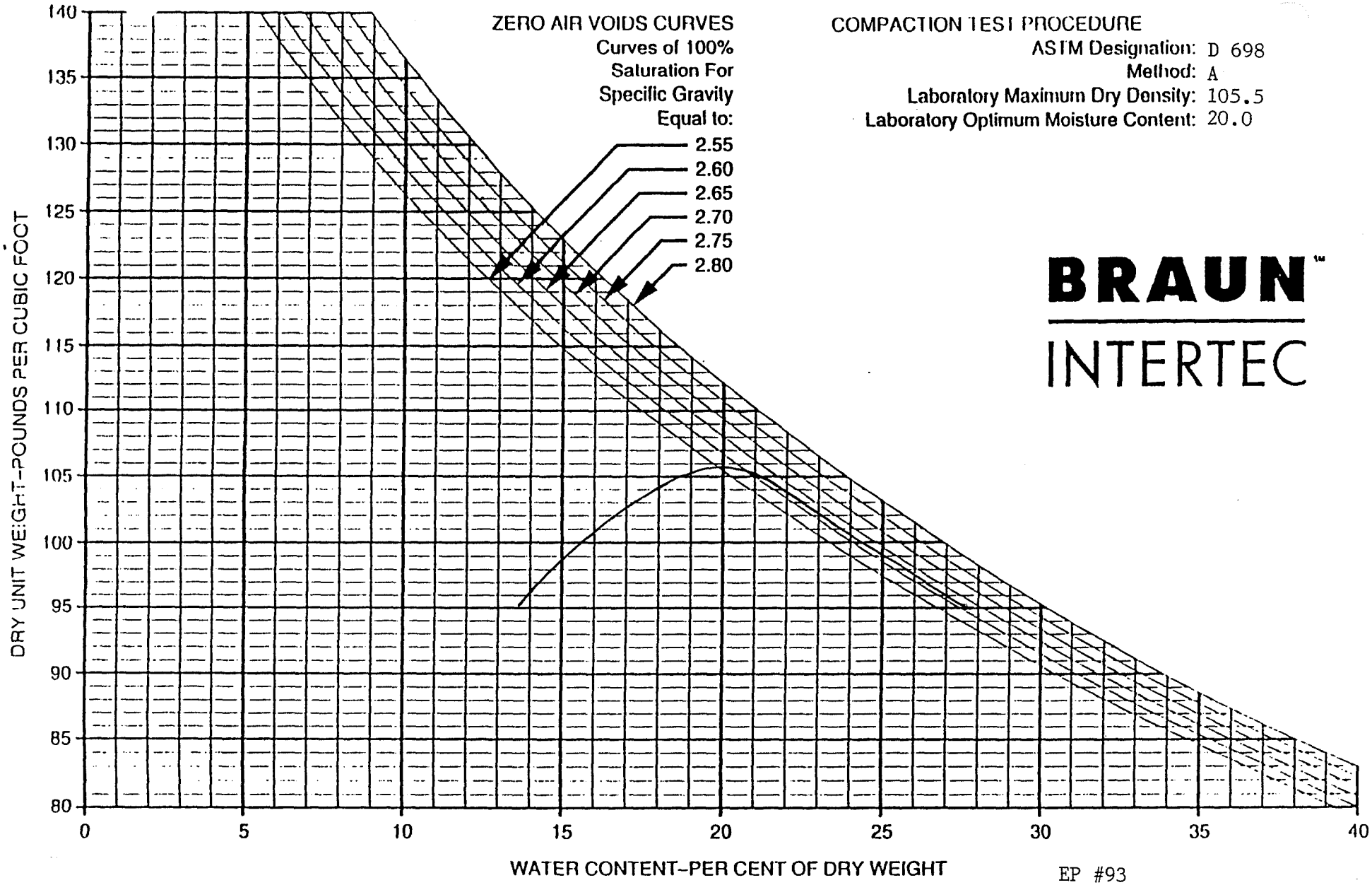
42665N 43234E

COMPACTION TEST

DRAWN BY: DS
CHECKED BY:
DATE: 8/25/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 105.5
Laboratory Optimum Moisture Content: 20.0

BRAUN™ INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST.93	CLB-CC -390	1887.1	15	30	45	Sandy Lean Clay (CL), olive brown

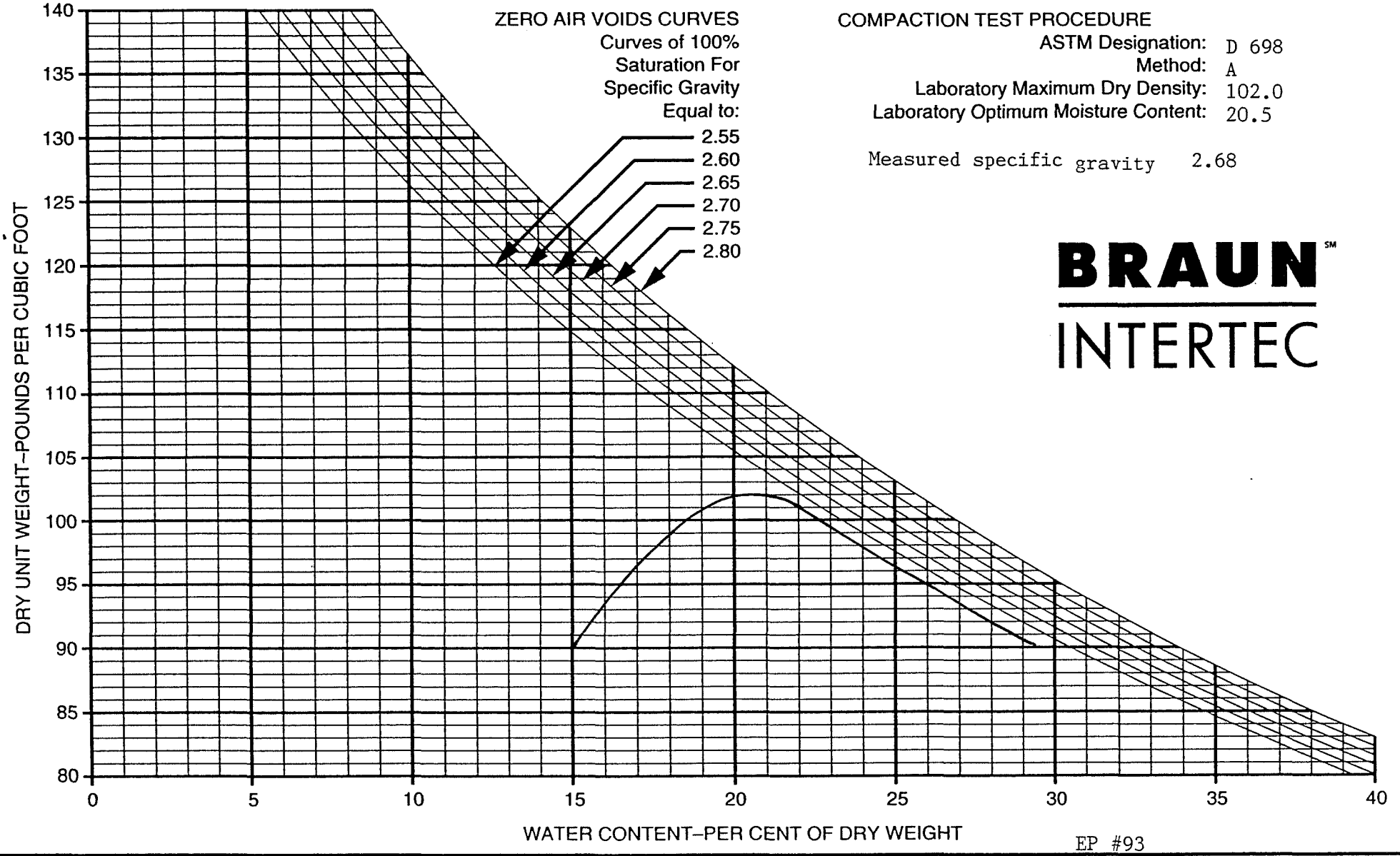
43178N 43556E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 8/10/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 102.0
Laboratory Optimum Moisture Content: 20.5

Measured specific gravity 2.68

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLB-CC-397	1886.5	17	29	46	Sandy Lean Clay (CL), olive brown

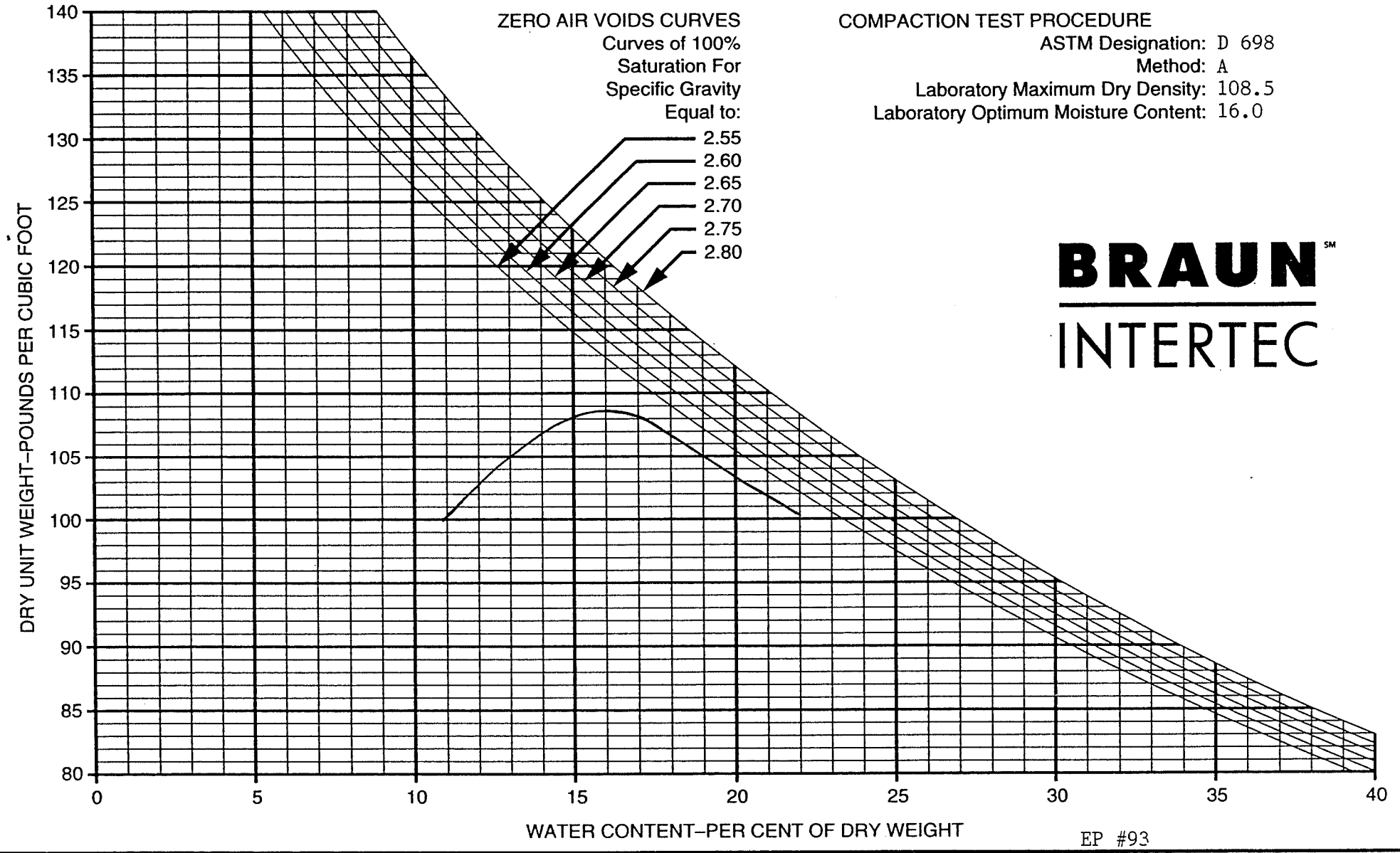
43152 N 43796E

COMPACTION TEST

DRAWN BY: DS
CHECKED BY:
DATE: 8/25/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 108.5
Laboratory Optimum Moisture Content: 16.0

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLB-CC -400	1884.5	13	31	44	Sandy Lean Clay (CL), olive brown

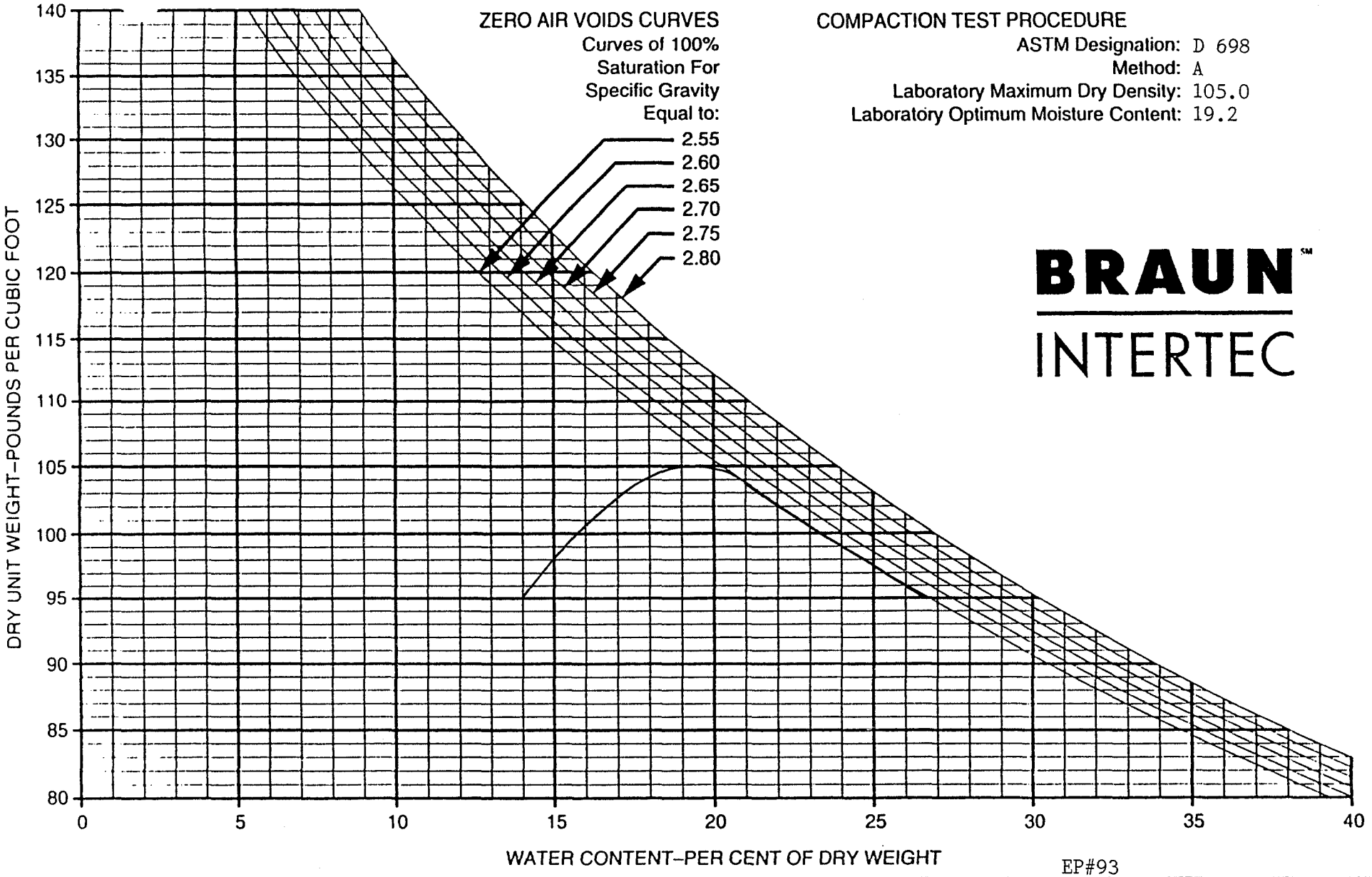
42861N 43951E

COMPACTION TEST

DRAWN BY: DS
CHECKED BY:
DATE: 8/25/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 105.0
Laboratory Optimum Moisture Content: 19.2

BRAUN INTERTEC

EP#93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	SG-CC-412	1883.4	15	30	45	Sandy Lean Clay (CL), olive brown

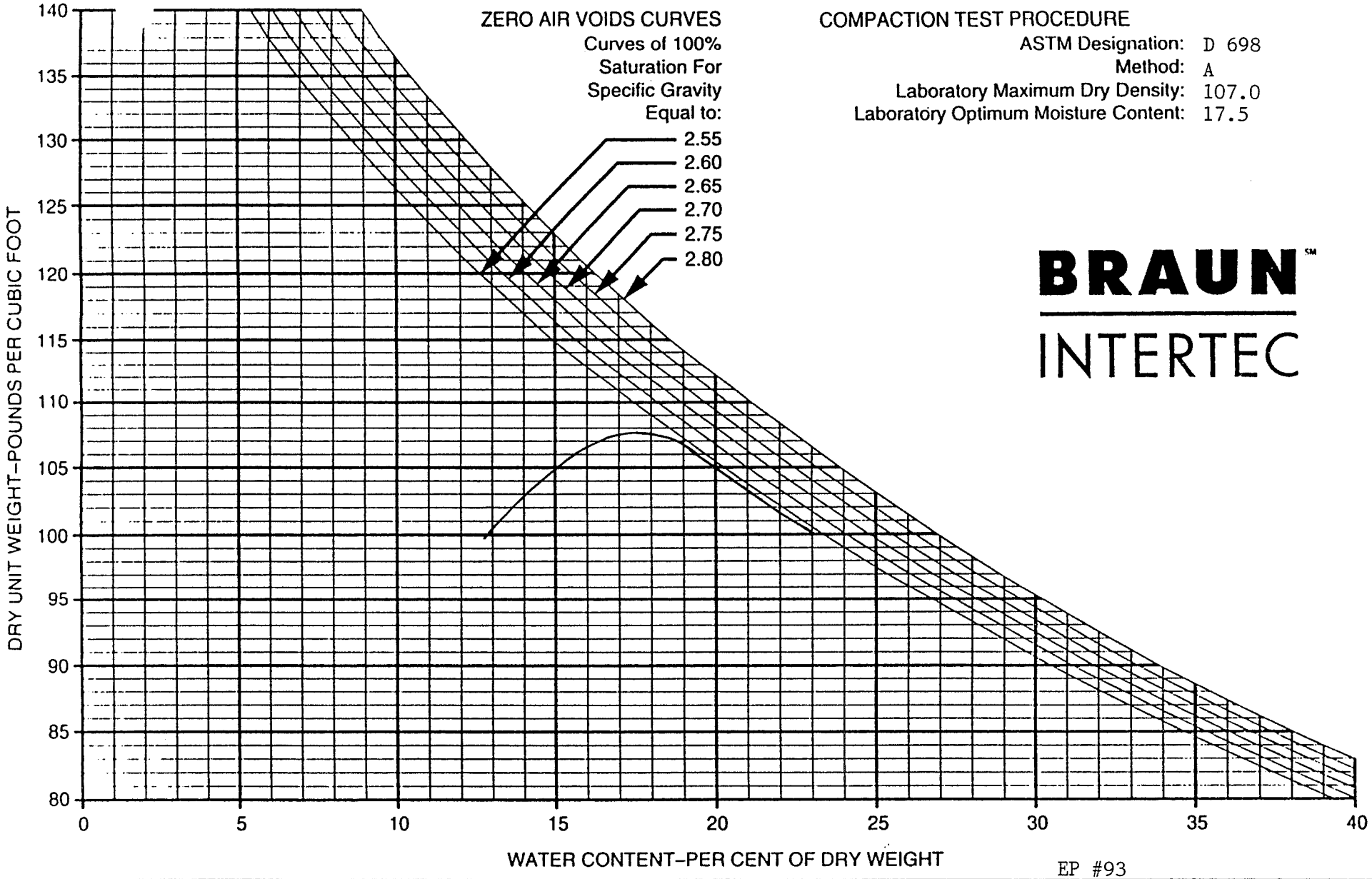
43408N 45129E

COMPACTION TEST

DRAWN BY: DS
CHECKED BY:
DATE: 8/25/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 107.0
Laboratory Optimum Moisture Content: 17.5

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLB-CC-418	1887.9	16	28	44	Sandy Lean Clay (CL), olive brown

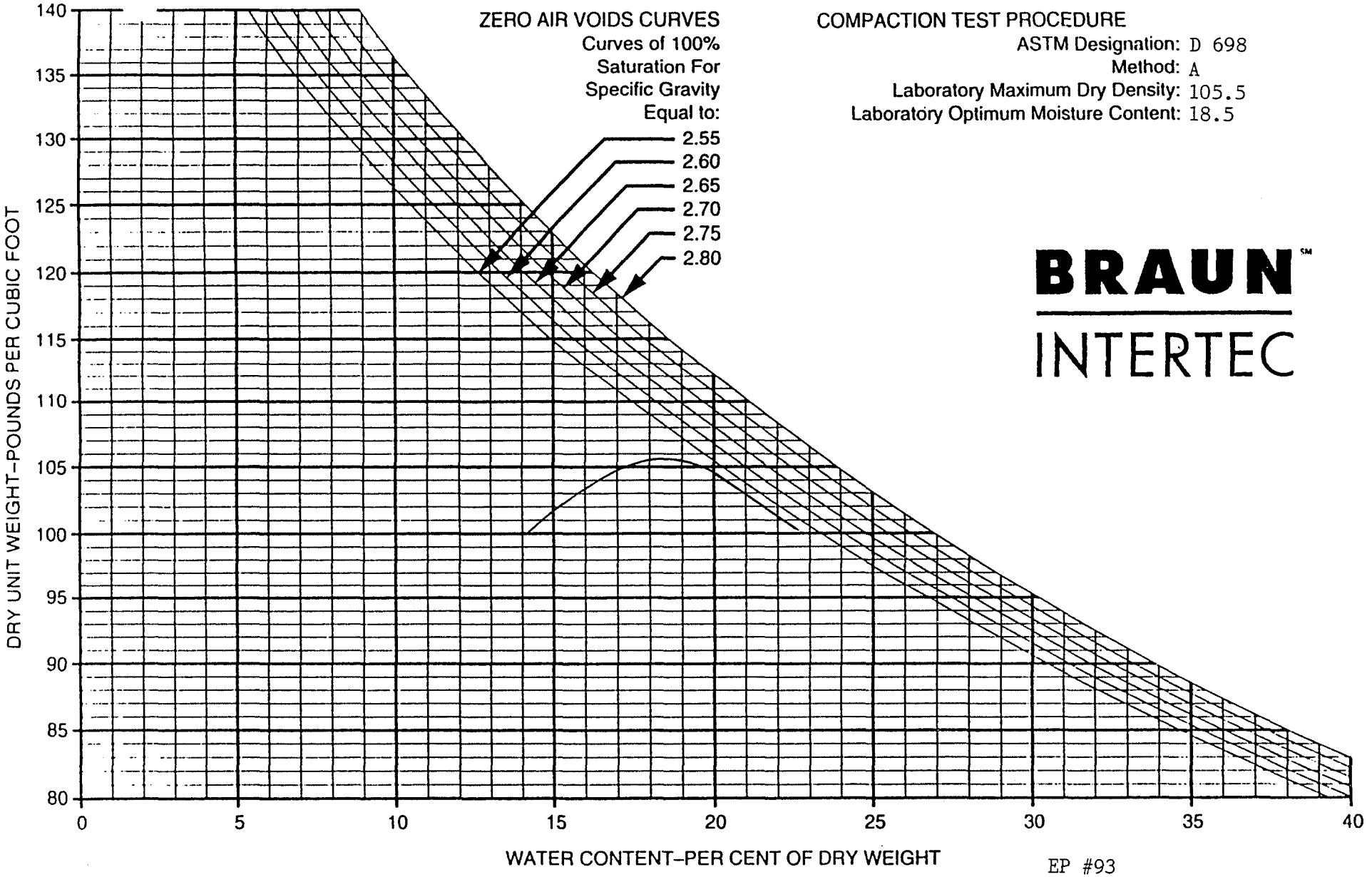
43209N 44140E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 7/29/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 105.5
Laboratory Optimum Moisture Content: 18.5

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST.115	CLB-CC -430	1885.6	17	26	43	Sandy Lean Clay (CL), olive brown

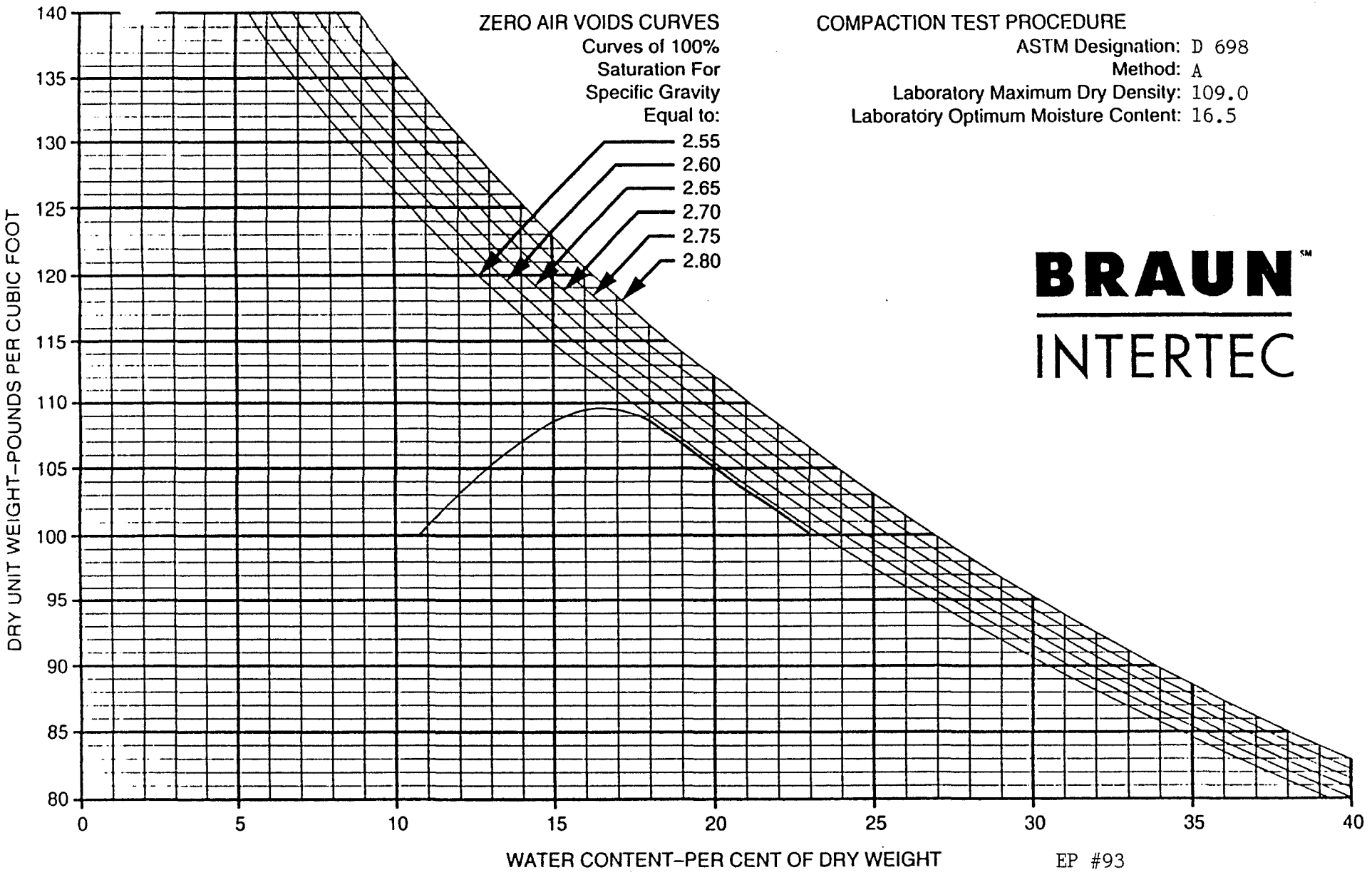
42809N 44038E

COMPACTION TEST

DRAWN BY: DS
CHECKED BY:
DATE: 8/25/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 109.0
Laboratory Optimum Moisture Content: 16.5

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	SG-CC -444	1879.6	15	28	43	Sandy Lean Clay (CL), grayish-brown

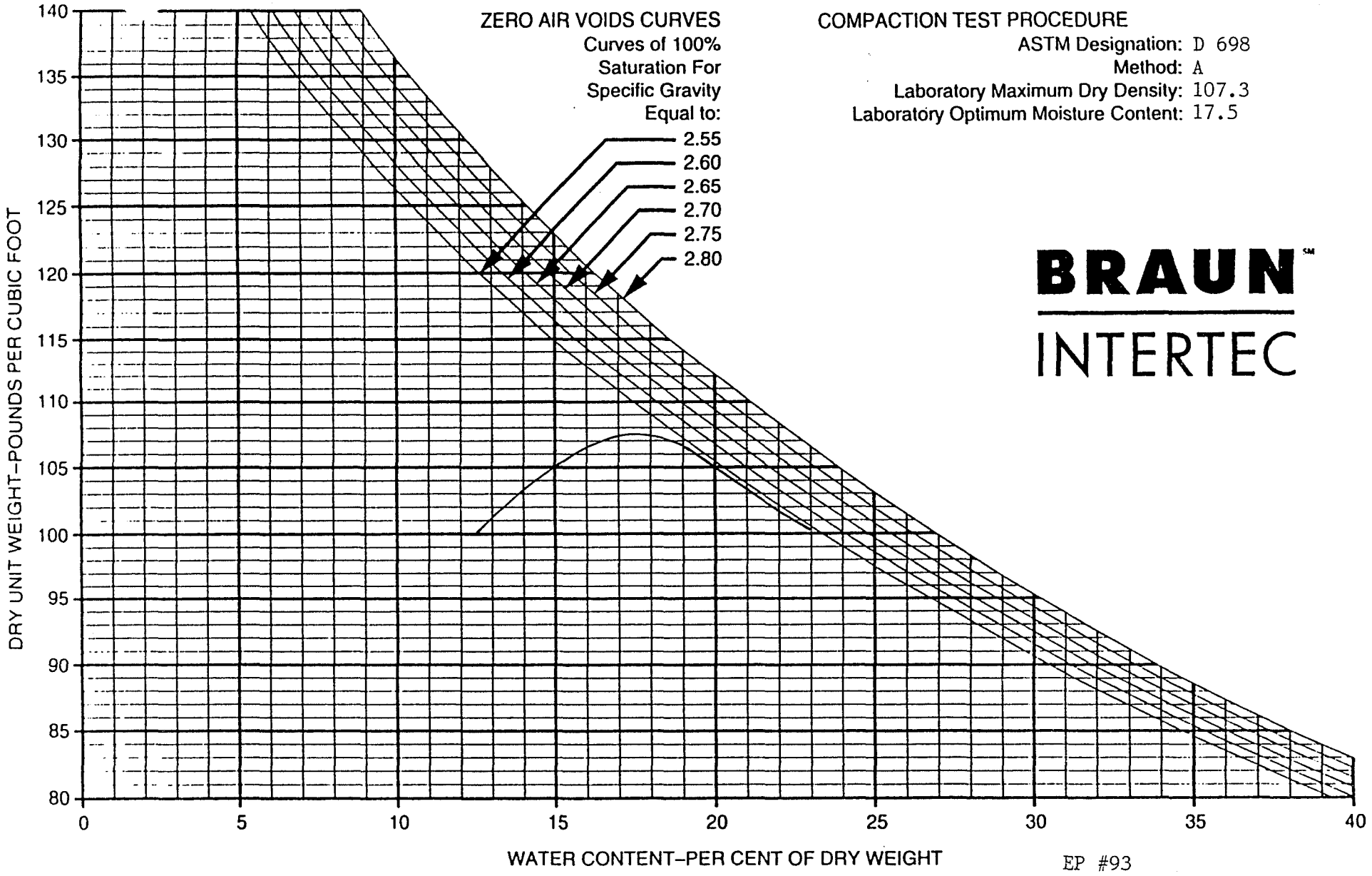
42647N 44556E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 8/27/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 107.3
Laboratory Optimum Moisture Content: 17.5

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	SG-CC-462	1884.4	17	26	43	Sandy Lean Clay (CL), dark grayish-brown

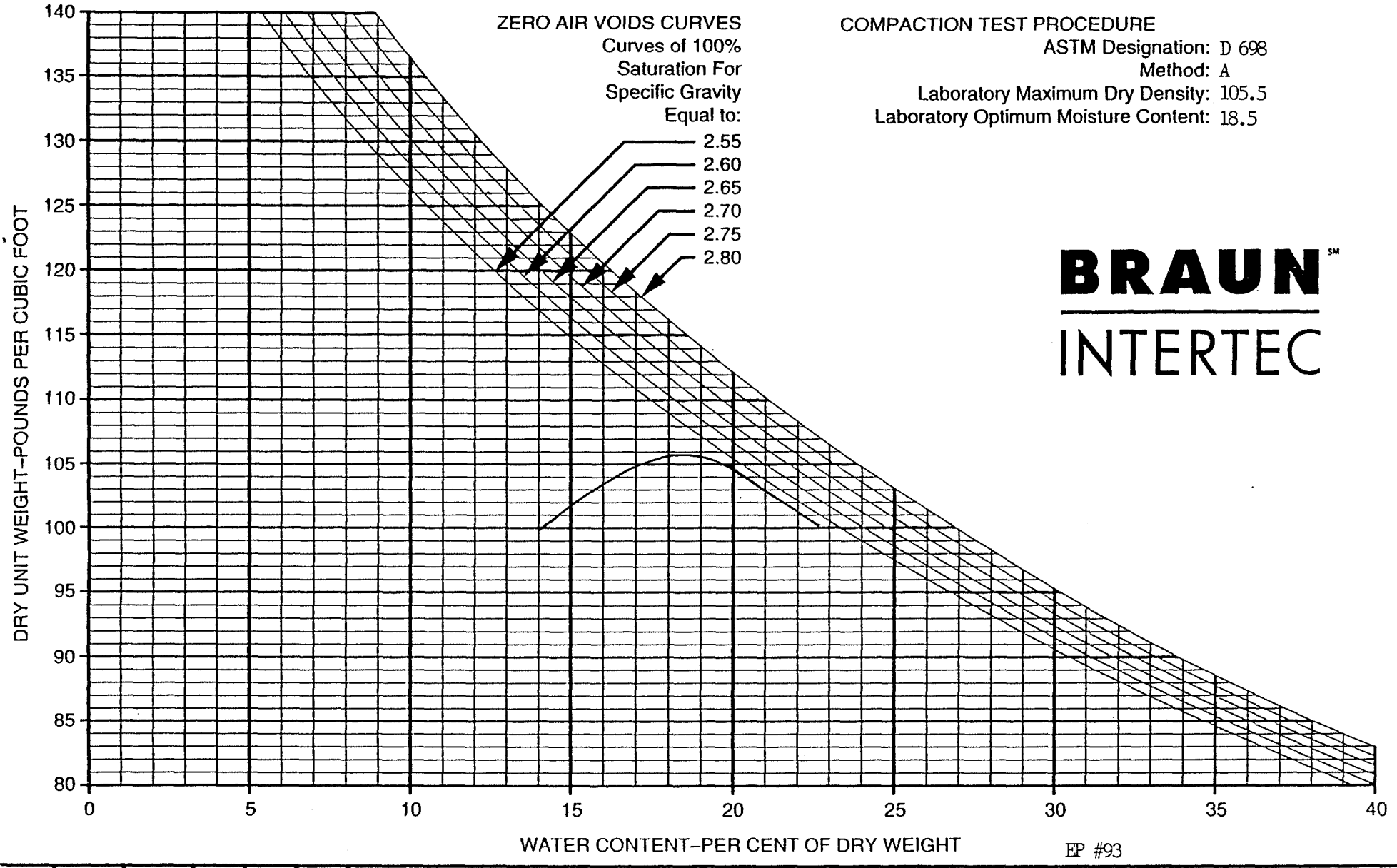
43074N 44555E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE: 8/3/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 105.5
Laboratory Optimum Moisture Content: 18.5

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	SG-CC-464	1881.9	12	29	41	Sandy Lean Clay (CL), very dark grayish-brown

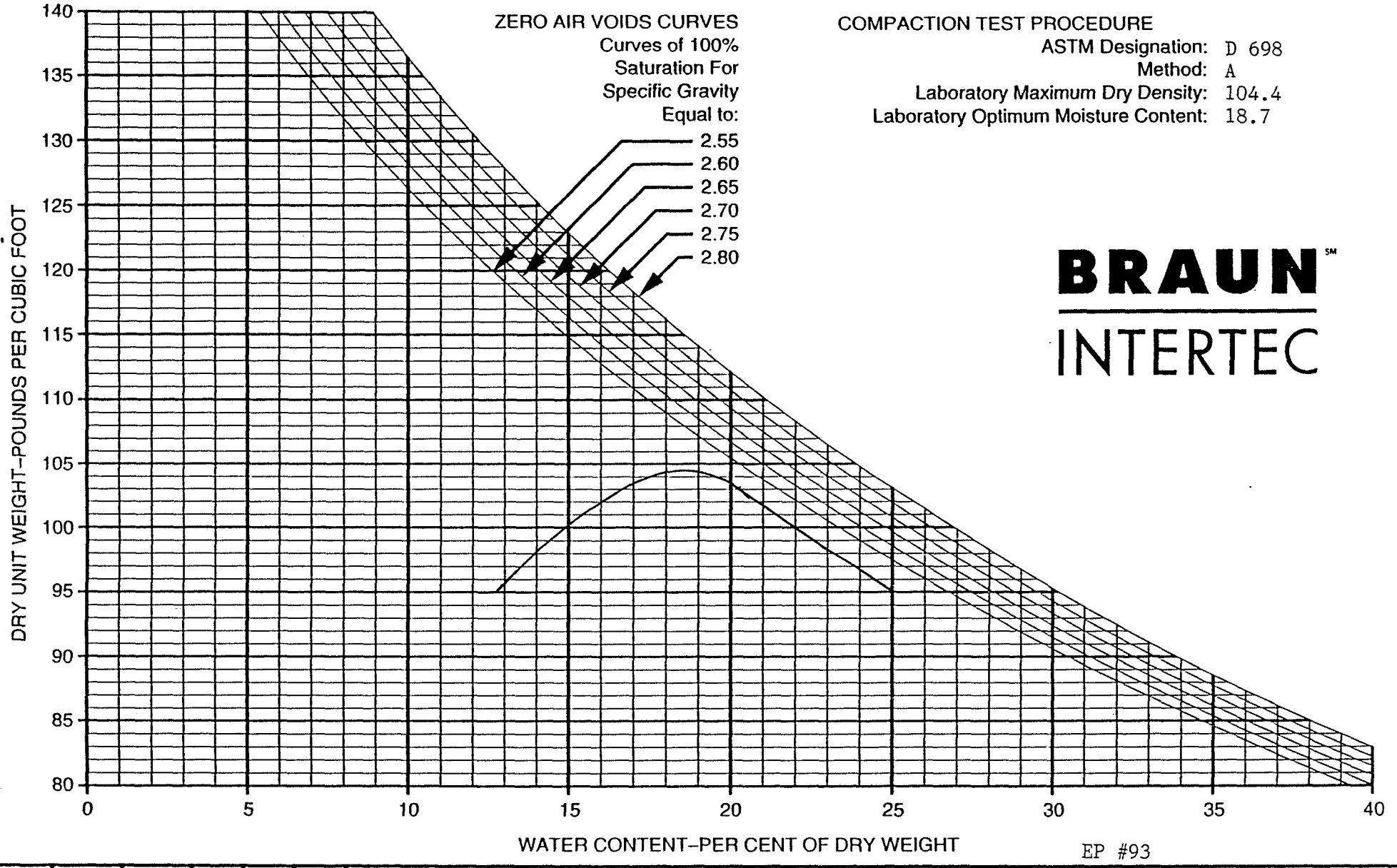
42685N 44531E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 8/5/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 104.4
Laboratory Optimum Moisture Content: 18.7

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	SG-CC-472	1883.8	15	26	41	Sandy Lean Clay (CL), dark grayish-brown

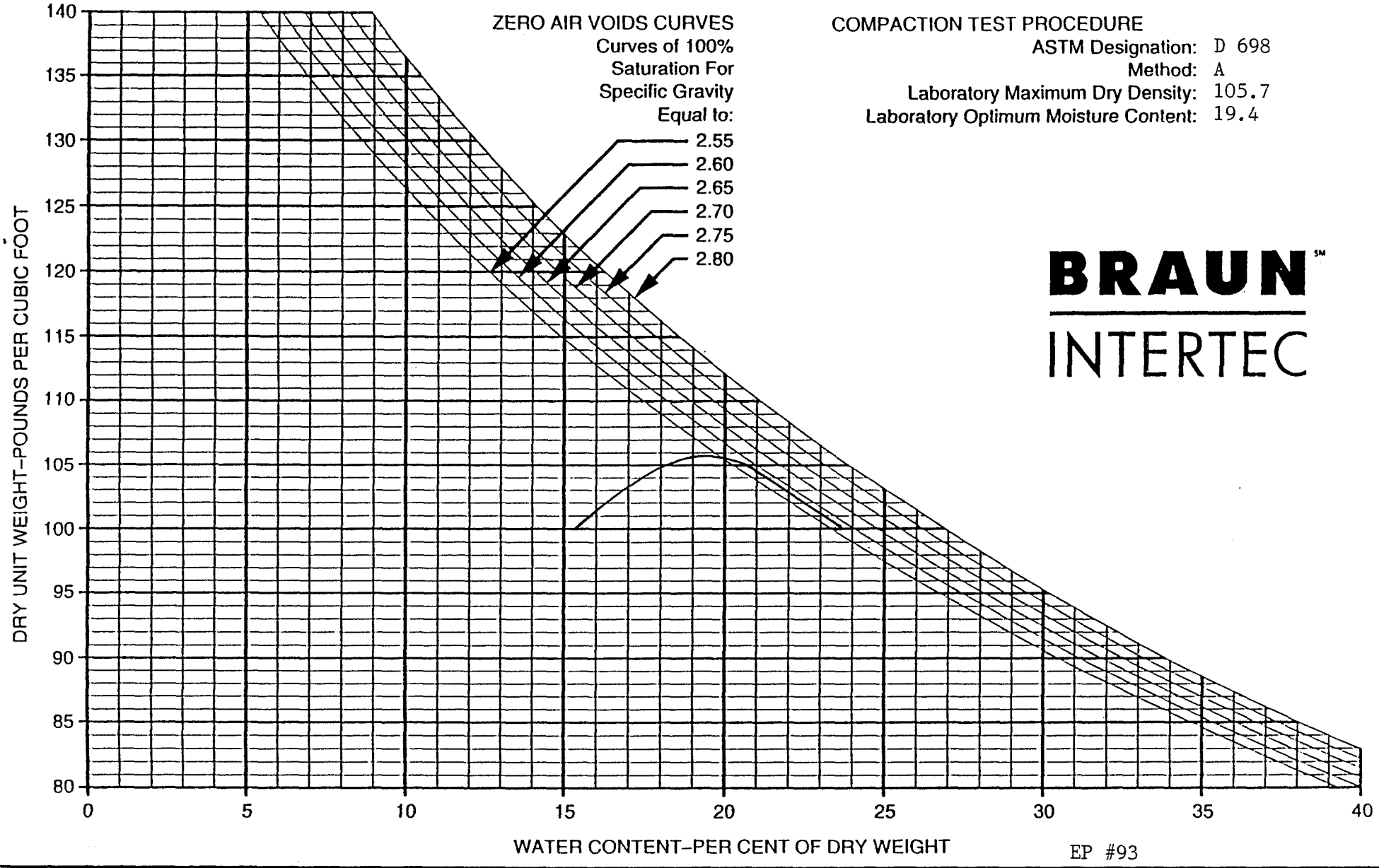
43220N 44847E

COMPACTION TEST

DRAWN BY: AC
CHECKED BY:
DATE: 8/26/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 105.7
Laboratory Optimum Moisture Content: 19.4

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST.129	CLB-OC-496	1881.3	16	26	42	Sandy Lean Clay (CL), olive brown

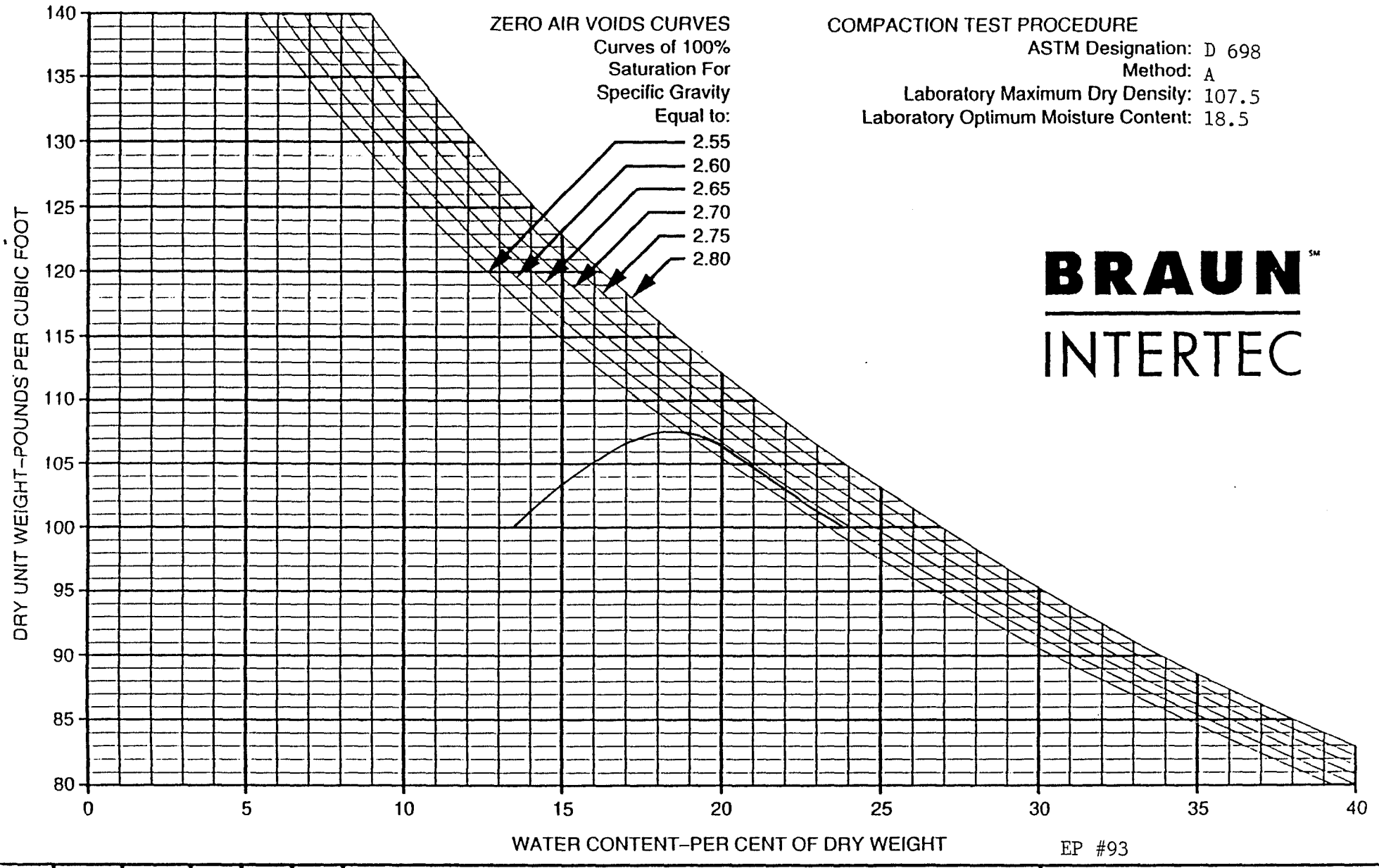
42686N 44593E

COMPACTION TEST

DRAWN BY: AC
CHECKED BY:
DATE: 8/28/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 107.5
Laboratory Optimum Moisture Content: 18.5

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST.131	CLB-CC -498	1886.1	16	24	40	Sandy Lean Clay (CL), olive brown

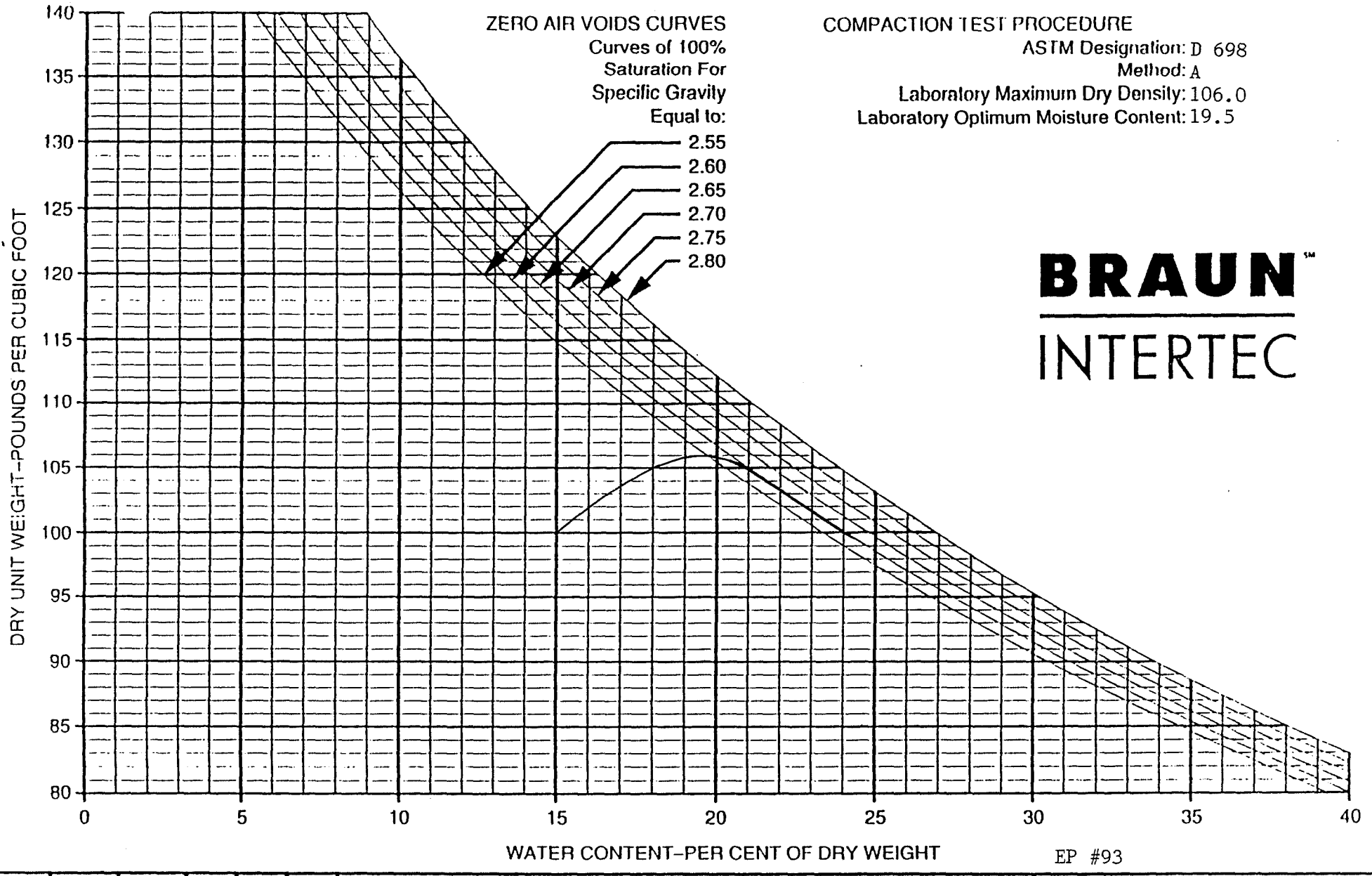
43033N 44201E

COMPACTION TEST

DRAWN BY: AC
CHECKED BY:
DATE: 8/12/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698

Method: A

Laboratory Maximum Dry Density: 106.0

Laboratory Optimum Moisture Content: 19.5

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST.140	CLB-CC -516	1886.6	16	26	42	Sandy Lean Clay (CL), olive brown

42997N 44333D

COMPACTION TEST

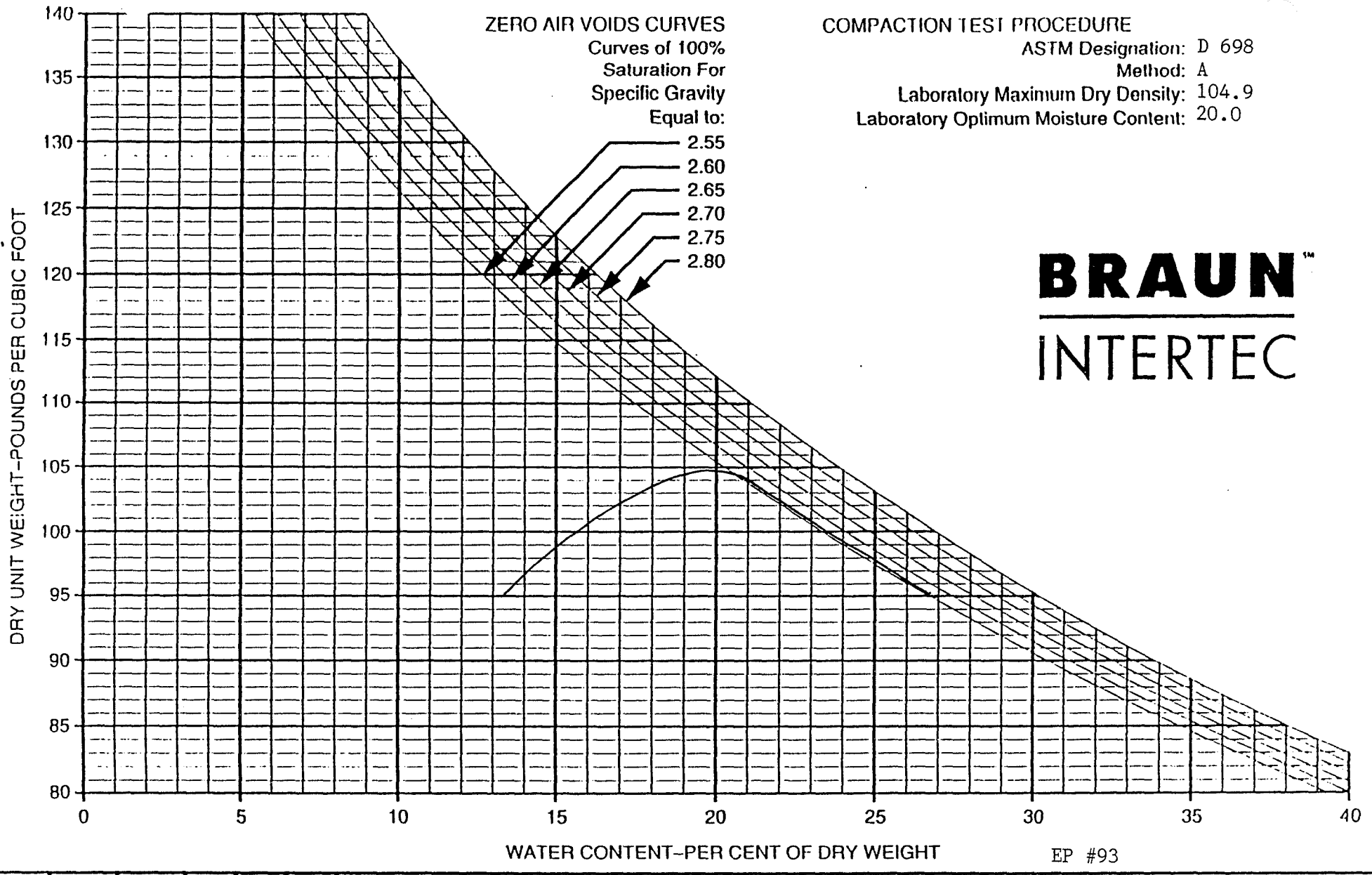
DRAWN BY: AC

CHECKED BY:

DATE: 9/1/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 104.9
Laboratory Optimum Moisture Content: 20.0

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST-142	CLB-CC -532	1885.8	17	24	41	Sandy Lean Clay (CL), olive brown

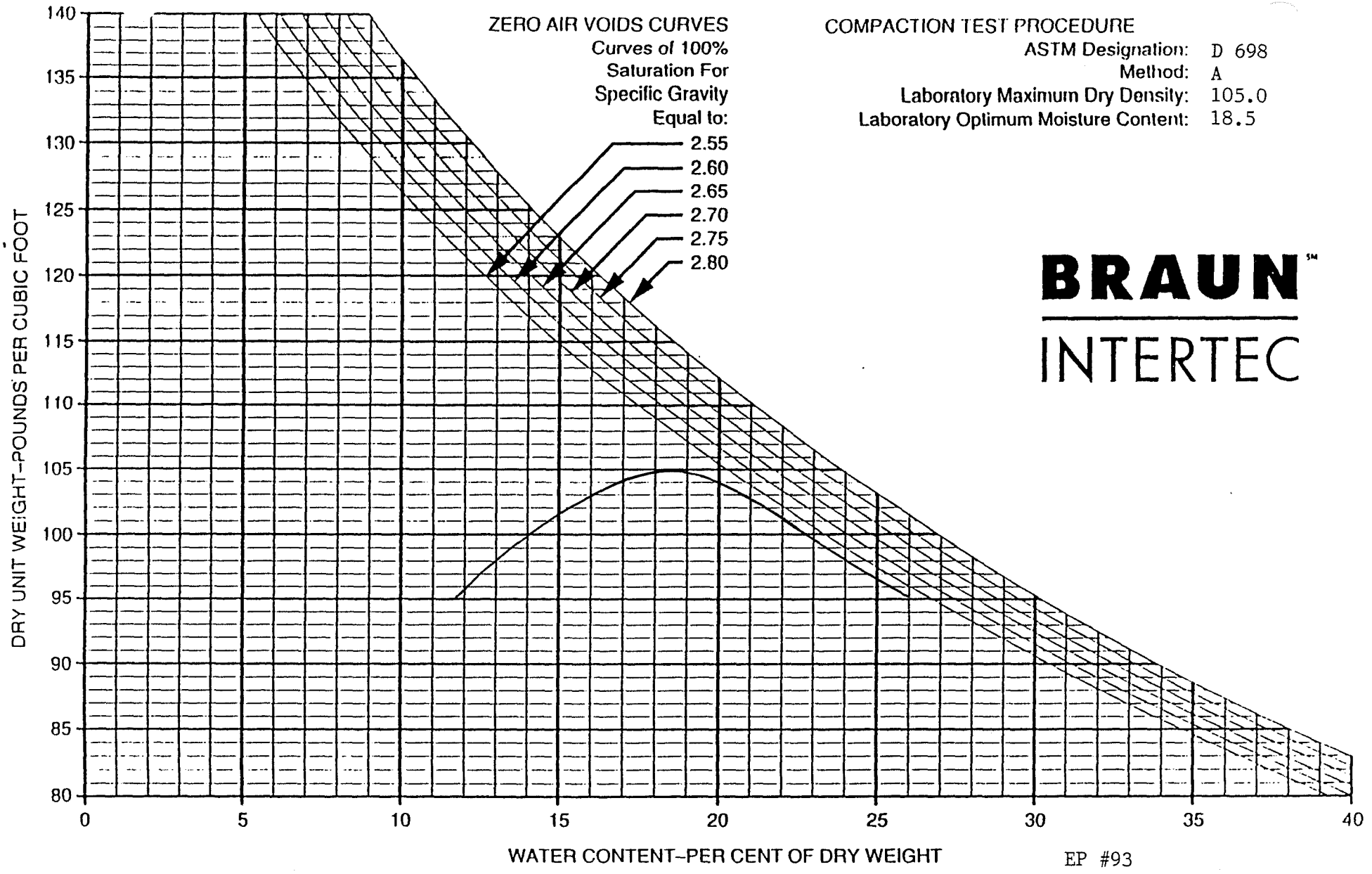
42880N 44211E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE: 9/1/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation:	D 698
Method:	A
Laboratory Maximum Dry Density:	105.0
Laboratory Optimum Moisture Content:	18.5

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST-145	CLB-CC-535	1884.5	16	23	39	Sandy Lean Clay (CL), olive brown

42678N 44526E

COMPACTION TEST

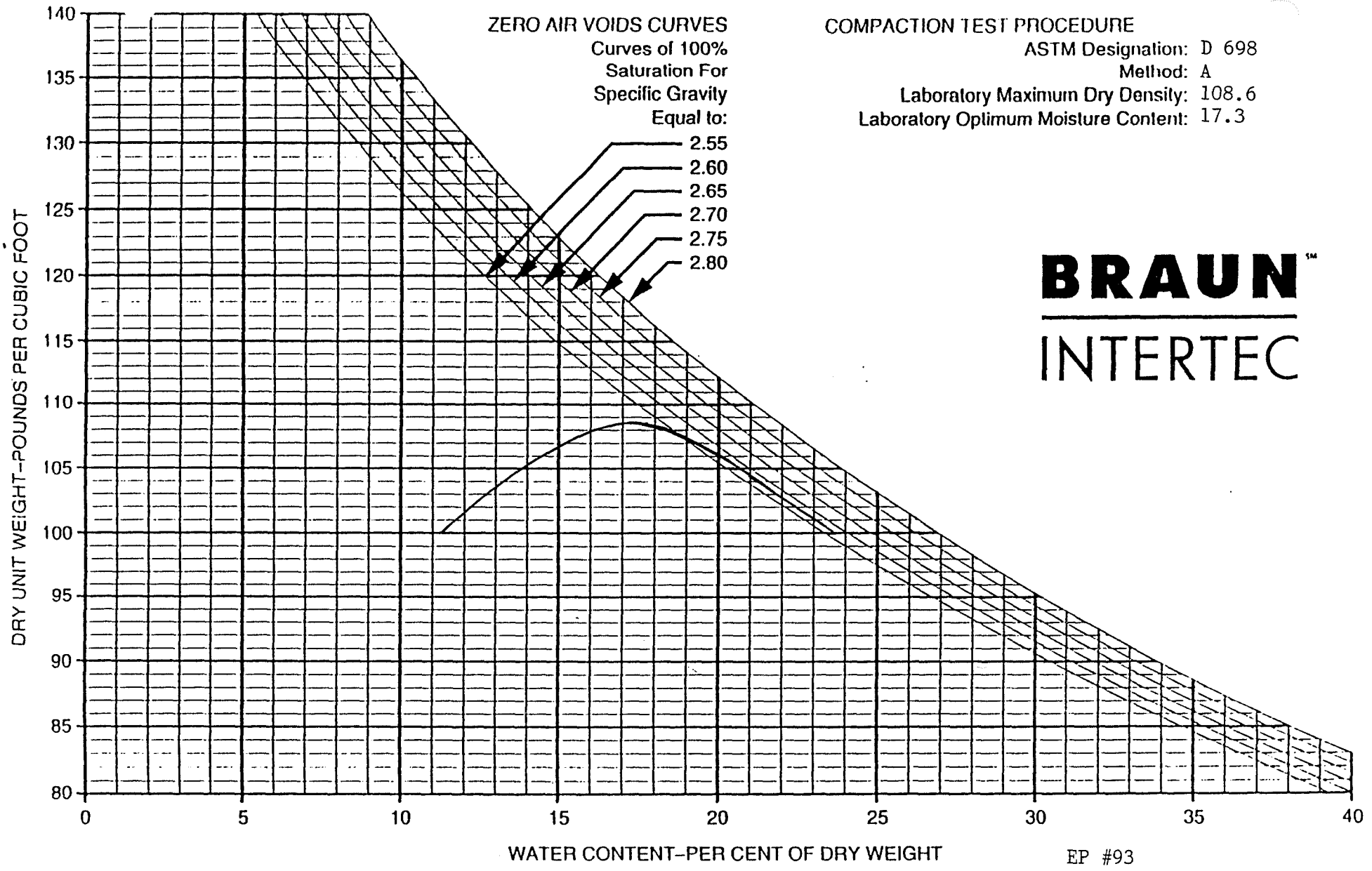
DRAWN BY:

CHECKED BY:

DATE: 9/4/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 108.6
Laboratory Optimum Moisture Content: 17.3

BRAUN™ INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	SG-CC 547	1884.7	15	25	40	Sandy Lean Clay (CL), dark grayish-brown

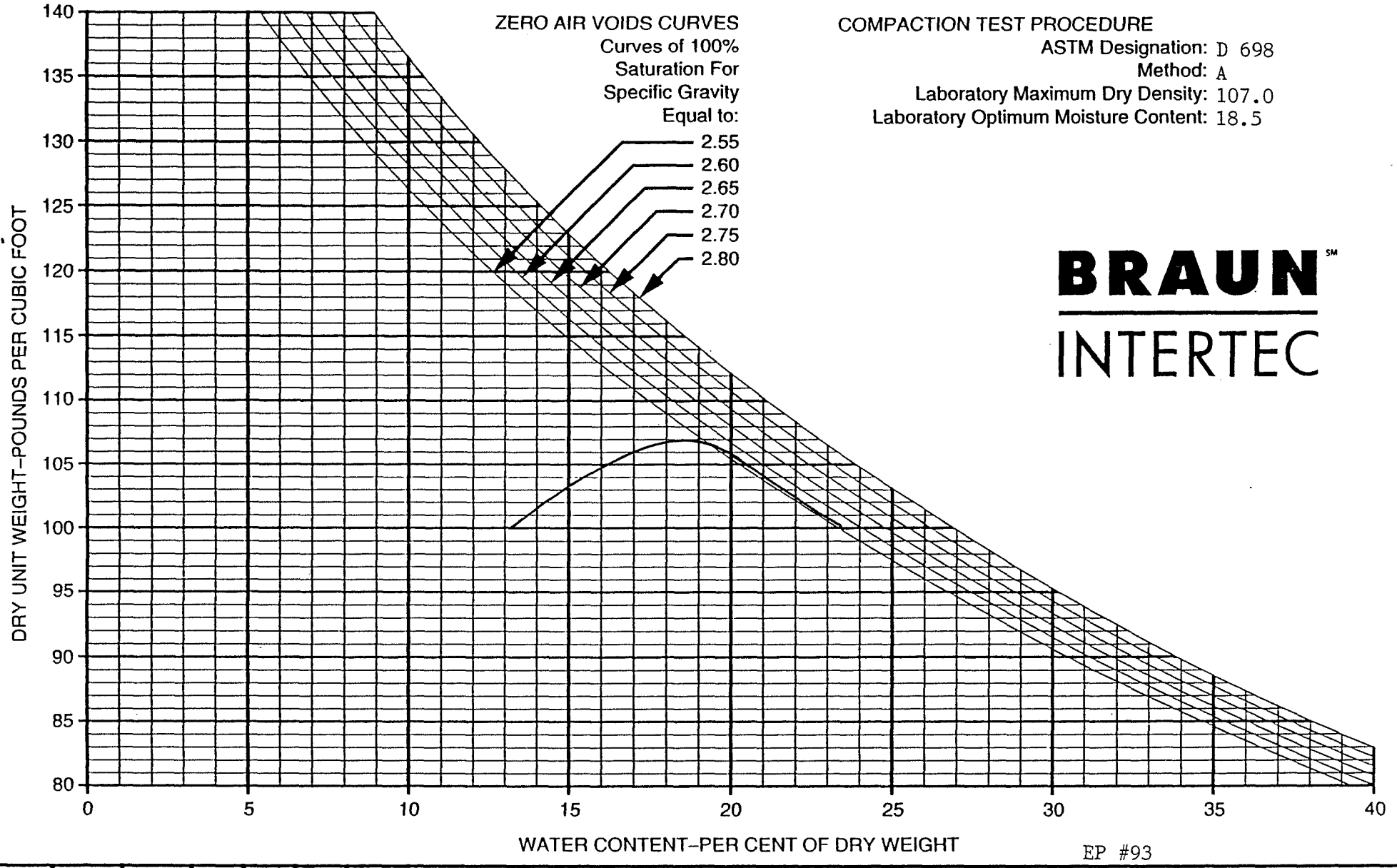
43235N 45092E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 8/12/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 107.0
Laboratory Optimum Moisture Content: 18.5

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST.140	CLB-CC -551	1885.9	17	27	44	Sandy Lean Clay (CL), olive brown

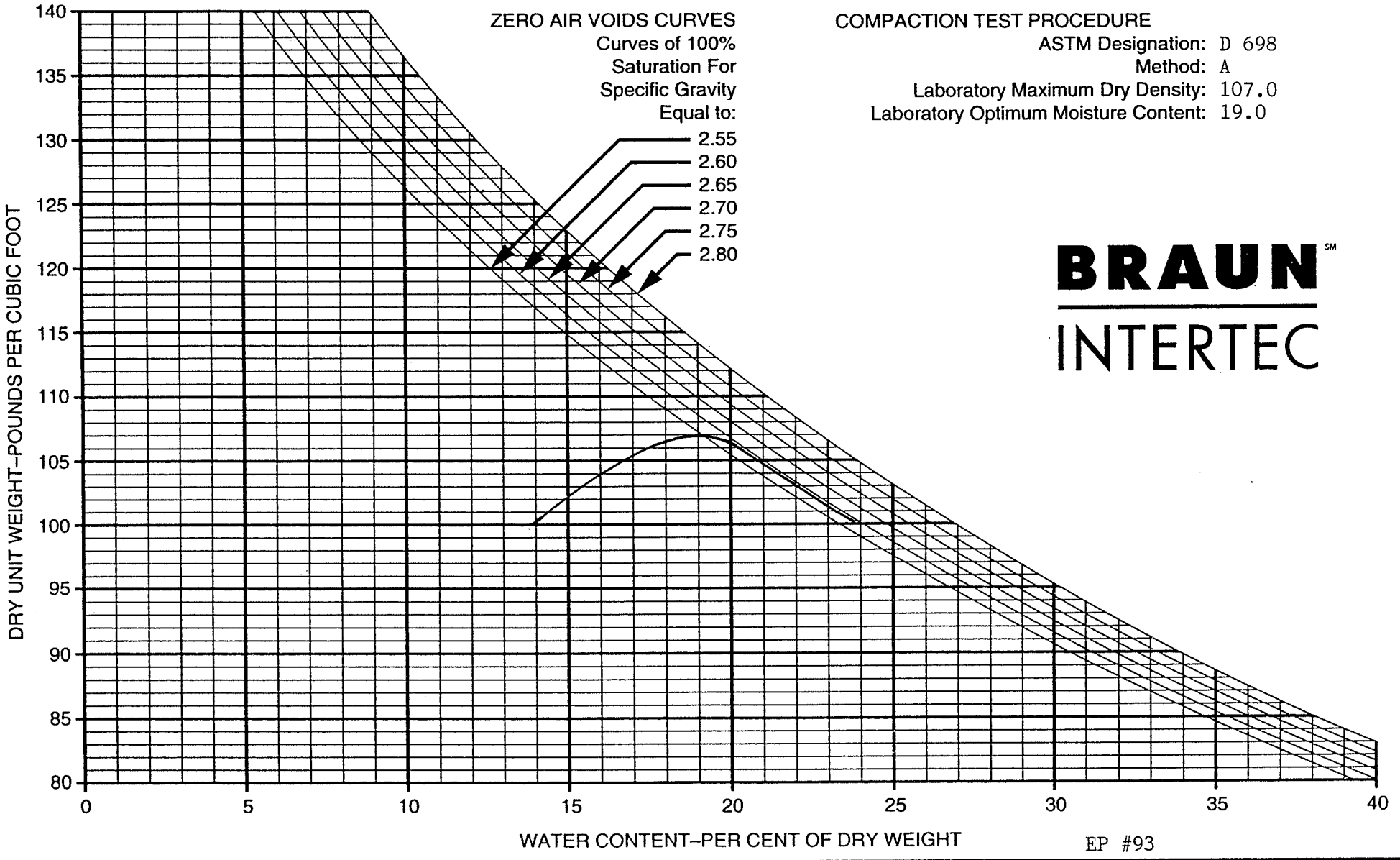
43067N 44738E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE: 9/8/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 107.0
Laboratory Optimum Moisture Content: 19.0

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	SG-CC 554	1886.4	16	27	43	Sandy Lean Clay (CL), olive brown

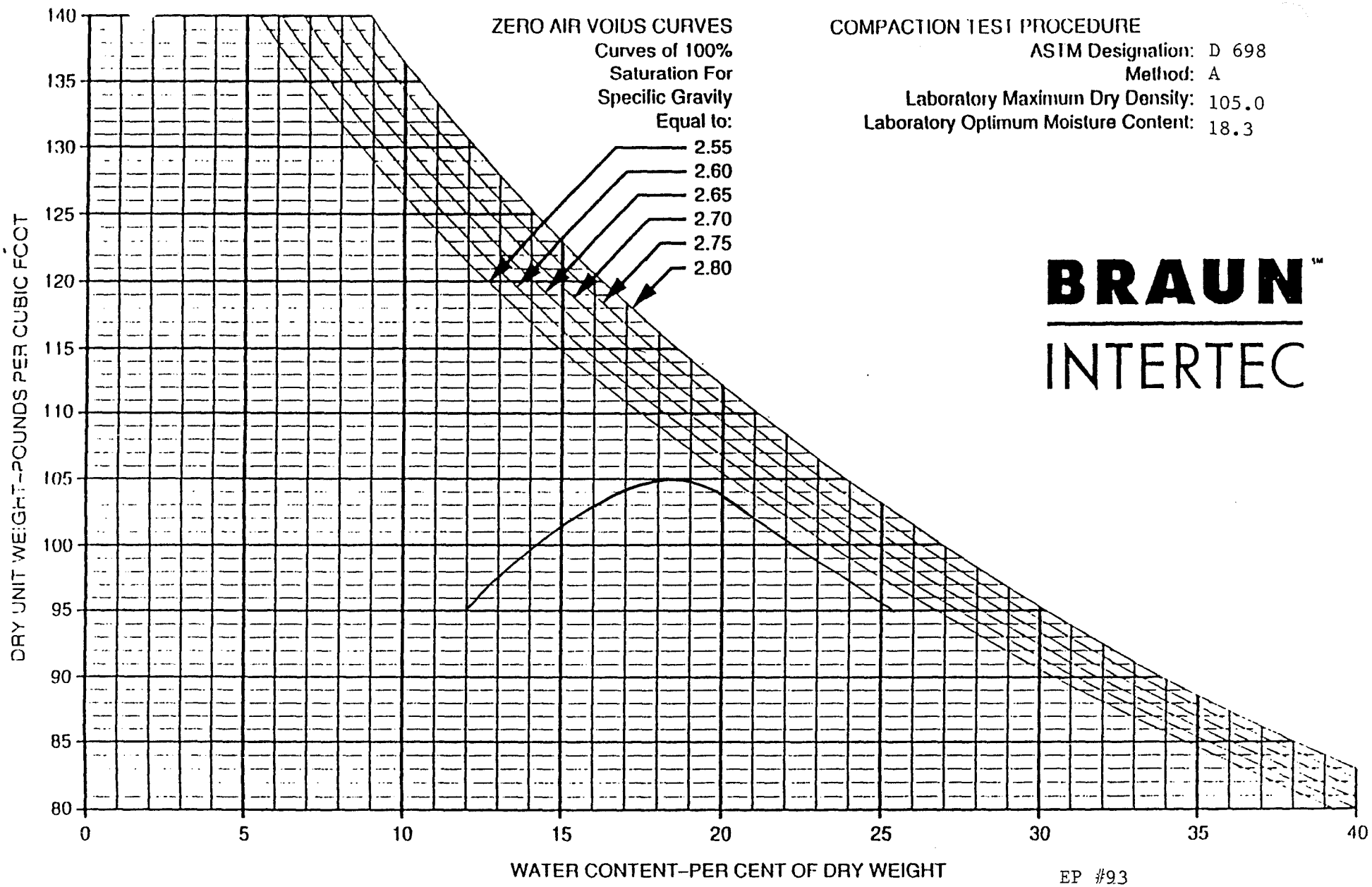
43397N 45067E

COMPACTION TEST

DRAWN BY: CBJ
CHECKED BY:
DATE: 9/8/92

JOB NO. BFDX-91-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 105.0
Laboratory Optimum Moisture Content: 18.3

BRAUN™
INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST-154	CLB-CC-571	1885.9	16	27	43	Sandy Lean Clay (CL), olive brown

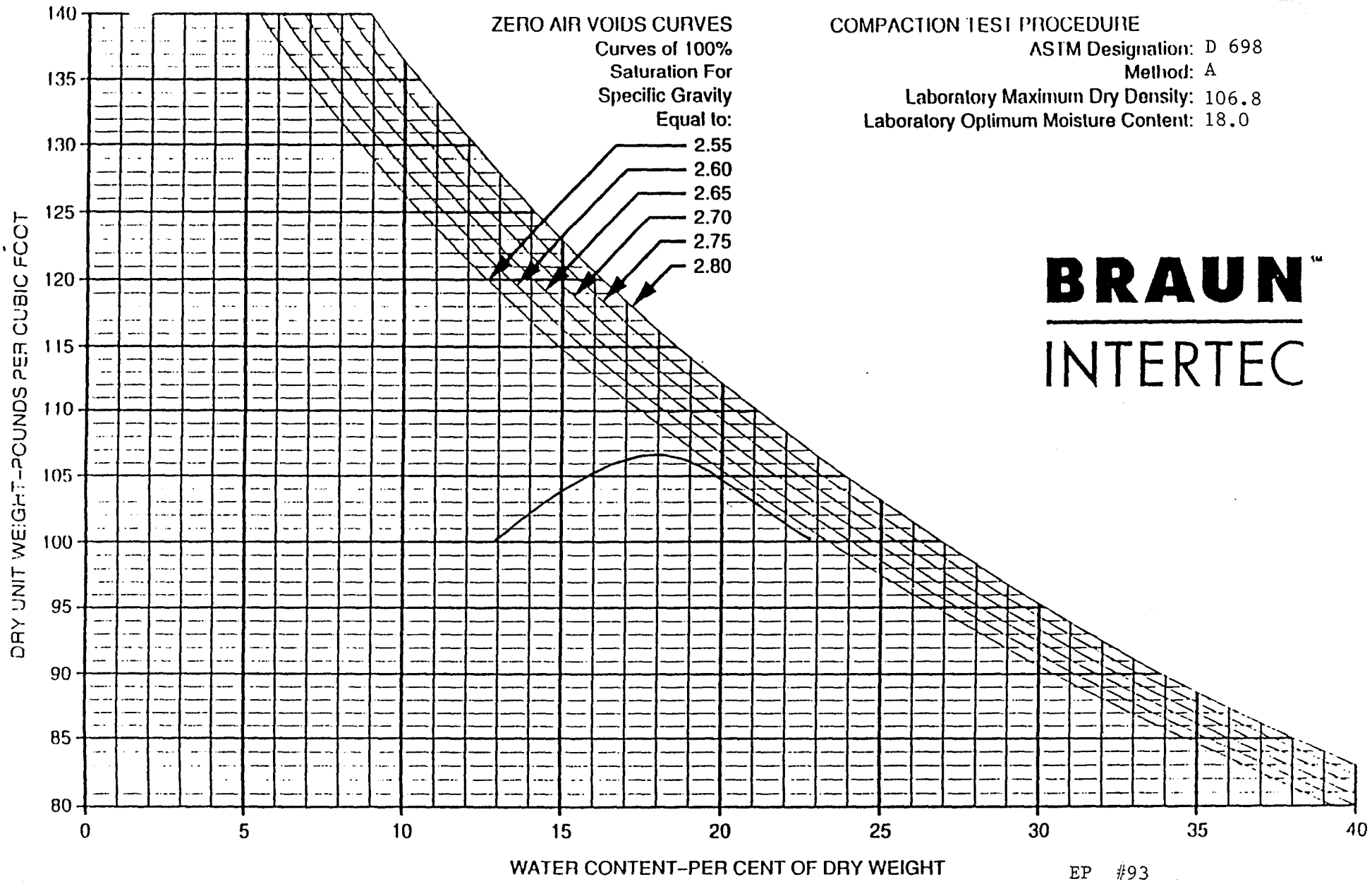
43163N 45516E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 9/10/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698

Method: A

Laboratory Maximum Dry Density: 106.8

Laboratory Optimum Moisture Content: 18.0

BRAUN™ INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST-158	CLB-CC-575	1885	17	26	43	Sandy Lean Clay (CL), olive brown

43012N 45005E

COMPACTION TEST

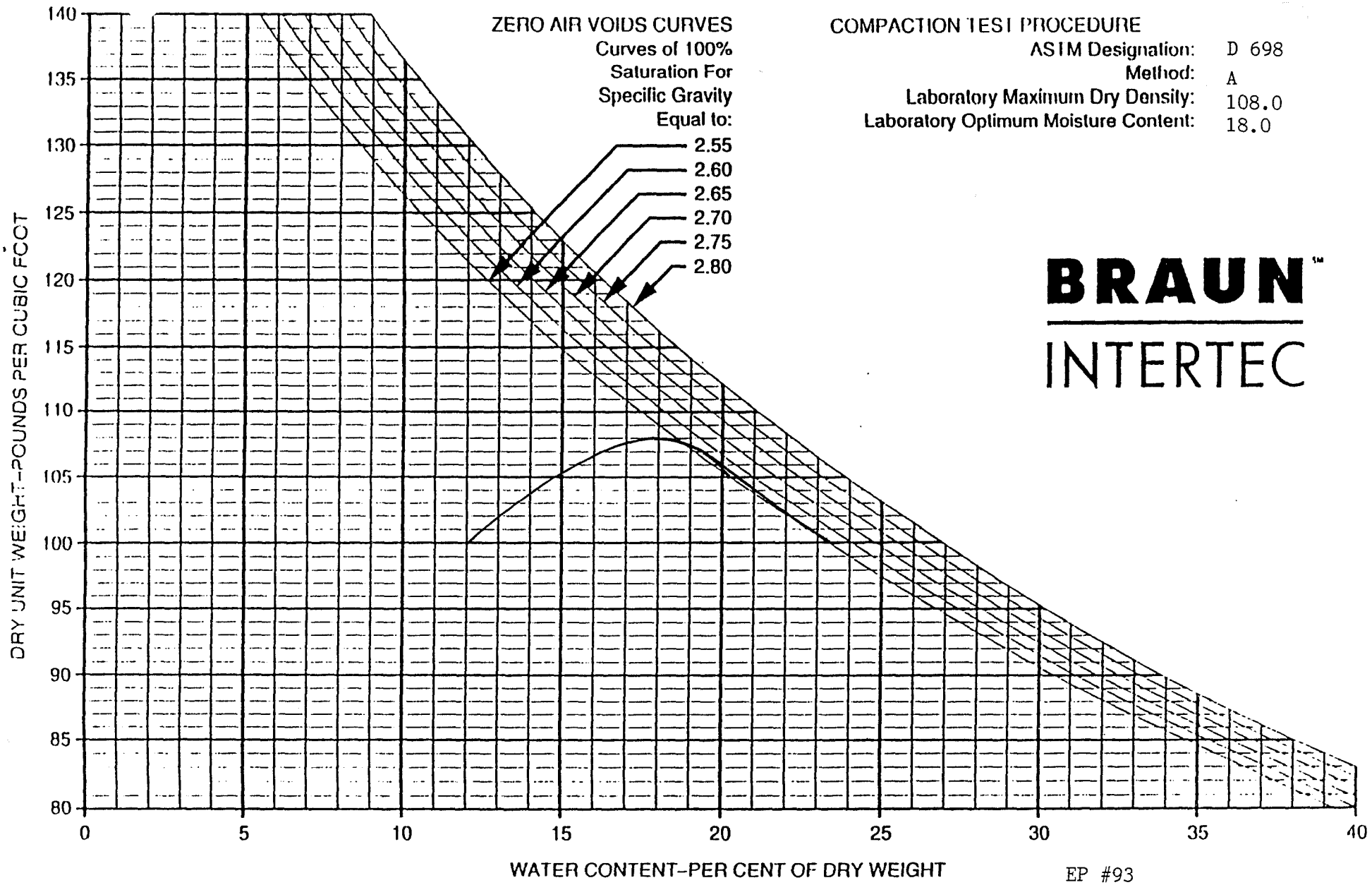
DRAWN BY:

CHECKED BY:

DATE: 9/8/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation:	D 698
Method:	A
Laboratory Maximum Dry Density:	108.0
Laboratory Optimum Moisture Content:	18.0

BRAUN INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST-173	CLB-CC-599	1886.3	26	17	43	Sandy Lean Clay (CL), olive brown

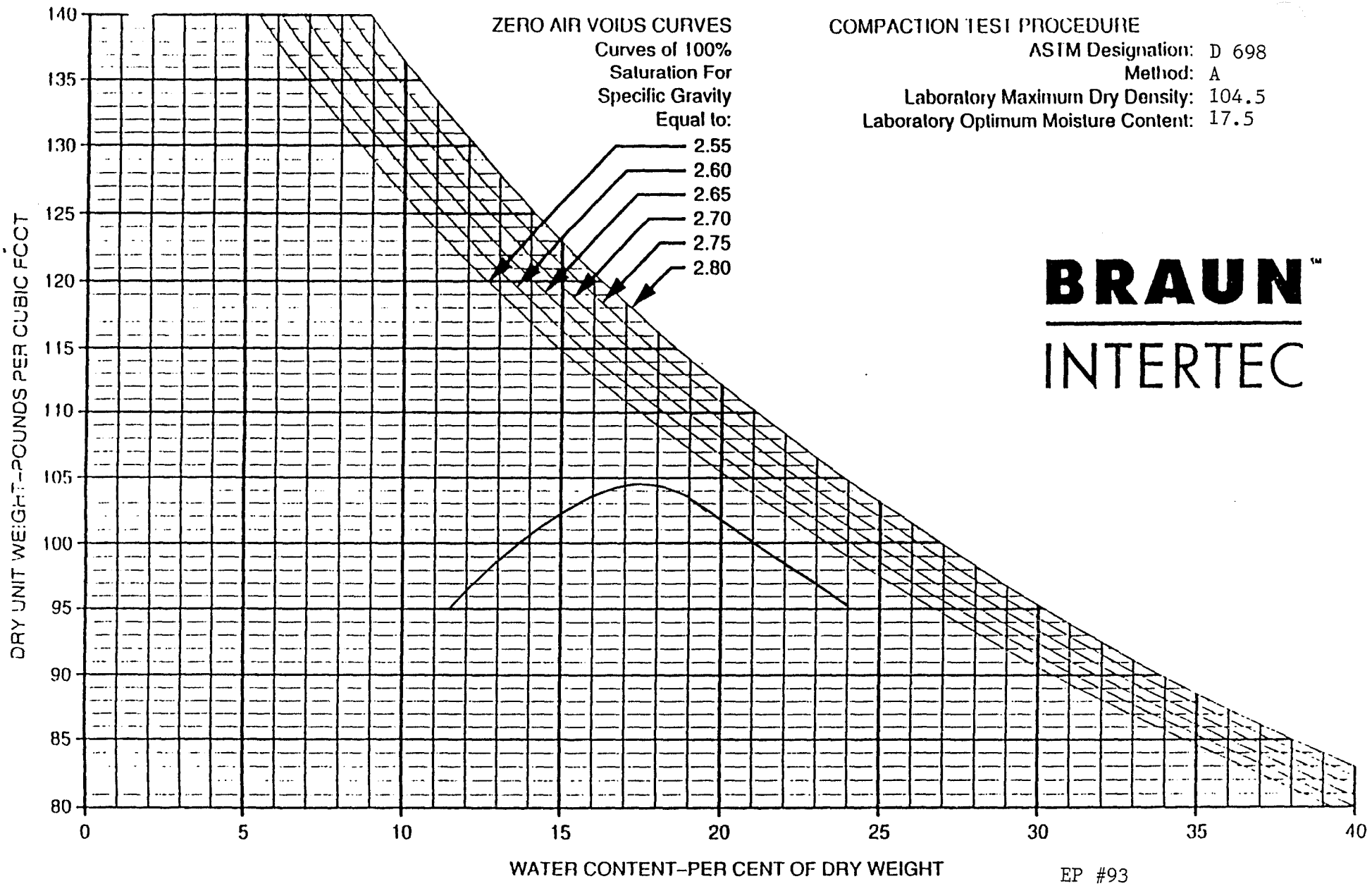
42999N 44687E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 9/10/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 104.5
Laboratory Optimum Moisture Content: 17.5

BRAUN™
INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST.186	CLB-CC-644	1883.5	17	23	40	Sandy Lean Clay (CL), olive brown

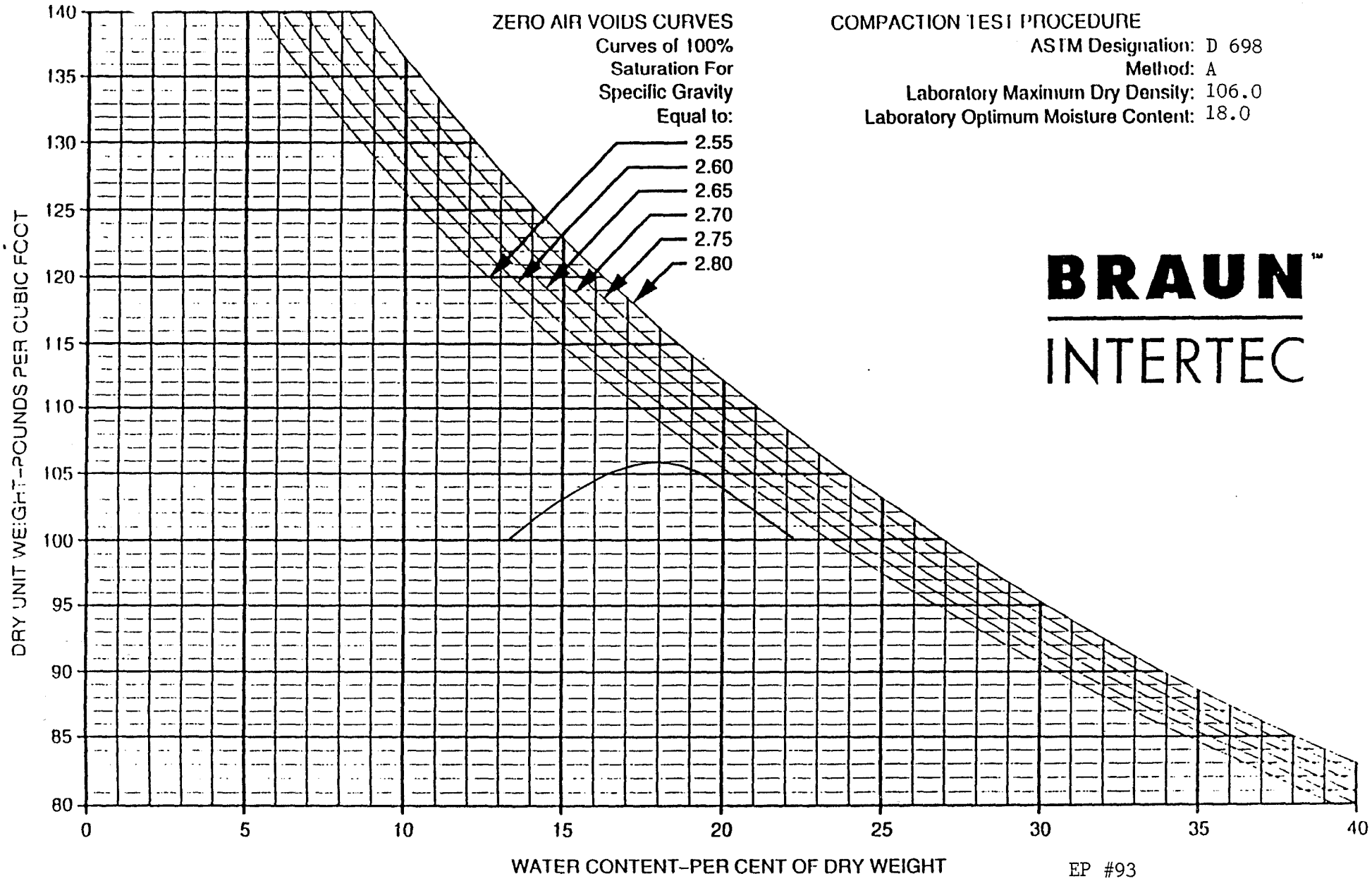
42780N 45305E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY: JA
DATE: 9/11/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 106.0
Laboratory Optimum Moisture Content: 18.0

BRAUN™
INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST.191	CLB-CC-649	1887.4	27	17	44	Sandy Lean Clay (CL), olive brown

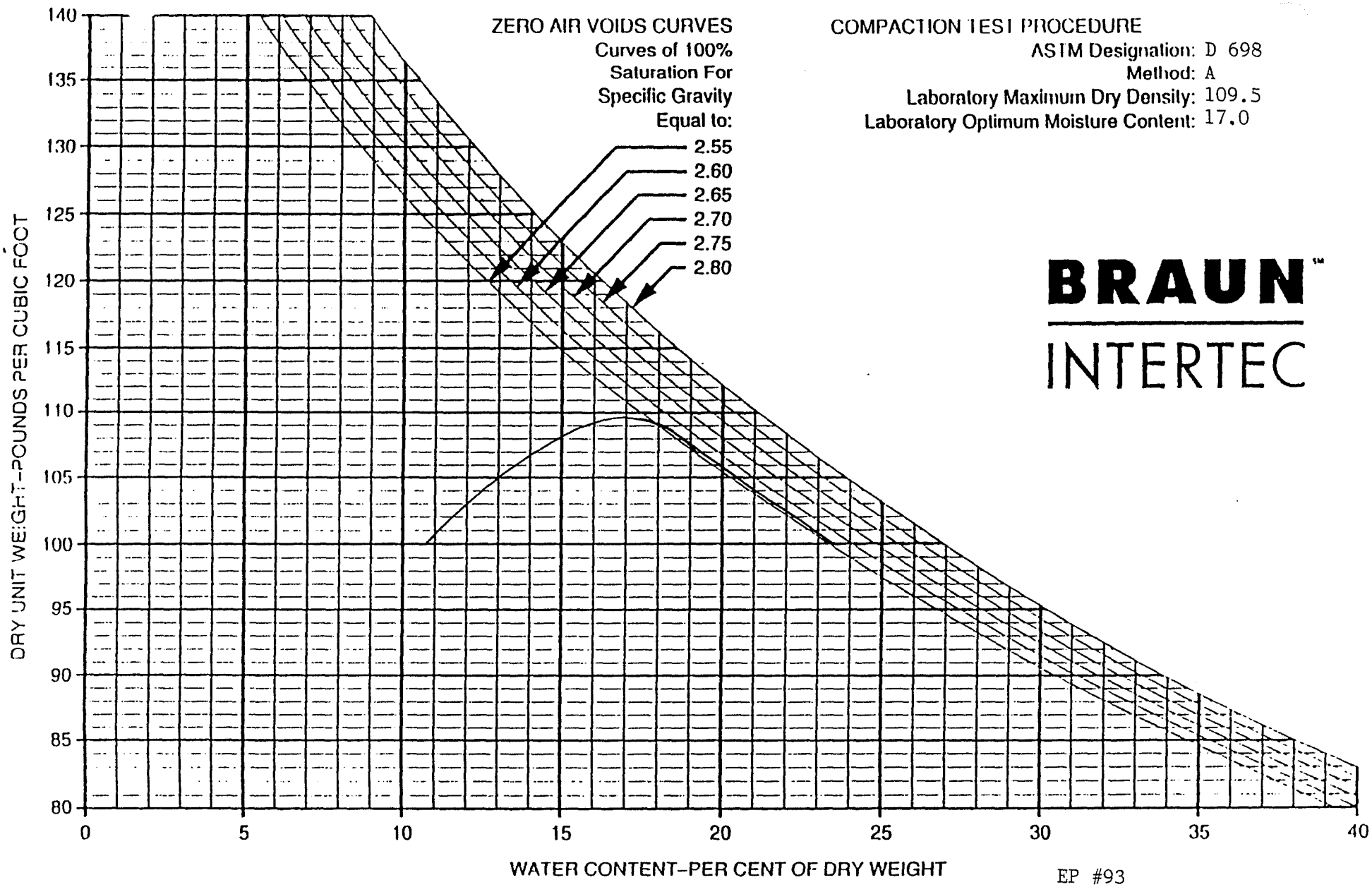
43213N 45253E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE: 9/8/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698

Method: A

Laboratory Maximum Dry Density: 109.5

Laboratory Optimum Moisture Content: 17.0

BRAUN™ INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST.197	CLB-CC-655	1883.7	23	16	39	Sandy Lean Clay (CL), olive brown

42633N 45746E

COMPACTION TEST

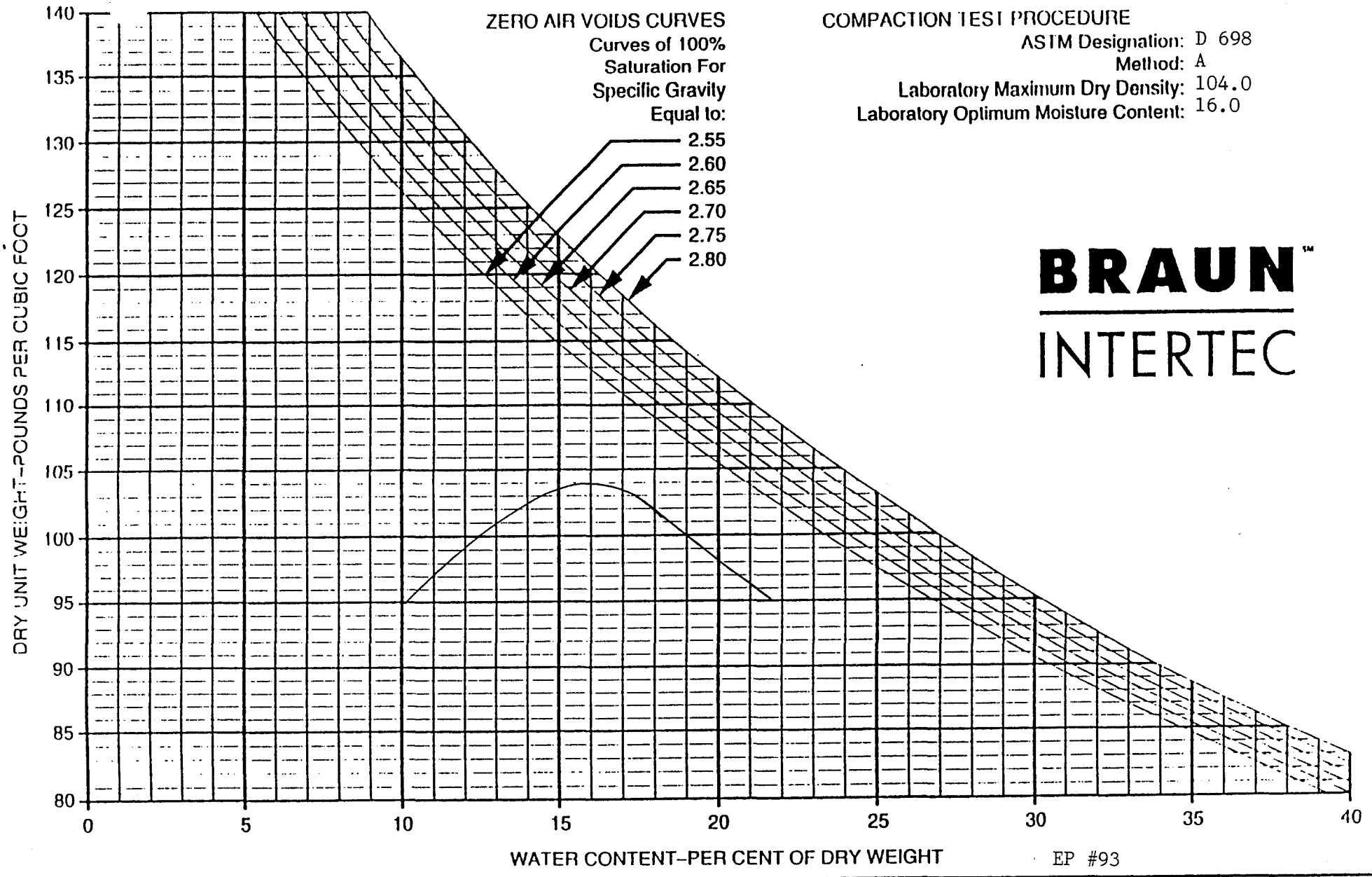
DRAWN BY:

CHECKED BY:

DATE: 9/8/92

JOB NO. BFDX-92-017C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 104.0
Laboratory Optimum Moisture Content: 16.0

BRAUN™
INTERTEC

EP #93

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST.201	CLB-OC-659	1884.2	24	17	41	Sandy Lean Clay (CL), olive brown

42687N 45202E

COMPACTION TEST

DRAWN BY:
CHECKED BY: JA
DATE:

JOB NO. BFDX-92-017C

PLATE

PERMEABILITIES

BRAUN INTERTEC

Braun Intertec Engineering, Inc.
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: August 12, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Minneapolis, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Boring Number	TP-2
Sample Number	CC-1
Location	43482N, 46606E
Type of Sample	Bag
Depth/Elevation	1'-10'
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY Relation of Soil:

ASTM D 698

Method	A
Max. Dry Density (pcf)	110.9
Optimum Moisture Content (%)	15.7

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Remolded
Dry Density (pcf)	106.4
Percent of Max. Density	95.9
Moisture Content (%)	18
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	5.3×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-tp2

BRAUN INTERTEC

Braun Intertec Engineering, Inc.
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: August 12, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Coopeative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Boring Number	TP-2
Sample Number	CC-2
Location	43482N, 46606E
Type of Sample	Bag
Depth/Elevation	1'-10'
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY
Relation of Soil: ASTM D 698

Method	A
Max. Dry Density (pcf)	106.5
Optimum Moisture Content (%)	19

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Remolded
Dry Density (pcf)	101.5
Percent of Max. Density	95.3
Moisture Content (%)	21
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.3×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-cc2

BRAUN INTERTEC

Braun Intertec Engineering, Inc.
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: August 12, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Boring Number	TP-3
Sample Number	CC-3
Location	43251N, 46633E
Type of Sample	Bag
Depth/Elevation	1'-10'
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY Relation of Soil:

ASTM D 698

Method	C
Max. Dry Density (pcf)	108
Optimum Moisture Content (%)	16.5

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Remolded
Dry Density (pcf)	103.4
Percent of Max. Density	95.7
Moisture Content (%)	19
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	7.2×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-cc3

BRAUN INTERTEC

Braun Intertec Engineering, Inc.
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: August 12, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Boring Number	TP-3
Sample Number	CC-4
Location	43251N, 46633E
Type of Sample	Bag
Depth/Elevation	1-10
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY Relation of Soil:

ASTM D 698

Method	A
Max. Dry Density (pcf)	104.5
Optimum Moisture Content (%)	19.5

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Remolded
Dry Density (pcf)	100
Percent of Max. Density	95.6
Moisture Content (%)	22
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-cc4

BRAUN INTERTEC

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P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: August 12, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Boring Number	TP-4
Sample Number	CC-5
Location	43205N, 46390E
Type of Sample	Bag
Depth/Elevation	1-10
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY
Relation of Soil: ASTM D 698

Method	A
Max. Dry Density (pcf)	105.0
Optimum Moisture Content (%)	18.5

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Remolded
Dry Density (pcf)	101
Percent of Max. Density	96.2
Moisture Content (%)	20
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	3.7×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-cc5

BRAUN INTERTEC

Braun Intertec Engineering, Inc.
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: February 3, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	ST-1A
Sample Number	CLS-CC-19
Location	43451N 45835E
Type of Sample	Tube
Depth/Elevation	1889.6
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	104.9
Percent of Max. Density	N/A
Moisture Content (%)	21
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

Braun Intertec Engineering, Inc.
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: August 12, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	ST 2A
Sample Number	CLS-CC-20
Location	43457N, 44902E
Type of Sample	Tube
Depth/Elevation	1889.8
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY Relation of Soil:

–

Method	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	105.1
Percent of Max. Density	N/A
Moisture Content (%)	21
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	7.6×10^{-9}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-cc20

Braun Intertec Engineering, Inc.
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: August 12, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	ST 3A
Sample Number	CLS-CC-21
Location	43207N, 45941E
Type of Sample	Tube
Depth/Elevation	1886.4
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY Relation of Soil:

-

Method	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	106.3
Percent of Max. Density	N/A
Moisture Content (%)	20
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.8×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Bauer, C.E.T.
Operations Manager

P-cc21

BRAUN INTERTEC

Braun Intertec Engineering, Inc.
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: August 12, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	ST 4A
Sample Number	CLS-CC-22
Location	42809N, 45941E
Type of Sample	Tube
Depth/Elevation	1886.3
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY Relation of Soil:

-

Method	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	109.4
Percent of Max. Density	N/A
Moisture Content (%)	21
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	3.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-cc22

BRAUN INTERTEC

Braun Intertec Engineering, Inc.
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: August 12, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	ST 5A
Sample Number	CLS-CC-23
Location	43103N, 45940E
Type of Sample	Tube
Depth/Elevation	1888.1
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY Relation of Soil:

ASTM D 698

Method	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	106.1
Percent of Max. Density	N/A
Moisture Content (%)	21
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.2×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-cc23

BRAUN INTERTEC

Braun Intertec Engineering, Inc.
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701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: February 3, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	ST-6A
Sample Number	CLS-CC-25
Location	43467N 45400E
Type of Sample	Tube
Depth/Elevation	1892.5
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	110.6
Percent of Max. Density	N/A
Moisture Content (%)	18
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.8×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-L/25

BRAUN INTERTEC

Braun Intertec Engineering, Inc.
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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: August 12, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	ST 7B
Sample Number	CLS-CC-26
Location	43396N, 45948E
Type of Sample	Tube
Depth/Elevation	1890.6
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY Relation of Soil:

-

Method	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	113.1
Percent of Max. Density	N/A
Moisture Content (%)	20
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	3.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-cc26

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: February 3, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	ST-8B
Sample Number	CLS-CC-27
Location	43460N 45699E
Type of Sample	Tube
Depth/Elevation	1892.8
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	111.9
Percent of Max. Density	N/A
Moisture Content (%)	21
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

P-L/27

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PERMEABILITY TESTS

DATE: August 13, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	ST 9B
Sample Number	CLS-CC-28
Location	43463N, 45101E
Type of Sample	Tube
Depth/Elevation	1892.8
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY
Relation of Soil: -

Method	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	105.9
Percent of Max. Density	N/A
Moisture Content (%)	21
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.2×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-cc28

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PERMEABILITY TESTS

DATE: August 13, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	ST 10A
Sample Number	CLS-CC-30
Location	43476N, 45192E
Type of Sample	Tube
Depth/Elevation	1895.2
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY
Relation of Soil: -

Method	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	108.9
Percent of Max. Density	N/A
Moisture Content (%)	20
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-cc30

BRAUN INTERTEC

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PERMEABILITY TESTS

DATE: August 13, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	ST 11A
Sample Number	CLS-CC-41
Location	42800N, 45953E
Type of Sample	Tube
Depth/Elevation	1894.8
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY Relation of Soil:

-

Method	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	108.8
Percent of Max. Density	N/A
Moisture Content (%)	19
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: August 13, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

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Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	12B
Sample Number	CLS-CC-42
Location	42896N, 45954E
Type of Sample	Tube
Depth/Elevation	1893.2
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY
Relation of Soil: -

Method	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	108.2
Percent of Max. Density	N/A
Moisture Content (%)	21
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	5.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: August 13, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	ST 13A
Sample Number	CLS-CC-50
Location	43463N, 43896E
Type of Sample	Tube
Depth/Elevation	1890.6
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY Relation of Soil:

-

Method	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	109.6
Percent of Max. Density	N/A
Moisture Content (%)	20
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.3×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-cc50

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PERMEABILITY TESTS

DATE: August 13, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

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Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	ST 14A
Sample Number	CLS-CC-51
Location	43465N, 44495E
Type of Sample	Tube
Depth/Elevation	1891.2
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY Relation of Soil:

-

Method	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	108.9
Percent of Max. Density	N/A
Moisture Content (%)	21
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	3.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-cc51

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PERMEABILITY TESTS

DATE: August 13, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPIES TO: Mr. Jim Martin

SAMPLE DATA:

Shelby Tube Number	ST-15A
Sample Number	CLS-CC-53
Location	43405N, 44738E
Type of Sample	Tube
Elevation	1903.6
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY Relation of Soil:

-

Method	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	112.7
Percent of Max. Density	N/A
Moisture Content (%)	18
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.7×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald E. Dauer, C.E.T.
Operations Manager

P-2/cc53

BRAUN INTERTEC

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: August 13, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPIES TO: Mr. Jim Martin

SAMPLE DATA:

Shelby Tube Number	ST-16A
Sample Number	CLS-CC-54
Location	43482N, 45299E
Type of Sample	Tube
Elevation	1897.7
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY Relation of Soil:

-

Method	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	111.5
Percent of Max. Density	N/A
Moisture Content (%)	20
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.1×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-2/ce54

BRAUN INTERTEC

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: February 3, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	ST-17A
Sample Number	CLS-CC-56
Location	43472N 43704E
Type of Sample	Tube
Depth/Elevation	1894.2
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	111.8
Percent of Max. Density	N/A
Moisture Content (%)	19
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	3.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

P-L/56

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: August 13, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPIES TO: Mr. Jim Martin

SAMPLE DATA:

Shelby Tube Number	ST-18A
Sample Number	CLS-CC-60
Location	43484N, 43996E
Type of Sample	Tube
Elevation	1898.3
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY Relation of Soil:

-

Method	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	107.1
Percent of Max. Density	N/A
Moisture Content (%)	17
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	5.2×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Datler, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: August 13, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPIES TO: Mr. Jim Martin

SAMPLE DATA:

Shelby Tube Number	ST-19A
Sample Number	CLS-CC-61
Location	42998N, 45973E
Type of Sample	Tube
Elevation	1897.5
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY Relation of Soil:

-

Method	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	112.9
Percent of Max. Density	N/A
Moisture Content (%)	18
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: August 13, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPIES TO: Mr. Jim Martin

SAMPLE DATA:

Shelby Tube Number	ST-20A
Sample Number	CLS-CC-62
Location	43479N, 44198E
Type of Sample	Tube
Elevation	1898.2
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY Relation of Soil: -

Method	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	109.2
Percent of Max. Density	N/A
Moisture Content (%)	19
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: February 3, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	21A
Sample Number	CLS-CC-63
Location	43482N 44401E
Type of Sample	Tube
Depth/Elevation	1898.1
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	109.1
Percent of Max. Density	N/A
Moisture Content (%)	19
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

P-L/63

Gerald L. Dauer, C.E.T.
Operations Manager

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: August 13, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPIES TO: Mr. Jim Martin

SAMPLE DATA:

Shelby Tube Number	22A
Sample Number	CLS-CC-81
Location	42581N, 45237E
Type of Sample	Tube
Elevation	1881.4
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY Relation of Soil:

-

Method	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	112.1
Percent of Max. Density	N/A
Moisture Content (%)	18
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: March 26, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	23A	23B
Sample Number	CLS-CC-82	CLS-CC-82
Location	42581N 45357E	42581N 45357E
Type of Sample	Tube	Tube
Depth/Elevation	1881.7	1881.7
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)	Sandy Lean Clay (CL)

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

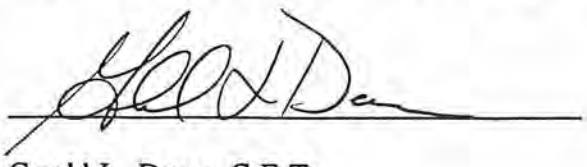
PERMEABILITY TEST DATA:

Type of Test	Falling Head	Falling Head
Type of Specimen	Undisturbed	Undisturbed
Dry Density (pcf)	N/I*	N/I*
Percent of Max. Density	N/A	N/A
Moisture Content (%)	N/I*	N/I*
Max. Head Differential (ft)	3	3
Confining Pressure (effective-PSI)	4	4
Coefficient of Permeability (cm/sec)	N/I*	N/I*

REMARKS:

* Non-recoverable samples.
Retested by CLS-CC-103.

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

P-L/82

BRAUN INTERTEC

Braun Intertec Engineering, Inc.
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: October 8, 1992

PROJECT: BFDX-92-017C

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

	Retest
Shelby Tube Number	23A
Sample Number	CLS-CC-103
Location	42567N, 45399E
Type of Sample	Tube
Depth/Elevation	1881.8
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), dark grayish-brown

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	106.8
Percent of Max. Density	N/A
Moisture Content (%)	21
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

p2/23r

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: August 13, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPIES TO: Mr. Jim Martin

SAMPLE DATA:

Shelby Tube Number	24A
Sample Number	CLS-CC-83
Location	42577N, 45603E
Type of Sample	Tube
Elevation	1883
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY Relation of Soil:

-

Method	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	107.6
Percent of Max. Density	N/A
Moisture Content (%)	21
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.1×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: August 13, 1992

PROJECT: BFDX-92-017C
EP #93

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Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

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SAMPLE DATA:

Shelby Tube Number	25A
Sample Number	CLS-CC-84
Location	42575N, 45801E
Type of Sample	Tube
Elevation	1883.5
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY Relation of Soil:

-

Method	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	107.7
Percent of Max. Density	N/A
Moisture Content (%)	20
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
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DATE: October 8, 1992

PROJECT: BFDX-92-017C

REPORTED TO:

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Eden Prairie, MN 55344-2287

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SAMPLE DATA:

Shelby Tube Number	26A
Sample Number	CLS-CC-100
Location	42570N, 44898E
Type of Sample	Tube
Depth/Elevation	1883.1
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), dark grayish-brown

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	106.8
Percent of Max. Density	N/A
Moisture Content (%)	21
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.2×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
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p2/26a

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PERMEABILITY TESTS

DATE: October 8, 1992

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Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	27A
Sample Number	CLS-CC-102
Location	42567N, 45504E
Type of Sample	Tube
Depth/Elevation	1884.7
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), dark grayish-brown

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	112.8
Percent of Max. Density	N/A
Moisture Content (%)	18
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
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p2/27a

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PERMEABILITY TESTS

DATE: October 8, 1992

PROJECT: BFDX-92-017C

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SAMPLE DATA:

Shelby Tube Number	28A
Sample Number	CLS-CC-108
Location	42566N, 44714E
Type of Sample	Tube
Depth/Elevation	1884.1
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), dark grayish-brown

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	109.8
Percent of Max. Density	N/A
Moisture Content (%)	19
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.1×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
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PERMEABILITY TESTS

DATE: October 8, 1992

PROJECT: BFDX-92-017C

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SAMPLE DATA:

Shelby Tube Number	29A
Sample Number	CLS-CC-116
Location	42574N, 44195E
Type of Sample	Tube
Depth/Elevation	1883.5
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	109.6
Percent of Max. Density	N/A
Moisture Content (%)	20
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.3×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

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P2/29a

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DATE: October 8, 1992

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SAMPLE DATA:

Shelby Tube Number	30A
Sample Number	CLS-CC-117
Location	42570N, 44392E
Type of Sample	Tube
Depth/Elevation	1885
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	110.8
Percent of Max. Density	N/A
Moisture Content (%)	19
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	3.3×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

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P2/30a

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PERMEABILITY TESTS

DATE: October 8, 1992

PROJECT: BFDX-92-017C

REPORTED TO:

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Attn: Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

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SAMPLE DATA:

Shelby Tube Number	31A
Sample Number	CLS-CC-119
Location	42555N, 45102E
Type of Sample	Tube
Depth/Elevation	1888.7
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	105.9
Percent of Max. Density	N/A
Moisture Content (%)	21
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

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P2/31a

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PERMEABILITY TESTS

DATE: October 8, 1992

PROJECT: BFDX-92-017C

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	32A
Sample Number	CLS-CC-125
Location	42557N, 44692E
Type of Sample	Tube
Depth/Elevation	1887.1
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	112.1
Percent of Max. Density	N/A
Moisture Content (%)	20
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

p2/32a

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PERMEABILITY TESTS

DATE: October 8, 1992

PROJECT: BFDX-92-017C

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	33A
Sample Number	CLS-CC-131
Location	42540N, 44975E
Type of Sample	Tube
Depth/Elevation	1893.3
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	109.3
Percent of Max. Density	N/A
Moisture Content (%)	19
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.2×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: February 3, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	34A
Sample Number	CLB-CC-175
Location	43369N 44345E
Type of Sample	Tube
Depth/Elevation	1887.6
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	111.6
Percent of Max. Density	N/A
Moisture Content (%)	18
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

P-L/175

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: February 3, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	35A
Sample Number	CLB-CC-176
Location	43367N 44117E
Type of Sample	Tube
Depth/Elevation	1888.2
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	108
Percent of Max. Density	N/A
Moisture Content (%)	20
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-L/176

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PERMEABILITY TESTS

DATE: February 3, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	36A
Sample Number	CLB-CC-177
Location	43365N 43919E
Type of Sample	Tube
Depth/Elevation	1888.3
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	102.8
Percent of Max. Density	N/A
Moisture Content (%)	21
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	$1x10^{-8}$

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-L/177

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PERMEABILITY TESTS

DATE: February 3, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	37A
Sample Number	CLB-CC-178
Location	43364N 43731E
Type of Sample	Tube
Depth/Elevation	1888.6
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	111
Percent of Max. Density	N/A
Moisture Content (%)	18
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-L/178

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PERMEABILITY TESTS

DATE: February 3, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	38A
Sample Number	CLB-CC-179
Location	43361N 43562E
Type of Sample	Tube
Depth/Elevation	1888.4
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	109.8
Percent of Max. Density	N/A
Moisture Content (%)	21
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-L/179

BRAUN INTERTEC

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: October 8, 1992

PROJECT: BFDX-92-017C

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	39A
Sample Number	CLB-CC-180
Location	43281N, 43569E
Type of Sample	Tube
Depth/Elevation	1887.9
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), dark grayish-brown

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	107.4
Percent of Max. Density	N/A
Moisture Content (%)	20
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.3×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Bauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: February 3, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	40B
Sample Number	CLB-CC-181
Location	43289N 43760E
Type of Sample	Tube
Depth/Elevation	1888.1
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), dark grayish-brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	107.6
Percent of Max. Density	N/A
Moisture Content (%)	18
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-L/181

BRAUN INTERTEC

Braun Intertec Engineering, Inc.
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: October 8, 1992

PROJECT: BFDX-92-017C

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	41A
Sample Number	CLB-CC-182
Location	43295N, 43957E
Type of Sample	Tube
Depth/Elevation	1887.9
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), dark grayish-brown

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	111.6
Percent of Max. Density	N/A
Moisture Content (%)	20.3
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: February 3, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	42A
Sample Number	CLB-CC-183
Location	43303N 44153E
Type of Sample	Tube
Depth/Elevation	1888
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), dark grayish-brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	108.3
Percent of Max. Density	N/A
Moisture Content (%)	20
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	$1x10^{-8}$

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

P-L/183

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: October 8, 1992

PROJECT: BFDX-92-017C

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

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SAMPLE DATA:

Shelby Tube Number	43A
Sample Number	CLB-CC-184
Location	43312N, 44364E
Type of Sample	Tube
Depth/Elevation	1887.7
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), dark grayish-brown

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	110.9
Percent of Max. Density	N/A
Moisture Content (%)	18.9
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: February 3, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	44A	44B
Sample Number	CLS-CC-221	CLS-CC-221
Location	42564N 43297E	42564N 43297E
Type of Sample	Tube	Tube
Depth/Elevation	1885.5	1885.5
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)	Sandy Lean Clay (CL)

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head	Falling Head
Type of Specimen	Undisturbed	Undisturbed
Dry Density (pcf)	N/I*	N/I*
Percent of Max. Density	N/A	N/A
Moisture Content (%)	N/I*	N/I*
Max. Head Differential (ft)	3	3
Confining Pressure (effective-PSI)	4	4
Coefficient of Permeability (cm/sec)	N/I*	N/I*

REMARKS:

* Non-recoverable samples. Sample retested by CLS-CC-240.

BRAUN INTERTEC ENGINEERING, INC.

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PERMEABILITY TESTS

DATE: February 3, 1993

PROJECT: BFDX-92-017C
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REPORTED TO:

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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	44R-A
Sample Number	CLS-CC-240
Location	42564N 43297E
Type of Sample	Tube
Depth/Elevation	1886.0
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), dark grayish-brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	104.3
Percent of Max. Density	N/A
Moisture Content (%)	20
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.5×10^{-8}

REMARKS:

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Operations Manager

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PERMEABILITY TESTS

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REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

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SAMPLE DATA:

Shelby Tube Number	45A
Sample Number	CLS-CC-222
Location	42696N 43064E
Type of Sample	Tube
Depth/Elevation	1884.9
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), dark grayish-brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	110.1
Percent of Max. Density	N/A
Moisture Content (%)	19
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.5×10^{-8}

REMARKS:

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COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	46A
Sample Number	CLS-CC-223
Location	42573N 43789E
Type of Sample	Tube
Depth/Elevation	1883.4
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	111.2
Percent of Max. Density	N/A
Moisture Content (%)	19
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.6×10^{-8}

REMARKS:

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SAMPLE DATA:

Shelby Tube Number	47B
Sample Number	CLS-CC-233
Location	42537N 44178E
Type of Sample	Tube
Depth/Elevation	1887.6
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), dark grayish-brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	109.6
Percent of Max. Density	N/A
Moisture Content (%)	19
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	$1x10^{-8}$

REMARKS:

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SAMPLE DATA:

Shelby Tube Number	48B
Sample Number	CLS-CC-241
Location	43459N 43206E
Type of Sample	Tube
Depth/Elevation	1889.7
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	109.7
Percent of Max. Density	N/A
Moisture Content (%)	19
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.4×10^{-8}

REMARKS:

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SAMPLE DATA:

Shelby Tube Number	49A
Sample Number	CLS-CC-242
Location	43279N 43037E
Type of Sample	Tube
Depth/Elevation	1891.5
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), dark grayish-brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	111.2
Percent of Max. Density	N/A
Moisture Content (%)	19
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.5×10^{-8}

REMARKS:

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SAMPLE DATA:

Shelby Tube Number	50A
Sample Number	CLS-CC-243
Location	42545N 43587E
Type of Sample	Tube
Depth/Elevation	1889.7
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), dark grayish-brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	105.0
Percent of Max. Density	N/A
Moisture Content (%)	18
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.0×10^{-8}

REMARKS:

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PERMEABILITY TESTS

DATE: December 7, 1992

PROJECT: BFDX-92-017C
EP #93

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Cooperative Power Association
Attn: Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	51A
Sample Number	CLS-CC-244
Location	43000N 43049E
Type of Sample	Tube
Depth/Elevation	1891.2
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), dark grayish-brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	107.6
Percent of Max. Density	N/A
Moisture Content (%)	22
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.5×10^{-8}

REMARKS:

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SAMPLE DATA:

Shelby Tube Number	52A
Sample Number	CLB-CC-289
Location	43404N 45571E
Type of Sample	Tube
Depth/Elevation	1887.3
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	111.1
Percent of Max. Density	N/A
Moisture Content (%)	16.9
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	5.6×10^{-8}

REMARKS:

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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	53B
Sample Number	CLB-CC-290
Location	43260N 45565E
Type of Sample	Tube
Depth/Elevation	1886.2
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), dark gray brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	112.3
Percent of Max. Density	N/A
Moisture Content (%)	17
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.6×10^{-8}

REMARKS:

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SAMPLE DATA:

Shelby Tube Number	54B
Sample Number	CLB-CC-291
Location	43123N 45563E
Type of Sample	Tube
Depth/Elevation	1885.3
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	112.7
Percent of Max. Density	N/A
Moisture Content (%)	17.8
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.5×10^{-8}

REMARKS:

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Attn: Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

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SAMPLE DATA:

Shelby Tube Number	55B
Sample Number	CLB-CC-303
Location	43356N 45895E
Type of Sample	Tube
Depth/Elevation	1887
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	111.6
Percent of Max. Density	N/A
Moisture Content (%)	17
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.6×10^{-8}

REMARKS:

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Attn: Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	56A
Sample Number	CLB-CC-304
Location	43219N 45897E
Type of Sample	Tube
Depth/Elevation	1886.1
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	112.1
Percent of Max. Density	N/A
Moisture Content (%)	17
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.1×10^{-8}

REMARKS:

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REPORTED TO:

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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	57B
Sample Number	CLB-CC-305
Location	43057N 45891E
Type of Sample	Tube
Depth/Elevation	1884.9
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	113.4
Percent of Max. Density	N/A
Moisture Content (%)	17
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	6.4×10^{-9}

REMARKS:

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701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	58A
Sample Number	CLB-CC-318
Location	43369N 45859E
Type of Sample	Tube
Depth/Elevation	1888.1
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	110.5
Percent of Max. Density	N/A
Moisture Content (%)	20.4
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.3×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

P-L/58

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	59A
Sample Number	CLB-CC-319
Location	43223N 45860E
Type of Sample	Tube
Depth/Elevation	1887.2
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), grayish-brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	112.8
Percent of Max. Density	N/A
Moisture Content (%)	17
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.2×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

P-L/59

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	60A
Sample Number	CLB-CC-320
Location	43079N 45859E
Type of Sample	Tube
Depth/Elevation	1886.3
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), grayish-brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	108.6
Percent of Max. Density	N/A
Moisture Content (%)	17.4
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

P-L/60

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	61B
Sample Number	CLB-CC-321
Location	42926N 45852E
Type of Sample	Tube
Depth/Elevation	1885.3
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), grayish-brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	109.1
Percent of Max. Density	N/A
Moisture Content (%)	19
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-L/61

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PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	62A
Sample Number	CLB-CC-322
Location	42894N 45626E
Type of Sample	Tube
Depth/Elevation	1884.9
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), grayish-brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	111.0
Percent of Max. Density	N/A
Moisture Content (%)	18.1
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	3.7×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

P-L/62

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: December 7, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	63B
Sample Number	CLB-CC-323
Location	43059N 45625E
Type of Sample	Tube
Depth/Elevation	1886.1
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	107.5
Percent of Max. Density	N/A
Moisture Content (%)	18.1
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	5.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: December 7, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	64A
Sample Number	CLB-CC-324
Location	43206N 45622E
Type of Sample	Tube
Depth/Elevation	1887
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	109.7
Percent of Max. Density	N/A
Moisture Content (%)	19
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: December 7, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

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Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	65B
Sample Number	CLB-CC-325
Location	43349N 45619E
Type of Sample	Tube
Depth/Elevation	1888
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	105.3
Percent of Max. Density	N/A
Moisture Content (%)	16.4
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.7×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: January 29, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	66A
Sample Number	CLS-CC-326
Location	43473N 43185E
Type of Sample	Tube
Depth/Elevation	1895.7
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	116.2
Percent of Max. Density	N/A
Moisture Content (%)	20
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.7×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: January 29, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

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Attn: Mr. Andy Stewart
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SAMPLE DATA:

Shelby Tube Number	67A
Sample Number	CLS-CC-332
Location	42945N 43032E
Type of Sample	Tube
Depth/Elevation	1897
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	104.3
Percent of Max. Density	N/A
Moisture Content (%)	22.5
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
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PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	68A
Sample Number	CLB-CC-352
Location	43222N 43151E
Type of Sample	Tube
Depth/Elevation	1887.4
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

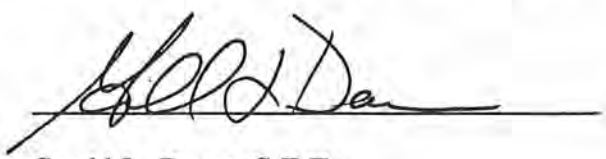
Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	110.7
Percent of Max. Density	N/A
Moisture Content (%)	21.1
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

P-L/68

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PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
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COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	69A
Sample Number	CLB-CC-353
Location	43034N 43156E
Type of Sample	Tube
Depth/Elevation	1886.2
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	106.2
Percent of Max. Density	N/A
Moisture Content (%)	21.5
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.8×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

P-L/69

Gerald L. Dauer, C.E.T.
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PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

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Attn: Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

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SAMPLE DATA:

Shelby Tube Number	70A
Sample Number	CLB-CC-354
Location	43174N 43326E
Type of Sample	Tube
Depth/Elevation	1887
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	107.5
Percent of Max. Density	N/A
Moisture Content (%)	23.6
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.8×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-L/70

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PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	71A
Sample Number	CLB-CC-355
Location	42969N 43325E
Type of Sample	Tube
Depth/Elevation	1885.7
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	102.7
Percent of Max. Density	N/A
Moisture Content (%)	22.9
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
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P-L/71

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PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

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Attn: Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

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SAMPLE DATA:

Shelby Tube Number	72A
Sample Number	CLB-CC-362
Location	43390N 43346E
Type of Sample	Tube
Depth/Elevation	1889
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	104.6
Percent of Max. Density	N/A
Moisture Content (%)	20.8
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-L/72

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PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	73A
Sample Number	CLB-CC-363
Location	42898N 43352E
Type of Sample	Tube
Depth/Elevation	1885.4
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	100
Percent of Max. Density	N/A
Moisture Content (%)	23.6
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	4.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

P-L/73

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PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	74A
Sample Number	CLB-CC-364
Location	42638N 43364E
Type of Sample	Tube
Depth/Elevation	1883.7
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	103.9
Percent of Max. Density	N/A
Moisture Content (%)	21.7
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-L/74

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PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

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Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	75A
Sample Number	CLB-CC-365
Location	42639N 43183E
Type of Sample	Tube
Depth/Elevation	1883.7
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	104.7
Percent of Max. Density	N/A
Moisture Content (%)	22.9
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-L/75

BRAUN INTERTEC

Braun Intertec Engineering, Inc.
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	76A
Sample Number	CLB-CC-366
Location	42886N 43175E
Type of Sample	Tube
Depth/Elevation	1885.9
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	100.6
Percent of Max. Density	N/A
Moisture Content (%)	23.6
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	3.2×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

P-L/76

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	77A
Sample Number	CLB-CC-367
Location	43390N 43164E
Type of Sample	Tube
Depth/Elevation	1889.1
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	105.2
Percent of Max. Density	N/A
Moisture Content (%)	23.2
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.3×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

P-L/77

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PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	78A
Sample Number	CLB-CC-372
Location	43421N 43132E
Type of Sample	Tube
Depth/Elevation	1890.2
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	105.1
Percent of Max. Density	N/A
Moisture Content (%)	22.4
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.1×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-L/78

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PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	79A
Sample Number	CLB-CC-373
Location	43218N 43138E
Type of Sample	Tube
Depth/Elevation	1888.2
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	106.5
Percent of Max. Density	N/A
Moisture Content (%)	22.8
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.1×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

P-L/79

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PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	80A
Sample Number	CLB-CC-374
Location	43014N 43143E
Type of Sample	Tube
Depth/Elevation	1886.9
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	103.1
Percent of Max. Density	N/A
Moisture Content (%)	22.7
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-L/80

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PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	81A
Sample Number	CLB-CC-375
Location	43012N 43274E
Type of Sample	Tube
Depth/Elevation	1887.1
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	105.2
Percent of Max. Density	N/A
Moisture Content (%)	22.1
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

P-L/81

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PERMEABILITY TESTS

DATE: March 26, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	82A
Sample Number	CLB-CC-376
Location	43219N 43271E
Type of Sample	Tube
Depth/Elevation	1888.5
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	102.9
Percent of Max. Density	N/A
Moisture Content (%)	22.1
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.0×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-L/82

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PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	83A
Sample Number	CLB-CC-377
Location	43416N 43265E
Type of Sample	Tube
Depth/Elevation	1890
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	102.2
Percent of Max. Density	N/A
Moisture Content (%)	23.6
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.3×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-L/83

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PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	84A
Sample Number	CLB-CC-378
Location	43415N 43440E
Type of Sample	Tube
Depth/Elevation	1890
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	107.5
Percent of Max. Density	N/A
Moisture Content (%)	20.9
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.2×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

P-L/84

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	85A
Sample Number	CLB-CC-379
Location	43210N 43443E
Type of Sample	Tube
Depth/Elevation	1887.8
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	105.9
Percent of Max. Density	N/A
Moisture Content (%)	22.7
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

P-L/85

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PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	86A
Sample Number	CLB-CC-380
Location	43016N 43445E
Type of Sample	Tube
Depth/Elevation	1887
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	101.8
Percent of Max. Density	N/A
Moisture Content (%)	22
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.2×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

P-L/86

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Operations Manager

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PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	87A
Sample Number	CLB-CC-384
Location	42898N 43135E
Type of Sample	Tube
Depth/Elevation	1886.8
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	104.8
Percent of Max. Density	N/A
Moisture Content (%)	22.2
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.8×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-L/87

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PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	88A
Sample Number	CLB-CC-385
Location	42647N 43139E
Type of Sample	Tube
Depth/Elevation	1885.3
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	114.2
Percent of Max. Density	N/A
Moisture Content (%)	22.2
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-L/88

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PERMEABILITY TESTS

DATE: January 29, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	89B
Sample Number	CLB-CC-386
Location	42799N 43230E
Type of Sample	Tube
Depth/Elevation	1887.2
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	109.6
Percent of Max. Density	N/A
Moisture Content (%)	21.4
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.2×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-L/89

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PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	90A
Sample Number	CLB-CC-387
Location	42665N 43234E
Type of Sample	Tube
Depth/Elevation	1885.4
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	105.1
Percent of Max. Density	N/A
Moisture Content (%)	21.6
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	6.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

P-L/90

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PERMEABILITY TESTS

DATE: December 7, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	91A
Sample Number	CLB-CC-388
Location	42980N 43438E
Type of Sample	Tube
Depth/Elevation	1886.9
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	108.4
Percent of Max. Density	N/A
Moisture Content (%)	22.6
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	4.0×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

P-388

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: December 7, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	92B
Sample Number	CLB-CC-389
Location	42696N 43440E
Type of Sample	Tube
Depth/Elevation	1885.4
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	112.2
Percent of Max. Density	N/A
Moisture Content (%)	22.1
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.0×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: December 7, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	93A
Sample Number	CLB-CC-390
Location	43178N 43556E
Type of Sample	Tube
Depth/Elevation	1887.1
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	107.2
Percent of Max. Density	N/A
Moisture Content (%)	22.7
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	4.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

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Bismarck, North Dakota 58502-2379
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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: January 29, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	94A	94B
Sample Number	CLB-CC-391	CLB-CC-391
Location	42999N 43548E	42999N 43548
Type of Sample	Tube	Tube
Depth/Elevation	1885.7	1885.7
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)	Sandy Lean Clay (CL)

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head	Falling Head
Type of Specimen	Undisturbed	Undisturbed
Dry Density (pcf)	*	*
Percent of Max. Density	N/A	N/A
Moisture Content (%)	*	*
Max. Head Differential (ft)	3	3
Confining Pressure (effective-PSI)	4	4
Coefficient of Permeability (cm/sec)	*	*

REMARKS:

* Non-recoverable sample. Retested by sample No. CLB-CC-408

P-L/94a/b

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: January 29, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	94A-R
Sample Number	CLB-CC-408
Location	42999N 43548E
Type of Sample	Tube
Depth/Elevation	1885.7
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	102.6
Percent of Max. Density	N/A
Moisture Content (%)	23.7
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.0×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-L/94

BRAUN INTERTEC

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PERMEABILITY TESTS

DATE: December 7, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	95A
Sample Number	CLB-CC-392
Location	43818N 43542E
Type of Sample	Tube
Depth/Elevation	1885
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	101.8
Percent of Max. Density	N/A
Moisture Content (%)	24
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	3.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

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DATE: December 7, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	96A
Sample Number	CLB-CC-393
Location	42639N 43544E
Type of Sample	Tube
Depth/Elevation	1883.8
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	104.5
Percent of Max. Density	N/A
Moisture Content (%)	22.5
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	5.3×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-393

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PERMEABILITY TESTS

DATE: December 7, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	97B
Sample Number	CLB-CC-394
Location	42647N 43759E
Type of Sample	Tube
Depth/Elevation	1883.2
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	102.4
Percent of Max. Density	N/A
Moisture Content (%)	22.9
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	$1x10^{-7}$

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
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PERMEABILITY TESTS

DATE: December 7, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	98B
Sample Number	CLB-CC-395
Location	42806N 43771E
Type of Sample	Tube
Depth/Elevation	1884.3
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), dark grayish-brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	112.8
Percent of Max. Density	N/A
Moisture Content (%)	22.7
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.7×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

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PERMEABILITY TESTS

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SAMPLE DATA:

Shelby Tube Number	99A
Sample Number	CLB-CC-396
Location	42976N 43782E
Type of Sample	Tube
Depth/Elevation	1885.5
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), light olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	102.1
Percent of Max. Density	N/A
Moisture Content (%)	23.5
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	6.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

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SAMPLE DATA:

Shelby Tube Number	100A
Sample Number	CLB-CC-397
Location	43152N 43796E
Type of Sample	Tube
Depth/Elevation	1886.5
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	104.7
Percent of Max. Density	N/A
Moisture Content (%)	23
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.3×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
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EP #93

REPORTED TO:

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Attn: Mr. Andy Stewart
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COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	101B
Sample Number	CLB-CC-398
Location	43190N 43970E
Type of Sample	Tube
Depth/Elevation	1886.9
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	106.3
Percent of Max. Density	N/A
Moisture Content (%)	20.5
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.0×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
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PERMEABILITY TESTS

DATE: December 7, 1992

PROJECT: BFDX-92-017C
EP #93

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COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	102A
Sample Number	CLB-CC-399
Location	43044N 43962E
Type of Sample	Tube
Depth/Elevation	1885.7
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	107.1
Percent of Max. Density	N/A
Moisture Content (%)	21.4
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

P-399

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PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	104A
Sample Number	CLB-CC-401
Location	42672N 43943E
Type of Sample	Tube
Depth/Elevation	1883.5
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	106.1
Percent of Max. Density	N/A
Moisture Content (%)	23.1
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

P-L/104

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PERMEABILITY TESTS

DATE: January 29, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	105A
Sample Number	CLB-CC-418
Location	43209N 44104E
Type of Sample	Tube
Depth/Elevation	1887.9
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	115.3
Percent of Max. Density	N/A
Moisture Content (%)	17.5
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	4.4×10^{-9}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-L/105

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PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	106A
Sample Number	CLB-CC-419
Location	43211N 43842E
Type of Sample	Tube
Depth/Elevation	1888.1
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	108.2
Percent of Max. Density	N/A
Moisture Content (%)	21.2
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.1×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-L/106

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PERMEABILITY TESTS

DATE: January 29, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
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COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	107B
Sample Number	CLB-CC-420
Location	43209N 43558E
Type of Sample	Tube
Depth/Elevation	1888.2
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	110.5
Percent of Max. Density	N/A
Moisture Content (%)	19.5
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	5.7×10^{-9}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-L/107

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PERMEABILITY TESTS

DATE: January 29, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	108A
Sample Number	CLB-CC-421
Location	43095N 43600E
Type of Sample	Tube
Depth/Elevation	1886.6
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	108.6
Percent of Max. Density	N/A
Moisture Content (%)	21.7
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-L/108

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PERMEABILITY TESTS

DATE: January 29, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	109A
Sample Number	CLB-CC-422
Location	42788N 43589E
Type of Sample	Tube
Depth/Elevation	1885.6
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	107.9
Percent of Max. Density	N/A
Moisture Content (%)	21.7
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	8.7×10^{-9}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-L/422

BRAUN INTERTEC

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PERMEABILITY TESTS

DATE: January 29, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	110A
Sample Number	CLB-CC-423
Location	42623N 43589E
Type of Sample	Tube
Depth/Elevation	1884.4
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	101.7
Percent of Max. Density	N/A
Moisture Content (%)	21.4
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-L/110

BRAUN INTERTEC

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PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
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SAMPLE DATA:

Shelby Tube Number	111A
Sample Number	CLB-CC-424
Location	43009N 43838E
Type of Sample	Tube
Depth/Elevation	1886.9
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	102.7
Percent of Max. Density	N/A
Moisture Content (%)	22.2
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
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P-L/111

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PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	112A	112B
Sample Number	CLB-CC-425	CLB-CC-425
Location	42820N 43832E	42820N 43832E
Type of Sample	Tube	Tube
Depth/Elevation	1886.1	1886.1
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)	Sandy Lean Clay (CL)

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head	Falling Head
Type of Specimen	Undisturbed	Undisturbed
Dry Density (pcf)	N/A	N/A
Percent of Max. Density	N/A	N/A
Moisture Content (%)	N/A	N/A
Max. Head Differential (ft)	3	3
Confining Pressure (effective-PSI)	4	4
Coefficient of Permeability (cm/sec)	N/A*	N/A*

REMARKS:

* Non-recoverable samples, retested by sample CLB-CC-465.

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

P-L/112

BRAUN INTERTEC

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701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: December 11, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	R-112A
Sample Number	CLB-CC-465
Location	42820N 43832E
Type of Sample	Tube
Depth/Elevation	1886.1
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	108.8
Percent of Max. Density	N/A
Moisture Content (%)	22.1
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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Eden Prairie, MN 55344-2287

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SAMPLE DATA:

Shelby Tube Number	113A
Sample Number	CLB-CC-426
Location	42623N 43828E
Type of Sample	Tube
Depth/Elevation	1885
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	103.1
Percent of Max. Density	N/A
Moisture Content (%)	22.6
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	4.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-L/113

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DATE: December 4, 1992

PROJECT: BFDX-92-017C
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REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	114A
Sample Number	CLB-CC-429
Location	42995N 44045E
Type of Sample	Tube
Depth/Elevation	1886.5
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	104.3
Percent of Max. Density	N/A
Moisture Content (%)	22.7
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	4.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

P-L/114

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PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	115B
Sample Number	CLB-CC-430
Location	42809N 44038E
Type of Sample	Tube
Depth/Elevation	1885.6
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	103.3
Percent of Max. Density	N/A
Moisture Content (%)	23.9
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-L/115

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PERMEABILITY TESTS

DATE: December 4, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	116A	116B
Sample Number	CLB-CC-431	CLB-CC-431
Location	42647N 44023E	42647N 44023E
Type of Sample	Tube	Tube
Depth/Elevation	1884.3	1884.3
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)	Sandy Lean Clay (CL)

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	N/A*
Percent of Max. Density	N/A
Moisture Content (%)	N/A*
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	N/A*

REMARKS:

* Non-recoverable samples.
Retested by CLB-CC-465

P-L/116

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
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PERMEABILITY TESTS

DATE: December 11, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	R-116A
Sample Number	CLB-CC-466
Location	42647N 44023E
Type of Sample	Tube
Depth/Elevation	1884.3
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	104.2
Percent of Max. Density	N/A
Moisture Content (%)	24
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.9×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: December 11, 1992

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SAMPLE DATA:

Shelby Tube Number	117A
Sample Number	CLB-CC-476
Location	43197N 44212E
Type of Sample	Tube
Depth/Elevation	1886.5
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	106.3
Percent of Max. Density	N/A
Moisture Content (%)	22.4
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.0×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



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PERMEABILITY TESTS

DATE: December 11, 1992

PROJECT: BFDX-92-017C
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REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
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SAMPLE DATA:

Shelby Tube Number	119B
Sample Number	CLB-CC-478
Location	42839N 44187E
Type of Sample	Tube
Depth/Elevation	1884.2
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	105.8
Percent of Max. Density	N/A
Moisture Content (%)	22.8
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



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REPORTED TO:

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Attn: Mr. Andy Stewart
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COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	120A
Sample Number	CLB-CC-479
Location	42631N 44174E
Type of Sample	Tube
Depth/Elevation	1883.4
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	108
Percent of Max. Density	N/A
Moisture Content (%)	20.4
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.3×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
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PERMEABILITY TESTS

DATE: January 29, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	121A
Sample Number	CLB-CC-488
Location	43204N 44389E
Type of Sample	Tube
Depth/Elevation	1886.7
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	105.1
Percent of Max. Density	N/A
Moisture Content (%)	23.4
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

P-488

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PERMEABILITY TESTS

DATE: December 15, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	122A
Sample Number	CLB-CC-489
Location	43026N 44385E
Type of Sample	Tube
Depth/Elevation	1885.3
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	103.5
Percent of Max. Density	N/A
Moisture Content (%)	21.8
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.2×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: December 15, 1992

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Attn: Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	123A
Sample Number	CLB-CC-490
Location	42847N 44376E
Type of Sample	Tube
Depth/Elevation	1884.6
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	103.1
Percent of Max. Density	N/A
Moisture Content (%)	21.5
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.1×10^{-8}

REMARKS:

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COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	124A
Sample Number	CLB-CC-491
Location	42660N 44371E
Type of Sample	Tube
Depth/Elevation	1883.5
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	109.9
Percent of Max. Density	N/A
Moisture Content (%)	21
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.1×10^{-8}

REMARKS:

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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	125A	125B
Sample Number	CLB-CC-492	CLB-CC-492
Location	43366N 44611E	43366N 44611E
Type of Sample	Tube	Tube
Depth/Elevation	1887.2	1887.2
Soil Classification (ASTM D 2487)	CL	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698	ASTM D 698
Max. Dry Density (pcf)	N/A	N/A
Optimum Moisture Content (%)	N/A	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head	Falling Head
Type of Specimen	Undisturbed	Undisturbed
Dry Density (pcf)	N/A*	N/A*
Percent of Max. Density	N/A	N/A
Moisture Content (%)	N/A*	N/A*
Max. Head Differential (ft)	3	3
Confining Pressure (effective-PSI)	4	4
Coefficient of Permeability (cm/sec)	N/A*	N/A*

REMARKS:

* Non-recoverable samples
Passed by sample CLB-CC-508

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
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PERMEABILITY TESTS

DATE: December 29, 1992

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REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	R-125A
Sample Number	CLB-CC-508
Location	43366N 44611E
Type of Sample	Tube
Depth/Elevation	1887.2
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	104
Percent of Max. Density	N/A
Moisture Content (%)	22.1
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: December 15, 1992

PROJECT: BFDX-92-017C
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REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	126A	126B
Sample Number	CLB-CC-493	CLB-CC-493
Location	43215N 44608E	43215N 44608E
Type of Sample	Tube	Tube
Depth/Elevation	1886.1	1886.1
Soil Classification (ASTM D 2487)	CL	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698	ASTM D 698
Max. Dry Density (pcf)	N/A	N/A
Optimum Moisture Content (%)	N/A	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head	Falling Head
Type of Specimen	Undisturbed	Undisturbed
Dry Density (pcf)	N/A*	N/A*
Percent of Max. Density	N/A	N/A
Moisture Content (%)	N/A*	N/A*
Max. Head Differential (ft)	3	3
Confining Pressure (effective-PSI)	4	4
Coefficient of Permeability (cm/sec)	N/A*	N/A*

REMARKS:

* Non-recoverable samples
Passed by sample CLB-CC-509

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
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REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	R-126A
Sample Number	CLB-CC-509
Location	43215N 44608E
Type of Sample	Tube
Depth/Elevation	1886.1
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	102.9
Percent of Max. Density	N/A
Moisture Content (%)	23.5
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: January 29, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	127A
Sample Number	CLB-CC-494
Location	43043N 44601E
Type of Sample	Tube
Depth/Elevation	1884.1
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	101.6
Percent of Max. Density	N/A
Moisture Content (%)	24.1
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

Braun Intertec Engineering, Inc.
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: December 15, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	128A
Sample Number	CLB-CC-495
Location	42870N 44596E
Type of Sample	Tube
Depth/Elevation	1882.8
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	103.3
Percent of Max. Density	N/A
Moisture Content (%)	22.9
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: December 15, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	129A
Sample Number	CLB-CC-496
Location	42686N 44593E
Type of Sample	Tube
Depth/Elevation	1881.3
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	108.8
Percent of Max. Density	N/A
Moisture Content (%)	21.1
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.1×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: December 15, 1992

PROJECT: BFDX-92-017C
EP #93

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Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	130A	130B
Sample Number	CLB-CC-497	CLB-CC-497
Location	43189N 44209E	43189N 44209E
Type of Sample	Tube	Tube
Depth/Elevation	1886.9	1886.9
Soil Classification (ASTM D 2487)	CL	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698	ASTM D 698
Max. Dry Density (pcf)	N/A	N/A
Optimum Moisture Content (%)	N/A	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head	Falling Head
Type of Specimen	Undisturbed	Undisturbed
Dry Density (pcf)	N/A*	N/A*
Percent of Max. Density	N/A	N/A
Moisture Content (%)	N/A*	N/A*
Max. Head Differential (ft)	3	3
Confining Pressure (effective-PSI)	4	4
Coefficient of Permeability (cm/sec)	N/A*	N/A*

REMARKS:

* Non-recoverable samples.
Passed by sample CLB-CC-512.

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

P-130a&b

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: December 15, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	131A
Sample Number	CLB-CC-498
Location	43033N 44201E
Type of Sample	Tube
Depth/Elevation	1886.1
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	108.6
Percent of Max. Density	N/A
Moisture Content (%)	22.6
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

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PERMEABILITY TESTS

DATE: December 15, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	132A
Sample Number	CLB-CC-499
Location	42878N 44192E
Type of Sample	Tube
Depth/Elevation	1885.4
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	104.6
Percent of Max. Density	N/A
Moisture Content (%)	21.9
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: March 26, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	134A
Sample Number	CLB-CC-510
Location	43334N 44455E
Type of Sample	Tube
Depth/Elevation	1888.3
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	103.5
Percent of Max. Density	N/A
Moisture Content (%)	22.8
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	135B
Sample Number	CLB-CC-511
Location	43320N 44627E
Type of Sample	Tube
Depth/Elevation	1888.4
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	106.2
Percent of Max. Density	N/A
Moisture Content (%)	21.3
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.3×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

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Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	R-130&136A
Sample Number	CLB-CC-512
Location	43177N 44198E
Type of Sample	Tube
Depth/Elevation	1887.5
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	103.1
Percent of Max. Density	N/A
Moisture Content (%)	22.9
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.3×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	137A
Sample Number	CLB-CC-513
Location	43160N 44381E
Type of Sample	Tube
Depth/Elevation	1887.4
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	104.7
Percent of Max. Density	N/A
Moisture Content (%)	22.2
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	138A
Sample Number	CLB-CC-514
Location	43147N 44599E
Type of Sample	Tube
Depth/Elevation	1887.1
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	104.1
Percent of Max. Density	N/A
Moisture Content (%)	21.2
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.7×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	139A
Sample Number	CLB-CC-515
Location	43000N 44163E
Type of Sample	Tube
Depth/Elevation	1886.6
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	104.5
Percent of Max. Density	N/A
Moisture Content (%)	23.2
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-139n

BRAUN INTERTEC

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: January 29, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	140A	140B
Sample Number	CLB-CC-516	CLB-CC-516
Location	42997N 44333E	42997N 44333E
Type of Sample	Tube	Tube
Depth/Elevation	1886.6	1886.6
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head	Falling Head
Type of Specimen	Undisturbed	Undisturbed
Dry Density (pcf)	*	*
Percent of Max. Density	N/A	N/A
Moisture Content (%)	*	*
Max. Head Differential (ft)	3	3
Confining Pressure (effective-PSI)	4	4
Coefficient of Permeability (cm/sec)	*	*

REMARKS:

* Non-recoverable samples. Retested by CLB-CC-531.

P-L/140

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	R-140B
Sample Number	CLB-CC-531
Location	42997N 44333E
Type of Sample	Tube
Depth/Elevation	1886.6
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	107.4
Percent of Max. Density	N/A
Moisture Content (%)	22.5
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.3×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	141B
Sample Number	CLB-CC-517
Location	42994N 44588E
Type of Sample	Tube
Depth/Elevation	1886.2
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	104.2
Percent of Max. Density	N/A
Moisture Content (%)	22.8
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	142A
Sample Number	CLB-CC-532
Location	42880N 44211E
Type of Sample	Tube
Depth/Elevation	1885.8
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	102.1
Percent of Max. Density	N/A
Moisture Content (%)	22.1
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	3.3×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	143B
Sample Number	CLB-CC-533
Location	42864N 44424E
Type of Sample	Tube
Depth/Elevation	1885.9
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	108.5
Percent of Max. Density	N/A
Moisture Content (%)	22.5
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	144A
Sample Number	CLB-CC-534
Location	42861N 44565E
Type of Sample	Tube
Depth/Elevation	1885.3
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	108.2
Percent of Max. Density	N/A
Moisture Content (%)	21.6
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.2×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	145B
Sample Number	CLB-CC-535
Location	42678N 44526E
Type of Sample	Tube
Depth/Elevation	1884.5
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	108.0
Percent of Max. Density	N/A
Moisture Content (%)	21.5
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.3×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

Braun Intertec Engineering, Inc.
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: January 29, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	146A	146B
Sample Number	CLB-CC-536	CLB-CC-536
Location	42672N 44343E	42672N 44343E
Type of Sample	Tube	Tube
Depth/Elevation	1884.9	1884.9
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head	Falling Head
Type of Specimen	Undisturbed	Undisturbed
Dry Density (pcf)	*	*
Percent of Max. Density	N/A	N/A
Moisture Content (%)	*	*
Max. Head Differential (ft)	3	3
Confining Pressure (effective-PSI)	4	4
Coefficient of Permeability (cm/sec)	*	*

REMARKS:

* Non-recoverable samples. Retested by CLB-CC-543.

P-L/146

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	R-146A
Sample Number	CLB-CC-543
Location	42672N 44343E
Type of Sample	Tube
Depth/Elevation	1884.9
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	107.7
Percent of Max. Density	N/A
Moisture Content (%)	21.5
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	4.8×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	147A
Sample Number	CLB-CC-537
Location	42671N 44163E
Type of Sample	Tube
Depth/Elevation	1885
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	105.6
Percent of Max. Density	N/A
Moisture Content (%)	22.7
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	7.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	148A
Sample Number	CLB-CC-549
Location	43373N 44781E
Type of Sample	Tube
Depth/Elevation	1887.5
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	106.9
Percent of Max. Density	N/A
Moisture Content (%)	20.3
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.1×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	149B
Sample Number	CLB-CC-550
Location	43224N 44756E
Type of Sample	Tube
Depth/Elevation	1886.5
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	107.6
Percent of Max. Density	N/A
Moisture Content (%)	21.1
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.2×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	150B
Sample Number	CLB-CC-551
Location	43067N 44738E
Type of Sample	Tube
Depth/Elevation	1885.9
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	105.8
Percent of Max. Density	N/A
Moisture Content (%)	19.1
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	151A
Sample Number	CLB-CC-552
Location	42916N 44728E
Type of Sample	Tube
Depth/Elevation	1884.8
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	105.8
Percent of Max. Density	N/A
Moisture Content (%)	20.0
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.7×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	152A
Sample Number	CLB-CC-553
Location	42763N 44720E
Type of Sample	Tube
Depth/Elevation	1883.5
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	103.1
Percent of Max. Density	N/A
Moisture Content (%)	21.8
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	153B
Sample Number	CLB-CC-570
Location	43326N 45526E
Type of Sample	Tube
Depth/Elevation	1886.7
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	111.9
Percent of Max. Density	N/A
Moisture Content (%)	16.3
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: January 28, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	154A	154B
Sample Number	CLB-CC-571	CLB-CC-571
Location	43163N 45516E	43163N 45516E
Type of Sample	Tube	Tube
Depth/Elevation	1885.9	1885.9
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)	Sandy Lean Clay (CL)

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head	Falling Head
Type of Specimen	Undisturbed	Undisturbed
Dry Density (pcf)	*	*
Percent of Max. Density	N/A	N/A
Moisture Content (%)	*	*
Max. Head Differential (ft)	3	3
Confining Pressure (effective-PSI)	4	4
Coefficient of Permeability (cm/sec)	*	*

REMARKS:

* Non-recoverable samples. Retested by CLB-CC-593.

P-L/154a/b

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	R-154A
Sample Number	CLB-CC-593
Location	43163N 45516E
Type of Sample	Tube
Depth/Elevation	1885.9
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	106.3
Percent of Max. Density	N/A
Moisture Content (%)	22.7
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	155A
Sample Number	CLB-CC-572
Location	42962N 45509E
Type of Sample	Tube
Depth/Elevation	1884.4
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	112.2
Percent of Max. Density	N/A
Moisture Content (%)	17
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.3×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-155a

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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	156B
Sample Number	CLB-CC-573
Location	43385N 45006E
Type of Sample	Tube
Depth/Elevation	1887.5
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	107.5
Percent of Max. Density	N/A
Moisture Content (%)	22.0
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.3×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-156b

BRAUN INTERTEC

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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	157B
Sample Number	CLB-CC-574
Location	43211N 45009E
Type of Sample	Tube
Depth/Elevation	1886.3
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	104.6
Percent of Max. Density	N/A
Moisture Content (%)	21.9
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	158A
Sample Number	CLB-CC-575
Location	43012N 45005E
Type of Sample	Tube
Depth/Elevation	1885
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	108.6
Percent of Max. Density	N/A
Moisture Content (%)	22.1
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.7×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	159A
Sample Number	CLB-CC-576
Location	42816N 44997E
Type of Sample	Tube
Depth/Elevation	1883.7
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	107.7
Percent of Max. Density	N/A
Moisture Content (%)	20.5
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.7×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	160A
Sample Number	CLB-CC-577
Location	42638N 44996E
Type of Sample	Tube
Depth/Elevation	1882.2
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	107.2
Percent of Max. Density	N/A
Moisture Content (%)	20.5
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	161A
Sample Number	CLB-CC-578
Location	43378N 45155E
Type of Sample	Tube
Depth/Elevation	1887.7
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	101
Percent of Max. Density	N/A
Moisture Content (%)	22.7
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	3.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

Braun Intertec Engineering, Inc.
913 South 18th Street
P.O. Box 2379
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701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	162A
Sample Number	CLB-CC-579
Location	43224N 45138E
Type of Sample	Tube
Depth/Elevation	1886.6
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	101.1
Percent of Max. Density	N/A
Moisture Content (%)	22.8
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	6.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	163A
Sample Number	CLB-CC-580
Location	43067N 45123E
Type of Sample	Tube
Depth/Elevation	1885.7
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	105.8
Percent of Max. Density	N/A
Moisture Content (%)	20.8
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.2×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	164A
Sample Number	CLB-CC-581
Location	42902N 45107E
Type of Sample	Tube
Depth/Elevation	1884.5
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	103.5
Percent of Max. Density	N/A
Moisture Content (%)	20.9
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

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Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	165A
Sample Number	CLB-CC-582
Location	42723N 45092E
Type of Sample	Tube
Depth/Elevation	1883.3
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	107.3
Percent of Max. Density	N/A
Moisture Content (%)	21.7
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.1×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

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Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	166A
Sample Number	CLB-CC-583
Location	42846N 45840E
Type of Sample	Tube
Depth/Elevation	1883.8
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	103.3
Percent of Max. Density	N/A
Moisture Content (%)	22.3
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
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REPORTED TO:

Cooperative Power Association
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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	167A
Sample Number	CLB-CC-584
Location	42666N 45833E
Type of Sample	Tube
Depth/Elevation	1882.6
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	104
Percent of Max. Density	N/A
Moisture Content (%)	25.3
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.3×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
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P-167a

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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	168B
Sample Number	CLB-CC-588
Location	43397N 45113E
Type of Sample	Tube
Depth/Elevation	1888.9
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	109.2
Percent of Max. Density	N/A
Moisture Content (%)	23.2
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	3.3×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-168b

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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	169A
Sample Number	CLB-CC-589
Location	43401N 44906E
Type of Sample	Tube
Depth/Elevation	1889
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	100
Percent of Max. Density	N/A
Moisture Content (%)	24.1
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
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PERMEABILITY TESTS

DATE: January 28, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	170A
Sample Number	CLB-CC-590
Location	43406N 44696E
Type of Sample	Tube
Depth/Elevation	1889
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	102.7
Percent of Max. Density	N/A
Moisture Content (%)	20.8
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
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P-L/170a

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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	171A
Sample Number	CLB-CC-591
Location	43196N 44683E
Type of Sample	Tube
Depth/Elevation	1887.5
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	105.9
Percent of Max. Density	N/A
Moisture Content (%)	20.9
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	172B
Sample Number	CLB-CC-592
Location	43191N 45104E
Type of Sample	Tube
Depth/Elevation	1887.4
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	104.7
Percent of Max. Density	N/A
Moisture Content (%)	24
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	4.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: January 28, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	173A	173B
Sample Number	CLB-CC-599	CLB-CC-599
Location	42999N 44687E	42999N 44687E
Type of Sample	Tube	Tube
Depth/Elevation	1886.3	1886.3
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head	Falling Head
Type of Specimen	Undisturbed	Undisturbed
Dry Density (pcf)	*	*
Percent of Max. Density	N/A	N/A
Moisture Content (%)	*	*
Max. Head Differential (ft)	3	3
Confining Pressure (effective-PSI)	4	4
Coefficient of Permeability (cm/sec)	*	*

REMARKS:

* Non-recoverable samples. Tested by CLB-CC-632 & 640

P-L/173

BRAUN INTERTEC ENGINEERING, INC.

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: February 10, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	R-173A	R-173B
Sample Number	CLB-CC-632	CLB-CC-632
Location	42999N 44687E	42999N 44687E
Type of Sample	Tube	Tube
Depth/Elevation	1886.3	1886.3
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)	Sandy Lean Clay (CL)

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head	Falling Head
Type of Specimen	Undisturbed	Undisturbed
Dry Density (pcf)	*	*
Percent of Max. Density	N/A	N/A
Moisture Content (%)	*	*
Max. Head Differential (ft)	3	3
Confining Pressure (effective-PSI)	4	4
Coefficient of Permeability (cm/sec)	*	*

REMARKS:

* - Non-recoverable samples.
Retested by CLB-CC-640

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	R-173A
Sample Number	CLB-CC-640
Location	42999N 44687E
Type of Sample	Tube
Depth/Elevation	1886.3
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	107.3
Percent of Max. Density	N/A
Moisture Content (%)	21.1
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	4.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

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Attn: Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	174A
Sample Number	CLB-CC-600
Location	42995N 44904E
Type of Sample	Tube
Depth/Elevation	1886.1
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	106.4
Percent of Max. Density	N/A
Moisture Content (%)	21.5
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.0×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
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PERMEABILITY TESTS

DATE: January 28, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	175A	175B
Sample Number	CLB-CC-601	CLB-CC-601
Location	42991N 45086E	42991N 45086E
Type of Sample	Tube	Tube
Depth/Elevation	1886	1886
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL), olive brown	Sandy Lean Clay (CL), olive brown

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head	Falling Head
Type of Specimen	Undisturbed	Undisturbed
Dry Density (pcf)	*	*
Percent of Max. Density	N/A	N/A
Moisture Content (%)	*	*
Max. Head Differential (ft)	3	3
Confining Pressure (effective-PSI)	4	4
Coefficient of Permeability (cm/sec)	*	*

REMARKS:

* Non-recoverable samples. Retested by CLB-CC-627

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BRAUN INTERTEC ENGINEERING, INC.

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DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	R-175B
Sample Number	CLB-CC-627
Location	42991N 45086E
Type of Sample	Tube
Depth/Elevation	1886
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	104.2
Percent of Max. Density	N/A
Moisture Content (%)	22.4
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1×10^{-7}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	176B
Sample Number	CLB-CC-602
Location	43109N 44889E
Type of Sample	Tube
Depth/Elevation	1887.3
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	105
Percent of Max. Density	N/A
Moisture Content (%)	20.8
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	3.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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913 South 18th Street
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Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	177B
Sample Number	CLB-CC-603
Location	42821N 44667E
Type of Sample	Tube
Depth/Elevation	1885.5
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	103.8
Percent of Max. Density	N/A
Moisture Content (%)	24.1
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

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COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	178B
Sample Number	CLB-CC-604
Location	42810N 44866E
Type of Sample	Tube
Depth/Elevation	1885.6
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	105.4
Percent of Max. Density	N/A
Moisture Content (%)	22.1
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.4×10^{-8}

REMARKS:

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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	179B
Sample Number	CLB-CC-605
Location	42799N 45046E
Type of Sample	Tube
Depth/Elevation	1885.4
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	102.1
Percent of Max. Density	N/A
Moisture Content (%)	23.5
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.5×10^{-8}

REMARKS:

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COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	180B
Sample Number	CLB-CC-610
Location	42608N 45072E
Type of Sample	Tube
Depth/Elevation	1883.8
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	102.6
Percent of Max. Density	N/A
Moisture Content (%)	22.1
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.6×10^{-8}

REMARKS:

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SAMPLE DATA:

Shelby Tube Number	181A
Sample Number	CLB-CC-611
Location	42611N 44886E
Type of Sample	Tube
Depth/Elevation	1884
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	101.6
Percent of Max. Density	N/A
Moisture Content (%)	24.8
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.4×10^{-8}

REMARKS:

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EP #93

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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	182A
Sample Number	CLB-CC-612
Location	42612N 44652E
Type of Sample	Tube
Depth/Elevation	1884
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	110.2
Percent of Max. Density	N/A
Moisture Content (%)	19
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.6×10^{-8}

REMARKS:

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PERMEABILITY TESTS

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REPORTED TO:

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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	183A
Sample Number	CLB-CC-641
Location	43343N 45338E
Type of Sample	Tube
Depth/Elevation	1887.5
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	112.8
Percent of Max. Density	N/A
Moisture Content (%)	18.7
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.3×10^{-8}

REMARKS:

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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	184A
Sample Number	CLB-CC-642
Location	43160N 45327E
Type of Sample	Tube
Depth/Elevation	1885.8
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	110.9
Percent of Max. Density	N/A
Moisture Content (%)	19.3
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.1×10^{-8}

REMARKS:

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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	185A
Sample Number	CLB-CC-643
Location	42969N 45315E
Type of Sample	Tube
Depth/Elevation	1884.7
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	105.8
Percent of Max. Density	N/A
Moisture Content (%)	25.1
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.6×10^{-8}

REMARKS:

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Eden Prairie, MN 55344-2287

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SAMPLE DATA:

Shelby Tube Number	186A
Sample Number	CLB-CC-644
Location	42780N 45305E
Type of Sample	Tube
Depth/Elevation	1883.5
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	101.5
Percent of Max. Density	N/A
Moisture Content (%)	21.2
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.4×10^{-8}

REMARKS:

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Cooperative Power Association
Attn: Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	187A
Sample Number	CLB-CC-645
Location	42615N 45297E
Type of Sample	Tube
Depth/Elevation	1882.4
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	110.2
Percent of Max. Density	N/A
Moisture Content (%)	21
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.3×10^{-8}

REMARKS:

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Operations Manager

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DATE: December 29, 1992

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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	188A
Sample Number	CLB-CC-646
Location	42871N 45536E
Type of Sample	Tube
Depth/Elevation	1884.3
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	113.4
Percent of Max. Density	N/A
Moisture Content (%)	18.7
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.3×10^{-8}

REMARKS:

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EP #93

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COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	189B
Sample Number	CLB-CC-647
Location	42638N 45527E
Type of Sample	Tube
Depth/Elevation	1883
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	111.2
Percent of Max. Density	N/A
Moisture Content (%)	20.0
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

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Operations Manager

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: February 10, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	190B
Sample Number	CLB-CC-648
Location	43408N 45272E
Type of Sample	Tube
Depth/Elevation	1888.8
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	105.7
Percent of Max. Density	N/A
Moisture Content (%)	21.7
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	191B
Sample Number	CLB-CC-649
Location	43213N 45253E
Type of Sample	Tube
Depth/Elevation	1887.4
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	103.4
Percent of Max. Density	N/A
Moisture Content (%)	23.3
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	4.5×10^{-8}

REMARKS:

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PERMEABILITY TESTS

DATE: December 29, 1992

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Cooperative Power Association
Attn: Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	192A
Sample Number	CLB-CC-650
Location	43040N 45238E
Type of Sample	Tube
Depth/Elevation	1886.4
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	105.8
Percent of Max. Density	N/A
Moisture Content (%)	23.4
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.3×10^{-8}

REMARKS:

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Operations Manager

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EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	193A
Sample Number	CLB-CC-651
Location	43410N 45475E
Type of Sample	Tube
Depth/Elevation	1888.5
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	106.2
Percent of Max. Density	N/A
Moisture Content (%)	23.5
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.5×10^{-8}

REMARKS:

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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	194B
Sample Number	CLB-CC-652
Location	43202N 45458E
Type of Sample	Tube
Depth/Elevation	1887.4
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	108
Percent of Max. Density	N/A
Moisture Content (%)	21.8
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
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P-194b

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REPORTED TO:

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COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	195A
Sample Number	CLB-CC-653
Location	43031N 45443E
Type of Sample	Tube
Depth/Elevation	1886.5
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	101.2
Percent of Max. Density	N/A
Moisture Content (%)	24
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

Braun Intertec Engineering, Inc.
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	196A
Sample Number	CLB-CC-654
Location	42807N 45749E
Type of Sample	Tube
Depth/Elevation	1885
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	104.8
Percent of Max. Density	N/A
Moisture Content (%)	21.9
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	197A
Sample Number	CLB-CC-655
Location	42663N 45746E
Type of Sample	Tube
Depth/Elevation	1883.7
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	104.2
Percent of Max. Density	N/A
Moisture Content (%)	22.3
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	198A
Sample Number	CLB-CC-656
Location	42607N 45611E
Type of Sample	Tube
Depth/Elevation	1883.2
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	103.2
Percent of Max. Density	N/A
Moisture Content (%)	23.8
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.



Gerald L. Dauer, C.E.T.
Operations Manager

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P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: February 10, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	199A	199B
Sample Number	CLB-CC-657	CLB-CC-657
Location	42796N 45598E	42796N 45598E
Type of Sample	Tube	Tube
Depth/Elevation	1885.2	1885.2
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)	Sandy Lean Clay (CL)

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head	Falling Head
Type of Specimen	Undisturbed	Undisturbed
Dry Density (pcf)	*	*
Percent of Max. Density	N/A	N/A
Moisture Content (%)	*	*
Max. Head Differential (ft)	3	3
Confining Pressure (effective-PSI)	4	4
Coefficient of Permeability (cm/sec)	*	*

REMARKS:

* Non-recoverable samples.
Retested by CLB-CC-662.

P-657

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

Braun Intertec Engineering, Inc.
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: February 10, 1993

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	R199A
Sample Number	CLB-CC-662
Location	42796N 45598E
Type of Sample	Tube
Depth/Elevation	1895.2
Soil Classification (ASTM D 2487)	Sandy Lean Clay (CL)

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	107.5
Percent of Max. Density	N/A
Moisture Content (%)	21.1
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.7×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

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913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	200A
Sample Number	CLB-CC-658
Location	42690N 45405E
Type of Sample	Tube
Depth/Elevation	1884.2
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	102.5
Percent of Max. Density	N/A
Moisture Content (%)	21.2
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.2×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	201A
Sample Number	CLB-CC-659
Location	42687N 45202E
Type of Sample	Tube
Depth/Elevation	1884.2
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	104.7
Percent of Max. Density	N/A
Moisture Content (%)	21.3
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

Braun Intertec Engineering, Inc.
913 South 18th Street
P.O. Box 2379
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701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	202
Sample Number	CLB-CC-660
Location	42856N 45410E
Type of Sample	Tube
Depth/Elevation	1885.5
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	104
Percent of Max. Density	N/A
Moisture Content (%)	22.7
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: December 29, 1992

PROJECT: BFDX-92-017C
EP #93

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	203A
Sample Number	CLB-CC-661
Location	42849N 45212E
Type of Sample	Tube
Depth/Elevation	1885.3
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY RELATION OF SOIL:

Method	ASTM D 698
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	109.4
Percent of Max. Density	N/A
Moisture Content (%)	18.3
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN[SM]
INTERTEC

Summary of 1993 Test Results
EP #93
Cooperative Power Association

Coal Creek Station
Underwood, North Dakota

Hydrometers
Atterbergs

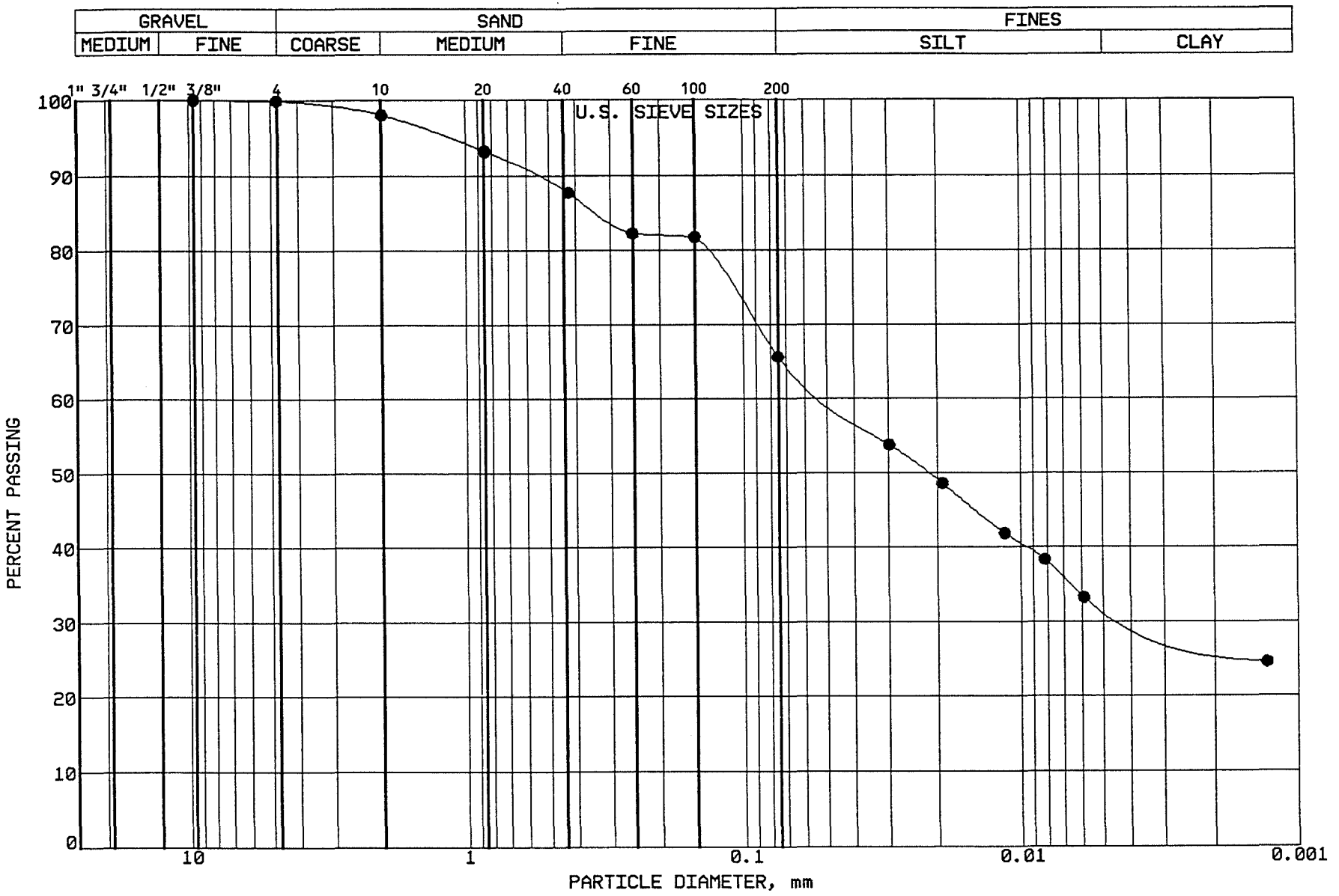
Project Number BFAX-92-017C

Braun Intertec Engineering, Inc.
April 2, 1993

Engineers and Scientists
Serving the Built and
Natural Environments

HYDROMETERS AND ATTERBERGS
(01 thru 332)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43482.0, E 46606.0
SAMPLE: CC-01 TUBE #: TP-2
ELEVATION: 1-10'

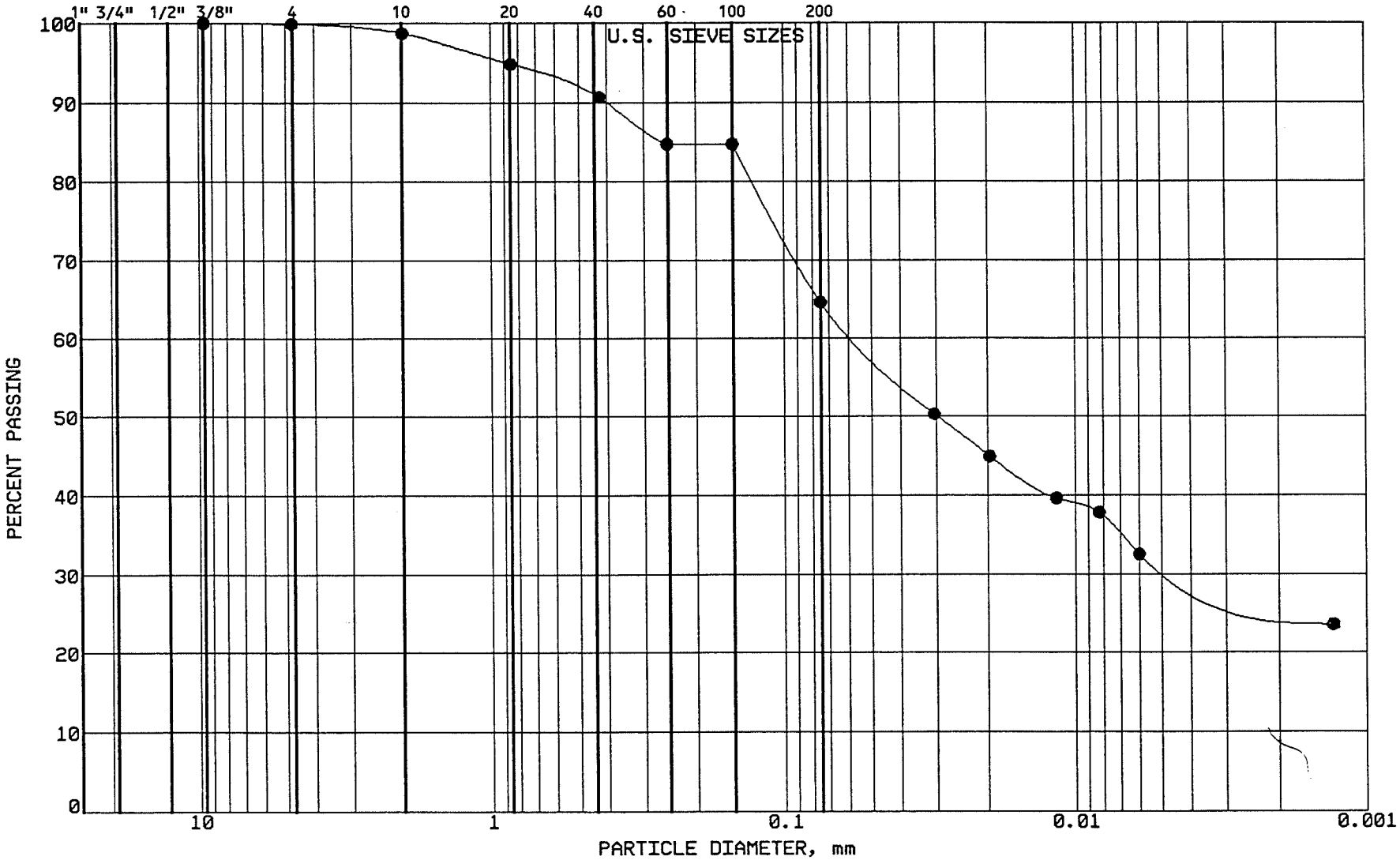
GRAVEL	0.1 %
SAND	34.3 %
SILT	33.3 %
CLAY	32.3 %
P 200	65.6 %

SOIL PROPERTIES

LL: 37.0%
PL: 15.0%
PI: 22.0%
CLASS: SANDY LEAN CLAY (CL)ol. br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43482.0, E 46606.0
SAMPLE: CC-02 TUBE #: TP-2
ELEVATION: 1-10'

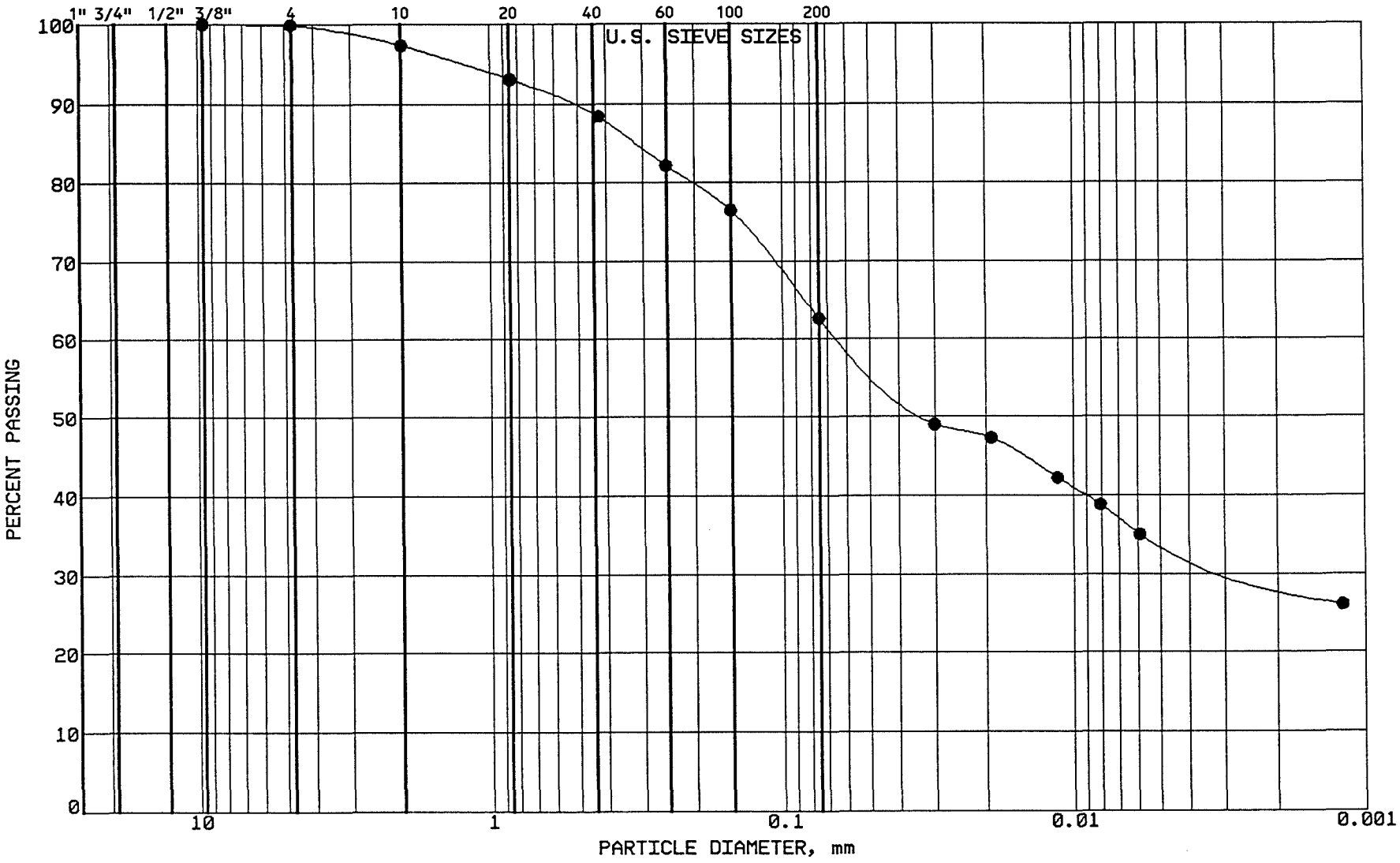
GRAVEL	0.1 %
SAND	35.3 %
SILT	33.2 %
CLAY	31.4 %
P 200	64.6 %

SOIL PROPERTIES

LL: 42.0%
PL: 16.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

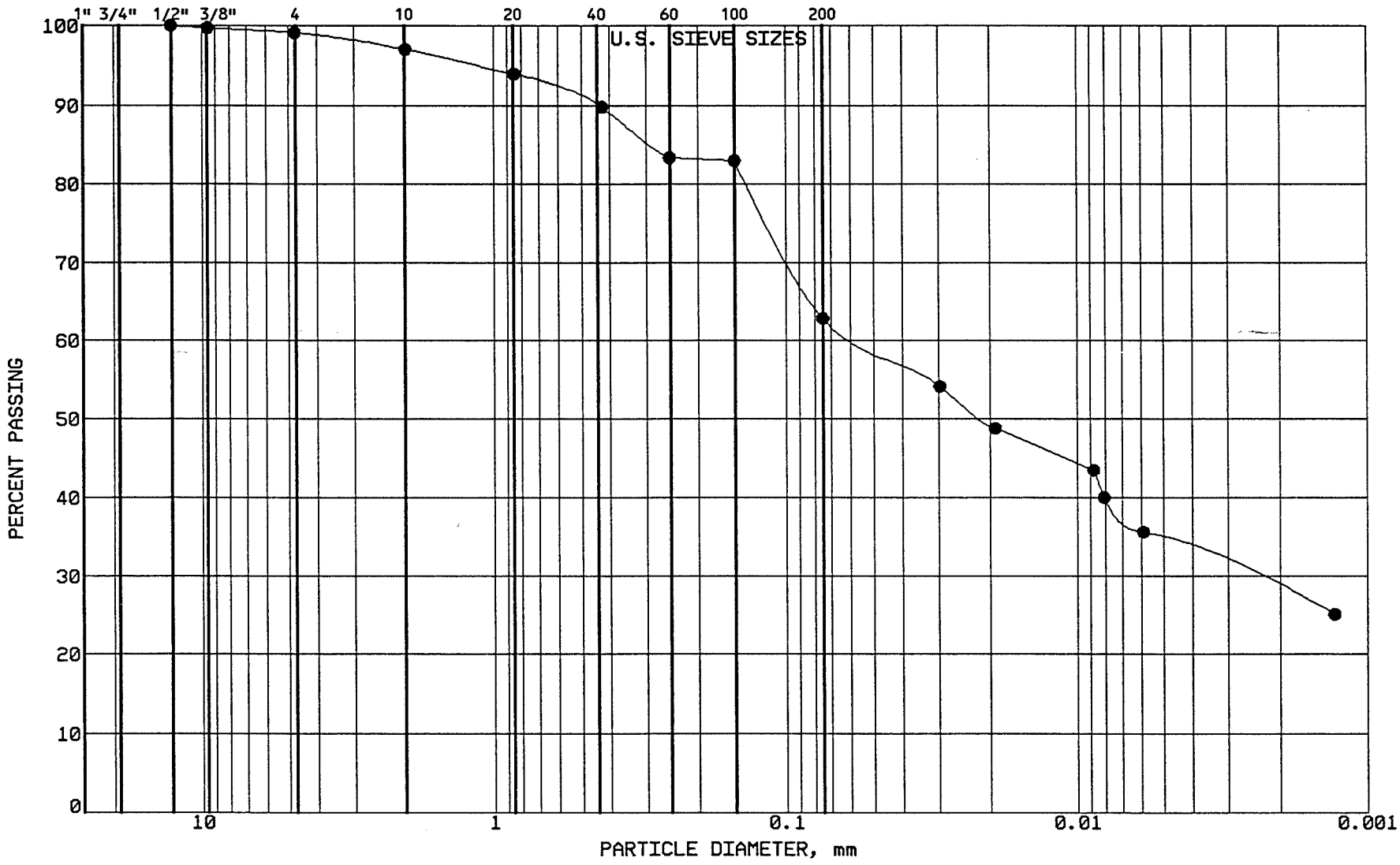
LOCATION: N 43251.0, E 46633.0
SAMPLE: CC-03 TUBE #: TP-3
ELEVATION: 1-10'

GRAVEL	0.1 %
SAND	37.3 %
SILT	28.5 %
CLAY	34.1 %
P 200	62.6 %

SOIL PROPERTIES

LL: 39.0%
PL: 15.0%
PI: 24.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

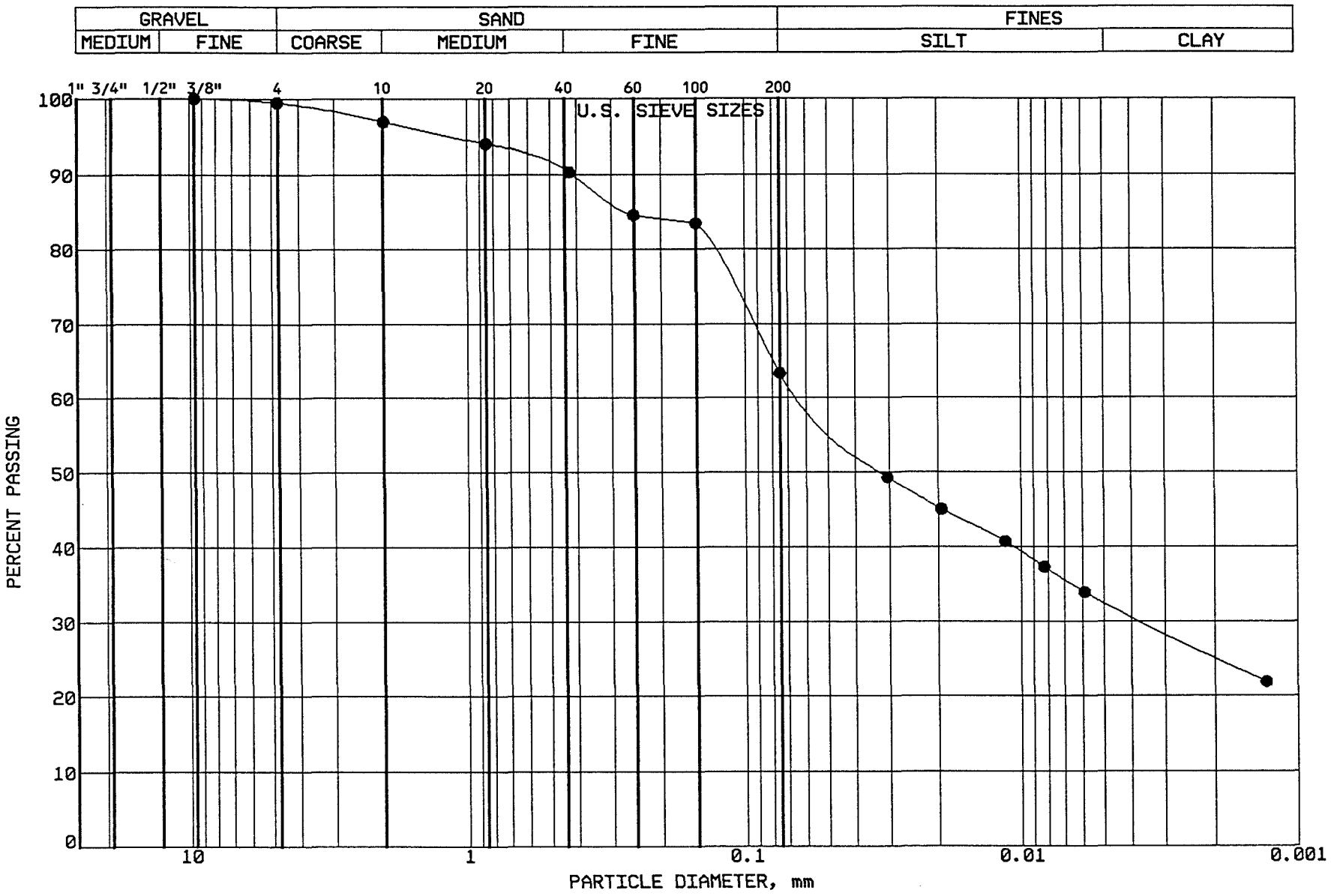
LOCATION: N 43251.0, E 46633.0
SAMPLE: CC-04 TUBE #: TP-3
ELEVATION: 1-10'

GRAVEL	0.9 %
SAND	36.3 %
SILT	28.3 %
CLAY	34.5 %
P 200	62.8 %

SOIL PROPERTIES

LL: 41.0%
PL: 16.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43205.0, E 46390.0
SAMPLE: CC-05 TUBE #: TP-4
ELEVATION: 1-10'

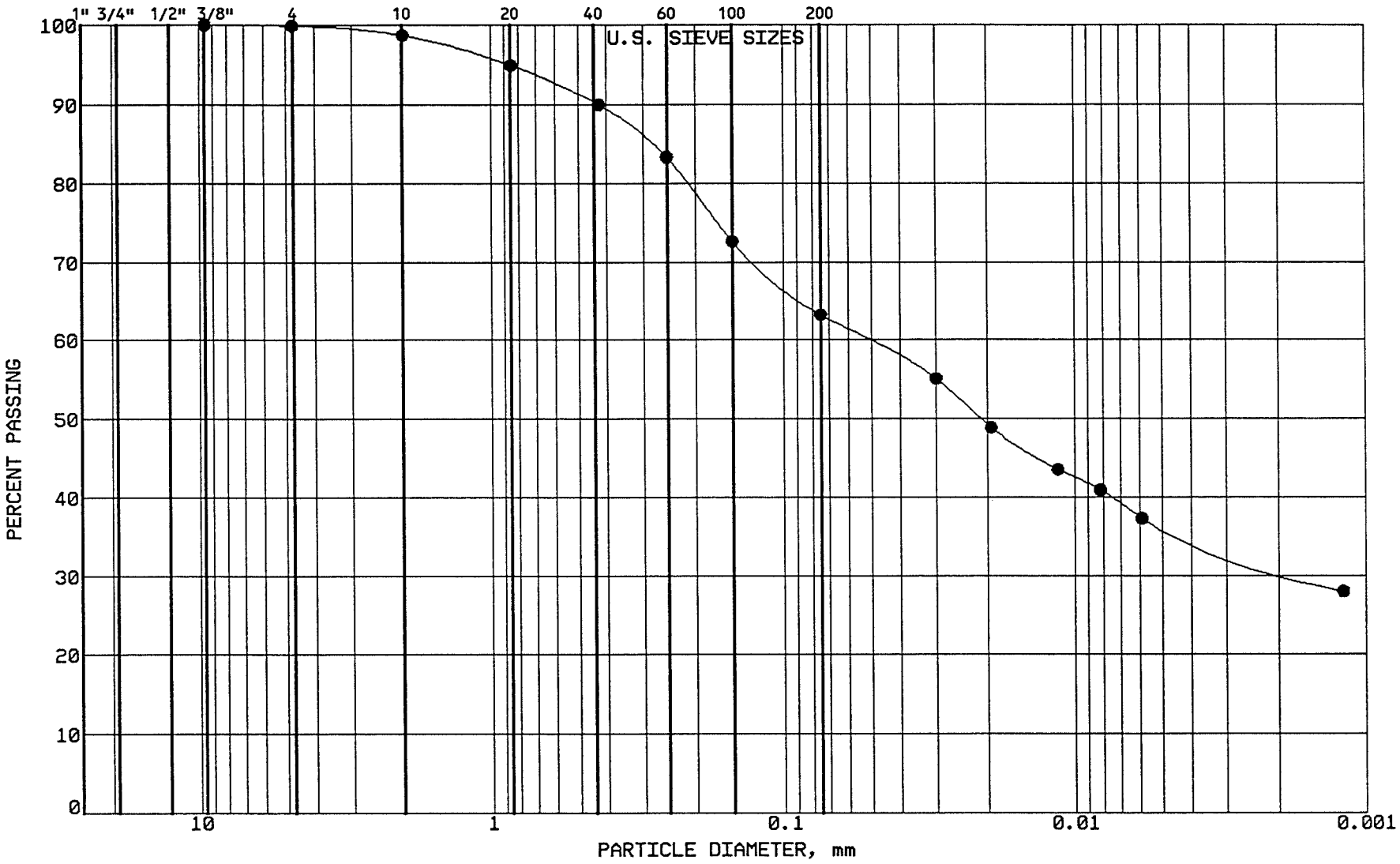
GRAVEL	0.5 %
SAND	36.2 %
SILT	30.7 %
CLAY	32.6 %
P 200	63.3 %

SOIL PROPERTIES

LL: 39.0%
PL: 16.0%
PI: 23.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

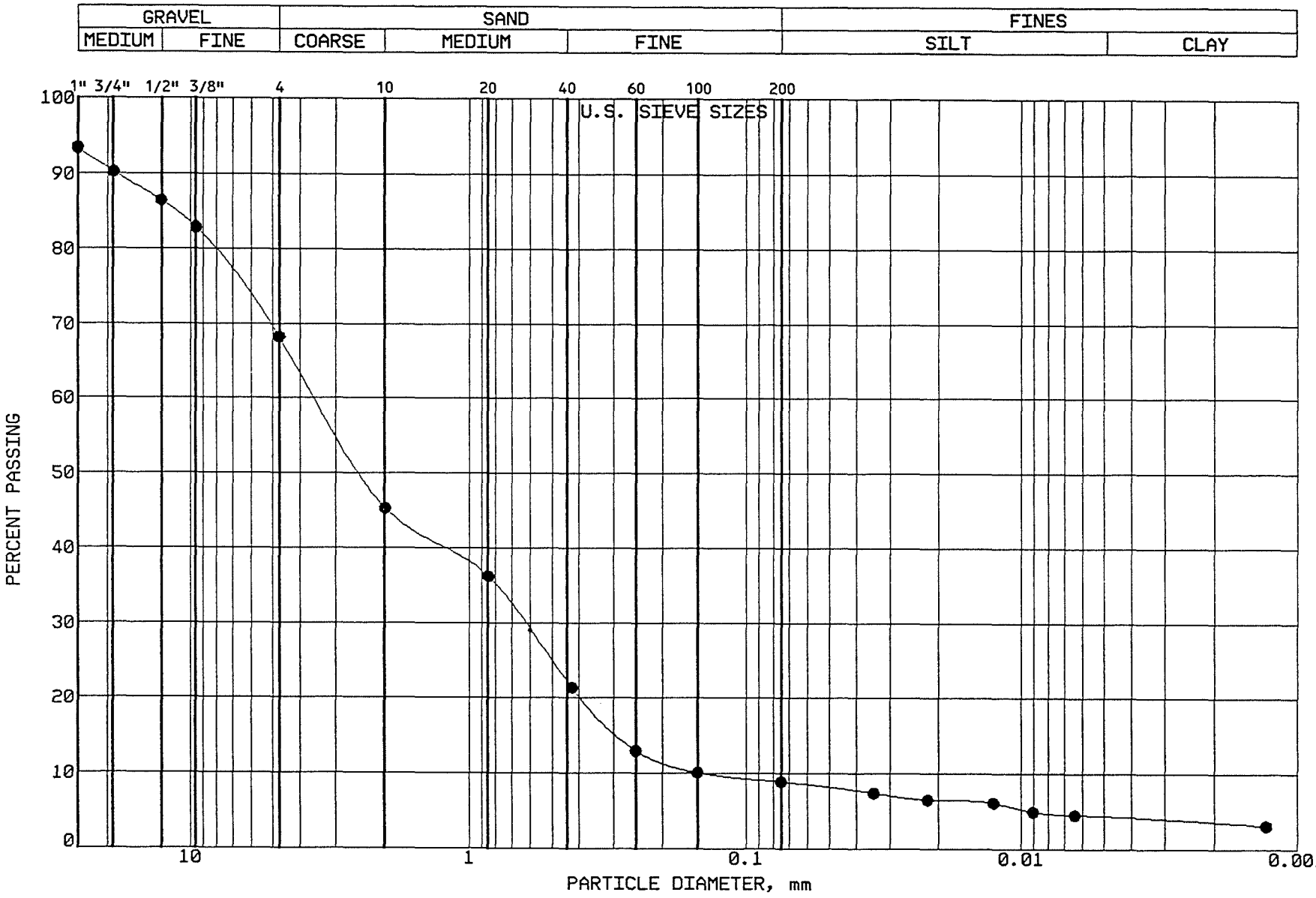
LOCATION: N 43441.0, E 45803.0
SAMPLE: SG-CC-06 TUBE #:
ELEVATION: 1885.4'

GRAVEL	0.1 %
SAND	36.7 %
SILT	26.9 %
CLAY	36.3 %
P 200	63.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

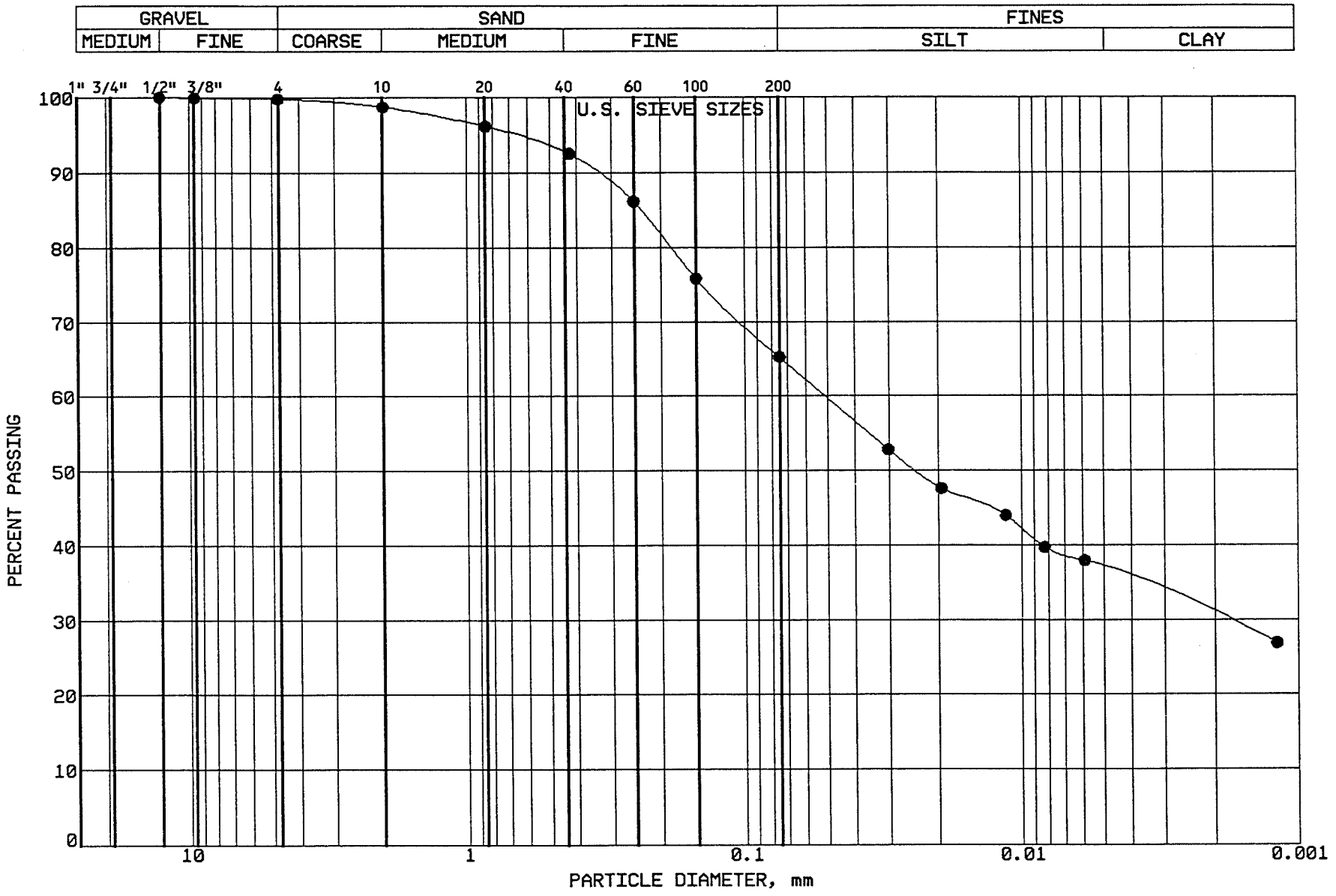
LOCATION: N 43442.0, E 45505.0
SAMPLE: SG-CC-07 TUBE #:
ELEVATION: 1886.0'

GRAVEL	31.8 %
SAND	59.3 %
SILT	4.6 %
CLAY	4.3 %
P 200	8.9 %

SOIL PROPERTIES

LL: NP%
PL: NP%
PI: NP%
CLASS: POORLY GR SAND/W GR (SP) lt ol gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

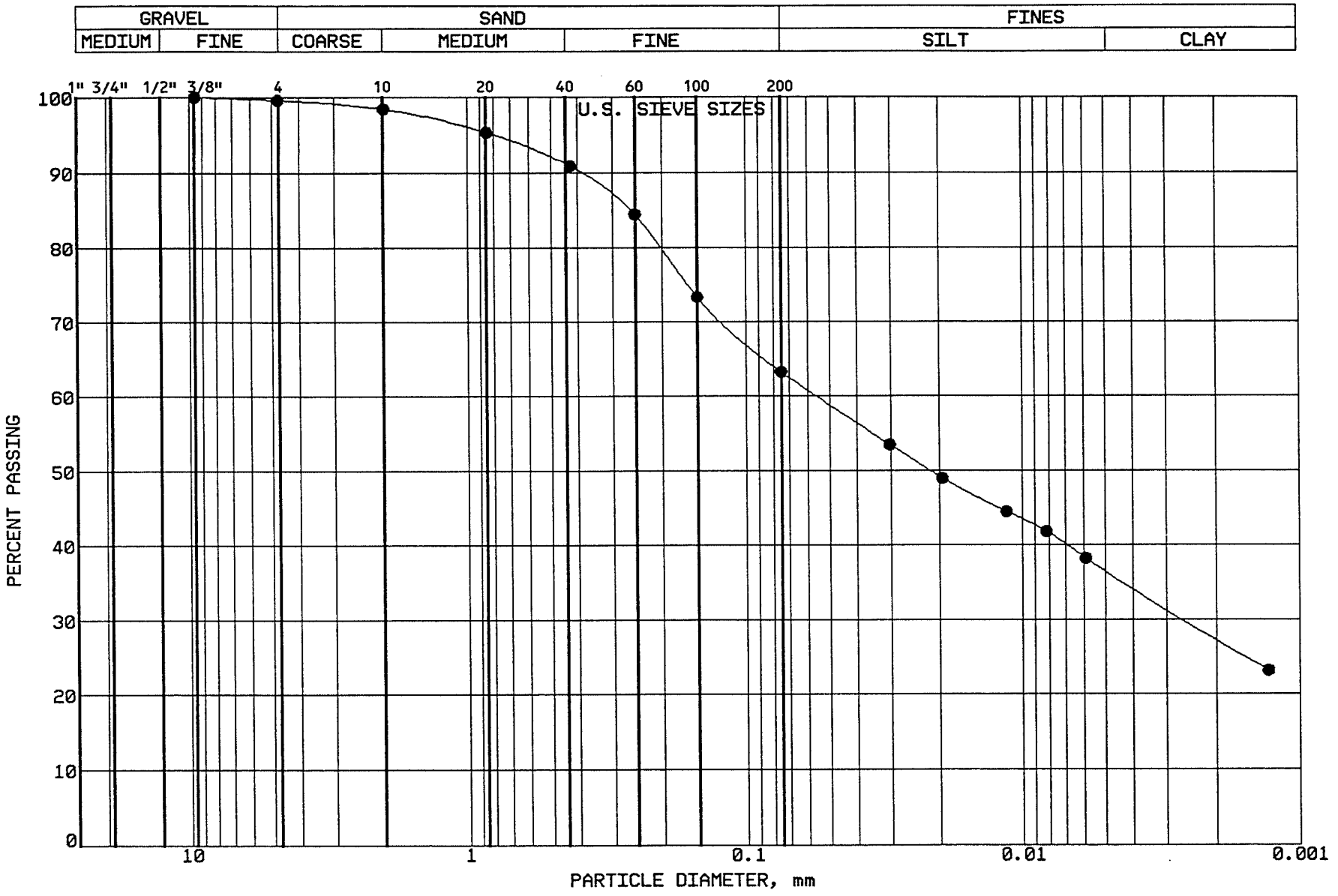
LOCATION: N 43444.0, E 45308.0
SAMPLE: SG-CC-08 TUBE #:
ELEVATION: 1886.3'

GRAVEL	0.2 %
SAND	34.6 %
SILT	28.4 %
CLAY	36.8 %
P 200	65.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

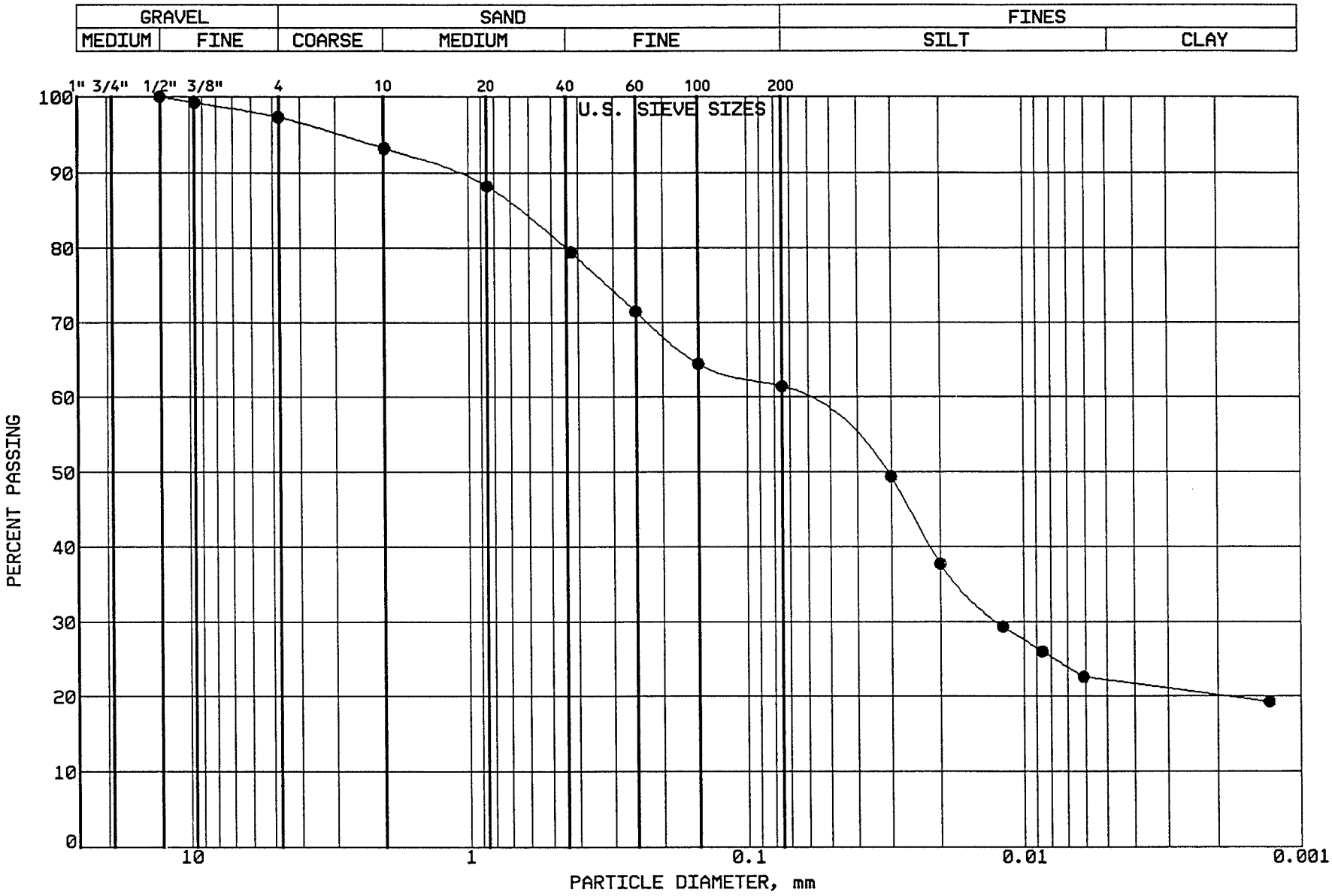
LOCATION: N 43444.0, E 45100.0
SAMPLE: SG-CC-09 TUBE #:
ELEVATION: 1885.4'

GRAVEL	0.4 %
SAND	36.4 %
SILT	26.6 %
CLAY	36.6 %
P 200	63.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43443.0, E 44904.0
SAMPLE: SG-CC-10 TUBE #:
ELEVATION: 1884.9'

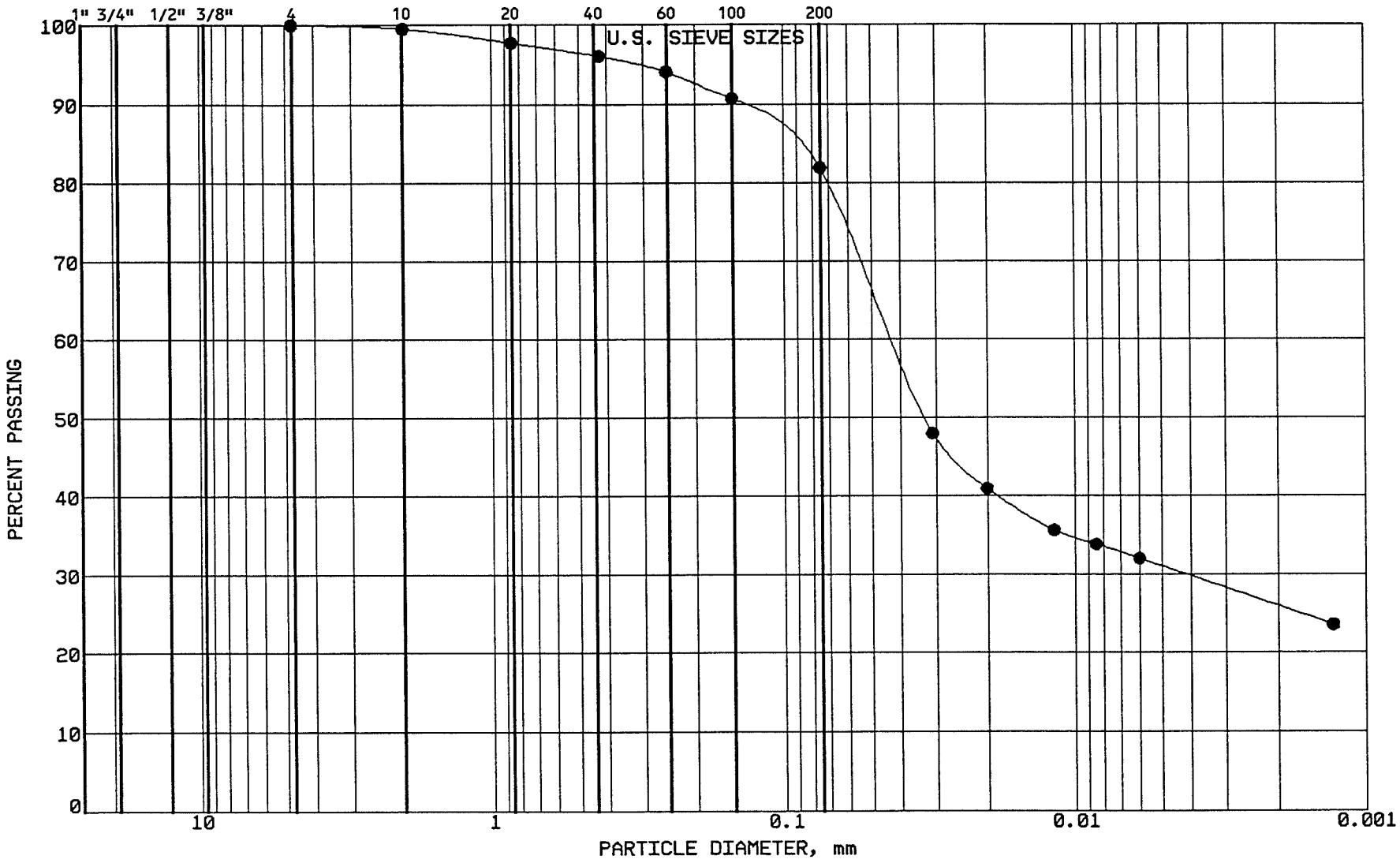
GRAVEL	2.7 %
SAND	35.9 %
SILT	39.2 %
CLAY	22.2 %
P 200	61.4 %

SOIL PROPERTIES

LL: 36.0%
PL: 17.0%
PI: 19.0%
CLASS: SANDY LEAN CLAY (CL) vy dk gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

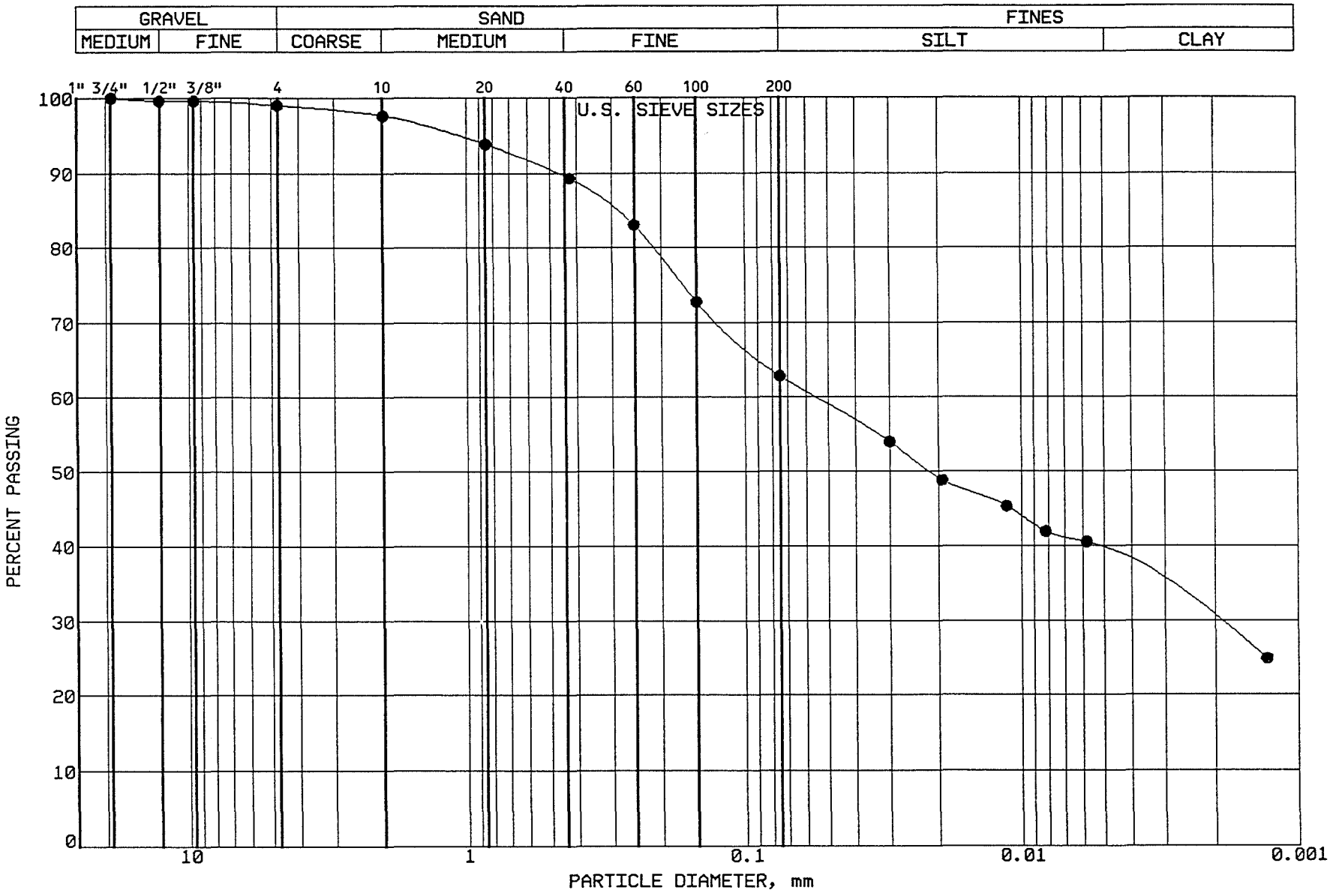
LOCATION: N 43336.0, E 45928.0
SAMPLE: SG-CC-11 TUBE #:
ELEVATION: 1885.1'

GRAVEL	0.0 %
SAND	18.1 %
SILT	50.9 %
CLAY	31.0 %
P 200	81.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: LEAN CLAY W SAND (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43149.0, E 45932.0
SAMPLE: SG-CC-12 TUBE #:
ELEVATION: 1884.5'

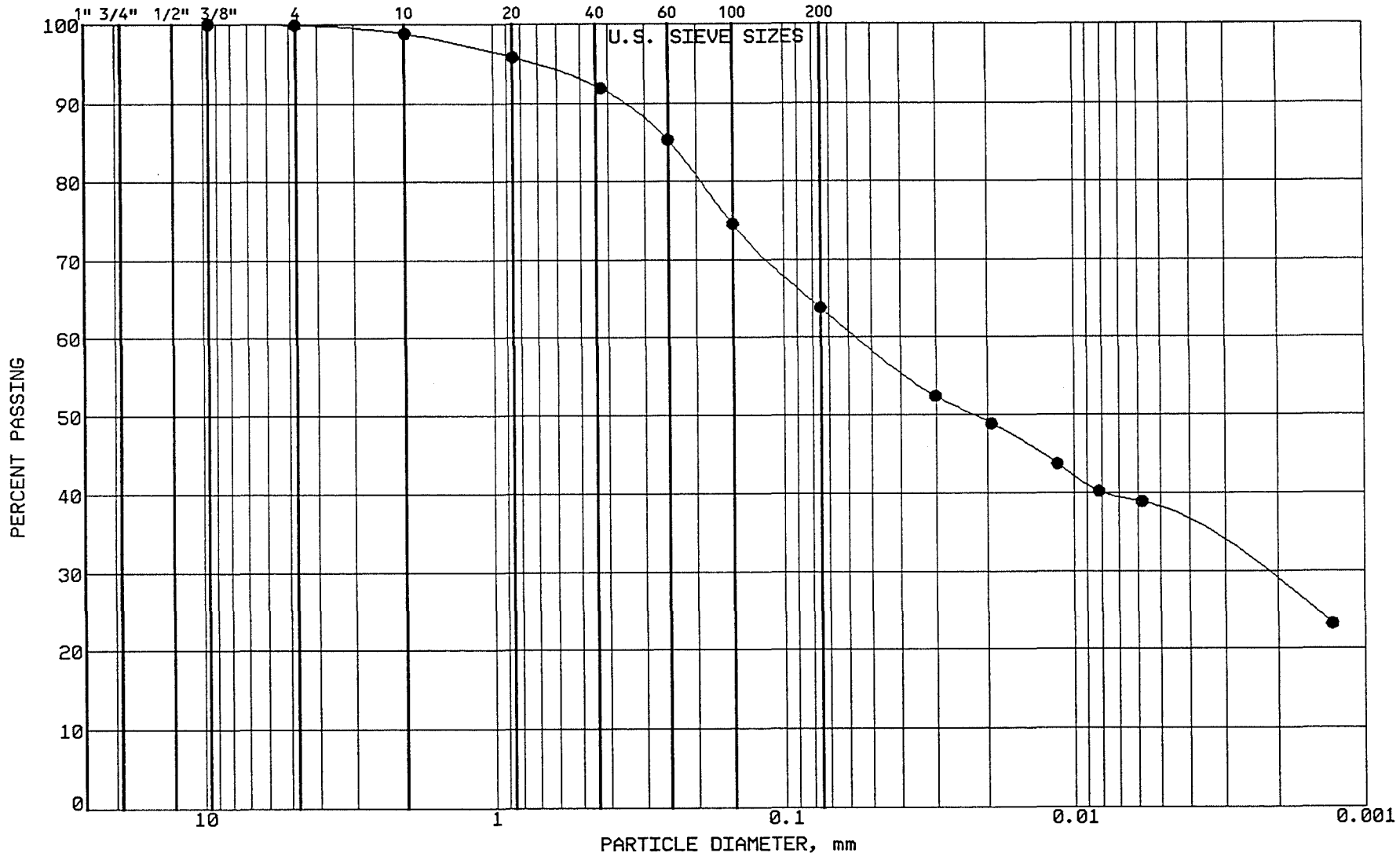
GRAVEL	1.0 %
SAND	36.2 %
SILT	23.8 %
CLAY	39.0 %
P 200	62.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

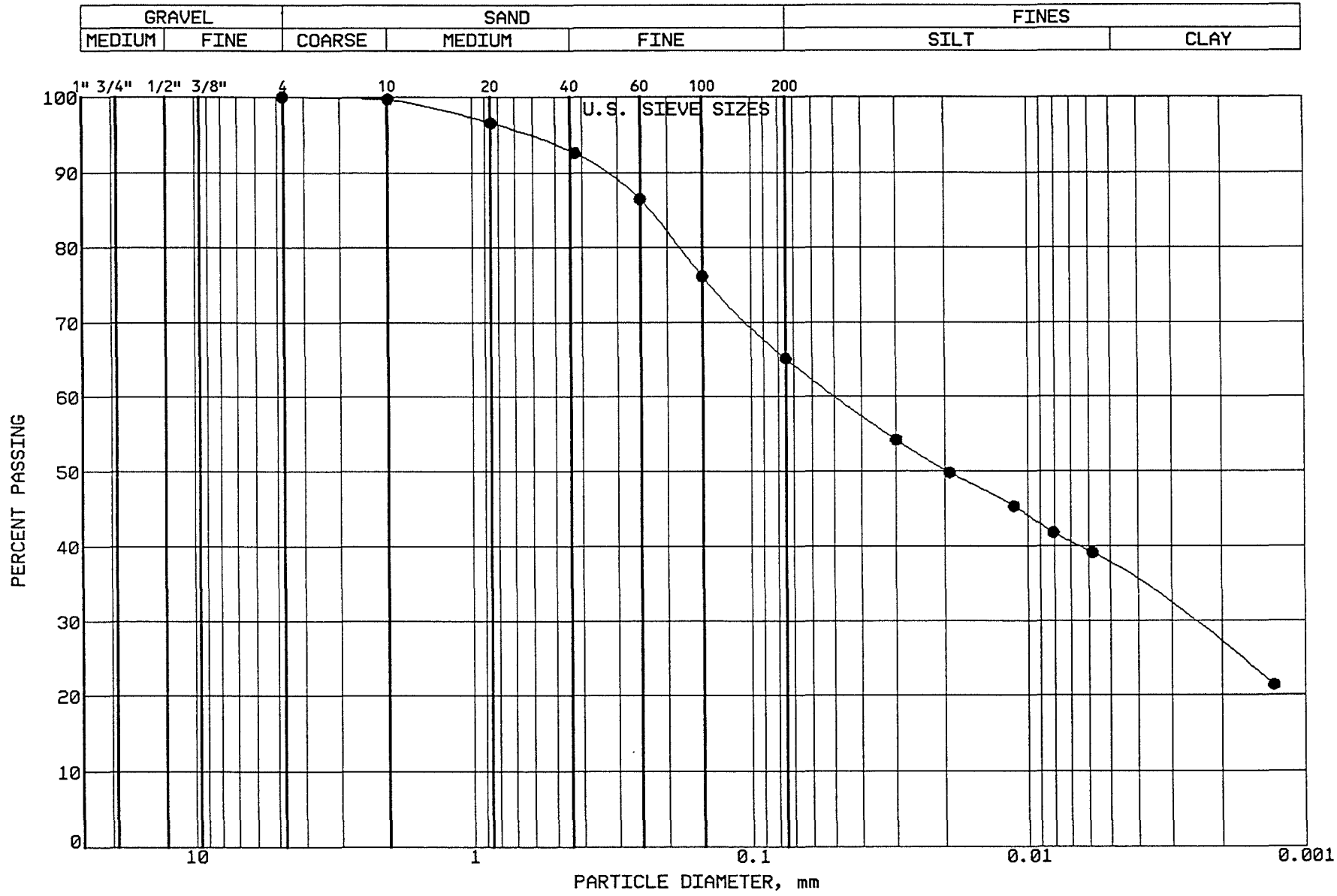
LOCATION: N 42955.0, E 45931.0
SAMPLE: SG-CC-13 TUBE #:
ELEVATION: 1883.3'

GRAVEL	0.1 %
SAND	36.1 %
SILT	26.5 %
CLAY	37.3 %
P 200	63.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

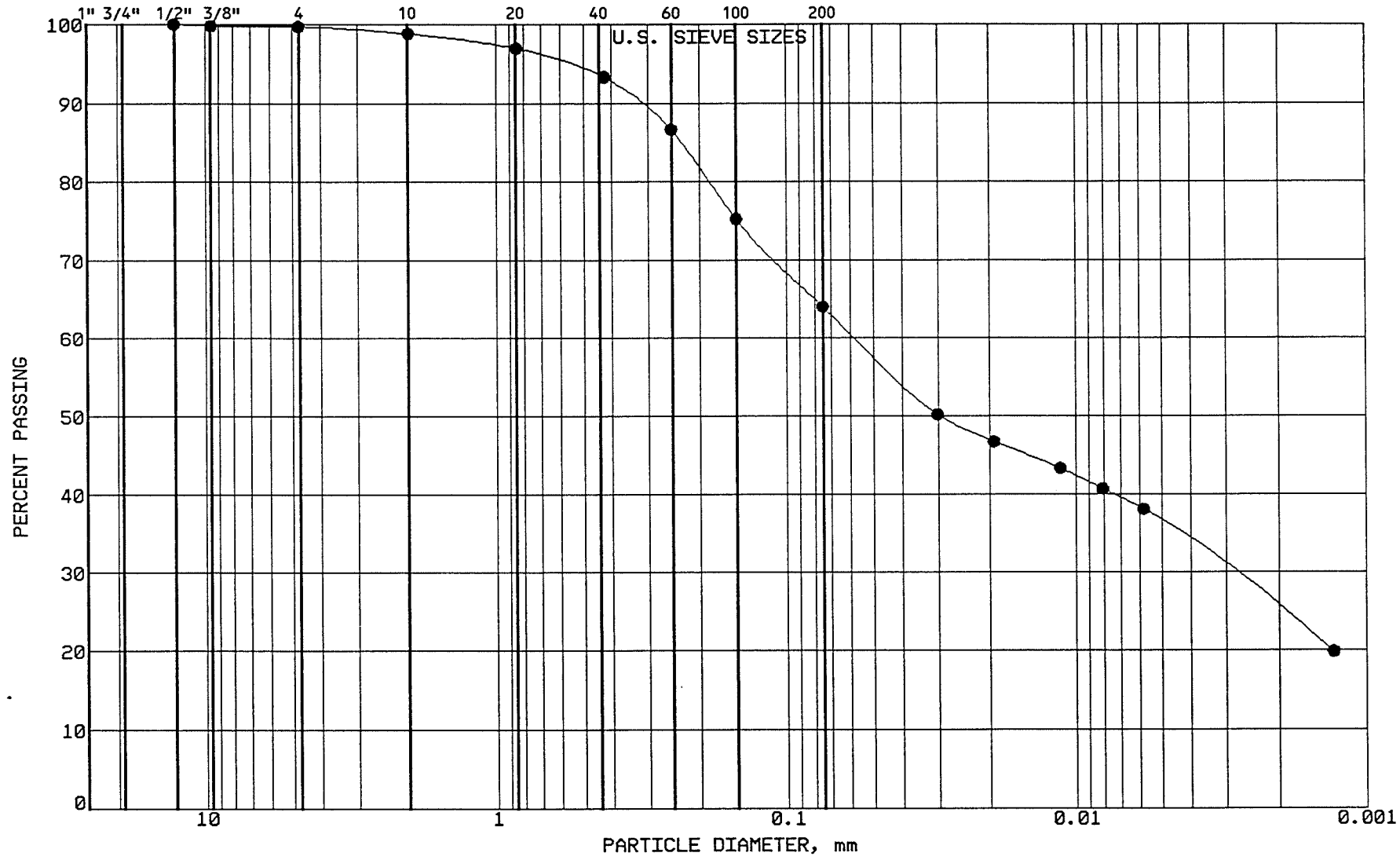
LOCATION: N 42767.0, E 45928.0
SAMPLE: SGCC014 TUBE #:
ELEVATION: 1882.2'

GRAVEL	0.0 %
SAND	34.9 %
SILT	27.8 %
CLAY	37.3 %
P 200	65.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

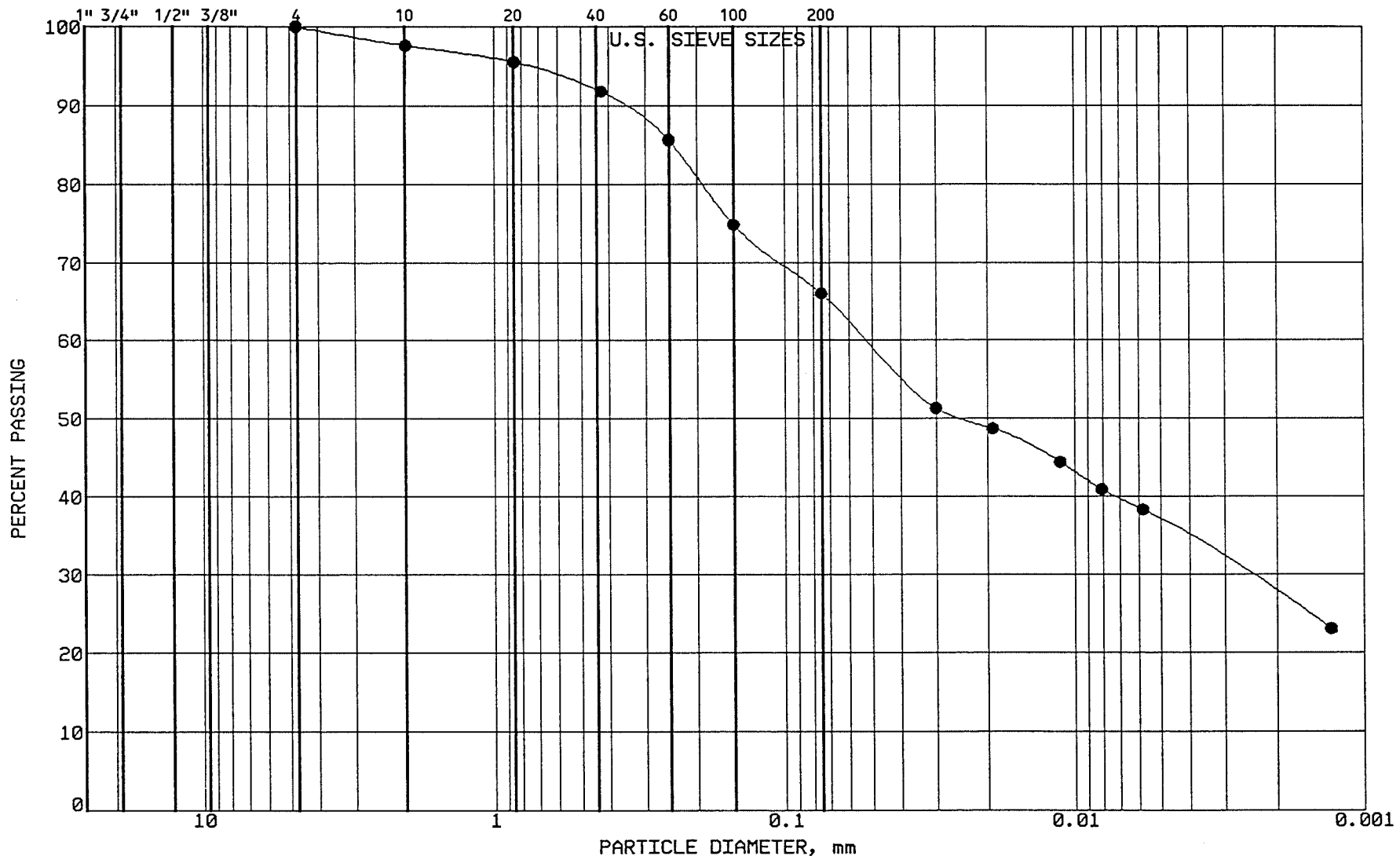
LOCATION: N 42603.0, E 45921.0
SAMPLE: SGCC015 TUBE #:
ELEVATION: 1880.8'

GRAVEL	0.3 %
SAND	35.7 %
SILT	27.7 %
CLAY	36.3 %
P 200	64.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43448.0, E 45495.0
SAMPLE: CLSCC016 TUBE #:
ELEVATION: 1887.6'

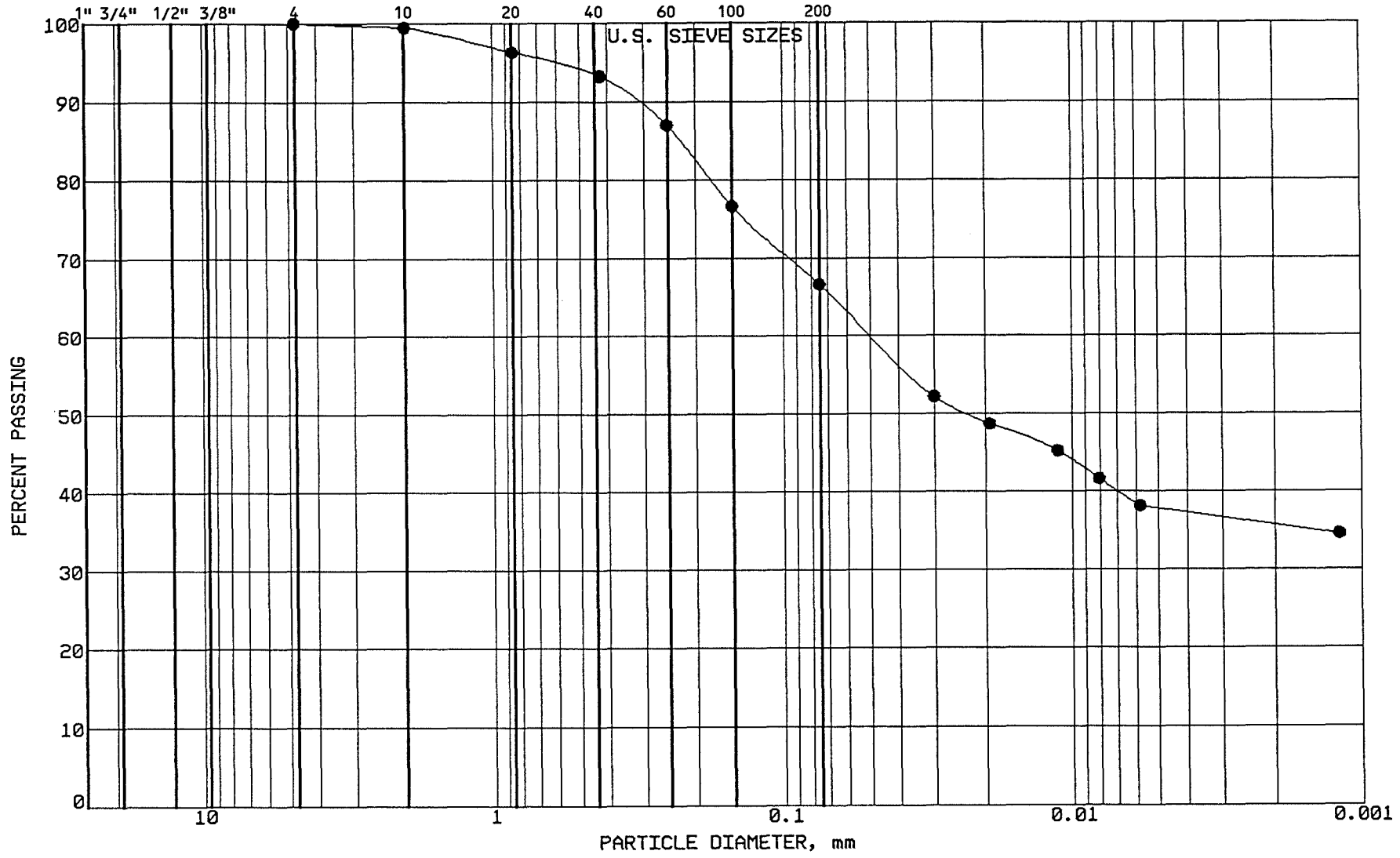
GRAVEL	0.0 %
SAND	34.0 %
SILT	29.2 %
CLAY	36.8 %
P 200	66.0 %

SOIL PROPERTIES

LL: 41.0%
PL: 14.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

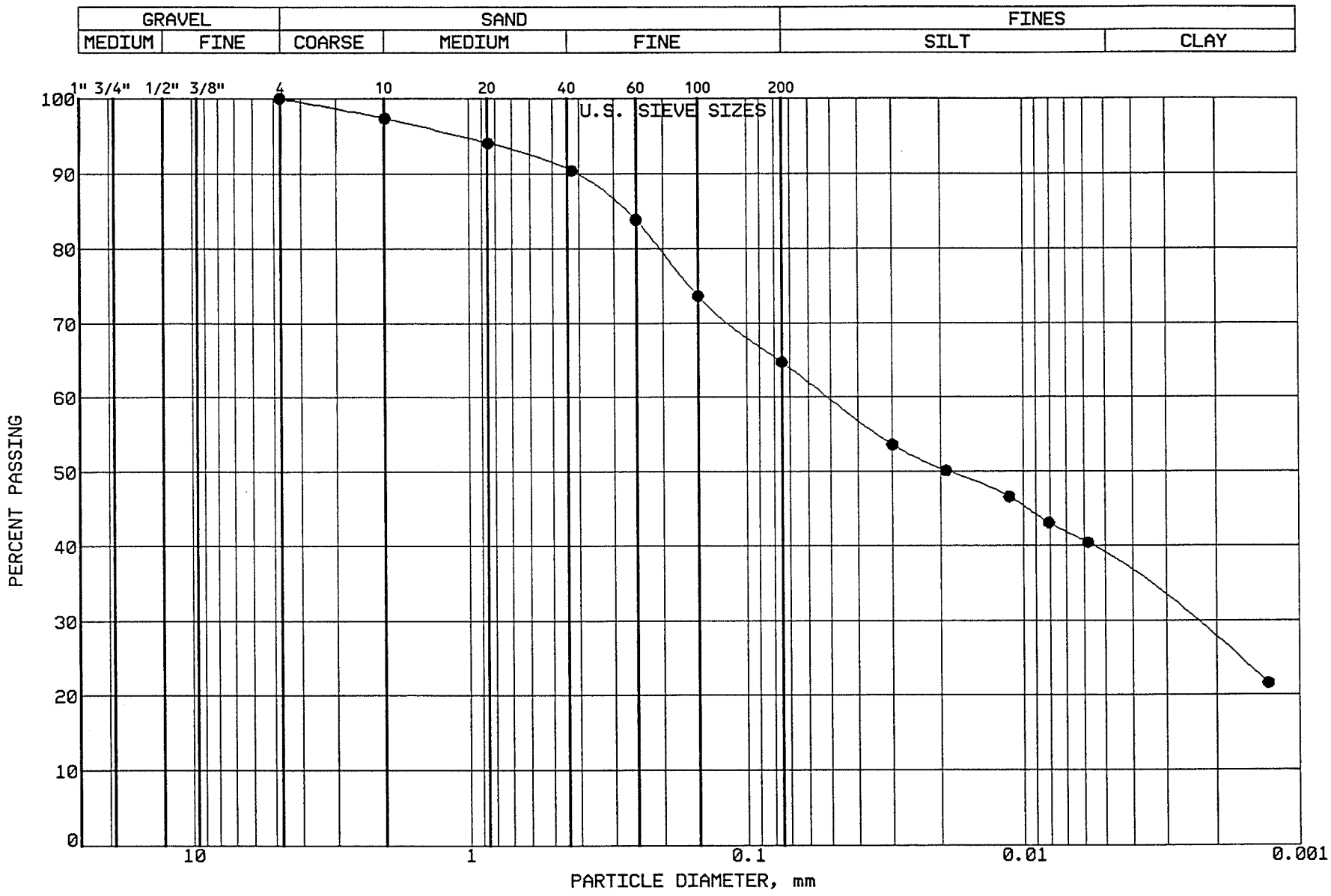
LOCATION: N 42604.0, E 45927.0
SAMPLE: SGCC017 TUBE #:
ELEVATION: 1882.0'

GRAVEL	0.0 %
SAND	33.4 %
SILT	28.8 %
CLAY	37.8 %
P 200	66.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

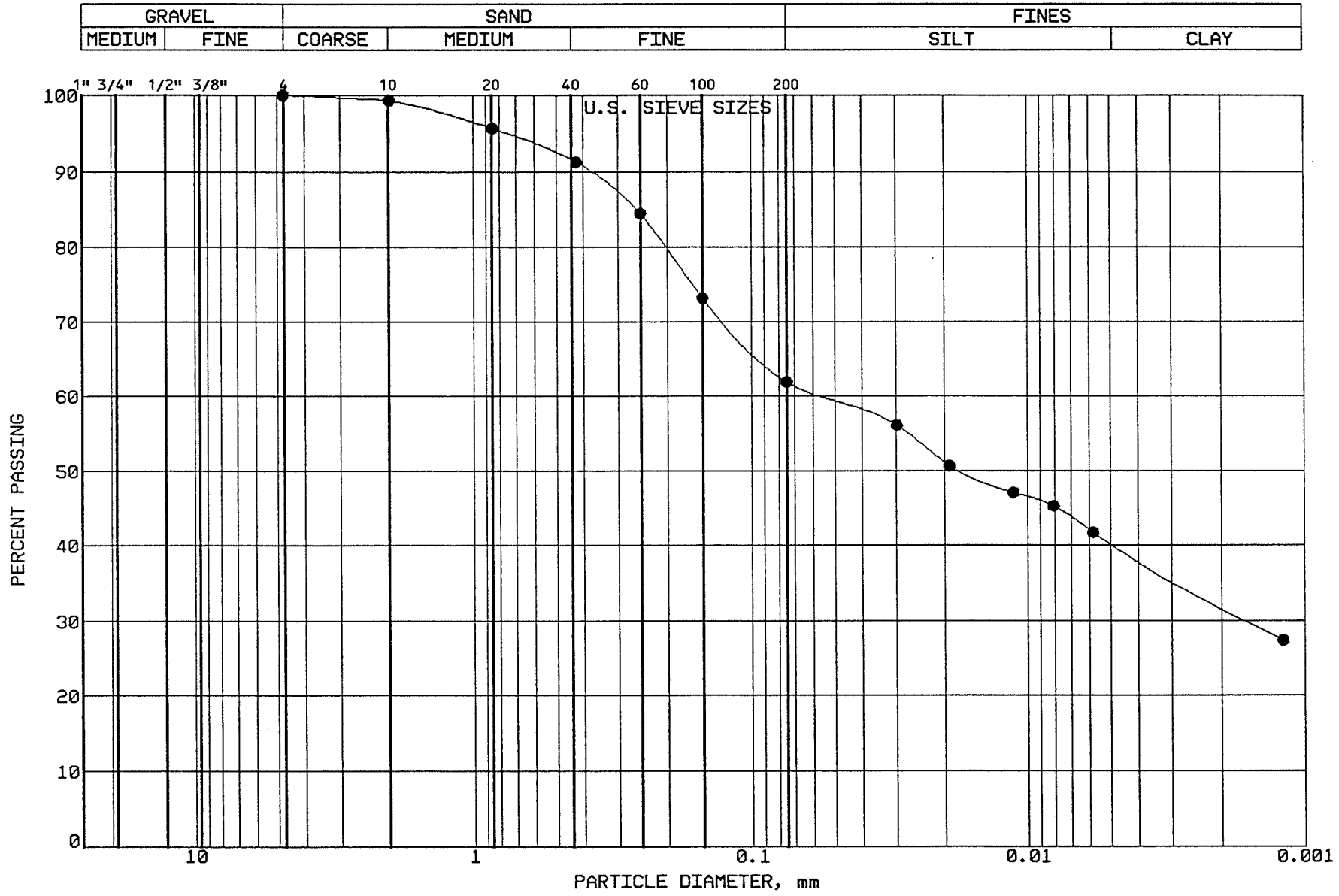
LOCATION: N 43009.0, E 45935.0
SAMPLE: CLSCC018 TUBE #:
ELEVATION: 1885.2'

GRAVEL	0.0 %
SAND	35.3 %
SILT	26.2 %
CLAY	38.5 %
P 200	64.7 %

SOIL PROPERTIES

LL: 41.0%
PL: 15.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

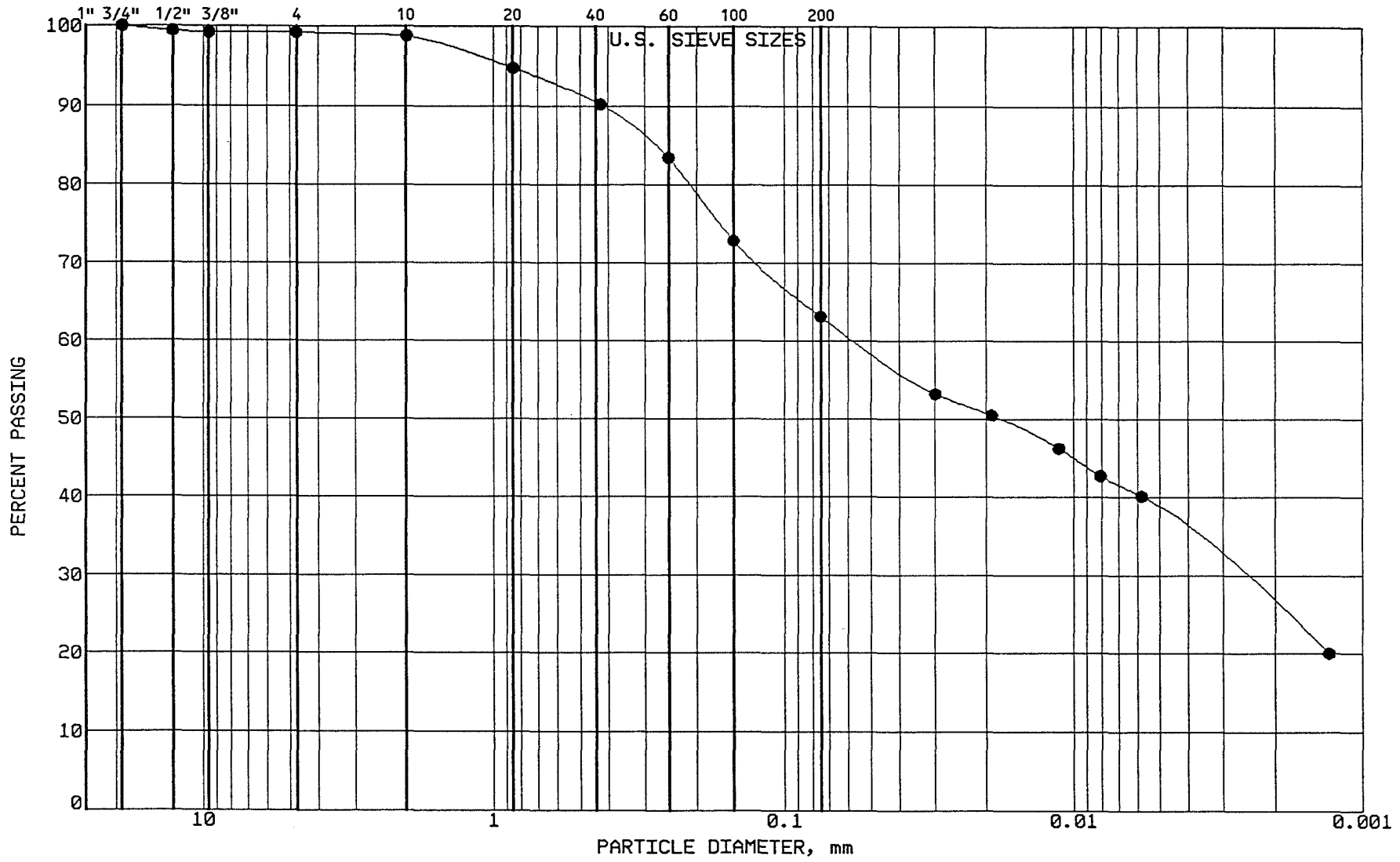
LOCATION: N 43451.0, E 45835.0
SAMPLE: CLSCC019 TUBE #: ST-1A
ELEVATION: 1889.6'

GRAVEL	0.0 %
SAND	38.1 %
SILT	21.5 %
CLAY	40.4 %
P 200	61.9 %

SOIL PROPERTIES

LL: 44.0%
PL: 17.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

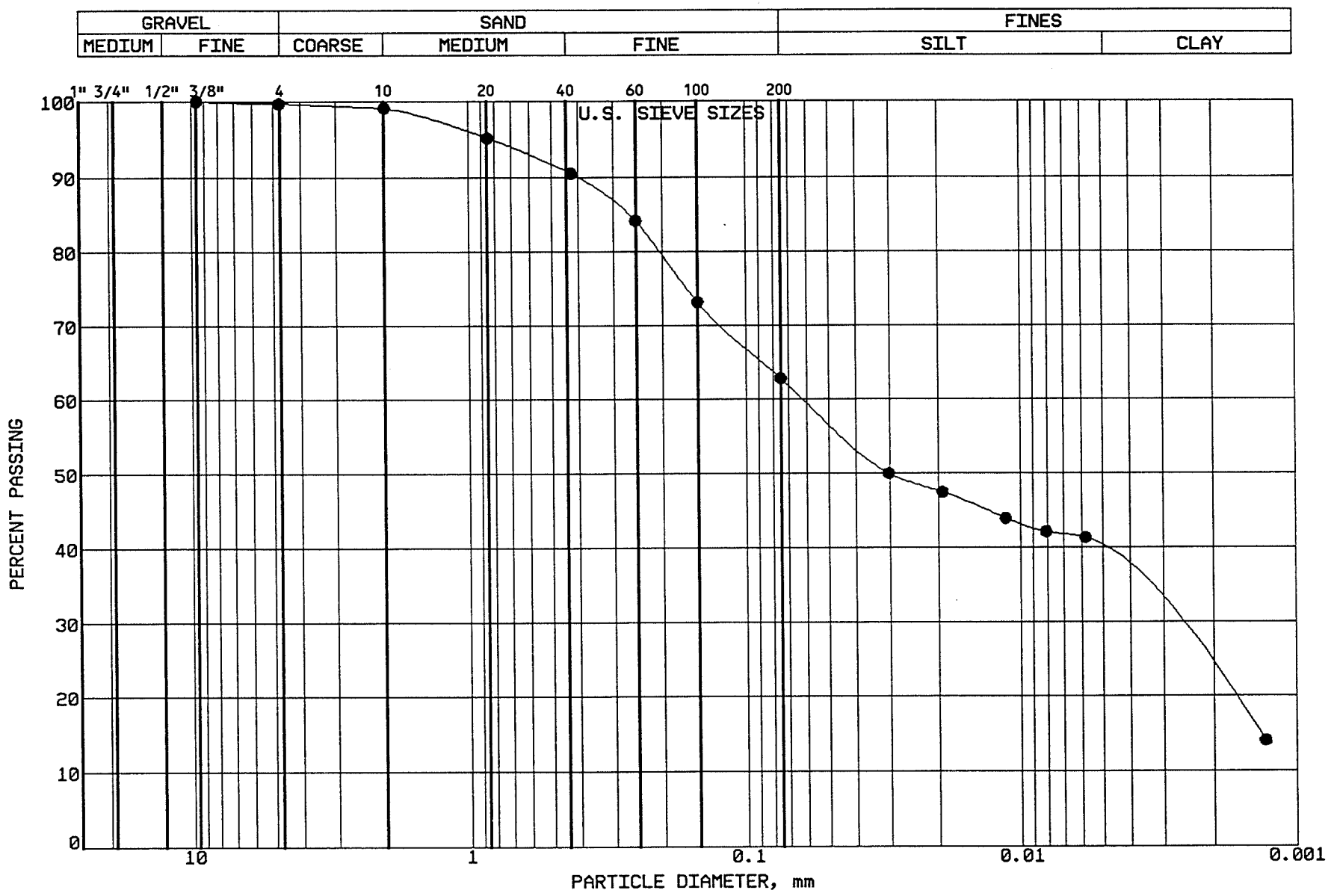
LOCATION: N 43457.0, E 44902.0
SAMPLE: CLSCC020 TUBE #: ST-2A
ELEVATION: 1889.8'

GRAVEL	0.8 %
SAND	36.1 %
SILT	25.0 %
CLAY	38.1 %
P 200	63.1 %

SOIL PROPERTIES

LL: 45.0%
PL: 15.0%
PI: 30.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

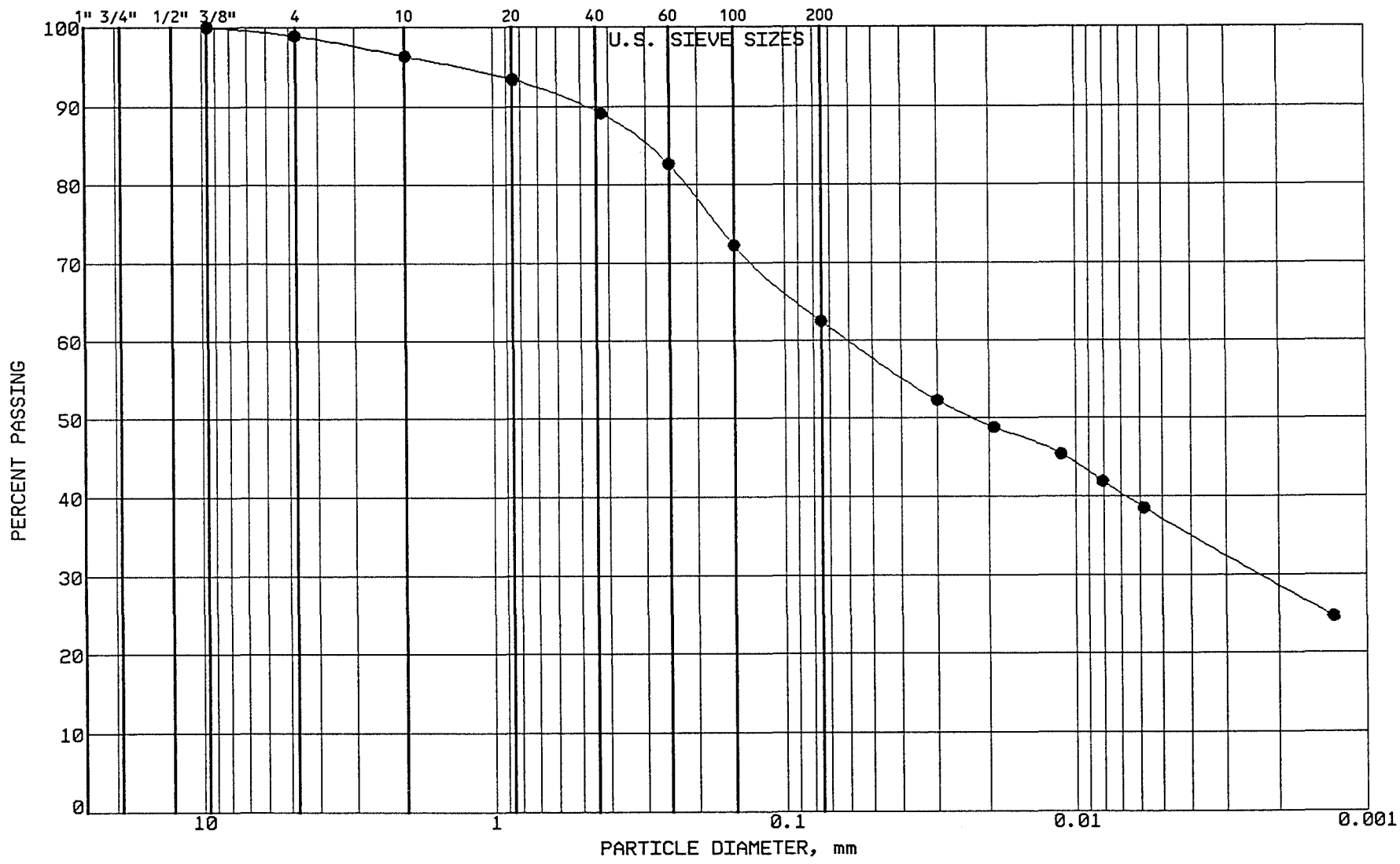
LOCATION: N 43207.0, E 45941.0
SAMPLE: CLSCC021 TUBE #: ST-3A
ELEVATION: 1886.4'

GRAVEL	0.3 %
SAND	36.9 %
SILT	24.2 %
CLAY	38.6 %
P 200	62.8 %

SOIL PROPERTIES

LL: 44.0%
PL: 17.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) lt ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42809.0, E 45941.0
SAMPLE: CLSCC022 TUBE #: ST-4A
ELEVATION: 1886.3'

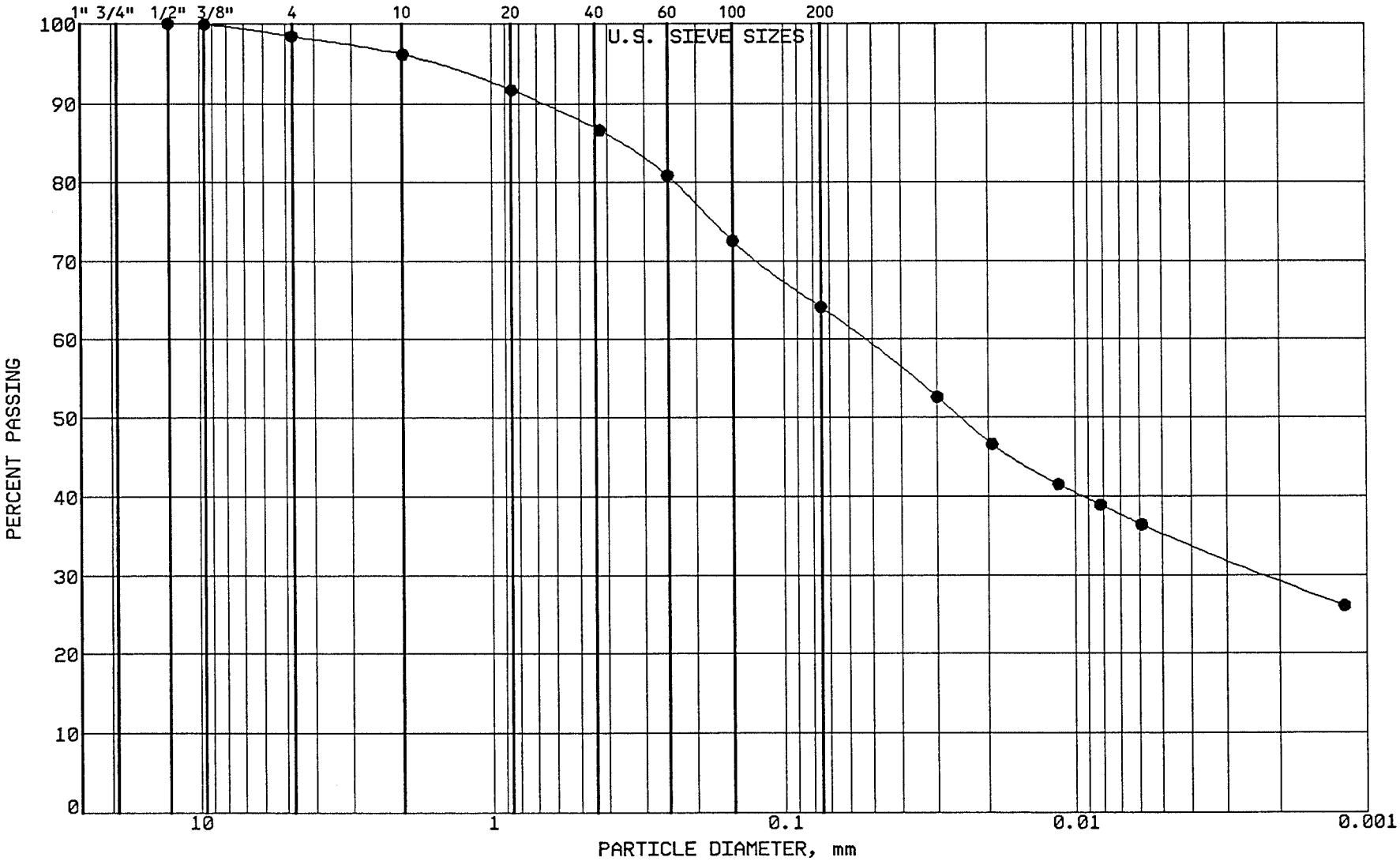
GRAVEL	1.1 %
SAND	36.4 %
SILT	25.4 %
CLAY	37.1 %
P 200	62.5 %

SOIL PROPERTIES

LL: 41.0%
PL: 14.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

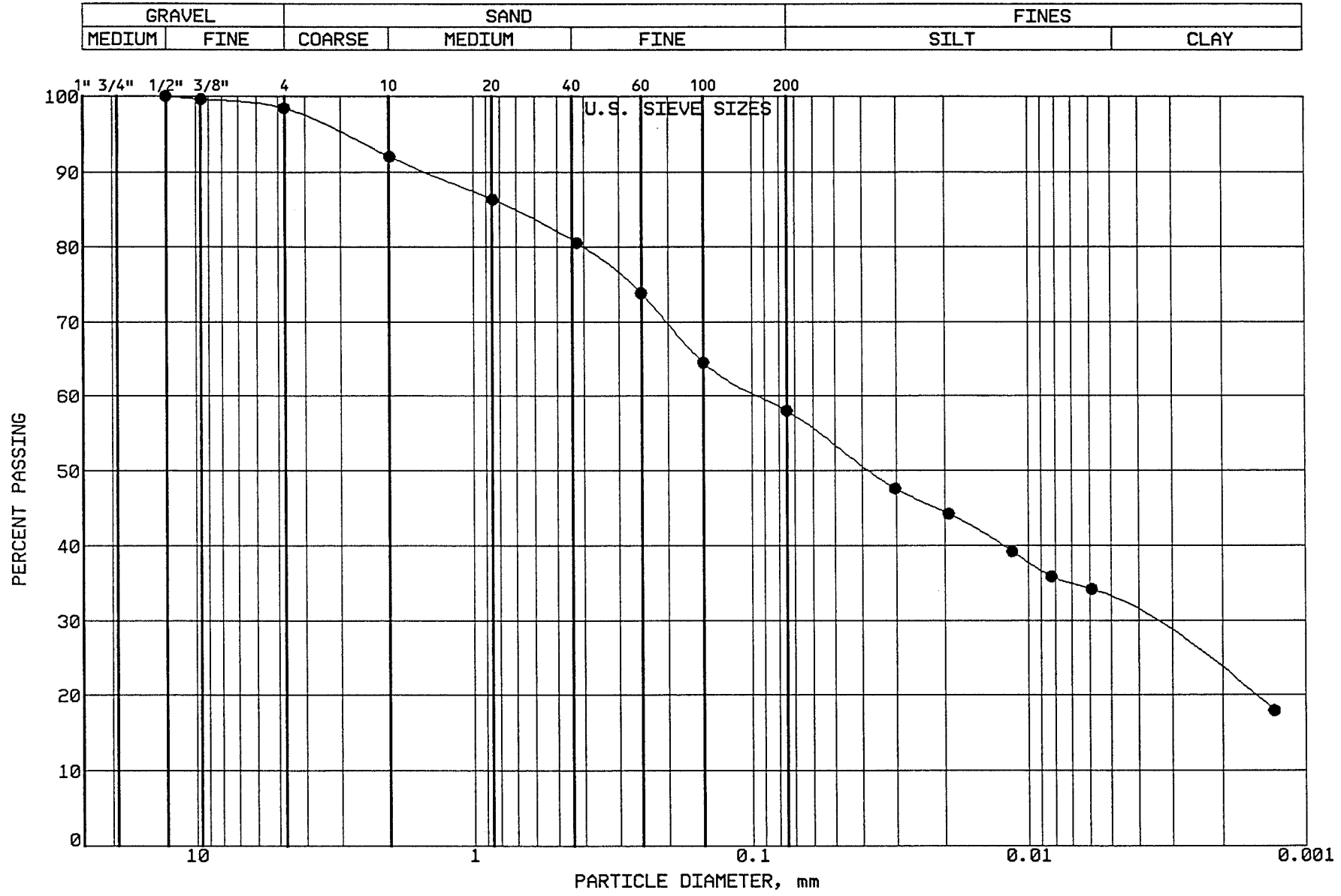
LOCATION: N 43103.0, E 45940.0
SAMPLE: CLSCC023 TUBE #: ST-5A
ELEVATION: 1888.1'

GRAVEL	1.6 %
SAND	34.3 %
SILT	28.8 %
CLAY	35.3 %
P 200	64.1 %

SOIL PROPERTIES

LL: 40.0%
PL: 15.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

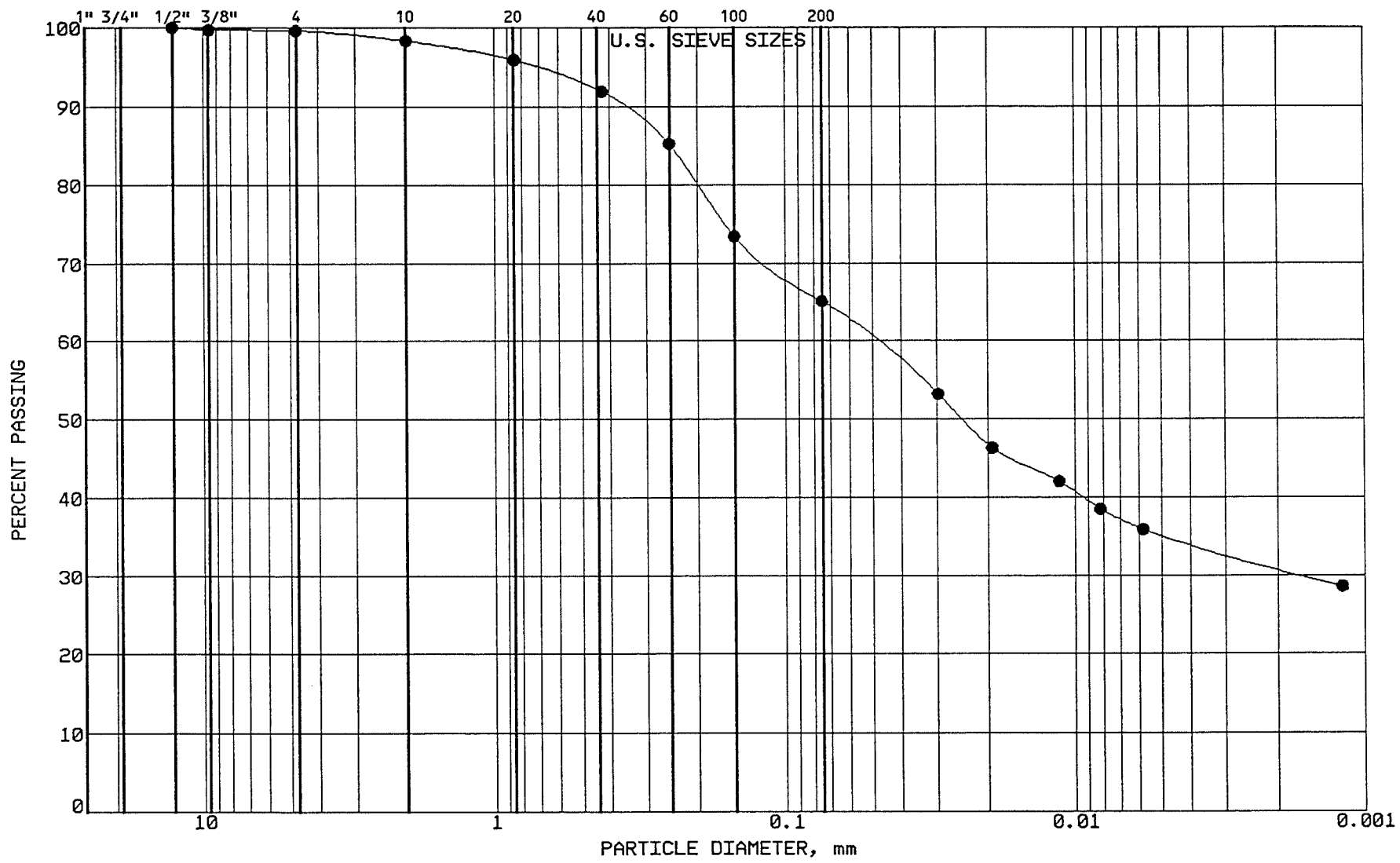
LOCATION: N 42698.0, E 45939.0
SAMPLE: CLSCC024 TUBE #:
ELEVATION: 1886.1'

GRAVEL	1.6 %
SAND	40.4 %
SILT	25.6 %
CLAY	32.4 %
P 200	58.0 %

SOIL PROPERTIES

LL: 41.0%
PL: 16.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

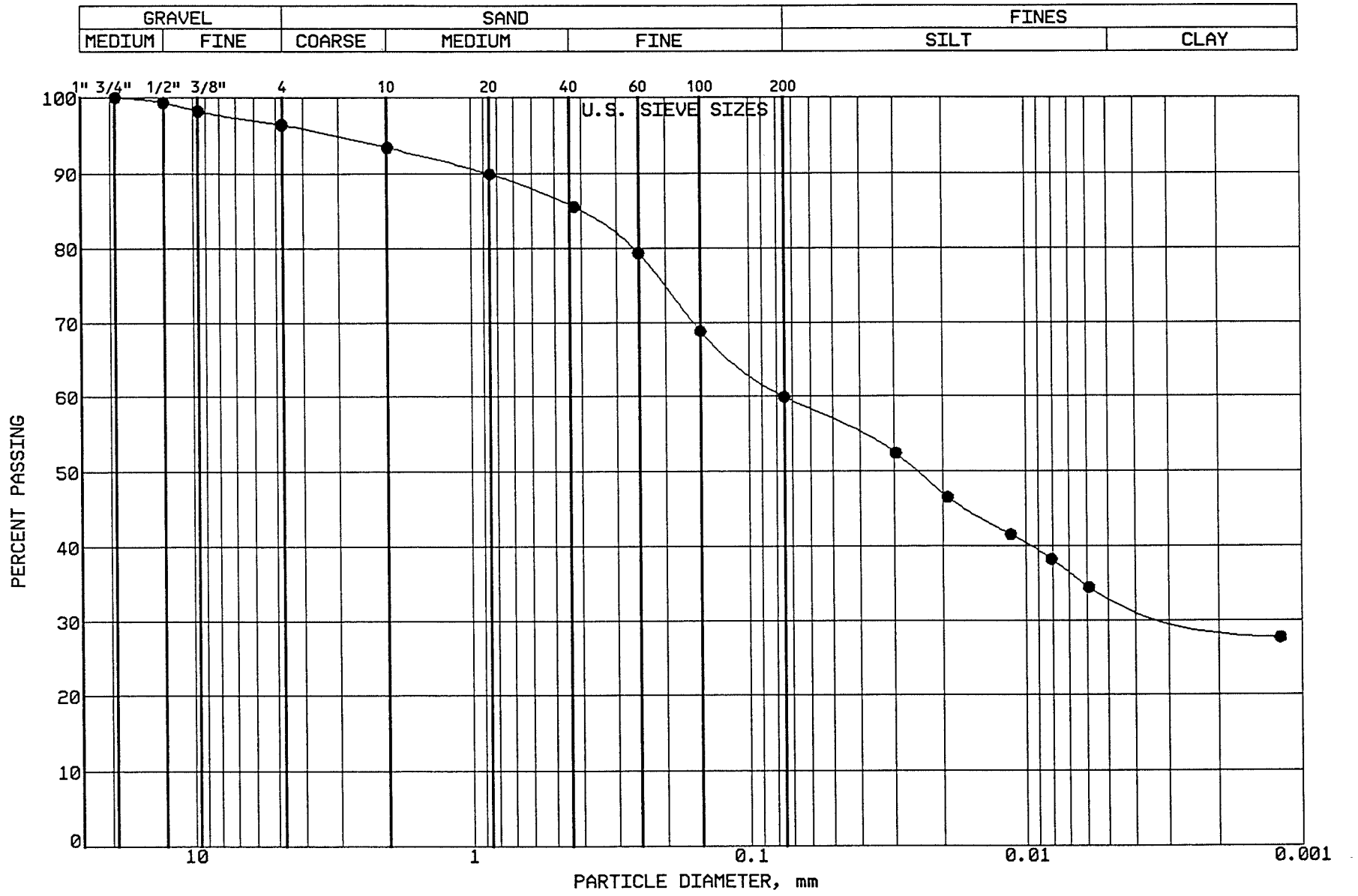
LOCATION: N 43467.0, E 45400.0
SAMPLE: CLSCC025 TUBE #: ST-6A
ELEVATION: 1892.5'

GRAVEL	0.4 %
SAND	34.5 %
SILT	29.9 %
CLAY	35.2 %
P 200	65.1 %

SOIL PROPERTIES

LL: 39.0%
PL: 14.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43396.0, E 45948.0
SAMPLE: CLSCC026 TUBE #:-ST-7B
ELEVATION: 1890.6'

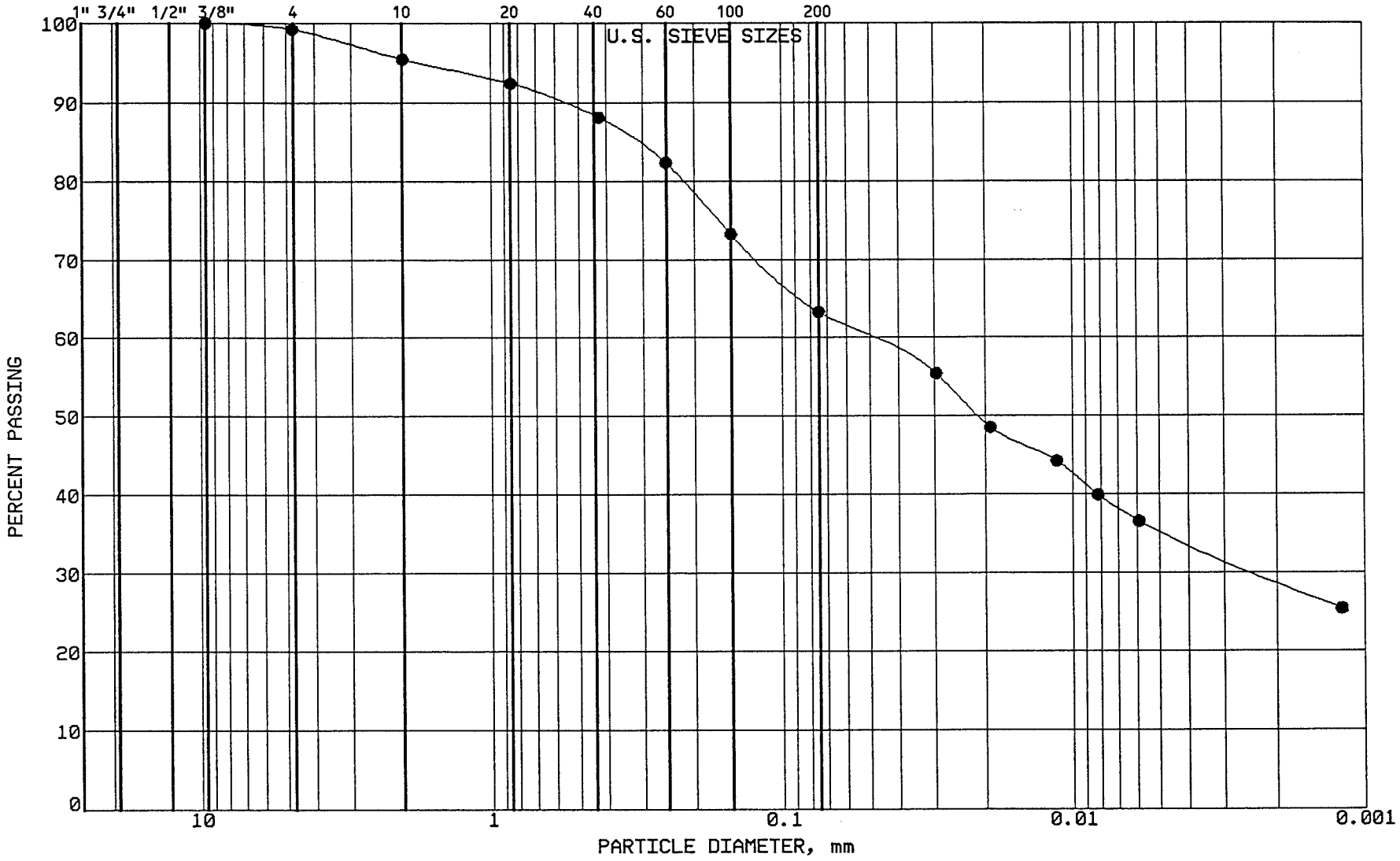
GRAVEL	3.6 %
SAND	36.5 %
SILT	26.2 %
CLAY	33.7 %
P 200	59.9 %

SOIL PROPERTIES

LL: 42.0%
PL: 14.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43460.0, E 45699.0
SAMPLE: CLSCC027 TUBE #: ST-8B
ELEVATION: 1892.8'

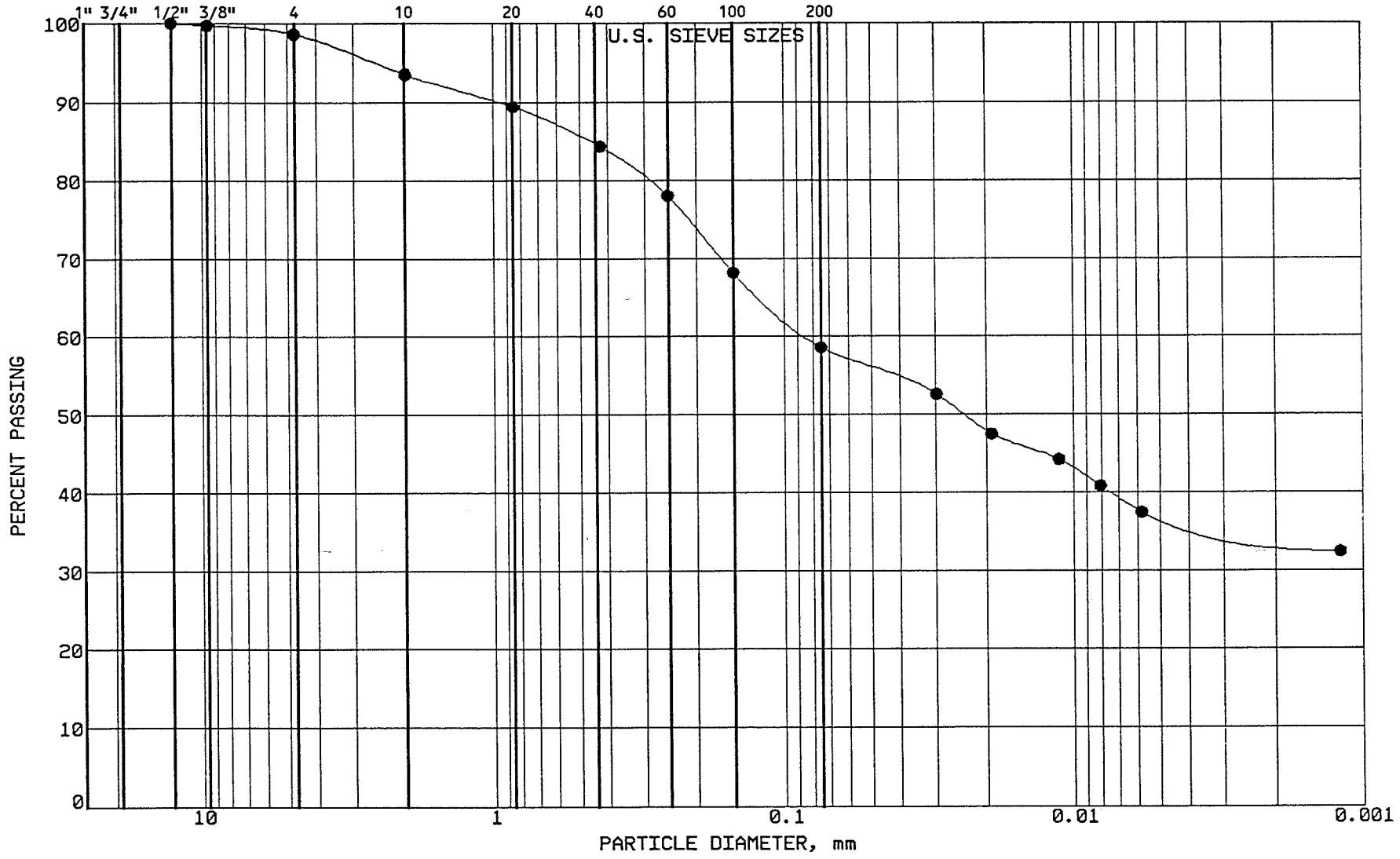
GRAVEL	0.8 %
SAND	36.0 %
SILT	27.9 %
CLAY	35.3 %
P 200	63.2 %

SOIL PROPERTIES

LL: 42.0%
PL: 15.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43463.0, E 45101.0
SAMPLE: CLSCC028 TUBE #:ST-9B
ELEVATION: 1892.8'

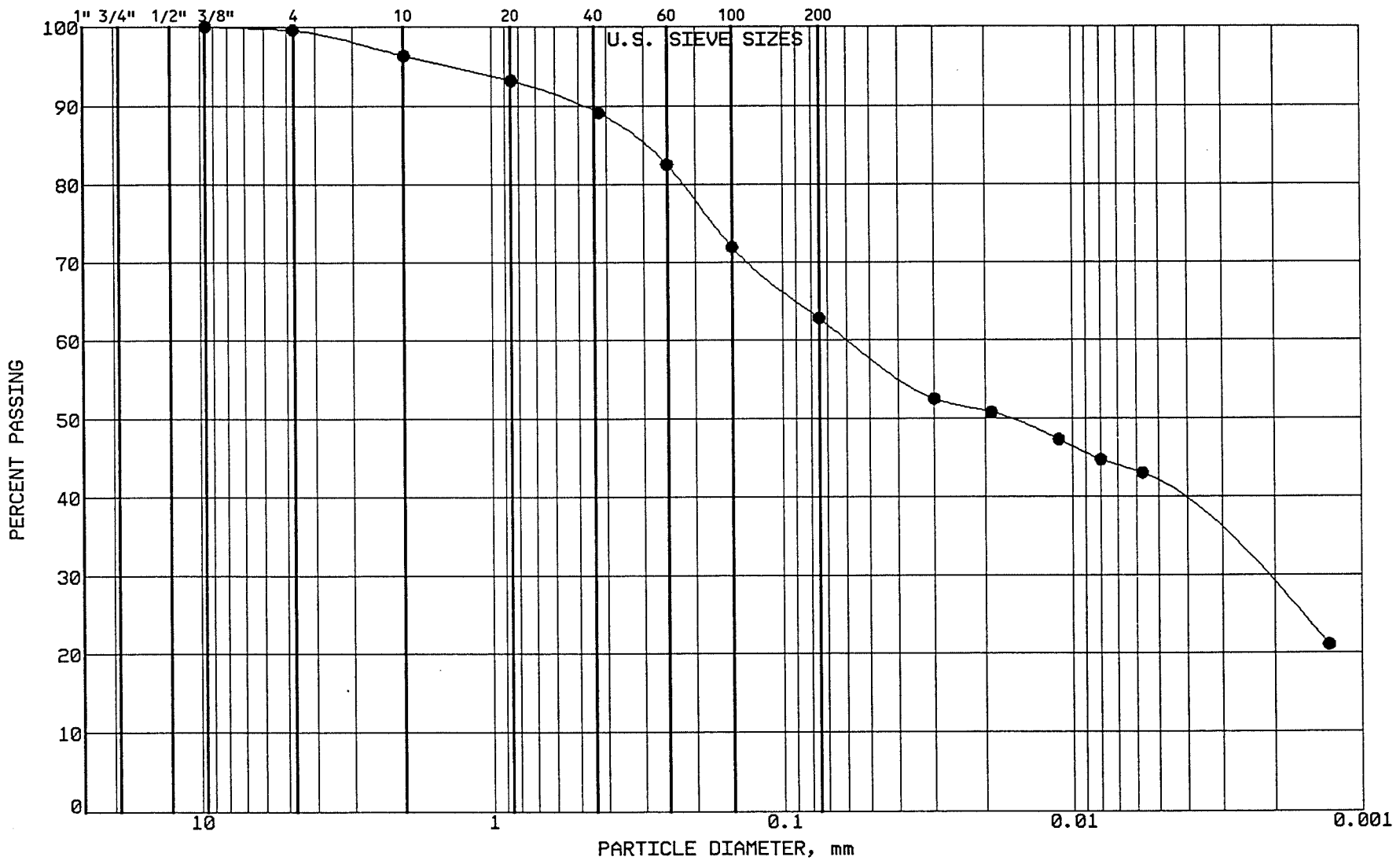
GRAVEL	1.4 %
SAND	40.0 %
SILT	21.7 %
CLAY	36.9 %
P 200	58.6 %

SOIL PROPERTIES

LL: 42.0%
PL: 15.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42804.0, E 45951.0
SAMPLE: CLSCC029 TUBE #:
ELEVATION: 1890.0'

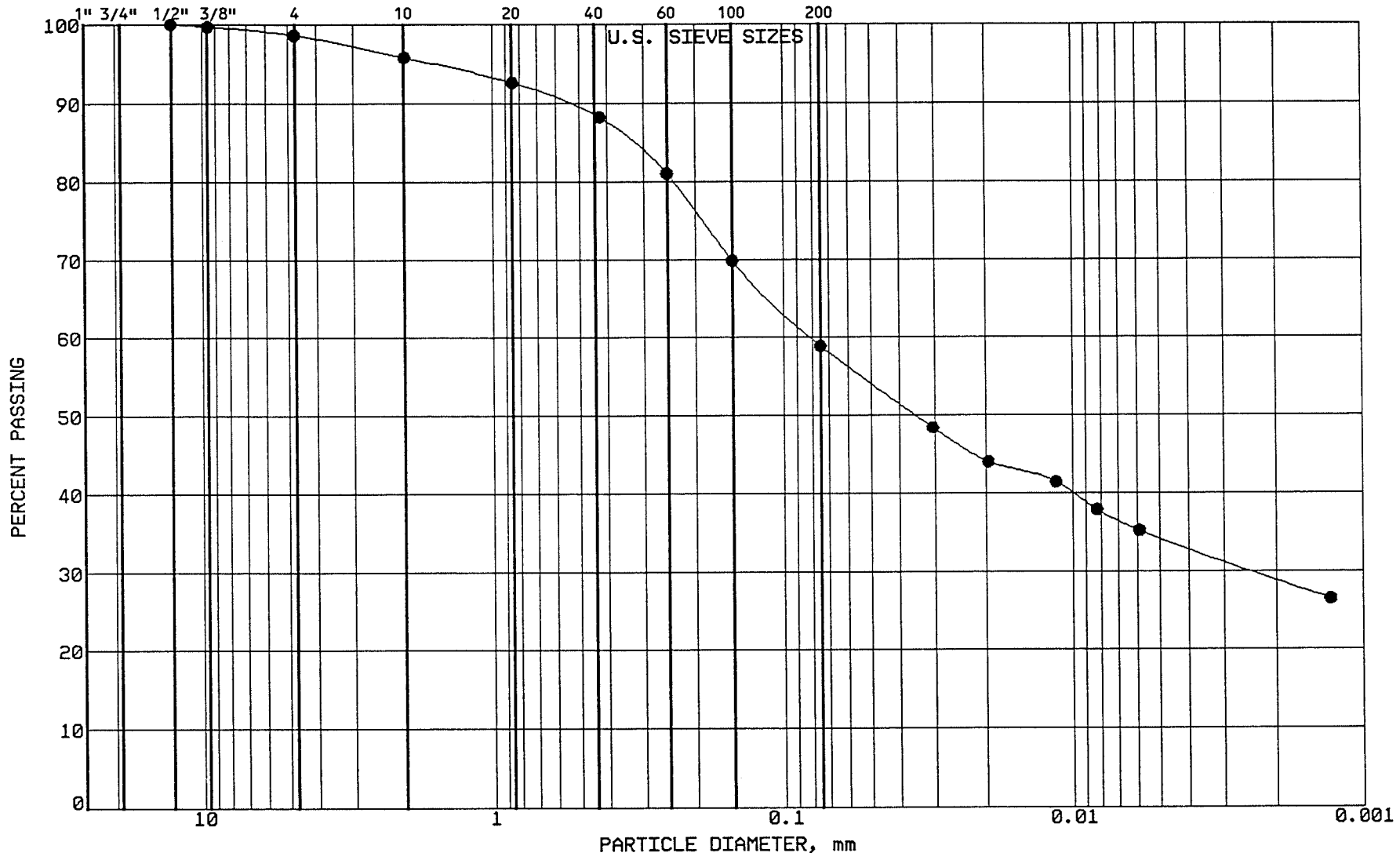
GRAVEL	0.4 %
SAND	36.8 %
SILT	21.7 %
CLAY	41.1 %
P 200	62.8 %

SOIL PROPERTIES

LL: 41.0%
PL: 15.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43476.0, E 45192.0
SAMPLE: CLSCC030 TUBE #:ST-10A
ELEVATION: 1895.2'

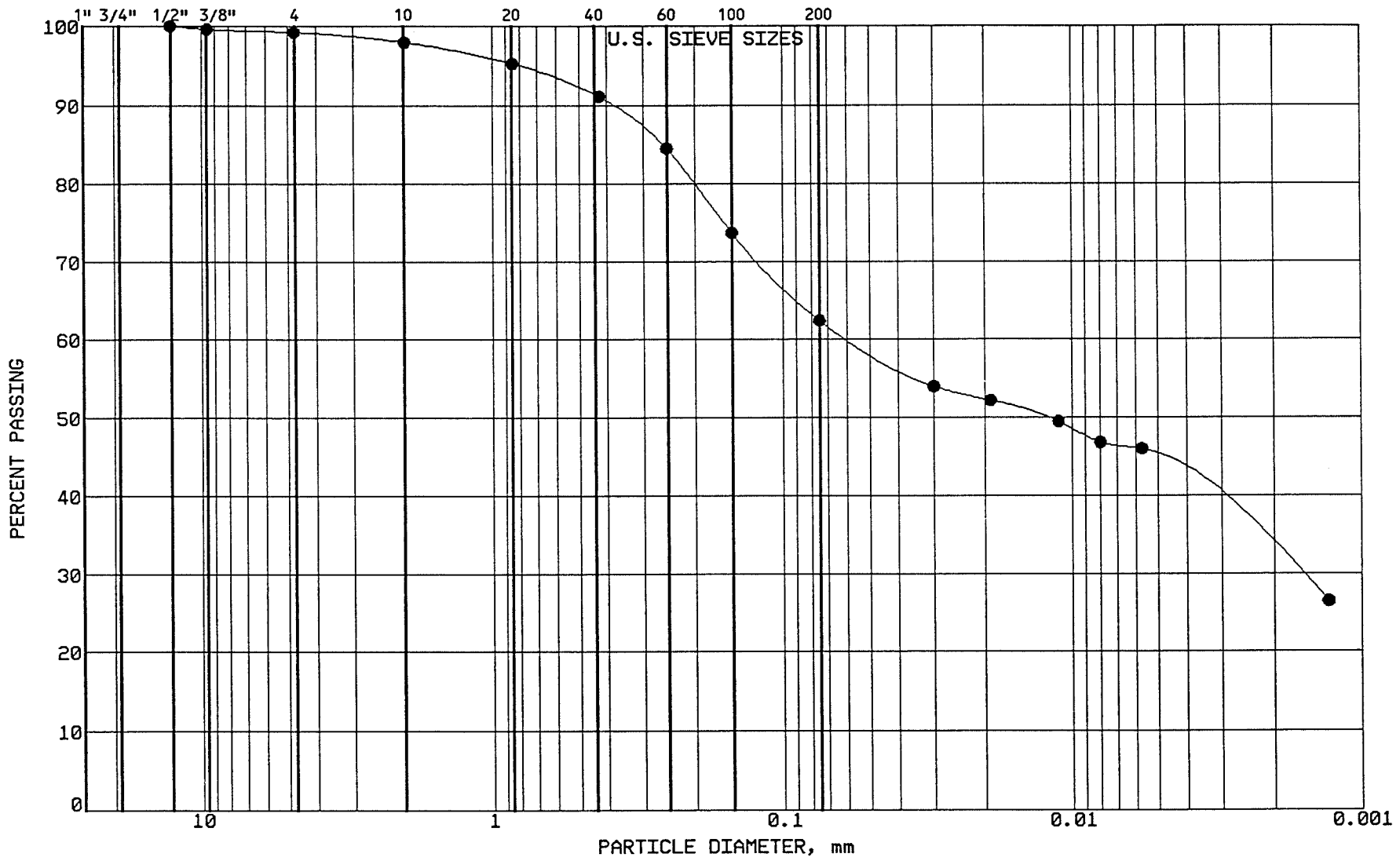
GRAVEL	1.4 %
SAND	39.7 %
SILT	24.7 %
CLAY	34.2 %
P 200	58.9 %

SOIL PROPERTIES

LL: 40.0%
PL: 25.0%
PI: 15.0%
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43454.0, E 43526.0
SAMPLE: SGCC031 TUBE #:
ELEVATION: 1885.2'

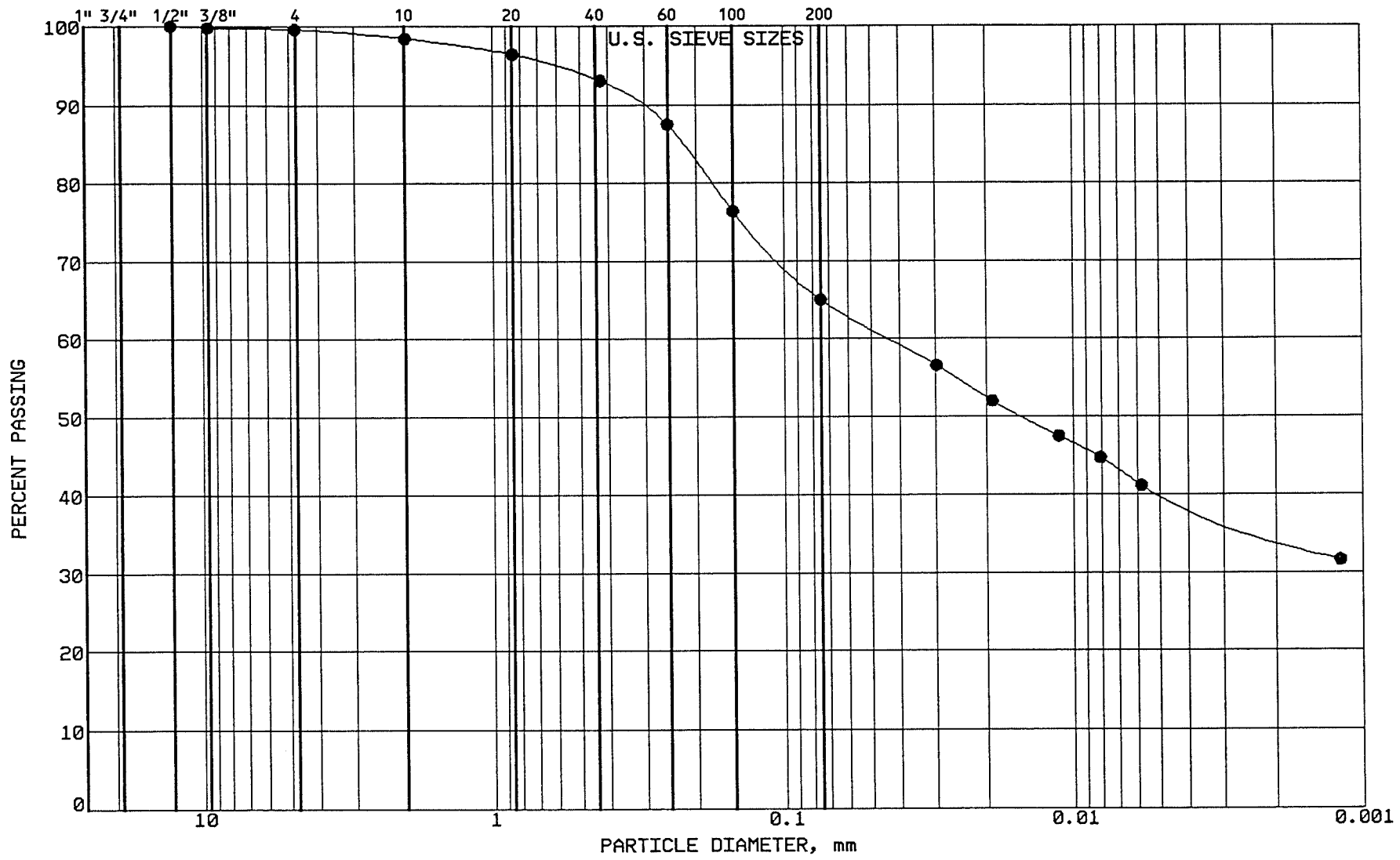
GRAVEL	0.8 %
SAND	36.8 %
SILT	18.1 %
CLAY	44.3 %
P 200	62.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43440.0, E 43727.0
SAMPLE: SGCC032 TUBE #:
ELEVATION: 1884.8'

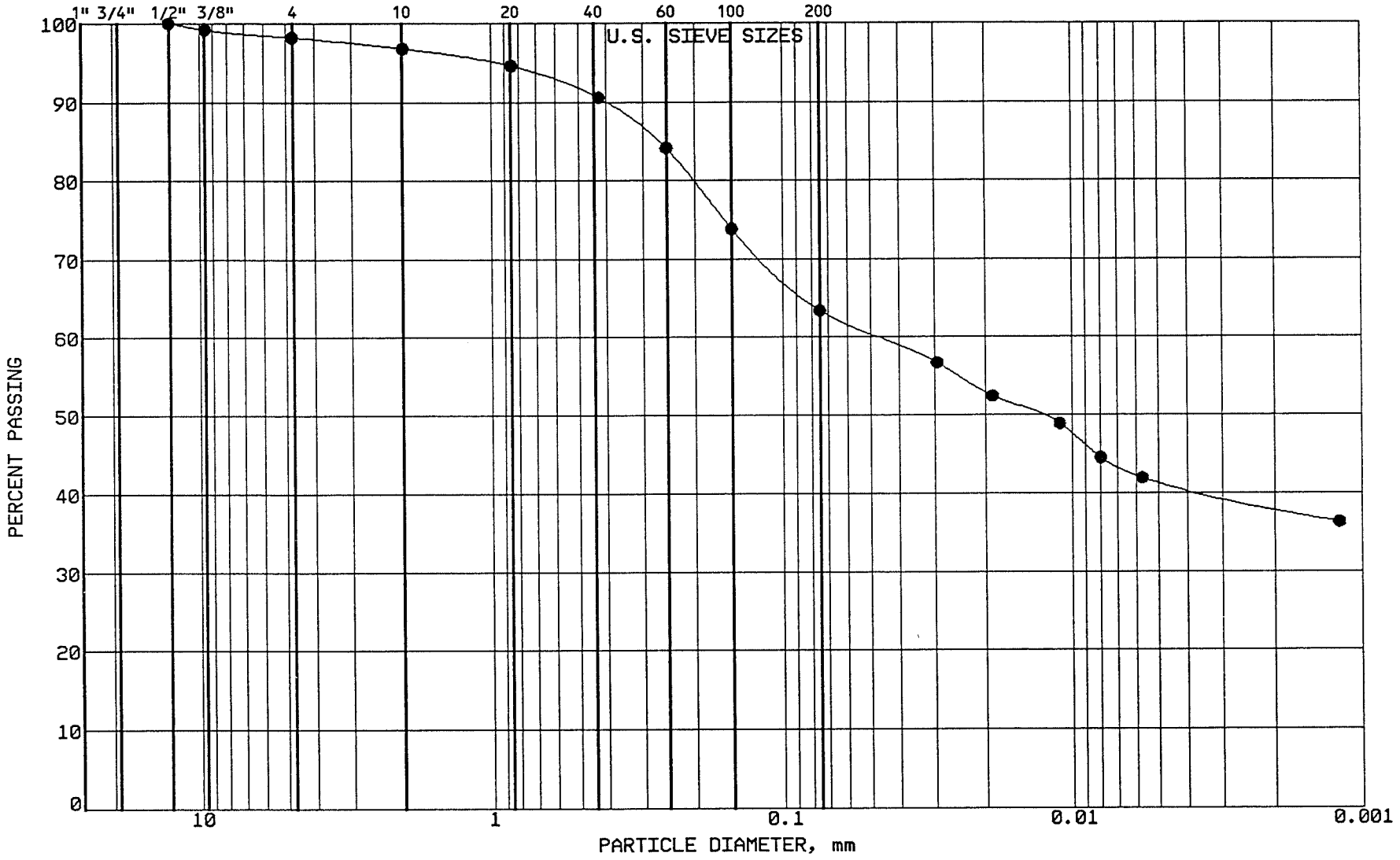
GRAVEL	0.4 %
SAND	34.6 %
SILT	24.8 %
CLAY	40.2 %
P 200	65.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43436.0, E 43913.0
SAMPLE: SGCC033 TUBE #:
ELEVATION: 1884.6'

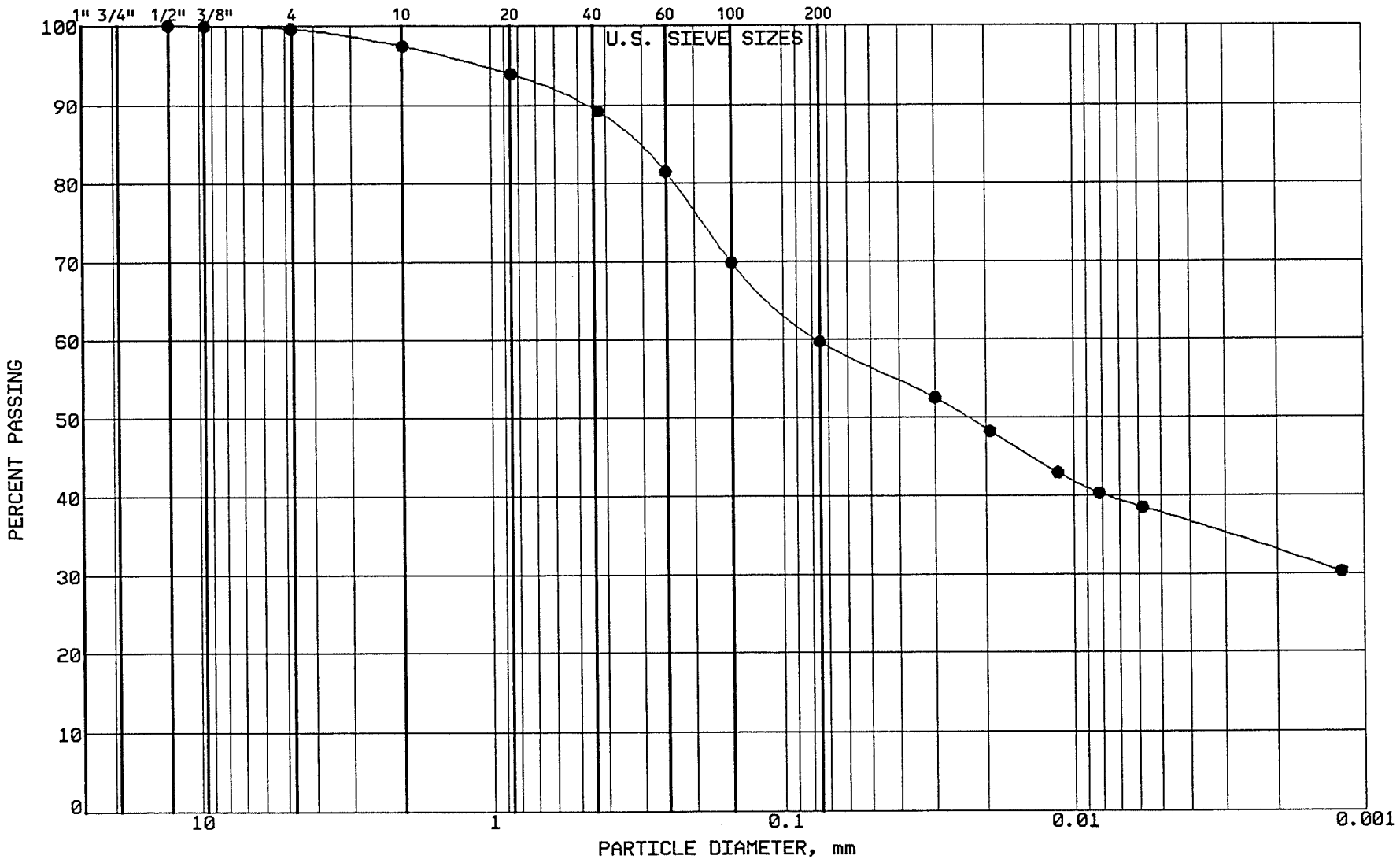
GRAVEL	1.8 %
SAND	34.8 %
SILT	22.0 %
CLAY	41.4 %
P 200	63.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

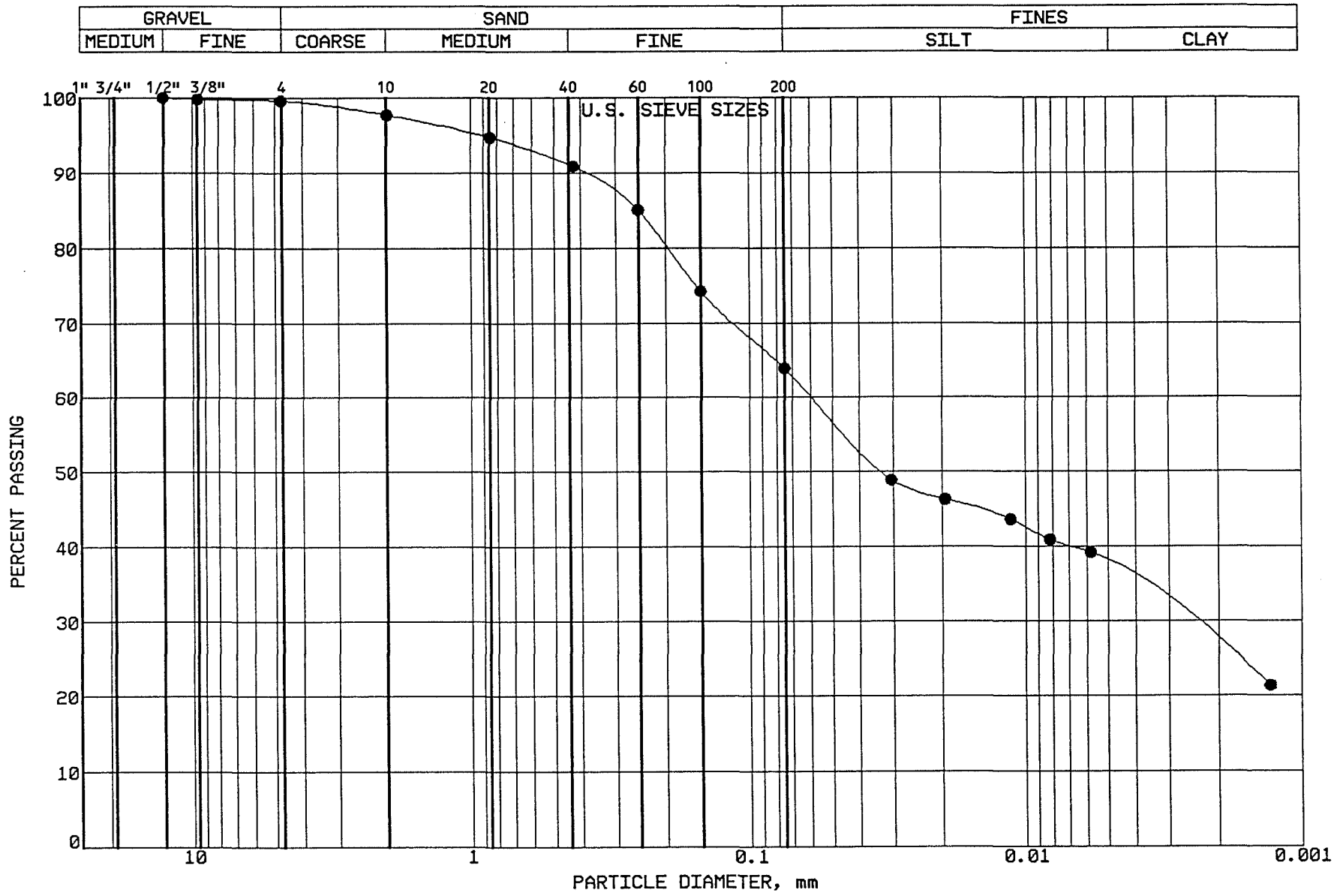
LOCATION: N 43437.0, E 44150.0
SAMPLE: SGCC034 TUBE #:
ELEVATION: 1885.0'

GRAVEL	0.4 %
SAND	39.9 %
SILT	22.0 %
CLAY	37.7 %
P 200	59.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43457.0, E 43604.0
SAMPLE: SGCC035 TUBE #:
ELEVATION: 1886.0'

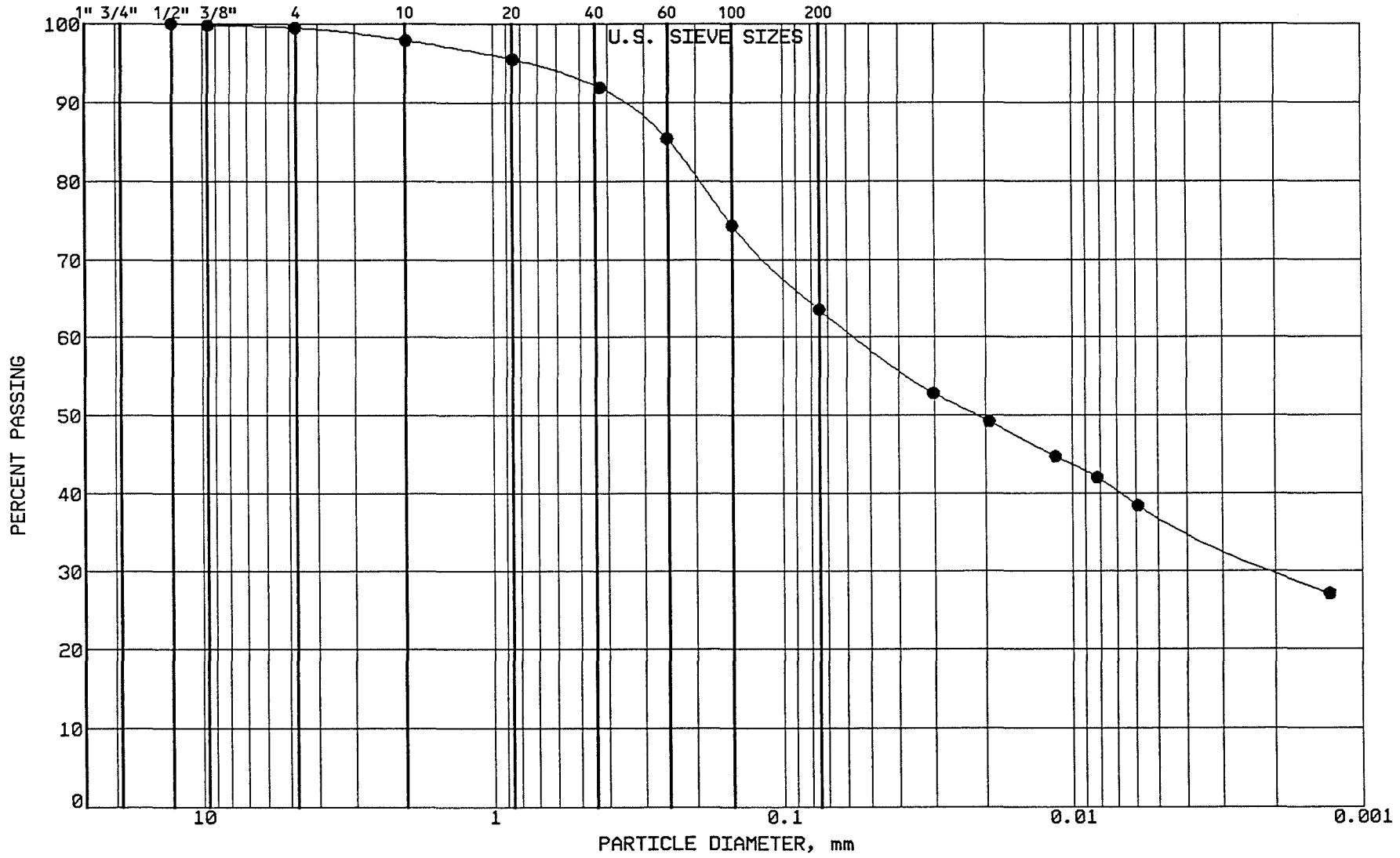
GRAVEL	0.4 %
SAND	35.7 %
SILT	26.5 %
CLAY	37.4 %
P 200	63.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43452.0, E 43815.0
SAMPLE: SGCC036 TUBE #:
ELEVATION: 1885.5'

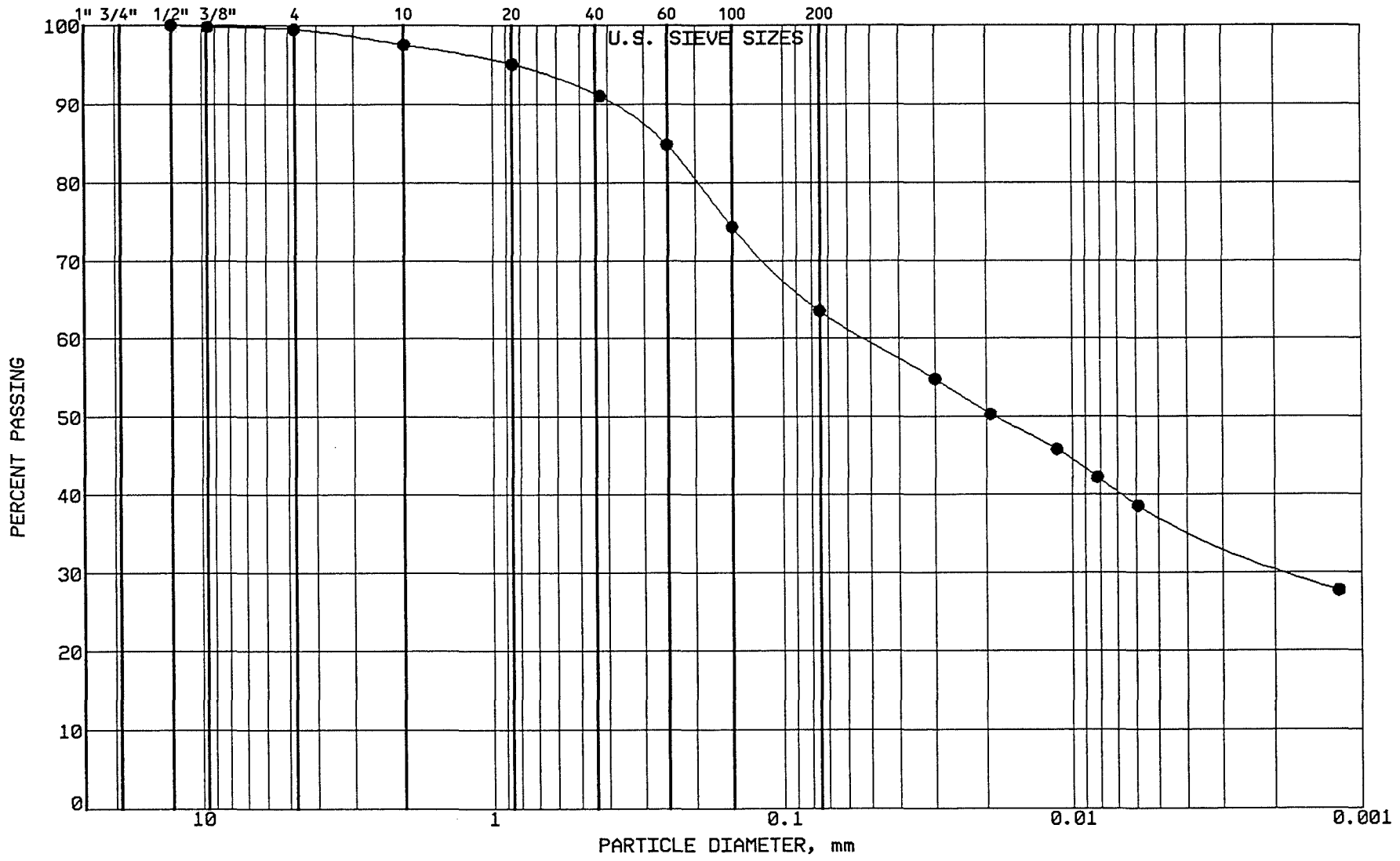
GRAVEL	0.5 %
SAND	36.0 %
SILT	26.3 %
CLAY	37.2 %
P 200	63.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43449.0, E 44027.0
SAMPLE: SGCC037 TUBE #:
ELEVATION: 1885.5'

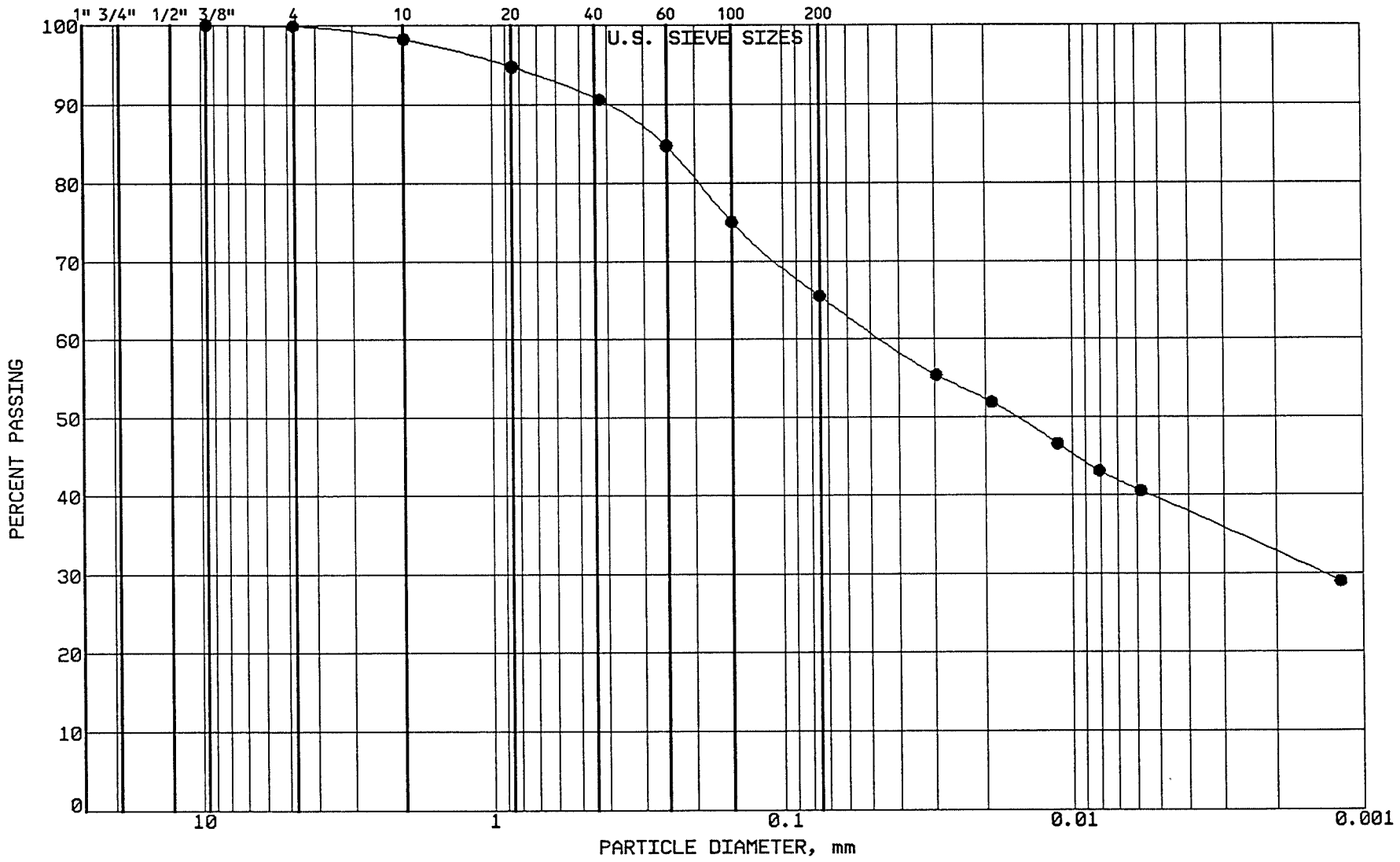
GRAVEL	0.5 %
SAND	36.0 %
SILT	26.1 %
CLAY	37.4 %
P 200	63.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43452.0, E 44269.0
SAMPLE: SGCC038 TUBE #:
ELEVATION: 1886.7'

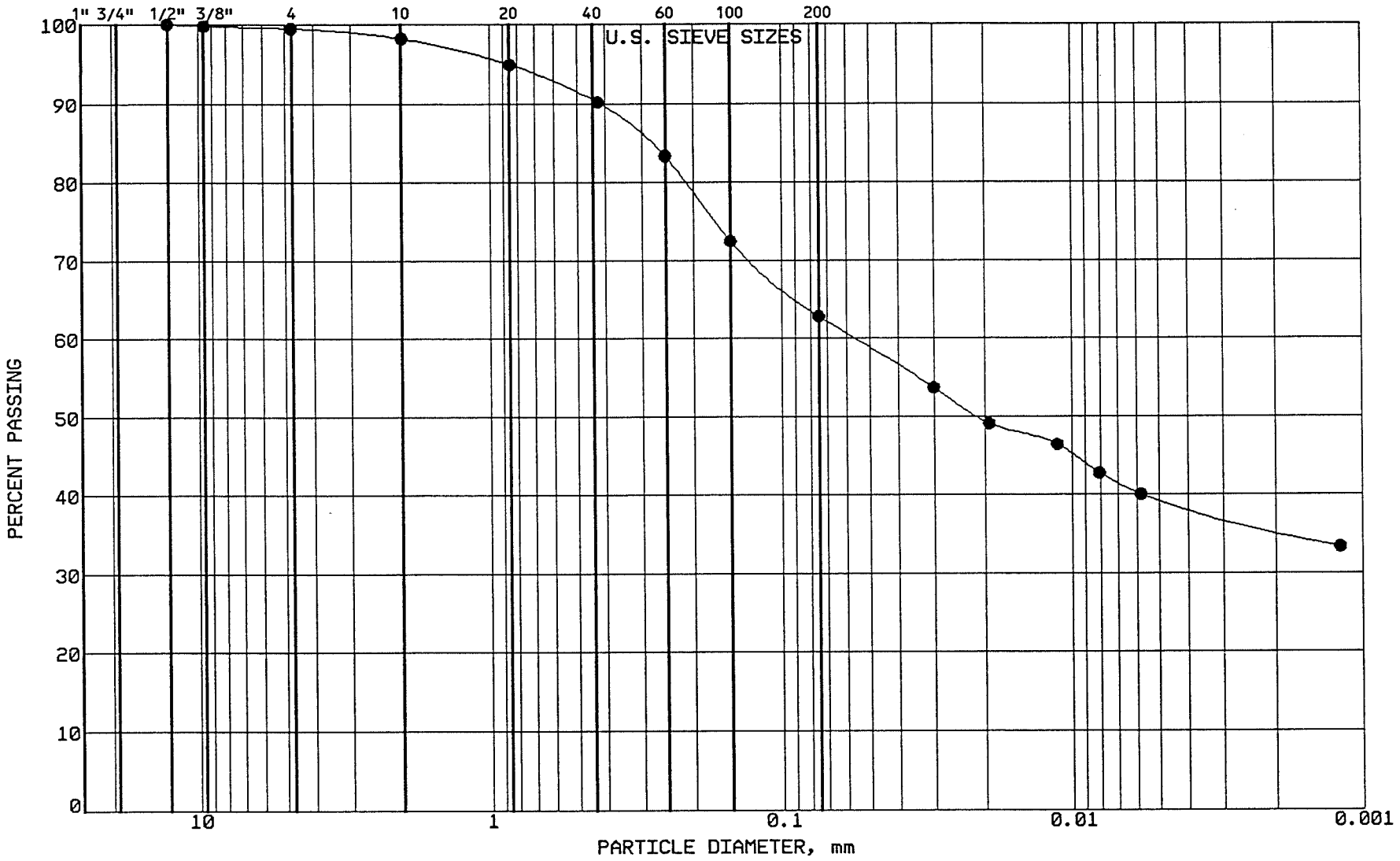
GRAVEL	0.1 %
SAND	34.4 %
SILT	26.1 %
CLAY	39.4 %
P 200	65.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

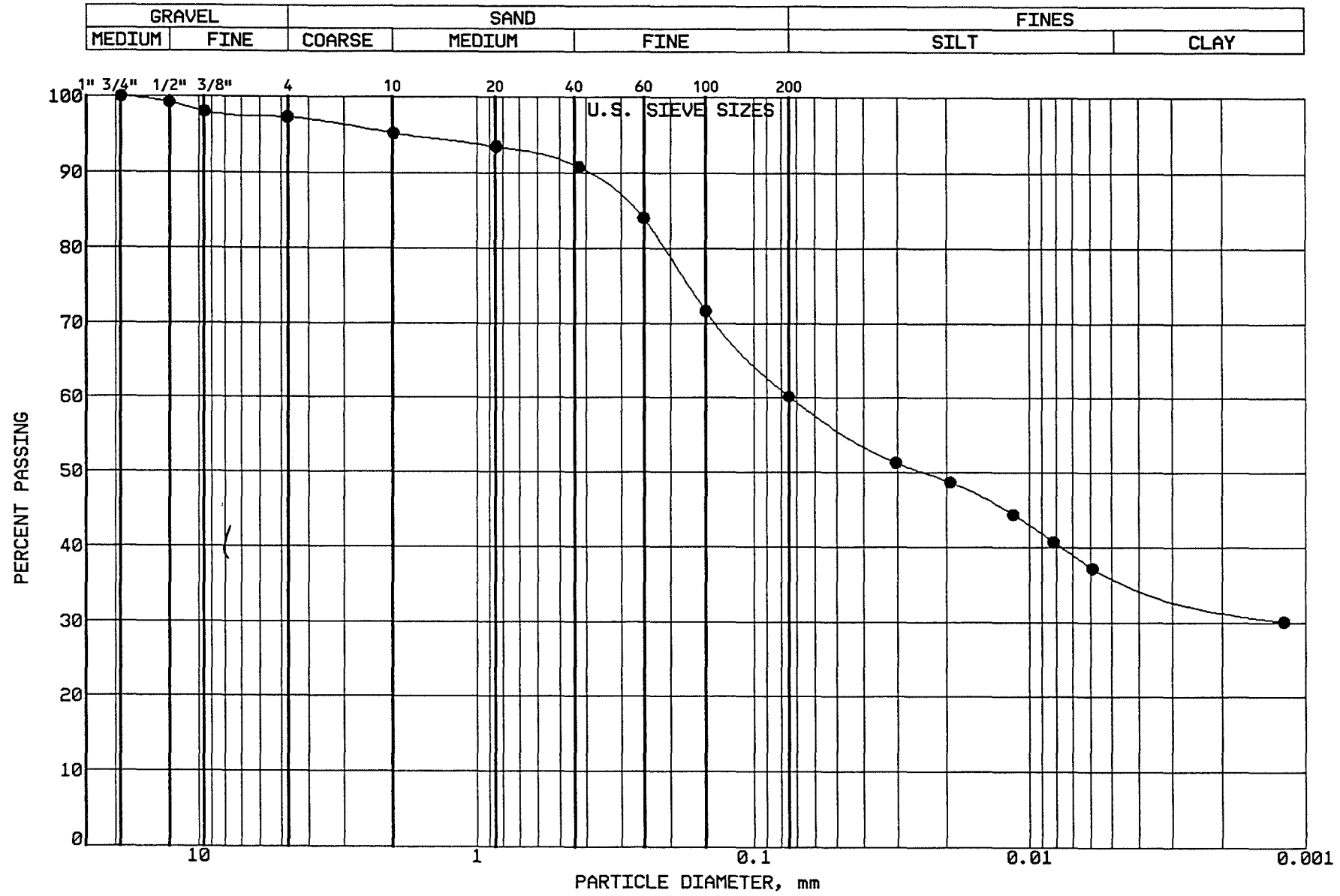
LOCATION: N 43453.0, E 44500.0
SAMPLE: SGCC039 TUBE #:
ELEVATION: 1886.8'

GRAVEL	0.5 %
SAND	36.7 %
SILT	23.4 %
CLAY	39.4 %
P 200	62.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43444.0, E 44689.0
SAMPLE: SG-CC-40 TUBE #:
ELEVATION: 1886.5'

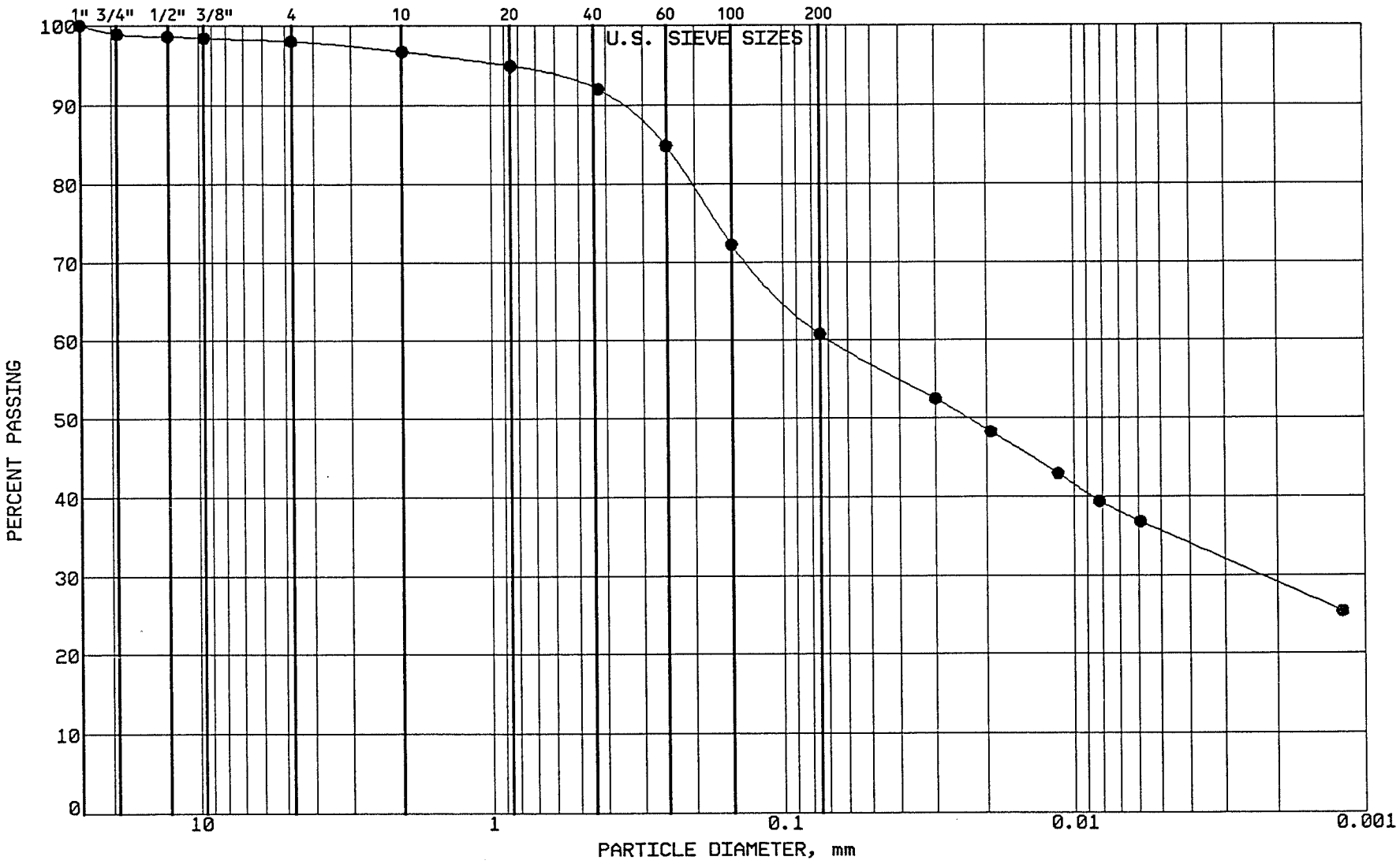
GRAVEL	2.7 %
SAND	37.1 %
SILT	23.7 %
CLAY	36.5 %
P 200	60.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42800.0, E 45953.0
SAMPLE: CLSCC041 TUBE #: ST-11A
ELEVATION: 1894.8'

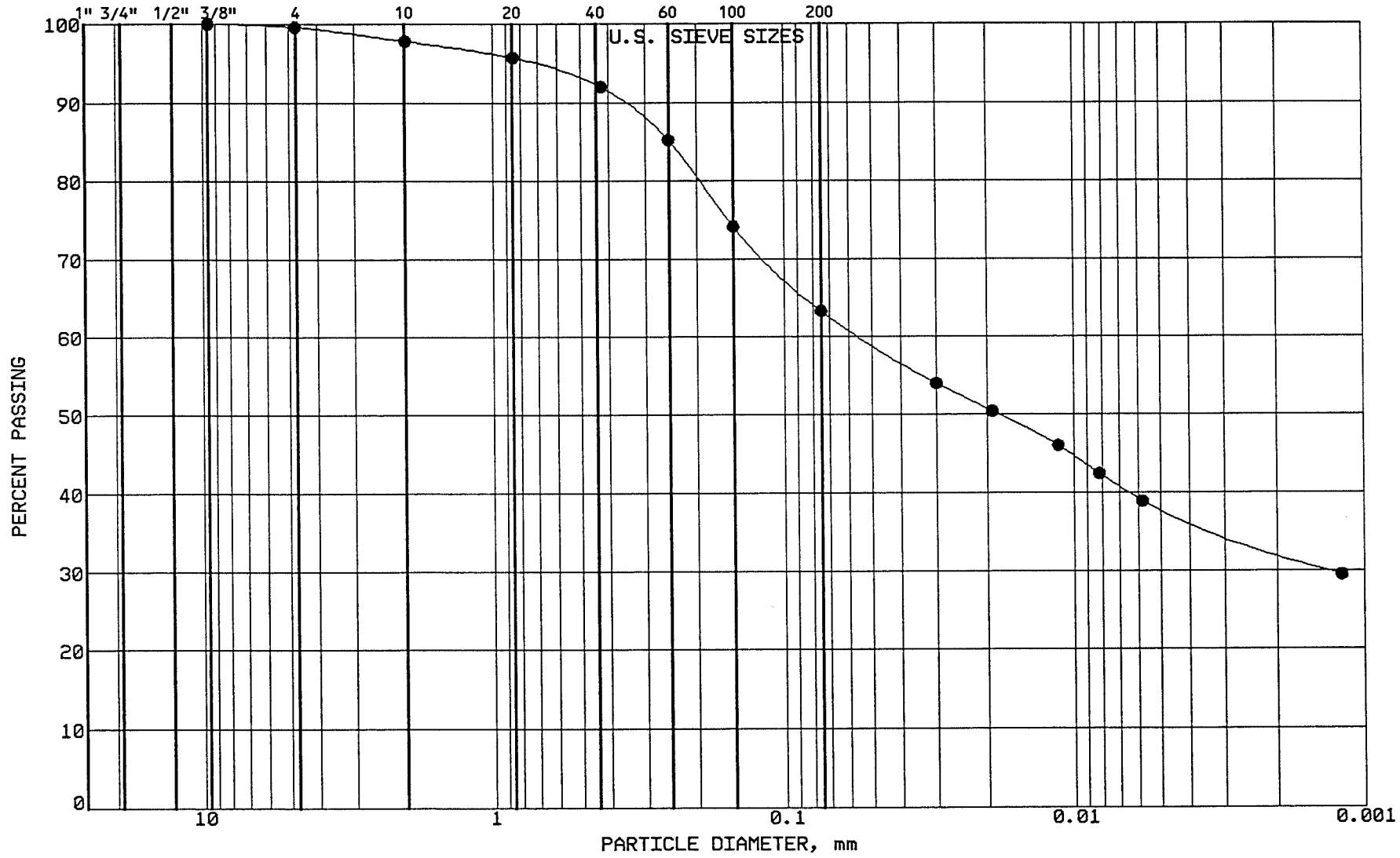
GRAVEL	2.0 %
SAND	37.2 %
SILT	25.2 %
CLAY	35.6 %
P 200	60.8 %

SOIL PROPERTIES

LL: 37.0%
PL: 15.0%
PI: 22.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42896.0, E 45954.0
SAMPLE: CLSCC042 TUBE #: ST-12B
ELEVATION: 1893.2'

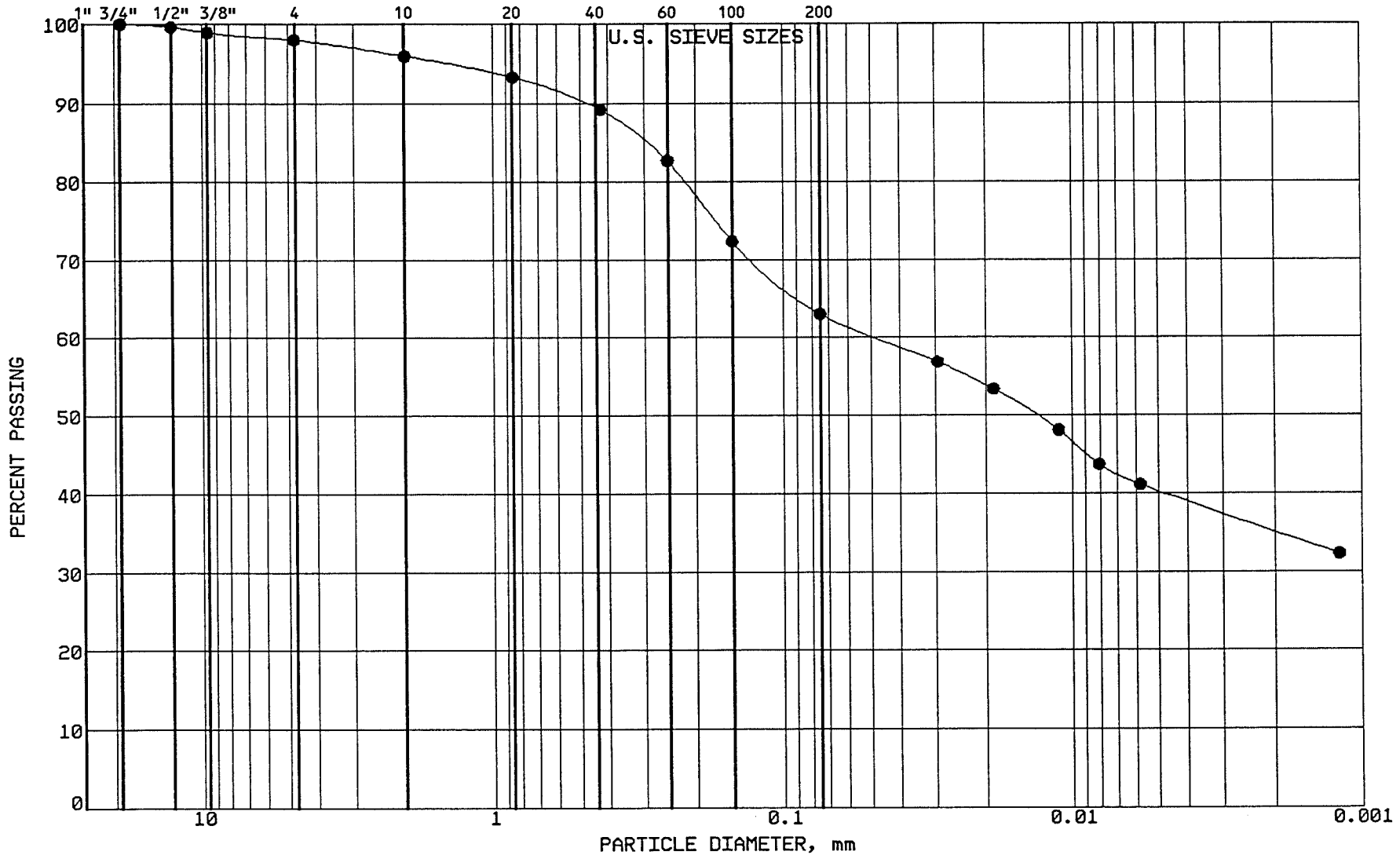
GRAVEL	0.4 %
SAND	36.3 %
SILT	25.3 %
CLAY	38.0 %
P 200	63.3 %

SOIL PROPERTIES

LL: 44.0%
PL: 16.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43400.0, E 43500.0
SAMPLE: CLSCC043 TUBE #:
ELEVATION: 1887.0'

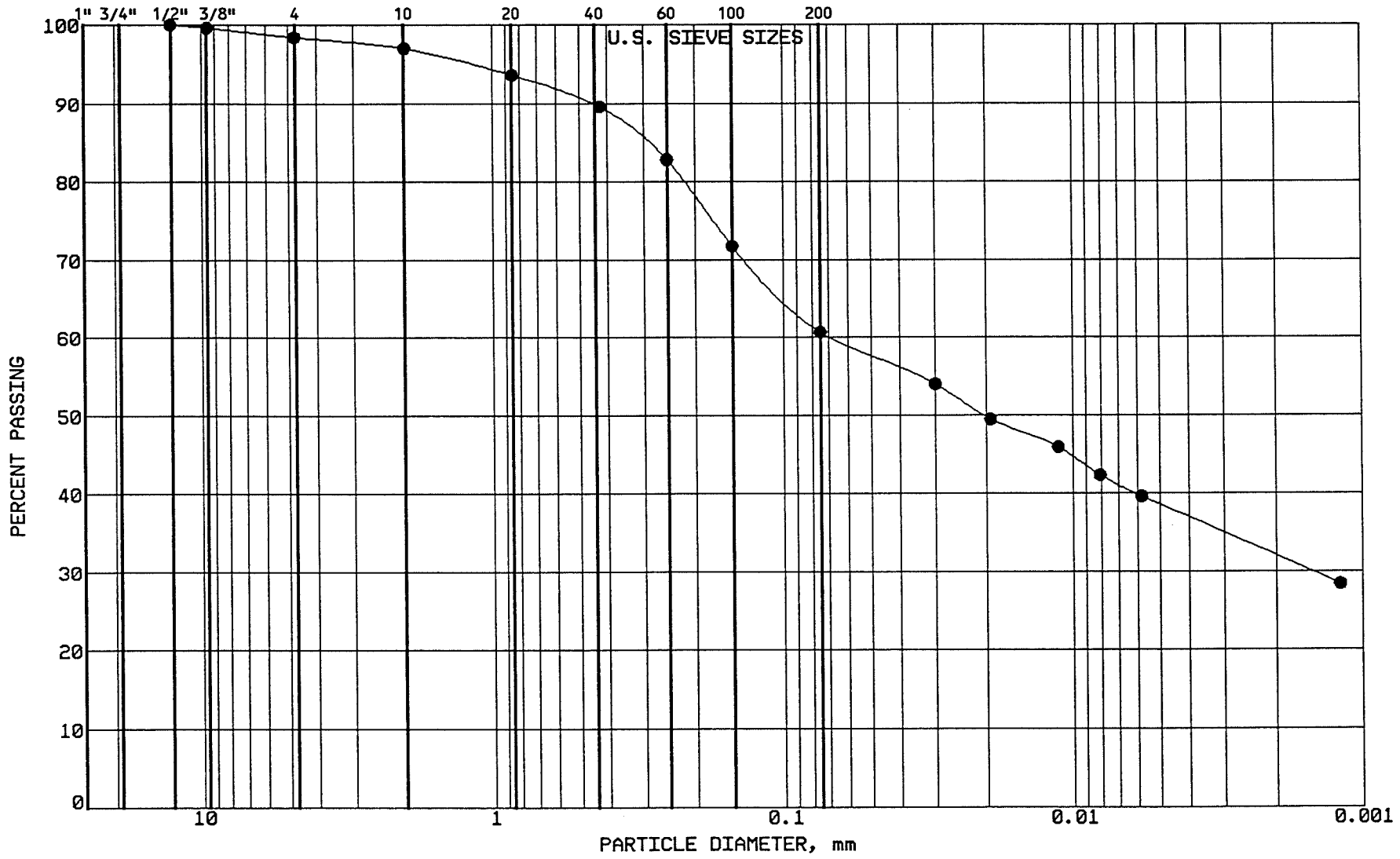
GRAVEL	2.0 %
SAND	35.0 %
SILT	22.7 %
CLAY	40.3 %
P 200	63.0 %

SOIL PROPERTIES

LL: 41.0%
PL: 14.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

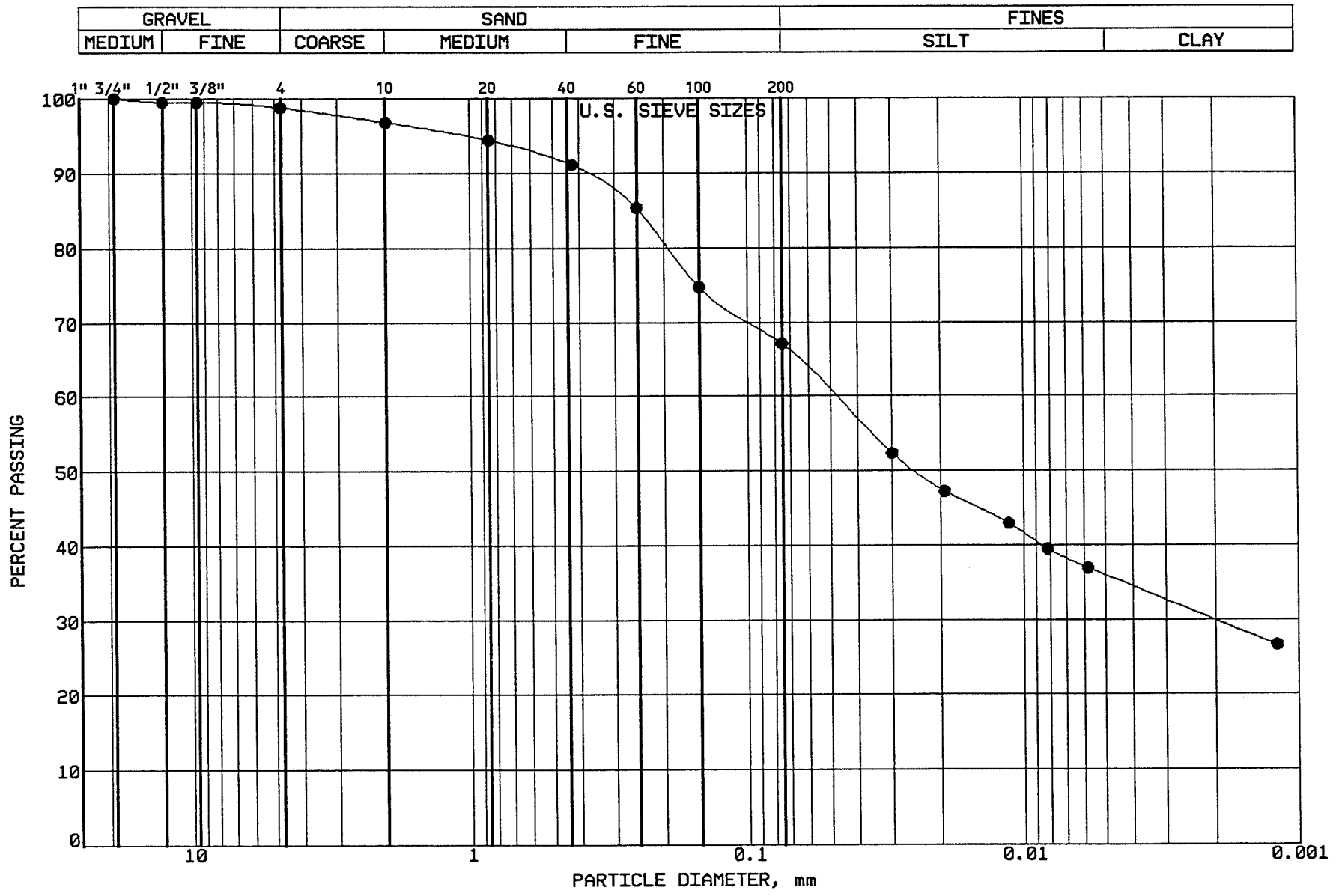
LOCATION: N 43463.0, E 43502.0
SAMPLE: SG-CC-44 TUBE #:
ELEVATION: 1888.9'

GRAVEL	1.6 %
SAND	37.7 %
SILT	22.2 %
CLAY	38.5 %
P 200	60.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

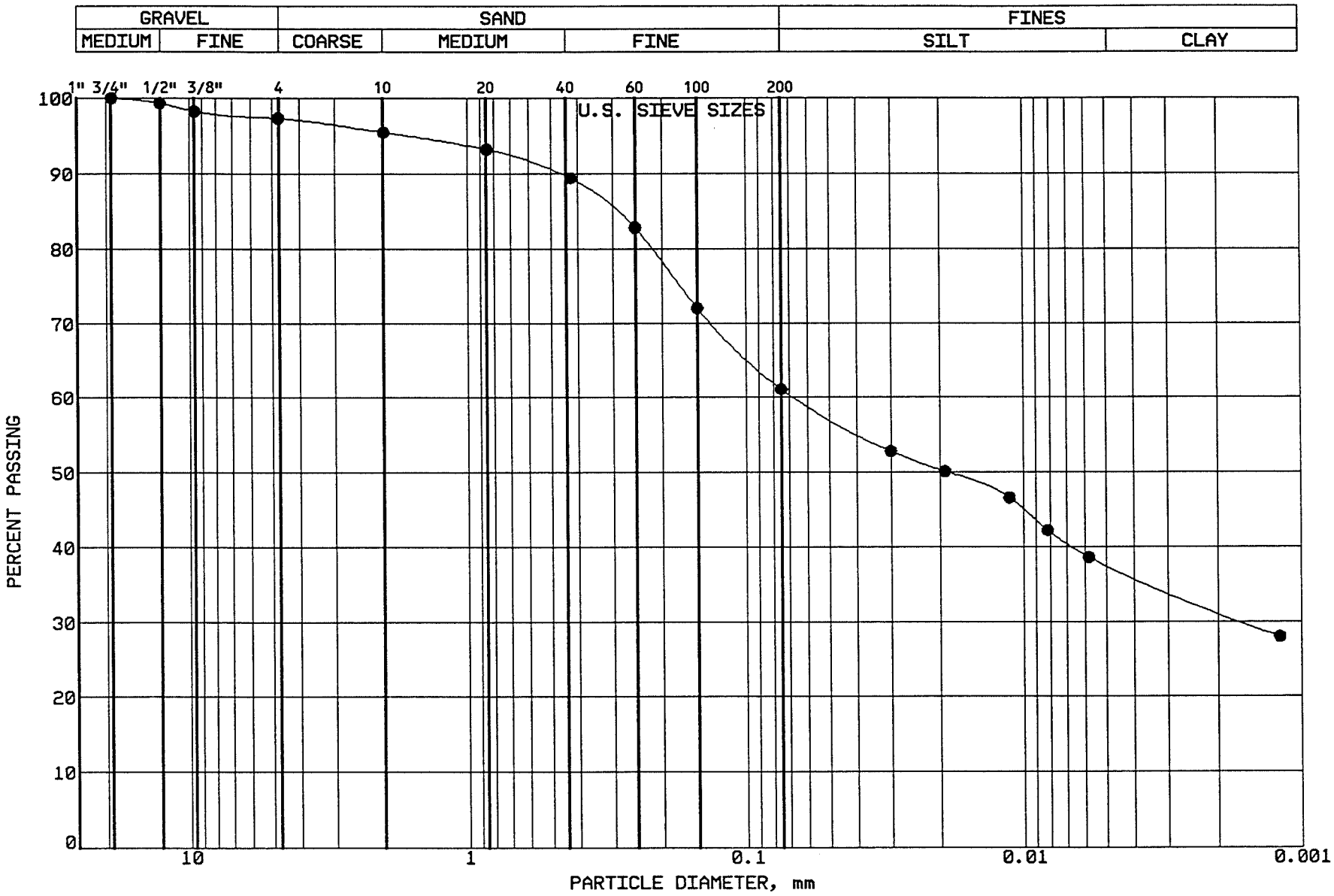
LOCATION: N 43459.0, E 43701.0
SAMPLE: SG-CC-45 TUBE #:
ELEVATION: 1889.1'

GRAVEL	1.2 %
SAND	31.7 %
SILT	31.2 %
CLAY	35.9 %
P 200	67.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43455.0, E 43899.0
SAMPLE: SG-CC-46 TUBE #:
ELEVATION: 1888.5'

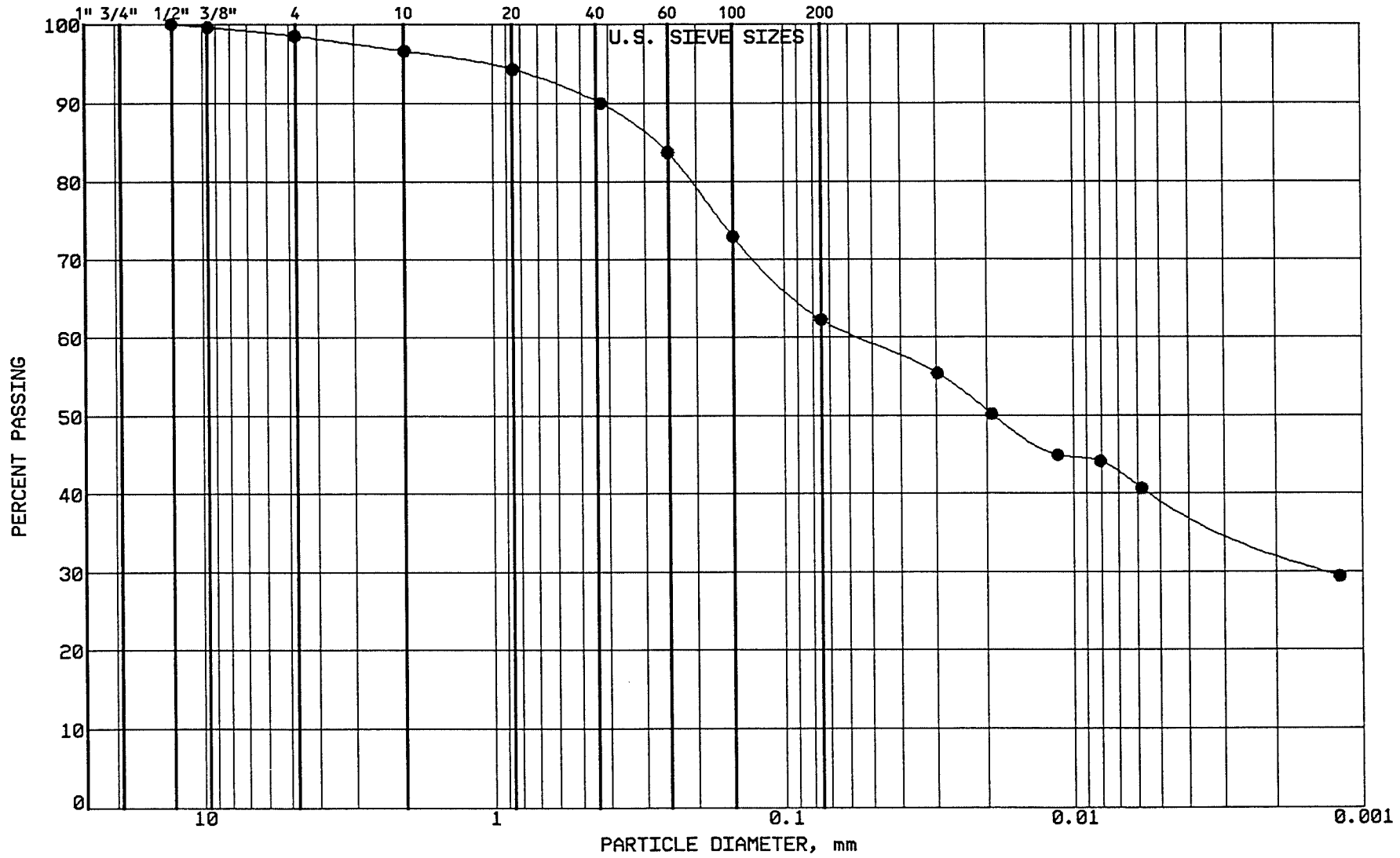
GRAVEL	2.7 %
SAND	36.2 %
SILT	23.5 %
CLAY	37.6 %
P 200	61.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43457.0, E 44086.0
SAMPLE: SG-CC-47 TUBE #:
ELEVATION: 1888.5'

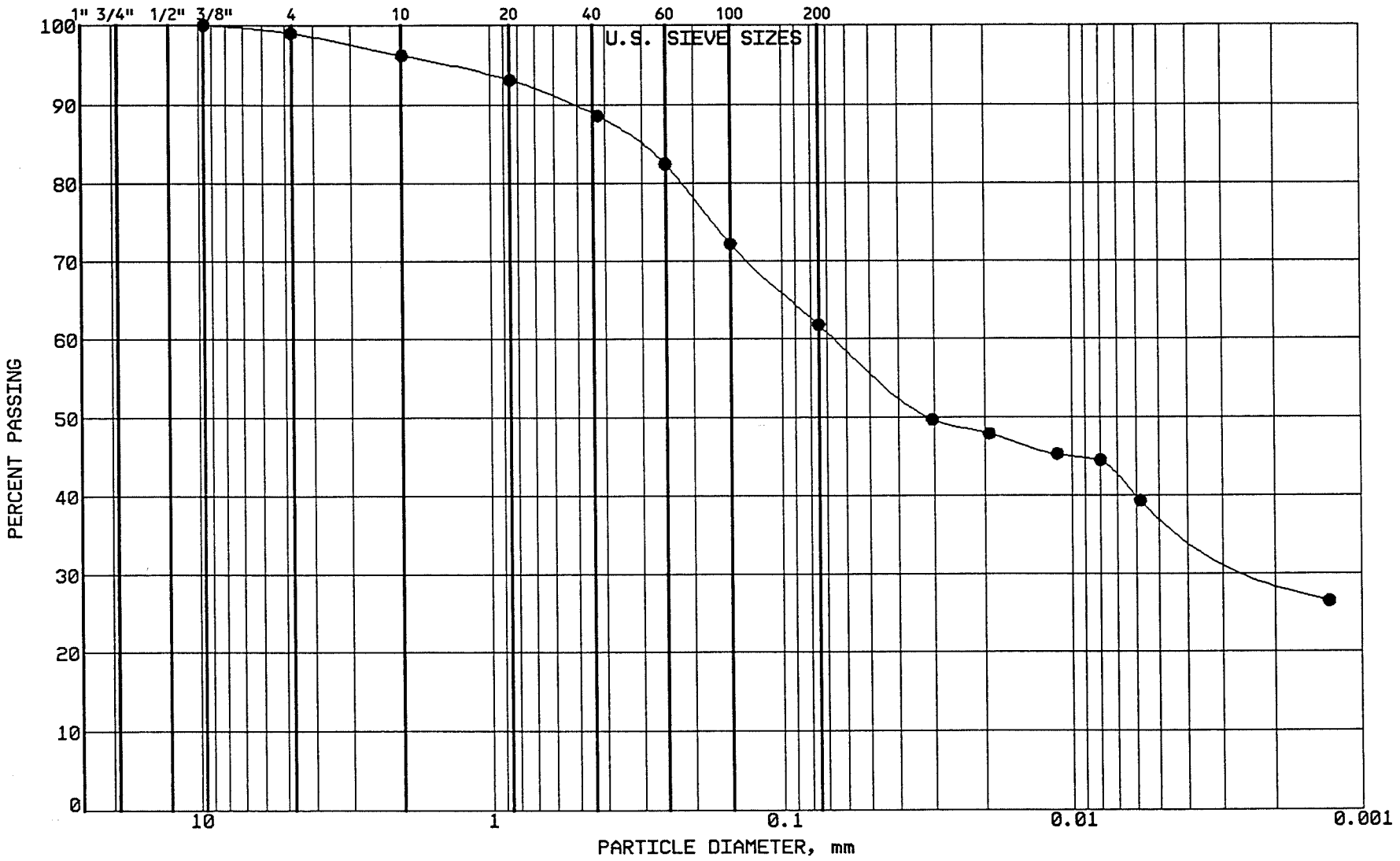
GRAVEL	1.5 %
SAND	36.2 %
SILT	22.8 %
CLAY	39.5 %
P 200	62.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43459.0, E 44280.0
SAMPLE: SG-CC-48 TUBE #:
ELEVATION: 1889.0'

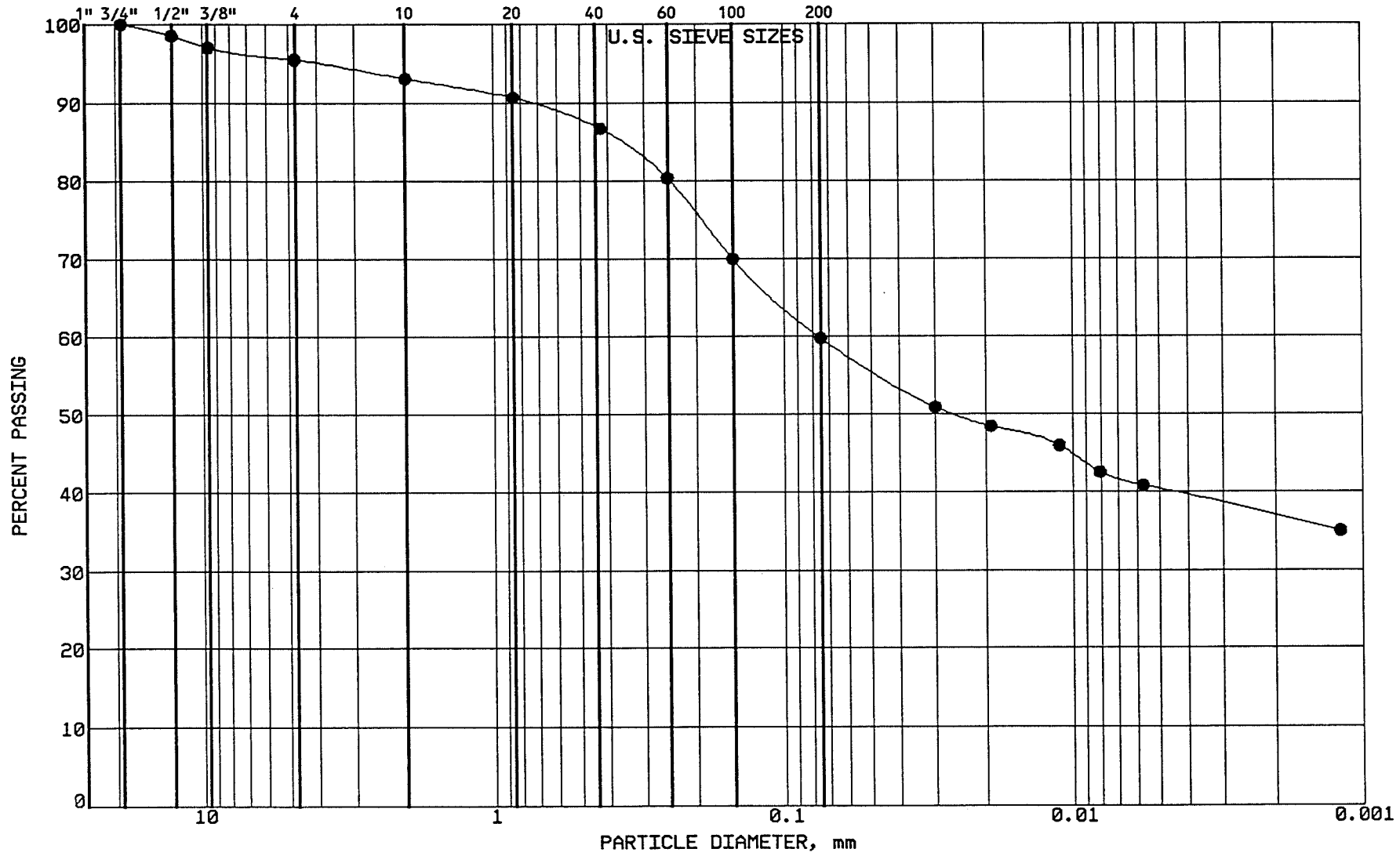
GRAVEL	1.0 %
SAND	37.2 %
SILT	23.8 %
CLAY	38.0 %
P 200	61.8 %

SOIL PROPERTIES

LL: 44.0%
PL: 16.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

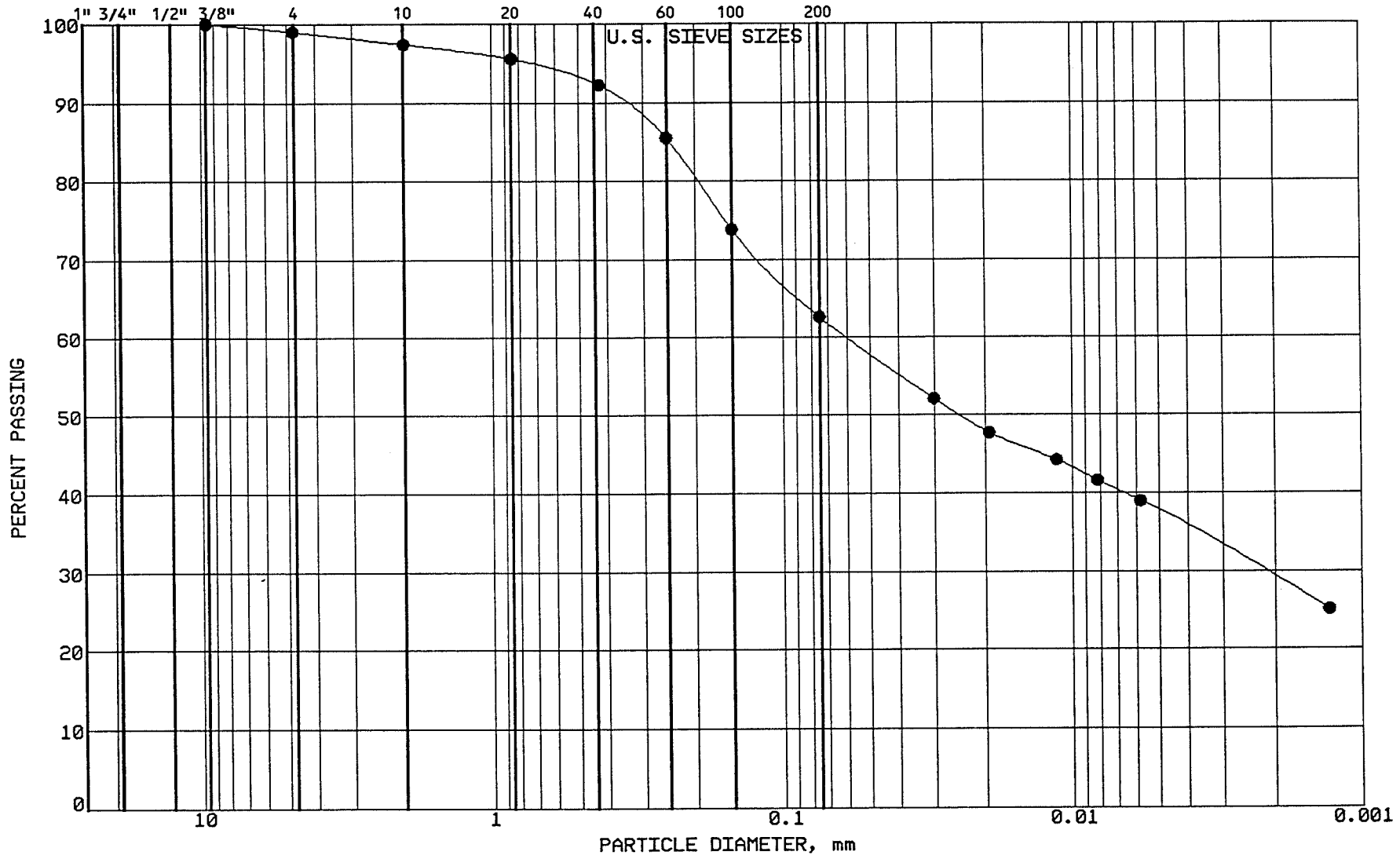
LOCATION: N 43457.0, E 44503.0
SAMPLE: SG-CC-49 TUBE #:
ELEVATION: 1889.1'

GRAVEL	4.5 %
SAND	35.7 %
SILT	19.5 %
CLAY	40.3 %
P 200	59.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43463.0, E 43896.0
SAMPLE: CLSCC050 TUBE #: ST-13A
ELEVATION: 1890.6'

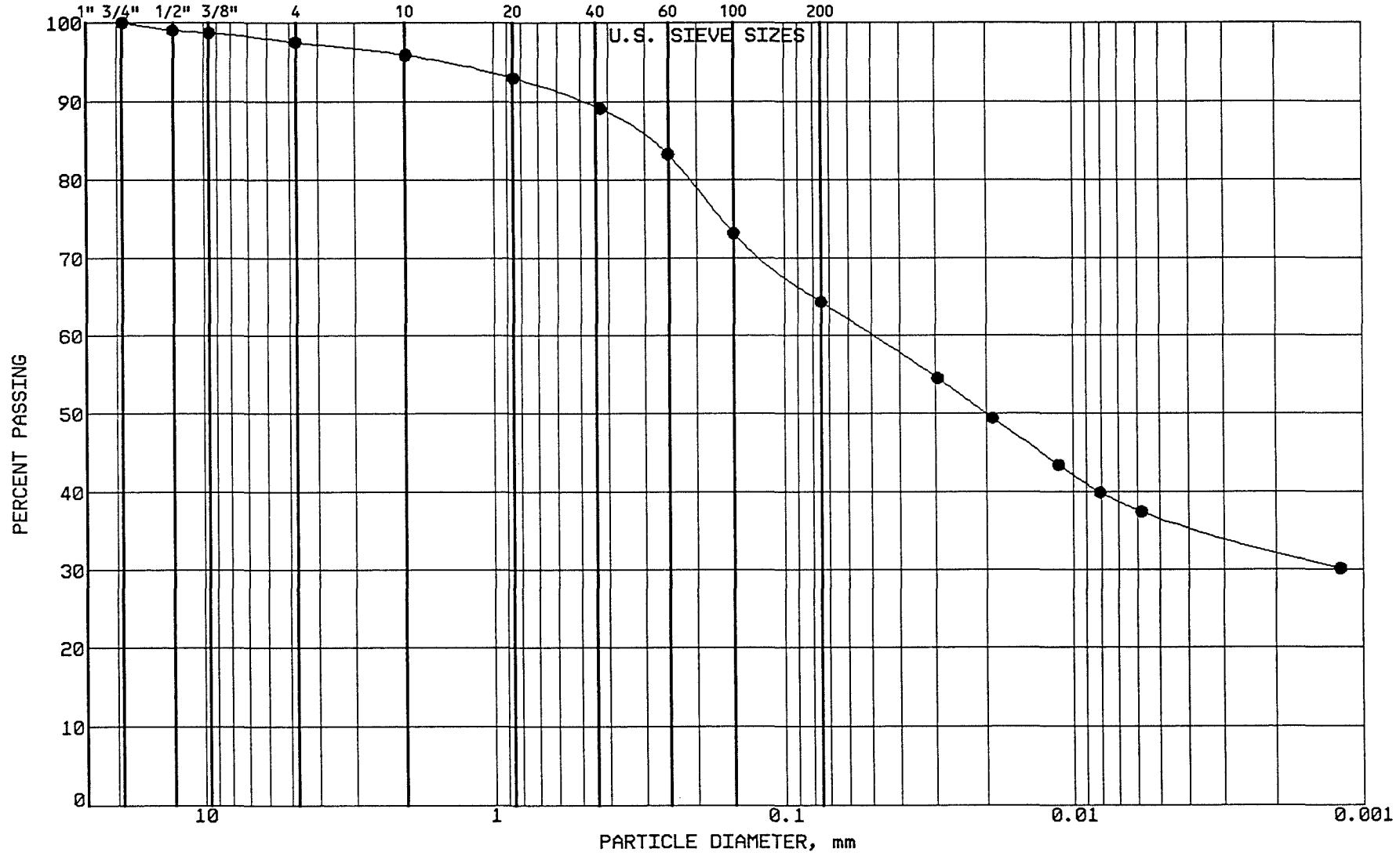
GRAVEL	1.0 %
SAND	36.4 %
SILT	25.0 %
CLAY	37.6 %
P 200	62.6 %

SOIL PROPERTIES

LL: 40.0%
PL: 15.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43465.0, E 44495.0
SAMPLE: CLSCC051 TUBE #: ST-14A
ELEVATION: 1891.2'

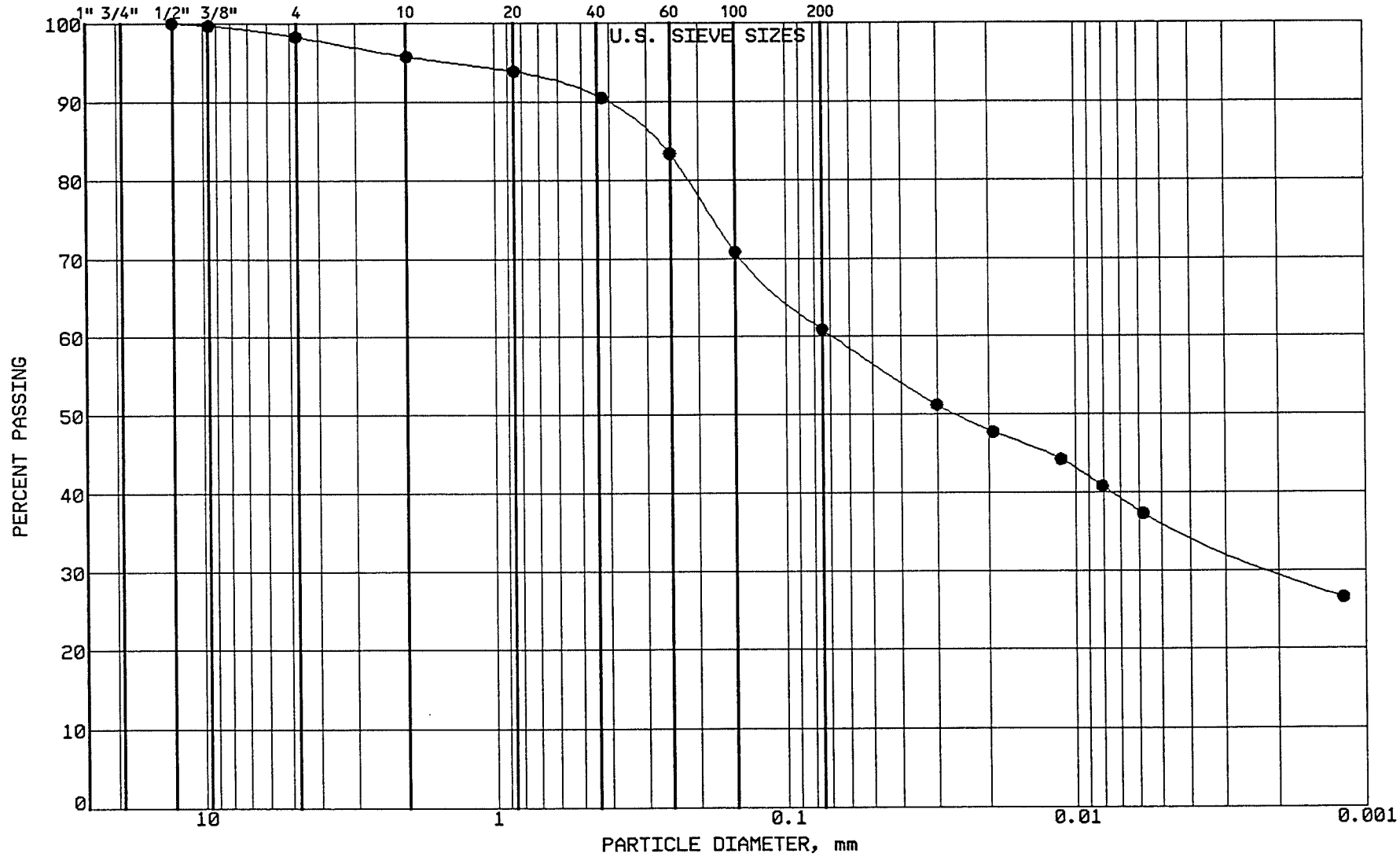
GRAVEL	2.5 %
SAND	33.2 %
SILT	27.6 %
CLAY	36.7 %
P 200	64.3 %

SOIL PROPERTIES

LL: 44.0%
PL: 16.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

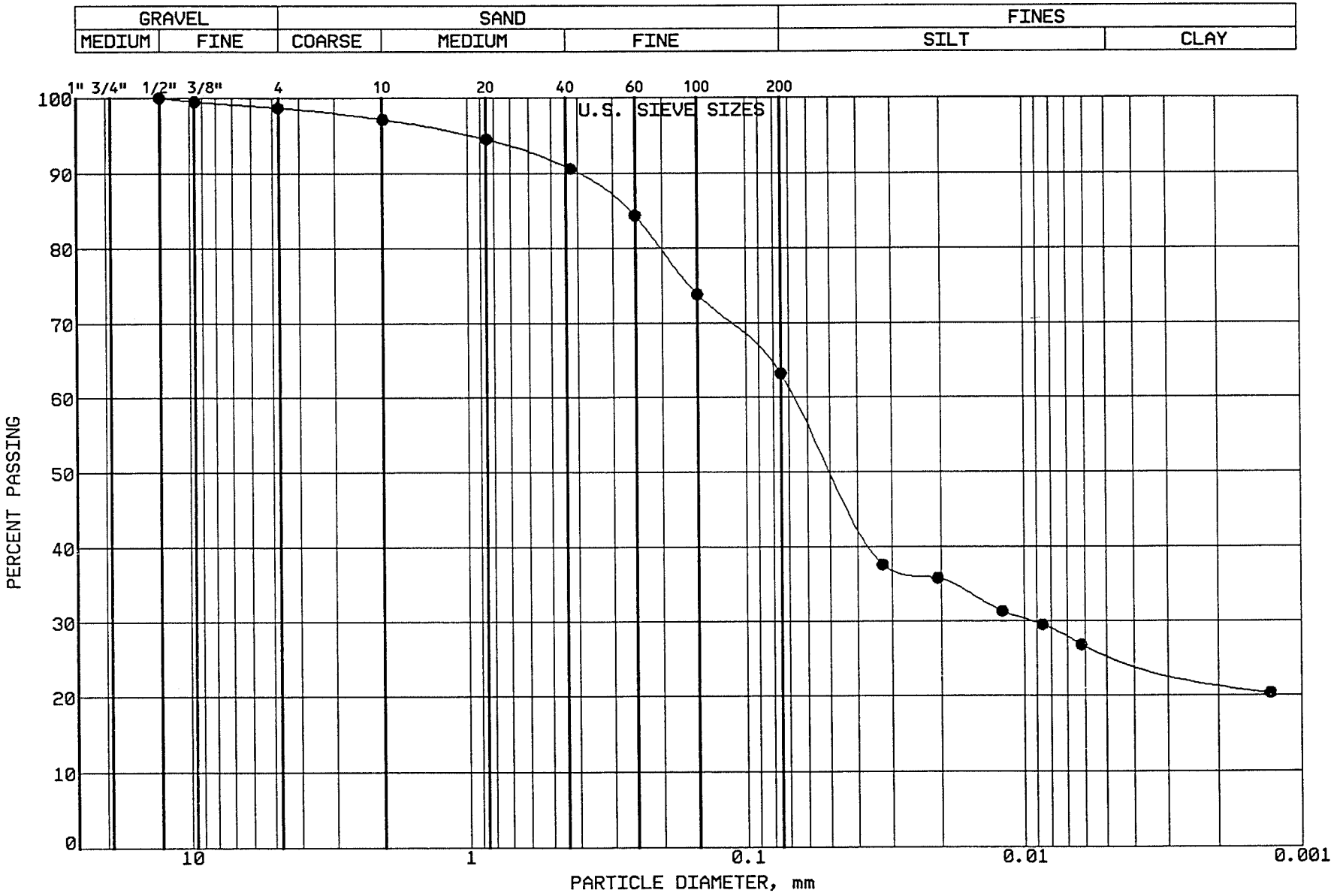
LOCATION: N 43462.0, E 44762.0
SAMPLE: CLSCC052 TUBE #:
ELEVATION: 1890.5'

GRAVEL	1.7 %
SAND	37.4 %
SILT	24.6 %
CLAY	36.3 %
P 200	60.9 %

SOIL PROPERTIES

LL: 40.0%
PL: 14.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

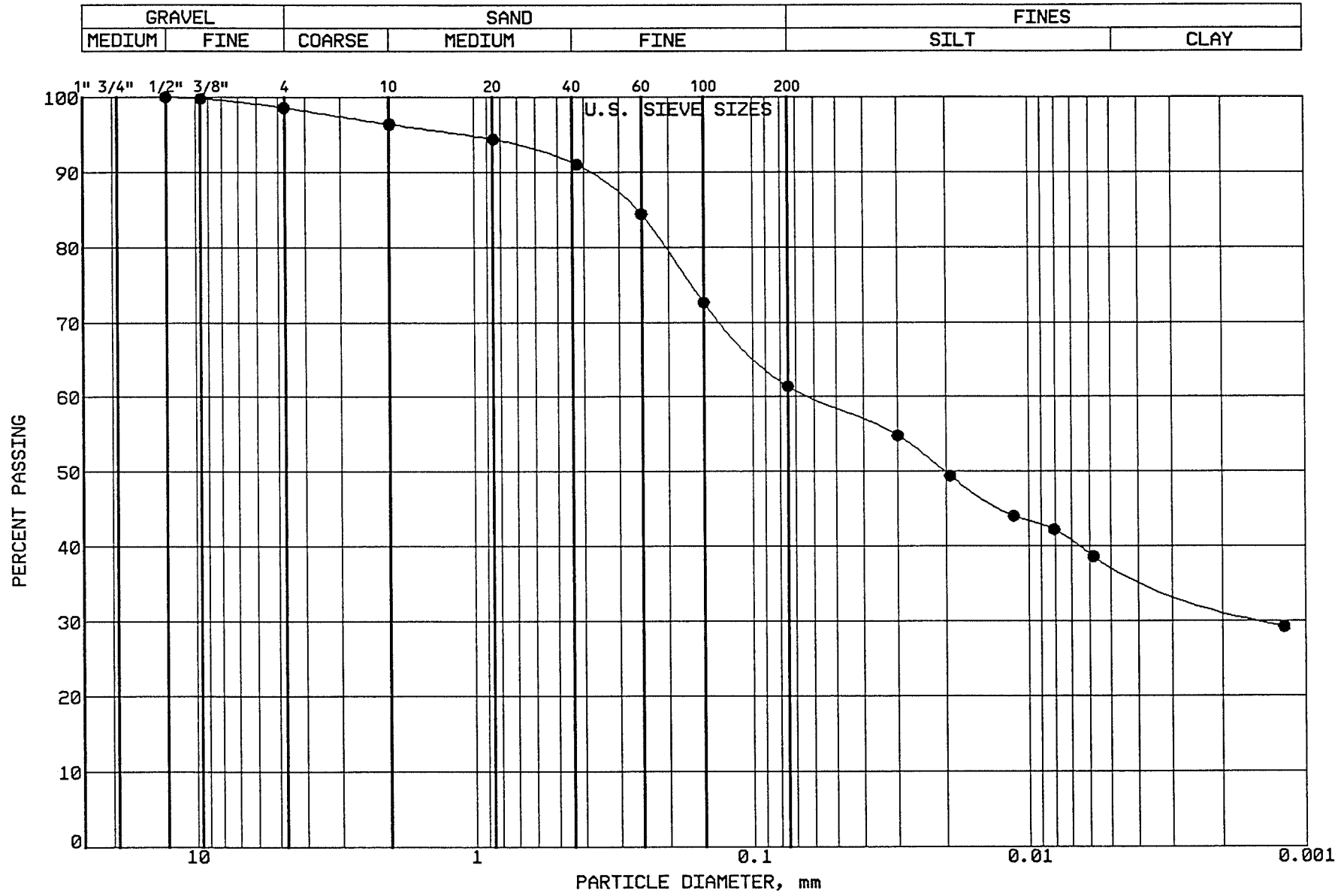
LOCATION: N 43405.0, E 44738.0
SAMPLE: CLSCC053 TUBE #: ST-15A
ELEVATION: 1903.6'

GRAVEL	1.3 %
SAND	35.5 %
SILT	37.3 %
CLAY	25.9 %
P 200	63.2 %

SOIL PROPERTIES

LL: 41.0%
PL: 14.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43482.0, E 45299.0
SAMPLE: CLSCC054 TUBE #: ST-16A
ELEVATION: 1897.7'

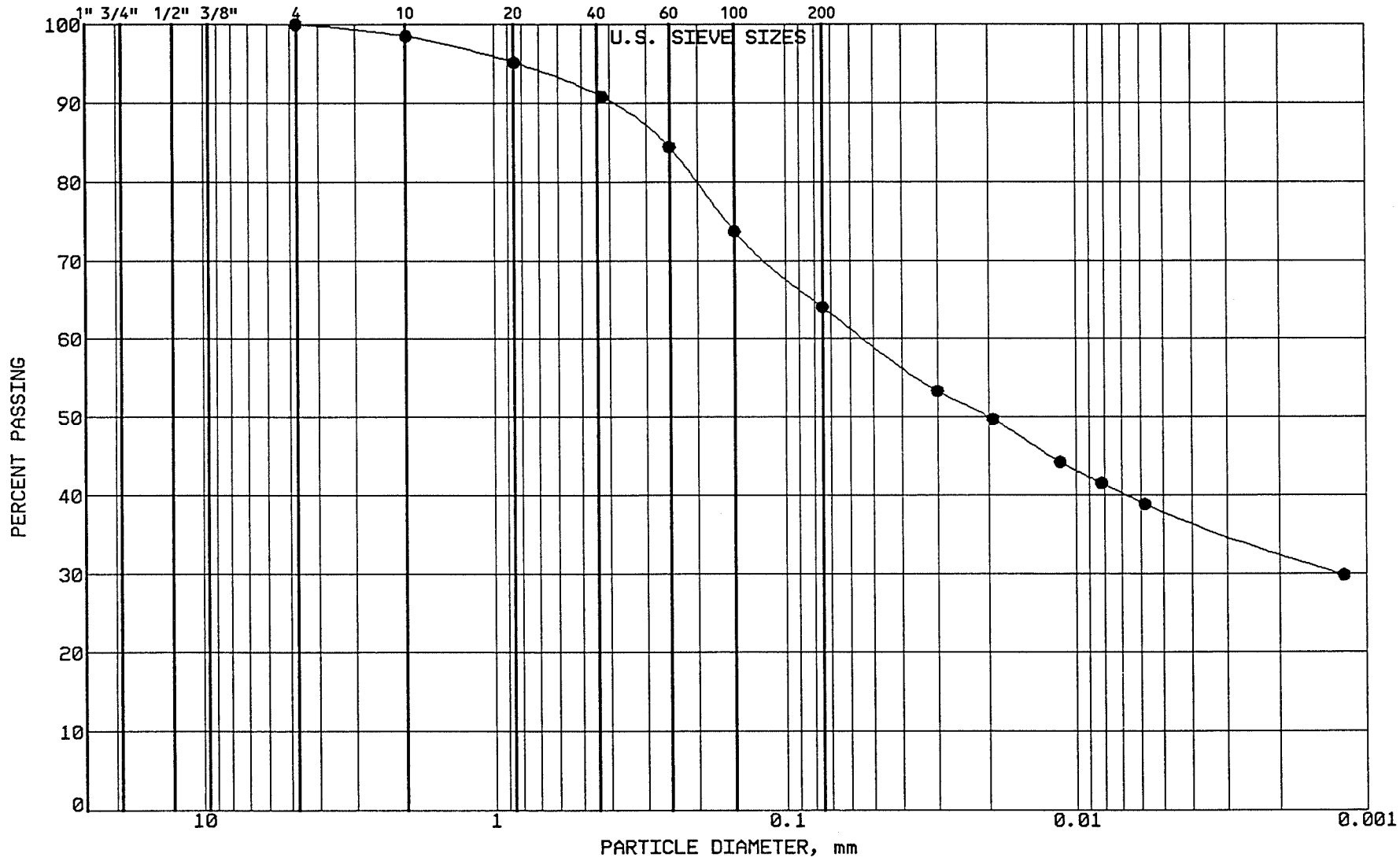
GRAVEL	1.4 %
SAND	37.2 %
SILT	23.7 %
CLAY	37.7 %
P 200	61.4 %

SOIL PROPERTIES

LL: 41.0%
PL: 16.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43483.0, E 45104.0
SAMPLE: CLSCC055 TUBE #:
ELEVATION: 1898.1'

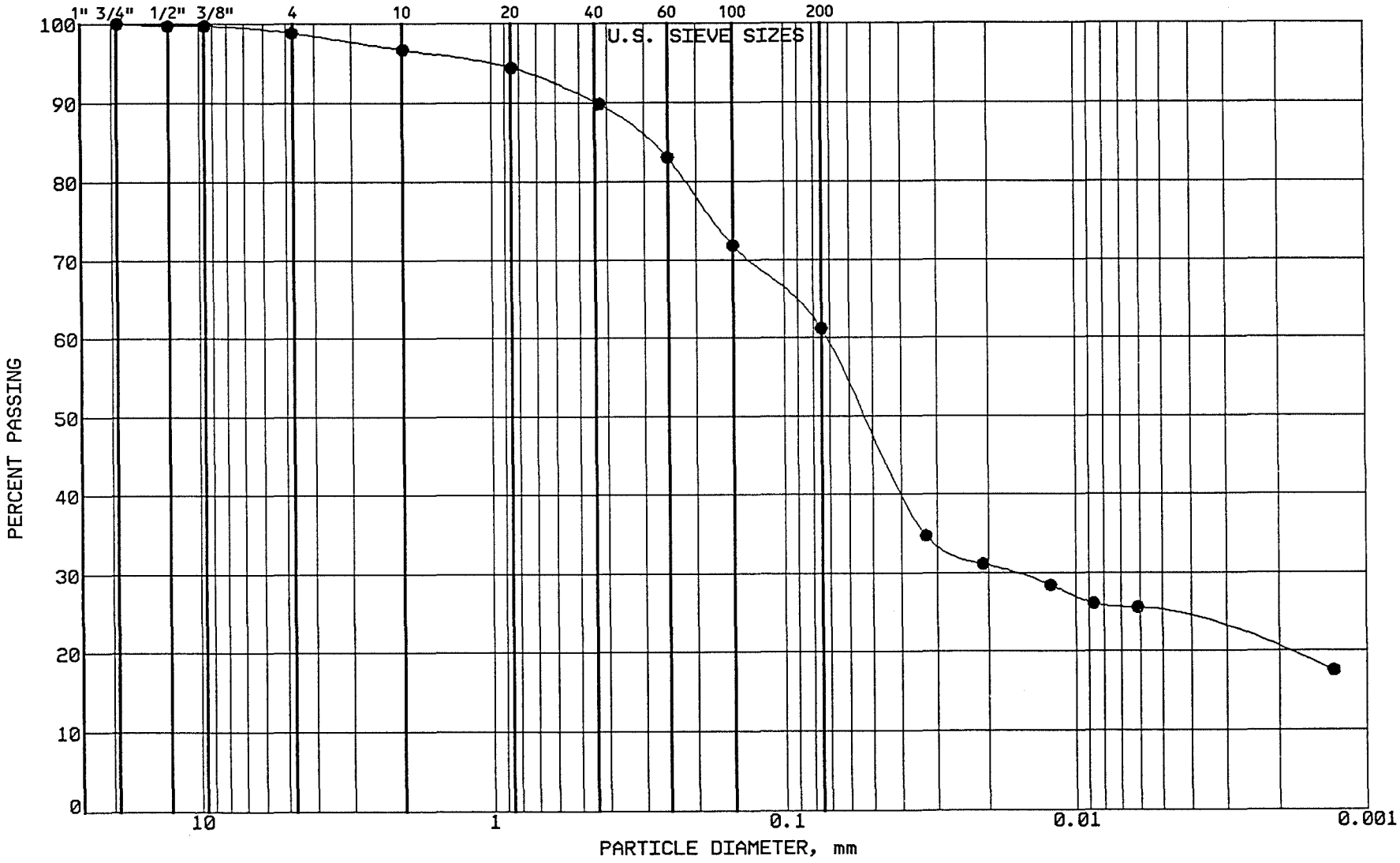
GRAVEL	0.0 %
SAND	36.0 %
SILT	26.0 %
CLAY	38.0 %
P 200	64.0 %

SOIL PROPERTIES

LL: 41.0%
PL: 14.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43472.0, E 43704.0
SAMPLE: CLSCC056 TUBE #: ST-17A
ELEVATION: 1894.2'

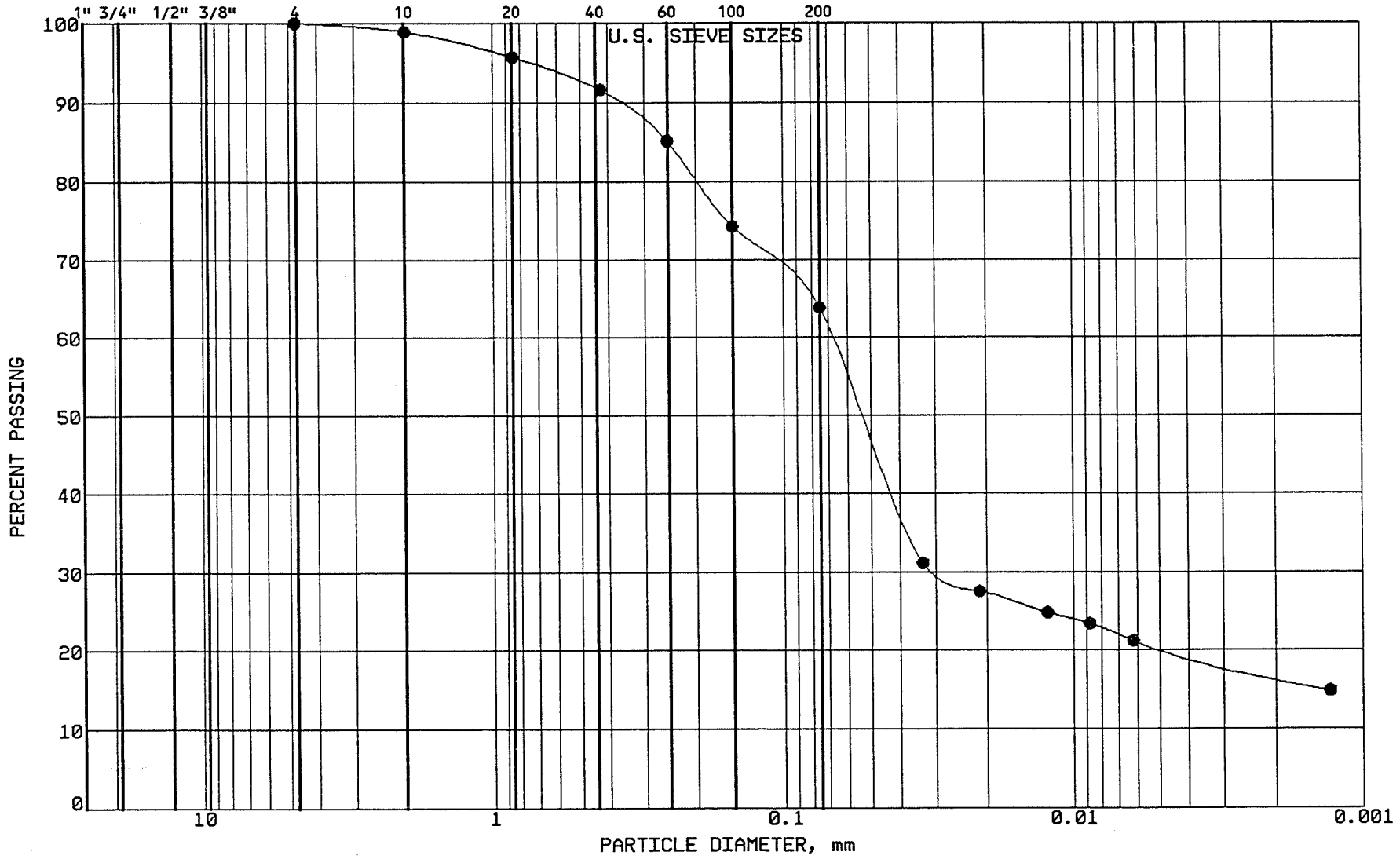
GRAVEL	1.2 %
SAND	37.6 %
SILT	36.6 %
CLAY	24.6 %
P 200	61.2 %

SOIL PROPERTIES

LL: 40.0%
PL: 15.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43473.0, E 44298.0
SAMPLE: CLSCC057 TUBE #:
ELEVATION: 1894.5'

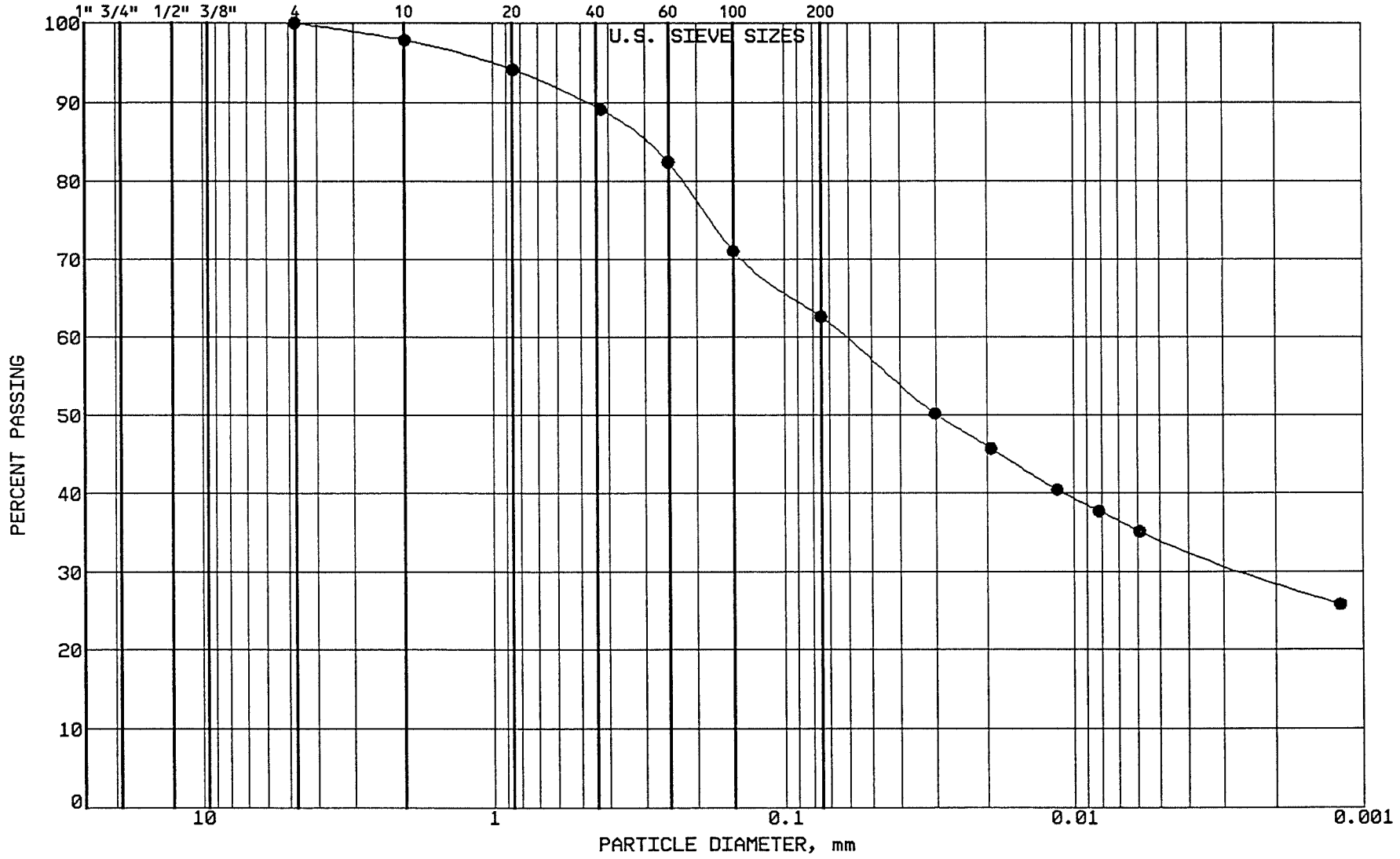
GRAVEL	0.0 %
SAND	36.2 %
SILT	43.5 %
CLAY	20.3 %
P 200	63.8 %

SOIL PROPERTIES

LL: 39.0%
PL: 14.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL) ol

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43481.0, E 44502.0
SAMPLE: CLSCC058 TUBE #:
ELEVATION: 1896.8'

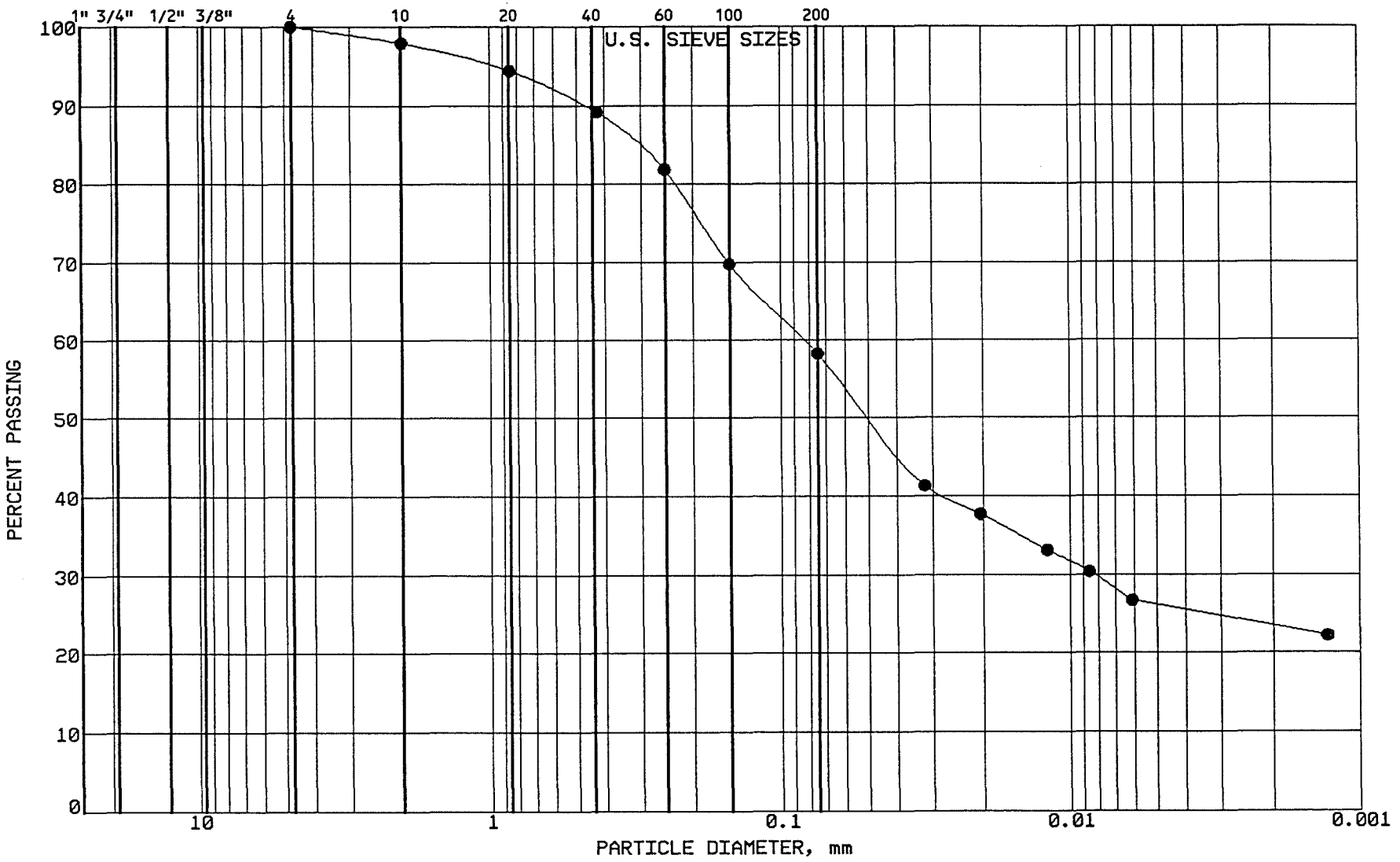
GRAVEL	0.0 %
SAND	37.4 %
SILT	28.5 %
CLAY	34.1 %
P 200	62.6 %

SOIL PROPERTIES

LL: 41.0%
PL: 15.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

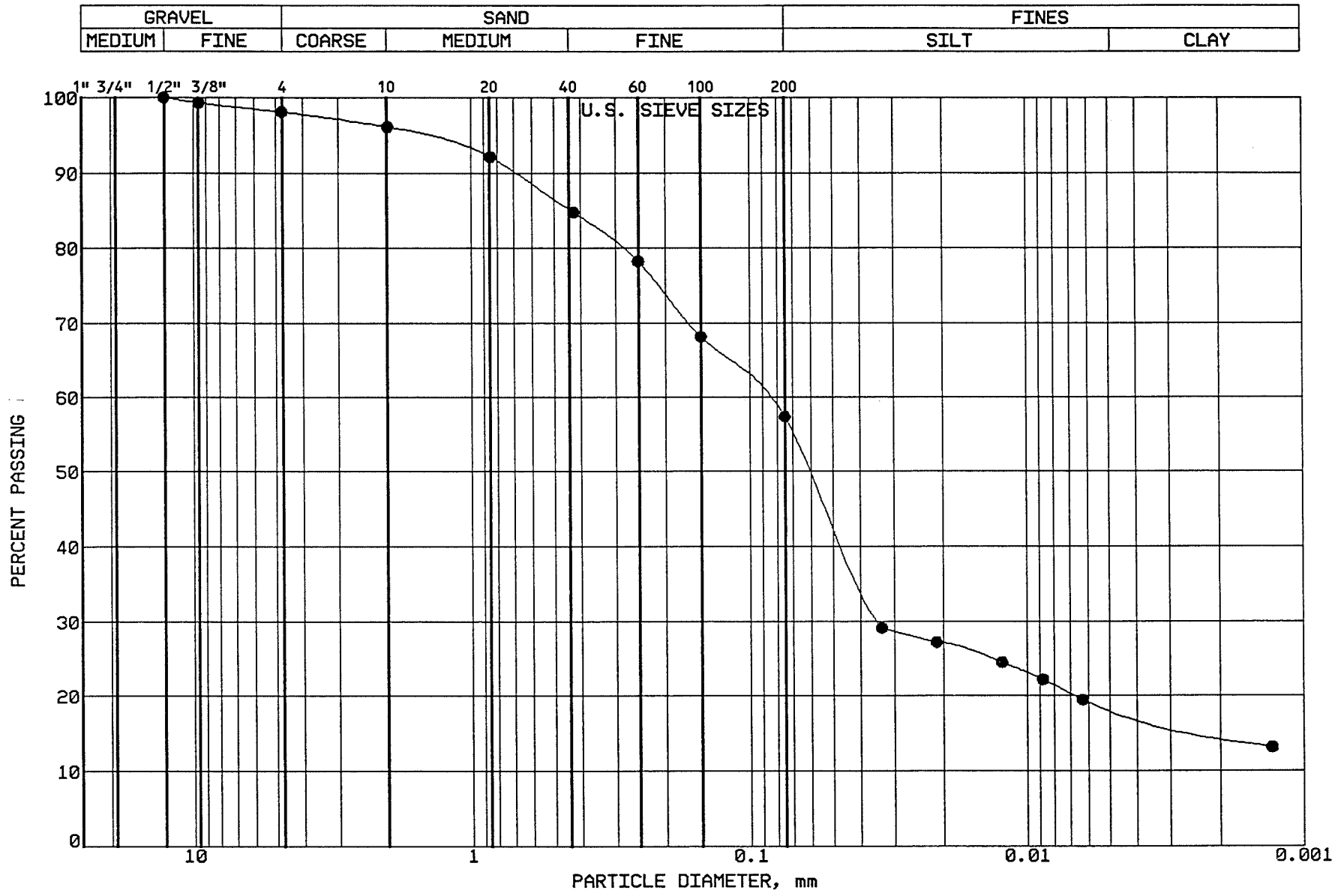
LOCATION: N 42602.0, E 45965.0
SAMPLE: CLSCC059 TUBE #:
ELEVATION: 1895.3'

GRAVEL	0.0 %
SAND	41.7 %
SILT	32.2 %
CLAY	26.1 %
P 200	58.3 %

SOIL PROPERTIES

LL: 41.0%
PL: 14.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43484.0, E 43996.0
SAMPLE: CLSCC060 TUBE #: ST-18A
ELEVATION: 1898.3'

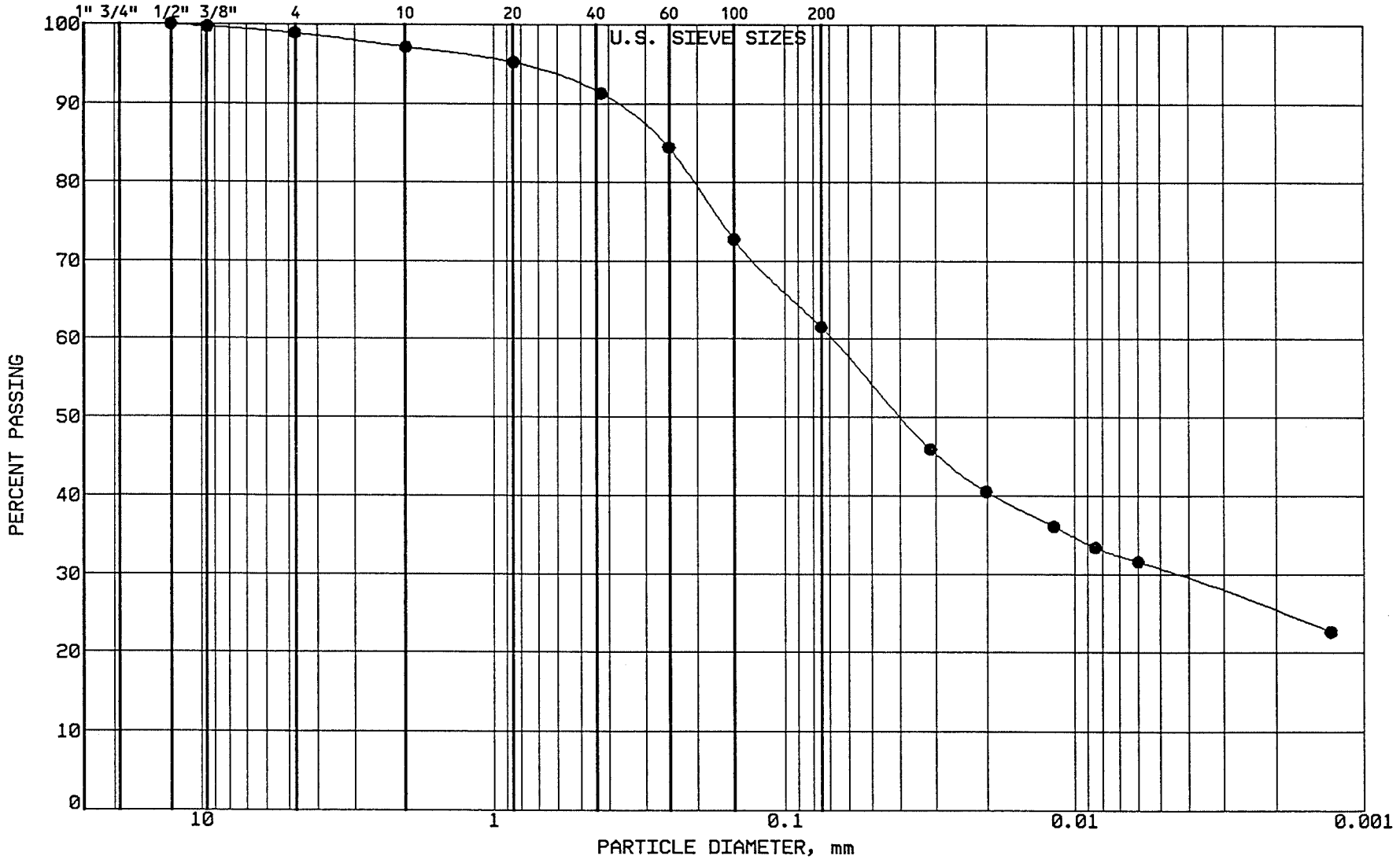
GRAVEL	1.9 %
SAND	40.7 %
SILT	38.8 %
CLAY	18.6 %
P 200	57.4 %

SOIL PROPERTIES

LL: 42.0%
PL: 15.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42998.0, E 45973.0
SAMPLE: CLSCC061 TUBE #: ST-19A
ELEVATION: 1897.5'

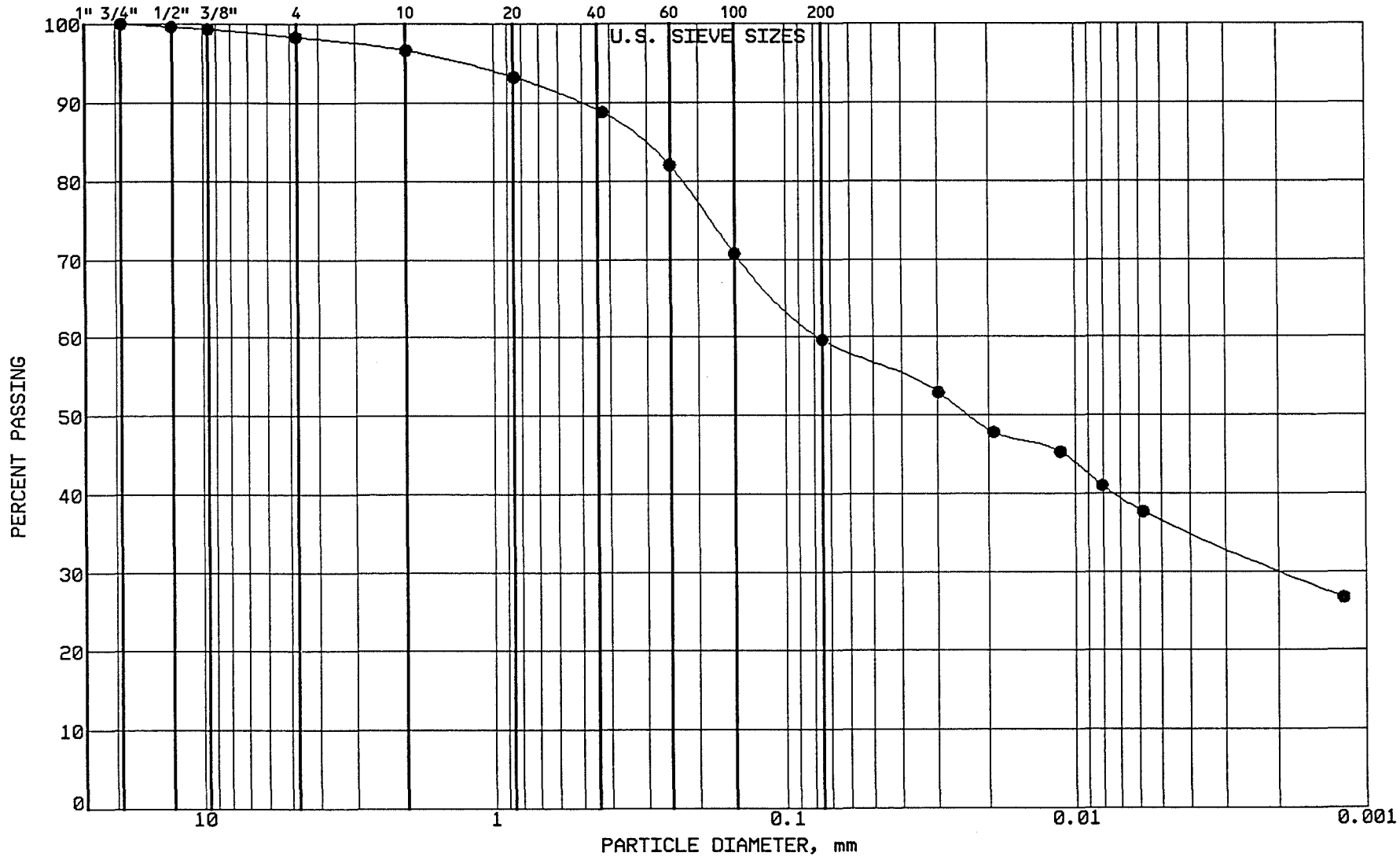
GRAVEL	1.1 %
SAND	37.4 %
SILT	31.0 %
CLAY	30.5 %
P 200	61.5 %

SOIL PROPERTIES

LL: 42.0%
PL: 16.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43479.0, E 44198.0
SAMPLE: CLSCC062 TUBE #: ST-20A
ELEVATION: 1898.2'

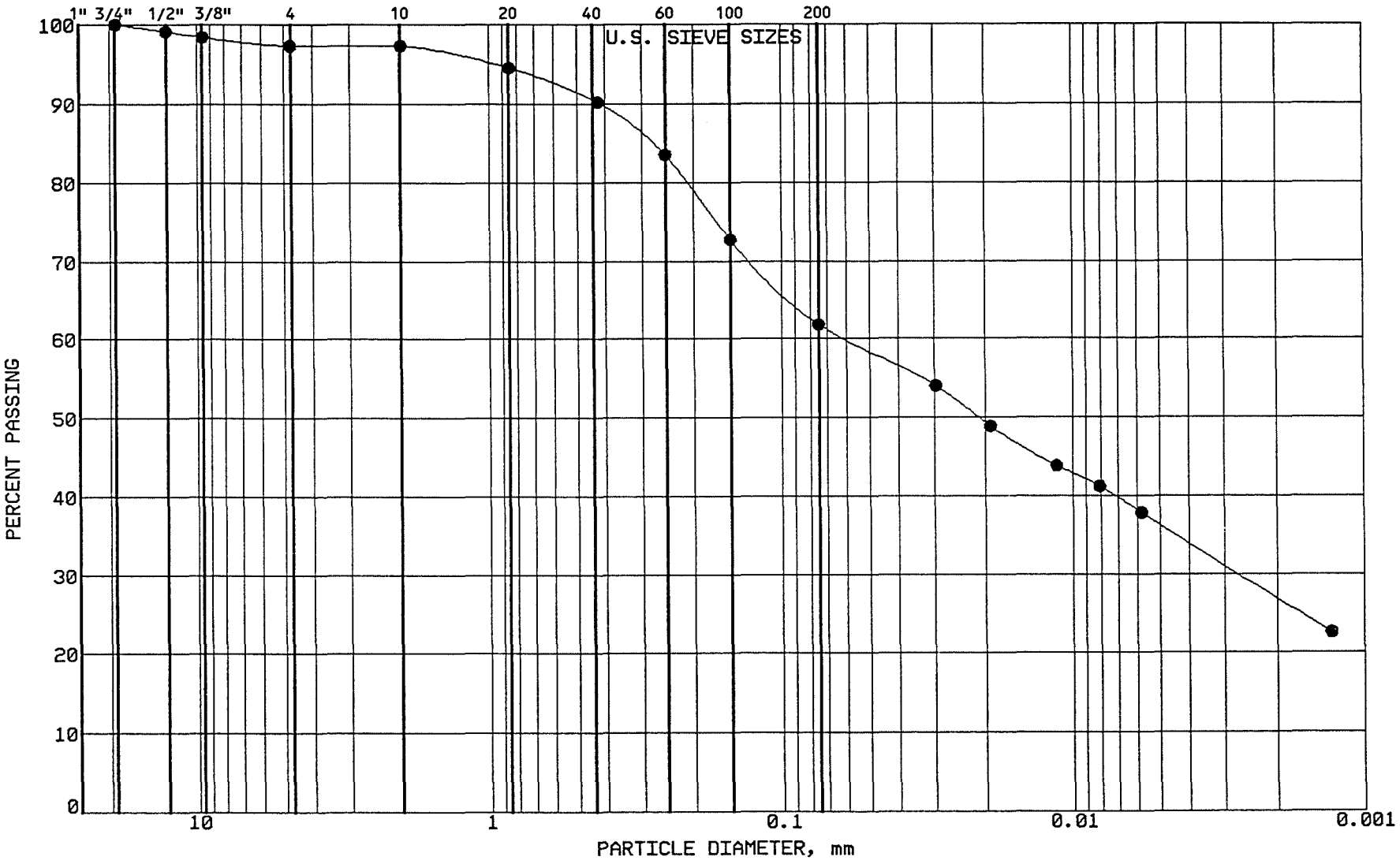
GRAVEL	1.7 %
SAND	38.7 %
SILT	22.9 %
CLAY	36.7 %
P 200	59.6 %

SOIL PROPERTIES

LL: 41.0%
PL: 15.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43482.0, E 44401.0
SAMPLE: CLSCC063 TUBE #: ST-21A
ELEVATION: 1898.1'

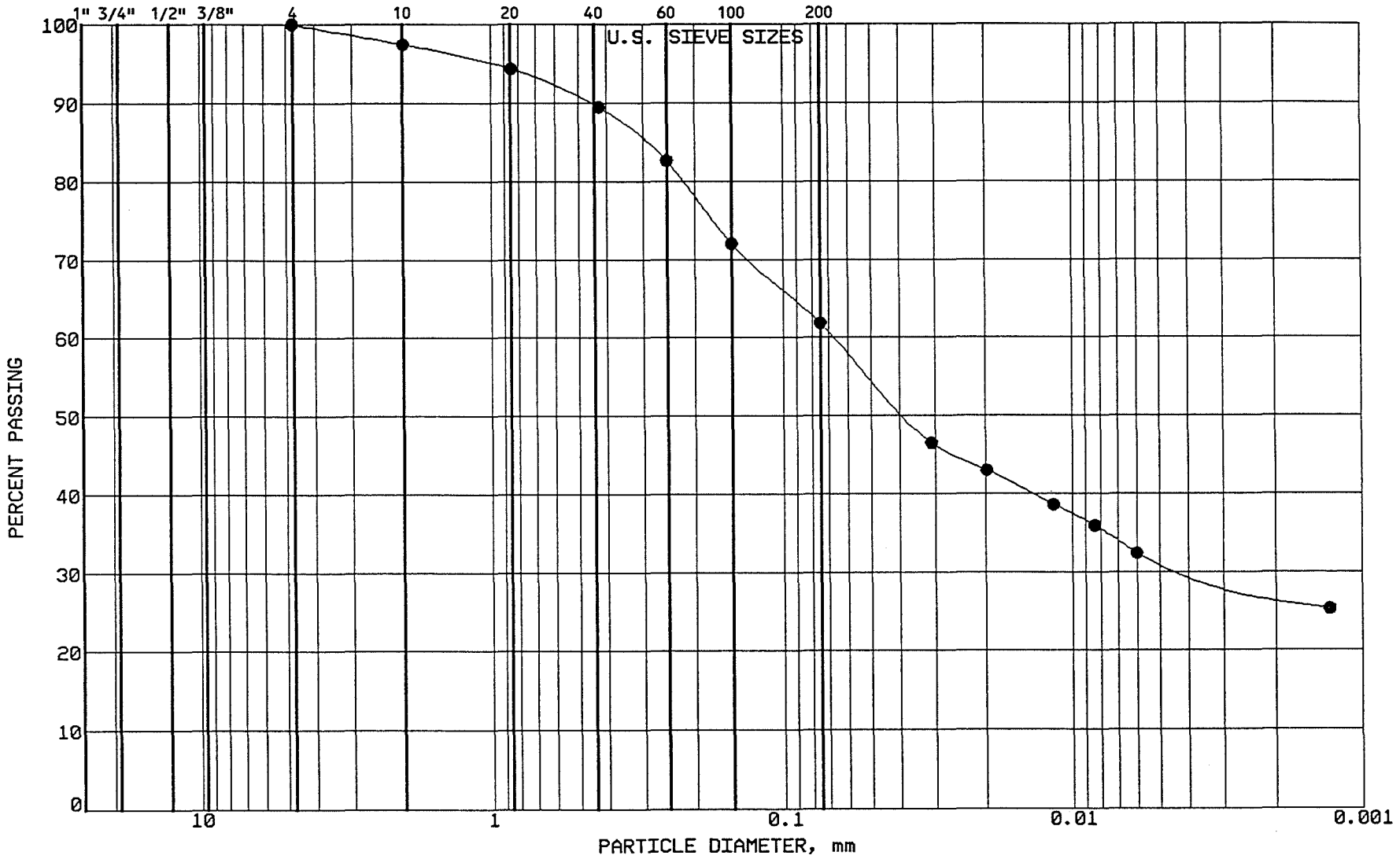
GRAVEL	2.7 %
SAND	35.5 %
SILT	25.5 %
CLAY	36.3 %
P 200	61.8 %

SOIL PROPERTIES

LL: 42.0%
PL: 16.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43484.0, E 44752.0
SAMPLE: CLSCC064 TUBE #:
ELEVATION: 1899.1'

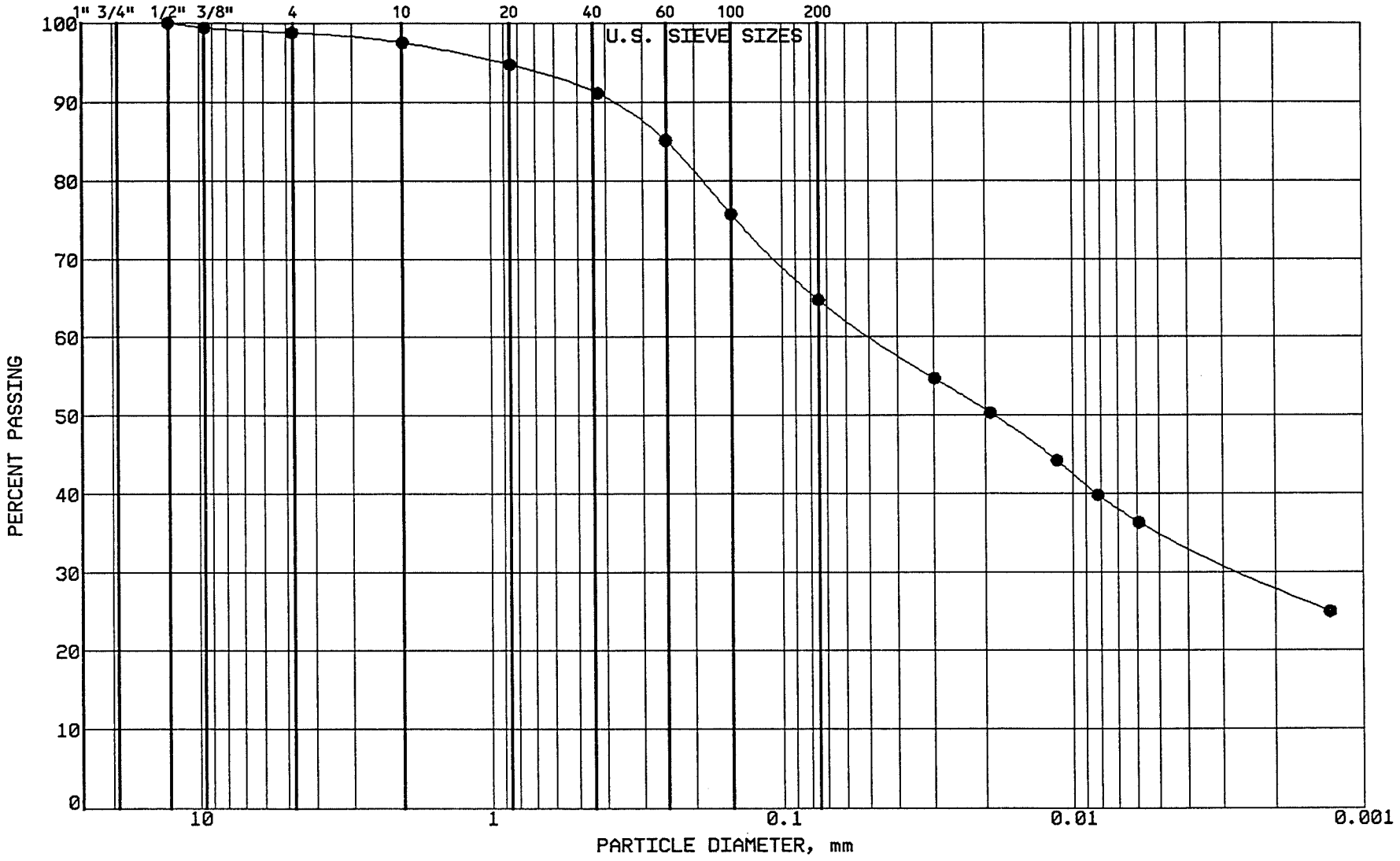
GRAVEL	0.0 %
SAND	38.2 %
SILT	30.2 %
CLAY	31.6 %
P 200	61.8 %

SOIL PROPERTIES

LL: 43.0%
PL: 15.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

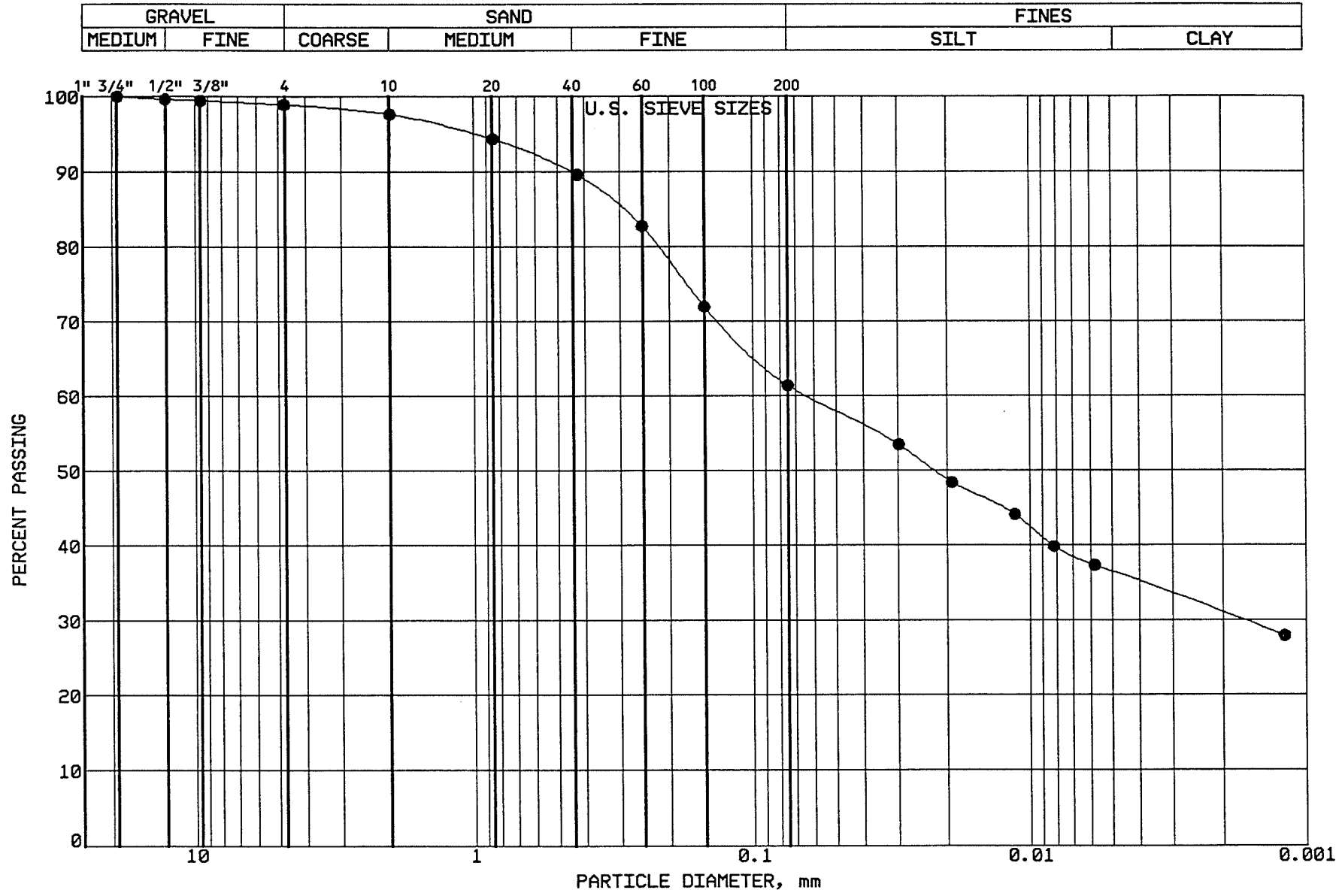
LOCATION: N 42585.0, E 45200.0
SAMPLE: SG-CC-65 TUBE #:
ELEVATION: 1878.7'

GRAVEL	1.2 %
SAND	34.1 %
SILT	29.6 %
CLAY	35.1 %
P 200	64.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

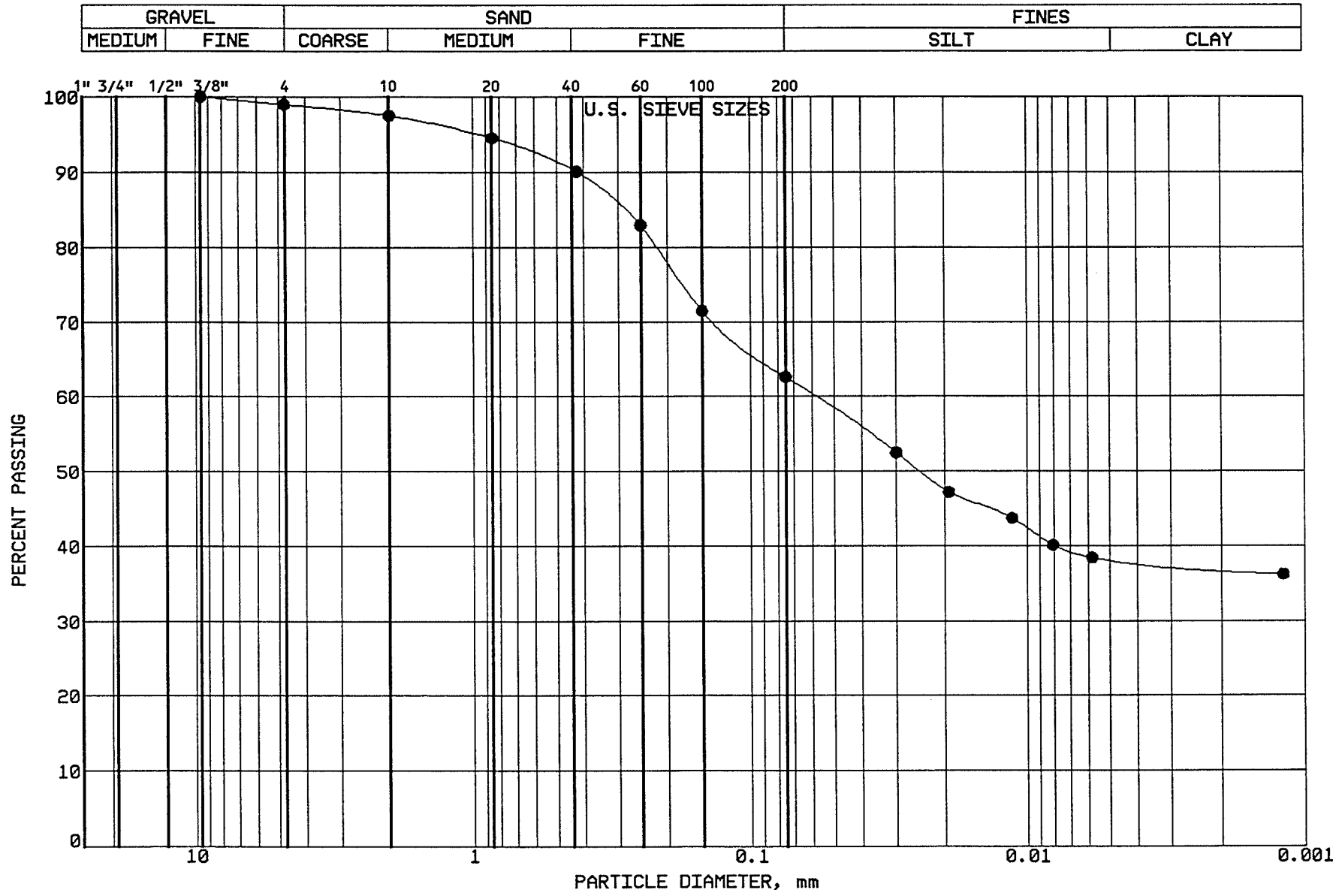
LOCATION: N 42603.0, E 45691.0
SAMPLE: SG-CC-66 TUBE #:
ELEVATION: 1876.8'

GRAVEL	1.1 %
SAND	37.5 %
SILT	25.0 %
CLAY	36.4 %
P 200	61.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

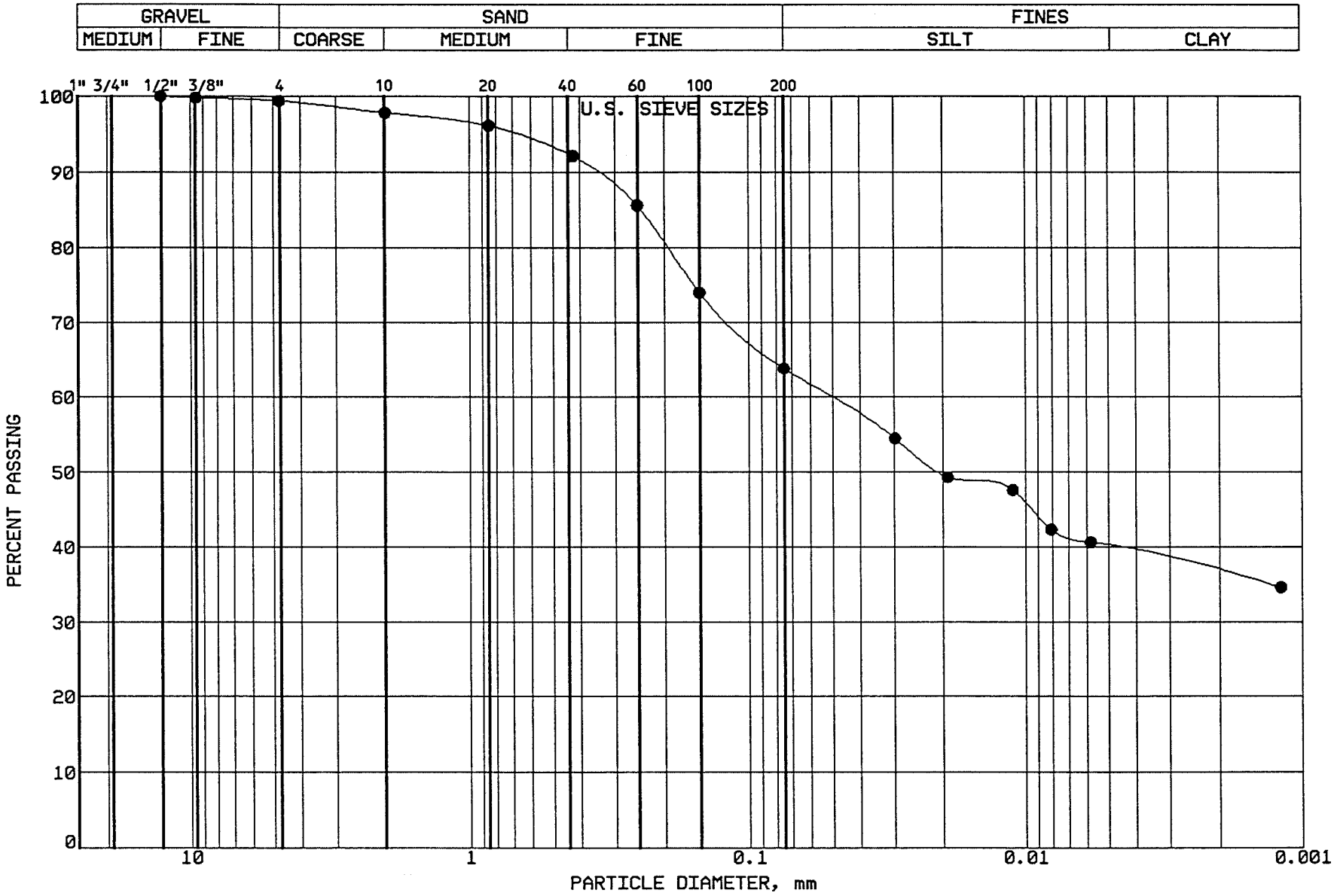
LOCATION: N 42589.0, E 45304.0
SAMPLE: SG-CC-67 TUBE #:
ELEVATION: 1879.9'

GRAVEL	1.0 %
SAND	36.4 %
SILT	24.4 %
CLAY	38.2 %
P 200	62.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42599.0, E 45799.0
SAMPLE: SG-CC-68 TUBE #:
ELEVATION: 1878.7'

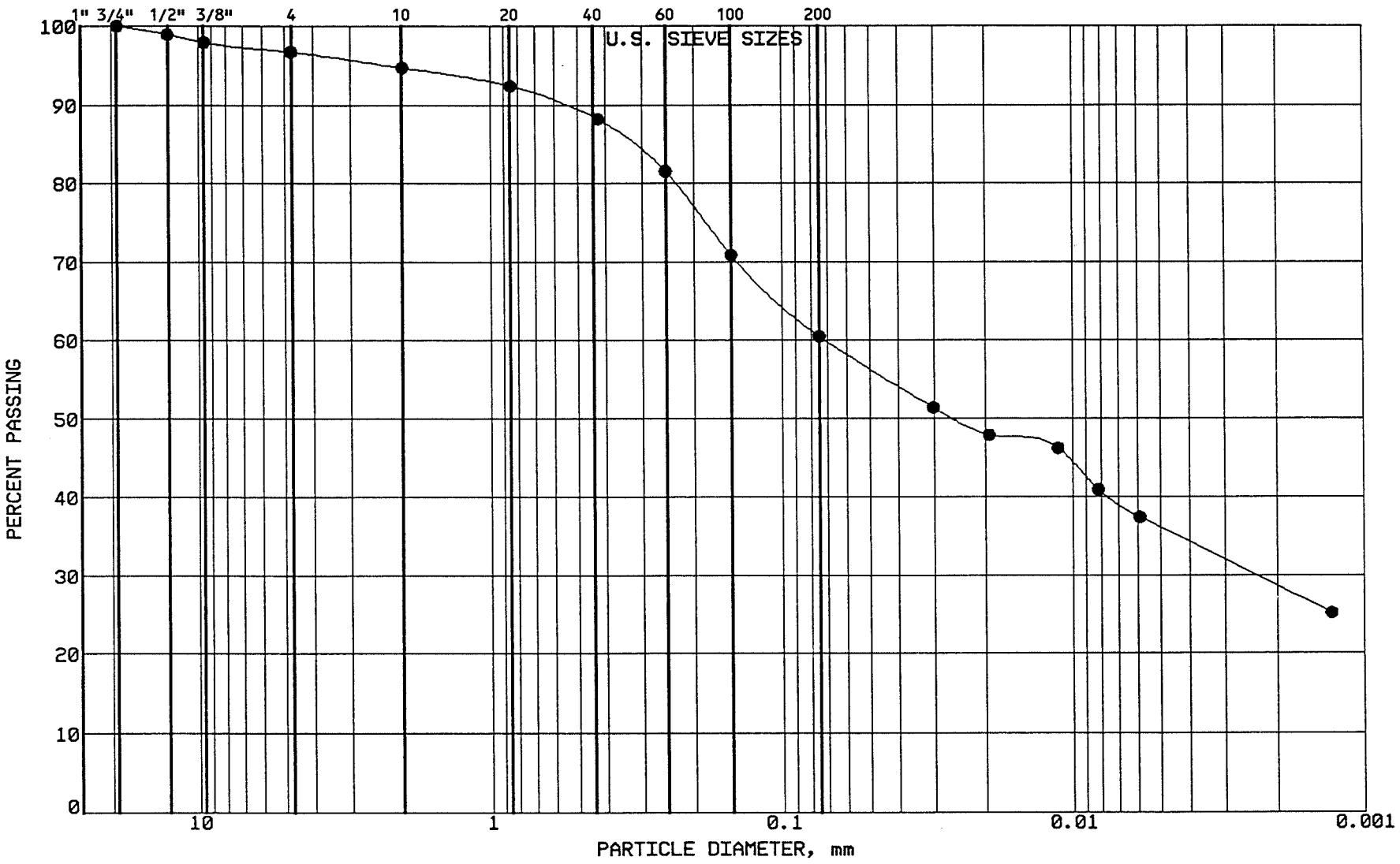
GRAVEL	0.6 %
SAND	35.6 %
SILT	23.8 %
CLAY	40.0 %
P 200	63.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42590.0, E 45166.0
SAMPLE: SG-CC-69 TUBE #:
ELEVATION: 1880.0'

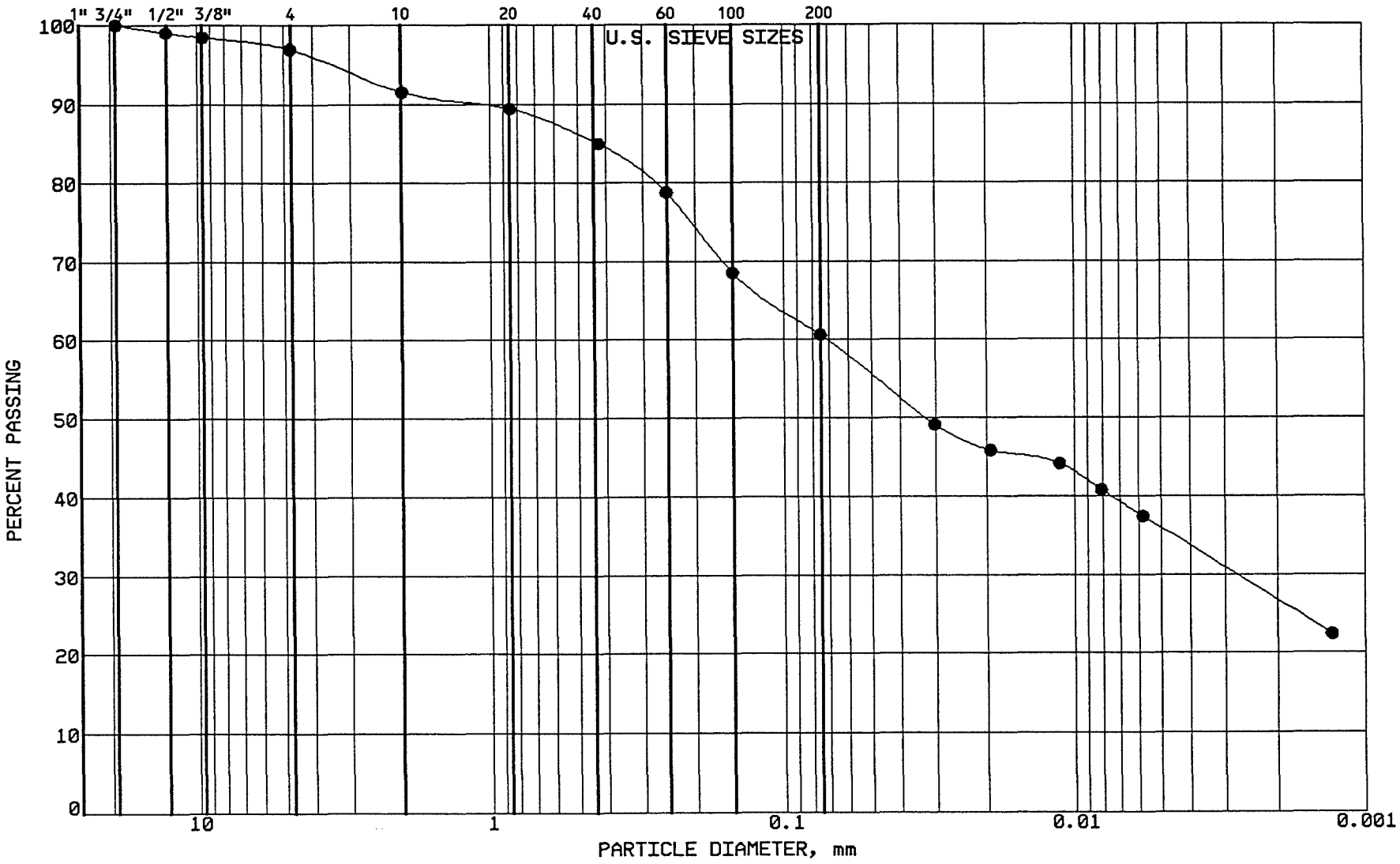
GRAVEL	3.3 %
SAND	36.2 %
SILT	24.4 %
CLAY	36.1 %
P 200	60.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42591.0, E 45306.0
SAMPLE: SG-CC-70 TUBE #:
ELEVATION: 1880.3'

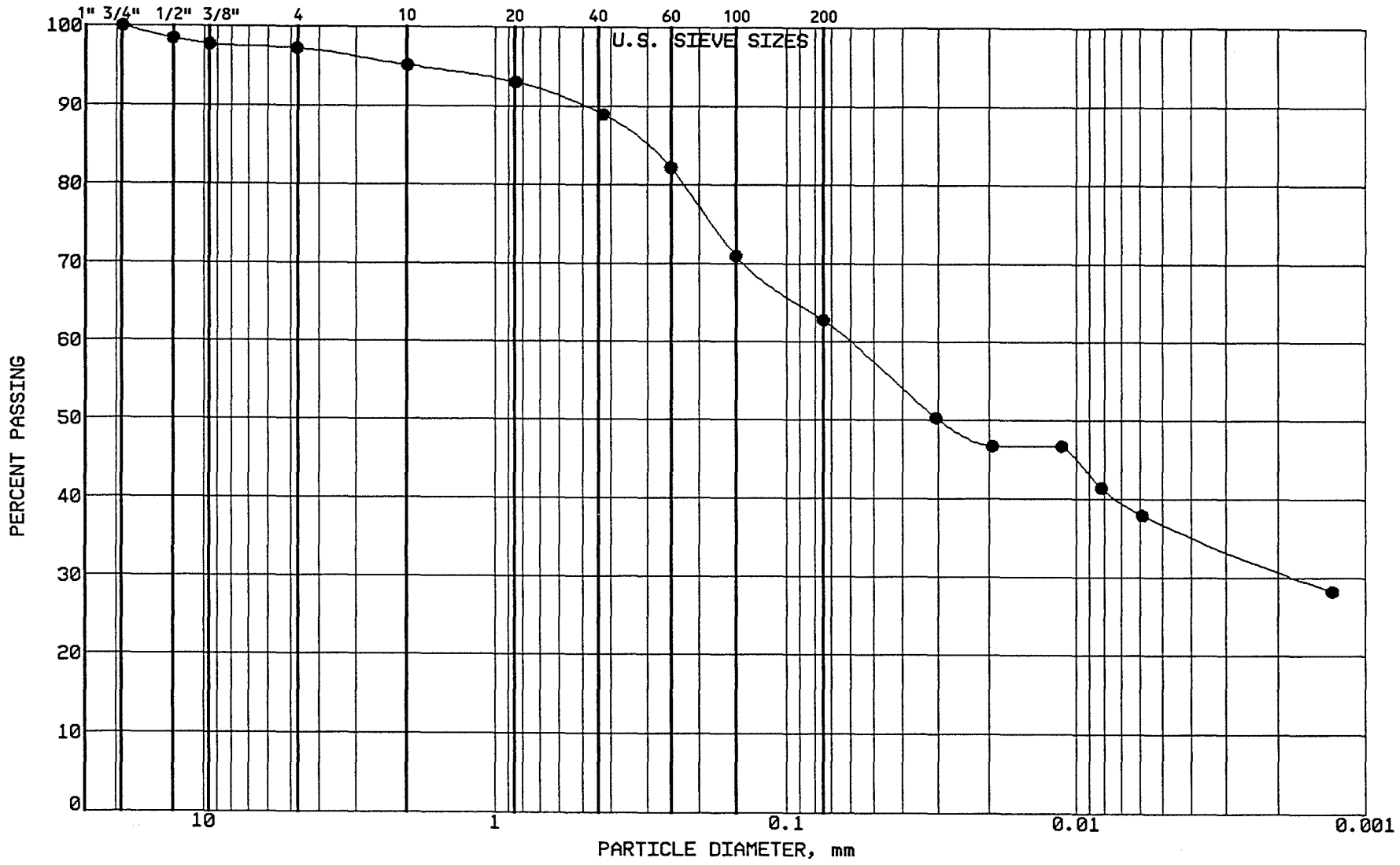
GRAVEL	3.1 %
SAND	36.3 %
SILT	24.7 %
CLAY	35.9 %
P 200	60.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CL SANDY LEAN CLAY

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

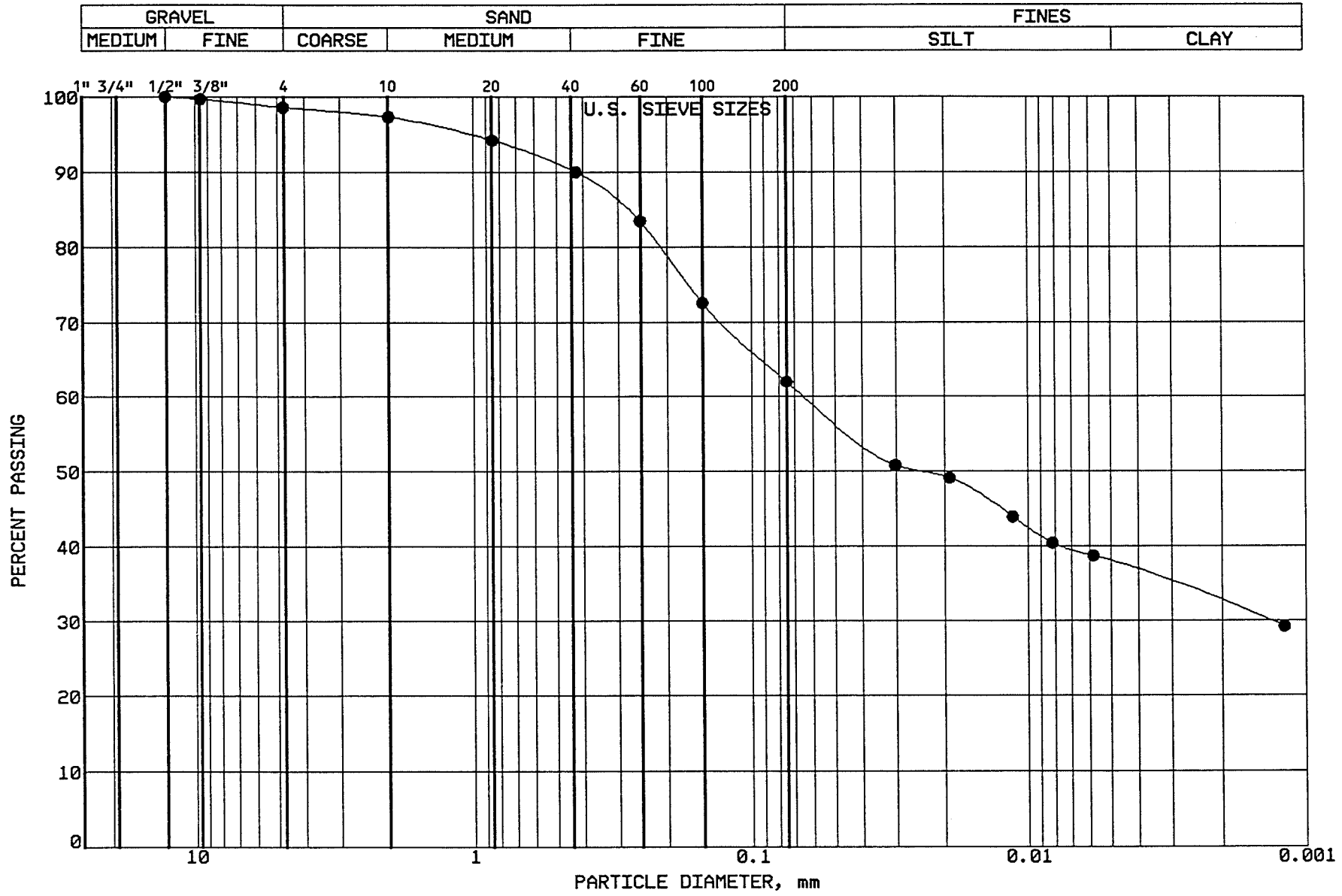
LOCATION: N 42599.0, E 45498.0
SAMPLE: SG-CC-71 TUBE #:
ELEVATION: 1880.3'

GRAVEL	2.8 %
SAND	34.4 %
SILT	26.0 %
CLAY	36.8 %
P 200	62.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42600.0, E 45699.0
SAMPLE: SG-CC-72 TUBE #:
ELEVATION: 1878.9'

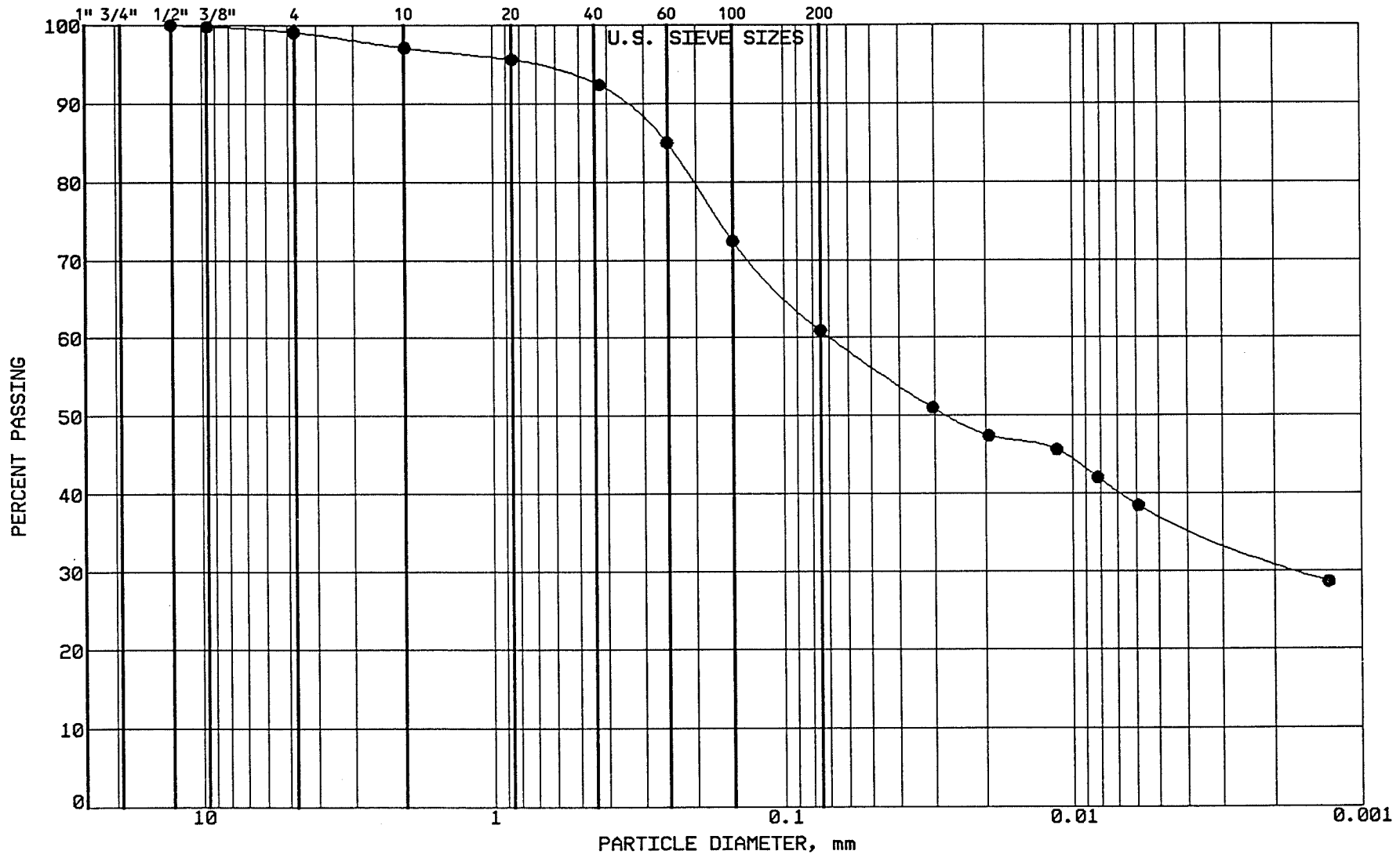
GRAVEL	1.4 %
SAND	36.6 %
SILT	24.2 %
CLAY	37.8 %
P 200	62.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

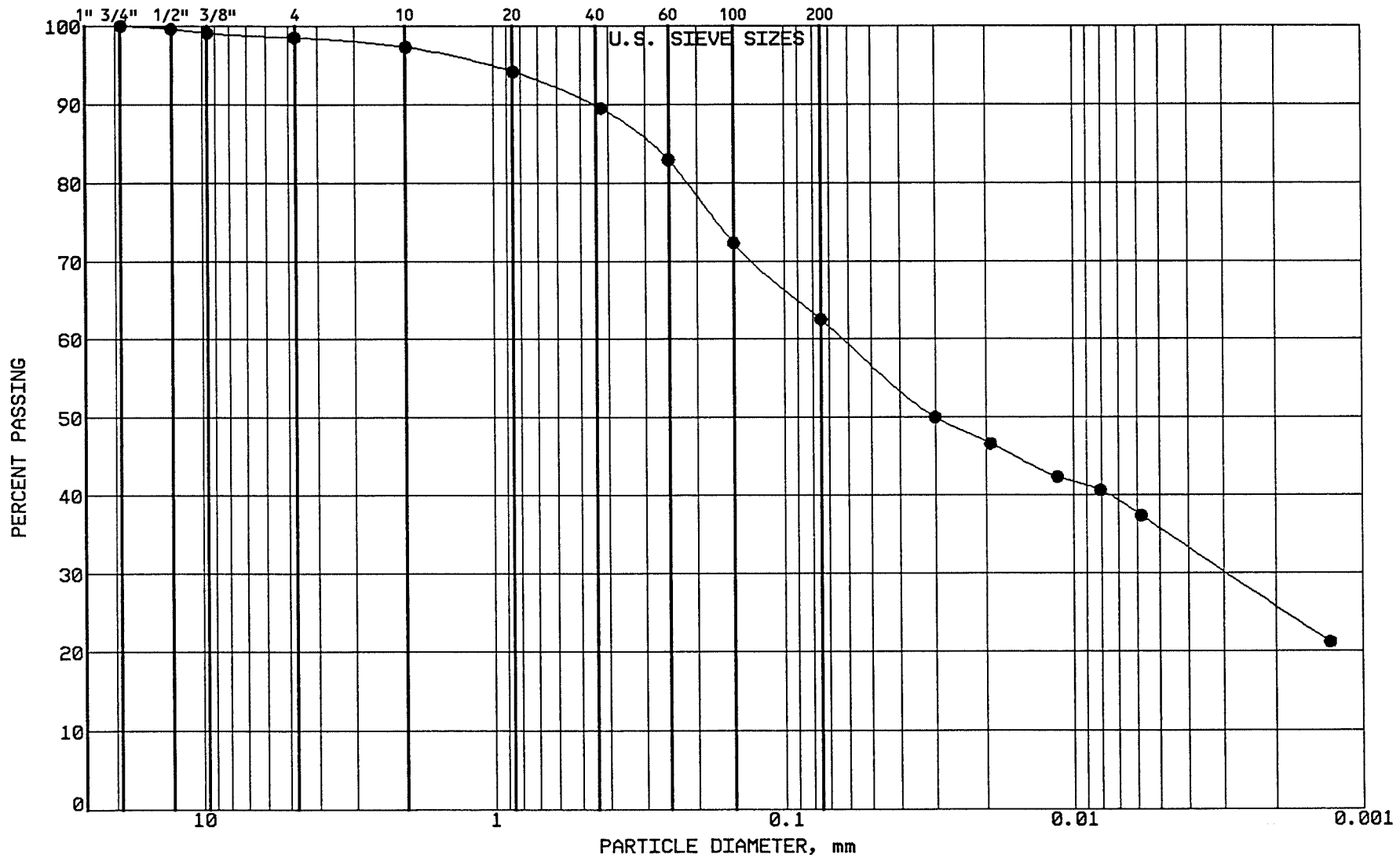
LOCATION: N 42600.0, E 45658.0
SAMPLE: SG-CC-73 TUBE #:
ELEVATION: 1879.9'

GRAVEL	0.9 %
SAND	38.2 %
SILT	23.6 %
CLAY	37.3 %
P 200	60.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42597.0, E 45826.0
SAMPLE: SG-CC-74 TUBE #:
ELEVATION: 1880.2'

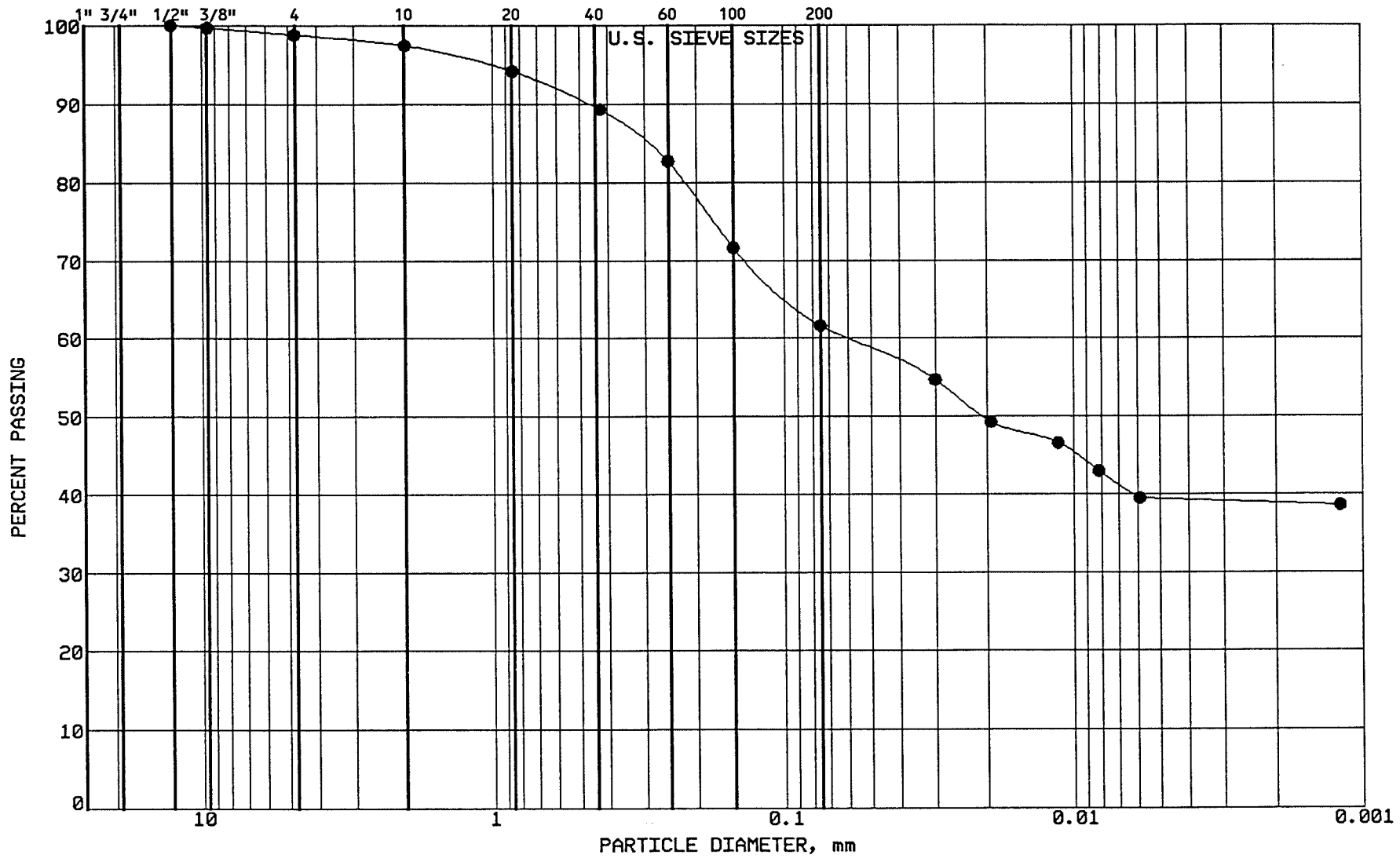
GRAVEL	1.5 %
SAND	36.0 %
SILT	26.8 %
CLAY	35.7 %
P 200	62.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42602.0, E 45609.0
SAMPLE: SG-CC-75 TUBE #:
ELEVATION: 1880.4'

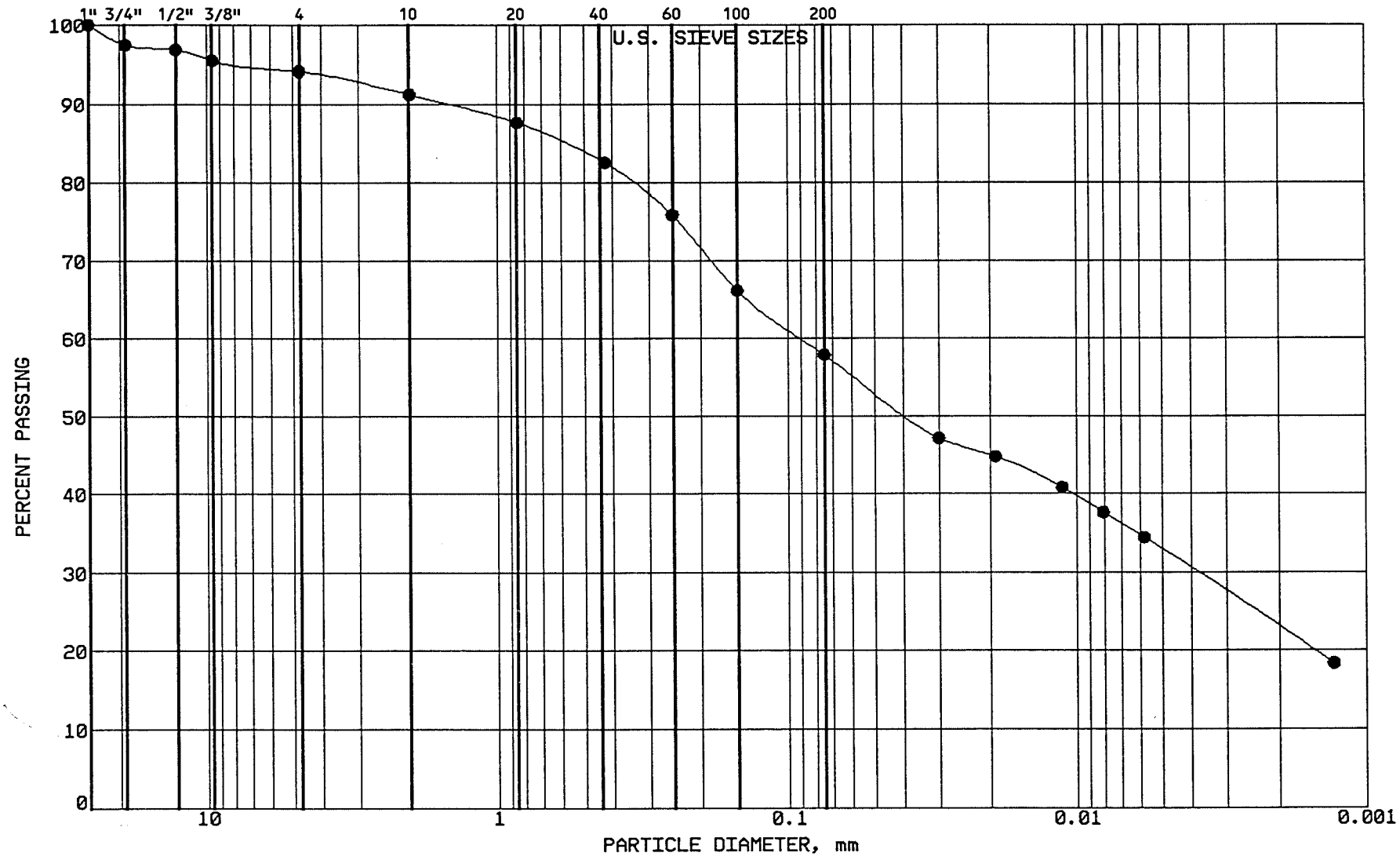
GRAVEL	1.2 %
SAND	37.2 %
SILT	22.2 %
CLAY	39.4 %
P 200	61.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42594.0, E 45796.0
SAMPLE: SG-CC-76 TUBE #:
ELEVATION: 1880.9'

GRAVEL	5.9 %
SAND	36.2 %
SILT	25.1 %
CLAY	32.8 %
P 200	57.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42582.0, E 45197.0
SAMPLE: SG-CC-77 TUBE #:
ELEVATION: 1880.7'

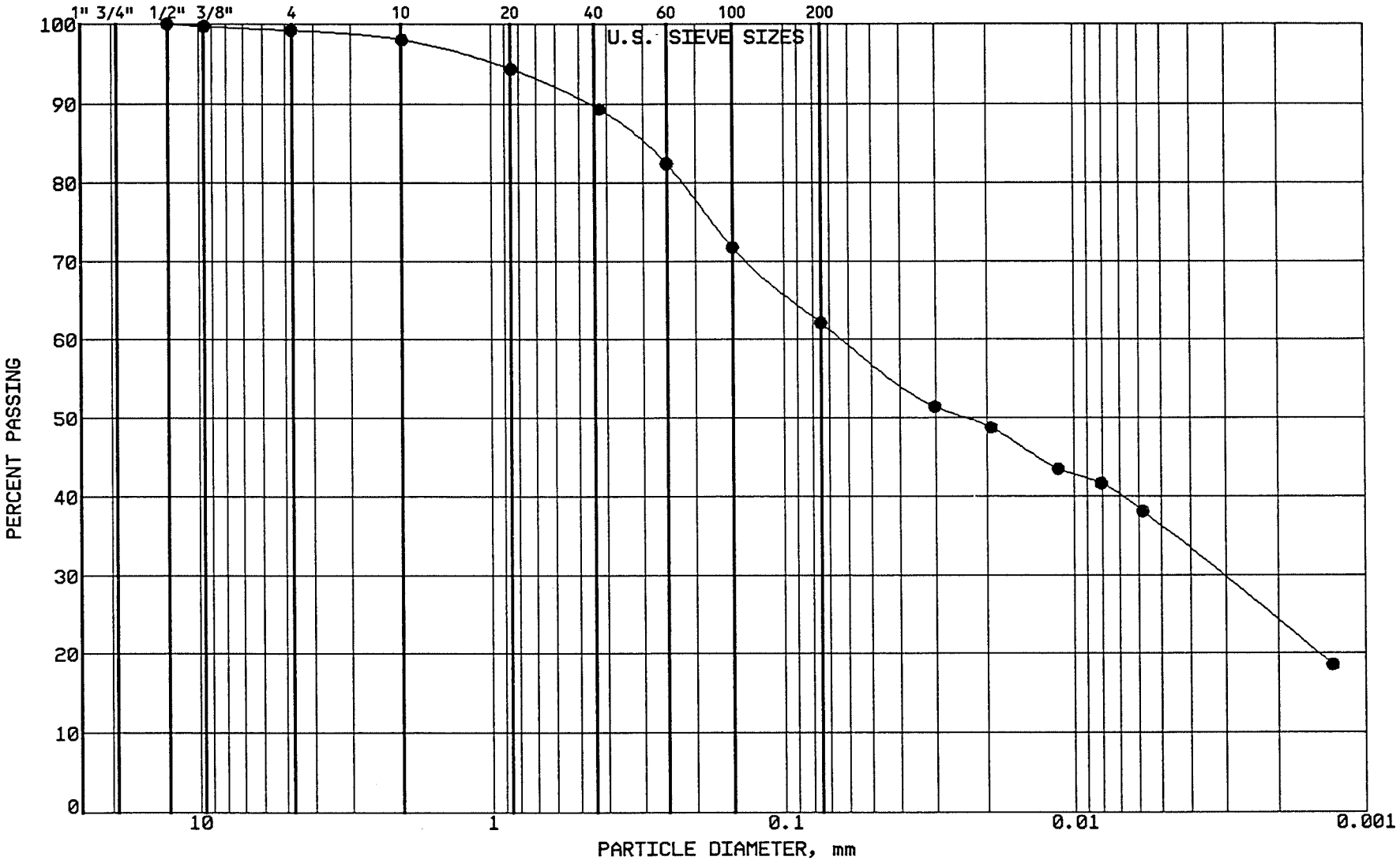
GRAVEL	2.6 %
SAND	34.6 %
SILT	27.2 %
CLAY	35.6 %
P 200	62.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42582.0, E 45393.0
SAMPLE: SG-CC-78 TUBE #:
ELEVATION: 1880.9'

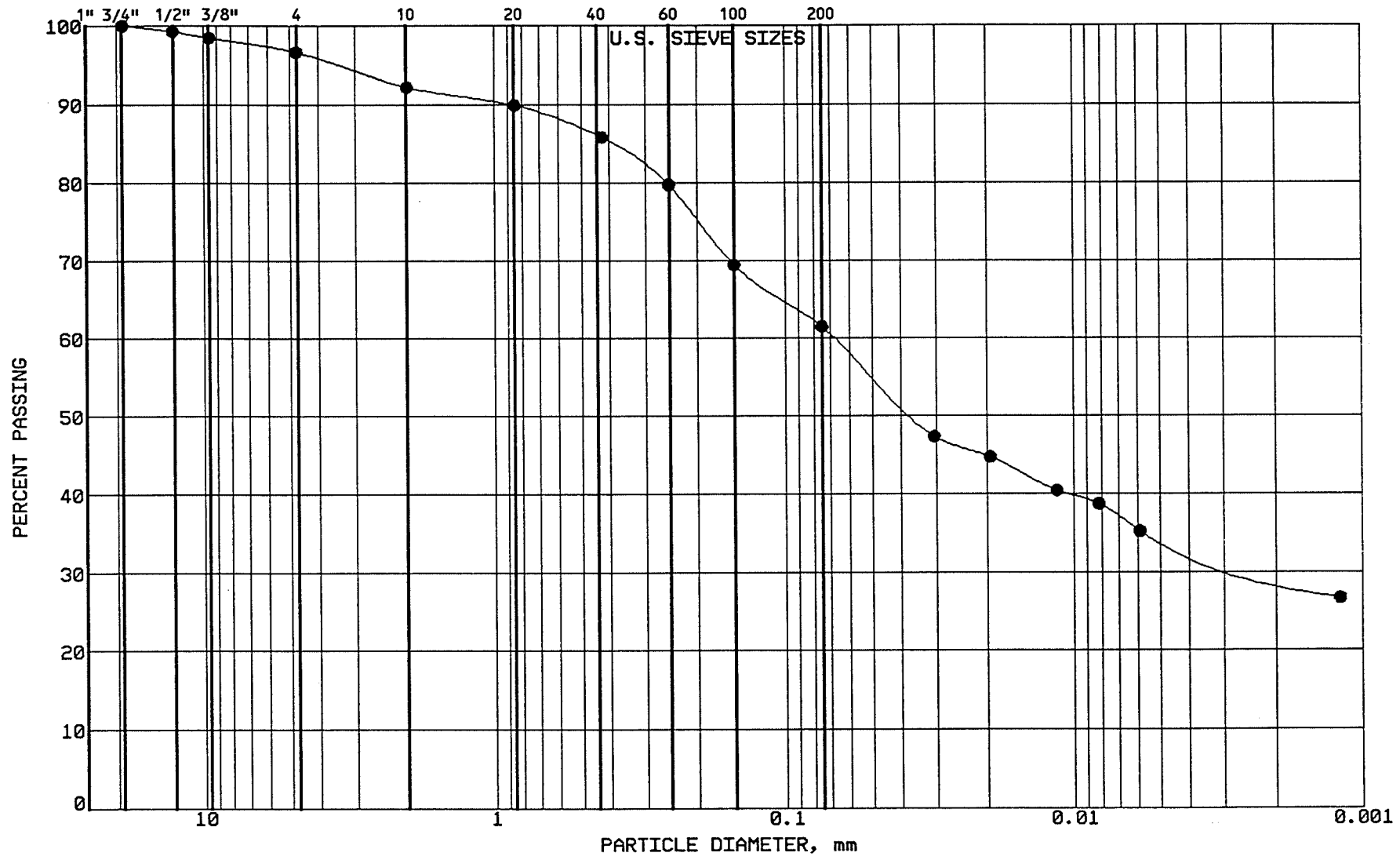
GRAVEL	0.8 %
SAND	37.1 %
SILT	25.9 %
CLAY	36.2 %
P 200	62.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42584.0, E 45601.0
SAMPLE: SG-CC-79 TUBE #:
ELEVATION: 1881.0'

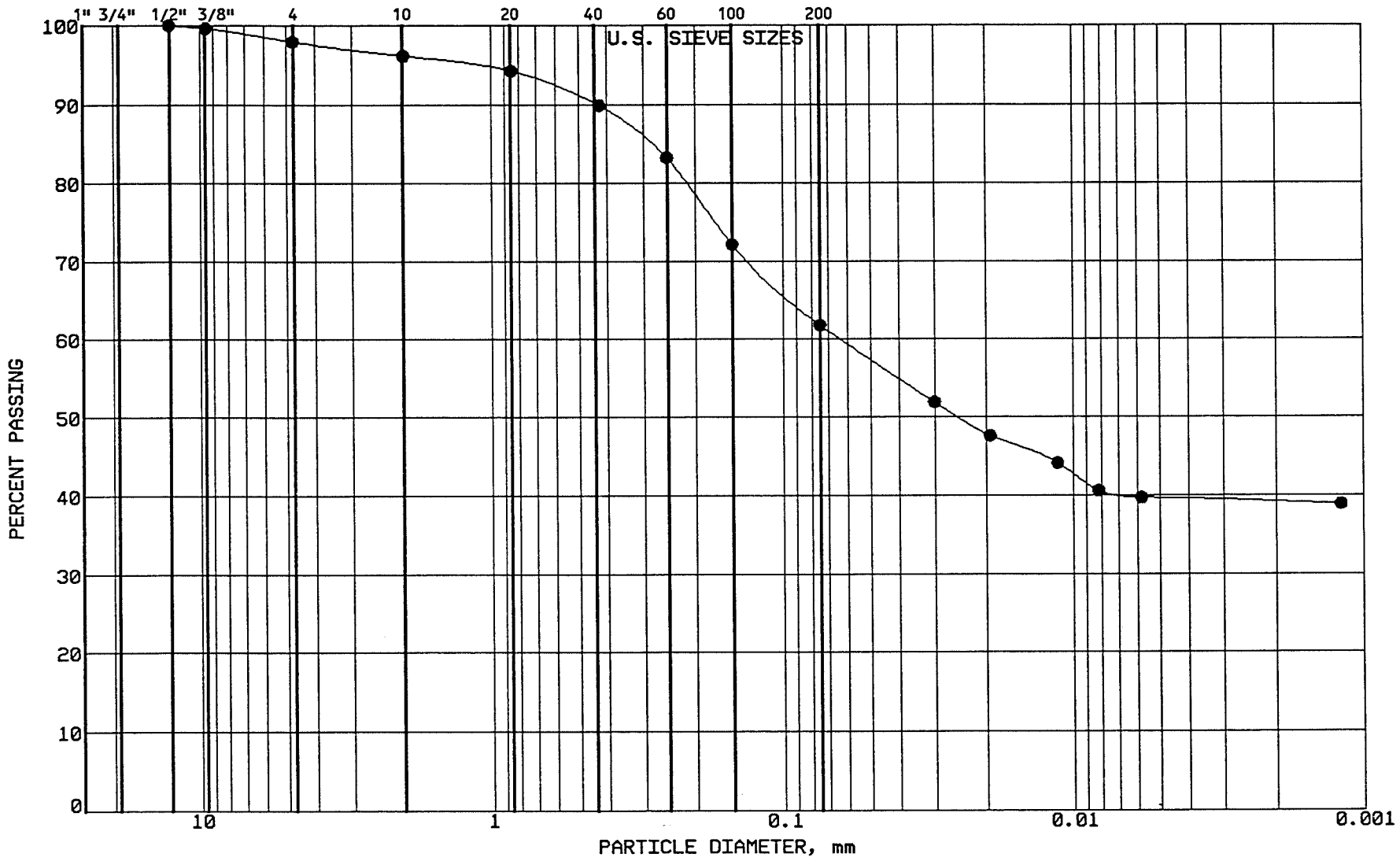
GRAVEL	3.4 %
SAND	35.1 %
SILT	27.2 %
CLAY	34.3 %
P 200	61.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42580.0, E 45801.0
SAMPLE: SG-CC-80 TUBE #:
ELEVATION: 1881.6'

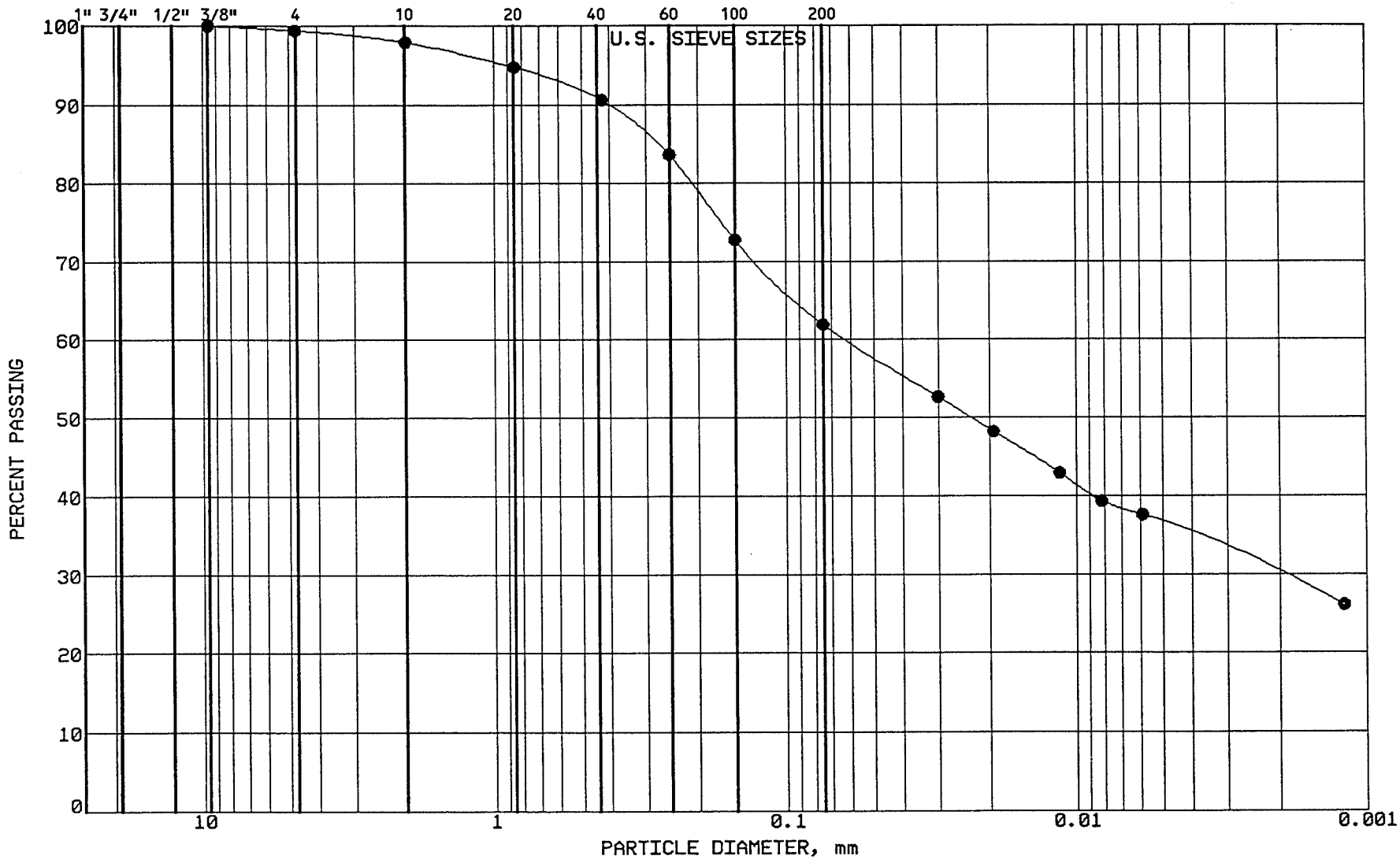
GRAVEL	2.1 %
SAND	36.1 %
SILT	22.2 %
CLAY	39.6 %
P 200	61.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

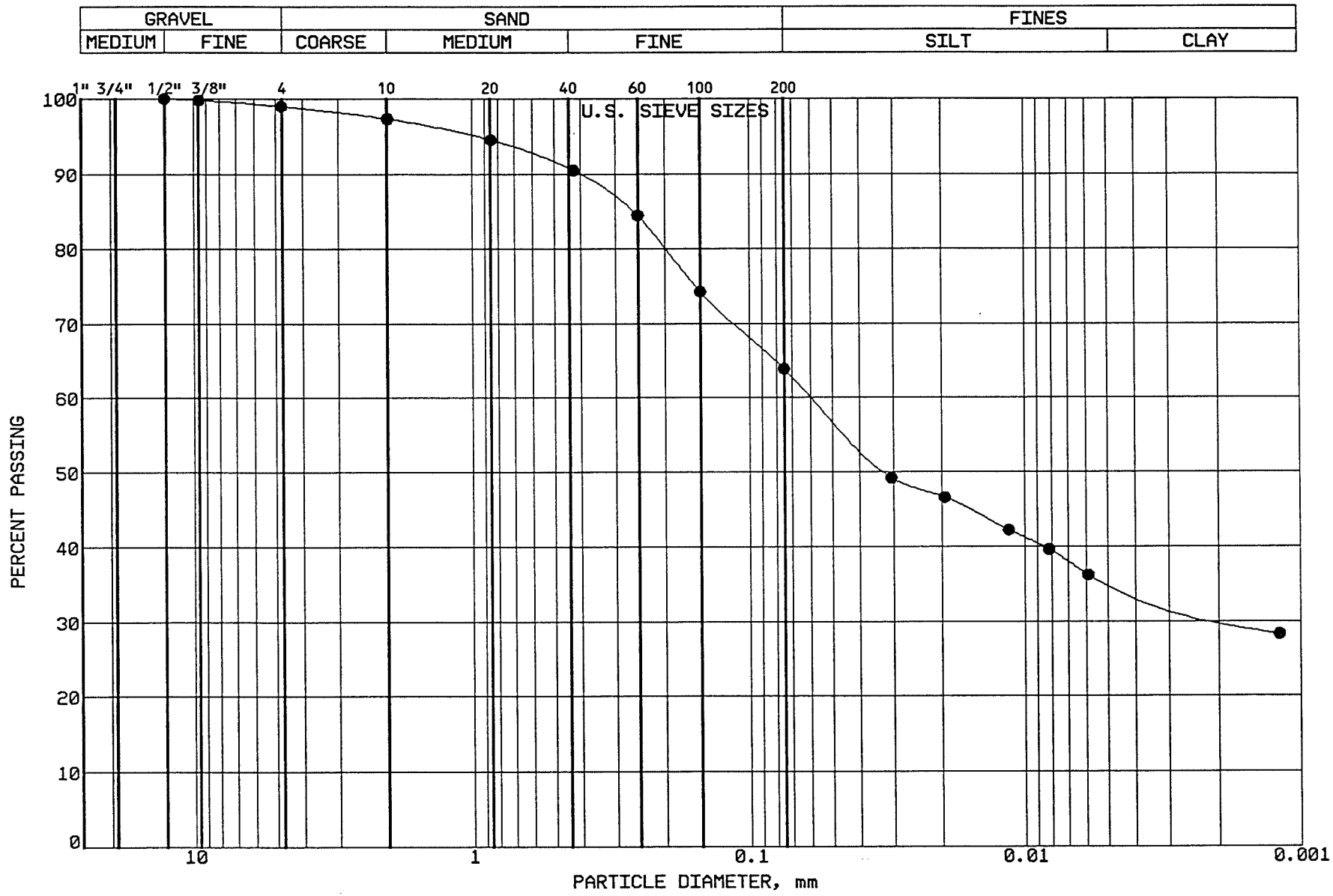
LOCATION: N 42581.0, E 45237.0
SAMPLE: CLSCC081 TUBE #: ST-22A
ELEVATION: 1881.4'

GRAVEL	0.6 %
SAND	37.5 %
SILT	25.5 %
CLAY	36.4 %
P 200	61.9 %

SOIL PROPERTIES

LL: 40.0%
PL: 15.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

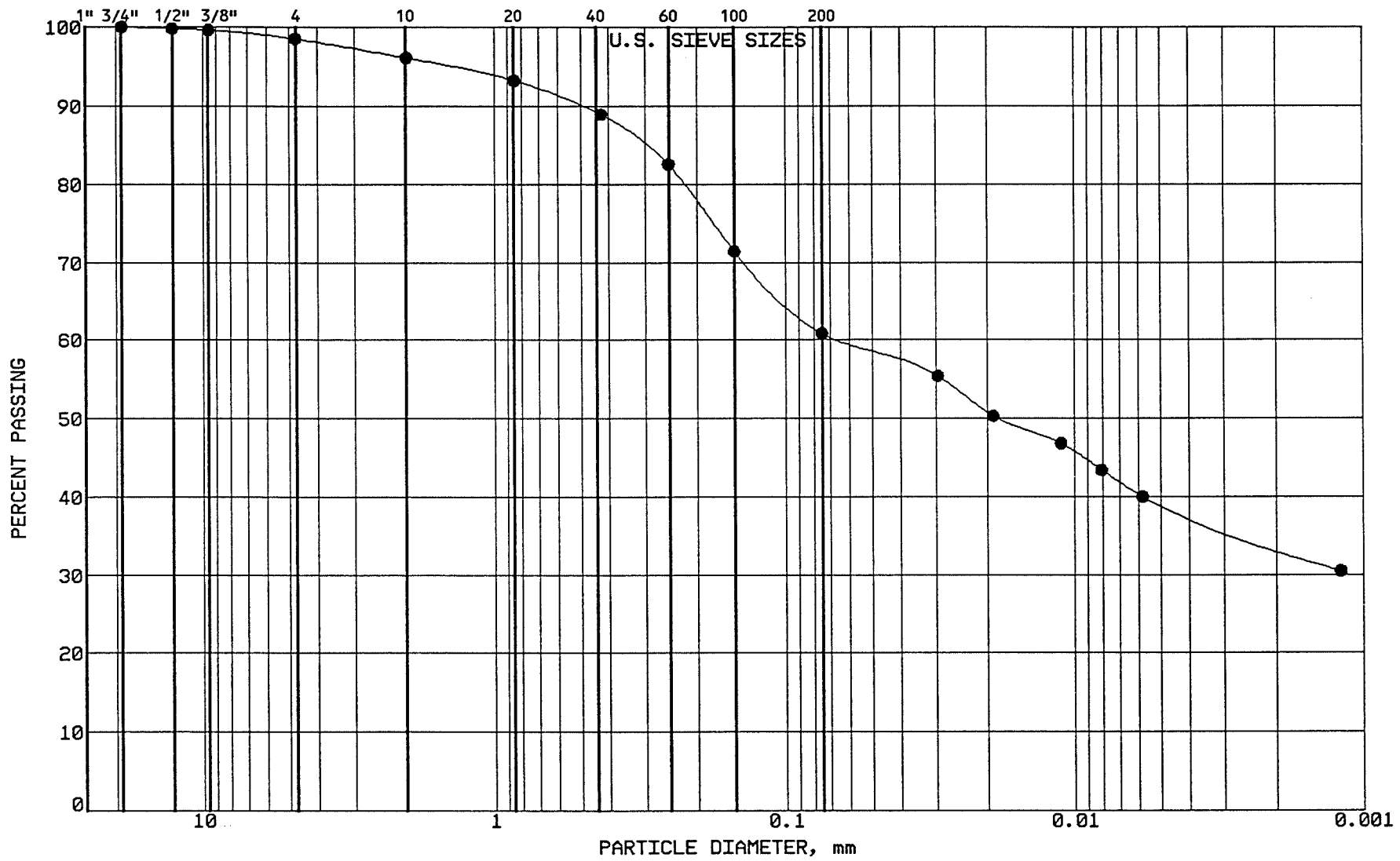
LOCATION: N 42577.0, E 45603.0
SAMPLE: CLSCC083 TUBE #: ST-24A
ELEVATION: 1883.0'

GRAVEL	1.0 %
SAND	35.1 %
SILT	28.5 %
CLAY	35.4 %
P 200	63.9 %

SOIL PROPERTIES

LL: 42.0%
PL: 15.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

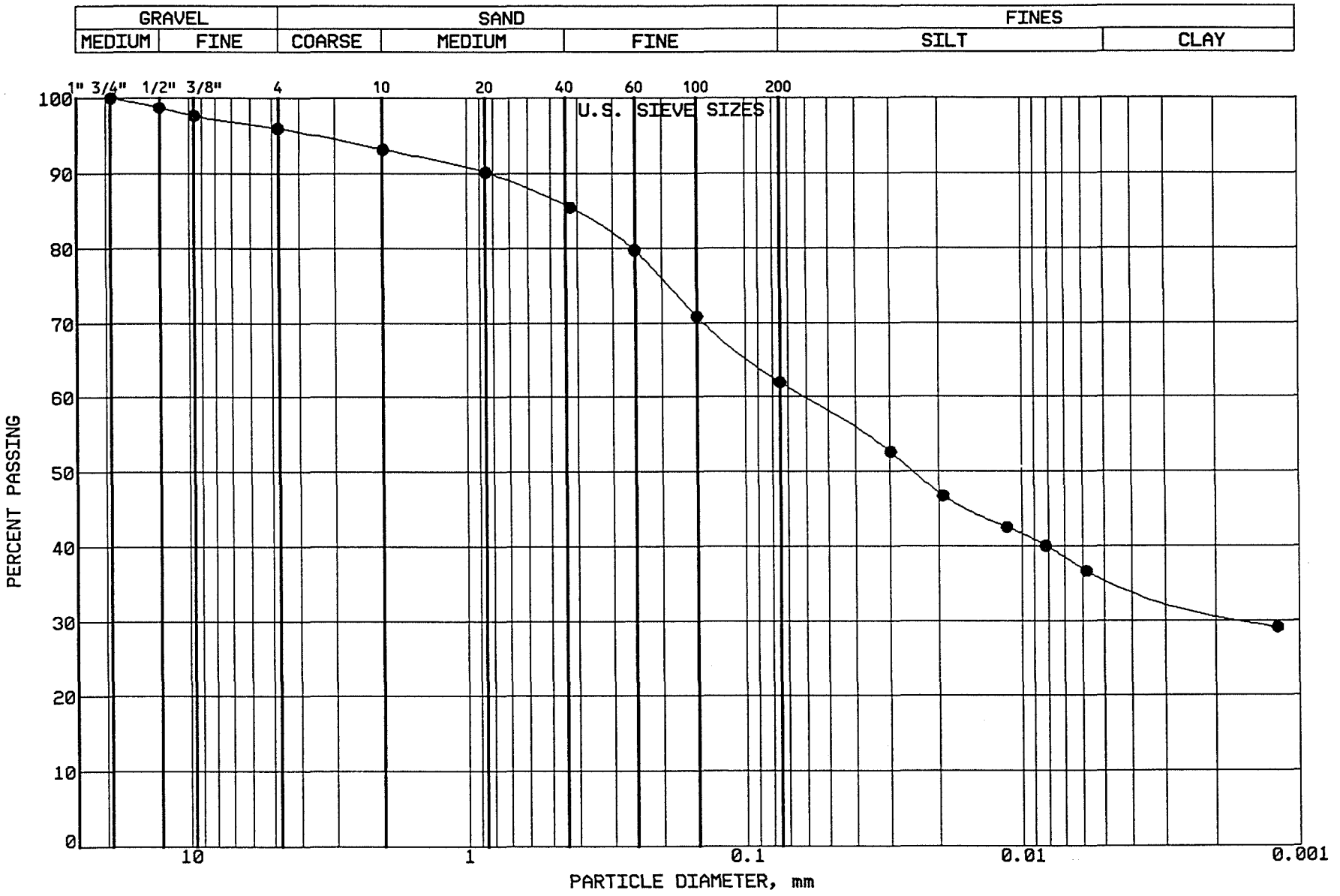
LOCATION: N 42575.0, E 45801.0
SAMPLE: CLSCC084 TUBE #: ST-25A
ELEVATION: 1883.5'

GRAVEL	1.5 %
SAND	37.7 %
SILT	21.7 %
CLAY	39.1 %
P 200	60.8 %

SOIL PROPERTIES

LL: 43.0%
PL: 16.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42588.0, E 44608.0
SAMPLE: SG-CC-85 TUBE #:
ELEVATION: 1879.1'

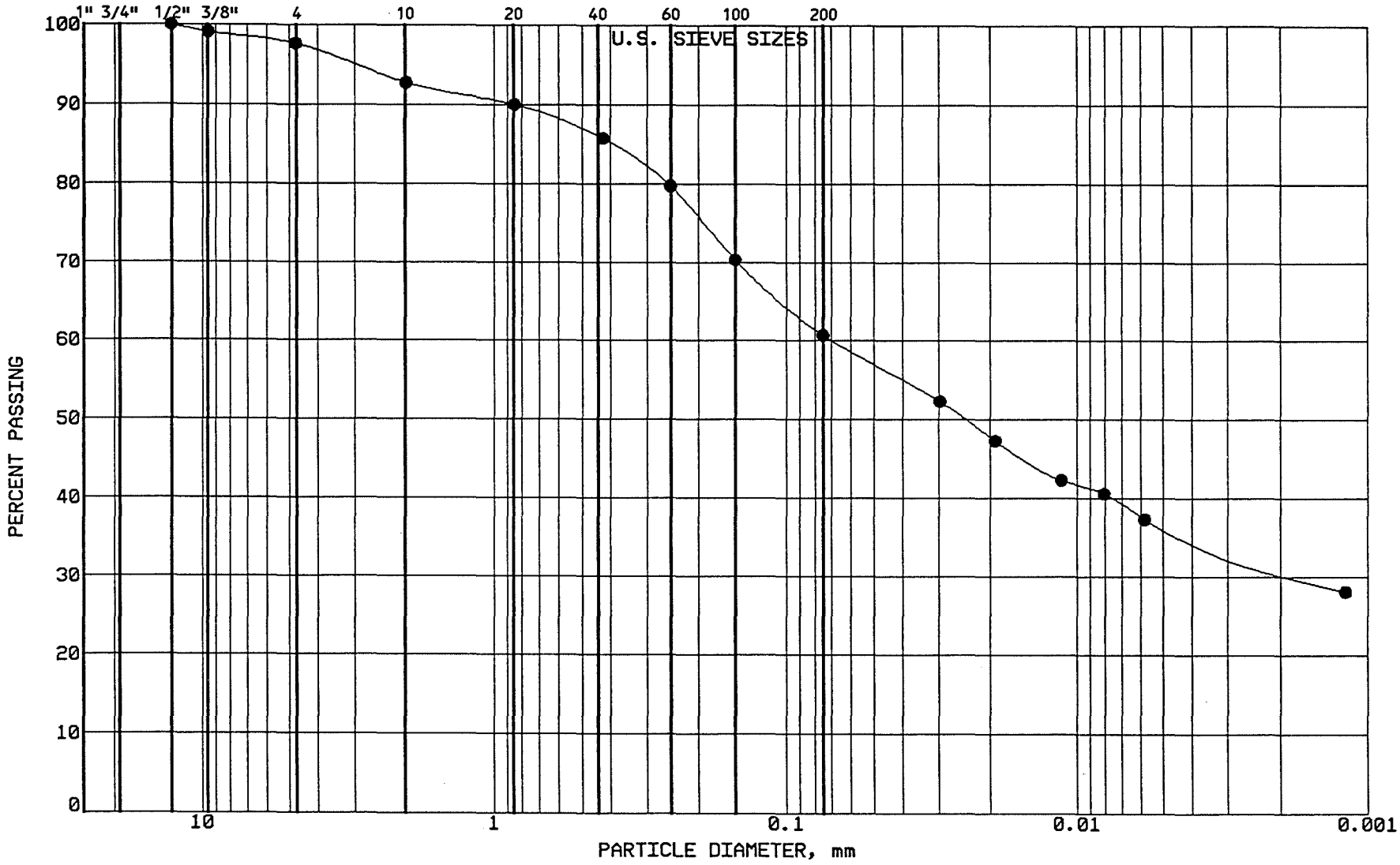
GRAVEL	4.1 %
SAND	34.0 %
SILT	26.0 %
CLAY	35.9 %
P 200	61.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

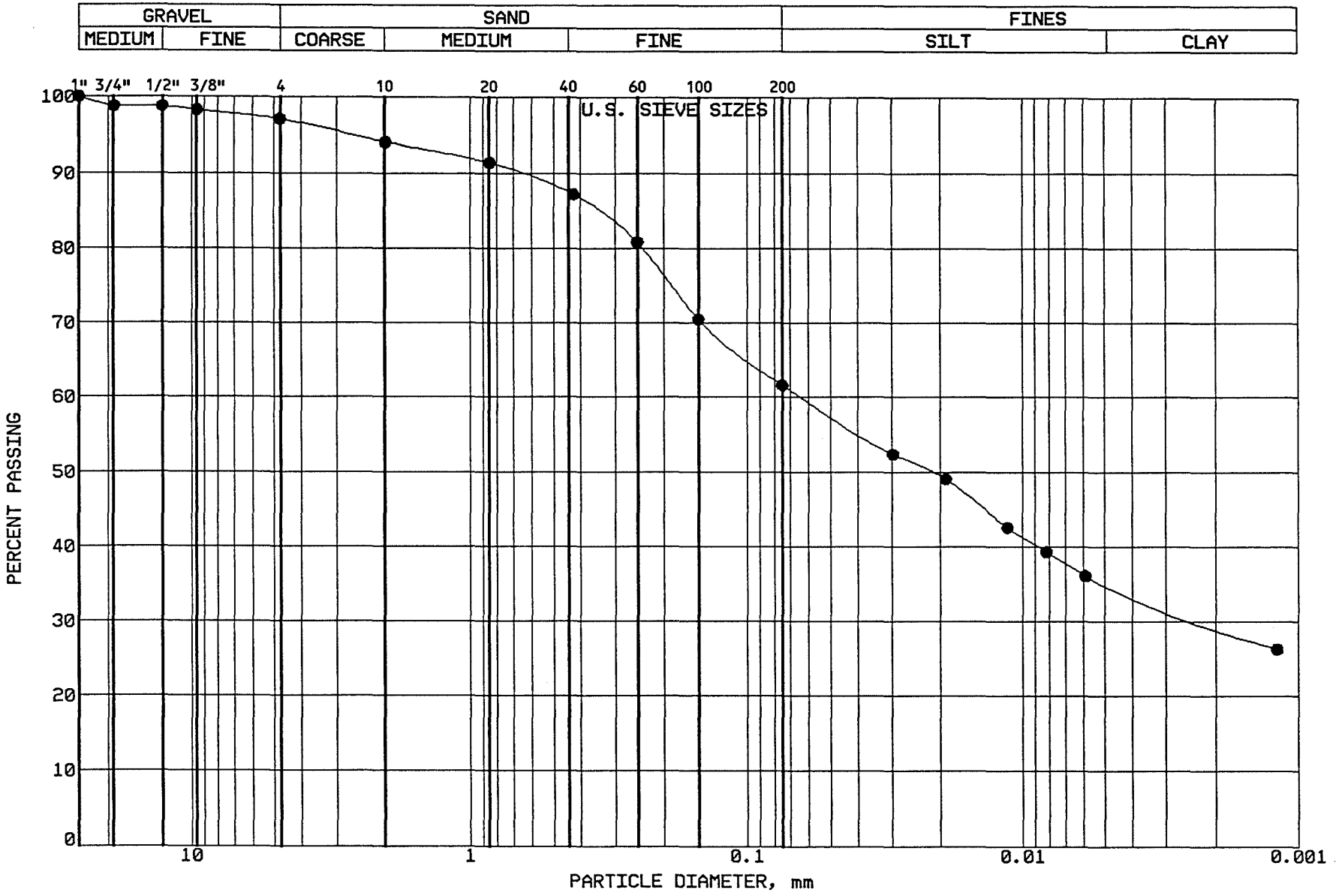
LOCATION: N 42599.0, E 44791.0
SAMPLE: SG-CC-86 TUBE #:
ELEVATION: 1876.0'

GRAVEL	2.4 %
SAND	36.9 %
SILT	24.3 %
CLAY	36.4 %
P 200	60.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

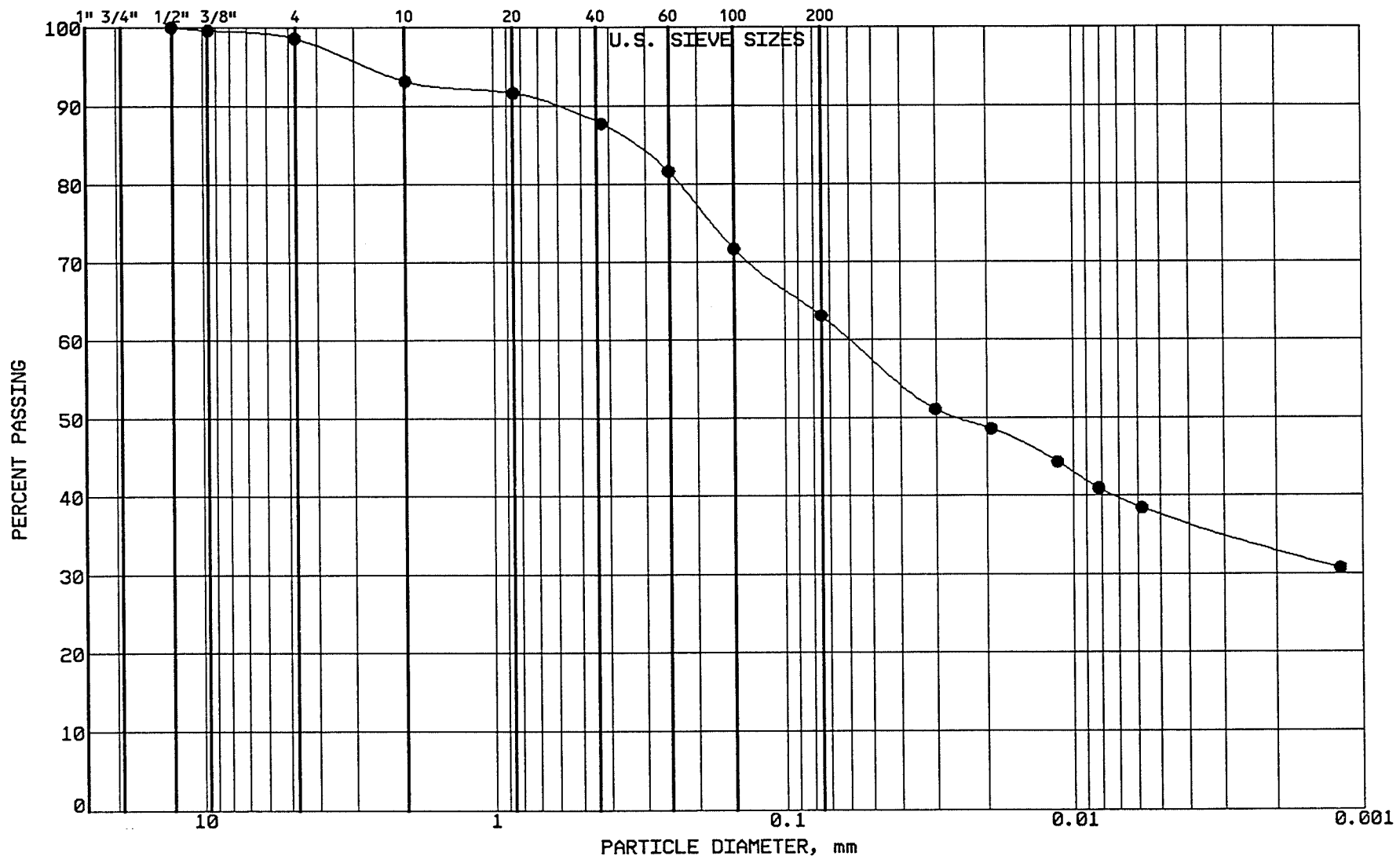
LOCATION: N 42596.0, E 45000.0
SAMPLE: SG-CC-87 TUBE #:
ELEVATION: 1878.3'

GRAVEL	3.0 %
SAND	35.4 %
SILT	26.5 %
CLAY	35.1 %
P 200	61.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42591.0, E 44688.0
SAMPLE: SG-CC-88 TUBE #:
ELEVATION: 1878.8'

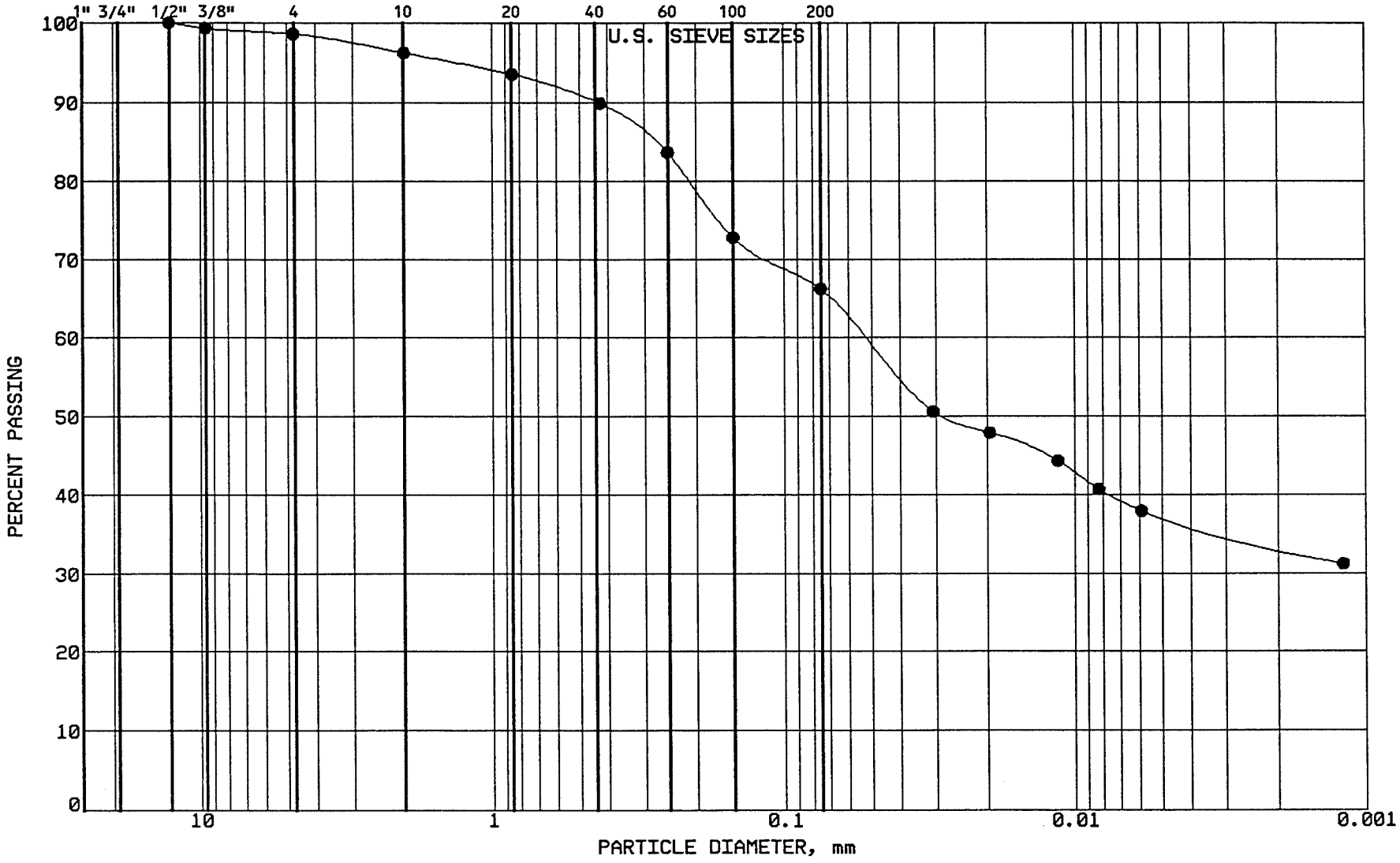
GRAVEL	1.4 %
SAND	35.5 %
SILT	25.4 %
CLAY	37.7 %
P 200	63.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42594.0, E 44892.0
SAMPLE: SG-CC-89 TUBE #:
ELEVATION: 1878.5'

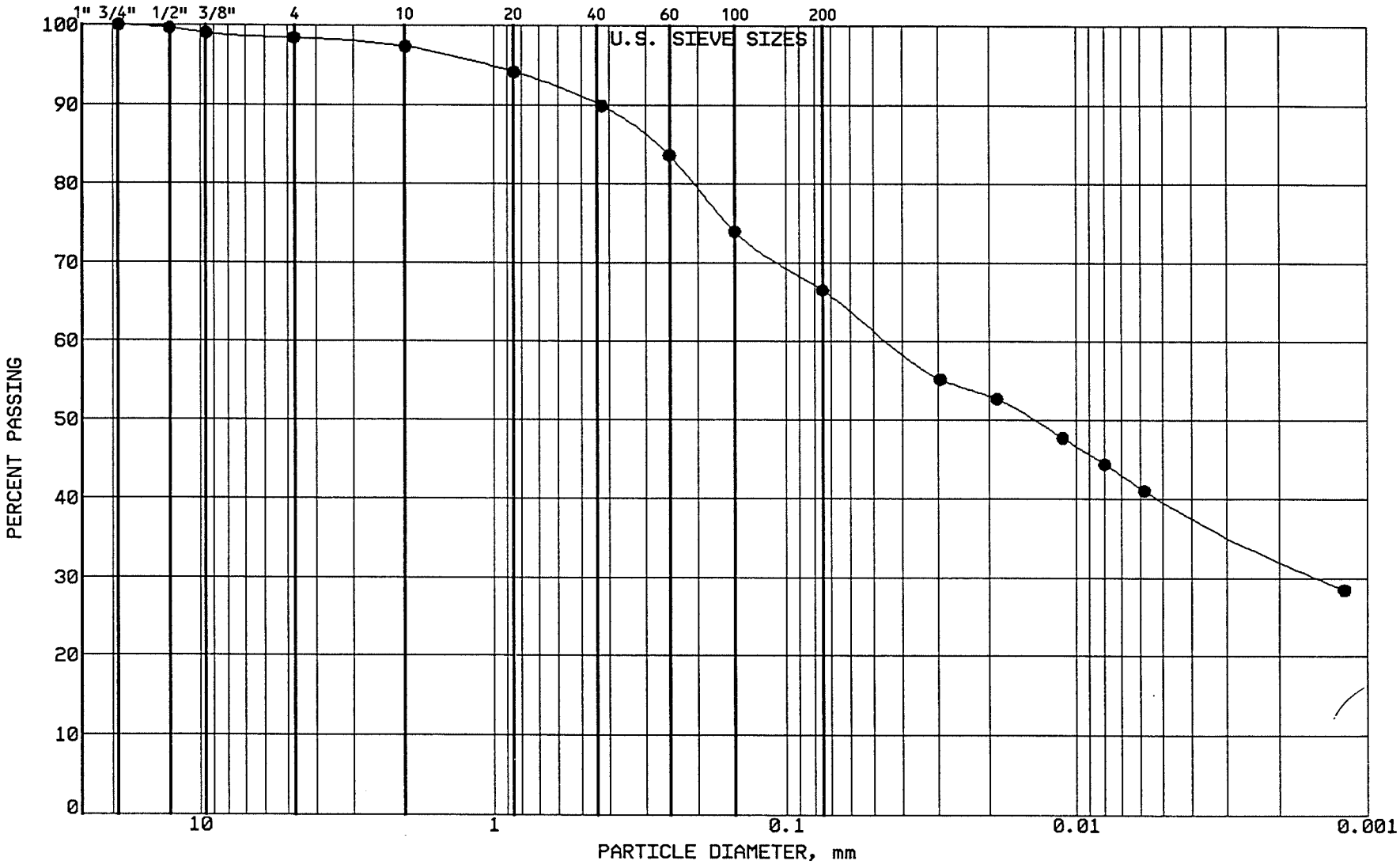
GRAVEL	1.4 %
SAND	32.4 %
SILT	29.0 %
CLAY	37.2 %
P 200	66.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42583.0, E 45084.0
SAMPLE: SG-CC-90 TUBE #:
ELEVATION: 1878.9'

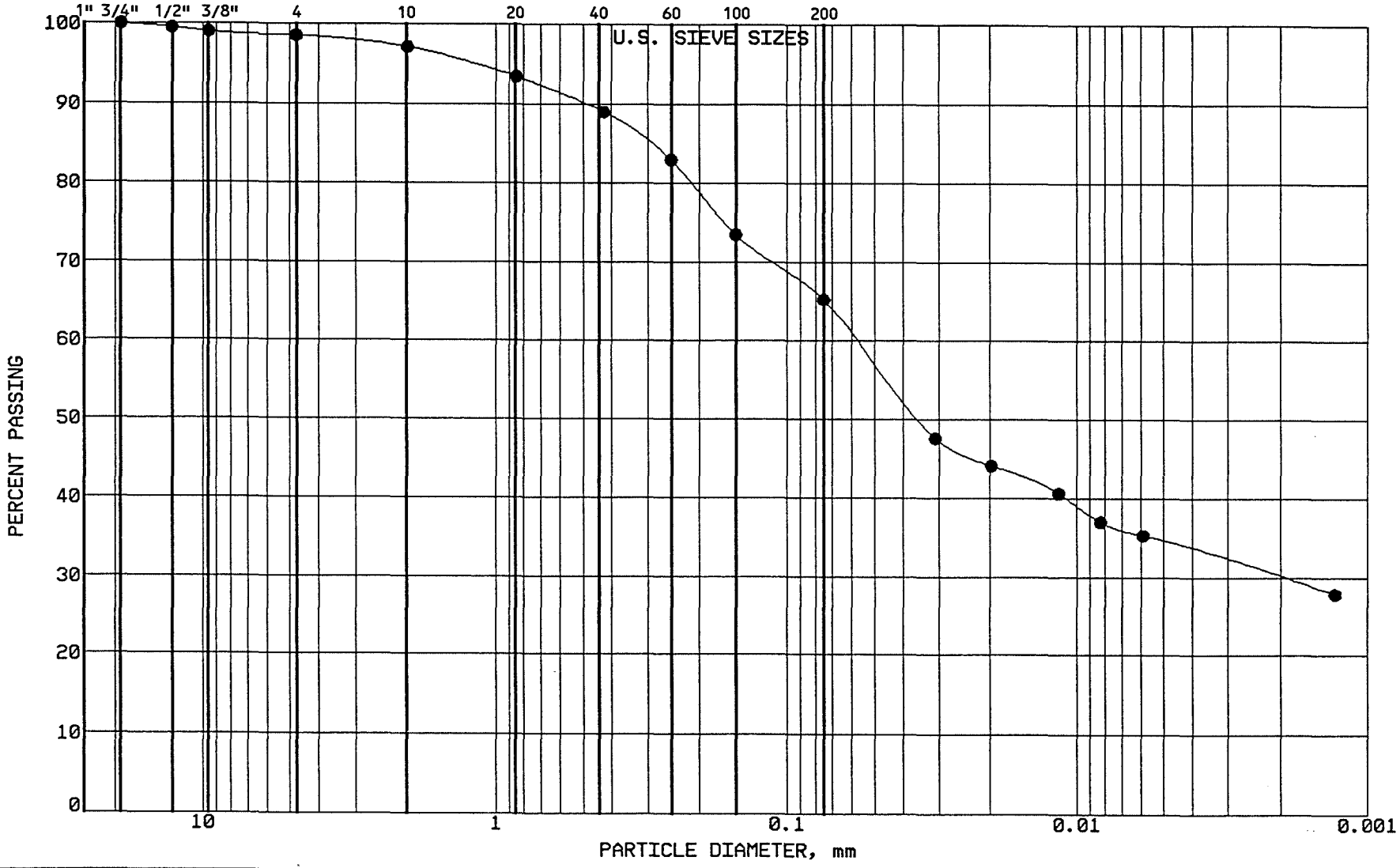
GRAVEL	1.6 %
SAND	31.9 %
SILT	26.7 %
CLAY	39.8 %
P 200	66.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

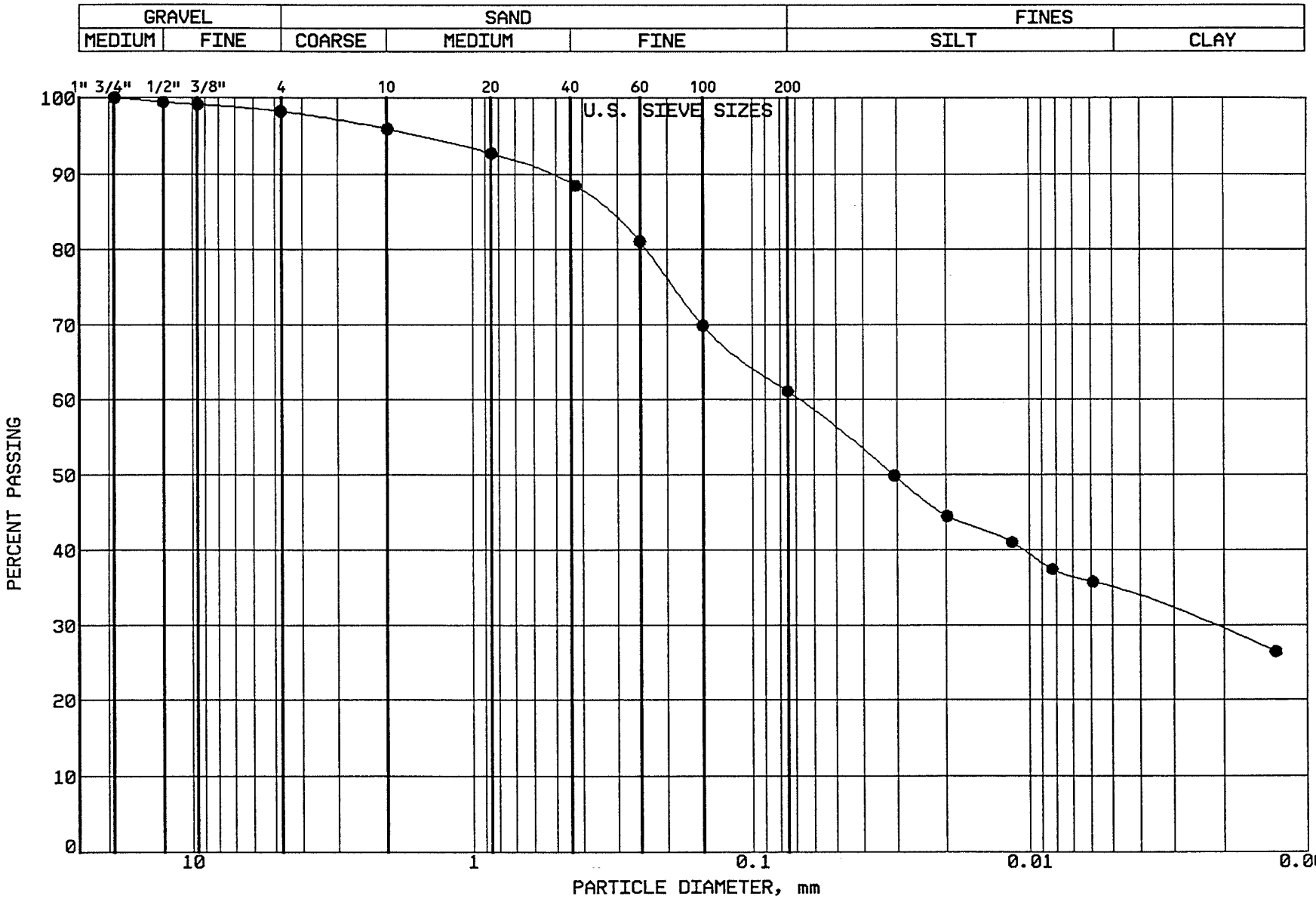
LOCATION: N 42585.0, E 44701.0
SAMPLE: SG-CC-91 TUBE #:
ELEVATION: 1879.4'

GRAVEL	1.5 %
SAND	33.3 %
SILT	30.7 %
CLAY	34.5 %
P 200	65.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

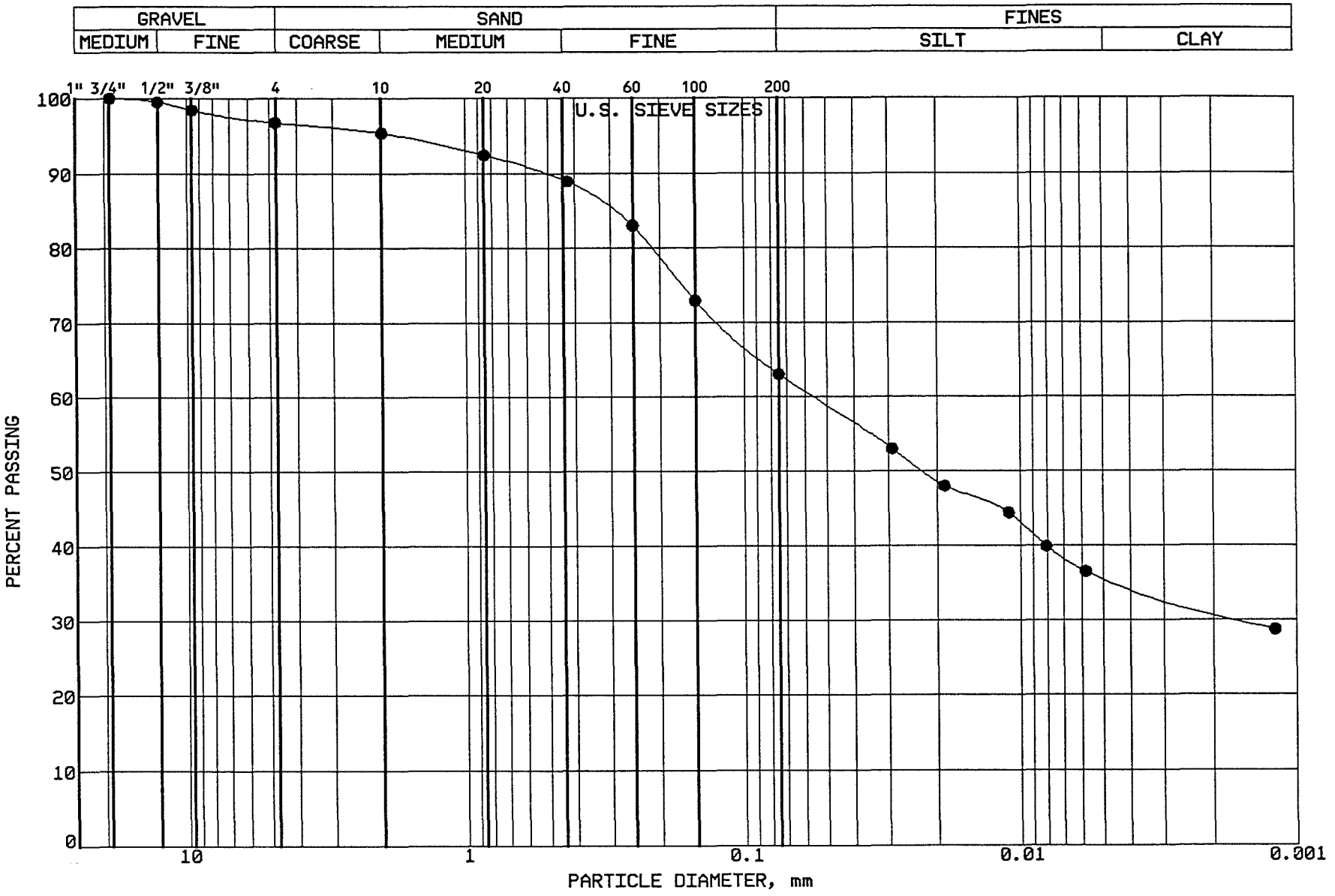
LOCATION: N 42597.0, E 44895.0
SAMPLE: SG-CC-92 TUBE #:
ELEVATION: 1879.1'

GRAVEL	1.8 %
SAND	37.1 %
SILT	26.4 %
CLAY	34.7 %
P 200	61.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

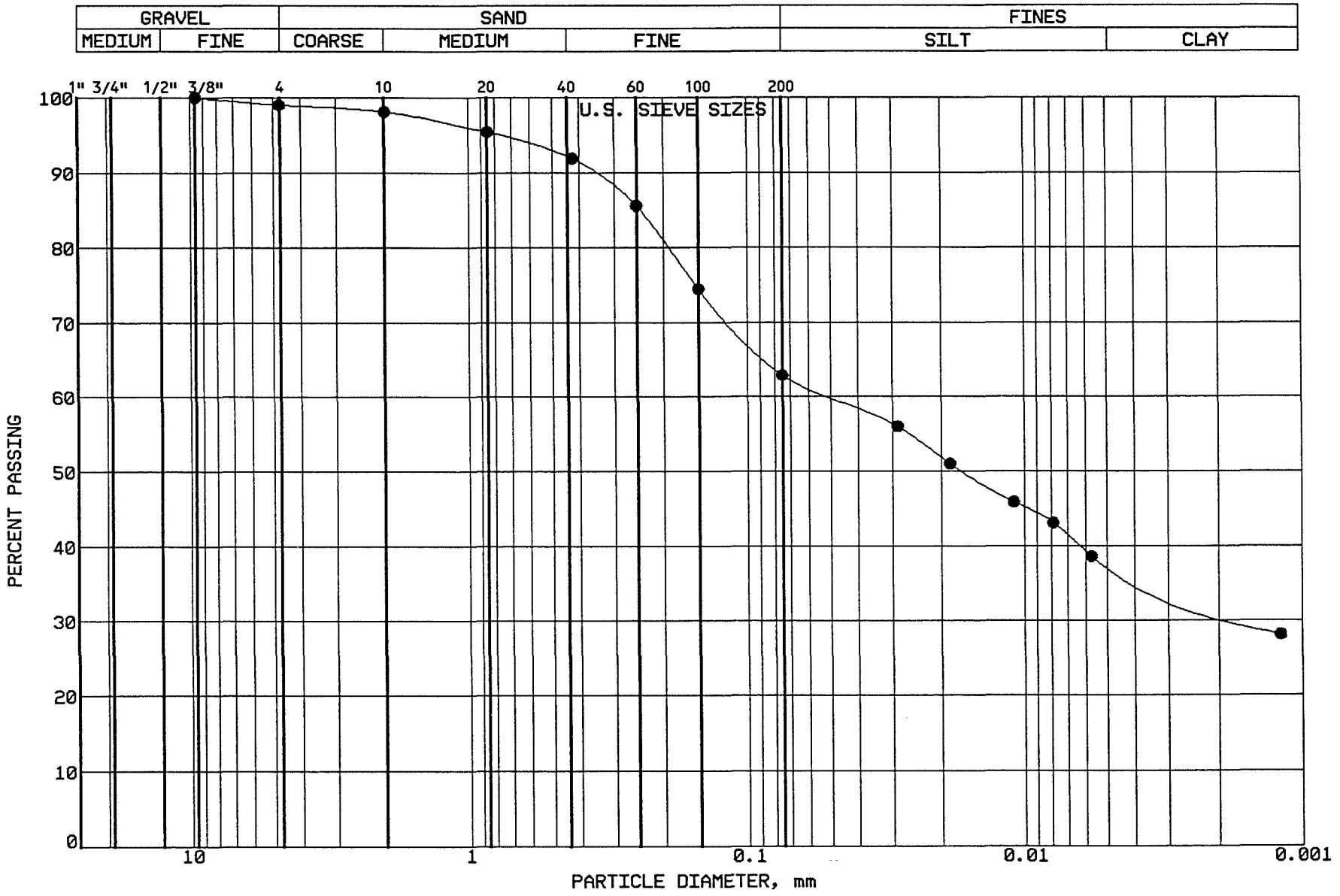
LOCATION: N 42586.0, E 45062.0
SAMPLE: SG-CC-93 TUBE #:
ELEVATION: 1879.8'

GRAVEL	3.3 %
SAND	33.7 %
SILT	27.2 %
CLAY	35.8 %
P 200	63.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42582.0, E 44703.0
SAMPLE: SG-CC-94 TUBE #:
ELEVATION: 1880.1'

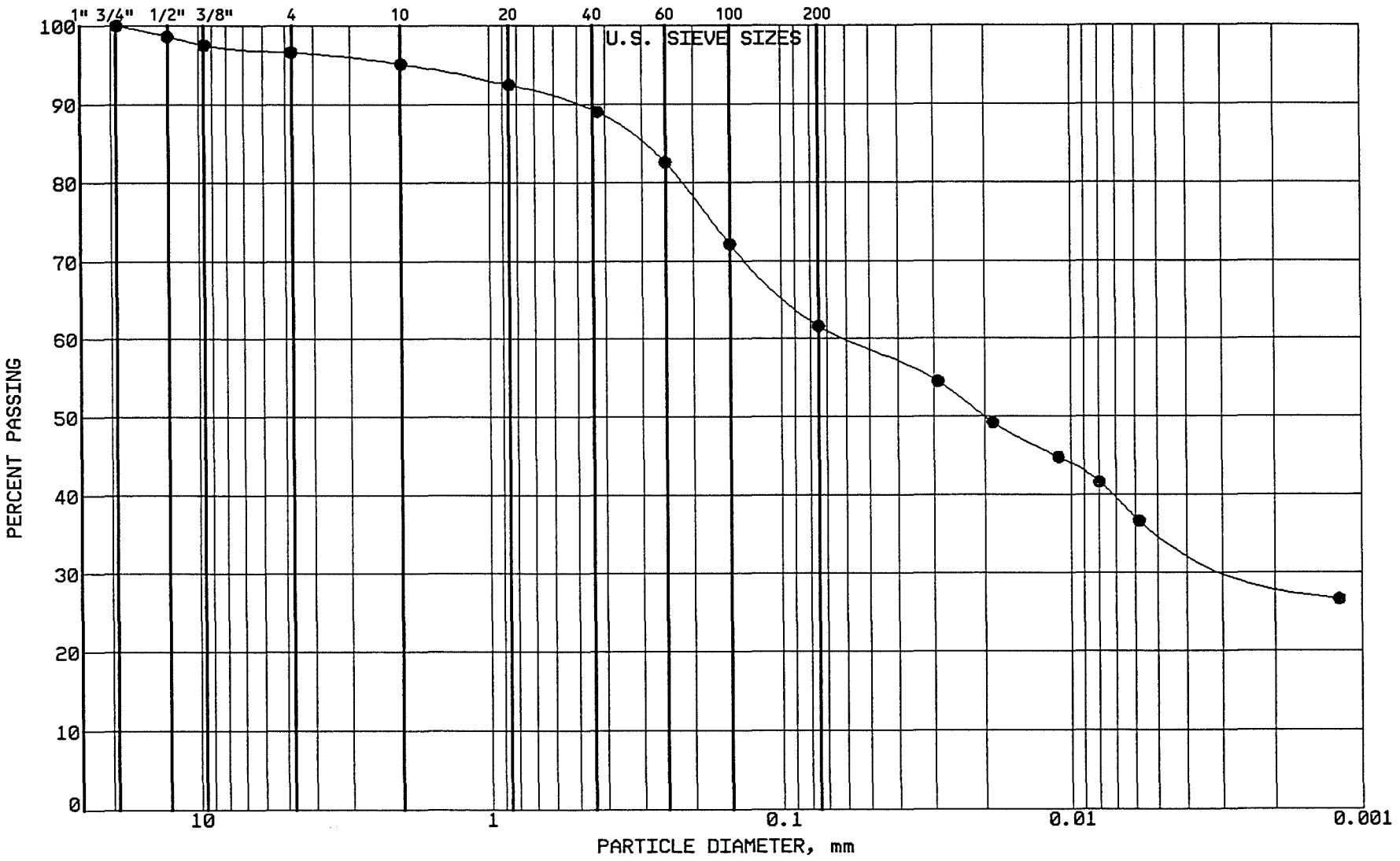
GRAVEL	1.0 %
SAND	36.1 %
SILT	25.2 %
CLAY	37.7 %
P 200	62.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42585.0, E 44887.0
SAMPLE: SG-CC-95 TUBE #:
ELEVATION: 1880.0'

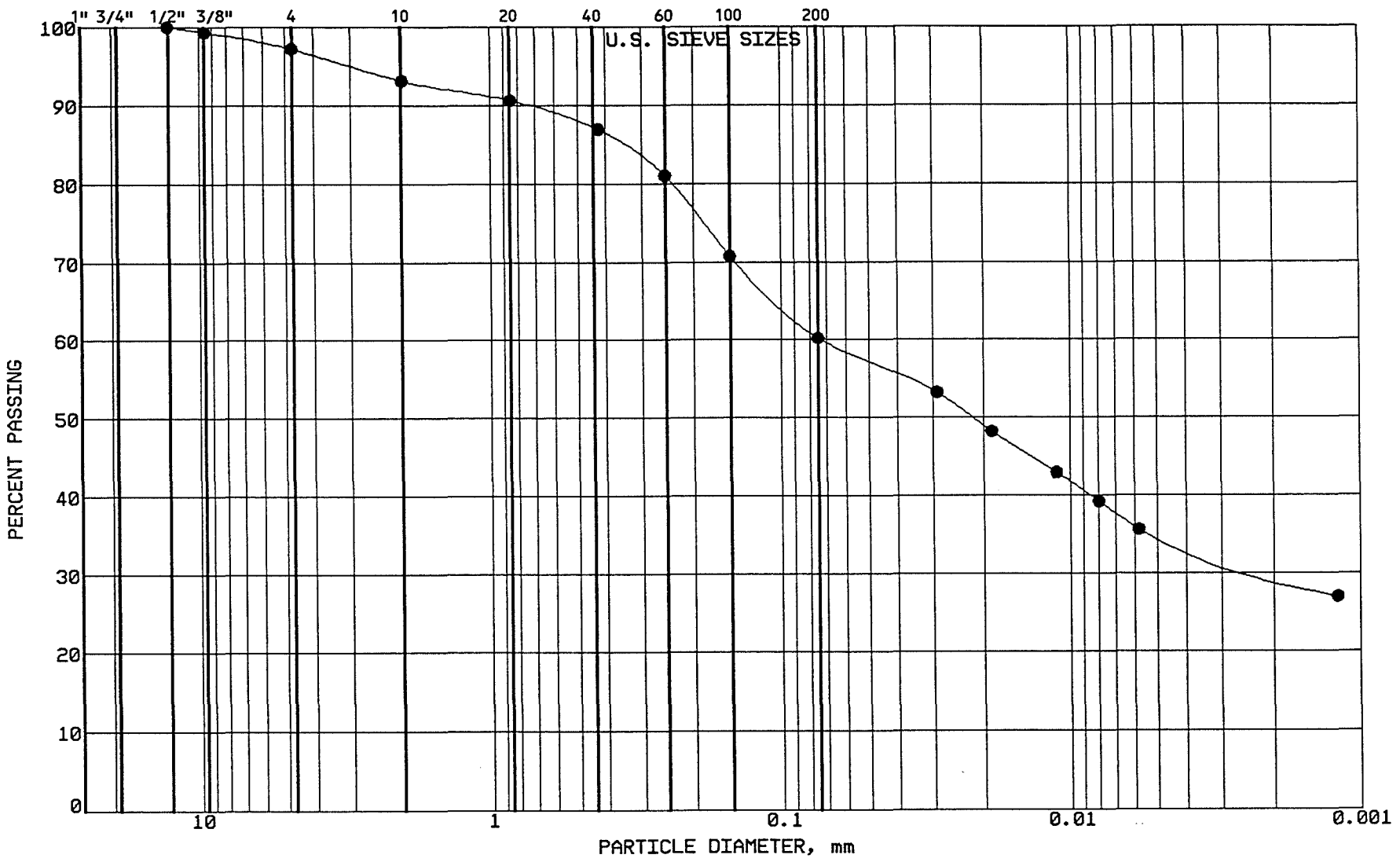
GRAVEL	3.4 %
SAND	35.0 %
SILT	25.9 %
CLAY	35.7 %
P 200	61.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42583.0, E 45052.0
SAMPLE: SG-CC-96 TUBE #:
ELEVATION: 1880.0'

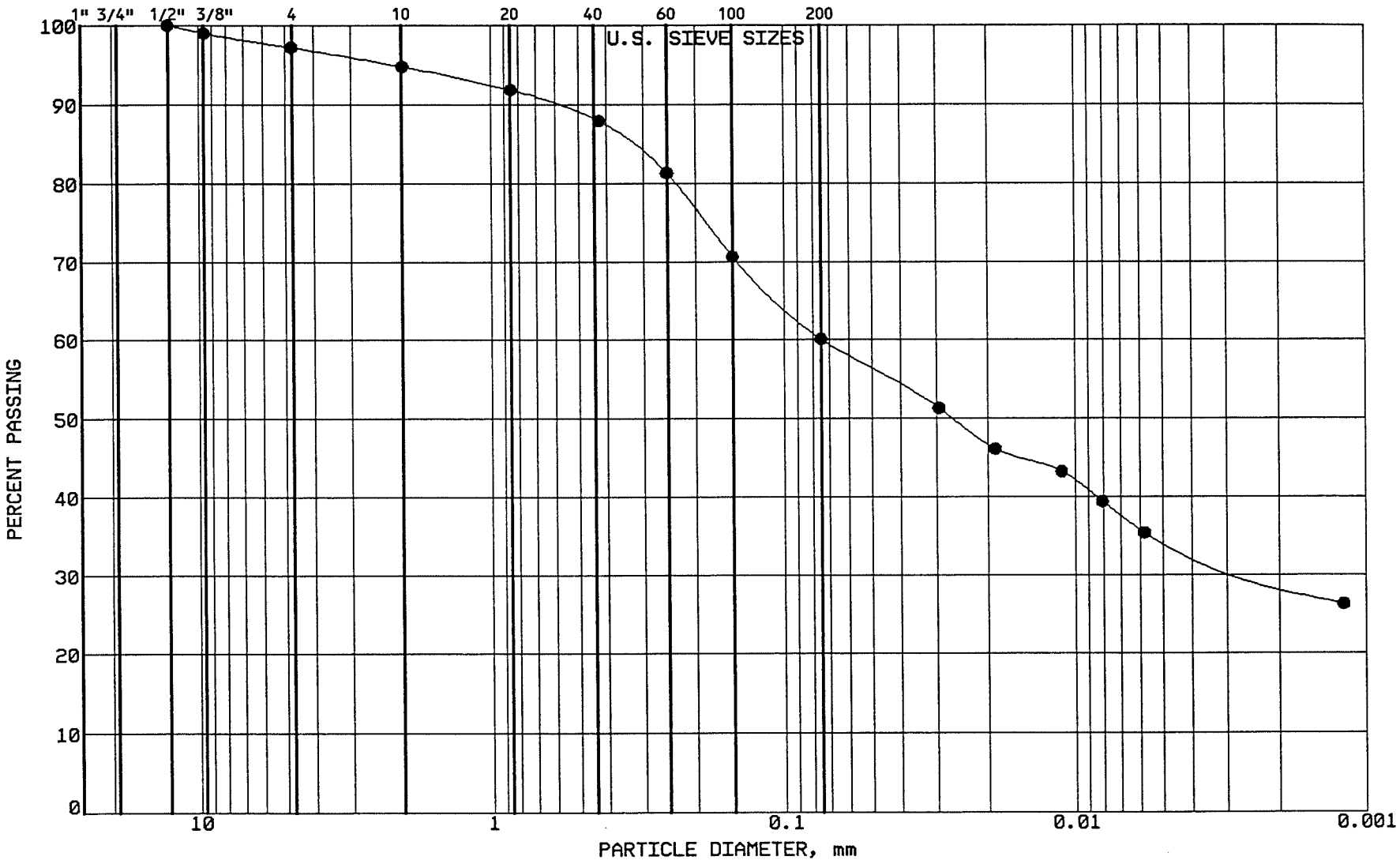
GRAVEL	2.8 %
SAND	37.0 %
SILT	25.4 %
CLAY	34.8 %
P 200	60.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42585.0, E 44691.0
SAMPLE: SG-CC-97 TUBE #:
ELEVATION: 1881.2'

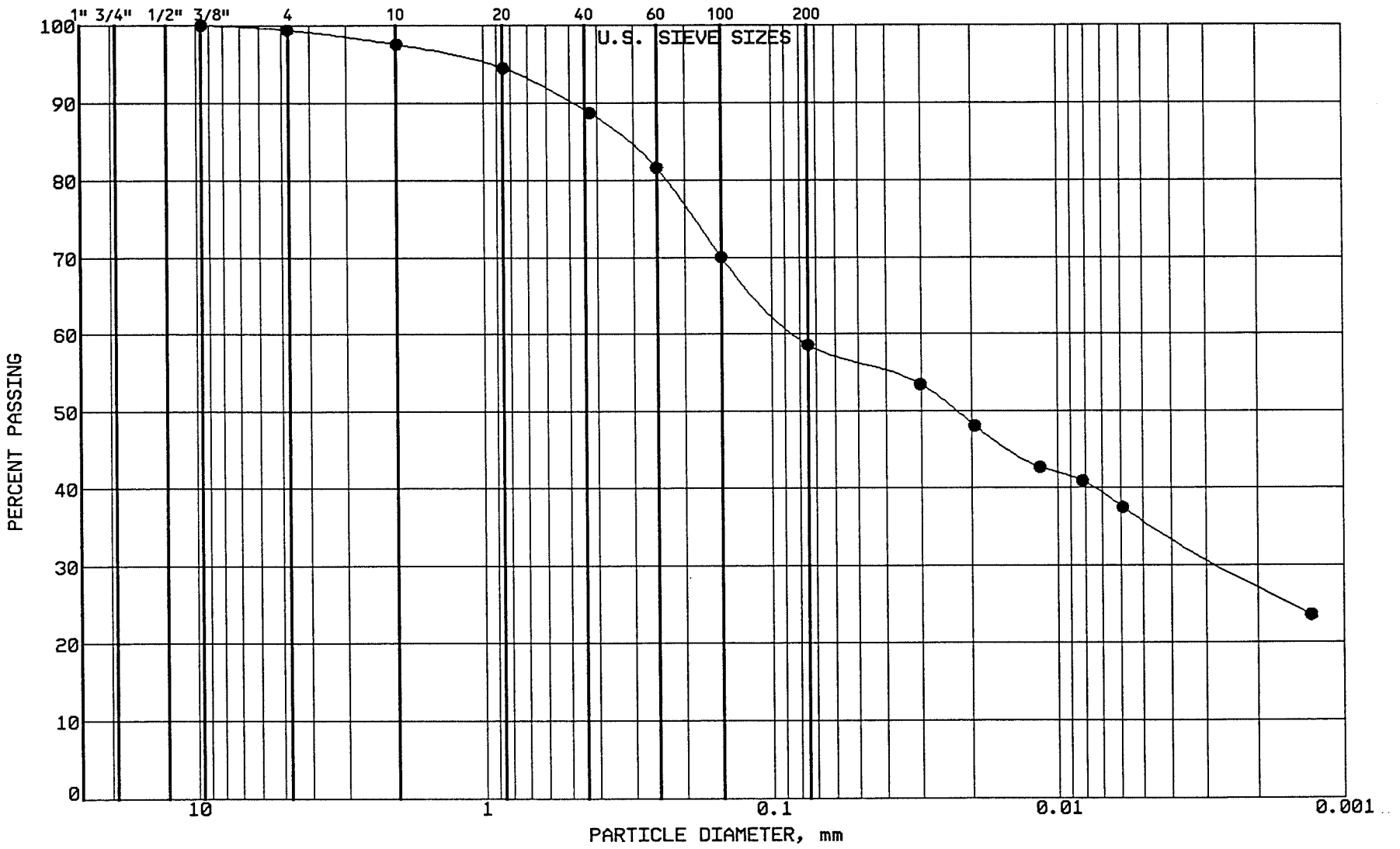
GRAVEL	2.8 %
SAND	37.1 %
SILT	25.6 %
CLAY	34.5 %
P 200	60.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

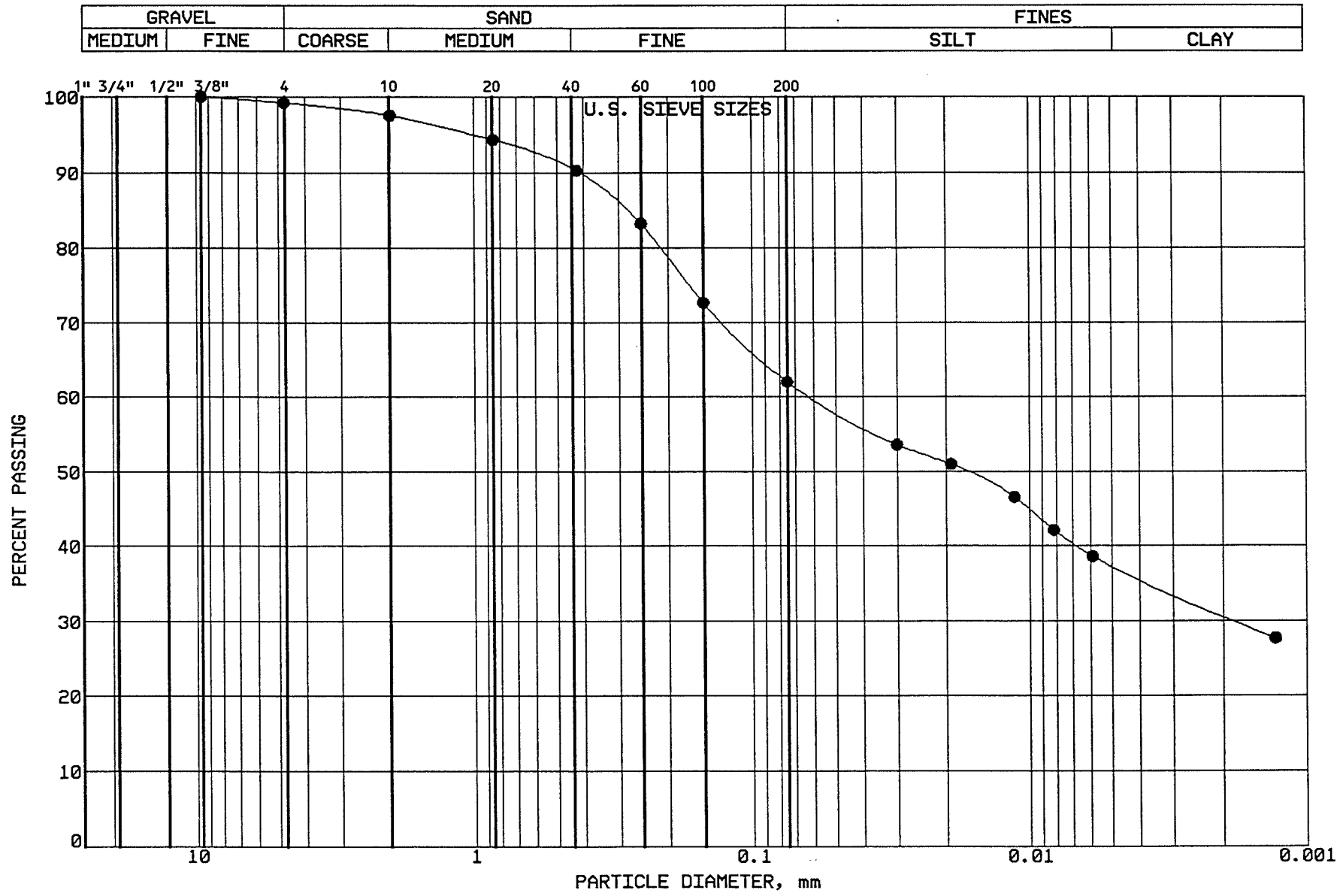
LOCATION: N 42588.0, E 44899.0
SAMPLE: SG-CC-98 TUBE #:
ELEVATION: 1880.9'

GRAVEL	0.6 %
SAND	40.8 %
SILT	22.7 %
CLAY	35.9 %
P 200	58.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42583.0, E 45077.0
SAMPLE: SG-CC-99 TUBE #:
ELEVATION: 1880.3'

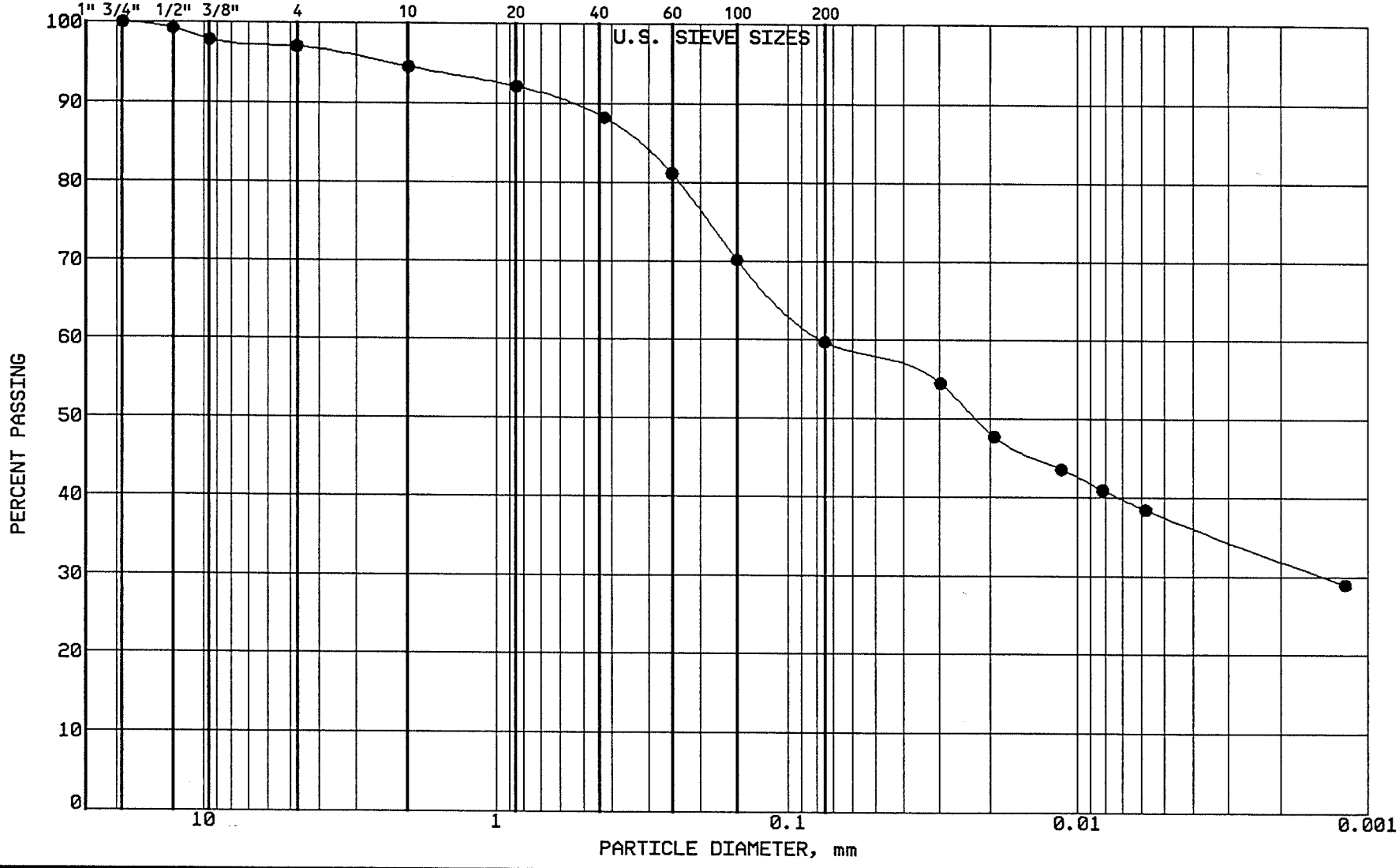
GRAVEL	0.8 %
SAND	37.2 %
SILT	24.6 %
CLAY	37.4 %
P 200	62.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

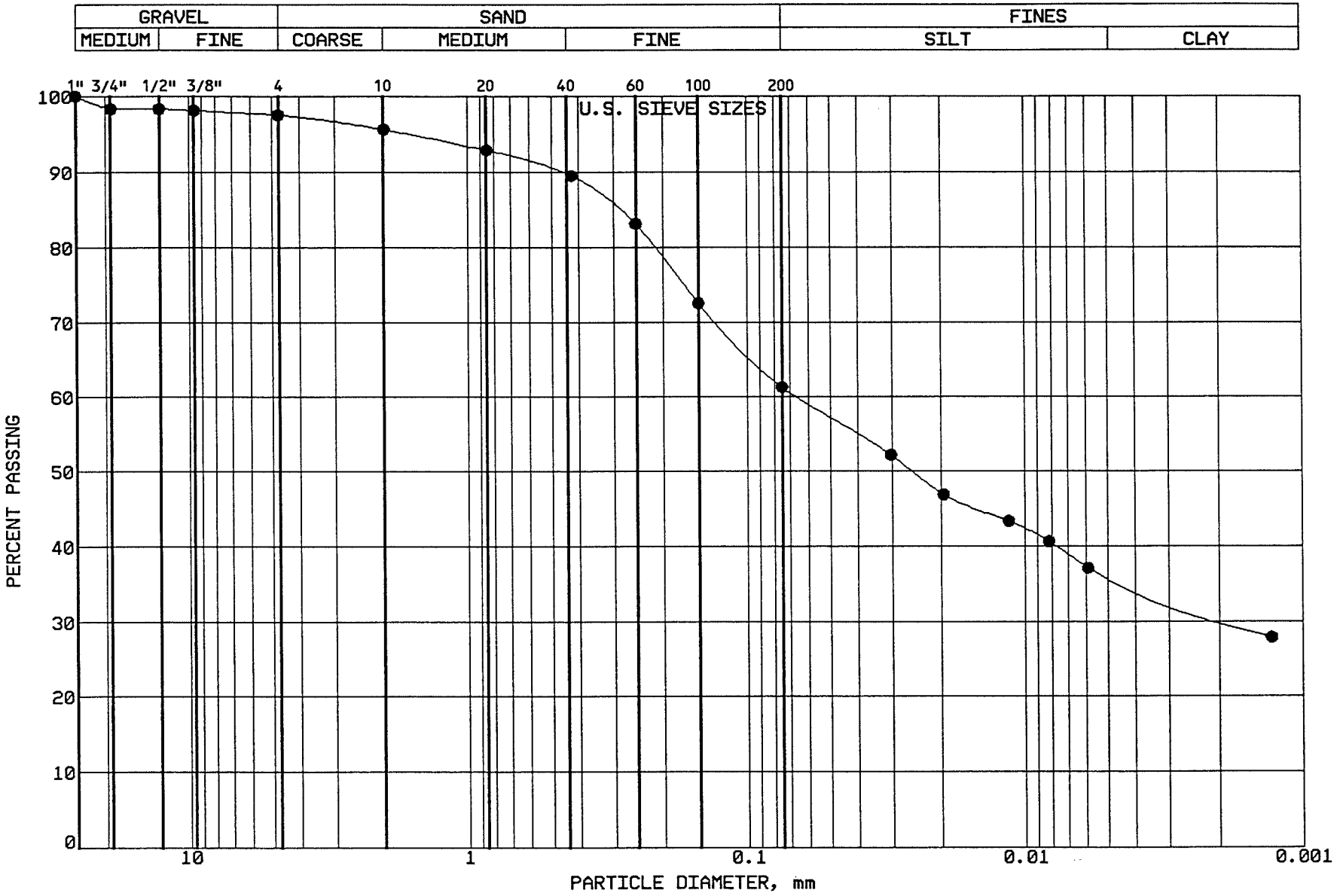
LOCATION: N 42570.0, E 44898.0
SAMPLE: CLSCC100 TUBE #: ST-26A
ELEVATION: 1883.1'

GRAVEL	3.0 %
SAND	37.3 %
SILT	22.2 %
CLAY	37.5 %
P 200	59.7 %

SOIL PROPERTIES

LL: 42.0%
PL: 13.0%
PI: 29.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

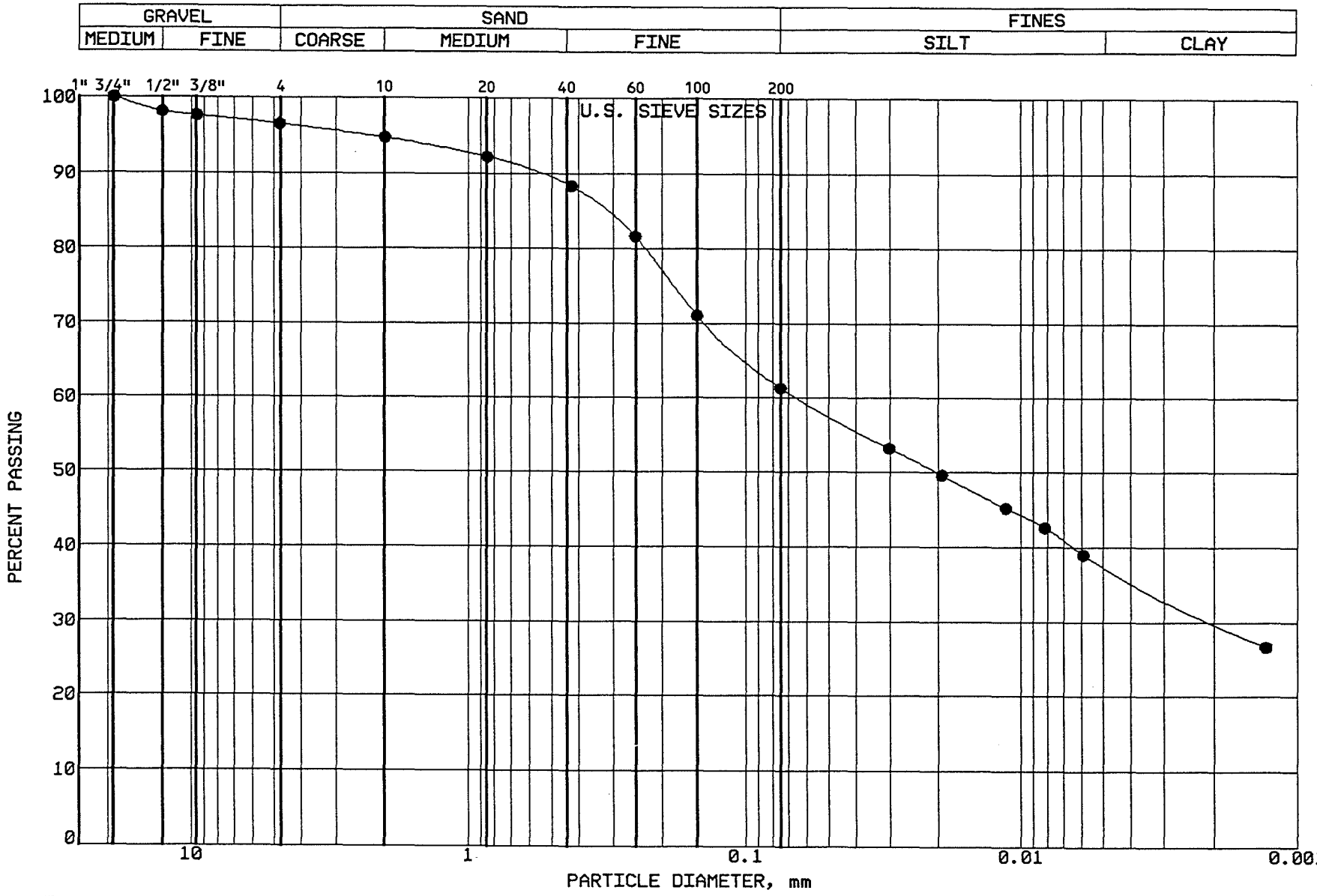
LOCATION: N 42568.0, E 45099.0
SAMPLE: CLSCC101 TUBE #:
ELEVATION: 1883.0'

GRAVEL	2.5 %
SAND	36.2 %
SILT	25.2 %
CLAY	36.1 %
P 200	61.3 %

SOIL PROPERTIES

LL: 40.0%
PL: 15.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

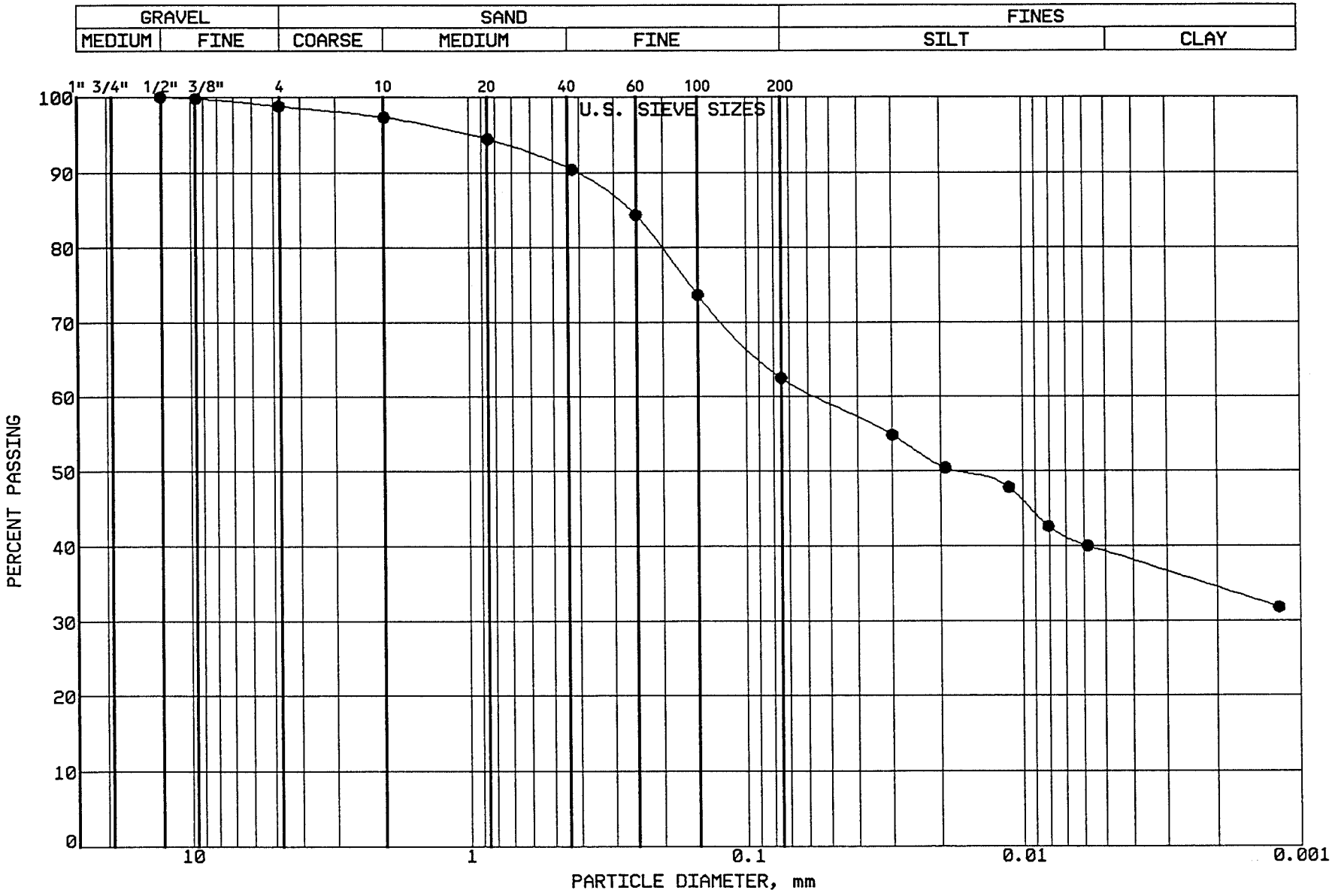
LOCATION: N 42567.0, E 45504.0
SAMPLE: CLSCC102 TUBE #: ST-27A
ELEVATION: 1884.7'

GRAVEL	3.5 %
SAND	35.2 %
SILT	23.6 %
CLAY	37.7 %
P 200	61.3 %

SOIL PROPERTIES

LL: 40.0%
PL: 14.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

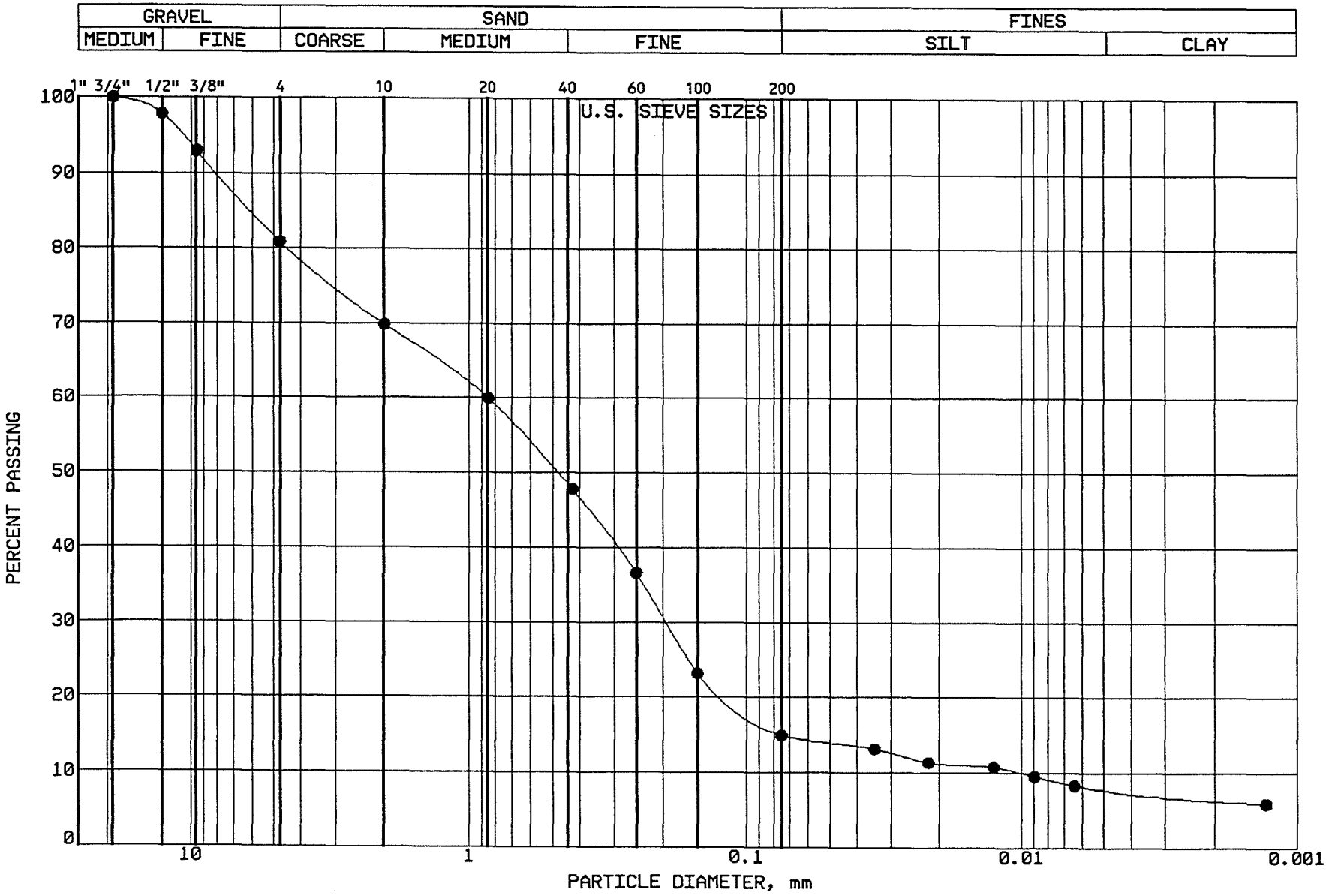
LOCATION: N 42567.0, E 45399.0
SAMPLE: CLSCC103 TUBE #: ST-RE23
ELEVATION: 1881.8'

GRAVEL	1.2 %
SAND	36.3 %
SILT	23.3 %
CLAY	39.2 %
P 200	62.5 %

SOIL PROPERTIES

LL: 42.0%
PL: 15.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

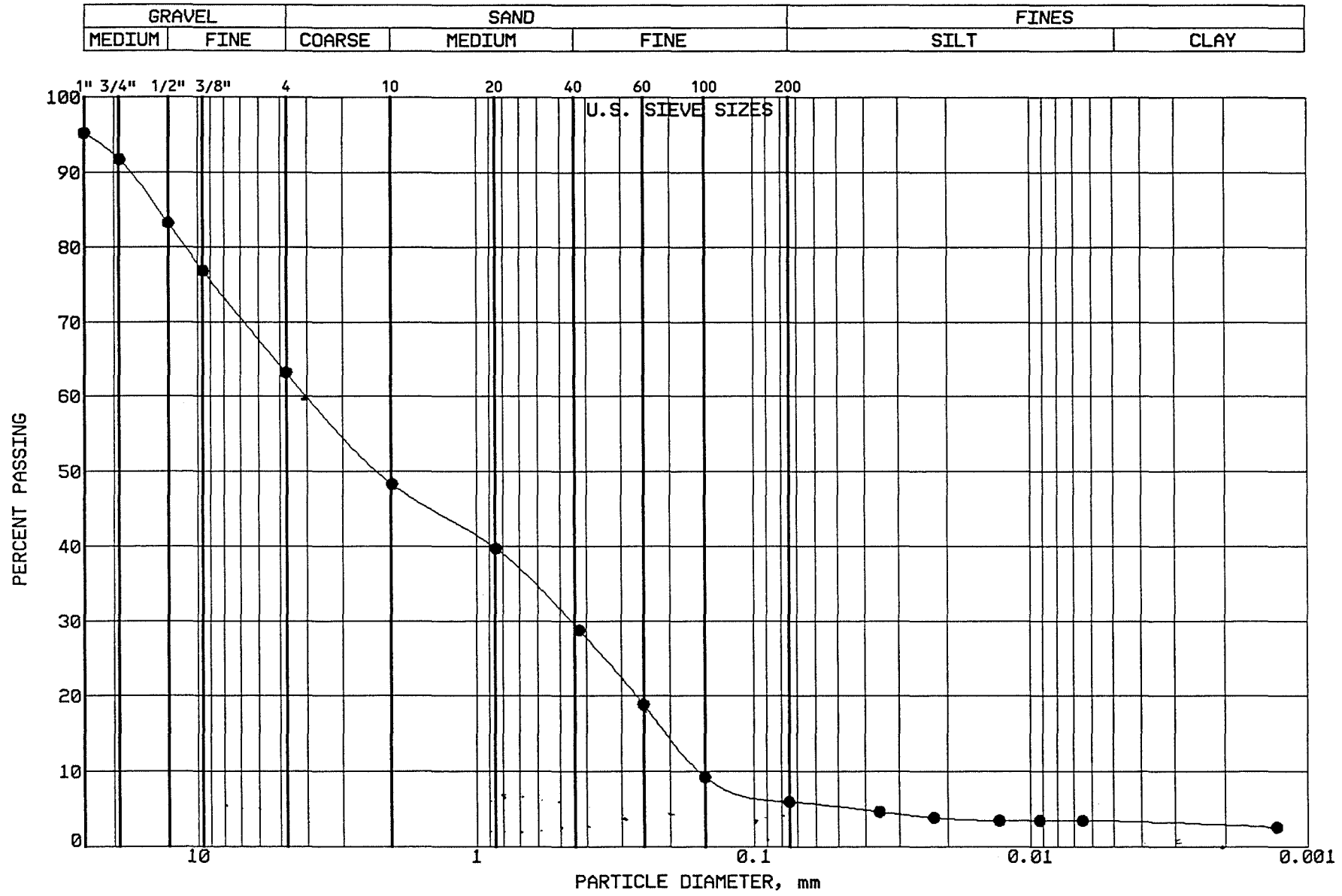
LOCATION: N 42579.0, E 44510.0
SAMPLE: SGCC104 TUBE #:
ELEVATION: 1876.7'

GRAVEL	19.2 %
SAND	65.8 %
SILT	7.0 %
CLAY	8.0 %
P 200	15.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND W GRAVEL(SC)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

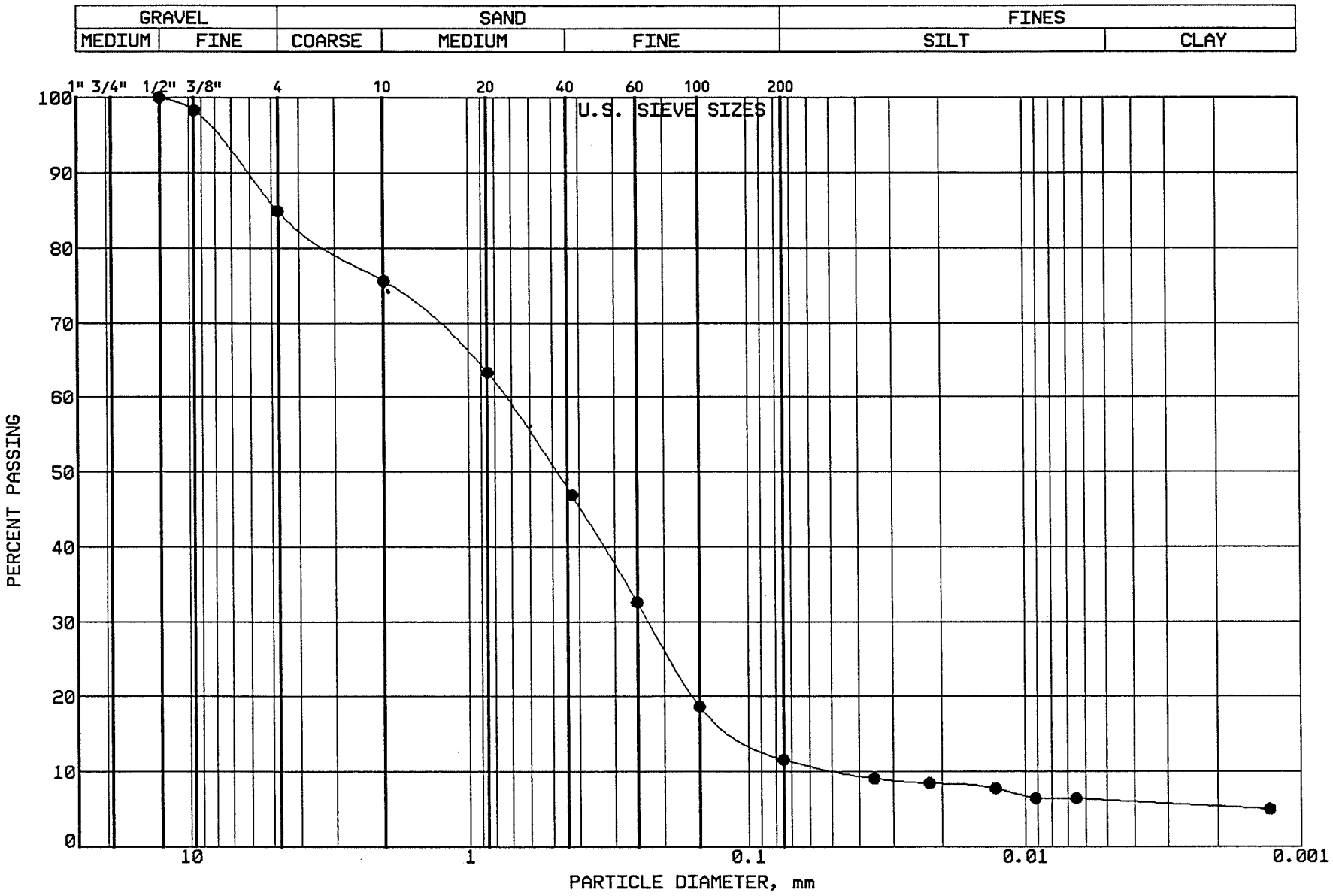
LOCATION: N 42577.0, E 44517.0
SAMPLE: SGCC105 TUBE #:
ELEVATION: 1877.8'

GRAVEL	36.8 %
SAND	57.2 %
SILT	2.6 %
CLAY	3.4 %
P 200	6.0 %

SOIL PROPERTIES

LL: NP%
PL: NP%
PI: NP%
CLASS: POORLY GRADED SAND W GRAVEL(SP-SM)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42577.0, E 44517.0
SAMPLE: SGCC106 TUBE #:
ELEVATION: 1877.8'

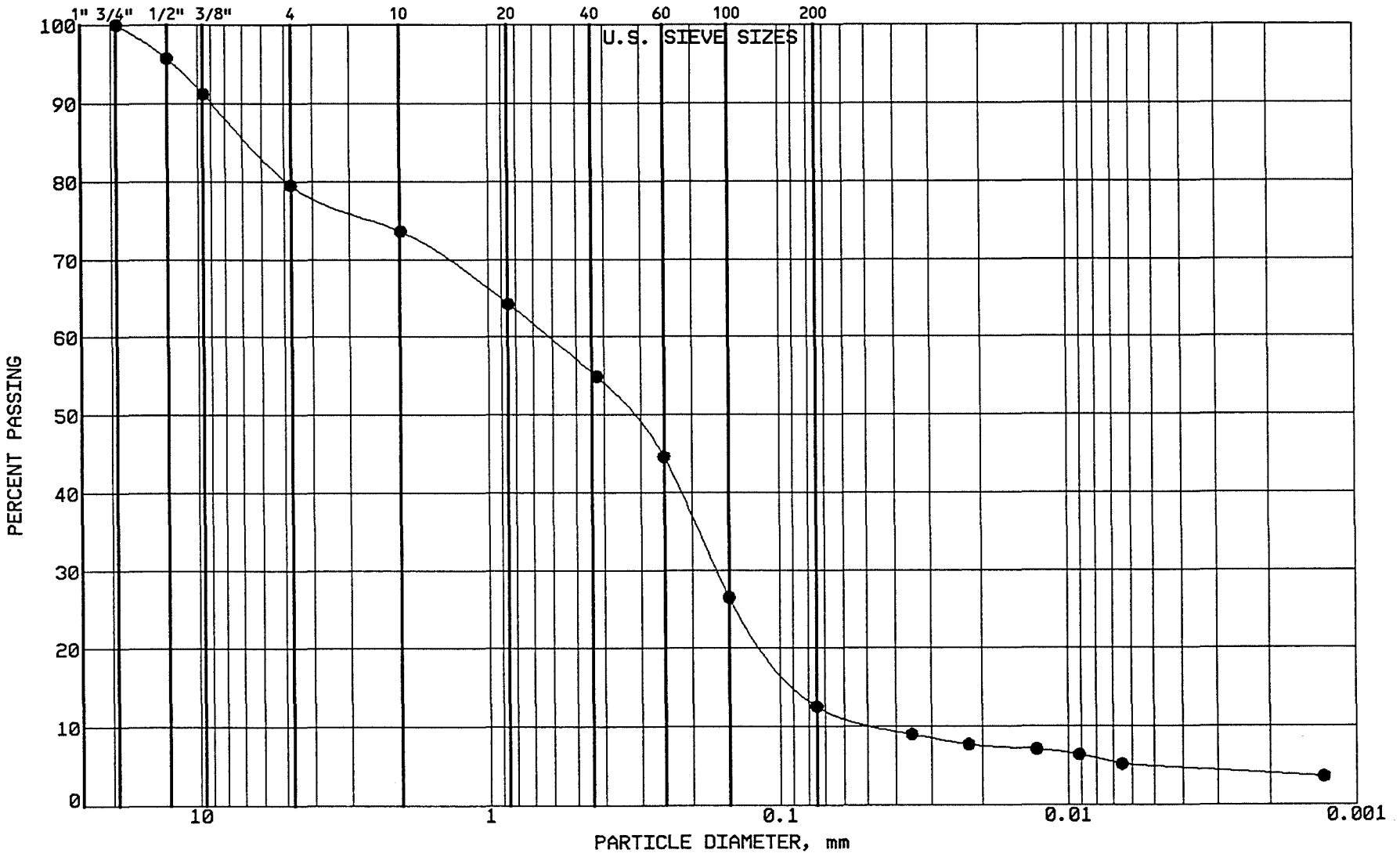
GRAVEL	15.1 %
SAND	73.3 %
SILT	5.3 %
CLAY	6.3 %
P 200	11.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: WELL GRADED SAND W SILT(SW-SM)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

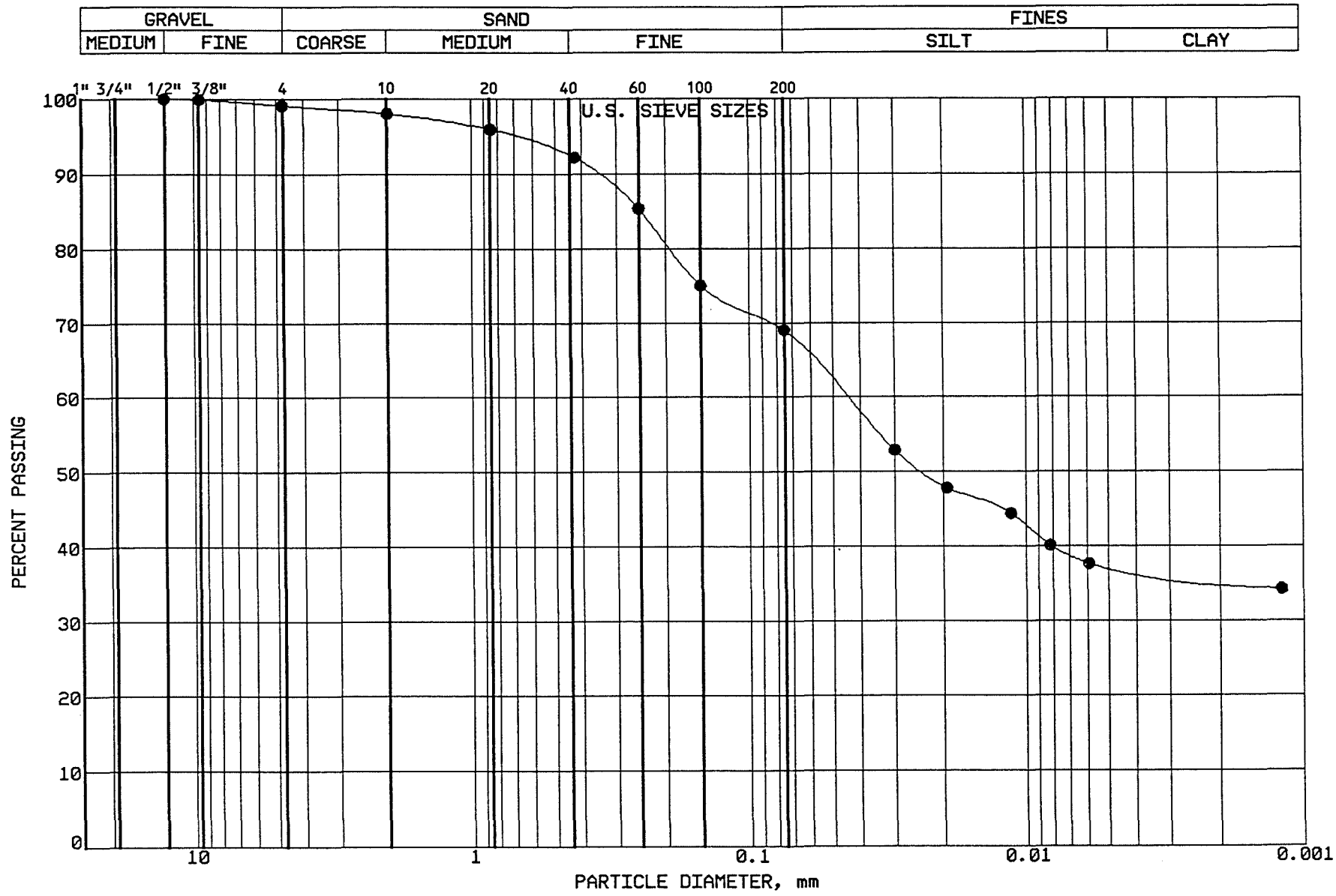
LOCATION: N 42581.0, E 44506.0
SAMPLE: SGCC107 TUBE #:
ELEVATION: 1878.7'

GRAVEL	20.5 %
SAND	66.9 %
SILT	7.7 %
CLAY	4.9 %
P 200	12.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: POORLY GRADED SAND W SILT /GRAVEL (SP-SM)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42566.0, E 44714.0
SAMPLE: CLSCC108 TUBE #: ST-28A
ELEVATION: 1884.1'

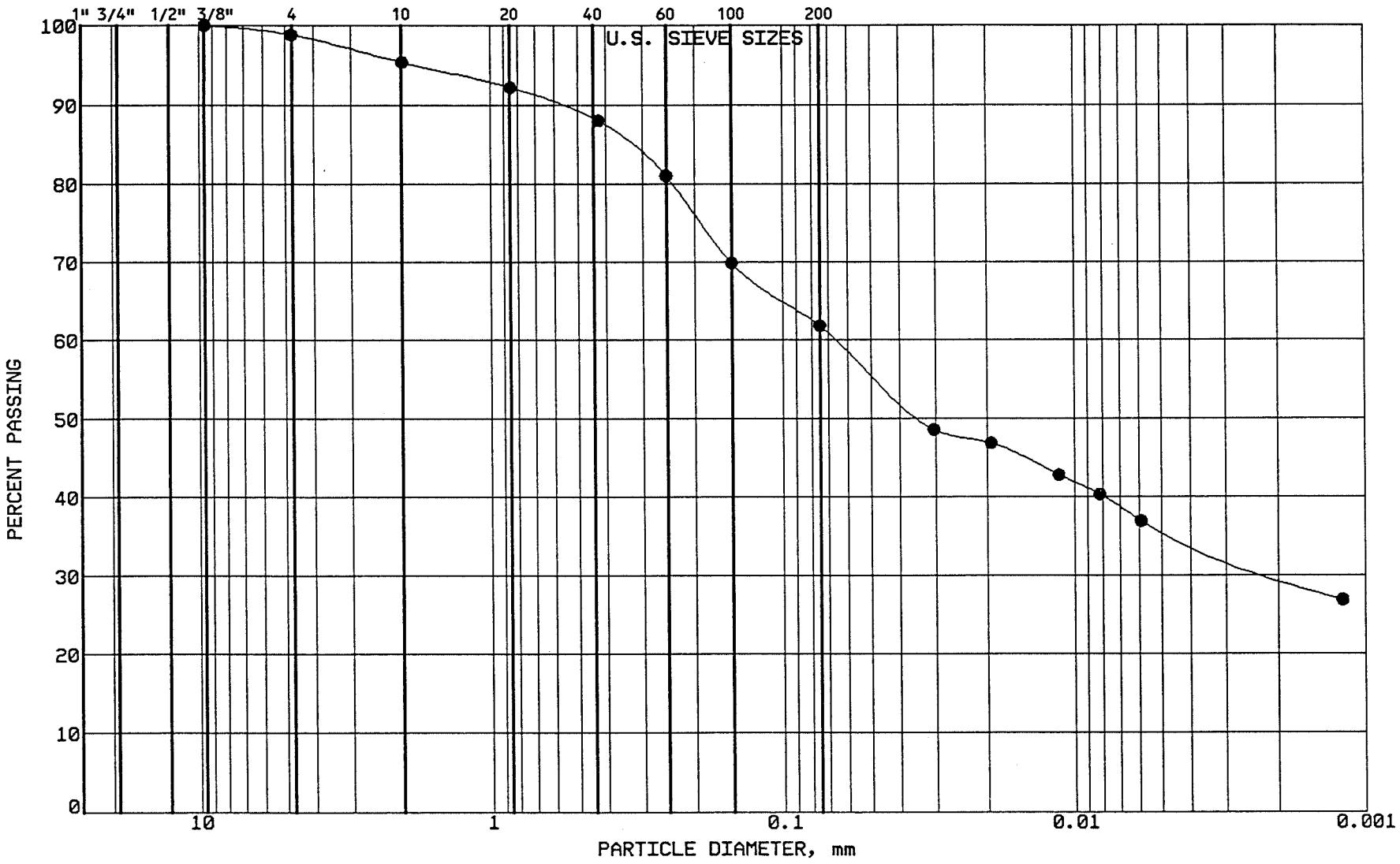
GRAVEL	0.9 %
SAND	30.1 %
SILT	31.8 %
CLAY	37.2 %
P 200	69.0 %

SOIL PROPERTIES

LL: 37.0%
PL: 14.0%
PI: 23.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42569.0, E 45810.0
SAMPLE: CLSCC109 TUBE #:
ELEVATION: 1884.6'

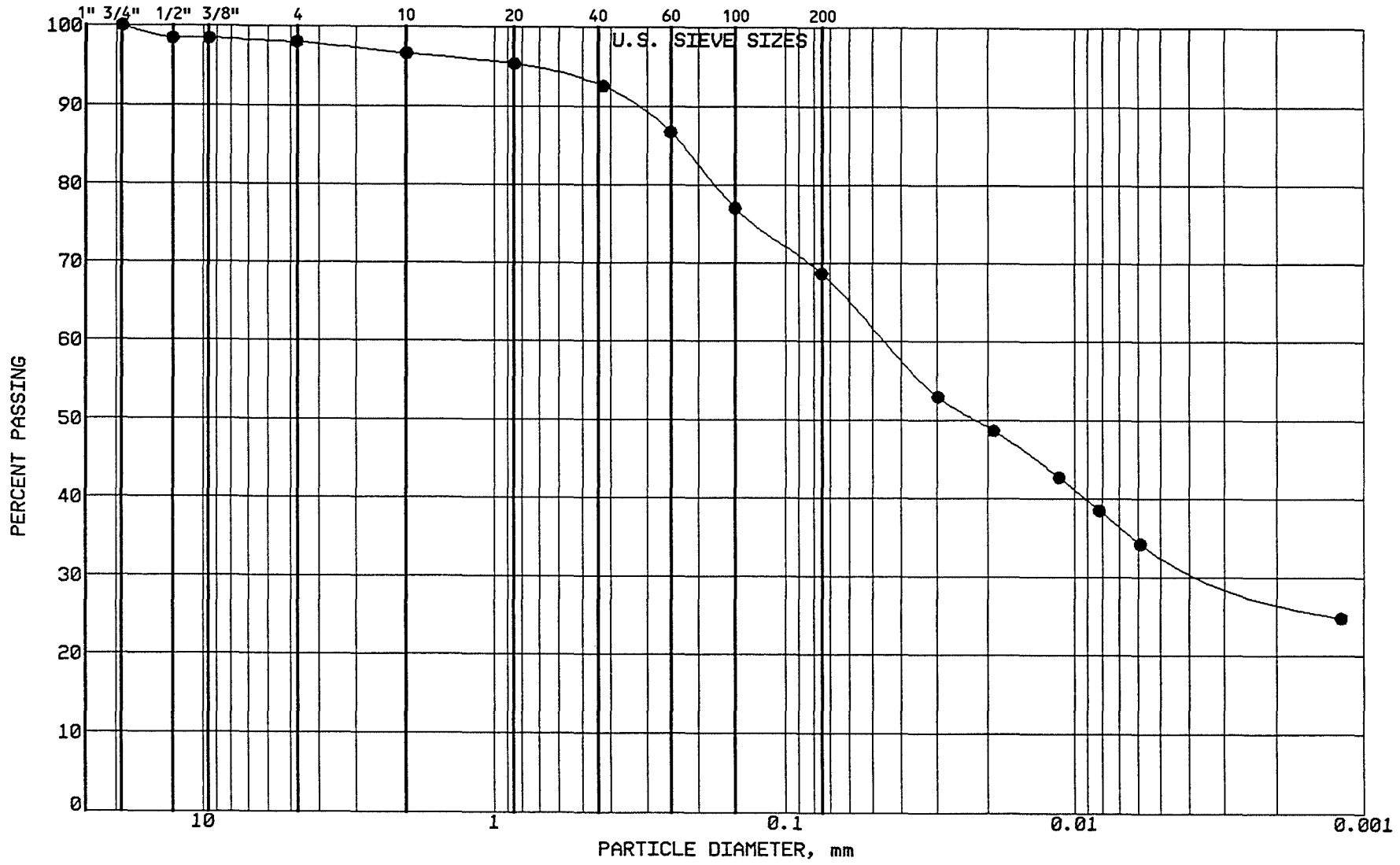
GRAVEL	1.2 %
SAND	37.0 %
SILT	25.9 %
CLAY	35.9 %
P 200	61.8 %

SOIL PROPERTIES

LL: 41.0%
PL: 15.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42579.0, E 42581.0
SAMPLE: SGCC110 TUBE #:
ELEVATION: 1879.6'

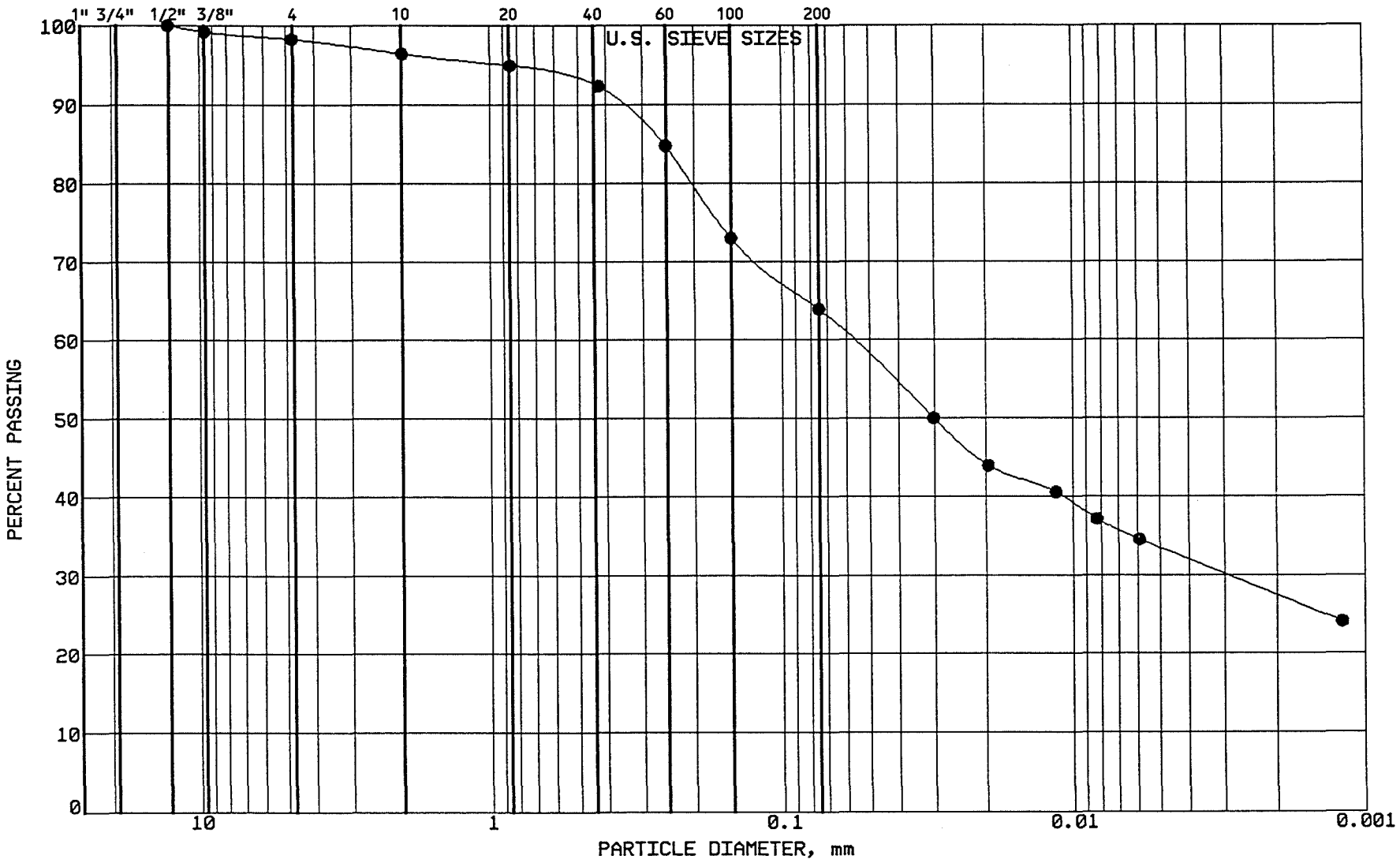
GRAVEL	2.0 %
SAND	29.4 %
SILT	35.4 %
CLAY	33.2 %
P 200	68.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

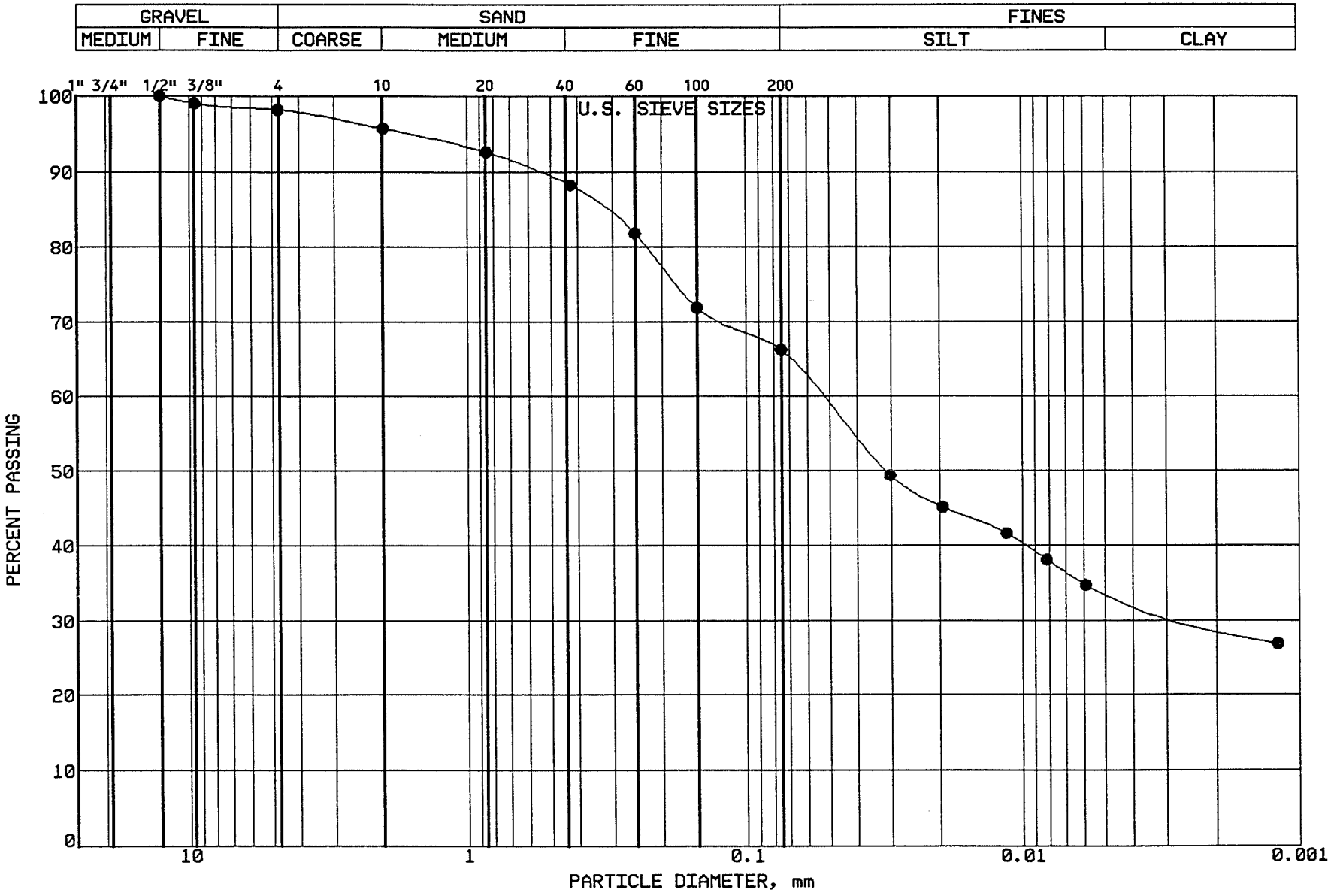
LOCATION: N 42581.0, E 44406.0
SAMPLE: SGCC111 TUBE #:
ELEVATION: 1880.1'

GRAVEL	1.7 %
SAND	34.4 %
SILT	30.5 %
CLAY	33.4 %
P 200	63.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

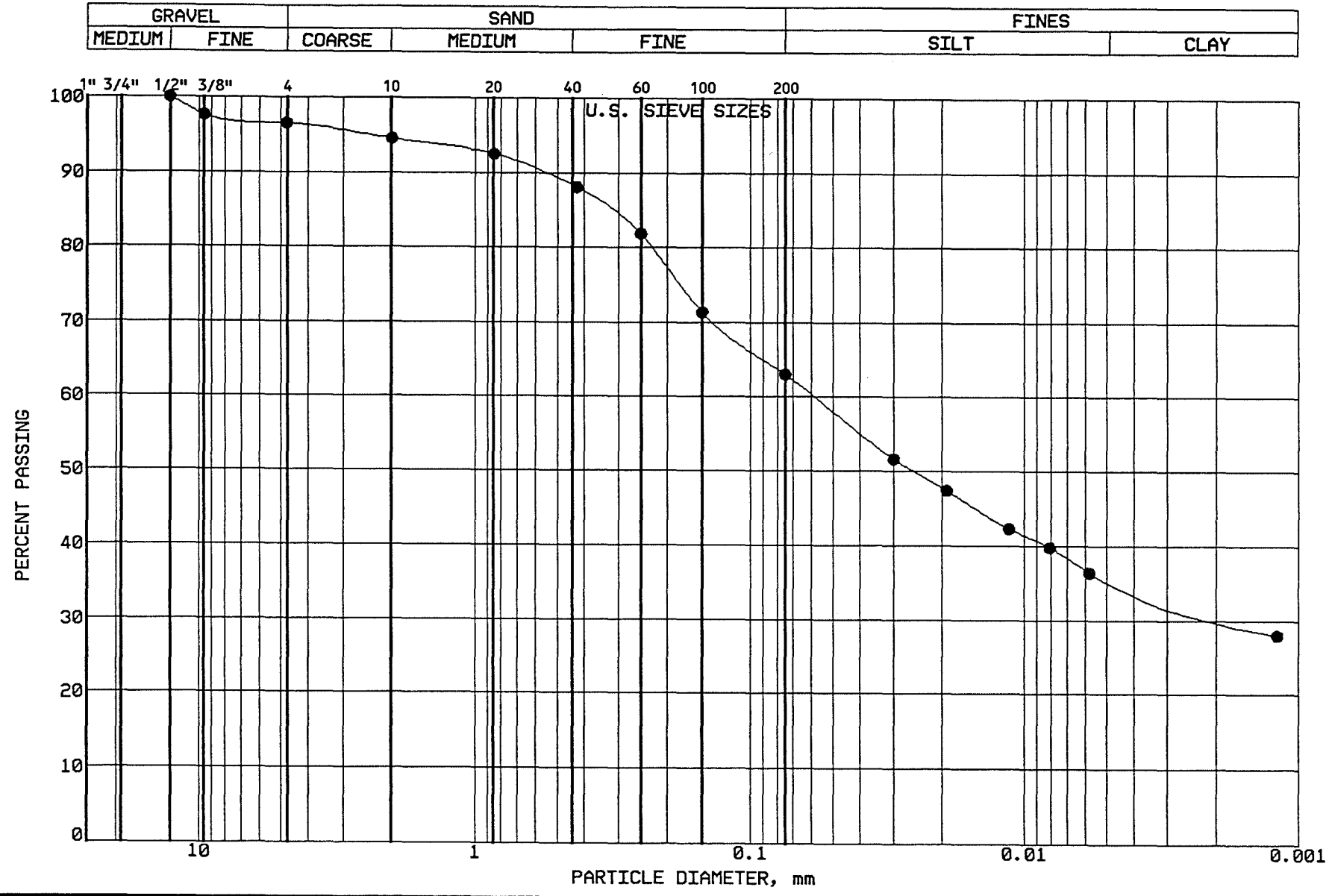
LOCATION: N 42577.0, E 44221.0
SAMPLE: SGCC112 TUBE #:
ELEVATION: 1880.1'

GRAVEL	1.8 %
SAND	32.0 %
SILT	32.3 %
CLAY	33.9 %
P 200	66.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42578.0, E 44603.0
SAMPLE: SGCC113 TUBE #:
ELEVATION: 1880.2'

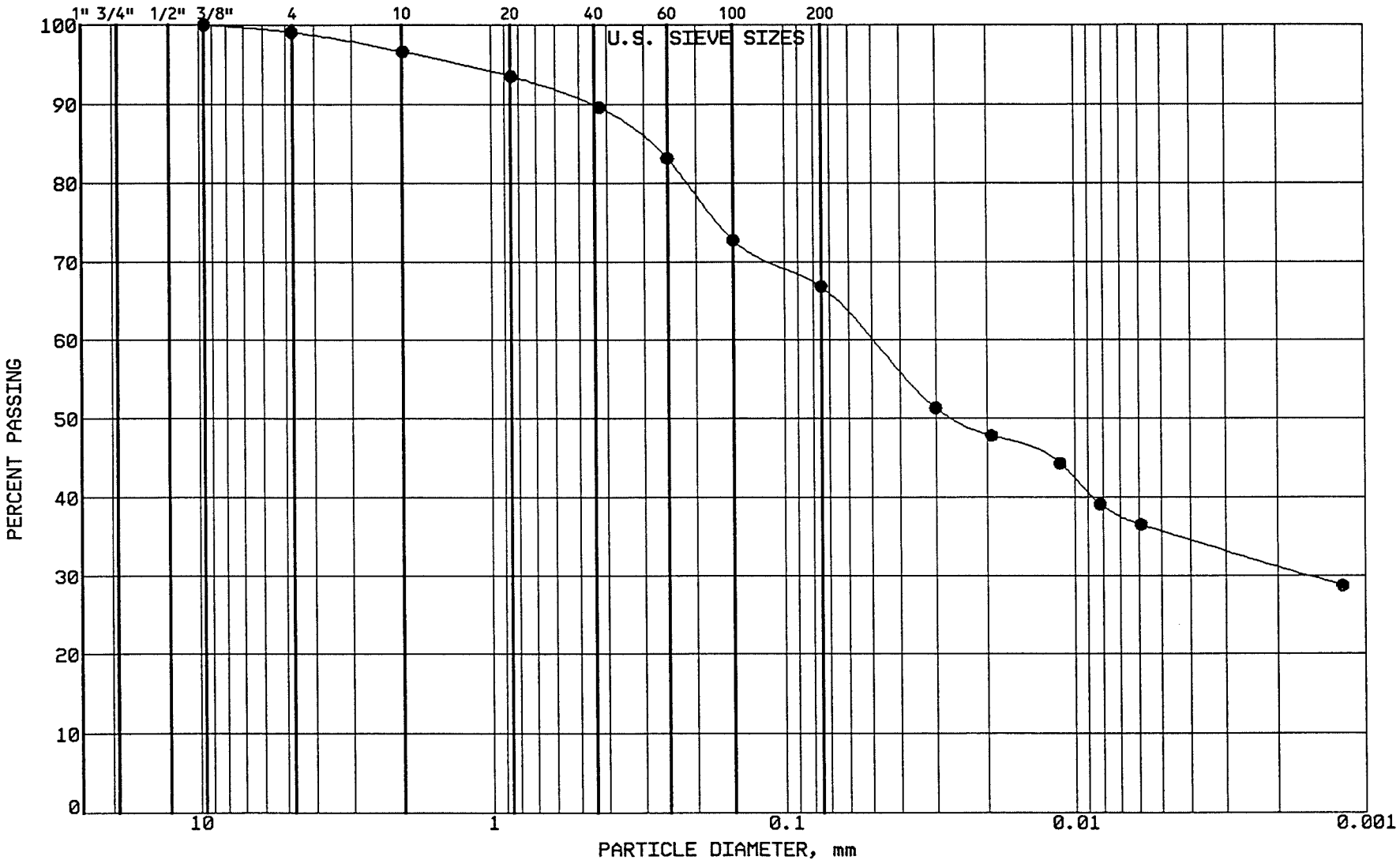
GRAVEL	3.5 %
SAND	33.5 %
SILT	27.4 %
CLAY	35.6 %
P 200	63.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42579.0, E 44407.0
SAMPLE: SGCC114 TUBE #:
ELEVATION: 1881.4'

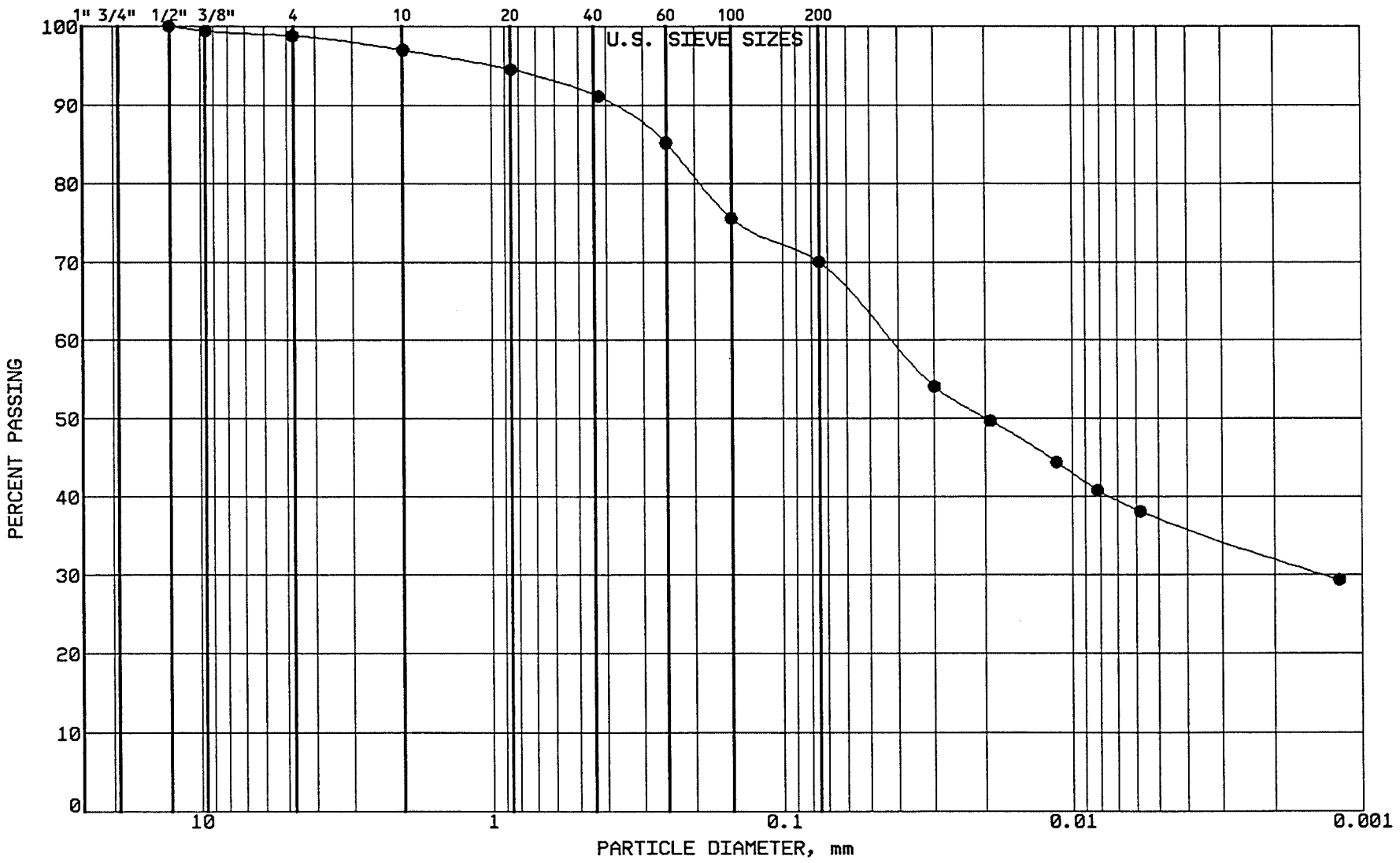
GRAVEL	0.9 %
SAND	32.3 %
SILT	31.1 %
CLAY	35.7 %
P 200	66.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

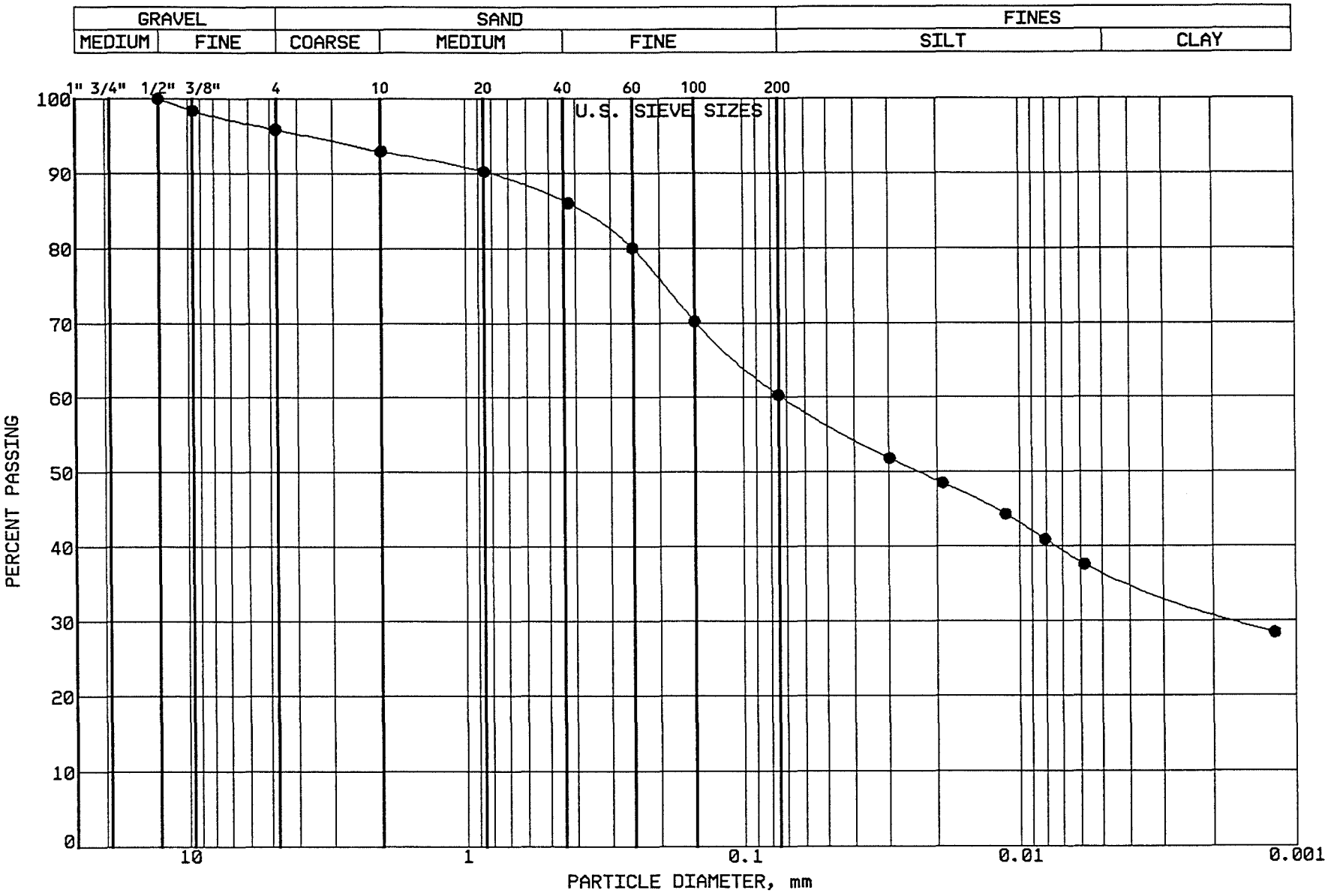
LOCATION: N 42574.0, E 44202.0
SAMPLE: SGCC115 TUBE #:
ELEVATION: 1882.6'

GRAVEL	1.2 %
SAND	28.8 %
SILT	32.7 %
CLAY	37.3 %
P 200	70.0 %

SOIL PROPERTIES

LL: 41.0%
PL: 15.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42574.0, E 44195.0
SAMPLE: CLSCC116 TUBE #: ST-29A
ELEVATION: 1883.5'

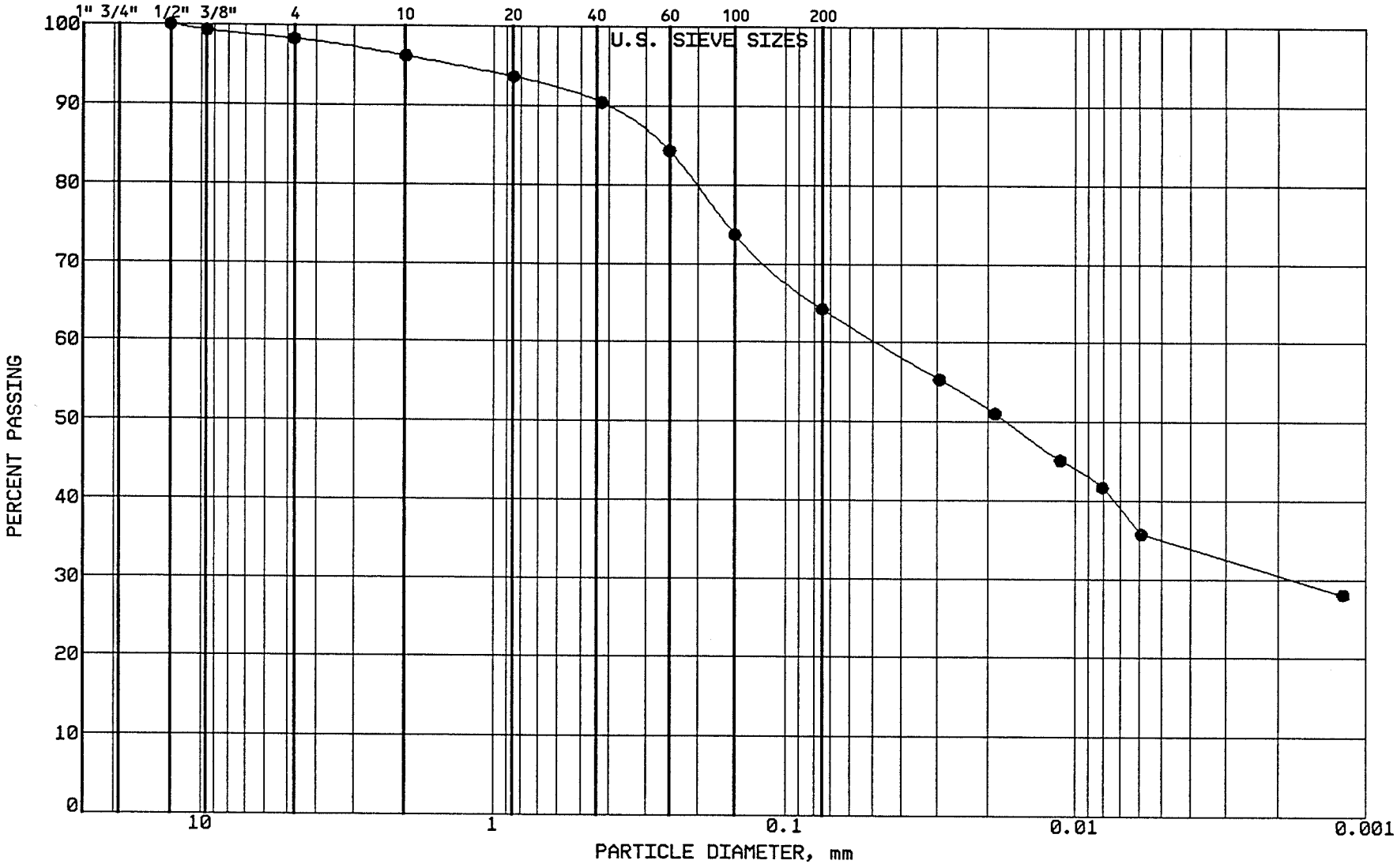
GRAVEL	4.1 %
SAND	35.6 %
SILT	23.6 %
CLAY	36.7 %
P 200	60.3 %

SOIL PROPERTIES

LL: 44.0%
PL: 14.0%
PI: 30.0%
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

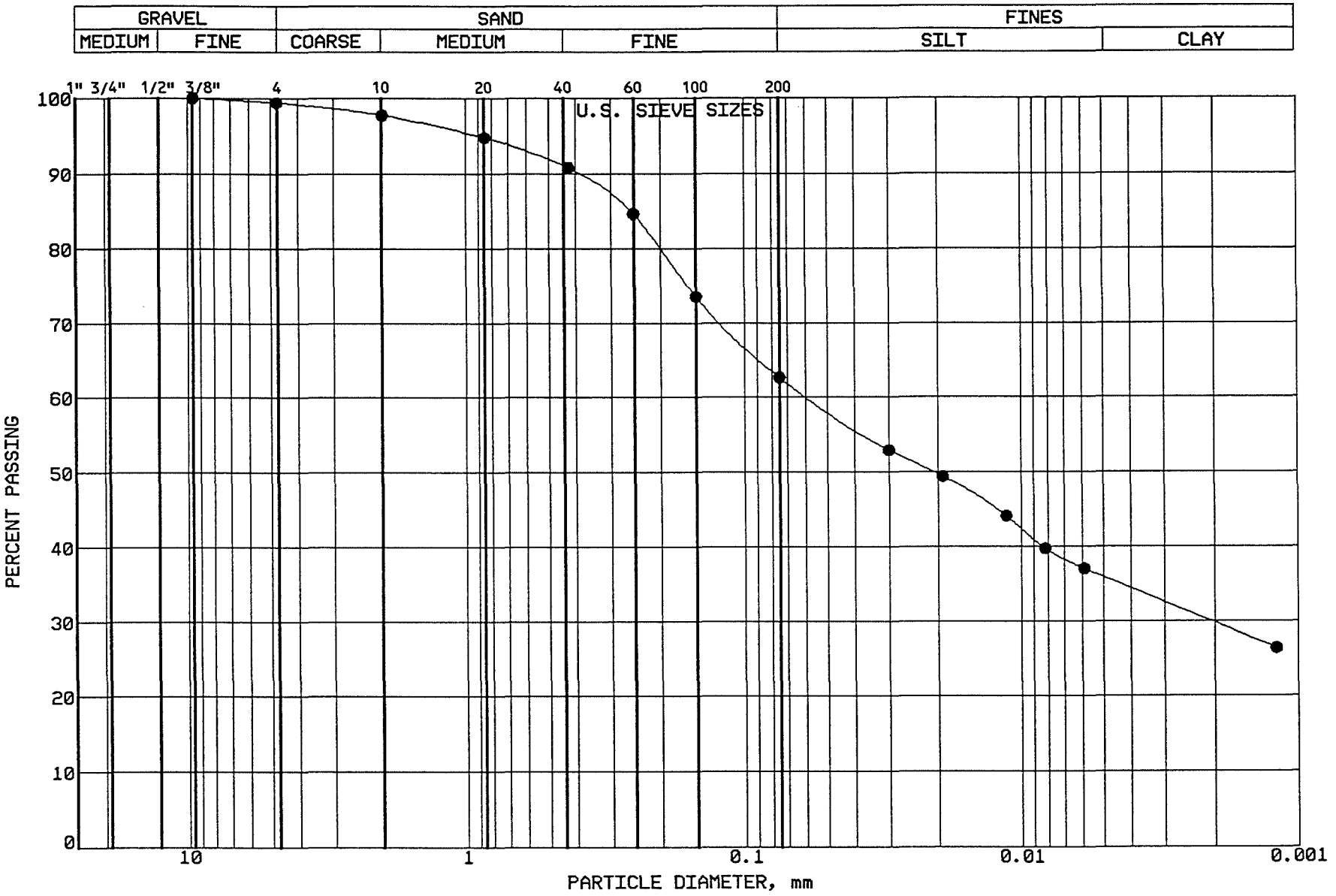
LOCATION: N 42570.0, E 44392.0
SAMPLE: CLSCC117 TUBE #: ST-30A
ELEVATION: 1885.0'

GRAVEL	1.7 %
SAND	34.1 %
SILT	29.3 %
CLAY	34.9 %
P 200	64.2 %

SOIL PROPERTIES

LL: 42.0%
PL: 14.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42567.0, E 44600.0
SAMPLE: CLSCC118 TUBE #:
ELEVATION: 1884.1'

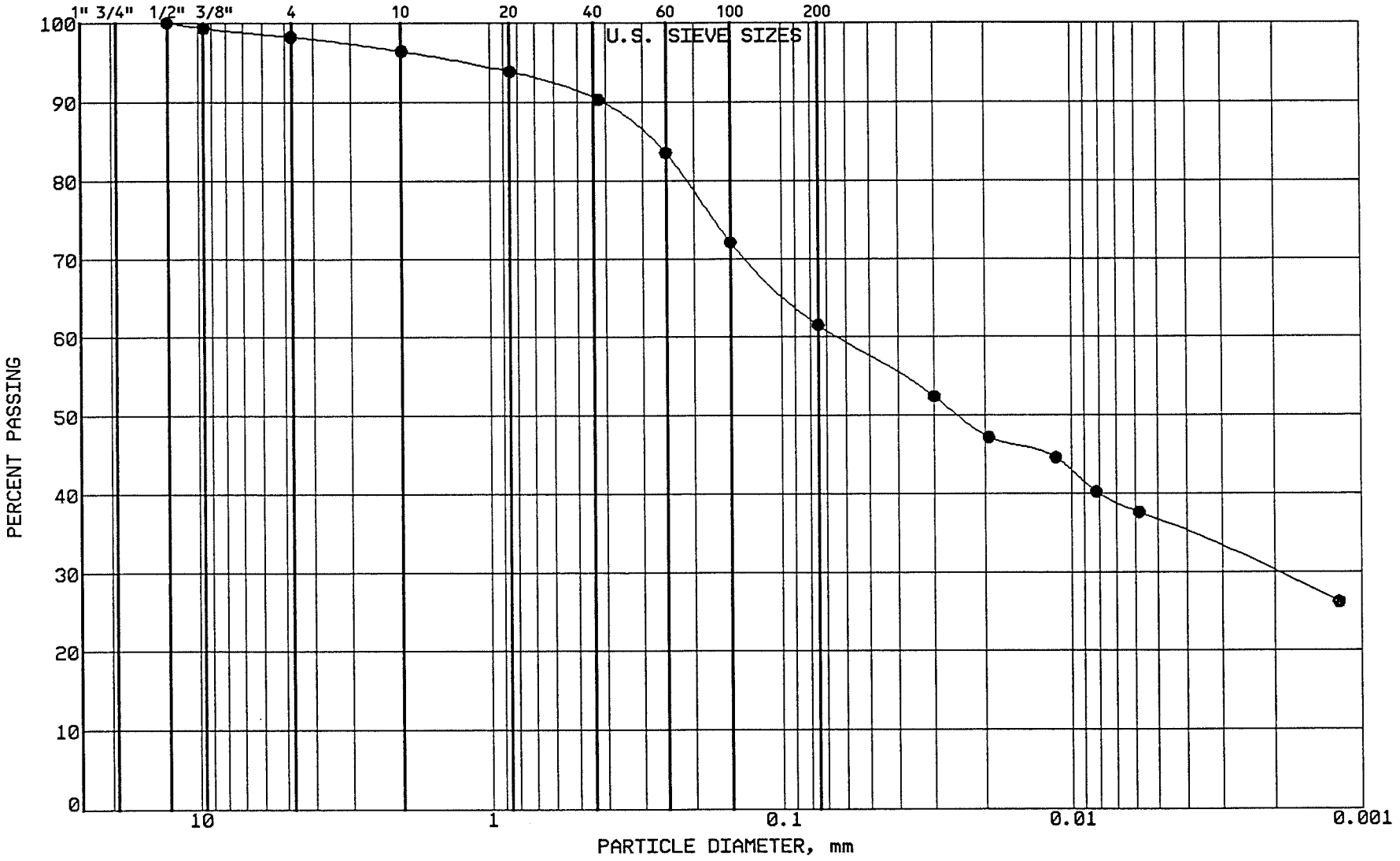
GRAVEL	0.6 %
SAND	36.8 %
SILT	26.7 %
CLAY	35.9 %
P 200	62.6 %

SOIL PROPERTIES

LL: 40.0%
PL: 15.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42555.0, E 45102.0
SAMPLE: CLSCC119 TUBE #: ST-31A
ELEVATION: 1888.7'

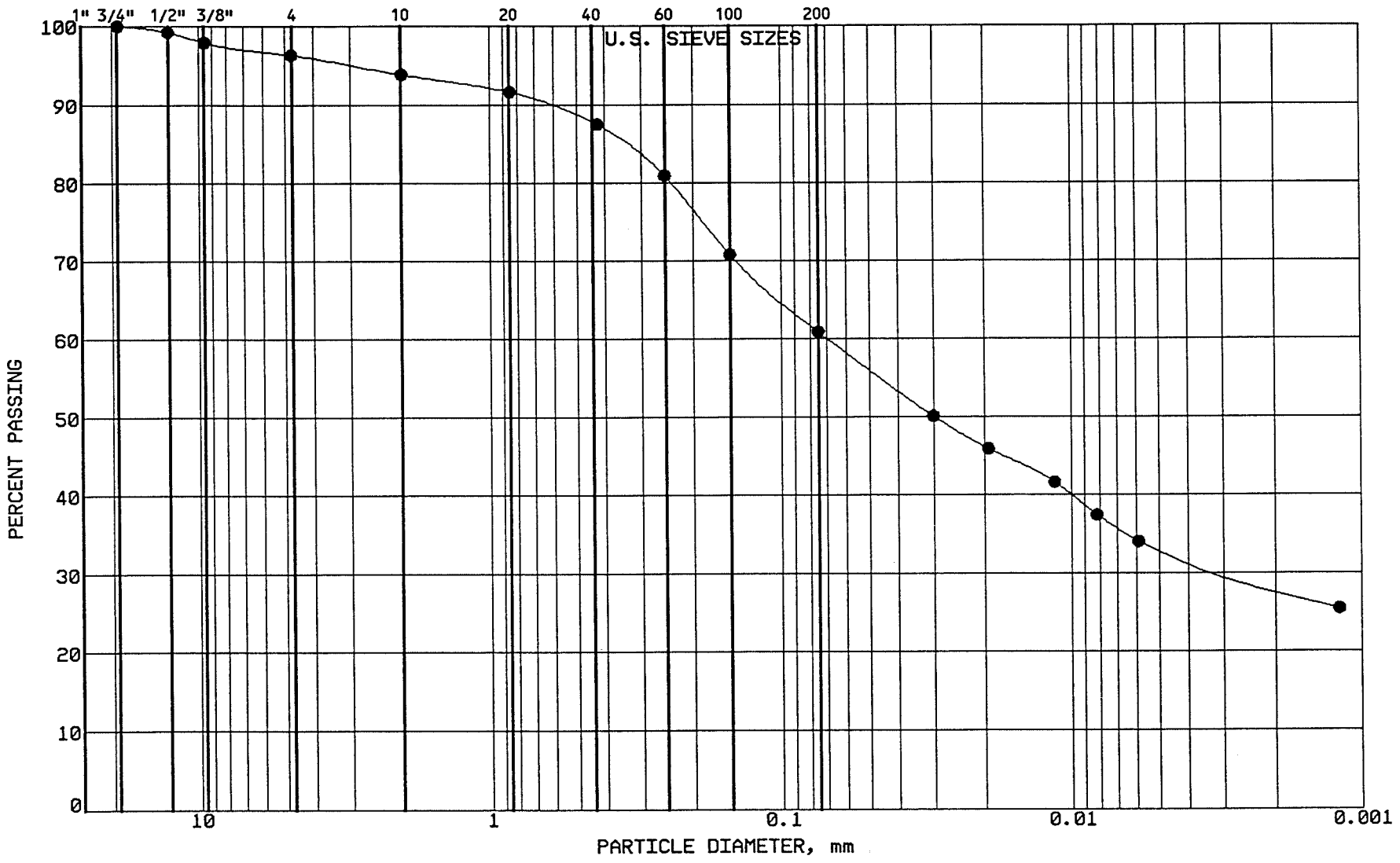
GRAVEL	1.8 %
SAND	36.7 %
SILT	25.0 %
CLAY	36.5 %
P 200	61.5 %

SOIL PROPERTIES

LL: 41.0%
PL: 16.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43367.0, E 44314.0
SAMPLE: SGCC120 TUBE #:
ELEVATION: 1882.8'

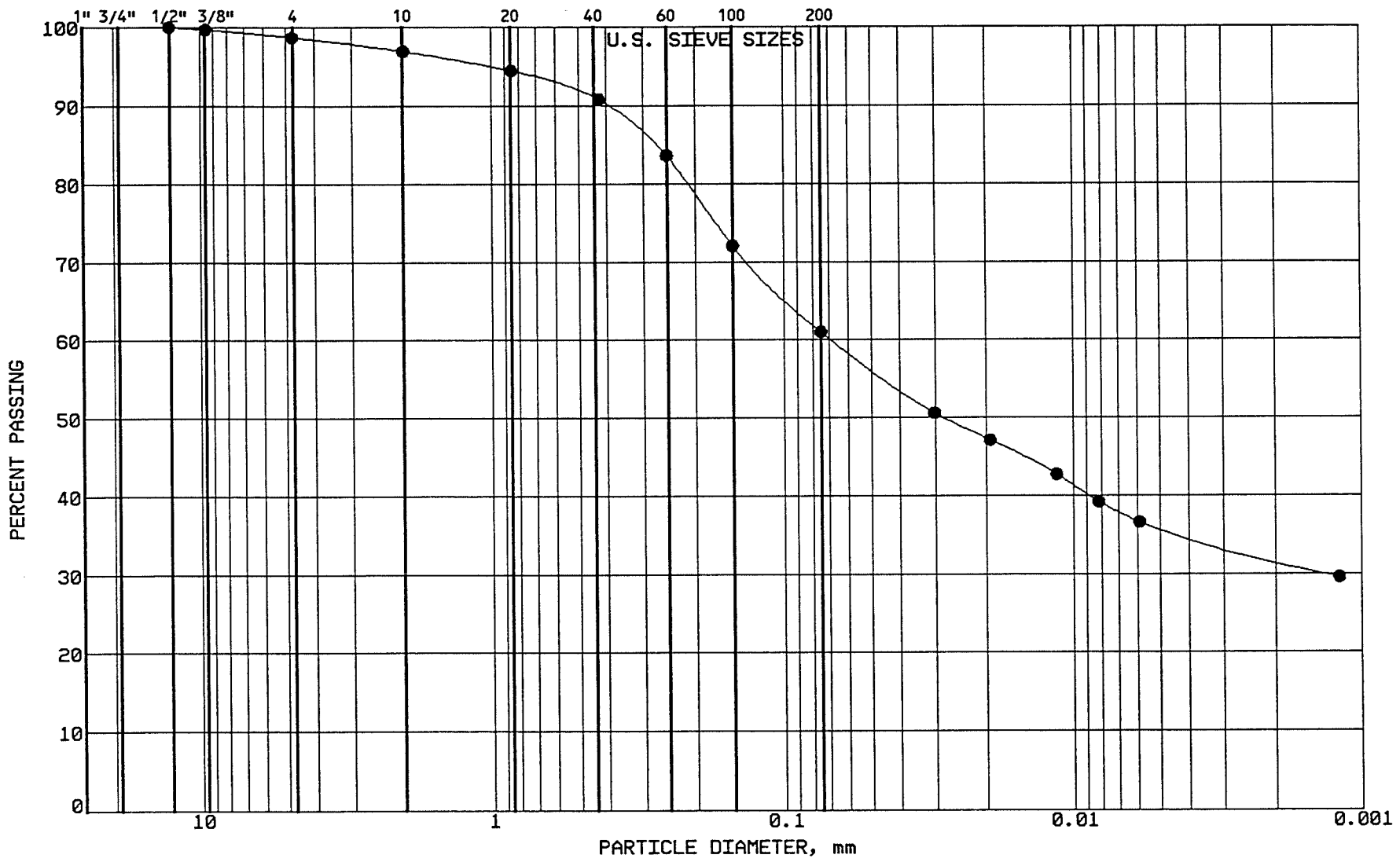
GRAVEL	3.7 %
SAND	35.4 %
SILT	27.8 %
CLAY	33.1 %
P 200	60.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43369.0, E 43522.0
SAMPLE: SGCC121 TUBE #:
ELEVATION: 1884.3'

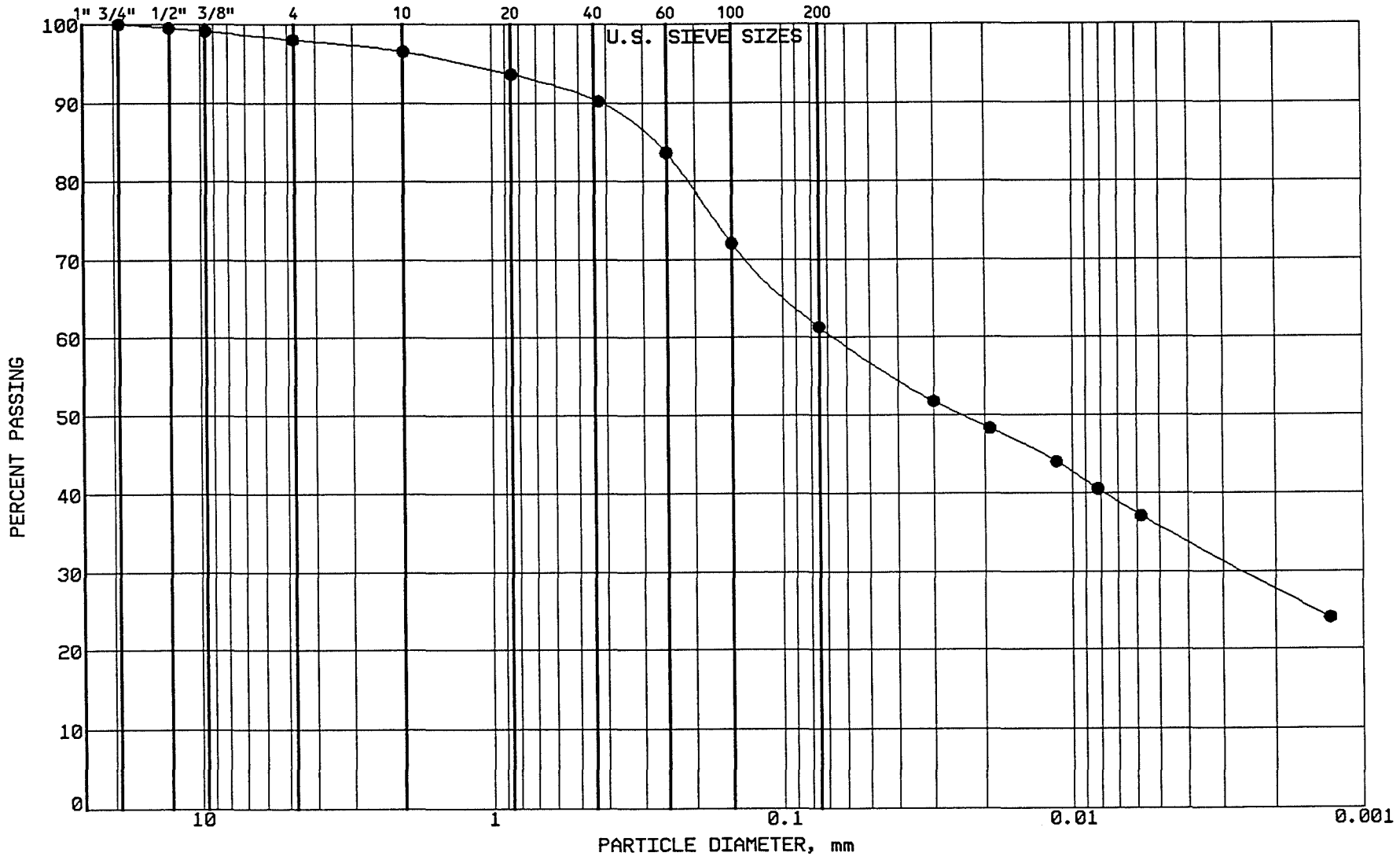
GRAVEL	1.3 %
SAND	37.7 %
SILT	25.1 %
CLAY	35.9 %
P 200	61.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43369.0, E 43694.0
SAMPLE: SGCC122 TUBE #:
ELEVATION: 1883.8'

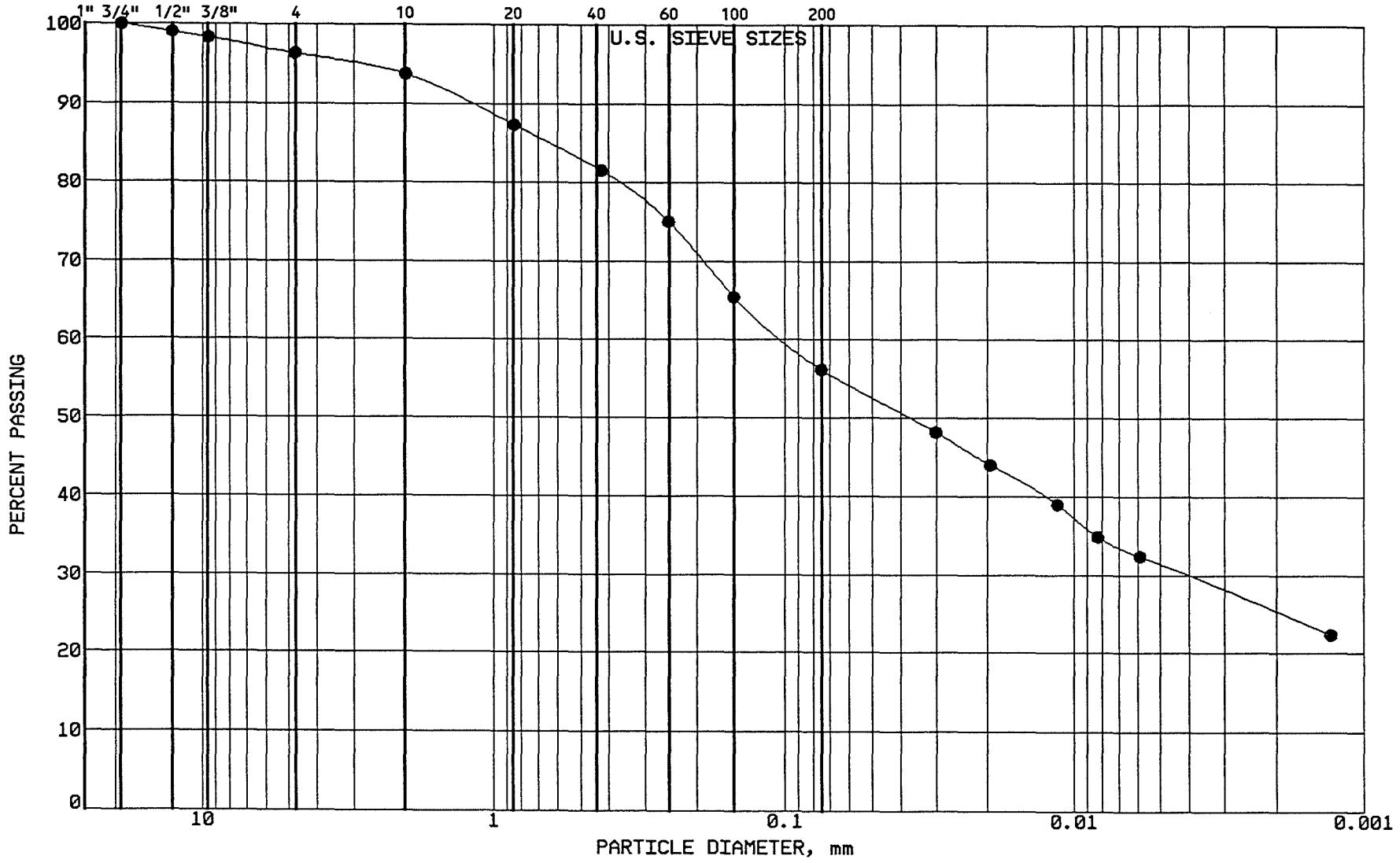
GRAVEL	2.0 %
SAND	36.7 %
SILT	25.5 %
CLAY	35.8 %
P 200	61.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

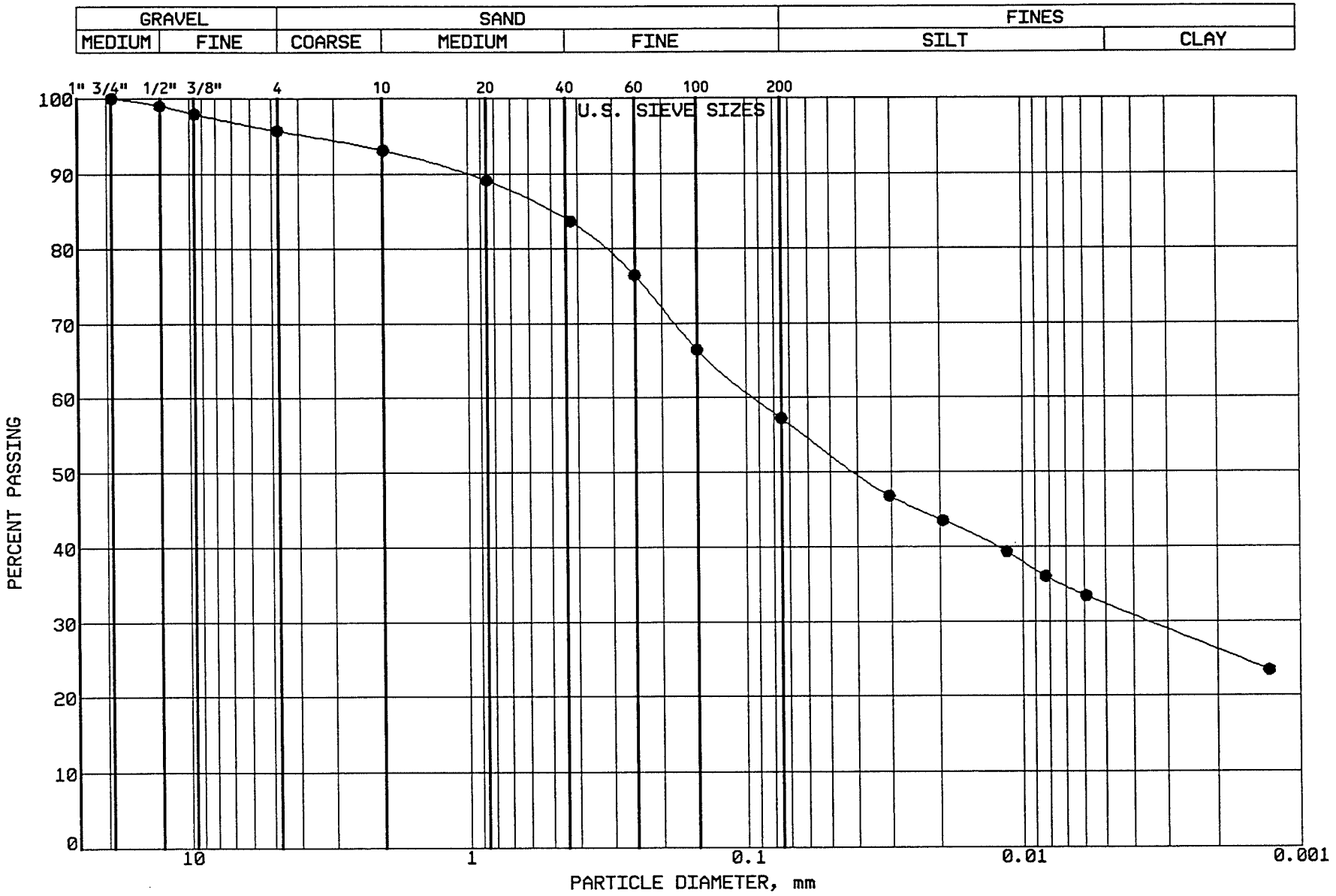
LOCATION: N 43365.0, E 43899.0
SAMPLE: SGCC123 TUBE #:
ELEVATION: 1885.5'

GRAVEL	3.7 %
SAND	40.1 %
SILT	24.9 %
CLAY	31.3 %
P 200	56.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

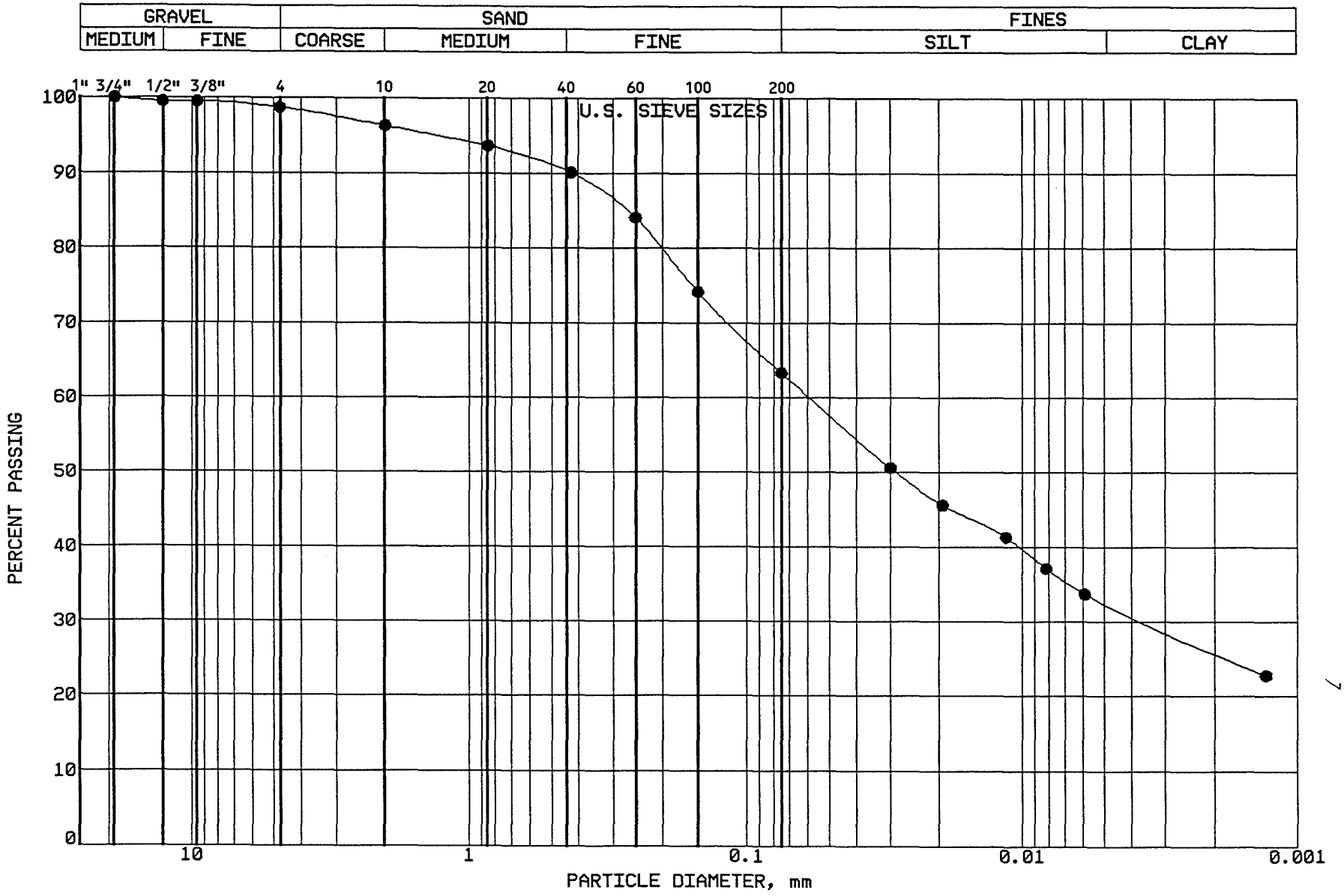
LOCATION: N 43361.0, E 44104.0
SAMPLE: SGCC124 TUBE #:
ELEVATION: 1883.8'

GRAVEL	4.3 %
SAND	38.5 %
SILT	24.9 %
CLAY	32.3 %
P 200	57.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

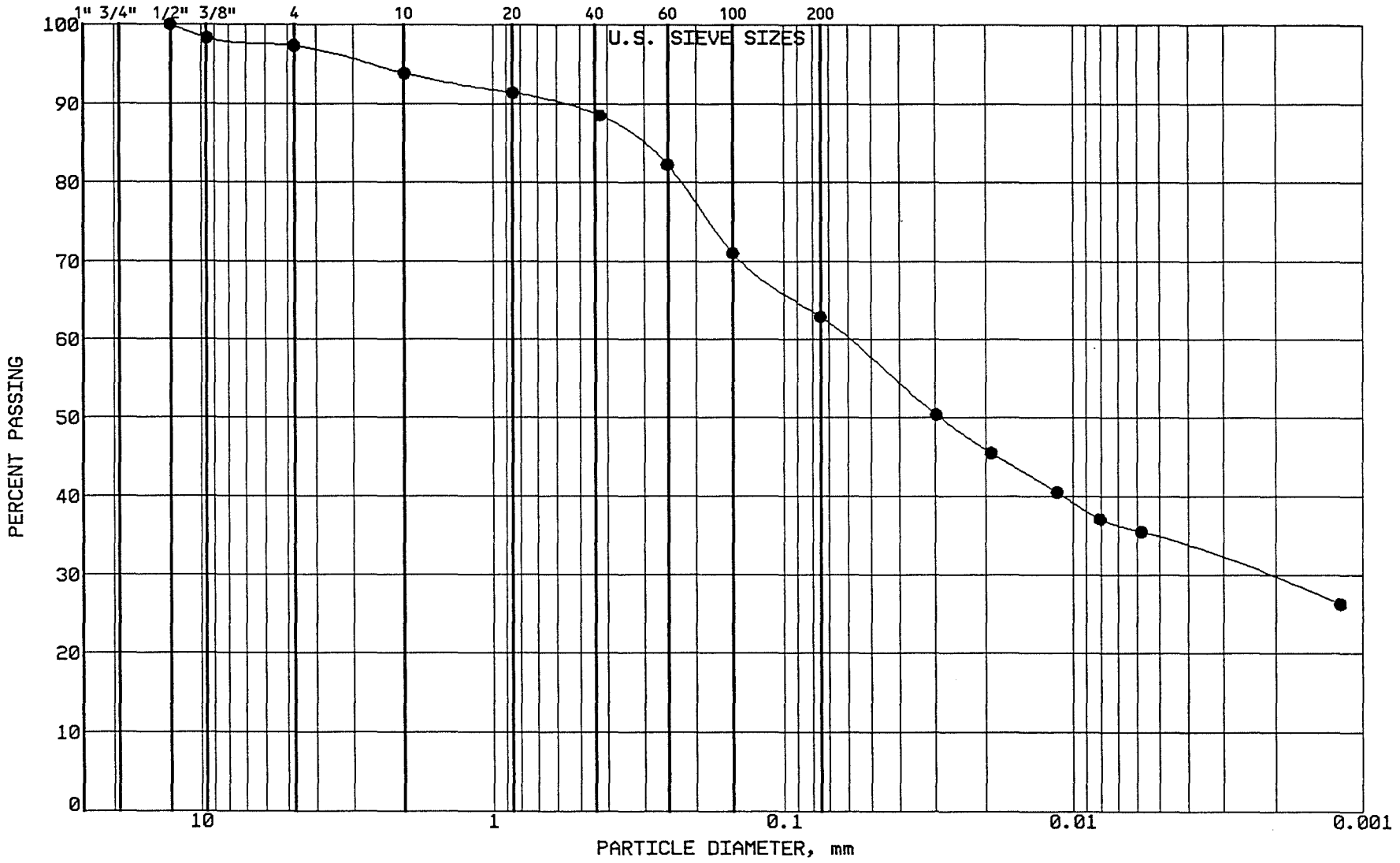
LOCATION: N 42557.0, E 44692.0
SAMPLE: CLSCC125 TUBE #: ST-32A
ELEVATION: 1887.1'

GRAVEL	1.3 %
SAND	35.4 %
SILT	30.8 %
CLAY	32.5 %
P 200	63.3 %

SOIL PROPERTIES

LL: 40.0%
PL: 15.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

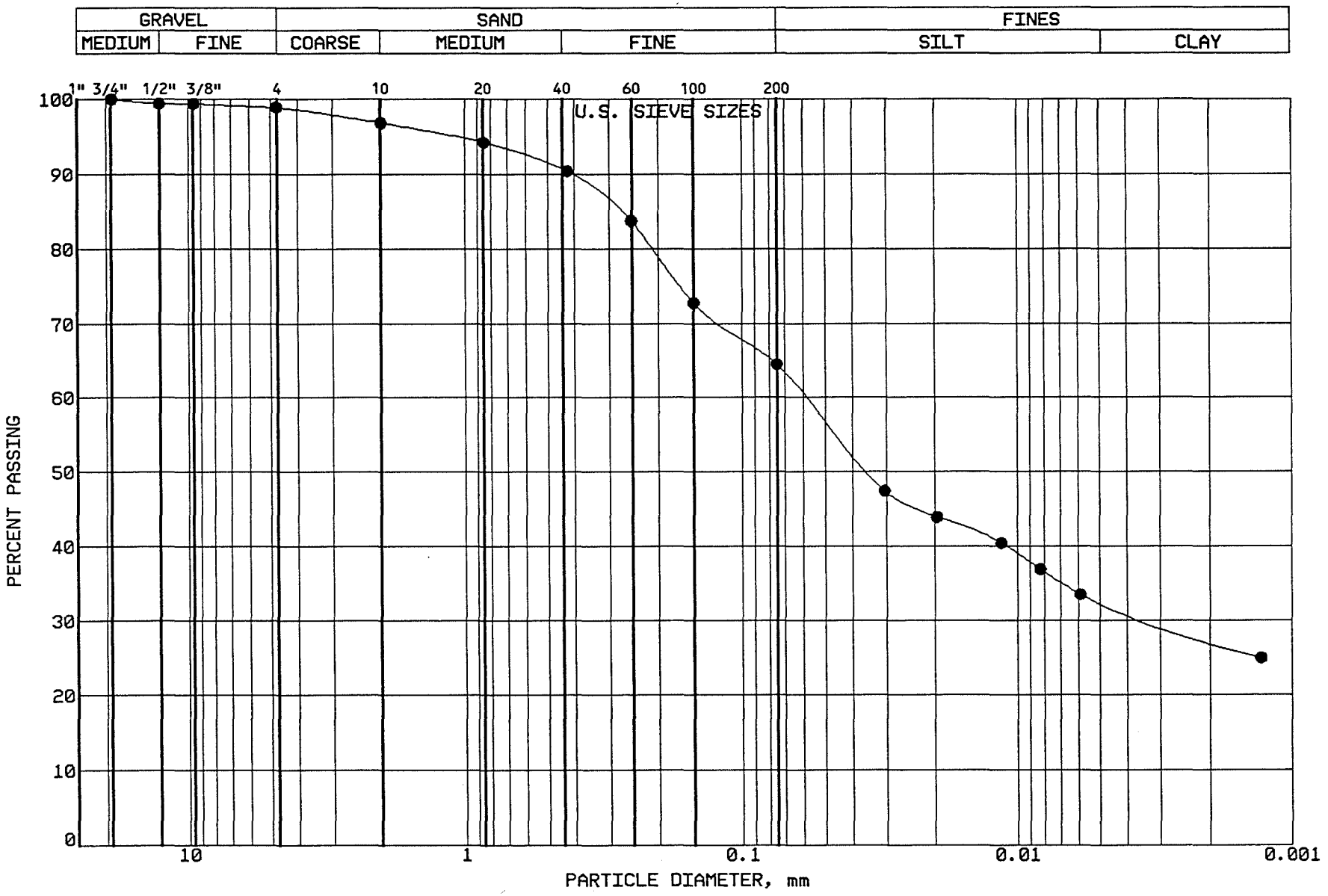
LOCATION: N 43316.0, E 43595.0
SAMPLE: SGCC126 TUBE #:
ELEVATION: 1883.8'

GRAVEL	2.7 %
SAND	34.4 %
SILT	28.3 %
CLAY	34.6 %
P 200	62.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

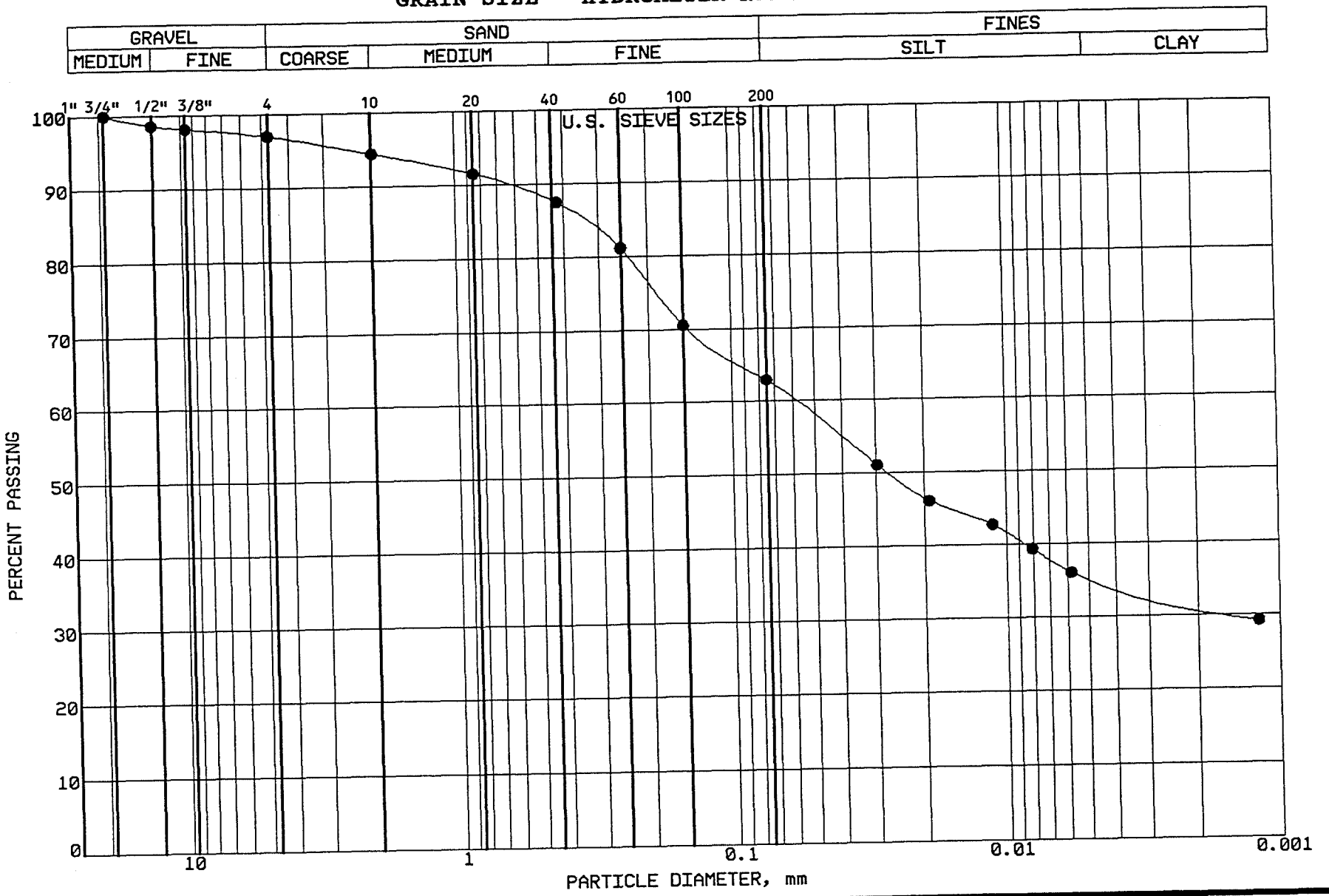
LOCATION: N 43315.0, E 43797.0
SAMPLE: SGCC127 TUBE #:
ELEVATION: 1883.9'

GRAVEL	1.1 %
SAND	34.4 %
SILT	31.9 %
CLAY	32.6 %
P 200	64.5 %

SOIL PROPERTIES

LL: 40.0%
PL: 15.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

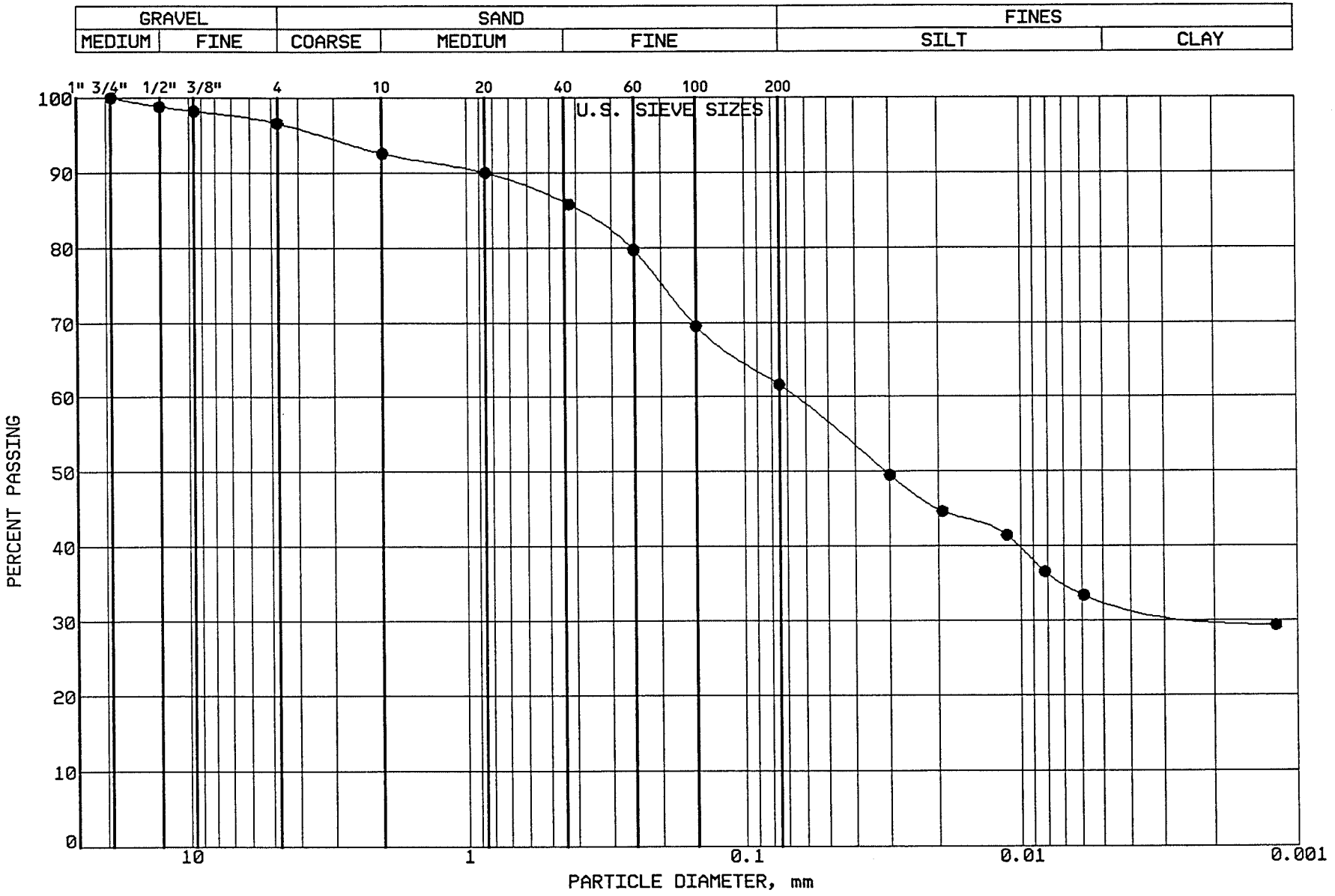
LOCATION: N 43318.0, E 44010.0
SAMPLE: SGCC128 TUBE #:
ELEVATION: 1883.3'

GRAVEL	3.0 %
SAND	34.1 %
SILT	27.5 %
CLAY	35.4 %
P 200	62.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

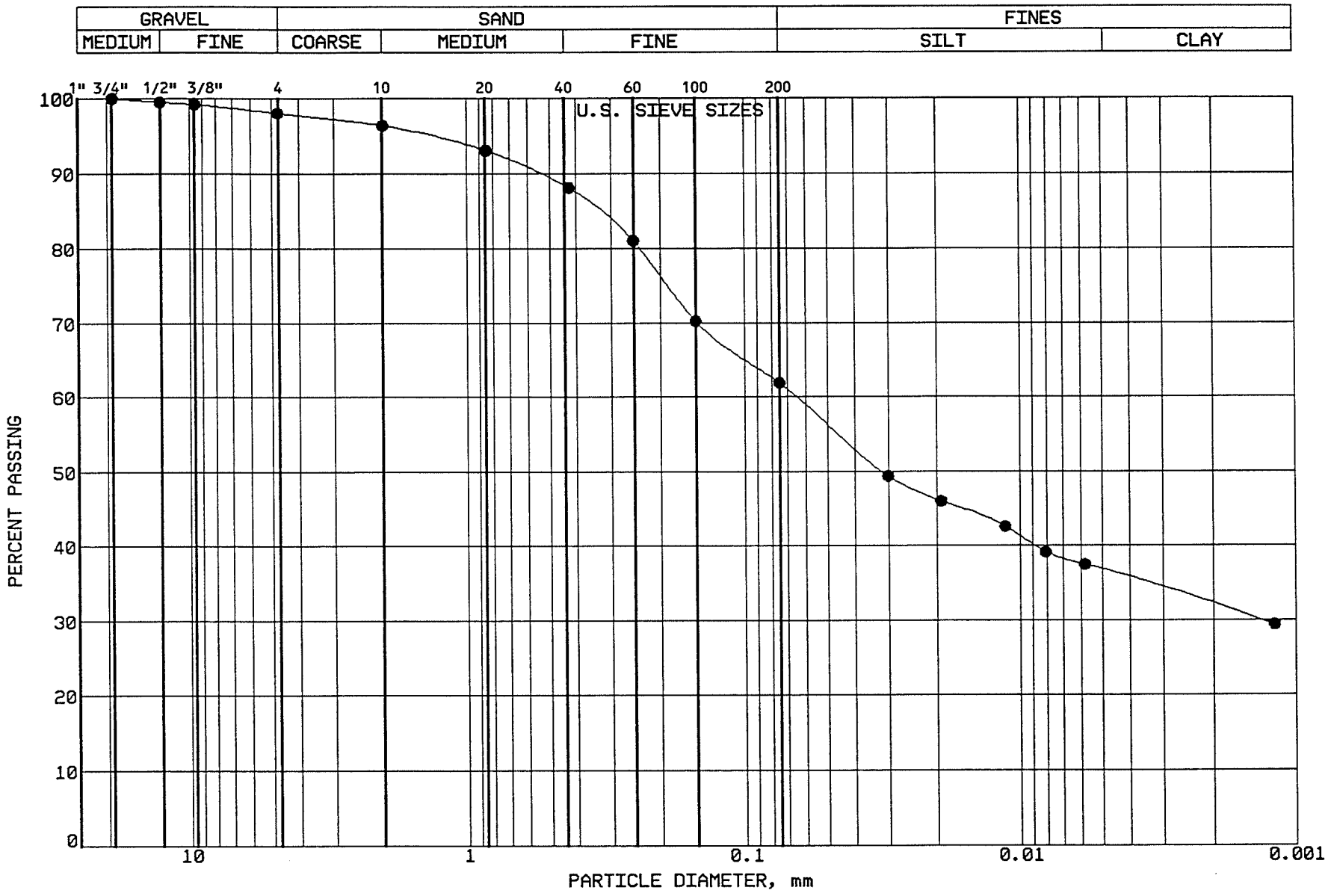
LOCATION: N 43315.0, E 44206.0
SAMPLE: SGCC129 TUBE #:
ELEVATION: 1885.5'

GRAVEL	3.4 %
SAND	35.0 %
SILT	28.7 %
CLAY	32.9 %
P 200	61.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

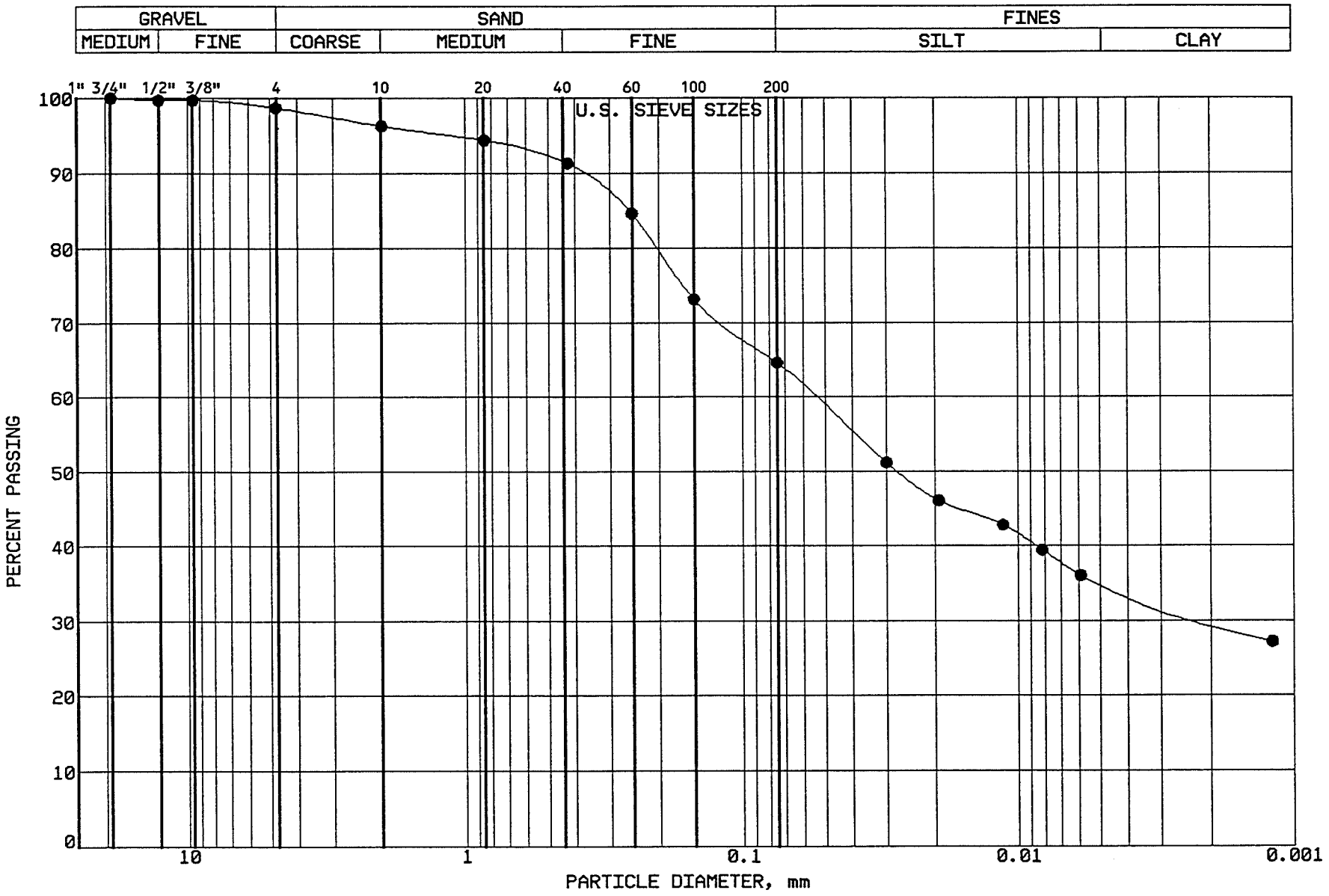
LOCATION: N 43318.0, E 44378.0
SAMPLE: SGCC130 TUBE #:
ELEVATION: 1884.2'

GRAVEL	2.0 %
SAND	36.1 %
SILT	25.3 %
CLAY	36.6 %
P 200	61.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42540.0, E 44975.0
SAMPLE: CLSCC131 TUBE #: ST-33A
ELEVATION: 1893.3'

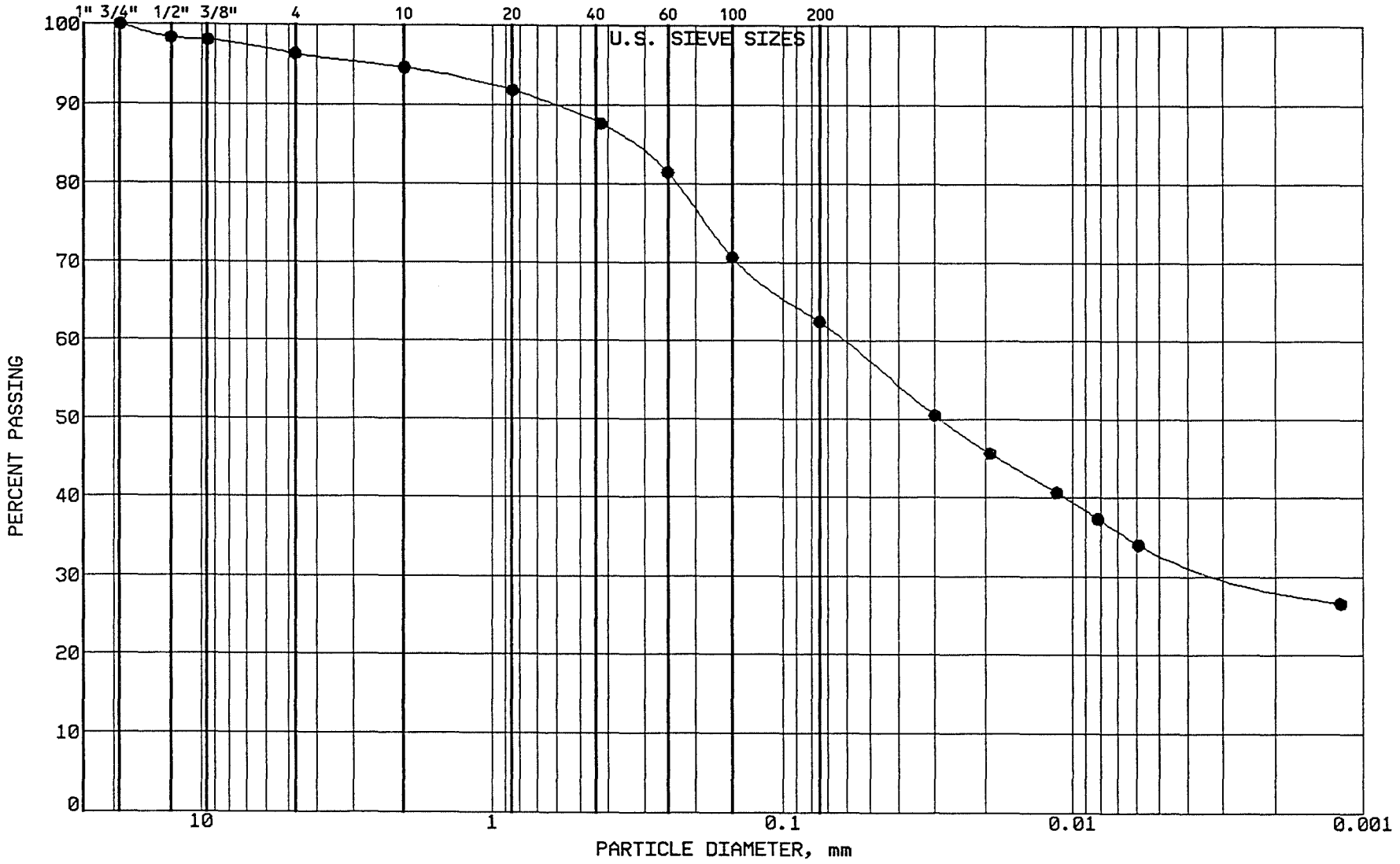
GRAVEL	1.3 %
SAND	34.1 %
SILT	29.5 %
CLAY	35.1 %
P 200	64.6 %

SOIL PROPERTIES

LL: 40.0%
PL: 14.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43263.0, E 44294.0
SAMPLE: SGCC132 TUBE #:
ELEVATION: 1885.5'

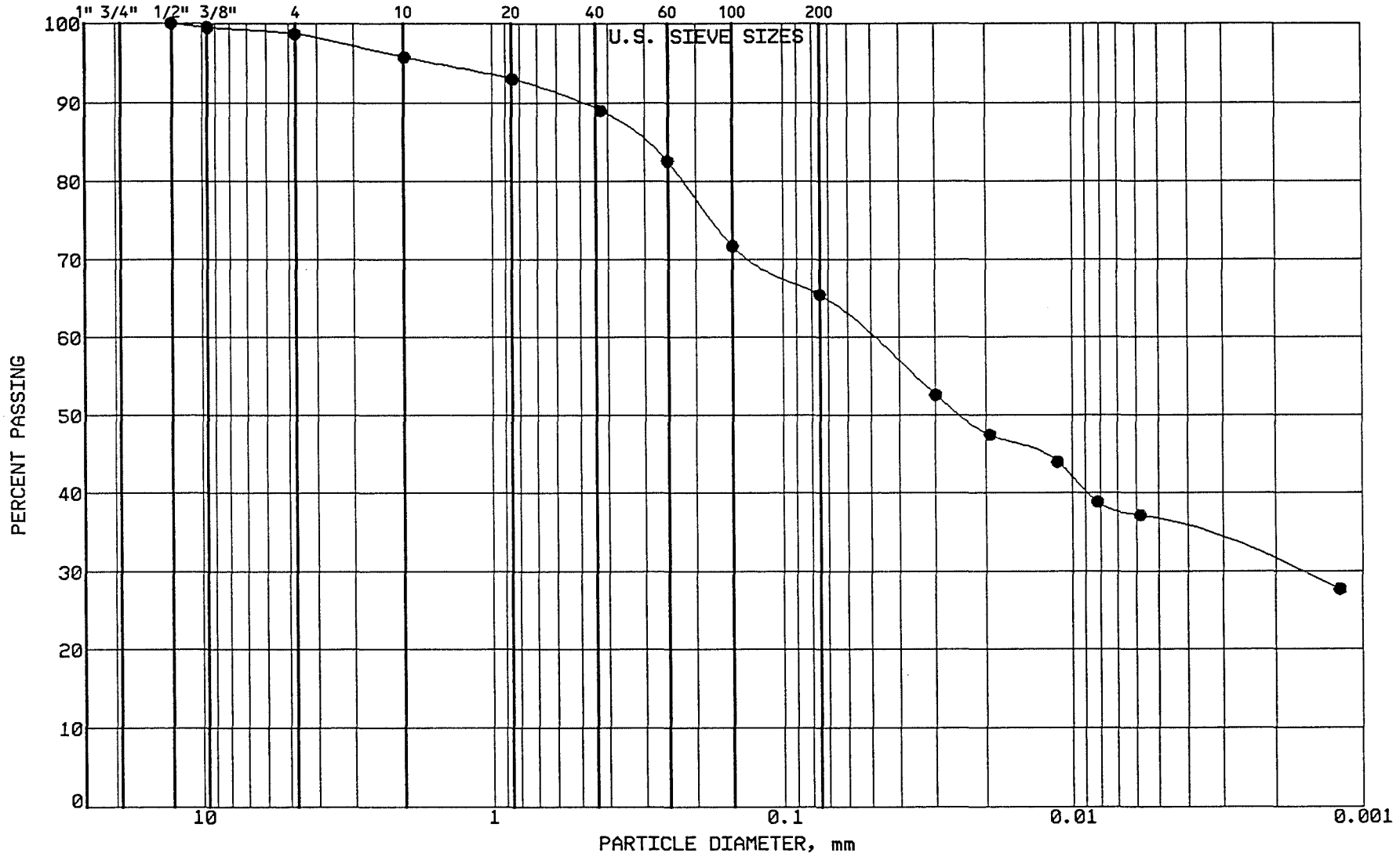
GRAVEL	3.7 %
SAND	33.9 %
SILT	29.2 %
CLAY	33.2 %
P 200	62.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

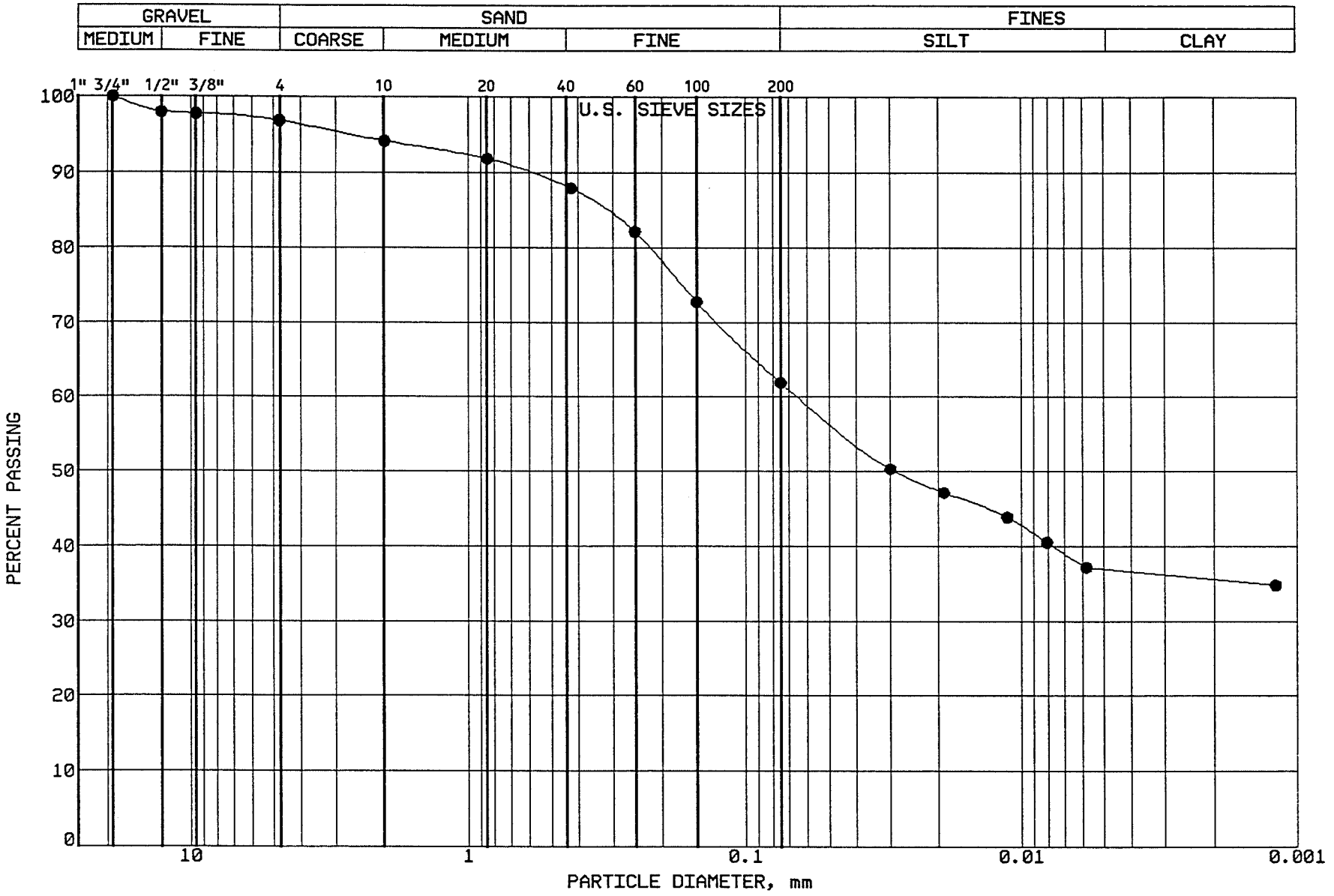
LOCATION: N 43252.0, E 44096.0
SAMPLE: SGCC133 TUBE #:
ELEVATION: 1884.2'

GRAVEL	1.3 %
SAND	33.3 %
SILT	29.2 %
CLAY	36.2 %
P 200	65.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43262.0, E 43891.0
SAMPLE: SGCC134 TUBE #:
ELEVATION: 1883.1'

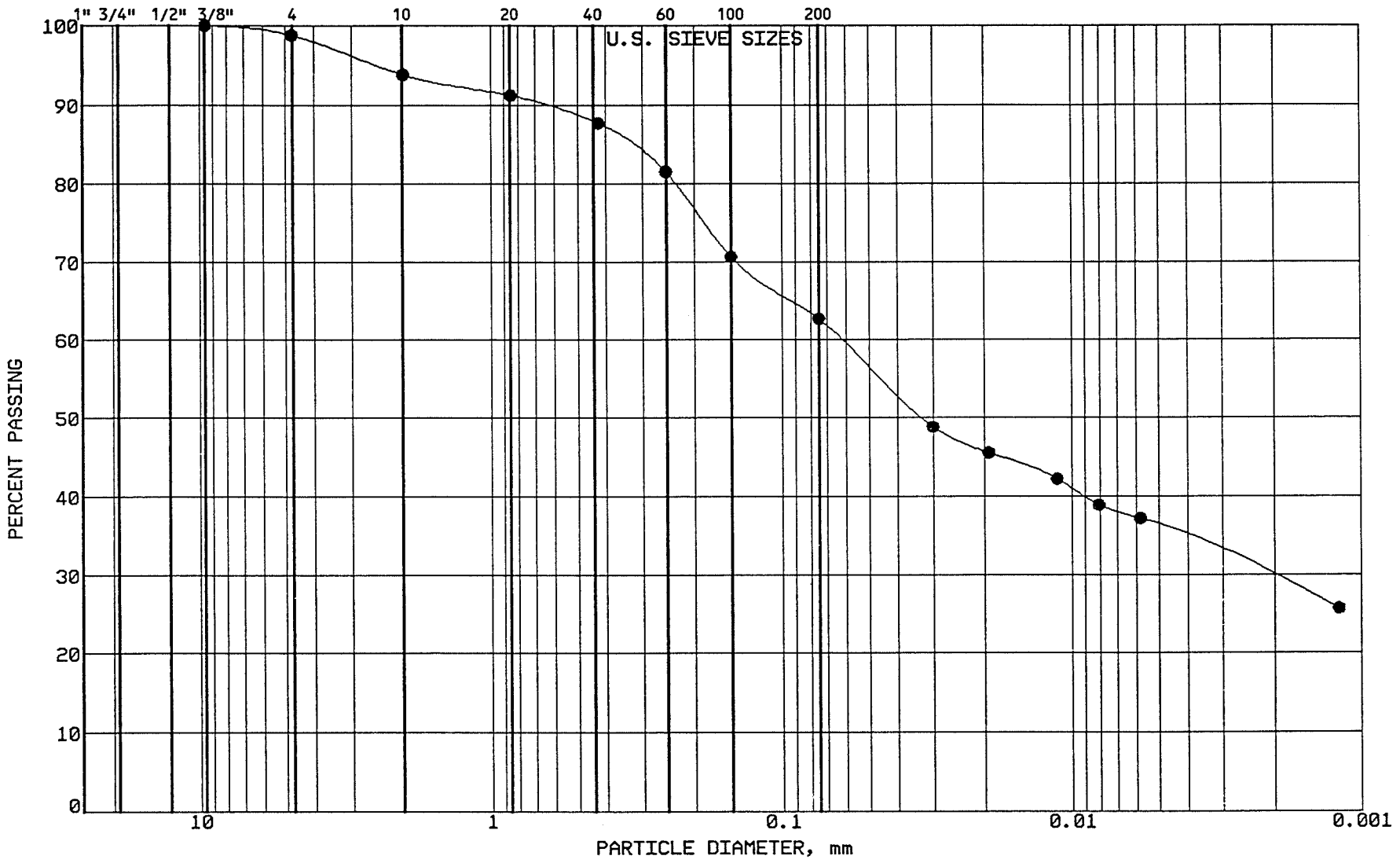
GRAVEL	3.2 %
SAND	34.9 %
SILT	24.9 %
CLAY	37.0 %
P 200	61.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43263.0, E 43697.0
SAMPLE: SGCC135 TUBE #:
ELEVATION: 1883.5'

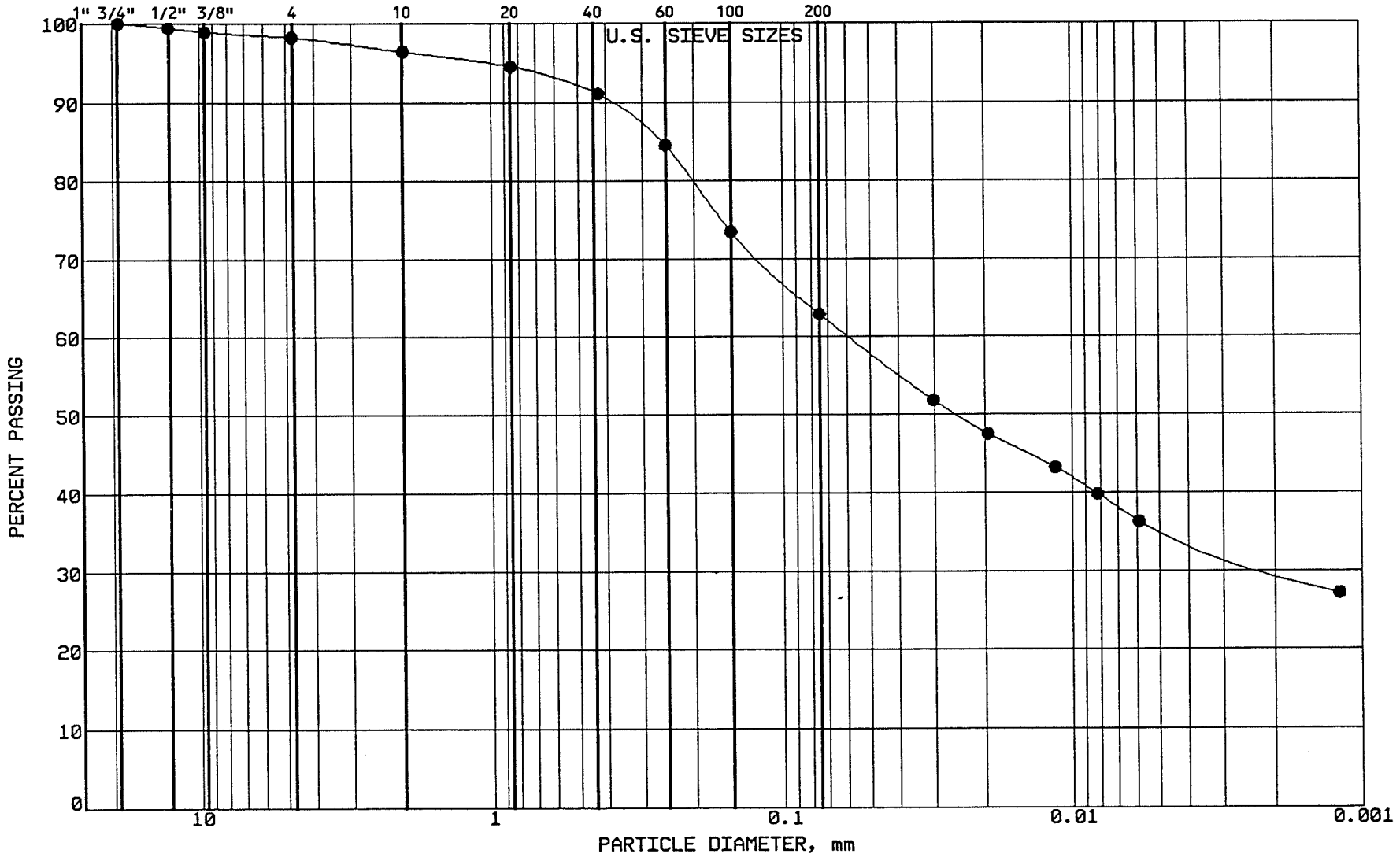
GRAVEL	1.2 %
SAND	36.1 %
SILT	26.6 %
CLAY	36.1 %
P 200	62.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42546.0, E 45192.0
SAMPLE: CLSCC136 TUBE #:
ELEVATION: 1893.0'

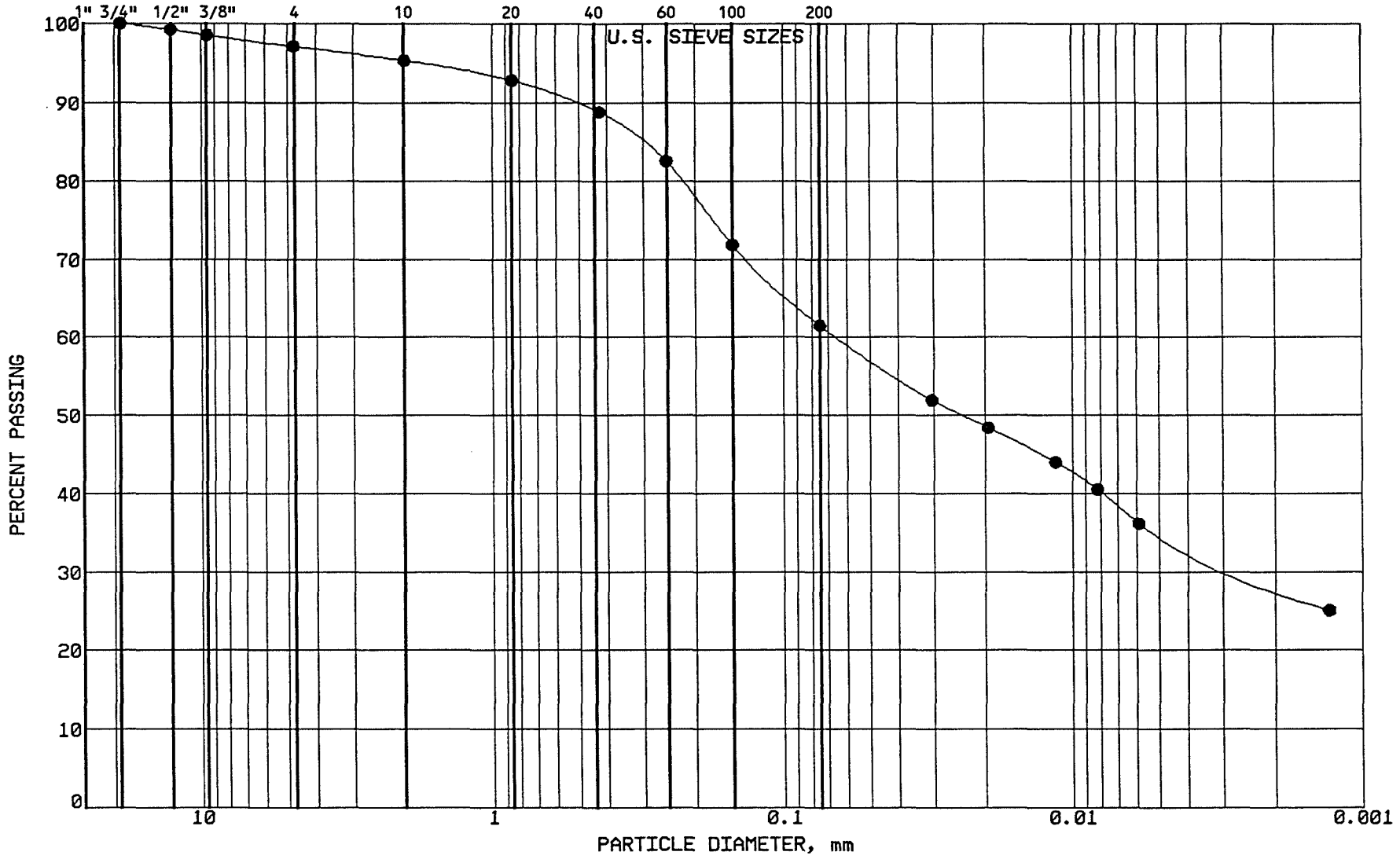
GRAVEL	1.8 %
SAND	35.3 %
SILT	27.5 %
CLAY	35.4 %
P 200	62.9 %

SOIL PROPERTIES

LL: 41.0%
PL: 15.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

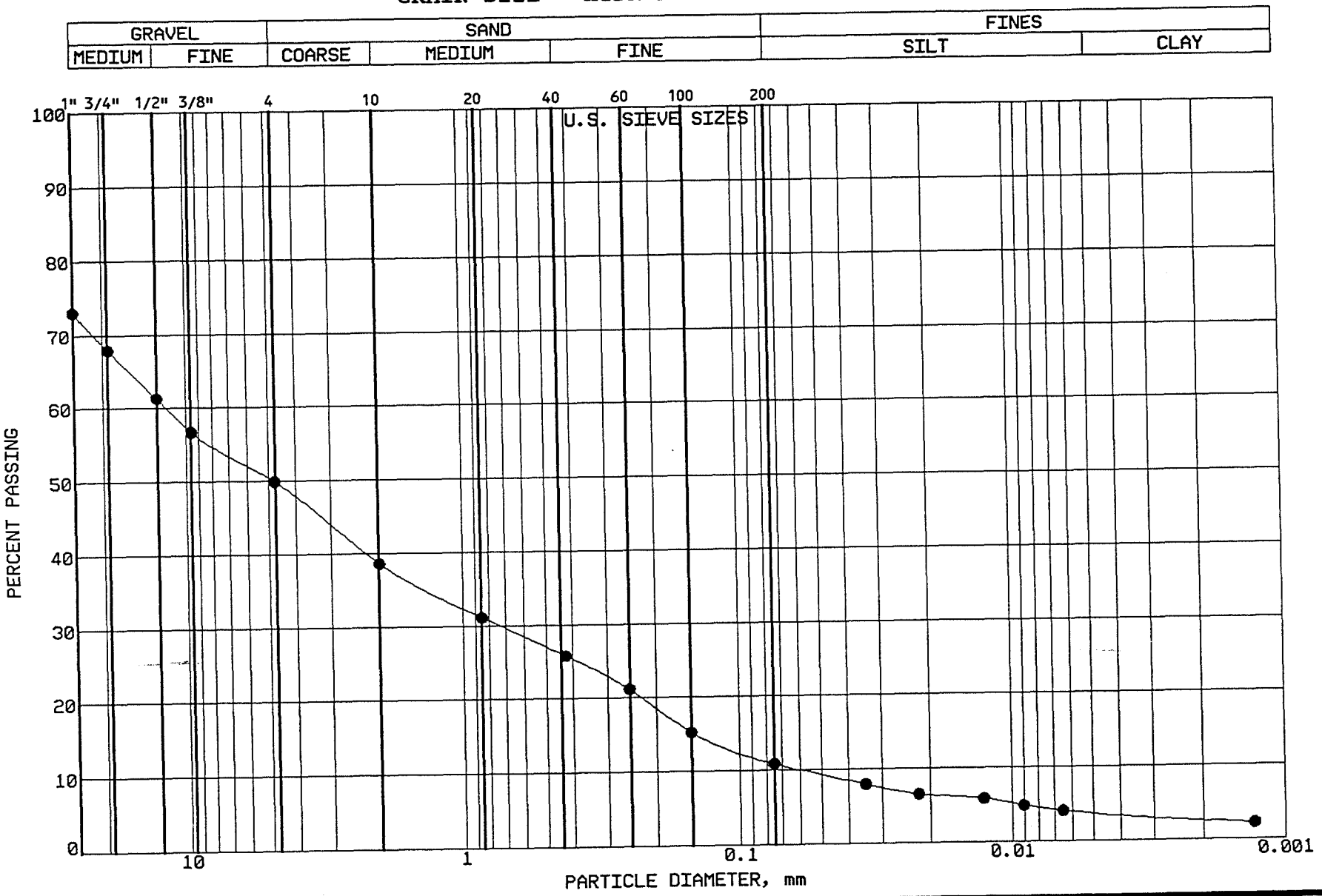
LOCATION: N 43248.0, E 44061.0
SAMPLE: SGCC137 TUBE #:
ELEVATION: 1884.6'

GRAVEL	2.9 %
SAND	35.6 %
SILT	26.5 %
CLAY	35.0 %
P 200	61.5 %

SOIL PROPERTIES

LL: 42.0%
PL: 15.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43000.0, E 46400.0
SAMPLE: SGCC138 TUBE #:
ELEVATION: 0.0'

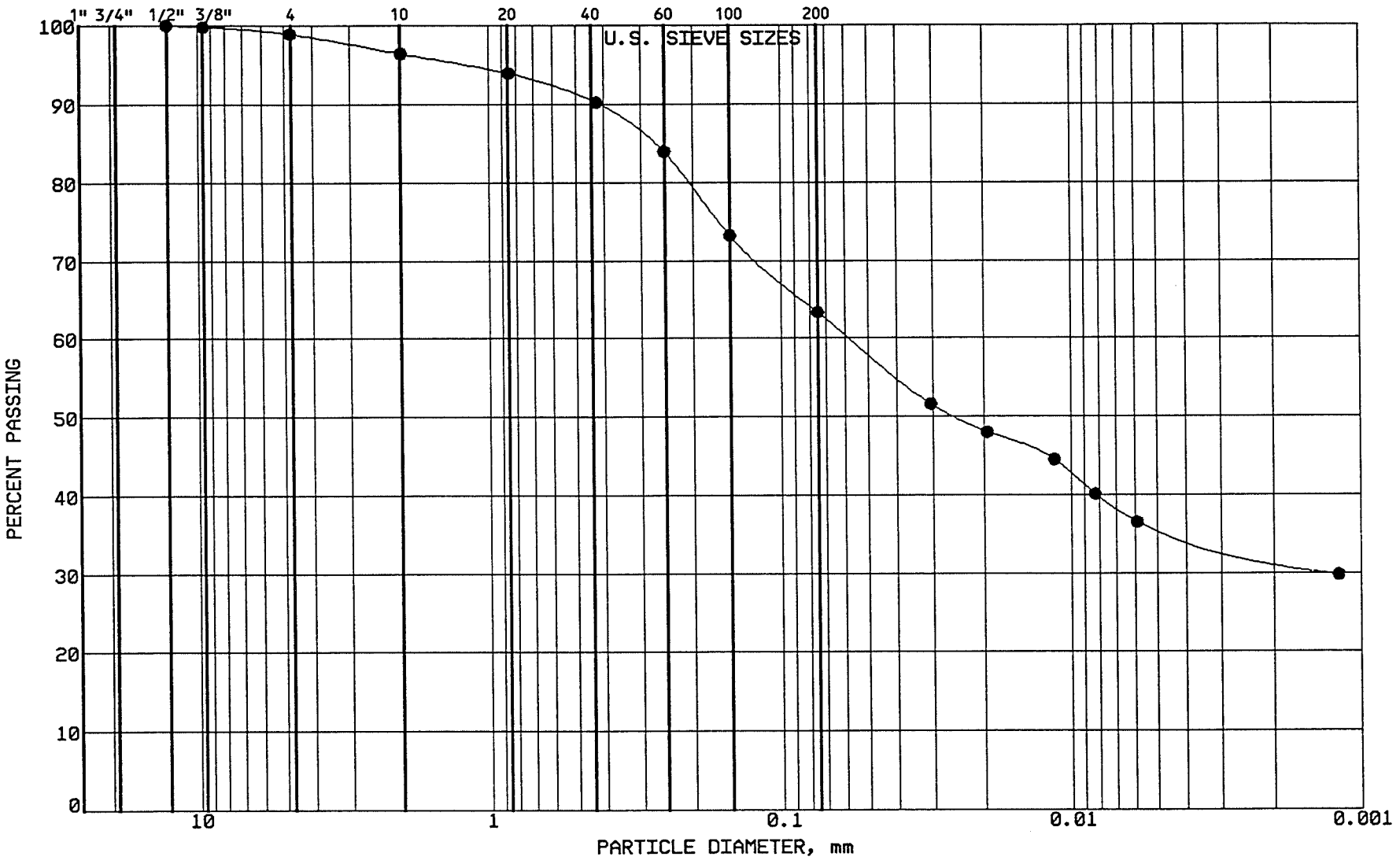
GRAVEL	47.0 %
SAND	39.0 %
SILT	7.1 %
CLAY	3.8 %
P 200	10.9 %

SOIL PROPERTIES

LL: 21.0%
PL: 19.0%
PI: 2.0%
CLASS: P.G. GR W SILT/SAND (GP-GM)st br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43405.0, E 44371.0
SAMPLE: SGCC139 TUBE #:
ELEVATION: 1888.1'

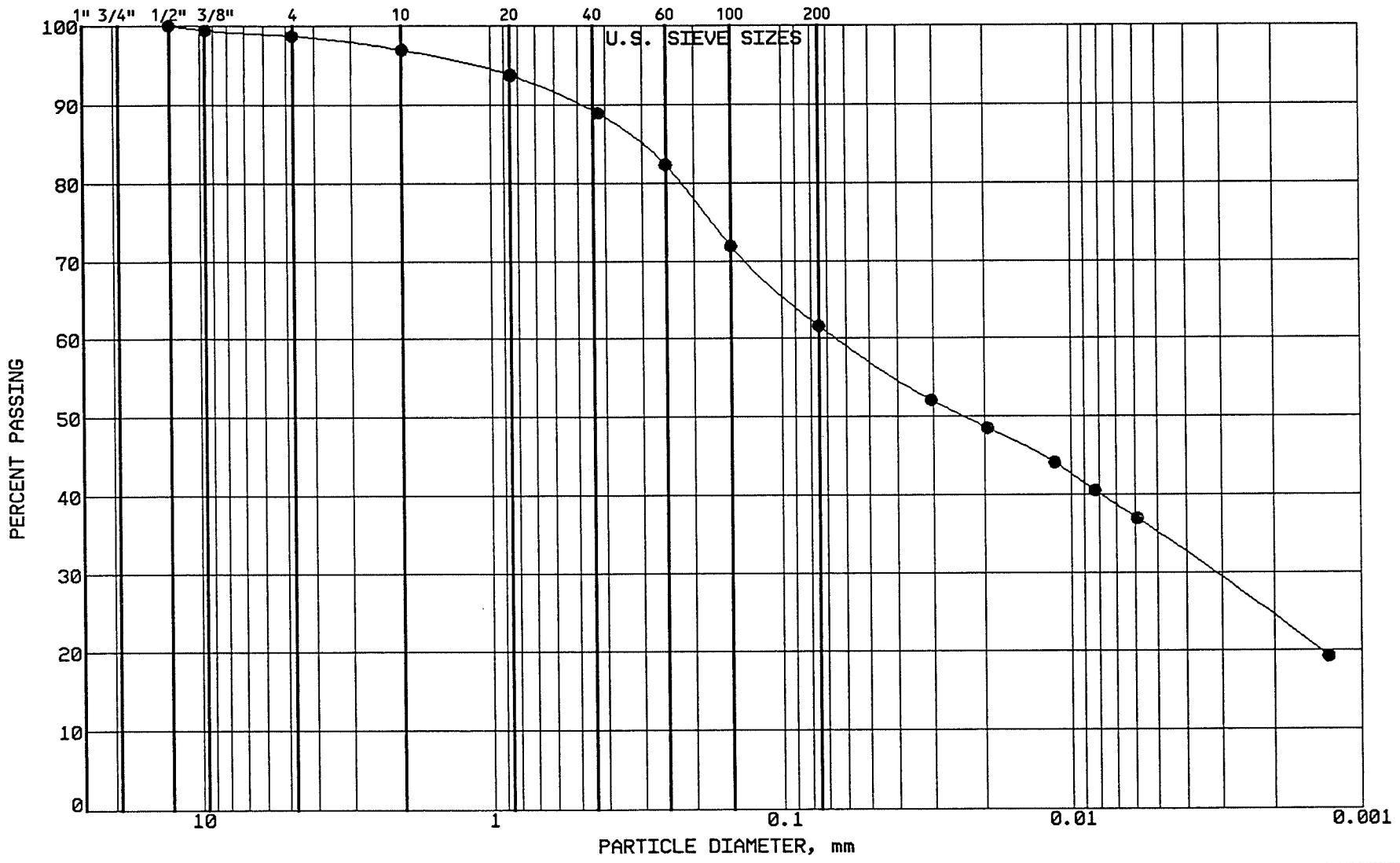
GRAVEL	1.1 %
SAND	35.6 %
SILT	27.5 %
CLAY	35.8 %
P 200	63.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43402.0, E 44203.0
SAMPLE: SGCC140 TUBE #:
ELEVATION: 1888.2'

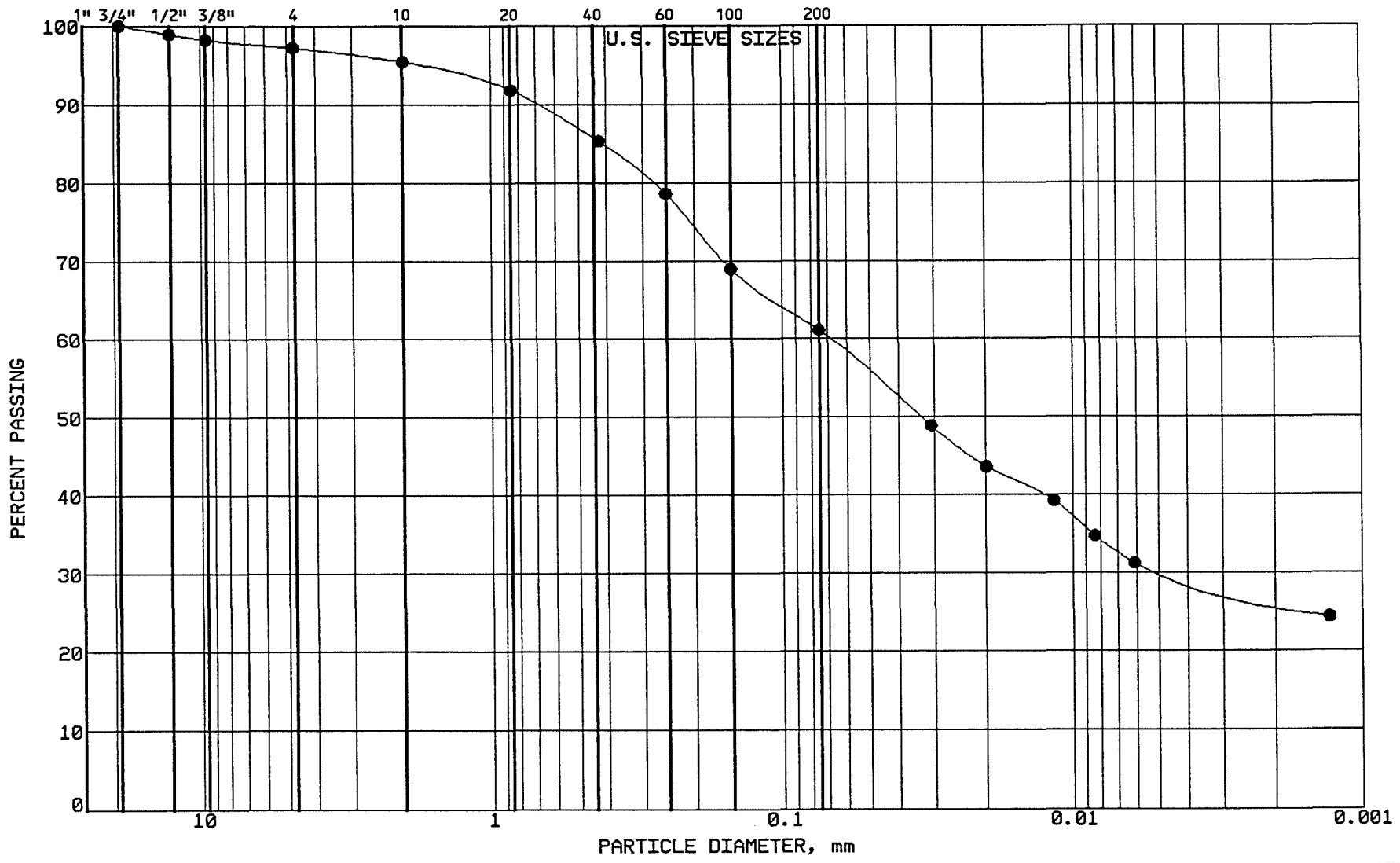
GRAVEL	1.3 %
SAND	37.1 %
SILT	26.6 %
CLAY	35.0 %
P 200	61.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43402.0, E 44003.0
SAMPLE: SGCC141 TUBE #:
ELEVATION: 1887.8'

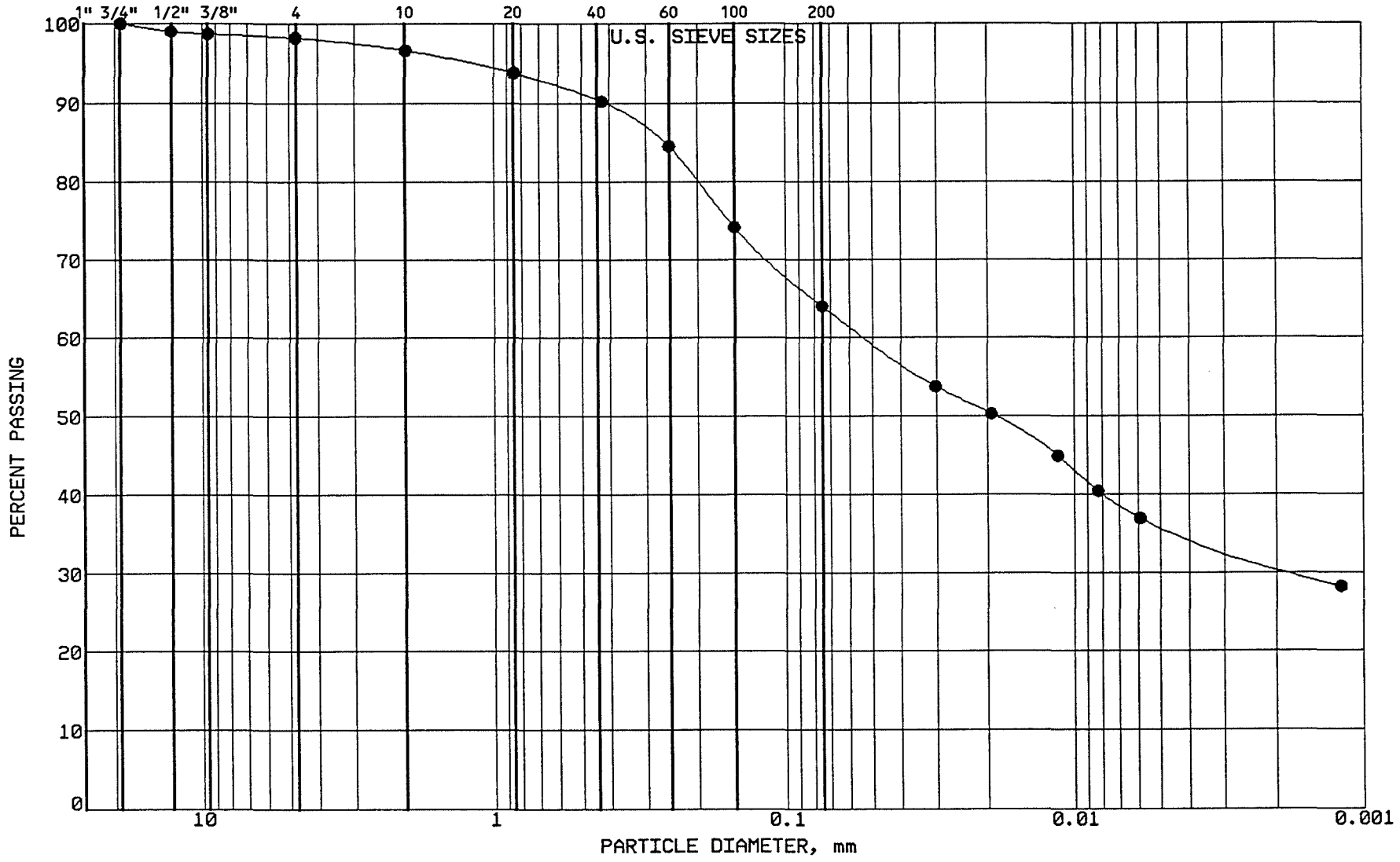
GRAVEL	2.8 %
SAND	36.1 %
SILT	30.8 %
CLAY	30.3 %
P 200	61.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43398.0, E 43798.0
SAMPLE: SGCC142 TUBE #:
ELEVATION: 1888.1'

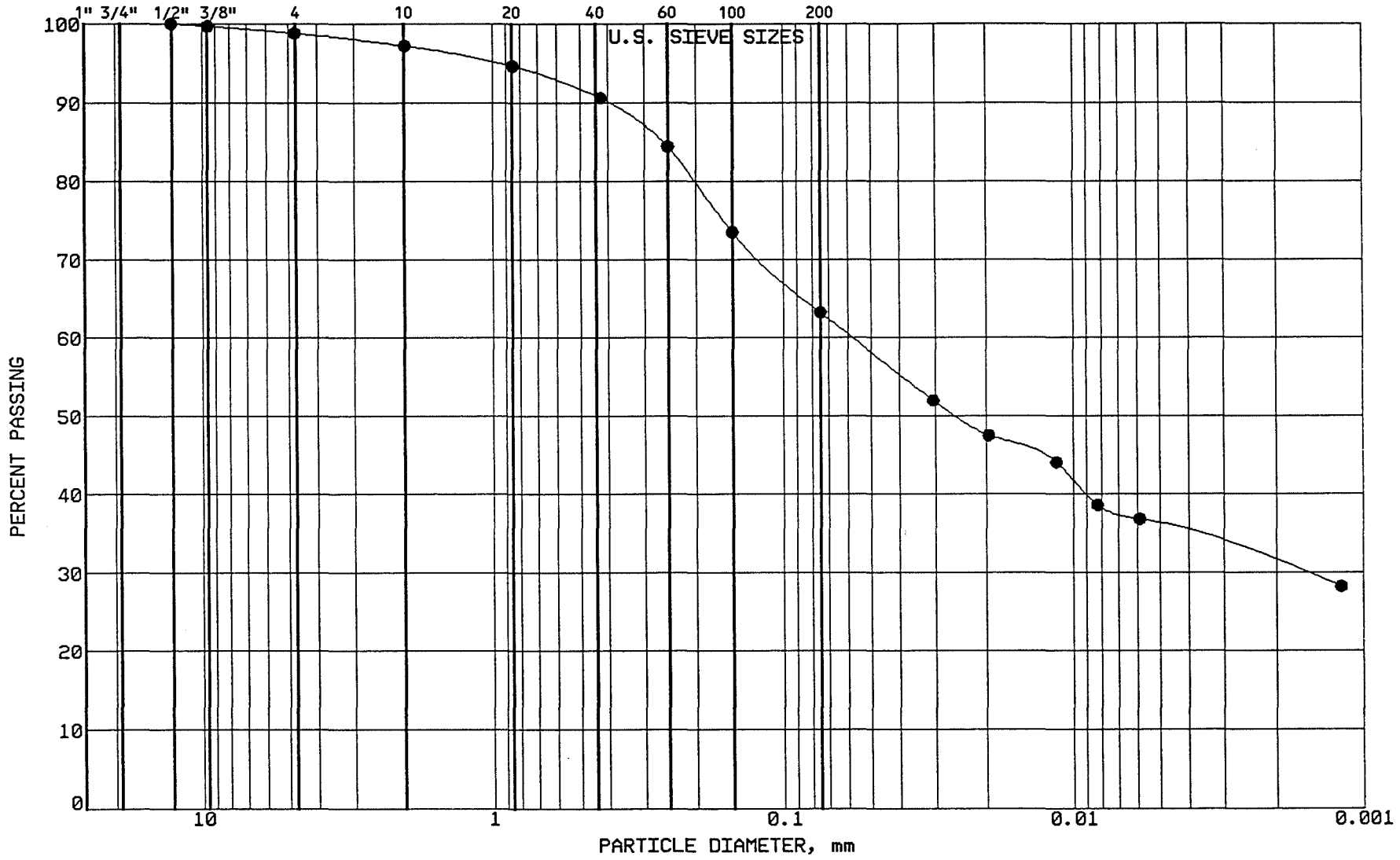
GRAVEL	1.8 %
SAND	34.2 %
SILT	28.0 %
CLAY	36.0 %
P 200	64.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43394.0, E 43593.0
SAMPLE: SGCC143 TUBE #:
ELEVATION: 1888.0'

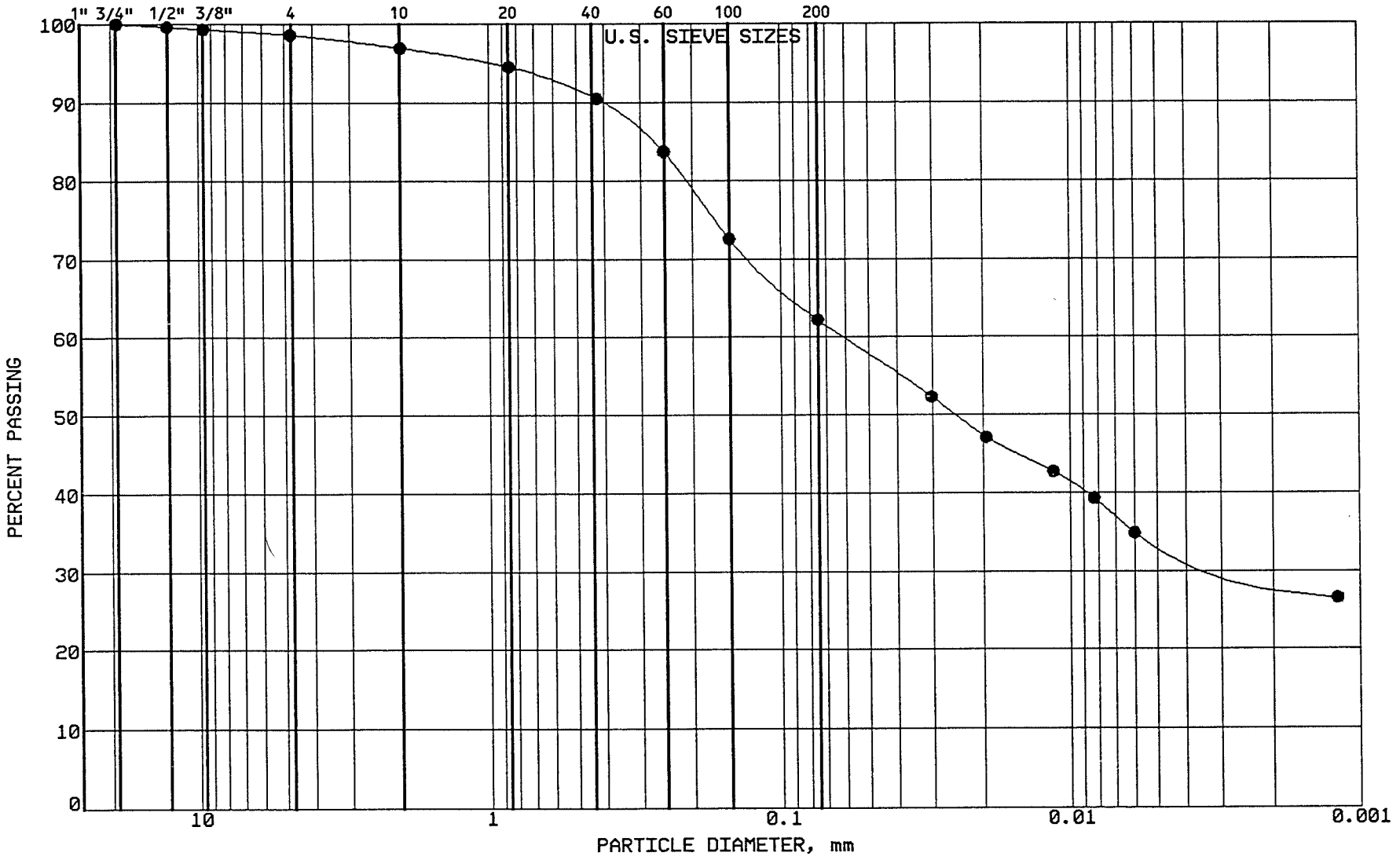
GRAVEL	1.2 %
SAND	35.6 %
SILT	27.3 %
CLAY	35.9 %
P 200	63.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

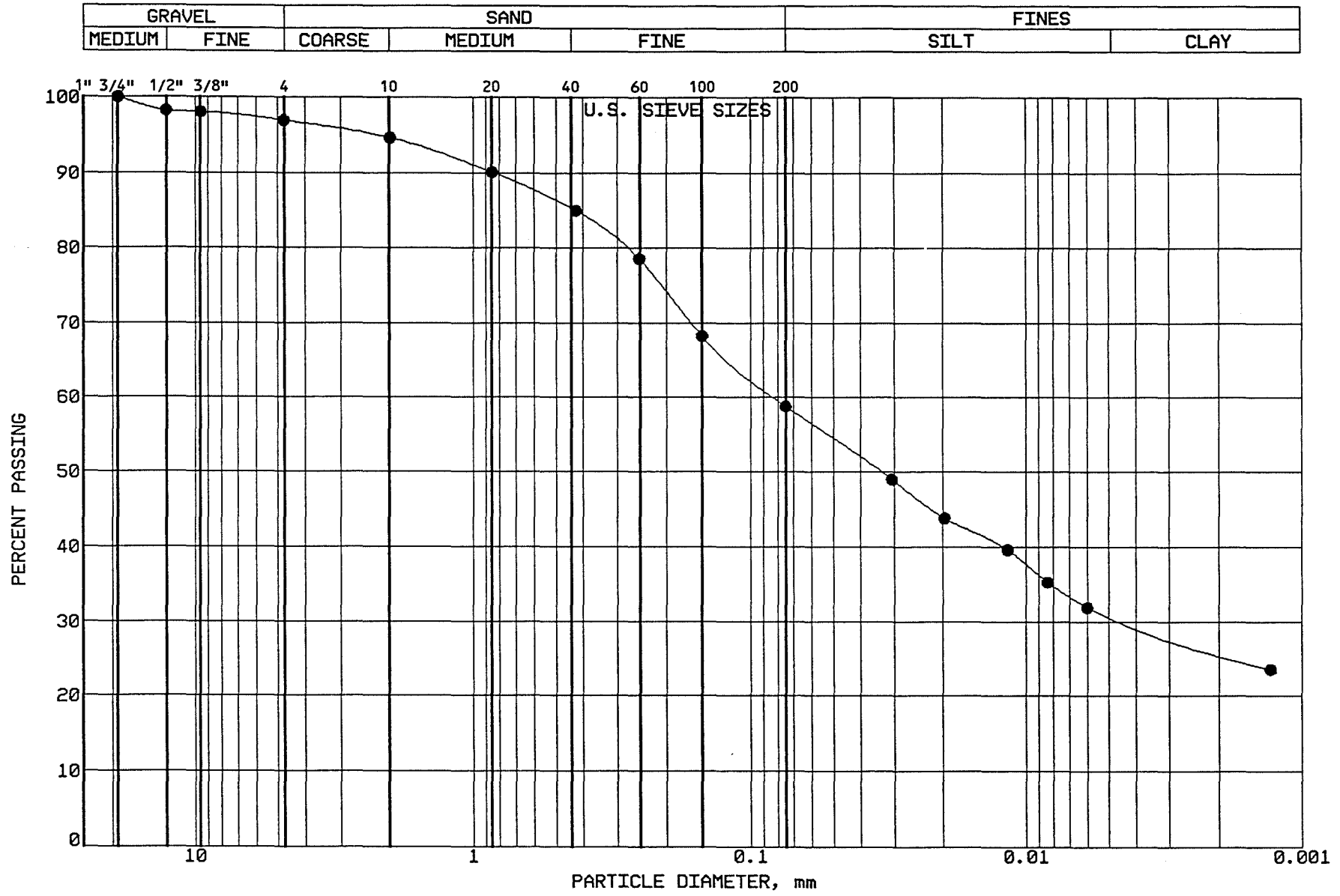
LOCATION: N 43089.0, E 43073.0
SAMPLE: SGCC144 TUBE #:
ELEVATION: 1881.5'

GRAVEL	1.4 %
SAND	36.4 %
SILT	28.2 %
CLAY	34.0 %
P 200	62.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43236.0, E 43072.0
SAMPLE: SGCC145 TUBE #:
ELEVATION: 1882.3'

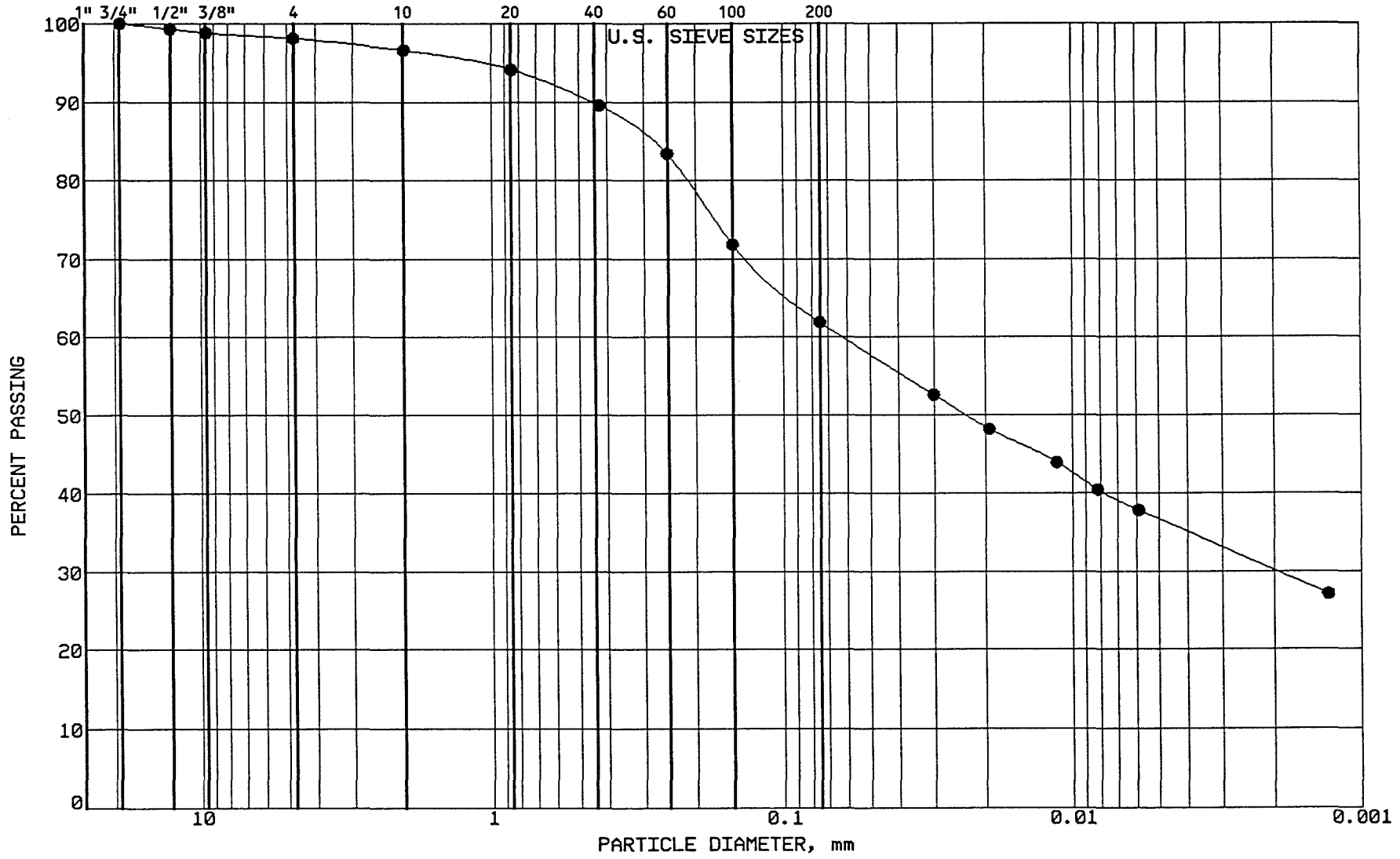
GRAVEL	3.1 %
SAND	38.1 %
SILT	27.9 %
CLAY	30.9 %
P 200	58.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43426.0, E 43109.0
SAMPLE: SGCC146 TUBE #:
ELEVATION: 1881.6'

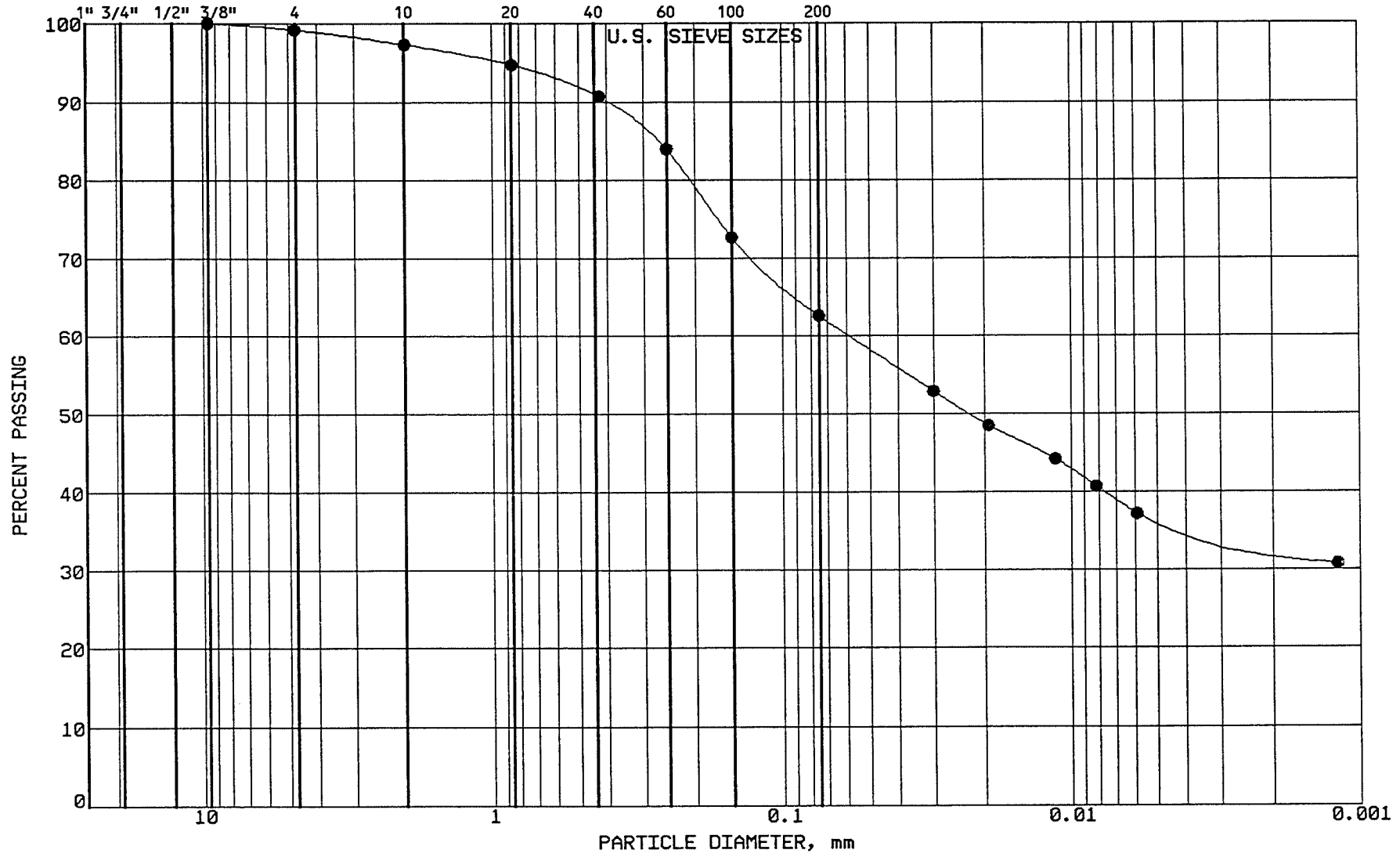
GRAVEL	1.9 %
SAND	36.2 %
SILT	25.3 %
CLAY	36.6 %
P 200	61.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43435.0, E 43284.0
SAMPLE: SGCC147 TUBE #:
ELEVATION: 1881.9'

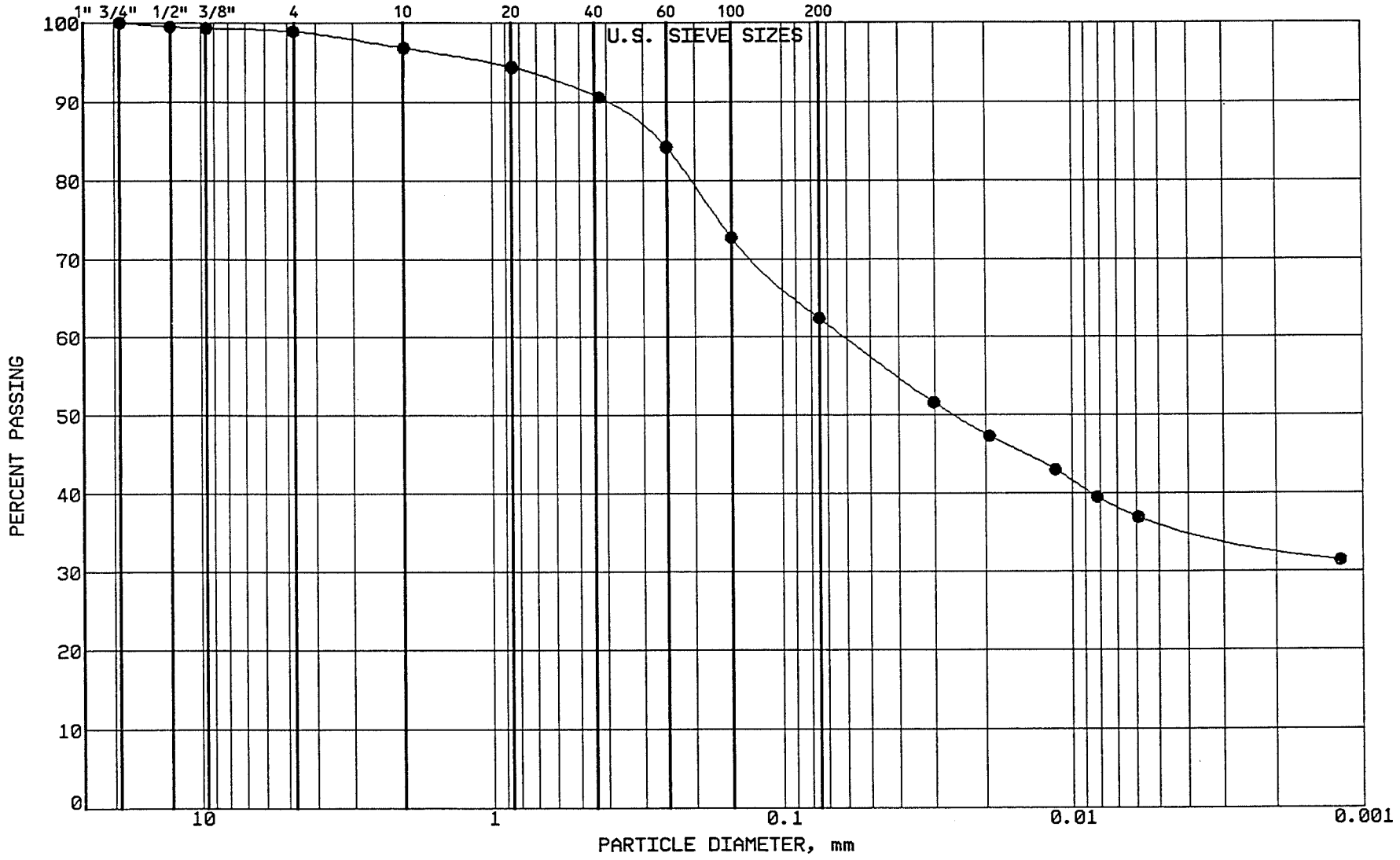
GRAVEL	0.8 %
SAND	36.6 %
SILT	26.1 %
CLAY	36.5 %
P 200	62.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43093.0, E 43089.0
SAMPLE: SGCC148 TUBE #:
ELEVATION: 1882.0'

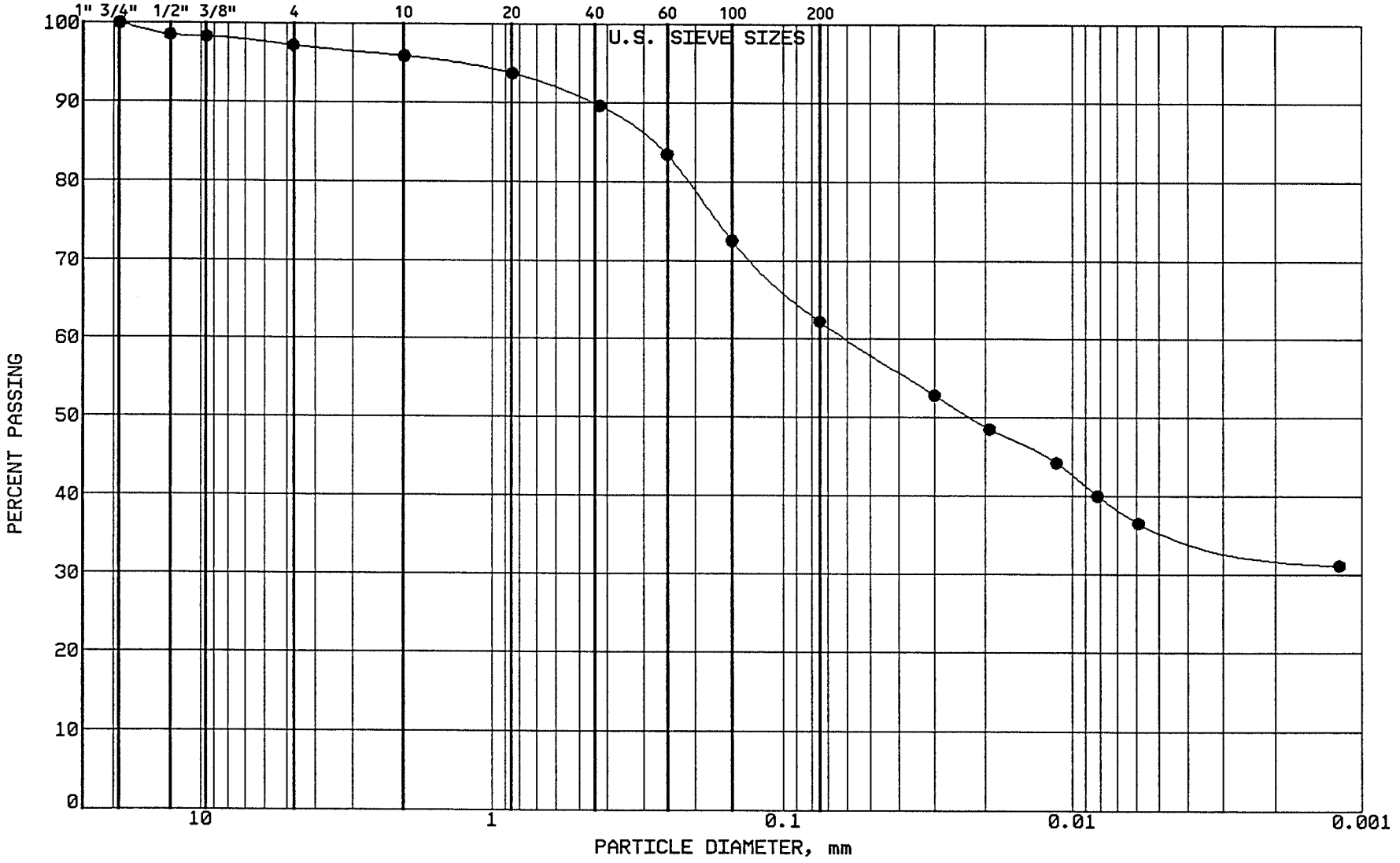
GRAVEL	1.1 %
SAND	36.5 %
SILT	26.1 %
CLAY	36.3 %
P 200	62.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

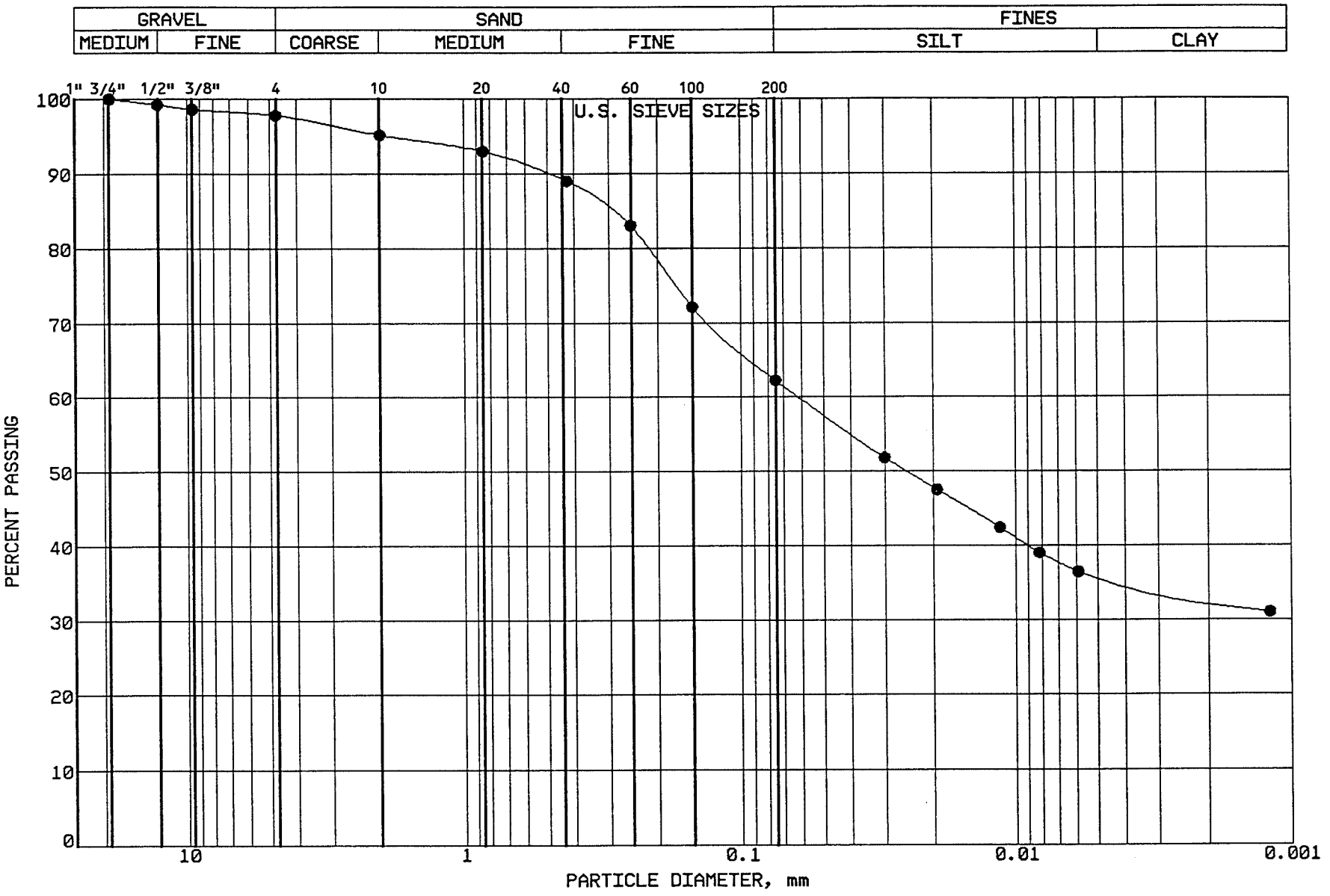
LOCATION: N 43249.0, E 43090.0
SAMPLE: SGCC149 TUBE #:
ELEVATION: 1882.6'

GRAVEL	2.8 %
SAND	35.0 %
SILT	26.3 %
CLAY	35.9 %
P 200	62.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

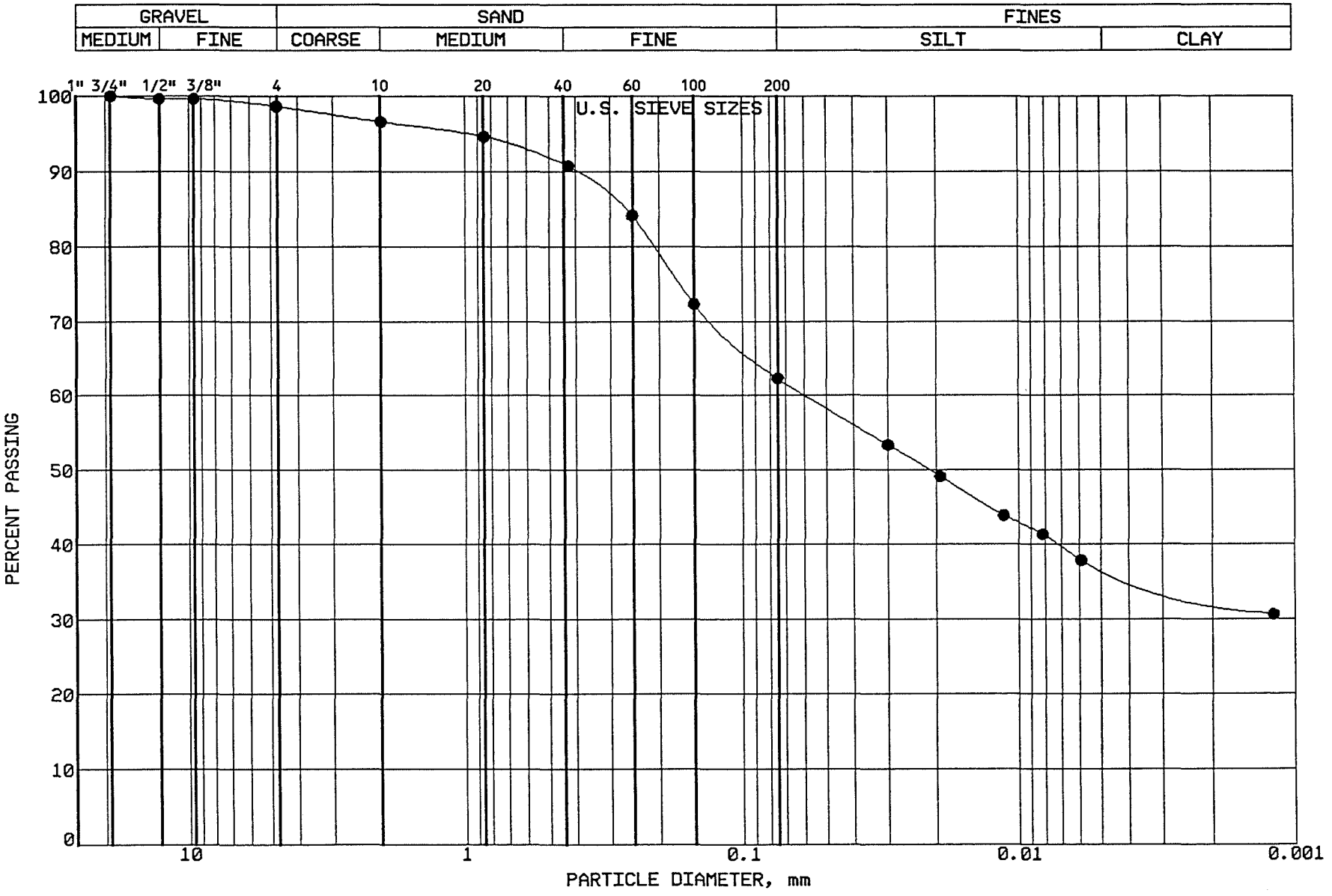
LOCATION: N 43405.0, E 43105.0
SAMPLE: SGCC150 TUBE #:
ELEVATION: 1882.0'

GRAVEL	2.2 %
SAND	35.6 %
SILT	26.4 %
CLAY	35.8 %
P 200	62.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43410.0, E 43303.0
SAMPLE: SGCC151 TUBE #:
ELEVATION: 1882.9'

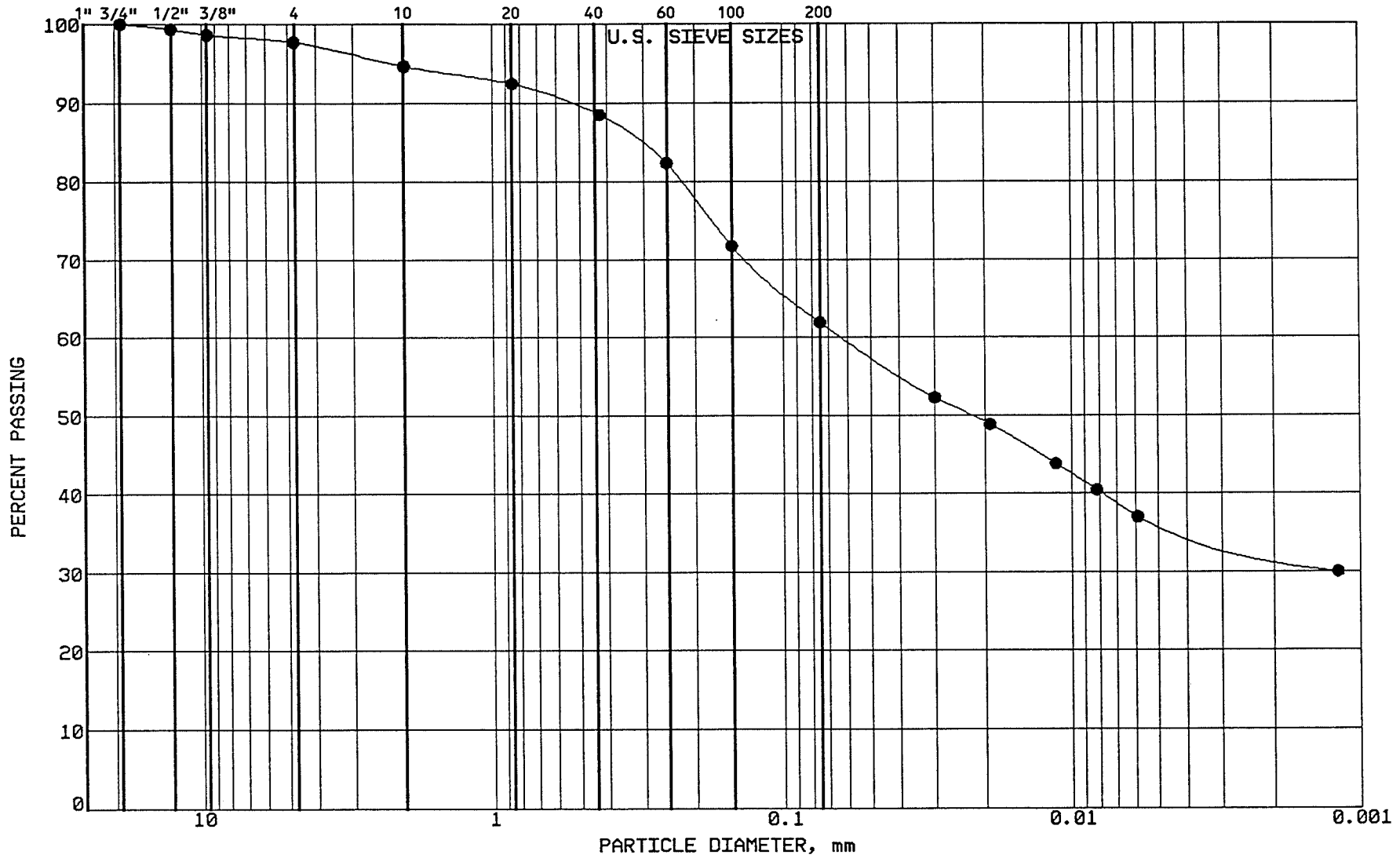
GRAVEL	1.4 %
SAND	36.3 %
SILT	25.2 %
CLAY	37.1 %
P 200	62.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

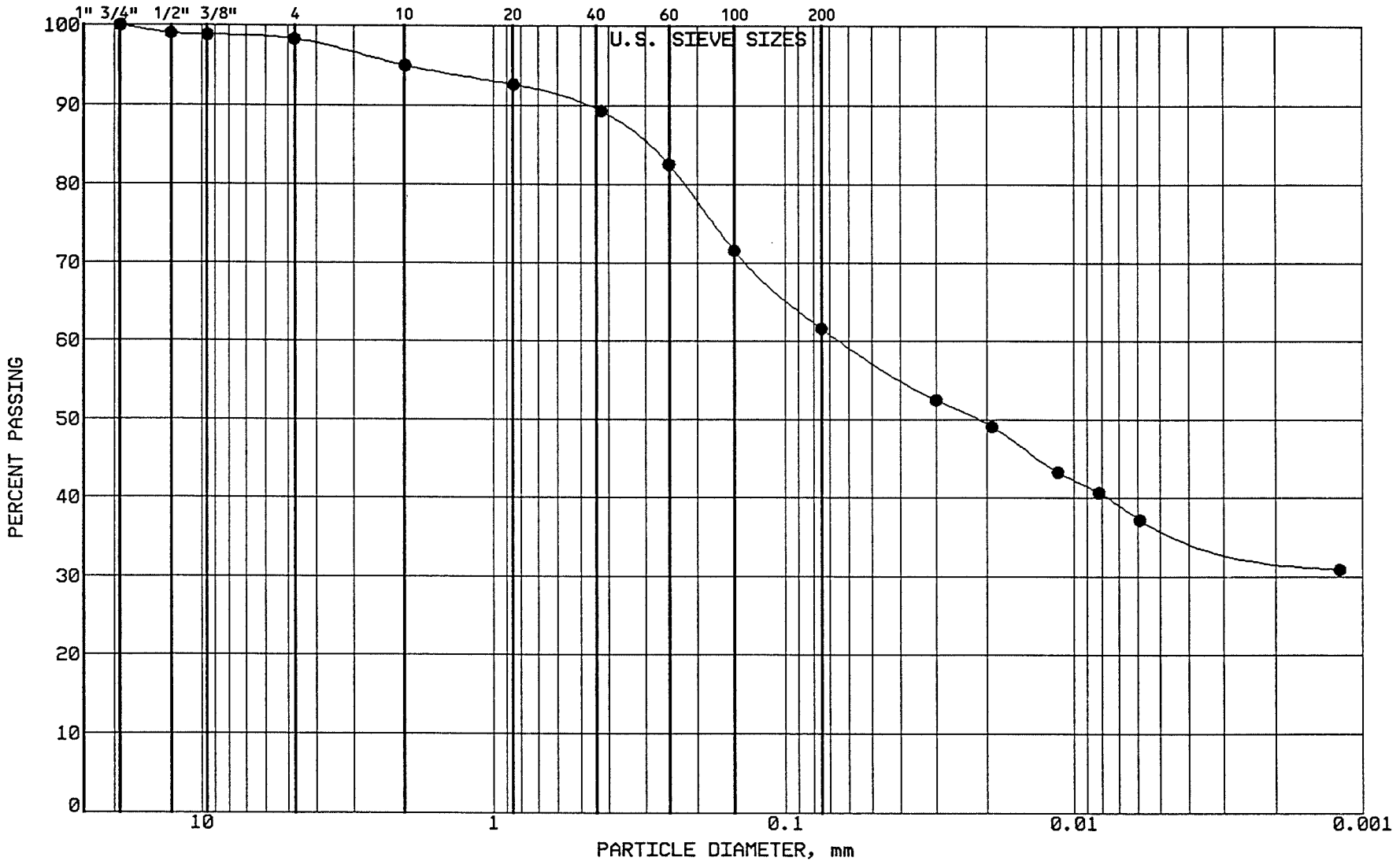
LOCATION: N 43139.0, E 43090.0
SAMPLE: SGCC152 TUBE #:
ELEVATION: 1882.9'

GRAVEL	2.3 %
SAND	35.8 %
SILT	25.6 %
CLAY	36.3 %
P 200	61.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43350.0, E 43092.0
SAMPLE: SGCC153 TUBE #:
ELEVATION: 1883.3'

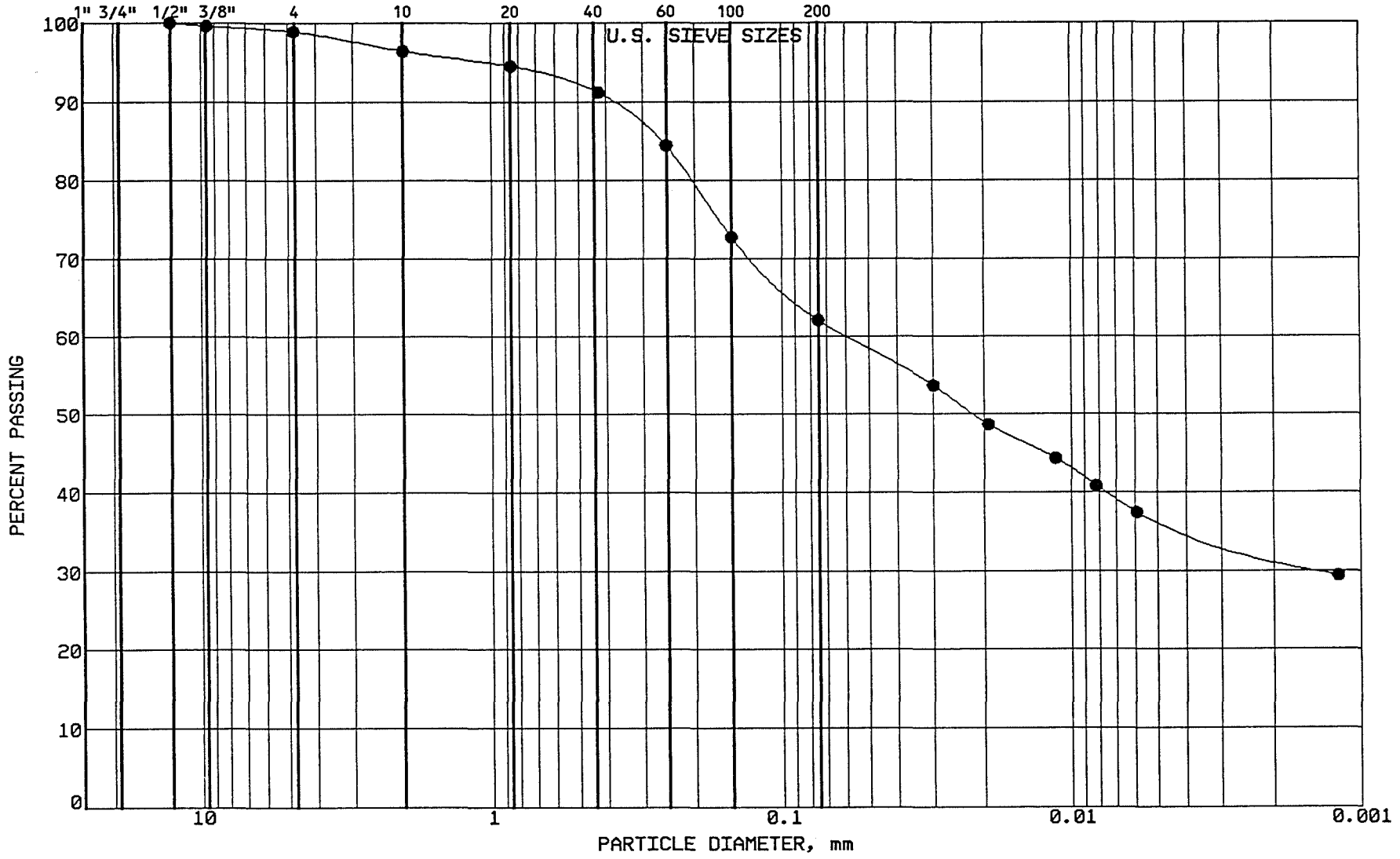
GRAVEL	1.7 %
SAND	36.7 %
SILT	25.1 %
CLAY	36.5 %
P 200	61.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

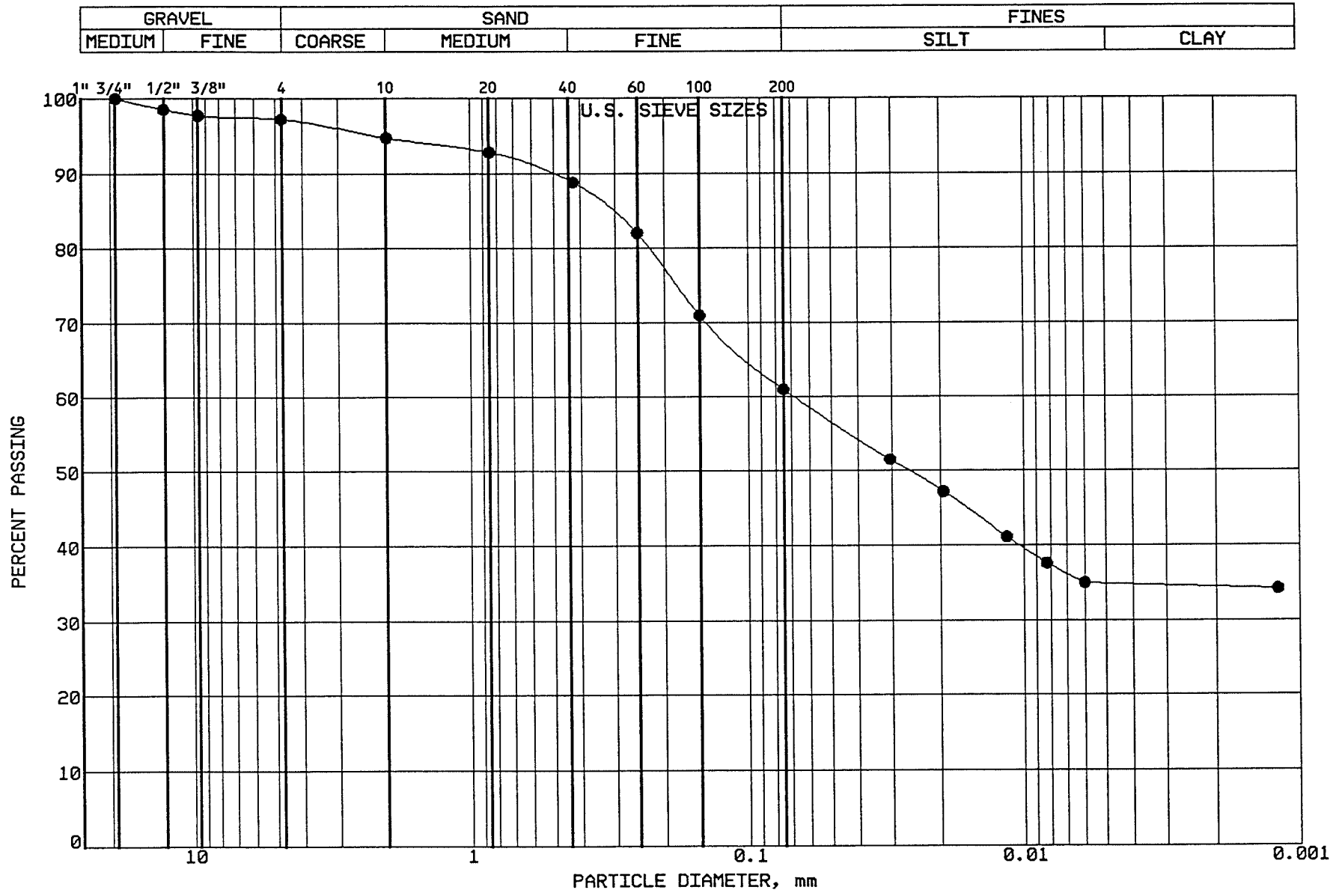
LOCATION: N 43414.0, E 43192.0
SAMPLE: SGCC154 TUBE #:
ELEVATION: 1882.7'

GRAVEL	1.1 %
SAND	36.8 %
SILT	25.5 %
CLAY	36.6 %
P 200	62.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

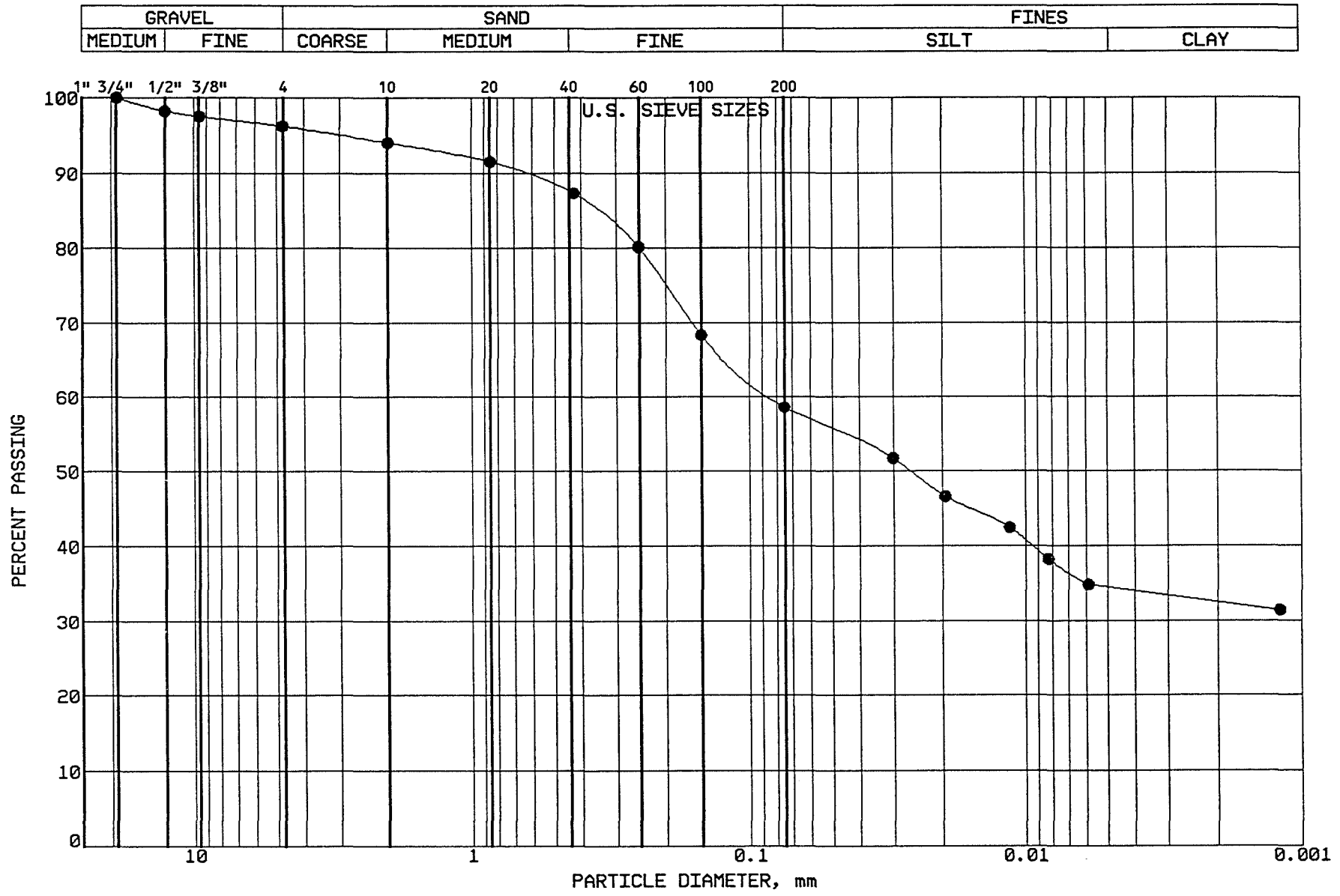
LOCATION: N 43412.0, E 43348.0
SAMPLE: SGCC155 TUBE #:
ELEVATION: 1883.9'

GRAVEL	2.8 %
SAND	36.2 %
SILT	26.1 %
CLAY	34.9 %
P 200	61.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43108.0, E 43070.0
SAMPLE: SGCC156 TUBE #:
ELEVATION: 1883.6'

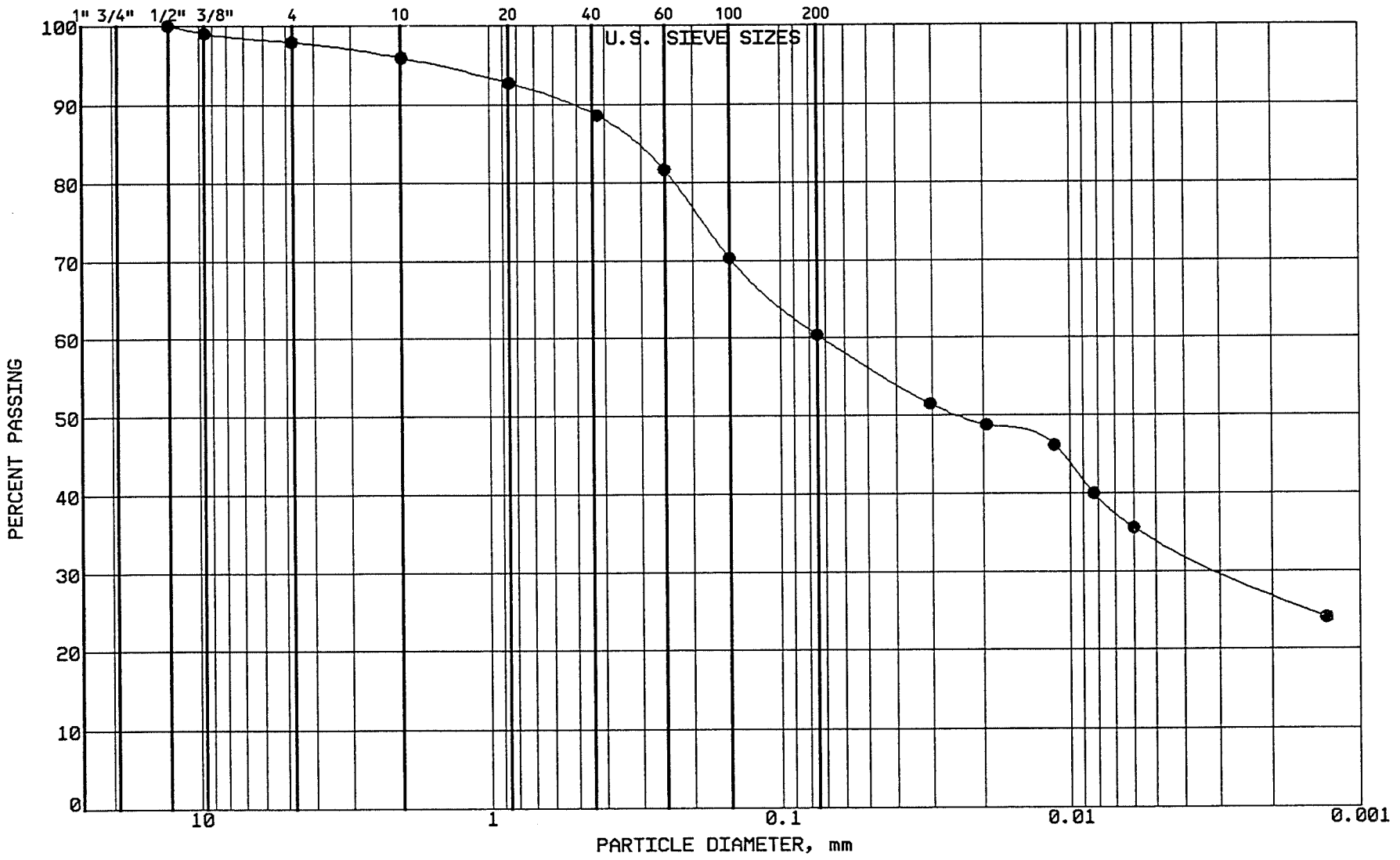
GRAVEL	3.8 %
SAND	37.6 %
SILT	24.2 %
CLAY	34.4 %
P 200	58.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43284.0, E 43067.0
SAMPLE: SGCC157 TUBE #:
ELEVATION: 1884.7'

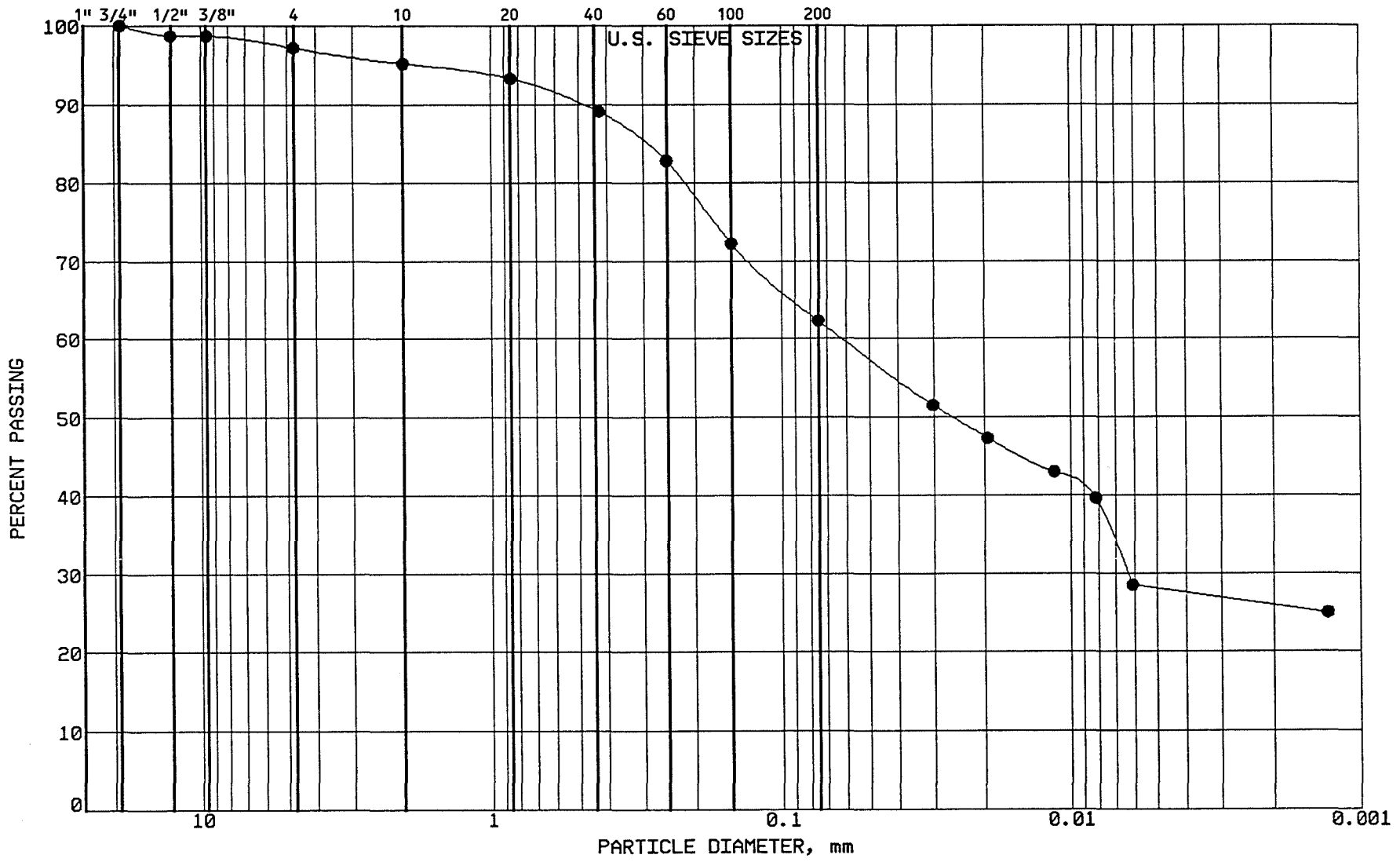
GRAVEL	2.1 %
SAND	37.5 %
SILT	26.2 %
CLAY	34.2 %
P 200	60.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43432.0, E 43107.0
SAMPLE: SGCC158 TUBE #:
ELEVATION: 1883.8'

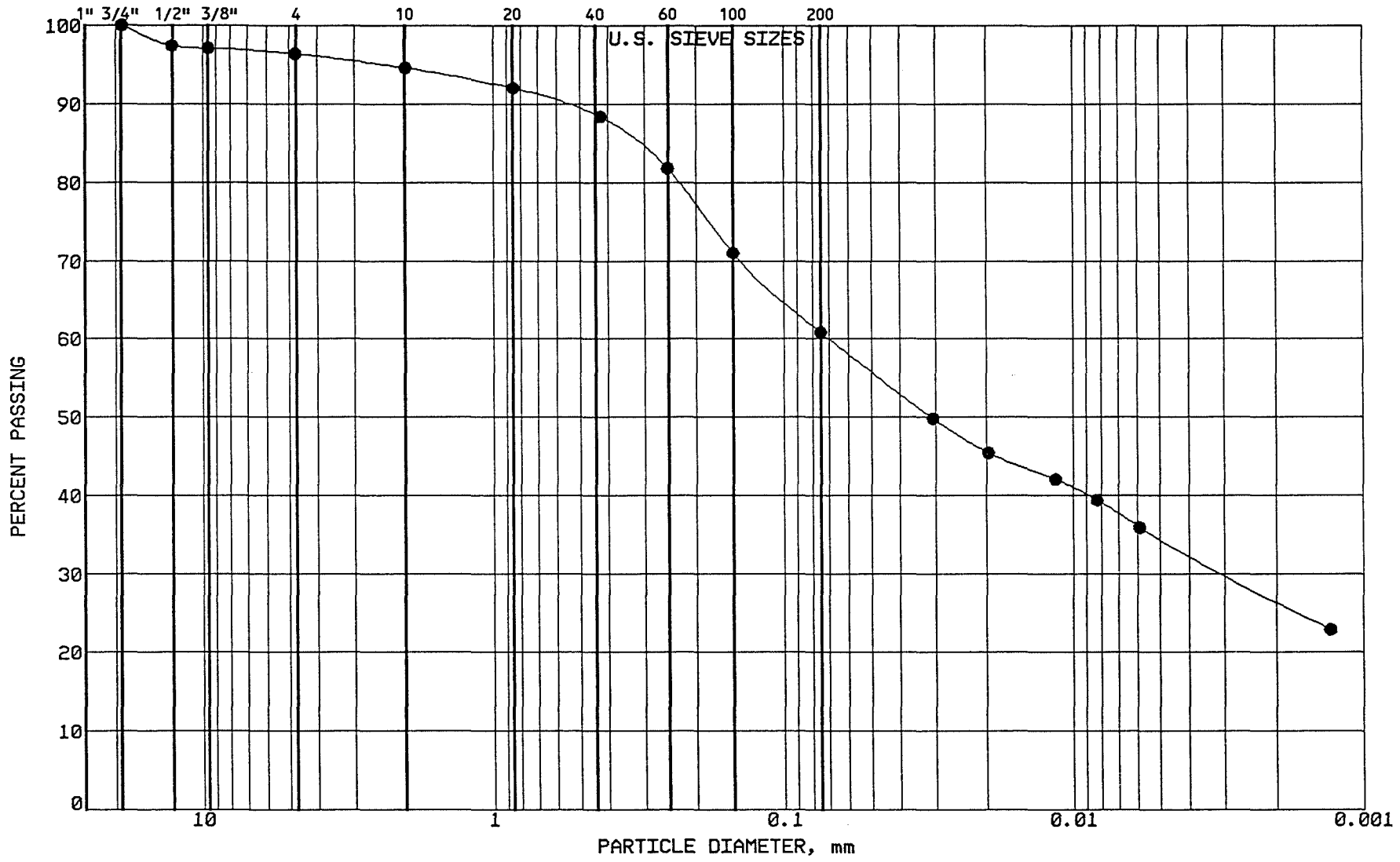
GRAVEL	2.8 %
SAND	34.9 %
SILT	34.3 %
CLAY	28.0 %
P 200	62.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43440.0, E 43295.0
SAMPLE: SGCC159 TUBE #:
ELEVATION: 1884.7'

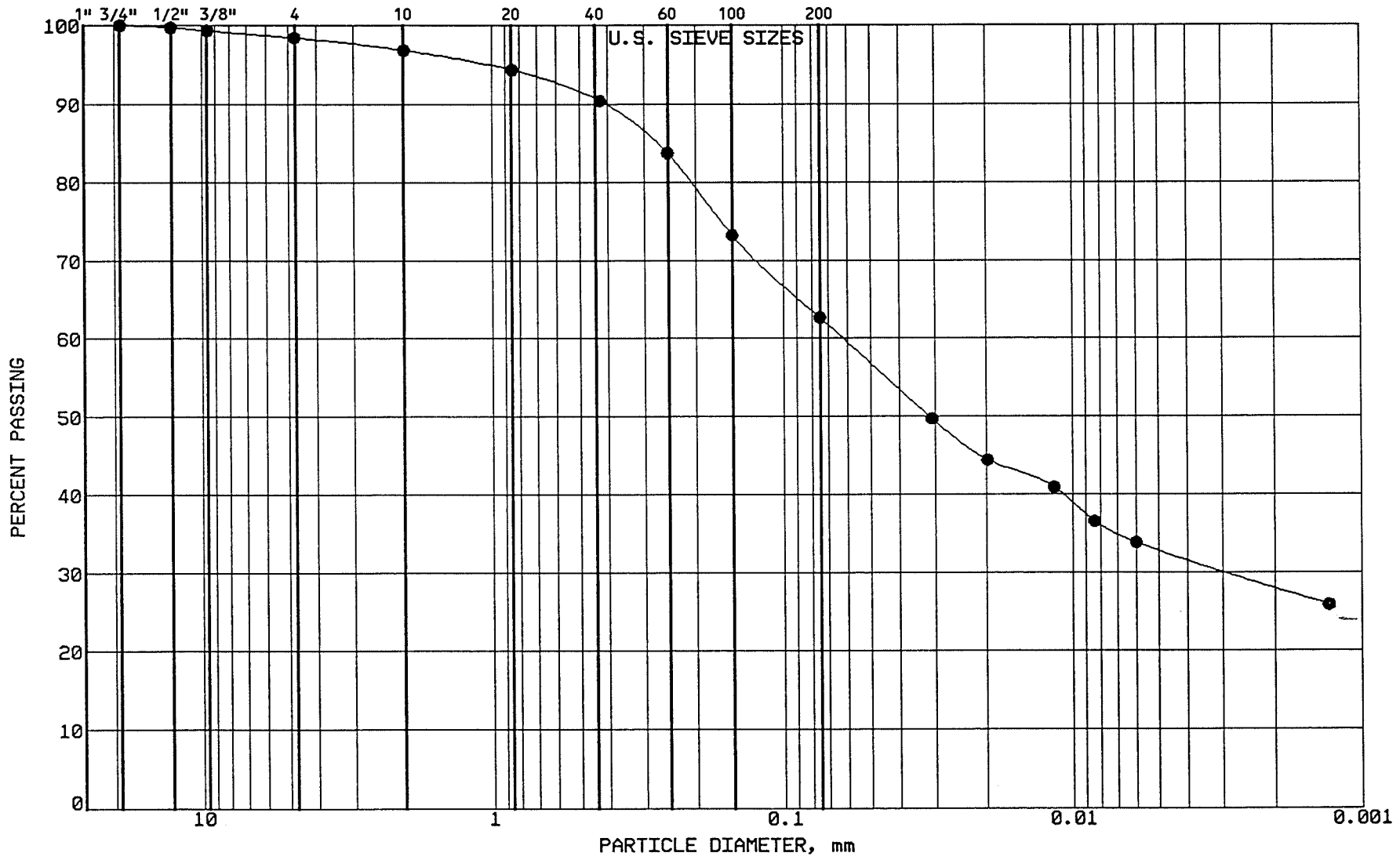
GRAVEL	3.6 %
SAND	35.6 %
SILT	26.3 %
CLAY	34.5 %
P 200	60.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43284.0, E 44368.0
SAMPLE: SGCC160 TUBE #:
ELEVATION: 1886.5'

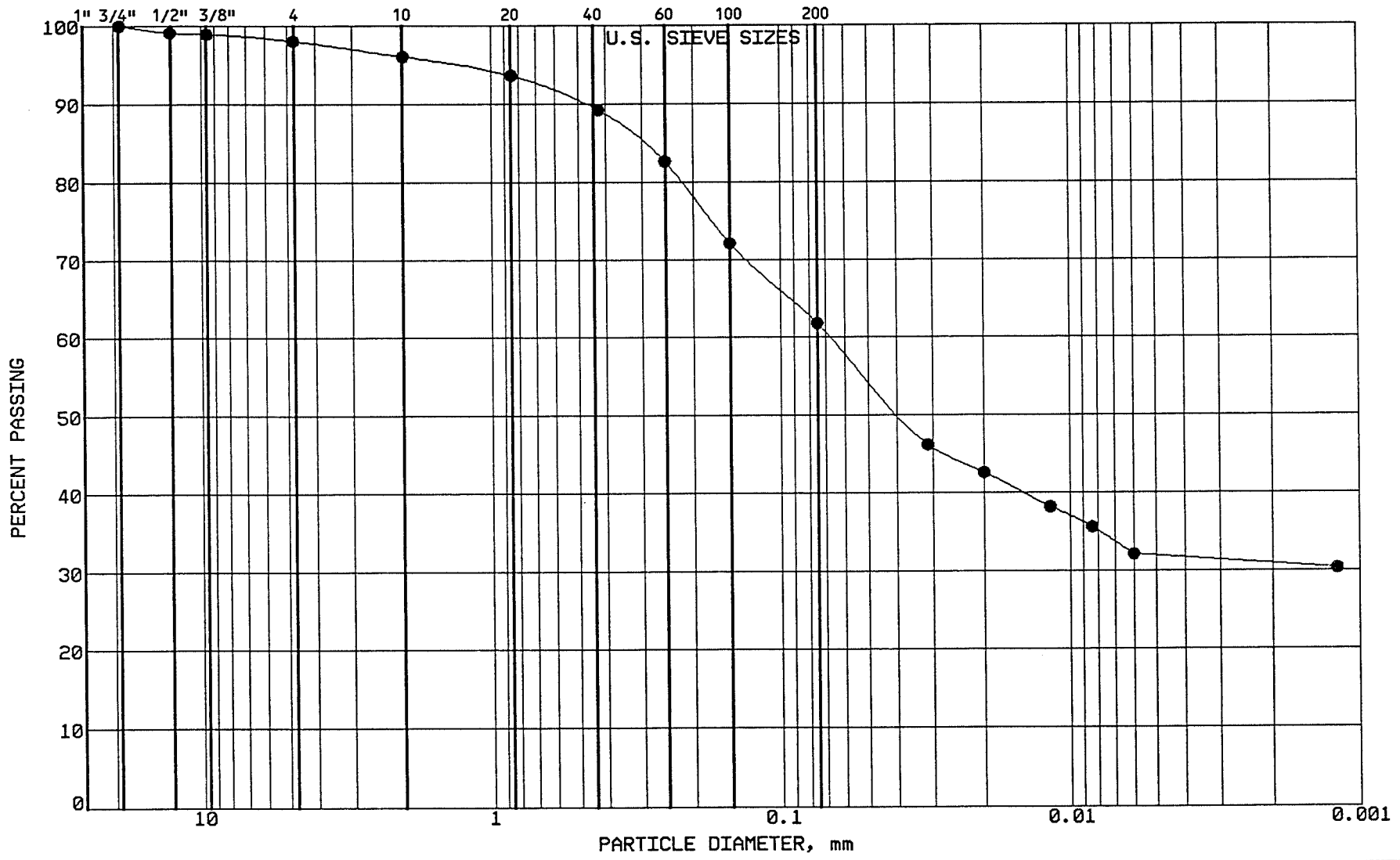
GRAVEL	1.6 %
SAND	35.8 %
SILT	29.7 %
CLAY	32.9 %
P 200	62.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43101.0, E 43094.0
SAMPLE: SGCC161 TUBE #:
ELEVATION: 1884.1'

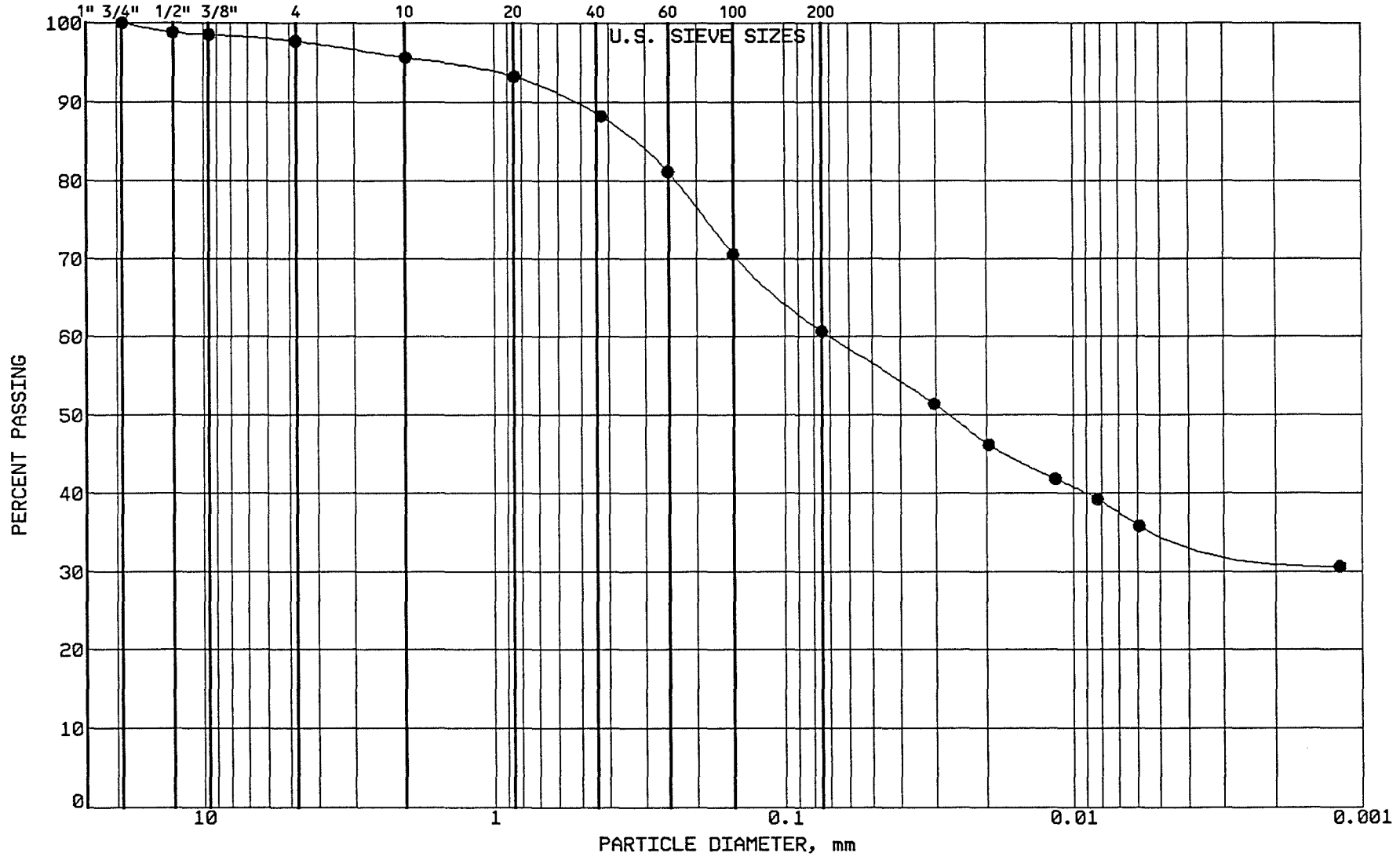
GRAVEL	2.0 %
SAND	36.2 %
SILT	29.9 %
CLAY	31.9 %
P 200	61.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43278.0, E 43088.0
SAMPLE: SGCC162 TUBE #:
ELEVATION: 1885.8'

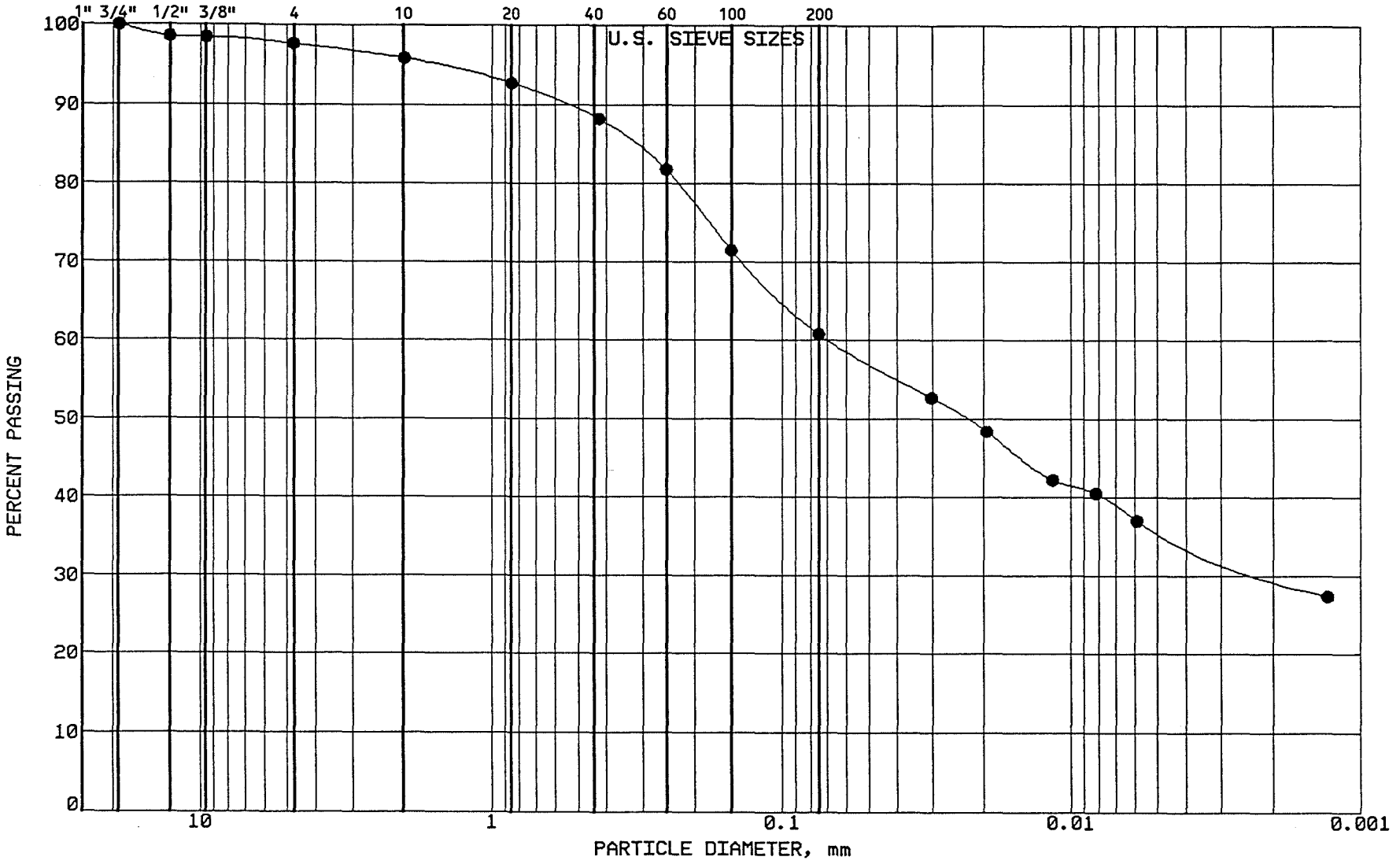
GRAVEL	2.3 %
SAND	37.0 %
SILT	25.4 %
CLAY	35.3 %
P 200	60.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

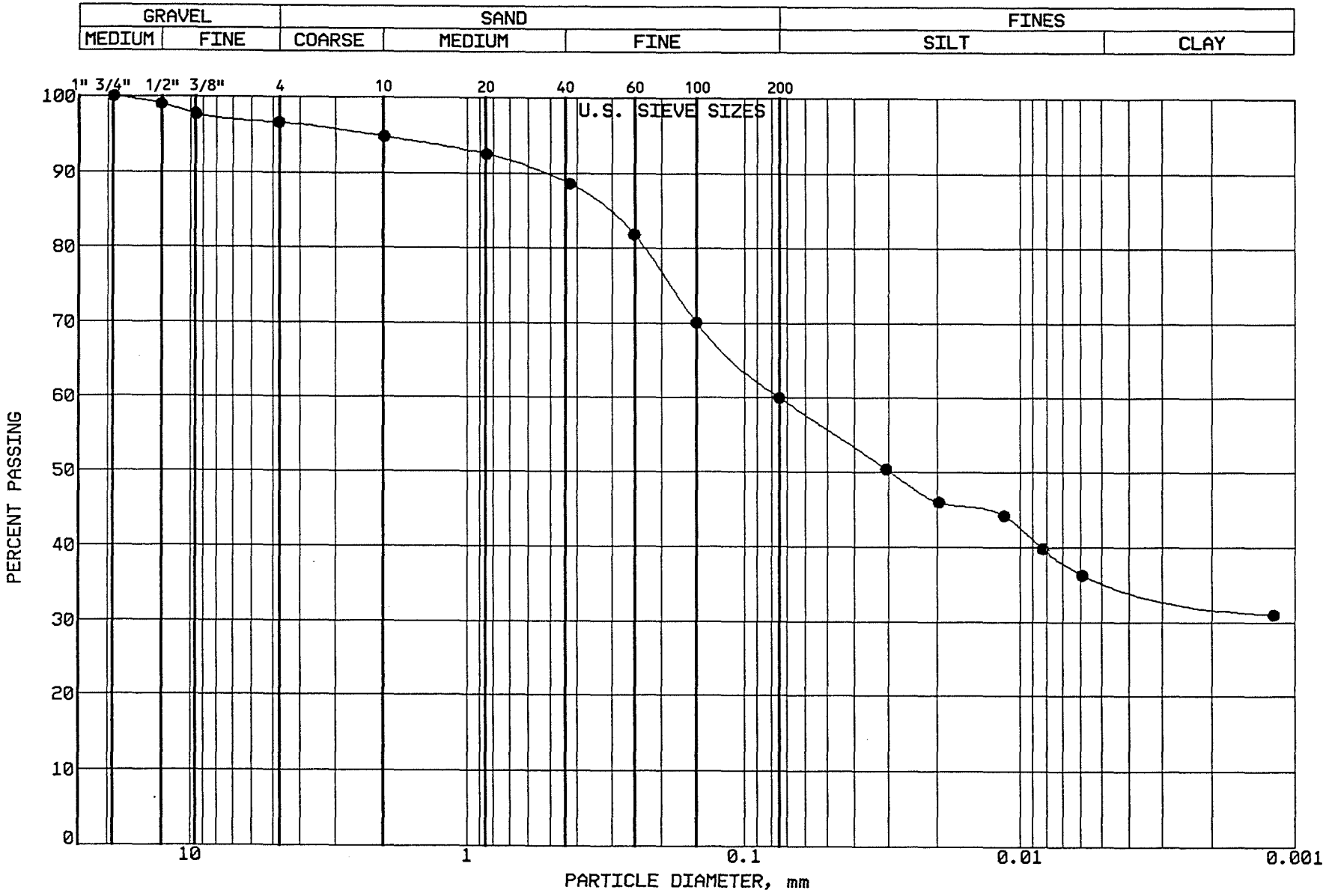
LOCATION: N 43418.0, E 43119.0
SAMPLE: SGCC163 TUBE #:
ELEVATION: 1884.8'

GRAVEL	2.4 %
SAND	36.8 %
SILT	24.9 %
CLAY	35.9 %
P 200	60.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43418.0, E 43298.0
SAMPLE: SGCC164 TUBE #:
ELEVATION: 1884.9'

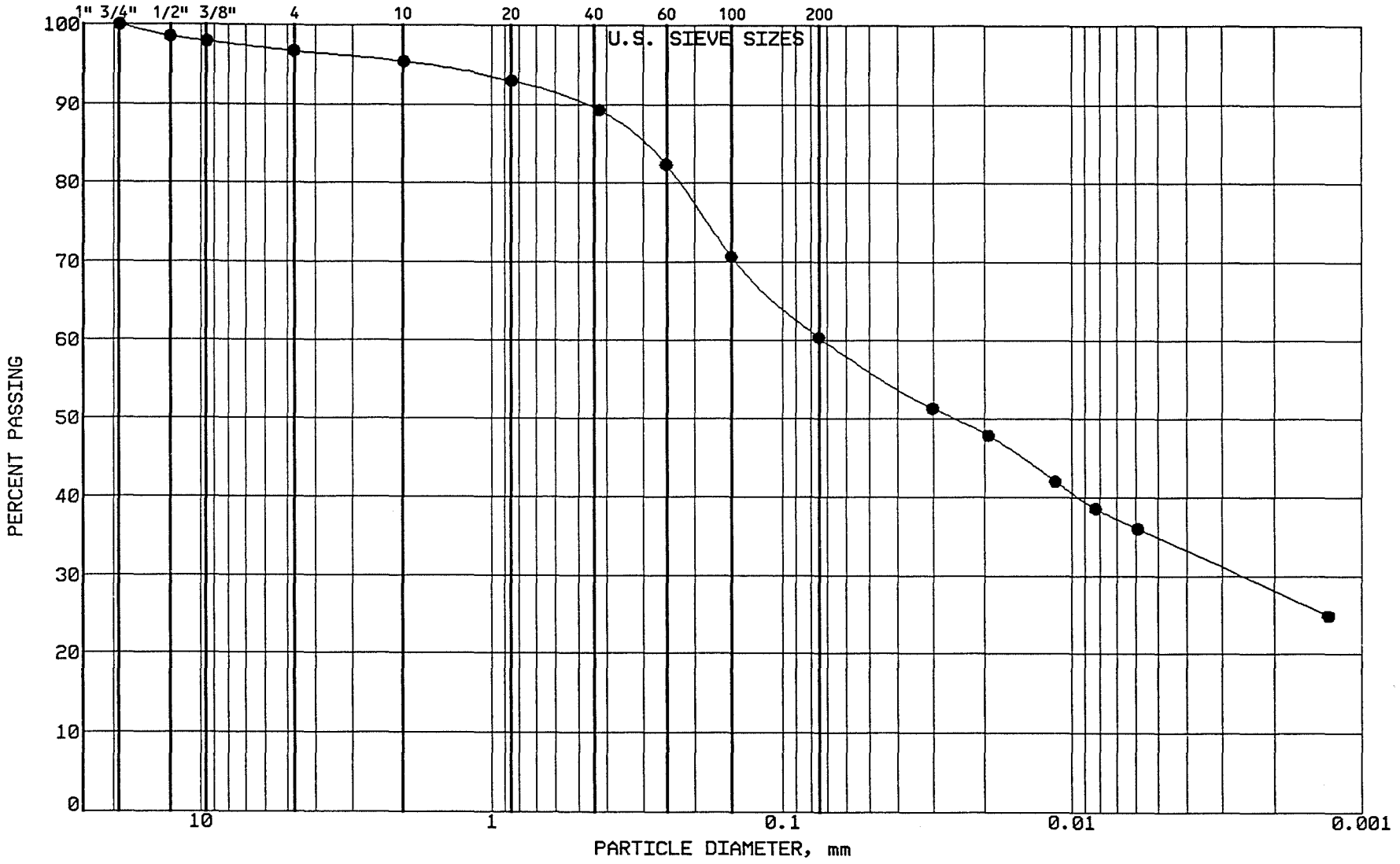
GRAVEL	3.4 %
SAND	36.6 %
SILT	24.3 %
CLAY	35.7 %
P 200	60.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42610.0, E 45324.0
SAMPLE: SGCC165 TUBE #:
ELEVATION: 1876.5'

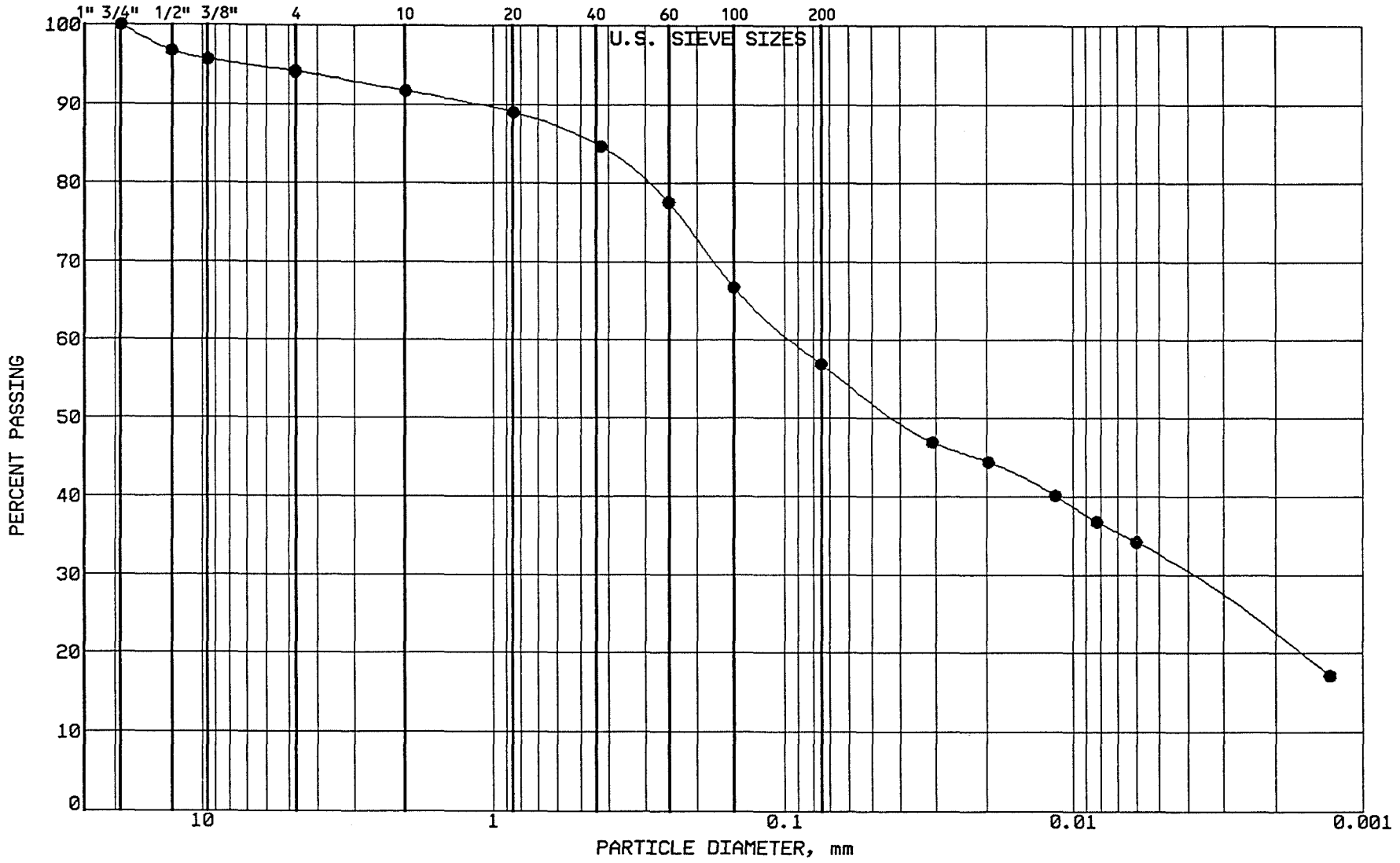
GRAVEL	3.3 %
SAND	36.3 %
SILT	25.6 %
CLAY	34.8 %
P 200	60.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42610.0, E 45103.0
SAMPLE: SGCC166 TUBE #:
ELEVATION: 1876.1'

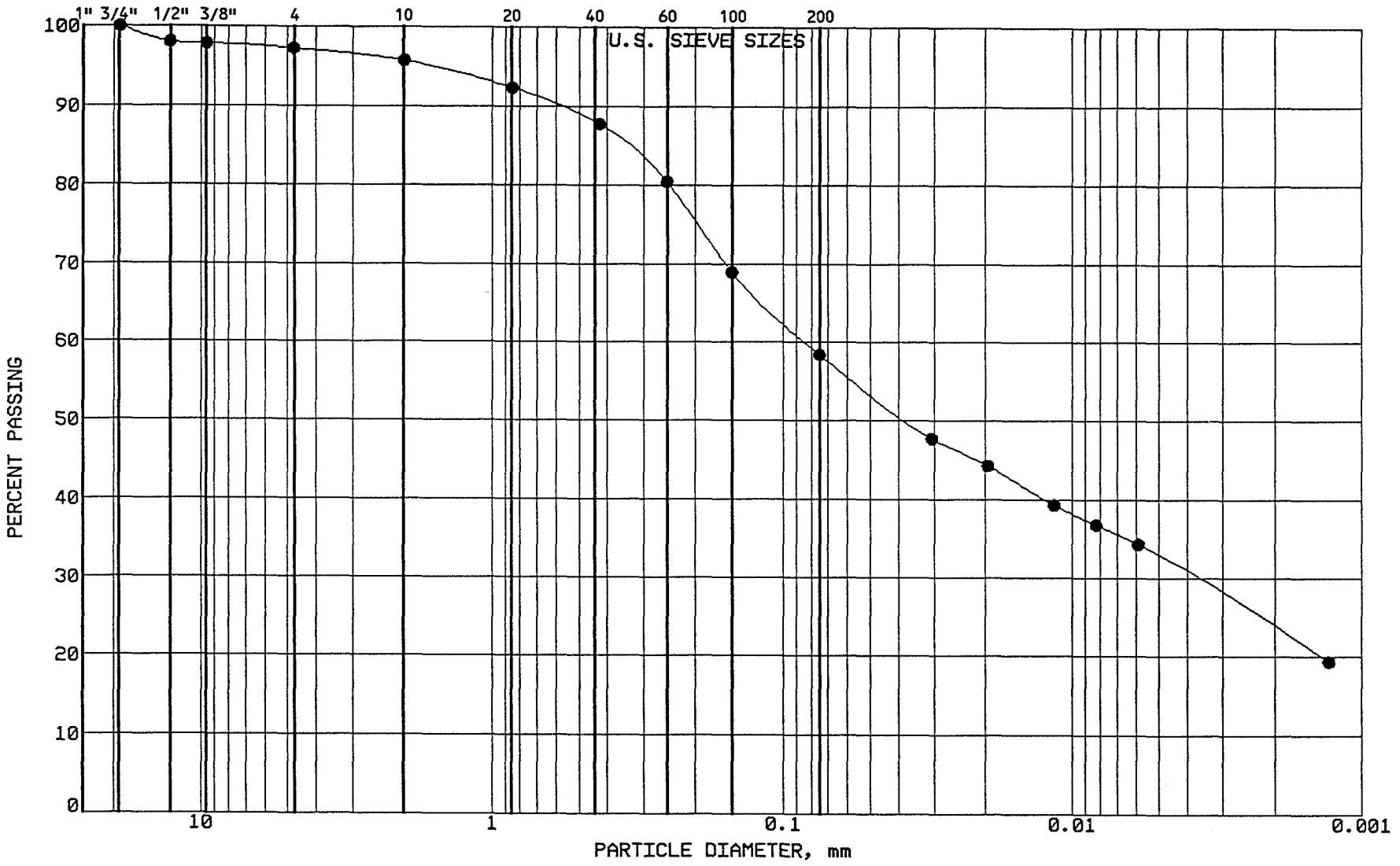
GRAVEL	5.9 %
SAND	37.2 %
SILT	24.7 %
CLAY	32.2 %
P 200	56.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

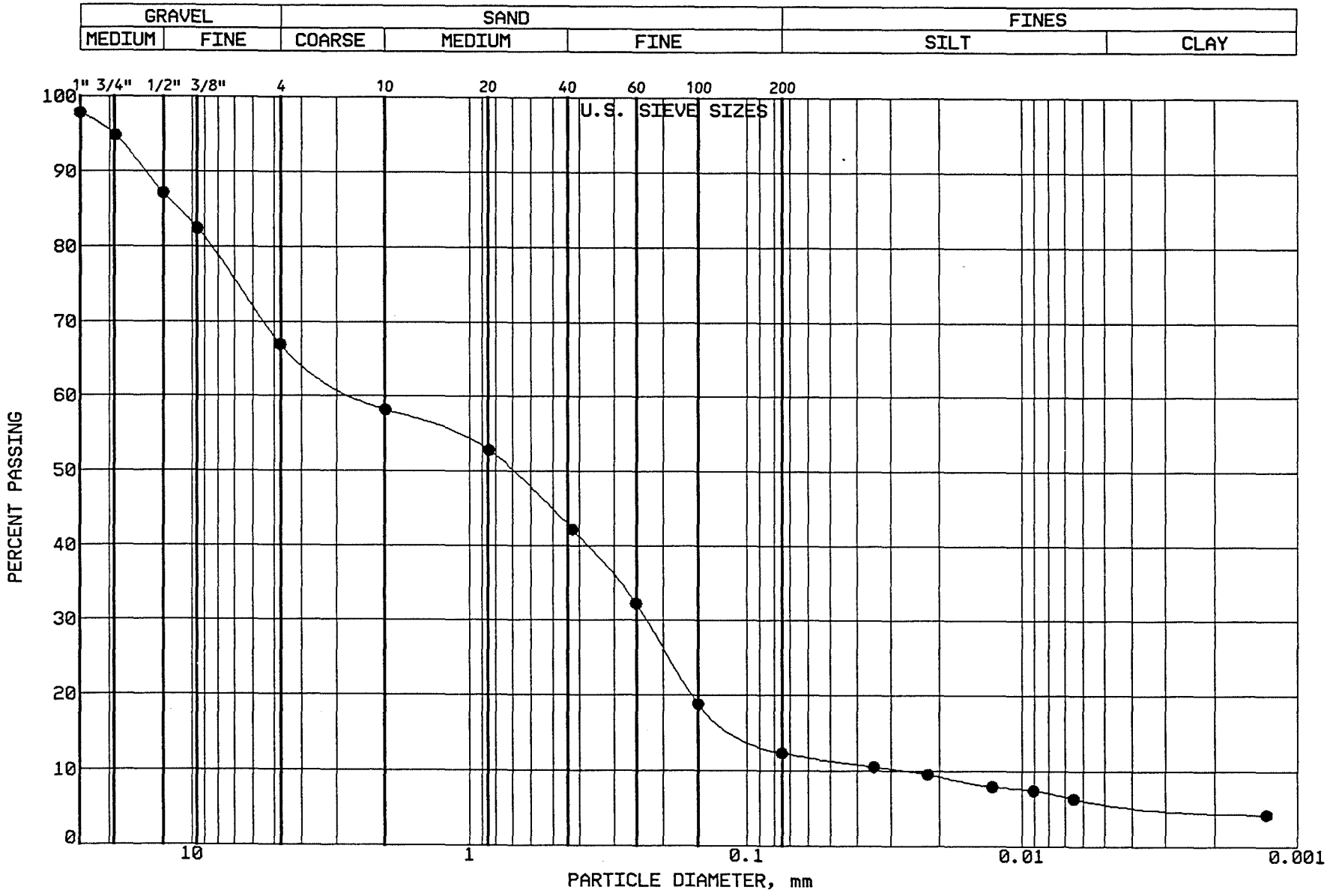
LOCATION: N 42611.0, E 44903.0
SAMPLE: SGCC167 TUBE #:
ELEVATION: 1877.1'

GRAVEL	2.8 %
SAND	38.8 %
SILT	25.7 %
CLAY	32.7 %
P 200	58.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42642.0, E 44988.0
SAMPLE: SGCC168 TUBE #:
ELEVATION: 1877.3'

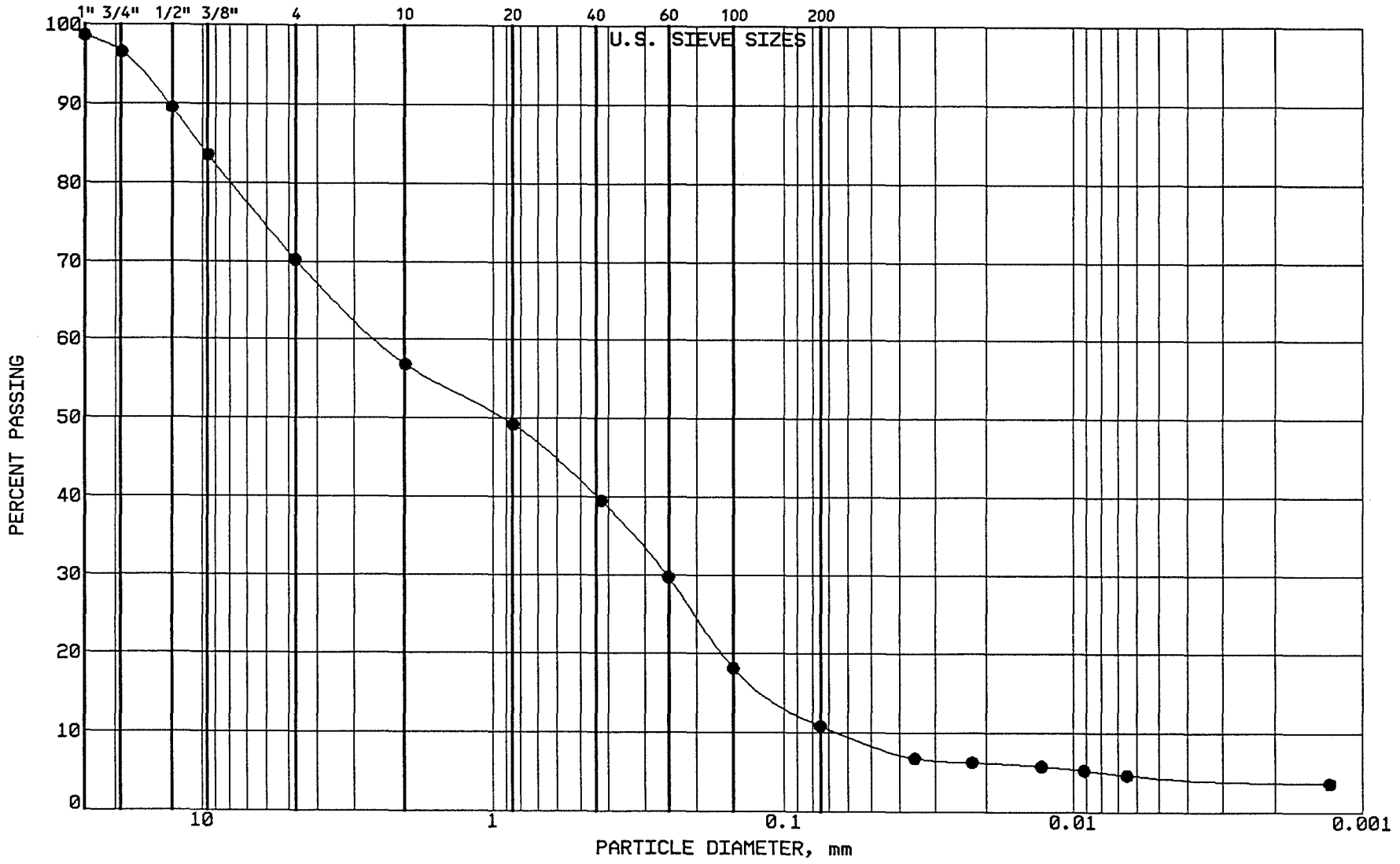
GRAVEL	33.1 %
SAND	54.5 %
SILT	6.3 %
CLAY	6.1 %
P 200	12.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SAND W GRAVEL (SM)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42641.0, E 45203.0
SAMPLE: SGCC169 TUBE #:
ELEVATION: 1877.2'

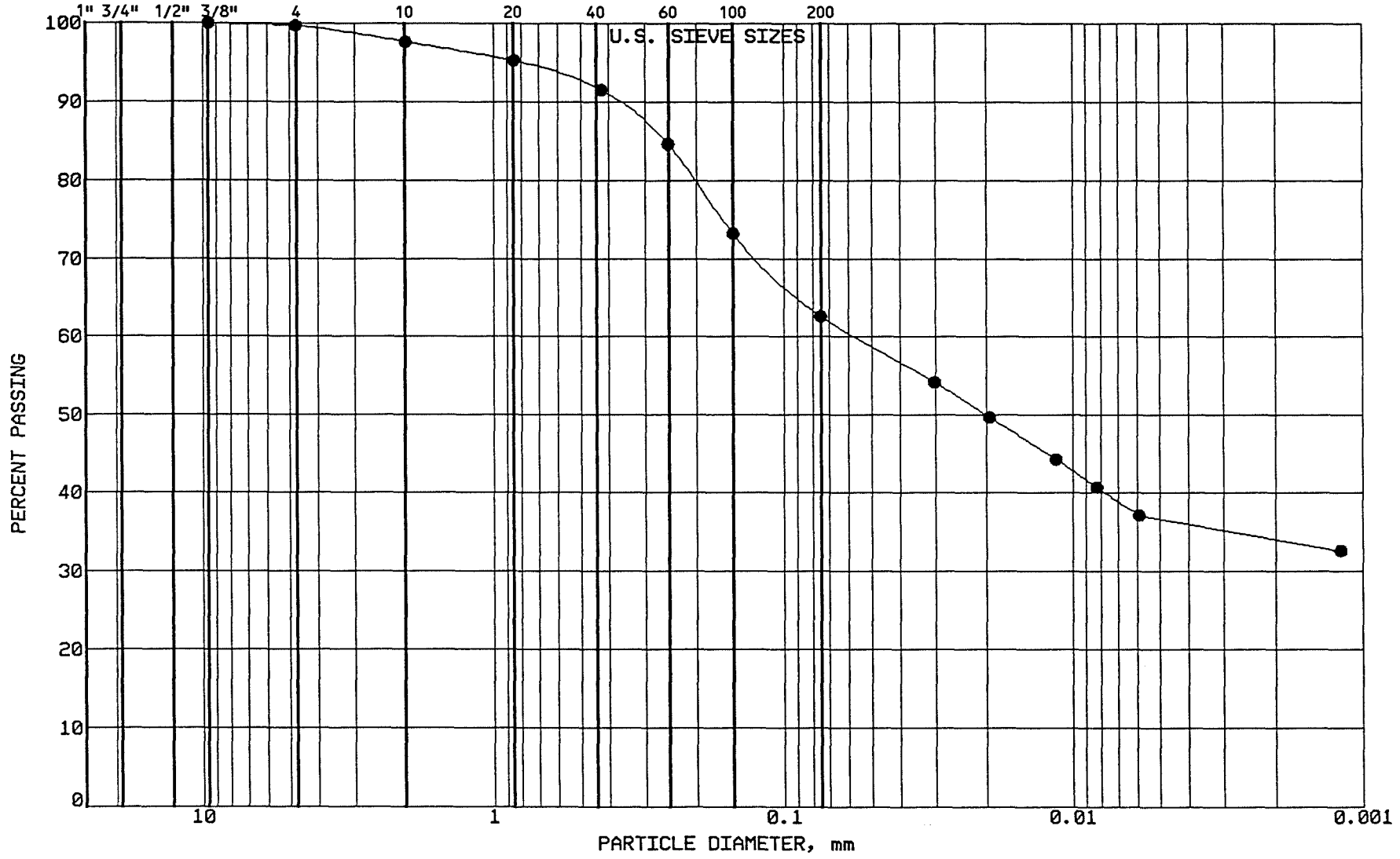
GRAVEL	29.8 %
SAND	59.3 %
SILT	6.4 %
CLAY	4.5 %
P 200	10.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: POORLY GRADED SAND W GRAVEL(SP-SC)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43289.0, E 44140.0
SAMPLE: CLBCC170 TUBE #:
ELEVATION: 1887.2'

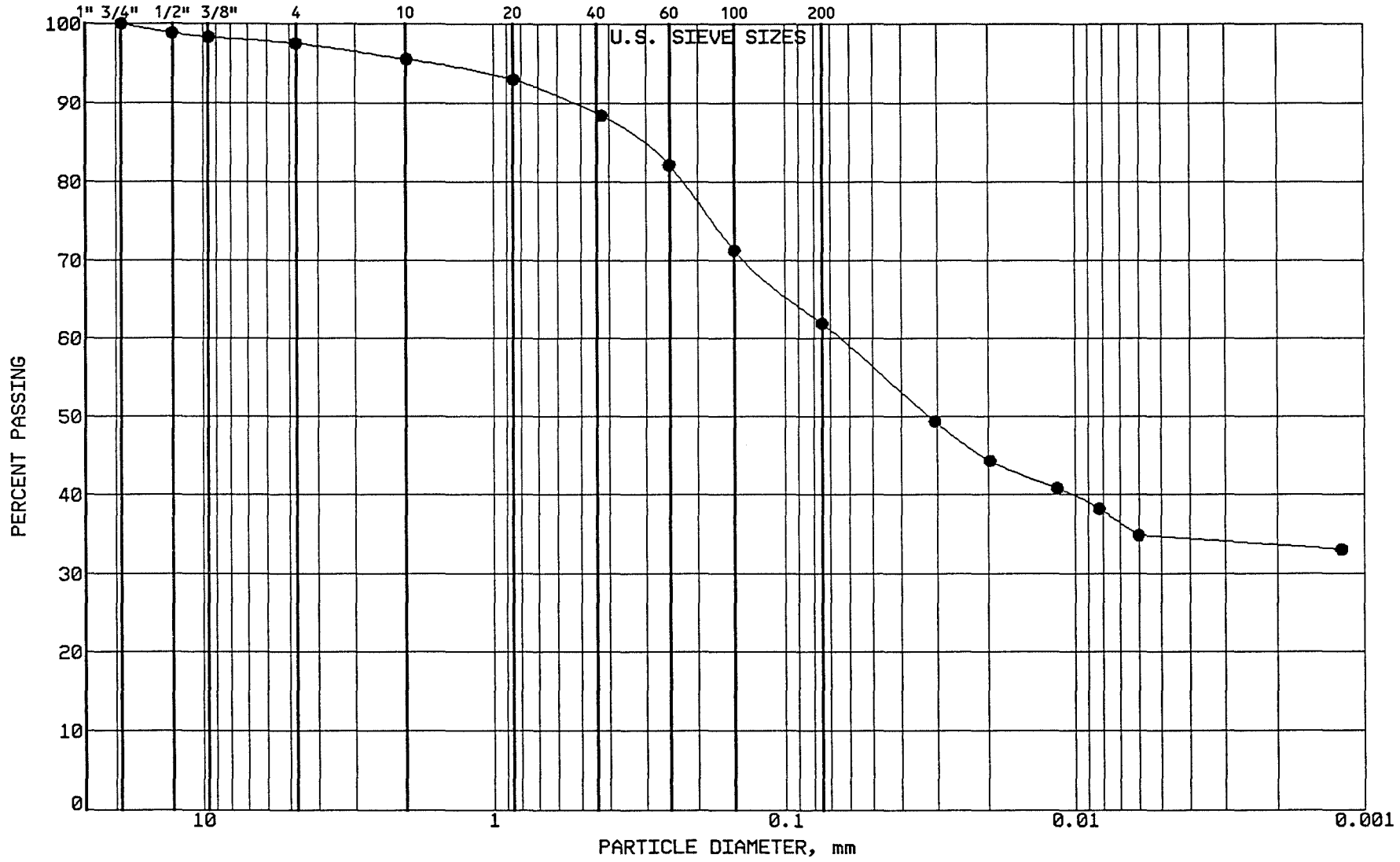
GRAVEL	0.3 %
SAND	37.1 %
SILT	26.0 %
CLAY	36.6 %
P 200	62.6 %

SOIL PROPERTIES

LL: 42.0%
PL: 15.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

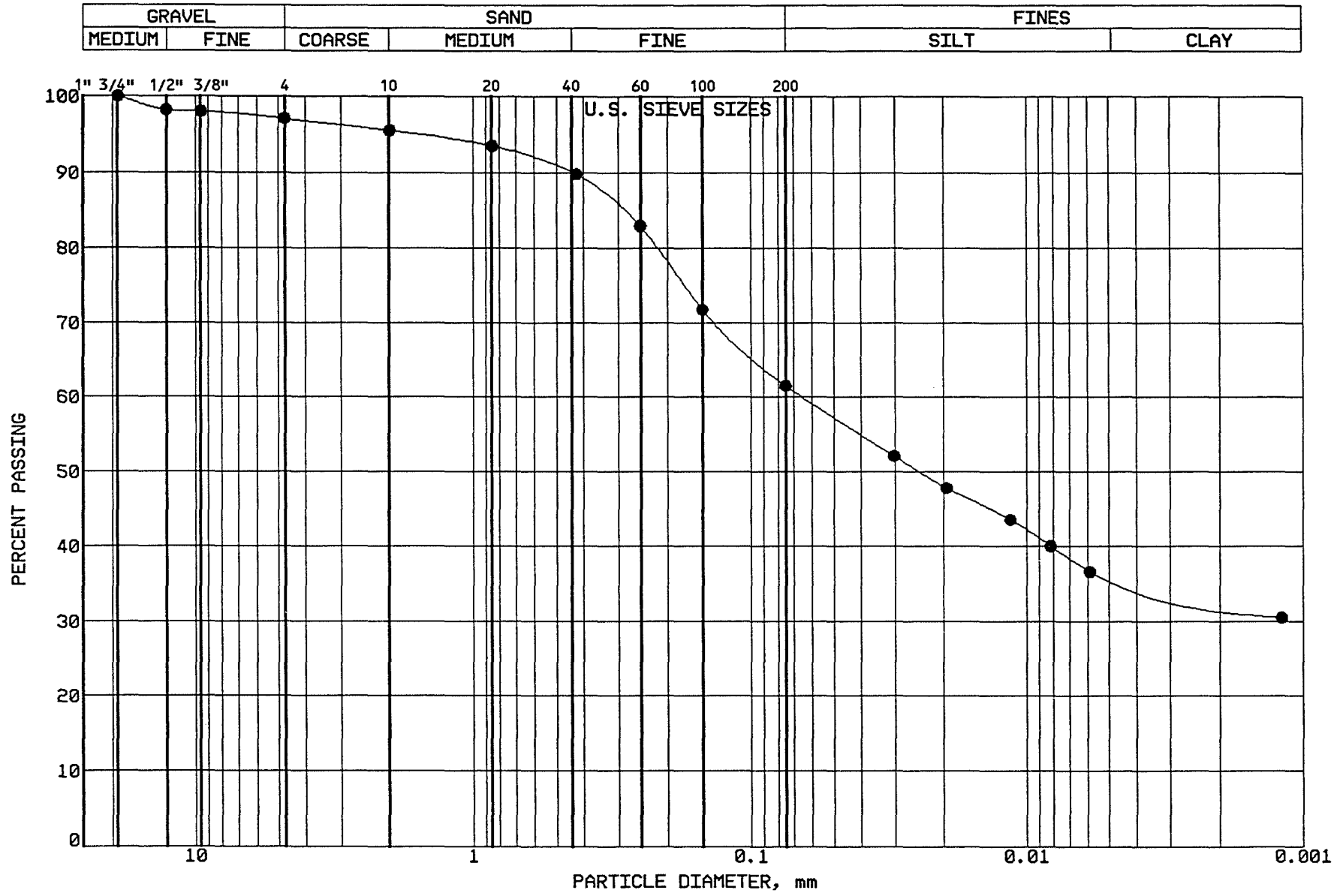
LOCATION: N 43105.0, E 43074.0
SAMPLE: SGCC171 TUBE #:
ELEVATION: 1885.0'

GRAVEL	2.5 %
SAND	35.6 %
SILT	27.3 %
CLAY	34.6 %
P 200	61.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43290.0, E 43068.0
SAMPLE: SGCC172 TUBE #:
ELEVATION: 1886.5'

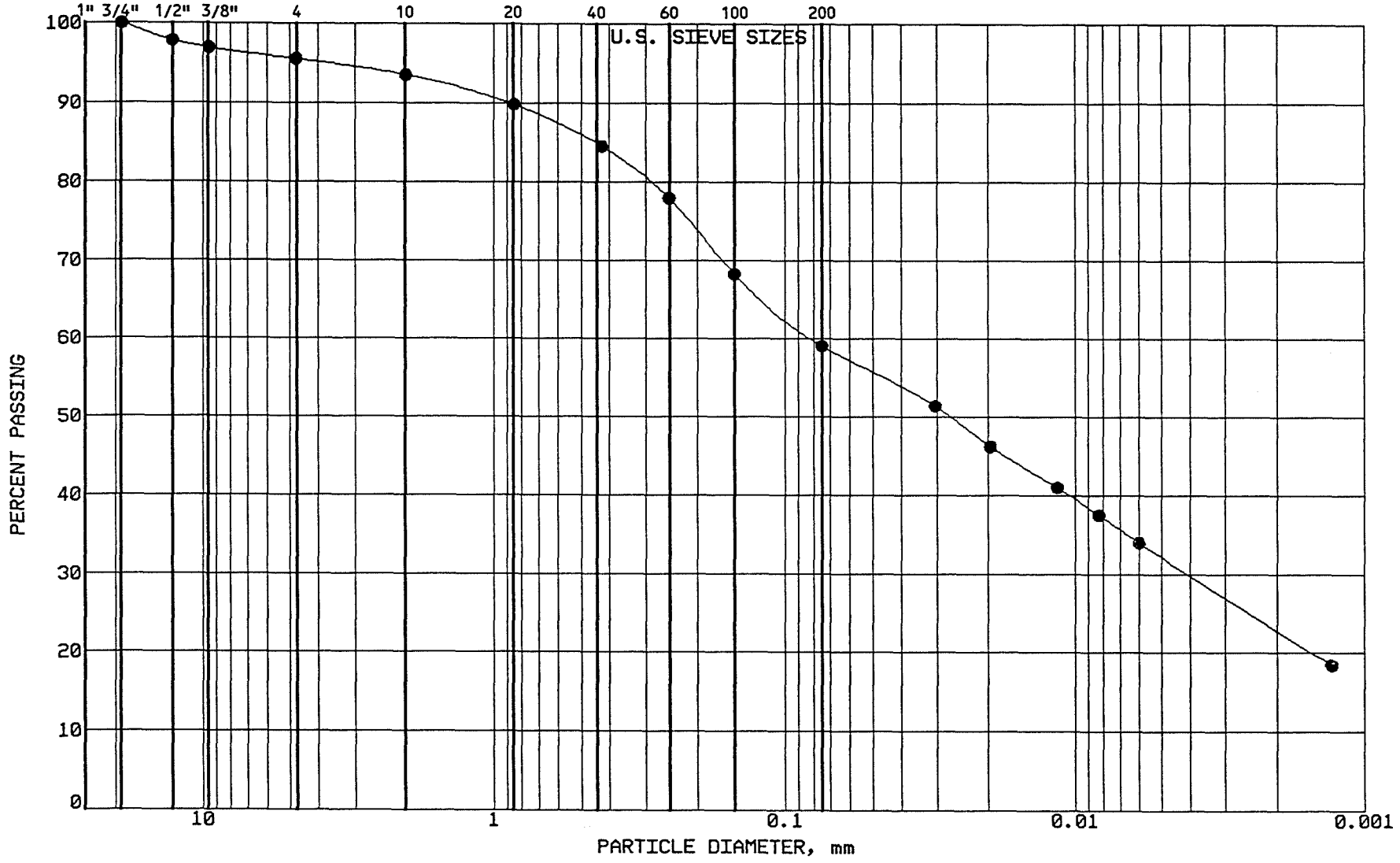
GRAVEL	2.9 %
SAND	35.6 %
SILT	25.5 %
CLAY	36.0 %
P 200	61.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43435.0, E 43110.0
SAMPLE: SGCC173 TUBE #:
ELEVATION: 1886.1'

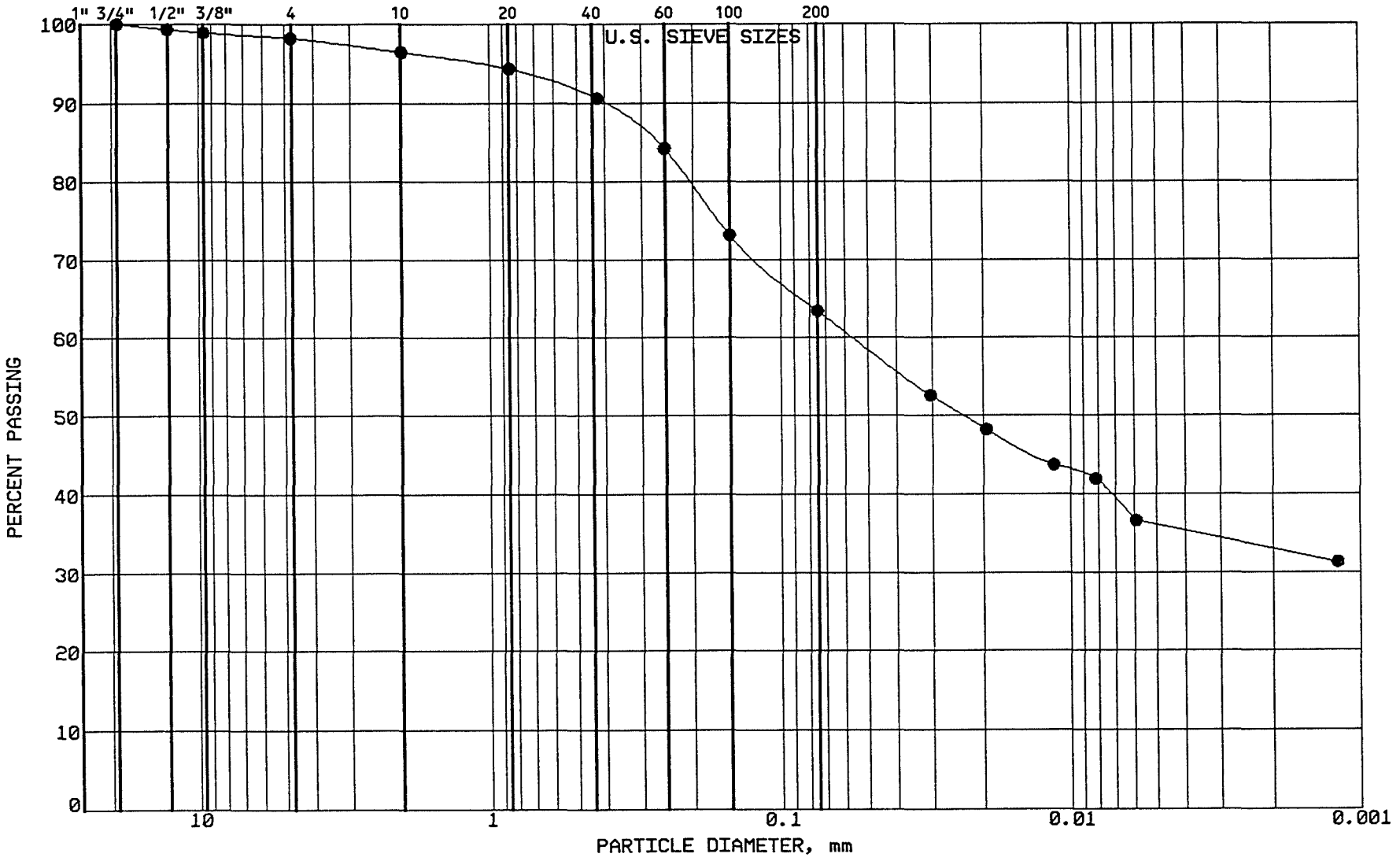
GRAVEL	4.5 %
SAND	36.4 %
SILT	26.9 %
CLAY	32.2 %
P 200	59.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43444.0, E 43289.0
SAMPLE: SGCC174 TUBE #:
ELEVATION: 1886.6'

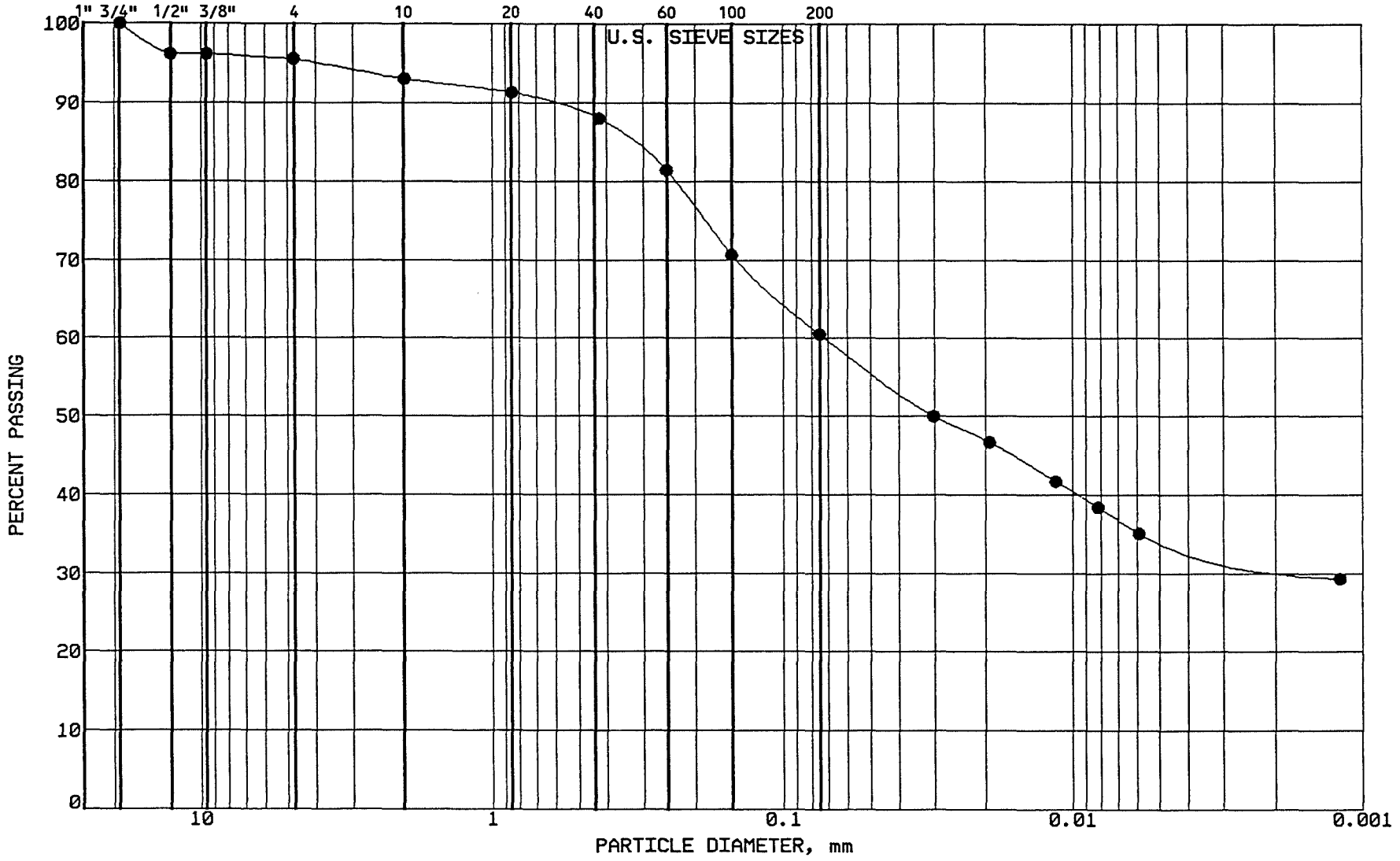
GRAVEL	1.8 %
SAND	34.8 %
SILT	27.4 %
CLAY	36.0 %
P 200	63.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43369.0, E 44345.0
SAMPLE: CLBCC175 TUBE #: ST-34A
ELEVATION: 1887.6'

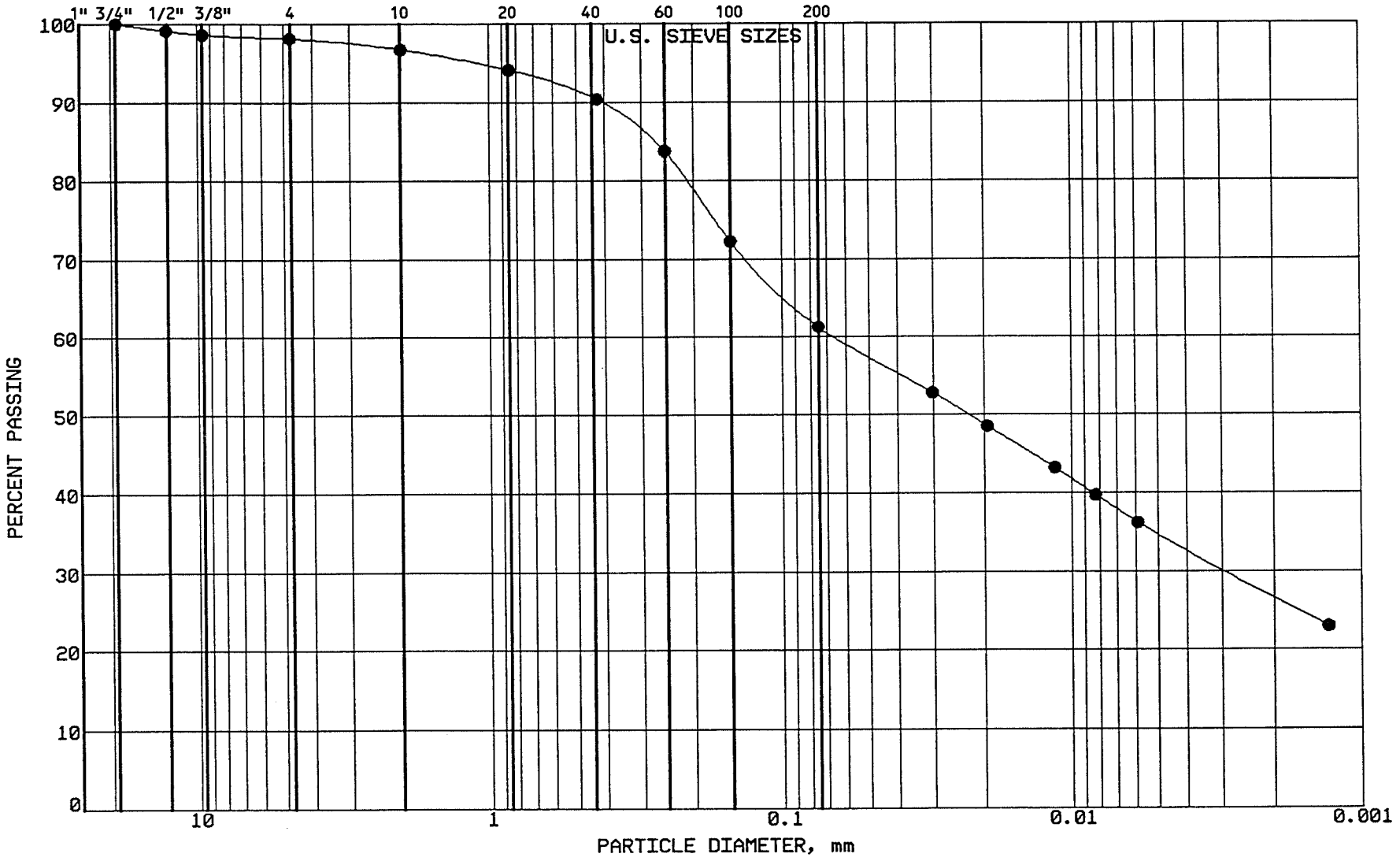
GRAVEL	4.5 %
SAND	35.0 %
SILT	26.0 %
CLAY	34.5 %
P 200	60.5 %

SOIL PROPERTIES

LL: 41.0%
PL: 15.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43367.0, E 44117.0
SAMPLE: CLBCC176 TUBE #: ST-35A
ELEVATION: 1888.2'

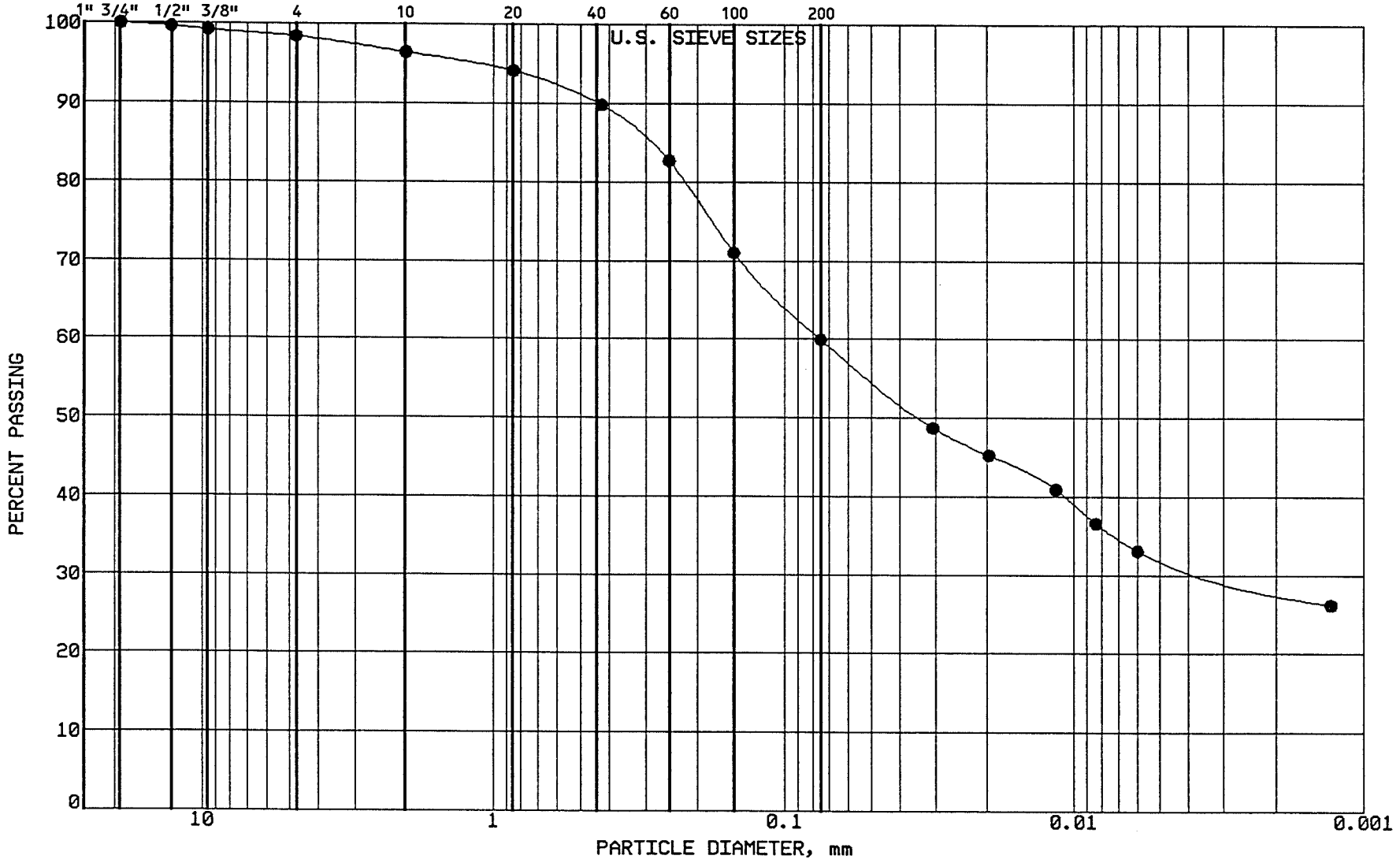
GRAVEL	1.9 %
SAND	36.8 %
SILT	26.5 %
CLAY	34.8 %
P 200	61.3 %

SOIL PROPERTIES

LL: 41.0%
PL: 15.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43365.0, E 43919.0
SAMPLE: CLBCC177 TUBE #: ST-36A
ELEVATION: 1888.3'

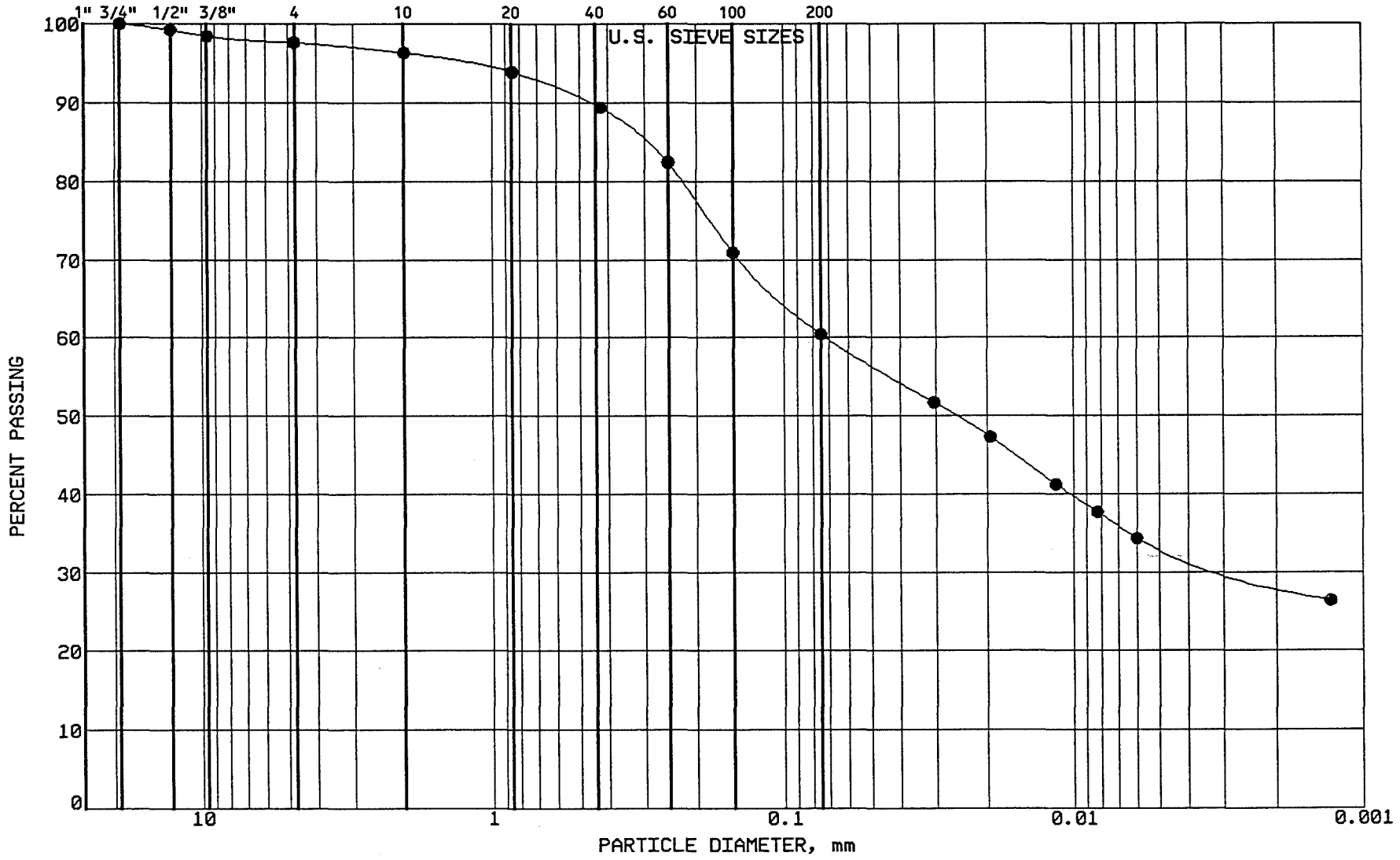
GRAVEL	1.6 %
SAND	38.5 %
SILT	27.6 %
CLAY	32.3 %
P 200	59.9 %

SOIL PROPERTIES

LL: 40.0%
PL: 15.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43364.0, E 43731.0
SAMPLE: CLBCC178 TUBE #: ST-37A
ELEVATION: 1888.6'

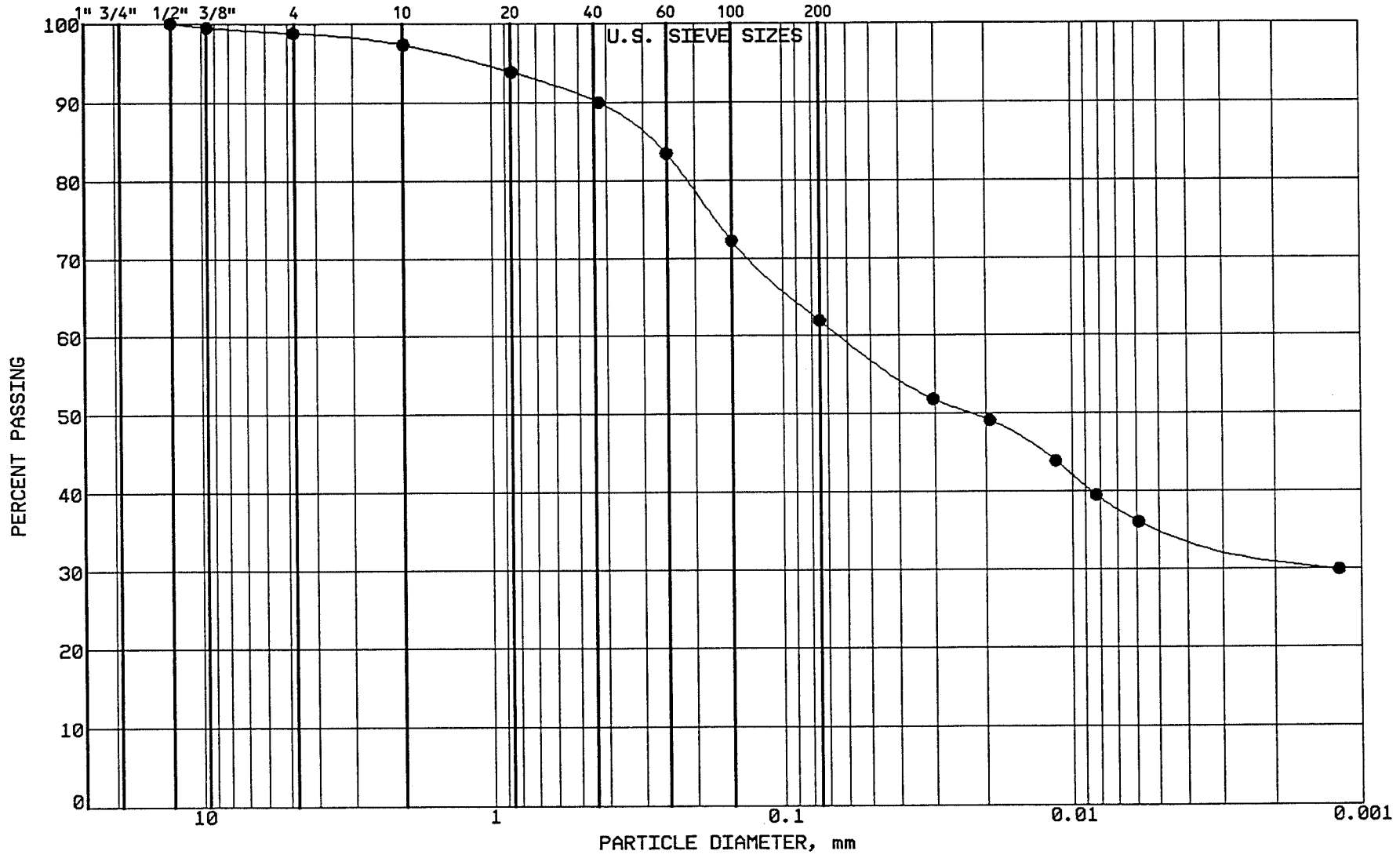
GRAVEL	2.4 %
SAND	37.2 %
SILT	27.0 %
CLAY	33.4 %
P 200	60.4 %

SOIL PROPERTIES

LL: 40.0%
PL: 15.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43361.0, E 43562.0
SAMPLE: CLBCC179 TUBE #: ST-38A
ELEVATION: 1888.4'

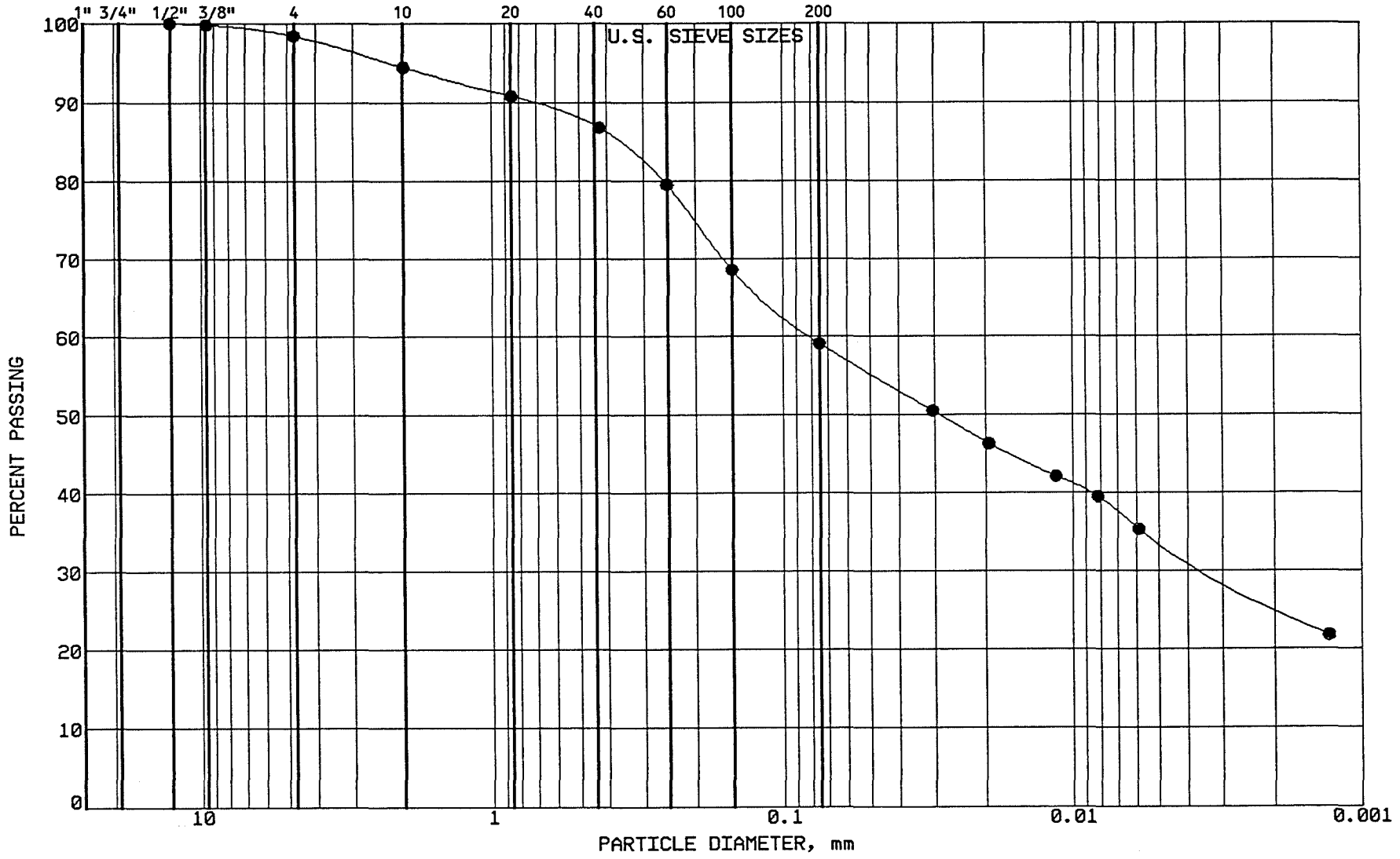
GRAVEL	1.2 %
SAND	36.9 %
SILT	26.5 %
CLAY	35.4 %
P 200	61.9 %

SOIL PROPERTIES

LL: 42.0%
PL: 15.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

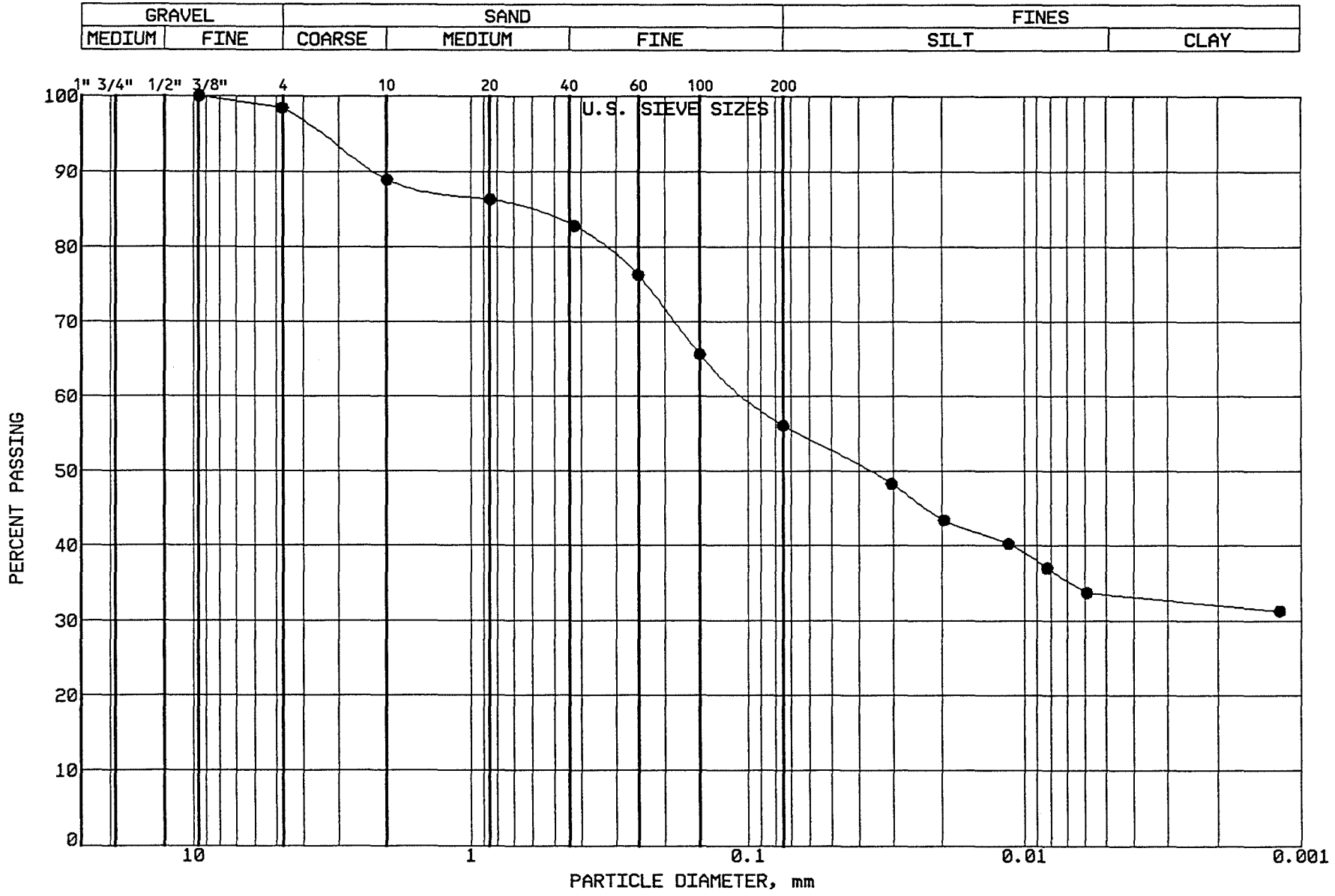
LOCATION: N 43281.0, E 43569.0
SAMPLE: CLBCC180 TUBE #: ST-39A
ELEVATION: 1887.9'

GRAVEL	1.6 %
SAND	39.3 %
SILT	25.3 %
CLAY	33.8 %
P 200	59.1 %

SOIL PROPERTIES

LL: 42.0%
PL: 15.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

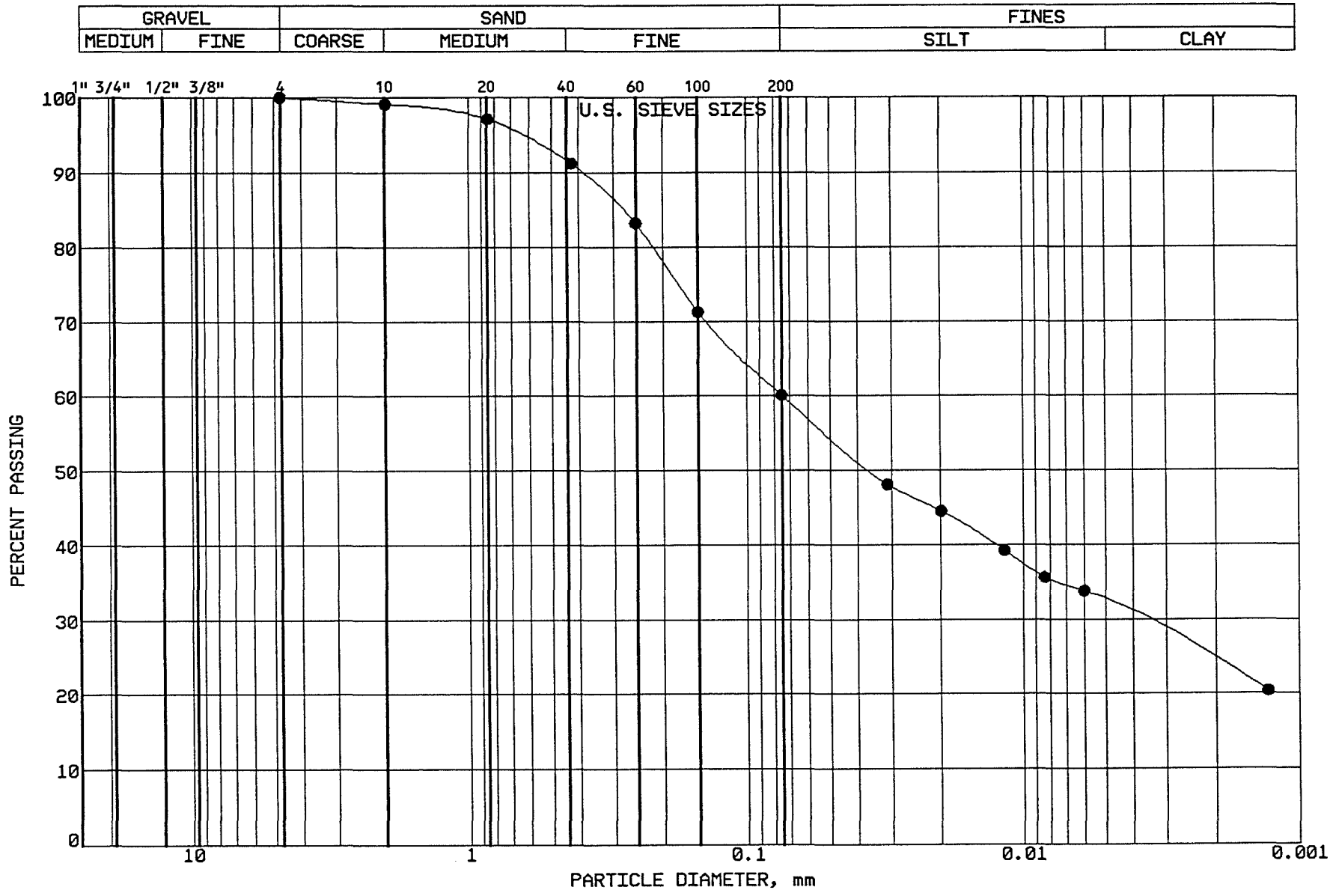
LOCATION: N 43289.0, E 43760.0
SAMPLE: CLBCC181 TUBE #: ST-40B
ELEVATION: 1888.1'

GRAVEL	1.6 %
SAND	42.3 %
SILT	22.6 %
CLAY	33.5 %
P 200	56.1 %

SOIL PROPERTIES

LL: 42.0%
PL: 15.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

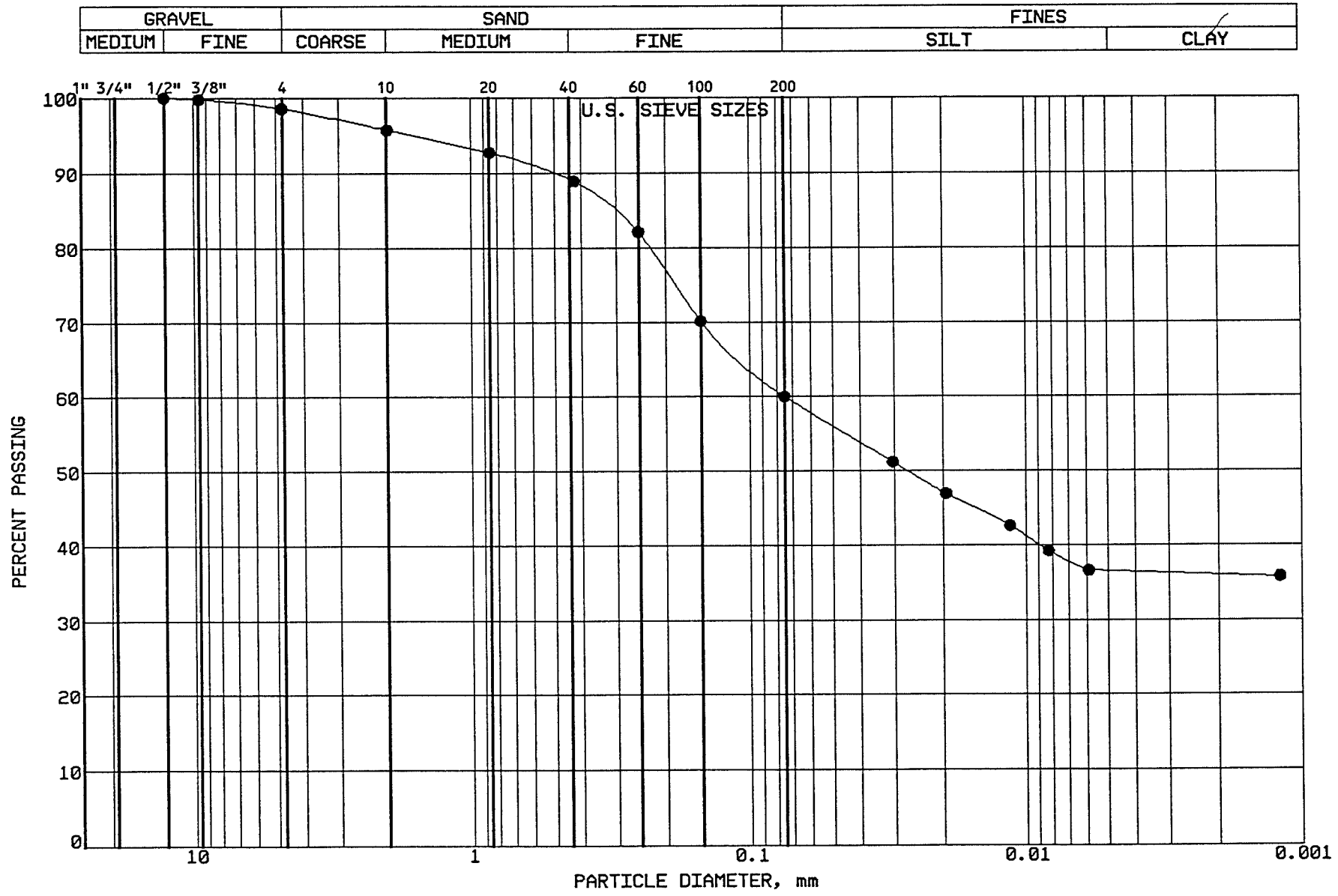
LOCATION: N 43295.0, E 43957.0
SAMPLE: CLBCC182 TUBE #: ST-41A
ELEVATION: 1887.9'

GRAVEL	0.0 %
SAND	39.9 %
SILT	27.9 %
CLAY	32.2 %
P 200	60.1 %

SOIL PROPERTIES

LL: 41.0%
PL: 16.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

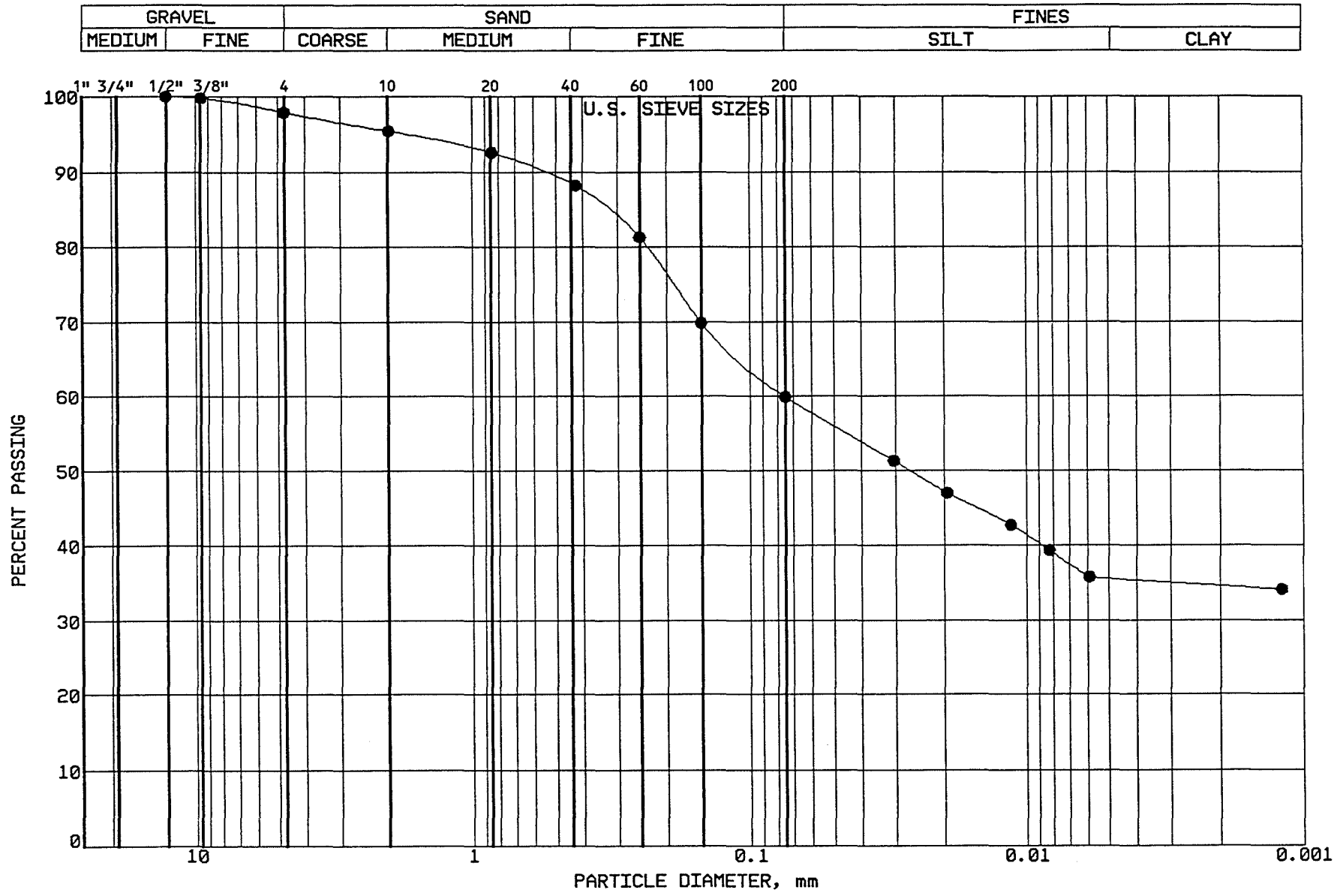
LOCATION: N 43303.0, E 44153.0
SAMPLE: CLBCC183 TUBE #: ST-42A
ELEVATION: 1888.0'

GRAVEL	1.4 %
SAND	38.6 %
SILT	23.5 %
CLAY	36.5 %
P 200	60.0 %

SOIL PROPERTIES

LL: 41.0%
PL: 15.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

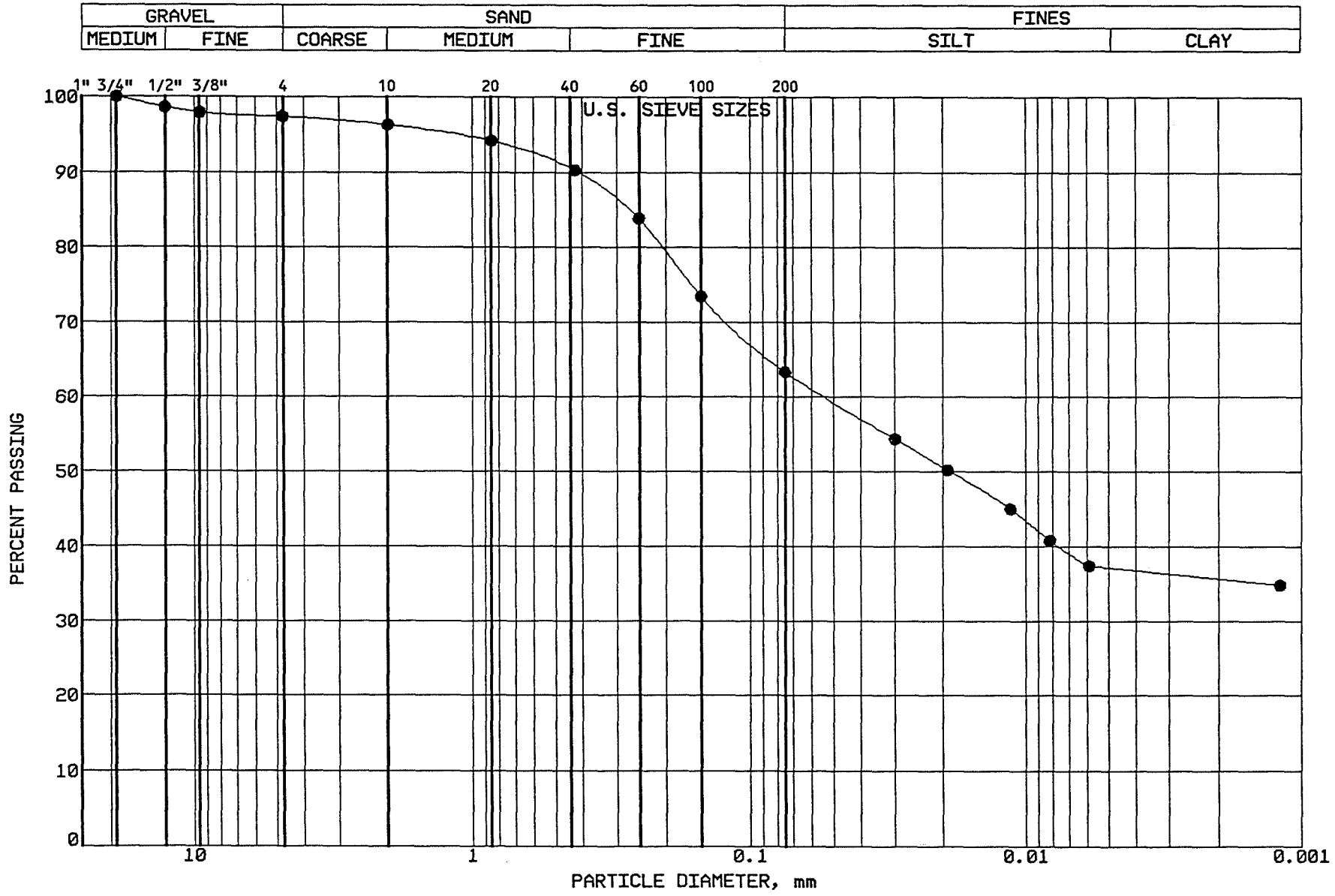
LOCATION: N 43312.0, E 44364.0
SAMPLE: CLBCC184 TUBE #: ST-43A
ELEVATION: 1887.7'

GRAVEL	2.1 %
SAND	38.0 %
SILT	24.3 %
CLAY	35.6 %
P 200	59.9 %

SOIL PROPERTIES

LL: 44.0%
PL: 14.0%
PI: 30.0%
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

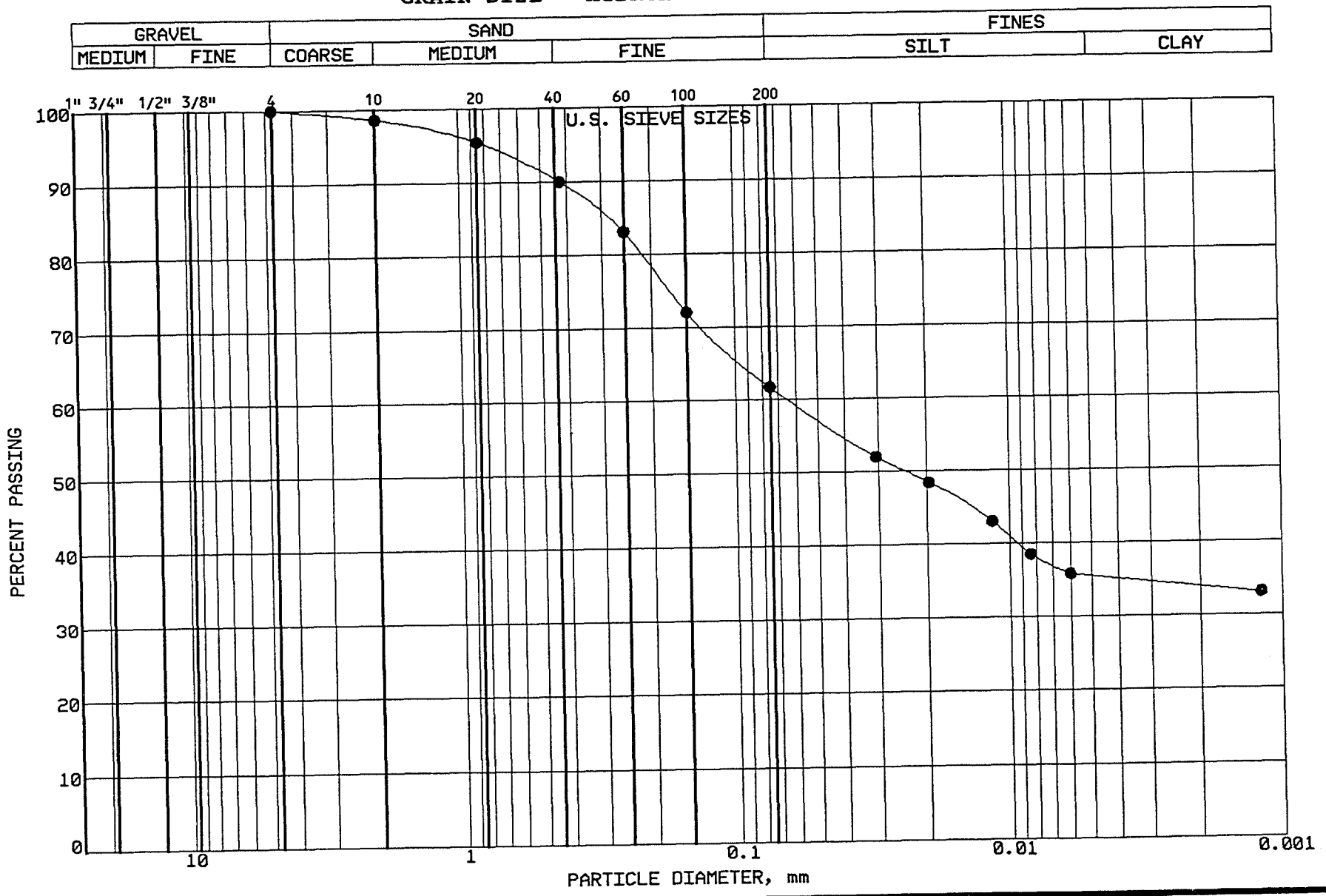
LOCATION: N 42939.0, E 43077.0
SAMPLE: SGCC185 TUBE #:
ELEVATION: 1880.6'

GRAVEL	2.6 %
SAND	34.1 %
SILT	26.2 %
CLAY	37.1 %
P 200	63.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

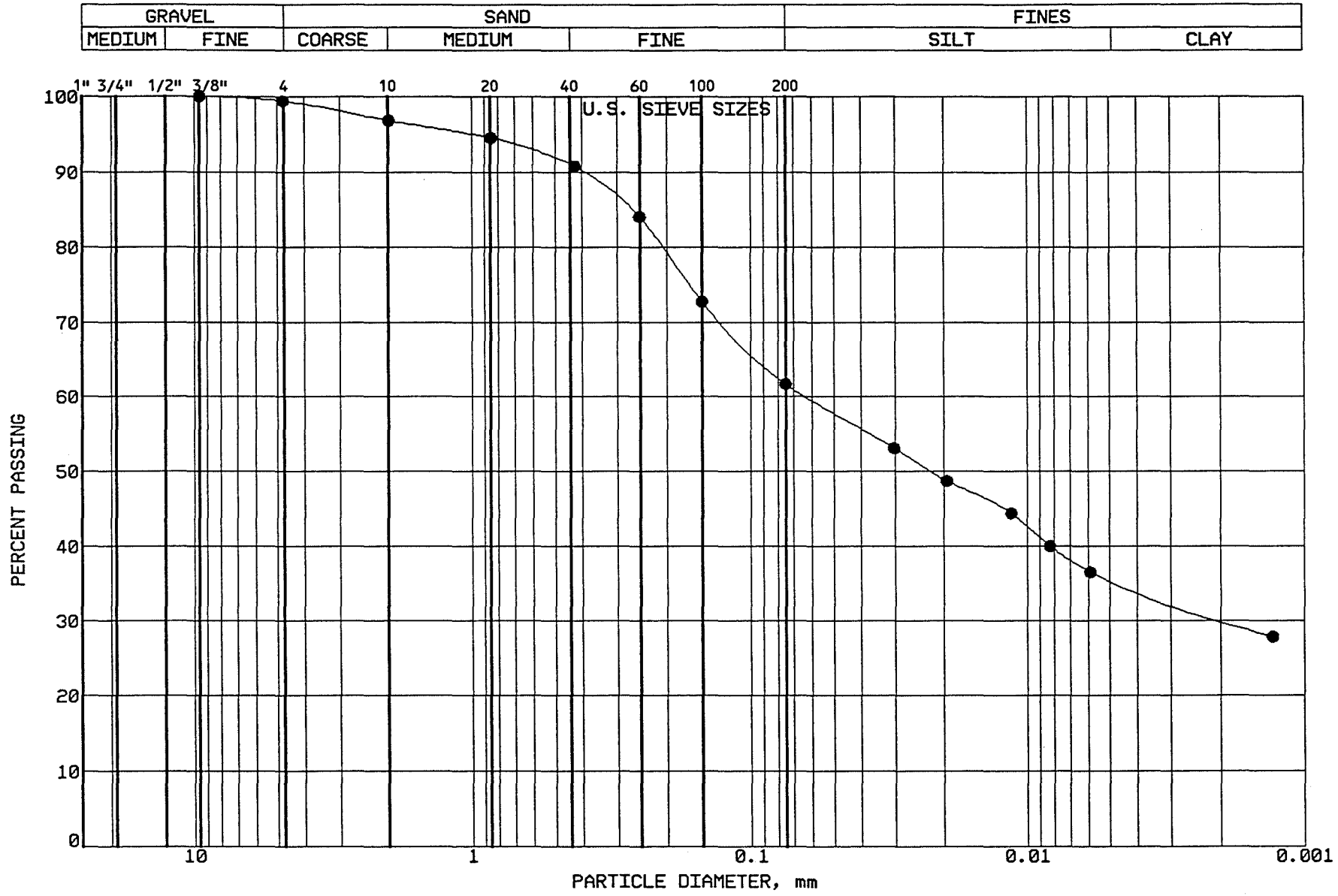
LOCATION: N 42787.0, E 43071.0
SAMPLE: SGCC186 TUBE #:
ELEVATION: 1881.3'

GRAVEL	0.0 %
SAND	38.3 %
SILT	26.2 %
CLAY	35.5 %
P 200	61.7 %

SOIL PROPERTIES

LL: 43.0%
PL: 15.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42659.0, E 43091.0
SAMPLE: SGCC187 TUBE #:
ELEVATION: 1880.6'

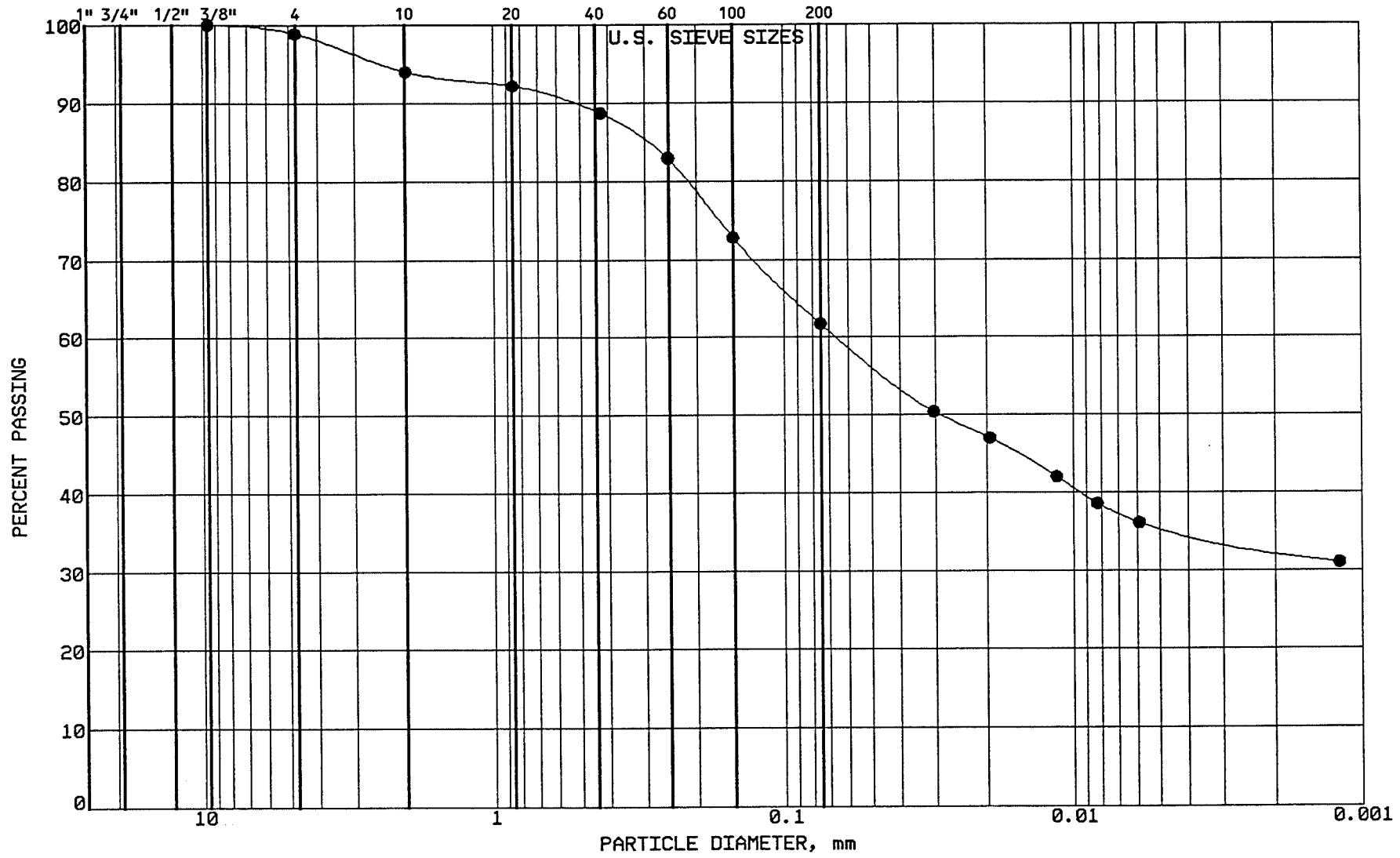
GRAVEL	0.6 %
SAND	37.7 %
SILT	26.2 %
CLAY	35.5 %
P 200	61.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

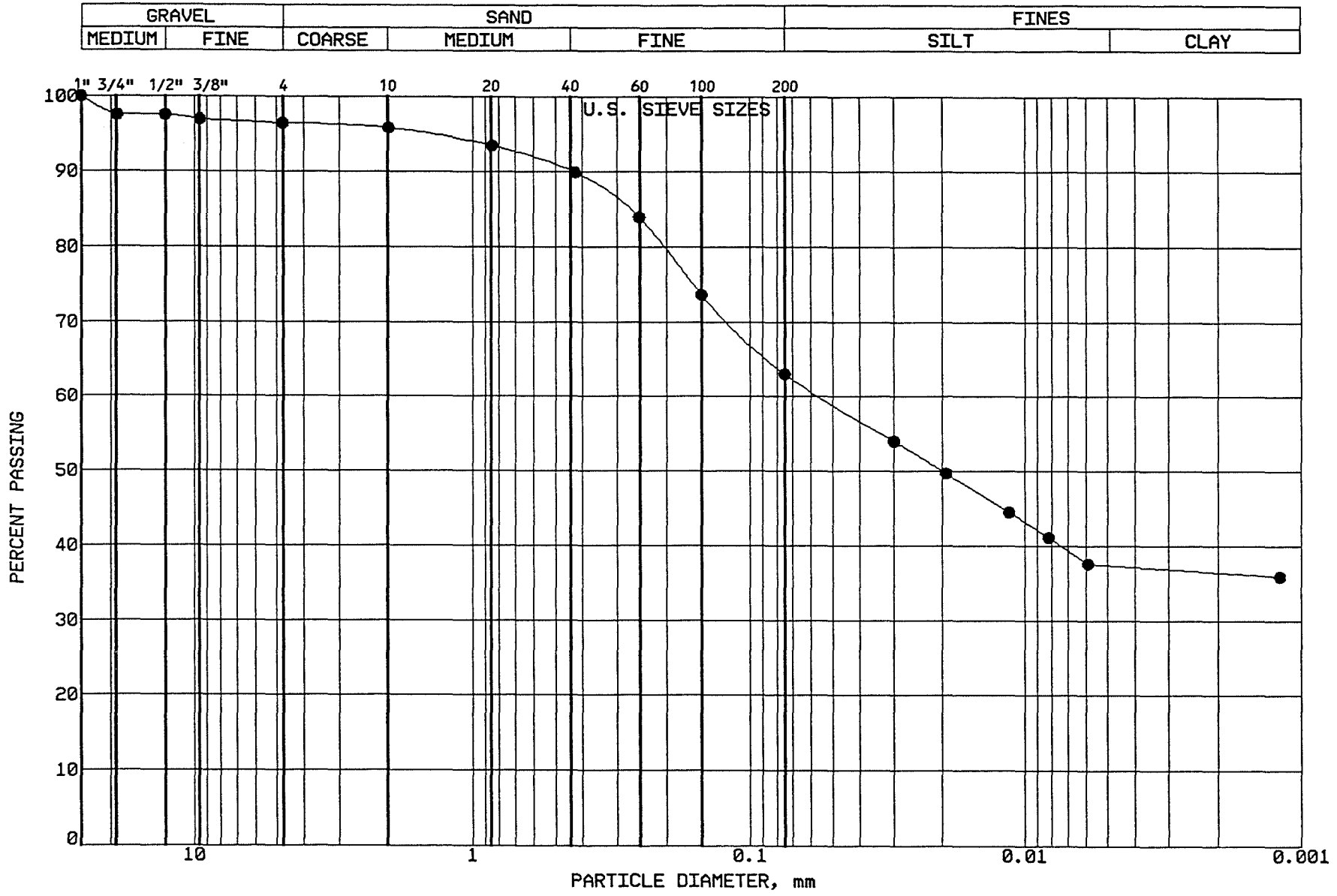
LOCATION: N 42596.0, E 43222.0
SAMPLE: SGCC188 TUBE #:
ELEVATION: 1879.0'

GRAVEL	1.1 %
SAND	37.2 %
SILT	26.1 %
CLAY	35.6 %
P 200	61.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

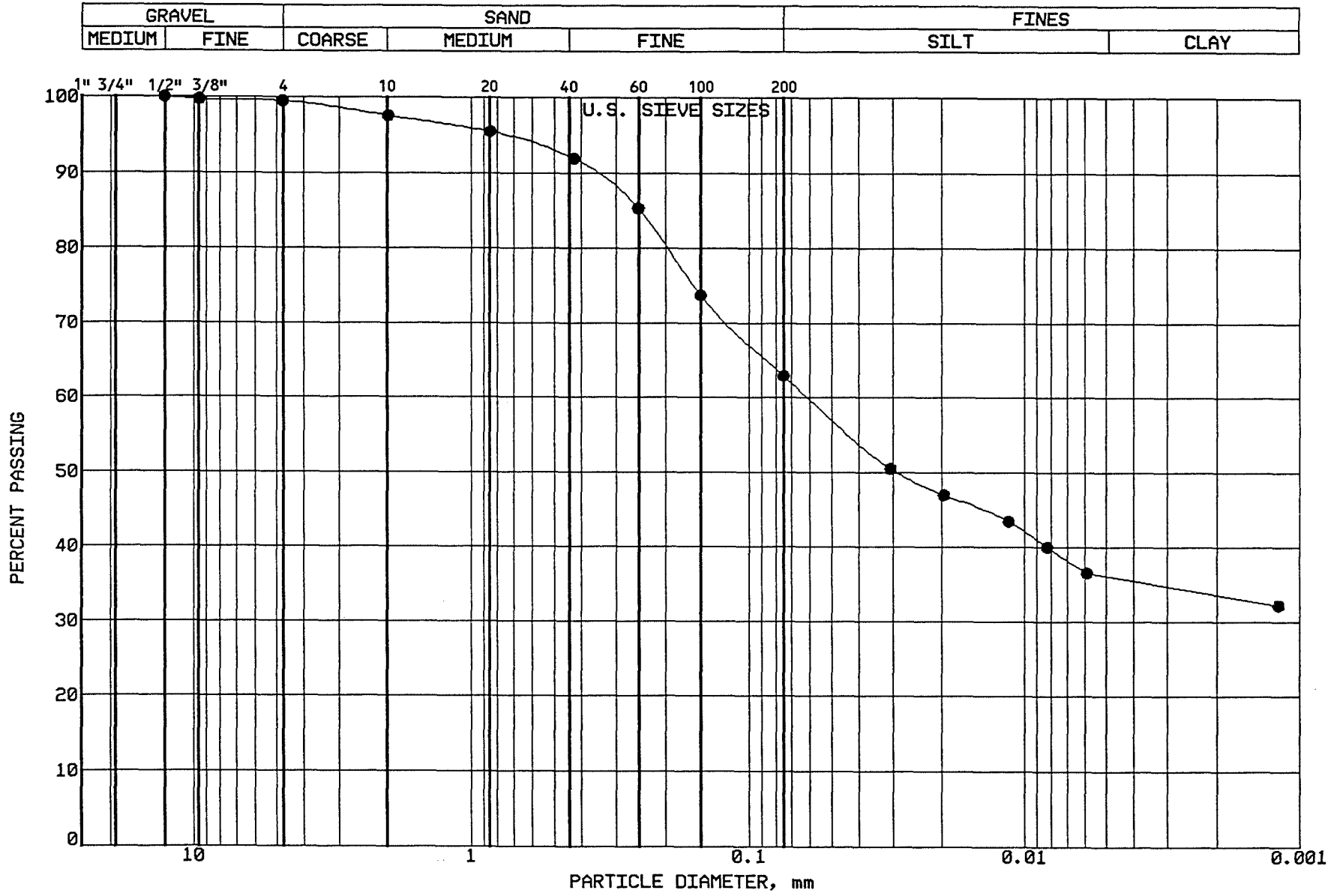
LOCATION: N 42599.0, E 43757.0
SAMPLE: SGCC189 TUBE #:
ELEVATION: 1880.3'

GRAVEL	3.6 %
SAND	33.4 %
SILT	25.6 %
CLAY	37.4 %
P 200	63.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42593.0, E 43587.0
SAMPLE: SGCC190 TUBE #:
ELEVATION: 1881.0'

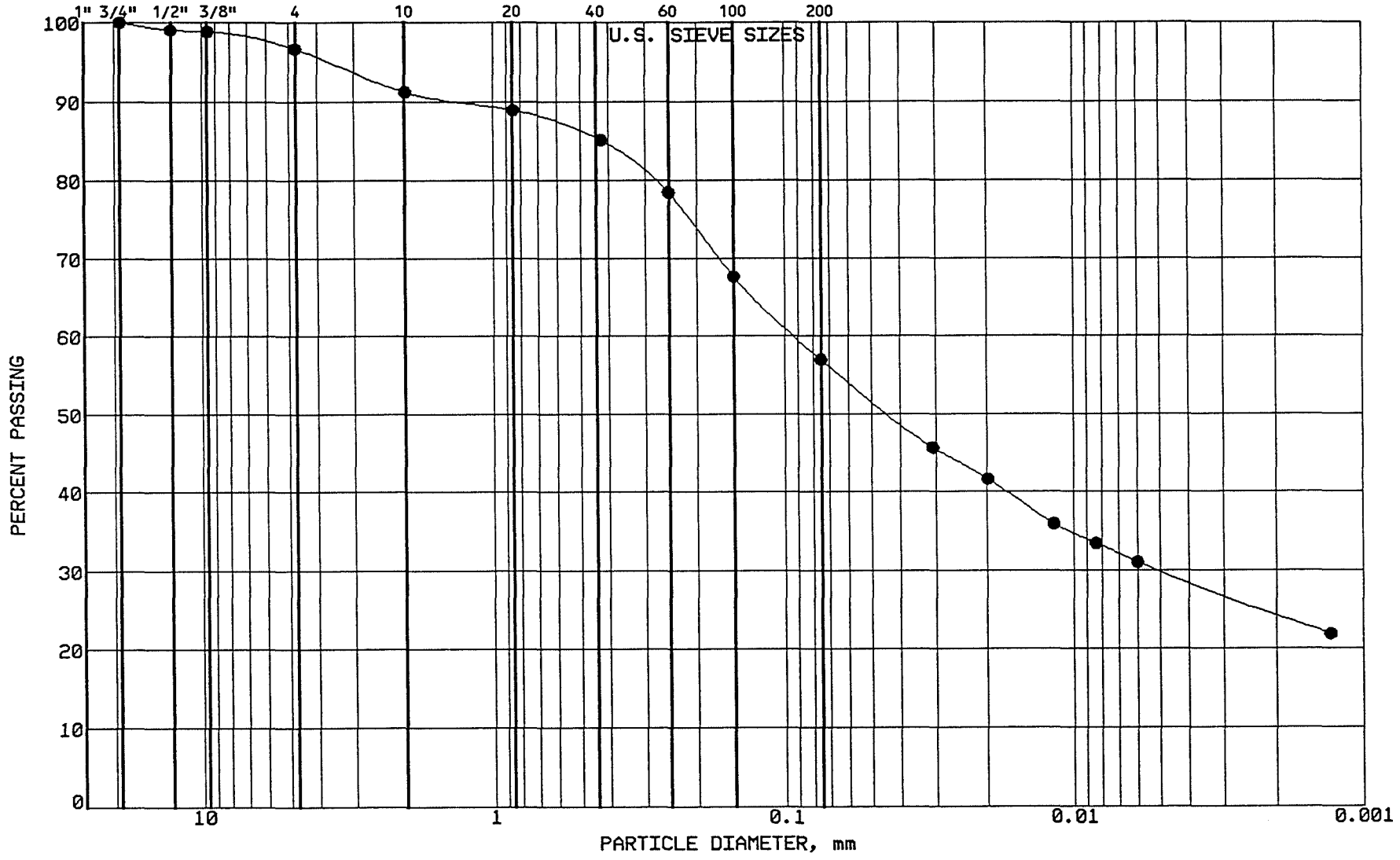
GRAVEL	0.5 %
SAND	36.6 %
SILT	26.8 %
CLAY	36.1 %
P 200	62.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

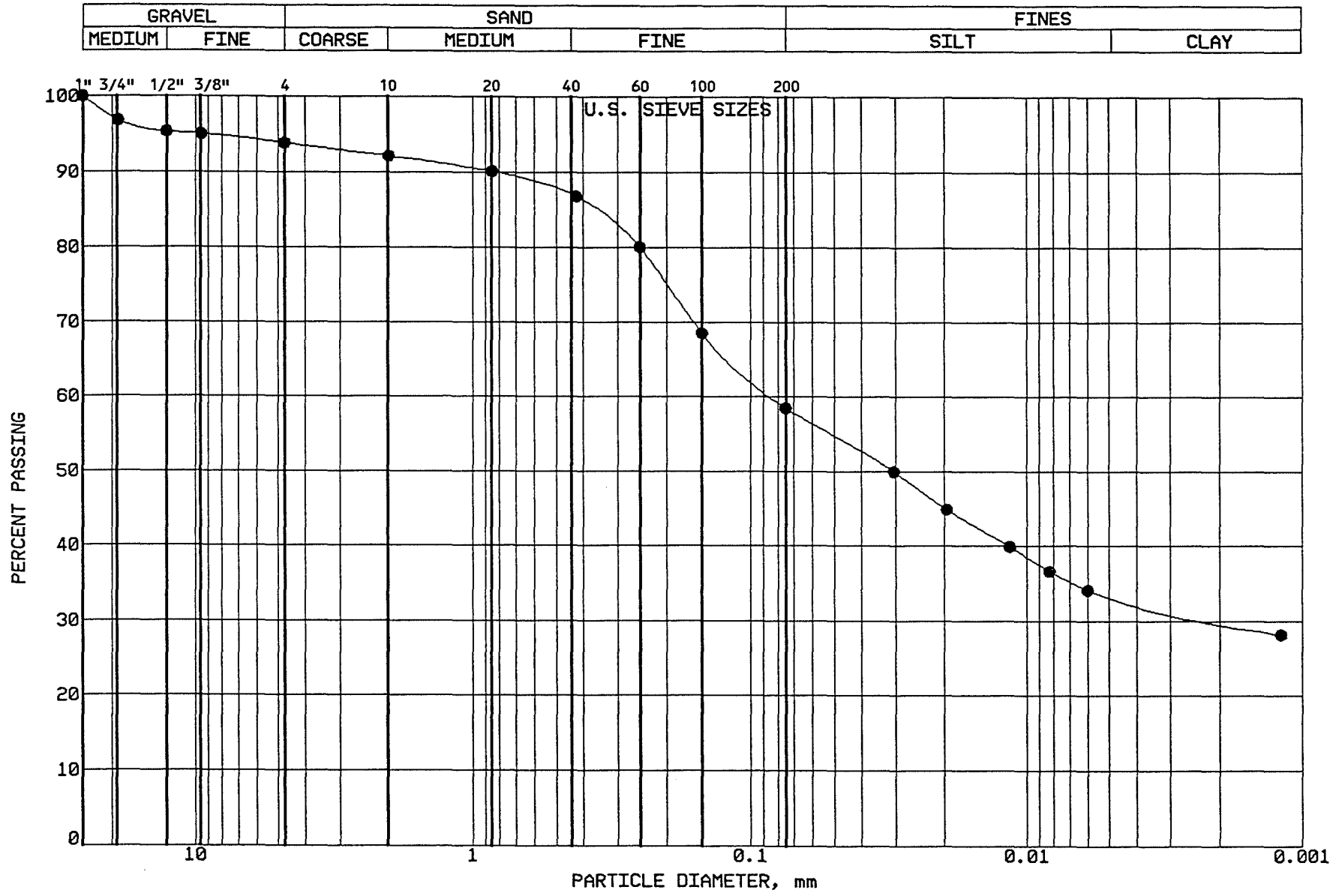
LOCATION: N 43124.0, E 43539.0
SAMPLE: SGCC191 TUBE #:
ELEVATION: 1880.5'

GRAVEL	3.4 %
SAND	39.6 %
SILT	27.1 %
CLAY	29.9 %
P 200	57.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

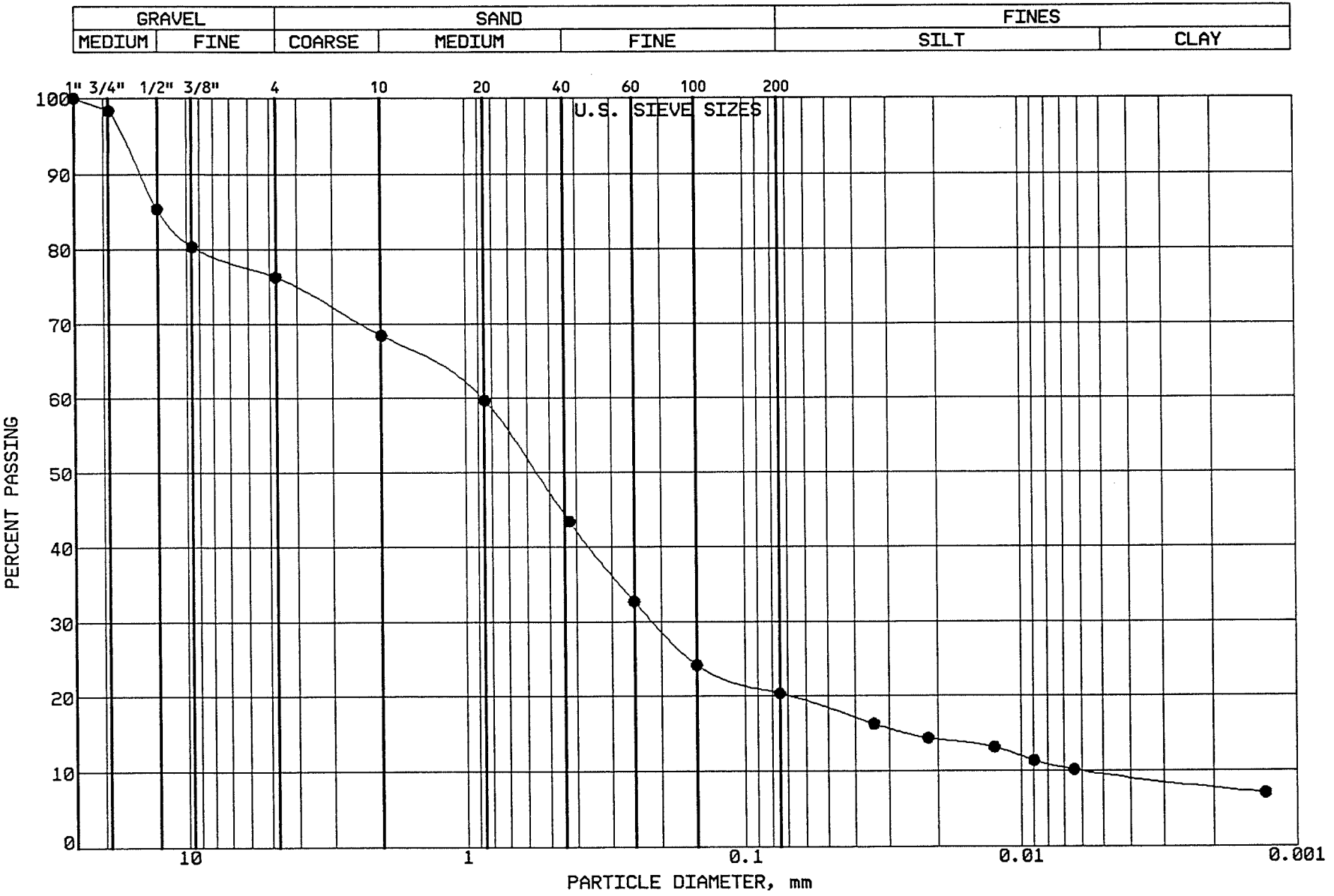
LOCATION: N 43124.0, E 43714.0
SAMPLE: SGCC192 TUBE #:
ELEVATION: 1880.5'

GRAVEL	6.2 %
SAND	35.3 %
SILT	25.1 %
CLAY	33.4 %
P 200	58.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

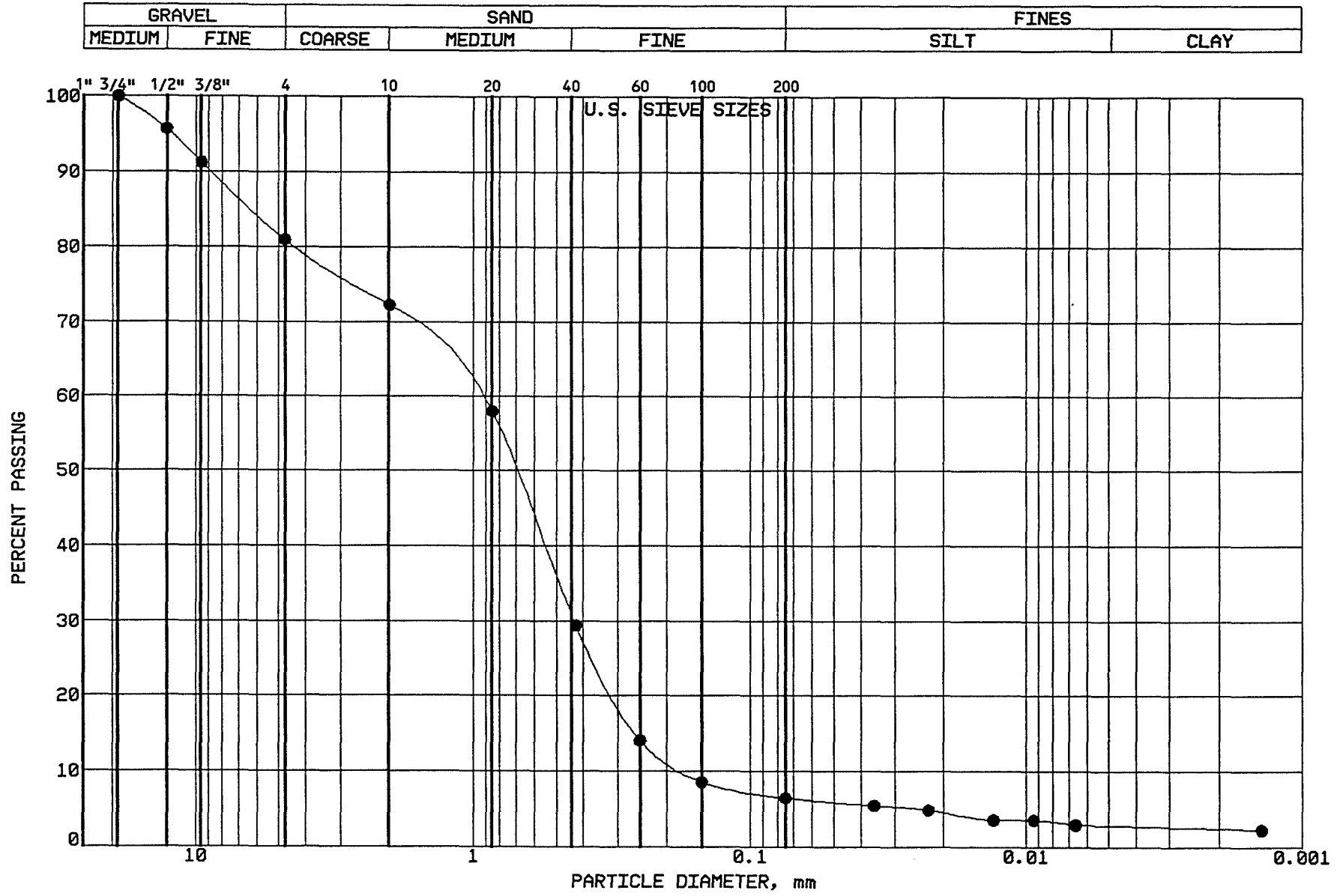
LOCATION: N 43124.0, E 43993.0
SAMPLE: SGCC193 TUBE #:
ELEVATION: 1882.0'

GRAVEL	23.8 %
SAND	55.8 %
SILT	10.7 %
CLAY	9.7 %
P 200	20.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND/W GRAVEL (SC)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

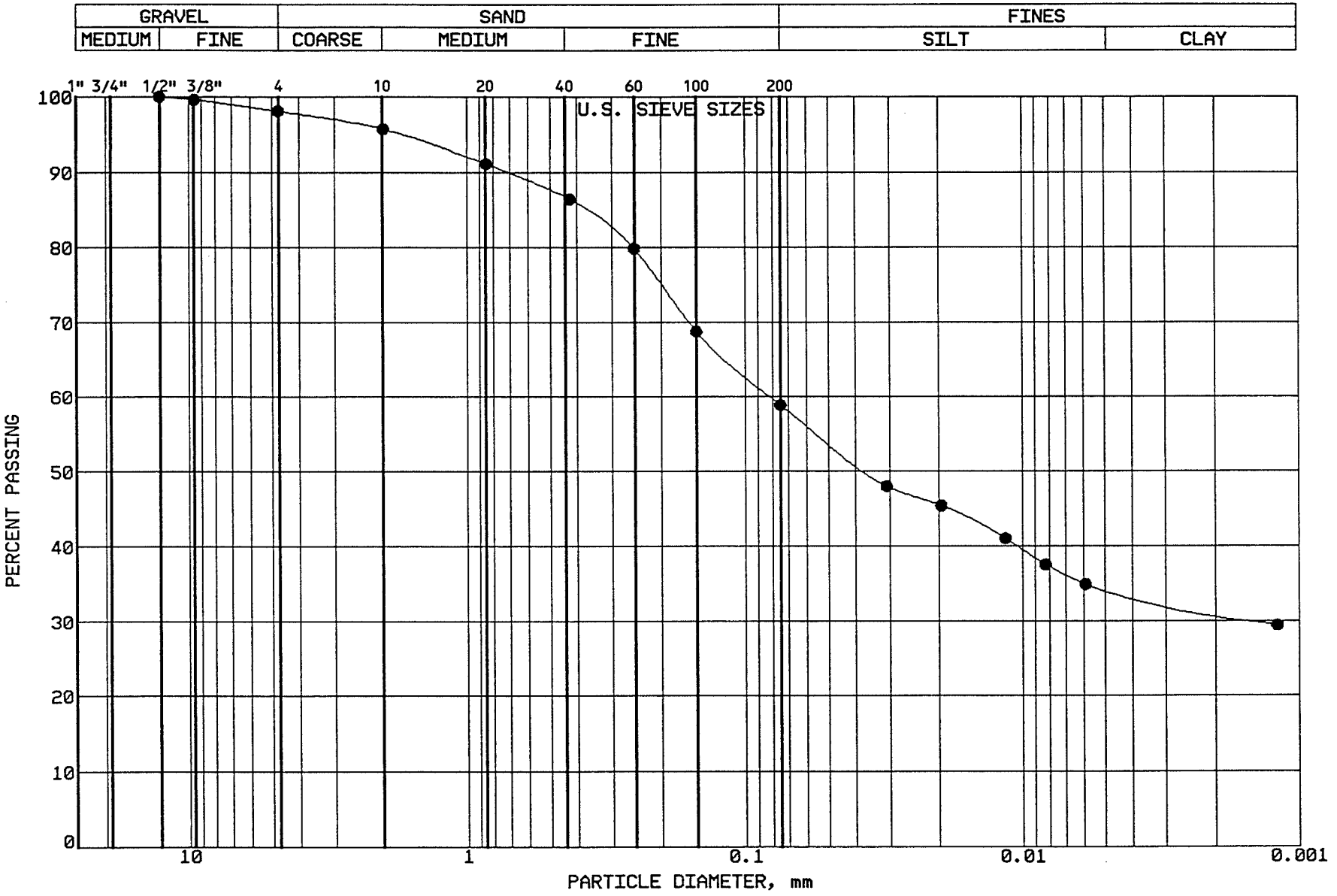
LOCATION: N 43113.0, E 44226.0
SAMPLE: SGCC194 TUBE #:
ELEVATION: 1881.5'

GRAVEL	19.1 %
SAND	74.4 %
SILT	3.6 %
CLAY	2.9 %
P 200	6.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: POORLY GR SAND/W GR/SILT (SP-SM)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

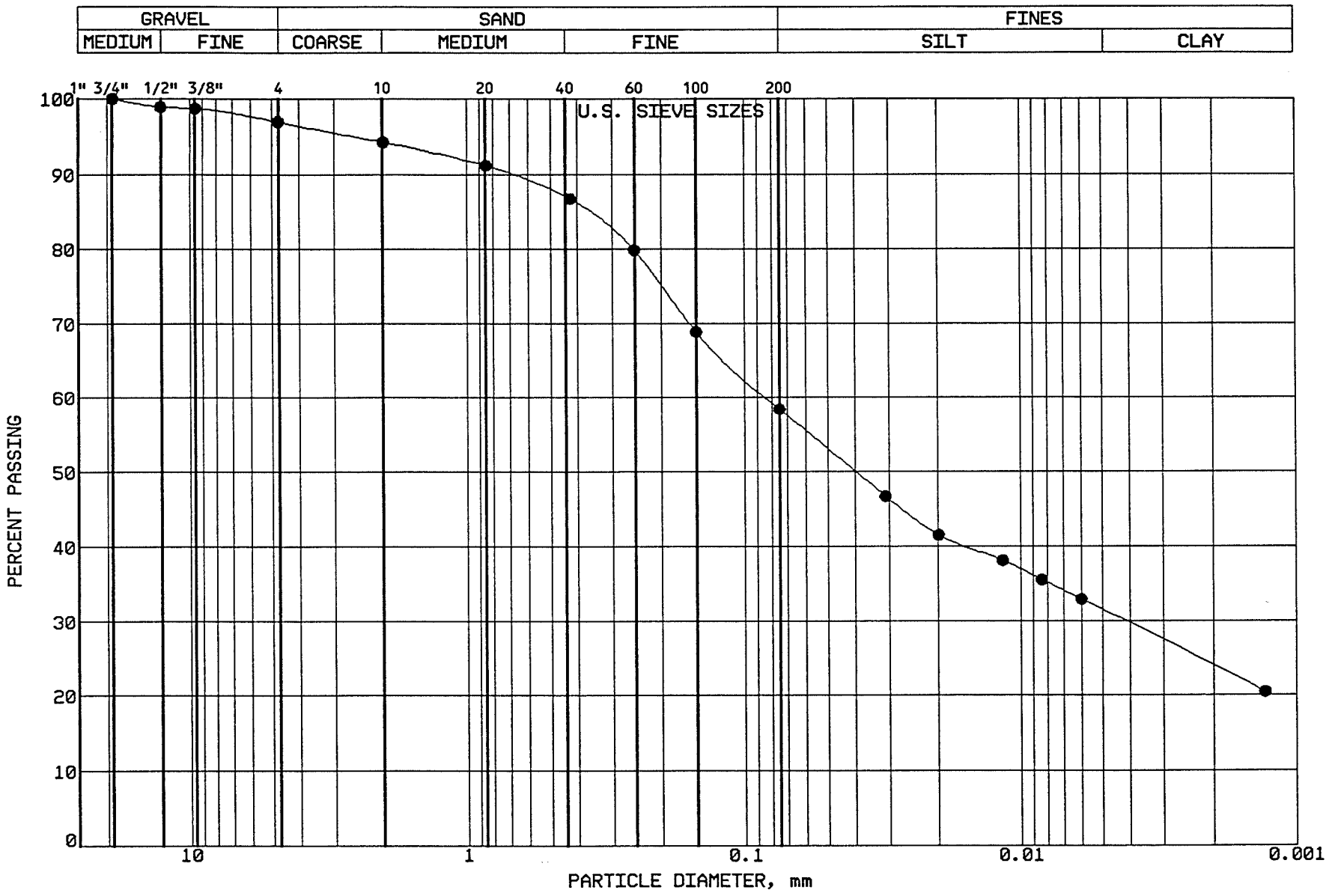
LOCATION: N 43111.0, E 44503.0
SAMPLE: SGCC195 TUBE #:
ELEVATION: 1879.6'

GRAVEL	1.9 %
SAND	39.2 %
SILT	24.6 %
CLAY	34.3 %
P 200	58.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

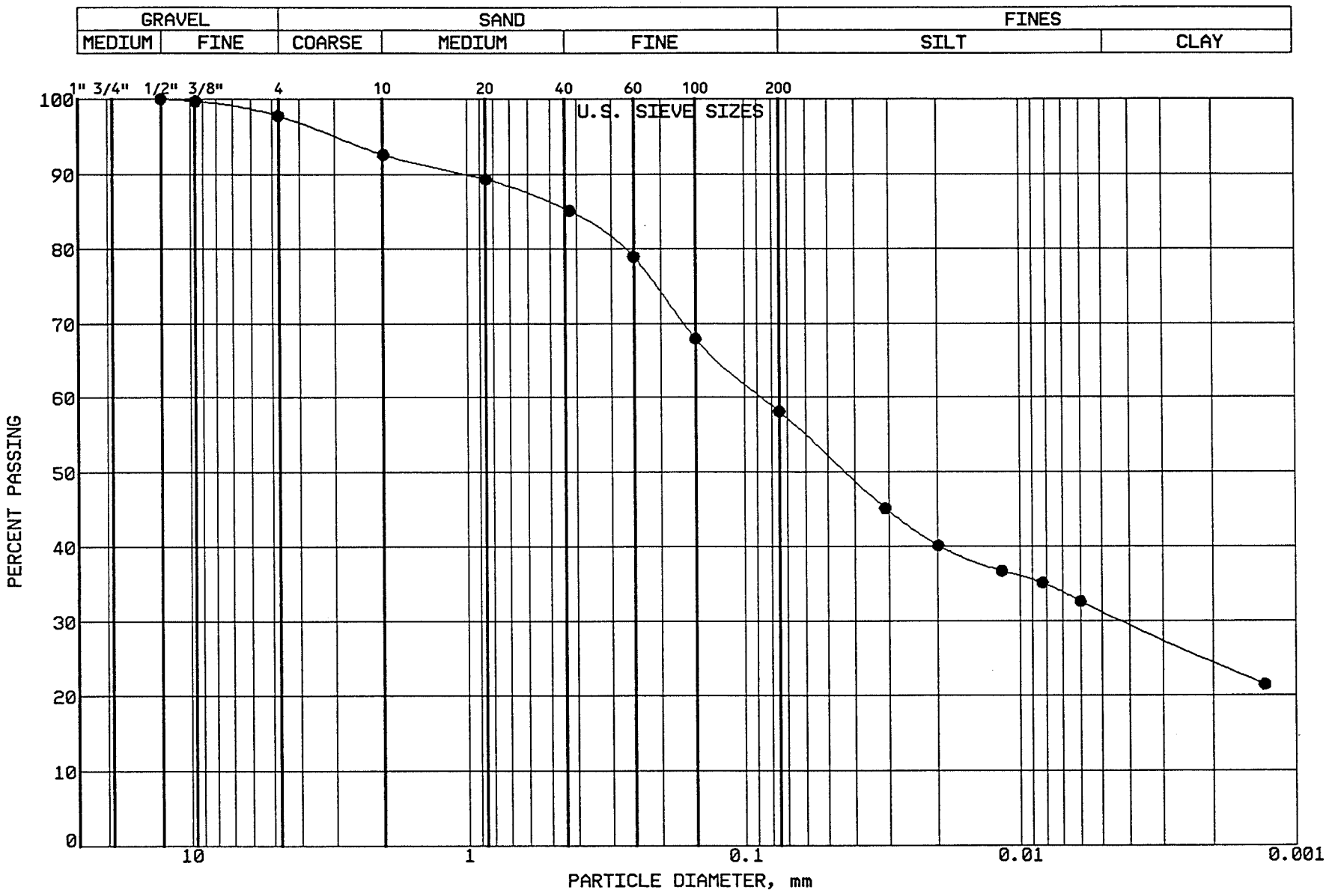
LOCATION: N 42572.0, E 44096.0
SAMPLE: SGCC196 TUBE #:
ELEVATION: 1883.9'

GRAVEL	3.1 %
SAND	38.5 %
SILT	27.0 %
CLAY	31.4 %
P 200	58.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

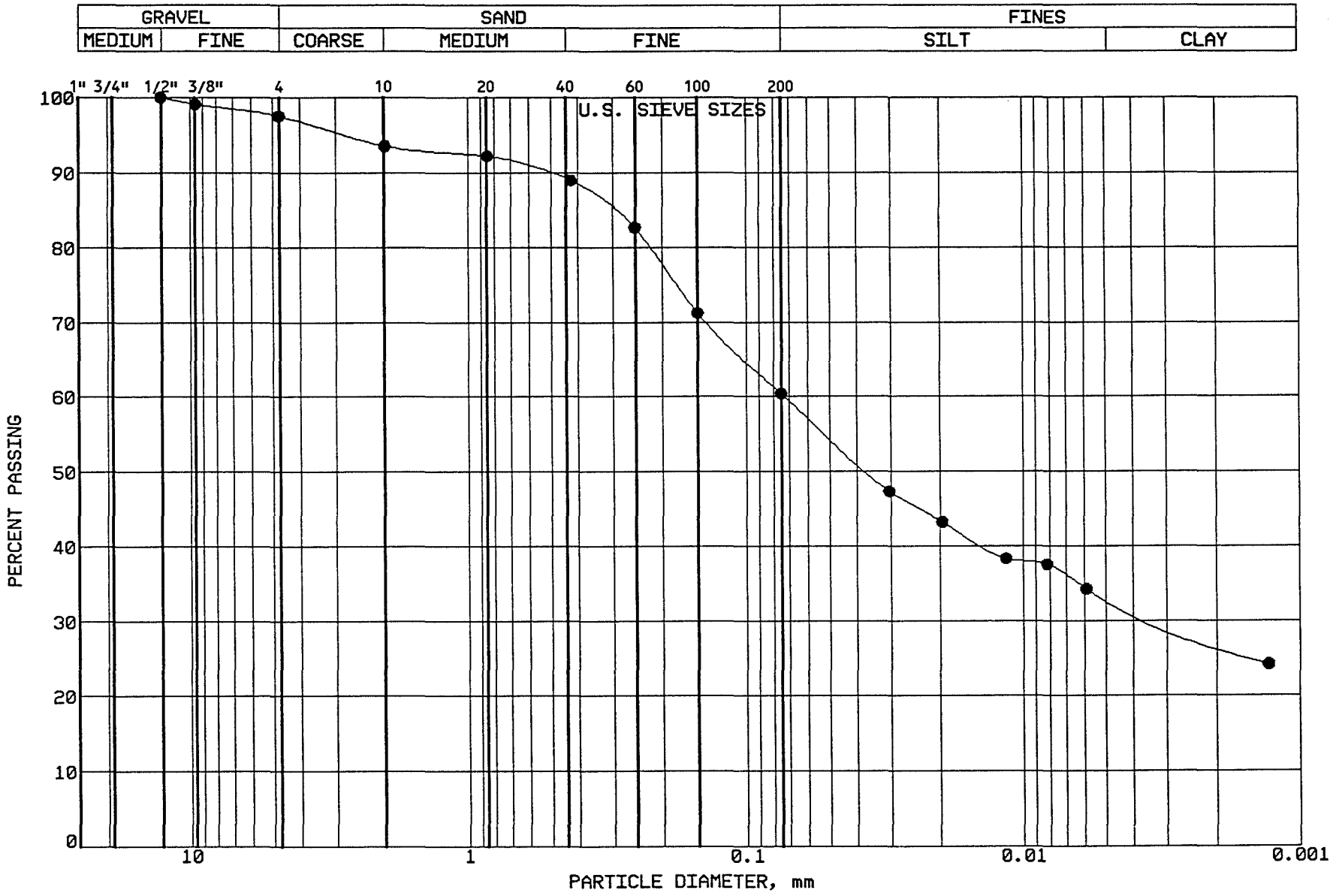
LOCATION: N 43579.0, E 43940.0
SAMPLE: SGCC197 TUBE #:
ELEVATION: 1882.3'

GRAVEL	2.2 %
SAND	39.7 %
SILT	26.8 %
CLAY	31.3 %
P 200	58.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43580.0, E 43761.0
SAMPLE: SGCC198 TUBE #:
ELEVATION: 1881.2'

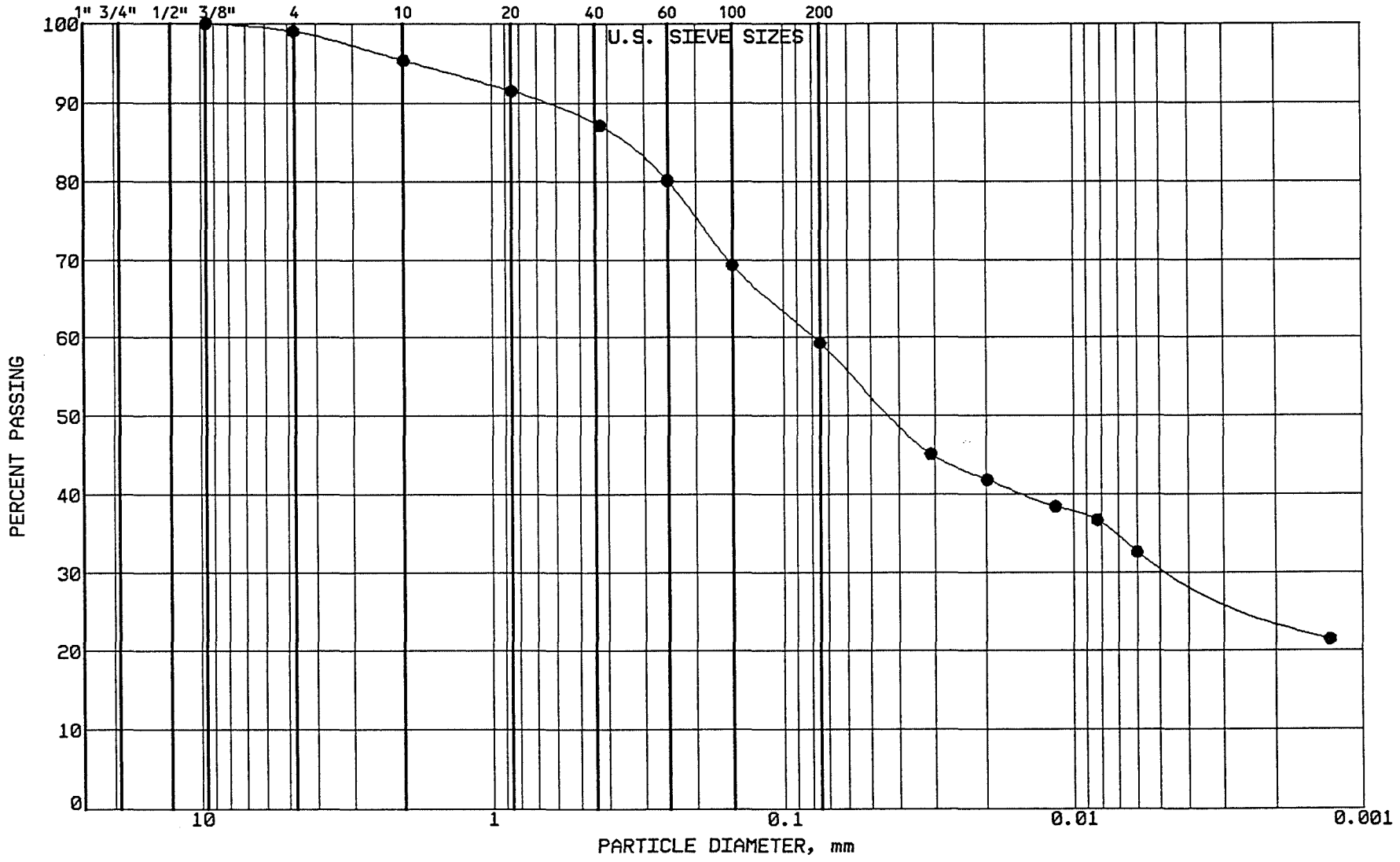
GRAVEL	2.5 %
SAND	37.1 %
SILT	27.3 %
CLAY	33.1 %
P 200	60.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

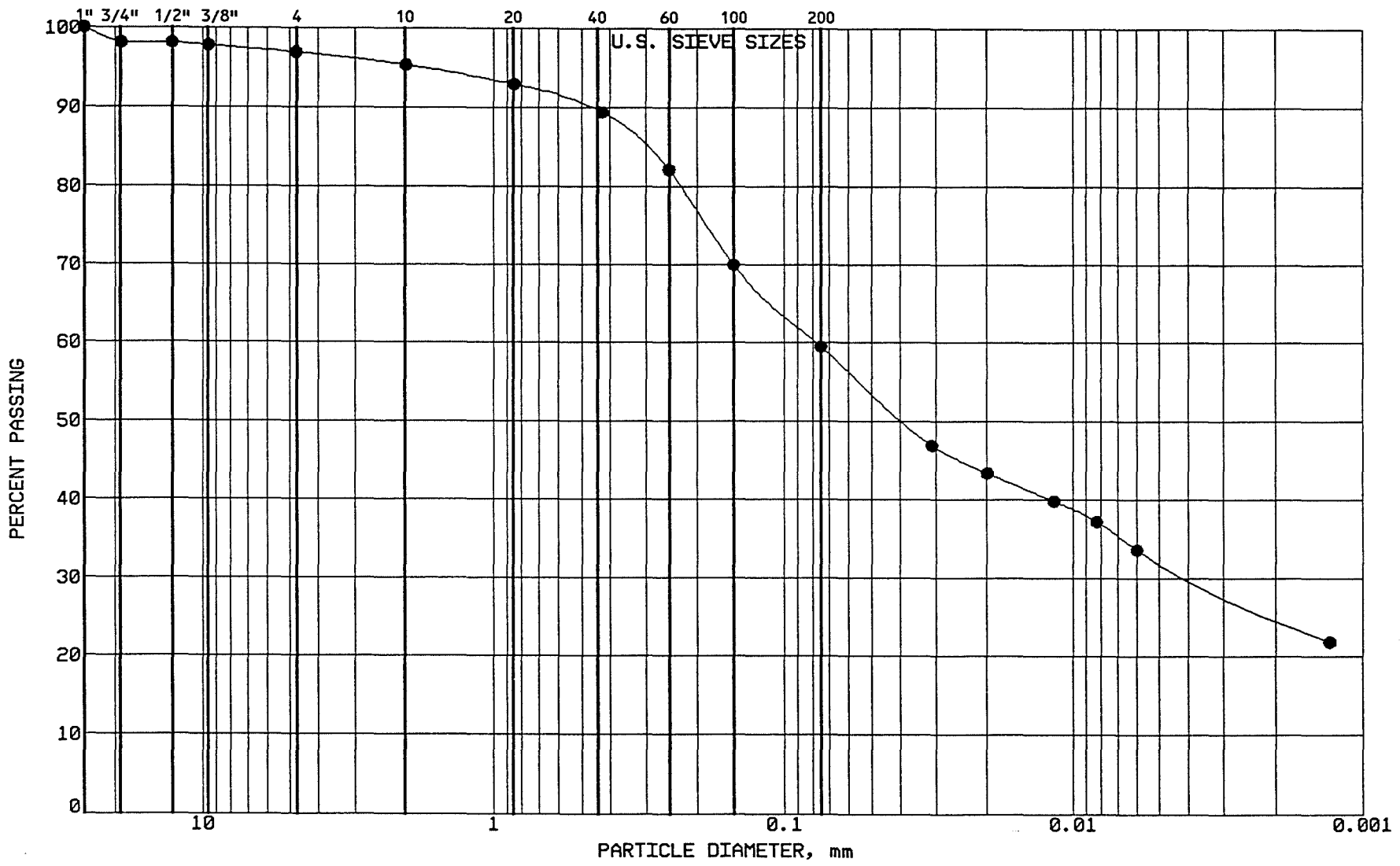
LOCATION: N 42569.0, E 43587.0
SAMPLE: SGCC199 TUBE #:
ELEVATION: 1882.7'

GRAVEL	1.0 %
SAND	39.7 %
SILT	28.0 %
CLAY	31.3 %
P 200	59.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

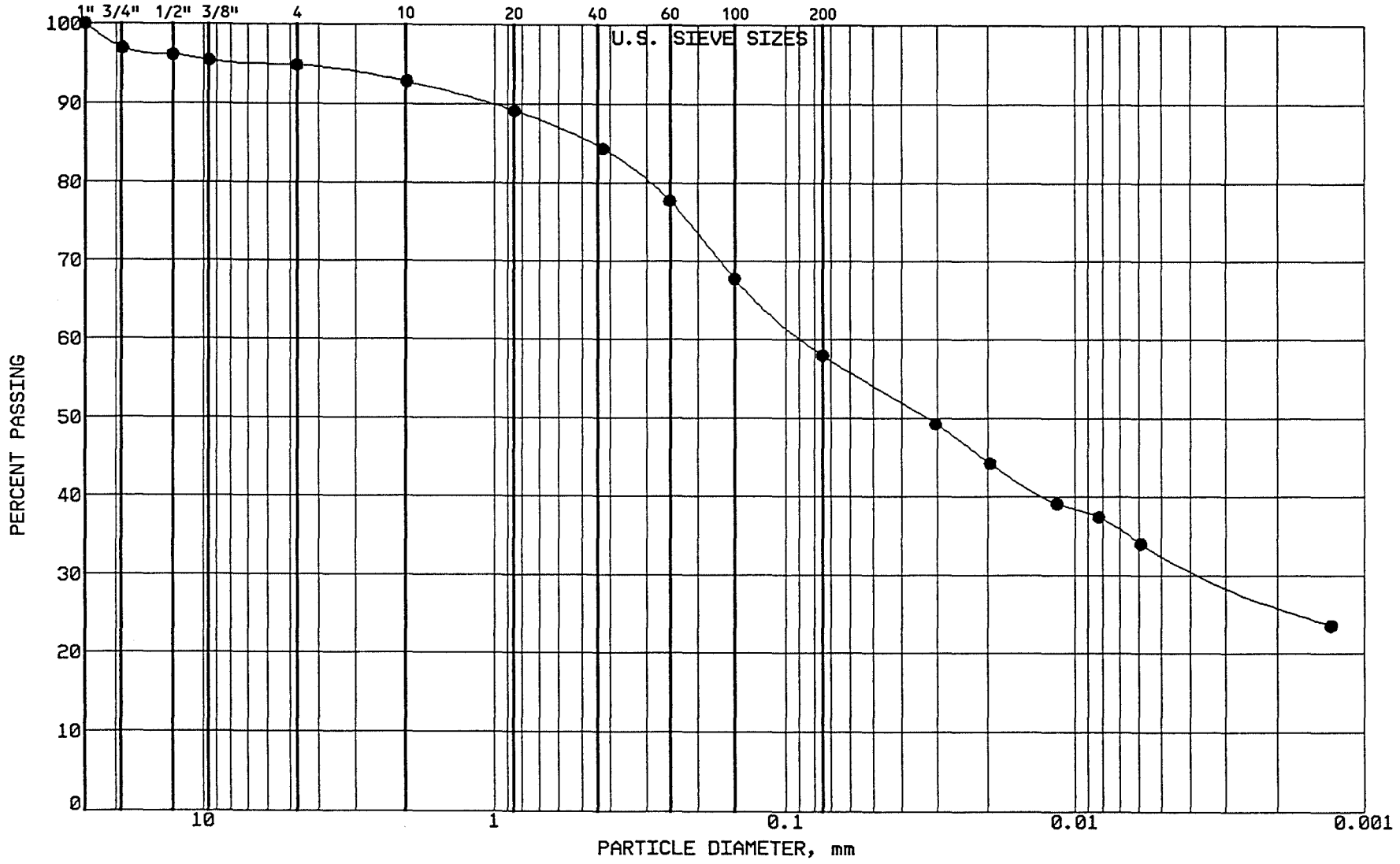
LOCATION: N 42566.0, E 43398.0
SAMPLE: SGCC200 TUBE #:
ELEVATION: 1883.2'

GRAVEL	3.1 %
SAND	37.4 %
SILT	27.3 %
CLAY	32.2 %
P 200	59.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

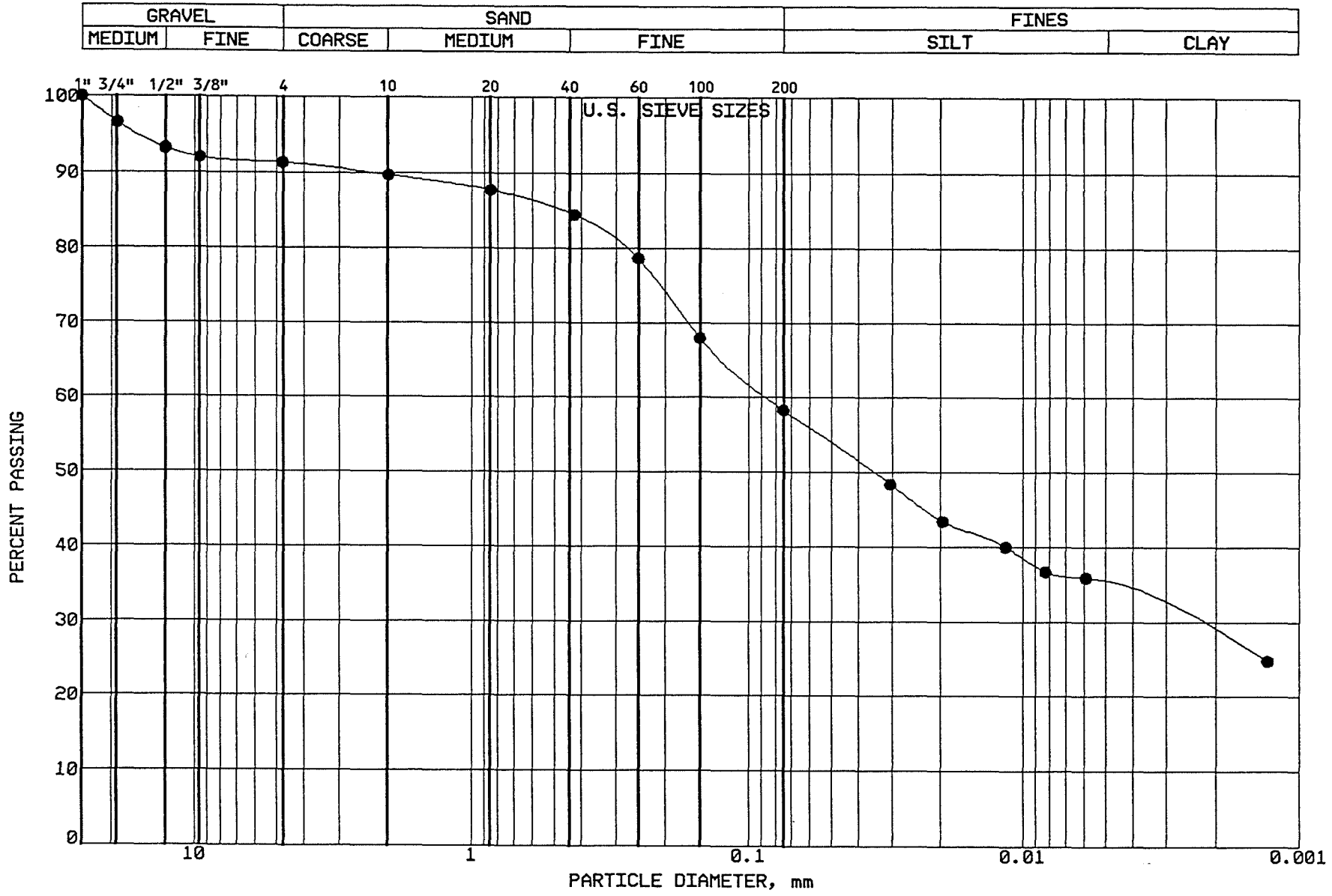
LOCATION: N 42567.0, E 43209.0
SAMPLE: SGCC201 TUBE #:
ELEVATION: 1882.7'

GRAVEL	5.2 %
SAND	36.8 %
SILT	25.1 %
CLAY	32.9 %
P 200	58.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

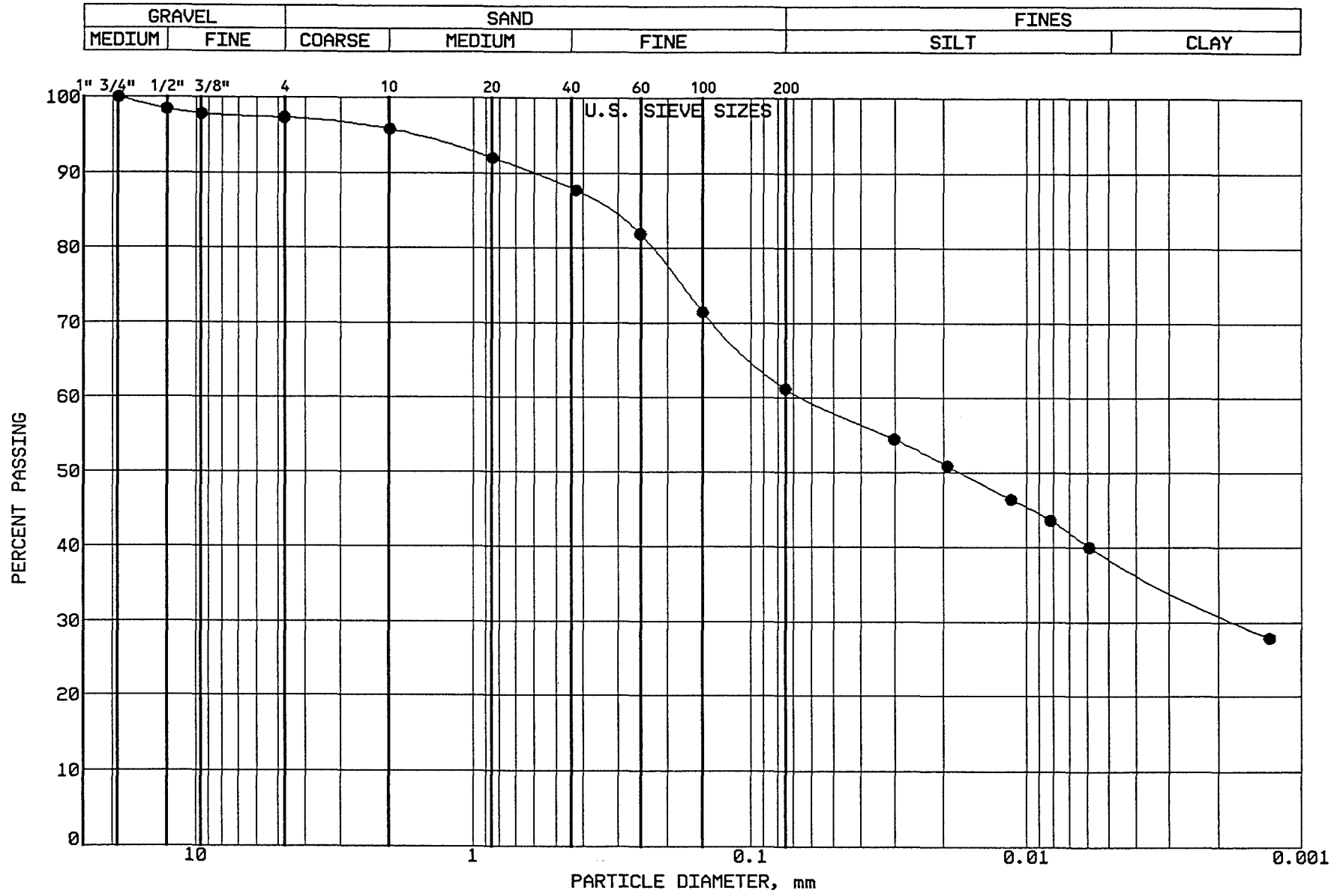
LOCATION: N 42654.0, E 43063.0
SAMPLE: SGCC202 TUBE #:
ELEVATION: 1883.3'

GRAVEL	8.7 %
SAND	33.0 %
SILT	23.6 %
CLAY	34.7 %
P 200	58.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42829.0, E 43068.0
SAMPLE: SGCC203 TUBE #:
ELEVATION: 1881.7'

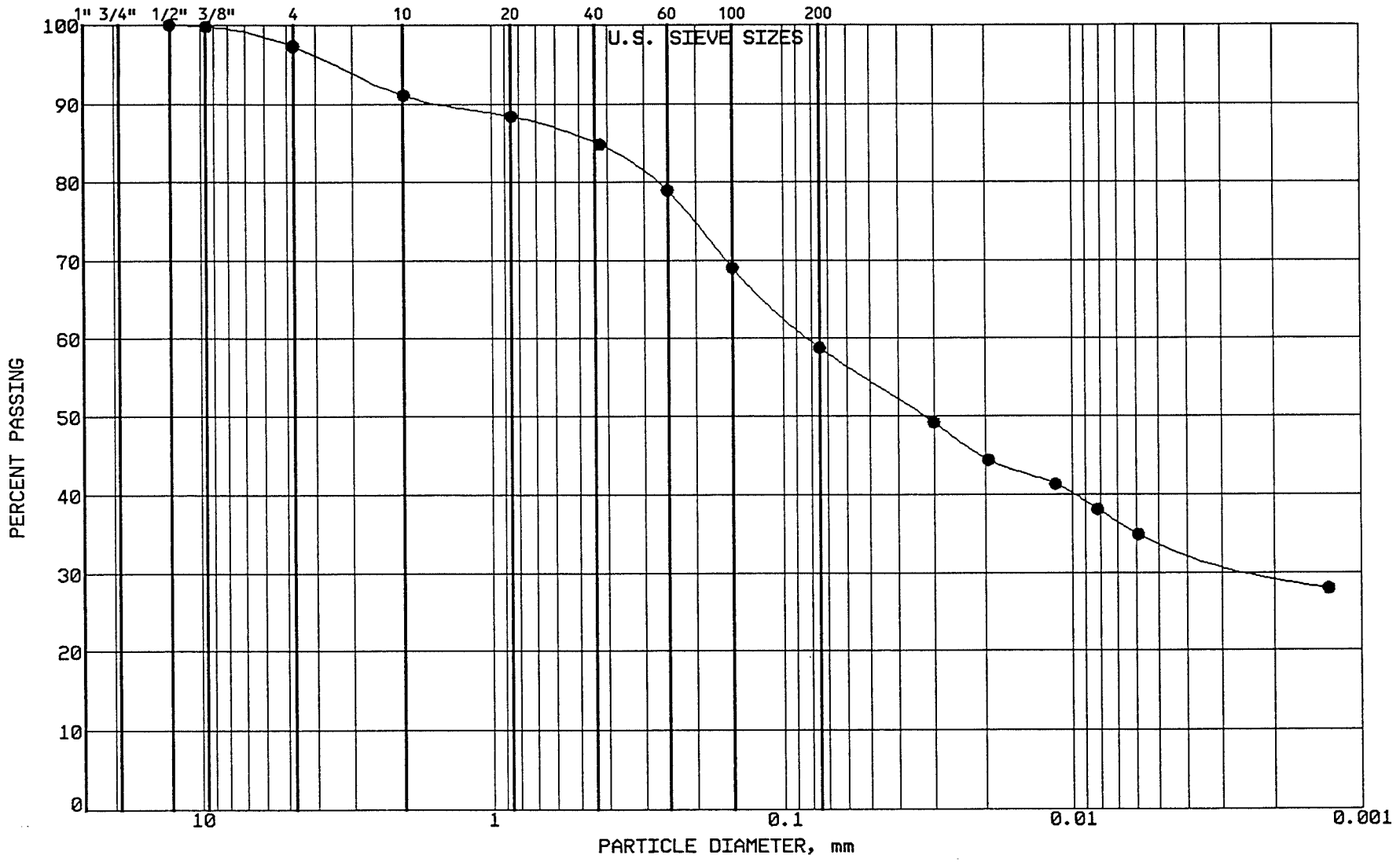
GRAVEL	2.7 %
SAND	36.1 %
SILT	22.5 %
CLAY	38.7 %
P 200	61.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43003.0, E 43076.0
SAMPLE: SGCC204 TUBE #:
ELEVATION: 1881.9'

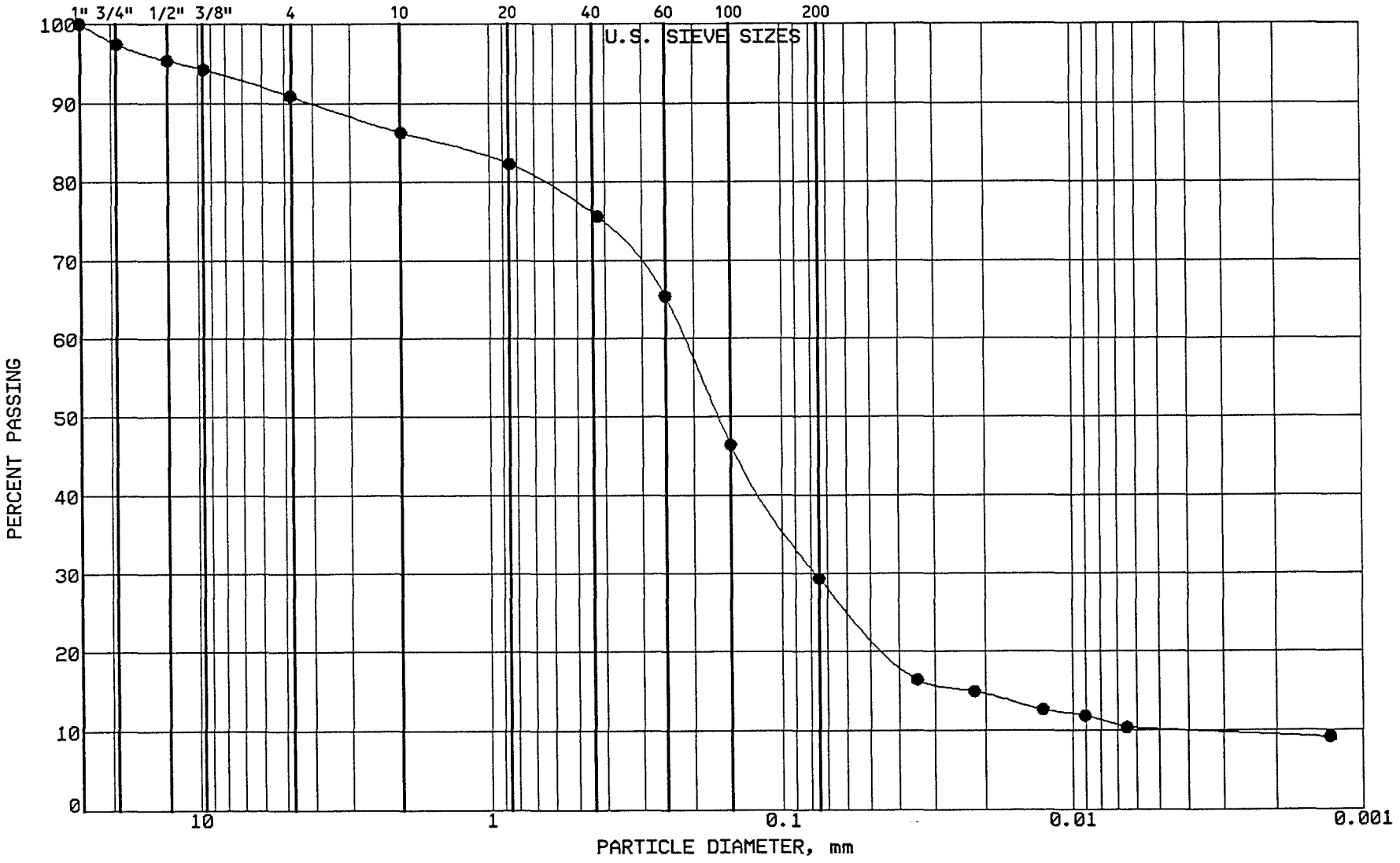
GRAVEL	2.7 %
SAND	38.5 %
SILT	24.7 %
CLAY	34.1 %
P 200	58.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42627.0, E 45777.0
SAMPLE: SGCC205 TUBE #:
ELEVATION: 1877.3'

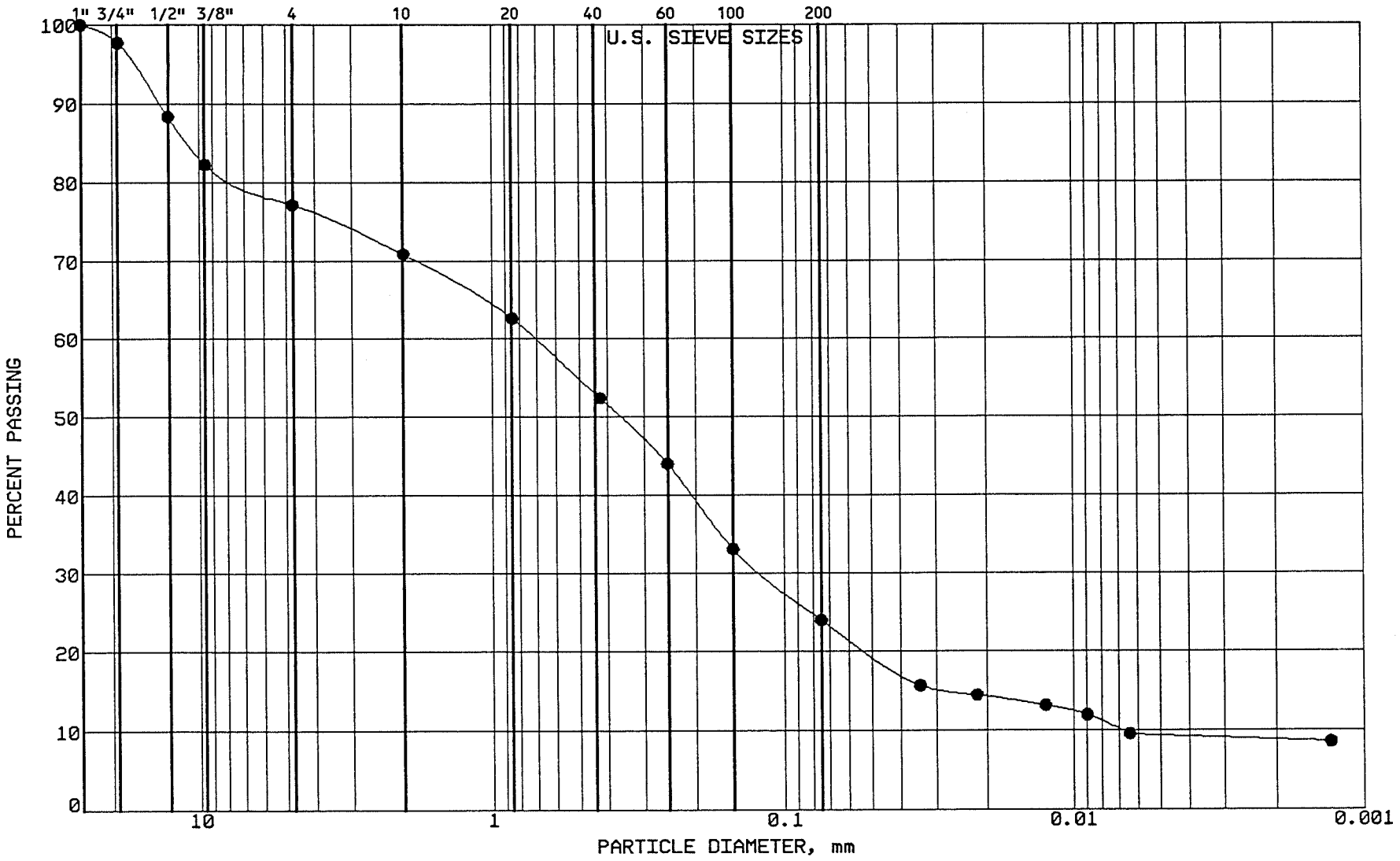
GRAVEL	9.1 %
SAND	61.6 %
SILT	19.1 %
CLAY	10.2 %
P 200	29.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND (SC)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42632.0, E 45602.0
SAMPLE: SGCC206 TUBE #:
ELEVATION: 1877.7'

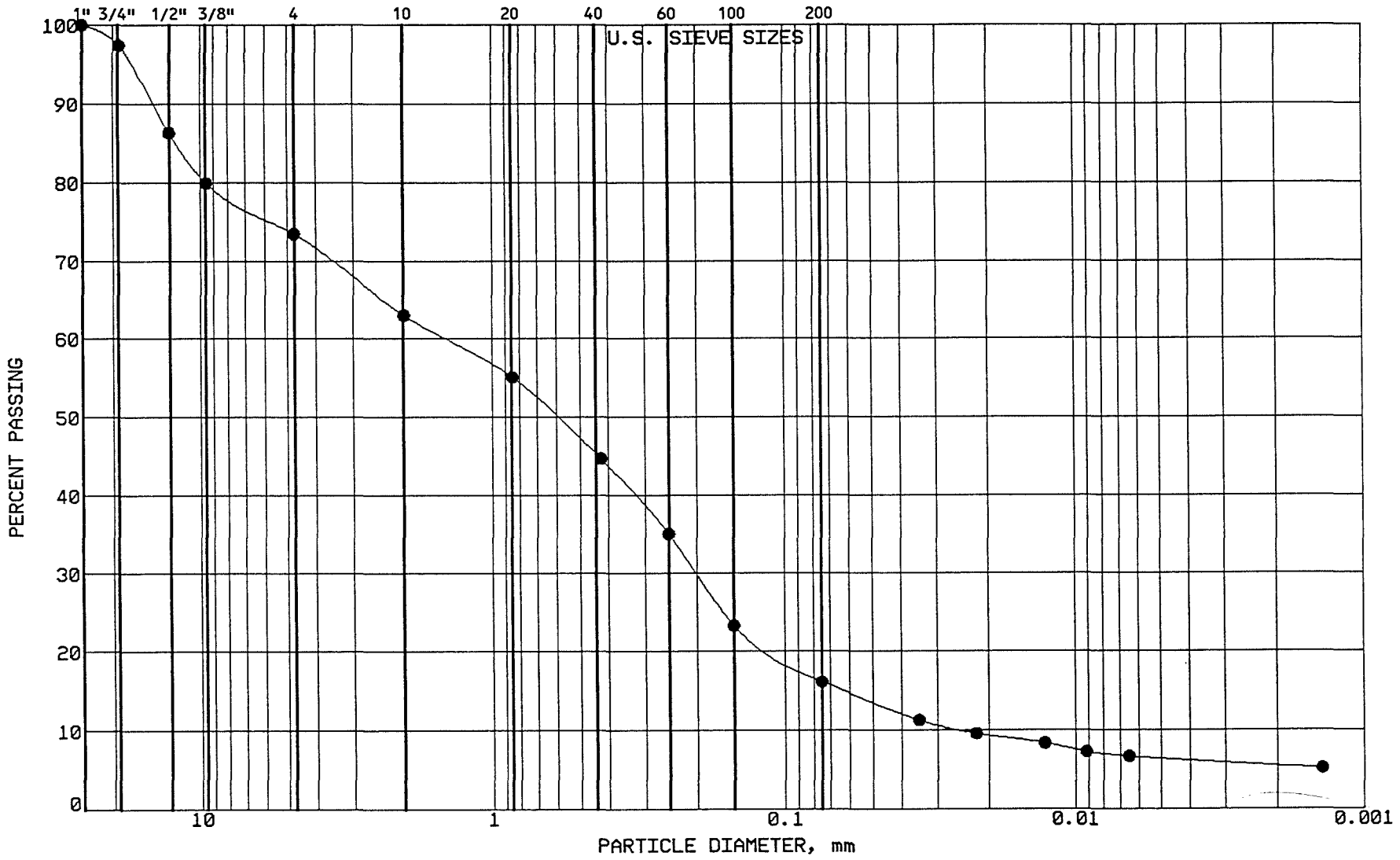
GRAVEL	22.9 %
SAND	53.1 %
SILT	14.6 %
CLAY	9.4 %
P 200	24.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND/W GRAVEL (SC)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42629.0, E 45400.0
SAMPLE: SGCC207 TUBE #:
ELEVATION: 1877.7'

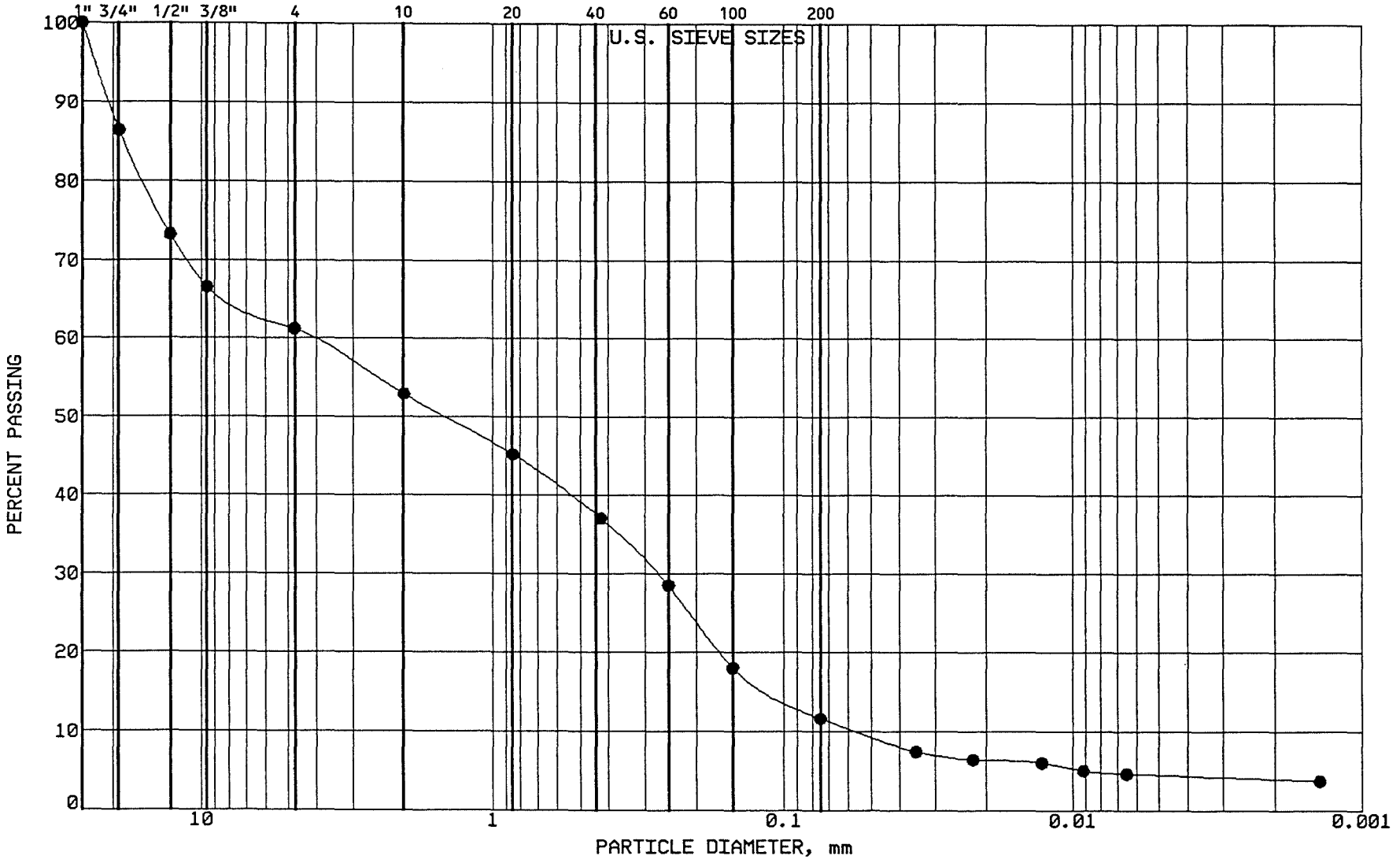
GRAVEL	26.6 %
SAND	57.2 %
SILT	9.8 %
CLAY	6.4 %
P 200	16.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND/W GRAVEL (SC)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42622.0, E 45207.0
SAMPLE: SGCC208 TUBE #:
ELEVATION: 1878.4'

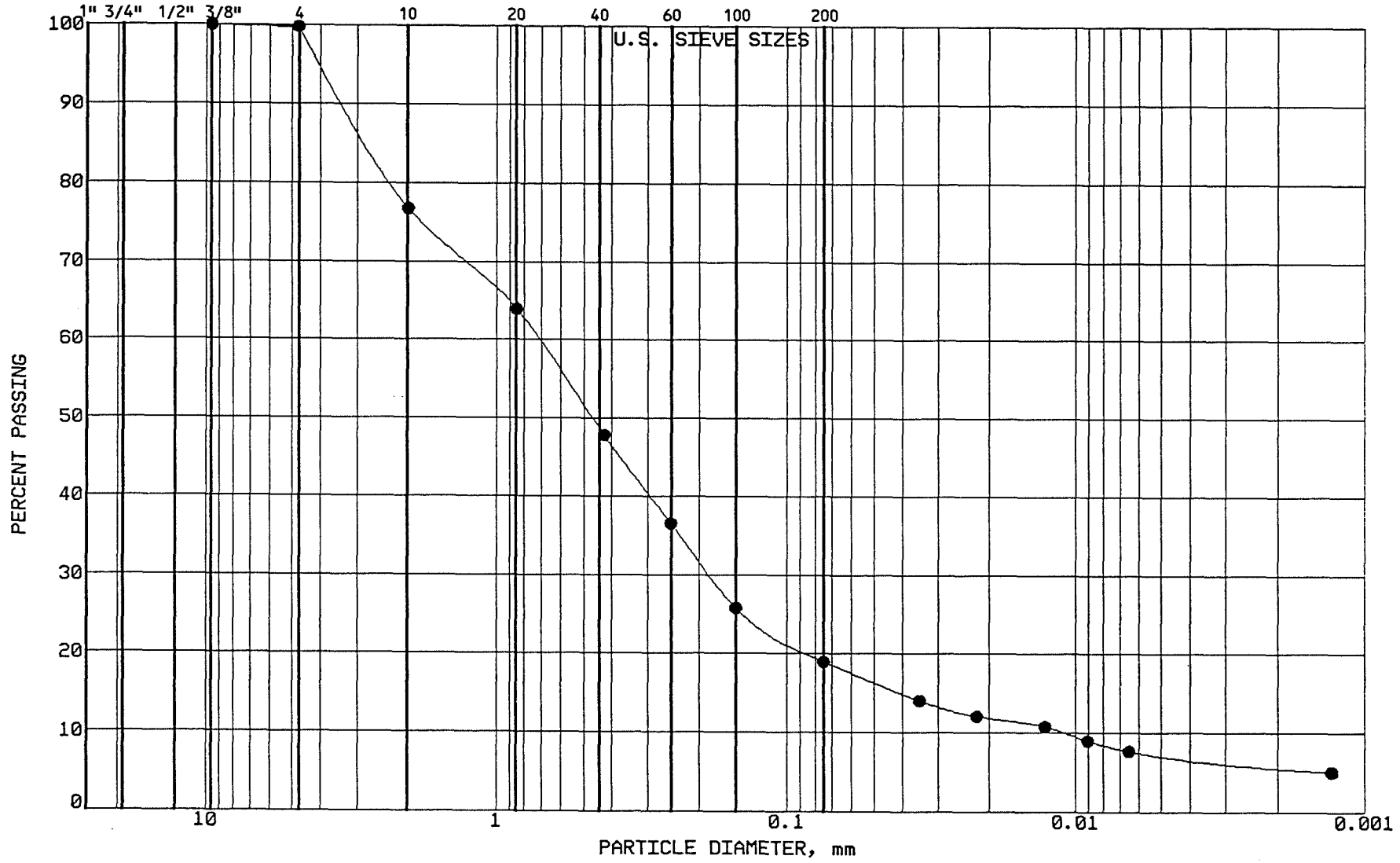
GRAVEL	38.8 %
SAND	49.5 %
SILT	7.2 %
CLAY	4.5 %
P 200	11.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: POORLY GR SAND/W CL&GR (SP-SC)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42623.0, E 45004.0
SAMPLE: SGCC209 TUBE #:
ELEVATION: 1878.1'

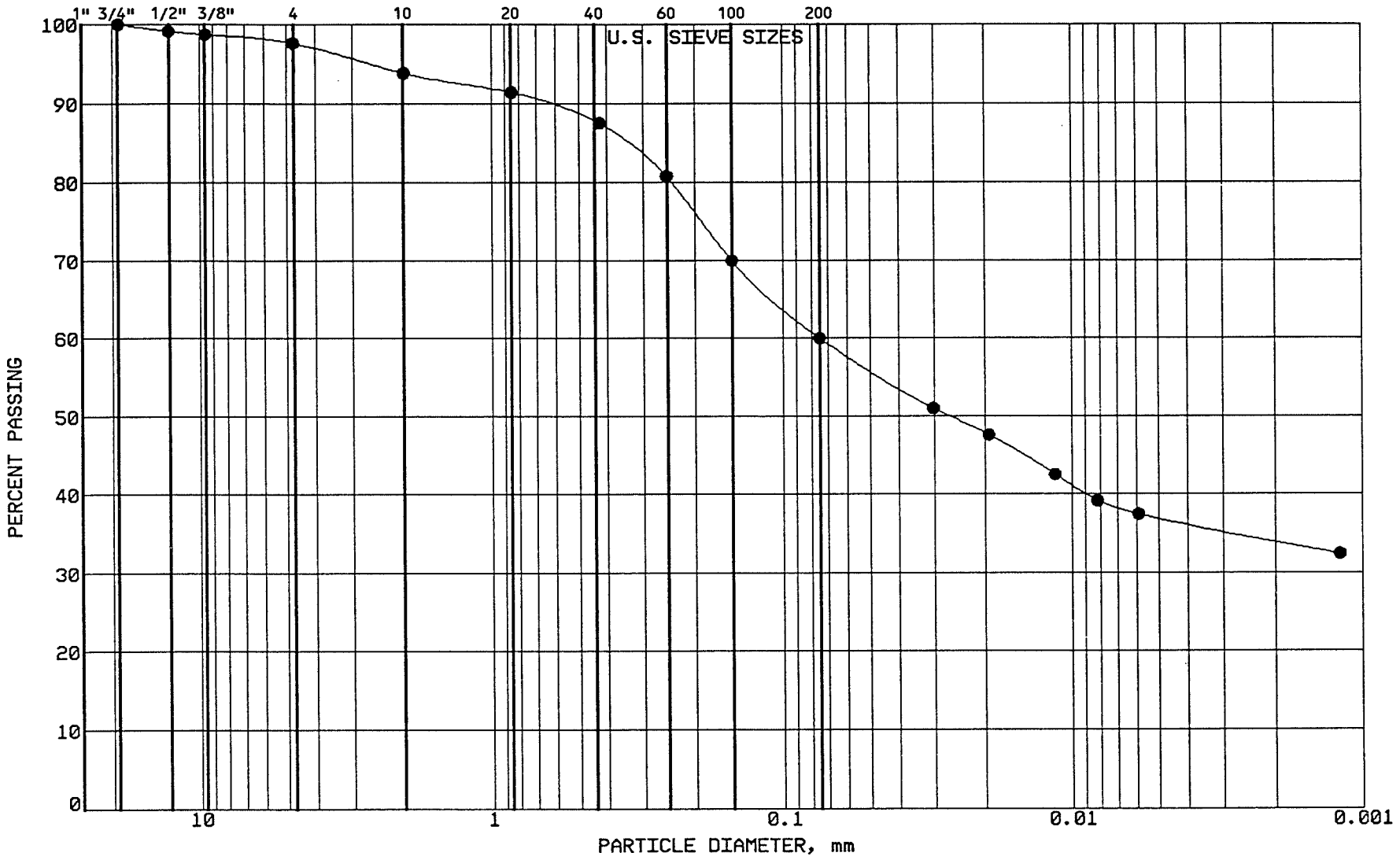
GRAVEL	0.2 %
SAND	80.8 %
SILT	11.7 %
CLAY	7.3 %
P 200	19.0 %

SOIL PROPERTIES

LL: 21.0%
PL: 17.0%
PI: 4.0%
CLASS: SILTY CLAYEY SAND (SC-SM)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42576.0, E 43396.0
SAMPLE: SGCC210 TUBE #:
ELEVATION: 1883.6'

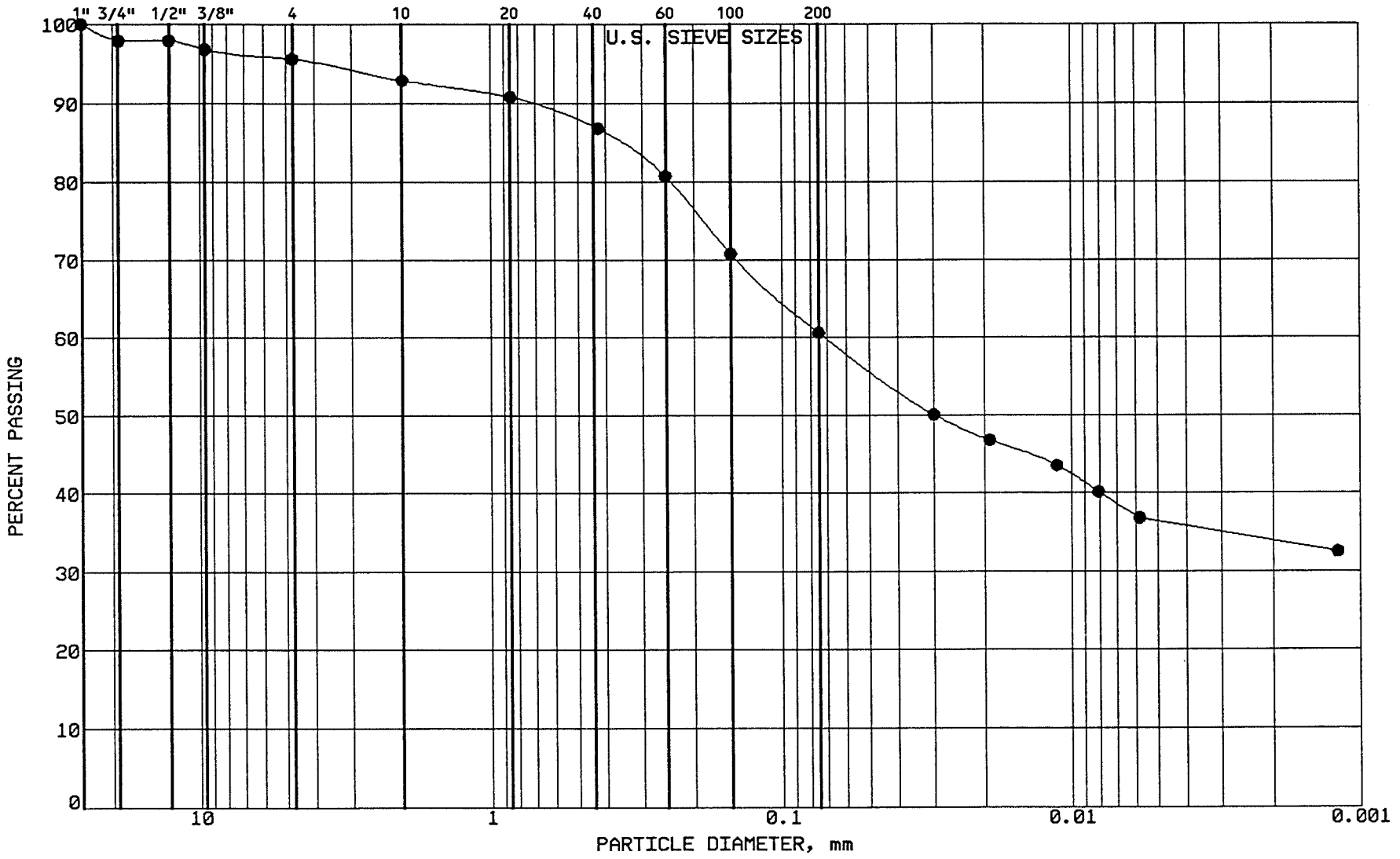
GRAVEL	2.4 %
SAND	37.6 %
SILT	23.1 %
CLAY	36.9 %
P 200	60.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42573.0, E 43199.0
SAMPLE: SGCC211 TUBE #:
ELEVATION: 1883.3'

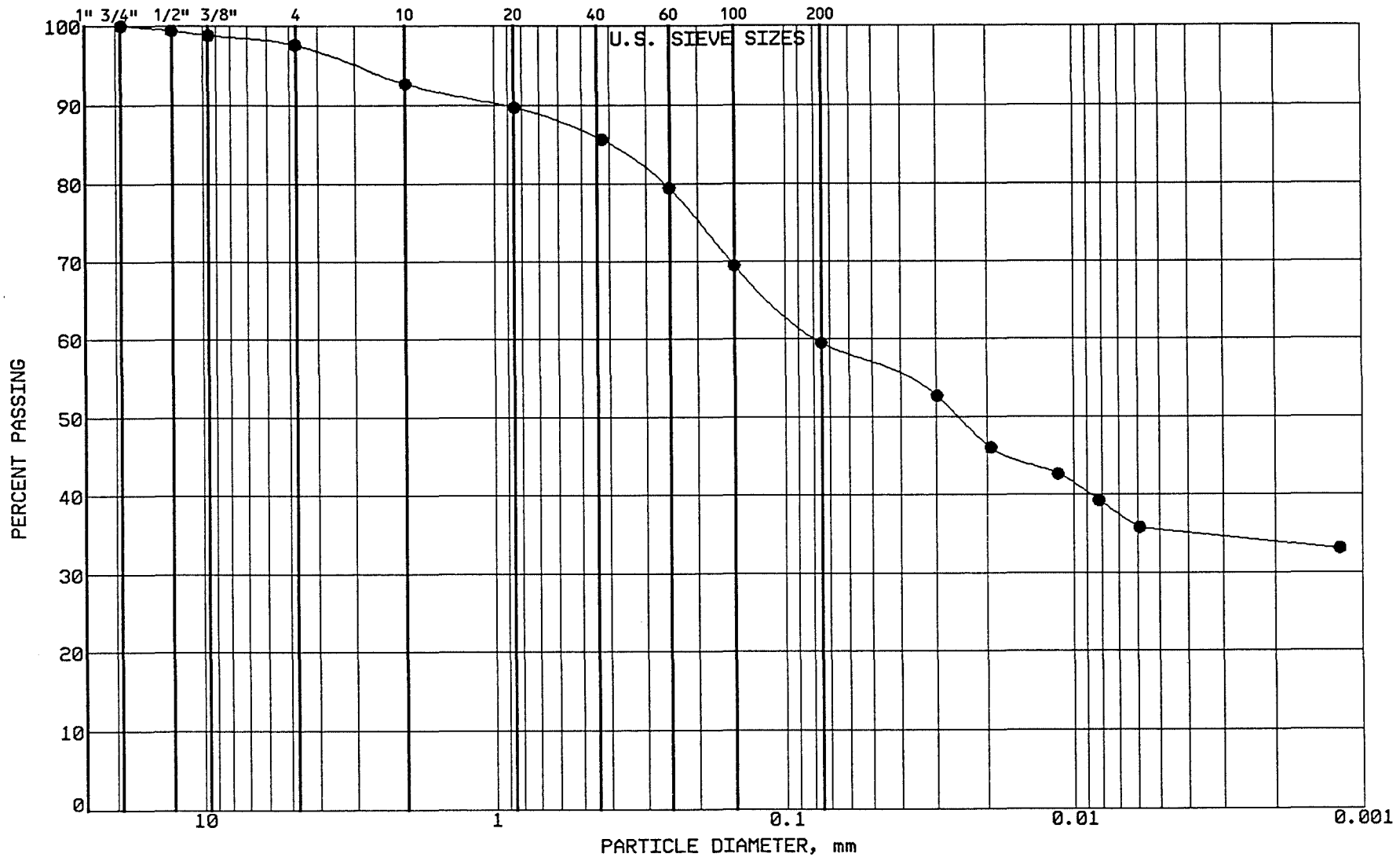
GRAVEL	4.4 %
SAND	35.0 %
SILT	24.2 %
CLAY	36.4 %
P 200	60.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42628.0, E 43070.0
SAMPLE: SGCC212 TUBE #:
ELEVATION: 1884.1'

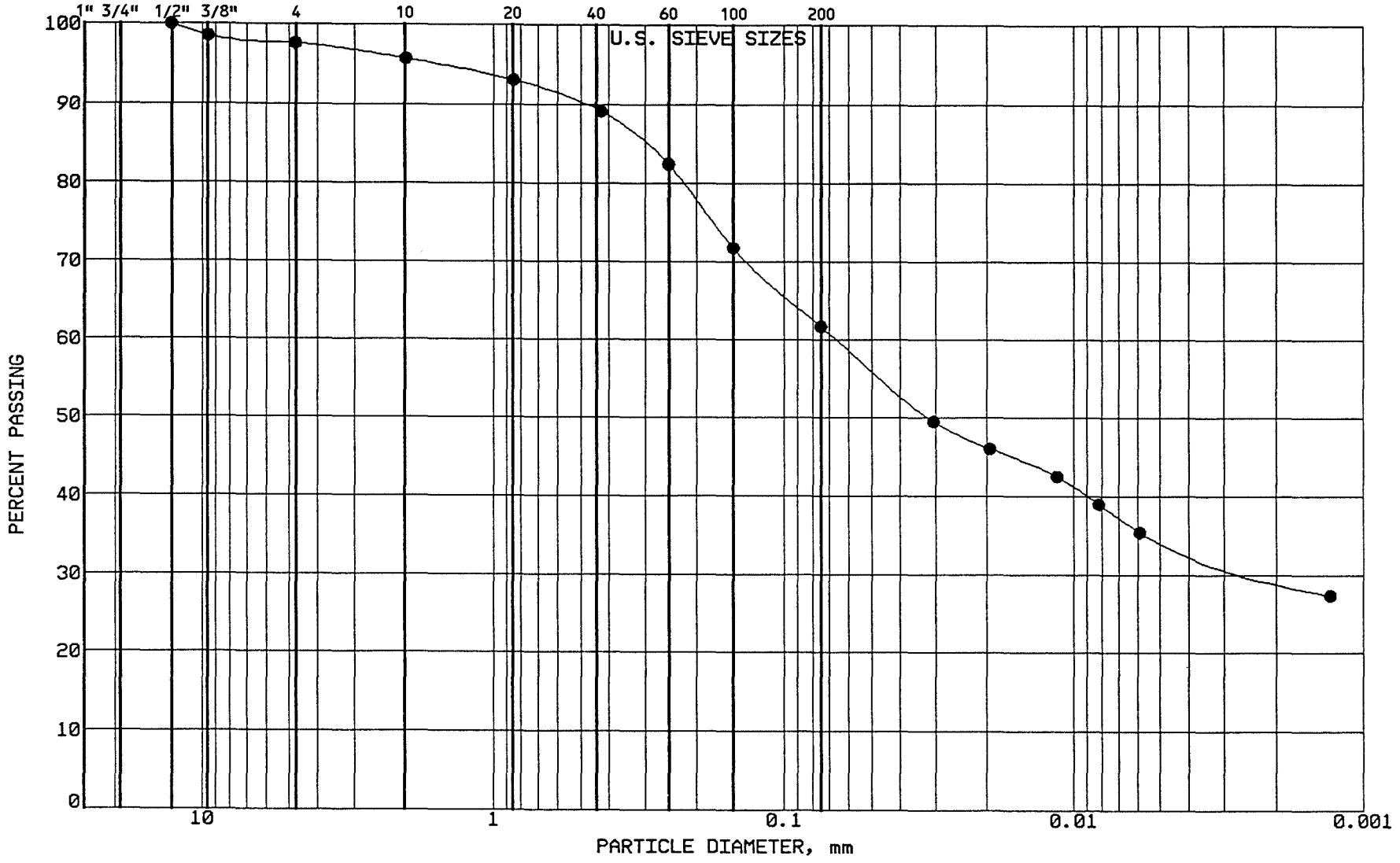
GRAVEL	2.4 %
SAND	38.1 %
SILT	24.0 %
CLAY	35.5 %
P 200	59.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42801.0, E 43068.0
SAMPLE: SGCC213 TUBE #:
ELEVATION: 1883.1'

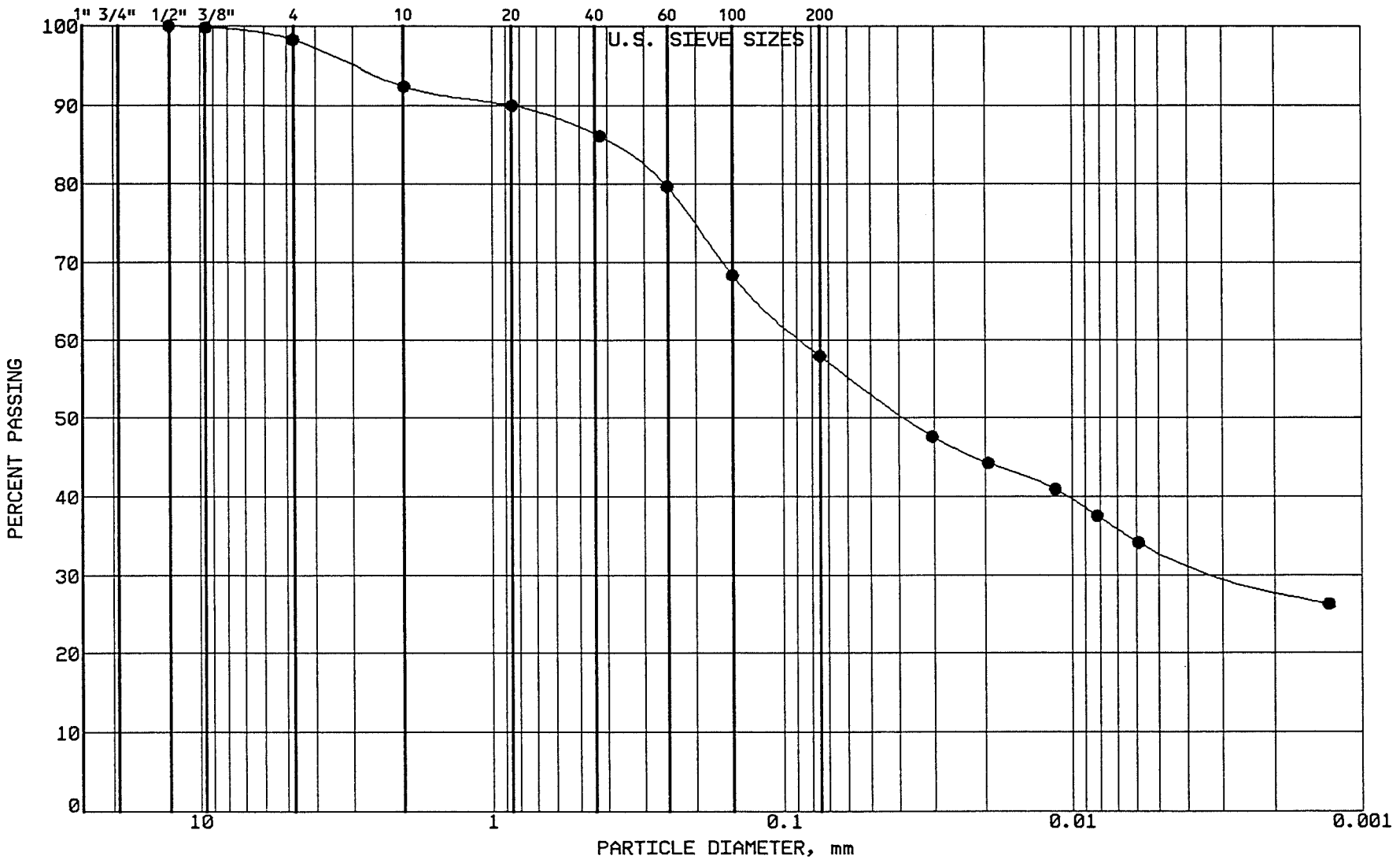
GRAVEL	2.4 %
SAND	35.9 %
SILT	27.2 %
CLAY	34.5 %
P 200	61.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42995.0, E 43070.0
SAMPLE: SGCC214 TUBE #:
ELEVATION: 1883.1'

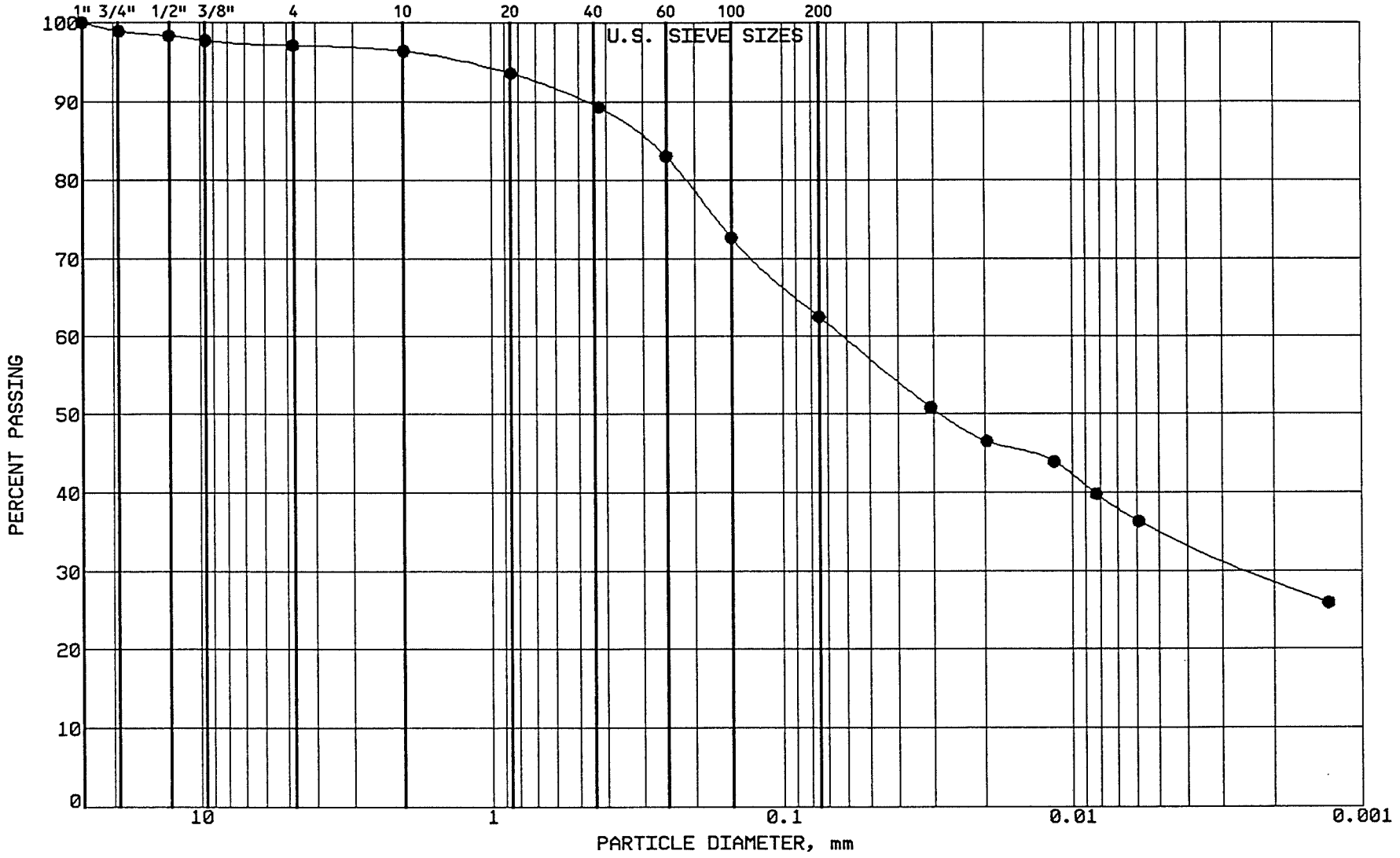
GRAVEL	1.7 %
SAND	40.3 %
SILT	24.8 %
CLAY	33.2 %
P 200	58.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42896.0, E 43070.0
SAMPLE: SGCC215 TUBE #:
ELEVATION: 1883.1'

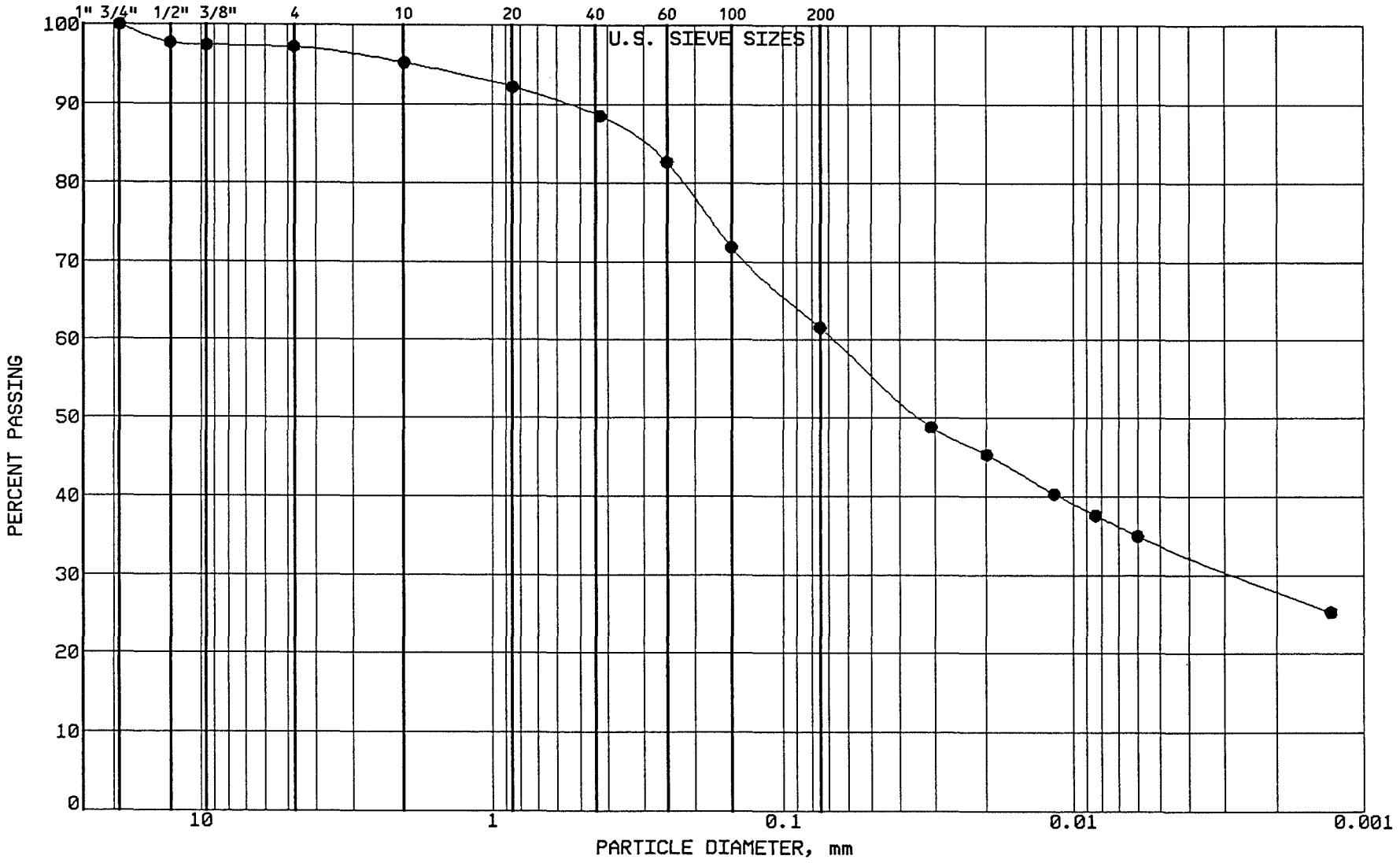
GRAVEL	2.9 %
SAND	34.6 %
SILT	27.3 %
CLAY	35.2 %
P 200	62.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43206.0, E 44416.0
SAMPLE: SGCC216 TUBE #:
ELEVATION: 1882.2'

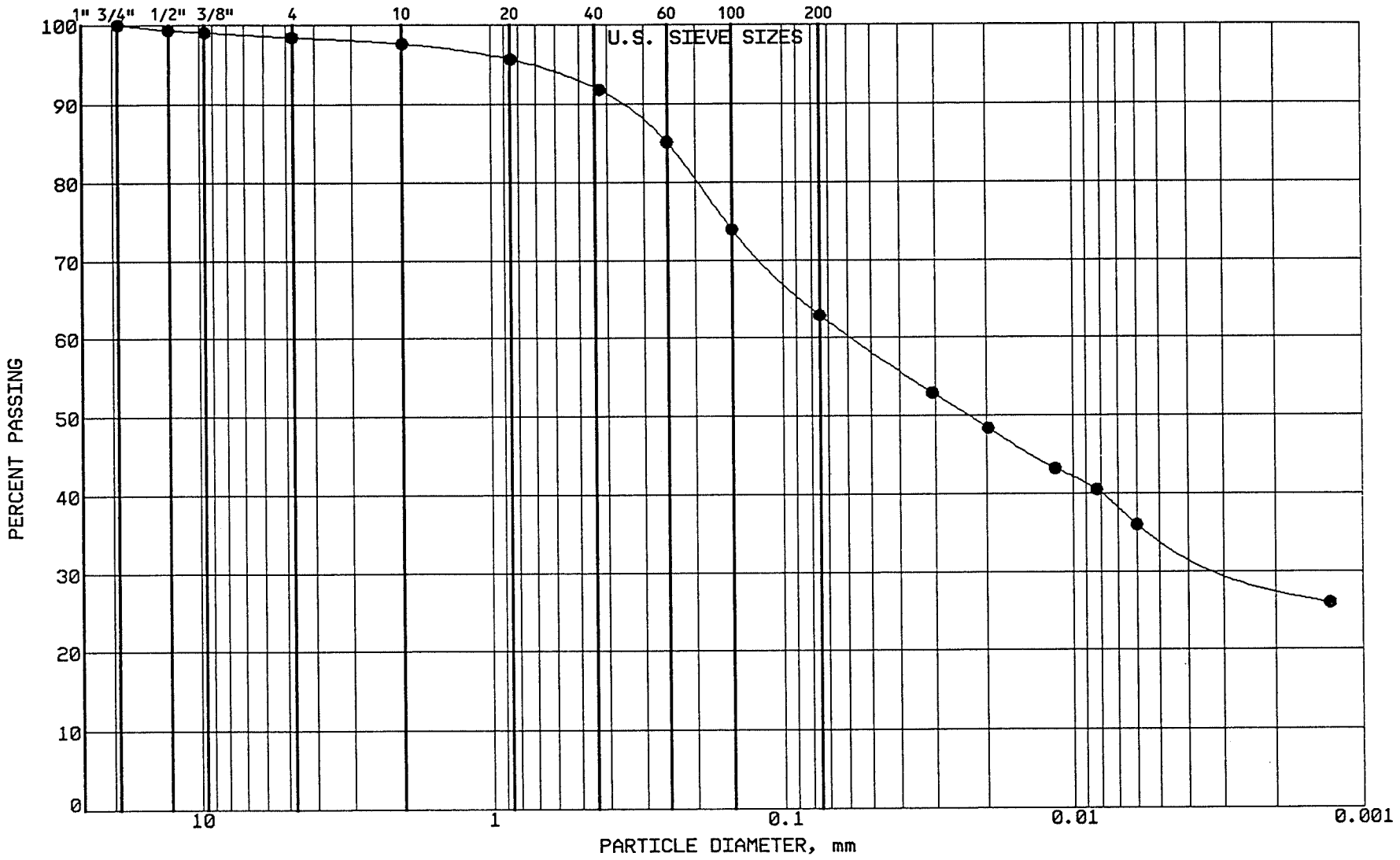
GRAVEL	2.8 %
SAND	35.6 %
SILT	27.8 %
CLAY	33.8 %
P 200	61.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

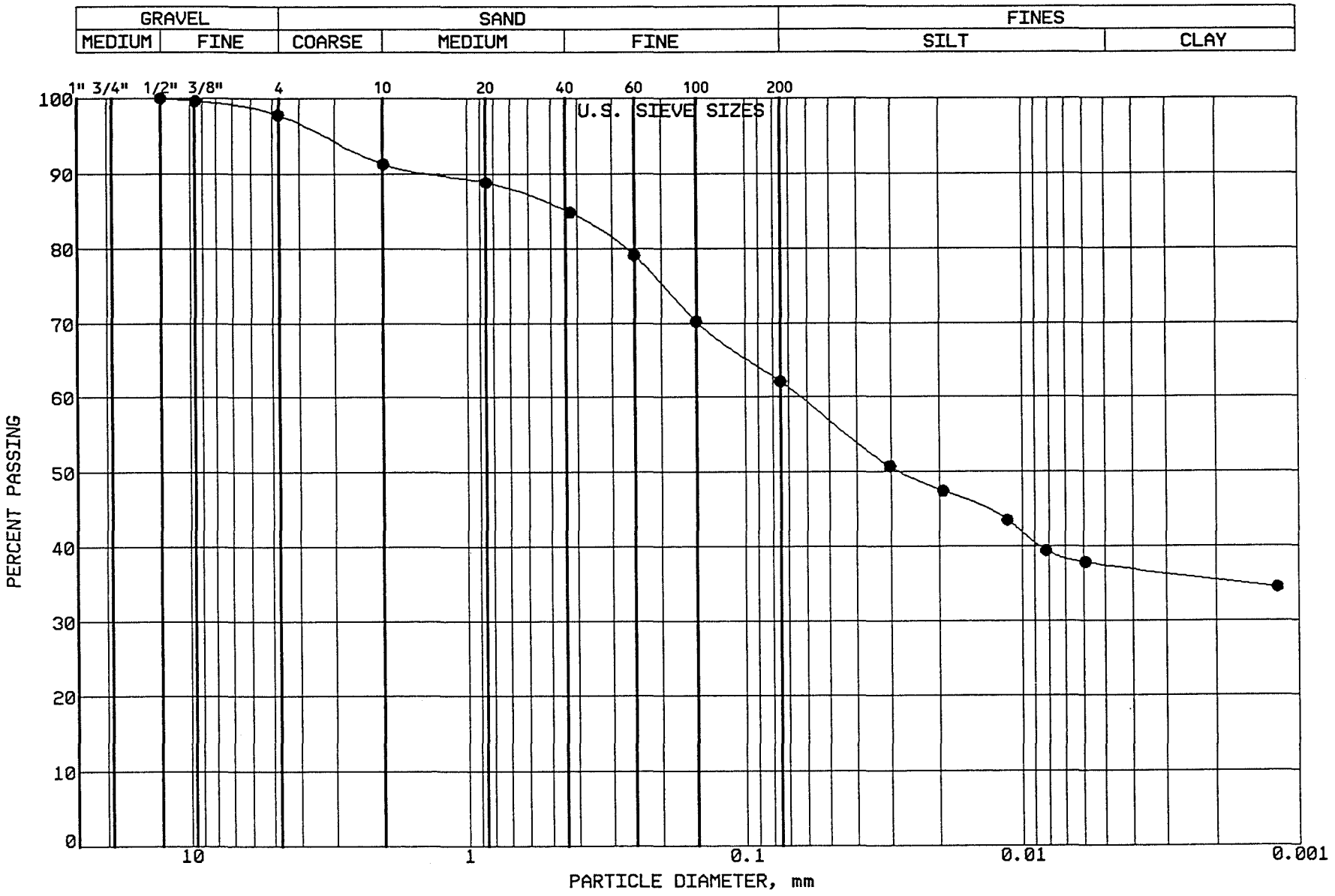
LOCATION: N 43207.0, E 44159.0
SAMPLE: SGCC217 TUBE #:
ELEVATION: 1883.1'

GRAVEL	1.6 %
SAND	35.5 %
SILT	28.1 %
CLAY	34.8 %
P 200	62.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43208.0, E 43979.0
SAMPLE: SGCC218 TUBE #:
ELEVATION: 1883.0'

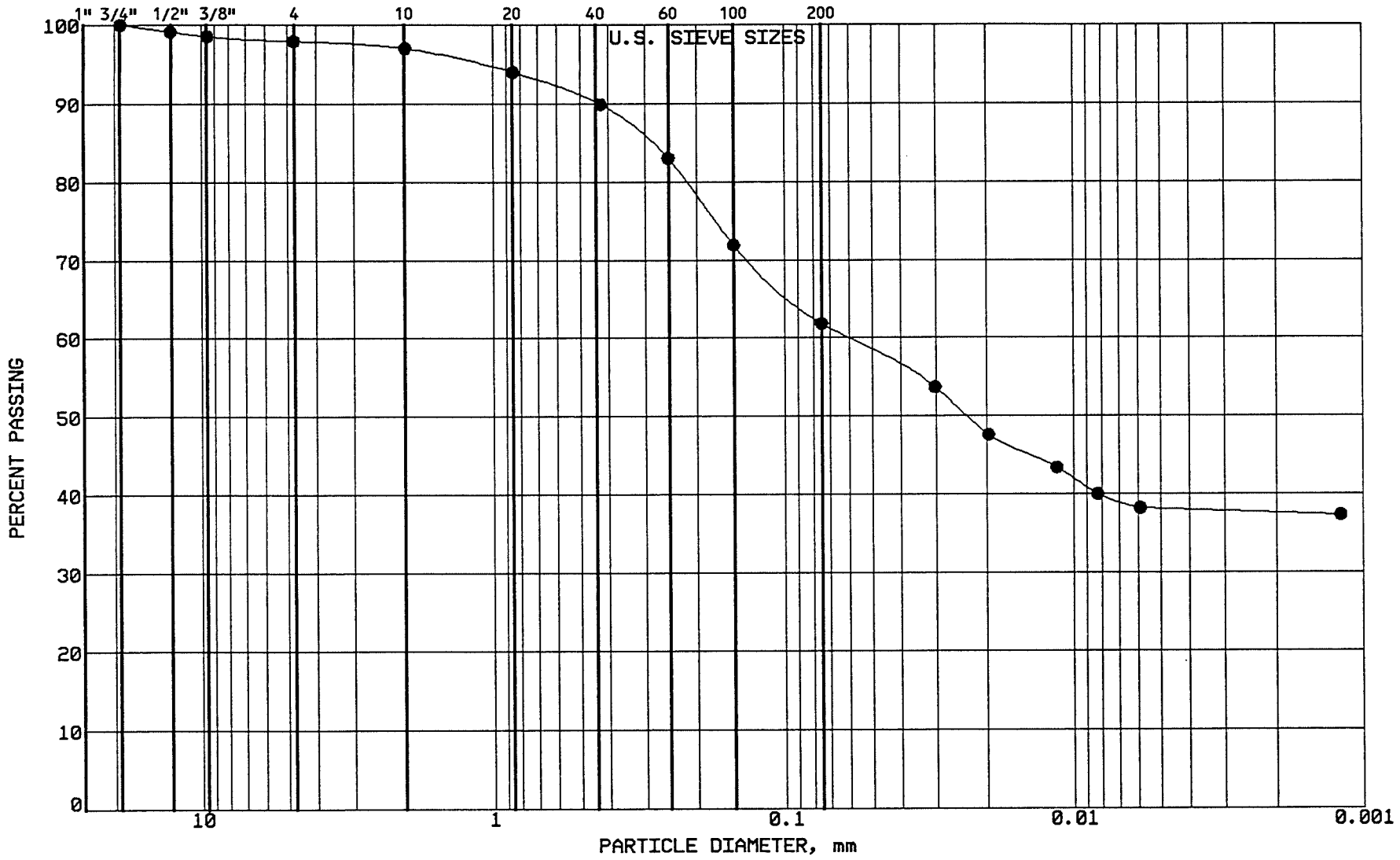
GRAVEL	2.2 %
SAND	35.7 %
SILT	24.6 %
CLAY	37.5 %
P 200	62.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

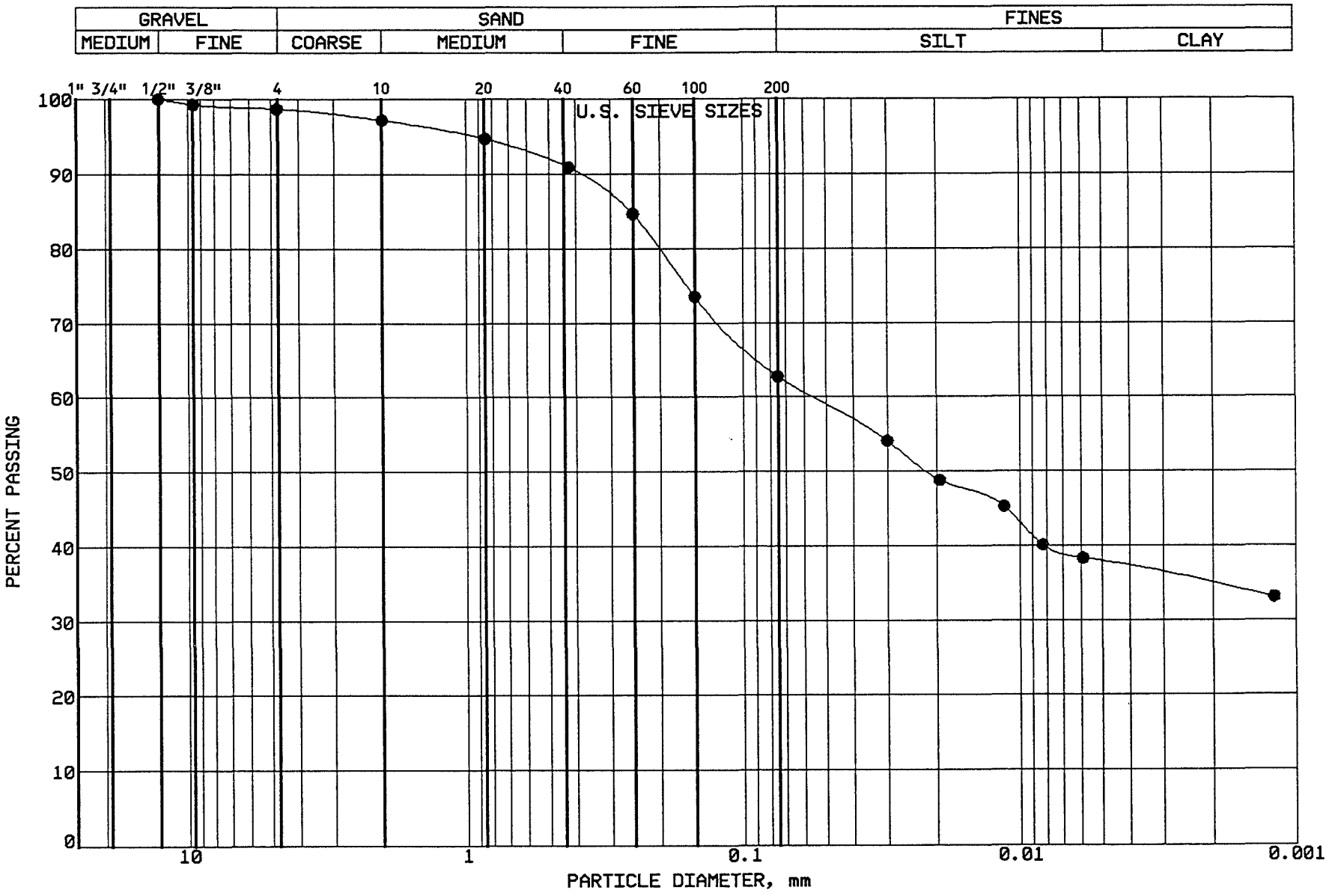
LOCATION: N 43208.0, E 43790.0
SAMPLE: SGCC219 TUBE #:
ELEVATION: 1882.6'

GRAVEL	2.1 %
SAND	36.1 %
SILT	23.7 %
CLAY	38.1 %
P 200	61.8 %

SOIL PROPERTIES

LL: 43.0%
PL: 17.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

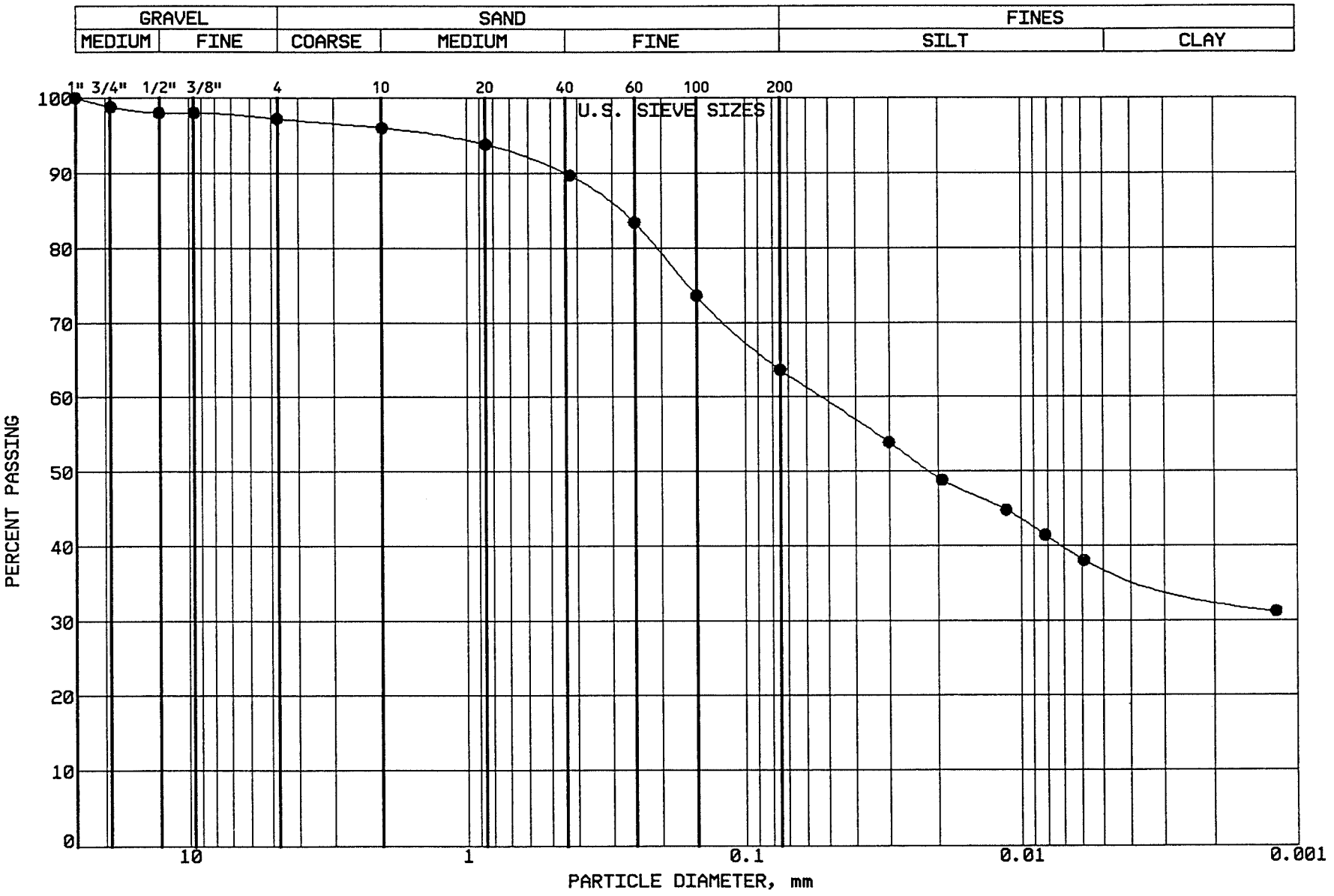
LOCATION: N 43205.0, E 43555.0
SAMPLE: SGCC220 TUBE #:
ELEVATION: 1881.8'

GRAVEL	1.3 %
SAND	36.0 %
SILT	24.9 %
CLAY	37.8 %
P 200	62.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

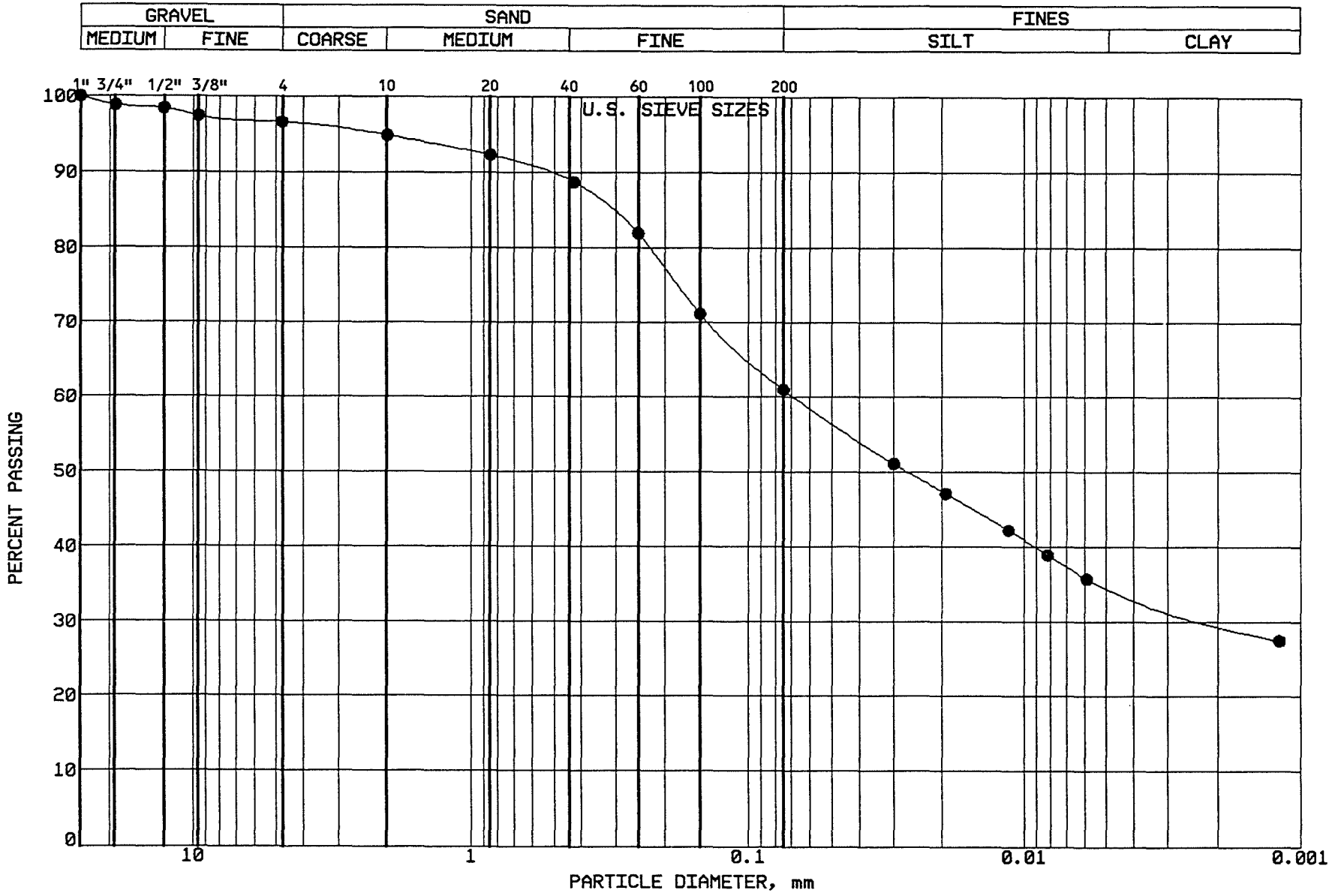
LOCATION: N 42564.0, E 43297.0
SAMPLE: CLSCC221 TUBE #: ST-44A
ELEVATION: 1885.5'

GRAVEL	2.8 %
SAND	33.6 %
SILT	26.3 %
CLAY	37.3 %
P 200	63.6 %

SOIL PROPERTIES

LL: 42.0%
PL: 15.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

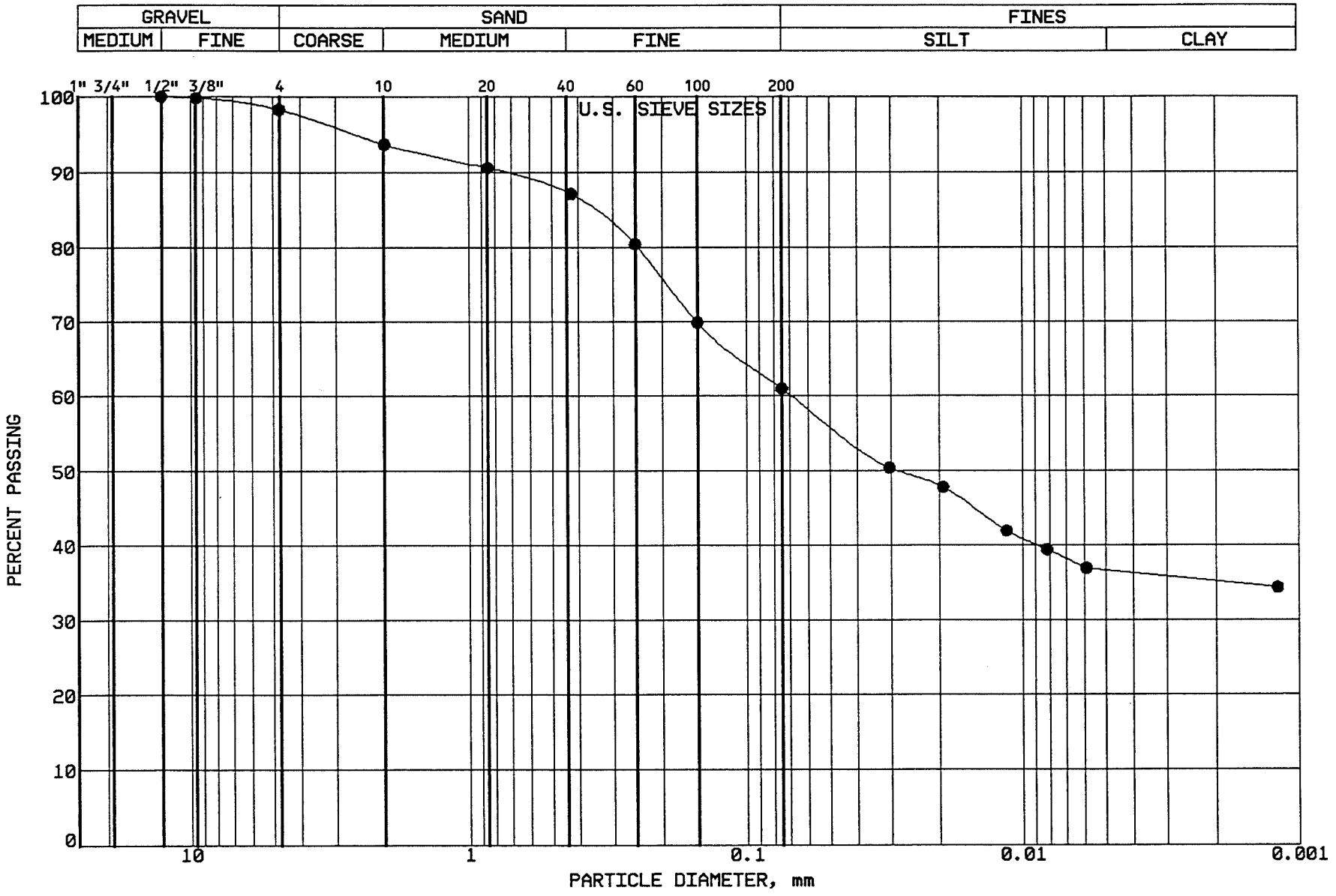
LOCATION: N 42696.0, E 43064.0
SAMPLE: CLSCC222 TUBE #: ST-45A
ELEVATION: 1884.9'

GRAVEL	3.4 %
SAND	35.6 %
SILT	26.2 %
CLAY	34.8 %
P 200	61.0 %

SOIL PROPERTIES

LL: 40.0%
PL: 15.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42573.0, E 43789.0
SAMPLE: CLSCC223 TUBE #: ST-46A
ELEVATION: 1883.4'

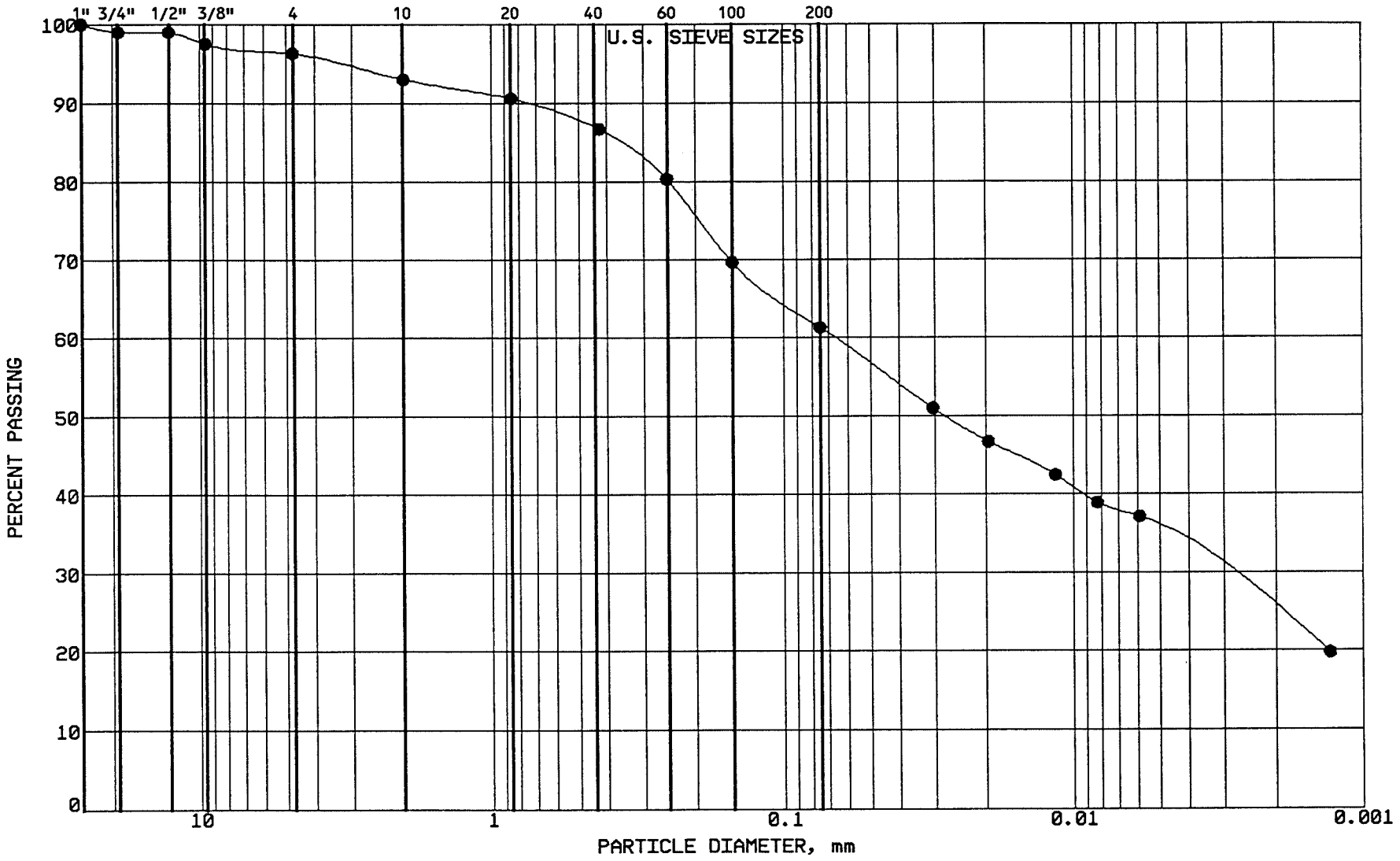
GRAVEL	1.7 %
SAND	37.3 %
SILT	24.4 %
CLAY	36.6 %
P 200	61.0 %

SOIL PROPERTIES

LL: 43.0%
PL: 16.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43178.0, E 43746.0
SAMPLE: SGCC224 TUBE #:
ELEVATION: 1883.2'

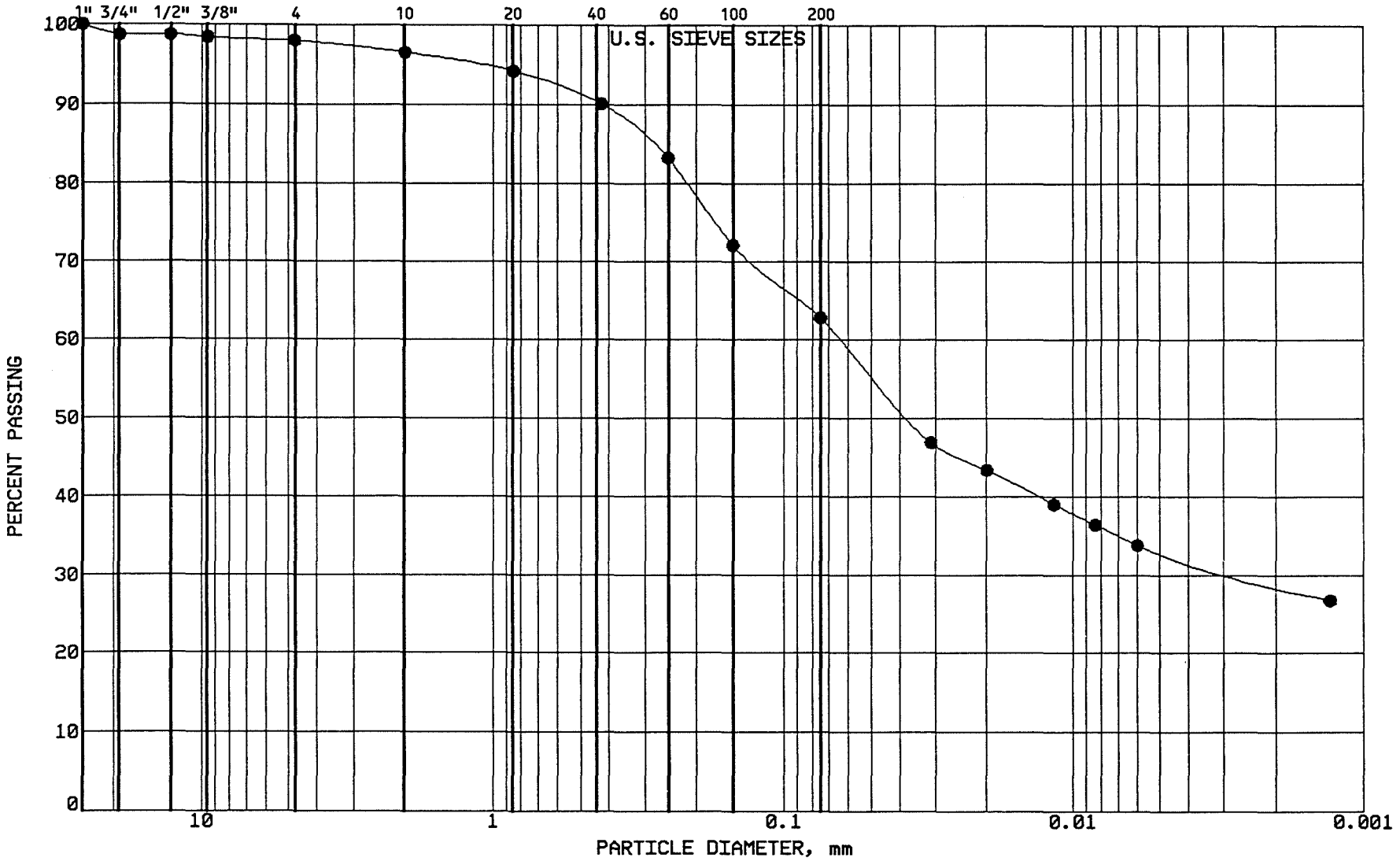
GRAVEL	3.7 %
SAND	35.0 %
SILT	26.1 %
CLAY	35.2 %
P 200	61.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

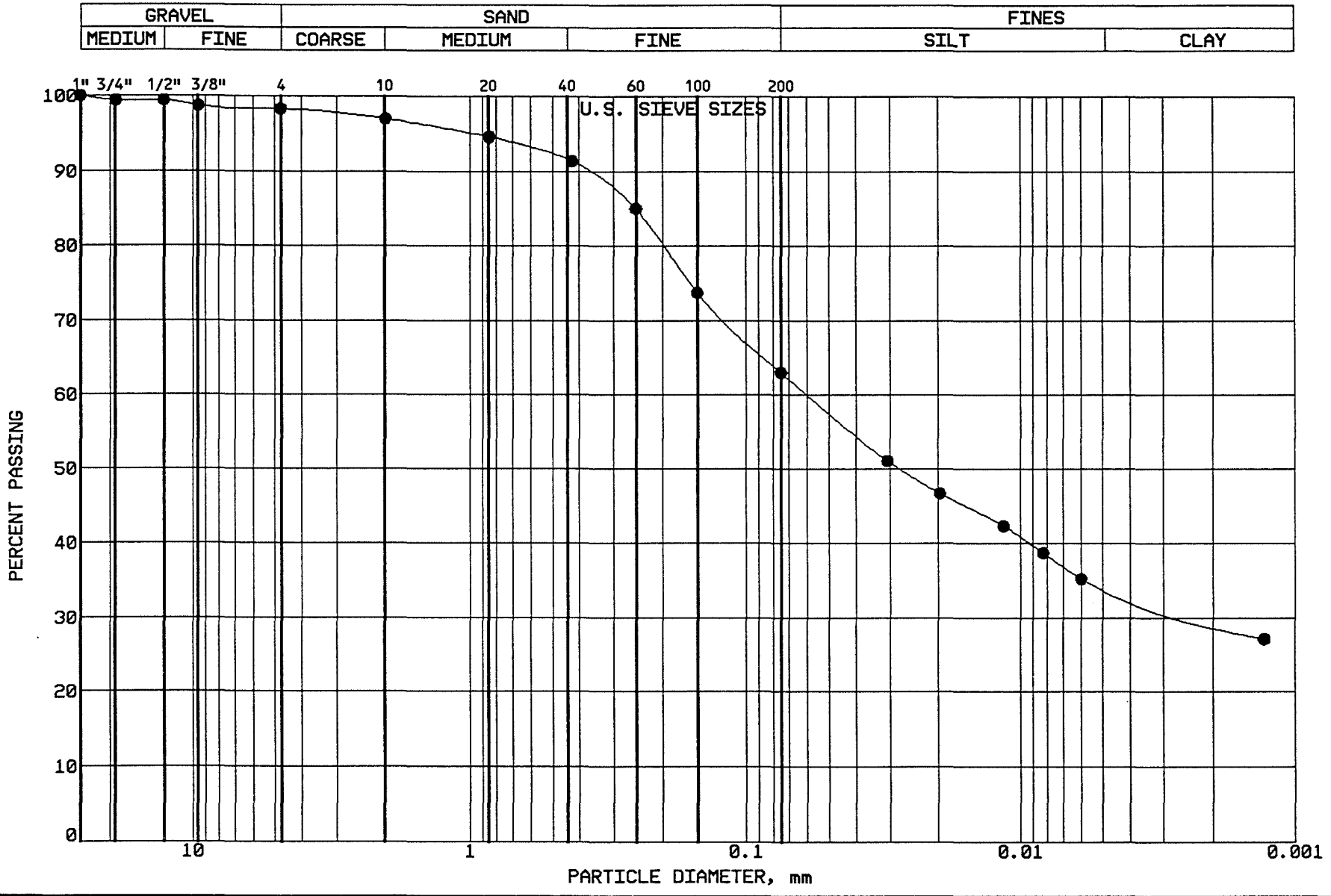
LOCATION: N 43182.0, E 43933.0
SAMPLE: SGCC225 TUBE #:
ELEVATION: 1883.4'

GRAVEL	2.0 %
SAND	35.2 %
SILT	29.8 %
CLAY	33.0 %
P 200	62.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43186.0, E 44132.0
SAMPLE: SGCC226 TUBE #:
ELEVATION: 1883.1'

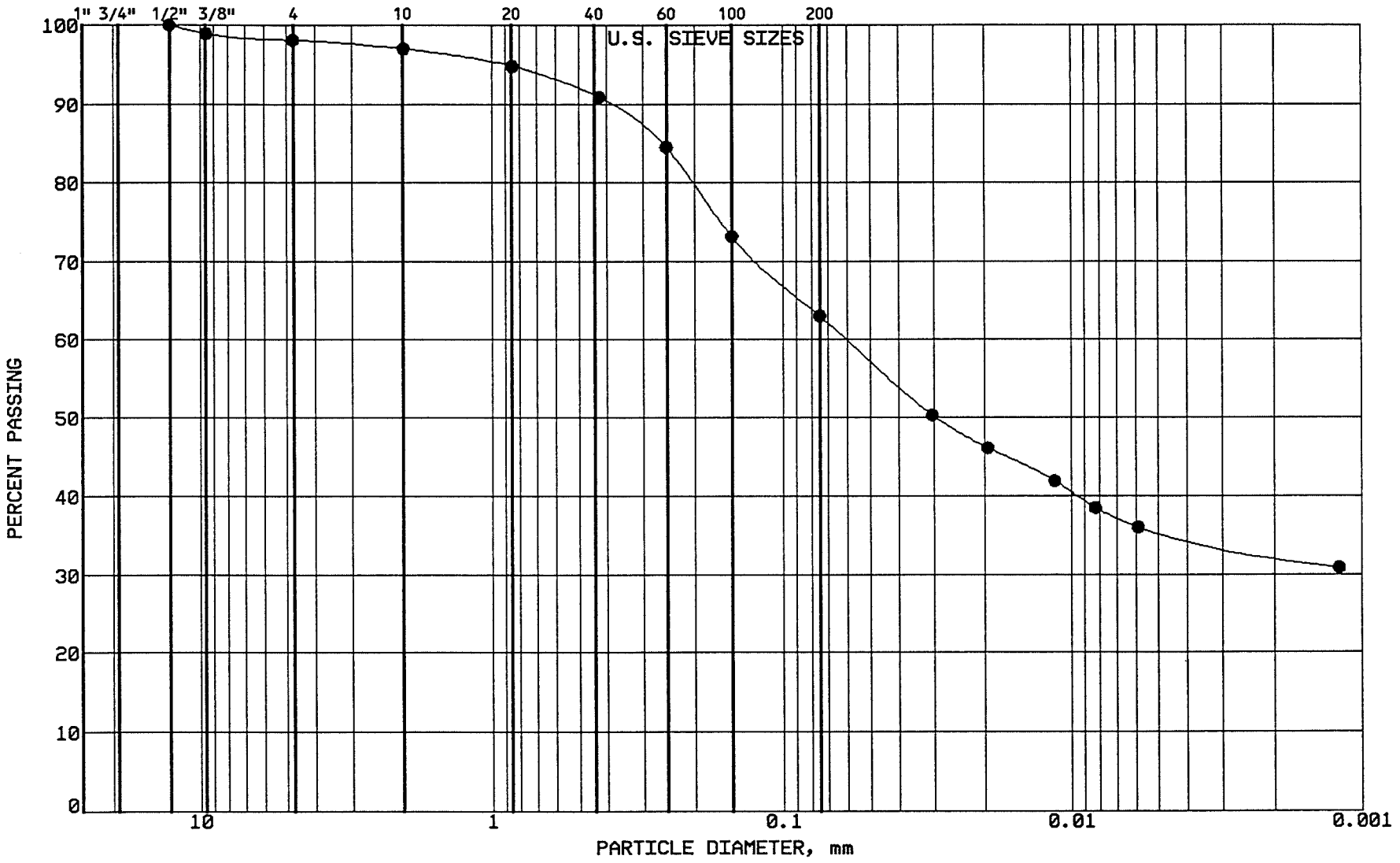
GRAVEL	1.7 %
SAND	35.3 %
SILT	28.8 %
CLAY	34.2 %
P 200	63.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

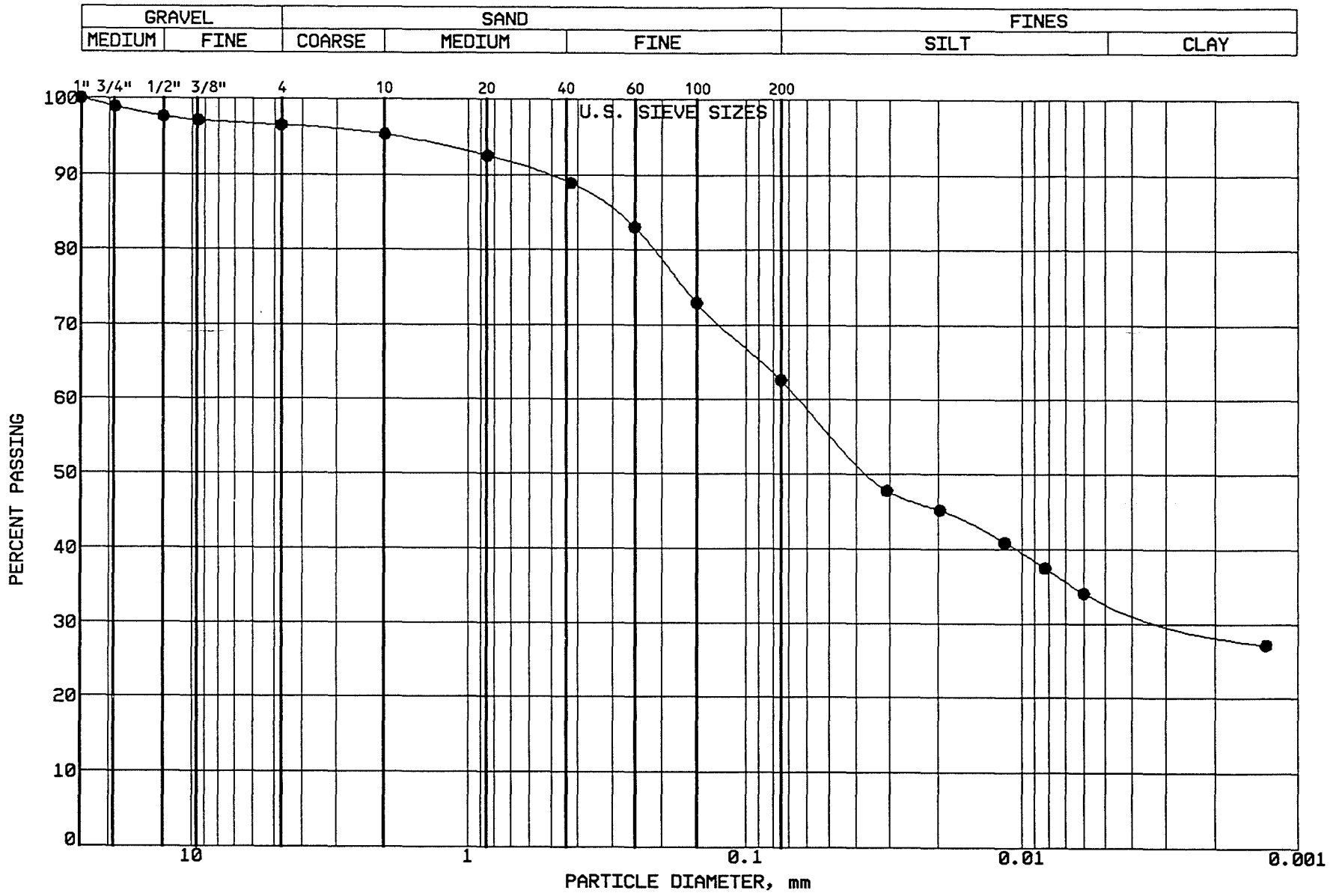
LOCATION: N 43194.0, E 44404.0
SAMPLE: SGCC227 TUBE #:
ELEVATION: 1882.4'

GRAVEL	1.9 %
SAND	35.1 %
SILT	27.5 %
CLAY	35.5 %
P 200	63.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

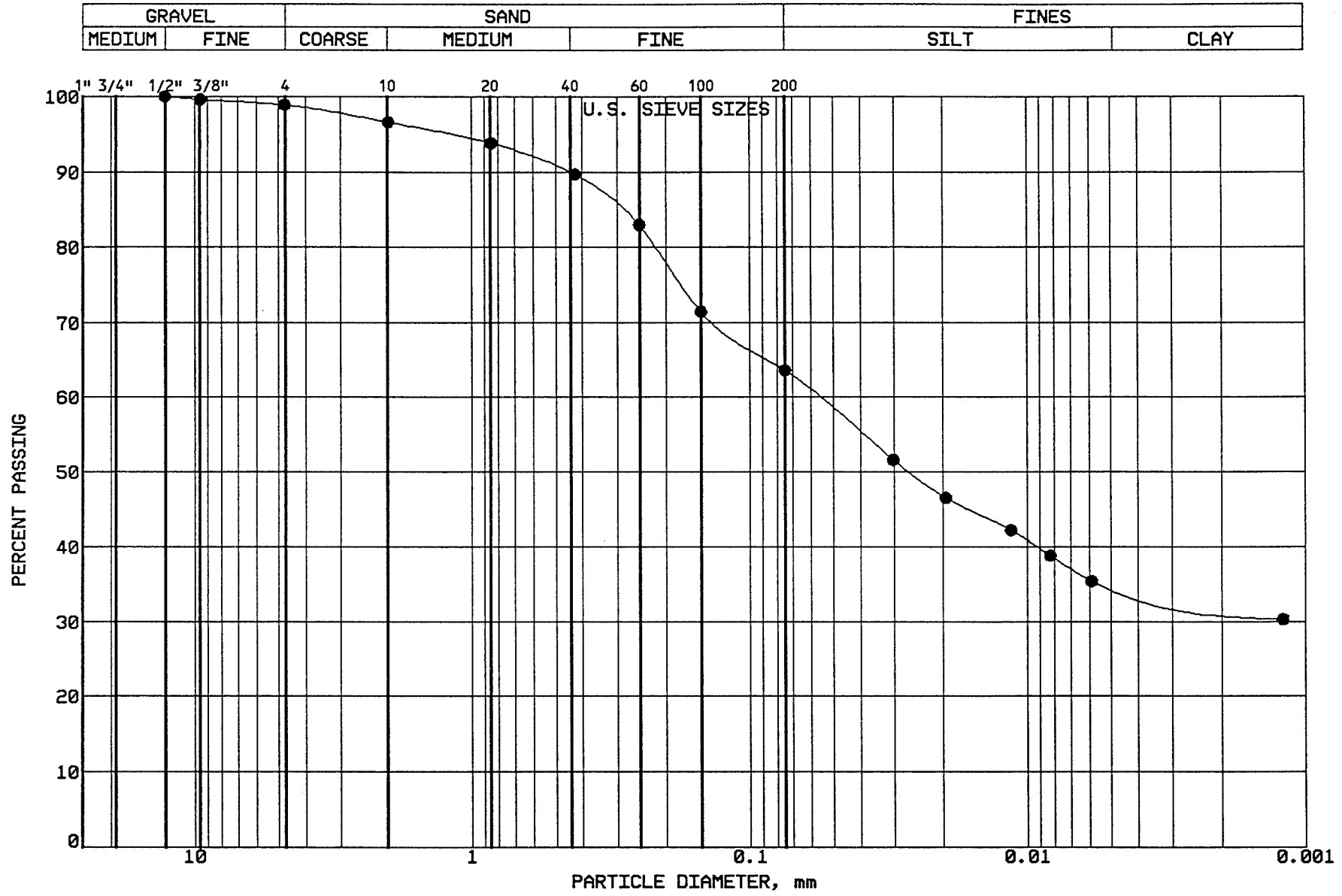
LOCATION: N 43605.0, E 44393.0
SAMPLE: SGCC228 TUBE #:
ELEVATION: 1880.2'

GRAVEL	3.5 %
SAND	33.9 %
SILT	29.3 %
CLAY	33.3 %
P 200	62.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

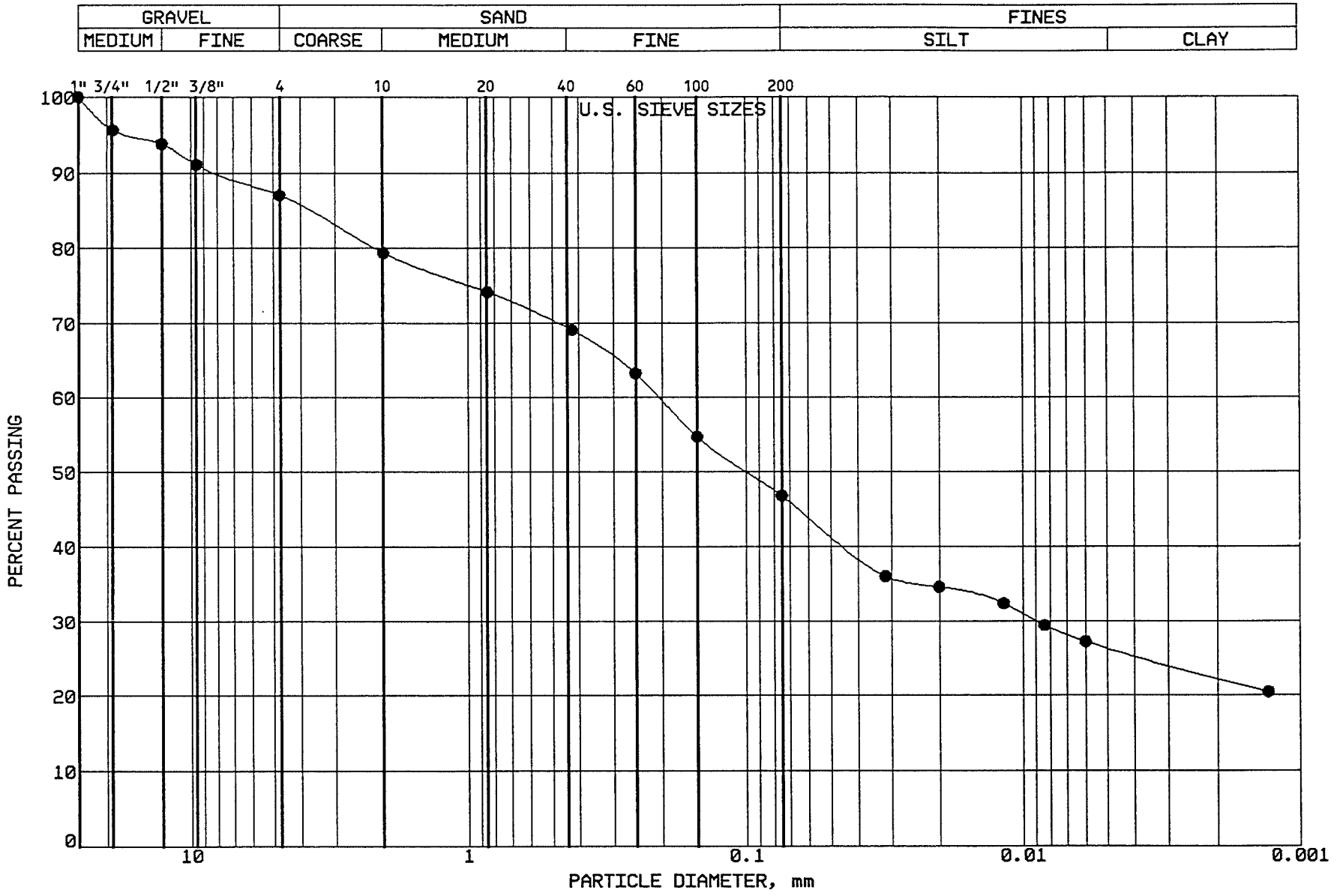
LOCATION: N 43068.0, E 44168.0
SAMPLE: SGCC229 TUBE #:
ELEVATION: 1882.3'

GRAVEL	1.1 %
SAND	35.3 %
SILT	28.7 %
CLAY	34.9 %
P 200	63.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

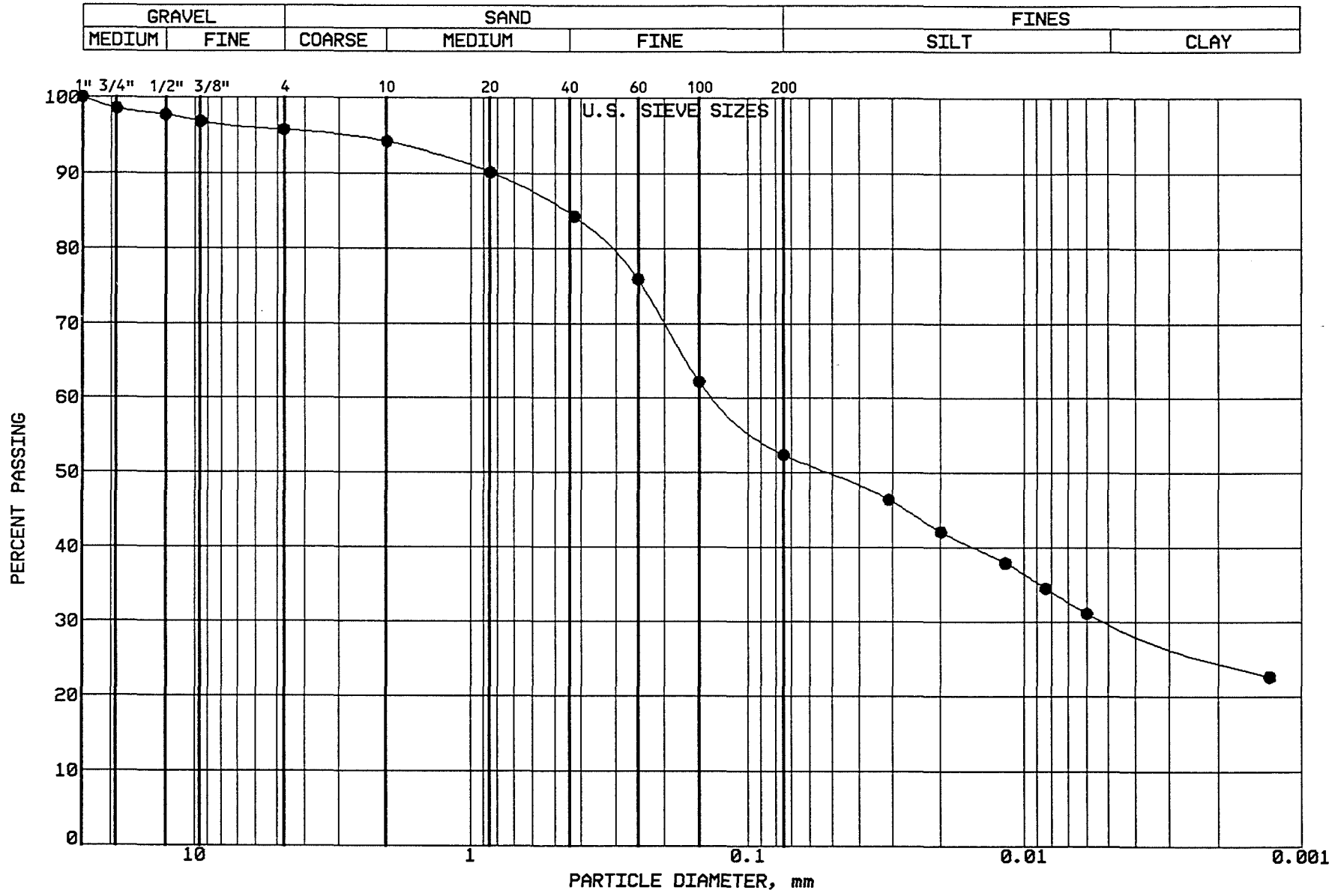
LOCATION: N 43070.0, E 43926.0
SAMPLE: SGCC230 TUBE #:
ELEVATION: 1883.8'

GRAVEL	13.0 %
SAND	40.2 %
SILT	20.4 %
CLAY	26.4 %
P 200	46.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND (SC), olive brown

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43074.0, E 43743.0
SAMPLE: SGCC231 TUBE #:
ELEVATION: 1882.7'

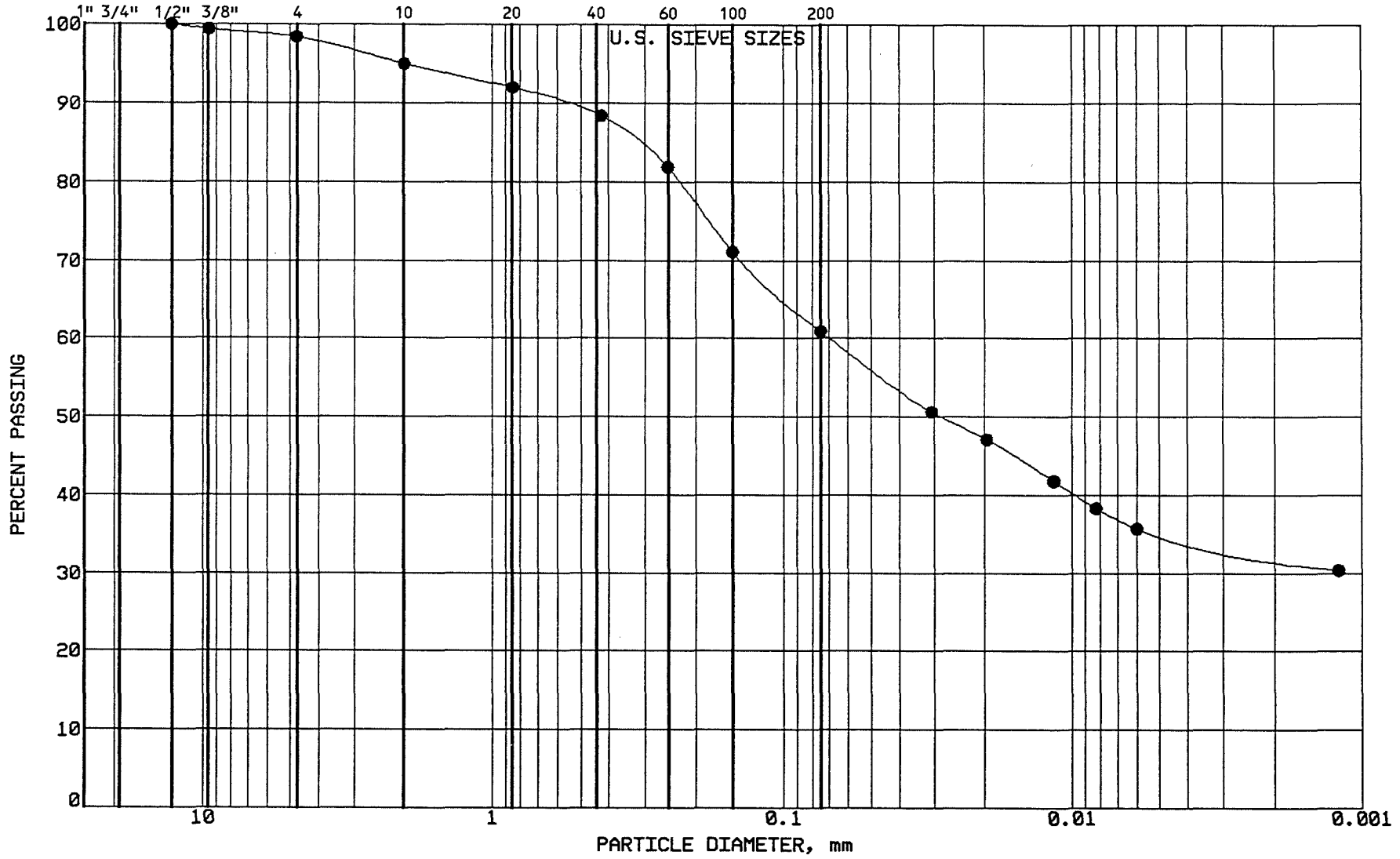
GRAVEL	4.3 %
SAND	43.3 %
SILT	22.3 %
CLAY	30.1 %
P 200	52.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43071.0, E 43577.0
SAMPLE: SGCC232 TUBE #:
ELEVATION: 1881.9'

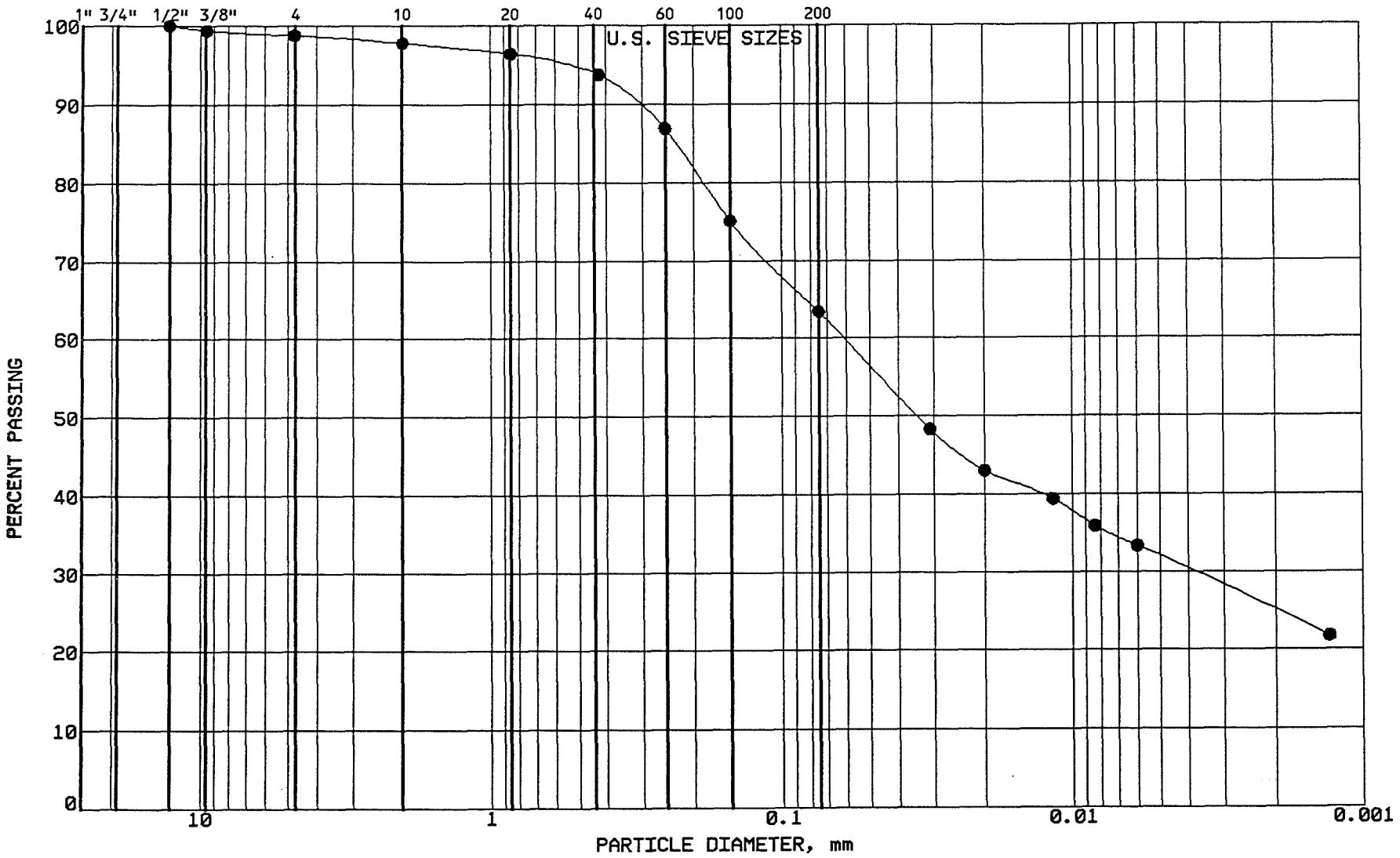
GRAVEL	1.6 %
SAND	37.5 %
SILT	25.8 %
CLAY	35.1 %
P 200	60.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

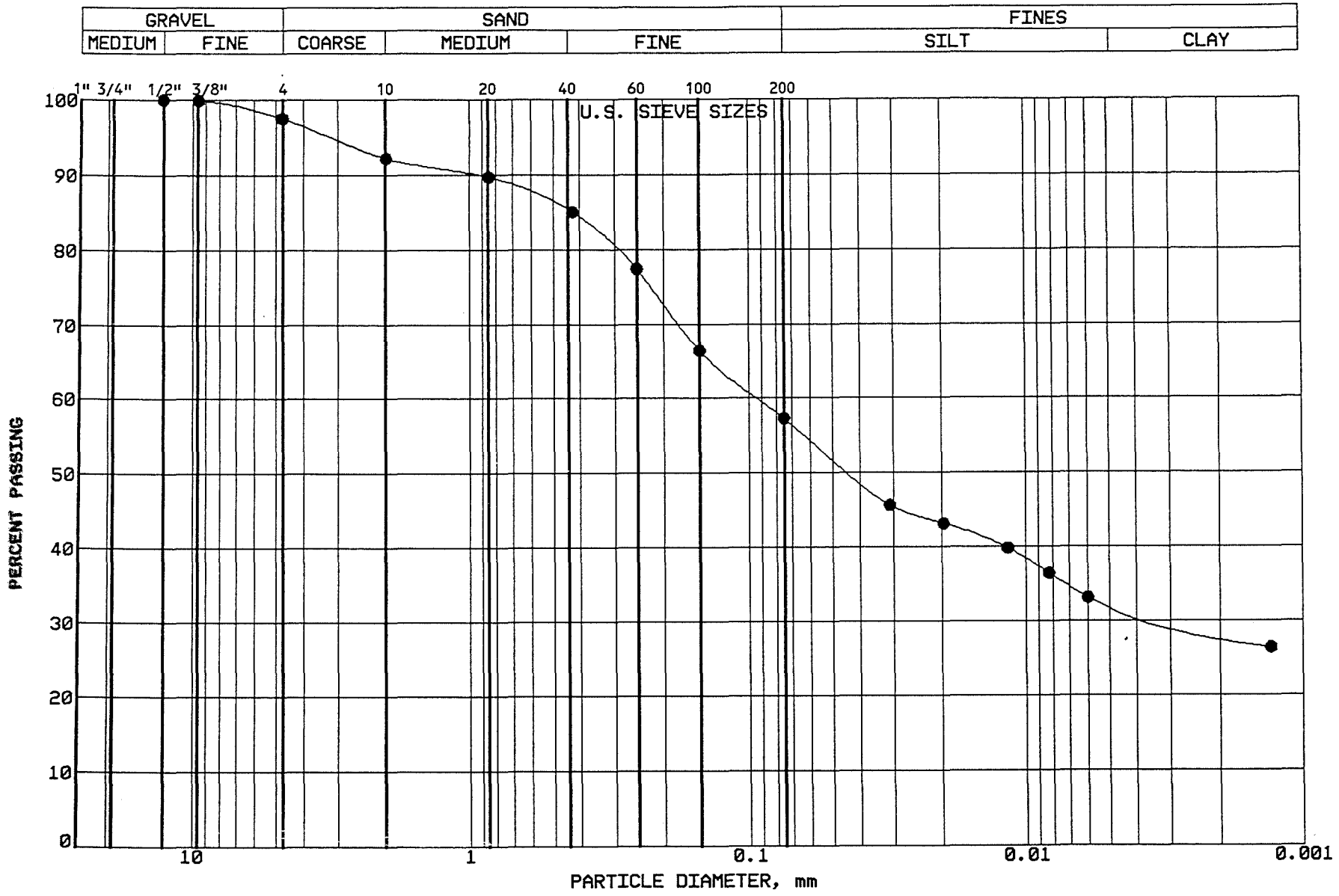
LOCATION: N 42537.0, E 44178.0
SAMPLE: CLSCC233 TUBE #: ST-47B
ELEVATION: 1887.6'

GRAVEL	1.2 %
SAND	35.4 %
SILT	31.5 %
CLAY	31.9 %
P 200	63.4 %

SOIL PROPERTIES

LL: 37.0%
PL: 14.0%
PI: 23.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42562.0, E 44199.0
SAMPLE: CLSCC234 TUBE #:
ELEVATION: 1889.1'

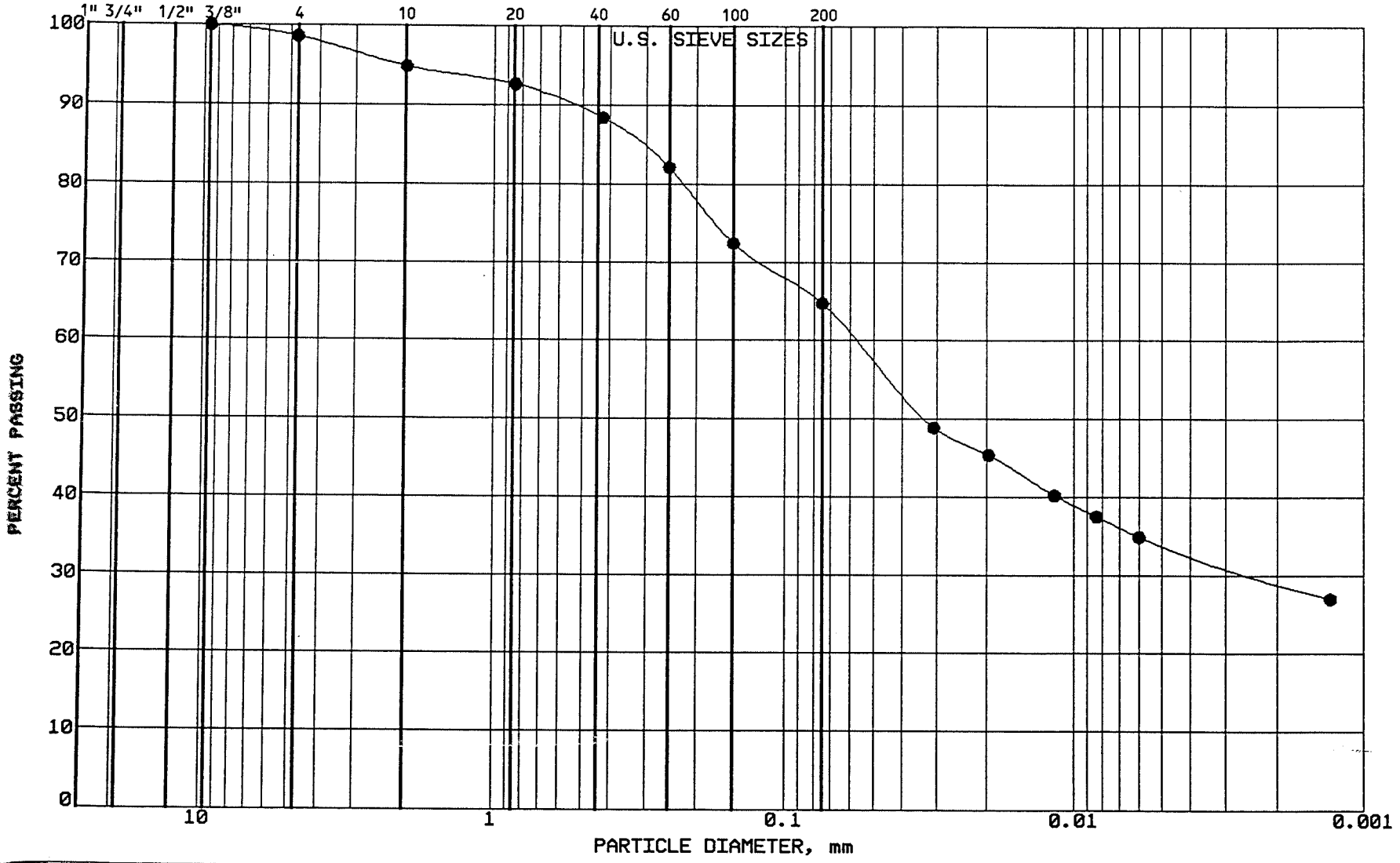
GRAVEL	2.5 %
SAND	40.2 %
SILT	25.0 %
CLAY	32.3 %
P 200	57.3 %

SOIL PROPERTIES

LL: 42.0%
PL: 16.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) dk.gr.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43210.0, E 44406.0
SAMPLE: SGCC235 TUBE #:
ELEVATION: 1883.7'

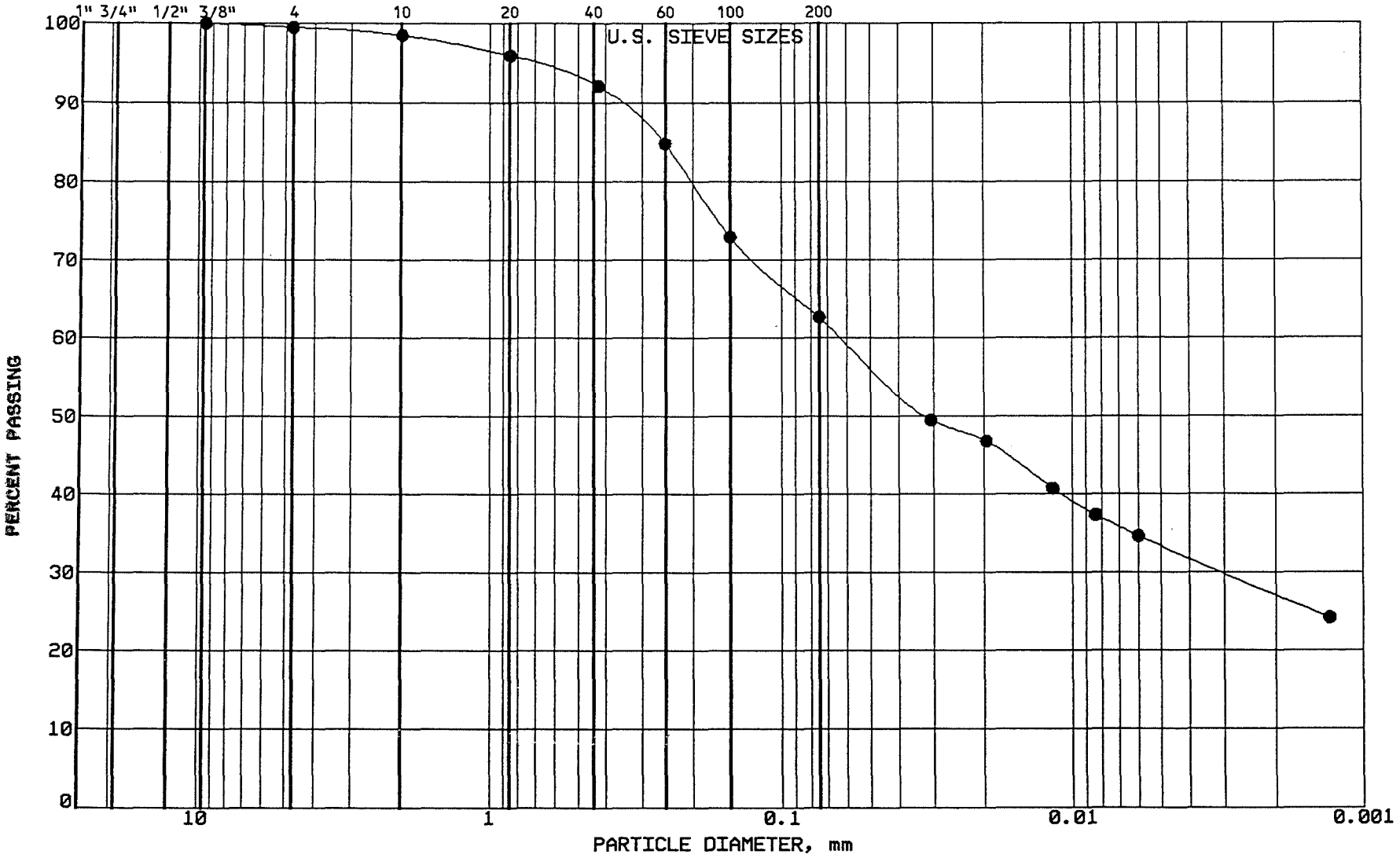
GRAVEL	1.4 %
SAND	33.9 %
SILT	30.7 %
CLAY	34.0 %
P 200	64.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43212.0, E 44168.0
SAMPLE: SGCC236 TUBE #:
ELEVATION: 1884.7'

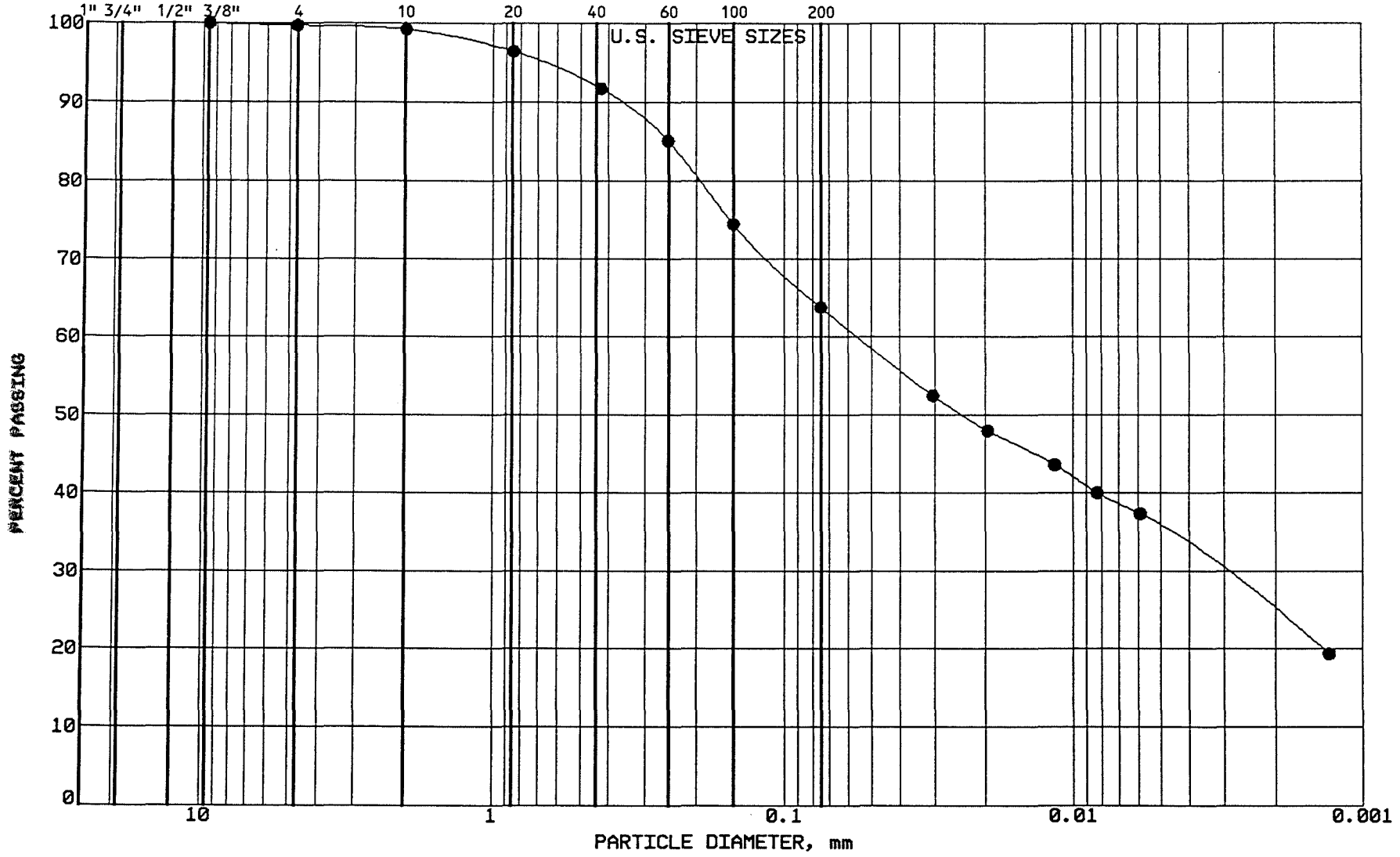
GRAVEL	0.5 %
SAND	36.9 %
SILT	29.2 %
CLAY	33.4 %
P 200	62.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

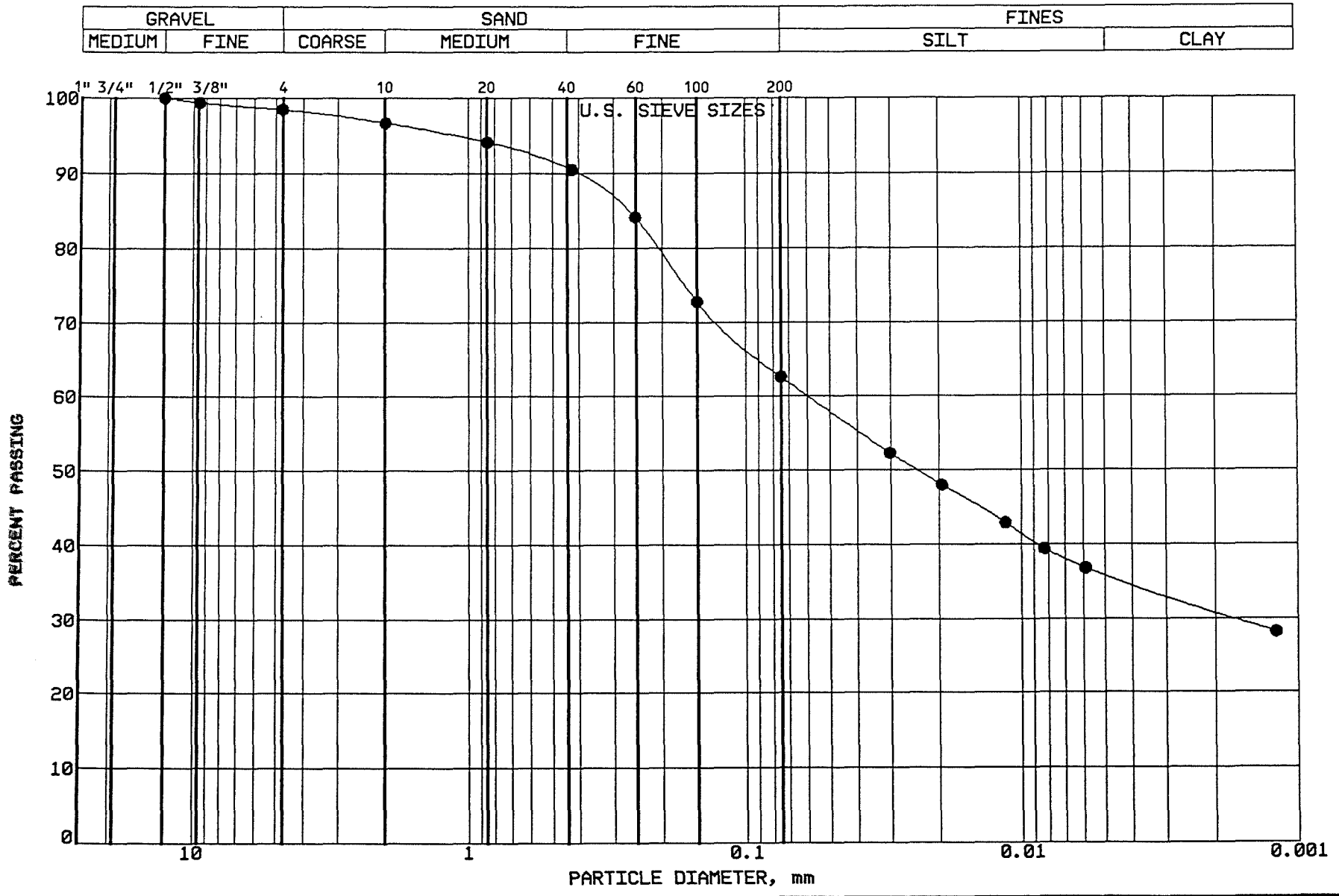
LOCATION: N 43210.0, E 43977.0
SAMPLE: SGCC237 TUBE #:
ELEVATION: 1884.7'

GRAVEL	0.3 %
SAND	35.9 %
SILT	28.5 %
CLAY	35.3 %
P 200	63.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43209.0, E 43749.0
SAMPLE: SGCC238 TUBE #:
ELEVATION: 1884.6'

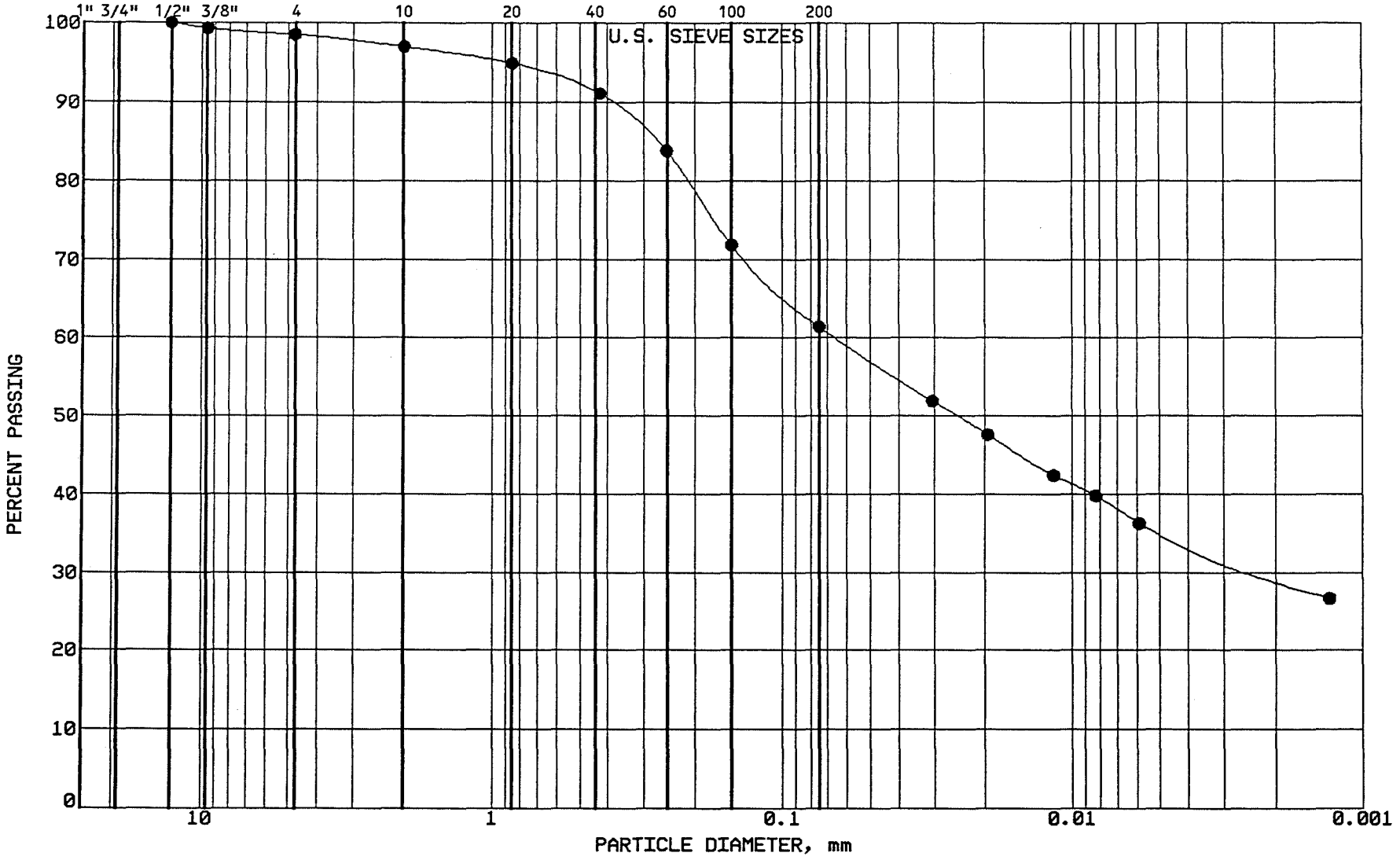
GRAVEL	1.5 %
SAND	35.9 %
SILT	26.7 %
CLAY	35.9 %
P 200	62.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43207.0, E 43574.0
SAMPLE: SGCC239 TUBE #:
ELEVATION: 1884.1'

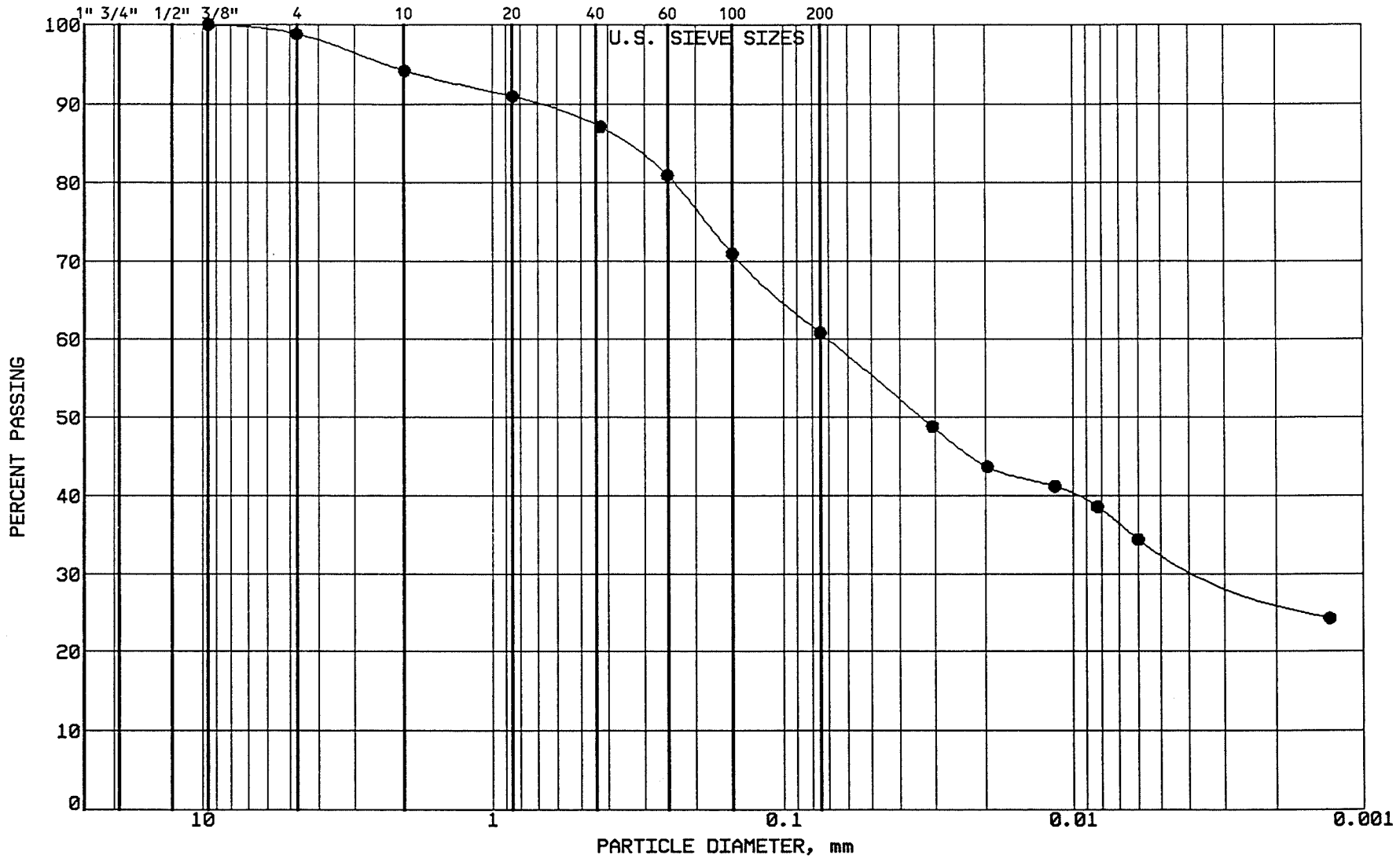
GRAVEL	1.5 %
SAND	37.1 %
SILT	26.2 %
CLAY	35.2 %
P 200	61.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42564.0, E 43297.0
SAMPLE: CLSCC240 TUBE #: ST-44R
ELEVATION: 1886.0'

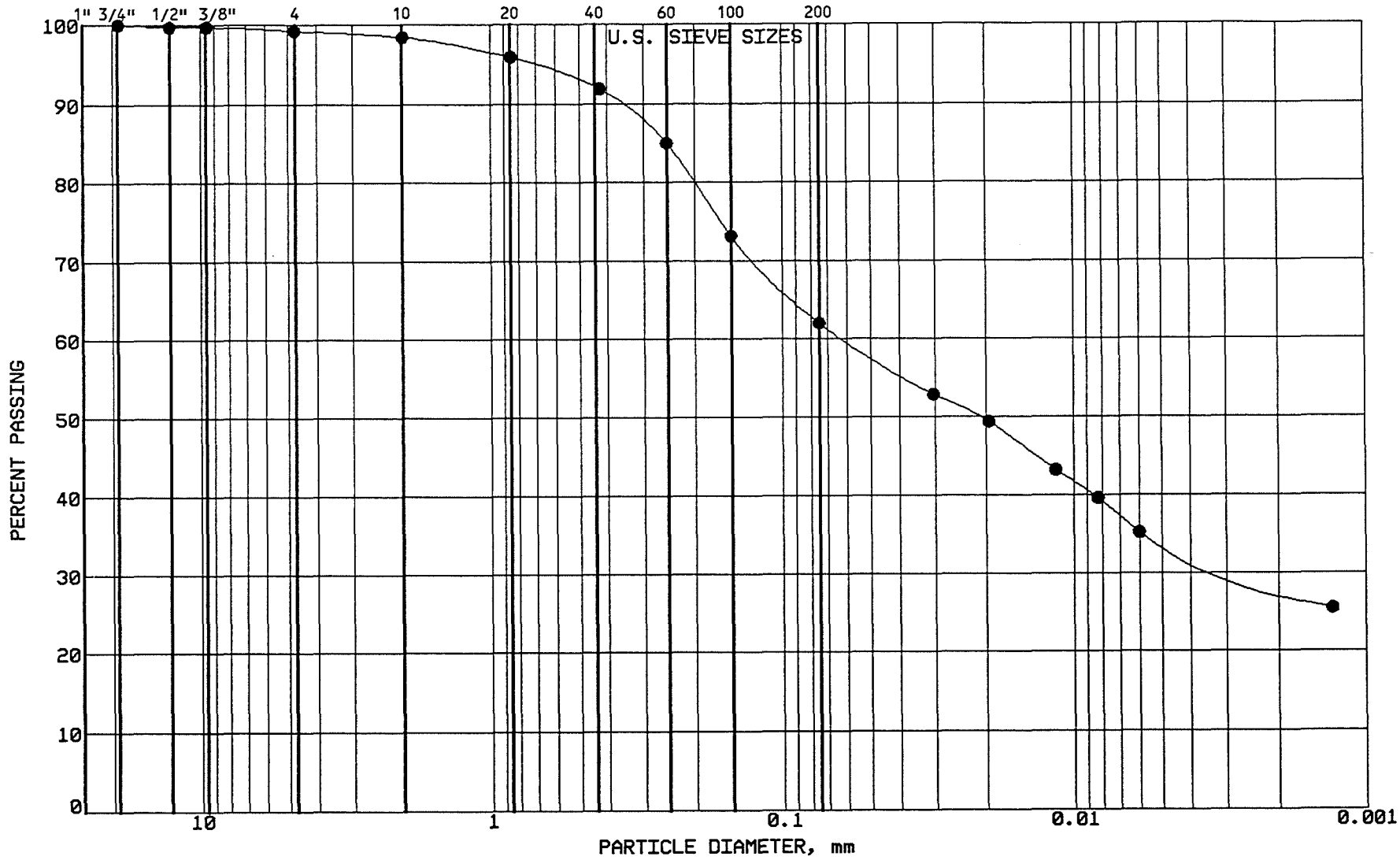
GRAVEL	1.2 %
SAND	38.0 %
SILT	27.6 %
CLAY	33.2 %
P 200	60.8 %

SOIL PROPERTIES

LL: 42.0%
PL: 15.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

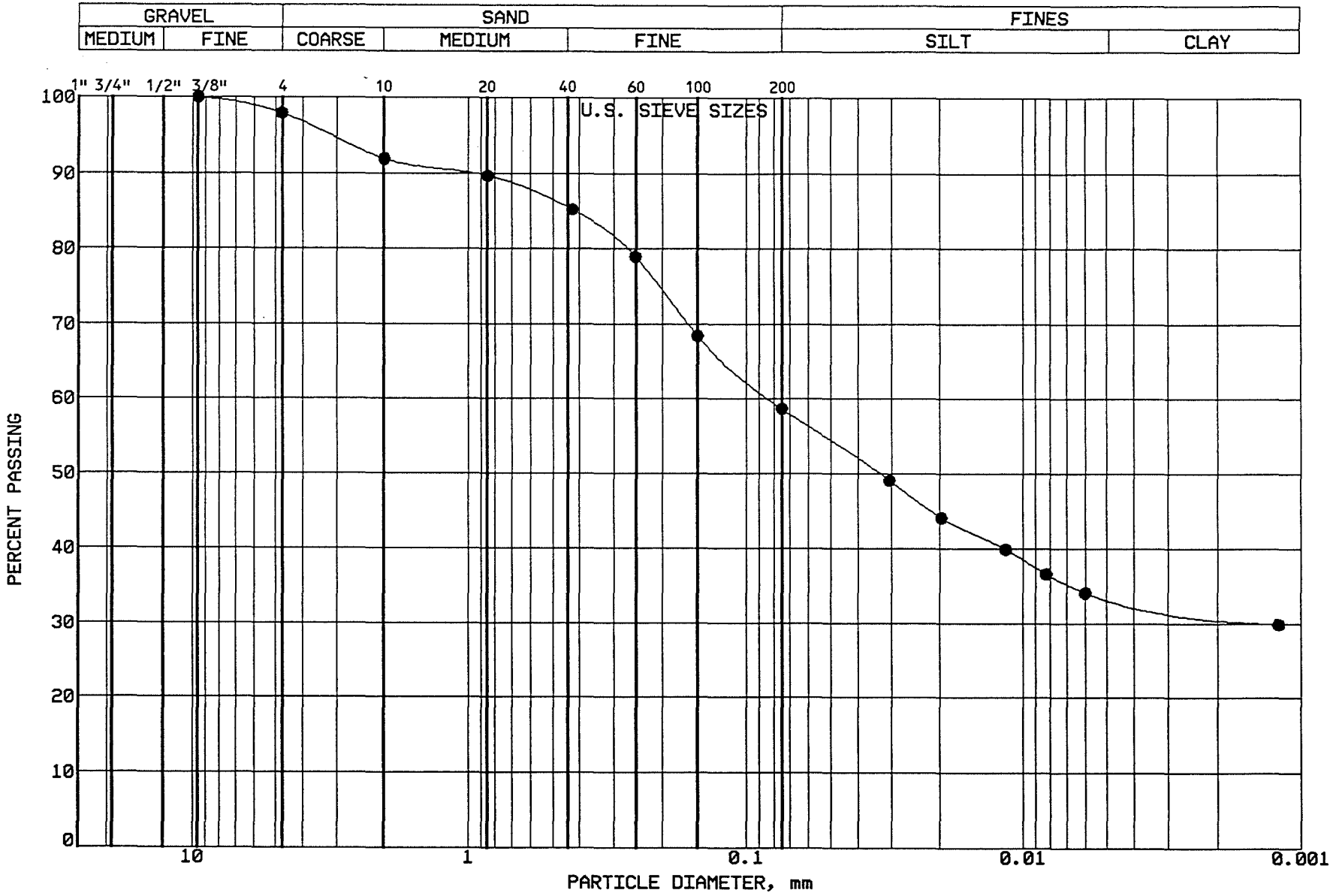
LOCATION: N 43459.0, E 43206.0
SAMPLE: CLSCC241 TUBE #: ST-48B
ELEVATION: 1889.7'

GRAVEL	0.8 %
SAND	37.2 %
SILT	28.0 %
CLAY	34.0 %
P 200	62.0 %

SOIL PROPERTIES

LL: 40.0%
PL: 16.0%
PI: 24.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

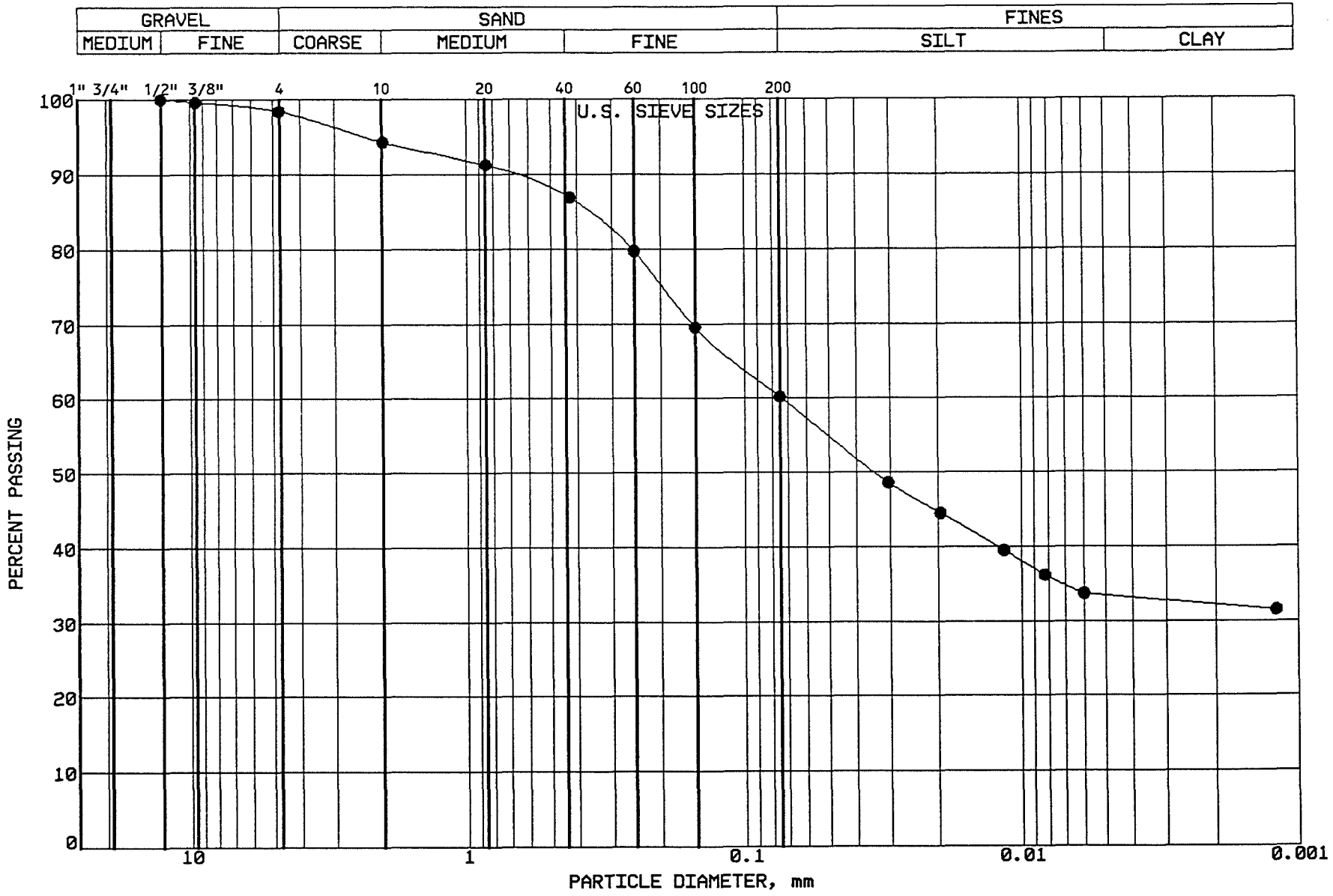
LOCATION: N 43279.0, E 43037.0
SAMPLE: CLSCC242 TUBE #: ST-49A
ELEVATION: 1891.5'

GRAVEL	2.1 %
SAND	39.2 %
SILT	25.1 %
CLAY	33.6 %
P 200	58.7 %

SOIL PROPERTIES

LL: 40.0%
PL: 15.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL) gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

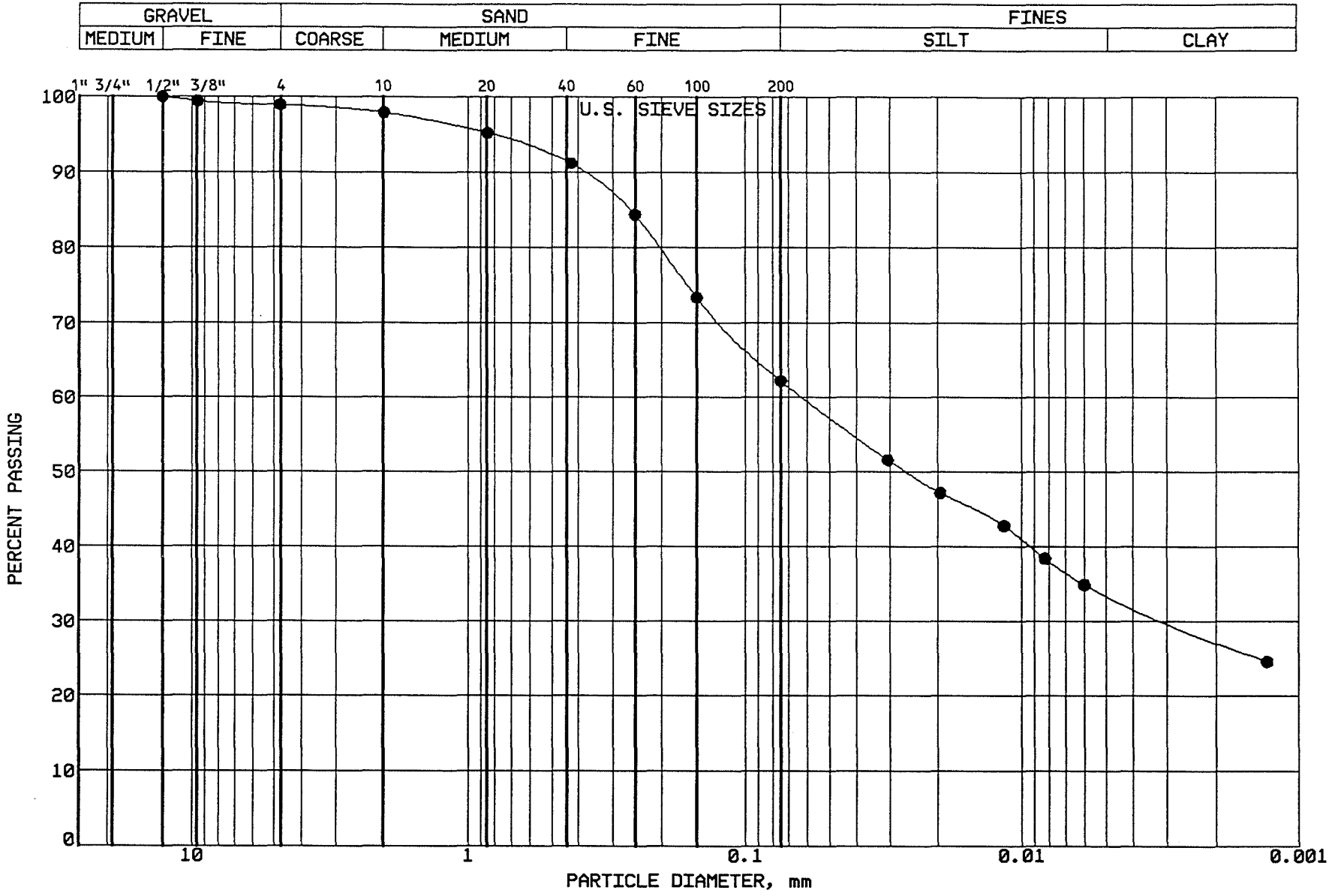
LOCATION: N 42545.0, E 43587.0
SAMPLE: CLSCC243 TUBE #: ST-50A
ELEVATION: 1889.7'

GRAVEL	1.6 %
SAND	38.2 %
SILT	26.7 %
CLAY	33.5 %
P 200	60.2 %

SOIL PROPERTIES

LL: 42.0%
PL: 14.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

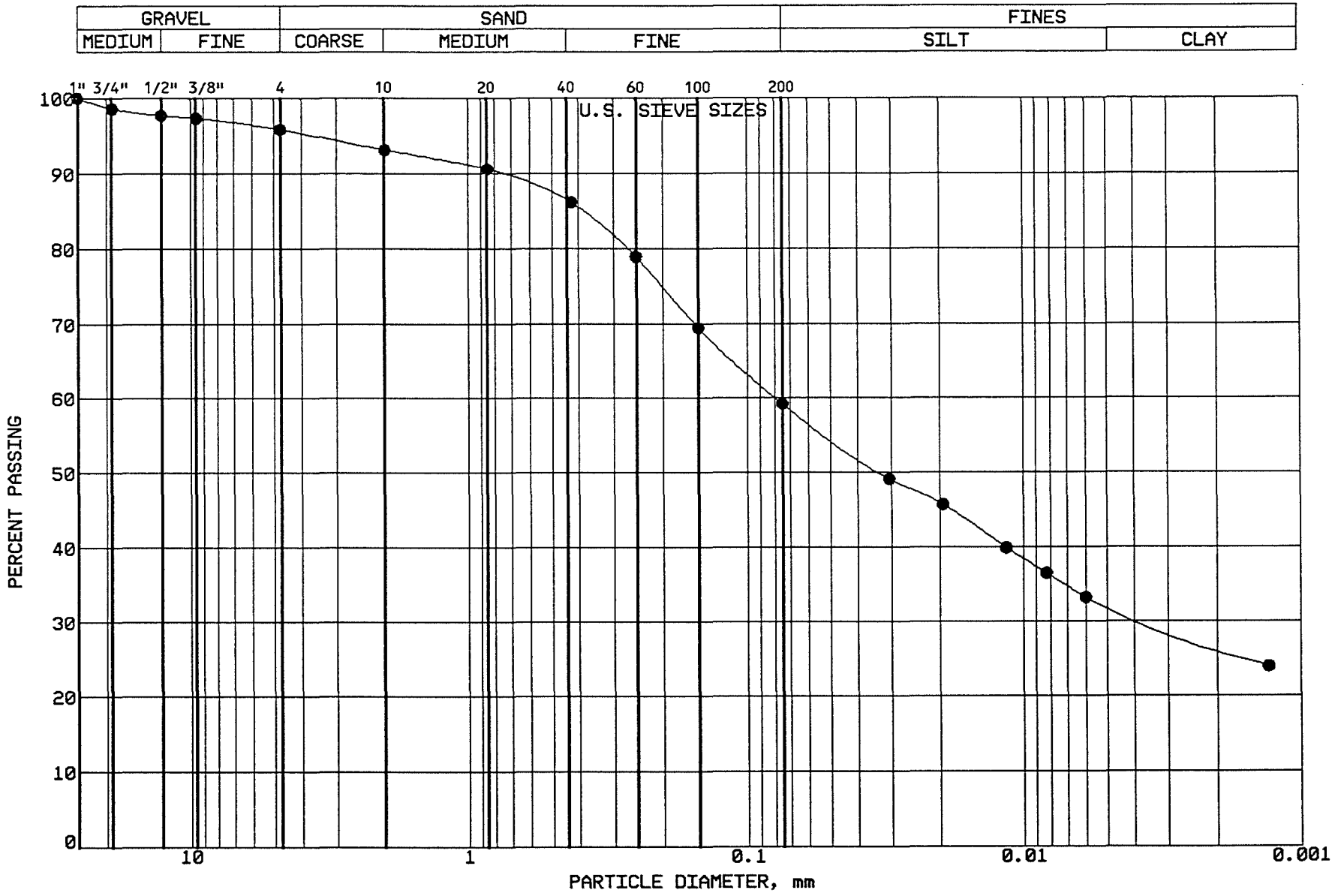
LOCATION: N 43000.0, E 43049.0
SAMPLE: CLSCC244 TUBE #: ST-51A
ELEVATION: 1891.2'

GRAVEL	1.1 %
SAND	36.7 %
SILT	28.5 %
CLAY	33.7 %
P 200	62.2 %

SOIL PROPERTIES

LL: 40.0%
PL: 15.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

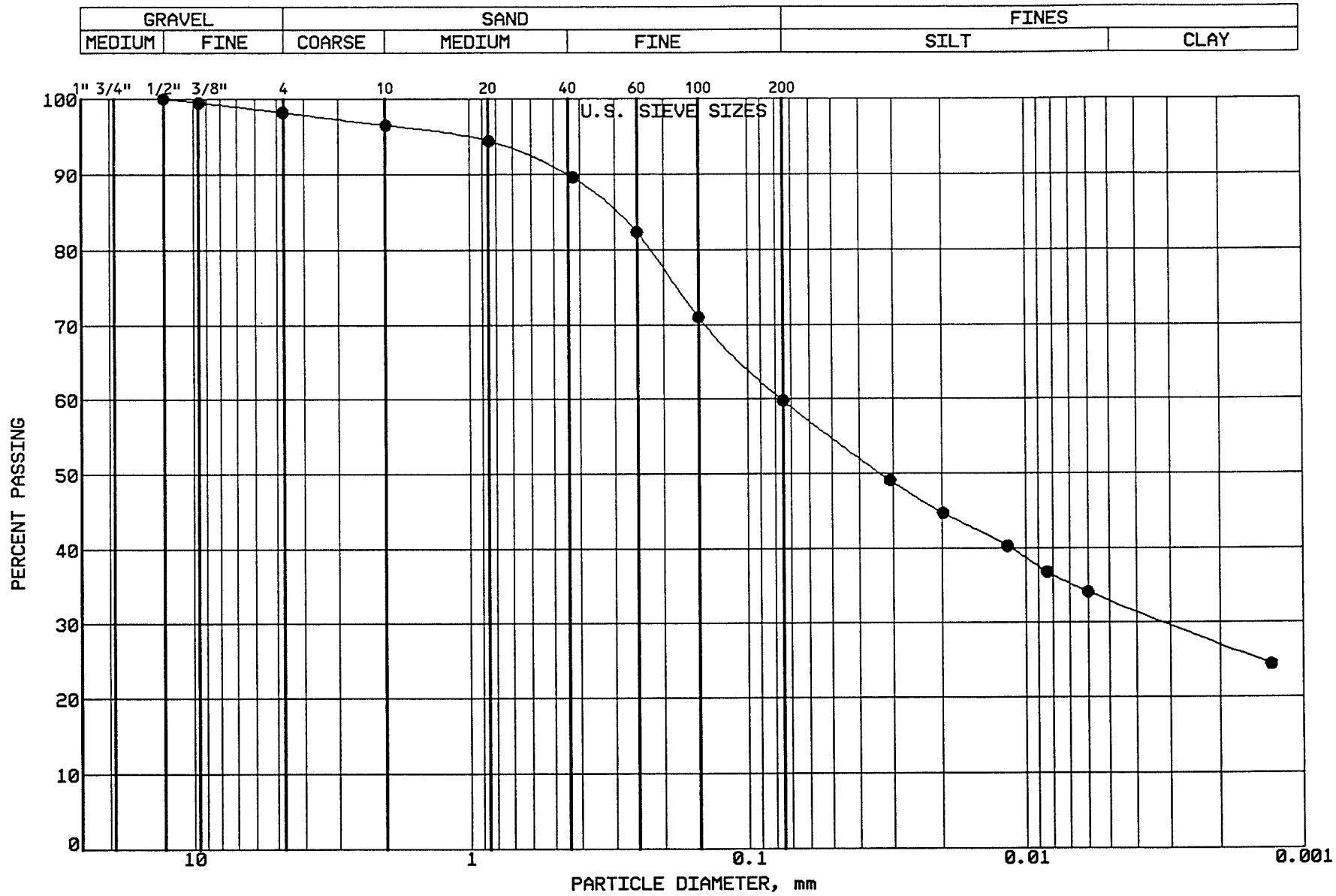
LOCATION: N 42785.0, E 43206.0
SAMPLE: SGCC245 TUBE #:
ELEVATION: 1872.8'

GRAVEL	4.2 %
SAND	36.6 %
SILT	27.1 %
CLAY	32.1 %
P 200	59.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42663.0, E 43213.0
SAMPLE: SGCC246 TUBE #:
ELEVATION: 1873.8'

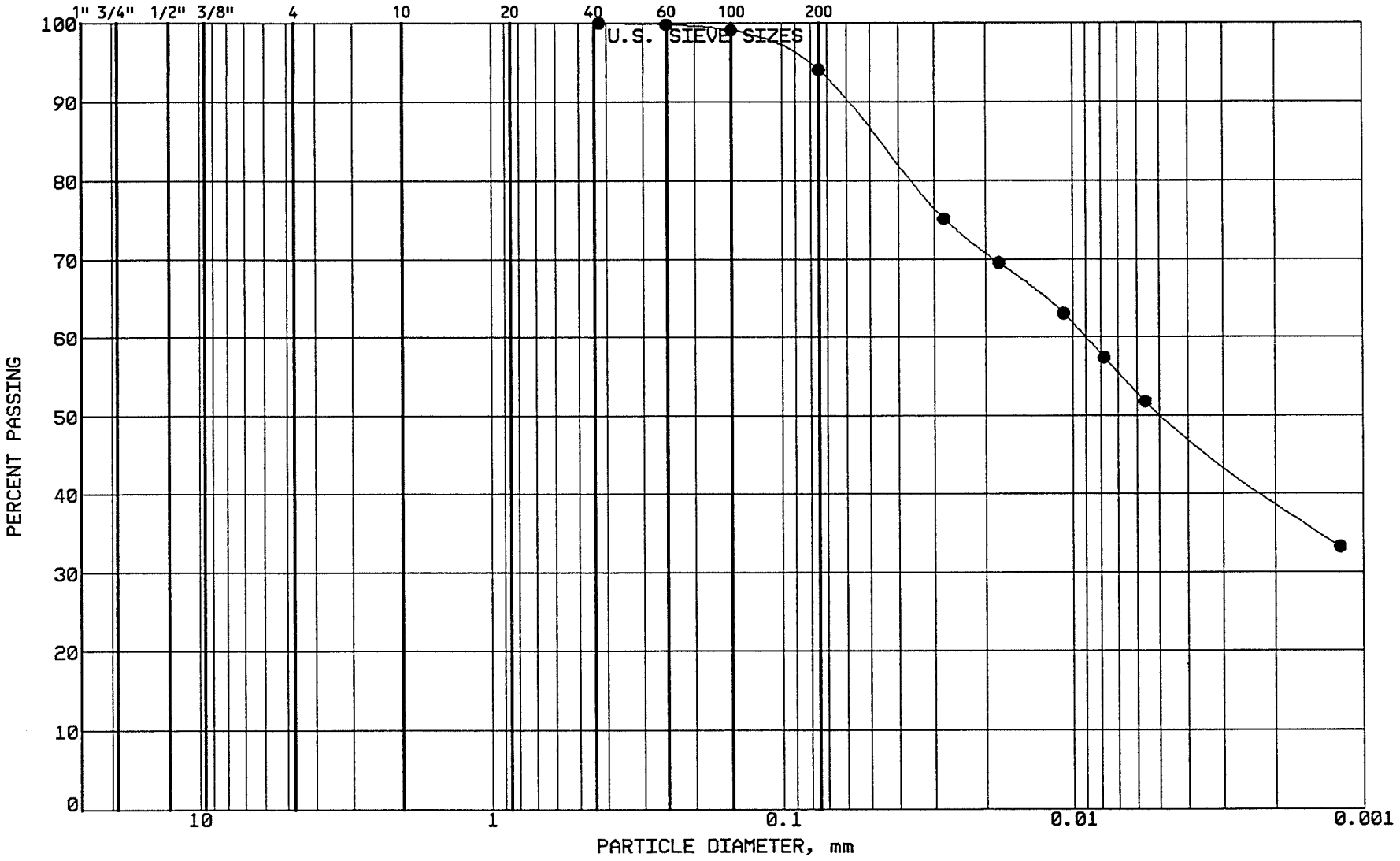
GRAVEL	1.8 %
SAND	38.4 %
SILT	26.9 %
CLAY	32.9 %
P 200	59.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

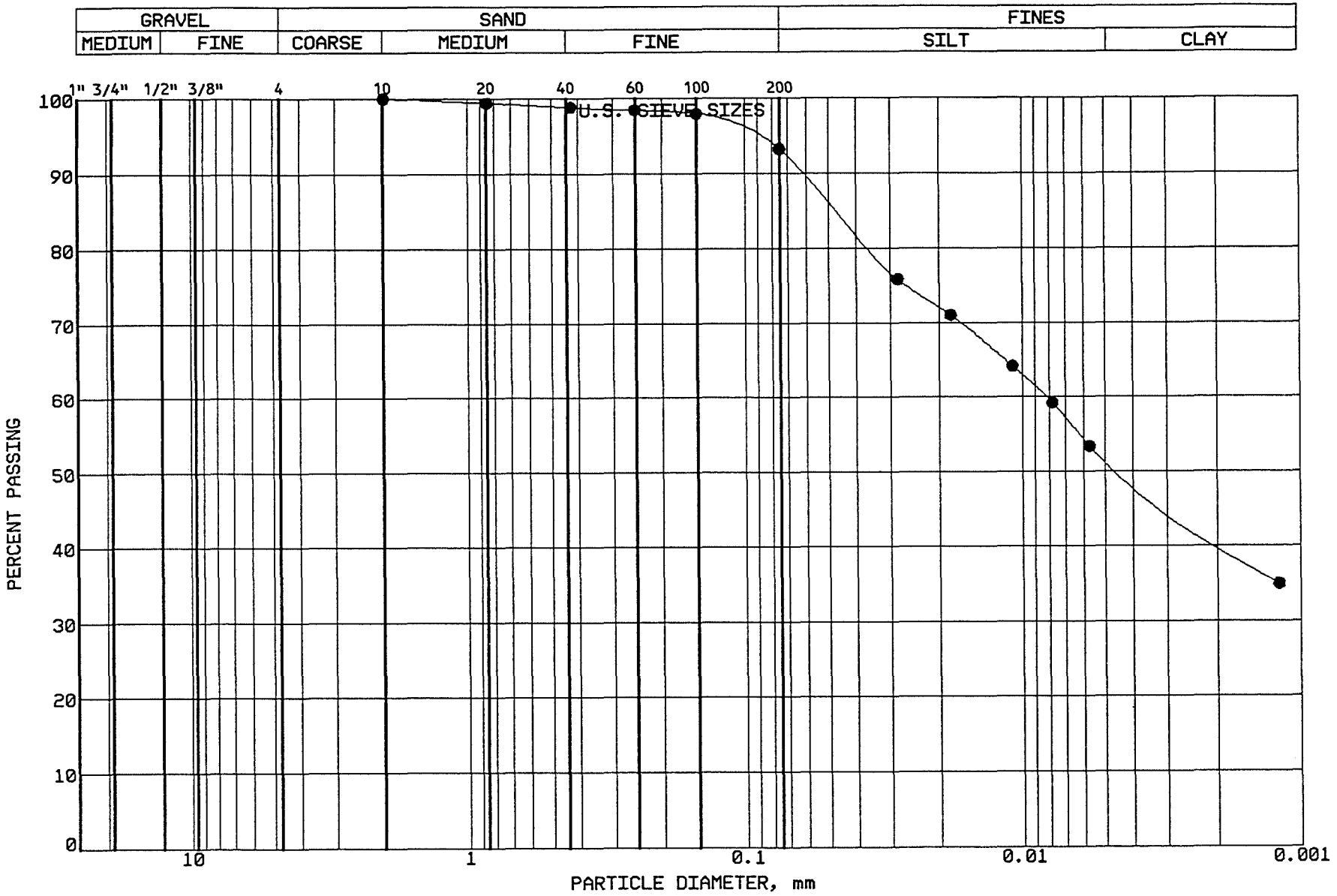
PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota
LOCATION: NW Stockpile
SAMPLE: CLBCC247 TUBE #:
ELEVATION: '

GRAVEL	0.0 %
SAND	6.0 %
SILT	43.6 %
CLAY	50.4 %
P 200	94.0 %

SOIL PROPERTIES

LL: 55.0%
PL: 20.0%
PI: 35.0%
CLASS: FAT CLAY (CH), vy.dk.gr.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: NW Stockpile
SAMPLE: CLBCC248 TUBE #:
ELEVATION: '

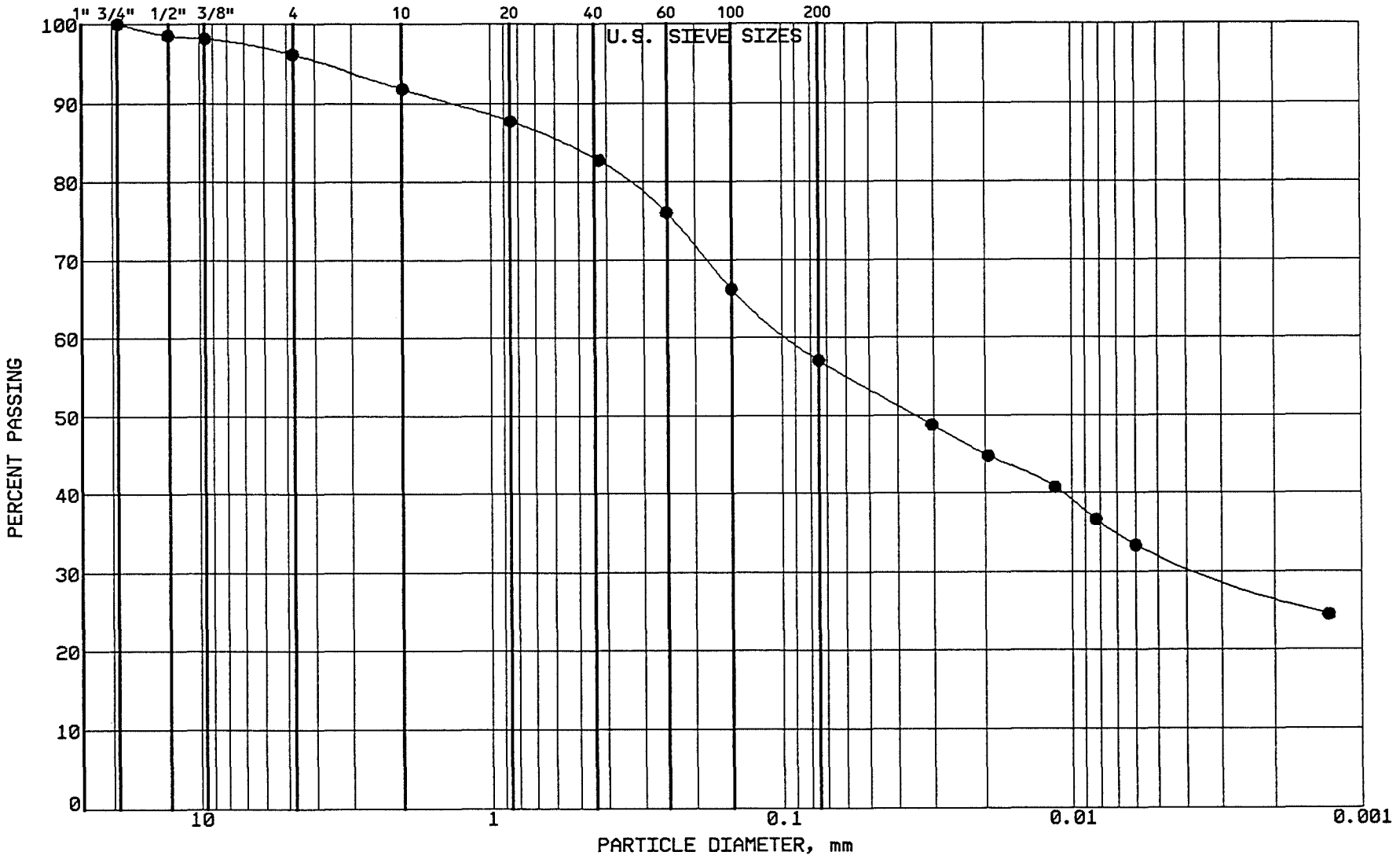
GRAVEL	0.0 %
SAND	6.8 %
SILT	41.4 %
CLAY	51.8 %
P 200	93.2 %

SOIL PROPERTIES

LL: 54.0%
PL: 19.0%
PI: 35.0%
CLASS: FAT CLAY (CH), vy.dk.gr.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42800.0, E 43200.0
SAMPLE: CLBCC249 TUBE #:
ELEVATION: 1873.0'

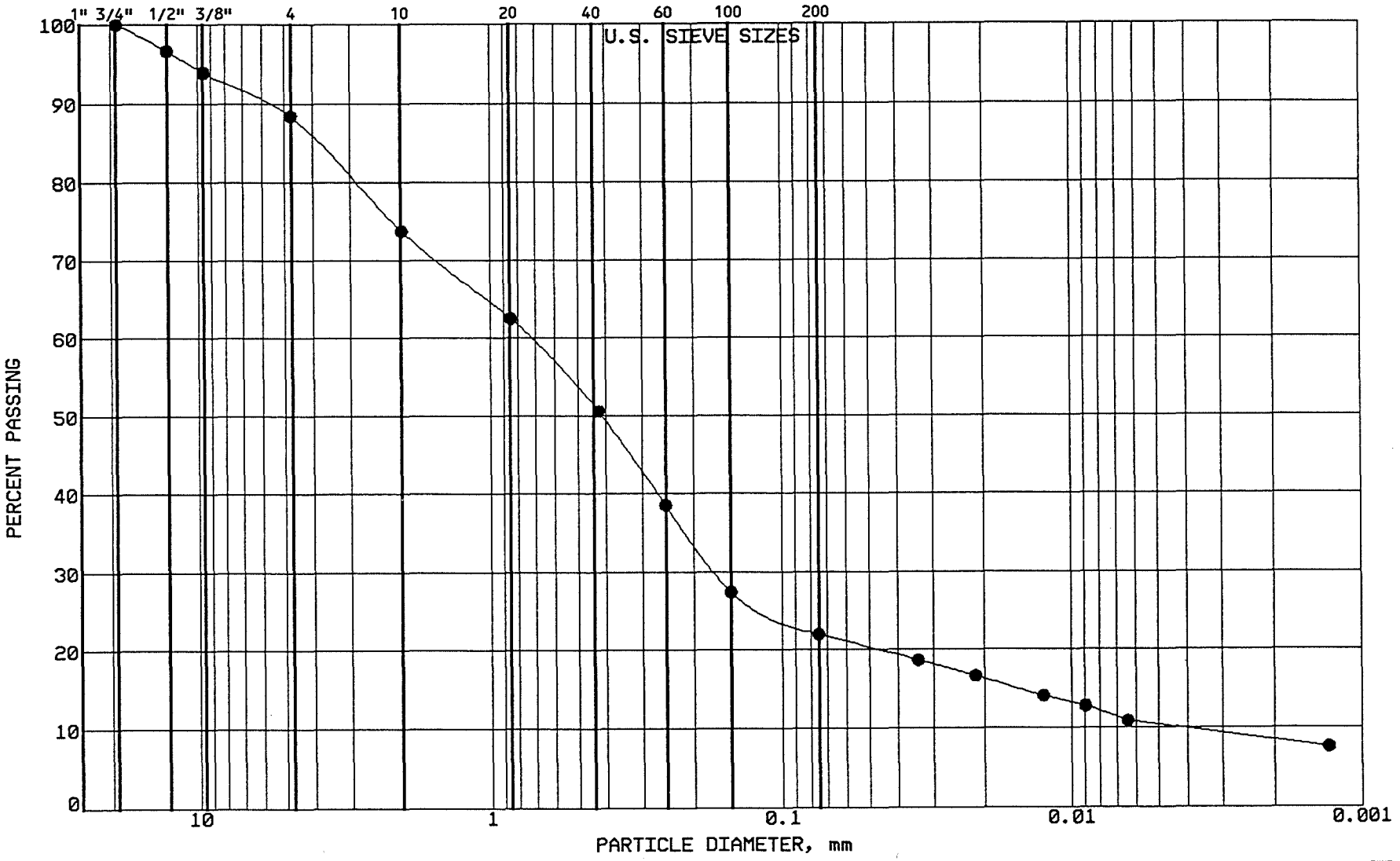
GRAVEL	3.9 %
SAND	39.0 %
SILT	24.8 %
CLAY	32.3 %
P 200	57.1 %

SOIL PROPERTIES

LL: 39.0%
PL: 15.0%
PI: 24.0%
CLASS: SANDY LEAN CLAY (CL), ol.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42887.0, E 45668.0
SAMPLE: SGCC250 TUBE #:
ELEVATION: 1880.9'

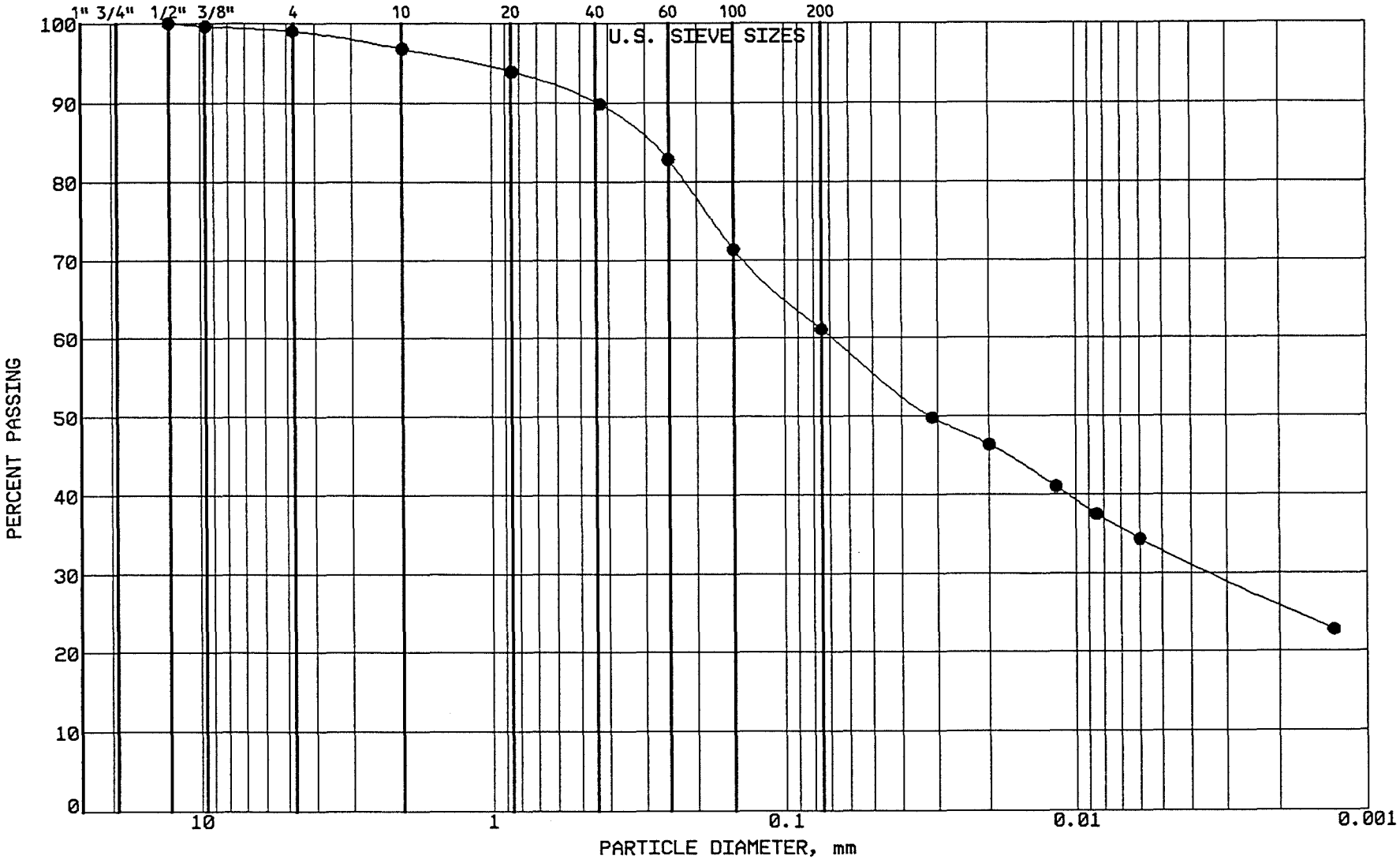
GRAVEL	11.6 %
SAND	66.4 %
SILT	11.6 %
CLAY	10.4 %
P 200	22.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND (SM), olive brown

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43084.0, E 45662.0
SAMPLE: SGCC251 TUBE #:
ELEVATION: 1881.7'

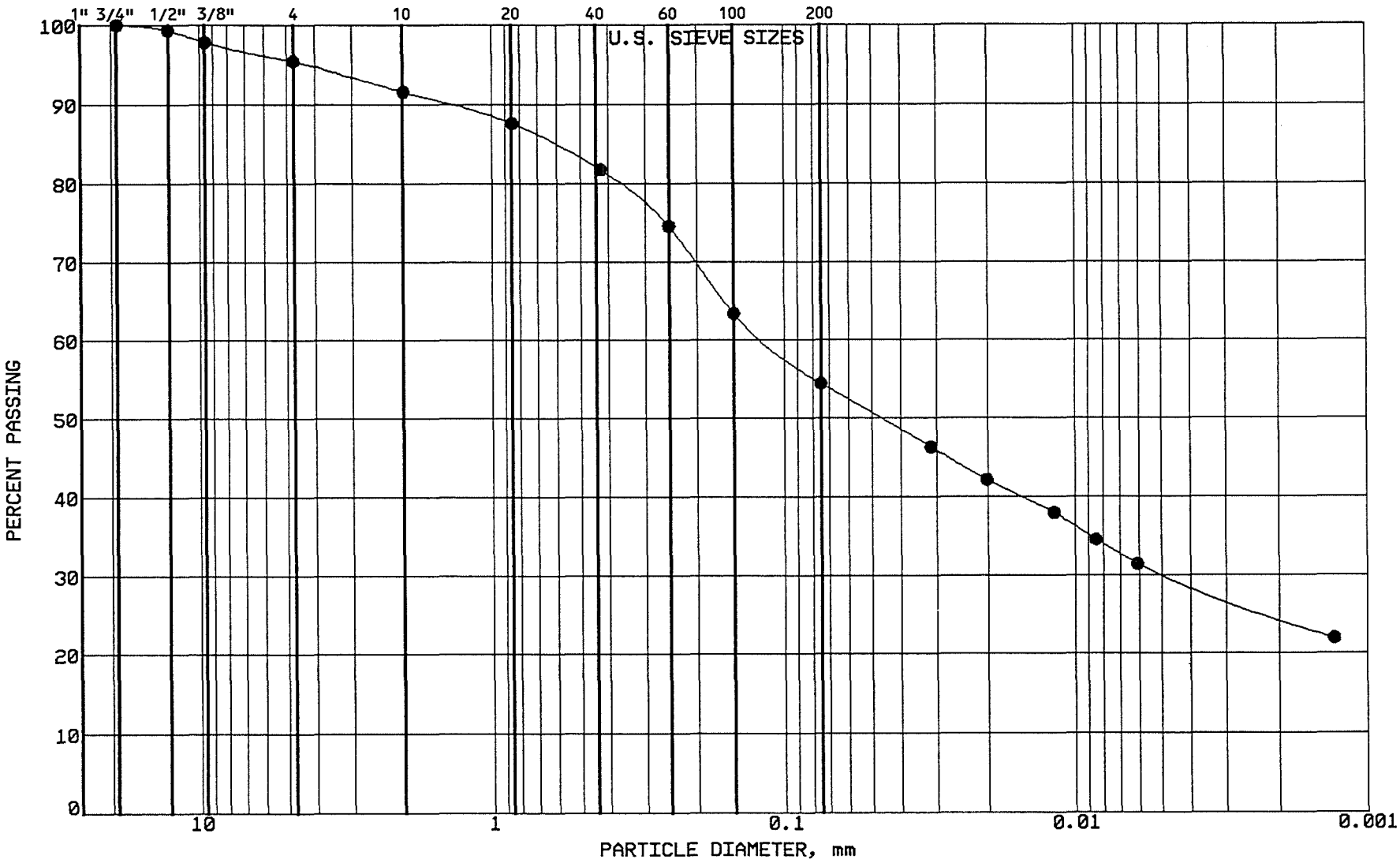
GRAVEL	1.0 %
SAND	37.9 %
SILT	28.2 %
CLAY	32.9 %
P 200	61.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43244.0, E 45659.0
SAMPLE: SGCC252 TUBE #:
ELEVATION: 1883.1'

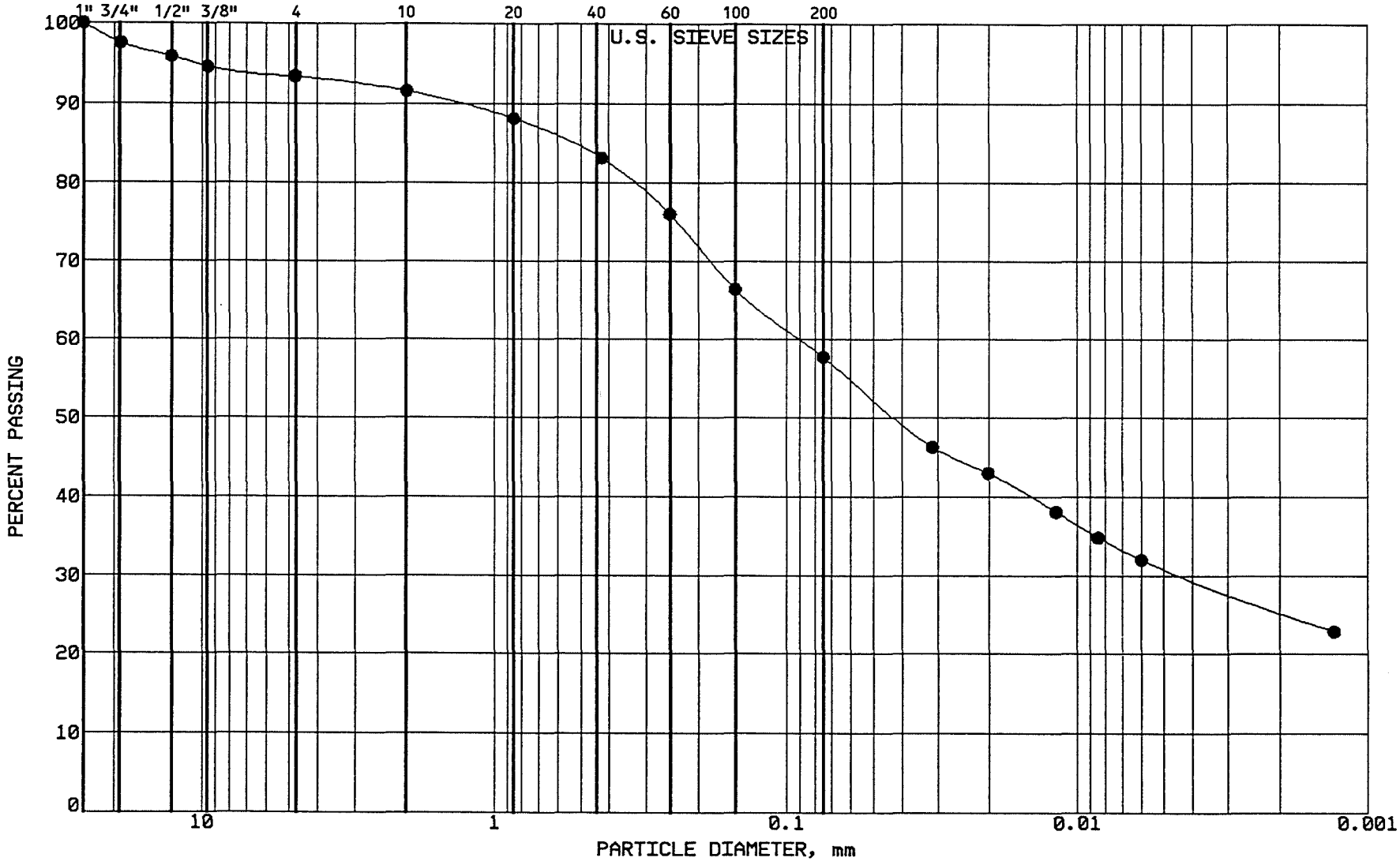
GRAVEL	4.6 %
SAND	40.9 %
SILT	24.3 %
CLAY	30.2 %
P 200	54.5 %

SOIL PROPERTIES

LL: 39.0%
PL: 17.0%
PI: 22.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42891.0, E 43337.0
SAMPLE: SGCC253 TUBE #:
ELEVATION: 1879.5'

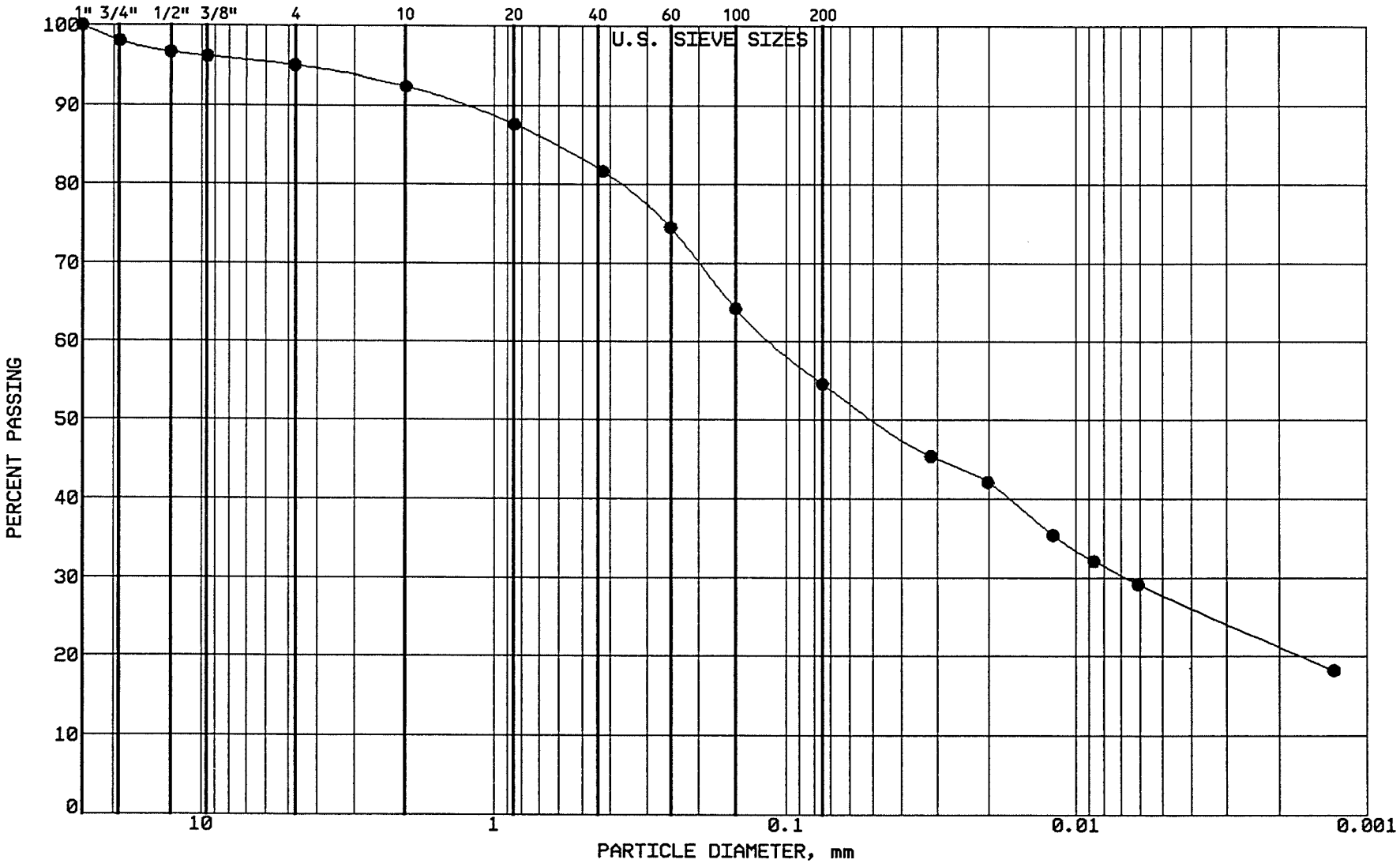
GRAVEL	6.6 %
SAND	35.6 %
SILT	26.9 %
CLAY	30.9 %
P 200	57.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42712.0, E 43334.0
SAMPLE: SGCC254 TUBE #:
ELEVATION: 1879.6'

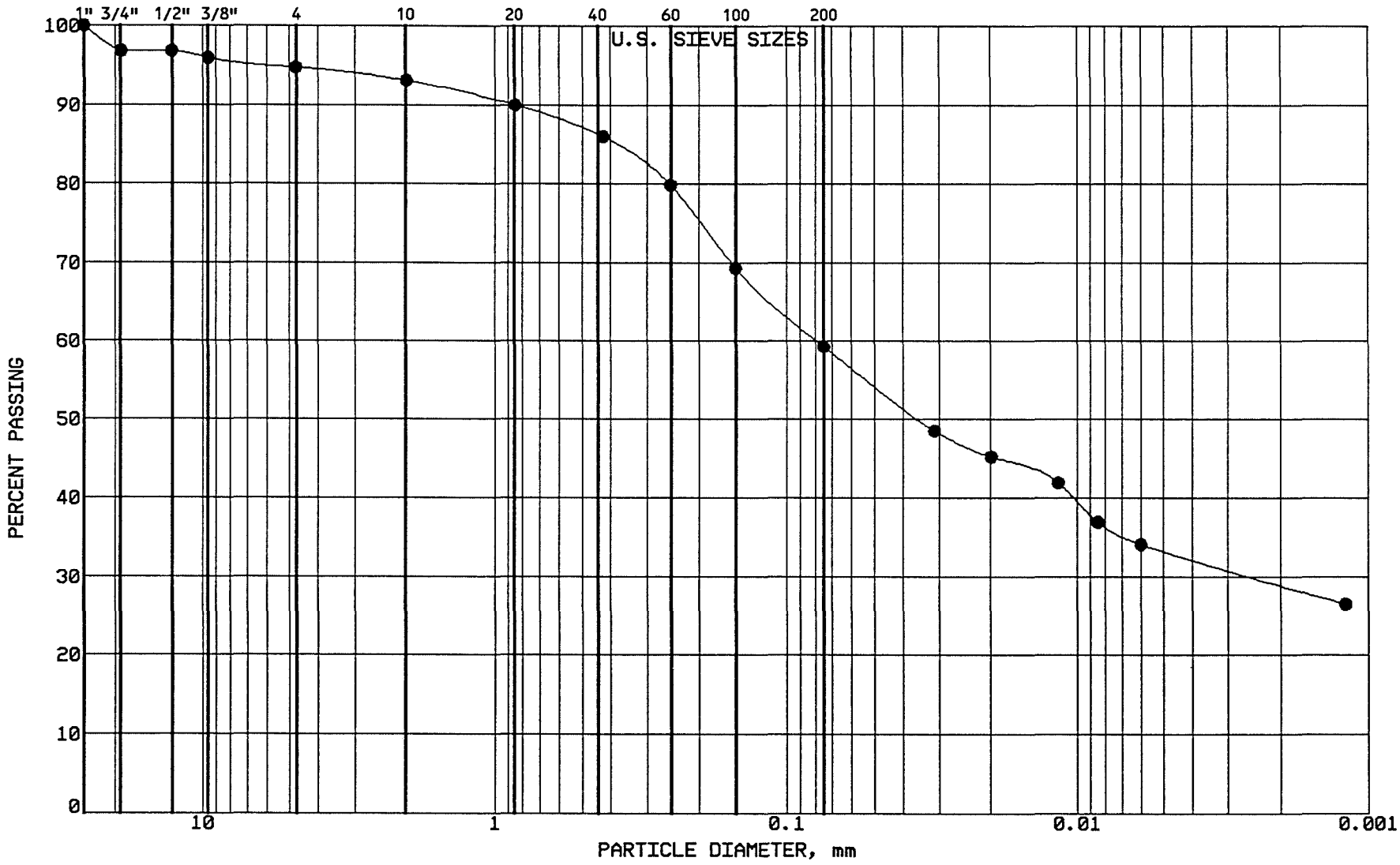
GRAVEL	5.0 %
SAND	40.4 %
SILT	26.8 %
CLAY	27.8 %
P 200	54.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42700.0, E 43110.0
SAMPLE: SGCC255 TUBE #:
ELEVATION: 1881.6'

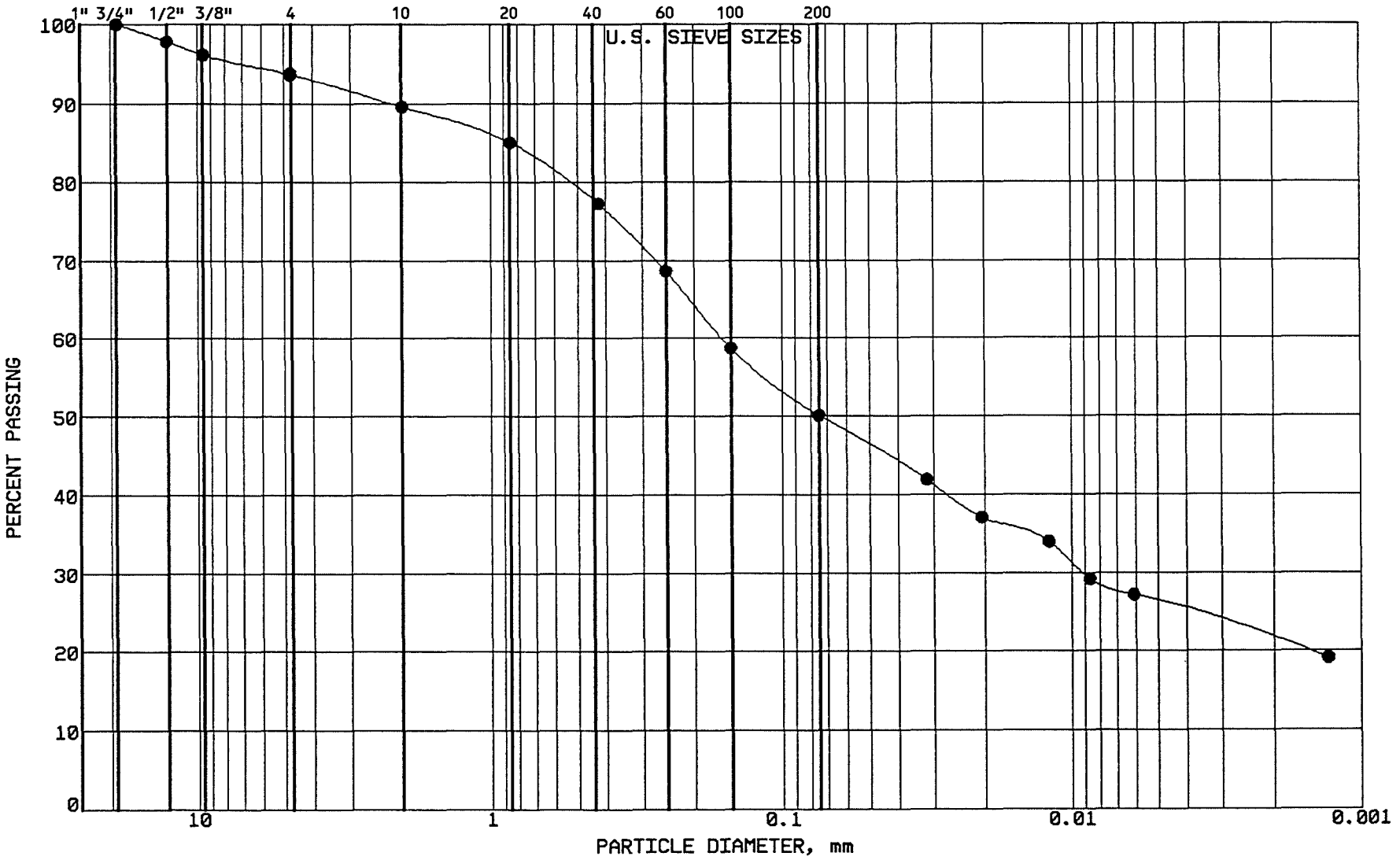
GRAVEL	5.3 %
SAND	35.4 %
SILT	26.1 %
CLAY	33.2 %
P 200	59.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42899.0, E 43114.0
SAMPLE: SGCC256 TUBE #:
ELEVATION: 1880.4'

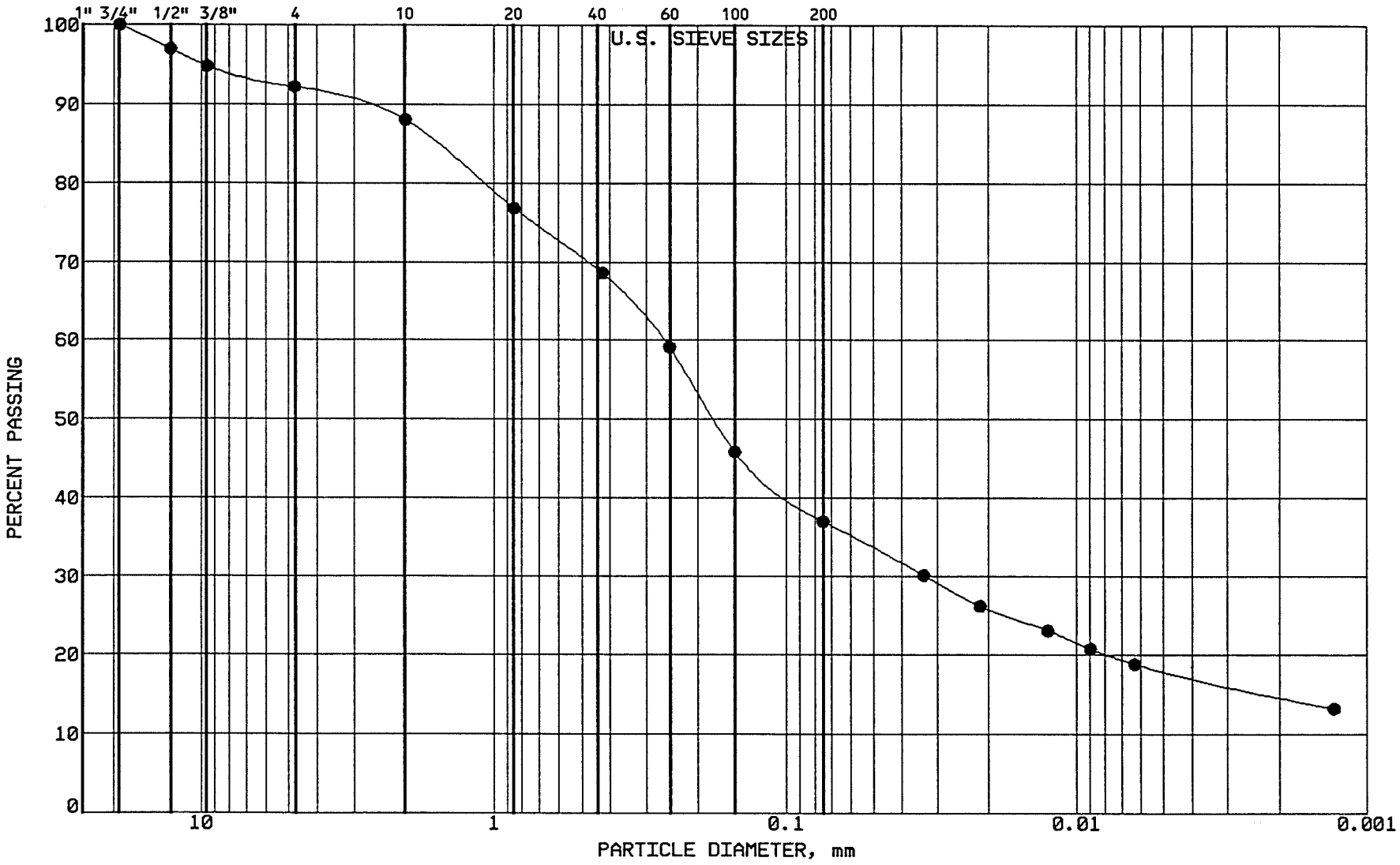
GRAVEL	6.3 %
SAND	43.6 %
SILT	23.9 %
CLAY	26.2 %
P 200	50.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43321.0, E 43126.0
SAMPLE: SGCC257 TUBE #:
ELEVATION: 1882.1'

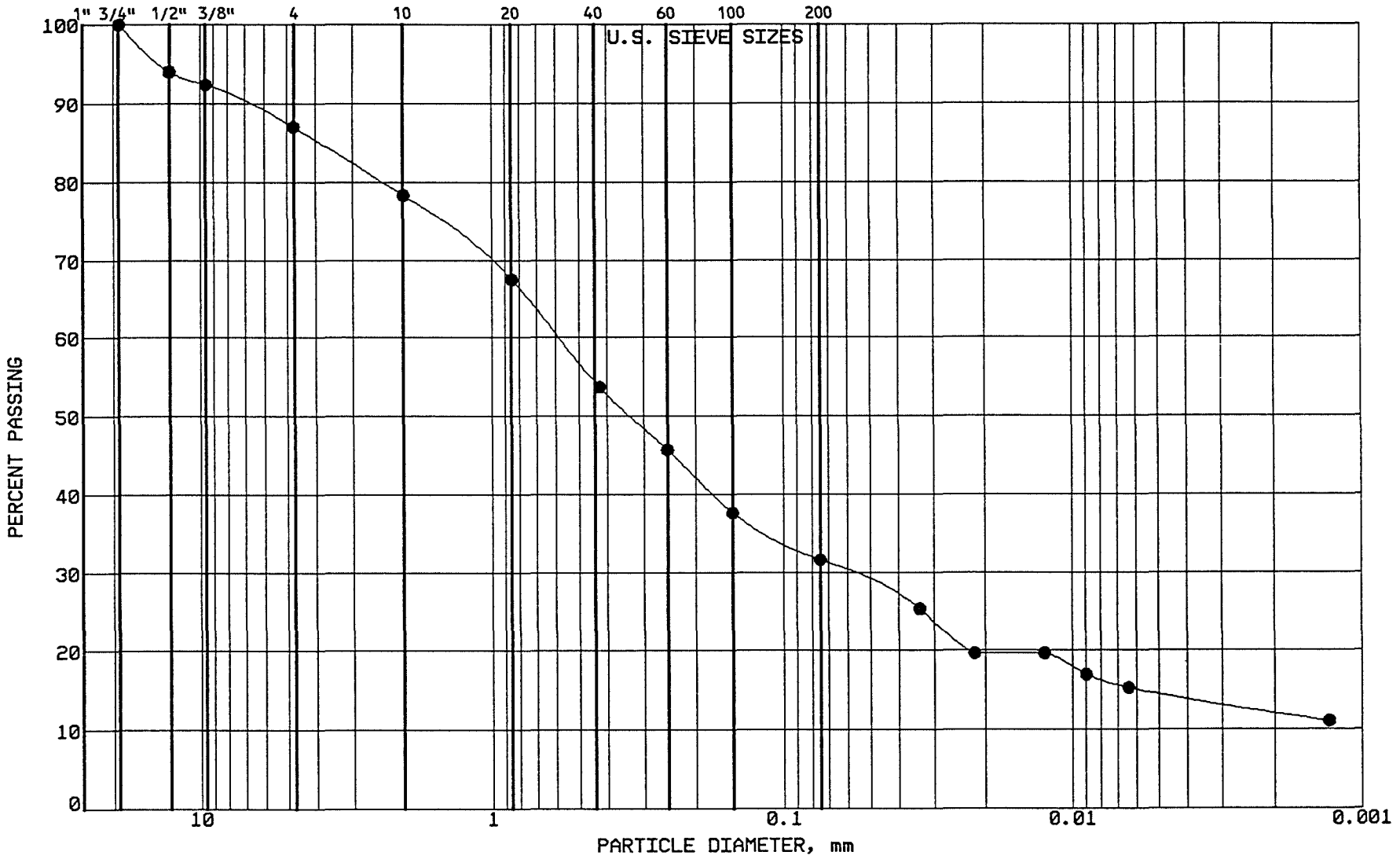
GRAVEL	7.8 %
SAND	55.2 %
SILT	18.9 %
CLAY	18.1 %
P 200	37.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND (SM)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43103.0, E 43185.0
SAMPLE: SGCC258 TUBE #:
ELEVATION: 1881.0'

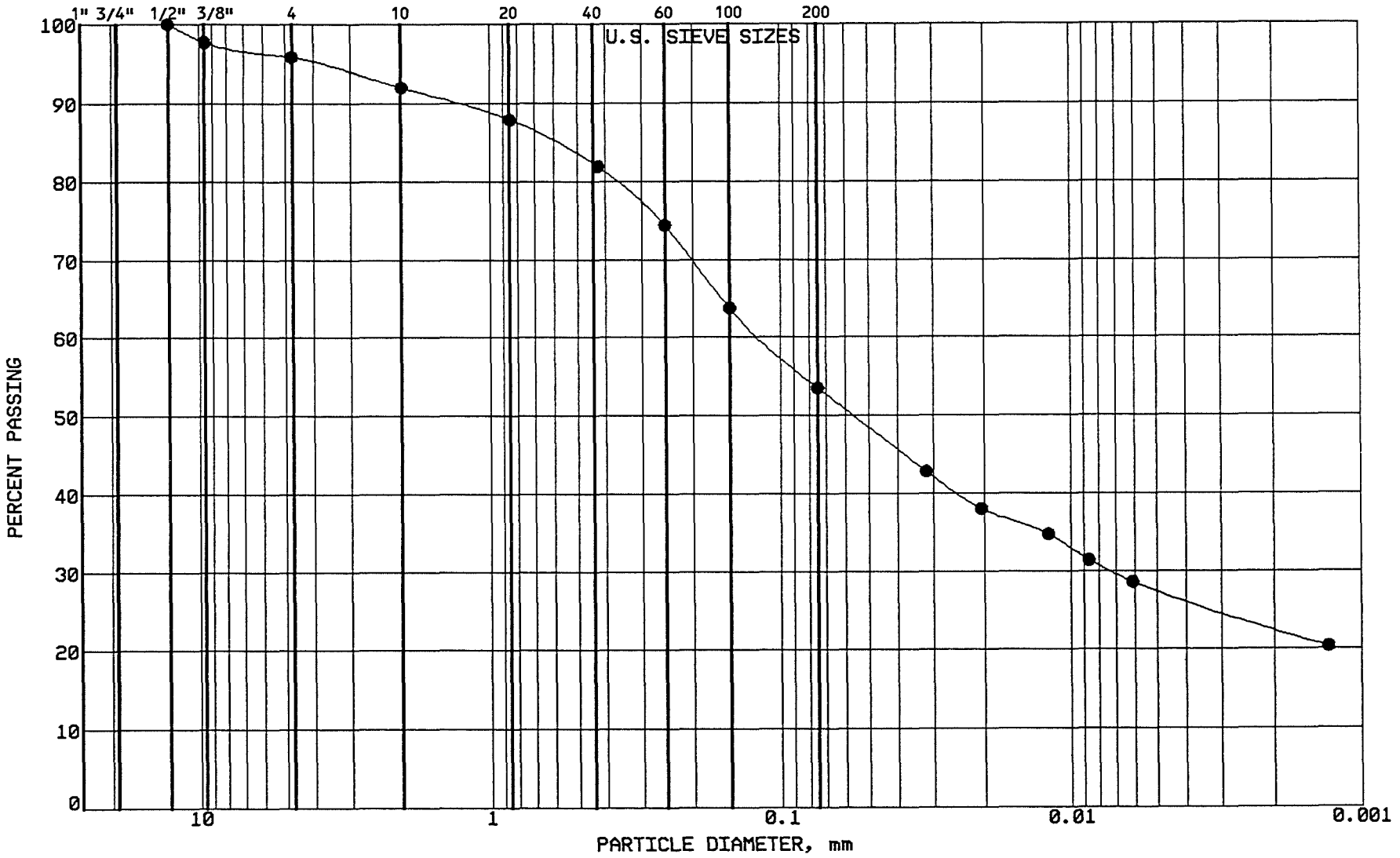
GRAVEL	13.0 %
SAND	55.4 %
SILT	17.0 %
CLAY	14.6 %
P 200	31.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND (SM)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43299.0, E 43355.0
SAMPLE: SGCC259 TUBE #:
ELEVATION: 1882.6'

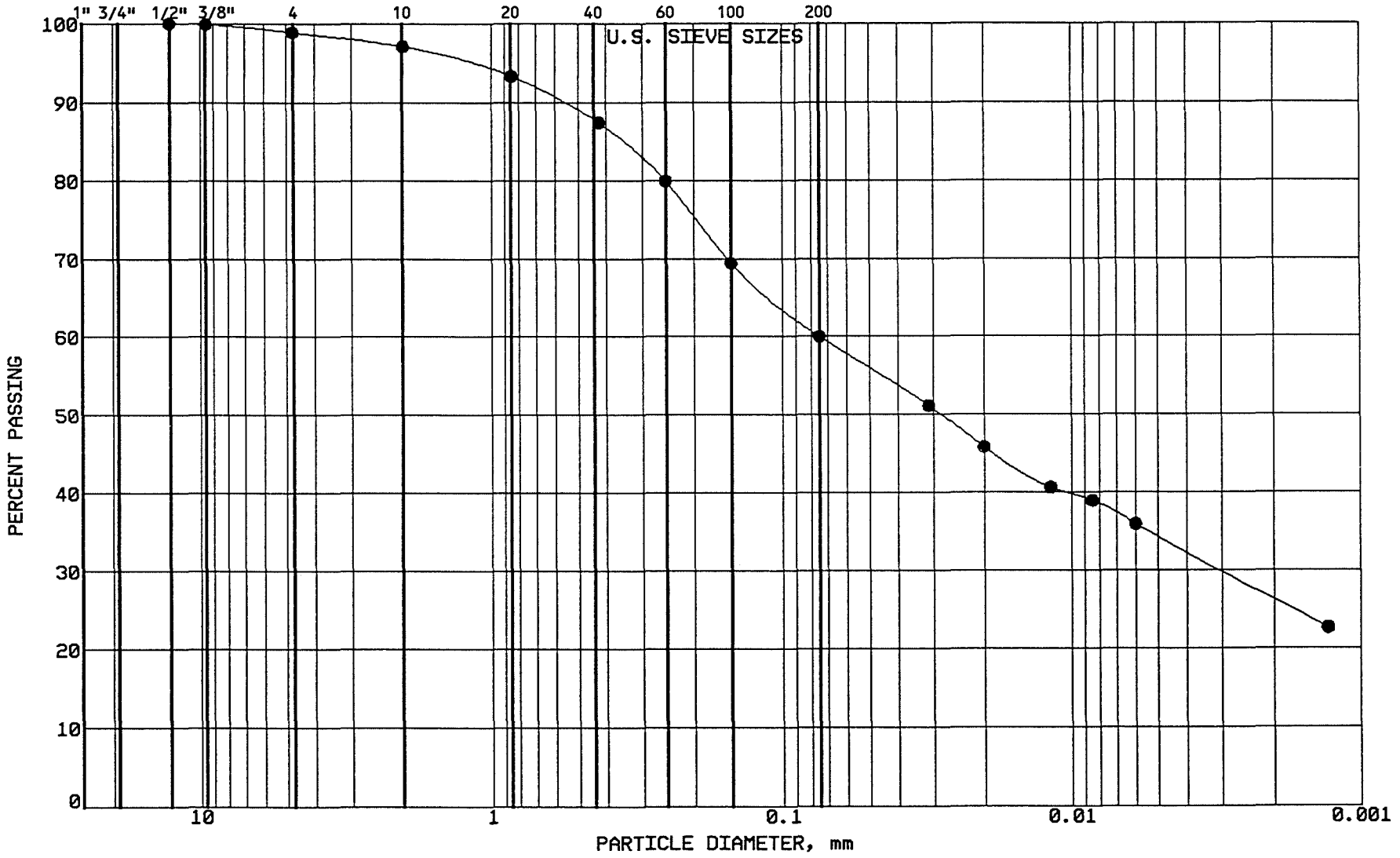
GRAVEL	4.2 %
SAND	42.3 %
SILT	26.0 %
CLAY	27.5 %
P 200	53.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42703.0, E 43152.0
SAMPLE: SGCC260 TUBE #:
ELEVATION: 1881.3'

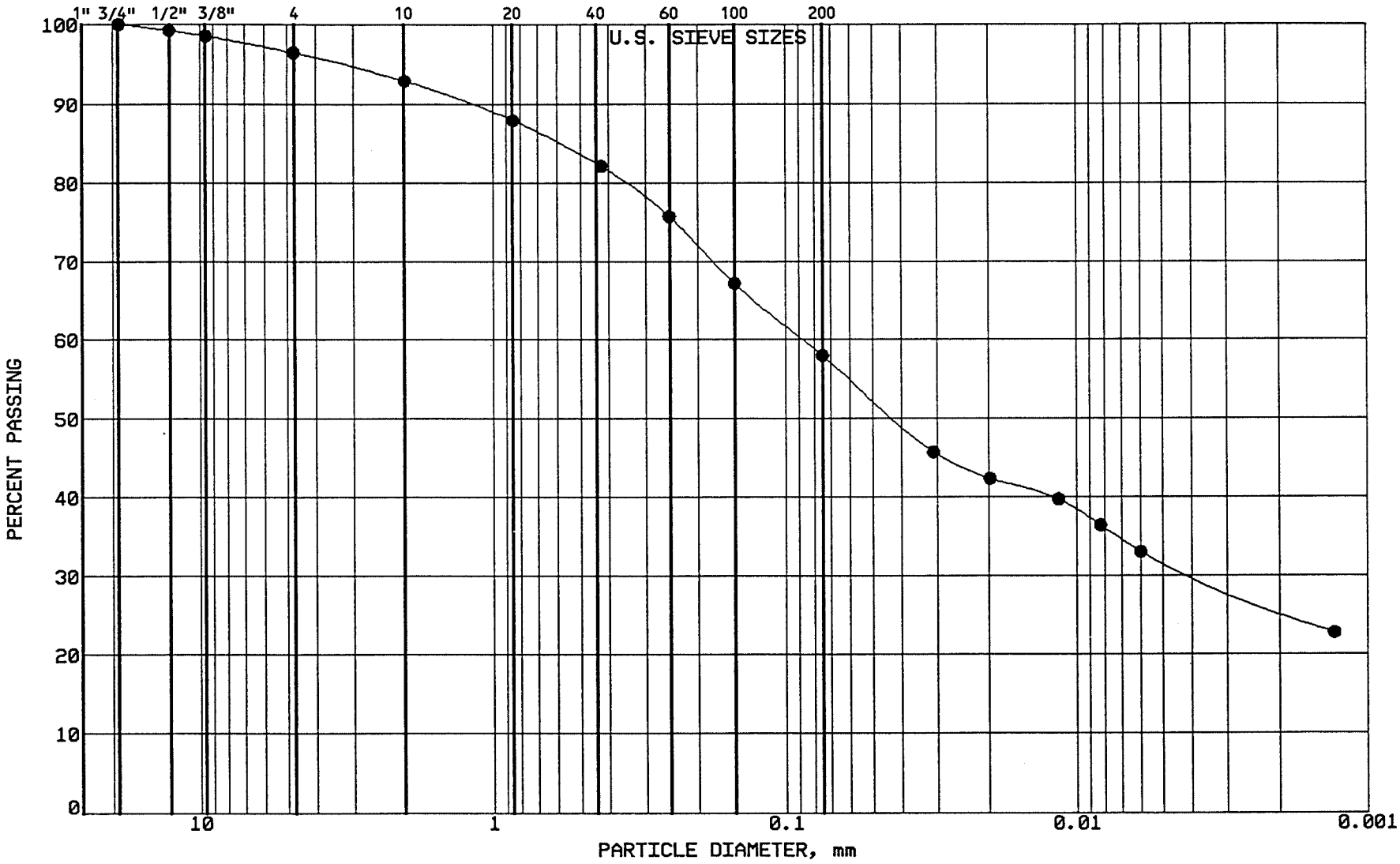
GRAVEL	1.1 %
SAND	38.9 %
SILT	25.7 %
CLAY	34.3 %
P 200	60.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

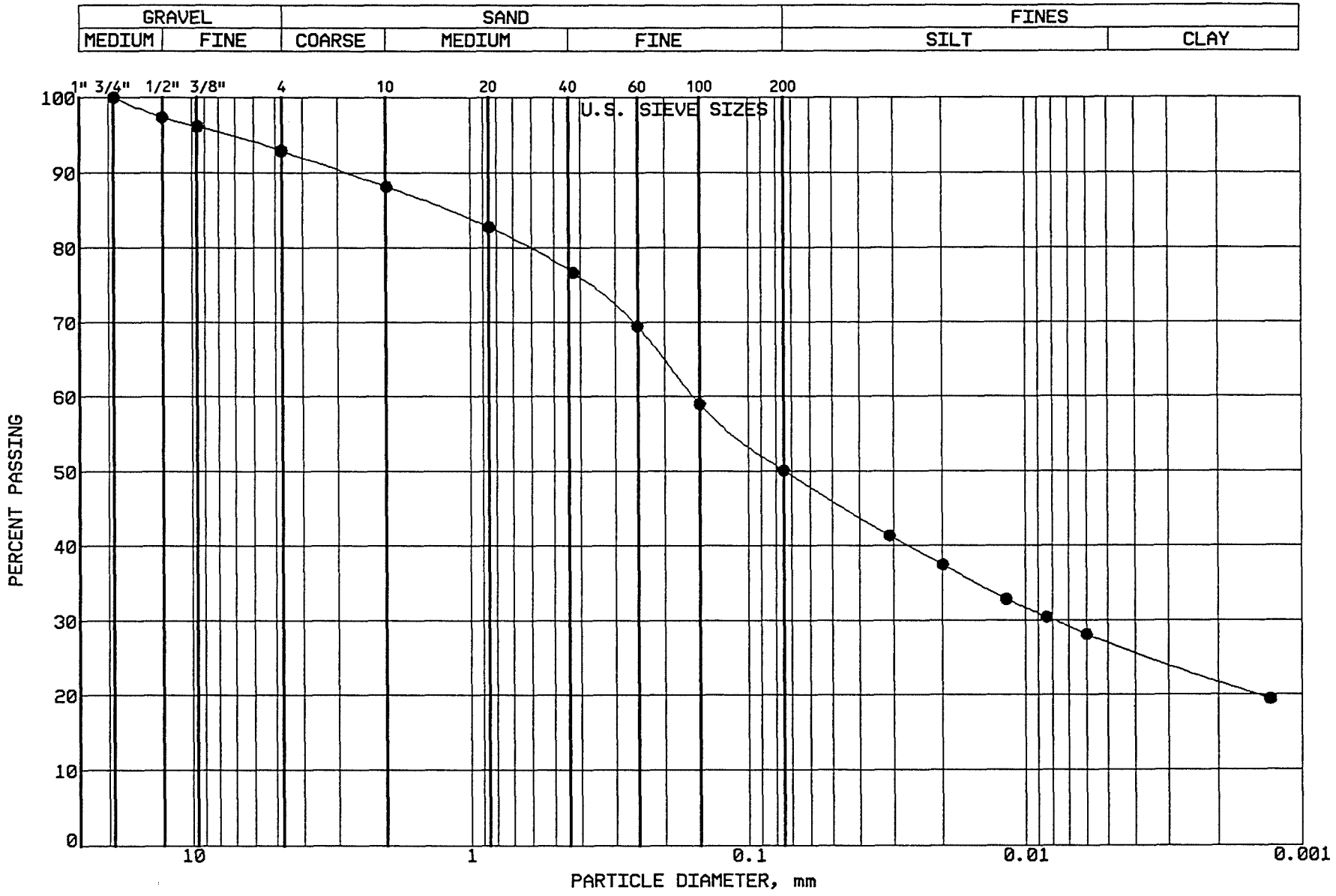
LOCATION: N 42903.0, E 43152.0
SAMPLE: SGCC261 TUBE #:
ELEVATION: 1880.9'

GRAVEL	3.6 %
SAND	38.4 %
SILT	26.2 %
CLAY	31.8 %
P 200	58.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

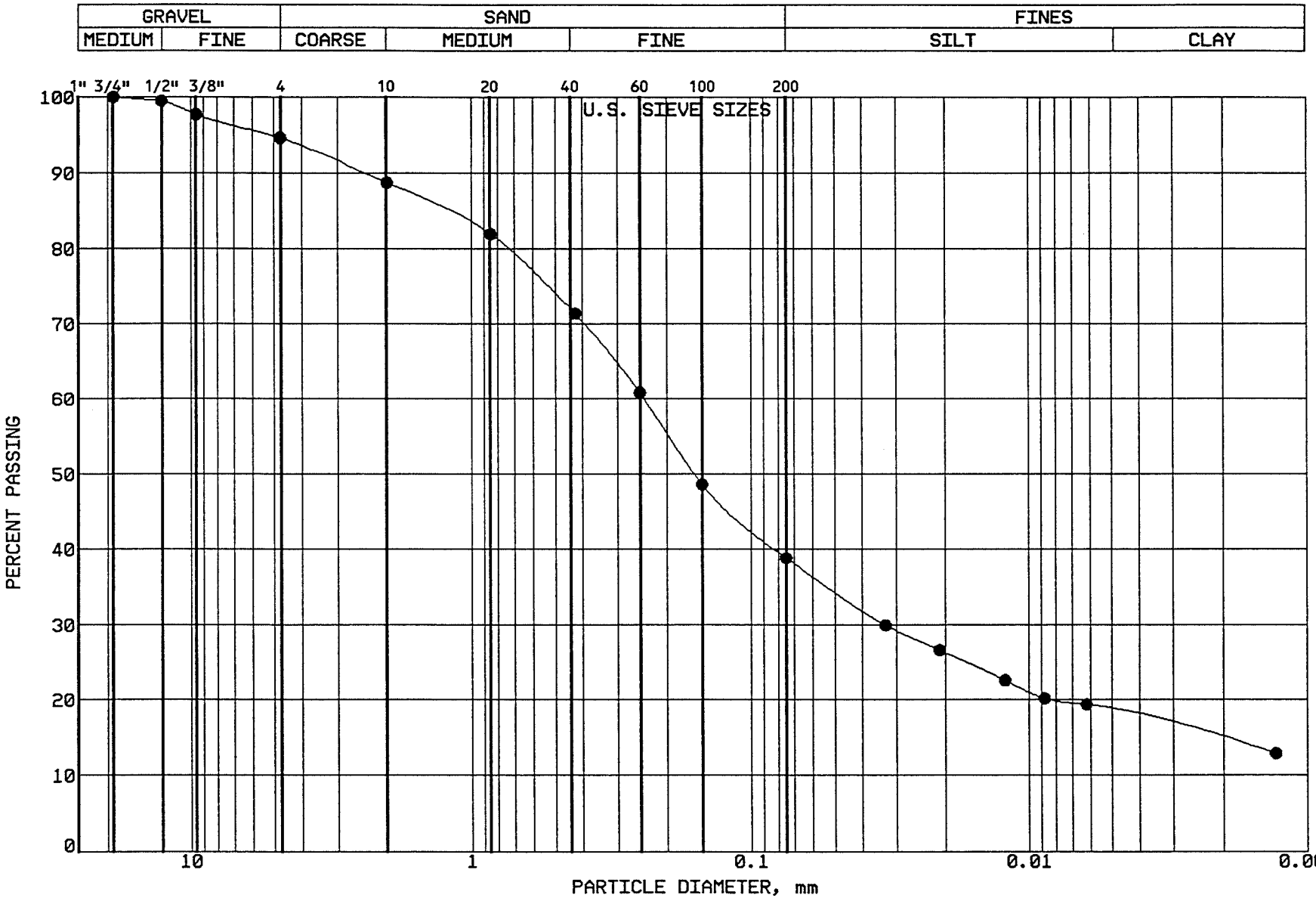
LOCATION: N 43094.0, E 43144.0
SAMPLE: SGCC262 TUBE #:
ELEVATION: 1881.3'

GRAVEL	7.1 %
SAND	42.8 %
SILT	23.0 %
CLAY	27.1 %
P 200	50.1 %

SOIL PROPERTIES

LL: 38.0%
PL: 15.0%
PI: 23.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

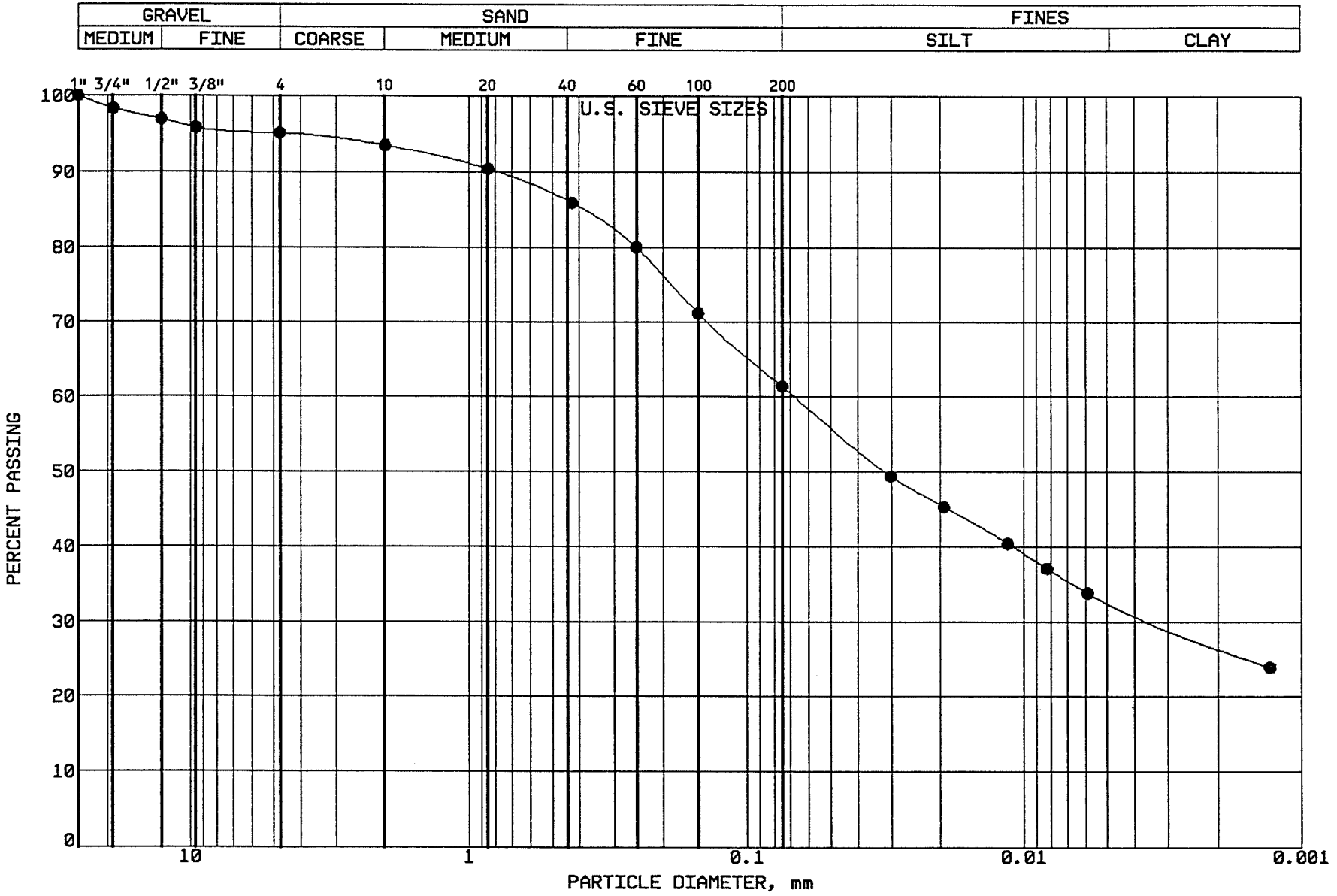
LOCATION: N 43299.0, E 43146.0
SAMPLE: SGCC263 TUBE #:
ELEVATION: 1882.7'

GRAVEL	5.4 %
SAND	55.8 %
SILT	20.3 %
CLAY	18.5 %
P 200	38.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND (SM), dk.gr.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

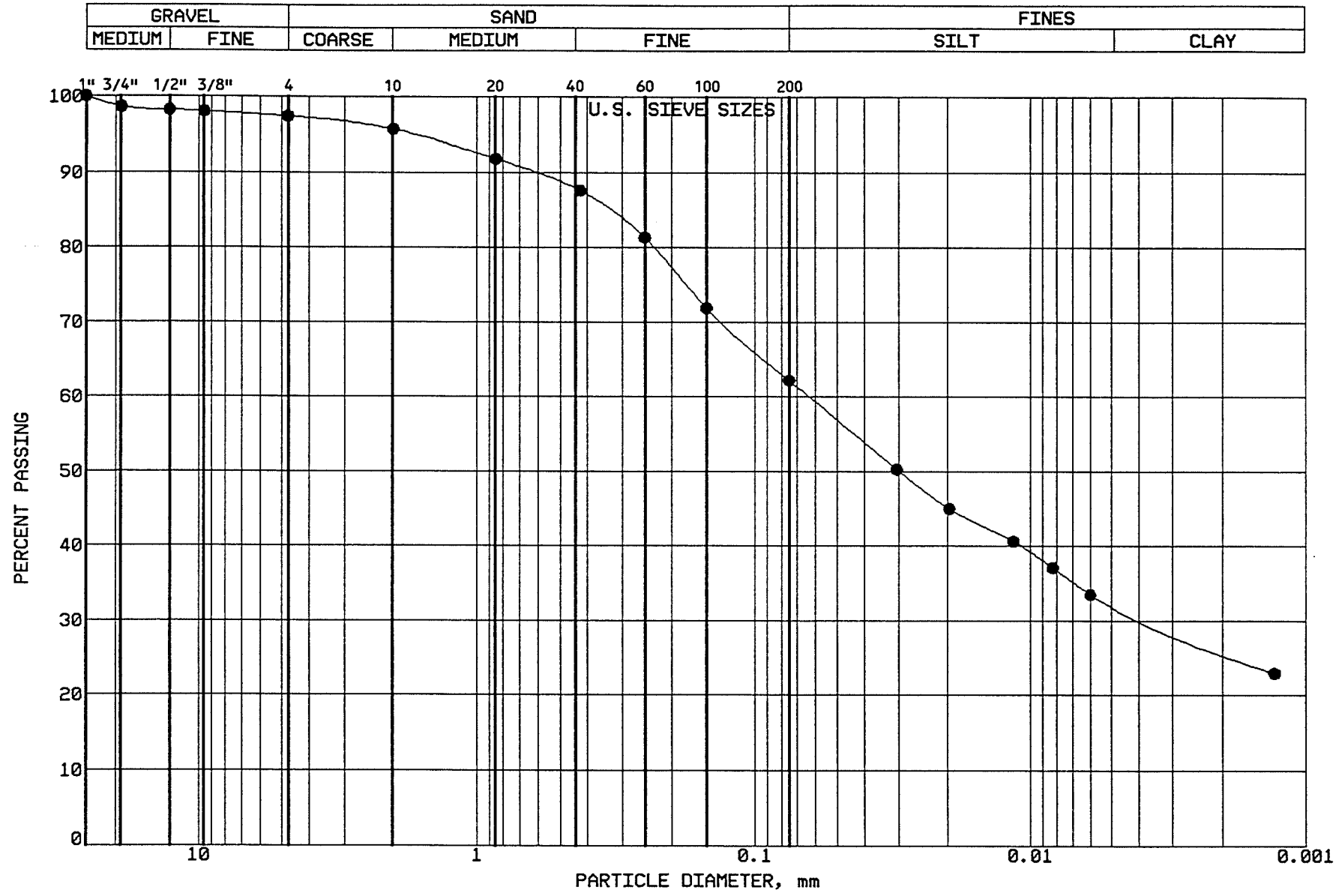
LOCATION: N 43306.0, E 45854.0
SAMPLE: SGCC264 TUBE #:
ELEVATION: 1885.5'

GRAVEL	4.9 %
SAND	33.7 %
SILT	28.7 %
CLAY	32.7 %
P 200	61.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43193.0, E 45852.0
SAMPLE: SGCC265 TUBE #:
ELEVATION: 1884.2'

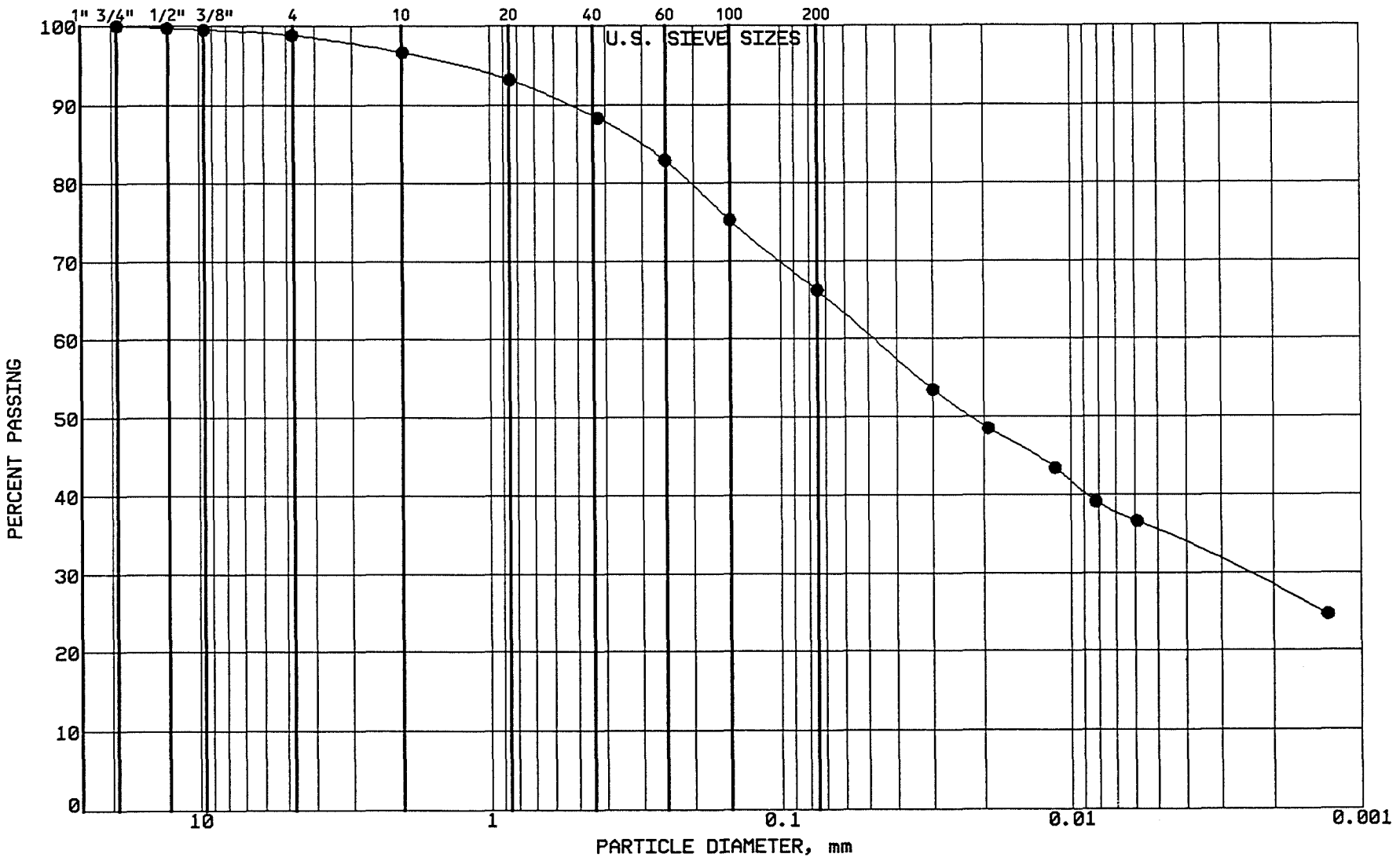
GRAVEL	2.6 %
SAND	35.2 %
SILT	30.0 %
CLAY	32.2 %
P 200	62.2 %

SOIL PROPERTIES

LL: 39.0%
PL: 14.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43079.0, E 45850.0
SAMPLE: SGCC266 TUBE #:
ELEVATION: 1883.9'

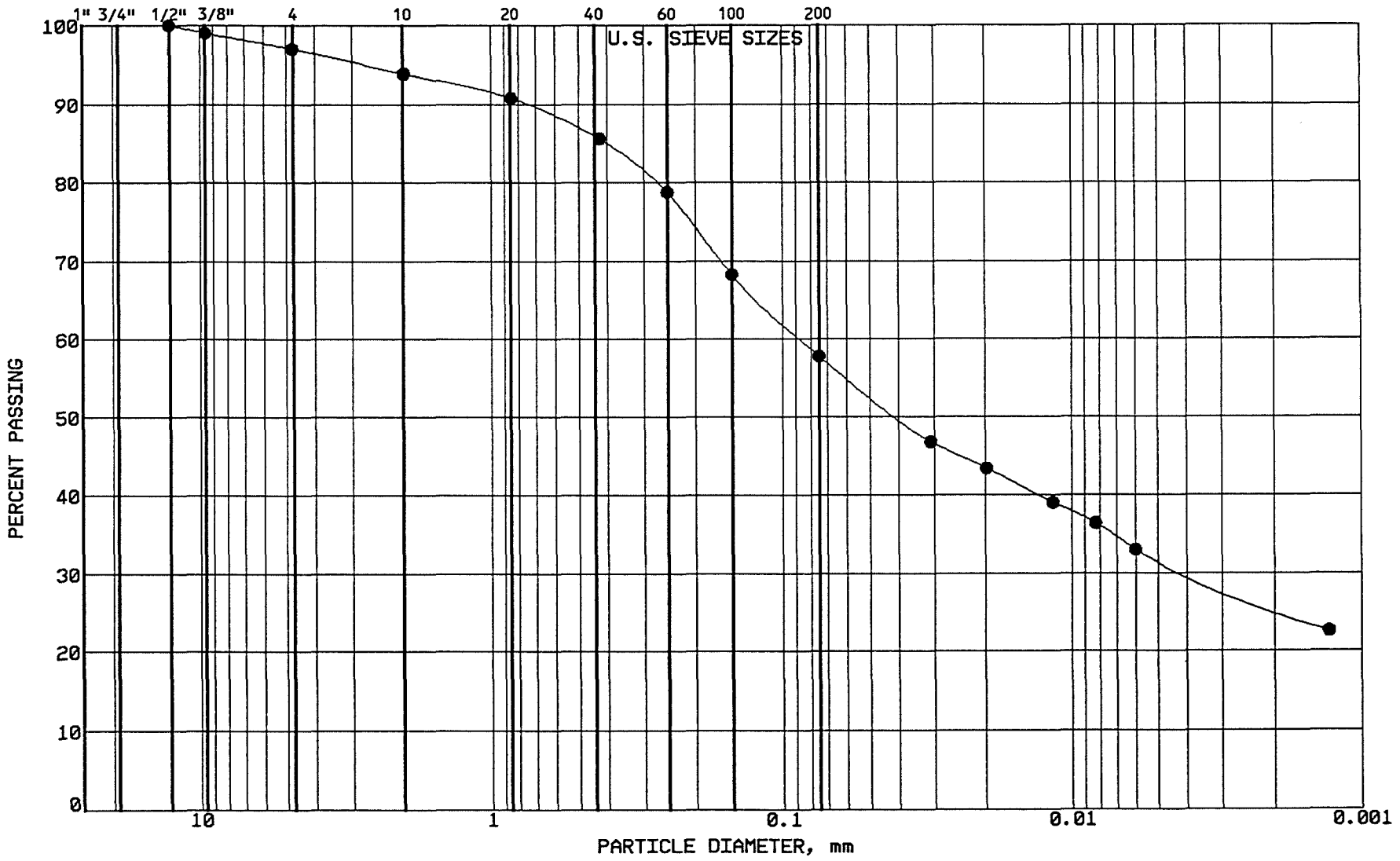
GRAVEL	1.2 %
SAND	32.6 %
SILT	30.9 %
CLAY	35.3 %
P 200	66.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

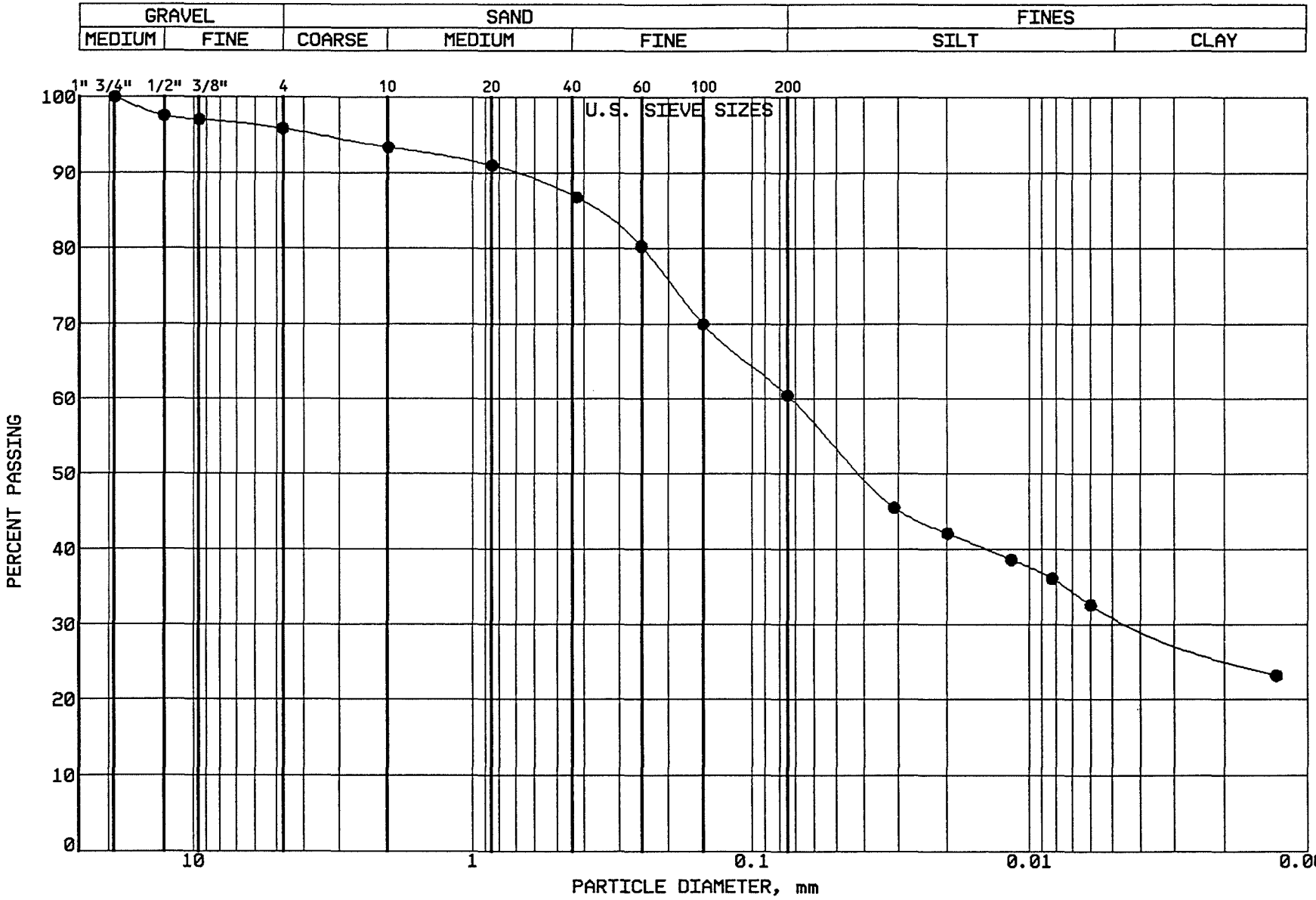
LOCATION: N 42961.0, E 45848.0
SAMPLE: SGCC267 TUBE #:
ELEVATION: 1883.0'

GRAVEL	3.0 %
SAND	39.2 %
SILT	26.0 %
CLAY	31.8 %
P 200	57.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43296.0, E 45492.0
SAMPLE: SGCC268 TUBE #:
ELEVATION: 1883.2'

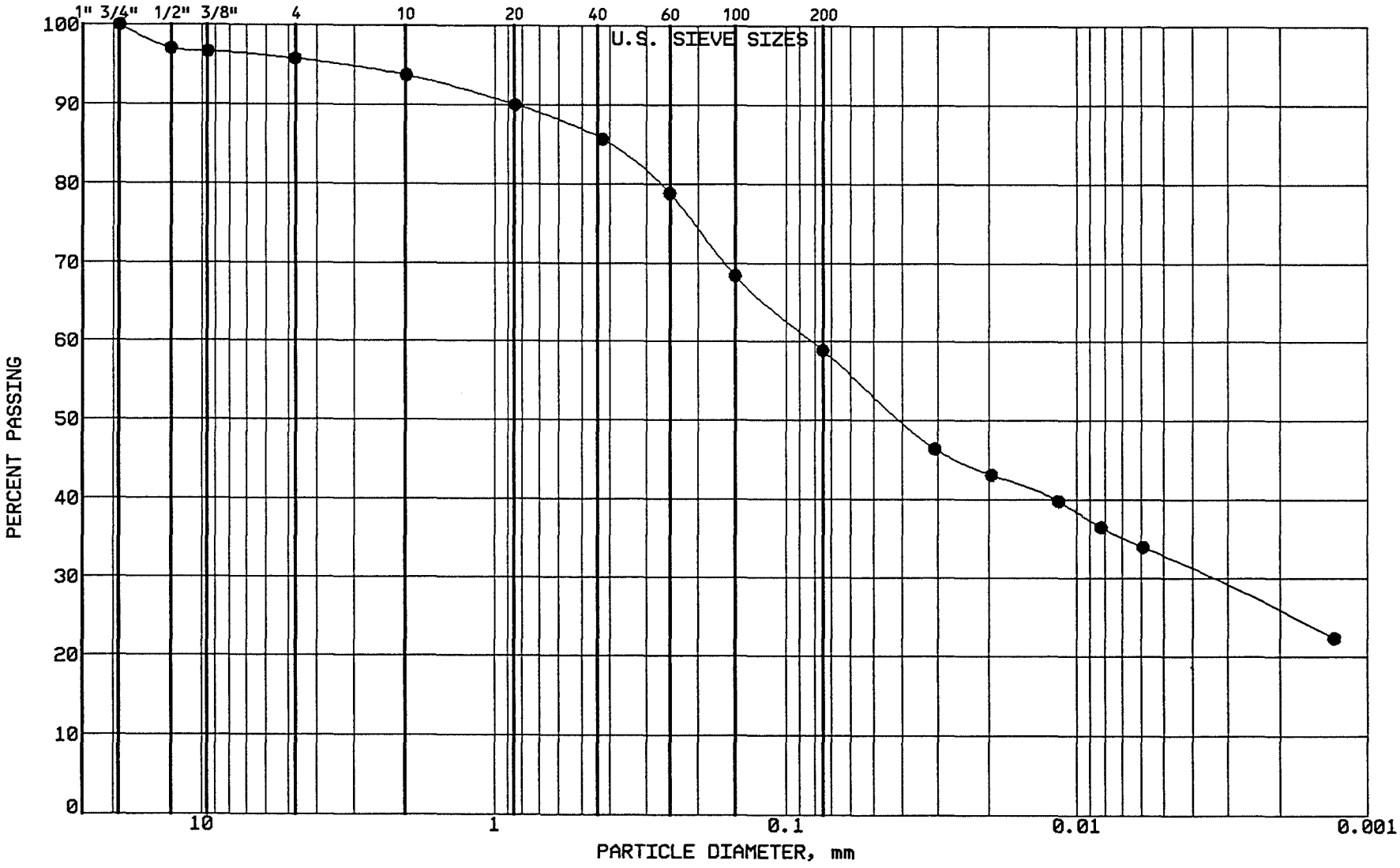
GRAVEL	4.2 %
SAND	35.3 %
SILT	29.0 %
CLAY	31.5 %
P 200	60.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43136.0, E 45485.0
SAMPLE: SGCC269 TUBE #:
ELEVATION: 1882.5'

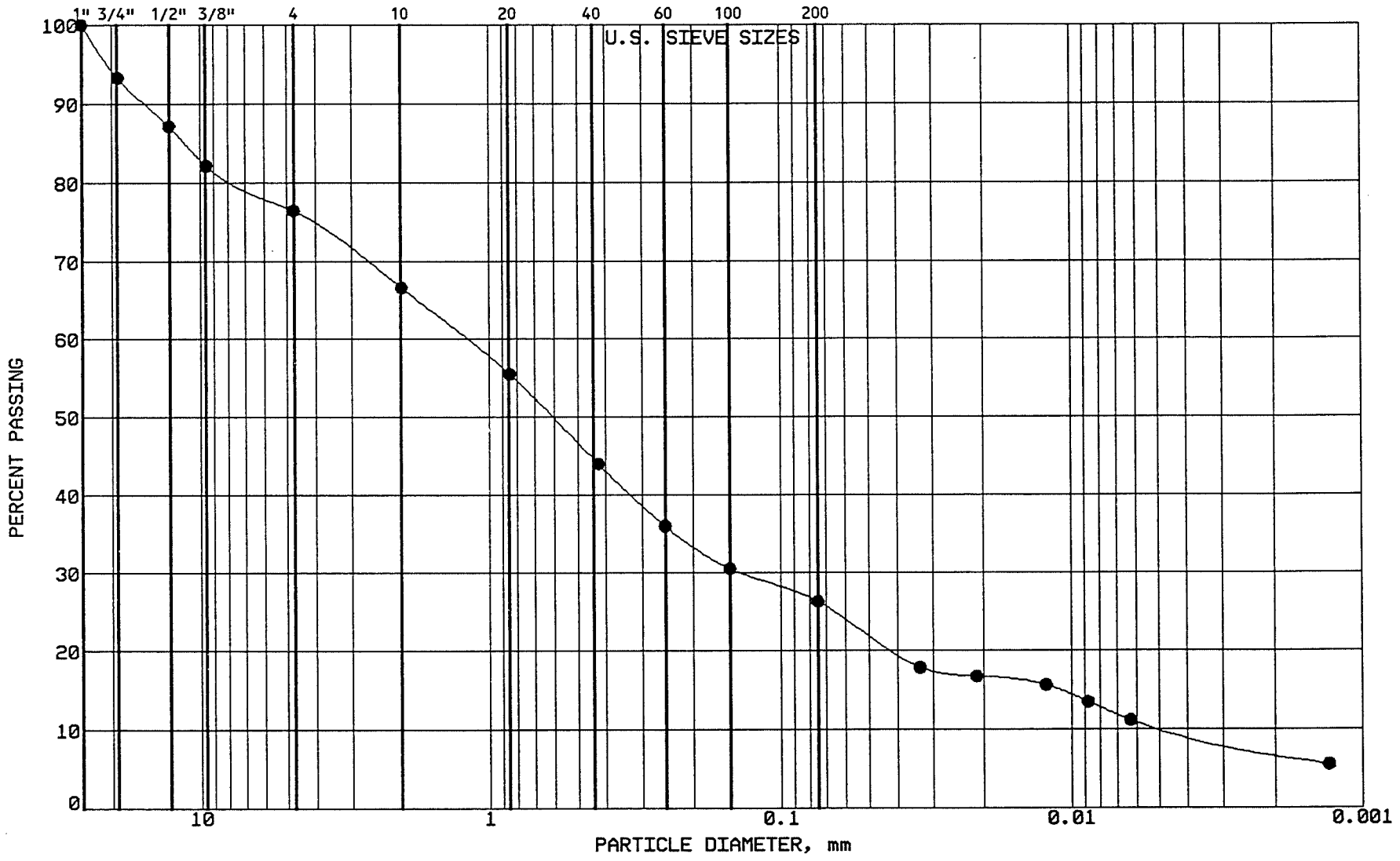
GRAVEL	4.3 %
SAND	36.8 %
SILT	26.2 %
CLAY	32.7 %
P 200	58.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42990.0, E 45477.0
SAMPLE: SGCC270 TUBE #:
ELEVATION: 1882.5'

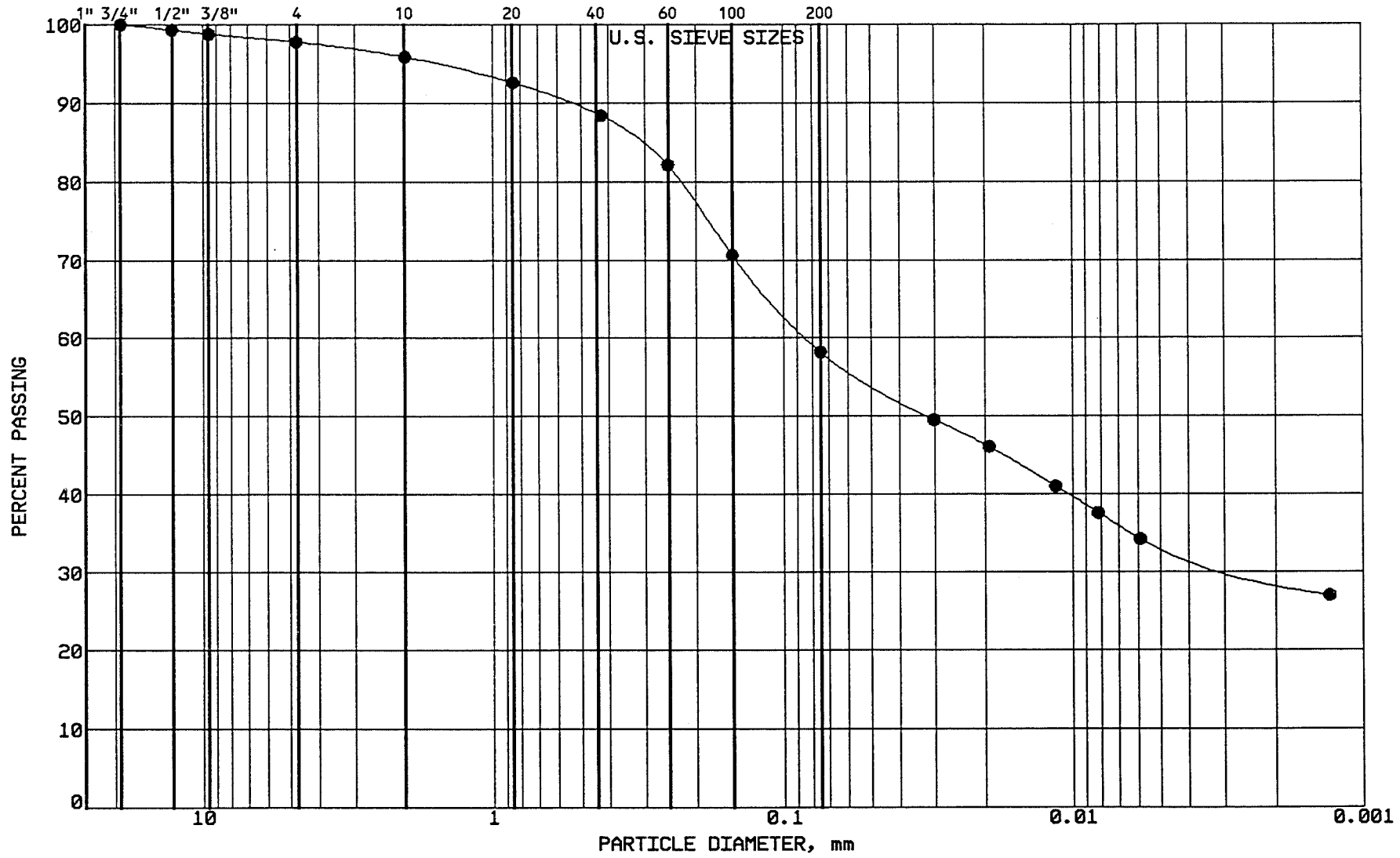
GRAVEL	23.6 %
SAND	50.1 %
SILT	15.9 %
CLAY	10.4 %
P 200	26.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND with GR. (SM), dk.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43383.0, E 45495.0
SAMPLE: SGCC271 TUBE #:
ELEVATION: 1882.1'

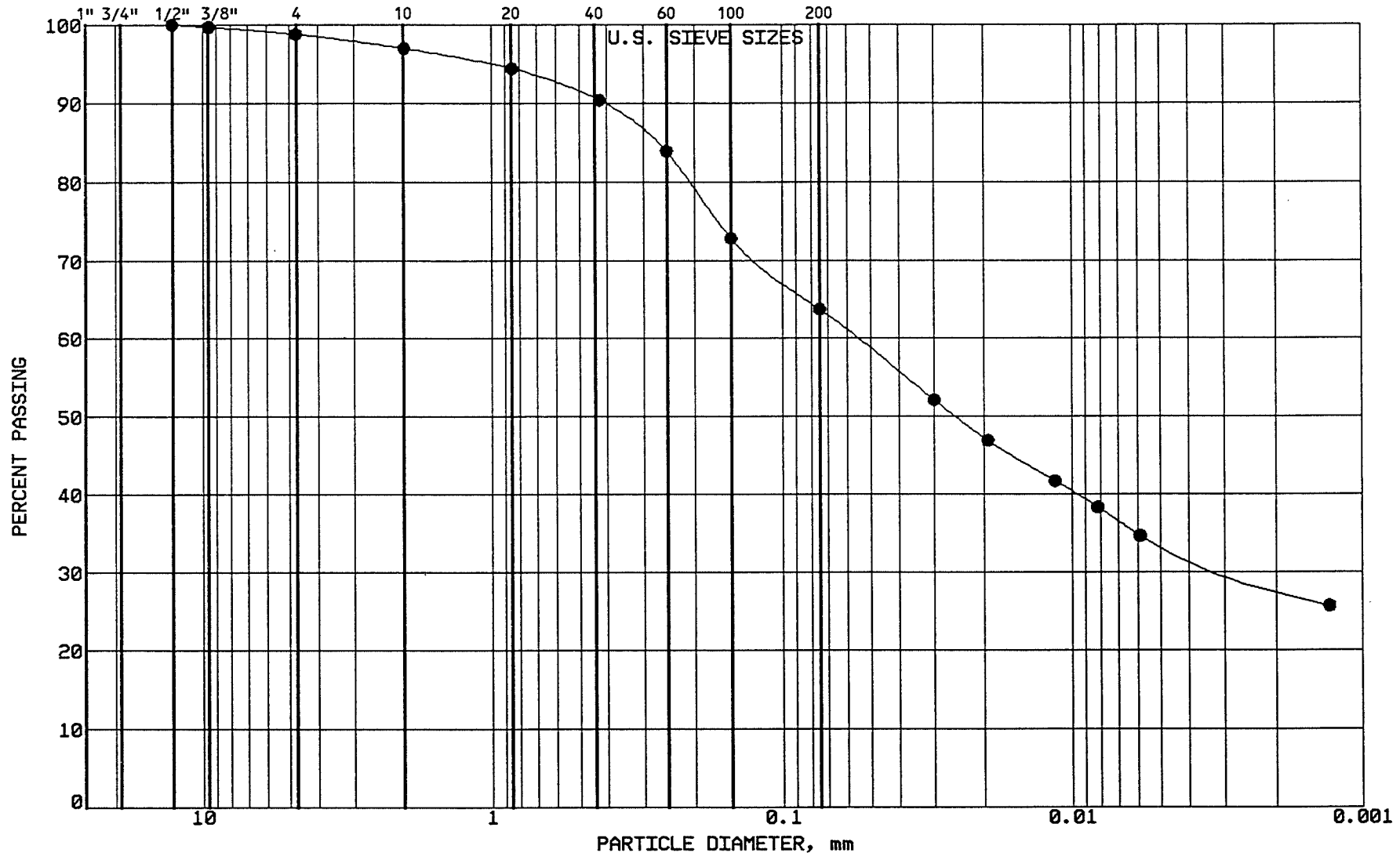
GRAVEL	2.2 %
SAND	39.6 %
SILT	24.8 %
CLAY	33.4 %
P 200	58.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43275.0, E 45496.0
SAMPLE: SGCC272 TUBE #:
ELEVATION: 1884.5'

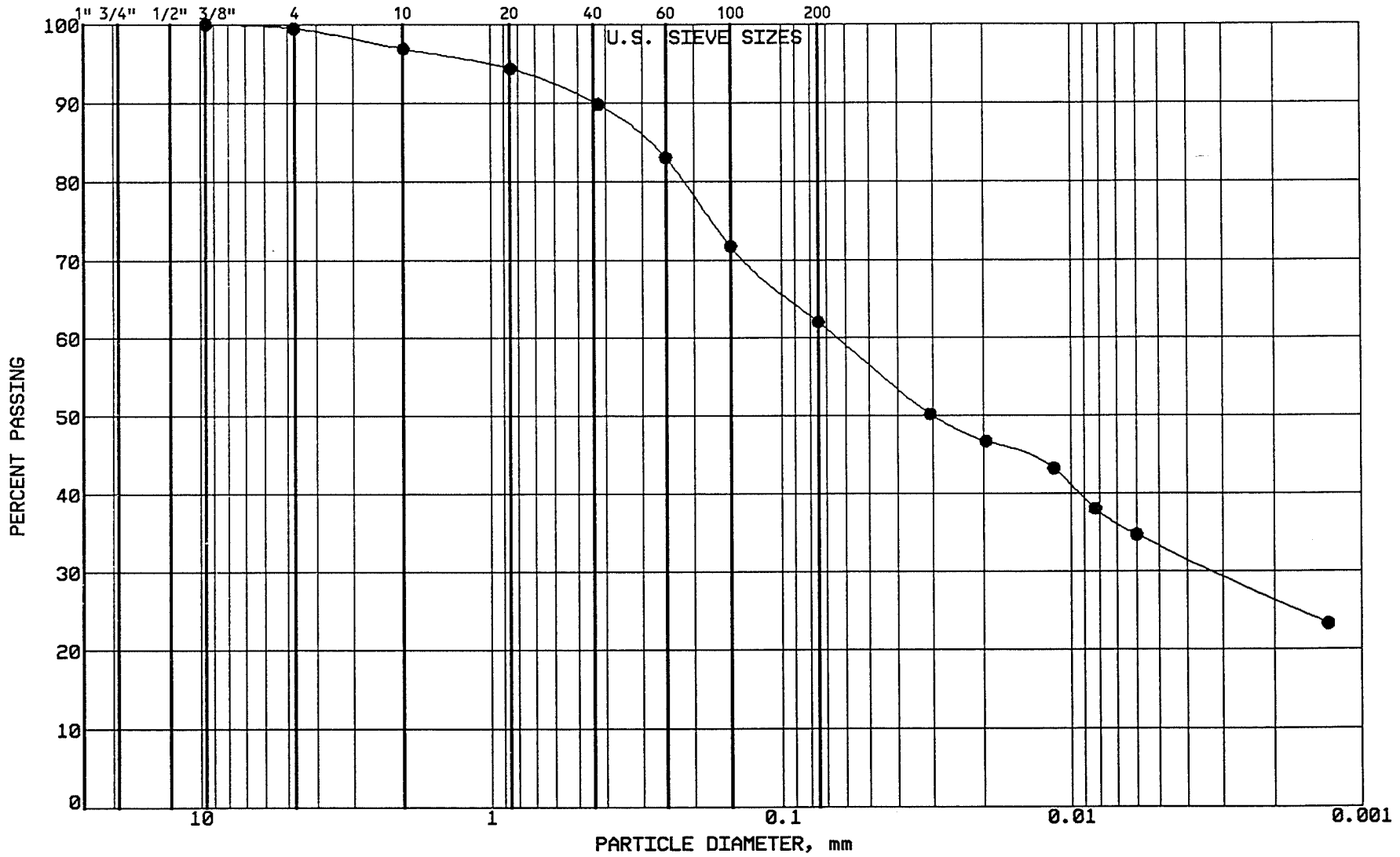
GRAVEL	1.2 %
SAND	35.1 %
SILT	30.1 %
CLAY	33.6 %
P 200	63.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43139.0, E 45493.0
SAMPLE: SGCC273 TUBE #:
ELEVATION: 1883.8'

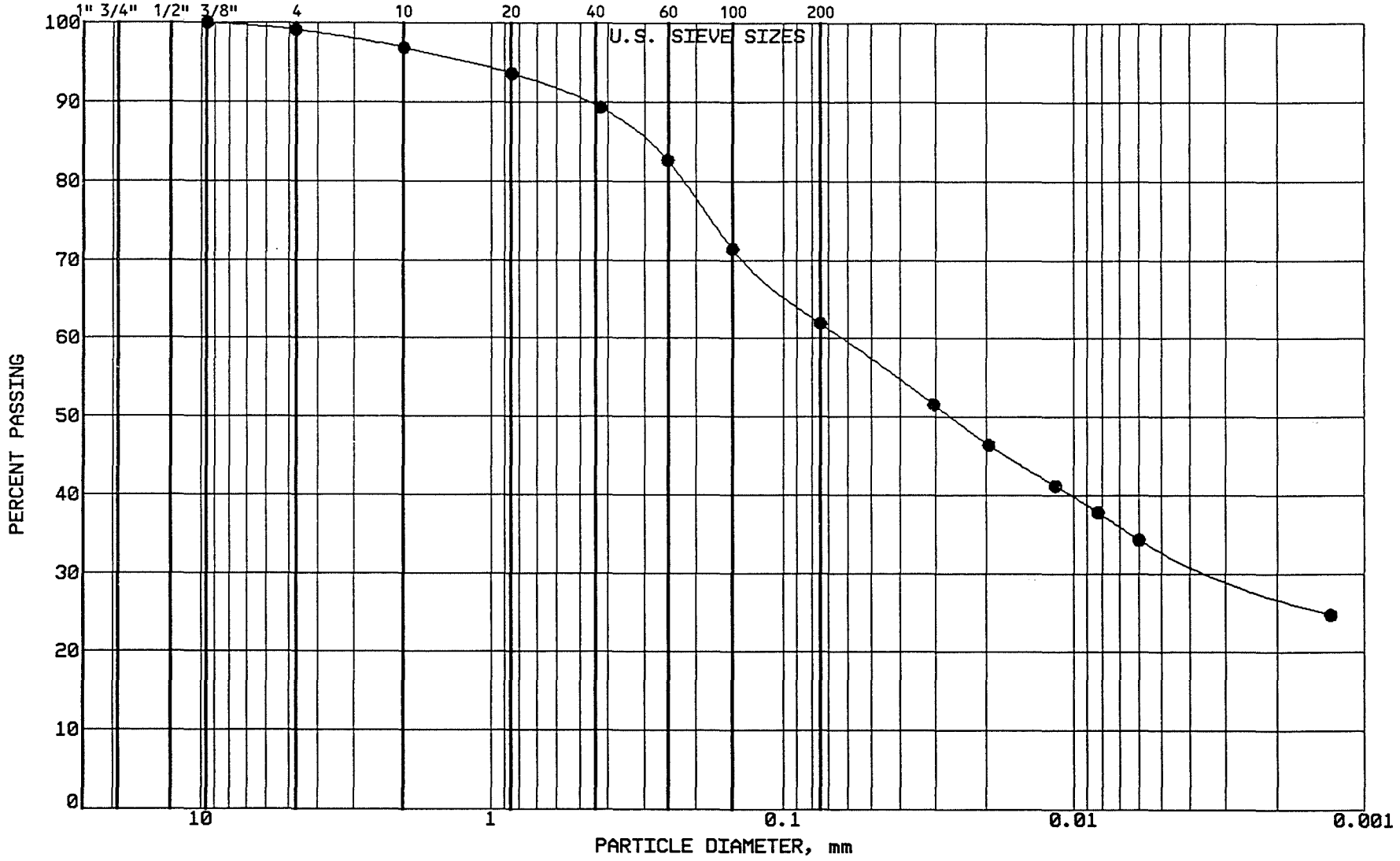
GRAVEL	0.5 %
SAND	37.5 %
SILT	28.7 %
CLAY	33.3 %
P 200	62.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43981.0, E 45491.0
SAMPLE: SGCC274 TUBE #:
ELEVATION: 1882.7'

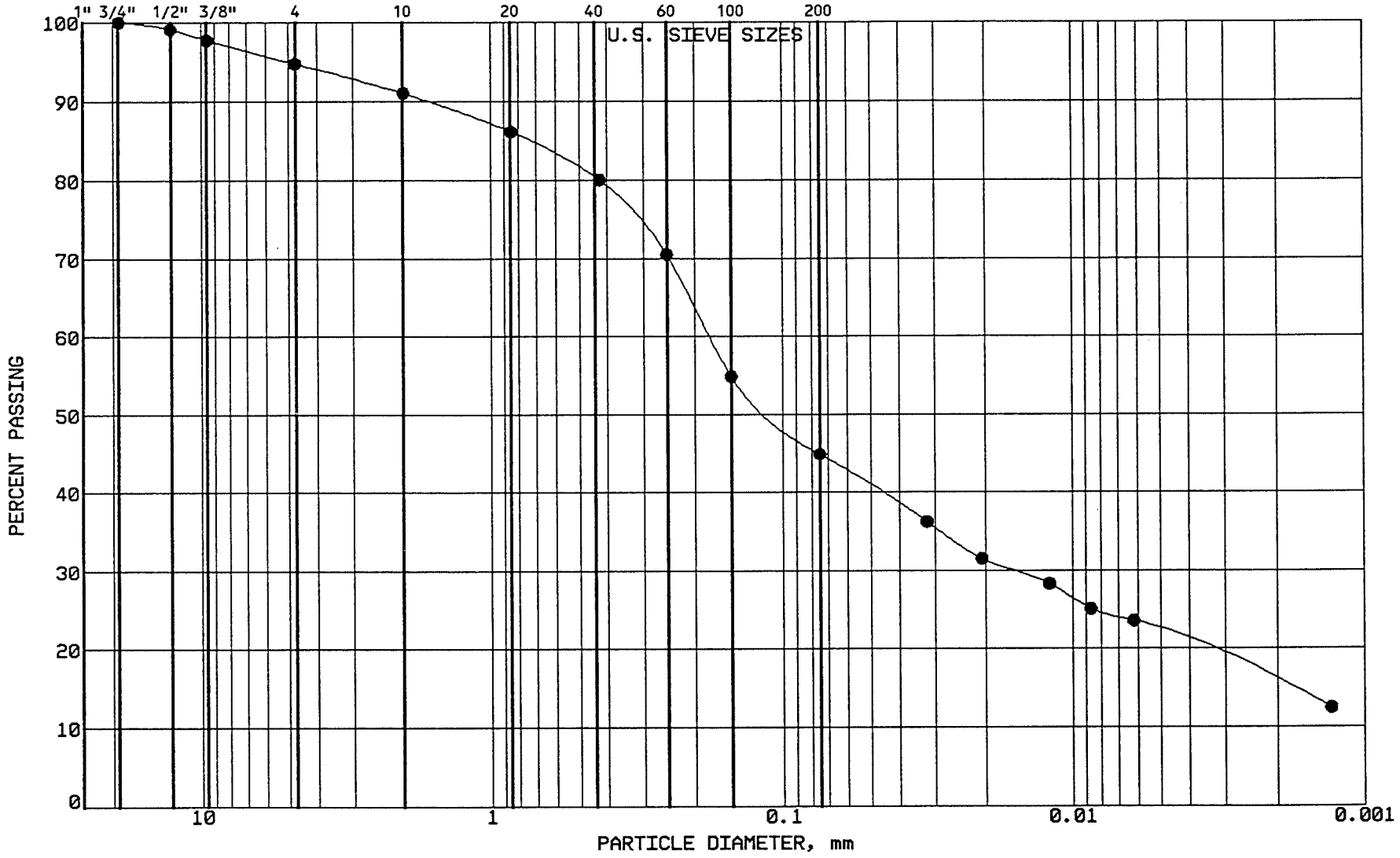
GRAVEL	0.9 %
SAND	37.2 %
SILT	28.7 %
CLAY	33.2 %
P 200	61.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43355.0, E 45626.0
SAMPLE: SGCC275 TUBE #:
ELEVATION: 1885.9'

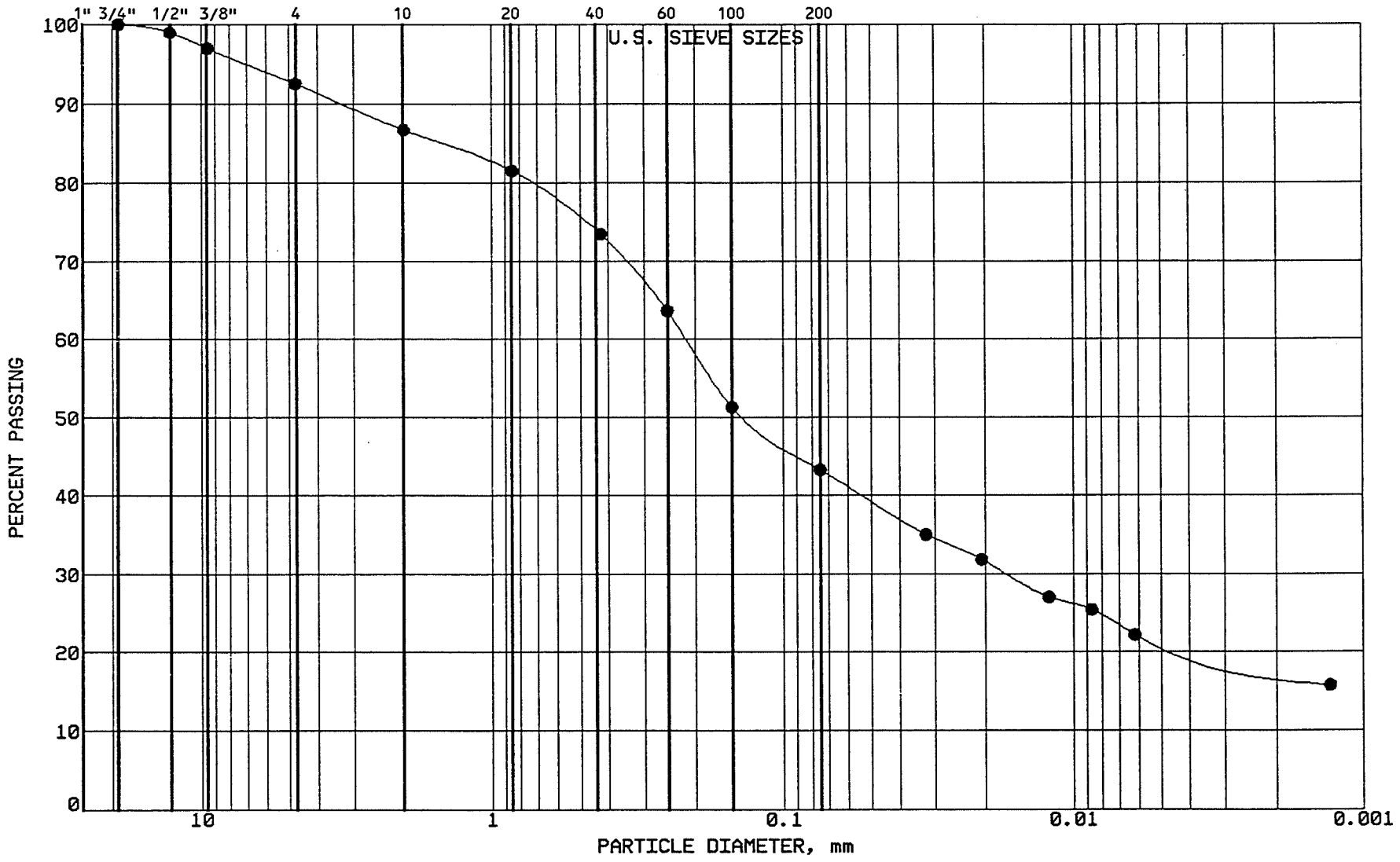
GRAVEL	5.3 %
SAND	49.8 %
SILT	22.8 %
CLAY	22.1 %
P 200	44.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND (SC), gr.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43266.0, E 45619.0
SAMPLE: SGCC276 TUBE #:
ELEVATION: 1885.1'

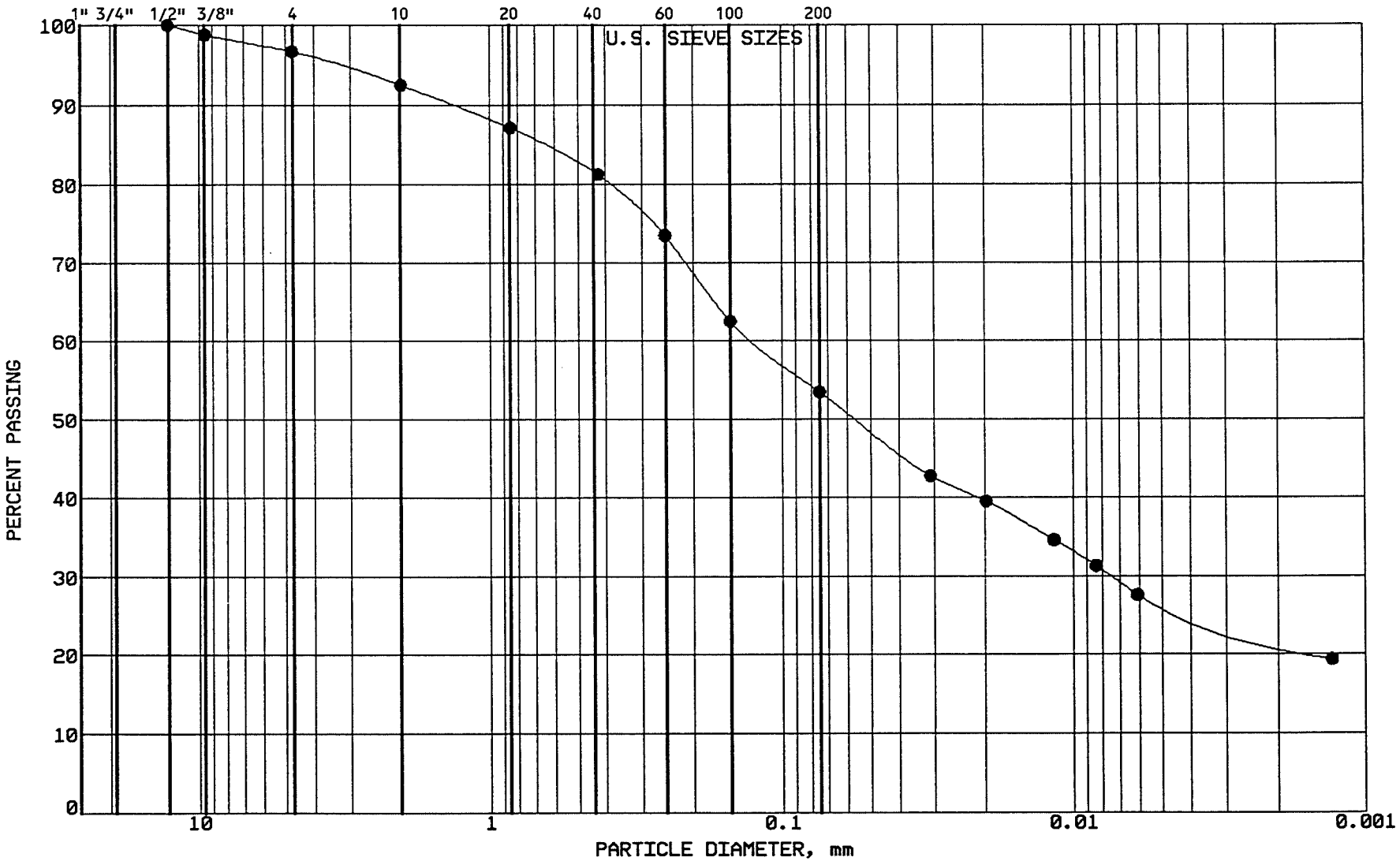
GRAVEL	7.5 %
SAND	49.3 %
SILT	21.9 %
CLAY	21.3 %
P 200	43.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND (SC), gr.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43144.0, E 45615.0
SAMPLE: SGCC277 TUBE #:
ELEVATION: 1884.5'

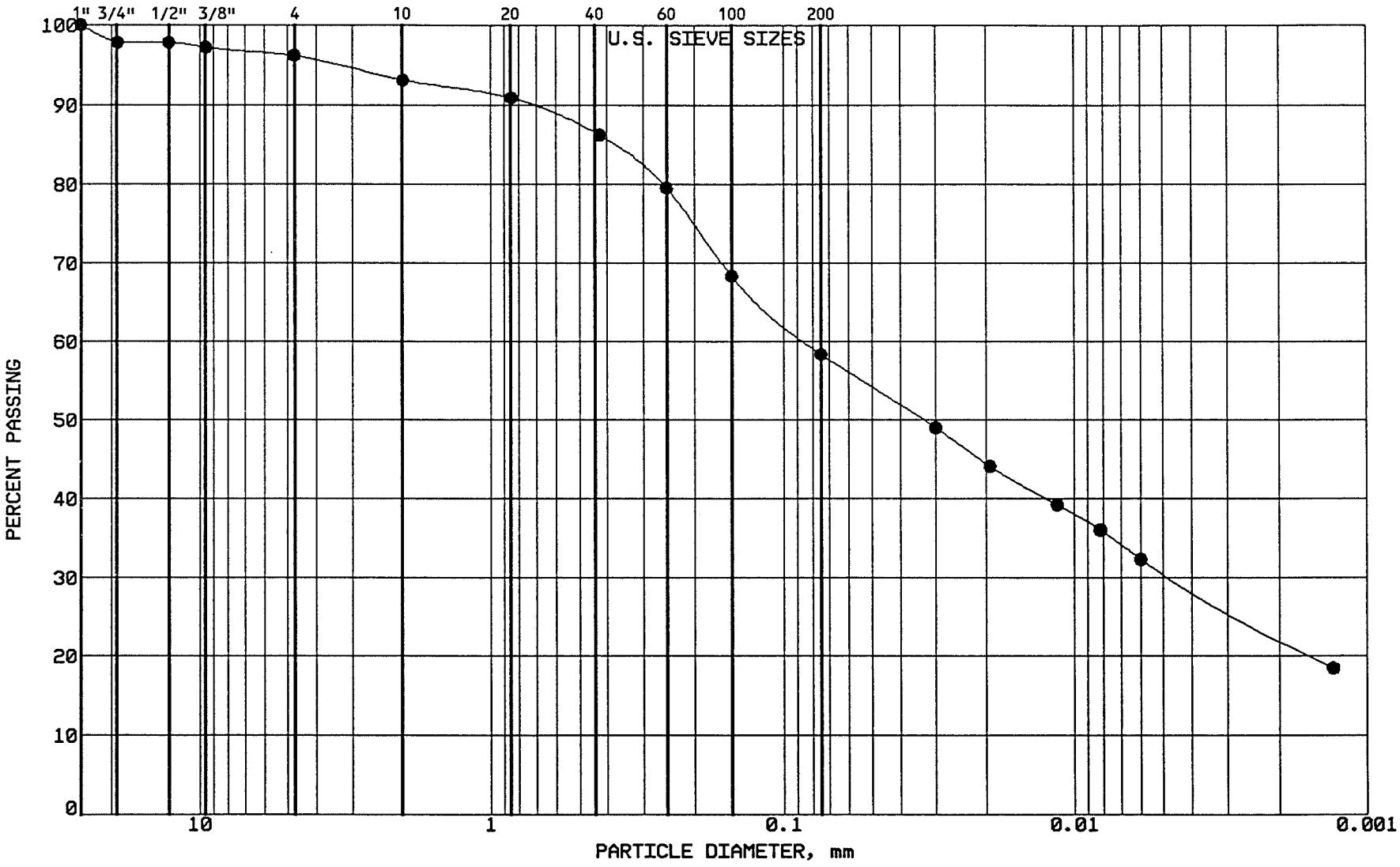
GRAVEL	3.3 %
SAND	43.2 %
SILT	27.0 %
CLAY	26.5 %
P 200	53.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42984.0, E 45607.0
SAMPLE: SGCC278 TUBE #:
ELEVATION: 1883.0'

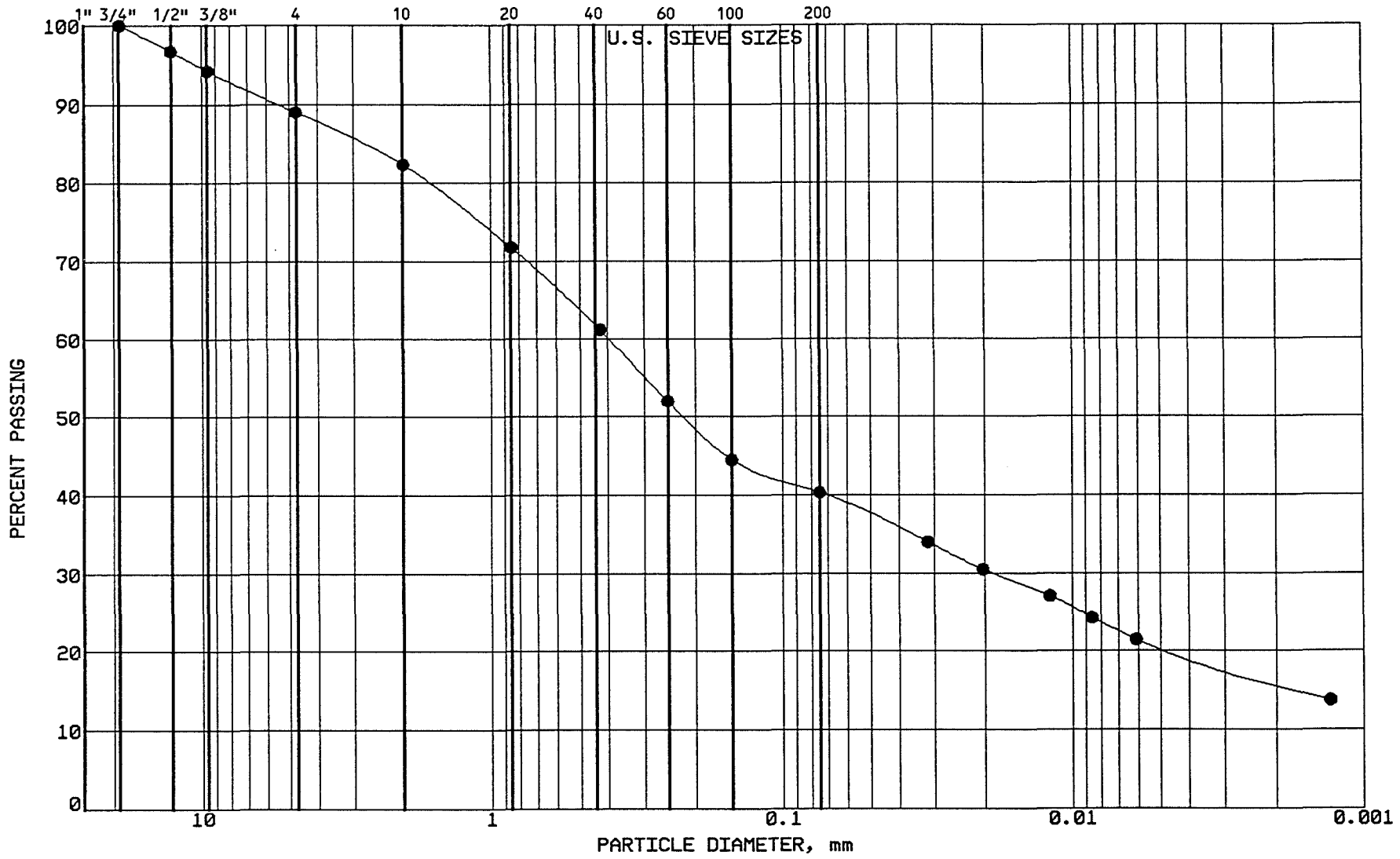
GRAVEL	3.8 %
SAND	37.8 %
SILT	27.7 %
CLAY	30.7 %
P 200	58.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43367.0, E 43182.0
SAMPLE: SGCC279 TUBE #:
ELEVATION: 1884.3'

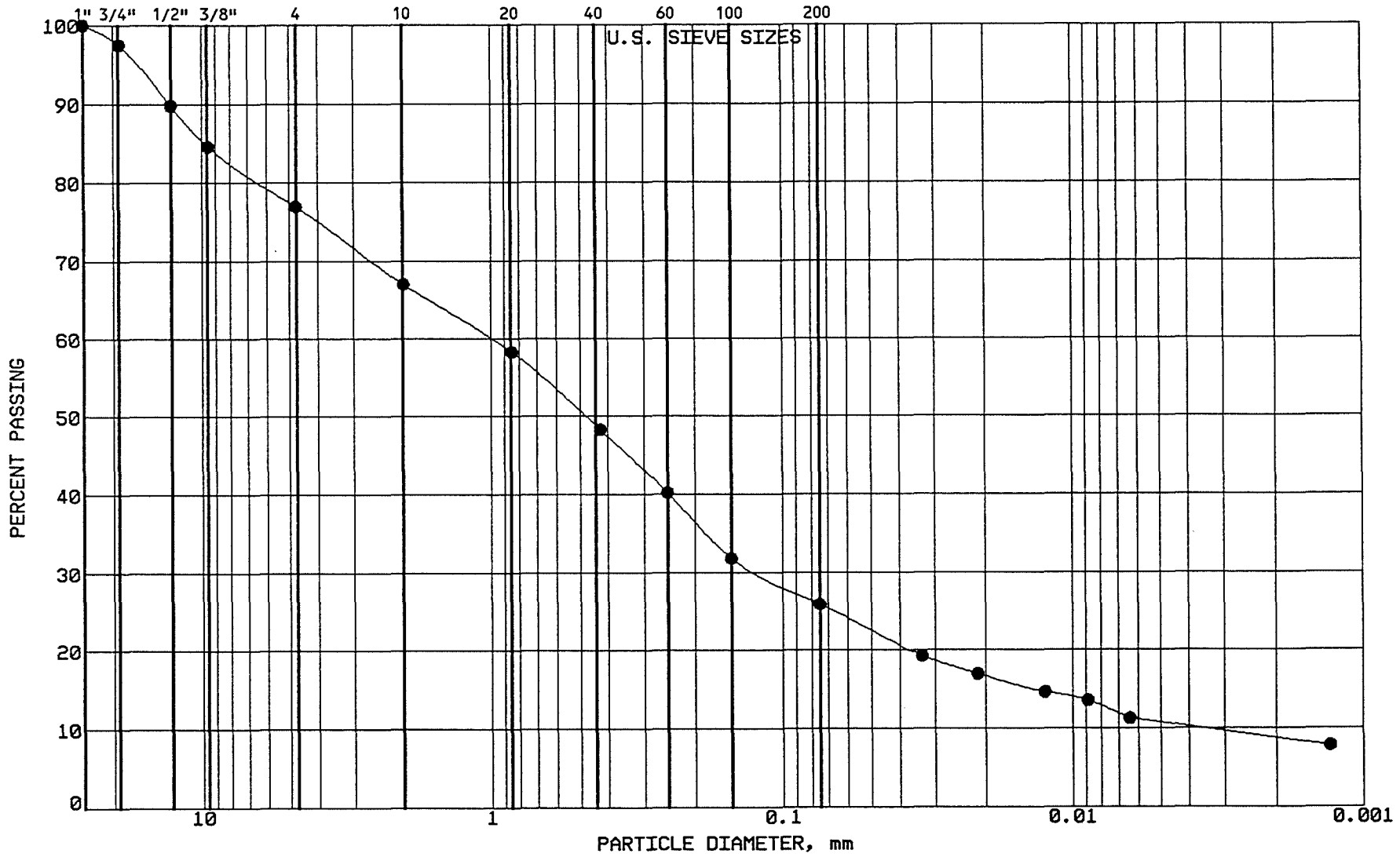
GRAVEL	11.0 %
SAND	48.7 %
SILT	19.8 %
CLAY	20.5 %
P 200	40.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND (SC), brown

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43273.0, E 43175.0
SAMPLE: SGCC280 TUBE #:
ELEVATION: 1883.9'

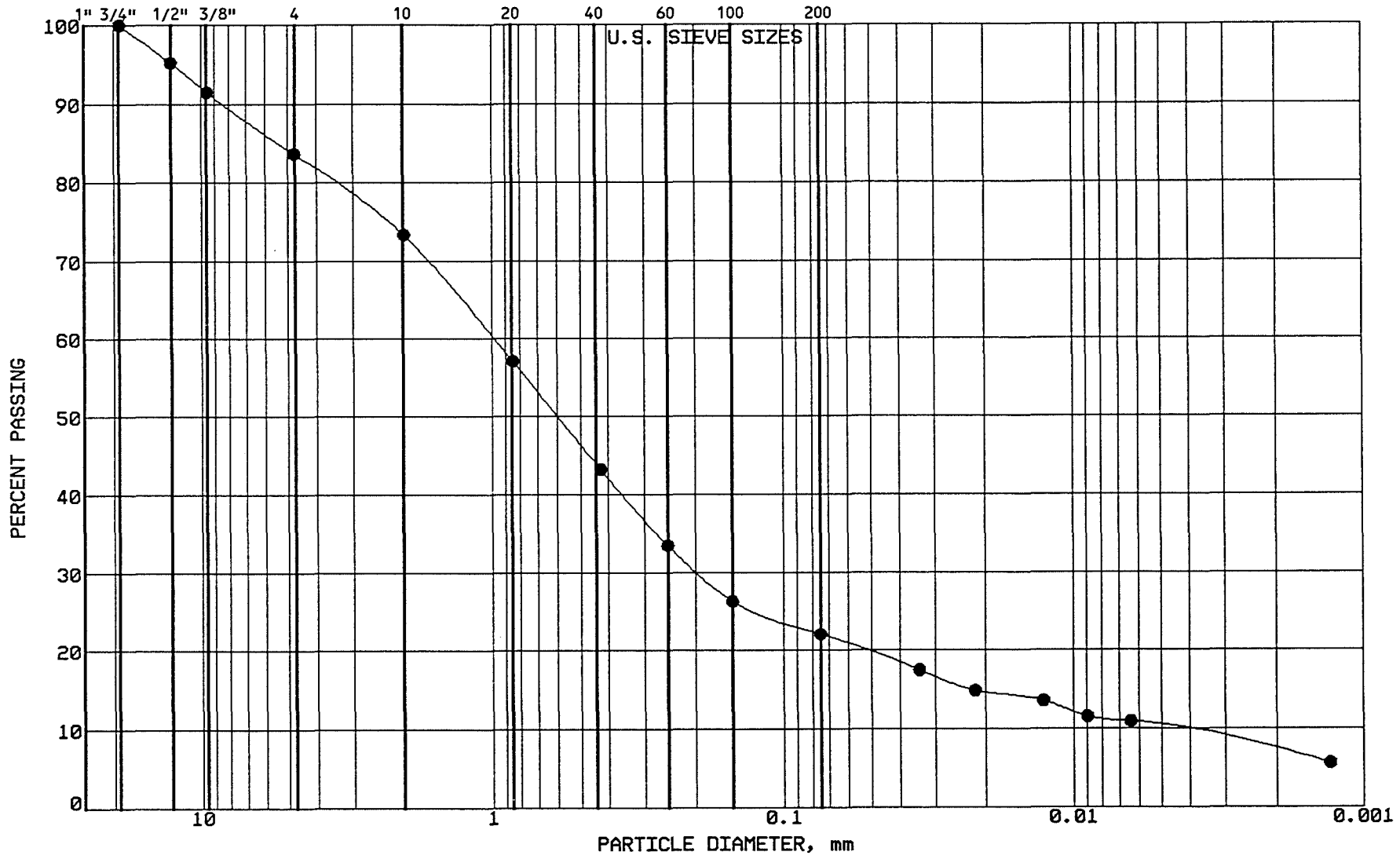
GRAVEL	23.1 %
SAND	51.0 %
SILT	15.1 %
CLAY	10.8 %
P 200	25.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND with GR. (SM), ol.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43089.0, E 43164.0
SAMPLE: SGCC281 TUBE #:
ELEVATION: 1882.8'

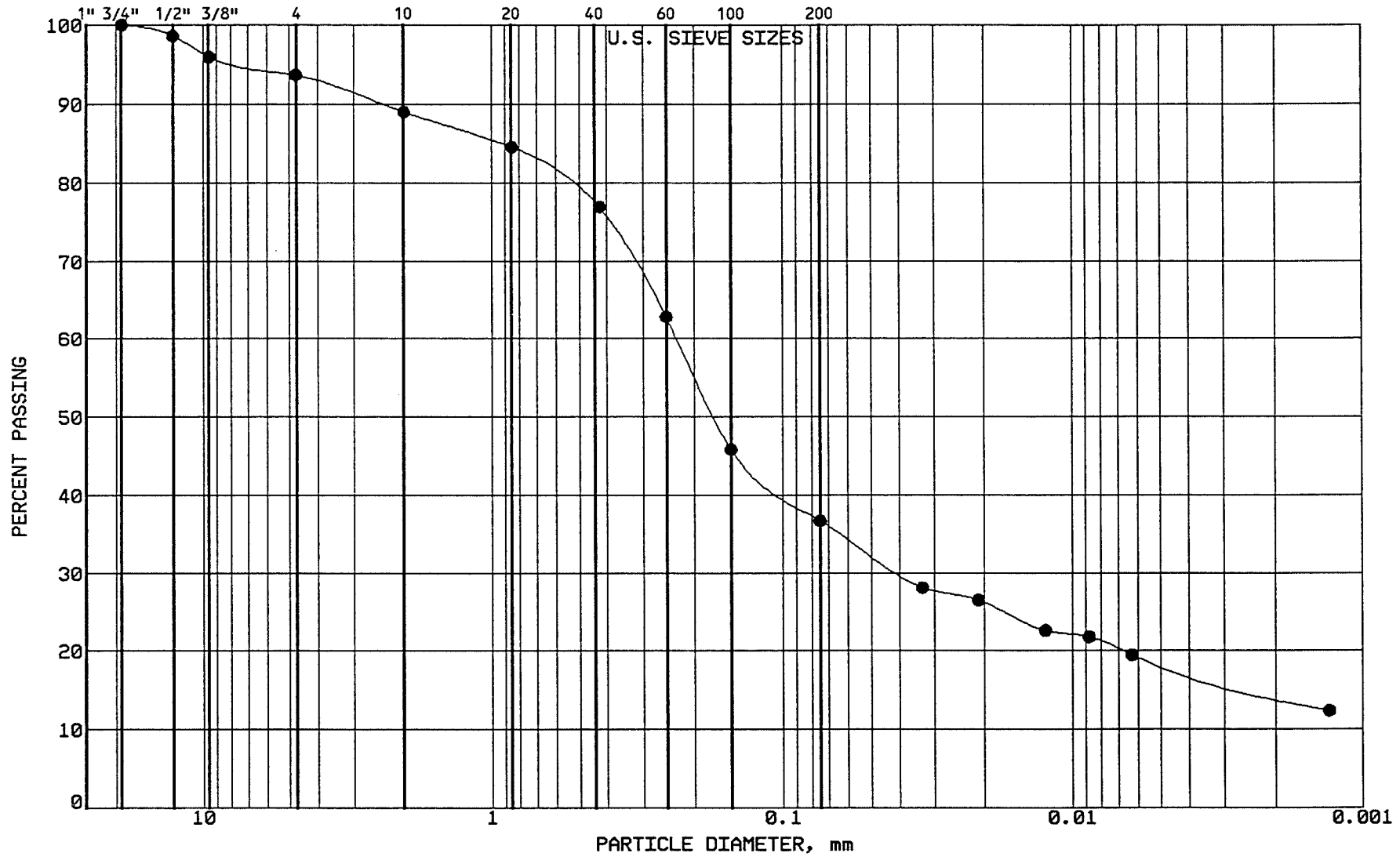
GRAVEL	16.4 %
SAND	61.5 %
SILT	11.9 %
CLAY	10.2 %
P 200	22.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND with GR. (SM), dk.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43289.0, E 43347.0
SAMPLE: SGCC282 TUBE #:
ELEVATION: 1884.0'

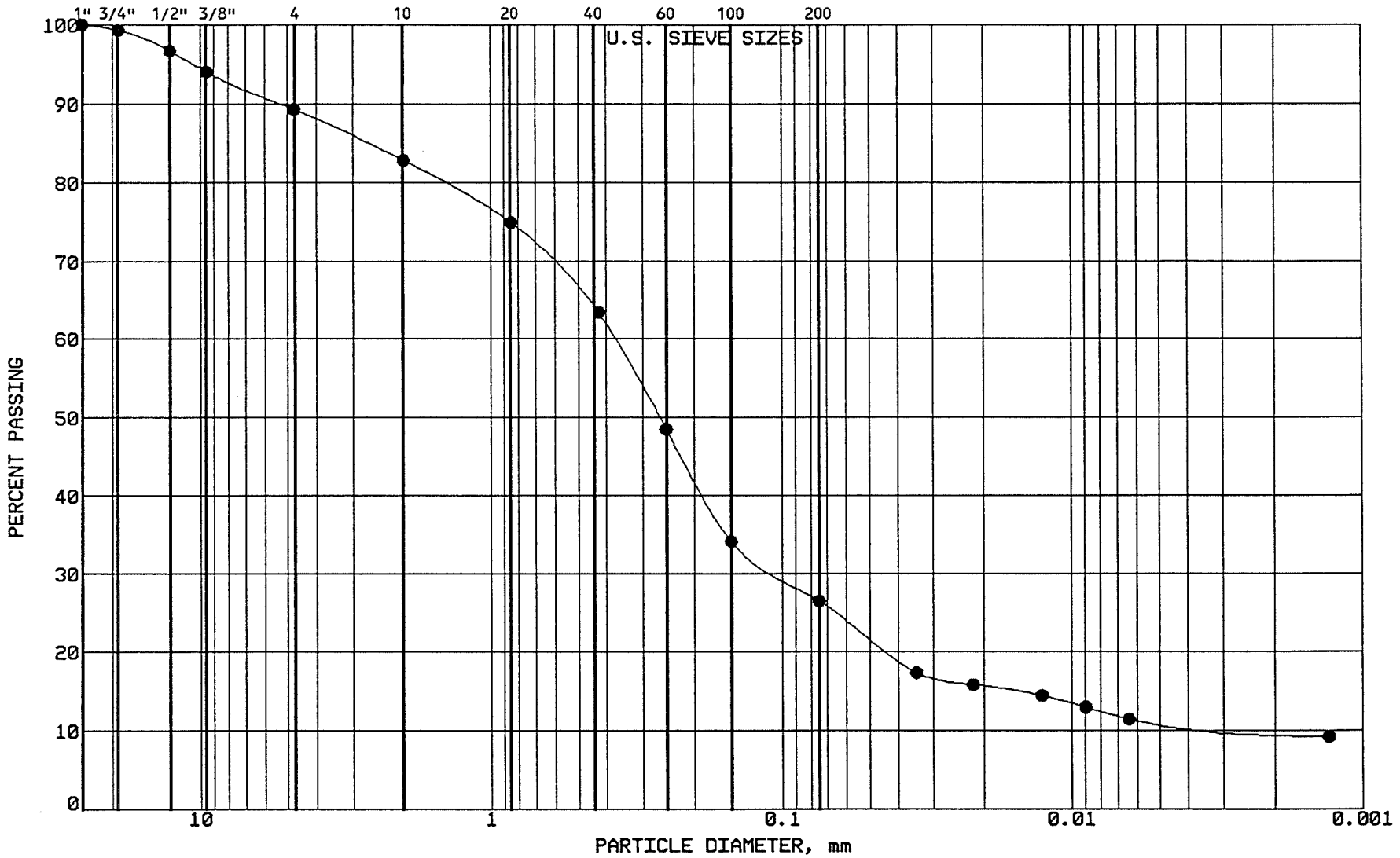
GRAVEL	6.4 %
SAND	56.9 %
SILT	18.2 %
CLAY	18.5 %
P 200	36.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND (SC), ol.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

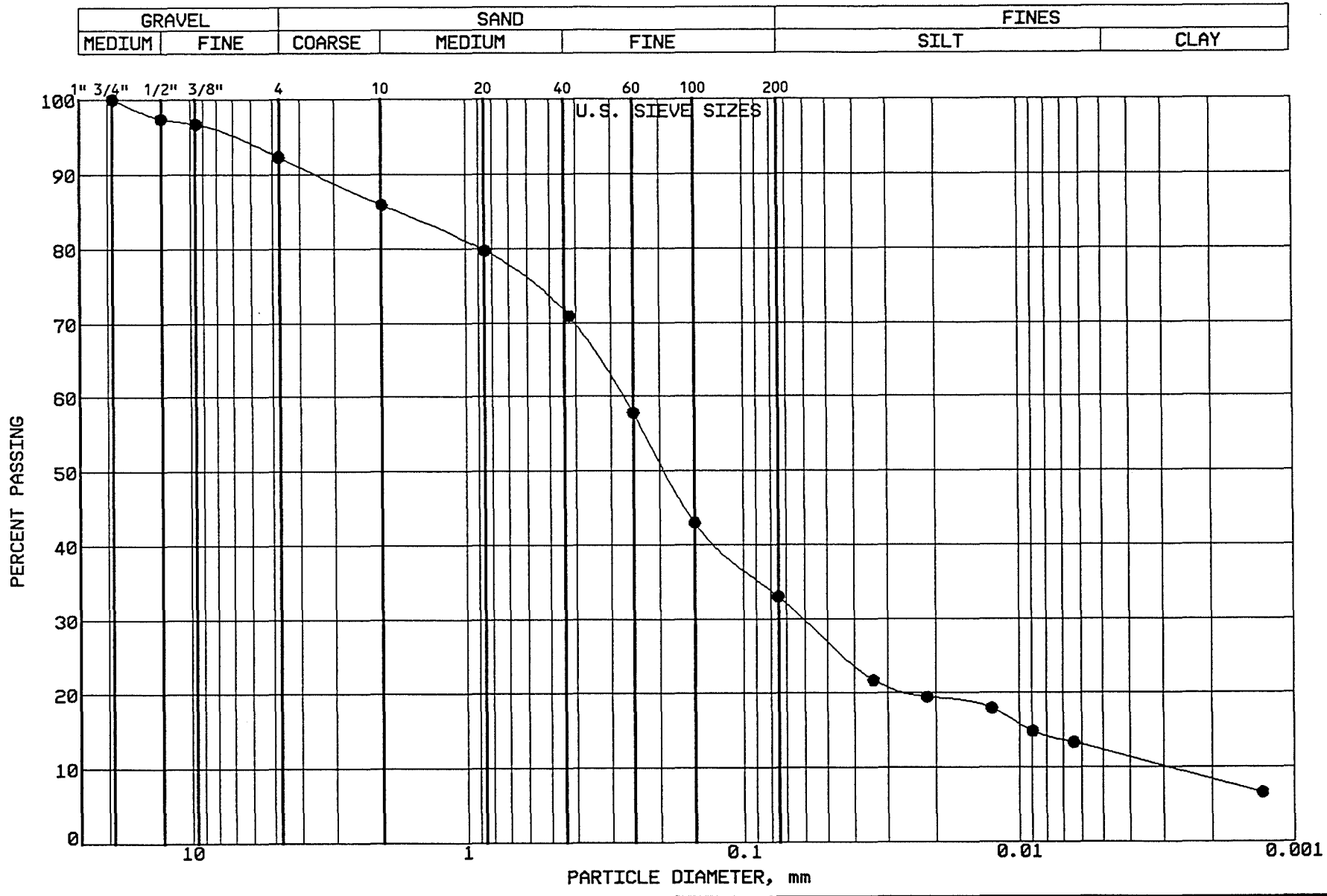
LOCATION: N 43207.0, E 43348.0
SAMPLE: SGCC283 TUBE #:
ELEVATION: 1883.7'

GRAVEL	10.7 %
SAND	62.8 %
SILT	15.3 %
CLAY	11.2 %
P 200	26.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND (SM), vy.dk.gr.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

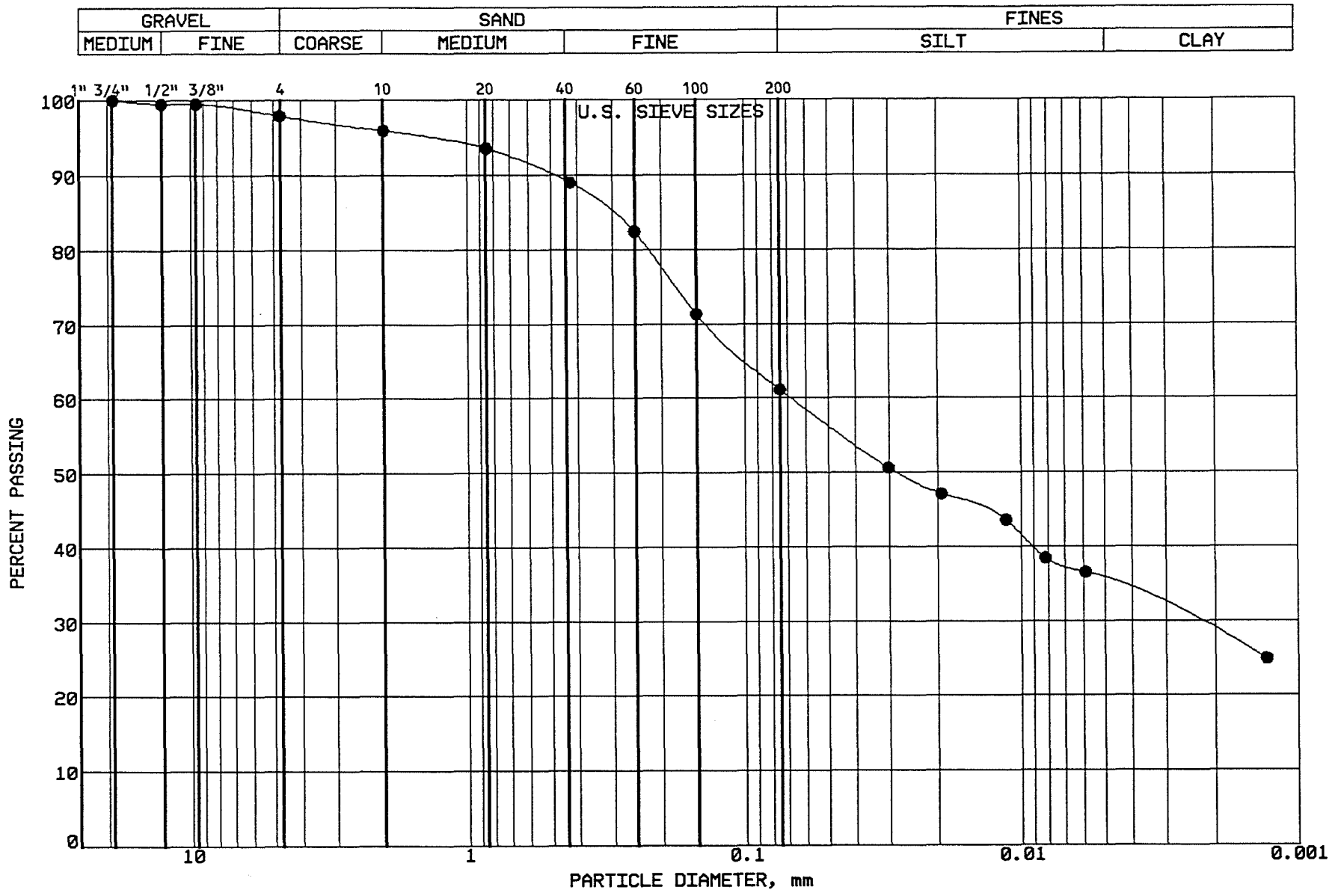
LOCATION: N 43076.0, E 43343.0
SAMPLE: SGCC284 TUBE #:
ELEVATION: 1884.7'

GRAVEL	7.7 %
SAND	59.3 %
SILT	20.7 %
CLAY	12.3 %
P 200	33.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND (SM), brown

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

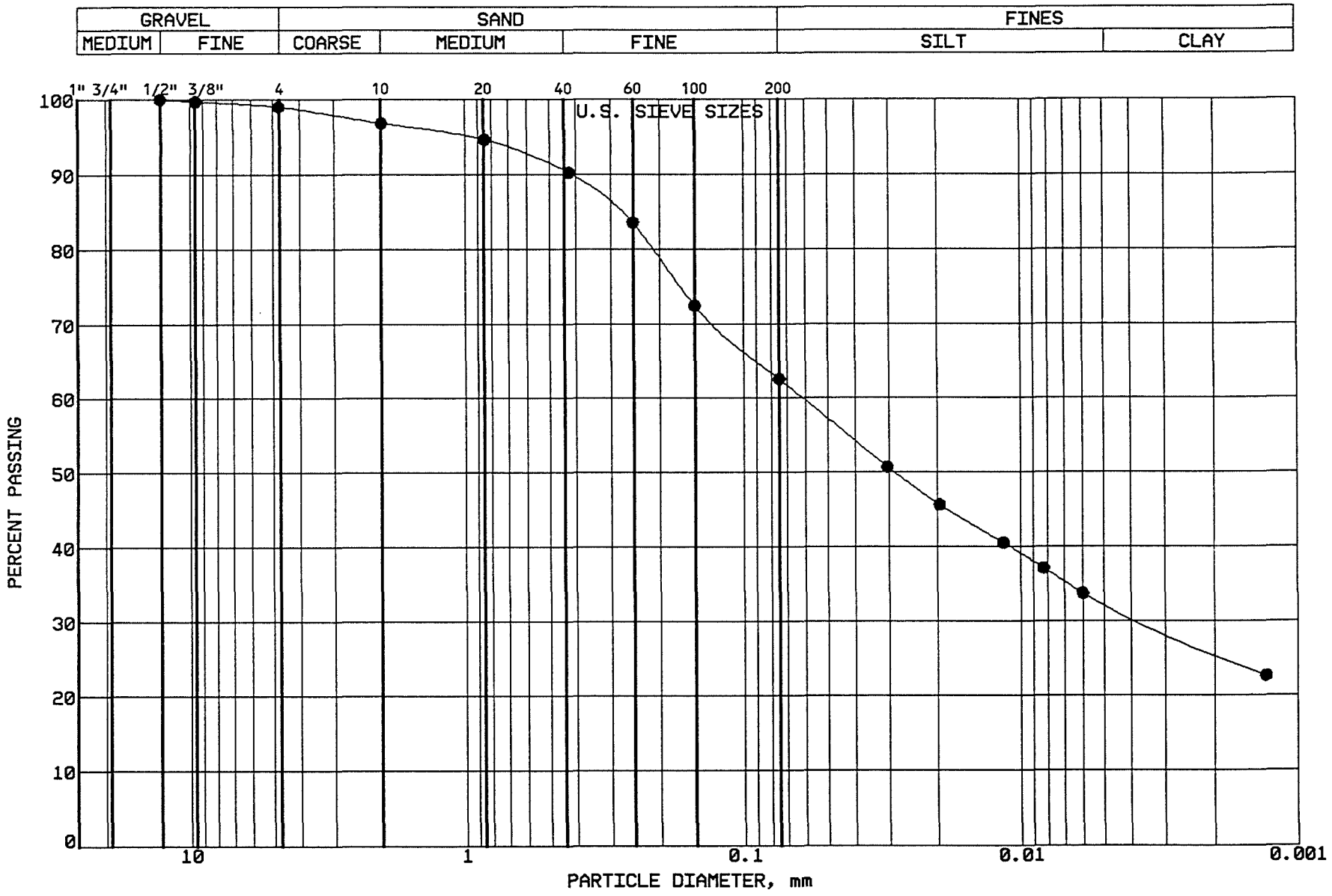
LOCATION: N 42958.0, E 45695.0
SAMPLE: SGCC285 TUBE #:
ELEVATION: 1883.7'

GRAVEL	2.1 %
SAND	36.8 %
SILT	25.9 %
CLAY	35.2 %
P 200	61.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

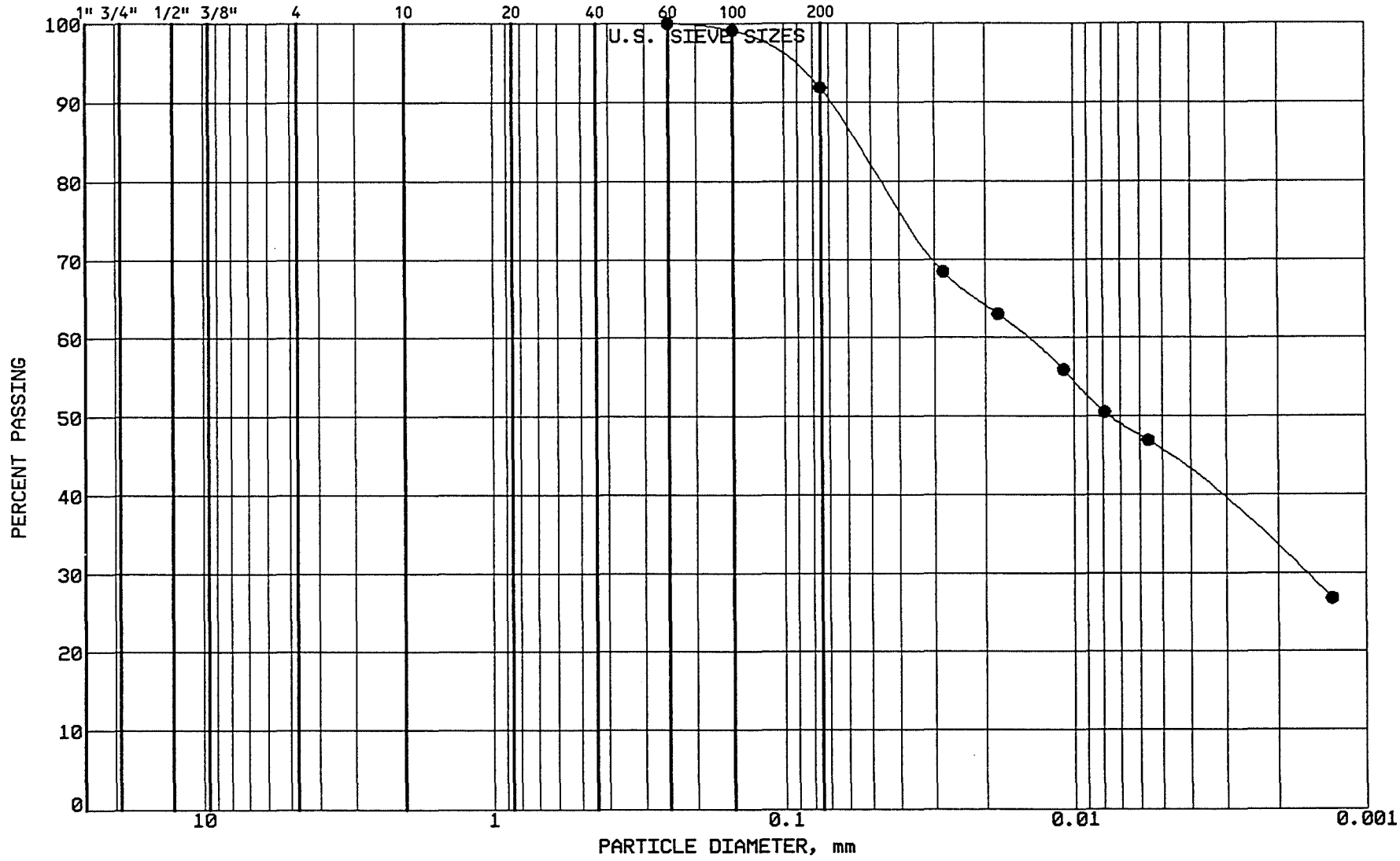
LOCATION: N 42843.0, E 45695.0
SAMPLE: SGCC286 TUBE #:
ELEVATION: 1881.2'

GRAVEL	1.0 %
SAND	36.5 %
SILT	30.1 %
CLAY	32.4 %
P 200	62.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

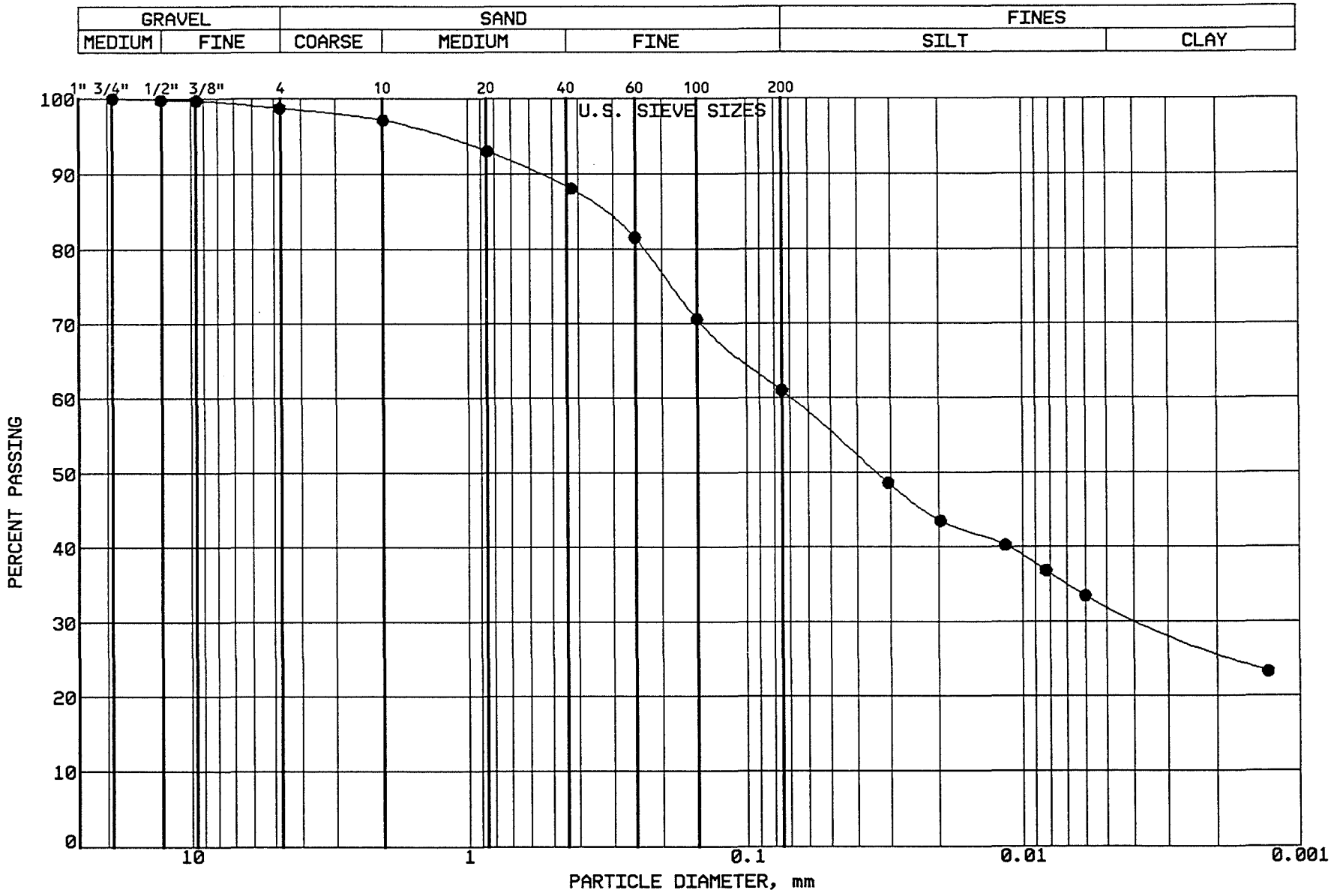
LOCATION: N ,Stockpile E
SAMPLE: SGCC287 TUBE #:
ELEVATION:

GRAVEL	0.0 %
SAND	8.2 %
SILT	46.5 %
CLAY	45.3 %
P 200	91.8 %

SOIL PROPERTIES

LL: 53.0%
PL: 24.0%
PI: 29.0%
CLASS: FAT CLAY (CH), black

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42925.0, E 45914.0
SAMPLE: SGCC288 TUBE #:
ELEVATION: 1883.3'

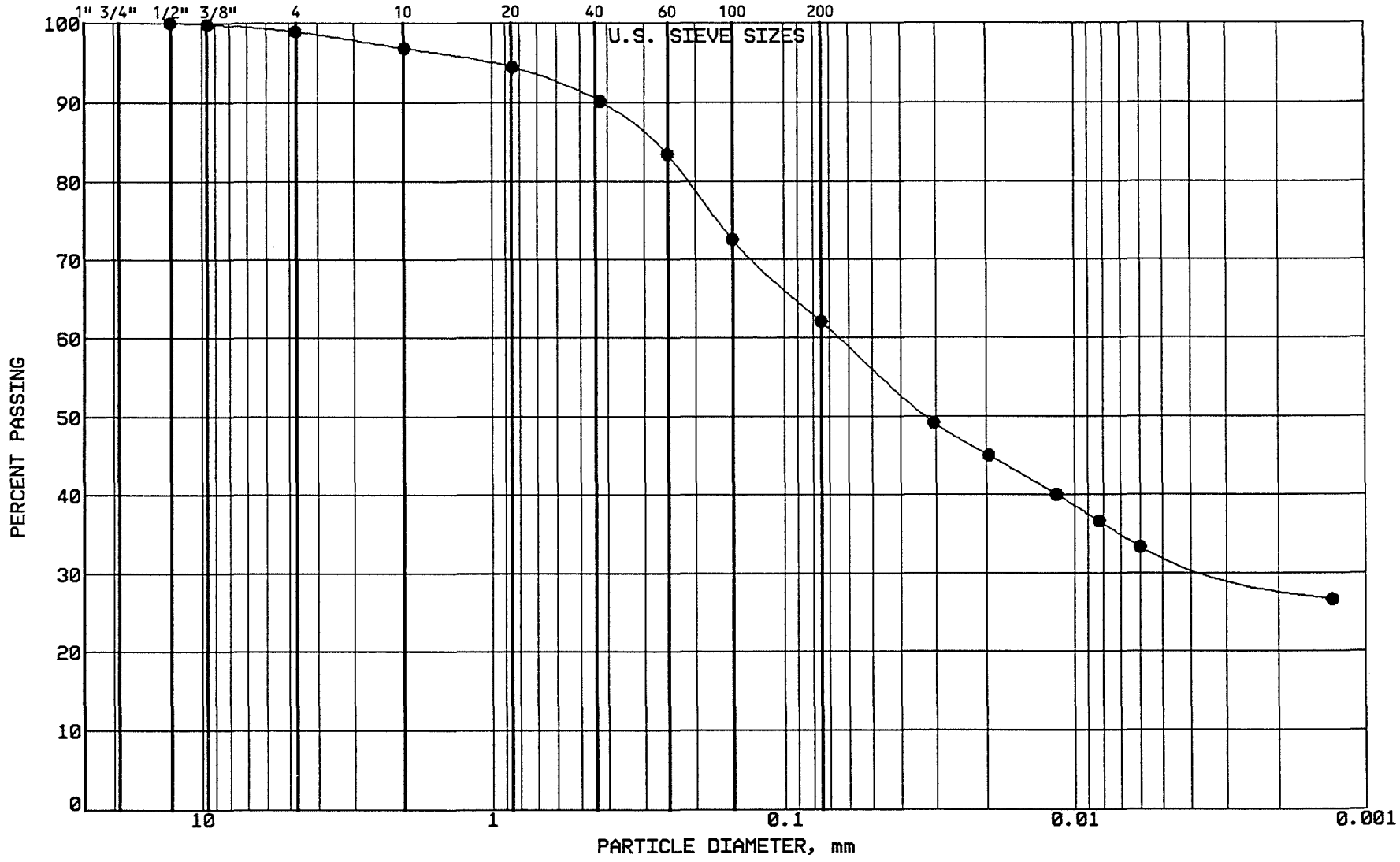
GRAVEL	1.3 %
SAND	37.7 %
SILT	28.8 %
CLAY	32.2 %
P 200	61.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

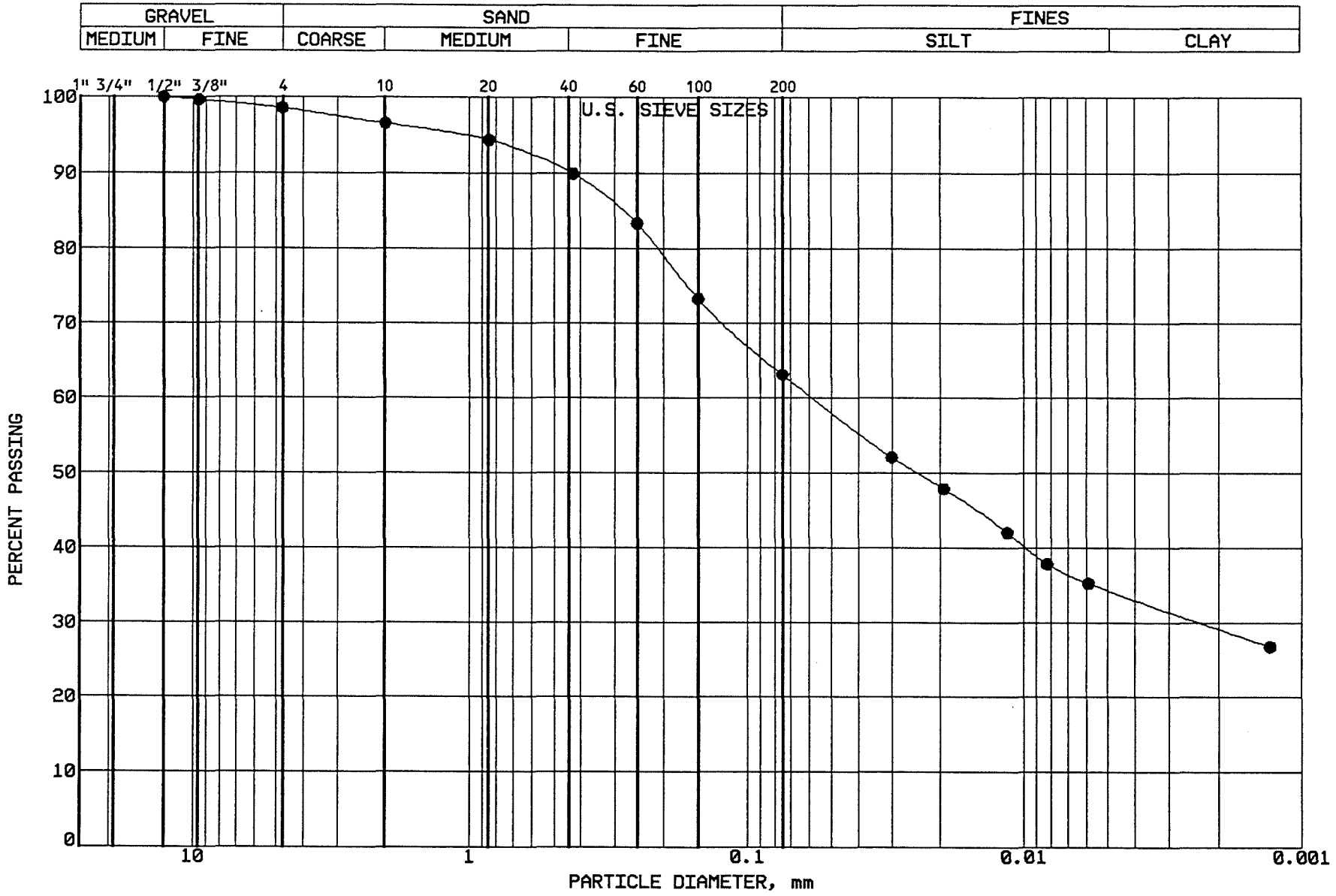
LOCATION: N 43404.0, E 45571.0
SAMPLE: CLBCC289 TUBE #: ST-52A
ELEVATION: 1887.3'

GRAVEL	1.1 %
SAND	36.8 %
SILT	29.6 %
CLAY	32.5 %
P 200	62.1 %

SOIL PROPERTIES

LL: 38.0%
PL: 15.0%
PI: 23.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

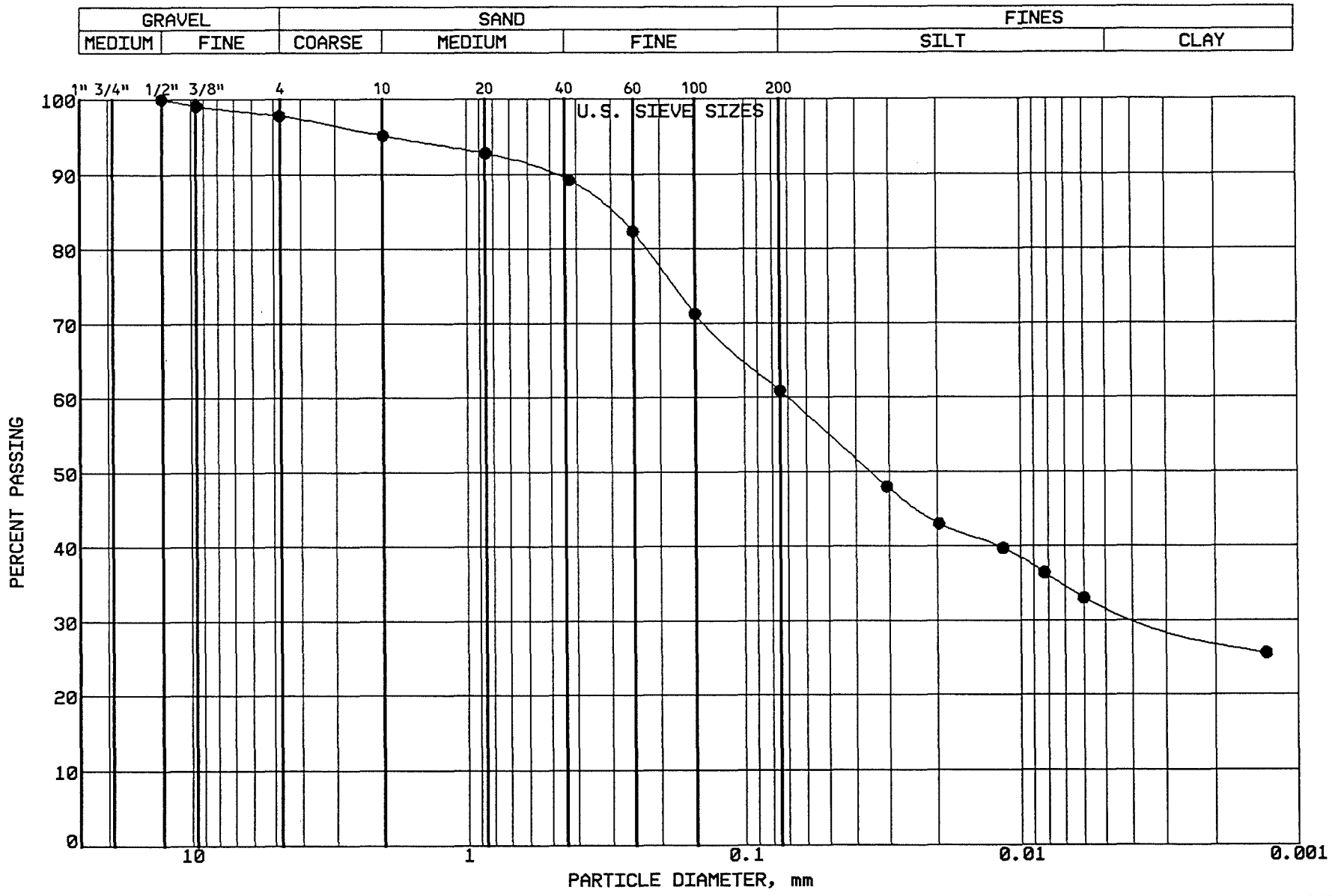
LOCATION: N 43260.0, E 45565.0
SAMPLE: CLBCC290 TUBE #: ST-53B
ELEVATION: 1886.2'

GRAVEL	1.5 %
SAND	35.4 %
SILT	28.8 %
CLAY	34.3 %
P 200	63.1 %

SOIL PROPERTIES

LL: 39.0%
PL: 15.0%
PI: 24.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

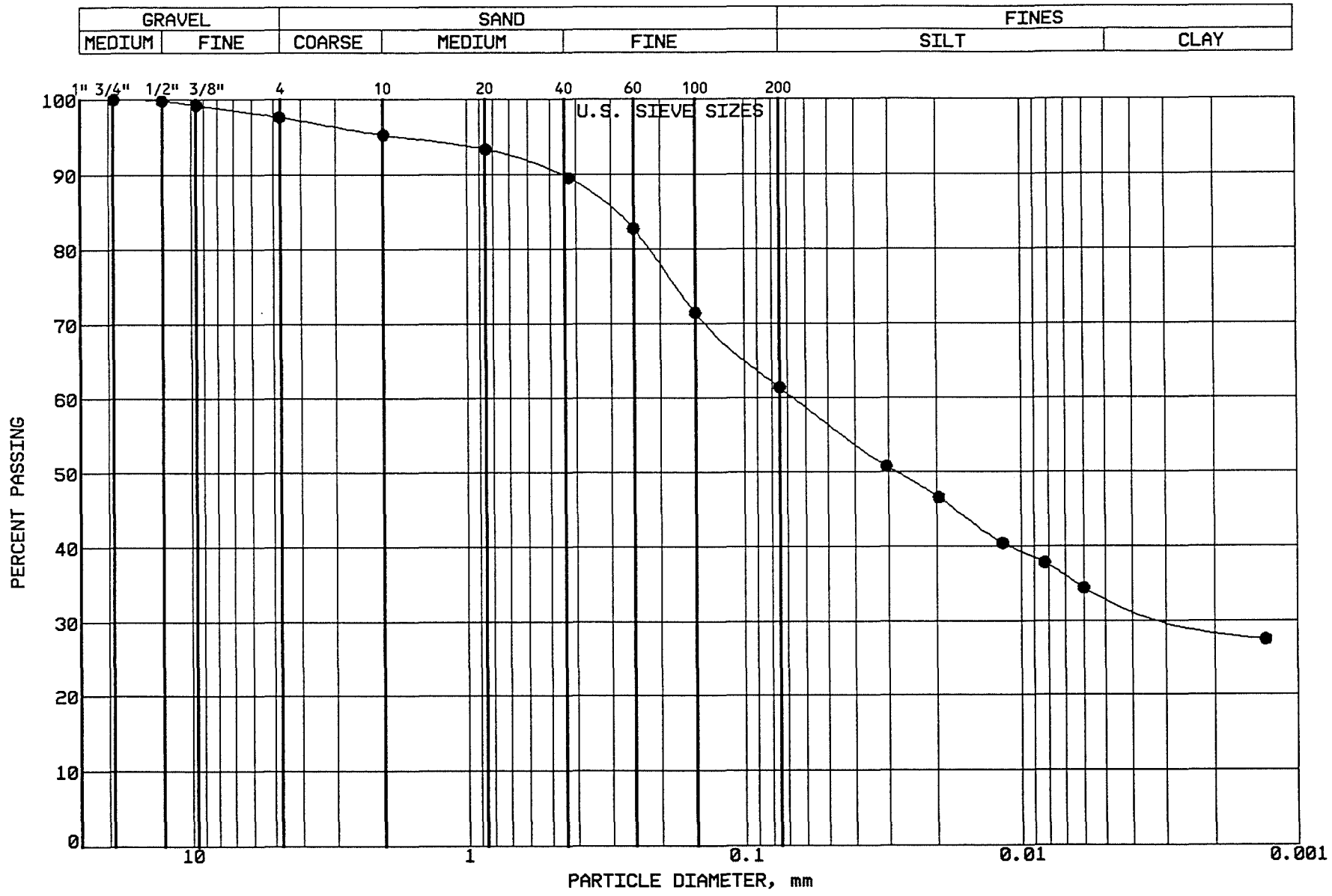
LOCATION: N 43123.0, E 45563.0
SAMPLE: CLBCC291 TUBE #: ST-54B
ELEVATION: 1885.3'

GRAVEL	2.2 %
SAND	36.9 %
SILT	28.8 %
CLAY	32.1 %
P 200	60.9 %

SOIL PROPERTIES

LL: 41.0%
PL: 15.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

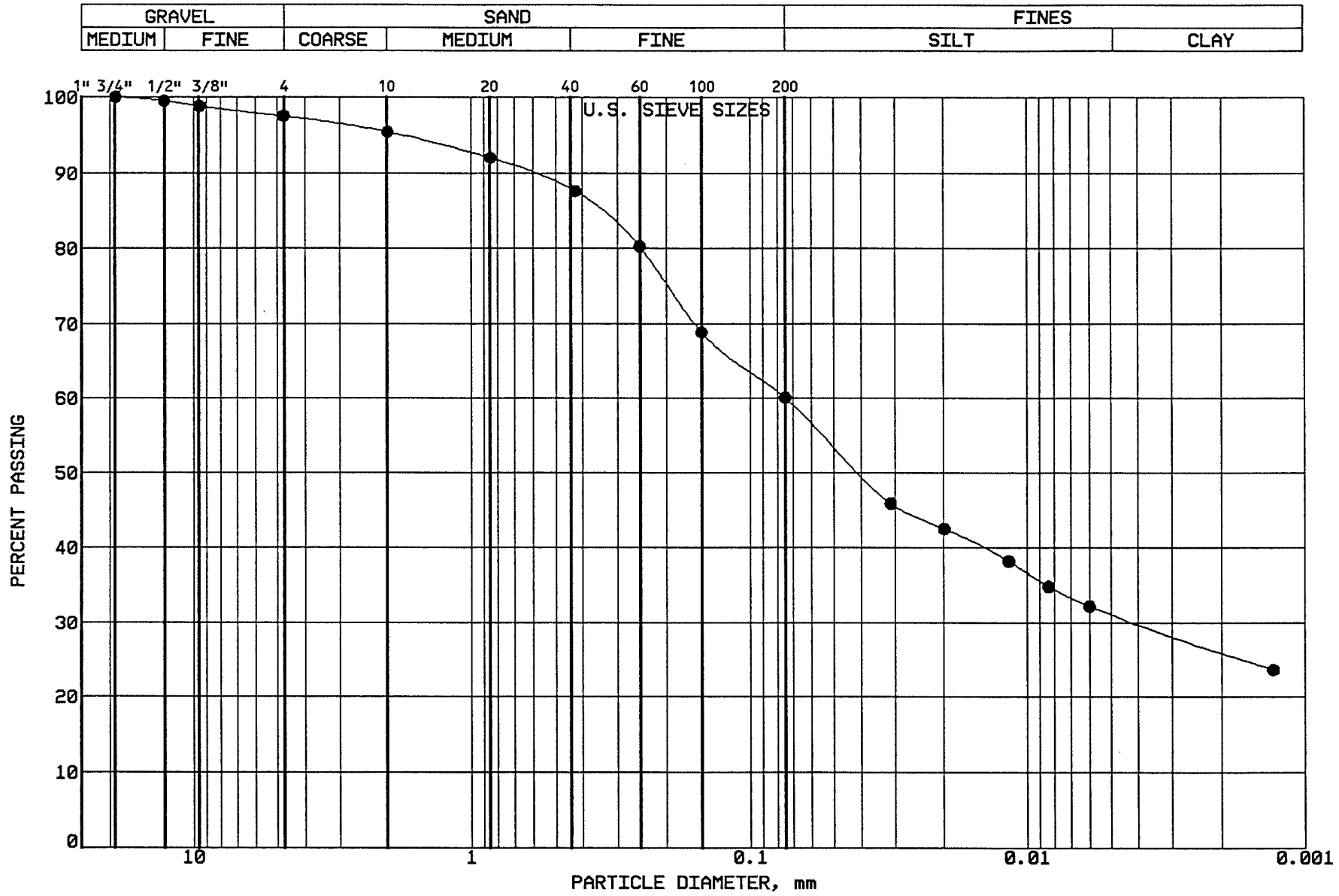
LOCATION: N 42948.0, E 45563.0
SAMPLE: SGCC292 TUBE #:
ELEVATION: 1883.7'

GRAVEL	2.4 %
SAND	36.2 %
SILT	27.8 %
CLAY	33.6 %
P 200	61.4 %

SOIL PROPERTIES

LL: 40.0%
PL: 15.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL) gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

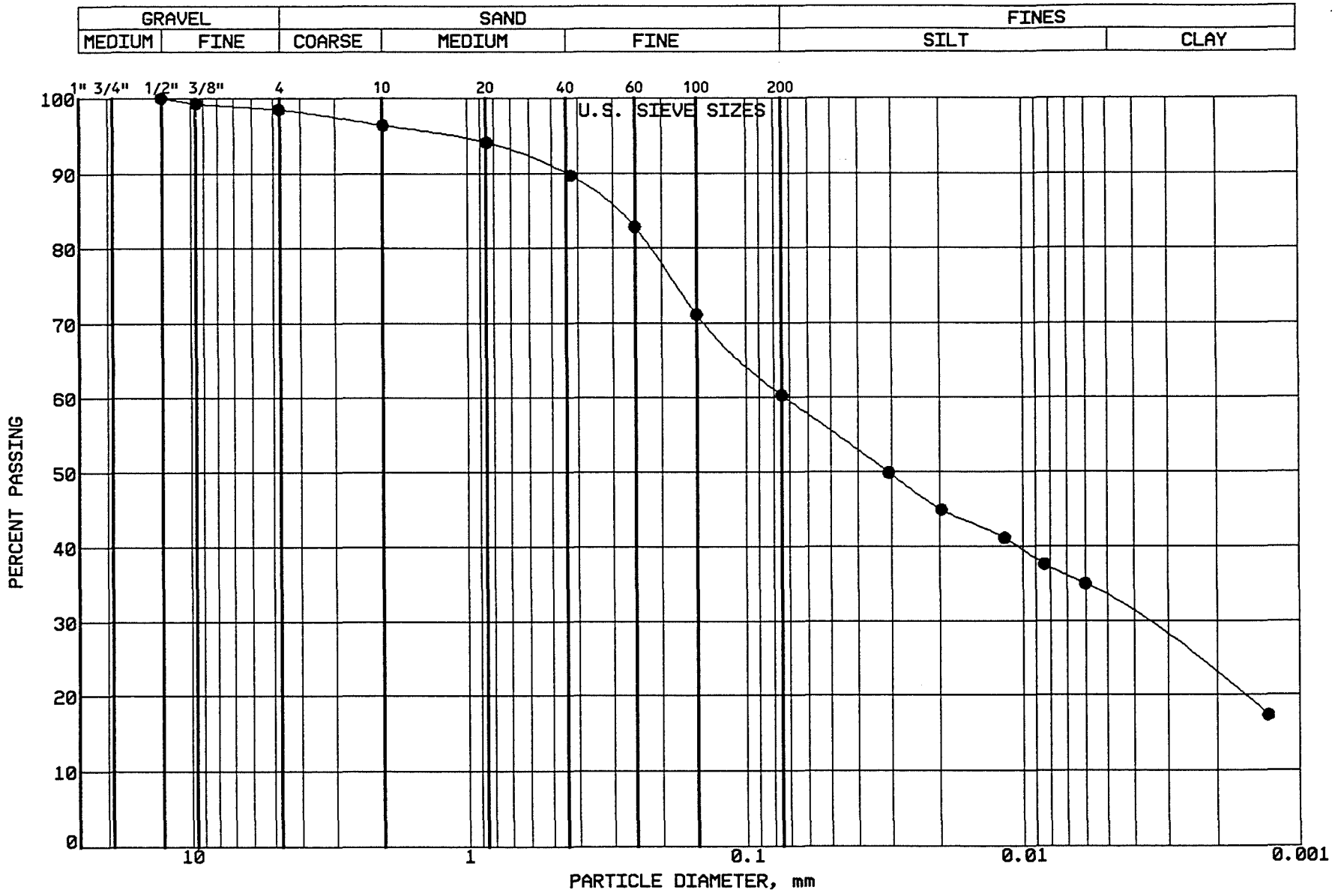
LOCATION: N 43384.0, E 43117.0
SAMPLE: SGCC293 TUBE #:
ELEVATION: 1885.3'

GRAVEL	2.5 %
SAND	37.4 %
SILT	28.9 %
CLAY	31.2 %
P 200	60.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) olive

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

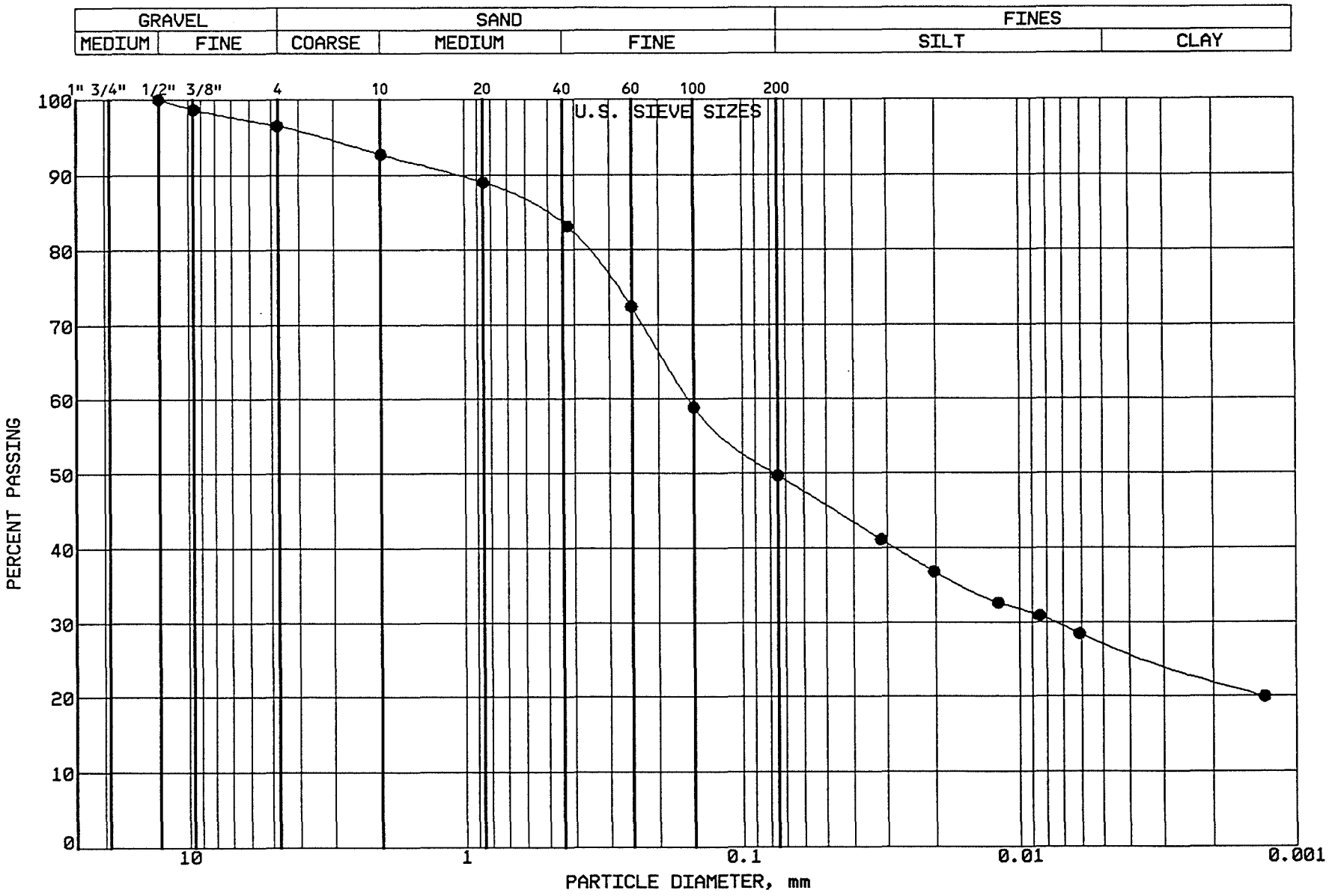
LOCATION: N 43242.0, E 43124.0
SAMPLE: SGCC294 TUBE #:
ELEVATION: 1885.0'

GRAVEL	1.5 %
SAND	38.2 %
SILT	27.4 %
CLAY	32.9 %
P 200	60.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

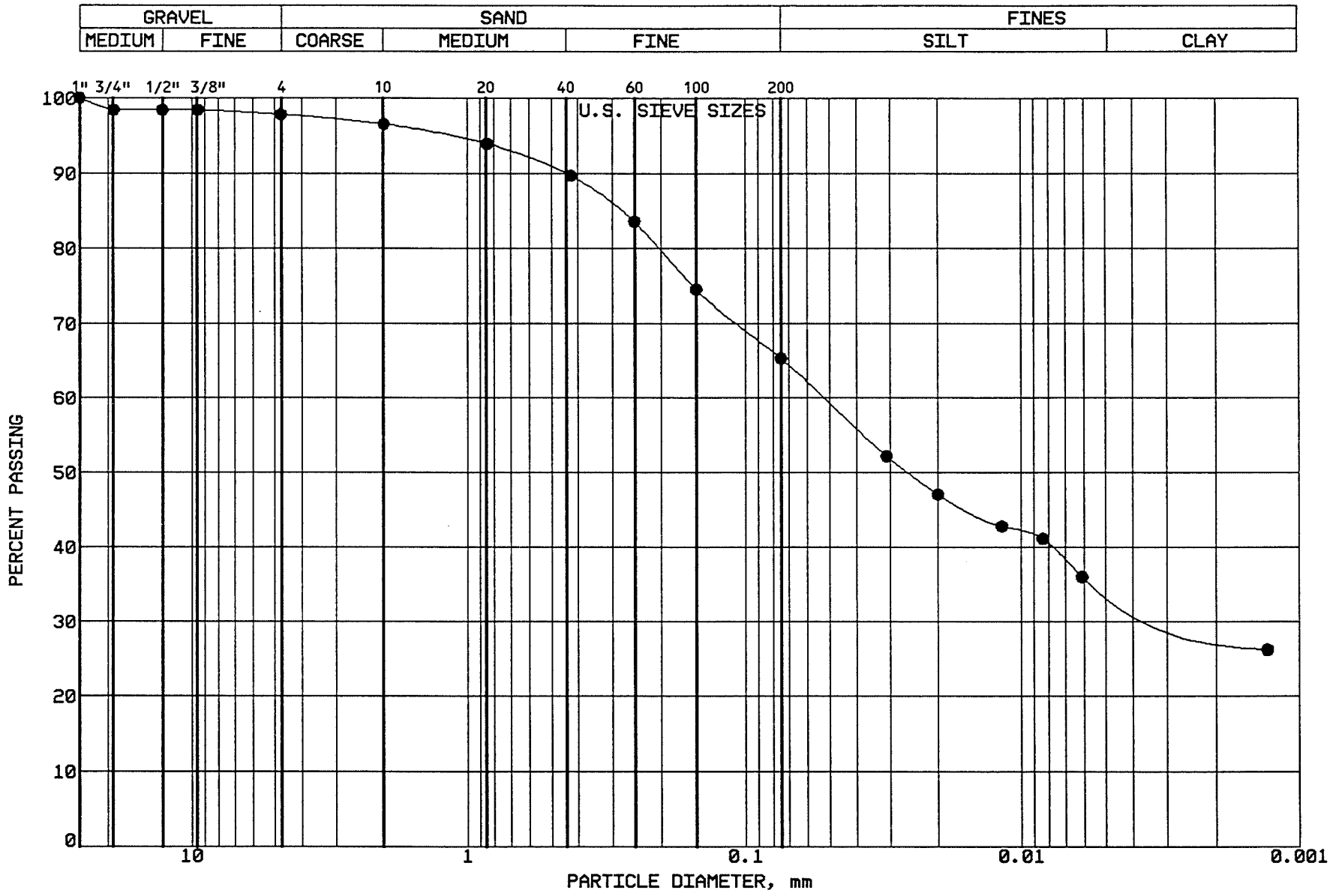
LOCATION: N 43056.0, E 43123.0
SAMPLE: SGCC295 TUBE #:
ELEVATION: 1884.4'

GRAVEL	3.5 %
SAND	46.8 %
SILT	22.4 %
CLAY	27.3 %
P 200	49.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND (SC), olive br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43245.0, E 43320.0
SAMPLE: SGCC296 TUBE #:
ELEVATION: 1884.8'

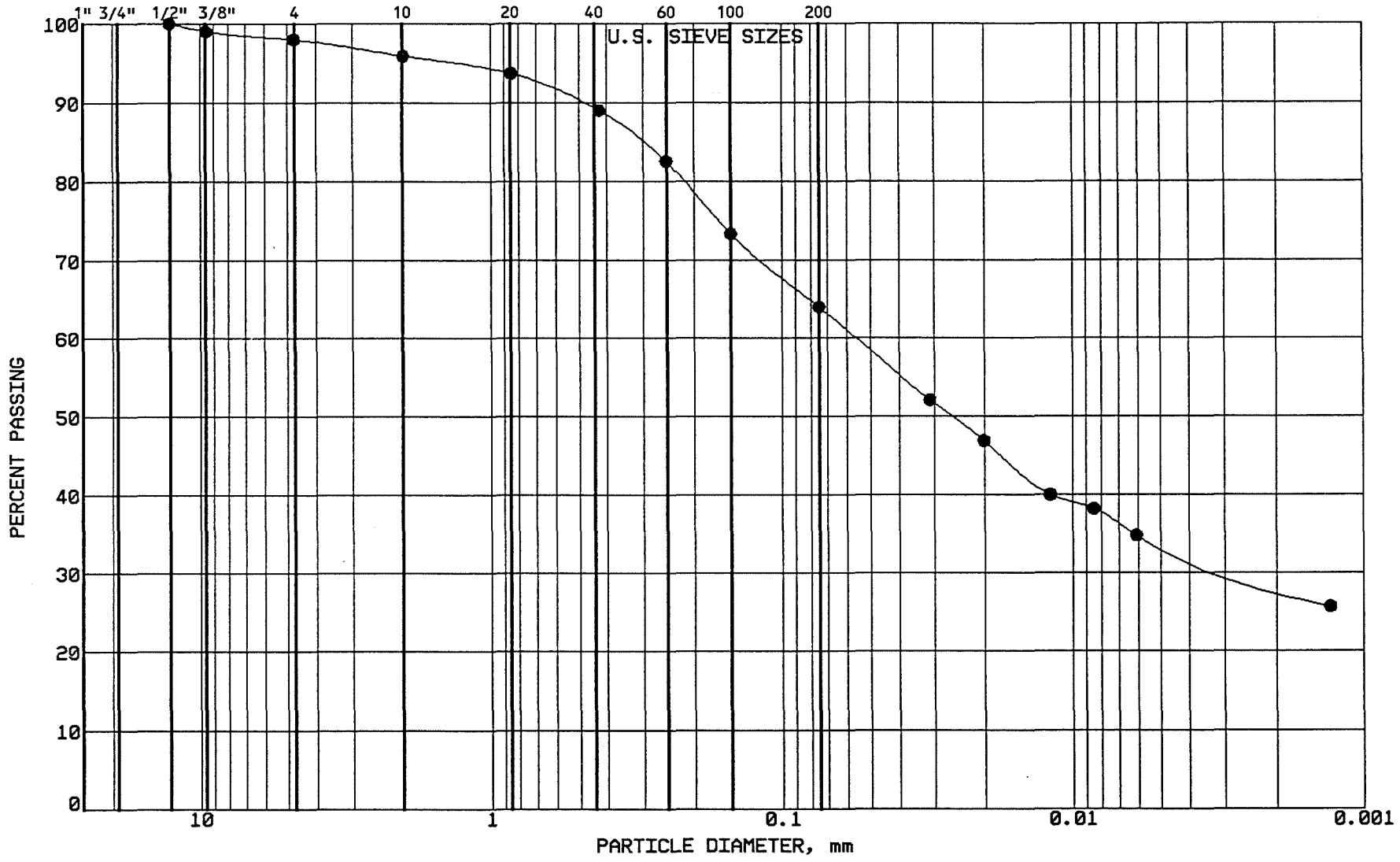
GRAVEL	2.2 %
SAND	32.5 %
SILT	30.6 %
CLAY	34.7 %
P 200	65.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43172.0, E 43312.0
SAMPLE: SGCC297 TUBE #:
ELEVATION: 1884.7'

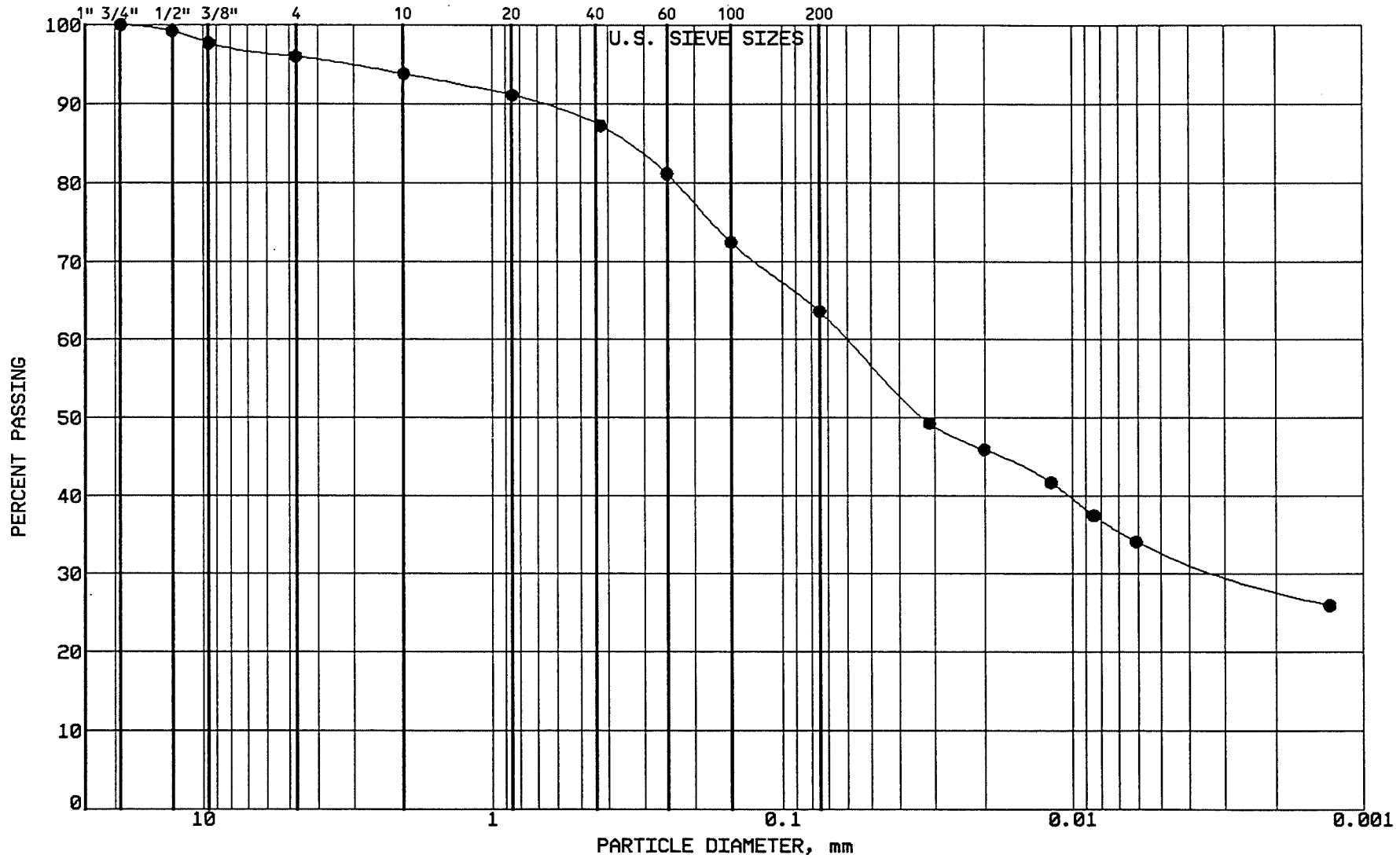
GRAVEL	2.0 %
SAND	34.0 %
SILT	30.4 %
CLAY	33.6 %
P 200	64.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

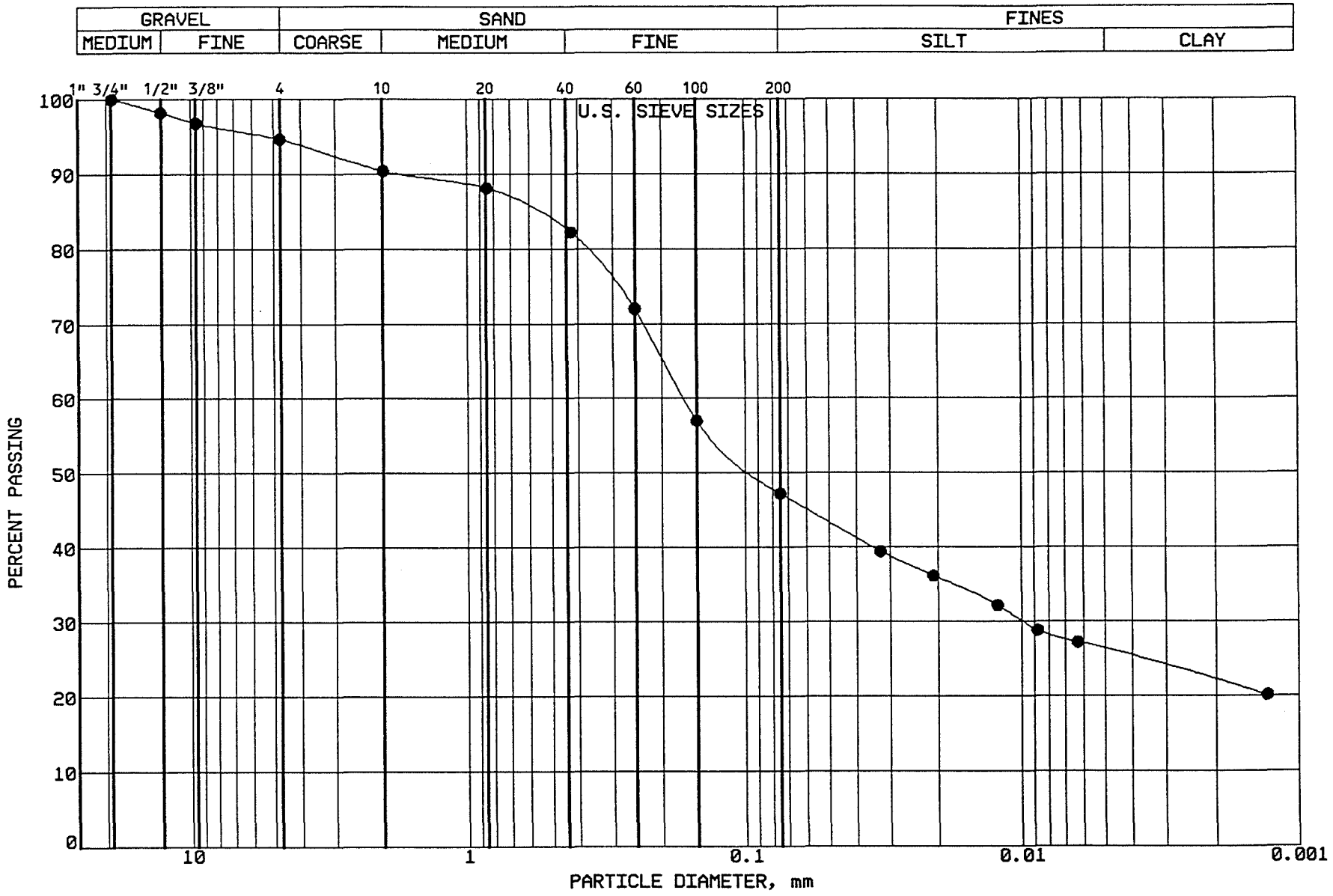
LOCATION: N 43354.0, E 43324.0
SAMPLE: SGCC298 TUBE #:
ELEVATION: 1885.4'

GRAVEL	4.0 %
SAND	32.4 %
SILT	30.5 %
CLAY	33.1 %
P 200	63.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

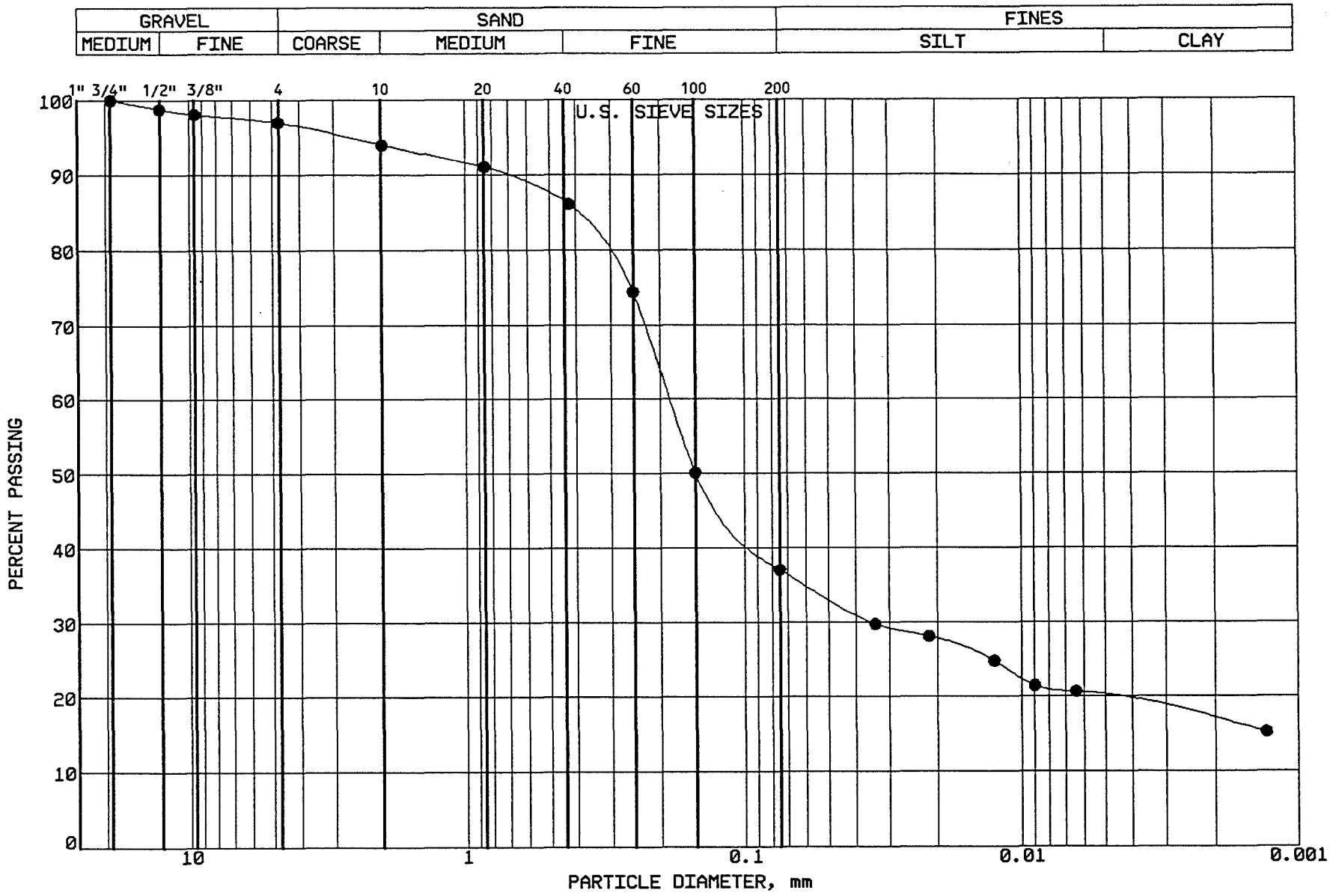
LOCATION: N 43405.0, E 43134.0
SAMPLE: SGCC299 TUBE #:
ELEVATION: 1886.3'

GRAVEL	5.4 %
SAND	47.4 %
SILT	21.0 %
CLAY	26.2 %
P 200	47.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND (SC) gr.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

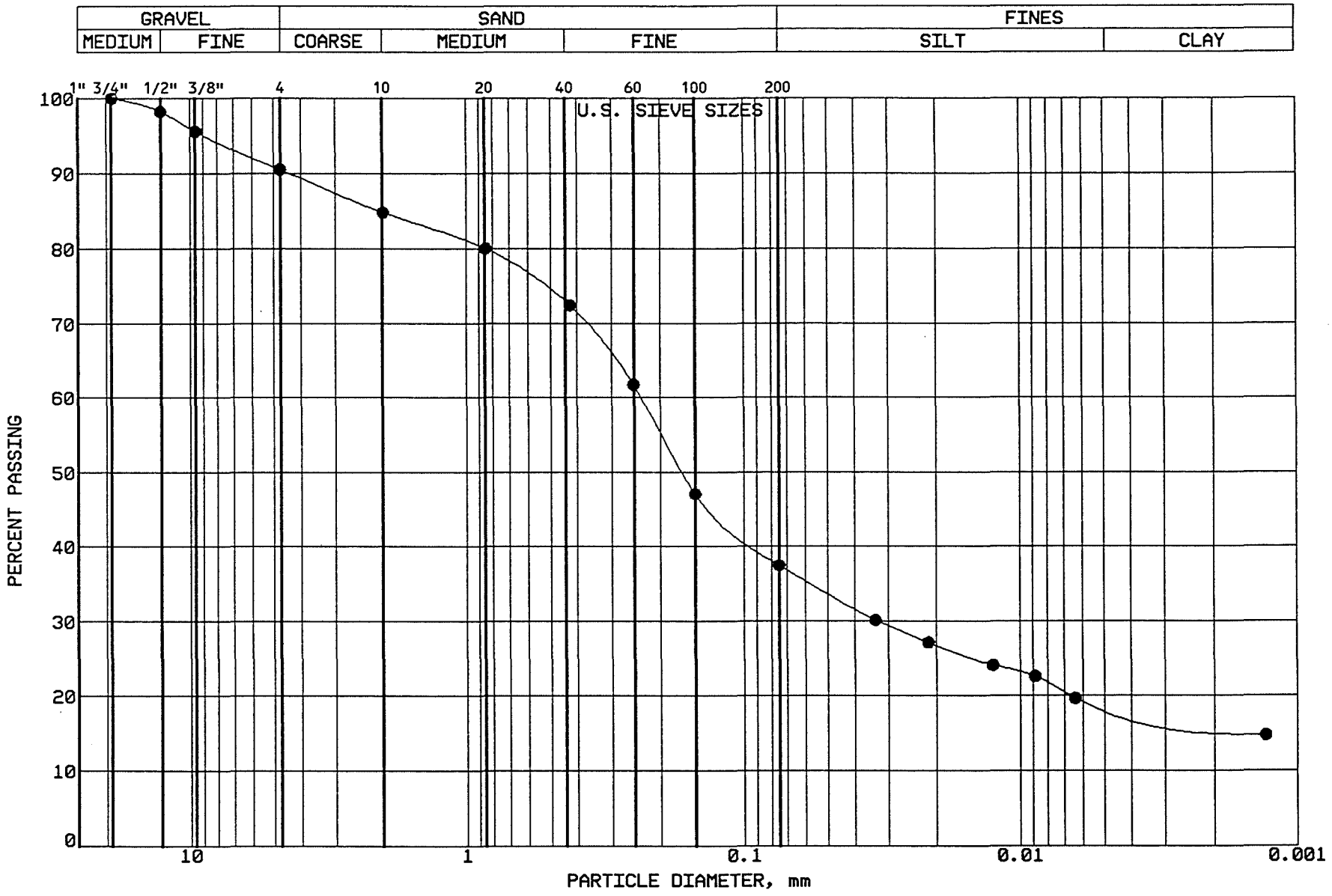
LOCATION: N 43282.0, E 43134.0
SAMPLE: SGCC300 TUBE #:
ELEVATION: 1885.8'

GRAVEL	3.0 %
SAND	60.0 %
SILT	17.1 %
CLAY	19.9 %
P 200	37.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND (SC), gr.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

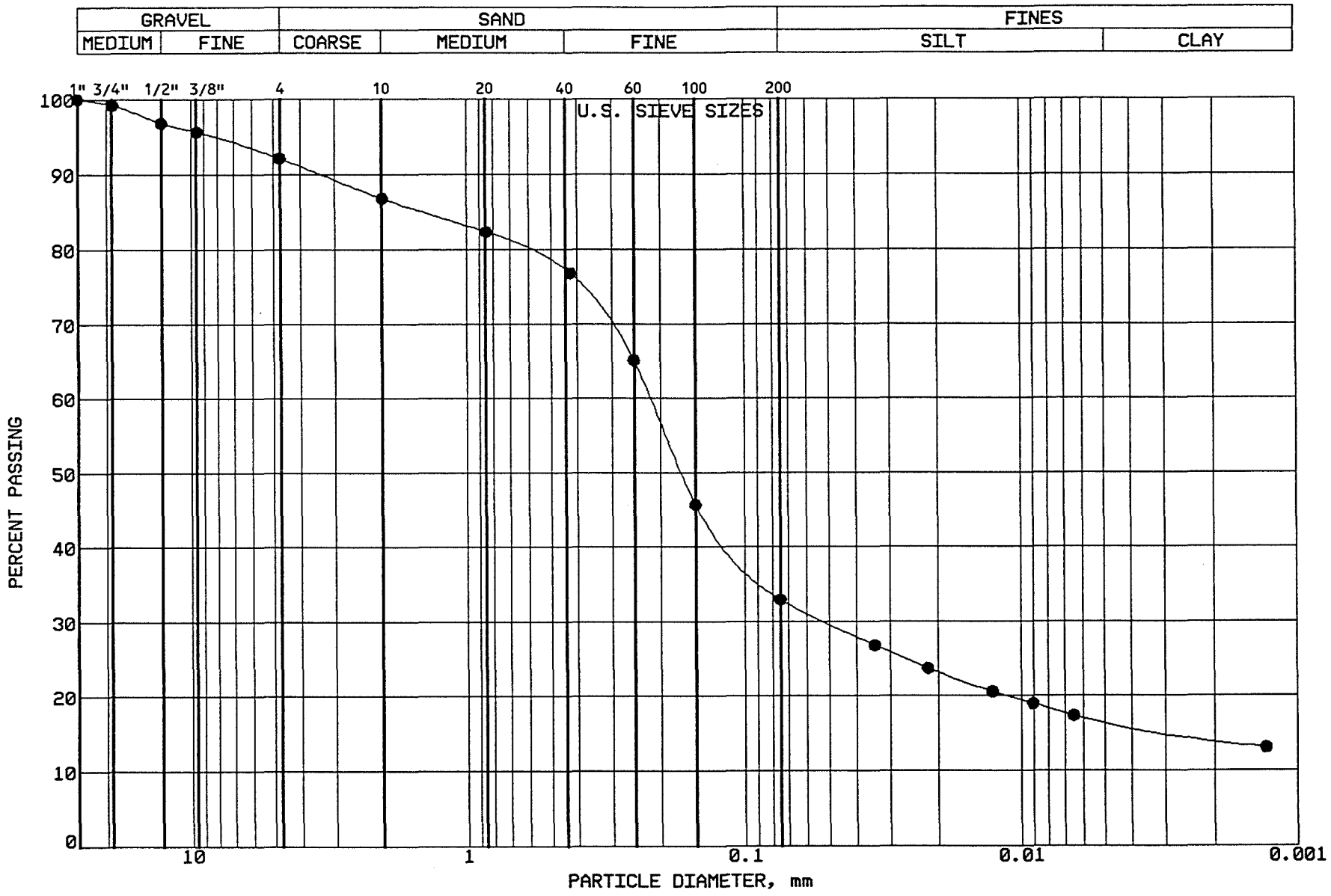
LOCATION: N 43078.0, E 43133.0
SAMPLE: SGCC301 TUBE #:
ELEVATION: 1884.8'

GRAVEL	9.5 %
SAND	53.1 %
SILT	18.5 %
CLAY	18.9 %
P 200	37.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND (SC), dk.gr.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

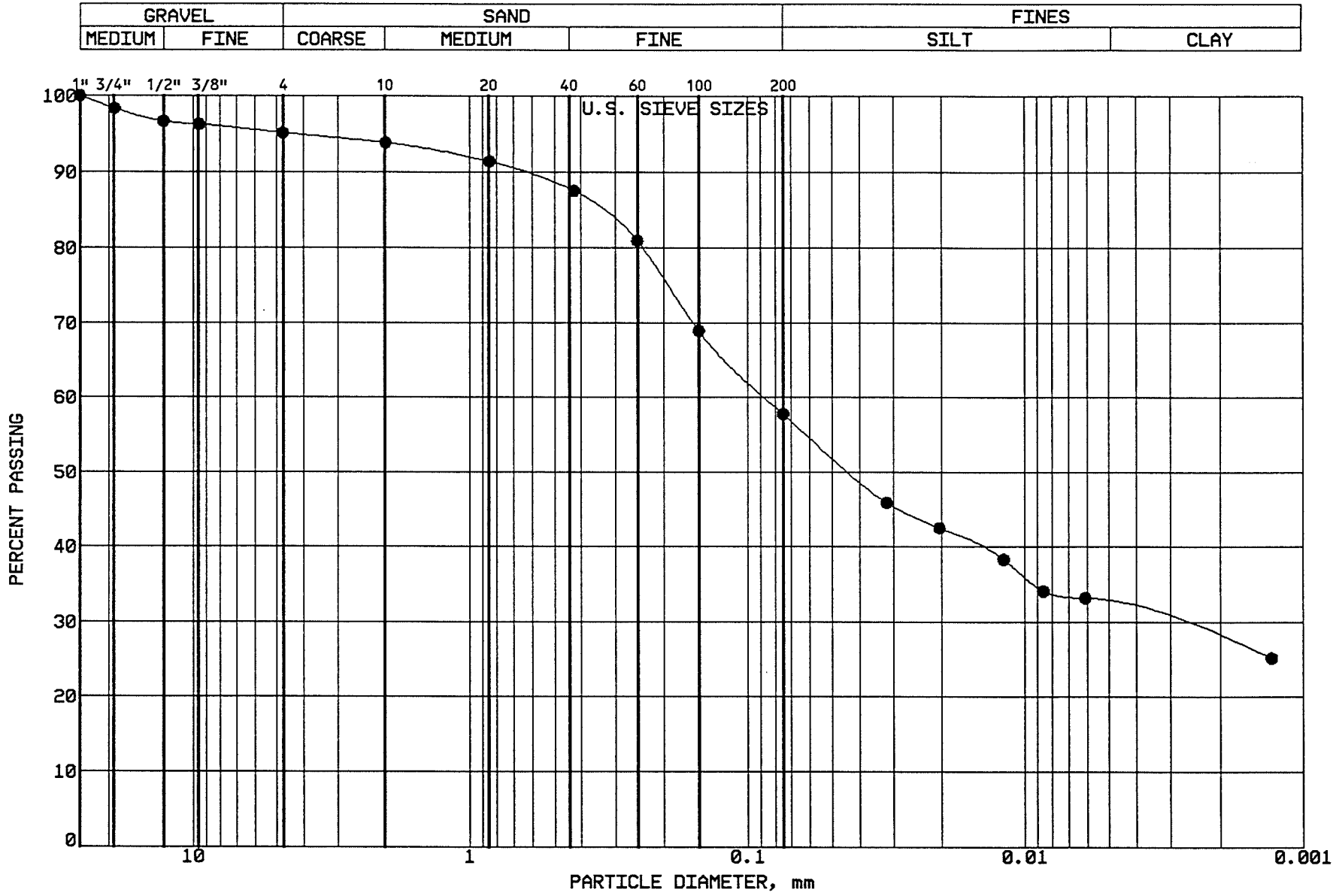
LOCATION: N 42797.0, E 43132.0
SAMPLE: SGCC302 TUBE #:
ELEVATION: 1882.5'

GRAVEL	7.9 %
SAND	59.2 %
SILT	16.2 %
CLAY	16.7 %
P 200	32.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND (SC), dk.gr.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43356.0, E 45895.0
SAMPLE: CLBCC303 TUBE #: ST-55B
ELEVATION: 1887.0'

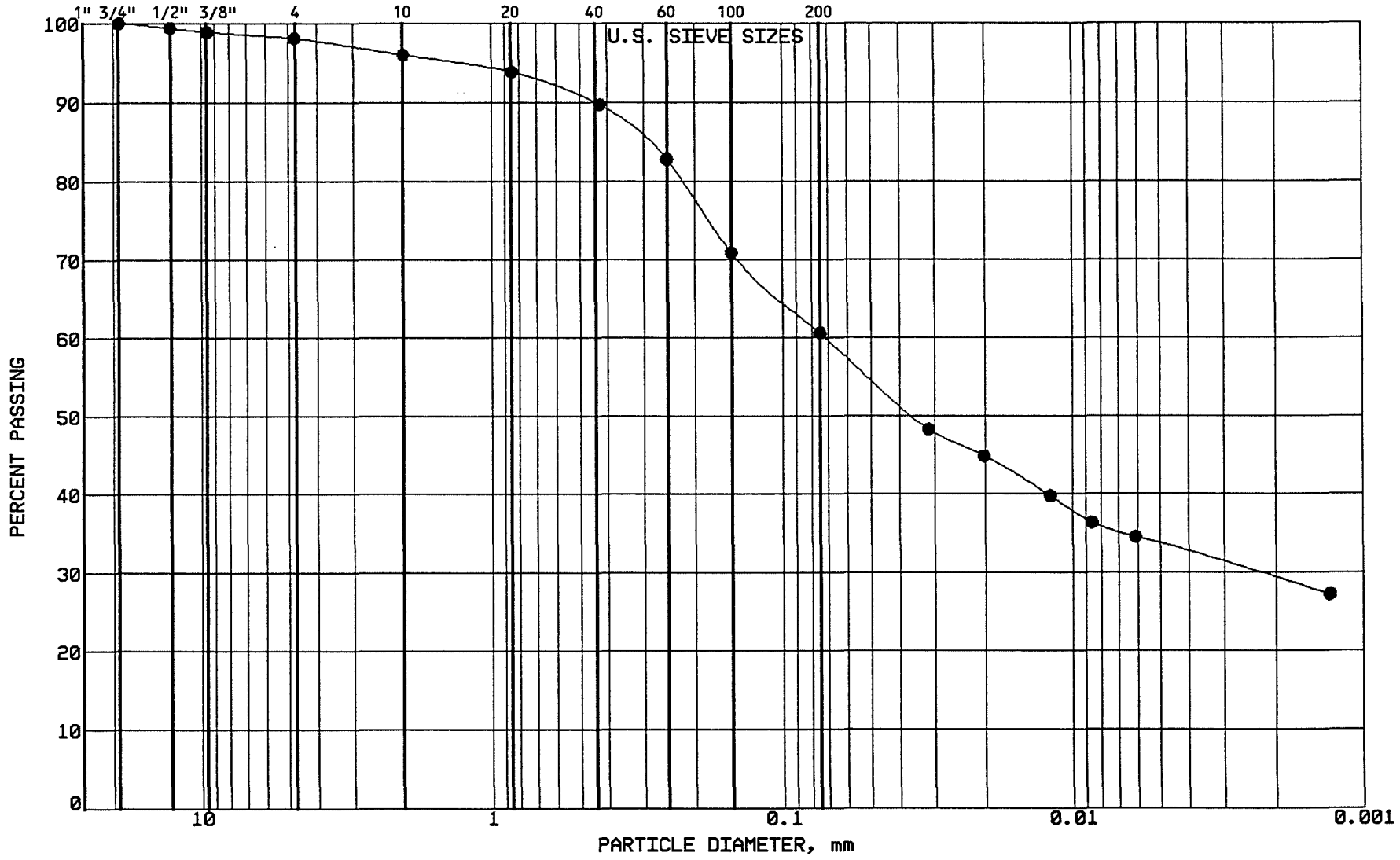
GRAVEL	4.9 %
SAND	37.3 %
SILT	25.6 %
CLAY	32.2 %
P 200	57.8 %

SOIL PROPERTIES

LL: 38.0%
PL: 15.0%
PI: 23.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

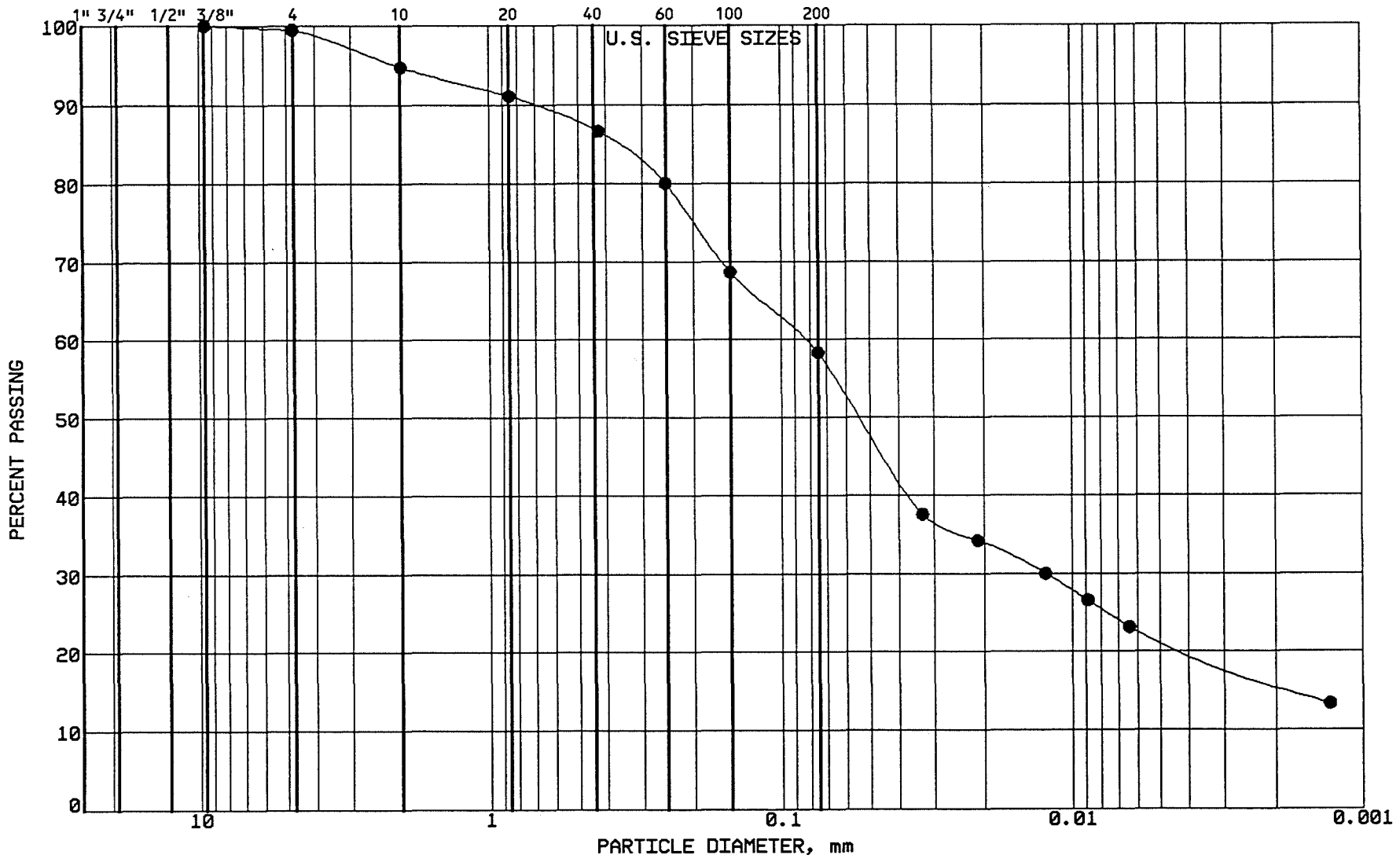
LOCATION: N 43219.0, E 45897.0
SAMPLE: CLBCC304 TUBE #: ST-56A
ELEVATION: 1886.1'

GRAVEL	1.9 %
SAND	37.5 %
SILT	27.0 %
CLAY	33.6 %
P 200	60.6 %

SOIL PROPERTIES

LL: 37.0%
PL: 14.0%
PI: 23.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

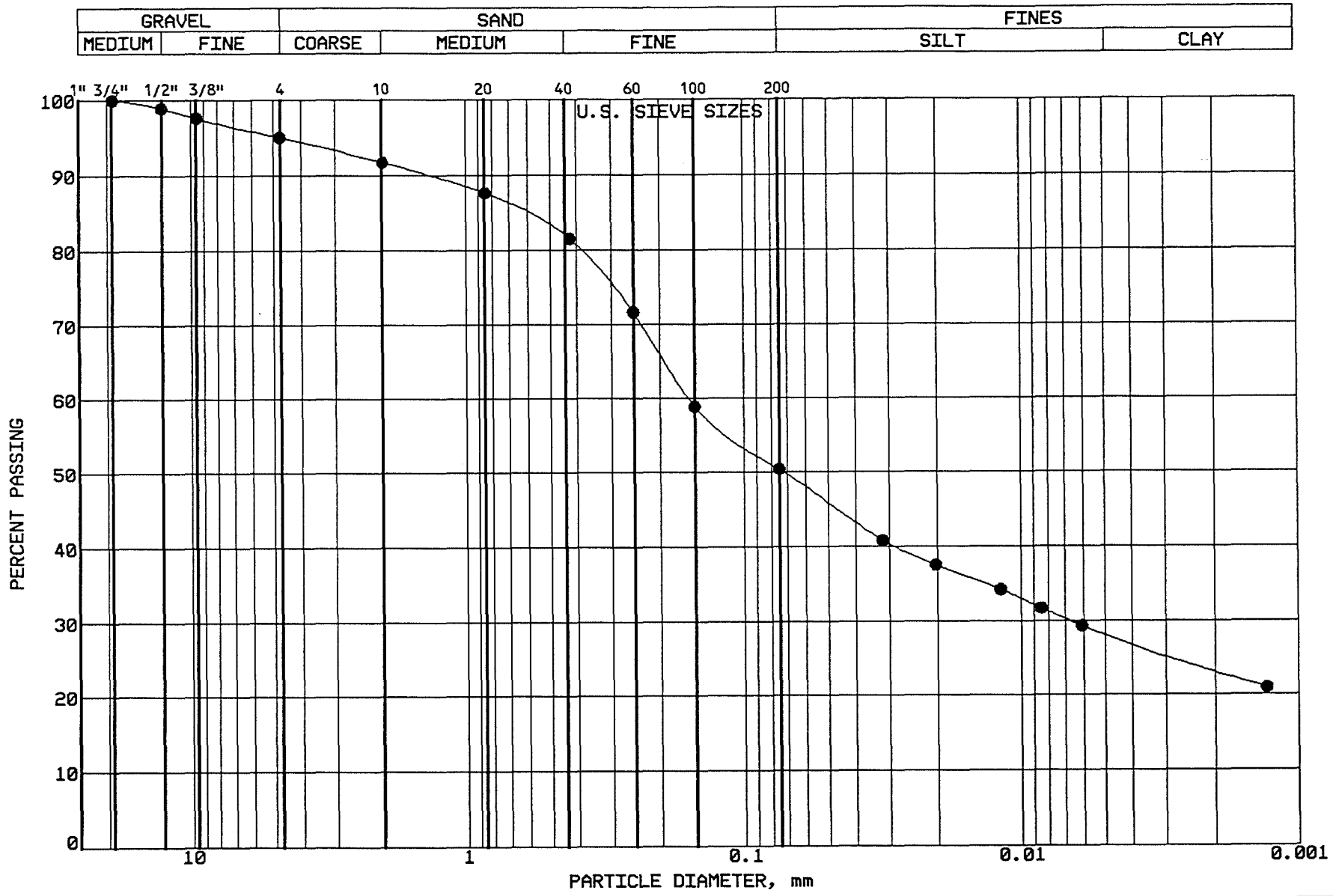
LOCATION: N 43057.0, E 45891.0
SAMPLE: CLBCC305 TUBE #:ST-57B
ELEVATION: 1884.9'

GRAVEL	0.5 %
SAND	41.2 %
SILT	36.6 %
CLAY	21.7 %
P 200	58.3 %

SOIL PROPERTIES

LL: 39.0%
PL: 13.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

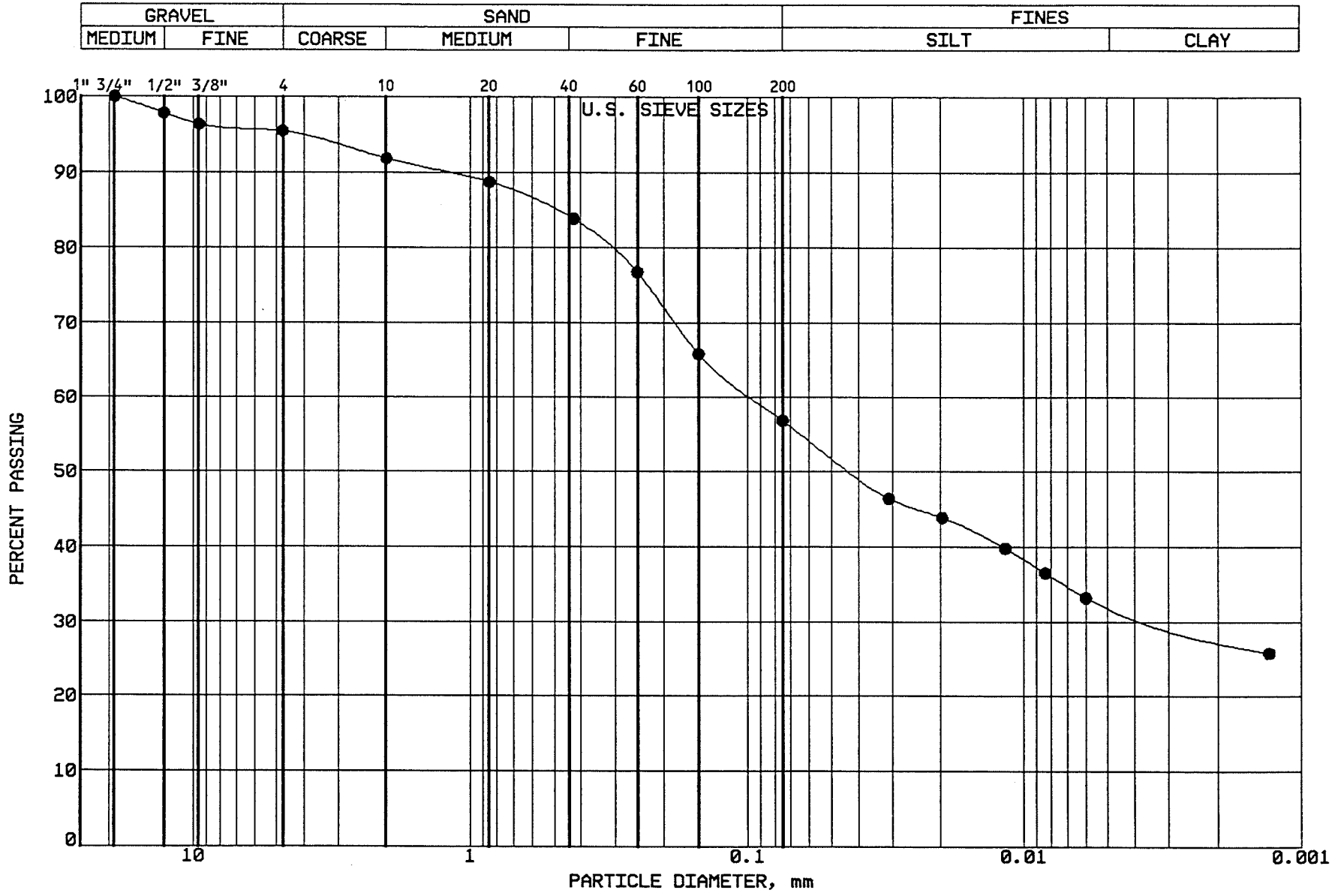
LOCATION: N 43405.0, E 43134.0
SAMPLE: SGCC306 TUBE #:
ELEVATION: 1886.3'

GRAVEL	5.0 %
SAND	44.6 %
SILT	22.2 %
CLAY	28.2 %
P 200	50.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

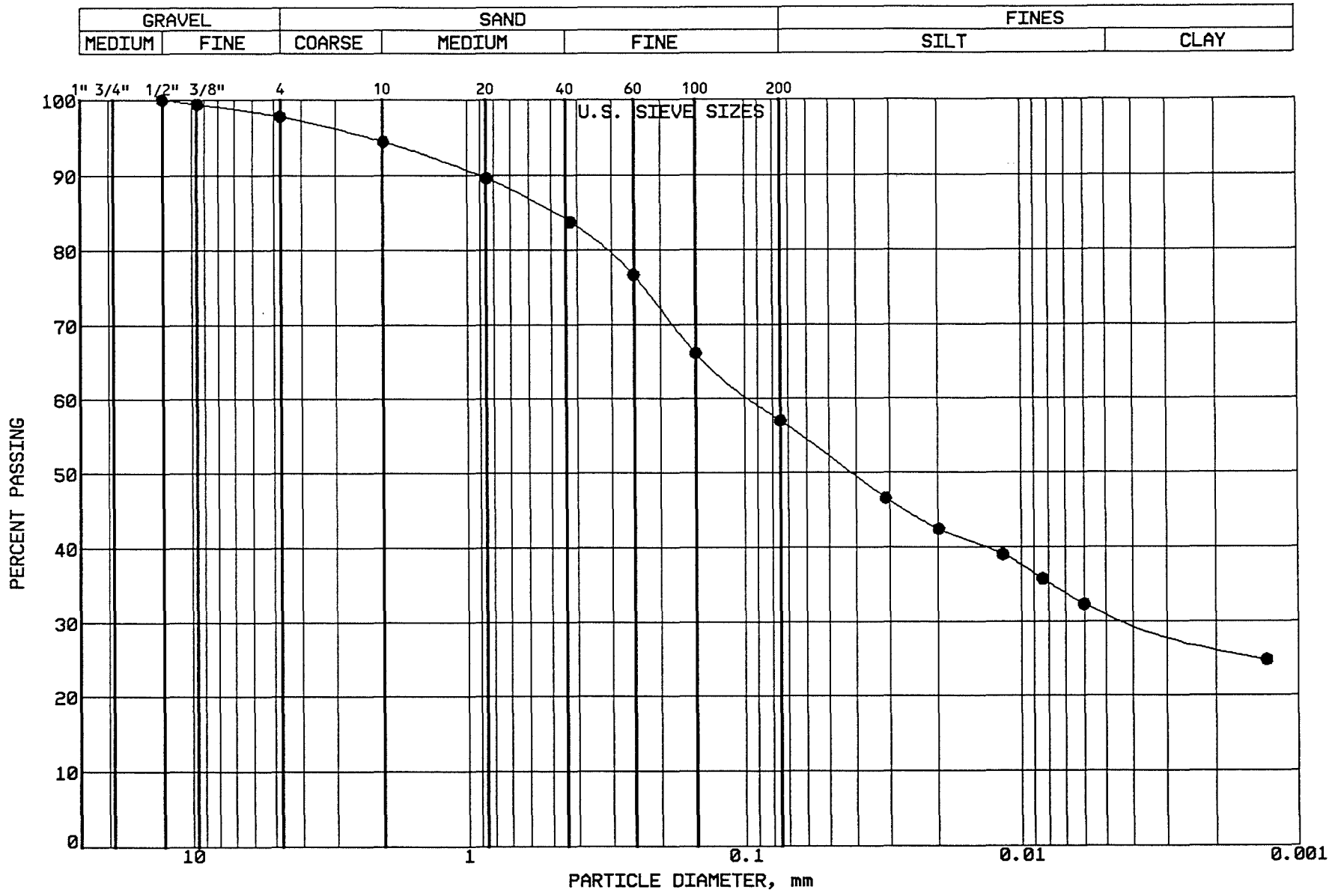
LOCATION: N 43282.0, E 43134.0
SAMPLE: SGCC307 TUBE #:
ELEVATION: 1885.8'

GRAVEL	4.6 %
SAND	38.5 %
SILT	24.6 %
CLAY	32.3 %
P 200	56.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

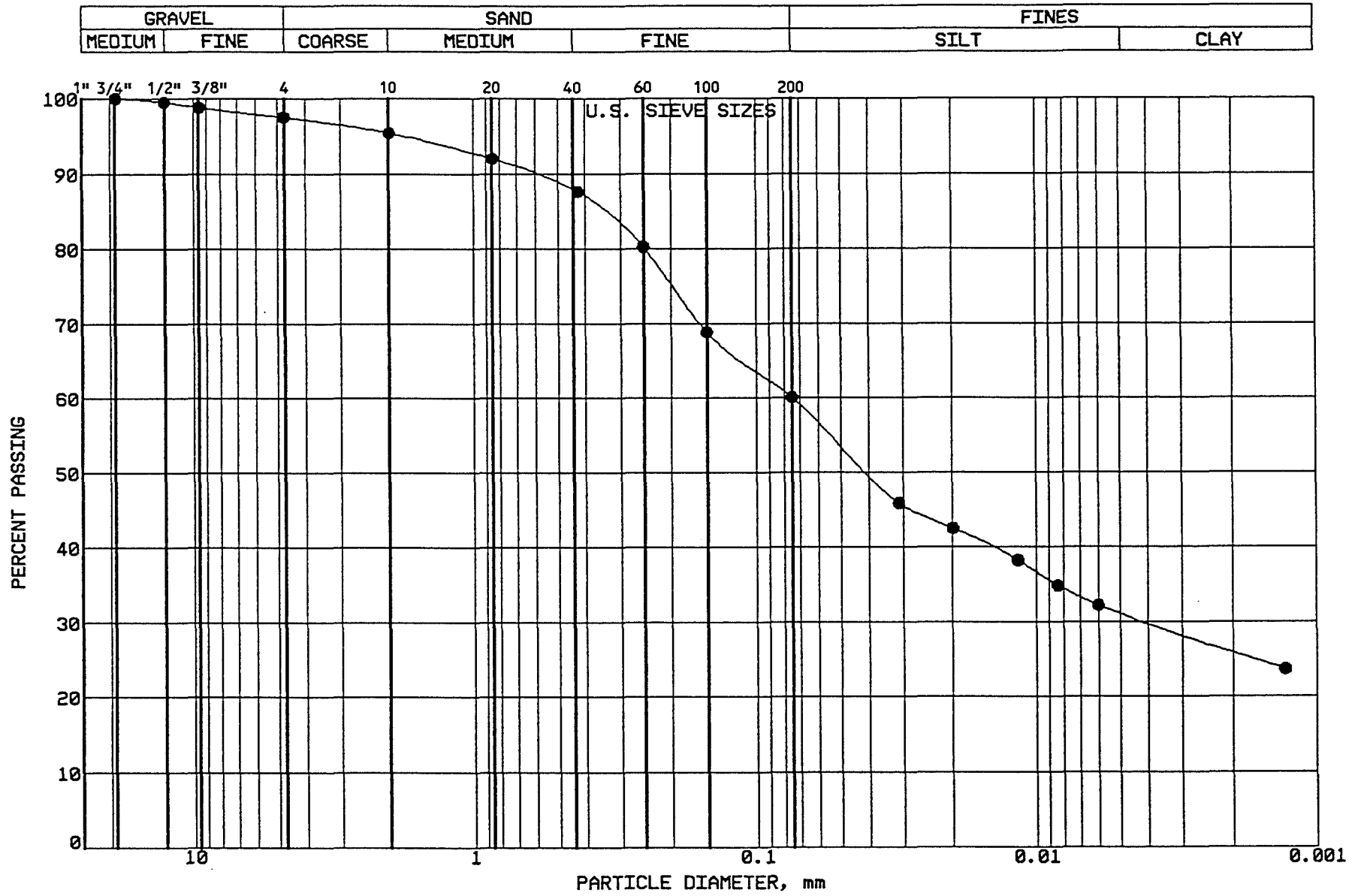
LOCATION: N 43078.0, E 43133.0
SAMPLE: SGCC308 TUBE #:
ELEVATION: 1884.8'

GRAVEL	2.2 %
SAND	40.8 %
SILT	25.6 %
CLAY	31.4 %
P 200	57.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43384.0, E 43117.0
SAMPLE: SGCC293 TUBE #:
ELEVATION: 1885.3'

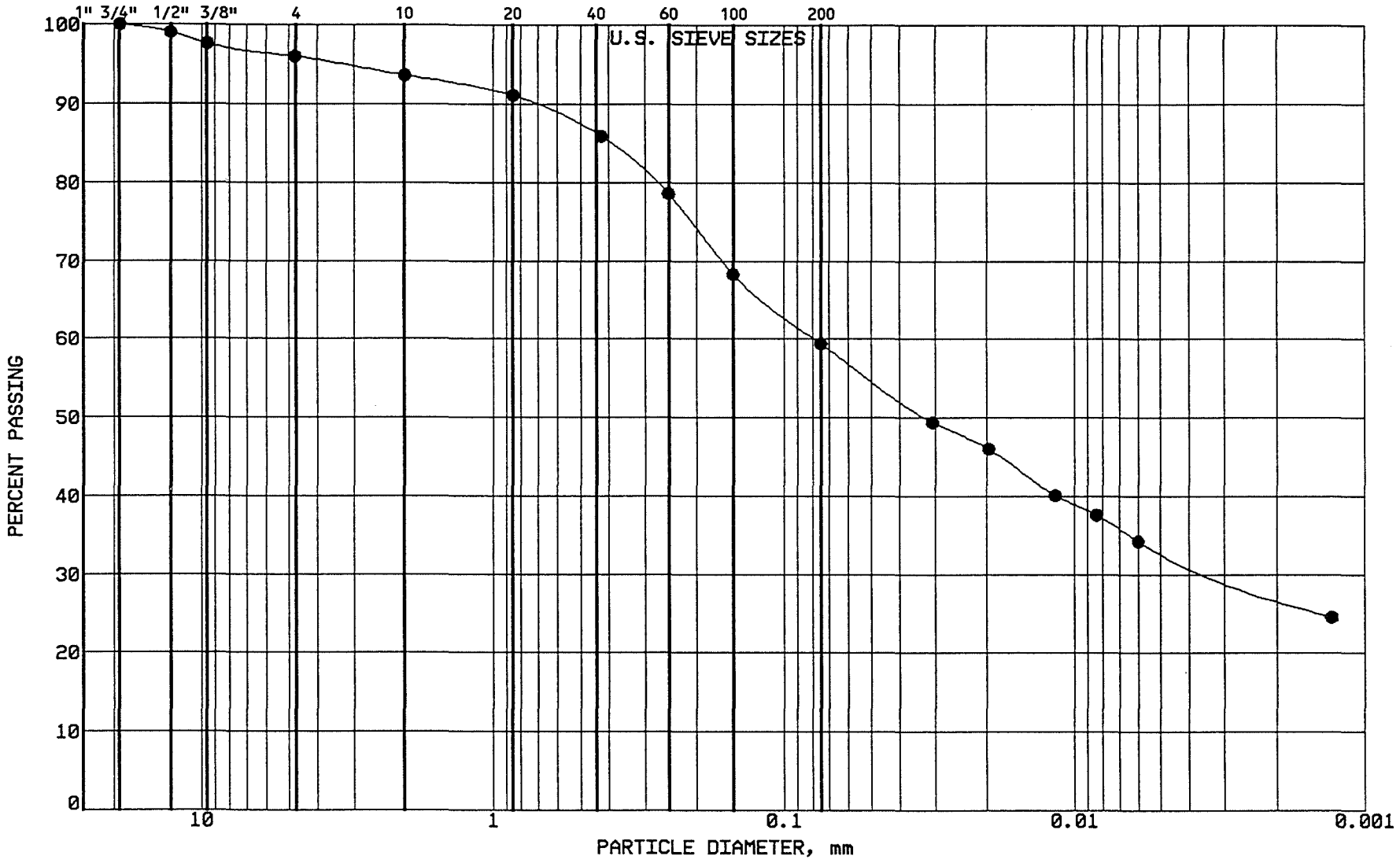
GRAVEL	2.5 %
SAND	37.4 %
SILT	28.9 %
CLAY	31.2 %
P 200	60.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) olive

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43357.0, E 45467.0
SAMPLE: SGCC310 TUBE #:
ELEVATION: 1886.0'

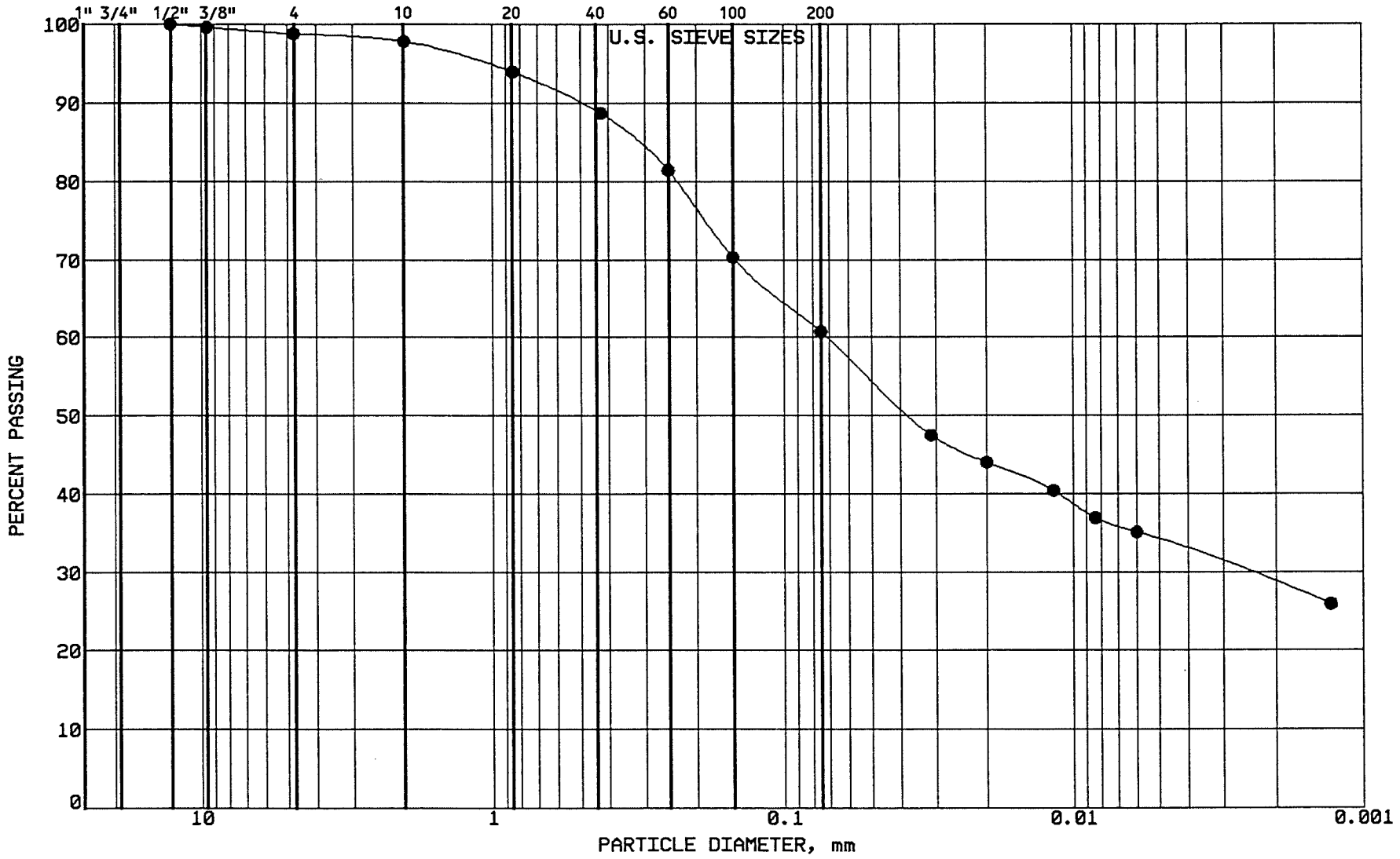
GRAVEL	4.0 %
SAND	36.6 %
SILT	26.3 %
CLAY	33.1 %
P 200	59.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43194.0, E 45463.0
SAMPLE: SGCC311 TUBE #:
ELEVATION: 1885.1'

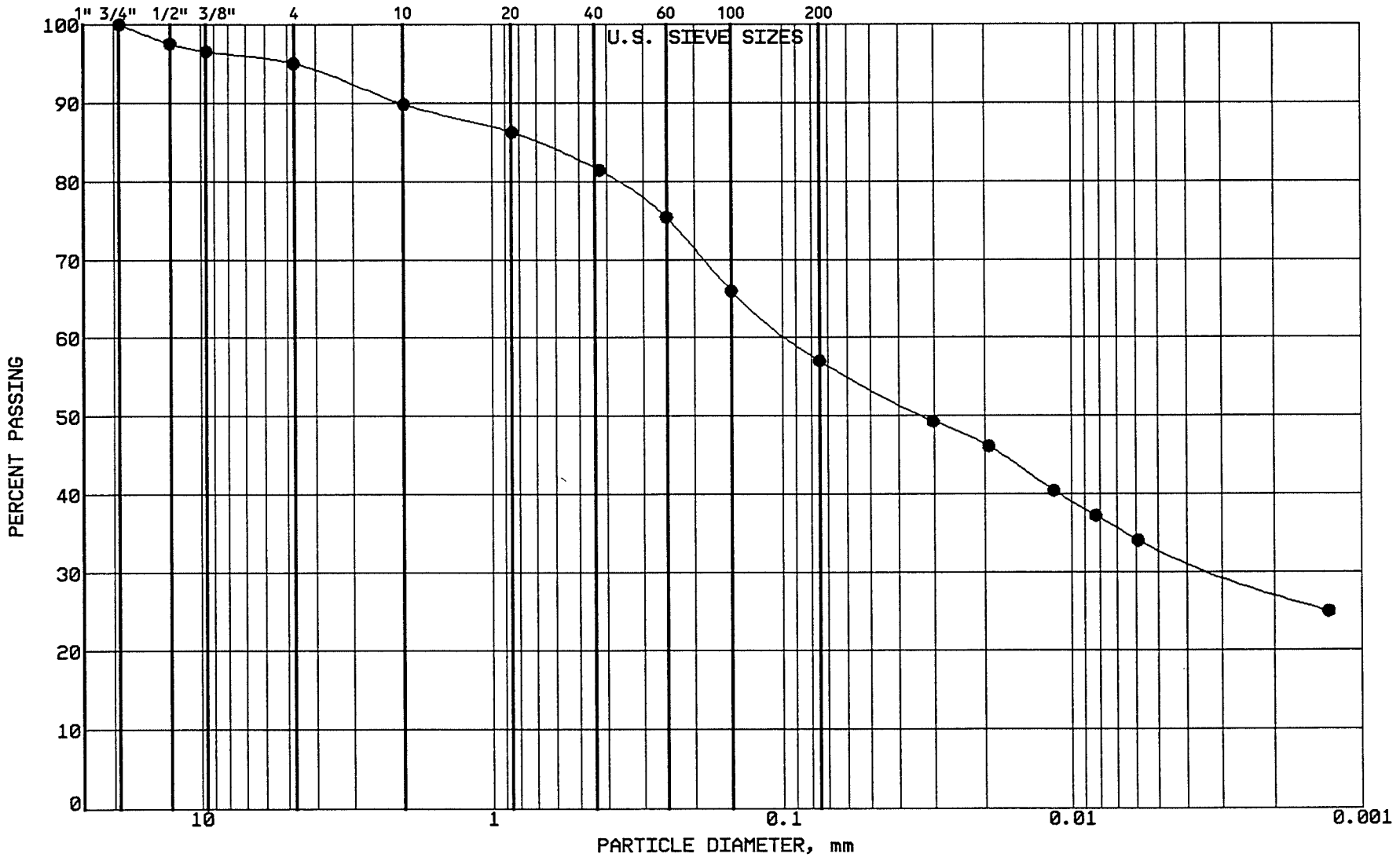
GRAVEL	1.2 %
SAND	38.1 %
SILT	26.7 %
CLAY	34.0 %
P 200	60.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43014.0, E 45457.0
SAMPLE: SGCC312 TUBE #:
ELEVATION: 1884.4'

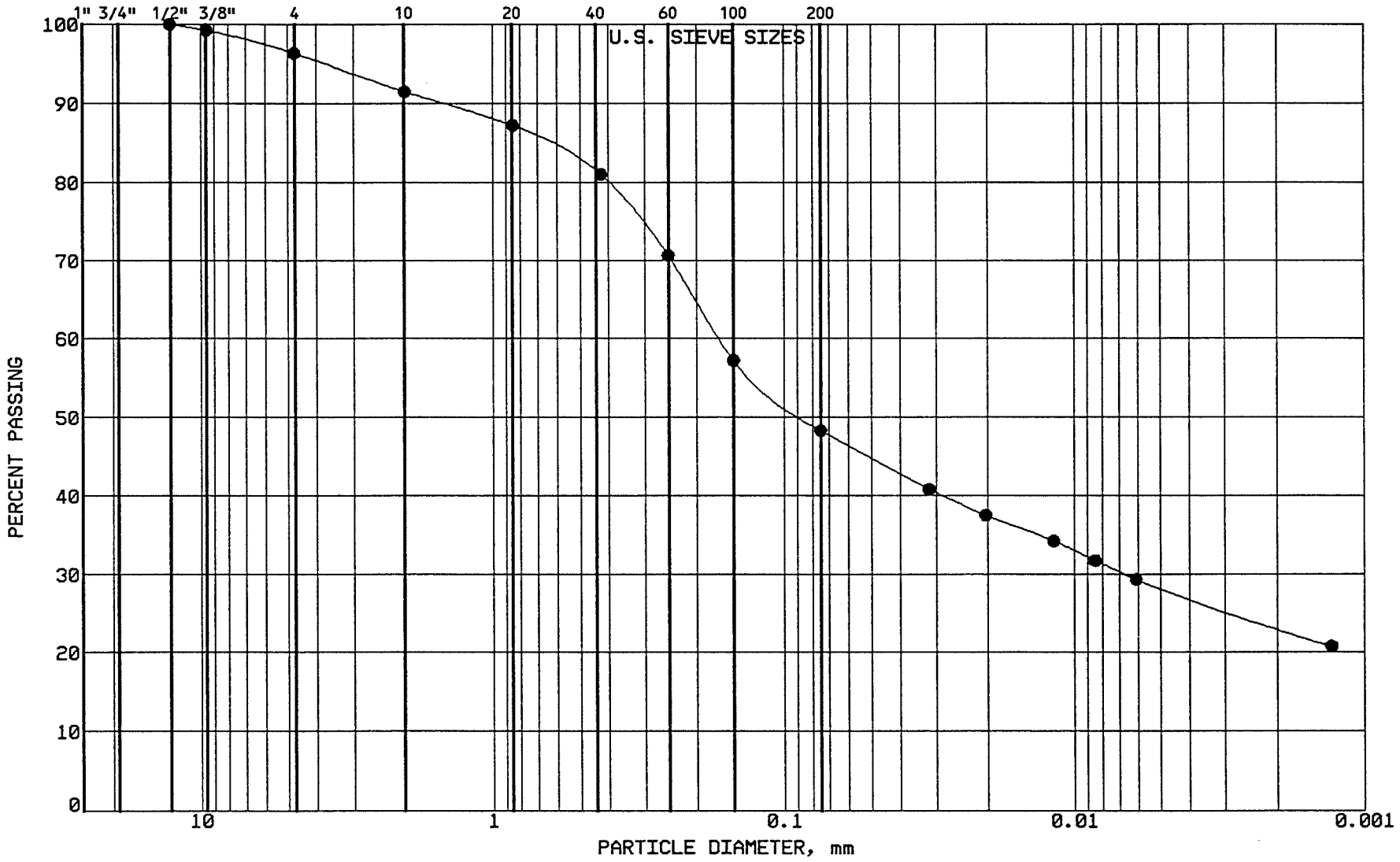
GRAVEL	5.0 %
SAND	38.0 %
SILT	24.0 %
CLAY	33.0 %
P 200	57.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43397.0, E 43336.0
SAMPLE: SGCC313 TUBE #:
ELEVATION: 1886.5'

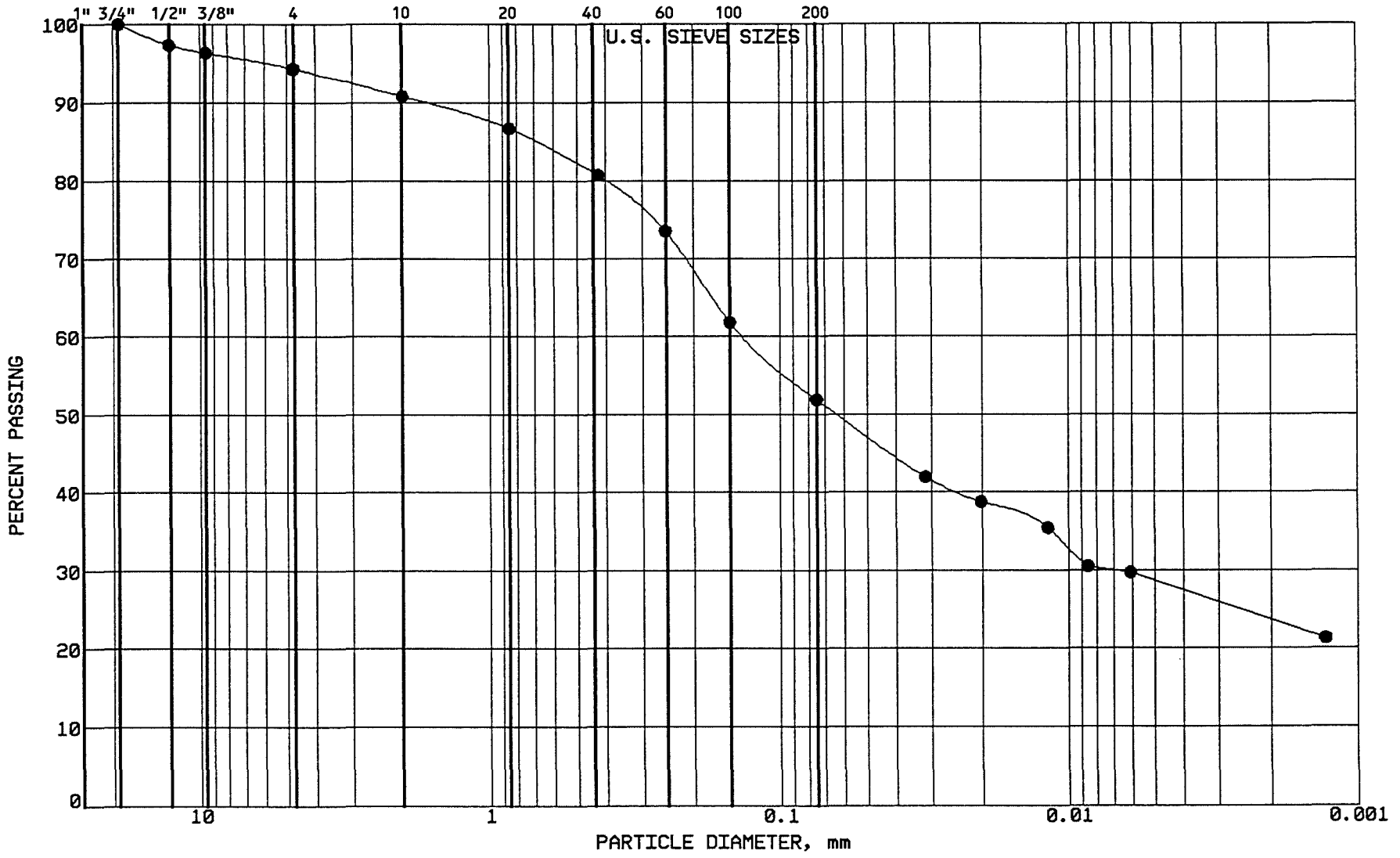
GRAVEL	3.7 %
SAND	48.0 %
SILT	20.1 %
CLAY	28.2 %
P 200	48.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND (SC), gr.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43197.0, E 43339.0
SAMPLE: SGCC314 TUBE #:
ELEVATION: 1885.2'

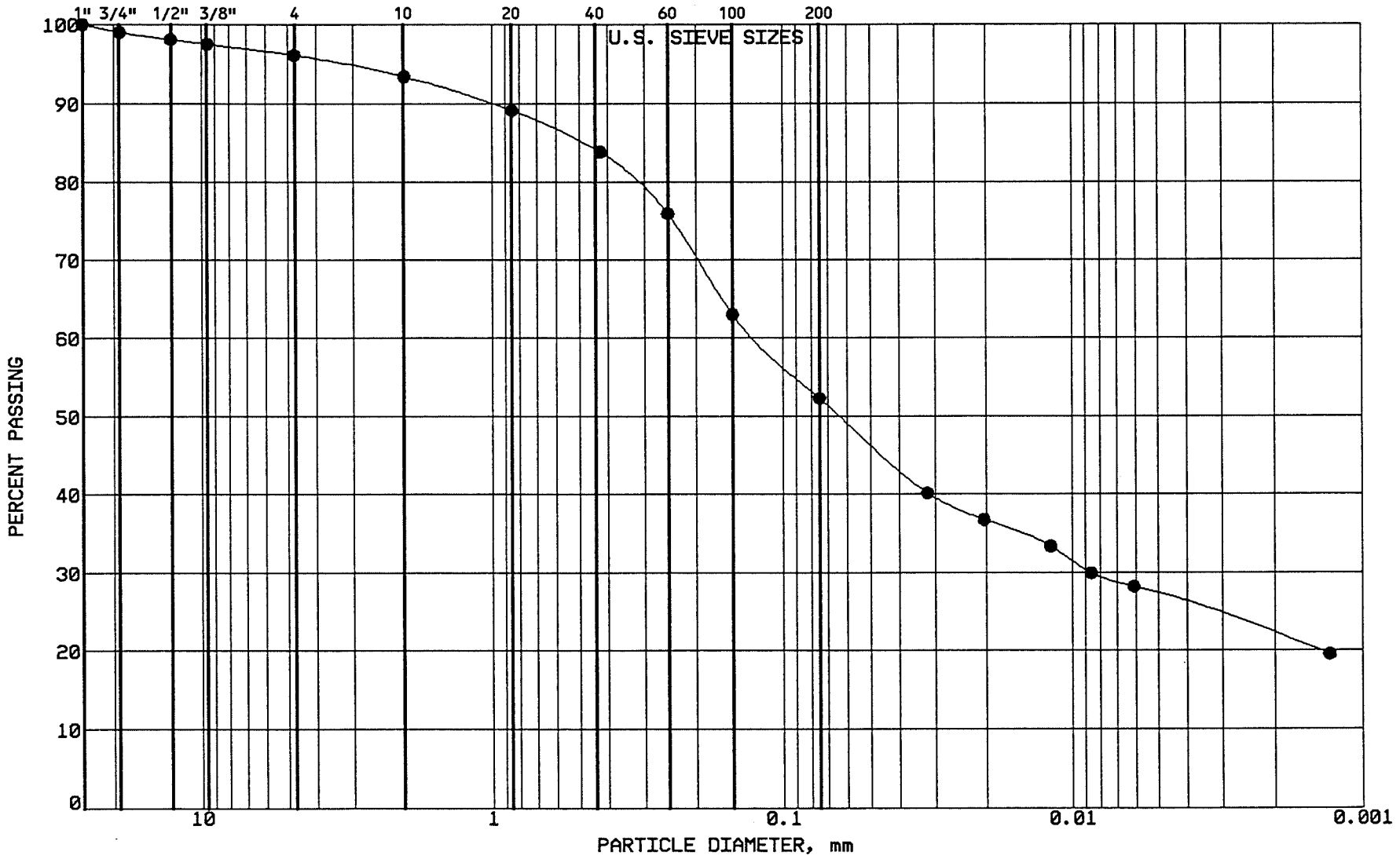
GRAVEL	5.7 %
SAND	42.4 %
SILT	23.3 %
CLAY	28.6 %
P 200	51.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43000.0, E 43342.0
SAMPLE: SGCC315 TUBE #:
ELEVATION: 1884.8'

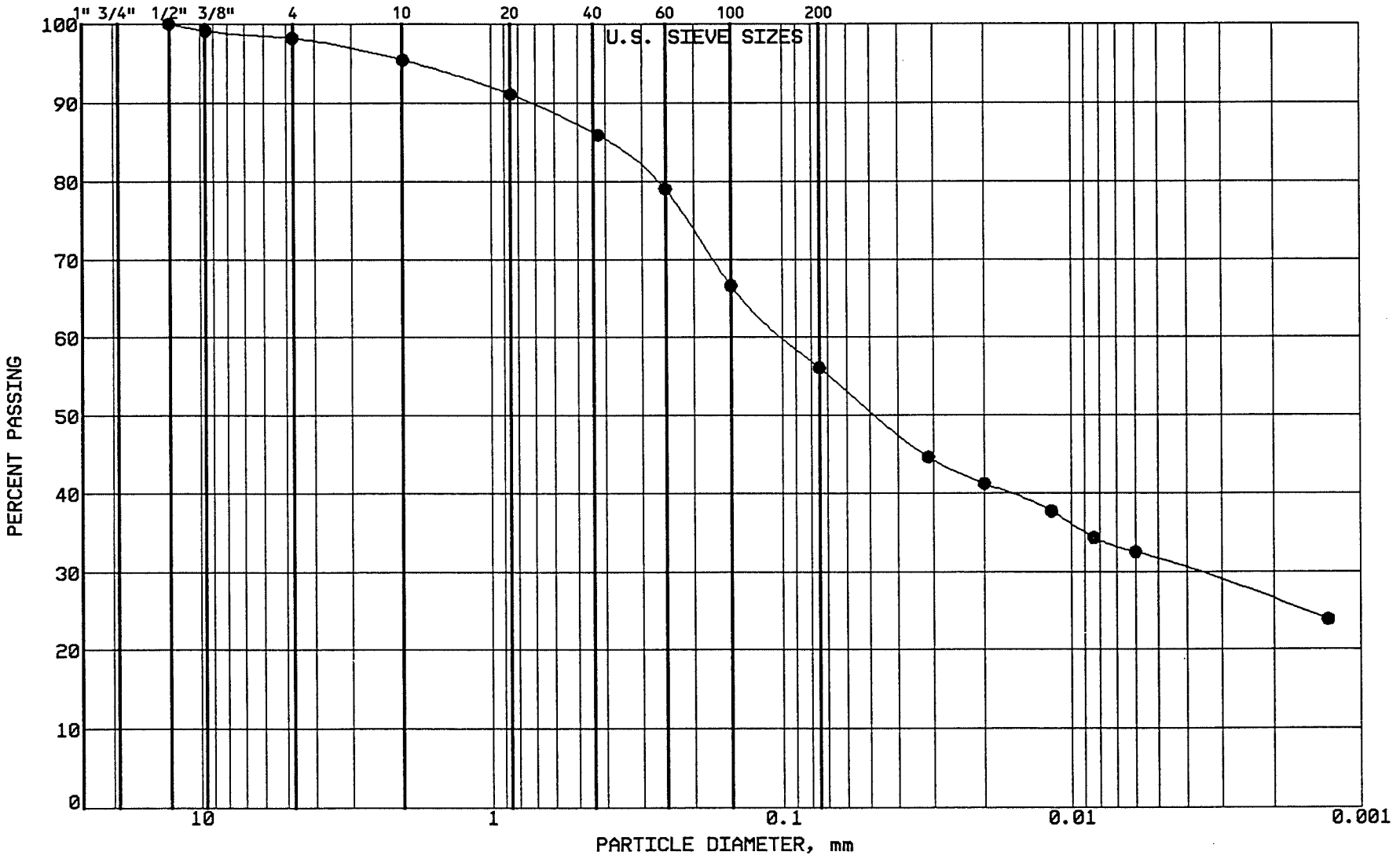
GRAVEL	3.9 %
SAND	43.8 %
SILT	25.2 %
CLAY	27.1 %
P 200	52.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42800.0, E 43340.0
SAMPLE: SGCC316 TUBE #:
ELEVATION: 1881.0'

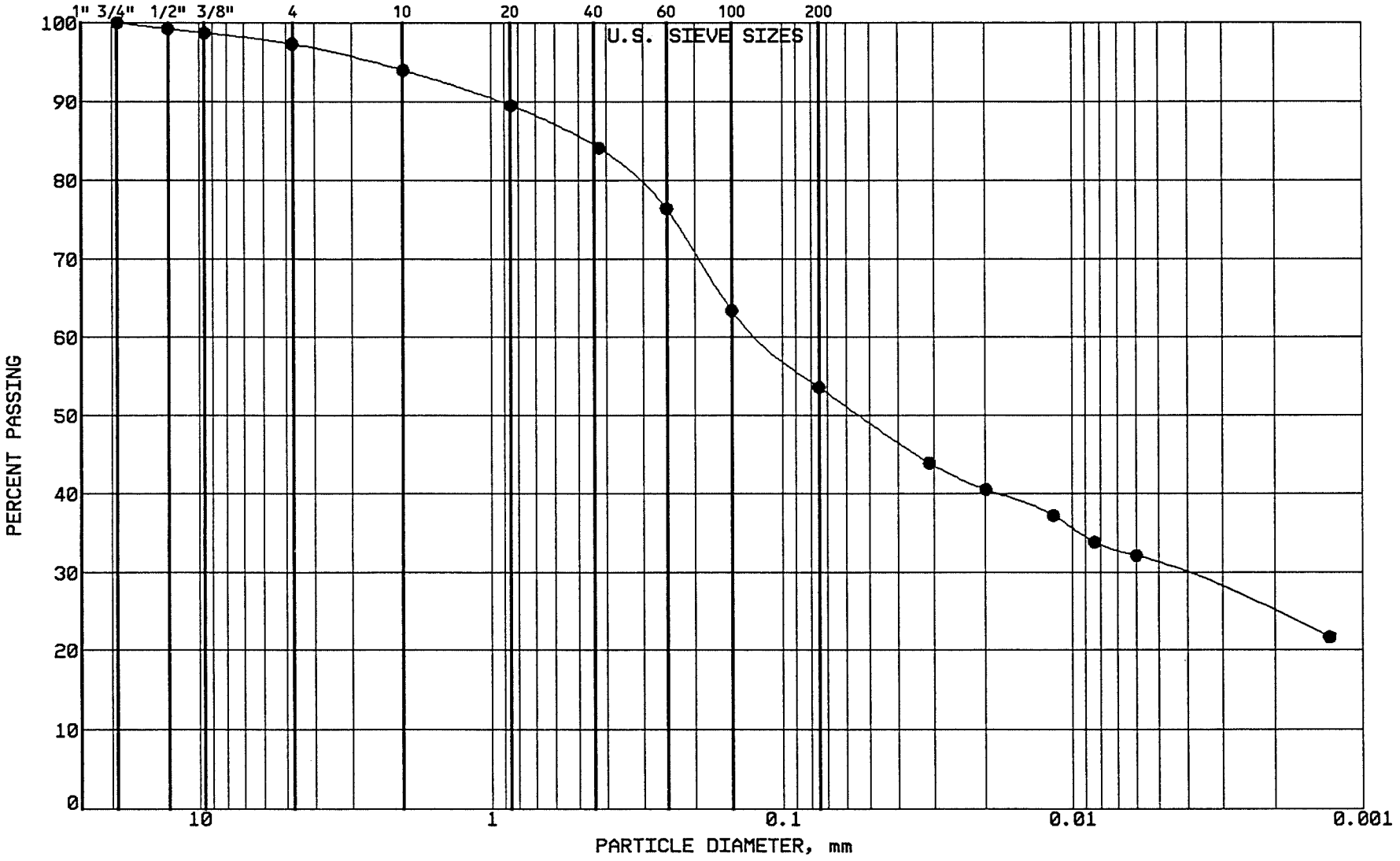
GRAVEL	1.8 %
SAND	42.1 %
SILT	24.6 %
CLAY	31.5 %
P 200	56.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42619.0, E 43348.0
SAMPLE: SGCC317 TUBE #:
ELEVATION: 1881.7'

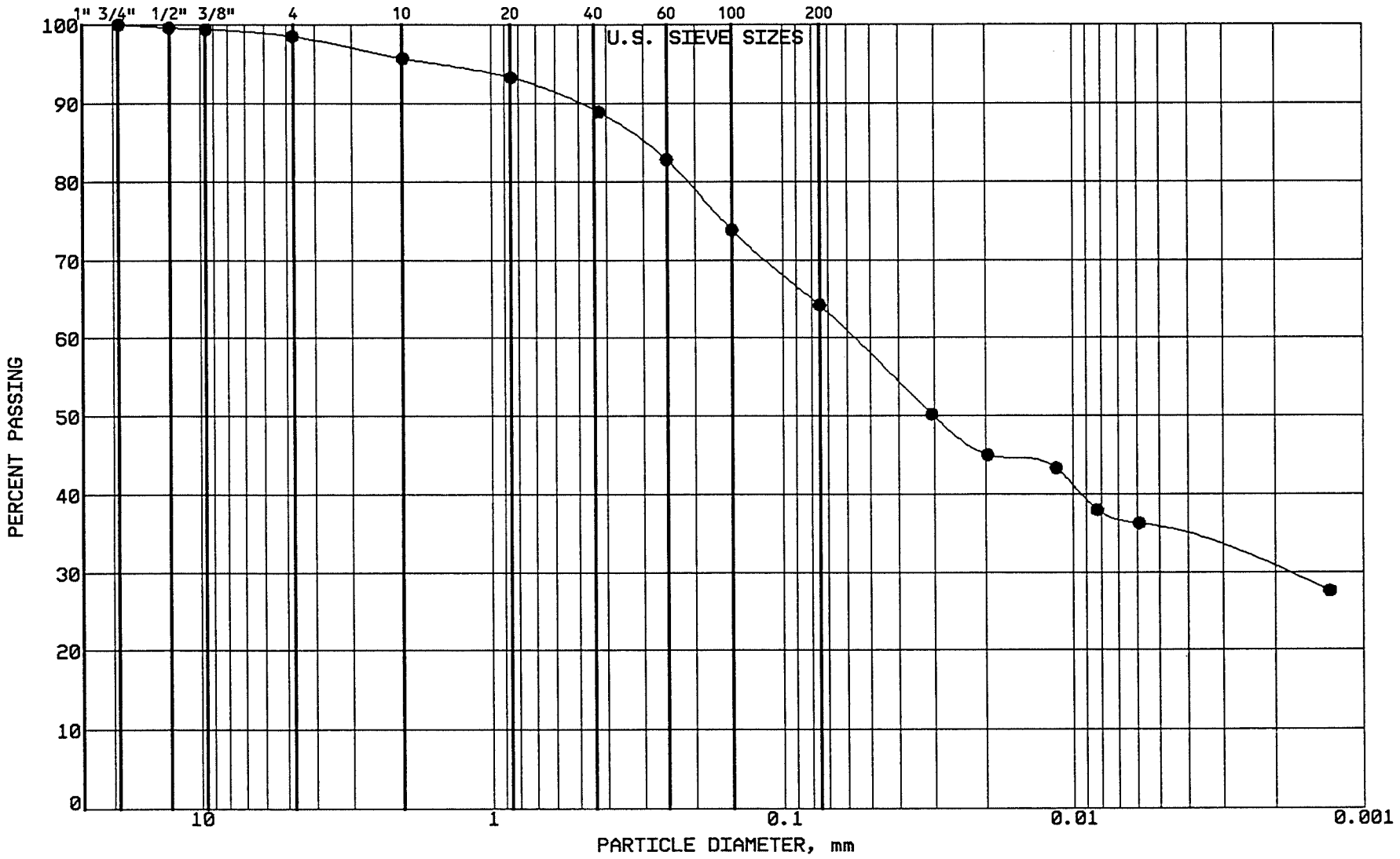
GRAVEL	2.7 %
SAND	43.7 %
SILT	22.7 %
CLAY	30.9 %
P 200	53.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43369.0, E 45859.0
SAMPLE: CLBCC318 TUBE #: ST-58A
ELEVATION: 1888.1'

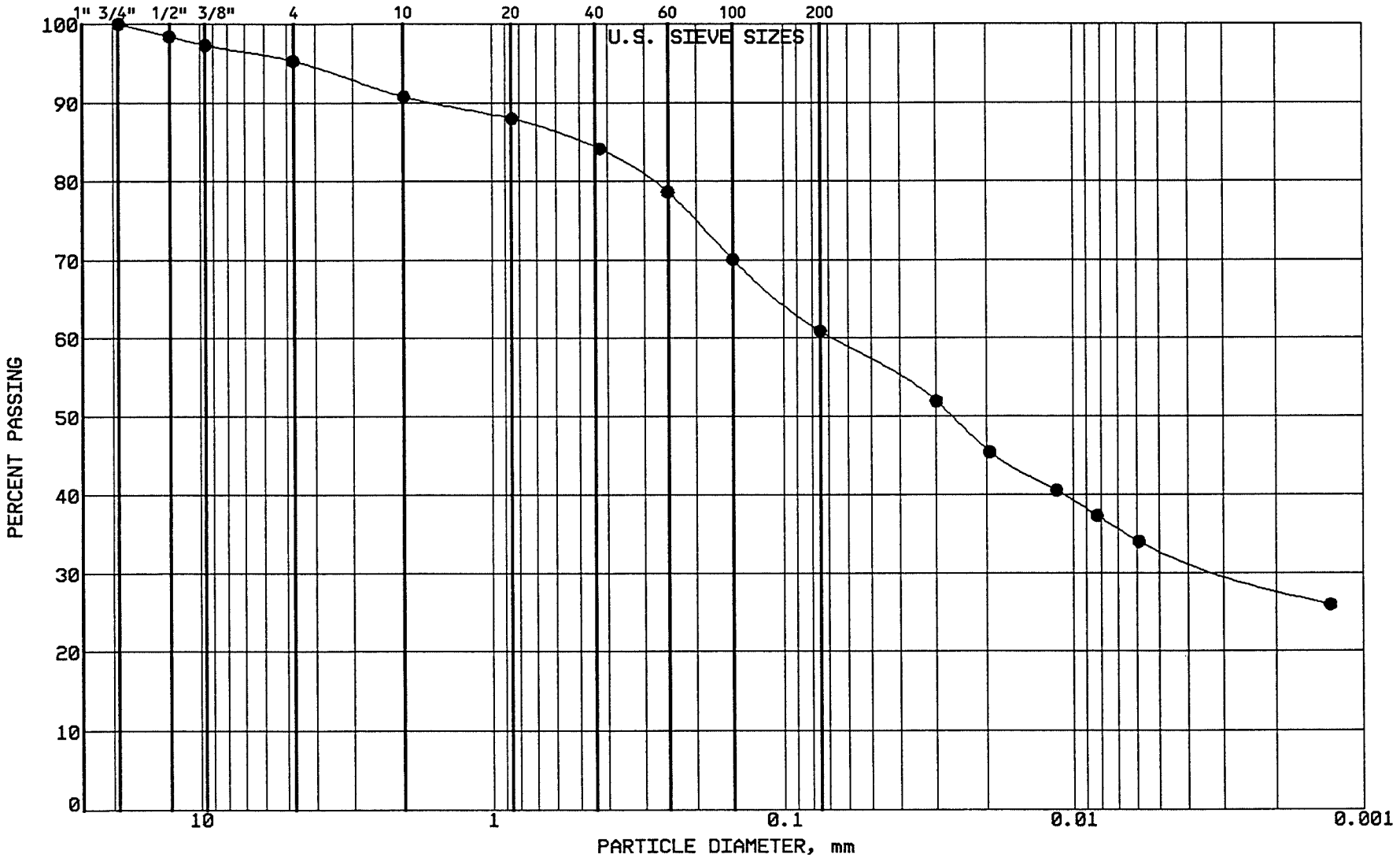
GRAVEL	1.5 %
SAND	34.3 %
SILT	28.9 %
CLAY	35.3 %
P 200	64.2 %

SOIL PROPERTIES

LL: 41.0%
PL: 13.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43223.0, E 45860.0
SAMPLE: CLBCC319 TUBE #: ST-59A
ELEVATION: 1887.2'

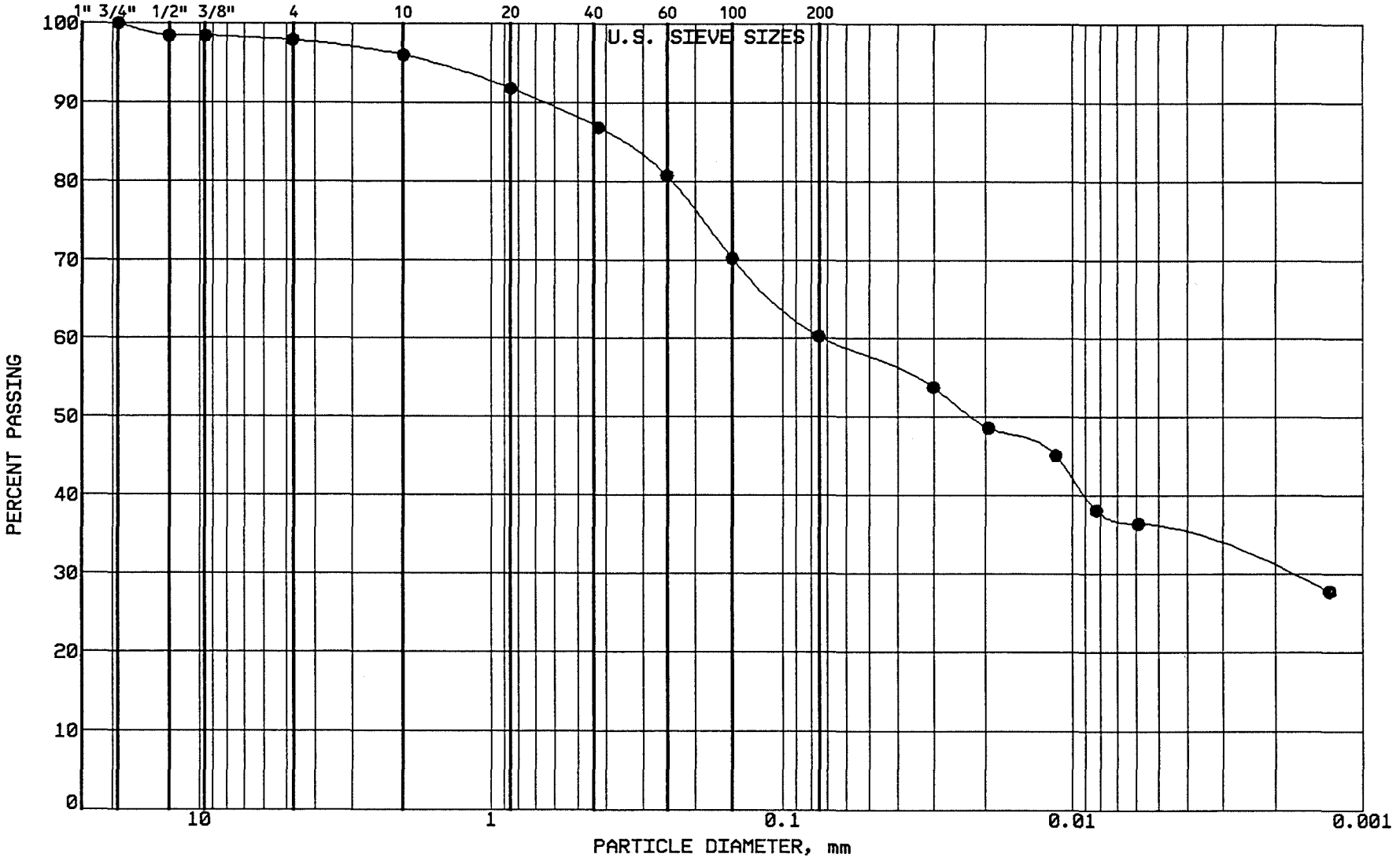
GRAVEL	4.7 %
SAND	34.4 %
SILT	27.8 %
CLAY	33.1 %
P 200	60.9 %

SOIL PROPERTIES

LL: 40.0%
PL: 13.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43079.0, E 45859.0
SAMPLE: CLBCC320 TUBE #: ST-60A
ELEVATION: 1886.3'

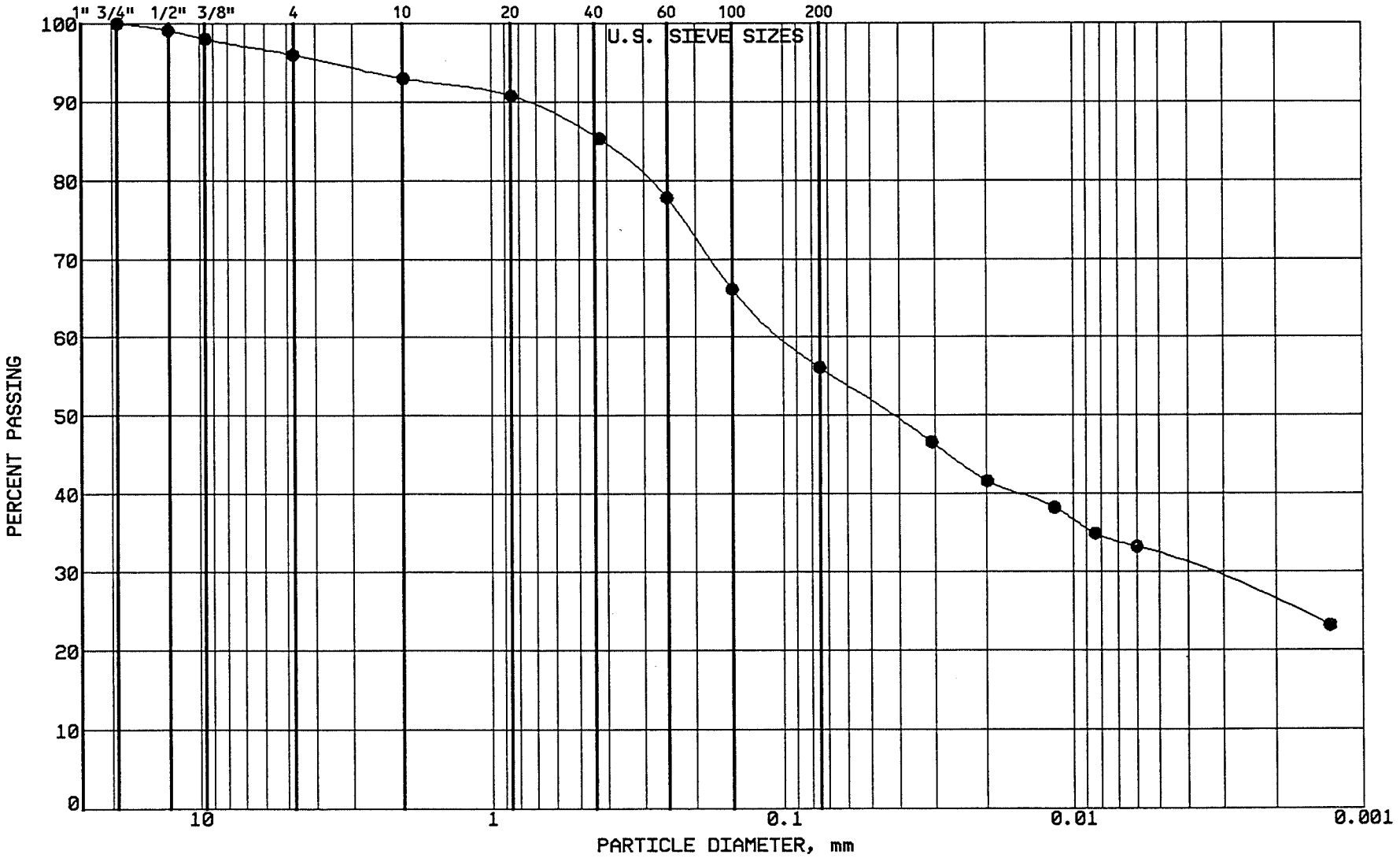
GRAVEL	2.1 %
SAND	37.6 %
SILT	24.9 %
CLAY	35.4 %
P 200	60.3 %

SOIL PROPERTIES

LL: 44.0%
PL: 15.0%
PI: 29.0%
CLASS: SANDY LEAN CLAY (CL) gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42926.0, E 45852.0
SAMPLE: CLBCC321 TUBE #: ST-61B
ELEVATION: 1885.3'

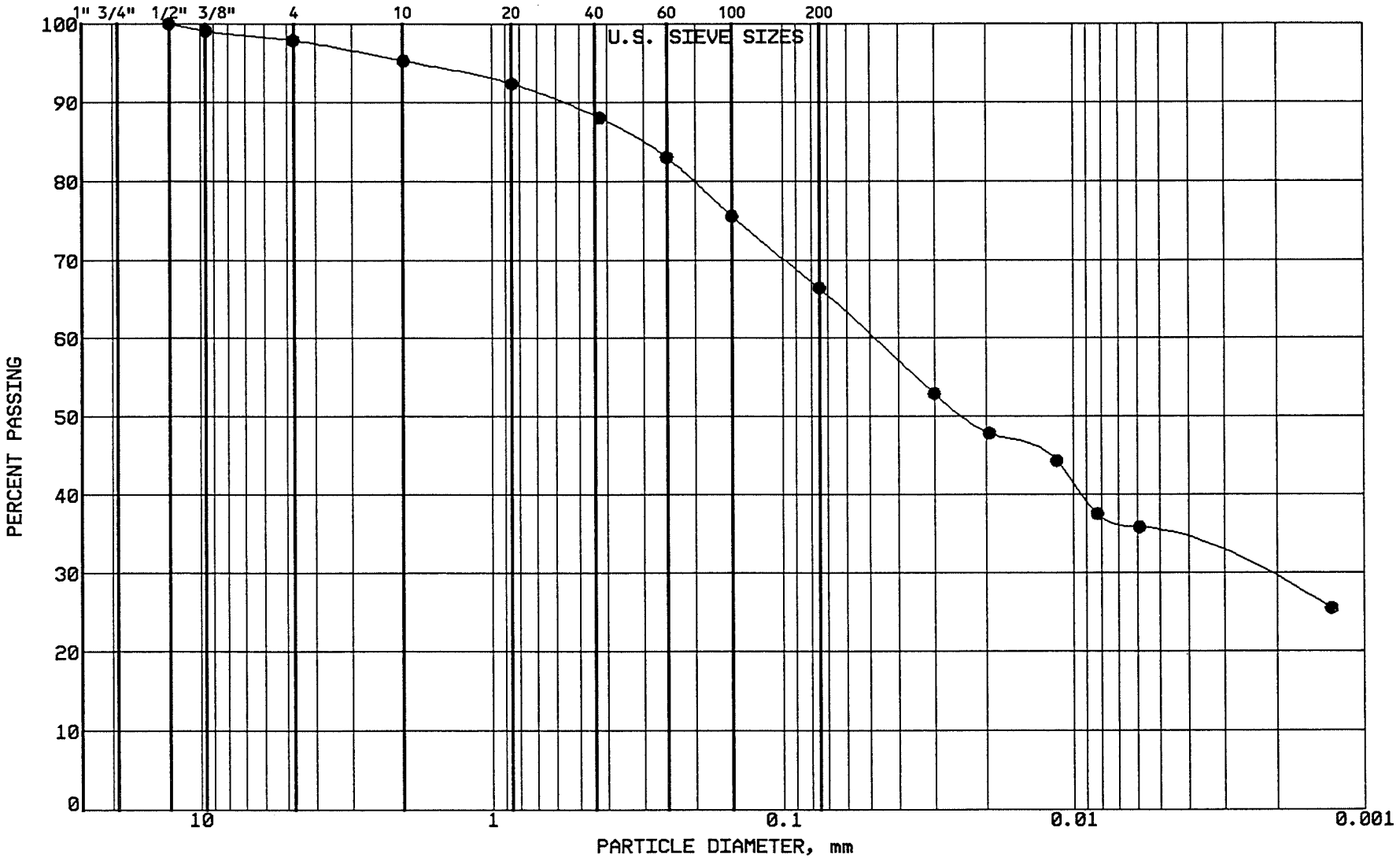
GRAVEL	4.0 %
SAND	39.9 %
SILT	24.1 %
CLAY	32.0 %
P 200	56.1 %

SOIL PROPERTIES

LL: 40.0%
PL: 15.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL) gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42894.0, E 45626.0
SAMPLE: CLBCC322 TUBE #: ST-62A
ELEVATION: 1884.9'

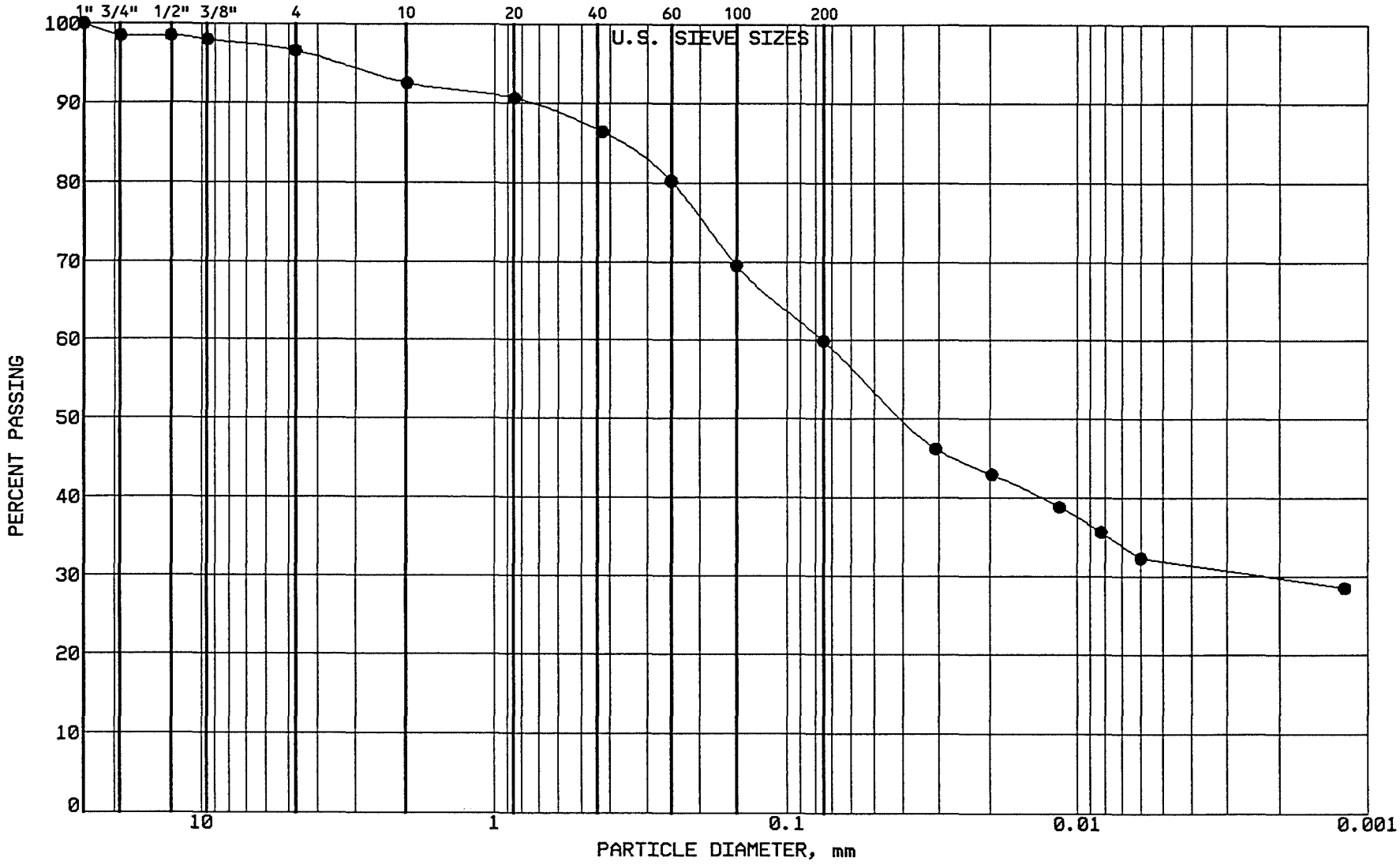
GRAVEL	2.1 %
SAND	31.5 %
SILT	31.7 %
CLAY	34.7 %
P 200	66.4 %

SOIL PROPERTIES

LL: 41.0%
PL: 16.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL) gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

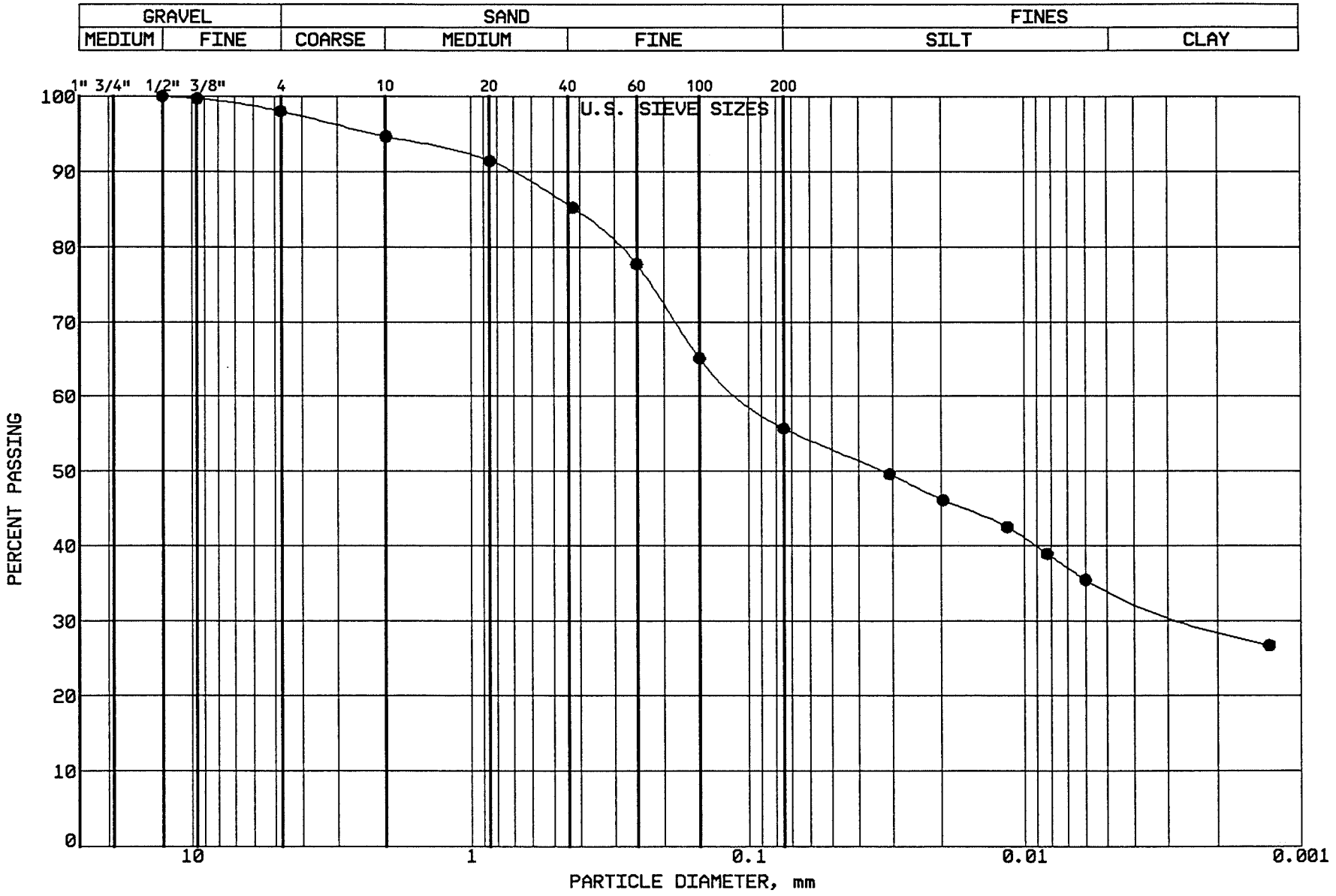
LOCATION: N 43059.0, E 45625.0
SAMPLE: CLBCC323 TUBE #: ST-63B
ELEVATION: 1886.1'

GRAVEL	3.4 %
SAND	36.7 %
SILT	28.0 %
CLAY	31.9 %
P 200	59.9 %

SOIL PROPERTIES

LL: 42.0%
PL: 15.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

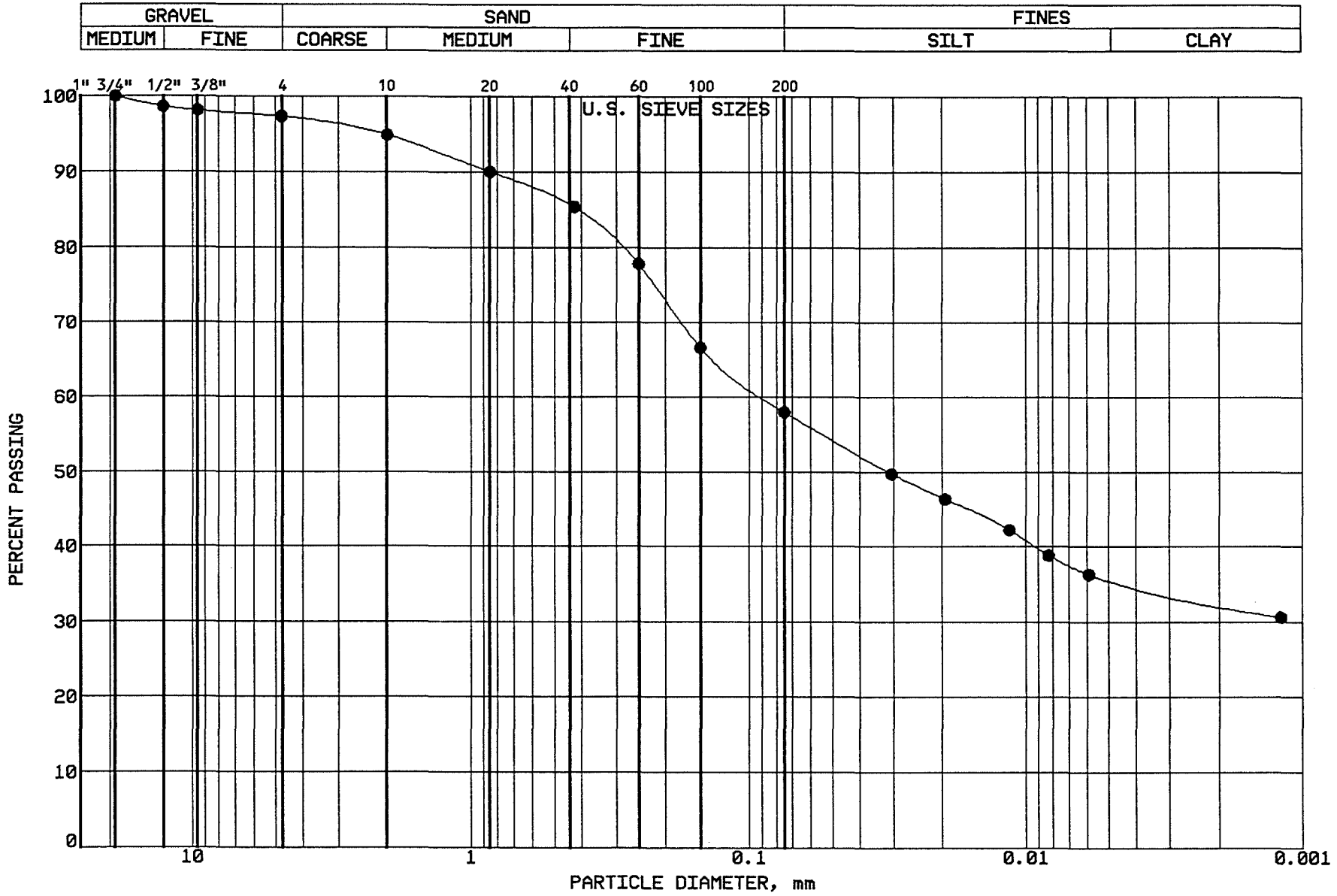
LOCATION: N 43206.0, E 45622.0
SAMPLE: CLBCC324 TUBE #: ST-64A
ELEVATION: 1887.0'

GRAVEL	2.0 %
SAND	42.3 %
SILT	21.3 %
CLAY	34.4 %
P 200	55.7 %

SOIL PROPERTIES

LL: 43.0%
PL: 17.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

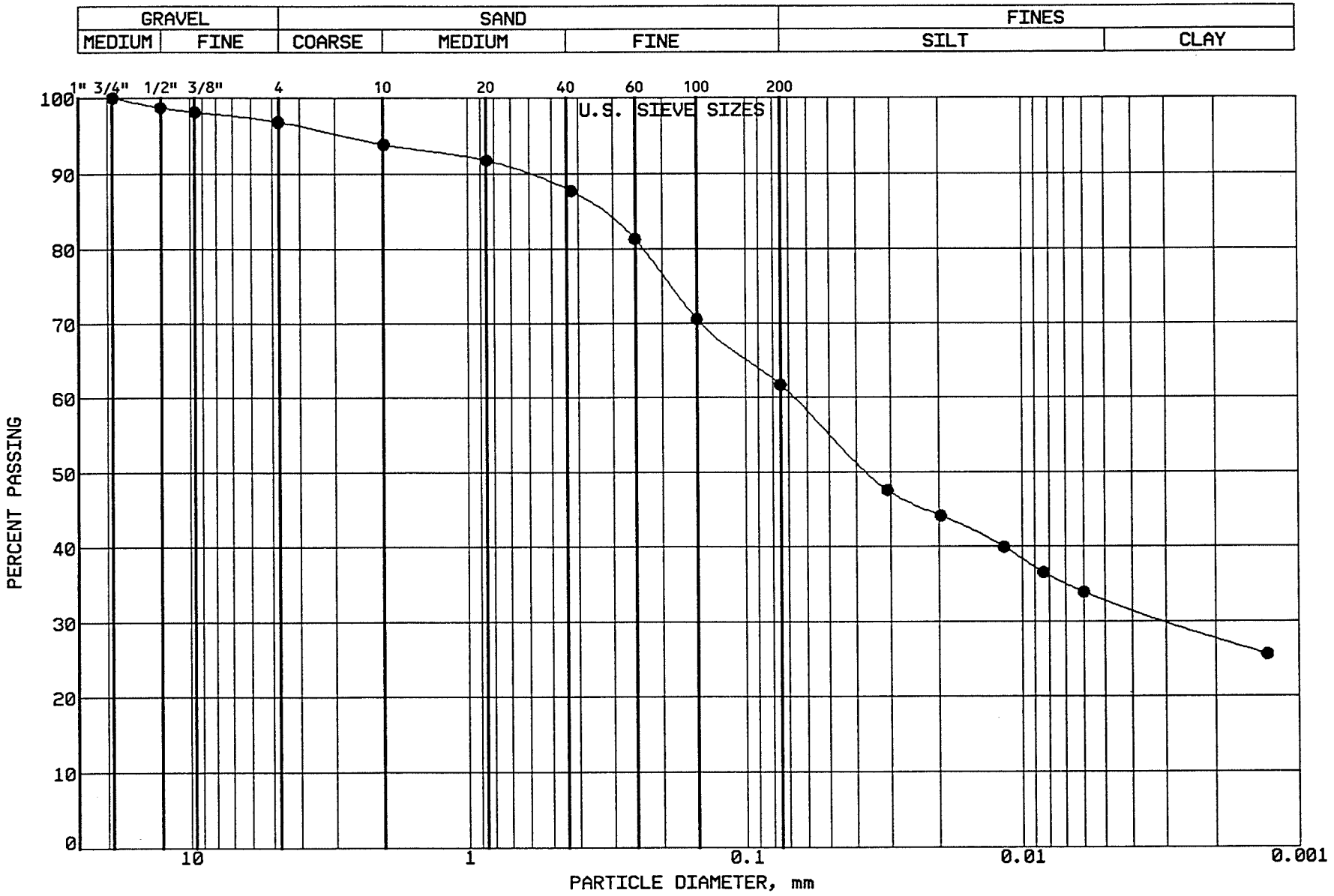
LOCATION: N 43349.0, E 45619.0
SAMPLE: CLBCC325 TUBE #: ST-65B
ELEVATION: 1888.0'

GRAVEL	2.7 %
SAND	39.3 %
SILT	22.3 %
CLAY	35.7 %
P 200	58.0 %

SOIL PROPERTIES

LL: 45.0%
PL: 16.0%
PI: 29.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43473.0, E 43185.0
SAMPLE: CLSCC326 TUBE #: ST-66A
ELEVATION: 1895.7'

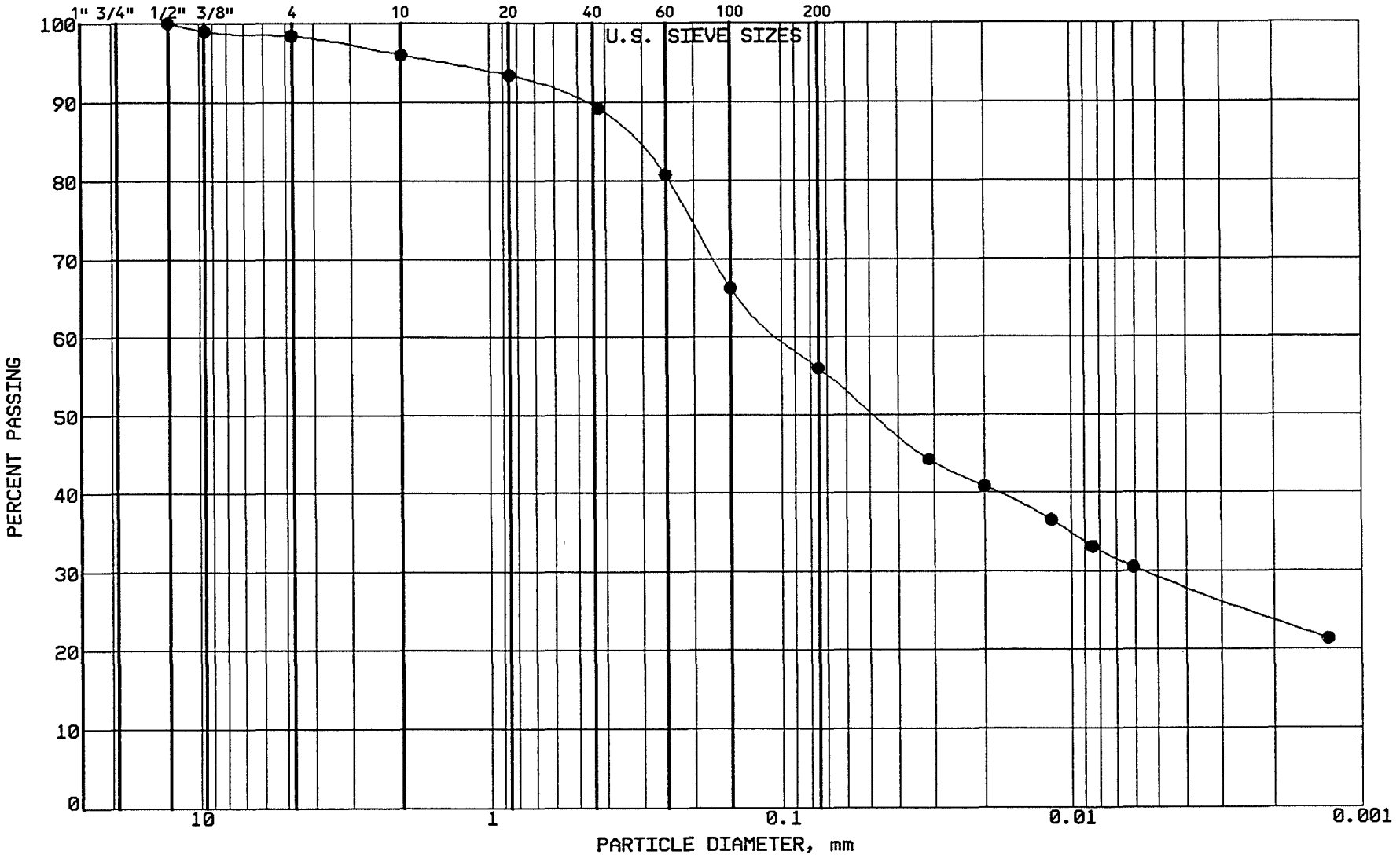
GRAVEL	3.2 %
SAND	35.1 %
SILT	28.8 %
CLAY	32.9 %
P 200	61.7 %

SOIL PROPERTIES

LL: 41.0%
PL: 14.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43024.0, E 43597.0
SAMPLE: SGCC327 TUBE #:
ELEVATION: 1880.9'

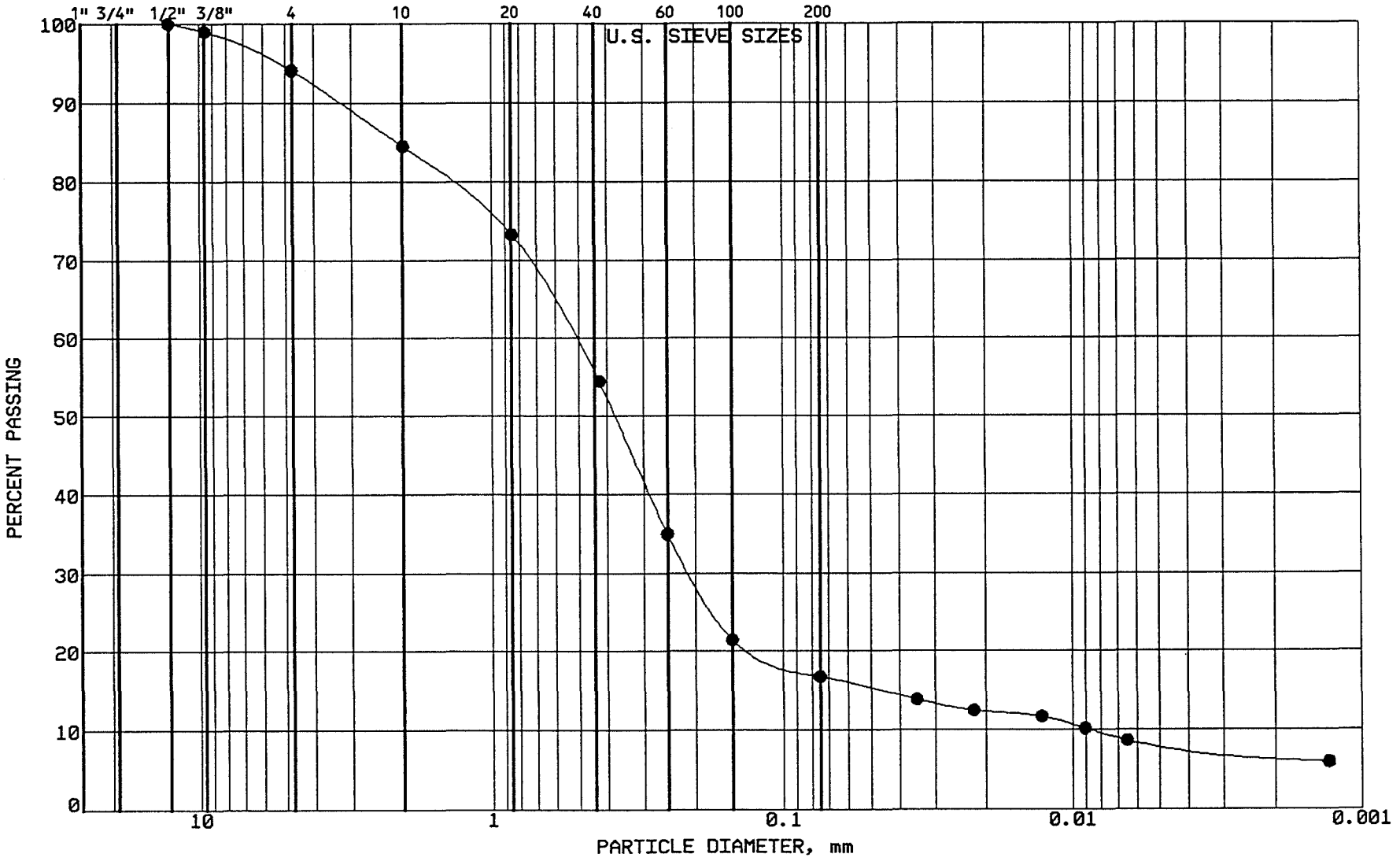
GRAVEL	1.6 %
SAND	42.4 %
SILT	26.7 %
CLAY	29.3 %
P 200	56.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43019.0, E 43712.0
SAMPLE: SGCC328 TUBE #:
ELEVATION: 1882.3'

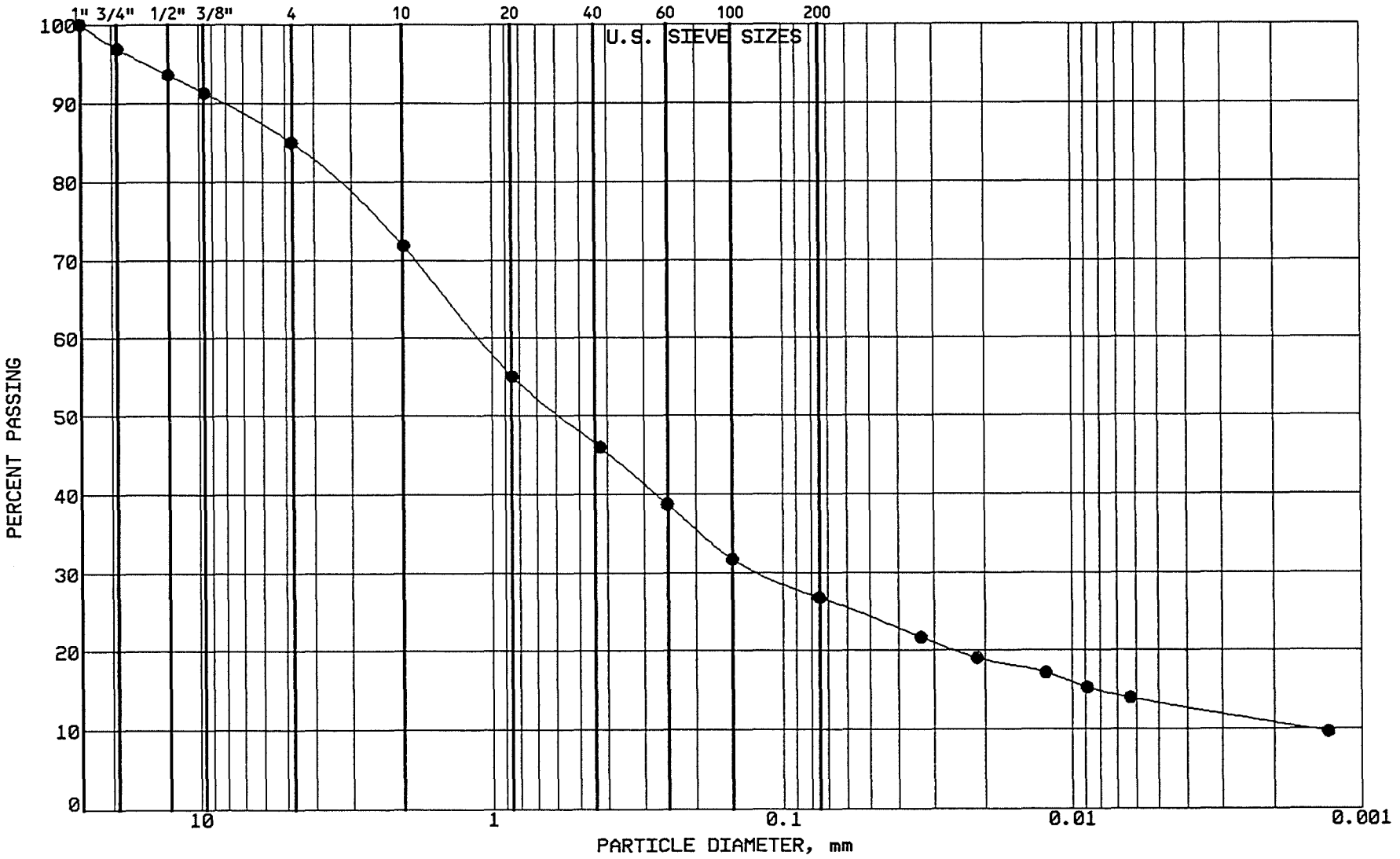
GRAVEL	5.9 %
SAND	77.3 %
SILT	8.5 %
CLAY	8.3 %
P 200	16.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND (SM), dr.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42832.0, E 43725.0
SAMPLE: SGCC329 TUBE #:
ELEVATION: 1881.2'

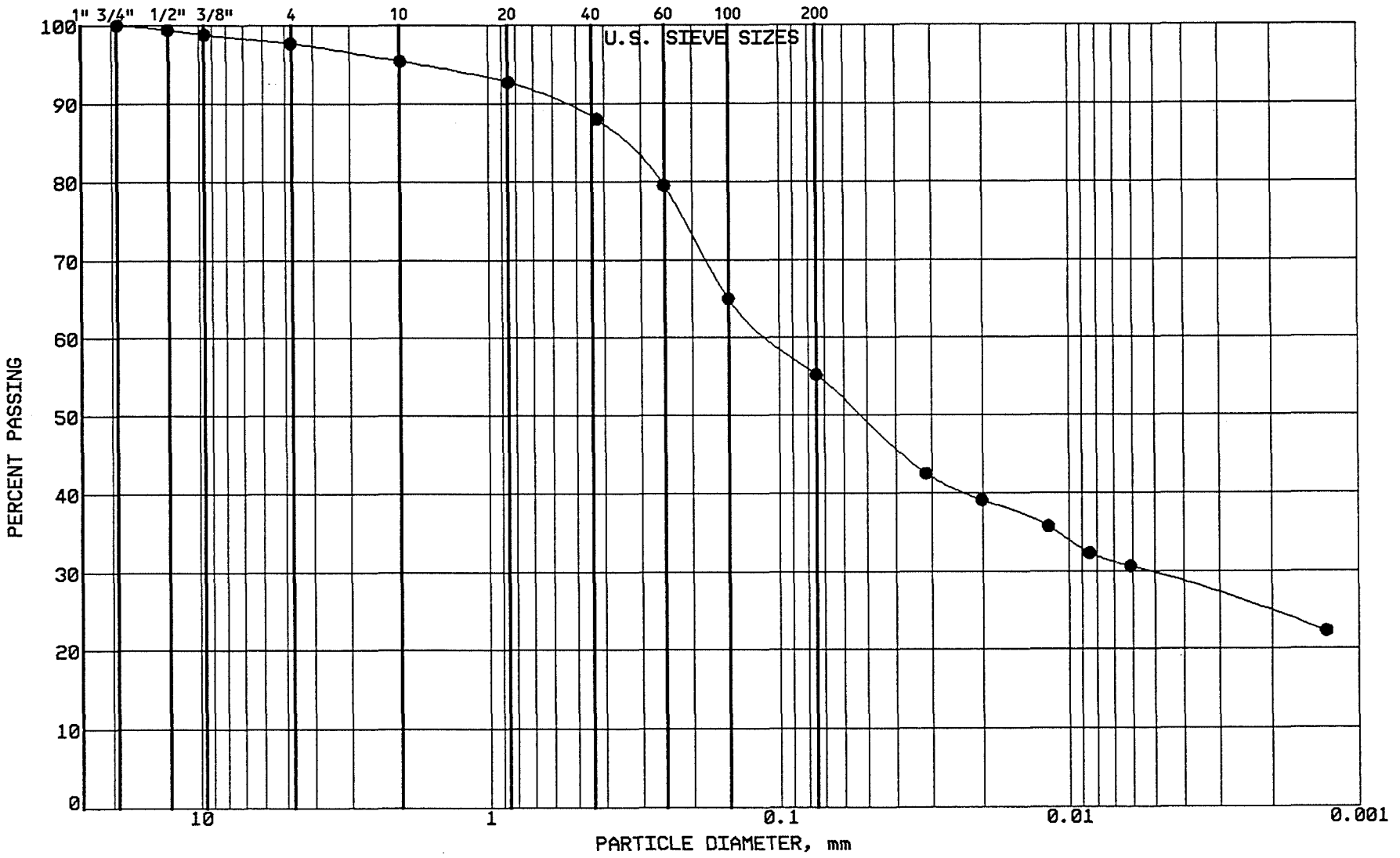
GRAVEL	15.0 %
SAND	58.2 %
SILT	13.4 %
CLAY	13.4 %
P 200	26.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND (SC), gr.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42809.0, E 43558.0
SAMPLE: SGCC330 TUBE #:
ELEVATION: 1882.8'

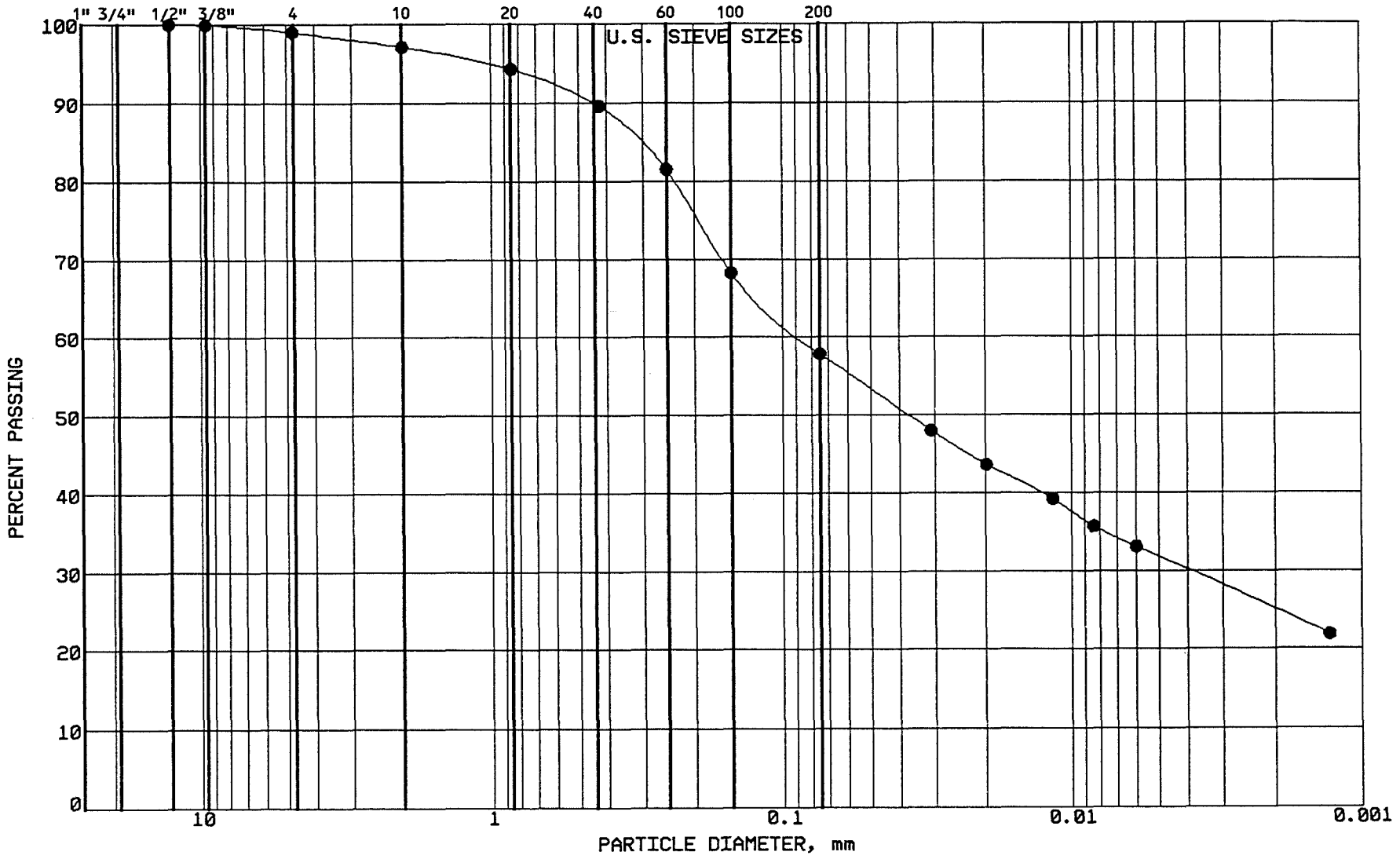
GRAVEL	2.3 %
SAND	42.5 %
SILT	25.7 %
CLAY	29.5 %
P 200	55.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42753.0, E 43038.0
SAMPLE: CLSCC331 TUBE #:
ELEVATION: 1895.0'

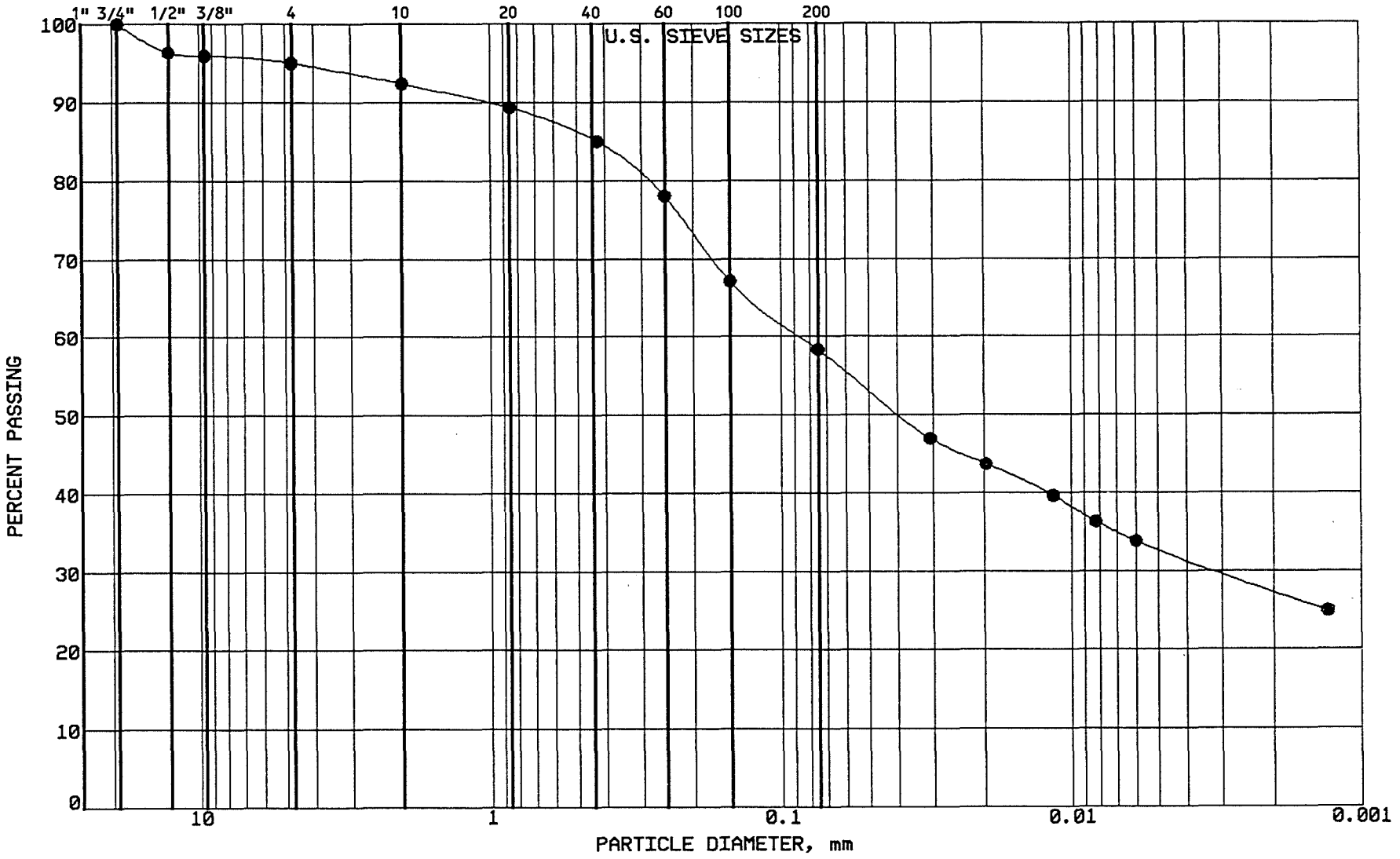
GRAVEL	1.0 %
SAND	41.2 %
SILT	26.0 %
CLAY	31.8 %
P 200	57.8 %

SOIL PROPERTIES

LL: 40.0%
PL: 17.0%
PI: 23.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42945.0, E 43032.0
SAMPLE: CLSCC332 TUBE #: ST-67A
ELEVATION: 1897.0'

GRAVEL	5.0 %
SAND	36.7 %
SILT	25.6 %
CLAY	32.7 %
P 200	58.3 %

SOIL PROPERTIES

LL: 44.0%
PL: 18.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) gr br

BRAUN[SM]
INTERTEC

Summary of 1993 Test Results
EP #93
Cooperative Power Association

Coal Creek Station
Underwood, North Dakota

Hydrometers
Atterbergs

Project Number BFAX-92-017C

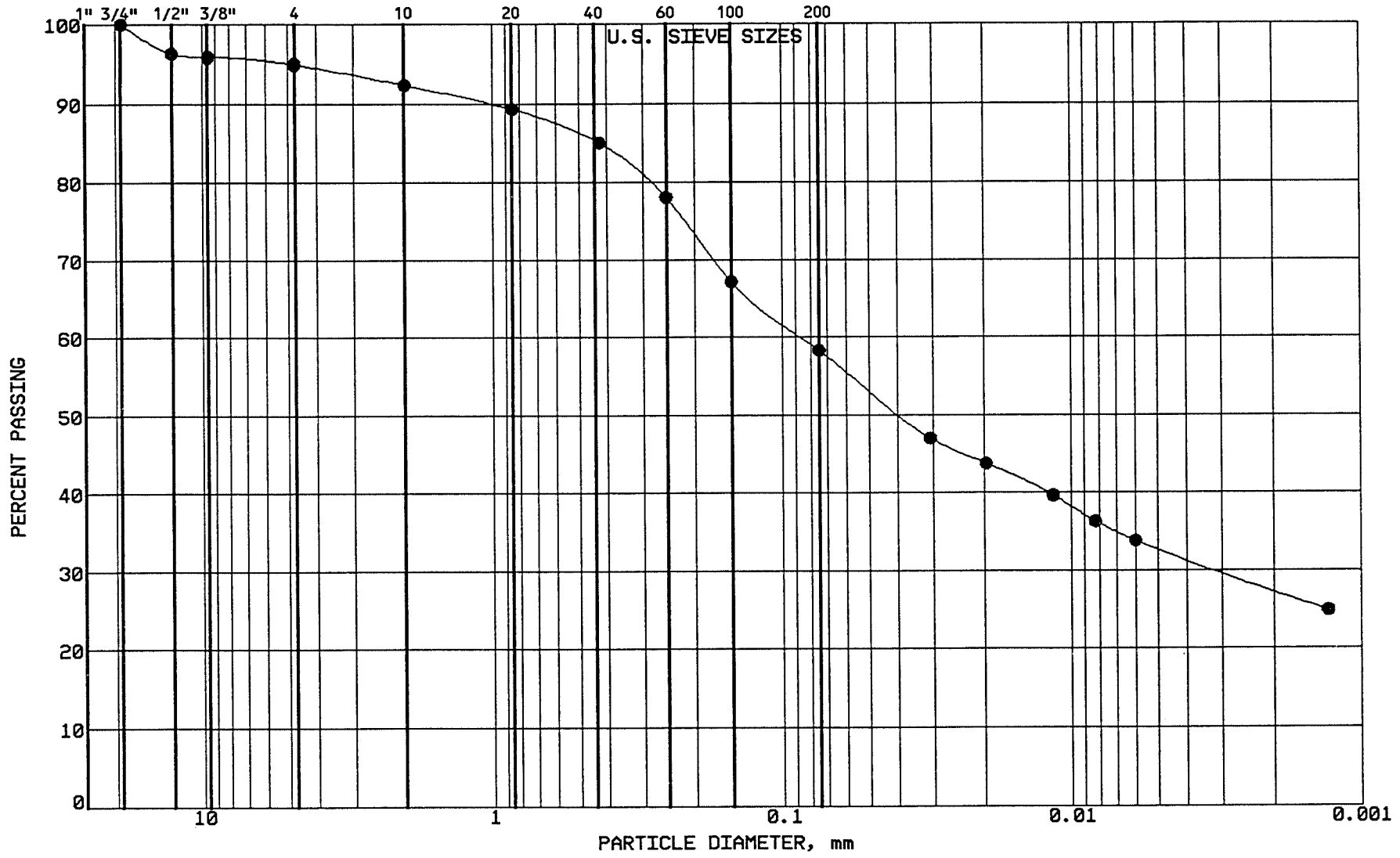
Braun Intertec Engineering, Inc.
April 2, 1993

Engineers and Scientists Serving the Built and Natural Environments

HYDROMETERS AND ATTERBERGS
(333 thru 662)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

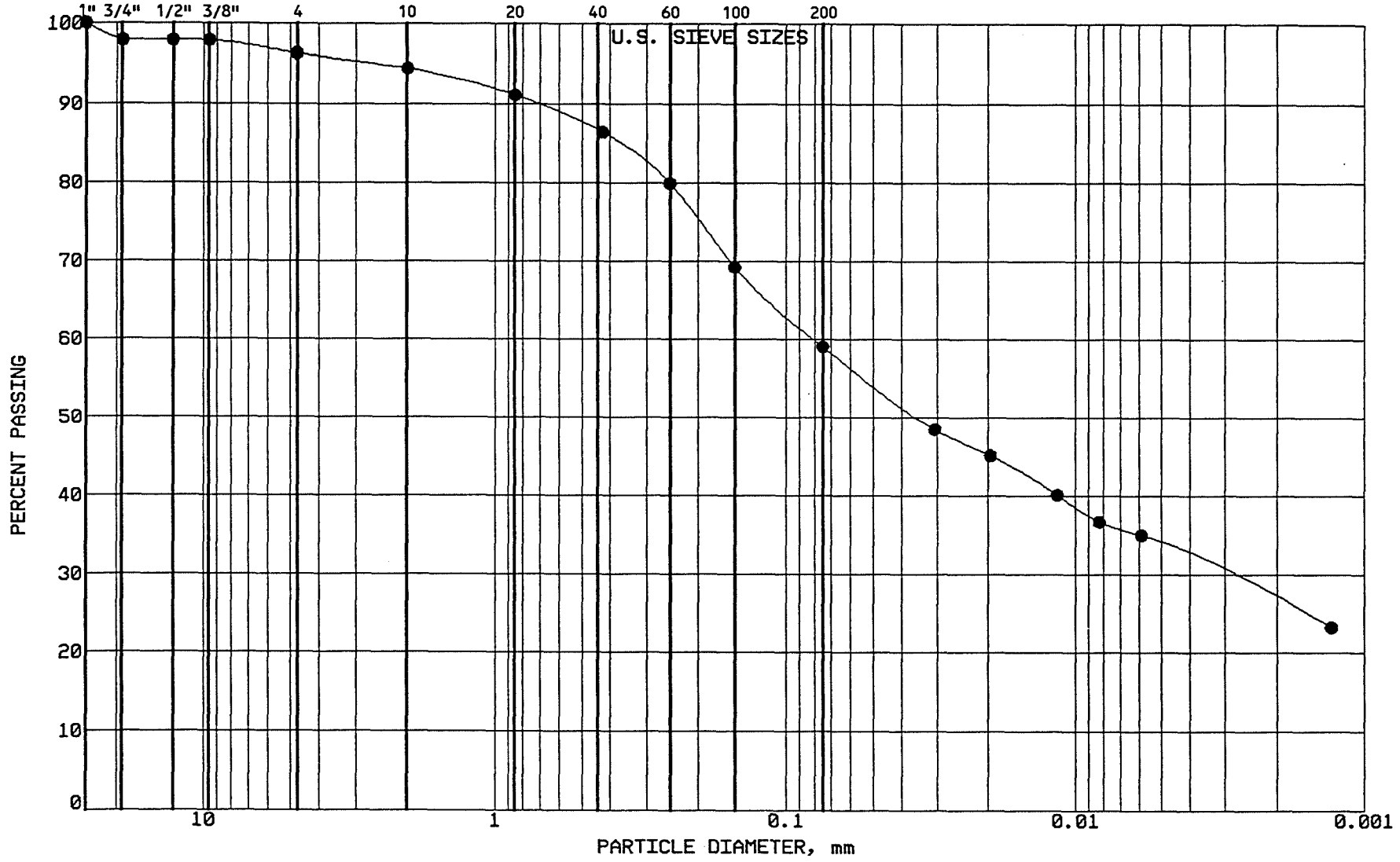
LOCATION: N 42945.0, E 43032.0
SAMPLE: CLSCC332 TUBE #: ST-67A
ELEVATION: 1897.0'

GRAVEL	5.0 %
SAND	36.7 %
SILT	25.6 %
CLAY	32.7 %
P 200	58.3 %

SOIL PROPERTIES

LL: 44.0%
PL: 18.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42596.0, E 43045.0
SAMPLE: CLSCC333 TUBE #:
ELEVATION: 1896.3'

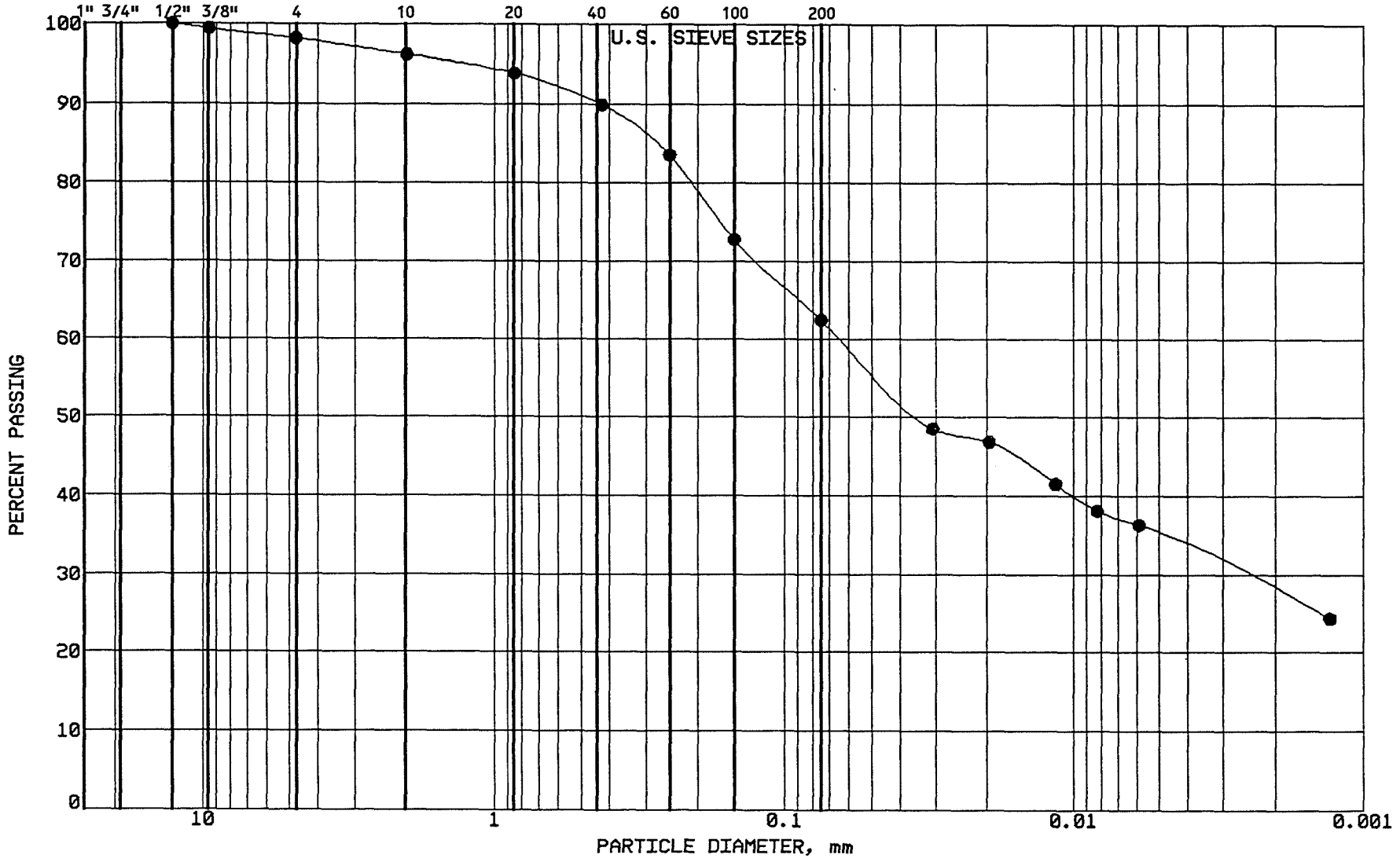
GRAVEL	3.7 %
SAND	37.2 %
SILT	25.4 %
CLAY	33.7 %
P 200	59.1 %

SOIL PROPERTIES

LL: 44.0%
PL: 18.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

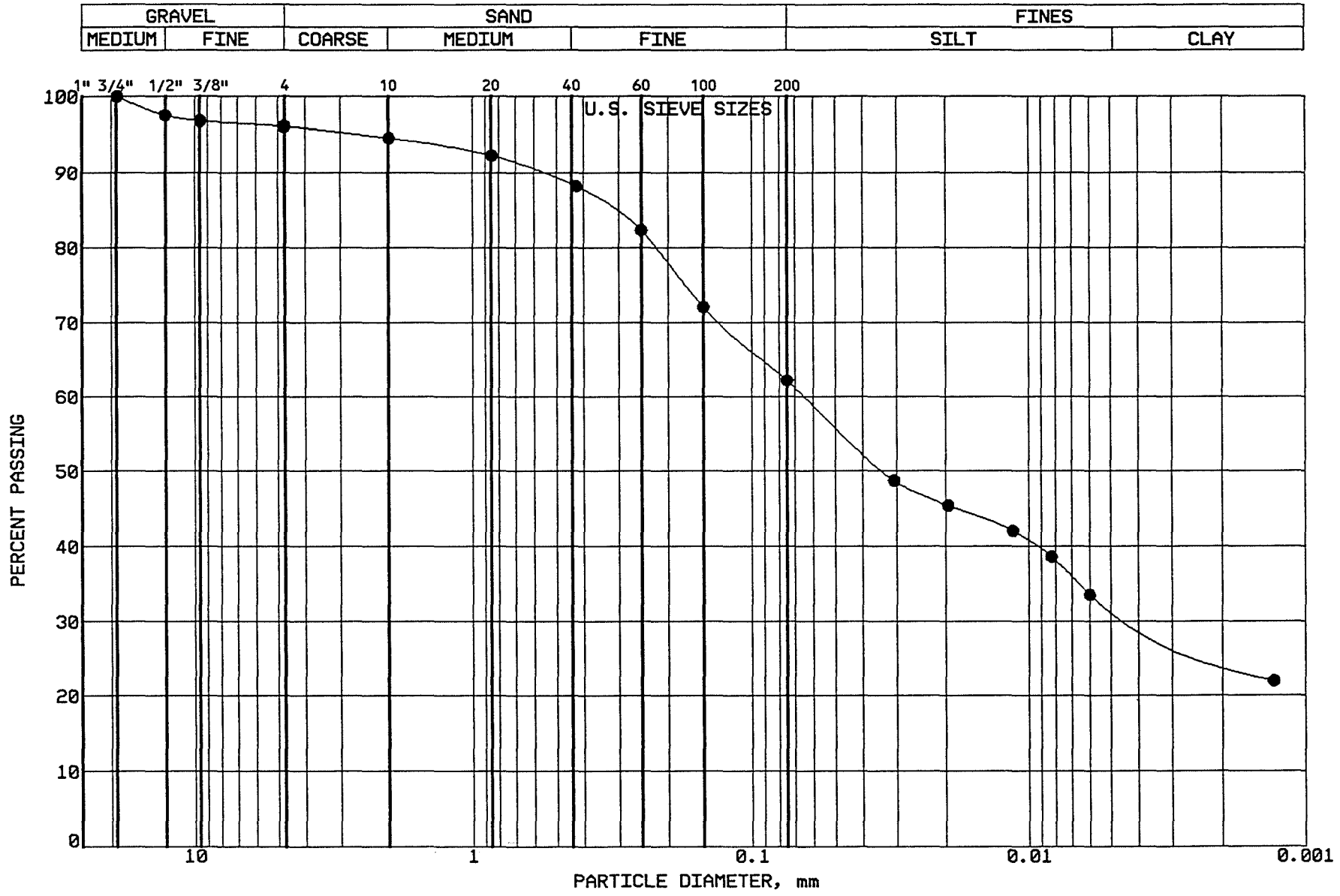
LOCATION: N 42908.0, E 43259.0
SAMPLE: SGCC334 TUBE #:
ELEVATION: 1881.6'

GRAVEL	1.8 %
SAND	35.7 %
SILT	27.5 %
CLAY	35.0 %
P 200	62.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42764.0, E 43255.0
SAMPLE: SGCC335 TUBE #:
ELEVATION: 1881.1'

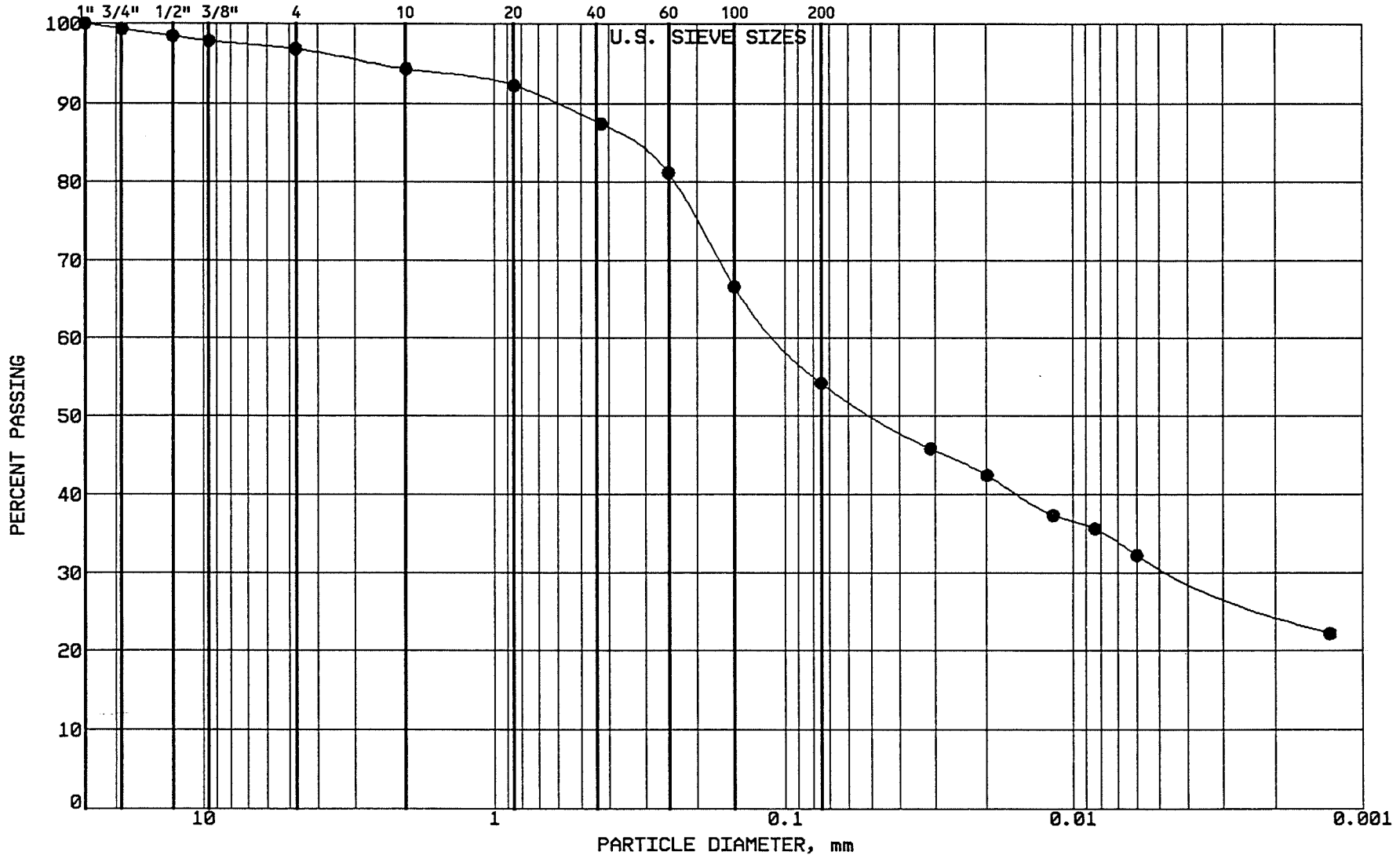
GRAVEL	3.9 %
SAND	33.9 %
SILT	30.1 %
CLAY	32.1 %
P 200	62.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42880.0, E 43219.0
SAMPLE: SGCC336 TUBE #:
ELEVATION: 1883.2'

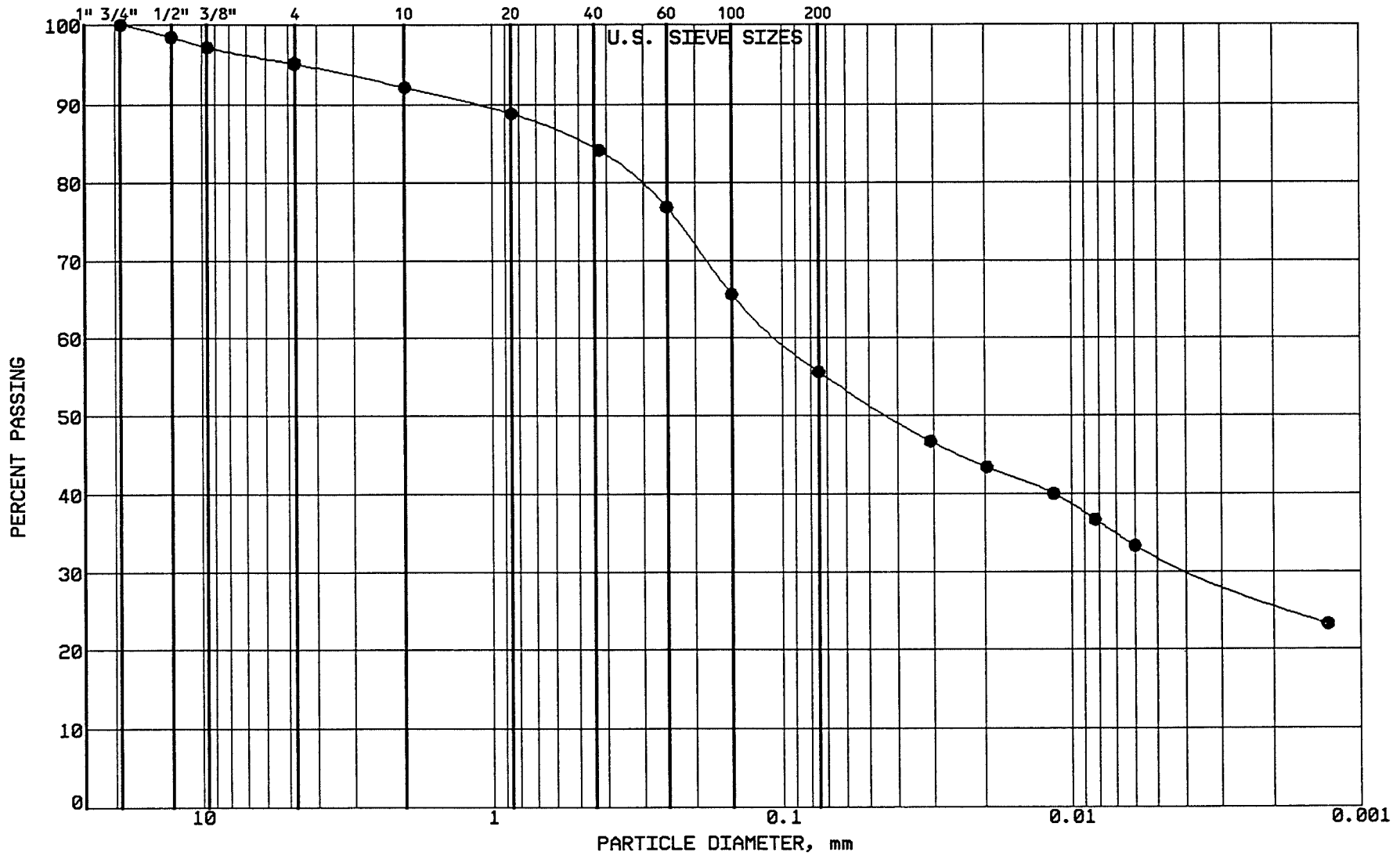
GRAVEL	3.2 %
SAND	42.6 %
SILT	23.2 %
CLAY	31.0 %
P 200	54.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

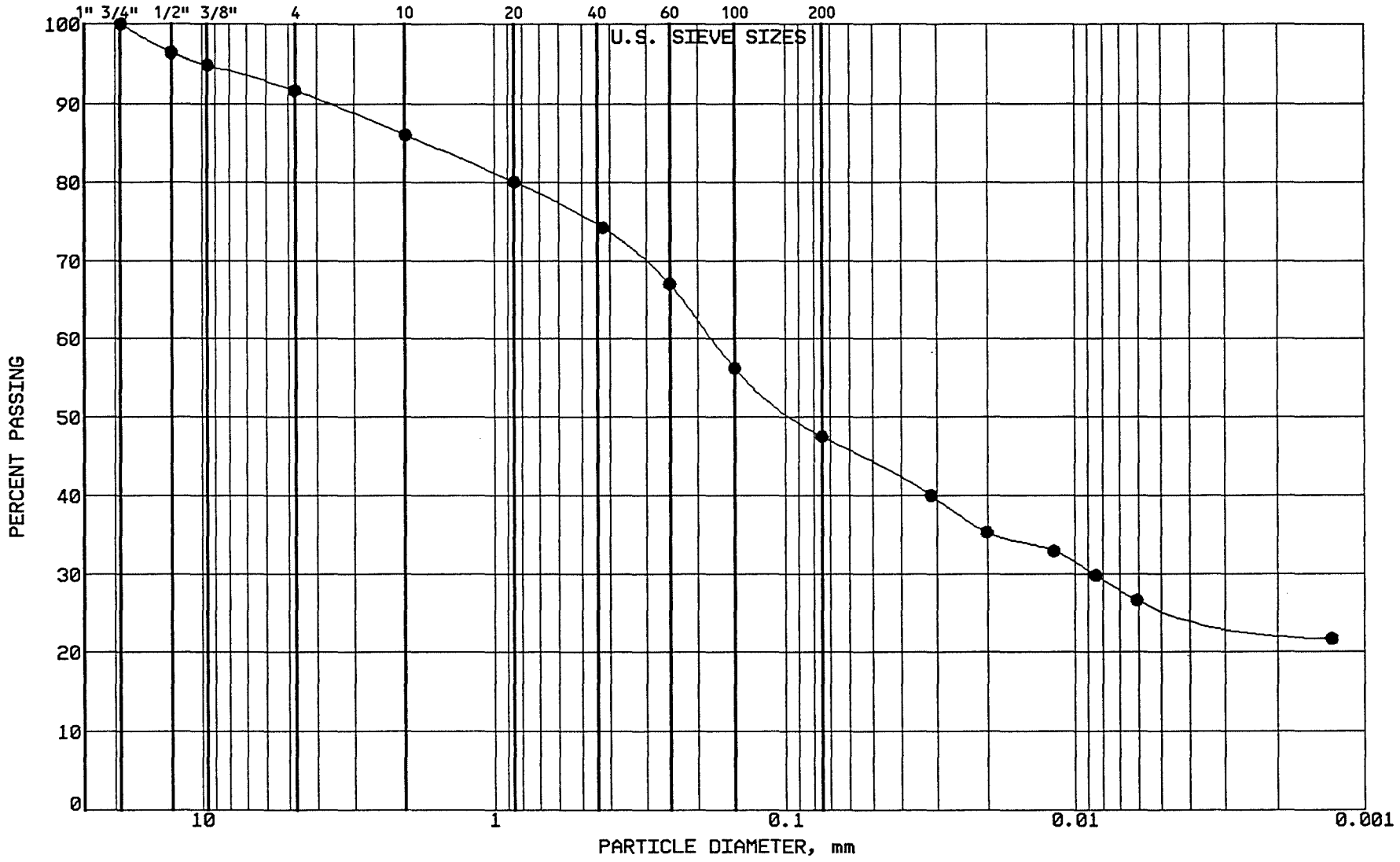
LOCATION: N 43355.0, E 43221.0
SAMPLE: SGCC337 TUBE #:
ELEVATION: 1887.2'

GRAVEL	4.8 %
SAND	39.6 %
SILT	23.5 %
CLAY	32.1 %
P 200	55.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43151.0, E 43223.0
SAMPLE: SGCC338 TUBE #:
ELEVATION: 1886.0'

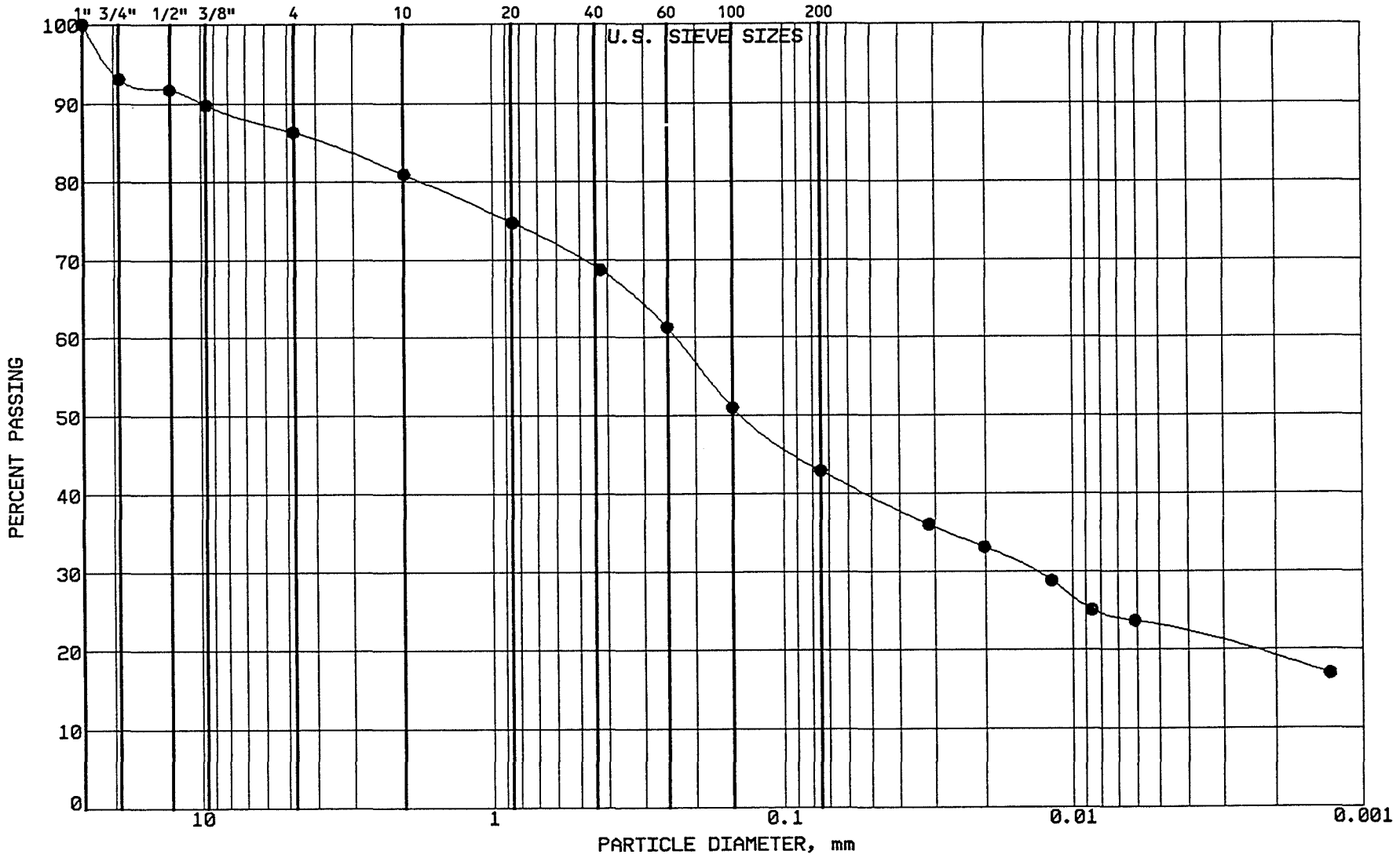
GRAVEL	8.3 %
SAND	44.2 %
SILT	21.5 %
CLAY	26.0 %
P 200	47.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND (SC), olive br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

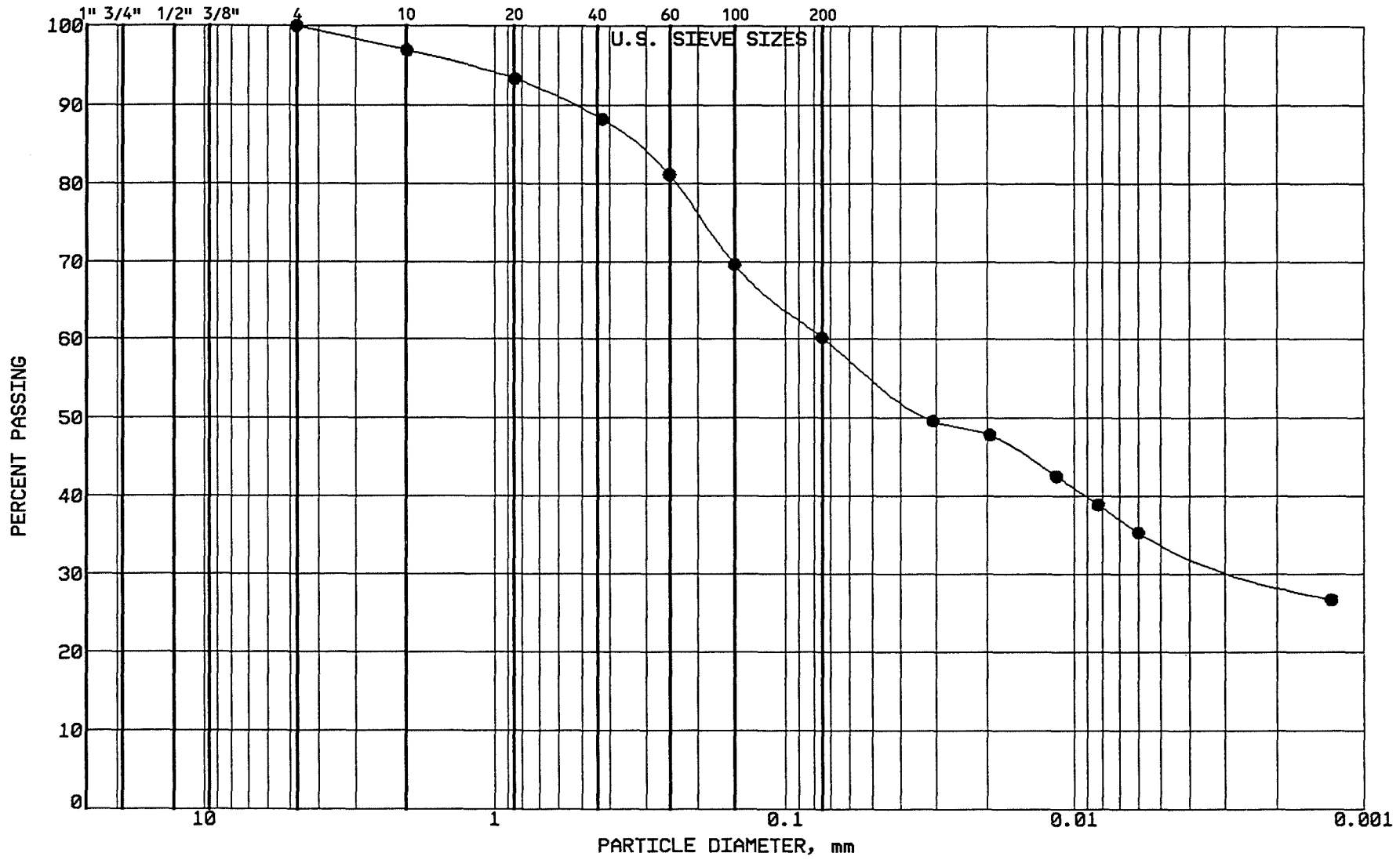
LOCATION: N 42948.0, E 43222.0
SAMPLE: SGCC339 TUBE #:
ELEVATION: 1884.4'

GRAVEL	13.7 %
SAND	43.4 %
SILT	20.1 %
CLAY	22.8 %
P 200	42.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND (SC), gr.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

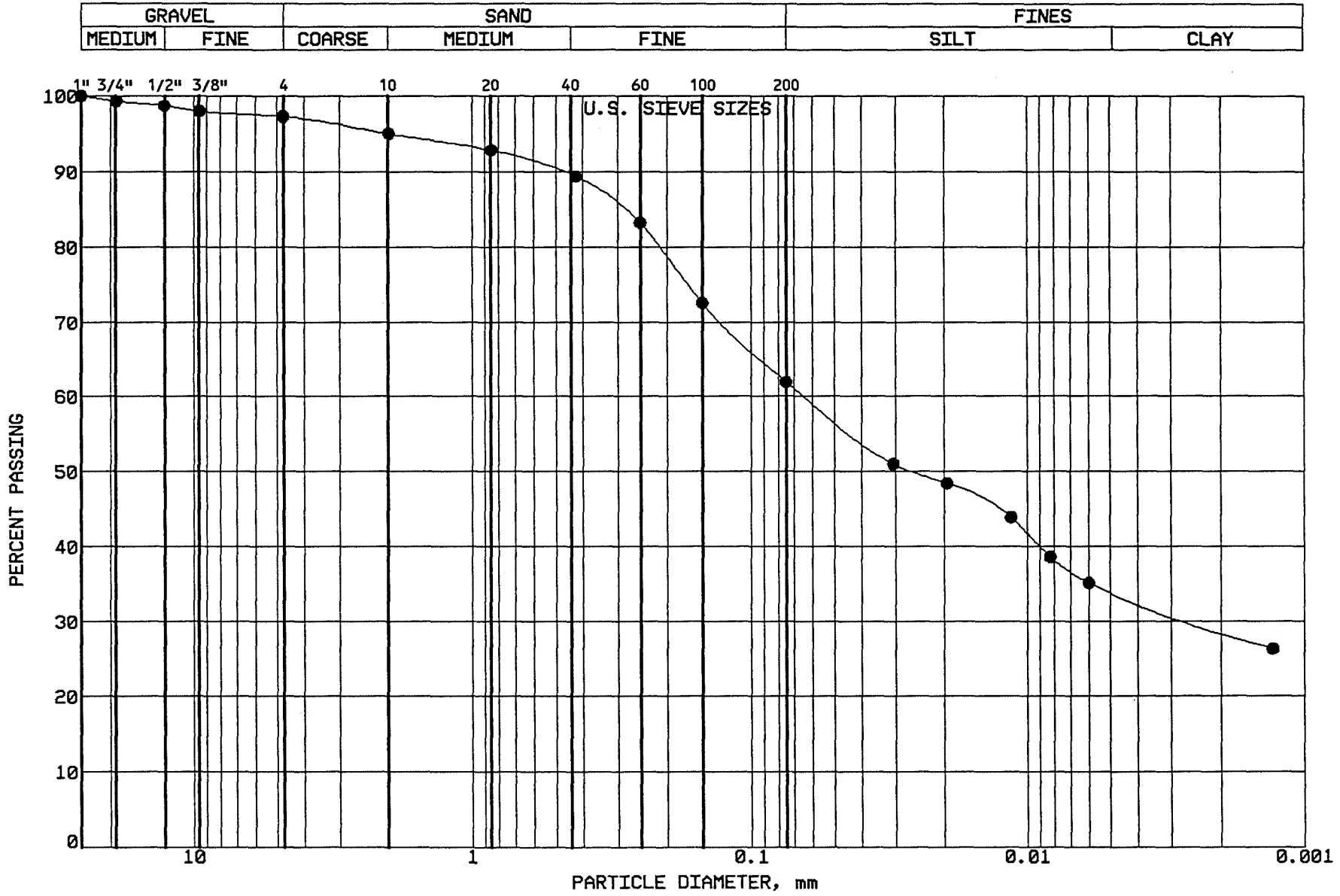
LOCATION: N 42754.0, E 43203.0
SAMPLE: SGCC340 TUBE #:
ELEVATION: 1883.2'

GRAVEL	0.0 %
SAND	39.8 %
SILT	25.9 %
CLAY	34.3 %
P 200	60.2 %

SOIL PROPERTIES

LL: 41.0%
PL: 16.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

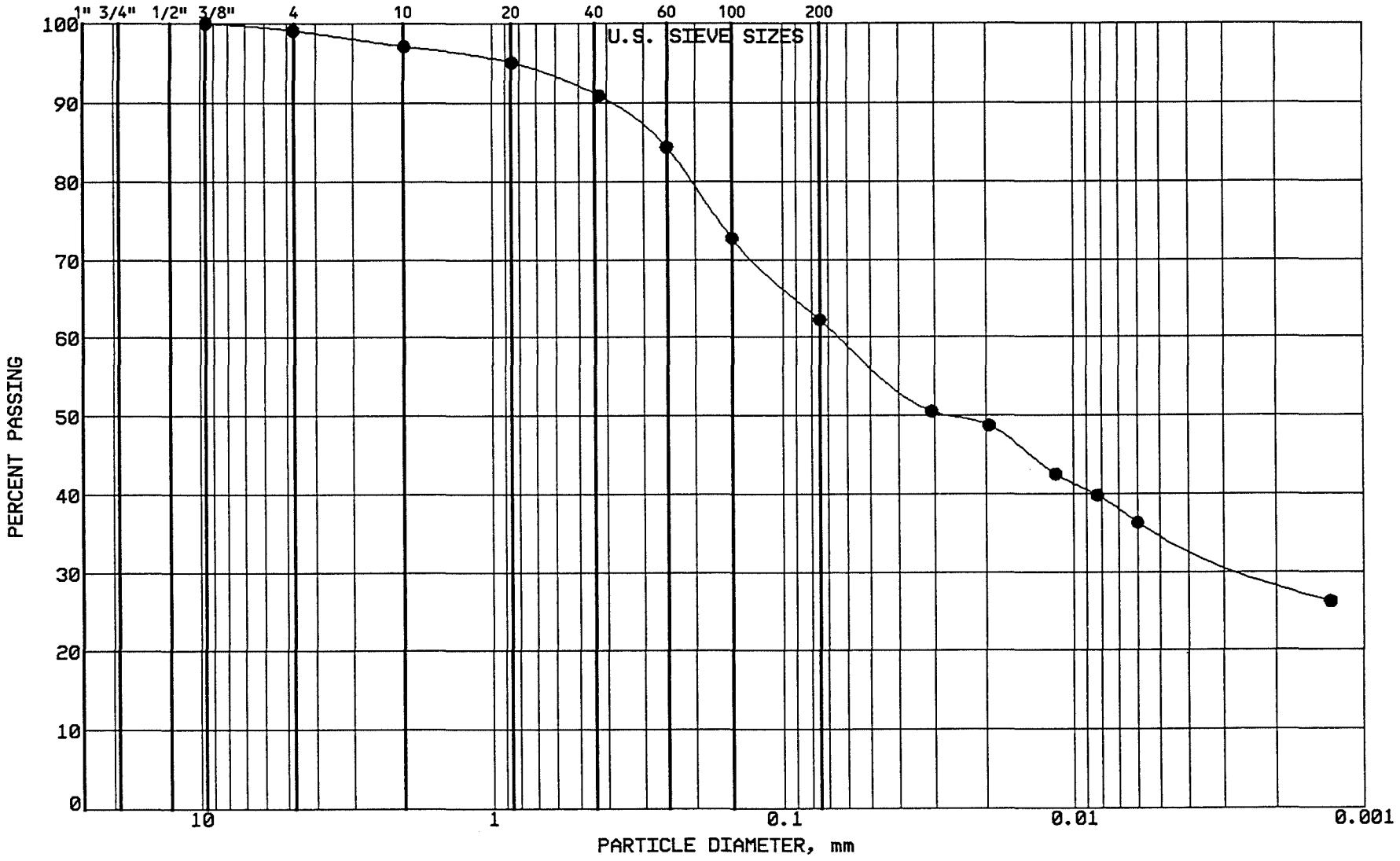
LOCATION: N 43321.0, E 43409.0
SAMPLE: SGCC341 TUBE #:
ELEVATION: 1886.0'

GRAVEL	2.7 %
SAND	35.4 %
SILT	27.8 %
CLAY	34.1 %
P 200	61.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43145.0, E 43415.0
SAMPLE: SGCC342 TUBE #:
ELEVATION: 1886.3'

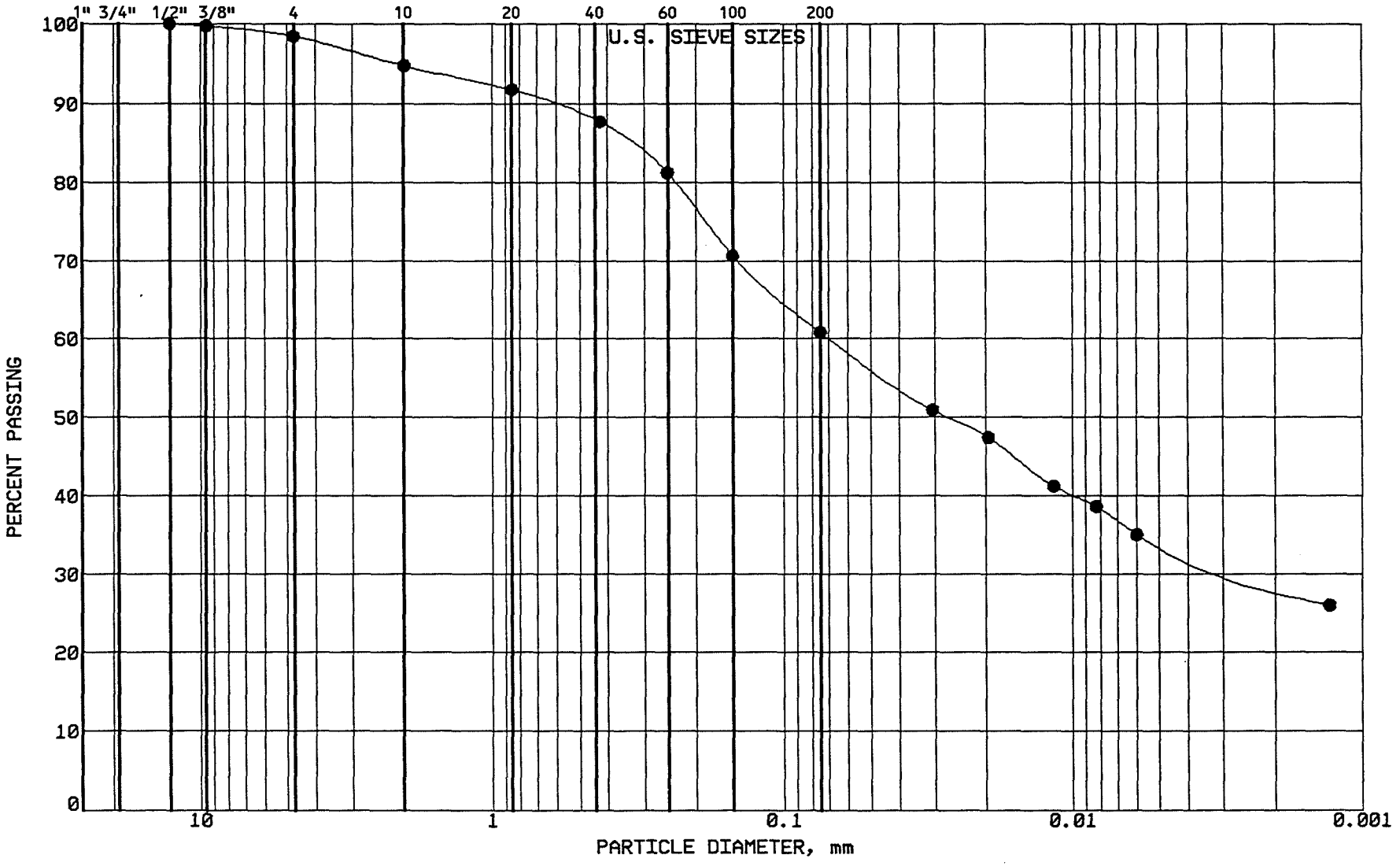
GRAVEL	0.9 %
SAND	36.9 %
SILT	27.1 %
CLAY	35.1 %
P 200	62.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

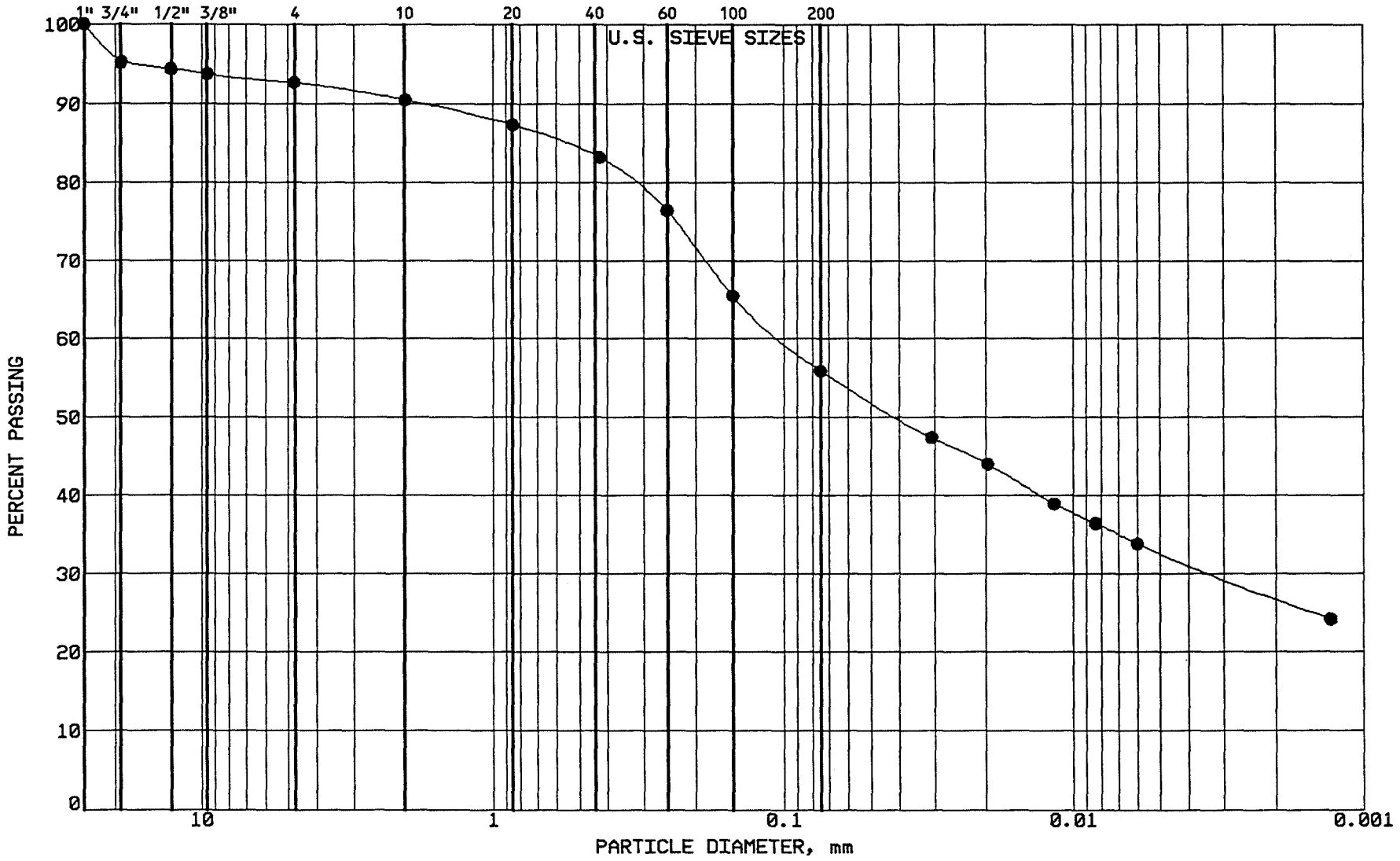
LOCATION: N 42931.0, E 43411.0
SAMPLE: SGCC343 TUBE #:
ELEVATION: 1883.9'

GRAVEL	1.6 %
SAND	37.6 %
SILT	26.9 %
CLAY	33.9 %
P 200	60.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

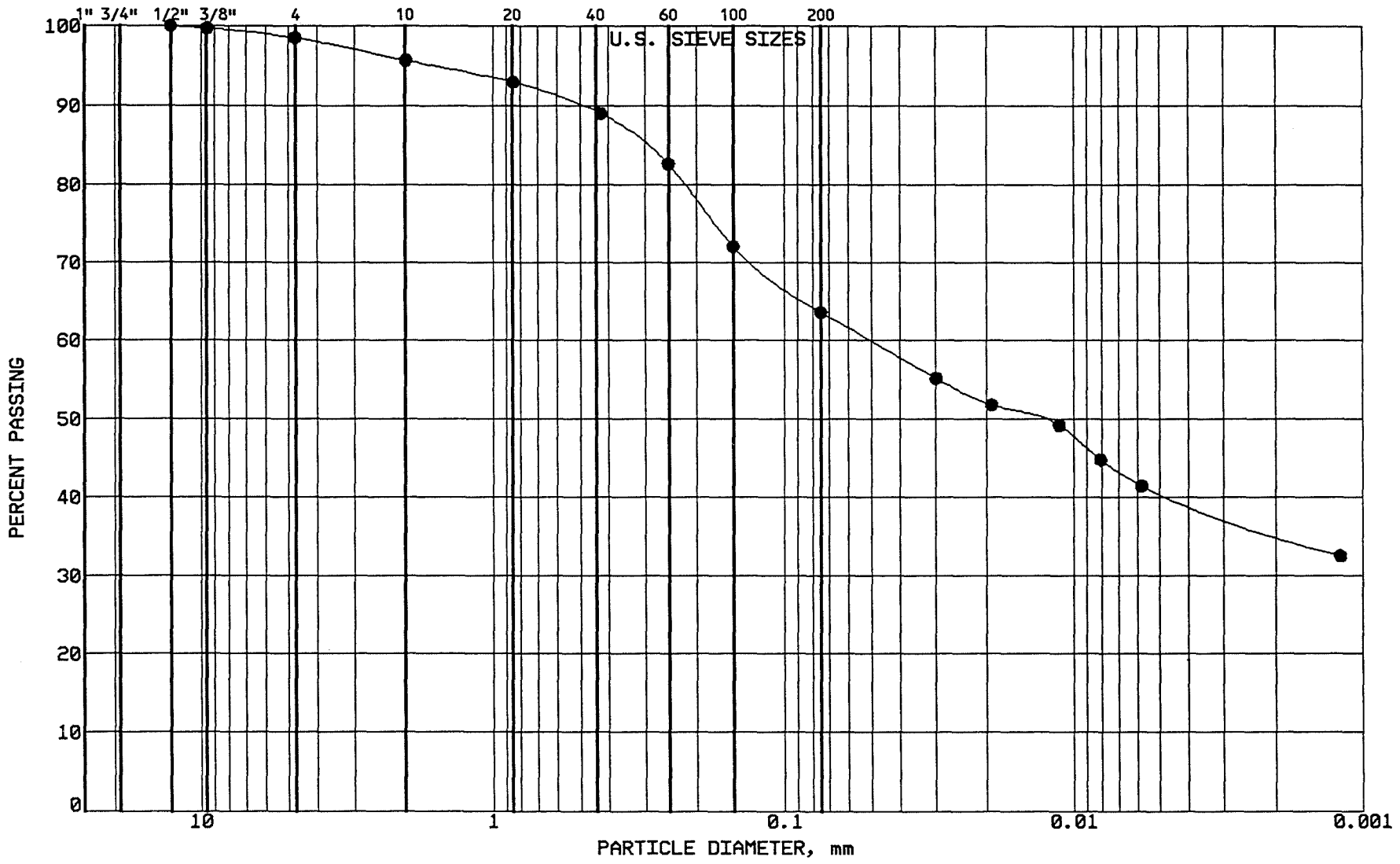
LOCATION: N 42740.0, E 43415.0
SAMPLE: SGCC344 TUBE #:
ELEVATION: 1883.2'

GRAVEL	7.3 %
SAND	36.8 %
SILT	23.2 %
CLAY	32.7 %
P 200	55.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

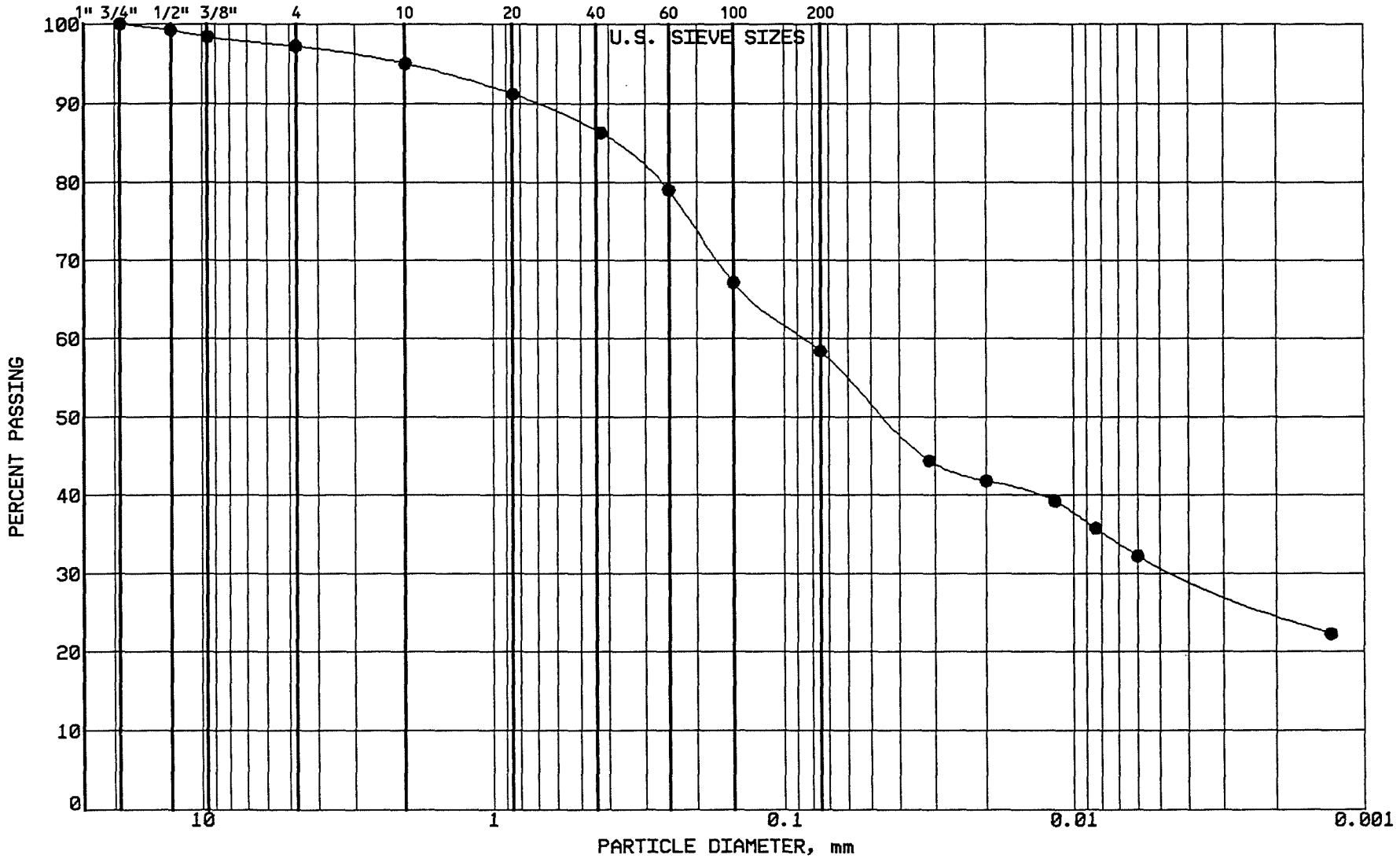
LOCATION: N 43153.0, E 43537.0
SAMPLE: SGCC345 TUBE #:
ELEVATION: 1882.2'

GRAVEL	1.5 %
SAND	34.9 %
SILT	23.0 %
CLAY	40.6 %
P 200	63.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

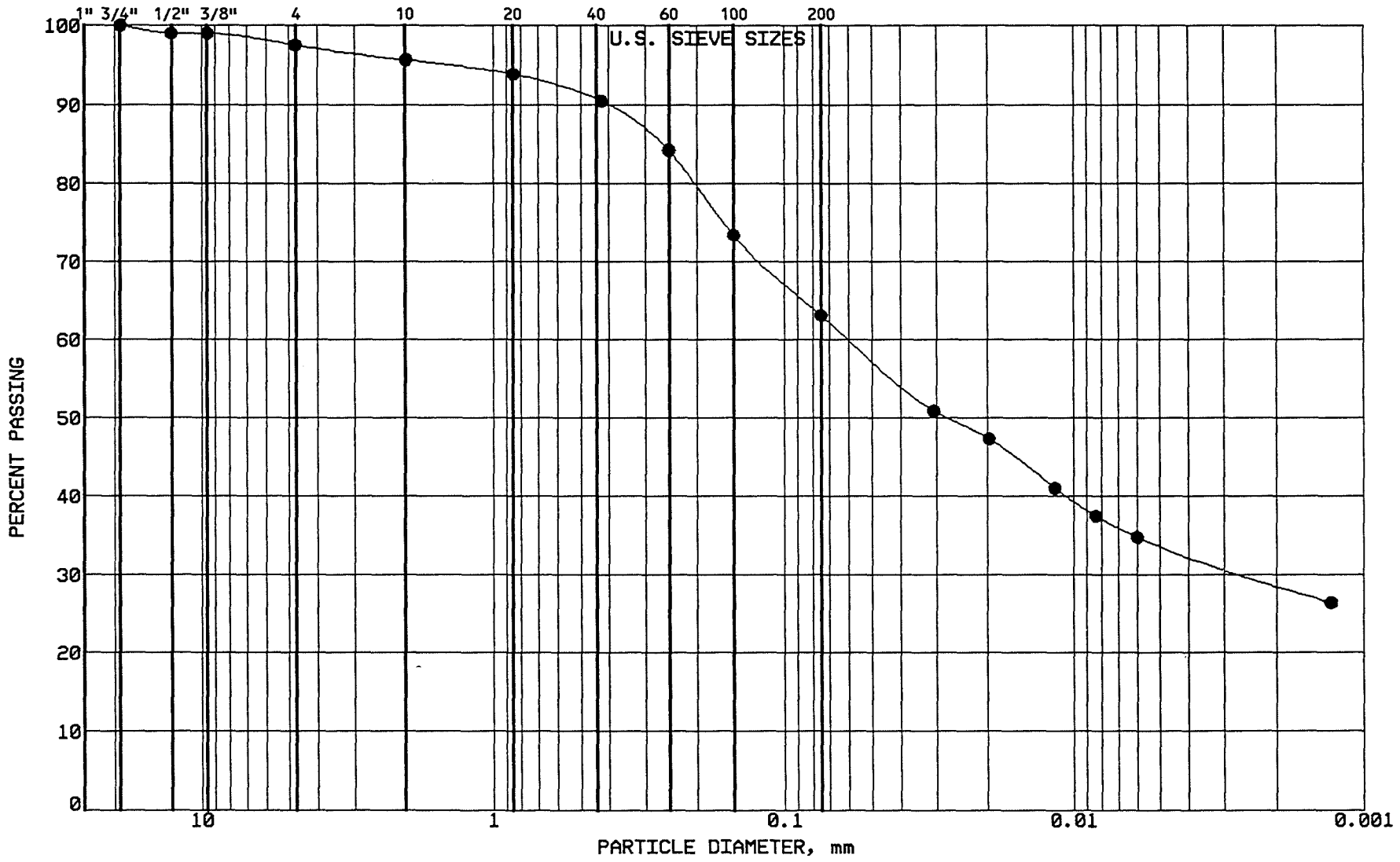
LOCATION: N 43012.0, E 43527.0
SAMPLE: SGCC346 TUBE #:
ELEVATION: 1881.7'

GRAVEL	2.8 %
SAND	38.8 %
SILT	27.4 %
CLAY	31.0 %
P 200	58.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

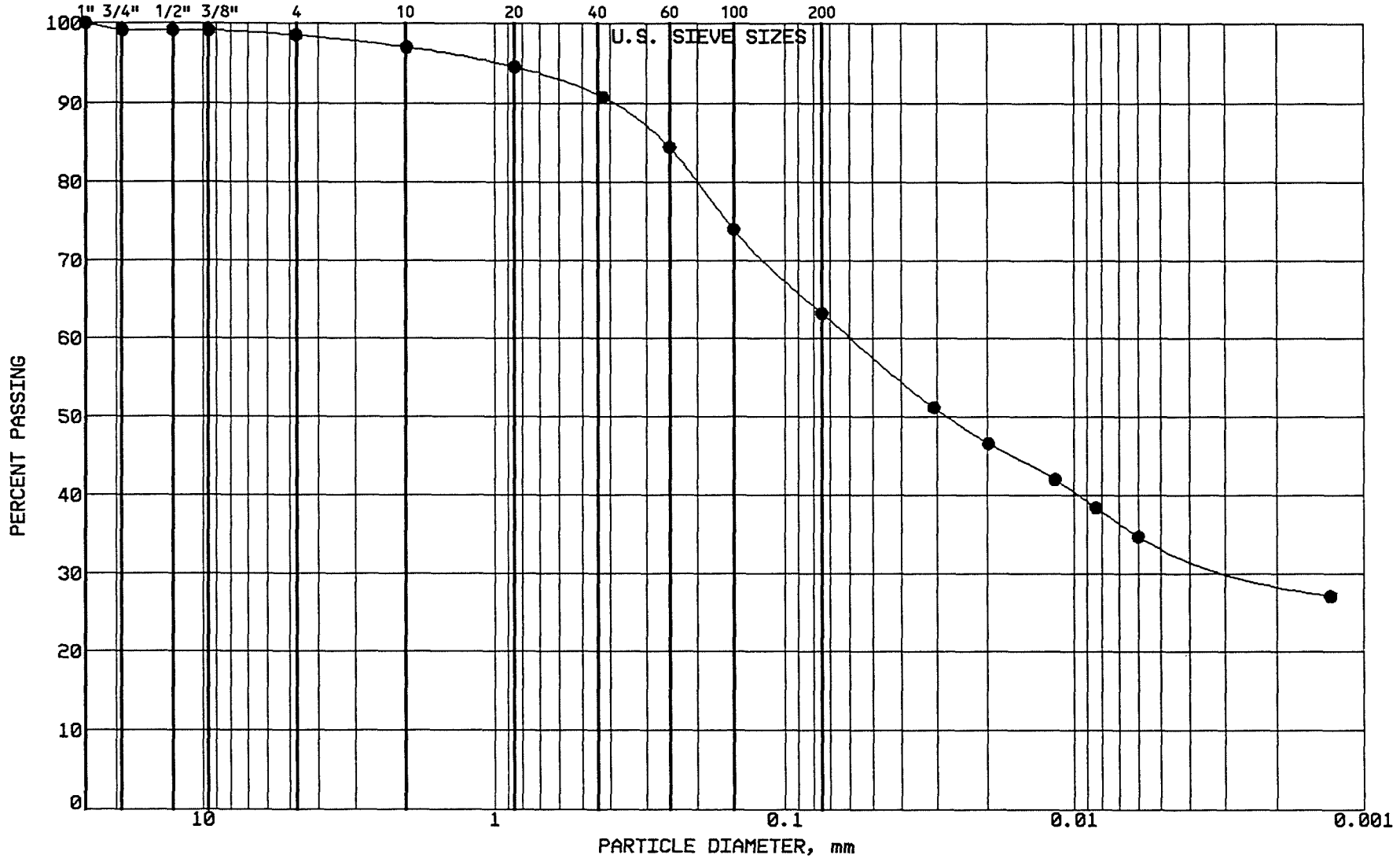
LOCATION: N 42852.0, E 43523.0
SAMPLE: SGCC347 TUBE #:
ELEVATION: 1881.5'

GRAVEL	2.5 %
SAND	34.4 %
SILT	29.4 %
CLAY	33.7 %
P 200	63.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

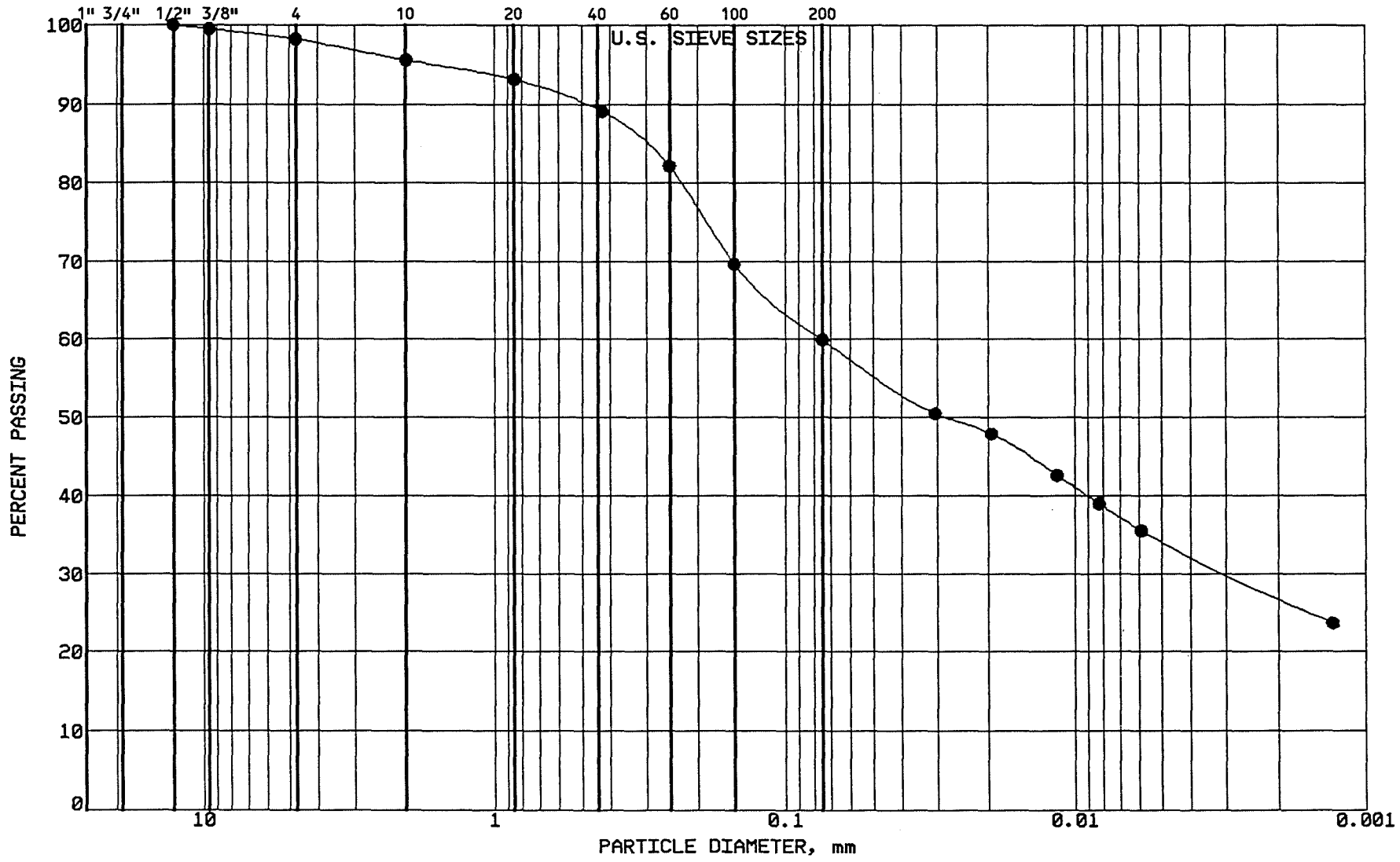
LOCATION: N 42703.0, E 43520.0
SAMPLE: SGCC348 TUBE #:
ELEVATION: 1881.8'

GRAVEL	1.5 %
SAND	35.3 %
SILT	29.4 %
CLAY	33.8 %
P 200	63.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

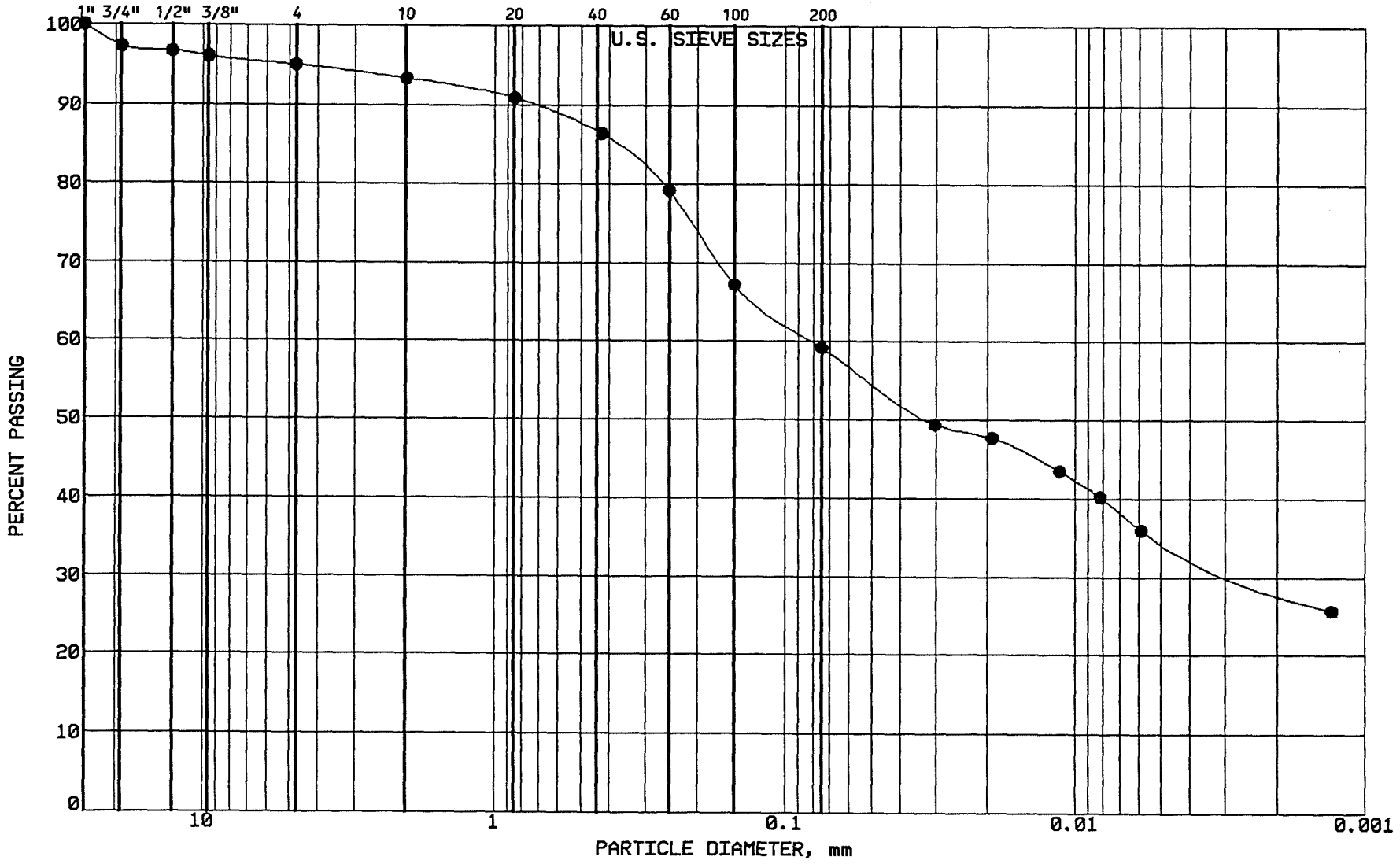
LOCATION: N 42710.0, E 43651.0
SAMPLE: SGCC349 TUBE #:
ELEVATION: 1880.4'

GRAVEL	1.8 %
SAND	38.3 %
SILT	25.7 %
CLAY	34.2 %
P 200	59.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

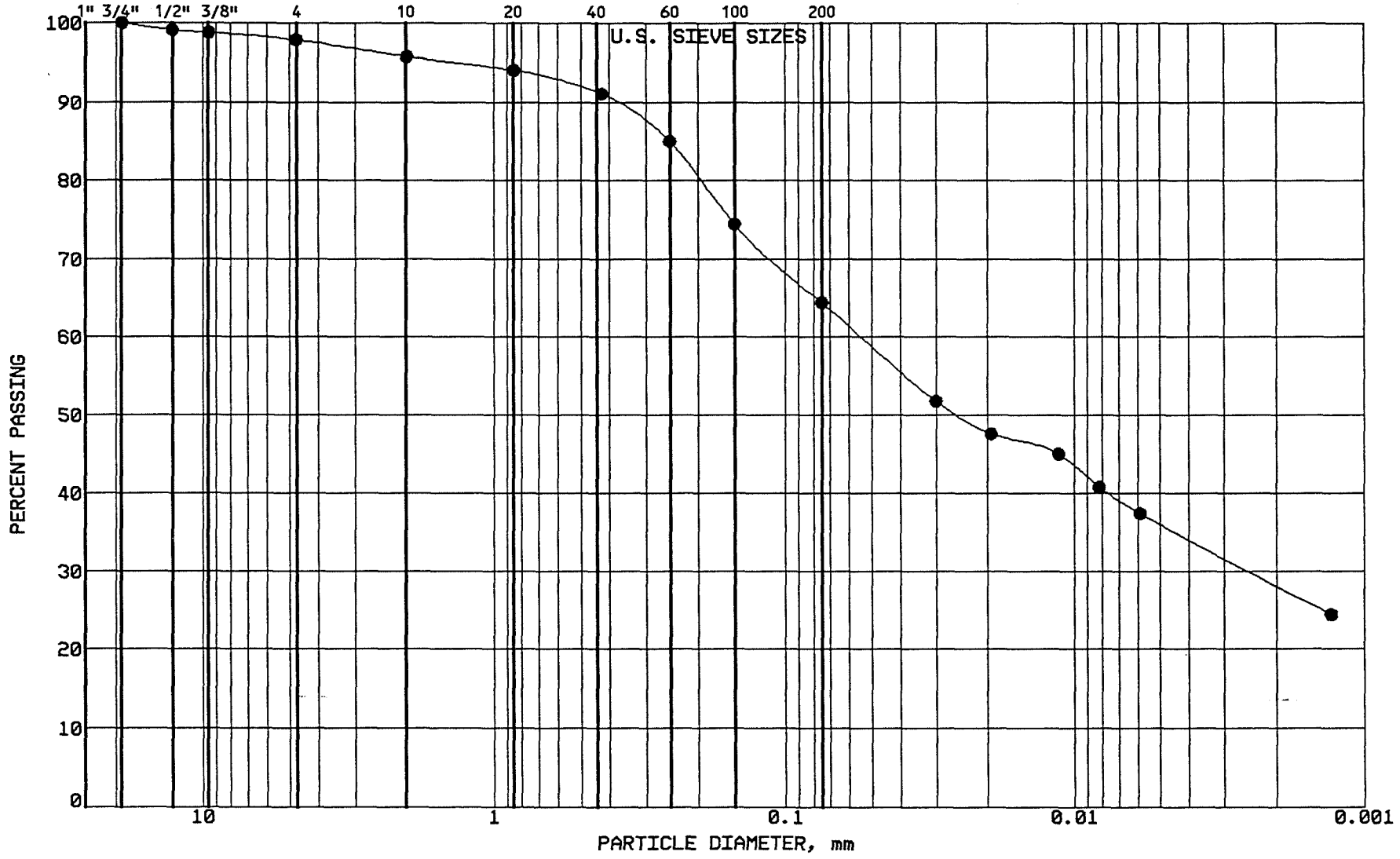
LOCATION: N 42856.0, E 43644.0
SAMPLE: SGCC350 TUBE #:
ELEVATION: 1880.2'

GRAVEL	4.9 %
SAND	35.9 %
SILT	24.3 %
CLAY	34.9 %
P 200	59.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

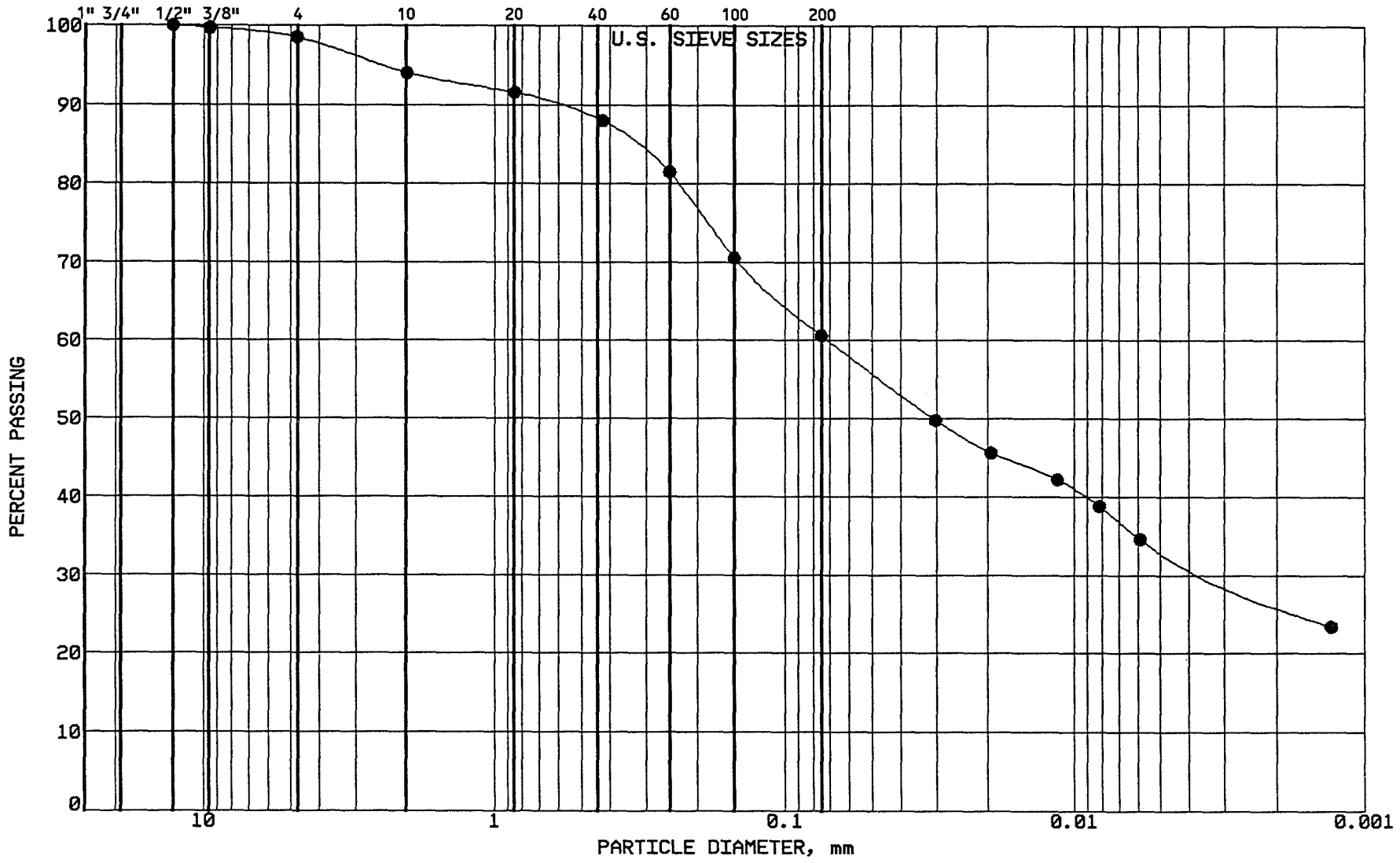
LOCATION: N 43014.0, E 43642.0
SAMPLE: SGCC351 TUBE #:
ELEVATION: 1881.1'

GRAVEL	2.1 %
SAND	33.5 %
SILT	28.4 %
CLAY	36.0 %
P 200	64.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

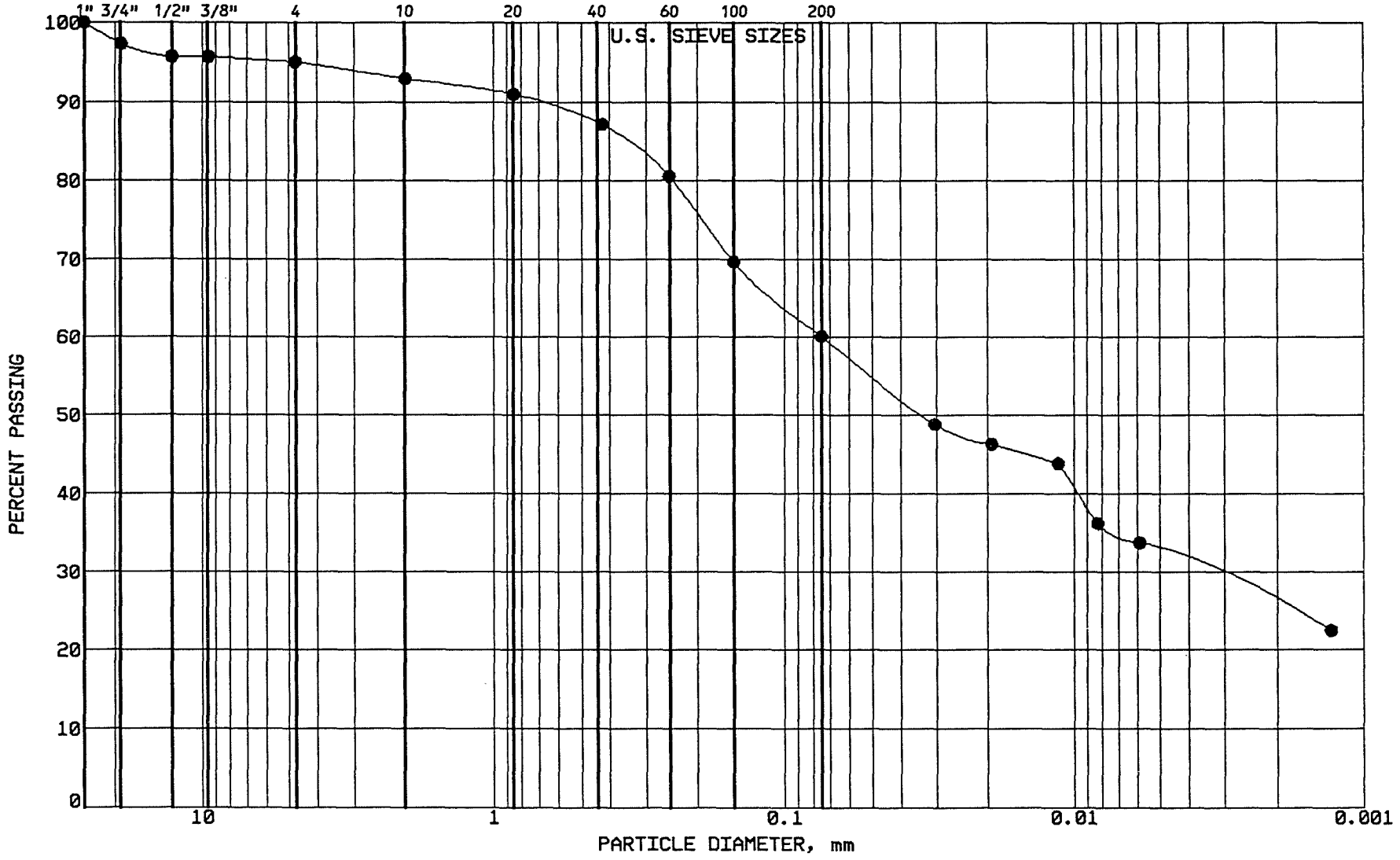
LOCATION: N 43222.0, E 43151.0
SAMPLE: CLBCC352 TUBE #: ST-68A
ELEVATION: 1887.4'

GRAVEL	1.5 %
SAND	37.9 %
SILT	27.2 %
CLAY	33.4 %
P 200	60.6 %

SOIL PROPERTIES

LL: 48.0%
PL: 16.0%
PI: 32.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

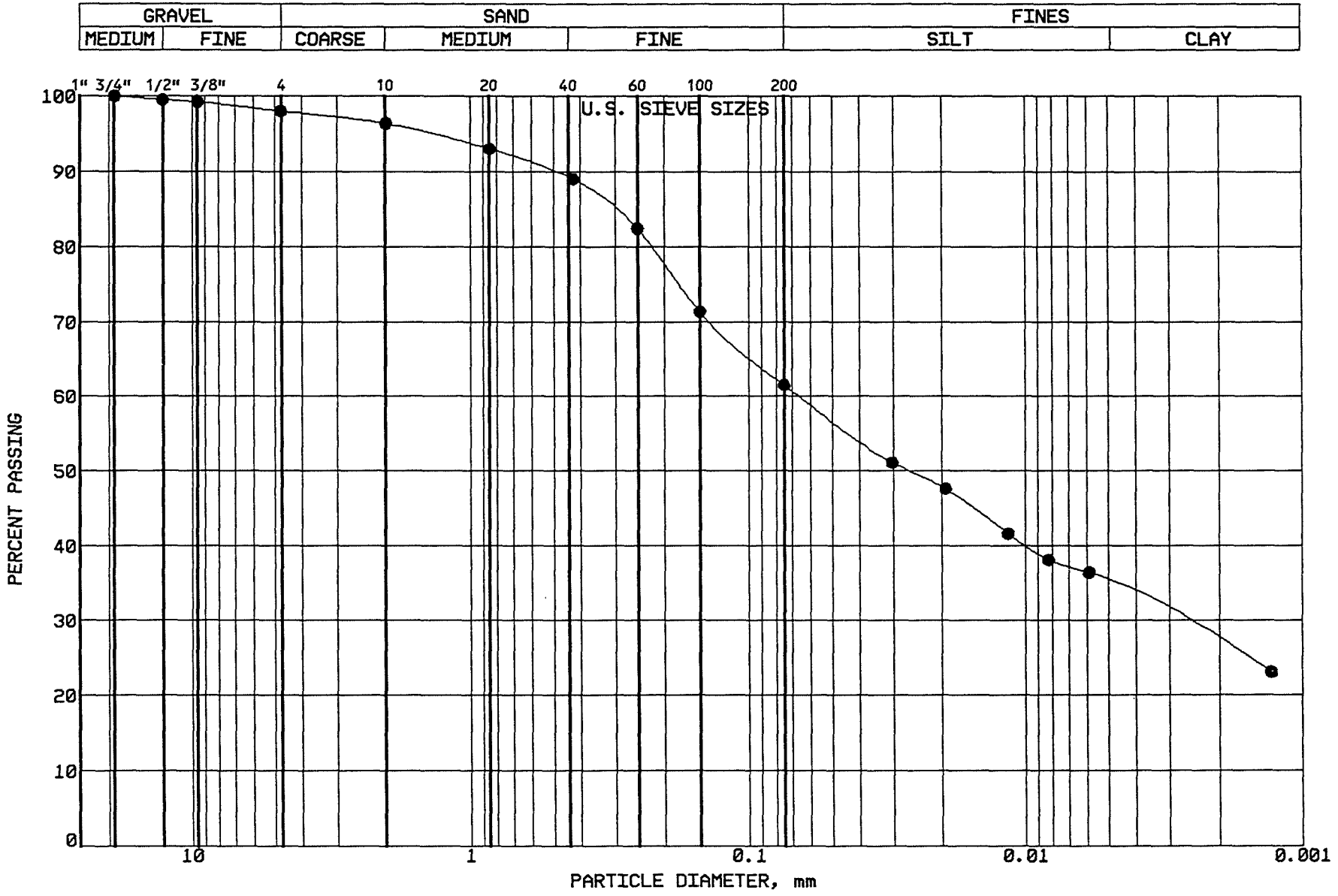
LOCATION: N 43034.0, E 43156.0
SAMPLE: CLBCC353 TUBE #: ST-69A
ELEVATION: 1886.2'

GRAVEL	4.9 %
SAND	35.0 %
SILT	27.6 %
CLAY	32.5 %
P 200	60.1 %

SOIL PROPERTIES

LL: 44.0%
PL: 16.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

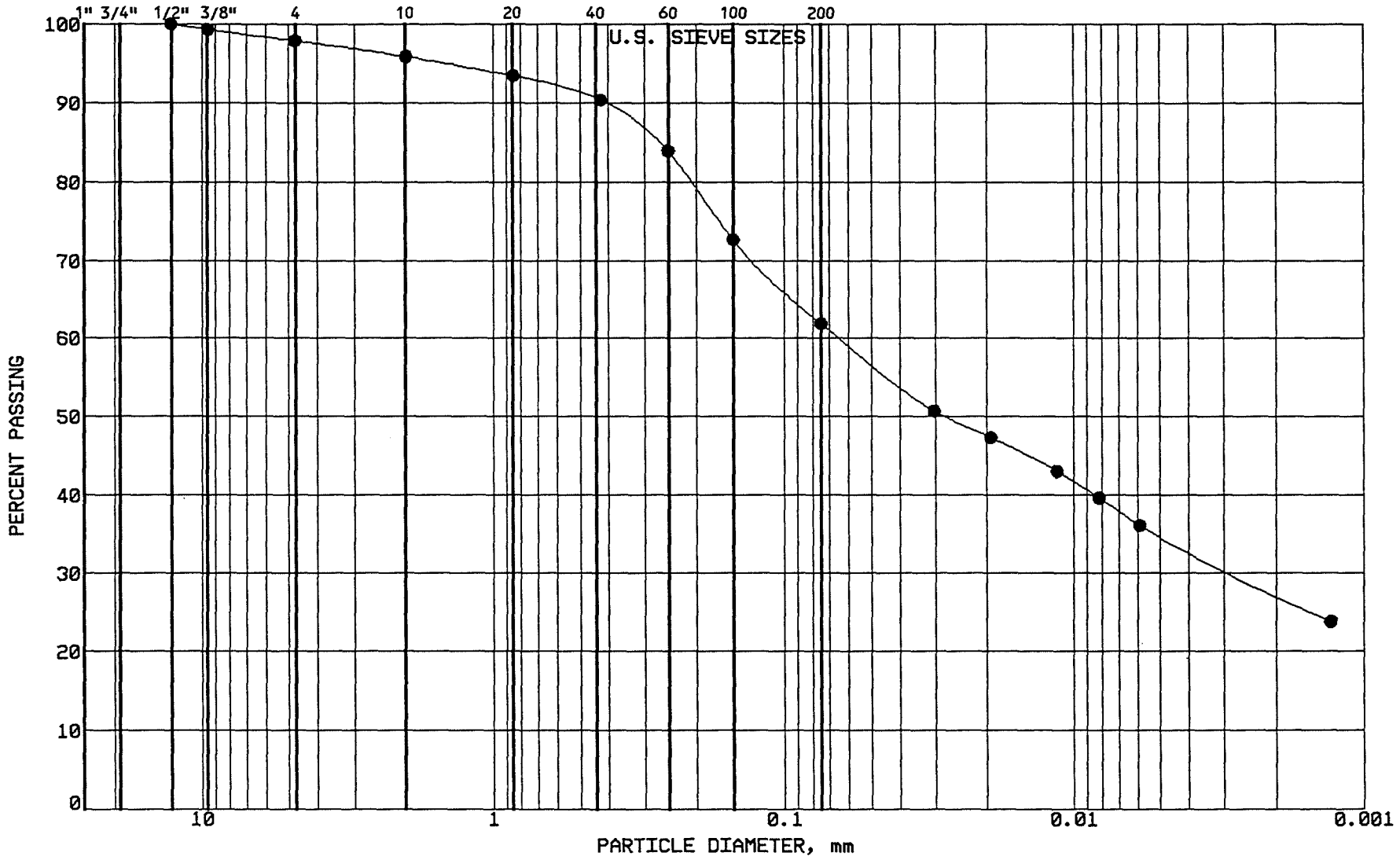
LOCATION: N 43174.0, E 43326.0
SAMPLE: CLBCC354 TUBE #: ST-70A
ELEVATION: 1887.0'

GRAVEL	2.0 %
SAND	36.5 %
SILT	26.6 %
CLAY	34.9 %
P 200	61.5 %

SOIL PROPERTIES

LL: 44.0%
PL: 15.0%
PI: 29.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

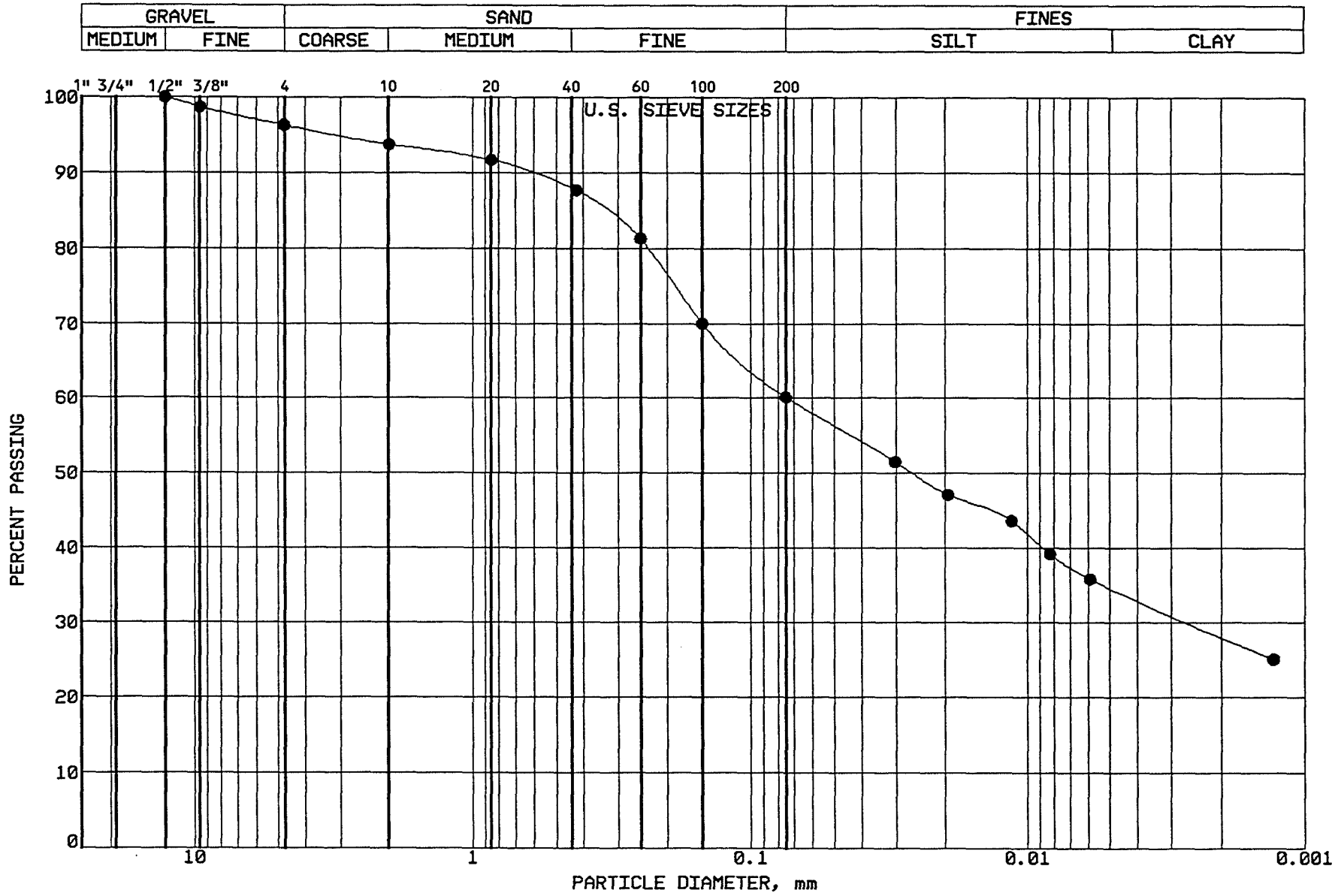
LOCATION: N 42969.0, E 43325.0
SAMPLE: CLBCC355 TUBE #: ST-71A
ELEVATION: 1885.7'

GRAVEL	2.1 %
SAND	36.0 %
SILT	27.1 %
CLAY	34.8 %
P 200	61.9 %

SOIL PROPERTIES

LL: 47.0%
PL: 16.0%
PI: 31.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42529.0, E 45680.0
SAMPLE: CLSCC356 TUBE #:
ELEVATION: 1900.2'

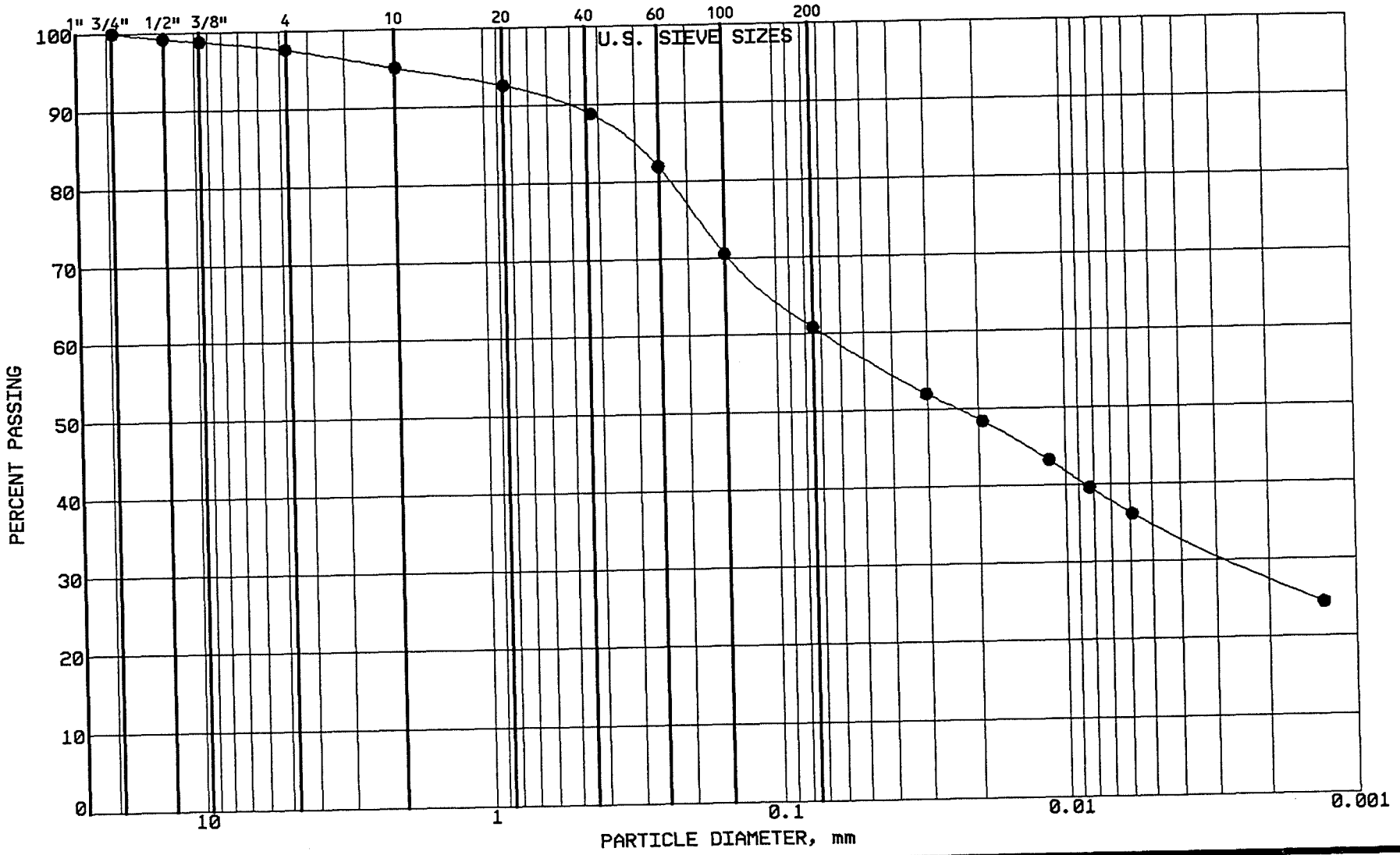
GRAVEL	3.7 %
SAND	36.2 %
SILT	25.5 %
CLAY	34.6 %
P 200	60.1 %

SOIL PROPERTIES

LL: 44.0%
PL: 15.0%
PI: 29.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

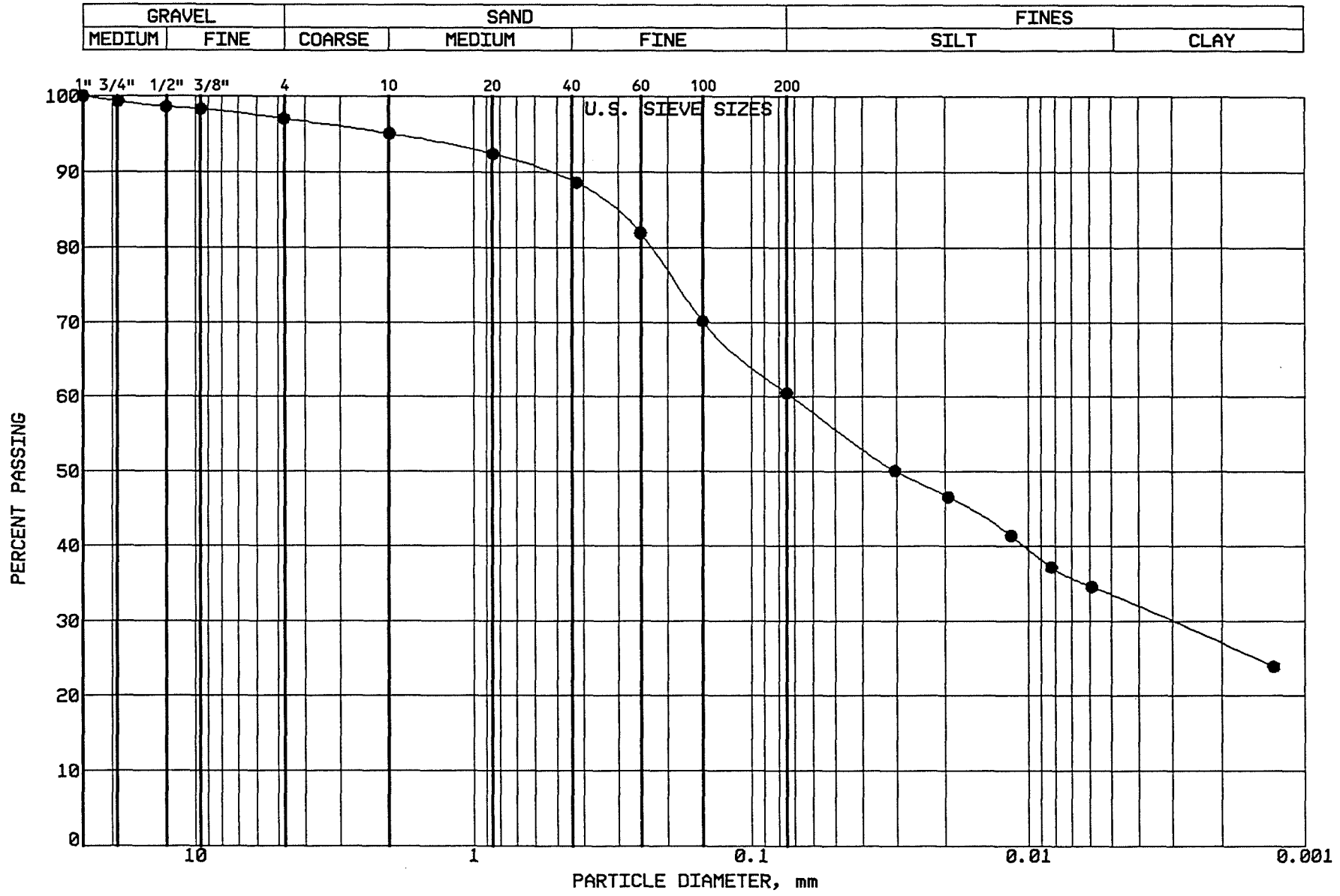
LOCATION: N 43482.0, E 45581.0
SAMPLE: CLSCC357 TUBE #:
ELEVATION: 1900.1'

GRAVEL	2.4 %
SAND	36.8 %
SILT	26.0 %
CLAY	34.8 %
P 200	60.8 %

SOIL PROPERTIES

LL: 44.0%
PL: 14.0%
PI: 30.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

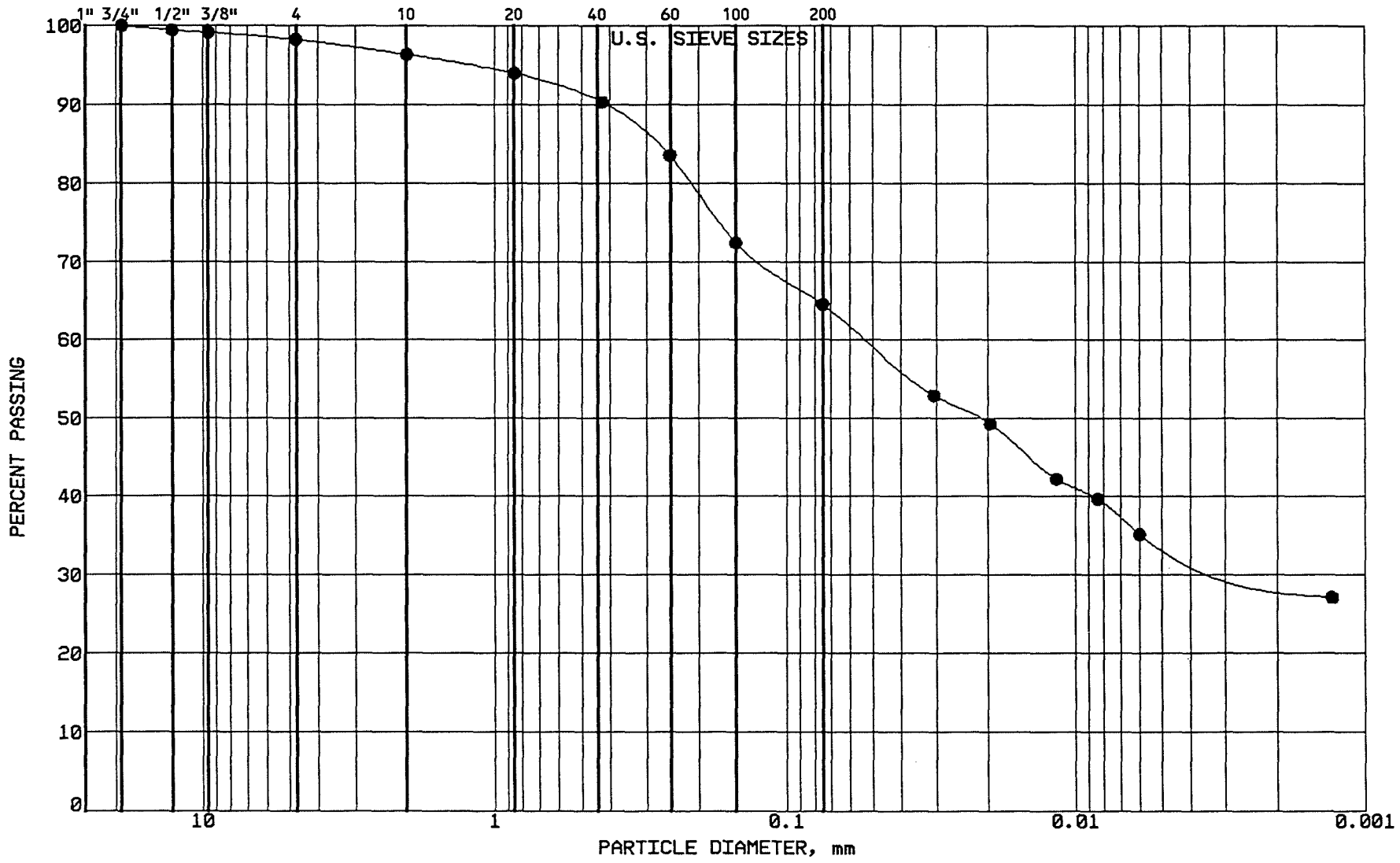
LOCATION: N 43144.0, E 43662.0
SAMPLE: SGCC358 TUBE #:
ELEVATION: 1884.3'

GRAVEL	3.0 %
SAND	36.5 %
SILT	27.2 %
CLAY	33.3 %
P 200	60.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

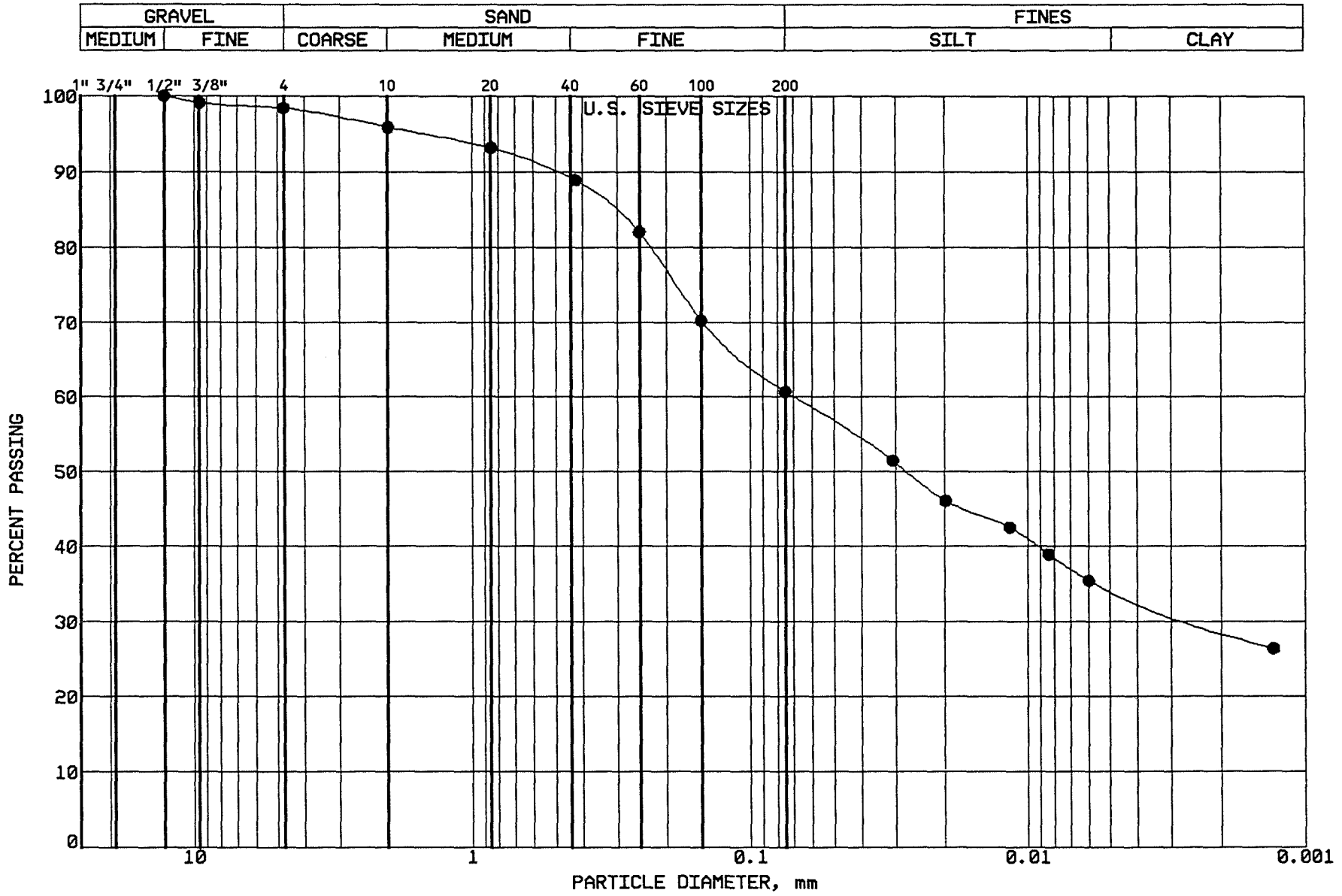
LOCATION: N 43005.0, E 43663.0
SAMPLE: SGCC359 TUBE #:
ELEVATION: 1882.7'

GRAVEL	1.8 %
SAND	33.7 %
SILT	30.4 %
CLAY	34.1 %
P 200	64.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

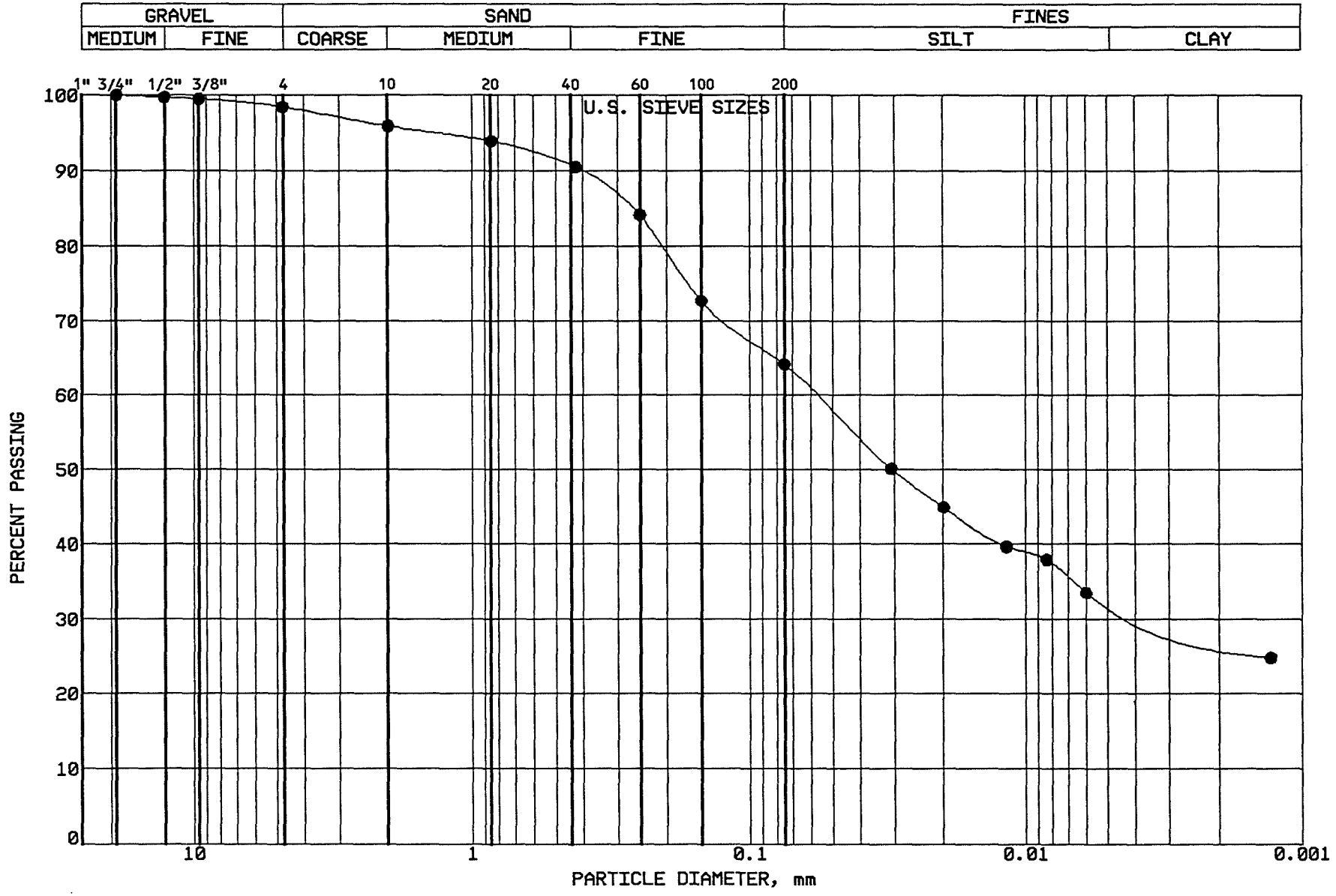
LOCATION: N 42835.0, E 43664.0
SAMPLE: SGCC360 TUBE #:
ELEVATION: 1882.4'

GRAVEL	1.6 %
SAND	37.7 %
SILT	26.4 %
CLAY	34.3 %
P 200	60.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

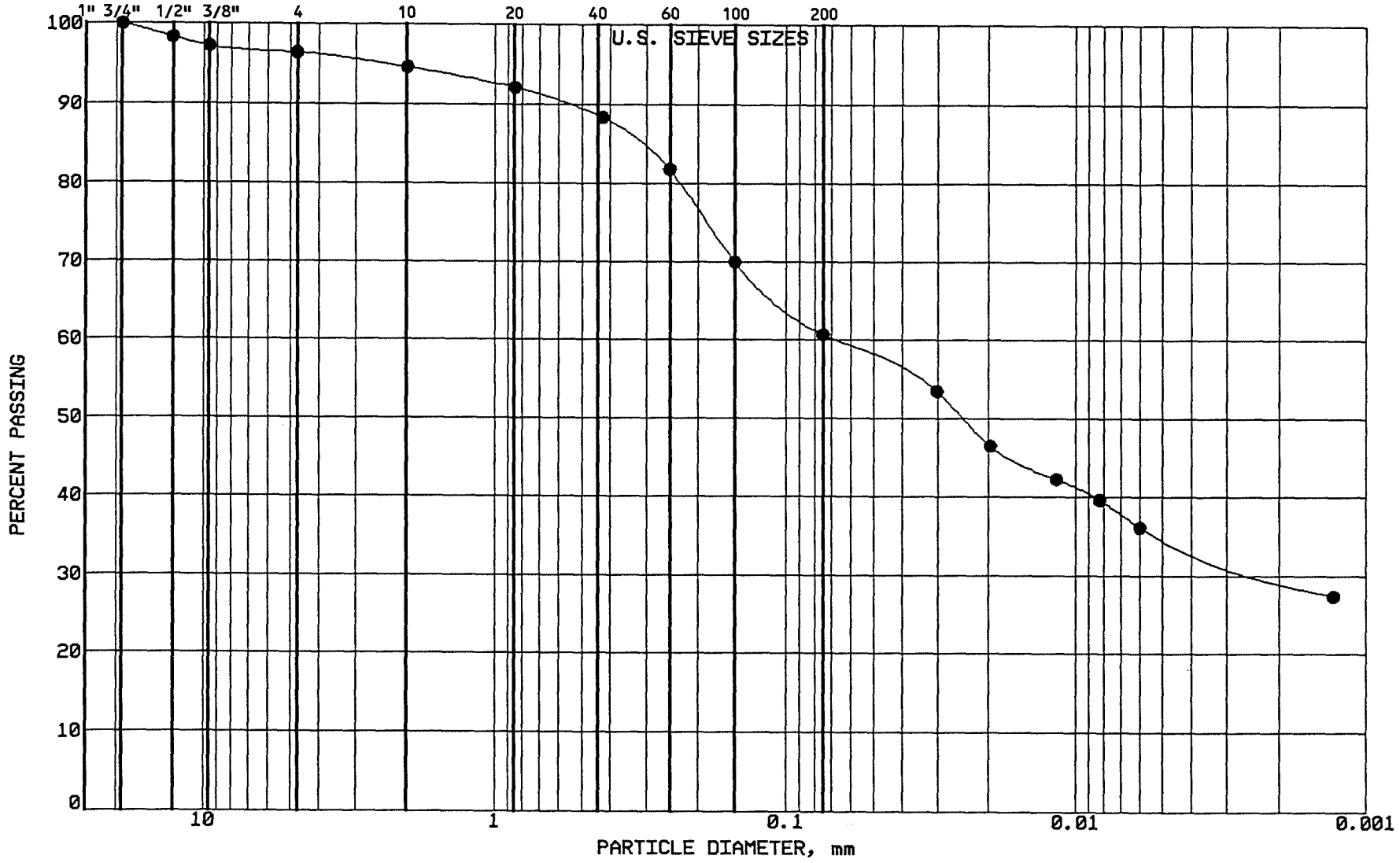
LOCATION: N 42653.0, E 43665.0
SAMPLE: SGCC361 TUBE #:
ELEVATION: 1880.2'

GRAVEL	1.6 %
SAND	34.3 %
SILT	31.6 %
CLAY	32.5 %
P 200	64.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

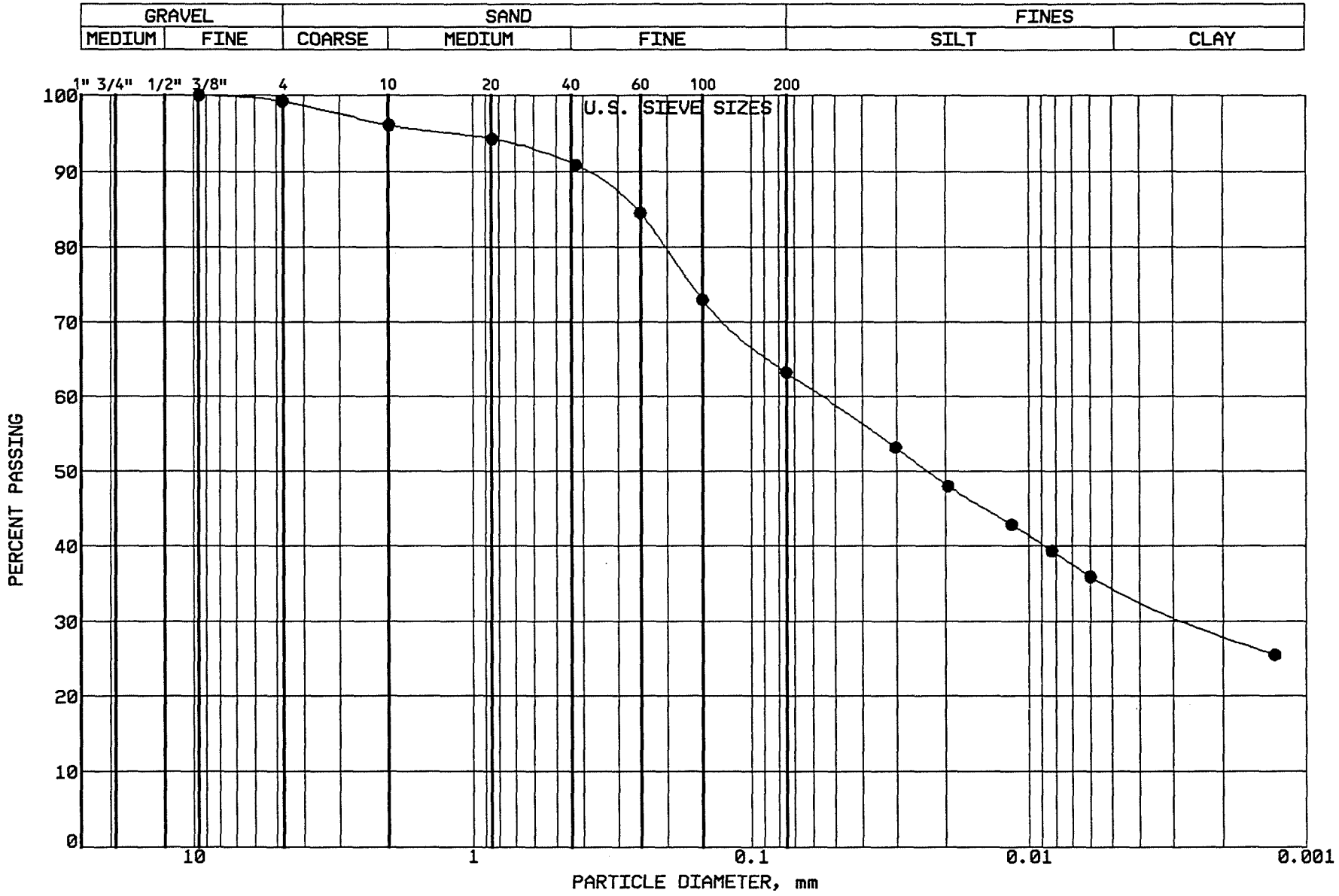
LOCATION: N 43390.0, E 43346.0
SAMPLE: CLBCC362 TUBE #: ST-72A
ELEVATION: 1889.0'

GRAVEL	3.6 %
SAND	35.7 %
SILT	25.6 %
CLAY	35.1 %
P 200	60.7 %

SOIL PROPERTIES

LL: 44.0%
PL: 14.0%
PI: 30.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

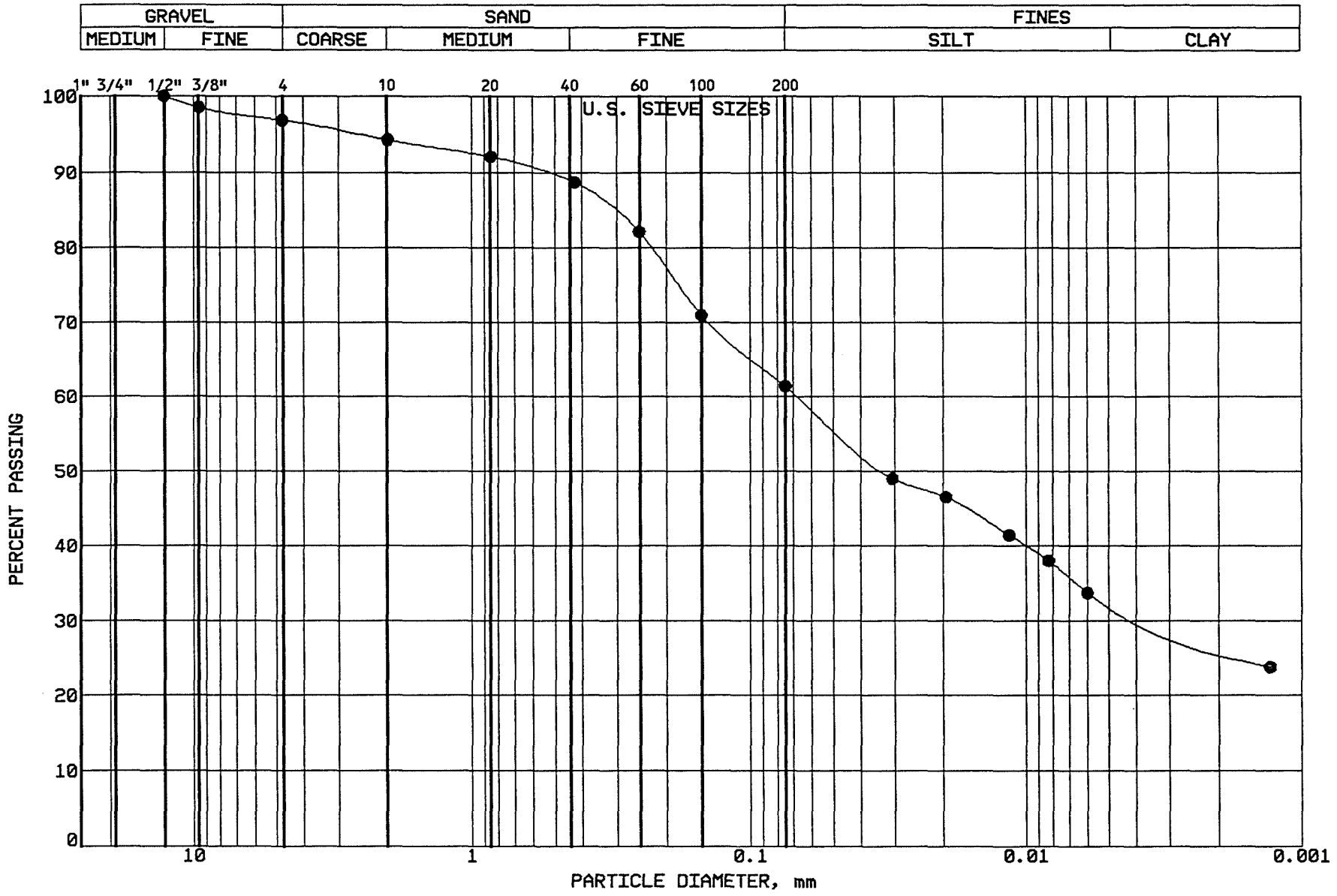
LOCATION: N 42898.0, E 43352.0
SAMPLE: CLBCC363 TUBE #: ST-73A
ELEVATION: 1885.4'

GRAVEL	0.8 %
SAND	36.0 %
SILT	28.5 %
CLAY	34.7 %
P 200	63.2 %

SOIL PROPERTIES

LL: 45.0%
PL: 13.0%
PI: 32.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42638.0, E 43364.0
SAMPLE: CLBCC364 TUBE #: ST-74A
ELEVATION: 1883.7'

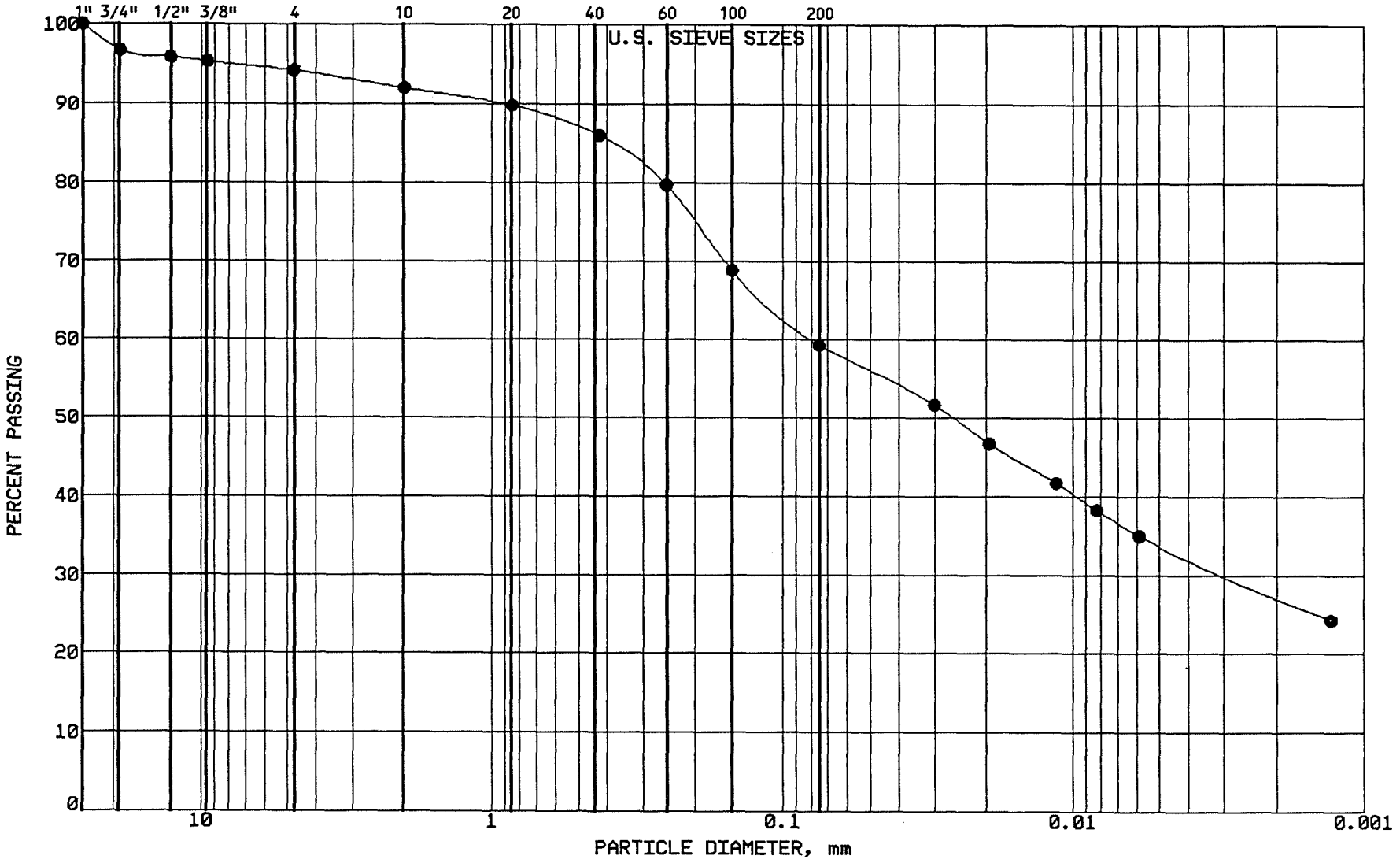
GRAVEL	3.2 %
SAND	35.4 %
SILT	28.9 %
CLAY	32.5 %
P 200	61.4 %

SOIL PROPERTIES

LL: 46.0%
PL: 16.0%
PI: 30.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42639.0, E 43182.0
SAMPLE: CLBCC365 TUBE #: ST-75A
ELEVATION: 1883.7'

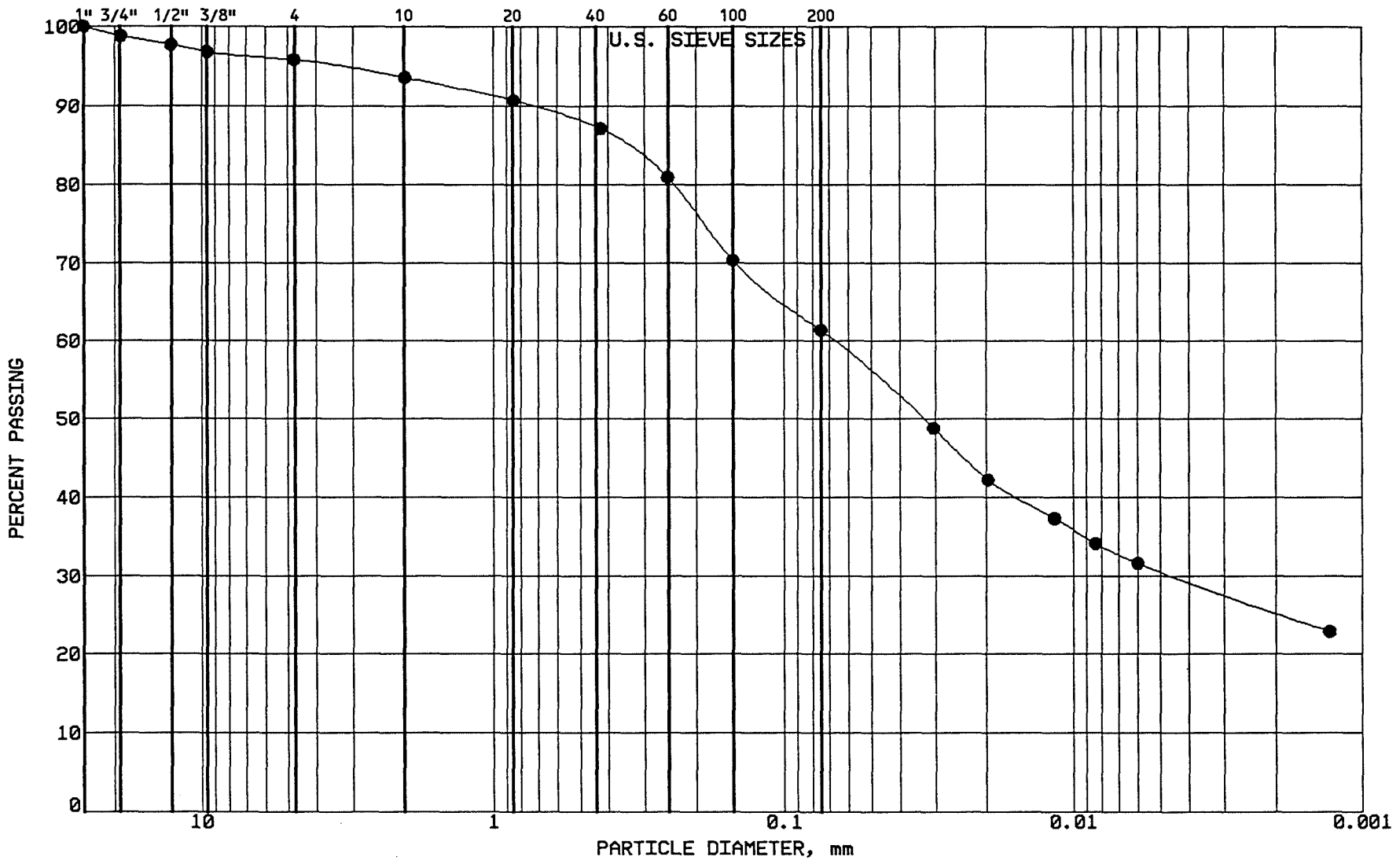
GRAVEL	5.8 %
SAND	34.9 %
SILT	25.5 %
CLAY	33.8 %
P 200	59.3 %

SOIL PROPERTIES

LL: 44.0%
PL: 16.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

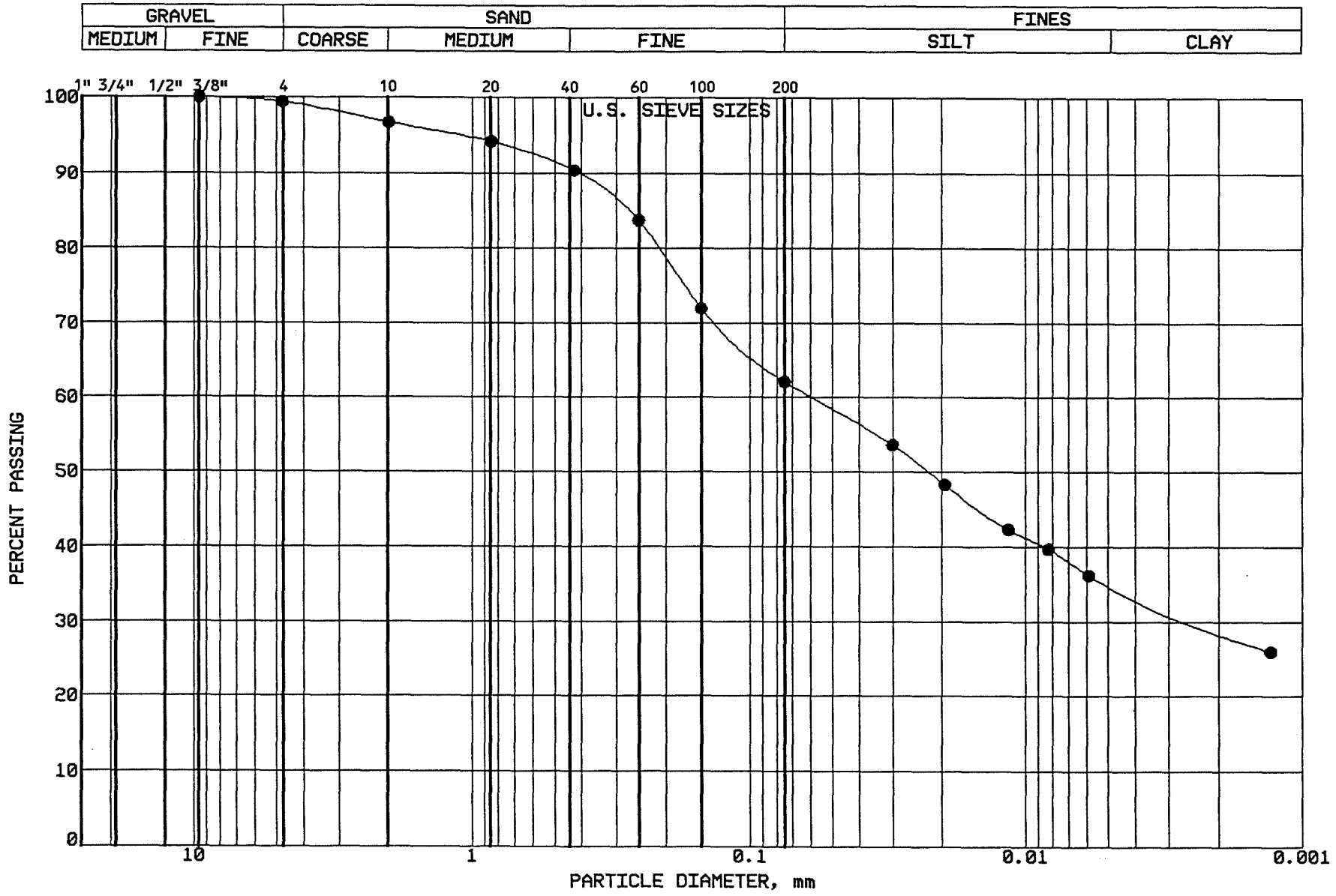
LOCATION: N 42886.0, E 43175.0
SAMPLE: CLBCC366 TUBE #: ST-76A
ELEVATION: 1885.9'

GRAVEL	4.2 %
SAND	34.4 %
SILT	30.8 %
CLAY	30.6 %
P 200	61.4 %

SOIL PROPERTIES

LL: 43.0%
PL: 16.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

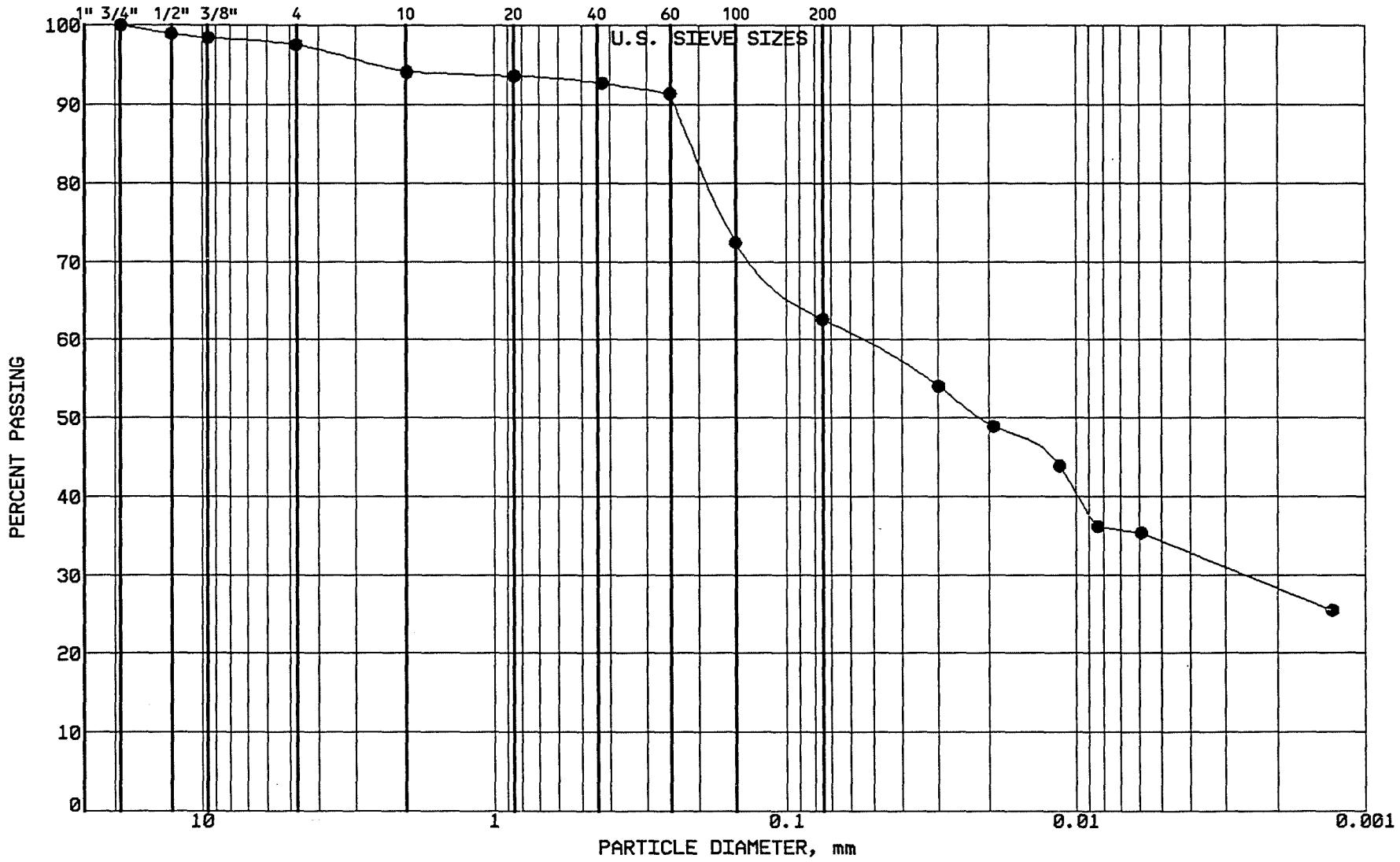
LOCATION: N 43390.0, E 43164.0
SAMPLE: CLBCC367 TUBE #: ST-77A
ELEVATION: 1889.1'

GRAVEL	0.6 %
SAND	37.3 %
SILT	27.0 %
CLAY	35.1 %
P 200	62.1 %

SOIL PROPERTIES

LL: 44.0%
PL: 16.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43150.0, E 43714.0
SAMPLE: SGCC368 TUBE #:
ELEVATION: 1885.4'

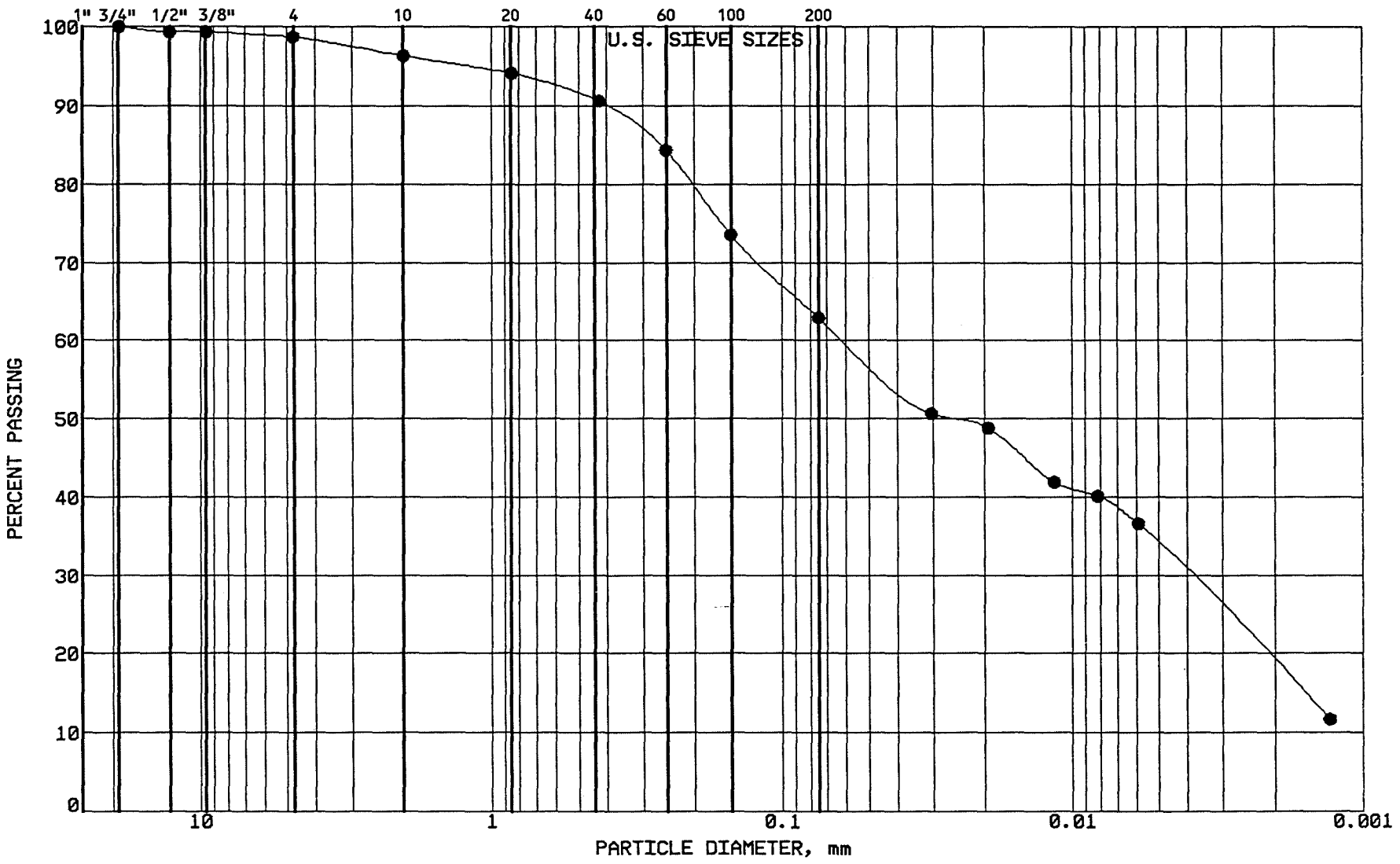
GRAVEL	2.5 %
SAND	34.9 %
SILT	28.3 %
CLAY	34.3 %
P 200	62.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

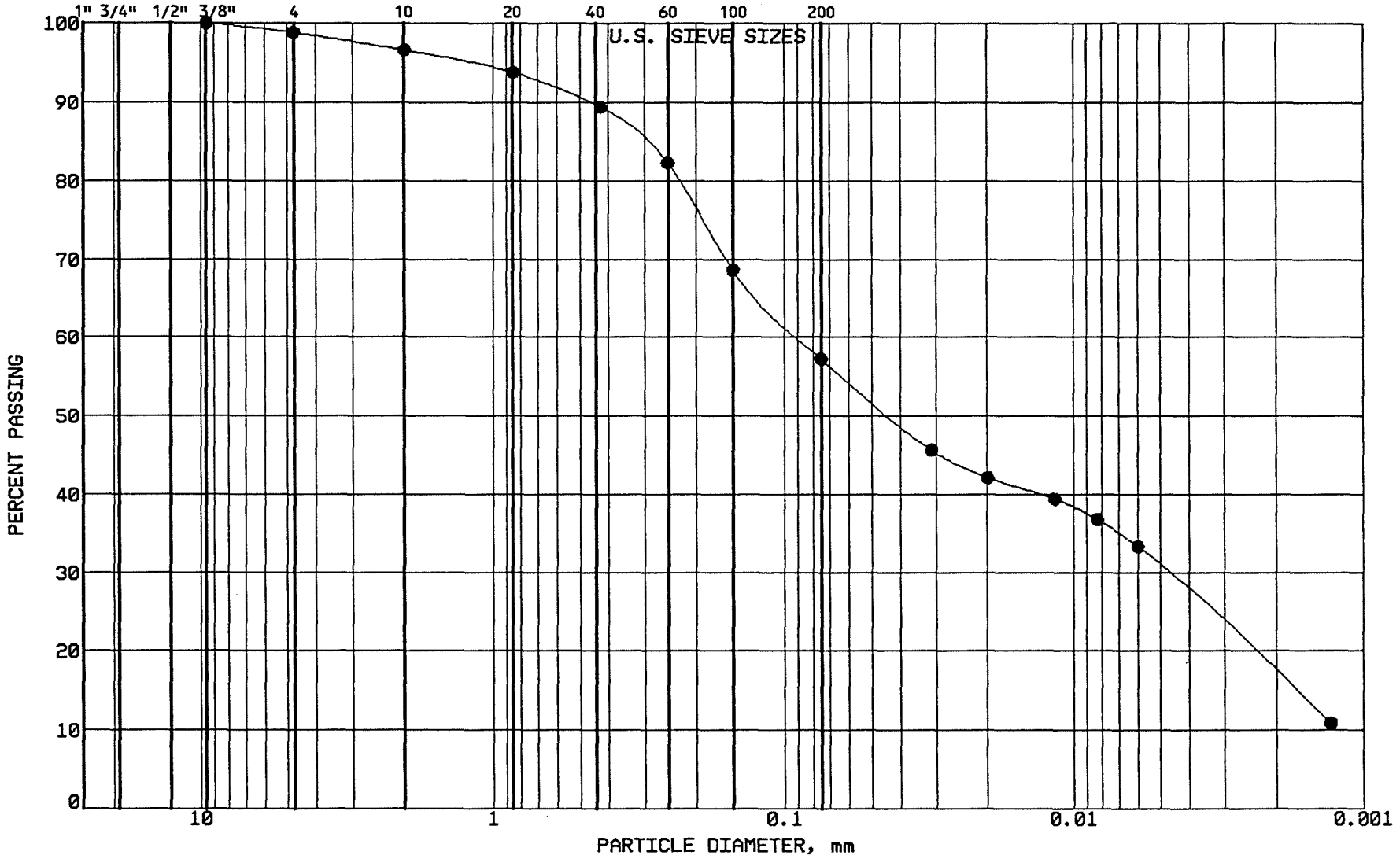
LOCATION: N 42968.0, E 43712.0
SAMPLE: SGCC369 TUBE #:
ELEVATION: 1884.1'

GRAVEL	1.3 %
SAND	35.8 %
SILT	29.0 %
CLAY	33.9 %
P 200	62.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

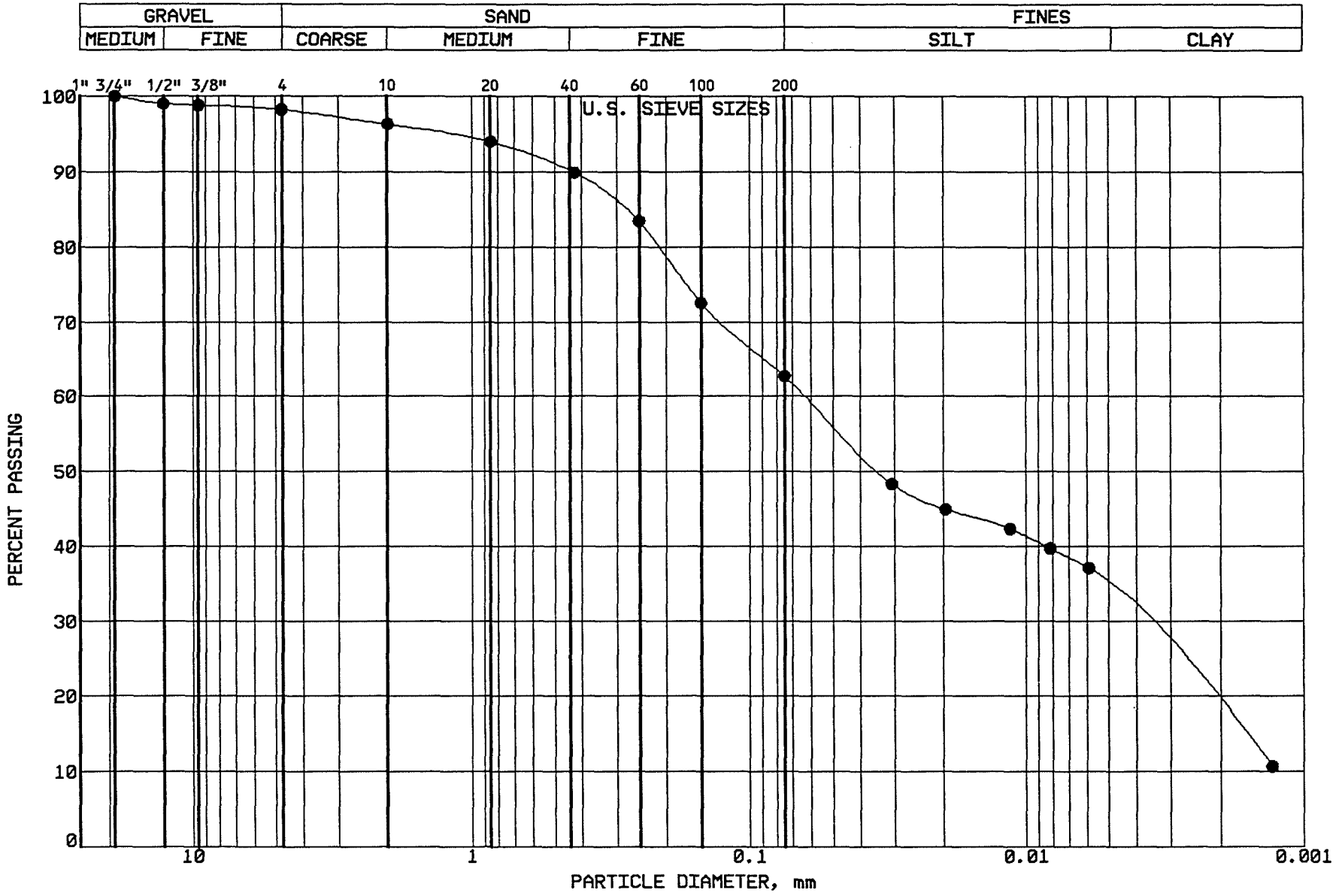
LOCATION: N 42789.0, E 43709.0
SAMPLE: SGCC370 TUBE #:
ELEVATION: 1882.9'

GRAVEL	1.2 %
SAND	41.6 %
SILT	26.6 %
CLAY	30.6 %
P 200	57.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42621.0, E 43708.0
SAMPLE: SGCC371 TUBE #:
ELEVATION: 1881.5'

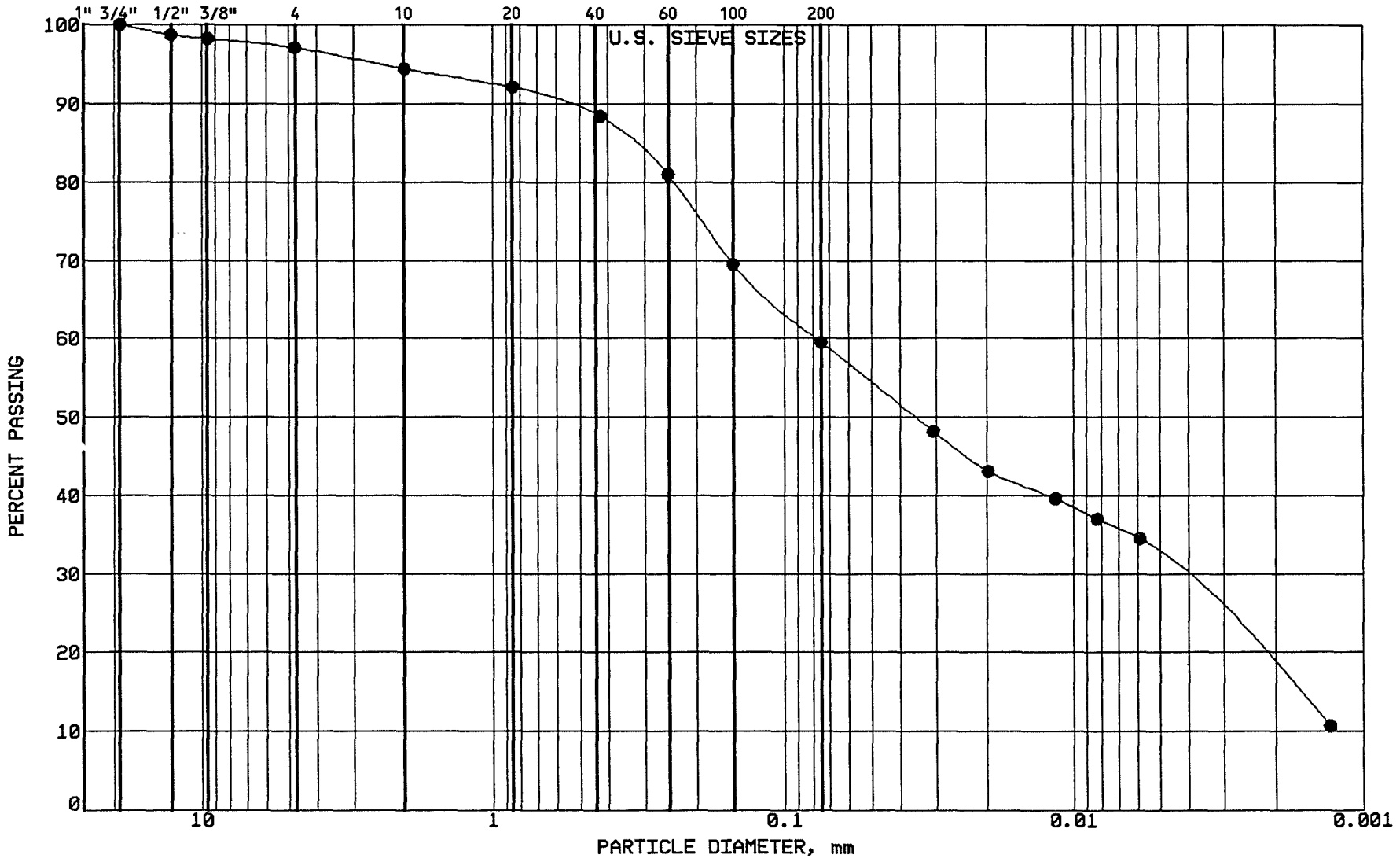
GRAVEL	1.8 %
SAND	35.5 %
SILT	28.5 %
CLAY	34.2 %
P 200	62.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

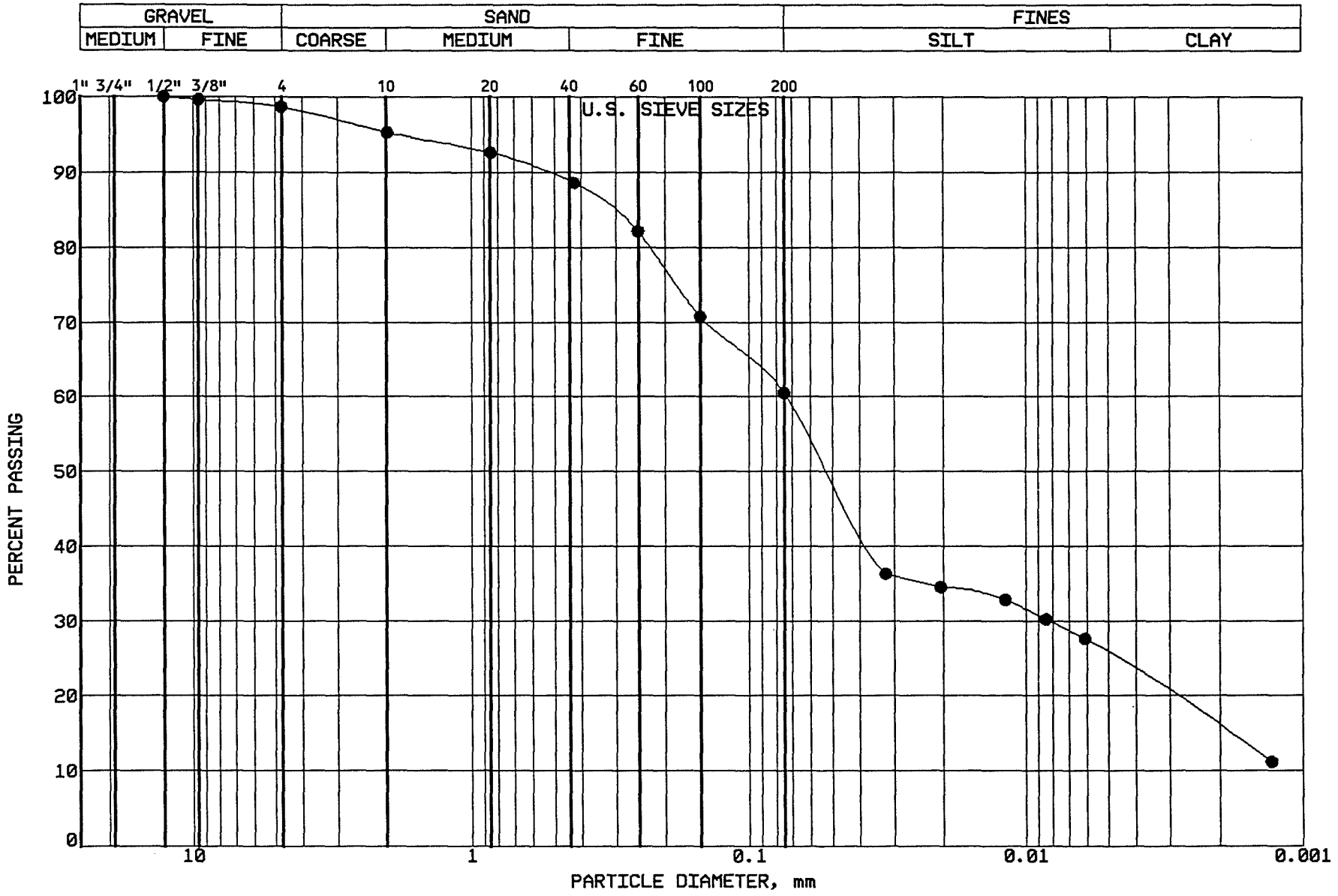
LOCATION: N 43421.0, E 43132.0
SAMPLE: CLBCC372 TUBE #: ST-78A
ELEVATION: 1890.2'

GRAVEL	2.9 %
SAND	37.6 %
SILT	27.6 %
CLAY	31.9 %
P 200	59.5 %

SOIL PROPERTIES

LL: 44.0%
PL: 18.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

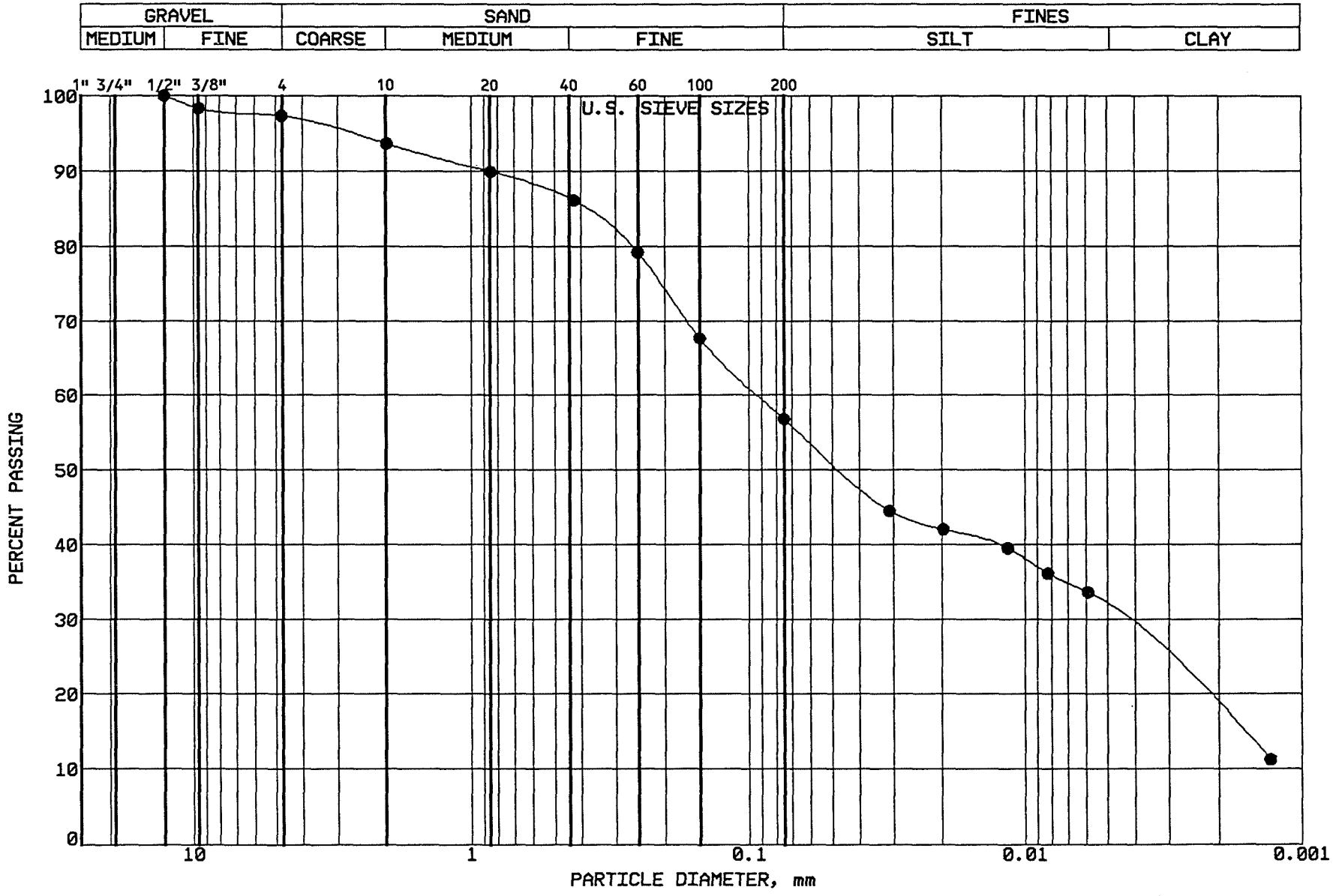
LOCATION: N 43218.0, E 43138.0
SAMPLE: CLBCC373 TUBE #: ST-79A
ELEVATION: 1888.2'

GRAVEL	1.3 %
SAND	38.2 %
SILT	35.0 %
CLAY	25.5 %
P 200	60.5 %

SOIL PROPERTIES

LL: 43.0%
PL: 15.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

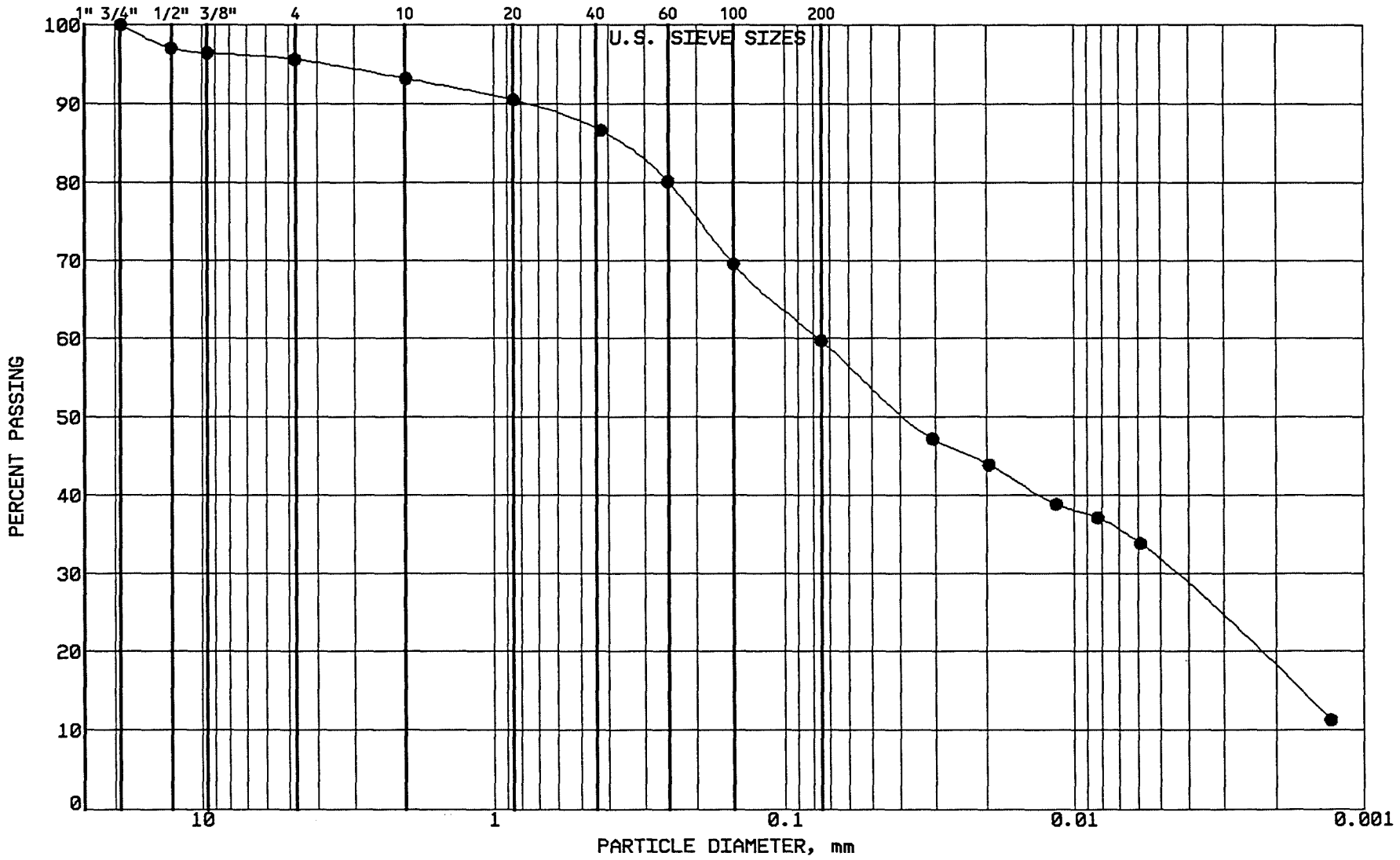
LOCATION: N 43014.0, E 43143.0
SAMPLE: CLBCC374 TUBE #: ST-80A
ELEVATION: 1886.9'

GRAVEL	2.7 %
SAND	40.5 %
SILT	25.6 %
CLAY	31.2 %
P 200	56.8 %

SOIL PROPERTIES

LL: 43.0%
PL: 16.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

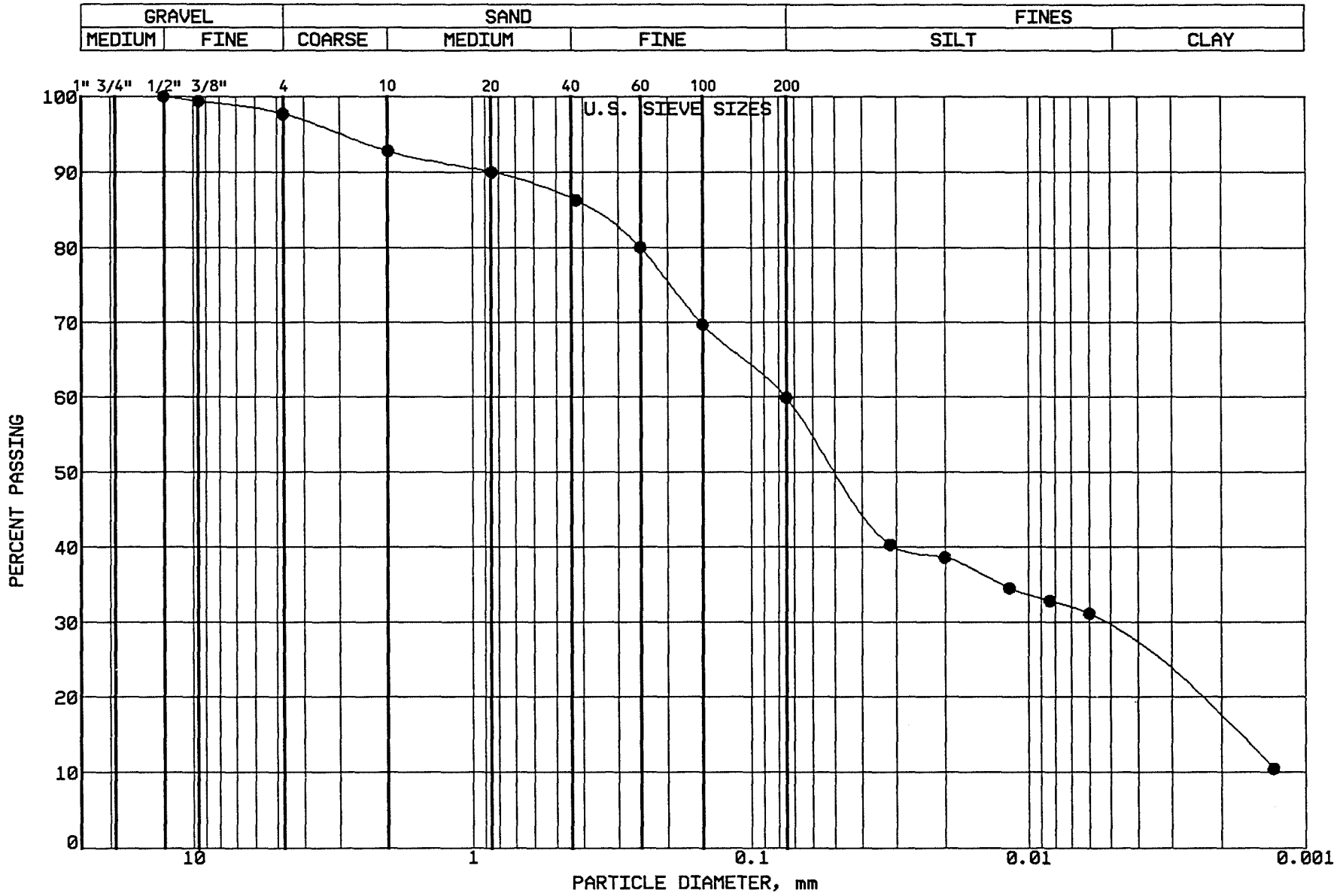
LOCATION: N 43012.0, E 43274.0
SAMPLE: CLBCC375 TUBE #: ST-81A
ELEVATION: 1887.1'

GRAVEL	4.4 %
SAND	35.9 %
SILT	28.4 %
CLAY	31.3 %
P 200	59.7 %

SOIL PROPERTIES

LL: 43.0%
PL: 15.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

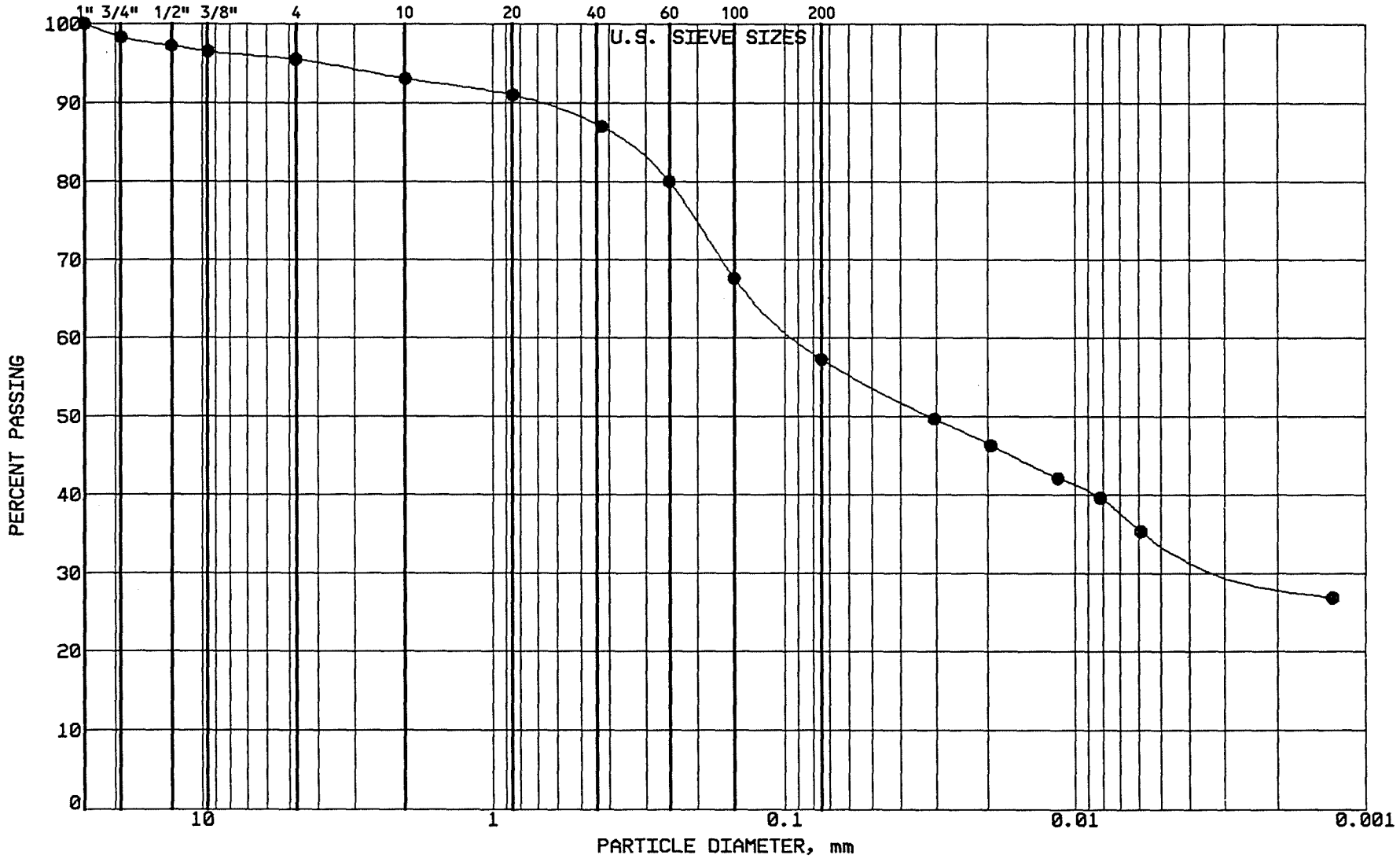
LOCATION: N 43219.0, E 43271.0
SAMPLE: CLBCC376 TUBE #: ST-82A
ELEVATION: 1888.5'

GRAVEL	2.3 %
SAND	37.8 %
SILT	31.3 %
CLAY	28.6 %
P 200	59.9 %

SOIL PROPERTIES

LL: 44.0%
PL: 16.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

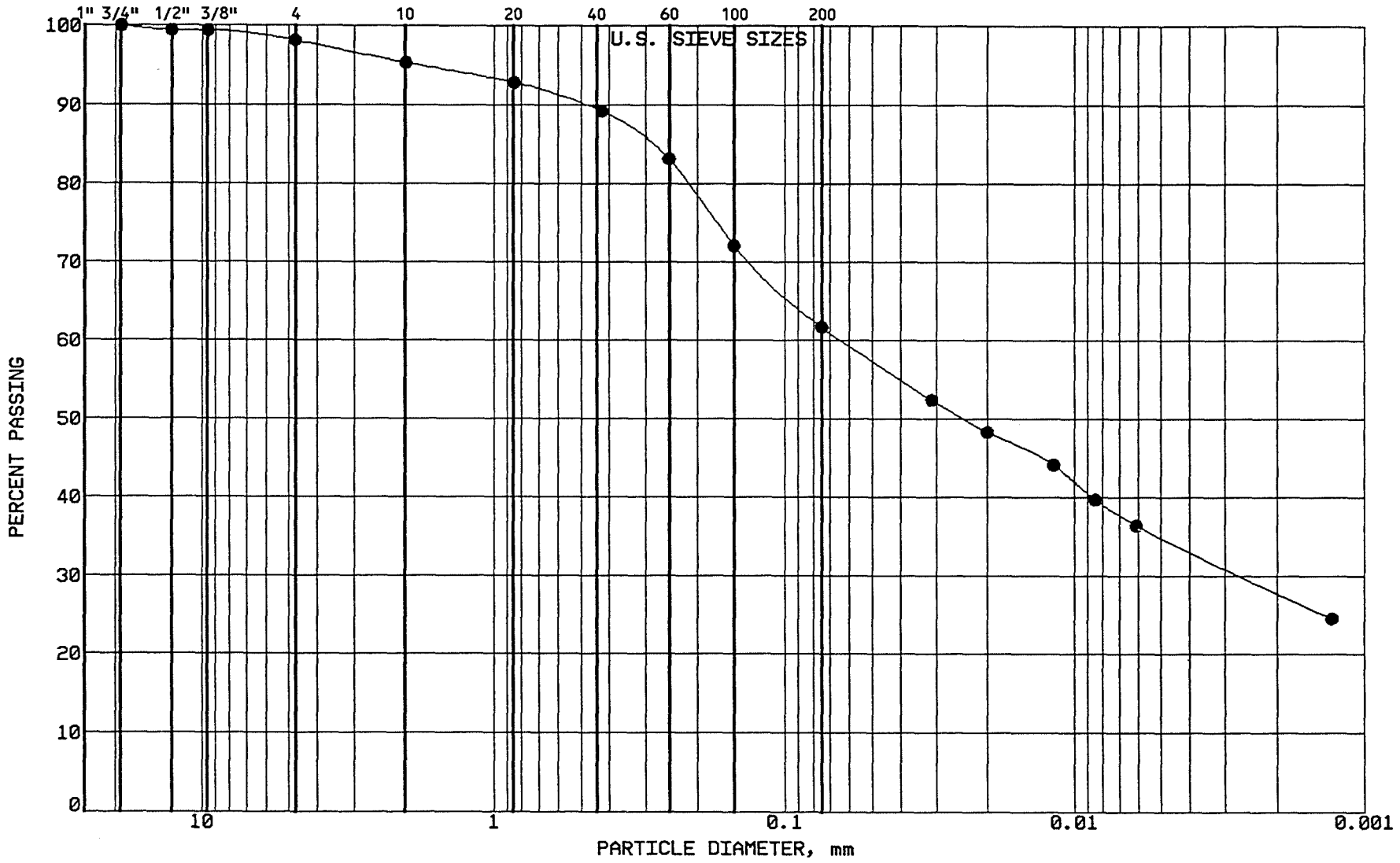
LOCATION: N 43416.0, E 43265.0
SAMPLE: CLBCC377 TUBE #: ST-83A
ELEVATION: 1890.0'

GRAVEL	4.5 %
SAND	38.2 %
SILT	22.9 %
CLAY	34.4 %
P 200	57.3 %

SOIL PROPERTIES

LL: 42.0%
PL: 15.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

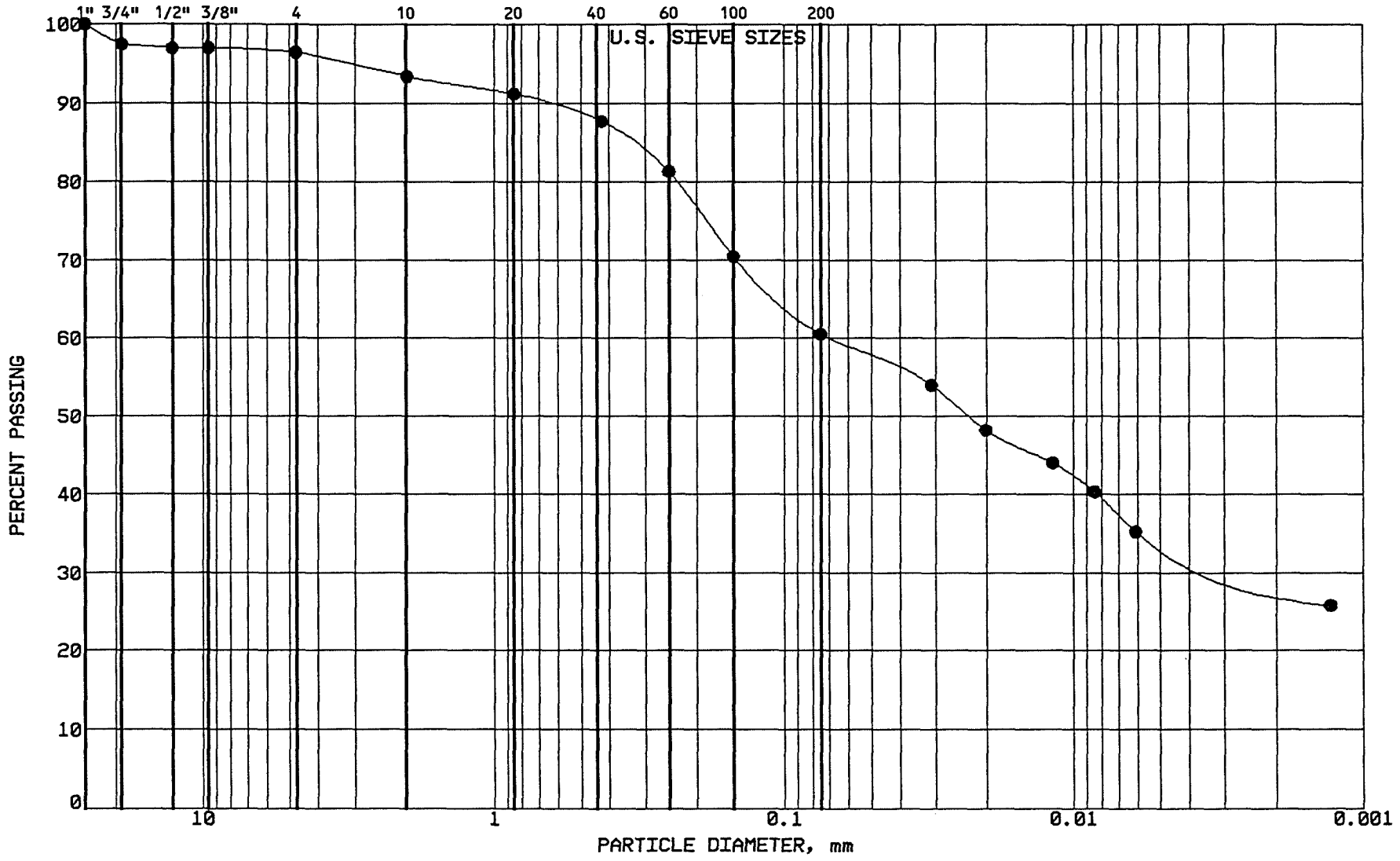
LOCATION: N 43416.0, E 43440.0
SAMPLE: CLBCC378 TUBE #: ST-84A
ELEVATION: 1890.0'

GRAVEL	1.9 %
SAND	36.4 %
SILT	26.8 %
CLAY	34.9 %
P 200	61.7 %

SOIL PROPERTIES

LL: 45.0%
PL: 16.0%
PI: 29.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43210.0, E 43443.0
SAMPLE: CLBCC379 TUBE #: ST-85A
ELEVATION: 1887.8'

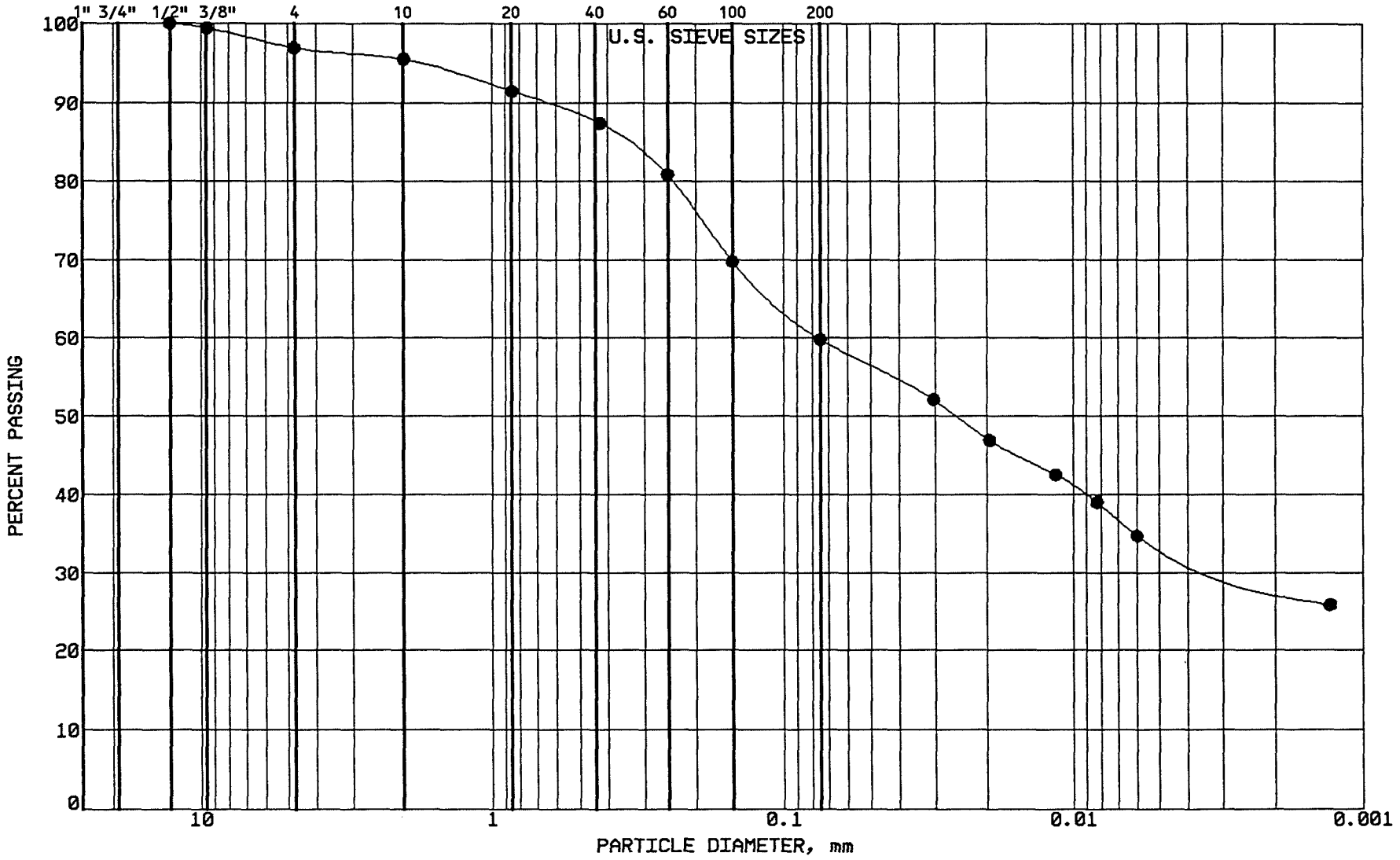
GRAVEL	3.6 %
SAND	35.9 %
SILT	26.5 %
CLAY	34.0 %
P 200	60.5 %

SOIL PROPERTIES

LL: 43.0%
PL: 15.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43016.0, E 43445.0
SAMPLE: CLBCC380 TUBE #: ST-86A
ELEVATION: 1887.0'

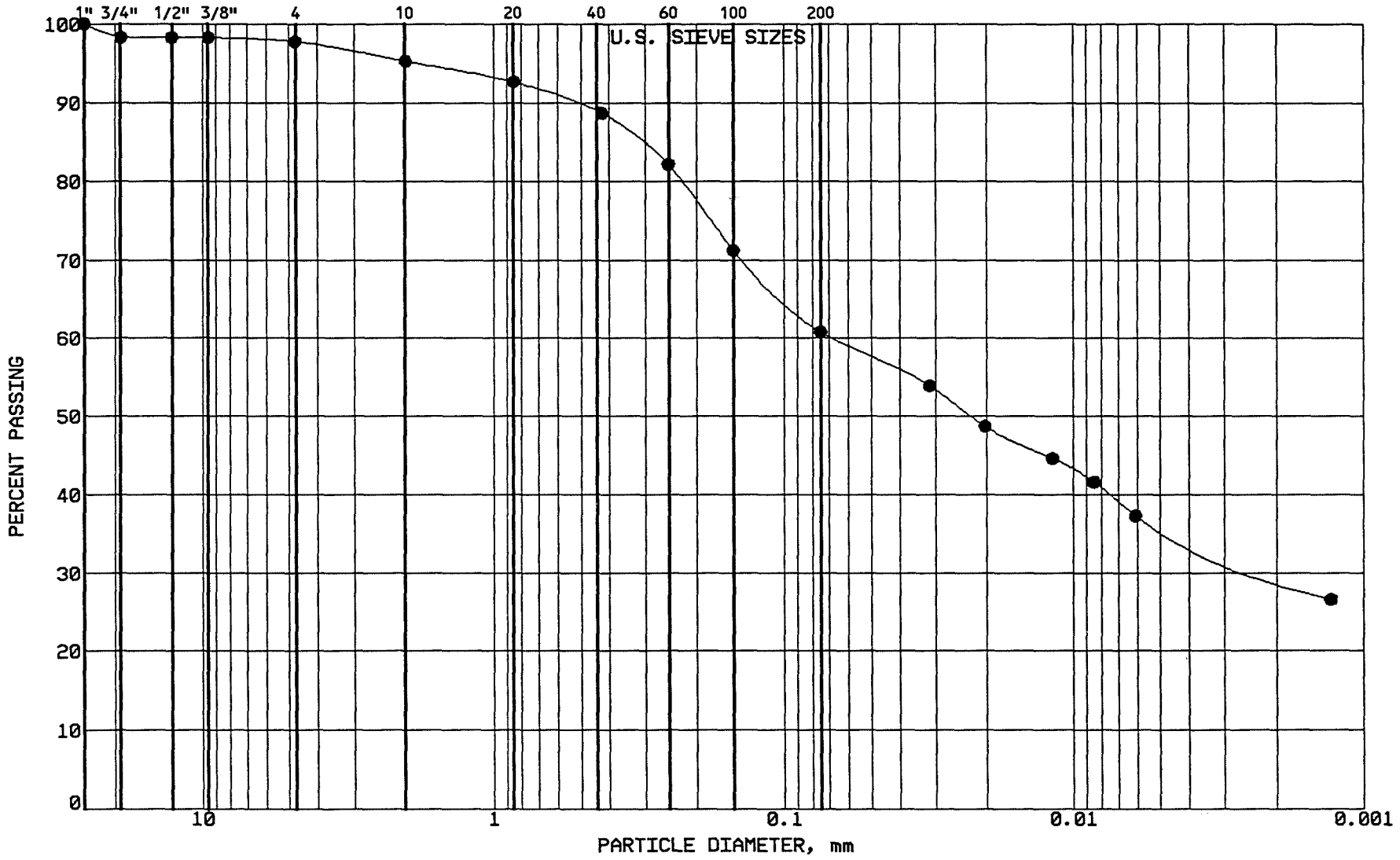
GRAVEL	3.1 %
SAND	37.1 %
SILT	26.1 %
CLAY	33.7 %
P 200	59.8 %

SOIL PROPERTIES

LL: 45.0%
PL: 15.0%
PI: 30.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43158.0, E 43964.0
SAMPLE: SGCC381 TUBE #:
ELEVATION: 1885.1'

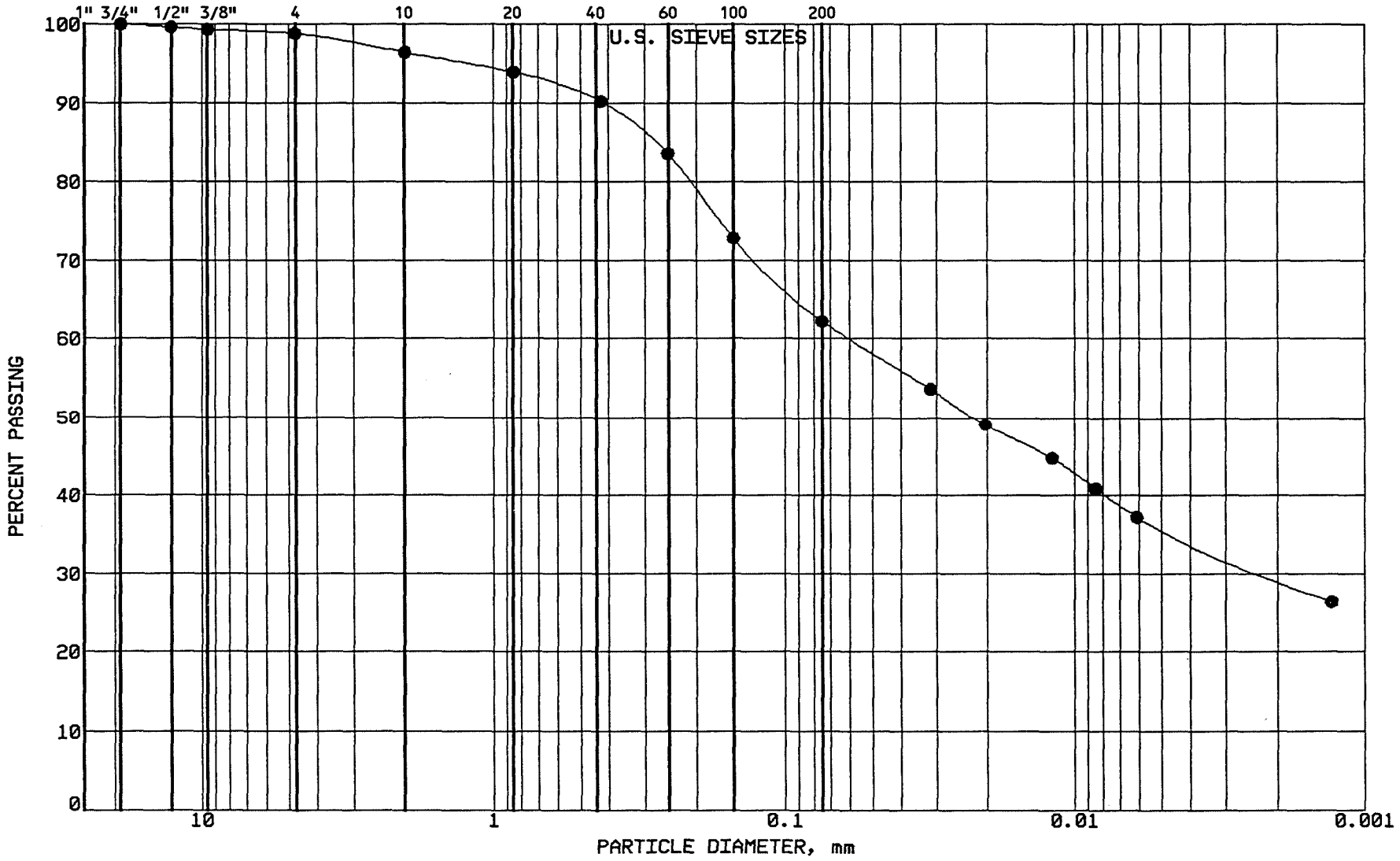
GRAVEL	2.2 %
SAND	37.0 %
SILT	24.9 %
CLAY	35.9 %
P 200	60.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42965.0, E 43957.0
SAMPLE: SGCC382 TUBE #:
ELEVATION: 1883.8'

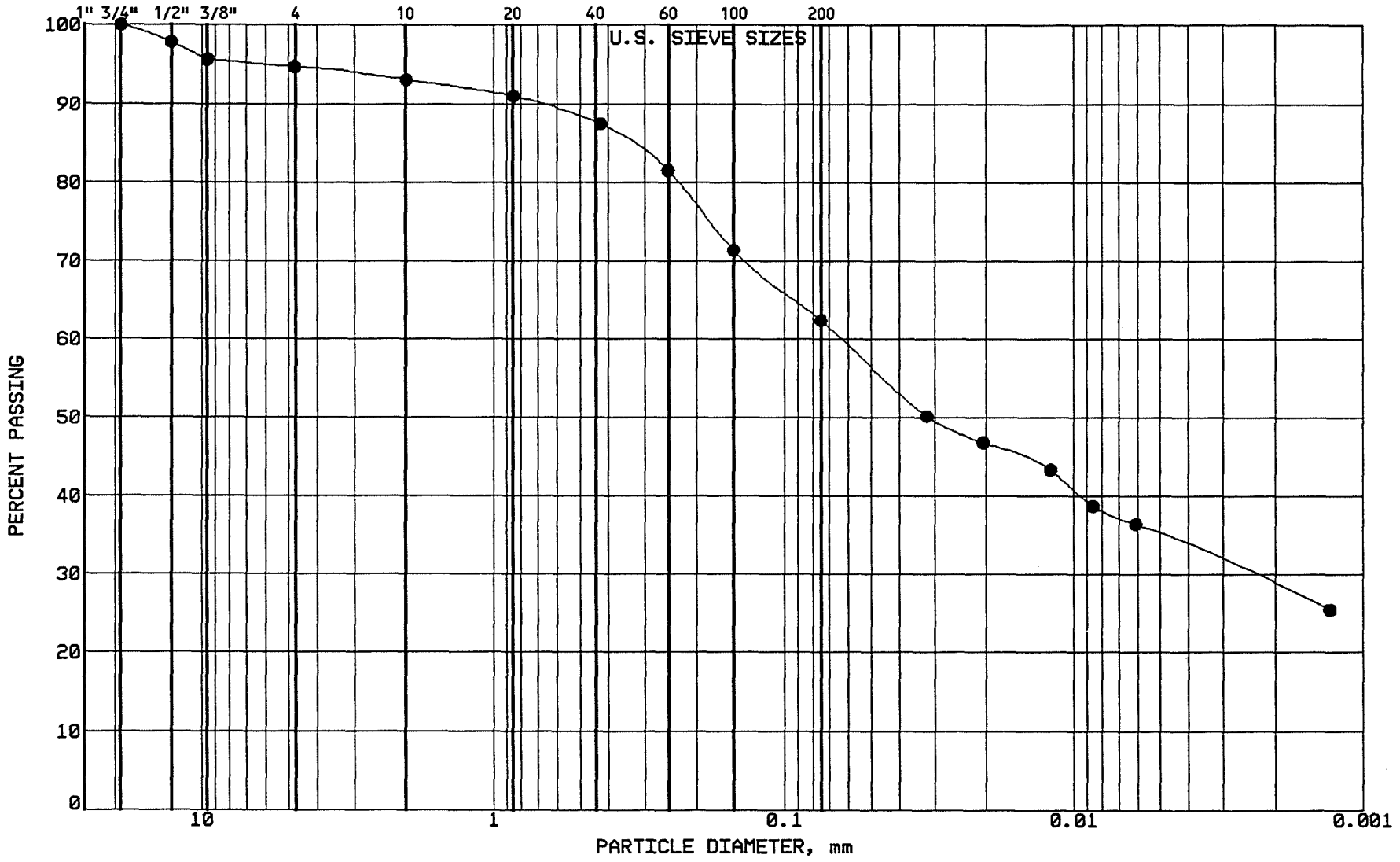
GRAVEL	1.2 %
SAND	36.6 %
SILT	26.4 %
CLAY	35.8 %
P 200	62.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

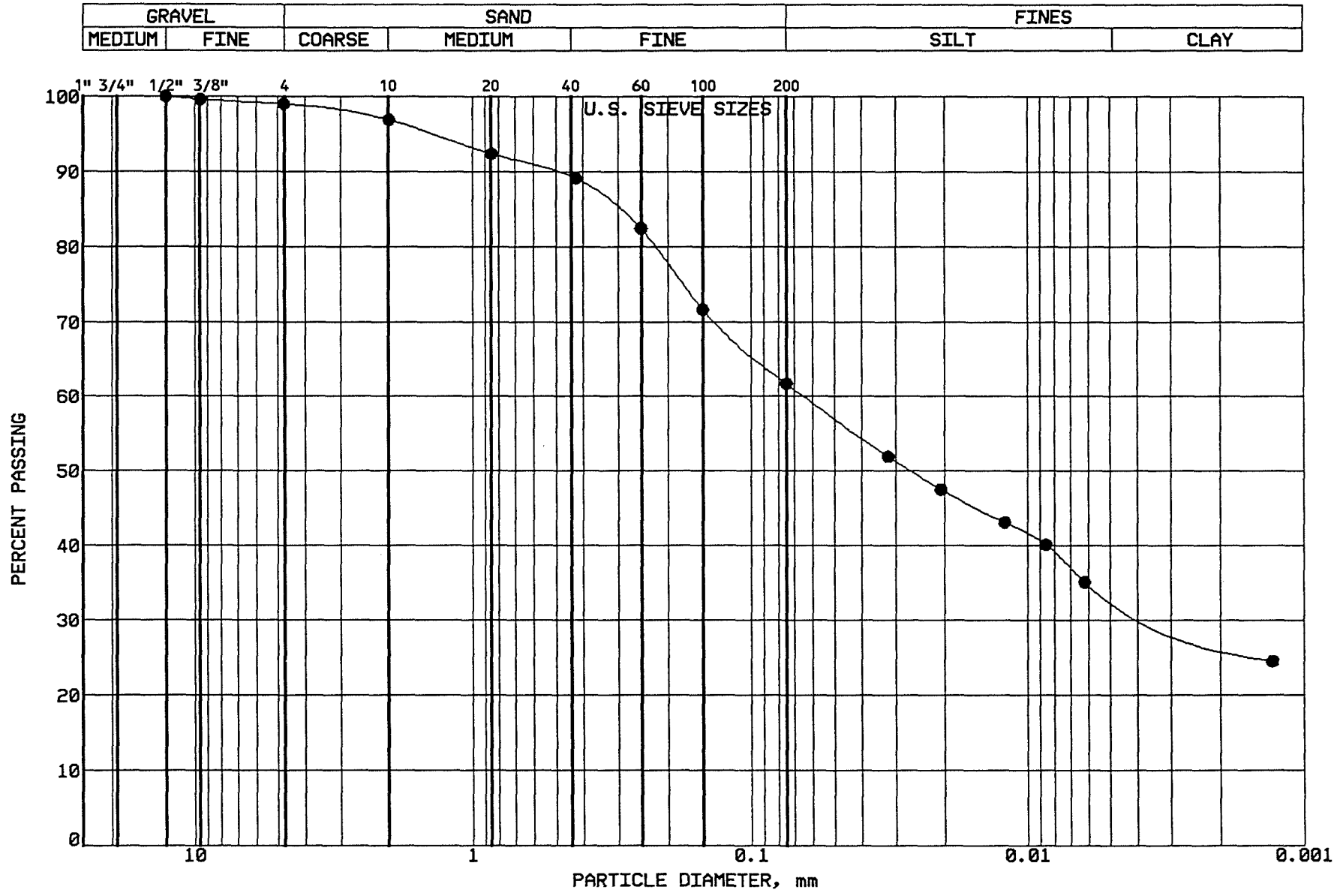
LOCATION: N 42737.0, E 43947.0
SAMPLE: SGCC383 TUBE #:
ELEVATION: 1882.3'

GRAVEL	5.3 %
SAND	32.3 %
SILT	27.4 %
CLAY	35.0 %
P 200	62.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

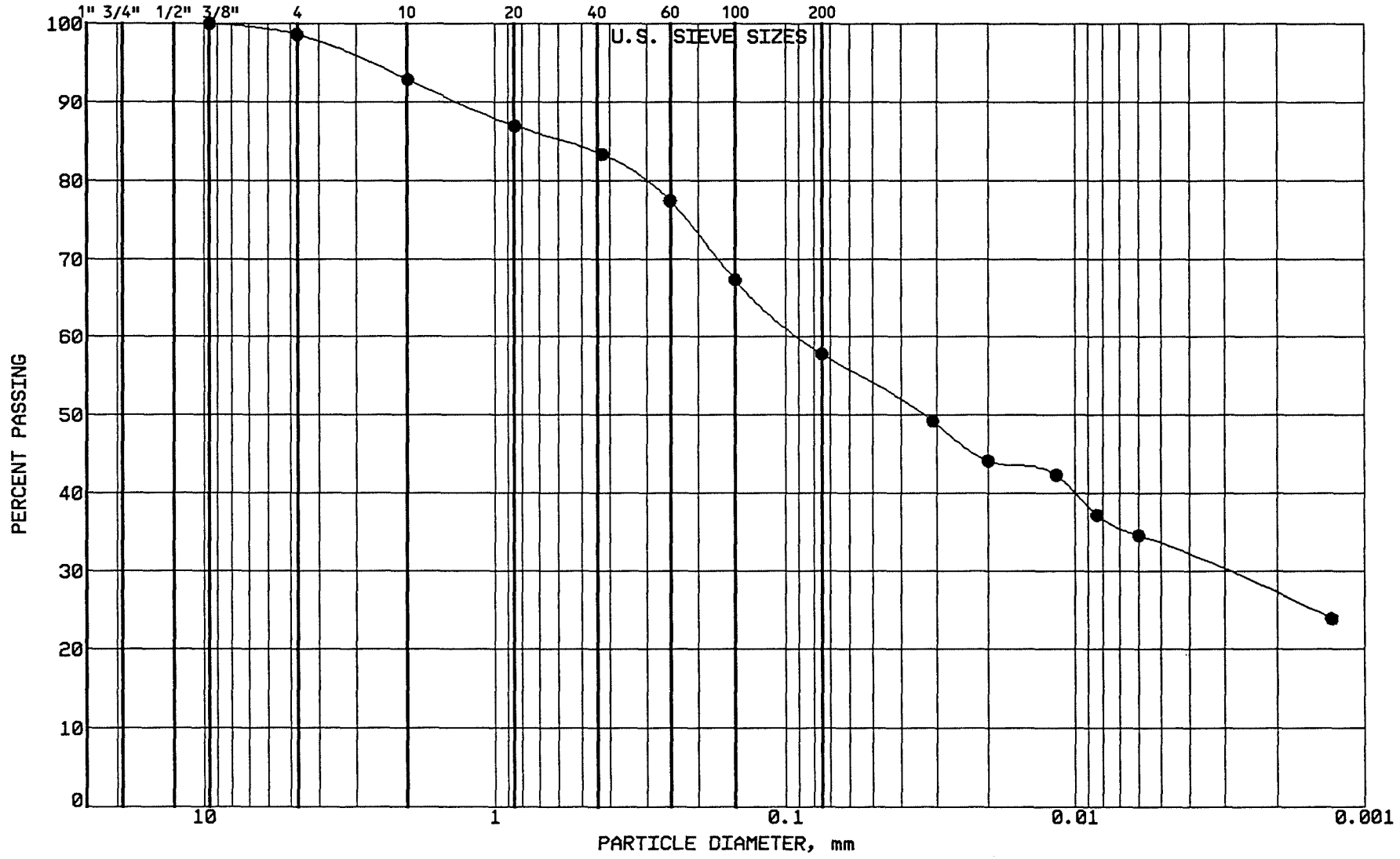
LOCATION: N 42898.0, E 43135.0
SAMPLE: CLBCC384 TUBE #: ST-87A
ELEVATION: 1886.7'

GRAVEL	1.0 %
SAND	37.3 %
SILT	28.1 %
CLAY	33.6 %
P 200	61.7 %

SOIL PROPERTIES

LL: 45.0%
PL: 15.0%
PI: 30.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

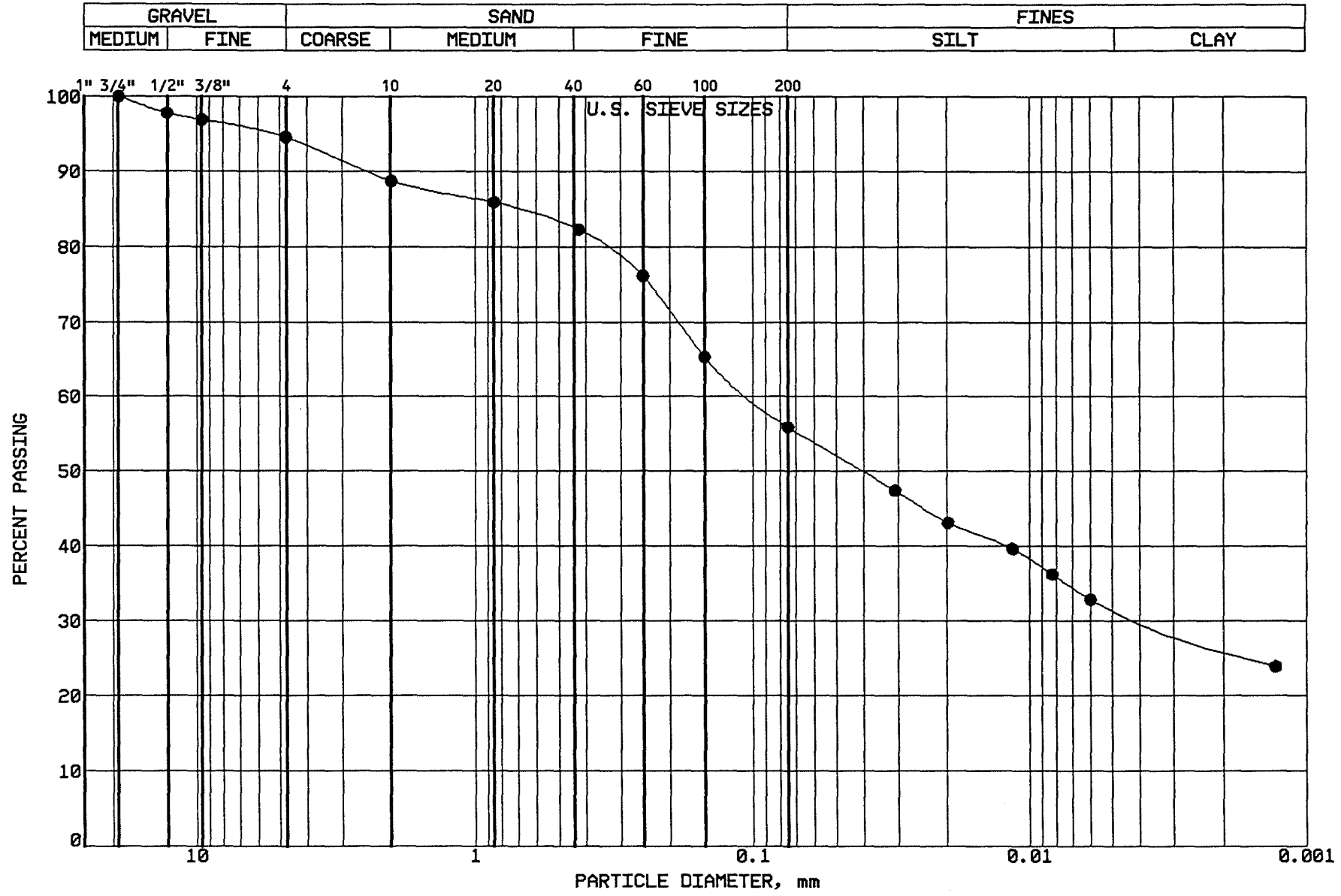
LOCATION: N 42647.0, E 43139.0
SAMPLE: CLBCC385 TUBE #: ST-88A
ELEVATION: 1885.3'

GRAVEL	1.4 %
SAND	40.8 %
SILT	24.5 %
CLAY	33.3 %
P 200	57.8 %

SOIL PROPERTIES

LL: 44.0%
PL: 16.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

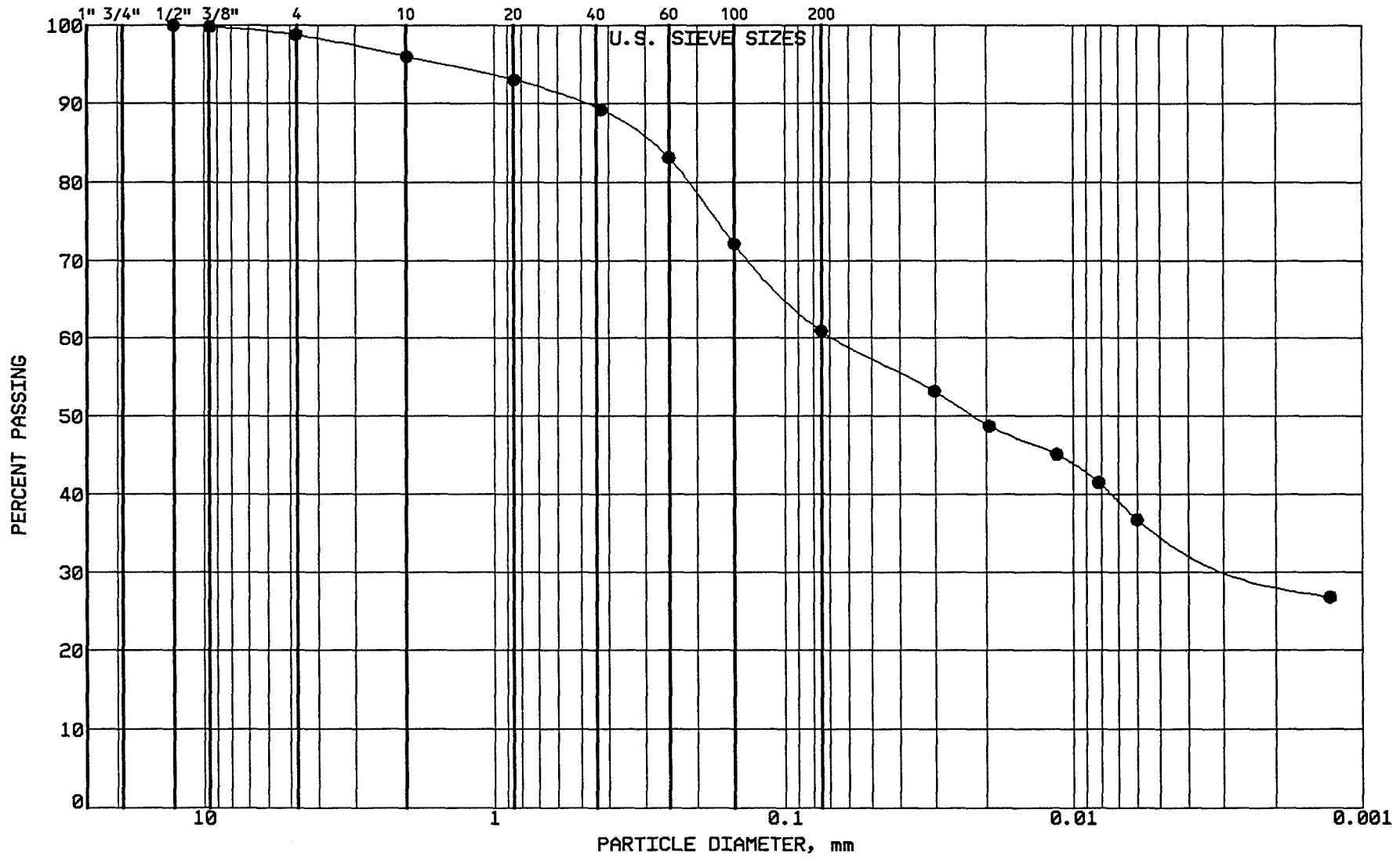
LOCATION: N 42799.0, E 43230.0
SAMPLE: CLBCC386 TUBE #: ST-89B
ELEVATION: 1887.2'

GRAVEL	5.4 %
SAND	38.7 %
SILT	24.2 %
CLAY	31.7 %
P 200	55.9 %

SOIL PROPERTIES

LL: 43.0%
PL: 14.0%
PI: 29.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

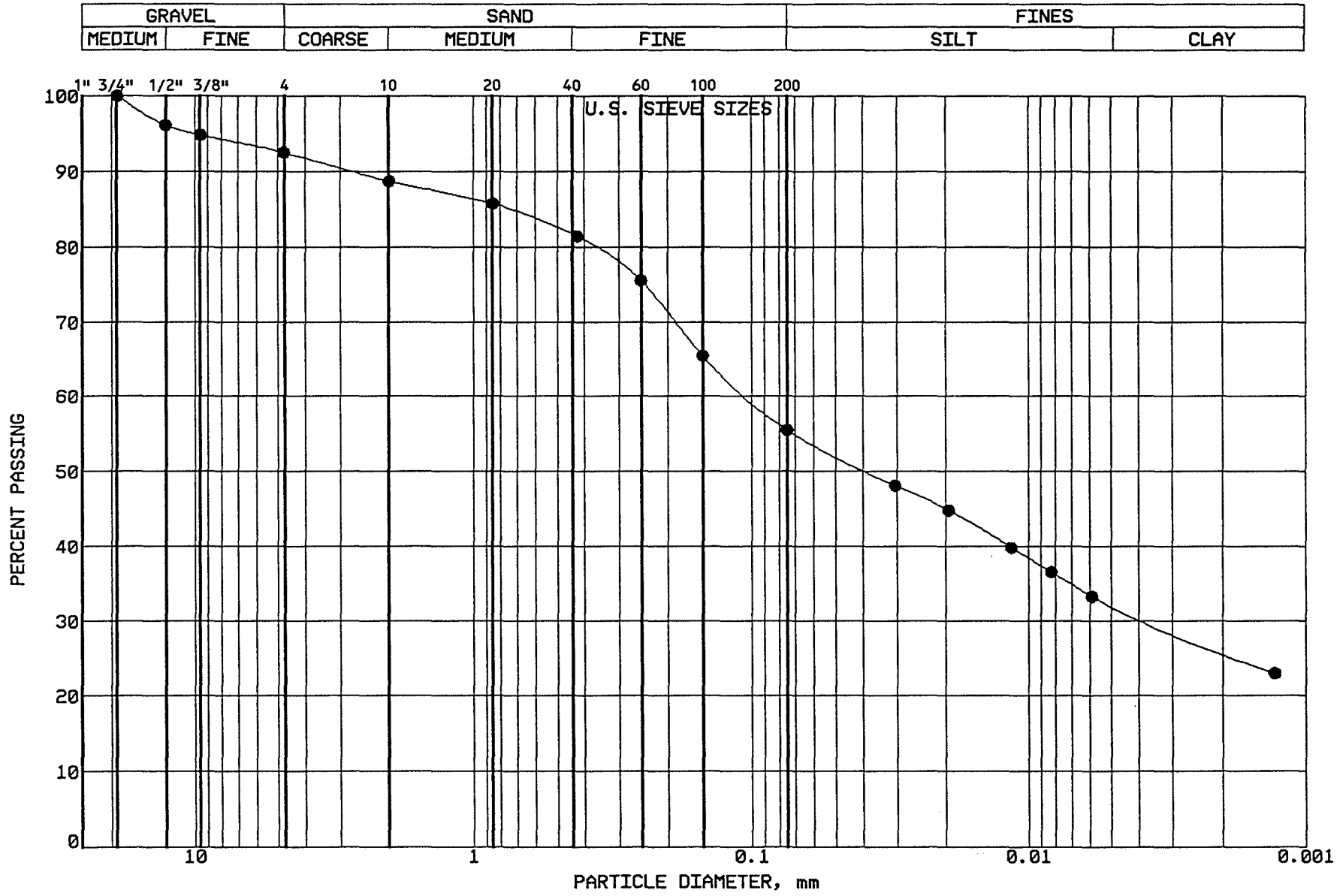
LOCATION: N 42665.0, E 43234.0
SAMPLE: CLBCC387 TUBE #: ST-90A
ELEVATION: 1885.4'

GRAVEL	1.2 %
SAND	37.9 %
SILT	25.4 %
CLAY	35.5 %
P 200	60.9 %

SOIL PROPERTIES

LL: 44.0%
PL: 16.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

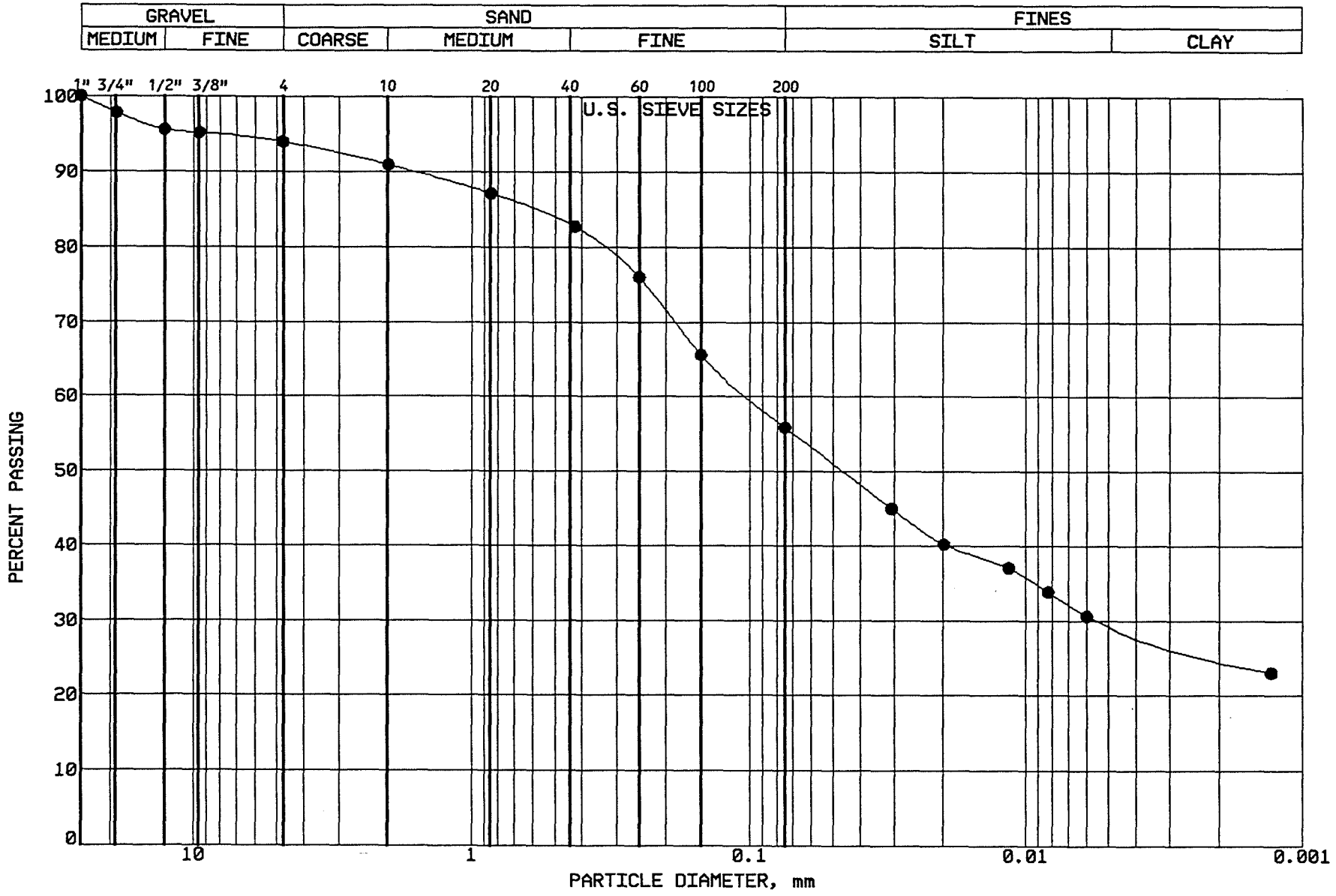
LOCATION: N 42980.0, E 43438.0
SAMPLE: CLBCC388 TUBE #: ST-91A
ELEVATION: 1886.9'

GRAVEL	7.5 %
SAND	37.0 %
SILT	23.4 %
CLAY	32.1 %
P 200	55.5 %

SOIL PROPERTIES

LL: 41.0%
PL: 15.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

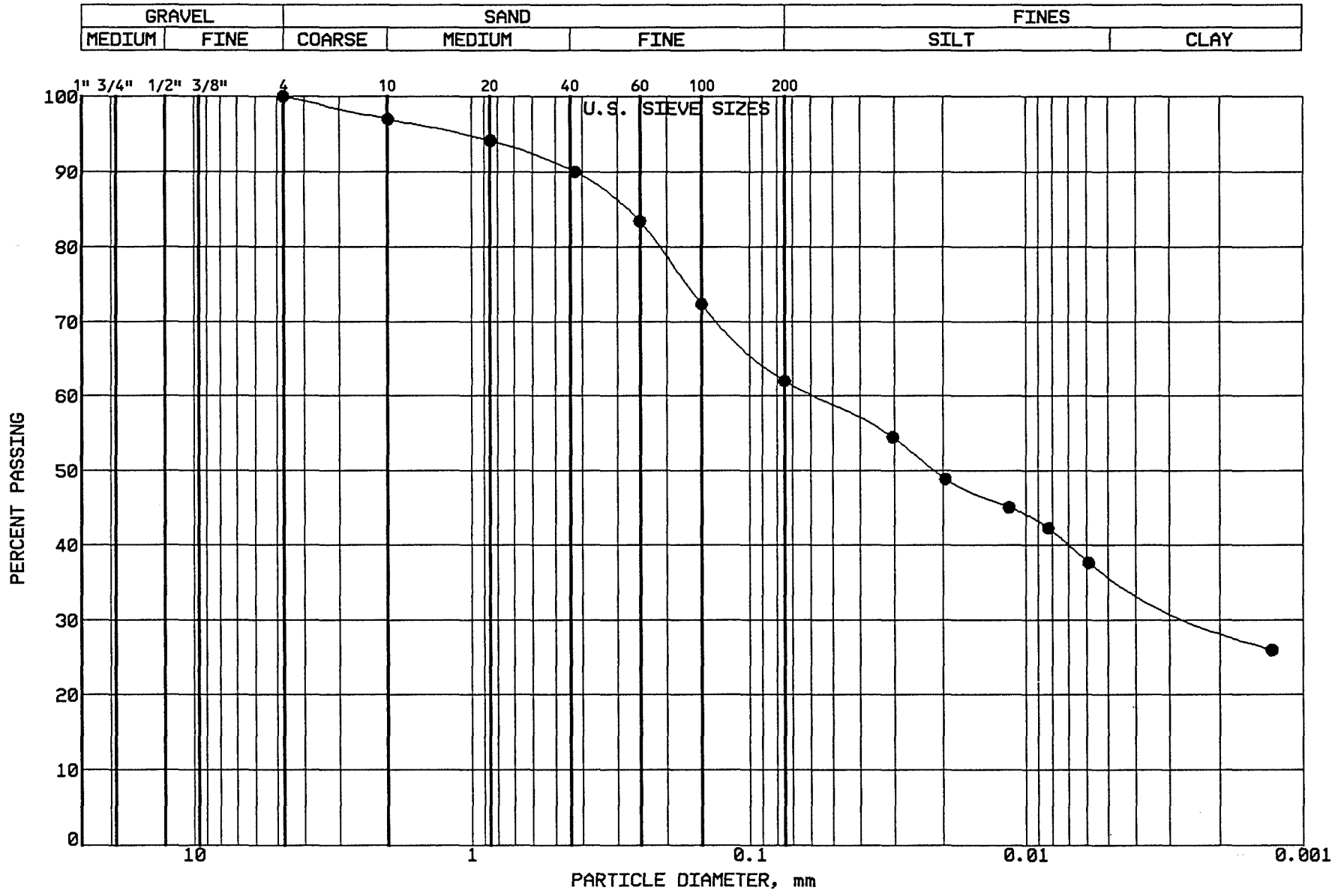
LOCATION: N 42696.0, E 43440.0
SAMPLE: CLBCC389 TUBE #: ST-92B
ELEVATION: 1885.4'

GRAVEL	6.1 %
SAND	38.0 %
SILT	26.2 %
CLAY	29.7 %
P 200	55.9 %

SOIL PROPERTIES

LL: 40.0%
PL: 14.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

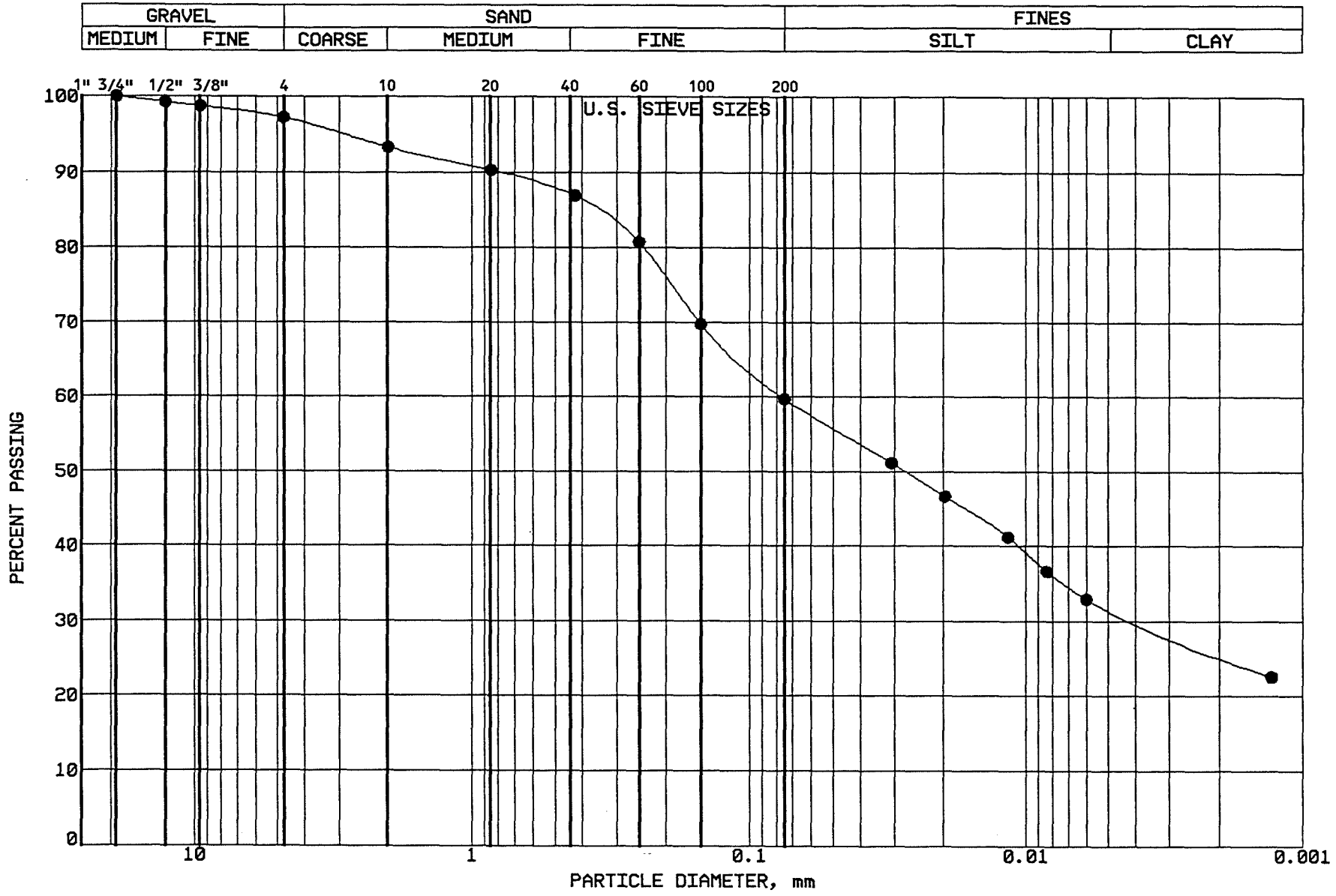
LOCATION: N 43178.0, E 43556.0
SAMPLE: CLBCC390 TUBE #: ST-93A
ELEVATION: 1887.1'

GRAVEL	0.0 %
SAND	38.0 %
SILT	25.7 %
CLAY	36.3 %
P 200	62.0 %

SOIL PROPERTIES

LL: 45.0%
PL: 15.0%
PI: 30.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

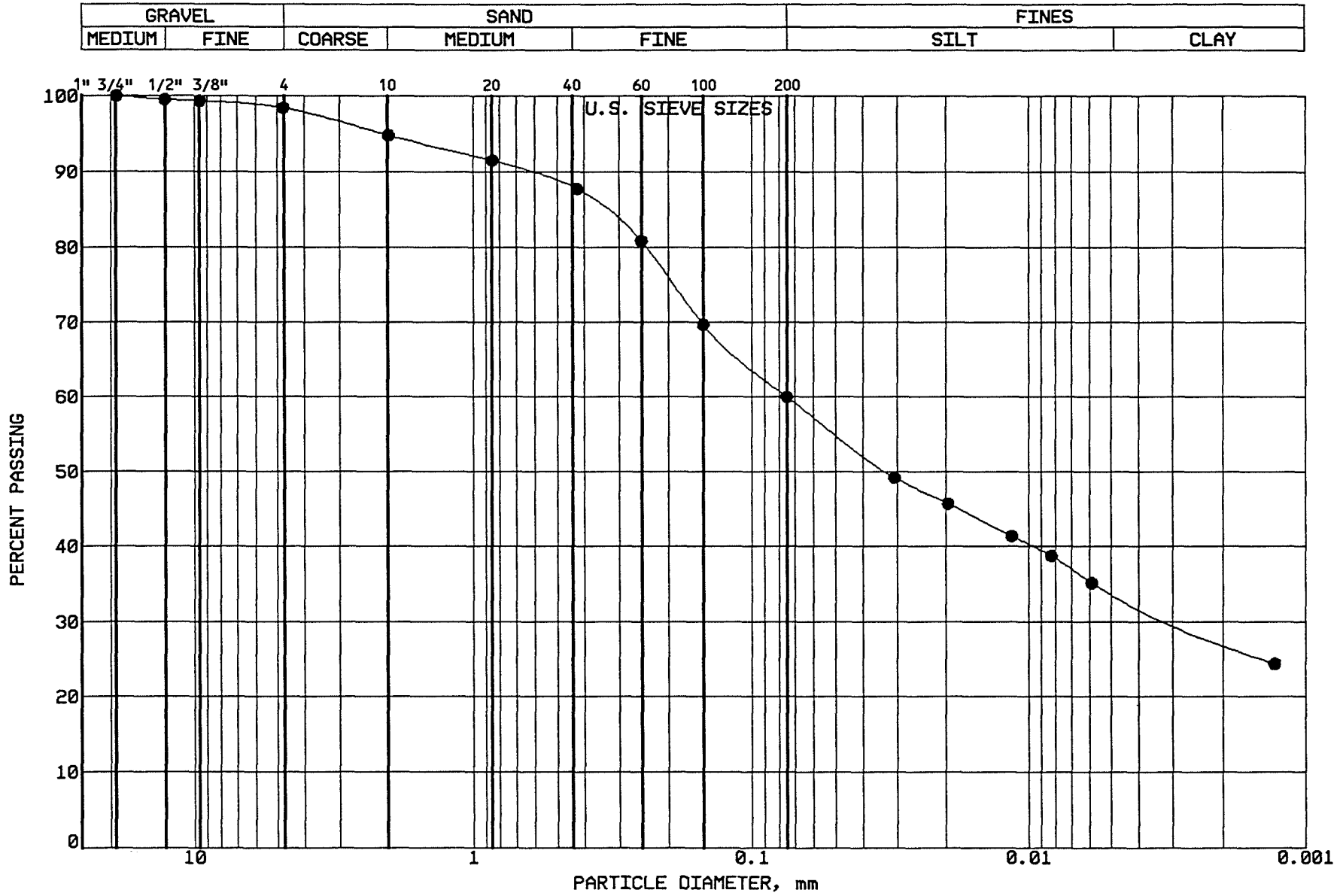
LOCATION: N 42999.0, E 43548.0
SAMPLE: CLBCC391 TUBE #: ST-94
ELEVATION: 1885.7'

GRAVEL	2.8 %
SAND	37.5 %
SILT	28.0 %
CLAY	31.7 %
P 200	59.7 %

SOIL PROPERTIES

LL: 45.0%
PL: 16.0%
PI: 29.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

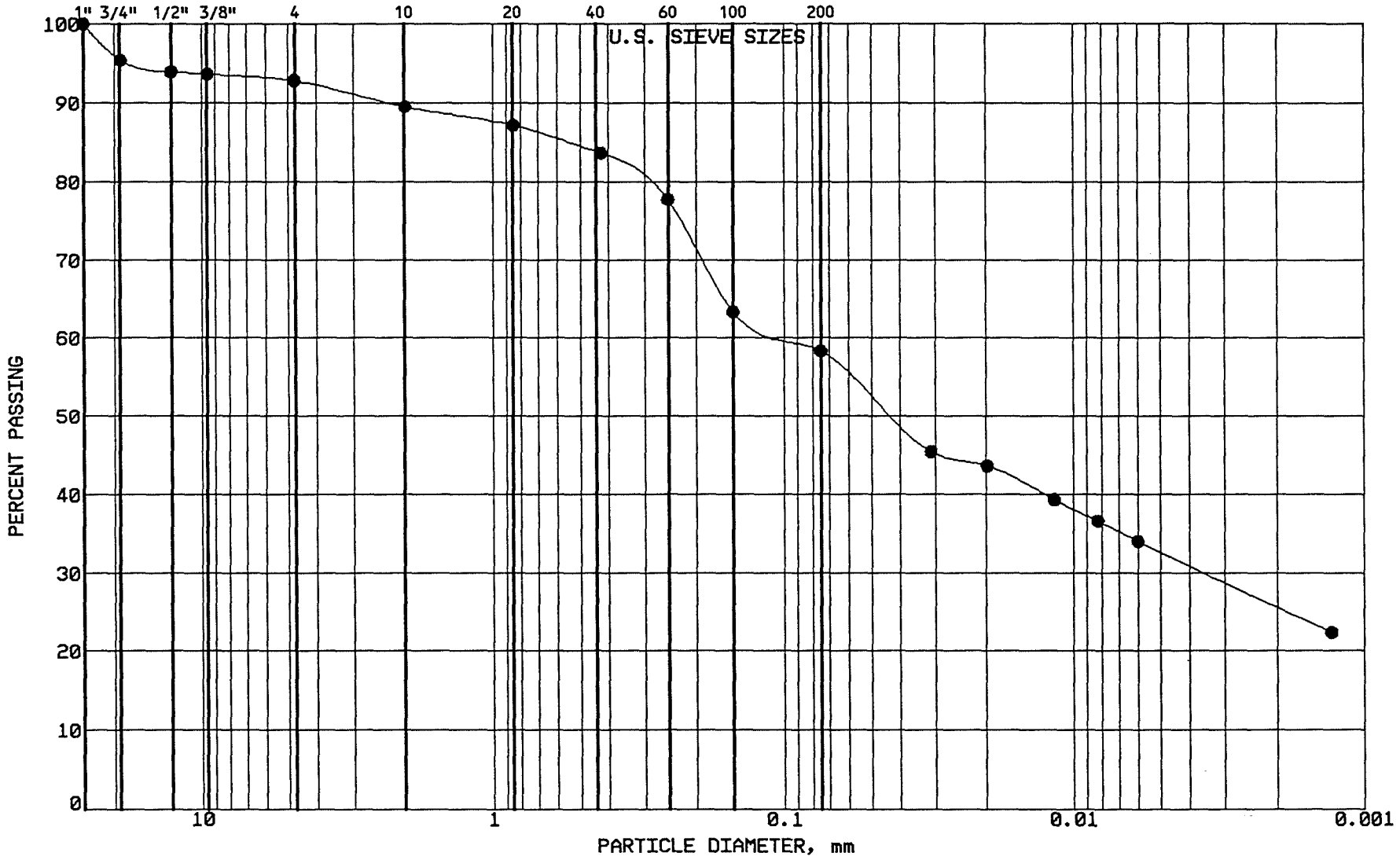
LOCATION: N 42818.0, E 43542.0
SAMPLE: CLBCC392 TUBE #: ST-95A
ELEVATION: 1885.0'

GRAVEL	1.6 %
SAND	38.4 %
SILT	26.1 %
CLAY	33.9 %
P 200	60.0 %

SOIL PROPERTIES

LL: 44.0%
PL: 14.0%
PI: 30.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

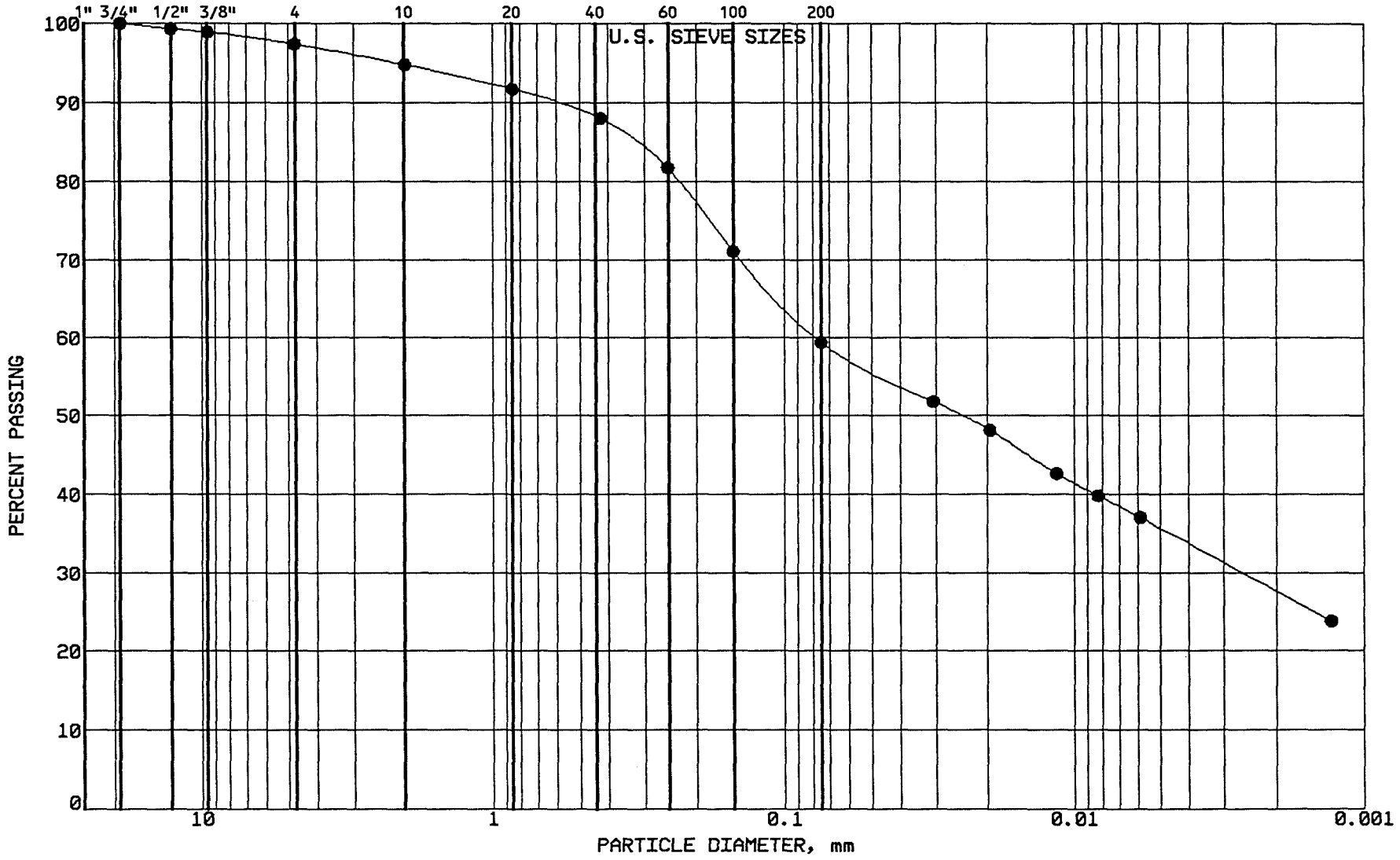
LOCATION: N 42639.0, E 43544.0
SAMPLE: CLBCC393 TUBE #: ST-96A
ELEVATION: 1883.8'

GRAVEL	7.2 %
SAND	34.5 %
SILT	25.7 %
CLAY	32.6 %
P 200	58.3 %

SOIL PROPERTIES

LL: 43.0%
PL: 15.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

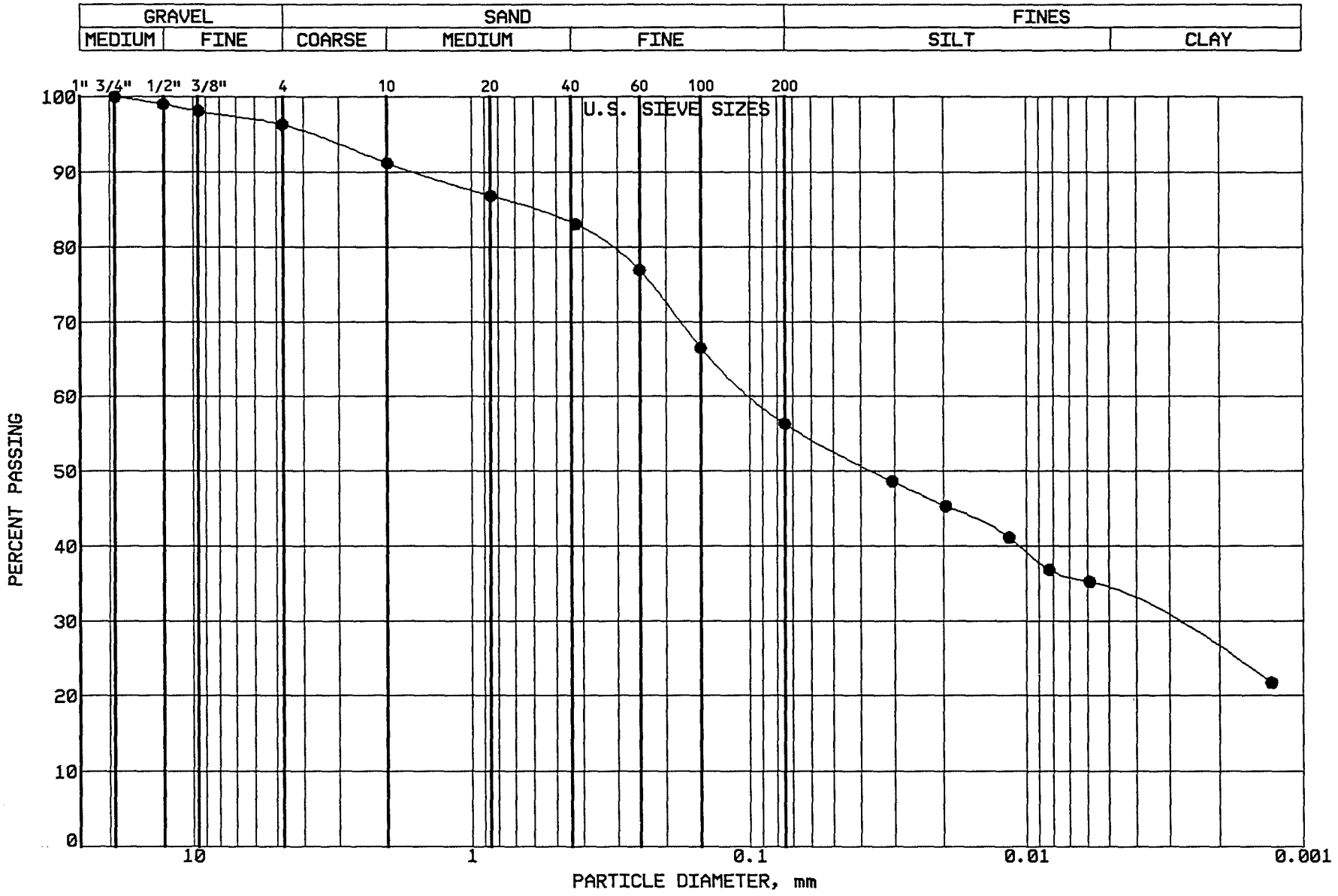
LOCATION: N 42647.0, E 43759.0
SAMPLE: CLBCC394 TUBE #: ST-97B
ELEVATION: 1883.2'

GRAVEL	2.6 %
SAND	38.0 %
SILT	23.8 %
CLAY	35.6 %
P 200	59.4 %

SOIL PROPERTIES

LL: 43.0%
PL: 16.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

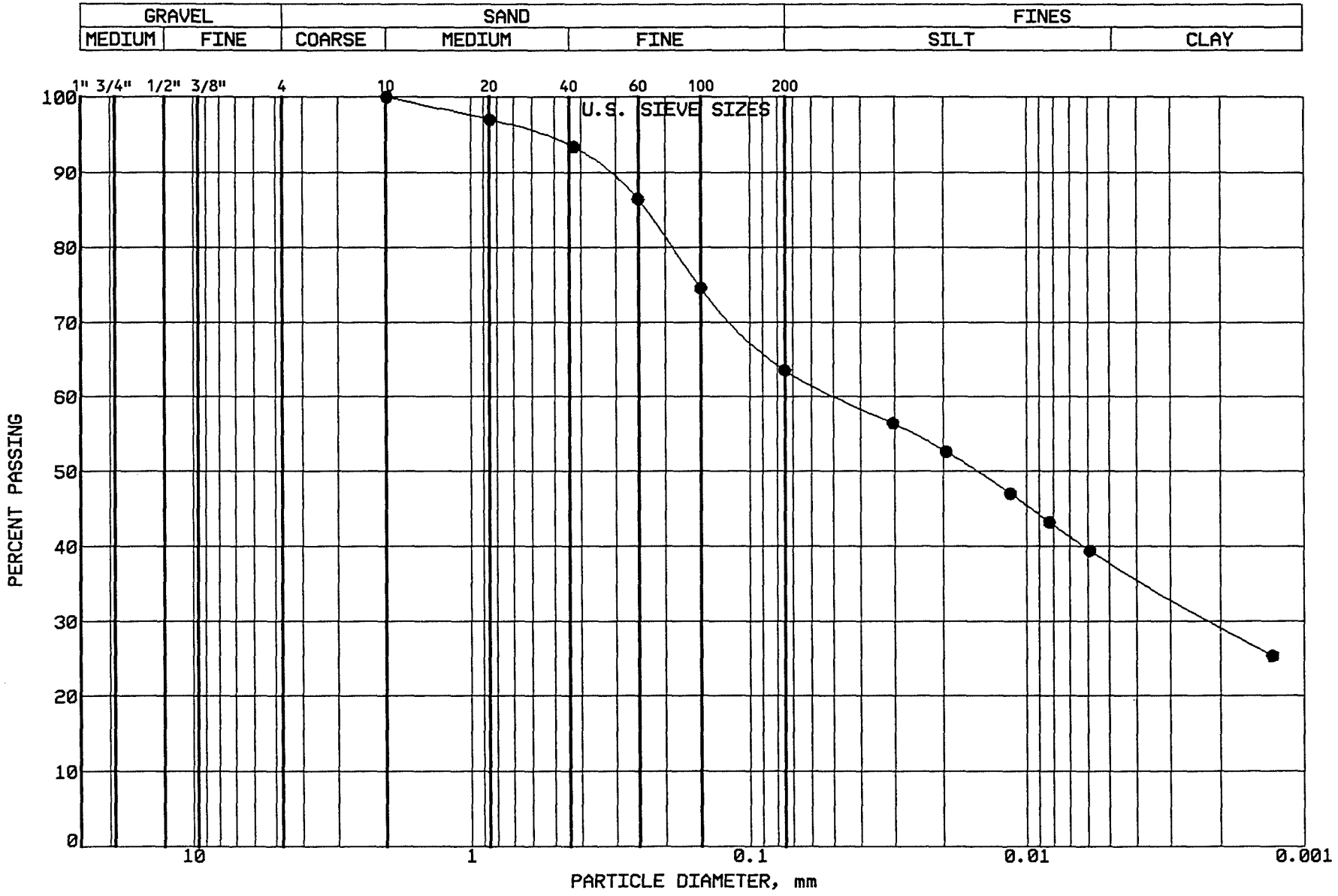
LOCATION: N 42806.0, E 43771.0
SAMPLE: CLBCC395 TUBE #: ST-98B
ELEVATION: 1884.3'

GRAVEL	3.7 %
SAND	40.0 %
SILT	22.6 %
CLAY	33.7 %
P 200	56.3 %

SOIL PROPERTIES

LL: 43.0%
PL: 16.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

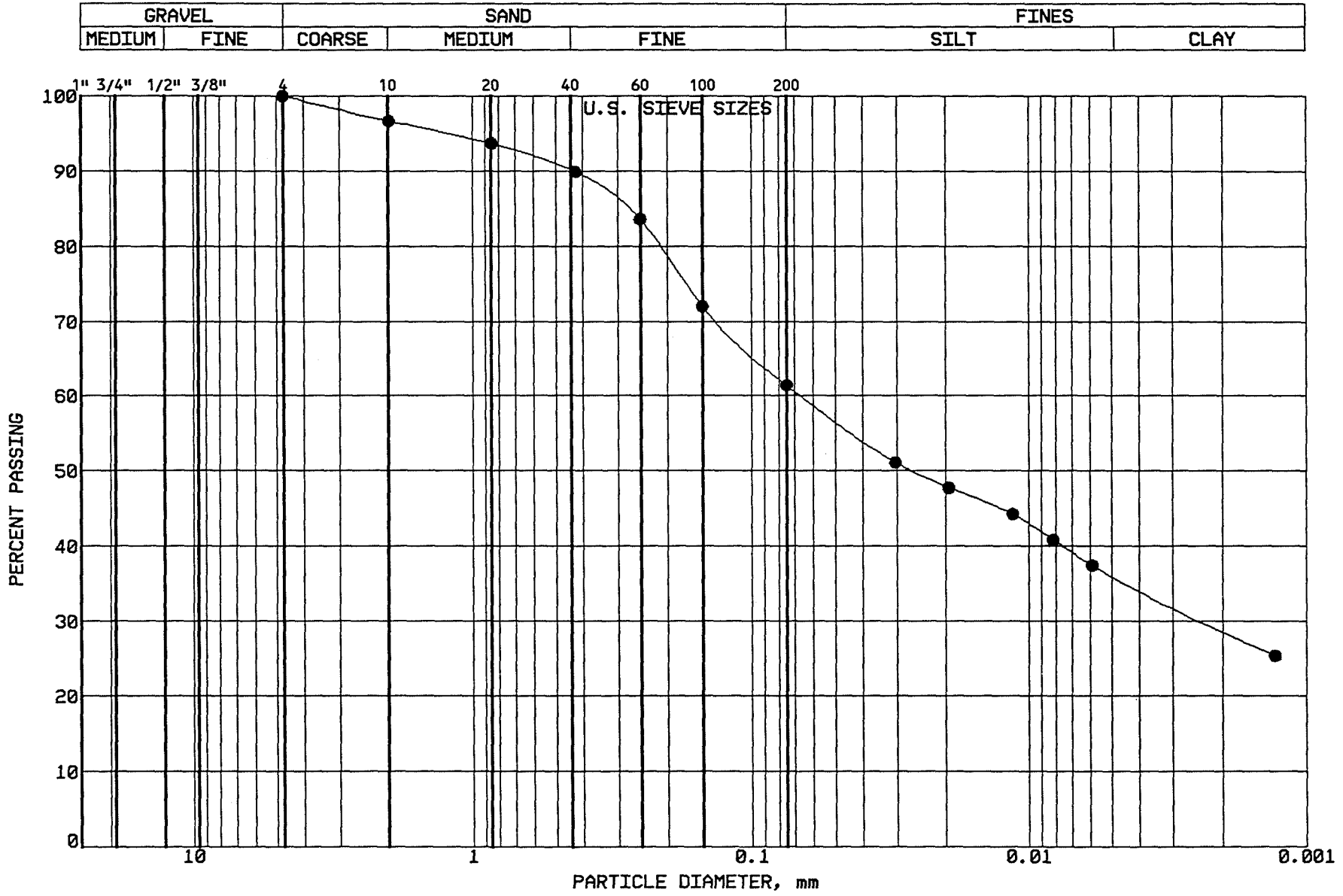
LOCATION: N 42976.0, E 43782.0
SAMPLE: CLBCC396 TUBE #: ST-99A
ELEVATION: 1885.5'

GRAVEL	0.0 %
SAND	36.5 %
SILT	25.6 %
CLAY	37.9 %
P 200	63.5 %

SOIL PROPERTIES

LL: 45.0%
PL: 17.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) lt ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

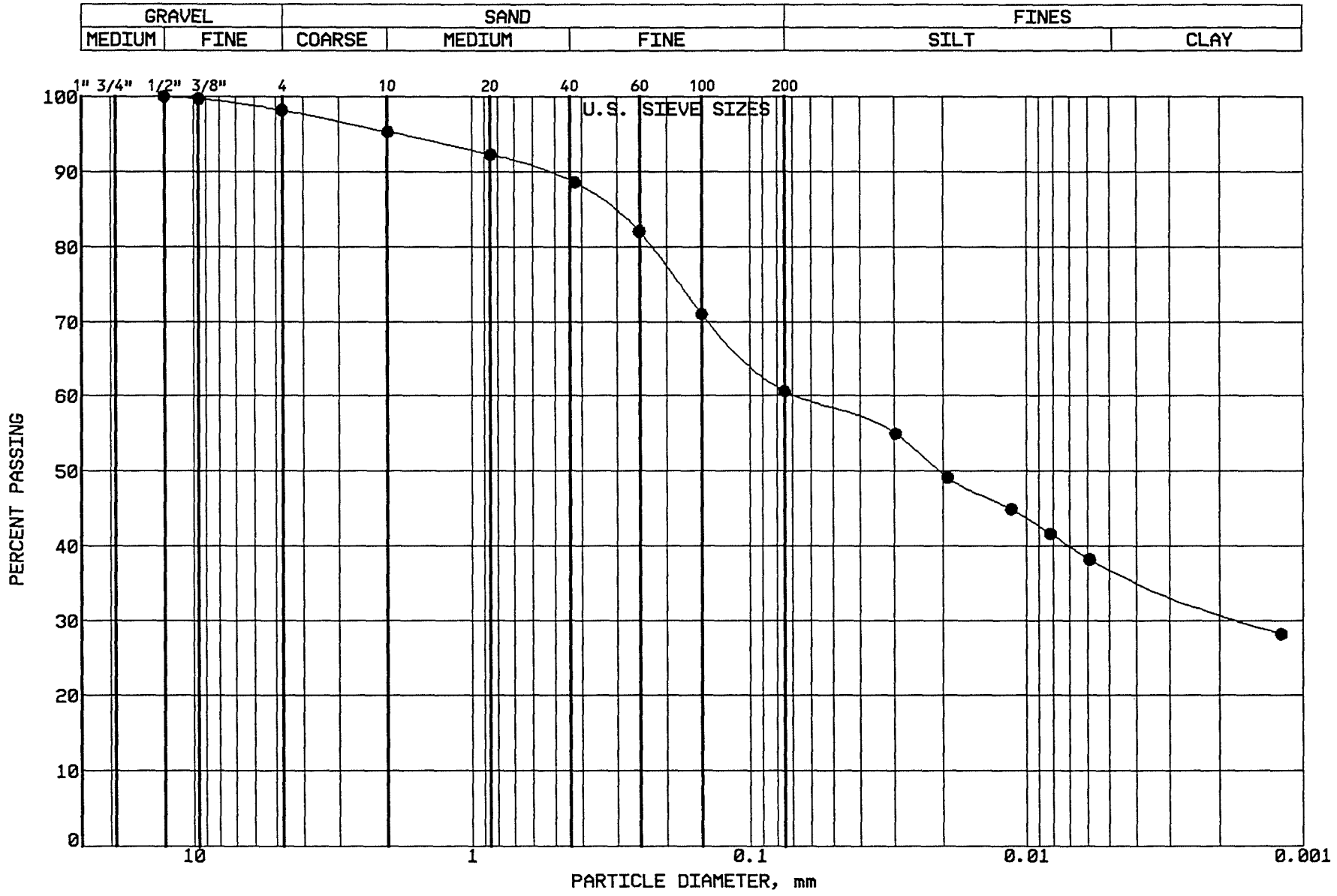
LOCATION: N 43152.0, E 43796.0
SAMPLE: CLBCC397 TUBE #: ST-100A
ELEVATION: 1886.5'

GRAVEL	0.0 %
SAND	38.6 %
SILT	25.3 %
CLAY	36.1 %
P 200	61.4 %

SOIL PROPERTIES

LL: 46.0%
PL: 17.0%
PI: 29.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

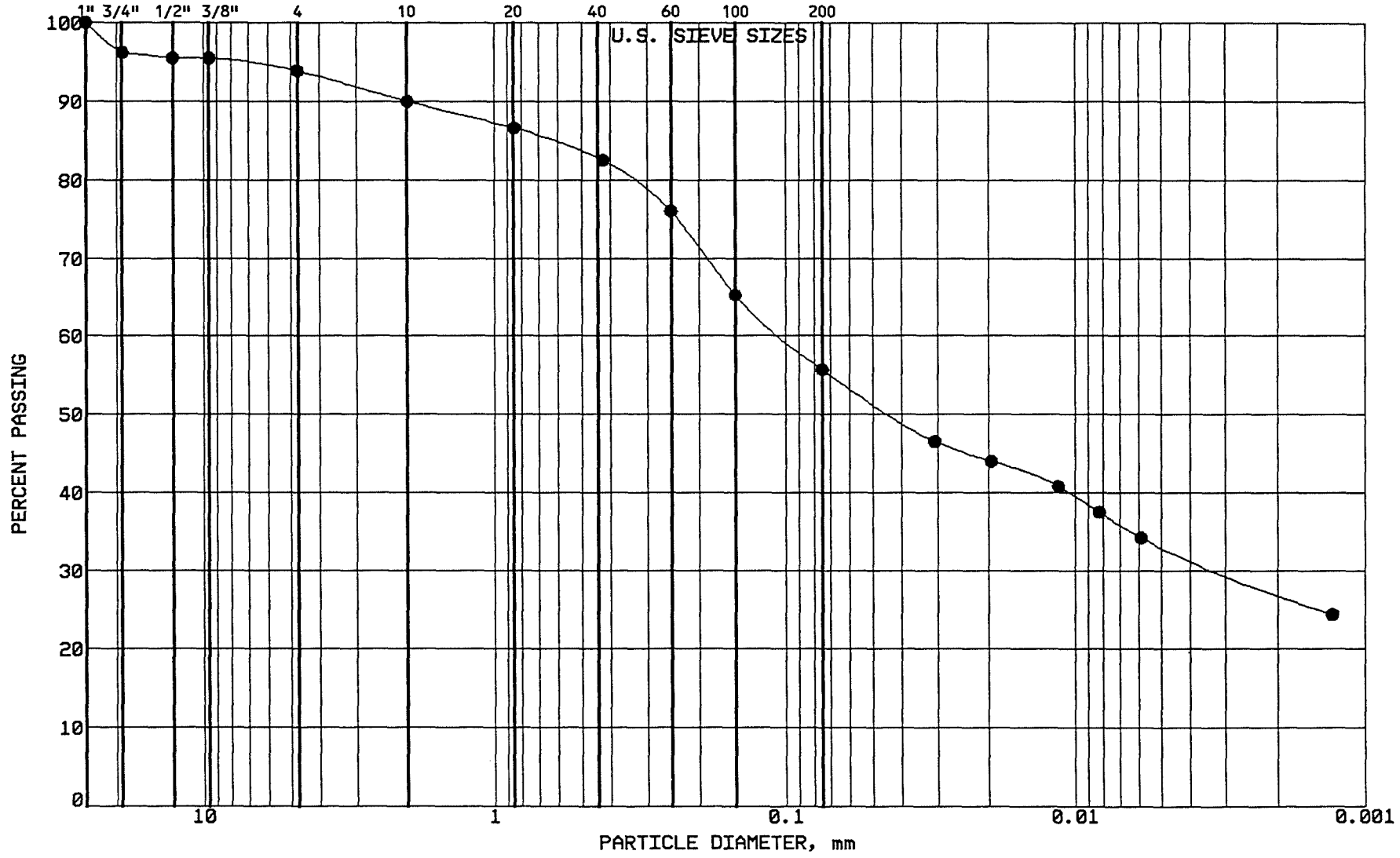
LOCATION: N 43190.0, E 43970.0
SAMPLE: CLBCC398 TUBE #: ST-101B
ELEVATION: 1886.9'

GRAVEL	1.8 %
SAND	37.6 %
SILT	23.4 %
CLAY	37.2 %
P 200	60.6 %

SOIL PROPERTIES

LL: 45.0%
PL: 15.0%
PI: 30.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

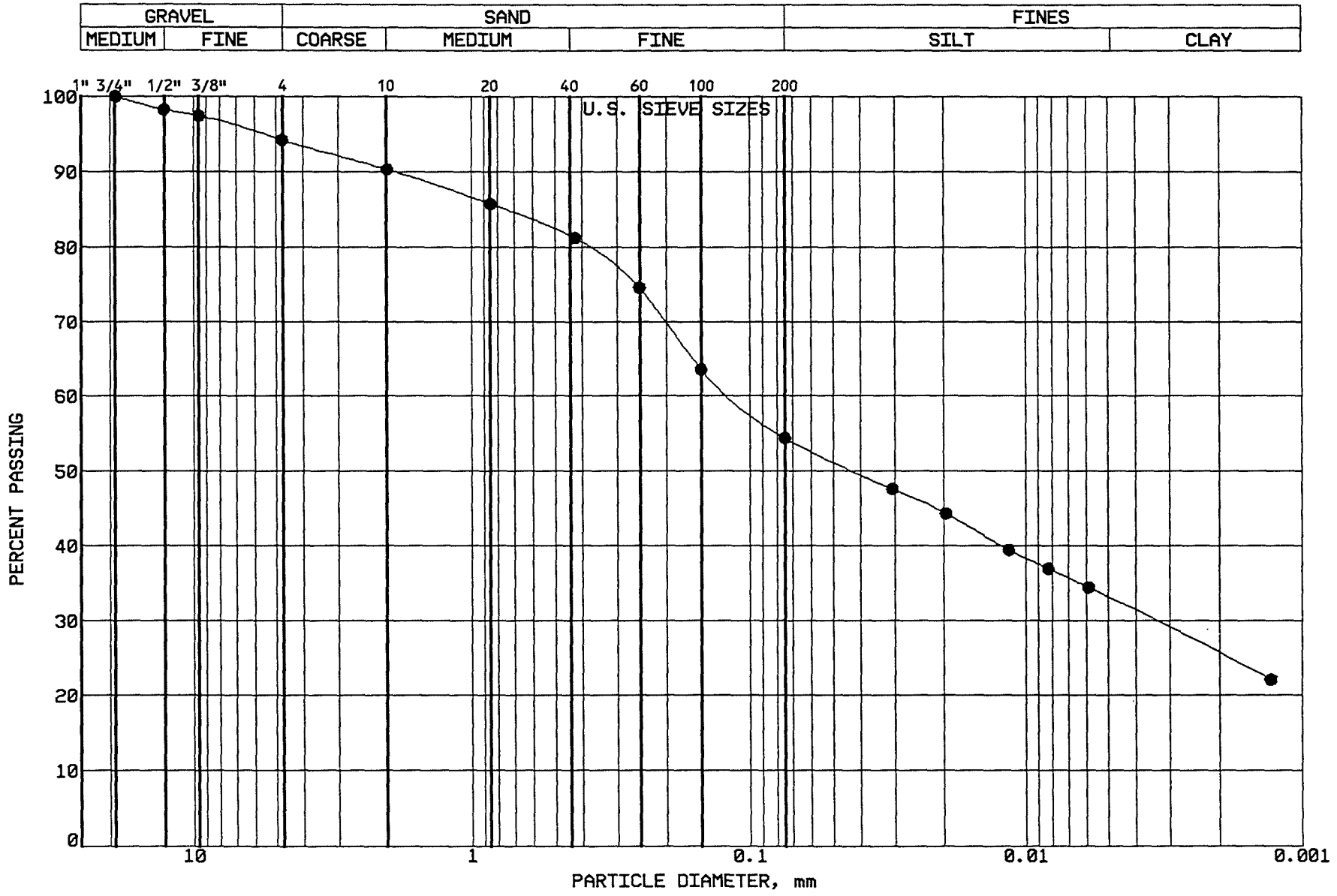
LOCATION: N 43044.0, E 43962.0
SAMPLE: CLBCC399 TUBE #: ST-102A
ELEVATION: 1885.7'

GRAVEL	6.1 %
SAND	38.2 %
SILT	22.6 %
CLAY	33.1 %
P 200	55.7 %

SOIL PROPERTIES

LL: 42.0%
PL: 16.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

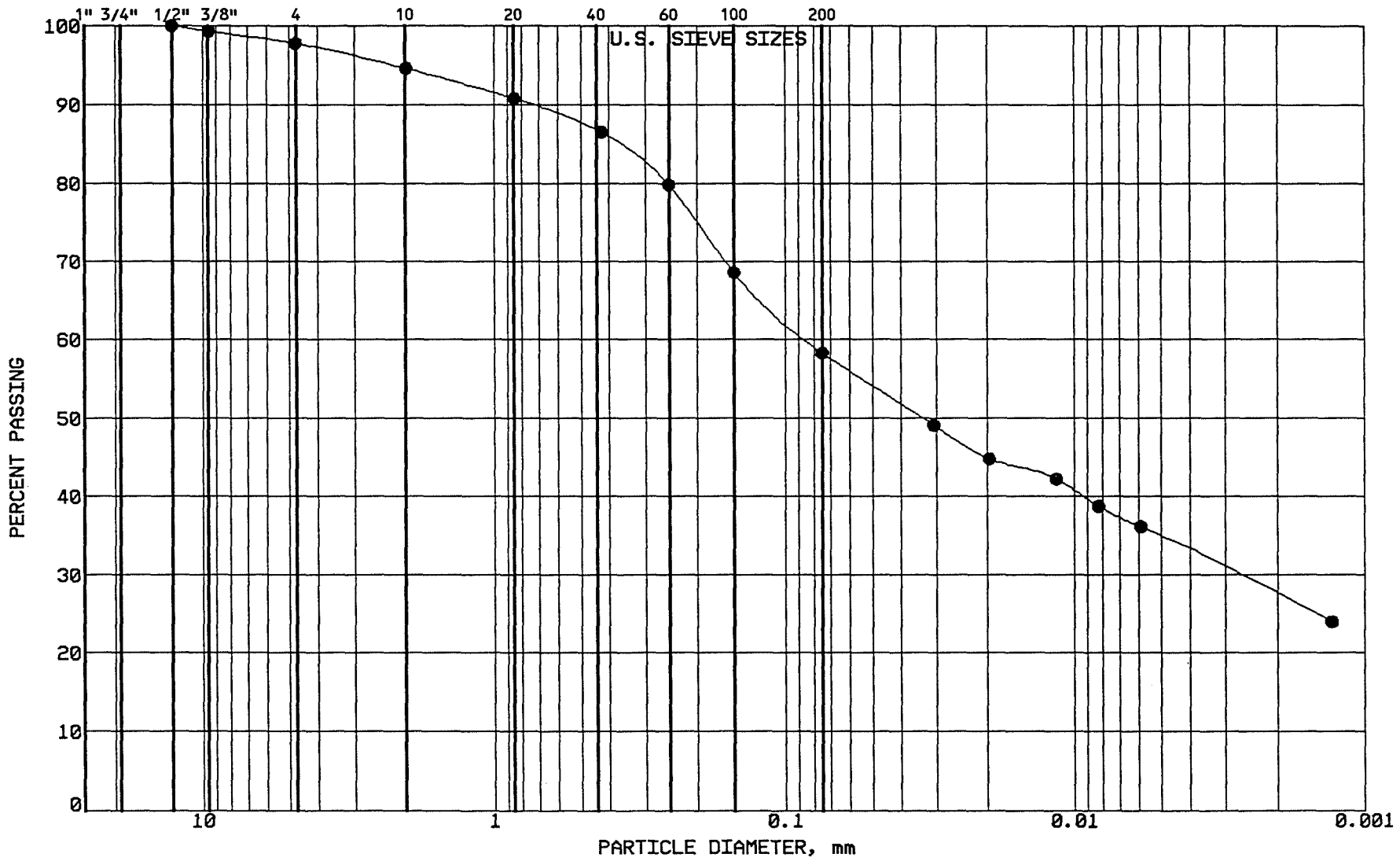
LOCATION: N 42861.0, E 43951.0
SAMPLE: CLBCC400 TUBE #: ST-103A
ELEVATION: 1884.5'

GRAVEL	5.8 %
SAND	39.8 %
SILT	21.3 %
CLAY	33.1 %
P 200	54.4 %

SOIL PROPERTIES

LL: 44.0%
PL: 13.0%
PI: 31.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42672.0, E 43943.0
SAMPLE: CLBCC401 TUBE #: ST-104A
ELEVATION: 1883.5'

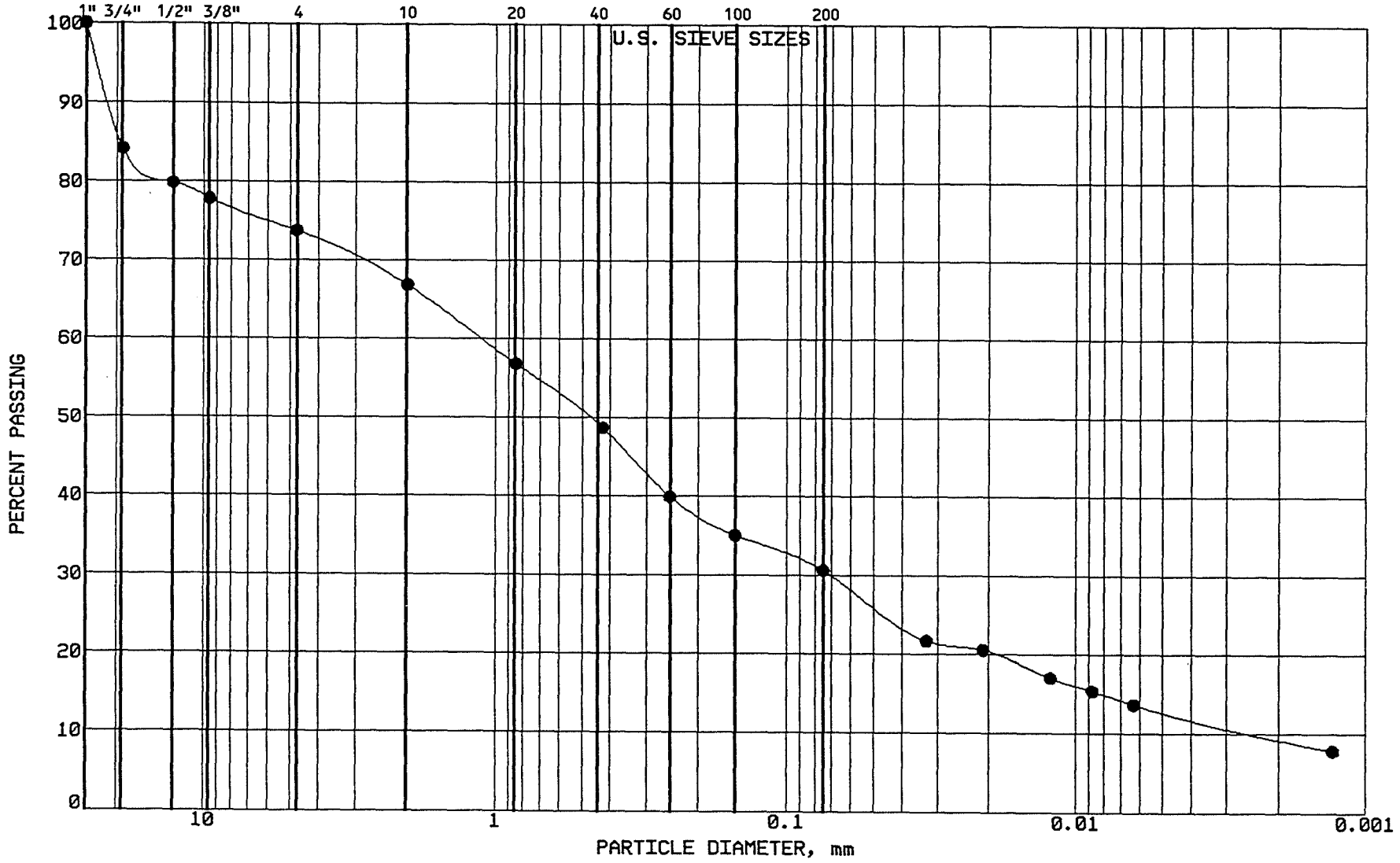
GRAVEL	2.2 %
SAND	39.5 %
SILT	23.5 %
CLAY	34.8 %
P 200	58.3 %

SOIL PROPERTIES

LL: 43.0%
PL: 14.0%
PI: 29.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

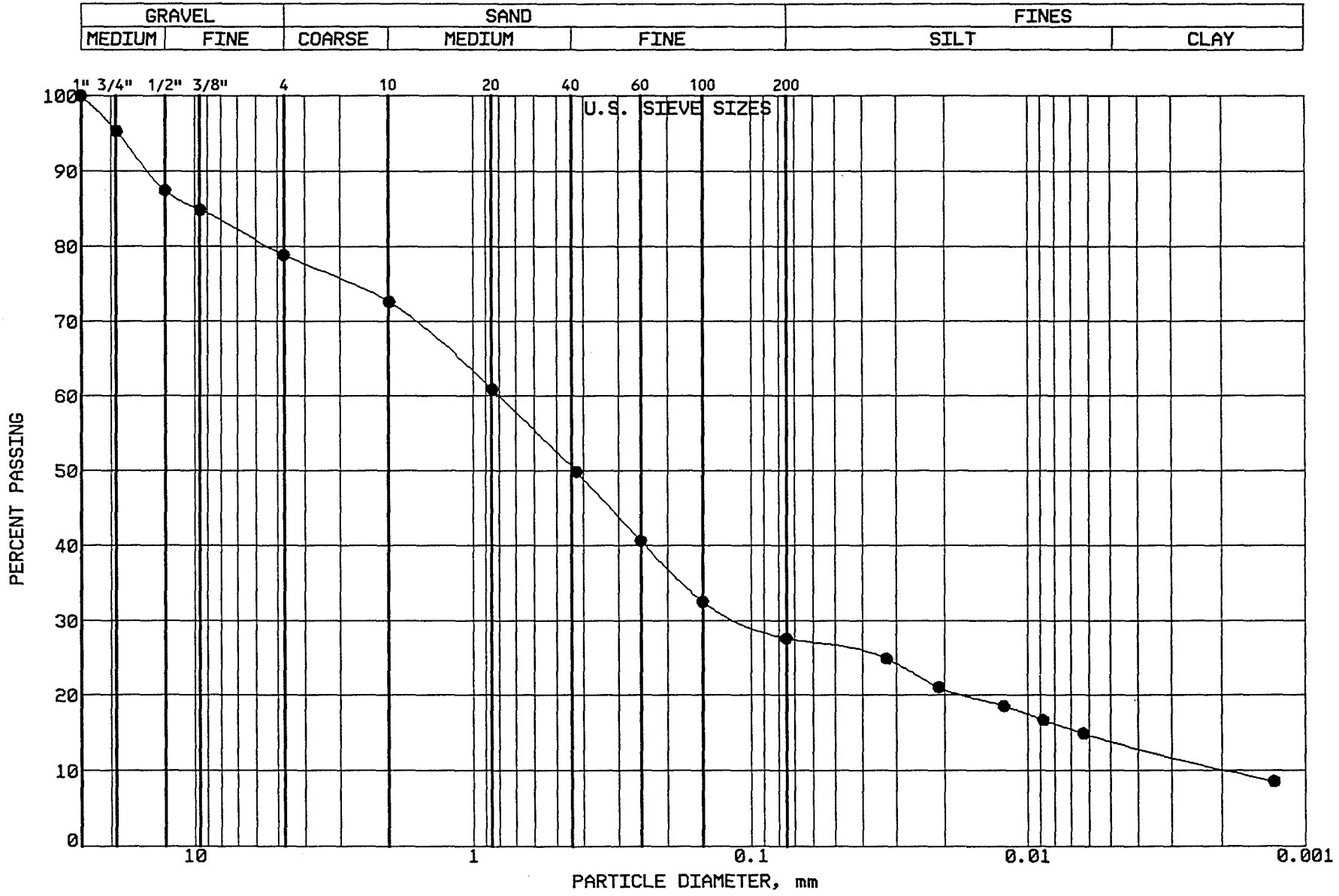
LOCATION: N 43206.0, E 44164.0
SAMPLE: SGCC402 TUBE #:
ELEVATION: 1883.8'

GRAVEL	26.3 %
SAND	43.1 %
SILT	17.7 %
CLAY	12.9 %
P 200	30.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND with GRAVEL (SM)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

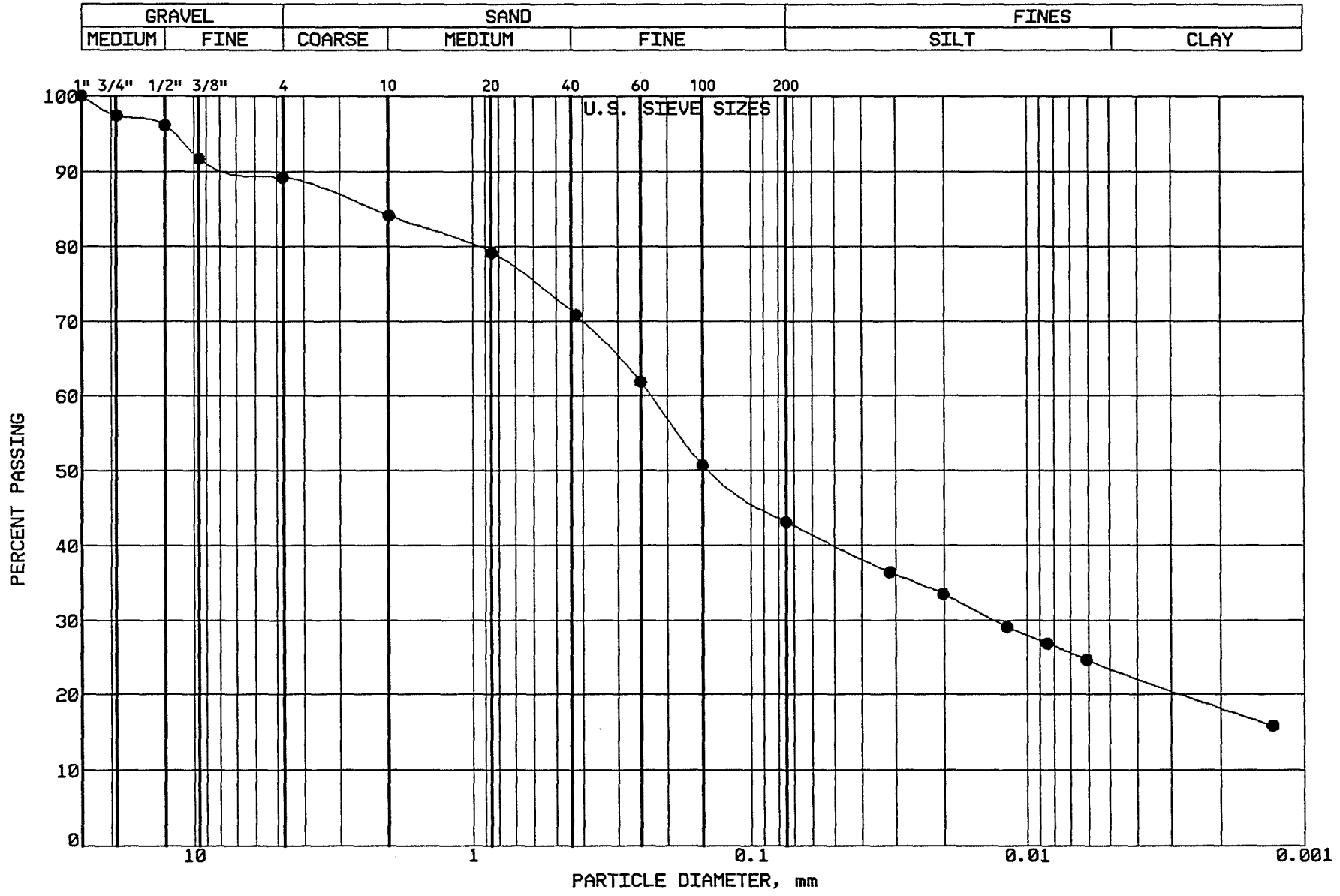
LOCATION: N 42846.0, E 44156.0
SAMPLE: SGCC403 TUBE #:
ELEVATION: 1882.8'

GRAVEL	21.2 %
SAND	51.2 %
SILT	13.6 %
CLAY	14.0 %
P 200	27.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND with GRAVEL (SC)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

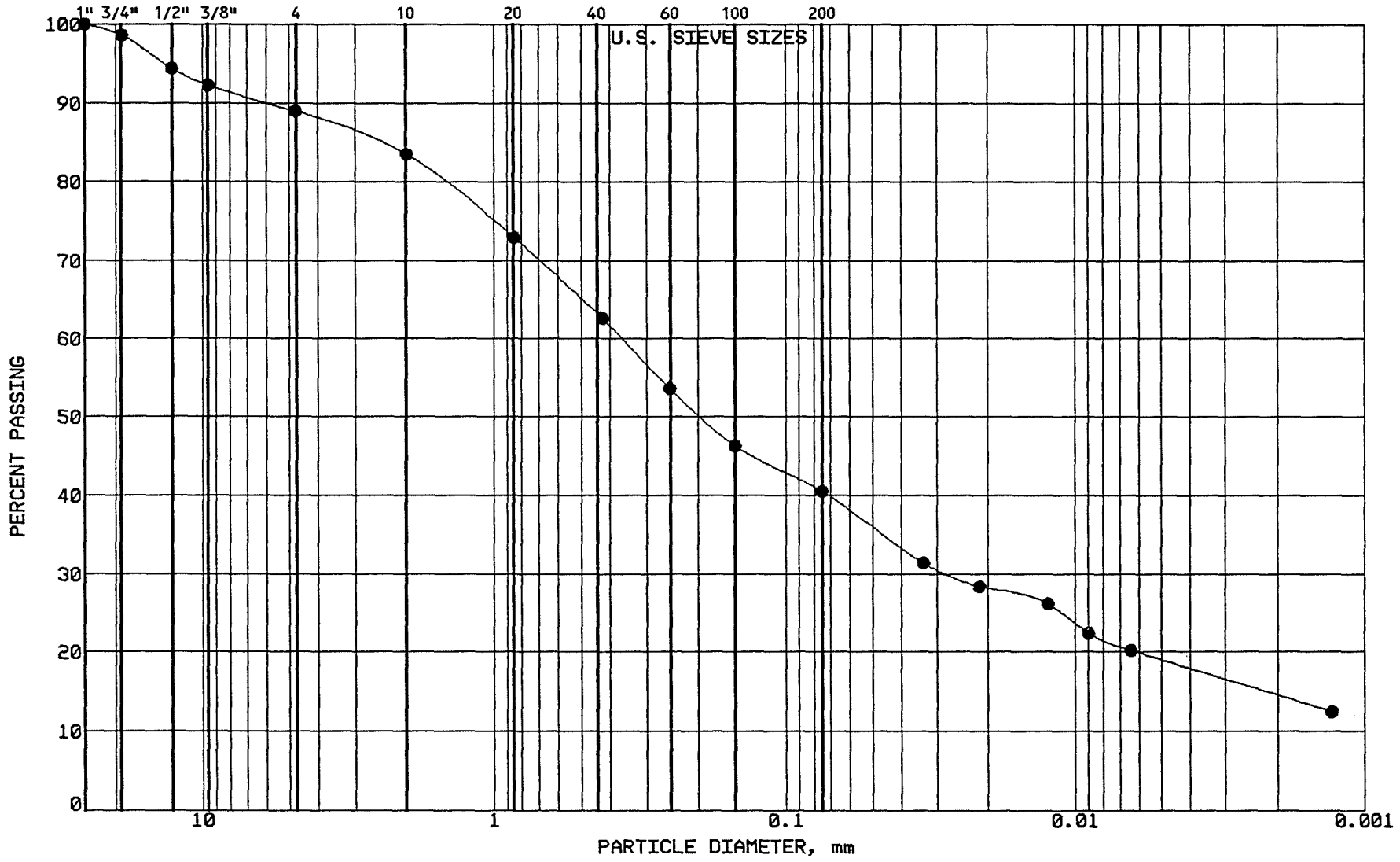
LOCATION: N 42665.0, E 44146.0
SAMPLE: SGCC404 TUBE #:
ELEVATION: 1881.9'

GRAVEL	10.8 %
SAND	46.1 %
SILT	19.5 %
CLAY	23.6 %
P 200	43.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND (SC)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43064.0, E 44314.0
SAMPLE: SGCC405 TUBE #:
ELEVATION: 1883.5'

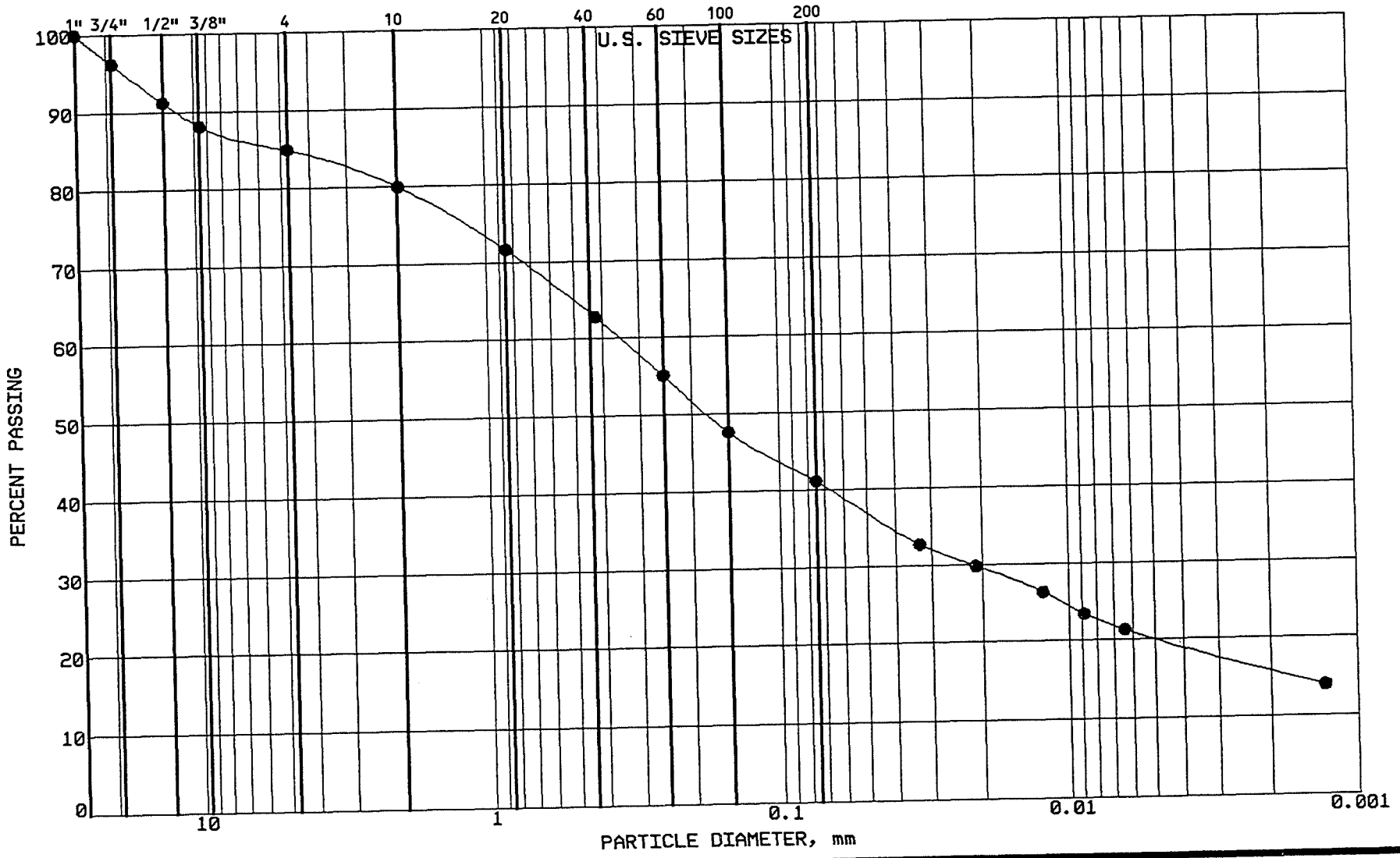
GRAVEL	11.0 %
SAND	48.5 %
SILT	21.5 %
CLAY	19.0 %
P 200	40.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND (SM), olive br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42864.0, E 44312.0
SAMPLE: SGCC406 TUBE #:
ELEVATION: 1882.5'

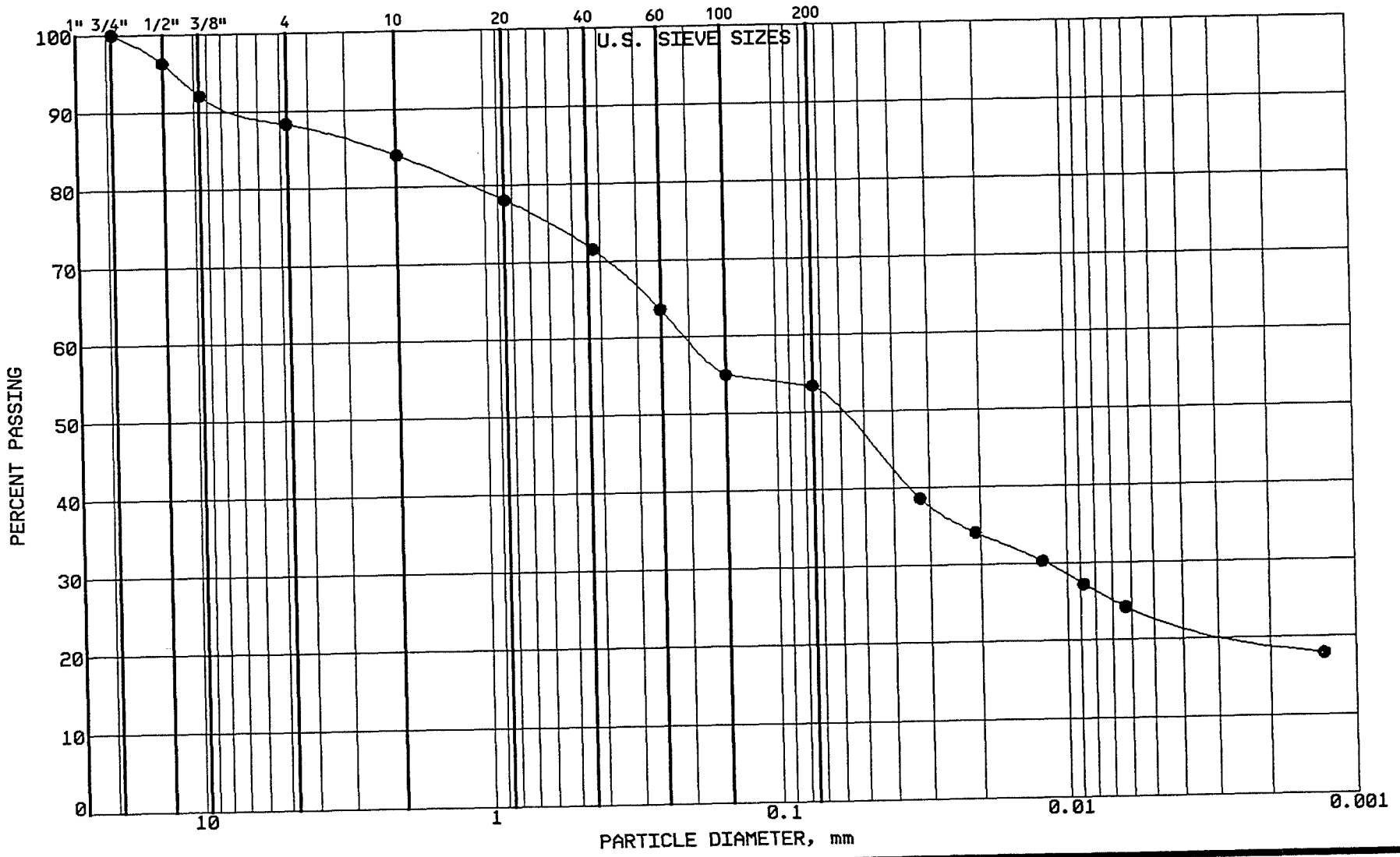
GRAVEL	15.1 %
SAND	43.8 %
SILT	20.9 %
CLAY	20.2 %
P 200	41.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND with GR.(SM), olive br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

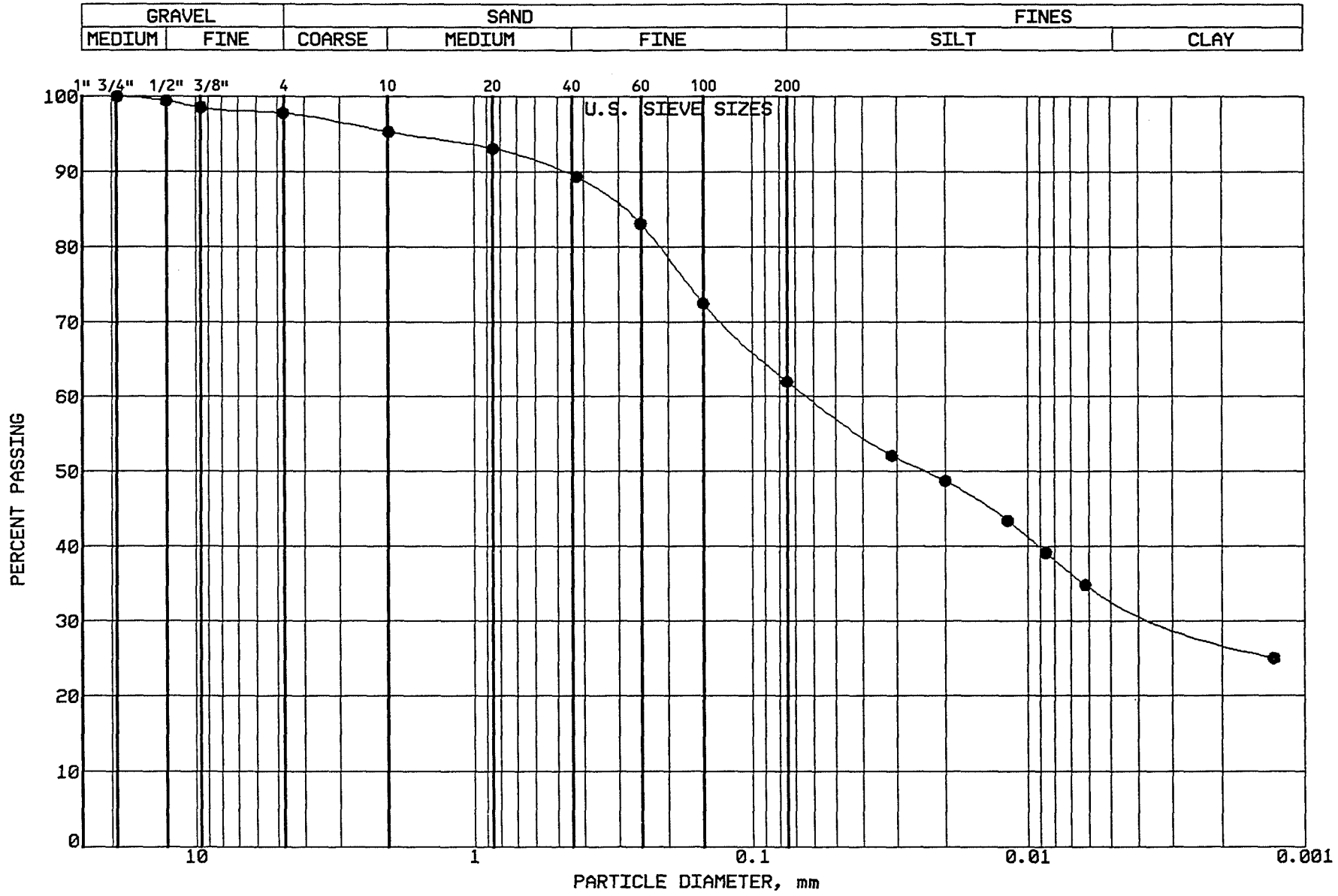
LOCATION: N 42668.0, E 44306.0
SAMPLE: SGCC407 TUBE #:
ELEVATION: 1881.4'

GRAVEL	11.7 %
SAND	34.9 %
SILT	30.1 %
CLAY	23.3 %
P 200	53.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL), ol. br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

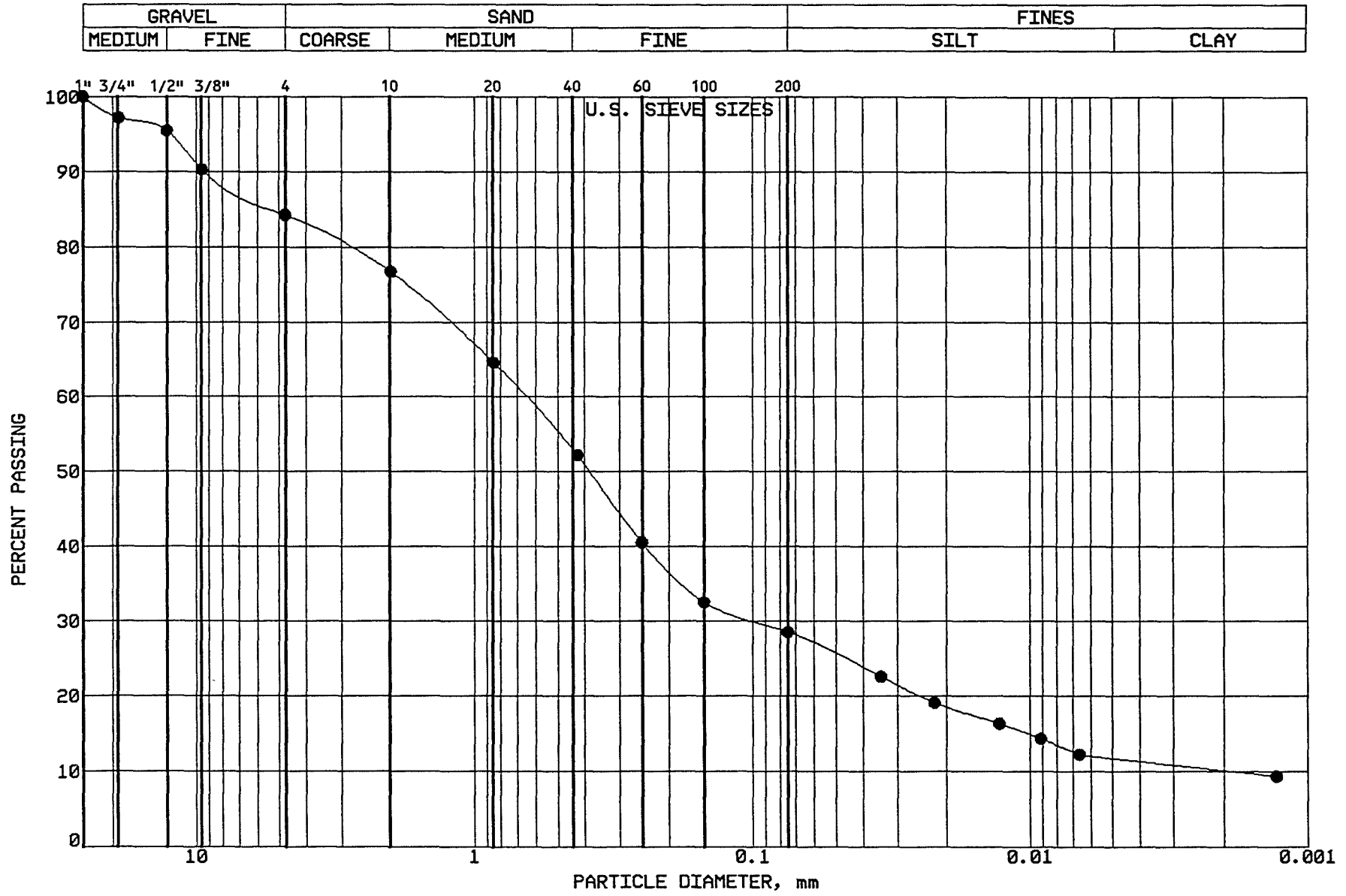
LOCATION: N 42999.0, E 43548.0
SAMPLE: CLBCC408 TUBE #: ST-94R
ELEVATION: 1885.7'

GRAVEL	2.2 %
SAND	35.8 %
SILT	28.5 %
CLAY	33.5 %
P 200	62.0 %

SOIL PROPERTIES

LL: 42.0%
PL: 15.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

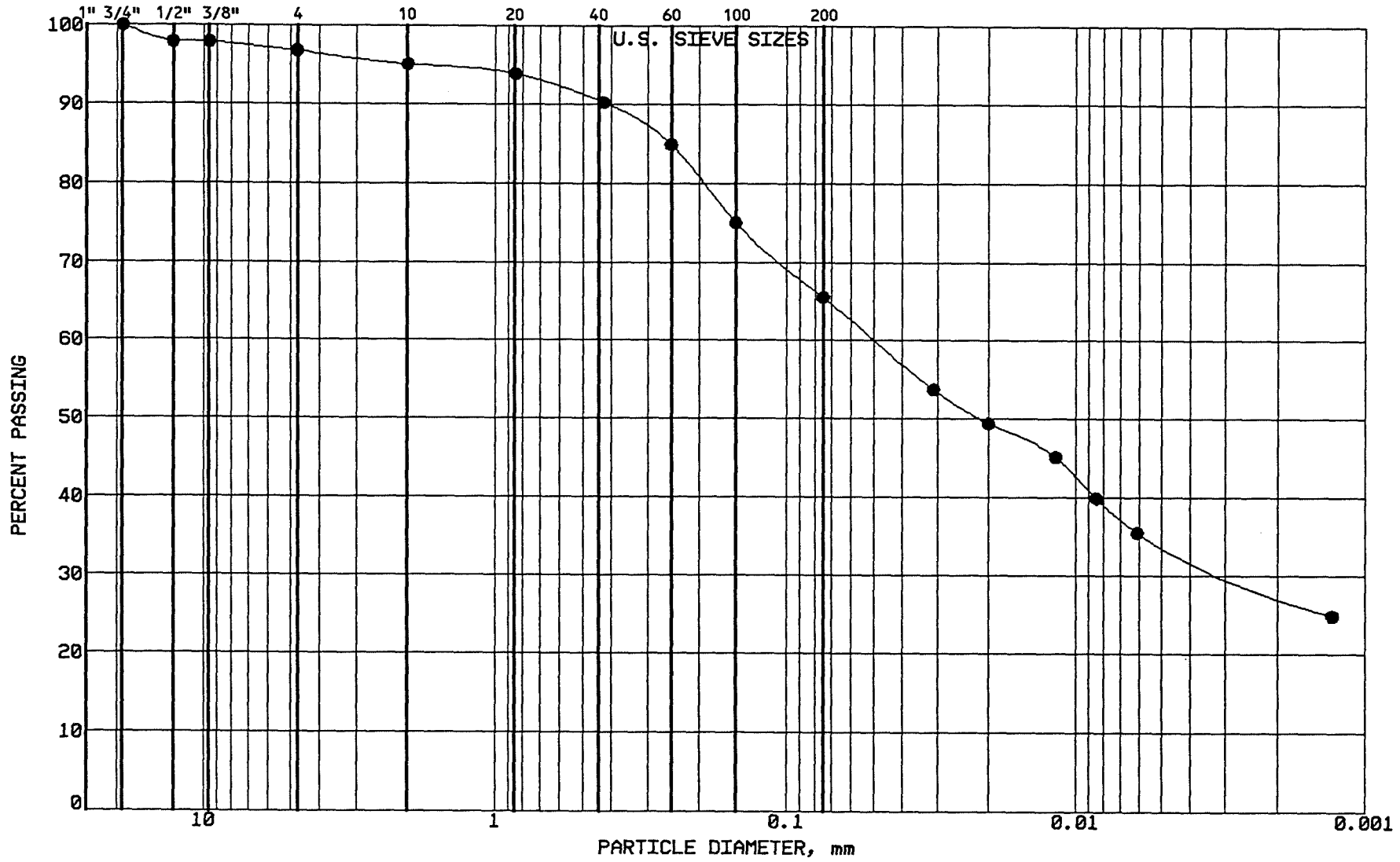
LOCATION: N 43405.0, E 44568.0
SAMPLE: SGCC409 TUBE #:
ELEVATION: 1885.1'

GRAVEL	15.8 %
SAND	55.7 %
SILT	16.7 %
CLAY	11.8 %
P 200	28.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND with GR. (SM), dk. br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

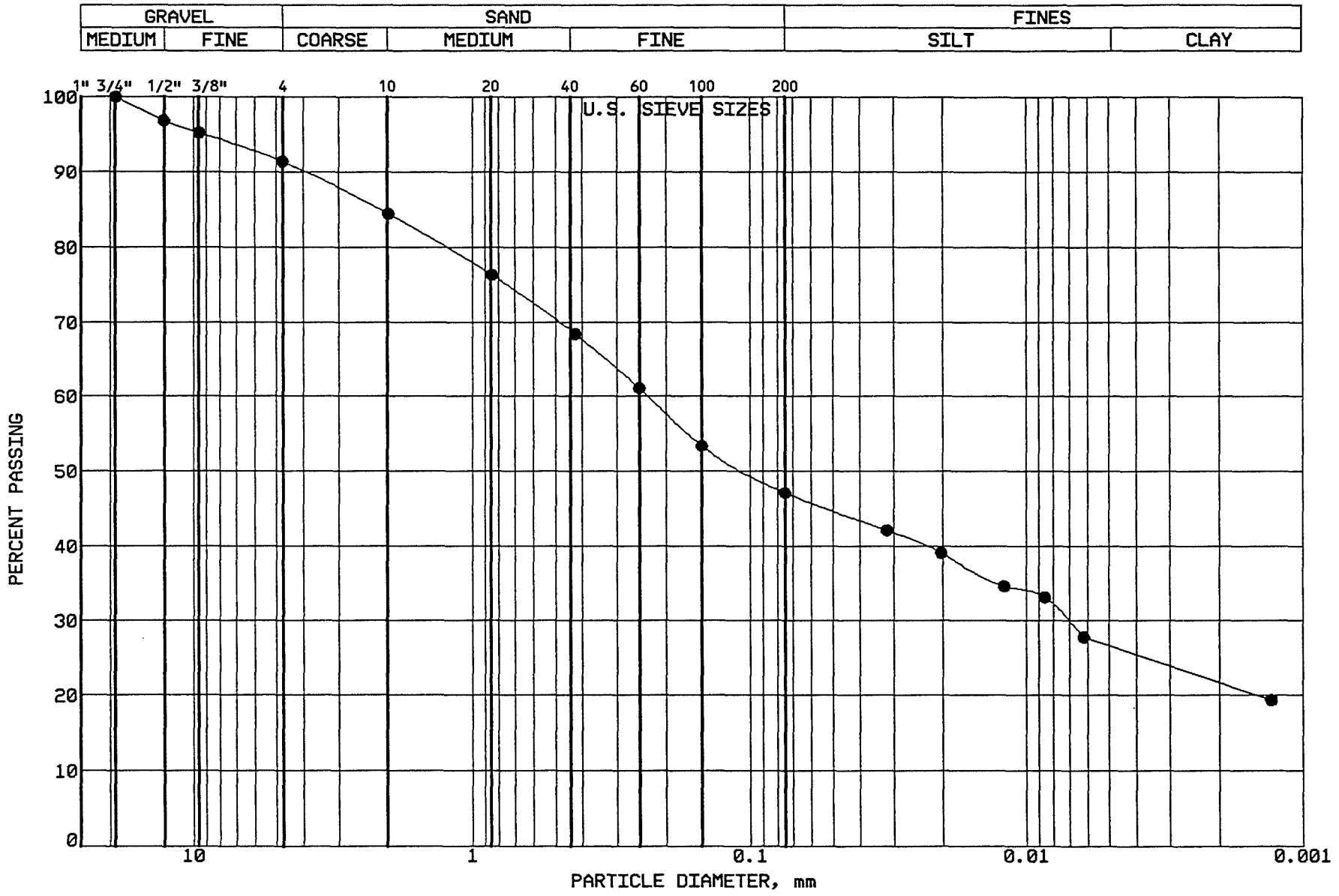
LOCATION: N 43406.0, E 44751.0
SAMPLE: SGCC410 TUBE #:
ELEVATION: 1883.7'

GRAVEL	3.2 %
SAND	31.3 %
SILT	31.4 %
CLAY	34.1 %
P 200	65.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

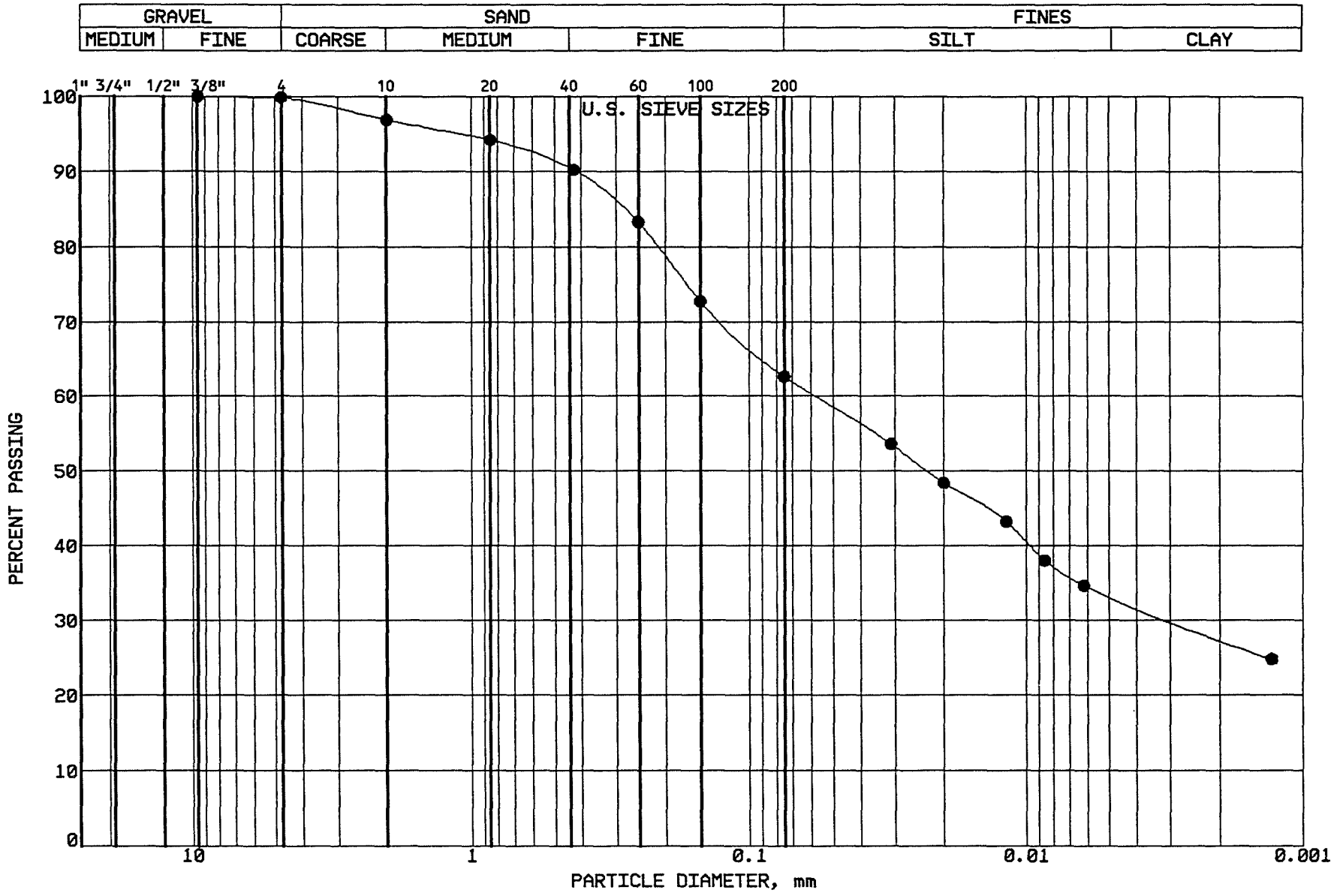
LOCATION: N 43407.0, E 44938.0
SAMPLE: SGCC411 TUBE #:
ELEVATION: 1883.8'

GRAVEL	8.6 %
SAND	44.3 %
SILT	20.5 %
CLAY	26.6 %
P 200	47.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND (SC), Dk.Gr.Br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

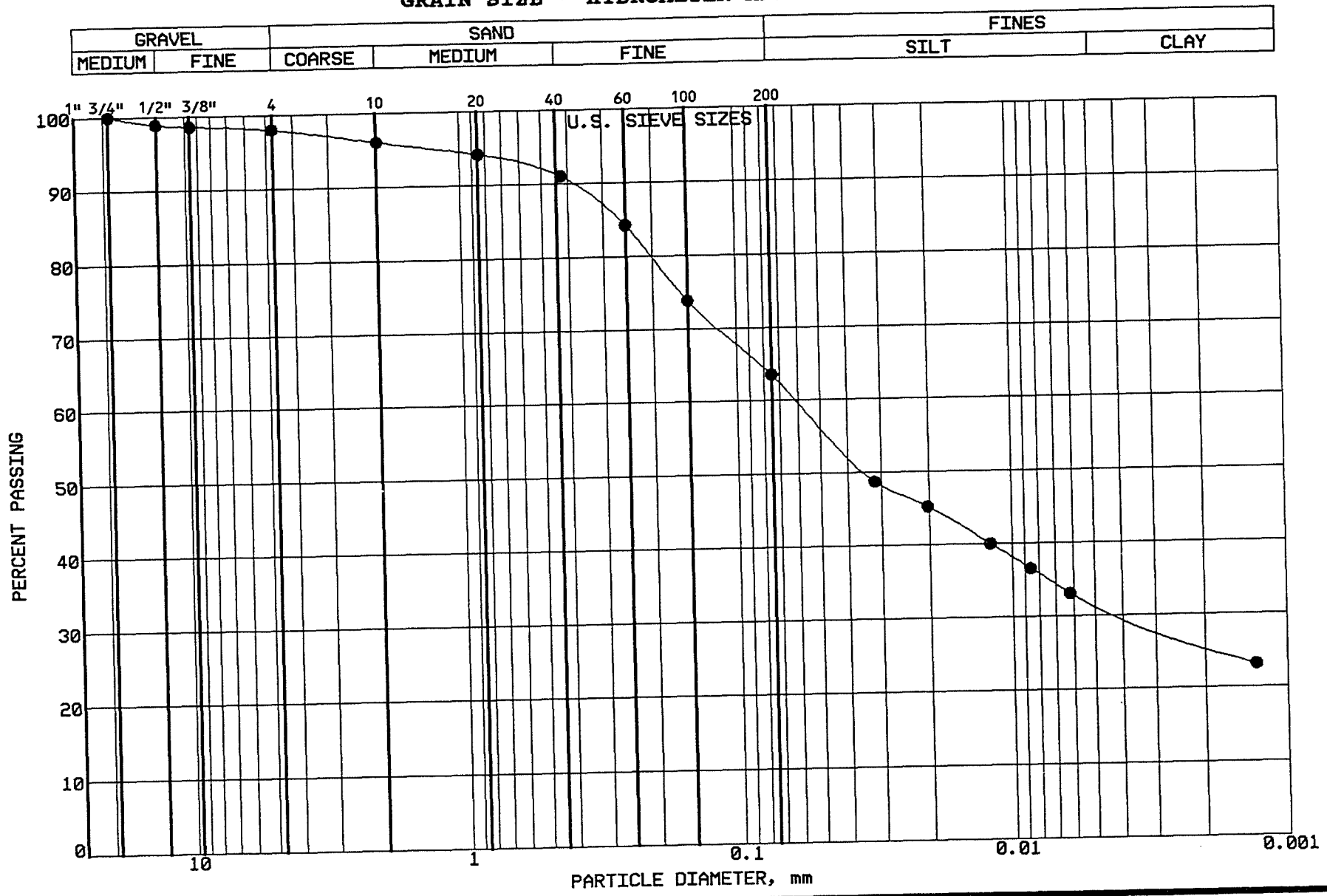
LOCATION: N 43408.0, E 45129.0
SAMPLE: SGCC412 TUBE #:
ELEVATION: 1883.4'

GRAVEL	0.1 %
SAND	37.3 %
SILT	29.3 %
CLAY	33.3 %
P 200	62.6 %

SOIL PROPERTIES

LL: 45.0%
PL: 15.0%
PI: 30.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

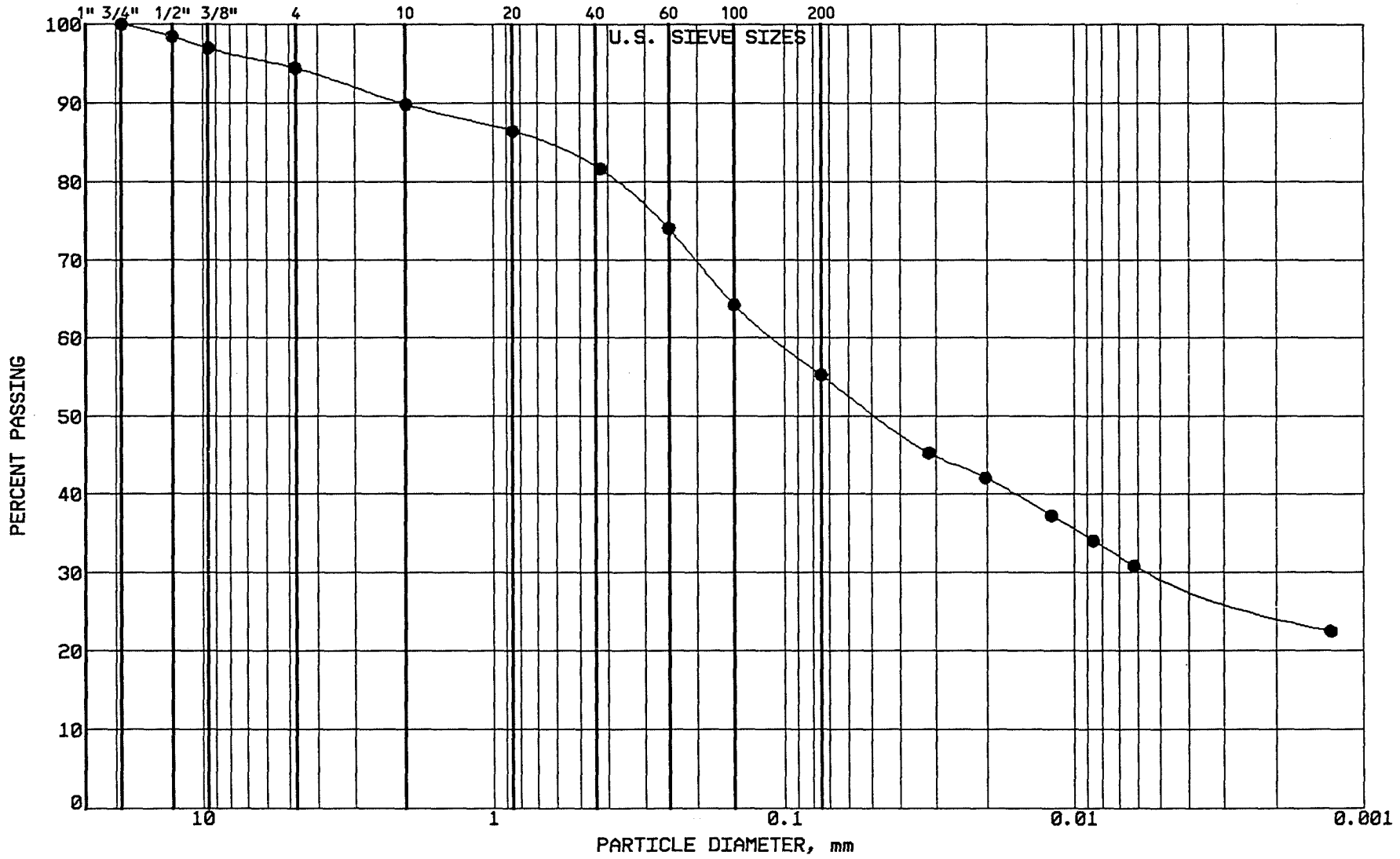
LOCATION: N 43417.0, E 45323.0
SAMPLE: SGCC413 TUBE #:
ELEVATION: 1885.0'

GRAVEL	2.0 %
SAND	34.5 %
SILT	31.8 %
CLAY	31.7 %
P 200	63.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

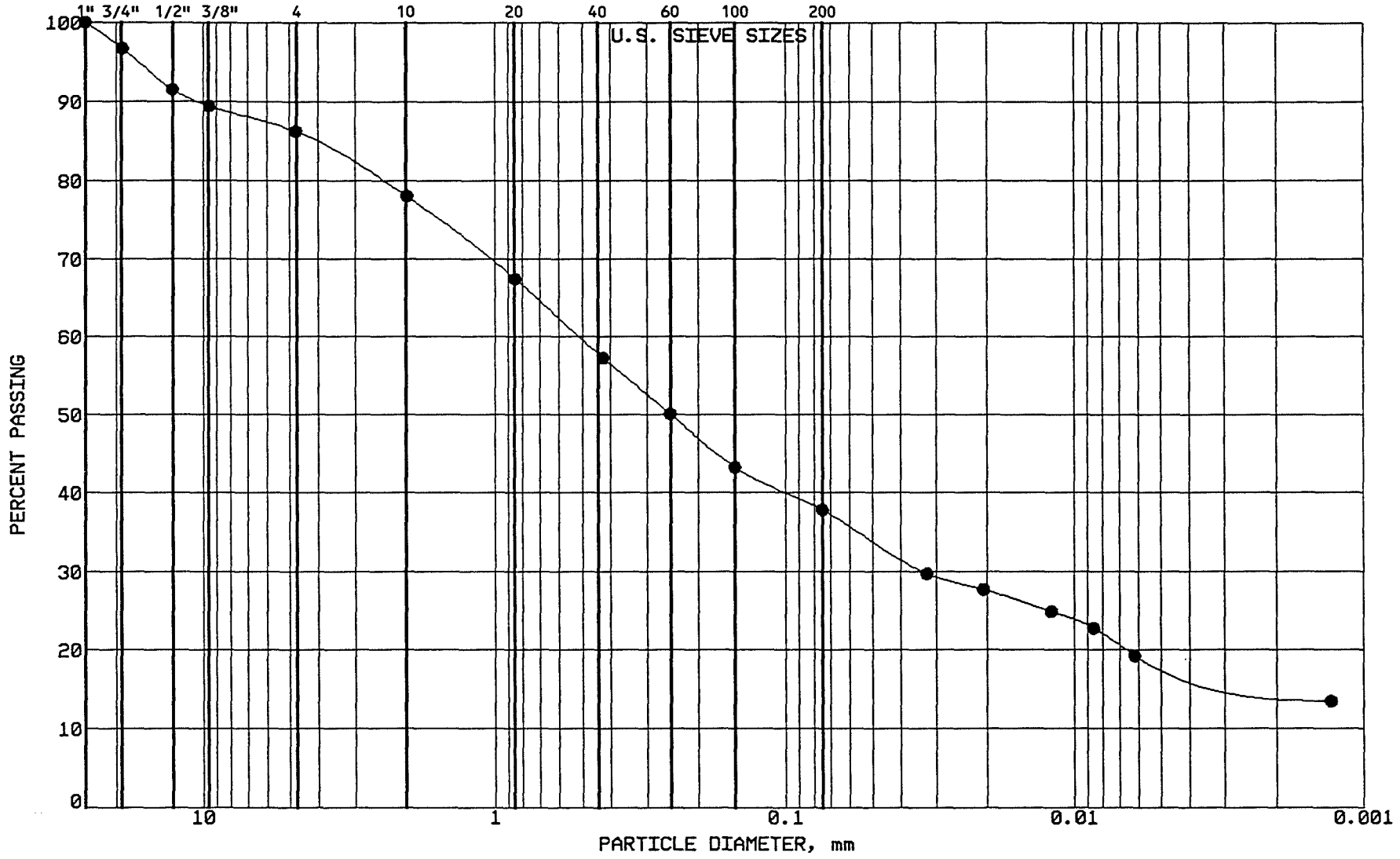
LOCATION: N 43410.0, E 45498.0
SAMPLE: SGCC414 TUBE #:
ELEVATION: 1886.9'

GRAVEL	5.6 %
SAND	39.1 %
SILT	25.6 %
CLAY	29.7 %
P 200	55.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

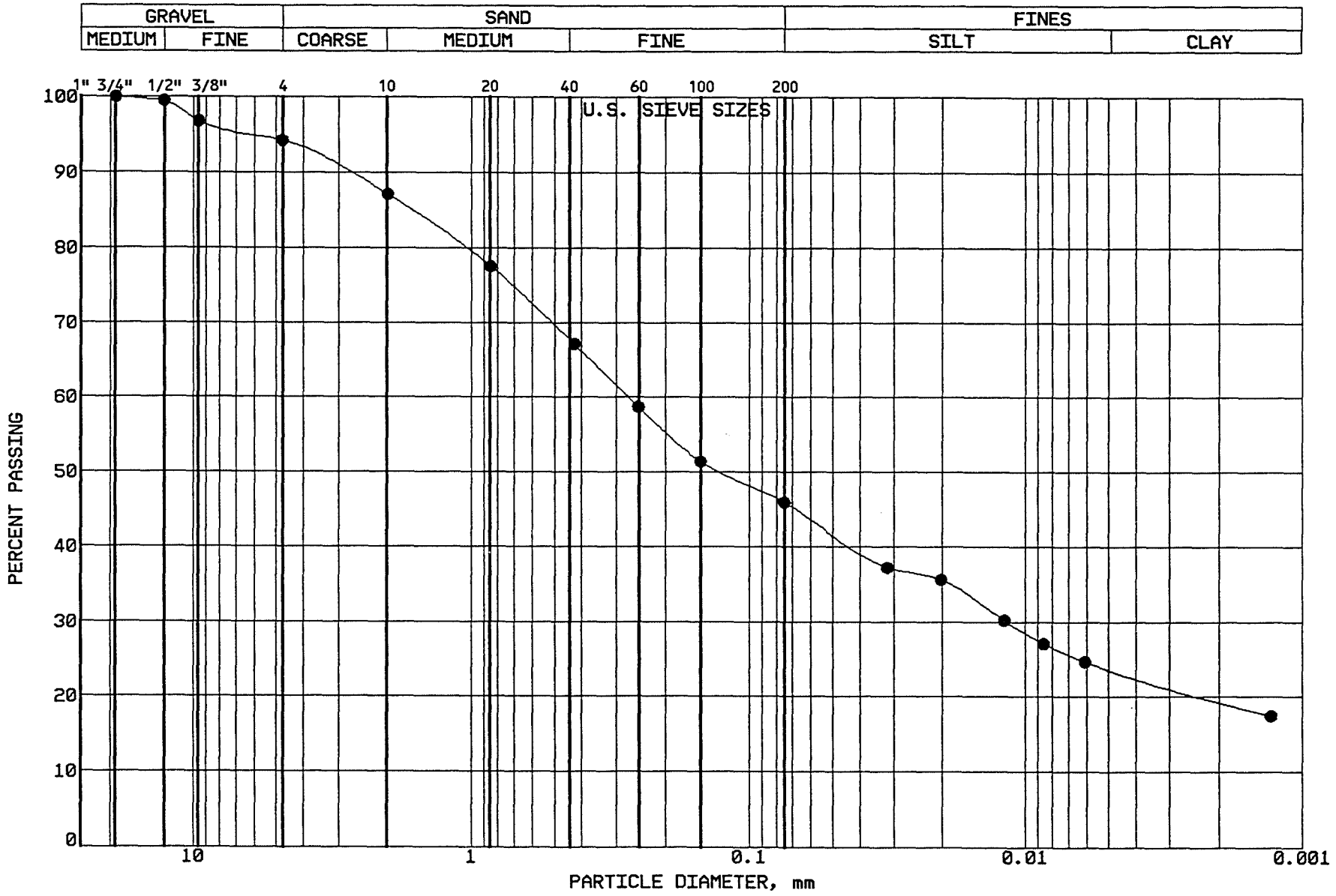
LOCATION: N 43131.0, E 44539.0
SAMPLE: SGCC415 TUBE #:
ELEVATION: 1881.2'

GRAVEL	13.8 %
SAND	48.4 %
SILT	19.3 %
CLAY	18.5 %
P 200	37.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND (SM), olive br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

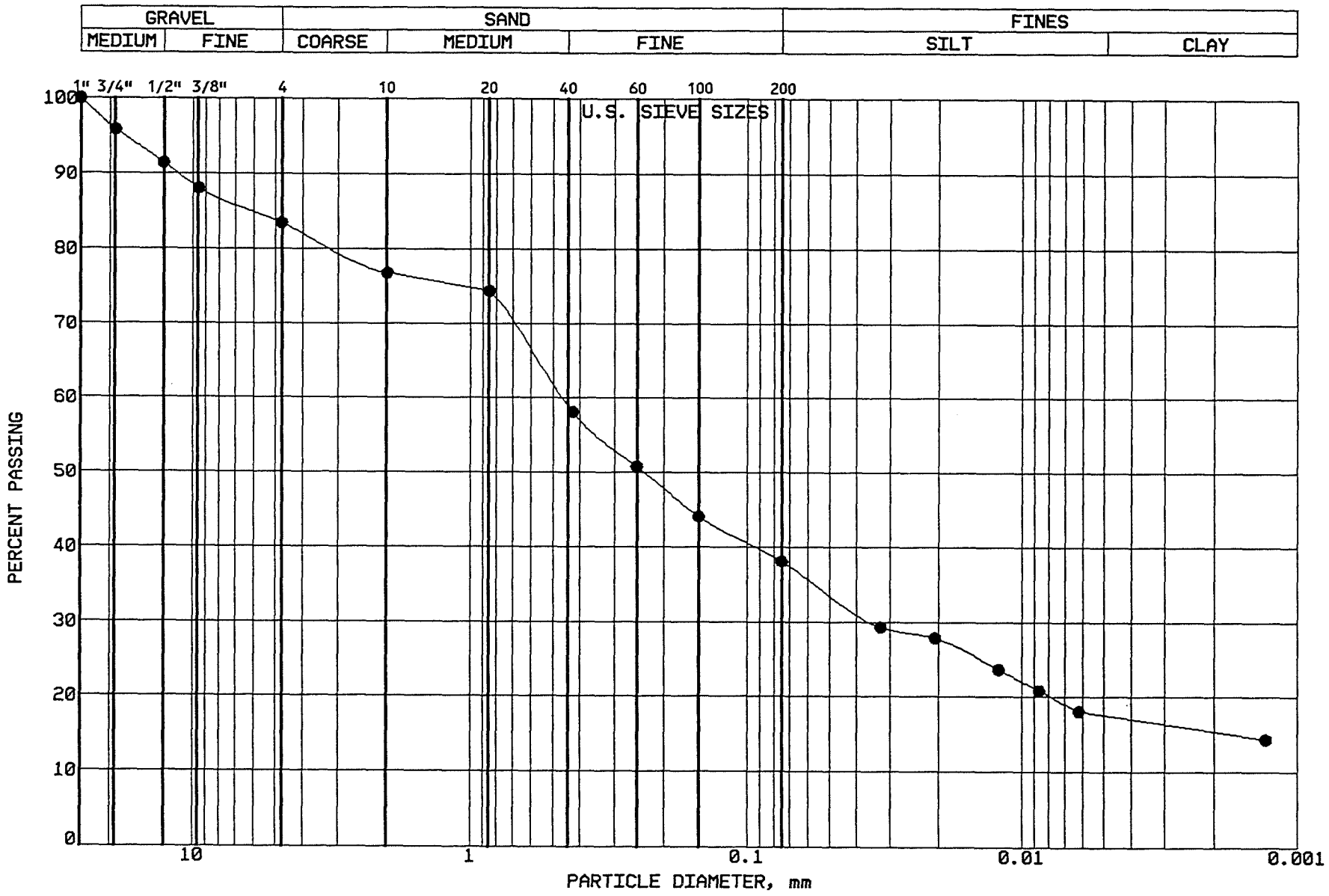
LOCATION: N 42948.0, E 44534.0
SAMPLE: SGCC416 TUBE #:
ELEVATION: 1880.1'

GRAVEL	5.8 %
SAND	48.3 %
SILT	22.1 %
CLAY	23.8 %
P 200	45.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND (SC), olive br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

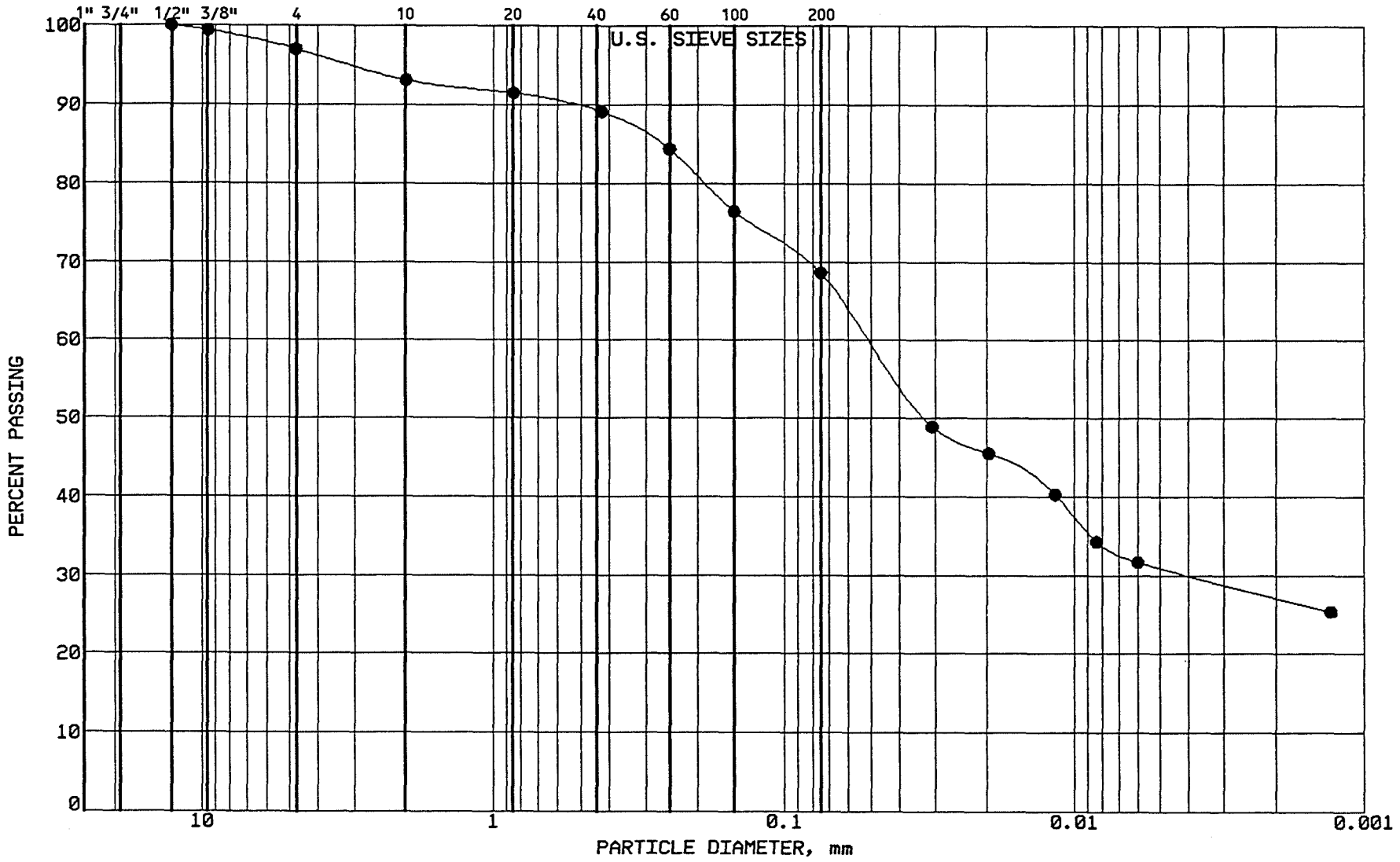
LOCATION: N 42763.0, E 44524.0
SAMPLE: SGCC417 TUBE #:
ELEVATION: 1879.6'

GRAVEL	16.6 %
SAND	45.3 %
SILT	20.5 %
CLAY	17.6 %
P 200	38.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND with GR (SM), ol.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43209.0, E 44104.0
SAMPLE: CLBCC418 TUBE #: ST-105
ELEVATION: 1887.9'

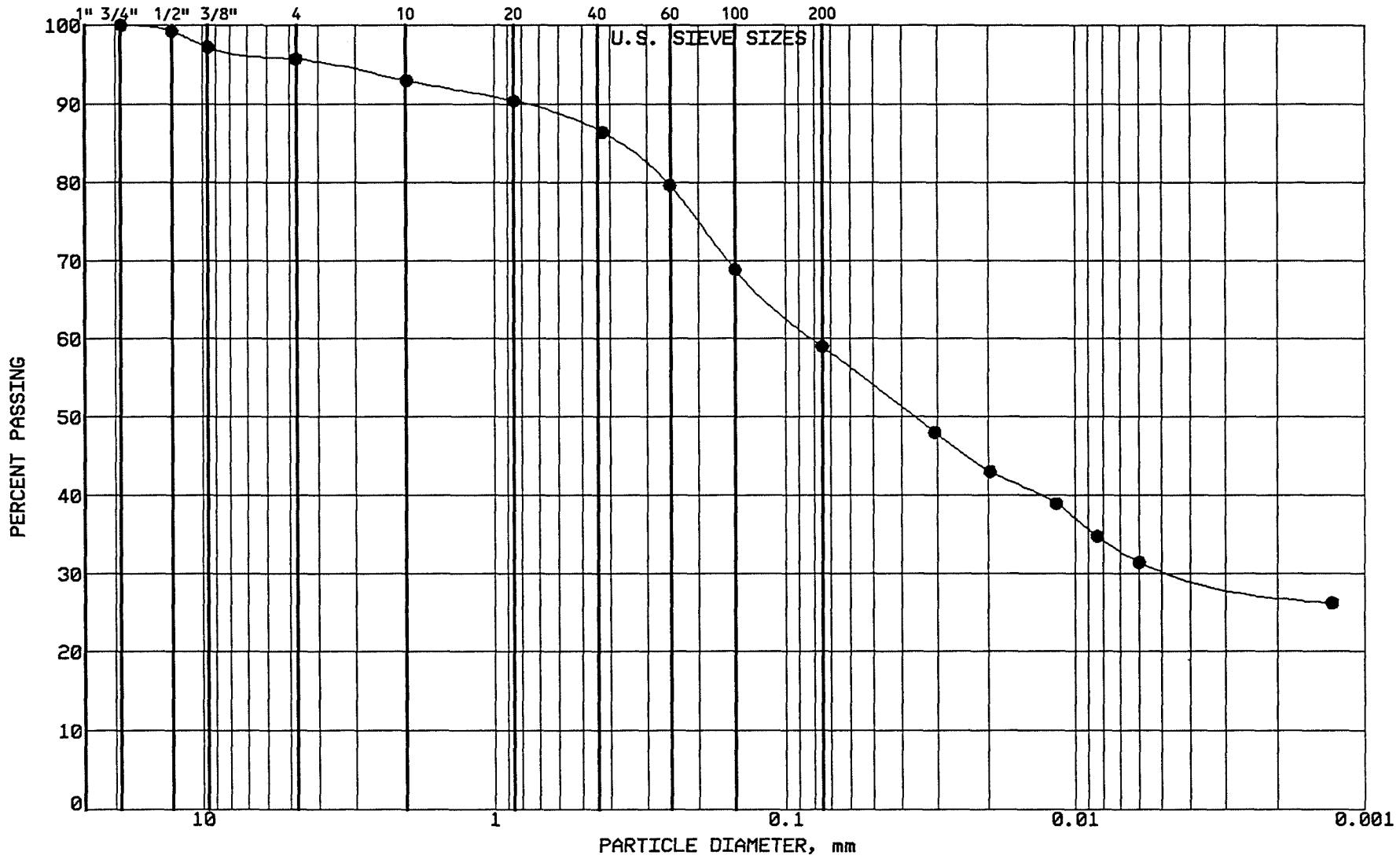
GRAVEL	3.0 %
SAND	28.4 %
SILT	37.7 %
CLAY	30.9 %
P 200	68.6 %

SOIL PROPERTIES

LL: 44.0%
PL: 16.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL), olive br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43211.0, E 43842.0
SAMPLE: CLBCC419 TUBE #: ST-106A
ELEVATION: 1888.1'

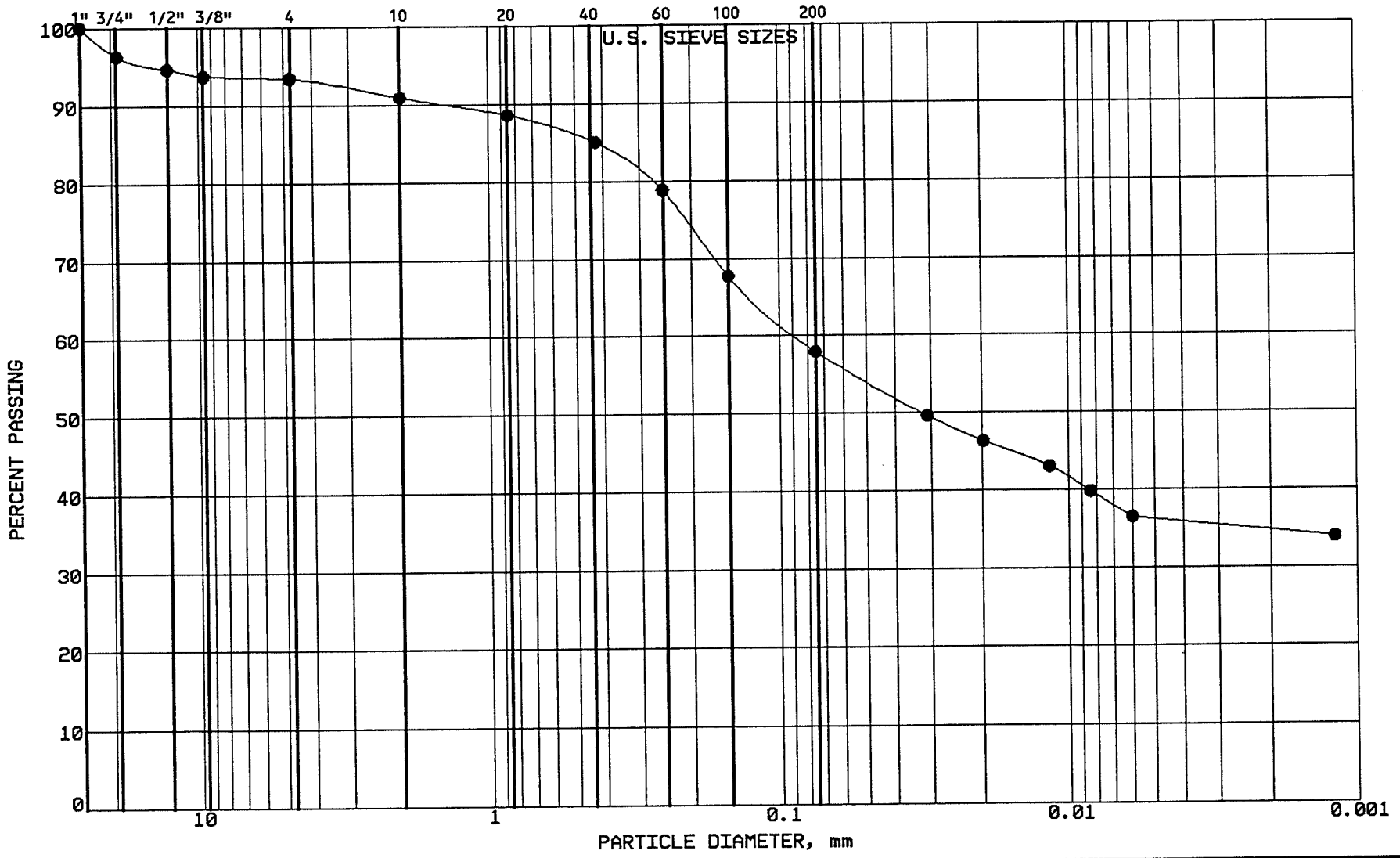
GRAVEL	4.3 %
SAND	36.7 %
SILT	28.2 %
CLAY	30.8 %
P 200	59.0 %

SOIL PROPERTIES

LL: 42.0%
PL: 14.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

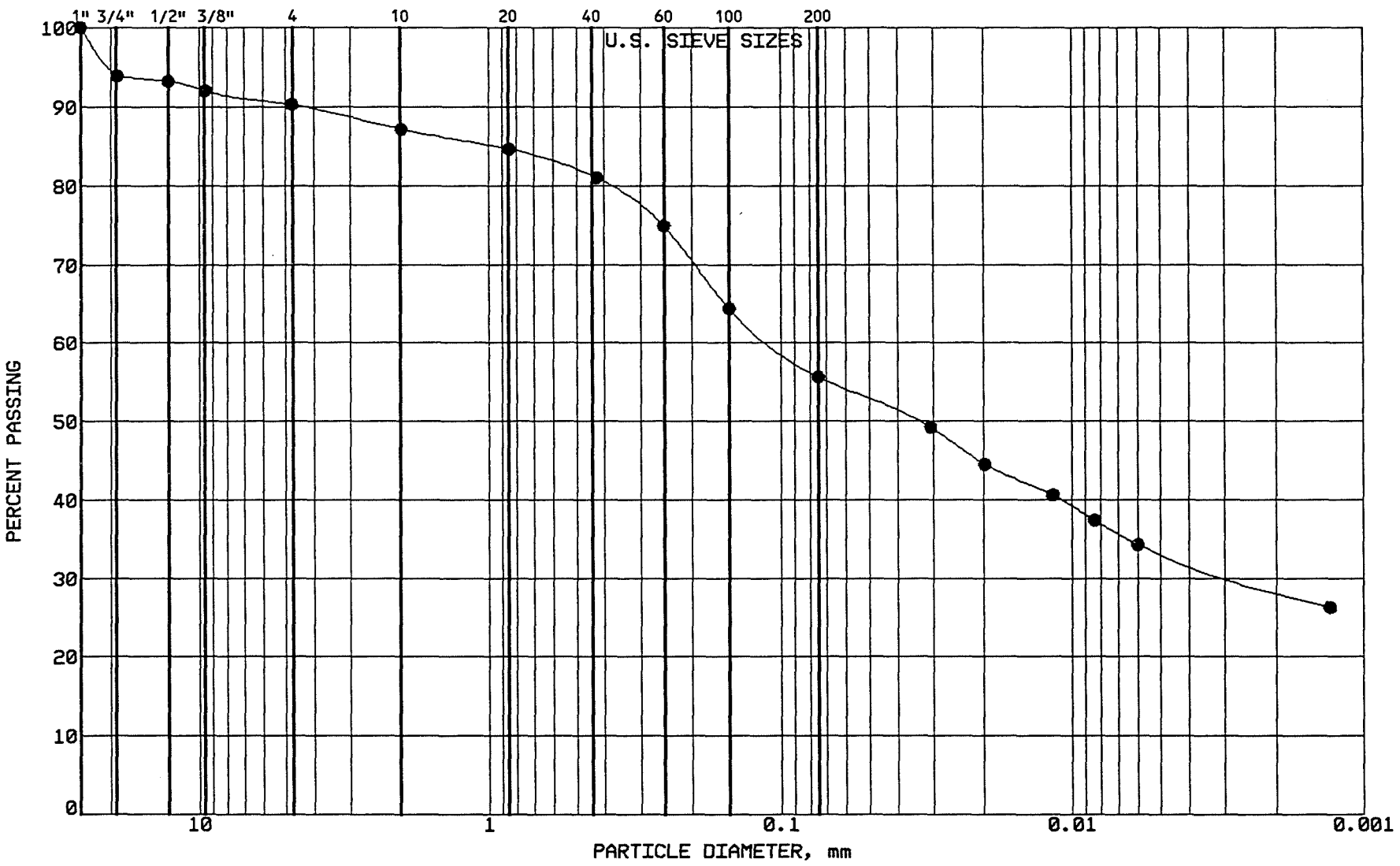
LOCATION: N 43209.0, E 43558.0
SAMPLE: CLBCC420 TUBE #: ST-107B
ELEVATION: 1888.2'

GRAVEL	6.6 %
SAND	35.5 %
SILT	21.7 %
CLAY	36.2 %
P 200	57.9 %

SOIL PROPERTIES

LL: 44.0%
PL: 17.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

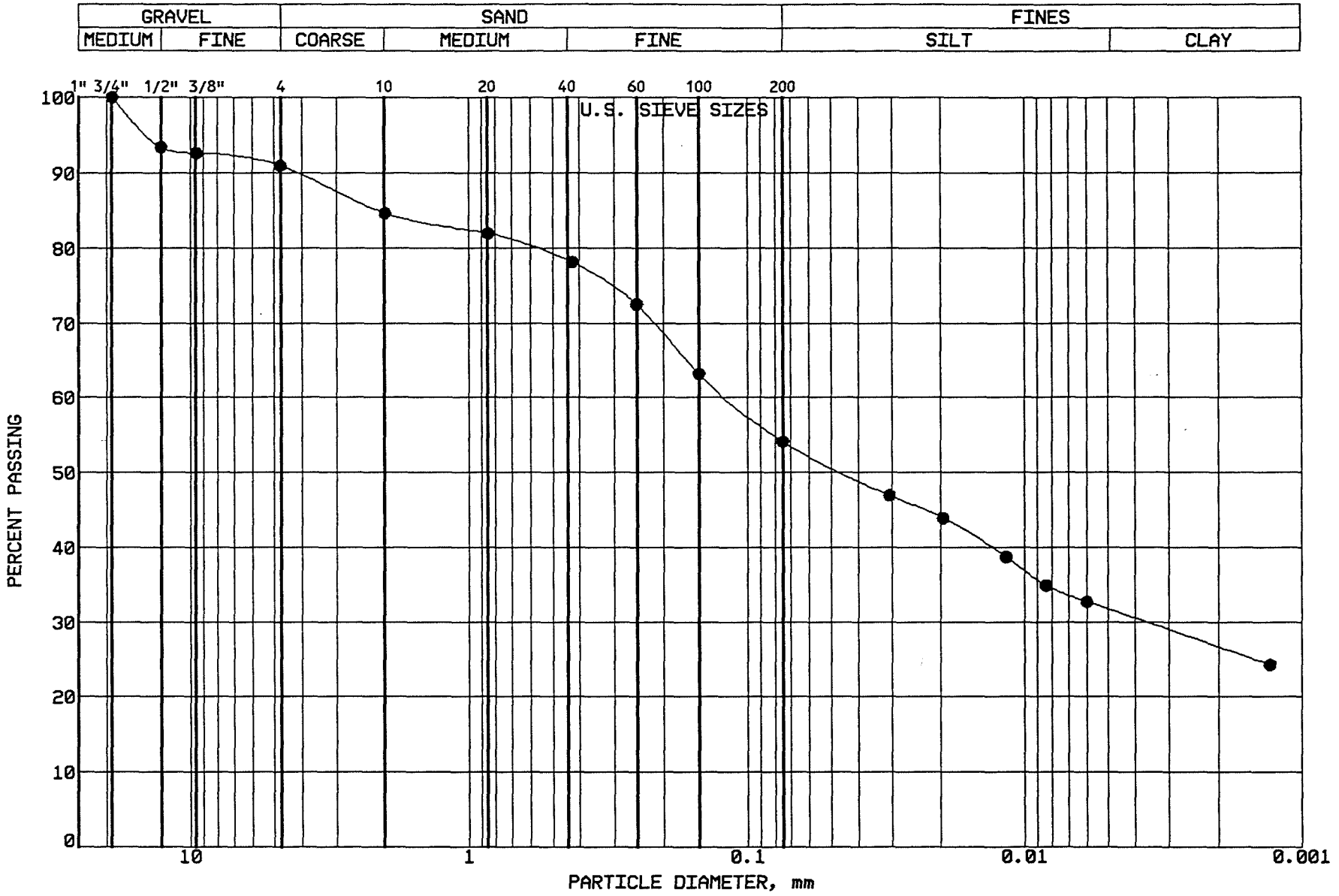
LOCATION: N 43095.0, E 43600.0
SAMPLE: CLBCC421 TUBE #:ST-108A
ELEVATION: 1886.6'

GRAVEL	9.7 %
SAND	34.7 %
SILT	22.3 %
CLAY	33.3 %
P 200	55.6 %

SOIL PROPERTIES

LL: 43.0%
PL: 15.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

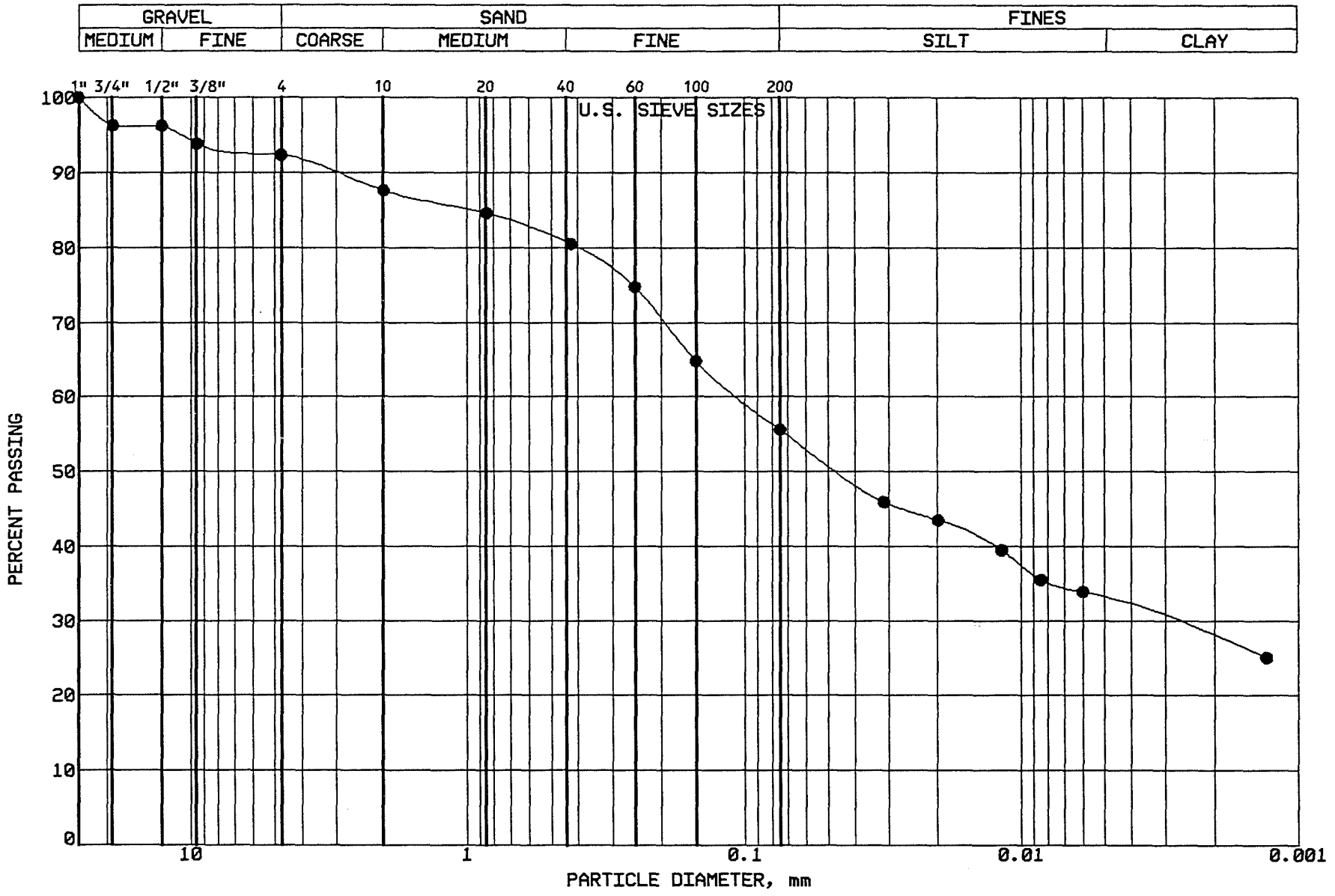
LOCATION: N 42788.0, E 43589.0
SAMPLE: CLBCC422 TUBE #: ST-109A
ELEVATION: 1885.6'

GRAVEL	9.1 %
SAND	36.8 %
SILT	22.4 %
CLAY	31.7 %
P 200	54.1 %

SOIL PROPERTIES

LL: 48.0%
PL: 17.0%
PI: 31.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42623.0, E 43589.0
SAMPLE: CLBCC423 TUBE #: ST-110
ELEVATION: 1884.4'

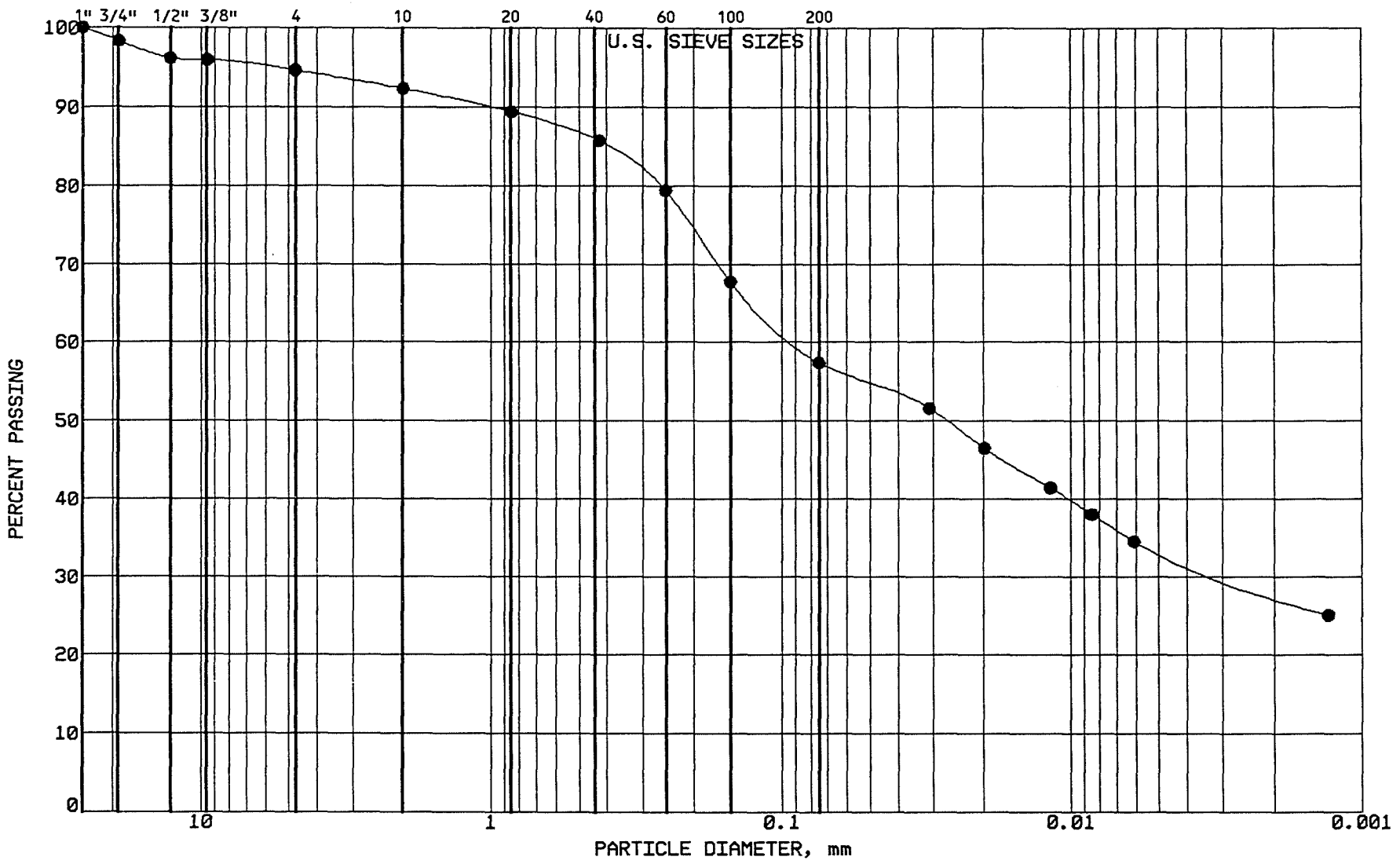
GRAVEL	7.7 %
SAND	36.7 %
SILT	22.7 %
CLAY	32.9 %
P 200	55.6 %

SOIL PROPERTIES

LL: 45.0%
PL: 15.0%
PI: 30.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

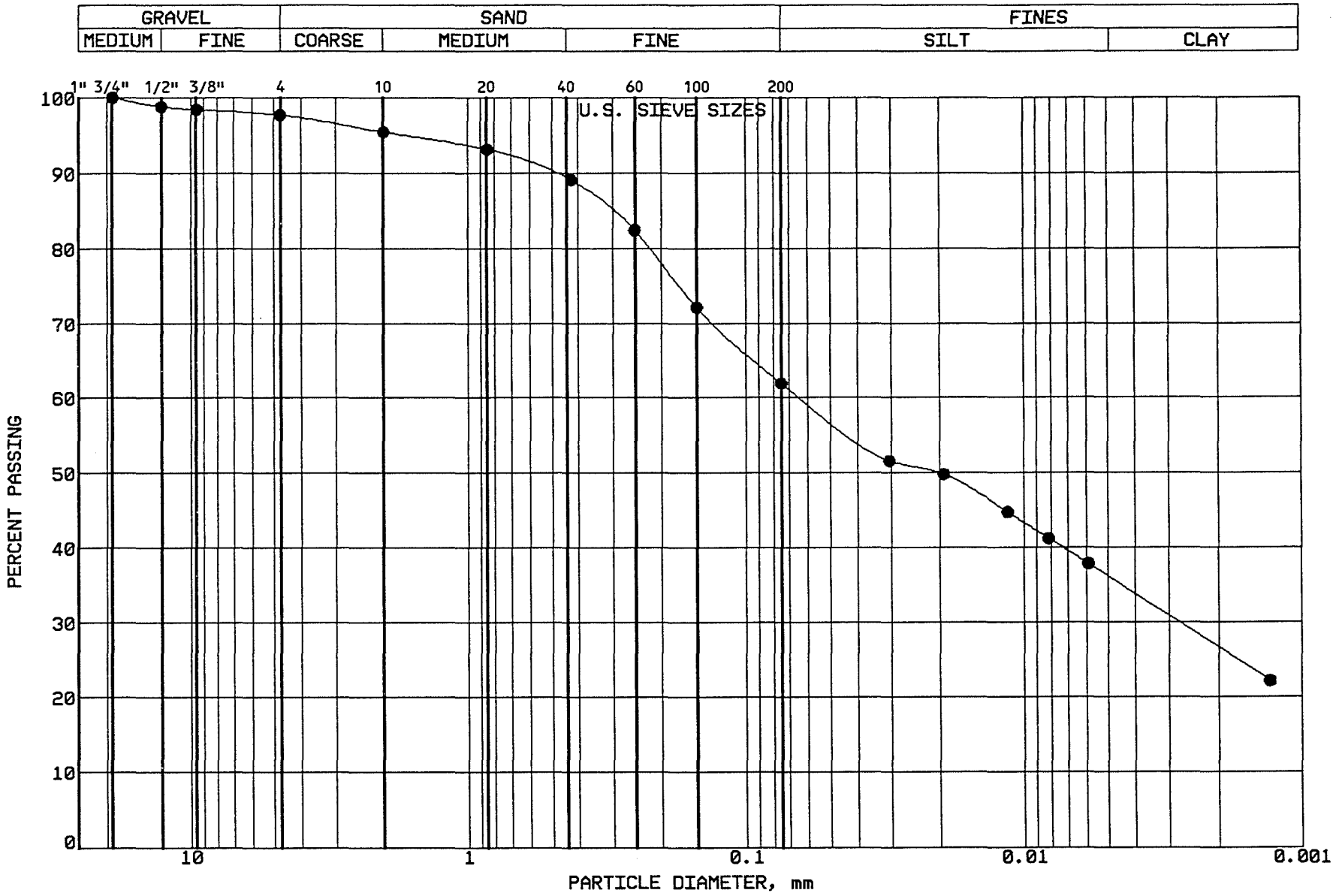
LOCATION: N 43009.0, E 43838.0
SAMPLE: CLBCC424 TUBE #: ST-111A
ELEVATION: 1886.9'

GRAVEL	5.4 %
SAND	37.2 %
SILT	24.1 %
CLAY	33.3 %
P 200	57.4 %

SOIL PROPERTIES

LL: 46.0%
PL: 16.0%
PI: 30.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

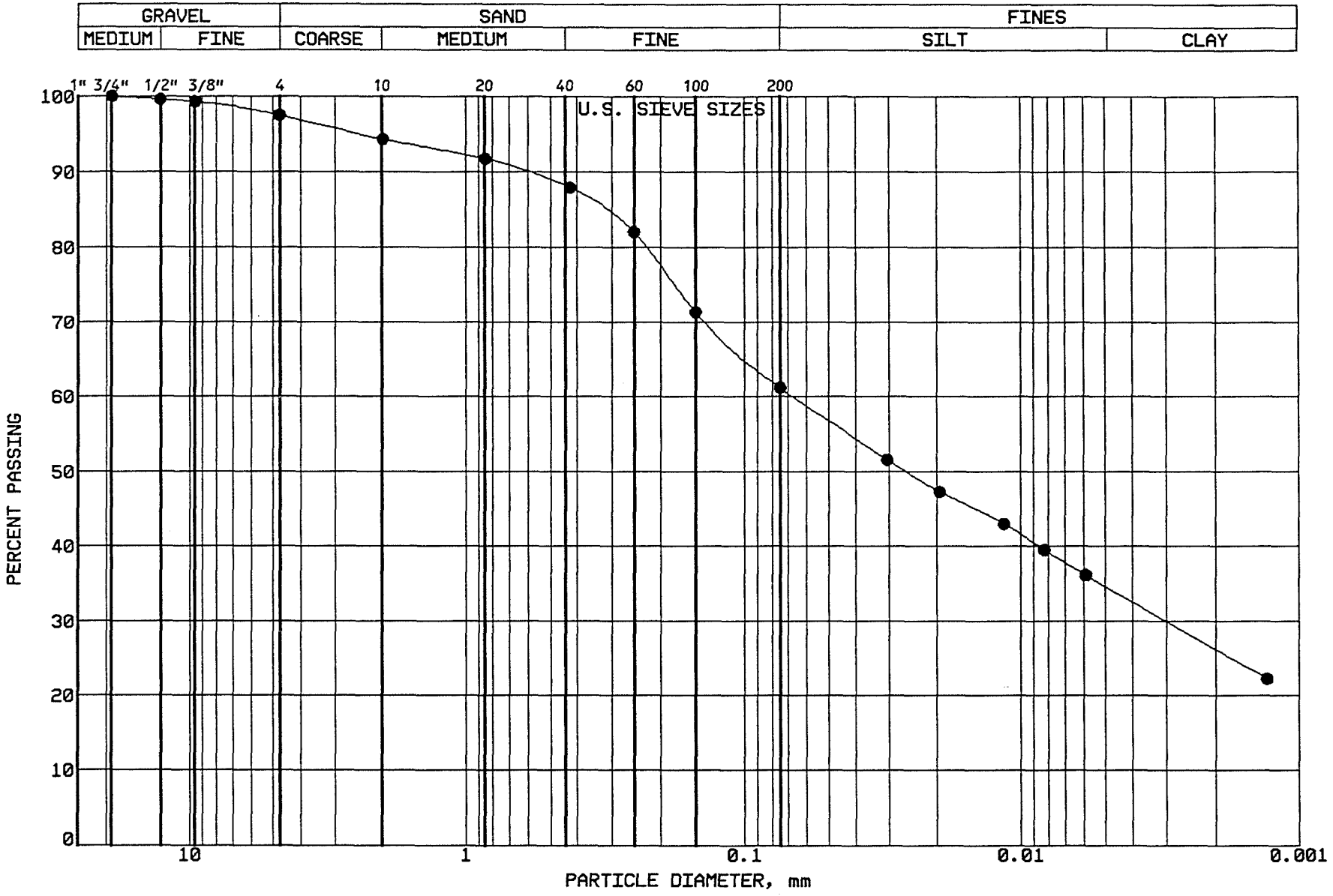
LOCATION: N 42820.0, E 43832.0
SAMPLE: CLBCC425 TUBE #: ST-112A
ELEVATION: 1886.1'

GRAVEL	2.3 %
SAND	35.8 %
SILT	25.8 %
CLAY	36.1 %
P 200	61.9 %

SOIL PROPERTIES

LL: 44.0%
PL: 16.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

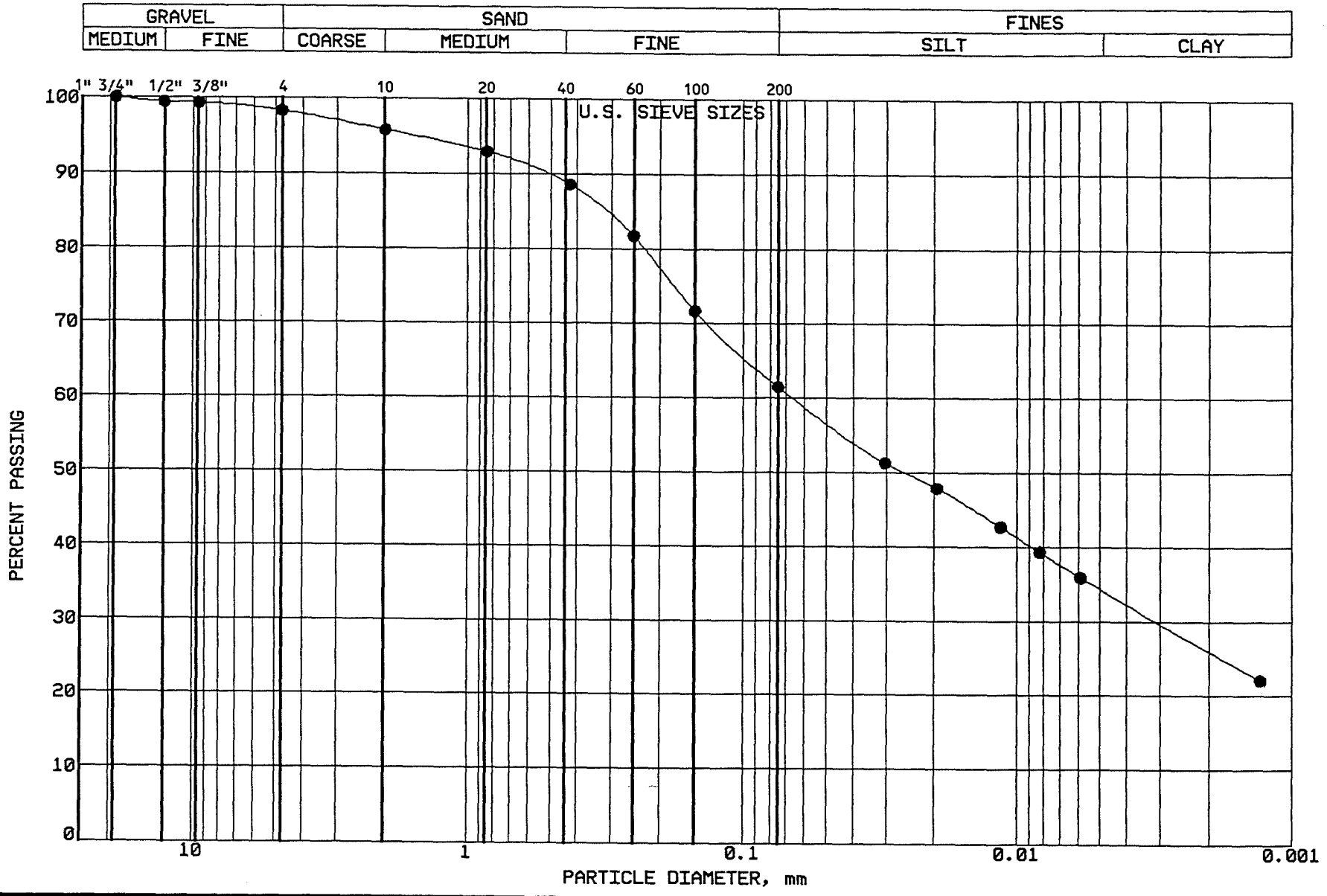
LOCATION: N 42632.0, E 43828.0
SAMPLE: CLBCC426 TUBE #: ST-113A
ELEVATION: 1885.0'

GRAVEL	2.5 %
SAND	36.3 %
SILT	26.6 %
CLAY	34.6 %
P 200	61.2 %

SOIL PROPERTIES

LL: 45.0%
PL: 17.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

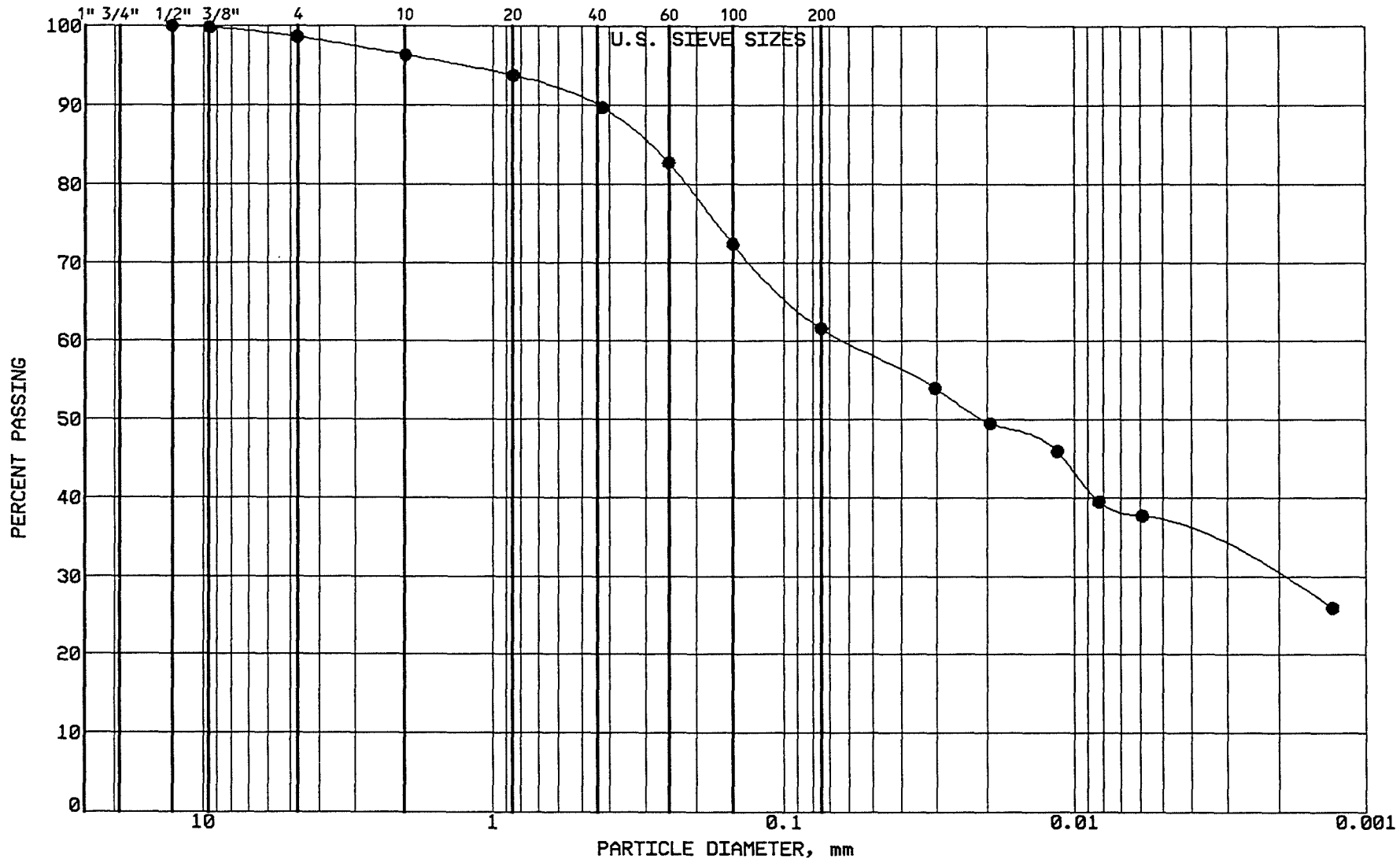
LOCATION: N 42660.0, E 44784.0
SAMPLE: SGCC427 TUBE #:
ELEVATION: 1877.7'

GRAVEL	1.7 %
SAND	36.8 %
SILT	27.1 %
CLAY	34.4 %
P 200	61.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

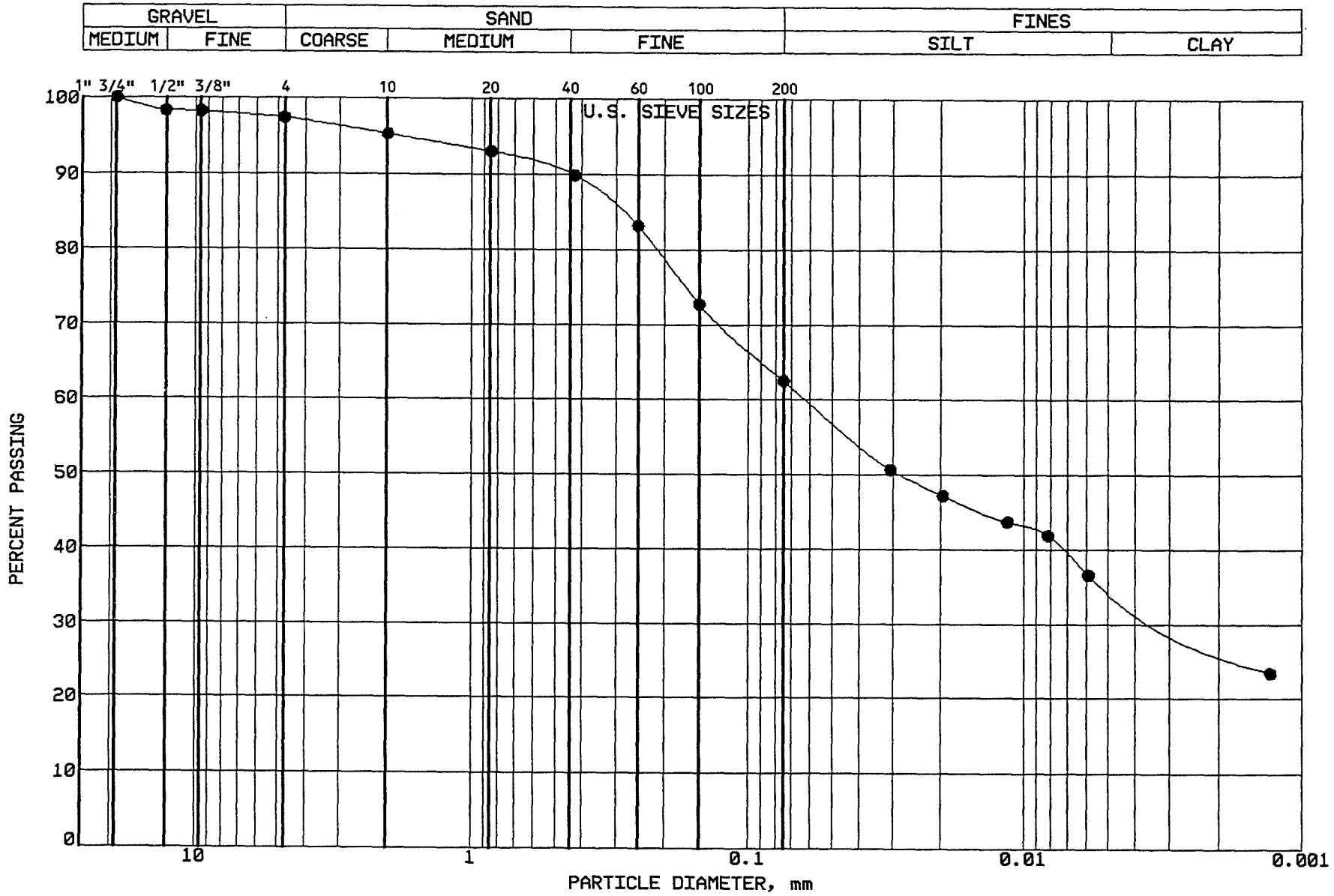
LOCATION: N 42664.0, E 44991.0
SAMPLE: SGCC428 TUBE #:
ELEVATION: 1877.5'

GRAVEL	1.4 %
SAND	37.0 %
SILT	25.2 %
CLAY	36.4 %
P 200	61.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

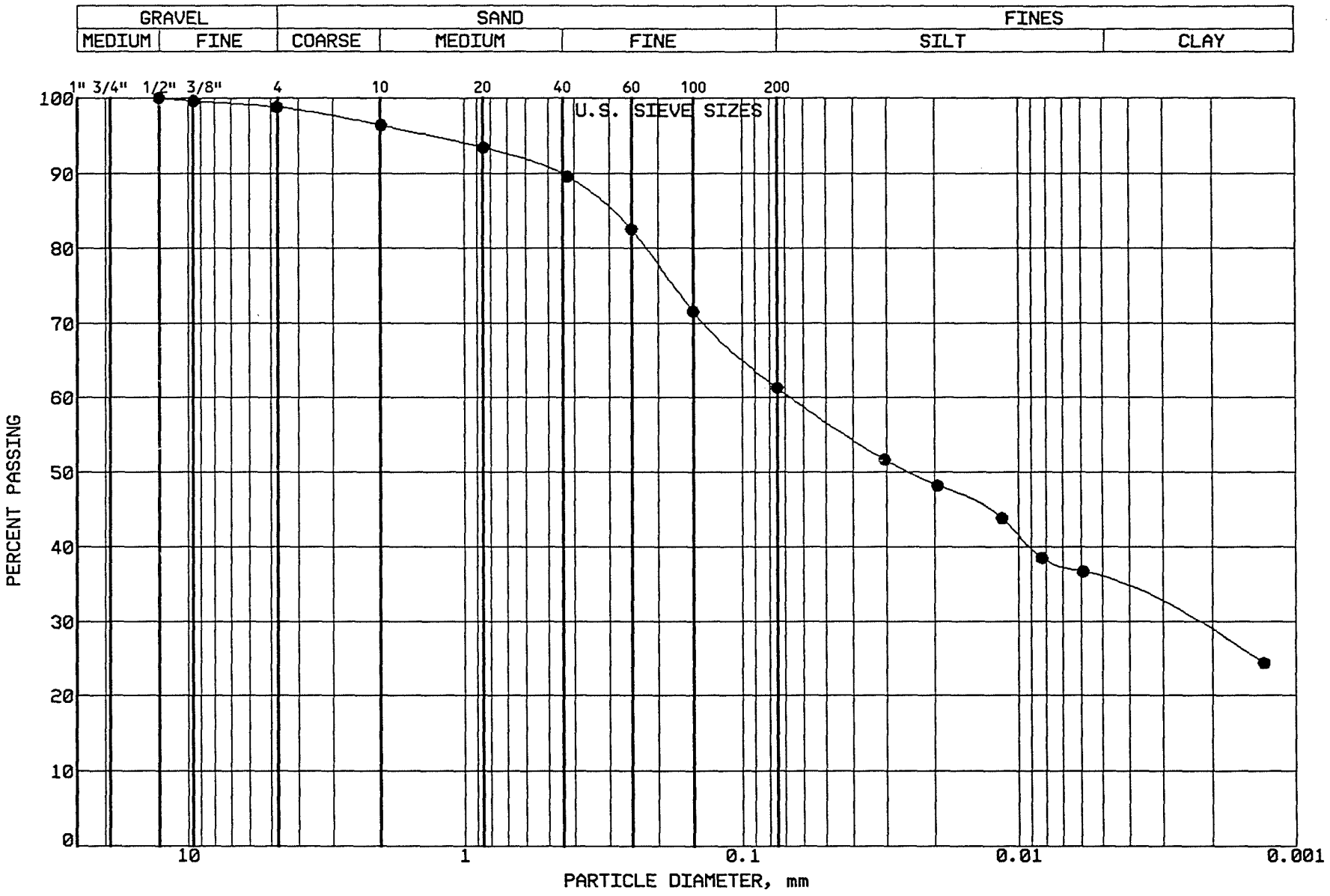
LOCATION: N 42995.0, E 44045.0
SAMPLE: CLBCC429 TUBE #: ST-114A
ELEVATION: 1886.5'

GRAVEL	2.6 %
SAND	34.9 %
SILT	27.3 %
CLAY	35.2 %
P 200	62.5 %

SOIL PROPERTIES

LL: 44.0%
PL: 15.0%
PI: 29.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

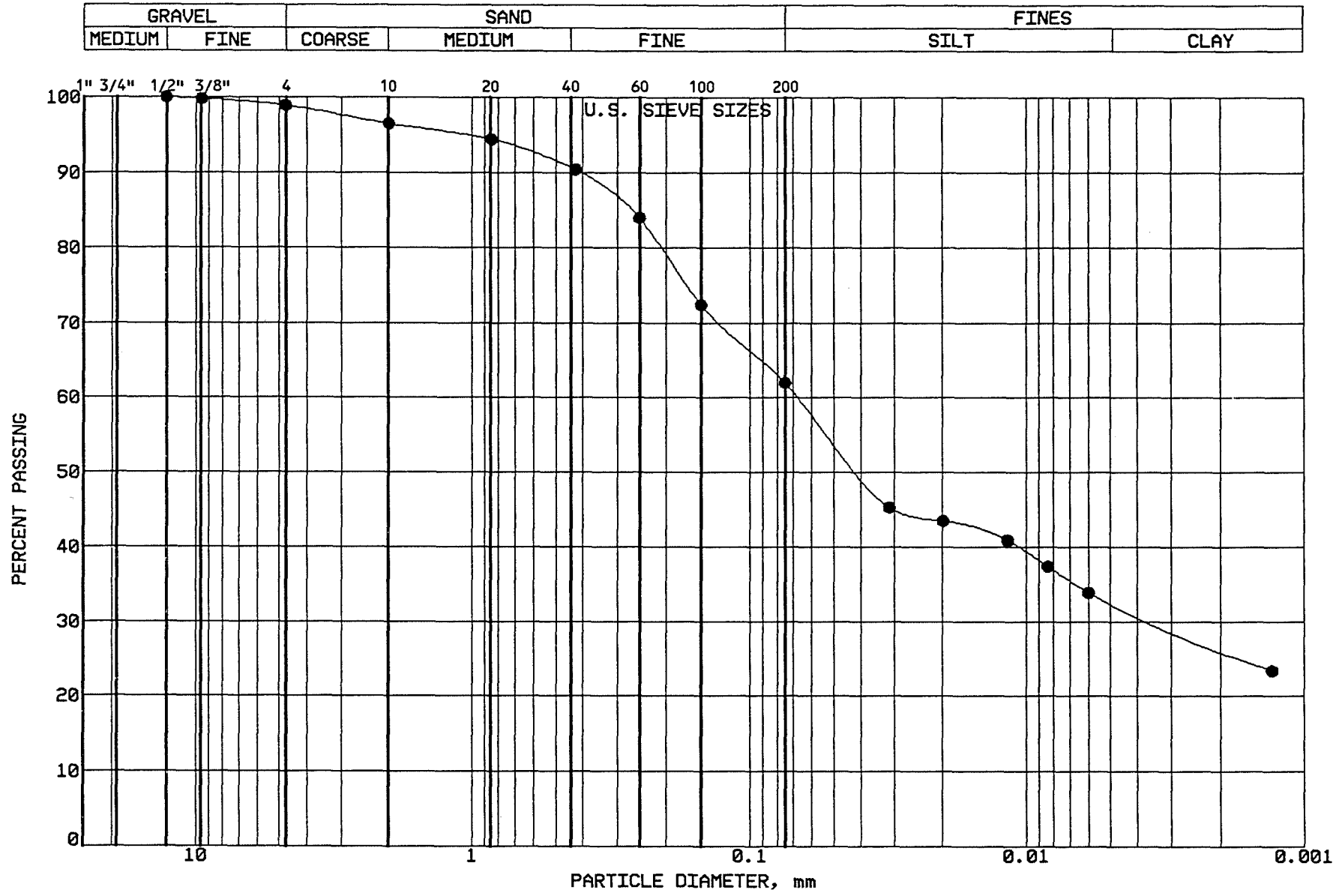
LOCATION: N 42809.0, E 44038.0
SAMPLE: CLBCC430 TUBE #: ST-115B
ELEVATION: 1885.6'

GRAVEL	1.2 %
SAND	37.5 %
SILT	25.9 %
CLAY	35.4 %
P 200	61.3 %

SOIL PROPERTIES

LL: 43.0%
PL: 17.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

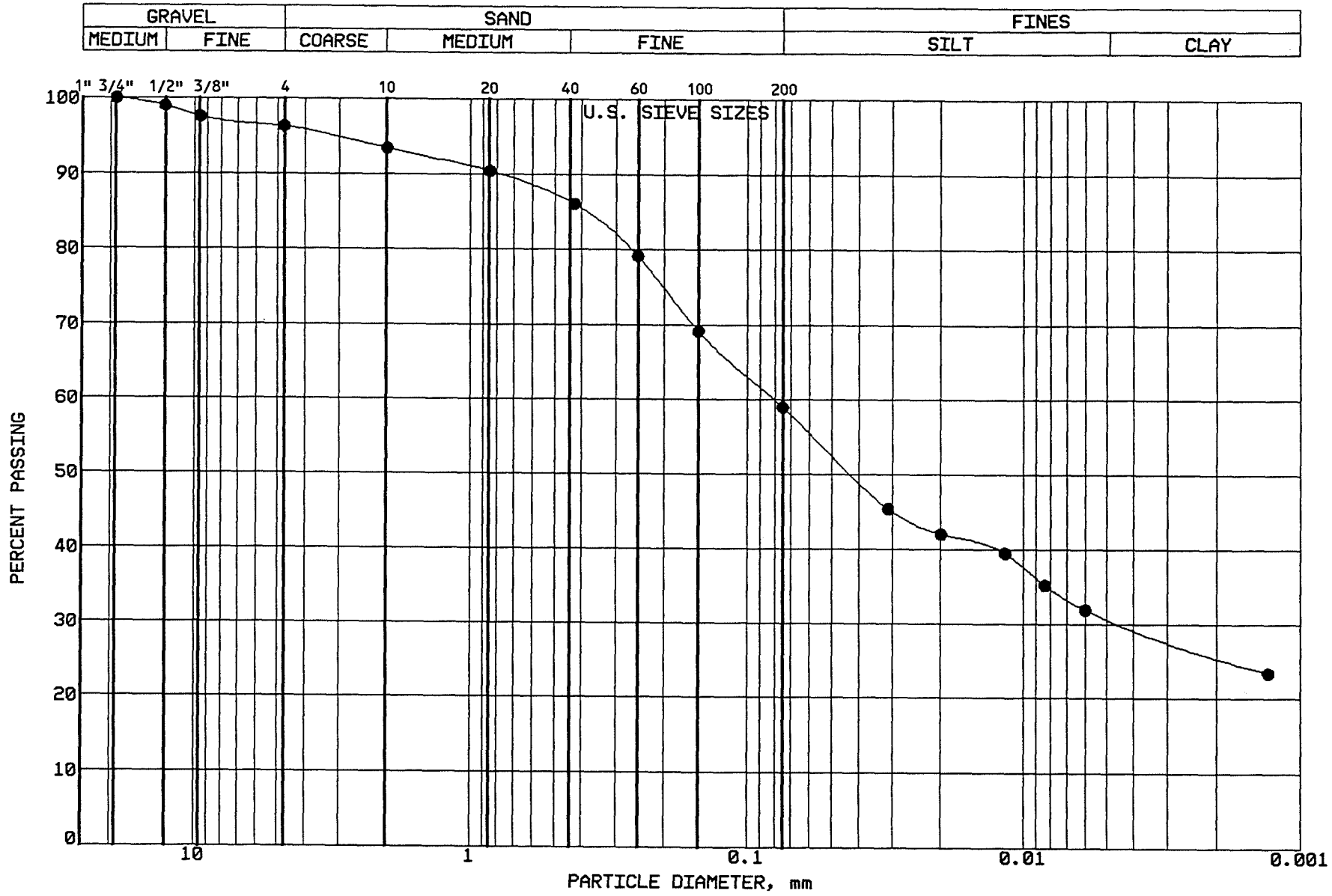
LOCATION: N 42647.0, E 44023.0
SAMPLE: CLBCC431 TUBE #: ST-116A
ELEVATION: 1884.3'

GRAVEL	1.1 %
SAND	36.9 %
SILT	29.4 %
CLAY	32.6 %
P 200	62.0 %

SOIL PROPERTIES

LL: 44.0%
PL: 15.0%
PI: 29.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

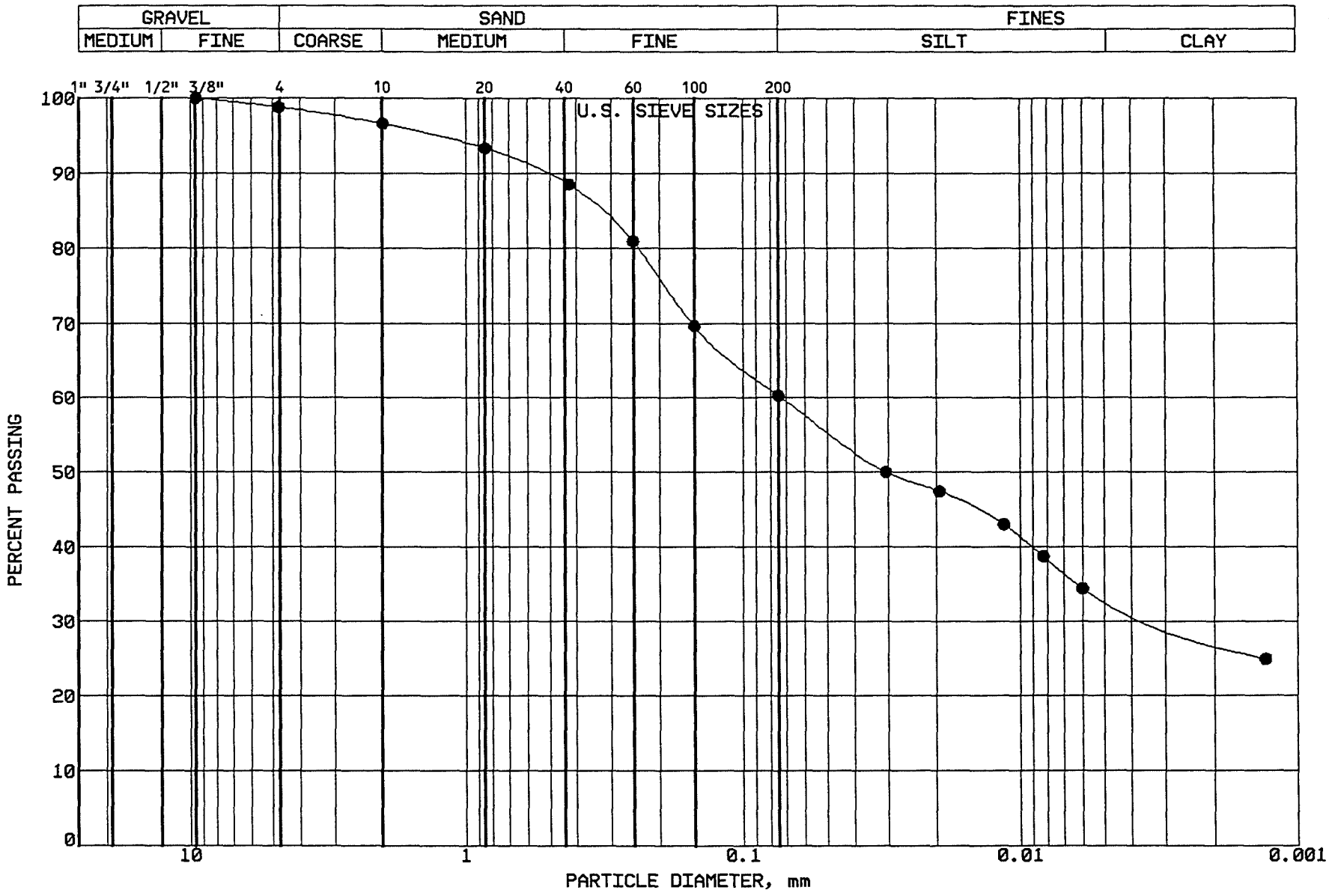
LOCATION: N 43202.0, E 44232.0
SAMPLE: SGCC432 TUBE #:
ELEVATION: 1885.6'

GRAVEL	3.7 %
SAND	37.3 %
SILT	28.1 %
CLAY	30.9 %
P 200	59.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43024.0, E 44217.0
SAMPLE: SGCC433 TUBE #:
ELEVATION: 1884.6'

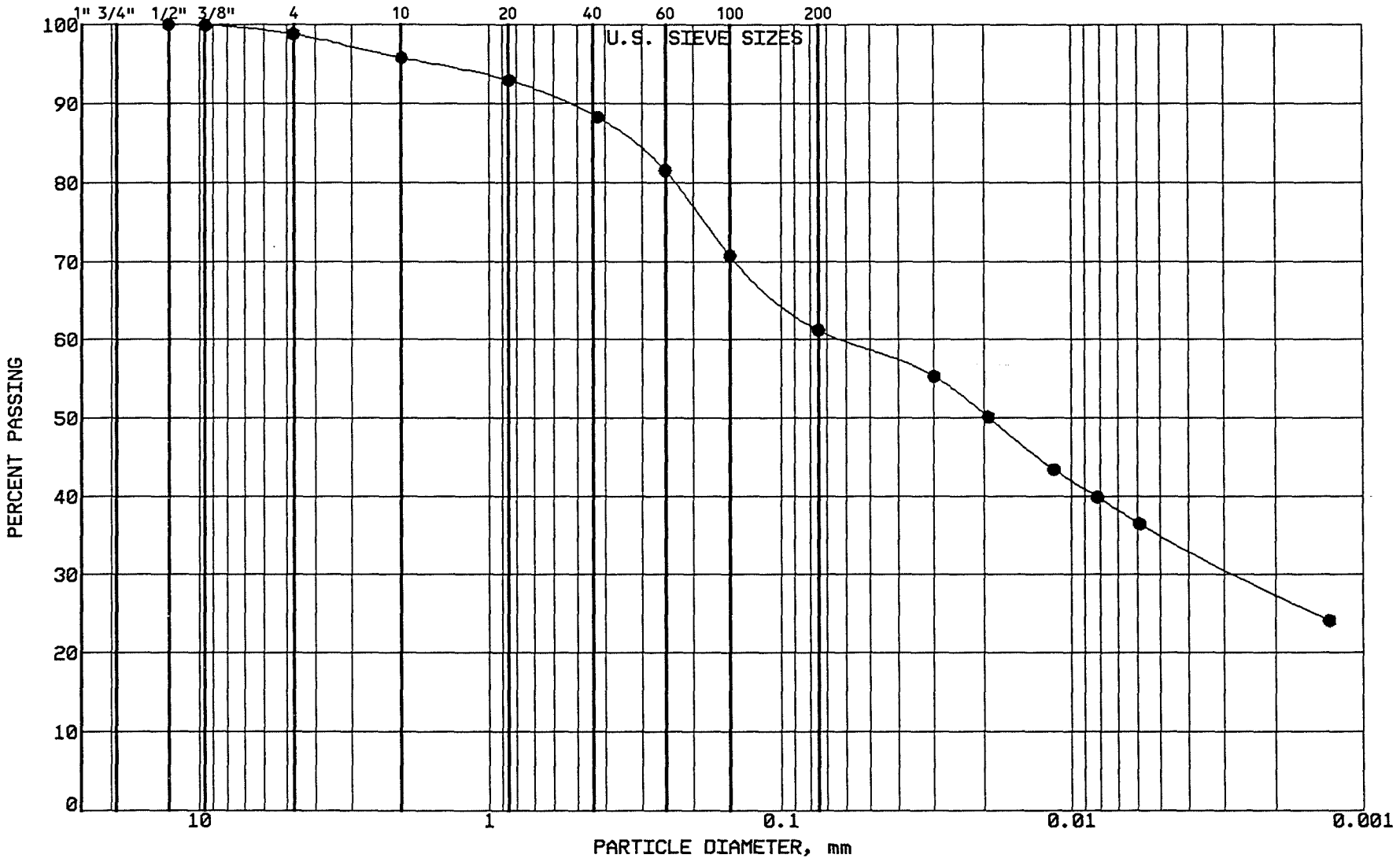
GRAVEL	1.2 %
SAND	38.5 %
SILT	27.0 %
CLAY	33.3 %
P 200	60.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

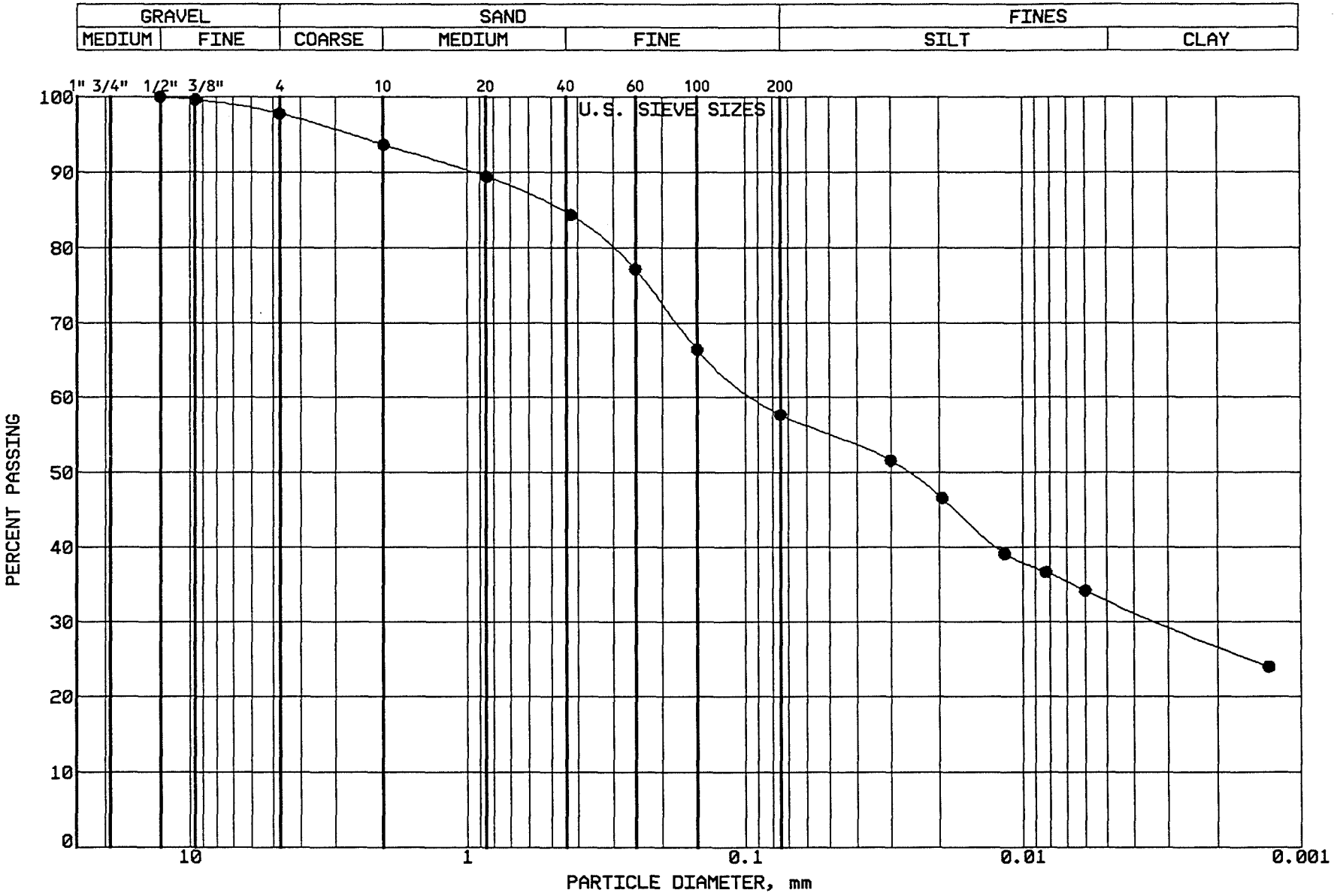
LOCATION: N 42815.0, E 44206.0
SAMPLE: SGCC434 TUBE #:
ELEVATION: 1883.2'

GRAVEL	1.2 %
SAND	37.6 %
SILT	26.1 %
CLAY	35.1 %
P 200	61.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

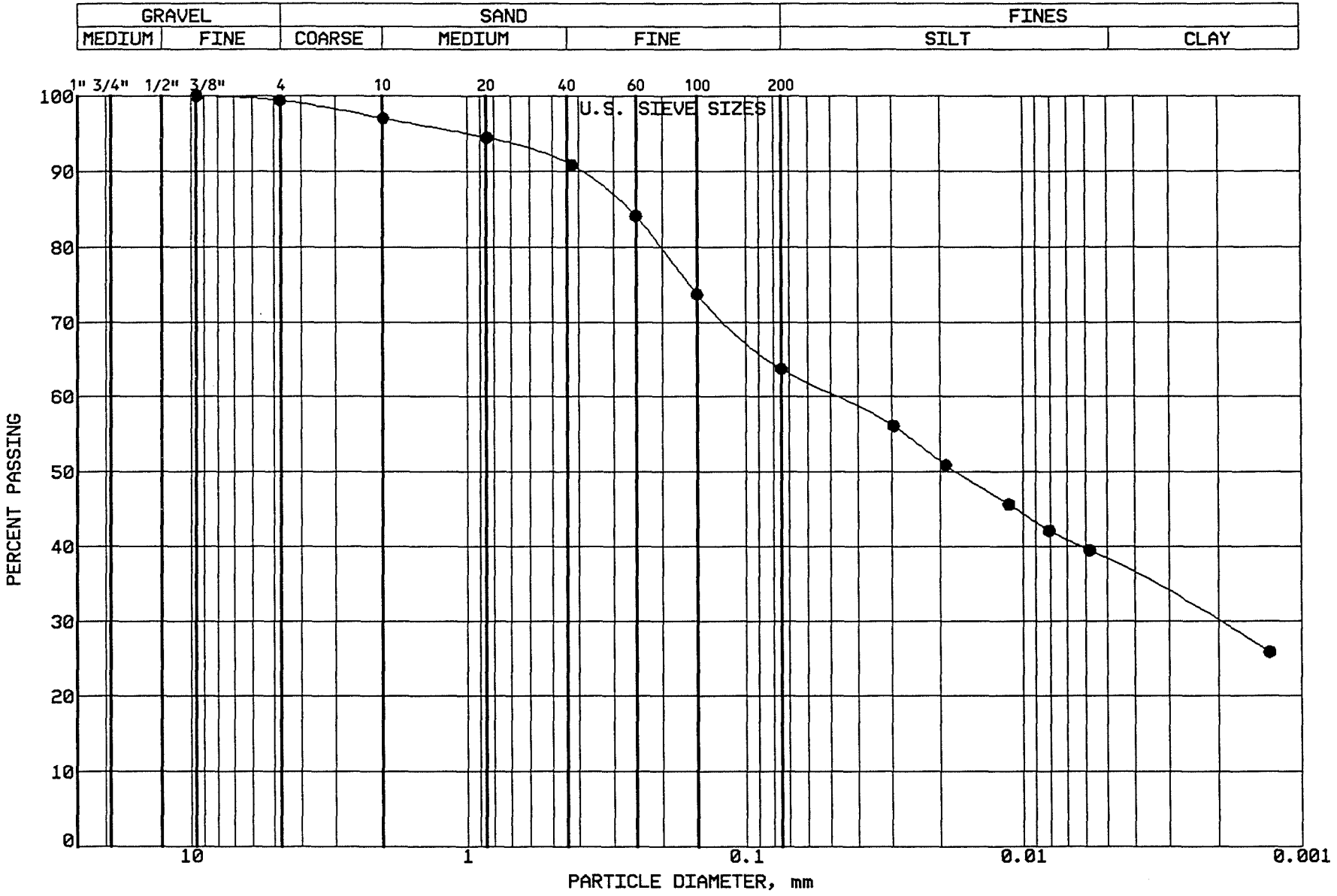
LOCATION: N 42637.0, E 44207.0
SAMPLE: SGCC435 TUBE #:
ELEVATION: 1882.1'

GRAVEL	2.2 %
SAND	40.1 %
SILT	24.8 %
CLAY	32.9 %
P 200	57.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS:

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

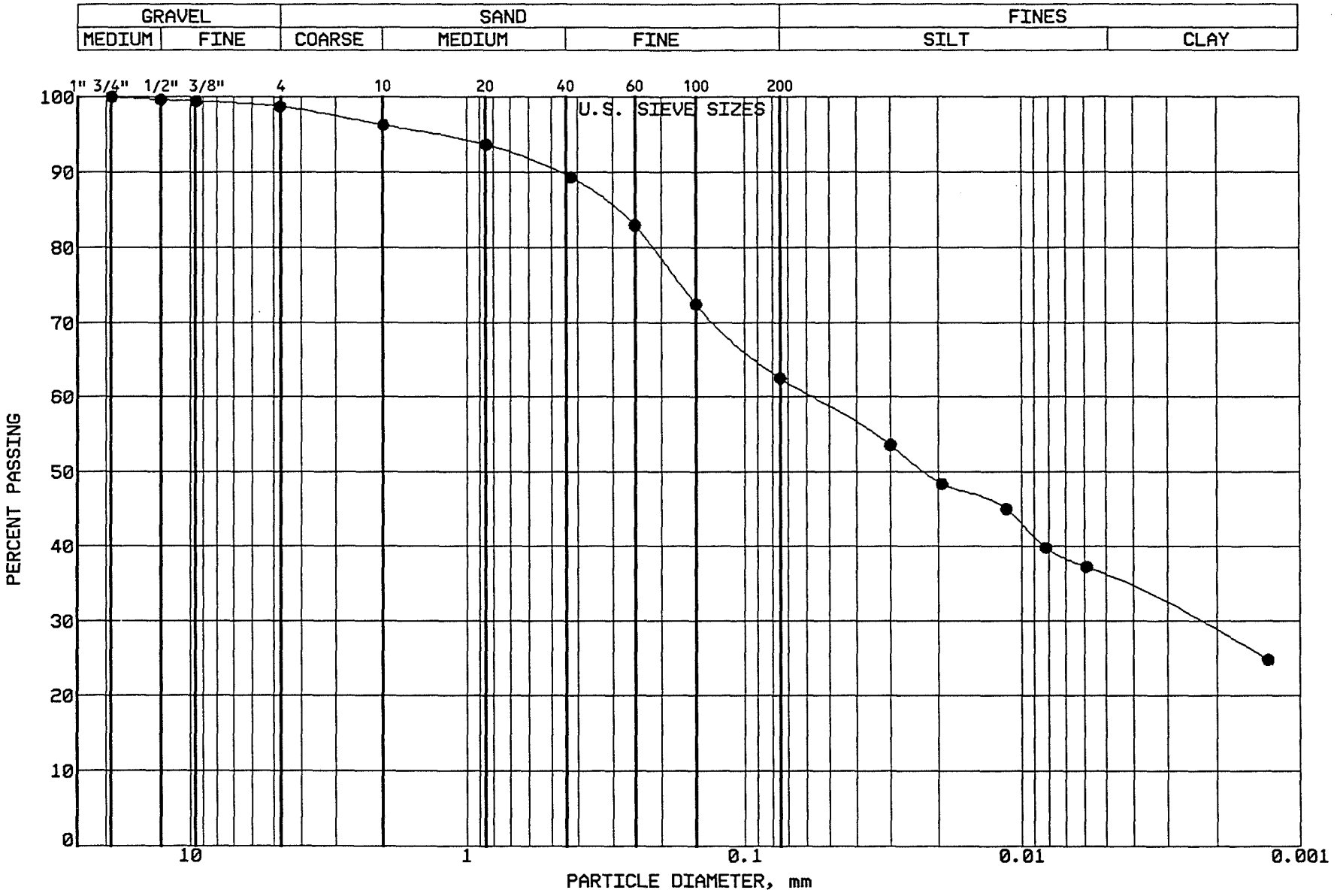
LOCATION: N 43200.0, E 44398.0
SAMPLE: SGCC436 TUBE #:
ELEVATION: 1884.7'

GRAVEL	0.6 %
SAND	35.7 %
SILT	25.5 %
CLAY	38.2 %
P 200	63.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS:

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

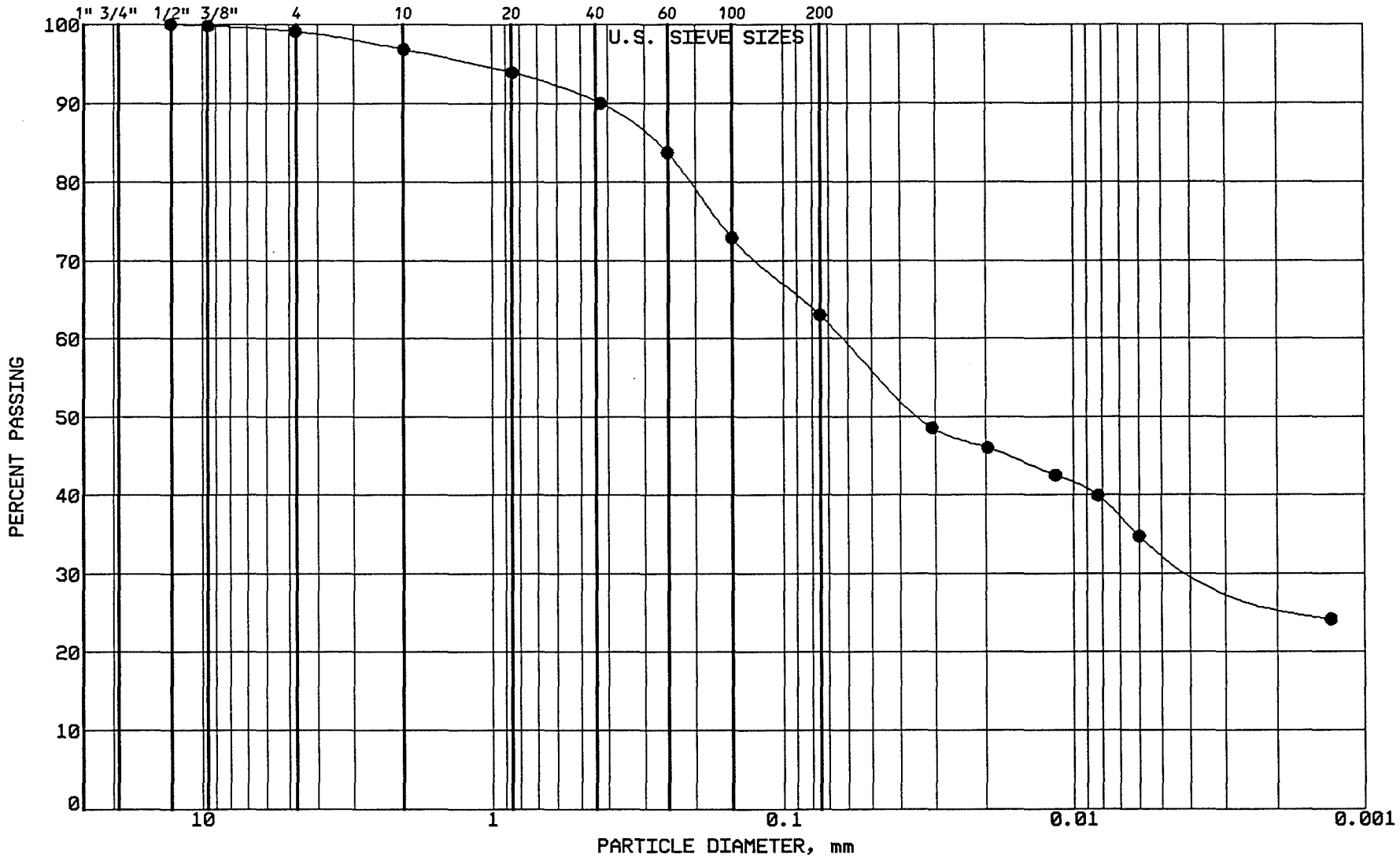
LOCATION: N 43018.0, E 44381.0
SAMPLE: SGCC437 TUBE #:
ELEVATION: 1882.6'

GRAVEL	1.3 %
SAND	36.2 %
SILT	26.7 %
CLAY	35.8 %
P 200	62.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

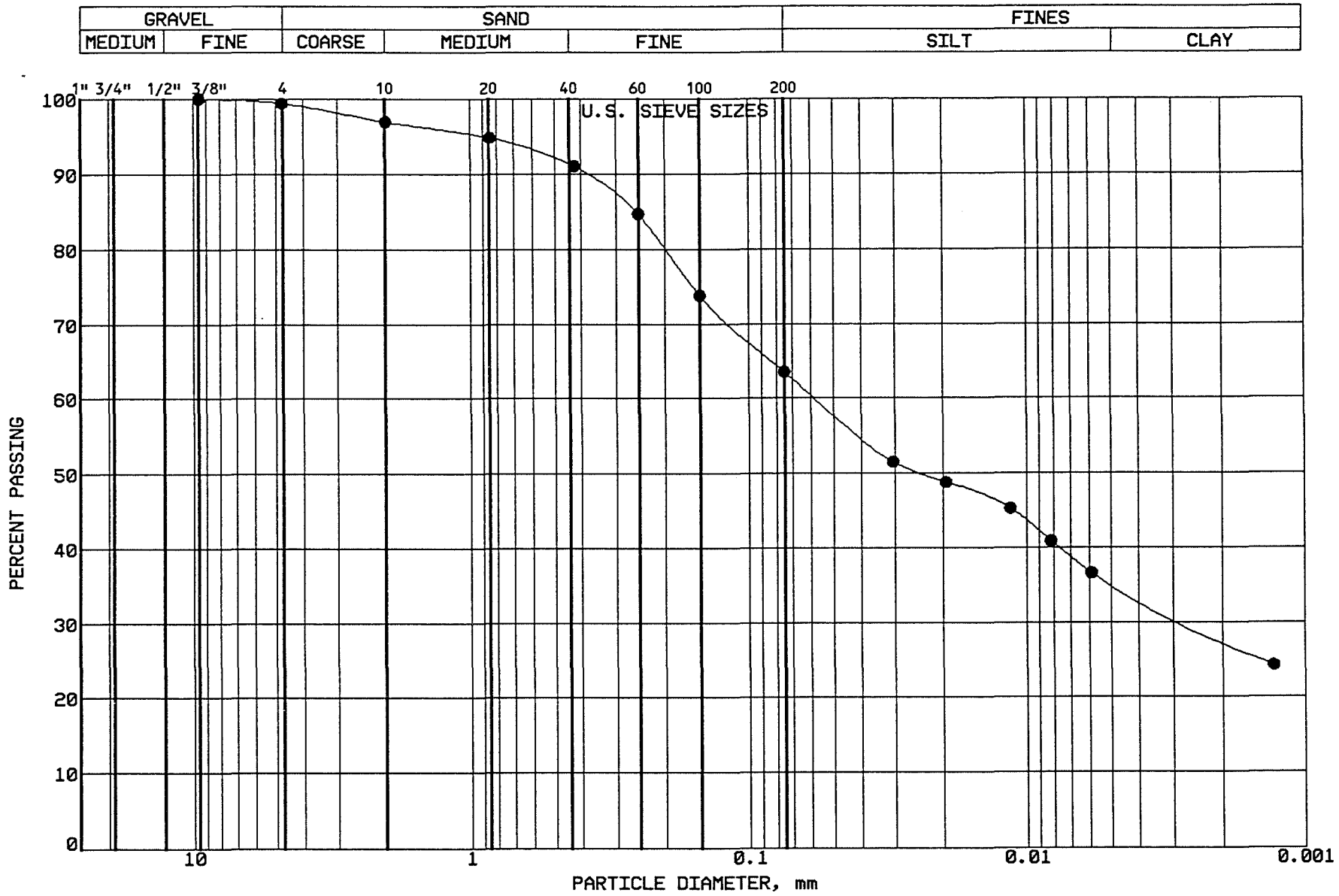
LOCATION: N 42842.0, E 44369.0
SAMPLE: SGCC438 TUBE #:
ELEVATION: 1882.0'

GRAVEL	0.9 %
SAND	36.1 %
SILT	29.6 %
CLAY	33.4 %
P 200	63.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

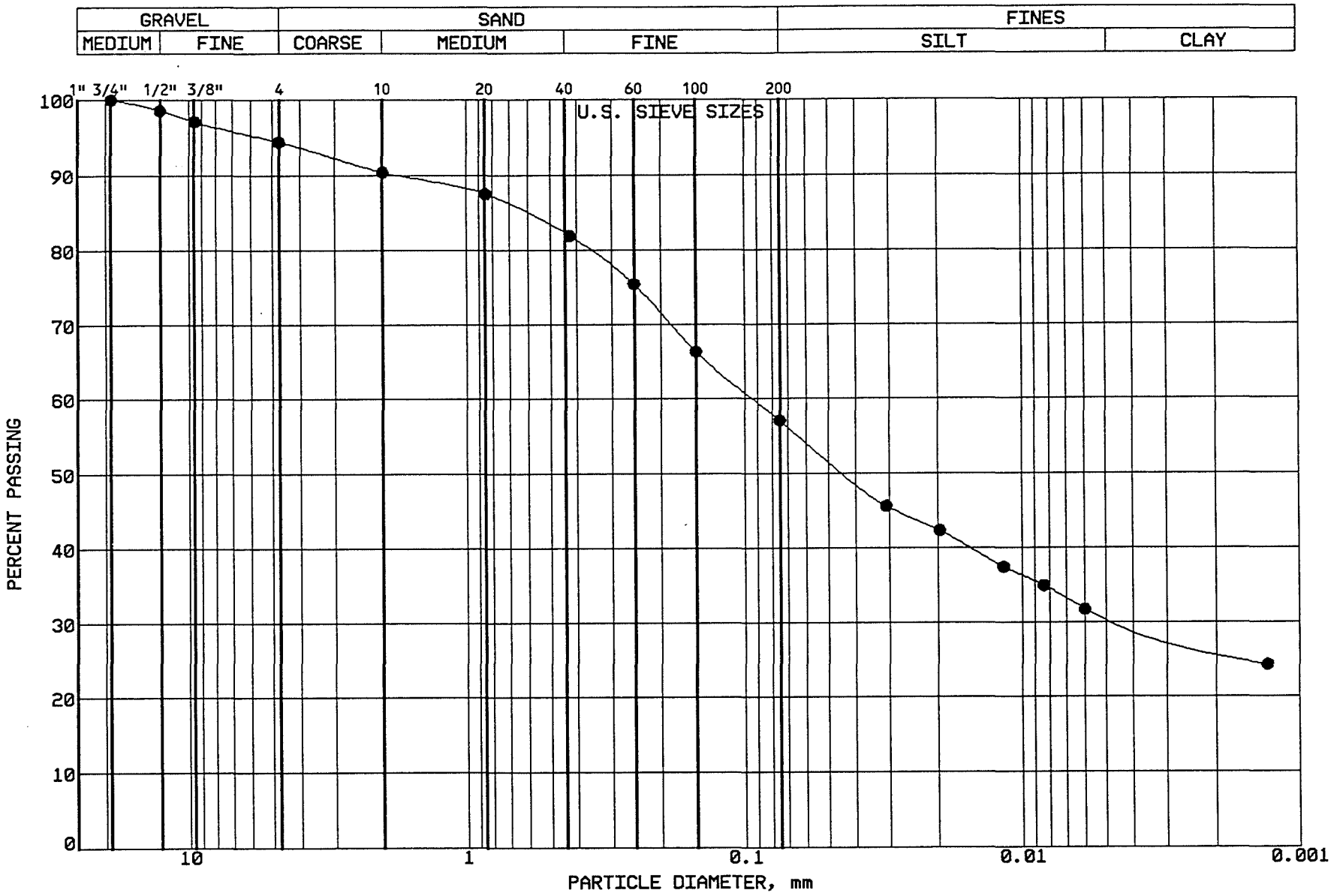
LOCATION: N 42661.0, E 44366.0
SAMPLE: SGCC439 TUBE #:
ELEVATION: 1881.5'

GRAVEL	0.6 %
SAND	35.9 %
SILT	28.2 %
CLAY	35.3 %
P 200	63.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

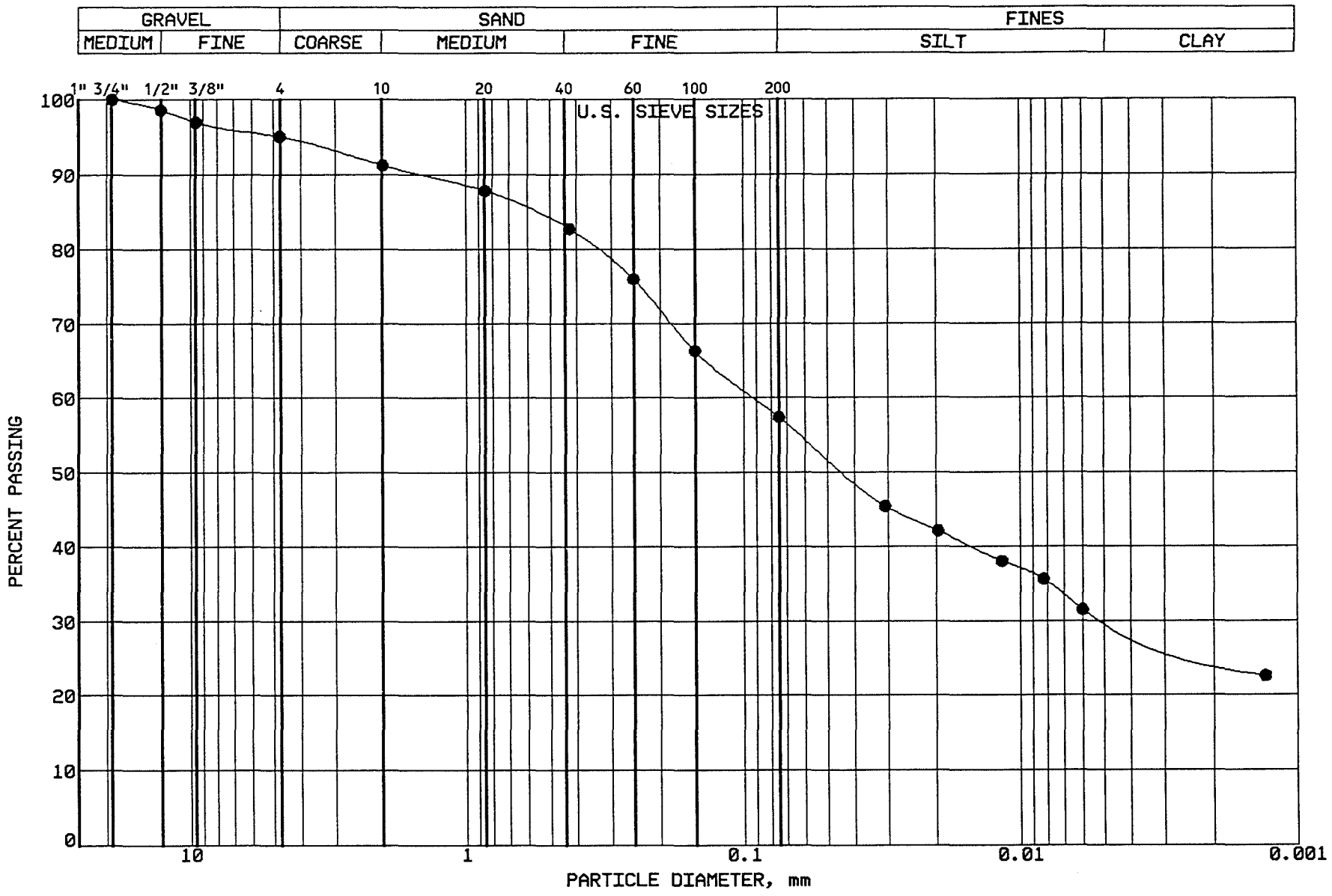
LOCATION: N 43396.0, E 44605.0
SAMPLE: SGCC440 TUBE #:
ELEVATION: 1885.2'

GRAVEL	5.6 %
SAND	37.3 %
SILT	26.3 %
CLAY	30.8 %
P 200	57.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

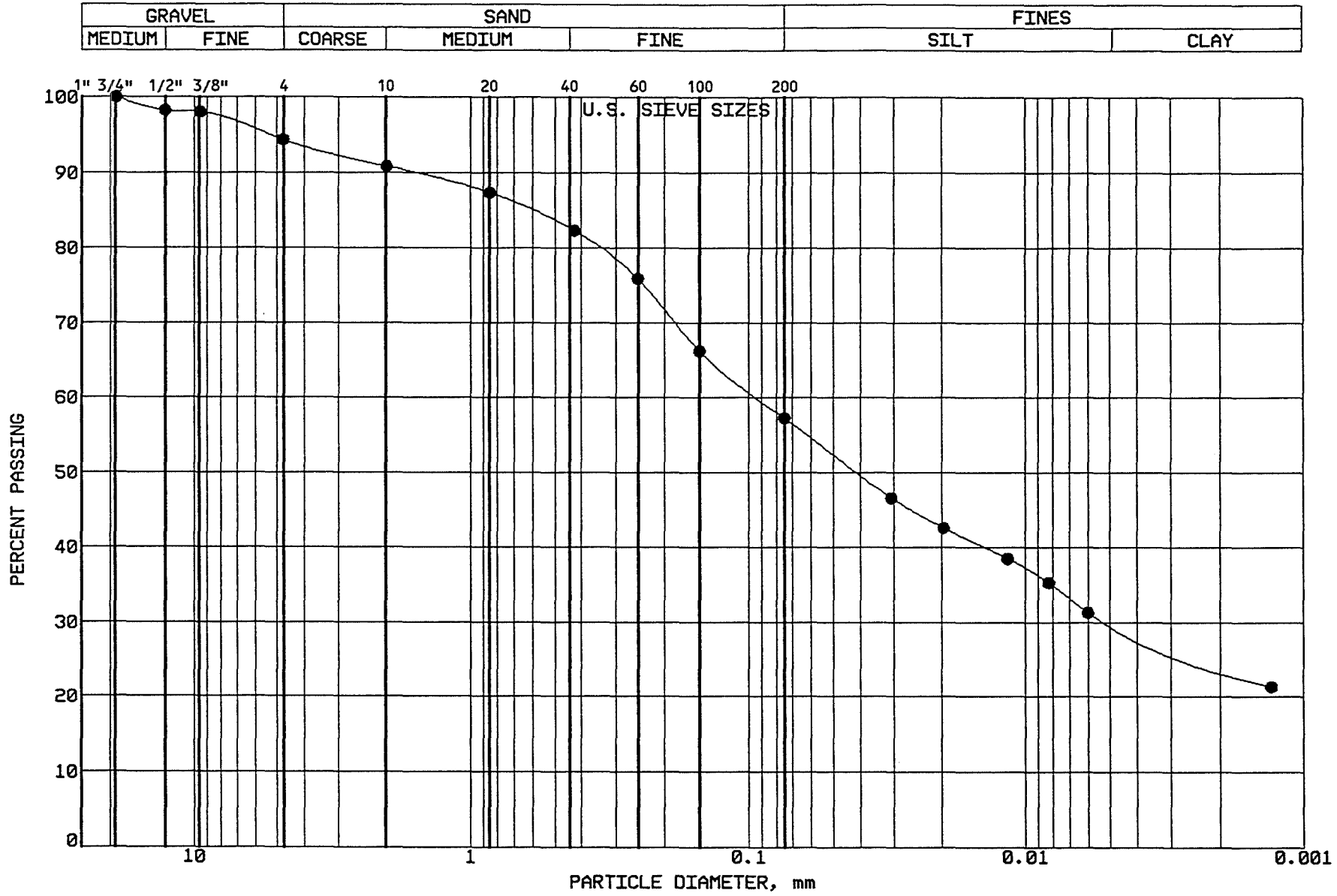
LOCATION: N 43210.0, E 44587.0
SAMPLE: SGCC441 TUBE #:
ELEVATION: 1881.9'

GRAVEL	5.0 %
SAND	37.6 %
SILT	27.0 %
CLAY	30.4 %
P 200	57.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

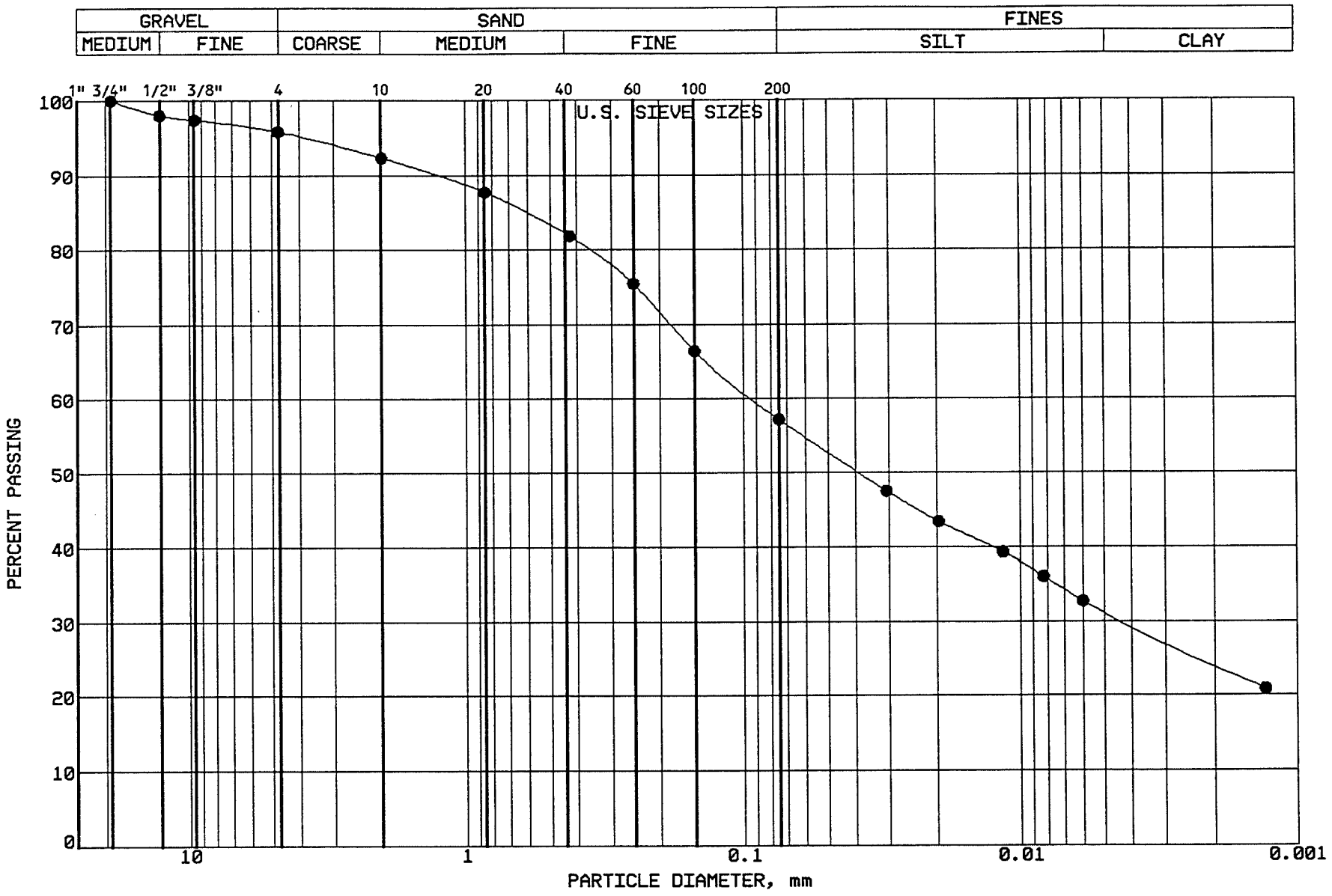
LOCATION: N 43025.0, E 44577.0
SAMPLE: SGCC442 TUBE #:
ELEVATION: 1880.3'

GRAVEL	5.7 %
SAND	37.0 %
SILT	27.2 %
CLAY	30.1 %
P 200	57.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

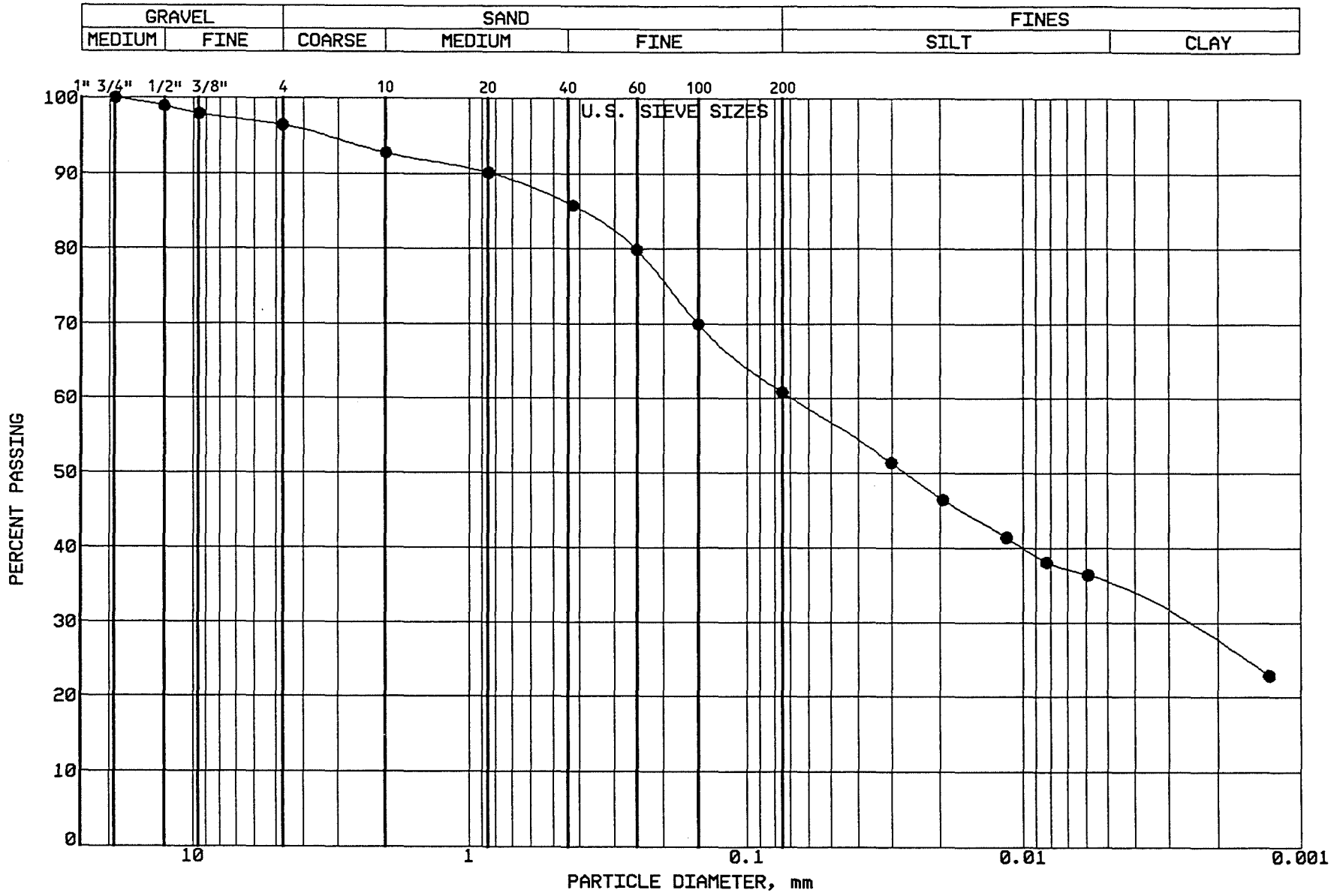
LOCATION: N 42836.0, E 44567.0
SAMPLE: SGCC443 TUBE #:
ELEVATION: 1880.4'

GRAVEL	4.2 %
SAND	38.6 %
SILT	25.9 %
CLAY	31.3 %
P 200	57.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

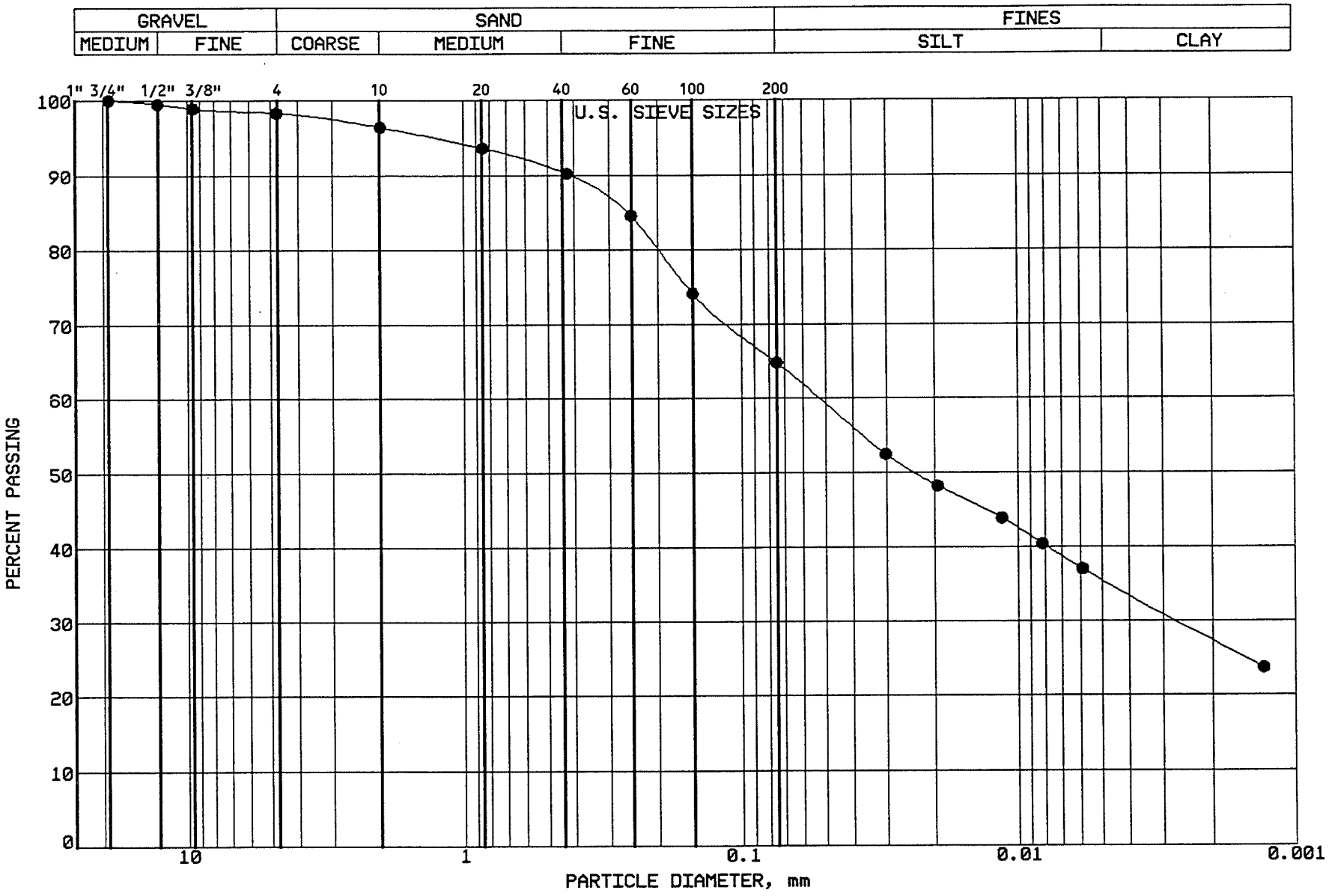
LOCATION: N 42647.0, E 44556.0
SAMPLE: SGCC444 TUBE #:
ELEVATION: 1879.6'

GRAVEL	3.6 %
SAND	35.6 %
SILT	25.9 %
CLAY	34.9 %
P 200	60.8 %

SOIL PROPERTIES

LL: 43.0%
PL: 15.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42679.0, E 44147.0
SAMPLE: SGCC445 TUBE #:
ELEVATION: 1882.8'

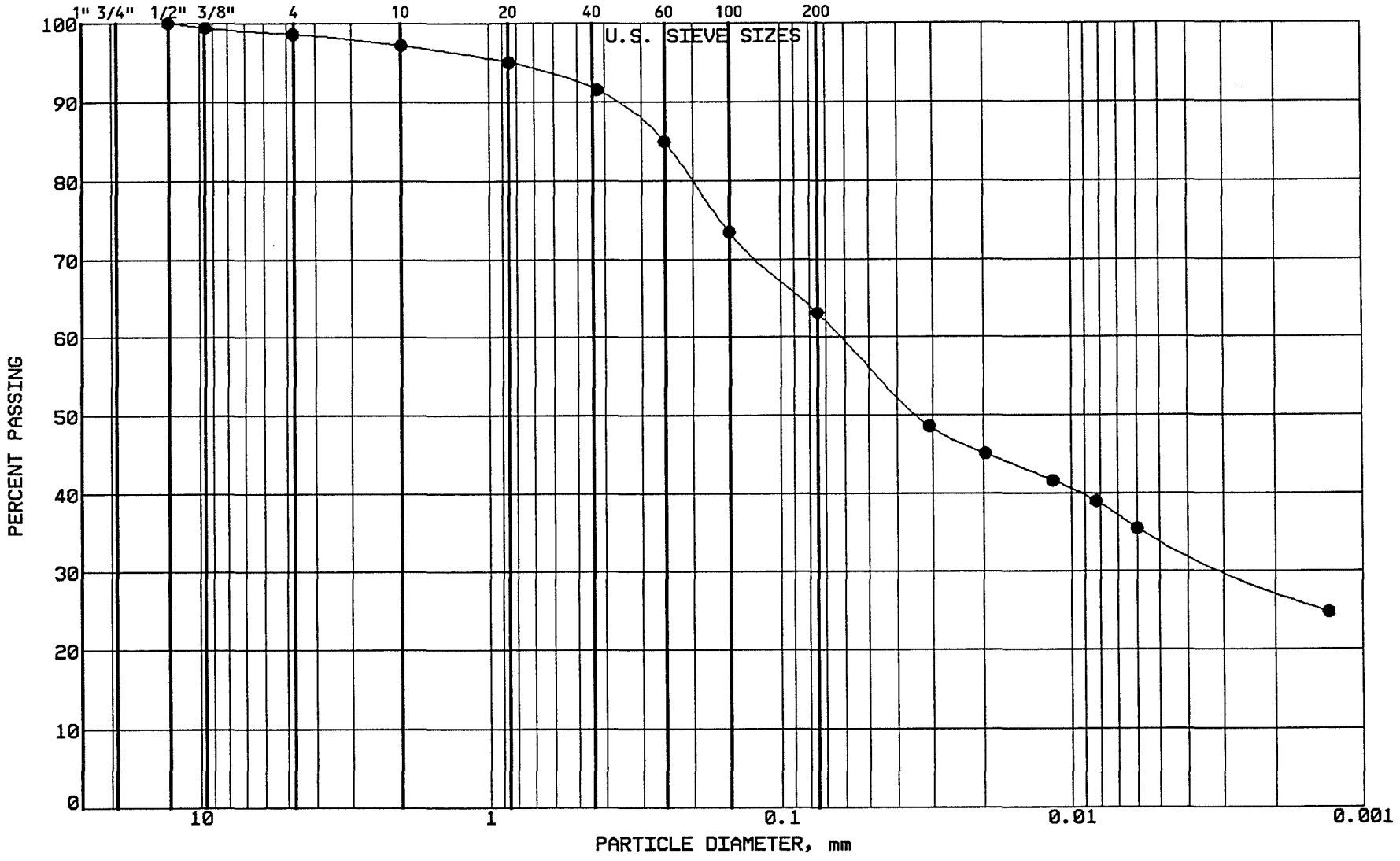
GRAVEL	1.7 %
SAND	33.5 %
SILT	29.3 %
CLAY	35.5 %
P 200	64.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42820.0, E 44152.0
SAMPLE: SGCC446 TUBE #:
ELEVATION: 1883.8'

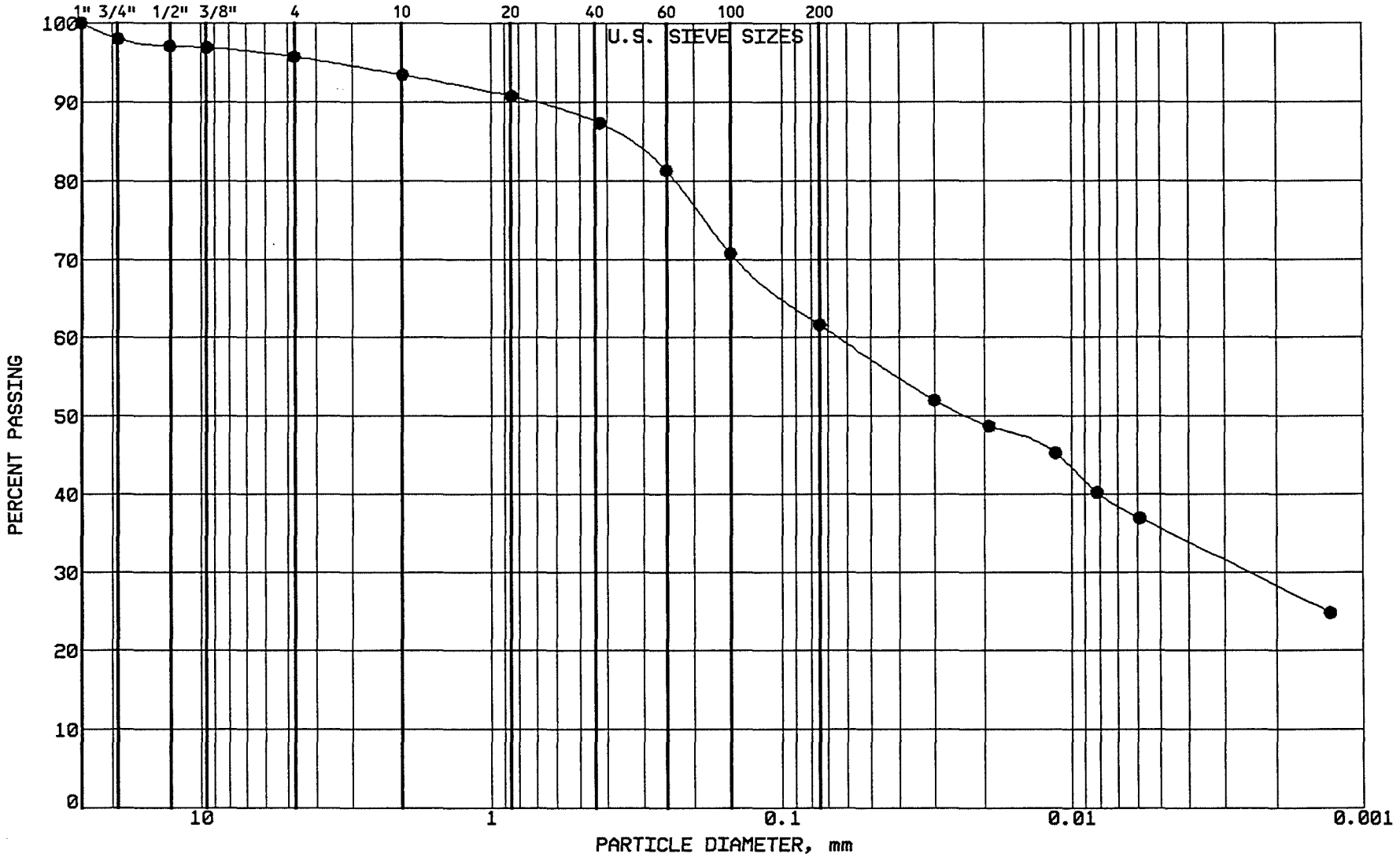
GRAVEL	1.4 %
SAND	35.5 %
SILT	28.9 %
CLAY	34.2 %
P 200	63.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43179.0, E 44375.0
SAMPLE: SGCC447 TUBE #:
ELEVATION: 1885.7'

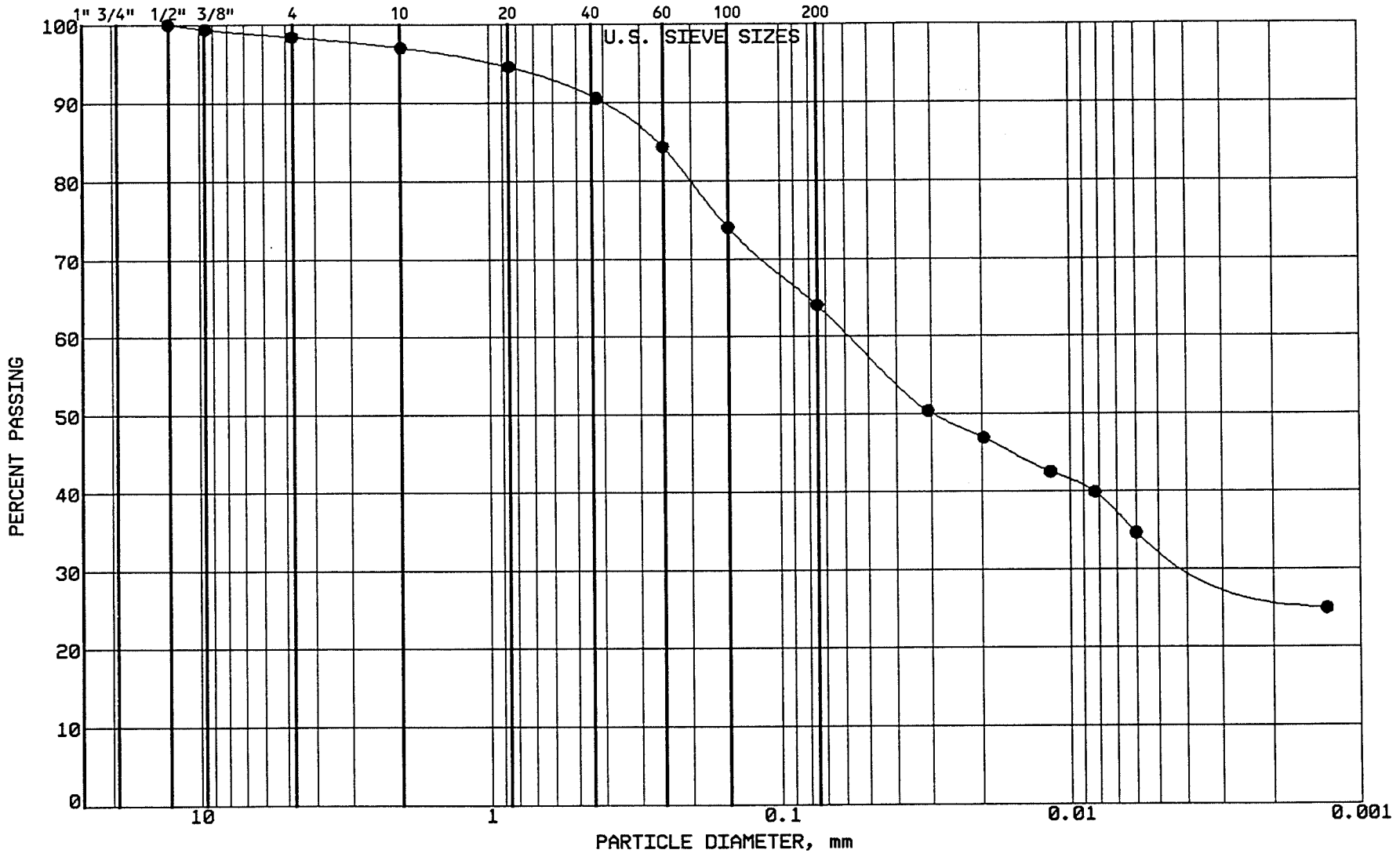
GRAVEL	4.3 %
SAND	34.1 %
SILT	26.0 %
CLAY	35.6 %
P 200	61.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

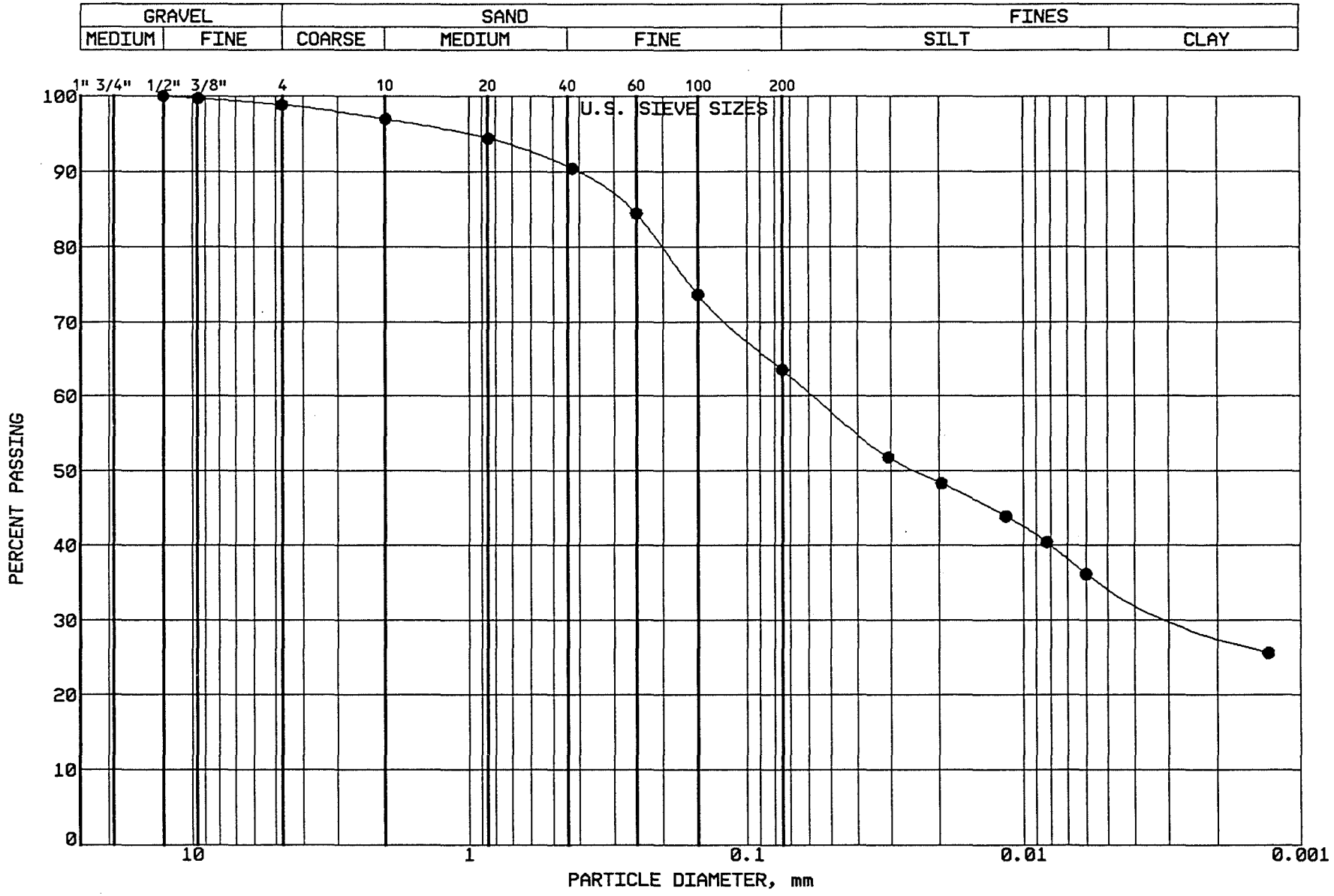
LOCATION: N 43990.0, E 44344.0
SAMPLE: SGCC448 TUBE #:
ELEVATION: 1884.6'

GRAVEL	1.6 %
SAND	34.4 %
SILT	30.5 %
CLAY	33.5 %
P 200	64.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

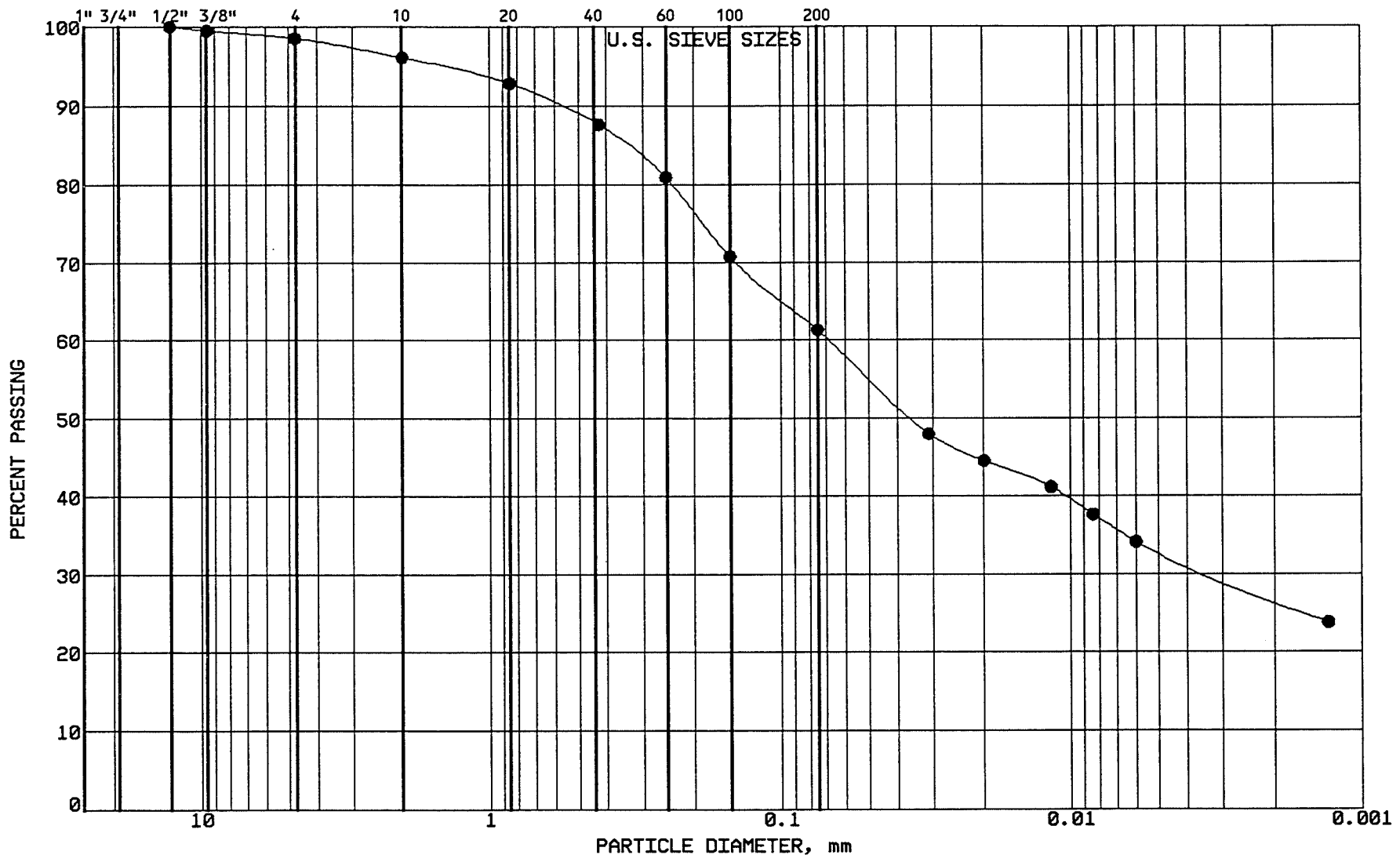
LOCATION: N 42801.0, E 44320.0
SAMPLE: SGCC449 TUBE #:
ELEVATION: 1883.9'

GRAVEL	1.2 %
SAND	35.3 %
SILT	28.7 %
CLAY	34.8 %
P 200	63.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

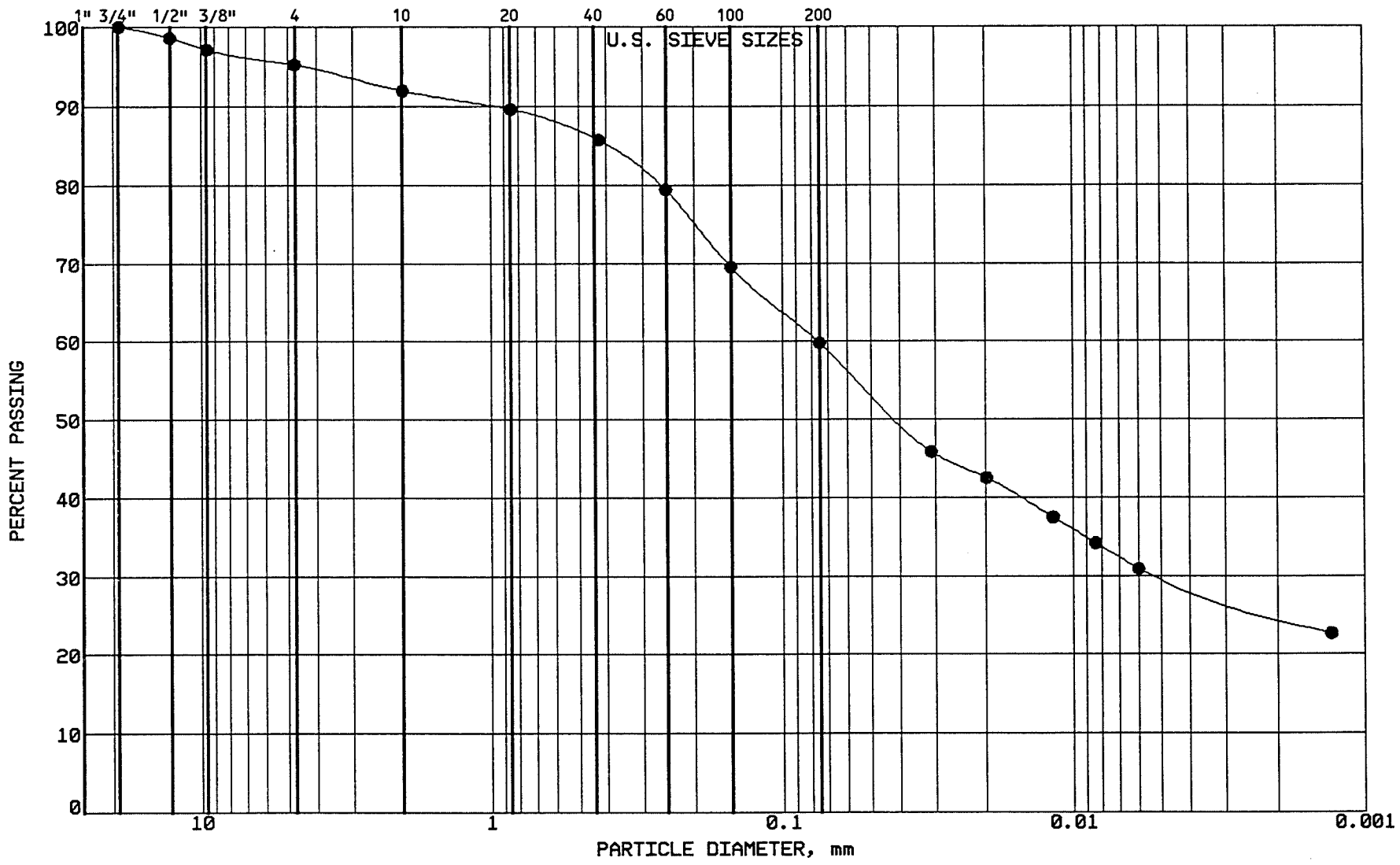
LOCATION: N 42610.0, E 44307.0
SAMPLE: SGCC450 TUBE #:
ELEVATION: 1882.4'

GRAVEL	1.5 %
SAND	37.2 %
SILT	28.4 %
CLAY	32.9 %
P 200	61.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43415.0, E 44564.0
SAMPLE: SGCC451 TUBE #:
ELEVATION: 1885.9'

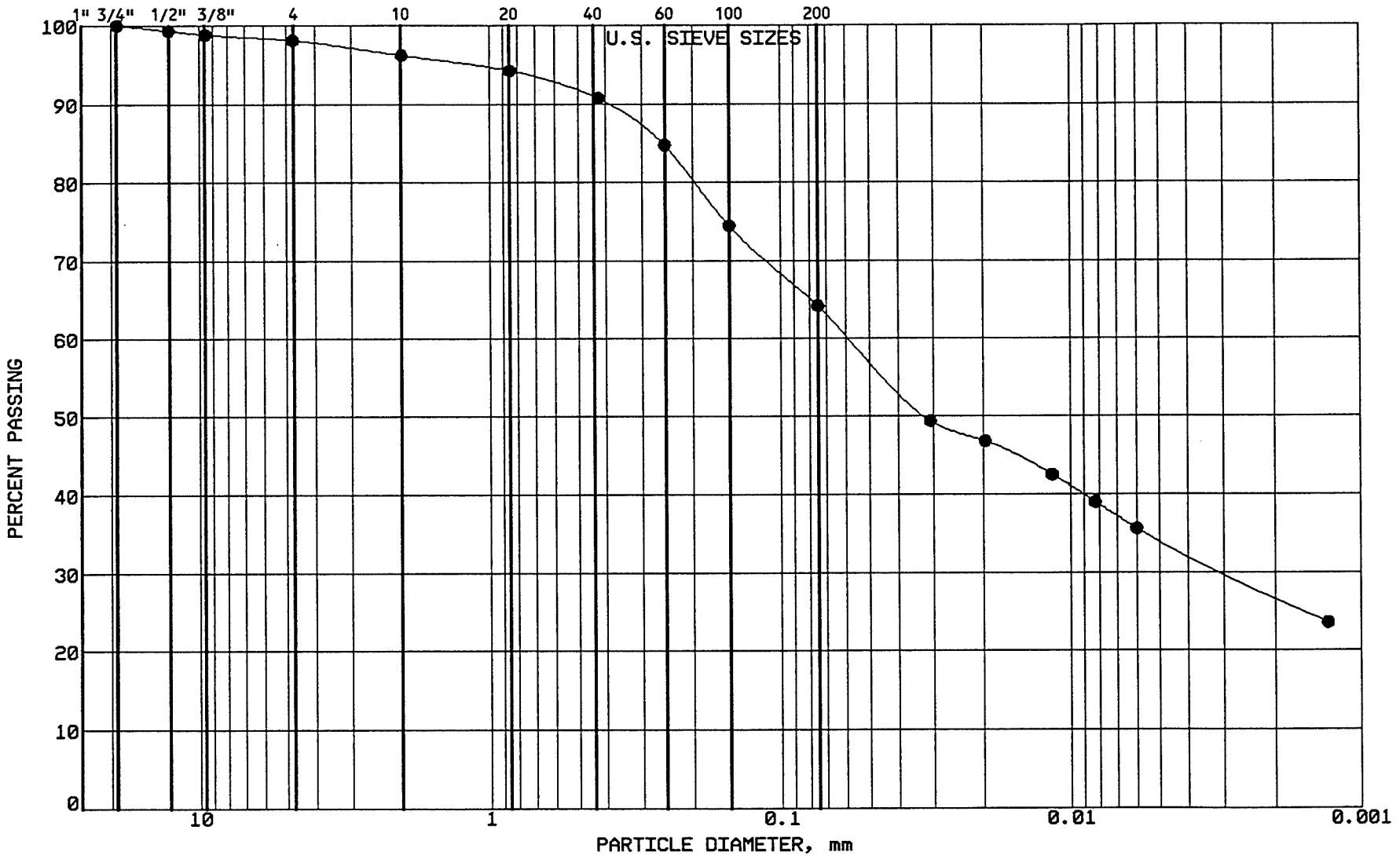
GRAVEL	4.8 %
SAND	35.4 %
SILT	29.9 %
CLAY	29.9 %
P 200	59.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43250.0, E 44543.0
SAMPLE: SGCC452 TUBE #:
ELEVATION: 1884.9'

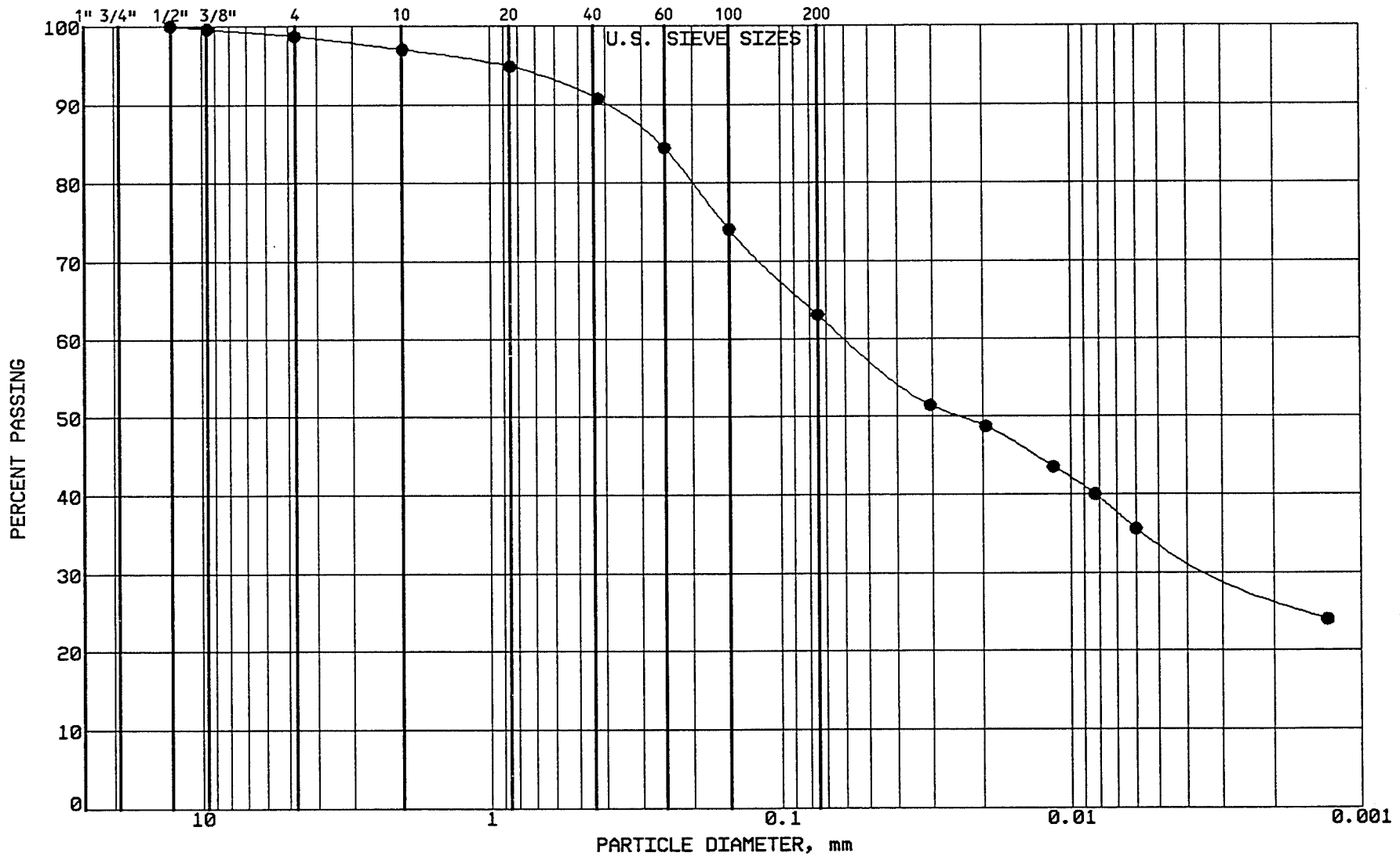
GRAVEL	1.9 %
SAND	33.9 %
SILT	30.0 %
CLAY	34.2 %
P 200	64.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) vy dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

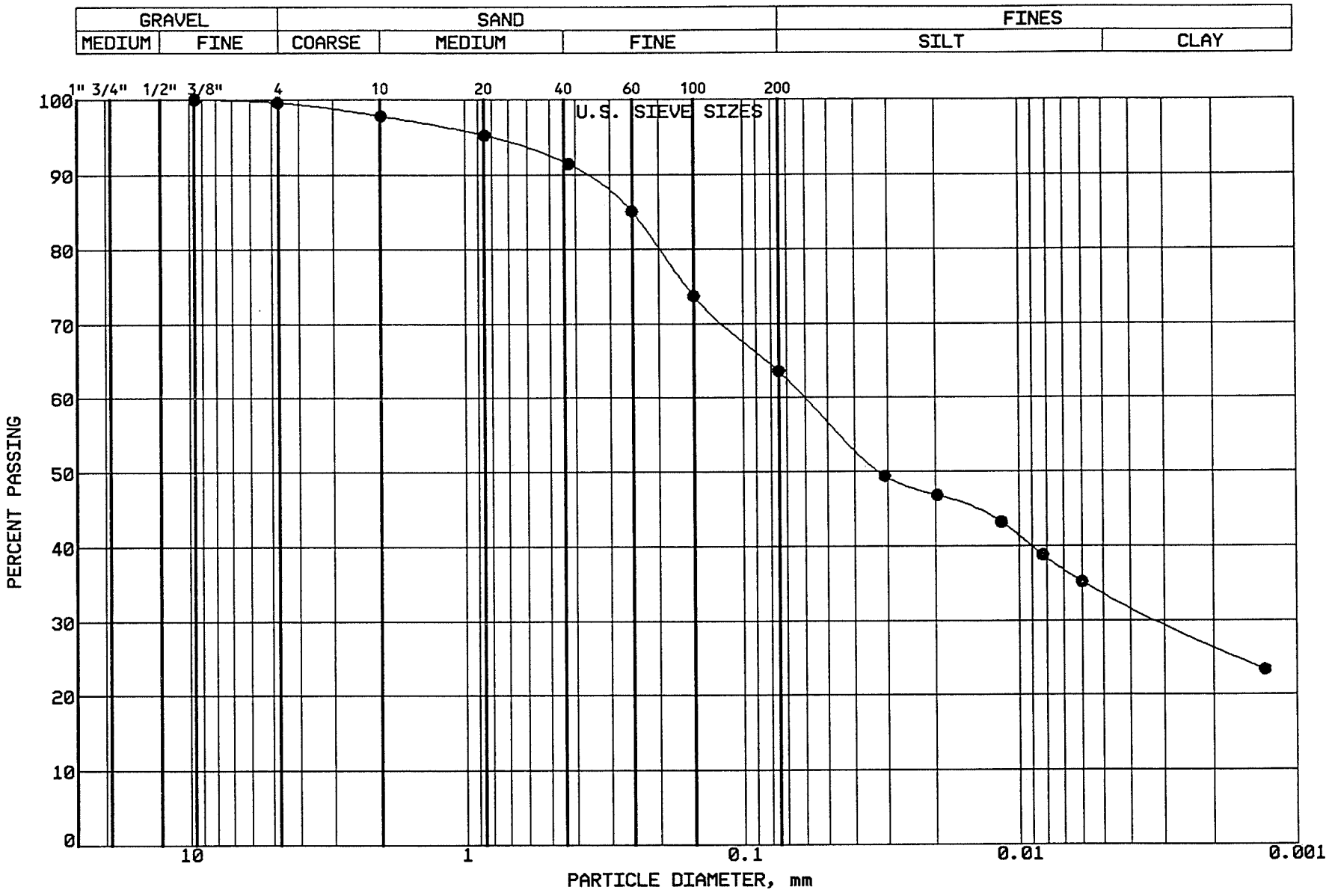
LOCATION: N 43078.0, E 44526.0
SAMPLE: SGCC453 TUBE #:
ELEVATION: 1883.6'

GRAVEL	1.3 %
SAND	35.6 %
SILT	28.9 %
CLAY	34.2 %
P 200	63.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) vy dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

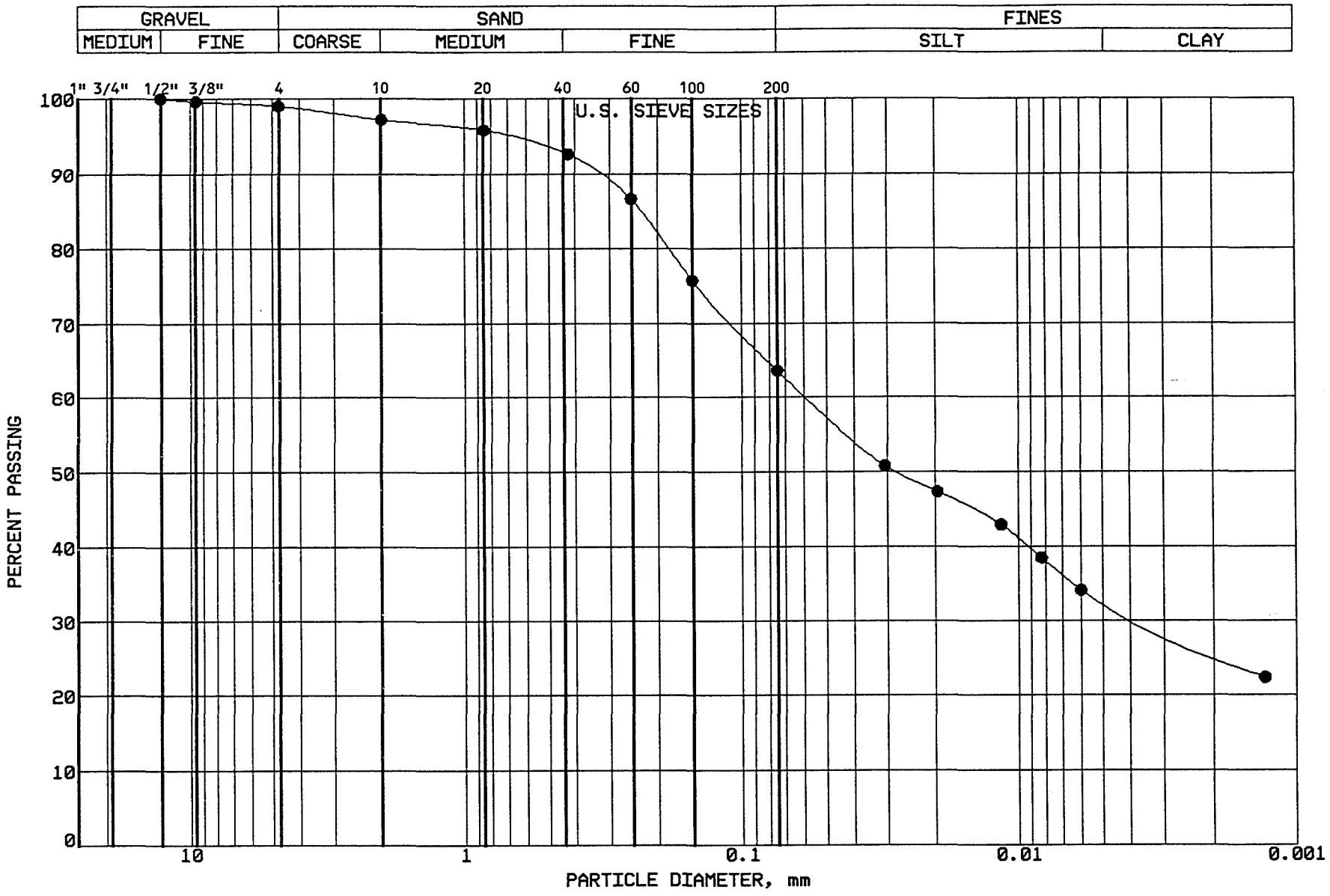
LOCATION: N 42908.0, E 44514.0
SAMPLE: SGCC454 TUBE #:
ELEVATION: 1882.5'

GRAVEL	0.4 %
SAND	36.0 %
SILT	29.8 %
CLAY	33.8 %
P 200	63.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) vy dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

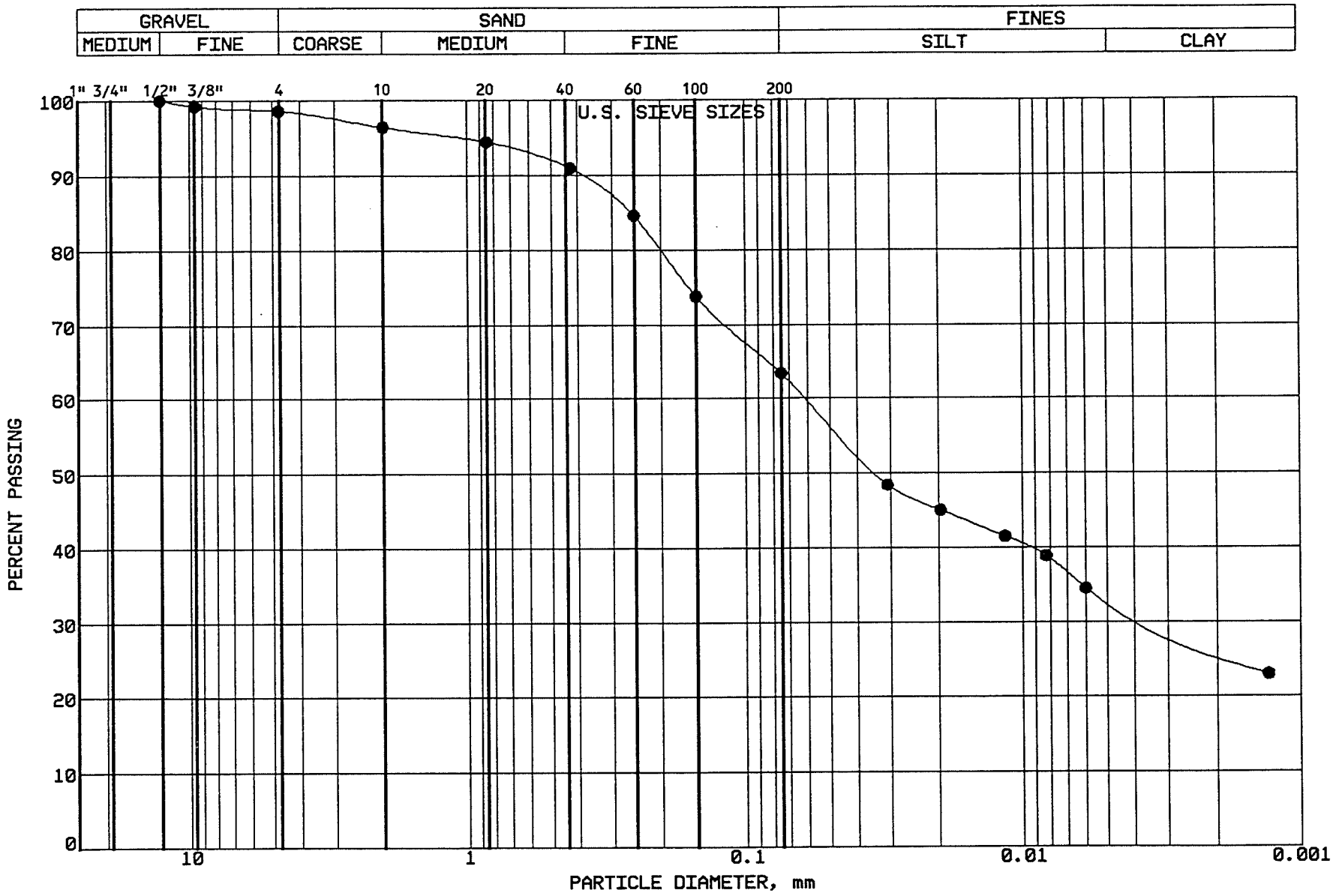
LOCATION: N 42699.0, E 44502.0
SAMPLE: SGCC455 TUBE #:
ELEVATION: 1881.3'

GRAVEL	1.0 %
SAND	35.4 %
SILT	30.9 %
CLAY	32.7 %
P 200	63.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) vy dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

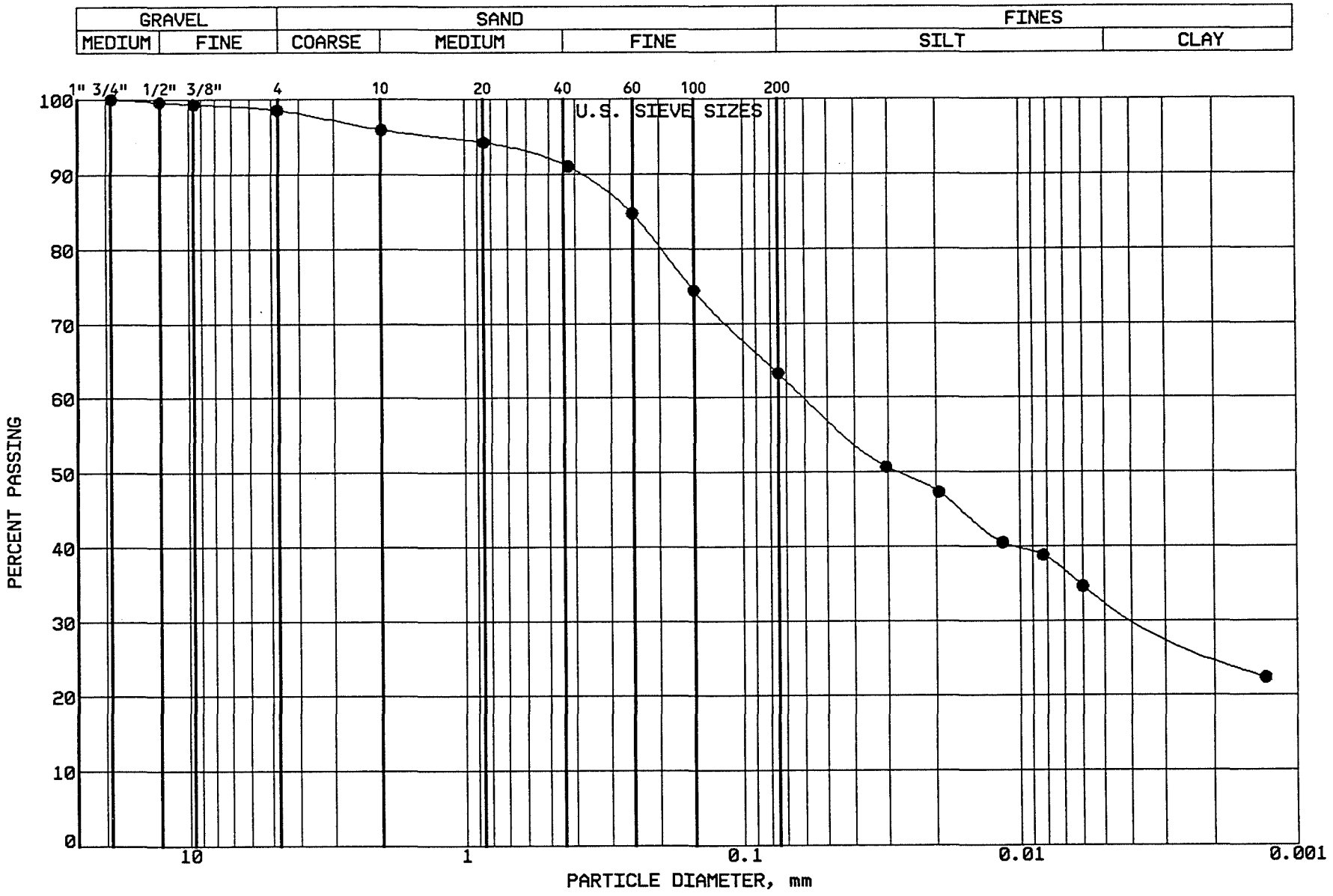
LOCATION: N 43192.0, E 44386.0
SAMPLE: SGCC456 TUBE #:
ELEVATION: 1885.9'

GRAVEL	1.4 %
SAND	35.2 %
SILT	30.3 %
CLAY	33.1 %
P 200	63.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) vy dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

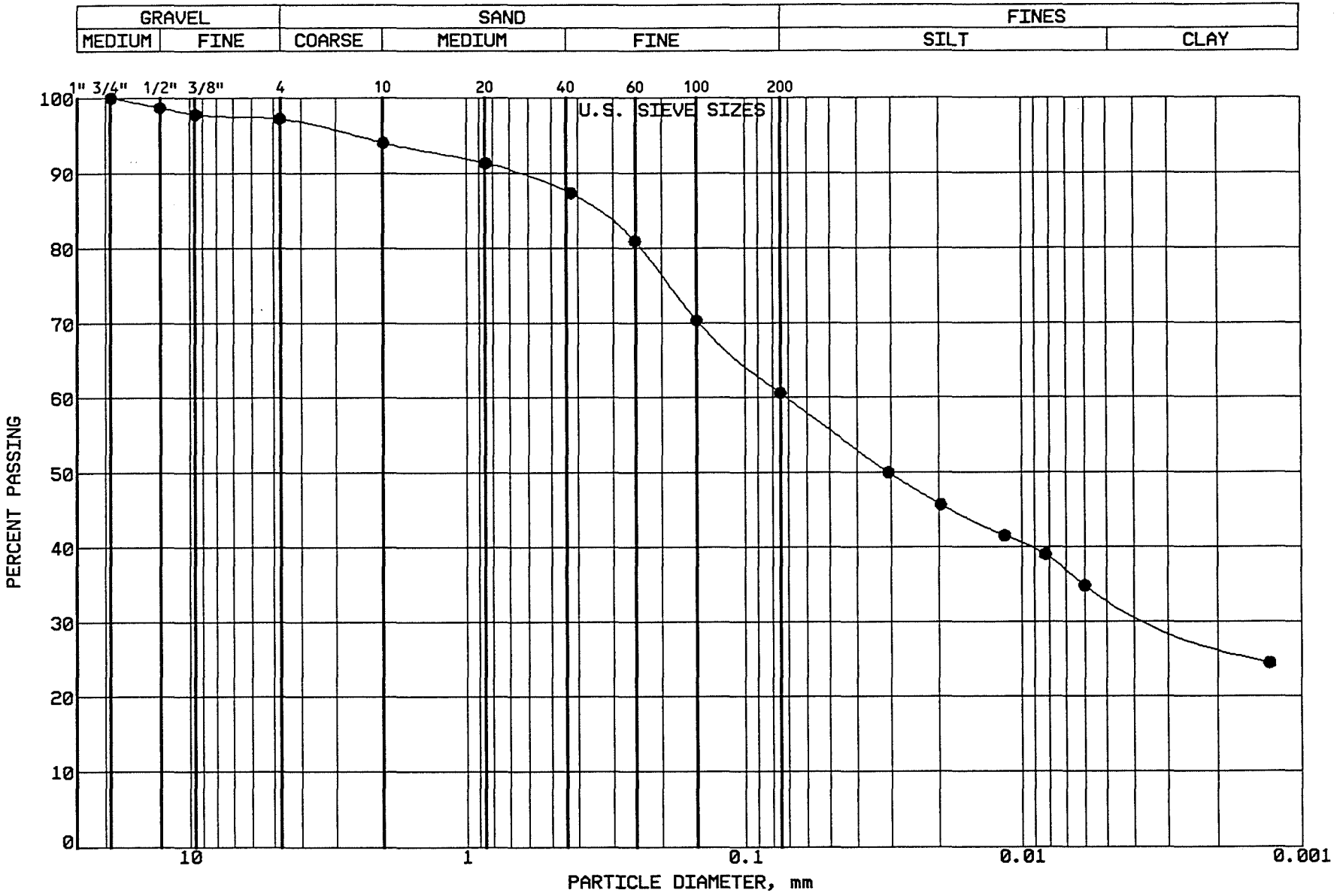
LOCATION: N 43039.0, E 44377.0
SAMPLE: SGCC457 TUBE #:
ELEVATION: 1884.9'

GRAVEL	1.5 %
SAND	35.3 %
SILT	30.1 %
CLAY	33.1 %
P 200	63.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) vy dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42846.0, E 44371.0
SAMPLE: SGCC458 TUBE #:
ELEVATION: 1883.5'

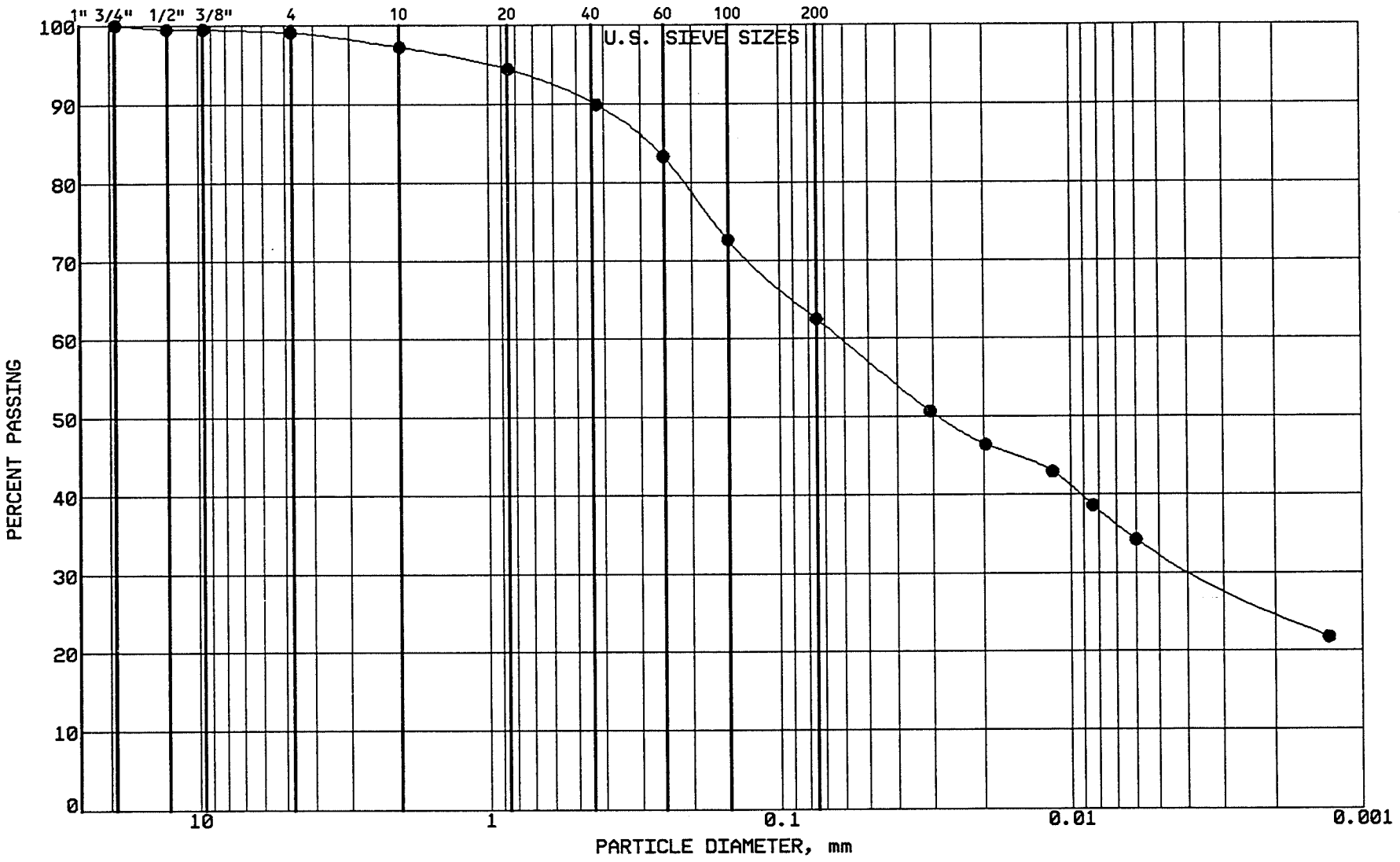
GRAVEL	2.8 %
SAND	36.6 %
SILT	27.0 %
CLAY	33.6 %
P 200	60.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

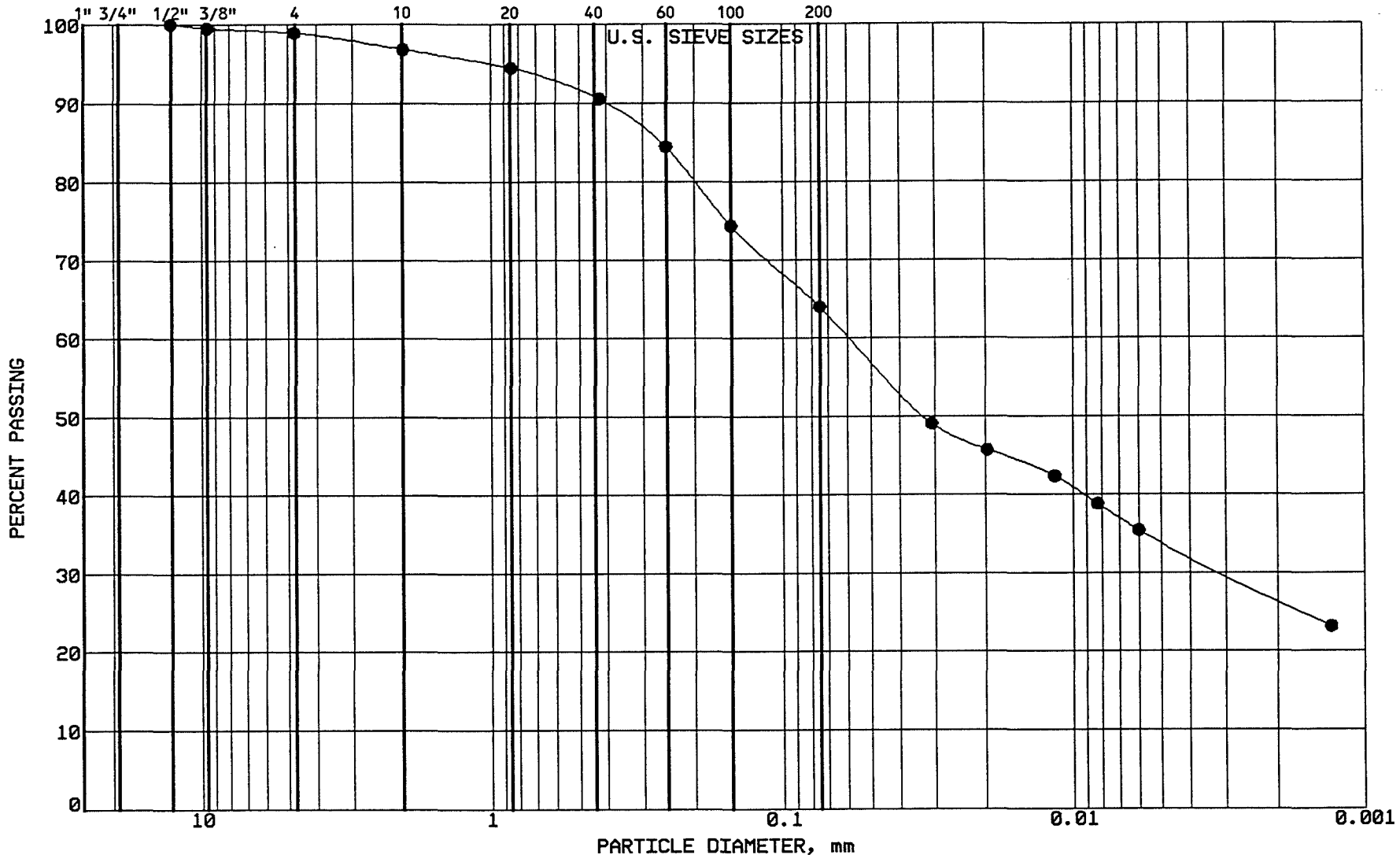
LOCATION: N 42670.0, E 44366.0
SAMPLE: SGCC459 TUBE #:
ELEVATION: 1882.6'

GRAVEL	0.9 %
SAND	36.6 %
SILT	29.8 %
CLAY	32.7 %
P 200	62.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

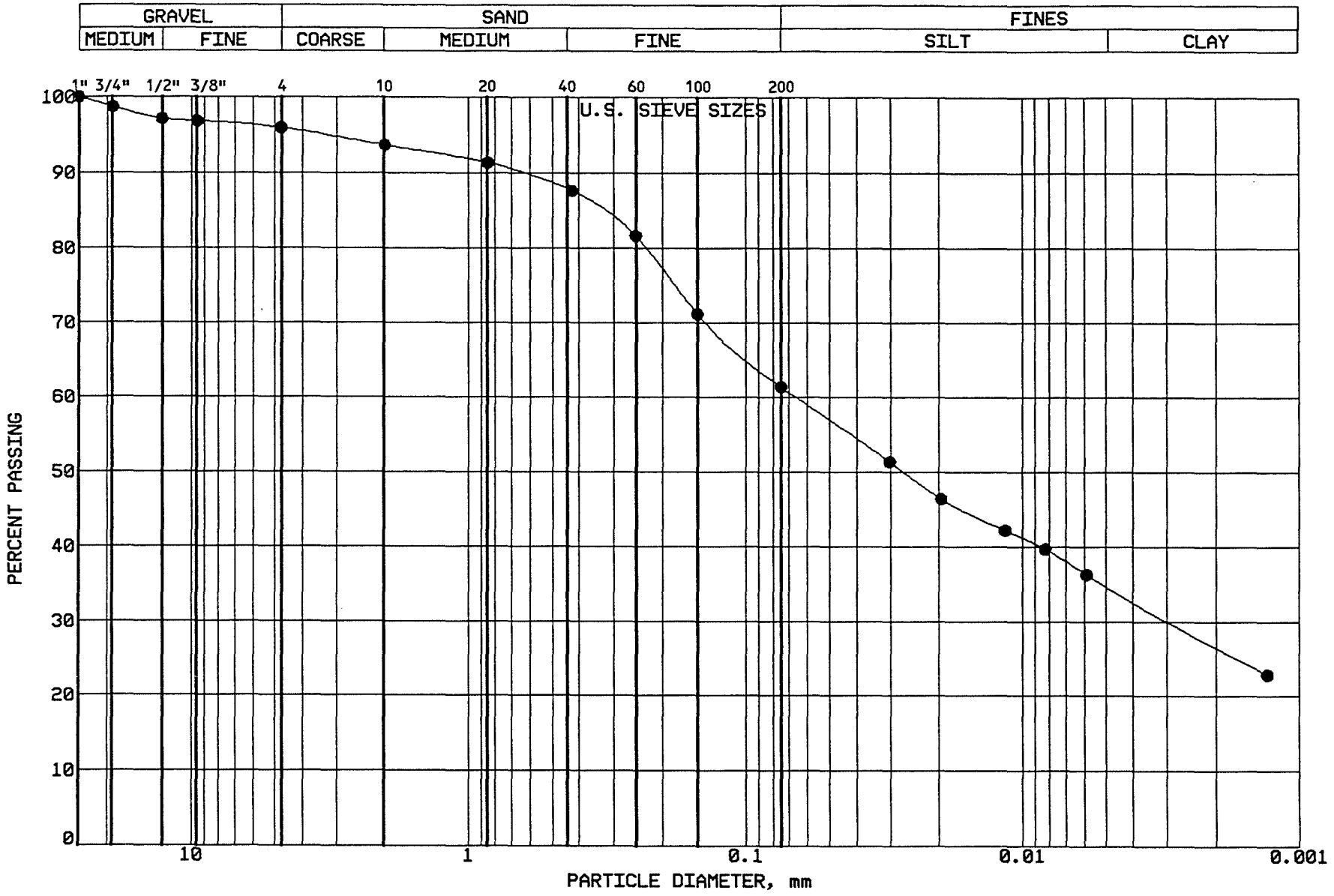
LOCATION: N 43405.0, E 44591.0
SAMPLE: SGCC460 TUBE #:
ELEVATION: 1887.0'

GRAVEL	1.1 %
SAND	34.9 %
SILT	30.1 %
CLAY	33.9 %
P 200	64.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

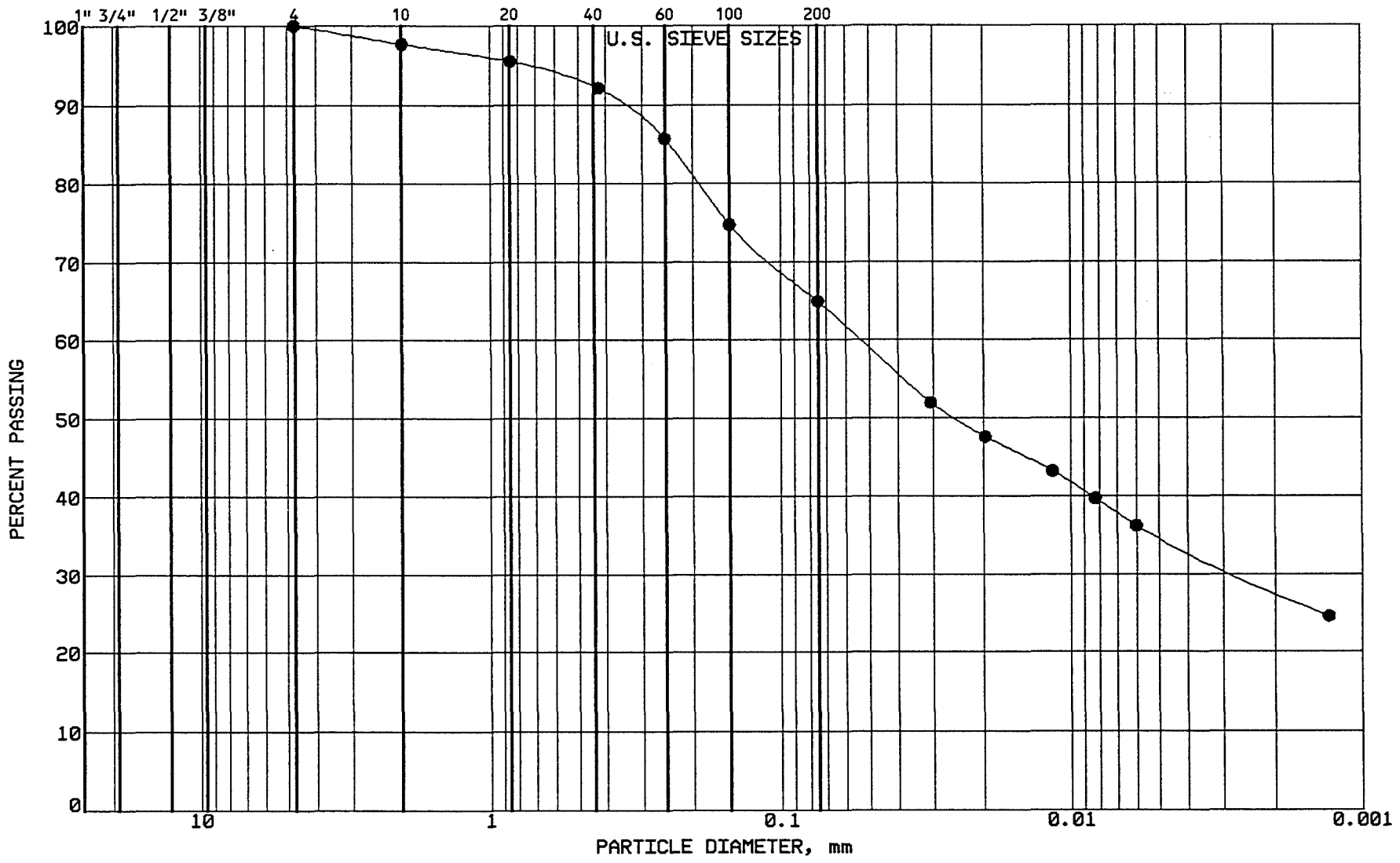
LOCATION: N 43225.0, E 44572.0
SAMPLE: SGCC461 TUBE #:
ELEVATION: 1885.6'

GRAVEL	4.1 %
SAND	34.5 %
SILT	26.6 %
CLAY	34.8 %
P 200	61.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

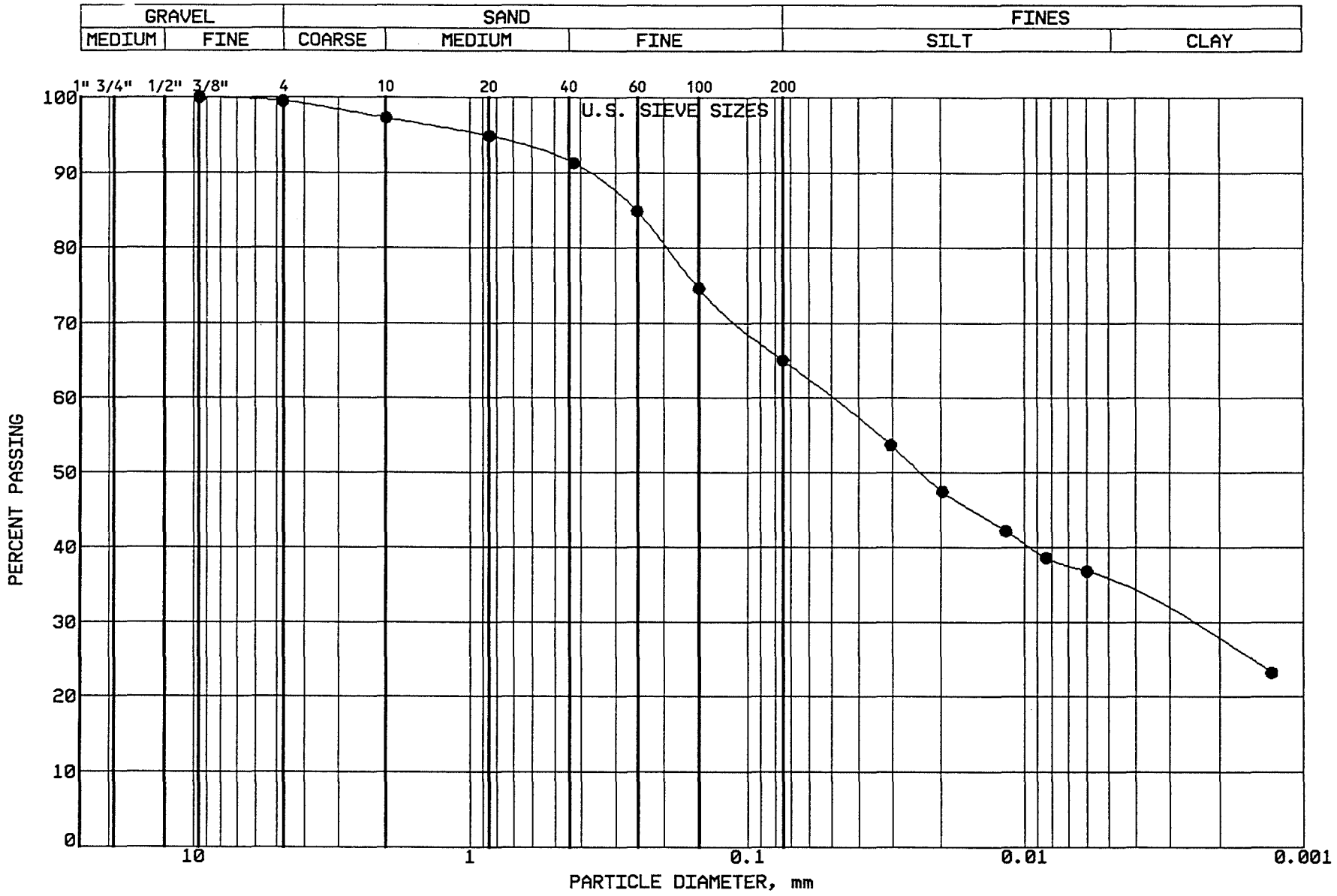
LOCATION: N 43074.0, E 44555.0
SAMPLE: SGCC462 TUBE #:
ELEVATION: 1884.4'

GRAVEL	0.0 %
SAND	35.1 %
SILT	30.1 %
CLAY	34.8 %
P 200	64.9 %

SOIL PROPERTIES

LL: 43.0%
PL: 17.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

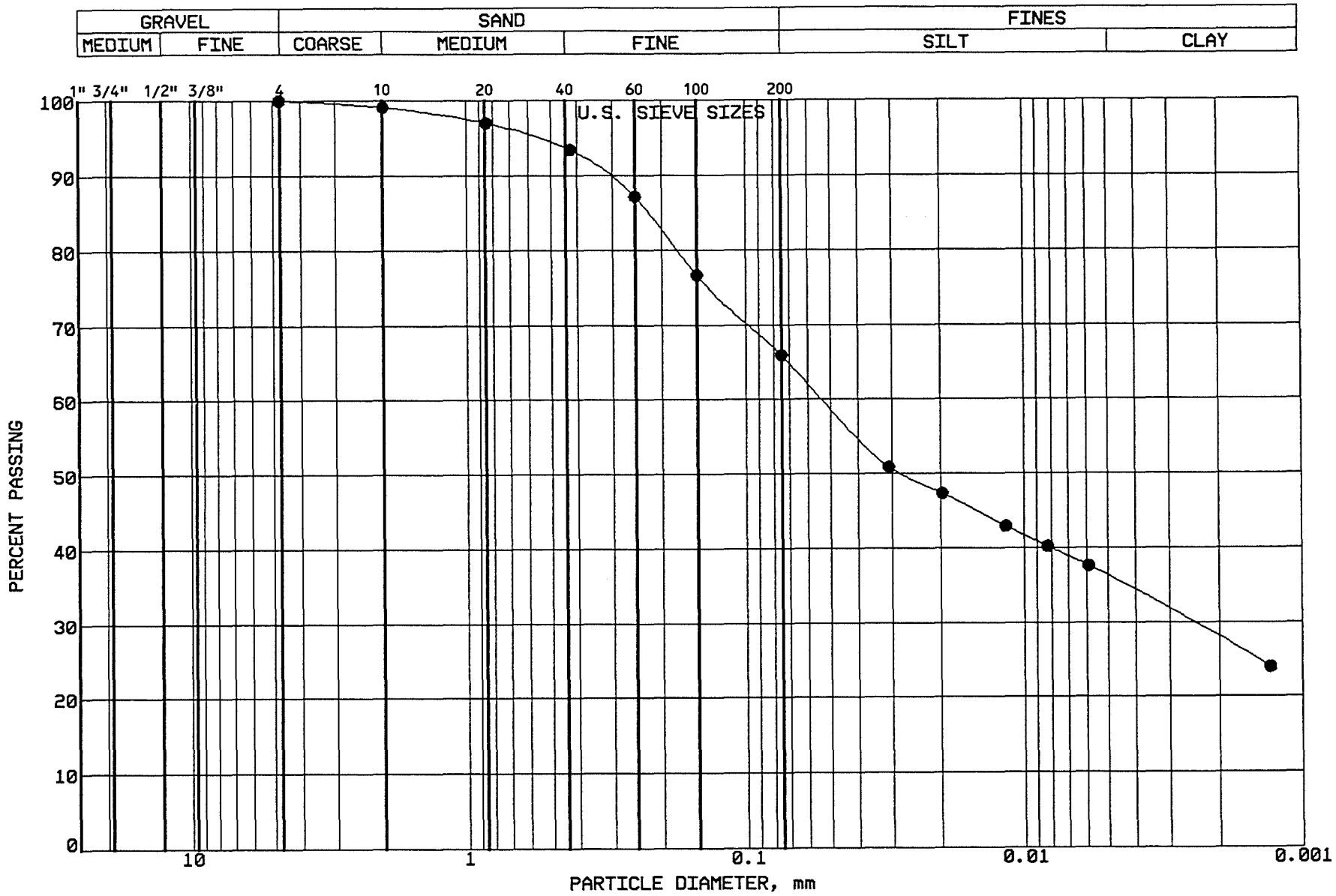
LOCATION: N 42875.0, E 44540.0
SAMPLE: SGCC463 TUBE #:
ELEVATION: 1883.2'

GRAVEL	0.5 %
SAND	34.5 %
SILT	29.8 %
CLAY	35.2 %
P 200	65.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42685.0, E 44531.0
SAMPLE: SGCC464 TUBE #:
ELEVATION: 1881.9'

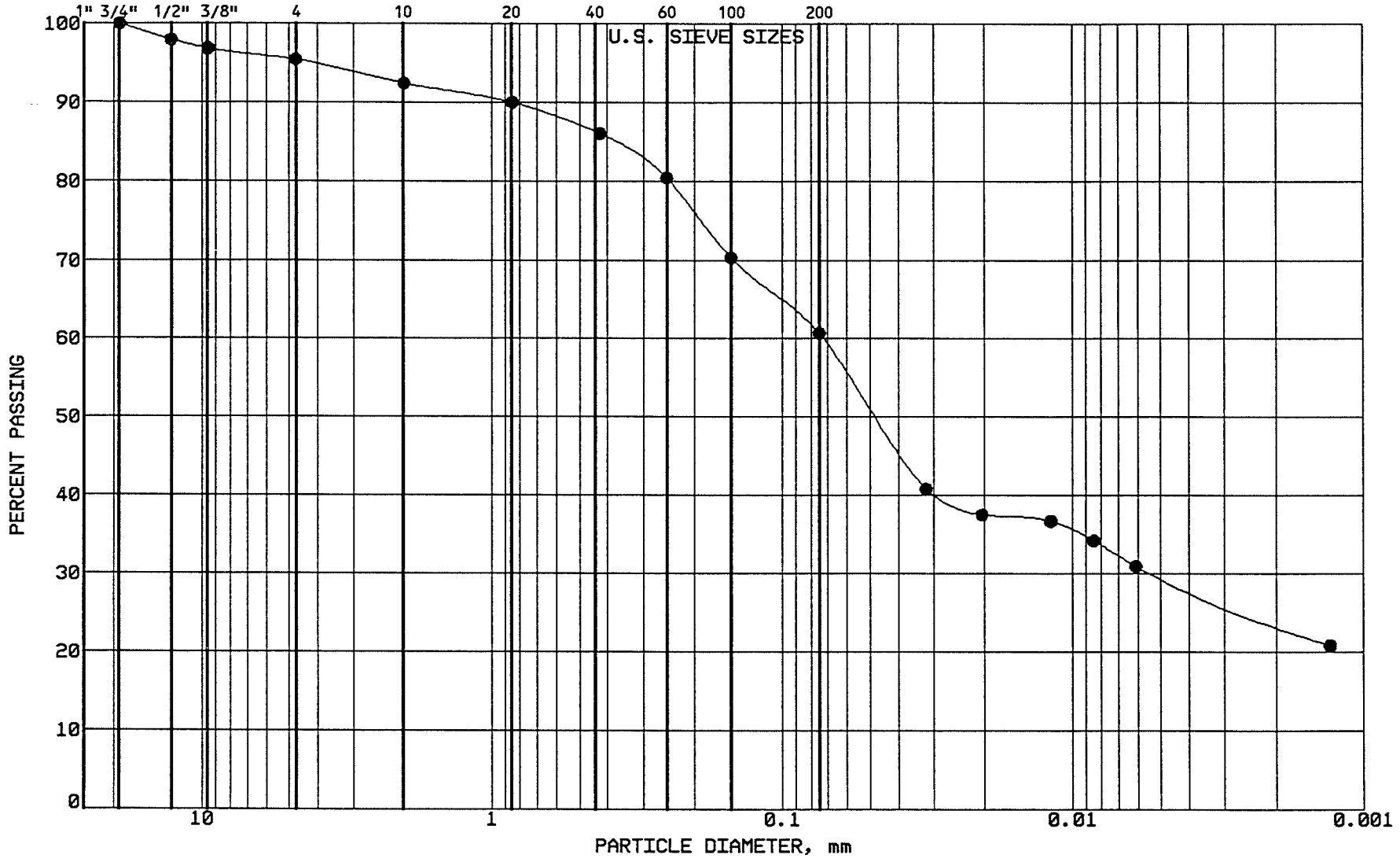
GRAVEL	0.0 %
SAND	34.1 %
SILT	29.8 %
CLAY	36.1 %
P 200	65.9 %

SOIL PROPERTIES

LL: 41.0%
PL: 12.0%
PI: 29.0%
CLASS: SANDY LEAN CLAY (CL) vy dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42820.0, E 43832.0
SAMPLE: CLBCC465 TUBE #: ST-112R
ELEVATION: 1886.1'

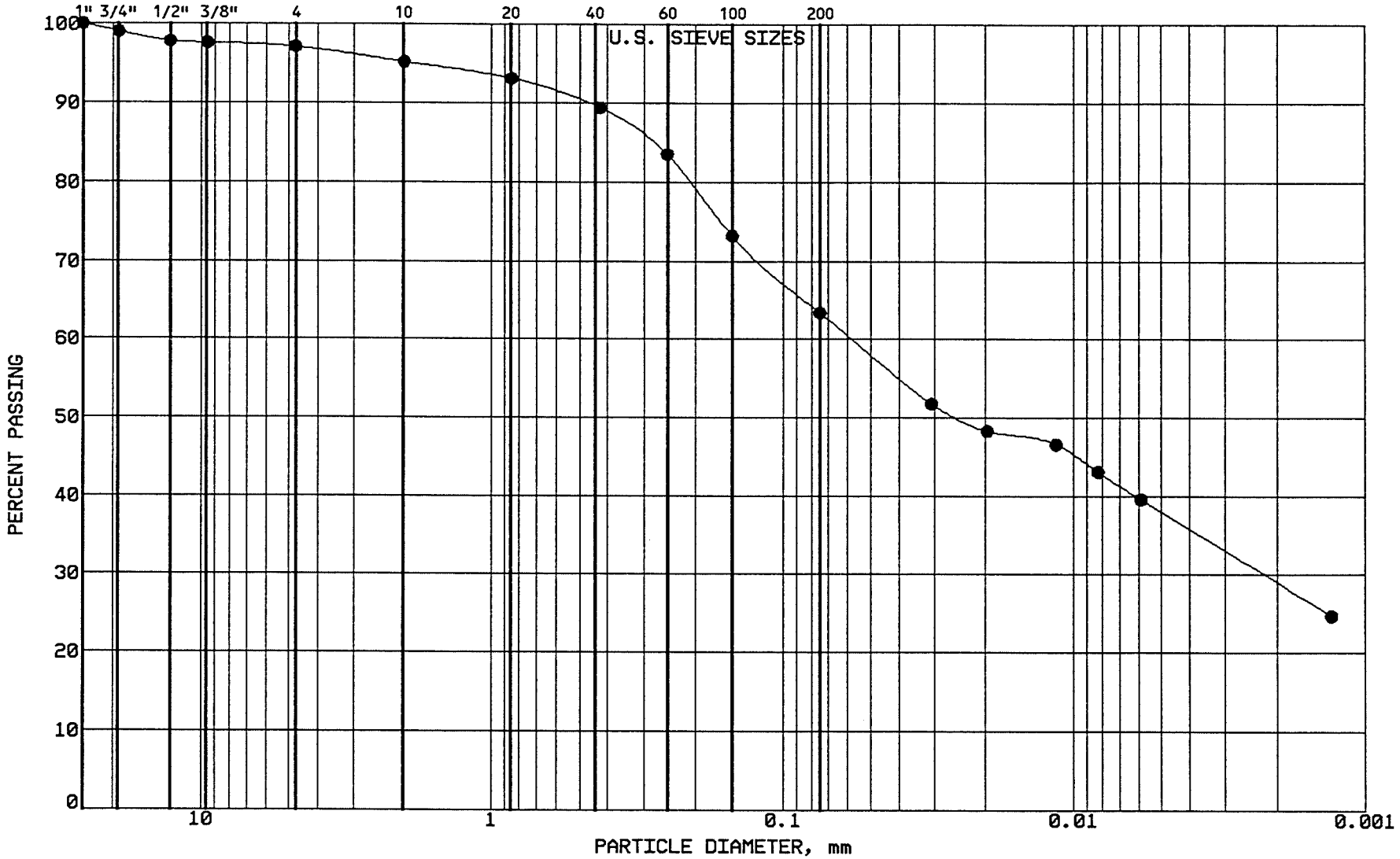
GRAVEL	4.6 %
SAND	34.7 %
SILT	31.1 %
CLAY	29.6 %
P 200	60.7 %

SOIL PROPERTIES

LL: 44.0%
PL: 17.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42647.0, E 44023.0
SAMPLE: CLBCC466 TUBE #: ST-116R
ELEVATION: 1884.3'

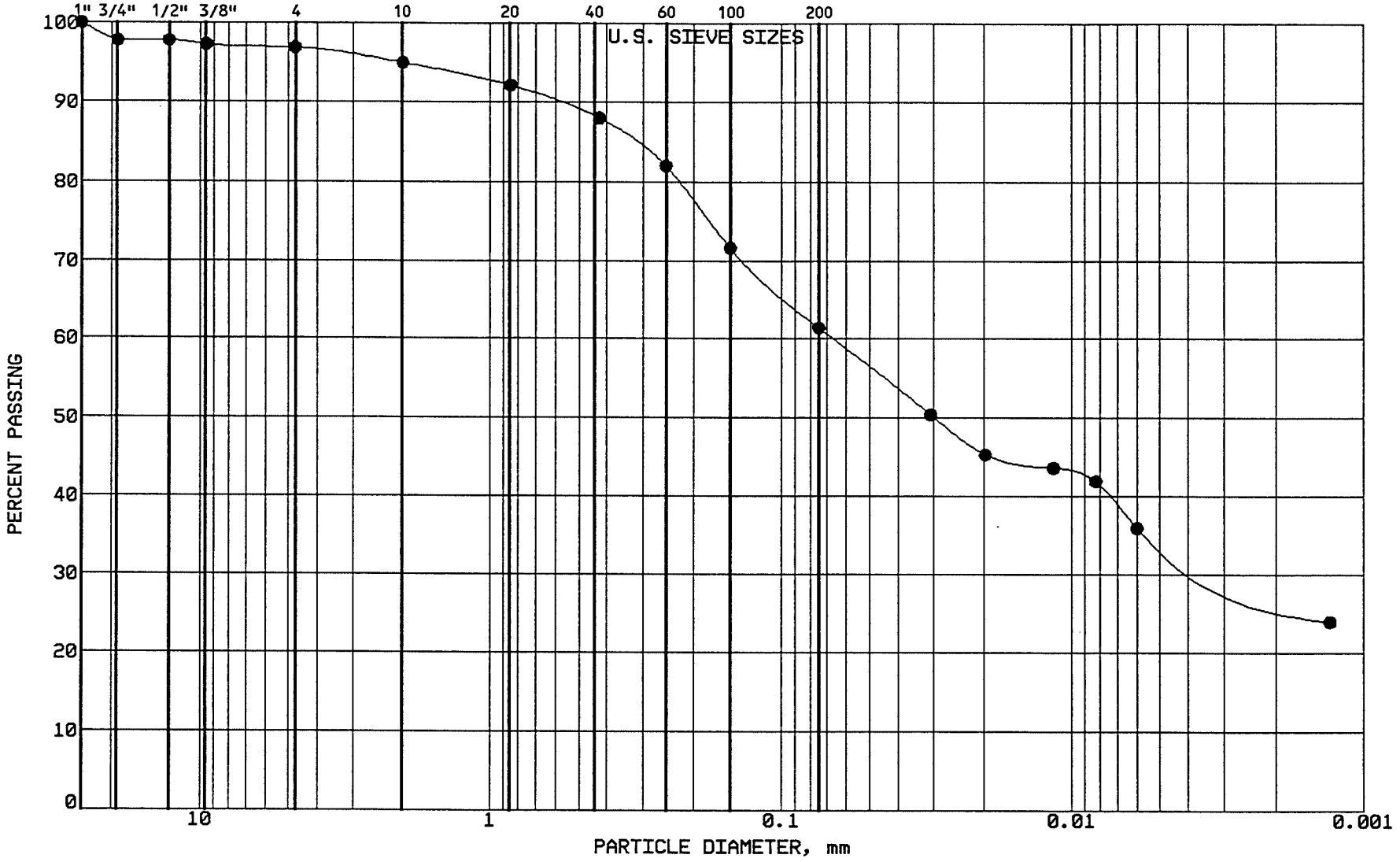
GRAVEL	2.9 %
SAND	33.7 %
SILT	25.4 %
CLAY	38.0 %
P 200	63.4 %

SOIL PROPERTIES

LL: 47.0%
PL: 16.0%
PI: 31.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

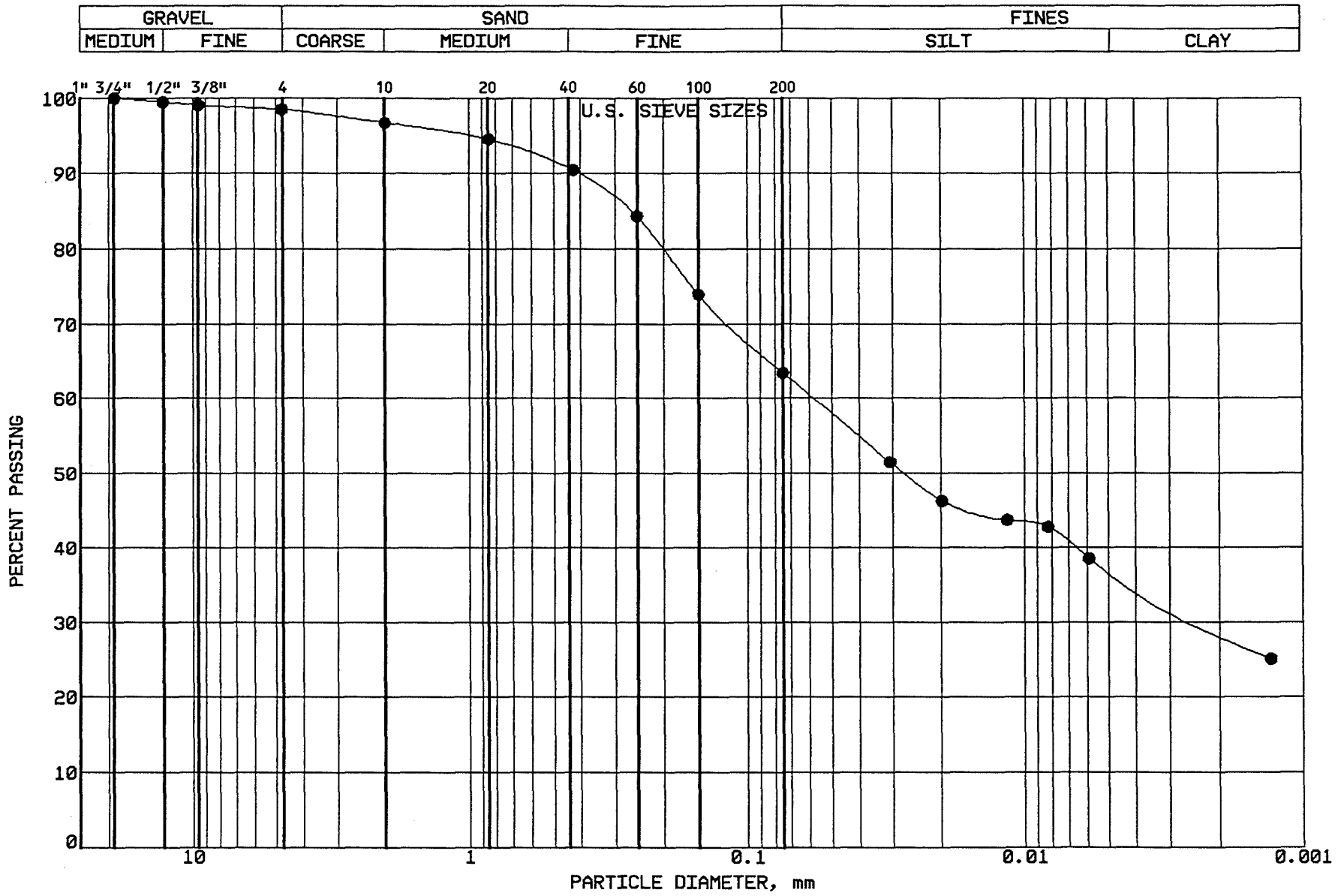
LOCATION: N 43375.0, E 44677.0
SAMPLE: SGCC467 TUBE #:
ELEVATION: 1885.3'

GRAVEL	3.1 %
SAND	35.5 %
SILT	26.9 %
CLAY	34.5 %
P 200	61.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

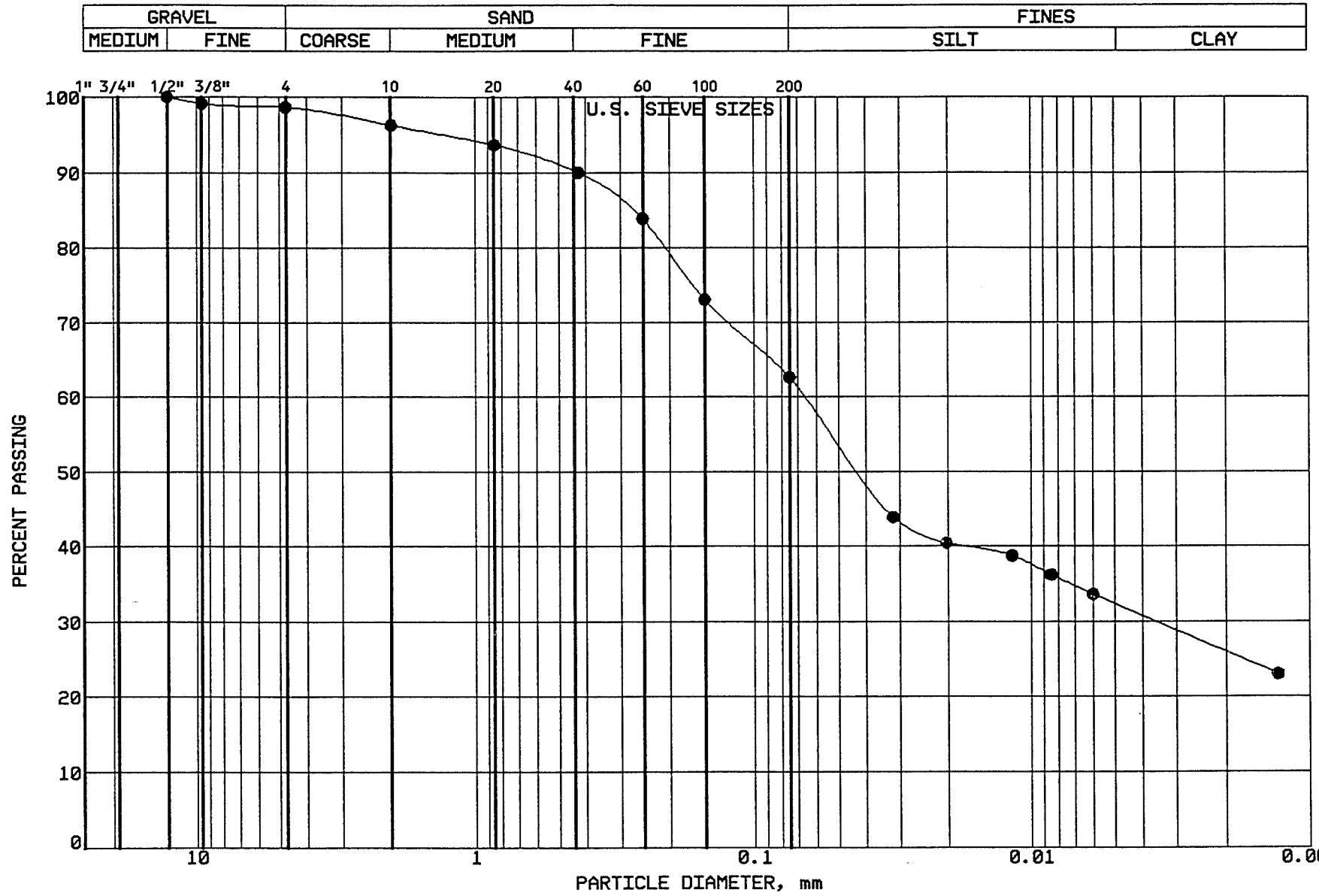
LOCATION: N 43187.0, E 44668.0
SAMPLE: SGCC468 TUBE #:
ELEVATION: 1883.9'

GRAVEL	1.5 %
SAND	35.1 %
SILT	26.4 %
CLAY	37.0 %
P 200	63.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

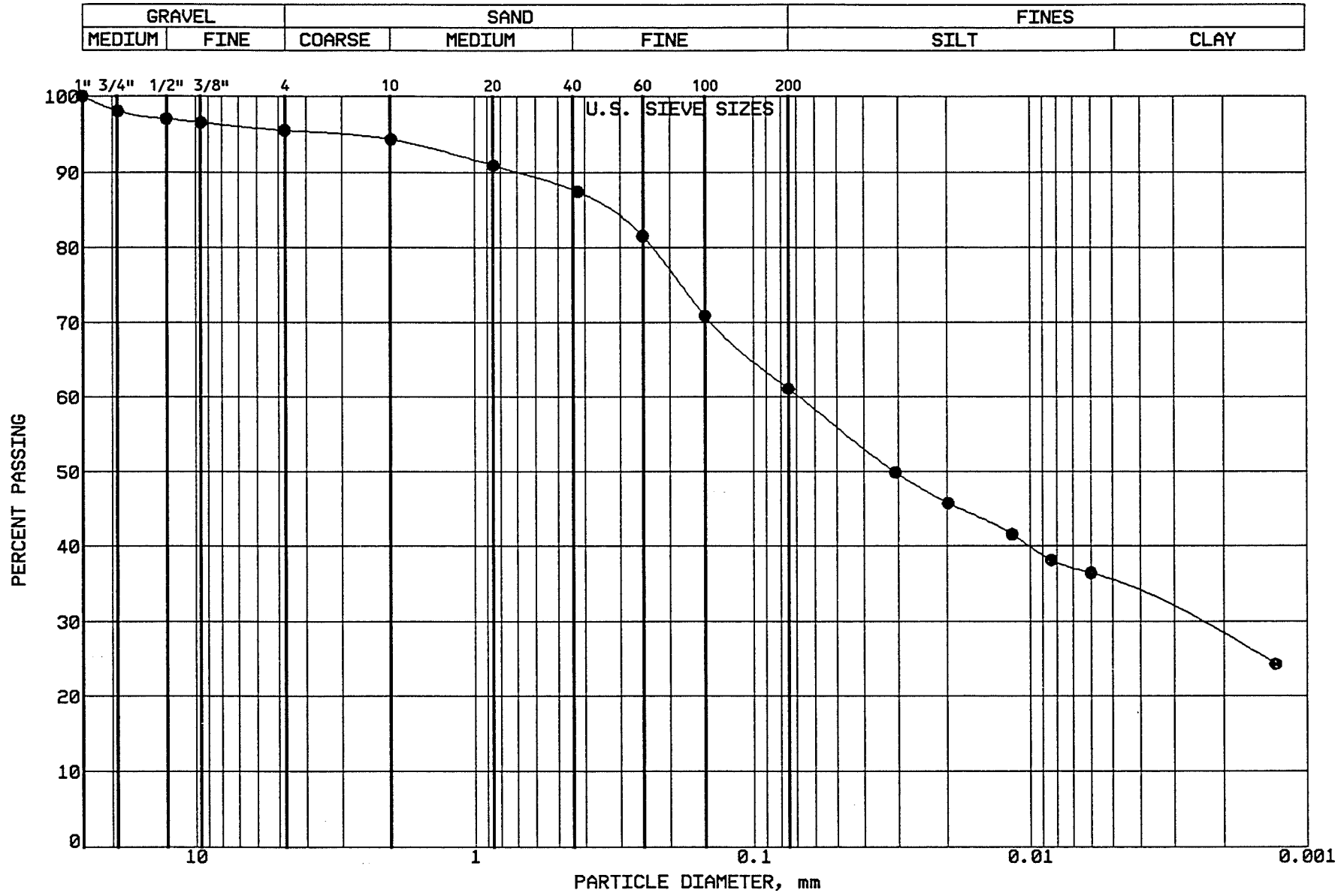
LOCATION: N 43000.0, E 44658.0
SAMPLE: SGCC469 TUBE #:
ELEVATION: 1883.1'

GRAVEL	1.4 %
SAND	36.0 %
SILT	30.3 %
CLAY	32.3 %
P 200	62.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

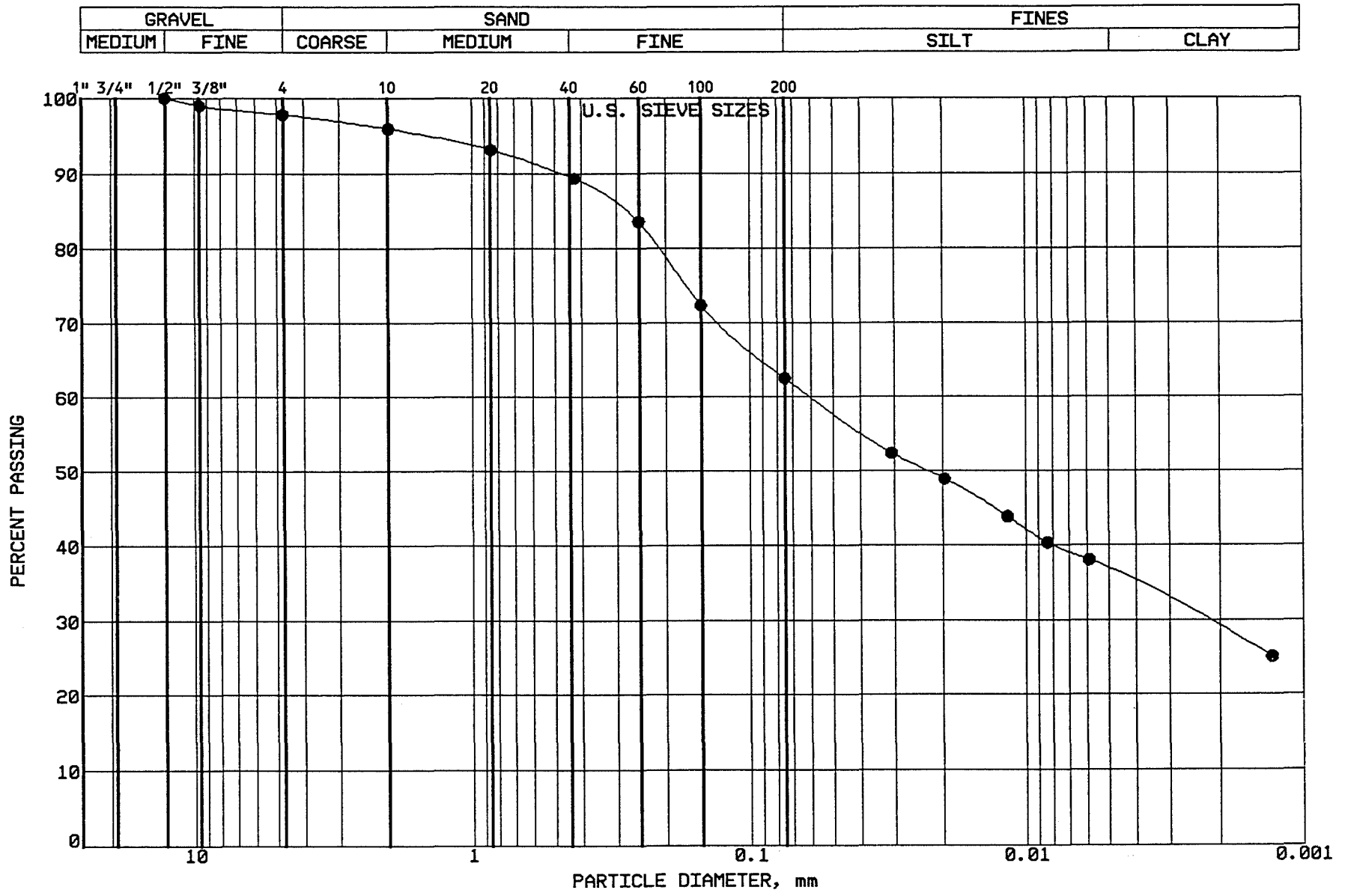
LOCATION: N 42811.0, E 44655.0
SAMPLE: SGCC470 TUBE #:
ELEVATION: 1882.2'

GRAVEL	4.5 %
SAND	34.4 %
SILT	26.1 %
CLAY	35.0 %
P 200	61.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

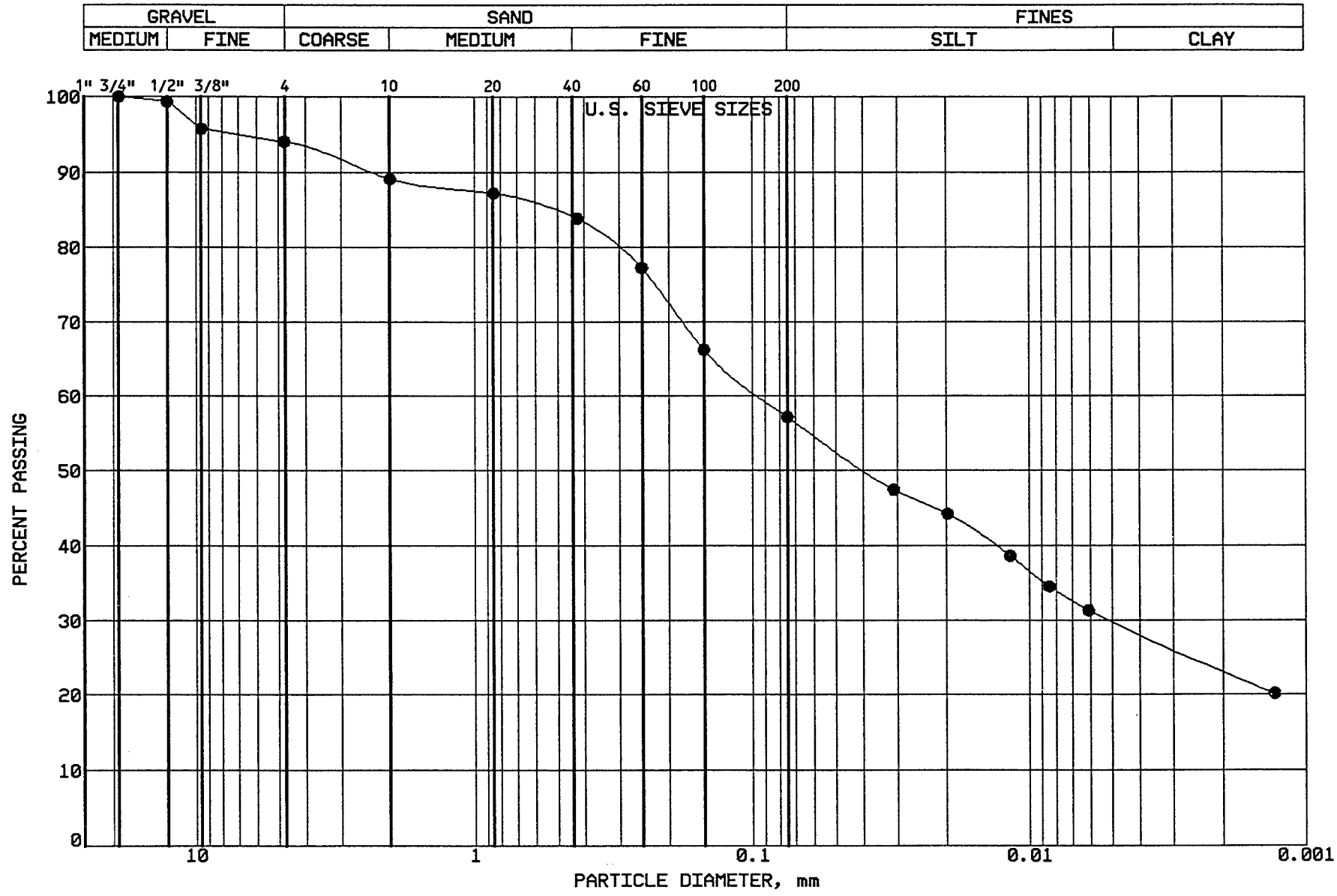
LOCATION: N 42621.0, E 44653.0
SAMPLE: SGCC471 TUBE #:
ELEVATION: 1879.0'

GRAVEL	2.2 %
SAND	35.3 %
SILT	25.9 %
CLAY	36.6 %
P 200	62.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43220.0, E 44847.0
SAMPLE: SGCC472 TUBE #:
ELEVATION: 1883.8'

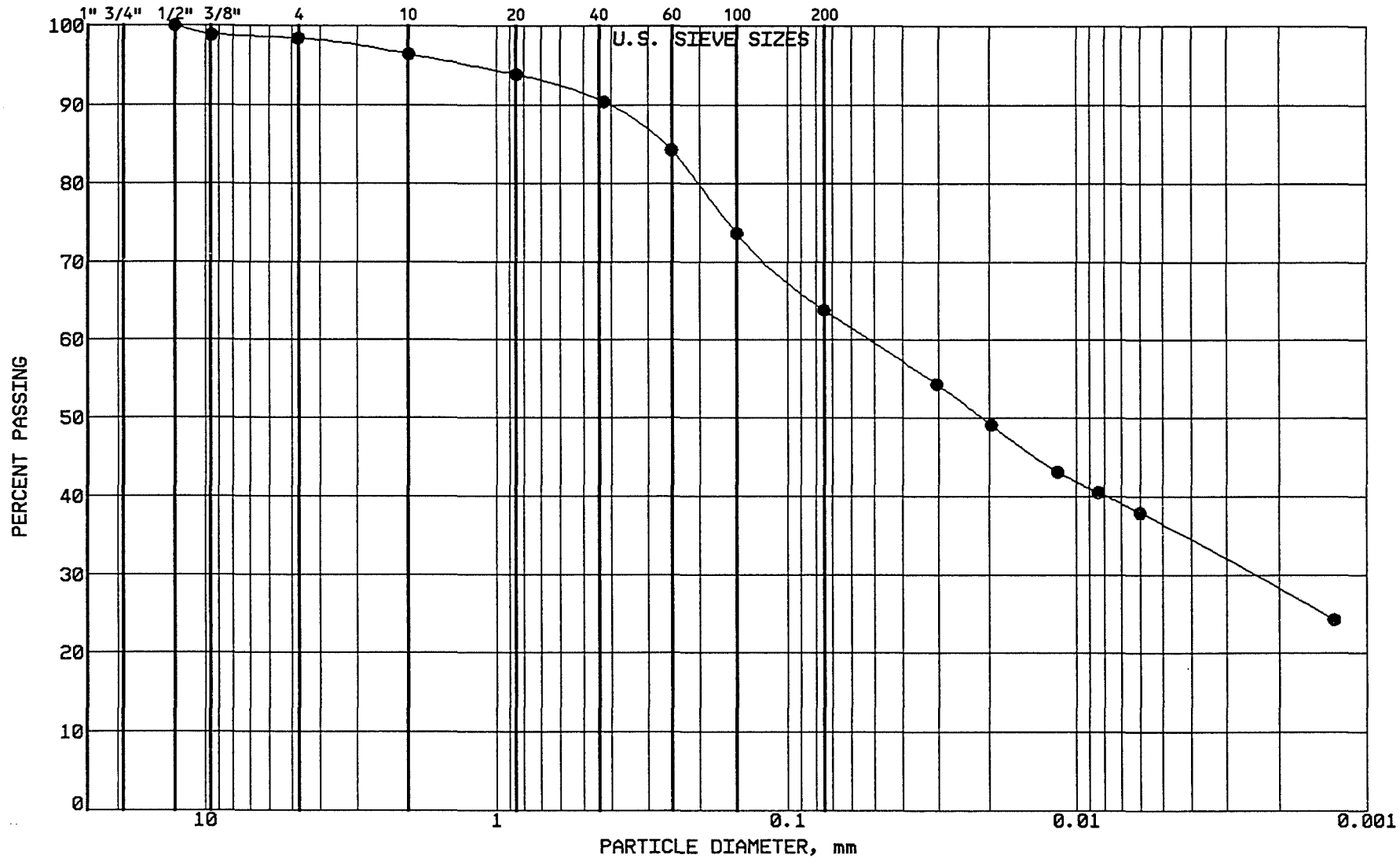
GRAVEL	6.0 %
SAND	36.8 %
SILT	27.3 %
CLAY	29.9 %
P 200	57.2 %

SOIL PROPERTIES

LL: 41.0%
PL: 15.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43607.0, E 44838.0
SAMPLE: SGCC473 TUBE #:
ELEVATION: 1883.4'

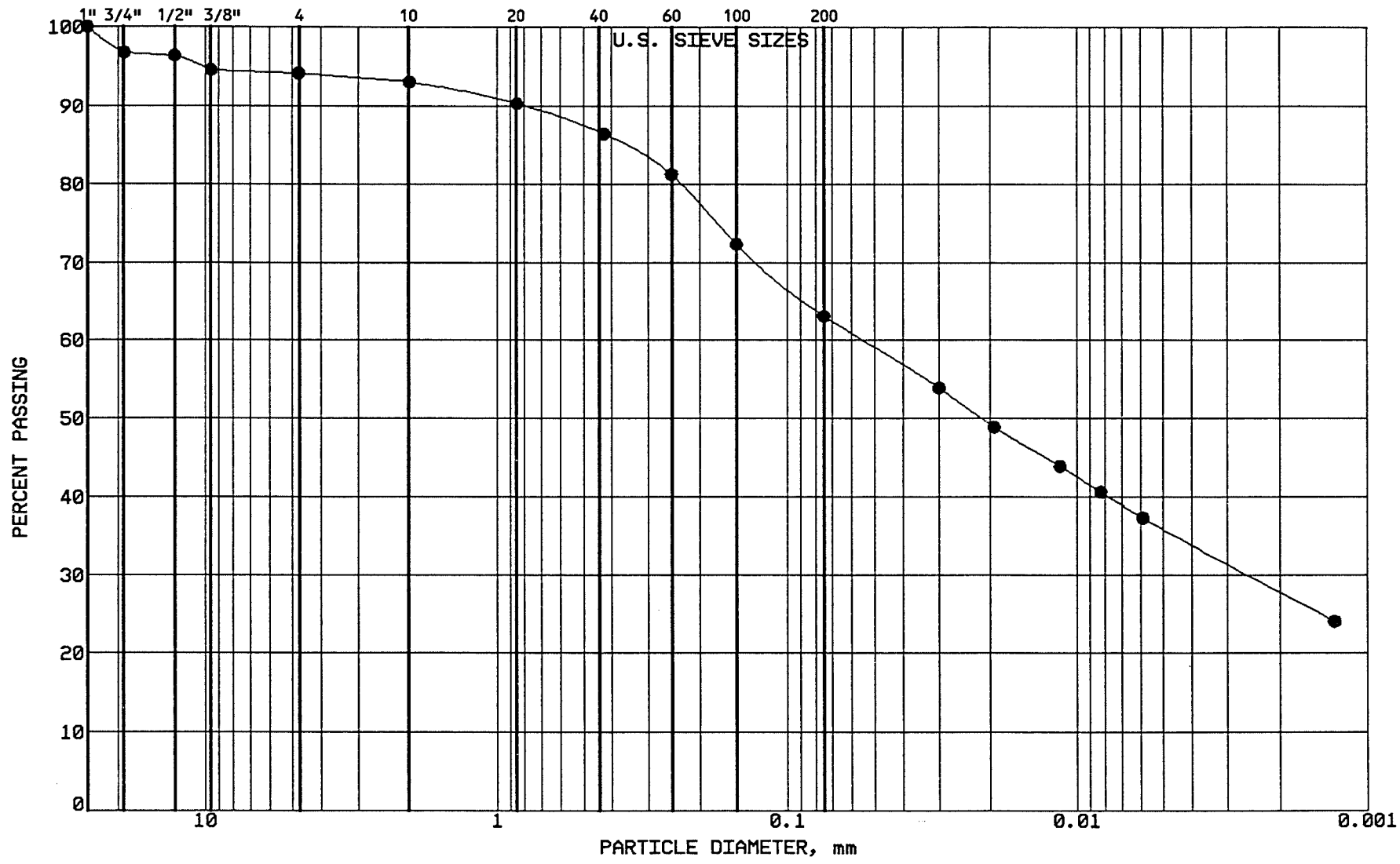
GRAVEL	1.6 %
SAND	34.6 %
SILT	27.5 %
CLAY	36.3 %
P 200	63.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

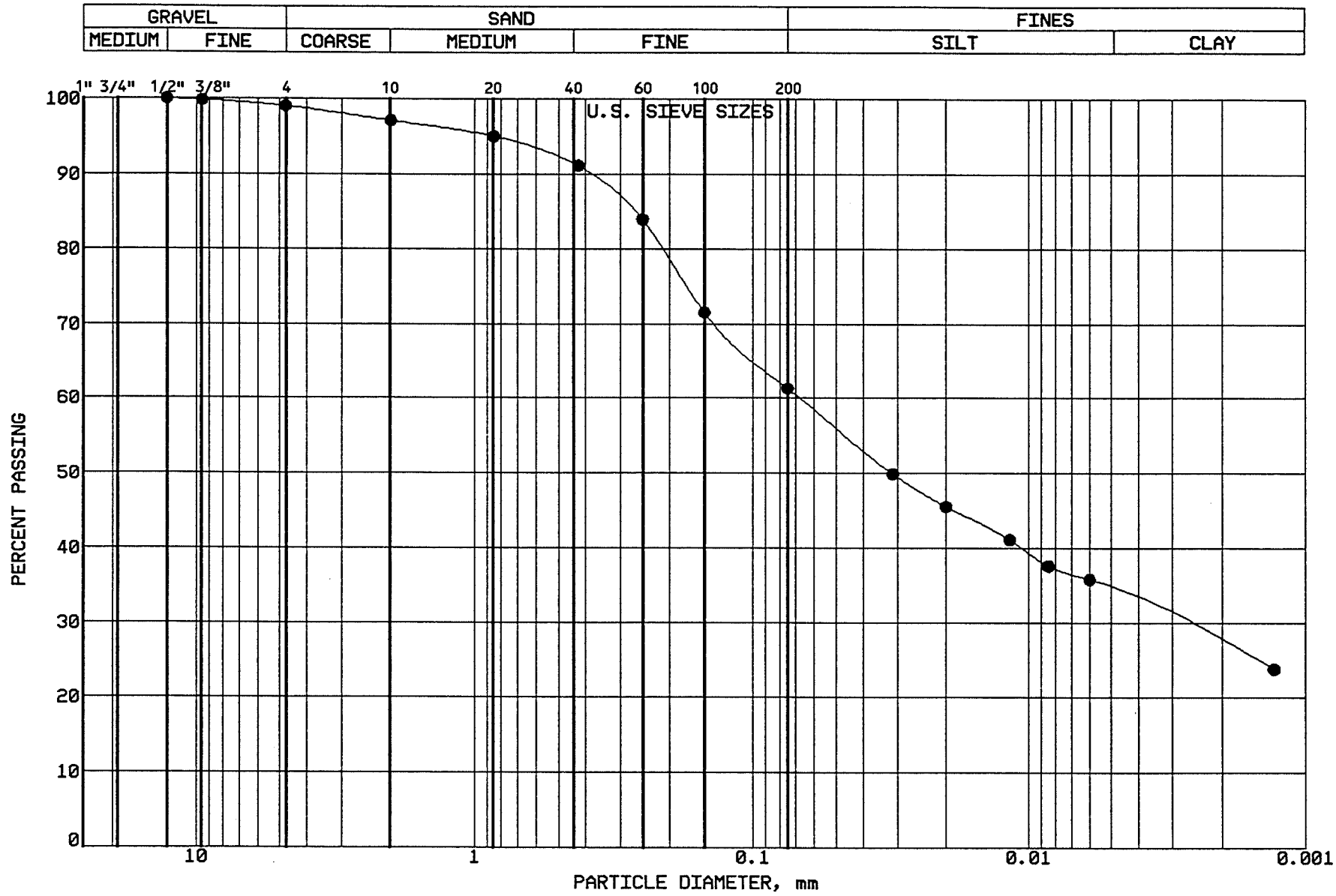
LOCATION: N 42885.0, E 44821.0
SAMPLE: SGCC474 TUBE #:
ELEVATION: 1881.3'

GRAVEL	5.9 %
SAND	31.0 %
SILT	27.2 %
CLAY	35.9 %
P 200	63.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42690.0, E 44811.0
SAMPLE: SGCC475 TUBE #:
ELEVATION: 1879.5'

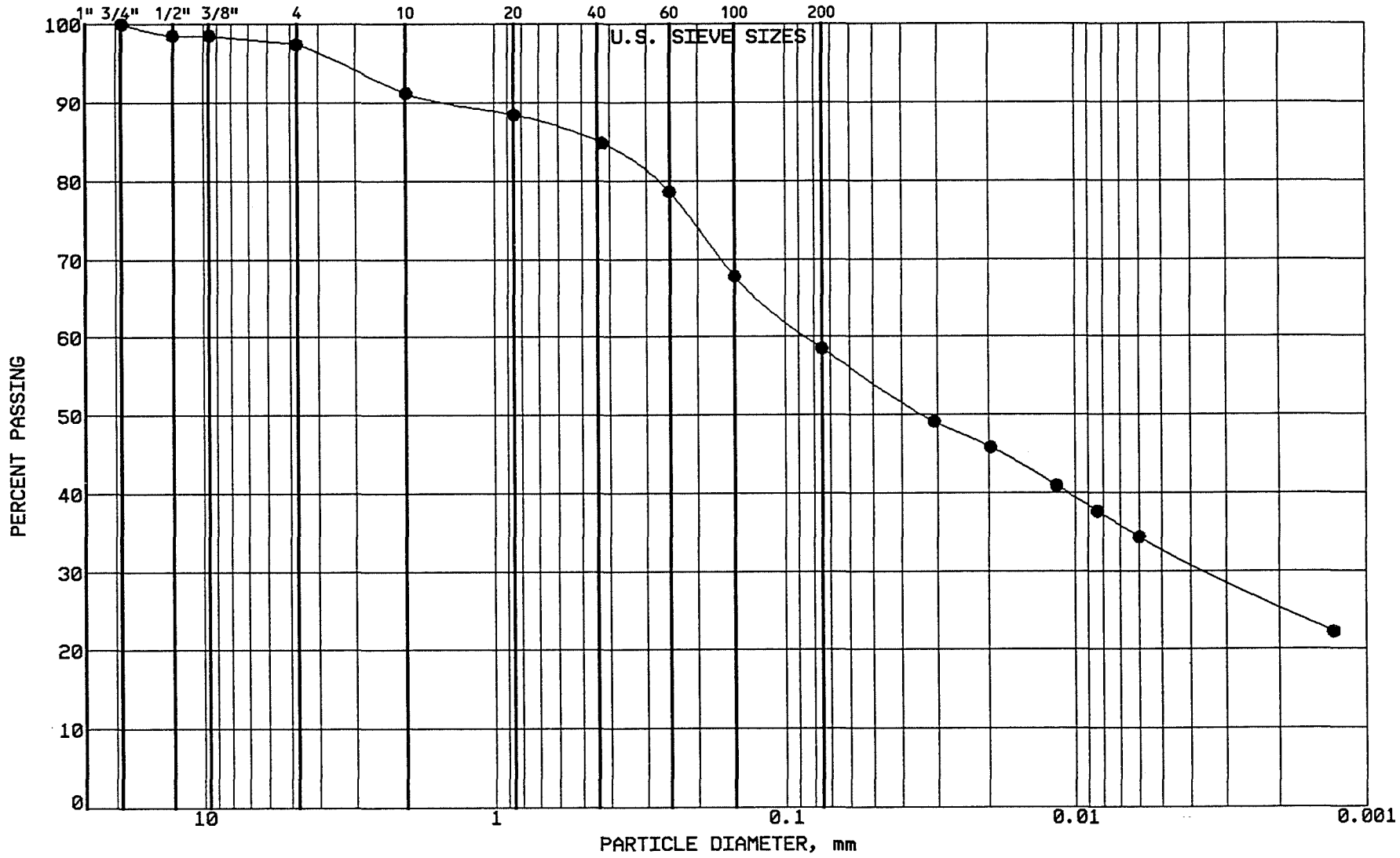
GRAVEL	1.0 %
SAND	37.7 %
SILT	26.9 %
CLAY	34.4 %
P 200	61.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43197.0, E 44212.0
SAMPLE: CLBCC476 TUBE #: ST-117A
ELEVATION: 1886.5'

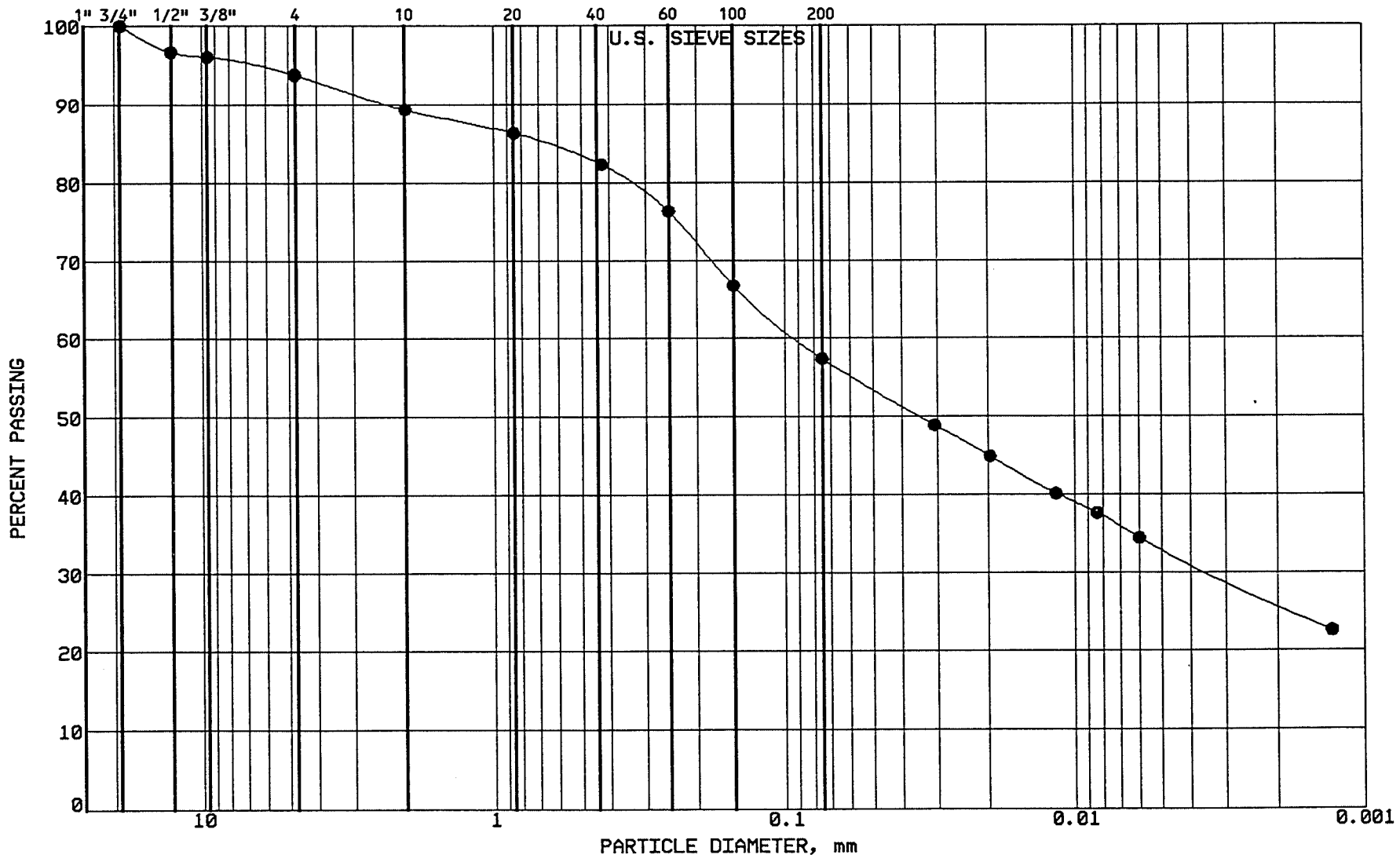
GRAVEL	2.6 %
SAND	38.9 %
SILT	25.6 %
CLAY	32.9 %
P 200	58.5 %

SOIL PROPERTIES

LL: 44.0%
PL: 15.0%
PI: 29.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43014.0, E 44197.0
SAMPLE: CLBCC477 TUBE #: ST-118A
ELEVATION: 1885.6'

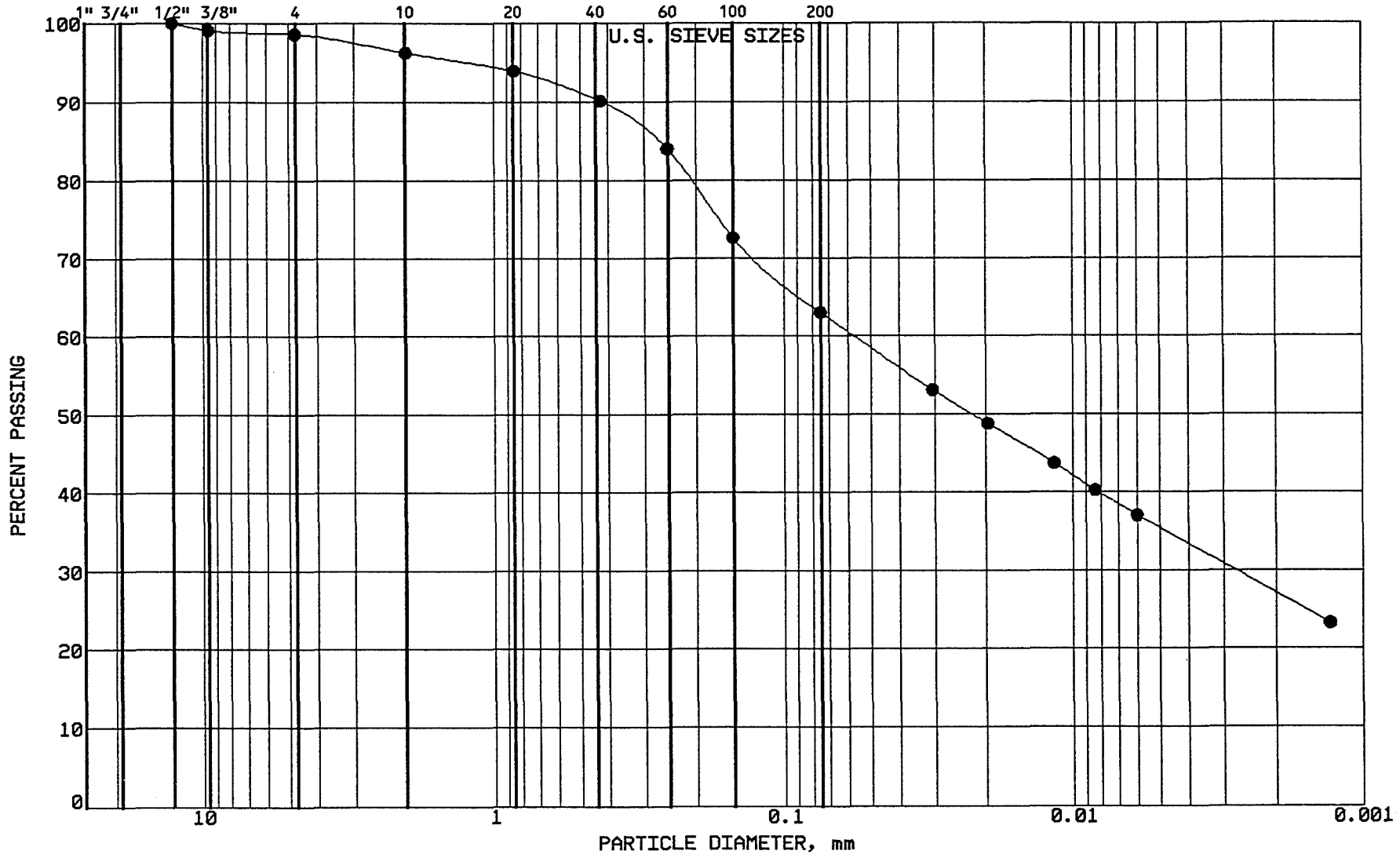
GRAVEL	6.3 %
SAND	36.3 %
SILT	24.4 %
CLAY	33.0 %
P 200	57.4 %

SOIL PROPERTIES

LL: 43.0%
PL: 15.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42839.0, E 44187.0
SAMPLE: CLBCC478 TUBE #: ST-119B
ELEVATION: 1884.2'

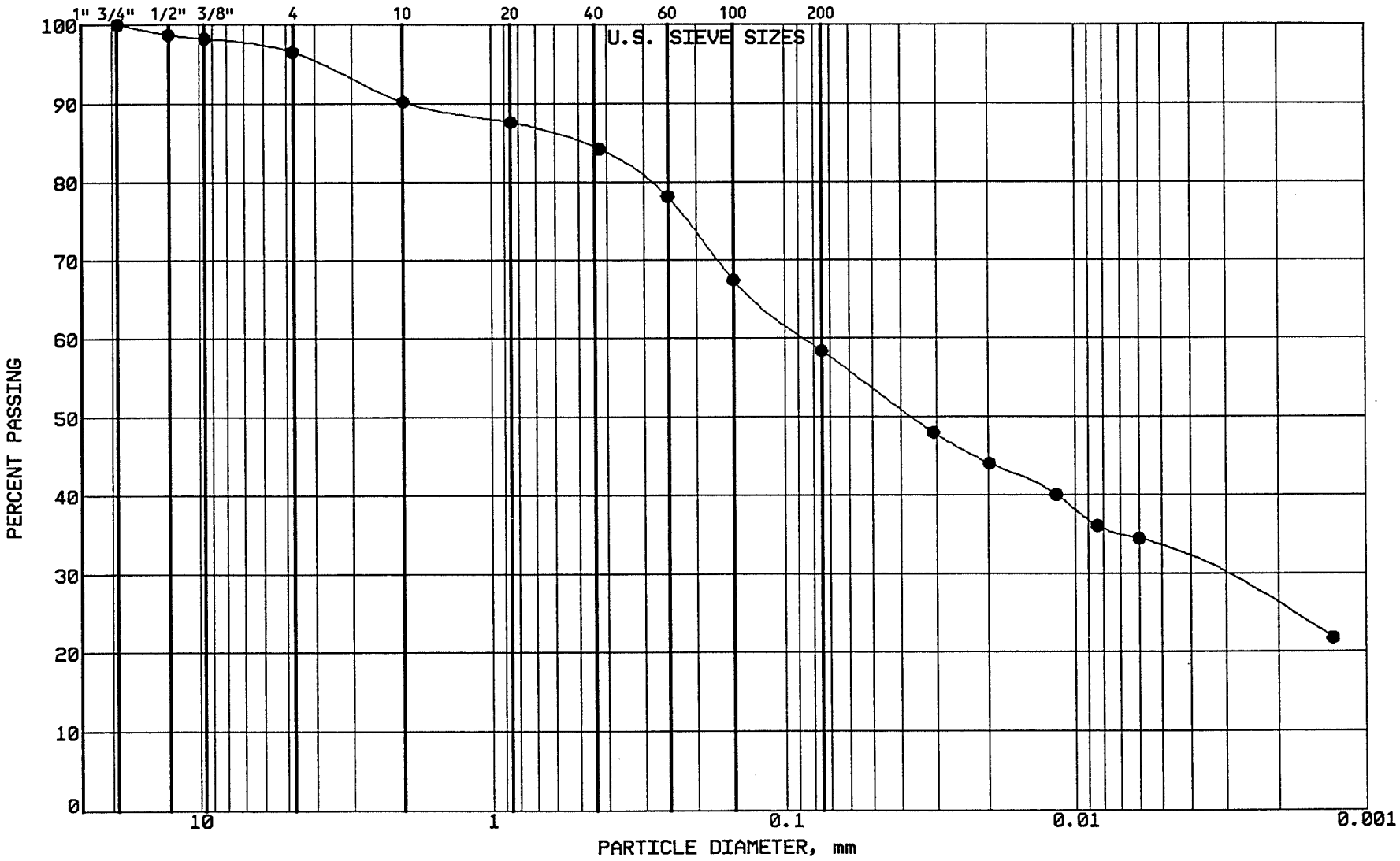
GRAVEL	1.4 %
SAND	35.6 %
SILT	27.6 %
CLAY	35.4 %
P 200	63.0 %

SOIL PROPERTIES

LL: 43.0%
PL: 15.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

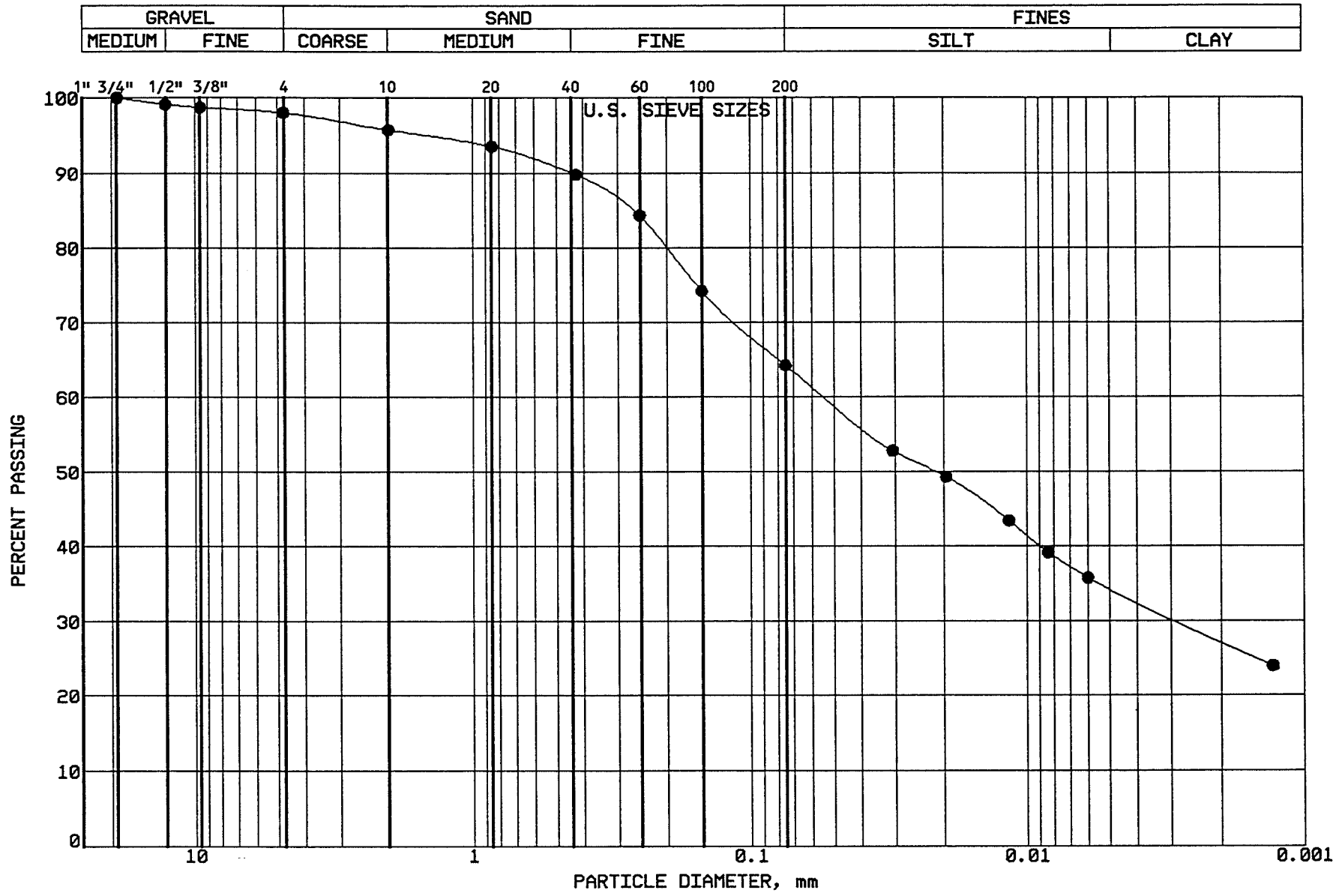
LOCATION: N 42631.0, E 44174.0
SAMPLE: CLBCC479 TUBE #: ST-120A
ELEVATION: 1883.4'

GRAVEL	3.5 %
SAND	38.1 %
SILT	25.5 %
CLAY	32.9 %
P 200	58.4 %

SOIL PROPERTIES

LL: 45.0%
PL: 17.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43394.0, E 44699.0
SAMPLE: SGCC480 TUBE #:
ELEVATION: 1886.3'

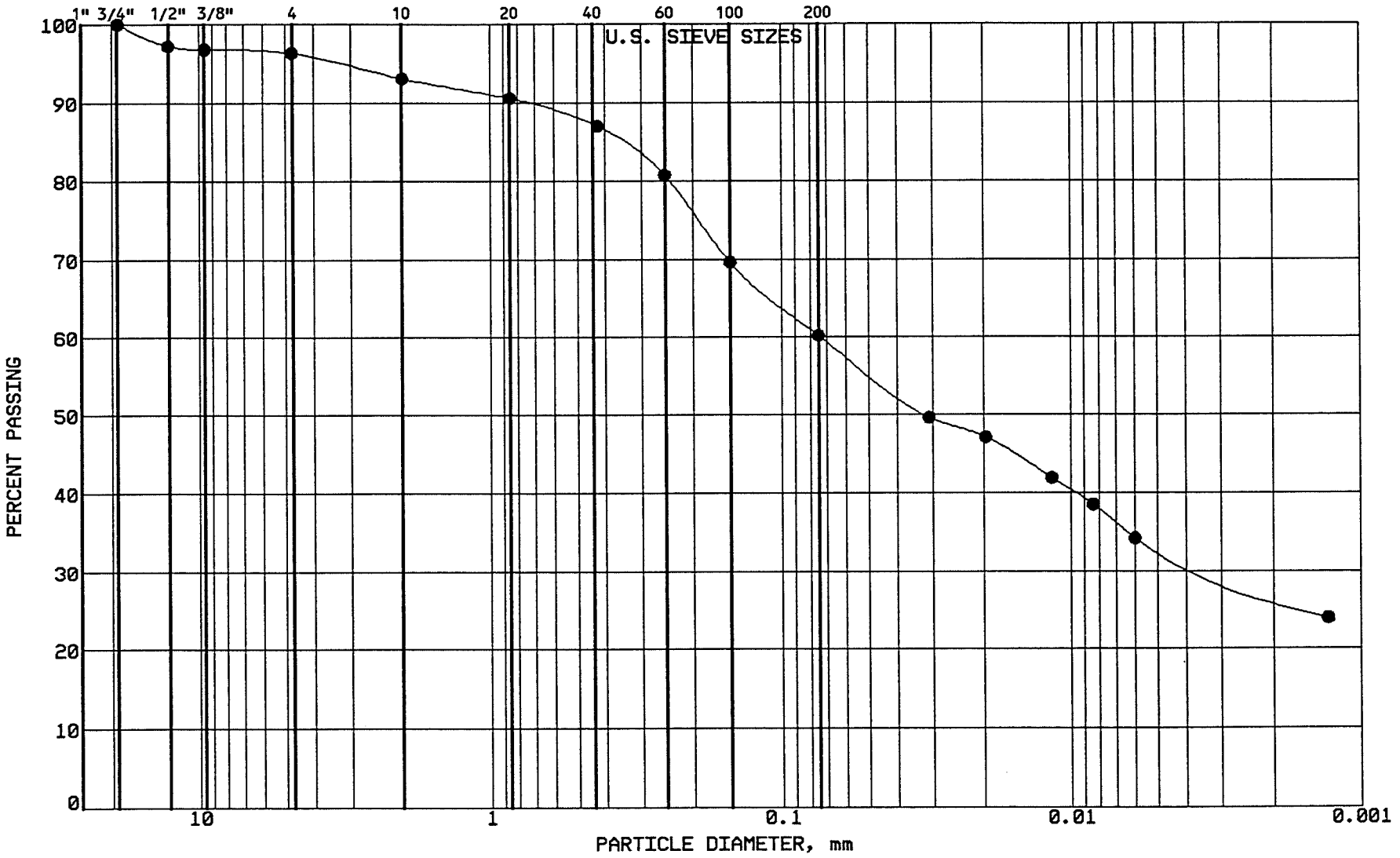
GRAVEL	2.0 %
SAND	33.8 %
SILT	29.9 %
CLAY	34.3 %
P 200	64.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

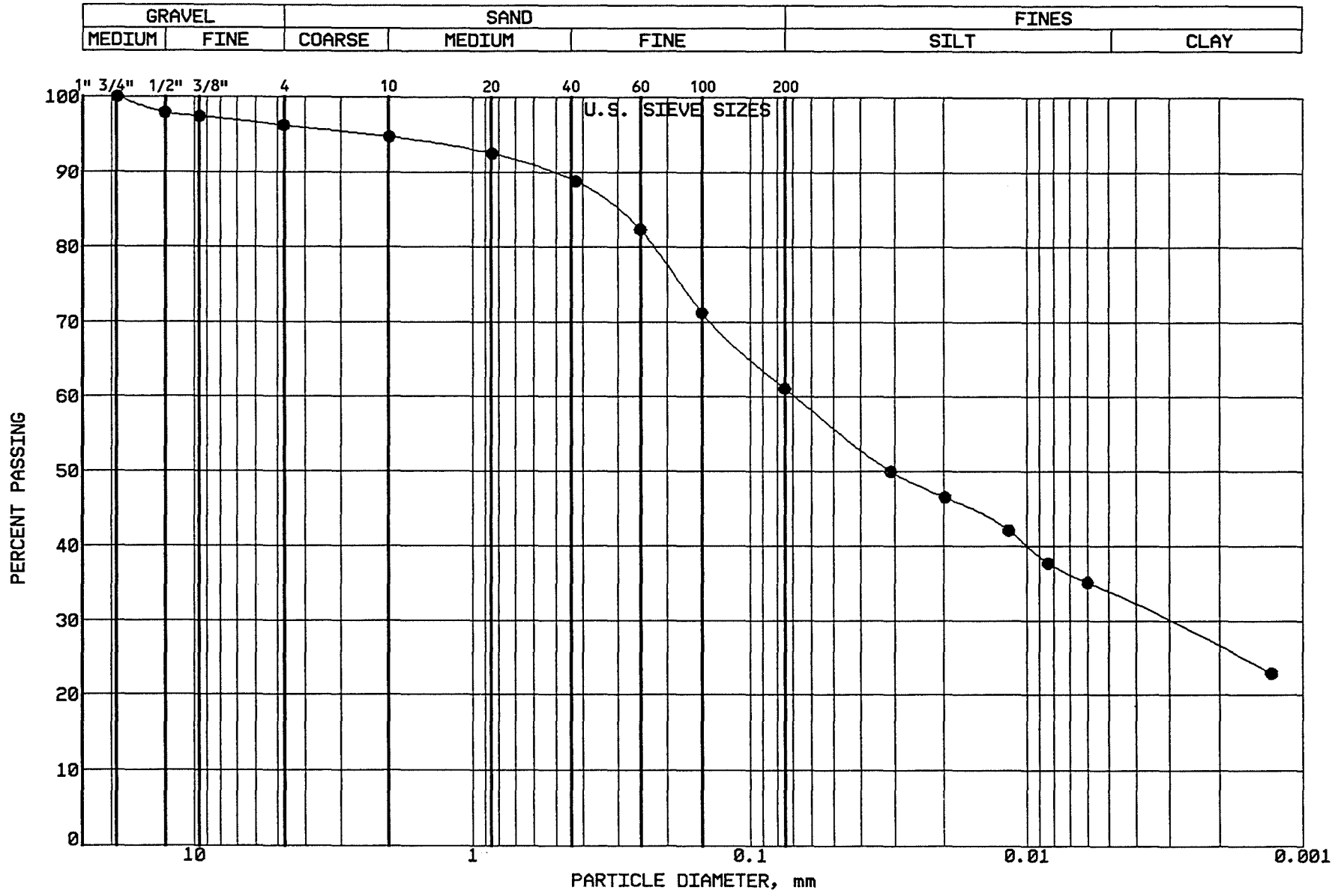
LOCATION: N 43214.0, E 44690.0
SAMPLE: SGCC481 TUBE #:
ELEVATION: 1885.2'

GRAVEL	3.7 %
SAND	36.1 %
SILT	27.2 %
CLAY	33.0 %
P 200	60.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43030.0, E 44683.0
SAMPLE: SGCC482 TUBE #:
ELEVATION: 1884.2'

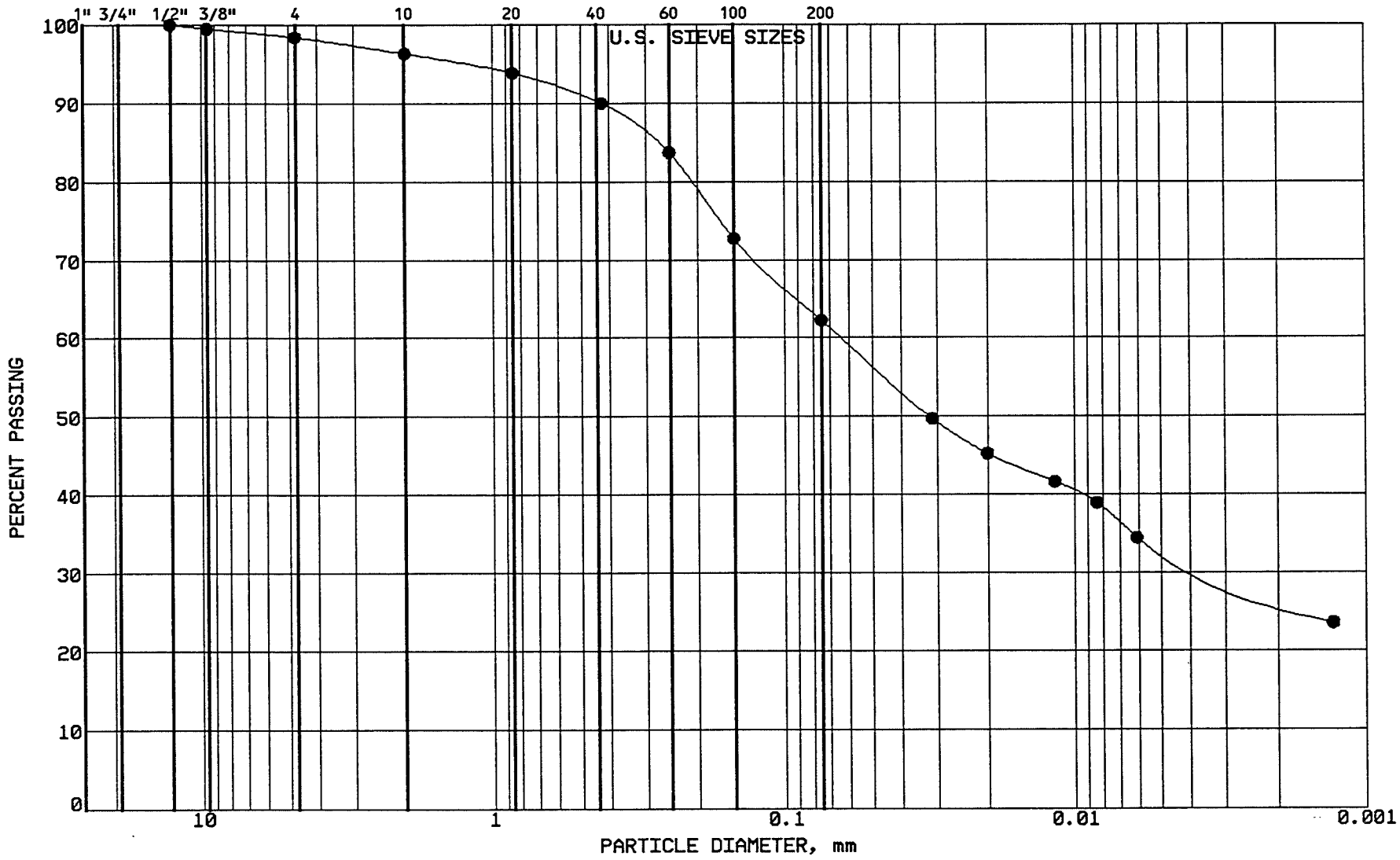
GRAVEL	3.8 %
SAND	35.1 %
SILT	27.5 %
CLAY	33.6 %
P 200	61.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

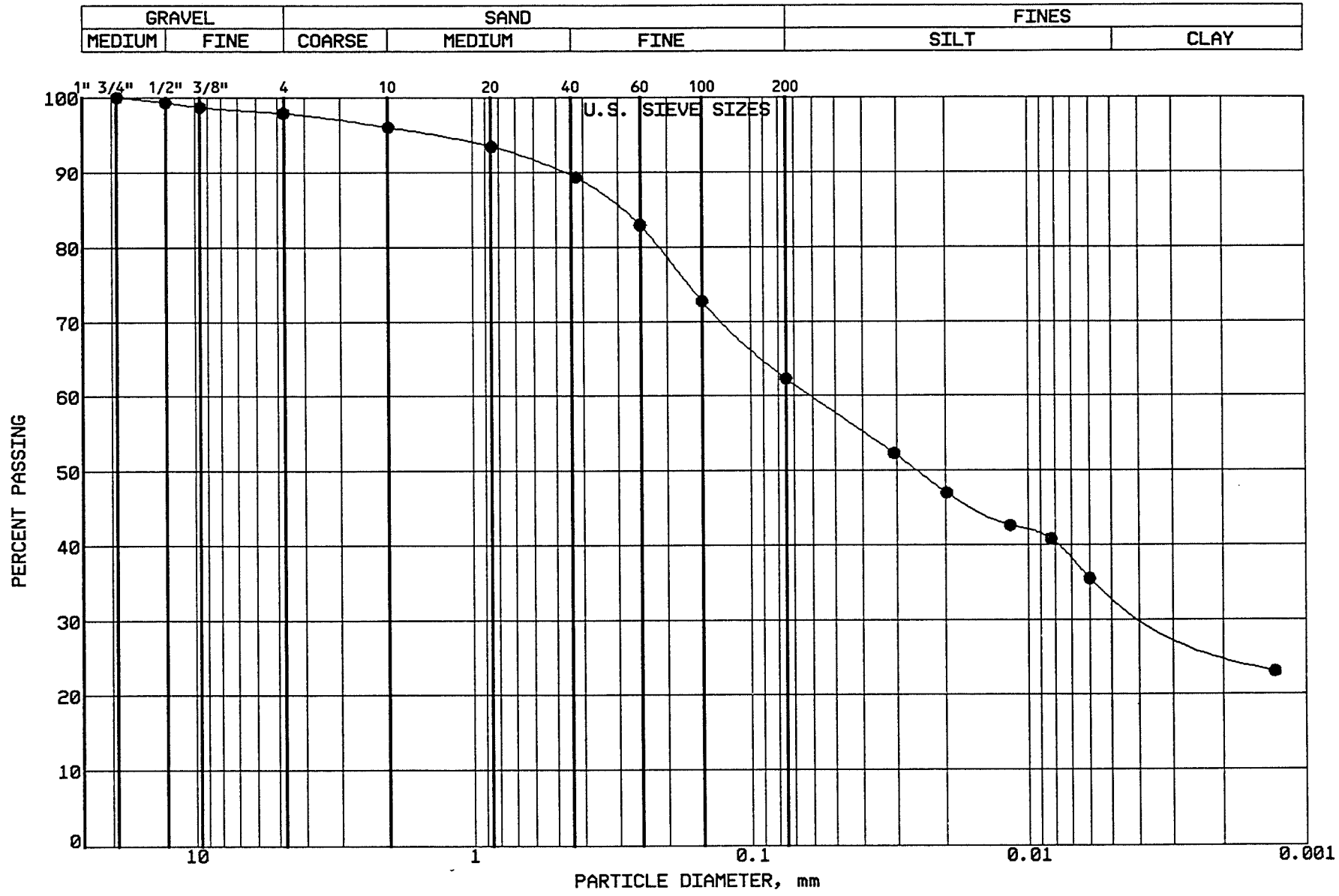
LOCATION: N 42858.0, E 44682.0
SAMPLE: SGCC483 TUBE #:
ELEVATION: 1883.4'

GRAVEL	1.6 %
SAND	36.2 %
SILT	29.2 %
CLAY	33.0 %
P 200	62.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42639.0, E 44681.0
SAMPLE: SGCC484 TUBE #:
ELEVATION: 1881.5'

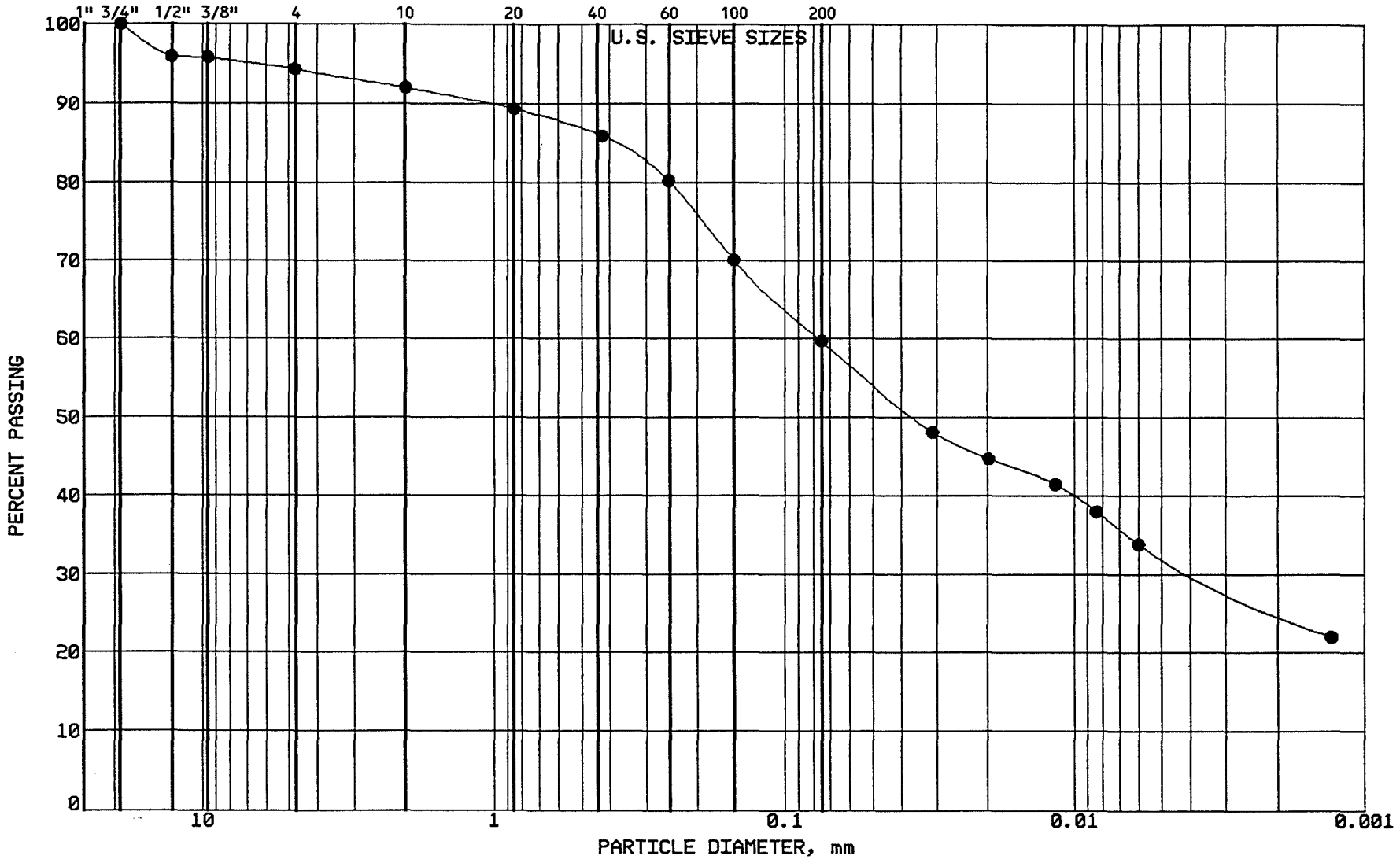
GRAVEL	2.1 %
SAND	35.6 %
SILT	28.3 %
CLAY	34.0 %
P 200	62.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

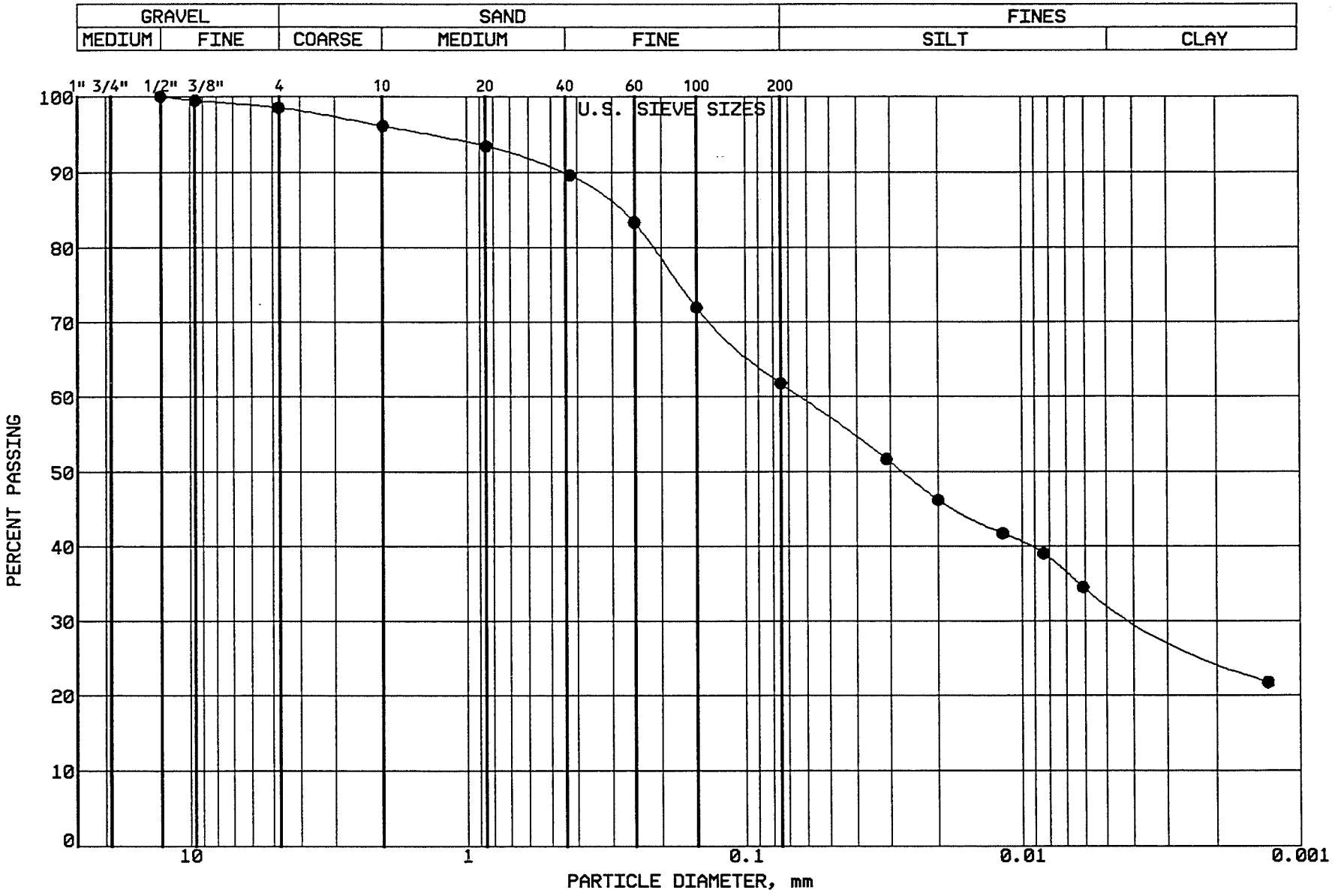
LOCATION: N 42634.0, E 44796.0
SAMPLE: SGCC485 TUBE #:
ELEVATION: 1880.8'

GRAVEL	5.7 %
SAND	34.6 %
SILT	27.3 %
CLAY	32.4 %
P 200	59.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

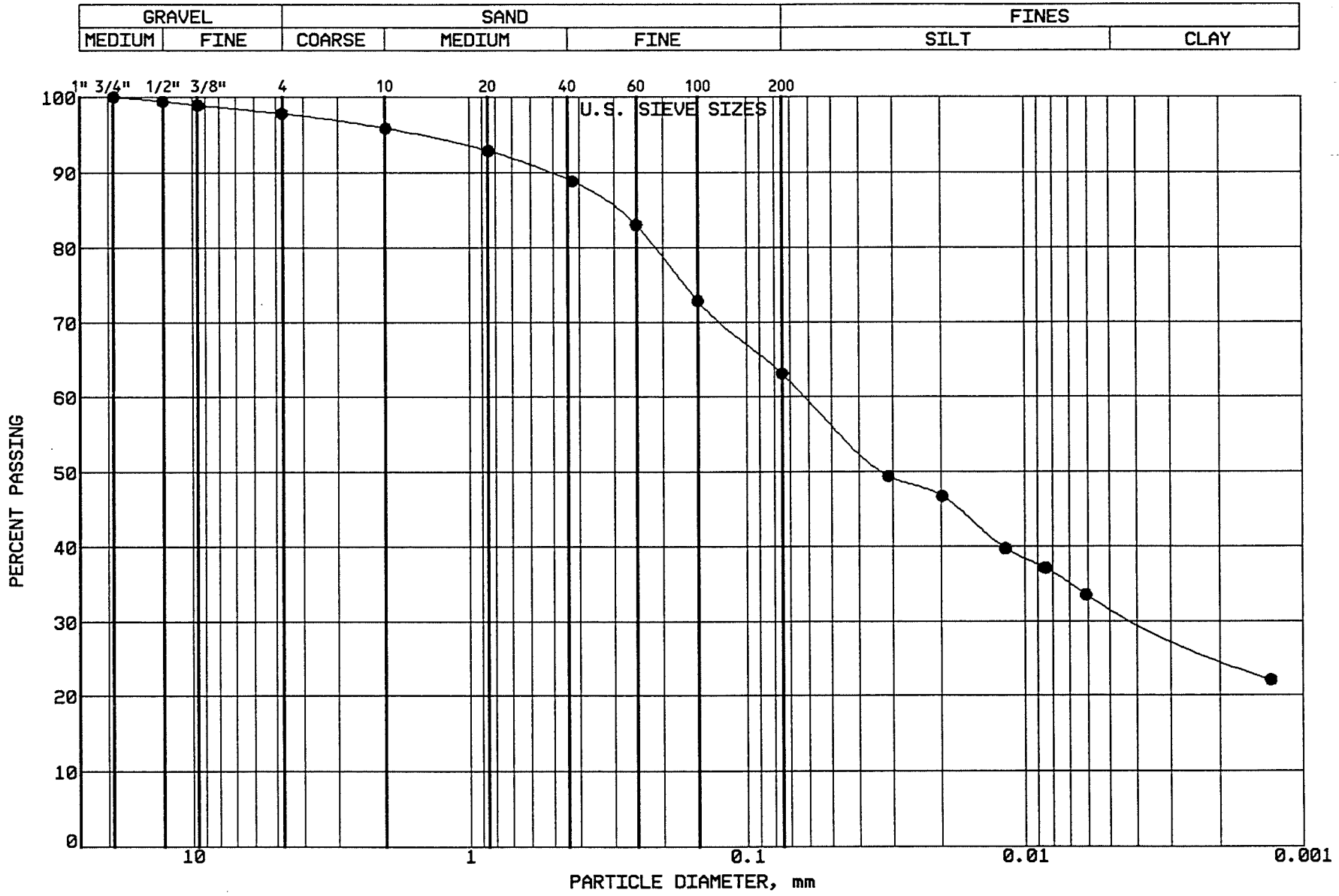
LOCATION: N 42811.0, E 44797.0
SAMPLE: SGCC486 TUBE #:
ELEVATION: 1882.2'

GRAVEL	1.5 %
SAND	36.7 %
SILT	28.9 %
CLAY	32.9 %
P 200	61.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42992.0, E 44794.0
SAMPLE: SGCC487 TUBE #:
ELEVATION: 1883.2'

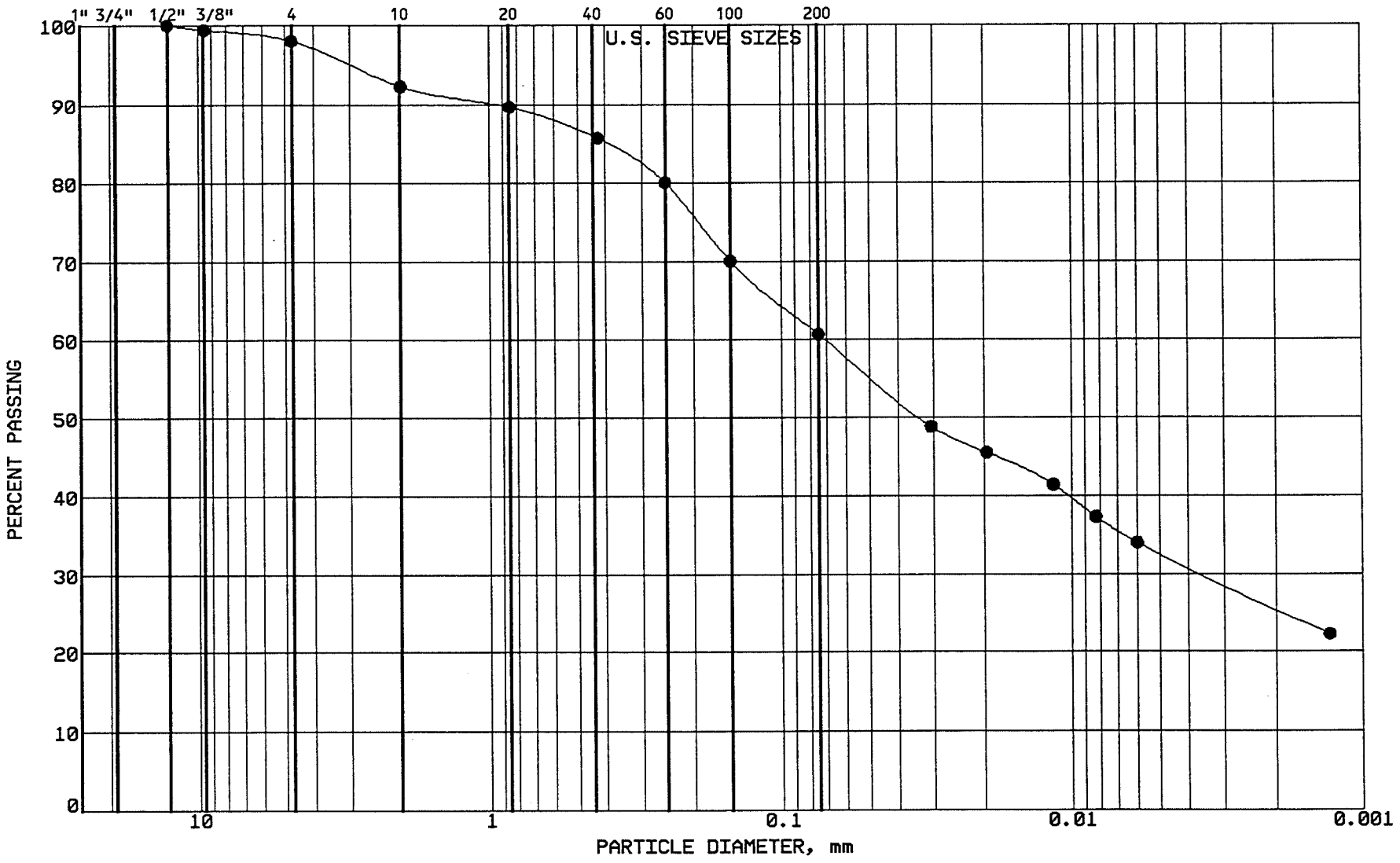
GRAVEL	2.2 %
SAND	34.7 %
SILT	31.1 %
CLAY	32.0 %
P 200	63.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43204.0, E 44389.0
SAMPLE: CLBCC488 TUBE #:
ELEVATION: 1886.7'

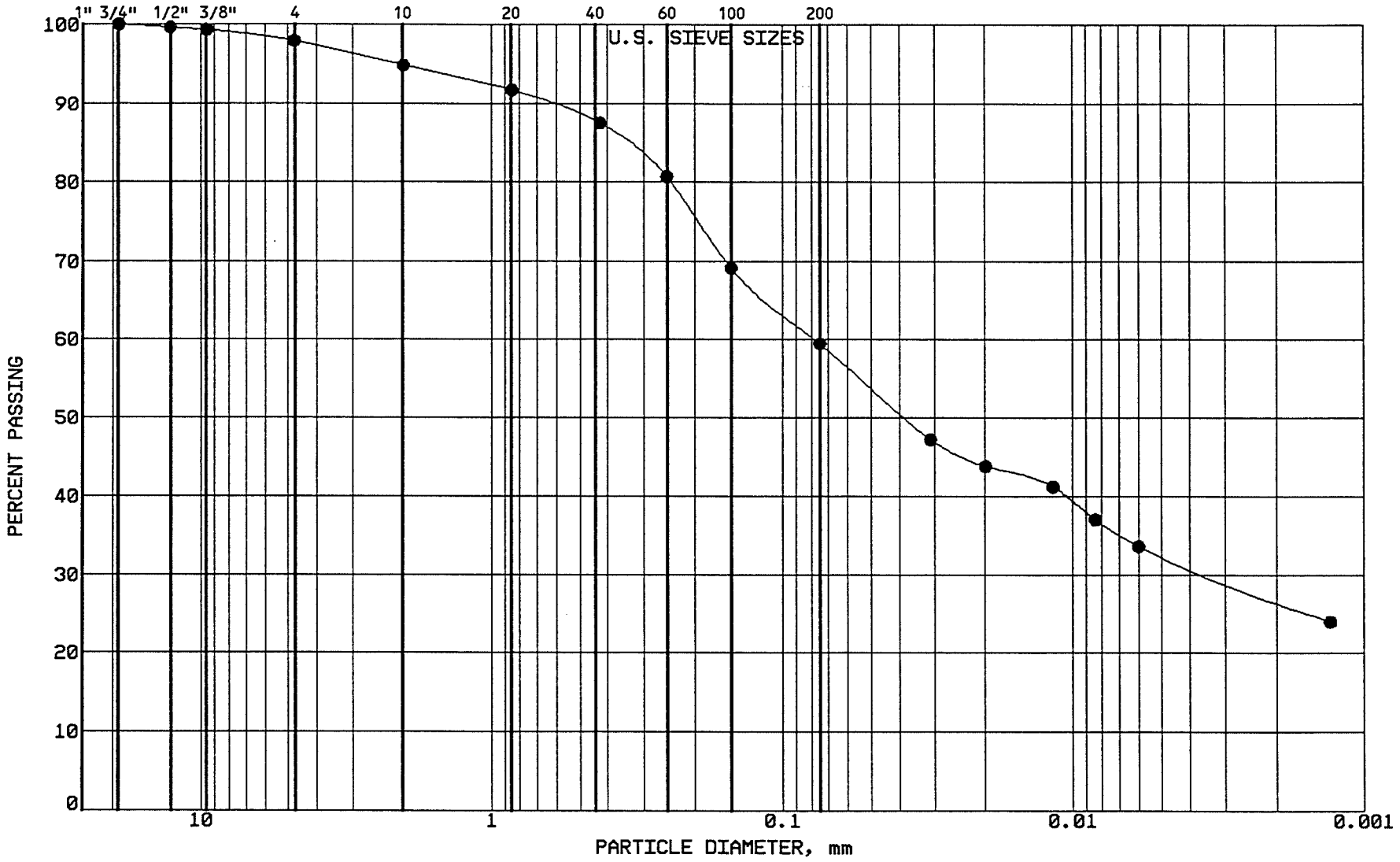
GRAVEL	2.0 %
SAND	37.3 %
SILT	28.1 %
CLAY	32.6 %
P 200	60.7 %

SOIL PROPERTIES

LL: 47.0%
PL: 15.0%
PI: 32.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43206.0, E 44385.0
SAMPLE: CLBCC489 TUBE #: ST-122A
ELEVATION: 1885.3'

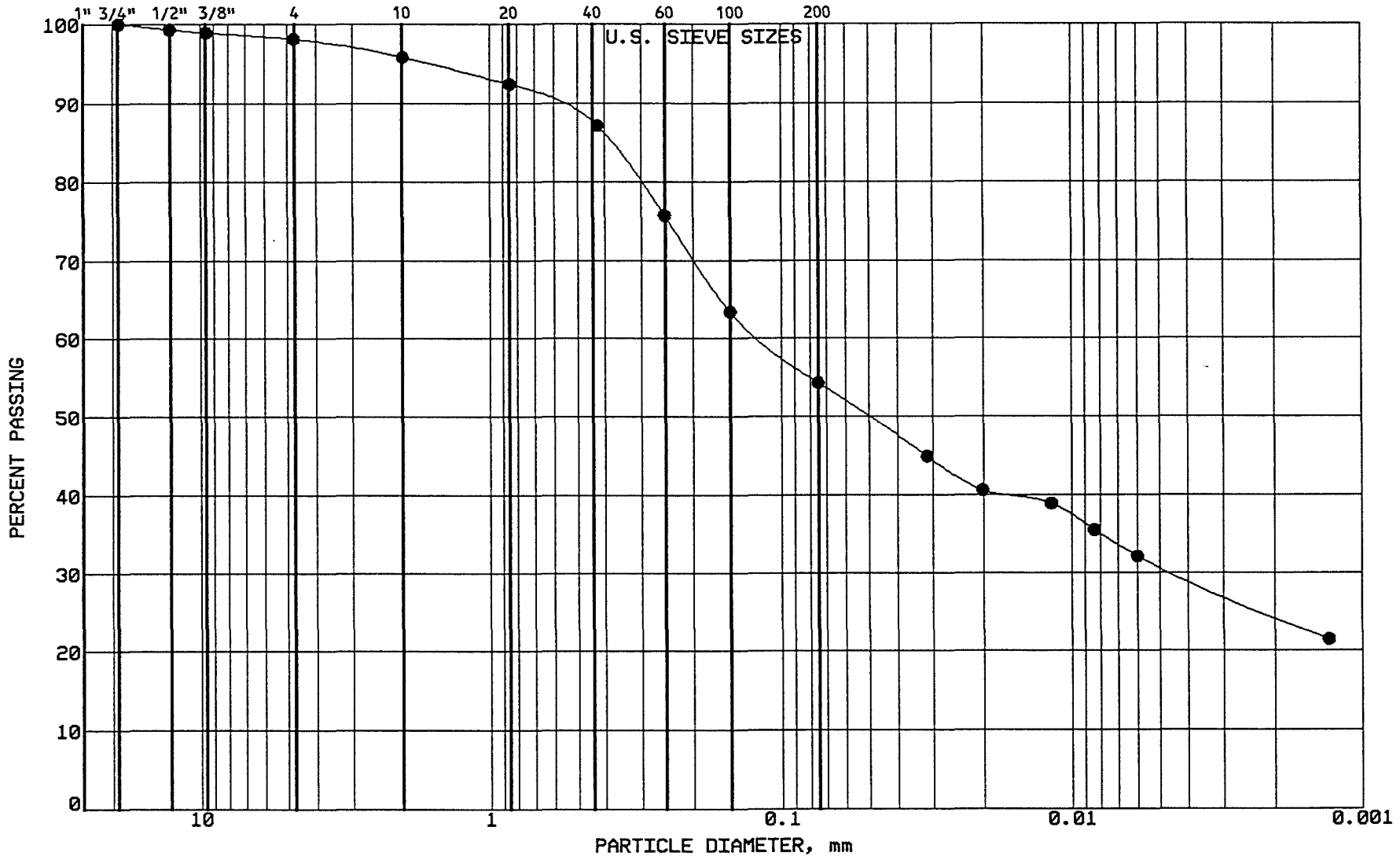
GRAVEL	2.1 %
SAND	38.4 %
SILT	27.0 %
CLAY	32.5 %
P 200	59.5 %

SOIL PROPERTIES

LL: 44.0%
PL: 15.0%
PI: 29.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

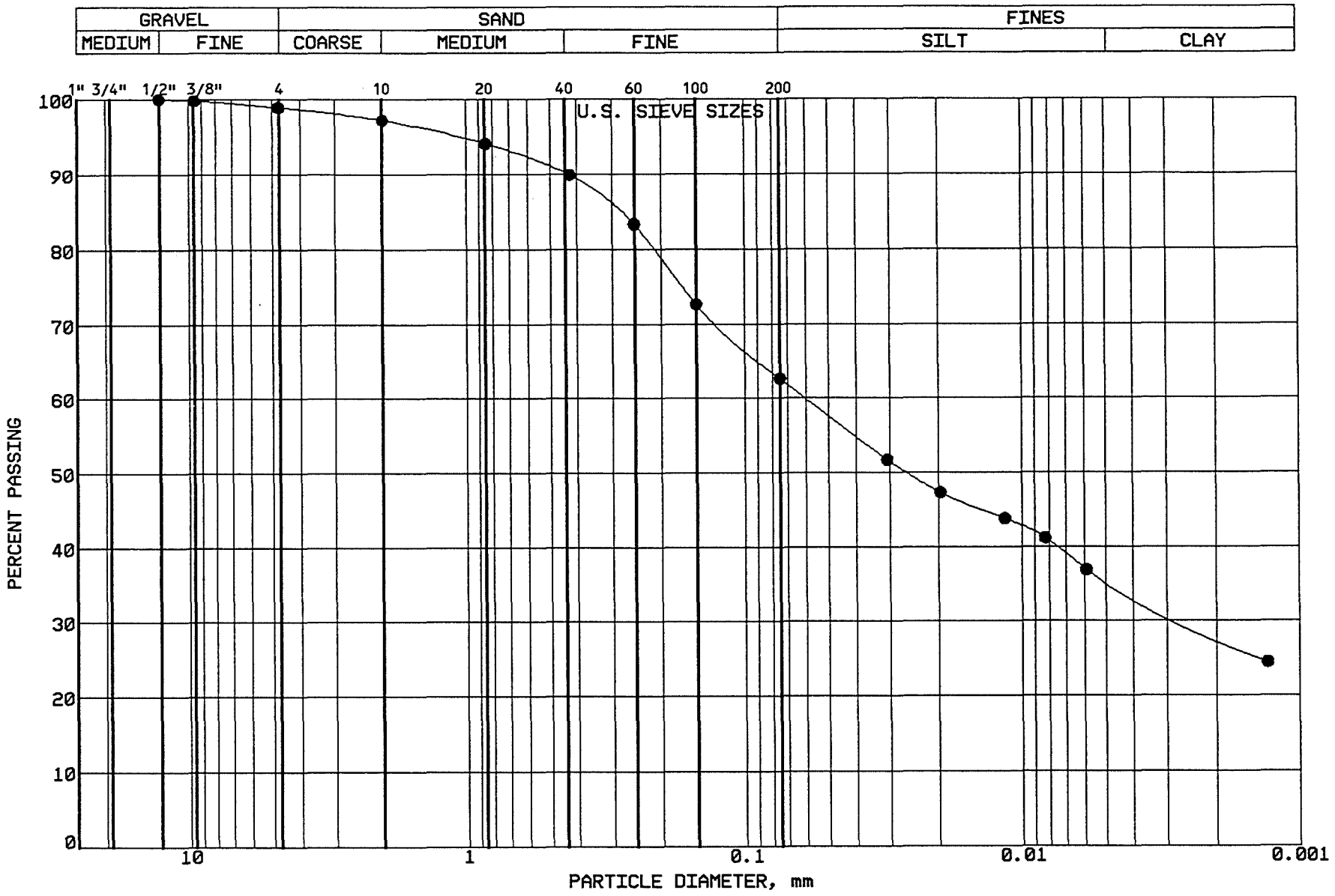
LOCATION: N 42847.0, E 44376.0
SAMPLE: CLBCC490 TUBE #: ST-123A
ELEVATION: 1884.6'

GRAVEL	1.9 %
SAND	43.8 %
SILT	23.5 %
CLAY	30.8 %
P 200	54.3 %

SOIL PROPERTIES

LL: 40.0%
PL: 14.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42660.0, E 44371.0
SAMPLE: CLBCC491 TUBE #: ST-124A
ELEVATION: 1883.5'

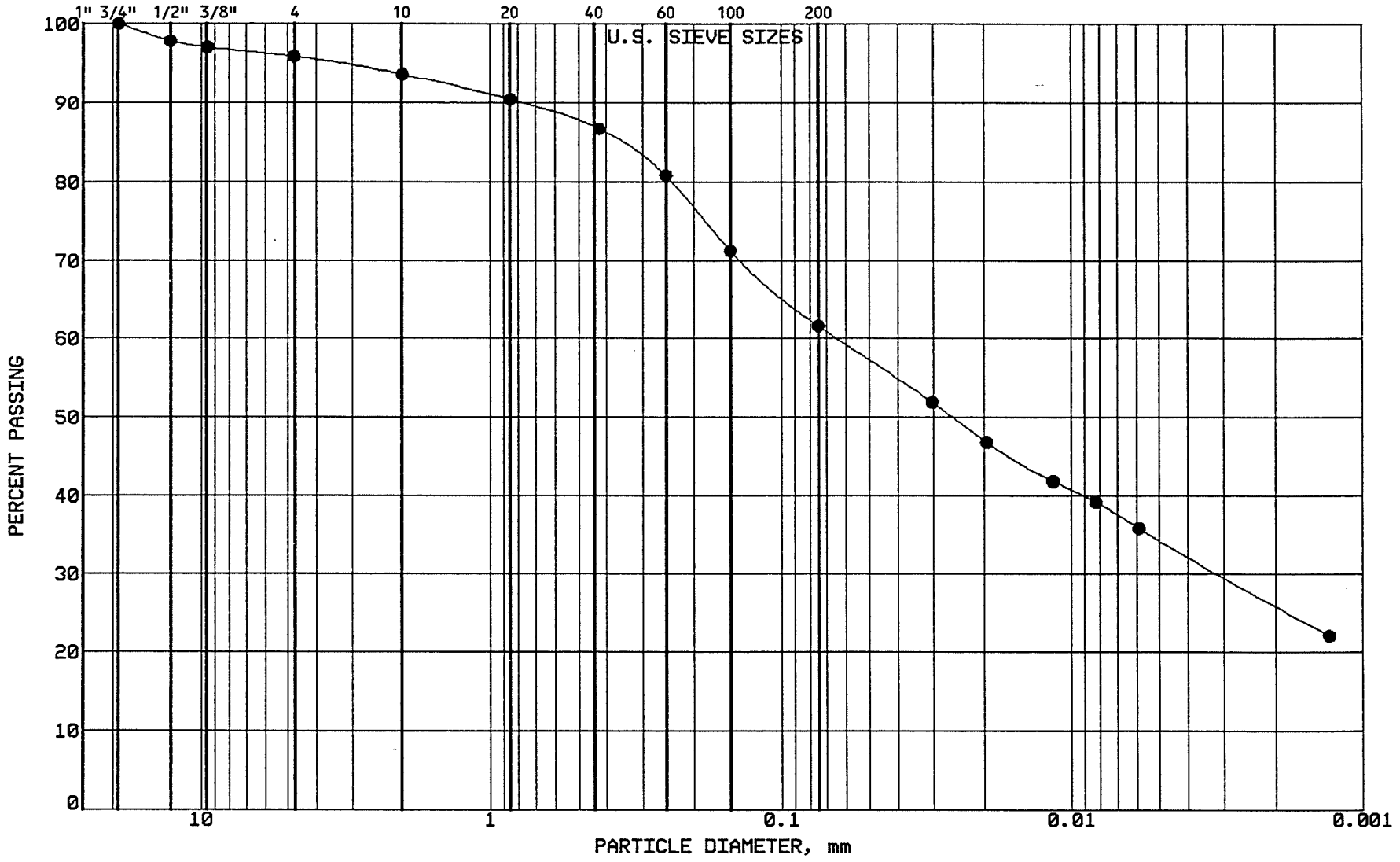
GRAVEL	1.1 %
SAND	36.3 %
SILT	27.1 %
CLAY	35.5 %
P 200	62.6 %

SOIL PROPERTIES

LL: 47.0%
PL: 16.0%
PI: 31.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

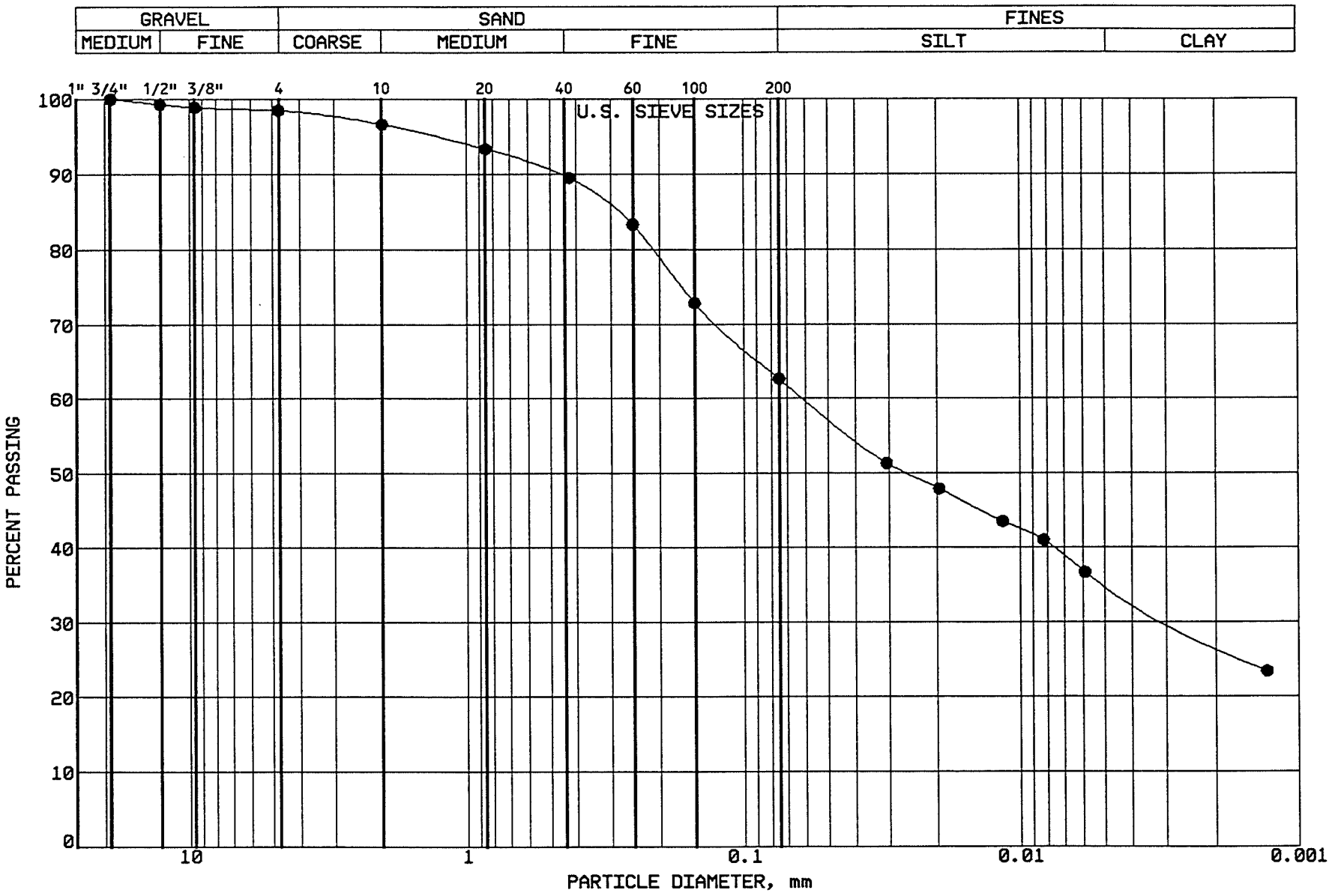
LOCATION: N 43366.0, E 44611.0
SAMPLE: CLBCC492 TUBE #: ST-125B
ELEVATION: 1887.2'

GRAVEL	4.2 %
SAND	34.2 %
SILT	27.3 %
CLAY	34.3 %
P 200	61.6 %

SOIL PROPERTIES

LL: 44.0%
PL: 15.0%
PI: 29.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

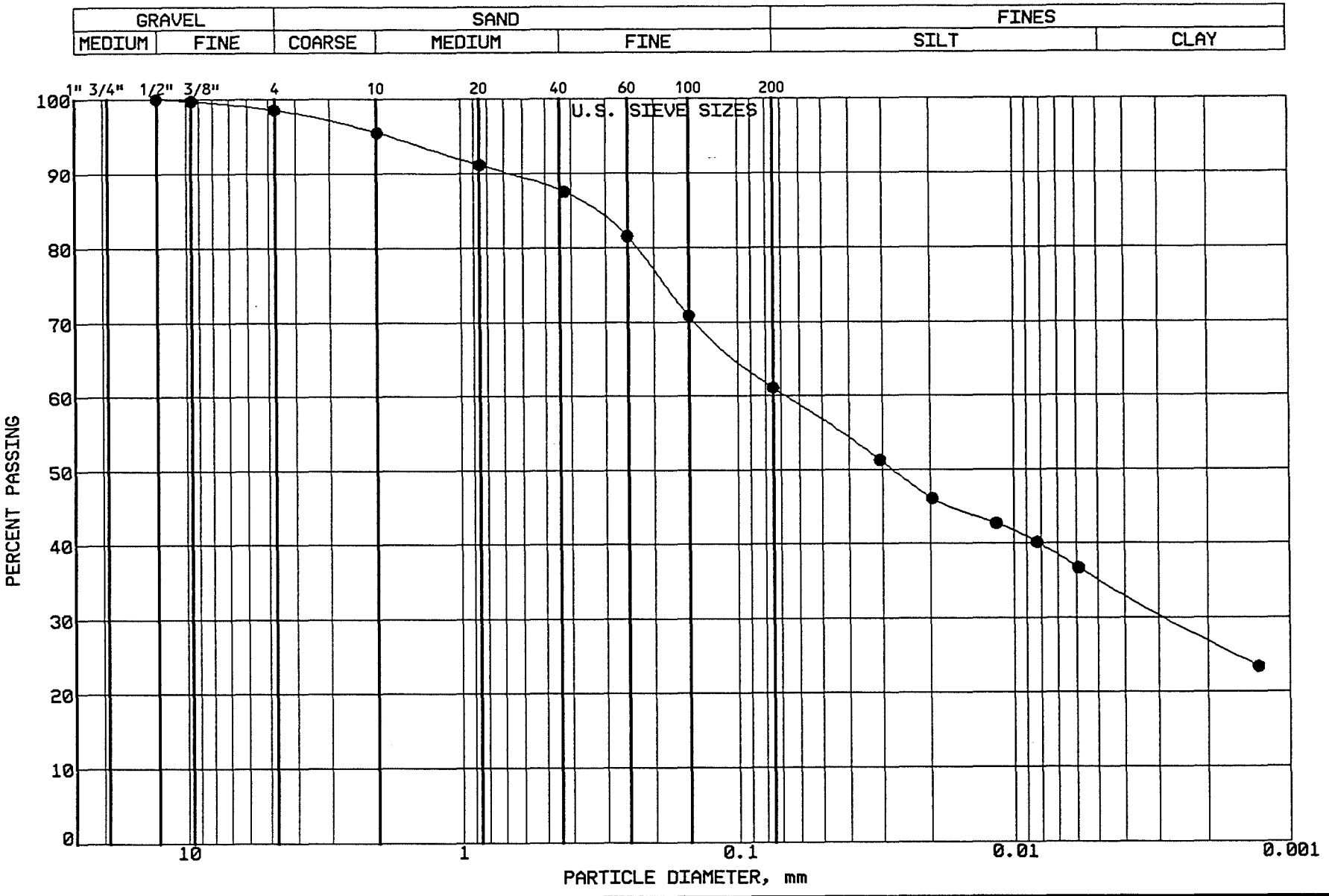
LOCATION: N 43215.0, E 44608.0
SAMPLE: CLBCC493 TUBE #: ST-126B
ELEVATION: 1886.1'

GRAVEL	1.5 %
SAND	35.9 %
SILT	27.4 %
CLAY	35.2 %
P 200	62.6 %

SOIL PROPERTIES

LL: 45.0%
PL: 16.0%
PI: 29.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43043.0, E 44601.0
SAMPLE: CLBCC494 TUBE #: ST-127A
ELEVATION: 1884.1'

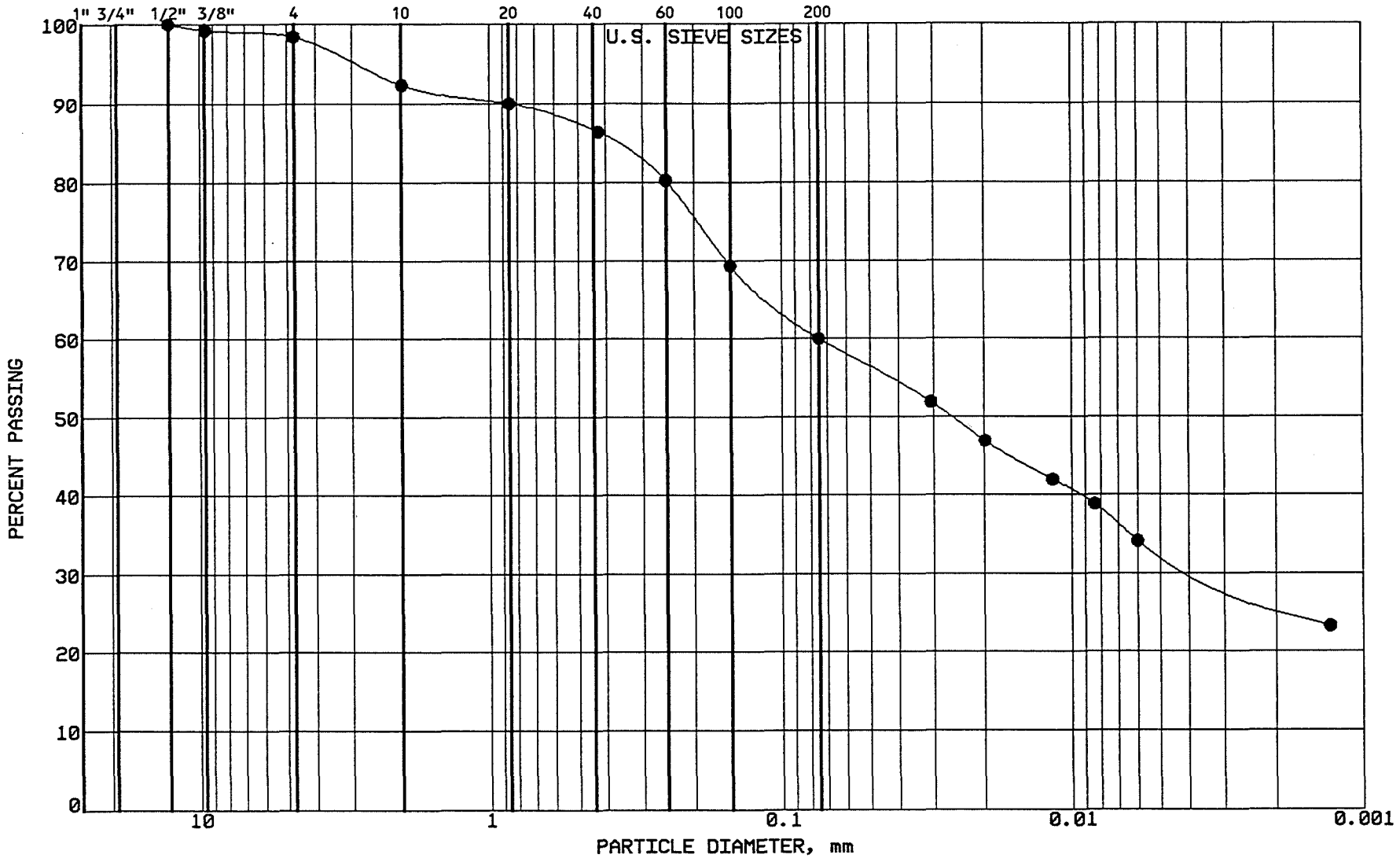
GRAVEL	1.5 %
SAND	37.4 %
SILT	25.9 %
CLAY	35.2 %
P 200	61.1 %

SOIL PROPERTIES

LL: 44.0%
PL: 18.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42870.0, E 44596.0
SAMPLE: CLBCC495 TUBE #: ST-128A
ELEVATION: 1882.8'

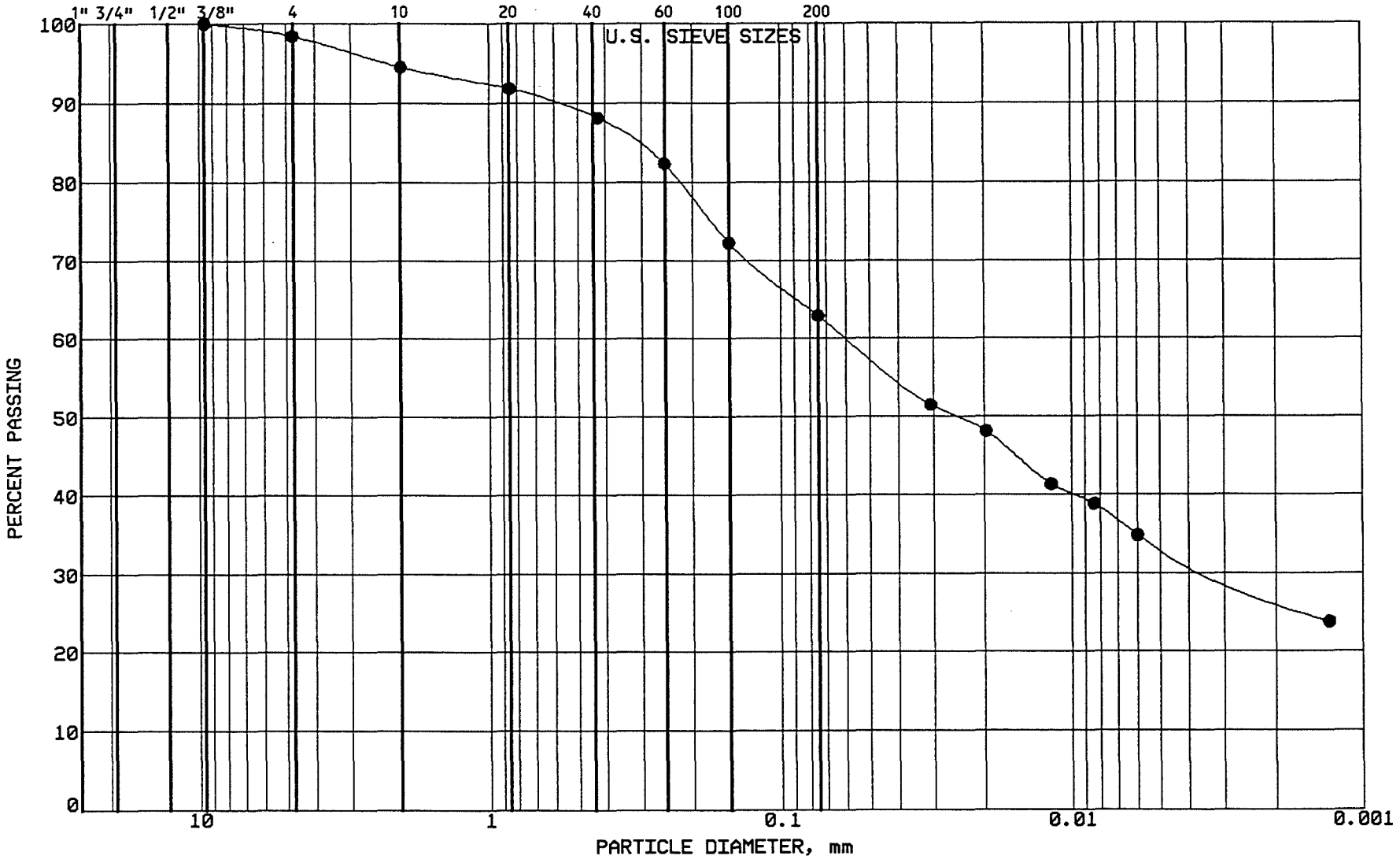
GRAVEL	1.6 %
SAND	38.4 %
SILT	27.2 %
CLAY	32.8 %
P 200	60.0 %

SOIL PROPERTIES

LL: 42.0%
PL: 16.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42686.0, E 44593.0
SAMPLE: CLBCC496 TUBE #: ST-129A
ELEVATION: 1881.3'

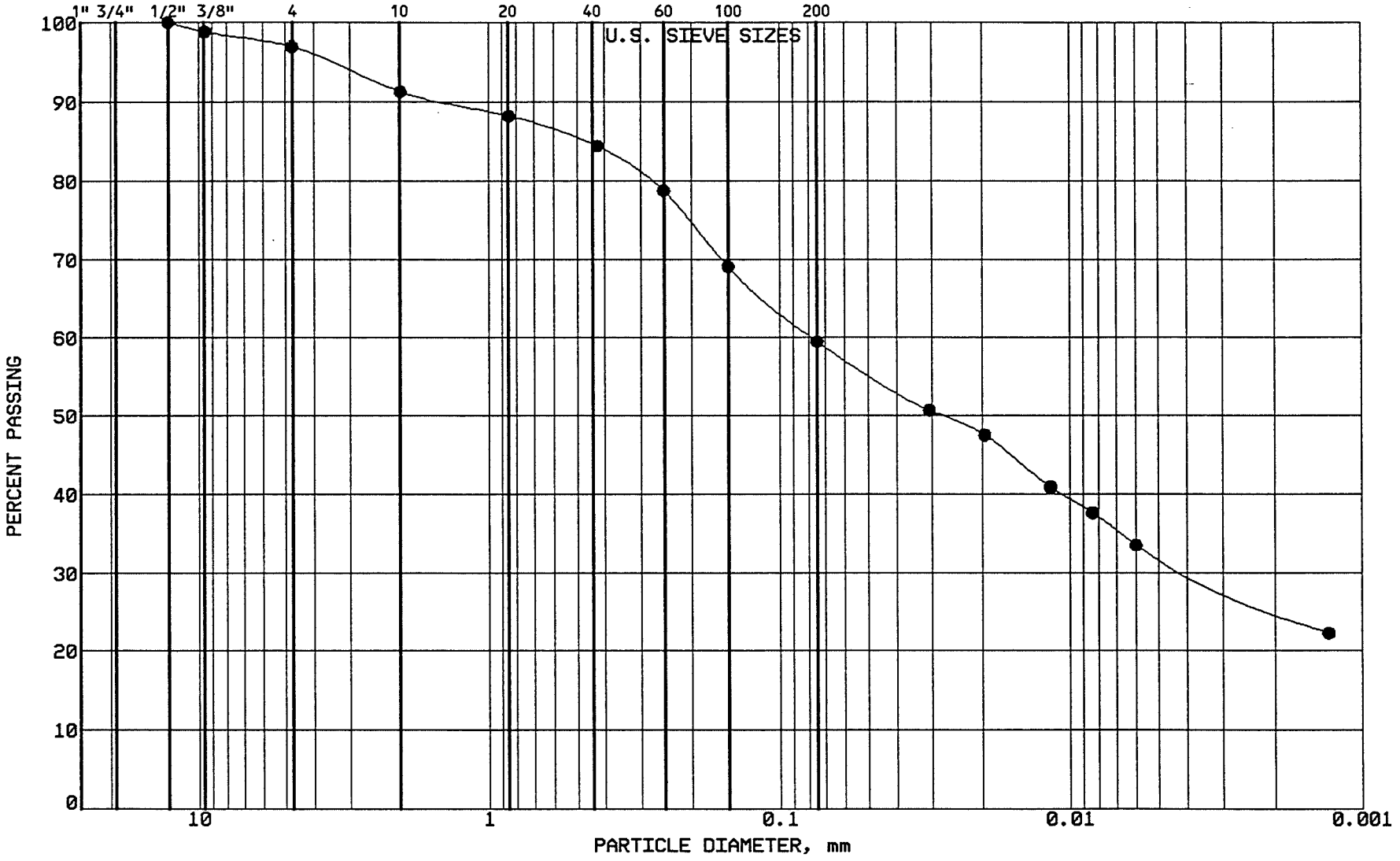
GRAVEL	1.6 %
SAND	35.5 %
SILT	29.4 %
CLAY	33.5 %
P 200	62.9 %

SOIL PROPERTIES

LL: 42.0%
PL: 16.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43189.0, E 44209.0
SAMPLE: CLBCC497 TUBE #: ST-130A
ELEVATION: 1886.9'

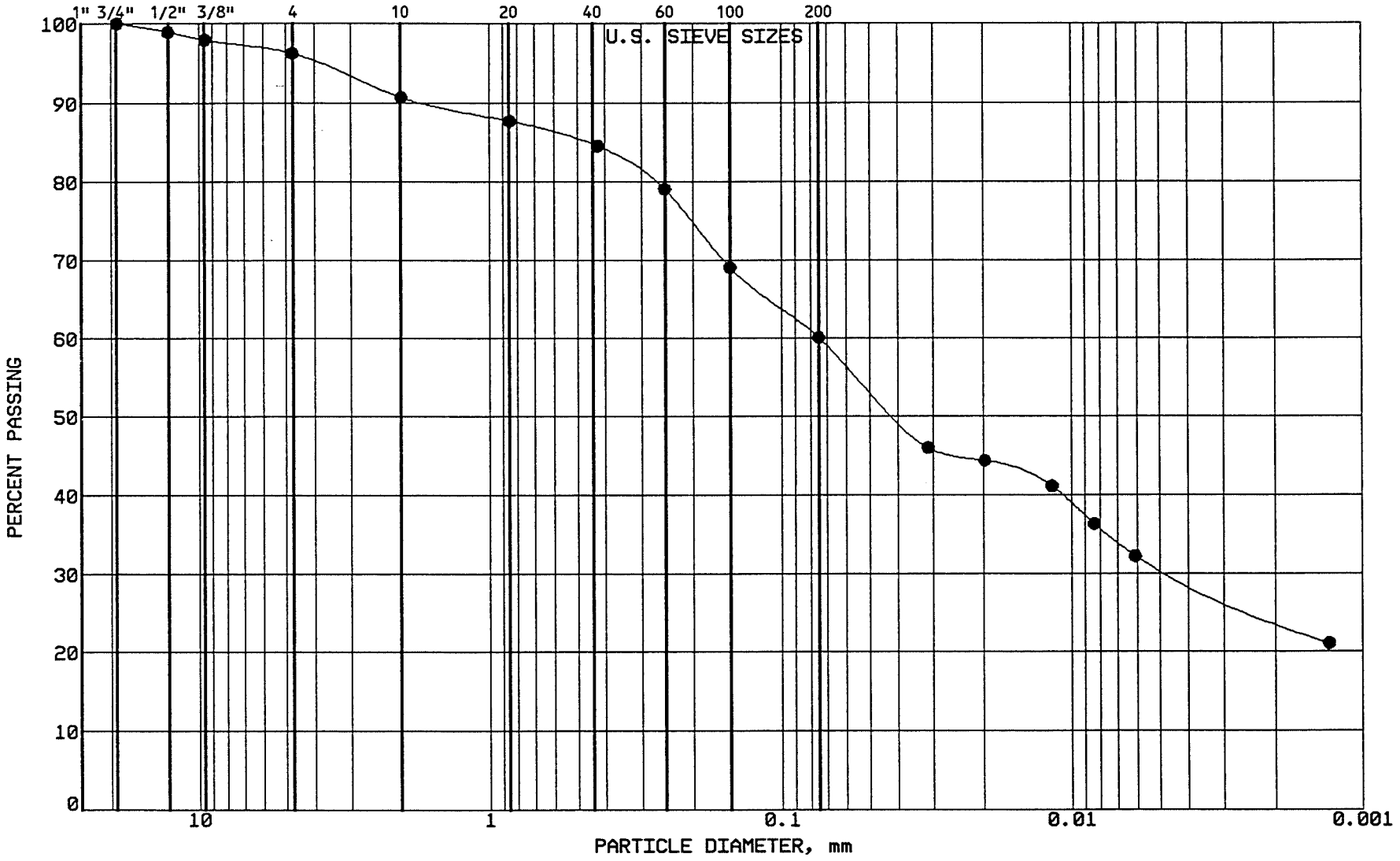
GRAVEL	3.1 %
SAND	37.4 %
SILT	27.3 %
CLAY	32.2 %
P 200	59.5 %

SOIL PROPERTIES

LL: 44.0%
PL: 17.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43033.0, E 44201.0
SAMPLE: CLBCC498 TUBE #: ST-131A
ELEVATION: 1886.1'

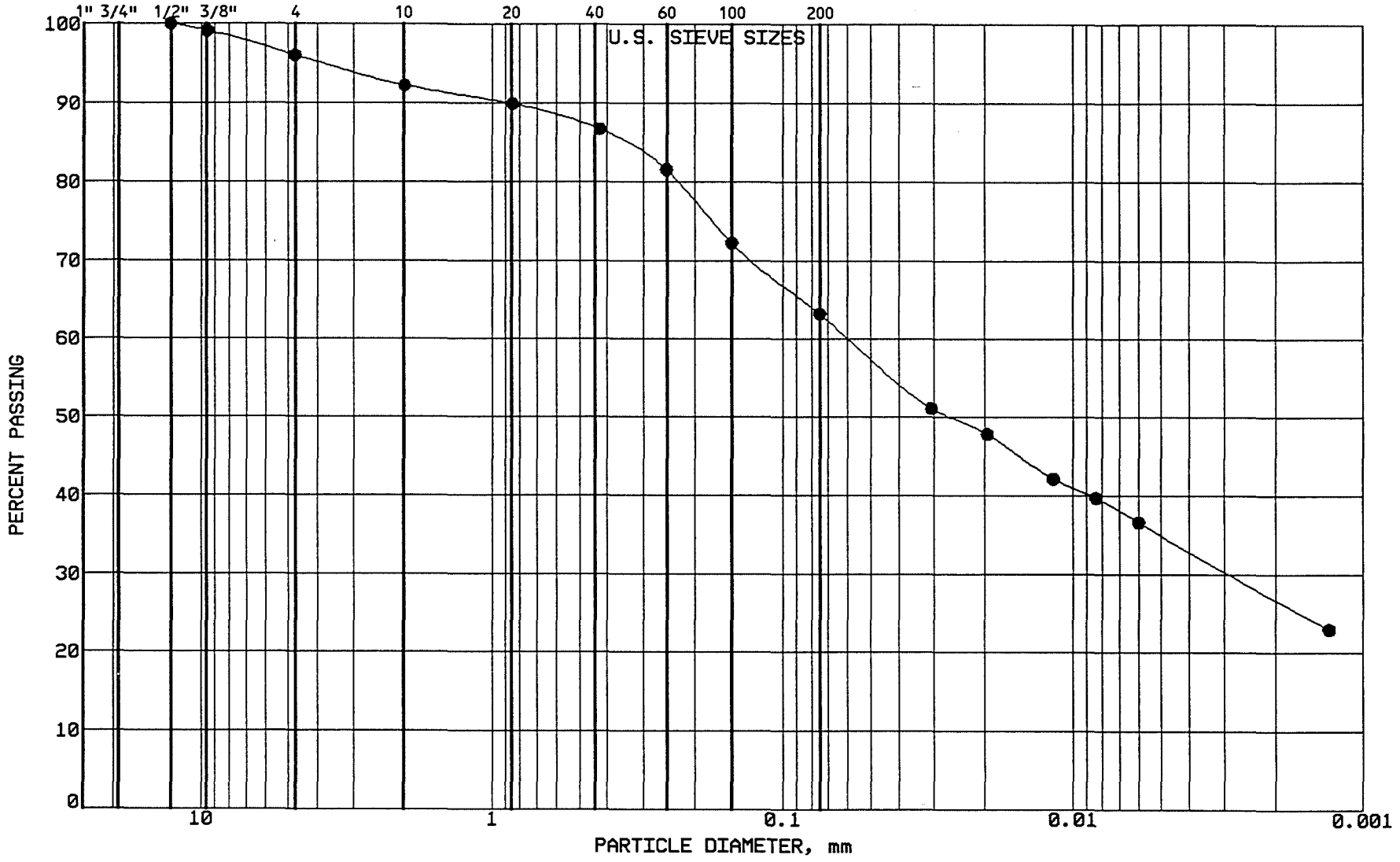
GRAVEL	3.8 %
SAND	36.1 %
SILT	29.3 %
CLAY	30.8 %
P 200	60.1 %

SOIL PROPERTIES

LL: 40.0%
PL: 16.0%
PI: 24.0%
CLASS: SANDY LEAN CLAY (CL) olive br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42878.0, E 44192.0
SAMPLE: CLBCC499 TUBE #: ST-132A
ELEVATION: 1885.4'

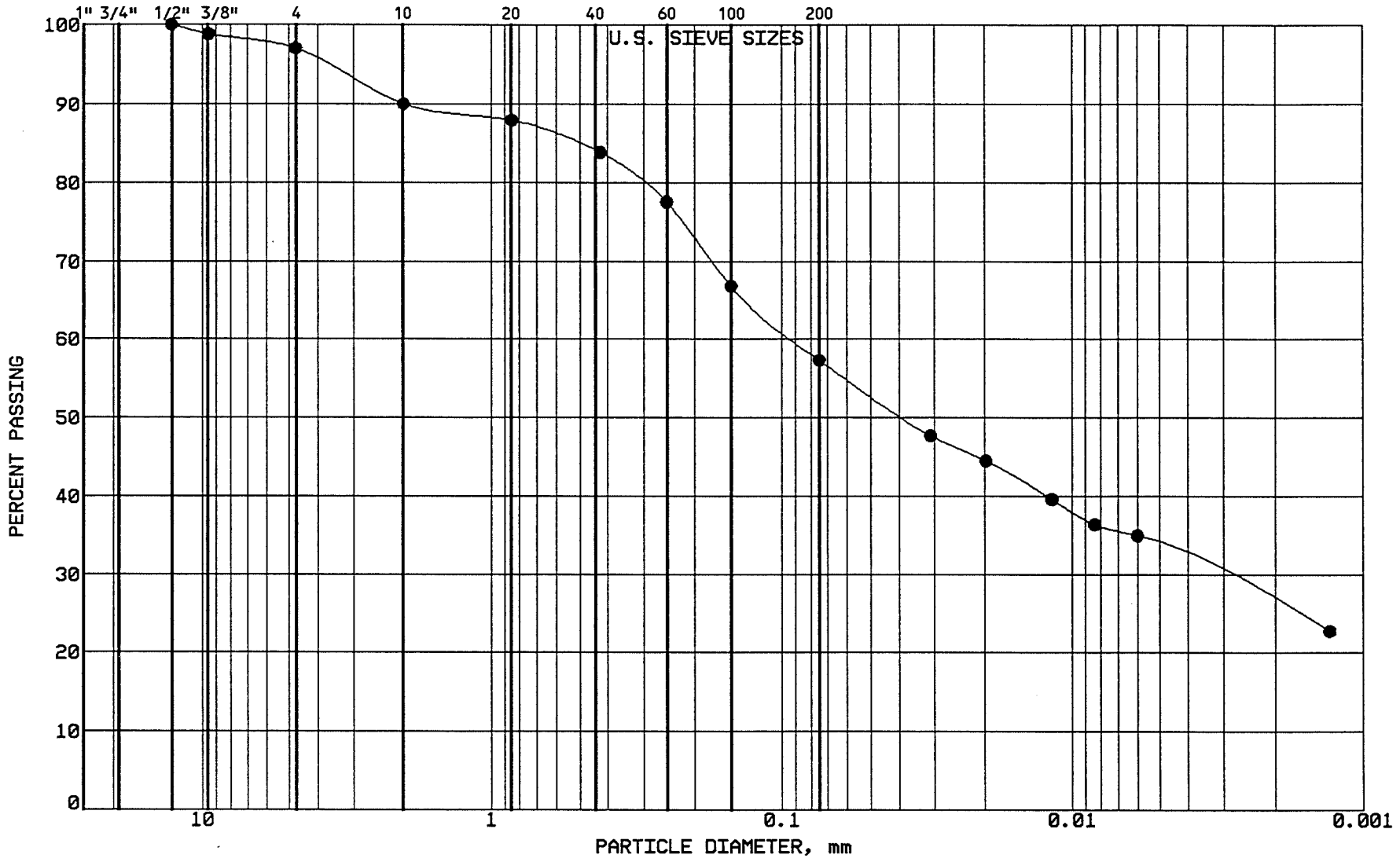
GRAVEL	4.0 %
SAND	32.8 %
SILT	28.2 %
CLAY	35.0 %
P 200	63.2 %

SOIL PROPERTIES

LL: 40.0%
PL: 16.0%
PI: 24.0%
CLASS: SANDY LEAN CLAY (CL) gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

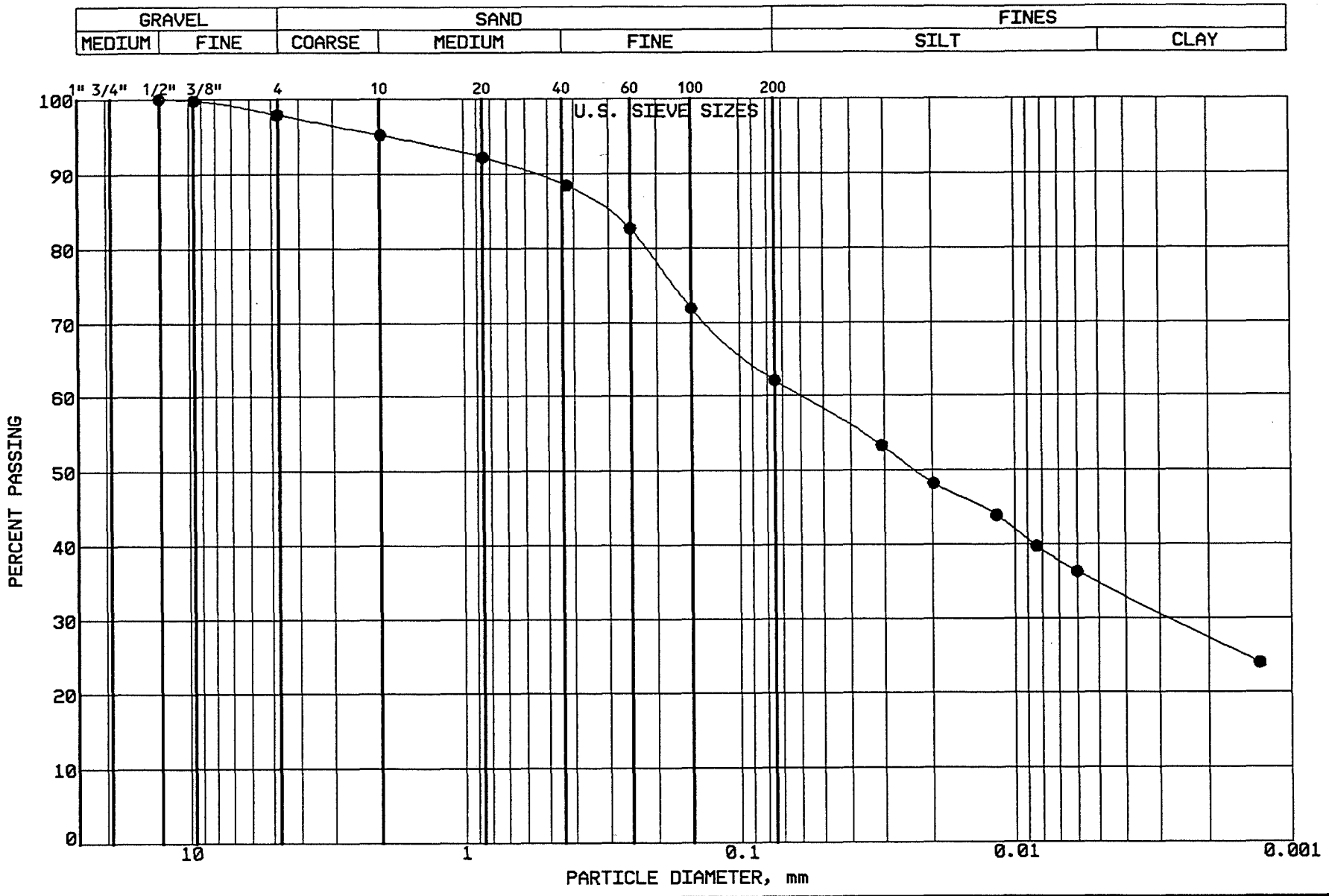
LOCATION: N 42670.0, E 44186.0
SAMPLE: CLBCC500 TUBE #: ST-133A
ELEVATION: 1884.2'

GRAVEL	3.0 %
SAND	39.7 %
SILT	23.8 %
CLAY	33.5 %
P 200	57.3 %

SOIL PROPERTIES

LL: 41.0%
PL: 17.0%
PI: 24.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42992.0, E 44794.0
SAMPLE: SGCC501 TUBE #:
ELEVATION: 1883.2'

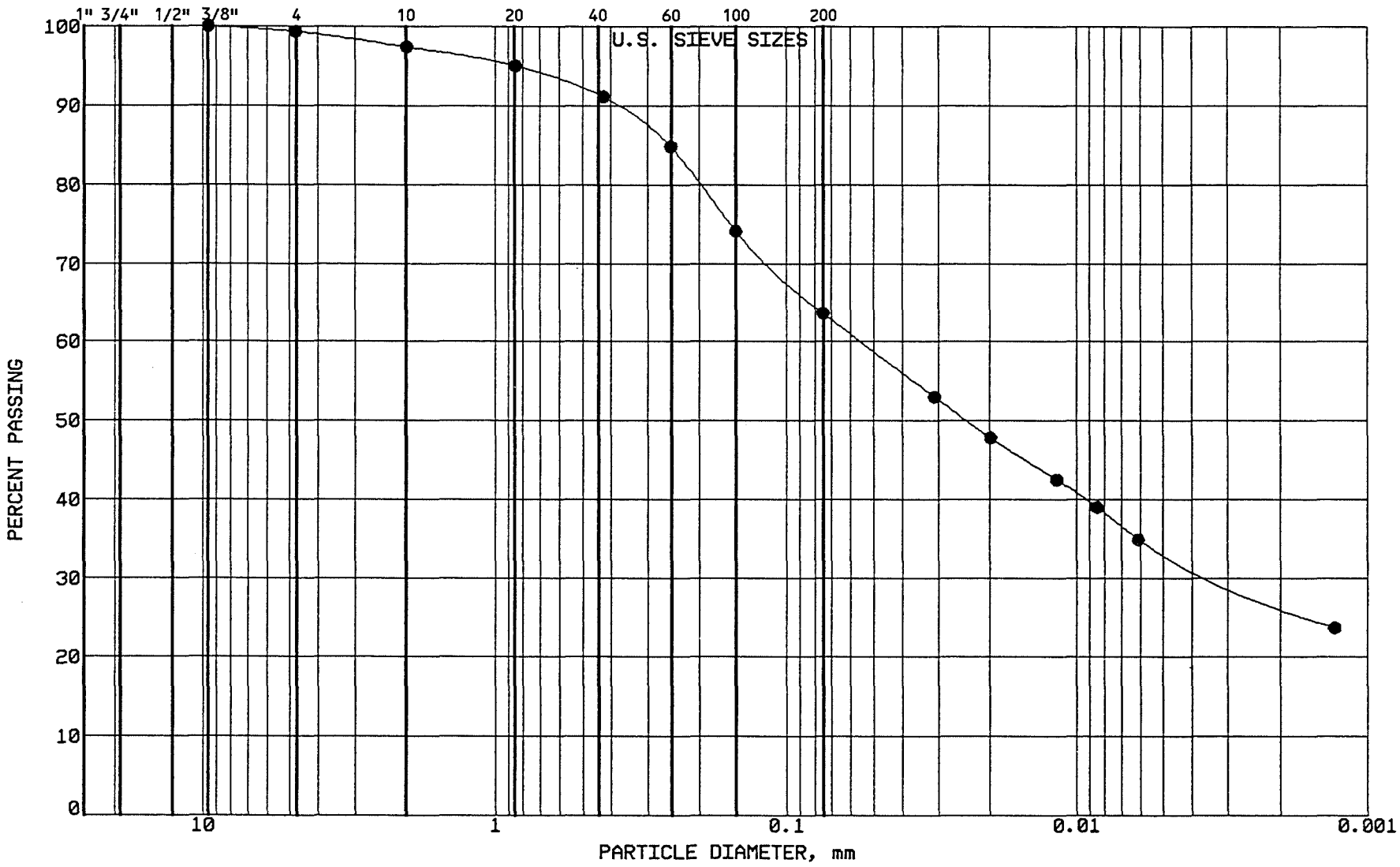
GRAVEL	2.1 %
SAND	35.8 %
SILT	27.3 %
CLAY	34.8 %
P 200	62.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42811.0, E 44797.0
SAMPLE: SGCC502 TUBE #:
ELEVATION: 1882.8'

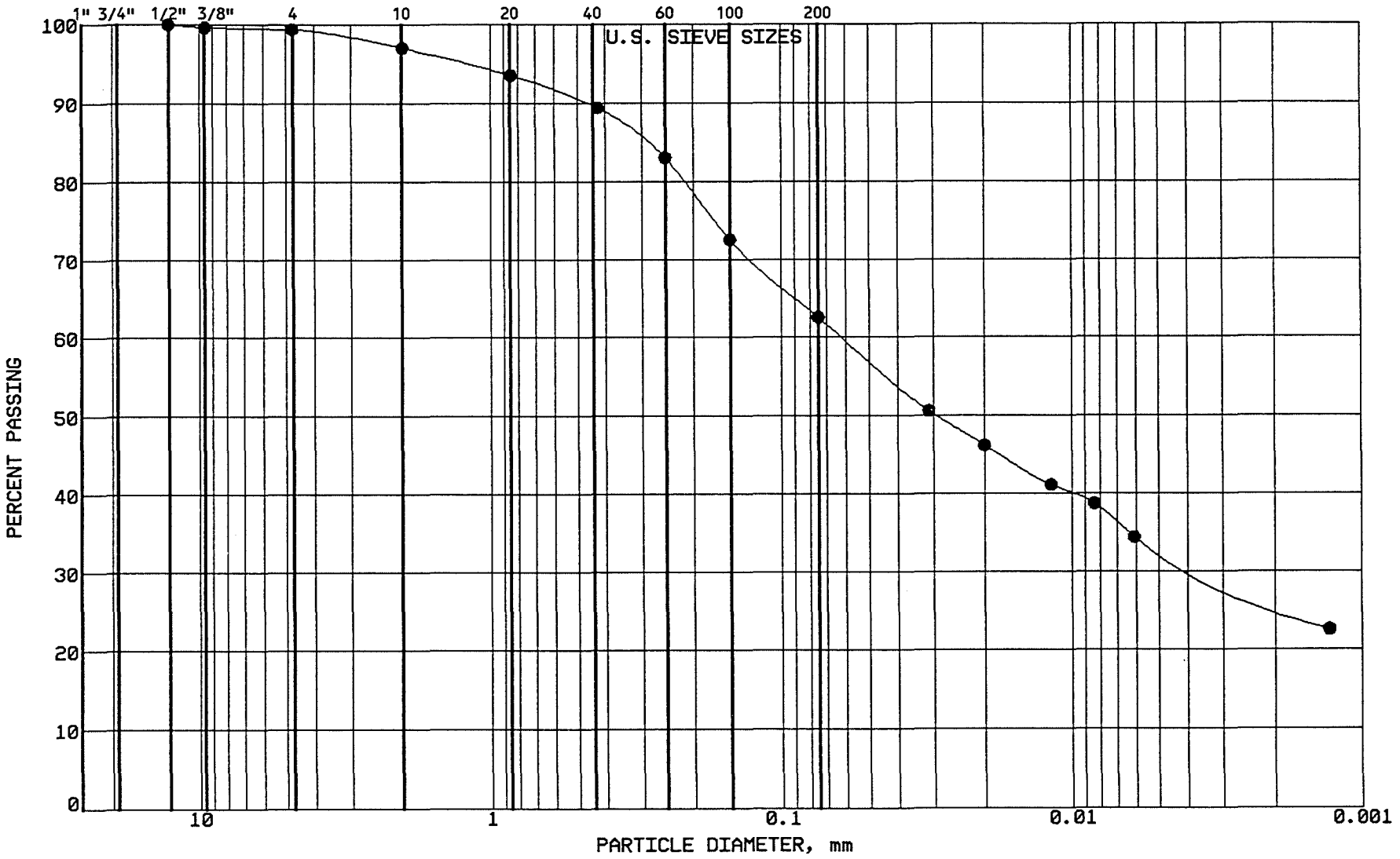
GRAVEL	0.7 %
SAND	35.7 %
SILT	30.1 %
CLAY	33.5 %
P 200	63.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

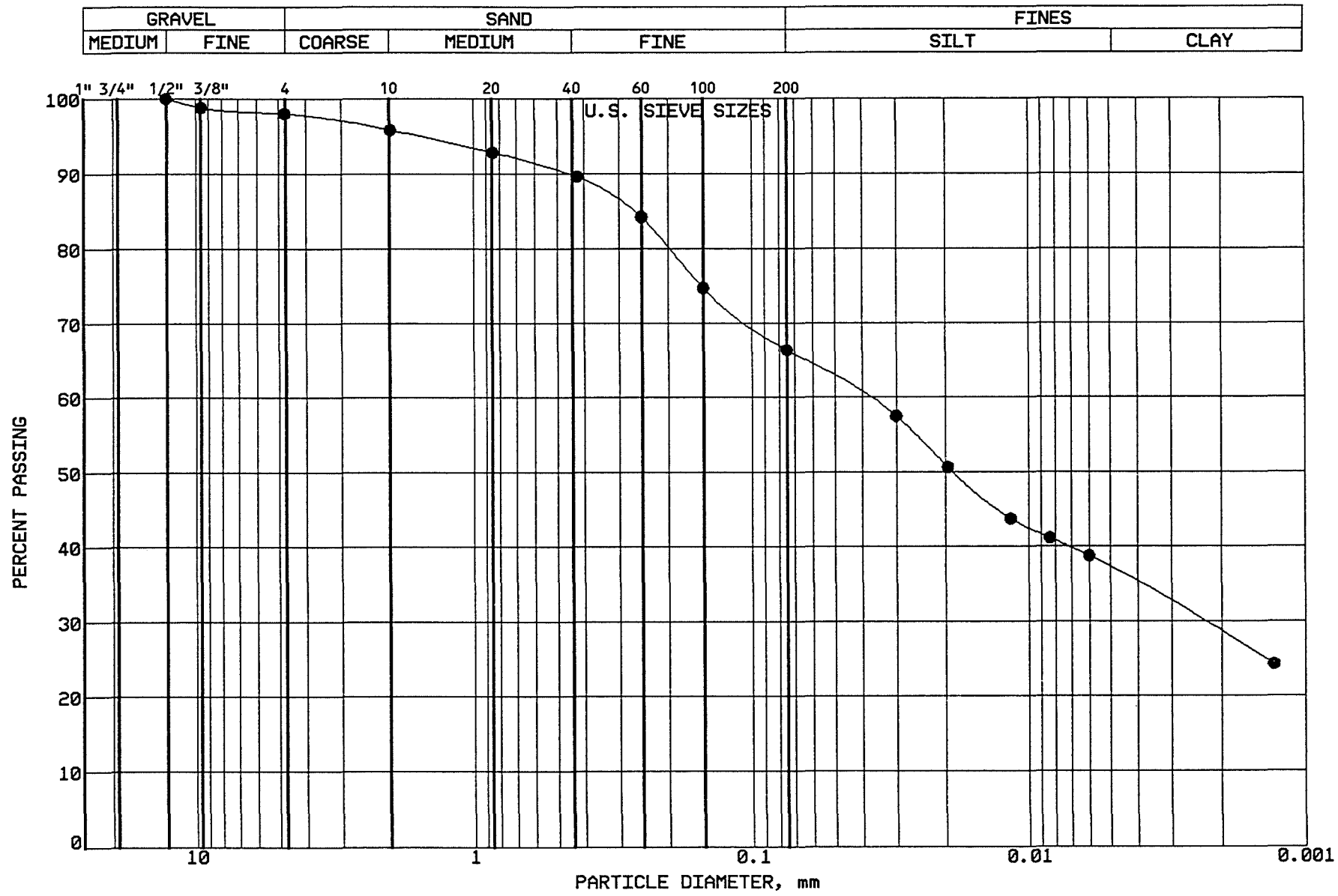
LOCATION: N 42634.0, E 44796.0
SAMPLE: SGCC503 TUBE #:
ELEVATION: 1880.8'

GRAVEL	0.6 %
SAND	36.9 %
SILT	29.6 %
CLAY	32.9 %
P 200	62.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

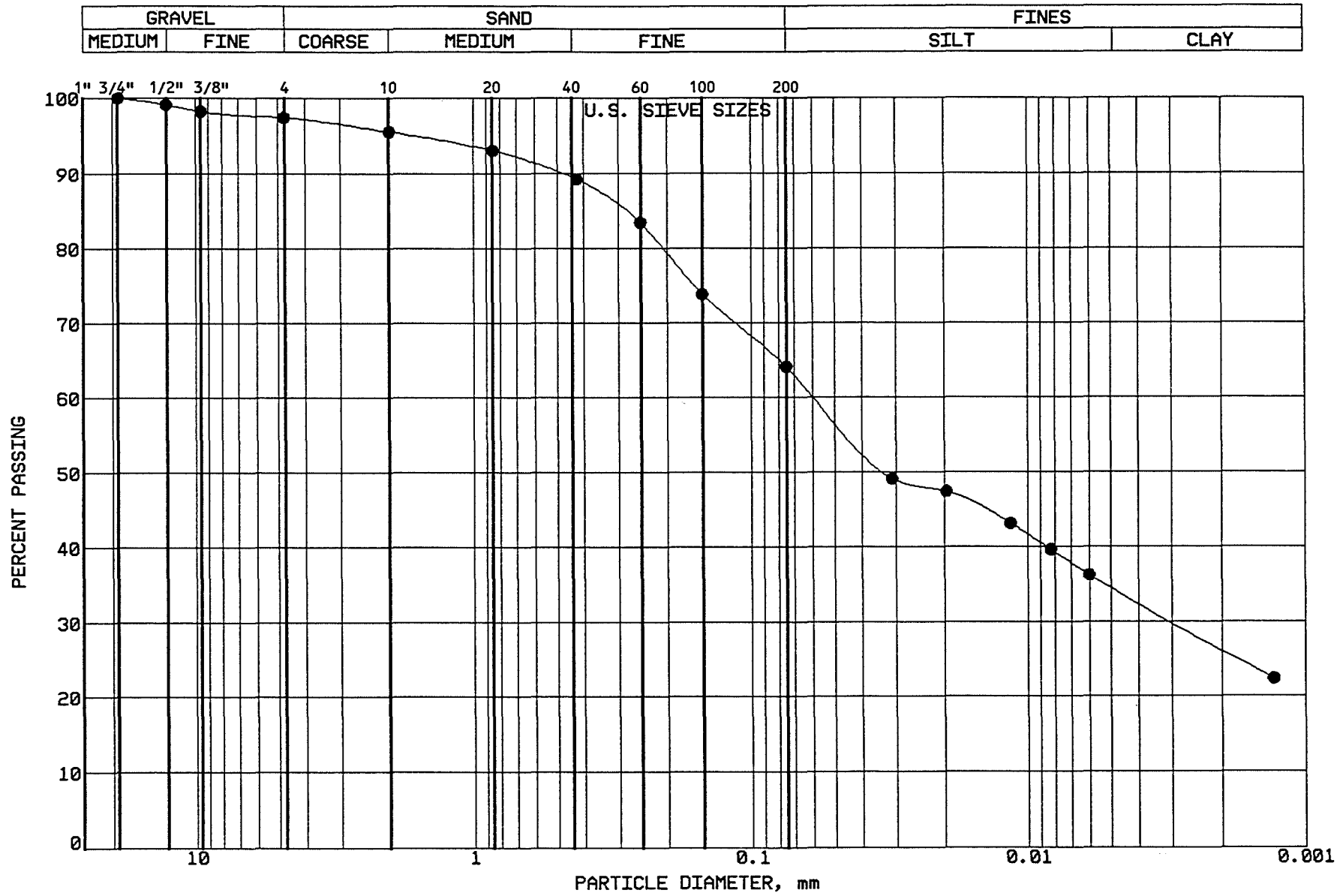
LOCATION: N 43235.0, E 45071.0
SAMPLE: SGCC504 TUBE #:
ELEVATION: 1881.1'

GRAVEL	2.0 %
SAND	31.7 %
SILT	29.3 %
CLAY	37.0 %
P 200	66.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43036.0, E 45080.0
SAMPLE: SGCC505 TUBE #:
ELEVATION: 1880.0'

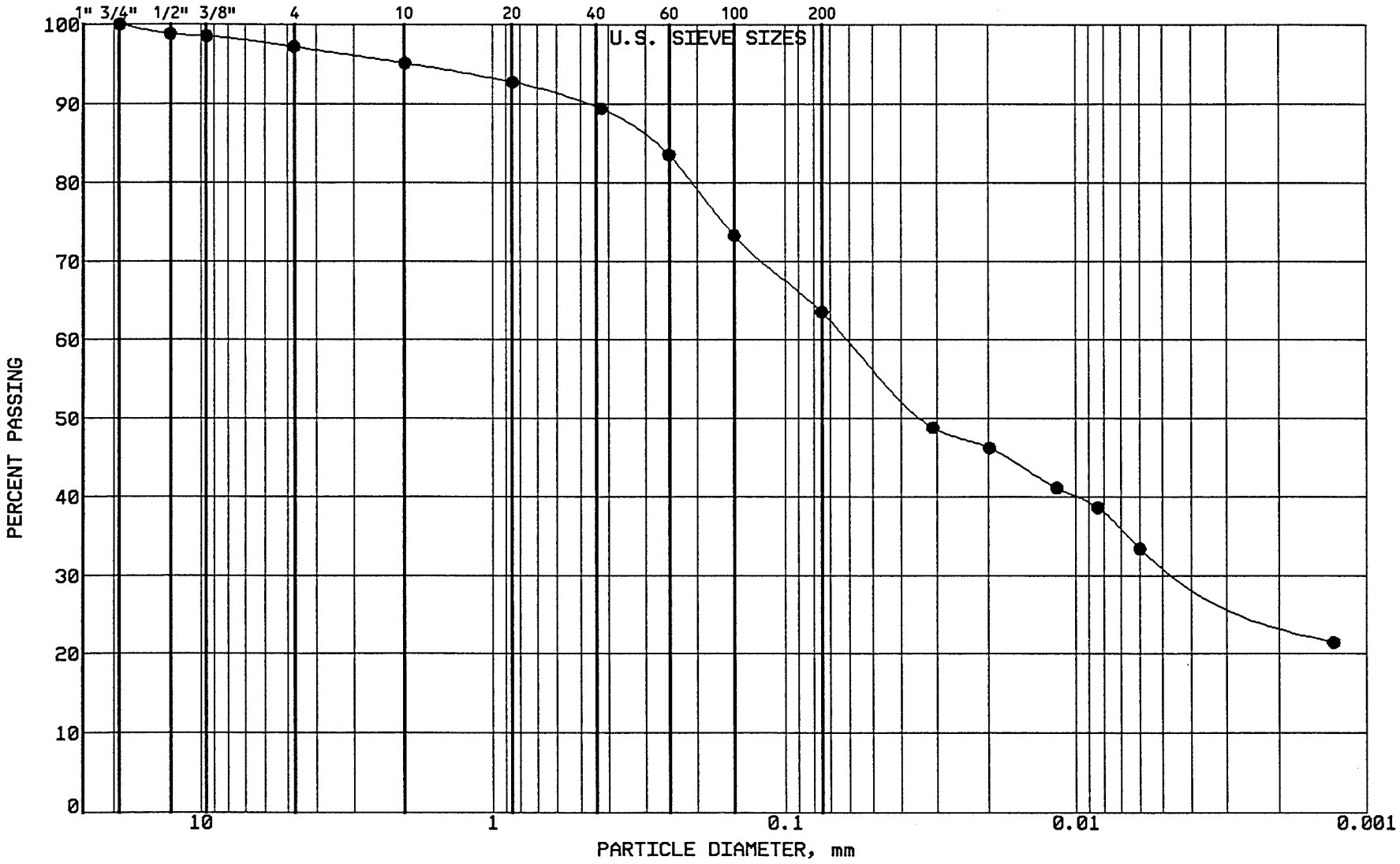
GRAVEL	2.6 %
SAND	33.3 %
SILT	29.5 %
CLAY	34.6 %
P 200	64.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42871.0, E 45084.0
SAMPLE: SGCC506 TUBE #:
ELEVATION: 1878.6'

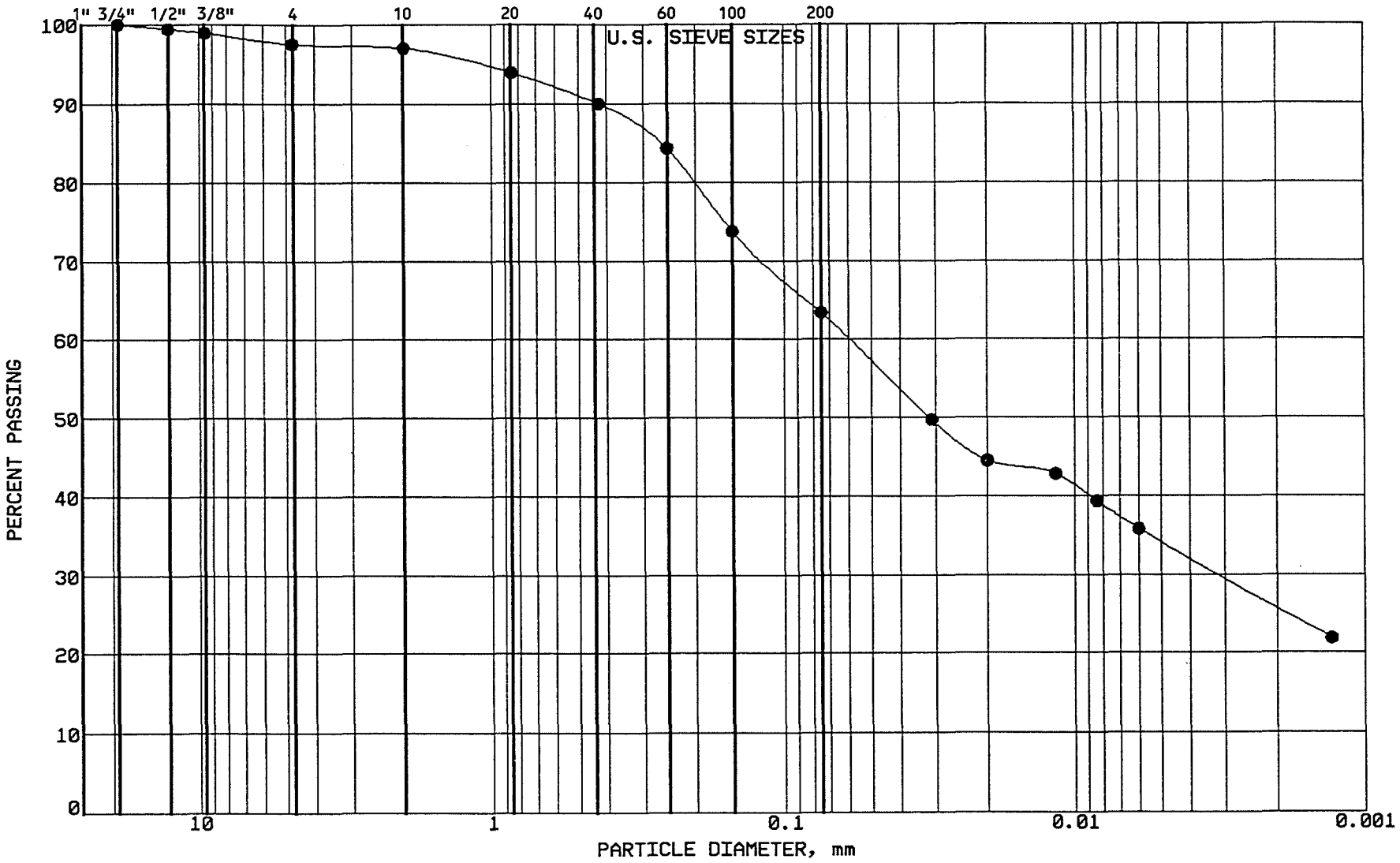
GRAVEL	2.8 %
SAND	33.7 %
SILT	31.5 %
CLAY	32.0 %
P 200	63.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42662.0, E 45083.0
SAMPLE: SGCC507 TUBE #:
ELEVATION: 1878.8'

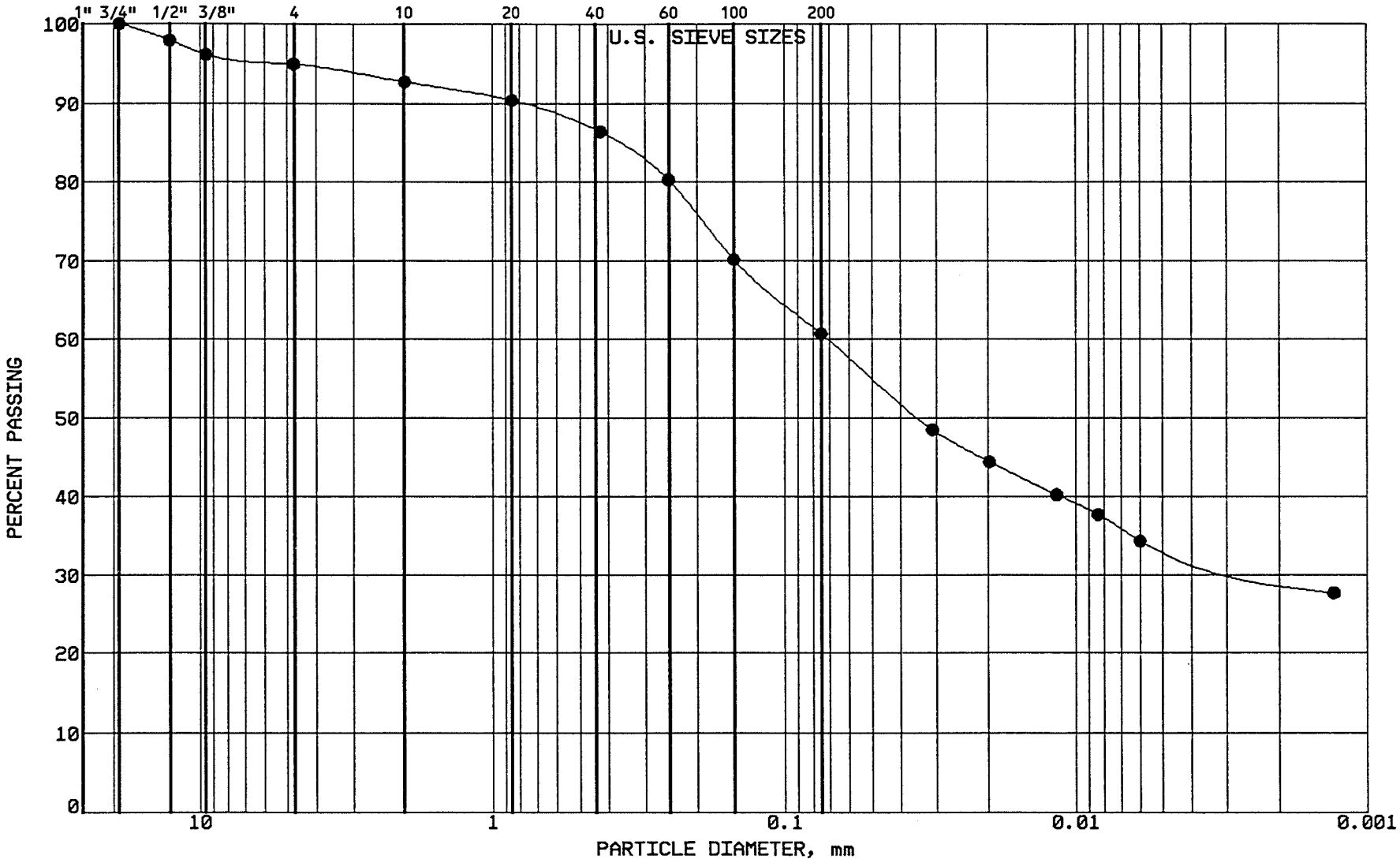
GRAVEL	2.5 %
SAND	34.1 %
SILT	29.3 %
CLAY	34.1 %
P 200	63.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43366.0, E 44611.0
SAMPLE: CLBCC508 TUBE #: ST-125R
ELEVATION: 1887.2'

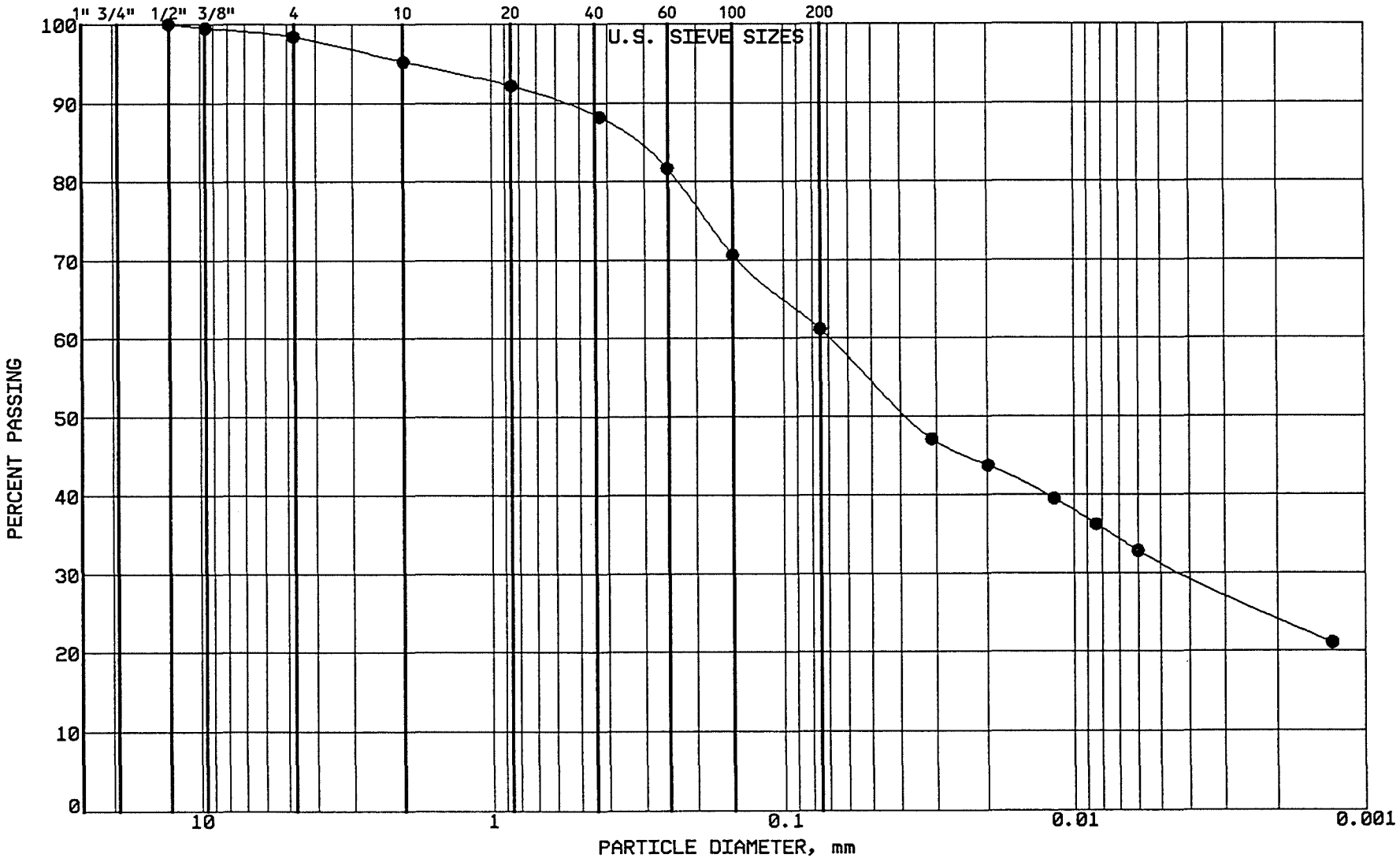
GRAVEL	5.1 %
SAND	34.2 %
SILT	27.2 %
CLAY	33.5 %
P 200	60.7 %

SOIL PROPERTIES

LL: 43.0%
PL: 17.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43215.0, E 44608.0
SAMPLE: CLBCC509 TUBE #: ST-126R
ELEVATION: 1886.1'

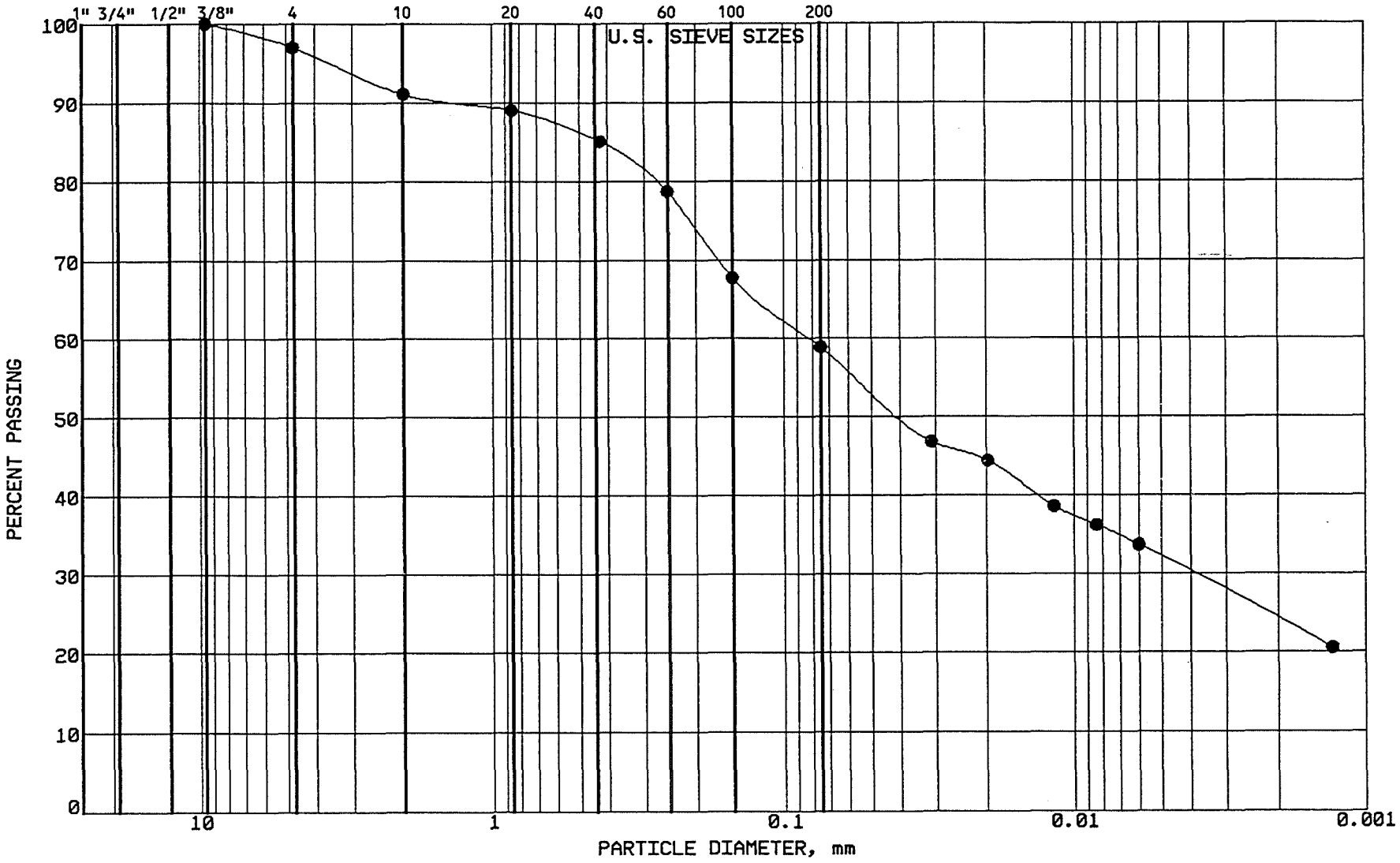
GRAVEL	1.6 %
SAND	37.2 %
SILT	29.8 %
CLAY	31.4 %
P 200	61.2 %

SOIL PROPERTIES

LL: 41.0%
PL: 15.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43334.0, E 44455.0
SAMPLE: CLBCC510 TUBE #: ST-134A
ELEVATION: 1888.3'

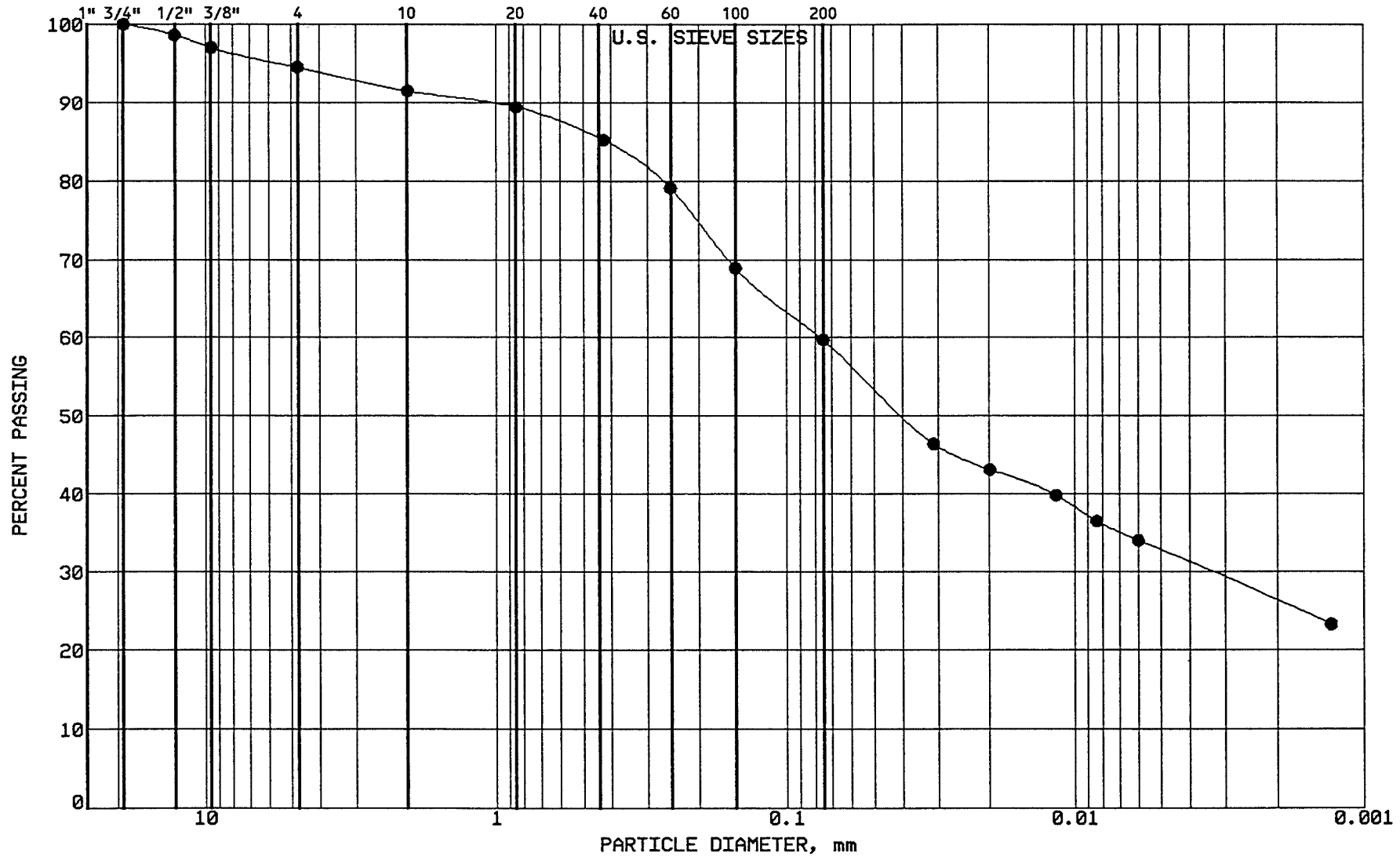
GRAVEL	3.0 %
SAND	38.1 %
SILT	26.8 %
CLAY	32.1 %
P 200	58.9 %

SOIL PROPERTIES

LL: 43.0%
PL: 17.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43320.0, E 44627.0
SAMPLE: CLBCC511 TUBE #:ST-135B
ELEVATION: 1888.4'

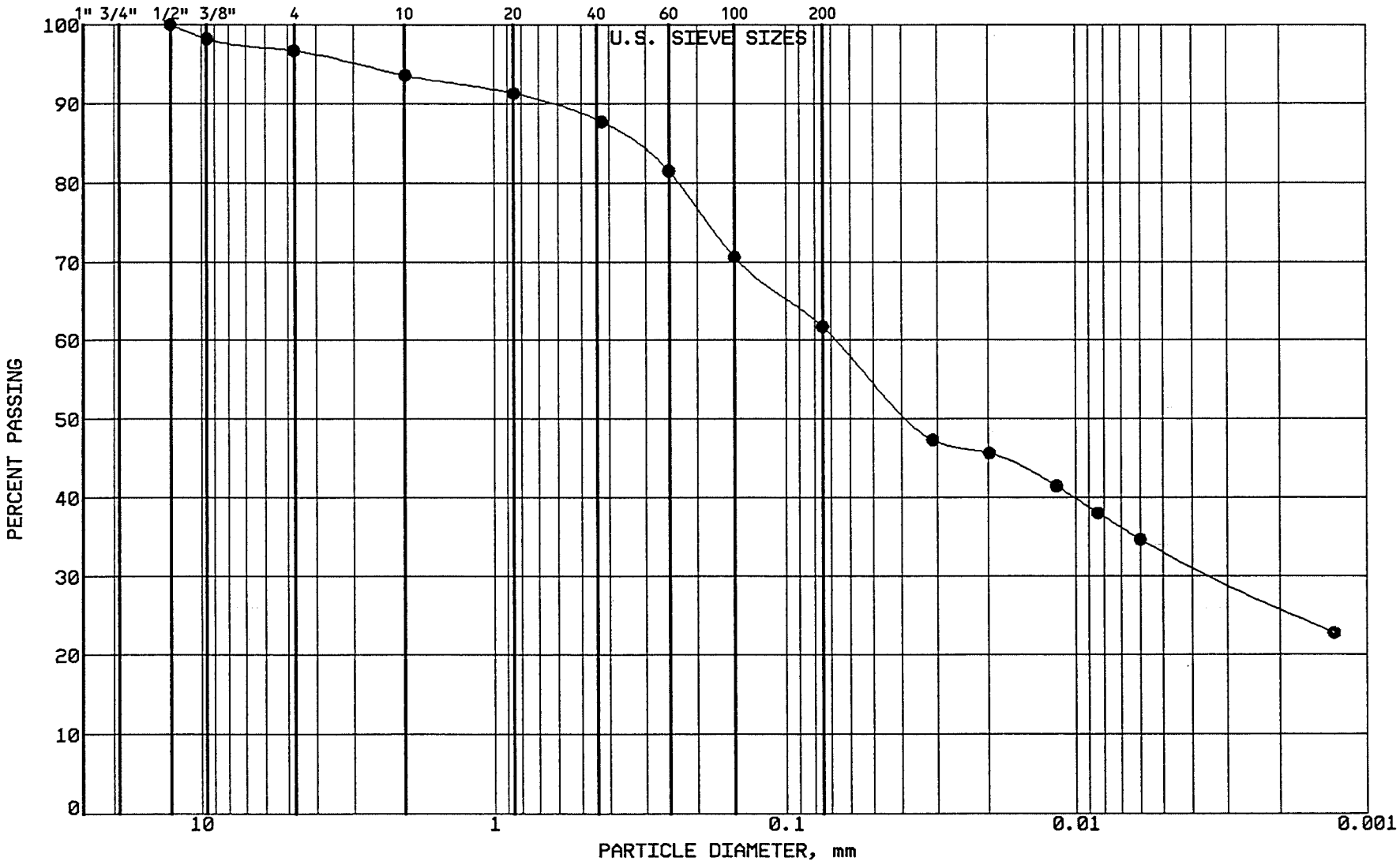
GRAVEL	5.5 %
SAND	34.8 %
SILT	27.0 %
CLAY	32.7 %
P 200	59.7 %

SOIL PROPERTIES

LL: 44.0%
PL: 17.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

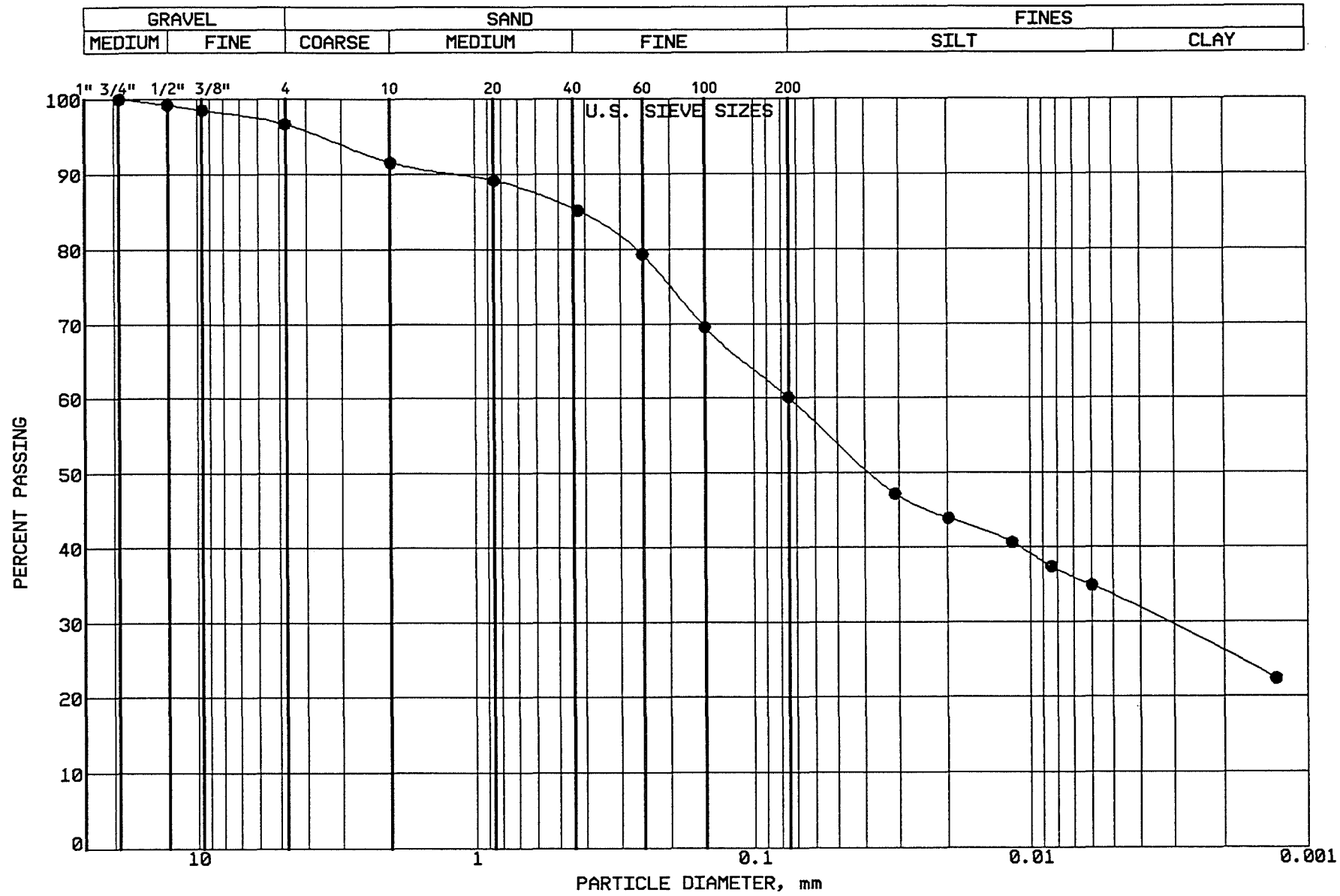
LOCATION: N 43177.0, E 44198.0
SAMPLE: CLBCC512 TUBE #: ST-136A
ELEVATION: 1887.5' ST-130R

GRAVEL	3.3 %
SAND	35.0 %
SILT	28.5 %
CLAY	33.2 %
P 200	61.7 %

SOIL PROPERTIES

LL: 44.0%
PL: 17.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43160.0, E 44381.0
SAMPLE: CLBCC513 TUBE #: ST-137
ELEVATION: 1887.4'

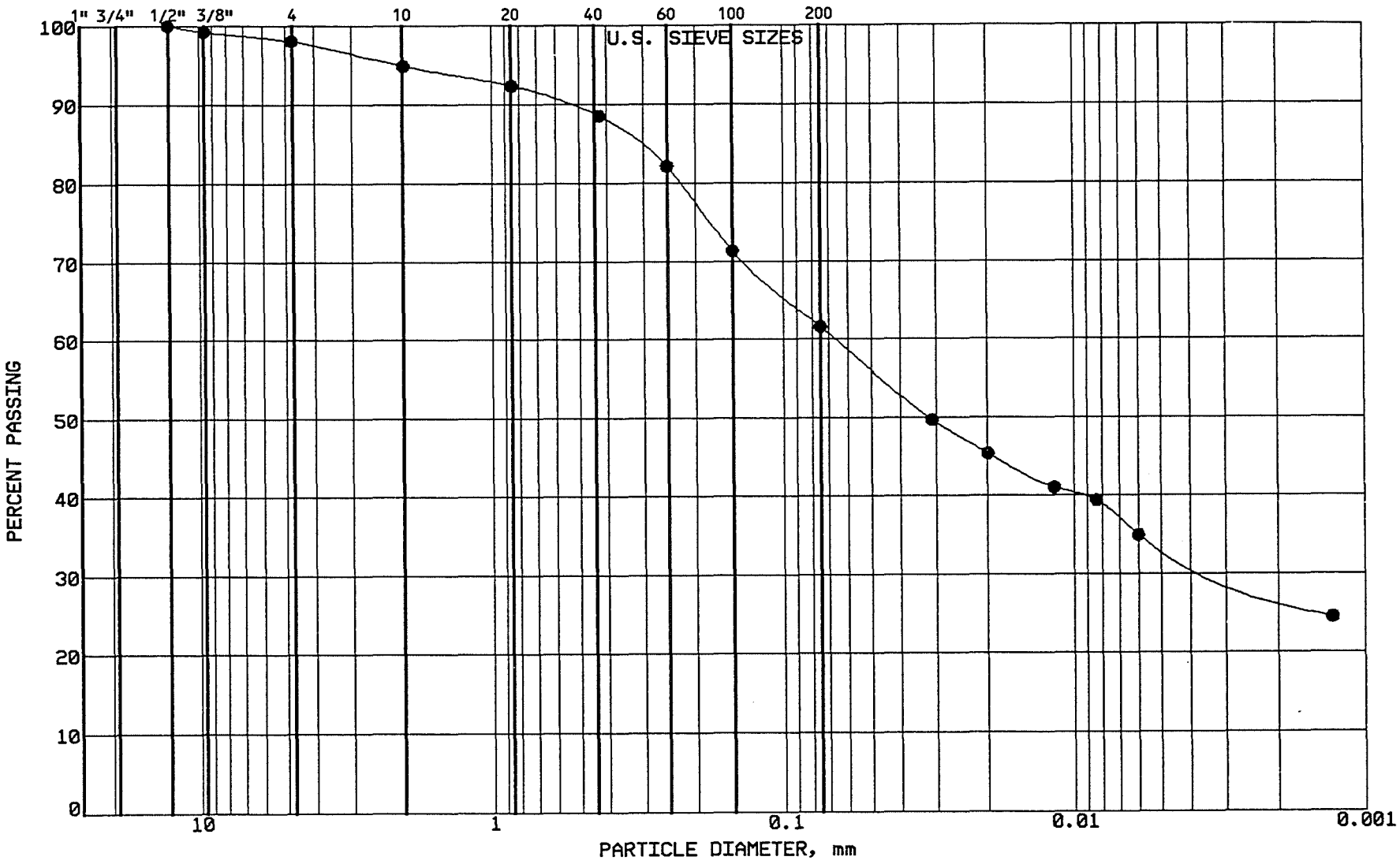
GRAVEL	3.4 %
SAND	36.5 %
SILT	26.8 %
CLAY	33.3 %
P 200	60.1 %

SOIL PROPERTIES

LL: 43.0%
PL: 16.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

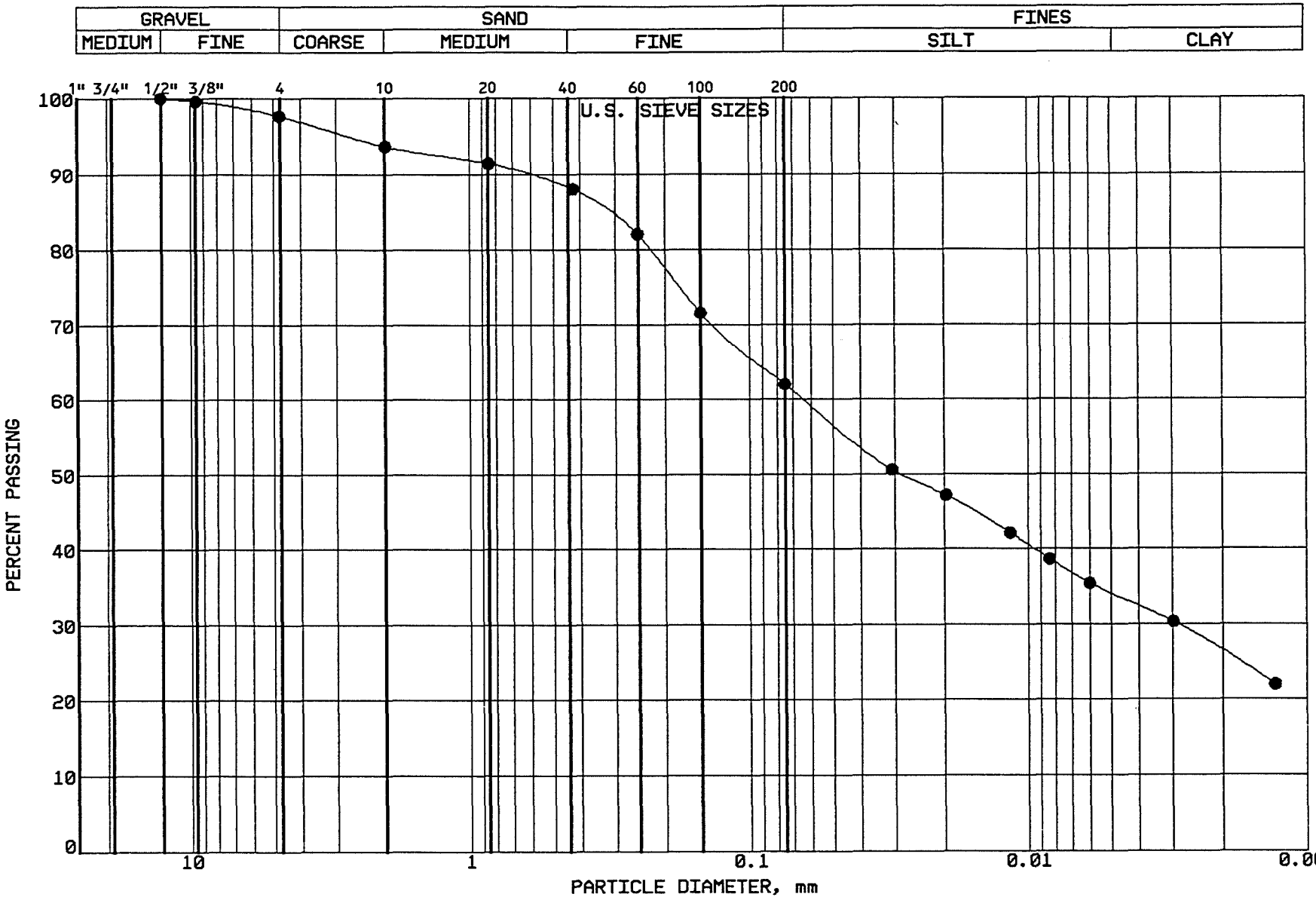
LOCATION: N 43147.0, E 44599.0
SAMPLE: CLBCC514 TUBE #: ST-138
ELEVATION: 1887.1'

GRAVEL	2.0 %
SAND	36.4 %
SILT	27.9 %
CLAY	33.7 %
P 200	61.6 %

SOIL PROPERTIES

LL: 43.0%
PL: 17.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

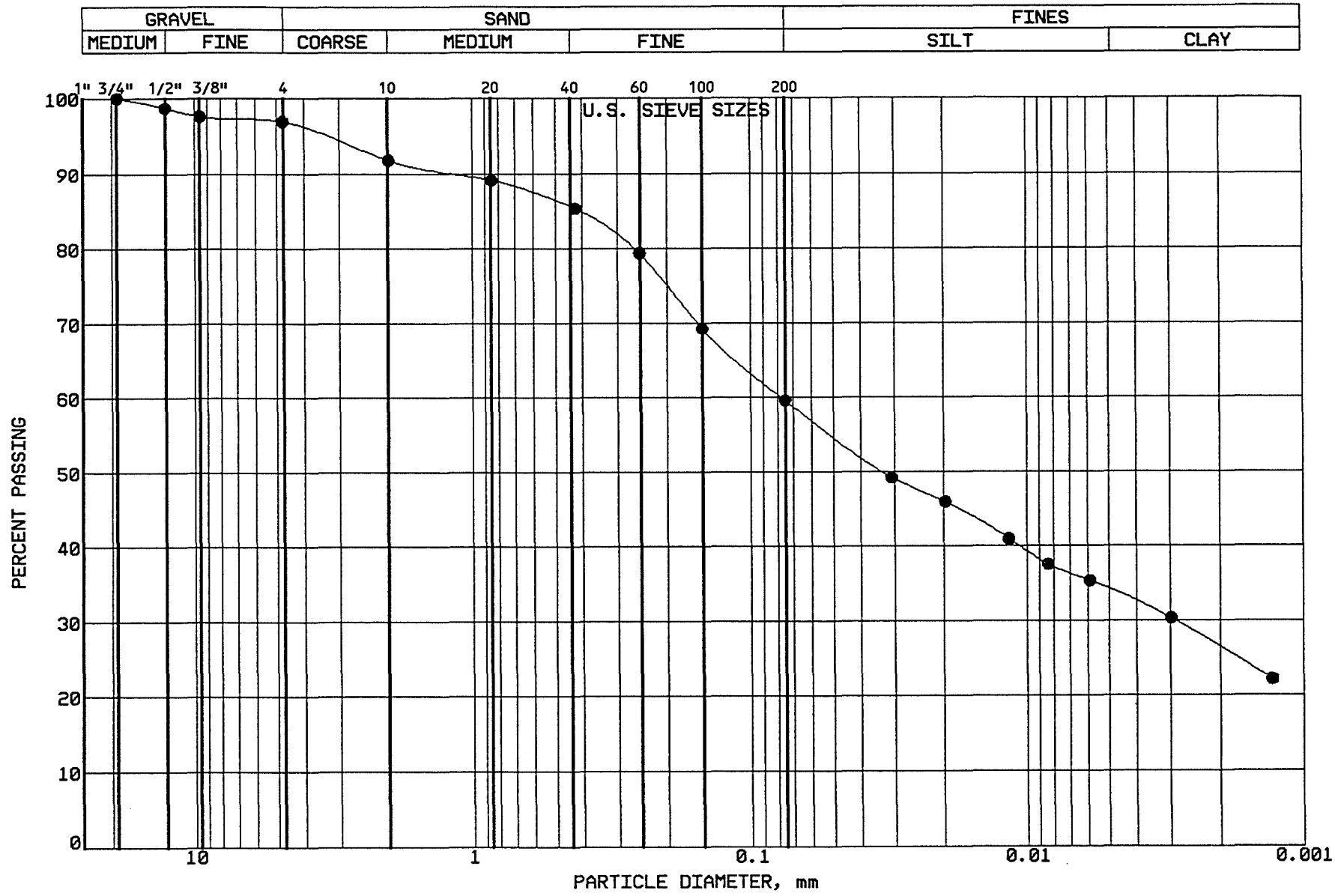
LOCATION: N 43000.0, E 44163.0
SAMPLE: CLBCC515 TUBE #: ST-139
ELEVATION: 1886.6'

GRAVEL	2.4 %
SAND	35.6 %
SILT	27.9 %
CLAY	34.1 %
P 200	62.0 %

SOIL PROPERTIES

LL: 41.0%
PL: 16.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42997.0, E 44333.0
SAMPLE: CLBCC516 TUBE #: ST-140
ELEVATION: 1886.6'

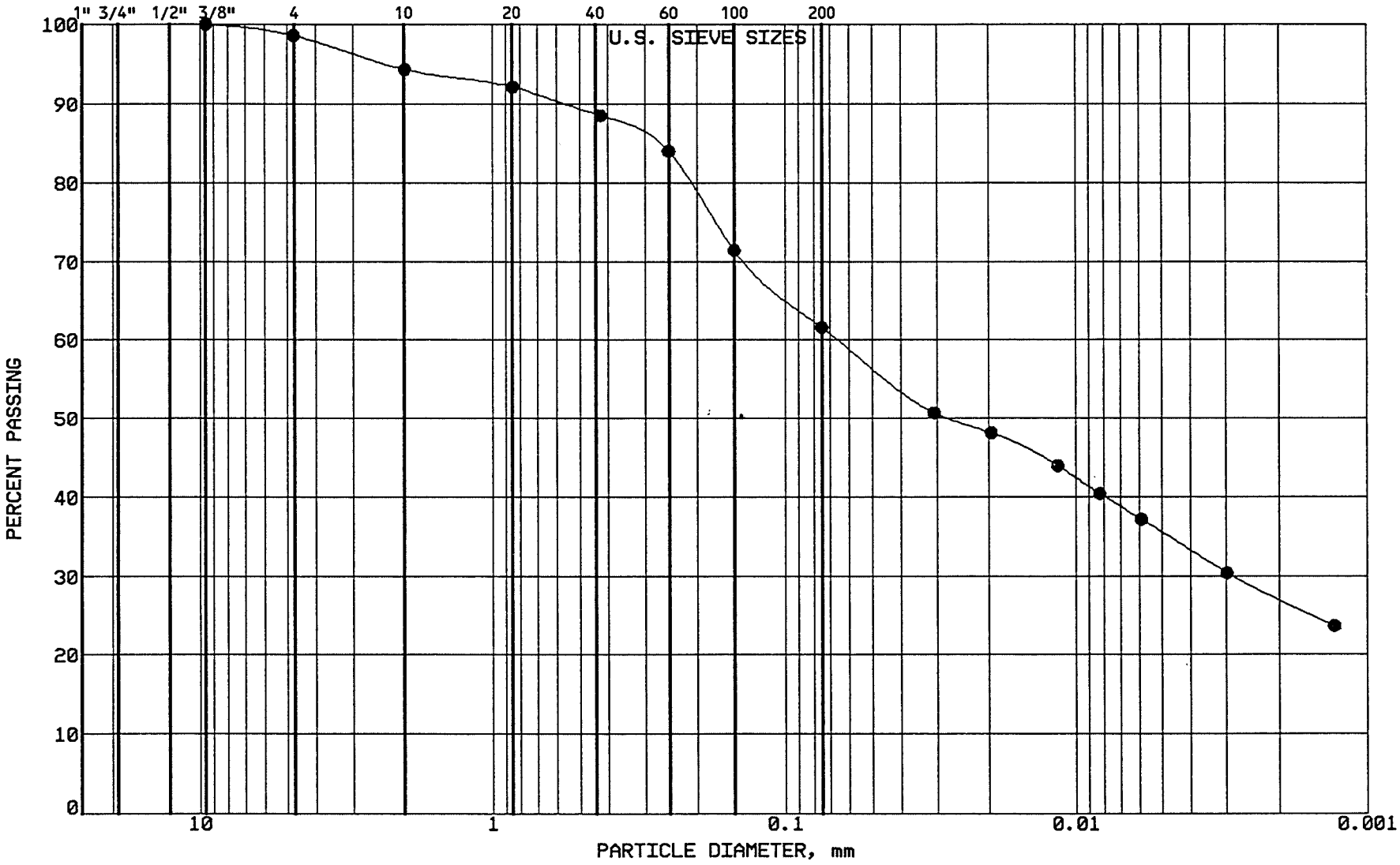
GRAVEL	3.1 %
SAND	37.3 %
SILT	25.5 %
CLAY	34.1 %
P 200	59.6 %

SOIL PROPERTIES

LL: 42.0%
PL: 16.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42994.0, E 44588.0
SAMPLE: CLBCC517 TUBE #: ST-141
ELEVATION: 1886.2'

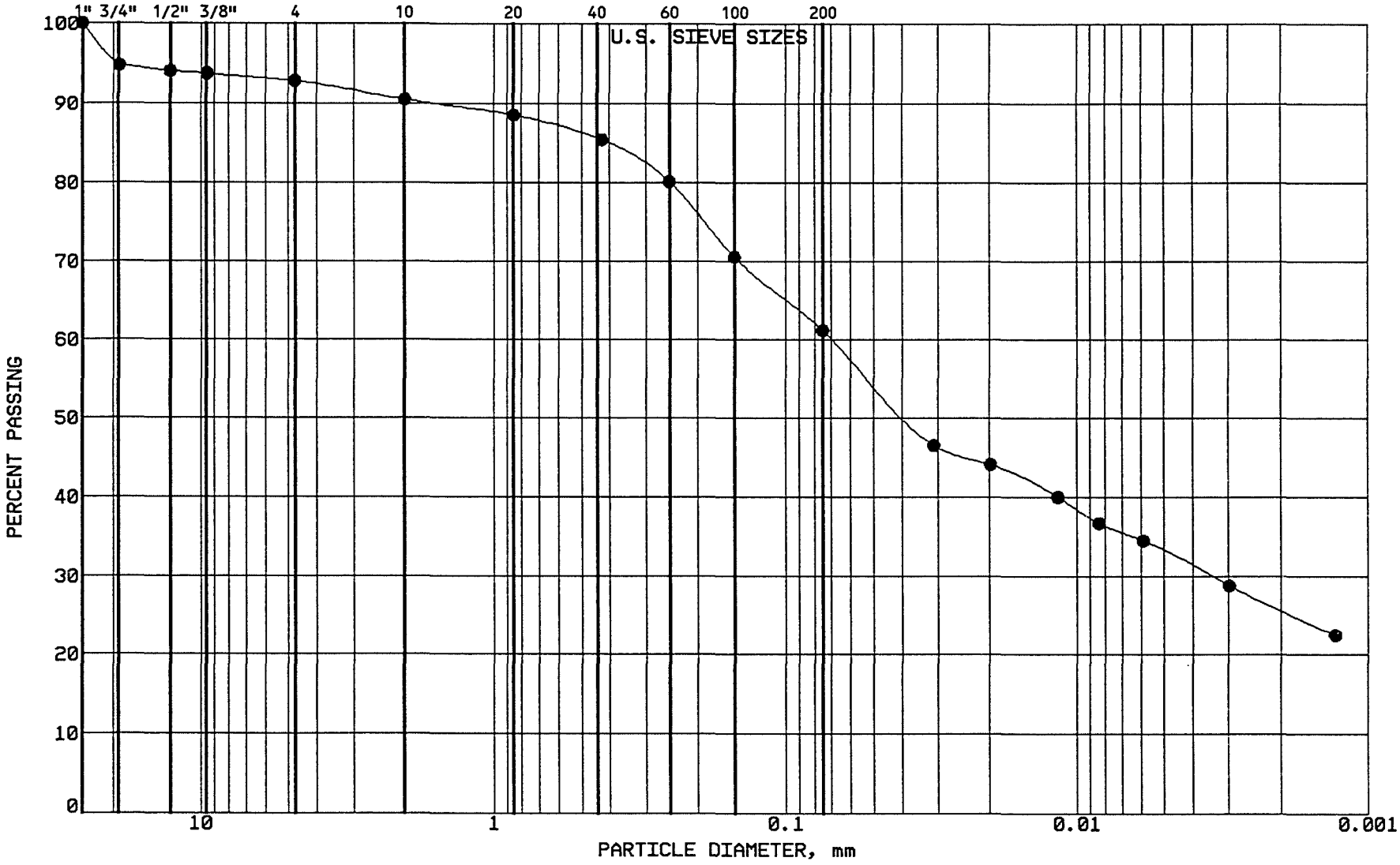
GRAVEL	1.4 %
SAND	37.0 %
SILT	26.1 %
CLAY	35.5 %
P 200	61.6 %

SOIL PROPERTIES

LL: 43.0%
PL: 17.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43074.0, E 45132.0
SAMPLE: SGCC518 TUBE #:
ELEVATION: 1879.2'

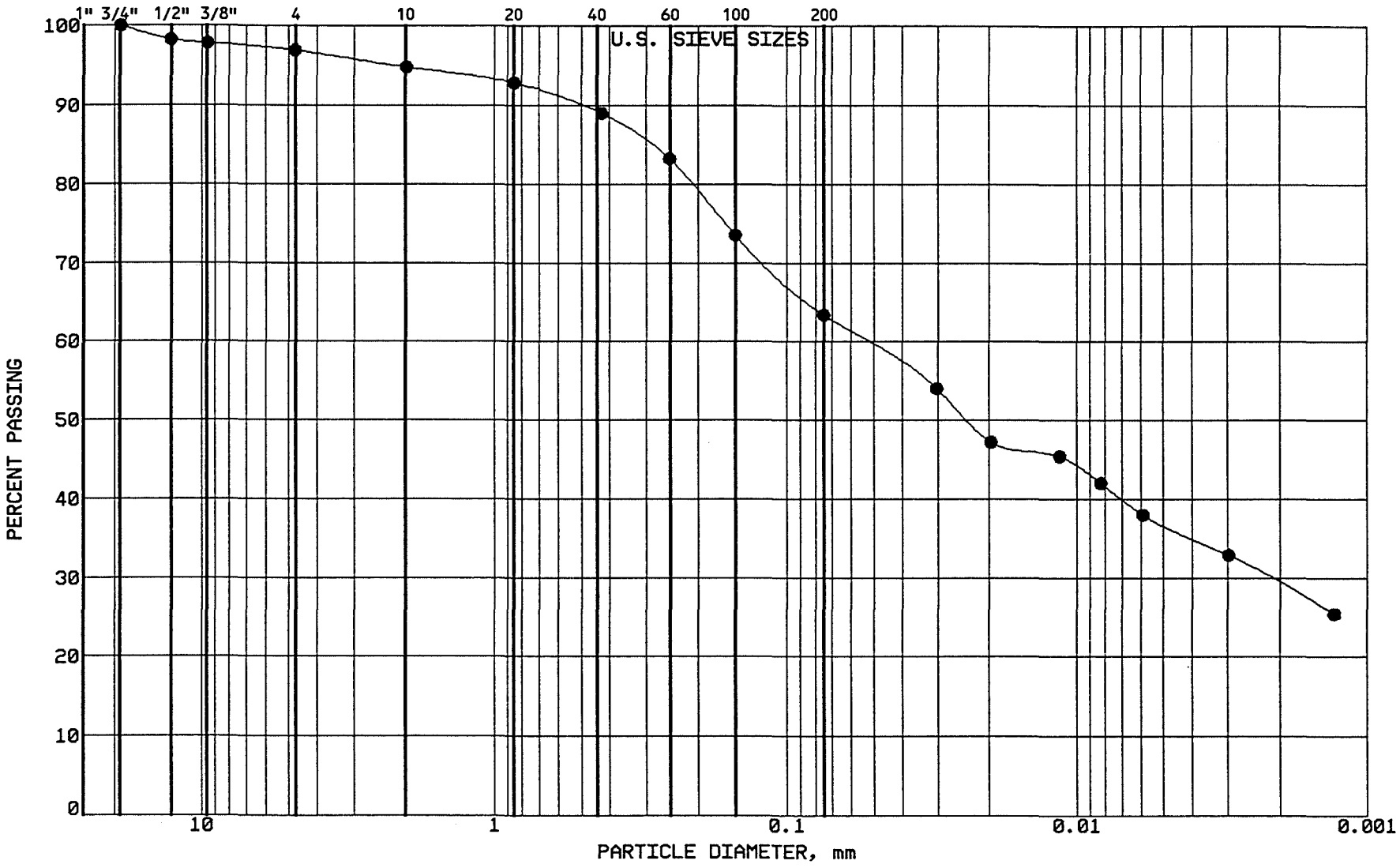
GRAVEL	7.2 %
SAND	31.6 %
SILT	28.1 %
CLAY	33.1 %
P 200	61.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

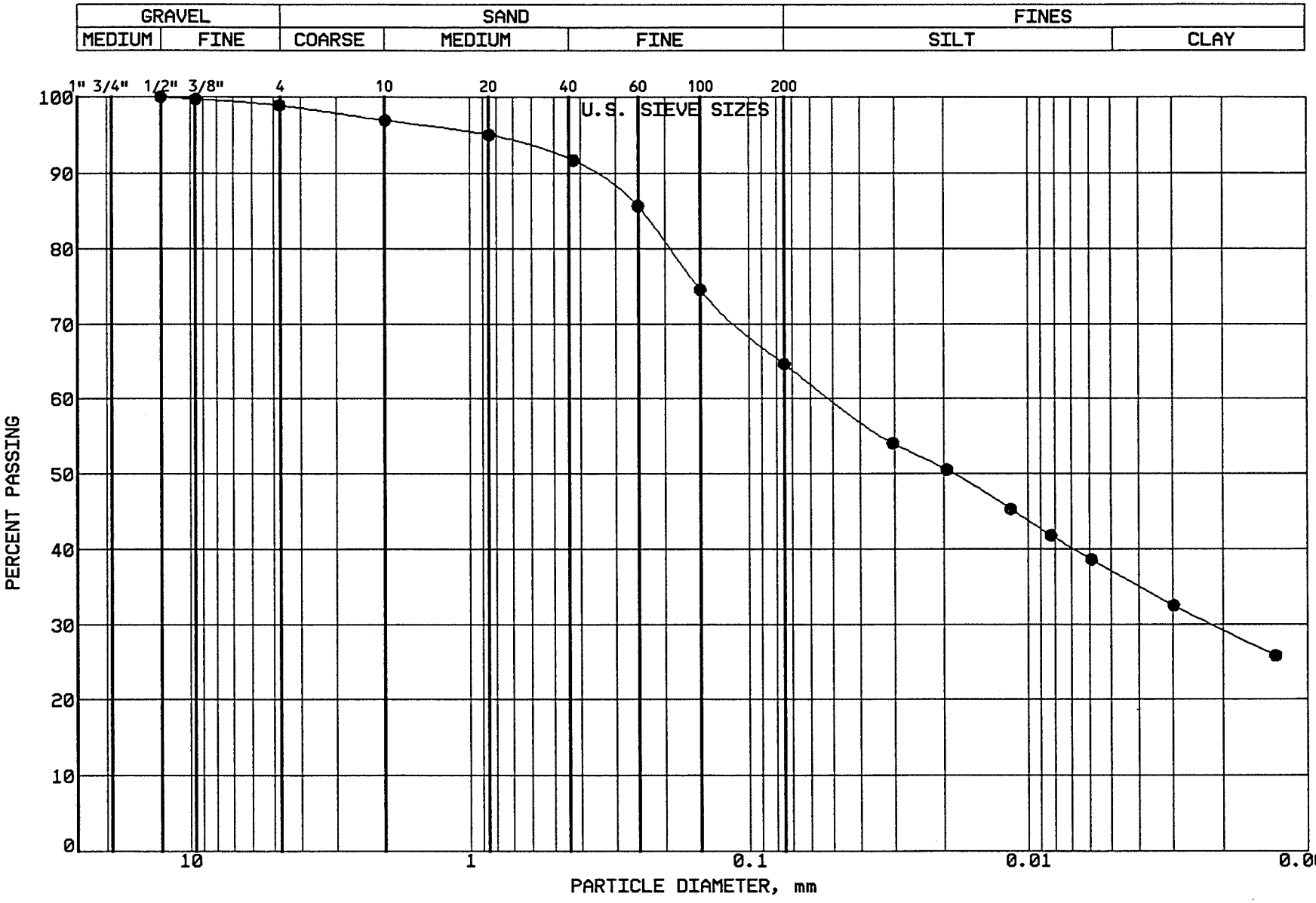
LOCATION: N 42894.0, E 45131.0
SAMPLE: SGCC519 TUBE #:
ELEVATION: 1879.0'

GRAVEL	3.1 %
SAND	33.5 %
SILT	26.6 %
CLAY	36.8 %
P 200	63.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42675.0, E 45127.0
SAMPLE: SGCC520 TUBE #:
ELEVATION: 1878.4'

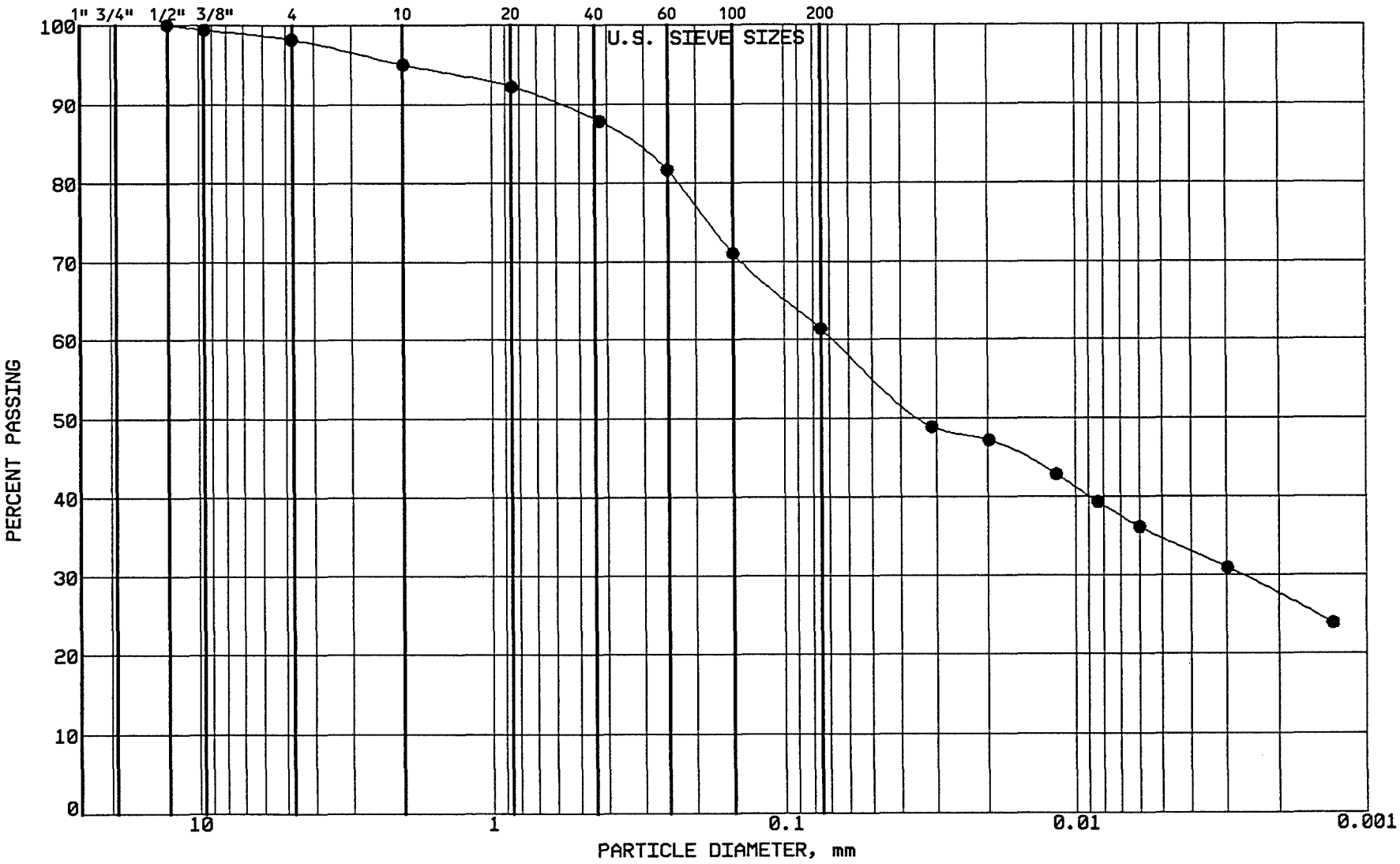
GRAVEL	1.1 %
SAND	34.3 %
SILT	27.5 %
CLAY	37.1 %
P 200	64.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43396.0, E 44893.0
SAMPLE: SGCC521 TUBE #:
ELEVATION: 1886.5'

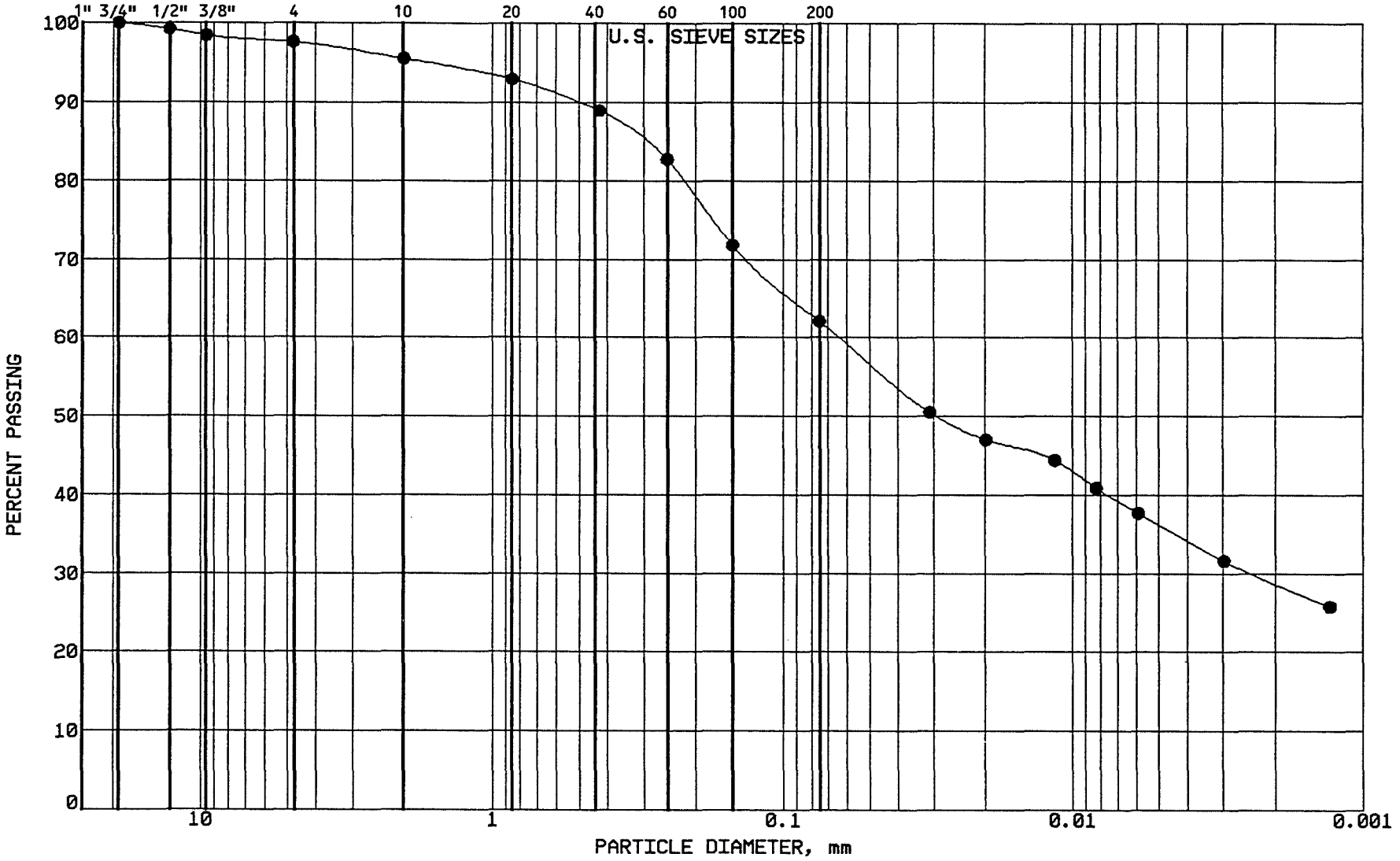
GRAVEL	1.8 %
SAND	36.8 %
SILT	26.7 %
CLAY	34.7 %
P 200	61.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43193.0, E 44879.0
SAMPLE: SGCC522 TUBE #:
ELEVATION: 1886.5'

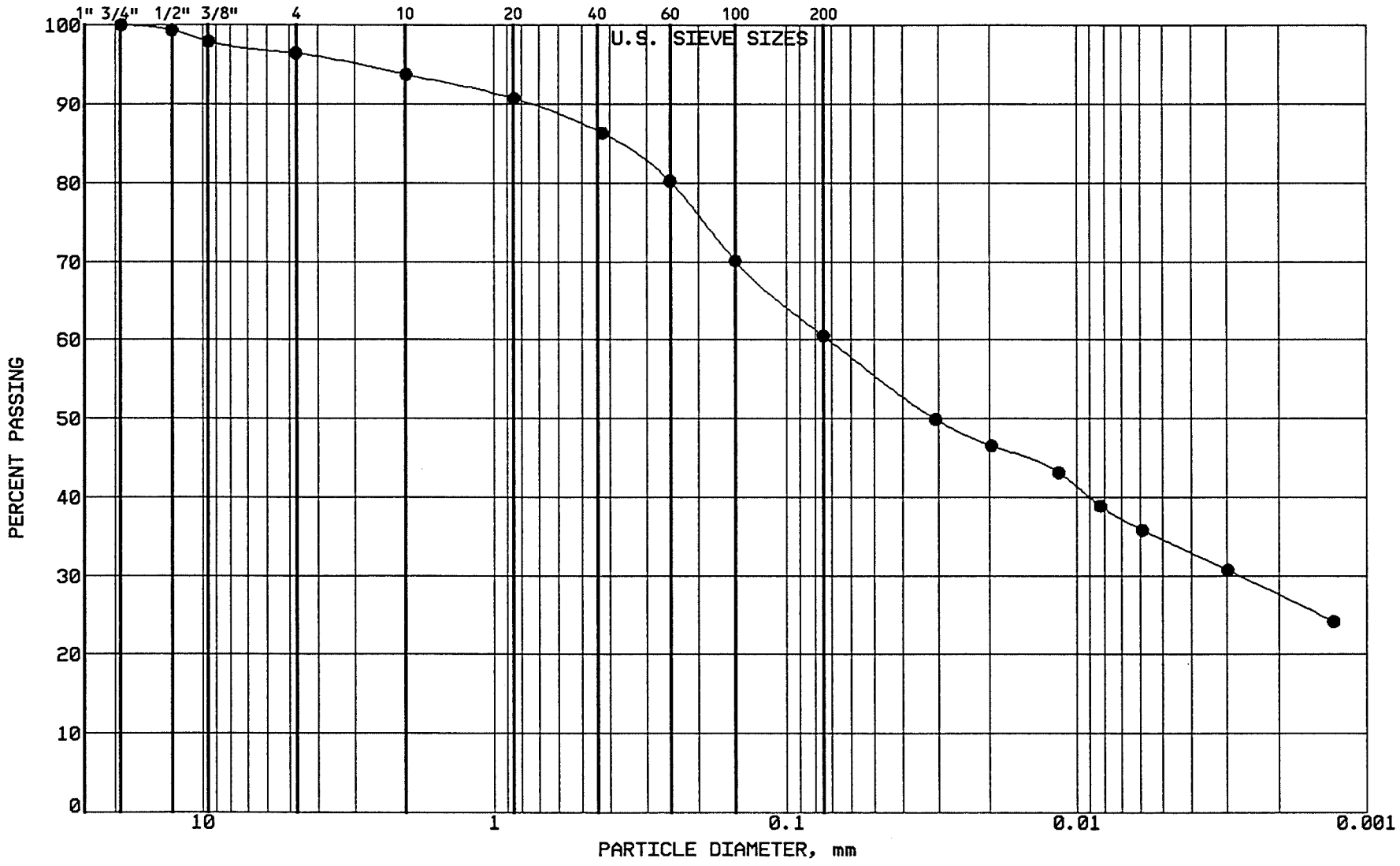
GRAVEL	2.4 %
SAND	35.5 %
SILT	25.9 %
CLAY	36.2 %
P 200	62.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43005.0, E 44868.0
SAMPLE: SGCC523 TUBE #:
ELEVATION: 1884.7'

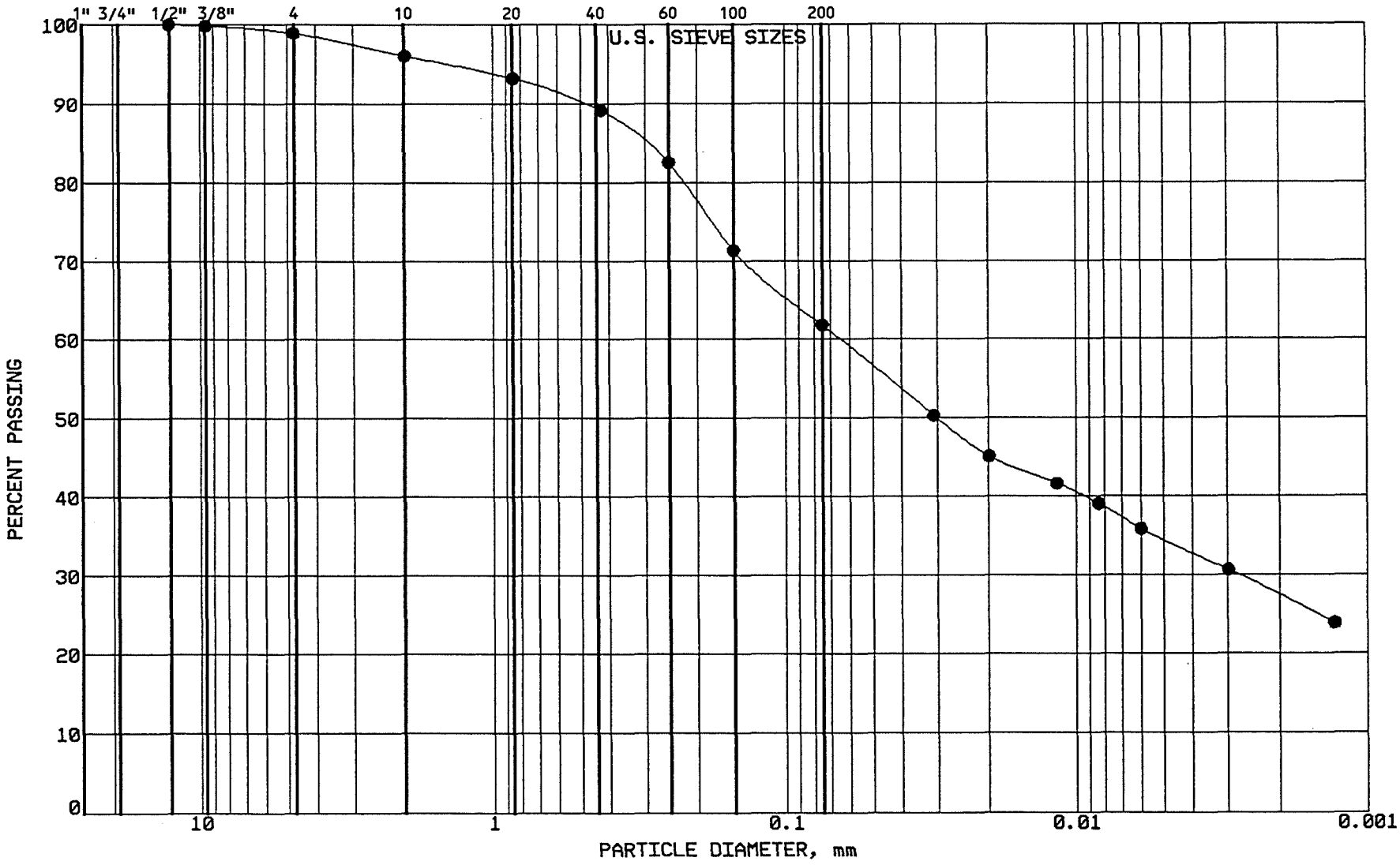
GRAVEL	3.6 %
SAND	35.9 %
SILT	25.9 %
CLAY	34.6 %
P 200	60.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

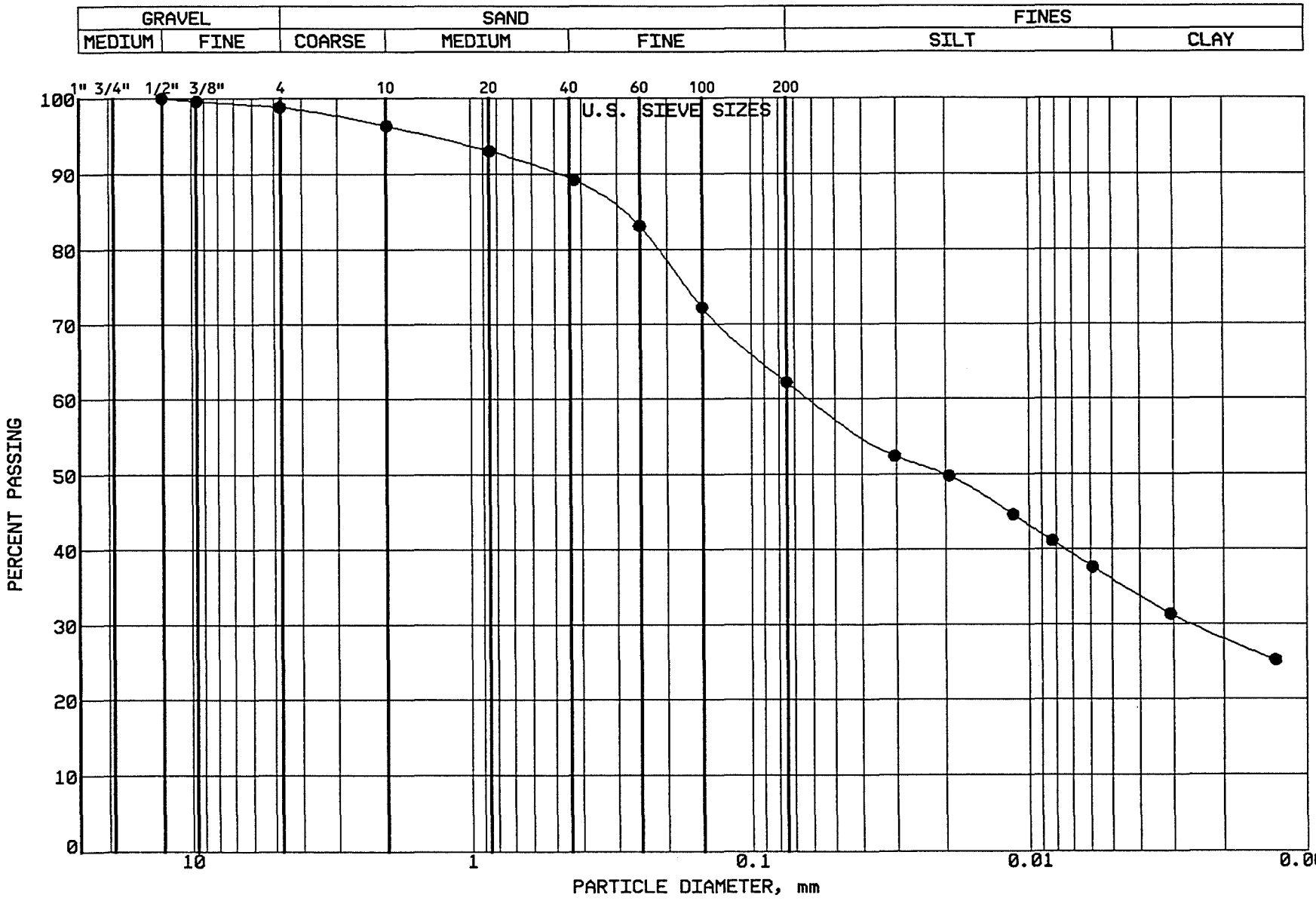
LOCATION: N 42796.0, E 44853.0
SAMPLE: SGCC524 TUBE #:
ELEVATION: 1885.3'

GRAVEL	1.1 %
SAND	37.1 %
SILT	27.4 %
CLAY	34.4 %
P 200	61.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

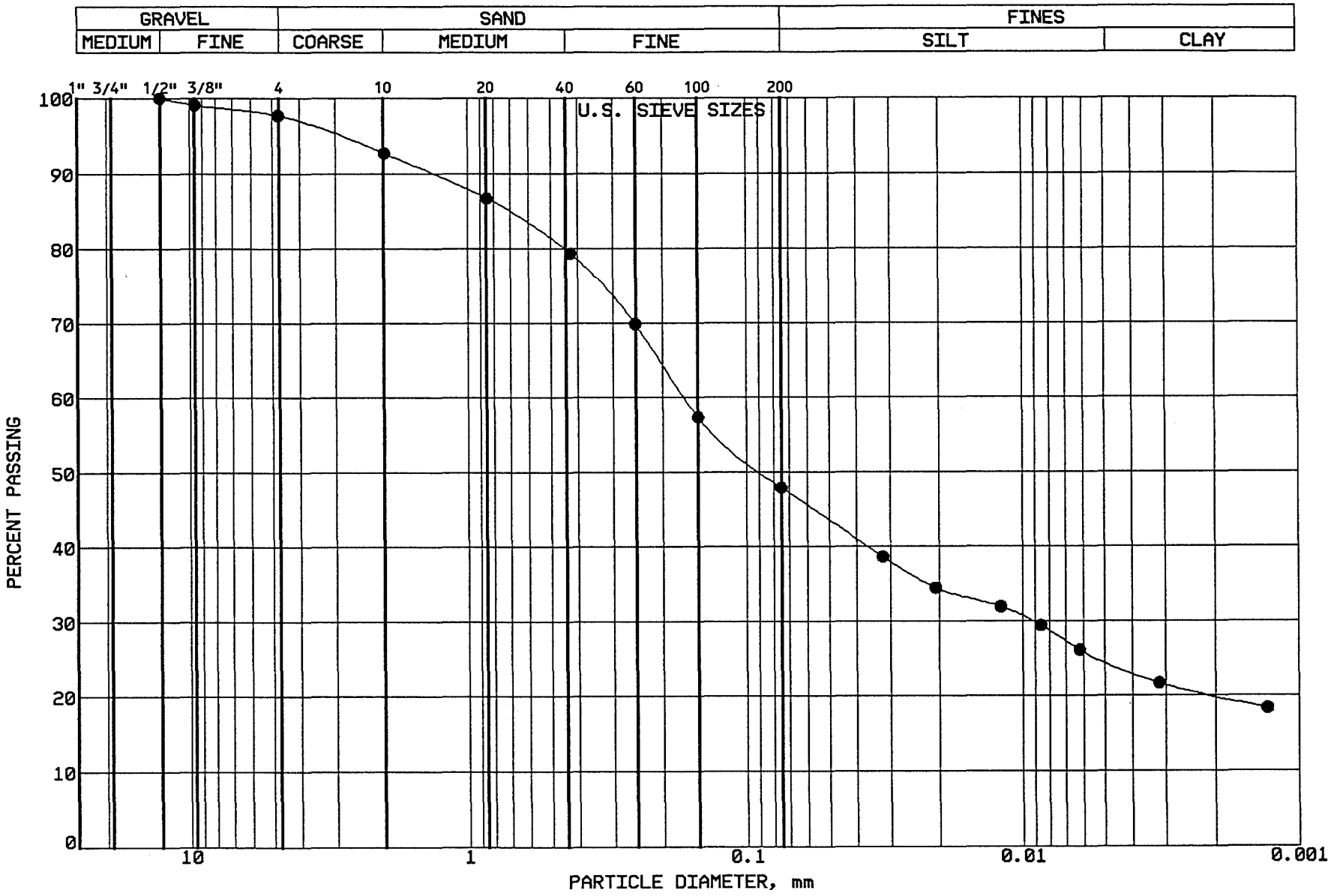
LOCATION: N 42605.0, E 44835.0
SAMPLE: SGCC525 TUBE #:
ELEVATION: 1881.3'

GRAVEL	1.2 %
SAND	36.6 %
SILT	26.2 %
CLAY	36.0 %
P 200	62.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43405.0, E 43031.0
SAMPLE: SGCC526 TUBE #:
ELEVATION: 1885.1'

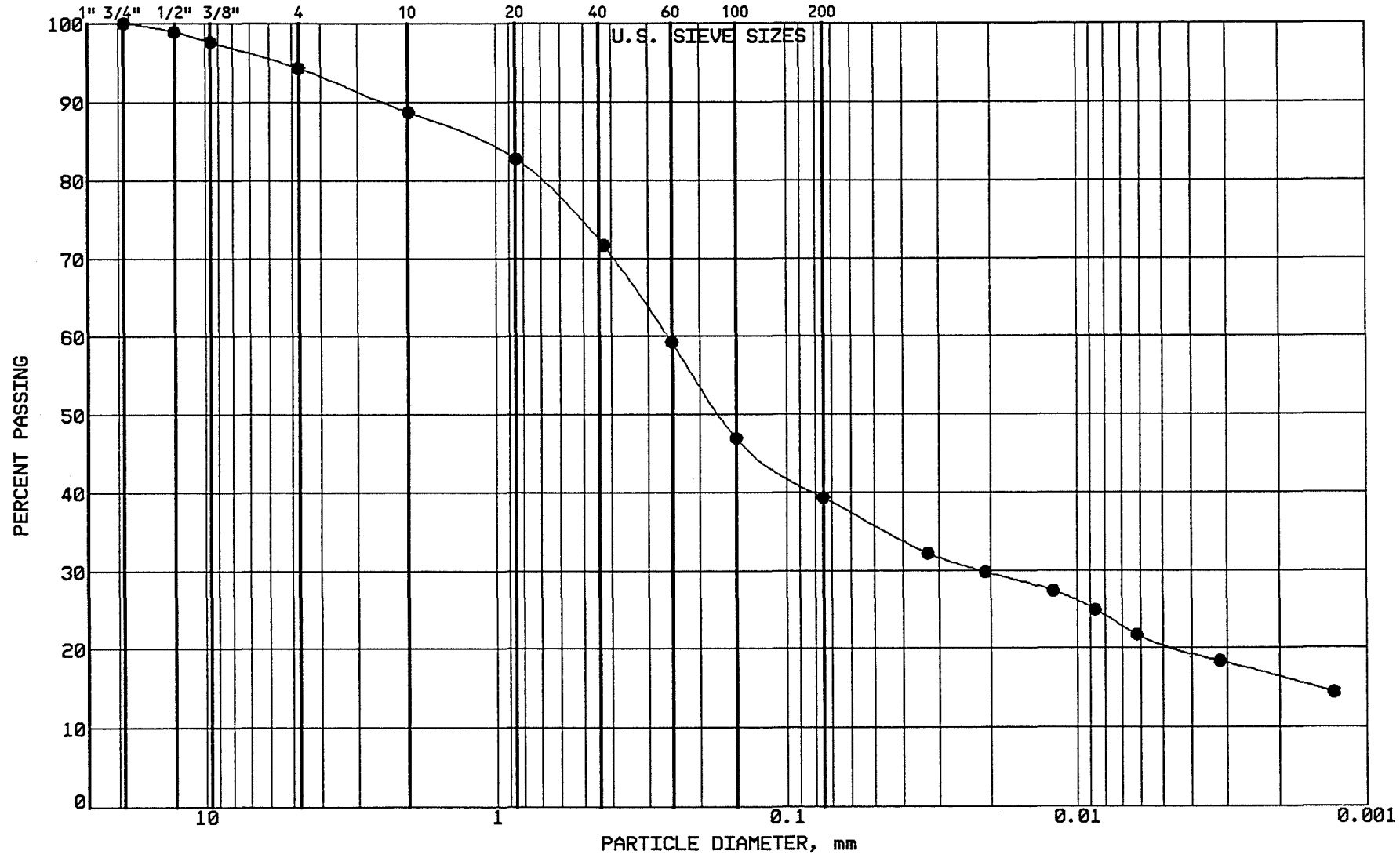
GRAVEL	2.3 %
SAND	49.8 %
SILT	23.2 %
CLAY	24.7 %
P 200	47.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND (SC) gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43218.0, E 45014.0
SAMPLE: SGCC527 TUBE #:
ELEVATION: 1883.4'

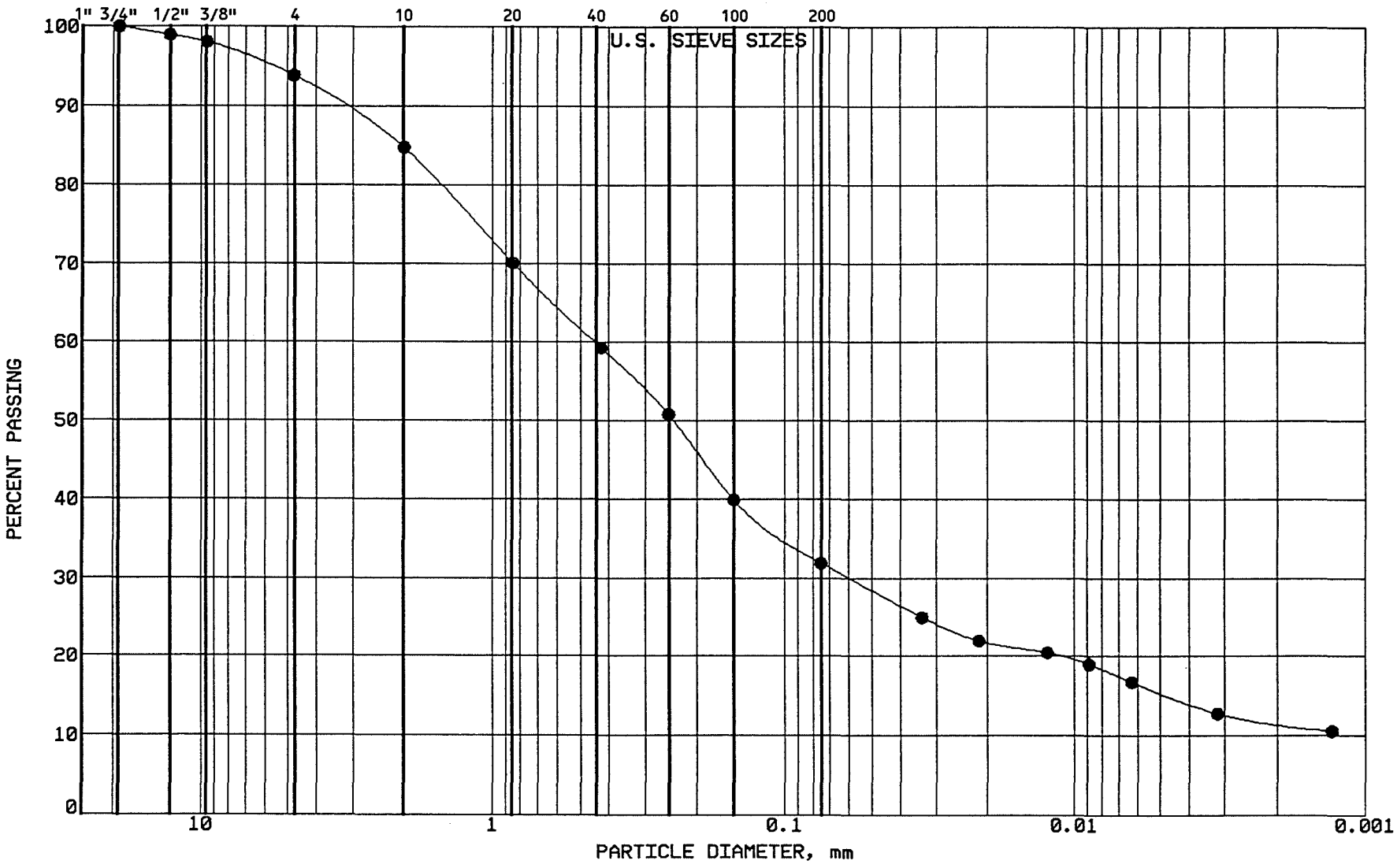
GRAVEL	5.7 %
SAND	55.0 %
SILT	18.6 %
CLAY	20.7 %
P 200	39.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43024.0, E 44993.0
SAMPLE: SGCC528 TUBE #:
ELEVATION: 1882.3'

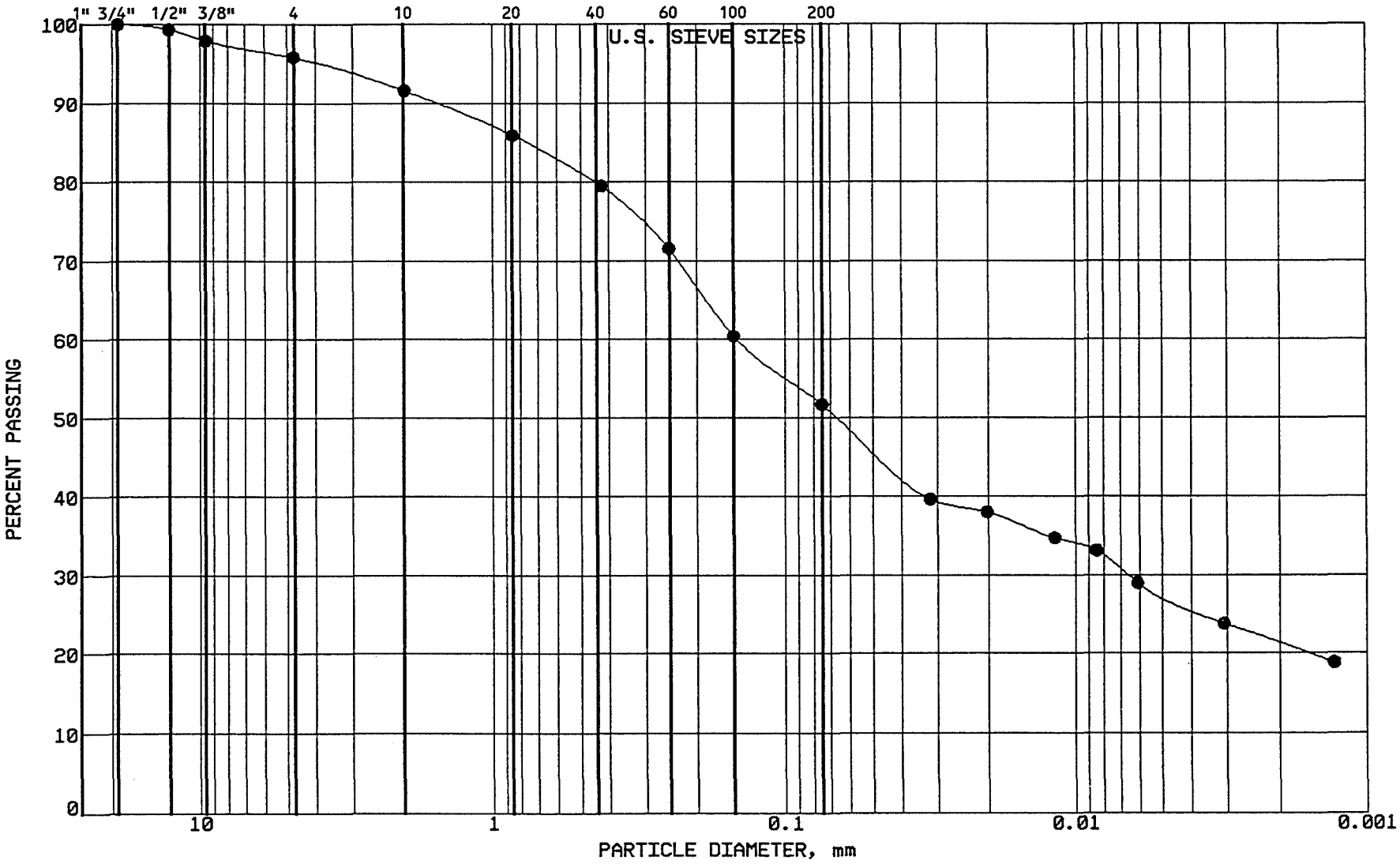
GRAVEL	6.2 %
SAND	61.9 %
SILT	16.5 %
CLAY	15.4 %
P 200	31.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND (SC) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42833.0, E 44975.0
SAMPLE: SGCC529 TUBE #:
ELEVATION: 1880.9'

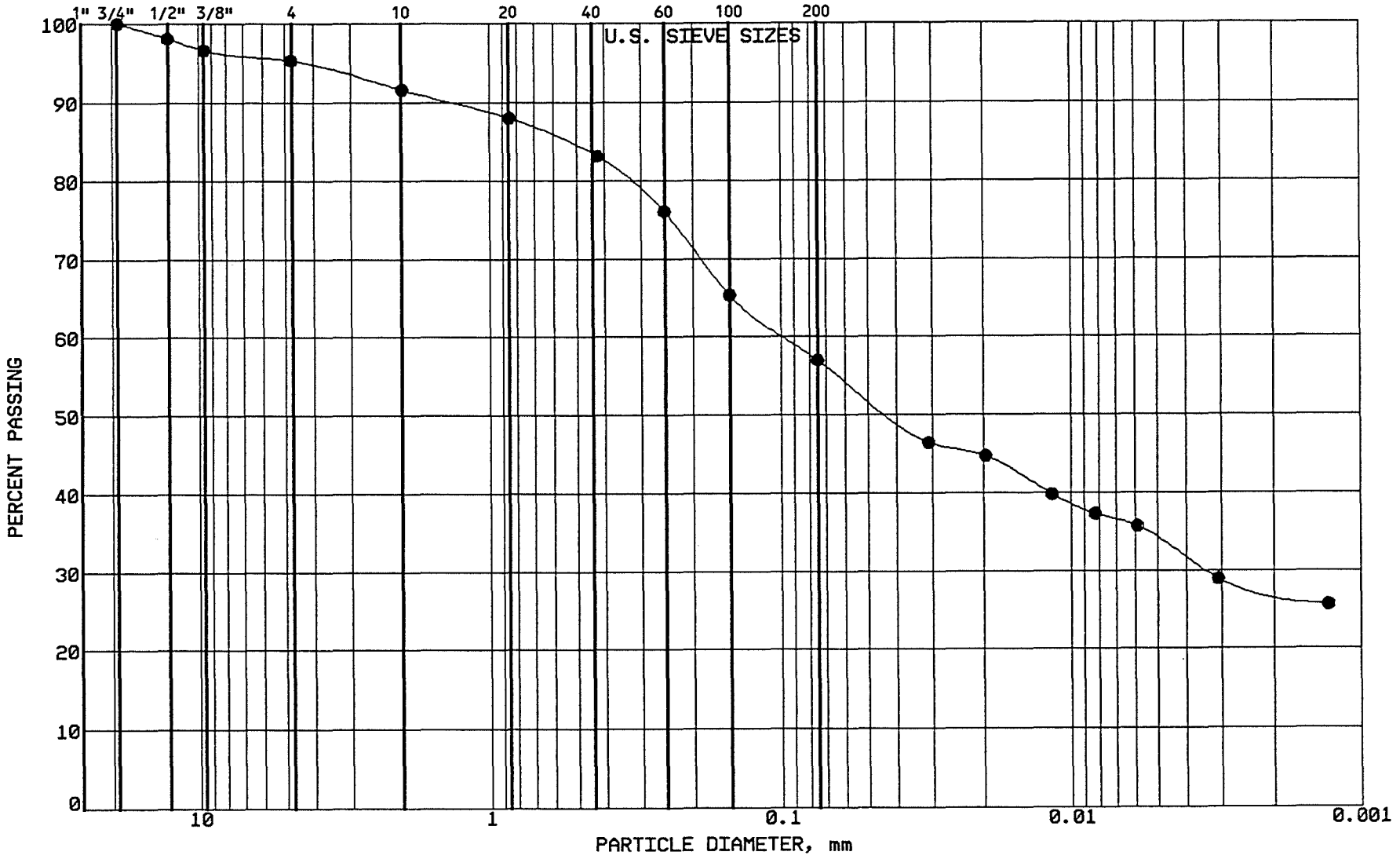
GRAVEL	4.2 %
SAND	44.1 %
SILT	24.2 %
CLAY	27.5 %
P 200	51.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42636.0, E 44957.0
SAMPLE: SGCC530 TUBE #:
ELEVATION: 1880.3'

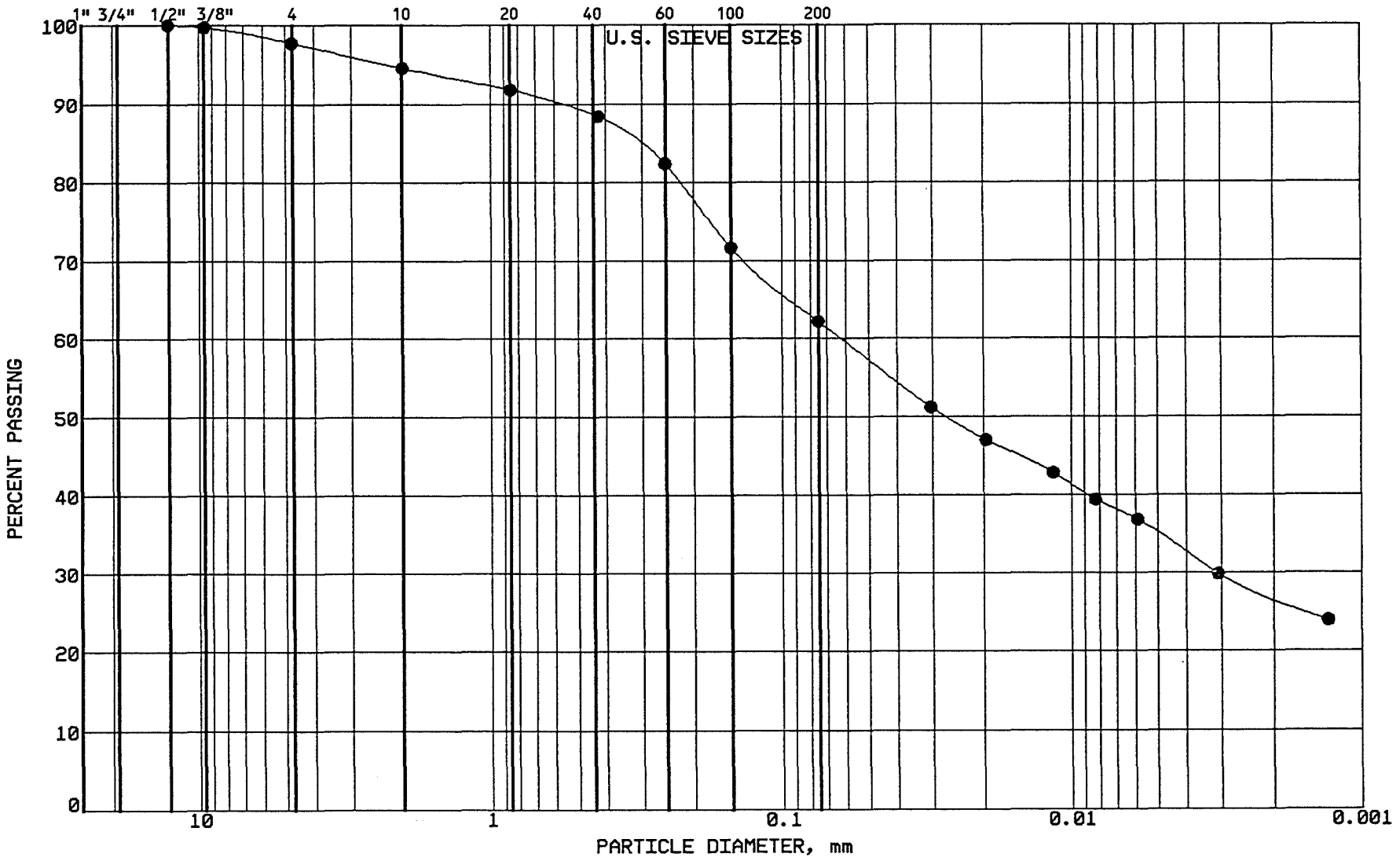
GRAVEL	4.7 %
SAND	38.3 %
SILT	23.0 %
CLAY	34.0 %
P 200	57.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42997.0, E 44333.0
SAMPLE: CLBCC531 TUBE #: ST-140R
ELEVATION: 1886.6'

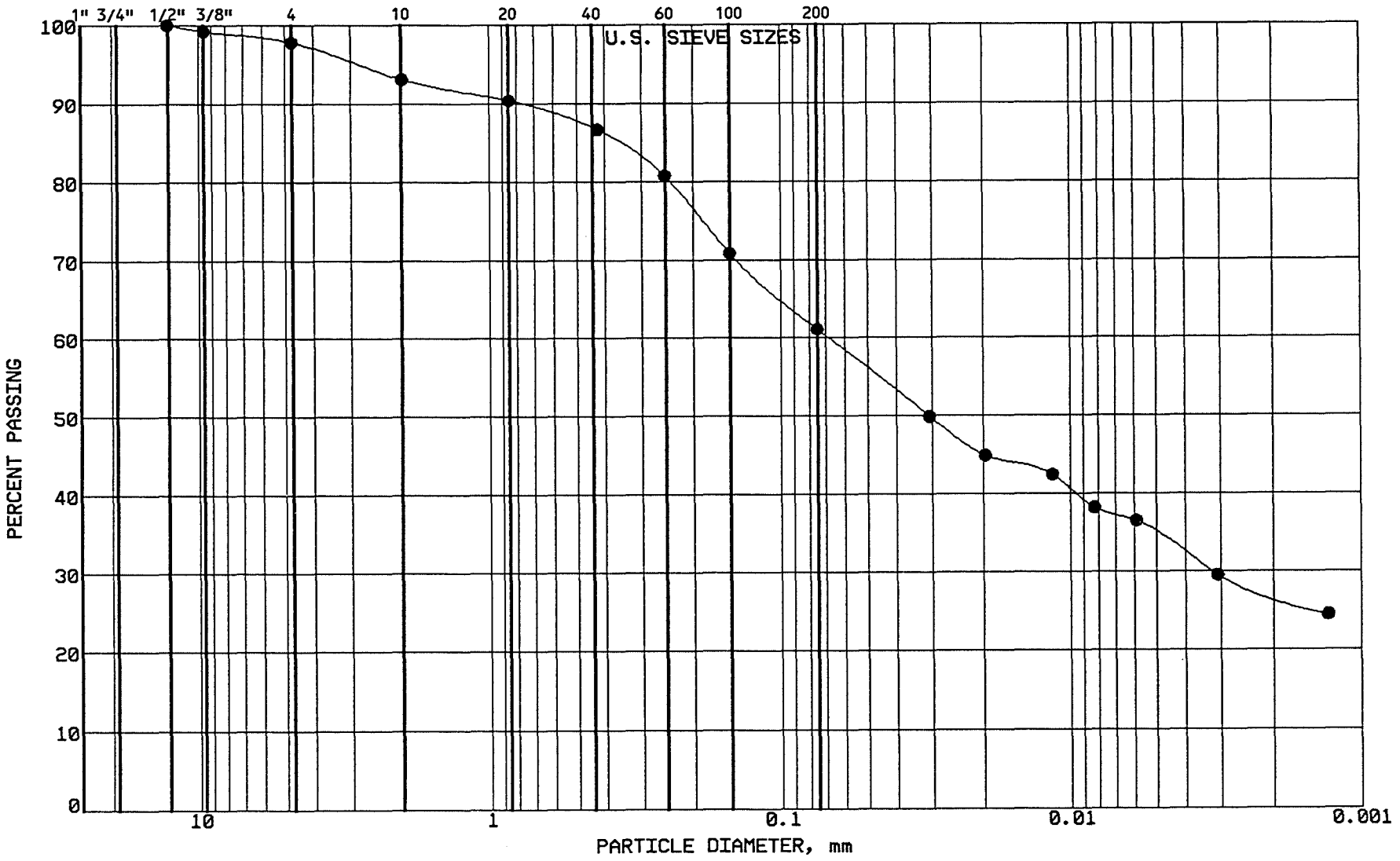
GRAVEL	2.3 %
SAND	35.5 %
SILT	27.2 %
CLAY	35.0 %
P 200	62.2 %

SOIL PROPERTIES

LL: 41.0%
PL: 17.0%
PI: 24.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42880.0, E 44211.0
SAMPLE: CLBCC532 TUBE #: ST-142
ELEVATION: 1885.8'

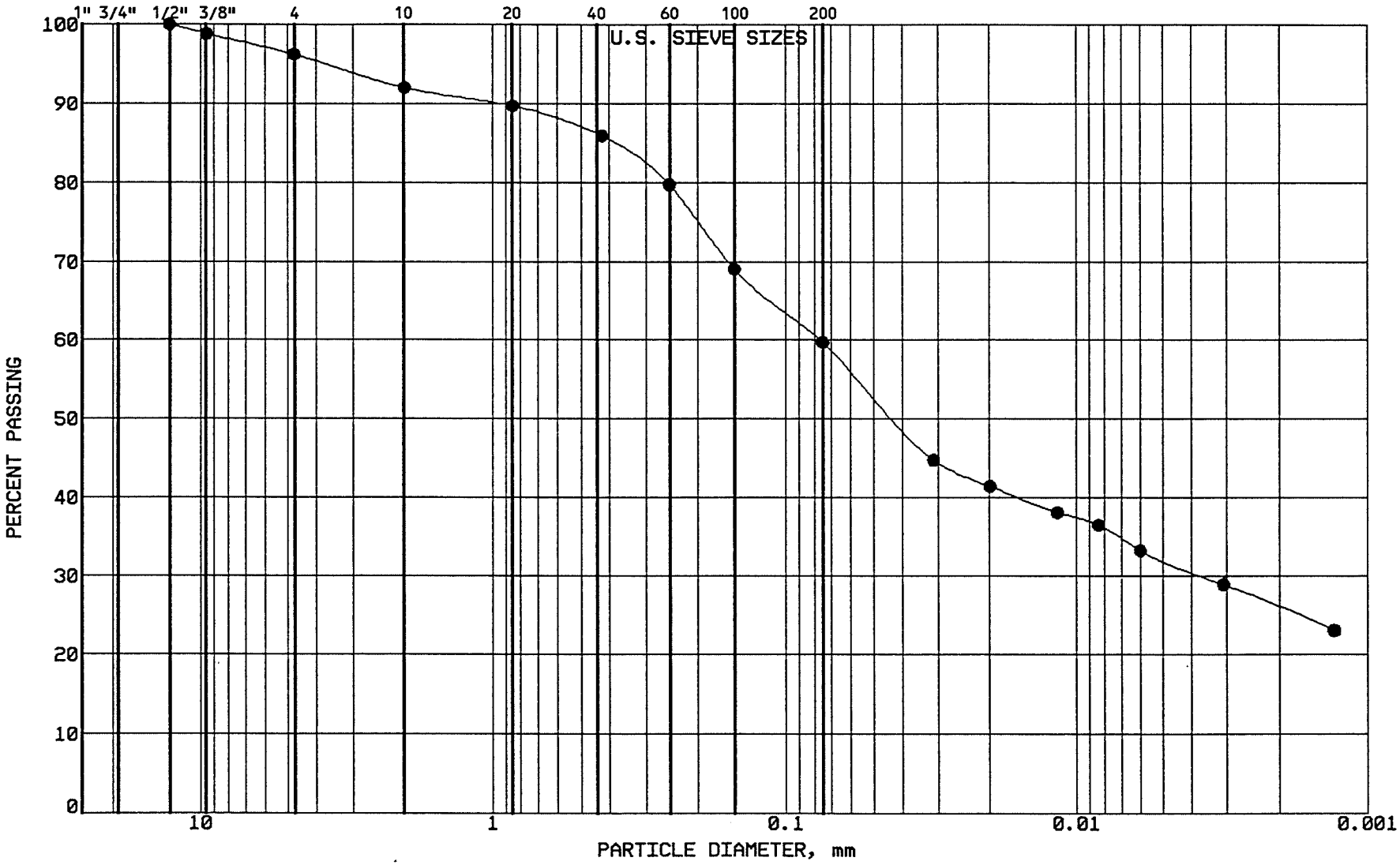
GRAVEL	2.2 %
SAND	36.7 %
SILT	26.4 %
CLAY	34.7 %
P 200	61.1 %

SOIL PROPERTIES

LL: 41.0%
PL: 17.0%
PI: 24.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

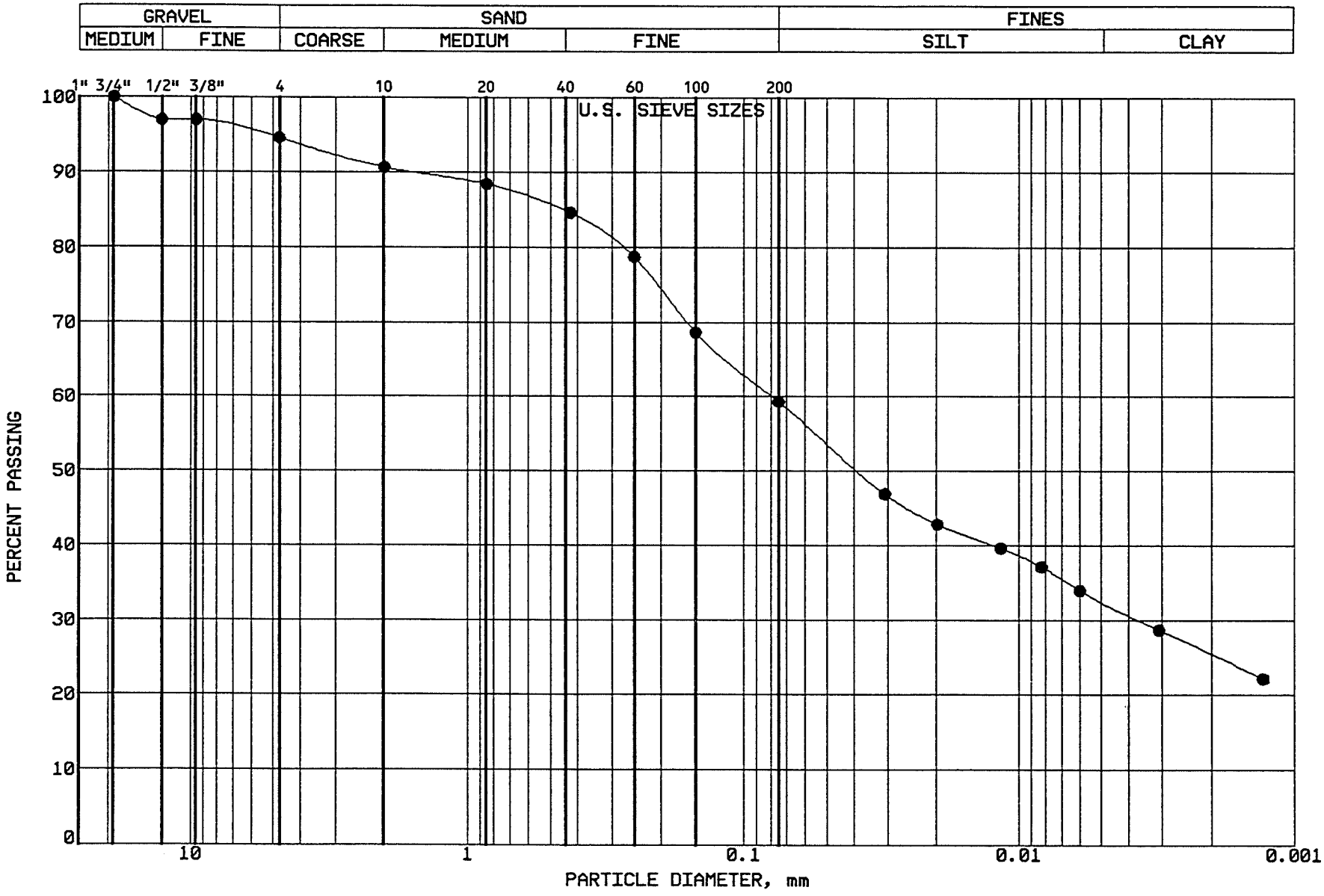
LOCATION: N 42864.0, E 44424.0
SAMPLE: CLBCC533 TUBE #: ST-143
ELEVATION: 1885.9'

GRAVEL	3.8 %
SAND	36.5 %
SILT	27.7 %
CLAY	32.0 %
P 200	59.7 %

SOIL PROPERTIES

LL: 42.0%
PL: 17.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42861.0, E 44565.0
SAMPLE: CLBCC534 TUBE #:ST-144
ELEVATION: 1885.3'

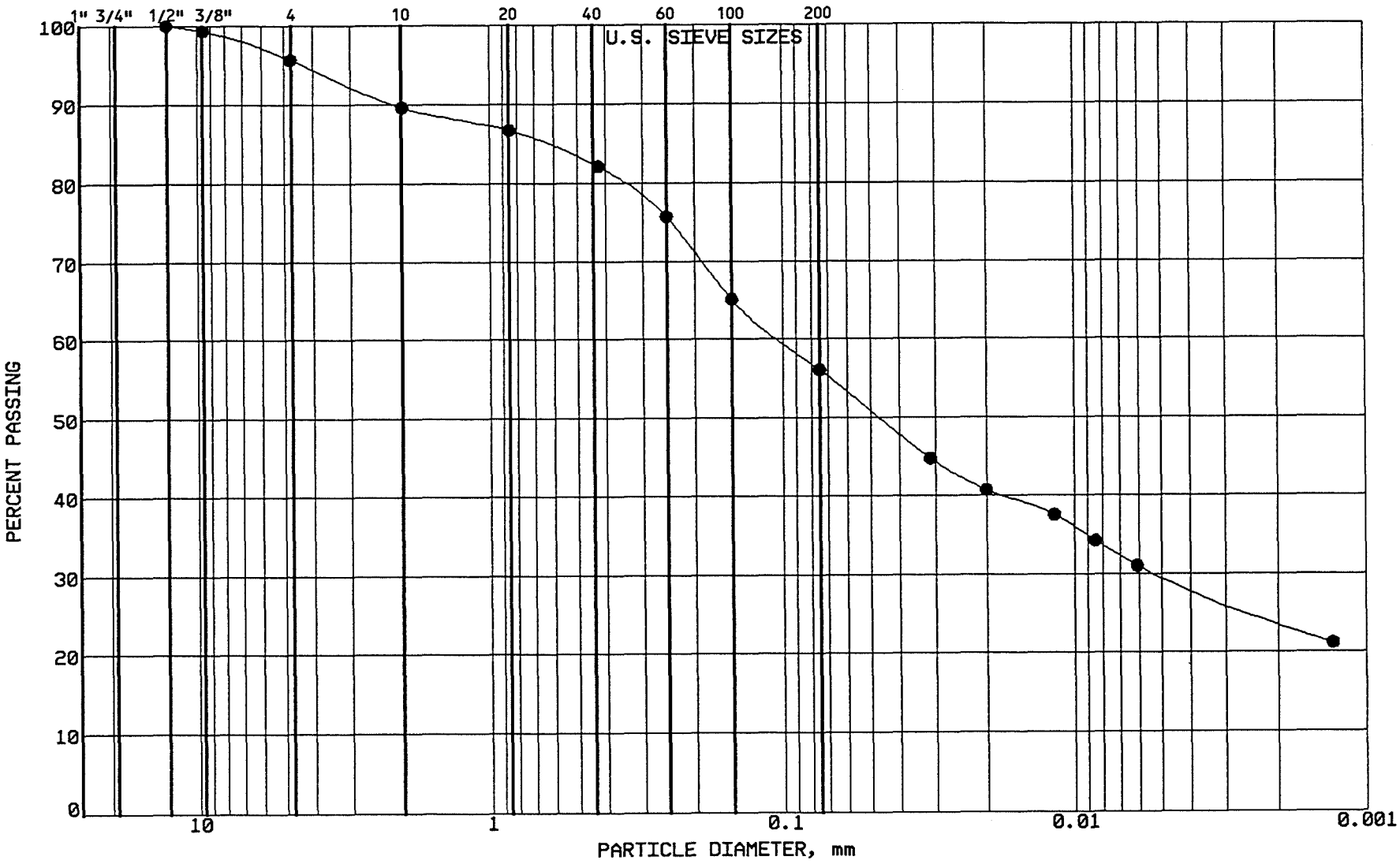
GRAVEL	5.5 %
SAND	35.2 %
SILT	26.8 %
CLAY	32.5 %
P 200	59.3 %

SOIL PROPERTIES

LL: 41.0%
PL: 16.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42678.0, E 44526.0
SAMPLE: CLBCC535 TUBE #: ST-145
ELEVATION: 1884.5'

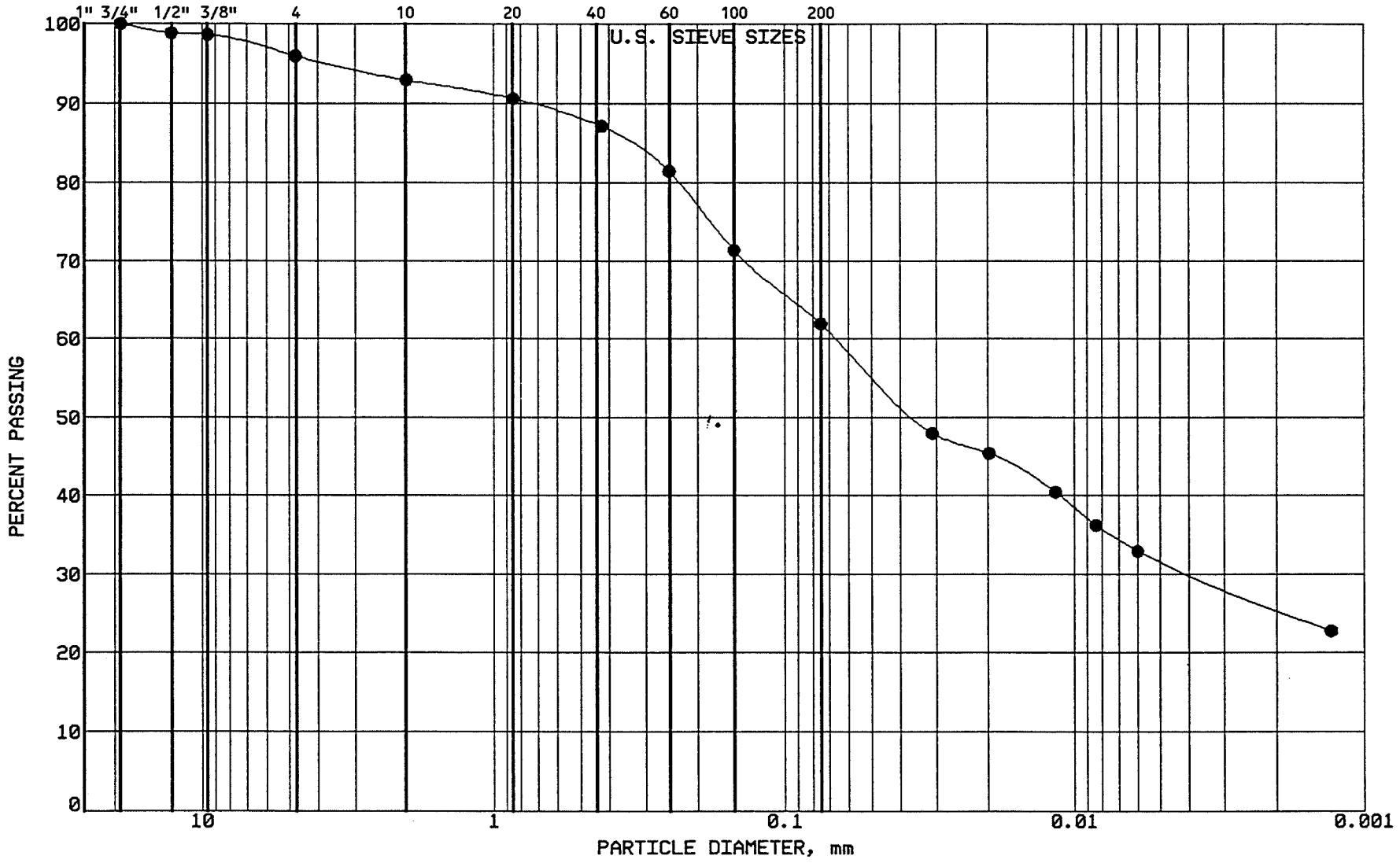
GRAVEL	4.4 %
SAND	39.5 %
SILT	26.4 %
CLAY	29.7 %
P 200	56.1 %

SOIL PROPERTIES

LL: 39.0%
PL: 16.0%
PI: 23.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42672.0, E 44343.0
SAMPLE: CLBCC536 TUBE #:ST-146
ELEVATION: 1884.9'

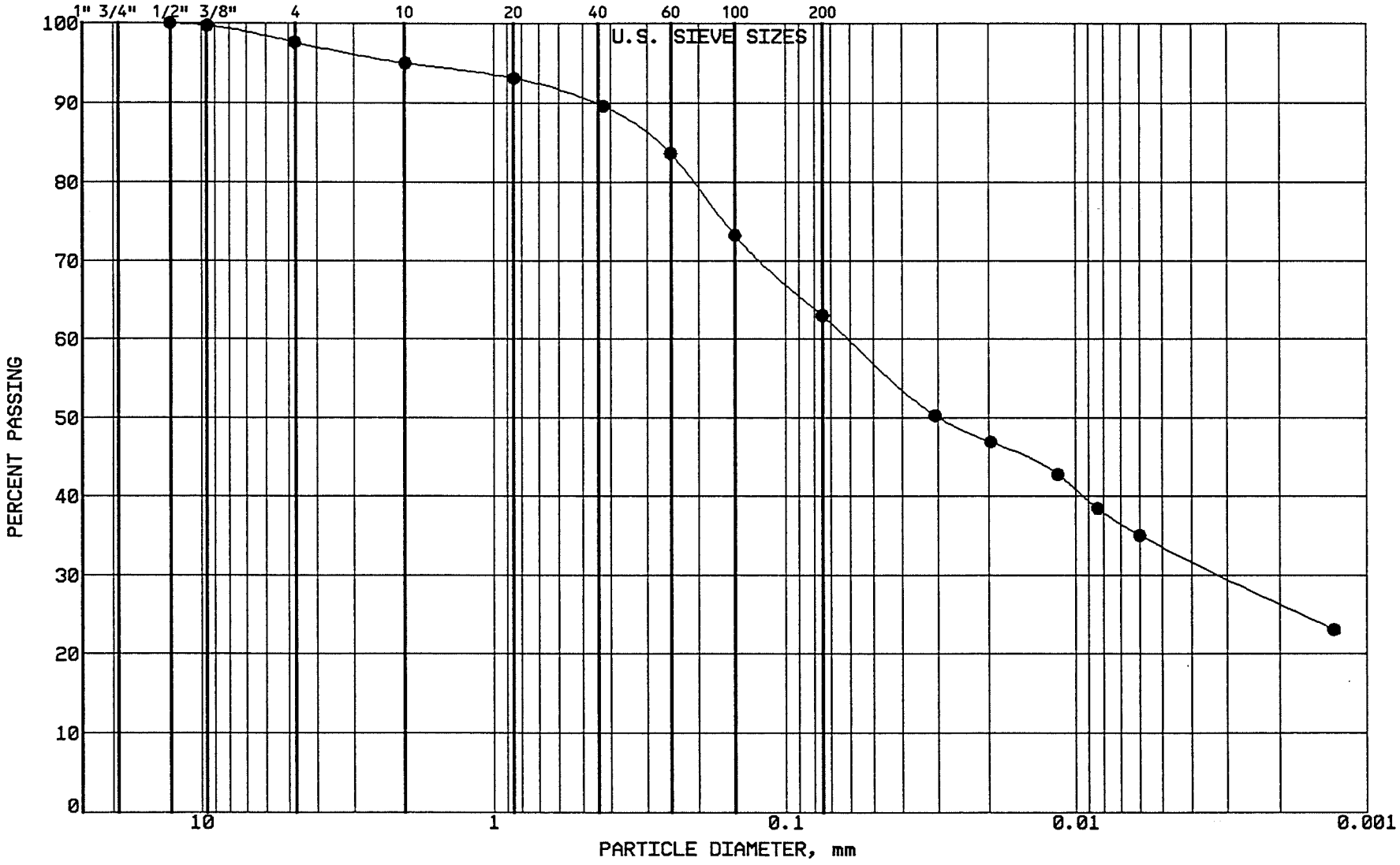
GRAVEL	4.1 %
SAND	34.0 %
SILT	30.2 %
CLAY	31.7 %
P 200	61.9 %

SOIL PROPERTIES

LL: 41.0%
PL: 18.0%
PI: 23.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42671.0, E 44163.0
SAMPLE: CLBCC537 TUBE #: ST-147
ELEVATION: 1885.0'

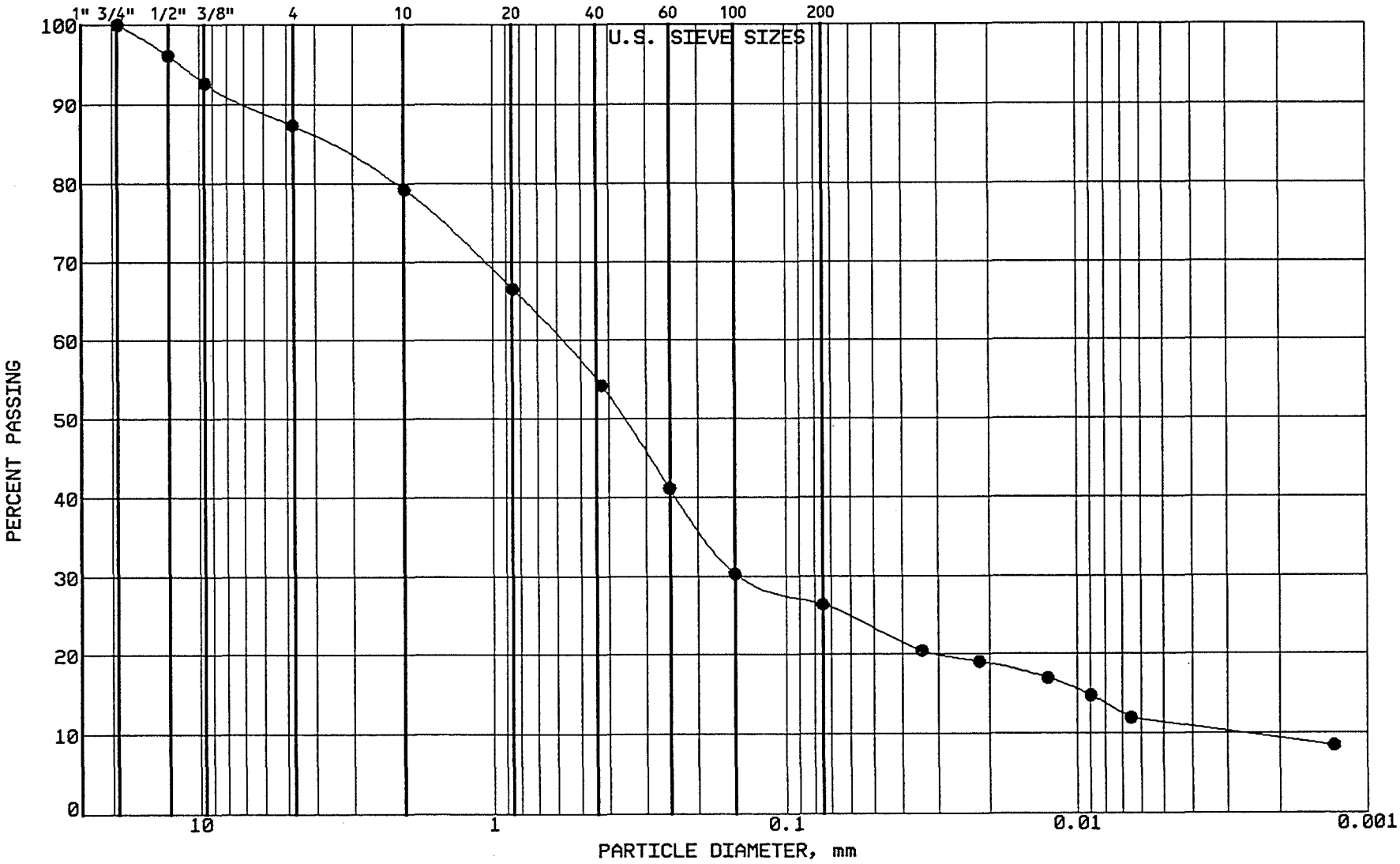
GRAVEL	2.4 %
SAND	34.6 %
SILT	29.4 %
CLAY	33.6 %
P 200	63.0 %

SOIL PROPERTIES

LL: 43.0%
PL: 16.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43389.0, E 45040.0
SAMPLE: SGCC538 TUBE #:
ELEVATION: 1884.9'

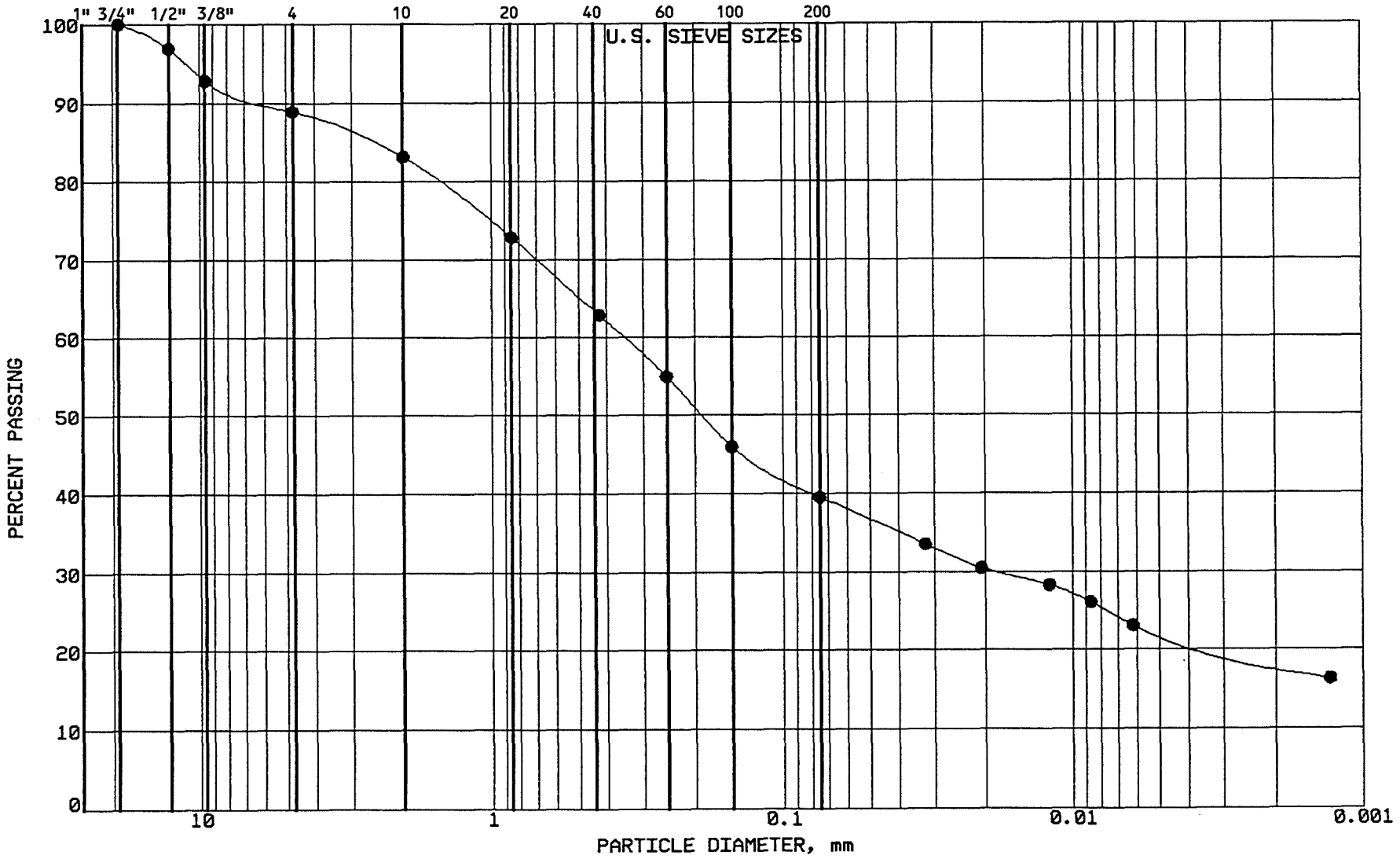
GRAVEL	12.7 %
SAND	60.9 %
SILT	15.0 %
CLAY	11.4 %
P 200	26.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND (SM), Vy.Dk.Gr.Br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

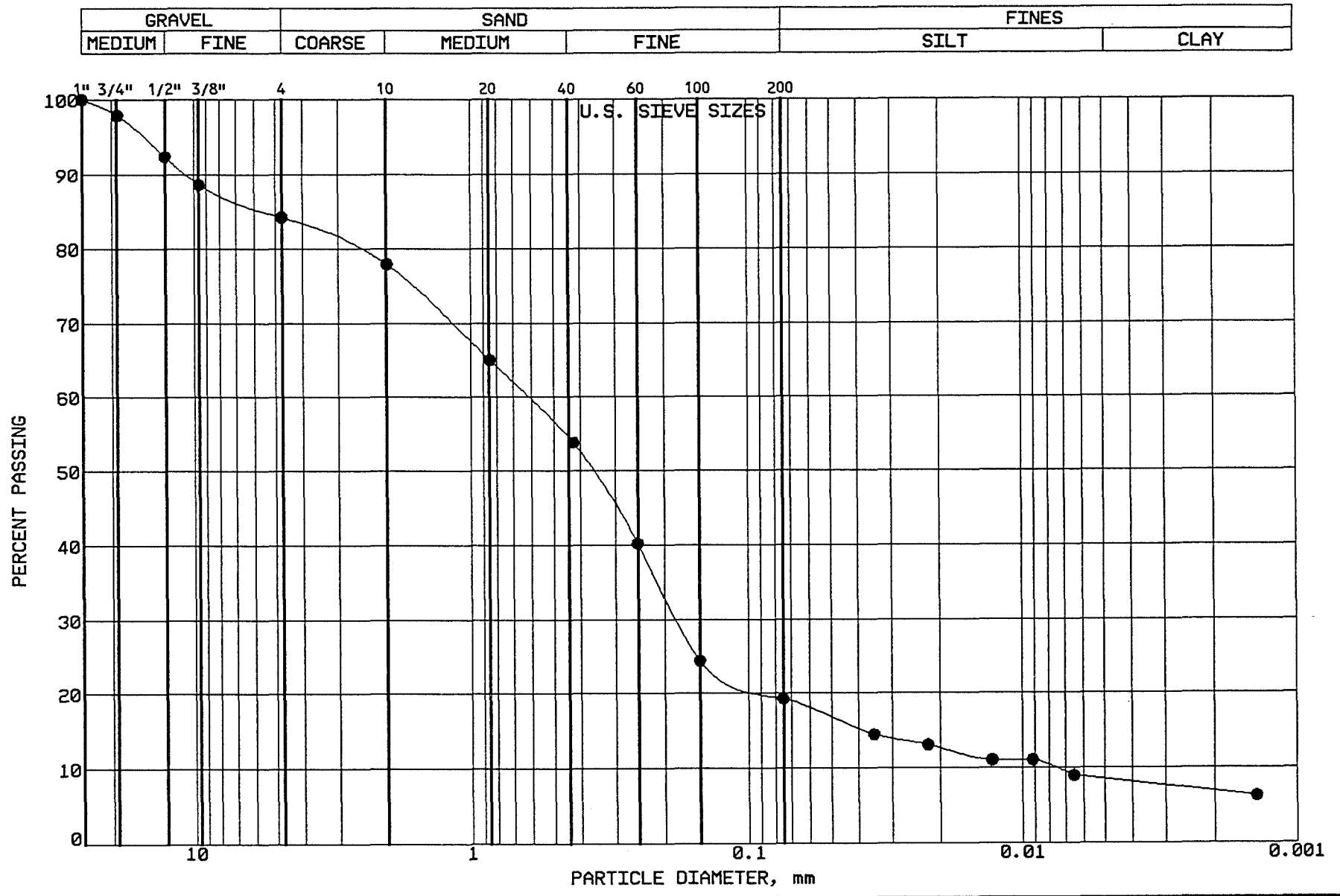
LOCATION: N 43196.0, E 45030.0
SAMPLE: SGCC539 TUBE #:
ELEVATION: 1883.7'

GRAVEL	11.1 %
SAND	49.4 %
SILT	17.3 %
CLAY	22.2 %
P 200	39.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND (SC) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43012.0, E 43016.0
SAMPLE: SGCC540 TUBE #:
ELEVATION: 1882.9'

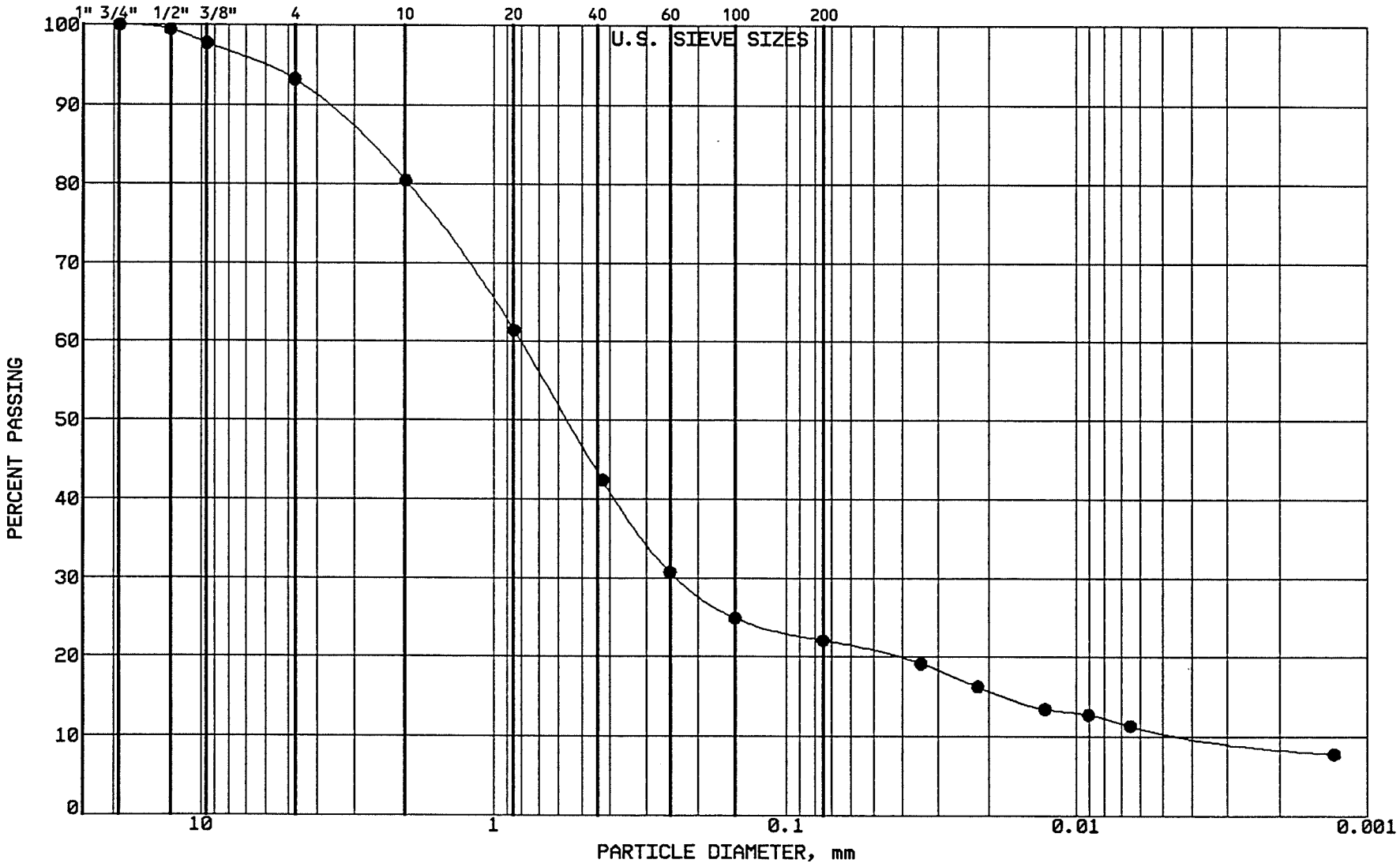
GRAVEL	15.8 %
SAND	64.9 %
SILT	10.8 %
CLAY	8.5 %
P 200	19.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND (SM), Vy.Dk.Gr.Br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42832.0, E 45002.0
SAMPLE: SGCC541 TUBE #:
ELEVATION: 1882.1'

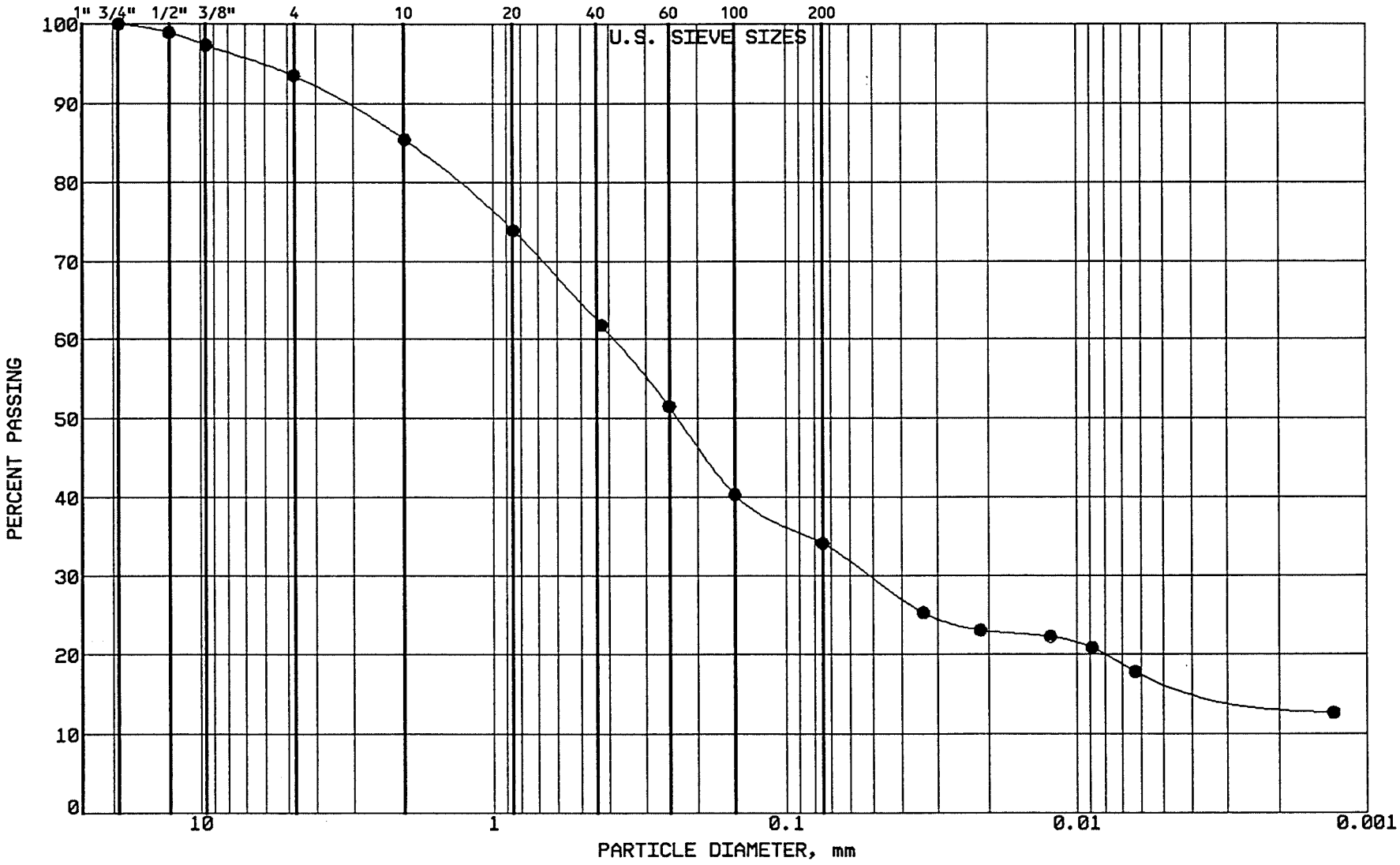
GRAVEL	6.8 %
SAND	71.1 %
SILT	11.3 %
CLAY	10.8 %
P 200	22.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND (SC) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42633.0, E 44991.0
SAMPLE: SGCC542 TUBE #:
ELEVATION: 1880.9'

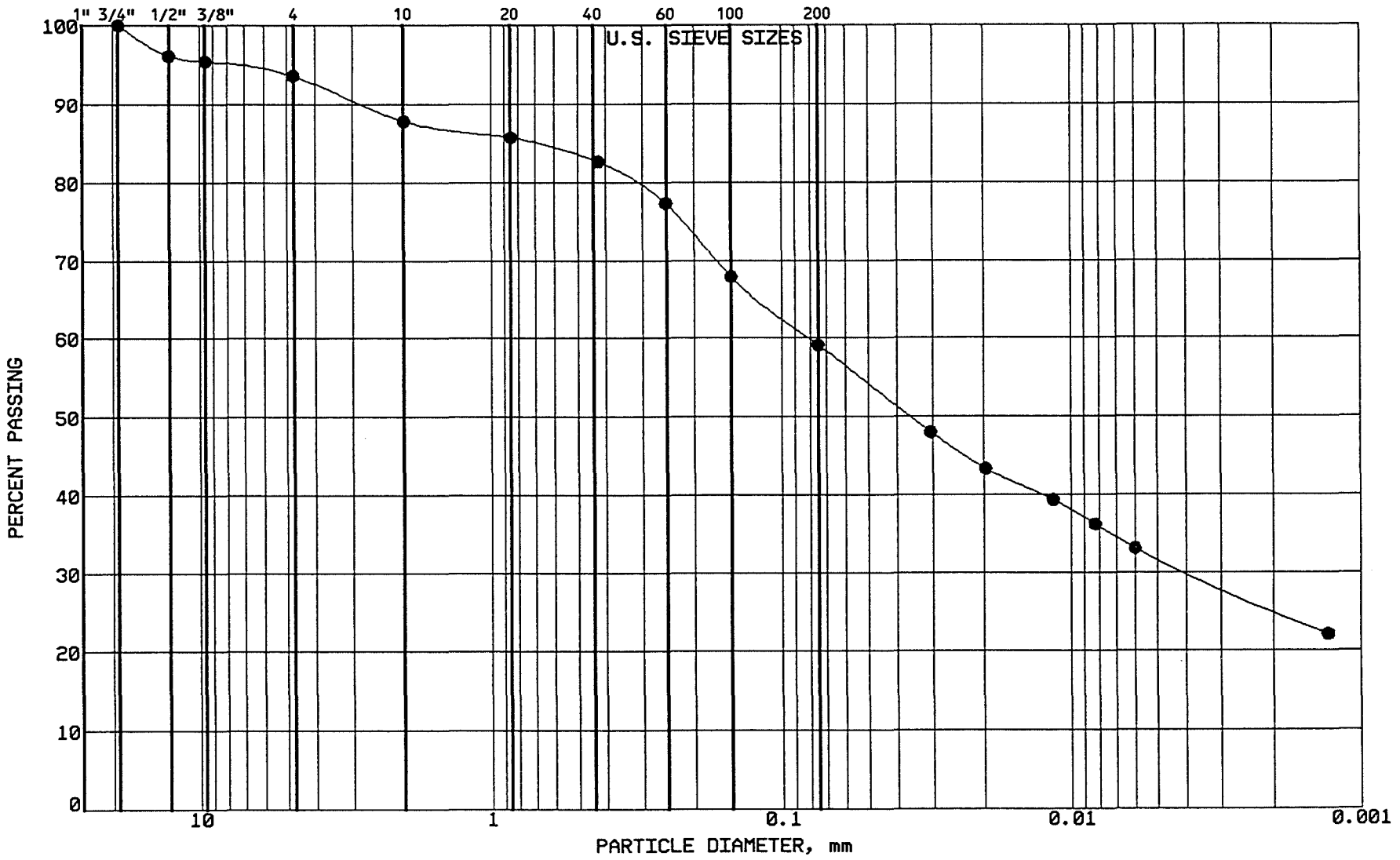
GRAVEL	6.5 %
SAND	59.4 %
SILT	17.0 %
CLAY	17.1 %
P 200	34.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND (SC) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42672.0, E 44343.0
SAMPLE: CLBCC543 TUBE #: ST-146R
ELEVATION: 1884.9'

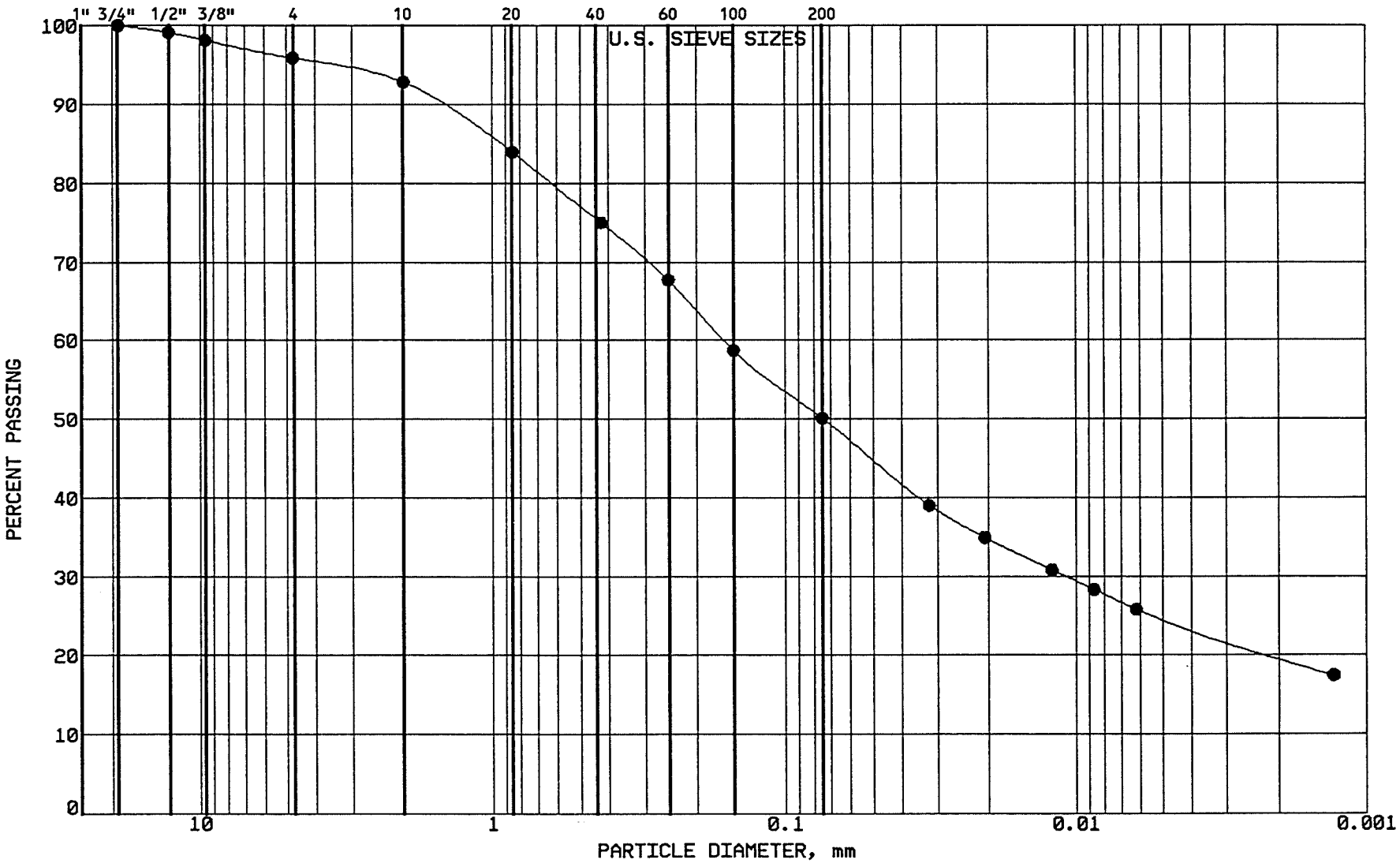
GRAVEL	6.4 %
SAND	34.5 %
SILT	27.3 %
CLAY	31.8 %
P 200	59.1 %

SOIL PROPERTIES

LL: 44.0%
PL: 17.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42643.0, E 45037.0
SAMPLE: SGCC544 TUBE #:
ELEVATION: 1881.0'

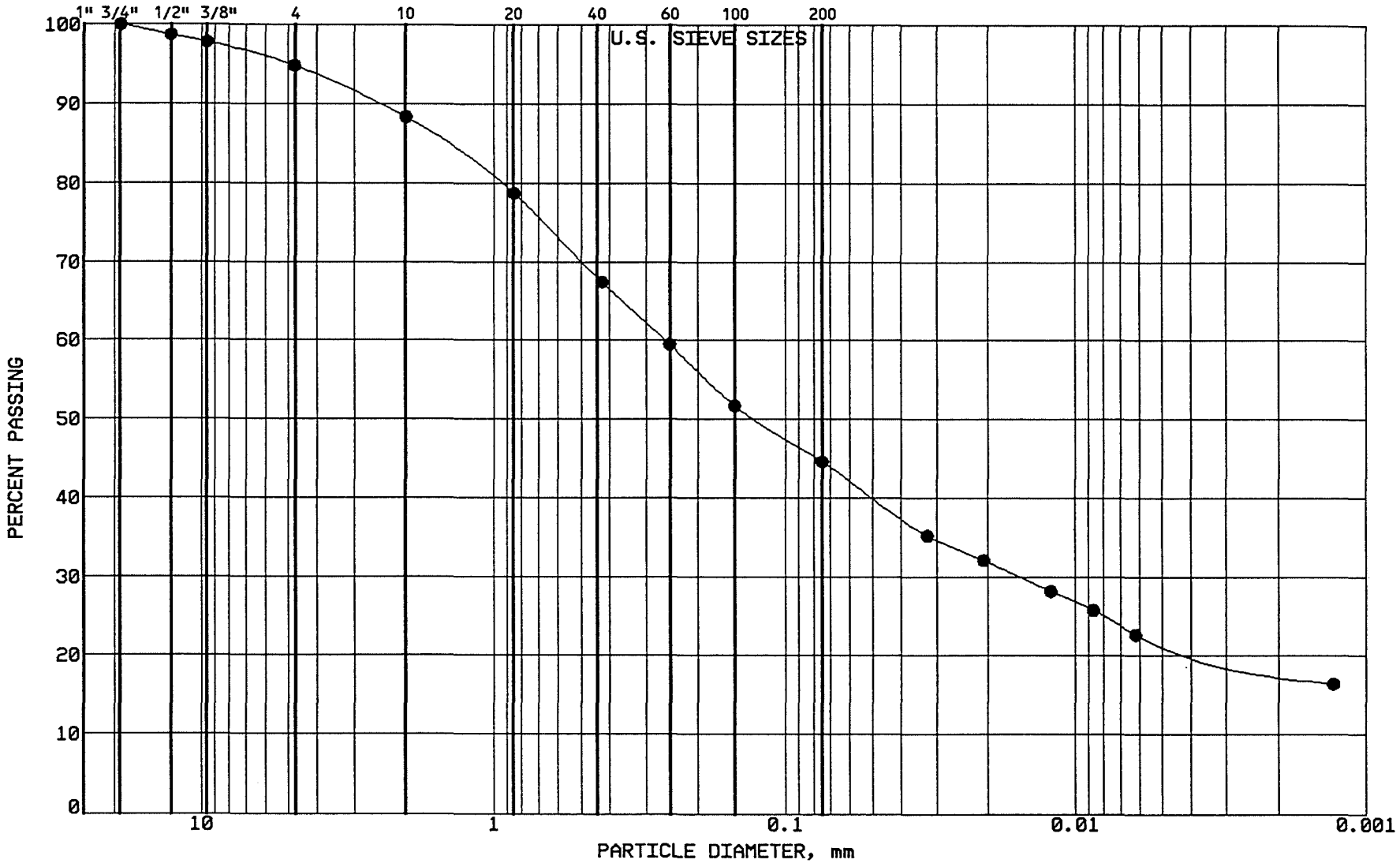
GRAVEL	4.1 %
SAND	45.8 %
SILT	25.4 %
CLAY	24.7 %
P 200	50.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND (SC) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42861.0, E 45055.0
SAMPLE: SGCC545 TUBE #:
ELEVATION: 1882.1'

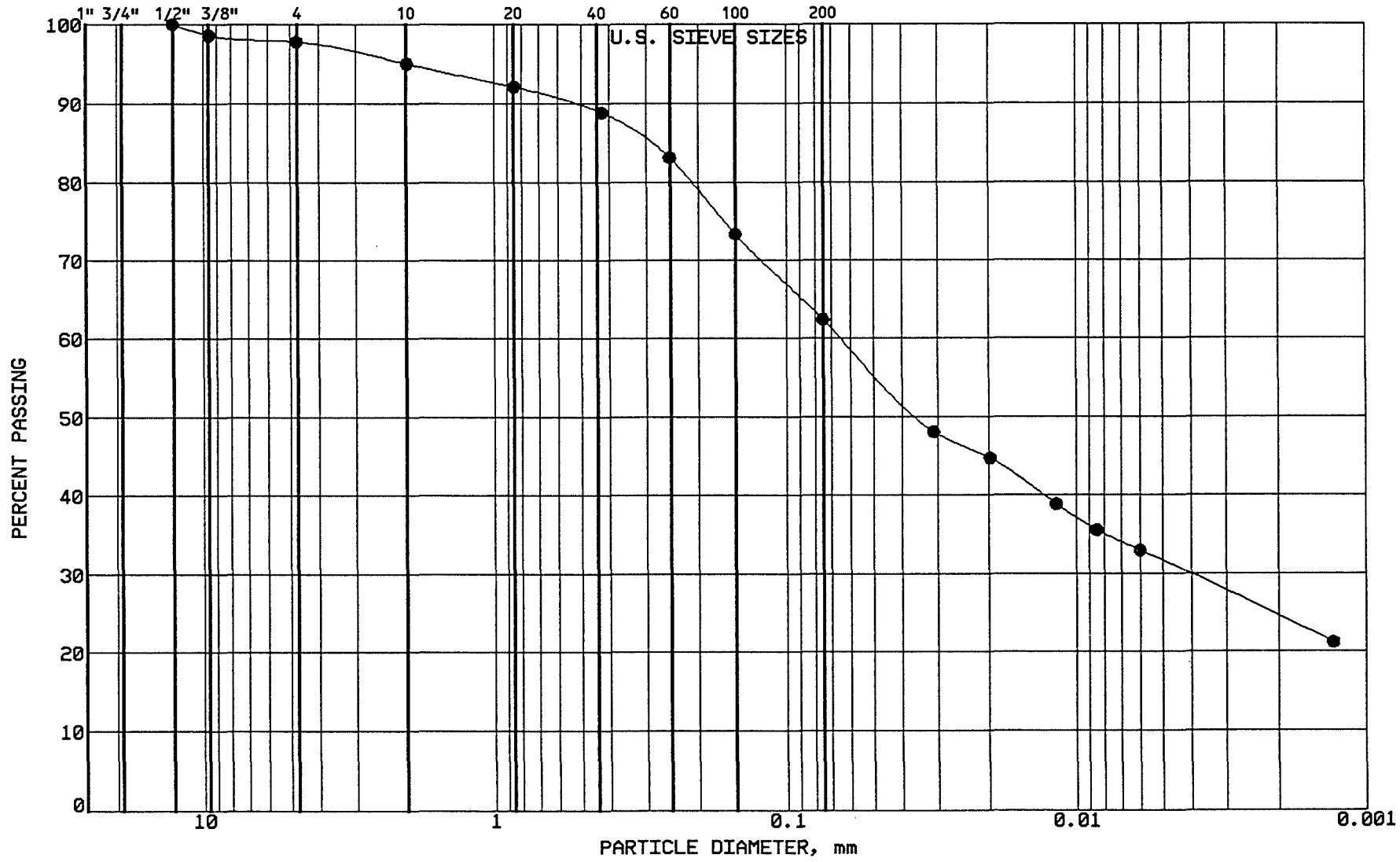
GRAVEL	5.2 %
SAND	50.2 %
SILT	22.8 %
CLAY	21.8 %
P 200	44.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CLAYEY SAND (SC) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43062.0, E 45072.0
SAMPLE: SGCC546 TUBE #:
ELEVATION: 1883.3'

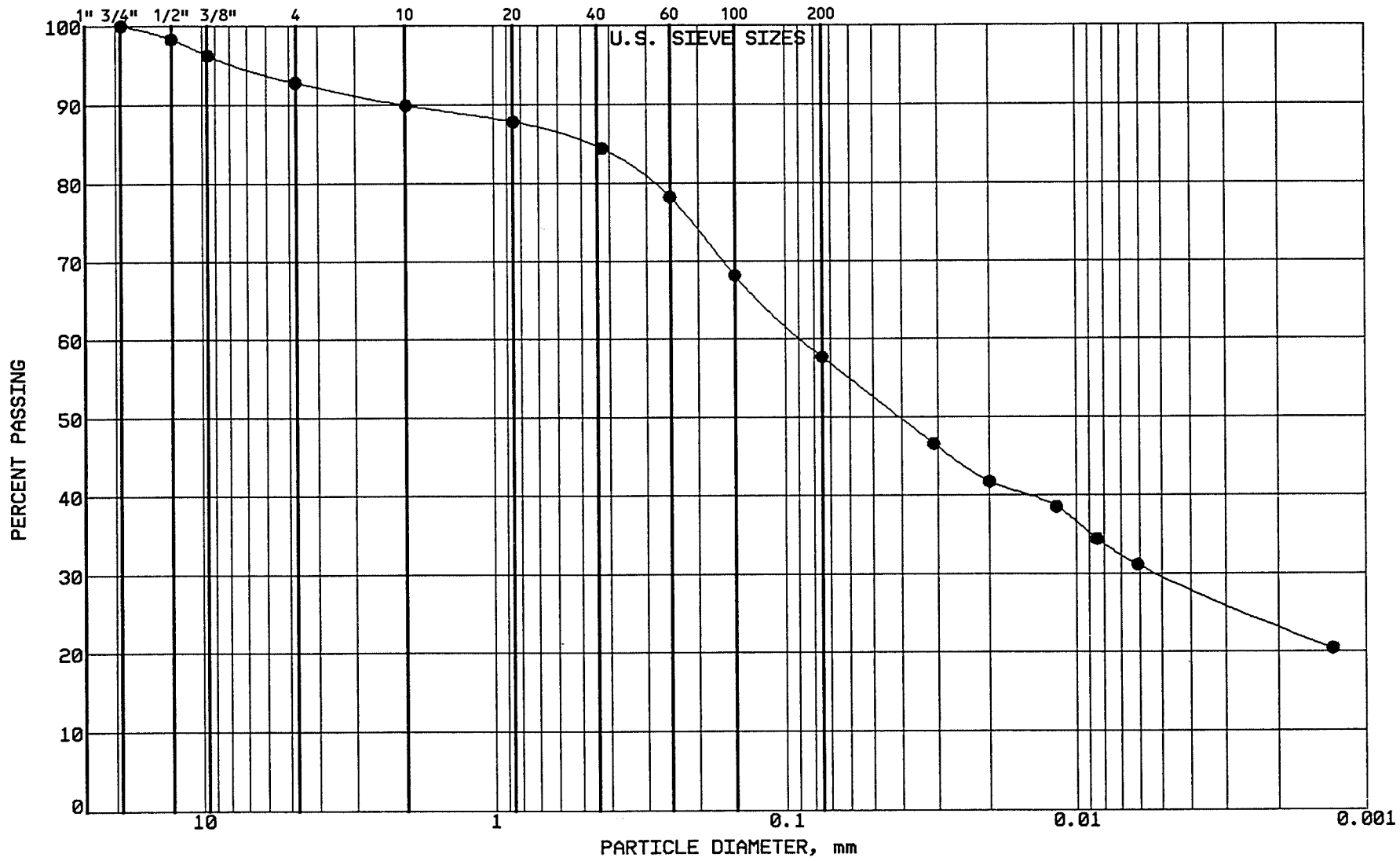
GRAVEL	2.2 %
SAND	35.4 %
SILT	30.9 %
CLAY	31.5 %
P 200	62.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43235.0, E 45092.0
SAMPLE: SGCC547 TUBE #:
ELEVATION: 1884.7'

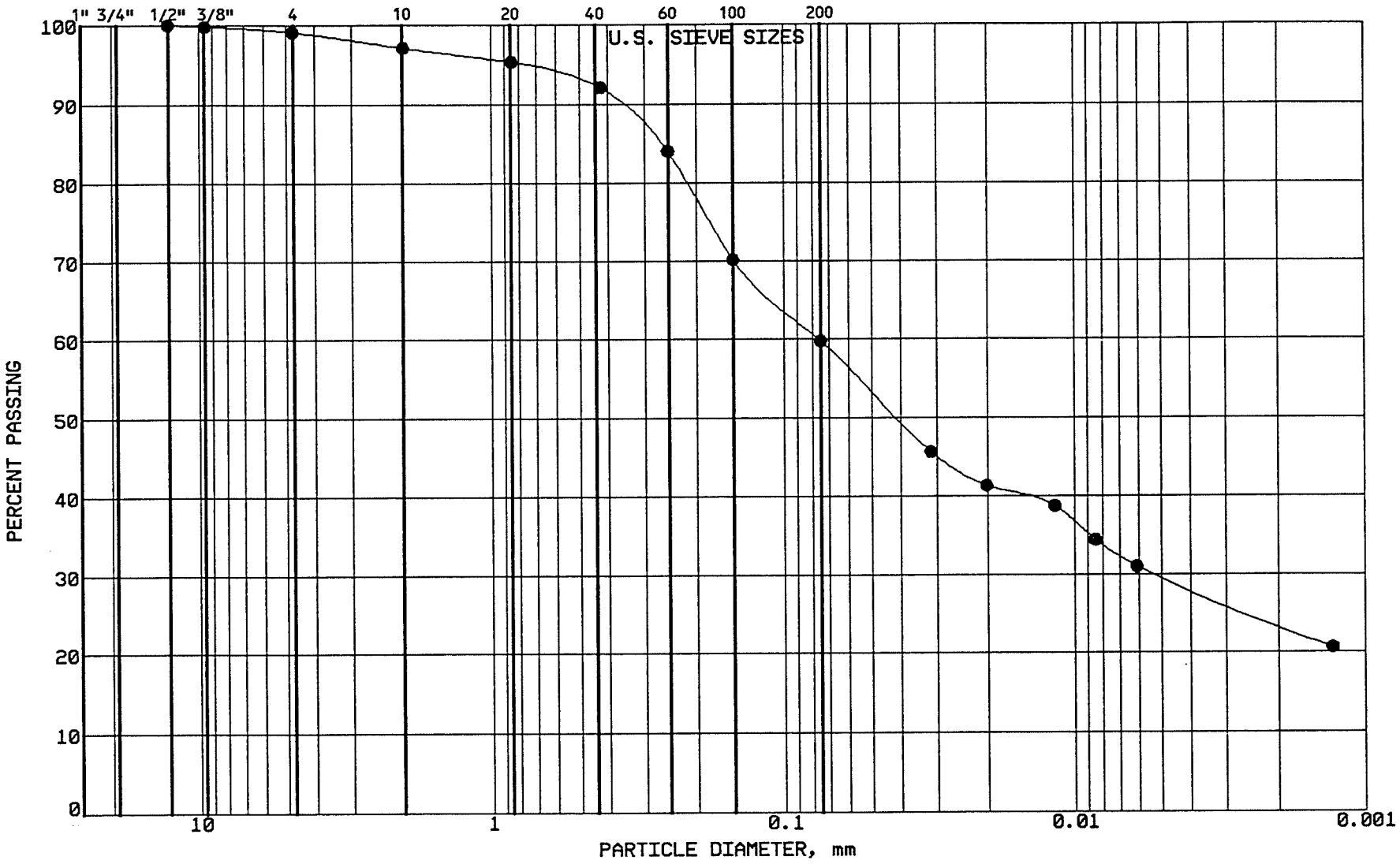
GRAVEL	7.2 %
SAND	35.1 %
SILT	28.0 %
CLAY	29.7 %
P 200	57.7 %

SOIL PROPERTIES

LL: 40.0%
PL: 15.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43392.0, E 45113.0
SAMPLE: SGCC548 TUBE #:
ELEVATION: 1885.8'

GRAVEL	0.9 %
SAND	39.3 %
SILT	30.1 %
CLAY	29.7 %
P 200	59.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43373.0, E 44781.0
SAMPLE: CLBCC549 TUBE #: ST-148
ELEVATION: 1887.5'

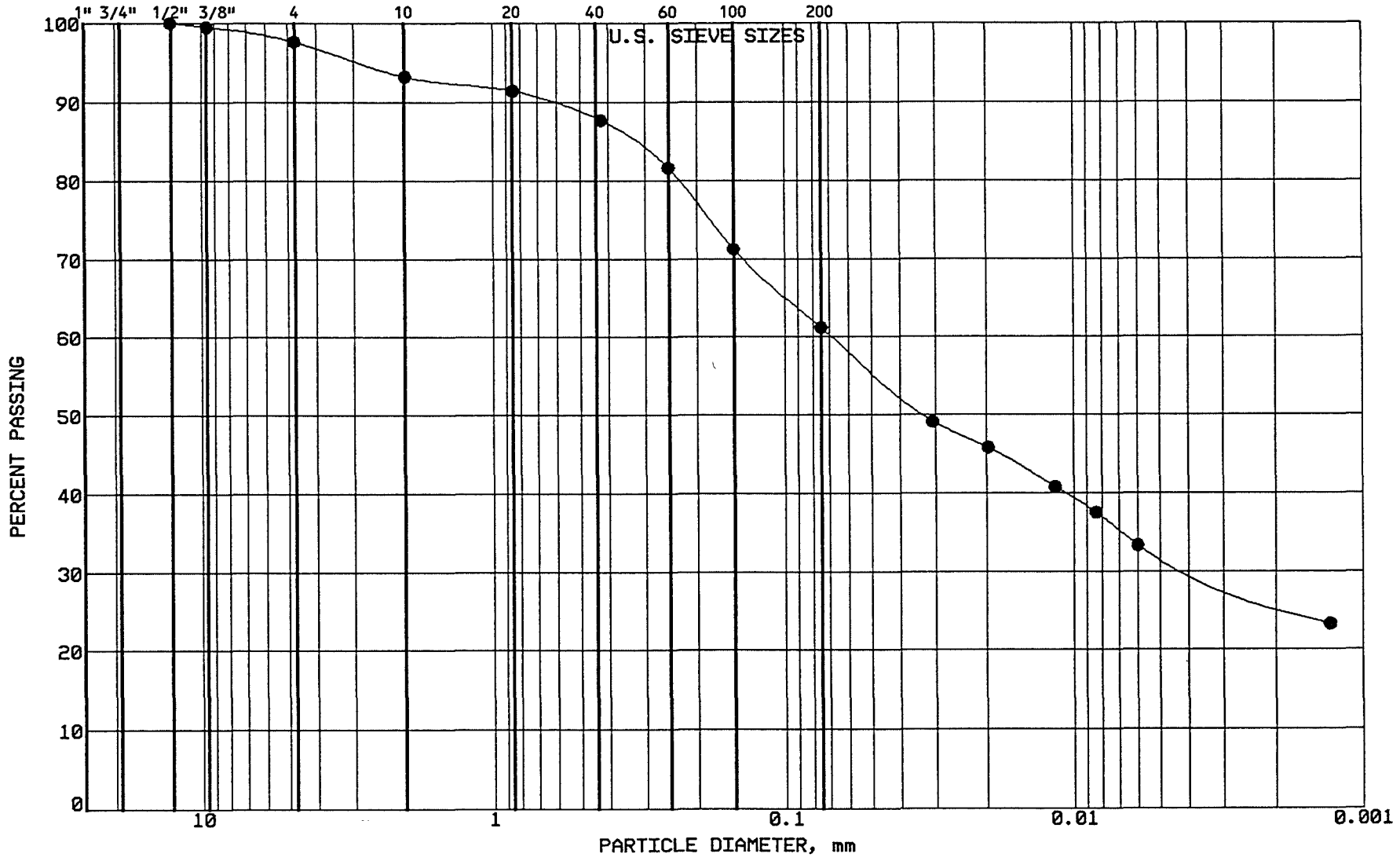
GRAVEL	1.2 %
SAND	38.8 %
SILT	29.3 %
CLAY	30.7 %
P 200	60.0 %

SOIL PROPERTIES

LL: 44.0%
PL: 16.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43204.0, E 44756.0
SAMPLE: CLBCC550 TUBE #:ST-149
ELEVATION: 1886.5'

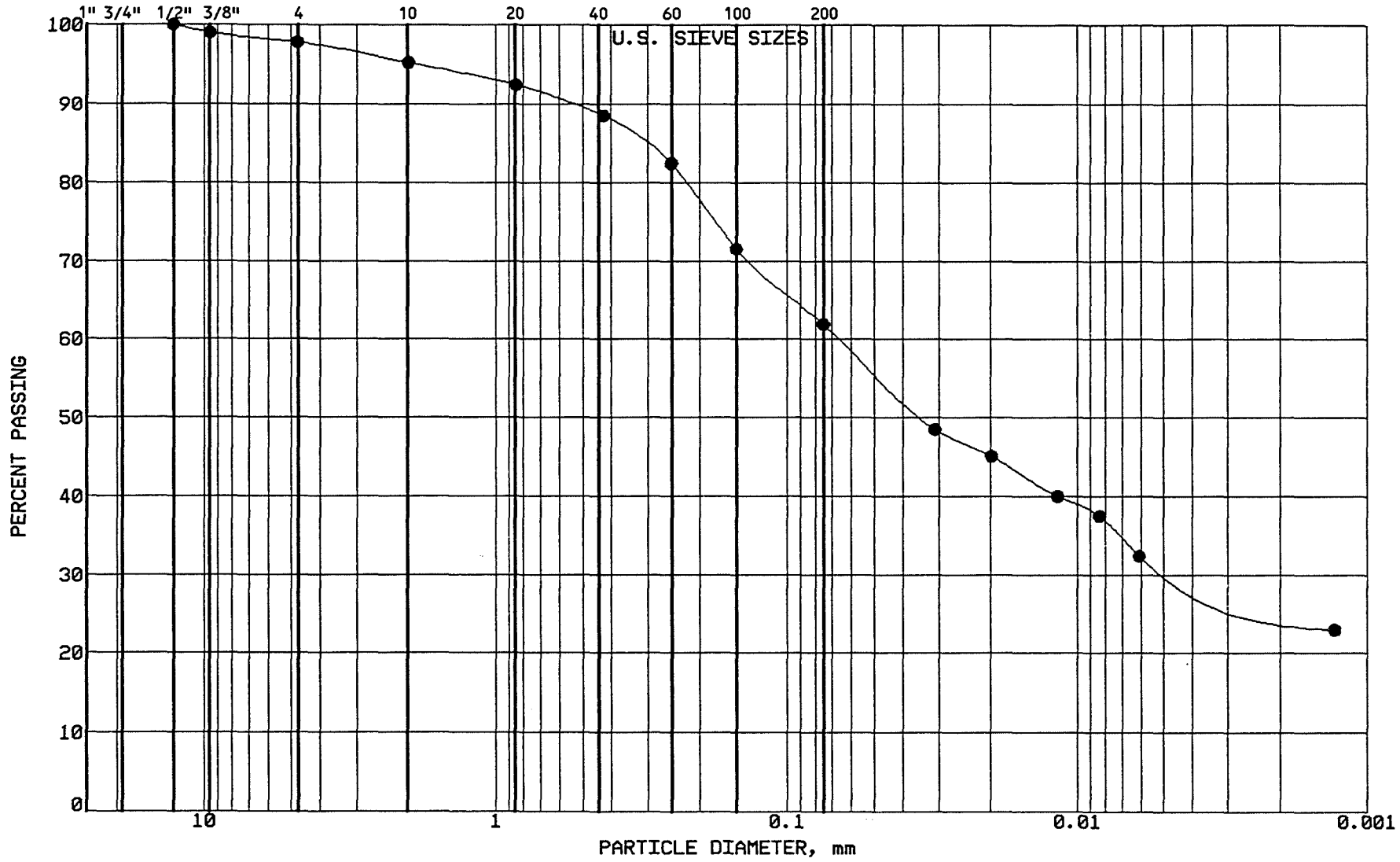
GRAVEL	2.4 %
SAND	36.4 %
SILT	29.1 %
CLAY	32.1 %
P 200	61.2 %

SOIL PROPERTIES

LL: 42.0%
PL: 16.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

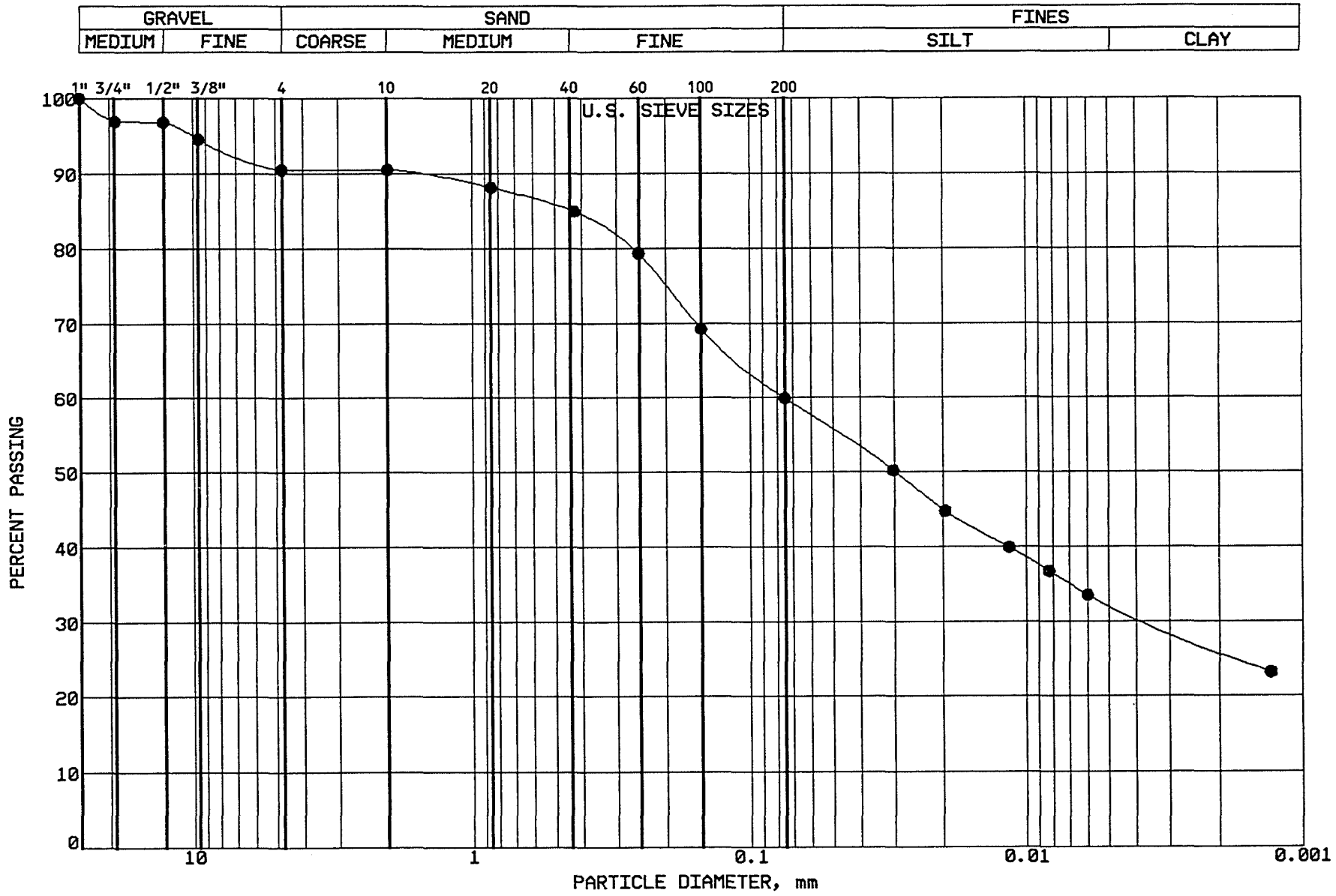
LOCATION: N 43067.0, E 44738.0
SAMPLE: CLBCC551 TUBE #: ST-150
ELEVATION: 1885.9'

GRAVEL	2.2 %
SAND	35.9 %
SILT	30.7 %
CLAY	31.2 %
P 200	61.9 %

SOIL PROPERTIES

LL: 44.0%
PL: 17.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42916.0, E 44728.0
SAMPLE: CLBCC552 TUBE #: ST-151
ELEVATION: 1884.8'

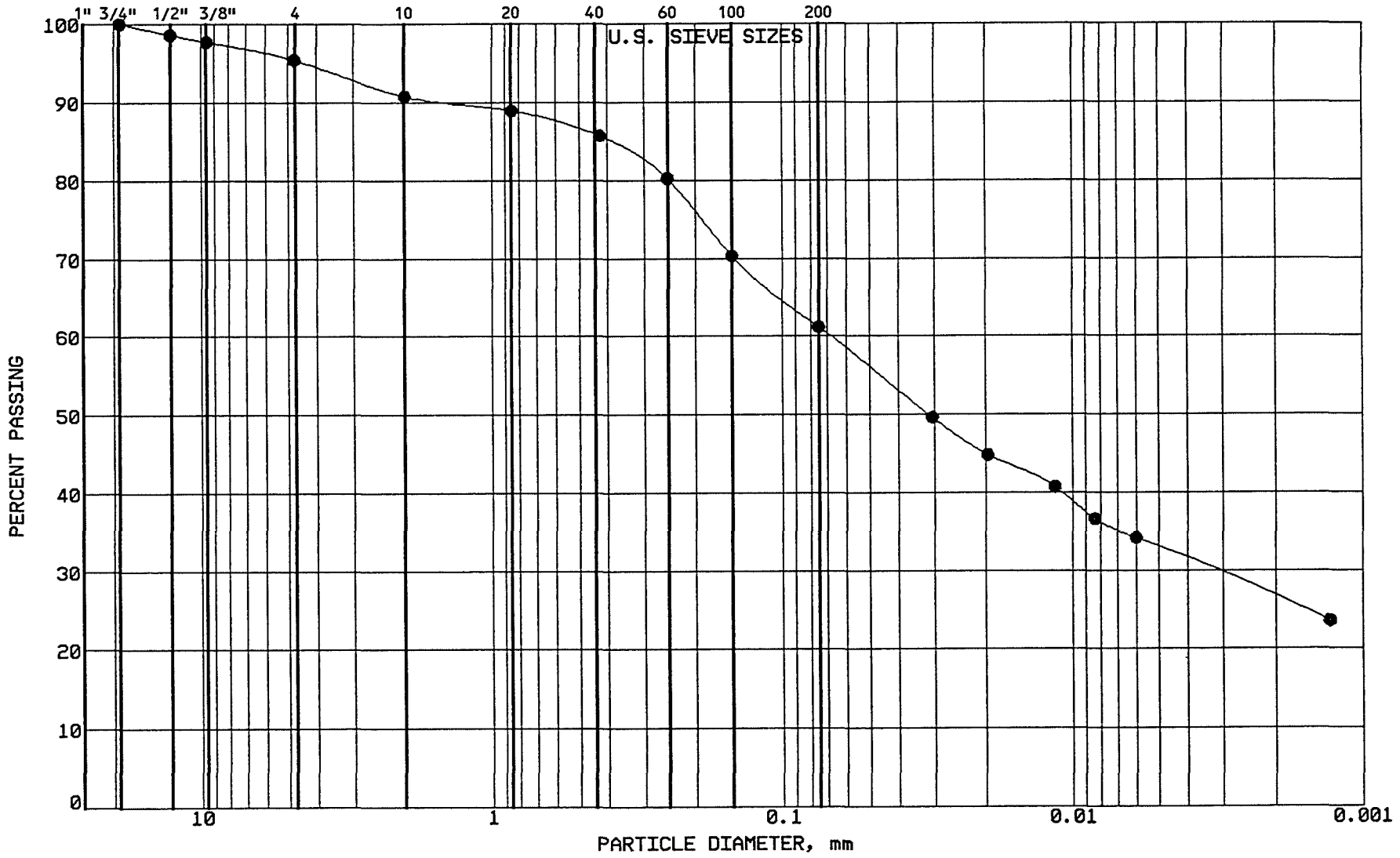
GRAVEL	9.5 %
SAND	30.6 %
SILT	27.6 %
CLAY	32.3 %
P 200	59.9 %

SOIL PROPERTIES

LL: 44.0%
PL: 16.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42763.0, E 44720.0
SAMPLE: CLBCC553 TUBE #: ST-152
ELEVATION: 1883.5'

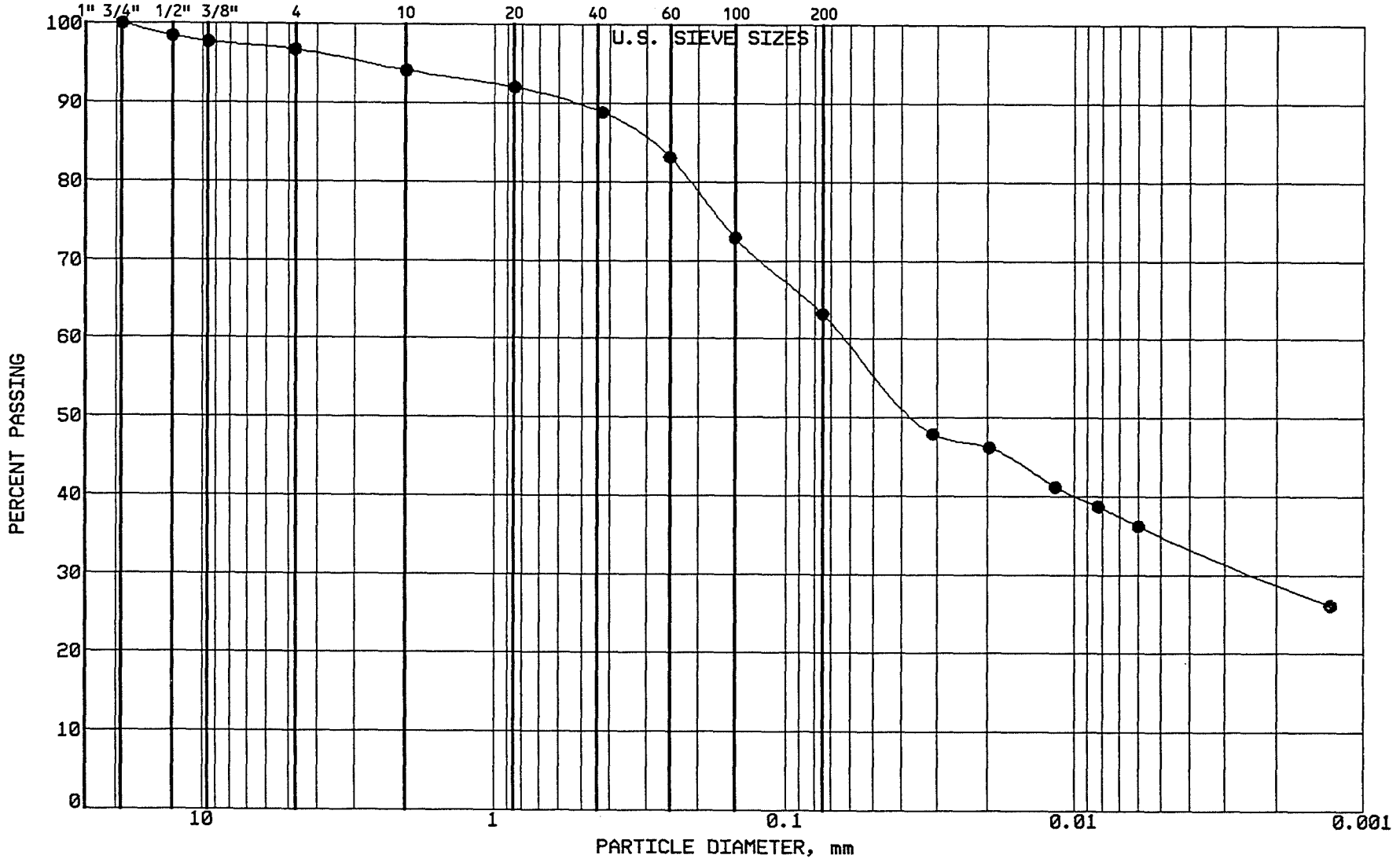
GRAVEL	4.6 %
SAND	34.2 %
SILT	28.3 %
CLAY	32.9 %
P 200	61.2 %

SOIL PROPERTIES

LL: 44.0%
PL: 16.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43397.0, E 45067.0
SAMPLE: SGCC554 TUBE #:
ELEVATION: 1886.4'

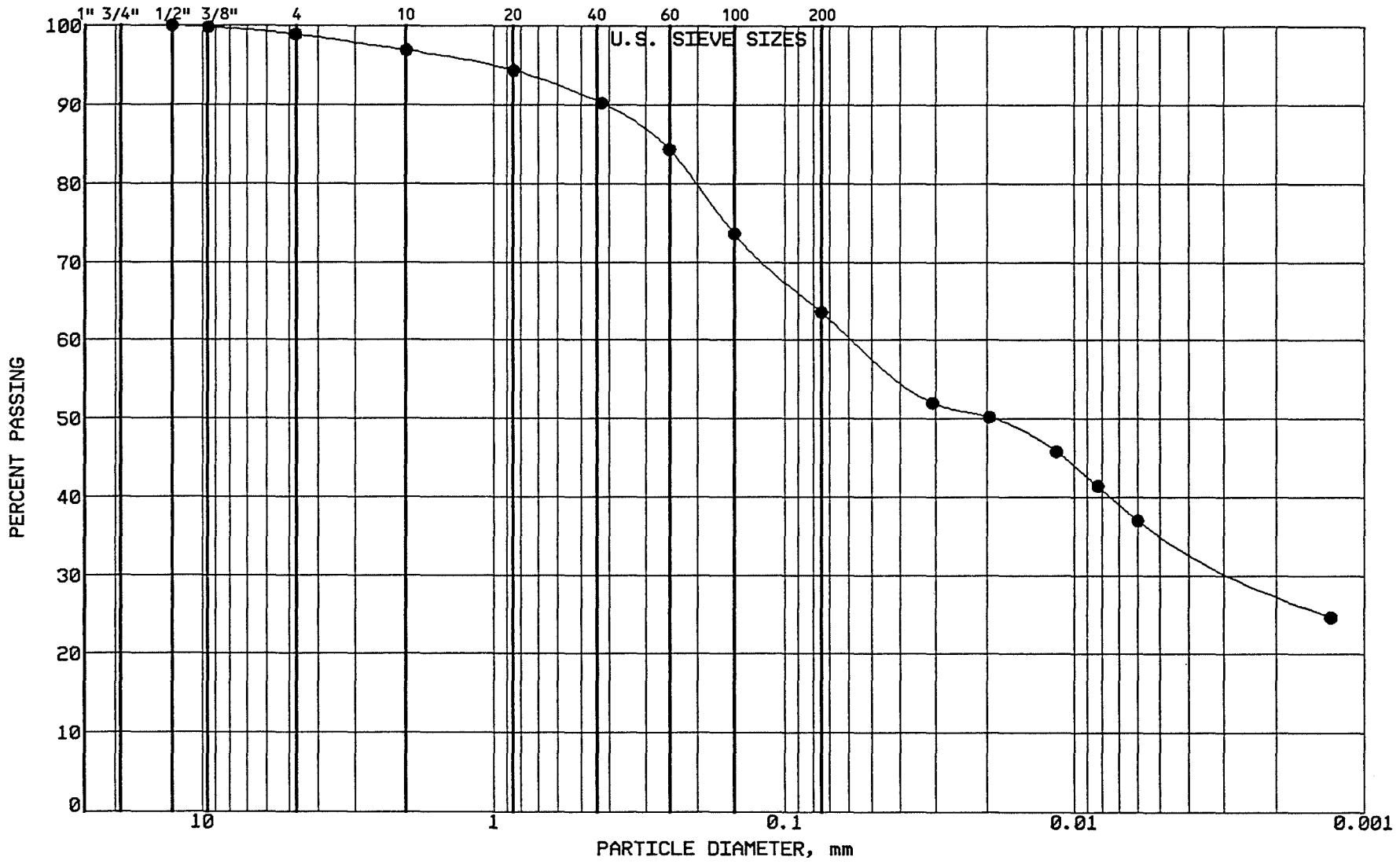
GRAVEL	3.3 %
SAND	33.5 %
SILT	28.2 %
CLAY	35.0 %
P 200	63.2 %

SOIL PROPERTIES

LL: 43.0%
PL: 16.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43218.0, E 45048.0
SAMPLE: SGCC555 TUBE #:
ELEVATION: 1885.4'

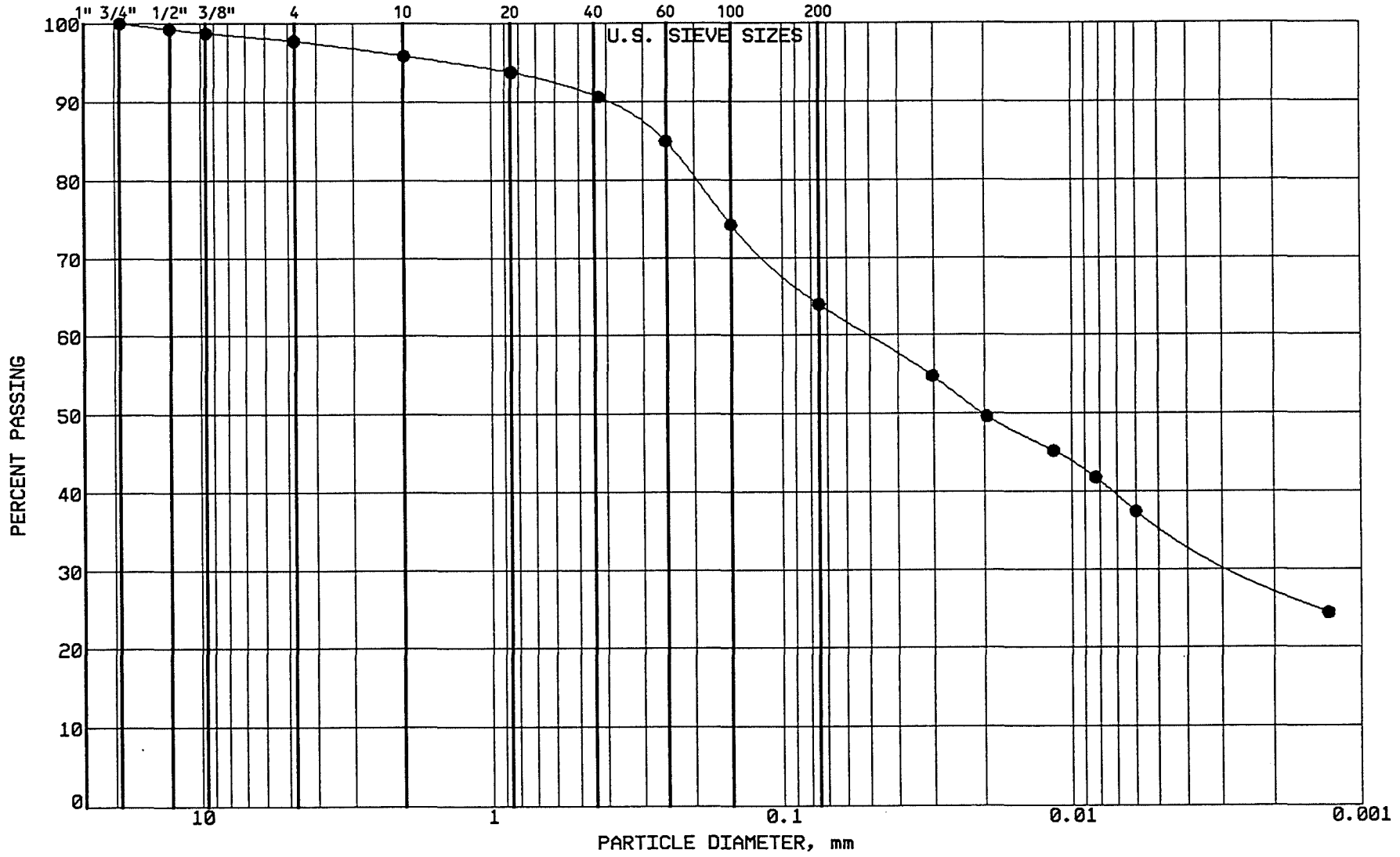
GRAVEL	1.1 %
SAND	35.4 %
SILT	28.0 %
CLAY	35.5 %
P 200	63.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

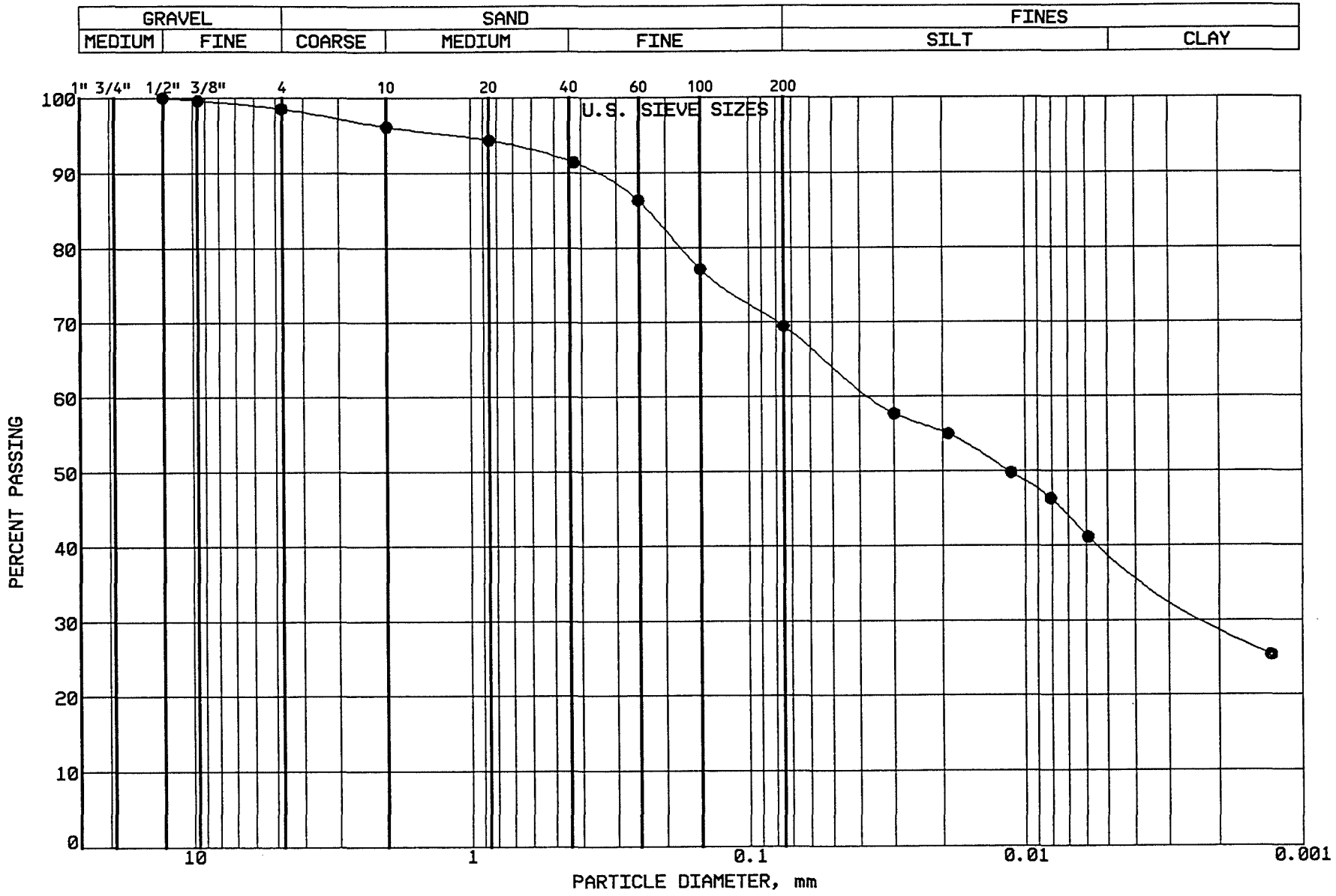
LOCATION: N 43058.0, E 45301.0
SAMPLE: SGCC556 TUBE #:
ELEVATION: 1884.6'

GRAVEL	2.3 %
SAND	33.8 %
SILT	28.0 %
CLAY	35.9 %
P 200	63.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

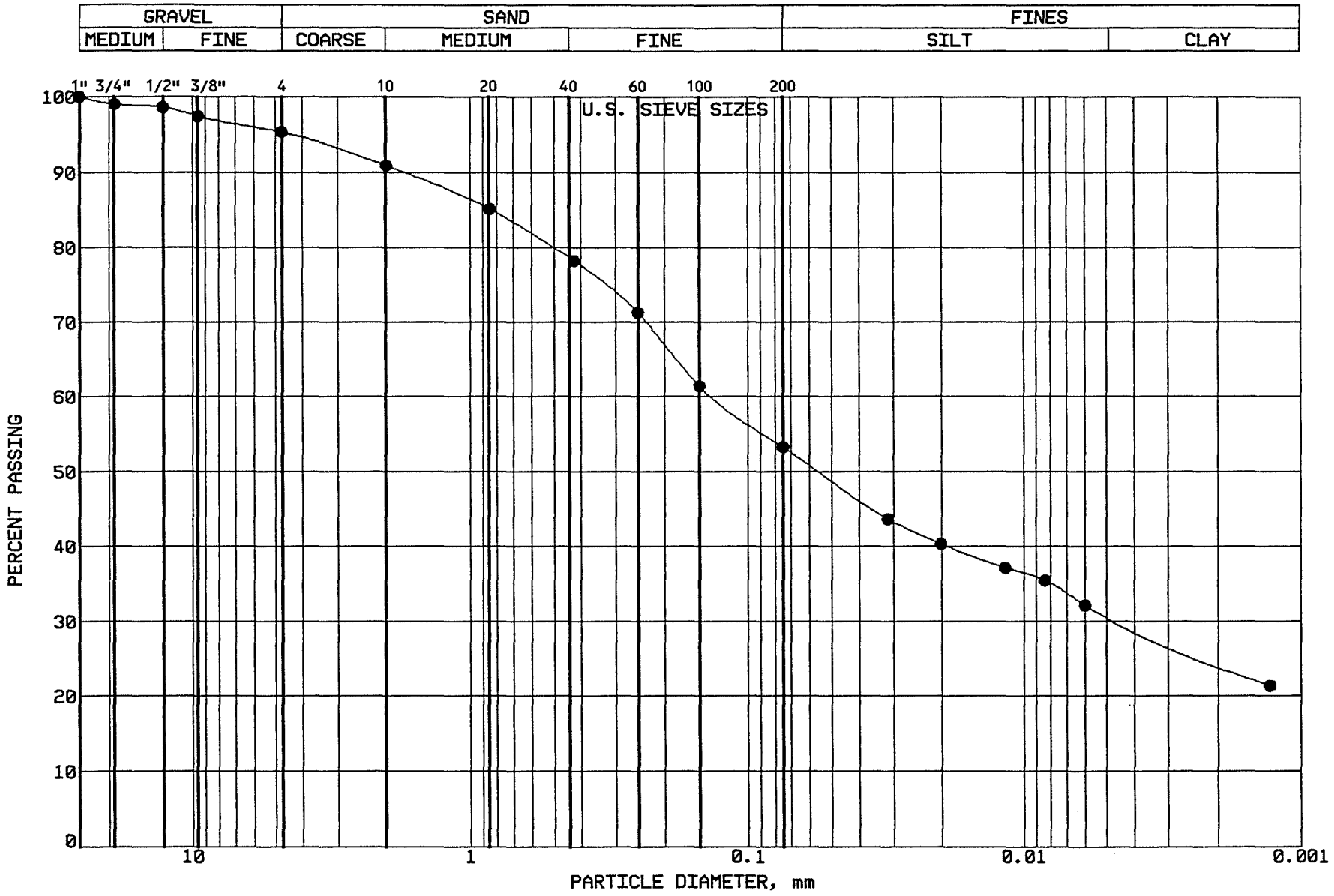
LOCATION: N 42878.0, E 45017.0
SAMPLE: SGCC557 TUBE #:
ELEVATION: 1883.4'

GRAVEL	1.5 %
SAND	29.1 %
SILT	30.0 %
CLAY	39.4 %
P 200	69.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42643.0, E 45003.0
SAMPLE: SGCC558 TUBE #:
ELEVATION: 1881.5'

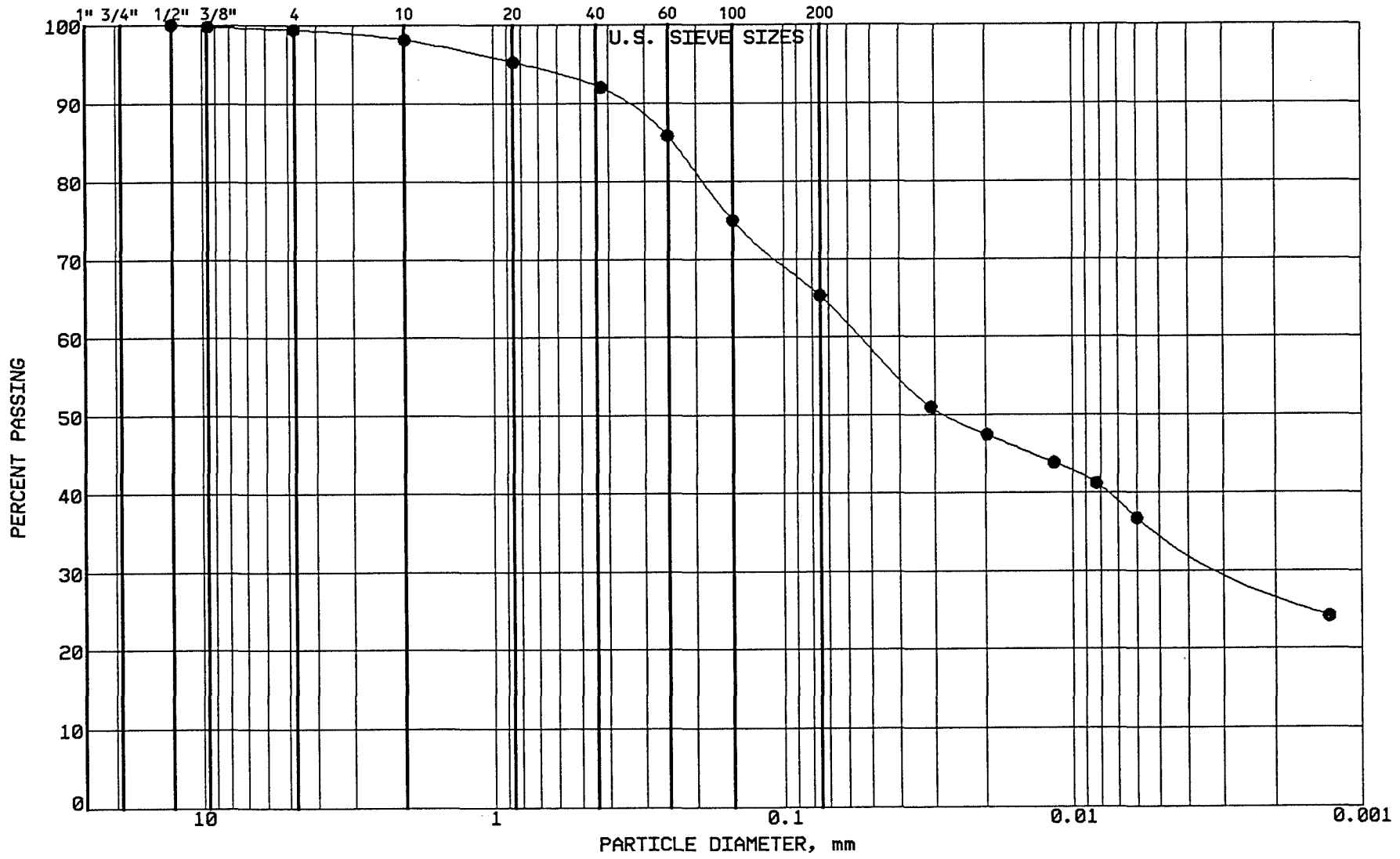
GRAVEL	4.7 %
SAND	42.0 %
SILT	22.5 %
CLAY	30.8 %
P 200	53.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42845.0, E 45864.0
SAMPLE: SGCC559 TUBE #:
ELEVATION: 1882.8'

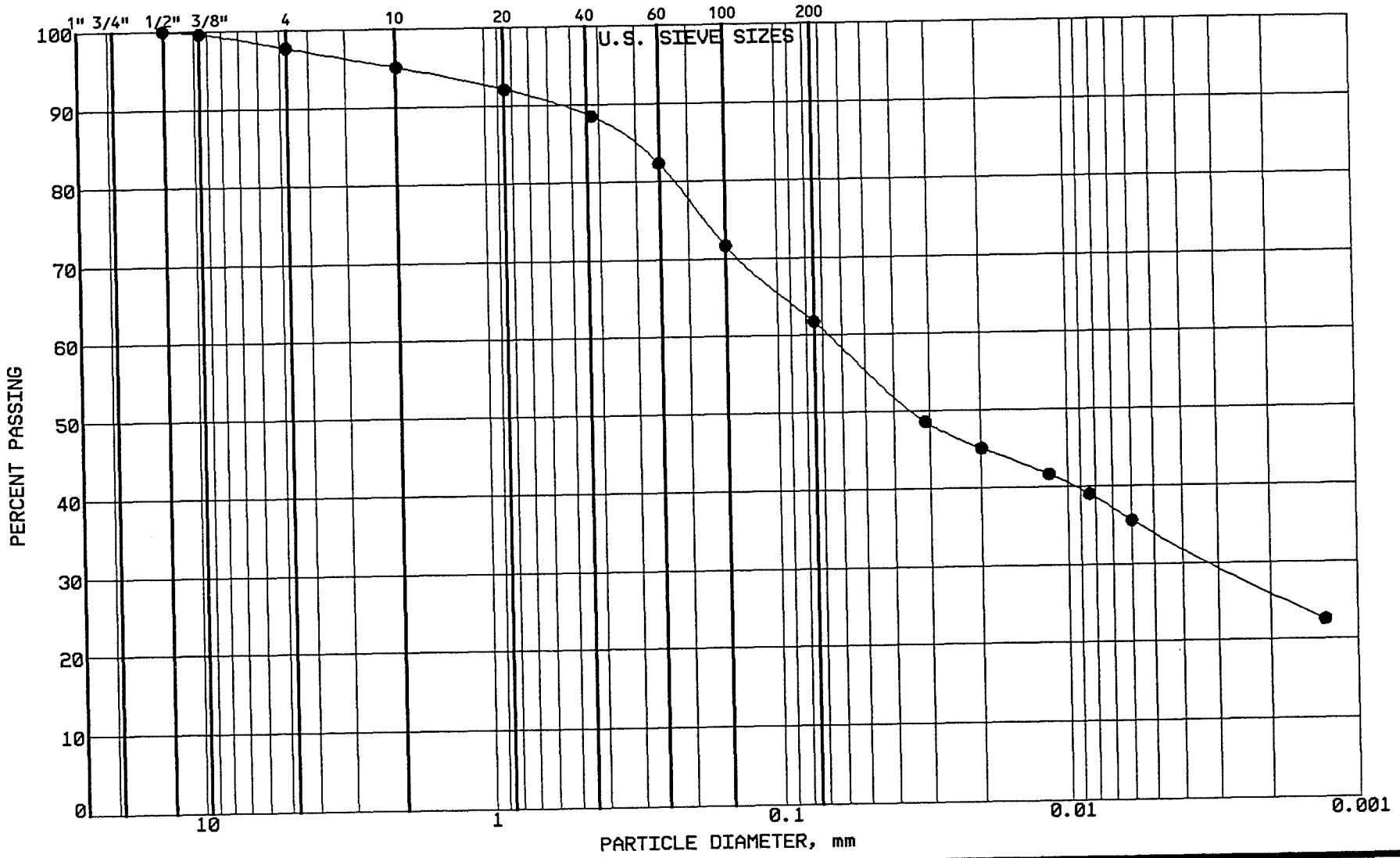
GRAVEL	0.6 %
SAND	34.1 %
SILT	30.1 %
CLAY	35.2 %
P 200	65.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42656.0, E 43798.0
SAMPLE: SGCC560 TUBE #:
ELEVATION: 1881.5'

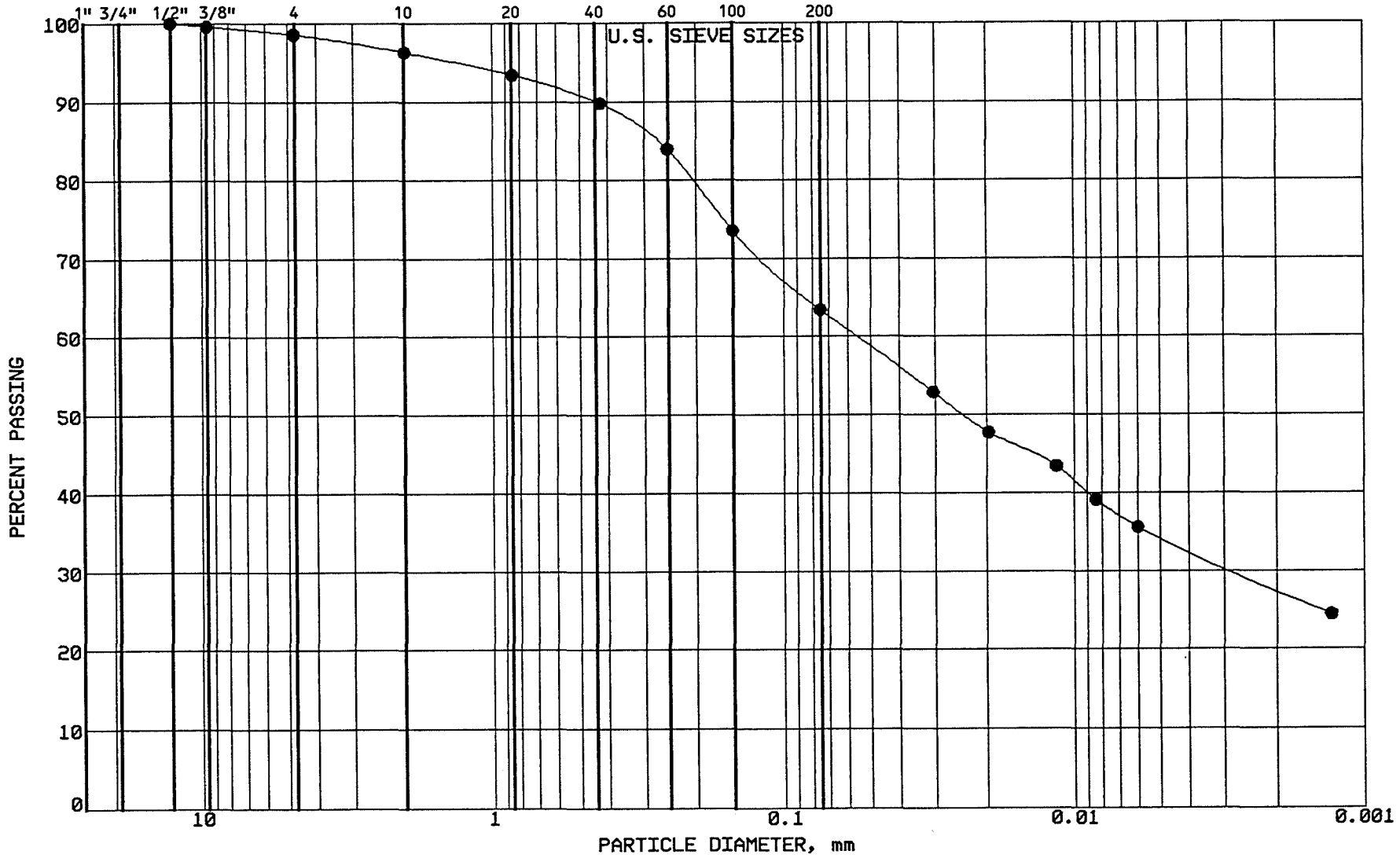
GRAVEL	2.3 %
SAND	36.0 %
SILT	27.6 %
CLAY	34.1 %
P 200	61.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

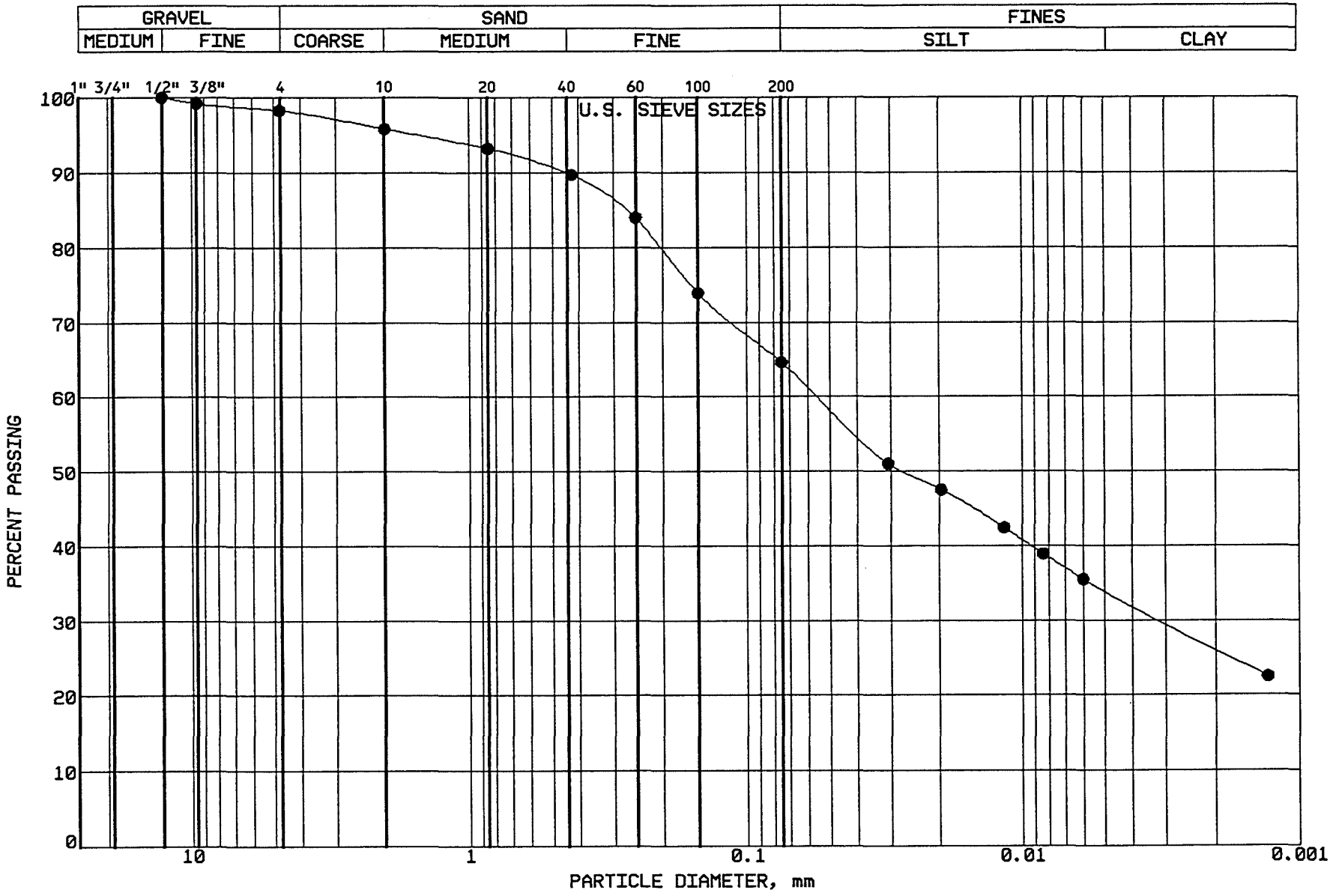
LOCATION: N 42729.0, E 45733.0
SAMPLE: SGCC561 TUBE #:
ELEVATION: 1880.0'

GRAVEL	1.4 %
SAND	35.2 %
SILT	29.1 %
CLAY	34.3 %
P 200	63.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

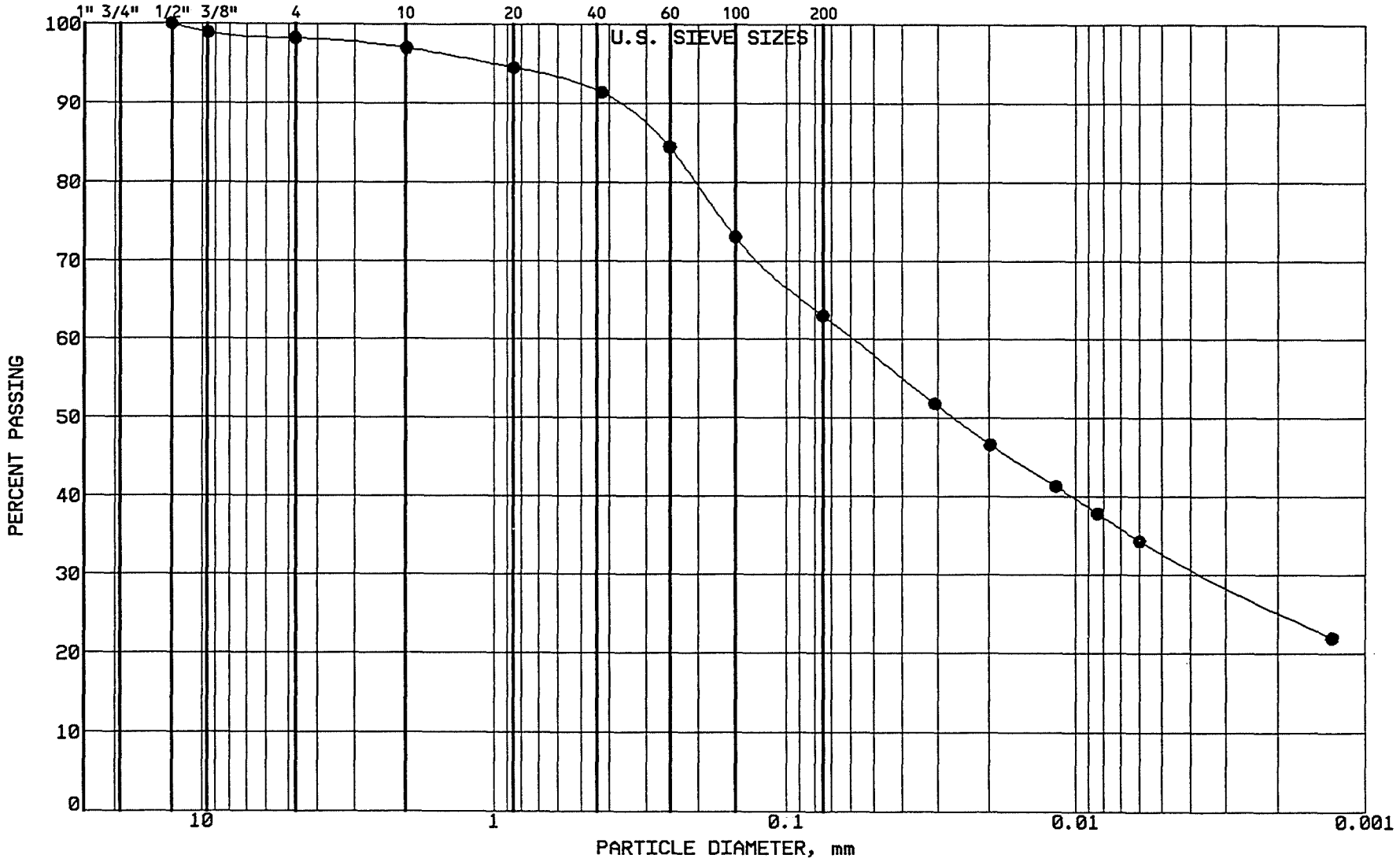
LOCATION: N 42650.0, E 45638.0
SAMPLE: SGCC562 TUBE #:
ELEVATION: 1878.6'

GRAVEL	1.7 %
SAND	33.7 %
SILT	30.6 %
CLAY	34.0 %
P 200	64.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42796.0, E 45580.0
SAMPLE: SGCC563 TUBE #:
ELEVATION: 1879.6'

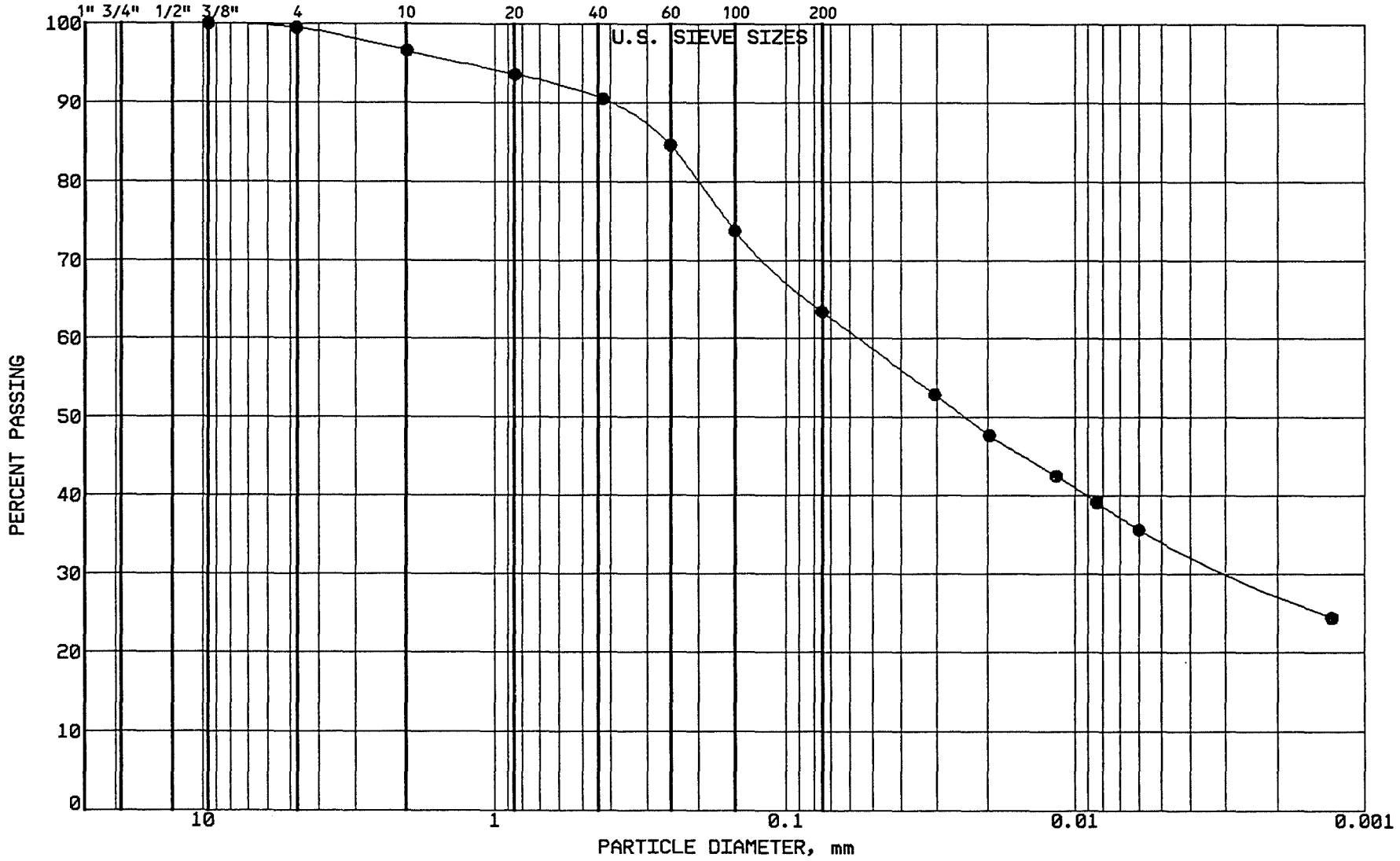
GRAVEL	1.8 %
SAND	35.2 %
SILT	30.2 %
CLAY	32.8 %
P 200	63.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

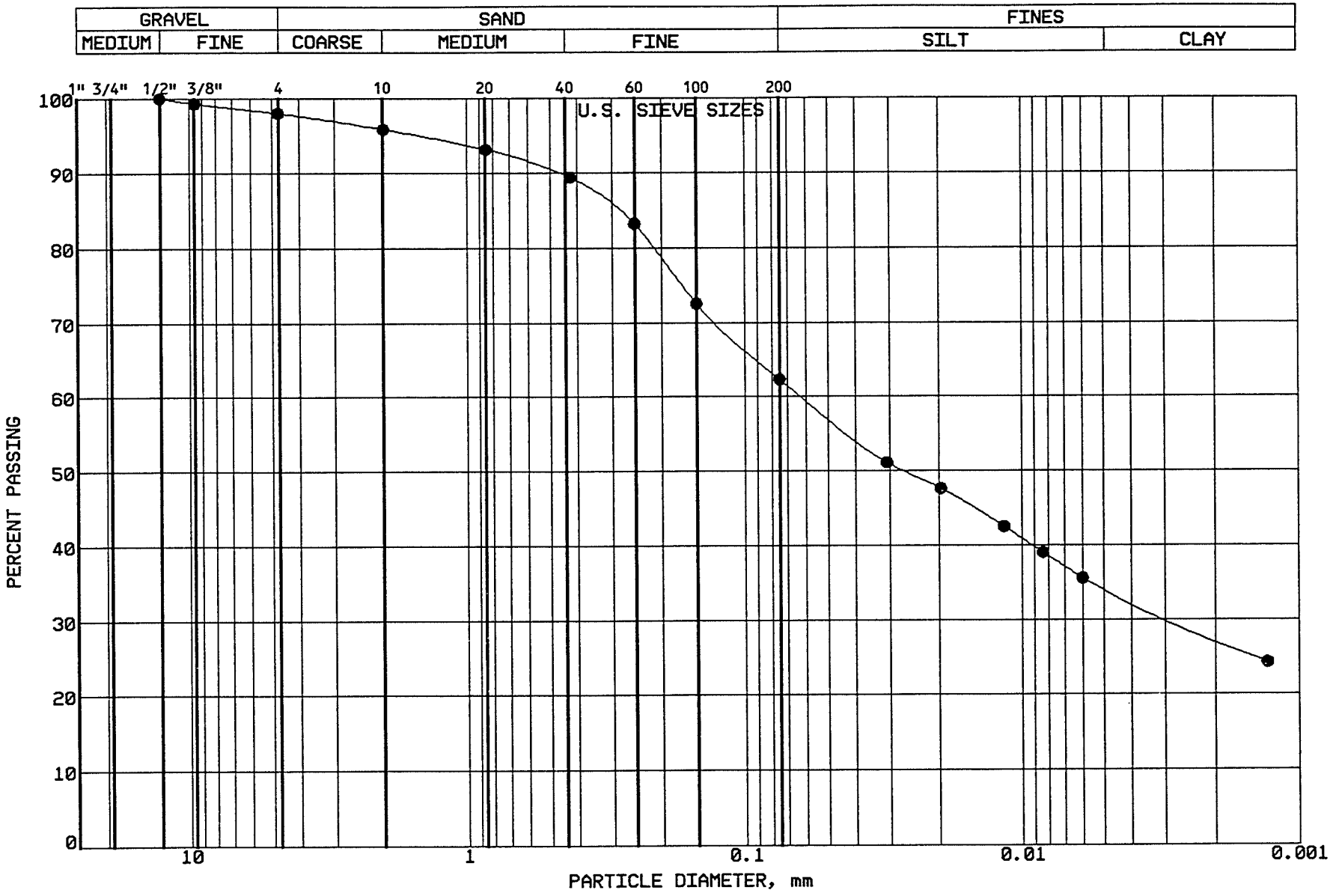
LOCATION: N 42668.0, E 45431.0
SAMPLE: SGCC564 TUBE #:
ELEVATION: 1878.4'

GRAVEL	0.5 %
SAND	36.1 %
SILT	29.1 %
CLAY	34.3 %
P 200	63.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43331.0, E 45354.0
SAMPLE: SGCC565 TUBE #:
ELEVATION: 1884.9'

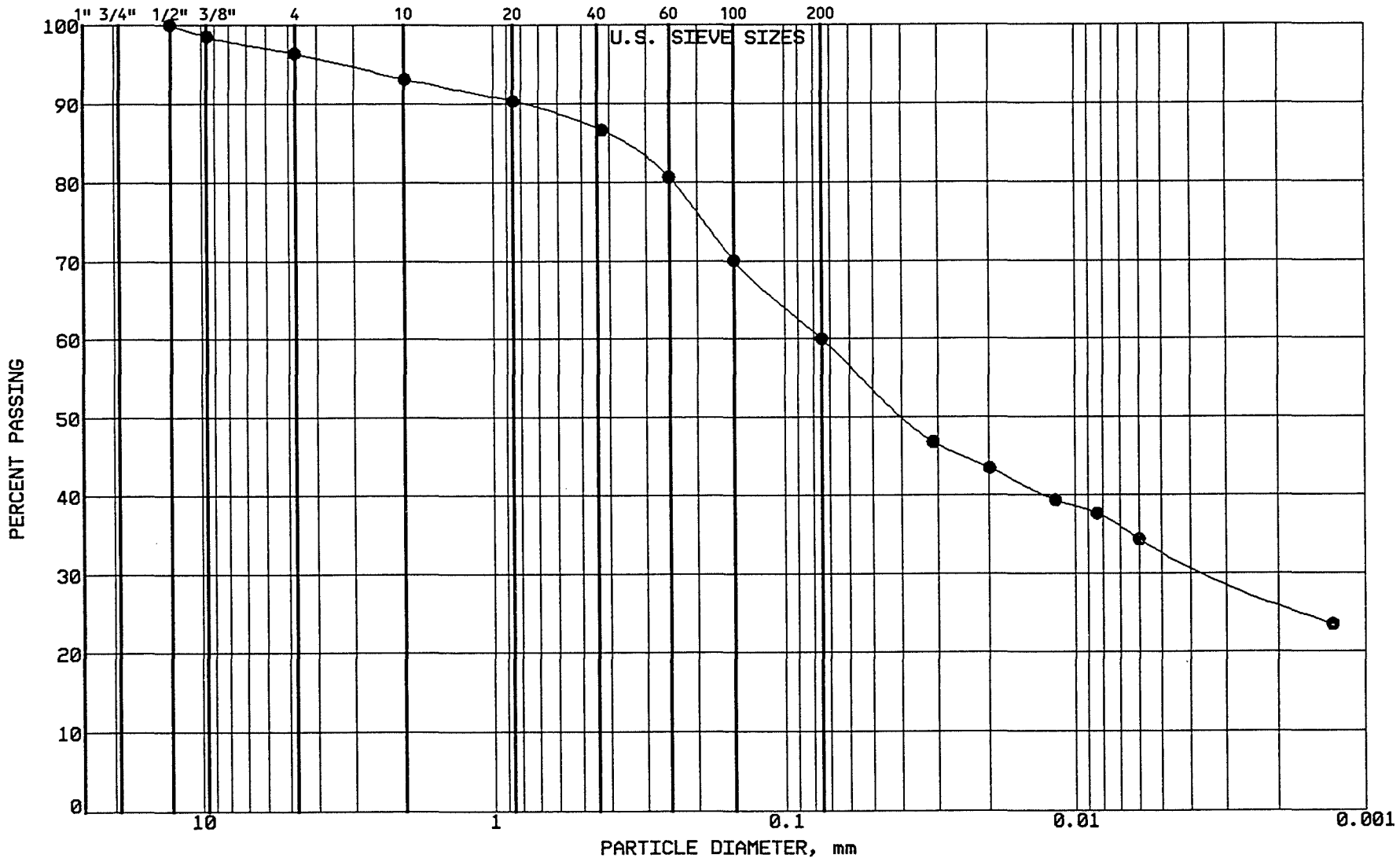
GRAVEL	2.0 %
SAND	35.7 %
SILT	28.1 %
CLAY	34.2 %
P 200	62.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

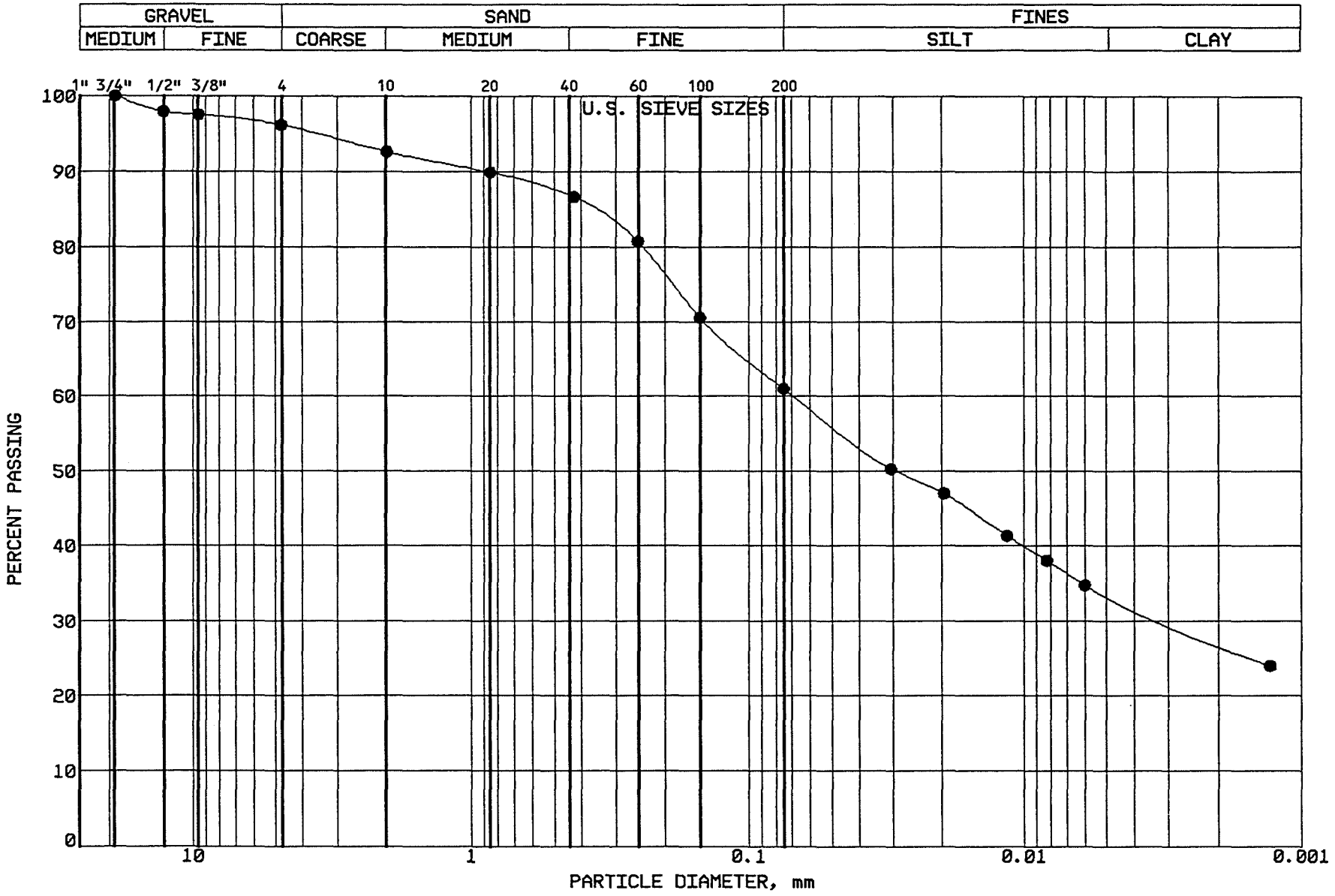
LOCATION: N 43141.0, E 45328.0
SAMPLE: SGCC566 TUBE #:
ELEVATION: 1882.5'

GRAVEL	3.7 %
SAND	36.3 %
SILT	27.0 %
CLAY	33.0 %
P 200	60.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42957.0, E 45302.0
SAMPLE: SGCC567 TUBE #:
ELEVATION: 1879.2'

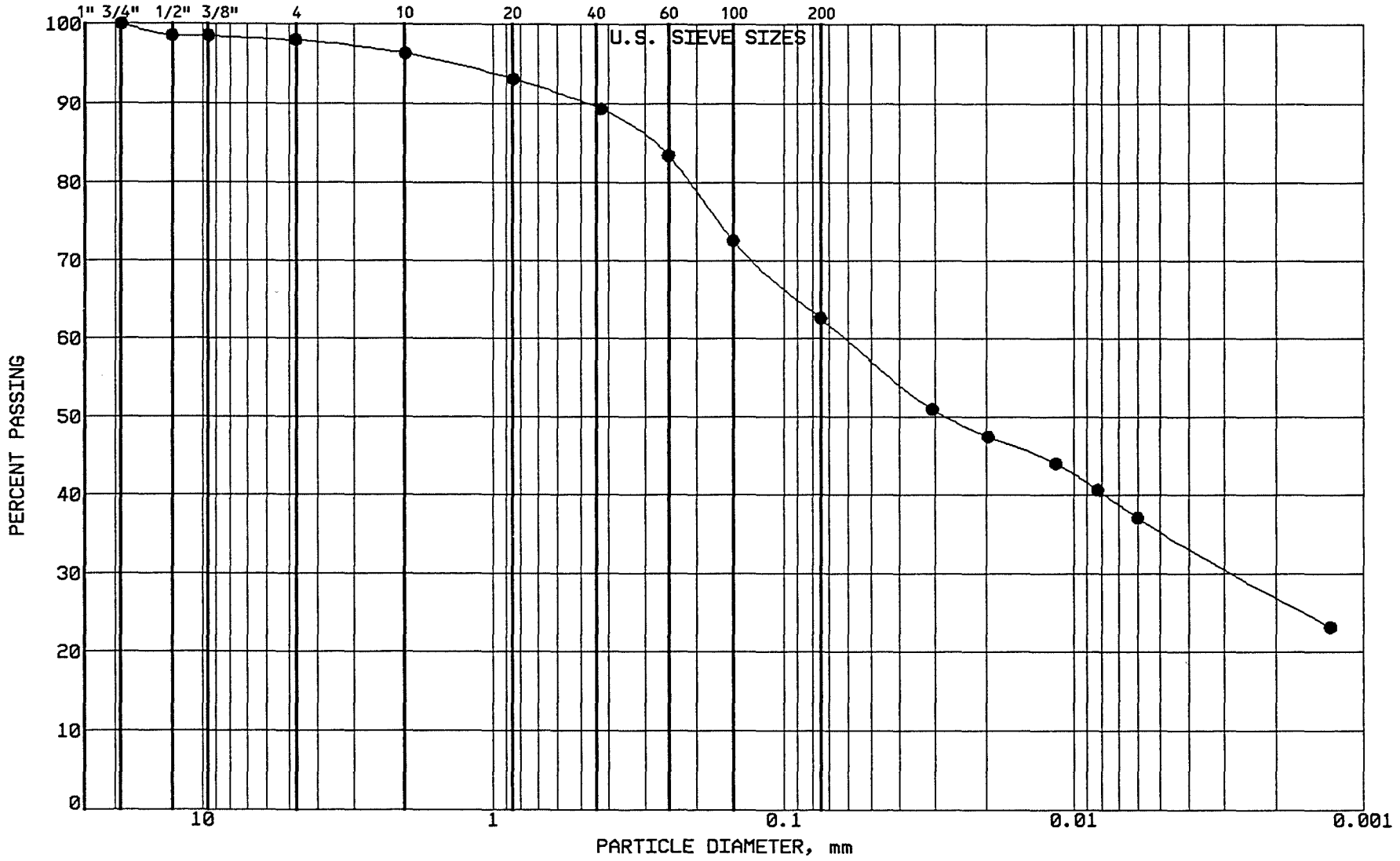
GRAVEL	3.9 %
SAND	35.1 %
SILT	27.6 %
CLAY	33.4 %
P 200	61.0 %

SOIL PROPERTIES

LL: 42.0%
PL: 18.0%
PI: 24.0%
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

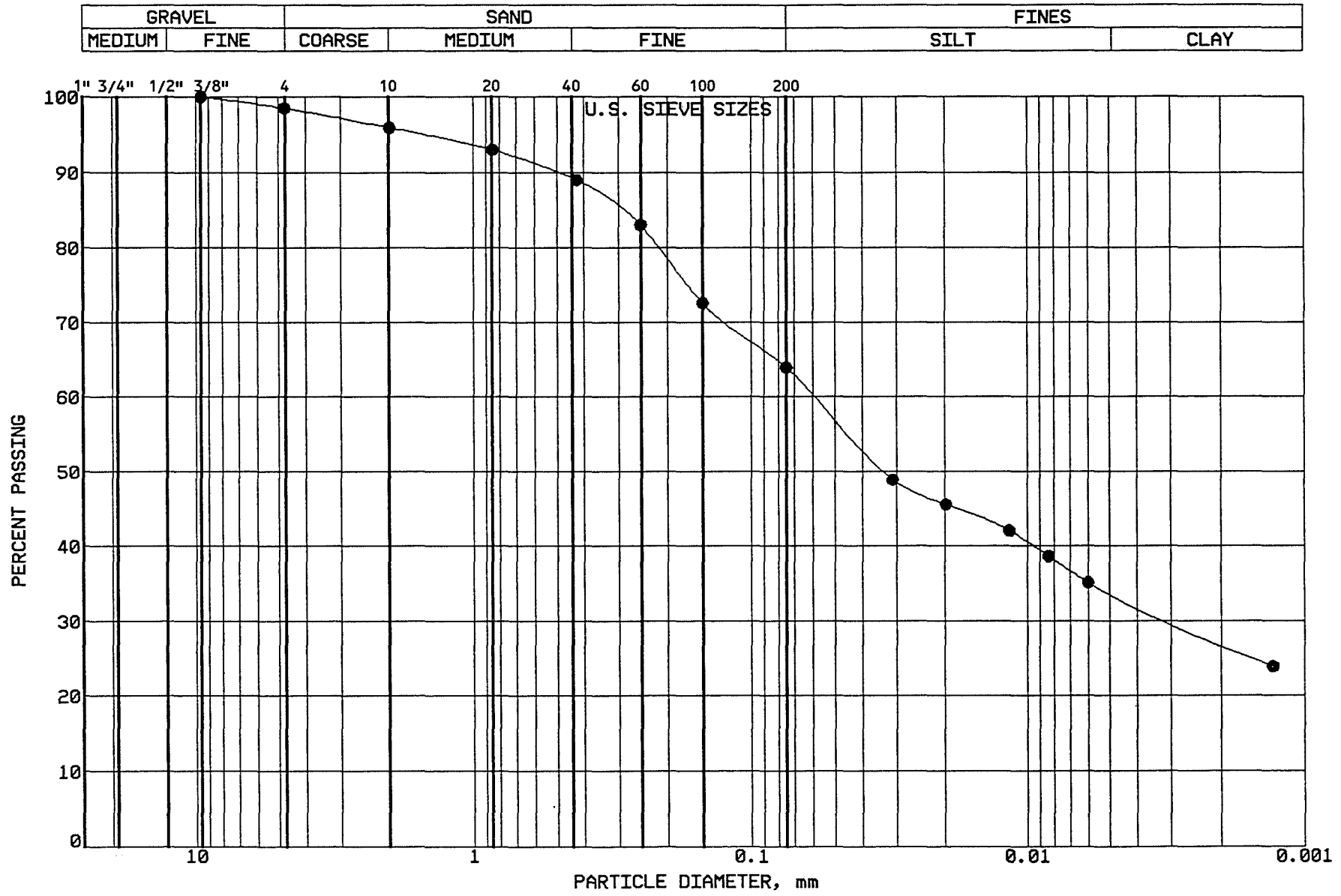
LOCATION: N 42765.0, E 45275.0
SAMPLE: SGCC568 TUBE #:
ELEVATION: 1879.1'

GRAVEL	2.0 %
SAND	35.4 %
SILT	27.2 %
CLAY	35.4 %
P 200	62.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

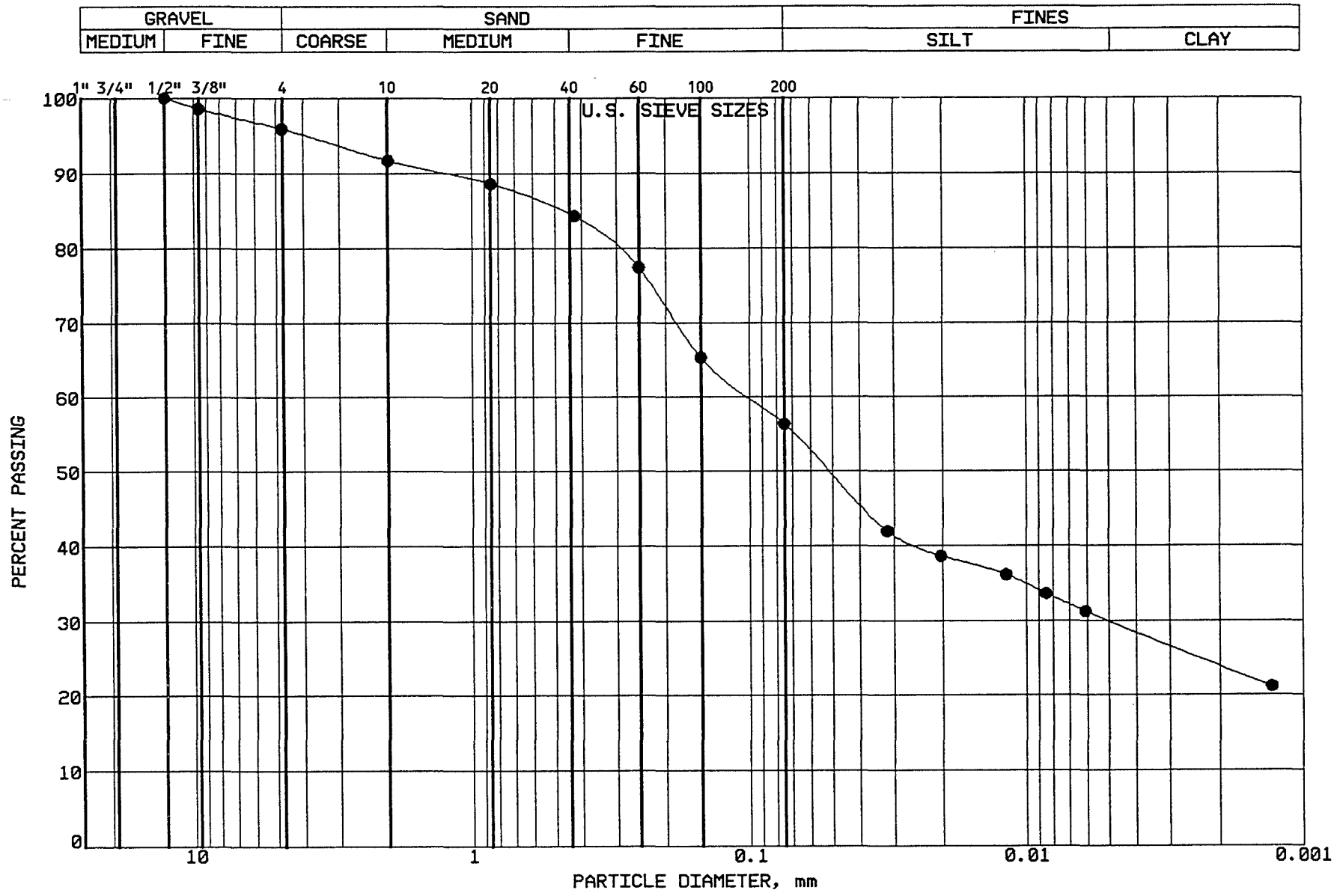
LOCATION: N 42629.0, E 45274.0
SAMPLE: SGCC569 TUBE #:
ELEVATION: 1879.2'

GRAVEL	1.5 %
SAND	34.6 %
SILT	30.1 %
CLAY	33.8 %
P 200	63.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43326.0, E 45526.0
SAMPLE: CLBCC570 TUBE #: ST-153
ELEVATION: 1886.7'

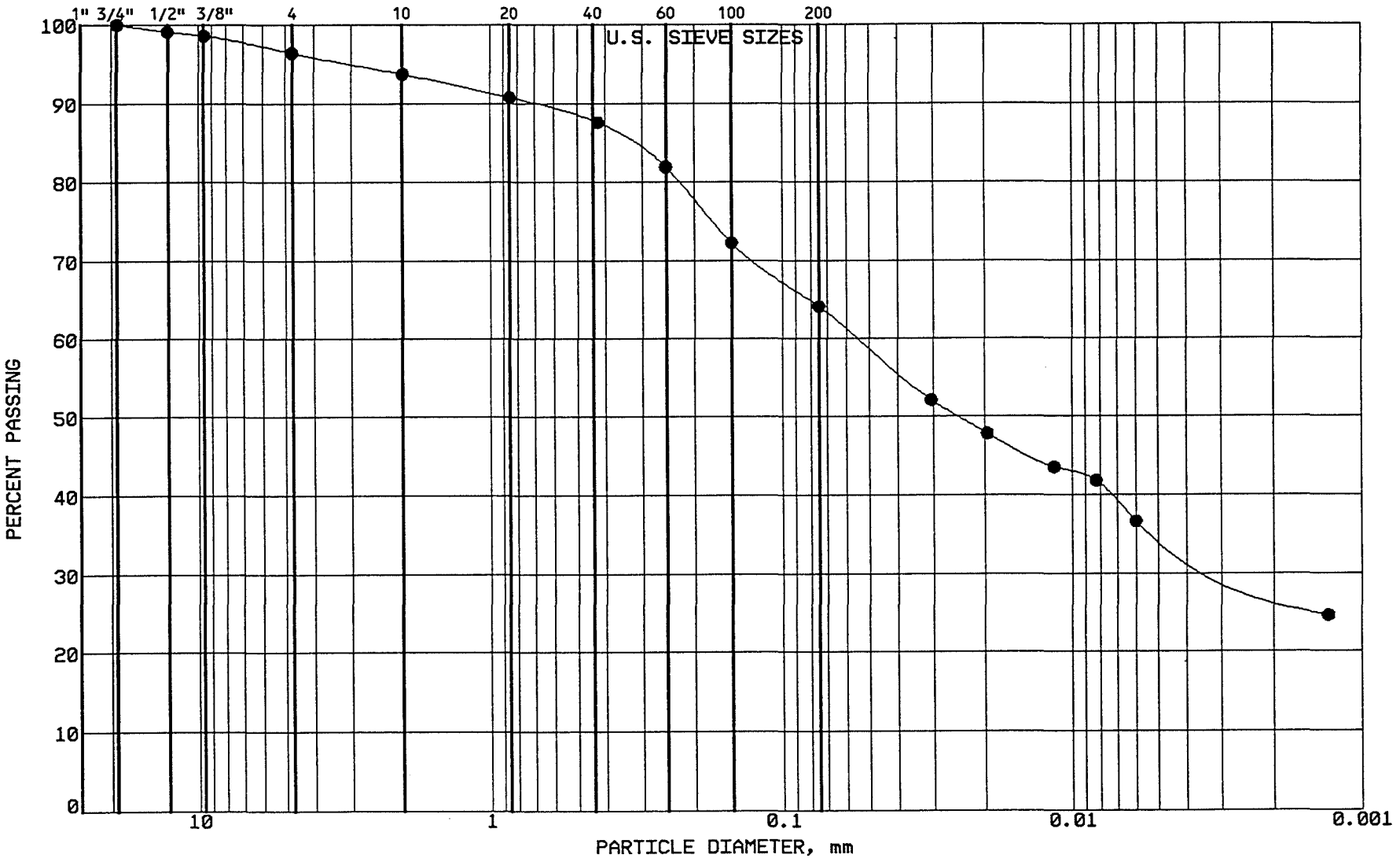
GRAVEL	4.1 %
SAND	39.5 %
SILT	26.5 %
CLAY	29.9 %
P 200	56.4 %

SOIL PROPERTIES

LL: 40.0%
PL: 15.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

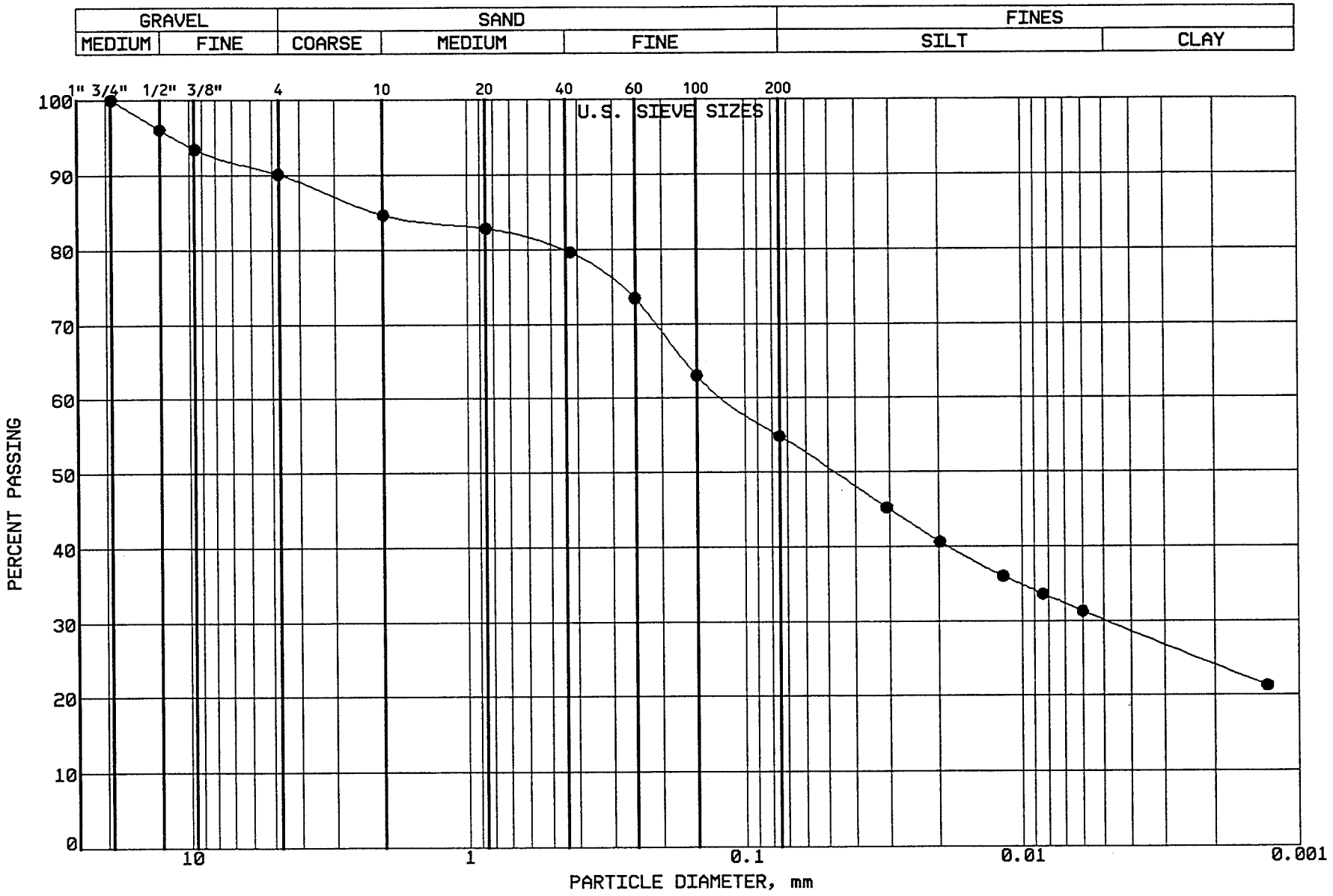
LOCATION: N 43163.0, E 45516.0
SAMPLE: CLBCC571 TUBE #: ST-154
ELEVATION: 1885.9'

GRAVEL	3.6 %
SAND	32.3 %
SILT	28.9 %
CLAY	35.2 %
P 200	64.1 %

SOIL PROPERTIES

LL: 43.0%
PL: 16.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

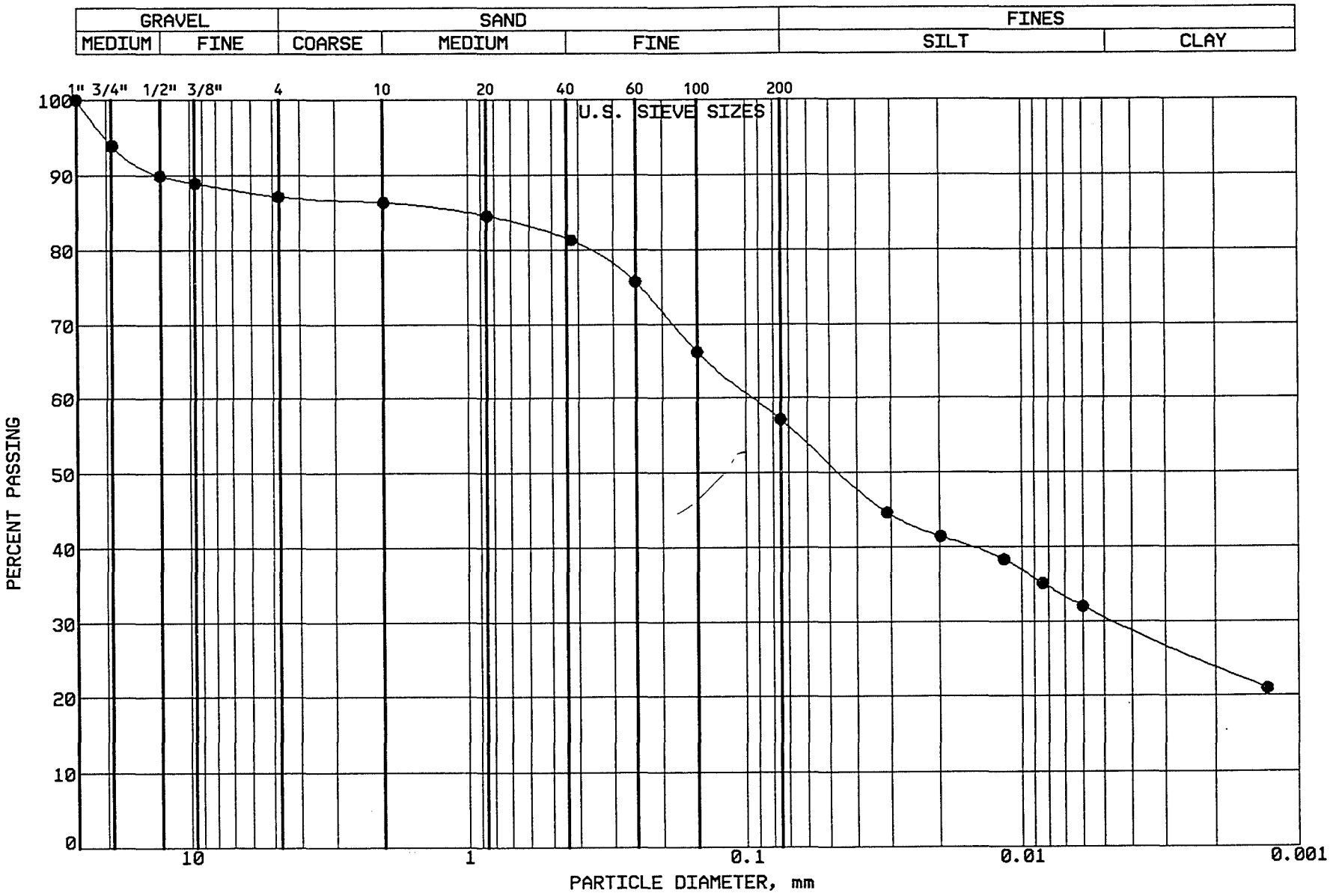
LOCATION: N 42962.0, E 45509.0
SAMPLE: CLBCC572 TUBE #: ST-155
ELEVATION: 1884.4'

GRAVEL	9.9 %
SAND	35.3 %
SILT	24.7 %
CLAY	30.1 %
P 200	54.8 %

SOIL PROPERTIES

LL: 39.0%
PL: 14.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43385.0, E 45006.0
SAMPLE: CLBCC573 TUBE #: ST-156
ELEVATION: 1887.5'

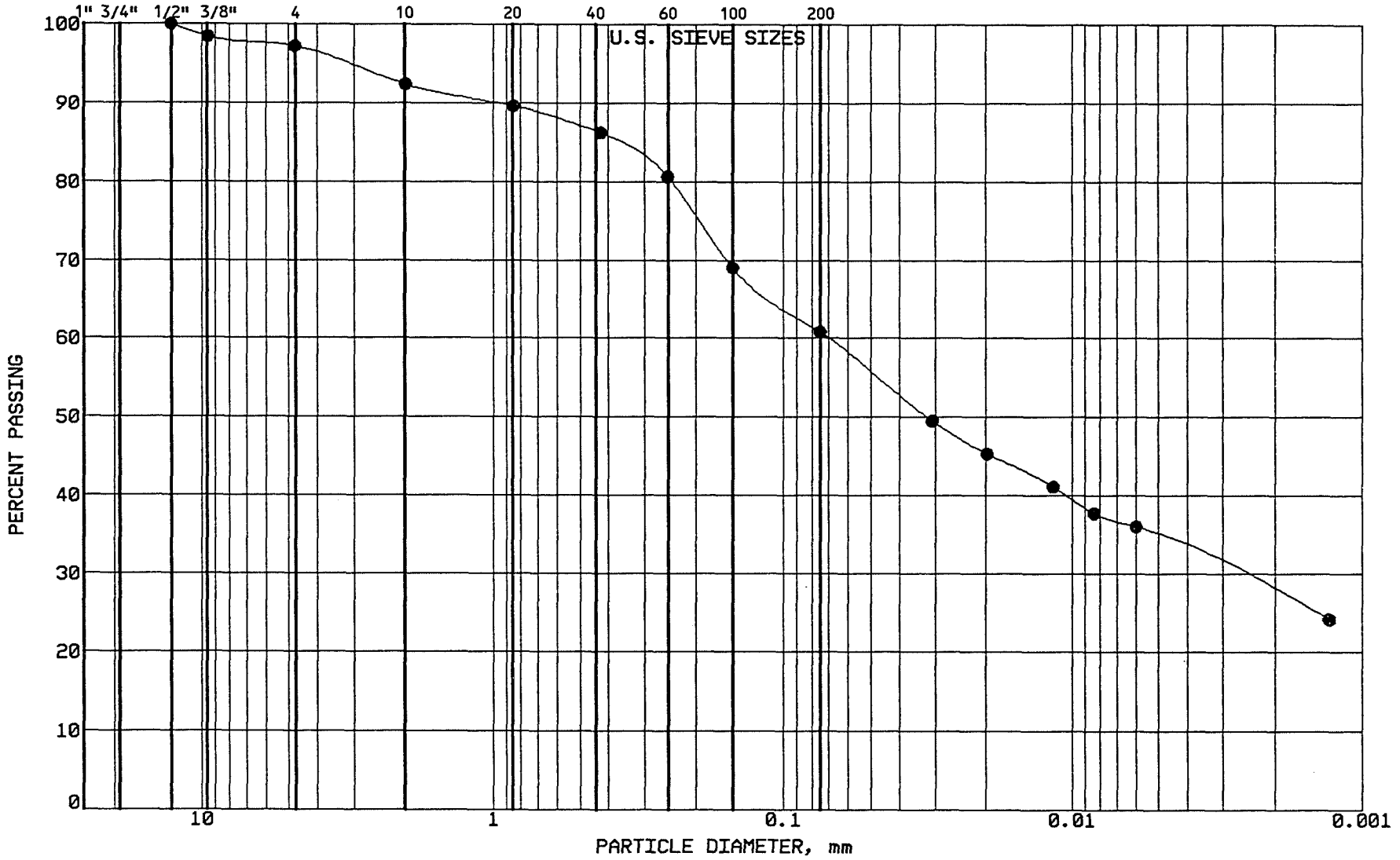
GRAVEL	12.9 %
SAND	30.0 %
SILT	26.4 %
CLAY	30.7 %
P 200	57.1 %

SOIL PROPERTIES

LL: 43.0%
PL: 16.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43211.0, E 45009.0
SAMPLE: CLBCC574 TUBE #: ST-157
ELEVATION: 1886.3'

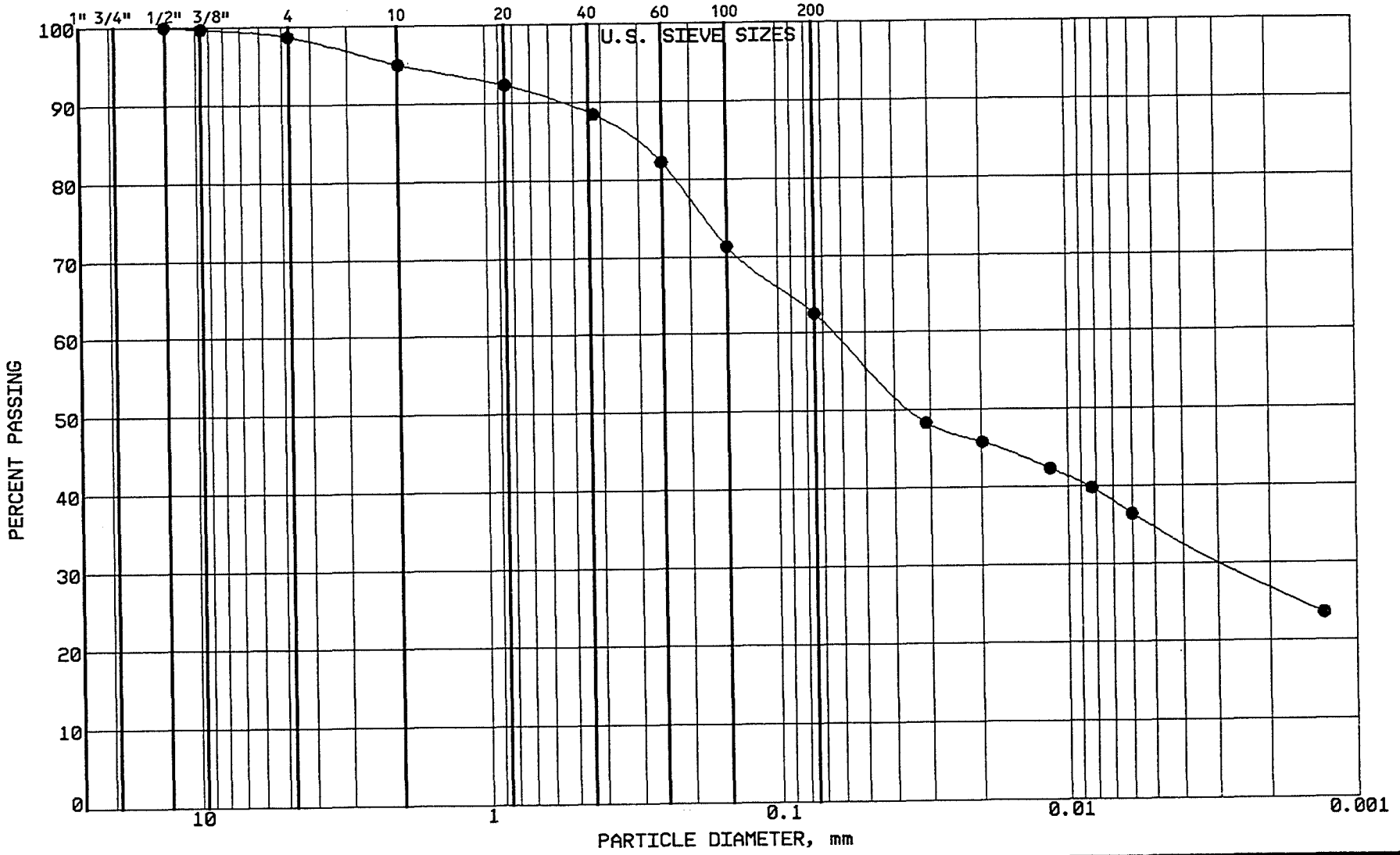
GRAVEL	2.8 %
SAND	36.4 %
SILT	26.2 %
CLAY	34.6 %
P 200	60.8 %

SOIL PROPERTIES

LL: 41.0%
PL: 15.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

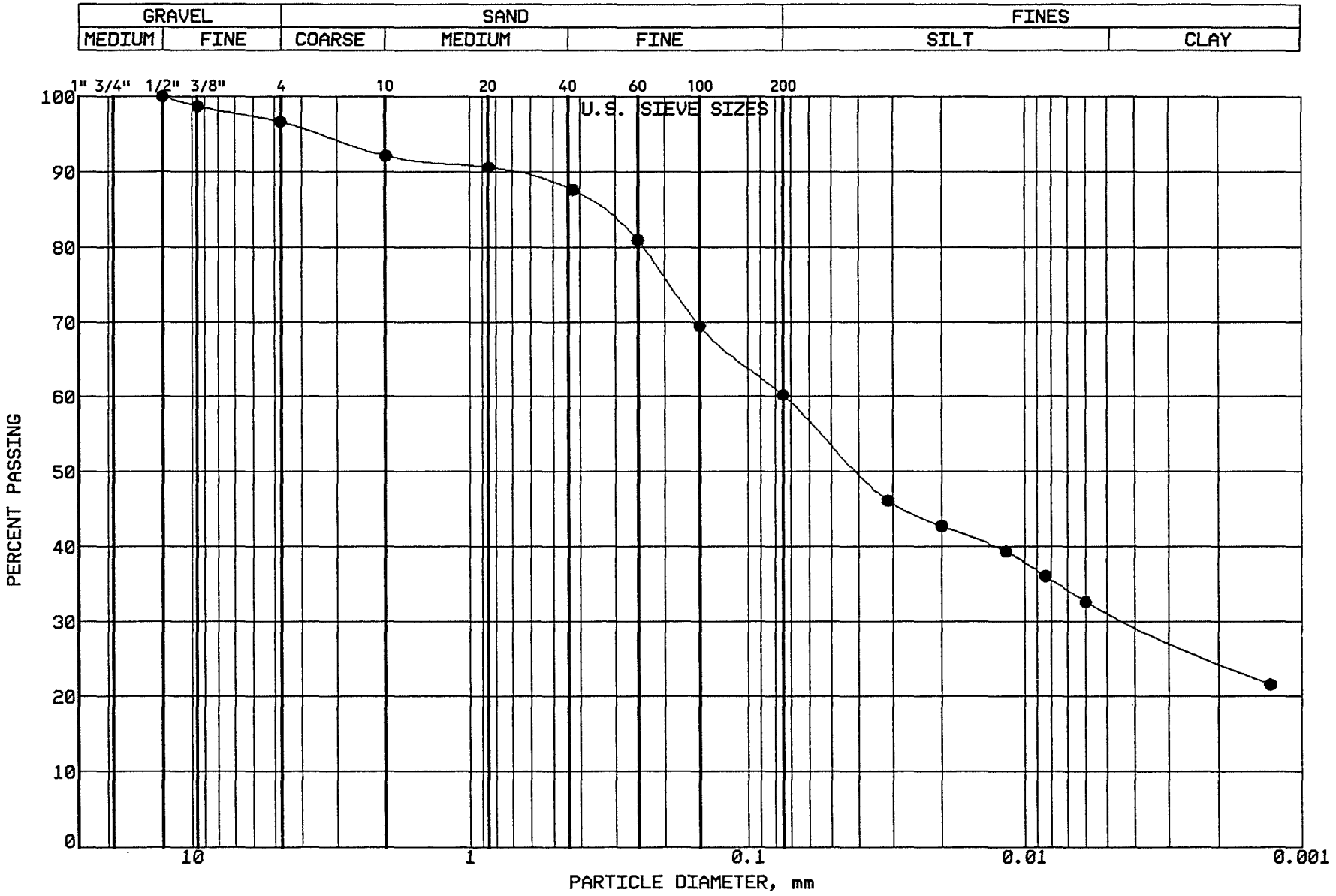
LOCATION: N 43012.0, E 45005.0
SAMPLE: CLBCC575 TUBE #: ST-158
ELEVATION: 1885.0'

GRAVEL	1.3 %
SAND	36.2 %
SILT	27.6 %
CLAY	34.9 %
P 200	62.5 %

SOIL PROPERTIES

LL: 43.0%
PL: 17.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42816.0, E 44997.0
SAMPLE: CLBCC576 TUBE #: ST-159
ELEVATION: 1883.7'

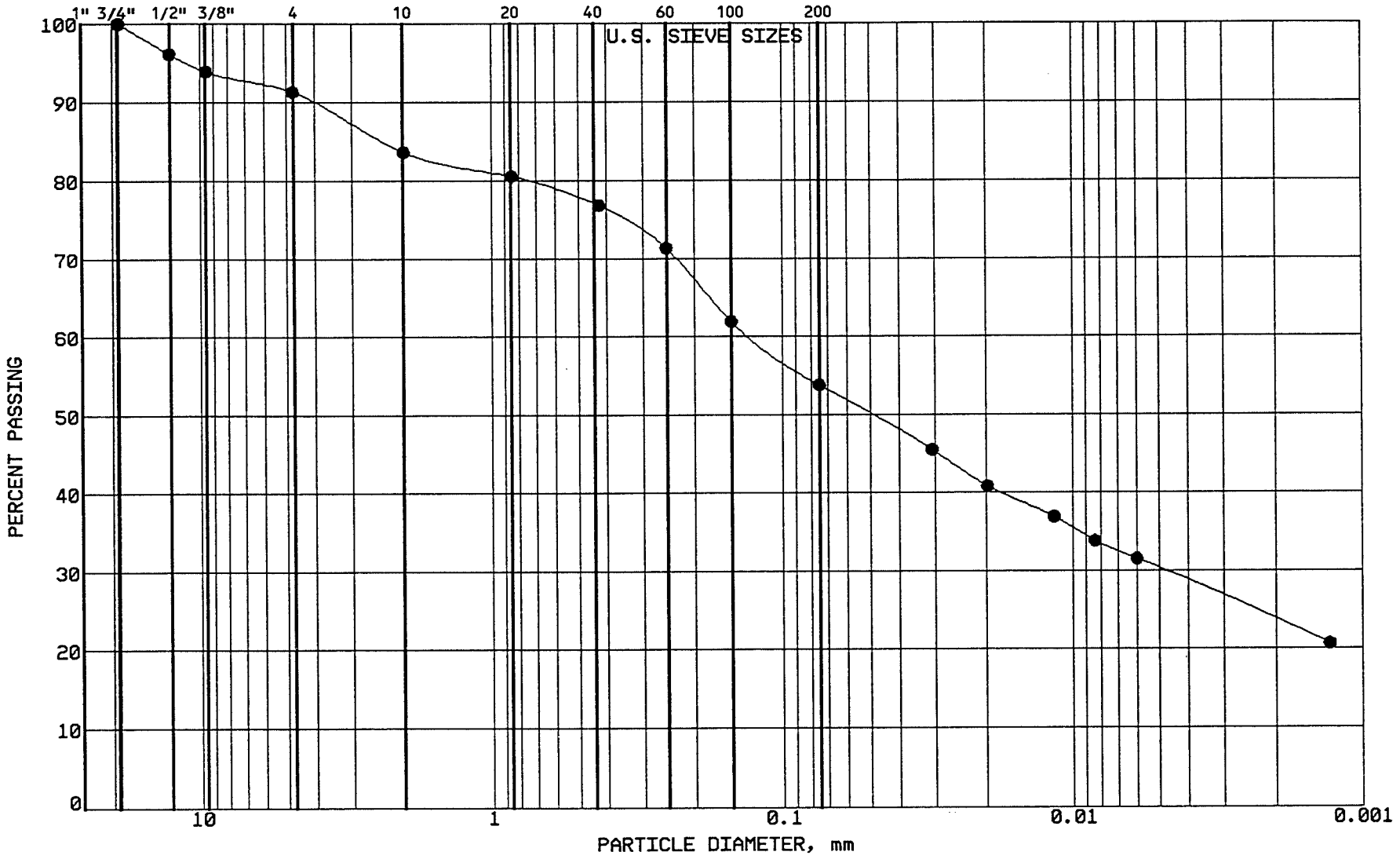
GRAVEL	3.4 %
SAND	36.4 %
SILT	28.9 %
CLAY	31.3 %
P 200	60.2 %

SOIL PROPERTIES

LL: 40.0%
PL: 16.0%
PI: 24.0%
CLASS: SANDY LEAN CLAY (CL) gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

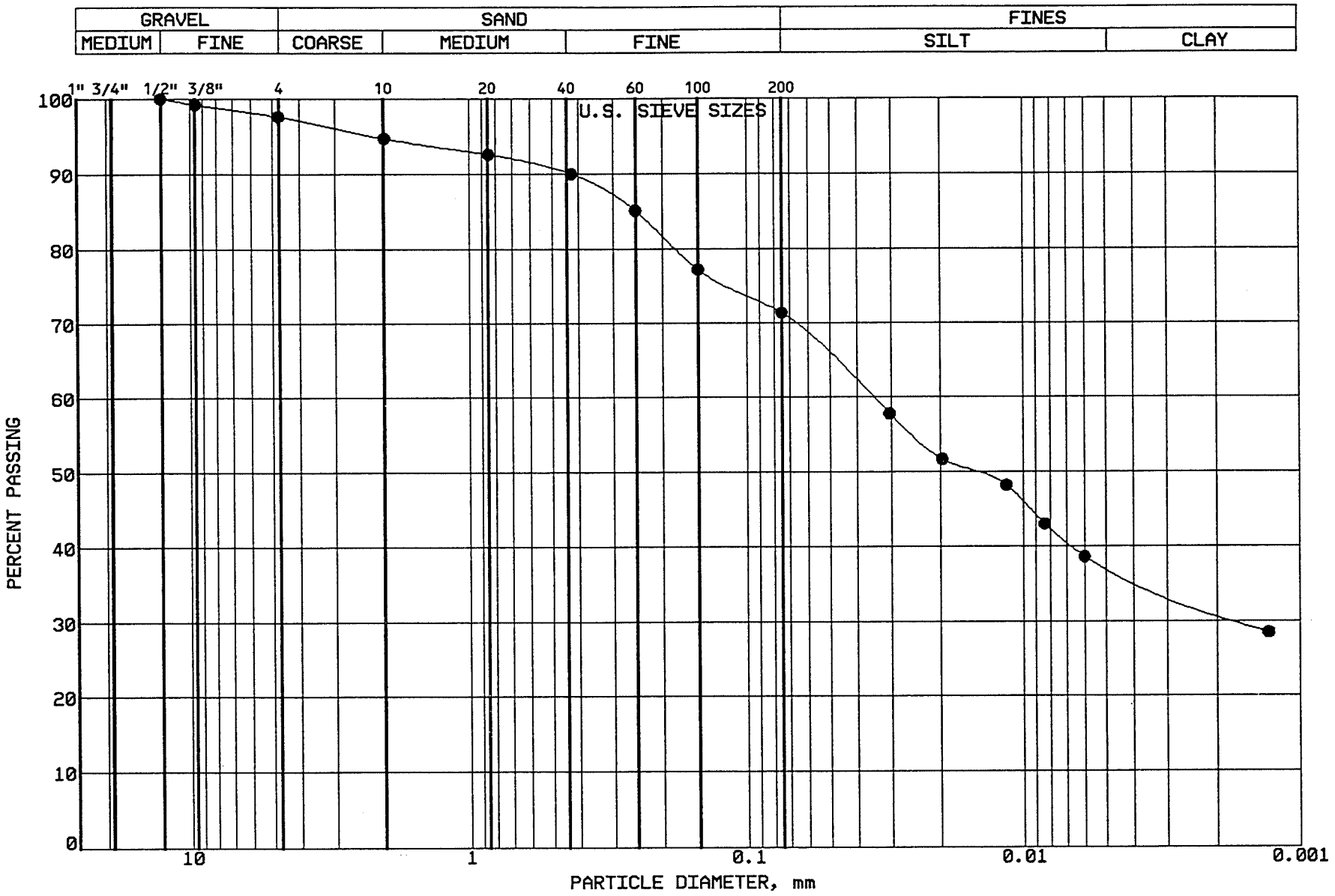
LOCATION: N 42638.0, E 44996.0
SAMPLE: CLBCC577 TUBE #: ST-160
ELEVATION: 1882.2'

GRAVEL	8.7 %
SAND	37.5 %
SILT	23.6 %
CLAY	30.2 %
P 200	53.8 %

SOIL PROPERTIES

LL: 43.0%
PL: 17.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

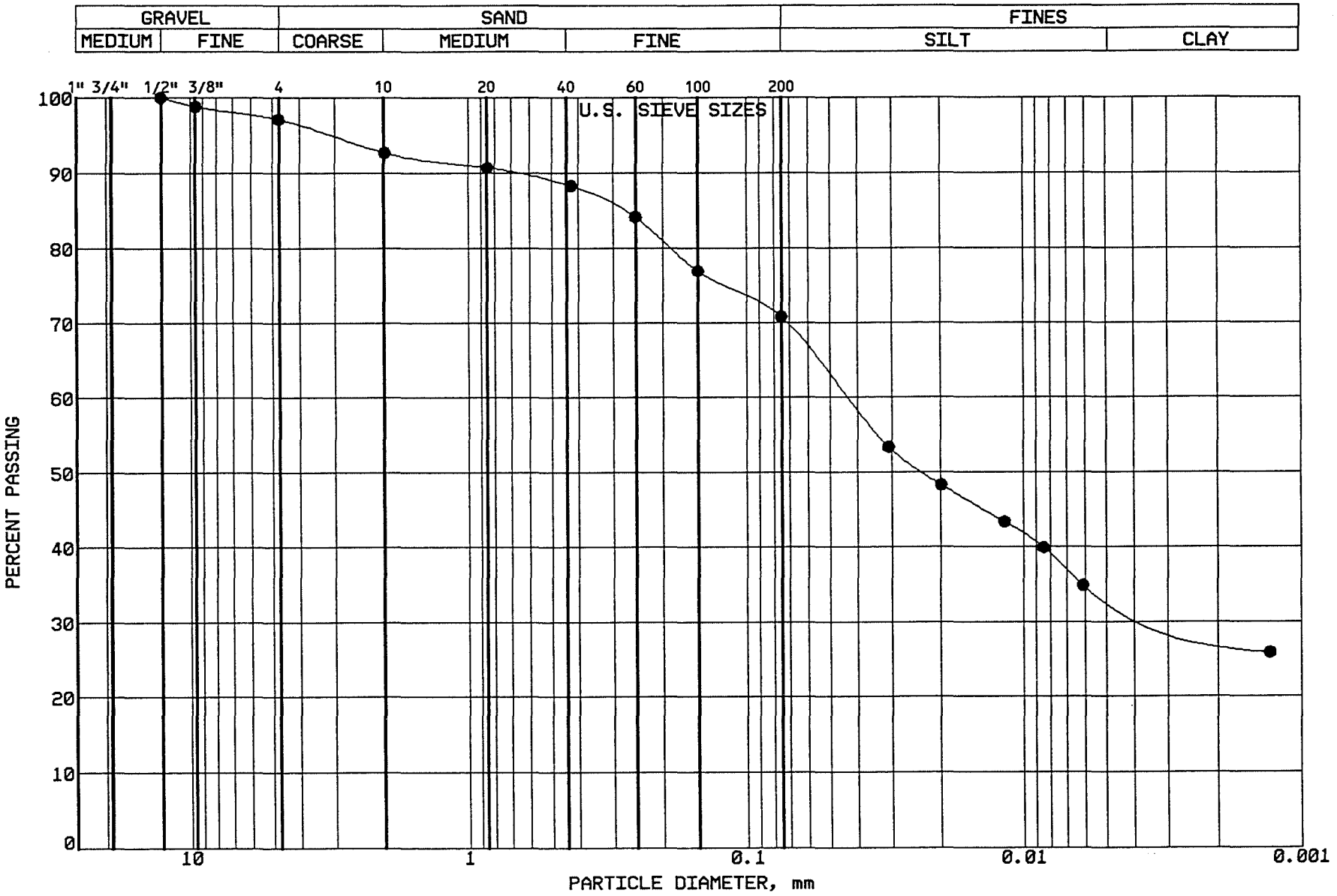
LOCATION: N 43378.0, E 45155.0
SAMPLE: CLBCC578 TUBE #: ST-161
ELEVATION: 1887.7'

GRAVEL	2.4 %
SAND	26.3 %
SILT	33.9 %
CLAY	37.4 %
P 200	71.3 %

SOIL PROPERTIES

LL: 44.0%
PL: 17.0%
PI: 27.0%
CLASS: LEAN CLAY W SAND (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

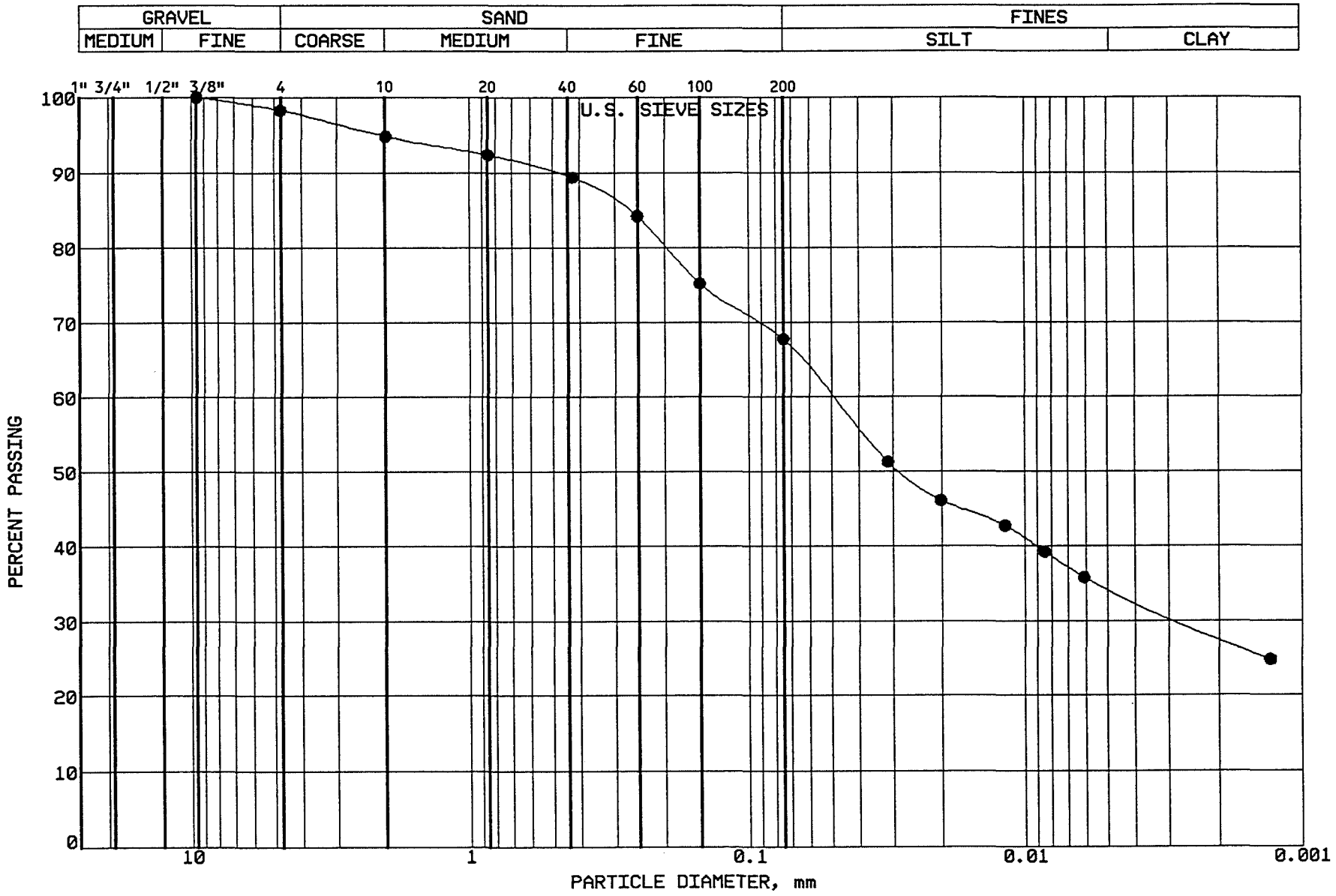
LOCATION: N 43224.0, E 45138.0
SAMPLE: CLBCC579 TUBE #: ST-162
ELEVATION: 1886.6'

GRAVEL	2.9 %
SAND	26.4 %
SILT	37.0 %
CLAY	33.7 %
P 200	70.7 %

SOIL PROPERTIES

LL: 46.0%
PL: 16.0%
PI: 30.0%
CLASS: LEAN CLAY W SAND (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

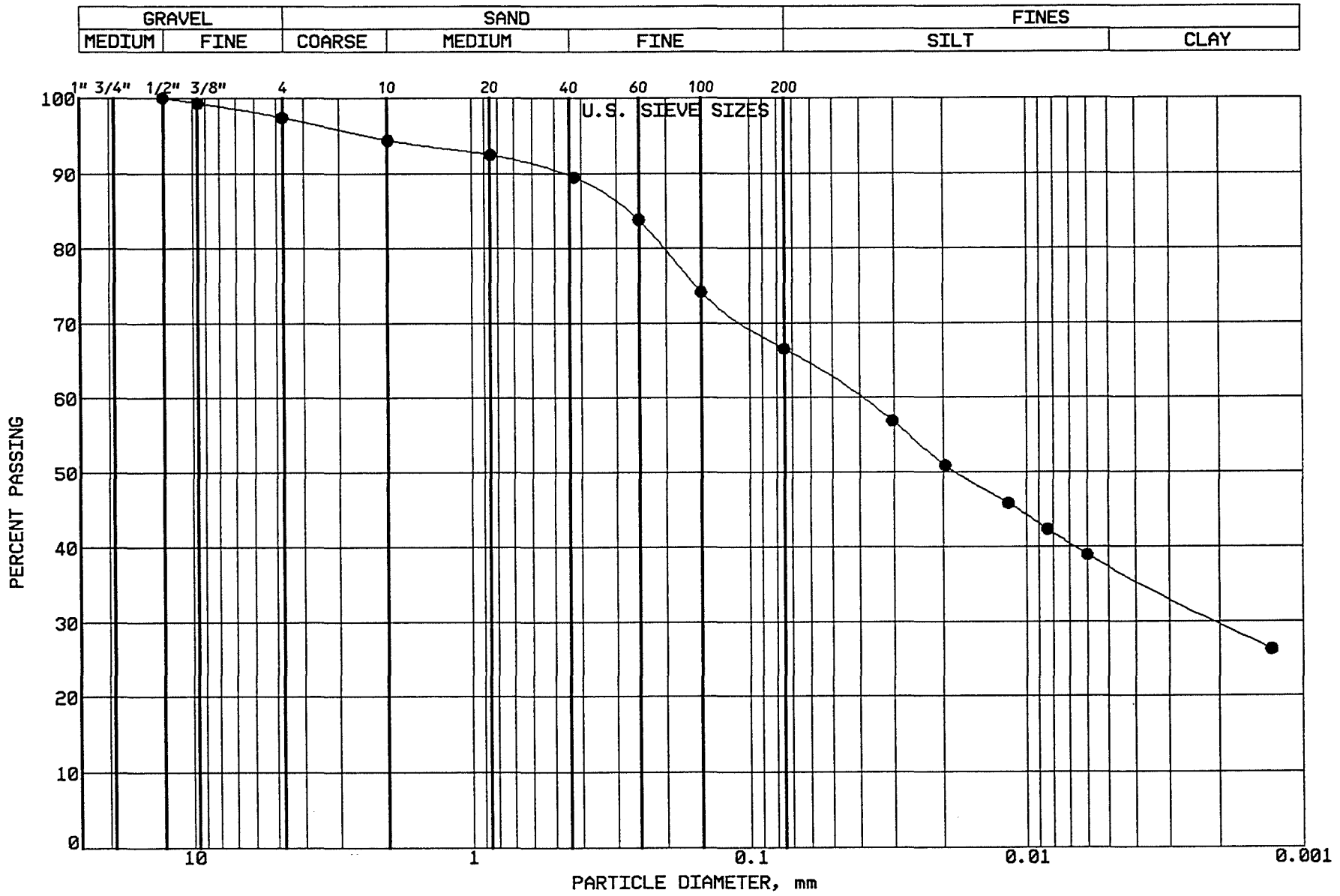
LOCATION: N 43067.0, E 45123.0
SAMPLE: CLBCC580 TUBE #: ST-163
ELEVATION: 1885.7'

GRAVEL	1.7 %
SAND	30.6 %
SILT	33.3 %
CLAY	34.4 %
P 200	67.7 %

SOIL PROPERTIES

LL: 43.0%
PL: 16.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42902.0, E 45107.0
SAMPLE: CLBCC581 TUBE #: ST-164
ELEVATION: 1884.5'

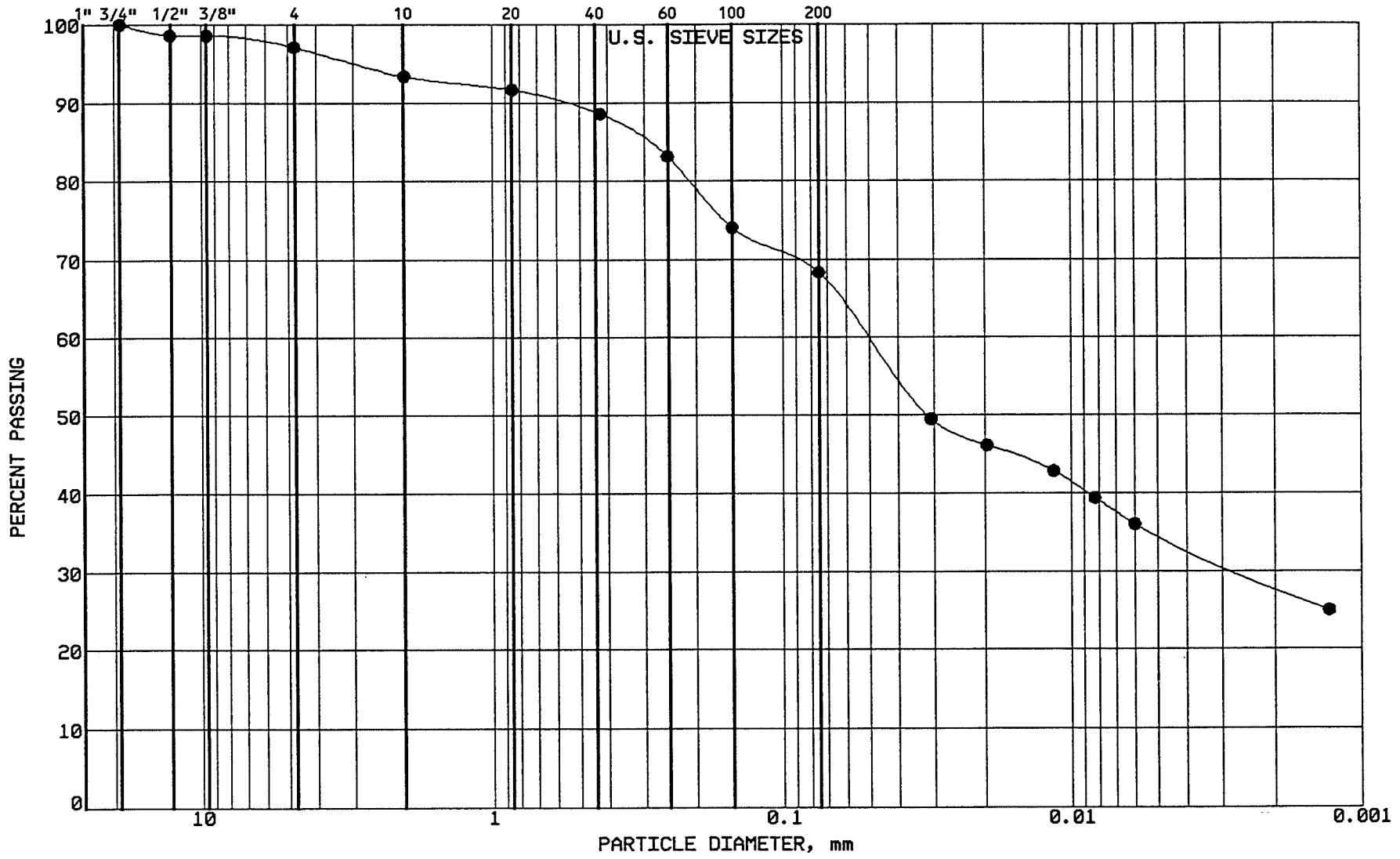
GRAVEL	2.6 %
SAND	30.9 %
SILT	29.1 %
CLAY	37.4 %
P 200	66.5 %

SOIL PROPERTIES

LL: 43.0%
PL: 17.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42723.0, E 45092.0
SAMPLE: CLBCC582 TUBE #: ST-165
ELEVATION: 1883.3'

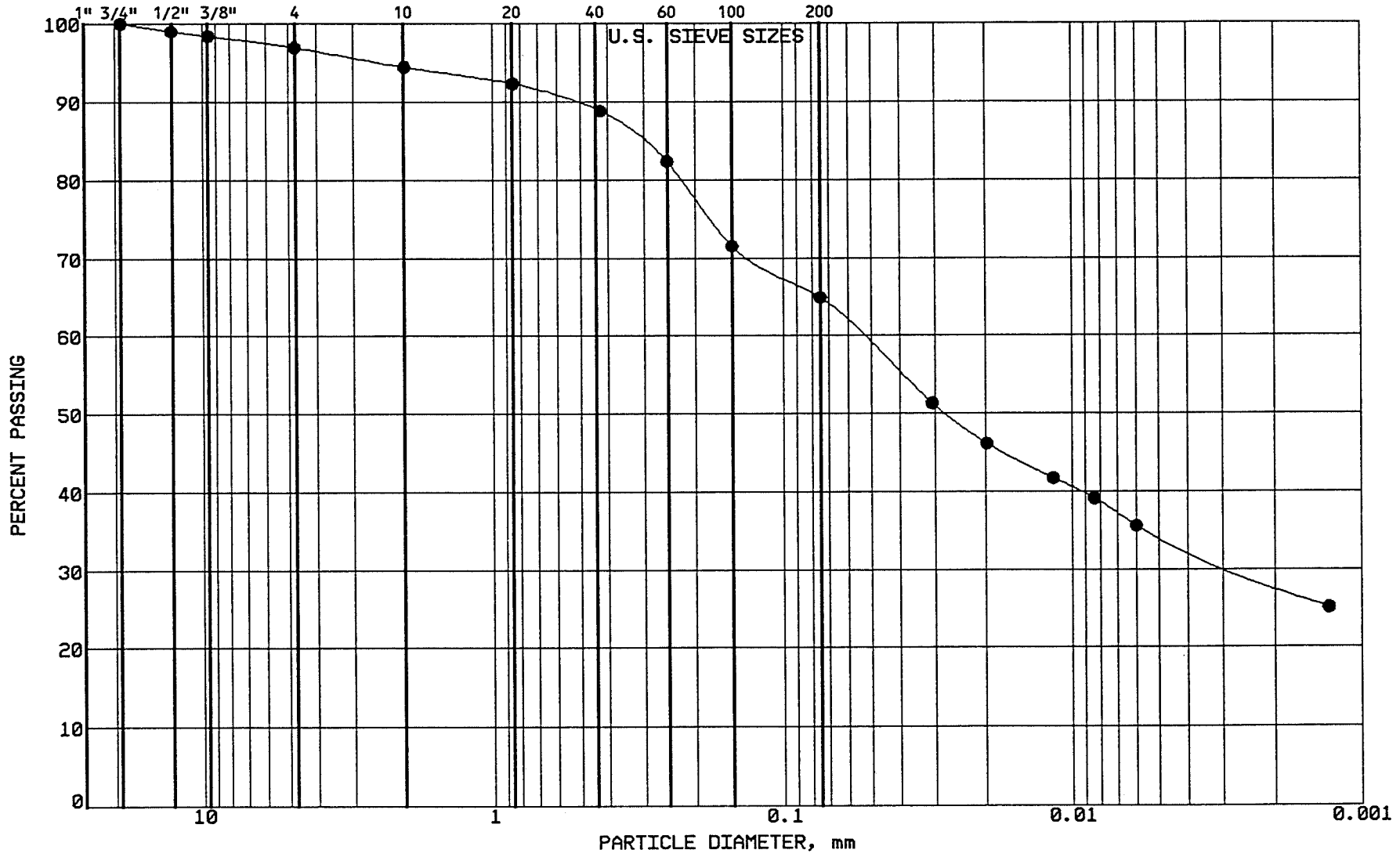
GRAVEL	2.9 %
SAND	28.8 %
SILT	33.6 %
CLAY	34.7 %
P 200	68.3 %

SOIL PROPERTIES

LL: 44.0%
PL: 16.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

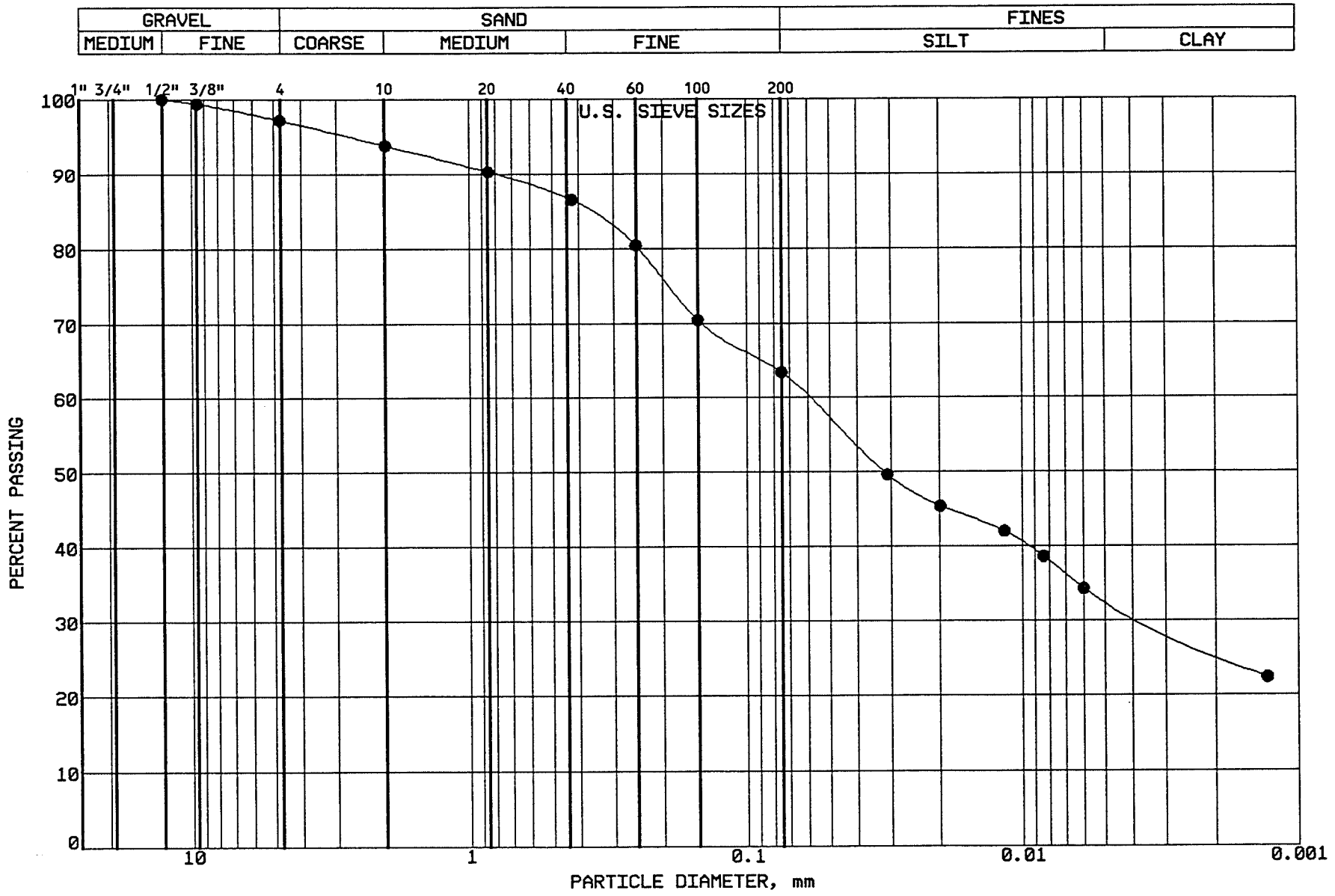
LOCATION: N 42846.0, E 45840.0
SAMPLE: CLBCC583 TUBE #: ST-166
ELEVATION: 1883.8'

GRAVEL	3.1 %
SAND	32.0 %
SILT	30.6 %
CLAY	34.3 %
P 200	64.9 %

SOIL PROPERTIES

LL: 44.0%
PL: 17.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42666.0, E 45833.0
SAMPLE: CLBCC584 TUBE #: ST-167
ELEVATION: 1882.6'

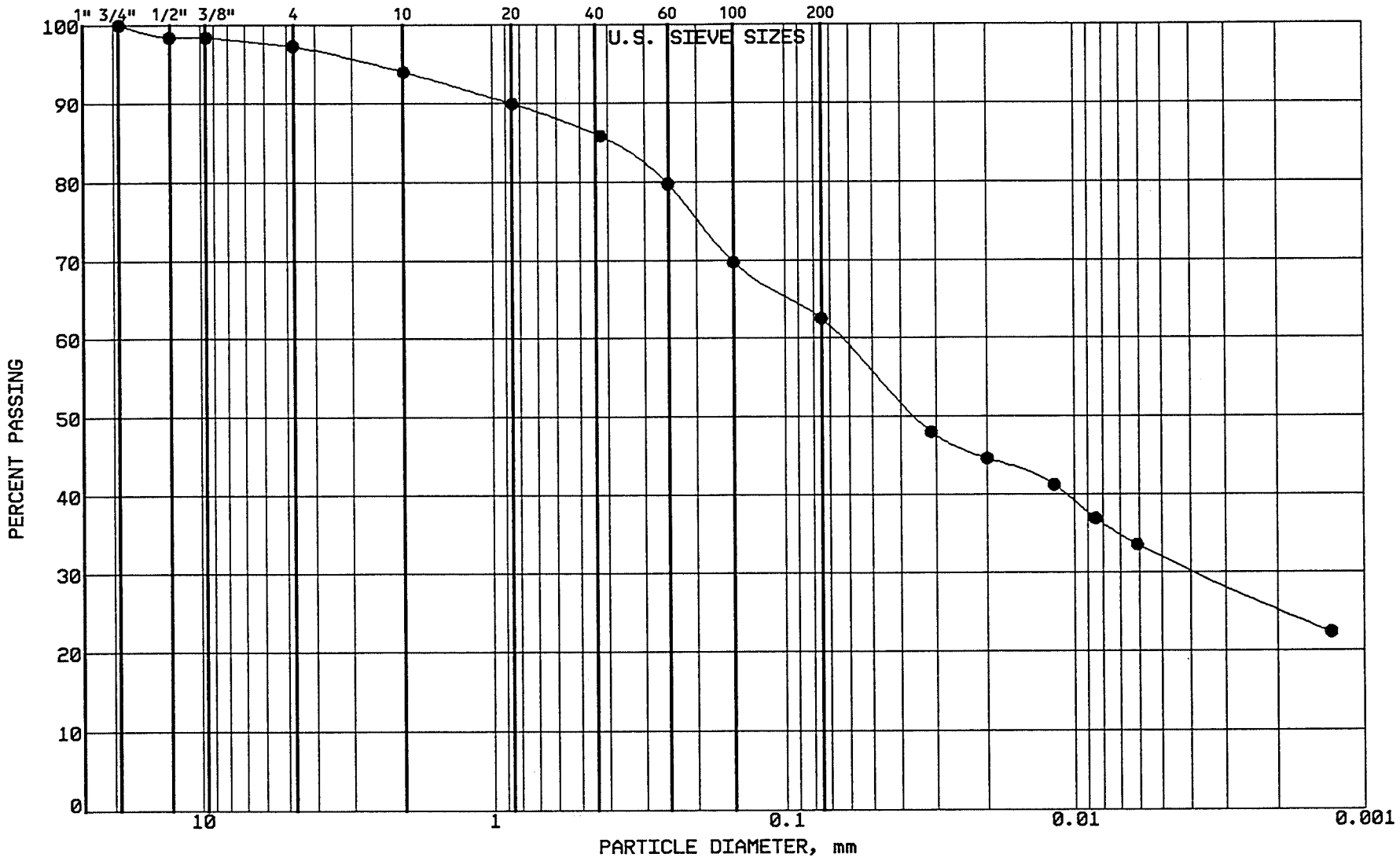
GRAVEL	2.8 %
SAND	33.8 %
SILT	30.5 %
CLAY	32.9 %
P 200	63.4 %

SOIL PROPERTIES

LL: 43.0%
PL: 17.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42729.0, E 45733.0
SAMPLE: SGCC585 TUBE #:
ELEVATION: 1880.0'

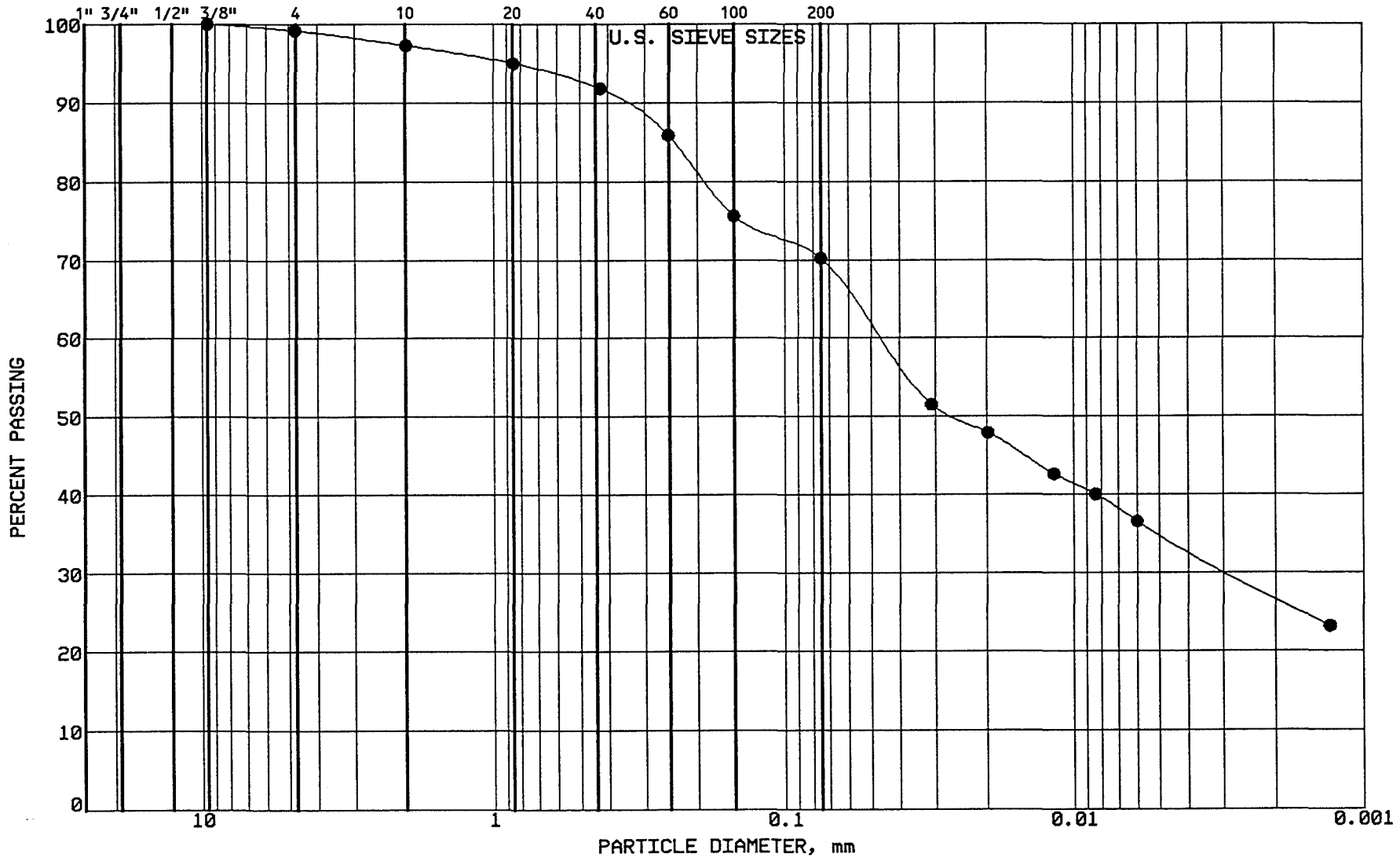
GRAVEL	2.7 %
SAND	34.8 %
SILT	30.4 %
CLAY	32.1 %
P 200	62.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42650.0, E 45638.0
SAMPLE: SGCC586 TUBE #:
ELEVATION: 1878.6'

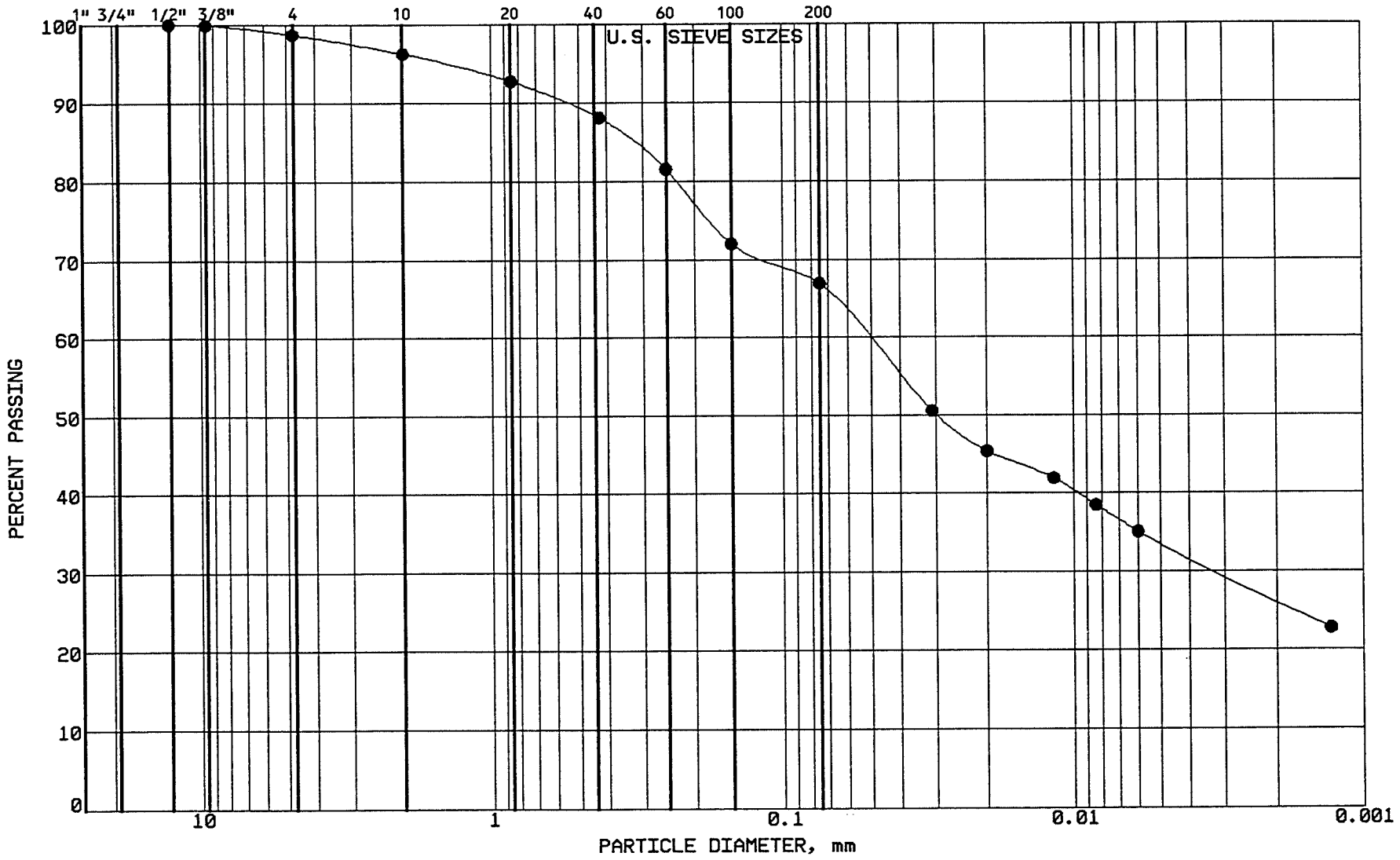
GRAVEL	0.8 %
SAND	29.0 %
SILT	35.3 %
CLAY	34.9 %
P 200	70.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

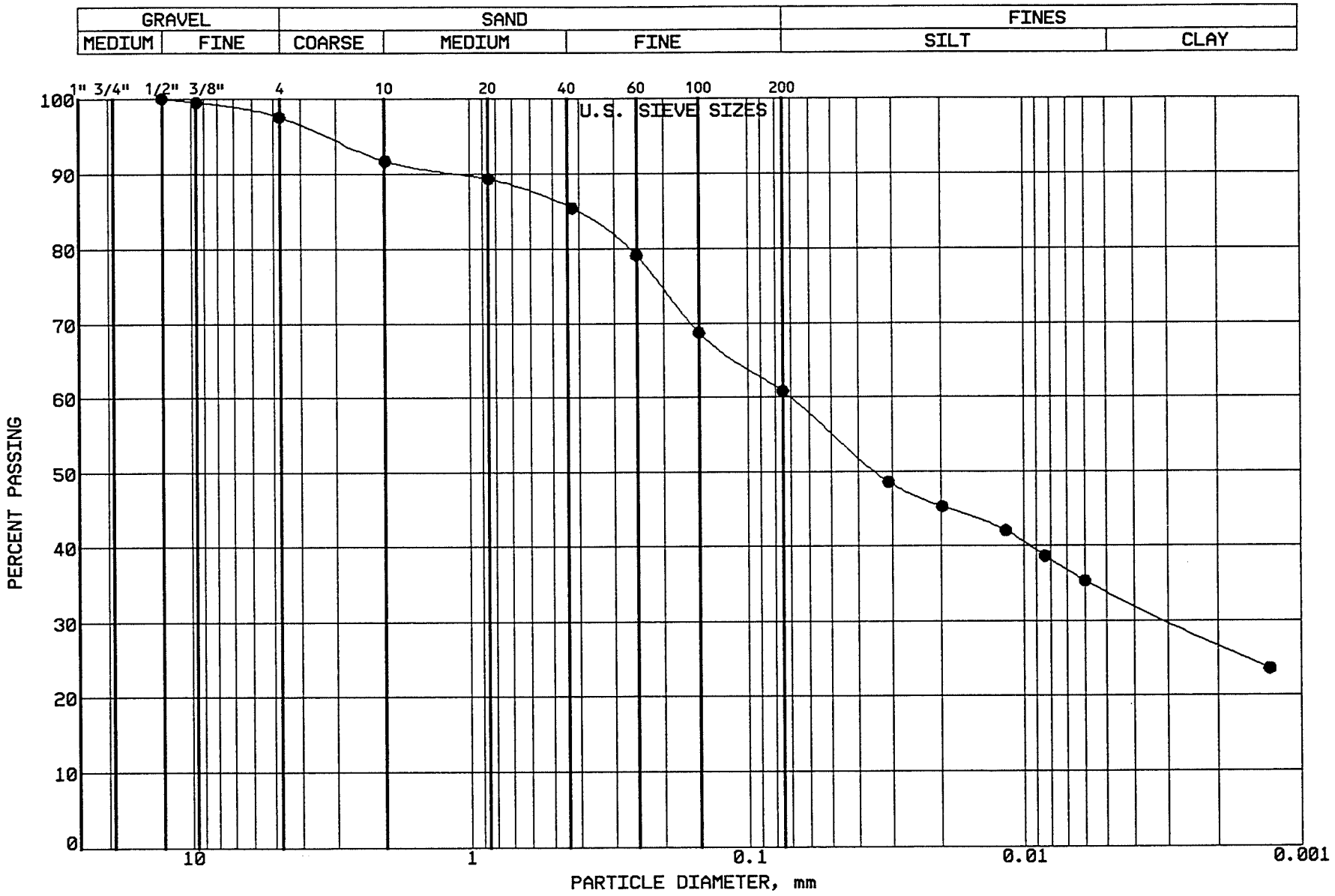
LOCATION: N 42668.0, E 45431.0
SAMPLE: SGCC587 TUBE #:
ELEVATION: 1878.4'

GRAVEL	1.3 %
SAND	31.8 %
SILT	33.4 %
CLAY	33.5 %
P 200	66.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43397.0, E 45113.0
SAMPLE: CLBCC588 TUBE #: ST-168
ELEVATION: 1888.9'

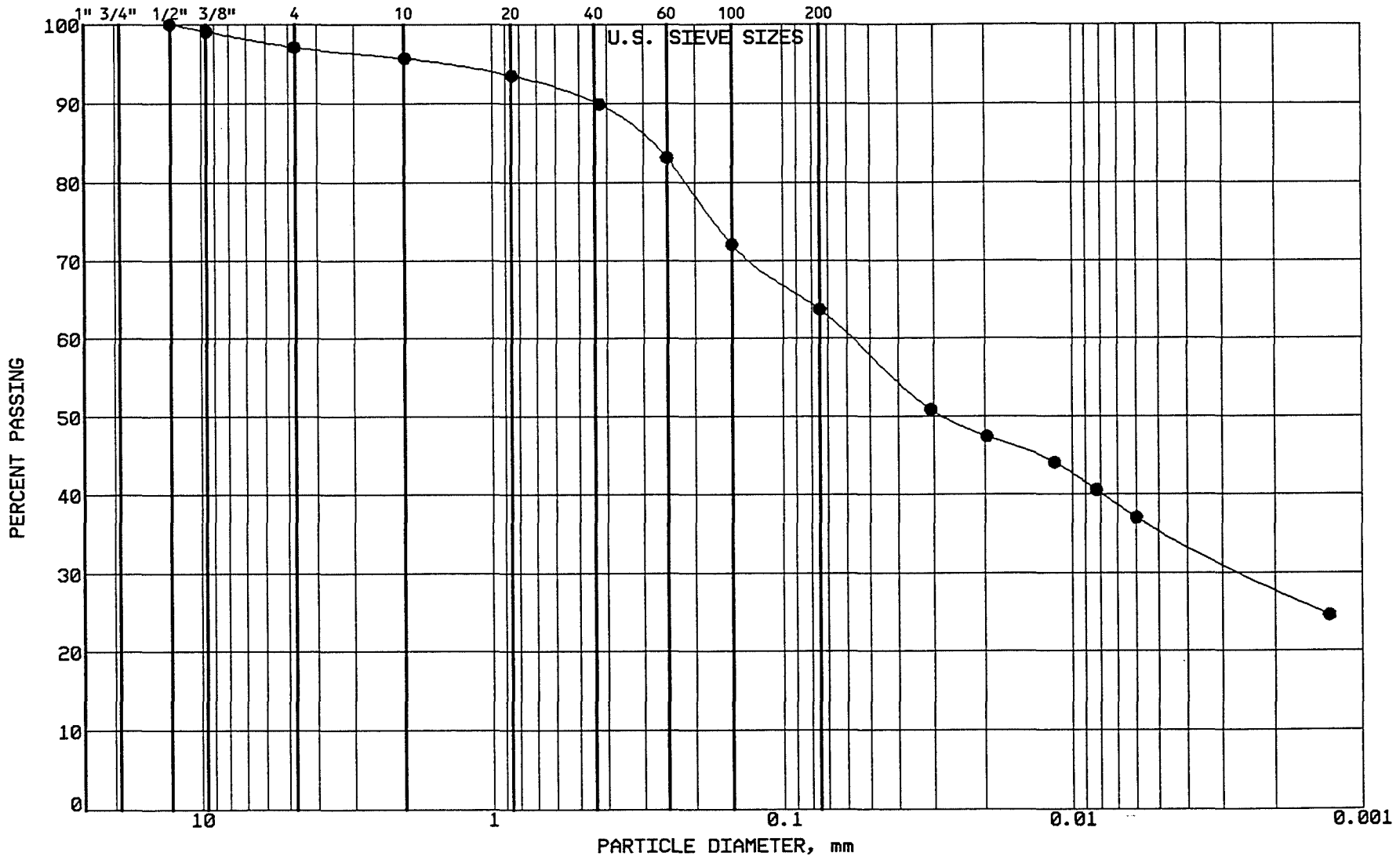
GRAVEL	2.5 %
SAND	36.7 %
SILT	26.9 %
CLAY	33.9 %
P 200	60.8 %

SOIL PROPERTIES

LL: 43.0%
PL: 18.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

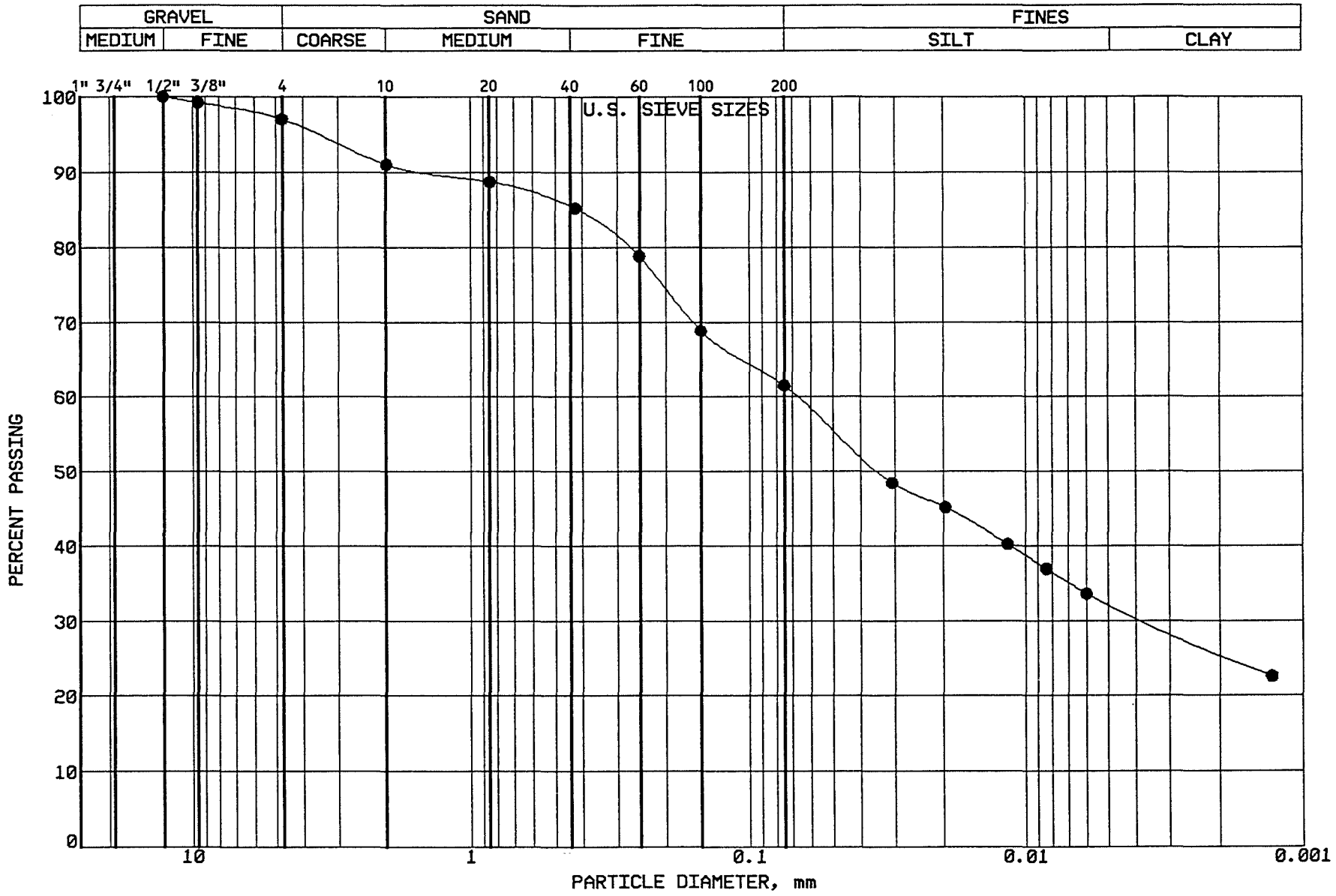
LOCATION: N 43401.0, E 44906.0
SAMPLE: CLBCC589 TUBE #: ST-169
ELEVATION: 1889.0'

GRAVEL	2.9 %
SAND	33.4 %
SILT	28.2 %
CLAY	35.5 %
P 200	63.7 %

SOIL PROPERTIES

LL: 42.0%
PL: 17.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43406.0, E 44696.0
SAMPLE: CLBCC590 TUBE #: ST-170
ELEVATION: 1889.0'

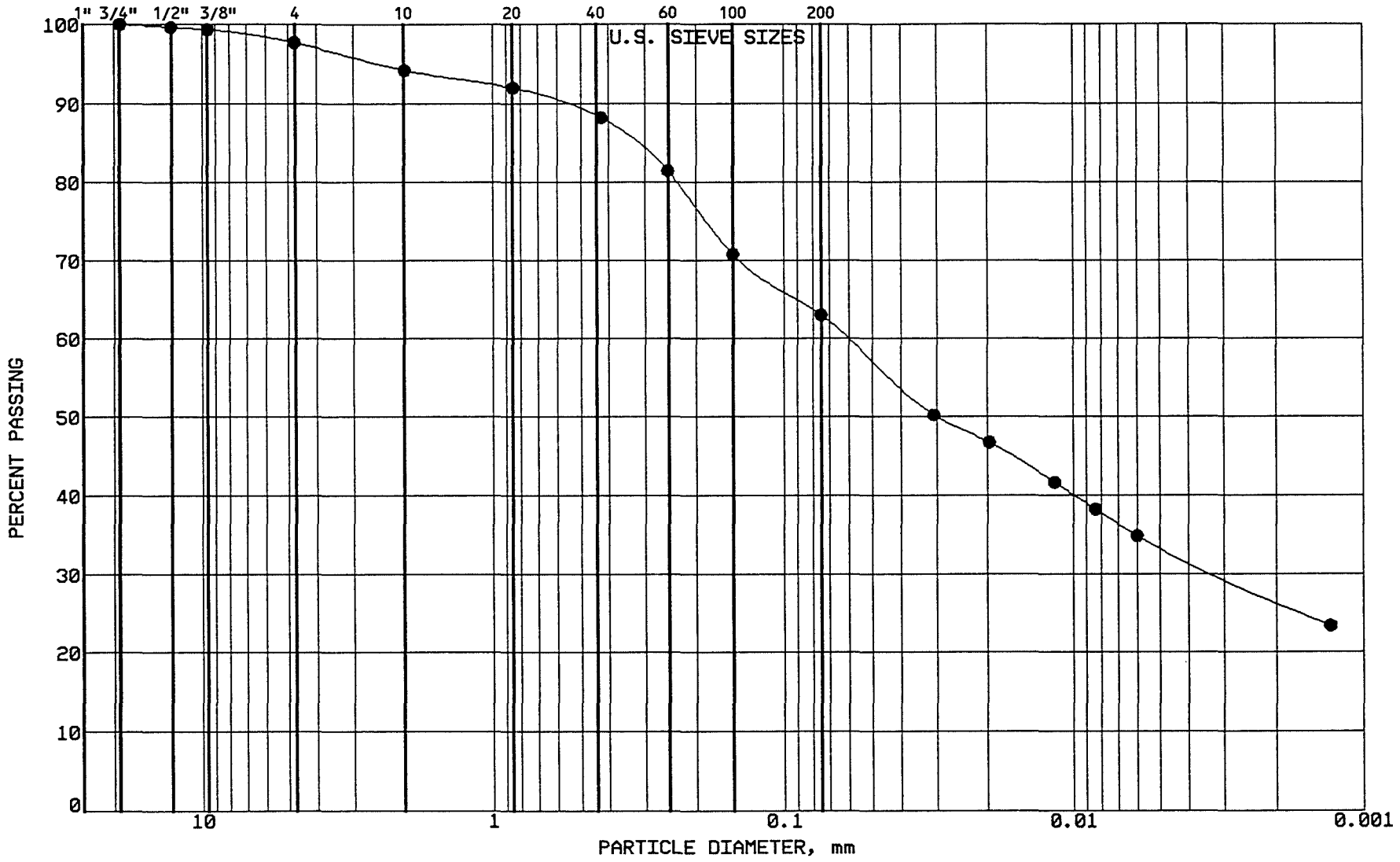
GRAVEL	3.0 %
SAND	35.5 %
SILT	29.2 %
CLAY	32.3 %
P 200	61.5 %

SOIL PROPERTIES

LL: 44.0%
PL: 16.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43196.0, E 44683.0
SAMPLE: CLBCC591 TUBE #: ST-171
ELEVATION: 1887.5'

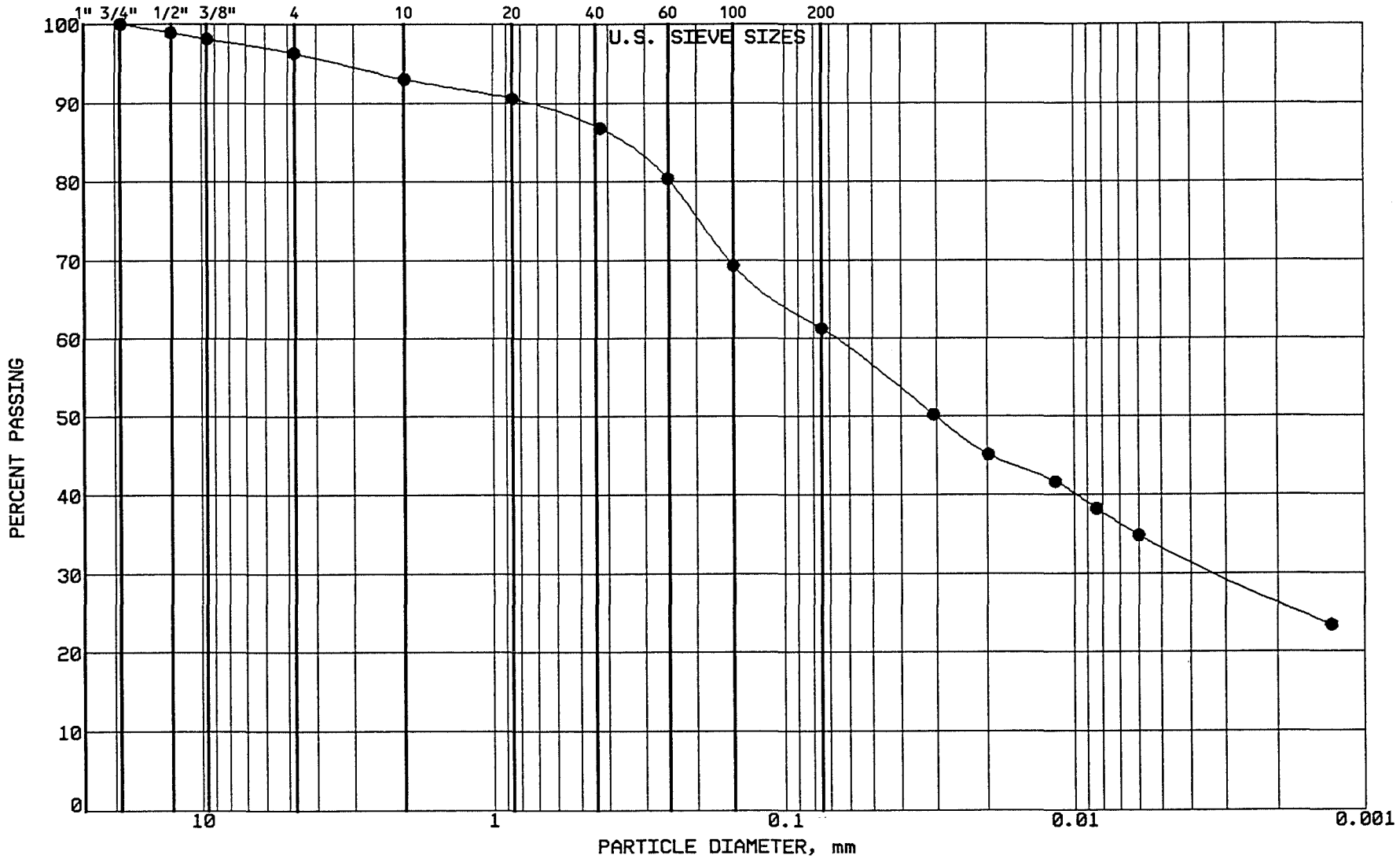
GRAVEL	2.3 %
SAND	34.7 %
SILT	29.6 %
CLAY	33.4 %
P 200	63.0 %

SOIL PROPERTIES

LL: 41.0%
PL: 17.0%
PI: 24.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43191.0, E 45104.0
SAMPLE: CLBCC592 TUBE #: ST-172
ELEVATION: 1887.4'

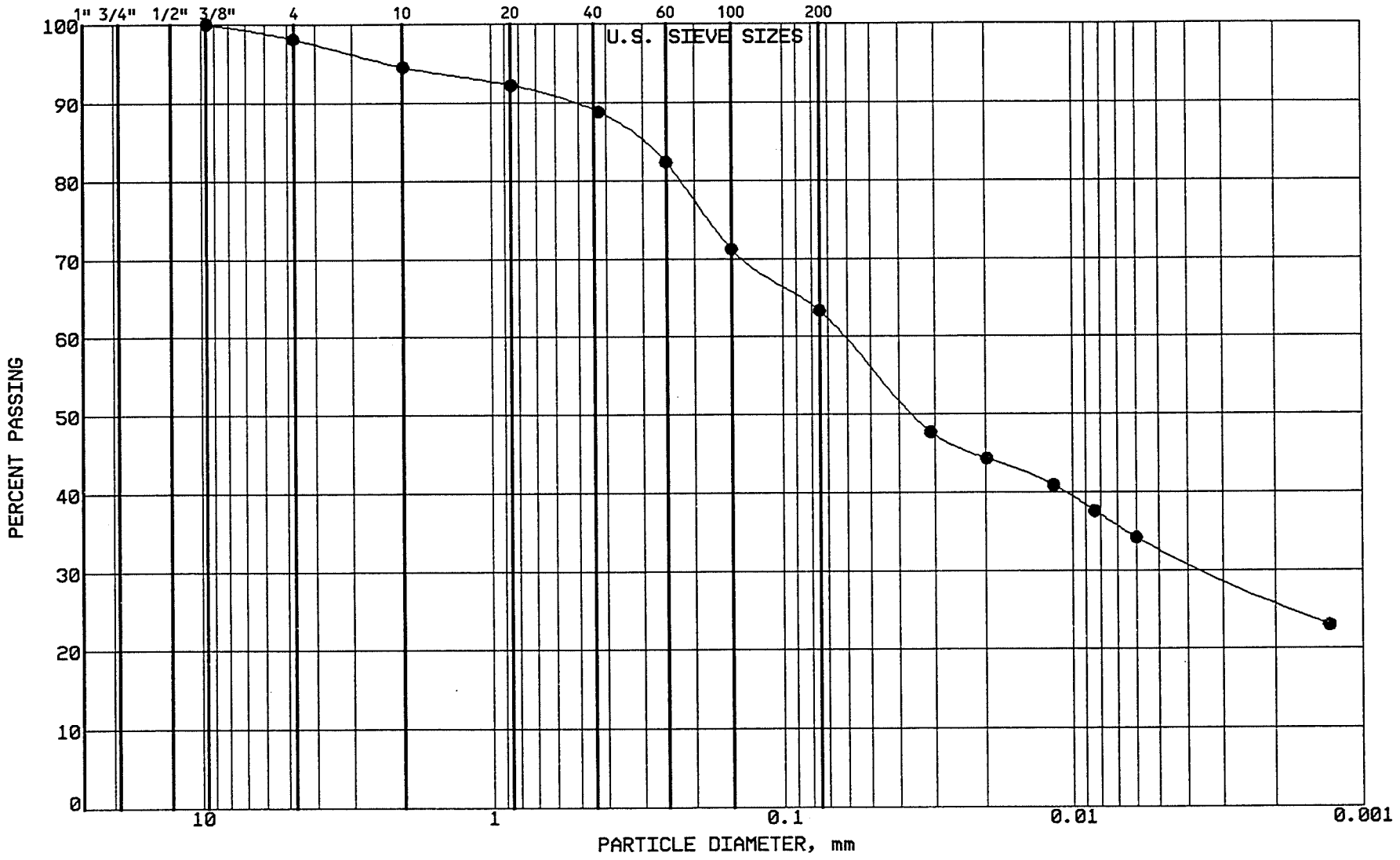
GRAVEL	3.7 %
SAND	35.0 %
SILT	27.9 %
CLAY	33.4 %
P 200	61.3 %

SOIL PROPERTIES

LL: 42.0%
PL: 18.0%
PI: 24.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43163.0, E 45516.0
SAMPLE: CLBCC593 TUBE #: ST-154R
ELEVATION: 1885.9'

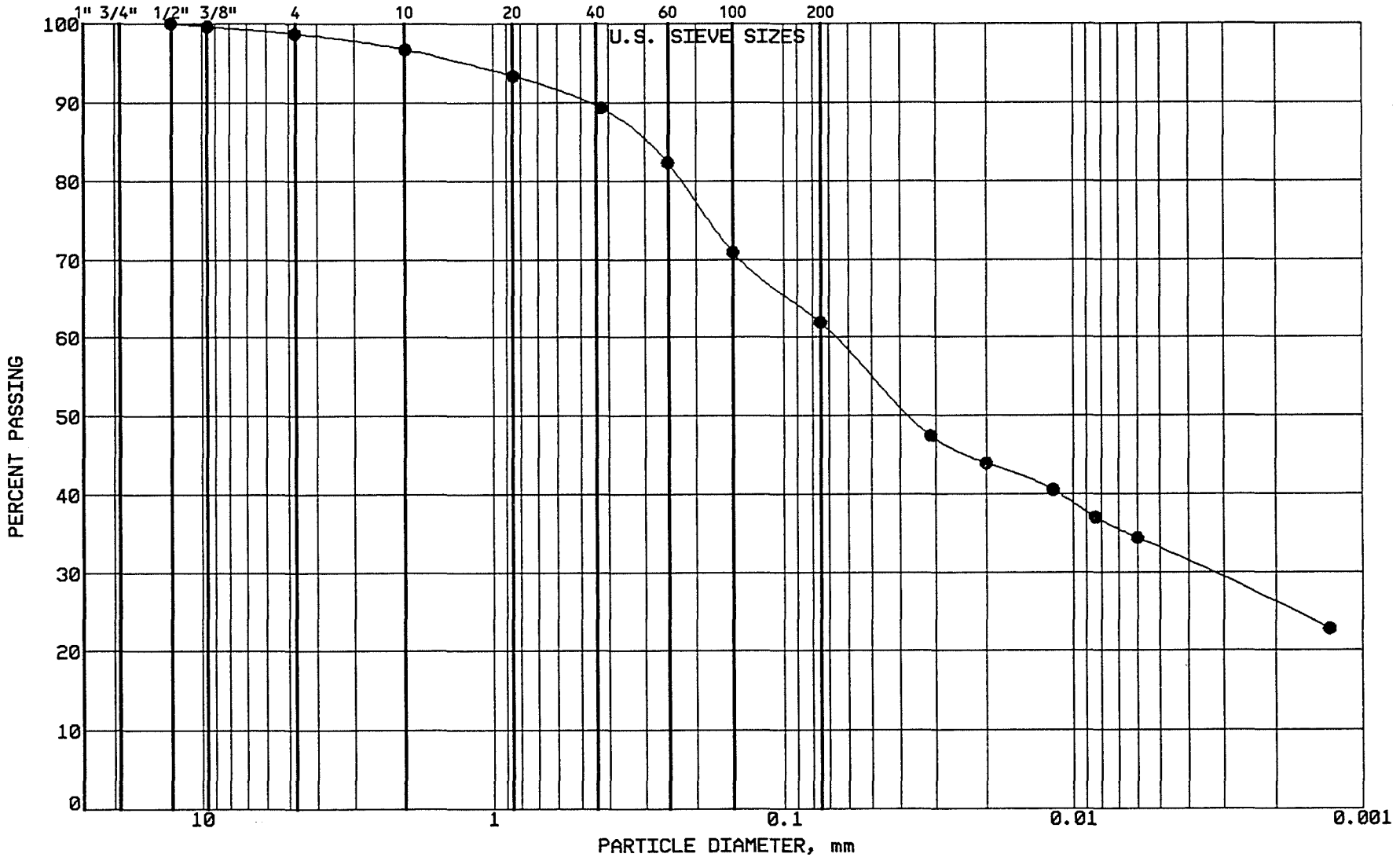
GRAVEL	1.9 %
SAND	34.8 %
SILT	30.4 %
CLAY	32.9 %
P 200	63.3 %

SOIL PROPERTIES

LL: 40.0%
PL: 17.0%
PI: 23.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43346.0, E 45349.0
SAMPLE: SGCC594 TUBE #:
ELEVATION: 1886.0'

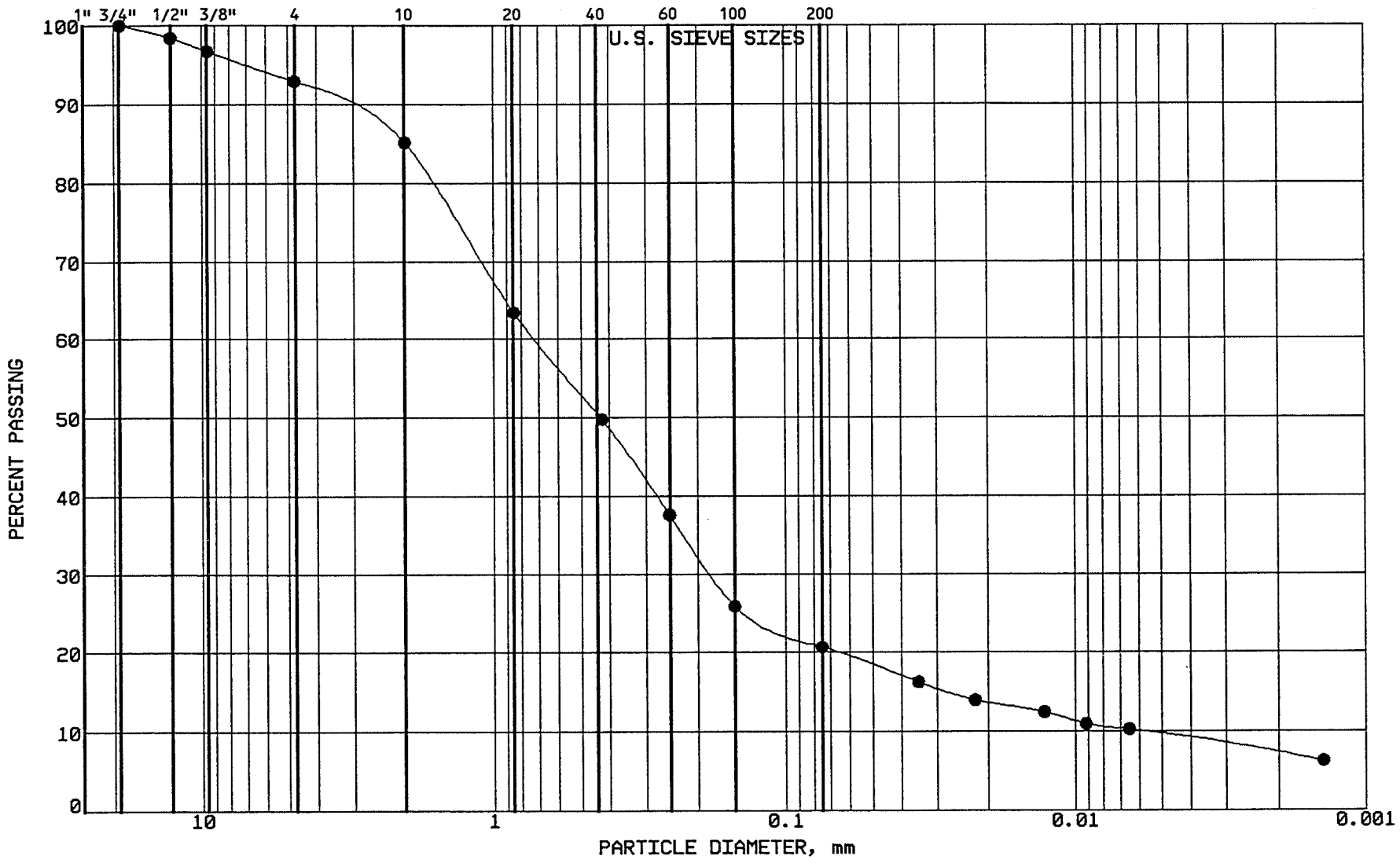
GRAVEL	1.3 %
SAND	36.8 %
SILT	28.9 %
CLAY	33.0 %
P 200	61.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43107.0, E 45345.0
SAMPLE: SGCC595 TUBE #:
ELEVATION: 1882.8'

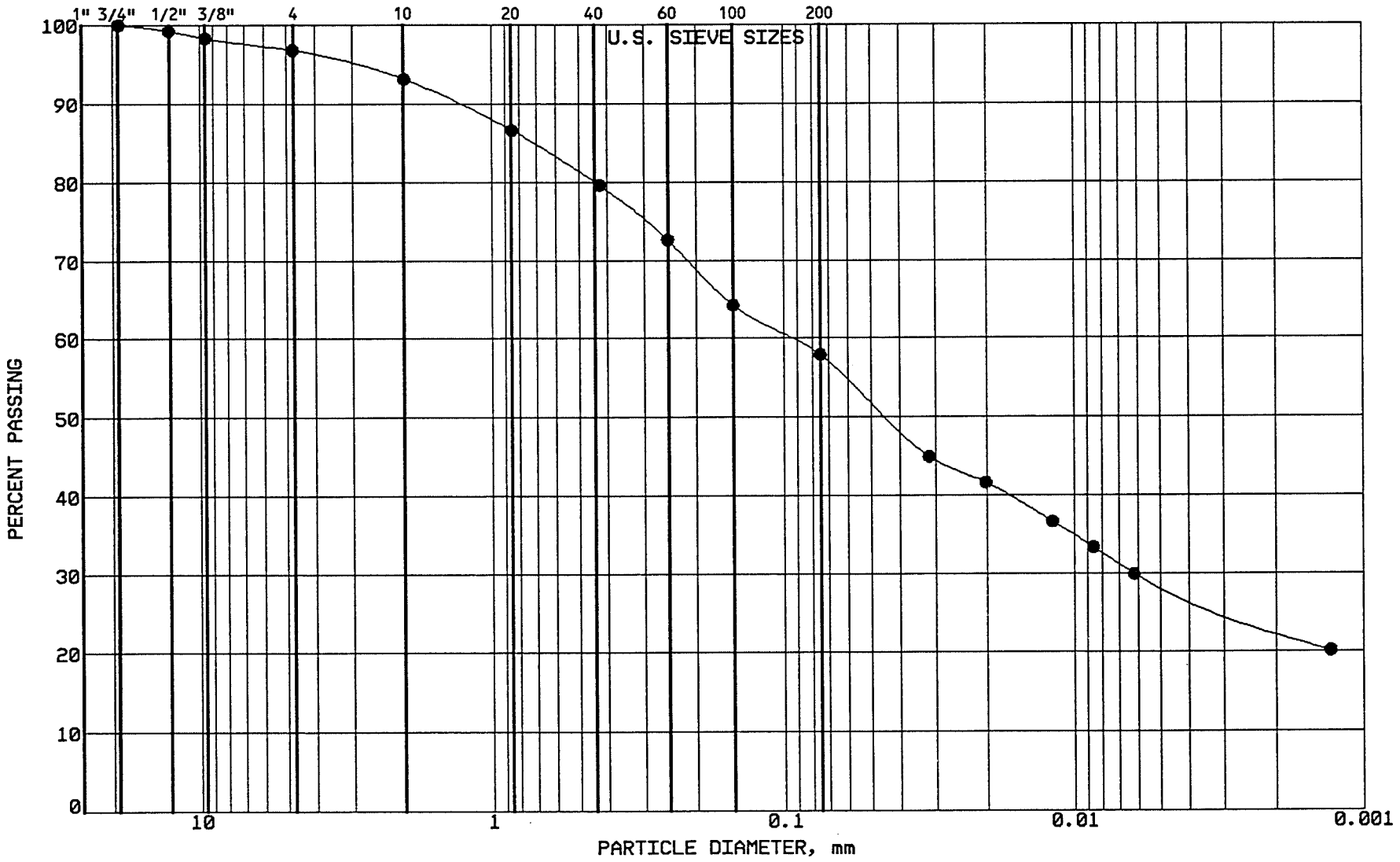
GRAVEL	7.1 %
SAND	72.2 %
SILT	11.1 %
CLAY	9.6 %
P 200	20.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND (SM), gr.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42953.0, E 45334.0
SAMPLE: SGCC596 TUBE #:
ELEVATION: 1880.4'

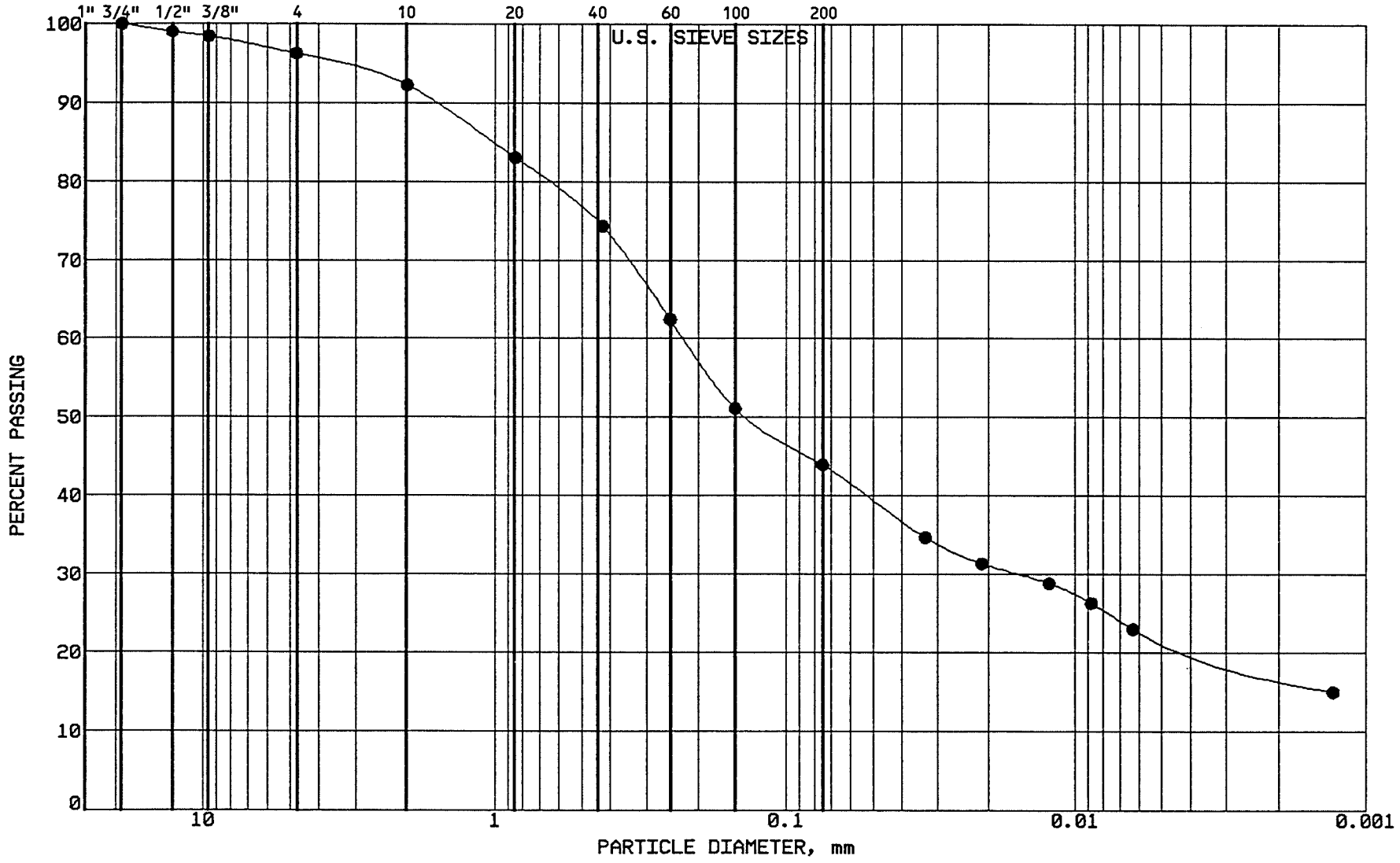
GRAVEL	3.2 %
SAND	38.9 %
SILT	29.3 %
CLAY	28.6 %
P 200	57.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42774.0, E 45318.0
SAMPLE: SGCC597 TUBE #:
ELEVATION: 1879.0'

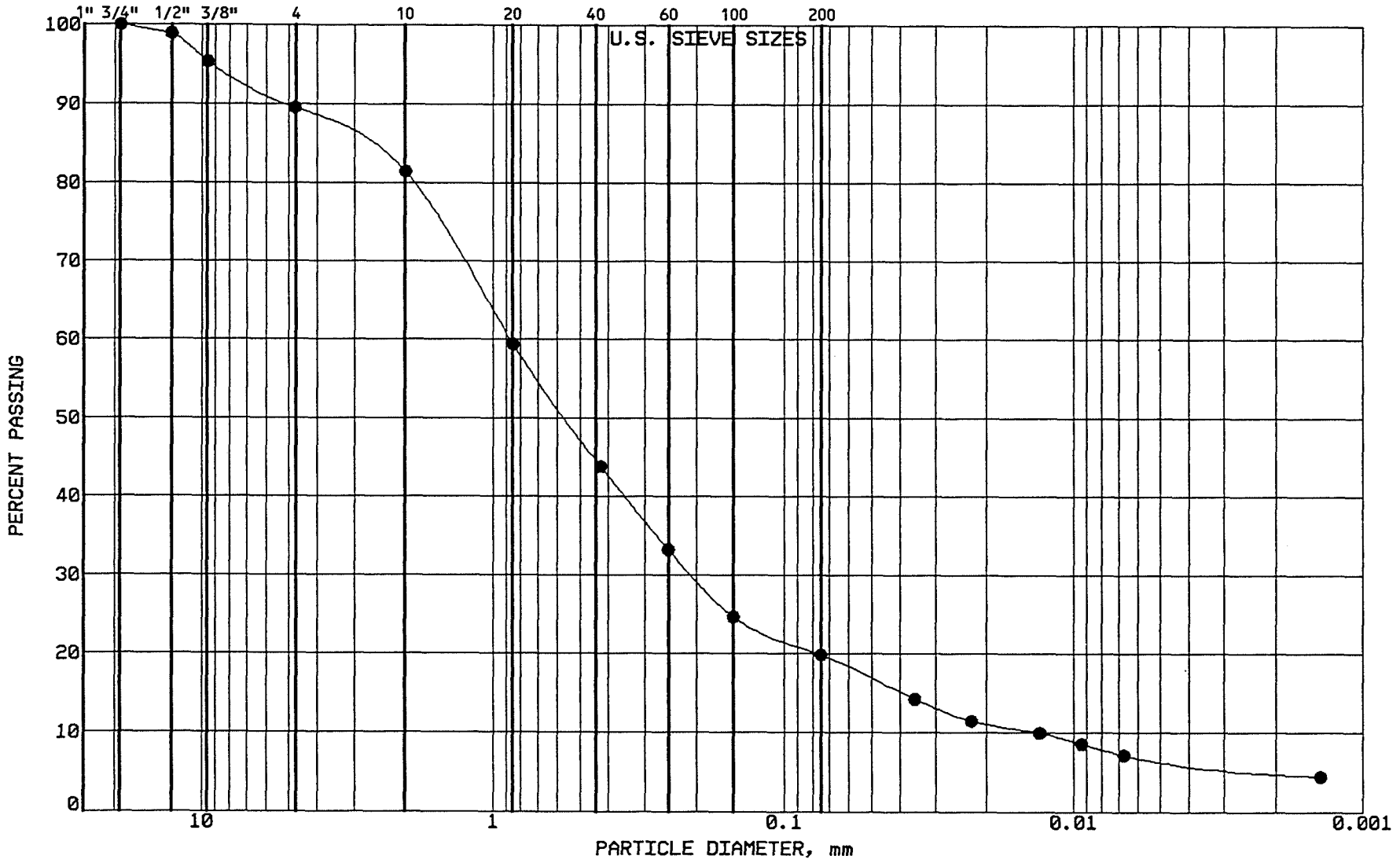
GRAVEL	3.8 %
SAND	52.3 %
SILT	22.1 %
CLAY	21.8 %
P 200	43.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND (SM), olive br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

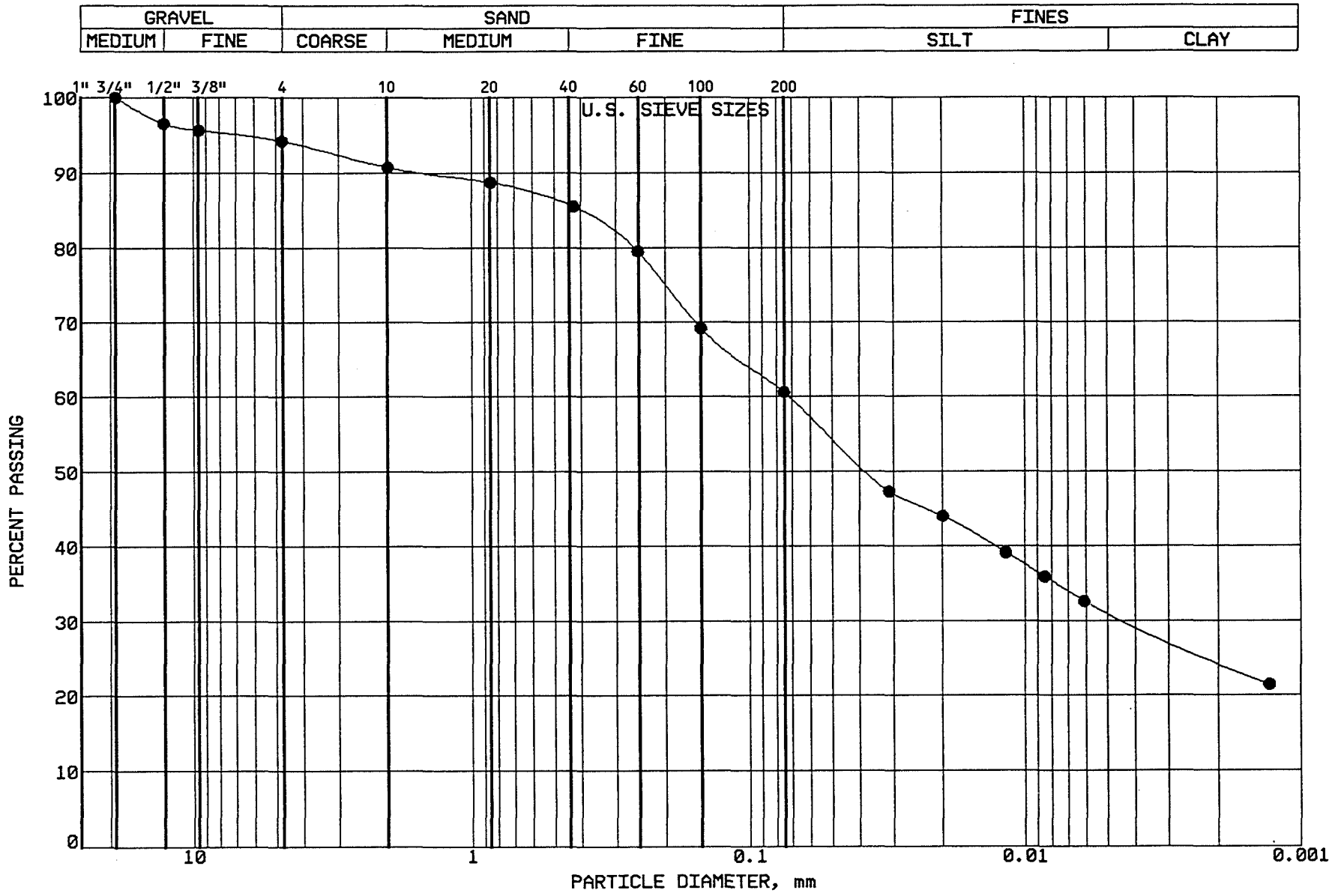
LOCATION: N 42610.0, E 45300.0
SAMPLE: SGCC598 TUBE #:
ELEVATION: 1879.1'

GRAVEL	10.5 %
SAND	69.6 %
SILT	13.2 %
CLAY	6.7 %
P 200	19.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND (SM)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42999.0, E 44687.0
SAMPLE: CLBCC599 TUBE #: ST-173
ELEVATION: 1886.3'

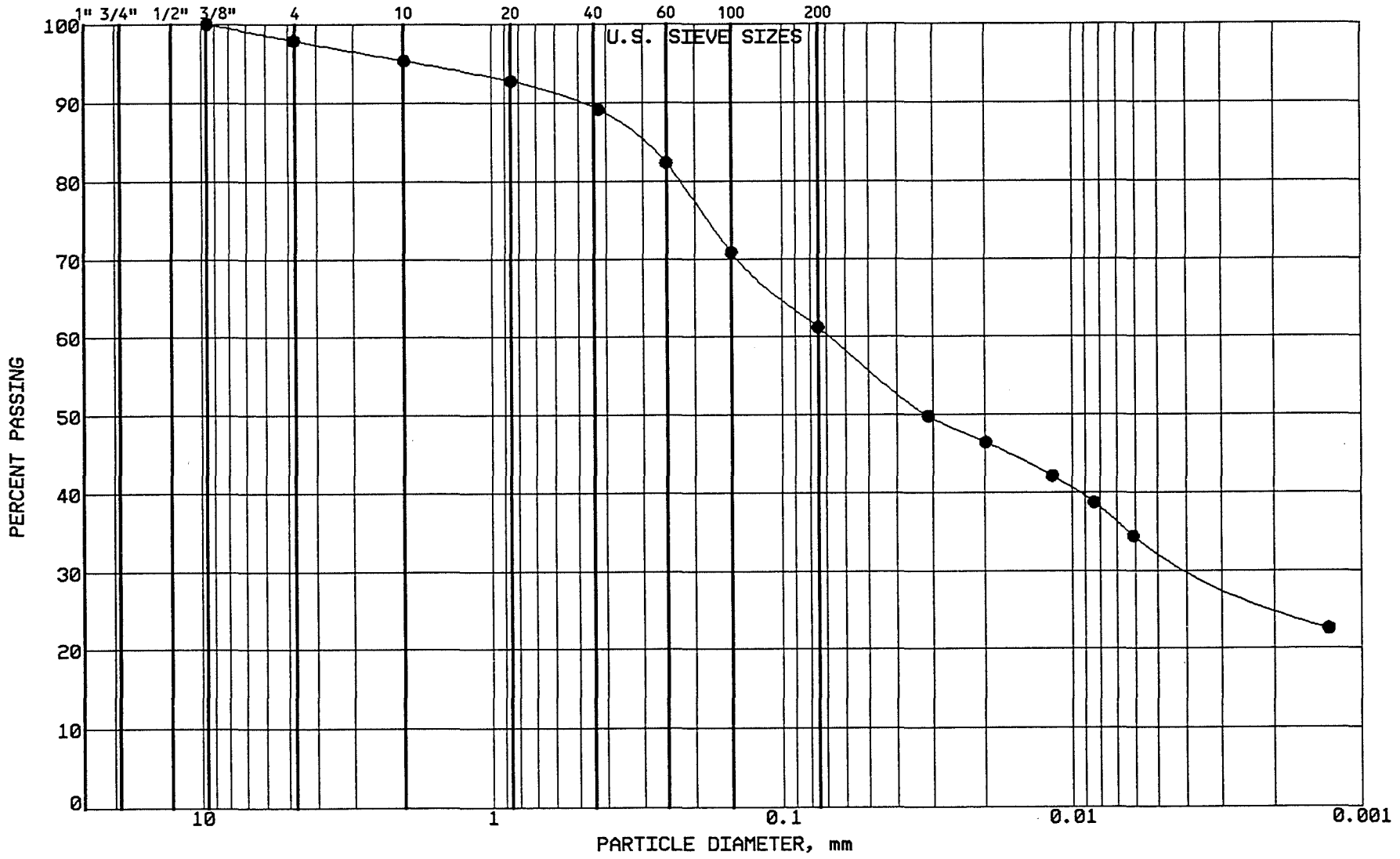
GRAVEL	5.8 %
SAND	33.6 %
SILT	29.4 %
CLAY	31.2 %
P 200	60.6 %

SOIL PROPERTIES

LL: 43.0%
PL: 17.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42995.0, E 44904.0
SAMPLE: CLBCC600 TUBE #: ST-174
ELEVATION: 1886.1'

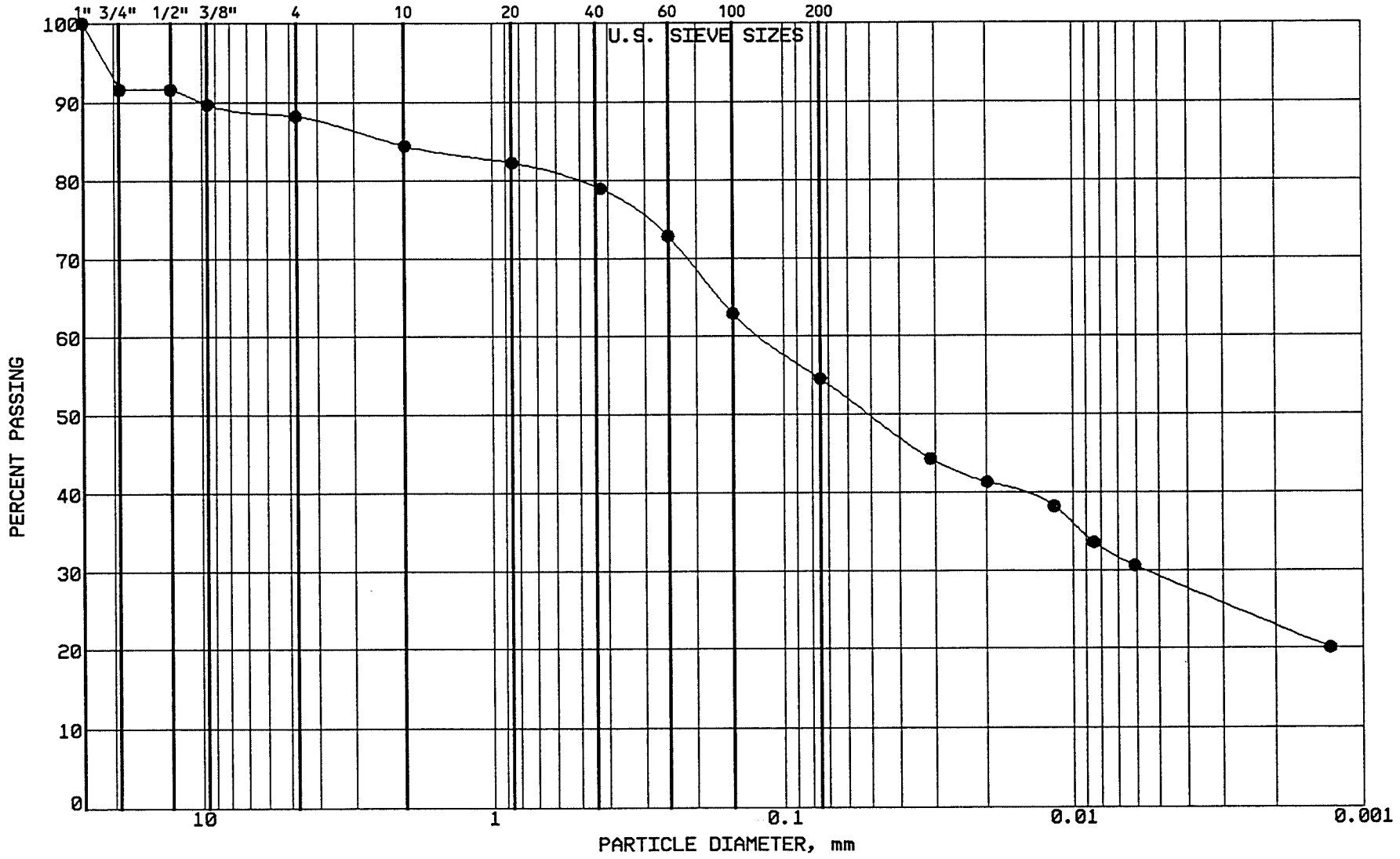
GRAVEL	2.1 %
SAND	36.7 %
SILT	28.3 %
CLAY	32.9 %
P 200	61.2 %

SOIL PROPERTIES

LL: 43.0%
PL: 16.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42991.0, E 45086.0
SAMPLE: CLBCC601 TUBE #:ST-175
ELEVATION: 1886.0'

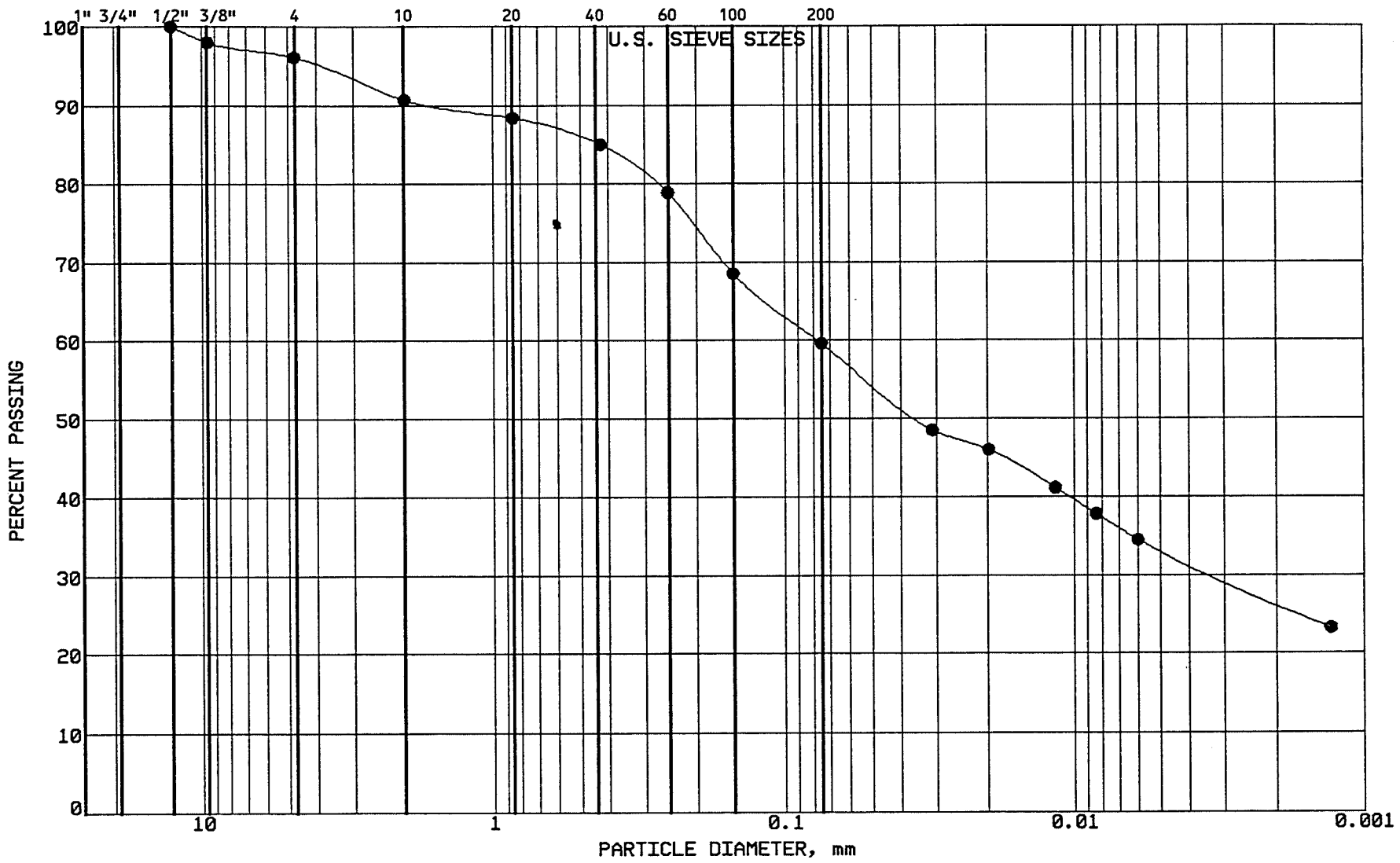
GRAVEL	11.8 %
SAND	33.6 %
SILT	25.4 %
CLAY	29.2 %
P 200	54.6 %

SOIL PROPERTIES

LL: 45.0%
PL: 17.0%
PI: 28.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

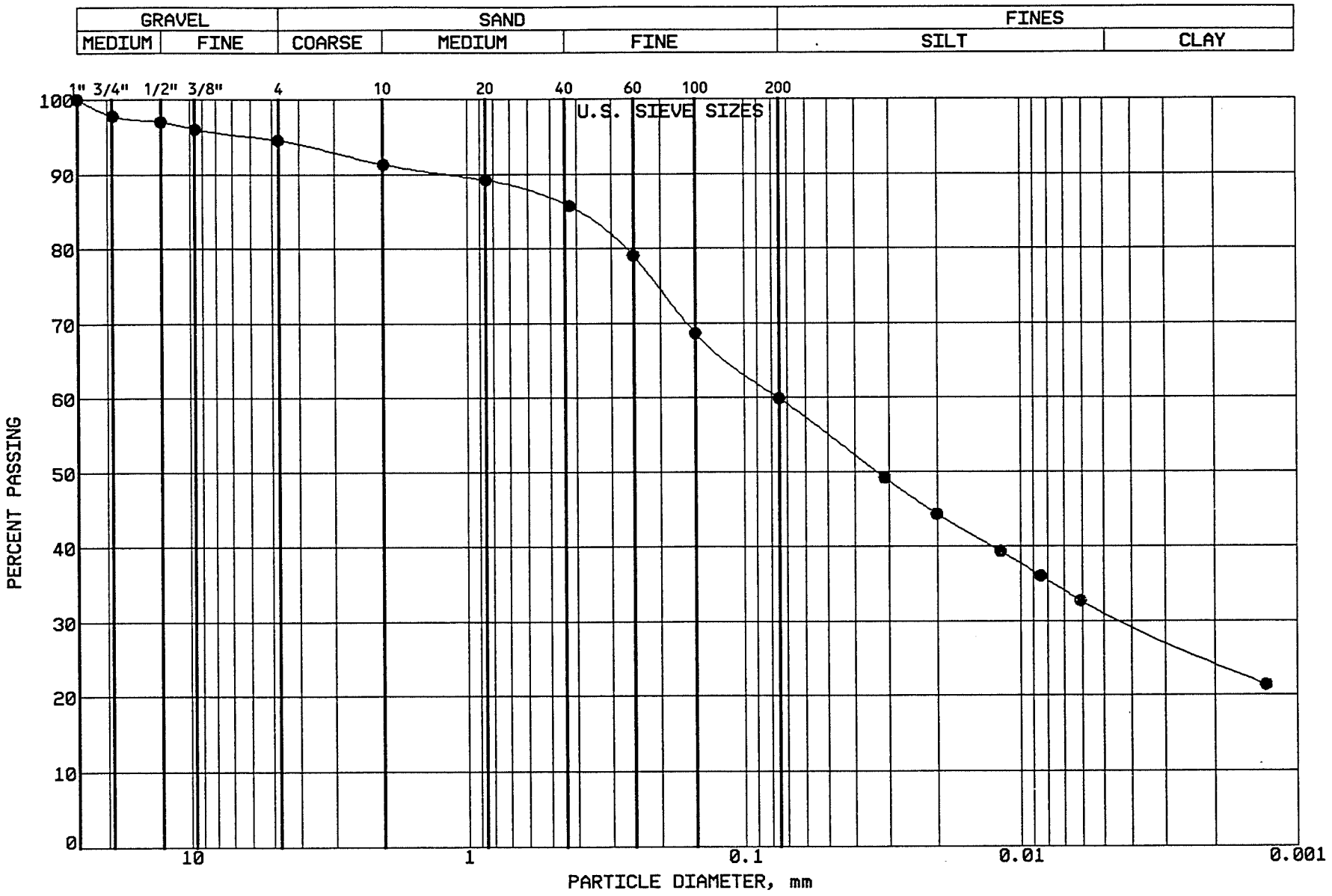
LOCATION: N 43190.0, E 44889.0
SAMPLE: CLBCC602 TUBE #:ST-176
ELEVATION: 1887.3'

GRAVEL	3.9 %
SAND	36.5 %
SILT	26.4 %
CLAY	33.2 %
P 200	59.6 %

SOIL PROPERTIES

LL: 44.0%
PL: 17.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42821.0, E 44667.0
SAMPLE: CLBCC603 TUBE #: ST-177
ELEVATION: 1885.5'

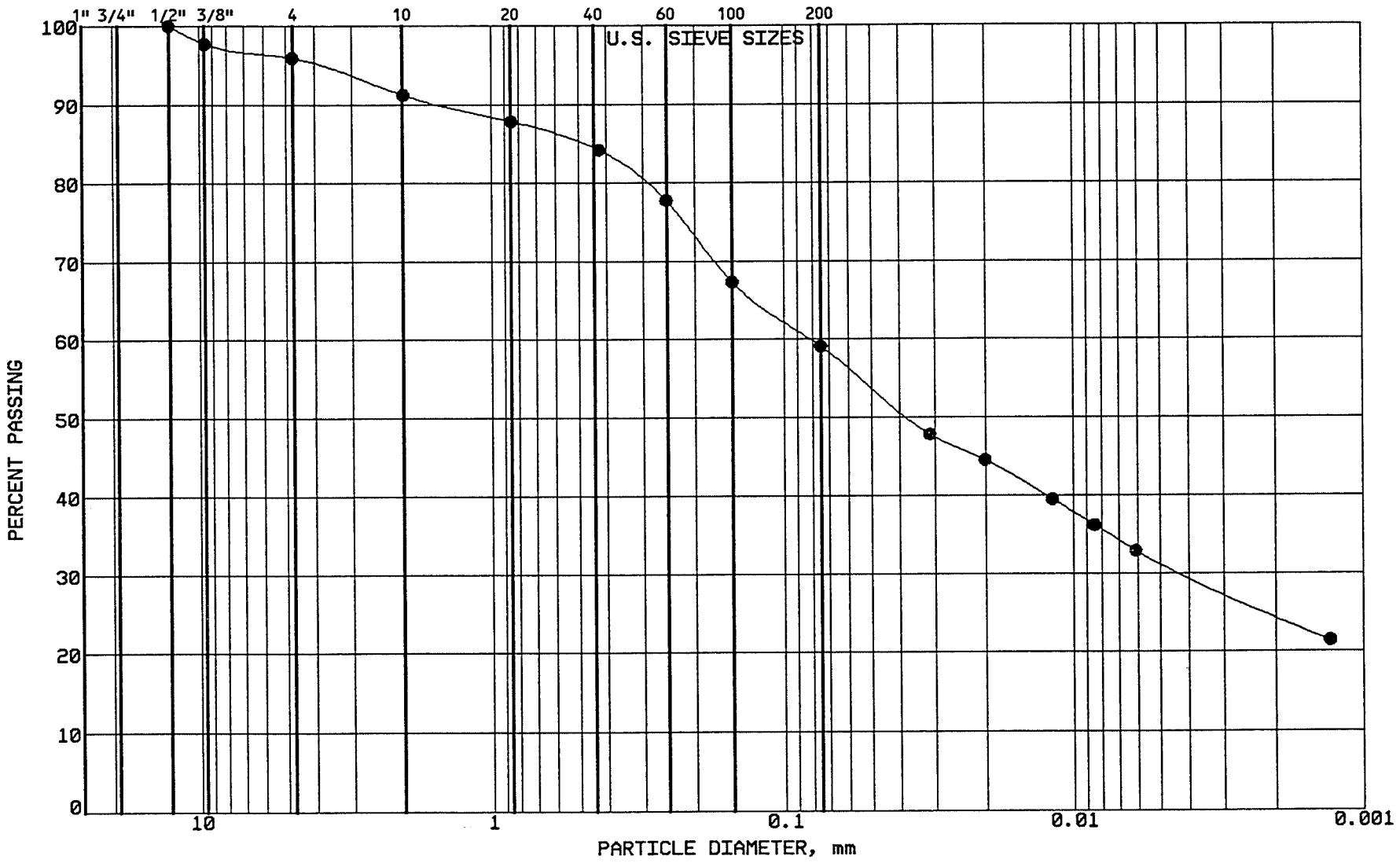
GRAVEL	5.5 %
SAND	34.6 %
SILT	28.7 %
CLAY	31.2 %
P 200	59.9 %

SOIL PROPERTIES

LL: 44.0%
PL: 17.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42810.0, E 44866.0
SAMPLE: CLBCC604 TUBE #: ST-178
ELEVATION: 1885.6'

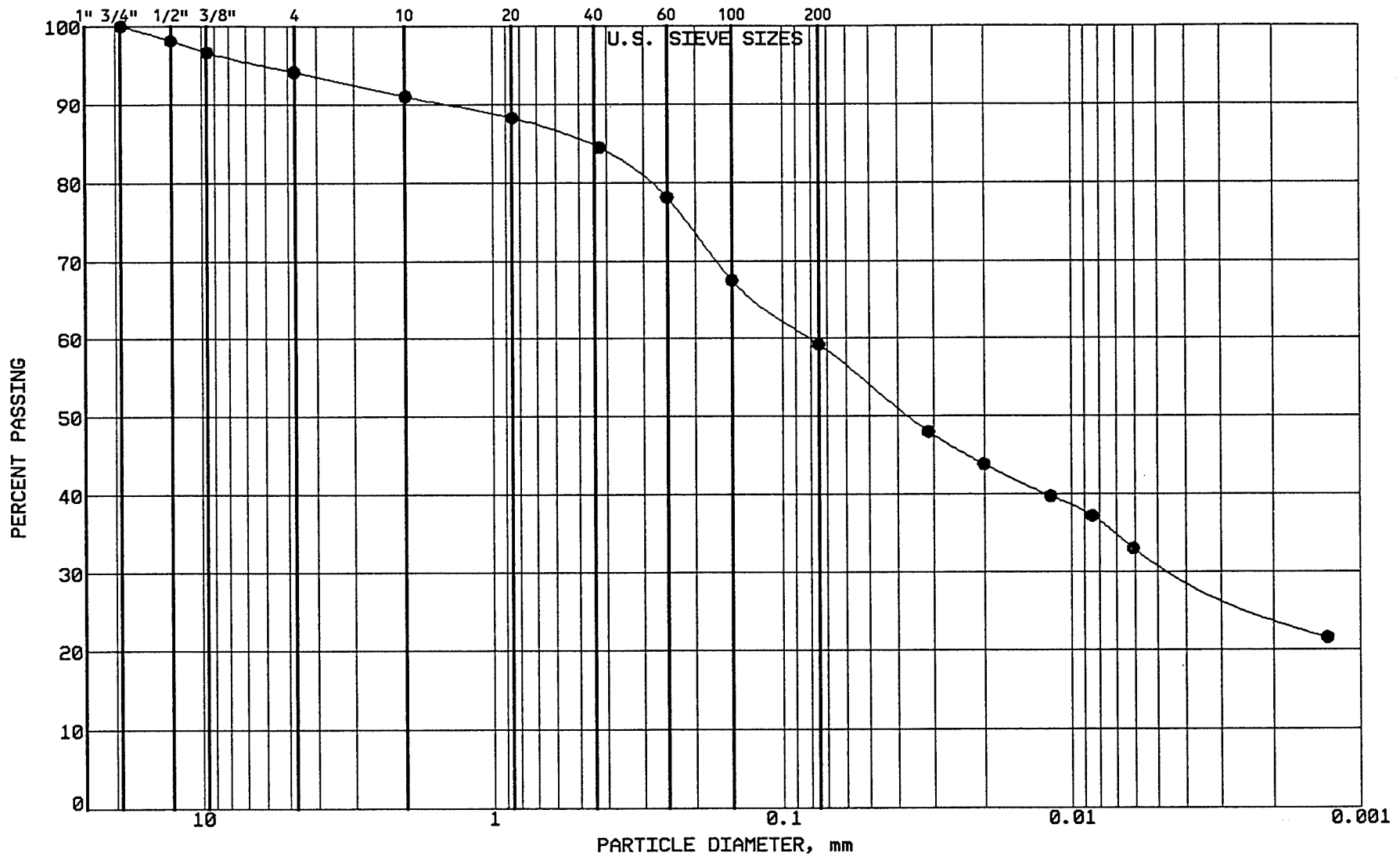
GRAVEL	4.1 %
SAND	36.8 %
SILT	27.7 %
CLAY	31.4 %
P 200	59.1 %

SOIL PROPERTIES

LL: 45.0%
PL: 18.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

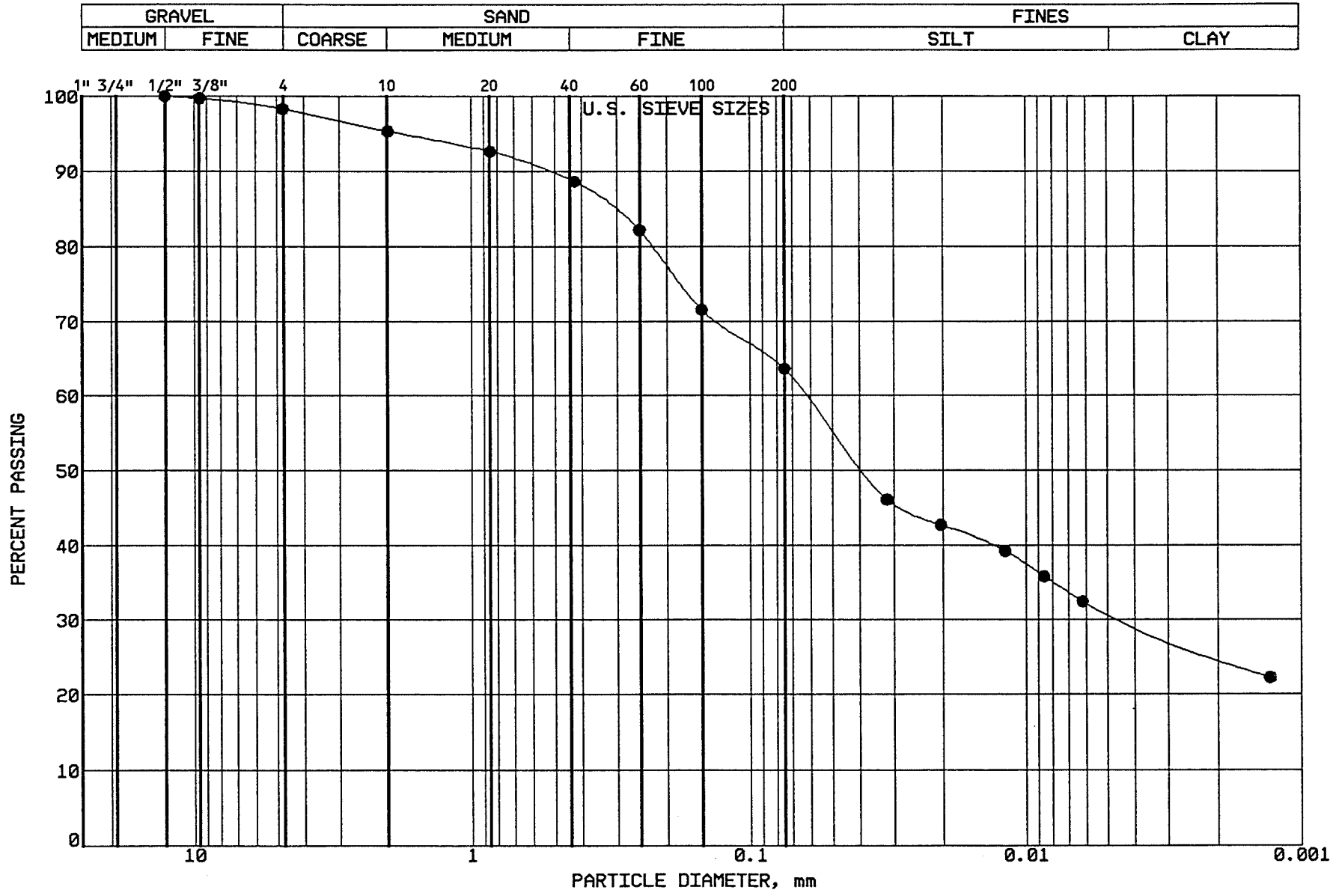
LOCATION: N 42799.0, E 45046.0
SAMPLE: CLBCC605 TUBE #:ST-179
ELEVATION: 1885.4'

GRAVEL	5.9 %
SAND	34.9 %
SILT	27.7 %
CLAY	31.5 %
P 200	59.2 %

SOIL PROPERTIES

LL: 43.0%
PL: 17.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42664.0, E 45383.0
SAMPLE: SGCC606 TUBE #:
ELEVATION: 1878.2'

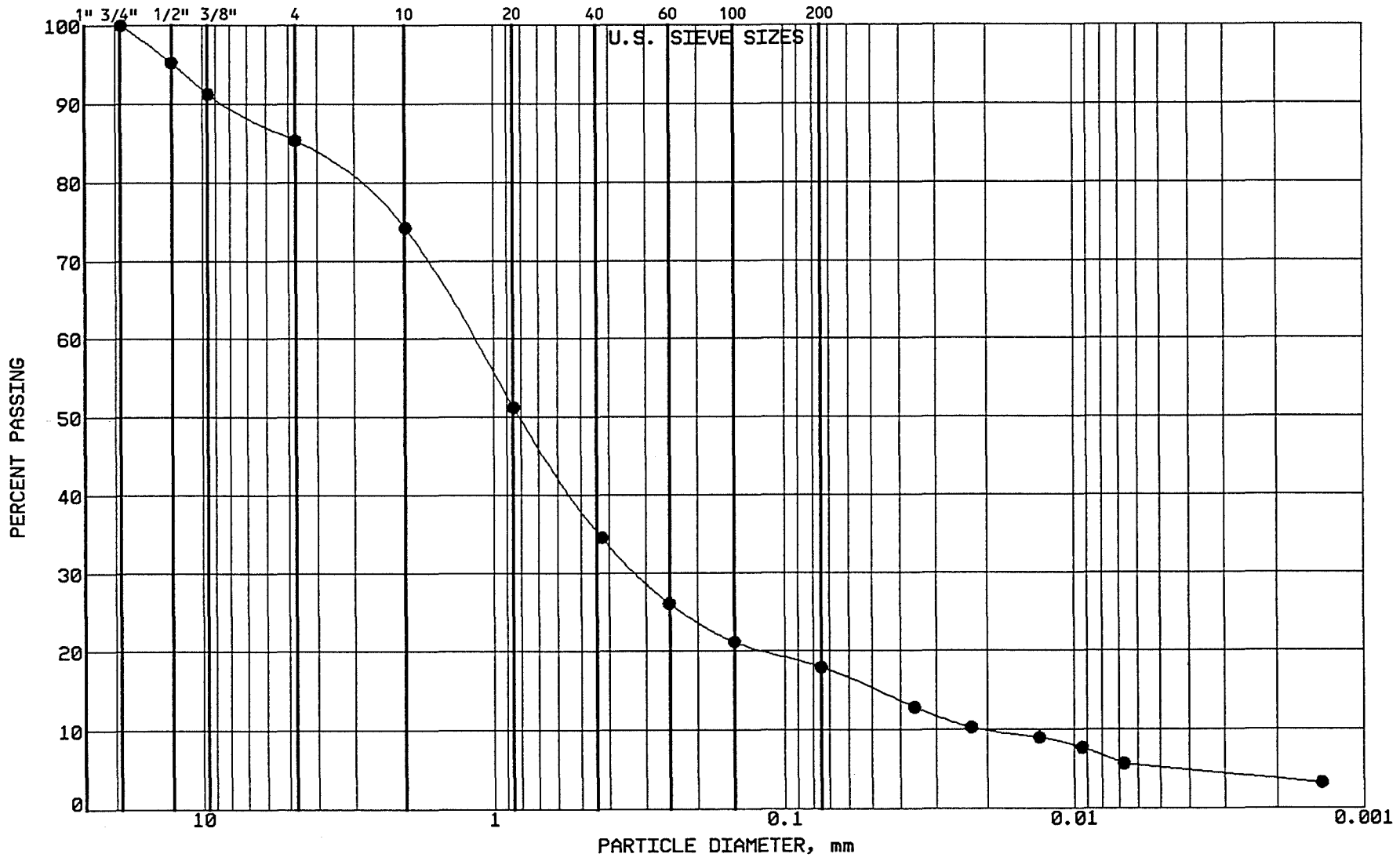
GRAVEL	1.7 %
SAND	34.7 %
SILT	32.6 %
CLAY	31.0 %
P 200	63.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42640.0, E 45581.0
SAMPLE: SGCC607 TUBE #:
ELEVATION: 1879.7'

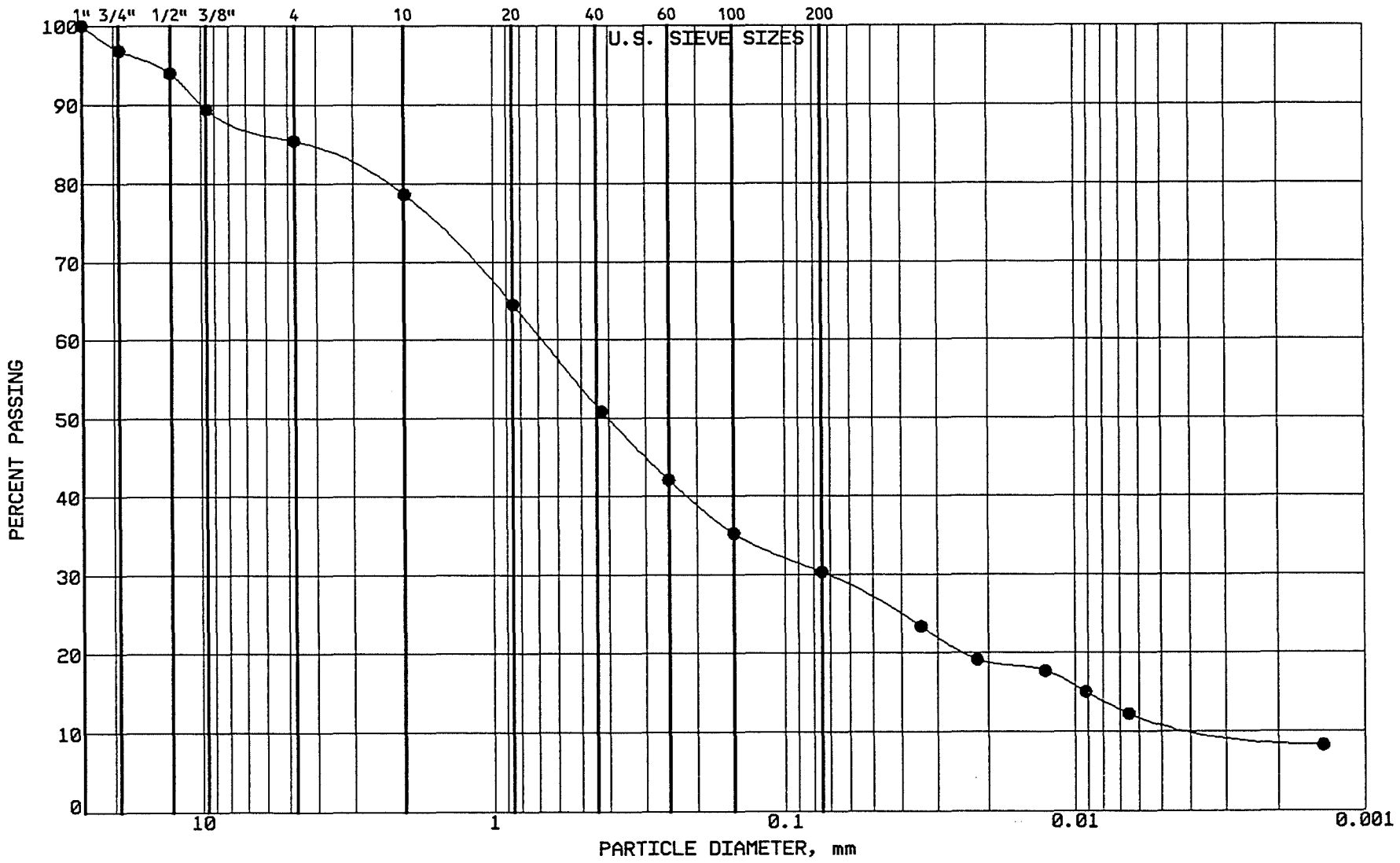
GRAVEL	14.7 %
SAND	67.3 %
SILT	12.7 %
CLAY	5.3 %
P 200	18.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND (SM), yellowish-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

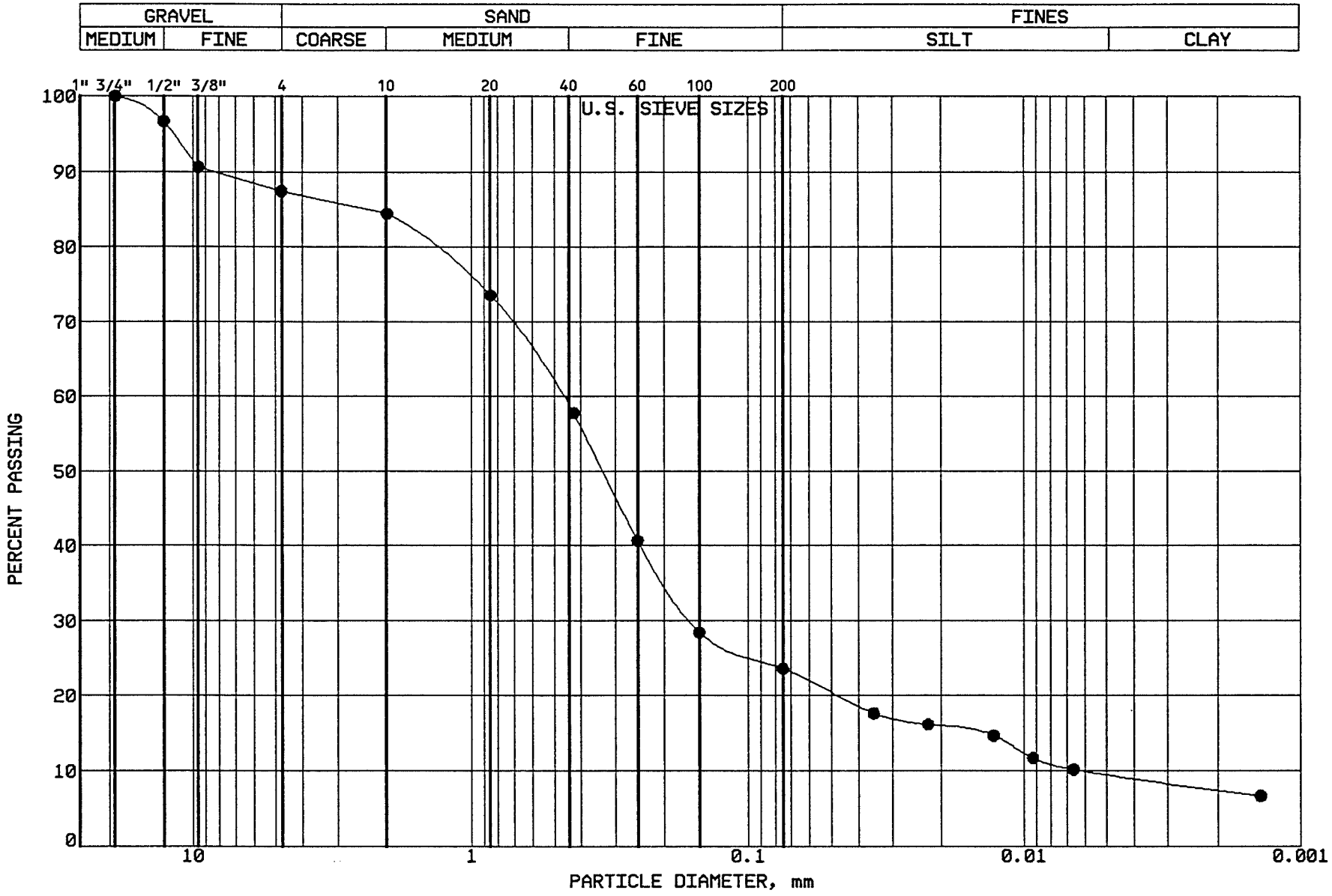
LOCATION: N 42822.0, E 45593.0
SAMPLE: SGCC608 TUBE #:
ELEVATION: 1880.7'

GRAVEL	14.6 %
SAND	55.1 %
SILT	18.7 %
CLAY	11.6 %
P 200	30.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND (SM), olive br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42833.0, E 45401.0
SAMPLE: SGCC609 TUBE #:
ELEVATION: 1878.7'

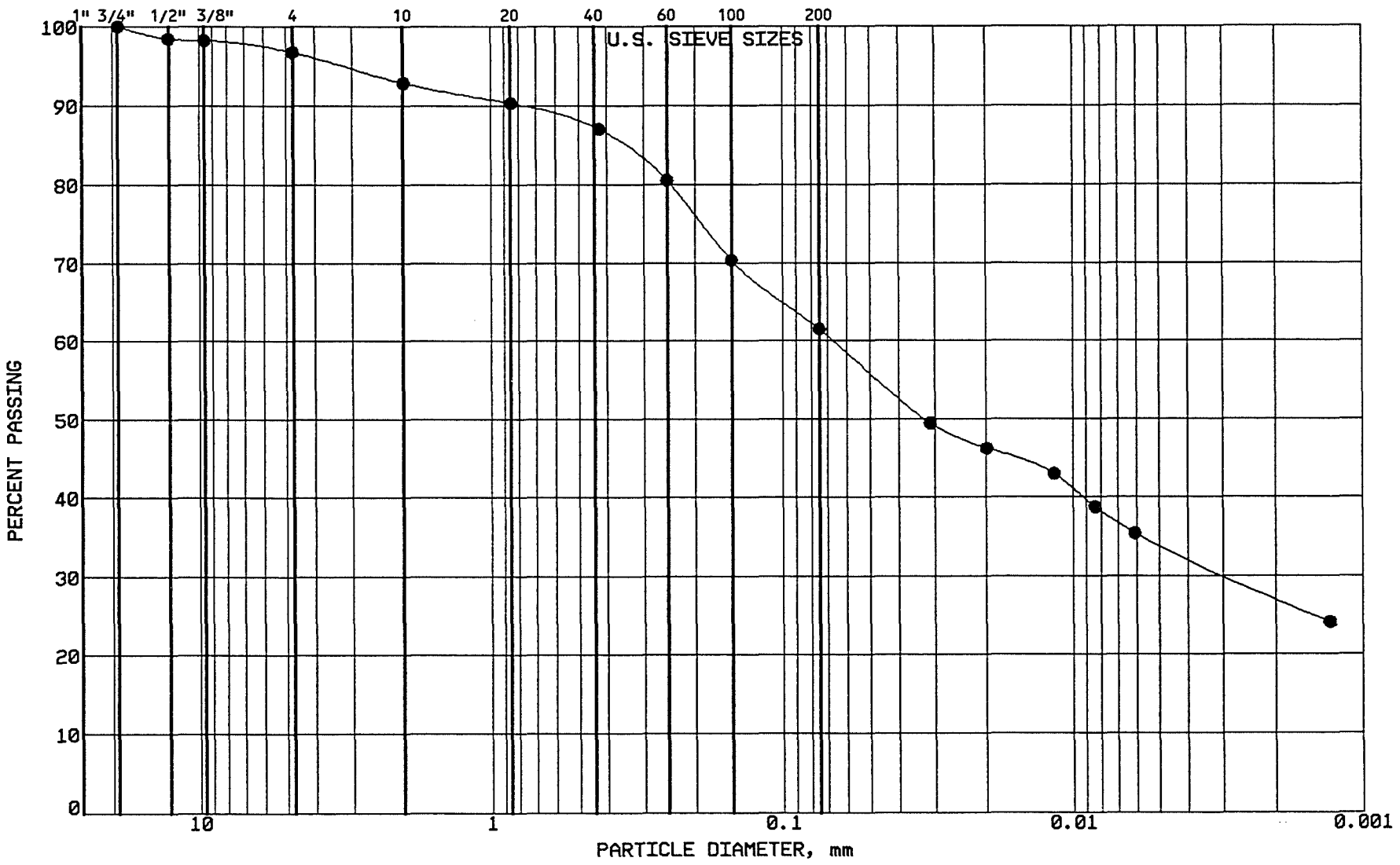
GRAVEL	12.6 %
SAND	63.8 %
SILT	14.0 %
CLAY	9.6 %
P 200	23.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND (SM), very dk.gr.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42608.0, E 45072.0
SAMPLE: CLBCC610 TUBE #: ST-180
ELEVATION: 1883.8'

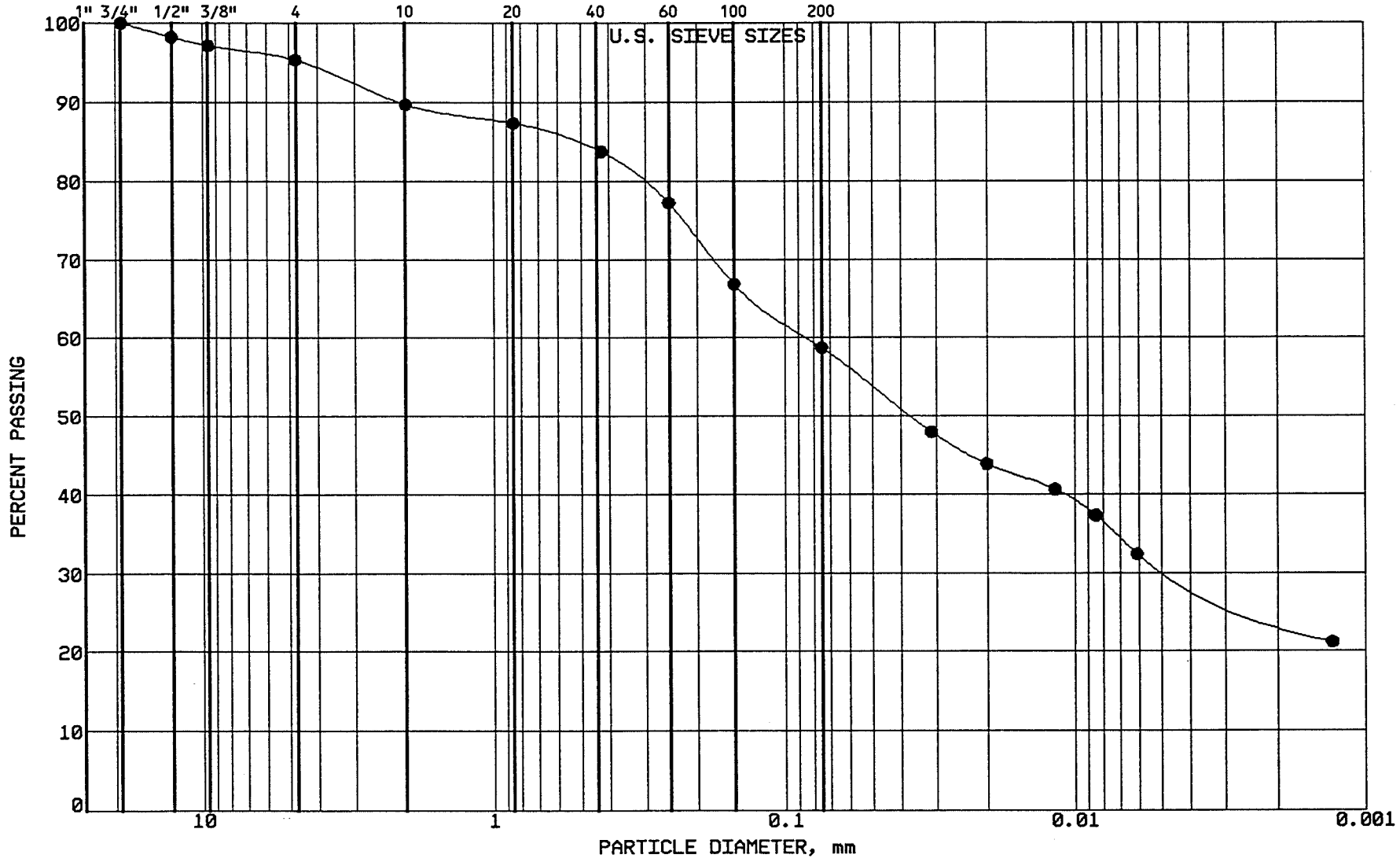
GRAVEL	3.3 %
SAND	35.2 %
SILT	27.6 %
CLAY	33.9 %
P 200	61.5 %

SOIL PROPERTIES

LL: 44.0%
PL: 17.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42611.0, E 44886.0
SAMPLE: CLBCC611 TUBE #: ST-181
ELEVATION: 1884.0'

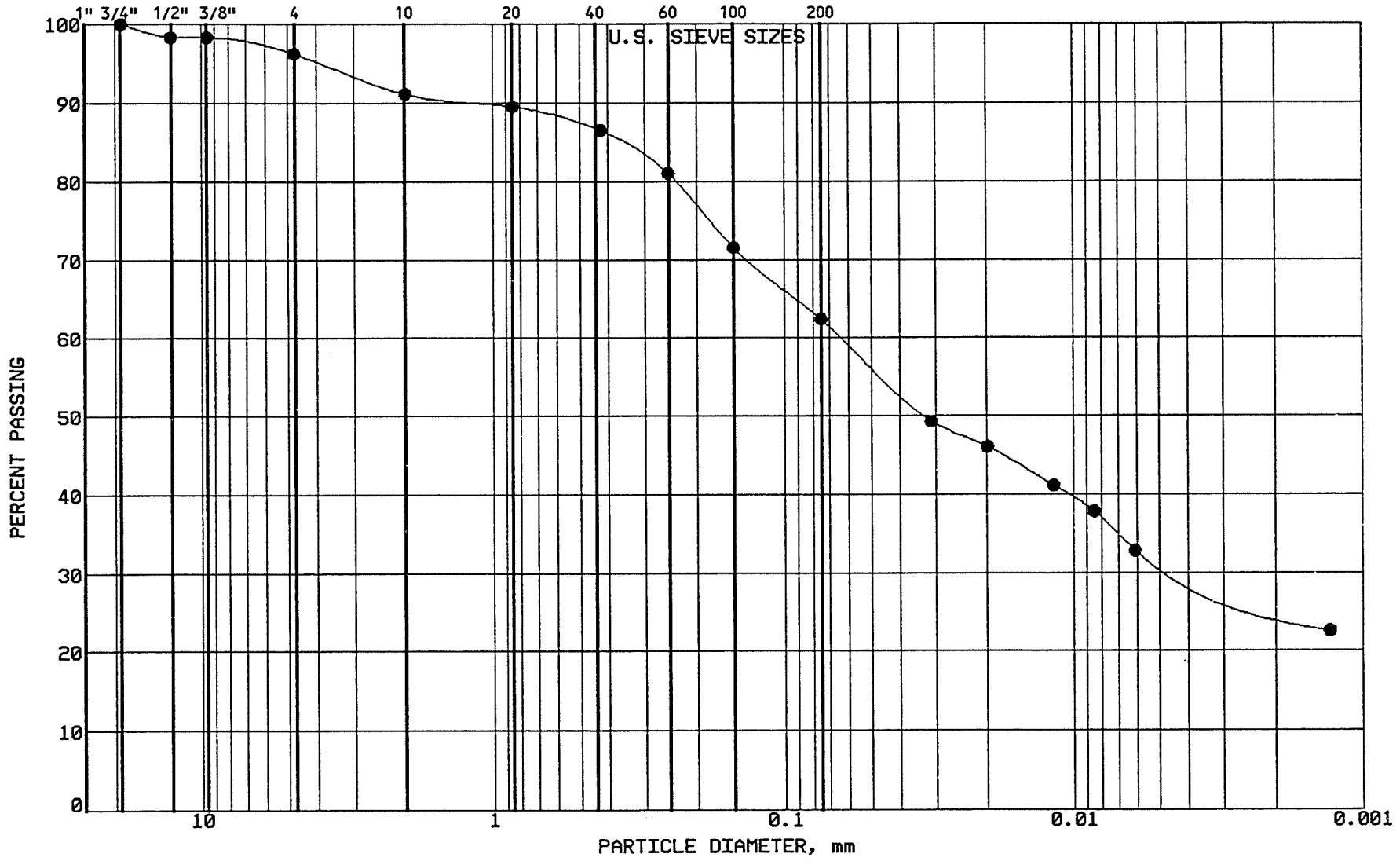
GRAVEL	4.7 %
SAND	36.6 %
SILT	27.7 %
CLAY	31.0 %
P 200	58.7 %

SOIL PROPERTIES

LL: 43.0%
PL: 18.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42612.0, E 44652.0
SAMPLE: CLBCC612 TUBE #: ST-182
ELEVATION: 1884.0'

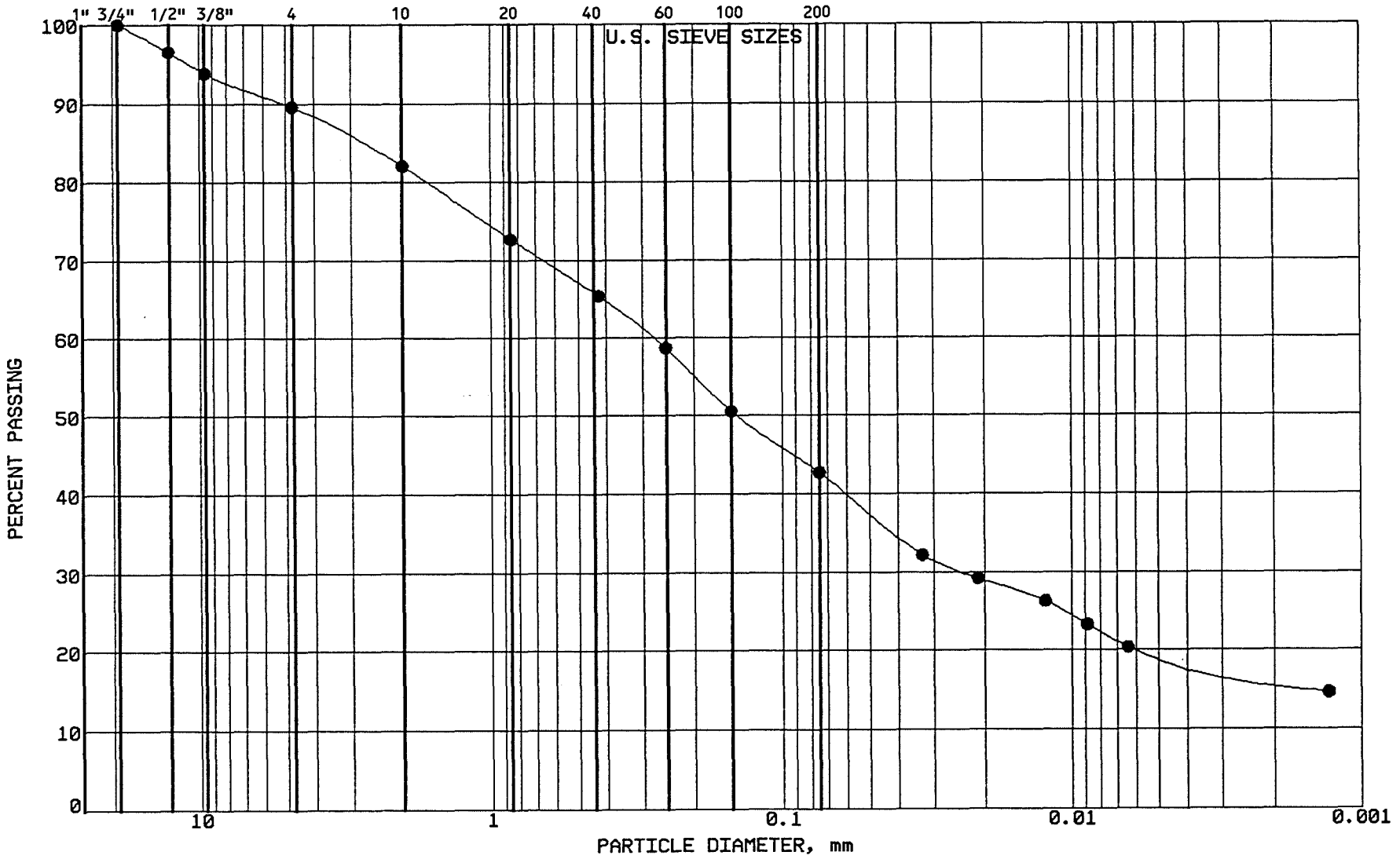
GRAVEL	3.8 %
SAND	33.8 %
SILT	30.9 %
CLAY	31.5 %
P 200	62.4 %

SOIL PROPERTIES

LL: 41.0%
PL: 17.0%
PI: 24.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

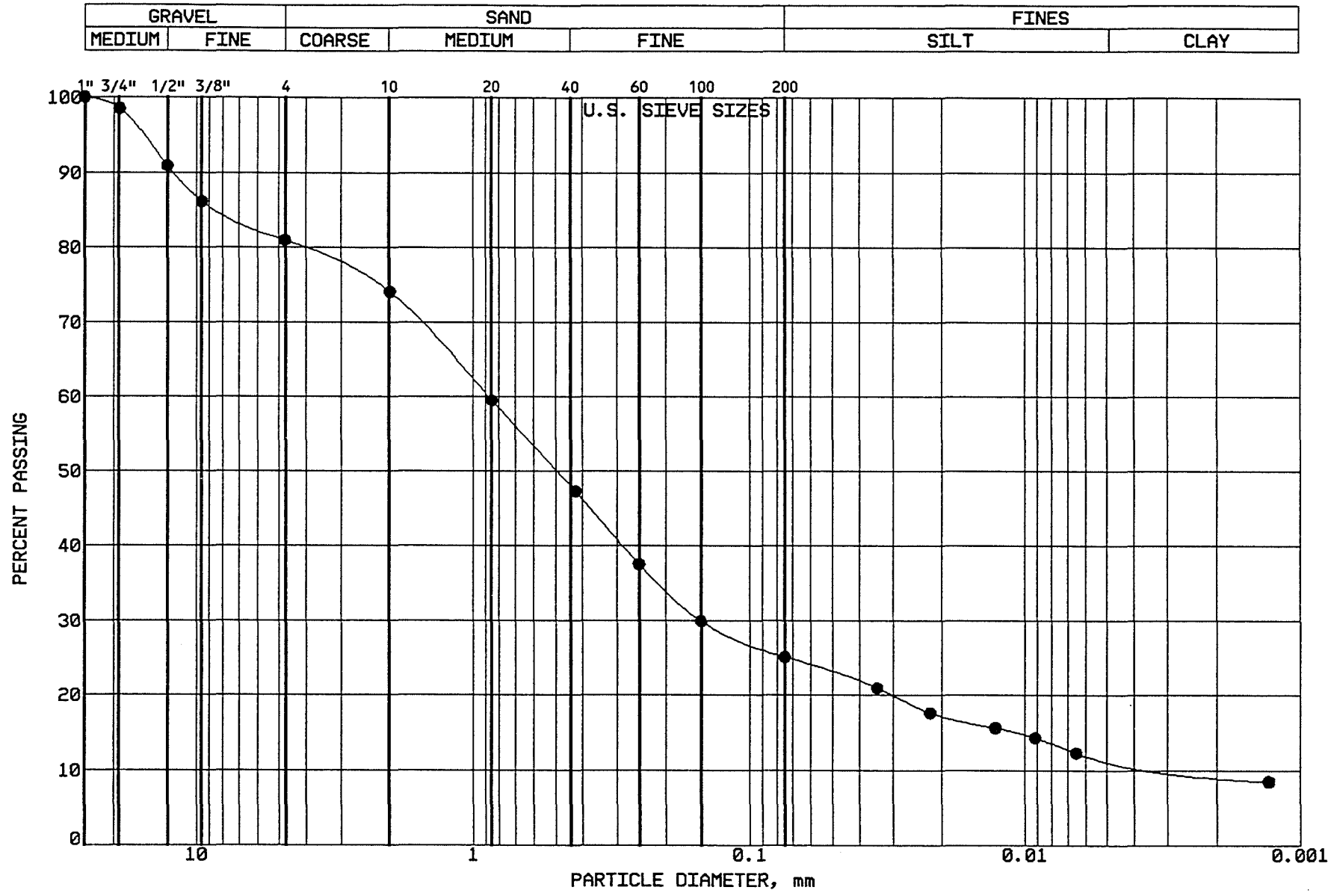
LOCATION: N 43326.0, E 45337.0
SAMPLE: SGCC613 TUBE #:
ELEVATION: 1884.9'

GRAVEL	10.4 %
SAND	46.9 %
SILT	23.2 %
CLAY	19.5 %
P 200	42.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND (SM) olive br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43142.0, E 43318.0
SAMPLE: SGCC614 TUBE #:
ELEVATION: 1883.4'

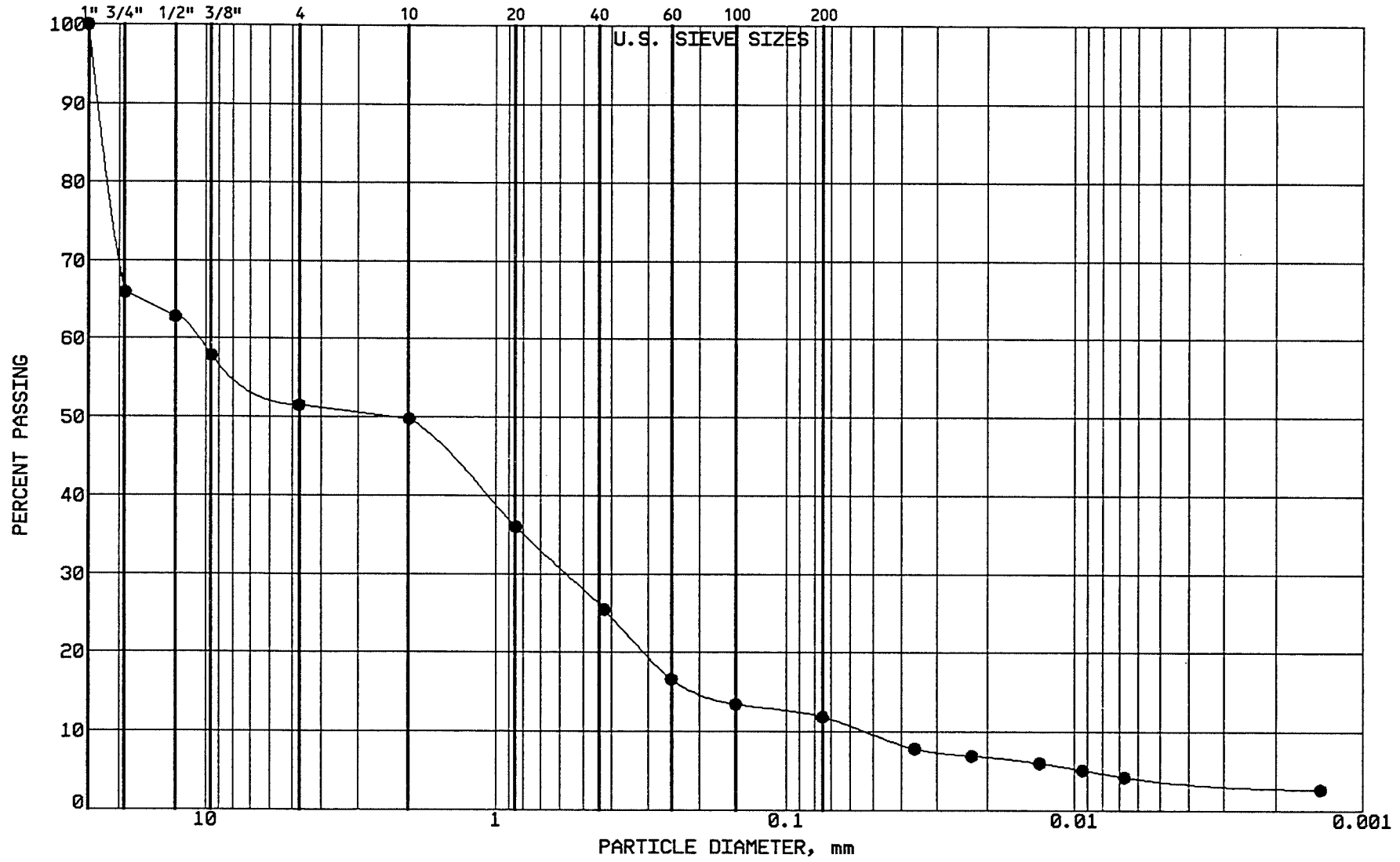
GRAVEL	19.1 %
SAND	55.8 %
SILT	13.3 %
CLAY	11.8 %
P 200	25.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND with GR. (SM), dk.gr.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

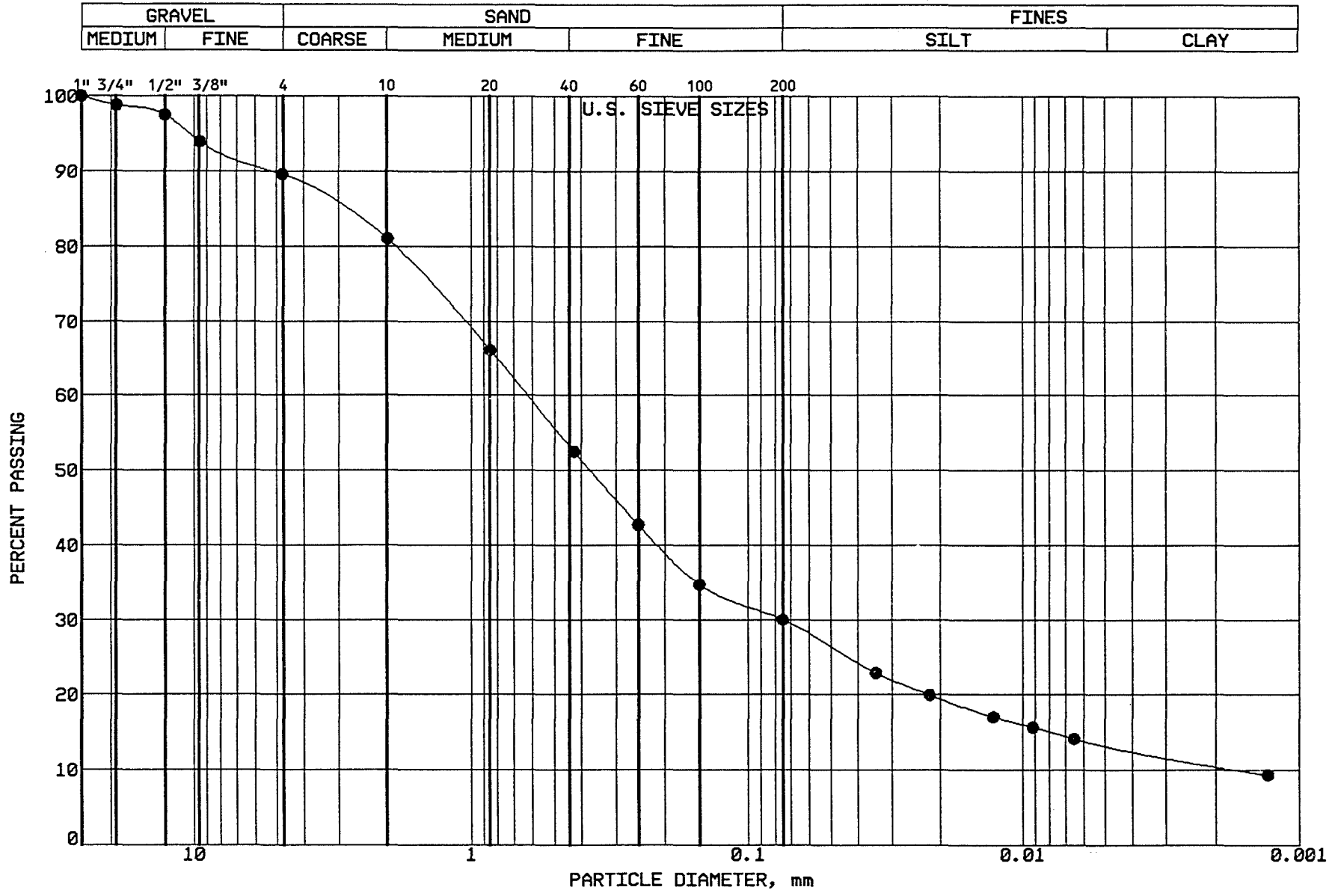
LOCATION: N 42996.0, E 43303.0
SAMPLE: SGCC615 TUBE #:
ELEVATION: 1882.0'

GRAVEL	48.5 %
SAND	39.6 %
SILT	7.9 %
CLAY	4.0 %
P 200	11.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY GRAVEL with SAND (GM), dk.gr.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42775.0, E 43294.0
SAMPLE: SGCC616 TUBE #:
ELEVATION: 1880.7'

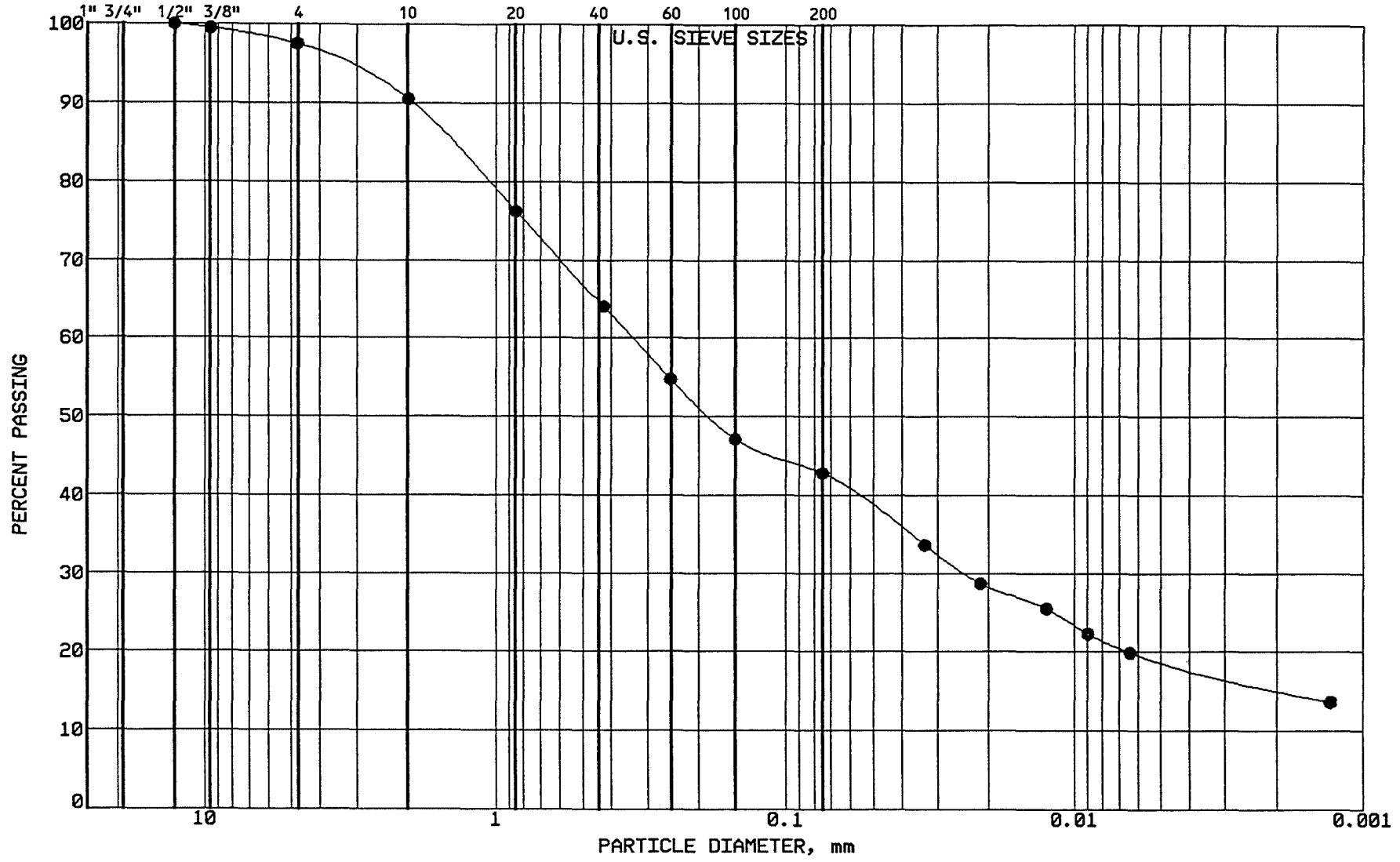
GRAVEL	10.4 %
SAND	59.6 %
SILT	16.6 %
CLAY	13.4 %
P 200	30.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND (SM), dk.gr.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42627.0, E 45284.0
SAMPLE: SGCC617 TUBE #:
ELEVATION: 1880.2'

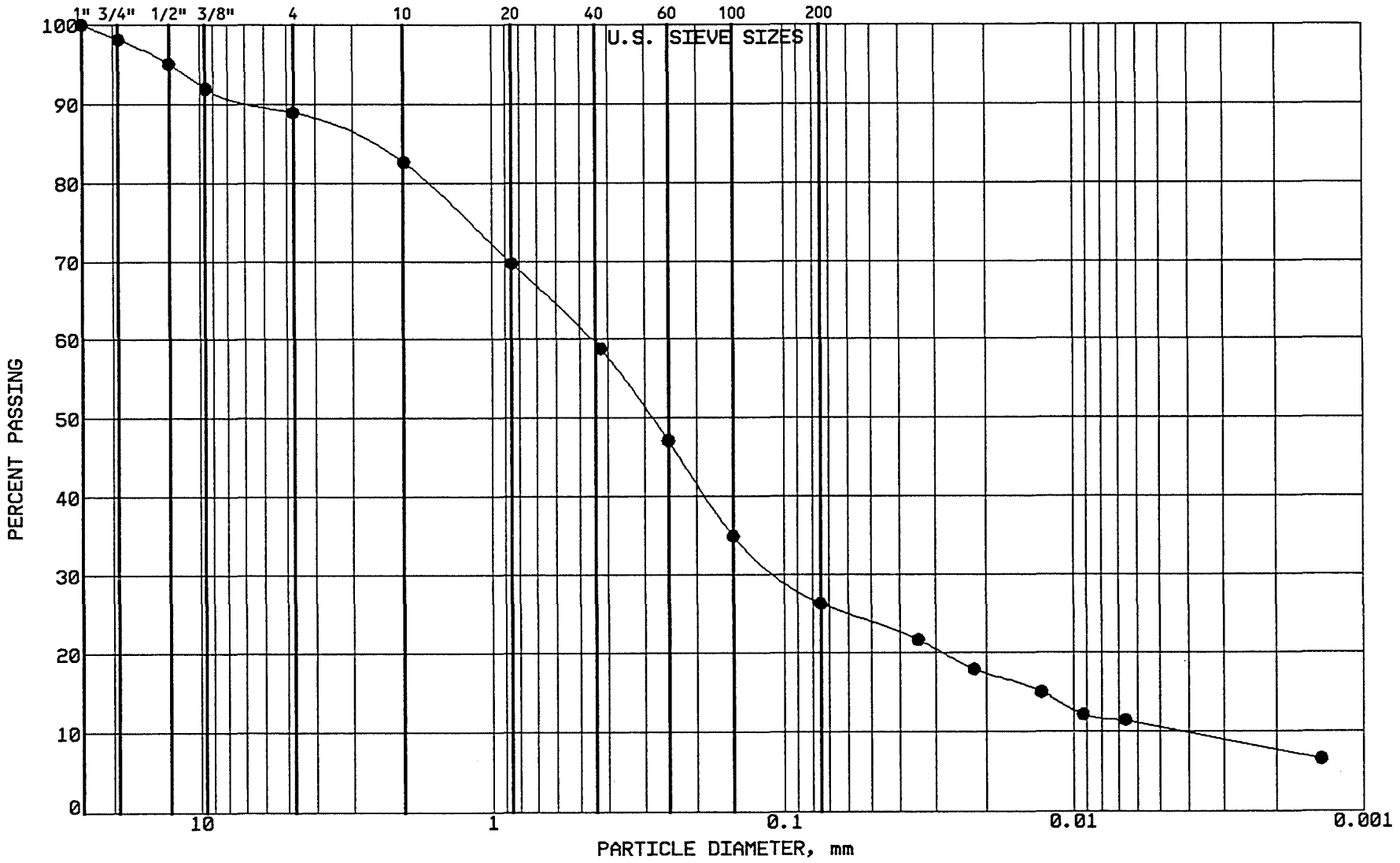
GRAVEL	2.5 %
SAND	54.7 %
SILT	23.9 %
CLAY	18.9 %
P 200	42.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND (SM)

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42854.0, E 45492.0
SAMPLE: SGCC618 TUBE #:
ELEVATION: 1881.2'

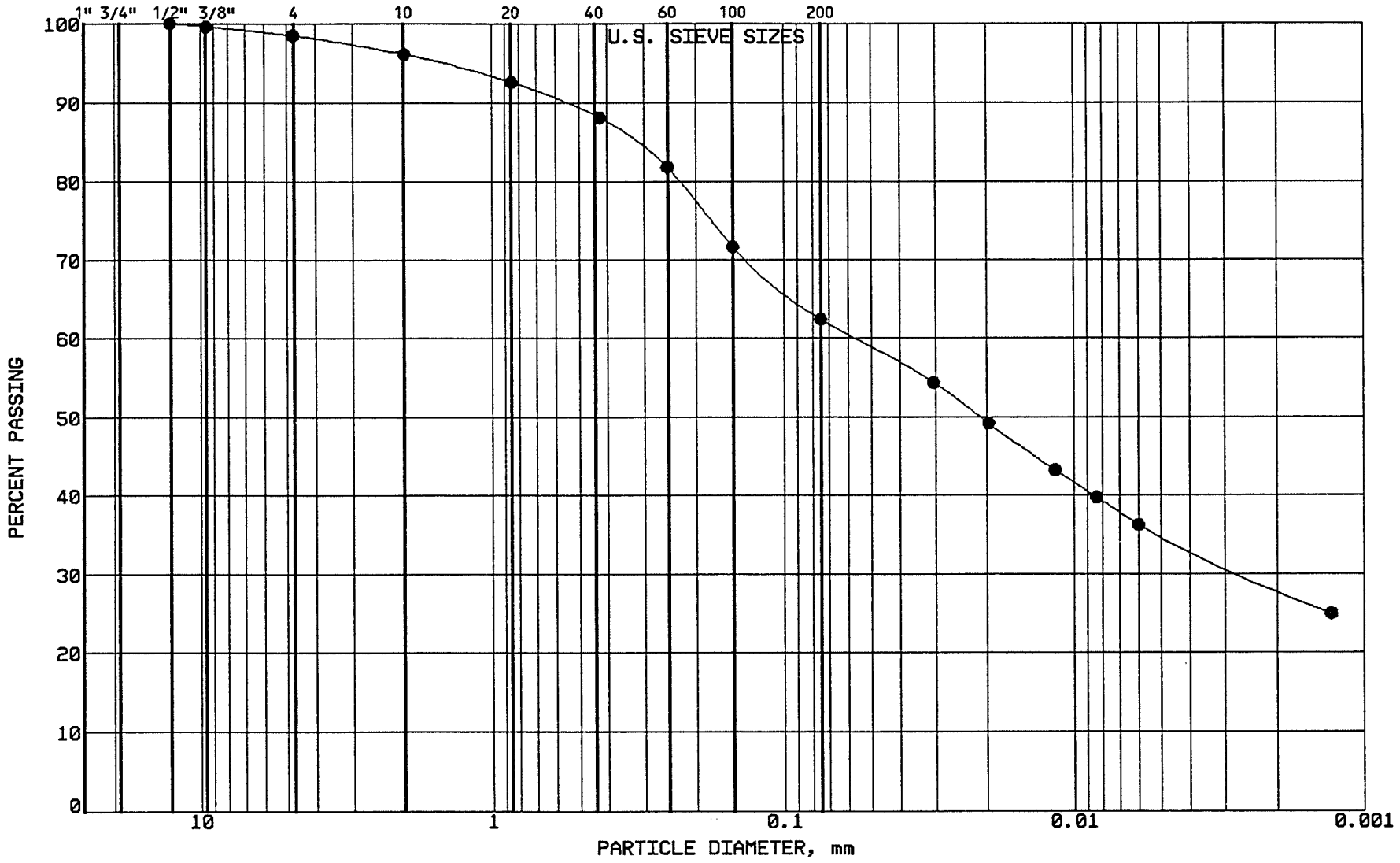
GRAVEL	11.1 %
SAND	62.6 %
SILT	15.7 %
CLAY	10.6 %
P 200	26.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND (SM), olive br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42648.0, E 45486.0
SAMPLE: SGCC619 TUBE #:
ELEVATION: 1880.5'

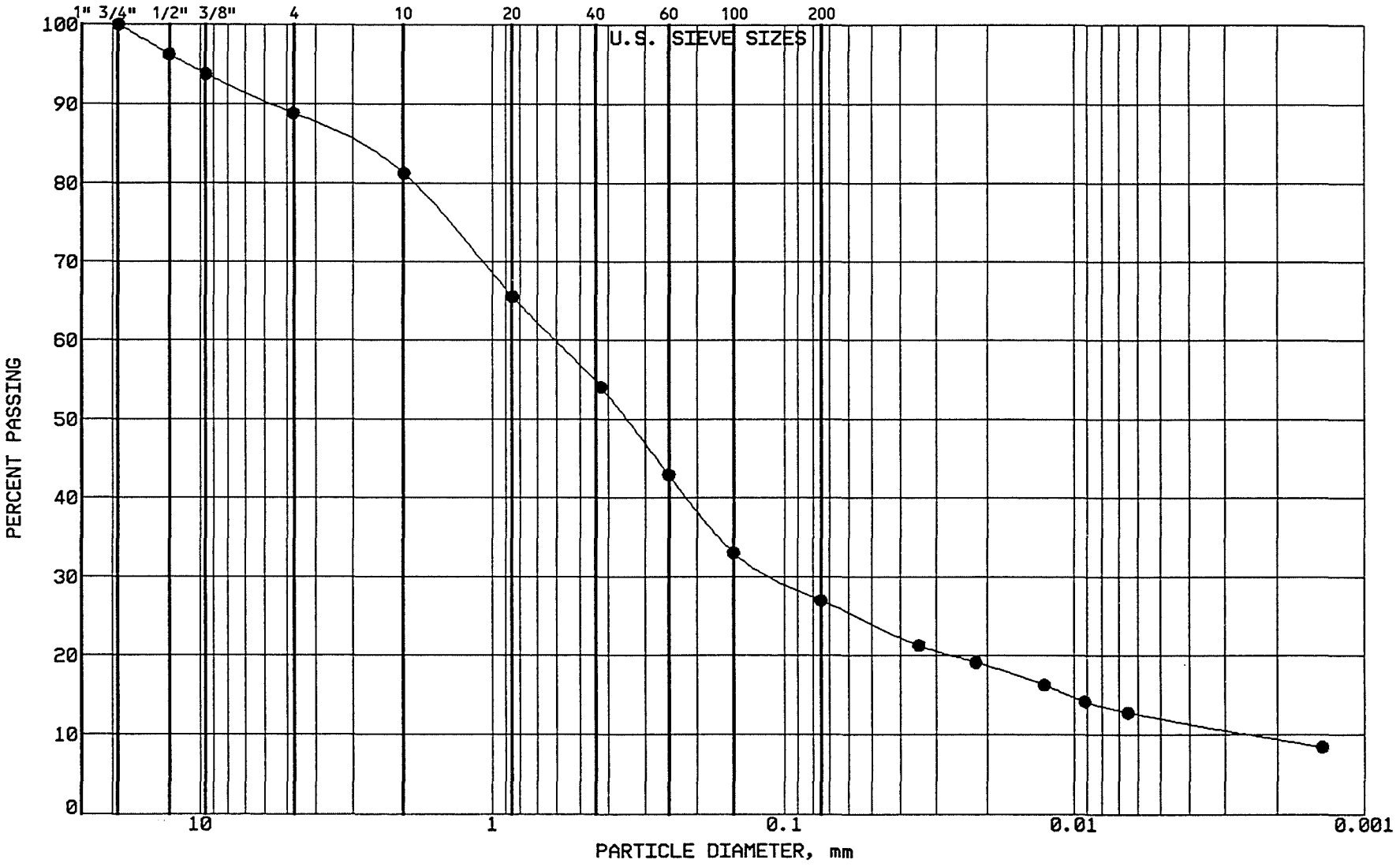
GRAVEL	1.5 %
SAND	36.1 %
SILT	27.5 %
CLAY	34.9 %
P 200	62.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

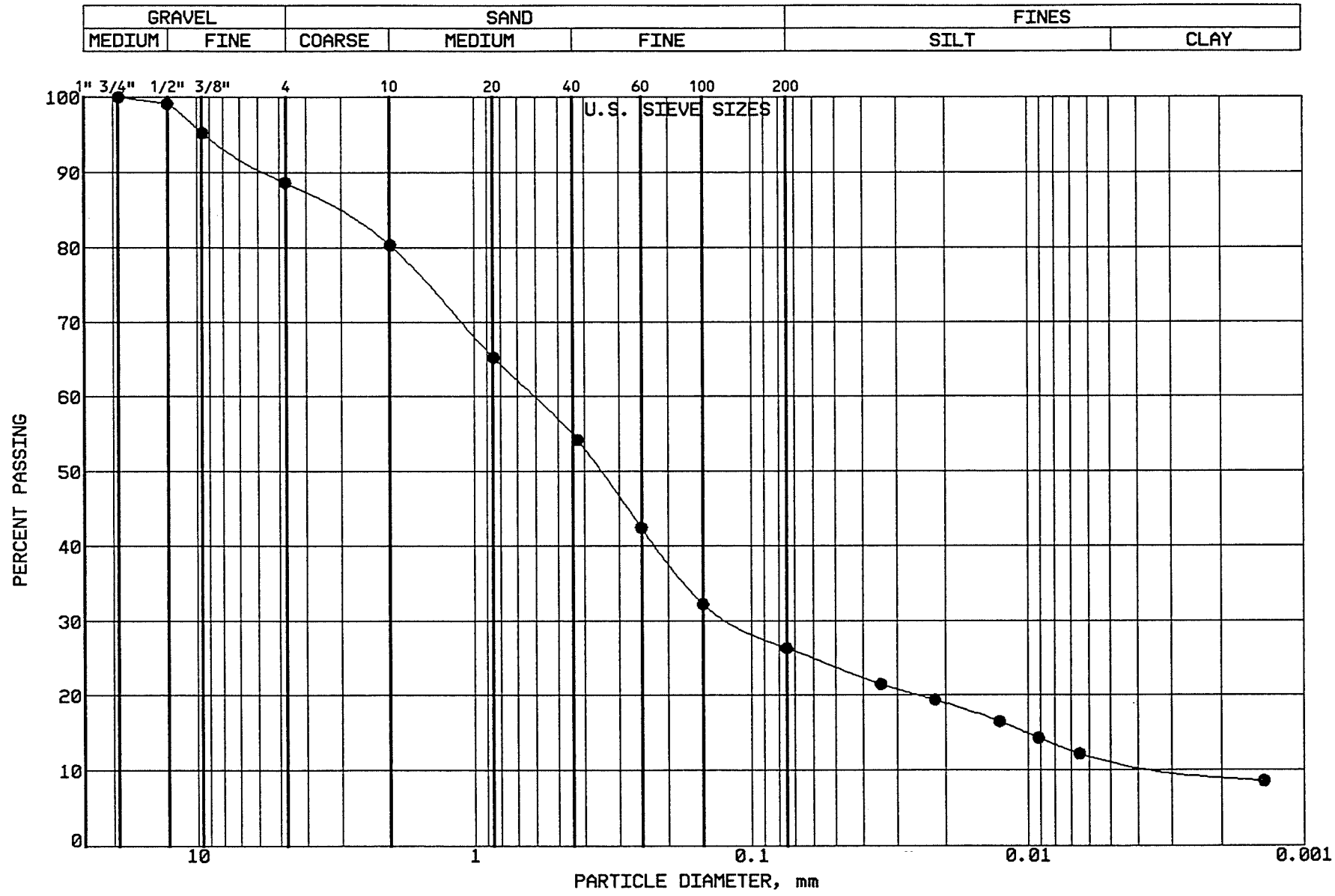
LOCATION: N 42804.0, E 45729.0
SAMPLE: SGCC620 TUBE #:
ELEVATION: 1882.6'

GRAVEL	11.2 %
SAND	61.8 %
SILT	14.9 %
CLAY	12.1 %
P 200	27.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND (SM), olive br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42634.0, E 45703.0
SAMPLE: SGCC621 TUBE #:
ELEVATION: 1881.0'

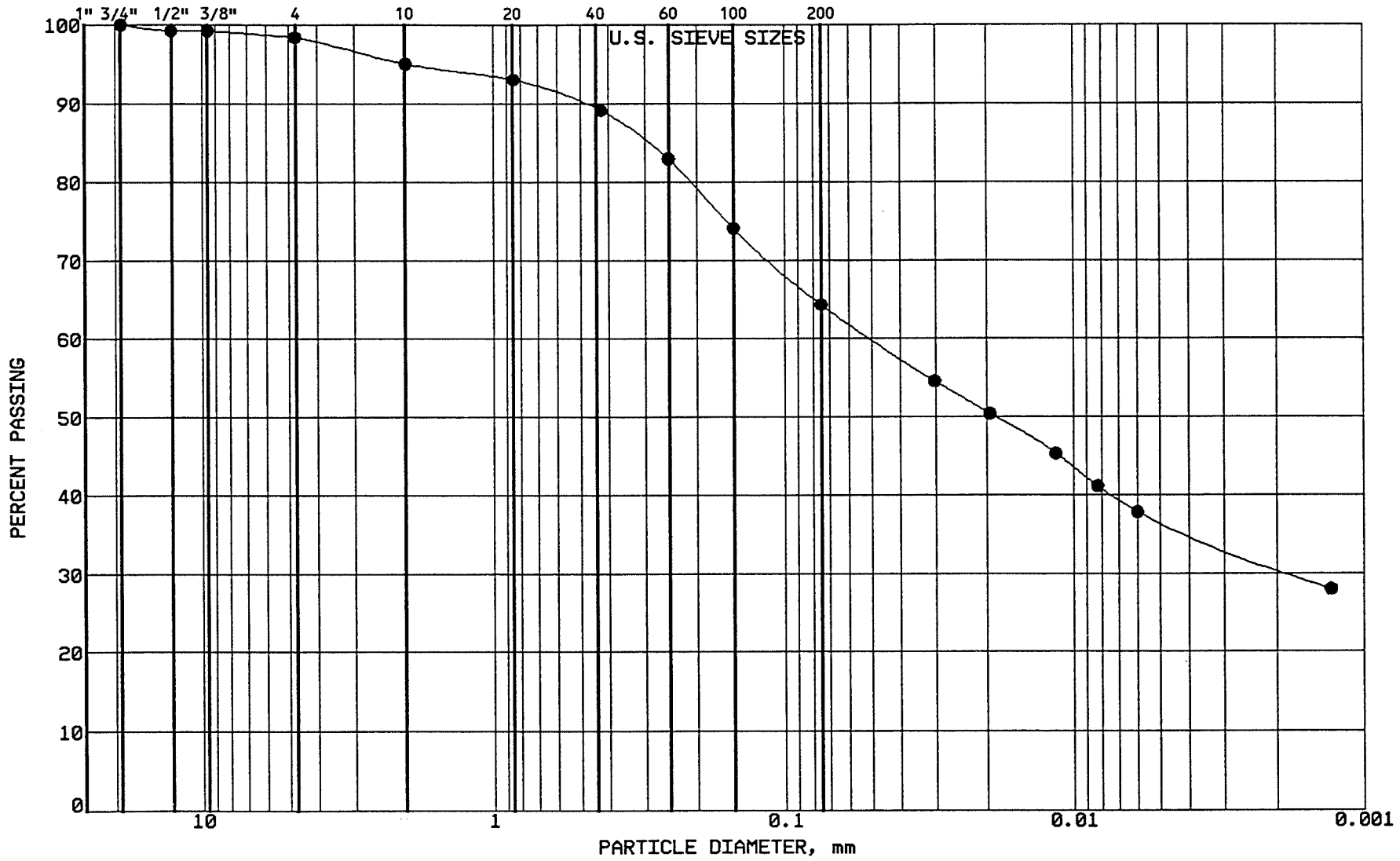
GRAVEL	11.4 %
SAND	62.3 %
SILT	14.7 %
CLAY	11.6 %
P 200	26.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SILTY SAND (SM), olive br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42668.0, E 45211.0
SAMPLE: SGCC622 TUBE #:
ELEVATION: 1881.1'

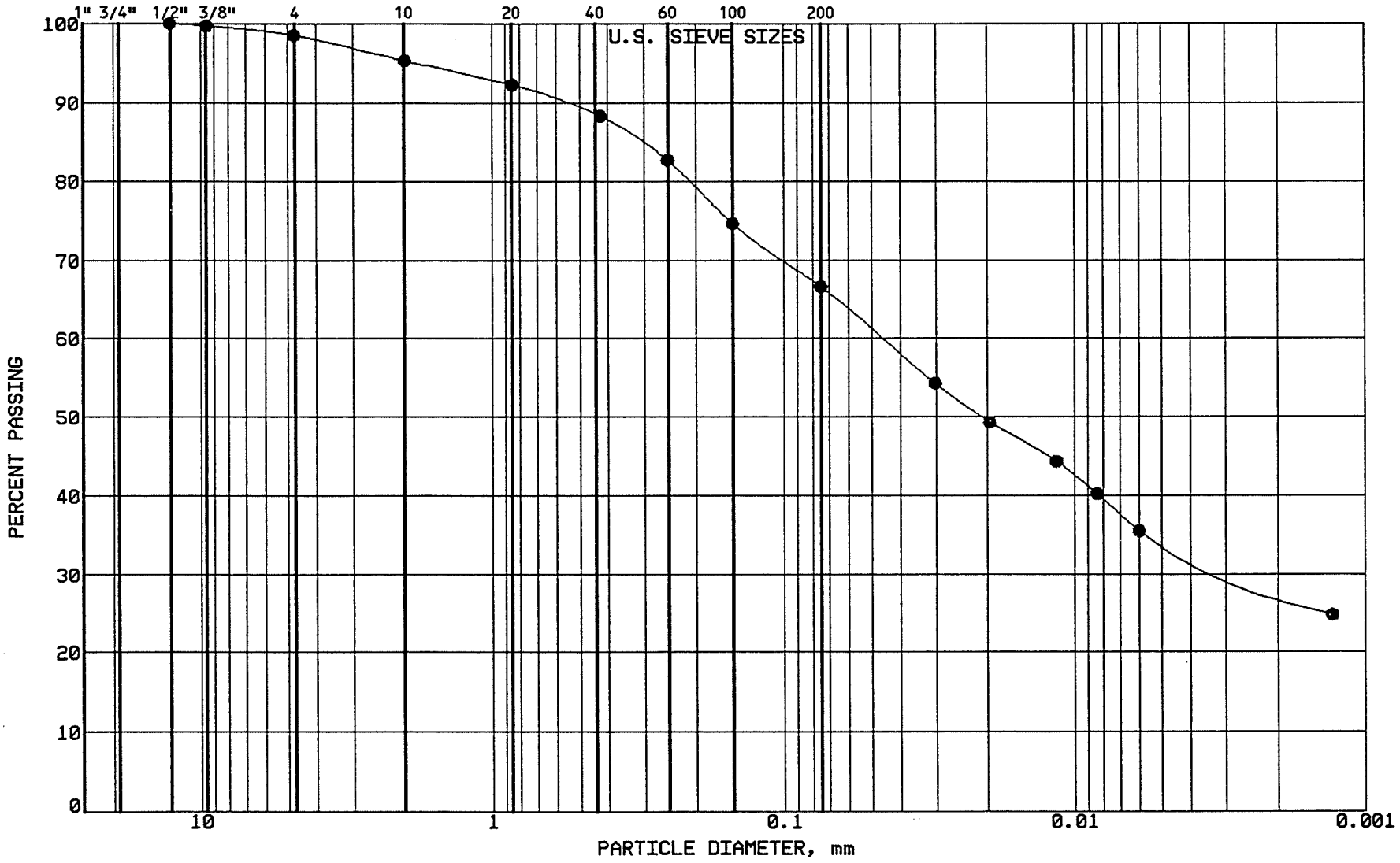
GRAVEL	1.6 %
SAND	34.1 %
SILT	27.7 %
CLAY	36.6 %
P 200	64.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42855.0, E 45228.0
SAMPLE: SGCC623 TUBE #:
ELEVATION: 1881.4'

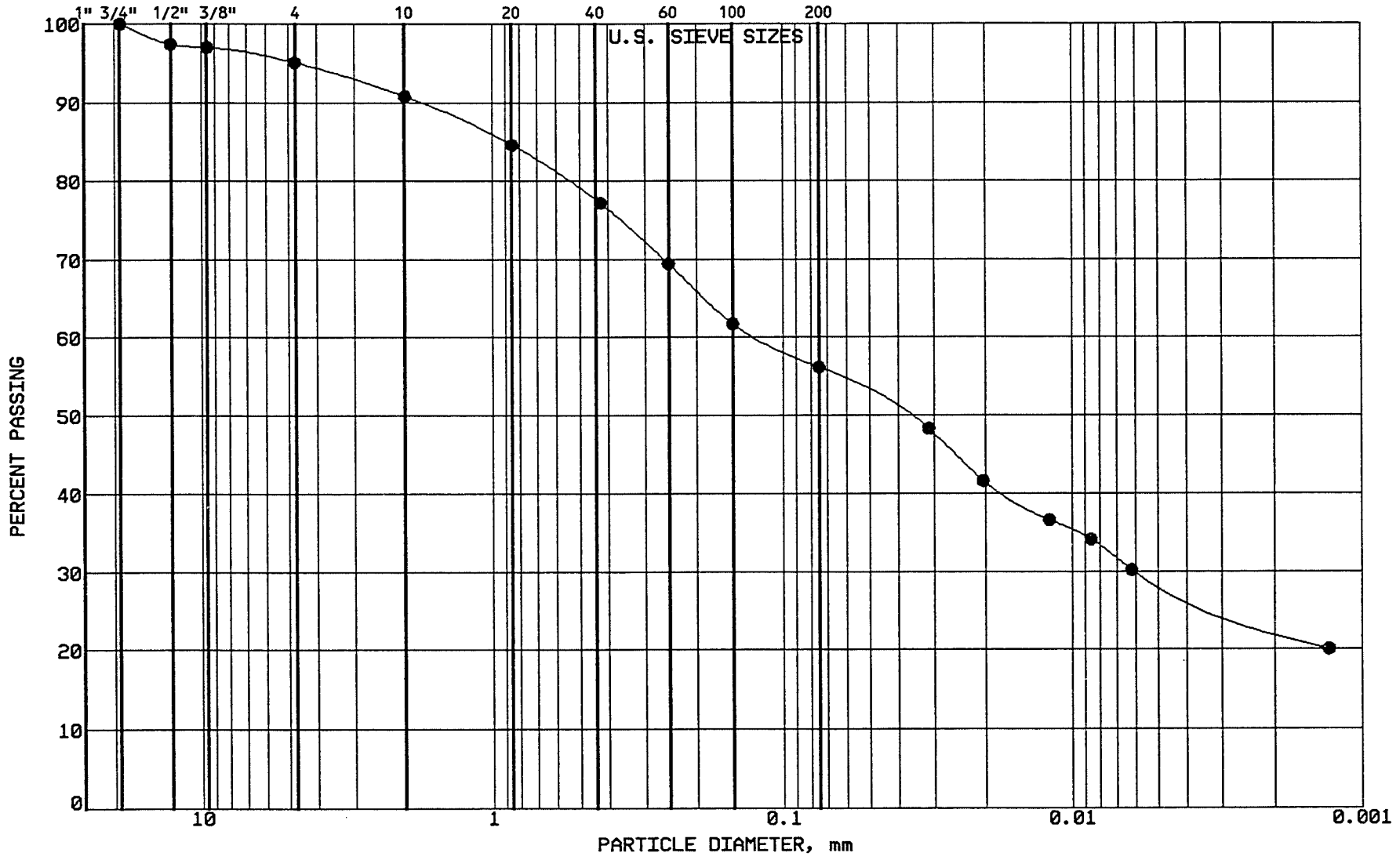
GRAVEL	1.5 %
SAND	31.9 %
SILT	32.4 %
CLAY	34.2 %
P 200	66.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43036.0, E 45250.0
SAMPLE: SGCC624 TUBE #:
ELEVATION: 1882.8'

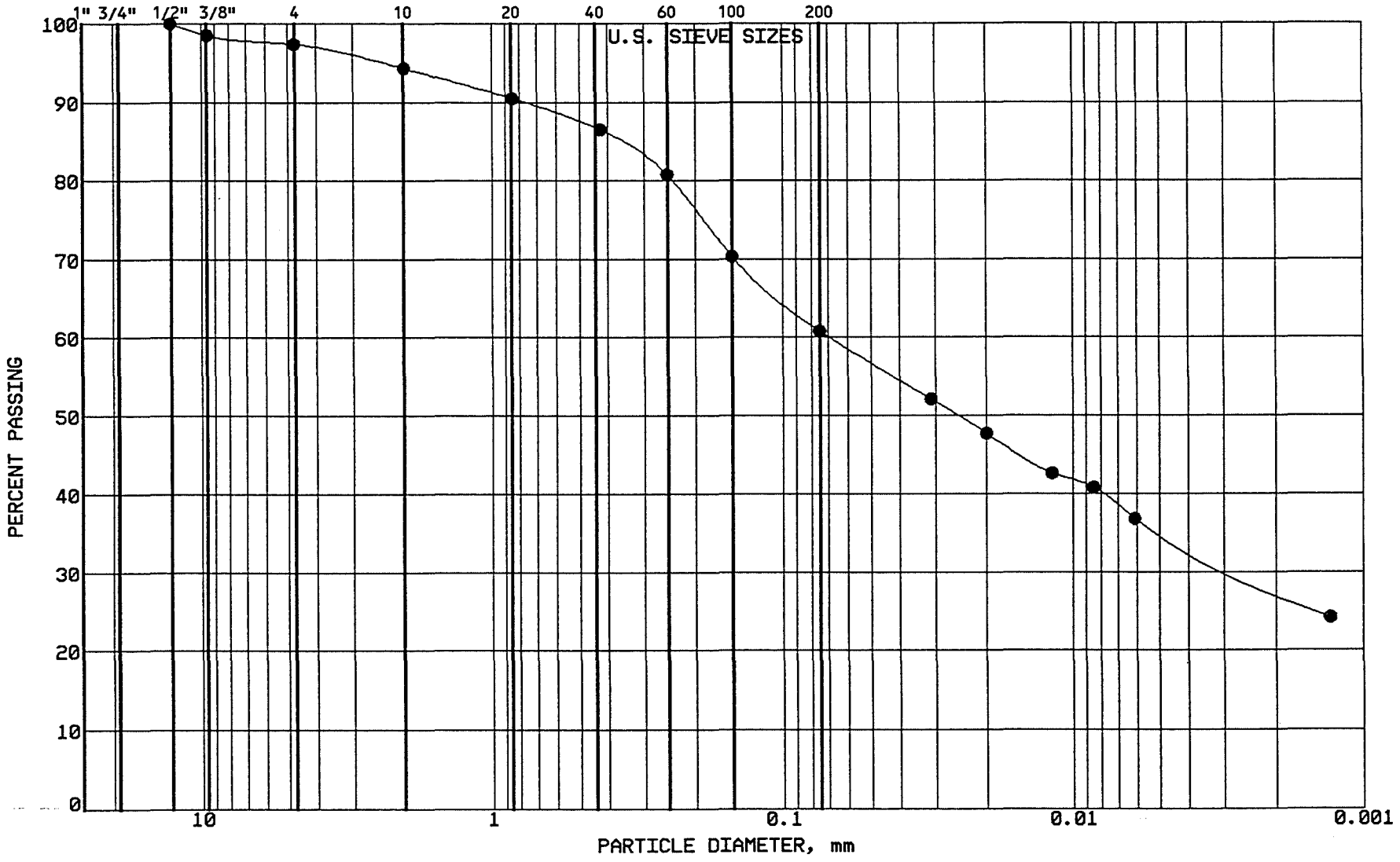
GRAVEL	4.9 %
SAND	38.9 %
SILT	27.4 %
CLAY	28.8 %
P 200	56.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43195.0, E 45272.0
SAMPLE: SGCC625 TUBE #:
ELEVATION: 1884.8'

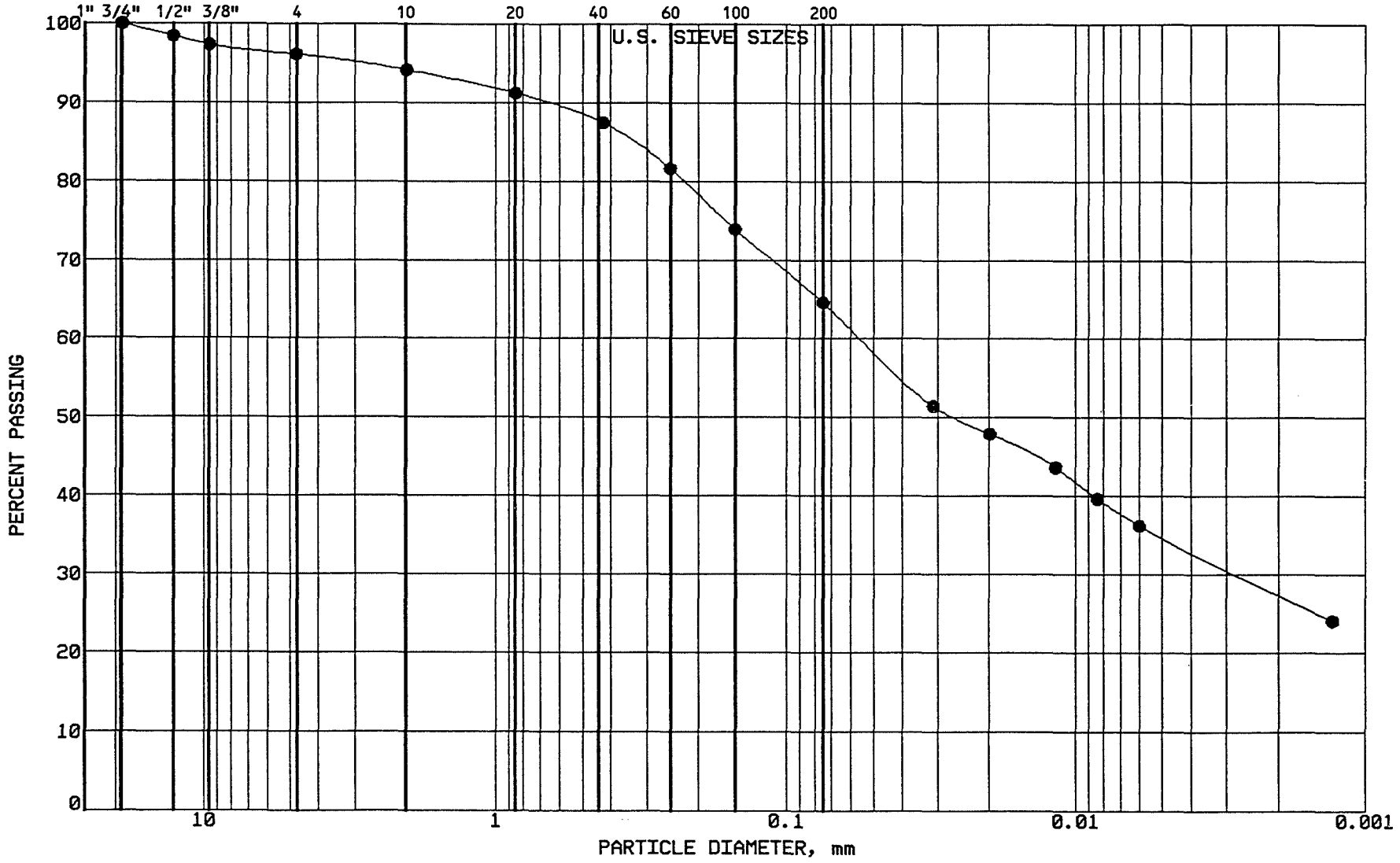
GRAVEL	2.6 %
SAND	36.6 %
SILT	25.6 %
CLAY	35.2 %
P 200	60.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43340.0, E 45303.0
SAMPLE: SGCC626 TUBE #:
ELEVATION: 1886.2'

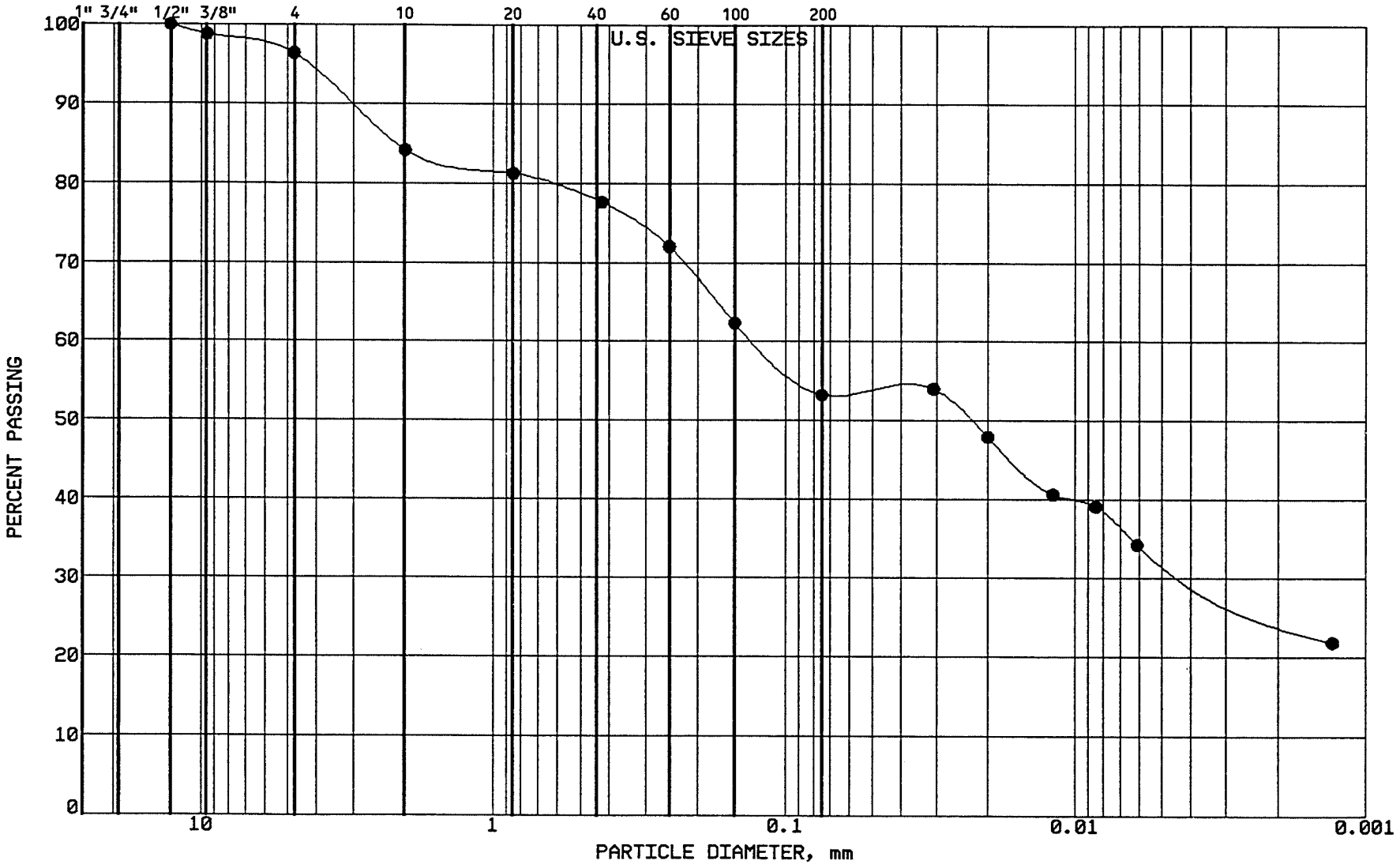
GRAVEL	3.9 %
SAND	31.5 %
SILT	29.8 %
CLAY	34.8 %
P 200	64.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42991.0, E 45086.0
SAMPLE: CLBCC627 TUBE #: ST-175R
ELEVATION: 1886.0'

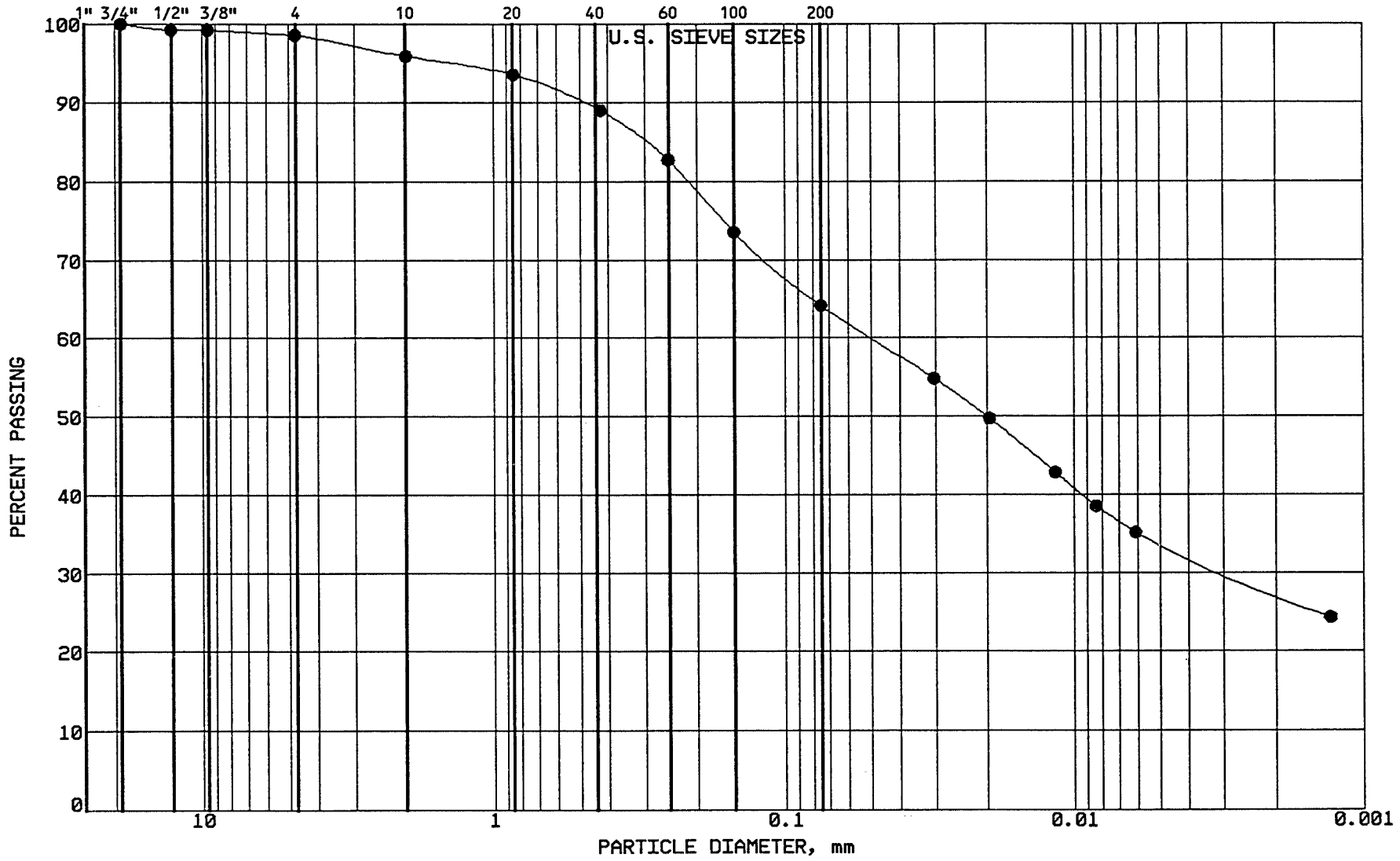
GRAVEL	3.6 %
SAND	43.2 %
SILT	20.6 %
CLAY	32.6 %
P 200	53.2 %

SOIL PROPERTIES

LL: 40.0%
PL: 18.0%
PI: 22.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

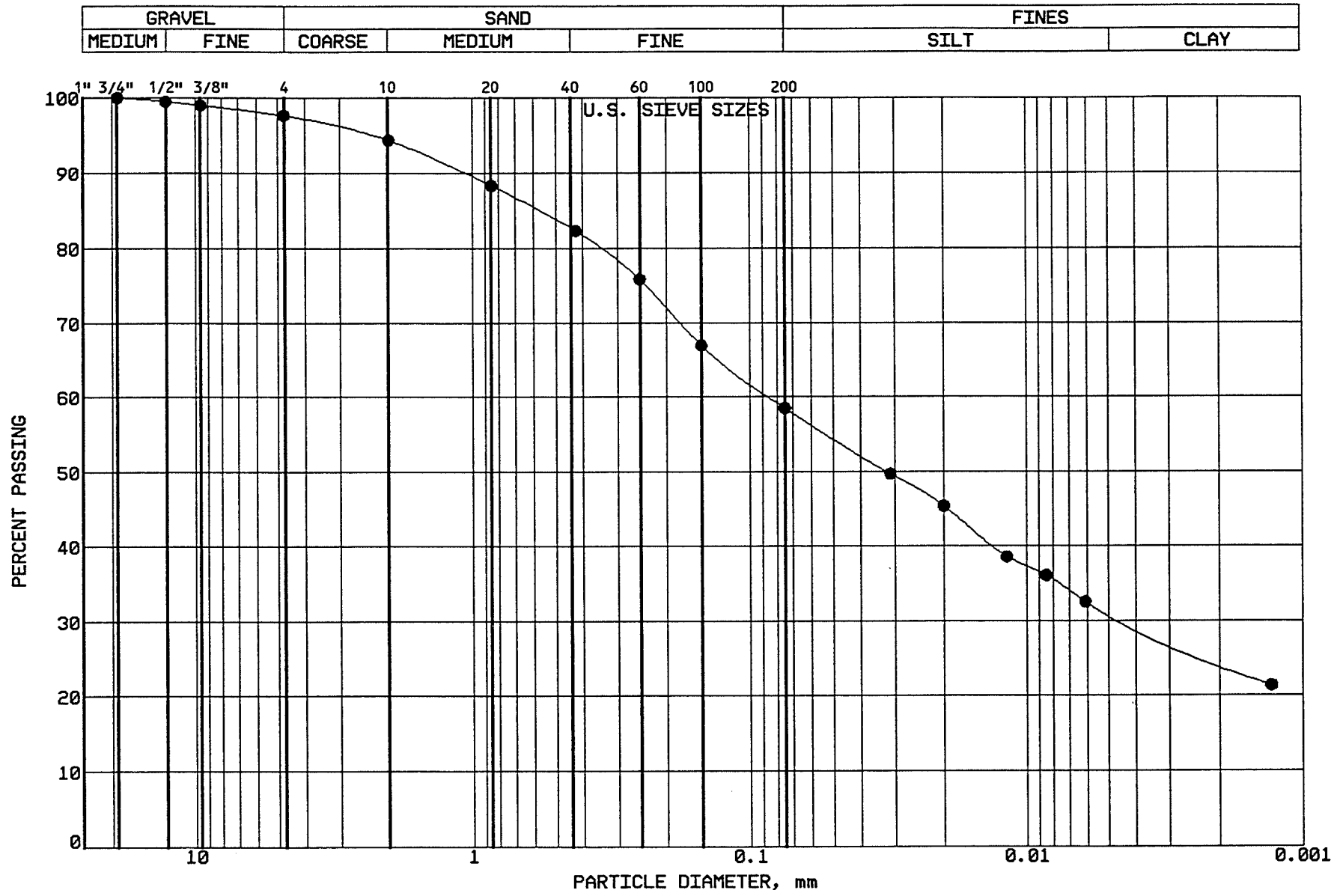
LOCATION: N 42893.0, E 45429.0
SAMPLE: SGCC628 TUBE #:
ELEVATION: 1882.0'

GRAVEL	1.4 %
SAND	34.5 %
SILT	30.4 %
CLAY	33.7 %
P 200	64.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42634.0, E 45405.0
SAMPLE: SGCC629 TUBE #:
ELEVATION: 1880.0'

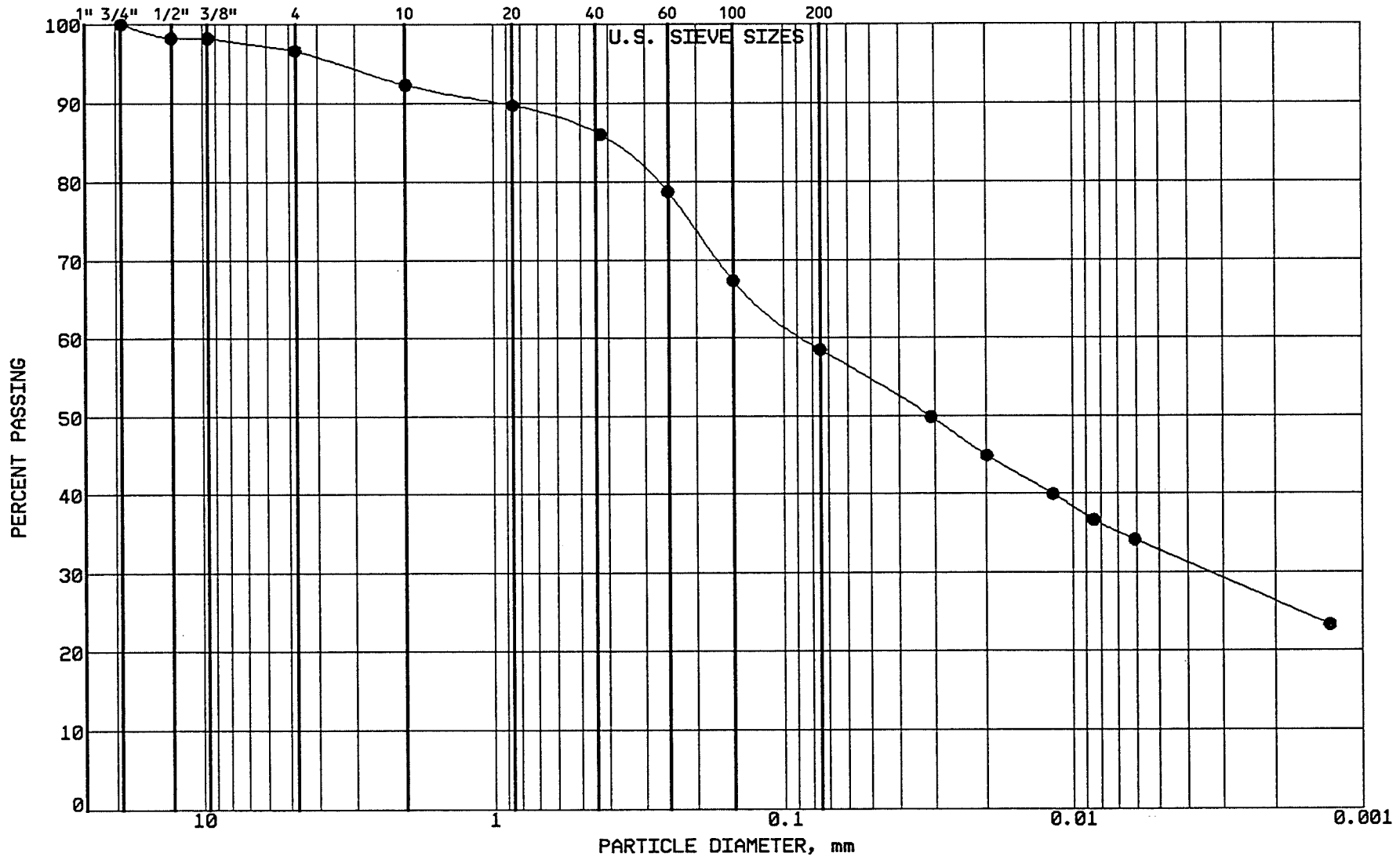
GRAVEL	2.4 %
SAND	39.1 %
SILT	27.4 %
CLAY	31.1 %
P 200	58.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42620.0, E 45667.0
SAMPLE: SGCC630 TUBE #:
ELEVATION: 1881.6'

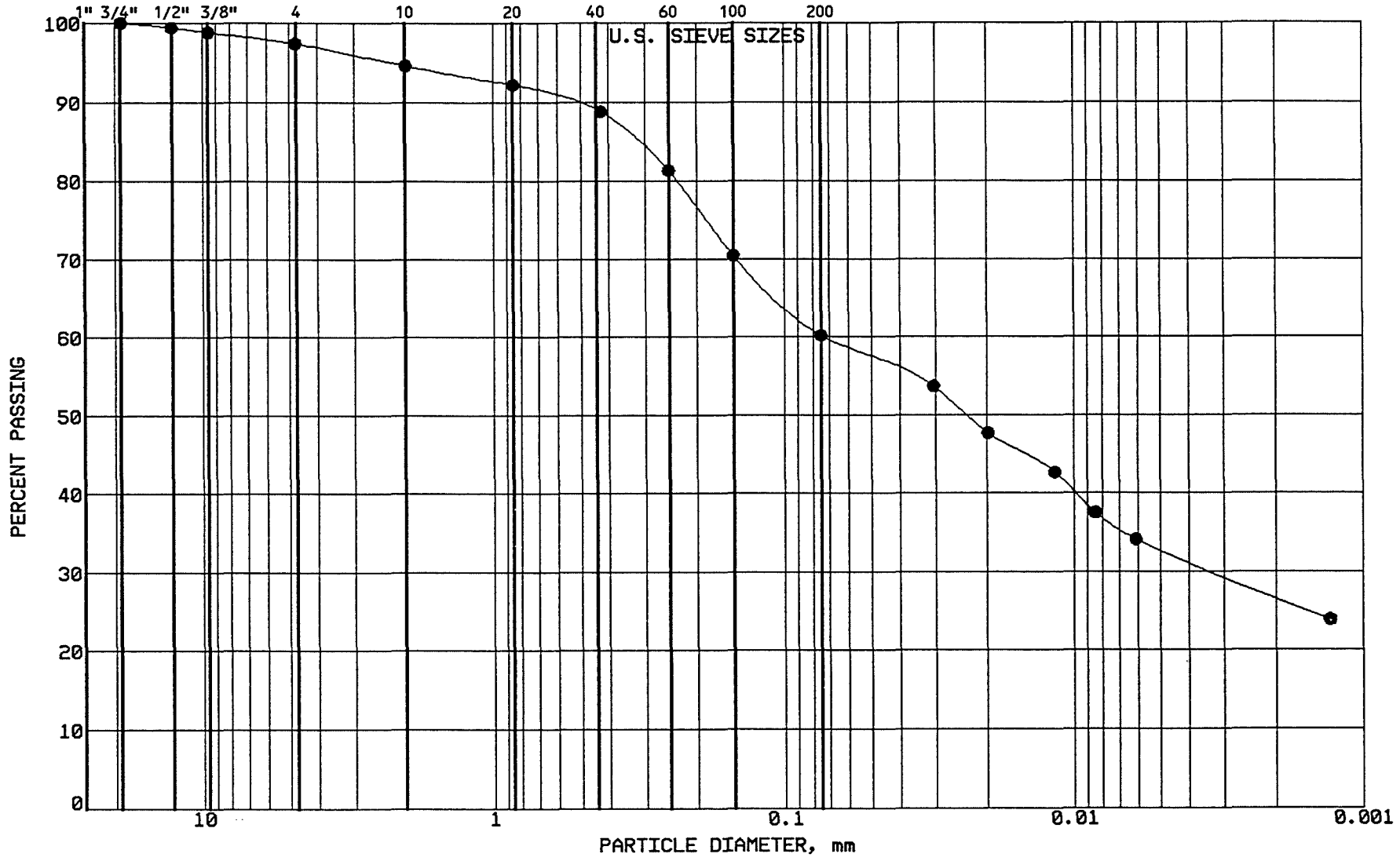
GRAVEL	3.4 %
SAND	38.1 %
SILT	25.8 %
CLAY	32.7 %
P 200	58.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42800.0, E 45679.0
SAMPLE: SGCC631 TUBE #:
ELEVATION: 1882.3'

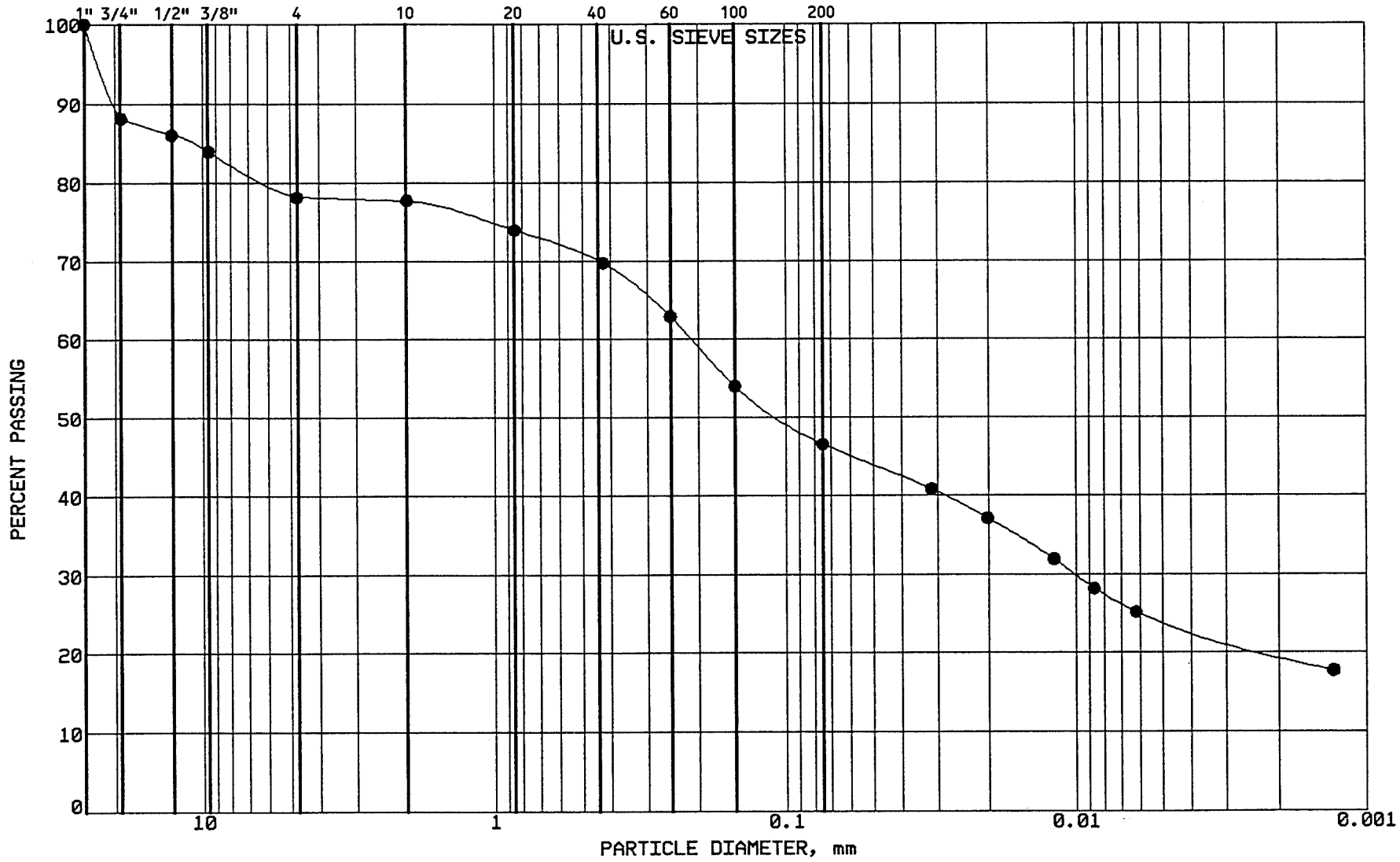
GRAVEL	2.6 %
SAND	37.2 %
SILT	27.4 %
CLAY	32.8 %
P 200	60.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42999.0, E 44687.0
SAMPLE: CLBCC632 TUBE #: ST-173R
ELEVATION: 1886.3'

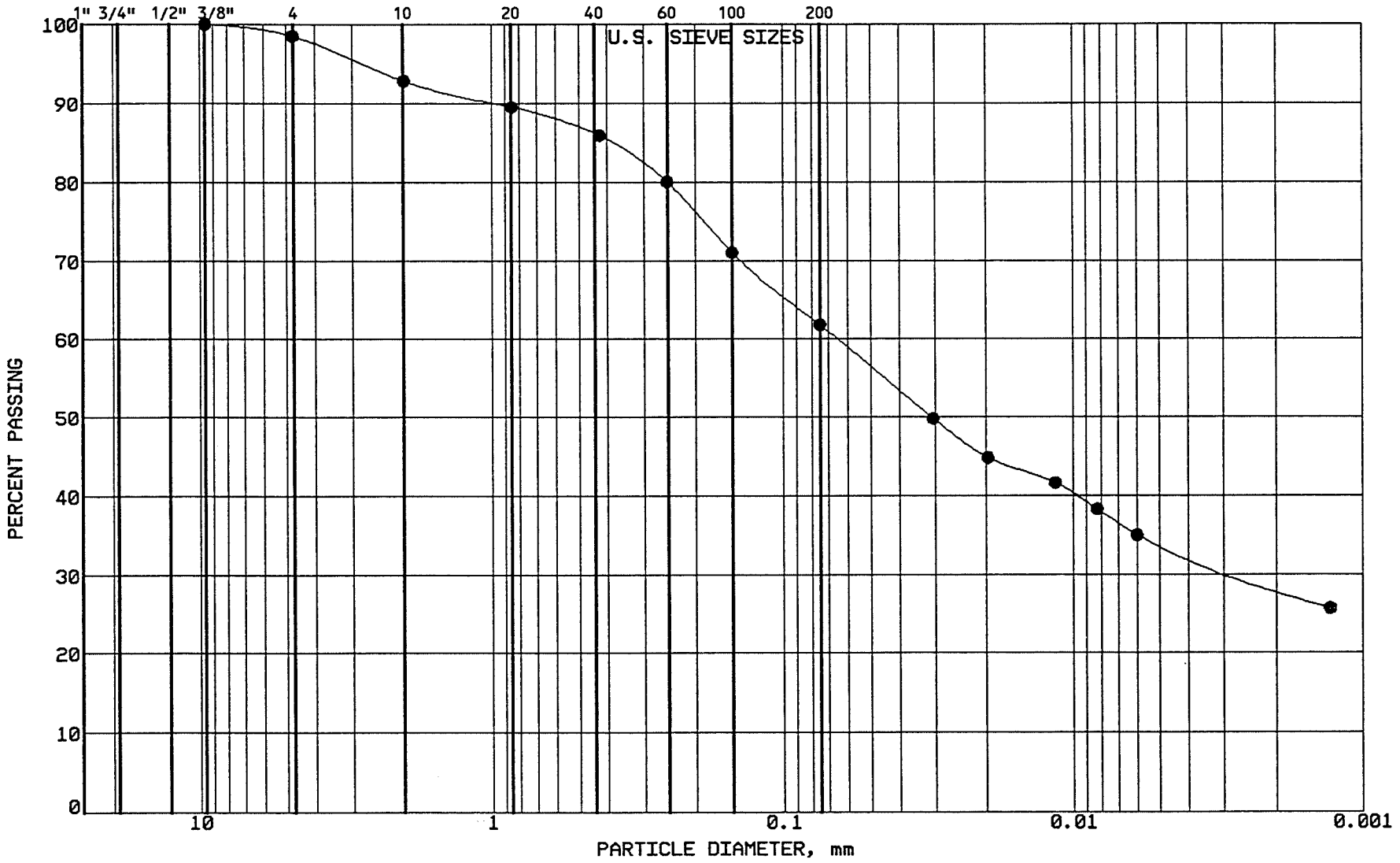
GRAVEL	21.9 %
SAND	31.6 %
SILT	22.3 %
CLAY	24.2 %
P 200	46.5 %

SOIL PROPERTIES

LL: 39.0%
PL: 16.0%
PI: 23.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43187.0, E 43332.0
SAMPLE: SGCC633 TUBE #:
ELEVATION: 1884.9'

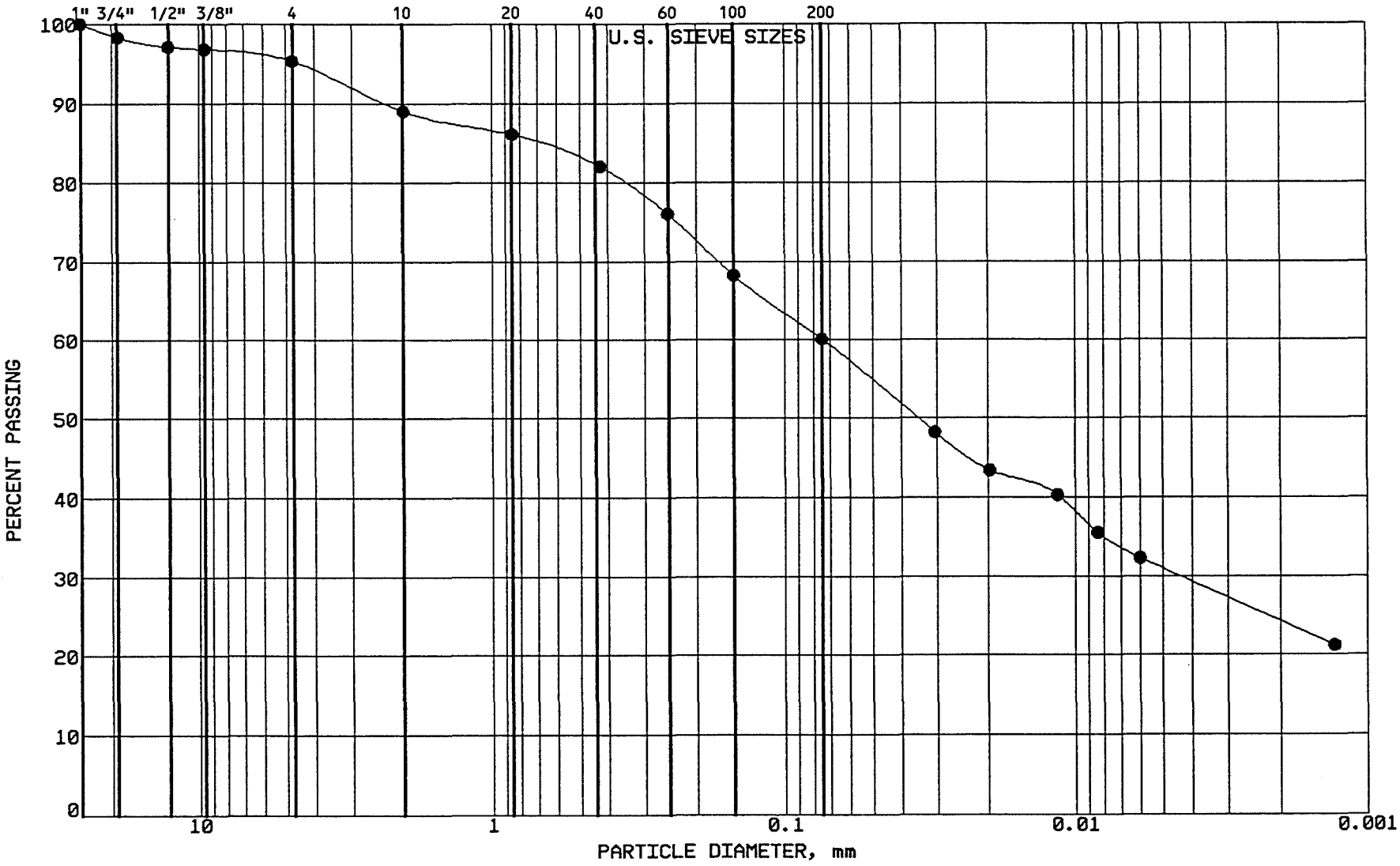
GRAVEL	1.5 %
SAND	36.7 %
SILT	27.9 %
CLAY	33.9 %
P 200	61.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42994.0, E 45333.0
SAMPLE: SGCC634 TUBE #:
ELEVATION: 1883.9'

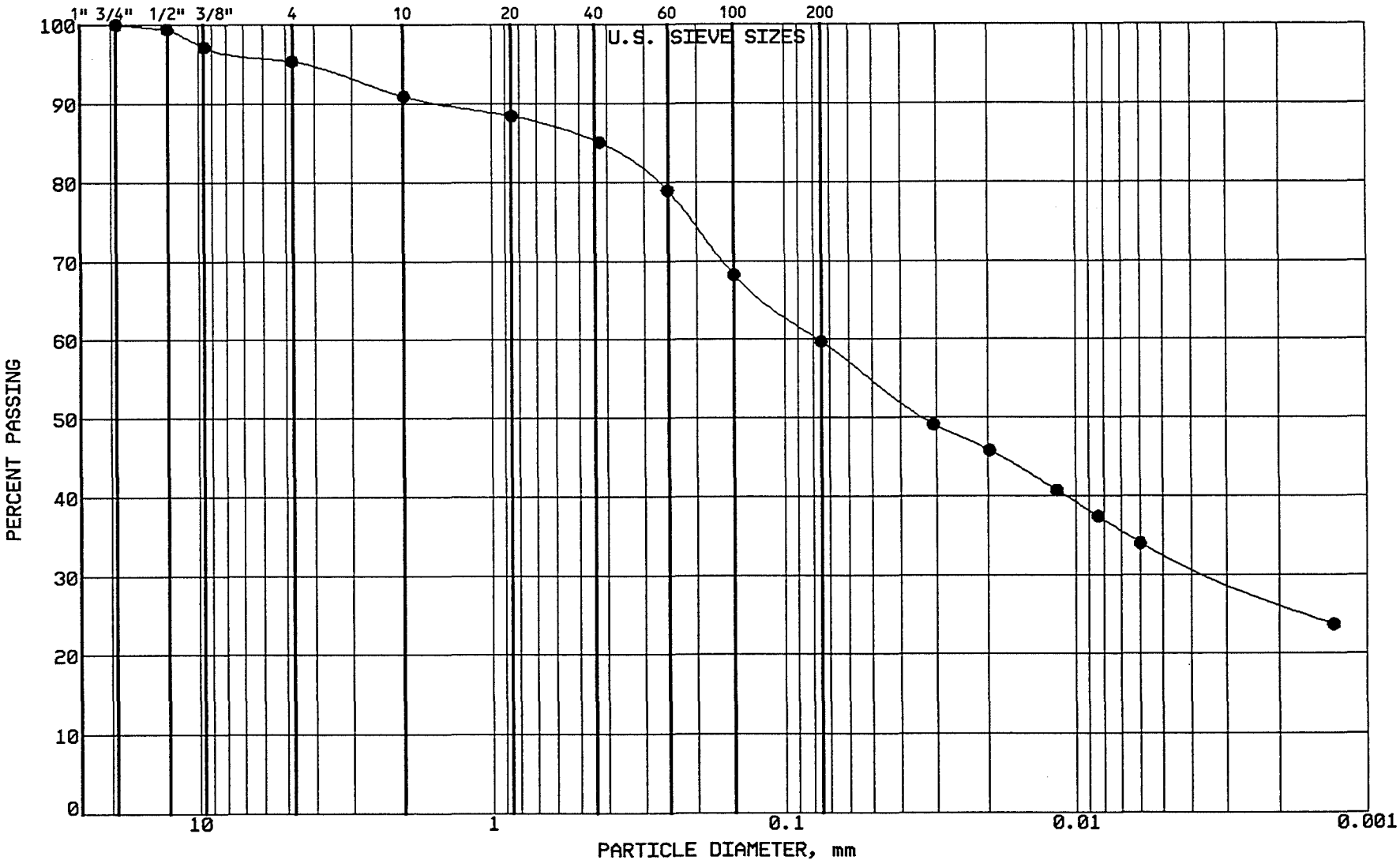
GRAVEL	4.7 %
SAND	35.2 %
SILT	29.1 %
CLAY	31.0 %
P 200	60.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42806.0, E 43302.0
SAMPLE: SGCC635 TUBE #:
ELEVATION: 1882.9'

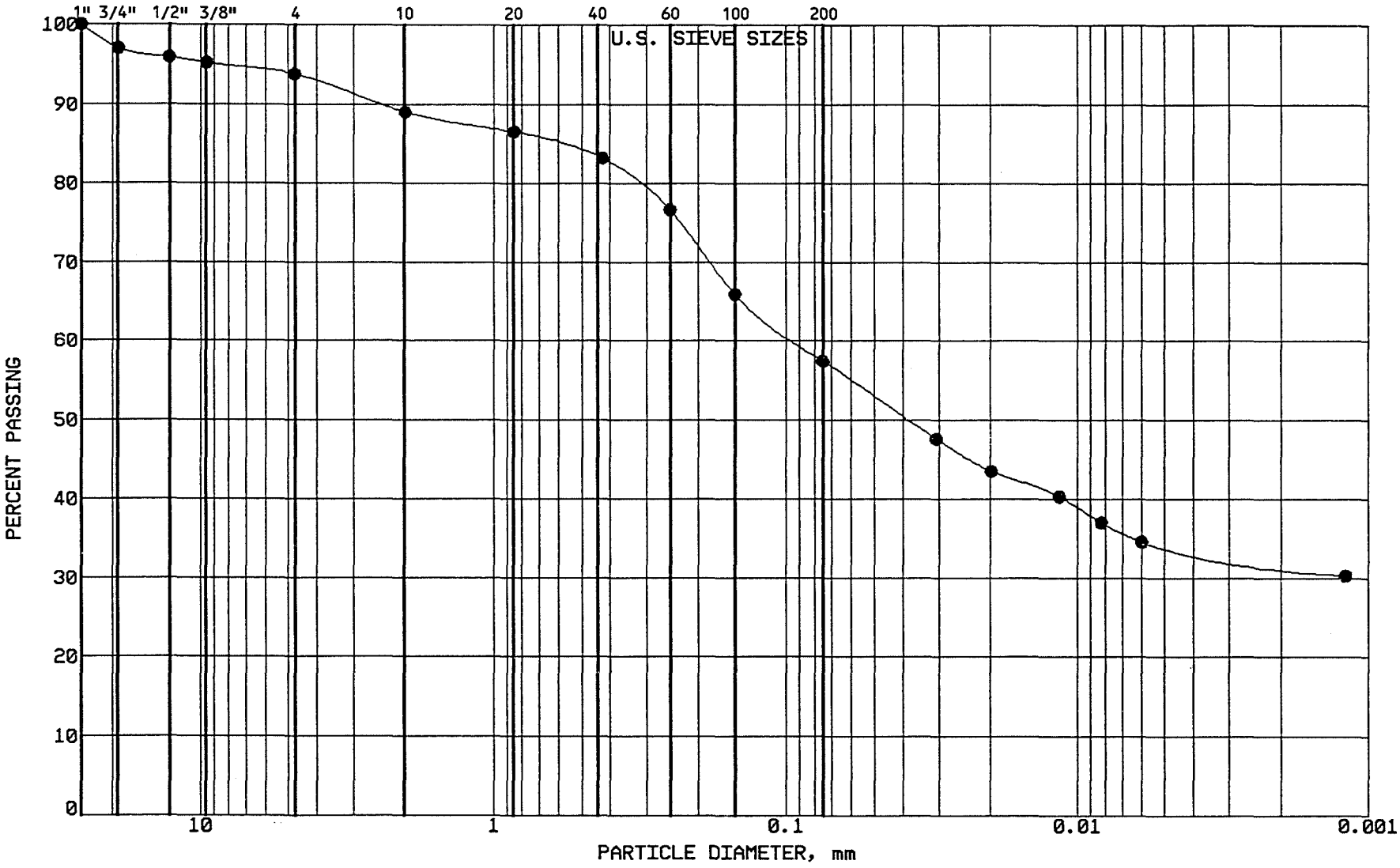
GRAVEL	4.7 %
SAND	35.6 %
SILT	26.9 %
CLAY	32.8 %
P 200	59.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42643.0, E 45279.0
SAMPLE: SGCC636 TUBE #:
ELEVATION: 1882.0'

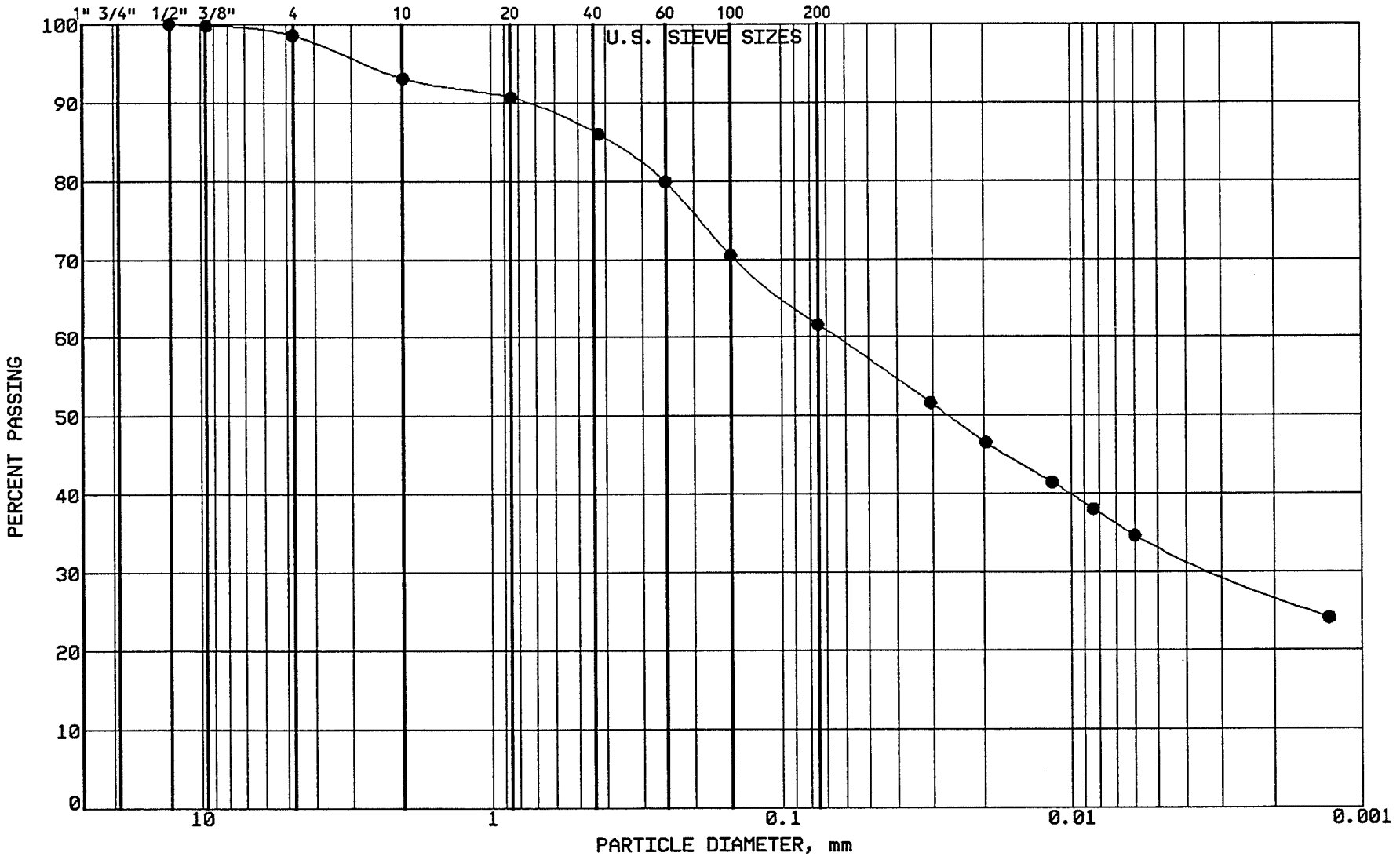
GRAVEL	6.2 %
SAND	36.4 %
SILT	23.3 %
CLAY	34.1 %
P 200	57.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42854.0, E 45526.0
SAMPLE: SGCC637 TUBE #:
ELEVATION: 1883.2'

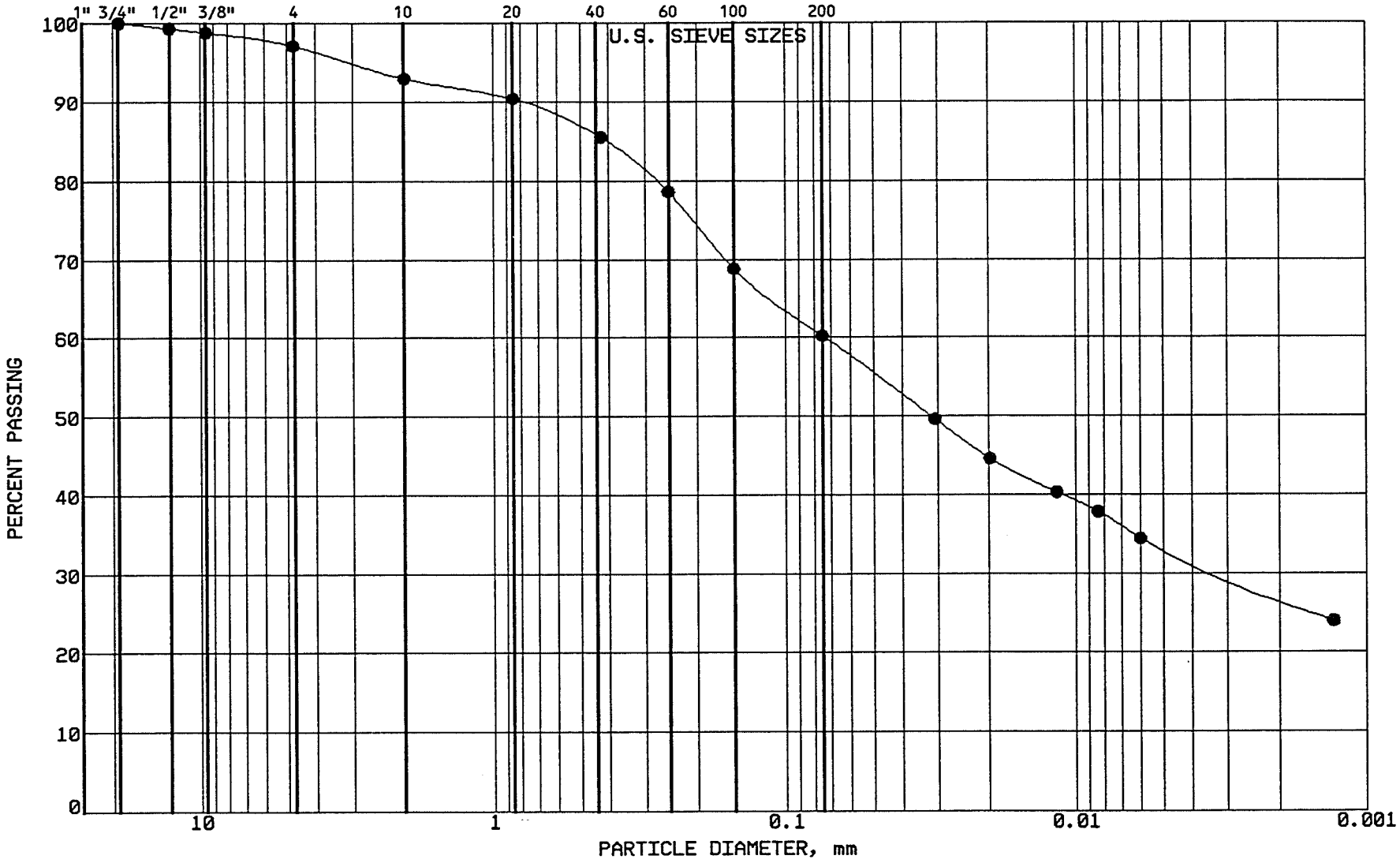
GRAVEL	1.4 %
SAND	37.0 %
SILT	28.3 %
CLAY	33.3 %
P 200	61.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42641.0, E 45504.0
SAMPLE: SGCC638 TUBE #:
ELEVATION: 1881.8'

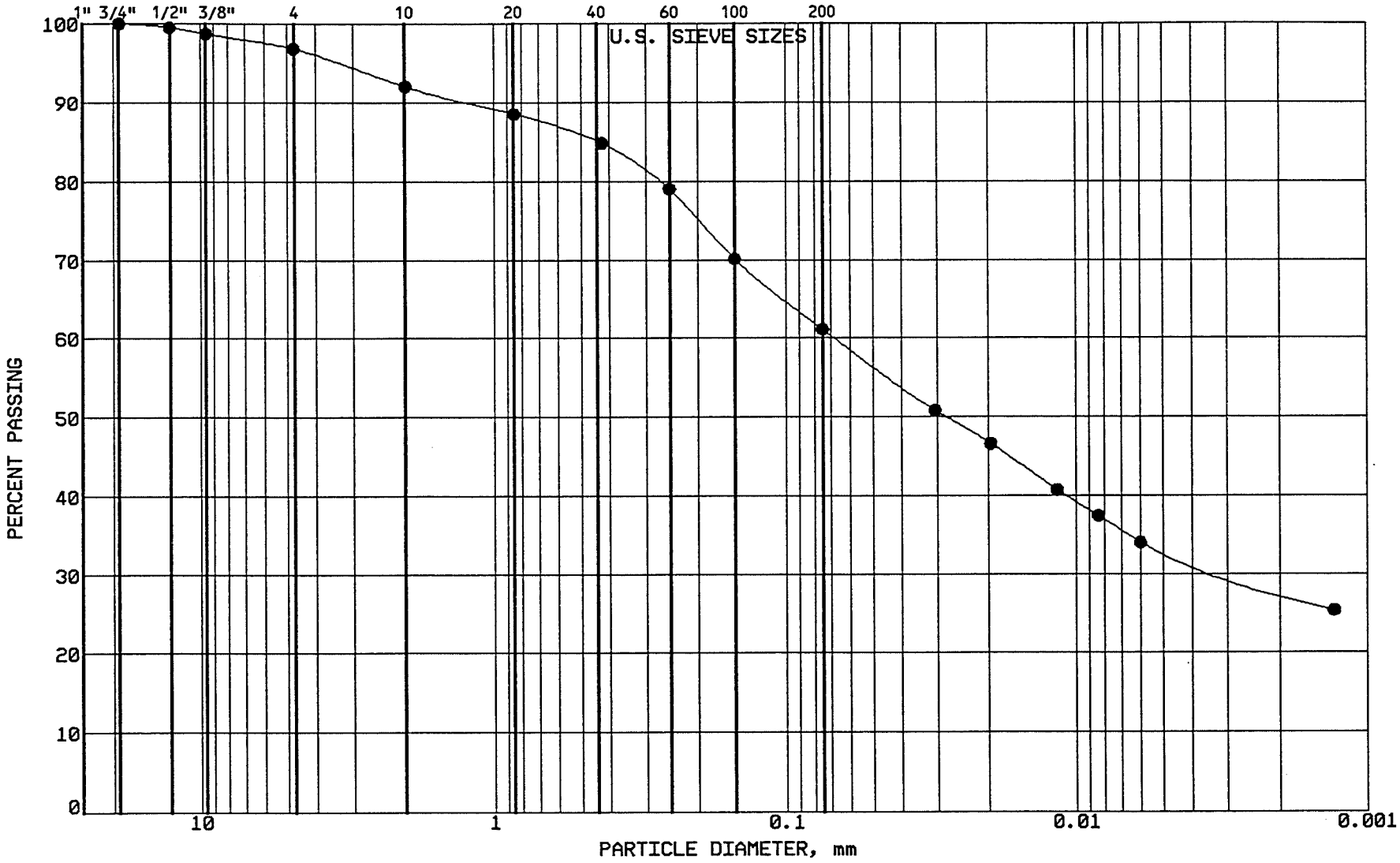
GRAVEL	2.9 %
SAND	36.9 %
SILT	27.0 %
CLAY	33.2 %
P 200	60.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

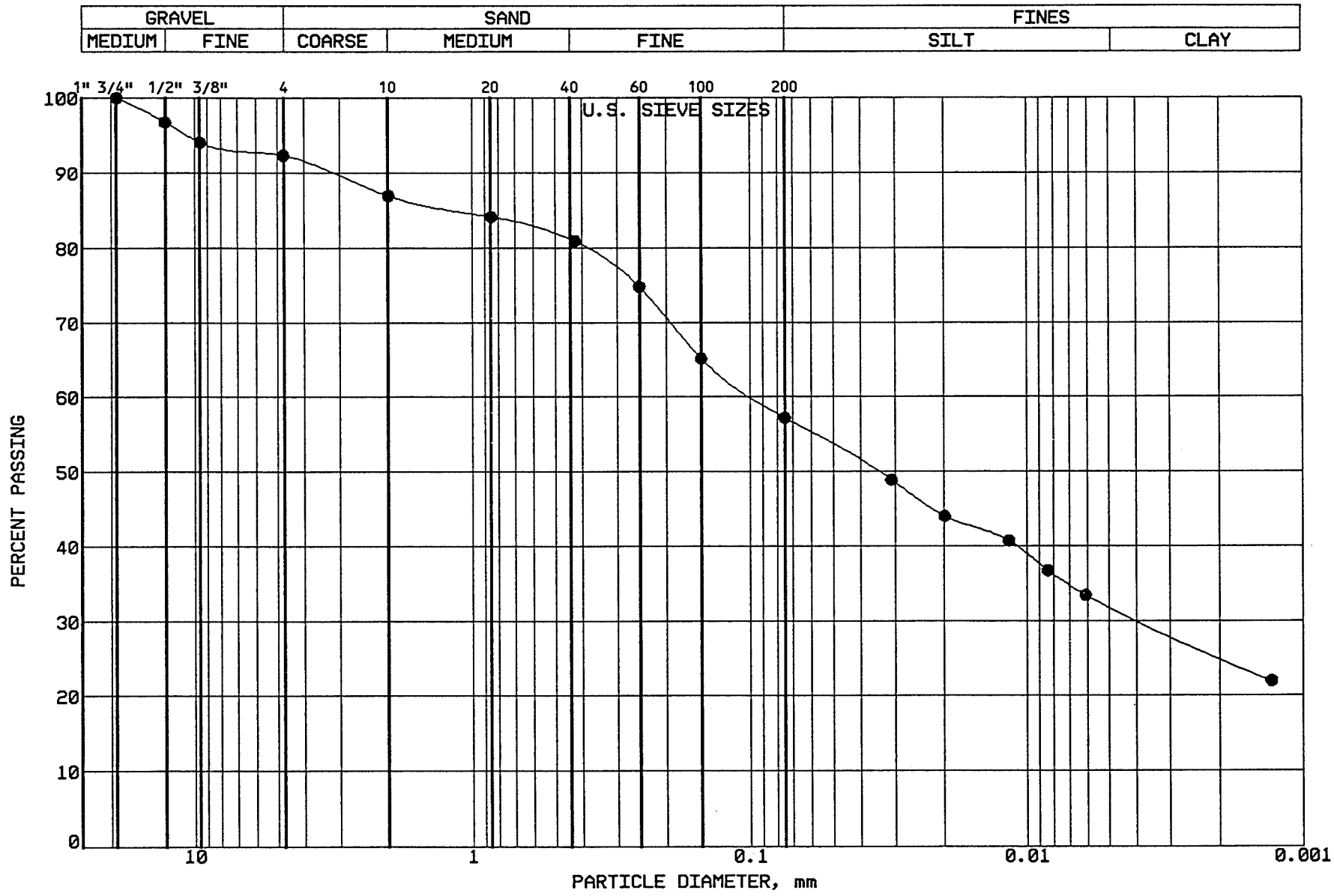
LOCATION: N 42740.0, E 45424.0
SAMPLE: SGCC639 TUBE #:
ELEVATION: 1882.8'

GRAVEL	3.2 %
SAND	35.7 %
SILT	28.1 %
CLAY	33.0 %
P 200	61.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

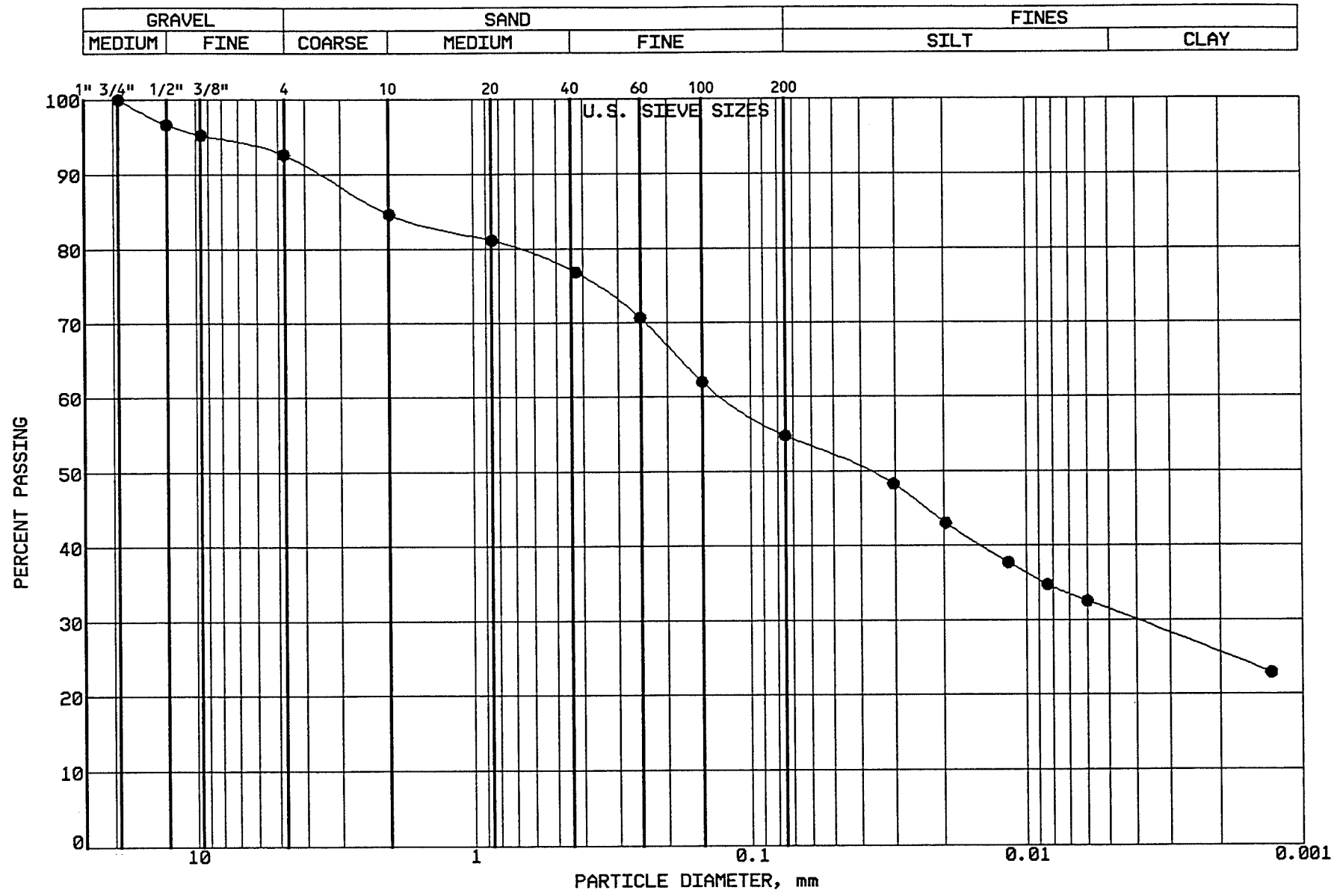
LOCATION: N 42999.0, E 44687.0
SAMPLE: CLBCC640 TUBE #: ST-173R
ELEVATION: 1886.3'

GRAVEL	7.7 %
SAND	35.1 %
SILT	25.3 %
CLAY	31.9 %
P 200	57.2 %

SOIL PROPERTIES

LL: 42.0%
PL: 17.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43343.0, E 45338.0
SAMPLE: CLBCC641 TUBE #: ST-183
ELEVATION: 1887.5'

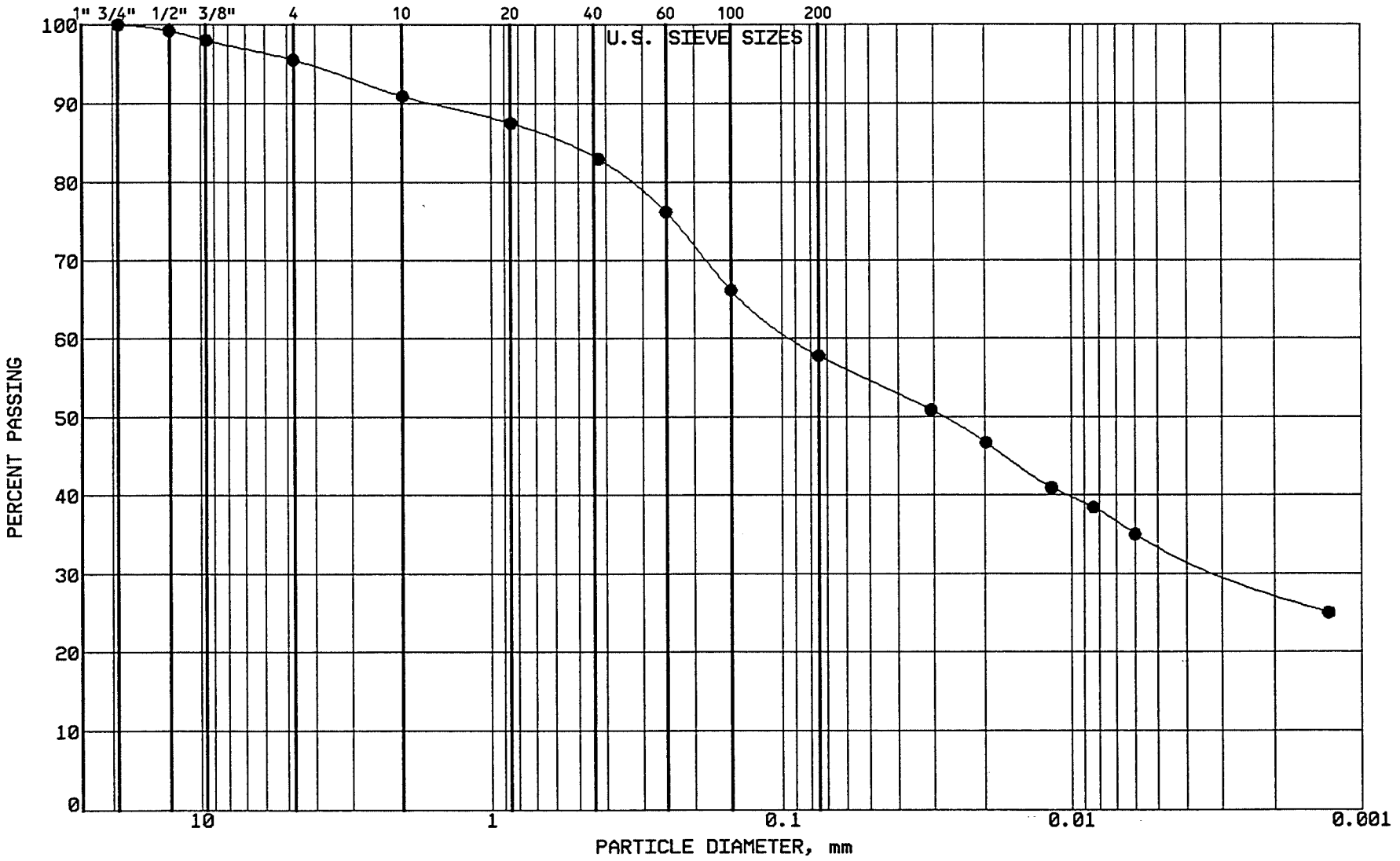
GRAVEL	7.4 %
SAND	37.8 %
SILT	23.4 %
CLAY	31.4 %
P 200	54.8 %

SOIL PROPERTIES

LL: 41.0%
PL: 15.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

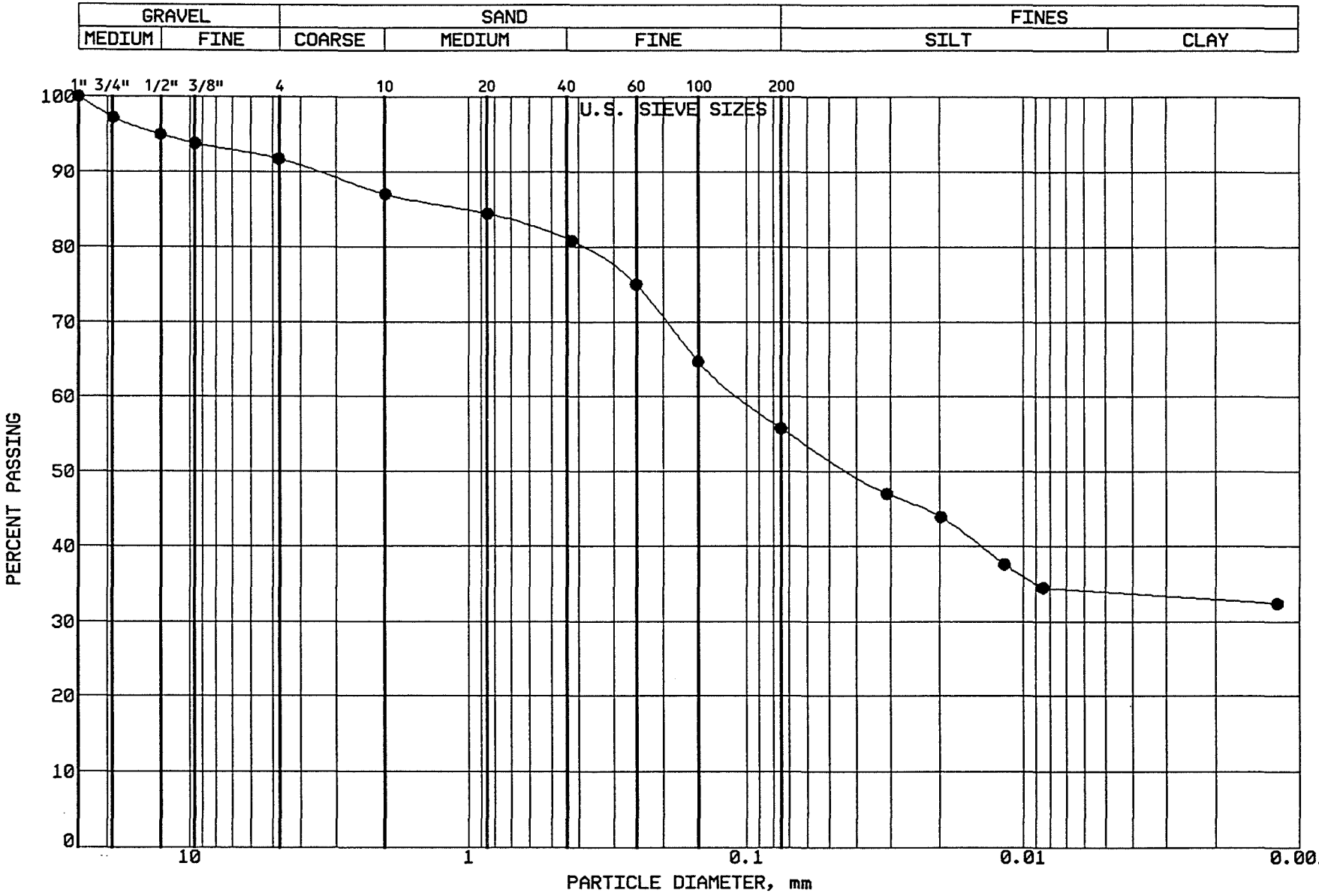
LOCATION: N 43160.0, E 45327.0
SAMPLE: CLBCC642 TUBE #: ST-184
ELEVATION: 1885.8'

GRAVEL	4.5 %
SAND	37.7 %
SILT	24.0 %
CLAY	33.8 %
P 200	57.8 %

SOIL PROPERTIES

LL: 40.0%
PL: 16.0%
PI: 24.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

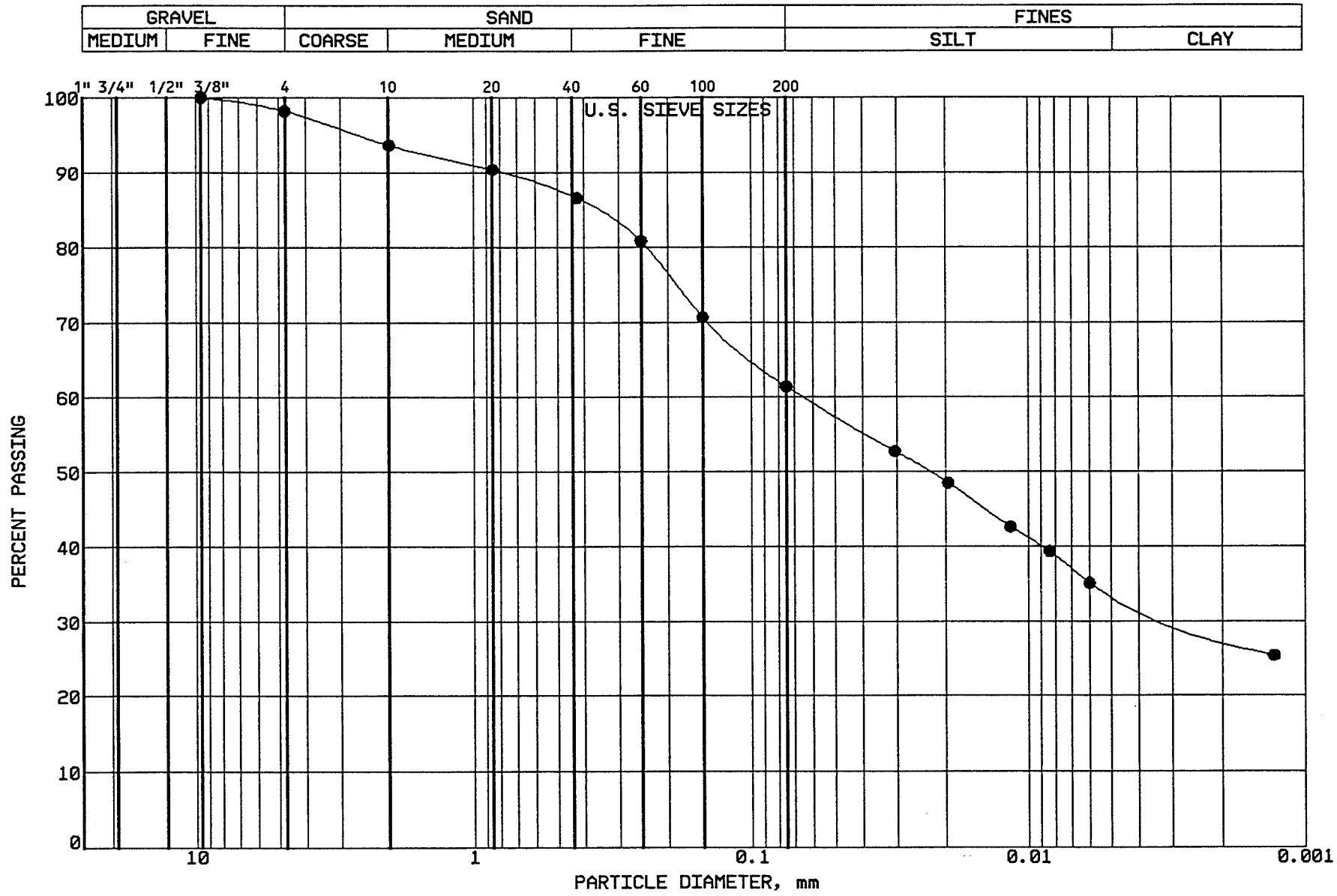
LOCATION: N 42969.0, E 45315.0
SAMPLE: CLBCC643 TUBE #: ST-185
ELEVATION: 1884.7'

GRAVEL	8.3 %
SAND	35.9 %
SILT	21.9 %
CLAY	33.9 %
P 200	55.8 %

SOIL PROPERTIES

LL: 40.0%
PL: 16.0%
PI: 24.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42780.0, E 45305.0
SAMPLE: CLBCC644 TUBE #: ST-186
ELEVATION: 1883.5'

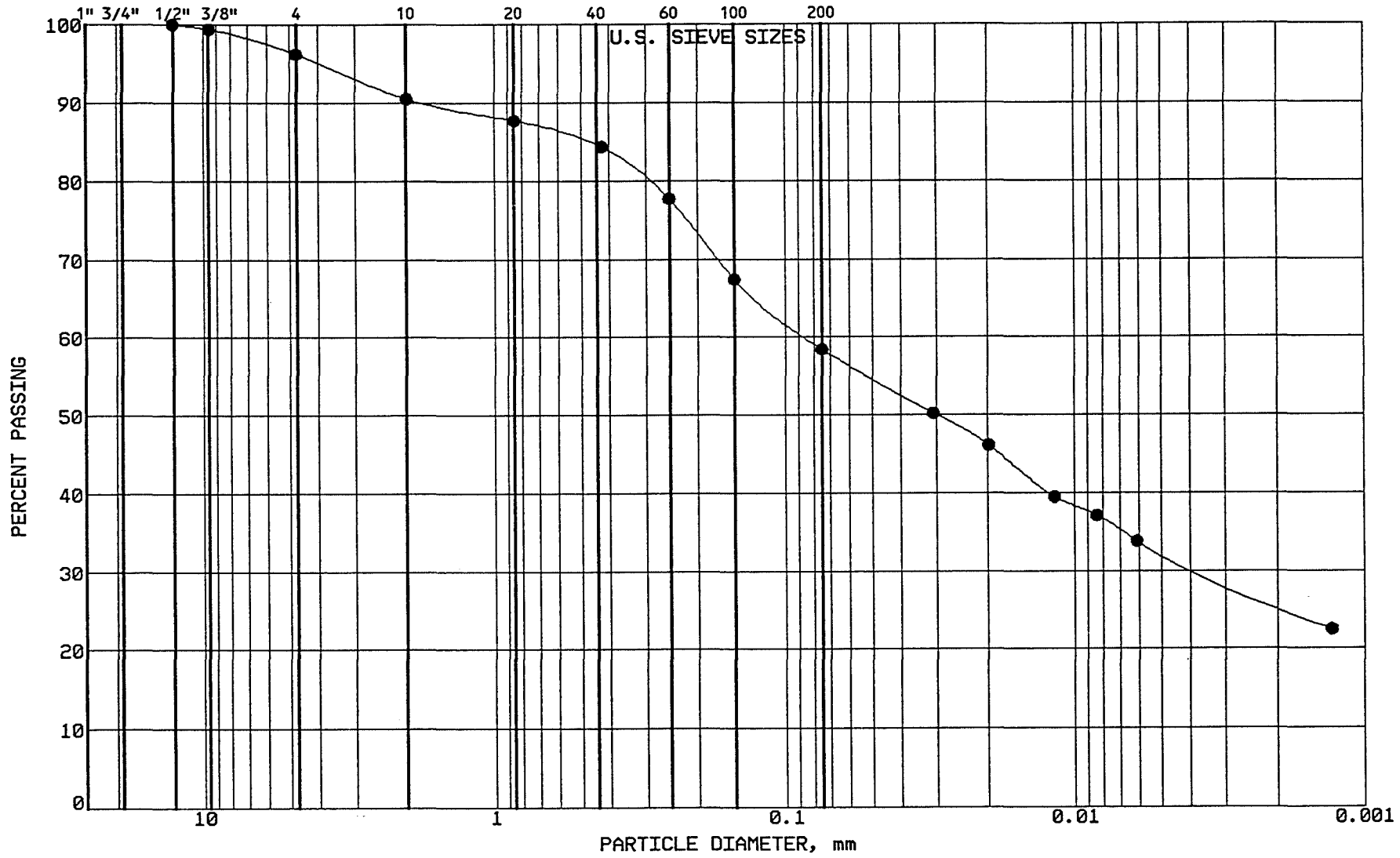
GRAVEL	1.8 %
SAND	36.8 %
SILT	27.5 %
CLAY	33.9 %
P 200	61.4 %

SOIL PROPERTIES

LL: 40.0%
PL: 17.0%
PI: 23.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42615.0, E 45297.0
SAMPLE: CLBCC645 TUBE #:ST-187
ELEVATION: 1882.4'

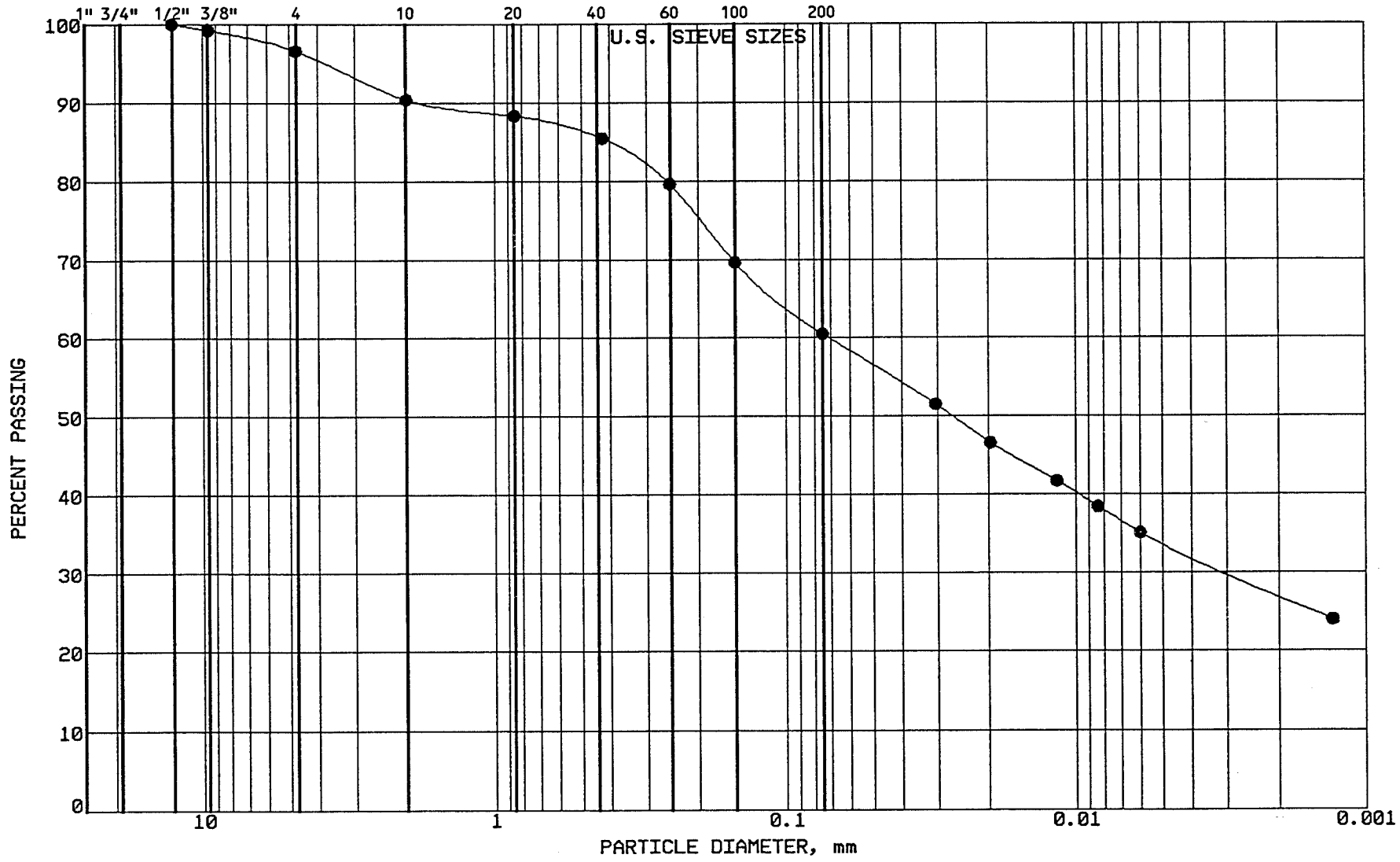
GRAVEL	3.8 %
SAND	37.8 %
SILT	26.1 %
CLAY	32.3 %
P 200	58.4 %

SOIL PROPERTIES

LL: 42.0%
PL: 16.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42871.0, E 45536.0
SAMPLE: CLBCC646 TUBE #:ST-188
ELEVATION: 1884.3'

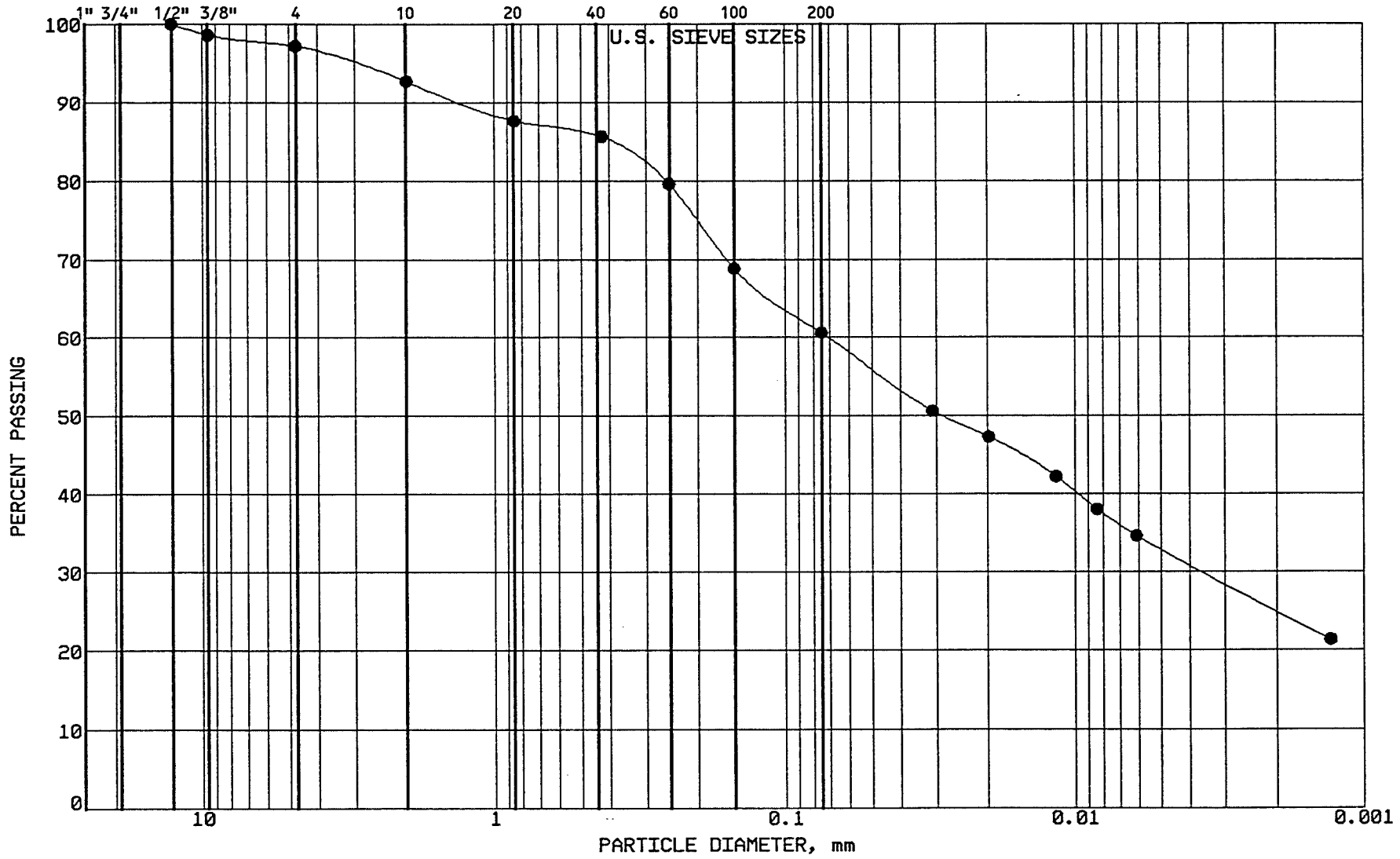
GRAVEL	3.4 %
SAND	36.1 %
SILT	26.7 %
CLAY	33.8 %
P 200	60.5 %

SOIL PROPERTIES

LL: 42.0%
PL: 15.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42638.0, E 45527.0
SAMPLE: CLBCC647 TUBE #:ST-189
ELEVATION: 1883.0'

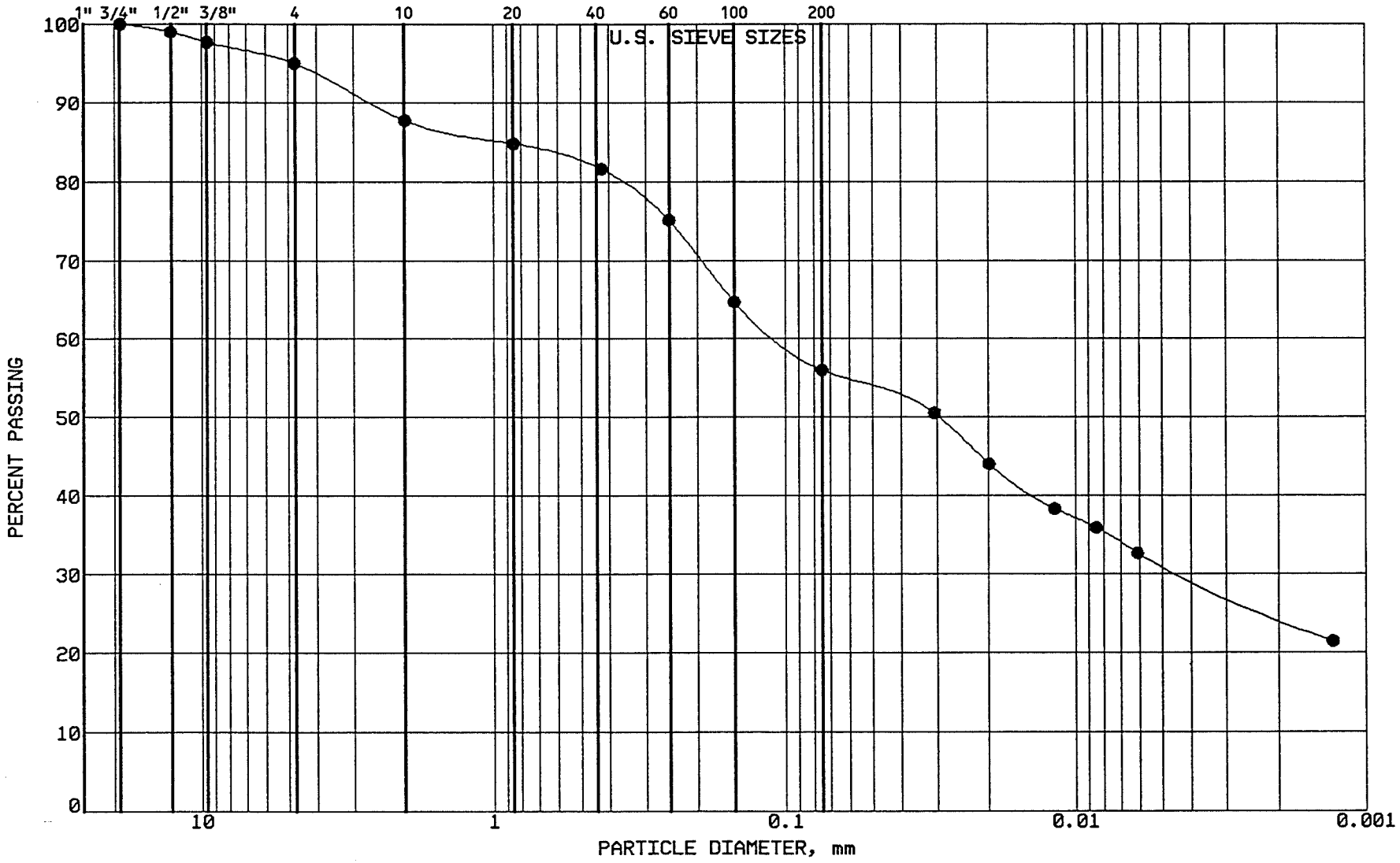
GRAVEL	2.8 %
SAND	36.6 %
SILT	27.7 %
CLAY	32.9 %
P 200	60.6 %

SOIL PROPERTIES

LL: 41.0%
PL: 17.0%
PI: 24.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43408.0, E 45272.0
SAMPLE: CLBCC648 TUBE #:ST-190
ELEVATION: 1888.8'

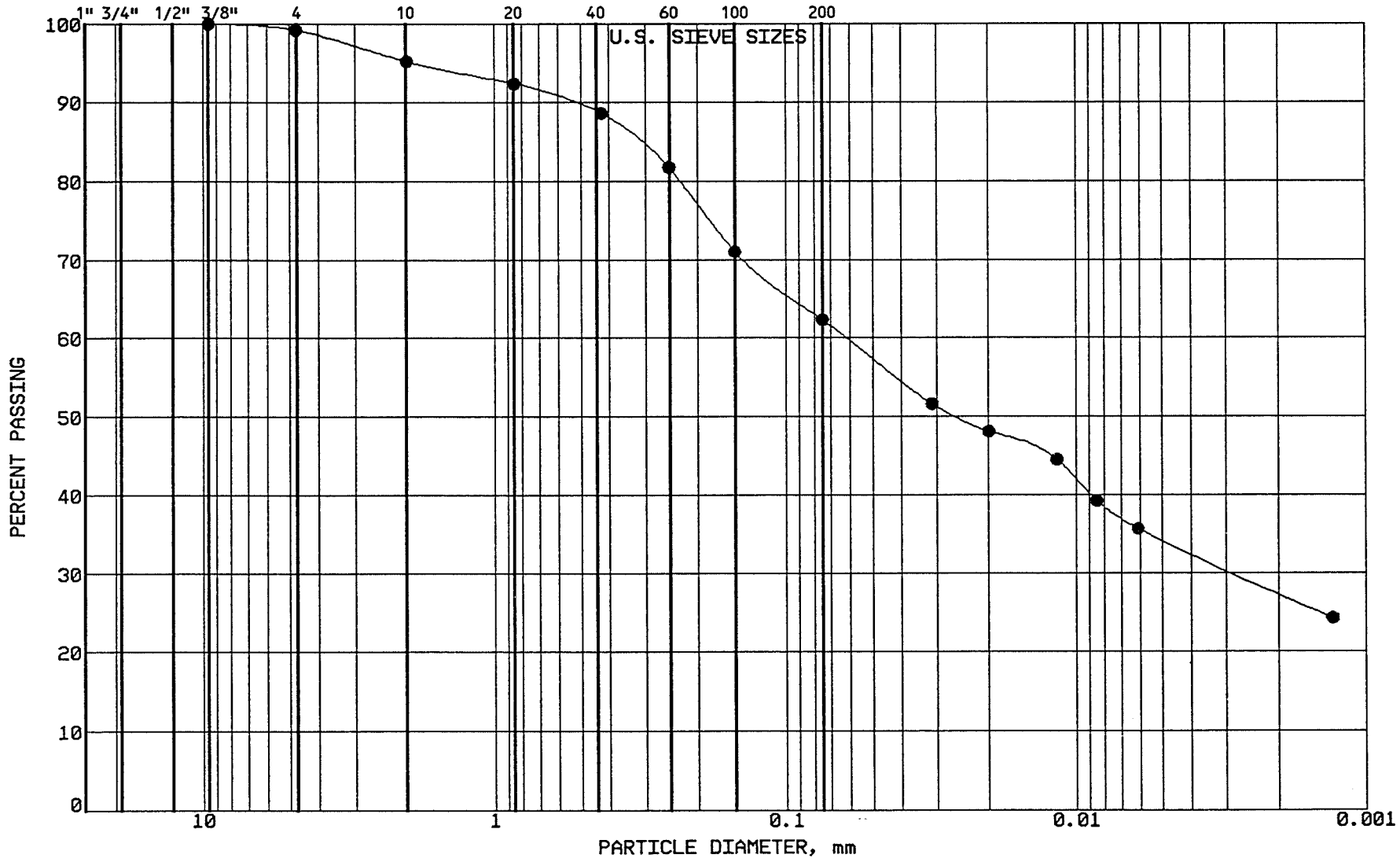
GRAVEL	5.0 %
SAND	39.0 %
SILT	24.8 %
CLAY	31.2 %
P 200	56.0 %

SOIL PROPERTIES

LL: 42.0%
PL: 18.0%
PI: 24.0%
CLASS: SANDY LEAN CLAY (CL) ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

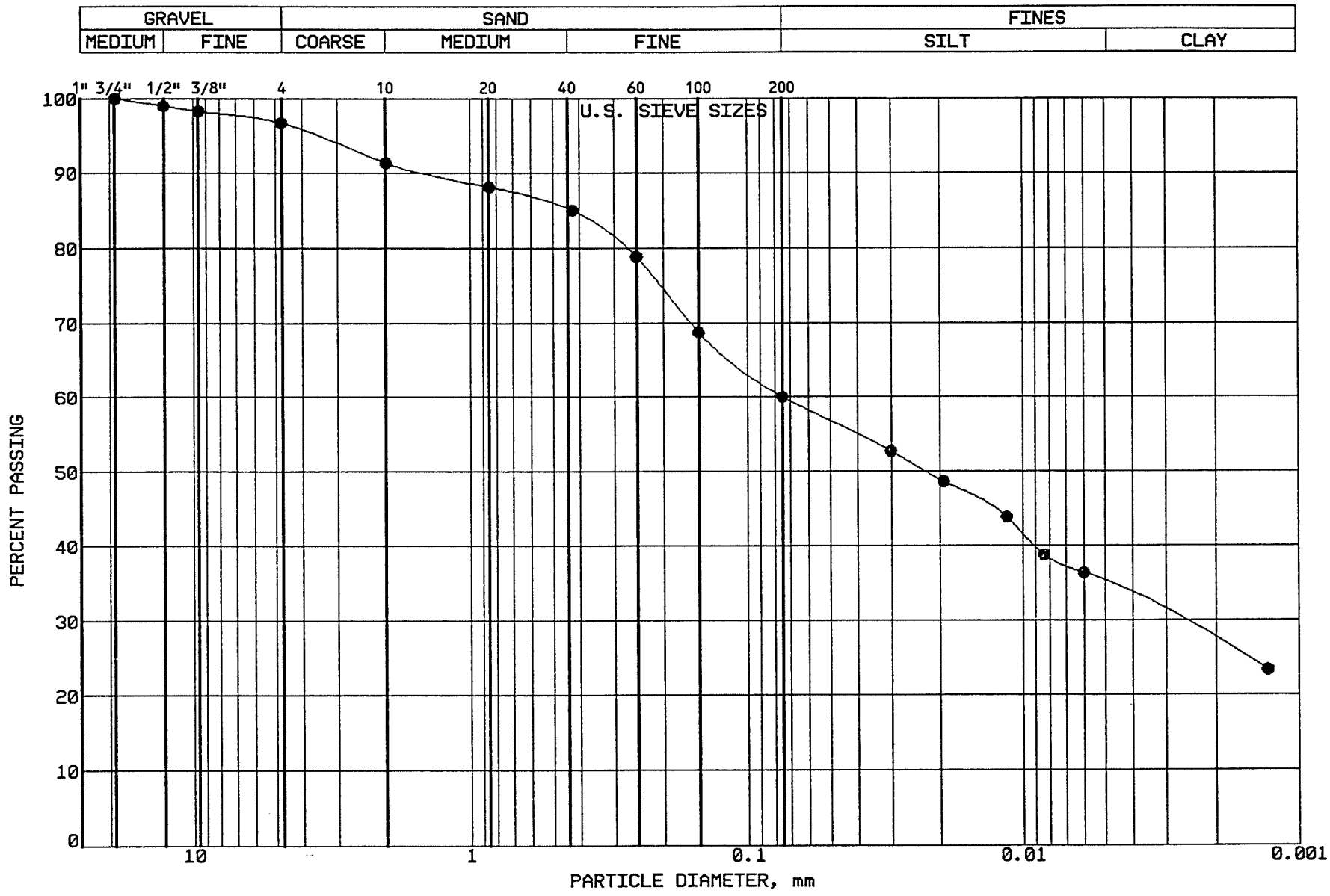
LOCATION: N 43213.0, E 45253.0
SAMPLE: CLBCC649 TUBE #:ST-191
ELEVATION: 1887.4'

GRAVEL	0.8 %
SAND	36.9 %
SILT	28.2 %
CLAY	34.1 %
P 200	62.3 %

SOIL PROPERTIES

LL: 44.0%
PL: 17.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL), olive brown

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

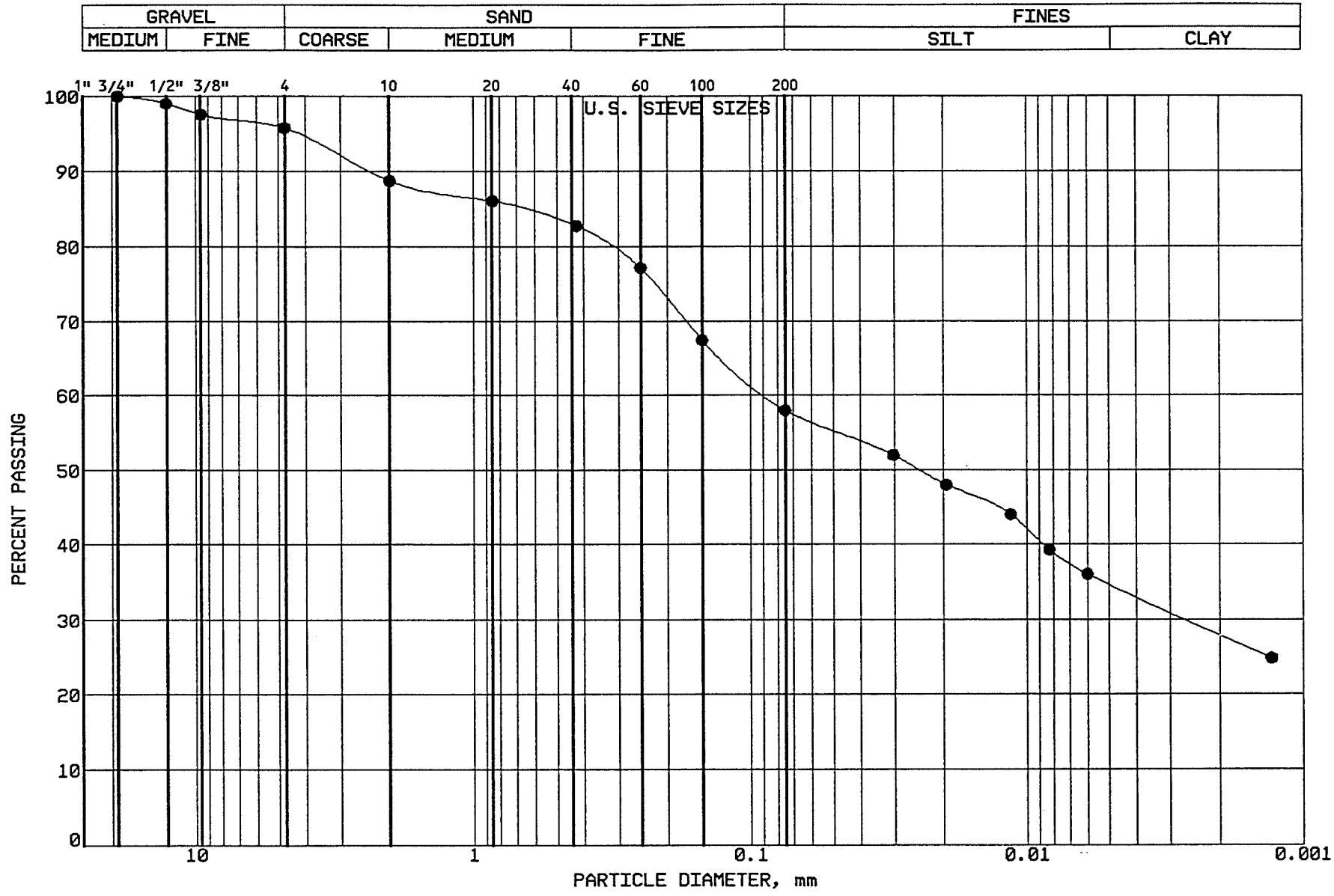
LOCATION: N 43040.0, E 45238.0
SAMPLE: CLBCC650 TUBE #: ST-192
ELEVATION: 1886.4'

GRAVEL	3.3 %
SAND	36.7 %
SILT	25.2 %
CLAY	34.8 %
P 200	60.0 %

SOIL PROPERTIES

LL: 44.0%
PL: 17.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL), olive brown

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43410.0, E 45475.0
SAMPLE: CLBCC651 TUBE #: ST-193
ELEVATION: 1888.5'

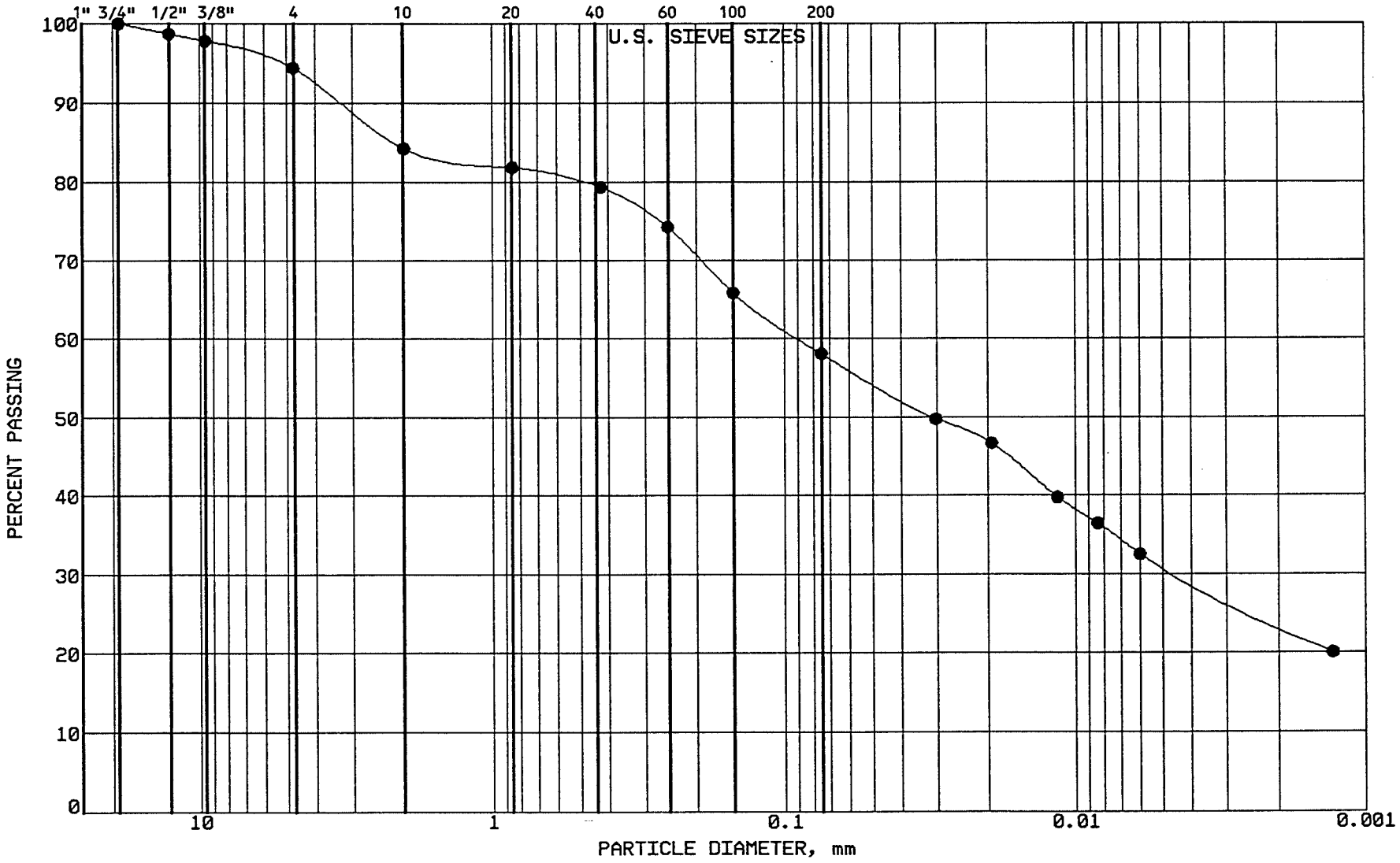
GRAVEL	4.3 %
SAND	37.7 %
SILT	23.3 %
CLAY	34.7 %
P 200	58.0 %

SOIL PROPERTIES

LL: 44.0%
PL: 18.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL), olive brown

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43202.0, E 45458.0
SAMPLE: CLBCC652 TUBE #:ST-194
ELEVATION: 1887.4'

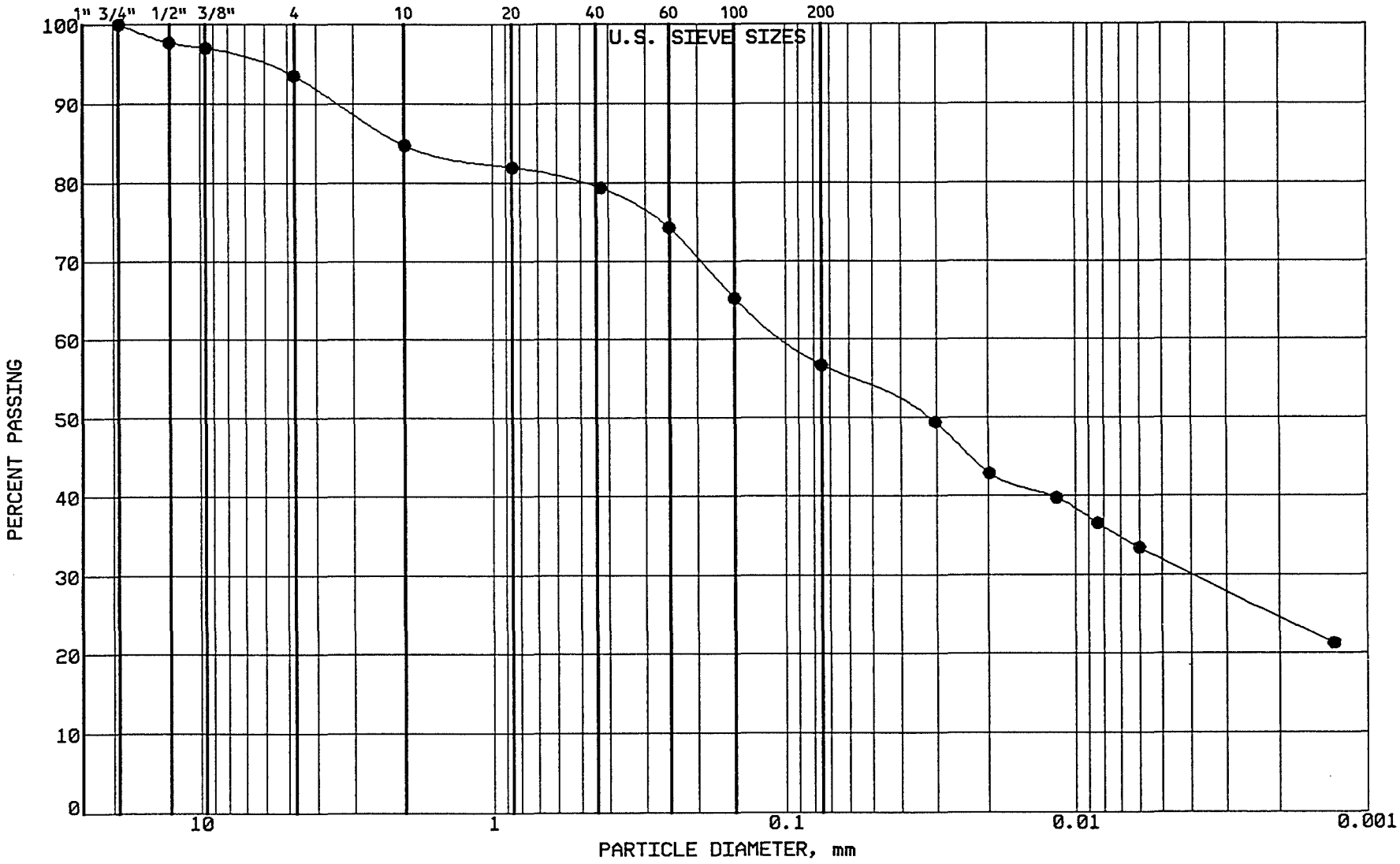
GRAVEL	5.6 %
SAND	36.3 %
SILT	27.1 %
CLAY	31.0 %
P 200	58.1 %

SOIL PROPERTIES

LL: 44.0%
PL: 18.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL), olive brown

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C

EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 43031.0, E 45443.0
SAMPLE: CLBCC653 TUBE #: ST-195
ELEVATION: 1886.5'

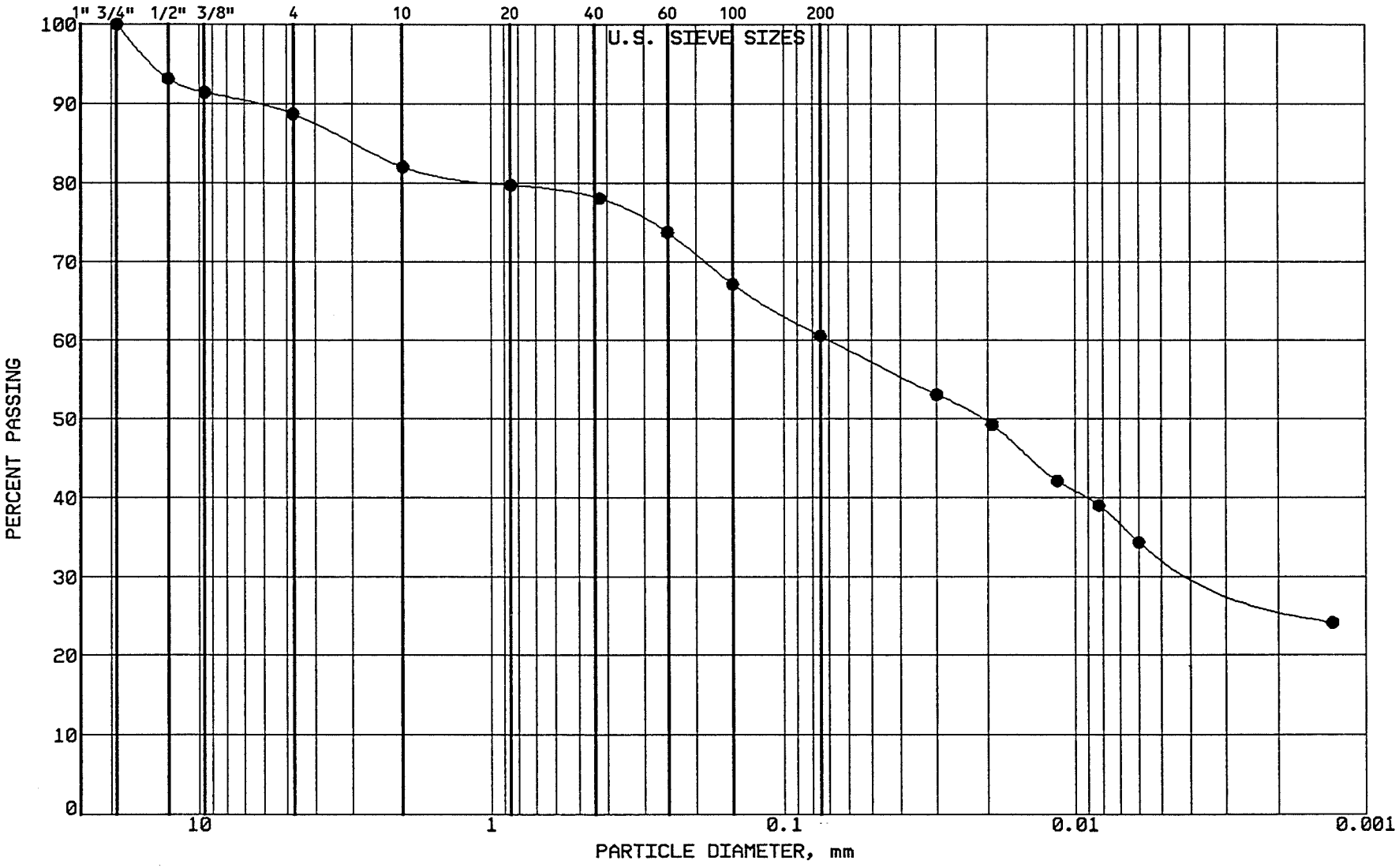
GRAVEL	6.5 %
SAND	36.8 %
SILT	24.7 %
CLAY	32.0 %
P 200	56.7 %

SOIL PROPERTIES

LL: 42.0%
PL: 16.0%
PI: 26.0%
CLASS: SANDY LEAN CLAY (CL), olive brown

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42807.0, E 45749.0
SAMPLE: CLBCC654 TUBE #:ST-196
ELEVATION: 1885.0'

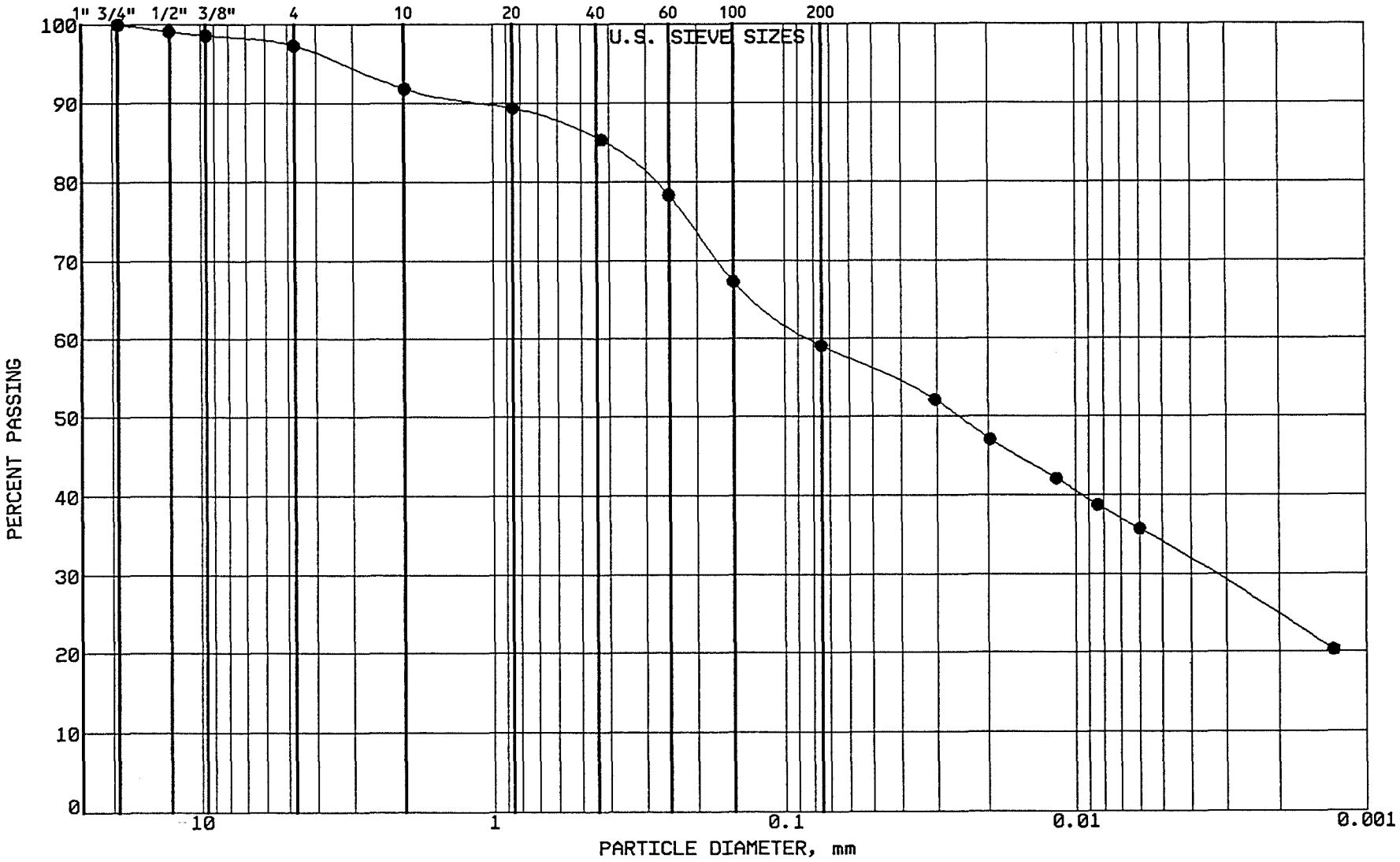
GRAVEL	11.3 %
SAND	28.1 %
SILT	27.5 %
CLAY	33.1 %
P 200	60.6 %

SOIL PROPERTIES

LL: 44.0%
PL: 17.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL), olive brown

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

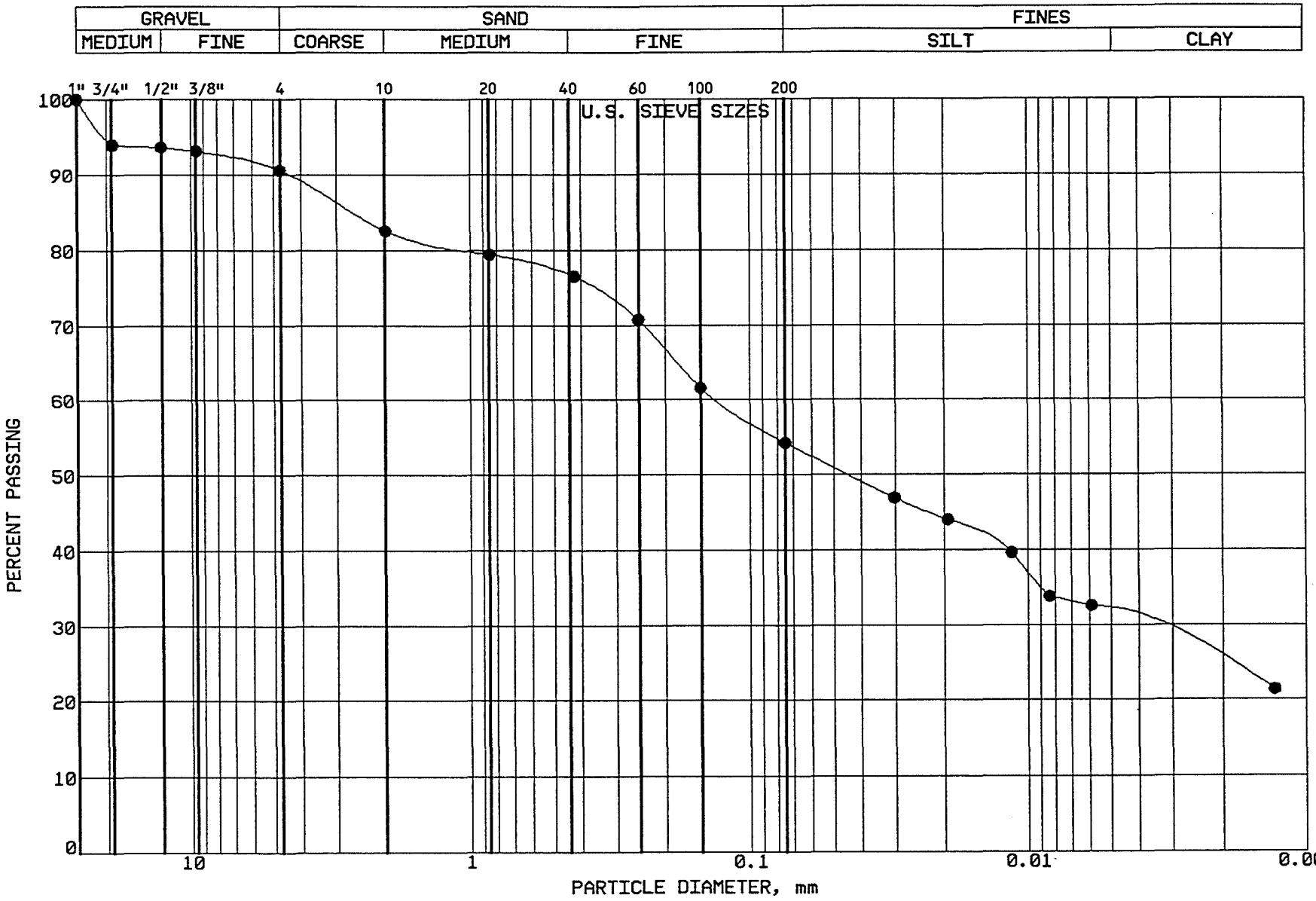
LOCATION: N 42663.0, E 45746.0
SAMPLE: CLBCC655 TUBE #: ST-197
ELEVATION: 1883.7'

GRAVEL	2.7 %
SAND	38.2 %
SILT	25.2 %
CLAY	33.9 %
P 200	59.1 %

SOIL PROPERTIES

LL: 39.0%
PL: 16.0%
PI: 23.0%
CLASS: SANDY LEAN CLAY (CL), olive brown

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42607.0, E 45611.0
SAMPLE: CLBCC656 TUBE #: ST-198
ELEVATION: 1883.2'

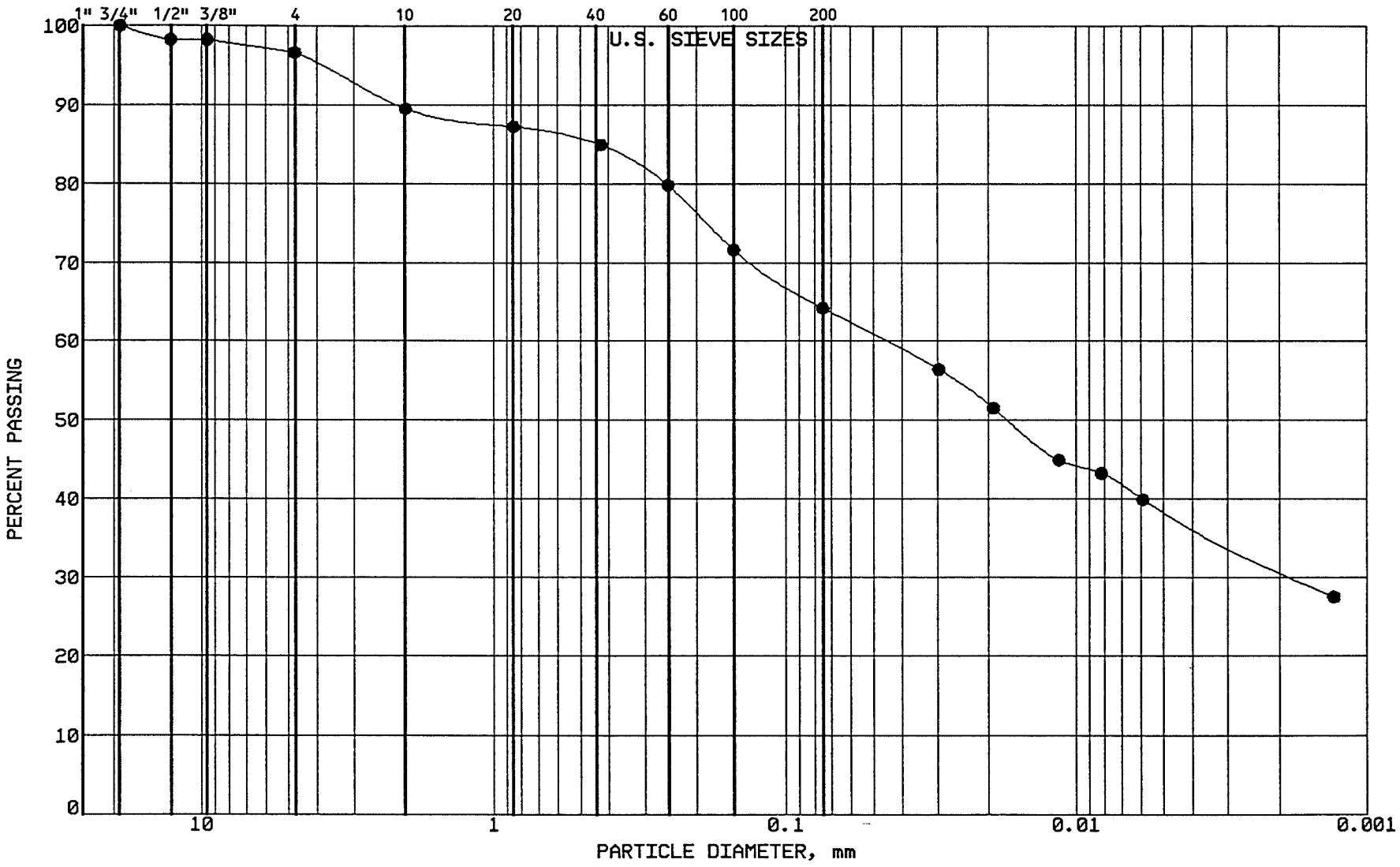
GRAVEL	9.4 %
SAND	36.4 %
SILT	22.8 %
CLAY	31.4 %
P 200	54.2 %

SOIL PROPERTIES

LL: 42.0%
PL: 17.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL), olive brown

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42796.0, E 45598.0
SAMPLE: CLBCC657 TUBE #: ST-199
ELEVATION: 1885.2'

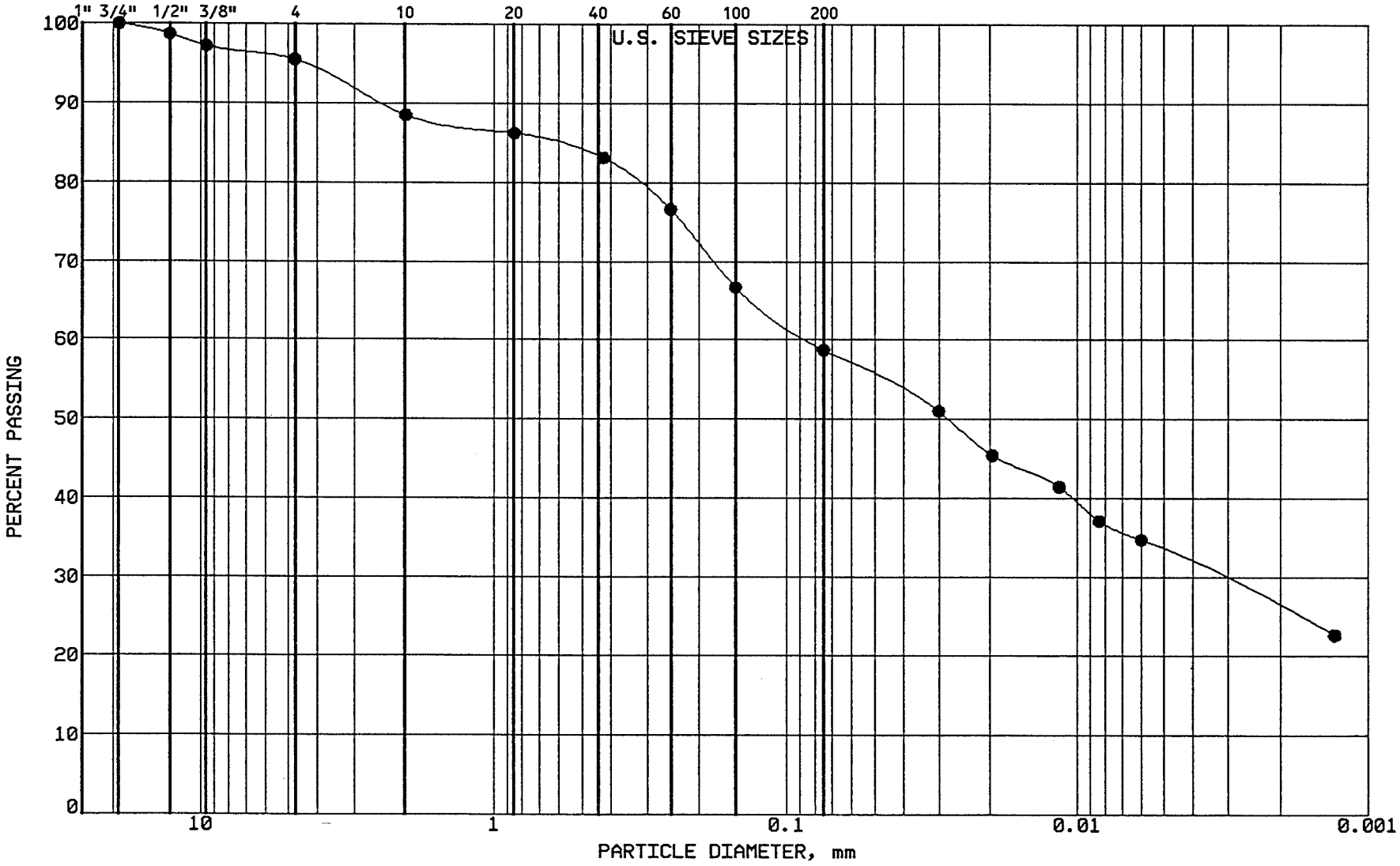
GRAVEL	3.4 %
SAND	32.4 %
SILT	25.7 %
CLAY	38.5 %
P 200	64.2 %

SOIL PROPERTIES

LL: 44.0%
PL: 17.0%
PI: 27.0%
CLASS: SANDY LEAN CLAY (CL), olive brown

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42690.0, E 45405.0
SAMPLE: CLBCC658 TUBE #: ST-200
ELEVATION: 1884.2'

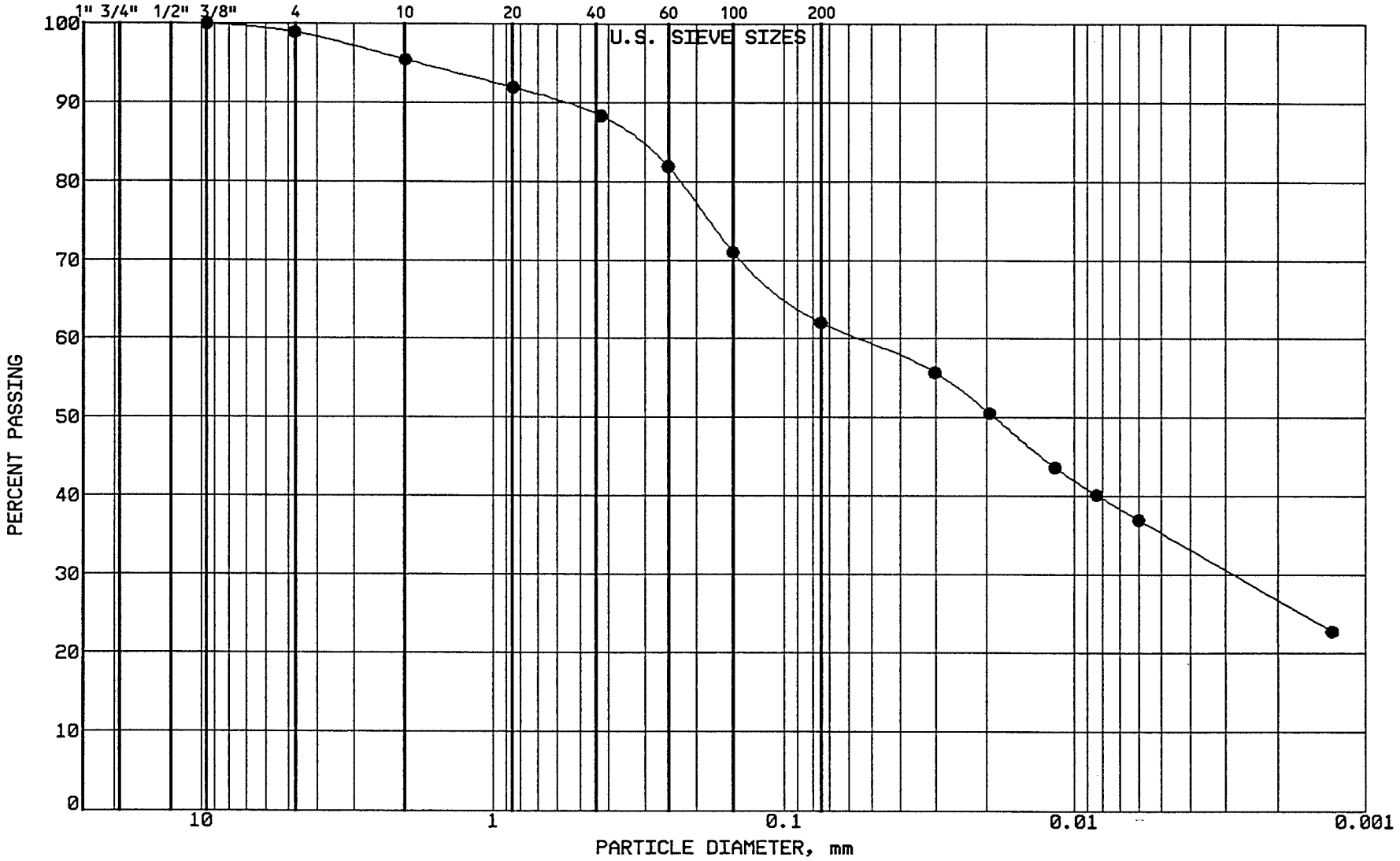
GRAVEL	4.5 %
SAND	36.8 %
SILT	25.4 %
CLAY	33.3 %
P 200	58.7 %

SOIL PROPERTIES

LL: 38.0%
PL: 15.0%
PI: 23.0%
CLASS: SANDY LEAN CLAY (CL), olive brown

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42687.0, E 45202.0
SAMPLE: CLBCC659 TUBE #: ST-201
ELEVATION: 1884.2'

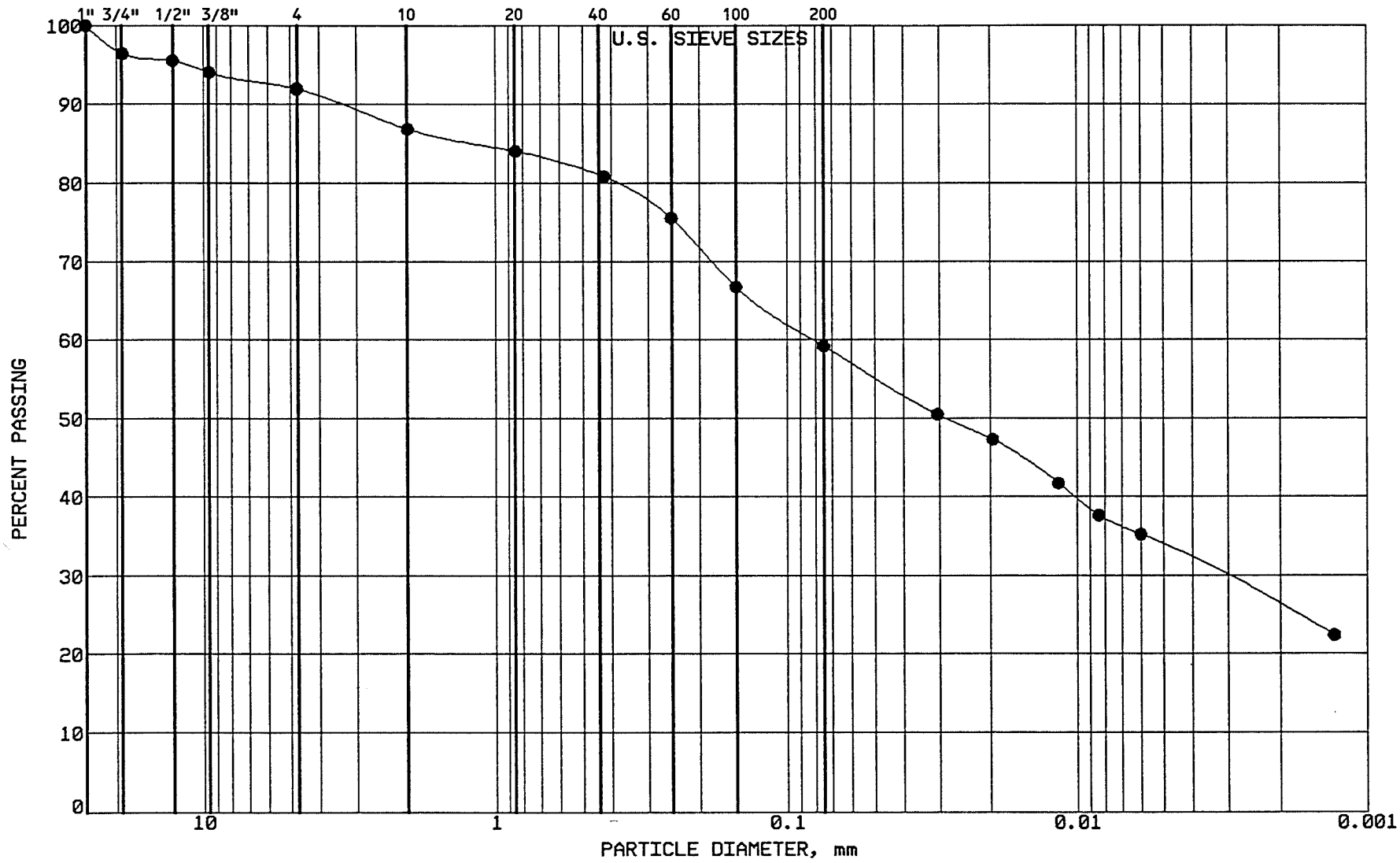
GRAVEL	1.1 %
SAND	36.9 %
SILT	26.8 %
CLAY	35.2 %
P 200	62.0 %

SOIL PROPERTIES

LL: 41.0%
PL: 17.0%
PI: 24.0%
CLASS: SANDY LEAN CLAY (CL), olive brown

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42856.0, E 45410.0
SAMPLE: CLBCC660 TUBE #: ST-202
ELEVATION: 1885.5'

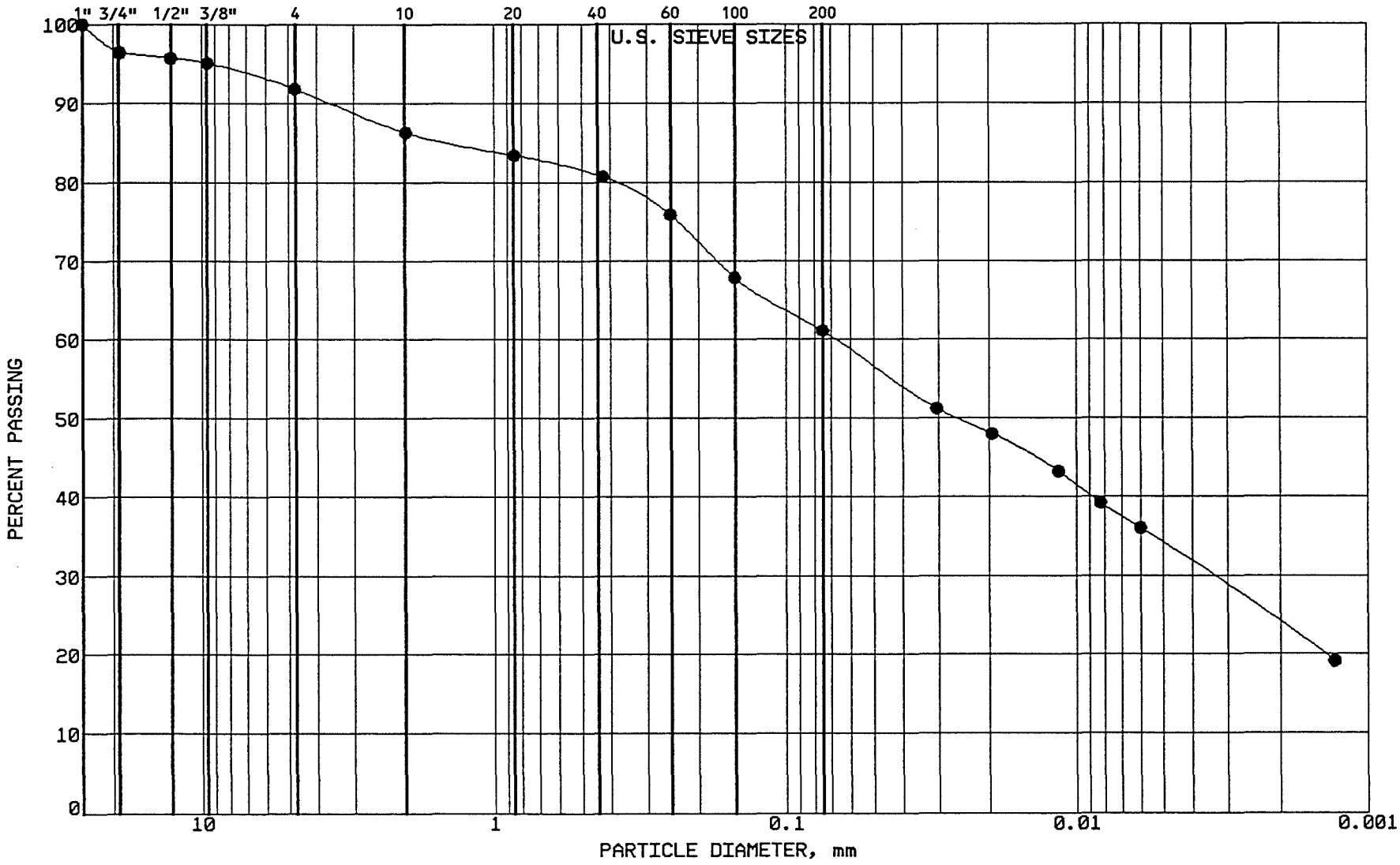
GRAVEL	8.1 %
SAND	32.7 %
SILT	25.5 %
CLAY	33.7 %
P 200	59.2 %

SOIL PROPERTIES

LL: 43.0%
PL: 18.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL), olive brown

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

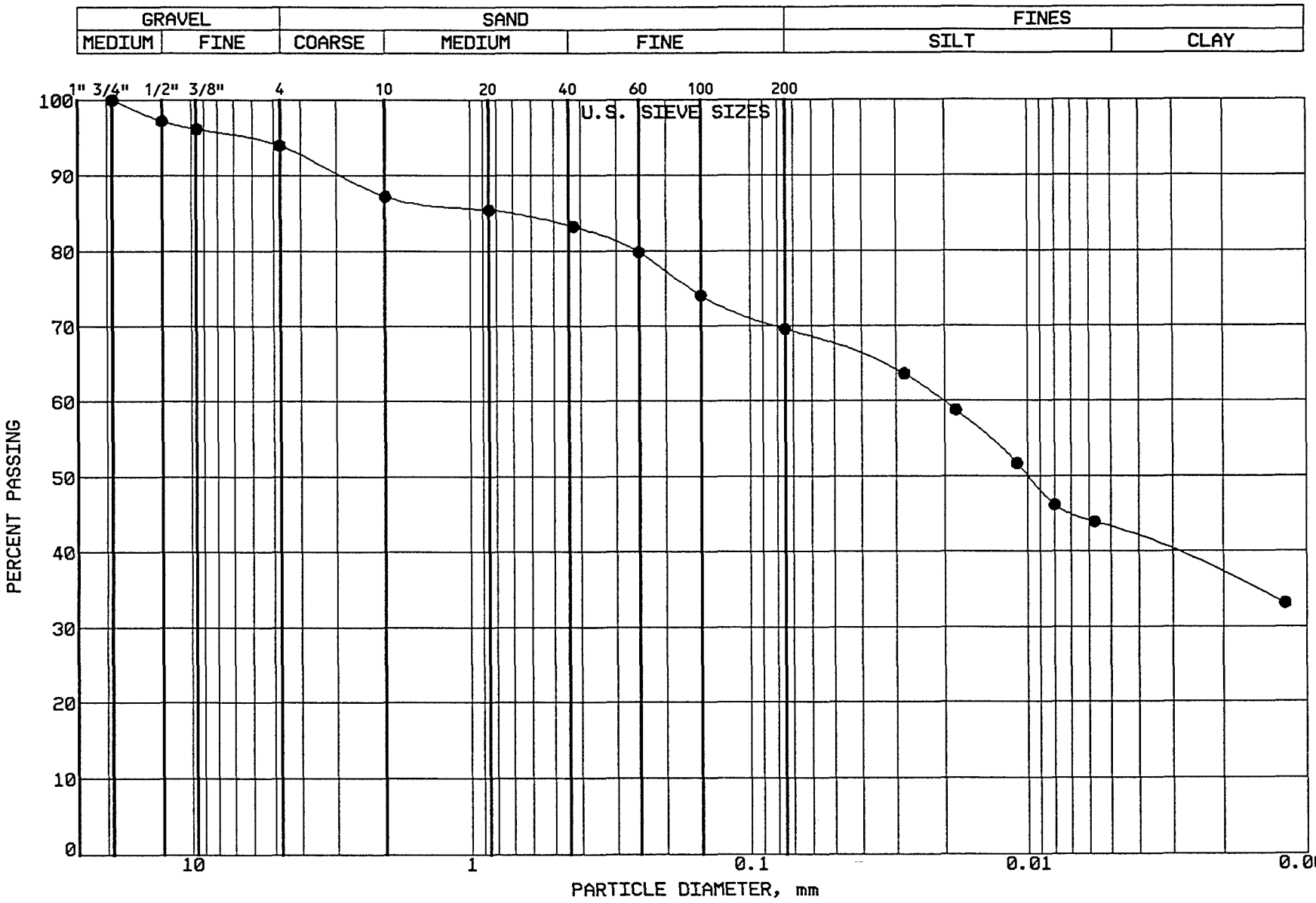
LOCATION: N 42849.0, E 45212.0
SAMPLE: CLBCC661 TUBE #: ST-203
ELEVATION: 1885.3'

GRAVEL	8.2 %
SAND	30.7 %
SILT	27.1 %
CLAY	34.0 %
P 200	61.1 %

SOIL PROPERTIES

LL: 41.0%
PL: 16.0%
PI: 25.0%
CLASS: SANDY LEAN CLAY (CL), olive brown

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-017C
EP #93
Coal Creek Station
Underwood, North Dakota

LOCATION: N 42796.0, E 45598.0
SAMPLE: CLBCC662 TUBE #: ST-199R
ELEVATION: 1885.2'

GRAVEL	6.1 %
SAND	24.4 %
SILT	26.5 %
CLAY	43.0 %
P 200	69.5 %

SOIL PROPERTIES

LL: 48.0%
PL: 18.0%
PI: 30.0%
CLASS: SANDY LEAN CLAY (CL), olive brown

BRAUN[SM]
INTERTEC

AP #91 Results
Coal Creek Station
Miscellaneous Tests

Volume I

Cooperative Power Association
Underwood, North Dakota

Project BFDX-92-018C
April 27, 1994

Braun Intertec Corporation

Engineers and Scientists
Serving the Built and
Natural Environments

Index

Volume I
Set I

Miscellaneous Tests

AP #91

1991 Densities

ABBREVIATIONS --

DE -- Dike Embankment
DC -- Dike Core
CLB -- Clay Liner Base
CLS -- Clay Liner Slope
SG -- Subgrade
SB -- Sand Blanket
CC -- Coal Creek Identifier

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-02	01	5'E OF PUMPHOUSE	6	1,909.8	CC-18	117.4	19.4	98.7	92.5	N/A		MC	06/05/91	NM	02/25/94
	02	5'E OF PUMPHOUSE	6	1,907.4	CC-18	115.2	20.0	96.0	90	N/A		MC	06/05/91	NM	02/25/94
	03	12'WEST OF PUMPHOUSE	6	1,905.5	CC-18	128.1	20.9	105.9	99.3	N/A		MC	06/05/91	NM	02/25/94

Count: 3

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-03	01	15'E OF MANHOLE	6	1,913.0	CC-18	129.3	21.6	106.3	99.7	N/A		DM	06/07/91	NM	02/25/94

Count: 1

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-04	01	15'W OF INLET	6	1,916	CC-4	116.3	23.0	94.6	95.7	N/A	RCP INLET ASH POND #91	MC	06/10/91	NM	02/25/94
	02	25'W OF INLET	6	1,918	CC-4	117.3	25.0	93.9	95	N/A	RCP INLET ASH POND #91	MC	06/10/91	NM	02/25/94
	03	CENTERLINE OF DIKE	6	1,919	CC-4	117.3	22.5	95.4	96.5	N/A	RCP INLET ASH POND #91	MC	06/10/91	NM	02/25/94

Count: 3

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-05	01	MH WEST OF PUMPHOUSE	6	1,912	CC-1	139.7	5.7	132.1	98.5	N/A	RPT 91-5	MC	06/11/91	NM	02/25/94
	02	20" PLASTIC PIPE 20'E OF E-MH	6	1,916	CC-2	118.2	23.4	95.8	95.6	N/A	RPT 91-6	MC	06/12/91	NM	02/25/94
	03	20" PLASTIC PIPE 12'SE -E-MH	6	1,912	CC-2	118.1	23.7	95.5	95.3	N/A	RPT 91-6	MC	06/12/91	NM	02/25/94
	04	20" PIPE 24'N&21'E-SE CORNER	6	1,918	CC-2	116.2	21.9	95.3	95.1	N/A	RPT 91-7	MC	06/17/91	NM	02/25/94

Count: 4

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-15	01	37056N 40899E	6	1,909.4	CC-6	129.9	19.9	108.2	100+	LIFT NO. DC	DC-CC-6, (PROCTOR)	MC	07/13/91	NM	02/25/94
	02	37071N 40779E	6	1,907.3	CC-7	125.1	19.5	104.6	100+	LIFT NO. DC	DC-CC-7, (PROCTOR)	MC	07/13/91	NM	02/25/94
	03	37068N 40803E	6	1,904.9	CC-4	114.4	22.3	93.4	94.5	LIFT NO. DC	"BRIDGE" MATERIAL	MC	07/13/91	NM	02/25/94
	04	37067N 40429E	6	1,909.0	CC-8	122.8	23.6	99.2	99.2	LIFT NO. DC	DC-CC-8 (PROCTOR)	MC	07/13/91	NM	02/25/94
	05	37069N 40543E	6	1,905.7	CC-4	121.3	23.1	98.4	99.6	LIFT NO. DC	"BRIDGE" MATERIAL	MC	07/13/91	NM	02/25/94
	06	37070N 40654E	6	1,905.9	CC-9	120.6	20.5	100.0	98	LIFT NO. DC	DC-CC-9 (PROCTOR)	MC	07/13/91	NM	02/25/94
	07	37072N 40819E	6	1,908.3	CC-10	123.9	20.7	102.5	100+	LIFT NO. DC	DC-CC-10 (PROCTOR)	MC	07/13/91	NM	02/25/94
	08	37082N 40641E	6	1,907.6	CC-11	121.8	22.6	99.2	97.3	LIFT NO. DC	DC-CC-11 (PROCTOR)	MC	07/13/91	NM	02/25/94

Count: 8

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-15A	01	37072N 40319E	6	1,908.3	CC-4	124.1	24.2	99.8	100+	LIFT NO. DC		DM	07/13/91	NM	02/25/94

Count: 1

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-16A	01	37059N 40776E	6	1,909.5	CC-4	123.8	20.0	103.0	100+	LIFT NO. DC		DM	07/15/91	NM	02/25/94
	02	37051N 40610E	6	1,909.0	CC-4	116.9	23.0	94.9	96.1	LIFT NO. DC		DM	07/15/91	NM	02/25/94
	03	37048N 40424E	6	1,910.9	CC-4	120.2	22.7	97.8	99.1	LIFT NO. DC		DM	07/15/91	NM	02/25/94
	04	37067N 40849E	6	1,910.8	CC-4	121.8	23.0	98.9	100	LIFT NO. DC	DC-CC-12, ST.1	DM	07/15/91	NM	02/25/94
	05	37065N 40670E	6	1,909.4	CC-4	115.5	22.3	94.3	95.7	LIFT NO. DC	DC-CC-13, ST.2	DM	07/15/91	NM	02/25/94
	06	37058N 40475E	6	1,910.3	CC-4	124.7	23.2	101.2	100+	LIFT NO. DC	DC-CC-14, ST.3	DM	07/15/91	NM	02/25/94

Count: 6

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-18	01	37042N 40598E	6	1,910.1	CC-4	114.1	20.5	95.7	95.8	DIKE CORE		MC	07/27/91	NM	02/25/94
	02	37051N 40797E	6	1,910.5	CC-4	121.6	24.3	97.7	98.9	DIKE CORE		MC	07/27/91	NM	02/25/94

Count: 2

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-19	01	37067N 40872E	6	1,912.3	CC-4	117.9	24.9	94.3	95.4	LIFT NO. DC		MC	07/29/91	NM	02/25/94
	02	37072N 40724E	6	1,910.9	CC-4	120.2	22.7	97.8	99	LIFT NO. DC		MC	07/29/91	NM	02/25/94
	03	37067N 40521E	6	1,911.1	CC-9	124.3	21.6	102.1	100+	LIFT NO. DC		MC	07/29/91	NM	02/25/94
	04	37068N 40840E	6	1,912.2	CC-19	131.3	23.3	106.4	100+	LIFT NO. DC	DC-CC-19, (PROCTOR), ST.4	MC	07/29/91	NM	02/25/94
	05	37070N 40675E	6	1,911.8	CC-4	122.5	25.1	97.8	99	LIFT NO. DC		MC	07/29/91	NM	02/25/94
	06	37064N 40481E	6	1,912.1	CC-9	121.8	16.6	104.3	100+	LIFT NO. DC		MC	07/29/91	NM	02/25/94

Count: 6

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-20	01	37073N 40871E	6	1,913.3	CC-9	120.4	21.1	99.3	97.4	LIFT NO. DC		MC	07/30/91	NM	02/25/94
	02	37070N 40680E	6	1,912.6	CC-9	119.8	21.7	98.3	96.3	LIFT NO. DC	DC-CC-21, ST.5	MC	07/30/91	NM	02/25/94
	03	37065N 40488E	6	1,912.8	CC-9	124.4	20.9	102.8	100+	LIFT NO. DC		MC	07/30/91	NM	02/25/94
	04	37073N 40881E	6	1,914.3	CC-9	122.3	21.1	100.8	98.8	LIFT NO. DC		MC	07/30/91	NM	02/25/94
	05	37067N 40690E	6	1,913.7	CC-9	117.9	21.0	97.3	95.4	LIFT NO. DC		MC	07/30/91	NM	02/25/94
	06	37059N 40491E	6	1,913.0	CC-9	125.1	21.4	102.9	100+	LIFT NO. DC	DC-CC-22, ST.6	MC	07/30/91	NM	02/25/94

Count: 6

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-22A	01	37070N 40680E	6	1,912.6	CC-6	128.9	21.3	106.2	100+	LIFT NO. DC	DC-CC-28, RETEST ST.5	DM	08/23/91	NM	02/25/94
	02	37059N 40491E	6	1,913.0	CC-6	126.2	21.1	104.1	99.6	LIFT NO. DC	DC-CC-29, RETEST ST.6	DM	08/23/91	NM	02/25/94

Count: 2

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-23A	01	37063N 40878E	6	1,914.7	CC-6'	124.8	18.6	105.2	100+	LIFT NO. DC		DM	08/26/91	NM	02/25/94
	02	37060N 40695E	6	1,914.3	CC-6	127.5	18.1	107.8	100+	LIFT NO. DC		DM	08/26/91	NM	02/25/94
	03	37059N 40470E	6	1,912.7	CC-6	125.1	22.6	102.0	97.6	LIFT NO. DC		DM	08/26/91	NM	02/25/94
	04	37067N 40866E	6	1,914.9	CC-9	126.4	24.8	101.2	99.2	LIFT NO. DC	DC-CC-30, ST.7	DM	08/26/91	NM	02/25/94
	05	37066N 40742E	6	1,914.7	CC-9	126.4	23.8	102.0	100	LIFT NO. DC	DC-CC-31, ST.8	DM	08/26/91	NM	02/25/94
	06	37061N 40540E	6	1,914.3	CC-9	121.0	23.2	98.2	96.3	LIFT NO. DC	DC-CC-32, ST.9	DM	08/26/91	NM	02/25/94
	07	37064N 40879E	6	1,915.8	CC-9	123.4	21.5	101.6	99.6	LIFT NO. DC	DC-CC-33 (PROCTOR)	DM	08/26/91	NM	02/25/94
	08	37063N 40714E	6	1,915.4	CC-9	123.5	21.6	101.4	99.5	LIFT NO. DC		DM	08/26/91	NM	02/25/94
	09	37057N 40507E	6	1,914.7	CC-9	119.3	22.6	97.2	95.3	LIFT NO. DC		DM	08/26/91	NM	02/25/94
	10	37061N 40741E	6	1,916.2	CC-9	124.3	23.3	100.7	98.7	LIFT NO. DC	DC-CC-34, ST.10	DM	08/26/91	NM	02/25/94
	11	37063N 40604E	6	1,915.8	CC-9	122.8	21.7	100.9	98.9	LIFT NO. DC	DC-CC-35, ST.11	DM	08/26/91	NM	02/25/94

Count: 11

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-24A	01	37065N 40780E	6	1,916.8	CC-9	119.6	22.9	97.2	95.3	LIFT NO. DC		DM	08/27/91	NM	02/25/94
	02	37064N 40626E	6	1,916.3	CC-9	126.0	25.1	100.6	98.6	LIFT NO. DC		DM	08/27/91	NM	02/25/94
	03	37066N 40881E	6	1,917.2	CC-9	123.0	23.6	99.4	97.4	LIFT NO. DC		DM	08/27/91	NM	02/25/94
	04	37062N 40709E	6	1,917.6	CC-9	119.1	20.9	98.4	96.5	LIFT NO. DC		DM	08/27/91	NM	02/25/94
	05	37061N 40518E	6	1,916.3	CC-9	119.6	21.1	98.6	96.7	LIFT NO. DC		DM	08/27/91	NM	02/25/94
	06	RETEST OF #4	6	1,917.6	CC-9	123.5	22.7	100.7	98.7	LIFT NO. DC		DM	08/27/91	NM	02/25/94
	07	RETEST OF #5	6	1,916.3	CC-9	127.8	22.6	104.1	100+	LIFT NO. DC	DC-CC-36, ST.12	DM	08/27/91	NM	02/25/94
	08	37065N 40740E	6	1,917.9	CC-9	127.1	23.7	102.6	100+	LIFT NO. DC		DM	08/27/91	NM	02/25/94
	09	37061N 40563E	6	1,917.2	CC-9	123.3	26.9	97.0	95.1	LIFT NO. DC		DM	08/27/91	NM	02/25/94

Count: 9

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-25A	01	37150N 40063E	6	1,908.4	CC-9	120.7	23.8	97.4	95.5	LIFT NO. DC		DM	08/28/91	NM	02/25/94
	02	37250N 39915E	6	1,909.6	CC-9	124.6	22.8	101.5	99.5	LIFT NO. DC		DM	08/28/91	NM	02/25/94
	03	37387N 39809E	6	1,907.7	CC-9	126.1	24.3	101.3	99.3	LIFT NO. DC		DM	08/28/91	NM	02/25/94
	04	37186N 40016E	6	1,909.3	CC-9	126.0	23.1	102.2	100+	LIFT NO. DC		DM	08/28/91	NM	02/25/94
	05	37307N 39865E	6	1,910.0	CC-9	118.2	21.7	97.0	95.1	LIFT NO. DC		DM	08/28/91	NM	02/25/94
	06	37130N 40111E	6	1,909.6	CC-9	122.4	22.0	100.2	98.2	LIFT NO. DC		DM	08/28/91	NM	02/25/94
	07	37239N 39936E	6	1,910.5	CC-9	124.6	22.6	101.5	99.5	LIFT NO. DC		DM	08/28/91	NM	02/25/94
	08	37394N 39806E	6	1,909.3	CC-9	122.3	22.9	99.5	97.6	LIFT NO. DC	DC-CC-39, ST.13	DM	08/28/91	NM	02/25/94
	09	37169N 39998E	6	1,910.6	CC-9	120.6	22.4	98.4	96.5	LIFT NO. DC		DM	08/28/91	NM	02/25/94
	10	37328N 39850E	6	1,910.7	CC-9	126.0	22.7	102.6	100+	LIFT NO. DC	DC-CC-40, ST.14	DM	08/28/91	NM	02/25/94

Count: 10

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-26	01	37096N 40123E	6	1,910.6	CC-4	122.2	20.0	101.7	100+	LIFT NO. DC		MC	08/29/91	NM	02/25/94
	02	37237N 39938E	6	1,911.7	CC-4	121.6	22.3	99.3	100	LIFT NO. DC		MC	08/29/91	NM	02/25/94
	03	37387N 39810E	6	1,910.0	CC-4	118.9	23.7	96.0	97.2	LIFT NO. DC		MC	08/29/91	NM	02/25/94
	04	37302N 39865E	6	1,911.8	CC-4	116.8	21.4	96.1	97.2	LIFT NO. DC	PASSED BY #1 91-26A	MC	08/29/91	NM	02/25/94

Count: 4

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-26A	01	RETEST OF #4 OF 91-26	6	1,911.8	CC-4	121.1	25.6	96.3	97.6	LIFT NO. DC		DM	08/29/91	NM	02/25/94
	02	37205N 39986E	6	1,911.8	CC-4	118.2	25.0	94.4	95.7	LIFT NO. DC		DM	08/29/91	NM	02/25/94
	03	37384N 39804E	6	1,912.2	CC-4	119.4	25.0	95.5	96.8	LIFT NO. DC		DM	08/29/91	NM	02/25/94
	04	37242N 39938E	6	1,912.6	CC-4	123.1	23.1	99.7	100+	LIFT NO. DC		DM	08/29/91	NM	02/25/94
	05	37131N 40101E	6	1,911.9	CC-4	122.3	23.4	99.1	100+	LIFT NO. DC		DM	08/29/91	NM	02/25/94
	06	37189N 40004E	6	1,913.2	CC-4	124.7	23.3	101.0	100+	LIFT NO. DC	DC-CC-41, ST.15	DM	08/29/91	NM	02/25/94
	07	37318N 39858E	6	1,913.2	CC-4	120.8	24.2	97.3	98.6	LIFT NO. DC		DM	08/29/91	NM	04/06/94

Count: 7

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-27A	01	37130N 40102E	6	1,913.0	CC-8	121.1	23.4	98.1	98.1	LIFT NO. DC		DM	08/30/91	NM	02/25/94
	02	37240N 39939E	6	1,914.2	CC-8	123.8	23.5	99.9	99.9	LIFT NO. DC		DM	08/30/91	NM	02/25/94
	03	37397N 39803E	6	1,912.9	CC-8	124.8	23.1	101.3	100+	LIFT NO. DC		DM	08/30/91	NM	02/25/94
	04	37179N 40019E	6	1,915.1	CC-9	120.9	22.1	100.8	98.8	LIFT NO. DC		DM	08/30/91	NM	02/25/94
	05	37308N 39863E	6	1,914.8	CC-8	123.7	23.9	99.8	99.8	LIFT NO. DC		DM	08/30/91	NM	02/25/94
	06	37128N 40125E	6	1,913.6	CC-8	123.9	19.8	103.3	100+	LIFT NO. DC	MOISTURE FAILS	DM	08/30/91	NM	02/25/94
	07	37227N 39964E	6	1,916.0	CC-8	119.7	20.6	99.1	99.1	LIFT NO. DC	MOISTURE FAILS	DM	08/30/91	NM	02/25/94
	08	37368N 39827E	6	1,915.5	CC-8	114.4	20.2	95.0	95.0	LIFT NO. DC	MOISTURE FAILS	DM	08/30/91	NM	02/25/94
	09	RETEST OF #6	6	1,913.6	CC-8	123.7	23.7	101.0	100+	LIFT NO. DC		DM	08/30/91	NM	02/25/94
	10	RETEST OF #7	6	1,916.0	CC-8	126.0	23.9	102.0	100+	LIFT NO. DC		DM	08/30/91	NM	02/25/94
	11	RETEST OF #8	6	1,915.5	CC-8	123.0	23.6	99.5	99.5	LIFT NO. DC		DM	08/30/91	NM	02/25/94
	12	37169N 40051E	6	1,916.1	CC-8	122.3	24.0	98.6	98.6	LIFT NO. DC		DM	08/30/91	NM	02/25/94
	13	37287N 39897E	6	1,916.8	CC-8	123.3	24.3	99.2	99.2	LIFT NO. DC		DM	08/30/91	NM	02/25/94

Count: 13

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-28A	01	37127N 40114E	6	1,915.5	CC-8	118.6	23.4	96.0	96.0	LIFT NO. DC	DC-CC-44, ST.16	DM	09/03/91	NM	02/25/94
	02	37231N 39952E	6	1,916.8	CC-8	120.1	23.8	97.0	97.0	LIFT NO. DC		DM	09/03/91	NM	02/25/94
	03	37384N 39804E	6	1,915.2	CC-8	118.4	23.2	96.0	96.0	LIFT NO. DC		DM	09/03/91	NM	02/25/94

Count: 3

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-29A	01	37171N 40034E	6	1,917.2	CC-8	123.9	23.4	100.4	100.0	LIFT NO. DC		DM	09/04/91	NM	02/25/94
	02	37335N 39846E	6	1,917.0	CC-8	121.8	23.2	98.9	98.9	LIFT NO. DC		DM	09/04/91	NM	02/25/94
	03	37178N 40082E	6	1,908.5	CC-8	119.4	25.5	95.2	95.2	LIFT NO. DE		DM	09/04/91	NM	02/25/94
	04	37279N 39940E	6	1,909.2	CC-8	120.7	24.1	97.3	97.3	LIFT NO. DE	DE-CC-45, ST.17	DM	09/04/91	NM	02/25/94
	05	37406N 39834E	6	1,908.5	CC-8	124.7	23.4	100.9	100+	LIFT NO. DE		DM	09/04/91	NM	02/25/94
	06	37204N 40040E	6	1,909.6	CC-8	119.1	23.0	96.7	96.7	LIFT NO. DE		DM	09/04/91	NM	02/25/94
	07	37351N 39875E	6	1,909.6	CC-8	123.5	25.2	98.5	98.5	LIFT NO. DE		DM	09/04/91	NM	02/25/94
	08	37336N 39847E	6	1,917.1	CC-8	126.4	25.0	101.0	100+	LIFT NO. DC		DM	09/04/91	NM	02/25/94
	09	37171N 40028E	6	1,917.4	CC-8	123.1	24.1	99.7	99.7	LIFT NO. DC		DM	09/04/91	NM	02/25/94
	10	37079N 40806E	6	1,914.8	CC-8	119.9	23.8	96.8	96.8	LIFT NO. DE		DM	09/04/91	NM	02/25/94
	11	37079N 40595E	6	1,914.2	CC-8	120.1	23.4	97.2	97.2	LIFT NO. DE		DM	09/04/91	NM	02/25/94
	12	37157N 40118E	6	1,909.3	CC-8	121.9	24.1	98.2	98.2	LIFT NO. DE		DM	09/04/91	NM	02/25/94
		37157N 40118E	6	1,909.3	CC-8	121.9	24.1	98.2	98.2	LIFT NO. DE		DM	09/04/91	NM	04/06/94
	13	37261N 39960E	6	1,910.4	CC-8	123.9	24.7	99.2	99.2	LIFT NO. DE		DM	09/04/91	NM	02/25/94
		37261N 39960E	6	1,910.4	CC-8	123.9	24.7	99.2	99.2	LIFT NO. DE		DM	09/04/91	NM	04/06/94
	14	37407N 39829E	6	1,910.0	CC-8	117.9	23.8	95.1	95.1	LIFT NO. DE		DM	09/04/91	NM	02/25/94
		37407N 39829E	6	1,910.0	CC-8	117.9	23.8	95.1	95.1	LIFT NO. DE		DM	09/04/91	NM	04/06/94

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INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-30A	01	37195N 40046E	6	1,910.6	CC-8	120.7	25.8	95.9	95.9	LIFT NO. DE		DM	09/05/91	NM	02/25/94
	02	37337N 39883E	6	1,911.0	CC-8	121.9	26.1	96.7	96.7	LIFT NO. DE		DM	09/05/91	NM	02/25/94
	03	37076N 40805E	6	1,915.0	CC-8	124.1	24.9	99.2	99.2	LIFT NO. DE		DM	09/05/91	NM	02/25/94
	04	37078N 40546E	6	1,914.8	CC-8	122.0	24.6	97.9	97.9	LIFT NO. DE		DM	09/05/91	NM	02/25/94
	05	37078N 40839E	6	1,916.2	CC-8	122.1	23.6	98.8	98.8	LIFT NO. DE		DM	09/05/91	NM	02/25/94
	06	37078N 40603E	6	1,915.5	CC-8	118.5	24.5	95.2	95.2	LIFT NO. DE		DM	09/05/91	NM	02/25/94
	07	37169N 40689E	6	1,911.1	CC-8	119.4	24.6	95.8	95.8	LIFT NO. DE		DM	09/05/91	NM	02/25/94
	08	37314N 39899E	6	1,911.6	CC-8	121.8	24.3	98.0	98.0	LIFT NO. DE		DM	09/05/91	NM	02/25/94
	09	37157N 40116E	6	1,911.4	CC-8	119.3	23.6	96.5	96.5	LIFT NO. DE		DM	09/05/91	NM	02/25/94
	10	37268N 39922E	6	1,912.8	CC-8	119.9	23.8	96.8	96.8	LIFT NO. DE		DM	09/05/91	NM	02/25/94
	11	37406N 39827E	6	1,911.6	CC-8	119.3	25.0	95.3	95.3	LIFT NO. DE	DE-CC-48, ST.18	DM	09/05/91	NM	02/25/94
	12	37078N 40848E	6	1,916.2	CC-8	120.6	26.0	95.6	95.6	LIFT NO. DE		DM	09/05/91	NM	02/25/94
	13	37072N 40676E	6	1,916.3	CC-8	119.1	24.4	95.6	95.6	LIFT NO. DE		DM	09/05/91	NM	02/25/94
	14	37072N 40540E	6	1,916.3	CC-8	122.8	23.3	99.5	99.5	LIFT NO. DE		DM	09/05/91	NM	02/25/94
	15	37181N 40077E	6	1,912.9	CC-8	120.7	23.3	97.8	97.8	LIFT NO. DE		DM	09/05/91	NM	02/25/94
	16	37327N 39891E	6	1,912.9	CC-8	119.9	25.7	95.4	95.4	LIFT NO. DE		DM	09/05/91	NM	02/25/94

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Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-31A	01	37508N 39768E	6	1,908.1	CC-8	125.9	22.4	102.7	100+	LIFT NO. DE		DM	09/06/91	NM	02/25/94
	02	37690N 39649E	6	1,907.0	CC-8	118.5	22.8	96.4	96.4	LIFT NO. DC		DM	09/06/91	NM	02/25/94
	03	37405N 39823E	6	1,912.8	CC-8	120.6	21.3	99.3	99.3	LIFT NO. DE		DM	09/06/91	NM	02/25/94
	04	37283N 39925E	6	1,913.7	CC-8	118.0	22.7	98.2	98.2	LIFT NO. DE		DM	09/06/91	NM	02/25/94
	05	37155N 40117E	6	1,912.9	CC-8	119.1	22.5	97.9	97.9	LIFT NO. DE		DM	09/06/91	NM	02/25/94
	06	37719N 39710E	6	1,907.8	CC-8	121.6	27.6	95.2	95.2	LIFT NO. DE		DM	09/06/91	NM	02/25/94
	07	37520N 39725E	6	1,908.4	CC-8	120.7	23.9	97.3	97.3	LIFT NO. DC	DC-CC-49, ST.19	DM	09/06/91	NM	02/25/94

Count: 7

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-34A	01	37073N 40280E	6	1,907.4	CC-8	122.1	23.7	98.7	98.7	LIFT NO. DC		DM	09/10/91	NM	02/25/94
	02	37107N 40339E	6	1,908.2	CC-8	118.4	23.8	95.6	96.6	LIFT NO. DE		DM	09/10/91	NM	02/25/94
	03	37086N 40188E	6	1,909.5	CC-8	123.4	23.3	100.0	100.0	LIFT NO. DC		DM	09/10/91	NM	02/25/94

Count: 3

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-35A	01	37532N 39759E	6	1,909.1	CC-8	123.7	23.9	99.8	99.8	LIFT NO. DE		DM	09/11/91	NM	02/25/94
	02	37691N 39684E	6	1,908.7	CC-8	124.0	24.3	99.7	99.7	LIFT NO. DC		DM	09/11/91	NM	02/25/94

Count: 2

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INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-36A	01	37062N 40336E	6	1,908.9	CC-8	118.2	23.9	95.3	95.3	LIFT NO. DC		DM	09/12/91	NM	02/25/94
	02	37123N 40196E	6	1,910.1	CC-8	125.3	26.0	99.3	99.3	LIFT NO. DE		DM	09/12/91	NM	02/25/94
	03	37193N 40035E	6	1,914.9	CC-8	119.5	24.3	96.1	96.1	LIFT NO. DE		DM	09/12/91	NM	02/25/94
	04	37362N 39849E	6	1,914.5	CC-8	120.1	24.0	96.9	96.9	LIFT NO. DE		DM	09/12/91	NM	02/25/94
	05	37508N 39734E	6	1,910.1	CC-8	127.6	24.2	102.6	100+	LIFT NO. DC		DM	09/12/91	NM	02/25/94
	06	37725N 39712E	6	1,908.7	CC-8	120.6	23.9	97.4	97.4	LIFT NO. DE		DM	09/12/91	NM	02/25/94
	07	37084N 40354E	6	1,909.4	CC-8	123.3	25.5	98.1	98.1	LIFT NO. DE		DM	09/12/91	NM	02/25/94
	08	37084N 40207E	6	1,910.8	CC-8	125.5	23.3	101.7	100+	LIFT NO. DC	DC-CC-52, ST.20	DM	09/12/91	NM	02/25/94
	09	37163N 40088E	6	1,915.5	CC-8	124.4	24.1	100.2	100+	LIFT NO. DE		DM	09/12/91	NM	02/25/94
	10	37257N 39951E	6	1,915.4	CC-8	123.9	24.7	99.4	99.4	LIFT NO. DE		DM	09/12/91	NM	02/25/94
	11	37401N 39821E	6	1,914.5	CC-8	125.5	23.2	101.8	100+	LIFT NO. DE		DM	09/12/91	NM	02/25/94
	12	37567N 39728E	6	1,910.3	CC-8	121.2	24.1	97.5	97.5	LIFT NO. DC		DM	09/12/91	NM	02/25/94
	13	37081N 40285E	6	1,910.9	CC-8	122.1	25.8	96.9	96.9	LIFT NO. DC		DM	09/12/91	NM	02/25/94
	14	37202N 40016E	6	1,916.1	CC-8	120.4	23.6	97.4	97.4	LIFT NO. DE		DM	09/12/91	NM	02/25/94
	15	37338N 39869E	6	1,915.7	CC-8	122.1	23.4	98.9	98.9	LIFT NO. DE		DM	09/12/91	NM	02/25/94
	16	37507N 39765E	6	1,911.3	CC-8	119.9	25.4	95.6	95.6	LIFT NO. DE		DM	09/12/91	NM	02/25/94
	17	37700N 39683E	6	1,910.3	CC-8	122.4	23.7	98.8	98.8	LIFT NO. DC		DM	09/12/91	NM	02/25/94

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INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-36A	18	37085N 40365E	6	1,910.9	CC-8	121.6	24.2	97.9	97.9	LIFT NO. DE		DM	09/12/91	NM	02/25/94
	19	37099N 40179E	6	1,912.6	CC-8	119.9	24.9	96.0	96.0	LIFT NO. DC		DM	09/12/91	NM	02/25/94
	20	37221N 39984E	6	1,916.7	CC-8	121.5	23.7	98.2	98.2	LIFT NO. DE		DM	09/12/91	NM	02/25/94
	21	37359N 39845E	6	1,916.8	CC-8	121.4	24.6	97.3	97.3	LIFT NO. DE		DM	09/12/91	NM	02/25/94

Count: 21

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INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-37A	01	37485N 39749E	6	1,911.8	CC-8	122.4	24.2	98.4	98.4	LIFT NO. DC		DM	09/13/91	NM	02/25/94
	02	37687N 39712E	6	1,910.6	CC-8	124.3	26.9	97.8	97.8	LIFT NO. DE		DM	09/13/91	NM	02/25/94
	03	37064N 40369E	6	1,912.5	CC-8	121.0	24.2	97.3	97.3	LIFT NO. DC		DM	09/13/91	NM	02/25/94
	04	37123N 40189E	6	1,912.7	CC-8	123.1	25.4	98.0	98.0	LIFT NO. DE		DM	09/13/91	NM	02/25/94
	05	37193N 40027E	6	1,917.1	CC-8	127.6	25.6	101.5	100+	LIFT NO. DE		DM	09/13/91	NM	02/25/94
	06	37286N 39911E	6	1,917.2	CC-8	127.1	25.7	101.0	100+	LIFT NO. DE		DM	09/13/91	NM	02/25/94
	07	39397N 39818E	6	1,915.7	CC-6	127.9	23.1	103.8	99.3	LIFT NO. DE		DM	09/13/91	NM	02/25/94
	08	37062N 40351E	6	1,912.7	CC-6	124.0	24.2	99.7	95.4	LIFT NO. DC		DM	09/13/91	NM	02/25/94
	09	37130N 40157E	6	1,913.6	CC-6	124.8	23.9	100.6	96.2	LIFT NO. DE		DM	09/13/91	NM	02/25/94
	10	37529N 39758E	6	1,912.4	CC-6	126.4	23.2	102.5	98.1	LIFT NO. DE		DM	09/13/91	NM	02/25/94
	11	37700N 39676E	6	1,910.7	CC-8	124.6	27.6	97.5	97.5	LIFT NO. DC	DC-CC-53, ST.21	DM	09/13/91	NM	02/25/94

Count: 11

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-45A	01	37844N 39673E	6	1,903.4	CC-75	119.6	19.8	99.7	89.8	LIFT NO. DC	DENSITY FAILS	MC	09/27/91	NM	02/25/94

Count: 1

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-49	01	38281N 39680E	6	1,901.6	CC-56	134.0	19.0	112.5	99.6	LIFT NO. DC	DC-CC-59 (PROCTOR)	MC	10/02/91	NM	02/25/94
	02	38140N 39707E	6	1,902.1	CC-56	132.3	20.7	109.5	96.9	LIFT NO. DE	DE-CC-60 (PROCTOR)	MC	10/02/91	NM	02/25/94

Count: 2

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-50A	01	38150N 39669E	6	1,902.8	CC-56	129.0	18.1	109.1	96.5	LIFT NO. DC		DM	10/03/91	NM	02/25/94
	02	38273N 39706E	6	1,901.2	CC-56	130.3	19.6	108.8	96.2	LIFT NO. DE		DM	10/03/91	NM	02/25/94
	03	38190N 39720E	6	1,902.6	CC-56	129.3	21.8	107.0	95	LIFT NO. DE		DM	10/03/91	NM	02/25/94
	04	37954N 39711E	6	1,903.9	CC-56	130.5	19.8	108.5	96	LIFT NO. DE		DM	10/03/91	NM	02/25/94
	05	38161N 39656E	6	1,903.3	CC-56	130.0	16.9	111.1	98.3	LIFT NO. DC	DC-CC-61, ST.22	DM	10/03/91	NM	02/25/94
	06	RETEST OF #1 RPT 91-45A	6	1,904.6	CC-75	131.2	20.7	108.7	97.9	LIFT NO. DC		DM	10/03/91	NM	02/25/94
	07	38228N 39729E	6	1,903.1	CC-56	131.3	15.4	113.6	100+	LIFT NO. DE	CC-62 PROCTOR	DM	10/03/91	NM	04/6/94
	08	38073N 39714E	6	1,904.3	CC-56	134.0	17.3	114.1	100+	LIFT NO. DE		DM	10/03/91	NM	04/06/94

Count: 8

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-51A	01	38176N 39725E	6	1,904.3	CC-63	131.2	21.0	108.3	100+	LIFT NO. DE	DE-CC-63, (PROCTOR)	MC	10/04/91	NM	02/25/94
	02	37917N 39708E	6	1,905.1	CC-64	134.7	16.2	115.8	100+	LIFT NO. DE	DE-CC-64, (PROCTOR)	MC	10/04/91	NM	02/25/94

Count: 2

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-53A	01	38202N 39724E	6	1,904.6	CC-2	127.3	20.1	106.0	95.7	LIFT NO. DE		DM	10/08/91	NM	02/25/94
	02	38049N 39684E	6	1,905.8	CC-2	133.6	18.6	112.5	100+	LIFT NO. DE	DE-CC-68, (PROCTOR)	DM	10/08/91	NM	02/25/94
	03	37916N 39711E	6	1,905.9	CC-2	125.9	19.1	105.7	95.4	LIFT NO. DC		DM	10/08/91	NM	02/25/94
	04	38015N 39709E	6	1,906.3	CC-2	129.0	16.1	111.1	100+	LIFT NO. DE	DE-CC-69, ST.23	DM	10/08/91	NM	02/25/94
	05	37835N 39660E	6	1,908.1	CC-2	130.2	18.7	109.6	98.9	LIFT NO. DC		DM	10/08/91	NM	02/25/94
	06	38228N 39667E	6	1,905.3	CC-2	133.6	18.3	112.8	100+	LIFT NO. DC	DC-CC-70	DM	10/08/91	NM	02/25/94
	07	38179N 39720E	6	1,905.6	CC-2	126.0	19.0	105.9	95.5	LIFT NO. DE		DM	10/08/91	NM	02/25/94

Count: 7

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-54A	01	37967N 39714E	6	1,907.4	CC-2	130.1	20.2	108.1	97.6	LIFT NO. DE		DM	10/09/91	NM	02/25/94
	02	38042N 39664E	6	1,907.8	CC-2	127.2	18.3	107.4	96.9	LIFT NO. DC		DM	10/09/91	NM	02/25/94
	03	38105N 39715E	6	1,907.1	CC-2	128.0	18.9	107.5	97.0	LIFT NO. DE		DM	10/09/91	NM	02/25/94
	04	38288N 39669E	6	1,906.1	CC-2	125.7	17.7	106.8	96.4	LIFT NO. DC		DM	10/09/91	NM	02/25/94
	05	37881N 39667E	6	1,908.7	CC-2	129.7	16.7	111.0	100.0	LIFT NO. DC	DC-CC-71, ST.24	DM	10/09/91	NM	02/25/94
	06	37882N 39709E	6	1,908.3	CC-2	131.7	21.0	108.7	98.1	LIFT NO. DE		DM	10/09/91	NM	02/25/94
	07	38186N 39717E	6	1,906.7	CC-2	131.4	19.4	109.9	99.2	LIFT NO. DE		DM	10/09/91	NM	02/25/94
	08	37965N 39662E	6	1,909.0	CC-2	126.3	16.7	108.2	97.7	LIFT NO. DC		DM	10/09/91	NM	02/25/94
	09	38007N 39713E	6	1,908.7	CC-2	127.6	19.4	106.9	96.5	LIFT NO. DE		DM	10/09/91	NM	02/25/94
	10	37894N 39667E	6	1,909.6	CC-2	129.7	20.6	107.5	97.1	LIFT NO. DC		DM	10/09/91	NM	02/25/94
	11	38300N 39669E	6	1,906.7	CC-2	123.4	16.9	105.4	95.2	LIFT NO. DC	DC-CC-72, ST.25	DM	10/09/91	NM	02/25/94

Count: 11

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-55A	01	38264N 39692E	6	1,907.5	CC-2	130.4	19.2	109.3	98.7	LIFT NO. DE		DM	10/10/91	NM	02/24/94
	02	38110N 39686E	6	1,908.3	CC-2	129.4	17.5	110.0	99.3	LIFT NO. DE		DM	10/10/91	NM	02/24/94
	03	37940N 39683E	6	1,910.0	CC-2	130.0	20.0	108.3	97.7	LIFT NO. DE		DM	10/10/91	NM	02/24/94
	04	37718N 39693E	6	1,912.7	CC-2	129.0	19.7	107.6	97.1	LIFT NO. DE		DM	10/10/91	NM	02/24/94
	05	37064N 40372E	6	1,913.6	CC-2	127.9	19.6	106.9	96.5	LIFT NO. DC		DM	10/10/91	NM	02/24/94
	06	37124N 40177E	6	1,914.6	CC-2	129.5	19.4	108.3	97.7	LIFT NO. DE		DM	10/10/91	NM	02/24/94

Count: 6

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-56A	01	38300N 39692E	6	1,908.2	CC-2	123.1	16.4	105.6	95.3	LIFT NO. DE	DE-CC-73, ST.26	DM	10/11/91	NM	02/24/94
	02	38117N 39688E	6	1,908.9	CC-2	126.3	16.6	108.3	97.7	LIFT NO. DE		DM	10/11/91	NM	02/24/94
	03	37935N 39690E	6	1,910.3	CC-2	130.9	18.8	110.1	99.4	LIFT NO. DE		DM	10/11/91	NM	02/24/94
	04	37747N 39694E	6	1,912.6	CC-2	129.8	18.2	109.7	99.0	LIFT NO. DE		DM	10/11/91	NM	02/24/94
	05	37075N 40294E	6	1,913.9	CC-2	128.4	19.7	107.1	96.7	LIFT NO. DE		DM	10/11/91	NM	02/24/94
	06	37606N 39706E	6	1,915.1	CC-2	127.2	17.8	107.9	97.4	LIFT NO. DC		DM	10/11/91	NM	02/24/94
	07	37807N 39674E	6	1,912.1	CC-2	129.7	17.7	110.1	99.4	LIFT NO. DC		DM	10/11/91	NM	02/24/94
	08	38041N 39670E	6	1,910.6	CC-2	125.0	18.8	105.2	95.0	LIFT NO. DC		DM	10/11/91	NM	02/24/94
	09	38290N 39671E	6	1,908.4	CC-2	128.7	18.0	108.9	98.3	LIFT NO. DC		DM	10/11/91	NM	02/24/94
	10	37106N 40219E	6	1,915.7	CC-2	129.4	22.0	105.9	95.6	LIFT NO. DE		DM	10/11/91	NM	02/24/94
	11	37513N 39748E	6	1,916.2	CC-46	130.5	17.3	111.2	100+	LIFT NO. DE		DM	10/11/91	NM	02/24/94
	12	37782N 39690E	6	1,913.2	CC-46	132.5	16.6	113.5	100+	LIFT NO. DE		DM	10/11/91	NM	02/24/94
	13	38088N 39694E	6	1,910.1	CC-46	131.9	17.1	112.6	100+	LIFT NO. DE		DM	10/11/91	NM	02/24/94
	14	38331N 39694E	6	1,908.6	CC-46	130.8	18.8	110.1	99.0	LIFT NO. DE		DM	10/11/91	NM	02/24/94
	15	37066N 40439E	6	1,918.2	CC-46	128.6	17.6	109.2	98.2	LIFT NO. DE		DM	10/11/91	NM	02/24/94
	16	37108N 40173E	6	1,917.8	CC-46	129.3	18.0	109.4	98.4	LIFT NO. DE		DM	10/11/91	NM	02/24/94

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Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-57A	01	37585N 39724E	6	1,916.6	CC-46	131.8	17.1	112.5	100+	LIFT NO. DE		DM	10/14/91	NM	02/24/94
	02	37848N 39700E	6	1,912.8	CC-46	132.3	16.1	113.8	100+	LIFT NO. DE		DM	10/14/91	NM	02/24/94
	03	38092N 39707E	6	1,910.9	CC-46	127.2	16.7	109.0	98.0	LIFT NO. DE	DE-CC-76, ST.27	DM	10/14/91	NM	02/24/94
	04	38315N 39713E	6	1,910.2	CC-46	128.3	16.6	110.0	98.9	LIFT NO. DE		DM	10/14/91	NM	02/24/94
	05	37663N 39689E	6	1,916.5	CC-46	131.6	18.4	111.0	99.9	LIFT NO. DE		DM	10/14/91	NM	02/24/94
	06	37940N 39673E	6	1,913.6	CC-46	131.9	18.2	111.5	100+	LIFT NO. DE		DM	10/14/91	NM	02/24/94
	07	38219N 39668E	6	1,911.0	CC-46	128.8	19.2	107.9	97.1	LIFT NO. DE		DM	10/14/91	NM	02/24/94

Count: 7

BRAUN[SM]
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Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-58A	01	37502N 39755E	6	1,917.5	CC-46	128.7	16.9	110.0	98.8	LIFT NO. DE		DM	10/15/91	NM	02/24/94
	02	37871N 39693E	6	1,914.2	CC-46	132.7	17.7	112.6	100+	LIFT NO. DE	DE-C-77, ST.28	DM	10/15/91	NM	02/24/94
	03	38125N 39702E	6	1,911.9	CC-46	131.6	19.1	110.4	99.3	LIFT NO. DE		DM	10/15/91	NM	02/24/94
	04	38339N 39704E	6	1,909.5	CC-46	130.5	17.1	111.3	100+	LIFT NO. DE		DM	10/15/91	NM	02/24/94
	05	37807N 39693E	6	1,916.6	CC-46	131.1	17.9	111.1	99.9	LIFT NO. DE		DM	10/15/91	NM	02/24/94
	06	38037N 39697E	6	1,913.2	CC-46	130.8	18.5	110.4	99.3	LIFT NO. DE		DM	10/15/91	NM	02/24/94
	07	38296N 39702E	6	1,911.2	CC-46	132.0	18.1	111.6	100+	LIFT NO. DE		DM	10/15/91	NM	02/24/94
	08	37822N 39677E	6	1,916.5	CC-46	128.5	18.7	108.1	97.3	LIFT NO. DE		DM	10/15/91	NM	02/24/94
	09	37980N 39671E	6	1,914.6	CC-46	127.6	18.1	107.9	97.0	LIFT NO. DE		DM	10/15/91	NM	02/24/94
	10	38126N 39675E	6	1,912.7	CC-46	132.2	17.9	112.0	100+	LIFT NO. DE		DM	10/15/91	NM	02/24/94

Count: 10

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-59A	01	37857N 39683E	6	1,917.5	CC-46	133.0	16.2	114.4	100+	LIFT NO. DE		DM	10/16/91	NM	02/24/94
	02	38098N 39688E	6	1,914.5	CC-46	127.1	15.8	109.6	98.6	LIFT NO. DE		DM	10/16/91	NM	02/24/94
	03	38349N 39679E	6	1,911.3	CC-46	132.5	17.0	113.1	100+	LIFT NO. DE		DM	10/16/91	NM	02/24/94
	04	38098N 39691E	6	1,916.3	CC-46	128.9	16.4	110.7	99.6	LIFT NO. DE		DM	10/16/91	NM	02/24/94
	05	38275N 39695E	6	1,913.7	CC-46	129.5	19.4	108.4	97.5	LIFT NO. DE	DE-CC-78, ST.29	DM	10/16/91	NM	02/24/94
	06	38121N 39689E	6	1,915.7	CC-46	127.7	16.8	109.2	98.2	LIFT NO. DE		DM	10/16/91	NM	02/24/94
	07	38322N 39697E	6	1,913.6	CC-46	130.0	19.2	108.9	97.9	LIFT NO. DE		DM	10/16/91	NM	02/24/94
	08	38164N 39684E	6	1,915.9	CC-46	126.4	19.0	106.1	95.4	LIFT NO. DE		DM	10/16/91	NM	02/24/94
	09	38030N 39677E	6	1,918.7	CC-46	129.8	16.3	111.5	100+	LIFT NO. DE		DM	10/16/91	NM	02/24/94
	10	38365N 39686E	6	1,914.7	CC-46	128.7	20.6	106.6	95.9	LIFT NO. DE		DM	10/16/91	NM	02/24/94

Count: 10

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Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-60A	01	38381N 39691E	6	1,916.9	CC-46	125.8	18.6	105.9	95.2	LIFT NO. DE		DM	10/17/91	NM	02/24/94

Count: 1

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INTERTEC

Summary of Density Results
(BFDX-91-035C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
91-61A	01	38411N 39689E	6	1,918.0	CC-46	130.3	16.0	112.2	100+	LIFT NO. DE	DE-CC-82, ST.30	DM	10/18/91	NM	02/24/94
	02	38215N 39686E	6	1,919.0	CC-46	135.1	17.5	114.8	100+	LIFT NO. DE		DM	10/18/91	NM	02/24/94

Count: 2

AP #91

1992 Densities

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Summary of Density Results
(BFDX-92-018C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
92-1	01	38832N 39840E	6	1,899.8	CC-6	124.0	20.6	102.7	98.2	LIFT NO.SG	SG-CC-91	MC	04/16/92	NM	02/24/94
	02	38832N 40105E	6	1,898.5	CC-6	124.5	17.2	106.1	100+	LIFT NO.SG	SG-CC-92	MC	04/16/92	NM	02/24/94

Count: 2

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-92-018C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
92-13	01	38842N 39950E	6	1,899	CC-6	128.7	17.2	109.7	100+	LIFT NO.SG		MC	05/04/92	NM	02/24/94
	01A	38842N 39950E	N/A	1,899	CC-6	128.9	20.5	108.1	100+	LIFT NO.SG	SC COMPARISON	MC	05/04/92	NM	02/24/94
	02	38842N 39940E	6	1,899	CC-6	130.0	16.7	111.3	100+	LIFT NO.SG	2"+ROCK-MOVED SC-2A	MC	05/04/92	NM	02/24/94
	02A	38842N 39940E	N/A	1,899	CC-6	126.6	19.2	105.1	100+	LIFT NO.SG	SC COMPARISON	MC	05/04/92	NM	02/24/94
	03	38840N 39955E	6	1,899	CC-6	128.5	18.9	107.9	100+	LIFT NO.SG		MC	05/04/92	NM	02/24/94
	03A	38840N 39955E	N/A	1,899	CC-6	130.0	19.9	108.3	100+	LIFT NO.SG	SC COMPARISON	MC	05/04/92	NM	02/24/94
	04	38840N 39945E	6	1,899	CC-6	128.0	20.0	106.5	100+	LIFT NO.SG		MC	05/04/92	NM	02/24/94
	04A	38840N 39945E	N/A	1,899	CC-6	127.8	21.0	105.7	100+	LIFT NO.SG	SC COMPARISON	MC	05/04/92	NM	02/24/94

Count: 8

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-92-018C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
92-95A	01	38612N 40516E	6	1,896.9	CC-78	133.0	19.0	111.8	95.6	LIFT NO.SG	SG-CC-133	JA	08/17/92	NM	02/24/94
	02	38624N 40740E	6	1,896.2	CC-78	131.6	18.7	110.9	94.8	LIFT NO.SG	SG-CC-134	JA	08/17/92	NM	02/24/94
	03	38382N 40626E	6	1,895.5	CC-78	135.5	20.1	112.8	96.4	LIFT NO.SG	SG-CC-135	JA	08/17/92	NM	02/24/94
	04	38656N 40651E	6	1,896.9	CC-78	132.6	17.7	112.7	96.3	LIFT NO.SG	SG-CC-136	JA	08/17/92	NM	02/24/94
	05	38659N 40476E	6	1,898.3	CC-78	133.3	19.7	111.4	95.2	LIFT NO.SG	SG-CC-137	JA	08/17/92	NM	02/24/94
	06	38354N 40621E	6	1,896.0	CC-65	127.8	21.4	105.3	96.8	LIFT NO.SG	SG-CC-138	JA	08/17/92	NM	02/24/94
	07	38526N 40526E	6	1,896.4	CC-78	131.7	19.3	110.4	94.4	LIFT NO.SG	SG-CC-139	JA	08/17/92	NM	02/24/94

Count: 7

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-92-018C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
92-96A	01	38702N 40445E	6	1,898.7	CC-78	134.5	17.8	114.2	97.6	LIFT NO.SG	SG-CC-140	JA	08/18/92	NM	02/24/94
	02	38691N 40654E	6	1,897.8	CC-78	134.9	18.8	113.6	97.1	LIFT NO.SG	SG-CC-141	JA	08/18/92	NM	02/24/94
	03	38515N 40735E	6	1,896.9	CC-78	127.7	18.1	108.1	92.4	LIFT NO.SG	SG-CC-142	JA	08/18/92	NM	02/24/94
	04	38500N 40584E	6	1,897.8	CC-78	130.2	19.0	109.4	93.5	LIFT NO.SG	SG-CC-143	JA	08/18/92	NM	02/24/94

Count: 4

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-92-018C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
92-98	01	37557N 41049E	6	1,899.9	CC-56	126.9	21.6	104.4	92.4	LIFT NO.SG	SG-CC-144	JA	08/20/92	NM	02/24/94
	02	37745N 41046E	6	1,898.8	CC-56	132.1	18.8	111.2	98.4	LIFT NO.SG	SG-CC-145	JA	08/20/92	NM	02/24/94
	03	37742N 41177E	6	1,897.8	CC-56	132.0	18.9	111.0	98.2	LIFT NO.SG	SG-CC-146 SANDCONE	JA	08/20/92	NM	02/24/94
	04	37745N 41303E	6	1,897.6	CC-56	132.2	21.2	109.1	96.5	LIFT NO.SG	SG-CC-147	JA	08/20/92	NM	02/24/94
	05	37839N 41445E	6	1,898.1	CC-70	128.3	23.6	103.8	96.6	LIFT NO.SG	SG-CC-148 (PROCTOR)	JA	08/20/92	NM	02/24/94
	06	37852N 41234E	6	1,897.4	CC-70	127.1	22.2	104.0	96.7	LIFT NO.SG	SG-CC-149	JA	08/20/92	NM	02/24/94
	07	37883N 40960E	6	1,897.5	CC-56	132.9	20.8	110.0	97.4	LIFT NO.SG	SG-CC-150	JA	08/20/92	NM	02/24/94
	08	37885N 40770E	6	1,898.6	CC-56	126.2	17.6	107.3	95.0	LIFT NO.SG	SG-CC-151	JA	08/20/92	NM	02/24/94
	09	38042N 40732E	6	1,896.8	CC-9	122.4	24.2	98.6	96.6	LIFT NO.SG	SG-CC-152	JA	08/20/92	NM	02/24/94
	10	38035N 40961E	6	1,895.1	CC-9	125.2	24.7	100.4	98.4	LIFT NO.SG	SG-CC-153	JA	08/20/92	NM	02/24/94
	11	38016N 41266E	6	1,896.7	CC-56	129.4	17.0	110.6	97.9	LIFT NO.SG	SG-CC-154	JA	08/20/92	NM	02/24/94
	12	38096N 40700E	6	1,899.1	CC-70	127.6	23.7	103.2	96.0	LIFT NO.SG	SG-CC-155	JA	08/20/92	NM	02/24/94
	13	38088N 40811E	6	1,897.2	CC-70	125.6	24.5	100.9	93.8	LIFT NO.SG	SG-CC-156	JA	08/20/92	NM	02/24/94
	14	38070N 40980E	6	1,896.5	CC-70	126.6	23.1	102.8	95.7	LIFT NO.SG	SG-CC-157	JA	08/20/92	NM	02/24/94

Count: 14

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INTERTEC

Summary of Density Results
(BFDX-92-018C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
92-99A	01	37992N 40675E	6	1,900.3	CC-56	128.4	19.7	107.3	95.0	LIFT NO.SG	SG-CC-158	JA	08/21/92	NM	02/24/94
	02	37983N 40840E	6	1,898.4	CC-70	127.6	23.4	103.4	96.2	LIFT NO.SG	SG-CC-159	JA	08/21/92	NM	02/24/94
	03	37979N 41032E	6	1,897.7	CC-56	130.8	20.7	108.4	95.9	LIFT NO.SG	SG-CC-160	JA	08/21/92	NM	02/24/94
	04	38814N 39588E	6	1,910.6	CC-8	121.8	25.3	97.2	97.2	LIFT NO.DC		JA	08/21/92	NM	02/24/94
	05	38837N 39481E	6	1,909.9	CC-8	117.4	27.0	92.4	92.4	LIFT NO.DC		JA	08/21/92	NM	02/24/94
	06	38851N 40148E	6	1,900.1	CC-56	130.2	16.8	111.5	98.6	LIFT NO.DC		JA	08/21/92	NM	02/24/94
	07	38849N 40020E	6	1,900.7	CC-70	125.9	19.9	105.0	97.7	LIFT NO.DC		JA	08/21/92	NM	02/24/94
	08	38846N 39900E	6	1,902.1	CC-56	131.4	17.1	112.2	99.3	LIFT NO.DC		JA	08/21/92	NM	02/24/94
	09	38175N 41078E	6	1,895.4	CC-78	132.5	14.8	115.4	98.6	LIFT NO.SG	SG-CC-161	JA	08/21/92	NM	02/24/94
	10	38176N 40935E	6	1,897.8	CC-78	134.9	18.9	113.5	97.0	LIFT NO.SG	SG-CC-162 (PROCTOR)	JA	08/21/92	NM	02/24/94
	11	38184N 40744E	6	1,900.3	CC-78	135.4	16.9	115.8	99.0	LIFT NO.SG	SG-CC-163	JA	08/21/92	NM	02/24/94
	12	37565N 40992E	6	1,901.4	CC-70	124.8	25.5	99.4	92.5	LIFT NO.SG	SG-CC-164	JA	08/21/92	NM	02/24/94
	13	37746N 41008E	6	1,899.6	CC-56	124.0	16.4	106.5	94.3	LIFT NO.SG	SG-CC-165	JA	08/21/92	NM	02/24/94
	14	37741N 41230E	6	1,898.5	CC-56	127.8	15.4	110.7	98.0	LIFT NO.SG	SG-CC-166	JA	08/21/92	NM	02/24/94

Count: 14

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INTERTEC

Summary of Density Results
(BFDX-92-018C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
92-102A	01	37936N 40772E	6	1,899.6	CC-78	134.1	17.6	114.0	97.5	LIFT NO.SG	SG-CC-170	JA	08/25/92	NM	02/24/94
	02	37933N 41006E	6	1,898.8	CC-78	134.9	15.9	116.4	99.5	LIFT NO.SG	SG-CC-171	JA	08/25/92	NM	02/24/94
	03	37929N 41225E	6	1,897.2	CC-78	134.2	18.0	113.7	97.2	LIFT NO.SG	SG-CC-172	JA	08/25/92	NM	02/24/94

Count: 3

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-92-018C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
92-103A	01	38368N 40933E	6	1,894.7	CC-62	126.6	22.8	103.1	95.6	LIFT NO.SG	SG-CC-173	JA	08/27/92	NM	02/24/94
	02	38573N 40931E	6	1,890.8	CC-62	129.0	21.8	105.9	98.2	LIFT NO.SG	SG-CC-174	JA	08/27/92	NM	02/24/94
	03	38270N 41065E	6	1,894.3	CC-62	130.1	21.0	107.5	99.7	LIFT NO.SG	SG-CC-175 (PROCTOR) SANDCONE	JA	08/27/92	NM	02/24/94
	04	38405N 41074E	6	1,893.7	CC-78	127.5	16.5	109.4	93.5	LIFT NO.SG	SG-CC-176	JA	08/27/92	NM	02/24/94
	05	38574N 41066E	6	1,891.5	CC-9	124.2	23.5	100.6	98.6	LIFT NO.SG	SG-CC-177	JA	08/27/92	NM	02/24/94
	06	37077N 40884E	6	1,919.1	CC-6	125.5	22.6	102.4	98.0	LIFT NO.DC	DC-CC-178 (PROCTOR)	JA	08/27/92	NM	02/24/94
	07	37067N 40691E	6	1,918.5	CC-4	118.8	26.9	93.6	94.7	LIFT NO.DC	M.C.-28.1	JA	08/27/92	NM	02/24/94
	08	37077N 40494E	6	1,918.6	CC-56	127.1	17.8	107.9	95.5	LIFT NO.DC		JA	08/27/92	NM	02/24/94
	09	37085N 40279E	6	1,918.4	CC-8	123.6	27.1	97.2	97.2	LIFT NO.DC		JA	08/27/92	NM	02/24/94
	10	37283N 39903E	6	1,918.0	CC-9	127.7	24.7	102.4	100+	LIFT NO.DC		JA	08/27/92	NM	02/24/94
	11	38379N 39687E	6	1,918.4	CC-6	127.1	23.3	103.1	98.6	LIFT NO.DC		JA	08/27/92	NM	02/24/94
	12	38123N 39686E	6	1,918.3	CC-6	124.1	19.9	103.5	99.0	LIFT NO.DC		JA	08/27/92	NM	02/24/94
	13	37888N 39682E	6	1,918.8	CC-6	123.5	21.9	101.3	96.9	LIFT NO.DC		JA	08/27/92	NM	02/24/94
	14	37674N 39704E	6	1,918.7	CC-6	124.4	23.1	101.1	96.7	LIFT NO.DC		JA	08/27/92	NM	02/24/94
	15	37478N 39760E	6	1,919.5	CC-6	125.2	23.8	101.1	96.8	LIFT NO.DC		JA	08/27/92	NM	02/24/94

Count: 15

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Summary of Density Results
(BFDX-92-018C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
92-104A	01	37069N 40812E	6	1,919.3	CC-8	125.9	28.4	98.3	98.3	LIFT NO.DC	DC-CC-179	JA	08/28/92	NM	02/24/94
	02	37075N 40594E	6	1,919.3	CC-9	130.1	25.7	103.5	100+	LIFT NO.DE		JA	08/28/92	NM	02/24/94
	03	37073N 40355E	6	1,919.0	CC-9	128.8	26.9	101.5	99.5	LIFT NO.DC	(SANDCONE) DC-CC-180	JA	08/28/92	NM	02/24/94
	04	37130N 40146E	6	1,919.3	CC-9	125.6	26.3	99.4	97.5	LIFT NO.DE		JA	08/28/92	NM	02/24/94
	05	37233N 39960E	6	1,920.0	CC-9	128.3	26.3	101.6	99.6	LIFT NO.DC		JA	08/28/92	NM	02/24/94
	06	37367N 39837E	6	1,919.6	CC-9	126.2	26.4	99.8	97.8	LIFT NO.DE	DE-CC-181	JA	08/28/92	NM	02/24/94
	07	38143N 41217E	6	1,896.7	CC-78	134.9	19.3	113.1	96.6	LIFT NO.SG	SG-CC-182	JA	08/28/92	NM	02/24/94
	08	38149N 41004E	6	1,897.5	CC-60	129.6	24.3	104.1	99.3	LIFT NO.SG	SG-CC-183 (PROCTOR)	JA	08/28/92	NM	02/24/94
	09	38151N 40762E	6	1,898.6	CC-78	133.4	14.8	116.2	99.3	LIFT NO.SG	SG-CC-184	JA	08/28/92	NM	02/24/94
	10	38287N 40939E	6	1,897.6	CC-9	126.3	26.2	100.1	98.1	LIFT NO.SG	SG-CC-185	JA	08/28/92	NM	02/24/94
	11	38266N 41139E	6	1,896.6	CC-9	127.5	26.2	101.0	99.0	LIFT NO.SG	SG-CC-186	JA	08/28/92	NM	02/24/94
	12	37670N 40971E	6	1,901.3	CC-9	121.6	23.8	98.2	96.3	LIFT NO.SG	SG-CC-187	JA	08/28/92	NM	02/24/94
	13	37665N 41118E	6	1,900.2	CC-70	127.3	25.5	101.4	94.4	LIFT NO.SG	SG-CC-188	JA	08/28/92	NM	02/24/94
	14	37668N 41267E	6	1,899.4	CC-70	127.1	22.7	103.6	96.4	LIFT NO.SG	SG-CC-189 (PROCTOR)	JA	08/28/92	NM	02/24/94
	15	37788N 41399E	6	1,898.2	CC-78	137.6	16.8	117.8	100+	LIFT NO.SG	SG-CC-190	JA	08/28/92	NM	02/24/94
	16	37793N 41221E	6	1,899.1	CC-9	124.4	24.6	99.8	97.8	LIFT NO.SG	SG-CC-191	JA	08/28/92	NM	02/24/94
	17	37802N 41022E	6	1,900.1	CC-9	121.7	25.4	97.0	95.1	LIFT NO.SG	SG-CC-192	JA	08/28/92	NM	02/24/94

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
92-104A	18	37811N 40810E	6	1,900.9	CC-9	122.7	22.6	100.1	98.1	LIFT NO.SG	SG-CC-193	JA	08/28/92	NM	02/24/94

Count: 18

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-92-018C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
92-105A	01	37935N 40711E	6	1,901.1	CC-9	124.9	23.2	101.4	99.4	LIFT NO.SG	SG-CC-194	JA	08/29/92	NM	02/24/94
	02	37931N 40892E	6	1,900.2	CC-56	128.4	19.2	107.7	95.3	LIFT NO.SG	SG-CC-195	JA	08/29/92	NM	02/24/94
	03	37924N 41115E	6	1,898.9	CC-6	122.1	19.7	102.0	97.6	LIFT NO.SG	SG-CC-196	JA	08/29/92	NM	02/24/94
	04	37925N 41302E	6	1,898.1	CC-6	125.1	22.1	102.5	98.0	LIFT NO.SG	SG-CC-197	JA	08/29/92	NM	02/24/94

Count: 4

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INTERTEC

Summary of Density Results
(BFDX-92-018C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
92-106A	01	37935N 40711E	6	1,901.1	CC-6	126.9	21.7	104.3	99.8	LIFT NO.SG	SG-CC-198	JA	08/31/91	NM	02/24/94
	02	37931N 40892E	6	1,900.2	CC-56	133.8	21.5	110.1	97.4	LIFT NO.SG	SG-CC-199	JA	08/31/91	NM	02/24/94
	03	37924N 41115E	6	1,898.9	CC-9	120.0	24.2	96.6	94.7	LIFT NO.SG	SG-CC-200	JA	08/31/91	NM	02/24/94
	04	37925N 41302E	6	1,898.1	CC-56	127.8	18.4	107.9	95.5	LIFT NO.SG	SG-CC-201	JA	08/31/91	NM	02/24/94
	05	38252N 41231E	6	1,896.3	CC-56	128.9	17.7	109.5	96.9	LIFT NO.SG	SG-CC-202	JA	08/31/91	NM	02/24/94
	06	38262N 41054E	6	1,897.4	CC-78	132.8	15.6	114.9	98.2	LIFT NO.SG	SG-CC-203	JA	08/31/91	NM	02/24/94
	07	38280N 40889E	6	1,898.2	CC-56	129.4	19.5	108.3	95.8	LIFT NO.SG	SG-CC-204	JA	08/31/91	NM	02/24/94
	08	38440N 40889E	6	1,894.7	CC-78	133.8	16.6	114.8	98.1	LIFT NO.SG	SG-CC-205 (PROCTOR)	JA	08/31/91	NM	02/24/94
	09	38420N 41064E	6	1,893.7	CC-78	130.2	16.5	111.8	95.5	LIFT NO.SG	SG-CC-206	JA	08/31/91	NM	02/24/94
	10	38670N 41150E	6	1,892.3	CC-78	134.6	17.8	114.3	97.7	LIFT NO.SG	SG-CC-207	JA	08/31/91	NM	02/24/94
	11	38664N 40937E	6	1,891.5	CC-62	126.1	19.5	105.5	97.9	LIFT NO.SG	SG-CC-208 (PROCTOR)	JA	08/31/91	NM	02/24/94
	12	38439N 41143E	6	1,895.6	CC-78	135.3	18.2	114.5	97.8	LIFT NO.SG	SG-CC-209	JA	08/31/91	NM	02/24/94
	13	38442N 41001E	6	1,894.4	CC-56	132.4	19.7	110.6	97.9	LIFT NO.SG	SG-CC-210	JA	08/31/91	NM	02/24/94
	14	38565N 41163E	6	1,893.8	CC-62	123.9	24.1	99.8	92.6	LIFT NO.SG	SG-CC-211	JA	08/31/91	NM	02/24/94
	15	38577N 40953E	6	1,892.8	CC-62	125.2	23.5	101.4	94.0	LIFT NO.SG	SG-CC-212	JA	08/31/91	NM	02/24/94

Count: 15

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Summary of Density Results
(BFDX-92-018C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
92-107A	01	38587N 40905E	6	1,894.2	CC-78	133.4	16.8	114.2	97.6	LIFT NO.SG	SG-CC-213	JA	09/01/92	NM	02/24/94
	02	38714N 40907E	6	1,893.8	CC-78	132.9	16.7	113.9	97.3	LIFT NO.SG	SG-CC-214	JA	09/01/92	NM	02/24/94
	03	38703N 41084E	6	1,892.3	CC-78	135.4	17.5	115.2	98.5	LIFT NO.SG	SG-CC-215	JA	09/01/92	NM	02/24/94

Count: 3

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-92-018C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
92-108A	01	38439N 41222E	6	1,895.6	CC-78	129.2	12.5	114.8	98.2	LIFT NO.SG	SG-CC-216	JA	09/02/92	NM	02/24/94
	02	38441N 41003E	6	1,896.7	CC-62	128.8	20.6	106.8	99.1	LIFT NO.SG	SG-CC-217	JA	09/02/92	NM	02/24/94
	03	38459N 40768E	6	1,898.0	CC-56	131.8	19.7	110.1	97.4	LIFT NO.SG	SG-CC-218	JA	09/02/92	NM	02/24/94
	04	38675N 41187E	6	1,894.8	CC-8	120.7	25.0	96.6	96.6	LIFT NO.SG	SANDCONE SG-CC-219	JA	09/02/92	NM	02/24/94
	05	38679N 40846E	6	1,885.5	CC-6	125.3	23.8	101.2	96.9	LIFT NO.SG	SG-CC-220	JA	09/02/92	NM	02/24/94

Count: 5

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-92-018C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
92-109A	01	38865N 40080E	6	1,900.6	CC-6	129.6	23.4	105.0	100+	LIFT NO.DC		JA	09/03/92	NM	02/24/94
	02	38859N 39832E	6	1,901.9	CC-70	126.8	18.3	107.2	99.7	LIFT NO.DC		JA	09/03/92	NM	02/24/94
	03	38837N 40129E	6	1,901.5	CC-6	121.3	18.1	102.7	98.2	LIFT NO.DC	DC-CC-221, (PROCTOR)	JA	09/03/92	NM	02/24/94
	04	38834N 39834E	6	1,903.2	CC-8	123.1	21.2	101.6	100+	LIFT NO.DC		JA	09/03/92	NM	02/24/94
	05	38860N 40160E	6	1,901.8	CC-8	123.0	22.6	100.3	100+	LIFT NO.DC		JA	09/03/92	NM	02/24/94
	06	38857N 39933E	6	1,902.7	CC-8	121.0	24.8	97.0	97	LIFT NO.DC		JA	09/03/92	NM	02/24/94
	07	38862N 39883E	6	1,902.9	CC-8	123.6	23.4	100.2	100+	LIFT NO.DC	DC-CC-222, ST.31	JA	09/03/92	NM	02/24/94
	08	38870N 40092E	6	1,901.6	CC-8	123.4	21.6	101.5	100+	LIFT NO.DC	DC-CC-223, ST.32	JA	09/03/92	NM	02/24/94
	09	38826N 40043E	6	1,902.9	CC-8	123.8	22.0	101.5	100+	LIFT NO.DC	DC-CC-224, ST.33	JA	09/03/92	NM	02/24/94
	10	38833N 39841E	6	1,904.2	CC-8	124.2	22.2	101.6	100+	LIFT NO.DC	DC-CC-225, ST.34	JA	09/03/92	NM	02/24/94

Count: 10

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-92-018C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
92-110A	01	38842N 39758E	6	1,906.3	CC-6	125.8	24.2	101.3	96.9	LIFT NO.DC	SANDCONE	JA	09/04/92	NM	02/24/94
	02	38843N 39982E	6	1,904.1	CC-6	125.7	19.1	105.5	100+	LIFT NO.DC		JA	09/04/92	NM	02/24/94

Count: 2

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
92-110B	01	38843N 39956E	6	1,905.2	CC-8	121.6	24.7	96.9	96.9	LIFT NO.DC	DC-CC-226, ST.35 Sand Cone	JA	09/04/92	NM	02/24/94
	02	38843N 40176E	6	1,904.7	CC-8	125.4	22.6	102.8	100+	LIFT NO.DC	Sand Cone	JA	09/04/92	NM	02/24/94
	03	38857N 39754E	6	1,908.1	CC-8	125.5	24.3	101.2	100+	LIFT NO.DC		JA	09/04/92	NM	02/24/94
	04	38854N 39978E	6	1,906.0	CC-8	127.0	24.7	102.3	100+	LIFT NO.DC		JA	09/04/92	NM	02/24/94
	05	38835N 40203E	6	1,906.2	CC-6	126.1	21.2	104.8	100+	LIFT NO.DC		JA	09/04/92	NM	02/24/94
	06	38832N 39984E	6	1,906.6	CC-8	117.0	21.2	95.8	95.8	LIFT NO.DC		JA	09/04/92	NM	02/24/94
	07	38837N 39859E	6	1,908.3	CC-8	125.6	24.1	101.5	100+	LIFT NO.DC	DC-CC-227 PROCTOR	JA	09/04/92	NM	02/24/94
	08	38847N 40089E	6	1,907.2	CC-4	120.8	26.6	94.2	95.3	LIFT NO.DC	Sand Cone	JA	09/04/92	NM	02/24/94

Count: 8

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INTERTEC

Summary of Density Results
(BFDX-92-018C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
92-111A	01	38843N 39824E	6	1,909.7	CC-8	124.3	23.2	102.1	100+	LIFT NO.DC	Sand Cone	JA	09/08/92	NM	02/24/94
	02	38843N 40078E	6	1,907.9	CC-8	125.4	26.7	99.0	99.0	LIFT NO.DC	DC-CC-228, ST.36	JA	09/08/92	NM	02/24/94
	03	38853N 39770E	6	1,911.3	CC-8	126.5	22.2	103.5	100+	LIFT NO.DC	M.C. Fails	JA	09/08/92	NM	02/24/94
	04	38850N 39989E	6	1,909.4	CC-8	124.6	24.1	100.4	100+	LIFT NO.DC		JA	09/08/92	NM	02/24/94
	05	RETEST #3	6	1,911.3	CC-8	125.3	24.0	101.0	100+	LIFT NO.DC		JA	09/08/92	NM	02/24/94
	06	38846N 39989E	6	1,910.1	CC-8	126.8	23.6	103.4	100+	LIFT NO.DC	Sand Cone	JA	09/08/92	NM	02/24/94
	07	38847N 40206E	6	1,909.6	CC-8	124.3	23.1	101.8	100+	LIFT NO.DC	DC-CC-229, ST.37	JA	09/08/92	NM	02/24/94
	08	38850N 39846E	6	1,911.9	CC-8	127.8	25.5	101.8	100+	LIFT NO.DC		JA	09/08/92	NM	02/24/94
	09	38851N 40064E	6	1,910.8	CC-8	125.6	22.9	102.2	100+	LIFT NO.DC		JA	09/08/92	NM	02/24/94
	10	38854N 39966E	6	1,911.9	CC-8	127.6	22.6	104.1	100+	LIFT NO.DC		JA	09/08/92	NM	02/24/94
	11	38855N 40198E	6	1,911.6	CC-8	129.7	21.4	106.8	100+	LIFT NO.DC		JA	09/08/92	NM	02/24/94

Count: 11

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-92-018C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
92-112A	01	38845N 40122E	6	1,912.1	CC-8	120.9	27.2	95.0	95.0	LIFT NO.DC		JA	09/09/92	NM	02/24/94
	02	38846N 39912E	6	1,912.3	CC-8	124.5	26.0	98.8	98.8	LIFT NO.DC		JA	09/09/92	NM	02/24/94
	03	38848N 39749E	6	1,916.2	CC-8	122.4	26.9	96.5	96.5	LIFT NO.DC	DC-CC-230, ST.38	JA	09/09/92	NM	02/24/94
	04	38849N 39983E	6	1,913.1	CC-8	125.6	27.0	98.9	98.9	LIFT NO.DC		JA	09/09/92	NM	02/24/94
	05	38846N 40105E	6	1,914.0	CC-8	121.7	24.5	97.8	97.8	LIFT NO.DC	Sand Cone	JA	09/09/92	NM	02/24/94
	06	38845N 39892E	6	1,914.4	CC-231	118.0	30.4	90.5	95.7	LIFT NO.DC	DC-CC-231 (PROCTOR)	JA	09/09/92	NM	02/24/94
	07	38848N 39974E	6	1,914.9	CC-8	123.0	24.8	98.6	98.6	LIFT NO.DC		JA	09/09/92	NM	02/24/94
	08	38854N 40205E	6	1,914.7	CC-231	115.4	26.0	91.5	96.8	LIFT NO.DC		JA	09/09/92	NM	02/24/94
	09	38848N 39774E	6	1,917.5	CC-8	123.6	26.3	97.7	97.7	LIFT NO.DC		JA	09/09/92	NM	02/24/94
	10	38847N 39977E	6	1,915.7	CC-8	124.6	24.8	99.7	99.7	LIFT NO.DC		JA	09/09/92	NM	02/24/94
	11	38846N 39869E	6	1,917.5	CC-231	119.6	28.9	92.8	98.2	LIFT NO.DC		JA	09/09/92	NM	02/24/94
	12	38847N 40094E	6	1,916.7	CC-8	121.5	21.8	99.8	99.8	LIFT NO.DC		JA	09/09/92	NM	02/24/94
	13	38837N 40000E	6	1,917.7	CC-8	120.6	24.7	96.6	96.6	LIFT NO.DC		JA	09/09/92	NM	02/24/94
	14	38846N 40204E	6	1,918.1	CC-8	118.7	25.1	94.9	94.9	LIFT NO.DC		JA	09/09/92	NM	02/24/94

Count: 14

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Summary of Density Results
(BFDX-92-018C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
92-115A	01	38837N 39574E	6	1,919.2	CC-8	113.8	21.8	93.3	93.3	LIFT NO.DC	PIPE RACK DIKE WEST OF AP #91	JA	09/12/92	NM	02/24/94
	02	38839N 39282E	6	1,924.2	CC-8	109.8	21.4	90.3	90.3	LIFT NO.DC	PIPE RACK DIKE WEST OF AP #91	JA	09/12/92	NM	02/24/94

Count: 2

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Summary of Density Results
(BFDX-92-018C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
92-119A	01	38749N 39810E	6	1,901.2	CC-78	126.2	18.9	106.0	90.6	LIFT NO.SG	SG-CC-232	JA	09/17/92	NM	02/24/94
	02	38745N 40040E	6	1,900.2	CC-78	132.4	14.5	115.5	98.7	LIFT NO.SG	SG-CC-233	JA	09/17/92	NM	02/24/94
	03	38739N 40237E	6	1,899.8	CC-78	132.1	16.7	113.1	96.7	LIFT NO.SG	SG-CC-234	JA	09/17/92	NM	02/24/94
	04	38526N 40339E	6	1,900.2	CC-65	125.0	20.9	103.3	94.9	LIFT NO.SG	SG-CC-235	JA	09/17/92	NM	02/24/94
	05	38530N 40146E	6	1,901.2	CC-70	125.0	20.4	103.8	96.6	LIFT NO.SG	SG-CC-236	JA	09/17/92	NM	02/24/94
	06	38533N 39955E	6	1,901.9	CC-65	126.3	20.6	104.6	96.1	LIFT NO.SG	SG-CC-237	JA	09/17/92	NM	02/24/94
	07	38536N 39769E	6	1,902.6	CC-65	125.5	21.0	103.6	95.2	LIFT NO.SG	SG-CC-238	JA	09/17/92	NM	02/24/94
	08	38338N 39862E	6	1,903.3	CC-65	131.7	18.4	111.1	102.1	LIFT NO.SG	SG-CC-239	JA	09/17/92	NM	02/24/94
	09	38330N 40039E	6	1,902.2	CC-65	124.9	20.3	103.7	95.3	LIFT NO.SG	SG-CC-240	JA	09/17/92	NM	02/24/94
	10	38326N 40236E	6	1,901.5	CC-8	123.7	23.1	100.4	100.4	LIFT NO.SG	SG-CC-241	JA	09/17/92	NM	02/24/94
	11	38315N 40439E	6	1,900.7	CC-70	126.8	18.7	106.7	99.3	LIFT NO.SG	SG-CC-242	JA	09/17/92	NM	02/24/94

Count: 11

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Summary of Density Results
(BFDX-92-018C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
92-124	01	38842N 40095E	6	1,908.2	CC-8	120	24.0	96.0	96	LIFT NO. DC	CULVERT DIKE EXTENSION	MC	09/24/92	NM	02/22/94
	02	38850N 40090E	6	1,909.1	CC-8	119	23.3	95.7	95.7	LIFT NO. DC	CULVERT DIKE EXTENSION	MC	09/24/92	NM	02/22/94

Count: 2

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-92-018C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
92-127	01	10'S OF VALVE RISER	6	1,912	CC-8	117.9	22	97.9	97.9	LIFT NO. SG	CULVERT DIKE EXTENSION	MC	09/29/92	NM	02/22/94
	02	10'N OF VALVE RISER	6	1,911	CC-8	118.4	23	96.3	96.3	LIFT NO. SG	CULVERT DIKE EXTENSION	MC	09/29/92	NM	02/22/94

Count: 2

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INTERTEC

Summary of Density Results
(BFDX-92-018C) Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
92-131	01	38208N 39831E	6	1,904.3	CC-8	117.5	22.6	95.9	95.9	LIFT NO. SG	SG-CC-243	MC	10/05/92	NM	02/22/94
	02	38207N 39998E	6	1,902.9	CC-183	125.9	22.9	102.4	96.6	LIFT NO. SG	SG-CC-244	MC	10/05/92	NM	02/22/94
	03	38209N 40231E	6	1,902.4	CC-183	128.0	23.7	103.5	97.6	LIFT NO. SG	SG-CC-245	MC	10/05/92	NM	02/22/94
	04	38203N 40448E	6	1,901.0	CC-56	132.1	18.4	111.6	98.8	LIFT NO. SG	SG-CC-246	MC	10/05/92	NM	02/22/94
	05	38082N 40452E	6	1,901.5	CC-183	118.3	18.4	99.9	94.2	LIFT NO. SG	SG-CC-247	MC	10/05/92	NM	02/22/94
	06	38082N 40218E	6	1,902.2	CC-56	134.7	19.4	112.9	99.9	LIFT NO. SG	SG-CC-248	MC	10/05/92	NM	02/22/94
	07	38095N 39992E	6	1,904.0	CC-56	127.7	20.7	105.8	93.6	LIFT NO. SG	SG-CC-249	MC	10/05/92	NM	02/22/94
	08	38092N 39826E	BS	1,904.8	CC-183	121.6	21.7	99.9	94.2	LIFT NO. SG	SG-CC-250	MC	10/05/92	NM	02/22/94
	09	38004N 39827E	BS	1,904.9	CC-8	112.5	20.7	93.2	93.2	LIFT NO. SG	SG-CC-251	MC	10/05/92	NM	02/22/94
	10	38004N 40009E	BS	1,904.5	CC-183	118.8	23.4	96.2	90.8	LIFT NO. SG	SG-CC-252	MC	10/05/92	NM	02/22/94
	11	37996N 40211E	BS	1,902.9	CC-183	127.1	22.8	103.5	97.6	LIFT NO. SG	SG-CC-253	MC	10/05/92	NM	02/22/94
	12	37993N 40446E	BS	1,901.8	CC-8	110.0	21.2	92.2	92.2	LIFT NO. SG	SG-CC-254	MC	10/05/92	NM	02/22/94

Count: 12

AP #91

1993 Densities

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-04A	01	38917N 39805E	6	1,900.6	CC-56	128.1	20.6	106.1	93.9	LIFT NO. SG	CC-263	MC	04/20/93	NM	12/20/93
	02	38922N 40105E	6	1,899.0	CC-56	130.5	19.1	109.4	96.8	LIFT NO. SG	CC-264	MC	04/20/93	NM	12/20/93
	03	38995N 40188E	6	1,897.9	CC-56	130.0	18.4	109.7	97.1	LIFT NO. SG	CC-265	MC	04/20/93	NM	12/20/93
	04	39302N 40184E	6	1,896.6	CC-56	134.1	18.7	112.8	99.8	LIFT NO. SG	CC-266, SAND CONE	MC	04/20/93	NM	12/20/93
	05	39400N 39834E	6	1,898.0	CC-78	126.9	16.9	108.4	92.6	LIFT NO. SG	CC-267	MC	04/20/93	NM	12/20/93
	06	39324N 39749E	6	1,898.8	CC-56	133.8	20.8	110.6	97.8	LIFT NO. SG	CC-268	MC	04/20/93	NM	12/20/93
	07	39000N 39743E	6	1,900.5	CC-56	132.3	19.4	110.7	97.9	LIFT NO. SG	CC-269	MC	04/20/93	NM	12/20/93
	08	38917N 39799E	6	1,901.9	CC-103	128.5	21.5	105.6	100+	LIFT NO. CLS	CC-270, PROCTOR	MC	04/20/93	NM	12/20/93
	09	38919N 39998E	6	1,901.0	CC-103	126.6	21.4	104.2	100+	LIFT NO. CLS		MC	04/20/93	NM	12/20/93
	10	38949N 40190E	6	1,898.9	CC-97	127.5	23.0	103.5	99.5	LIFT NO. CLS		MC	04/20/93	NM	12/20/93
	11	39142N 40189E	6	1,898.3	CC-97	130.2	21.8	106.8	100+	LIFT NO. CLS		MC	04/20/93	NM	12/20/93
	12	39346N 40187E	6	1,897.3	CC-97	125.1	21.9	102.5	98.5	LIFT NO. CLS		MC	04/20/93	NM	12/20/93
	13	38973N 39738E	6	1,901.7	CC-97	125.5	21.8	102.9	99	LIFT NO. CLS		MC	04/20/93	NM	12/20/93
	14	39159N 39742E	6	1,900.6	CC-97	127.8	22.2	104.5	100+	LIFT NO. CLS		MC	04/20/93	NM	12/20/93
	15	39301N 39755E	6	1,899.5	CC-97	127.0	21.9	104.1	100+	LIFT NO. CLS		MC	04/20/93	NM	12/20/93
	16	39398N 39888E	6	1,898.7	CC-97	125.7	19.5	105.1	100+	LIFT NO. CLS		MC	04/20/93	NM	12/20/93
	17	39396N 40102E	6	1,897.9	CC-97	125.1	20.3	103.9	99.9	LIFT NO. CLS	CC-271, PROCTOR	MC	04/20/93	NM	12/20/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-04A	18	38916N 39860E	6	1,901.7	CC-97	123.2	21.7	101.1	97.2	LIFT NO. CLS	MOISTURE (22.1)	MC	04/20/93	NM	12/20/93
	19	38916N 40056E	6	1,901.1	CC-97	126.8	23.9	102.2	98.2	LIFT NO. CLS		MC	04/20/93	NM	12/20/93
	20	38999N 40194E	6	1,899.3	CC-97	126.0	23.7	101.7	97.8	LIFT NO. CLS		MC	04/20/93	NM	12/20/93
	21	39251N 40190E	6	1,898.6	CC-97	122.8	21.8	100.7	96.8	LIFT NO. CLS		MC	04/20/93	NM	12/20/93

Count: 21

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-05A	01	38958N 39852E	6	1,901.0	CC-97	125.4	20.0	104.4	100+	LIFT NO. 1ST		MC	04/21/93	NM	12/20/93
	02	38963N 40079E	6	1,899.9	CC-97	124.2	22.0	101.7	97.8	LIFT NO. 1ST		MC	04/21/93	NM	12/20/93
	03	39085N 40086E	6	1,898.9	CC-95	129.2	16.9	110.4	96.8	LIFT NO. 1ST		MC	04/21/93	NM	12/20/93
	04	39076N 39840E	6	1,900.2	CC-109	126.2	17.1	107.6	96.9	LIFT NO. 1ST		MC	04/21/93	NM	12/20/93
	05	39342N 39827E	6	1,898.9	CC-97	120.9	22.3	99.0	95.2	LIFT NO. 1ST		MC	04/21/93	NM	12/20/93
	06	39352N 40045E	6	1,897.5	CC-97	122.5	20.4	101.6	97.7	LIFT NO. 1ST	SAND CONE	MC	04/21/93	NM	12/20/93
	07	39021N 39823E	6	1,901.1	CC-97	128.7	22.0	105.4	100+	LIFT NO. 2ND	ST.39, CLB-CC-272	MC	04/21/93	NM	12/20/93
	08	39026N 40093E	6	1,899.5	CC-97	129.2	20.3	107.3	100+	LIFT NO. 2ND	ST.40, CLB-CC-273	MC	04/21/93	NM	12/20/93
	09	39134N 39841E	6	1,900.6	CC-97	125.9	20.9	104.0	100	LIFT NO. 2ND	ST.41, CLB-CC-274	MC	04/21/93	NM	12/20/93
	10	39156N 40088E	6	1,899.0	CC-97	122.9	23.5	99.4	95.6	LIFT NO. 2ND	ST.42, CLB-CC-275	MC	04/21/93	NM	12/20/93
	11	39243N 39889E	6	1,899.8	CC-106	123.5	15.0	107.3	N/A	LIFT NO. 2ND	SAND (MATERIAL REMOVED)	MC	04/21/93	NM	12/20/93
	12	39248N 40088E	6	1,899.0	CC-97	122.2	17.6	103.8	99.8	LIFT NO. 2ND	ST.43, CLB-CC-276	MC	04/21/93	NM	12/20/93

Count: 12

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-06A	01	39106N 40190E	6	1,899.8	CC-97	124.4	19.0	104.4	100+	LIFT NO. CLS		MC	04/22/93	NM	12/17/93
	02	39339N 40188E	6	1,898.7	CC-97	127.9	22.8	104.0	100	LIFT NO. CLS		MC	04/22/93	NM	12/17/93
	03	39399N 40085E	6	1,898.5	CC-104	125.2	22.6	102.0	100+	LIFT NO. CLS		MC	04/22/93	NM	12/17/93
	04	39403N 39818E	6	1,899.9	CC-104	124.8	22.1	102.1	100+	LIFT NO. CLS		MC	04/22/93	NM	12/17/93
	05	39329N 39740E	6	1,900.6	CC-106	117.0	20.5	98.3	91	LIFT NO. CLS	MATERIAL NOT CONSOLIDATED	MC	04/22/93	NM	12/17/93
	06	39143N 39738E	6	1,901.6	CC-106	122.1	17.6	99.2	91.9	LIFT NO. CLS	MATERIAL NOT CONSOLIDATED	MC	04/22/93	NM	12/17/93
	07	RETEST OF #11, RPT. 93-05	6	1,899.8	CC-106	129.7	22.7	105.6	97.8	LIFT NO. 2ND	ST.44, CLB-CC-277	MC	04/22/93	NM	12/17/93
	08	38916N 39834E	6	1,902.4	CC-106	117.8	24.2	94.7	87.8	LIFT NO. CLS	NOT CONSOLIDATED	MC	04/22/93	NM	12/17/93
	09	38912N 40110E	6	1,902.4	CC-97	122.5	20.0	93.6	90	LIFT NO. CLS	NOT CONSOLIDATED	MC	04/22/93	NM	12/17/93
	10	39018N 40199E	6	1,900.6	CC-106	131.7	19.3	110.3	100+	LIFT NO. CLS	CLS-CC-278, PROCTOR	MC	04/22/93	NM	12/17/93
	11	39285N 40188E	6	1,899.4	CC-97	123.5	20.8	102.1	98.1	LIFT NO. CLS		MC	04/22/93	NM	12/17/93
	12	39395N 40111E	6	1,898.7	CC-97	127.4	22.6	103.8	99.8	LIFT NO. CLS	CLS-CC-279, PROCTOR	MC	04/22/93	NM	12/17/93
	13	39405N 39835E	6	1,900.5	CC-97	124.7	20.9	103.0	99	LIFT NO. CLS	ST.46, CLS-CC-281	MC	04/22/93	NM	12/17/93
	14	RETEST OF #5	6	1,900.5	CC-106	124.7	20.9	103.0	98	LIFT NO. CLS	ST.46, CLS-CC-281	MC	04/22/93	NM	12/17/93
	15	RETEST OF #6	6	1,901.6	CC-106	127.0	18.9	106.7	98.8	LIFT NO. CLS		MC	04/22/93	NM	12/17/93
	16	RETEST OF #8	6	1,902.4	CC-106	128.4	20.9	106.1	98.2	LIFT NO. CLS		MC	04/22/93	NM	12/20/93
	17	RETEST OF #9	6	1,902.4	CC-97	125.8	22.8	102.3	98.4	LIFT NO.		MC	04/22/93	NM	12/20/93

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-06A	17									CLS					
	18	38915N 39828E	6	1,902.9	CC-106	131.1	22.7	106.7	98.8	LIFT NO. CLS	ST.47, CLS-CC-282	MC	04/22/93	NM	12/20/93
	19	38912N 40084E	6	1,902.0	CC-106	130.7	20.9	108.0	100	LIFT NO. CLS	ST.48, CLS-CC-283	MC	04/22/93	NM	12/20/93
	20	39021N 40196E	6	1,900.9	CC-106	126.3	21.9	103.5	95.8	LIFT NO. CLS	ST.49, CLS-CC-284, PROCTOR	MC	04/22/93	NM	12/20/93
	21	38290N 40193E	6	1,899.6	CC-106	129.8	20.6	107.5	99.5	LIFT NO. CLS	ST.50, CLS-CC-285	MC	04/22/93	NM	12/20/93
	22	39044N 40091E	6	1,900.1	CC-97	126.0	23.4	102.0	98.1	LIFT NO. 3RD		MC	04/22/93	NM	12/20/93
	23	39039N 39806E	6	1,901.5	CC-106	131.5	20.9	108.6	100+	LIFT NO. 3RD		MC	04/22/93	NM	12/20/93
	24	39325N 39736E	6	1,901.5	CC-97	121.0	22.3	98.8	95	LIFT NO. CLS		MC	04/22/93	NM	12/20/93
	25	39406N 39861E	6	1,900.8	CC-106	127.1	18.6	107.0	99.1	LIFT NO. CLS		MC	04/22/93	NM	12/20/93
	26	39402N 40105E	6	1,899.2	CC-106	126.0	19.5	105.3	97.5	LIFT NO. CLS		MC	04/22/93	NM	12/20/93
	27	38911N 39850E	6	1,903.3	CC-104	122.3	23.1	99.2	98.3	LIFT NO. CLS		MC	04/22/93	NM	12/20/93
	28	38912N 40075E	6	1,902.7	CC-97	126.2	21.8	103.5	99.5	LIFT NO. CLS		MC	04/22/93	NM	12/20/93
	29	39036N 40195E	6	1,901.2	CC-106	131.3	22.2	107.3	99.3	LIFT NO. CLS		MC	04/22/93	NM	12/20/93
	30	39293N 40195E	6	1,900.3	CC-97	121.7	21.2	100.3	96.5	LIFT NO. CLS		MC	04/22/93	NM	12/20/93
	31	39400N 40100E	6	1,899.7	CC-106	129.0	20.4	107.0	99	LIFT NO. CLS		MC	04/22/93	NM	12/20/93
	32	39407N 38854E	6	1,901.4	CC-106	127.3	21.2	104.9	97.1	LIFT NO. CLS		MC	04/22/93	NM	12/20/93
	33	39320N 39735E	6	1,902.6	CC-106	128.8	18.7	108.4	100+	LIFT NO. CLS		MC	04/22/93	NM	12/20/93
	34	39006N	6	1,900.1	CC-106	129.9	19.4	108.7	100+	LIFT NO.		MC	04/22/93	NM	12/20/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-06A	34	39733E								CLS					
	35	38912N	6	1,903.7	CC-106	128.0	21.1	105.6	97.8	LIFT NO.		MC	04/22/93	NM	12/20/93
		39864E								CLS					
	36	38912N	6	1,903.0	CC-97	127.5	22.0	104.4	100+	LIFT NO.		MC	04/22/93	NM	12/20/93
		40090E								CLS					
	37	39030N	6	1,901.7	CC-97	129.5	21.1	106.8	100+	LIFT NO.		MC	04/22/93	NM	12/20/93
		40199E								CLS					
	38	39274N	6	1,900.9	CC-106	126.1	22.0	103.2	95.6	LIFT NO.		MC	04/22/93	NM	12/20/93
		40197E								CLS					
	39	39407N	6	1,900.5	CC-97	125.0	21.6	102.7	98.8	LIFT NO.		MC	04/22/93	NM	12/20/93
		40088E								CLS					
	40	39413N	6	1,902.1	CC-97	122.1	20.0	101.6	97.7	LIFT NO.		MC	04/22/93	NM	12/20/93
		39844E								CLS					
	41	39287N	6	1,903.1	CC-97	127.1	20.2	105.6	100+	LIFT NO.		MC	04/22/93	NM	12/20/93
		39728E								CLS					
	42	38984N	6	1,903.9	CC-97	126.9	21.6	104.2	100+	LIFT NO.		MC	04/22/93	NM	12/20/93
		39729E								CLS					
	43	38906N	6	1,904.0	CC-106	131.6	19.9	109.6	100+	LIFT NO.	SAND CONE	MC	04/22/93	NM	12/20/93
		39935E								CLS					
	44	39146N	6	1,902.2	CC-97	126.7	22.5	103.3	99.3	LIFT NO.		MC	04/22/93	NM	12/20/93
		40201E								CLS					
	45	39409N	6	1,901.7	CC-97	126.2	22.5	102.9	99	LIFT NO.		MC	04/22/93	NM	12/20/93
		39964E								CLS					
	46	39214N	6	1,903.9	CC-106	129.6	21.0	107.0	99.1	LIFT NO.		MC	04/22/93	NM	12/20/93
		39727E								CLS					

Count: 46

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-07A	01	38916N 39826E	6	1,904.7	CC-97	122.3	20.7	101.2	97.3	LIFT NO. CLS		MC	04/23/93	NM	12/17/93
	02	38907N 40094E	6	1,903.8	CC-97	126.6	20.0	105.2	100+	LIFT NO. CLS		MC	04/23/93	NM	12/17/93
	03	39029N 40201E	6	1,903.0	CC-106	122.7	21.0	101.0	93.5	LIFT NO. CLS		MC	04/23/93	NM	12/17/93
	04	39258N 40196E	6	1,901.7	CC-97	118.0	24.2	95.5	91.8	LIFT NO. CLS		MC	04/23/93	NM	12/17/93

Count: 4

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-08A	01	38993N 39725E	6	1,905.7	CC-97	128.7	23.6	104.0	100	LIFT NO. CLS	ST.52, CLS-CC-288	AC	04/26/93	NM	12/17/93
	02	39326N 39723E	6	1,906.1	CC-97	124.1	19.3	103.9	99.9	LIFT NO. CLS		AC	04/26/93	NM	12/17/93
	03	39419N 39850E	6	1,904.5	CC-97	123.6	19.6	103.2	99.2	LIFT NO. CLS		AC	04/26/93	NM	12/17/93
	04	39415N 40082E	6	1,902.8	CC-97	122.8	21.6	100.9	97.1	LIFT NO. CLS		AC	04/26/93	NM	12/17/93
	05	38905N 39971E	6	1,905.9	CC-271	127.8	19.3	102.0	95.3	LIFT NO. CLS		AC	04/26/93	NM	12/17/93
	06	39132N 40198E	6	1,904.3	CC-97	122.2	19.7	102.0	98.1	LIFT NO. CLS		AC	04/26/93	NM	12/17/93
	07	39205N 39724E	6	1,905.8	CC-97	124.3	20.1	103.4	99.5	LIFT NO. CLS	SAND CONE	AC	04/26/93	NM	12/17/93
	08	39416N 39979E	6	1,903.9	CC-97	122.6	22.6	99.9	96.0	LIFT NO. CLS		AC	04/26/93	NM	12/17/93
	09	38905N 39819E	6	1,906.7	CC-271	121.8	13.3	107.4	100	LIFT NO. CLS		AC	04/26/93	NM	12/17/93
	10	38904N 40099E	6	1,906.5	CC-271	128.2	17.2	109.3	100+	LIFT NO. CLS		AC	04/26/93	NM	12/17/93
	11	39002N 40211E	6	1,905.4	CC-97	121.6	22.1	99.5	95.6	LIFT NO. CLS		AC	04/26/93	NM	12/17/93
	12	39297N 40200E	6	1,904.7	CC-97	125.7	20.4	104.3	100+	LIFT NO. CLS		AC	04/26/93	NM	12/17/93
	13	39430N 40093E	6	1,906.2	CC-270	123.8	23.3	100.3	99.4	LIFT NO. CLS		AC	04/26/93	NM	12/17/93
	14	39417N 40094E	6	1,903.7	CC-97	127.4	21.1	105.1	97.4	LIFT NO. CLS		AC	04/26/93	NM	12/17/93
	15	38900N 39831E	6	1,907.4	CC-97	127.4	22.4	104.0	100	LIFT NO. CLS		AC	04/26/93	NM	12/17/93
	16	38901N 40108E	6	1,907.0	CC-97	122.2	21.2	100.7	96.8	LIFT NO. CLS		AC	04/26/93	NM	12/17/93
	17	39001N 40208E	6	1,906.3	CC-271	127.9	19.1	107.3	100+	LIFT NO. CLS		AC	04/26/93	NM	12/17/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-08A	18	39290N 40202E	6	1,905.2	CC-97	123.9	18.9	104.1	100+	LIFT NO. CLS		AC	04/26/93	NM	12/17/93
	19	38987N 39723E	6	1,908.0	CC-97	122.8	23.6	99.2	95.4	LIFT NO. CLS		AC	04/26/93	NM	12/17/93
	20	39319N 39726E	6	1,906.8	CC-97	127.1	22.3	103.8	99.8	LIFT NO. CLS		AC	04/26/93	NM	12/17/93
	21	38901N 39820E	6	1,908.8	CC-271	131.1	16.7	112.2	100+	LIFT NO. CLS		AC	04/26/93	NM	12/17/93
	22	38900N 40111E	6	1,907.8	CC-271	132.1	20.0	110.0	100+	LIFT NO. CLS		AC	04/26/93	NM	12/17/93
	23	38997N 40206E	6	1,906.8	CC-271	128.3	19.9	106.9	99.9	LIFT NO. CLS		AC	04/26/93	NM	12/17/93
	24	39000N 40205E	6	1,905.8	CC-97	127.1	23.4	102.9	99.0	LIFT NO. CLS		AC	04/26/93	NM	12/17/93

Count: 24

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-088	01	38903N 39821E	6	1,905.0	CC-271	128.4	20.0	106.9	99.9	LIFT NO. CLS		MC	04/26/93	NM	12/17/93
	02	38910N 40096E	6	1,903.8	CC-271	129.5	20.3	107.5	100+	LIFT NO. CLS	CLS-CC-286, PROCTOR	MC	04/26/93	NM	12/17/93
	03	RETEST OF #3, RPT. 92-07A	6	1,903.0	CC-97	123.4	22.4	100.7	96.8	LIFT NO. CLS		MC	04/26/93	NM	12/17/93
	04	RETEST OF #4, RPT. 92-07A	6	1,901.7	CC-97	121.2	18.6	102.1	98.2	LIFT NO. CLS		MC	04/26/93	NM	12/17/93
	05	39005N 39729E	6	1,904.6	CC-271	128.8	22.4	105.1	98.2	LIFT NO. CLS		MC	04/26/93	NM	12/17/93
	06	39298N 39727E	6	1,905.3	CC-271	127.6	20.2	106.0	99	LIFT NO. CLS		MC	04/26/93	NM	12/17/93
	07	39420N 39842E	6	1,904.0	CC-271	123.4	20.7	102.8	96.1	LIFT NO. CLS		MC	04/26/93	NM	12/17/93
	08	39413N 40076E	6	1,901.8	CC-271	127.4	20.6	105.5	98.6	LIFT NO. CLS	ST.51, CLS-CC-287	MC	04/26/93	NM	12/17/93
	09	38909N 39825E	6	1,905.1	CC-97	122.8	21.2	101.2	97.3	LIFT NO. CLS		MC	04/26/93	NM	12/17/93
	10	38907N 40091E	6	1,904.8	CC-97	126.0	21.7	103.6	99.6	LIFT NO. CLS		MC	04/26/93	NM	12/17/93
	11	39021N 40200E	6	1,904.1	CC-271	127.7	21.0	105.4	98.5	LIFT NO. CLS		MC	04/26/93	NM	12/17/93
	12	39307N 40196E	6	1,902.6	CC-97	124.3	22.9	101.0	97.1	LIFT NO. CLS		MC	04/26/93	NM	12/17/93
	13	39303N 39722E	6	1,906.9	CC-97	127.5	21.9	104.5	100+	LIFT NO. CLS	CLS-CC-289, PROCTOR	MC	04/26/93	NM	12/17/93
	14	38993N 39723E	6	1,907.3	CC-270	124.7	25.9	98.9	98.1	LIFT NO. CLS		MC	04/26/93	NM	12/17/93
	15	39421N 39812E	6	1,907.6	CC-270	126.8	24.3	101.9	100+	LIFT NO. CLS	MOISTURE CONTENT - 25.9	MC	04/26/93	NM	12/17/93
	16	39417N 40099E	6	1,904.6	CC-270	121.6	23.0	98.8	97.8	LIFT NO. CLS		MC	04/26/93	NM	12/17/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-010A	01	38890N 39809E	6	1,909.5	CC-97	122.7	22.2	100.3	96.5	LIFT NO. CLS		AC	04/28/93	NM	12/17/93
	02	38889N 40072E	6	1,908.6	CC-97	124.2	22.5	101.3	97.4	LIFT NO. CLS		AC	04/28/93	NM	12/17/93
	03	39026N 40218E	6	1,907.8	CC-97	121.0	19.8	100.9	97.0	LIFT NO. CLS		AC	04/28/93	NM	12/17/93
	04	39245N 40215E	6	1,907.3	CC-97	123.9	21.8	101.6	97.7	LIFT NO. CLS		AC	04/28/93	NM	12/17/93
	05	39431N 39819E	6	1,908.7	CC-97	124.3	19.6	103.8	99.8	LIFT NO. CLS		AC	04/28/93	NM	12/17/93
	06	39424N 40097E	6	1,905.3	CC-97	126.3	20.5	104.7	100+	LIFT NO. CLS		AC	04/28/93	NM	12/17/93
	07	39312N 39722E	6	1,908.6	CC-97	125.6	22.9	102.1	98.2	LIFT NO. CLS		AC	04/28/93	NM	12/17/93
	08	38895N 40088E	6	1,909.2	CC-270	124.2	23.8	100.2	99.3	LIFT NO. CLS		AC	04/28/93	NM	12/17/93
	09	39024N 40211E	6	1,908.7	CC-270	121.9	23.2	98.8	97.9	LIFT NO. CLS		AC	04/28/93	NM	12/17/93
	10	39263N 40219E	6	1,907.9	CC-97	124.0	20.8	102.5	98.6	LIFT NO. CLS		AC	04/28/93	NM	12/17/93
	11	38971N 39717E	6	1,910.0	CC-271	127.2	19.1	106.7	99.7	LIFT NO. CLS		AC	04/28/93	NM	12/17/93
	12	39325N 39716E	6	1,909.6	CC-97	125.7	23.1	102.0	98.0	LIFT NO. CLS		AC	04/28/93	NM	12/17/93
	13	39433N 39839E	6	1,909.5	CC-97	125.8	21.0	103.8	99.8	LIFT NO. CLS		AC	04/28/93	NM	12/17/93
	14	39169N 39714E	6	1,910.0	CC-271	123.6	17.6	105.0	98.1	LIFT NO. CLS		AC	04/28/93	NM	12/17/93

Count: 14

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-010B	01	38987N 39716E	6	1,909.4	CC-97	120.1	21.4	99.0	95.1	LIFT NO. CLS		MC	04/28/93	NM	12/17/93
	02	38899N 39824E	6	1,909.7	CC-270	122.0	25.0	97.6	96.7	LIFT NO. CLS	SAND CONE	MC	04/28/93	NM	12/17/93
	03	39427N 40102E	6	1,905.9	CC-270	120.0	22.7	98.0	97.2	LIFT NO. CLS		MC	04/28/93	NM	12/17/93
	04	38894N 39964E	6	1,910.2	CC-270	120.0	26.9	96.7	95.8	LIFT NO. CLS	ST.53, CC-290	MC	04/28/93	NM	12/17/93
	05	39136N 40215E	6	1,909.5	CC-270	121.0	22.6	98.7	97.8	LIFT NO. CLS	ST.54, CC-291	MC	04/28/93	NM	12/17/93
	06	39431N 39926E	6	1,909.0	CC-97	120.1	20.3	99.9	96.1	LIFT NO. CLS		MC	04/28/93	NM	12/17/93
	07	38887N 39821E	6	1,911.2	CC-97	120.7	21.1	99.6	95.7	LIFT NO. CLS		MC	04/28/93	NM	12/17/93
	08	38894N 40109E	6	1,910.3	CC-97	121.1	22.6	98.6	95	LIFT NO. CLS		MC	04/28/93	NM	12/17/93
	09	39014N 40223E	6	1,910.1	CC-97	122.0	19.1	102.9	98.9	LIFT NO. CLS		MC	04/28/93	NM	12/17/93
	10	38274N 40221E	6	1,909.6	CC-270	117.6	21.9	96.5	95.6	LIFT NO. CLS		MC	04/28/93	NM	12/17/93
	11	38894N 39711E	6	1,911.6	CC-98	116.2	24.2	93.6	95	LIFT NO. CLS		MC	04/28/93	NM	12/17/93
	12	39312N 39710E	6	1,910.8	CC-270	121.3	22.3	99.1	98.2	LIFT NO. CLS		MC	04/28/93	NM	12/17/93
	13	39428N 39828E	6	1,910.4	CC-97	122.0	20.8	101.0	97.1	LIFT NO. CLS		MC	04/28/93	NM	12/17/93
	14	39431N 40070E	6	1,908.1	CC-97	114.3	15.6	98.9	95	LIFT NO. CLS	M.C. FAILS	MC	04/28/93	NM	12/17/93
	15	39244N 39844E	6	1,900.4	CC-97	128.4	23.0	104.3	100+	LIFT NO. 3RD	CLB-CC-292, PROCTOR	AC	04/28/93	NM	12/17/93
	16	39297N 40050E	6	1,899.4	CC-97	128.5	24.7	102.9	98.8	LIFT NO. 3RD		AC	04/28/93	NM	12/17/93
	17	37735N 39781E	6	1,906.6	CC-205	128.7	21.0	106.2	93.2	LIFT NO. SG	CC-293	AC	04/28/93	NM	12/17/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-010B	18	37690N 39955E	6	1,906.4	CC-205	126.2	17.7	107.1	93.9	LIFT NO. SG	CC-294	AC	04/28/93	NM	12/17/93
	19	37648N 40103E	6	1,905.6	CC-227	128.3	21.6	105.4	100+	LIFT NO. SG	CC-295	AC	04/28/93	NM	12/17/93
	20	37594N 40301E	6	1,904.8	CC-175	126.1	20.2	104.8	94	LIFT NO. SG	CC-296	AC	04/28/93	NM	12/17/93
	21	37360N 40314E	6	1,905.7	CC-175	125.7	22.5	102.5	91.9	LIFT NO. SG	CC-297	AC	04/28/93	NM	12/17/93
	22	37380N 40134E	6	1,906.8	CC-175	130.7	19.5	109.2	97.9	LIFT NO. SG	CC-298	AC	04/28/93	NM	12/17/93
	23	37416N 39957E	6	1,907.5	CC-175	128.8	20.2	107.0	96	LIFT NO. SG	CC-299	AC	04/28/93	NM	12/17/93
	24	38890N 39937E	6	1,911.5	CC-97	124.9	21.4	102.8	98.9	LIFT NO. CLS		AC	04/28/93	NM	12/17/93
	25	39148N 40218E	6	1,910.9	CC-97	125.6	22.3	102.6	98.6	LIFT NO. CLS		AC	04/28/93	NM	12/17/93
	26	RETEST OF #14	6	1,908.1	CC-97	123.1	16.9	105.2	100+	LIFT NO. CLS	M.C. FAILS	AC	04/28/93	NM	12/17/93
	27	39180N 39180E	6	1,910.7	CC-97	127.2	22.3	103.9	99.9	LIFT NO. CLS		AC	04/28/93	NM	12/17/93
	28	RETEST OF #14 & #26	6	1,908.1	CC-97	121.8	20.4	101.9	98	LIFT NO. CLS		AC	04/28/93	NM	12/17/93

Count: 28

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-011A	01	39374N 39831E	6	1,901.0	CC-97	126.6	20.2	105.2	100+	LIFT NO. 3RD		AC	04/29/93	NM,SC	12/17/93
	02	39376N 40032E	6	1,897.8	CC-97	129.6	24.7	103.8	99.3	LIFT NO. 3RD		AC	04/29/93	NM,SC	12/17/93
	03	38902N 38718E	6	1,912.5	CC-97	129.2	21.5	106.2	100+	LIFT NO. CLS		AC	04/29/93	NM,SC	12/17/93
	04	39312N 39710E	6	1,911.7	CC-97	126.1	22.3	103.0	99.0	LIFT NO. CLS		AC	04/29/93	NM,SC	12/17/93
	05	39436N 39820E	6	1,911.4	CC-97	125.3	21.4	103.1	99.1	LIFT NO. CLS		AC	04/29/93	NM,SC	12/17/93
	06	39428N 40083E	6	1,908.6	CC-97	122.7	19.1	102.9	98.9	LIFT NO. CLS		AC	04/29/93	NM,SC	12/17/93
	07	38885N 37806E	6	1,913.4	CC-271	127.3	13.4	112.1	100+	LIFT NO. CLS	SAND CONE	AC	04/29/93	NM,SC	12/17/93
	08	38886N 40126E	6	1,911.9	CC-271	133.0	19.4	111.3	100+	LIFT NO. CLS		AC	04/29/93	NM,SC	12/17/93
	09	39007N 40224E	6	1,912.1	CC-271	123.7	21.5	101.7	95.0	LIFT NO. CLS		AC	04/29/93	NM,SC	12/17/93
	10	39276N 40224E	6	1,911.2	CC-270	118.9	20.9	98.2	97.3	LIFT NO. CLS		AC	04/29/93	NM,SC	12/17/93
	11	38980N 39708E	6	1,912.6	CC-271	124.8	16.7	106.8	99.8	LIFT NO. CLS		AC	04/29/93	NM,SC	12/17/93
	12	39314N 39708E	6	1,912.2	CC-270	124.9	25.0	99.8	98.9	LIFT NO. CLS		AC	04/29/93	NM,SC	12/17/93
	13	39435N 39837E	6	1,911.6	CC-270	125.9	24.1	101.3	100+	LIFT NO. CLS		AC	04/29/93	NM,SC	12/17/93
	14	39433N 40079E	6	1,909.3	CC-270	117.3	20.0	97.6	96.8	LIFT NO. CLS		AC	04/29/93	NM,SC	12/17/93
	15	38885N 39778E	6	1,914.1	CC-270	127.7	23.5	103.3	100+	LIFT NO. CLS		AC	04/29/93	NM,SC	12/17/93
	16	38884N 40134E	6	1,913.0	CC-270	128.4	21.1	105.9	100+	LIFT NO. CLS		AC	04/29/93	NM	12/17/93
	17	39021N 40224E	6	1,912.6	CC-270	121.0	22.1	99.0	98.2	LIFT NO. CLS		AC	04/29/93	NM	12/17/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-011A	18	39300N 40220E	6	1,911.9	CC-97	124.3	21.6	102.1	98.1	LIFT NO. CLS		AC	04/29/93	NM	12/17/93
	19	38959N 39708E	6	1,913.8	CC-97	123.7	22.0	101.3	97.4	LIFT NO. CLS		AC	04/29/93	NM	12/17/93
	20	39294N 39707E	6	1,912.8	CC-97	126.8	19.3	106.2	100+	LIFT NO. CLS		AC	04/29/93	NM	12/17/93
	21	39442N 39822E	6	1,912.5	CC-270	117.3	21.4	96.5	95.7	LIFT NO. CLS		AC	04/29/93	NM	12/17/93
	22	39439N 40084E	6	1,910.2	CC-270	124.8	20.8	103.2	100+	LIFT NO. CLS		AC	04/29/93	NM	12/17/93
	23	38885N 39971E	6	1,914.2	CC-270	123.7	21.1	102.0	100+	LIFT NO. CLS		AC	04/29/93	NM	12/17/93
	24	39184N 40224E	6	1,913.6	CC-270	127.6	22.4	104.1	100+	LIFT NO. CLS		AC	04/29/93	NM	12/17/93
	25	39188N 39703E	6	1,913.4	CC-270	121.5	24.6	97.4	96.6	LIFT NO. CLS		AC	04/29/93	NM	12/17/93
	26	39443N 39949E	6	1,912.2	CC-270	125.4	21.7	102.9	100+	LIFT NO. CLS		AC	04/29/93	NM	12/17/93
	27	38883N 39784E	6	1,916.5	CC-270	117.9	22.5	96.1	95.3	LIFT NO. CLS		AC	04/29/93	NM	12/17/93
	28	38884N 40067E	6	1,914.7	CC-270	119.8	21.2	98.7	97.8	LIFT NO. CLS		AC	04/29/93	NM	12/17/93
	29	39005N 40229E	6	1,915.0	CC-97	123.1	20.3	102.2	98.2	LIFT NO. CLS		AC	04/29/93	NM	12/17/93
	30	39292N 40226E	6	1,913.4	CC-270	117.6	22.1	96.2	95.4	LIFT NO. CLS		AC	04/29/93	NM	12/17/93
	31	38971N 39702E	6	1,915.4	CC-271	125.8	20.1	104.6	97.8	LIFT NO. CLS		AC	04/29/93	NM	12/17/93
	32	39335N 39702E	6	1,914.5	CC-271	125.9	19.3	105.4	98.5	LIFT NO. CLS		AC	04/29/93	NM	12/17/93
	33	39445N 39809E	6	1,914.0	CC-270	121.7	24.4	97.7	96.9	LIFT NO. CLS		AC	04/29/93	NM	12/17/93
	34	39443N 40070E	6	1,911.4	CC-97	124.1	22.5	101.2	97.3	LIFT NO. CLS		AC	04/29/93	NM	12/17/93

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-011A	35	38878N 39814E	6	1,917.7	CC-97	128.7	21.5	105.8	100+	LIFT NO. CLS		AC	04/29/93	NM	12/17/93
	36	38884N 40119E	6	1,915.0	CC-270	124.4	24.9	99.5	98.6	LIFT NO. CLS		AC	04/29/93	NM	12/17/93
	37	38997N 40231E	6	1,915.3	CC-270	126.8	20.8	104.8	100+	LIFT NO. CLS		AC	04/29/93	NM	12/17/93
	38	39324N 40227E	6	1,914.2	CC-270	125.6	20.6	104.0	100+	LIFT NO. CLS		AC	04/29/93	NM	12/17/93
	39	38993N 39697E	6	1,916.2	CC-270	126.0	21.8	103.3	100+	LIFT NO. CLS		AC	04/29/93	NM	12/17/93
	40	39316N 39696E	6	1,915.6	CC-270	124.3	21.0	102.6	100+	LIFT NO. CLS		AC	04/29/93	NM	12/17/93
	41	39449N 39821E	6	1,914.6	CC-270	119.6	23.1	97.6	96.2	LIFT NO. CLS		AC	04/29/93	NM	12/17/93
	42	39444N 40077E	6	1,912.2	CC-270	123.2	20.3	102.3	100+	LIFT NO. CLS		AC	04/29/93	NM	12/17/93
	43	38879N 39821E	6	1,917.9	CC-270	124.4	21.7	102.1	100+	LIFT NO. CLS		AC	04/29/93	NM	12/17/93
	44	38884N 40133E	6	1,915.3	CC-270	128.0	21.5	105.2	100+	LIFT NO. CLS		AC	04/29/93	NM	12/17/93
	45	39016N 40232E	6	1,916.2	CC-270	125.0	21.3	102.9	100+	LIFT NO. CLS		AC	04/29/93	NM	12/17/93
	46	39318N 40227E	6	1,914.7	CC-270	122.9	22.1	100.5	99.6	LIFT NO. CLS		AC	04/29/93	NM	12/17/93

Count: 46

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-011B	01	38891N 39826E	6	1,912.6	CC-271	129.0	20.8	106.7	99.7	LIFT NO. CLS		MC	04/29/93	NM	12/17/93
	02	38889N 40065E	6	1,911.4	CC-271	127.9	19.6	106.8	99.8	LIFT NO. CLS		MC	04/29/93	NM	12/17/93
	03	39040N 40218E	6	1,911.3	CC-271	127.6	18.3	107.7	100+	LIFT NO. CLS		MC	04/29/93	NM	12/17/93
	04	39302N 40218E	6	1,910.4	CC-271	128.9	21.8	105.7	98.8	LIFT NO. CLS		MC	04/29/93	NM	12/17/93
	05	38941N 39816E	6	1,902.7	CC-271	128.5	21.5	105.6	98.7	LIFT NO. 4TH	ST.55, CLB-CC-300	MC	04/29/93	NM	12/17/93
	06	38939N 39980E	6	1,901.7	CC-271	127.8	21.3	105.2	98.3	LIFT NO. 4TH	ST.56, CLB-CC-301	MC	04/29/93	NM	12/17/93
	07	38944N 40130E	6	1,901.1	CC-271	131.7	19.9	109.7	100+	LIFT NO. 4TH	ST.57, CLB-CC-302	MC	04/29/93	NM	12/17/93
	08	39110N 40144E	6	1,900.1	CC-271	128.5	18.1	108.7	100+	LIFT NO. 4TH	ST.58, CLB-CC-303	MC	04/29/93	NM	12/17/93
	09	39106N 39971E	6	1,901.2	CC-271	123.9	21.6	101.8	95.1	LIFT NO. 4TH	ST.59, CLB-CC-304, PROCTOR	MC	04/29/93	NM	12/17/93
	10	39100N 39797E	6	1,902.2	CC-271	126.2	20.9	104.3	97.5	LIFT NO. 4TH	ST.60, CLB-CC-305	MC	04/29/93	NM	12/17/93
	11	39314N 39778E	6	1,901.1	CC-271	127.8	20.8	105.7	98.7	LIFT NO. 4TH	ST.61, CLB-CC-306	MC	04/29/93	NM	12/17/93
	12	39322N 39939E	6	1,900.1	CC-271	126.4	21.6	103.8	97	LIFT NO. 4TH	ST.62, CLB-CC-307	MC	04/29/93	NM	12/17/93
	13	39333N 40109E	6	1,899.1	CC-271	126.0	22.3	102.9	96.2	LIFT NO. 4TH	ST.63, CLB-CC-308, PROCTOR	MC	04/29/93	NM	12/17/93

Count: 13

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-012A	01	38983N 39696E	6	1,917.1	CC-97	132.5	20.5	109.8	100+	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	02	39364N 39697E	6	1,916.5	CC-97	126.7	22.5	103.3	99.3	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	03	39440N 39842E	6	1,914.8	CC-97	126.6	21.6	104.0	100	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	04	39444N 40103E	6	1,912.9	CC-97	121.8	20.4	101.0	97.1	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	05	39002N 39693E	6	1,917.3	CC-97	128.7	19.0	107.5	100+	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	06	39309N 39693E	6	1,917.0	CC-270	122.4	22.9	99.5	98.6	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	07	39446N 39814E	6	1,916.0	CC-271	124.9	18.2	105.5	98.6	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	08	39442N 40052E	6	1,913.5	CC-270	122.1	24.4	98.0	97.1	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	09	38877N 39768E	6	1,918.7	CC-97	120.6	20.3	100.1	96.2	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	10	38878N 40081E	6	1,916.6	CC-270	122.3	22.7	99.5	98.6	LIFT NO. CLS	SAND CONE	AC	04/30/93	NM,SC	12/17/93
	11	39017N 40223E	6	1,917.1	CC-97	120.1	20.8	99.3	95.5	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	12	39316N 40230E	6	1,915.3	CC-97	127.7	20.4	105.9	100+	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	13	39167N 39690E	6	1,917.7	CC-97	125.9	20.0	104.8	100+	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	14	39452N 39930E	6	1,915.6	CC-97	121.3	20.9	100.2	96.4	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	15	38871N 39959E	6	1,918.1	CC-271	123.1	17.1	105.0	98.1	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	16	39159N 40235E	6	1,917.1	CC-97	127.2	23.2	103.5	99.5	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	17	38983N 39698E	6	1,918.5	CC-271	127.4	19.3	106.7	99.7	LIFT NO. CLS		AC	04/30/93	NM	12/17/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-012A	18	39304N 39692E	6	1,918.1	CC-97	126.3	21.7	103.5	99.5	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	19	39454N 39831E	6	1,917.6	CC-97	125.9	22.2	102.9	98.9	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	20	38867N 39971E	6	1,918.6	CC-97	128.7	20.4	106.9	100+	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	21	39183N 40236E	6	1,917.5	CC-97	125.4	23.5	101.4	97.5	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	22	39113N 39686E	6	1,918.9	CC-97	124.7	22.0	102.1	98.2	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	23	39449N 39963E	6	1,916.4	CC-97	124.9	20.4	103.6	99.6	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	24	38872N 39972E	6	1,919.4	CC-97	125.2	21.1	103.3	99.3	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	25	39040N 40237E	6	1,918.4	CC-97	123.8	21.6	101.7	97.8	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	26	39294N 40235E	6	1,917.3	CC-97	127.2	21.2	104.8	100+	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	27	39052N 39689E	6	1,919.5	CC-97	122.1	19.6	102.0	98.1	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	28	39307N 39686E	6	1,919.7	CC-97	129.3	21.0	106.7	100+	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	29	39454N 39829E	6	1,918.8	CC-97	125.7	20.8	103.9	99.9	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	30	39452N 40087E	6	1,915.9	CC-97	122.1	20.4	101.3	97.4	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	31	38875N 40114E	6	1,919.1	CC-97	126.6	19.6	105.7	100+	LIFT NO. CLS		AC	04/30/93	NM	12/17/93
	32	39105N 40237E	6	1,918.9	CC-97	127.4	18.7	107.2	100+	LIFT NO. CLS		AC	04/30/93	NM	12/17/93

Count: 32

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-0128	01	39450N 40089E	6	1,914.4	CC-108	124.7	23.4	100.9	97.4	LIFT NO. CLS	CC-309, PROCTOR, SAND CONE	MC	04/30/93	NM	12/17/93
	02	39110N 40144E	6	1,900.1	CC-271	125.3	20.4	104.1	97.2	LIFT NO. 4TH	R-ST.58, CLB-CC-310	MC	04/30/93	NM	12/17/93

Count: 2

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-013A	01	37262N 40022E	6	1,908.7	CC-97	120.8	20.3	100.3	96.5	LIFT NO. 1ST		AC	05/03/93	NM	12/17/93
	02	37608N 39787E	6	1,907.9	CC-97	127.7	20.3	106.0	100+	LIFT NO. 1ST		AC	05/03/93	NM	12/17/93
	03	37687N 39847E	6	1,907.5	CC-97	124.7	21.3	102.7	98.8	LIFT NO. 1ST		AC	05/03/93	NM	12/17/93
	04	37726N 40046E	6	1,906.1	CC-97	125.9	21.6	103.4	99.4	LIFT NO. 1ST		AC	05/03/93	NM	12/17/93
	05	37430N 39959E	6	1,908.2	CC-97	129.7	19.6	108.3	100+	LIFT NO. 1ST		AC	05/03/93	NM	12/17/93
	06	37510N 40177E	6	1,906.6	CC-270	118.8	17.1	101.3	100+	LIFT NO. 1ST		AC	05/03/93	NM	12/17/93
	07	37320N 40169E	6	1,907.5	CC-270	119.3	20.6	98.8	97.9	LIFT NO. 1ST		AC	05/03/93	NM	12/17/93
	08	37258N 40240E	6	1,908.1	CC-270	118.4	20.3	98.3	97.4	LIFT NO. 2ND	ST.64, CLB-CC-311, PROCTOR	AC	05/03/93	NM	12/17/93
	09	37392N 40039E	6	1,908.4	CC-270	126.5	22.7	104.0	100+	LIFT NO. 2ND	ST.65, CLB-CC-312	AC	05/03/93	NM	12/17/93
	10	37551N 39820E	6	1,908.7	CC-270	119.0	24.6	95.4	94.6	LIFT NO. 2ND	ST.66, CLB-CC-313	AC	05/03/93	NM	12/17/93
	11	RETEST #8	6	1,908.1	CC-270	129.7	23.2	105.3	100+	LIFT NO. 2ND	R-ST.64, CLB-CC-314	AC	05/03/93	NM	12/17/93

Count: 11

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-014A	01	37462N 40321E	6	1,906.4	CC-270	127.2	21.0	105.0	100+	LIFT NO. 2ND	M.C. FAILS	AC	05/04/93	NM	12/17/93
	02	37615N 40085E	6	1,907.0	CC-270	124.4	18.2	105.1	100+	LIFT NO. 2ND	M.C. FAILS	AC	05/04/93	NM	12/17/93
	03	37769N 39859E	6	1,907.0	CC-270	124.3	18.9	104.4	100+	LIFT NO. 2ND	M.C. FAILS	AC	05/04/93	NM	12/17/93
	04	37610N 40413E	6	1,905.3	CC-270	125.4	20.2	104.2	100+	LIFT NO. 2ND	M.C. FAILS	AC	05/04/93	NM	12/17/93
	05	37734N 40211E	6	1,905.7	CC-270	124.7	20.1	103.7	100+	LIFT NO. 2ND	M.C. FAILS	AC	05/04/93	NM	12/17/93
	06	RETEST #1	6	1,906.4	CC-270	126.0	22.5	102.7	100+	LIFT NO. 2ND	ST.67, CLB-CC-315	AC	05/04/93	NM	12/17/93
	07	RETEST #2	6	1,907.0	CC-270	123.2	22.6	100.4	99.5	LIFT NO. 2ND	ST.68, CLB-CC-316	AC	05/04/93	NM	12/17/93
	08	RETEST #3	6	1,907.0	CC-270	123.1	24.7	98.6	97.7	LIFT NO. 2ND	ST.69, CLB-CC-317	AC	05/04/93	NM	12/17/93
	09	RETEST #4	6	1,905.3	CC-270	122.0	21.2	100.5	99.6	LIFT NO. 2ND	ST.70, CLB-CC-318	AC	05/04/93	NM	12/17/93
	10	RETEST #5	6	1,905.7	CC-270	123.1	22.5	100.4	99.5	LIFT NO. 2ND	ST.71, CLB-CC-319	AC	05/04/93	NM	12/17/93

Count: 10

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-017A	01	37544N 40575E	6	1,904.7	CC-19	128.7	21.1	106.3	98.8	LIFT NO. 2ND		AC	05/07/93	NM	12/17/93
	02	37378N 40482E	6	1,905.5	CC-19	127.8	22.4	104.4	97.0	LIFT NO. 1ST		AC	05/07/93	NM	12/17/93
	03	37200N 40403E	6	1,906.9	CC-19	128.3	19.8	107.1	99.5	LIFT NO. 1ST		AC	05/07/93	NM	12/17/93
	04	37858N 39754E	6	1,907.6	CC-21	119.8	20.9	99.0	97.6	LIFT NO. 1ST		AC	05/07/93	NM	12/17/93
	05	38191N 39755E	6	1,905.2	CC-21	122.9	22.0	100.6	99.3	LIFT NO. 1ST		AC	05/07/93	NM	12/17/93
	06	38582N 39758E	6	1,903.3	CC-21	117.6	22.1	96.4	95.7	LIFT NO. 1ST		AC	05/07/93	NM	12/17/93

Count: 6

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-018A	01	37734N 40211E	6	1,905.7	CC-270	126.9	22.3	103.6	100+	LIFT NO. 2ND	R-ST.71, CLB-CC-320, PROCTOR	AC	05/10/93	NM	12/17/93
	02	37781N 40453E	6	1,903.8	CC-272	124.5	20.5	103.2	100+	LIFT NO. 1ST		AC	05/10/93	NM	12/17/93
	03	37881N 40085E	6	1,905.4	CC-41	121.7	21.8	99.8	98.8	LIFT NO. 1ST		AC	05/10/93	NM	12/17/93
	04	37871N 39964E	6	1,905.8	CC-41	118.6	24.0	95.5	94.6	LIFT NO. 1ST		AC	05/10/93	NM	12/17/93
	05	37865N 40349E	6	1,903.8	CC-41	124.1	22.5	101.2	100+	LIFT NO. 1ST		AC	05/10/93	NM	12/17/93
	06	37864N 40501E	6	1,903.0	CC-40	121.4	17.5	103.2	95.0	LIFT NO. 1ST		AC	05/10/93	NM	12/17/93
	07	38025N 40484E	6	1,902.0	CC-41	127.4	21.9	104.4	100+	LIFT NO. 1ST		AC	05/10/93	NM	12/17/93
	08	38028N 40209E	6	1,903.3	CC-41	119.9	22.1	98.1	97.1	LIFT NO. 1ST		AC	05/10/93	NM	12/17/93
	09	38029N 39894E	6	1,905.2	CC-41	127.4	21.9	104.4	100+	LIFT NO. 1ST		AC	05/10/93	NM	12/17/93
	10	37352N 39977E	6	1,909.4	CC-40	129.1	18.6	108.7	100+	LIFT NO. 3RD		AC	05/10/93	NM	12/17/93
	11	37211N 40351E	6	1,908.0	CC-40	124.3	16.3	106.7	98.3	LIFT NO. 3RD		AC	05/10/93	NM	12/17/93
	12	37347N 40491E	6	1,906.5	CC-40	127.5	16.0	109.8	100+	LIFT NO. 3RD	SAND CONE	AC	05/10/93	NM	12/17/93
	13	37439N 40213E	6	1,907.5	CC-40	125.2	16.4	107.9	99.3	LIFT NO. 3RD		AC	05/10/93	NM	12/17/93
	14	37522N 39944E	6	1,908.4	CC-40	126.9	19.2	106.3	97.9	LIFT NO. 3RD		AC	05/10/93	NM	12/17/93

Count: 14

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-019	01	37440N 40817E	6	1,904.0	CC-40	130.2	17.2	111.0	100+	LIFT NO. SG	CC-321	AC	05/11/93	NM	12/17/93
	02	37199N 40655E	6	1,905.2	CC-40	124.8	16.4	107.1	98.6	LIFT NO. SG	CC-322	AC	05/11/93	NM	12/17/93
	03	37163N 40819E	6	1,904.7	CC-42	123.5	21.8	101.3	100+	LIFT NO. SG	CC-323	AC	05/11/93	NM	12/17/93
	04	37335N 40923E	6	1,903.0	CC-40	126.9	20.6	105.1	96.8	LIFT NO. SG	CC-324	AC	05/11/93	NM	12/17/93
	05	37469N 40658E	6	1,904.0	CC-40	132.8	18.1	112.3	100+	LIFT NO. 3RD		AC	05/11/93	NM	12/17/93
	06	37567N 40392E	6	1,905.9	CC-40	127.8	19.9	106.5	98.1	LIFT NO. 3RD		AC	05/11/93	NM	12/17/93
	07	37653N 40104E	6	1,907.0	CC-40	127.1	19.5	106.2	97.8	LIFT NO. 3RD		AC	05/11/93	NM	12/17/93
	08	37714N 39870E	6	1,907.9	CC-40	128.4	17.7	109.0	100+	LIFT NO. 3RD		AC	05/11/93	NM	12/17/93
	09	37315N 39973E	6	1,909.7	CC-41	120.0	20.1	99.8	98.8	LIFT NO. 4TH	ST.72, CLB-CC-325	AC	05/11/93	NM	12/17/93
	10	37180N 40330E	6	1,908.7	CC-41	128.1	20.7	106.0	100+	LIFT NO. 4TH	ST.73, CLB-CC-326	AC	05/11/93	NM	12/17/93
	11	37334N 40463E	6	1,907.3	CC-41	123.8	23.2	100.4	99.4	LIFT NO. 4TH	ST.74, CLB-CC-327	AC	05/11/93	NM	12/17/93
	12	37387N 40190E	6	1,908.4	CC-41	122.3	20.3	101.5	100+	LIFT NO. 4TH	ST.75, CLB-CC-328	AC	05/11/93	NM	12/17/93
	13	37422N 39979E	6	1,909.3	CC-97	127.5	19.7	106.4	100+	LIFT NO. 4TH	ST.76, CLB-CC-329	AC	05/11/93	NM	12/17/93

Count: 13

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-020A	01	37622N 39849E	6	1,908.9	CC-41	125.1	21.3	103.0	100+	LIFT NO. CLS	ST.77, CC-330, PROCTOR	AC	05/12/93	NM	12/16/93
	02	37573N 40097E	6	1,908.2	CC-41	124.9	22.8	101.6	100+	LIFT NO. CLS	ST.78, CC-331	AC	05/12/93	NM	12/16/93
	03	37526N 40337E	6	1,907.0	CC-41	127.9	22.8	104.0	100+	LIFT NO. CLS	ST.79, CC-332	AC	05/12/93	NM	12/16/93
	04	37483N 40538E	6	1,906.4	CC-41	122.7	23.7	99.1	98.1	LIFT NO. CLS	ST.80, CC-333	AC	05/12/93	NM	12/16/93
	05	37450N 40693E	6	1,905.7	CC-41	124.3	23.4	100.6	100+	LIFT NO. CLS		AC	05/12/93	NM	12/16/93
	06	37801N 39793E	6	1,908.4	CC-97	125.5	21.2	103.4	99.4	LIFT NO. CLS	ST.81, CC-334	AC	05/12/93	NM	12/16/93
	07	37748N 40044E	6	1,907.5	CC-97	128.2	21.0	105.8	100+	LIFT NO. CLS	ST.82, CC-335	AC	05/12/93	NM	12/16/93
	08	37694N 40314E	6	1,906.4	CC-97	124.1	20.9	102.5	98.6	LIFT NO. CLS	ST.83, CC-336, PROCTOR	AC	05/12/93	NM	12/16/93
	09	37627N 40616E	6	1,905.1	CC-97	123.5	23.1	100.2	96.3	LIFT NO. CLS	ST.84, CC-337	AC	05/12/93	NM	12/16/93

Count: 9

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-025A	01	38688N 41515E	6	1,896.1	CC-265	135.7	17.8	115.2	100+	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	02	38494N 41514E	6	1,895.4	CC-265	138.0	16.5	118.5	100+	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	03	38299N 41521E	6	1,896.3	CC-265	135.9	16.6	116.6	100+	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	04	38094N 41516E	6	1,897.4	CC-265	132.1	18.4	112.1	100+	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	05	38766N 41363E	6	1,896.2	CC-265	132.7	18.5	112.0	100+	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	06	38759N 41174E	6	1,896.9	CC-265	129.5	17.7	110.0	98.7	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	07	38764N 40970E	6	1,897.1	CC-265	130.9	18.3	110.7	99.2	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	08	38763N 40762E	6	1,898.8	CC-265	130.8	17.6	111.2	99.8	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	09	38617N 41516E	6	1,895.8	CC-265	129.3	19.7	108.0	96.9	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	10	38407N 41512E	6	1,896.7	CC-265	132.3	17.8	112.3	100+	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	11	38203N 41517E	6	1,897.2	CC-265	128.9	17.0	110.2	98.8	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	12	38006N 41522E	6	1,898.6	CC-265	126.2	18.3	106.7	95.7	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	13	37801N 41519E	6	1,900.0	CC-265	124.9	17.3	106.5	95.5	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	14	38751N 41354E	6	1,896.6	CC-265	128.0	20.4	106.2	95.2	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	15	38749N 41175E	6	1,897.0	CC-265	130.7	21.3	107.6	96.5	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	16	38753N 40984E	6	1,897.8	CC-265	131.8	18.1	111.5	100	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	17	38755N 40773E	6	1,899.3	CC-265	133.9	16.1	115.2	100+	LIFT NO. CLS		AC	05/19/93	NM	12/16/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-025A	18	38760N 40575E	6	1,900.3	CC-265	128.0	20.3	106.3	95.3	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	19	38760N 40378E	6	1,900.9	CC-265	133.1	19.1	111.6	100+	LIFT NO. CLS	ST.86, CC-343	AC	05/19/93	NM	12/16/93
	20	38768N 39982E	6	1,902.4	CC-265	133.0	18.9	111.7	100+	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	21	38776N 39783E	6	1,904.5	CC-265	132.0	19.1	110.7	99.3	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	22	38684N 39731E	6	1,905.4	CC-265	132.5	18.2	112.0	100+	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	23	38515N 39731E	6	1,905.7	CC-265	126.1	18.9	105.9	95.0	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	24	38700N 41517E	6	1,897.5	CC-265	132.3	17.2	114.7	100+	LIFT NO. CLS	ST.87, CC-344	AC	05/19/93	NM	12/16/93
	25	38506N 41521E	6	1,896.9	CC-265	133.1	19.0	112.7	100+	LIFT NO. CLS	ST.88, CC-345	AC	05/19/93	NM	12/16/93
	26	38305N 41526E	6	1,897.8	CC-265	133.5	18.1	113.9	100+	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	27	38113N 41528E	6	1,898.7	CC-265	129.3	17.5	110.9	99.5	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	28	37914N 41532E	6	1,900.4	CC-265	127.6	17.2	109.7	98.4	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	29	38760N 40676E	6	1,900.5	CC-265	131.7	18.7	111.8	100+	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	30	38762N 40467E	6	1,901.1	CC-265	131.0	17.8	112.0	100+	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	31	38767N 40274E	6	1,902.0	CC-265	132.9	17.0	114.4	100+	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	32	38774N 40077E	6	1,902.1	CC-265	131.1	17.3	112.6	100+	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	33	38779N 39867E	6	1,904.1	CC-265	130.9	19.0	110.8	99.4	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	34	38769N 39738E	6	1,905.7	CC-265	130.5	18.6	110.8	99.4	LIFT NO. CLS		AC	05/19/93	NM	12/16/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-025A	35	38580N 39729E	6	1,906.4	CC-265	127.7	20.1	107.1	96.0	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	36	38704N 41520E	6	1,898.9	CC-265	133.8	18.7	113.5	100+	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	37	38507N 41522E	6	1,897.9	CC-265	135.4	19.5	114.1	100+	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	38	38304N 41528E	6	1,898.6	CC-265	131.2	19.4	110.7	99.2	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	39	38752N 41395E	6	1,896.8	CC-265	132.4	18.1	112.9	100+	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	40	38753N 41224E	6	1,897.7	CC-265	132.0	18.5	112.2	100+	LIFT NO. CLS		AC	05/19/93	NM	12/16/93
	41	38754N 41062E	6	1,899.0	CC-265	132.1	19.5	111.3	99.8	LIFT NO. CLS		AC	05/19/93	NM	12/16/93

Count: 41

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-025B	01	37897N 41517E	6	1,898.8	CC-265	127.3	19.8	106.1	95.2	LIFT NO. CLS		MC	05/19/93	NM	12/16/93
	02	37596N 41380E	6	1,900.7	CC-249	127.8	14.9	111.1	97.6	LIFT NO. CLS		MC	05/19/93	NM	12/16/93
	03	37444N 41257E	6	1,902.7	CC-265	124.1	19.2	104.0	93.2	LIFT NO. CLS		MC	05/19/93	NM	12/16/93
	04	37296N 41126E	6	1,904.1	CC-265	126.5	17.1	107.9	96.8	LIFT NO. CLS		MC	05/19/93	NM	12/16/93
	05	37164N 40995E	6	1,904.9	CC-265	125.2	16.9	107.0	96	LIFT NO. CLS		MC	05/19/93	NM	12/16/93
	06	38759N 40566E	6	1,899.7	CC-265	127.5	17.4	108.5	97.3	LIFT NO. CLS		MC	05/19/93	NM	12/16/93
	07	38760N 40378E	6	1,900.2	CC-265	126.8	17.2	108.1	96.9	LIFT NO. CLS		MC	05/19/93	NM	12/16/93
	08	38764N 40176E	6	1,900.6	CC-265	125.9	18.4	106.2	95.2	LIFT NO. CLS		MC	05/19/93	NM	12/16/93
	09	38767N 39978E	6	1,901.9	CC-265	126.5	18.9	106.3	95.3	LIFT NO. CLS		MC	05/19/93	NM	12/16/93
	10	38781N 39777E	6	1,903.9	CC-265	126.9	20.0	106.0	95	LIFT NO. CLS		MC	05/19/93	NM	12/16/93
	11	38677N 39736E	6	1,904.8	CC-265	128.3	17.3	109.2	97.9	LIFT NO. CLS	CLS-CC-341, PROCTOR	MC	05/19/93	NM	12/16/93
	12	38521N 39738E	6	1,904.8	CC-265	126.9	20.7	105.8	95	LIFT NO. CLS		MC	05/19/93	NM	12/16/93
	13	37532N 41334E	6	1,902.3	CC-265	121.0	24.2	97.3	87.2	LIFT NO. CLS	MC - FAILS	MC	05/19/93	NM	12/16/93
	14	37373N 41189E	6	1,903.6	CC-265	119.8	24.4	96.2	86.3	LIFT NO. CLS	MC - FAILS	MC	05/19/93	NM	12/16/93
	15	37225N 41055E	6	1,905.3	CC-265	121.3	24.4	97.4	87.3	LIFT NO. CLS	MC - FAILS	MC	05/19/93	NM	12/16/93
	16	38765N 40182E	6	1,901.3	CC-265	126.2	19.0	105.9	95	LIFT NO. CLS	ST.85, CC-342	MC	05/19/93	NM	12/16/93
	17	37741N 41508E	6	1,901.6	CC-265	128.4	17.2	109.4	98.2	LIFT NO. CLS		MC	05/19/93	NM	12/16/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-025B	18	38752N 41375E	6	1,896.2	CC-265	127.2	16.8	108.8	97.5	LIFT NO. CLS		MC	05/19/93	NM	12/16/93
	19	38746N 41219E	6	1,897.2	CC-265	124.7	17.4	106.1	95.2	LIFT NO. CLS		MC	05/19/93	NM	12/16/93
	20	38753N 41072E	6	1,898.5	CC-265	126.6	20.8	106.0	95.1	LIFT NO. CLS	ST.89, CC-346	MC	05/19/93	NM	12/16/93
	21	38760N 40876E	6	1,899.0	CC-265	126.5	19.4	105.8	95	LIFT NO. CLS	ST.90, CC-347	MC	05/19/93	NM	12/16/93
	22	38107N 41531E	6	1,899.7	CC-265	126.6	18.1	107.1	96	LIFT NO. CLS	ST.91, CC-348	MC	05/19/93	NM	12/16/93
	23	37907N 41535E	6	1,901.5	CC-265	126.3	20.0	106.0	95.1	LIFT NO. CLS		MC	05/19/93	NM	12/16/93
	24	37732N 41503E	6	1,902.5	CC-265	126.5	19.4	105.9	95	LIFT NO. CLS		MC	05/19/93	NM	12/16/93
	25	38760N 40871E	6	1,900.1	CC-265	126.4	18.7	106.0	95.1	LIFT NO. CLS		MC	05/19/93	NM	12/16/93
	26	38765N 40674E	6	1,901.5	CC-265	126.8	19.0	106.4	95.4	LIFT NO. CLS		MC	05/19/93	NM	12/16/93
	27	38768N 40475E	6	1,902.6	CC-265	126.2	19.4	105.9	95	LIFT NO. CLS		MC	05/19/93	NM	12/16/93

Count: 27

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-026A	01	38770N 40273E	6	1,902.7	CC-249	136.4	15.9	118.6	100+	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	02	38776N 40077E	6	1,903.7	CC-265	133.5	16.8	115.1	100+	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	03	38778N 39873E	6	1,904.4	CC-265	132.3	17.7	113.2	100+	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	04	38606N 41526E	6	1,899.0	CC-265	131.9	19.3	111.4	99.9	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	05	38402N 41530E	6	1,900.0	CC-265	126.6	18.4	107.7	96.6	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	06	38203N 41533E	6	1,900.9	CC-265	126.4	20.1	106.0	95.0	LIFT NO. CLS	ST.93, CC-350	AC	05/20/93	NM	12/16/93
	07	38006N 41537E	6	1,902.3	CC-265	132.3	16.8	114.1	100+	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	08	37798N 41529E	6	1,903.0	CC-265	129.4	18.7	109.8	98.5	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	09	38768N 40769E	6	1,901.6	CC-265	130.9	17.8	111.9	100+	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	10	38767N 40568E	6	1,902.6	CC-265	126.6	18.4	107.7	96.6	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	11	38776N 40366E	6	1,903.8	CC-265	132.2	19.7	111.2	99.8	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	12	38779N 40171E	6	1,903.7	CC-265	130.6	19.9	109.7	98.4	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	13	38779N 39776E	6	1,906.4	CC-265	129.6	21.6	107.3	96.3	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	14	38677N 39730E	6	1,906.9	CC-265	130.2	20.9	108.5	97.3	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	15	38851N 39728E	6	1,908.4	CC-265	131.7	21.7	108.2	97.1	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	16	RETEST 12, RPT. 93-25B	6	1,904.8	CC-265	129.8	19.2	109.7	98.4	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	17	RETEST 13, RPT. 93-25B	6	1,902.3	CC-265	127.2	19.6	106.2	95.2	LIFT NO. CLS		AC	05/20/93	NM	12/16/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-026A	18	RETEST 14, RPT. 93-25B	6	1,903.6	CC-265	129.3	18.1	110.3	99.0	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	19	RETEST 15, RPT. 93-25B	6	1,905.3	CC-265	129.5	18.8	109.8	98.4	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	20	38599N 41529E	6	1,900.0	CC-265	133.2	18.5	113.2	100+	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	21	38403N 41534E	6	1,901.1	CC-265	134.9	19.2	114.0	100+	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	22	38202N 41538E	6	1,901.9	CC-265	128.7	19.9	108.1	97.0	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	23	38007N 41538E	6	1,903.0	CC-265	126.0	18.7	106.9	95.8	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	24	37791N 41528E	6	1,903.7	CC-265	132.1	18.1	112.7	100+	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	25	38768N 41412E	6	1,898.9	CC-265	132.8	19.2	111.3	99.9	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	26	38765N 41265E	6	1,899.1	CC-265	128.6	19.5	108.4	97.2	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	27	38768N 41072E	6	1,899.9	CC-265	130.4	21.4	107.3	96.3	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	28	38770N 40872E	6	1,900.5	CC-265	134.3	18.0	114.7	100+	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	29	37636N 41428E	6	1,902.7	CC-265	132.6	19.5	111.8	100+	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	30	37517N 41323E	6	1,903.1	CC-265	128.6	21.5	105.8	94.9	LIFT NO. CLS	ST.95, CC-355, PROCTOR	AC	05/20/93	NM	12/16/93
	31	37364N 41191E	6	1,905.0	CC-265	129.0	21.6	106.0	95.1	LIFT NO. CLS	ST.95, CC-356	AC	05/20/93	NM	12/16/93
	32	37213N 41054E	6	1,906.7	CC-265	130.0	20.4	108.8	97.5	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	33	37133N 40959E	6	1,908.2	CC-265	131.0	20.4	109.6	98.3	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	34	38765N 41367E	6	1,899.2	CC-265	130.1	21.2	108.1	96.9	LIFT NO. CLS		AC	05/20/93	NM	12/16/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-026A	35	38768N 41169E	6	1,900.2	CC-265	133.4	19.2	112.7	100+	LIFT NO. CLS	ST.96, CC-357	AC	05/20/93	NM	12/16/93
	36	38769N 40975E	6	1,901.4	CC-265	133.5	18.7	113.3	100+	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	37	38769N 40771E	6	1,902.7	CC-265	131.7	19.1	110.6	99.2	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	38	38772N 40566E	6	1,904.5	CC-265	131.4	18.6	111.4	99.9	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	39	38778N 40373E	6	1,904.7	CC-265	135.3	18.0	115.5	100+	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	40	38780N 40166E	6	1,904.8	CC-265	132.2	19.6	111.3	99.8	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	41	38783N 39969E	6	1,905.9	CC-265	134.2	17.9	114.7	100+	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	42	38699N 41529E	6	1,902.8	CC-265	128.4	18.2	109.4	98.1	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	43	38506N 41537E	6	1,901.9	CC-265	133.5	17.5	114.5	100+	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	44	38302N 41542E	6	1,902.8	CC-265	129.8	18.5	110.3	98.9	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	45	38104N 41544E	6	1,904.0	CC-265	126.8	18.3	108.0	96.8	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	46	38768N 41369E	6	1,899.8	CC-265	131.4	19.1	111.1	99.6	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	47	38770N 41169E	6	1,900.9	CC-265	134.1	18.3	114.2	100+	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	48	38770N 40977E	6	1,901.9	CC-265	132.5	19.1	112.1	100+	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	49	38771N 40771E	6	1,903.0	CC-265	133.6	18.8	113.3	100+	LIFT NO. CLS		AC	05/20/93	NM	12/16/93
	50	38774N 40563E	6	1,905.4	CC-265	129.5	17.8	110.7	99.3	LIFT NO. CLS		AC	05/20/93	NM	12/16/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-026B	01	38737N 39730E	6	1,906.4	CC-265	130.6	18.2	110.4	99	LIFT NO. CLS	ST.92, CC-349	MC	05/20/93	NM	12/16/93
	02	38489N 39732E	6	1,906.9	CC-265	126.2	18.1	106.8	95.8	LIFT NO. CLS		MC	05/20/93	NM	12/16/93
	03	38764N 41364E	6	1,897.8	CC-265	130.7	16.5	112.1	100+	LIFT NO. CLS	CC-351, PROCTOR	MC	05/20/93	NM	12/16/93
	04	38763N 41171E	6	1,899.0	CC-265	129.1	20.3	107.2	96.2	LIFT NO. CLS	SAND CONE	MC	05/20/93	NM	12/16/93
	05	38766N 40971E	6	1,900.2	CC-265	130.7	18.7	110.0	98.6	LIFT NO. CLS		MC	05/20/93	NM	12/16/93
	06	38782N 39976E	6	1,904.9	CC-265	130.8	19.1	109.7	98.4	LIFT NO. CLS	ST.94, CC-352	MC	05/20/93	NM	12/16/93
	07	38700N 41517E	6	1,897.5	CC-265	128.7	19.0	108.2	97	LIFT NO. CLS	R-ST.87, CC-353	MC	05/20/93	NM	12/16/93
	08	38773N 40672E	6	1,903.0	CC-265	131.5	17.8	111.5	100	LIFT NO. CLS		MC	05/20/93	NM	12/16/93
	09	38768N 40464E	6	1,900.9	CC-265	129.1	16.1	111.1	99.7	LIFT NO. CLS	R-ST.86, CC-354	MC	05/20/93	NM	12/16/93
	10	38597N 41532E	6	1,901.0	CC-265	131.7	18.6	110.9	99.4	LIFT NO. CLS		MC	05/20/93	NM	12/16/93
	11	38405N 41538E	6	1,901.7	CC-249	126.4	16.4	108.5	95.3	LIFT NO. CLS		MC	05/20/93	NM	12/16/93
	12	38199N 41541E	6	1,902.6	CC-265	127.2	20.4	105.6	95	LIFT NO. CLS		MC	05/20/93	NM	12/16/93
	13	38002N 41541E	6	1,903.8	CC-265	126.5	19.9	105.9	95.1	LIFT NO. CLS		MC	05/20/93	NM	12/16/93
	14	37797N 41534E	6	1,905.0	CC-265	128.6	18.7	108.2	97.1	LIFT NO. CLS		MC	05/20/93	NM	12/16/93
	15	38782N 39775E	6	1,907.5	CC-265	131.9	17.0	112.6	100+	LIFT NO. CLS		MC	05/20/93	NM	12/16/93
	16	38683N 39729E	6	1,908.7	CC-265	128.7	17.1	109.8	98.4	LIFT NO. CLS		MC	05/20/93	NM	12/16/93
	17	39723N 38485E	6	1,909.4	CC-265	125.7	18.7	105.8	95	LIFT NO. CLS		MC	05/20/93	NM	12/16/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-026B	18	37902N 41543E	6	1,905.5	CC-265	126.8	19.6	106.0	95.1	LIFT NO. CLS		MC	05/20/93	NM	12/16/93
	19	37734N 41519E	6	1,905.7	CC-265	126.7	17.8	107.4	96.4	LIFT NO. CLS		MC	05/20/93	NM	12/16/93
	20	37593N 41392E	6	1,902.9	CC-249	134.2	17.3	114.3	100+	LIFT NO. CLS	MATERIAL REMOVED-GRAVEL	MC	05/20/93	NM	12/16/93
	21	37439N 41265E	6	1,905.0	CC-249	130.7	16.3	112.2	98.6	LIFT NO. CLS	MATERIAL REMOVED-GRAVEL	MC	05/20/93	NM	12/16/93
	22	37290N 41129E	6	1,906.3	CC-249	129.6	16.9	110.7	97.3	LIFT NO. CLS	MATERIAL REMOVED-GRAVEL	MC	05/20/93	NM	12/16/93
	23	37165N 41033E	6	1,907.8	CC-249				N/A	LIFT NO. CLS	MATERIAL REMOVED-GRAVEL	MC	05/20/93	NM	12/16/93
	24	RETEST OF #3, RPT. 93-025B	6	1,902.7	CC-265	127.0	19.3	106.4	95.4	LIFT NO. CLS		MC	05/20/93	NM	12/16/93

Count: 24

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-027A	01	38777N 40370E	6	1,905.3	CC-265	133.0	18.4	113.2	100+	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	02	38779N 40179E	6	1,905.8	CC-265	134.2	18.3	114.3	100+	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	03	38789N 39970E	6	1,906.8	CC-265	133.2	19.5	112.3	100+	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	04	38787N 39777E	6	1,908.4	CC-265	127.6	15.9	110.9	99.5	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	05	38684N 39724E	6	1,909.7	CC-265	127.7	20.2	107.0	96.0	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	06	38497N 39725E	6	1,909.6	CC-265	128.1	15.4	111.8	100+	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	07	37595N 41397E	6	1,904.8	CC-265	128.8	17.3	109.7	98.3	LIFT NO. CLS	ST.97, CC-358	AC	05/21/93	NM	12/15/93
	08	37436N 41265E	6	1,906.3	CC-265	131.6	16.4	112.9	100+	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	09	37291N 41132E	6	1,907.5	CC-265	130.8	19.4	109.4	98.1	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	10	37153N 40997E	6	1,909.5	CC-265	130.0	17.3	110.7	99.3	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	11	38787N 41456E	6	1,903.0	CC-265	127.5	18.9	107.1	96.1	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	12	38769N 41274E	6	1,900.9	CC-265	131.3	17.0	112.1	100+	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	13	38773N 41068E	6	1,902.1	CC-265	132.3	15.8	114.1	100+	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	14	38776N 40867E	6	1,902.7	CC-265	132.6	17.7	112.5	100+	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	15	38775N 40668E	6	1,904.3	CC-265	129.8	16.9	110.9	99.5	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	16	38778N 40468E	6	1,906.4	CC-265	127.4	15.7	110.0	98.7	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	17	38783N 40279E	6	1,905.6	CC-265	132.2	17.4	112.5	100+	LIFT NO. CLS		AC	05/21/93	NM	12/15/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-027A	18	38789N 40077E	6	1,906.5	CC-265	130.7	17.8	110.8	99.3	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	19	38792N 39874E	6	1,908.1	CC-265	132.1	17.2	112.6	100+	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	20	38767N 39730E	6	1,909.7	CC-265	132.0	17.2	112.5	100+	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	21	38587N 39725E	6	1,910.1	CC-265	124.9	14.6	108.9	97.7	LIFT NO. CLS	ST.98, CC-359	AC	05/21/93	NM	12/15/93
	22	37634N 41436E	6	1,906.2	CC-265	131.4	16.5	112.7	100+	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	23	37514N 41334E	6	1,906.1	CC-265	127.3	19.4	106.6	95.6	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	24	37364N 41198E	6	1,907.5	CC-265	127.9	18.7	107.6	96.5	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	25	37215N 41064E	6	1,909.5	CC-265	128.9	18.4	108.7	97.5	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	26	37129N 40696E	6	1,912.0	CC-265	129.4	18.1	109.4	98.1	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	27	38772N 41376E	6	1,901.3	CC-265	132.7	18.6	111.8	100+	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	28	38773N 41174E	6	1,902.4	CC-265	132.0	17.7	112.0	100+	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	29	38776N 40974E	6	1,902.8	CC-265	127.8	18.9	107.4	96.3	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	30	38779N 40772E	6	1,903.9	CC-265	128.8	16.1	110.8	99.3	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	31	38796N 39777E	6	1,910.0	CC-265	132.2	17.1	112.8	100+	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	32	38686N 39720E	6	1,911.0	CC-265	129.9	17.1	110.8	99.4	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	33	38487N 39723E	6	1,910.4	CC-265	129.9	18.0	110.0	98.6	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	34	38687N 41542E	6	1,906.9	CC-265	132.5	18.7	112.4	100+	LIFT NO. CLS		AC	05/21/93	NM	12/15/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-027A	35	38508N 41547E	6	1,906.9	CC-265	129.3	19.2	109.3	98.0	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	36	38305N 41551E	6	1,907.2	CC-265	130.2	19.1	109.2	98.0	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	37	38103N 41551E	6	1,907.6	CC-265	130.9	19.2	110.6	99.2	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	38	37901N 41555E	6	1,909.2	CC-265	132.3	19.3	111.7	100+	LIFT NO. CLS		AC	05/21/93	NM	12/15/93
	39	37731N 41522E	6	1,908.2	CC-265	134.3	19.0	114.7	100+	LIFT NO. CLS		AC	05/21/93	NM	12/15/93

Count: 39

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-027B	01	38699N 41539E	6	1,904.4	CC-265	125.8	21.0	103.8	93.1	LIFT NO. CLS	FAILED - DENSITY	MC	05/21/93	NM	12/15/93
	02	38499N 41540E	6	1,903.1	CC-265	120.9	22.2	98.8	88.6	LIFT NO. CLS	FAILED - DENSITY	MC	05/21/93	NM	12/15/93
	03	38304N 41544E	6	1,903.8	CC-265	124.7	19.3	104.4	93.6	LIFT NO. CLS	FAILED - DENSITY	MC	05/21/93	NM	12/15/93
	04	38103N 41545E	6	1,904.5	CC-265	123.5	17.8	104.7	93.9	LIFT NO. CLS	FAILED - DENSITY	MC	05/21/93	NM	12/15/93
	05	37899N 41550E	6	1,906.8	CC-265	122.8	18.8	103.2	92.6	LIFT NO. CLS	FAILED - DENSITY	MC	05/21/93	NM	12/15/93
	06	37727N 41519E	6	1,906.3	CC-265	123.7	24.4	99.3	89.1	LIFT NO. CLS	FAILED - DENSITY	MC	05/21/93	NM	12/15/93
	07	RETEST OF #1	6	1,904.4	CC-265	127.4	20.4	105.7	95	LIFT NO. CLS		MC	05/21/93	NM	12/15/93
	08	RETEST OF #2	6	1,903.1	CC-265	126.0	20.3	106.0	95.1	LIFT NO. CLS		MC	05/21/93	NM	12/15/93
	09	RETEST OF #3	6	1,903.8	CC-265	122.7	19.3	100.0	90	LIFT NO. CLS	FAILED - DENSITY	MC	05/21/93	NM	12/15/93
	10	RETEST OF #3 & 9	6	1,903.8	CC-265	126.0	19.0	105.9	95	LIFT NO. CLS		MC	05/21/93	NM	12/15/93
	11	RETEST OF #4	6	1,904.5	CC-265	125.7	19.0	105.5	94.6	LIFT NO. CLS		MC	05/21/93	NM	12/15/93
	12	RETEST OF #5	6	1,906.8	CC-265	117.0	13.4	103.2	92.5	LIFT NO. CLS	FAILED DENSITY	MC	05/21/93	NM	12/15/93
	13	RETEST OF #5 & 12	6	1,906.8	CC-265	129.4	18.4	109.2	98	LIFT NO. CLS		MC	05/21/93	NM	12/15/93
	14	RETEST OF #6	6	1,906.3	CC-265	127.4	19.9	106.1	95.2	LIFT NO. CLS		MC	05/21/93	NM	12/15/93
	15	38608N 41541E	6	1,905.4	CC-265	127.3	21.1	105.0	94.8	LIFT NO. CLS	SAND CONE	MC	05/21/93	NM	12/15/93
	16	38401N 41544E	6	1,905.8	CC-265	128.8	19.9	107.3	96.2	LIFT NO. CLS		MC	05/21/93	NM	12/15/93
	17	38206N 41547E	6	1,906.5	CC-265	127.1	19.1	106.6	95.6	LIFT NO. CLS		MC	05/21/93	NM	12/15/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-027B	18	38000N 41544E	6	1,907.3	CC-249	128.2	16.6	109.8	96.5	LIFT NO. CLS		MC	05/21/93	NM	12/15/93
	19	37804N 41540E	6	1,908.1	CC-249	128.5	16.5	110.2	96.8	LIFT NO. CLS		MC	05/21/93	NM	12/15/93
	20	38781N 40561E	6	1,906.2	CC-265	129.4	16.3	111.6	100	LIFT NO. CLS	ST.99, CC-360	MC	05/21/93	NM	12/15/93
	21	38787N 40372E	6	1,906.7	CC-249	128.6	16.2	110.7	97.3	LIFT NO. CLS		MC	05/21/93	NM	12/15/93
	22	38789N 40170E	6	1,906.8	CC-249	130.2	16.2	112.1	98.5	LIFT NO. CLS		MC	05/21/93	NM	12/15/93
	23	38791N 39971E	6	1,907.7	CC-249	126.6	16.5	108.5	95.3	LIFT NO. CLS		MC	05/21/93	NM	12/15/93
	24	37589N 41394E	6	1,906.6	CC-265	126.9	21.3	106.0	95.1	LIFT NO. CLS		MC	05/21/93	NM	12/15/93
	25	37437N 41267E	6	1,907.6	CC-249	130.1	18.1	110.0	96.6	LIFT NO. CLS		MC	05/21/93	NM	12/15/93
	26	37289N 41131E	6	1,909.2	CC-265	127.9	20.4	106.1	95.1	LIFT NO. CLS		MC	05/21/93	NM	12/15/93
	27	37150N 40994E	6	1,911.4	CC-265	129.6	20.3	107.6	96.5	LIFT NO. CLS		MC	05/21/93	NM	12/15/93

Count: 27

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-028A	01	38761N 41374E	6	1,902.4	CC-265	133.5	18.8	113.2	100+	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	02	38774N 41170E	6	1,903.2	CC-265	130.1	20.2	109.0	97.7	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	03	38770N 40965E	6	1,903.8	CC-265	132.0	18.2	112.5	100+	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	04	38773N 40766E	6	1,904.9	CC-265	130.5	19.6	109.9	98.6	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	05	38780N 40567E	6	1,906.9	CC-262	131.1	17.8	111.2	98.0	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	06	38786N 40378E	6	1,907.3	CC-265	134.0	18.2	114.2	100+	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	07	38791N 40181E	6	1,908.2	CC-265	129.0	20.2	108.1	97.0	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	08	38795N 39968E	6	1,908.9	CC-265	129.2	21.4	107.2	96.1	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	09	38797N 39773E	6	1,910.6	CC-265	130.0	20.3	108.8	97.6	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	10	38683N 39710E	6	1,911.7	CC-265	134.9	20.0	113.2	100+	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	11	38493N 39720E	6	1,910.6	CC-262	132.2	19.0	112.0	98.7	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	12	38788N 41471E	6	1,905.1	CC-262	129.6	20.0	107.9	96.8	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	13	38777N 41271E	6	1,903.5	CC-262	133.3	15.7	115.1	100+	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	14	38778N 41078E	6	1,904.4	CC-262	131.5	17.2	112.1	100+	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	15	38776N 40869E	6	1,904.9	CC-262	133.7	18.0	113.2	100+	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	16	38794N 39877E	6	1,910.3	CC-265	129.8	21.4	106.8	95.8	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	17	38774N 39721E	6	1,912.1	CC-265	130.2	18.2	110.0	98.7	LIFT NO. CLS		AC	05/24/93	NM	12/15/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-028A	18	39577N 39713E	6	1,912.3	CC-262	125.4	20.5	103.9	96.8	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	19	38603N 41547E	6	1,907.1	CC-262	125.4	21.4	103.2	96.2	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	20	38401N 41542E	6	1,907.2	CC-292	126.8	19.9	105.6	96.4	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	21	38205N 41546E	6	1,908.1	CC-292	127.5	21.5	104.8	95.7	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	22	38002N 41552E	6	1,909.4	CC-292	126.8	20.7	104.9	95.8	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	23	37804N 41545E	6	1,909.8	CC-262	130.3	17.2	111.0	97.8	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	24	38784N 40472E	6	1,908.6	CC-292	129.6	20.2	107.7	98.3	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	25	38786N 40271E	6	1,908.6	CC-292	127.9	20.9	105.7	96.5	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	26	38793N 40070E	6	1,910.1	CC-292	126.8	20.7	104.9	95.8	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	27	38797N 39873E	6	1,911.2	CC-292	126.4	21.0	104.3	95.2	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	28	38773N 39720E	6	1,912.9	CC-292	129.0	19.4	107.9	98.5	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	29	38373N 39714E	6	1,912.9	CC-292	126.7	19.0	106.3	97.1	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	30	38600N 31545E	6	1,908.7	CC-292	127.8	20.4	106.0	96.8	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	31	38402N 41548E	6	1,908.0	CC-292	126.7	19.6	105.8	96.6	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	32	38201N 41553E	6	1,909.1	CC-292	128.7	18.7	108.3	98.9	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	33	38002N 41555E	6	1,910.5	CC-292	127.0	20.5	105.3	96.1	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	34	37805N 41550E	6	1,910.9	CC-292	127.3	19.7	106.2	97.0	LIFT NO. CLS		AC	05/24/93	NM	12/15/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-028A	35	38781N 40871E	6	1,905.7	CC-292	128.5	21.5	105.6	96.5	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	36	38784N 40671E	6	1,908.2	CC-292	125.7	20.3	104.5	95.4	LIFT NO. CLS		AC	05/24/93	NM	12/15/93
	37	38783N 40469E	6	1,909.3	CC-292	129.6	20.1	107.8	98.4	LIFT NO. CLS		AC	05/24/93	NM	12/15/93

Count: 37

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-028B	01	38776N 40679E	6	1,906.4	CC-249	131.6	15.5	113.8	100	LIFT NO. CLS		MC	05/24/93	NM	12/15/93
	02	38783N 40474E	6	1,908.1	CC-265	128.0	21.3	105.4	94.5	LIFT NO. CLS	SAND CONE, PROCTOR	MC	05/24/93	NM	12/15/93
	03	RETEST OF #2	6	1,908.1	CC-292	127.9	21.0	105.6	96.4	LIFT NO. CLS	ST.100, CC-361	MC	05/24/93	NM	12/15/93
	04	38785N 40273E	6	1,908.0	CC-292	128.6	17.6	109.2	99.7	LIFT NO. CLS		MC	05/24/93	NM	12/15/93
	05	38790N 40080E	6	1,909.3	CC-292	128.9	21.1	106.3	97.1	LIFT NO. CLS		MC	05/24/93	NM	12/15/93
	06	38784N 41471E	6	1,905.2	CC-292	128.3	20.7	106.2	97	LIFT NO. CLS	ST.101, CC-362	MC	05/24/93	NM	12/15/93
	07	38776N 41267E	6	1,904.2	CC-292	129.3	18.6	108.9	99.5	LIFT NO. CLS		MC	05/24/93	NM	12/15/93
	08	38778N 41071E	6	1,904.8	CC-292	129.1	21.9	105.8	96.6	LIFT NO. CLS		MC	05/24/93	NM	12/15/93
	09	38781N 40876E	6	1,905.1	CC-292	130.7	19.3	109.4	99.9	LIFT NO. CLS		MC	05/24/93	NM	12/15/93
	10	38784N 40676E	6	1,907.0	CC-292	128.1	21.0	105.7	96.5	LIFT NO. CLS		MC	05/24/93	NM	12/15/93
	11	38785N 41456E	6	1,905.8	CC-292	126.5	22.2	104.0	95	LIFT NO. CLS		MC	05/24/93	NM	12/15/93
	12	38777N 41274E	6	1,905.1	CC-292	129.1	21.4	106.2	96.9	LIFT NO. CLS		MC	05/24/93	NM	12/15/93
	13	38780N 41070E	6	1,905.7	CC-249	131.2	17.0	112.0	98.4	LIFT NO. CLS		MC	05/24/93	NM	12/15/93

Count: 13

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-029A	01	38794N 40365E	6	1,909.3	CC-292	131.3	20.3	109.9	100+	LIFT NO. CLS		AC	05/25/93	NM	12/15/93
	02	38797N 40169E	6	1,910.2	CC-292	128.7	19.2	107.8	98.5	LIFT NO. CLS		AC	05/25/93	NM	12/15/93
	03	38801N 39969E	6	1,910.8	CC-292	127.4	20.3	105.8	96.6	LIFT NO. CLS		AC	05/25/93	NM	12/15/93
	04	38806N 39774E	6	1,913.1	CC-292	129.5	19.3	108.4	99.0	LIFT NO. CLS	CC-363, PROCTOR	AC	05/25/93	NM	12/15/93
	05	38676N 39706E	6	1,914.2	CC-292	129.6	20.9	107.1	97.8	LIFT NO. CLS	ST.102, CC-364	AC	05/25/93	NM	12/15/93
	06	38521N 39714E	6	1,912.7	CC-292	131.3	16.4	112.7	100+	LIFT NO. CLS		AC	05/25/93	NM	12/15/93
	07	38191N 41559E	6	1,911.0	CC-292	125.8	20.9	103.9	94.9	LIFT NO. CLS		AC	05/25/93	NM	12/15/93
	08	37996N 41559E	6	1,912.2	CC-292	129.6	20.9	107.1	97.8	LIFT NO. CLS		AC	05/25/93	NM	12/15/93
	09	37801N 41552E	6	1,911.9	CC-292	127.2	21.3	104.7	95.6	LIFT NO. CLS		AC	05/25/93	NM	12/15/93
	10	38786N 40577E	6	1,909.4	CC-292	132.4	17.8	113.2	100+	LIFT NO. CLS		AC	05/25/93	NM	12/15/93
	11	38796N 40363E	6	1,910.1	CC-292	127.6	19.4	106.7	97.5	LIFT NO. CLS		AC	05/25/93	NM	12/15/93
	12	38799N 40177E	6	1,911.2	CC-292	126.5	20.4	104.9	95.8	LIFT NO. CLS		AC	05/25/93	NM	12/15/93
	13	38800N 39973E	6	1,912.3	CC-292	130.6	18.6	110.0	100+	LIFT NO. CLS		AC	05/25/93	NM	12/15/93
	14	38803N 39776E	6	1,914.0	CC-292	130.1	20.5	107.8	98.4	LIFT NO. CLS		AC	05/25/93	NM	12/15/93
	15	38679N 39704E	6	1,915.6	CC-292	128.8	21.7	106.2	97.0	LIFT NO. CLS		AC	05/25/93	NM	12/15/93
	16	38493N 39713E	6	1,914.2	CC-292	126.7	20.8	104.8	95.7	LIFT NO. CLS		AC	05/25/93	NM	12/15/93
	17	38700N 41554E	6	1,911.2	CC-292	129.5	19.4	108.3	98.9	LIFT NO. CLS		AC	05/25/93	NM	12/15/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-029A	18	38500N 41556E	6	1,911.2	CC-292	129.0	20.5	106.9	97.6	LIFT NO. CLS		AC	05/25/93	NM	12/15/93
	19	38303N 41560E	6	1,911.2	CC-292	130.3	20.1	108.4	99.0	LIFT NO. CLS		AC	05/25/93	NM	12/15/93
	20	38100N 41563E	6	1,912.5	CC-292	127.3	19.3	106.6	97.4	LIFT NO. CLS		AC	05/25/93	NM	12/15/93
	21	37902N 41564E	6	1,913.2	CC-292	129.6	18.9	108.9	99.4	LIFT NO. CLS		AC	05/25/93	NM	12/15/93
	22	38795N 41472E	6	1,908.2	CC-292	130.2	20.0	108.4	99.0	LIFT NO. CLS		AC	05/25/93	NM	12/15/93
	23	38792N 41272E	6	1,907.7	CC-292	128.1	19.0	107.5	98.1	LIFT NO. CLS		AC	05/25/93	NM	12/15/93
	24	38794N 41072E	6	1,908.2	CC-292	132.7	17.0	113.2	100+	LIFT NO. CLS		AC	05/25/93	NM	12/15/93
	25	38794N 40874E	6	1,908.8	CC-292	132.9	17.5	113.0	100+	LIFT NO. CLS		AC	05/25/93	NM	12/15/93
	26	38793N 40675E	6	1,910.2	CC-292	130.1	20.5	107.8	98.4	LIFT NO. CLS		AC	05/25/93	NM	12/15/93
	27	38771N 39712E	6	1,915.7	CC-292	127.3	22.0	104.2	95.1	LIFT NO. CLS		AC	05/25/93	NM	12/15/93
	28	39523N 39705E	6	1,915.9	CC-292	126.0	20.9	104.1	95.0	LIFT NO. CLS		AC	05/25/93	NM	12/15/93

Count: 28

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTE
93-029B	01	38598N 41552E	6	1,909.3	CC-292	129.1	21.2	106.4	97.1	LIFT NO. CLS	ST.103, CC-365	MC	05/25/93	NM	12/15/9
	02	38400N 41556E	6	1,909.8	CC-292	128.7	22.0	105.4	96.2	LIFT NO. CLS	ST.104, CC-366	MC	05/25/93	NM	12/15/9
	03	38777N 41376E	6	1,906.5	CC-265	130.2	19.4	108.9	97.7	LIFT NO. CLS	ST.105, CC-367	MC	05/25/93	NM	12/15/9
	04	38780N 41174E	6	1,906.7	CC-292	124.3	22.0	101.9	93	LIFT NO. CLS	FAILED	MC	05/25/93	NM	12/15/9
	05	38782N 40976E	6	1,907.0	CC-265	129.7	18.3	109.5	98.2	LIFT NO. CLS		MC	05/25/93	NM	12/15/9
	06	38786N 40777E	6	1,908.5	CC-249	134.8	17.4	114.7	100+	LIFT NO. CLS	CC-368, PROCTOR	MC	05/25/93	NM	12/15/9
	07	RETEST OF #4	6	1,906.7	CC-292	129.6	22.2	105.9	96.7	LIFT NO. CLS	SAND CONE	MC	05/25/93	NM	12/15/9
	08	37726N 41523E	6	1,911.9	CC-265	132.0	20.1	109.8	98.5	LIFT NO. CLS	ST.106, CC-396	MC	05/25/93	NM	12/15/9
	09	38795N 40466E	6	1,910.6	CC-249	132.5	18.1	112.1	98.5	LIFT NO. CLS		MC	05/25/93	NM	12/15/9
	10	38797N 40274E	6	1,911.6	CC-249	127.3	20.6	105.4	92.6	LIFT NO. CLS	BAD DIVET-GRAVEL	MC	05/25/93	NM	12/15/9
	11	38798N 40070E	6	1,912.1	CC-249	124.9	18.9	104.9	92.2	LIFT NO. CLS	BAD DIVET-ROCK	MC	05/25/93	NM	12/15/9
	12	38806N 39871E	6	1,914.2	CC-265	127.0	20.1	105.6	95	LIFT NO. CLS		MC	05/25/93	NM	12/15/9

Count: 12

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-030A	01	38698N 41558E	6	1,912.3	CC-265	130.2	17.7	110.5	99.1	LIFT NO. CLS		AC	05/26/93	NM	12/14/93
	02	38502N 41562E	6	1,912.4	CC-265	128.7	20.2	106.9	95.9	LIFT NO. CLS		AC	05/26/93	NM	12/14/93
	03	38302N 41564E	6	1,912.7	CC-265	129.1	19.3	108.1	97.0	LIFT NO. CLS		AC	05/26/93	NM	12/14/93
	04	38103N 41566E	6	1,914.0	CC-265	128.1	20.3	106.4	95.5	LIFT NO. CLS		AC	05/26/93	NM	12/14/93
	05	38794N 40467E	6	1,911.6	CC-357	126.9	21.5	104.3	95.2	LIFT NO. CLS		AC	05/26/93	NM	12/14/93
	06	38794N 40272E	6	1,912.5	CC-357	131.5	19.5	109.9	100+	LIFT NO. CLS		AC	05/26/93	NM	12/14/93
	07	38802N 40071E	6	1,913.1	CC-357	128.2	21.1	105.7	96.6	LIFT NO. CLS		AC	05/26/93	NM	12/14/93
	08	38808N 39871E	6	1,915.3	CC-357	128.2	22.2	104.8	95.7	LIFT NO. CLS	SAND CONE	AC	05/26/93	NM	12/14/93
	09	38773N 39710E	6	1,916.6	CC-357	128.0	20.8	105.8	96.6	LIFT NO. CLS		AC	05/26/93	NM	12/14/93
	10	38587N 39703E	6	1,917.1	CC-357	126.6	22.3	103.4	94.5	LIFT NO. CLS		AC	05/26/93	NM	12/14/93
	11	38606N 41560E	6	1,913.1	CC-340	128.1	22.2	105.6	96.0	LIFT NO. CLS		AC	05/26/93	NM	12/14/93
	12	38404N 41567E	6	1,913.2	CC-340	126.5	21.9	104.5	95.0	LIFT NO. CLS		AC	05/26/93	NM	12/14/93
	13	38202N 41570E	6	1,914.5	CC-340	125.7	21.4	104.3	94.8	LIFT NO. CLS		AC	05/26/93	NM	12/14/93
	14	37806N 41563E	6	1,915.1	CC-340	130.1	19.5	109.7	99.8	LIFT NO. CLS		AC	05/26/93	NM	12/14/93
	15	38793N 41464E	6	1,910.6	CC-249	130.2	21.3	108.1	95.2	LIFT NO. CLS		AC	05/26/93	NM	12/14/93
	16	38795N 41270E	6	1,911.0	CC-249	127.6	21.2	106.0	93.4	LIFT NO. CLS	MOISTURE - FAILS	AC	05/26/93	NM	12/15/93
	17	38796N 41067E	6	1,911.0	CC-249	129.0	21.4	107.0	94.3	LIFT NO. CLS	MOISTURE FAILS	AC	05/26/93	NM	12/15/93

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-030A	18	38795N 40869E	6	1,911.7	CC-249	127.6	20.9	106.3	93.7	LIFT NO. CLS	MOISTURE FAILS	AC	05/26/93	NM	12/15/93
	19	38795N 40670E	6	1,912.5	CC-249	127.0	21.0	105.7	93.1	LIFT NO. CLS	MOISTURE FAILS	AC	05/26/93	NM	12/15/93

Count: 19

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTE
93-030B	01	RETEST OF #10, RPT. 93-029B	6	1,911.6	CC-249	130.8	17.5	111.2	97.7	LIFT NO. CLS		MC	05/26/93	NM	12/15/9
	02	RETEST OF #11, RPT. 93-029B	6	1,912.1	CC-249	130.5	20.2	108.4	95.3	LIFT NO. CLS		MC	05/26/93	NM	12/15/9
	03	37905N 41568E	6	1,914.5	CC-357	125.5	21.6	103.1	94.2	LIFT NO. CLS		MC	05/26/93	NM	12/15/9
	04	37726N 41532E	6	1,912.2	CC-357	126.4	22.1	103.4	94.4	LIFT NO. CLS		MC	05/26/93	NM	12/15/9
	05	RETEST OF 3	6	1,914.6	CC-357	125.8	20.9	104.0	95	LIFT NO. CLS		MC	05/26/93	NM	12/15/9
	06	RETEST OF 4	6	1,912.2	CC-357	125.5	20.3	104.2	95.2	LIFT NO. CLS		MC	05/26/93	NM	12/15/9
	07	38786N 41473E	6	1,909.6	CC-249	131.9	16.8	112.8	99.1	LIFT NO. CLS	CC-370, PROCTOR	MC	05/26/93	NM	12/15/9
	08	38793N 41269E	6	1,909.1	CC-340	128.3	21.9	104.5	95	LIFT NO. CLS		MC	05/26/93	NM	12/15/9
	09	38795N 41073E	6	1,909.5	CC-340	129.4	19.6	108.1	98.3	LIFT NO. CLS		MC	05/26/93	NM	12/15/9
	10	38793N 40873E	6	1,909.9	CC-249	133.3	19.5	111.4	97.9	LIFT NO. CLS		MC	05/26/93	NM	12/15/9
	11	38794N 40665E	6	1,911.3	CC-340	128.0	20.7	105.9	96.3	LIFT NO. CLS		MC	05/26/93	NM	12/15/9
	12	38001N 41572E	6	1,916.2	CC-340	128.4	24.3	103.2	93.8	LIFT NO. CLS		MC	05/26/93	NM	12/15/9
	13	RETEST OF #12	6	1,916.2	CC-340	124.4	19.0	104.4	94.9	LIFT NO. CLS	ST.107, CC-371	MC	05/26/93	NM	12/15/9
	14	38801N 40469E	6	1,913.0	CC-340	128.2	19.9	106.8	97.1	LIFT NO. CLS		MC	05/26/93	NM	12/15/9
	15	38801N 40271E	6	1,913.5	CC-249	127.0	20.2	105.5	92.7	LIFT NO. CLS	MOISTURE - FAIL	MC	05/26/93	NM	12/15/9
	16	38801N 40067E	6	1,913.8	CC-249	128.5	21.4	105.7	92.9	LIFT NO. CLS	MOISTURE - FAIL	MC	05/26/93	NM	12/15/9

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTE
93-030B	17	38810N 39870E	6	1,916.0	CC-249				N/A	LIFT NO. CLS	TOO MUCH ROCK	MC	05/26/93	NM	12/15/9
	18	38772N 39713E	6	1,915.5	CC-249				N/A	LIFT NO. CLS	TOO MUCH ROCK	MC	05/26/93	NM	12/15/9
	19	38590N 39704E	6	1,918.0	CC-249	127.7	20.9	106.4	93.5	LIFT NO. CLS	CC-372, PROCTOR	MC	05/26/93	NM	12/15/9

Count: 19

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-033A	01	37157N 40641E	6	1,906.3	CC-340	129.9	19.6	109.4	99.5	LIFT NO. 1ST		AC	06/01/93	NM	12/14/93
	02	37155N 40784E	6	1,905.7	CC-340	132.3	21.9	109.3	99.4	LIFT NO. 1ST		AC	06/01/93	NM	12/14/93
	03	37209N 40952E	6	1,904.3	CC-340	127.7	21.1	106.2	96.5	LIFT NO. 1ST		AC	06/01/93	NM	12/14/93
	04	37342N 41082E	6	1,903.2	CC-340	124.4	22.1	102.5	93.1	LIFT NO. 1ST	MOISTURE FAILS	AC	06/01/93	NM	12/14/93
	05	37796N 40769E	6	1,904.9	CC-340	127.6	21.5	105.8	96.1	LIFT NO. 1ST	SAND CONE	AC	06/01/93	NM	12/14/93

Count: 5

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-035A	01	37553N 41273E	6	1,900.0	CC-340	128.0	20.4	107.1	97.4	LIFT NO. 1ST		AC	06/03/93	NM	12/14/93
	02	37586N 41054E	6	1,901.8	CC-340	129.3	20.0	108.5	98.6	LIFT NO. 1ST		AC	06/03/93	NM	12/14/93
	03	37651N 40760E	6	1,903.1	CC-340	129.7	19.1	109.7	99.7	LIFT NO. 1ST		AC	06/03/93	NM	12/14/93
	04	37673N 41335E	6	1,899.6	CC-340	127.8	21.5	105.1	95.6	LIFT NO. 1ST		AC	06/03/93	NM	12/14/93
	05	37719N 41094E	6	1,900.9	CC-340	126.4	18.4	107.5	97.7	LIFT NO. 1ST		AC	06/03/93	NM	12/14/93
	06	37775N 40828E	6	1,902.3	CC-340	128.5	21.0	107.0	97.3	LIFT NO. 1ST		AC	06/03/93	NM	12/14/93
	07	37825N 40592E	6	1,903.1	CC-340	130.1	20.8	108.5	98.7	LIFT NO. 2ND	SAND CONE	AC	06/03/93	NM	12/14/93
	08	RETEST #4, RPT. 93-033A	6	1,903.2	CC-340	127.0	21.0	105.7	96.1	LIFT NO. 1ST		AC	06/03/93	NM	12/14/93

Count: 8

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-034A	01	37470N 41189E	6	1,901.6	CC-340	129.7	21.5	107.5	97.7	LIFT NO. 1ST		AC	06/02/93	NM	12/14/93
	02	37524N 40931E	6	1,903.3	CC-340	129.7	20.3	108.1	98.9	LIFT NO. 1ST		AC	06/02/93	NM	12/14/93

Count: 2

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-036A	01	37926N 40653E	6	1,902.1	CC-340	126.3	21.4	104.5	95	LIFT NO. 1ST		AC	06/04/93	NM,SC	12/14/93
	02	37974N 40399E	6	1,903.2	CC-340	126.7	18.8	107.4	97.6	LIFT NO. 2ND	ST.112, CLB-CC-396	AC	06/04/93	NM,SC	12/14/93
	03	38027N 40106E	6	1,904.4	CC-340	127.8	21.2	106.2	96.5	LIFT NO. 2ND	ST.113, CLB-CC-397	AC	06/04/93	NM,SC	12/14/93
	04	38060N 39859E	6	1,905.7	CC-340	124.9	20.4	104.5	95.0	LIFT NO. 2ND	ST.114, CLB-CC-398	AC	06/04/93	NM,SC	12/14/93
	05	37214N 40593E	6	1,905.3	CC-40	132.4	17.9	113.1	100+	LIFT NO. SG	SG-CC-389	AC	06/04/93	NM,SC	12/14/93
	06	37382N 40731E	6	1,904.6	CC-40	126.3	18.6	107.3	98.8	LIFT NO. SG	SG-CC-390	AC	06/04/93	NM,SC	12/14/93

Count: 6

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-037B	01	37164N 40515E	6	1,907.0	CC-340	130.3	21.6	107.1	97.4	LIFT NO. 2ND		MC	06/05/93	NM	12/14/93
	02	37347N 40652E	6	1,905.1	CC-340	126.8	20.3	105.4	95.8	LIFT NO. 2ND	CLB-CC-391, PROCTOR	MC	06/05/93	NM	12/14/93
	03	37537N 40793E	6	1,903.6	CC-340	130.5	20.2	108.5	98.6	LIFT NO. 2ND		MC	06/05/93	NM	12/14/93
	04	37258N 40993E	6	1,904.2	CC-340	128.5	21.0	106.1	96.5	LIFT NO. 2ND	ST.108, CLB-CC-392	MC	06/05/93	NM	12/14/93
	05	37412N 41139E	6	1,902.7	CC-340	129.0	19.6	107.7	97.9	LIFT NO. 2ND	ST.109, CLB-CC-393, PROCTOR	MC	06/05/93	NM	12/14/93
	06	37561N 41279E	6	1,900.8	CC-340	130.3	20.2	108.3	98.5	LIFT NO. 1ST		MC	06/05/93	NM	12/14/93
	07	37364N 40927E	6	1,904.2	CC-340	128.2	19.9	107.0	97.9	LIFT NO. 2ND	ST.110, CLB-CC-394	MC	06/05/93	NM	12/14/93
	08	37493N 41045E	6	1,902.9	CC-340	126.3	21.3	104.5	95	LIFT NO. 2ND	ST.111, CLB-CC-395	MC	06/05/93	NM	12/14/93
	09	37641N 41179E	6	1,900.8	CC-340	126.9	20.7	105.1	95.6	LIFT NO. 1ST		MC	06/05/93	NM	12/14/93
	10	37209N 40596E	6	1,907.0	CC-340	128.1	21.5	105.4	95.0	LIFT NO. 3RD	ST.115, CLB-CC-399	MC	06/05/93	NM	12/14/93
	11	37375N 40731E	6	1,905.4	CC-340	128.4	21.9	105.3	95.9	LIFT NO. 3RD	ST.116, CLB-CC-400	MC	06/05/93	NM	12/14/93
	12	37556N 40853E	6	1,903.9	CC-340	128.4	20.6	106.5	96.8	LIFT NO. 3RD	ST.117, CLB-CC-401	MC	06/05/93	NM	12/14/93

Count: 12

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-038A	01	37196N 40948E	6	1,905.1	CC-341	125.0	21.2	103.4	92.4	LIFT NO. 3RD		AC	06/07/93	NM	12/14/93
	02	37183N 40699E	6	1,906.8	CC-341	126.2	19.9	106.0	94.7	LIFT NO. 3RD		AC	06/07/93	NM	12/14/93
	03	37320N 40816E	6	1,905.5	CC-341	130.9	20.3	109.6	97.9	LIFT NO. 3RD		AC	06/07/93	NM	12/14/93
	04	37306N 41056E	6	1,904.1	CC-341	128.1	22.4	105.4	94.2	LIFT NO. 3RD		AC	06/07/93	NM	12/14/93
	05	37428N 41157E	6	1,903.0	CC-341	124.9	22.7	102.5	91.6	LIFT NO. 3RD		AC	06/07/93	NM	12/14/93
	06	37454N 41006E	6	1,903.7	CC-341	129.1	21.0	107.5	96.1	LIFT NO. 3RD		AC	06/07/93	NM	12/14/93
	07	37474N 40882E	6	1,904.1	CC-341	129.7	20.6	108.3	96.7	LIFT NO. 3RD		AC	06/07/93	NM	12/14/93
	08	37650N 40800E	6	1,903.0	CC-341	130.0	19.0	110.0	98.3	LIFT NO. 2ND		AC	06/07/93	NM	12/14/93
	09	37617N 40975E	6	1,902.5	CC-341	125.7	16.1	109.1	97.5	LIFT NO. 2ND		AC	06/07/93	NM	12/14/93
	10	37578N 41145E	6	1,902.2	CC-341	128.1	20.4	106.3	95.1	LIFT NO. 2ND		AC	06/07/93	NM	12/14/93
	11	37830N 40000E	6	1,906.4	CC-340	125.3	20.3	104.2	94.7	LIFT NO. 2ND	ST.118, CLB-CC-402	AC	06/07/93	NM	12/14/93
	12	37950N 39800E	6	1,906.6	CC-340	125.5	20.7	104.7	95.2	LIFT NO. 2ND	ST.119, CLB-CC-403	AC	06/07/93	NM	12/14/93

Count: 12

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-043A	01	RETEST #16, RPT. 93-030A	6	1,911.0	CC-249	132.8	19.6	111.0	97.5	LIFT NO. CLS		MC	06/12/93	NM	12/14/93
	02	RETEST #17, RPT. 93-030A	6	1,911.0	CC-249	130.5	16.9	111.6	98	LIFT NO. CLS		MC	06/12/93	NM	12/14/93
	03	RETEST #18, RPT. 93-030A	6	1,911.7	CC-249	127.1	19.5	106.4	93.5	LIFT NO. CLS	FAILURE	MC	06/12/93	NM	12/14/93
	04	RETEST #19, RPT. 93-030A	6	1,912.5	CC-249	127.4	22.9	103.7	91	LIFT NO. CLS	FAILURE	MC	06/12/93	NM	12/14/93
	05	RETEST #15, RPT. 93-030B	6	1,913.5	CC-249	125.4	21.5	103.2	90.7	LIFT NO. CLS	FAILURE	MC	06/12/93	NM	12/14/93
	06	RETEST #16, RPT. 93-030B	6	1,913.8	CC-249	129.9	19.9	108.3	95.2	LIFT NO. CLS		MC	06/12/93	NM	12/14/93
	07	RETEST #17, RPT. 93-030B	6	1,916.0	CC-249	130.4	18.9	109.7	96.4	LIFT NO. CLS		MC	06/12/93	NM	12/14/93
	08	RETEST #18, RPT. 93-030B	6	1,915.5	CC-249	129.7	20.0	108.0	95	LIFT NO. CLS		MC	06/12/93	NM	12/14/93
	09	RETEST #19, RPT. 93-030B	6	1,918.0	CC-249	128.7	19.0	108.2	95.1	LIFT NO. CLS		MC	06/12/93	NM	12/14/93
	10	RETEST OF 3	6	1,911.7	CC-249	131.8	18.1	111.6	98.1	LIFT NO. CLS		MC	06/12/93	NM	12/14/93
	11	RETEST OF 4	6	1,912.5	CC-249	131.9	18.7	111.1	97.6	LIFT NO. CLS		MC	06/12/93	NM	12/14/93
	12	RETEST OF 5	6	1,913.5	CC-249	132.1	17.6	112.3	98.7	LIFT NO. CLS		MC	06/12/93	NM	12/14/93

Count: 12

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-044A	01	37143N 40992E	6	1,911.3	CC-379	132.2	16.8	114.0	100+	LIFT NO. CLS		AC	06/14/93	NM	12/14/93
	02	37278N 41127E	6	1,909.4	CC-379	131.2	17.8	112.2	100+	LIFT NO. CLS		AC	06/14/93	NM	12/14/93
	03	37428N 41263E	6	1,907.6	CC-379	127.6	19.3	107.2	96.6	LIFT NO. CLS		AC	06/14/93	NM	12/14/93
	04	37580N 41393E	6	1,906.8	CC-379	129.6	17.2	111.4	99.9	LIFT NO. CLS		AC	06/14/93	NM	12/14/93
	05	37721N 41533E	6	1,913.1	CC-377	135.1	14.3	119.1	100+	LIFT NO. CLS		AC	06/14/93	NM	12/14/93
	06	37899N 41571E	6	1,914.9	CC-377	138.0	15.4	120.5	100+	LIFT NO. CLS		AC	06/14/93	NM	12/14/93
	07	38098N 41572E	6	1,915.6	CC-377	129.8	16.8	112.0	96.6	LIFT NO. CLS		AC	06/14/93	NM	12/14/93
	08	38300N 41568E	6	1,914.4	CC-377	135.9	13.6	120.5	100+	LIFT NO. CLS		AC	06/14/93	NM	12/14/93
	09	38502N 41565E	6	1,914.0	CC-379	124.8	17.1	107.4	96.3	LIFT NO. CLS		AC	06/14/93	NM	12/14/93
	10	38712N 41560E	6	1,914.5	CC-377	133.2	13.7	118.0	100+	LIFT NO. CLS		AC	06/14/93	NM	12/14/93
	11	38797N 41458E	6	1,911.5	CC-379	130.4	15.7	113.6	100+	LIFT NO. CLS		AC	06/14/93	NM	12/14/93
	12	38798N 41272E	6	1,912.6	CC-379	129.6	15.6	113.0	100+	LIFT NO. CLS		AC	06/14/93	NM	12/14/93
	13	38799N 41072E	6	1,912.2	CC-379	134.4	15.0	117.8	100+	LIFT NO. CLS		AC	06/14/93	NM	12/14/93
	14	38798N 40864E	6	1,913.0	CC-379	130.4	17.8	111.5	100+	LIFT NO. CLS		AC	06/14/93	NM	12/14/93
	15	38800N 40670E	6	1,913.6	CC-379	133.6	16.9	115.1	100+	LIFT NO. CLS		AC	06/14/93	NM	12/14/93
	16	37204N 41067E	6	1,912.0	CC-377	134.8	16.4	116.7	100+	LIFT NO. CLS		AC	06/14/93	NM	12/14/93
	17	37354N 41202E	6	1,910.0	CC-377	131.0	16.6	113.2	97.6	LIFT NO. CLS		AC	06/14/93	NM	12/14/93

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-044A	18	37508N 41334E	6	1,908.5	CC-377	137.7	15.2	119.5	100+	LIFT NO. CLS	SAND CONE	AC	06/14/93	NM	12/14/93
	19	37647N 41449E	6	1,908.2	CC-377	132.0	19.9	110.1	94.9	LIFT NO. CLS		AC	06/14/93	NM	12/14/93
	20	38811N 40563E	6	1,915.5	CC-377	133.0	18.5	113.1	97.5	LIFT NO. CLS		AC	06/14/93	NM	12/14/93
	21	38808N 40368E	6	1,915.0	CC-377	133.6	17.0	115.0	99.1	LIFT NO. CLS		AC	06/14/93	NM	12/14/93
	22	38813N 40159E	6	1,916.7	CC-377	133.8	17.2	115.0	99.1	LIFT NO. CLS		AC	06/14/93	NM	12/14/93
	23	38814N 39979E	6	1,918.1	CC-377	132.5	17.9	113.2	97.5	LIFT NO. CLS		AC	06/14/93	NM	12/14/93
	24	38814N 39775E	6	1,918.5	CC-377	131.2	15.5	114.4	98.6	LIFT NO. CLS		AC	06/14/93	NM	12/14/93
	25	38723N 39696E	6	1,919.3	CC-377	133.7	17.6	114.5	98.7	LIFT NO. CLS		AC	06/14/93	NM	12/14/93
	26	38557N 39698E	6	1,918.9	CC-377	130.1	17.4	111.6	96.2	LIFT NO. CLS		AC	06/14/93	NM	12/14/93

Count: 26

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-044B	01	38804N 40468E	6	1,914.2	CC-377	136.1	17.0	116.2	100+	LIFT NO. CLS		MC	06/14/93	NM	12/14/93
	02	38808N 40243E	6	1,914.5	CC-377	134.7	14.7	117.3	100+	LIFT NO. CLS	CC-404, PROCTOR	MC	06/14/93	NM	12/14/93
	03	38811N 40064E	6	1,916.4	CC-377	136.4	17.3	116.1	100	LIFT NO. CLS	CC-405, PROCTOR	MC	06/14/93	NM	12/14/93
	04	38814N 39866E	6	1,917.1	CC-377	133.6	17.2	113.9	98.2	LIFT NO. CLS		MC	06/14/93	NM	12/14/93
	05	38750N 39698E	6	1,918.7	CC-377	133.2	16.7	114.1	98.4	LIFT NO. CLS		MC	06/14/93	NM	12/14/93
	06	38534N 39699E	6	1,918.1	CC-379	127.3	17.3	108.4	97.2	LIFT NO. CLS		MC	06/14/93	NM	12/14/93
	07	37795N 41567E	6	1,915.1	CC-377	132.1	19.1	110.8	95.5	LIFT NO. CLS	FAIL,M.C=19.9, CC-406, PROCTOR	MC	06/14/93	NM	12/14/93
	08	37998N 41576E	6	1,917.2	CC-377	131.5	20.2	109.3	94.2	LIFT NO. CLS	FAIL	MC	06/14/93	NM	12/14/93
	09	38195N 41574E	6	1,916.8	CC-377	134.4	17.0	114.7	98.9	LIFT NO. CLS		MC	06/14/93	NM	12/14/93
	10	38395N 41571E	6	1,915.5	CC-377	130.3	21.3	107.3	92.5	LIFT NO. CLS	FAIL	MC	06/14/93	NM	12/14/93
	11	38615N 41564E	6	1,914.9	CC-377	135.4	17.7	114.9	99.1	LIFT NO. CLS		MC	06/14/93	NM	12/14/93
	12	RETEST OF #10	6	1,915.5	CC-377	134.7	18.6	113.4	97.7	LIFT NO. CLS		MC	06/14/93	NM	12/14/93
	13	38803N 41368E	6	1,913.4	CC-377	135.8	16.4	116.5	100+	LIFT NO. CLS		MC	06/14/93	NM	12/14/93
	14	38801N 41172E	6	1,913.5	CC-377	138.2	16.7	118.3	100+	LIFT NO. CLS		MC	06/14/93	NM	12/14/93
	15	38801N 40969E	6	1,914.5	CC-377	136.7	14.2	119.6	100+	LIFT NO. CLS		MC	06/14/93	NM	12/14/93
	16	38806N 40768E	6	1,915.2	CC-377	132.6	14.9	115.3	99.4	LIFT NO. CLS		MC	06/14/93	NM	12/14/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-045A	01	38807N 41463E	6	1,914.8	CC-377	131.3	17.7	112.4	96.9	LIFT NO. CLS		AC	06/15/93	NM	12/14/93
	02	38811N 41270E	6	1,915.7	CC-377	134.8	17.6	114.6	98.8	LIFT NO. CLS		AC	06/15/93	NM	12/14/93
	03	38807N 41071E	6	1,915.3	CC-377	132.8	16.0	117.4	100+	LIFT NO. CLS		AC	06/15/93	NM	12/14/93
	04	38810N 40867E	6	1,916.5	CC-377	128.4	17.2	110.4	95.1	LIFT NO. CLS		AC	06/15/93	NM	12/14/93
	05	38809N 40670E	6	1,617.0	CC-377	134.9	16.2	117.0	100+	LIFT NO. CLS		AC	06/15/93	NM	12/14/93
	06	38809N 40472E	6	1,915.9	CC-379	127.0	19.7	106.1	95.2	LIFT NO. CLS		AC	06/15/93	NM	12/14/93
	07	38805N 40262E	6	1,916.4	CC-379	128.7	20.2	106.9	95.9	LIFT NO. CLS		AC	06/15/93	NM	12/14/93
	08	38809N 40075E	6	1,918.6	CC-377	137.3	16.9	118.3	100+	LIFT NO. CLS		AC	06/15/93	NM	12/14/93
	09	38811N 39872E	6	1,918.6	CC-377	133.7	15.2	116.9	100+	LIFT NO. CLS		AC	06/15/93	NM	12/14/93
	10	37200N 41077E	6	1,915.5	CC-377	134.2	16.9	115.7	99.7	LIFT NO. CLS	ST.121, CC-408	AC	06/15/93	NM	12/14/93
	11	37432N 41294E	6	1,913.9	CC-377	134.1	16.5	116.0	100	LIFT NO. CLS	ST.120, CC-407	AC	06/15/93	NM	12/14/93
	12	37495N 41334E	6	1,911.5	CC-377	132.3	18.6	112.4	96.9	LIFT NO. CLS		AC	06/15/93	NM	12/14/93
	13	37630N 41449E	6	1,909.9	CC-379	128.4	20.3	107.5	96.4	LIFT NO. CLS		AC	06/15/93	NM	12/14/93
	14	38808N 41517E	6	1,916.7	CC-379	135.0	18.1	115.2	100+	LIFT NO. CLS		AC	06/15/93	NM	12/14/93
	15	38812N 41278E	6	1,916.8	CC-379	128.7	20.2	106.9	95.8	LIFT NO. CLS		AC	06/15/93	NM	12/14/93
	16	38811N 41064E	6	1,916.4	CC-379	130.1	19.8	108.5	97.3	LIFT NO. CLS		MC	06/15/93	NM	12/14/93
	17	38812N 40862E	6	1,917.6	CC-379	126.7	18.8	107.4	96.3	LIFT NO. CLS		MC	06/15/93	NM	12/14/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-045A	18	38811N 40671E	6	1,917.9	CC-379	128.4	19.5	107.3	96.3	LIFT NO. CLS		MC	06/15/93	NM	12/14/93
	19	38810N 40467E	6	1,916.9	CC-379	134.6	16.0	116.9	100+	LIFT NO. CLS		MC	06/15/93	NM	12/14/93
	20	38809N 40246E	6	1,917.4	CC-379	128.6	19.9	108.0	96.8	LIFT NO. CLS		MC	06/15/93	NM	12/14/93
	21	38815N 40073E	6	1,919.2	CC-379	132.7	19.4	111.9	100+	LIFT NO. CLS		MC	06/15/93	NM	12/14/93
	22	38815N 39903E	6	1,919.5	CC-379	134.0	16.2	116.2	100+	LIFT NO. CLS		MC	06/15/93	NM	12/14/93
	23	38816N 39740E	6	1,920.1	CC-379	131.6	19.3	111.1	99.6	LIFT NO. CLS	SAND CONE	MC	06/15/93	NM	12/14/93
	24	37131N 41005E	6	1,917.8	CC-377	130.6	18.8	110.7	95.4	LIFT NO. CLS		MC	06/15/93	NM	12/14/93
	25	37279N 41150E	6	1,916.0	CC-377	130.5	19.3	110.2	95.0	LIFT NO. CLS		MC	06/15/93	NM	12/14/93
	26	37426N 41281E	6	1,914.0	CC-377	136.9	15.3	119.6	100+	LIFT NO. CLS		MC	06/15/93	NM	12/14/93
	27	37575N 41406E	6	1,911.8	CC-377	137.4	14.6	120.8	100+	LIFT NO. CLS		MC	06/15/93	NM	12/14/93

Count: 27

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-045B	01	37115N 40971E	6	1,916.3	CC-377	138.0	14.3	120.8	100+	LIFT NO. CLS		MC	06/15/93	NM	12/14/93
	02	37273N 41136E	6	1,913.4	CC-377	139.1	15.0	120.8	100+	LIFT NO. CLS		MC	06/15/93	NM	12/14/93
	03	37432N 41271E	6	1,910.2	CC-377	136.5	13.1	120.5	100+	LIFT NO. CLS		MC	06/15/93	NM	12/14/93
	04	37580N 41400E	6	1,909.3	CC-377	131.7	14.0	115.4	99.5	LIFT NO. CLS		MC	06/15/93	NM	12/14/93
	05	RETEST #7, RPT. 93-044B	6	1,915.1	CC-377	123.7	19.7	103.2	90	LIFT NO. CLS	FAILS	MC	06/15/93	NM	12/14/93
	06	RETEST #8, RPT. 93-044B	6	1,917.2	CC-377	122.3	20.1	102.7	89	LIFT NO. CLS	FAILS	MC	06/15/93	NM	12/14/93
	07	38531N 39697E	6	1,919.3	CC-377	131.7	17.9	111.6	96.2	LIFT NO. CLS		MC	06/15/93	NM	12/14/93
	08	38684N 39694E	6	1,919.7	CC-377	132.8	20.6	110.3	95	LIFT NO. CLS		MC	06/15/93	NM	12/14/93
	09	38812N 39745E	6	1,919.5	CC-377	137.8	15.9	117.0	100+	LIFT NO. CLS		MC	06/15/93	NM	12/14/93
	10	38645N 39695E	6	1,919.7	CC-377	134.8	20.9	111.5	96.1	LIFT NO. CLS		MC	06/15/93	NM	12/14/93

Count: 10

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-046A	01	38814N 41512E	6	1,918.5	CC-377	130.0	15.3	113.6	97.9	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	02	38816N 41355E	6	1,918.4	CC-377	132.7	17.0	114.3	98.5	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	03	38817N 41169E	6	1,918.3	CC-377	133.5	16.1	115.8	99.8	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	04	38817N 40967E	6	1,918.8	CC-377	137.3	12.4	123.1	100+	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	05	38817N 40772E	6	1,919.2	CC-377	135.1	15.0	118.4	100+	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	06	38816N 40577E	6	1,919.1	CC-377	135.4	16.7	116.9	100+	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	07	38815N 40373E	6	1,917.8	CC-377	133.9	17.7	114.6	98.8	LIFT NO. CLS	CC-409 PROCTOR	AC	06/16/93	NM	12/14/93
	08	38815N 40166E	6	1,919.4	CC-377	133.8	16.2	116.0	100	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	09	38817N 40004E	6	1,919.9	CC-377	131.5	17.6	112.6	97.0	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	10	38702N 41569E	6	1,917.0	CC-377	133.4	17.4	114.5	98.7	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	11	38508N 41508E	6	1,916.7	CC-377	126.5	13.9	111.9	96.4	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	12	38299N 41575E	6	1,917.1	CC-377	131.5	16.9	112.4	96.9	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	13	38097N 41574E	6	1,917.3	CC-377	131.3	17.0	113.1	97.5	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	14	37898N 41575E	6	1,917.6	CC-377	128.6	17.1	110.6	95.4	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	15	37711N 41529E	6	1,914.9	CC-377	134.2	14.3	118.3	100+	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	16	37167N 41053E	6	1,918.0	CC-109	125.8	17.6	106.8	96.2	LIFT NO. CLS		AC	06/16/93	NM,SC	12/14/93
	17	37341N 41210E	6	1,916.5	CC-109	130.5	19.2	110.3	99.4	LIFT NO. CLS		AC	06/16/93	NM,SC	12/14/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-046A	18	37797N 41563E	6	1,917.3	CC-109	133.9	17.6	114.7	100+	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	19	37997N 41581E	6	1,918.6	CC-109	132.7	17.0	114.3	100+	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	20	38199N 41580E	6	1,918.1	CC-109	133.3	15.0	116.8	100+	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	21	37107N 40969E	6	1,919.5	CC-109	130.5	21.4	108.3	97.6	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	22	37249N 41139E	6	1,918.4	CC-109	126.6	18.3	107.8	97.1	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	23	37425N 41290E	6	1,916.5	CC-109	129.9	16.8	112.0	100+	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	24	38177N 41584E	6	1,918.9	CC-109	126.7	16.6	109.5	98.6	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	25	38392N 41579E	6	1,918.6	CC-109	124.7	18.0	105.7	95.2	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	26	38604N 41578E	6	1,918.2	CC-97	127.0	21.3	104.6	100+	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	27	37166N 41050E	6	1,919.1	CC-95	129.2	17.6	110.7	97.1	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	28	37336N 41211E	6	1,917.7	CC-95	132.8	15.9	115.4	100+	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	29	38818N 41470E	6	1,919.2	CC-95	135.7	16.7	117.1	100+	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	30	38820N 41268E	6	1,919.1	CC-95	132.1	18.4	112.4	98.6	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	31	38821N 41060E	6	1,919.4	CC-95	133.5	18.9	113.1	99.2	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	32	38821N 40866E	6	1,919.8	CC-95	132.6	20.0	111.3	97.7	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	33	38820N 40668E	6	1,919.4	CC-95	129.9	17.6	111.2	97.5	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	34	37803N 41574E	6	1,919.6	CC-95	132.0	18.3	112.4	98.6	LIFT NO. CLS		AC	06/16/93	NM	12/14/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-046A	35	38014N 41578E	6	1,920.1	CC-95	129.6	16.8	111.8	98.1	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	36	38208N 41580E	6	1,919.8	CC-95	130.6	16.2	113.2	99.3	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	37	38423N 41574E	6	1,919.0	CC-95	126.5	18.0	108.0	94.7	LIFT NO. CLS		AC	06/16/93	NM	12/14/93
	38	38616N 41580E	6	1,919.0	CC-95	128.6	16.3	111.4	97.7	LIFT NO. CLS		AC	06/16/93	NM	12/14/93

Count: 38

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-0468	01	RETEST OF #5 RPT. 93-45B	6	1,915.1	CC-377	138.0	17.0	117.9	100+	LIFT NO. CLS		MC	06/16/93	NM	12/14/93
	02	RETEST OF #6 RPT. 93-45B	6	1,917.2	CC-377	135.9	18.3	114.7	98.8	LIFT NO. CLS		MC	06/16/93	NM	12/14/93
	03	37599N 41427E	6	1,911.6	CC-377	132.0	16.4	113.3	97.7	LIFT NO. CLS		MC	06/16/93	NM	12/14/93
	04	37422N 41293E	6	1,915.0	CC-377	129.6	18.5	110.2	95	LIFT NO. CLS		MC	06/16/93	NM	12/14/93
	05	37256N 41133E	6	1,916.9	CC-377	129.5	15.6	111.9	96.5	LIFT NO. CLS		MC	06/16/93	NM	12/14/93
	06	37130N 41001E	6	1,917.9	CC-377	132.7	19.6	110.8	95.5	LIFT NO. CLS	SAND CONE	MC	06/16/93	NM	12/14/93
	07	37642N 41462E	6	1,911.9	CC-109	132.6	19.0	111.3	100+	LIFT NO. CLS		MC	06/16/93	NM	12/14/93
	08	37513N 41358E	6	1,914.6	CC-109	130.2	18.3	109.9	99	LIFT NO. CLS		MC	06/16/93	NM	12/14/93
	09	38612N 41570E	6	1,917.1	CC-95	136.4	15.5	118.0	100+	LIFT NO. CLS		MC	06/16/93	NM	12/14/93
	10	38396N 41571E	6	1,917.5	CC-95	135.4	16.5	116.0	100+	LIFT NO. CLS		MC	06/16/93	NM	12/14/93
	11	37597N 41436E	6	1,913.8	CC-95	128.4	15.6	110.9	97.2	LIFT NO. CLS		MC	06/16/93	NM	12/14/93
	12	37733N 41546E	6	1,917.1	CC-95	132.6	17.7	112.5	98.7	LIFT NO. CLS		MC	06/16/93	NM	12/14/93
	13	37941N 41577E	6	1,919.7	CC-109	128.8	18.9	108.2	97.5	LIFT NO. CLS		MC	06/16/93	NM	12/14/93
	14	37641N 41473E	6	1,914.0	CC-109	125.6	19.4	105.1	100+	LIFT NO. CLS		MC	06/16/93	NM	12/14/93
	15	37506N 41360E	6	1,916.6	CC-109	124.1	20.6	102.8	98.9	LIFT NO. CLS		MC	06/16/93	NM	12/14/93
	16	38819N 40472E	6	1,919.3	CC-109	132.3	18.2	111.8	100+	LIFT NO. CLS		MC	06/16/93	NM	12/14/93
	17	38819N 40264E	6	1,919.2	CC-109	130.0	19.3	108.8	98.1	LIFT NO. CLS		MC	06/16/93	NM	12/14/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-0468	18	38818N 40061E	6	1,920.2	CC-93	134.7	15.3	116.7	100+	LIFT NO. CLS		MC	06/16/93	NM	12/14/93
	19	38821N 39859E	6	1,919.9	CC-109	128.2	17.8	108.7	97.9	LIFT NO. CLS		MC	06/16/93	NM	12/14/93
	20	37205N 41089E	6	1,919.6	CC-109	131.2	20.0	109.2	98.3	LIFT NO. CLS		MC	06/16/93	NM	12/14/93
	21	37349N 41225E	6	1,918.5	CC-109	128.2	16.6	109.8	98.9	LIFT NO. CLS		MC	06/16/93	NM	12/14/93
	22	37529N 41383E	6	1,917.1	CC-109	127.0	16.2	109.2	98.4	LIFT NO. CLS		MC	06/16/93	NM	12/14/93

Count: 22

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-047A	01	37273N 41159E	6	1,920.0	CC-95	129.1	17.7	110.5	96.9	LIFT NO. CLS		AC	06/17/93	NM	12/14/93
	02	37440N 41316E	6	1,920.2	CC-95	130.1	15.8	113.2	99.3	LIFT NO. CLS		AC	06/17/93	NM	12/14/93
	03	37617N 41480E	6	1,919.9	CC-95	124.7	15.2	108.3	95.0	LIFT NO. CLS		AC	06/17/93	NM	12/14/93
	04	38216N 41581E	6	1,920.2	CC-95	129.1	17.7	109.7	96.2	LIFT NO. CLS		AC	06/17/93	NM	12/14/93
	05	38468N 41577E	6	1,920.0	CC-95	131.7	19.4	110.3	96.8	LIFT NO. CLS		AC	06/17/93	NM	12/14/93
	06	38694N 41574E	6	1,919.8	CC-95	130.2	18.4	109.8	96.3	LIFT NO. CLS		AC	06/17/93	NM	12/14/93
	07	38790N 39695E	4	1,920.0	CC-93	132.3	17.7	113.2	96.8	LIFT NO. DC		AC	06/17/93	NM	12/14/93
	08	38488N 39688E	4	1,920.0	CC-93	133.9	15.2	117.1	100+	LIFT NO. DC		AC	06/17/93	NM	12/14/93
	09	38175N 39686E	4	1,920.0	CC-93	134.7	16.7	116.3	99.5	LIFT NO. DC		AC	06/17/93	NM	12/14/93
	10	37880N 39685E	4	1,920.0	CC-93	135.4	17.3	115.3	98.6	LIFT NO. DC		AC	06/17/93	NM	12/14/93
	11	37550N 39725E	4	1,920.0	CC-93	130.3	17.2	112.0	95.8	LIFT NO. DC		AC	06/17/93	NM	12/14/93
	12	37270N 39910E	4	1,920.0	CC-93	127.2	14.2	112.2	96.0	LIFT NO. DC		AC	06/17/93	NM	12/14/93
	13	37070N 40829E	6	1,920.0	CC-93	132.7	17.8	113.5	97.0	LIFT NO. CLS		AC	06/17/93	NM	12/14/93
	14	37067N 40567E	6	1,920.6	CC-93	135.9	17.0	117.0	100+	LIFT NO. CLS		AC	06/17/93	NM	12/14/93
	15	37083N 40283E	6	1,920.5	CC-93	128.8	15.8	112.1	95.9	LIFT NO. CLS		AC	06/17/93	NM	12/14/93
	16	37192N 40053E	6	1,920.5	CC-93	130.0	17.3	111.6	95.3	LIFT NO. CLS		AC	06/17/93	NM	12/14/93
	17	RETEST #1, RPT. #93-38A	6	1,905.1	CC-341	129.6	20.8	107.2	95.8	LIFT NO. 3RD		AC	06/17/93	NM	12/14/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-047A	18	RETEST #4, RPT. #93-38A	6	1,904.1	CC-341	129.2	20.0	108.4	96.9	LIFT NO. 3RD		AC	06/17/93	NM	12/14/93
	19	RETEST #5, RPT. #93-38A	6	1,903.0	CC-341	132.3	21.4	109.8	98.2	LIFT NO. 3RD		AC	06/17/93	NM	12/14/93

Count: 19

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-048A	01	RETEST REP. 93-48B #2	6	1,906.5	CC-376	131.3	17.3	112.8	100+	LIFT NO. 4TH		AC	07/18/93	NM	12/14/93
	02	37160N 40581E	6	1,907.7	CC-377	130.5	15.1	114.2	98.2	LIFT NO. 4TH		AC	07/18/93	NM	12/14/93
	03	37325N 40670E	6	1,906.4	CC-377	133.4	14.8	117.1	100+	LIFT NO. 4TH		AC	07/18/93	NM	12/14/93
	04	37516N 40775E	6	1,904.9	CC-377	136.2	17.8	116.5	100+	LIFT NO. 4TH		AC	07/18/93	NM	12/14/93
	05	37144N 40783E	6	1,906.8	CC-377	134.3	16.4	116.2	100+	LIFT NO. 4TH		AC	07/18/93	NM	12/14/93
	06	37299N 40861E	6	1,905.9	CC-377	130.5	17.3	112.1	96.7	LIFT NO. 4TH		AC	07/18/93	NM	12/14/93
	07	37438N 40932E	6	1,904.5	CC-377	132.2	12.4	113.4	97.8	LIFT NO. 4TH	ST.127, CC-416, PROCTOR	AC	07/18/93	NM	12/14/93
	08	37600N 41010E	6	1,903.4	CC-377	130.5	17.8	111.6	96.2	LIFT NO. 4TH	ST.128, CC-417	AC	07/18/93	NM	12/14/93
	09	37190N 40965E	6	1,905.8	CC-383	130.5	18.9	110.6	99.9	LIFT NO. 4TH	ST.129, CC-418	AC	07/18/93	NM	12/14/93
	10	37337N 41070E	6	1,904.5	CC-383	129.8	18.6	109.4	98.8	LIFT NO. 4TH	ST.130, CC-419	AC	07/18/93	NM	12/14/93
	11	37484N 41175E	6	1,903.3	CC-383	129.2	18.7	108.7	98.2	LIFT NO. 4TH	ST.131, CC-420	AC	07/18/93	NM	12/14/93
	12	37484N 41175E	6	1,903.3	CC-383	130.9	19.3	109.7	99.1	LIFT NO. 4TH	SAND CONE FOR #11	AC	07/18/93	NM,SC	12/14/93

Count: 12

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-048B	01	37163N 40533E	6	1,908.0	CC-376	132.8	17.9	112.5	100	LIFT NO. 4TH	CLB-CC-410, PROCTOR	MC	06/18/93	NM	12/14/93
	02	37346N 40633E	6	1,906.5	CC-376	132.3	13.2	116.7	N/A	LIFT NO. 4TH	FAIL	MC	06/18/93	NM	12/14/93
	03	37538N 40738E	6	1,905.1	CC-376	127.7	18.5	107.6	97.8	LIFT NO. 4TH		MC	06/18/93	NM	12/14/93
	04	37538N 40738E	6	1,905.1	CC-376	129.2	22.3	105.6	96	LIFT NO. 4TH	SAND CONE FOR #3	MC	06/18/93	NM	12/14/93
	05	RETEST OF #2	6	1,906.5	CC-376	131.3	17.3	112.8	100+	LIFT NO. 4TH		MC	06/18/93	NM	12/14/93
	06	37160N 40581E	6	1,907.7	CC-377	131.9	14.7	114.9	99	LIFT NO. 4TH	ST.122, CLB-CC-411	MC	06/18/93	NM	12/14/93
	07	37325N 40670E	6	1,906.4	CC-377	128.2	14.0	112.2	96.8	LIFT NO. 4TH	ST.123, CLB-CC-412	MC	06/18/93	NM	12/14/93
	08	37516N 40775E	6	1,904.9	CC-377	137.8	16.8	117.6	100+	LIFT NO. 4TH	ST.124, CLB-CC-413	MC	06/18/93	NM	12/14/93
	09	37144N 40783E	6	1,906.8	CC-377	134.5	20.5	111.6	96.2	LIFT NO. 4TH	ST.125, CLB-CC-414	MC	06/18/93	NM	12/14/93
	10	37299N 40861E	6	1,905.9	CC-377	133.7	18.8	112.4	96.9	LIFT NO. 4TH	ST.126, CLB-CC-415	MC	06/18/93	NM	12/14/93
	11	37299N 40861E	6	1,905.9	CC-377	133.6	19.9	111.3	95.9	LIFT NO. 4TH		MC	06/18/93	NM	12/14/93
	12	37438N 40932E	6	1,904.5	CC-377	134.7	20.3	111.8	96.4	LIFT NO. 4TH		MC	06/18/93	NM	12/14/93
	13	37600N 41010E	6	1,903.4	CC-376	132.4	19.5	108.0	98.2	LIFT NO. 4TH		MC	06/18/93	NM	12/14/93

Count: 13

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-0498	01	37892N 39828E	6	1,907.7	CC-387	131.4	17.6	111.6	100+	LIFT NO. 3RD		MC	06/19/93	NM	12/14/93
	02	37844N 40038E	6	1,906.8	CC-387	134.4	19.2	112.6	100+	LIFT NO. 3RD		MC	06/19/93	NM	12/14/93
	03	37844N 40038E	6	1,906.8	CC-387	128.9	20.4	106.9	95.9	LIFT NO. 3RD		MC	06/19/93	NM	12/14/93
	04	37805N 40212E	6	1,905.9	CC-387	131.4	20.2	109.2	98	LIFT NO. 3RD	CLB-CC-421, PROCTOR	MC	06/19/93	NM	12/14/93
	05	37766N 40391E	6	1,905.3	CC-387	131.7	21.6	108.2	97	LIFT NO. 3RD		MC	06/19/93	NM	12/14/93
	06	37721N 40597E	6	1,904.3	CC-387	131.1	18.8	110.2	98.8	LIFT NO. 3RD		MC	06/19/93	NM	12/14/93
	07	37995N 39785E	6	1,906.9	CC-387	127.4	21.7	104.6	93.8	LIFT NO. 3RD	M.C. FAILS	MC	06/19/93	NM	12/14/93
	08	37953N 39969E	6	1,906.5	CC-387	128.1	24.6	102.7	92.1	LIFT NO. 3RD	CLB-CC-422, PROCTOR	MC	06/19/93	NM	12/14/93
	09	37909N 40156E	6	1,905.8	CC-378	125.2	26.5	98.8	93.7	LIFT NO. 3RD	M.C. FAILS	MC	06/19/93	NM	12/14/93
	10	37866N 40353E	6	1,905.0	CC-387	130.3	21.4	107.2	96.1	LIFT NO. 3RD	M.C. FAILS	MC	06/19/93	NM	12/14/93
	11	37826N 40551E	6	1,904.1	CC-387	129.6	21.0	107.0	95.9	LIFT NO. 3RD	M.C. FAILS	MC	06/19/93	NM	12/14/93
	12	37791N 40715E	6	1,903.2	CC-378	126.3	26.0	100.1	94.9	LIFT NO. 3RD	M.C. FAILS	MC	06/19/93	NM	12/14/93

Count: 12

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-050A	01	RETEST #8, RPT. 93-049B	6	1,906.5	CC-387	121.4	15.7	105.5	94.6	LIFT NO. 3RD		AC	06/21/93	NM	12/10/93
	02	RETEST #9, RPT. 93-049B	6	1,905.8	CC-387	126.8	15.9	110.2	98.8	LIFT NO. 3RD		AC	06/21/93	NM	12/10/93
	03	RETEST #10, RPT. 93-049B	6	1,905.0	CC-387	125.1	15.9	108.7	97.5	LIFT NO. 3RD		AC	06/21/93	NM	12/10/93
	04	RETEST #11, RPT. 93-049B	6	1,904.1	CC-387	119.6	14.1	105.6	94.7	LIFT NO. 3RD		AC	06/21/93	NM	12/10/93
	05	RETEST #12, RPT. 93-049B	6	1,903.2	CC-387	130.5	16.9	112.5	100+	LIFT NO. 3RD		AC	06/21/93	NM	12/10/93
	06	38038N 39873E	6	1,906.3	CC-378	123.5	16.2	107.1	100+	LIFT NO. 3RD	MOISTURE FAILS	AC	06/21/93	NM	12/10/93
	07	38000N 40063E	6	1,905.5	CC-378	122.9	16.9	105.9	100+	LIFT NO. 3RD	MOISTURE FAILS	AC	06/21/93	NM	12/10/93
	08	37948N 40286E	6	1,904.7	CC-378	120.6	17.4	103.5	98.1	LIFT NO. 3RD	MOISTURE FAILS	AC	06/21/93	NM	12/10/93
	09	37905N 40480E	6	1,903.9	CC-378	129.4	14.9		N/A	LIFT NO. 3RD	MOISTURE FAILS	AC	06/21/93	NM	12/10/93
	10	37867N 40657E	6	1,903.2	CC-378	129.4	15.6		N/A	LIFT NO. 3RD	MOISTURE FAILS	AC	06/21/93	NM	12/10/93
	11	38169N 39862E	6	1,905.9	CC-378	129.3	19.2	108.3	100+	LIFT NO. 3RD		AC	06/21/93	NM	12/10/93
	12	38124N 40074E	6	1,904.9	CC-378	129.1	19.1	108.3	100+	LIFT NO. 3RD		AC	06/21/93	NM	12/10/93
	13	38078N 40299E	6	1,904.1	CC-378	130.7	20.5	108.3	100+	LIFT NO. 3RD		AC	06/21/93	NM	12/10/93
	14	38037N 40499E	6	1,903.3	CC-378	125.6	21.0	103.7	98.3	LIFT NO. 3RD		AC	06/21/93	NM	12/10/93
	15	38007N 40655E	6	1,902.5	CC-378	124.8	22.9	101.4	96.1	LIFT NO. 3RD		AC	06/21/93	NM	12/10/93

Count: 15

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-050B	01	37664N 41338E	6	1,900.3	CC-378	123.2	26.8	97.0	92	LIFT NO. 3RD	M.C. FAILS	MC	06/21/93	NM	12/14/93
	02	37700N 41169E	6	1,901.0	CC-387	126.3	20.7	104.5	93.7	LIFT NO. 3RD	LIFTS NOT BONDED	MC	06/21/93	NM	12/14/93
	03	37746N 40951E	6	1,901.7	CC-387	122.0	9.4		N/A	LIFT NO. 3RD	LIFTS NOT BONDED, M.C. FAILS	MC	06/21/93	NM	12/14/93

Count: 3

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-051A	01	RETEST #10, RPT. 93-050A	6	1,903.2	CC-378	130.3	21.3	108.2	100+	LIFT NO. 3RD		AC	06/22/93	NM	12/10/93
	02	RETEST #9, RPT. 93-050A	6	1,903.9	CC-378	122.3	16.5		N/A	LIFT NO. 3RD	FAILS	AC	06/22/93	NM	12/10/93
	03	RETEST #8, RPT. 93-050A	6	1,904.7	CC-378	127.9	16.1		N/A	LIFT NO. 3RD	FAILS	AC	06/22/93	NM	12/10/93
	04	RETEST #7, RPT. 93-050A	6	1,905.5	CC-378	116.7	16.3		N/A	LIFT NO. 3RD	FAILS	AC	06/22/93	NM	12/10/93
	05	RETEST #6, RPT. 93-050A	6	1,906.3	CC-378	129.6	17.6	111.0	100+	LIFT NO. 3RD		AC	06/22/93	NM	12/10/93
	06	38289N 39902E	6	1,904.0	CC-388	124.3	23.6	101.3	100+	LIFT NO. 1ST		AC	06/22/93	NM	12/10/93
	07	38252N 40086E	6	1,903.4	CC-388	123.7	23.8	100.6	100+	LIFT NO. 1ST	CC-429, PROCTOR	AC	06/22/93	NM	12/10/93
	08	38217N 40286E	6	1,902.6	CC-388	127.3	23.5	103.8	100+	LIFT NO. 1ST		AC	06/22/93	NM	12/10/93
	09	38176N 40497E	6	1,901.7	CC-376	129.4	20.5	108.2	98	LIFT NO. 1ST		AC	06/22/93	NM	12/10/93
	10	38150N 40634E	6	1,901.1	CC-376	129.6	21.9	107.1	97.4	LIFT NO. 1ST		AC	06/22/93	NM	12/10/93
	11	38518N 39870E	6	1,903.2	CC-376	132.6	19.9	111.4	100+	LIFT NO. 1ST		AC	06/22/93	NM	12/10/93
	12	38489N 40083E	6	1,902.1	CC-376	124.5	22.4	102.4	93.1	LIFT NO. 1ST		AC	06/22/93	NM	12/10/93
	13	38458N 40261E	6	1,901.5	CC-376	128.3	20.4	107.3	97.6	LIFT NO. 1ST		AC	06/22/93	NM	12/10/93
	14	38429N 40435E	6	1,900.7	CC-376	125.1	20.7	104.4	94.9	LIFT NO. 1ST		AC	06/22/93	NM	12/10/93
	15	38392N 40659E	6	1,899.7	CC-376	126.3	21.5	104.7	95.2	LIFT NO. 1ST	SAND CONE	AC	06/22/93	NM,SC	12/10/93
	16	RETEST #2, RPT. 93-051A	6	1,903.9	CC-378	130.8	19.0	110.7	100+	LIFT NO. 3RD		AC	06/22/93	NM	12/10/93
	17	RETEST #3, RPT. 93-051A	6	1,904.7	CC-378	125.1	18.7	106.7	100+	LIFT NO. 3RD		AC	06/22/93	NM	12/10/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-051A	18	RETEST #4, RPT. 93-051A	6	1,905.5	CC-378	128.4	18.9	108.8	100+	LIFT NO. 3RD		AC	06/22/93	NM	12/10/93
	19	38115N 40708E	6	1,901.3	CC-388	124.6	24.7	100.6	100+	LIFT NO. 3RD	CC-434, ST.136	AC	06/22/93	NM	12/10/93
	20	38157N 40503E	6	1,902.4	CC-388	133.7	18.8	113.4	100+	LIFT NO. 3RD	CC-435, ST.137	AC	06/22/93	NM	12/10/93
	21	38192N 40278E	6	1,903.5	CC-388	127.2	21.5	105.4	100+	LIFT NO. 3RD	CC-436, ST.138	AC	06/22/93	NM	12/10/93
	22	38227N 40077E	6	1,903.9	CC-378	123.3	20.8	102.8	97.4	LIFT NO. 3RD	CC-437, ST.139	AC	06/22/93	NM	12/10/93
	23	38264N 39851E	6	1,904.9	CC-378	126.5	19.9	107.2	100+	LIFT NO. 3RD	CC-438, ST.140	AC	06/22/93	NM	12/10/93

Count: 23

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-051B	01	37995N 40833E	6	1,901.1	CC-387	128.0	20.3	106.3	95.3	LIFT NO. 2ND	CLB-CC-430, ST.132	MC	06/22/93	NM	12/10/93
	02	37963N 41018E	6	1,900.7	CC-378	127.1	24.8	101.7	96.4	LIFT NO. 2ND	CLB-CC-431, ST.133	MC	06/22/93	NM	12/10/93
	03	37910N 41240E	6	1,899.5	CC-378	125.3	23.4	101.4	96.1	LIFT NO. 2ND	CLB-CC-432, ST.134	MC	06/22/93	NM	12/10/93
	04	37865N 41450E	6	1,898.5	CC-378	131.9	22.7	107.4	100+	LIFT NO. 2ND	CLB-CC-433, ST.135	MC	06/22/93	NM	12/10/93
	05	RETEST #7, RPT. 93-049B	6	1,906.9	CC-387	126.5	16.5	108.5	97.3	LIFT NO. 3RD		MC	06/22/93	NM	12/10/93

Count: 5

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-052A	01	38260N 40736E	6	1,900.0	CC-376	125.7	21.1	104.5	95.0	LIFT NO. 2ND	CC-439, ST.141	AC	06/23/93	NM	12/10/93
	02	38288N 40543E	6	1,901.3	CC-376	127.6	22.0	105.3	95.7	LIFT NO. 2ND	CC-440, ST.142, PROCTOR	AC	06/23/93	NM	12/10/93
	03	38322N 40332E	6	1,902.3	CC-378	125.1	24.7	100.2	95.0	LIFT NO. 2ND	CC-441, ST.143	AC	06/23/93	NM	12/10/93
	04	38353N 40125E	6	1,903.2	CC-378	127.4	23.9	103.5	98.1	LIFT NO. 2ND	CC-442, ST.144	AC	06/23/93	NM	12/10/93
	05	38391N 39895E	6	1,904.0	CC-378	128.4	24.3	104.0	98.5	LIFT NO. 2ND	CC-443, ST.145	AC	06/23/93	NM	12/10/93
	06	38550N 39818E	6	1,903.7	CC-376	124.5	21.5	103.2	97.8	LIFT NO. 2ND		AC	06/23/93	NM	12/10/93
	07	38518N 40018E	6	1,903.1	CC-376	127.4	24.1		N/A	LIFT NO. 2ND	MOISTURE FAILS	AC	06/23/93	NM	12/10/93
	08	38479N 40225E	6	1,902.2	CC-376	127.8	22.6		N/A	LIFT NO. 2ND	MOISTURE FAILS	AC	06/23/93	NM	12/10/93
	09	38431N 40459E	6	1,901.3	CC-376	124.3	24.3		N/A	LIFT NO. 2ND	MOISTURE FAILS	AC	06/23/93	NM	12/10/93
	10	38387N 40701E	6	1,900.2	CC-376	124.8	25.8		N/A	LIFT NO. 2ND	MOISTURE FAILS	AC	06/23/93	NM	12/10/93
	11	RETEST #3, RPT. 93-050B	6	1,901.7	CC-387	129.2	20.3	108.2	97.0	LIFT NO. 2ND	CC-444, ST.146	AC	06/23/93	NM	12/10/93
	12	RETEST #2, RPT. 93-050B	6	1,901.0	CC-387	127.2	19.8	106.2	95.3	LIFT NO. 2ND	CC-445, ST.147	AC	06/23/93	NM	12/10/93
	13	RETEST #1, RPT. 93-050B	6	1,900.3	CC-378	130.4	19.4	110.0	100+	LIFT NO. 2ND	CC-446, ST.148	AC	06/23/93	NM	12/10/93

Count: 13

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-055A	01	38376N 39849E	6	1,904.7	CC-416	126.3	24.7		N/A	LIFT NO. 3RD	MOISTURE FAILS	AC	06/28/93	NM	12/10/93
	02	38328N 40096E	6	1,904.1	CC-416	116.8	26.1		N/A	LIFT NO. 3RD	MOISTURE FAILS	AC	06/28/93	NM	12/10/93
	03	38286N 40321E	6	1,903.2	CC-416	127.2	24.0	104.1	94.2	LIFT NO. 3RD	MOISTURE FAILS	AC	06/28/93	NM	12/10/93
	04	38246N 40539E	6	1,902.0	CC-416	127.0	24.1	103.9	94.0	LIFT NO. 3RD	MOISTURE FAILS	AC	06/28/93	NM	12/10/93
	05	38223N 40695E	6	1,901.3	CC-416	126.3	24.4	103.1	93.3	LIFT NO. 3RD	MOISTURE FAILS	AC	06/28/93	NM	12/10/93
	06	RETEST #6, RPT. 93-052A	6	1,903.7	CC-376	130.4	18.3	111.0	100+	LIFT NO. 2ND	CC-447, ST.149	AC	06/28/93	NM	12/10/93
	07	RETEST #7, RPT. 93-052A	6	1,903.1	CC-376	124.2	20.3	104.1	94.6	LIFT NO. 2ND	CC-448, ST.150	AC	06/28/93	NM	12/10/93
	08	RETEST #8, RPT. 93-052A	6	1,902.2	CC-376	127.7	20.2	107.0	97.3	LIFT NO. 2ND	CC-449, ST.151	AC	06/28/93	NM	12/10/93
	09	RETEST #9, RPT. 93-052A	6	1,901.3	CC-381	126.3	22.4	103.9	100+	LIFT NO. 2ND	CC-450, ST.152	AC	06/28/93	NM	12/10/93
	10	RETEST #10, RPT. 93-052A	6	1,900.2	CC-376	130.1	18.5	110.6	100+	LIFT NO. 2ND	CC-451, ST.153	AC	06/28/93	NM	12/10/93
	11	RETEST #1	6	1,904.7	CC-416	127.8	20.5	106.8	96.7	LIFT NO. 3RD		AC	06/28/93	NM	12/10/93
	12	RETEST #2	6	1,904.1	CC-416	128.2	20.6	107.2	97.0	LIFT NO. 3RD		AC	06/28/93	NM	12/10/93
	13	RETEST #3	6	1,903.2	CC-416	130.7	18.2	111.4	100+	LIFT NO. 3RD		AC	06/28/93	NM	12/10/93
	14	RETEST #4	6	1,902.0	CC-416	126.3	19.4	106.7	96.6	LIFT NO. 3RD		AC	06/28/93	NM	12/10/93
	15	RETEST #5	6	1,901.3	CC-416	126.3	19.8	106.2	96.1	LIFT NO. 3RD		AC	06/28/93	NM	12/10/93

Count: 15

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-073B	01	37706N 40769E	6"	1,902.9	CC-376	124.9	19.6	104.5	95	LIFT NO. 2ND	RECHECK DENSITIES	MC	08/03/93	NM	12/10/93
	02	37677N 40941E	6"	1,902.2	CC-376	129.3	18.5	109.0	99.1	LIFT NO. 2ND	RECHECK DENSITIES	MC	08/03/93	NM	12/10/93
	03	37655N 41141E	6"	1,901.3	CC-376	122.0	16.1	105.1	95.5	LIFT NO. 2ND	RECHECK DENSITIES	MC	08/03/93	NM	12/10/93
	04	37603N 41317E	6"	1,900.6	CC-376	127.3	16.4	109.2	99.2	LIFT NO. 2ND	RECHECK DENSITIES	MC	08/03/93	NM	12/10/93
	05	37756N 41356E	6"	1,899.7	CC-376	129.7	18.4	109.4	99.5	LIFT NO. 2ND	RECHECK DENSITIES	MC	08/03/93	NM	12/10/93
	06	37799N 41136E	6"	1,900.0	CC-376	125.6	19.7	104.8	95.2	LIFT NO. 2ND	RECHECK DENSITIES	MC	08/03/93	NM	12/10/93
	07	37821N 40970E	6"	1,901.3	CC-376	126.0	19.5	105.2	95.6	LIFT NO. 2ND	RECHECK DENSITIES	MC	08/03/93	NM	12/10/93
	08	37850N 40793E	6"	1,902.2	CC-376	125.1	19.1	104.9	95.4	LIFT NO. 2ND	RECHECK DENSITIES	MC	08/03/93	NM	12/10/93

Count: 8

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-074A	01	37992N 40636E	6"	1,902.6	CC-376	124.0	17.9	105.9	96.3	LIFT NO. 2ND		AC	08/04/93	NM	12/10/93
	02	38040N 40421E	6"	1,903.6	CC-376	129.6	18.0	110.6	100+	LIFT NO. 2ND		AC	08/04/93	NM	12/10/93
	03	38083N 40222E	6"	1,904.8	CC-376	127.7	19.1	108.0	98.1	LIFT NO. 2ND		AC	08/04/93	NM	12/10/93
	04	38136N 39991E	6"	1,905.9	CC-376	129.2	20.3	107.3	97.6	LIFT NO. 2ND		AC	08/04/93	NM	12/10/93
	05	38199N 39777E	6"	1,906.7	CC-376	128.8	20.1	108.0	98.1	LIFT NO. 2ND		AC	08/04/93	NM	12/10/93

Count: 5

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-074B	01	37786N 41412E	6"	1,900.1	CC-410	119.2	28.4	92.7	85.1	LIFT NO. 3RD	FAILS	MC	08/04/93	NM	12/10/93
	02	37830N 41188E	6"	1,900.0	CC-416	129.1	21.9	105.8	95.8	LIFT NO. 3RD		MC	08/04/93	NM	12/10/93
	03	37864N 40971E	6"	1,901.8	CC-416	124.0	20.0	106.0	96	LIFT NO. 3RD		MC	08/04/93	NM	12/10/93
	04	37875N 40799E	6"	1,902.3	CC-416	126.1	20.3	104.9	95	LIFT NO. 3RD		MC	08/04/93	NM	12/10/93
	05	37735N 40921E	6"	1,902.8	CC-385	121.6	24.1	98.0	98	LIFT NO. 3RD	CC-452, PROCTOR	MC	08/04/93	NM	12/10/93
	06	37701N 41278E	6"	1,901.0	CC-385	122.8	24.0	99.0	99	LIFT NO. 3RD		MC	08/04/93	NM	12/10/93

Count: 6

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-075A	01	37691N 40799E	6"	1,903.6	CC-410	126.8	21.8	104.6	95.8	LIFT NO. 3RD		AC	08/05/93	NM	12/10/93
	02	37668N 41071E	6"	1,902.3	CC-410	123.6	21.6	104.4	95.7	LIFT NO. 3RD		AC	08/05/93	NM	12/10/93
	03	37649N 41269E	6"	1,901.1	CC-410	124.7	21.4	102.6	94.2	LIFT NO. 3RD		AC	08/05/93	NM	12/10/93
	04	RETEST #1, RPT. 93-74B	6"	1,900.1	CC-410	133.0	18.2	113.3	100+	LIFT NO. 3RD		AC	08/05/93	NM	12/10/93

Count: 4

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-076A	01	37895N 41359E	6"	1,899.4	CC-445	123.8	22.3	101.9	99.8	LIFT NO. 3RD		AC	08/06/93	NM	12/10/93
	02	37921N 41184E	6"	1,900.3	CC-421	126.3	22.4	103.9	98.7	LIFT NO. 3RD		AC	08/06/93	NM	12/10/93
	03	37942N 40980E	6"	1,901.2	CC-421	125.4	21.4	103.2	98.1	LIFT NO. 3RD	SAND CONE	AC	08/06/93	NM,SC	12/10/93
	04	37967N 40789E	6"	1,902.0	CC-421	122.2	17.5	103.9	98.7	LIFT NO. 3RD		AC	08/06/93	NM	12/10/93

Count: 4

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-077A	01	38295N 39831E	6"	1,905.9	CC-410	128.5	19.9	107.9	99.1	LIFT NO. 4TH	CC-462, ST.163	AC	08/07/93	NM	12/10/93
	02	38258N 40044E	6"	1,905.2	CC-410	127.3	20.5	106.4	97.7	LIFT NO. 4TH	CC-461, ST.162	AC	08/07/93	NM	12/10/93
	03	38220N 40218E	6"	1,904.4	CC-410	125.9	19.1	106.5	97.8	LIFT NO. 4TH	CC-460, ST.161	AC	08/07/93	NM	12/10/93
	04	38184N 40402E	6"	1,903.6	CC-410	125.6	17.3	107.9	99.1	LIFT NO. 4TH	CC-459, ST.160, PROCTOR	AC	08/07/93	NM	12/10/93
	05	38136N 40645E	6"	1,902.7	CC-410	128.4	23.5	104.6	96.0	LIFT NO. 4TH	CC-458, ST.159	AC	08/07/93	NM	12/10/93
	06	38242N 40671E	6"	1,901.9	CC-410	127.5	21.8	105.4	96.8	LIFT NO. 4TH	CC-467, ST.168	AC	08/07/93	NM	12/10/93
	07	38293N 40430E	6"	1,902.8	CC-410	128.2	19.1	108.4	99.5	LIFT NO. 4TH	CC-466, ST.167	AC	08/07/93	NM	12/10/93
	08	38332N 40235E	6"	1,903.7	CC-410	120.5	17.4	103.7	95.2	LIFT NO. 4TH	CC-465, ST.166	AC	08/07/93	NM	12/10/93
	09	38369N 40060E	6"	1,904.4	CC-410	126.0	18.7	106.9	98.2	LIFT NO. 4TH	CC-464, ST.165, PROCTOR	AC	08/07/93	NM	12/10/93
	10	38411N 39832E	6"	1,905.2	CC-421	122.7	19.7	103.2	97.8	LIFT NO. 4TH	CC-463, ST.164	AC	08/07/93	NM	12/10/93

Count: 10

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-077B	01	38192N 39823E	6"	1,906.6	CC-410	123.5	17.9	104.6	96	LIFT NO. 4TH	CC-453, ST.154	MC	08/05/93	NM	12/10/93
	02	38157N 40016E	6"	1,905.8	CC-410	126.6	18.6	106.6	97.9	LIFT NO. 4TH	CC-454, ST.155	MC	08/05/93	NM	12/10/93
	03	38118N 40188E	6"	1,905.0	CC-410	129.6	17.9	109.8	100	LIFT NO. 4TH	CC-455, ST.156	MC	08/05/93	NM	12/10/93
	04	38079N 40385E	6"	1,904.4	CC-410	124.1	19.8	103.0	94.5	LIFT NO. 4TH		MC	08/05/93	NM	12/10/93
	05	RETEST #4	6"	1,904.4	CC-410	128.2	17.7	108.8	99.9	LIFT NO. 4TH	CC-456, ST.157	MC	08/05/93	NM	12/10/93
	06	38040N 40587E	6"	1,903.6	CC-410	124.8	19.1	104.7	96.2	LIFT NO. 4TH	CC-457, ST.158	MC	08/05/93	NM	12/10/93

Count: 6

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-078A	01	37582N 41284E	6"	1,902.3	CC-376	125.9	15.9	109.4	99.5	LIFT NO. 4TH	CC-468, ST.169, PROCTOR	AC	08/09/93	NM	12/10/93
	02	37626N 41076E	6"	1,903.1	CC-410	123.6	18.5	105.1	96.5	LIFT NO. 4TH	CC-469, ST.170	AC	08/09/93	NM	12/10/93
	03	37651N 40870E	6"	1,904.1	CC-410	127.0	21.5	105.3	96.7	LIFT NO. 4TH	CC-470, ST.171	AC	08/09/93	NM	12/10/93
	04	37676N 40644E	6"	1,904.9	CC-410	123.3	20.4	103.6	95.1	LIFT NO. 4TH	CC-471, ST.172	AC	08/09/93	NM	12/10/93
	05	37858N 40690E	6"	1,903.7	CC-410	126.3	22.2	104.1	95.6	LIFT NO. 4TH	CC-472, ST.173	AC	08/09/93	NM	12/10/93
	06	37861N 40887E	6"	1,903.0	CC-410	125.7	20.6	105.0	96.4	LIFT NO. 4TH	CC-473, ST.174	AC	08/09/93	NM	12/10/93
	07	37831N 41087E	6"	1,902.1	CC-410	127.1	22.8	103.5	95.0	LIFT NO. 4TH	CC-474, ST.175, PROCTOR	AC	08/09/93	NM	12/10/93
	08	37792N 41303E	6"	1,901.2	CC-410	129.4	19.5	109.1	100+	LIFT NO. 4TH	CC-475, ST.176, SAND CONE	AC	08/09/93	NM,SC	12/10/93
	09	37760N 41460E	6"	1,900.6	CC-410	127.1	23.2	103.9	95.4	LIFT NO. 4TH	CC-476, ST.177	AC	08/09/93	NM	12/10/93
	10	38020N 40724E	6"	1,902.9	CC-410	126.4	19.4	106.6	97.9	LIFT NO. 4TH	CC-477, ST.178	AC	08/09/93	NM	12/10/93
	11	37993N 40902E	6"	1,902.3	CC-410	126.8	20.7	105.1	96.5	LIFT NO. 4TH	CC-478, ST.179	AC	08/09/93	NM	12/10/93
	12	37960N 41119E	6"	1,901.4	CC-410	128.5	21.6	105.7	97.0	LIFT NO. 4TH	CC-479, ST.180	AC	08/09/93	NM	12/10/93
	13	37922N 41333E	6"	1,900.3	CC-410	125.9	21.6	104.3	95.8	LIFT NO. 4TH	CC-480, ST.181	AC	08/09/93	NM	12/10/93
	14	37896N 41466E	6"	1,899.9	CC-410	125.6	23.3	103.6	95.1	LIFT NO. 4TH	CC-481, ST.182	AC	08/09/93	NM	12/10/93
	15	38225N 41420E	6"	1,896.1	CC-265	135.5	16.0	117.7	100+	LIFT NO. SG	CC-482	AC	08/09/93	NM	12/10/93
	16	38240N 41256E	6"	1,896.8	CC-265	136.3	16.8	117.6	100+	LIFT NO. SG	CC-483	AC	08/09/93	NM	12/10/93
	17	38259N 41086E	6"	1,897.5	CC-265	129.4	19.1	109.4	98.1	LIFT NO. SG	CC-484	AC	08/09/93	NM	12/10/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-078A	18	38280N 40914E	6"	1,898.3	CC-265	130.4	19.0	110.4	99.0	LIFT NO. SG	CC-485	AC	08/09/93	NM	12/10/93
	19	38458N 40893E	6"	1,897.6	CC-265	128.2	20.4	107.2	96.1	LIFT NO. SG	CC-486	AC	08/09/93	NM	12/10/93
	20	38445N 41056E	6"	1,896.9	CC-265	127.2	21.3	105.6	94.7	LIFT NO. SG	CC-487	AC	08/09/93	NM	12/10/93
	21	38430N 41221E	6"	1,896.1	CC-265	127.2	21.3	105.6	94.7	LIFT NO. SG	CC-488	AC	08/09/93	NM	12/10/93
	22	38592N 41228E	6"	1,895.3	CC-462	118.9	22.7	96.9	90.3	LIFT NO. SG	CC-489	AC	08/09/93	NM	12/10/93
	23	38592N 41077E	6"	1,896.0	CC-265	125.2	21.5	103.0	92.4	LIFT NO. SG	CC-490	AC	08/09/93	NM	12/10/93
	24	38596N 40940E	6"	1,896.5	CC-265	124.6	21.9	102.2	91.7	LIFT NO. SG	CC-491	AC	08/09/93	NM	12/10/93
	25	38133N 40800E	6"	1,900.0	CC-406	128.1	16.6	110.7	100+	LIFT NO. 1ST		AC	08/09/93	NM	12/10/93
	26	38106N 40966E	6"	1,899.6	CC-406	124.8	20.1	104.7	96.0	LIFT NO. 1ST		AC	08/09/93	NM	12/10/93
	27	38076N 41155E	6"	1,898.5	CC-406	123.8	18.6	104.4	95.8	LIFT NO. 1ST	CC-492, PROCTOR	AC	08/09/93	NM	12/10/93
	28	38044N 41391E	6"	1,897.8	CC-406	129.1	16.4	111.7	100+	LIFT NO. 1ST		AC	08/09/93	NM	12/10/93
	29	38408N 40755E	6"	1,899.3	CC-406	129.3	19.4	109.4	100+	LIFT NO. 3RD		AC	08/09/93	NM	12/10/93
	30	38456N 40533E	6"	1,900.6	CC-406	123.5	18.5	105.0	96.3	LIFT NO. 3RD		AC	08/09/93	NM	12/10/93
	31	38495N 40329E	6"	1,901.6	CC-406	127.0	19.8	106.8	97.9	LIFT NO. 3RD		AC	08/09/93	NM	12/10/93
	32	38539N 40107E	6"	1,902.5	CC-406	127.4	16.8	109.1	100	LIFT NO. 3RD		AC	08/09/93	NM	12/10/93
	33	38579N 39864E	6"	1,903.4	CC-406	127.5	19.4	106.7	97.8	LIFT NO. 3RD		AC	08/09/93	NM	12/10/93

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-079A	01	38707N 39840E	6"	1,903.1	CC-421	124.2	19.6	104.6	99.4	LIFT NO. 2ND	CC-493, ST.183	AC	08/10/93	NM	12/10/93
	02	38692N 40044E	6"	1,902.3	CC-421	120.0	19.3	101.3	96.3	LIFT NO. 2ND	CC-494, ST.184	AC	08/10/93	NM	12/10/93
	03	38671N 40233E	6"	1,901.1	CC-421	121.7	16.7	104.3	99.1	LIFT NO. 2ND	CC-495, ST.185	AC	08/10/93	NM	12/10/93
	04	38645N 40442E	6"	1,900.0	CC-421	120.8	18.2	102.2	97.1	LIFT NO. 1ST		AC	08/10/93	NM	12/10/93
	05	38623N 40629E	6"	1,899.1	CC-421	124.6	21.6	103.2	98.1	LIFT NO. 1ST		AC	08/10/93	NM	12/10/93
	06	38601N 40822E	6"	1,898.1	CC-421	122.9	20.3	102.9	97.8	LIFT NO. 1ST		AC	08/10/93	NM	12/10/93

Count: 6

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-079B	01	38641N 39882E	6"	1,903.6	CC-387	129.7	16.3	111.4	99.9	LIFT NO. 3RD		MC	08/10/93	NM	12/10/93
	02	38618N 40090E	6"	1,902.7	CC-387	128.1	16.6	109.7	98.4	LIFT NO. 3RD		MC	08/10/93	NM	12/10/93
	03	38589N 40278E	6"	1,901.9	CC-387	127.8	22.0	104.6	93.9	LIFT NO. 3RD	MOISTURE FAILS	MC	08/10/93	NM	12/10/93

Count: 3

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-080A	01	38345N 41437E	6"	1,895.4	CC-376	127.1	21.2	104.2	94.7	LIFT NO. 1ST	DENSITY FAILS	AC	08/11/93	NM	12/9/93
	02	38373N 41230E	6"	1,896.9	CC-376	121.7	19.4	102.7	93.4	LIFT NO. 1ST	DENSITY FAILS	AC	08/11/93	NM	12/9/93
	03	38326N 41067E	6"	1,897.6	CC-376	122.8	21.4	101.9	92.6	LIFT NO. 1ST	DENSITY FAILS	AC	08/11/93	NM	12/9/93
	04	38422N 40855E	6"	1,898.3	CC-376	117.4	16.7	100.6	91.4	LIFT NO. 1ST	DENSITY FAILS	AC	08/11/93	NM	12/9/93
	05	38598N 40795E	6"	1,898.4	CC-376	127.9	17.7	109.5	99.5	LIFT NO. 1ST		AC	08/11/93	NM	12/9/93
	06	38578N 41024E	6"	1,897.0	CC-376	123.5	18.5	105.0	95.4	LIFT NO. 1ST		AC	08/11/93	NM	12/9/93
	07	38569N 41232E	6"	1,896.0	CC-376	129.3	19.8	108.7	98.8	LIFT NO. 1ST		AC	08/11/93	NM	12/9/93
	08	38561N 41387E	6"	1,894.4	CC-376	126.1	23.0	103.2	93.8	LIFT NO. SG	CC-499	AC	08/11/93	NM	12/9/93
	09	RETEST #1	6"	1,895.4	CC-376	129.3	21.5	107.2	97.4	LIFT NO. 1ST		AC	08/11/93	NM	12/9/93
	10	RETEST #2	6"	1,896.8	CC-376	131.5	17.8	112.5	100+	LIFT NO. 1ST		AC	08/11/93	NM	12/9/93
	11	RETEST #3	6"	1,897.6	CC-376	123.8	18.4	104.6	95.1	LIFT NO. 1ST		AC	08/11/93	NM	12/9/93
	12	RETEST #4	6"	1,898.3	CC-376	126.8	19.8	106.6	96.9	LIFT NO. 1ST		AC	08/11/93	NM	12/9/93
	13	RETEST #1, REP.#93-80B	6"	1,899.0	CC-376	127.7	18.7	108.4	98.6	LIFT NO. 1ST		AC	08/11/93	NM	12/9/93
	14	38699N 40966E	6"	1,986.0	CC-292	122.6	21.4	101.7	92.6	LIFT NO. SG	CC-500	AC	08/11/93	NM	12/9/93
	15	38682N 41293E	6"	1,894.3	CC-292	127.7	21.4	105.9	96.4	LIFT NO. SG	CC-501	AC	08/11/93	NM	12/9/93
	16	38177N 40802E	6"	1,900.4	CC-380	128.4	20.8	106.2	98.8	LIFT NO. 2ND	CC-502, ST.186	AC	08/11/93	NM	12/10/93
	17	38140N 41032E	6"	1,899.6	CC-380	124.9	21.7	102.5	95.3	LIFT NO. 2ND	CC-503, ST.187	AC	08/11/93	NM	12/10/93

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-080A	18	38106N 41242E	6"	1,898.5	CC-380	127.5	22.2	105.1	97.8	LIFT NO. 2ND	CC-504, ST.188	AC	08/11/93	NM	12/10/93
	19	38088N 41425E	6"	1,897.8	CC-376	132.4	16.2	114.8	100+	LIFT NO. 2ND	CC-505, ST.189	AC	08/11/93	NM	12/10/93
	20	RETEST #3, RPT. #93-79B	6"	1,901.9	CC-376	131.7	15.8	114.6	100+	LIFT NO. 3RD		AC	08/11/93	NM	12/10/93
	21	38567N 40518E	6"	1,900.0	CC-376	127.5	16.7	110.1	100+	LIFT NO. 2ND	CC-512, ST.196	AC	08/11/93	NM	12/10/93
	22	38542N 40701E	6"	1,899.0	CC-376	125.6	19.1	105.5	95.9	LIFT NO. 2ND	CC-513, ST.197	AC	08/11/93	NM	12/10/93

Count: 22

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-080B	01	38306N 40829E	6"	1,899.0	CC-376	126.7	12.6		N/A	LIFT NO. 1	MOISTURE FAILS	MC	08/11/93	NM	12/10/93
	02	38279N 41009E	6"	1,898.4	CC-376	122.8	16.4	105.4	95.8	LIFT NO. 1		MC	08/11/93	NM	12/10/93
	03	38249N 41207E	6"	1,897.4	CC-387	126.8	13.9	111.4	N/A	LIFT NO. 1	MOISTURE FAILS	MC	08/11/93	NM	12/10/93
	04	RETEST #3	6"	1,896.5	CC-387	130.4	15.4	112.9	100+	LIFT NO. 1		MC	08/11/93	NM	12/10/93
	05	38226N 41410	6"	1,896.5	CC-387	133.3	15.1	114.0	100+	LIFT NO. 1		MC	08/11/93	NM	12/10/93
	06	RETEST #3, RPT. 93-79A	6"	1,901.1	CC-421	120.4	18.1	101.8	96.8	LIFT NO. 2	CC-498, R-ST.185	MC	08/11/93	NM	12/10/93
	07	RETEST #2, RPT. 93-79A	6"	1,902.3	CC-377	131.0	15.2	114.0	98.3	LIFT NO. 2	CC-497, R-ST.184	MC	08/11/93	NM	12/10/93
	08	RETEST #1, RPT. 93-79A	6"	1,903.1	CC-377	134.1	17.9	113.6	98	LIFT NO. 2	CC-496, R-ST.183	MC	08/11/93	NM	12/10/93
	09	38470N 40184E	6"	1,903.2	CC-416	126.4	18.0	107.0	96.9	LIFT NO. 4TH	CC-506, ST.190	MC	08/11/93	NM	12/10/93
	10	38504N 40006E	6"	1,903.8	CC-421	119.5	17.3	102.1	97.1	LIFT NO. 4TH	CC-507, ST.191	MC	08/11/93	NM	12/10/93
	11	38543N 39797E	6"	1,904.8	CC-416	123.9	17.7	104.9	95	LIFT NO. 4TH	CC-508, ST.192	MC	08/11/93	NM	12/10/93
	12	38647N 39806E	6"	1,904.3	CC-416	130.8	18.2	110.5	100	LIFT NO. 4TH	CC-509, ST.193	MC	08/11/93	NM	12/10/93
	13	38613N 39990E	6"	1,903.4	CC-416	126.6	17.1	108.0	97.7	LIFT NO. 4TH	CC-510, ST.194	MC	08/11/93	NM	12/10/93
	14	38584N 40176E	6"	1,902.7	CC-416	126.9	20.1	105.5	95.5	LIFT NO. 4TH	CC-511, ST.195	MC	08/11/93	NM	12/10/93

Count: 14

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-081A	01	38693N 40892E	6"	1,897.3	CC-340	133.1	19.3	112.4	100+	LIFT NO. 1ST		AC	08/12/93	NM	12/9/93
	02	38689N 41085E	6"	1,895.9	CC-340	128.6	19.6	108.3	98.4	LIFT NO. 1ST		AC	08/12/93	NM	12/9/93
	03	38681N 41265E	6"	1,894.8	CC-340	132.9	19.1	112.4	100+	LIFT NO. 1ST		AC	08/12/93	NM	12/9/93
	04	38450N 41413E	6"	1,896.0	CC-340	130.5	19.1	110.4	100+	LIFT NO. 1ST	CC-519, ST.202	AC	08/12/93	NM	12/9/93
	05	38477N 41204E	6"	1,897.0	CC-340	122.9	18.5	104.5	95.0	LIFT NO. 1ST	CC-520, ST.203	AC	08/12/93	NM	12/9/93
	06	38496N 41029E	6"	1,897.7	CC-340	120.6	16.0	104.7	95.2	LIFT NO. 1ST	CC-521, ST.204	AC	08/12/93	NM	12/9/93
	07	38520N 40833E	6"	1,898.5	CC-340	130.5	15.5	113.8	100+	LIFT NO. 1ST	CC-522, ST.205	AC	08/12/93	NM	12/9/93
	08	38681N 40655E	6"	1,898.7	CC-340	130.5	17.1	112.3	100+	LIFT NO. 1ST	CC-523, ST.206	AC	08/12/93	NM	12/9/93
	09	38670N 40791E	6"	1,898.1	CC-340	134.8	17.4	114.7	100+	LIFT NO. 1ST	CC-524, ST.207, PROCTOR	AC	08/12/93	NM	12/9/93
	10	38652N 40980E	6"	1,897.1	CC-340	130.5	16.5	112.9	100+	LIFT NO. 1ST	CC-525, ST.208	AC	08/12/93	NM	12/9/93
	11	38635N 41158E	6"	1,896.4	CC-340	131.2	19.4	110.7	100+	LIFT NO. 1ST	CC-526, ST.209	AC	08/12/93	NM	12/9/93
	12	38619N 41340E	6"	1,895.4	CC-340	132.8	18.5	112.9	100+	LIFT NO. 1ST	CC-527, ST.210	AC	08/12/93	NM	12/9/93

Count: 12

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-081B	01	38334N 40761E	6"	1,900.0	CC-416	126.6	16.1	108.9	98.6	LIFT NO. 2ND	CC-514, ST.198	MC	08/12/93	NM	12/9/93
	02	38309N 40956E	6"	1,898.9	CC-416	130.5	16.9	111.5	100+	LIFT NO. 2ND	CC-515, ST.199	MC	08/12/93	NM	12/9/93
	03	38283N 41112E	6"	1,898.4	CC-416	128.9	22.1	105.1	95.1	LIFT NO. 2ND	CC-516, ST.200	MC	08/12/93	NM	12/9/93
	04	38253N 41287E	6"	1,897.6	CC-416	130.1	18.9	109.3	98.9	LIFT NO. 2ND	CC-517, ST.201, PROCTOR	MC	08/12/93	NM	12/9/93
	05	38504N 40006E	6"	1,903.8	CC-416	123.4	15.8	106.4	96.2	LIFT NO. 4TH	CC-518, R-ST.191	MC	08/12/93	NM	12/9/93

Count: 5

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Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-082A	01	38136N 40783E	6"	1,901.2	CC-340	124.8	18.3	106.3	96.6	LIFT NO. 3RD	CC-528, PROCTOR	AC	08/13/93	NM	12/9/93
	02	38099N 40984E	6"	1,900.4	CC-340	131.1	20.0	110.0	100	LIFT NO. 3RD		AC	08/13/93	NM	12/9/93
	03	38067N 41162E	6"	1,899.8	CC-378	126.5	22.2	103.8	98.3	LIFT NO. 3RD		AC	08/13/93	NM	12/9/93
	04	38040N 41326E	6"	1,899.2	CC-340	130.5	19.2	110.3	100+	LIFT NO. 3RD	SAND CONE	AC	08/13/93	NM,SC	12/9/93
	05	38019N 41475E	6"	1,898.5	CC-340	131.2	19.5	110.6	100+	LIFT NO. 3RD		AC	08/13/93	NM	12/9/93
	06	38333N 40764E	6"	1,900.4	CC-340	127.4	20.6	106.4	96.8	LIFT NO. 3RD		AC	08/13/93	NM	12/9/93
	07	38302N 40977E	6"	1,899.5	CC-340	127.5	19.1	107.8	98.0	LIFT NO. 3RD		AC	08/13/93	NM	12/9/93
	08	38280N 41138E	6"	1,898.7	CC-340	128.8	21.7	106.6	96.9	LIFT NO. 3RD		AC	08/13/93	NM	12/9/93
	09	38257N 41301E	6"	1,898.1	CC-340	129.8	17.6	111.2	100+	LIFT NO. 3RD	CC-529, PROCTOR	AC	08/13/93	NM	12/9/93
	10	38240N 41446E	6"	1,897.5	CC-340	129.3	20.1	108.4	98.6	LIFT NO. 3RD		AC	08/13/93	NM	12/9/93
	11	38425N 41413E	6"	1,897.1	CC-378	123.4	22.3	100.9	96.6	LIFT NO. 3RD		AC	08/13/93	NM	12/9/93
	12	38450N 41171E	6"	1,897.6	CC-378	125.8	22.0	102.3	95.1	LIFT NO. 3RD		AC	08/13/93	NM	12/9/93
	13	38474N 40997E	6"	1,898.2	CC-340	132.6	19.0	112.2	100+	LIFT NO. 3RD	CC-530, PROCTOR	AC	08/13/93	NM	12/9/93
	14	38494N 40823E	6"	1,899.1	CC-340	133.0	18.2	113.3	100+	LIFT NO. 3RD		AC	08/13/93	NM	12/9/93
	15	38518N 40660E	6"	1,900.1	CC-340	127.5	21.7	104.6	97.3	LIFT NO. 3RD		AC	08/13/93	NM	12/9/93
	16	38551N 40471E	6"	1,901.0	CC-340	128.4	21.5	106.4	96.7	LIFT NO. 3RD		AC	08/13/93	NM	12/9/93
	17	38582N 40268E	6"	1,901.7	CC-340	127.7	16.9	109.1	99.2	LIFT NO. 3RD		AC	08/13/93	NM	12/9/93

BRAUN[SM]
INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-082A	18	38697N 40331E	6"	1,901.0	CC-340	130.8	20.1	109.7	99.7	LIFT NO. 3RD		AC	08/13/93	NM	12/9/93
	19	38669N 40524E	6"	1,900.4	CC-340	127.5	20.9	106.2	96.5	LIFT NO. 3RD		AC	08/13/93	NM	12/9/93
	20	38643N 40700E	6"	1,899.4	CC-340	132.7	20.3	111.1	100+	LIFT NO. 3RD	CC-531, PROCTOR	AC	08/13/93	NM	12/9/93
	21	38615N 40905E	6"	1,898.4	CC-340	127.5	21.4	105.8	96.2	LIFT NO. 3RD		AC	08/13/93	NM	12/9/93
	22	38584N 41127E	6"	1,897.4	CC-340	127.7	21.1	107.1	97.3	LIFT NO. 3RD		AC	08/13/93	NM	12/9/93
	23	38562N 41366E	6"	1,896.5	CC-340	129.9	19.5	109.5	99.5	LIFT NO. 3RD		AC	08/13/93	NM	12/9/93

Count: 23

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INTERTEC

Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-085A	01	38509N 40197E	6"	1,903.4	CC-379	126.3	22.1	104.2	96.9	LIFT NO. 4TH	ST-211, CC-533, PROCTOR	AC	08/17/93	NM	12/9/93
	02	38474N 40419E	6"	1,902.3	CC-379	129.8	20.9	108.7	100+	LIFT NO. 4TH	ST-212, CC-534	AC	08/17/93	NM	12/9/93
	03	38431N 40626E	6"	1,901.5	CC-379	127.0	21.8	105.0	97.6	LIFT NO. 4TH	ST-213, CC-535	AC	08/17/93	NM	12/9/93
	04	38391N 40844E	6"	1,900.6	CC-379	125.8	22.9	103.1	95.9	LIFT NO. 4TH	ST-214, CC-536	AC	08/17/93	NM	12/9/93
	05	38356N 41054E	6"	1,899.7	CC-379	129.8	21.2	107.9	100+	LIFT NO. 4TH	ST-215, CC-537	AC	08/17/93	NM	12/9/93
	06	38322N 41252E	6"	1,898.9	CC-379	130.7	20.4	109.3	100+	LIFT NO. 4TH	ST-216, CC-538	AC	08/17/93	NM	12/9/93
	07	38294N 41436E	6"	1,898.3	CC-379	129.3	20.6	108.0	100+	LIFT NO. 4TH	ST-217, CC-539	AC	08/17/93	NM	12/9/93
	08	38177N 40733E	6"	1,902.1	CC-379	126.7	22.3	104.3	97.0	LIFT NO. 4TH	ST-218, CC-540	AC	08/17/93	NM	12/9/93
	09	38144N 40930E	6"	1,901.3	CC-379	126.9	22.5	104.3	97.0	LIFT NO. 4TH	ST-219, CC-541, PROCTOR	AC	08/17/93	NM	12/9/93
	10	38114N 41132E	6"	1,900.5	CC-379	127.1	21.6	105.3	97.9	LIFT NO. 4TH	ST-220, CC-542	AC	08/17/93	NM	12/9/93
	11	38082N 41346E	6"	1,899.6	CC-379	136.9	17.9	117.0	100+	LIFT NO. 4TH	ST-221, CC-543	AC	08/17/93	NM	12/9/93

Count: 11

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INTERTEC

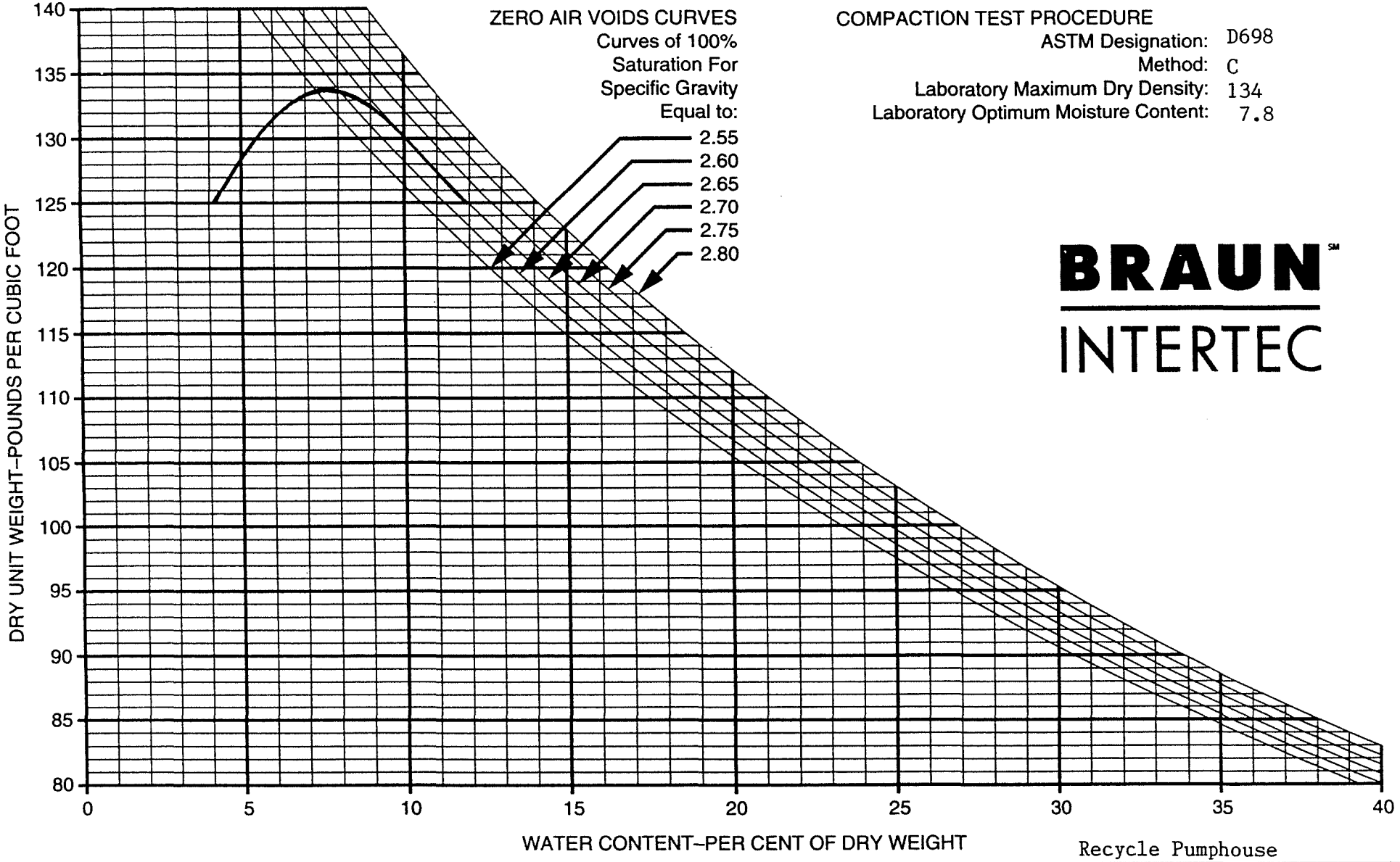
Summary of Density Results
(BFDX-92-018C) CPA Ash Pond #91

REPORT #	TST#	LOCAT.	DEPT	ELEV.	PROCT	WET	MOIST.	DRY	% COMP.	KEY	REMARKS	TECH.	DATE	METHOD	REPORTED
93-086A	01	38492N 41444E	6"	1,895.9	CC-340	132.1	20.7	109.4	99.5	LIFT NO. 3RD		AC	08/18/93	NM	12/9/93
	02	38633N 41389E	6"	1,895.6	CC-379	130.5	19.5	110.0	100+	LIFT NO. 3RD		AC	08/18/93	NM	12/9/93
	03	38492N 41401E	6"	1,896.4	CC-379	126.6	20.4	105.9	98.5	LIFT NO. 4TH	ST-222, CC-544	AC	08/18/93	NM	12/9/93
	04	38512N 41211E	6"	1,898.1	CC-379	125.0	23.2	102.2	95.1	LIFT NO. 4TH	ST-223, CC-545	AC	08/18/93	NM	12/9/93
	05	38548N 41001E	6"	1,898.9	CC-379	124.8	23.2	101.8	94.9	LIFT NO. 4TH	ST-224, CC-546 PROCTOR	AC	08/18/93	NM	12/9/93
	06	38577N 40790E	6"	1,900.0	CC-379	124.6	22.7	102.3	95.2	LIFT NO. 4TH	ST-225, CC-547 SAND CONE	AC	08/18/93	NM,SC	12/9/93
	07	38609N 40570E	6"	1,900.7	CC-379	126.0	22.2	103.8	96.6	LIFT NO. 4TH	ST-226, CC-548	AC	08/18/93	NM	12/9/93
	08	38636N 40360E	6"	1,901.7	CC-379	126.3	23.3	102.4	95.3	LIFT NO. 4TH	ST-227, CC-549	AC	08/18/93	NM	12/9/93
	09	38659N 40181E	6"	1,902.3	CC-379	133.5	23.6	108.8	100+	LIFT NO. 4TH	ST-228, CC-550 PROCTOR	AC	08/18/93	NM	12/9/93
	10	38699N 41202E	6"	1,897.2	CC-379	127.0	23.0	104.0	96.8	LIFT NO. 4TH	ST-229, CC-551	AC	08/18/93	NM	12/9/93
	11	38708N 40966E	6"	1,898.4	CC-379	127.3	23.1	103.4	96.2	LIFT NO. 4TH	ST-230, CC-552	AC	08/18/93	NM	12/9/93
	12	38726N 40728E	6"	1,899.4	CC-379	129.9	20.3	108.8	100+	LIFT NO. 4TH	ST-231, CC-553 PROCTOR	AC	08/18/93	NM	12/9/93
	13	38736N 40515E	6"	1,900.5	CC-379	127.9	23.0	104.7	97.4	LIFT NO. 4TH	ST-232, CC-554	AC	08/18/93	NM	12/9/93

Count: 13

AP #91

Proctors



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: C
Laboratory Maximum Dry Density: 134
Laboratory Optimum Moisture Content: 7.8

BRAUN℠ INTERTEC

Recycle Pumphouse

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CC-1	N/A	NP	NP	NP	SP - Poorly Graded Sand, with Gravel, brown

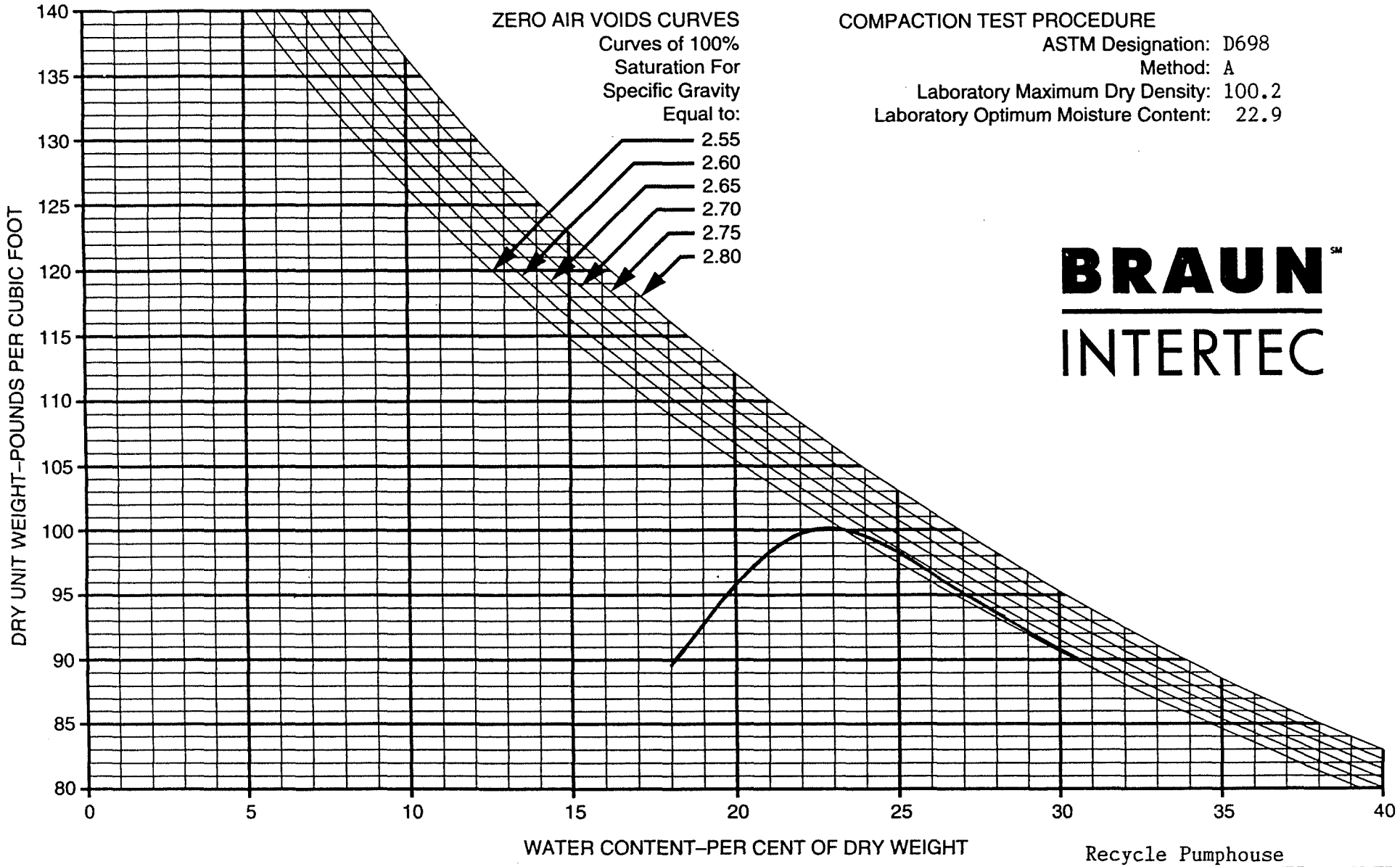
Stockpile

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-91-035C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 100.2
Laboratory Optimum Moisture Content: 22.9

BRAUN INTERTEC

Recycle Pumphouse

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CC-2	N/A	22	19	41	CL - Lean Clay with Sand, dark gray

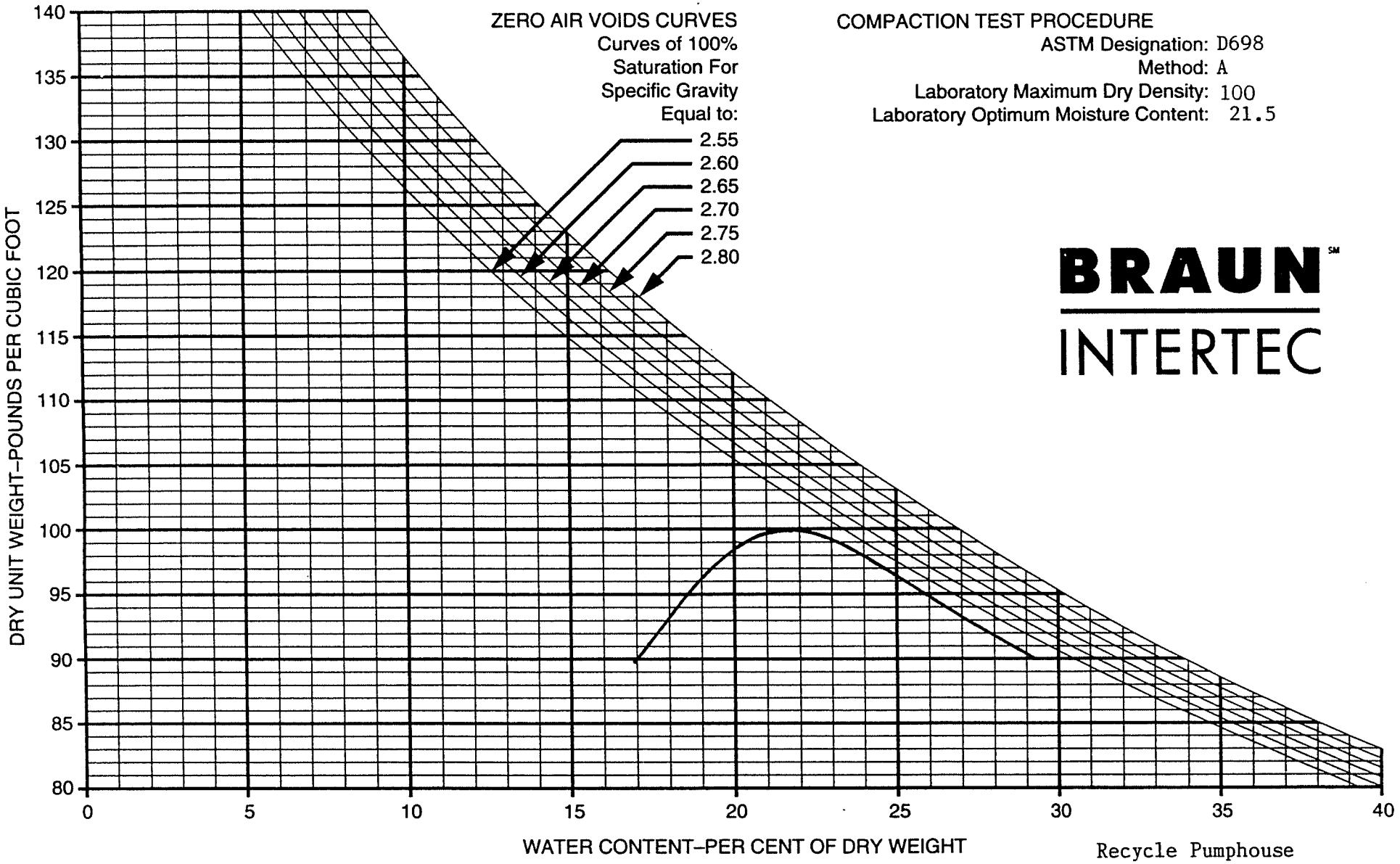
Stockpile

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-91-035C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 100
Laboratory Optimum Moisture Content: 21.5

BRAUN℠ INTERTEC

Recycle Pumphouse

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CC-3	N/A	18	25	43	CL - Lean Clay with Sand, dark gray

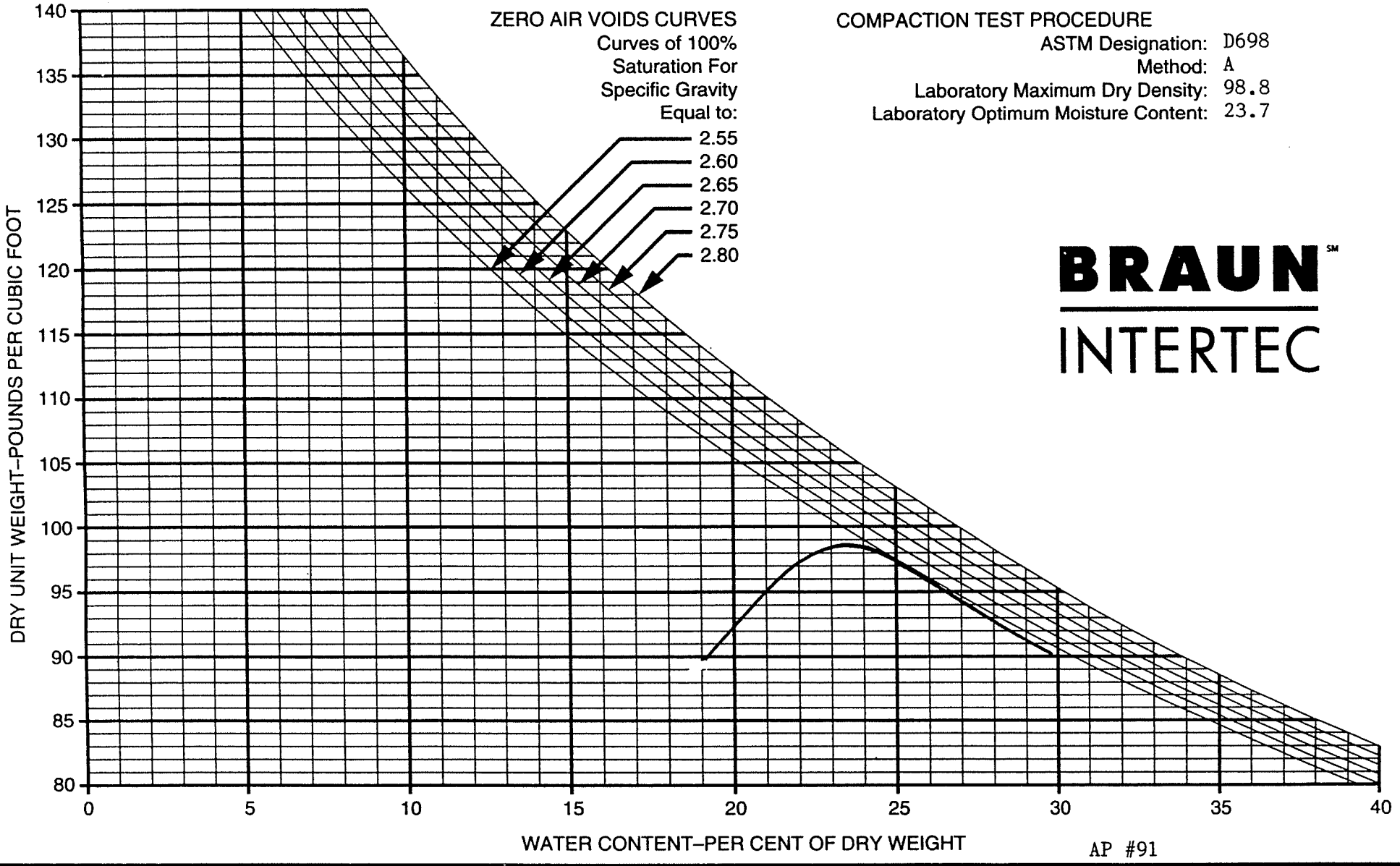
Stockpile

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-91-035C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 98.8
Laboratory Optimum Moisture Content: 23.7

BRAUN℠ INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CC-4	N/A	24	30	54	CH - Fat Clay, dark gray

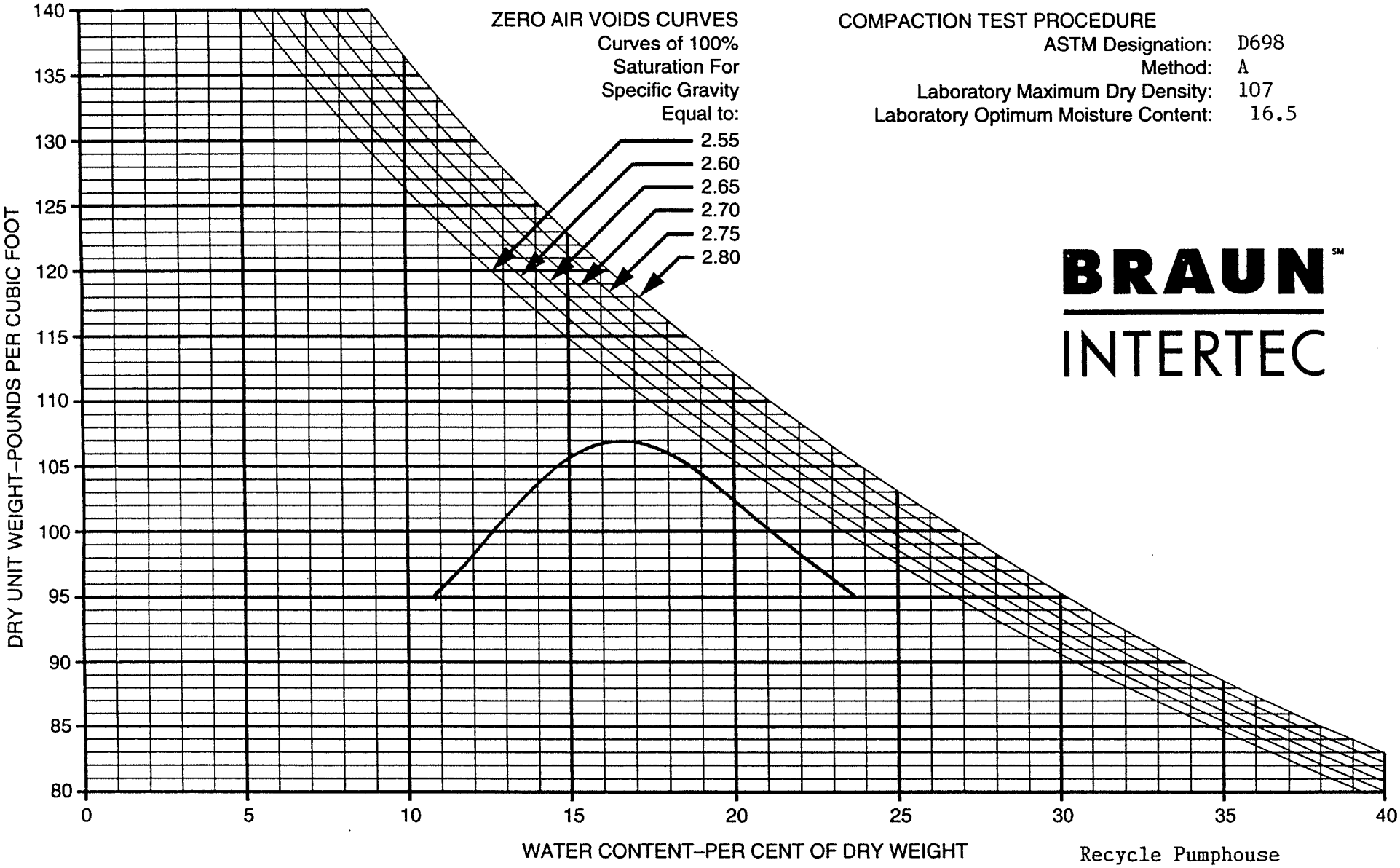
37500N 40500E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-91-035C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 107
Laboratory Optimum Moisture Content: 16.5

BRAUN SM INTERTEC

Recycle Pumphouse

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CC-5	N/A	12	27	39	CL - Sandy Lean Clay, olive brown

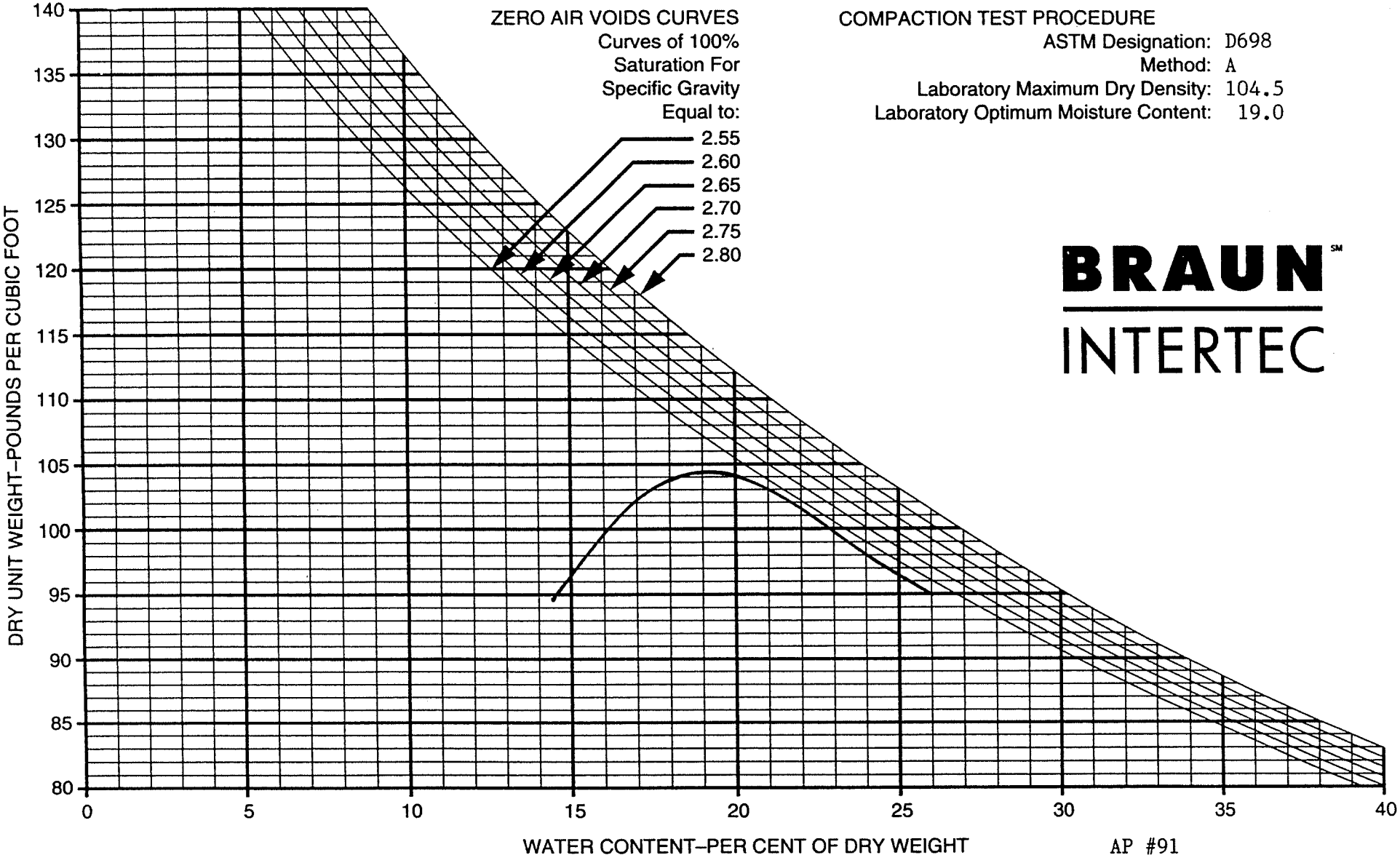
Stockpile

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-91-035C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 104.5
Laboratory Optimum Moisture Content: 19.0

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	DC-CC -6	1909.4	16	42	58	CH - Fat Clay, dark grayish brown

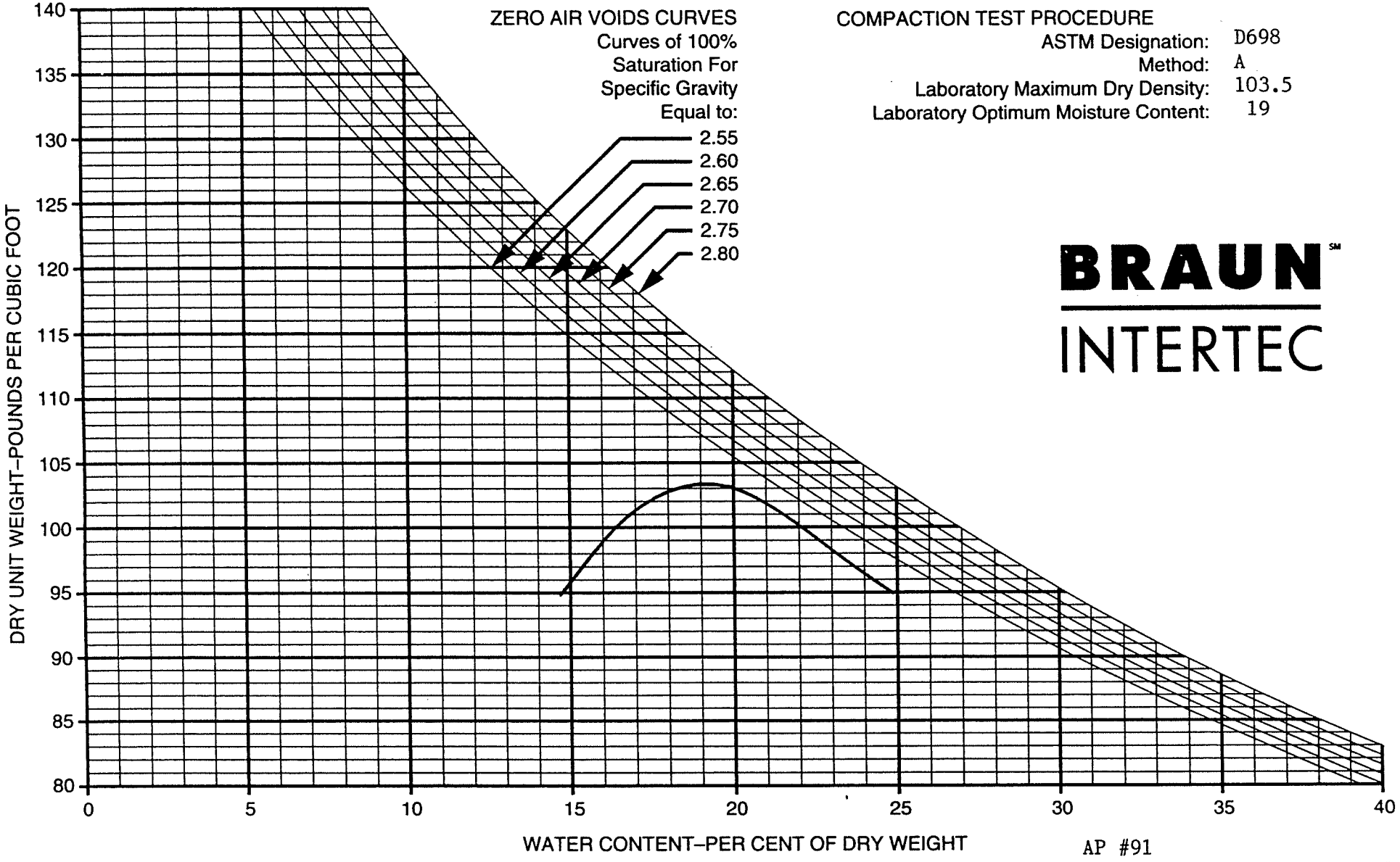
37056N 40899E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-91-035C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 103.5
Laboratory Optimum Moisture Content: 19

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	DC-CC -7	1907.3	16	43	59	CH - Fat Clay, dark grayish brown

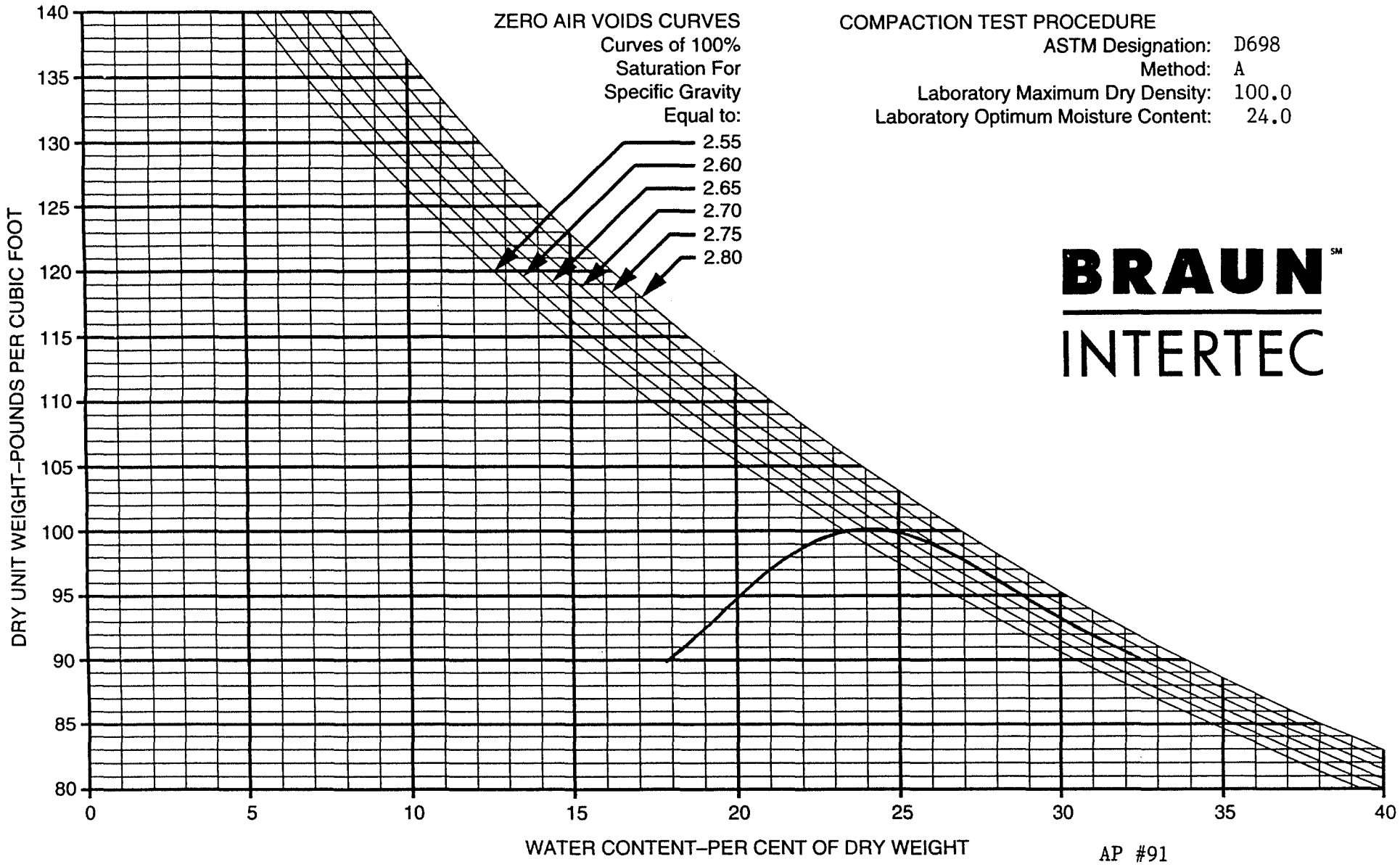
37071N 40779E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-91-035C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 100.0
Laboratory Optimum Moisture Content: 24.0

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	DC-CC -8	1909	17	44	61	CH - Fat Clay, dark gray

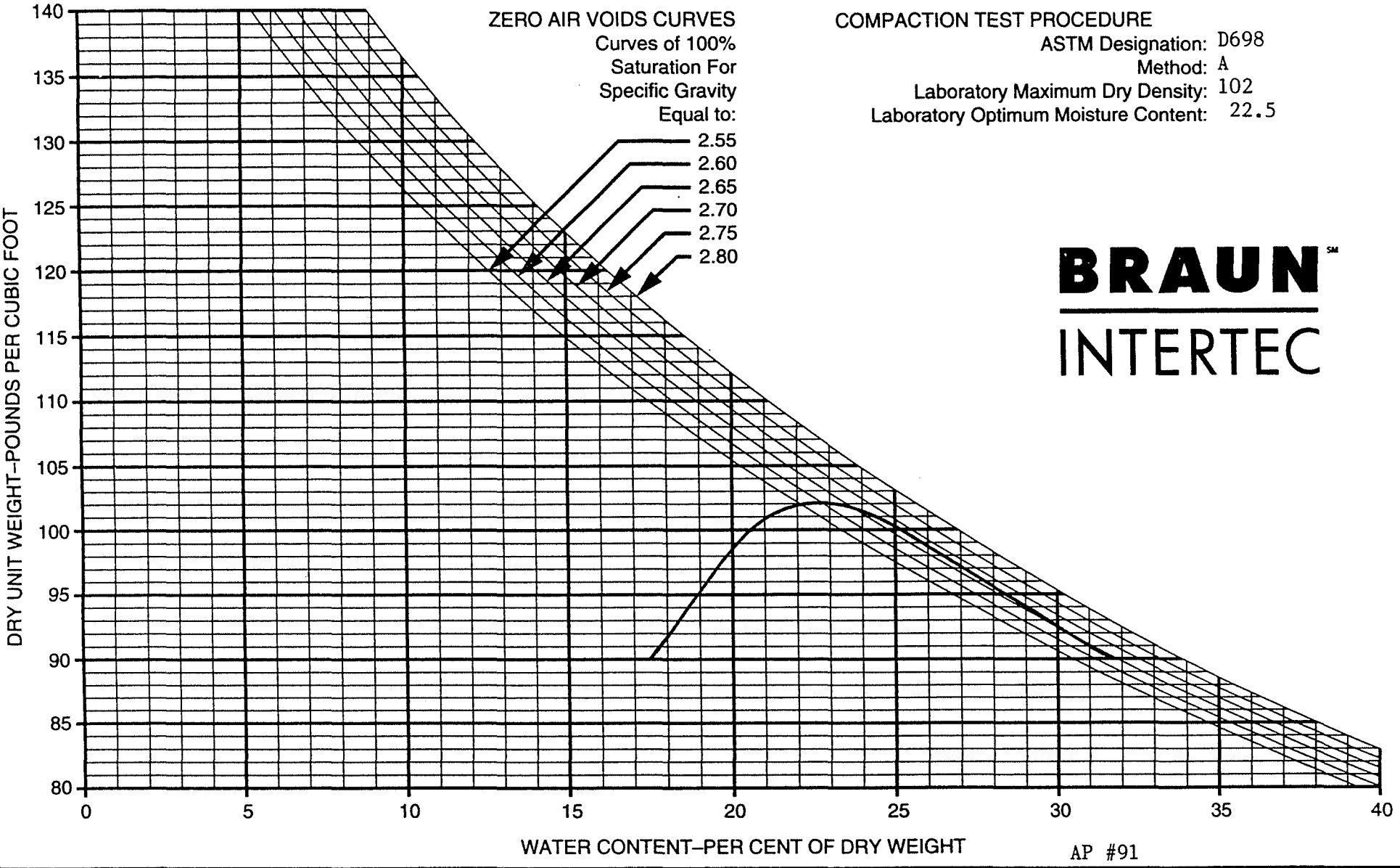
37067N 40429E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-91-035C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 102
Laboratory Optimum Moisture Content: 22.5

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	DC-CC -9	1905.9	16	42	58	CH - Fat Clay, dark grayish brown

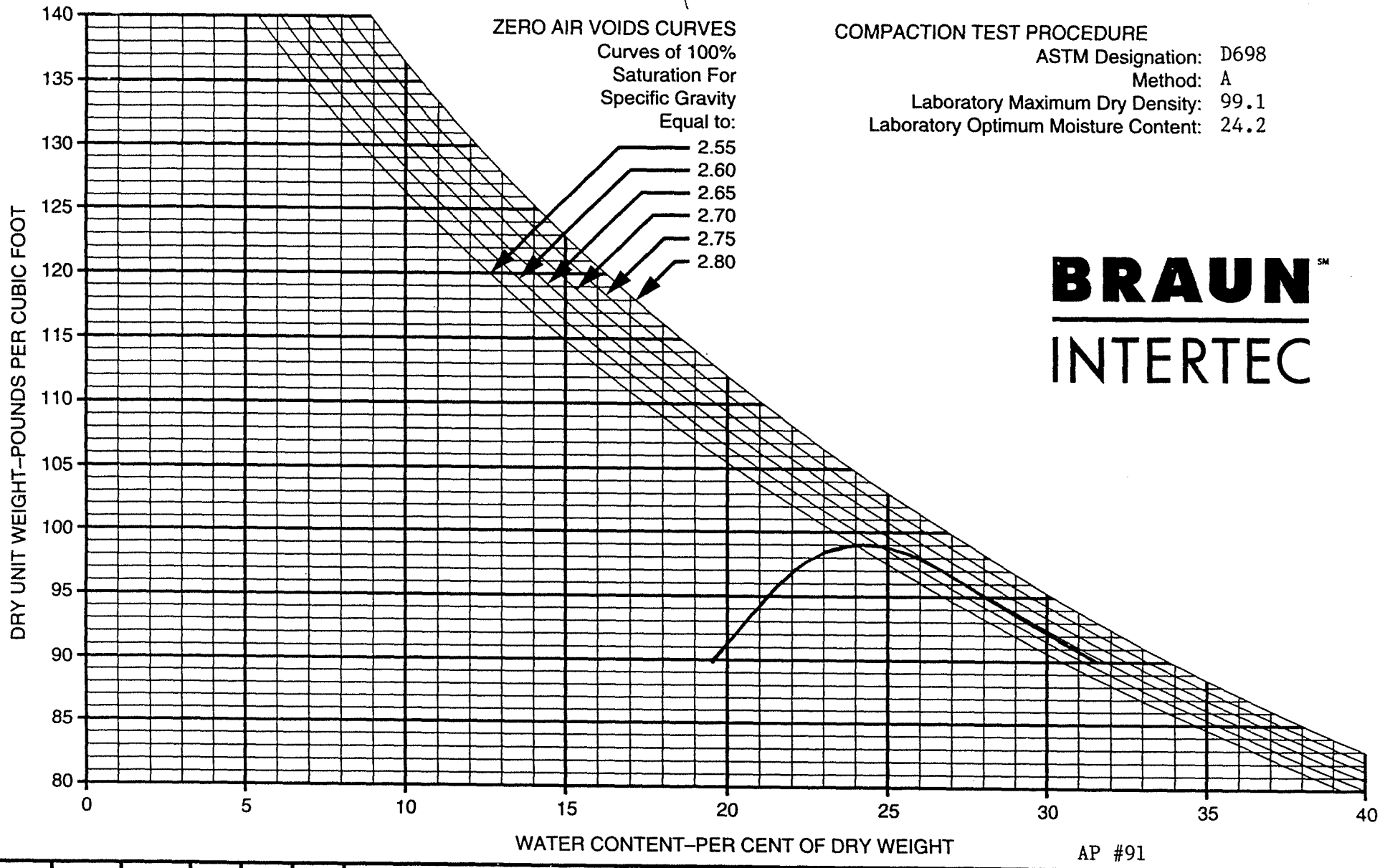
37070N 40654E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-91-035C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 99.1
Laboratory Optimum Moisture Content: 24.2

BRAUN℠ INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	DC-CC -10	1908.3	17	43	60	CH - Fat Clay, dark olive gray

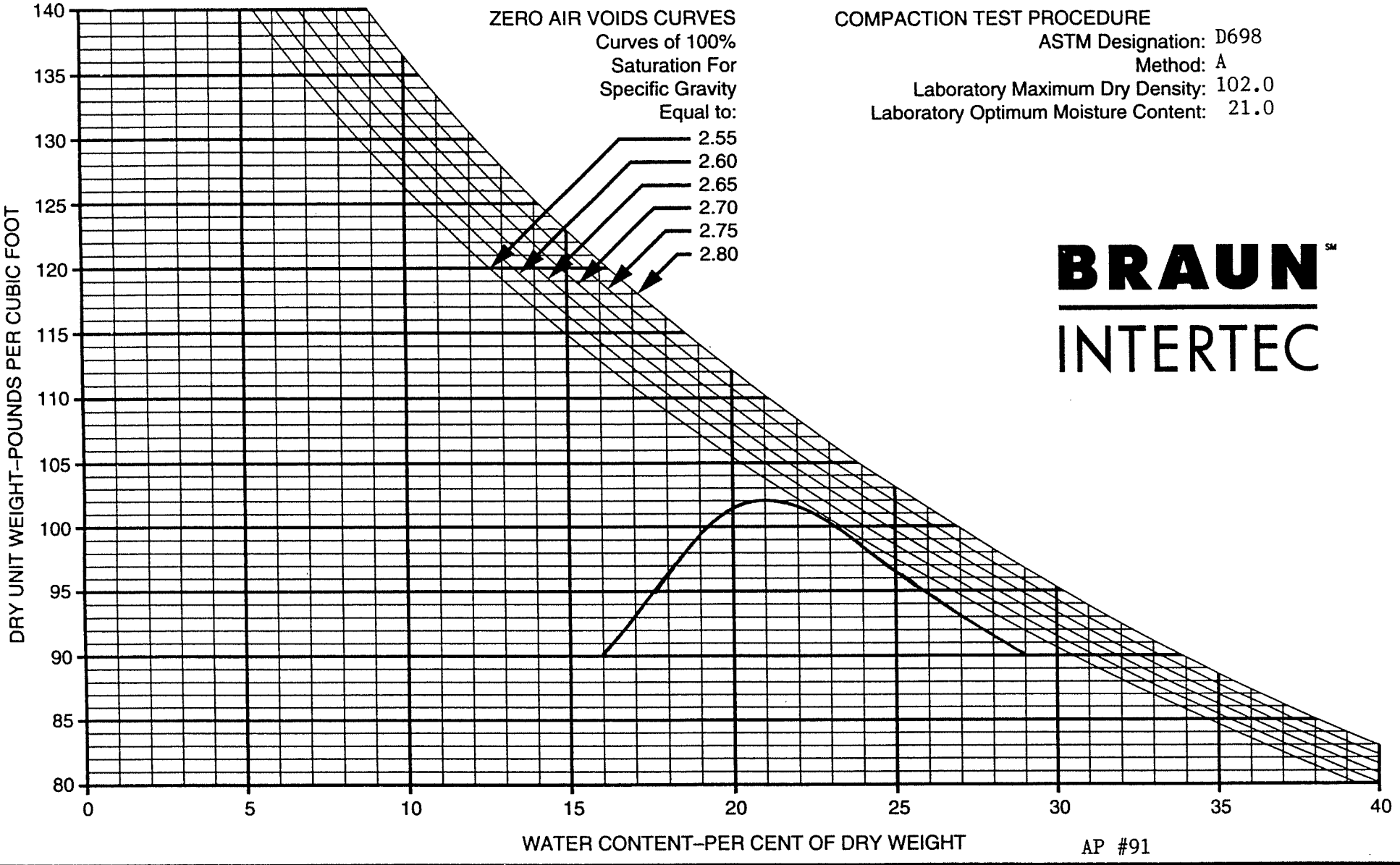
37072N 40819E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-91-035C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 102.0
Laboratory Optimum Moisture Content: 21.0

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	DC-CC -11	1907.6	15	36	51	CH - Fat Clay, dark olive gray

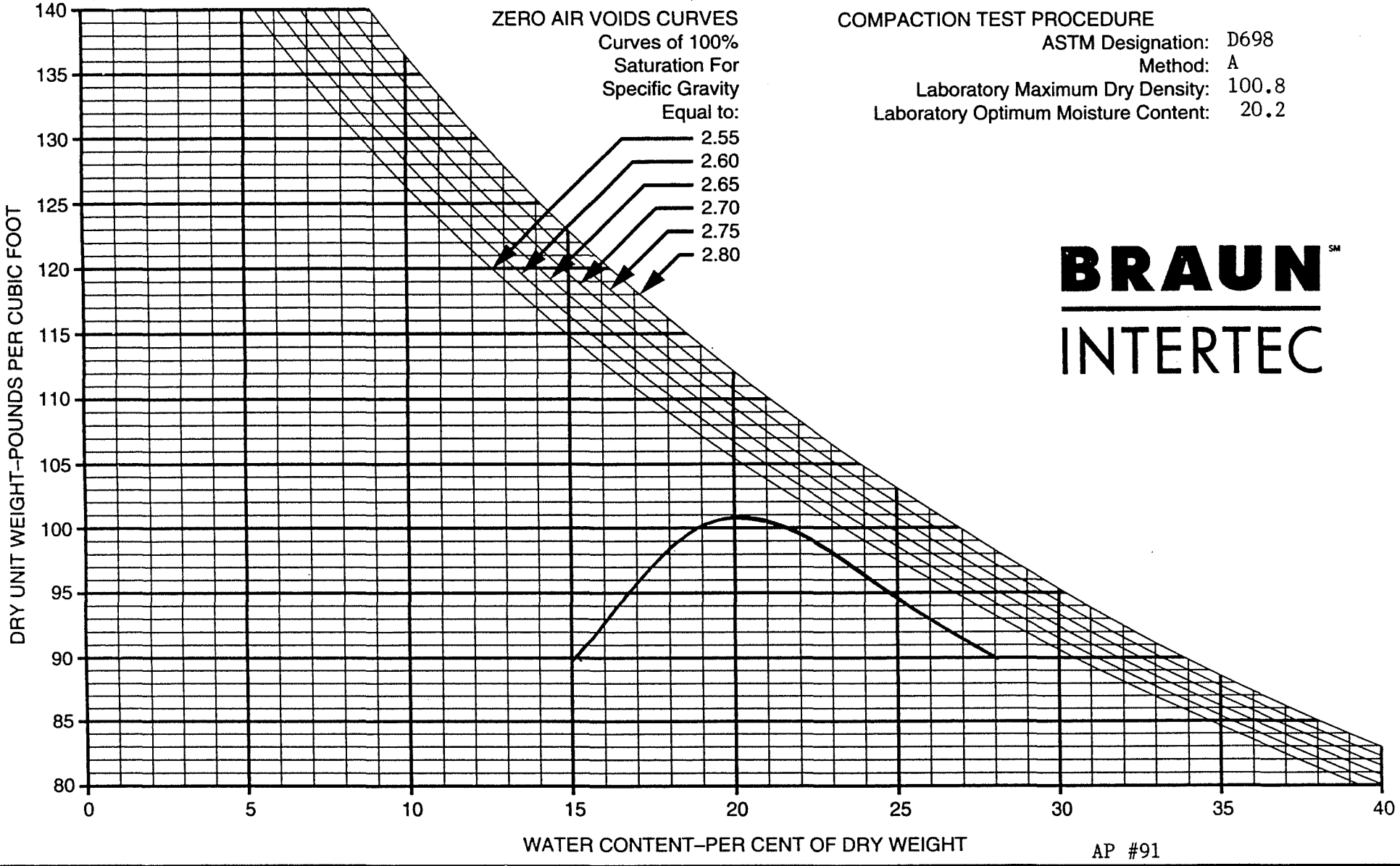
37082N 40641E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-91-035C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 100.8
Laboratory Optimum Moisture Content: 20.2

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST.4	DC-OC-19	1912.2	21	37	58	CH - Fat Clay, gray

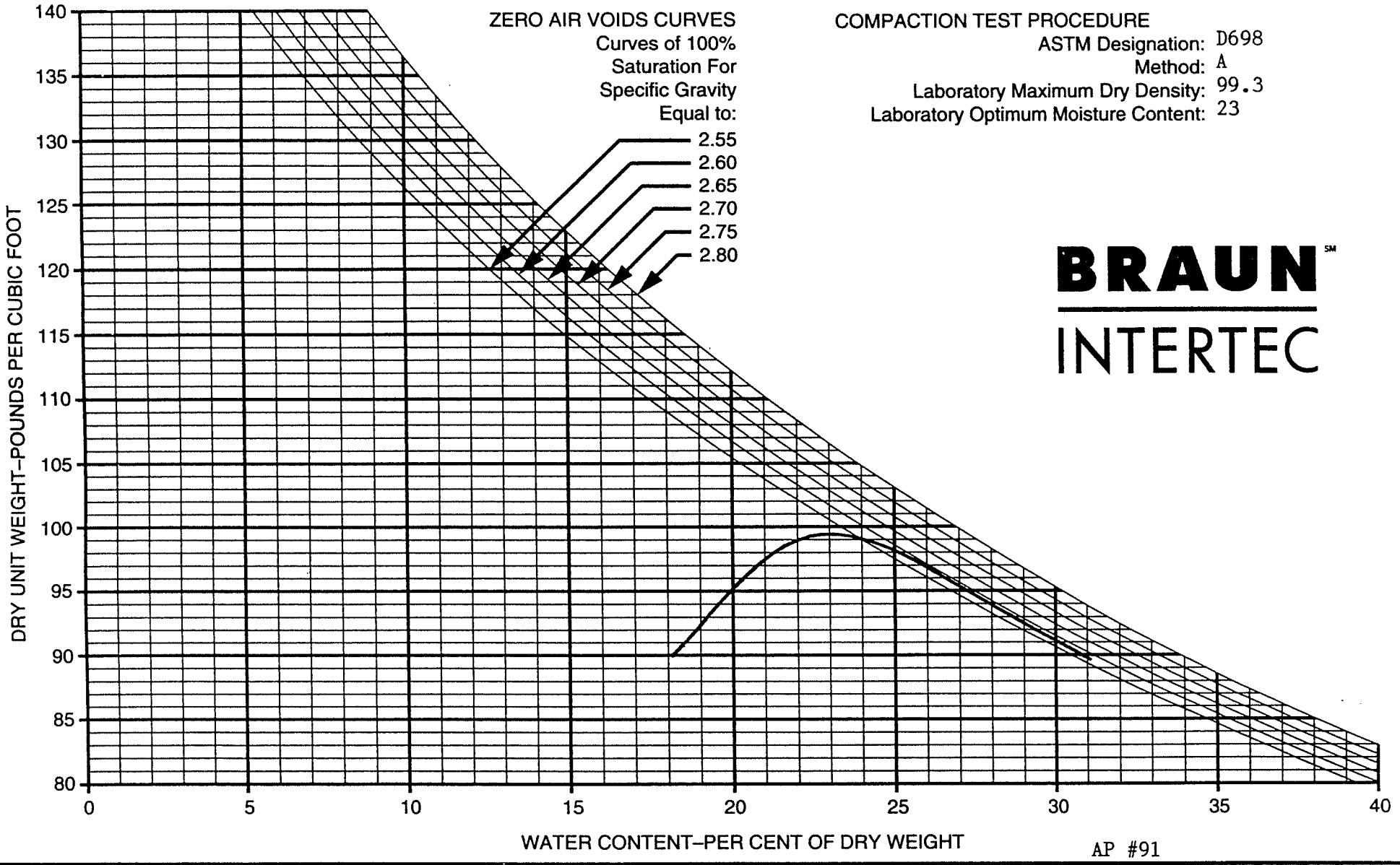
37068N 40840E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-91-035C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 99.3
Laboratory Optimum Moisture Content: 23

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	DC-CC -33	1915.8	21	45	66	CH - Fat Clay, very dark gray

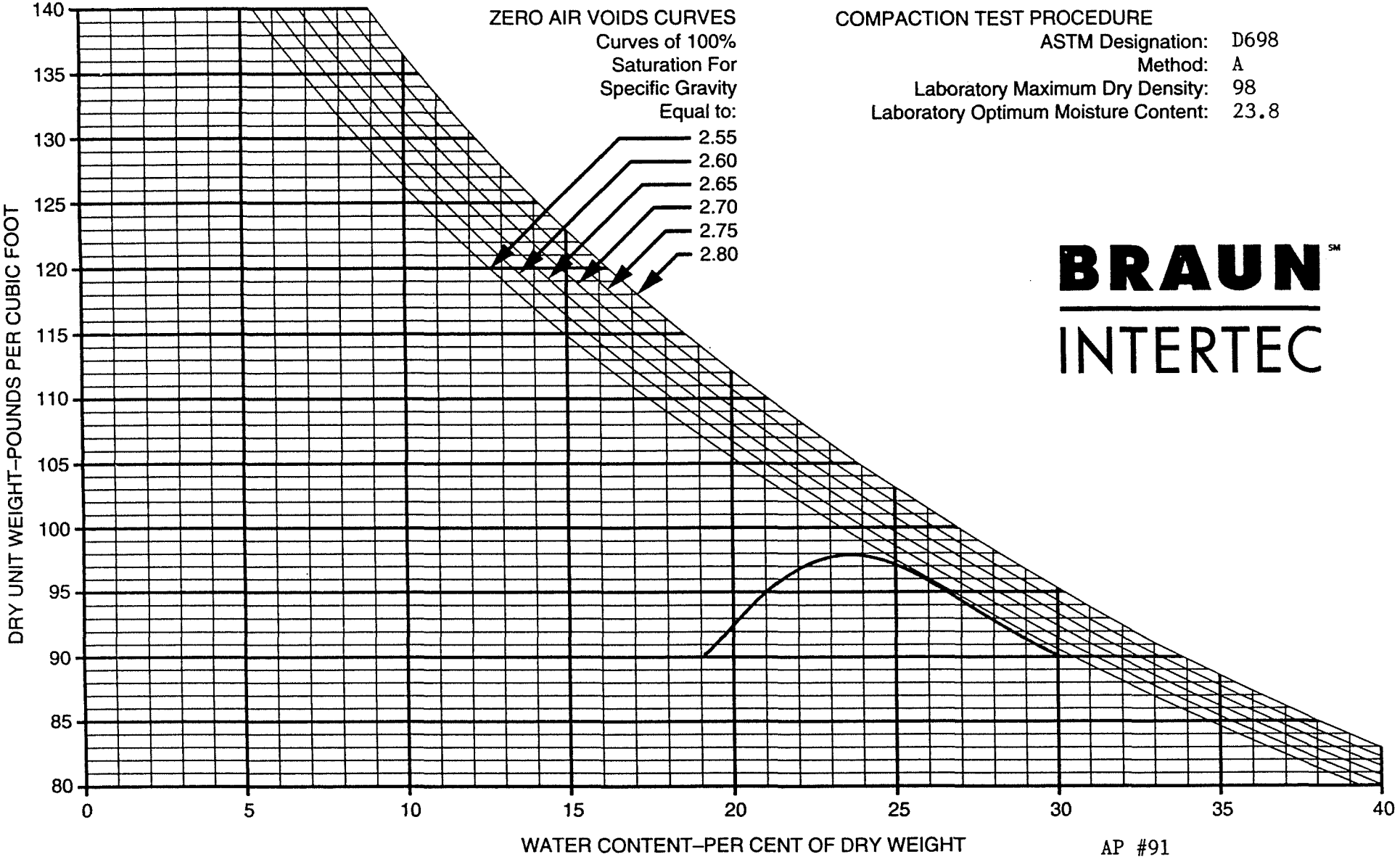
37064N 40879E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-91-035C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation:	D698
Method:	A
Laboratory Maximum Dry Density:	98
Laboratory Optimum Moisture Content:	23.8

BRAUN℠ INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	DC-CC 42	1914	22	38	60	CH - Fat Clay, olive gray

37100N 40000E

COMPACTION TEST

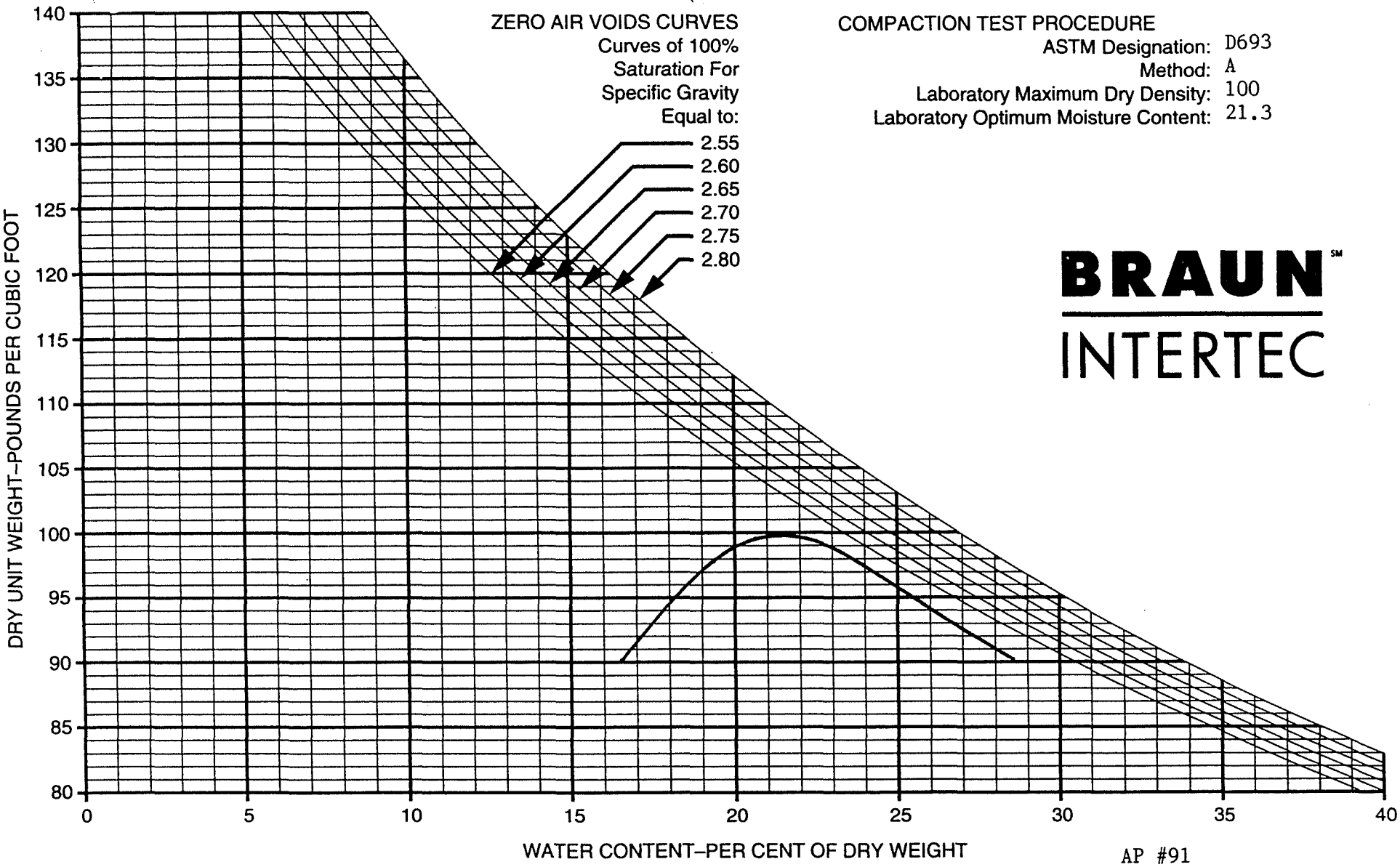
DRAWN BY:

CHECKED BY:

DATE:

JOB NO. BFDX-91-035C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D693
Method: A
Laboratory Maximum Dry Density: 100
Laboratory Optimum Moisture Content: 21.3

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST.20	DC-OC -52	1910.8	20	33	53	CH - Fat Clay, dark gray

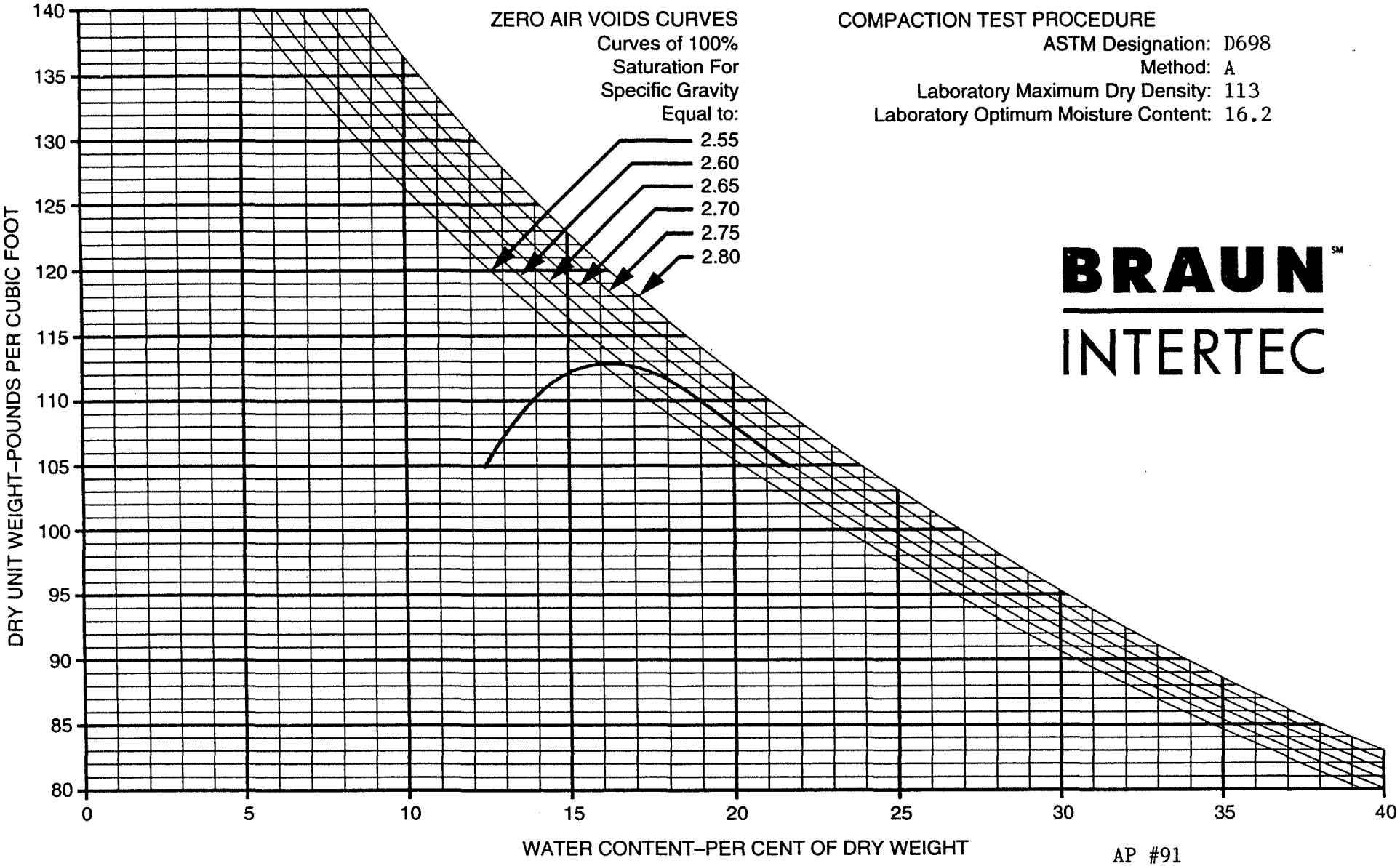
37084N 40207E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-91-035C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 113
Laboratory Optimum Moisture Content: 16.2

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CC-56	N/A	15	25	40	CL - Gravelly Lean Clay, olive brown

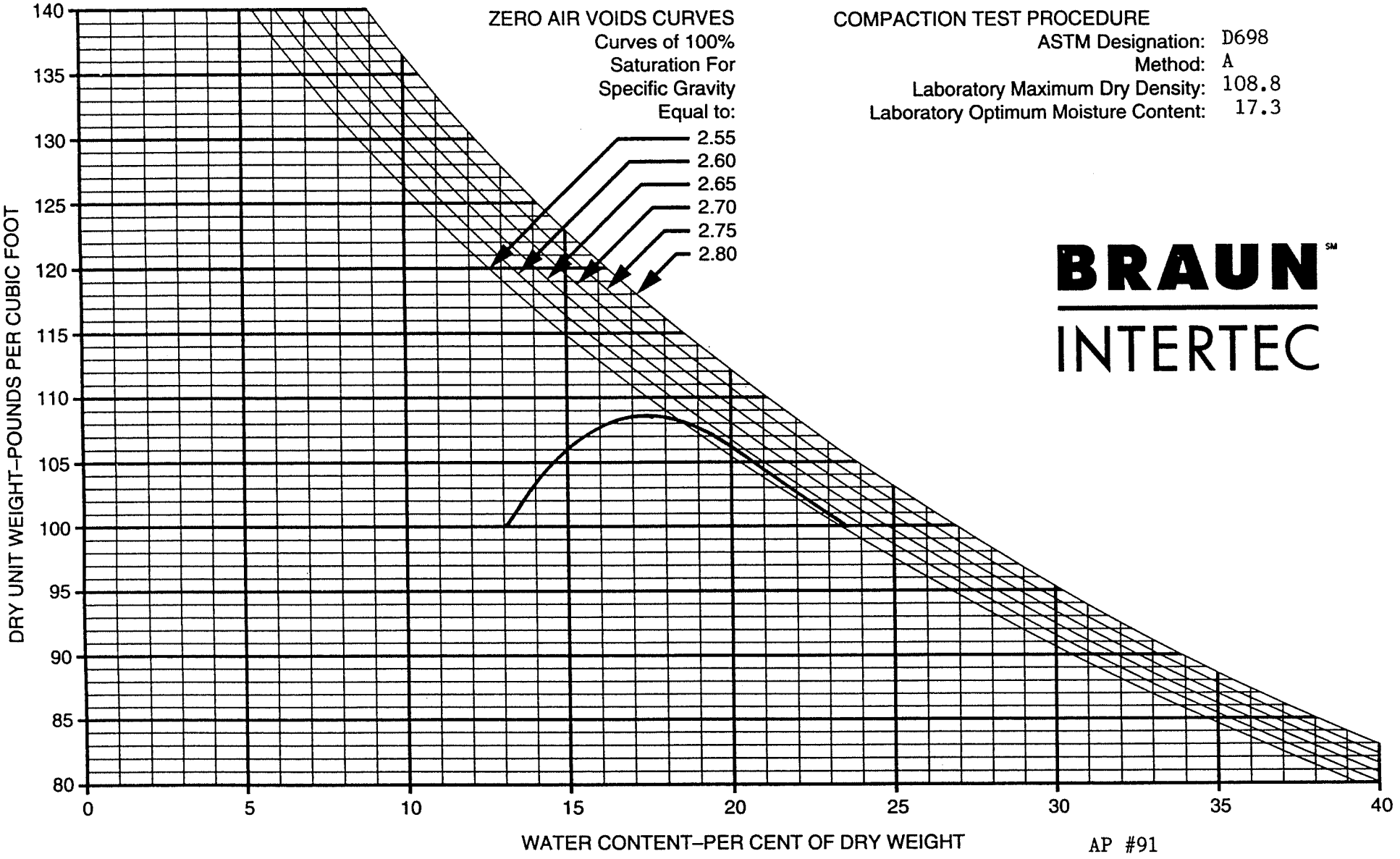
37900N 39800E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-91-035C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 108.8
Laboratory Optimum Moisture Content: 17.3

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	DC-CC -59	1901.6	15	26	41	CL - Sandy Lean Clay, olive brown

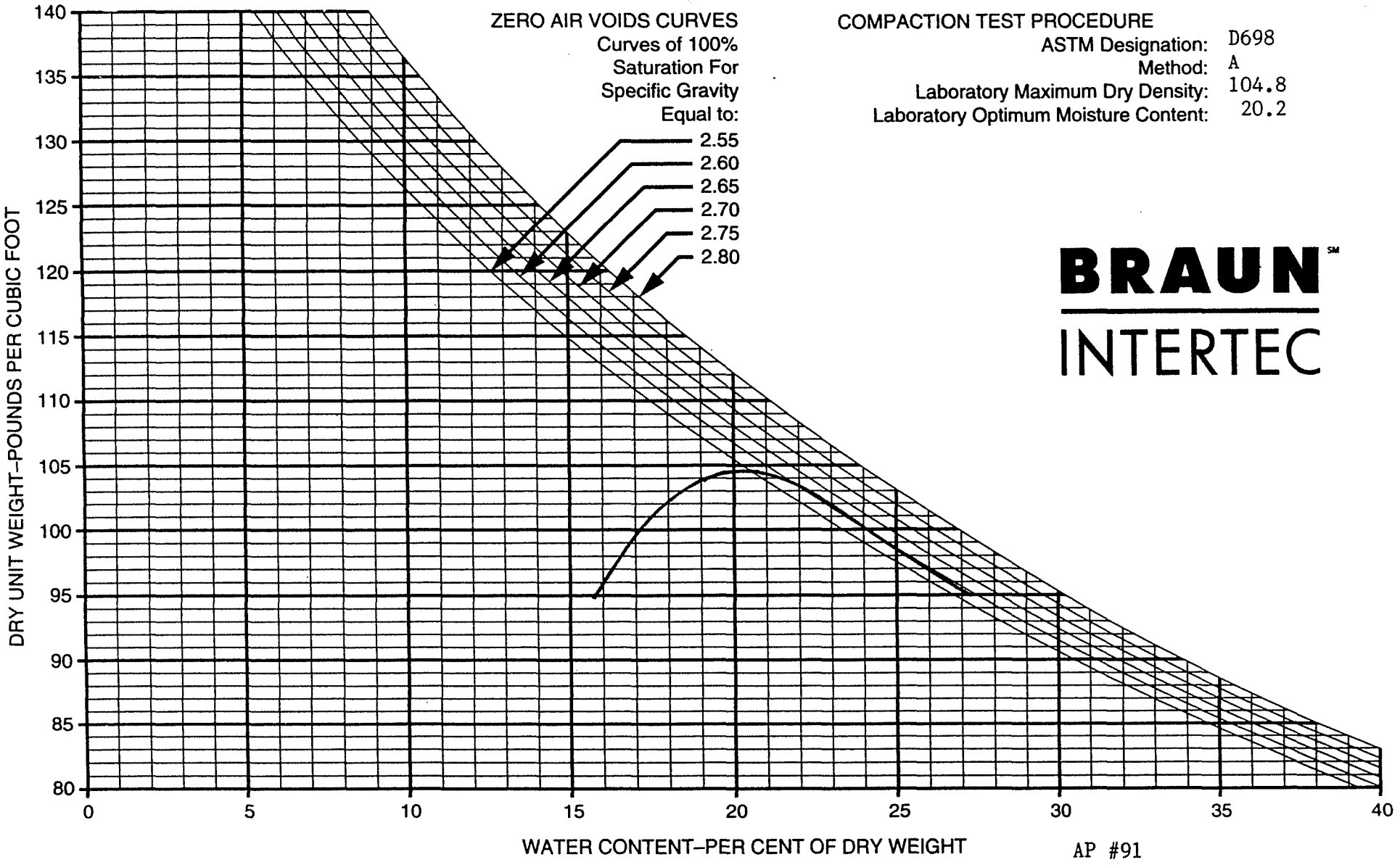
38281N 39680E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-91-035C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 104.8
Laboratory Optimum Moisture Content: 20.2

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	DE-CC -60	1902.1	17	29	46	CL - Sandy Lean Clay, olive

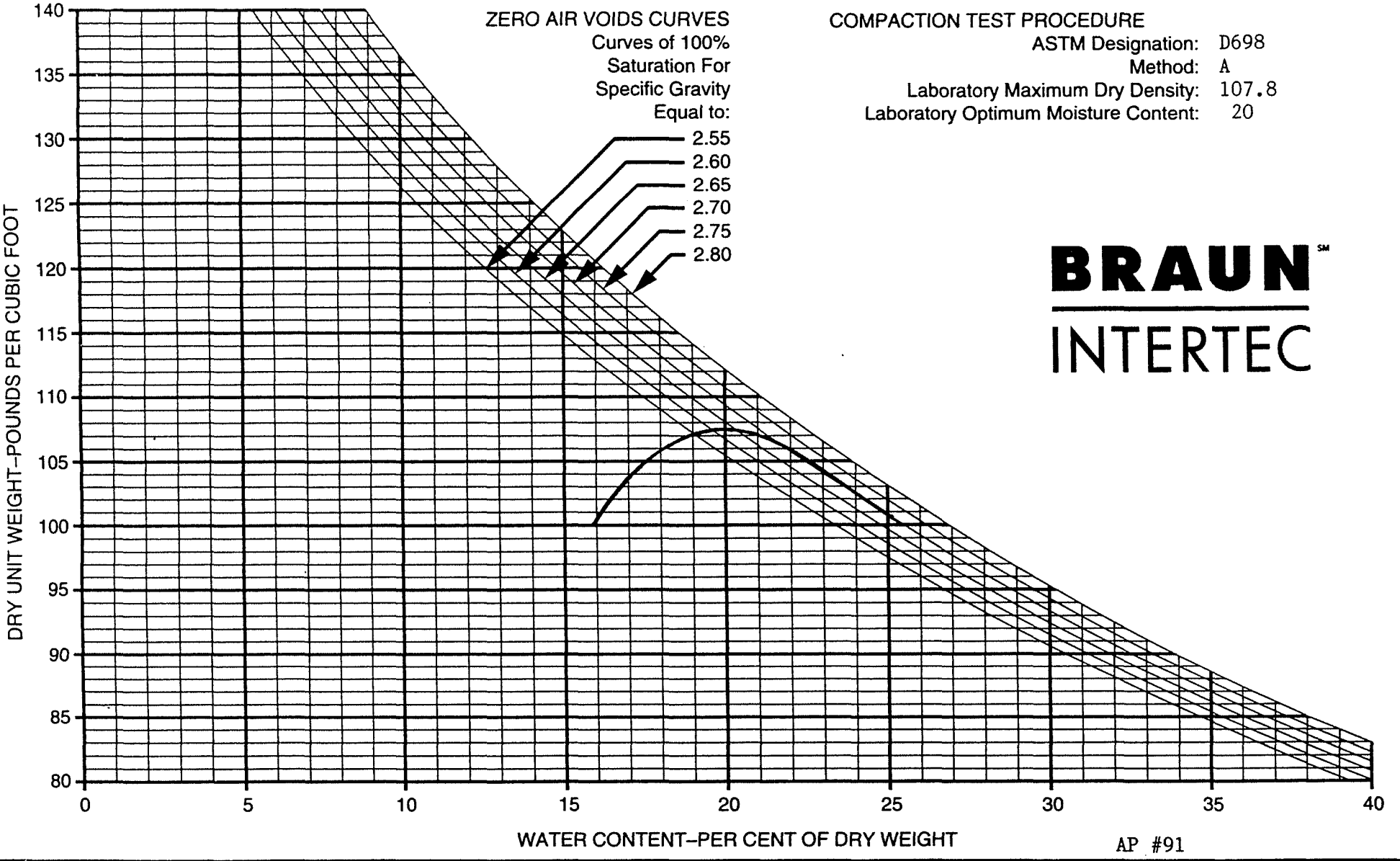
38140N 39707E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-91-035C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 107.8
Laboratory Optimum Moisture Content: 20

BRAUN SM INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	DE-CC 62	1903.1	14	28	42	CL - Lean Clay with Sand, olive brown

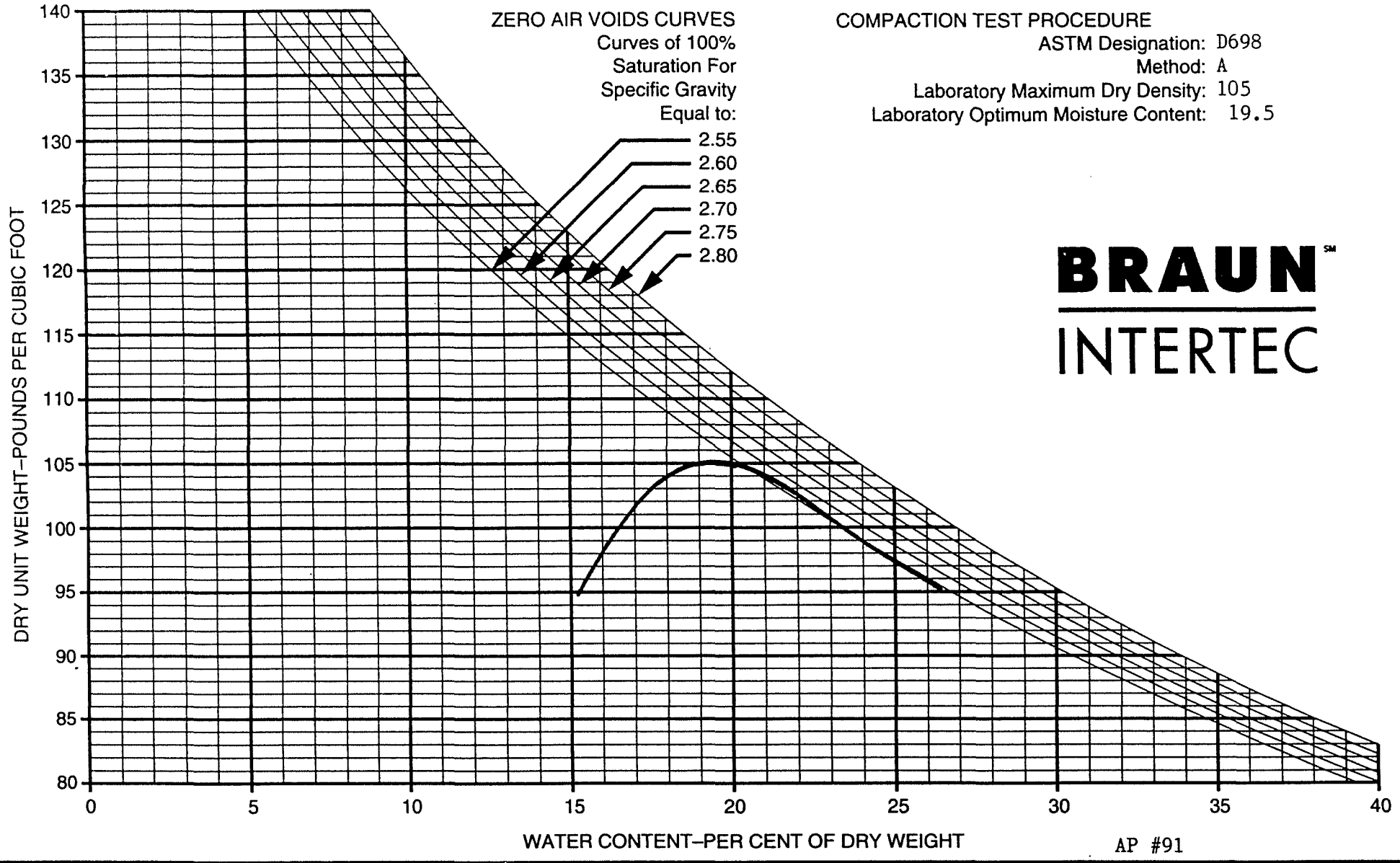
38228N 39729E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-91-035C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 105
Laboratory Optimum Moisture Content: 19.5

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	DE-CC -63	1904.3	16	32	48	CL - Sandy Lean Clay, very dark gray

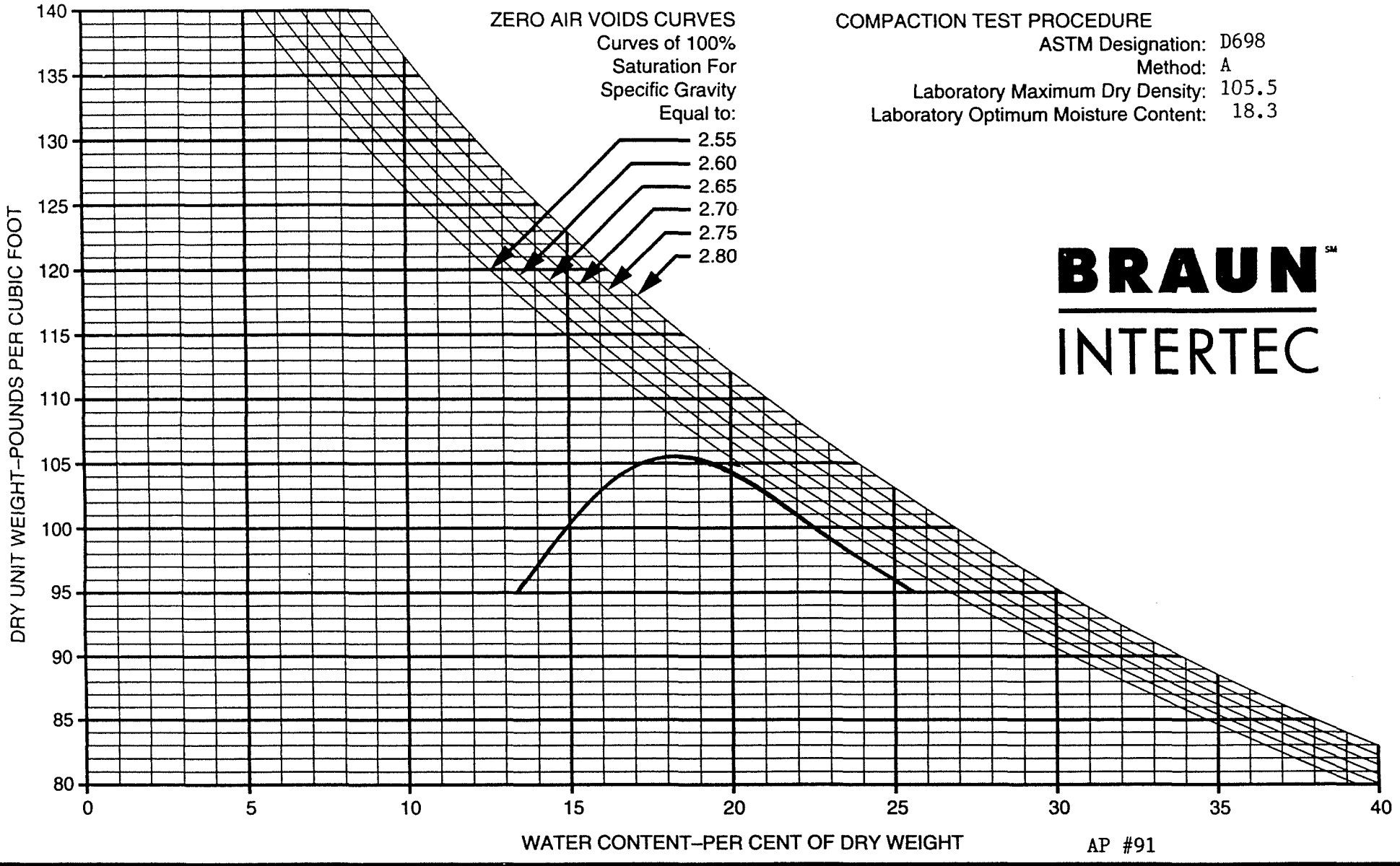
38176N 39725E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-91-035C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 105.5
Laboratory Optimum Moisture Content: 18.3

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	DE-CC -64	1905.1	16	31	47	CL - Sandy Lean Clay, olive

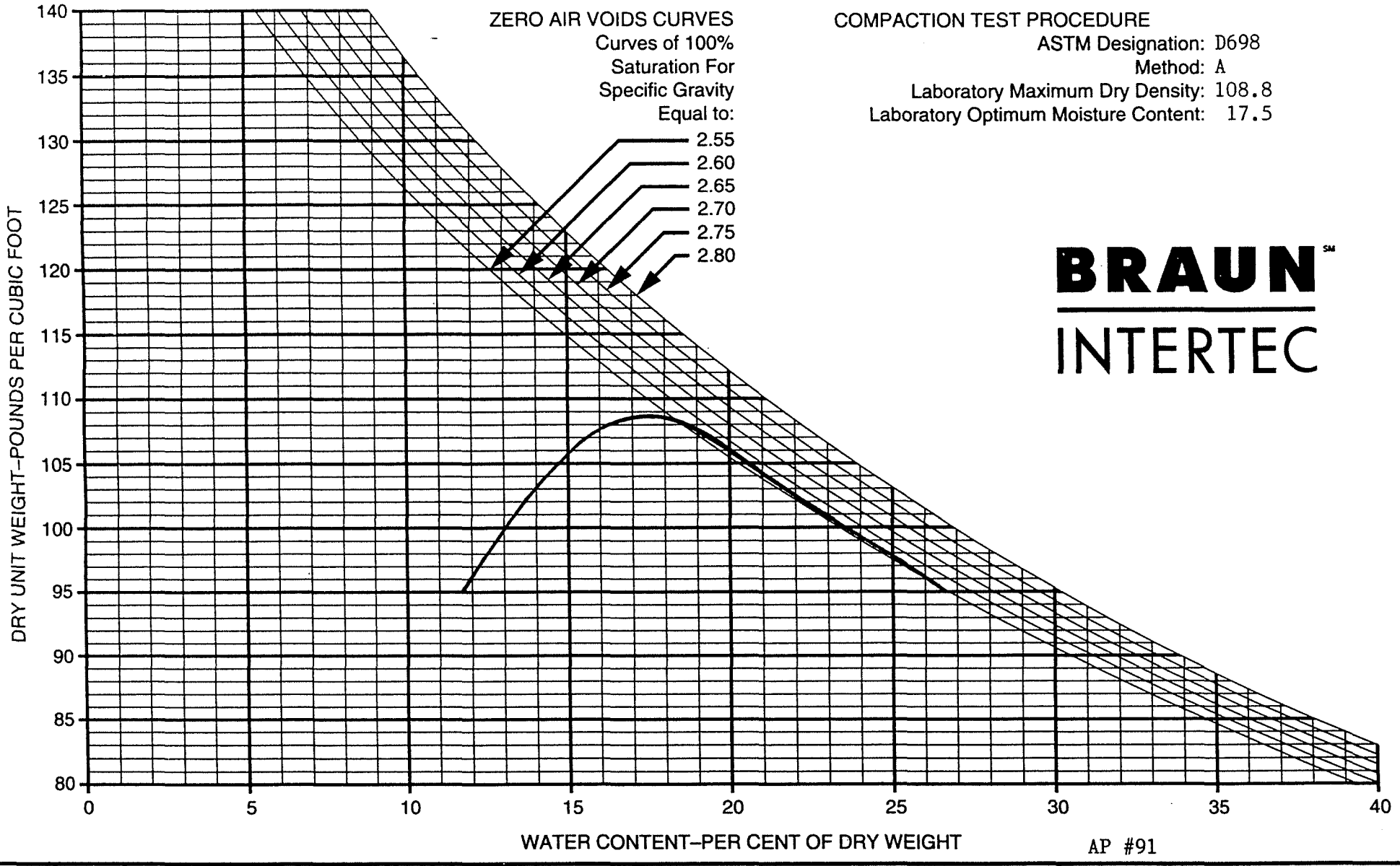
37917N 39708E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-91-035C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 108.8
Laboratory Optimum Moisture Content: 17.5

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	DE-CC -65	1904	16	29	45	SC - Clayey Sand with Gravel, very dark gray

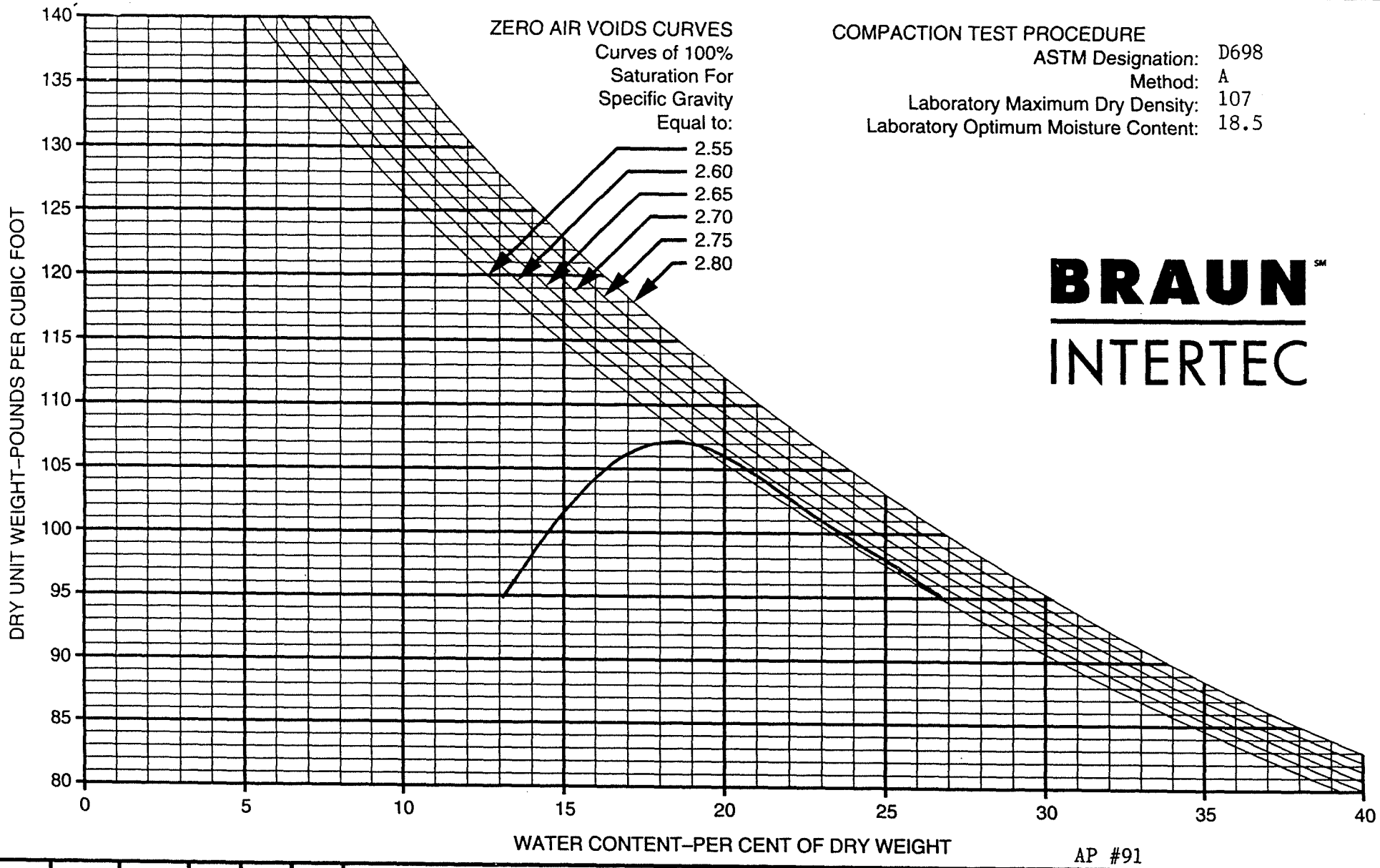
38271N 39670E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-91-035C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 107
Laboratory Optimum Moisture Content: 18.5

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	DE-CC -68	1905.8	16	32	48	CL - Sandy Lean Clay, olive brown

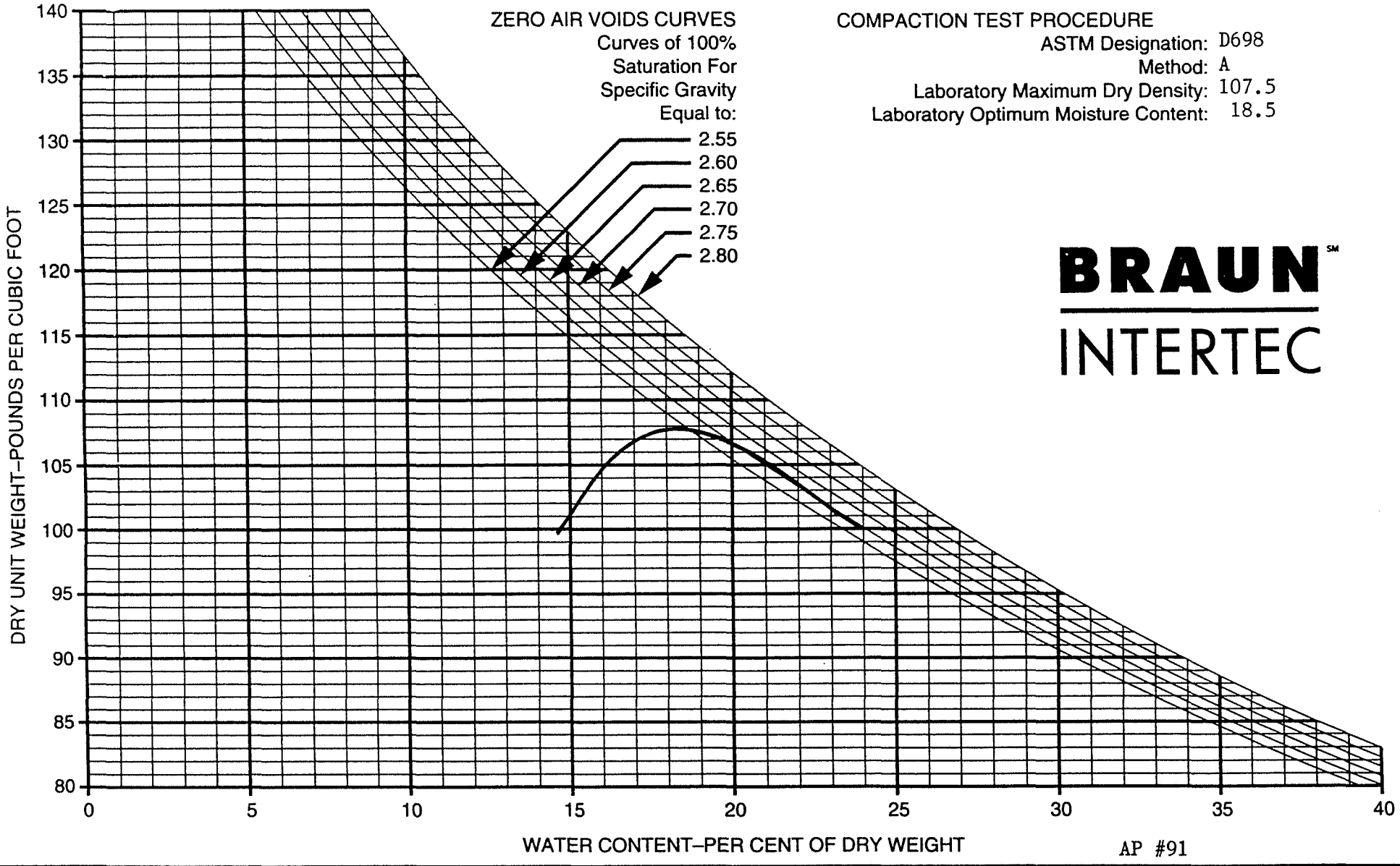
38049N 39684E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-91-035C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 107.5
Laboratory Optimum Moisture Content: 18.5

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	DC-OC -70	1905.3	15	31	46	CL - Sandy Lean Clay, olive brown

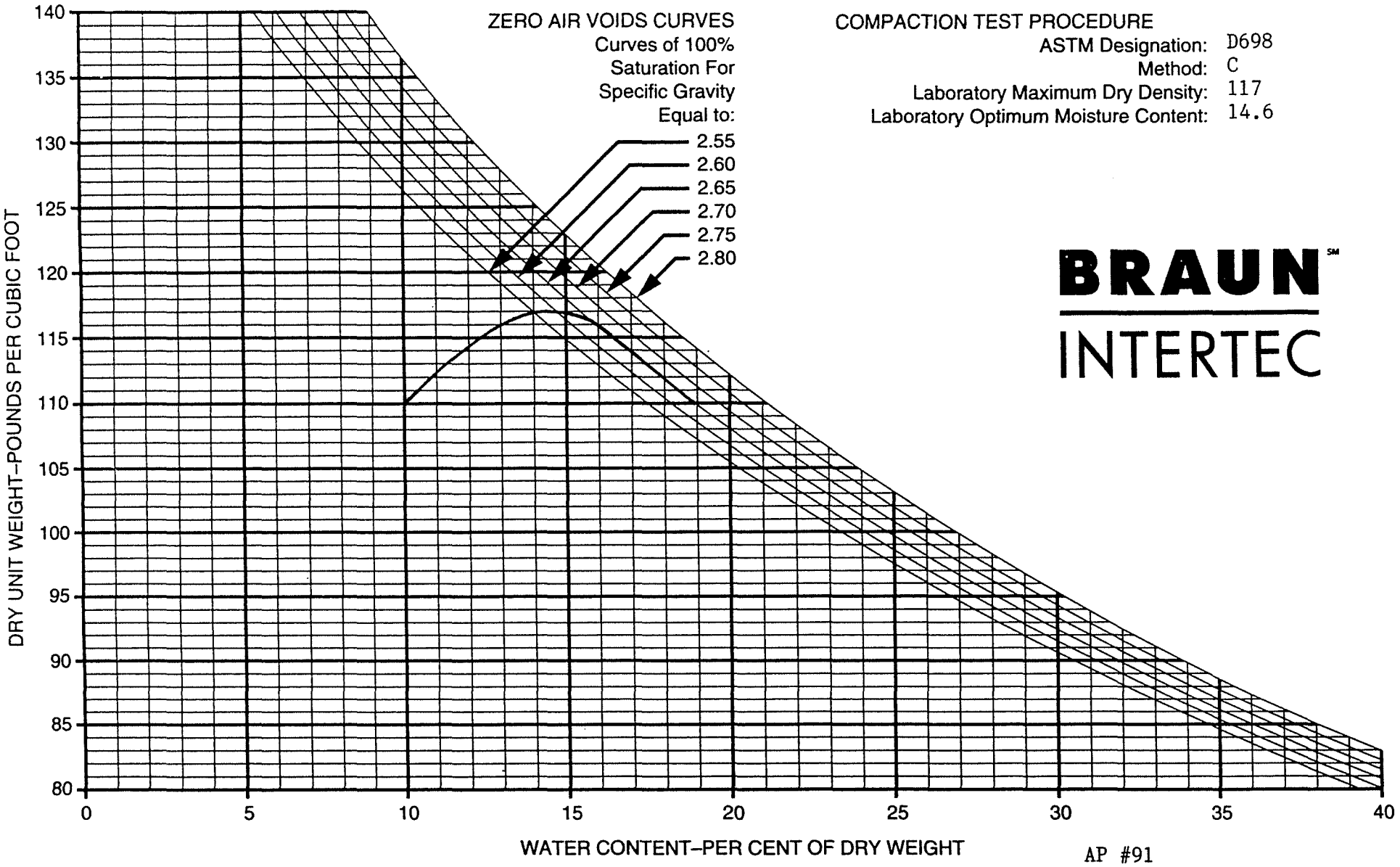
38228N 39667E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-91-035C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: C
Laboratory Maximum Dry Density: 117
Laboratory Optimum Moisture Content: 14.6

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST.29	DE-CC -78	1913.7	17	31	48	GC - Clayey Gravel, olive brown

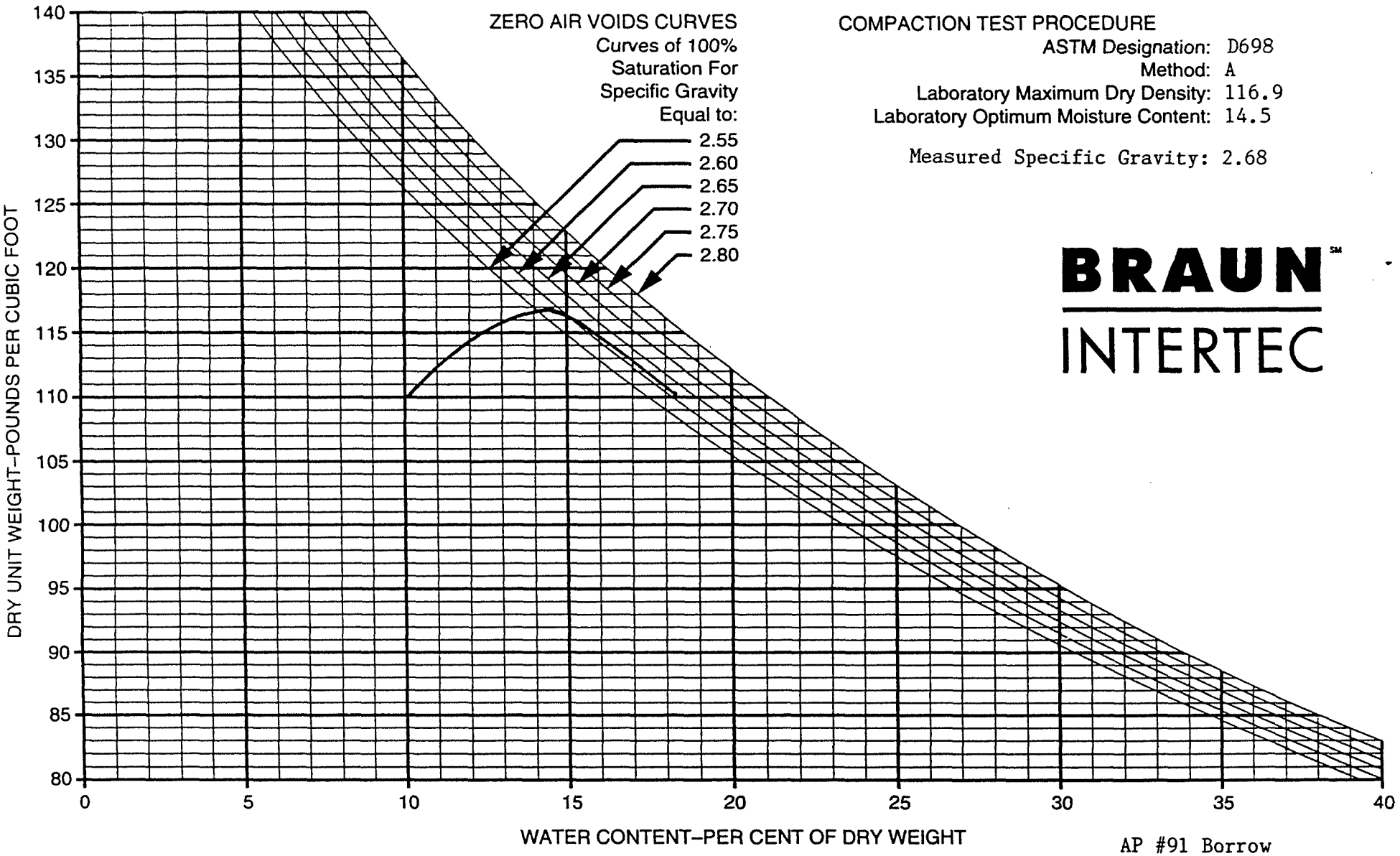
38275N 39695E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-91-035C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 116.9
Laboratory Optimum Moisture Content: 14.5

Measured Specific Gravity: 2.68

BRAUN INTERTEC

AP #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CC-93	1-2	14	18	32	CL - Sandy Lean Clay, brown

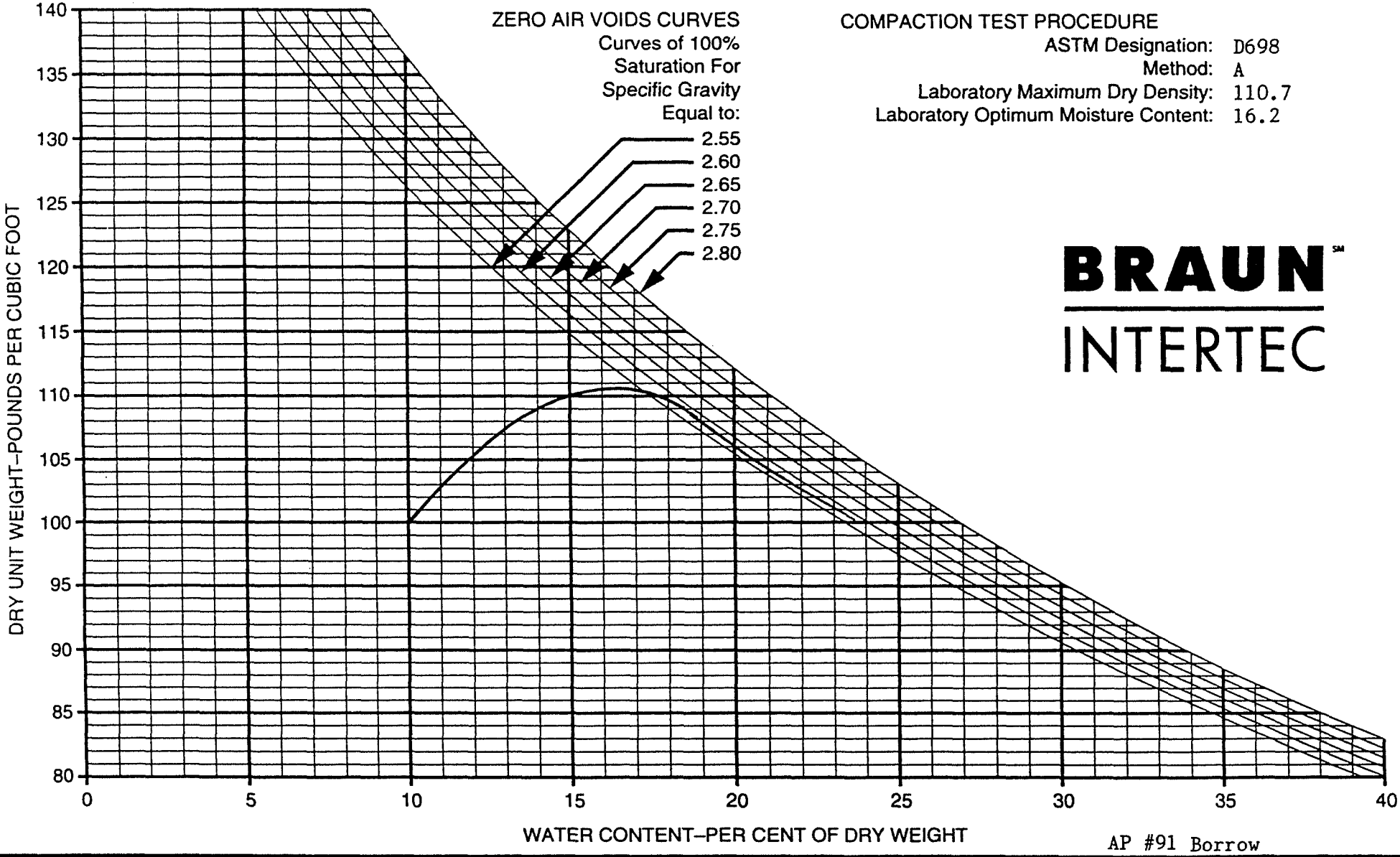
37000N 40500E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 110.7
Laboratory Optimum Moisture Content: 16.2

BRAUN INTERTEC

AP #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CC-94	1'-2'	16	22	38	CL - SANDY LEAN CLAY, olive brown

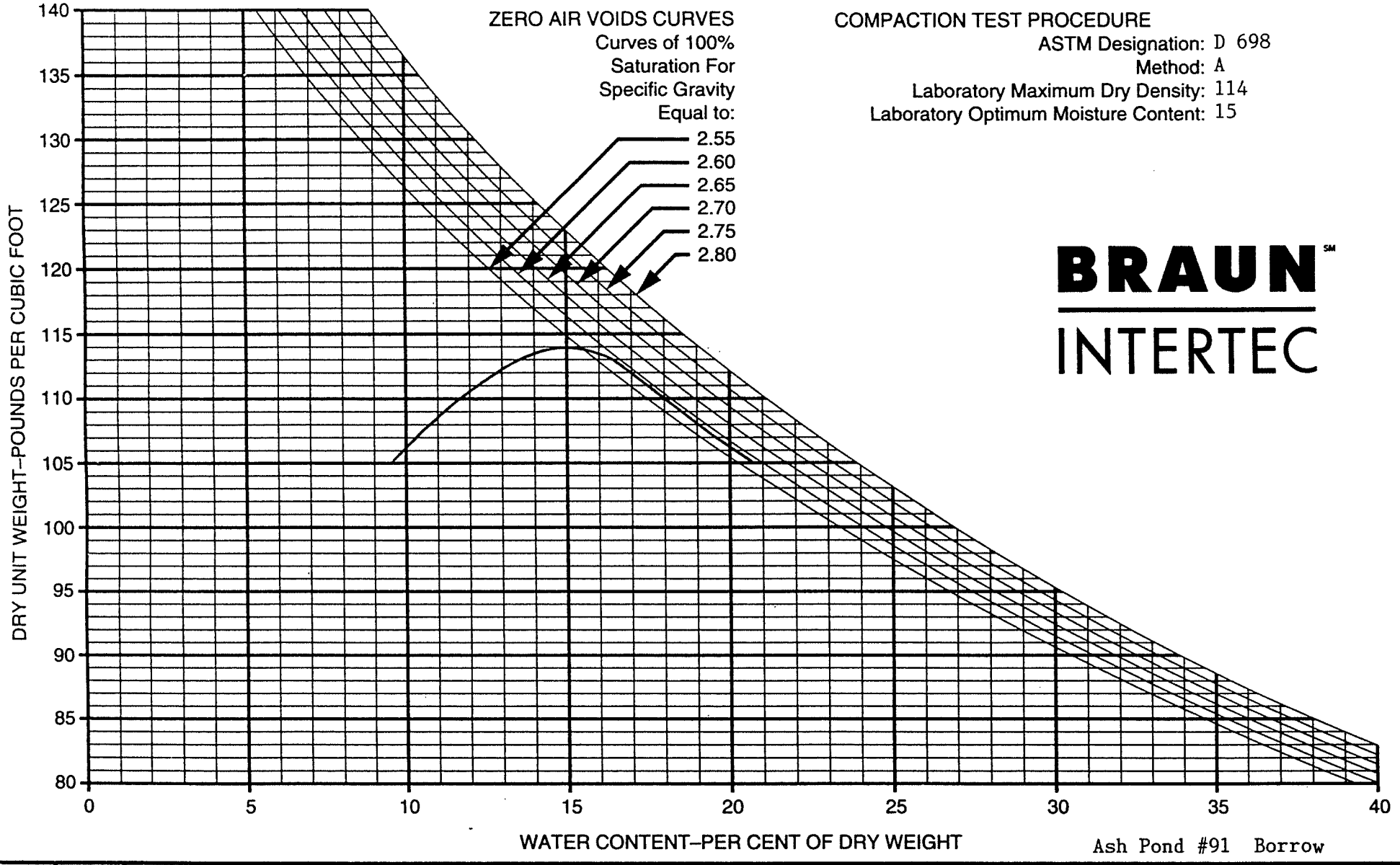
36950N 40800E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 114
Laboratory Optimum Moisture Content: 15

BRAUN INTERTEC

Ash Pond #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP.2	CC-95	2'-6'	14	18	32	Sandy Lean Clay (CL), olive brown

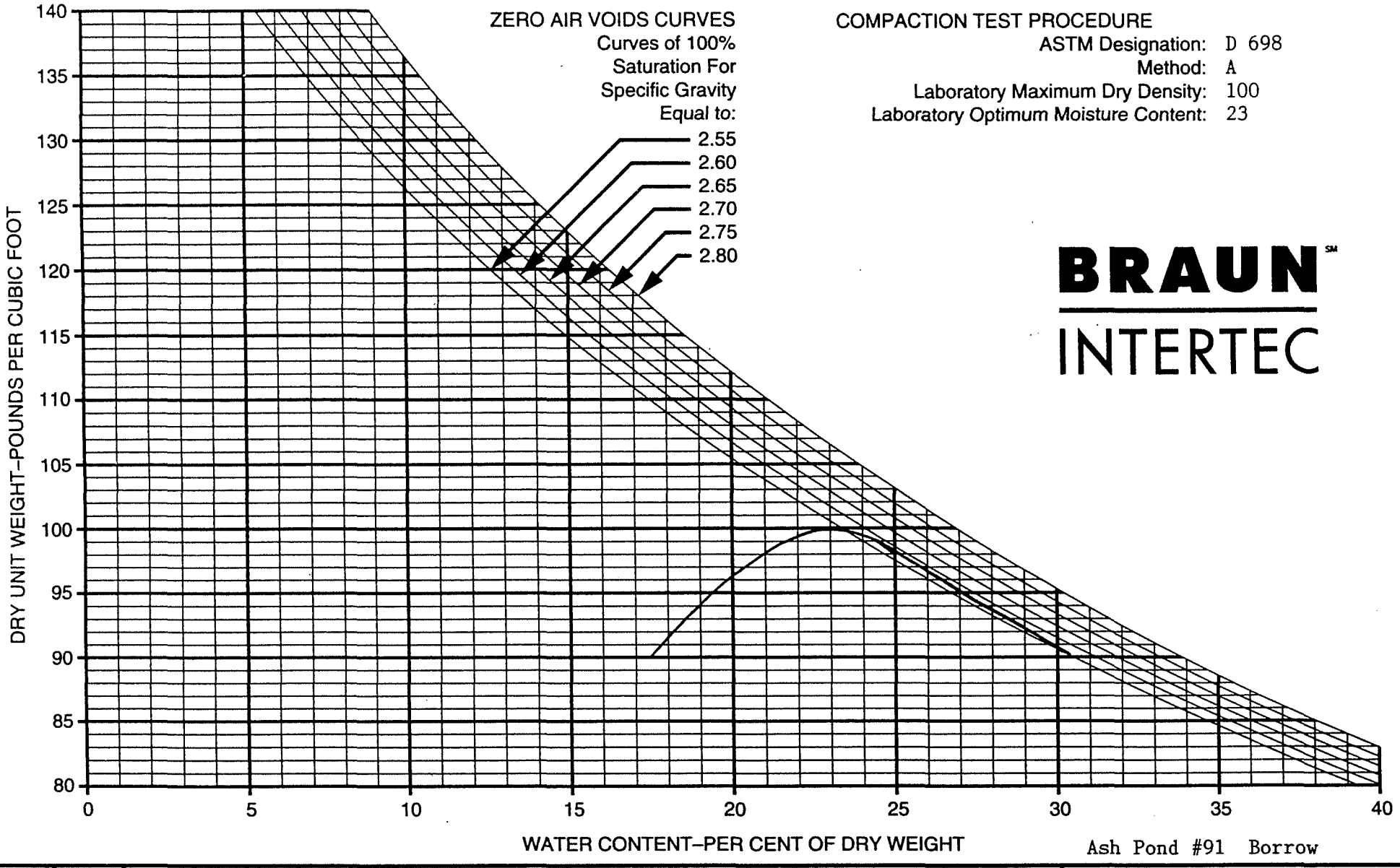
36656N 40465E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 100
Laboratory Optimum Moisture Content: 23

BRAUN INTERTEC

Ash Pond #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP.2	CC-96	15'-20'	20	34	54	Fat Clay (CH), olive brown

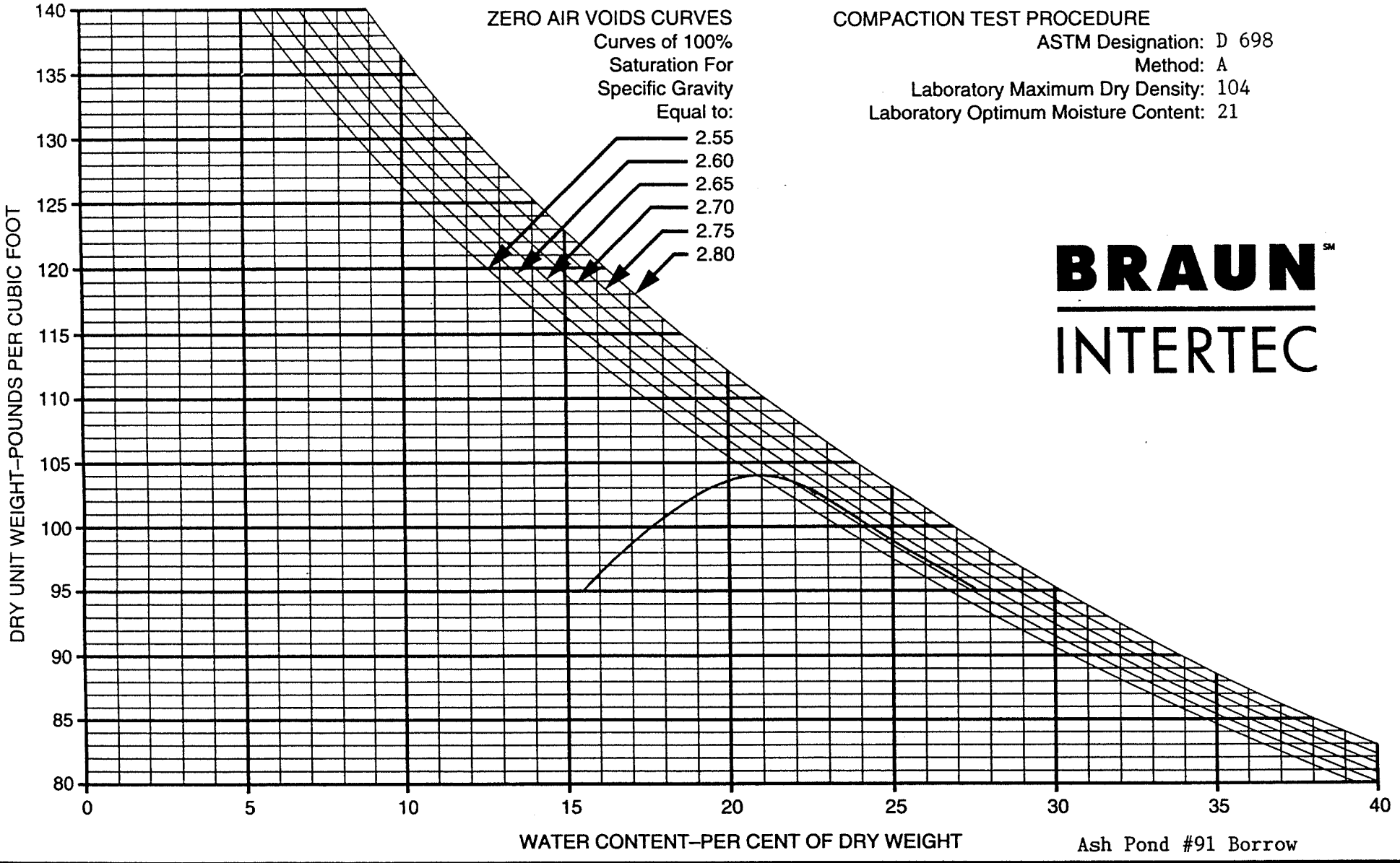
36656N 40465E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 104
Laboratory Optimum Moisture Content: 21

BRAUN INTERTEC

Ash Pond #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP.3	CC-97	10'-20'	18	18	36	Lean Clay with Sand (CL), olive brown

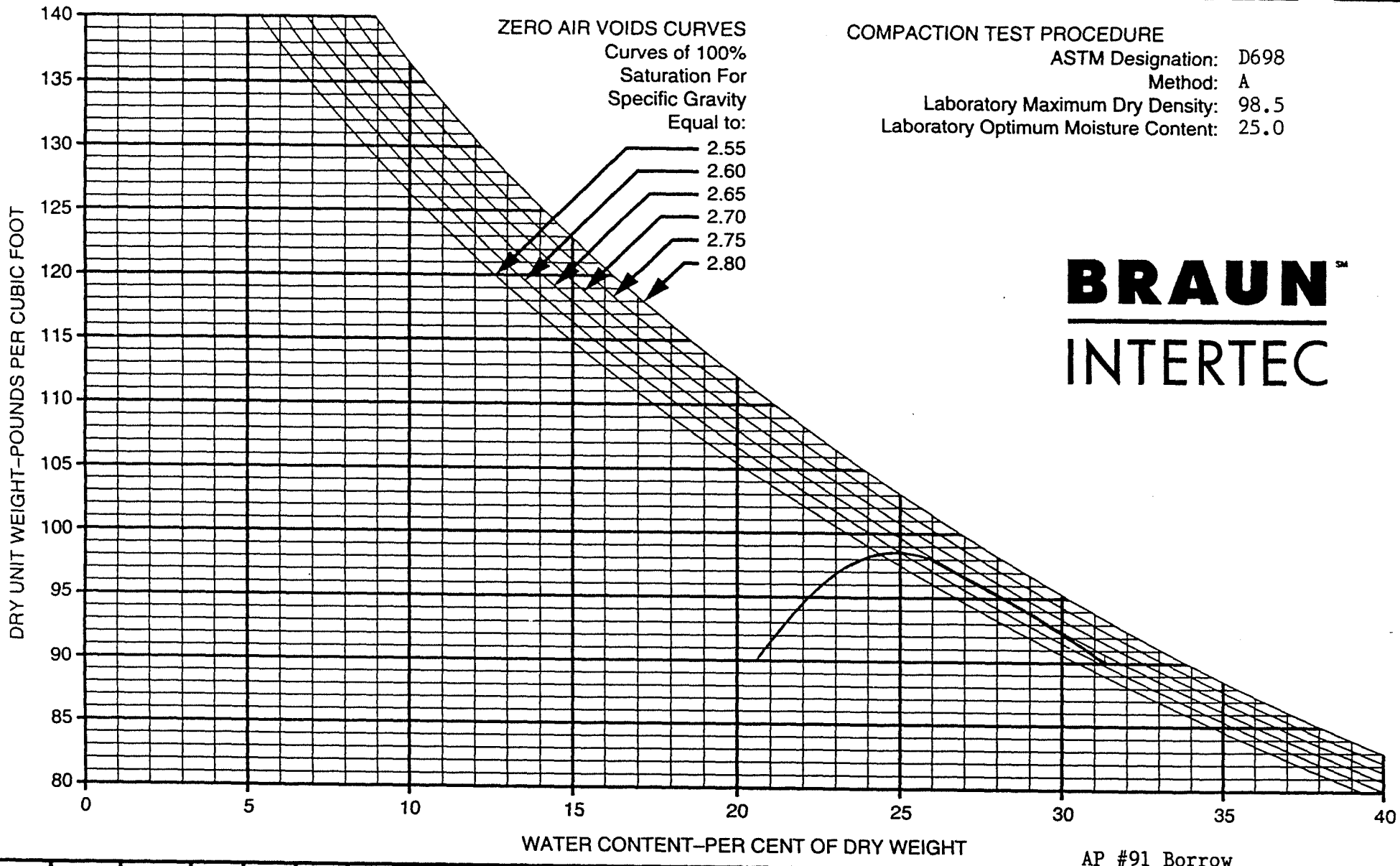
36661N 40100E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 98.5
Laboratory Optimum Moisture Content: 25.0

BRAUN INTERTEC

AP #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-4	CC-98	10	20	33	53	CH - FAT CLAY, olive brown

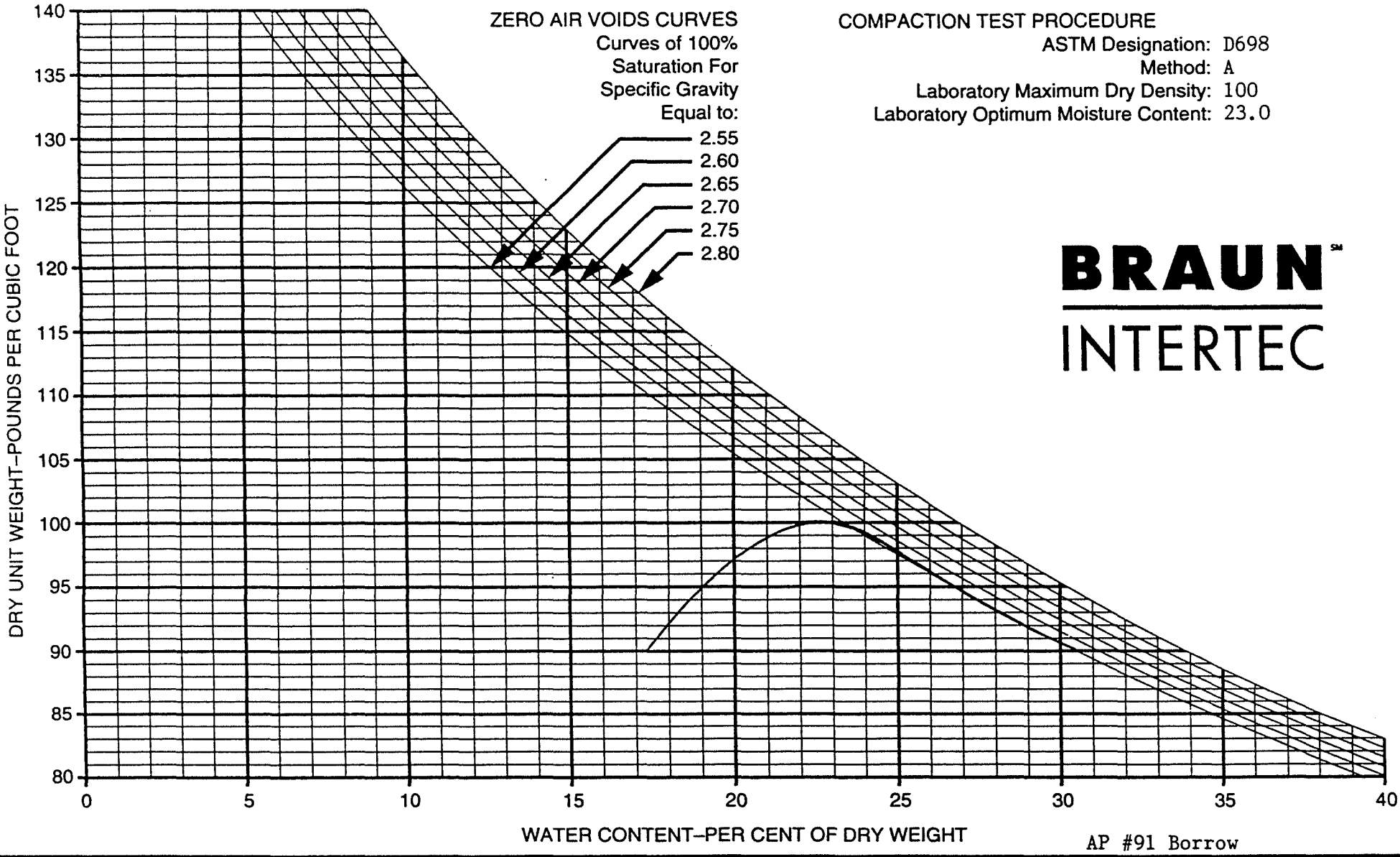
36610N 39772E

COMPACTION TEST

DRAWN BY: DS
CHECKED BY:
DATE: 5/16/92

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 100
Laboratory Optimum Moisture Content: 23.0

BRAUN INTERTEC

AP #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-4	CC-99	20-22	21	34	55	CH - FAT CLAY, olive brown

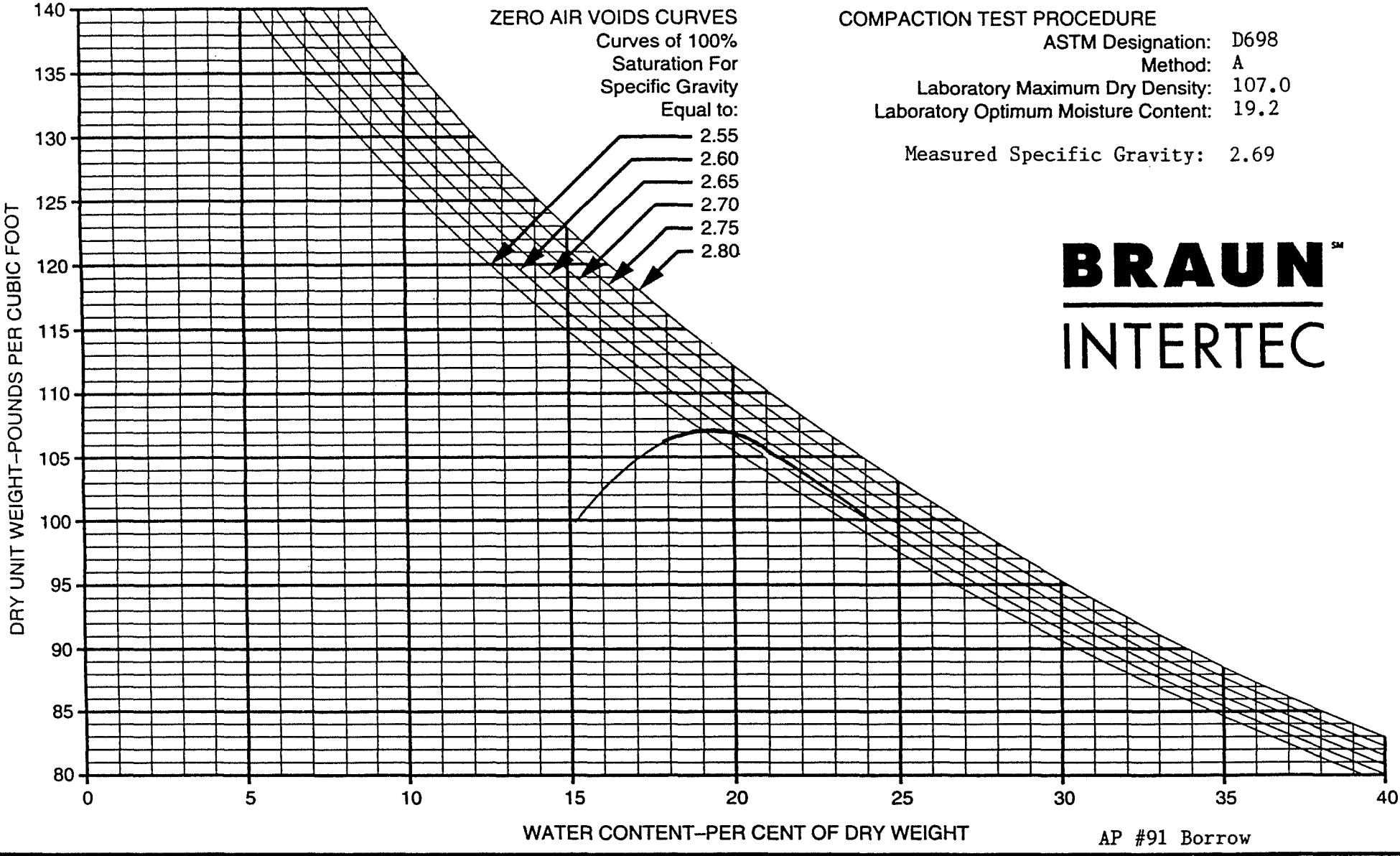
36610N 39772E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 107.0
Laboratory Optimum Moisture Content: 19.2

Measured Specific Gravity: 2.69

BRAUN INTERTEC

AP #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-5	CC-10C	6-8	17	24	41	CL - SANDY LEAN CLAY, olive brown

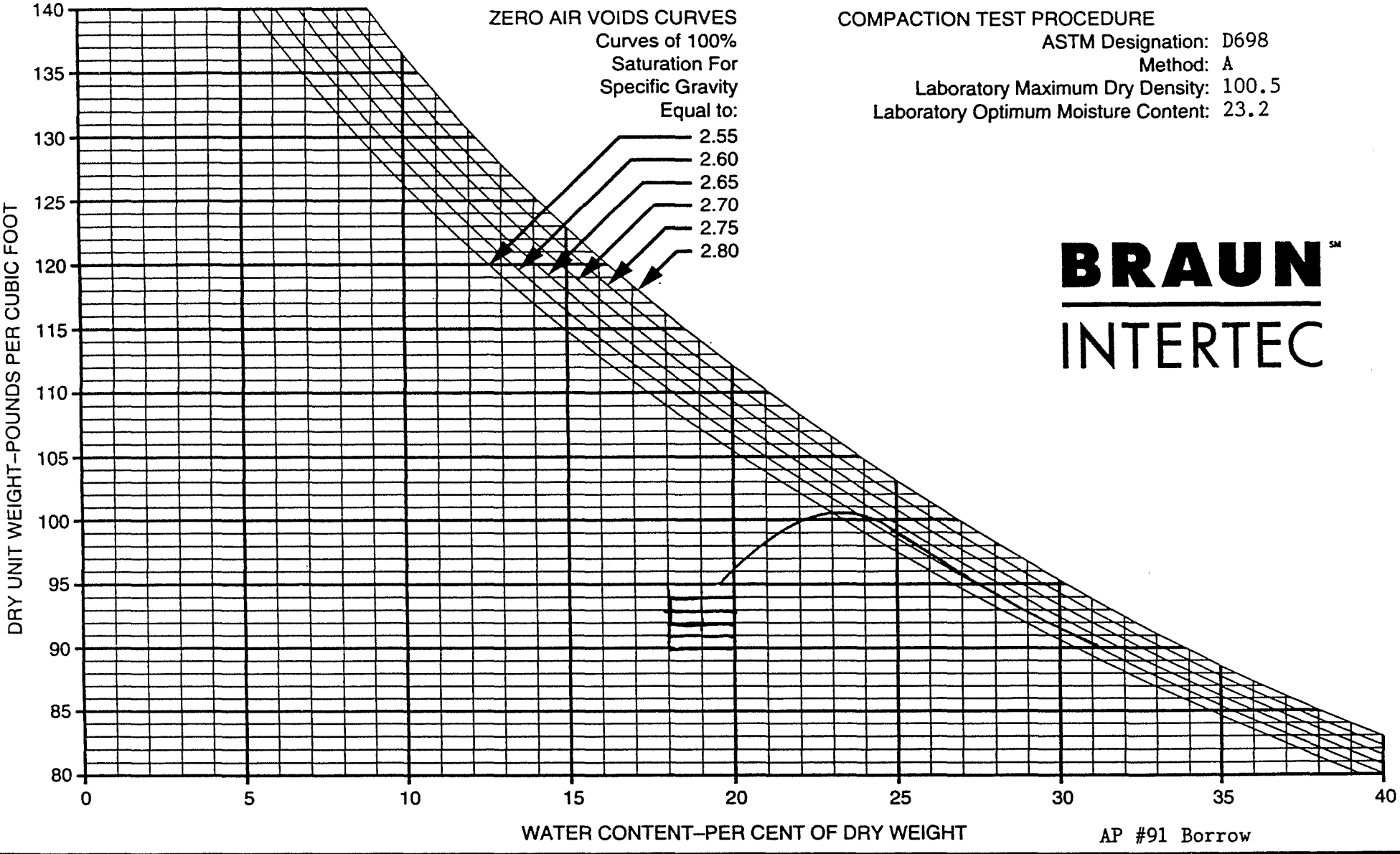
36500N 38400E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 100.5
Laboratory Optimum Moisture Content: 23.2

BRAUN INTERTEC

AP #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-6	CC-103	8-15	23	43	66	CH - FAT CLAY, olive yellow

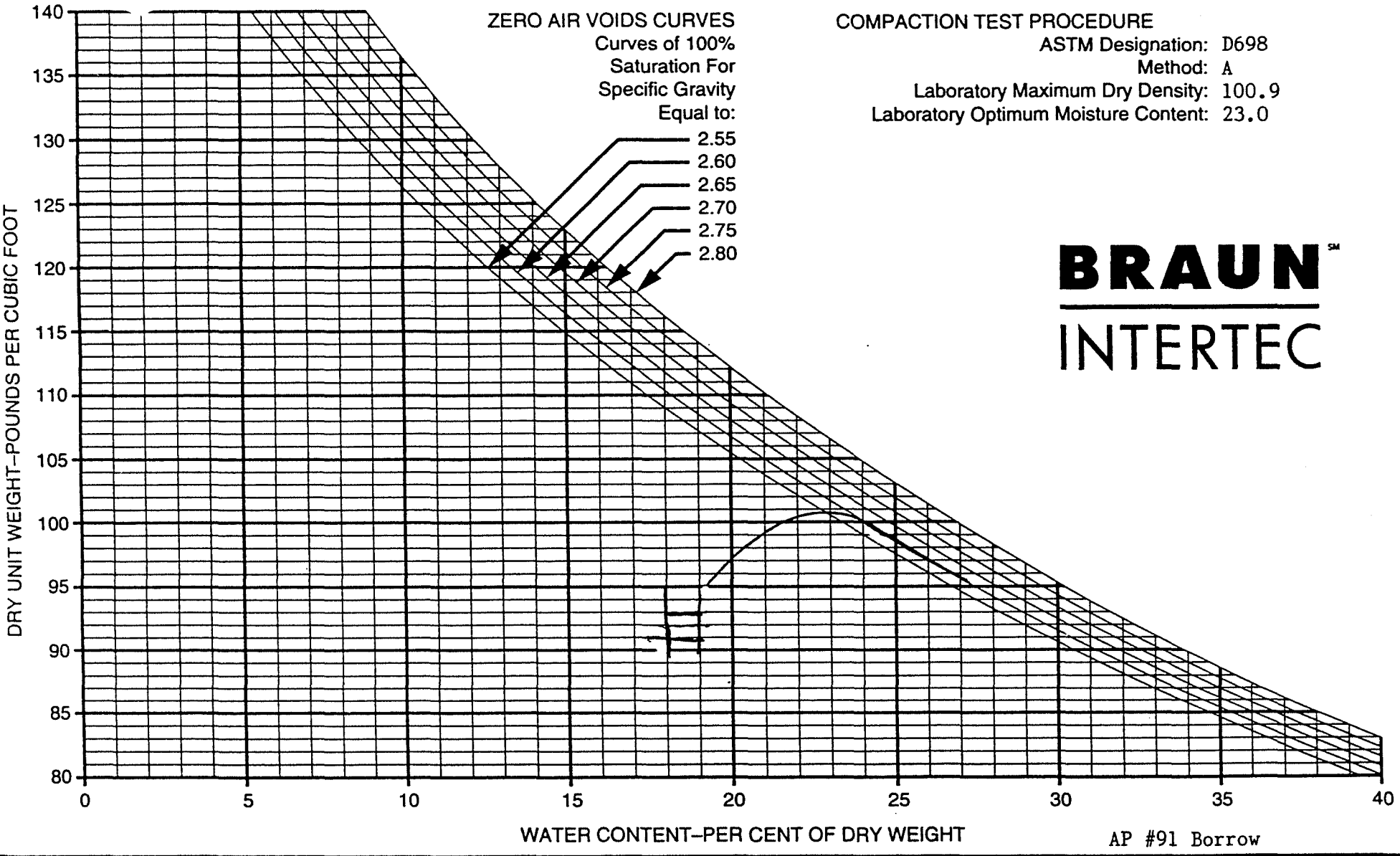
36345N 39650E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 100.9
Laboratory Optimum Moisture Content: 23.0

BRAUN INTERTEC

AP #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-6	CC-104	20	19	36	55	CH - FAT CLAY, grayish brown

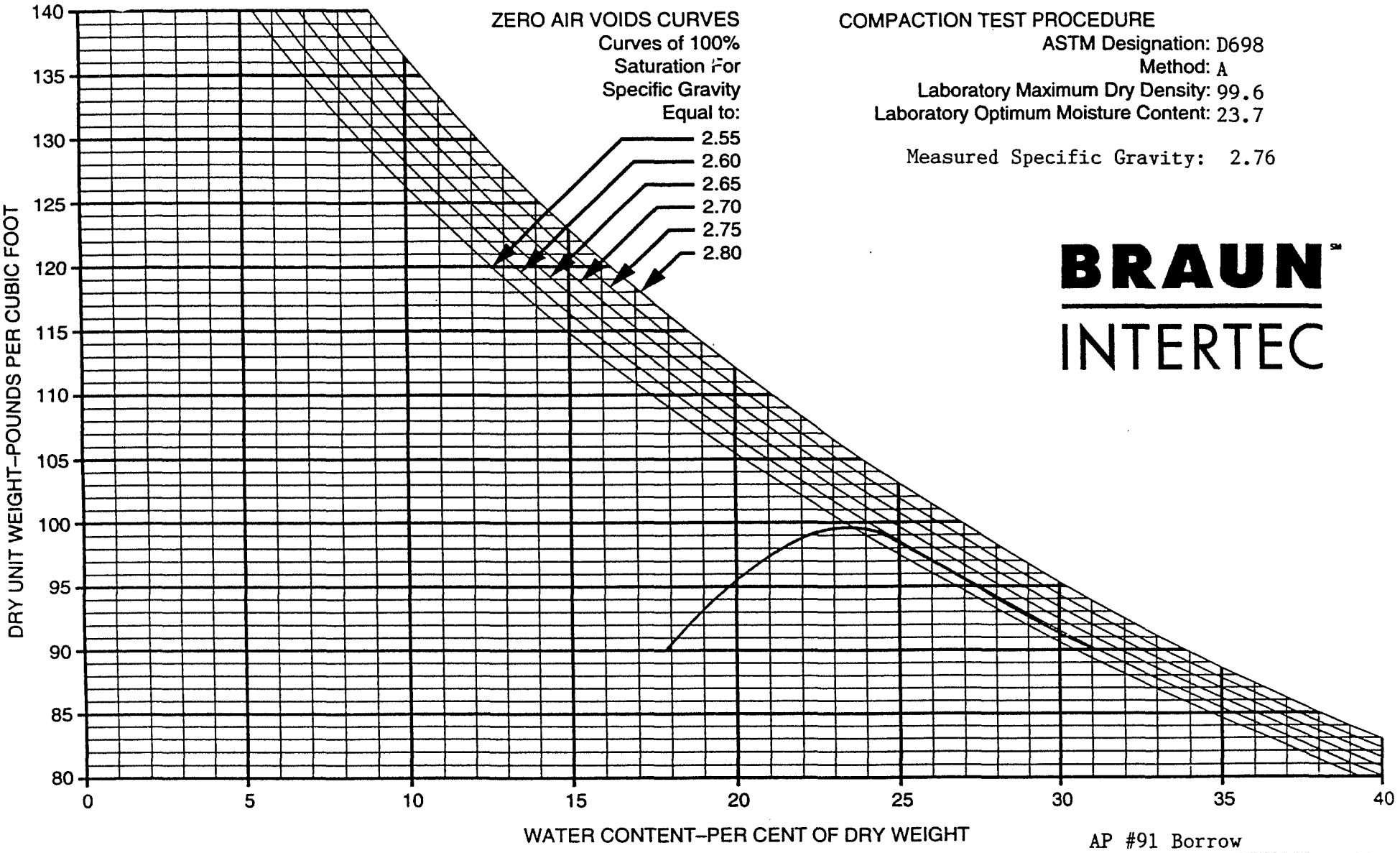
36345N 39650E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 99.6
Laboratory Optimum Moisture Content: 23.7

Measured Specific Gravity: 2.76

BRAUN INTERTEC

AP #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-7	CC-105	5-10	21	38	59	CH - FAT CLAY, dk grayish brown

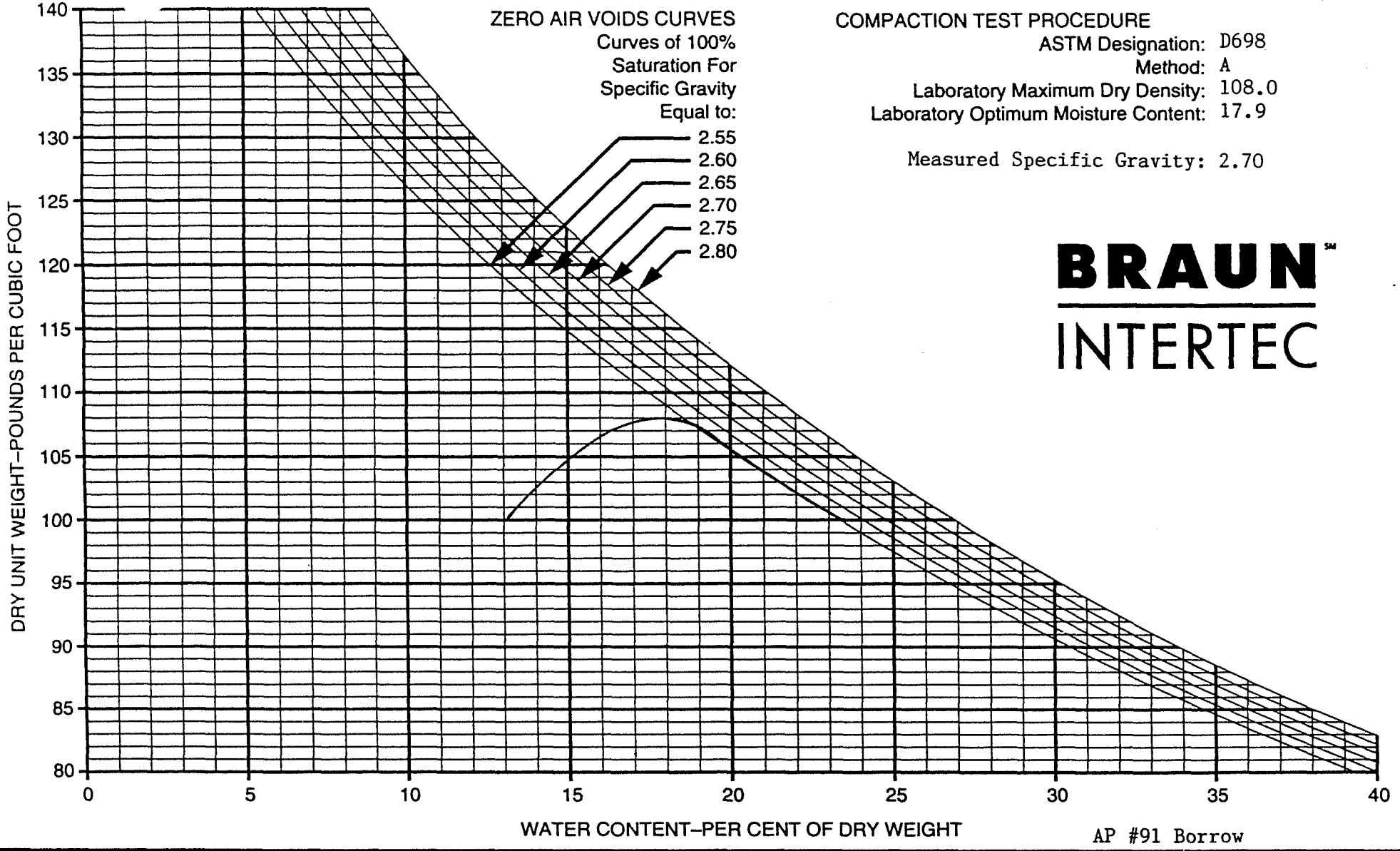
36520N 39650E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 108.0
Laboratory Optimum Moisture Content: 17.9

Measured Specific Gravity: 2.70

BRAUN℠ INTERTEC

AP #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-7	CC-106	20	17	21	38	CL - LEAN CLAY, olive brown

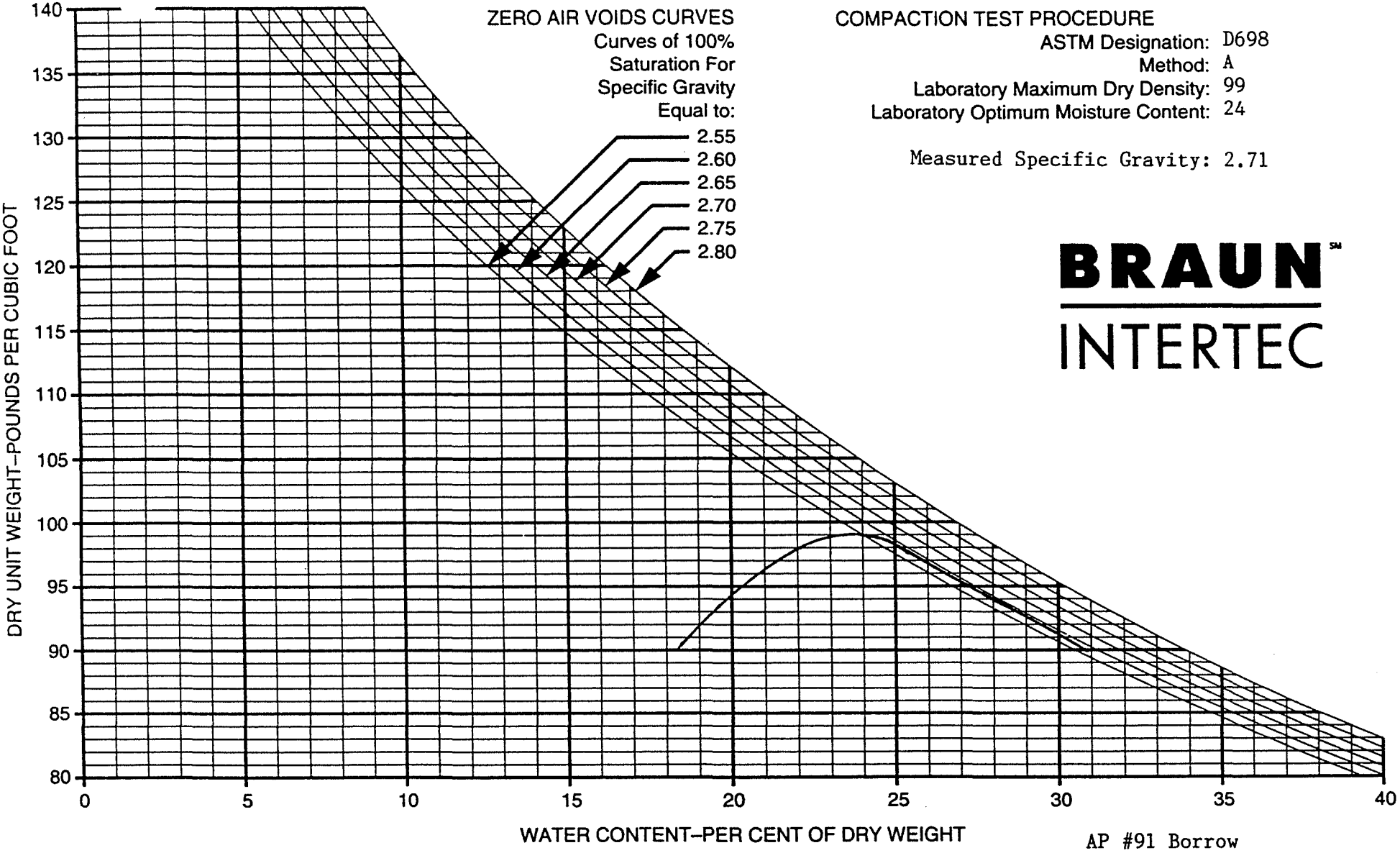
36520N 39650E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 99
Laboratory Optimum Moisture Content: 24

Measured Specific Gravity: 2.71

BRAUN INTERTEC

AP #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-8	CC-107	10-15	22	46	68	CH - FAT CLAY, olive

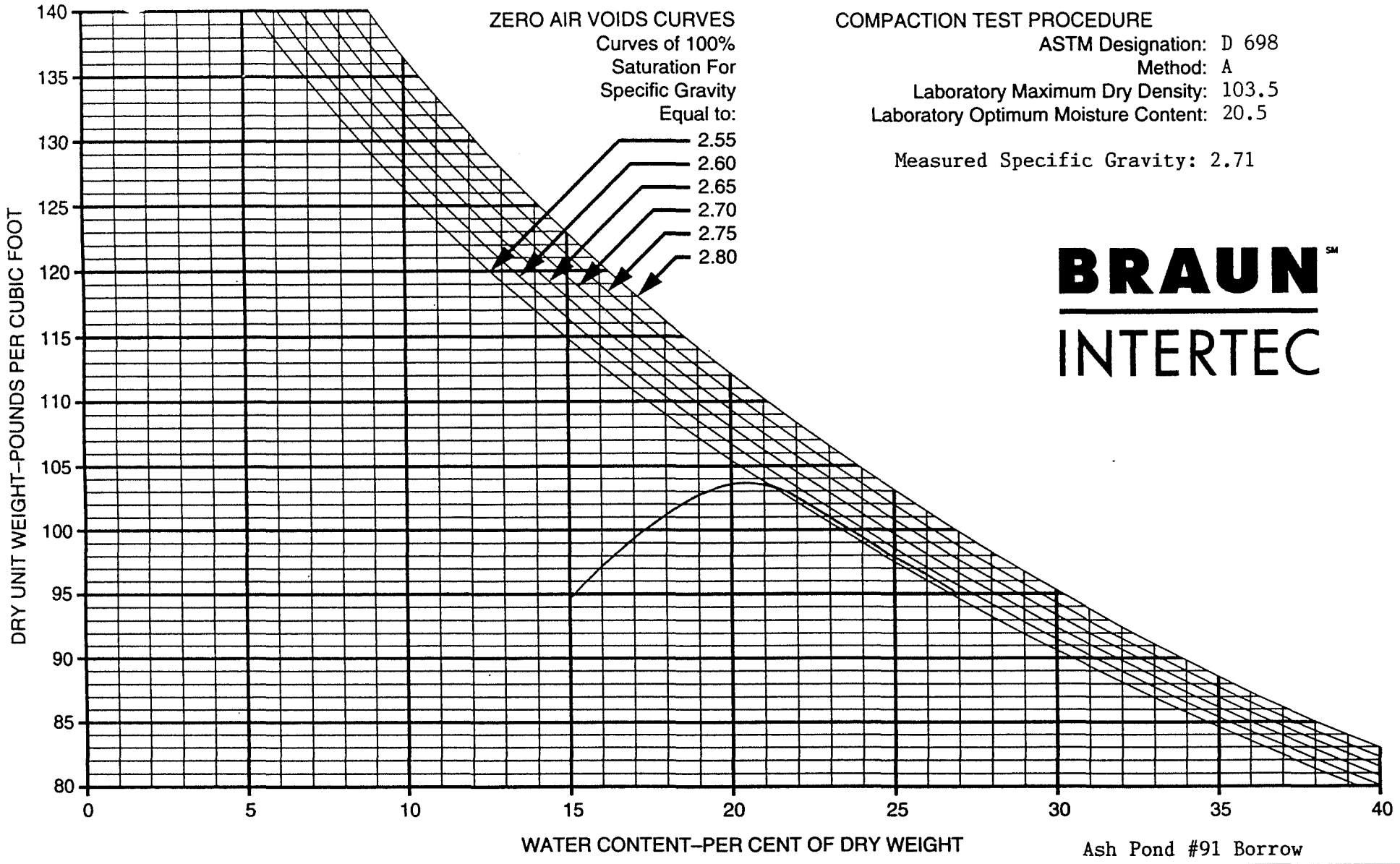
36340N 39950E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 103.5
Laboratory Optimum Moisture Content: 20.5

Measured Specific Gravity: 2.71

BRAUN INTERTEC

Ash Pond #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP.9	CC-108	10'-20'	17	32	49	Lean Clay (CL), light olive brown

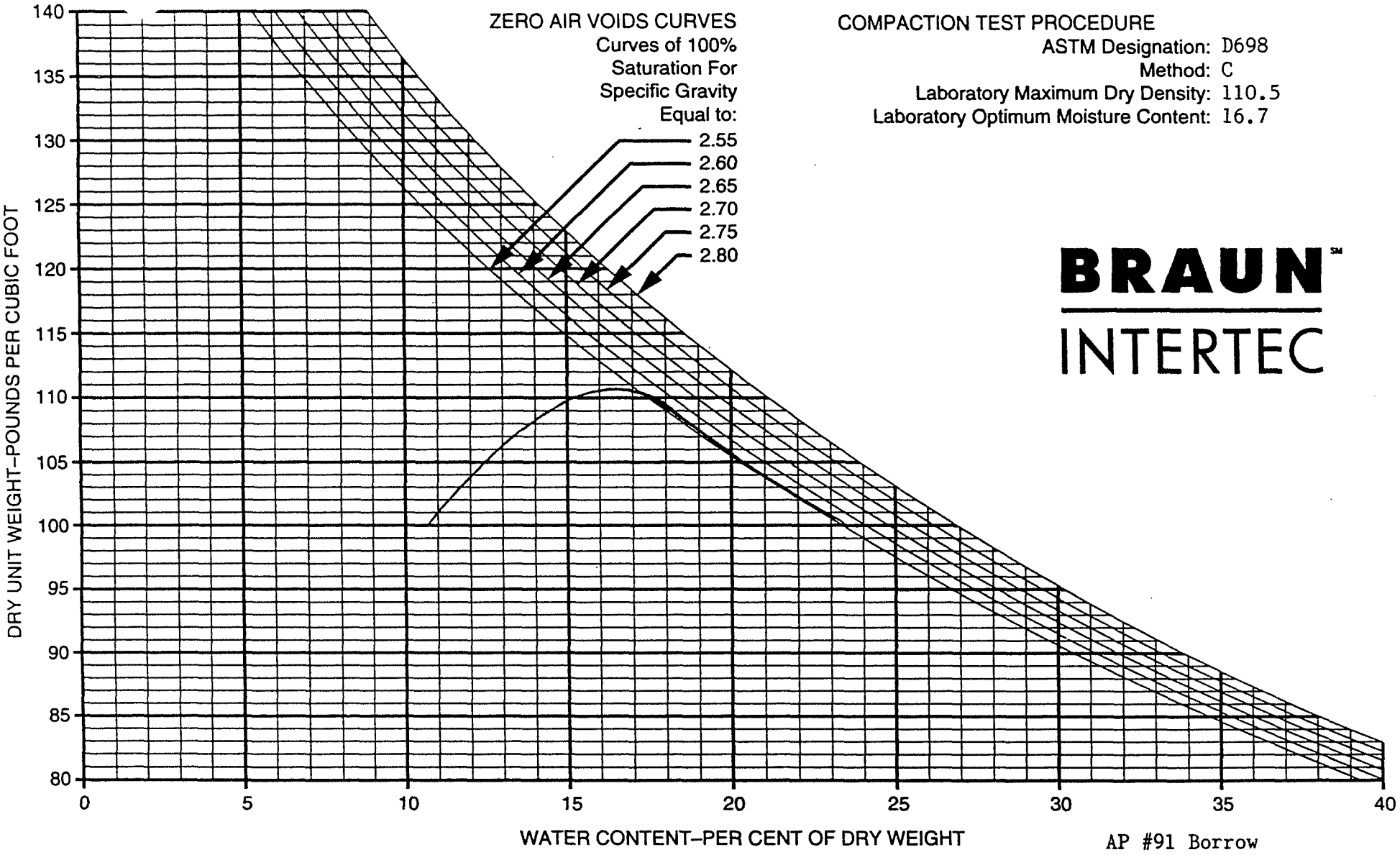
36531N 40172E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D698
Method: C
Laboratory Maximum Dry Density: 110.5
Laboratory Optimum Moisture Content: 16.7

BRAUN INTERTEC

AP #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-10	CC-109	10-12	14	25	39	CL - SANDY LEAN CLAY, olive brown

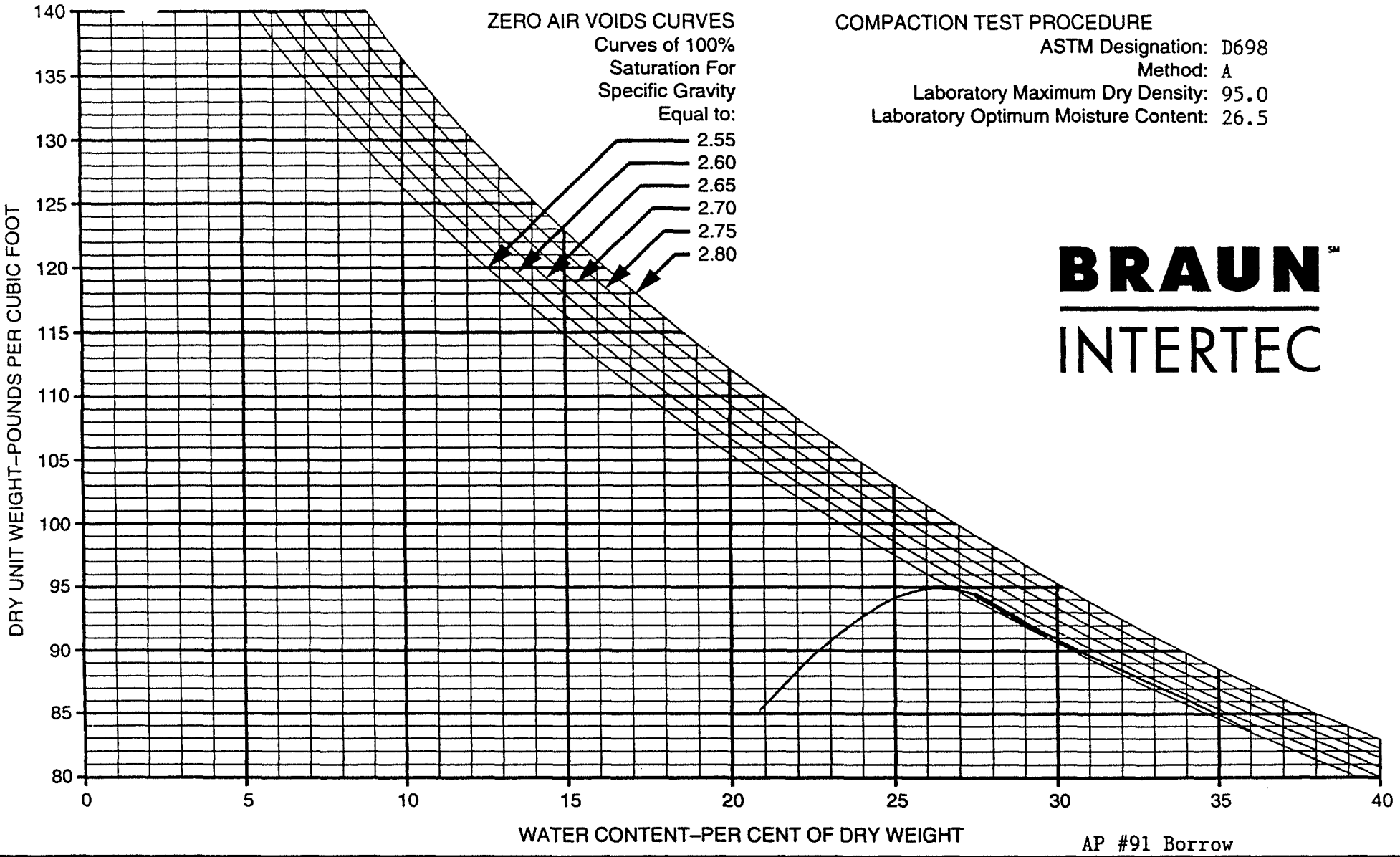
36347N 40395E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D698
Method: A
Laboratory Maximum Dry Density: 95.0
Laboratory Optimum Moisture Content: 26.5

BRAUN INTERTEC

AP #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-11	CC-110	15-20	19	40	59	CH - FAT CLAY, light grayish, brown

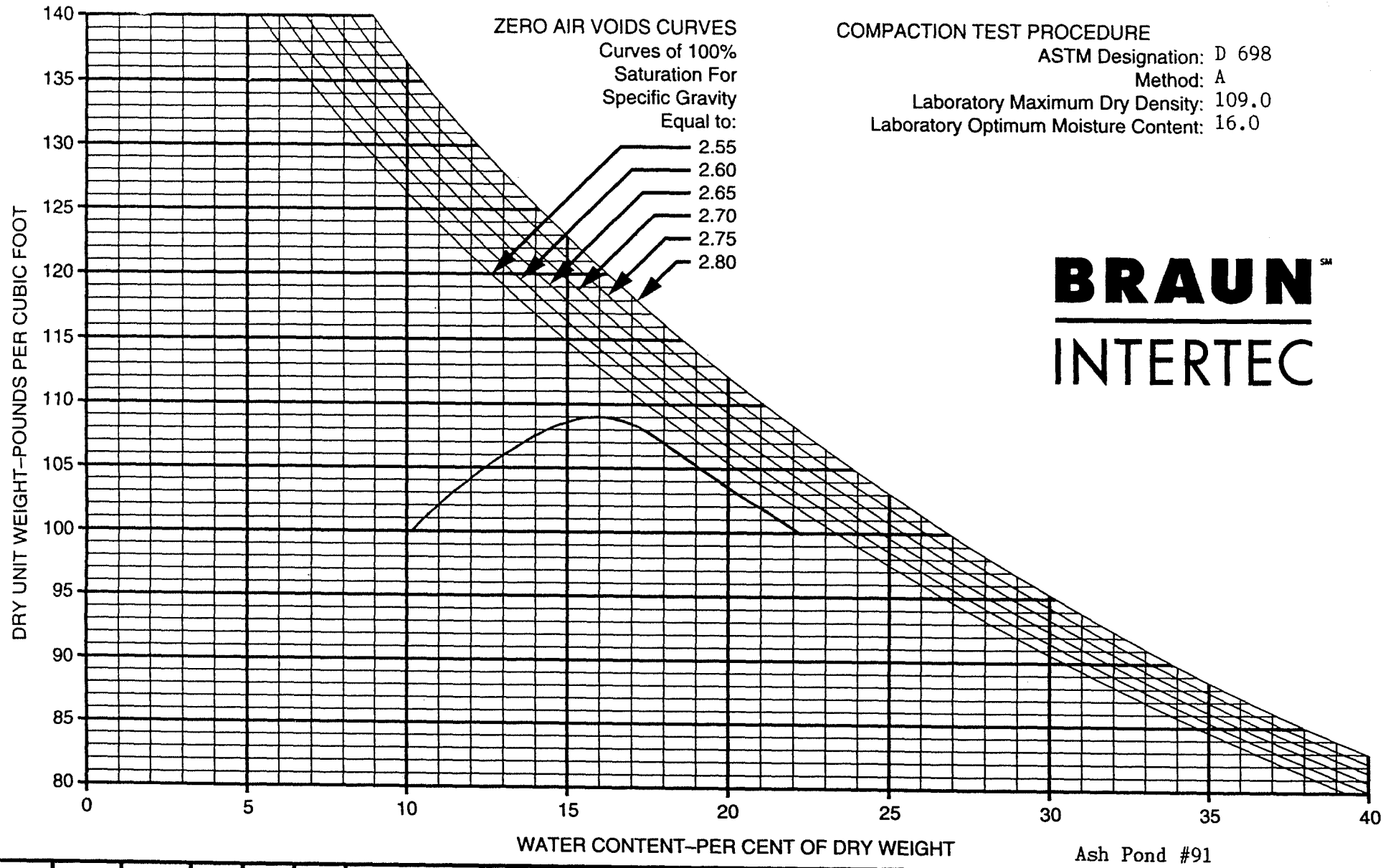
36527N 40775E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 109.0
Laboratory Optimum Moisture Content: 16.0

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	SG-CC-133	1896.9	17	23	40	Sandy Lean Clay(CL), olive brown

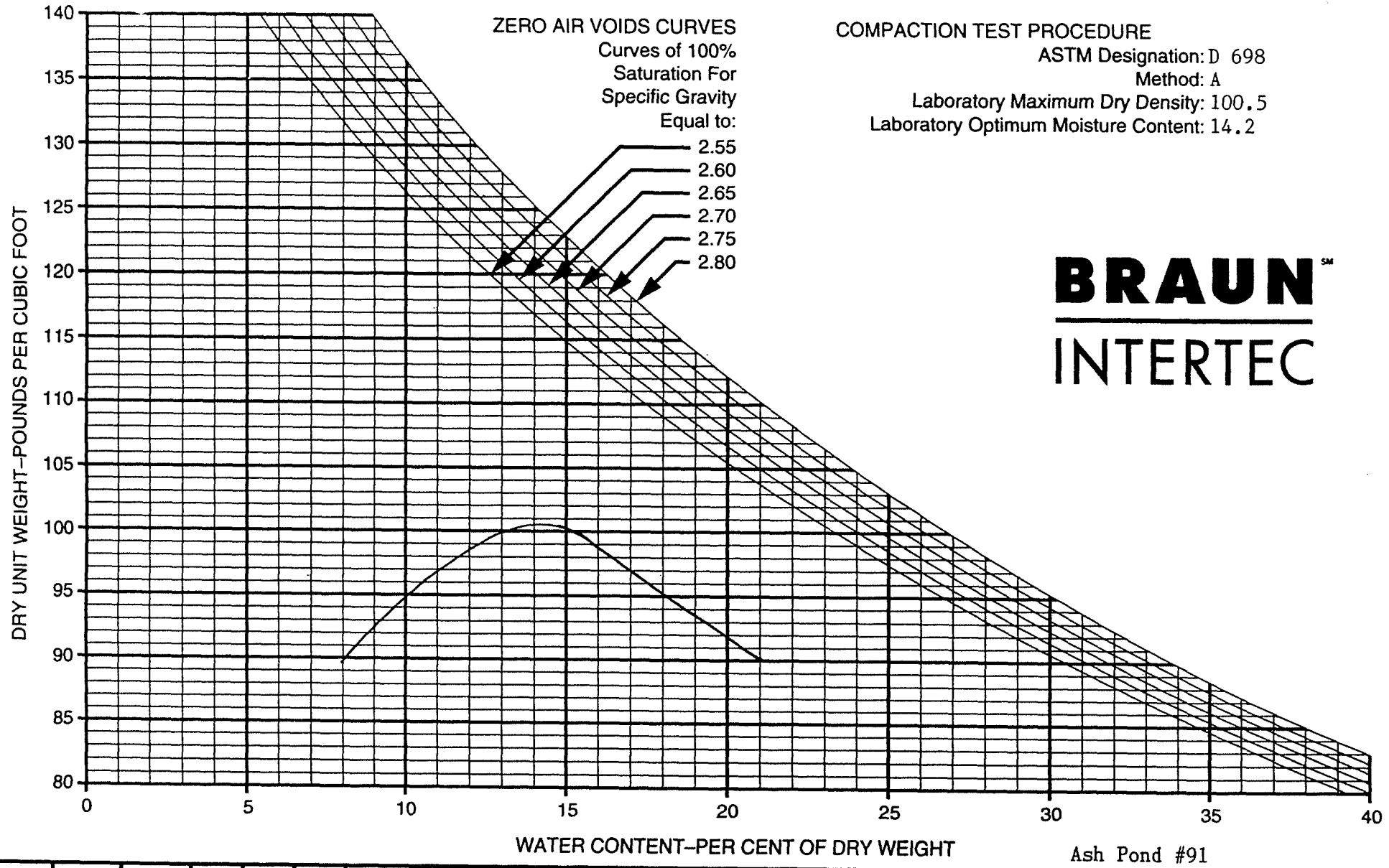
38612N 40516E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 9/23/92

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 100.5
Laboratory Optimum Moisture Content: 14.2

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	SG-CC-148	1898.1	19	25	44	Sandy Lean Clay (CL), olive brown

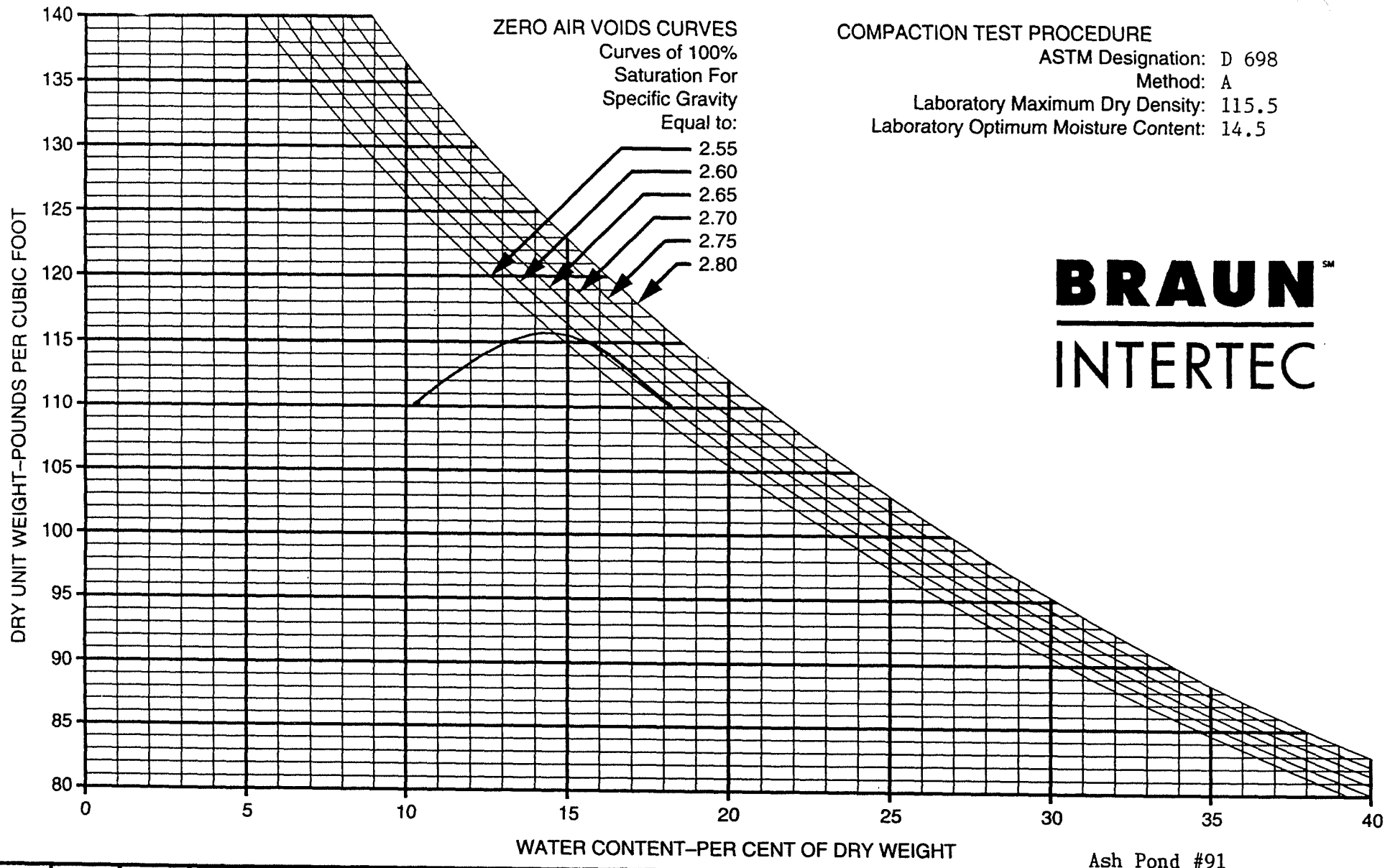
37839N 41445E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 9/24/92

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 115.5
Laboratory Optimum Moisture Content: 14.5

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	SG-CC-162	1897.8	N/I	N/I	N/I	Sandy Lean Clay (CL), olive brown

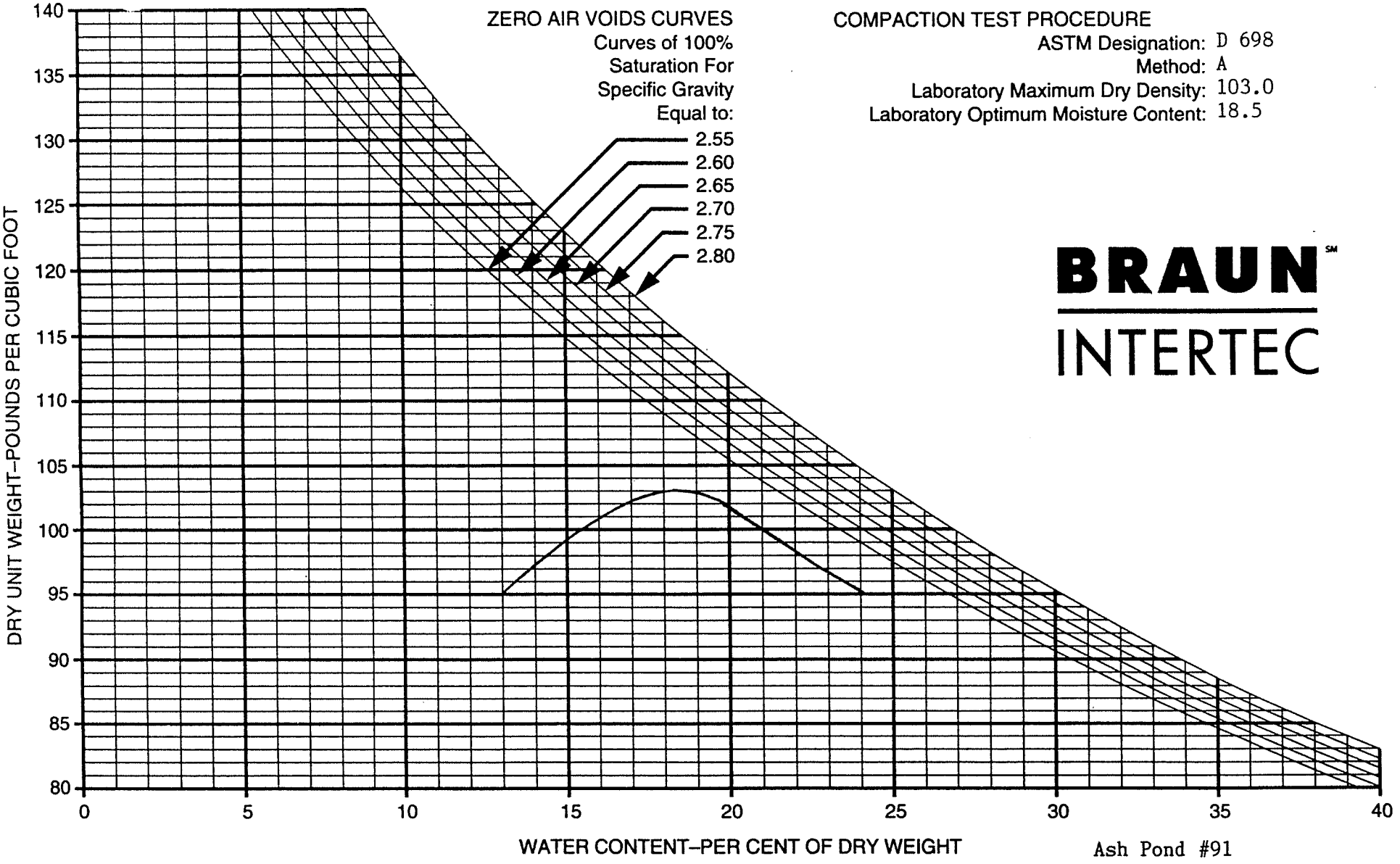
38176N 40935E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 8/31/92

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 103.0
Laboratory Optimum Moisture Content: 18.5

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CC-167	N/A	19	28	47	Lean Clay (CL), dark grayish-brown

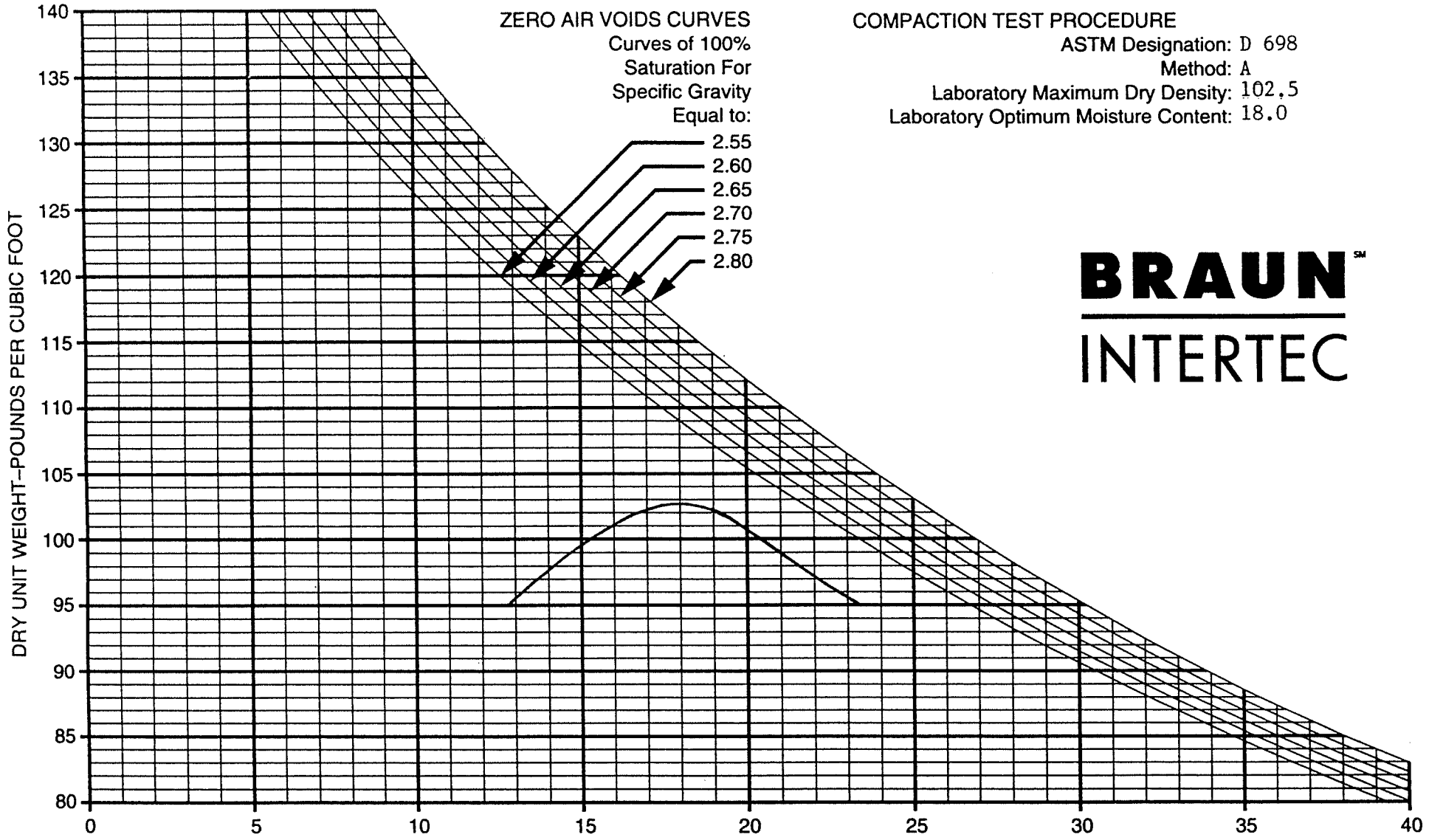
37500N 40000E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 9/23/92

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698

Method: A

Laboratory Maximum Dry Density: 102.5

Laboratory Optimum Moisture Content: 18.0

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CC-168	N/A	17	21	38	Lean Clay (CL), dark olive brown

37550N 40100E

COMPACTION TEST

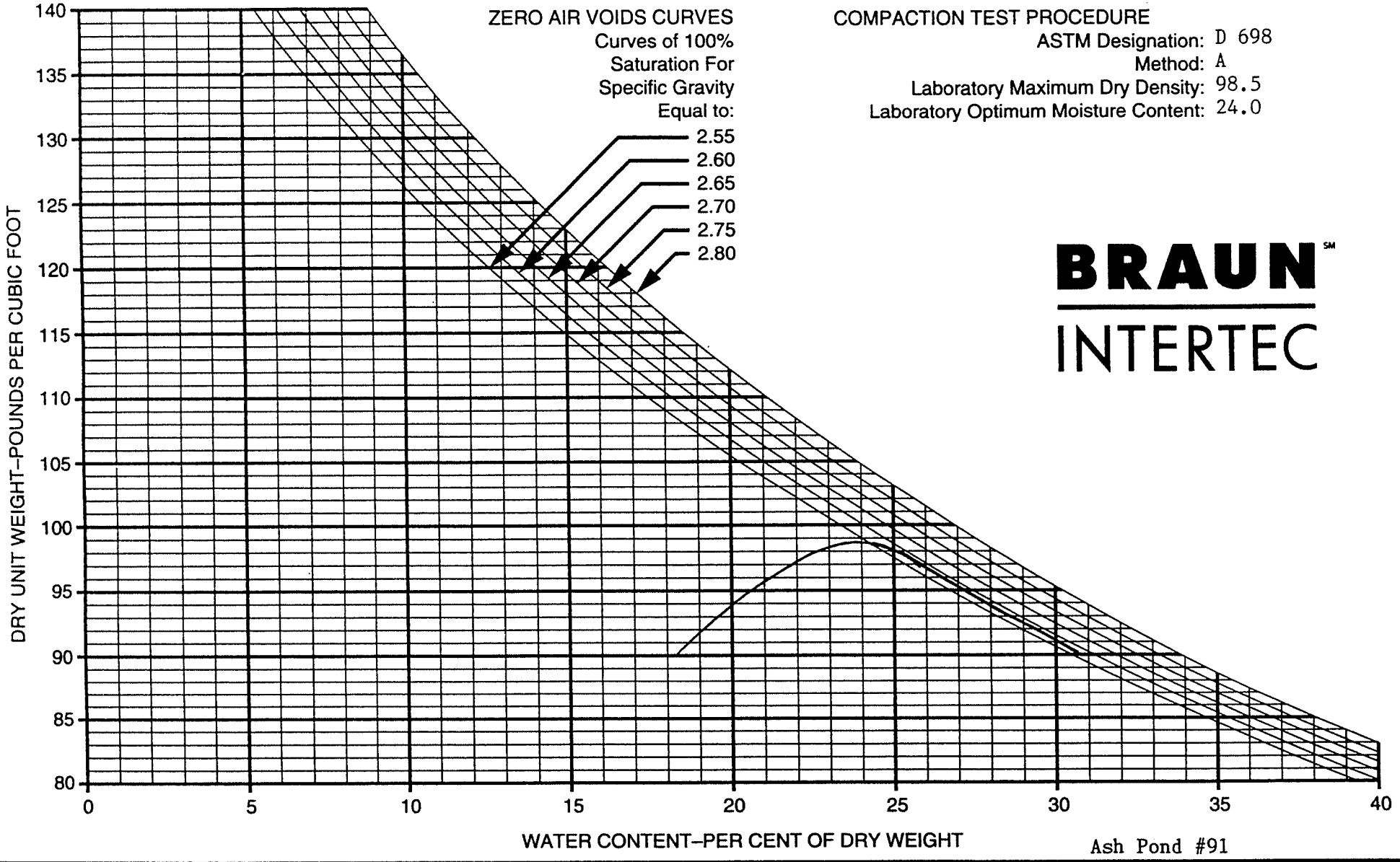
DRAWN BY: JA

CHECKED BY:

DATE: 8/31/92

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 98.5
Laboratory Optimum Moisture Content: 24.0

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CC-169	N/A	22	38	60	Fat Clay (CH), dark gray

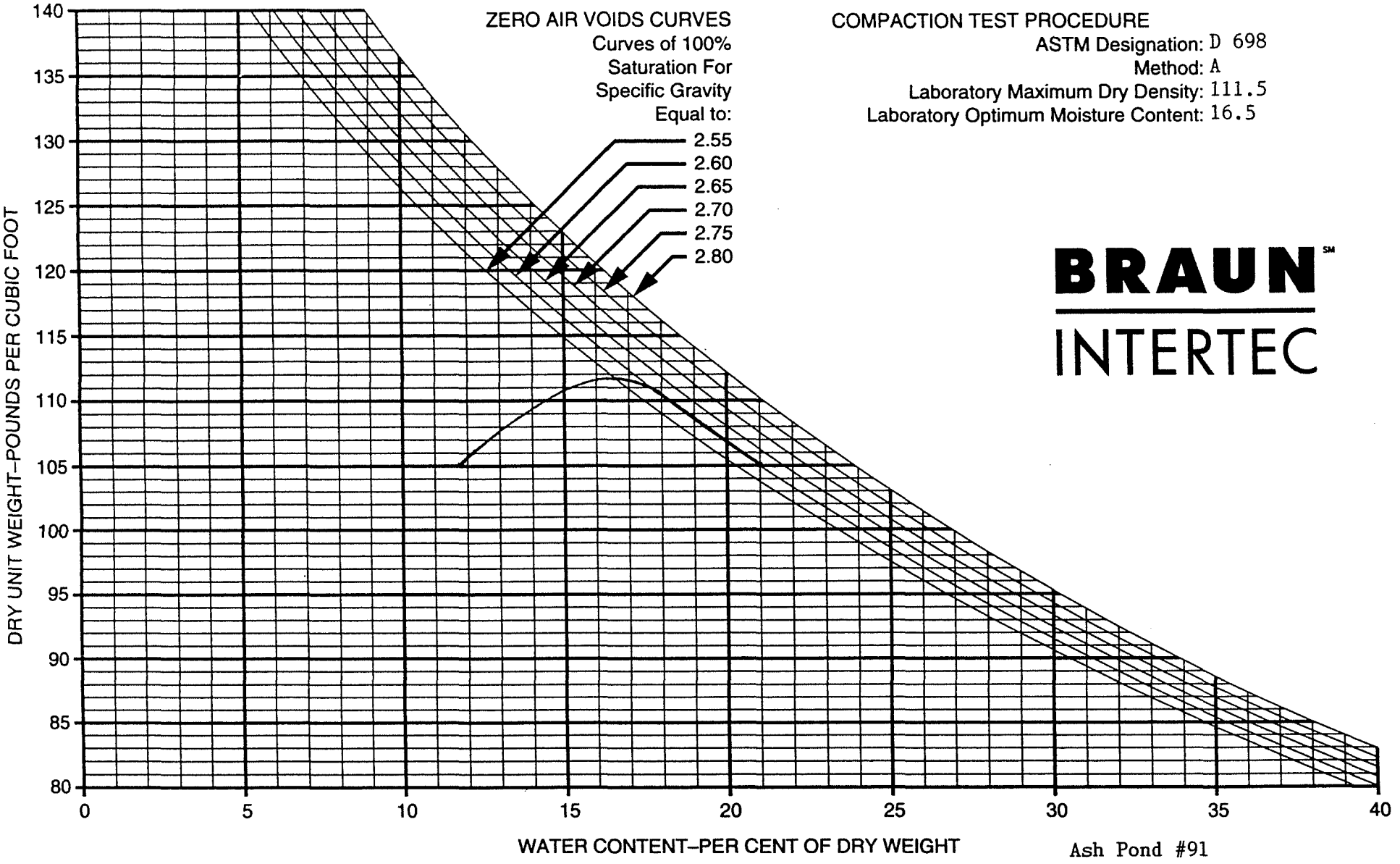
37600N 40500E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 9/4/92

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 111.5
Laboratory Optimum Moisture Content: 16.5

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	SG-CC-175	1894.3	20	11	31	Lean Clay w/Sand (CL), olive brown

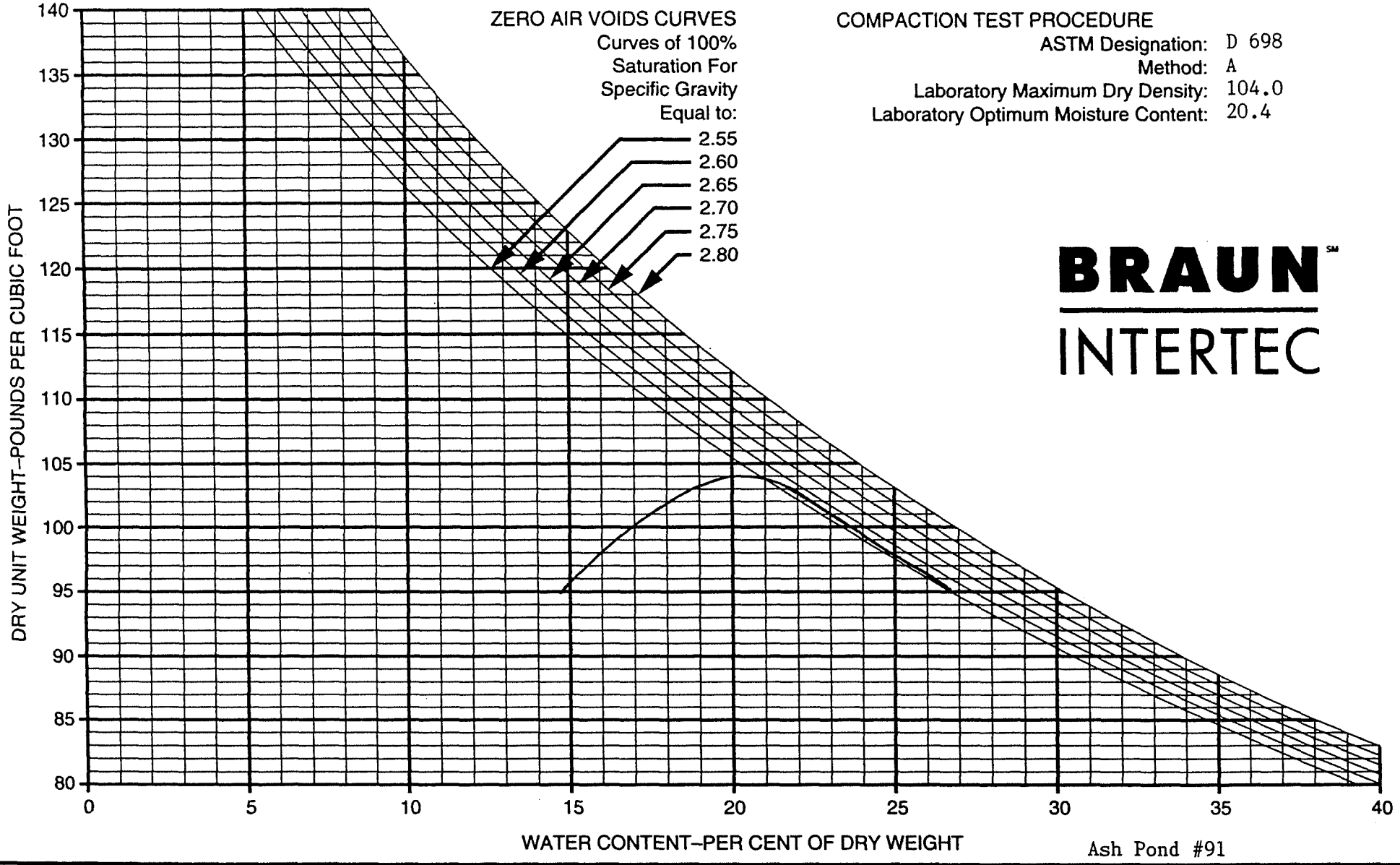
38270N 41064E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 9/28/92

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 104.0
Laboratory Optimum Moisture Content: 20.4

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	SG-CC-189	1899.4	18	27	45	Clayey Sand (SC), olive brown

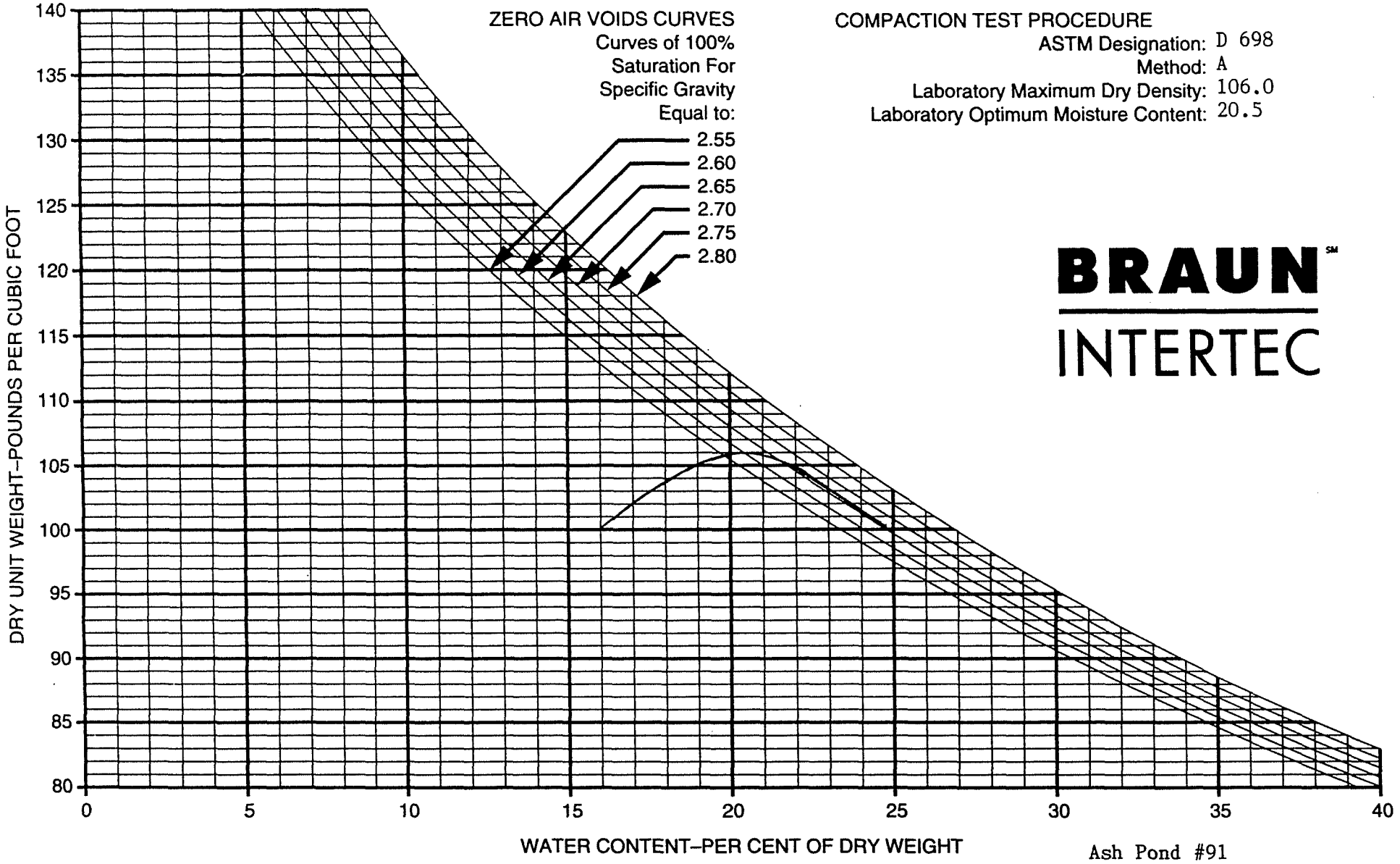
37668N 41267E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE: 10/1/92

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 106.0
Laboratory Optimum Moisture Content: 20.5

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	SG-CC-183	1897.5	17	30	47	Sandy Lean Clay (CL), dark brown

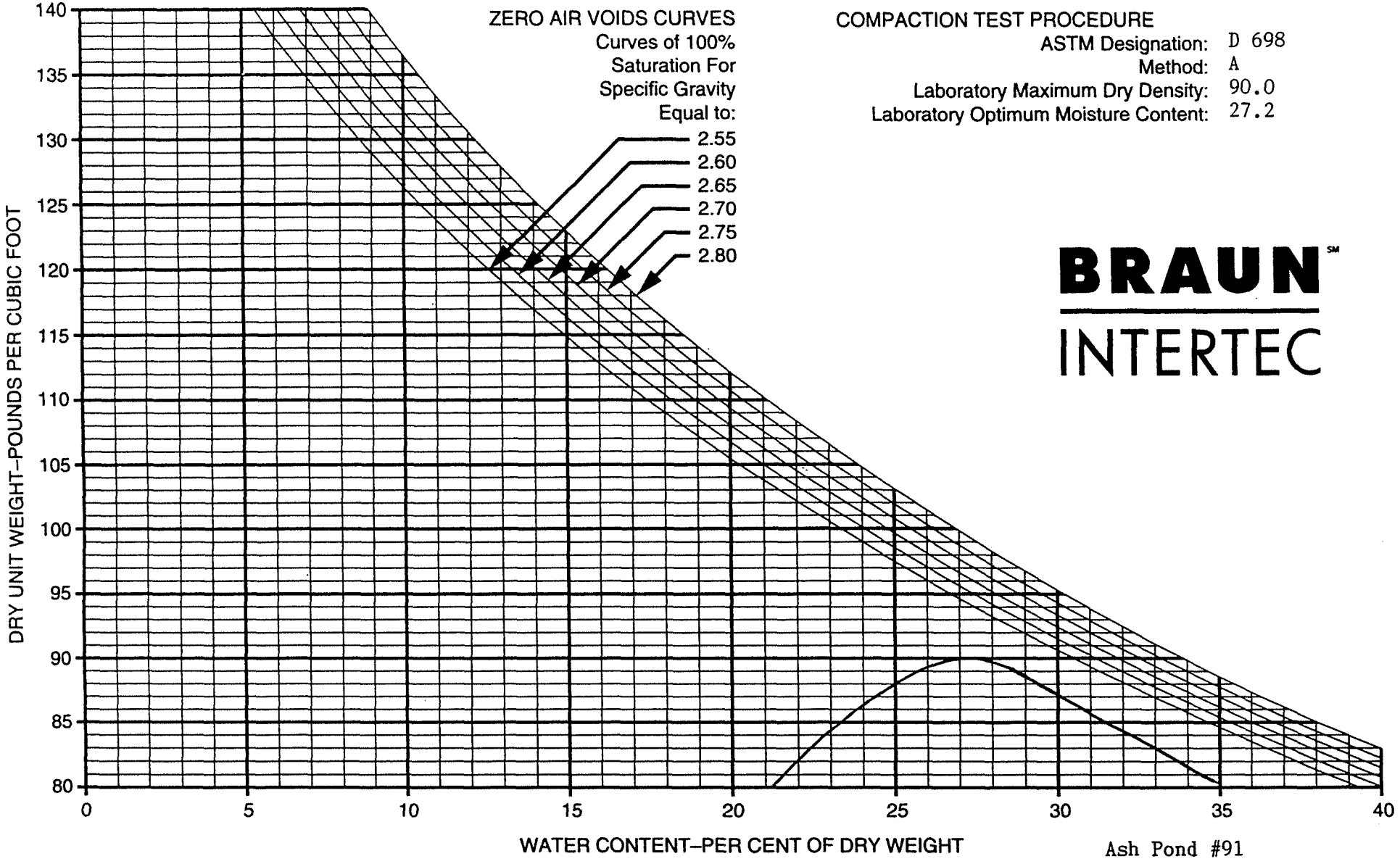
38149N 41004E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 9/23/92

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 90.0
Laboratory Optimum Moisture Content: 27.2

BRAUN℠ INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	DE-OC-181	1919.6	24	40	64	Fat Clay (CH), dark brown

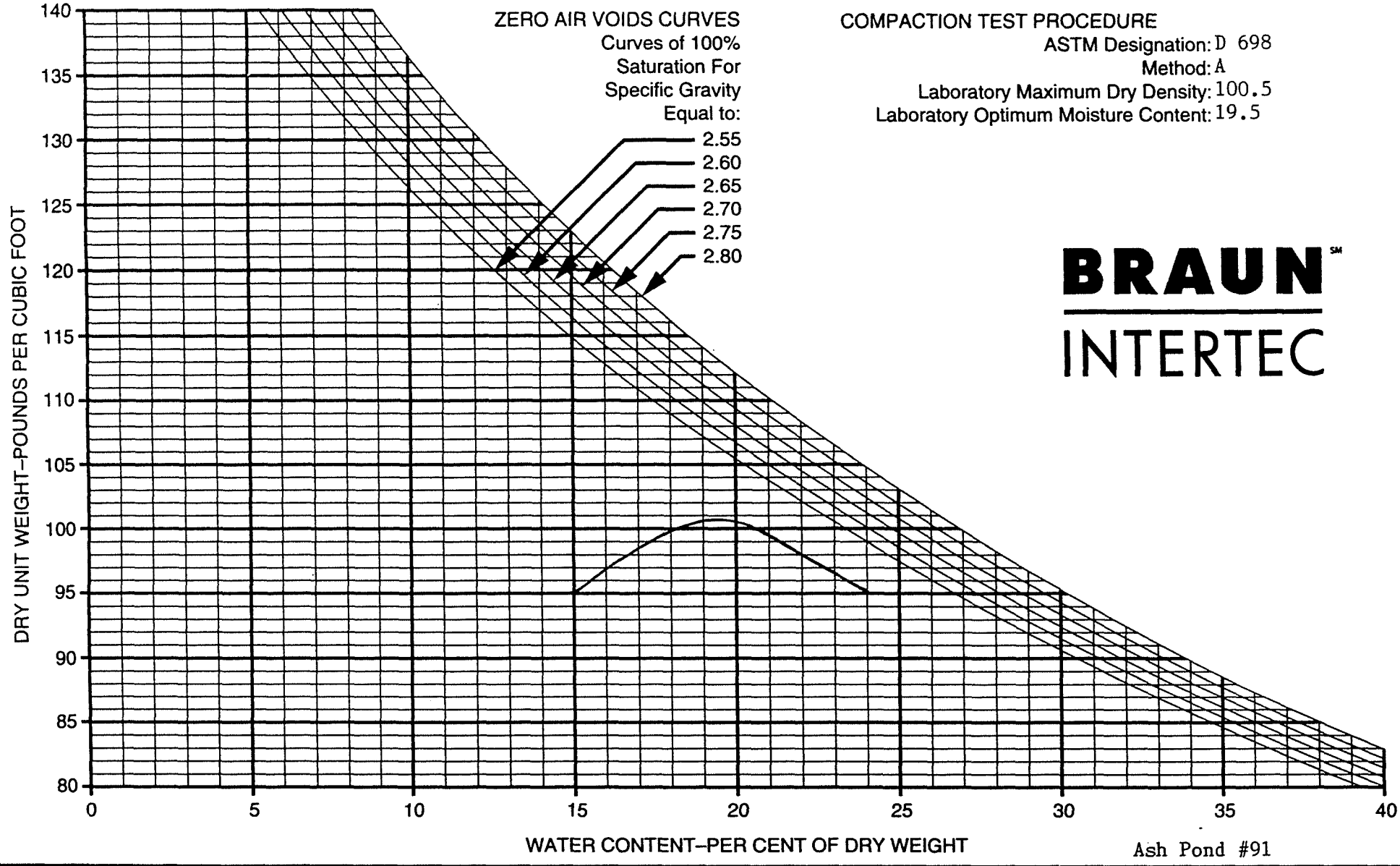
37367N 39837E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698

Method: A

Laboratory Maximum Dry Density: 100.5

Laboratory Optimum Moisture Content: 19.5

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	DC-CC-180	1919	19	33	52	Fat Clay (CH), olive brown

37073N 40355E

COMPACTION TEST

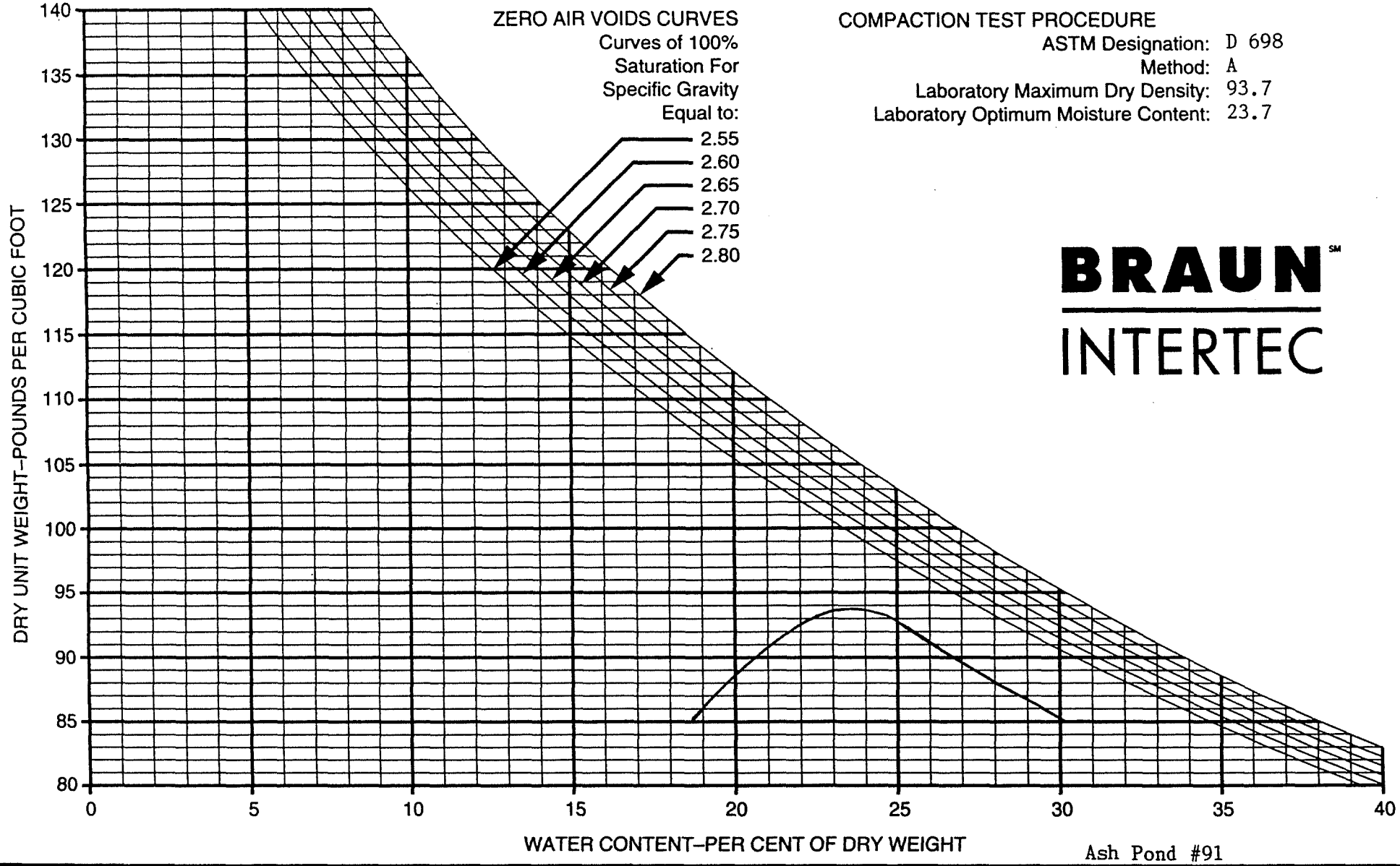
DRAWN BY:

CHECKED BY:

DATE: 10/1/92

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 93.7
Laboratory Optimum Moisture Content: 23.7

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	DC-CC-179	1919.3	22	41	63	Fat Clay (CH), olive brown

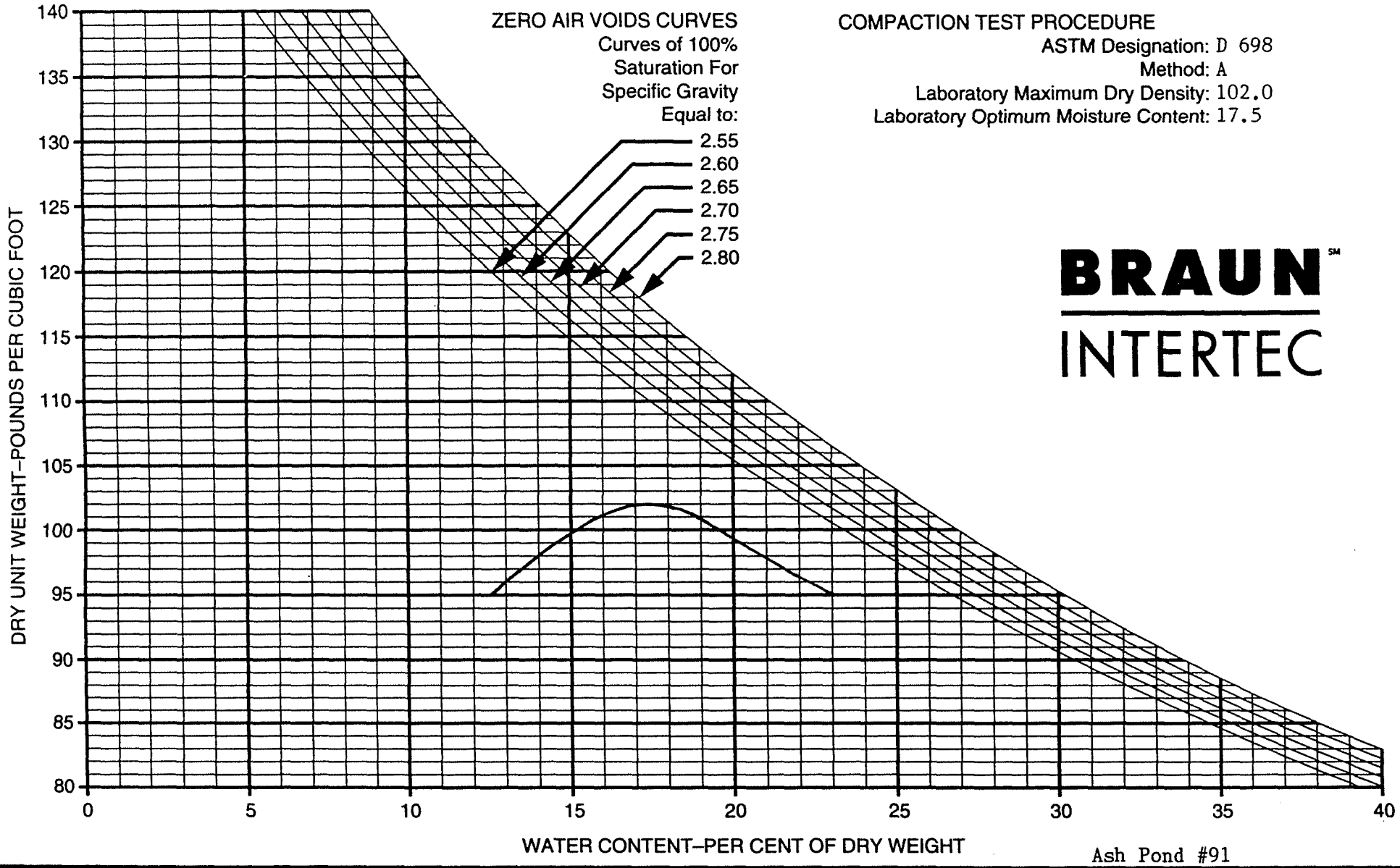
37069N 40812E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 102.0
Laboratory Optimum Moisture Content: 17.5

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	DC-CC-178	1919.1	21	29	50	Fat Clay w/Sand (CH), olive brown

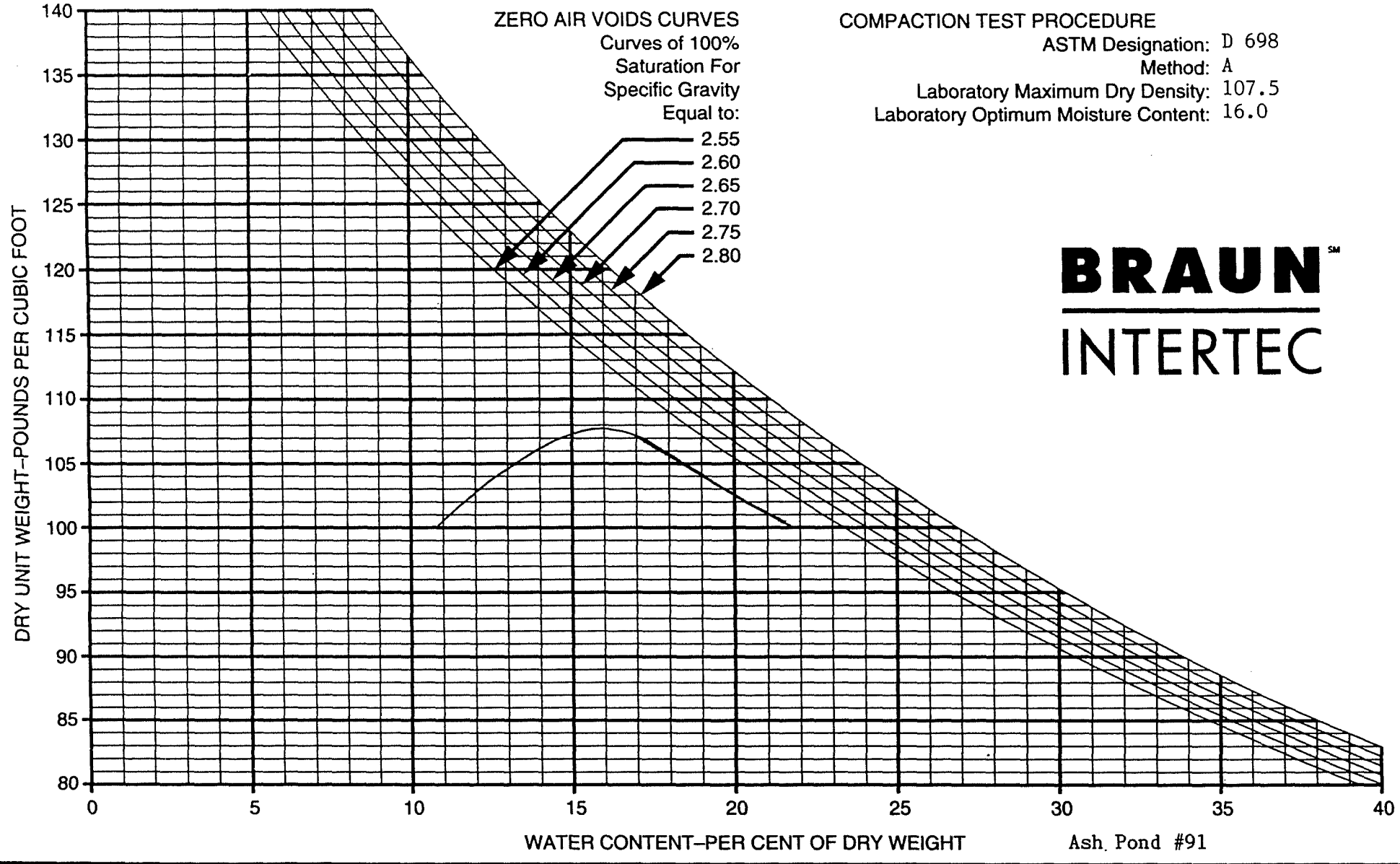
37077N 40884E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 107.5
Laboratory Optimum Moisture Content: 16.0

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	SG-CC-208	1891.5	23	5	28	Silty Clay (CL-ML), olive brown

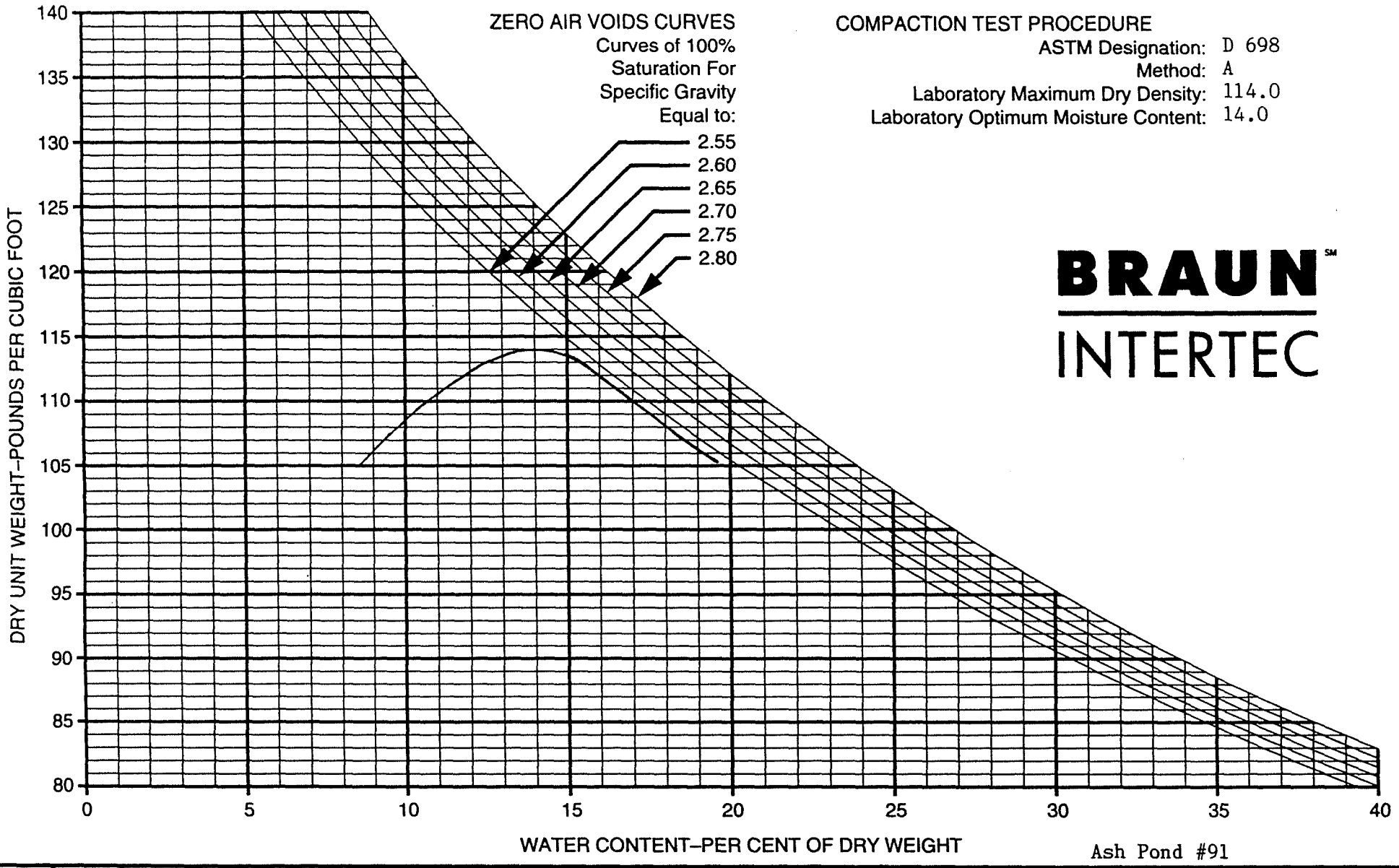
38664N 40937E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE: 10/1/92

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 114.0
Laboratory Optimum Moisture Content: 14.0

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	SG-CC-205	1894.7	18	10	28	Sandy Lean Clay(CL), olive brown

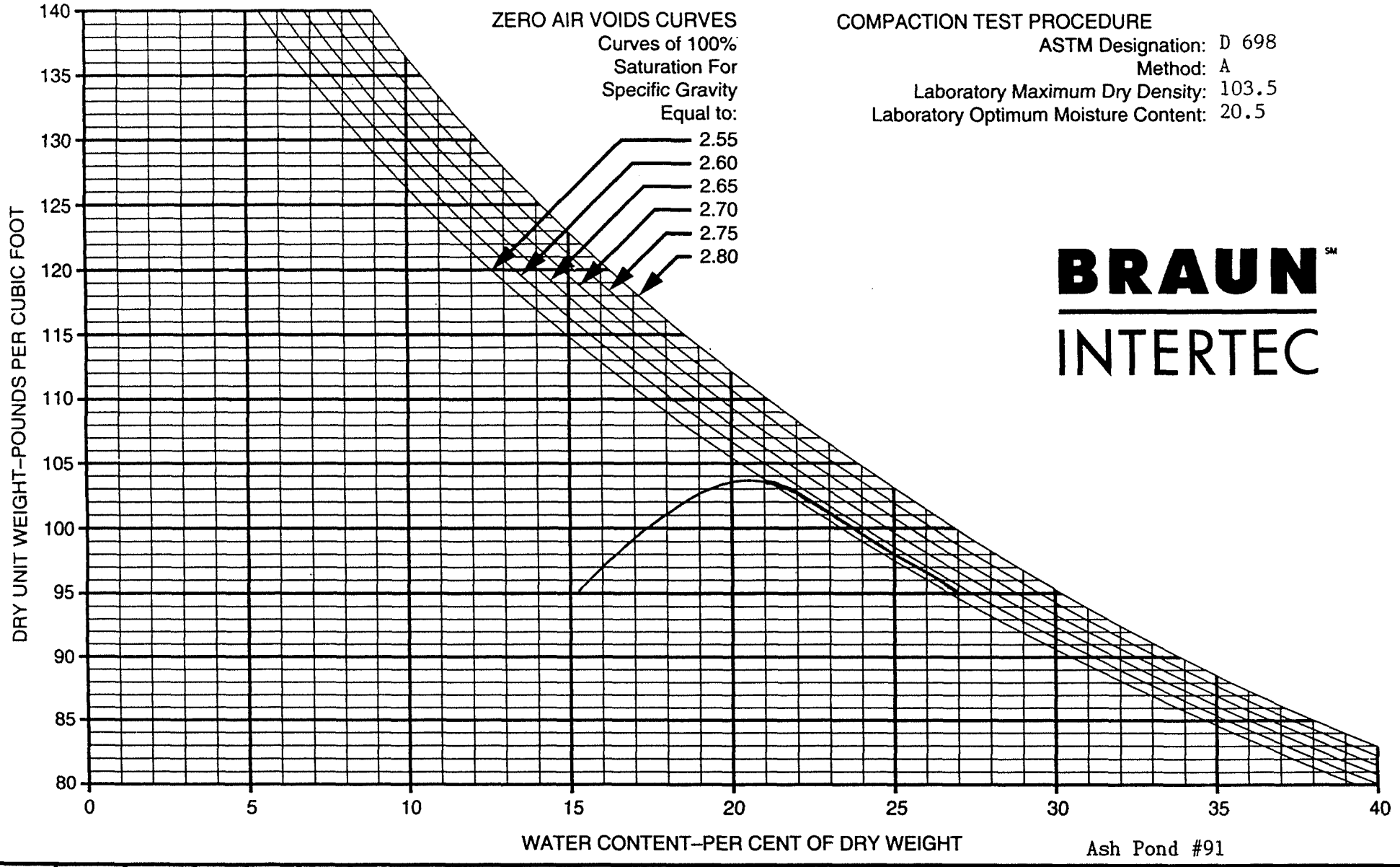
38440N 40889E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE: 10/2/92

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 103.5
Laboratory Optimum Moisture Content: 20.5

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	DC-CC-221	1901.5	17	15	32	Lean Clay with Sand (CL), dark grayish-brown

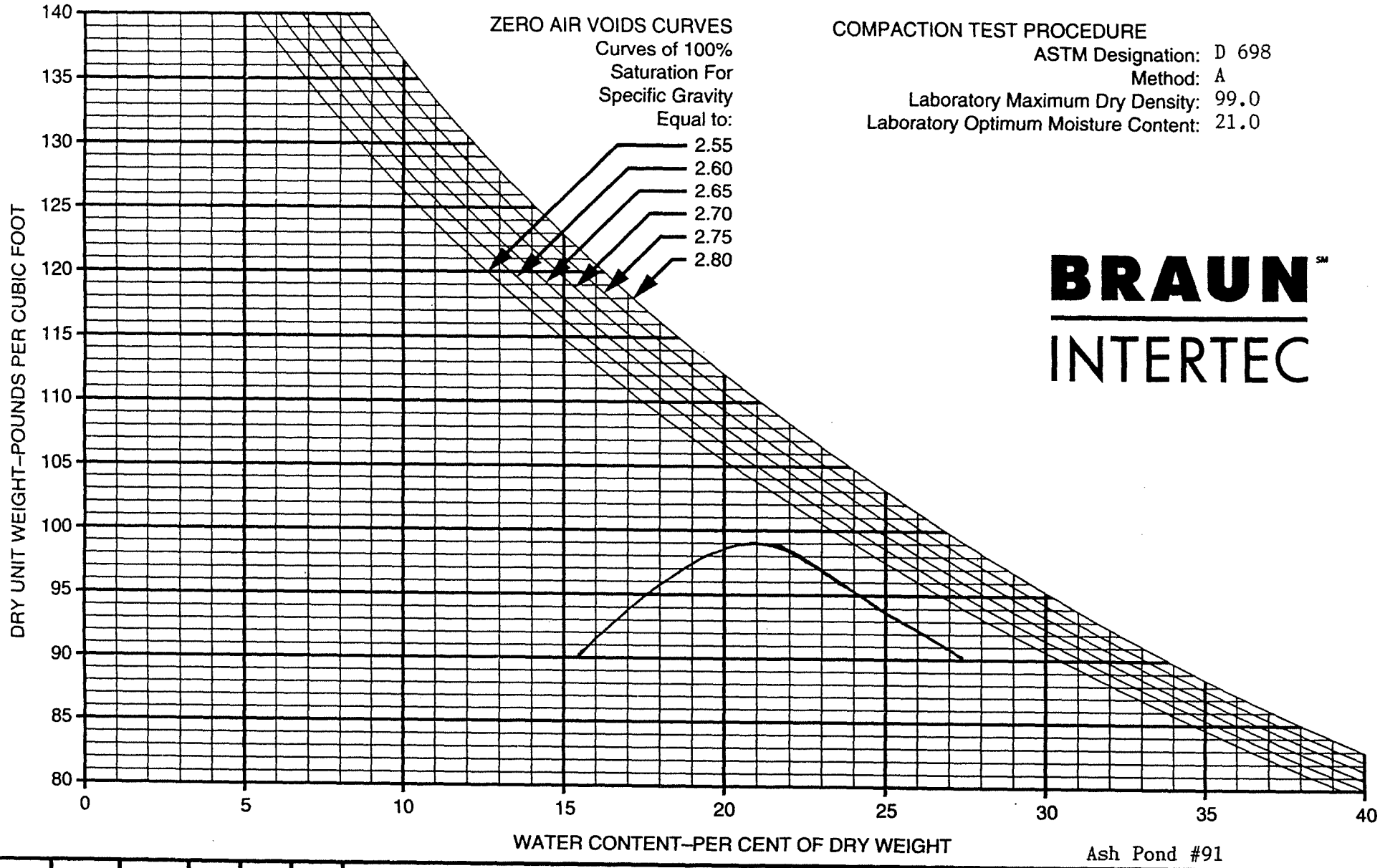
38837N 40129E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 9/24/92

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 99.0
Laboratory Optimum Moisture Content: 21.0

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	DC-CC -227	1908.3	22	38	60	Fat Clay (CH), dark gray

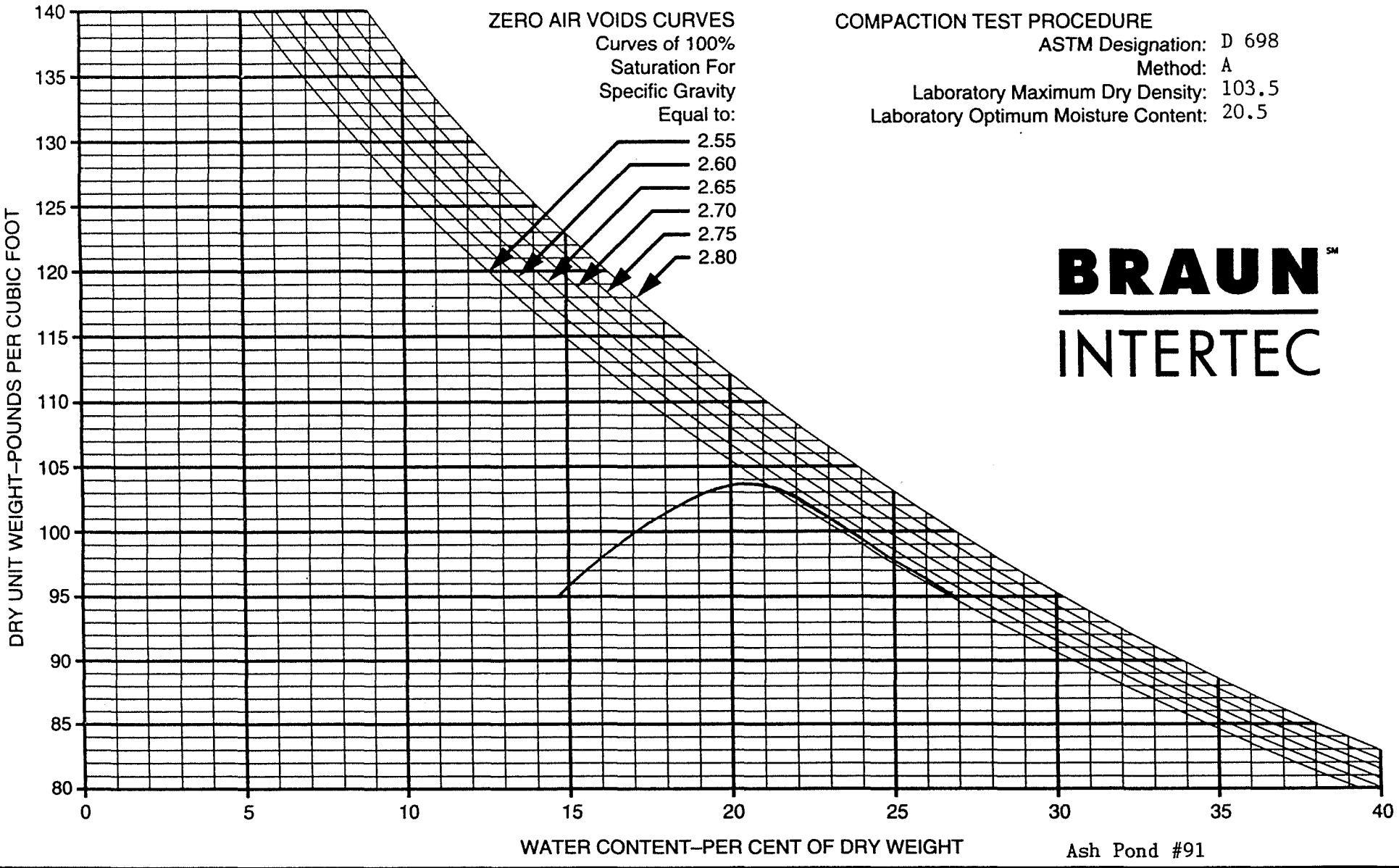
38837N 39859E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 9/10/92

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 103.5
Laboratory Optimum Moisture Content: 20.5

BRAUN℠ INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST.38	DC-CC -230	1916.2	19	27	46	Lean Clay (CL), very dark gray

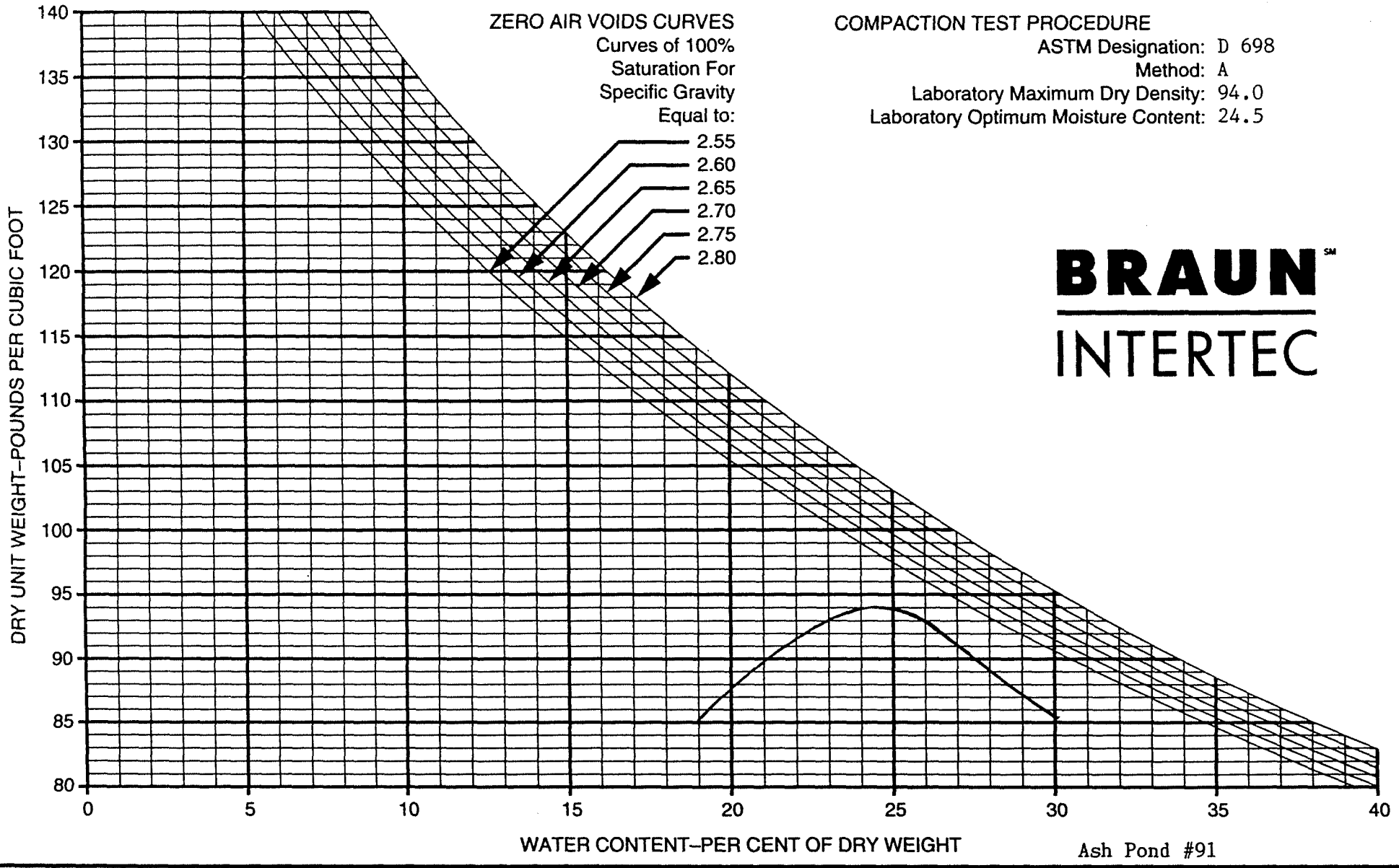
38848N 39749E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 9/22/92

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 94.0
Laboratory Optimum Moisture Content: 24.5

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	DC-CC-231	1914.4	24	40	64	Fat Clay (CH), dark grayish-brown

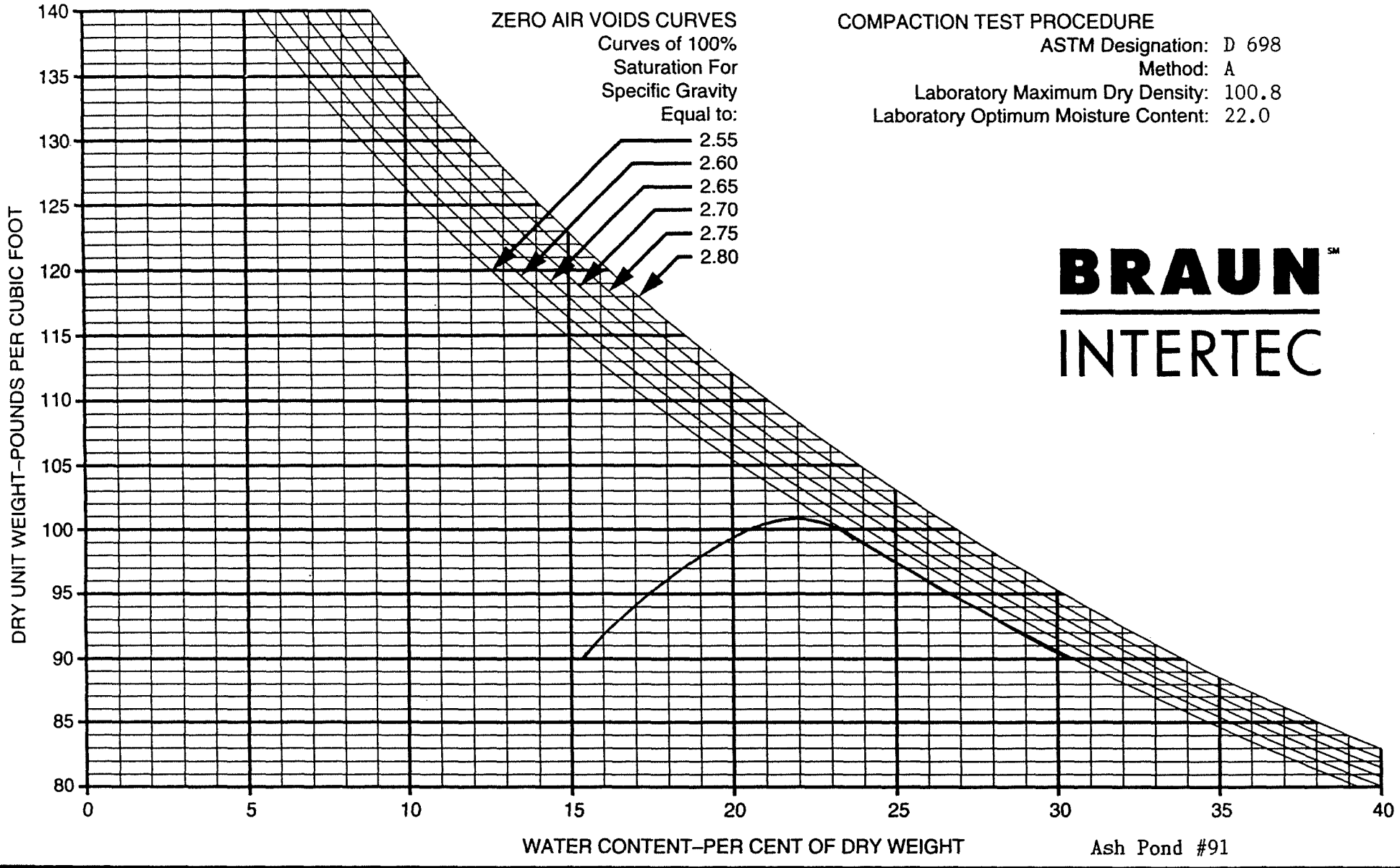
38845N 39892E

COMPACTION TEST

DRAWN BY: JA
CHECKED BY:
DATE: 9/22/92

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 100.8
Laboratory Optimum Moisture Content: 22.0

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CC-255	N/A	21	11	32	Sandy Lean Clay (CL), very dark gray

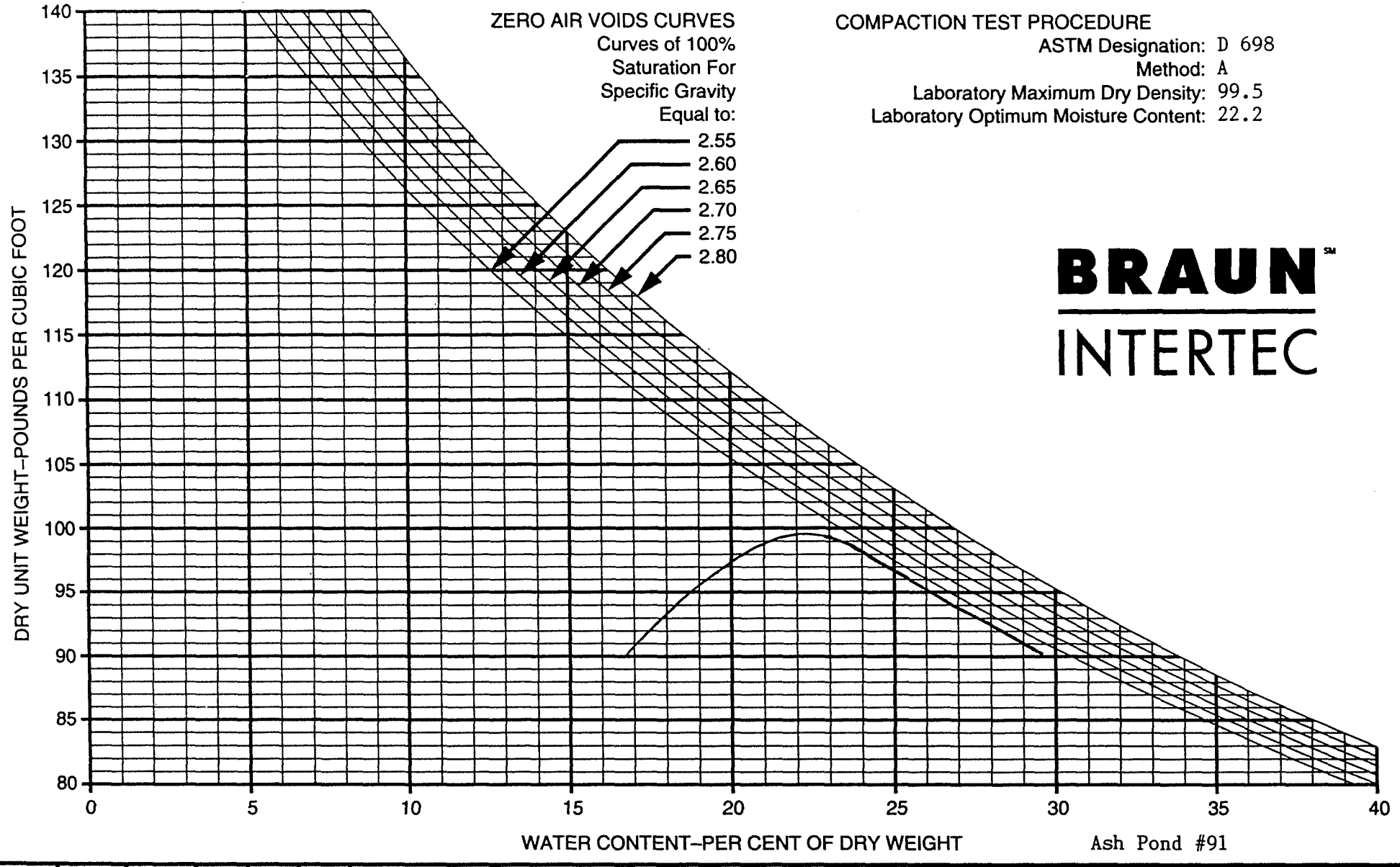
Stockpile N of EP #94

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE: 3/11/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 99.5
Laboratory Optimum Moisture Content: 22.2

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CC-256	N/A	22	27	49	Lean Clay (CL), very dark gray

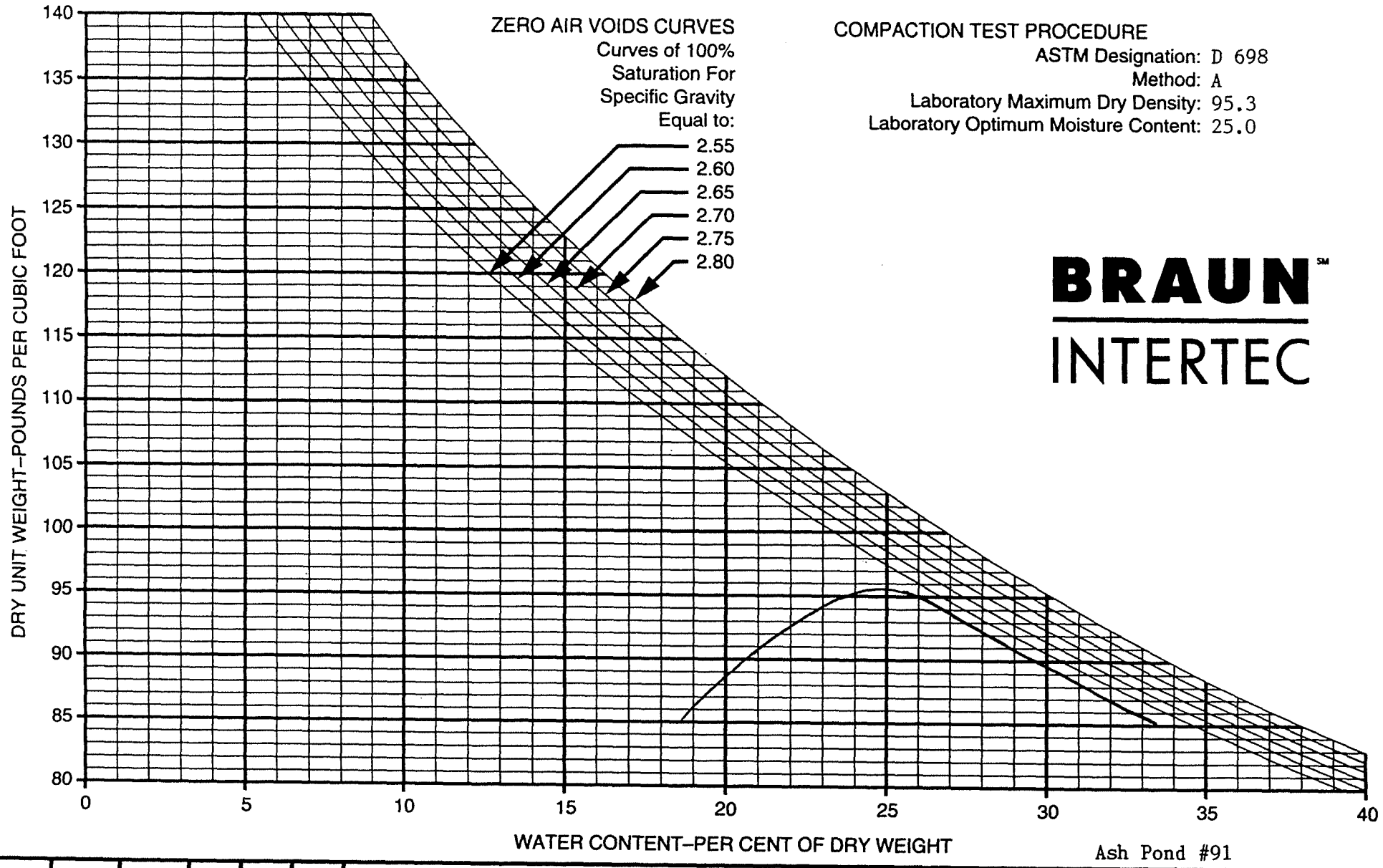
Stockpile N of EP #94

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE: 3/11/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 95.3
Laboratory Optimum Moisture Content: 25.0

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CC-257	N/A	21	33	54	Fat Clay (CH), very dark grayish-brown

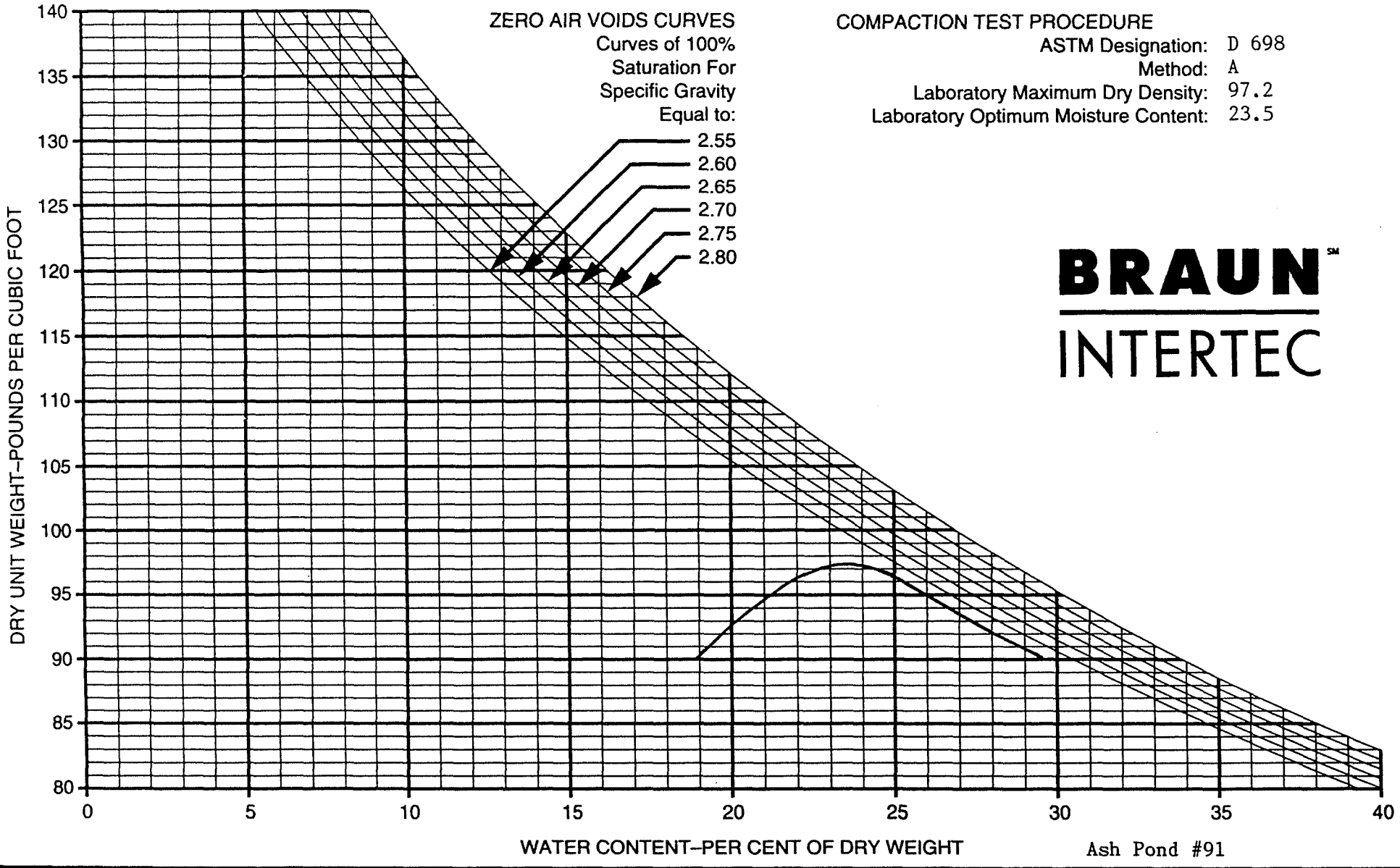
Stockpile N of EP #94

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE: 3/5/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 97.2
Laboratory Optimum Moisture Content: 23.5

BRAUN℠ INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CC-258	N/A	20	32	52	Fat Clay (CH), black

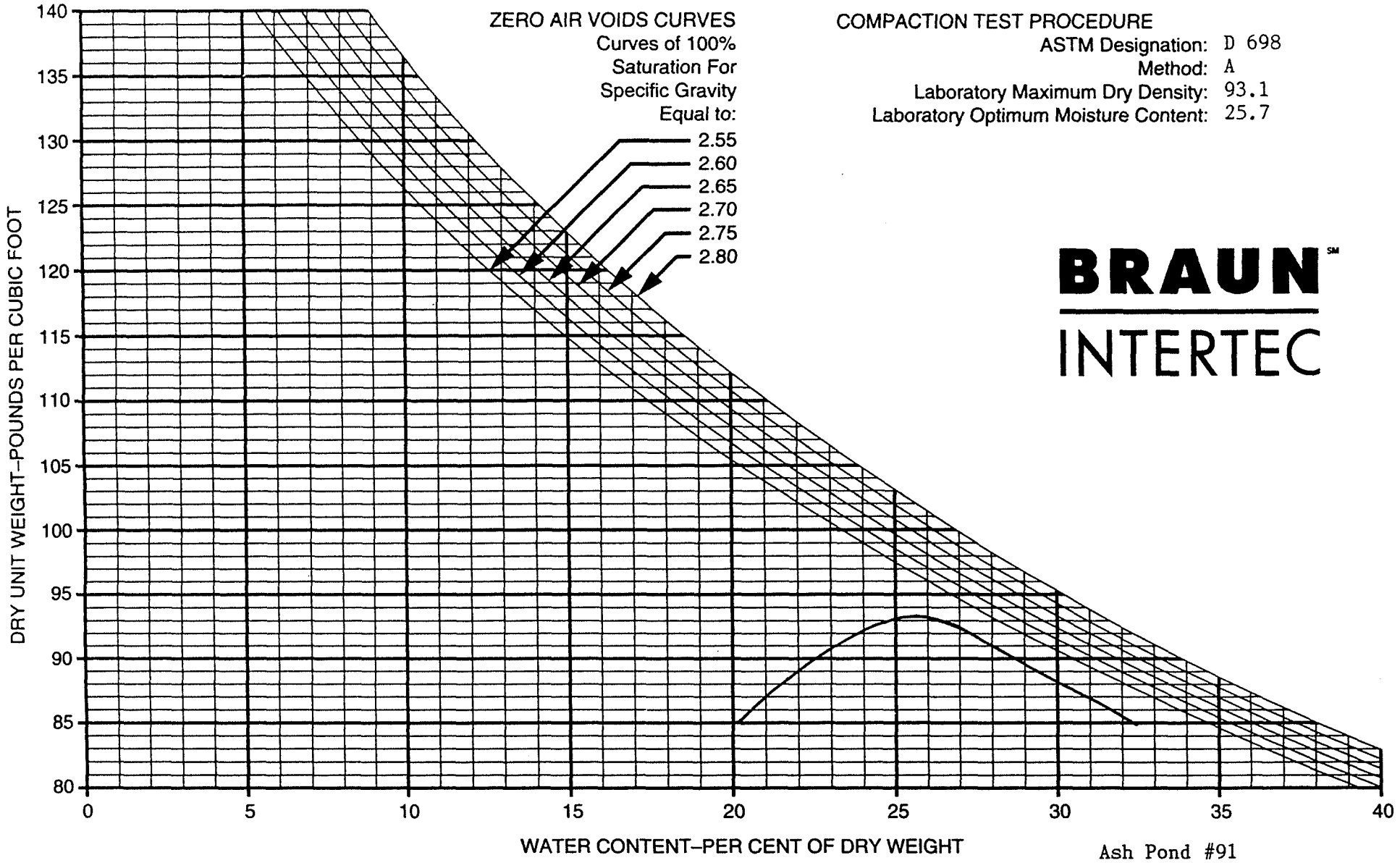
Stockpile N of EP #94

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE: 3/10/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 93.1
Laboratory Optimum Moisture Content: 25.7

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CC-259	N/A	23	29	52	Fat Clay (CH), black

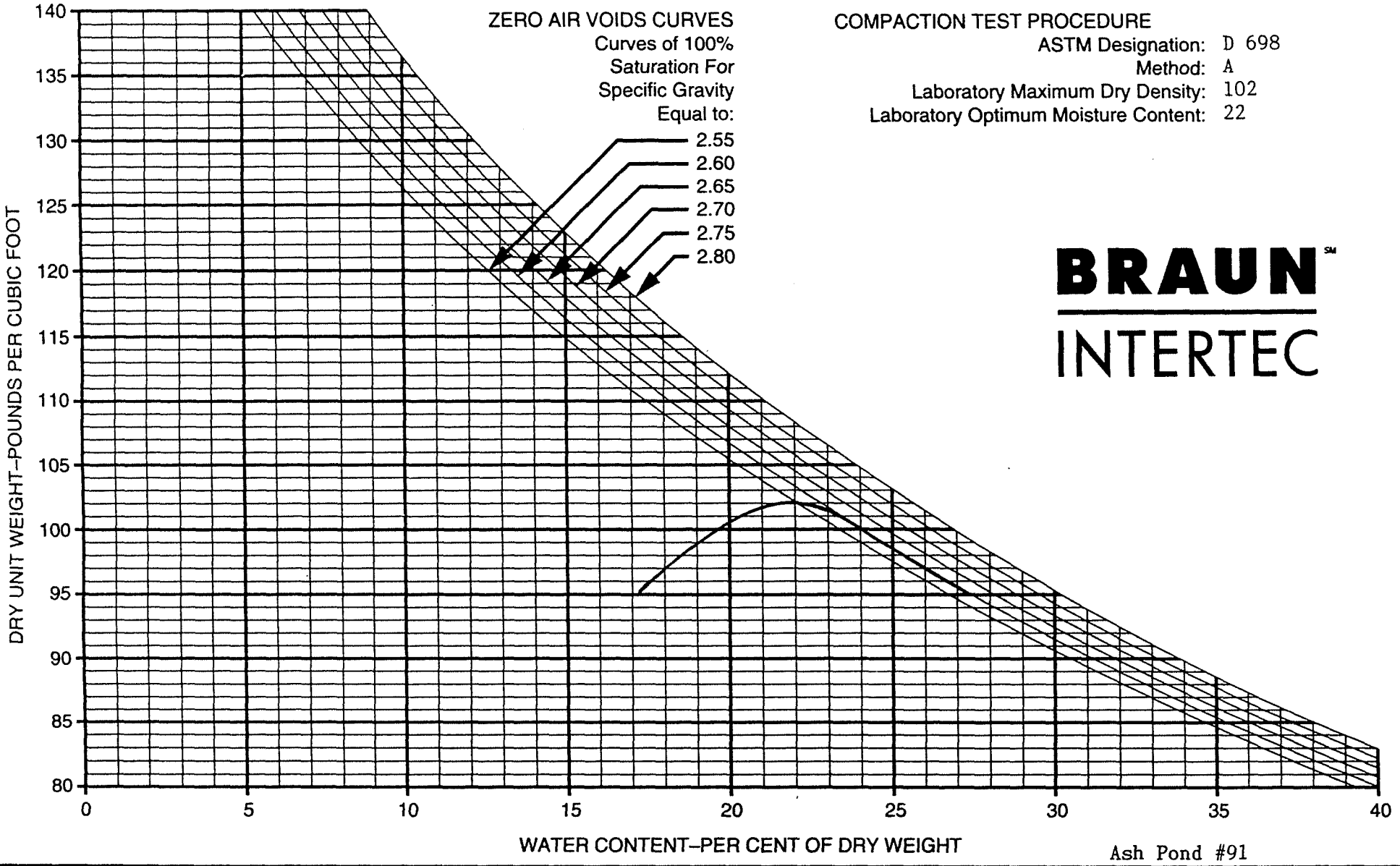
Stockpile N of EP #94

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 102
Laboratory Optimum Moisture Content: 22

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CC-260	N/A	18	29	47	Lean Clay (CL), very dark gray

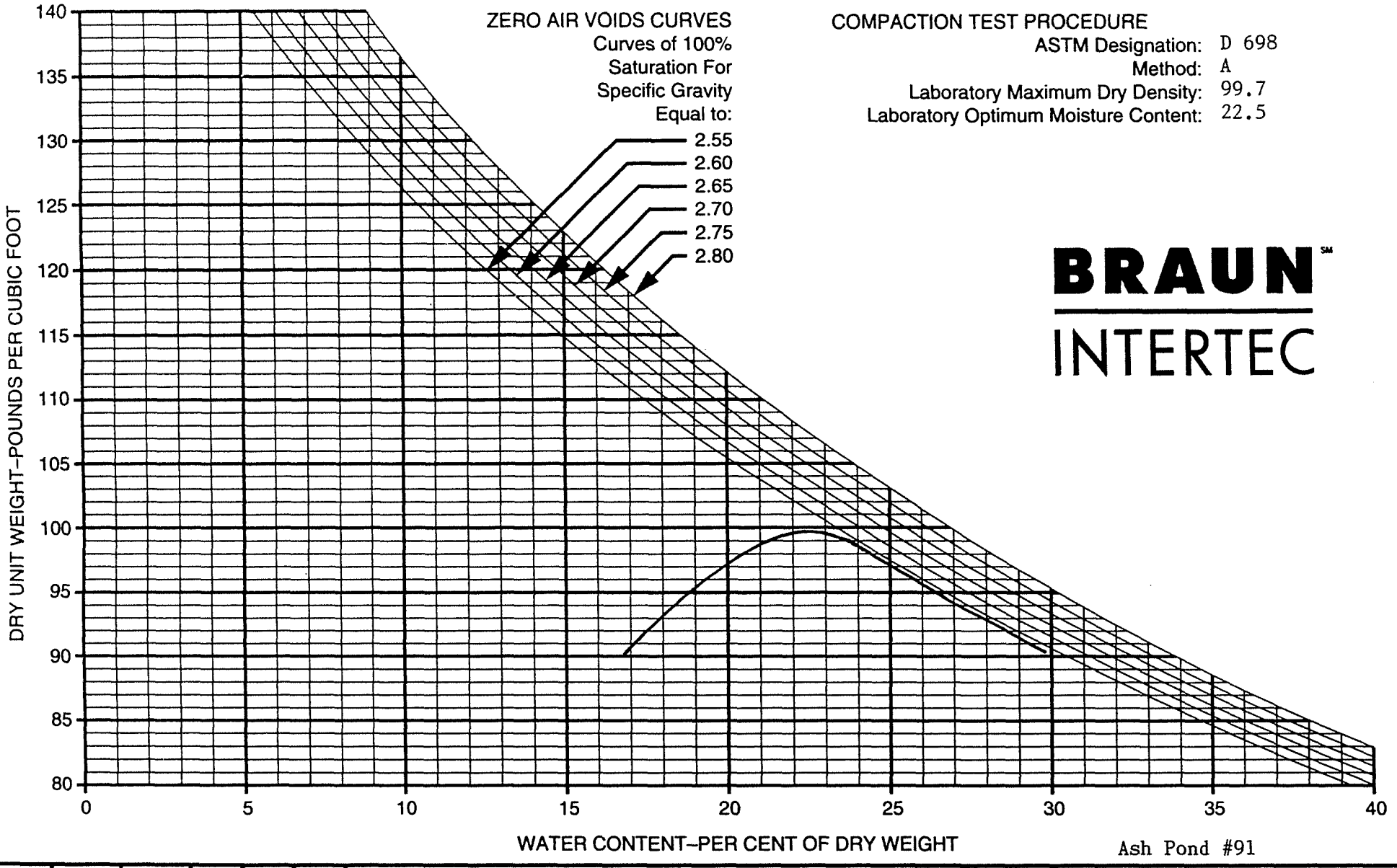
Stockpile N of EP #94

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE: 3/12/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 99.7
Laboratory Optimum Moisture Content: 22.5

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CC-261	N/A	19	30	49	Lean Clay (CL), very dark grayish-brown

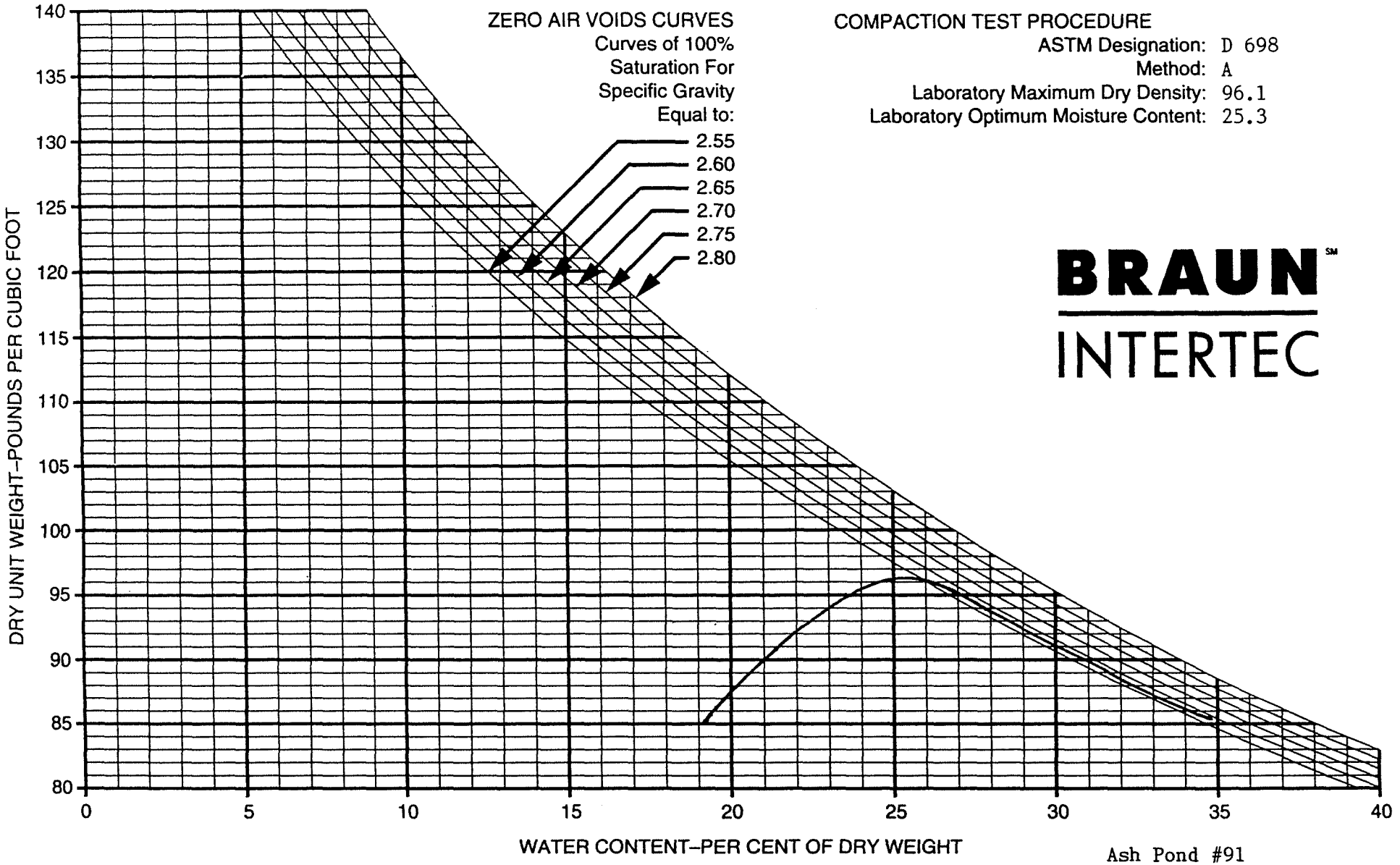
Stockpile N of EP #94

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE: 3/11/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 96.1
Laboratory Optimum Moisture Content: 25.3

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CC-262	N/A	20	32	52	Fat Clay (CH), very dark grayish-brown

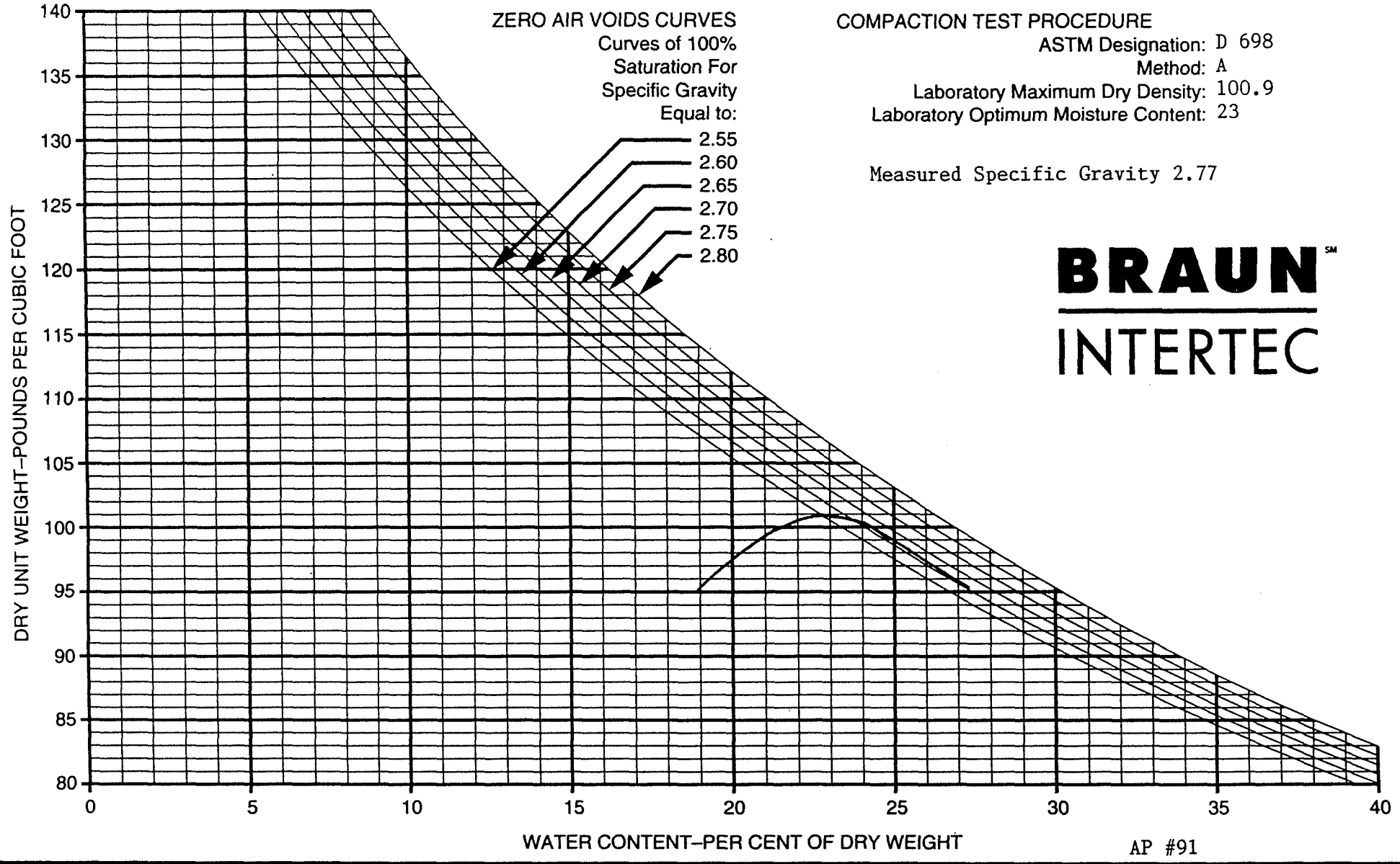
Stockpile N of EP #94

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE: 3/12/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 100.9
Laboratory Optimum Moisture Content: 23

Measured Specific Gravity 2.77

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLS-CC -270	1901.9	19	33	52	Fat Clay (CH), olive brown

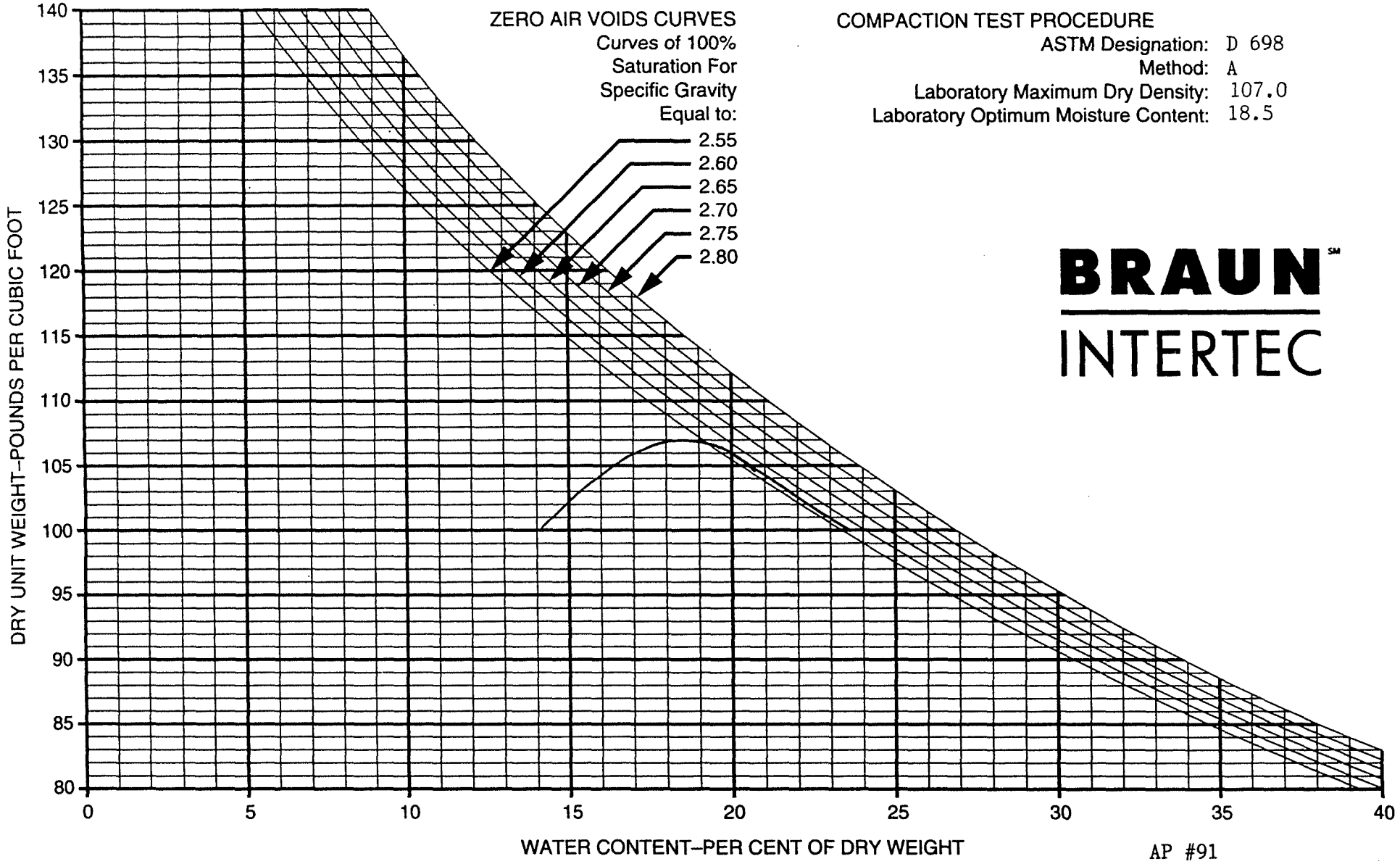
38917N 39799E

COMPACTION TEST

DRAWN BY: DS
CHECKED BY:
DATE: 4/22/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 107.0
Laboratory Optimum Moisture Content: 18.5

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLS-CC -271	1897.9	15	26	41	Lean Clay (CL), olive brown

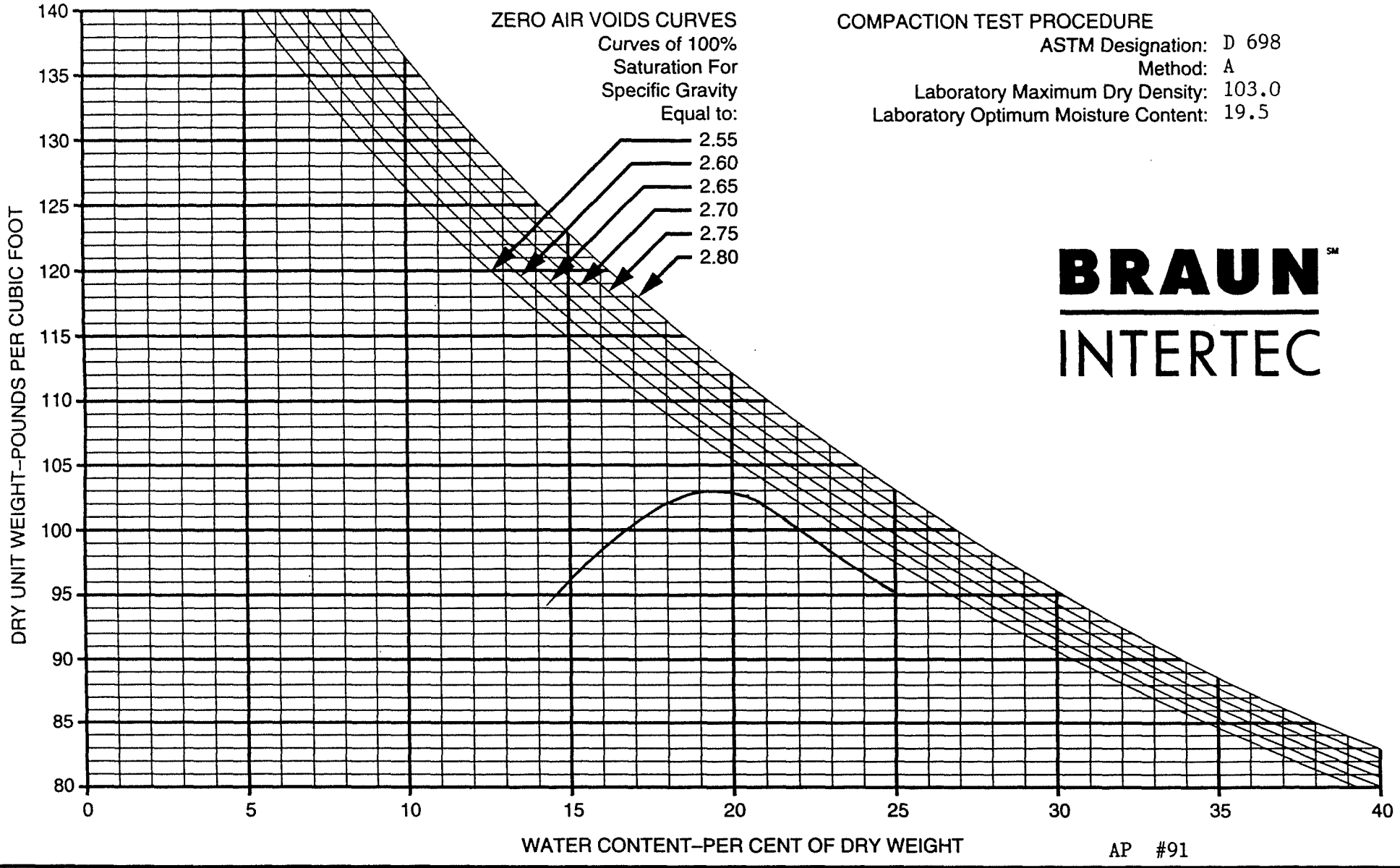
39396N 40102E

COMPACTION TEST

DRAWN BY: DS
CHECKED BY:
DATE: 4/22/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 103.0
Laboratory Optimum Moisture Content: 19.5

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLS-CC -278		14	32	46	Lean Clay (CL), olive

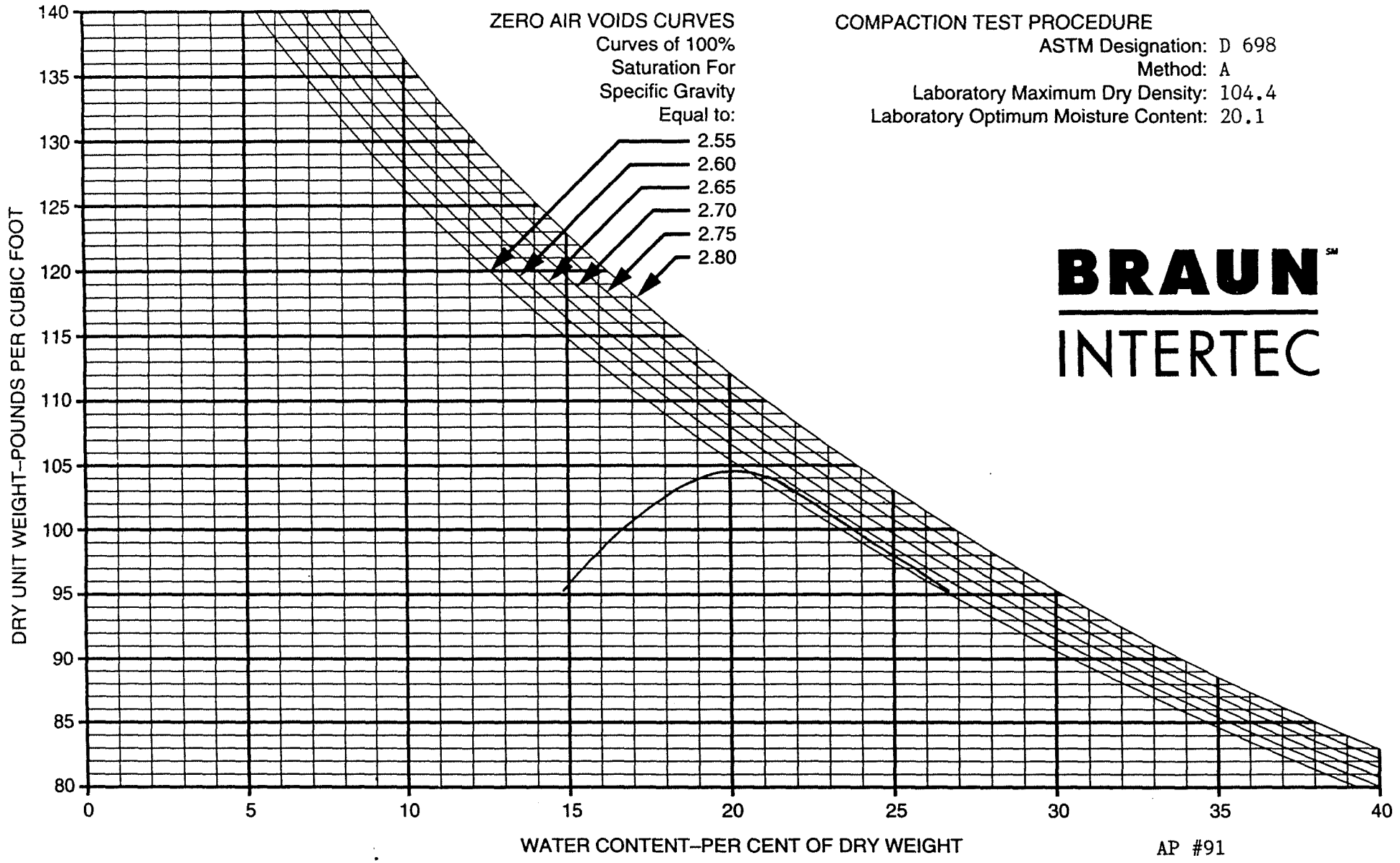
39018N 40199E

COMPACTION TEST

DRAWN BY: DS
CHECKED BY:
DATE: 5/3/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 104.4
Laboratory Optimum Moisture Content: 20.1

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLS-CC -279	1898.7	15	31	46	Lean Clay (CL), olive

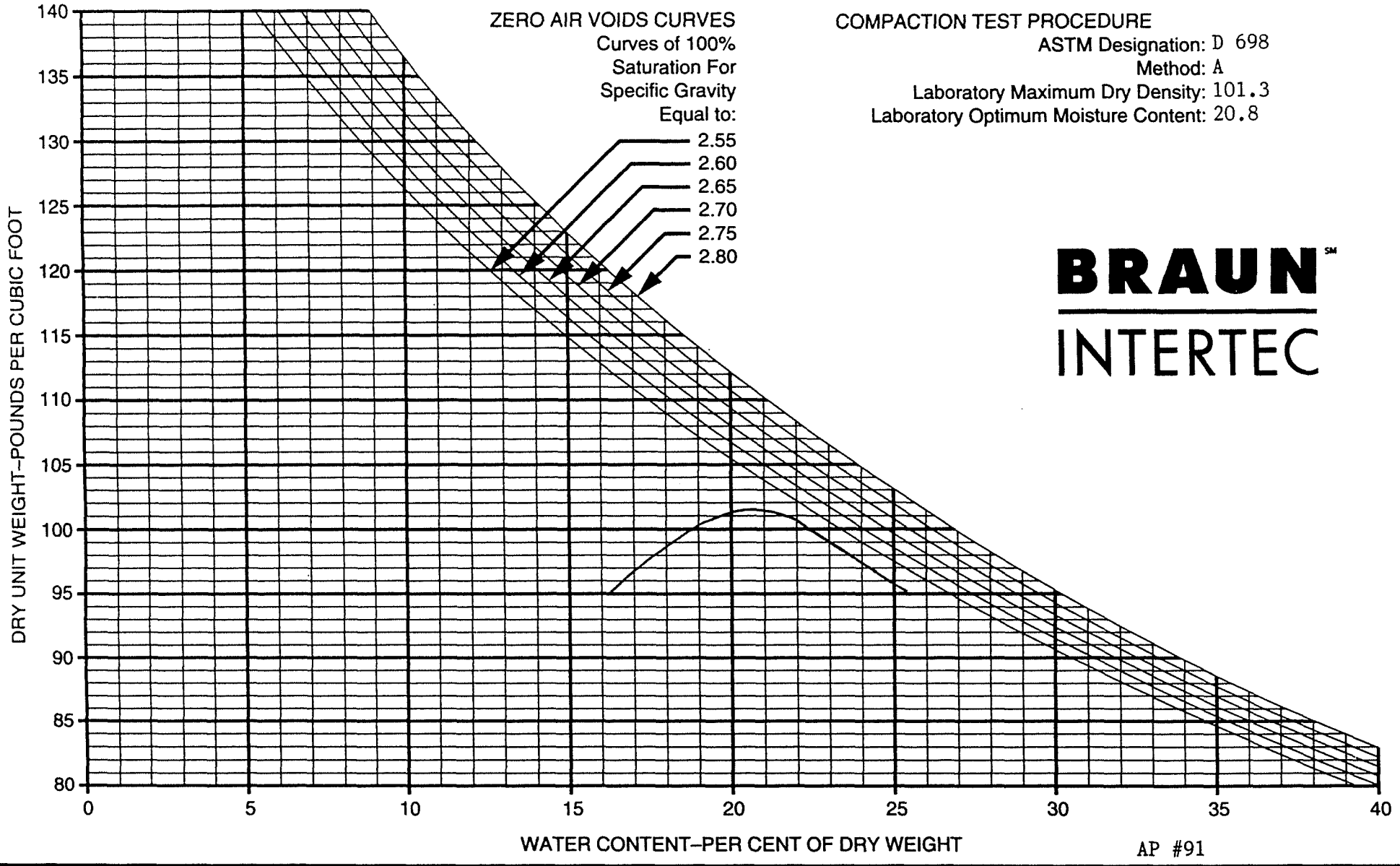
39395N 40111E

COMPACTION TEST

DRAWN BY: DS
CHECKED BY:
DATE: 5/4/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 101.3
Laboratory Optimum Moisture Content: 20.8

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
St.49	CLS-CC 284	1900.9	17	34	51	Fat Clay (CH), Olive gray

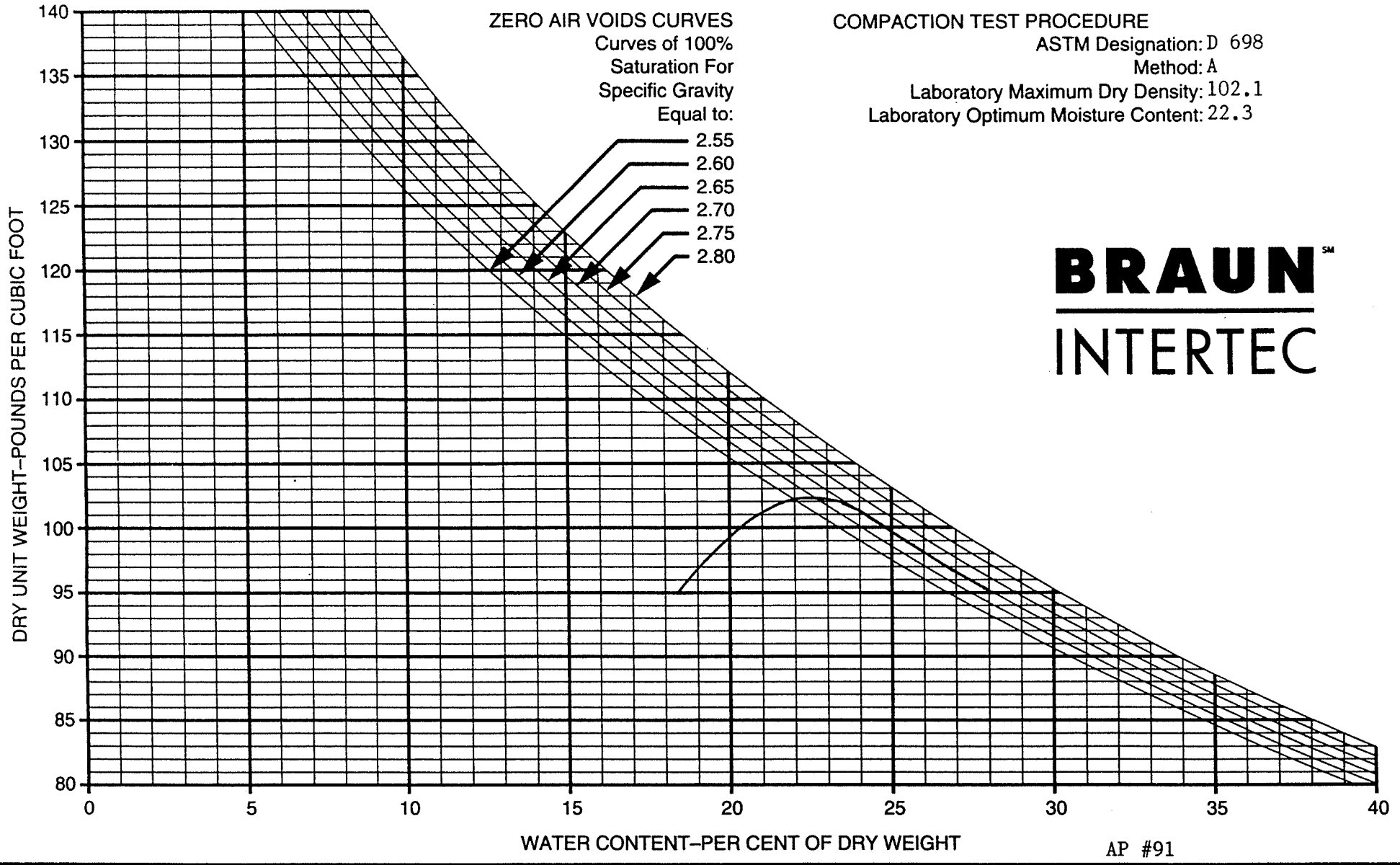
39021N 40196E

COMPACTION TEST

DRAWN BY: DS
CHECKED BY:
DATE: 4/27/93

JOB NO. BEDX-92-018C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 102.1
Laboratory Optimum Moisture Content: 22.3

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLS-OC -286	1903.8	16	32	48	Lean Clay (CL), dark grayish-brown

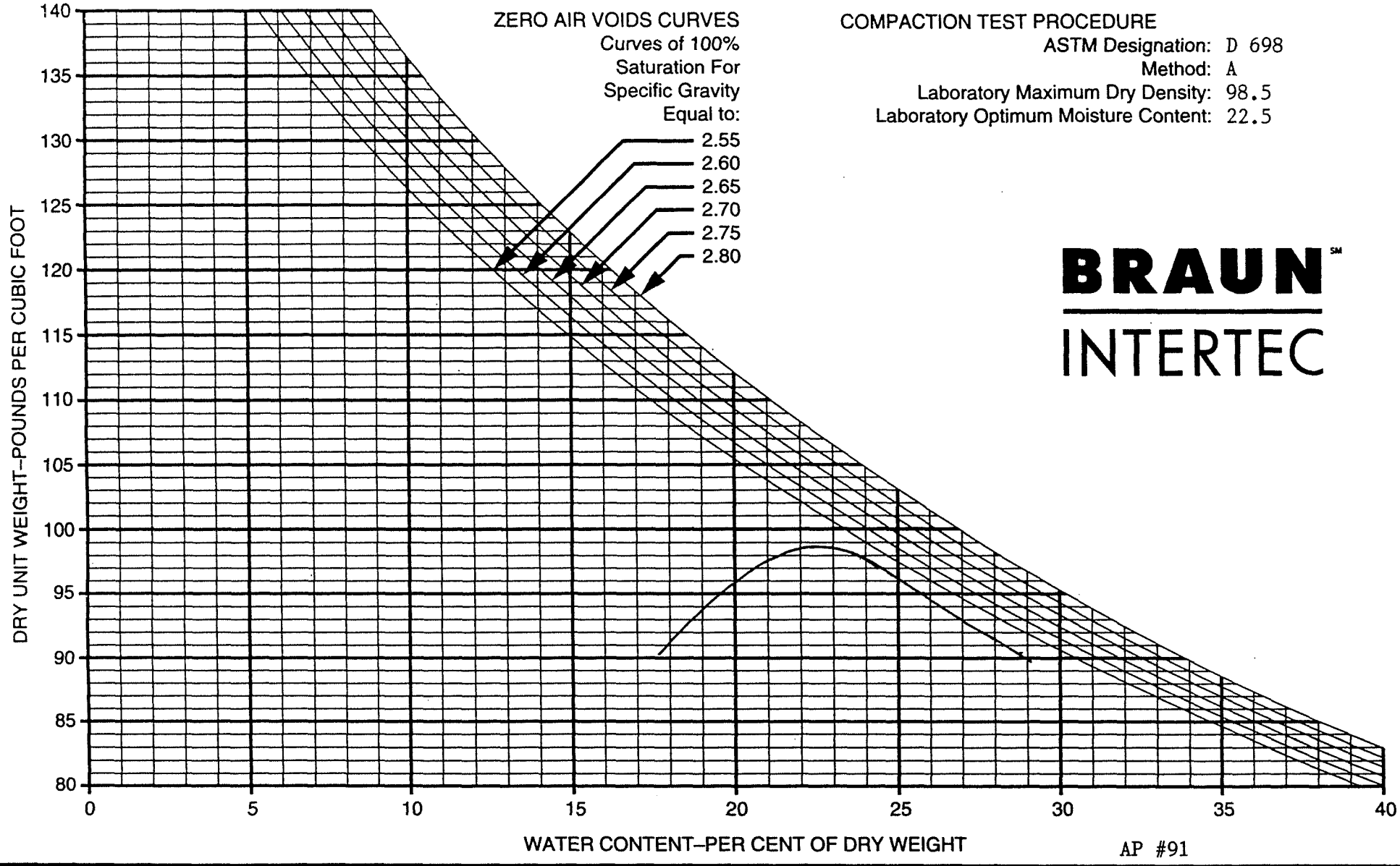
38910N 40096E

COMPACTION TEST

DRAWN BY: DS
CHECKED BY:
DATE: 5/3/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 98.5
Laboratory Optimum Moisture Content: 22.5

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLS-CC -289	1906.918	38	56		Fat Clay(CH), dark gray

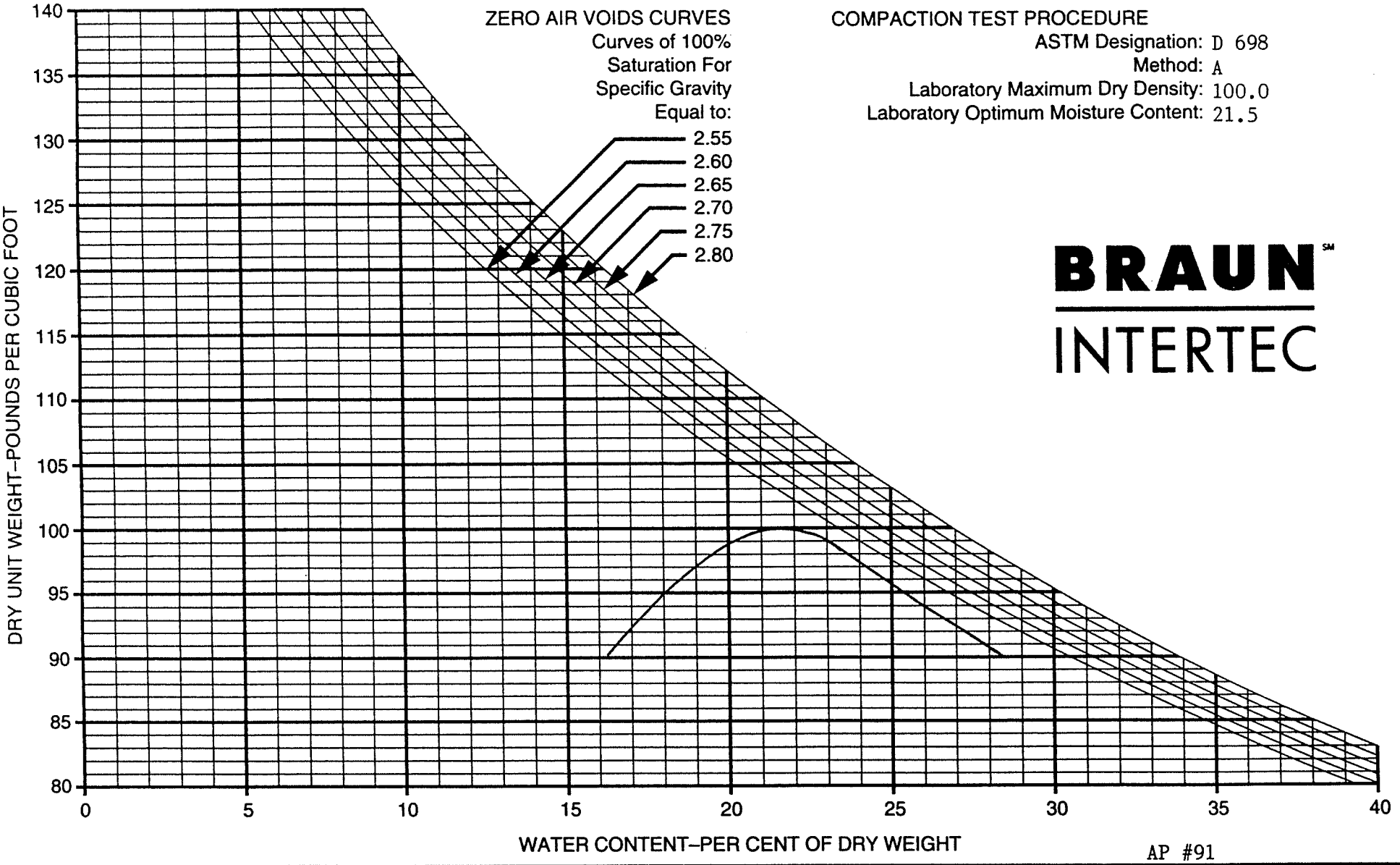
39303N 39722E

COMPACTION TEST

DRAWN BY: DS
CHECKED BY:
DATE: 4/29/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 100.0
Laboratory Optimum Moisture Content: 21.5

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLB-CC -292	1900.4	19	36	55	Fat Clay (CH), grayish-brown

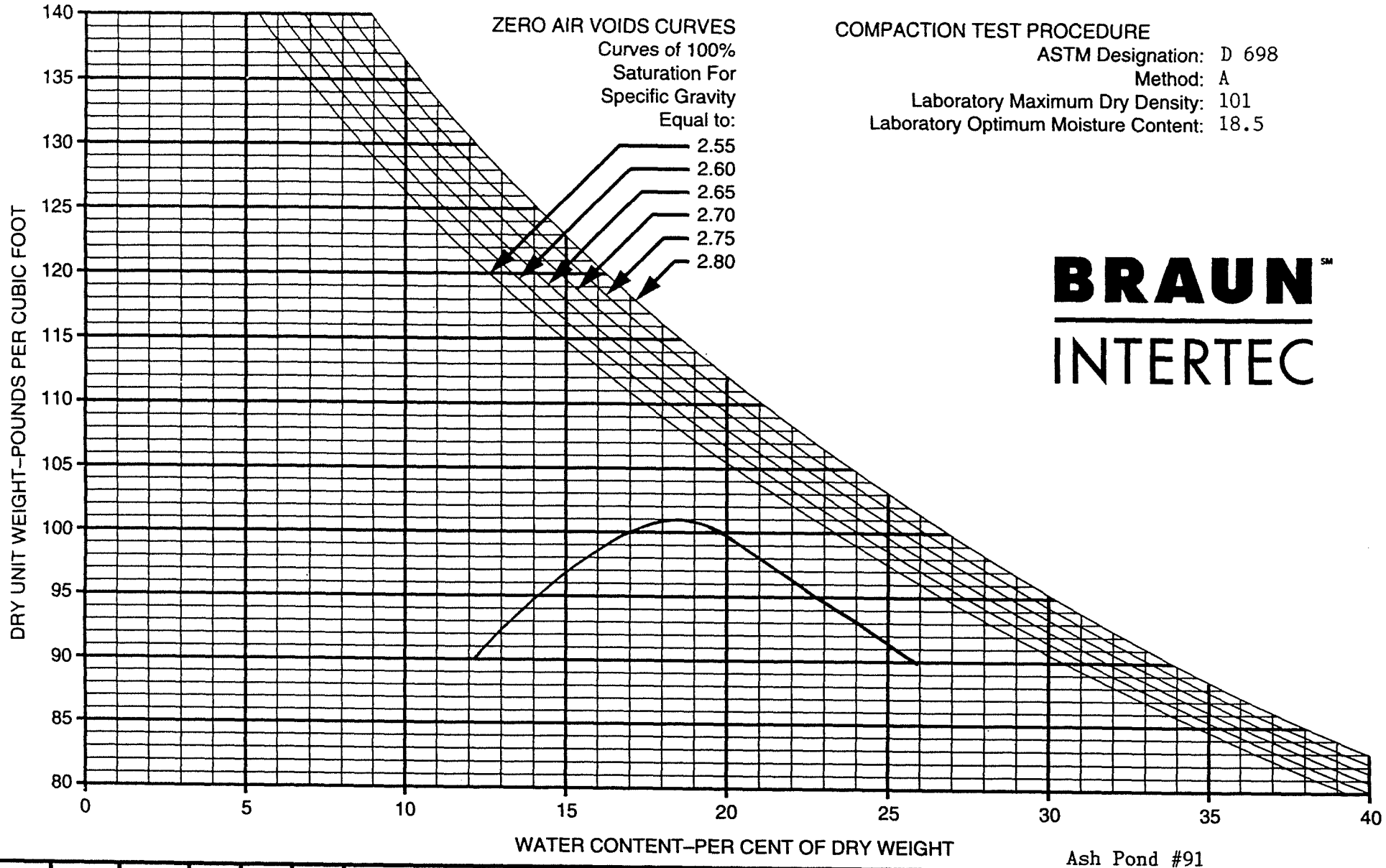
39240N 39844E

COMPACTION TEST

DRAWN BY: DS
CHECKED BY:
DATE: 5/7/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 101
Laboratory Optimum Moisture Content: 18.5

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST.59	CLB-CC-304	1901.2	16	32	48	Lean Clay (CL), olive

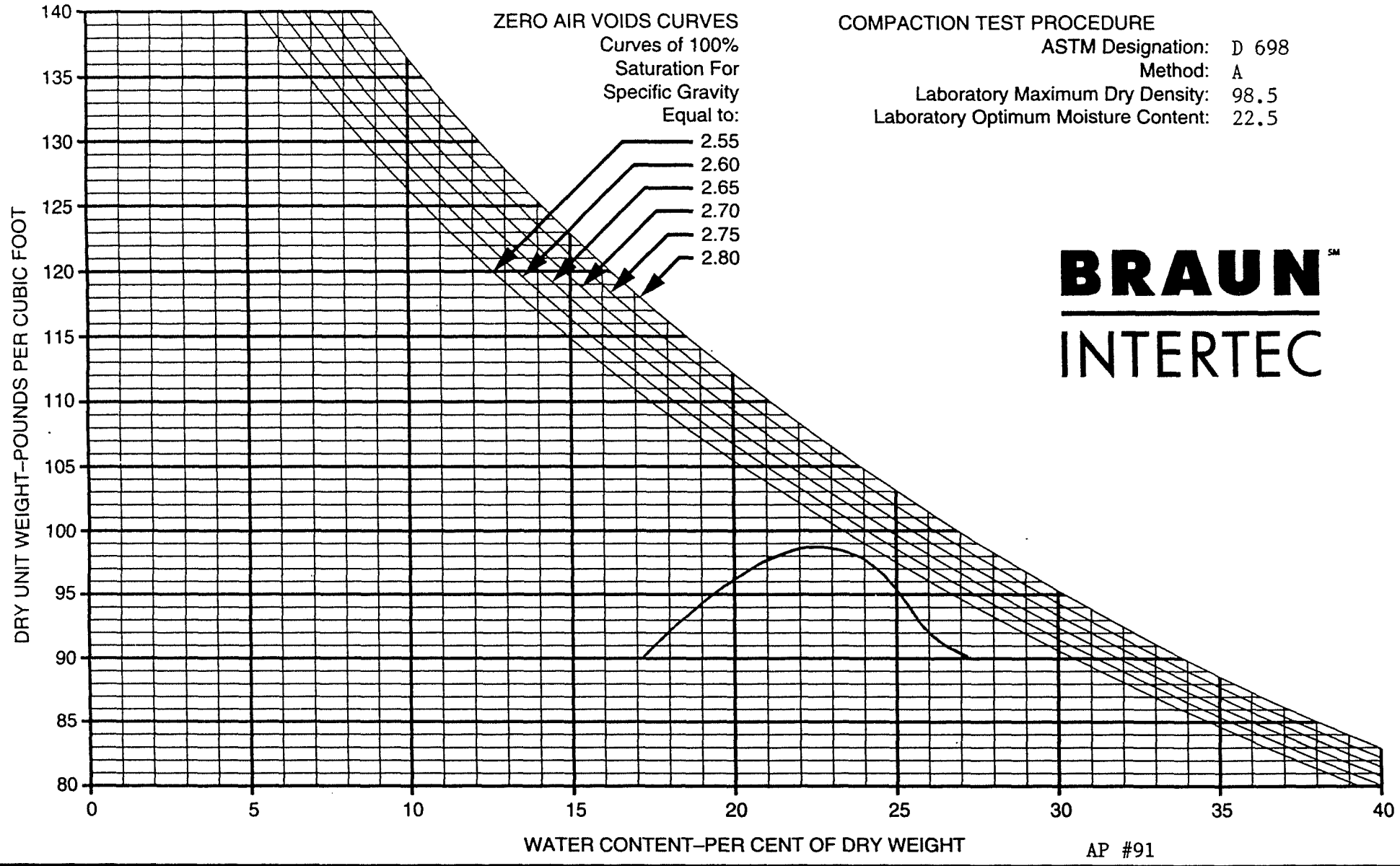
39106N 39971E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation:	D 698
Method:	A
Laboratory Maximum Dry Density:	98.5
Laboratory Optimum Moisture Content:	22.5

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
St.63	CLB-CC -308	1899.1	17	38	55	Fat Clay (CH), olive

39333N 40109E

COMPACTION TEST

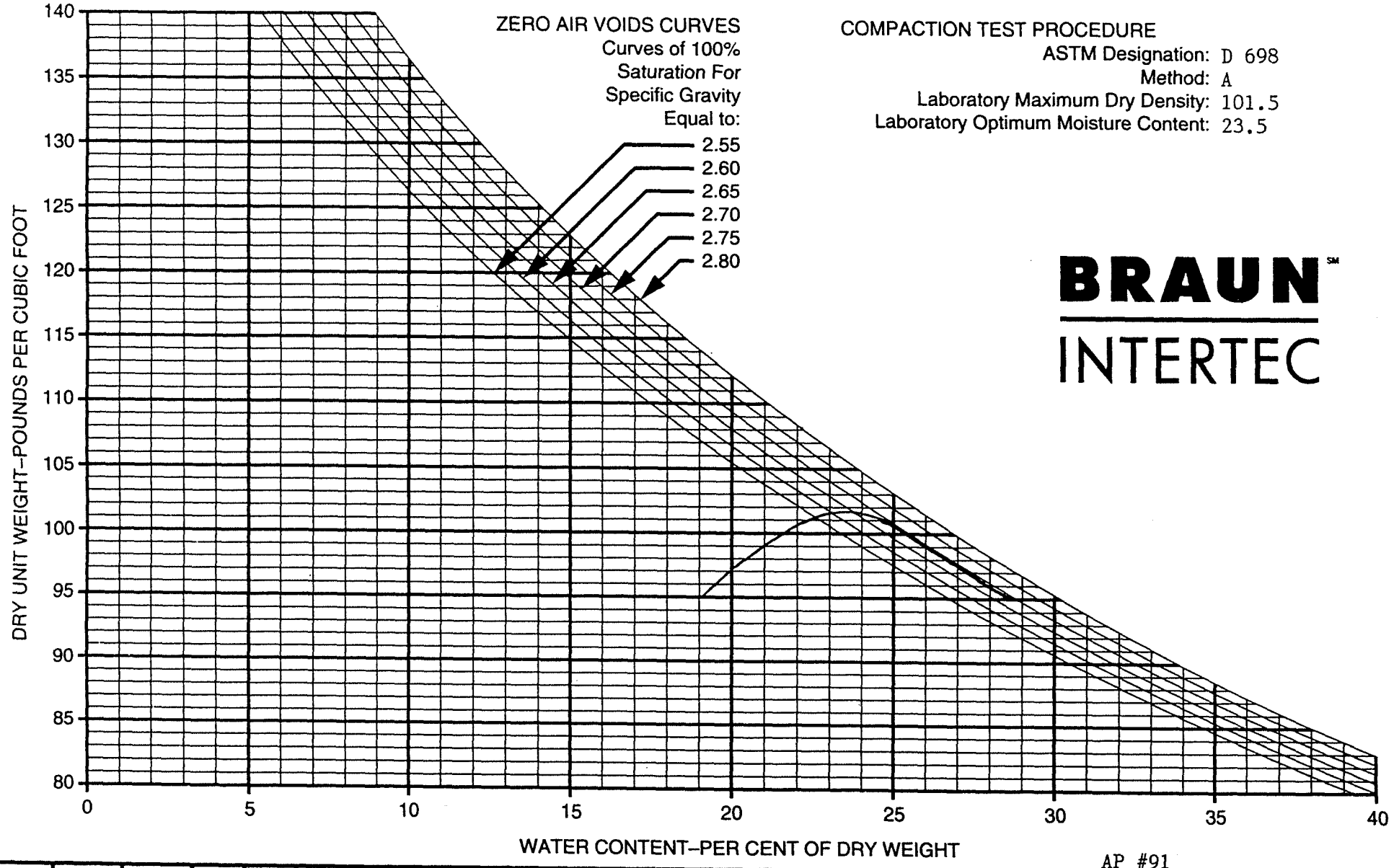
DRAWN BY: DS

CHECKED BY:

DATE: 5/21/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 101.5
Laboratory Optimum Moisture Content: 23.5

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLS-CC -309	1914.4	15	33	98	Lean Clay (CL), dark grayish-brown

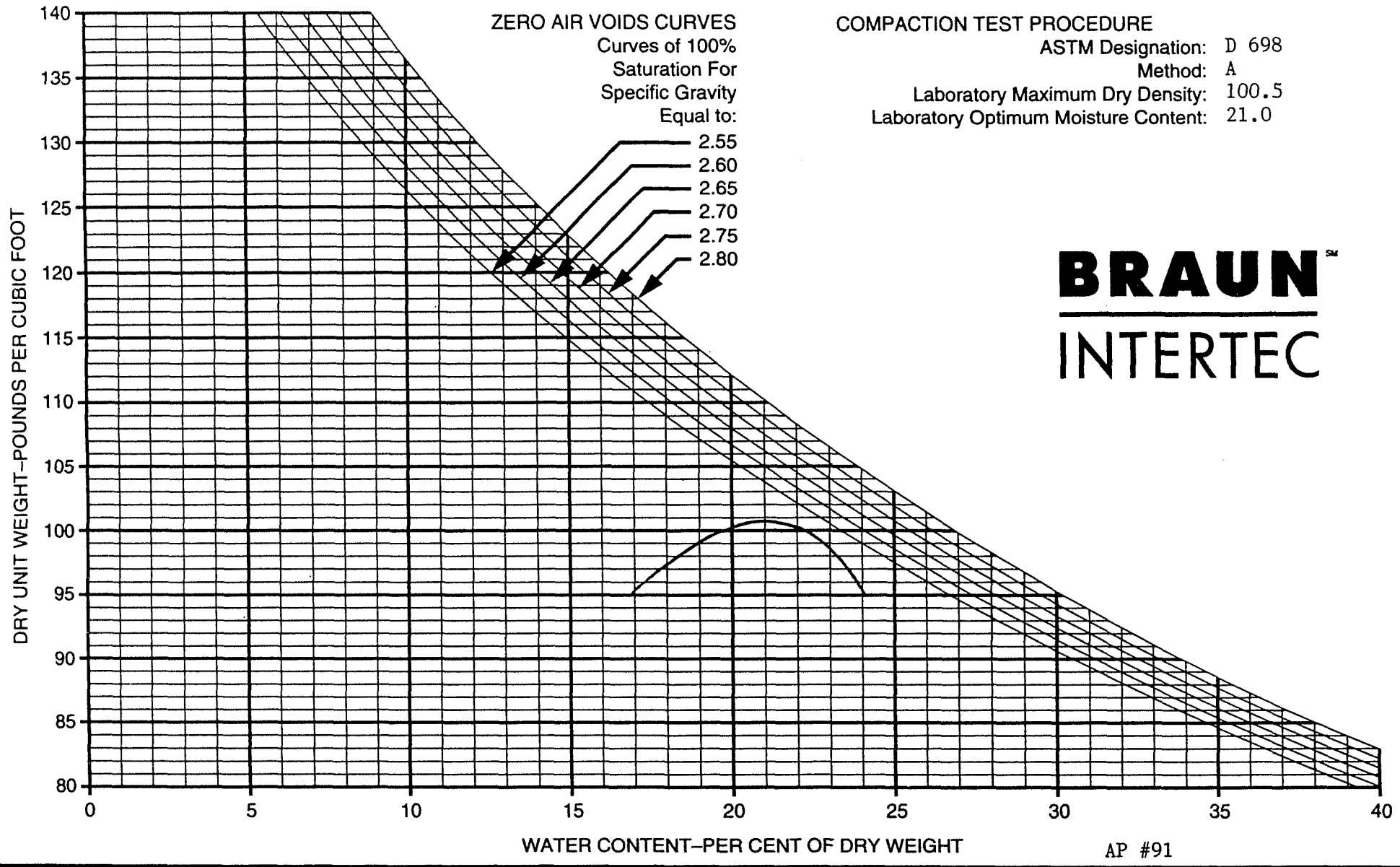
39450N 40089E

COMPACTION TEST

DRAWN BY: DS
CHECKED BY:
DATE: 5/18/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 100.5
Laboratory Optimum Moisture Content: 21.0

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
R St.64	CLB-CC-314	1908.1	18	32	50	Fat Clay (CH), dark gray brown

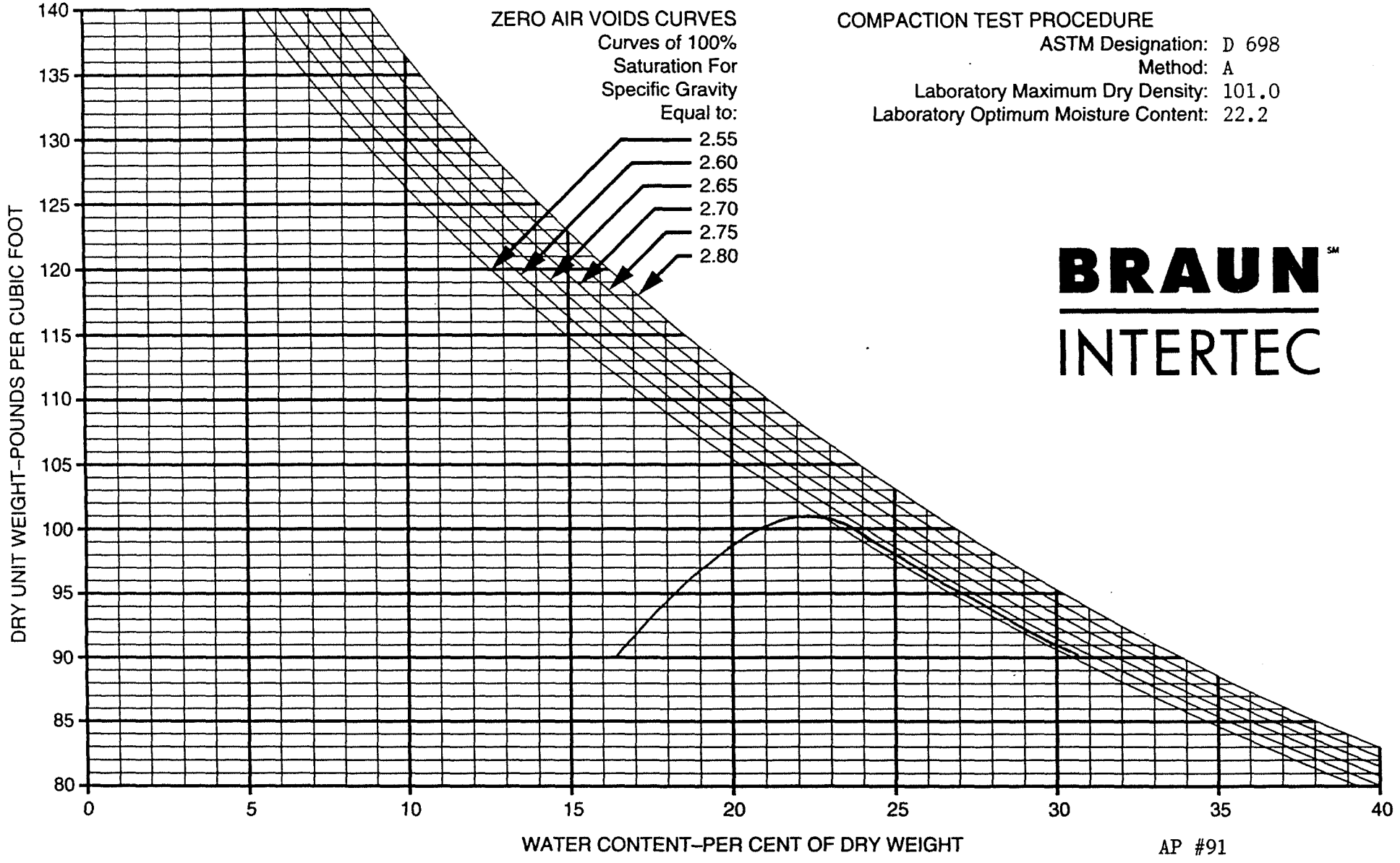
37258N 40240E

COMPACTION TEST

DRAWN BY: DS
CHECKED BY:
DATE: 5/19/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 101.0
Laboratory Optimum Moisture Content: 22.2

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
R-ST-71	CLB-CC-320	1905.7	21	31	52	Fat Clay (CH), dark gray

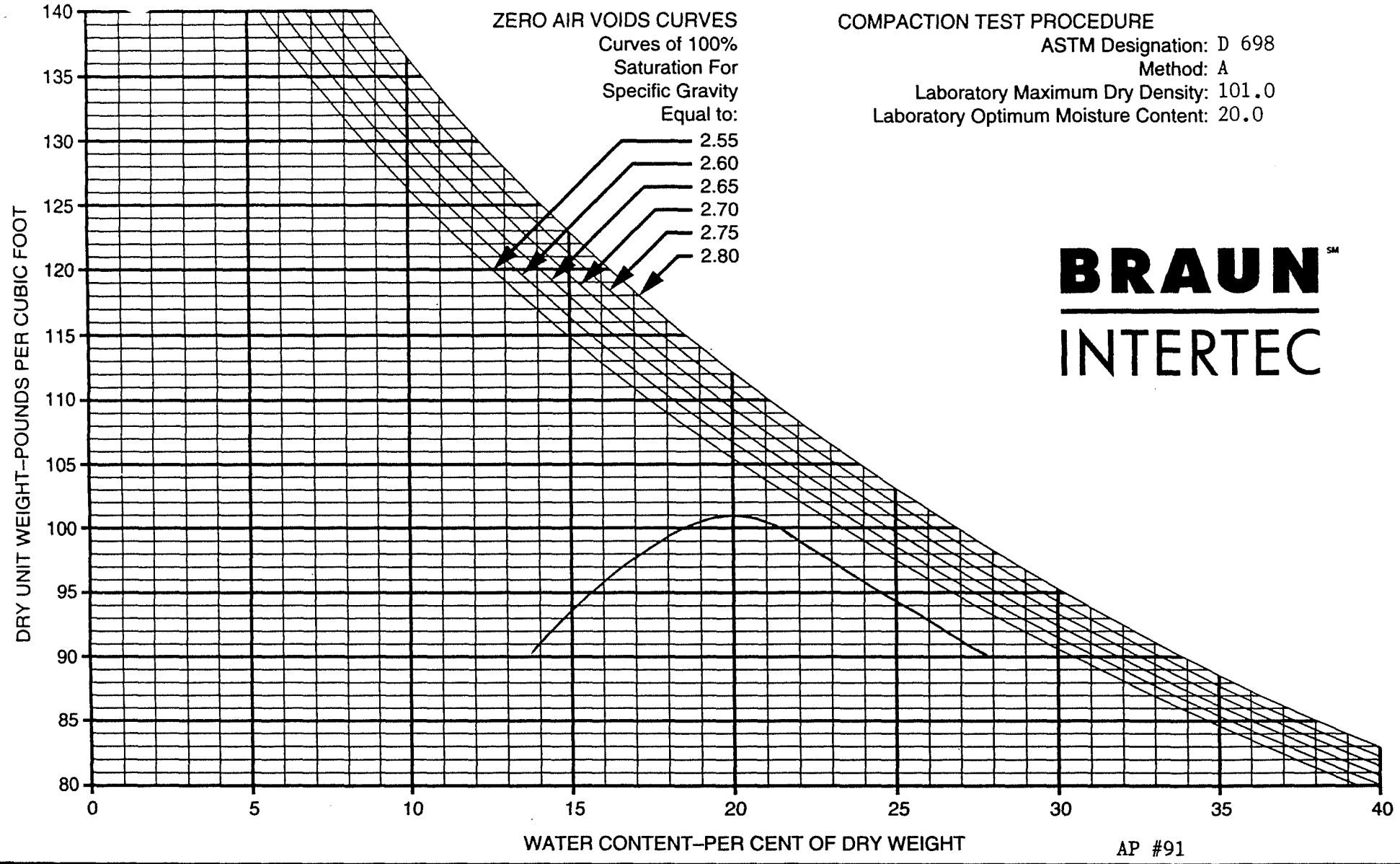
37734N 40211E

COMPACTION TEST

DRAWN BY: DS
CHECKED BY:
DATE: 5/26/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 101.0
Laboratory Optimum Moisture Content: 20.0

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
St.77	CLB-CC -330	1908.9	17	33	50	Fat Clay (CH), dark grayish-brown

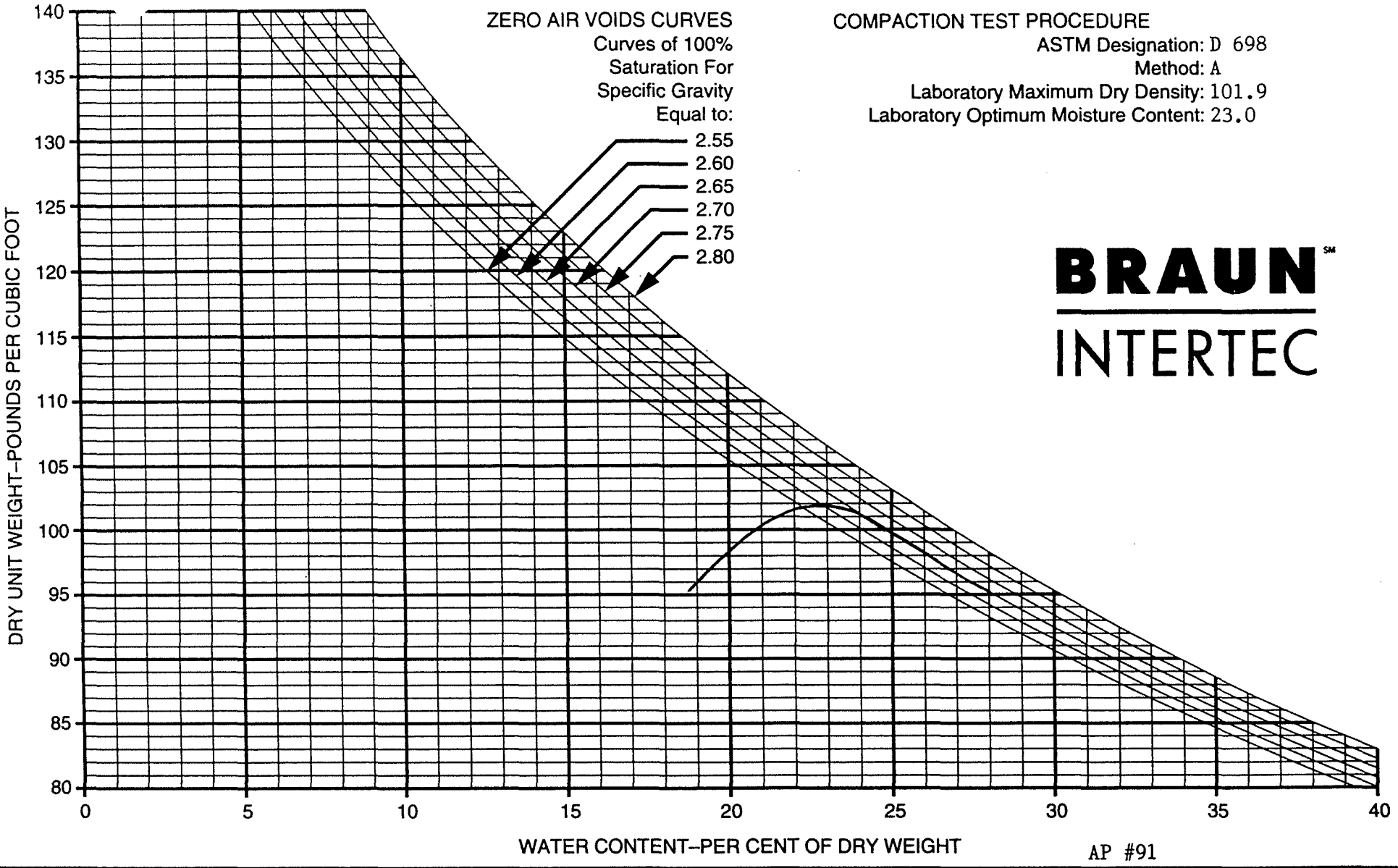
37622N 39849E

COMPACTION TEST

DRAWN BY: LL
CHECKED BY:
DATE: 5/18/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 101.9
Laboratory Optimum Moisture Content: 23.0

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
St.83	CLB-CC-336	1906.4	21	30	51	Fat Clay (CH), dark grayish-brown

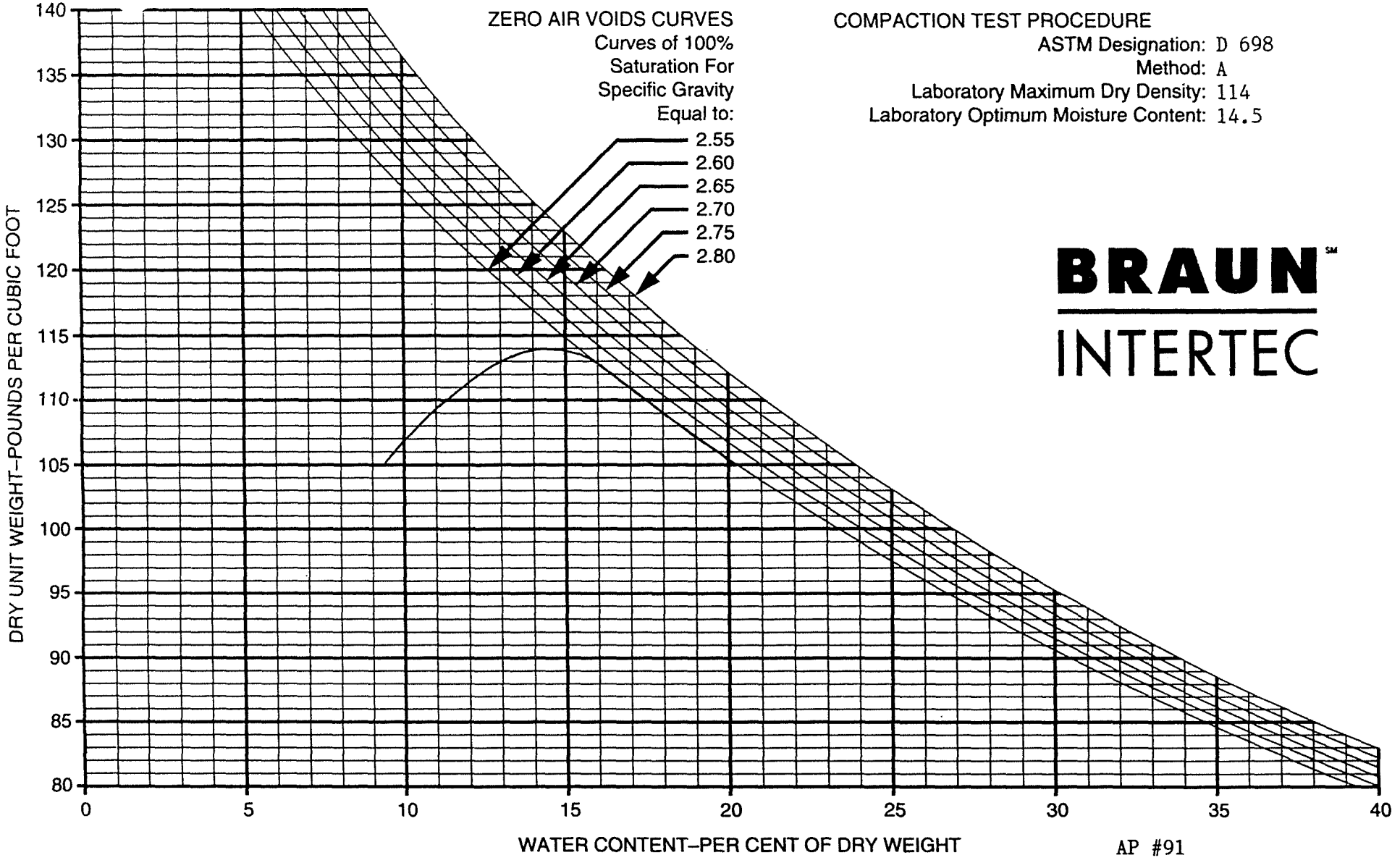
37694N 40314E

COMPACTION TEST

DRAWN BY: JC
CHECKED BY:
DATE: 5/27/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 114
Laboratory Optimum Moisture Content: 14.5

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLS-CC -339	N/A	14	23	37	Sandy Lean Clay (CL), olive brown

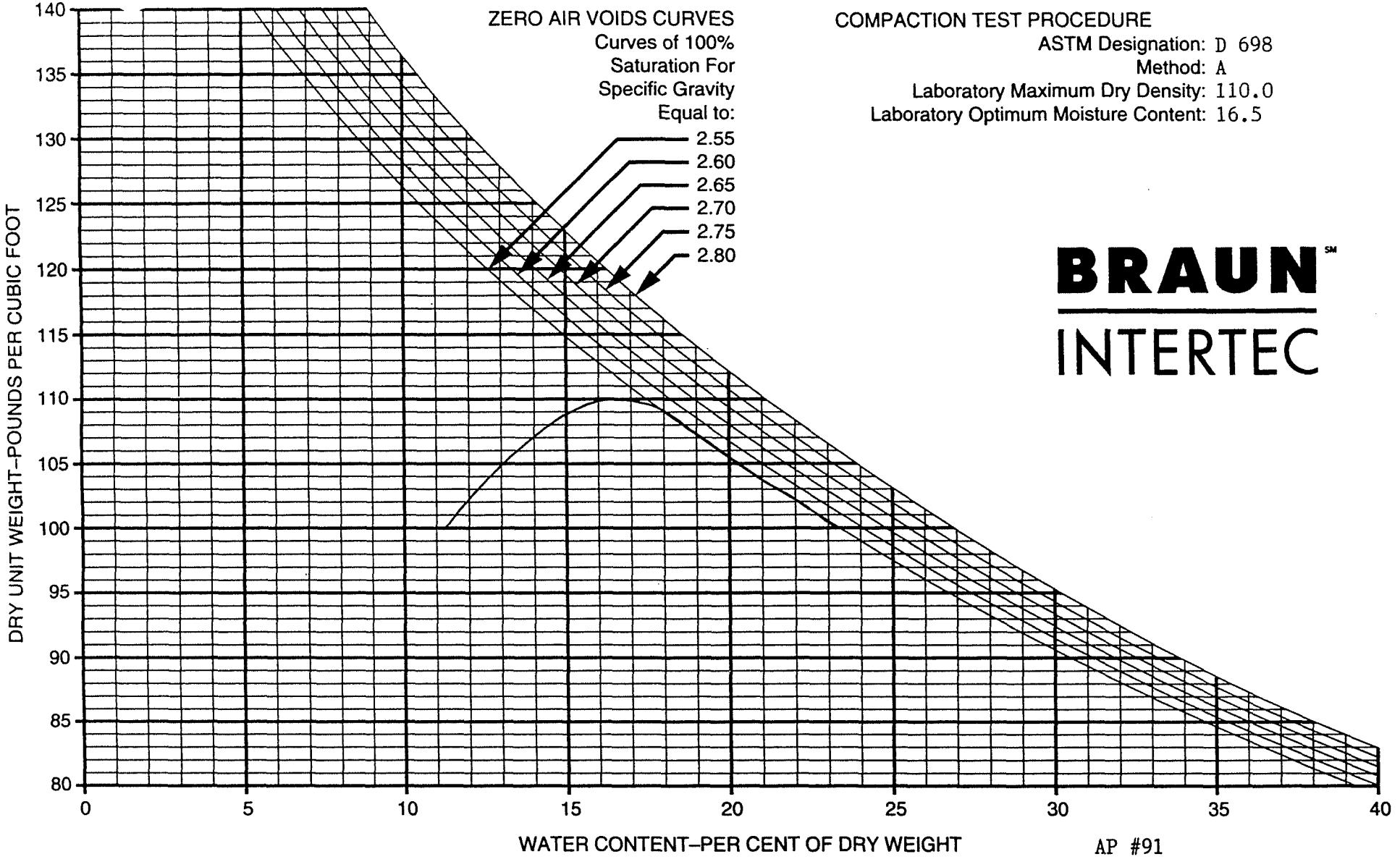
38500N 41500E

COMPACTION TEST

DRAWN BY: JC
CHECKED BY:
DATE: 5/26/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 110.0
Laboratory Optimum Moisture Content: 16.5

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
	CLS-CC -340	N/A	15	26	51	Sandy Lean Clay (CL), olive brown

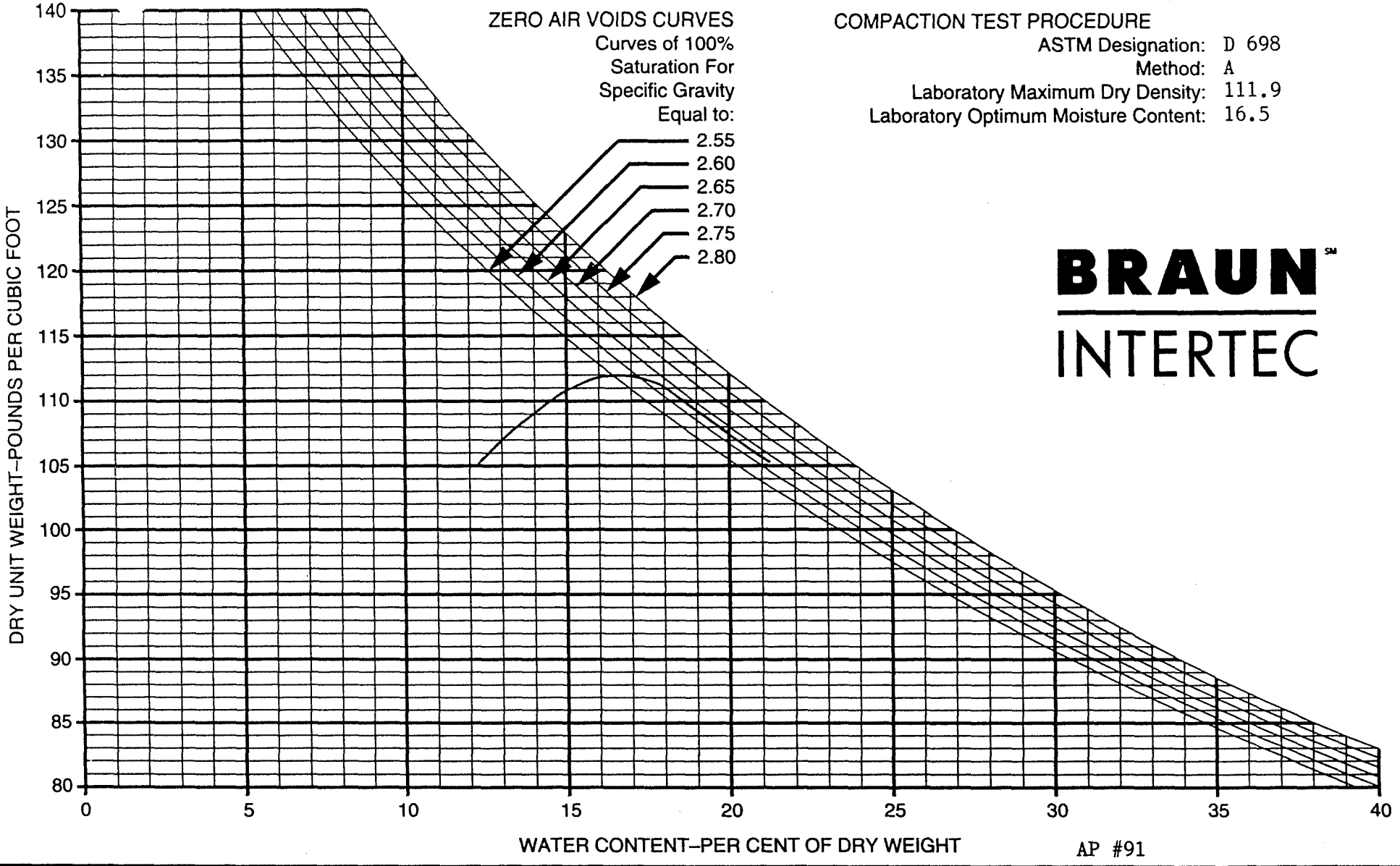
38000N 41500E

COMPACTION TEST

DRAWN BY: JC
CHECKED BY:
DATE: 5/25/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 111.9
Laboratory Optimum Moisture Content: 16.5

BRAUN INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CLS-CC -341	1904.8	16	22	38	Sandy Lean Clay (CL), olive brown

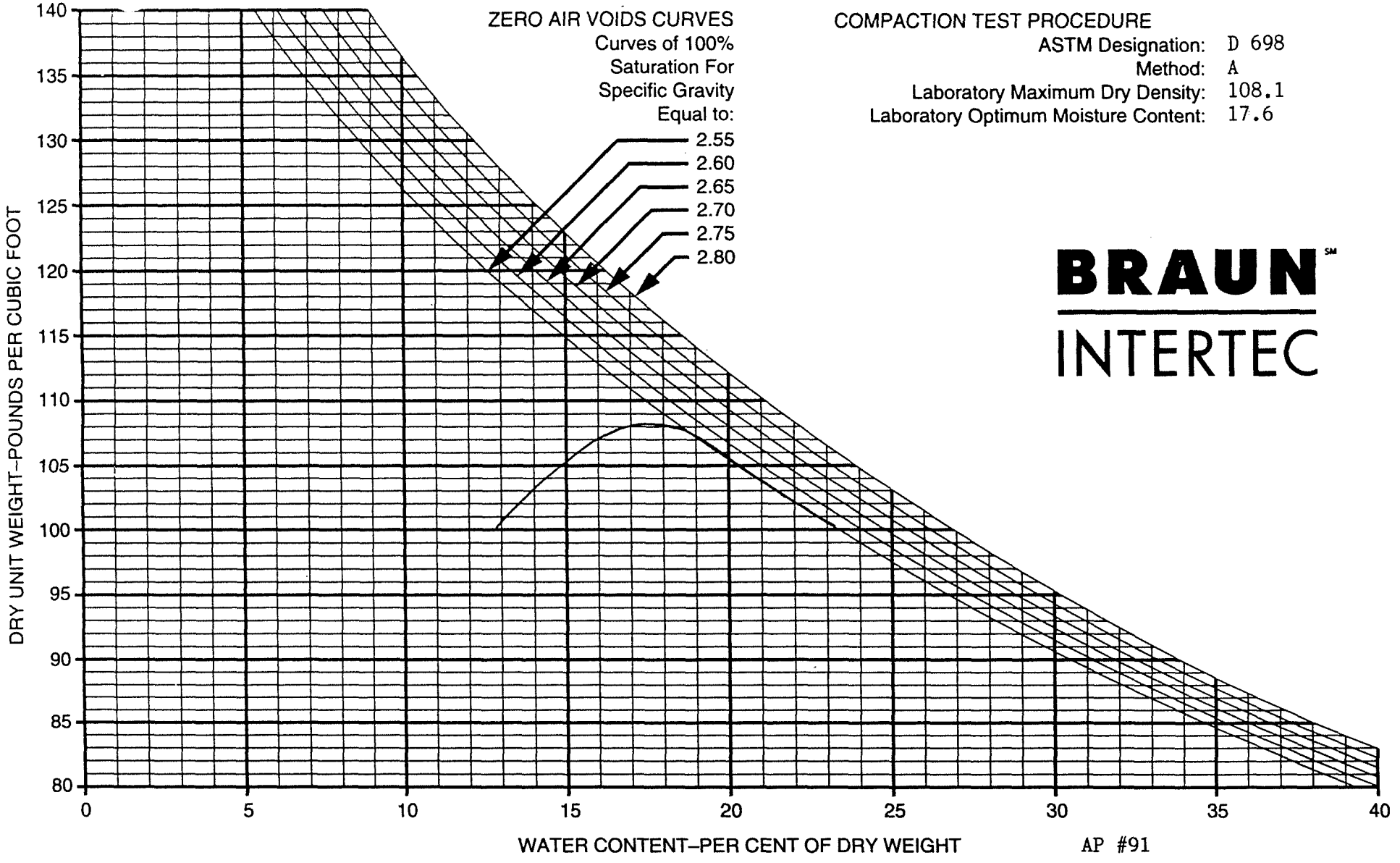
38677N 39736E

COMPACTION TEST

DRAWN BY: DS
CHECKED BY:
DATE: 6/1/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 108.1
Laboratory Optimum Moisture Content: 17.6

BRAUN SM
INTERTEC

AP #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CLS-CC -351	1897.8	13	28	41	Sandy Lean Clay (CL), olive brown

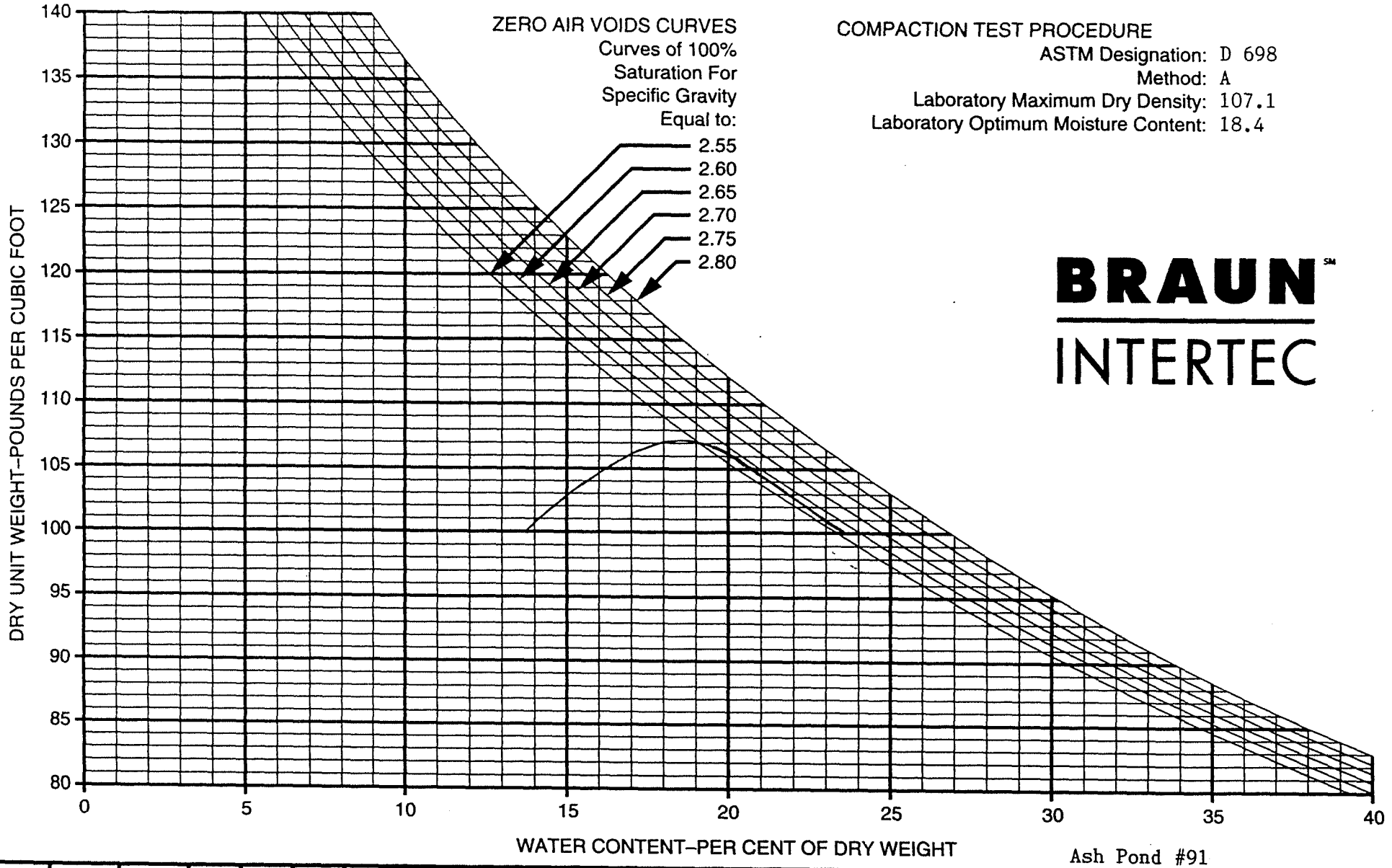
38764N 41364E

COMPACTION TEST

DRAWN BY: DS
CHECKED BY:
DATE: 6/2/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 107.1
Laboratory Optimum Moisture Content: 18.4

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
R-86	CLS-OC -354	1900.9	16	25	41	Sandy Lean Clay (CL), olive brown

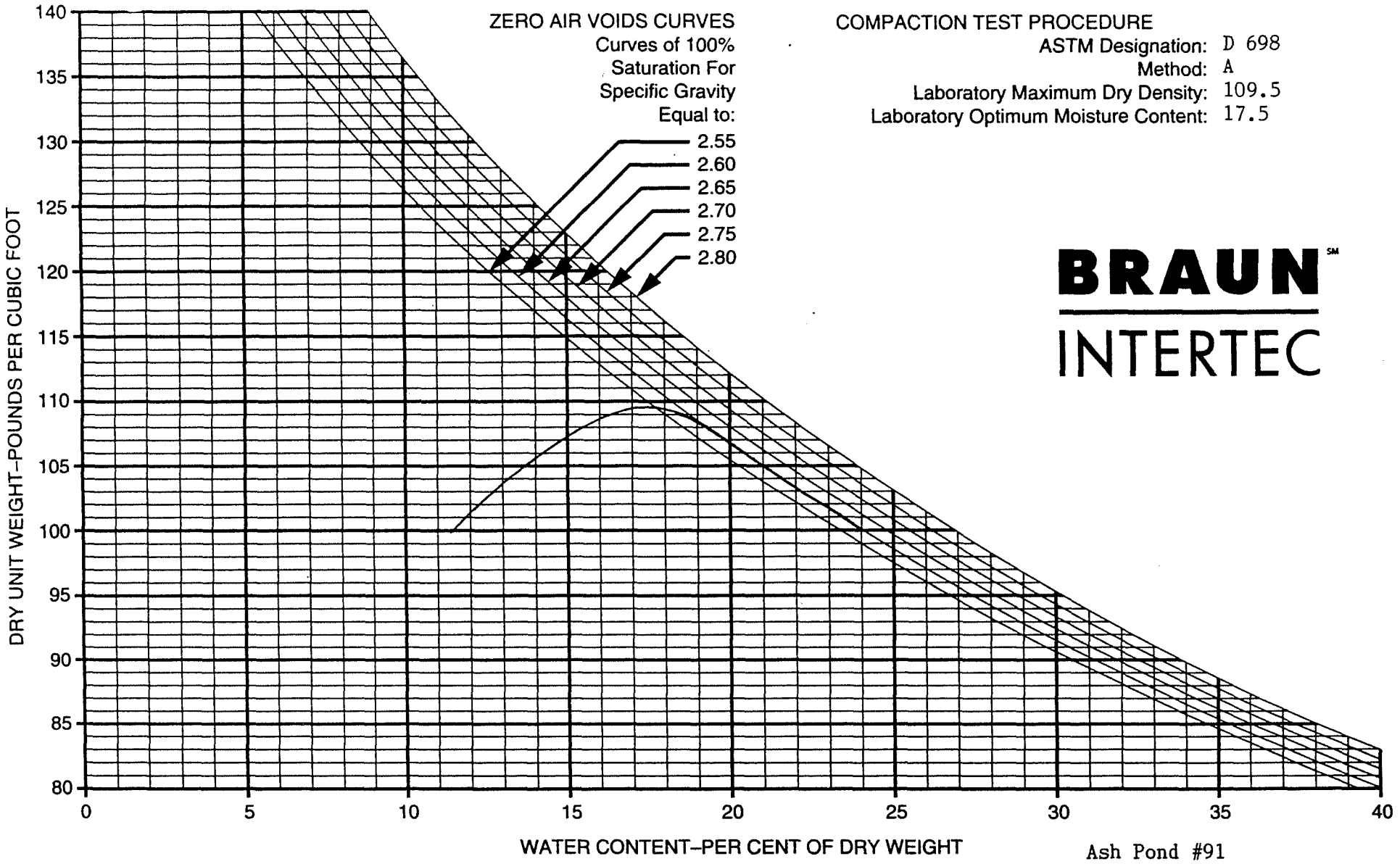
38768N 40464E

COMPACTION TEST

DRAWN BY: LL
CHECKED BY:
DATE: 6/2/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 109.5
Laboratory Optimum Moisture Content: 17.5

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CLS-CC -355	1903.1	16	25	41	Sandy Lean Clay (CL), olive brown

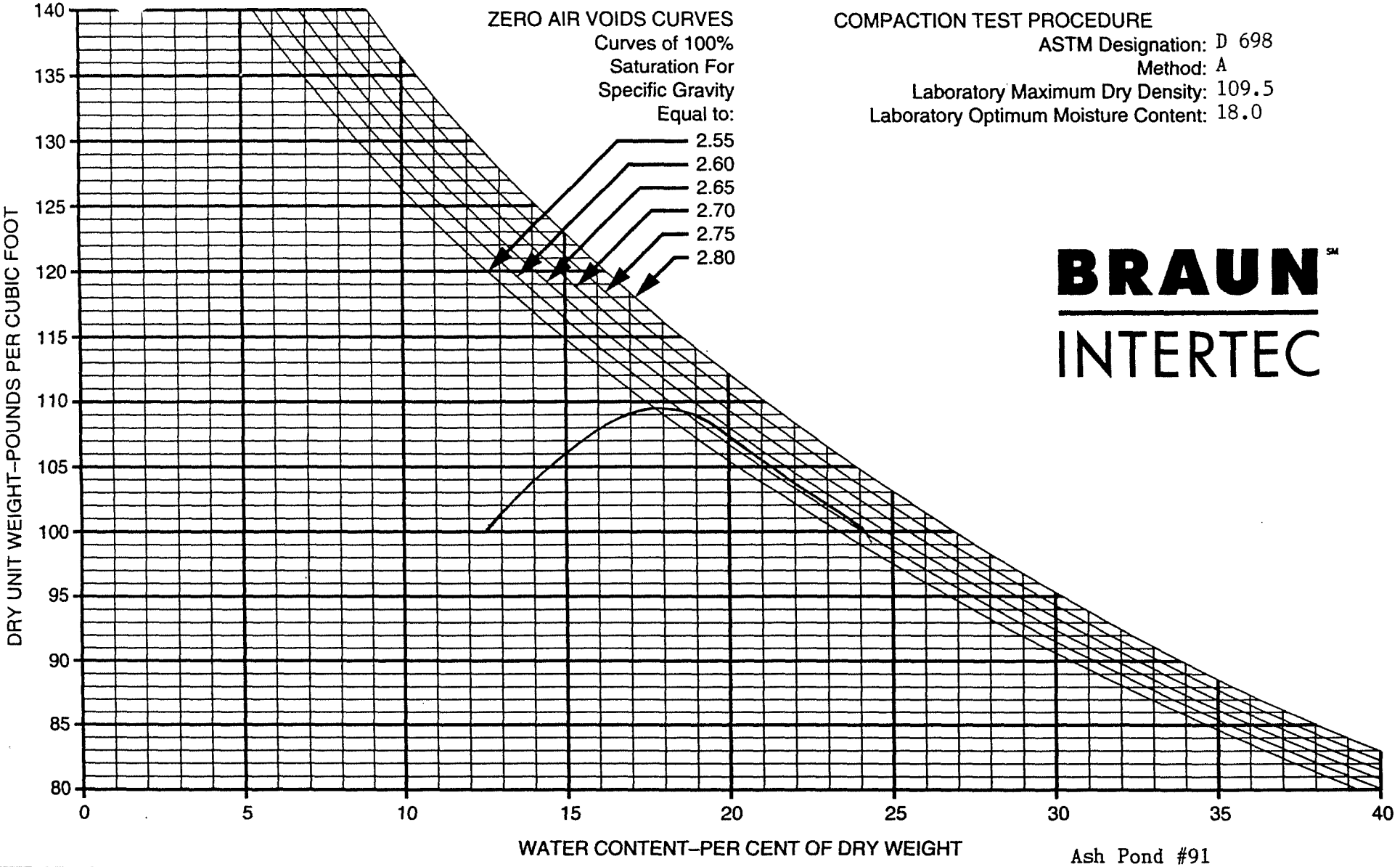
37517N 41323E

COMPACTION TEST

DRAWN BY: DS
CHECKED BY:
DATE: 6/8/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 109.5
Laboratory Optimum Moisture Content: 18.0

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST.96	CLS-CC -357	1900.2	14	28	42	Sandy Lean Clay (CL), olive brown

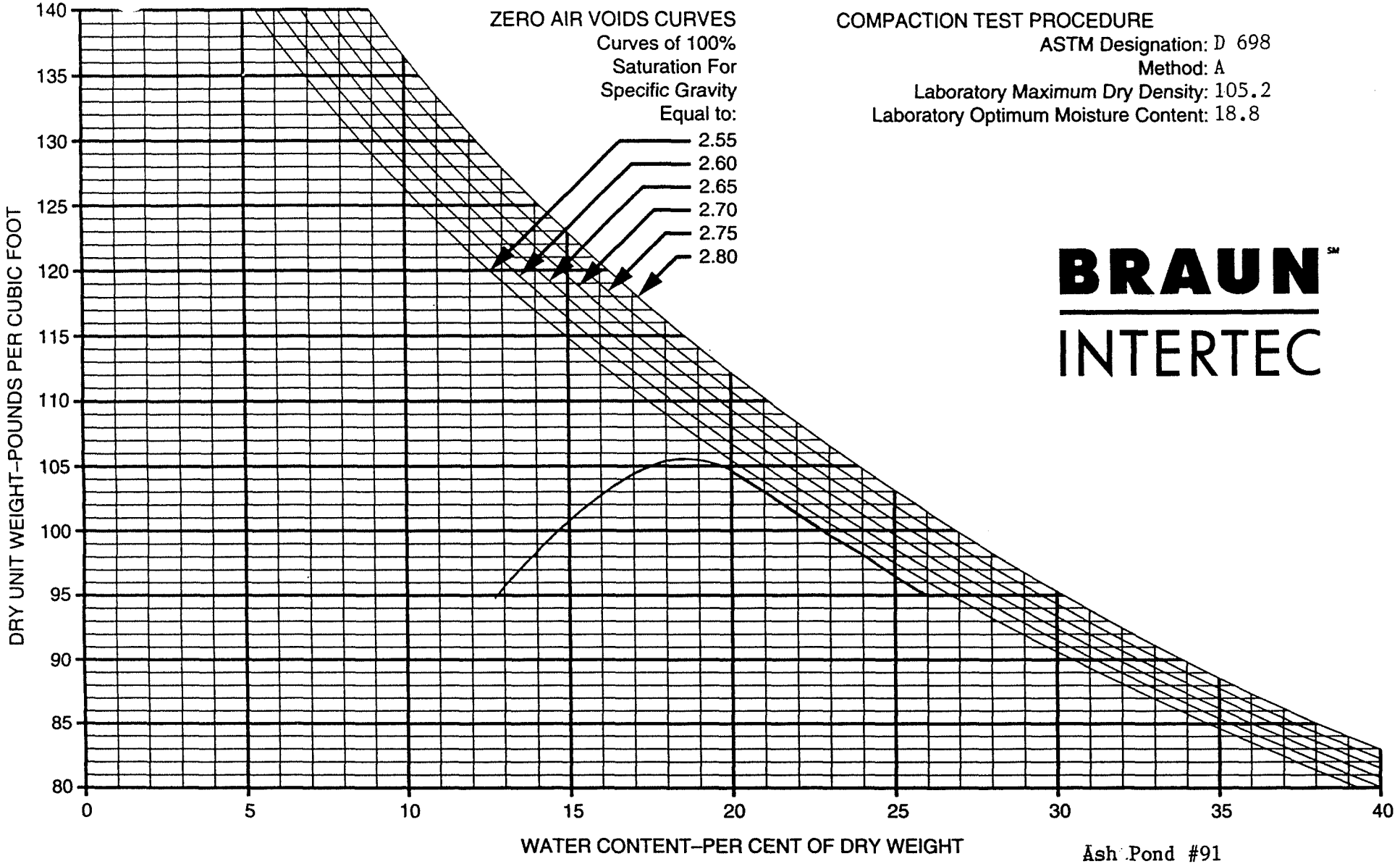
38768N 41169E

COMPACTION TEST

DRAWN BY: DS
CHECKED BY:
DATE: 5/25/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 105.2
Laboratory Optimum Moisture Content: 18.8

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST.100	CLS-CC -361	1908.1	16	31	47	Sandy Lean Clay (CL), dark grayish-brown

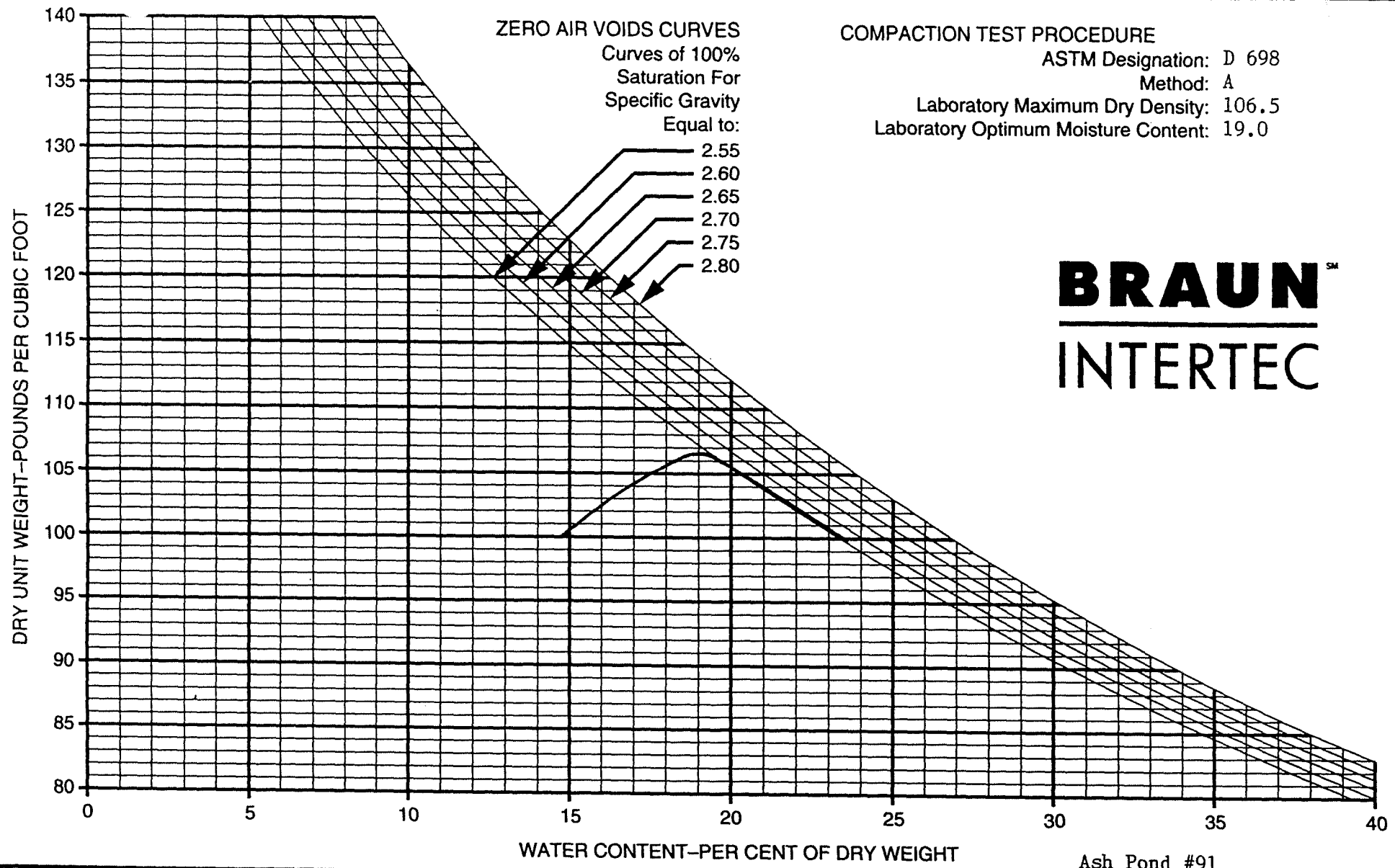
38783N 40474E

COMPACTION TEST

DRAWN BY: LL
CHECKED BY:
DATE: 6/2/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 106.5
Laboratory Optimum Moisture Content: 19.0

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CLS-CC -363	1913.1	16	26	42	Sandy Lean Clay (CL), dark grayish-brown

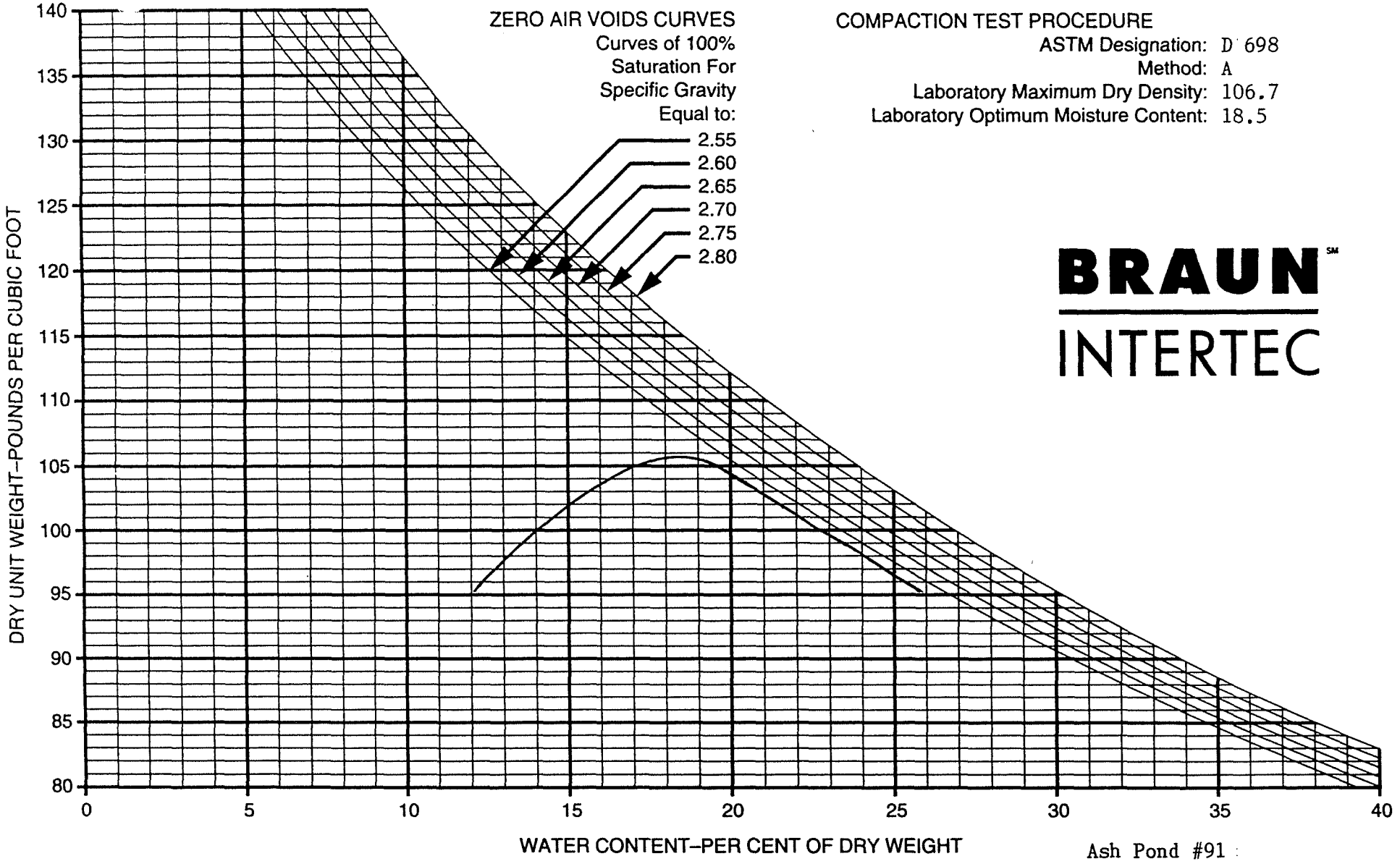
38806N 39774E

COMPACTION TEST

DRAWN BY: DS
CHECKED BY:
DATE: 6/8/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 106.7
Laboratory Optimum Moisture Content: 18.5

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CLS-CC -368	1908.5	14	29	43	Sandy Lean Clay (CL), olive brown

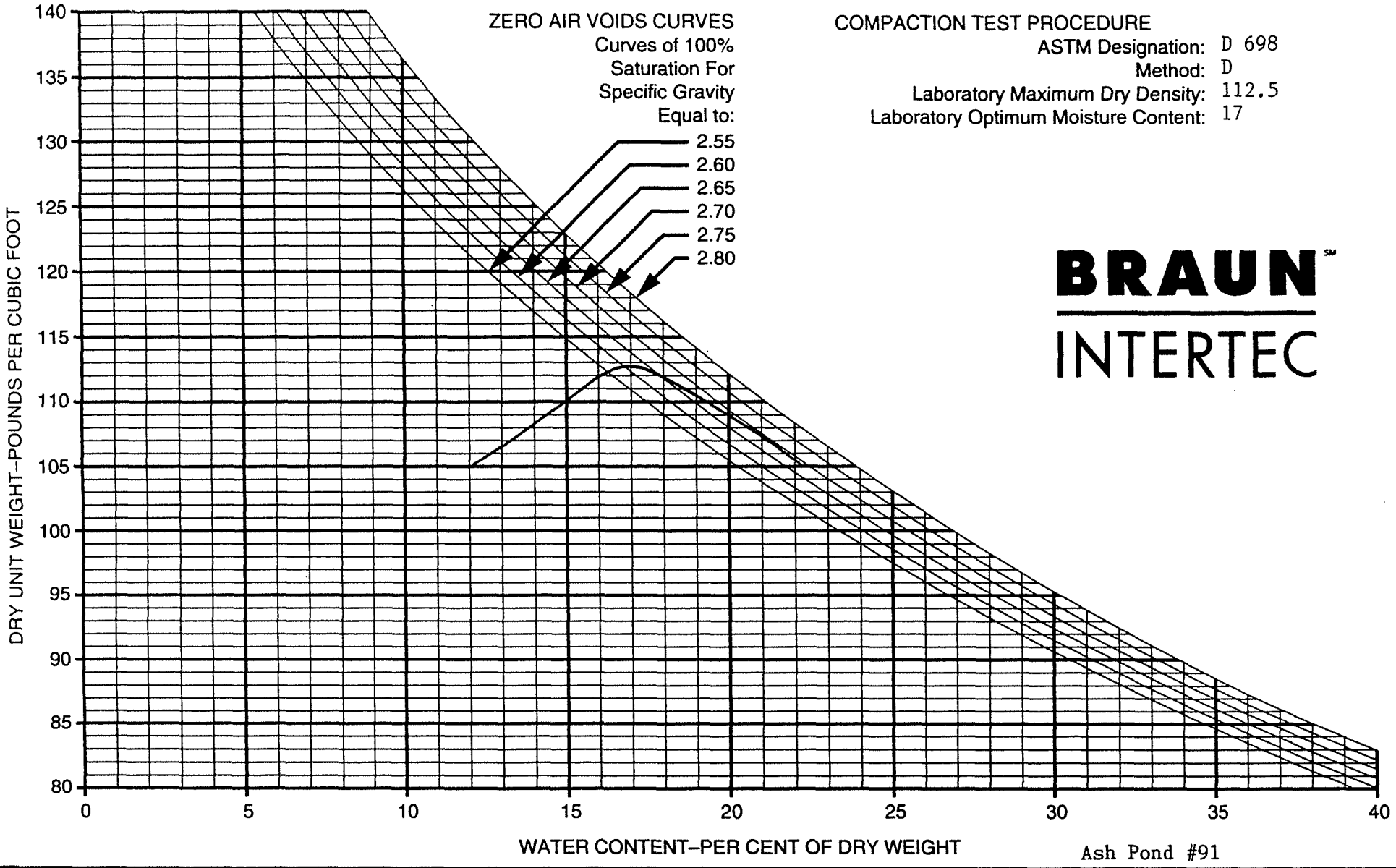
38786N 40777E

COMPACTION TEST

DRAWN BY: DS
CHECKED BY:
DATE: 6/14/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: D
Laboratory Maximum Dry Density: 112.5
Laboratory Optimum Moisture Content: 17

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CC-370	1909.6	15	28	43	Clayey Sand with Gravel (SC), dark grayish-brown

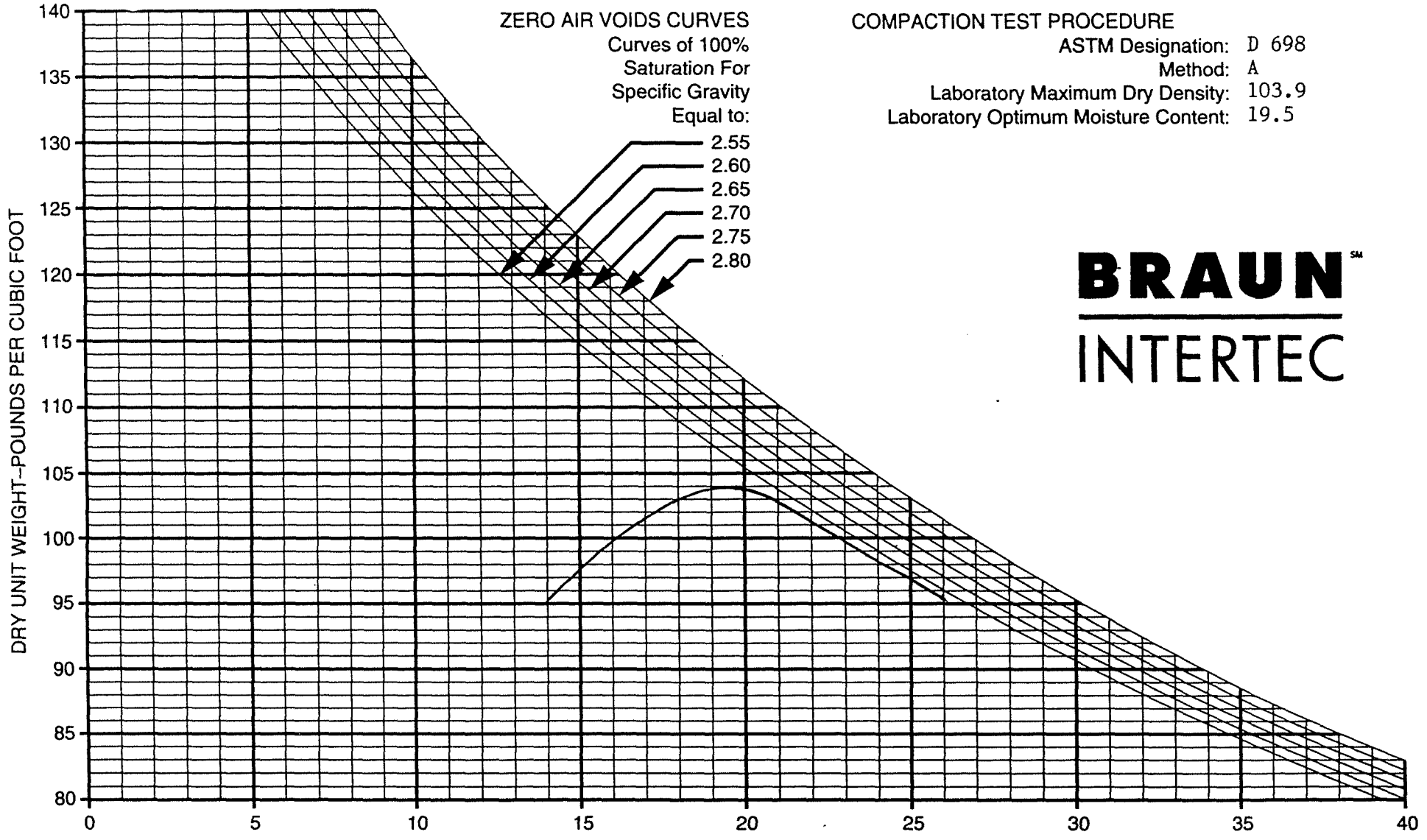
38786N 41473E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 103.9
Laboratory Optimum Moisture Content: 19.5

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CLS-CC-372	1918	15	28	43	Sandy Lean Clay (CL), grayish-brown

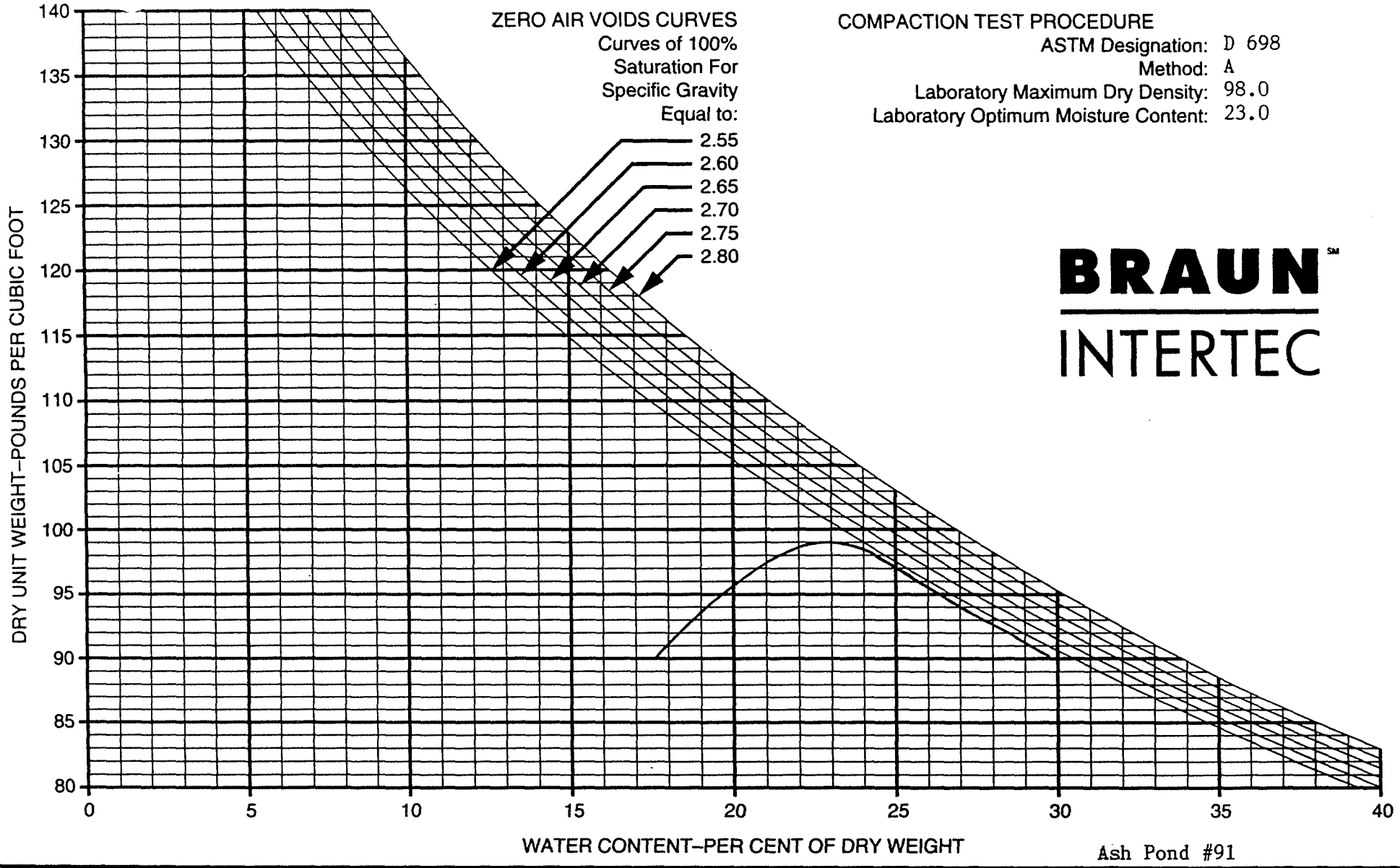
38590N 39704E

COMPACTION TEST

DRAWN BY: DS
CHECKED BY:
DATE: 6/7/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 98.0
Laboratory Optimum Moisture Content: 23.0

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP.1	CC-373	1885.6	16	30	46	Sandy Lean Clay (CL), olive brown

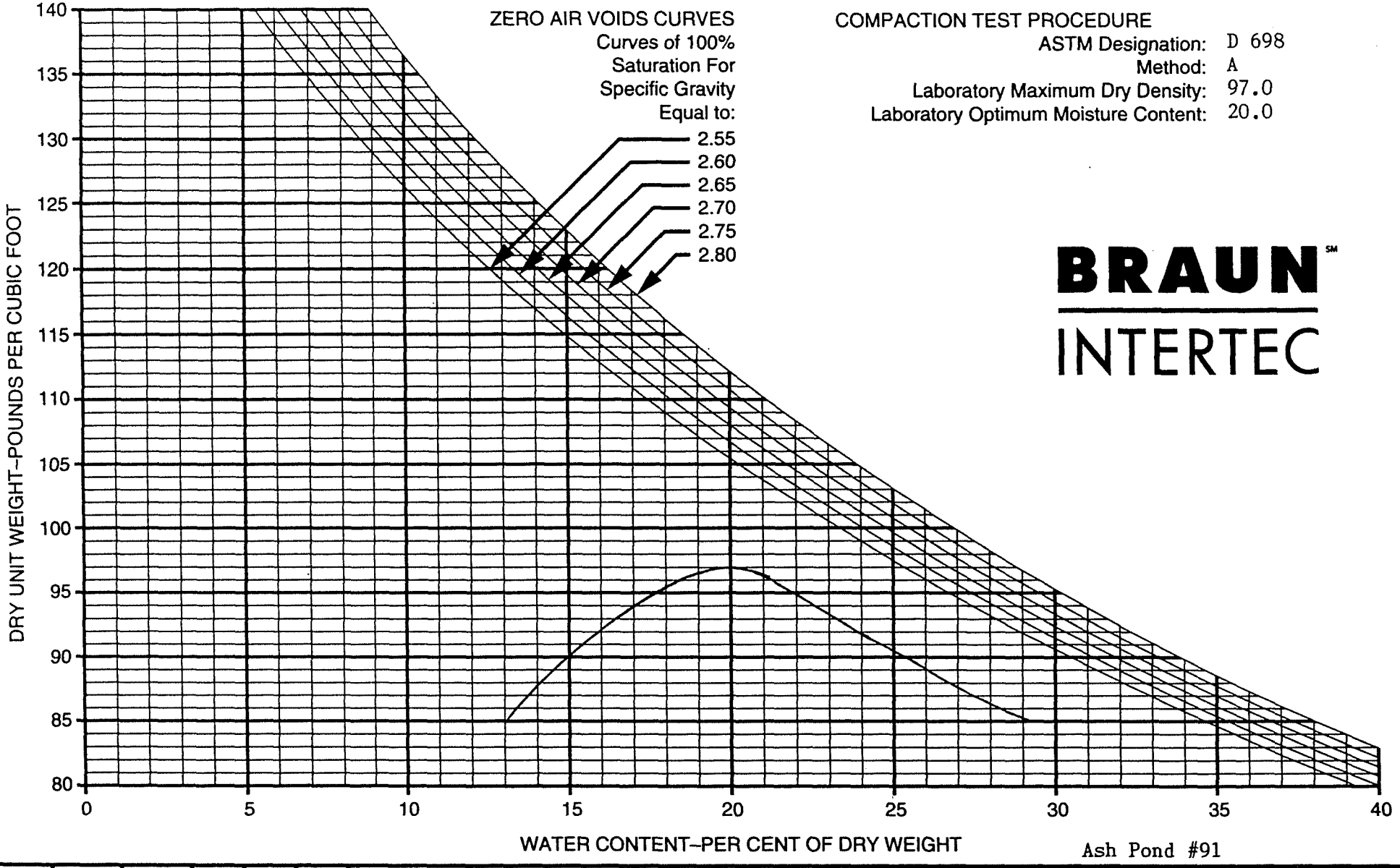
40902N 40536E

COMPACTION TEST

DRAWN BY: LL
CHECKED BY:
DATE: 6/4/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 97.0
Laboratory Optimum Moisture Content: 20.0

BRAUN SM
INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-1	CC-374	1885.8	21	27	48	Sandy Lean Clay (CL), olive brown

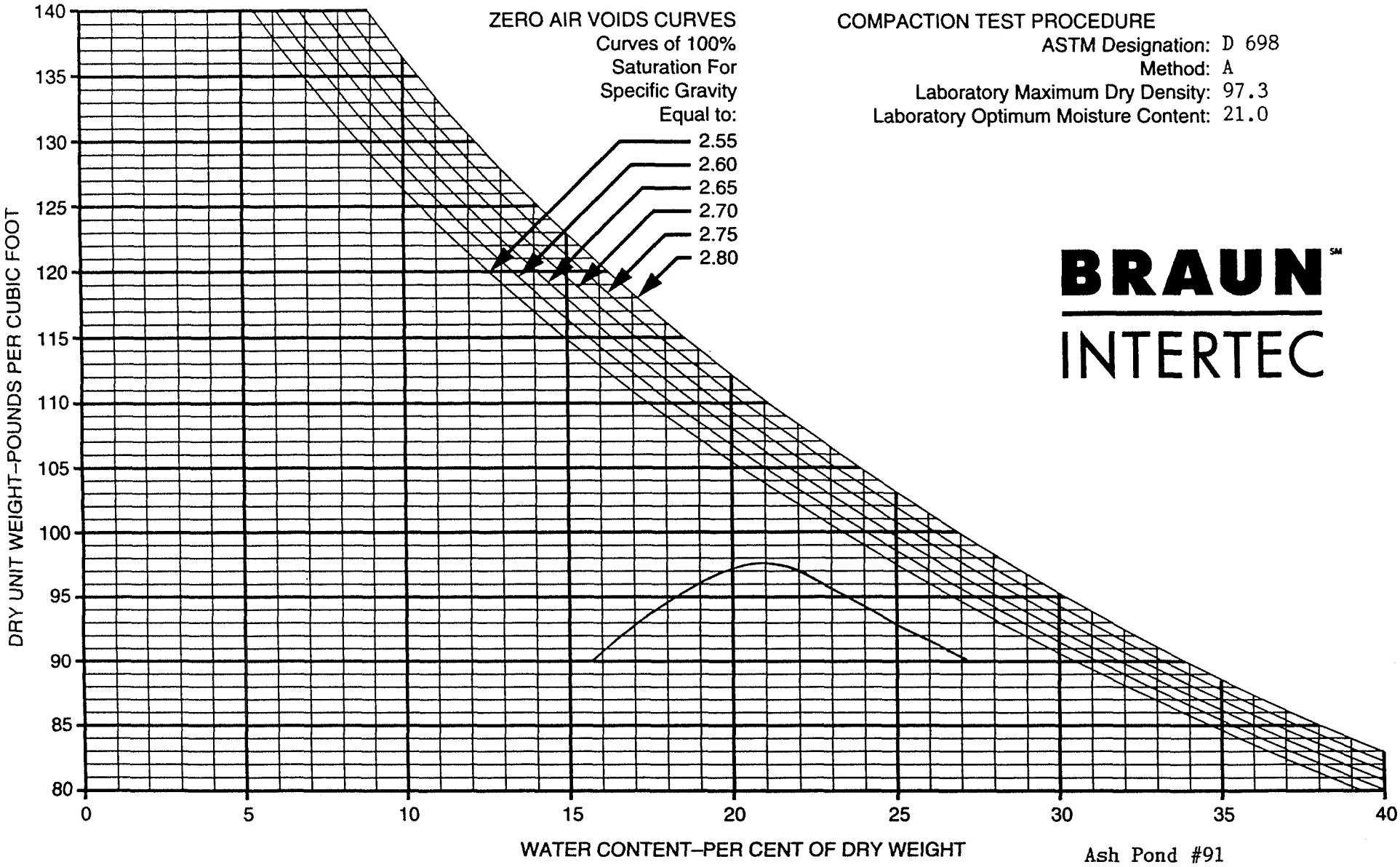
40902N 40536E

COMPACTION TEST

DRAWN BY: LL
CHECKED BY:
DATE: 6/6/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 97.3
Laboratory Optimum Moisture Content: 21.0

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-2	CC-375	1883	19	26	45	Sandy Lean Clay (CL), olive brown

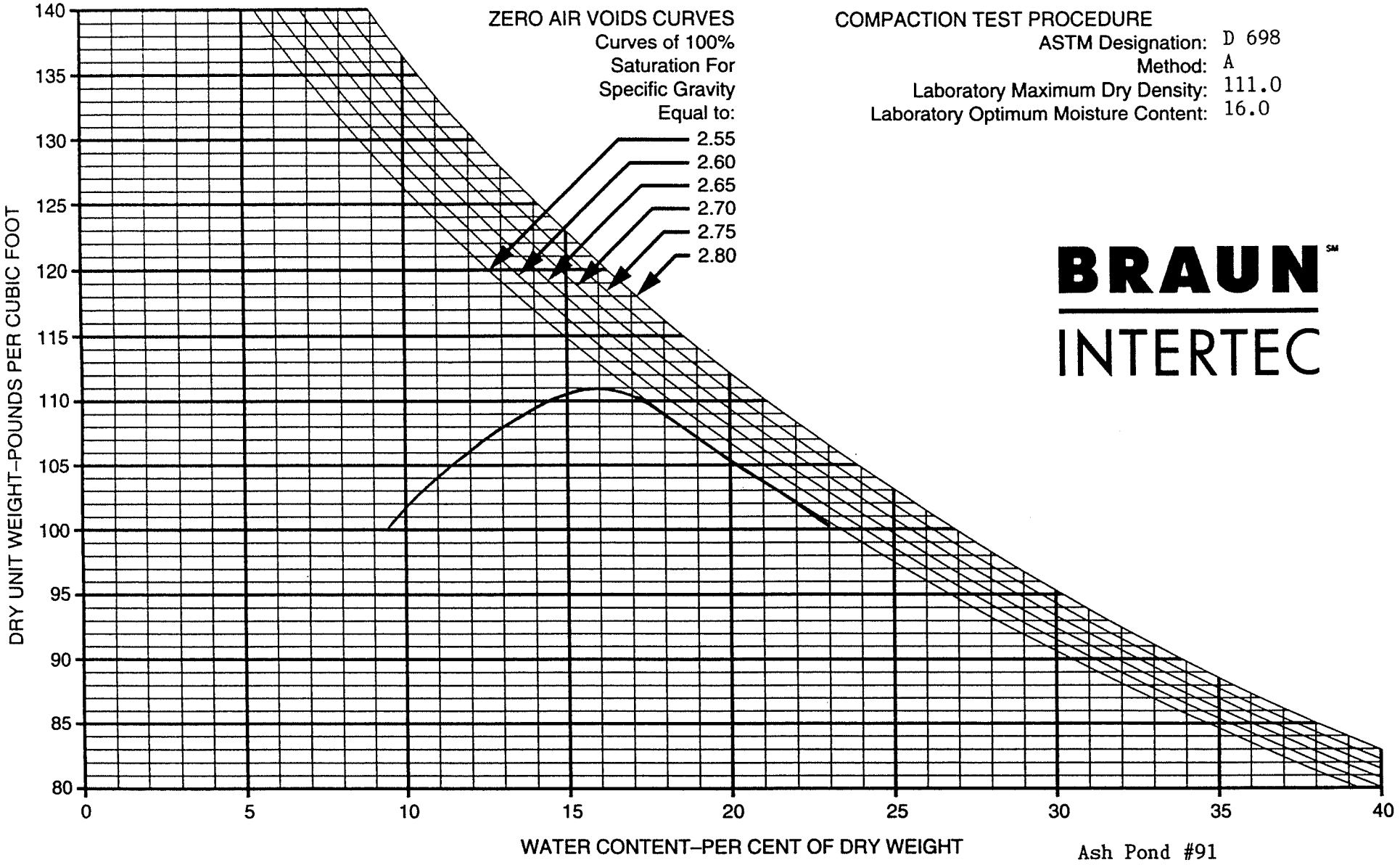
40860N 40876E

COMPACTION TEST

DRAWN BY: LL
CHECKED BY:
DATE: 6/6/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 111.0
Laboratory Optimum Moisture Content: 16.0

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-4	CC-376	1882.7	13	24	37	Sandy Lean Clay (CL), olive brown

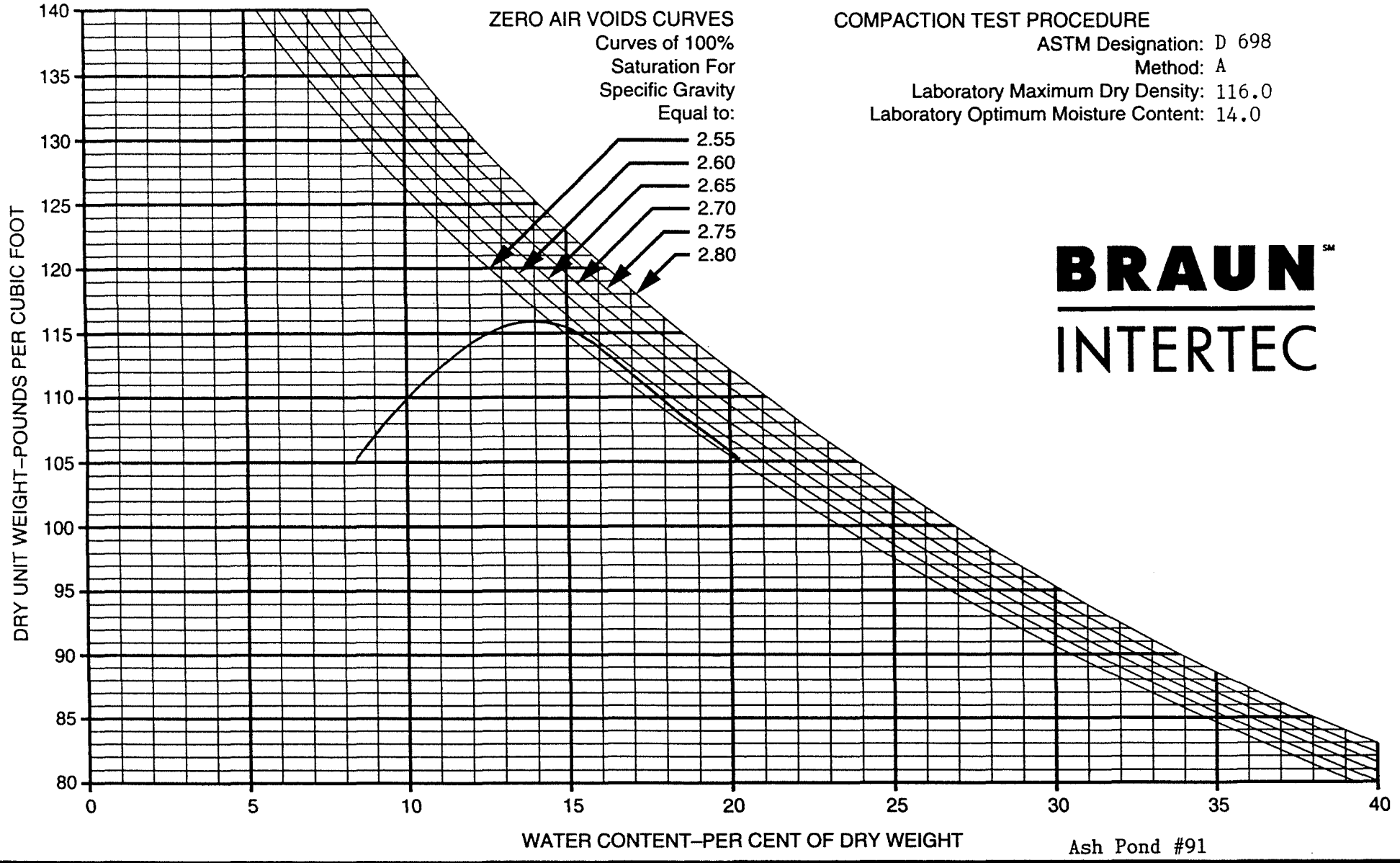
41031N 40670E

COMPACTION TEST

DRAWN BY: LL
CHECKED BY:
DATE: 6/7/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 116.0
Laboratory Optimum Moisture Content: 14.0

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP.3	CC-377	1885.9	14	16	30	Clayey Sand (SC), dark grayish-brown

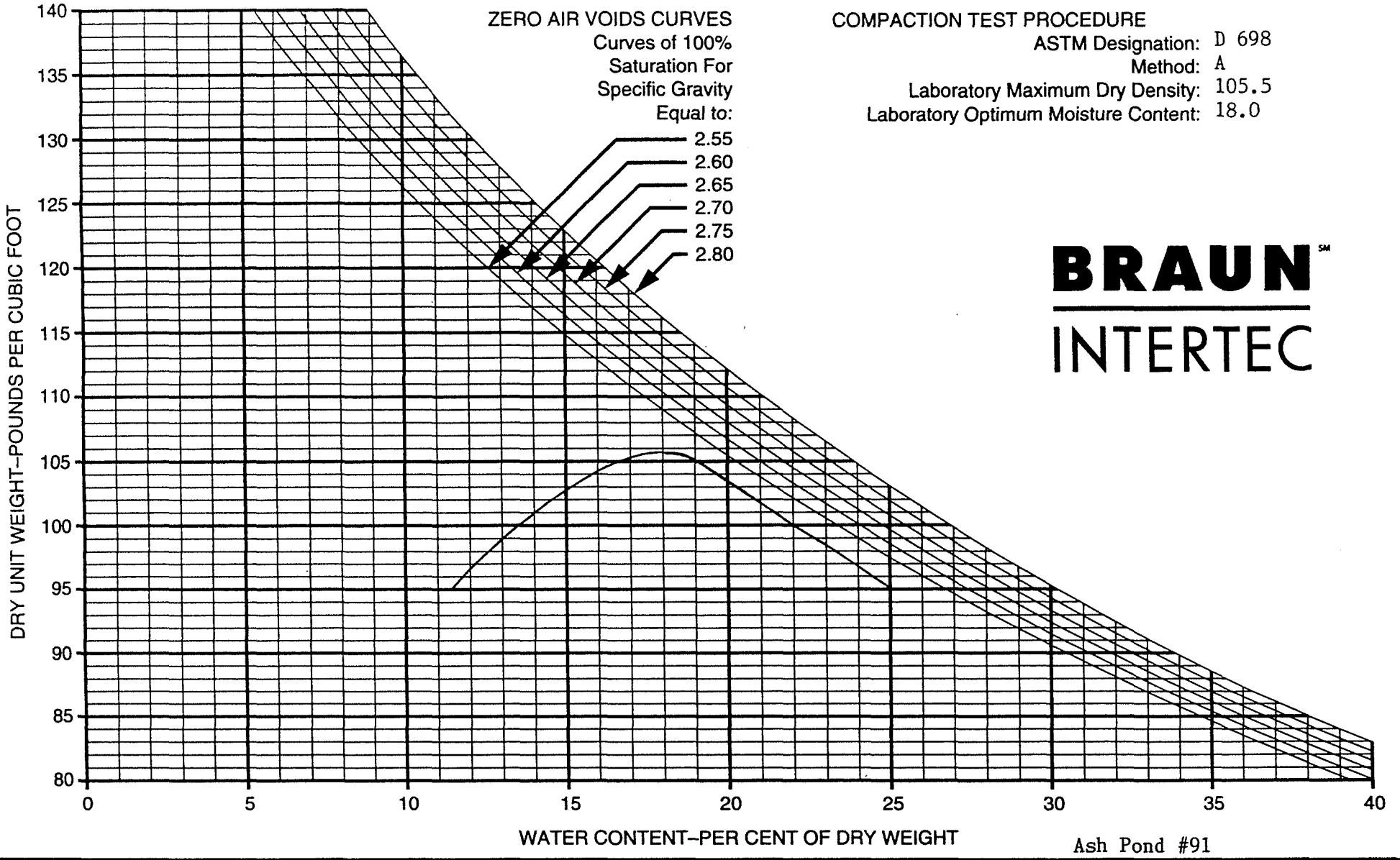
41070N 40432E

COMPACTION TEST

DRAWN BY: LL
CHECKED BY:
DATE: 6/4/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 105.5
Laboratory Optimum Moisture Content: 18.0

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-5	CC-378	1886.2	17	22	39	Sandy Lean Clay (CL), grayish-brown

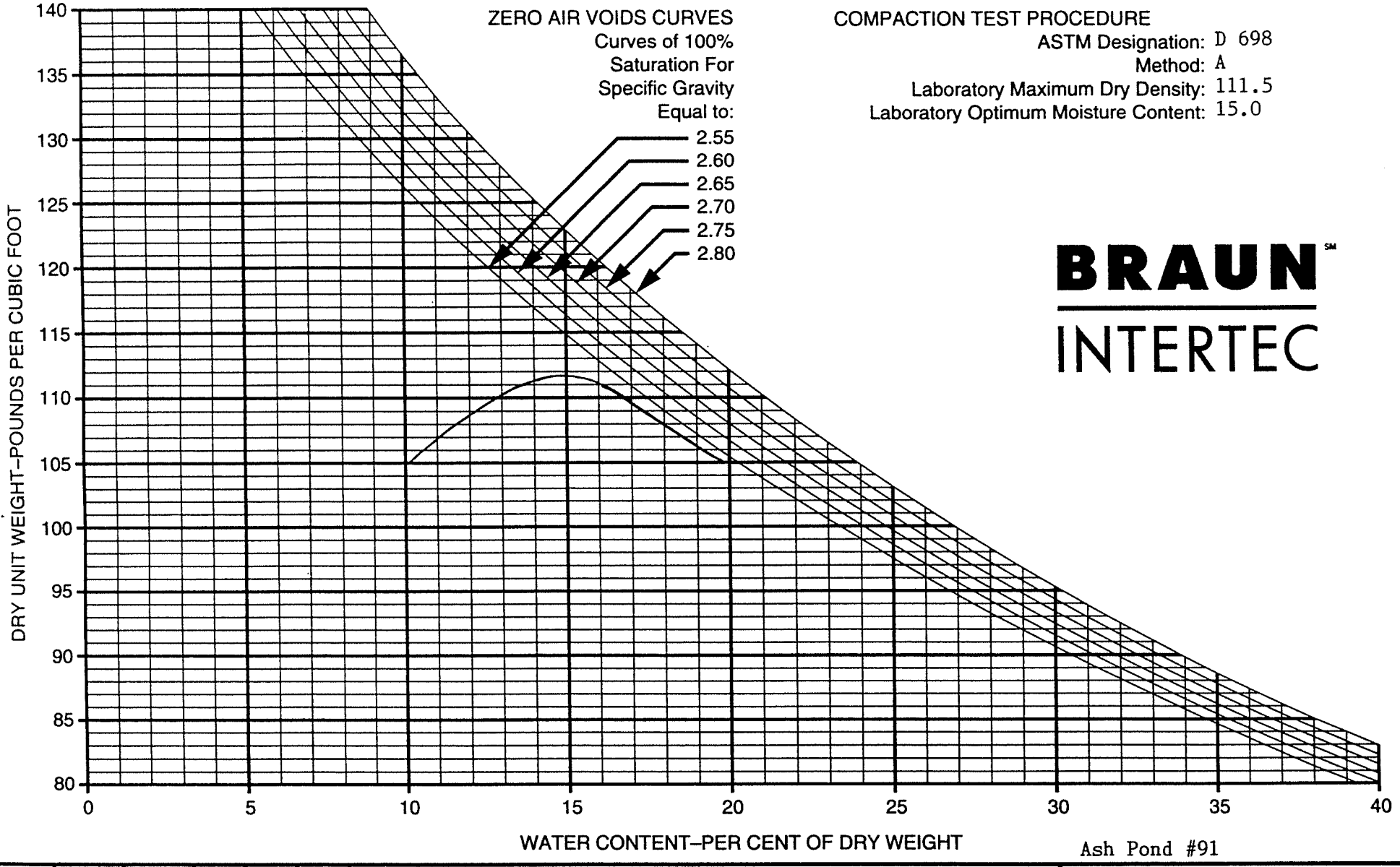
40672N 42098E

COMPACTION TEST

DRAWN BY: LL
CHECKED BY:
DATE: 6/10/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698

Method: A

Laboratory Maximum Dry Density: 111.5

Laboratory Optimum Moisture Content: 15.0

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-5	CC-379	1886.2	14	23	37	Sandy lean Clay (CL), grayish-brown

40672N 42098E

COMPACTION TEST

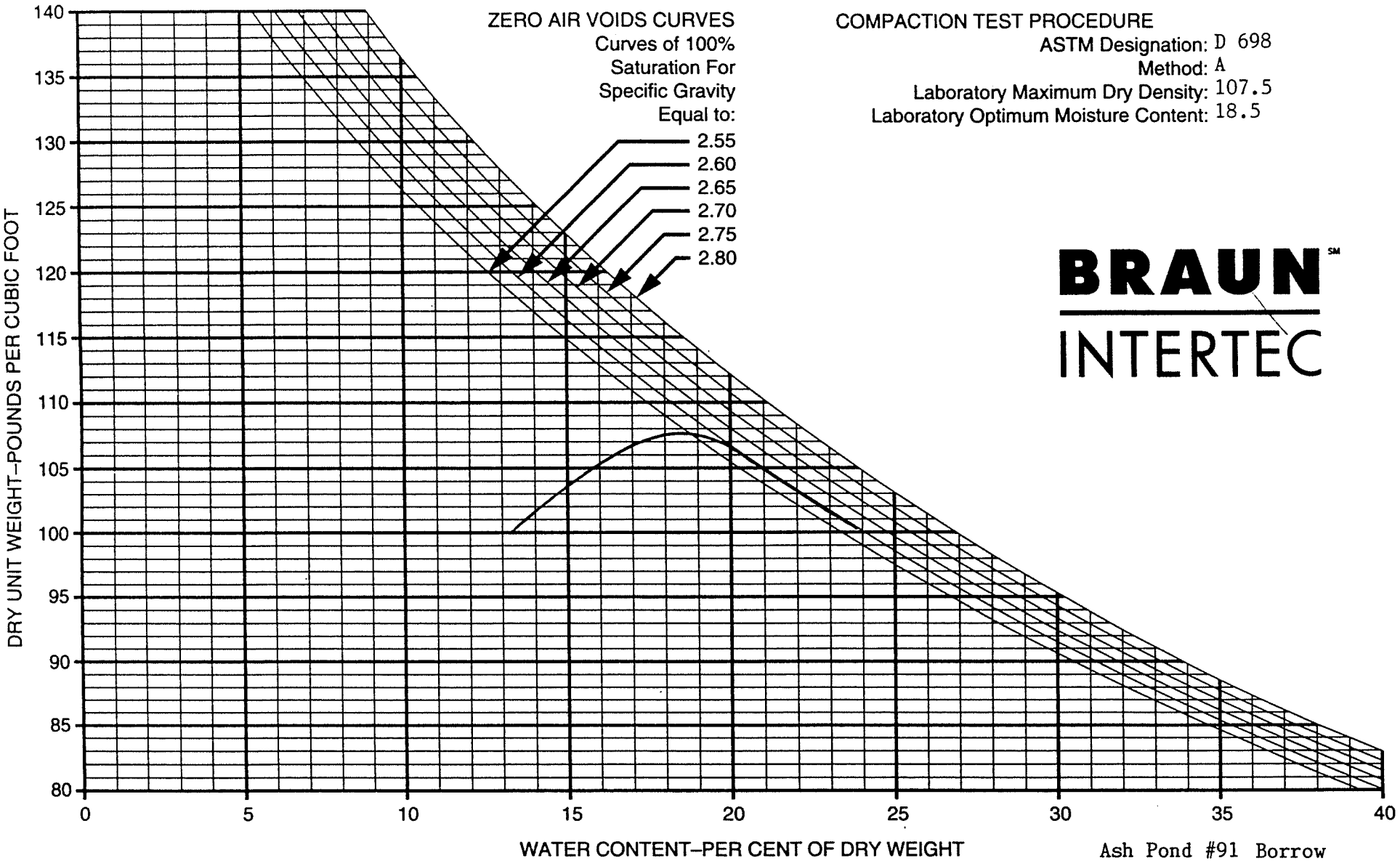
DRAWN BY: LL

CHECKED BY:

DATE: 6/11/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 107.5
Laboratory Optimum Moisture Content: 18.5

BRAUN INTERTEC

Ash Pond #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-6	CC-380	1886.8	15	20	35	Sandy Lean Clay(CL), grayish-brown

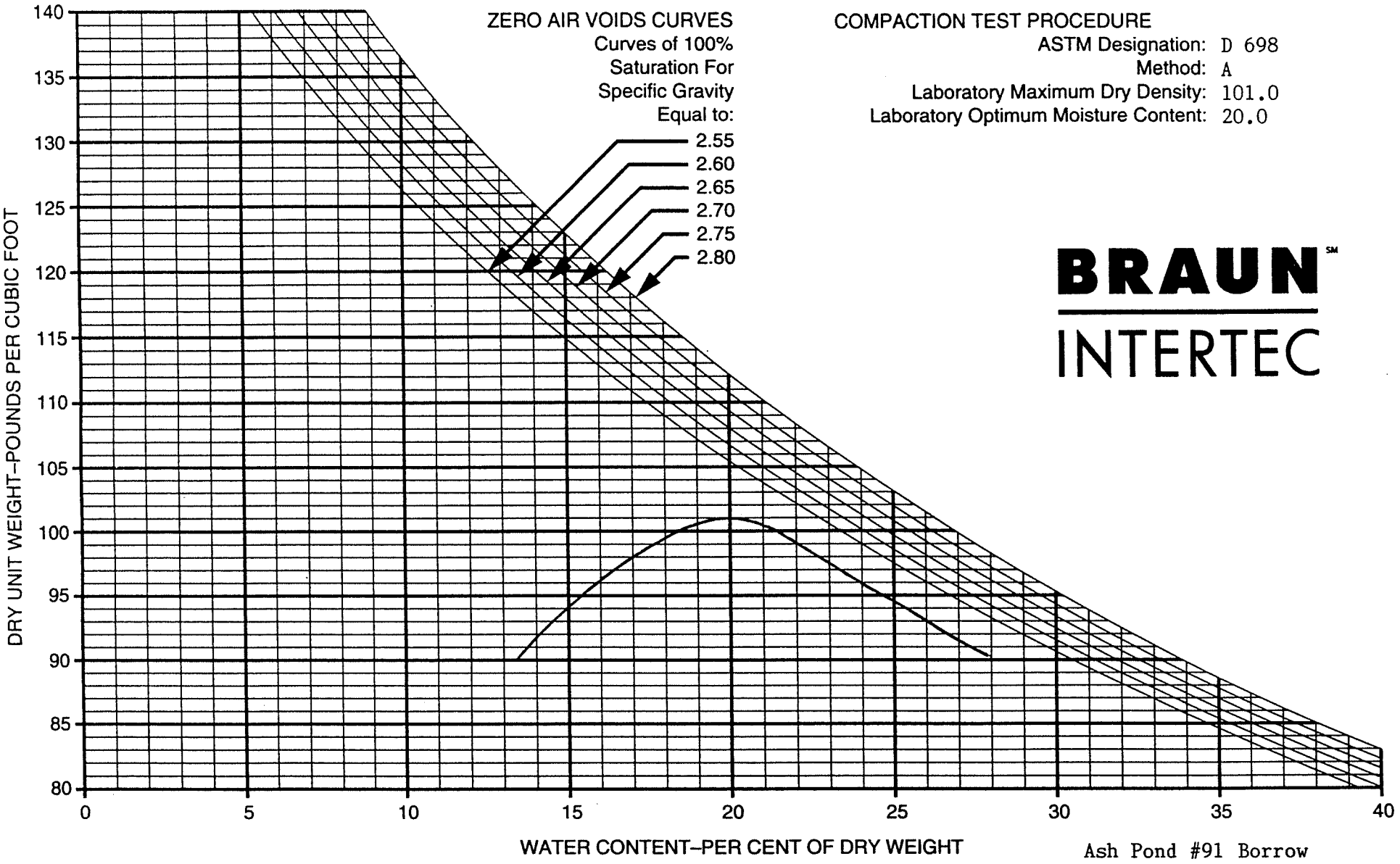
40603N 42028E

COMPACTION TEST

DRAWN BY: LL
CHECKED BY:
DATE: 6/8/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 101.0
Laboratory Optimum Moisture Content: 20.0

BRAUN℠ INTERTEC

Ash Pond #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-6	CC-381	1886.8	17	27	44	Sandy Lean Clay(CL), olive brown

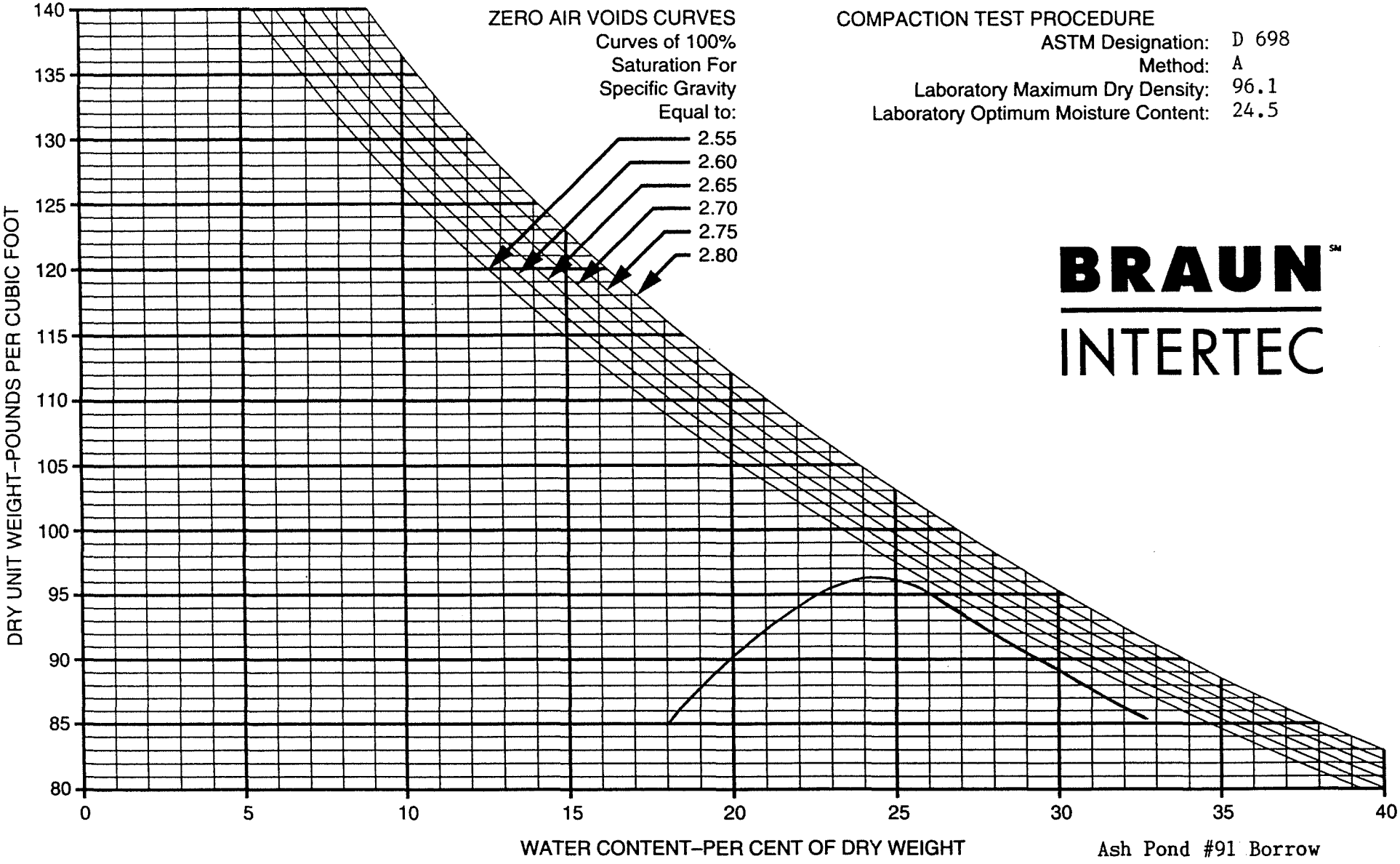
40603N 42028E

COMPACTION TEST

DRAWN BY: LL
CHECKED BY:
DATE: 6/15/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 96.1
Laboratory Optimum Moisture Content: 24.5

BRAUN INTERTEC

Ash Pond #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-7	CC-382	1884.3	18	28	46	Sandy Lean Clay (CL), olive brown

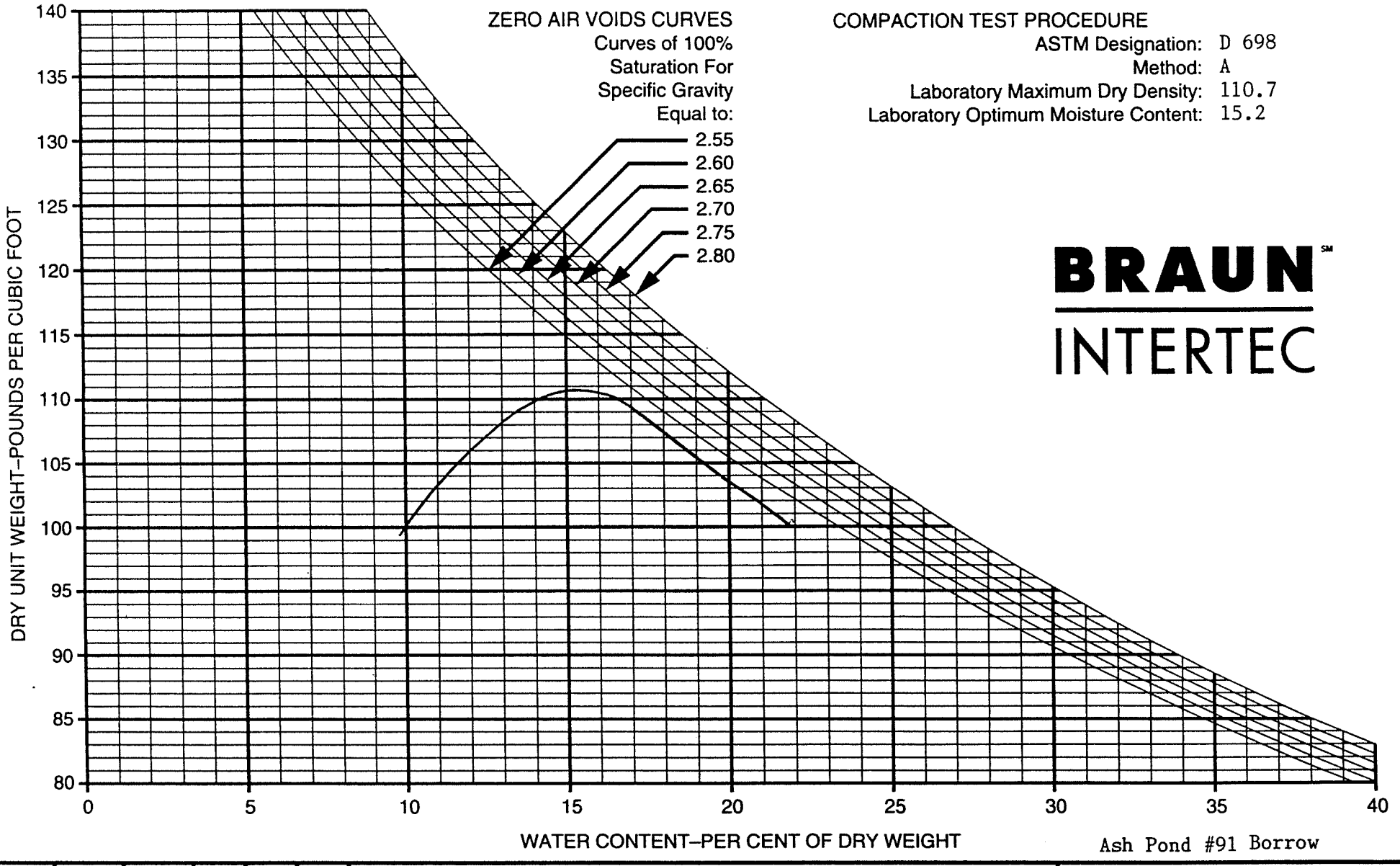
40721N 41910E

COMPACTION TEST

DRAWN BY: DS
CHECKED BY:
DATE: 6/14/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 110.7
Laboratory Optimum Moisture Content: 15.2

BRAUN INTERTEC

Ash Pond #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-7	CC-383	1884.3	14	23	37	Sandy Lean Clay (CL), olive brown

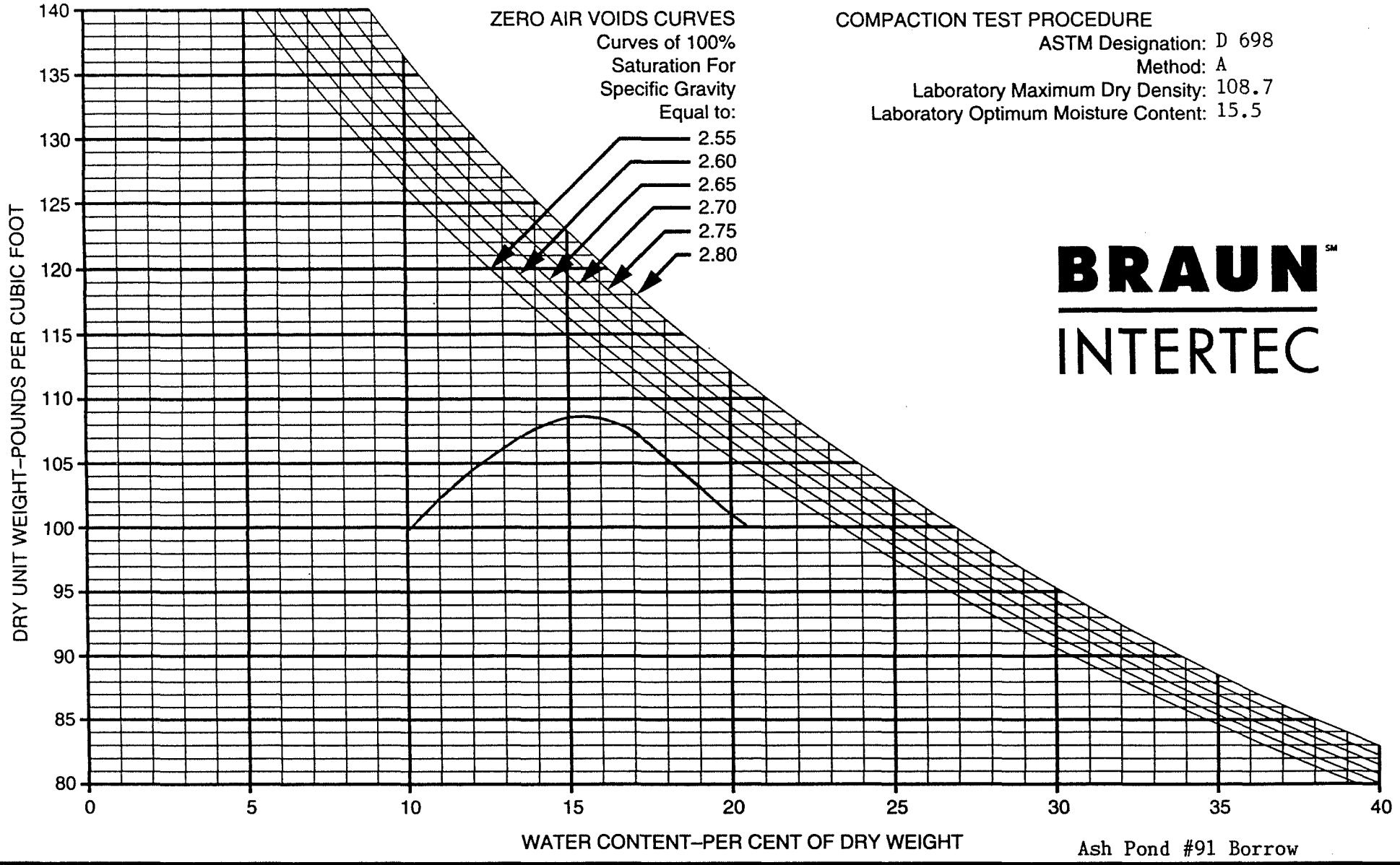
40721N 41910E

COMPACTION TEST

DRAWN BY: DS
CHECKED BY:
DATE: 6/14/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698

Method: A

Laboratory Maximum Dry Density: 108.7

Laboratory Optimum Moisture Content: 15.5

BRAUN INTERTEC

Ash Pond #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-8	OC-384	1884.5	13	30	43	Sandy Lean Clay (CL), olive brown

40812N 42063E

COMPACTION TEST

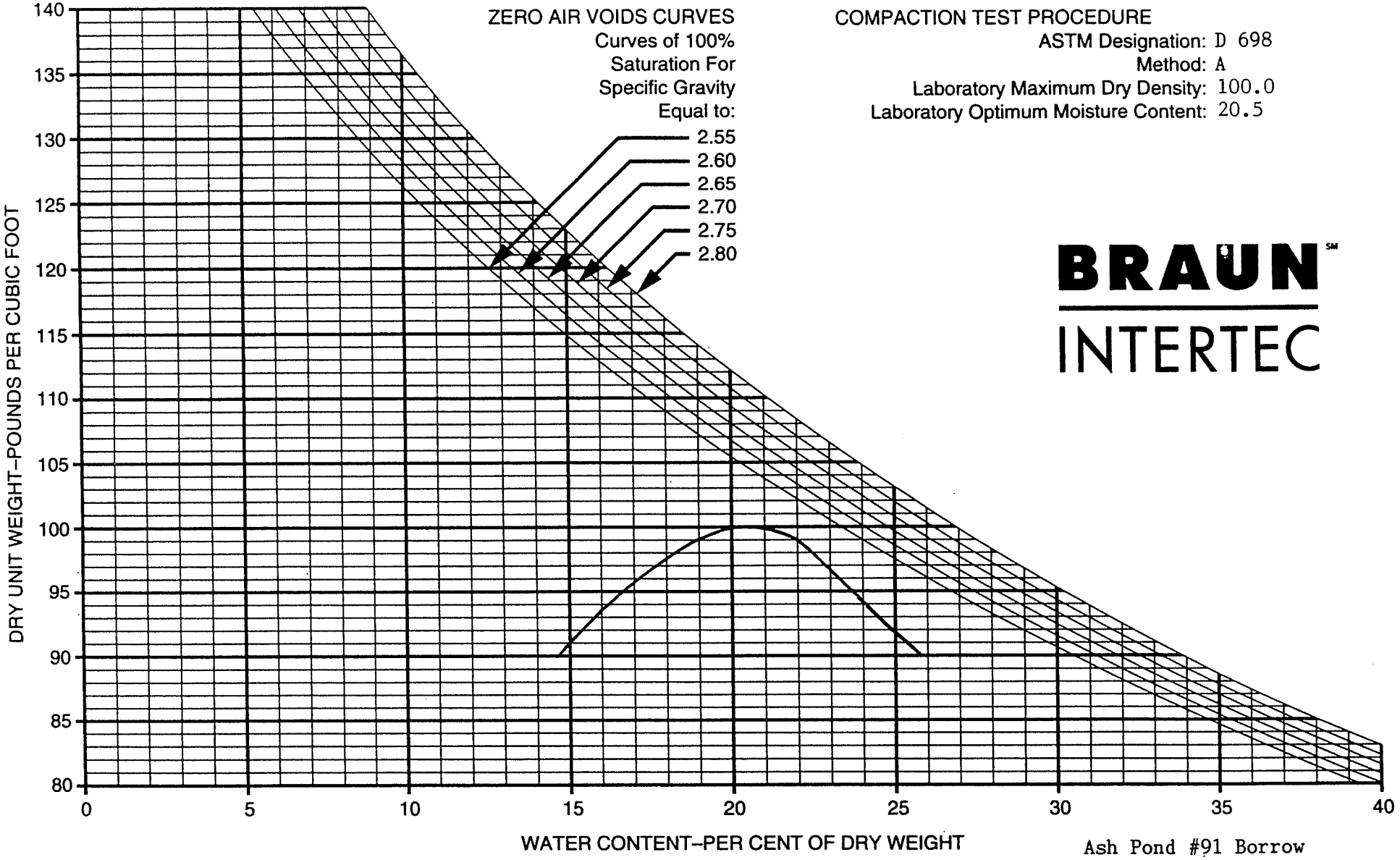
DRAWN BY: DS

CHECKED BY:

DATE: 6/14/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 100.0
Laboratory Optimum Moisture Content: 20.5

BRAUN INTERTEC

Ash Pond #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-9	CC-385	1881.3	16	28	44	Sandy Lean Clay (CL), grayish-brown

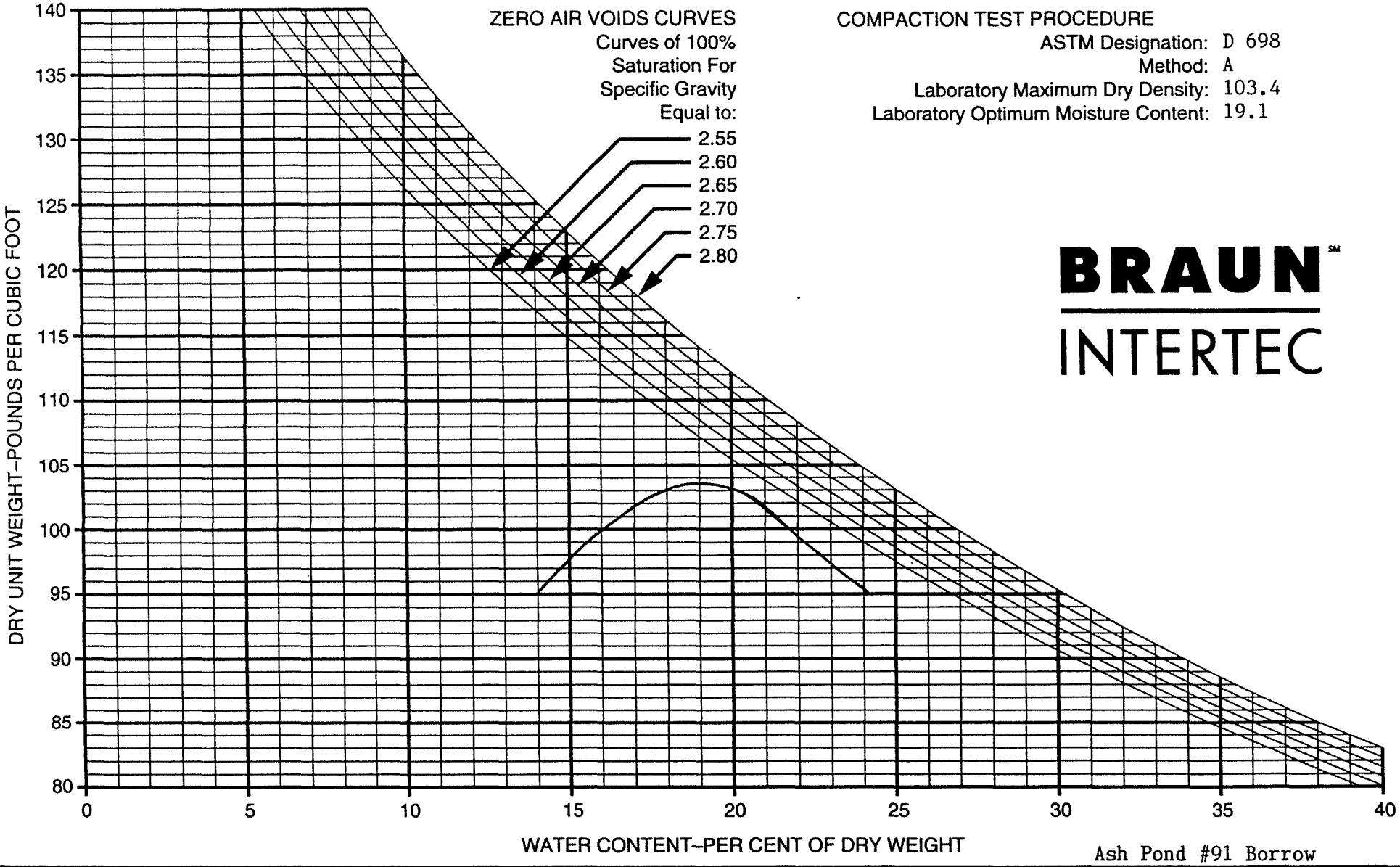
40726N 42291E

COMPACTION TEST

DRAWN BY: LL
CHECKED BY:
DATE: 6/10/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 103.4
Laboratory Optimum Moisture Content: 19.1

BRAUN INTERTEC

Ash Pond #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-10	CC-386	1885.6	13	28	41	Sandy Lean Clay (CL), olive brown

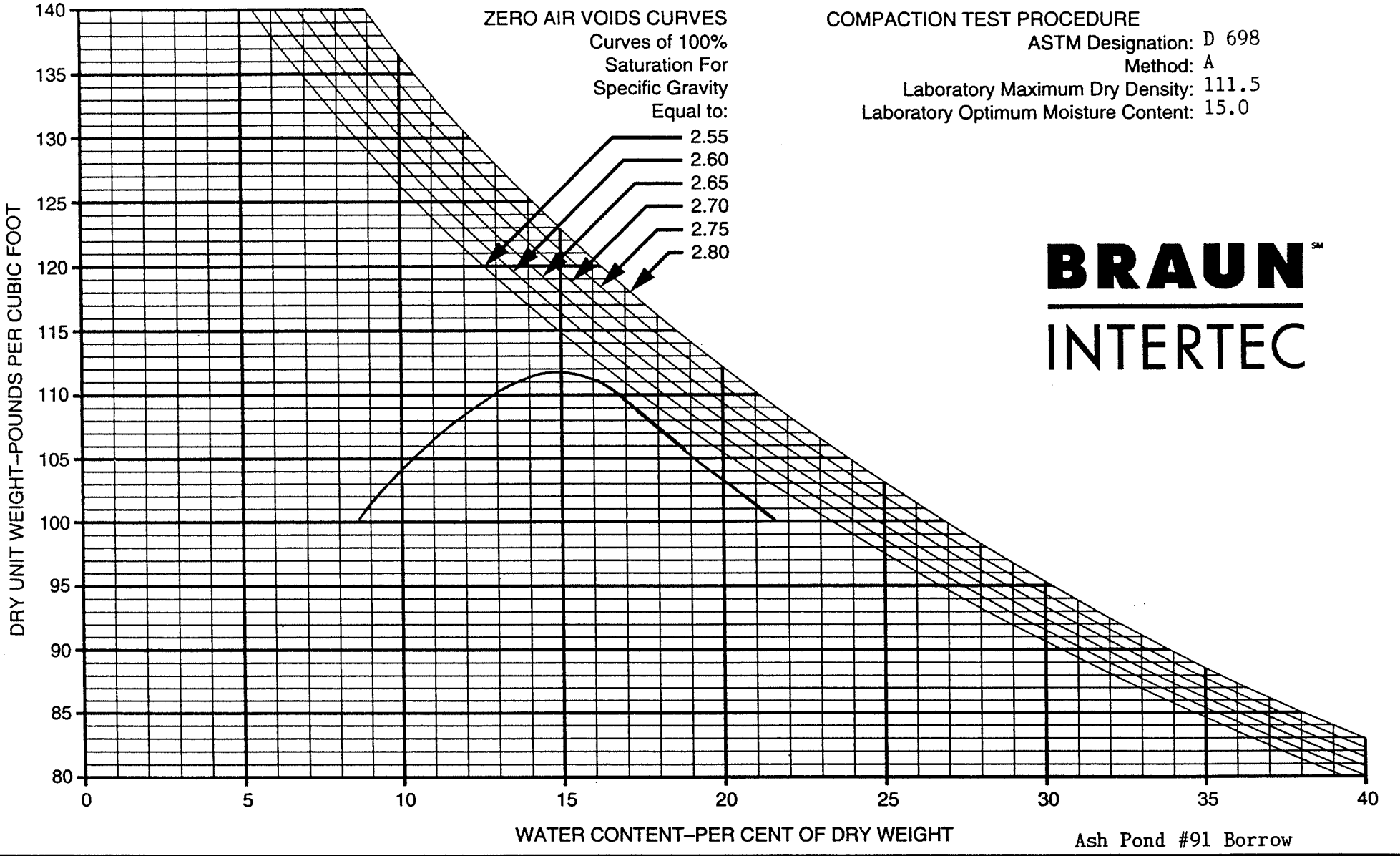
40614N 42334E

COMPACTION TEST

DRAWN BY: LL
CHECKED BY:
DATE: 6/10/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 111.5
Laboratory Optimum Moisture Content: 15.0

BRAUN INTERTEC

Ash Pond #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-11	CC-387	1885.7	12	21	33	Sandy Lean Clay (CL), grayish-brown

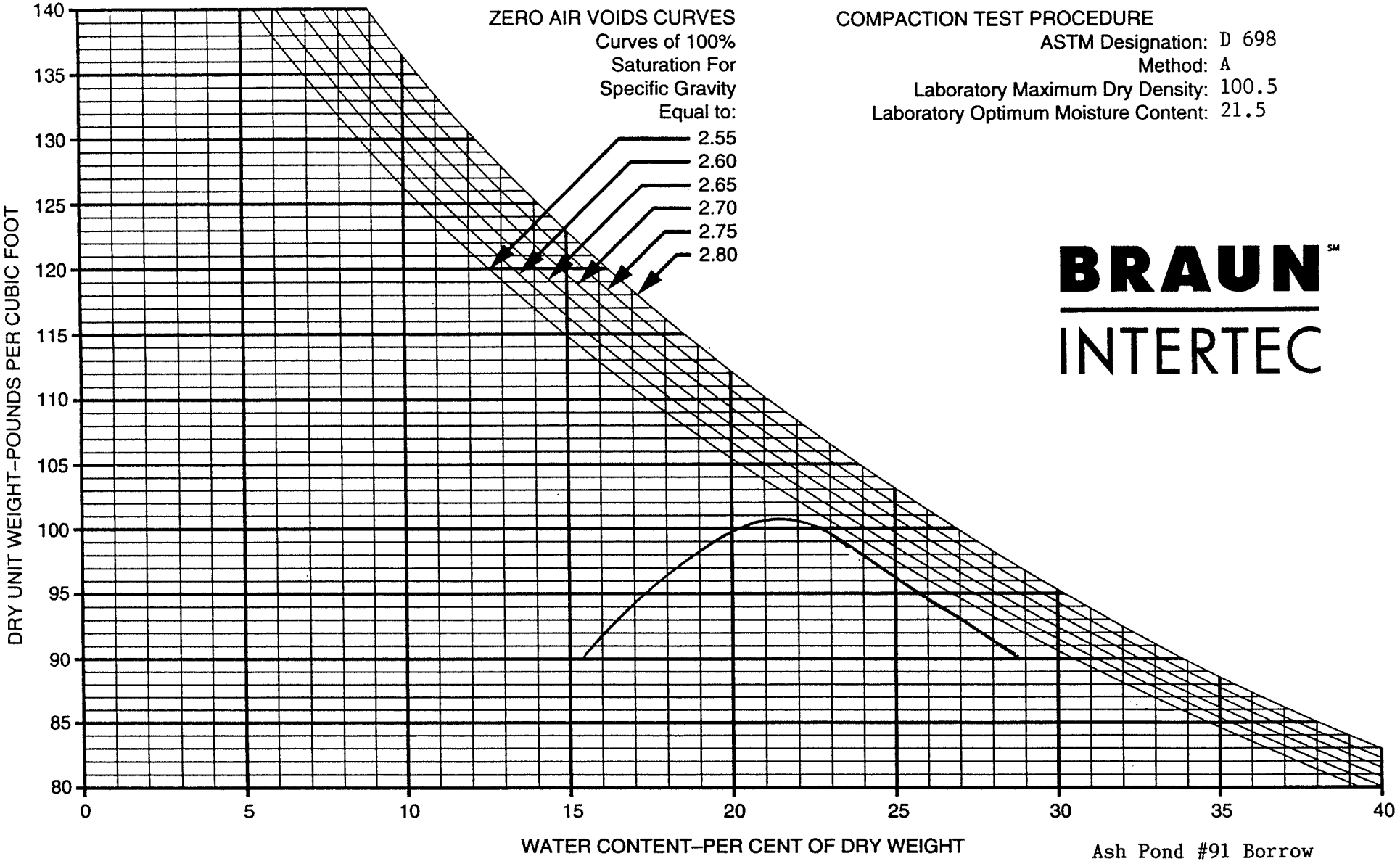
40477N 42446E

COMPACTION TEST

DRAWN BY: LL
CHECKED BY:
DATE: 6/10/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 100.5
Laboratory Optimum Moisture Content: 21.5

BRAUN INTERTEC

Ash Pond #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
TP-12	CC-388	1885	14	28	42	Sandy Lean Clay (CL), olive brown

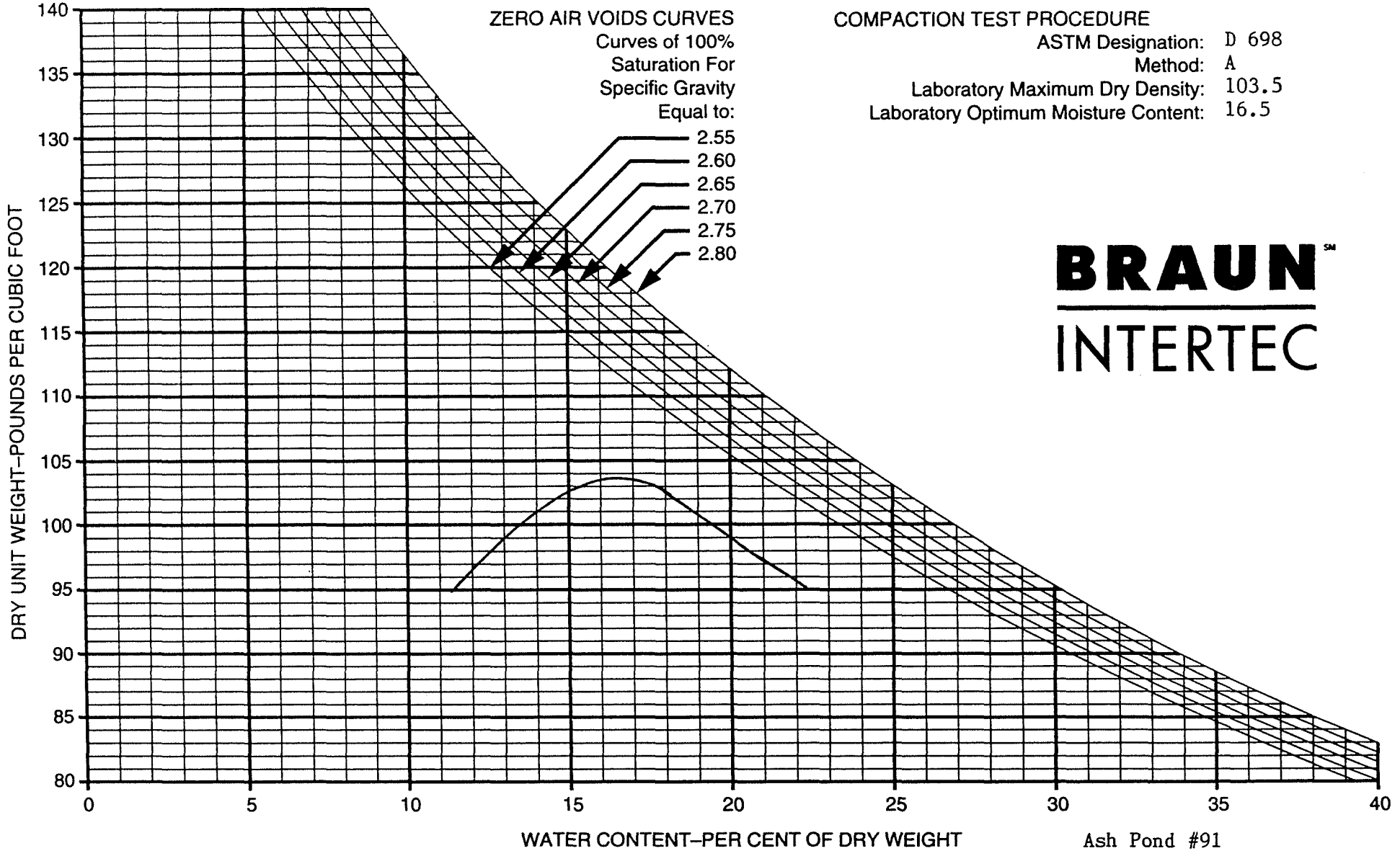
41005N 41979E

COMPACTION TEST

DRAWN BY: LL
CHECKED BY:
DATE: 6/10/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 103.5
Laboratory Optimum Moisture Content: 16.5

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CLB-CC -391	1905.1	15	26	41	Sandy Lean Clay (CL), dark grayish-brown

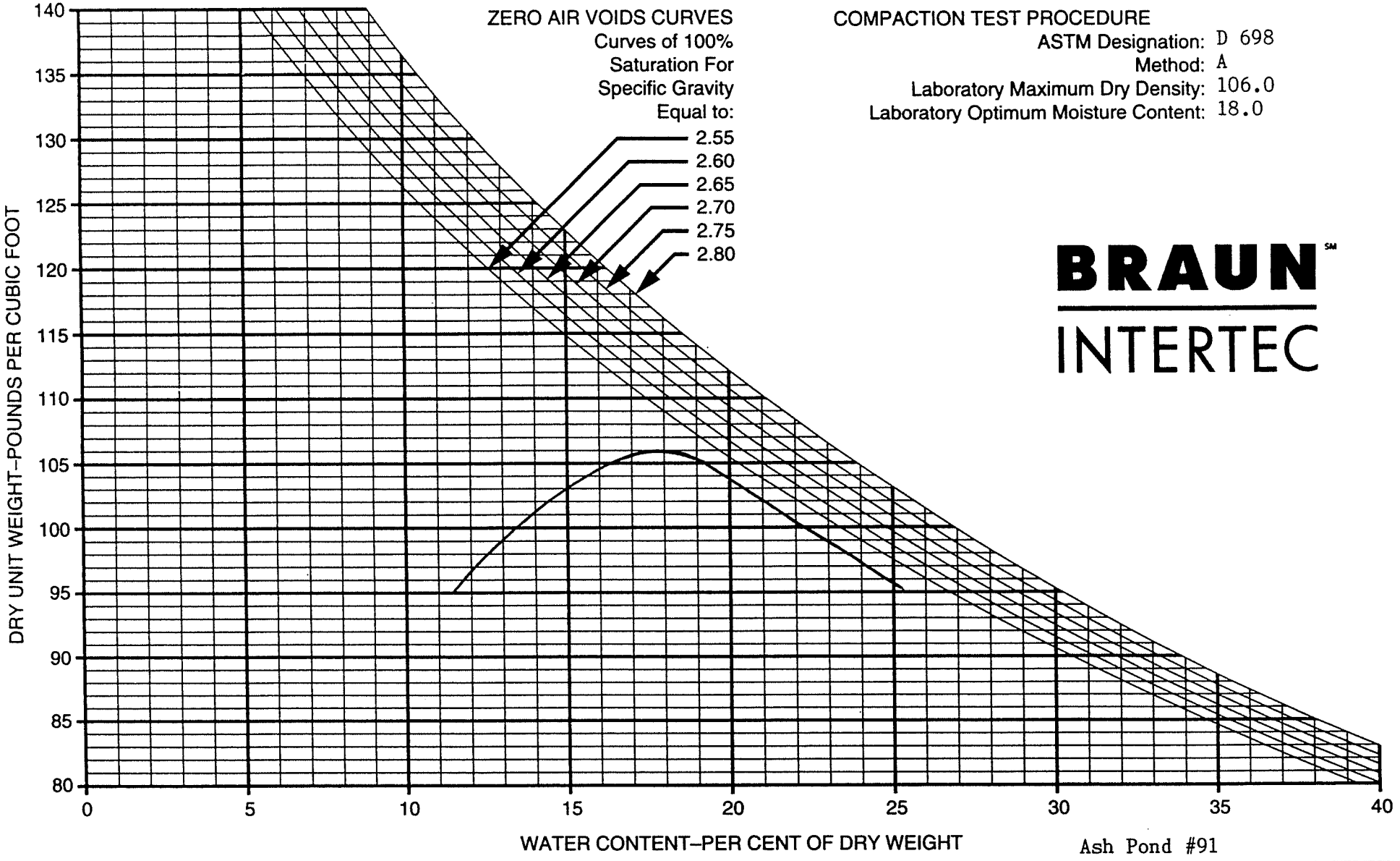
37347N 40652E

COMPACTION TEST

DRAWN BY: LL
CHECKED BY:
DATE: 6/15/93

JOB NO. BEDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 106.0
Laboratory Optimum Moisture Content: 18.0

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST-109	CLB-CC -393	1902.7	14	27	41	Sandy Lean Clay (CL), grayish-brown

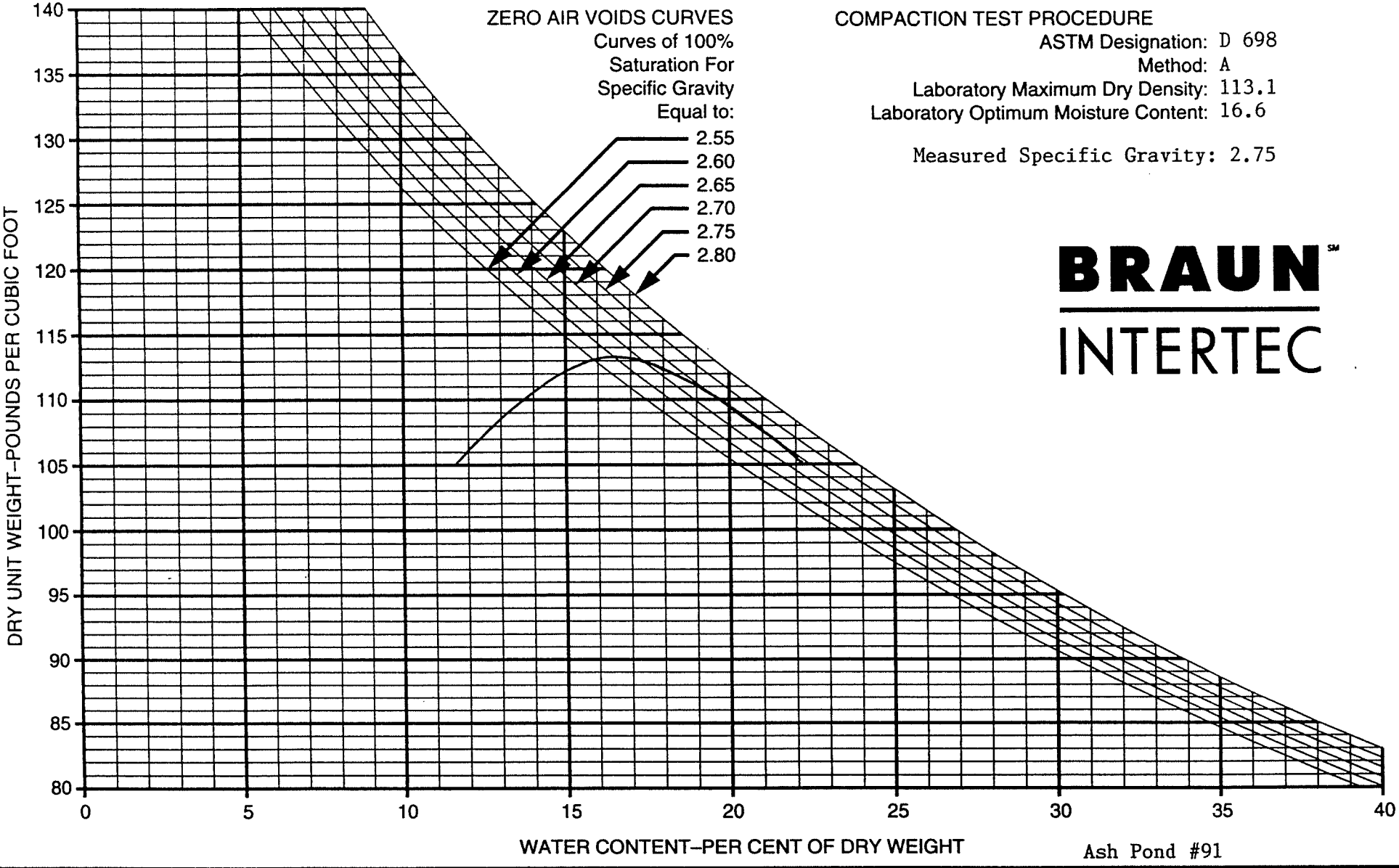
37412N 41139E

COMPACTION TEST

DRAWN BY: LL
CHECKED BY:
DATE: 6/15/93

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 113.1
Laboratory Optimum Moisture Content: 16.6

Measured Specific Gravity: 2.75

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CLS-CC-404	1914.5	14	29	43	Sandy Lean Clay (CL), dark grayish-brown

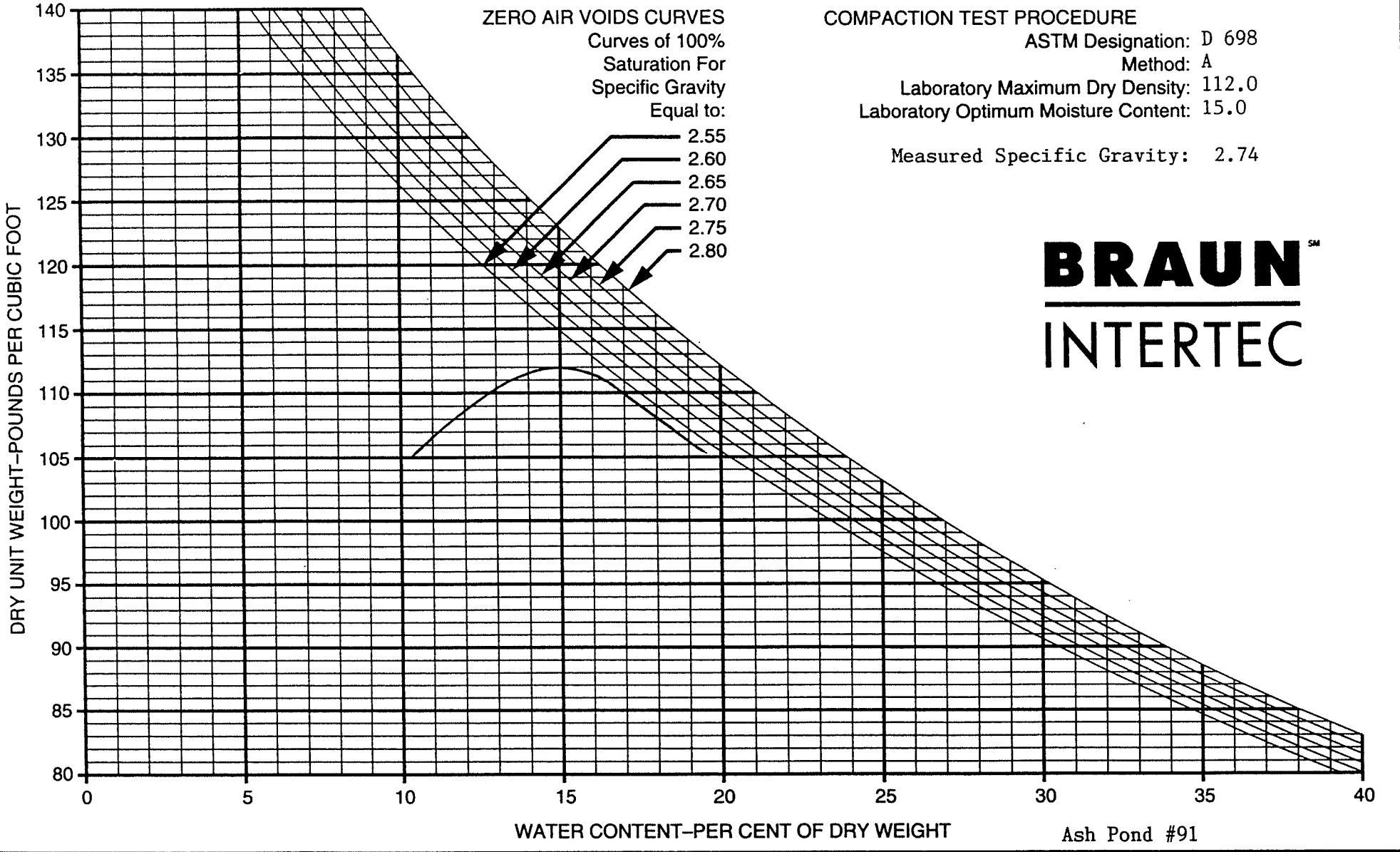
38808N 40243E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 112.0
Laboratory Optimum Moisture Content: 15.0

Measured Specific Gravity: 2.74

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CLS-CC-405	1916.4	13	26	39	Sandy Lean Clay (CL), dark grayish-brown

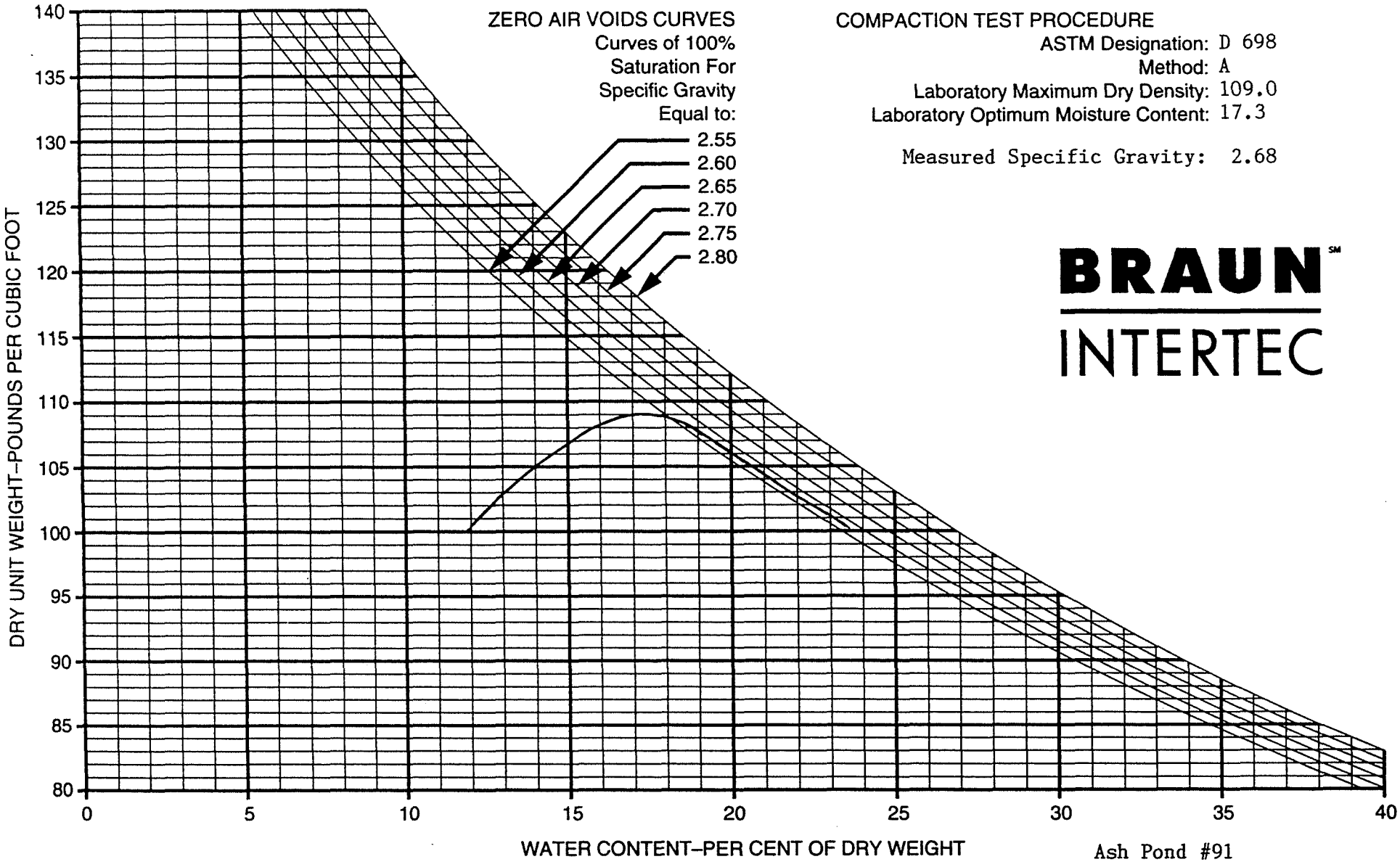
38811N 40064E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 109.0
Laboratory Optimum Moisture Content: 17.3

Measured Specific Gravity: 2.68

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CLS-CC-406	1915	13	27	40	Sandy Lean Clay (CL), dark grayish-brown

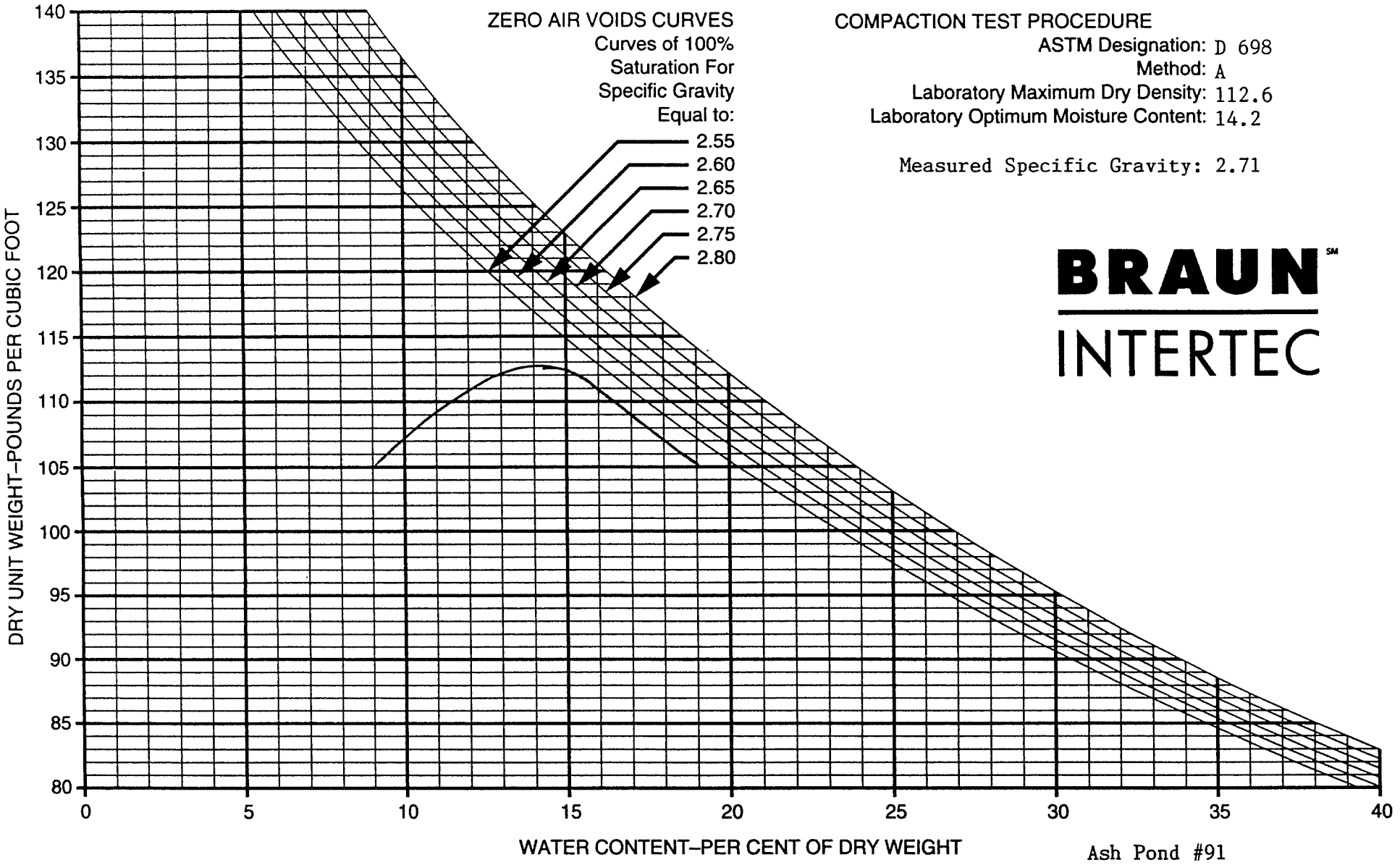
37795N 41567E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 112.6
Laboratory Optimum Moisture Content: 14.2

Measured Specific Gravity: 2.71

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CLS-CC-409	1917.8	14	31	45	Sandy Lean Clay (CL), dark grayish-brown

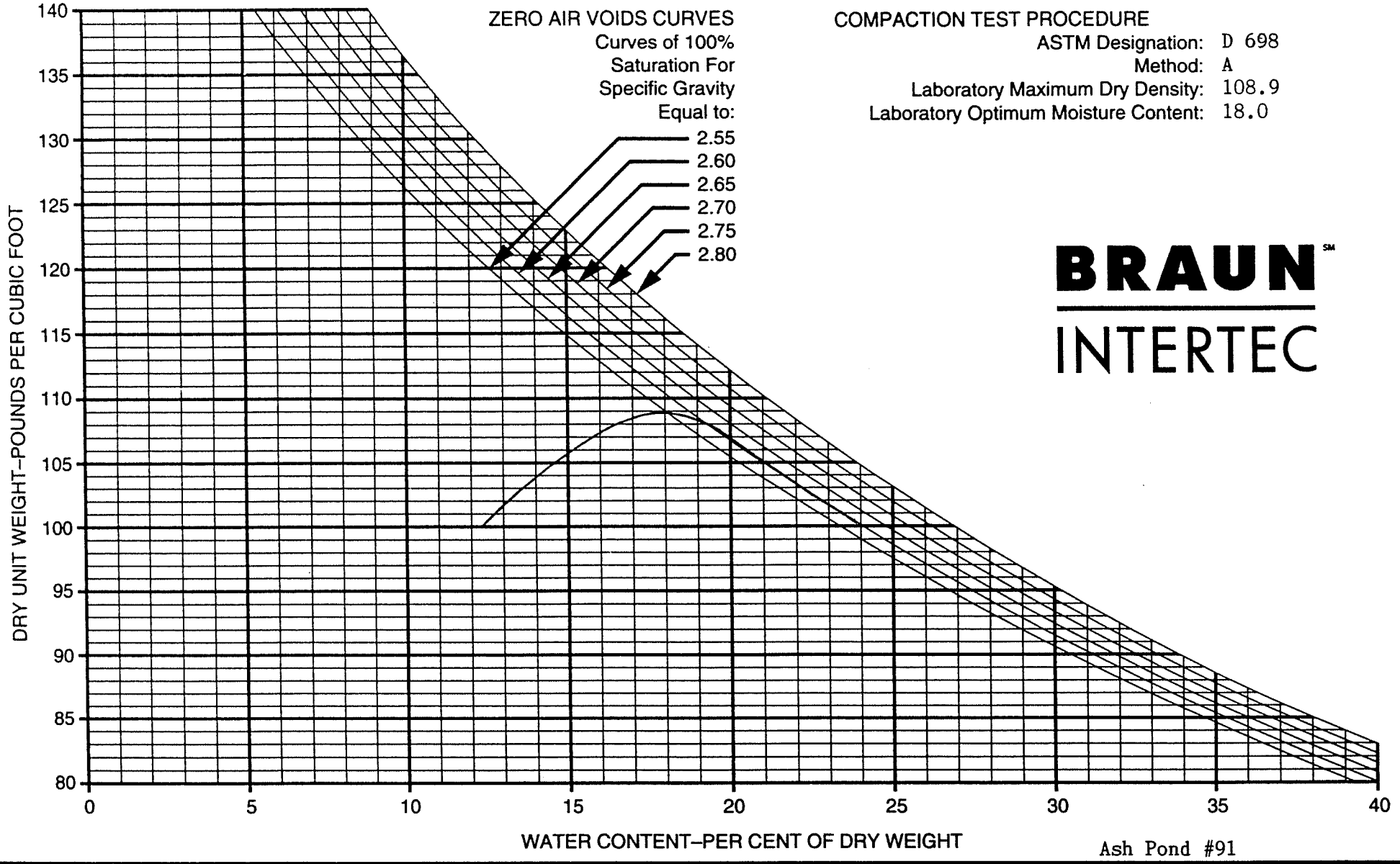
38815N 40373E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 108.9
Laboratory Optimum Moisture Content: 18.0

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CLB-CC -410	1980	14	26	40	Sandy Lean Clay(CL), olive brown

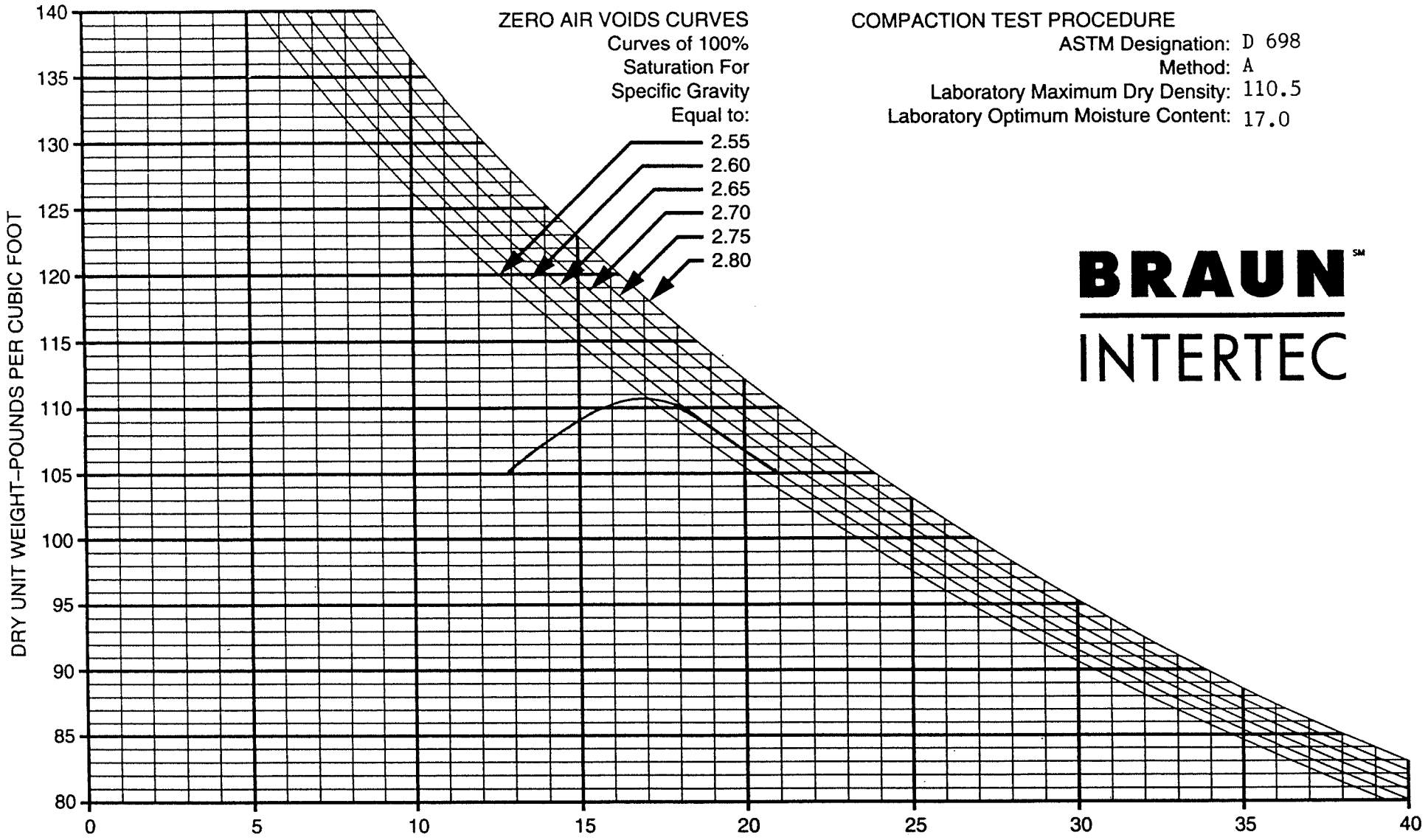
37163N 40533E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 110.5
Laboratory Optimum Moisture Content: 17.0

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST-127	CLB-CC -416	1904.5	14	26	40	Sandy Lean Clay (CL), olive brown

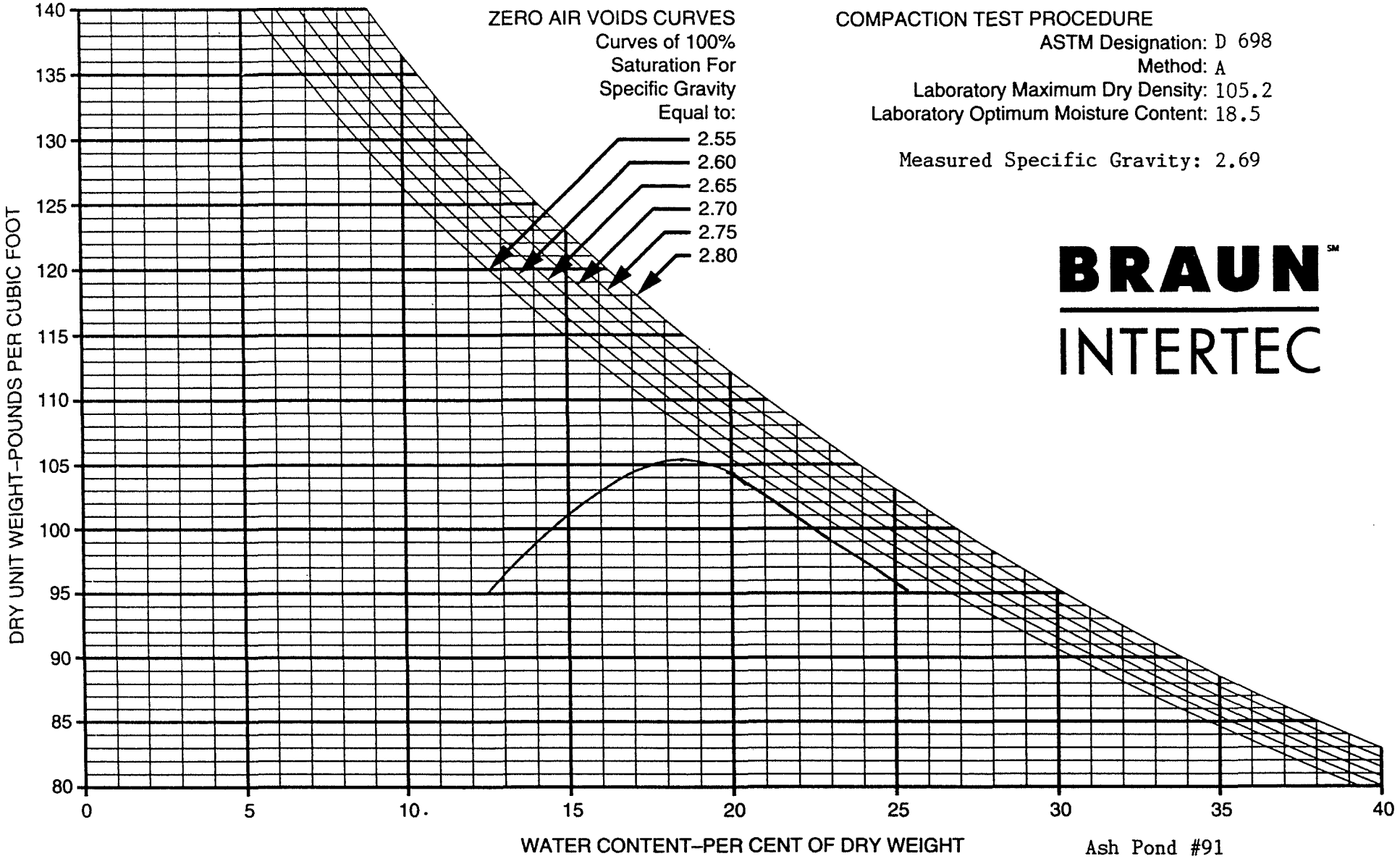
37438N 40932E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 105.2
Laboratory Optimum Moisture Content: 18.5

Measured Specific Gravity: 2.69

BRAUN SM
INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CLB-CC -421	1905.9	17	25	42	Sandy Lean Clay (CL), olive brown

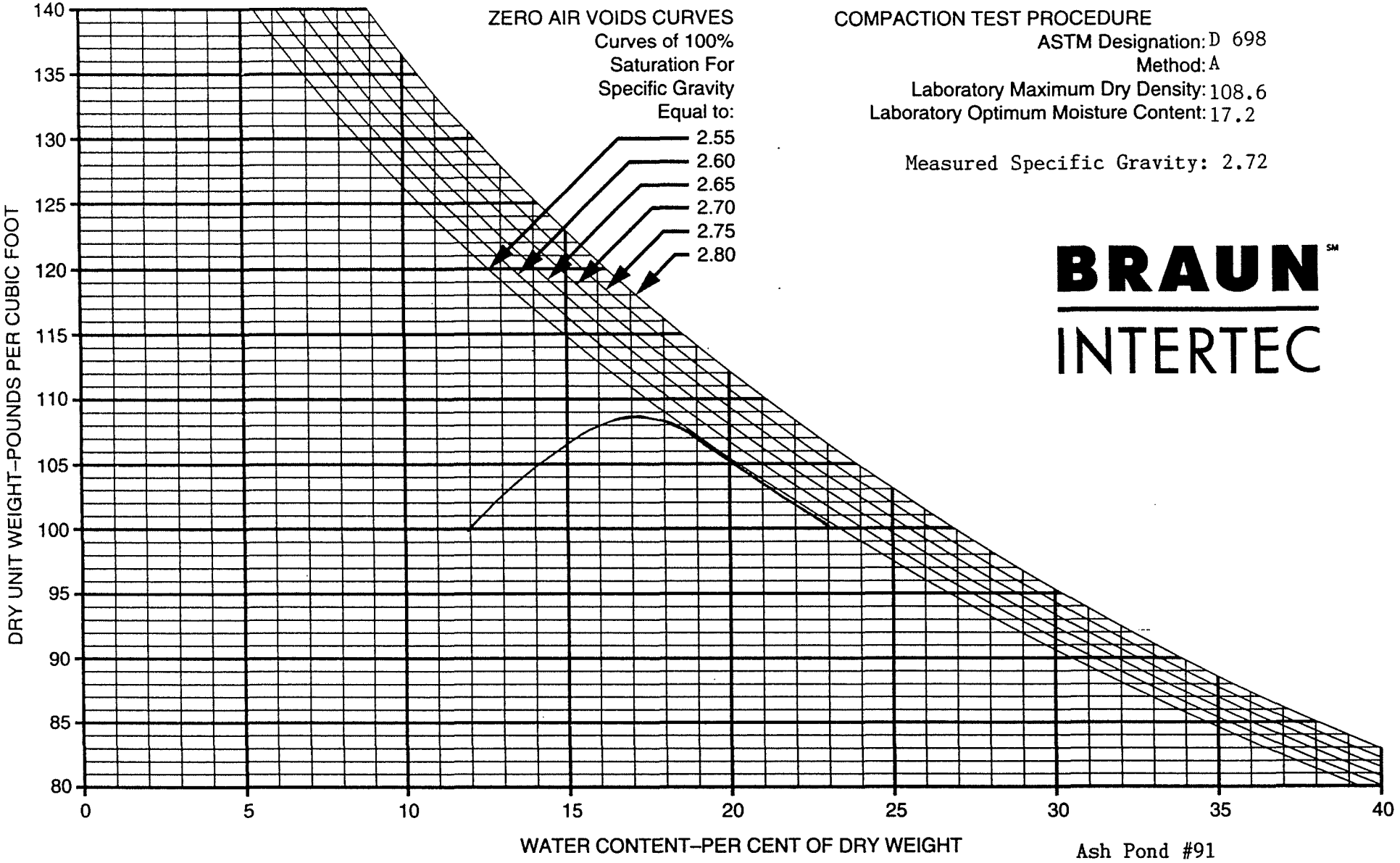
37805N 40212E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698

Method: A

Laboratory Maximum Dry Density: 108.6

Laboratory Optimum Moisture Content: 17.2

Measured Specific Gravity: 2.72

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CLB-CC -422	1906.5	15	27	42	Sandy Lean Clay (CL), olive brown

37953N 39969E

COMPACTION TEST

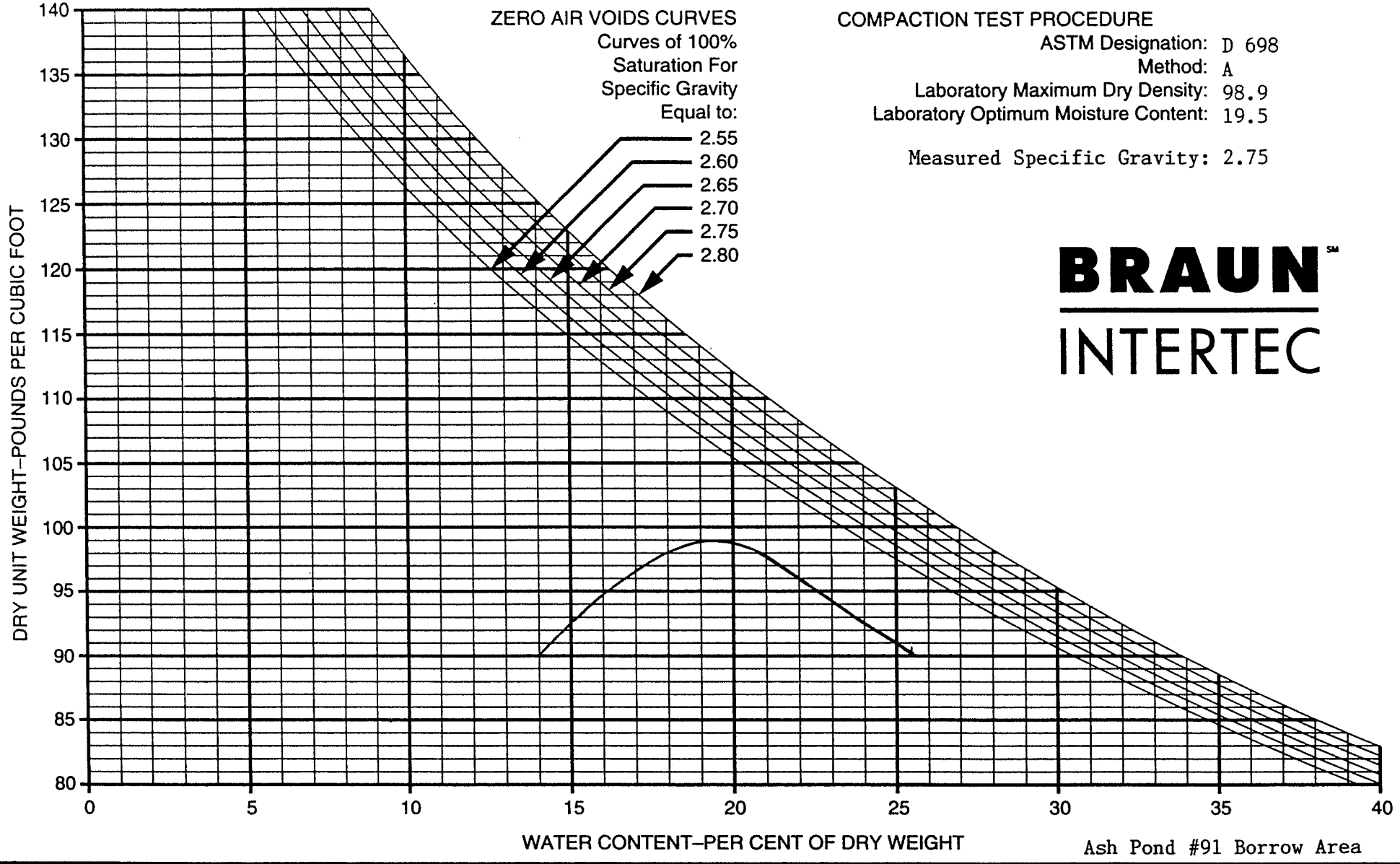
DRAWN BY:

CHECKED BY:

DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 98.9
Laboratory Optimum Moisture Content: 19.5

Measured Specific Gravity: 2.75

BRAUN INTERTEC

Ash Pond #91 Borrow Area

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CLB-CC -426	N/A	17	30	47	Sandy Lean Clay (CL), olive brown

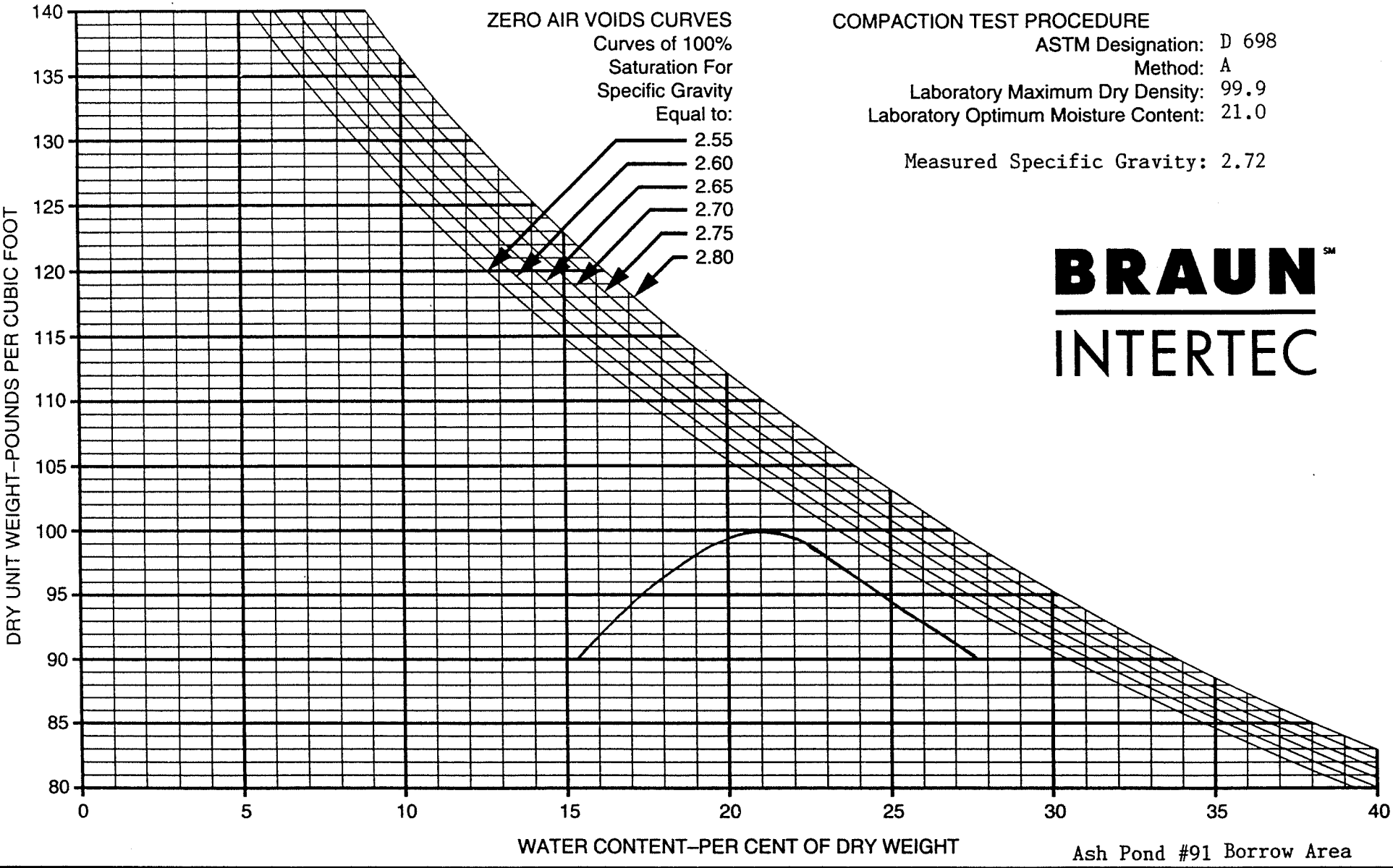
38150N 40200E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 99.9
Laboratory Optimum Moisture Content: 21.0

Measured Specific Gravity: 2.72

BRAUN INTERTEC

Ash Pond #91 Borrow Area

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CLB-CC 427	N/A	16	29	45	Sandy Lean Clay (CL), dark grayish-brown

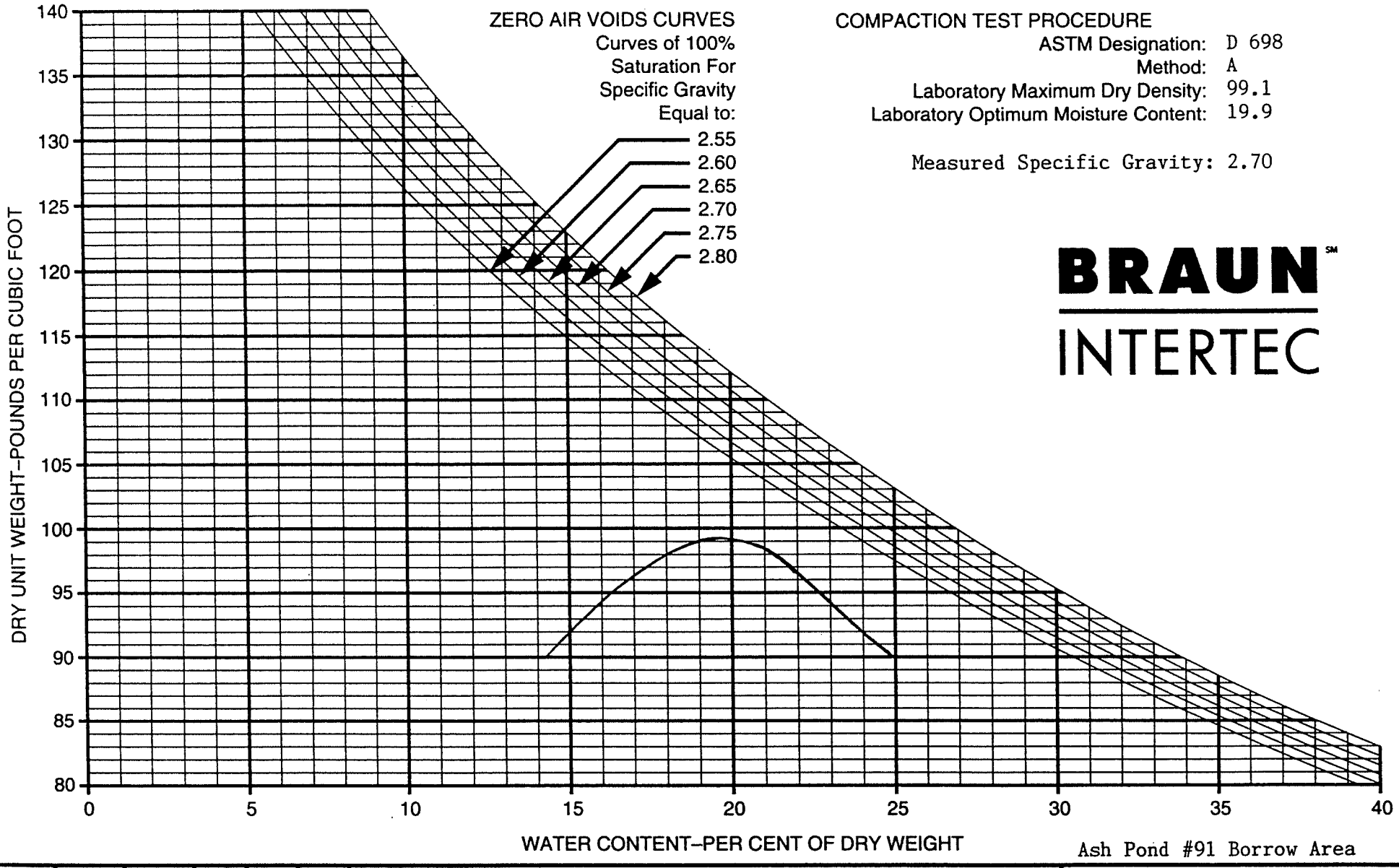
38000N 40100E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 99.1
Laboratory Optimum Moisture Content: 19.9

Measured Specific Gravity: 2.70

BRAUN INTERTEC

Ash Pond #91 Borrow Area

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CLB-CC-428	N/A	18	27	45	Sandy Lean Clay (CL), dark grayish-brown

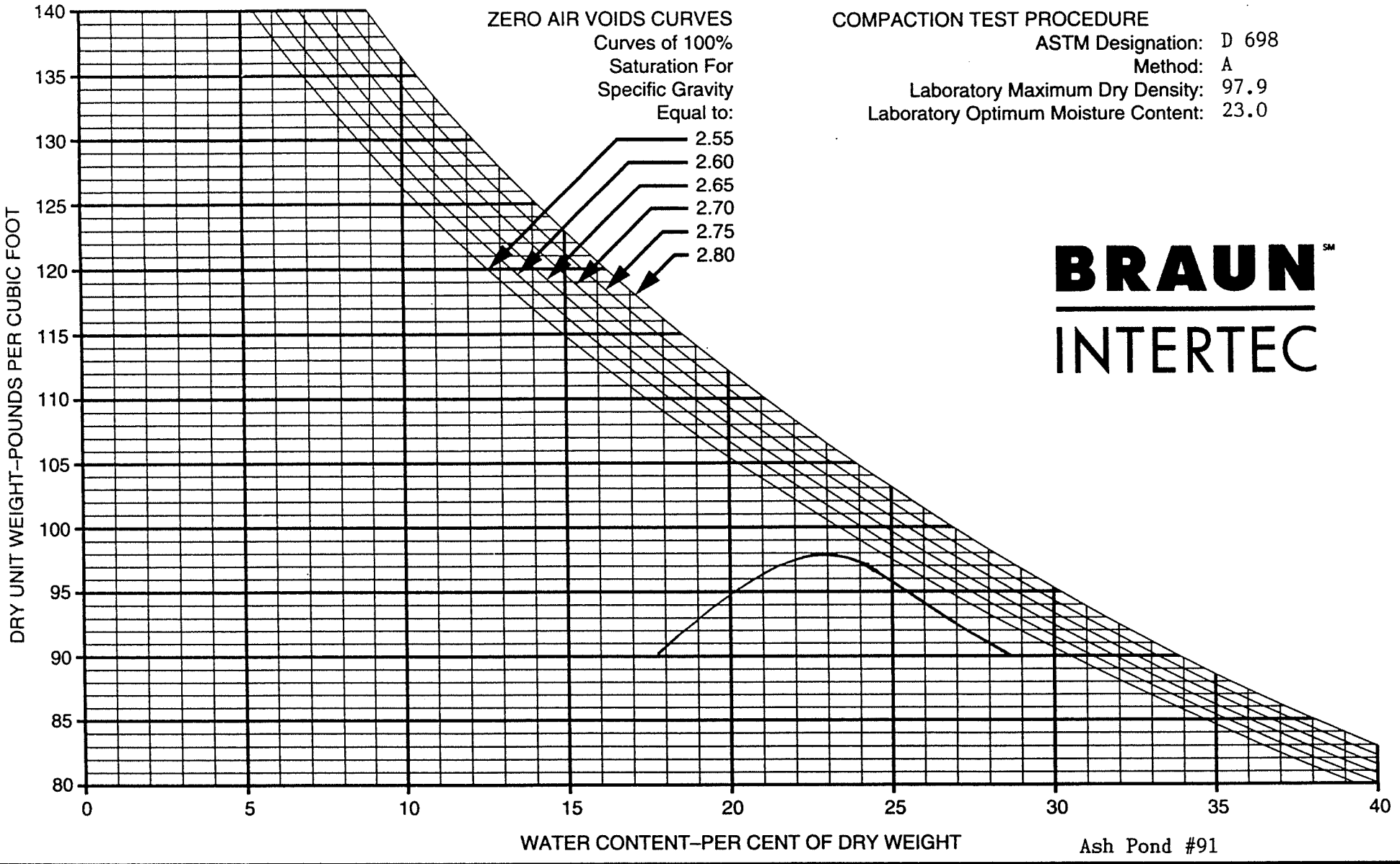
38100N 40400E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 97.9
Laboratory Optimum Moisture Content: 23.0

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CLB-CC-429	1903.4	17	29	46	Lean Clay with Sand (CL), dark grayish-brown

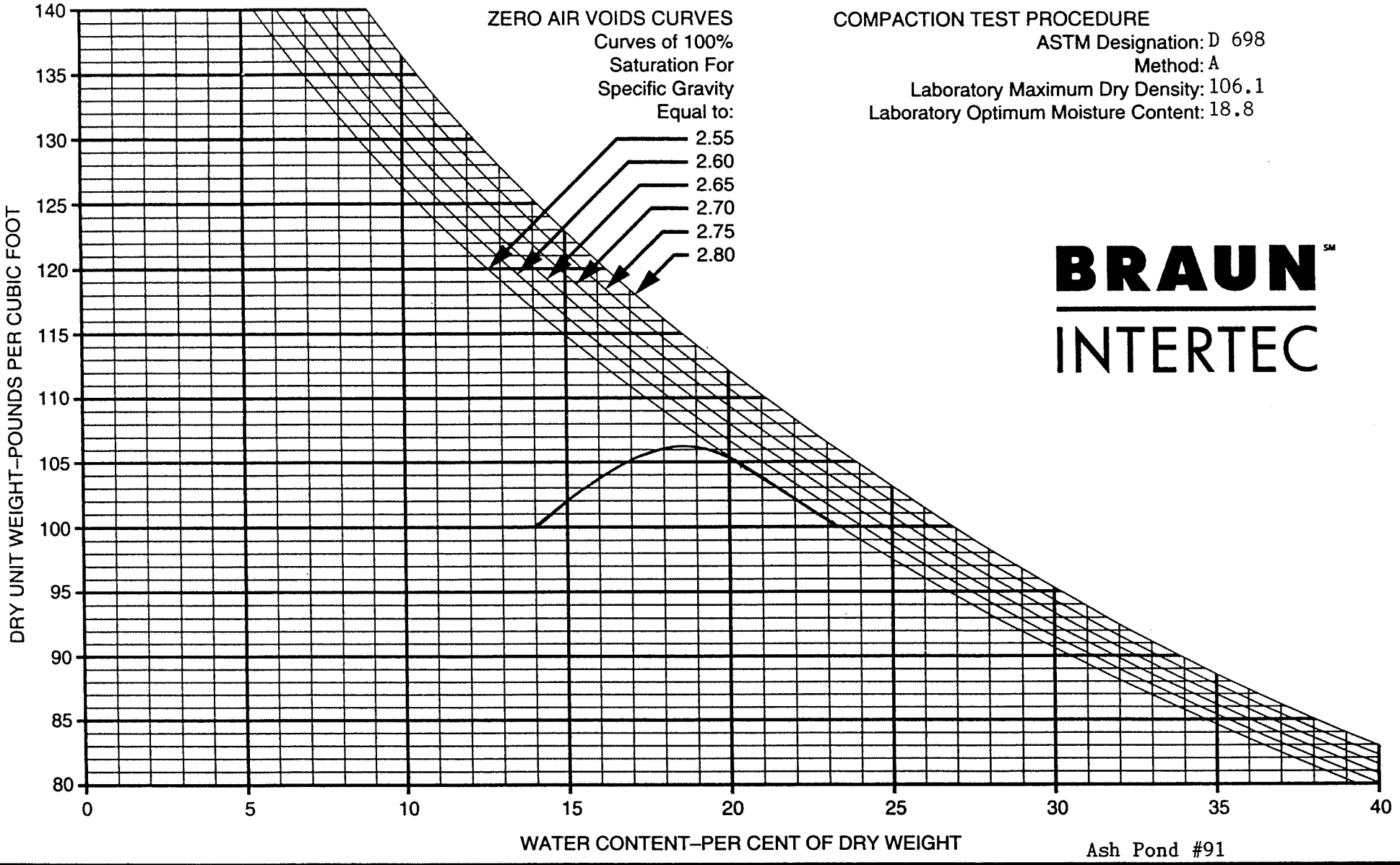
38252N 40086E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698

Method: A

Laboratory Maximum Dry Density: 106.1

Laboratory Optimum Moisture Content: 18.8

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST-132	CLB-CC -430	1901.1	15	26	41	Sandy Lean Clay (CL), olive brown

37995N 40833E

COMPACTION TEST

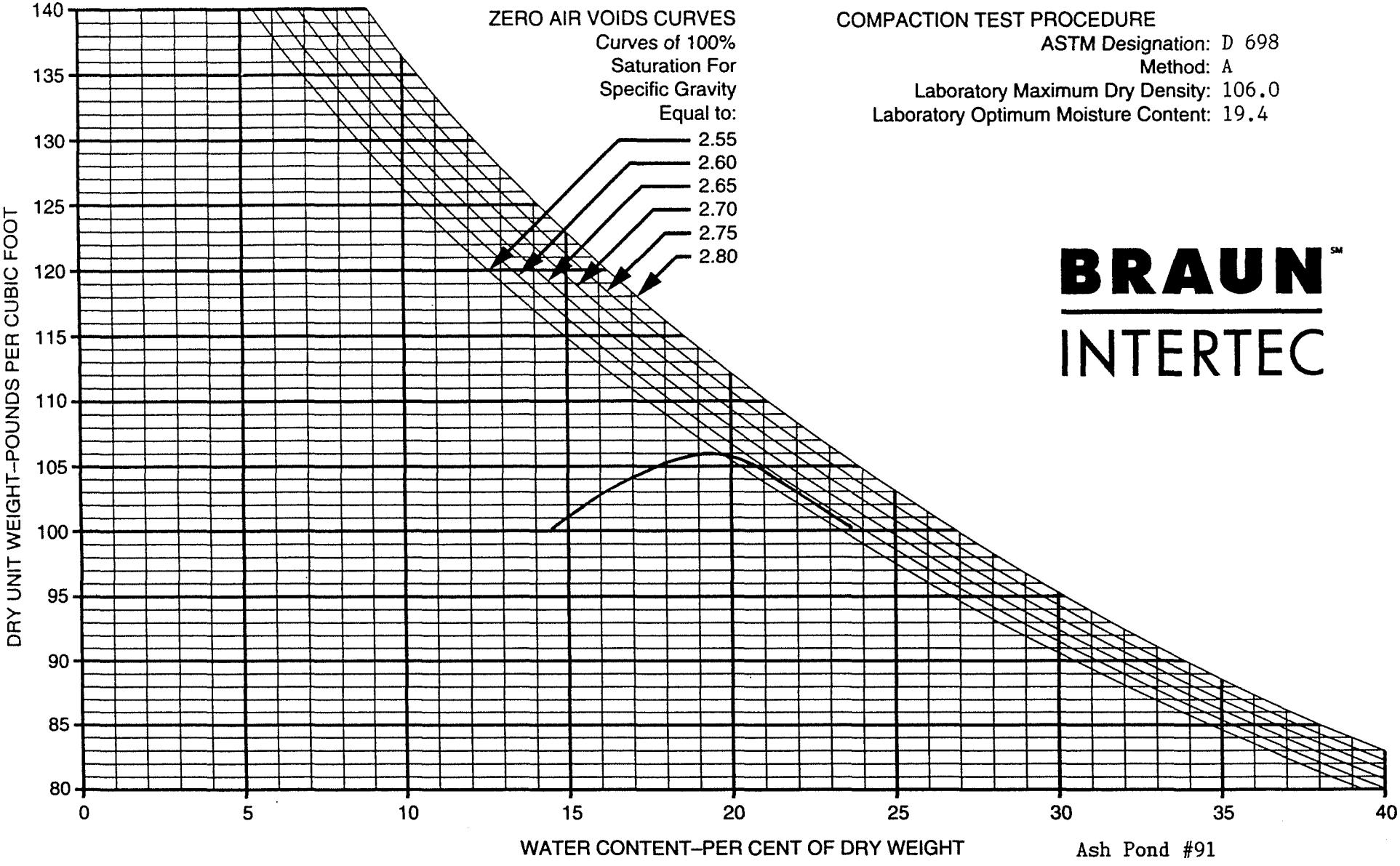
DRAWN BY:

CHECKED BY:

DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 106.0
Laboratory Optimum Moisture Content: 19.4

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST-142	CLB-CC -440	1901.3	16	32	48	Sandy Lean Clay (CL), grayish-brown

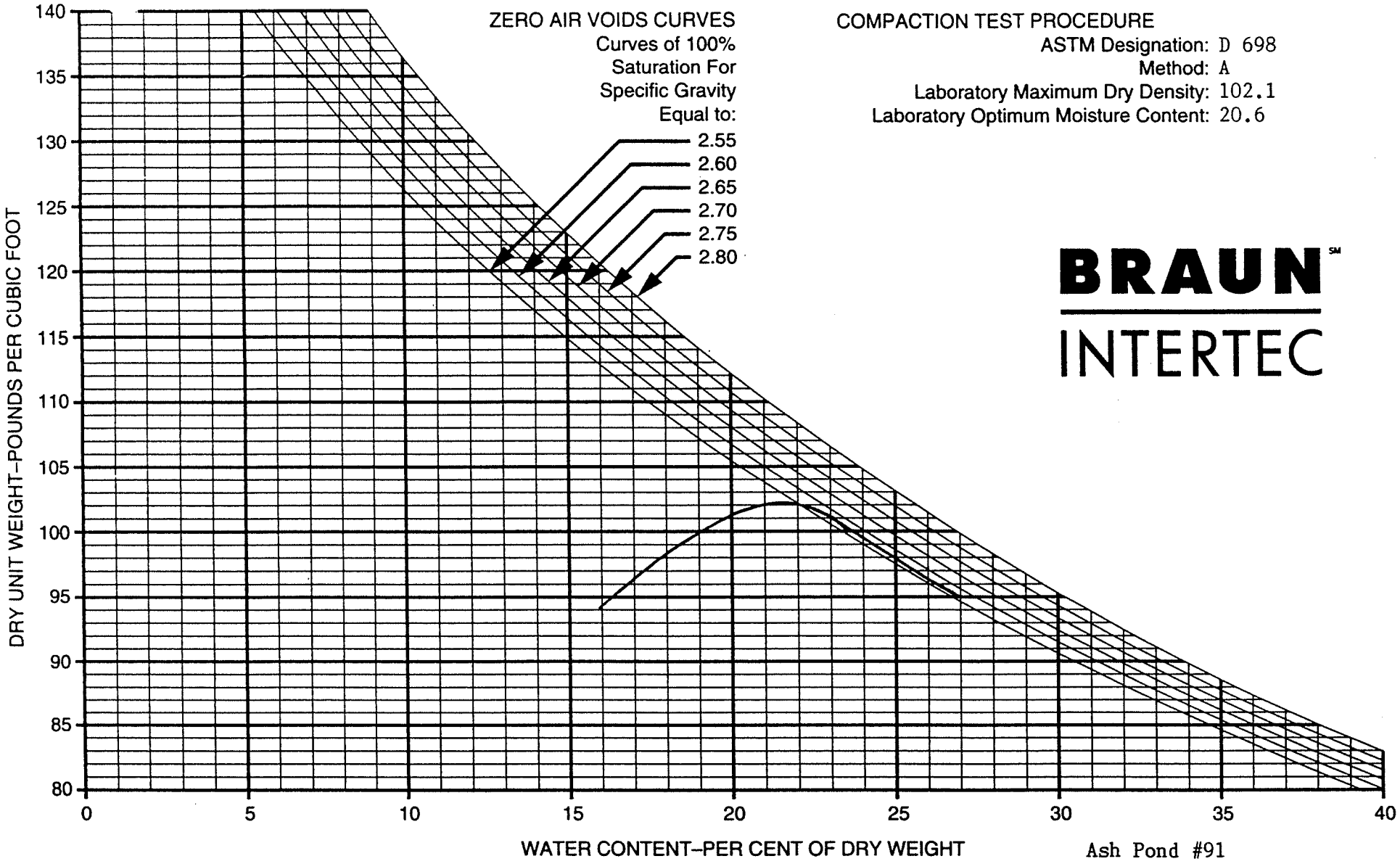
38288N 40543E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 102.1
Laboratory Optimum Moisture Content: 20.6

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST-147	CLB-CC -445	1901	17	27	44	Sandy Lean Clay (CL), olive brown

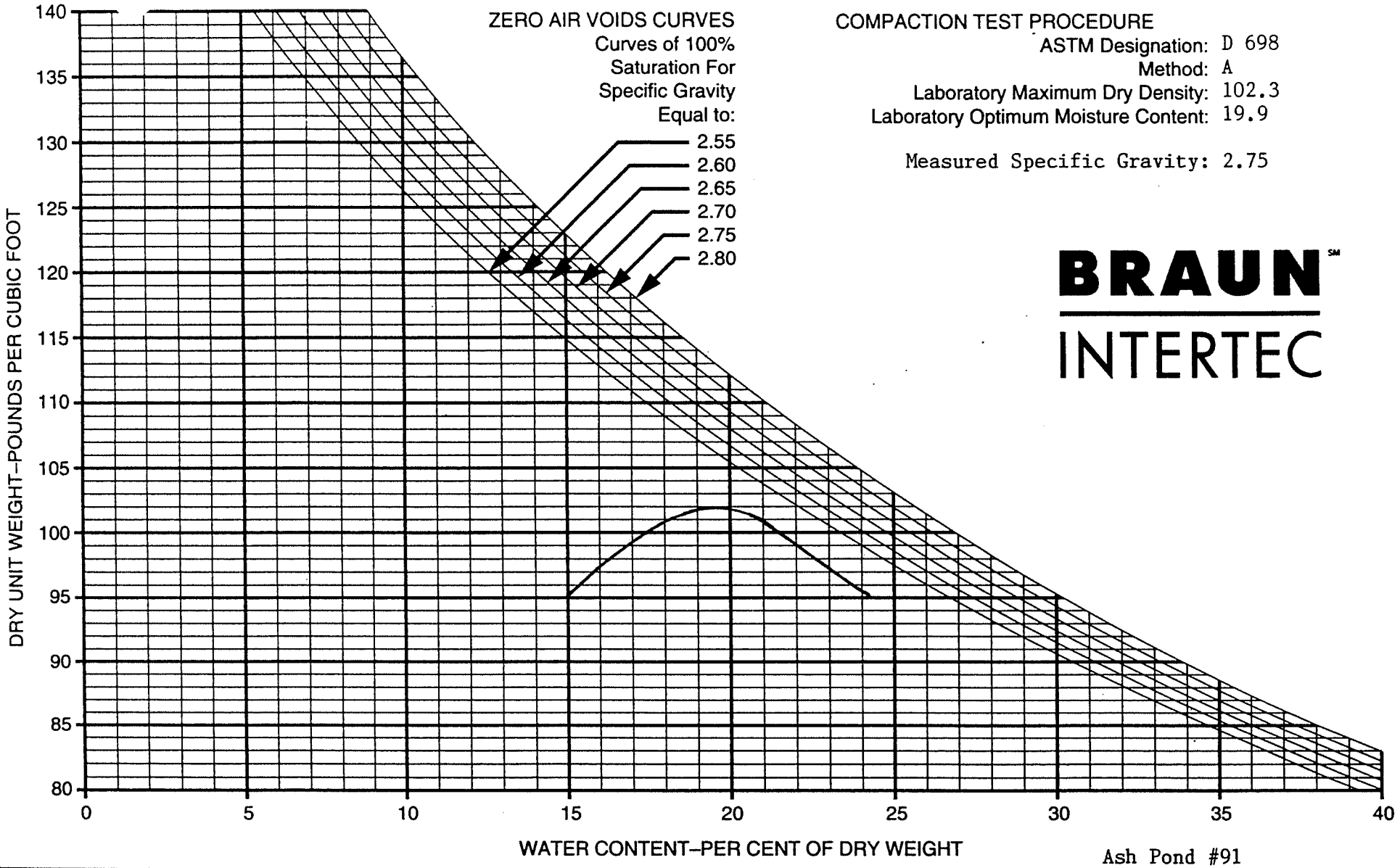
37700N 41169E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 102.3
Laboratory Optimum Moisture Content: 19.9

Measured Specific Gravity: 2.75

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CLB-CC-452	1902.8	17	28	45	Sandy Lean Clay (CL), dark grayish-brown

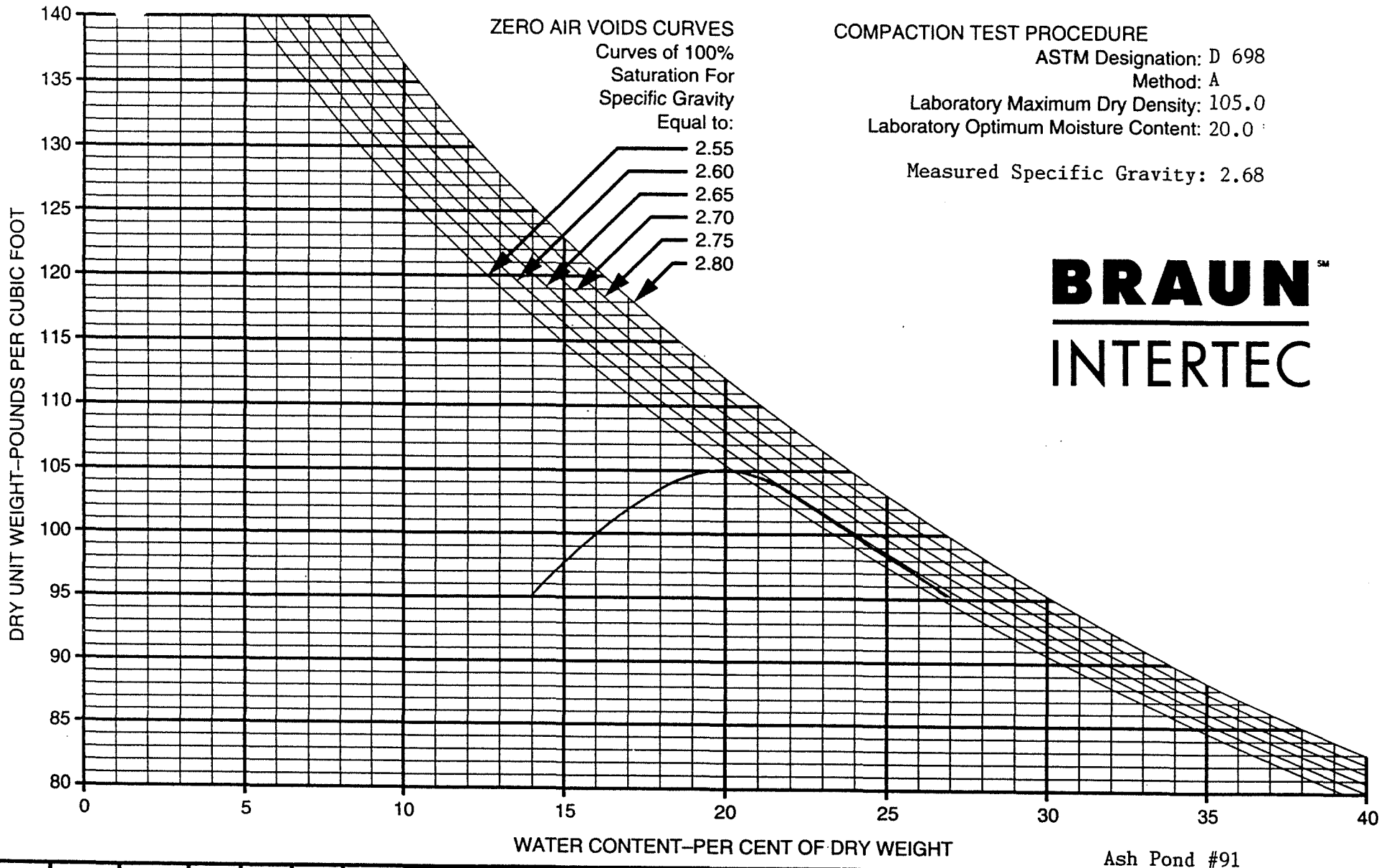
37735N 40921E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 105.0
Laboratory Optimum Moisture Content: 20.0

Measured Specific Gravity: 2.68

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST-160	CLE-CC -459	1903.6	17	29	46	Sandy Lean Clay (CL), very dark grayish-brown

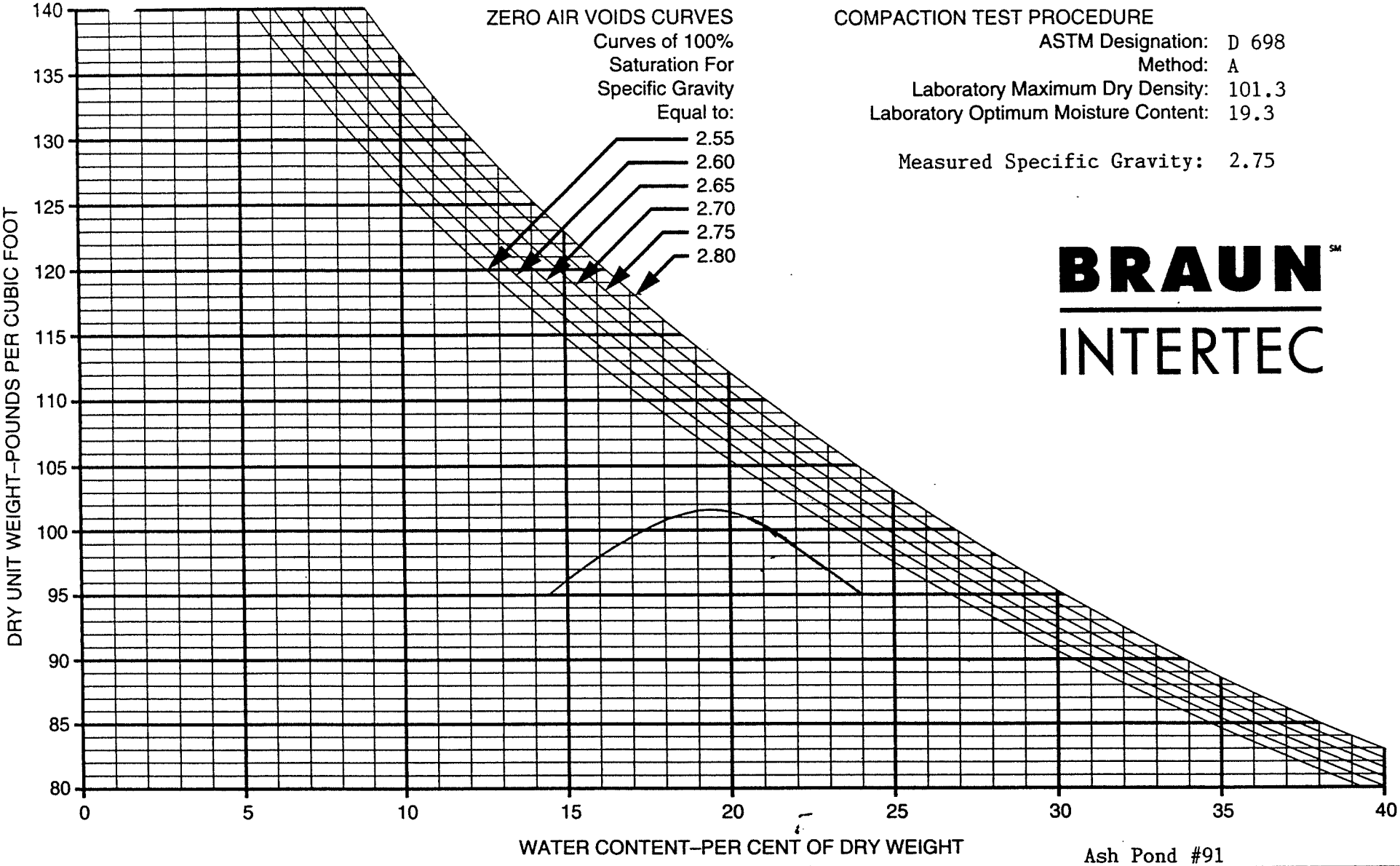
38184N 40402E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation:	D 698
Method:	A
Laboratory Maximum Dry Density:	101.3
Laboratory Optimum Moisture Content:	19.3
Measured Specific Gravity:	2.75

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST-165	CLB-CC -464	1904.4	17	28	45	Sandy Lean Clay (CL), dark grayish-brown

38369N 40060E

COMPACTION TEST

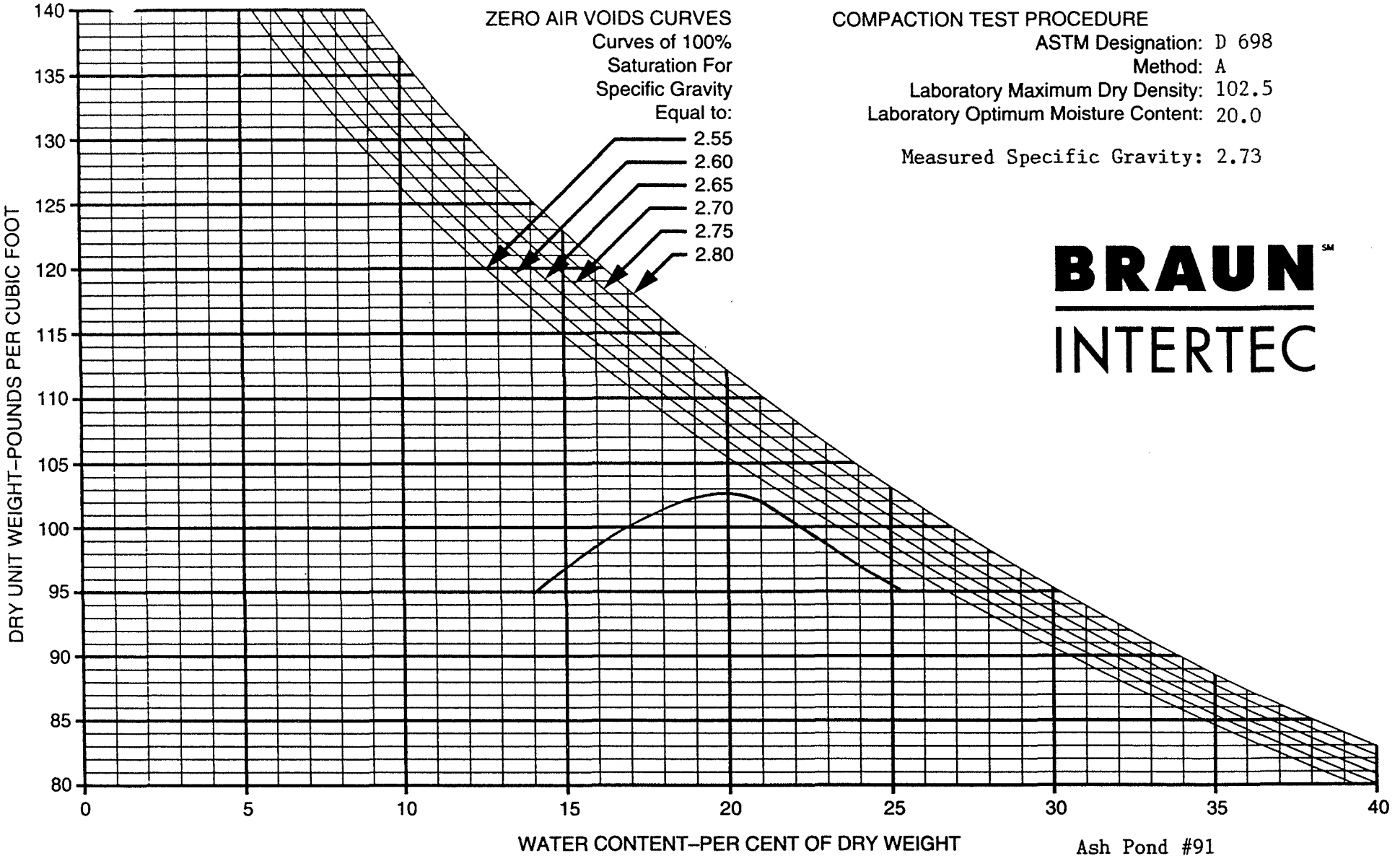
DRAWN BY:

CHECKED BY:

DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 102.5
Laboratory Optimum Moisture Content: 20.0

Measured Specific Gravity: 2.73

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST-172	CLB-CC-471	1904.9	16	30	46	Sandy Lean Clay(CL), olive brown

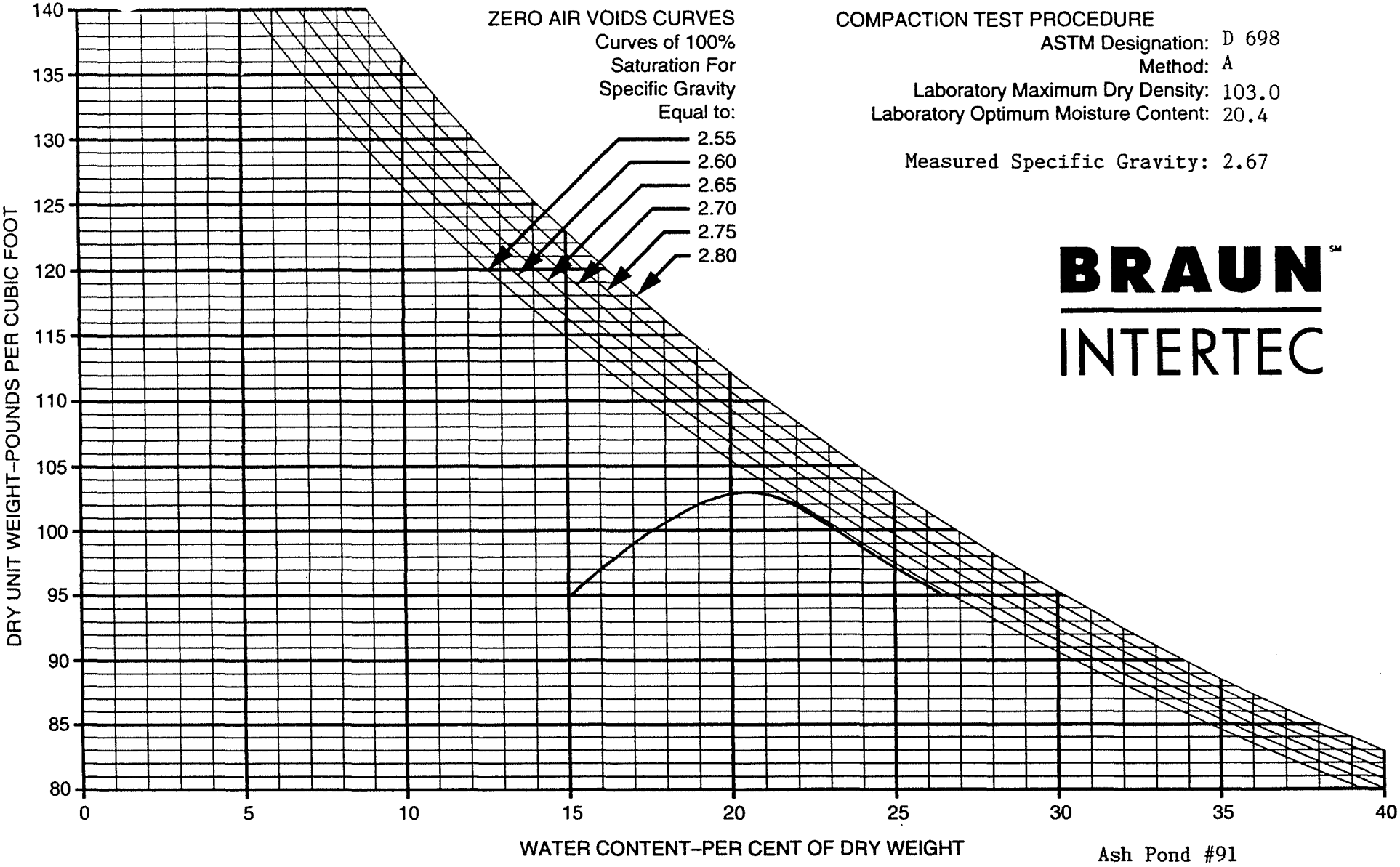
37676N 40644E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 103.0
Laboratory Optimum Moisture Content: 20.4

Measured Specific Gravity: 2.67

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST-173	CLB-CC -472	1903.7	17	28	45	Sandy Lean Clay (CL), olive brown

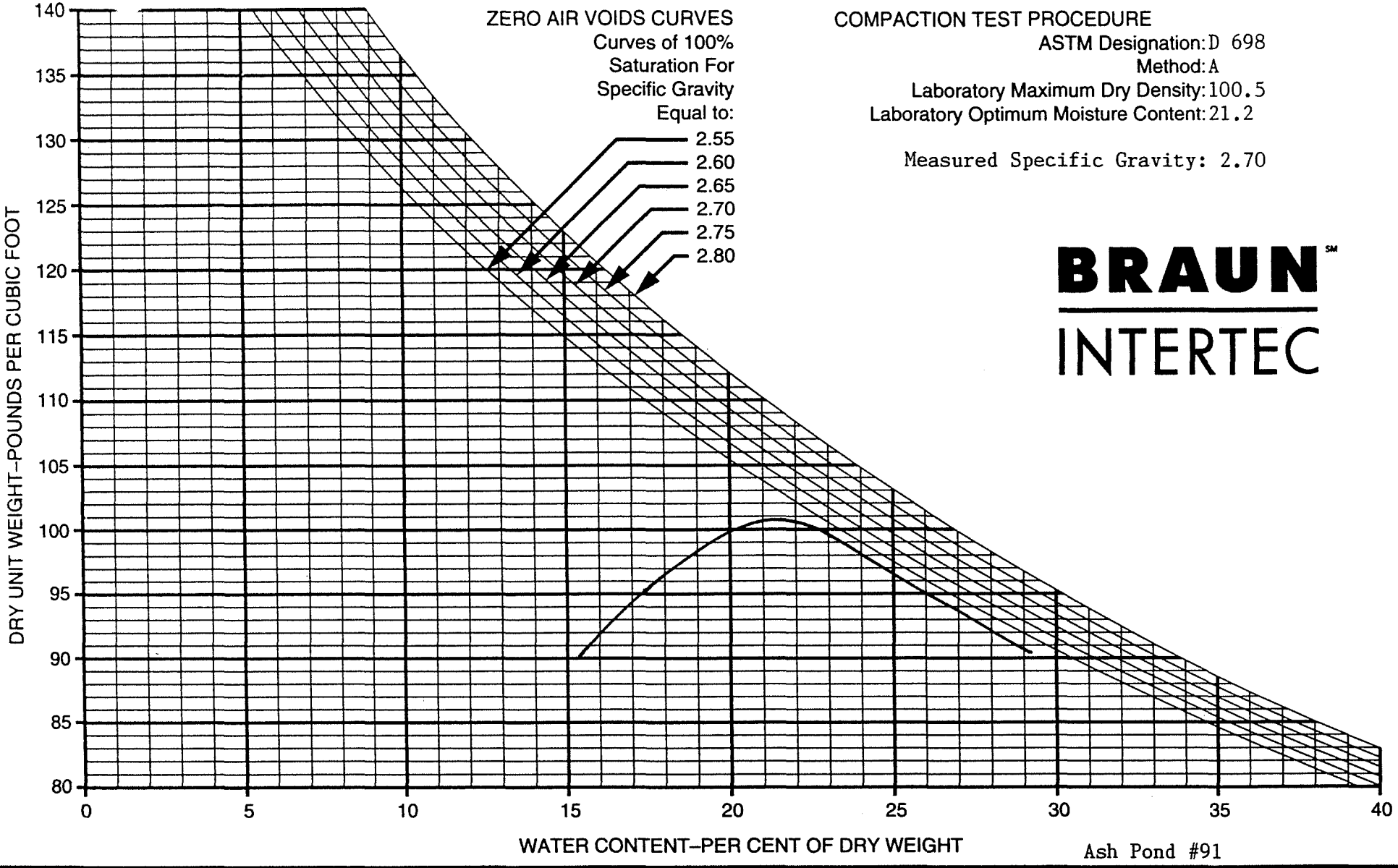
37888N 40690E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE
ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 100.5
Laboratory Optimum Moisture Content: 21.2

Measured Specific Gravity: 2.70

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST-175	CLB-CC-474	1902.1	17	31	48	Sandy Lean Clay (CL), dark grayish-brown

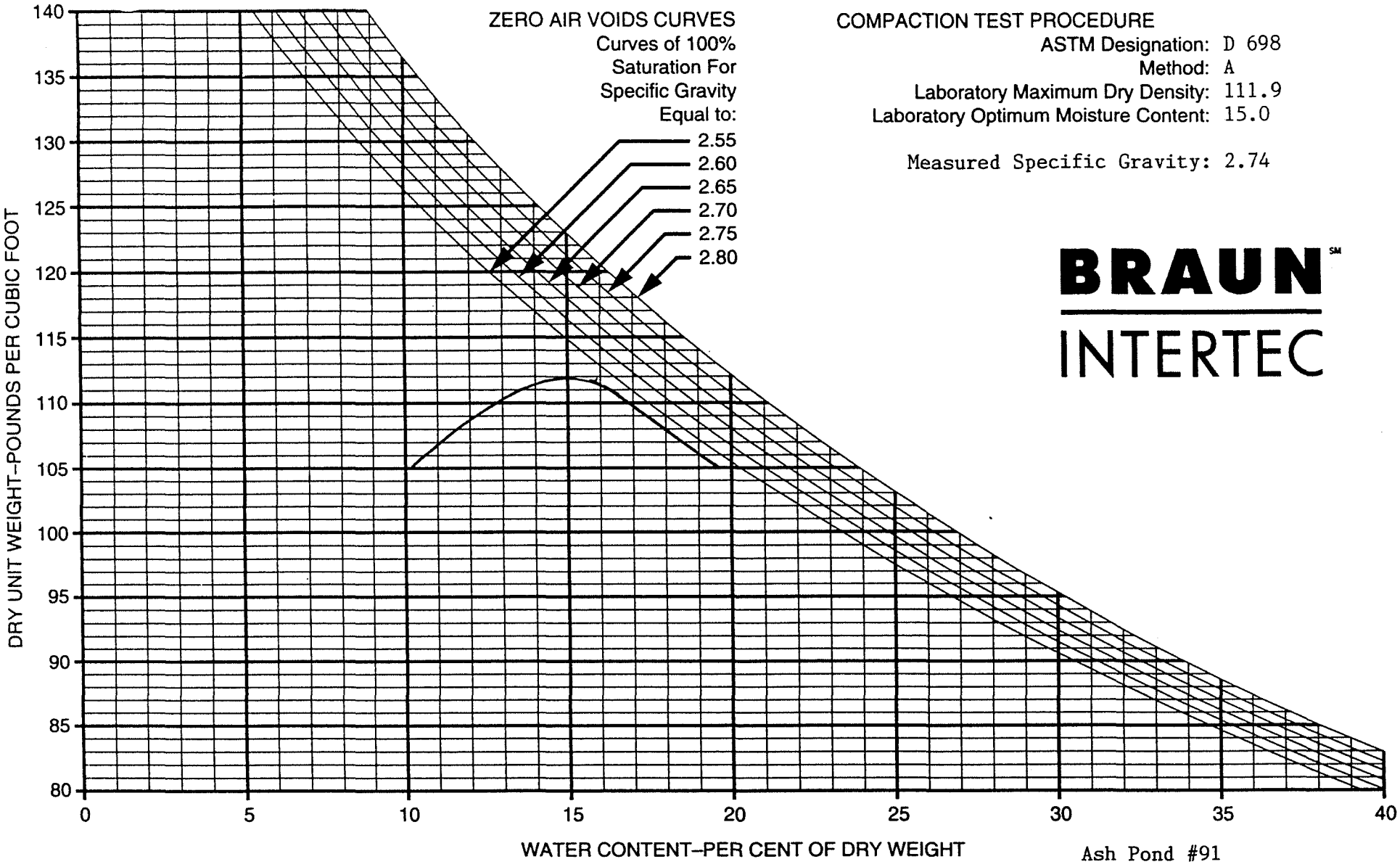
37831N 41087E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 111.9
Laboratory Optimum Moisture Content: 15.0

Measured Specific Gravity: 2.74

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CLB-CC -492	1898.5	14	21	35	Sandy Lean Clay (CL), olive brown

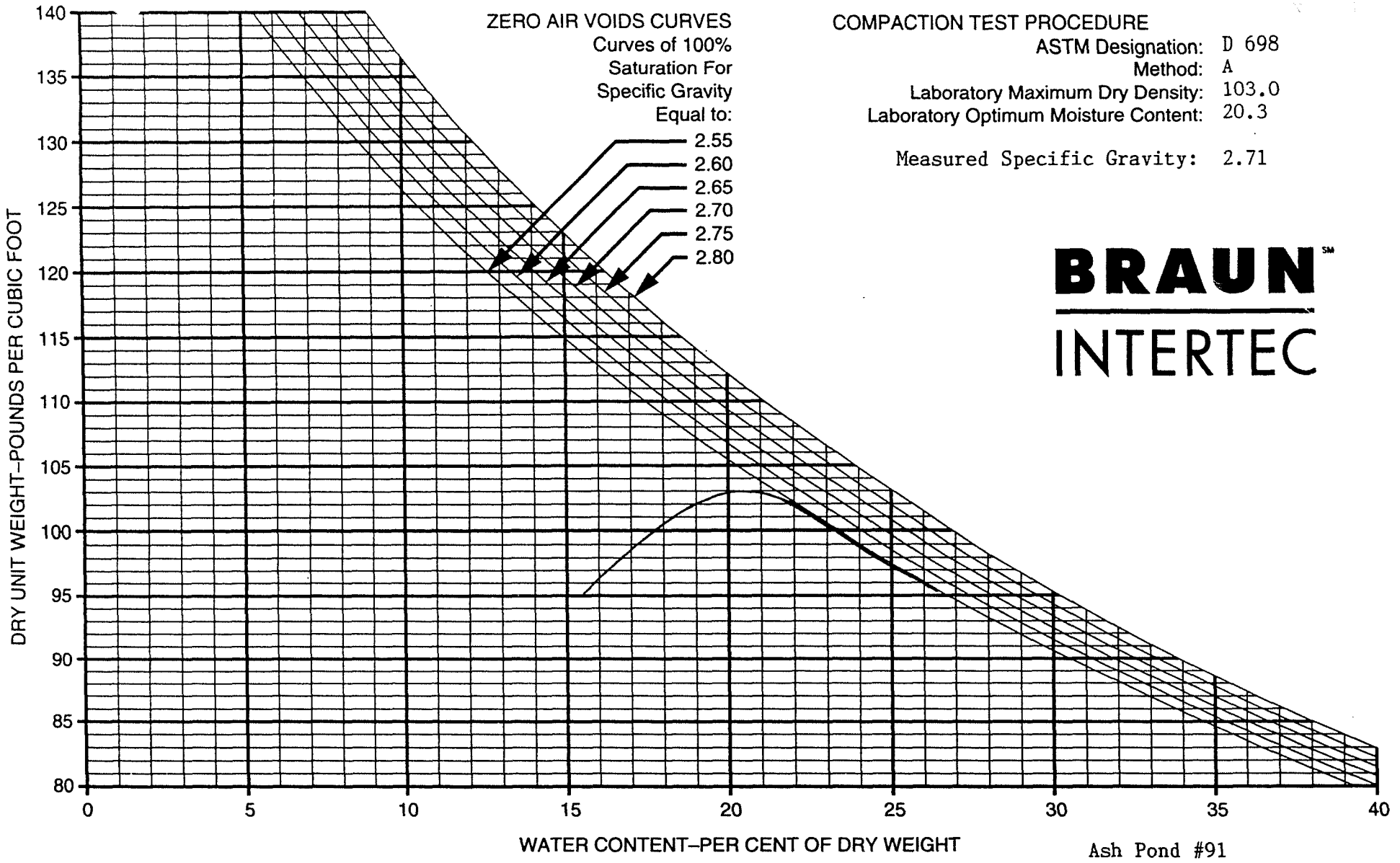
38076N 41155E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 103.0
Laboratory Optimum Moisture Content: 20.3

Measured Specific Gravity: 2.71

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST.201	CLB-CC -517	1897.6	22	17	39	Sandy Lean Clay (CL), grayish-brown.

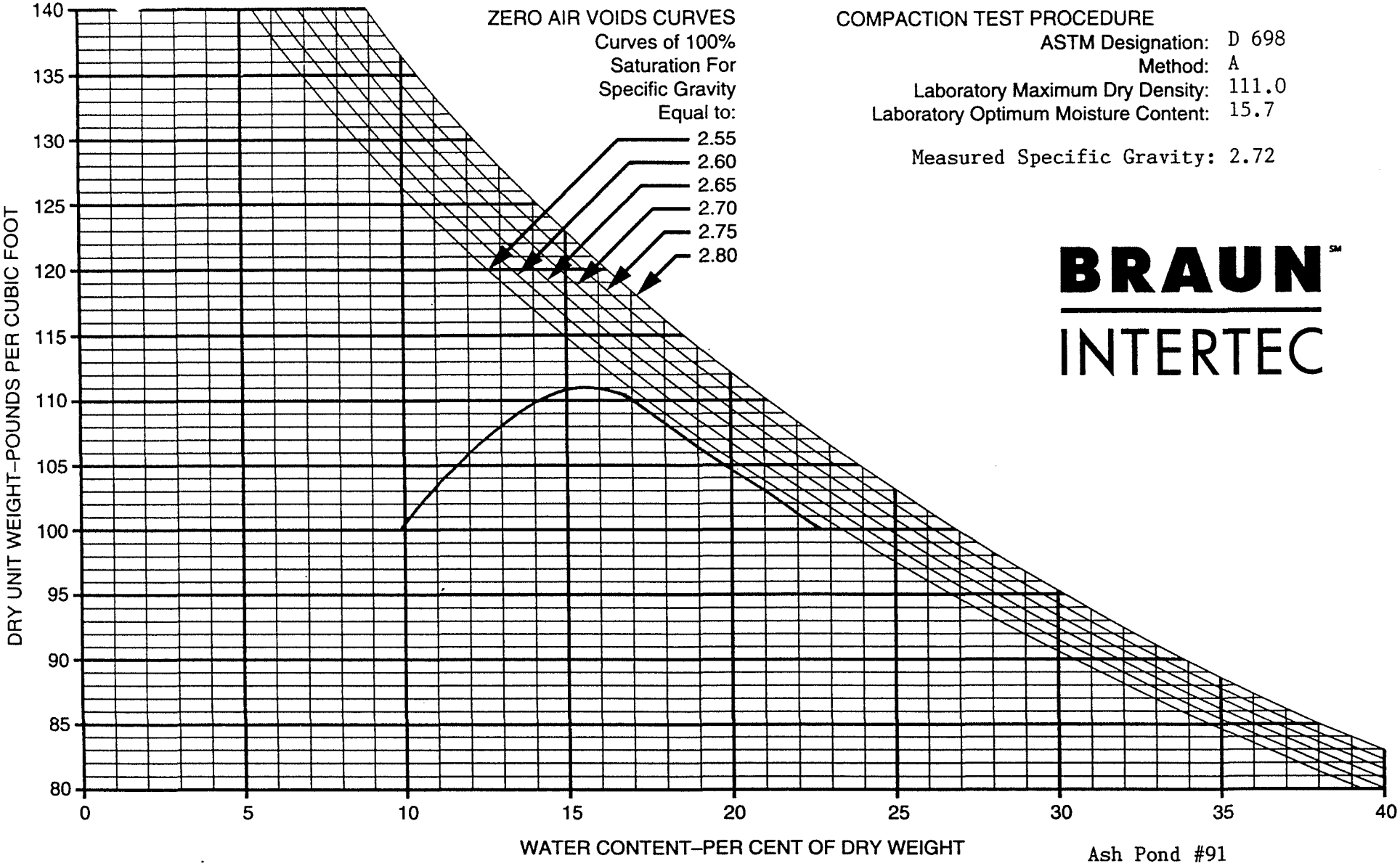
38253N 41287E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 111.0
Laboratory Optimum Moisture Content: 15.7

Measured Specific Gravity: 2.72

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST.207	CLB-CC -524	1898.1	25	16	41	Sandy Lean Clay (CL), dark grayish-brown.

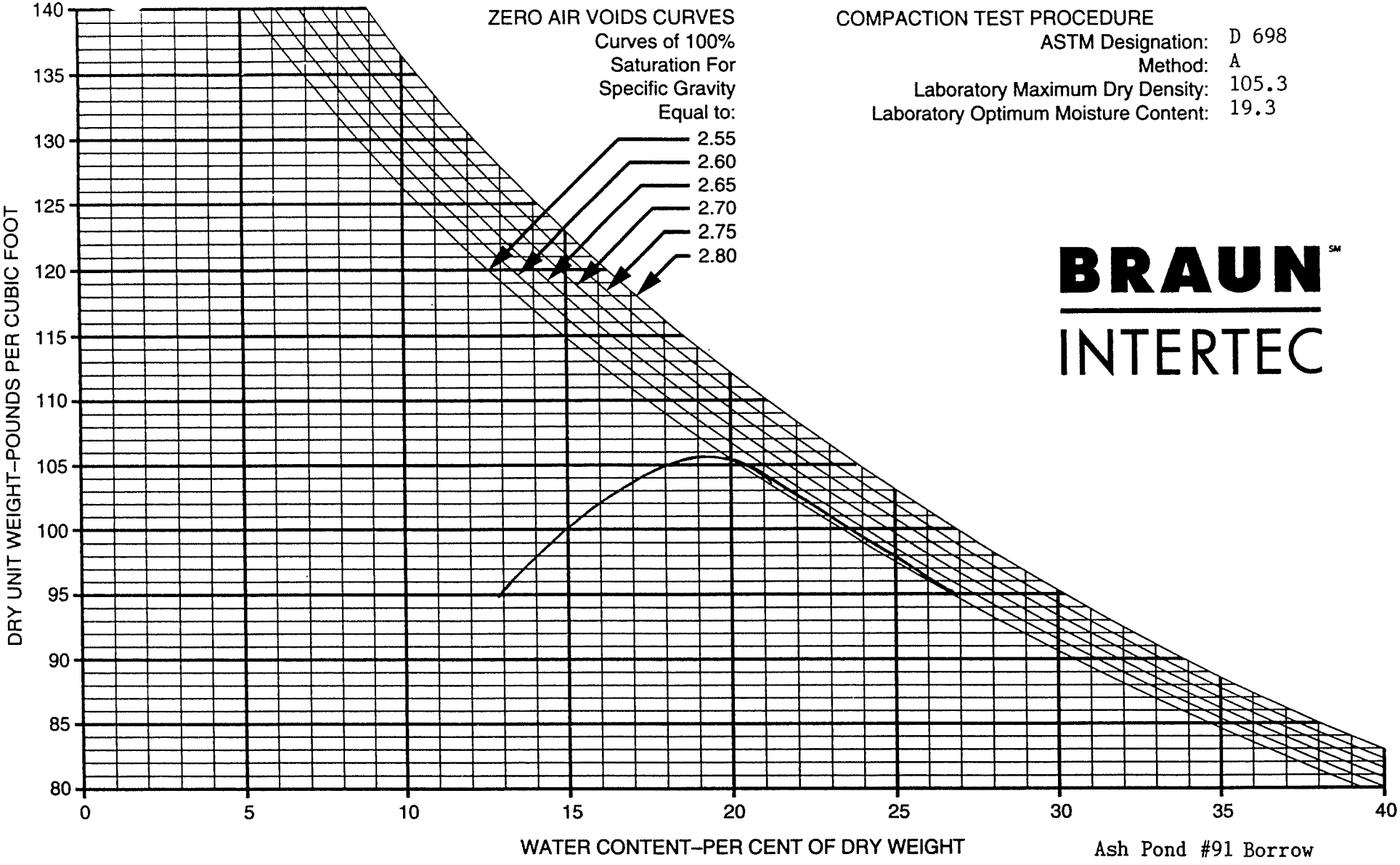
38670N 40791E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation:	D 698
Method:	A
Laboratory Maximum Dry Density:	105.3
Laboratory Optimum Moisture Content:	19.3

BRAUN INTERTEC

Ash Pond #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CLB-CC -528	1901.2	30	17	47	Sandy Lean Clay (CL), dark grayish-brown

38136N 40783E

COMPACTION TEST

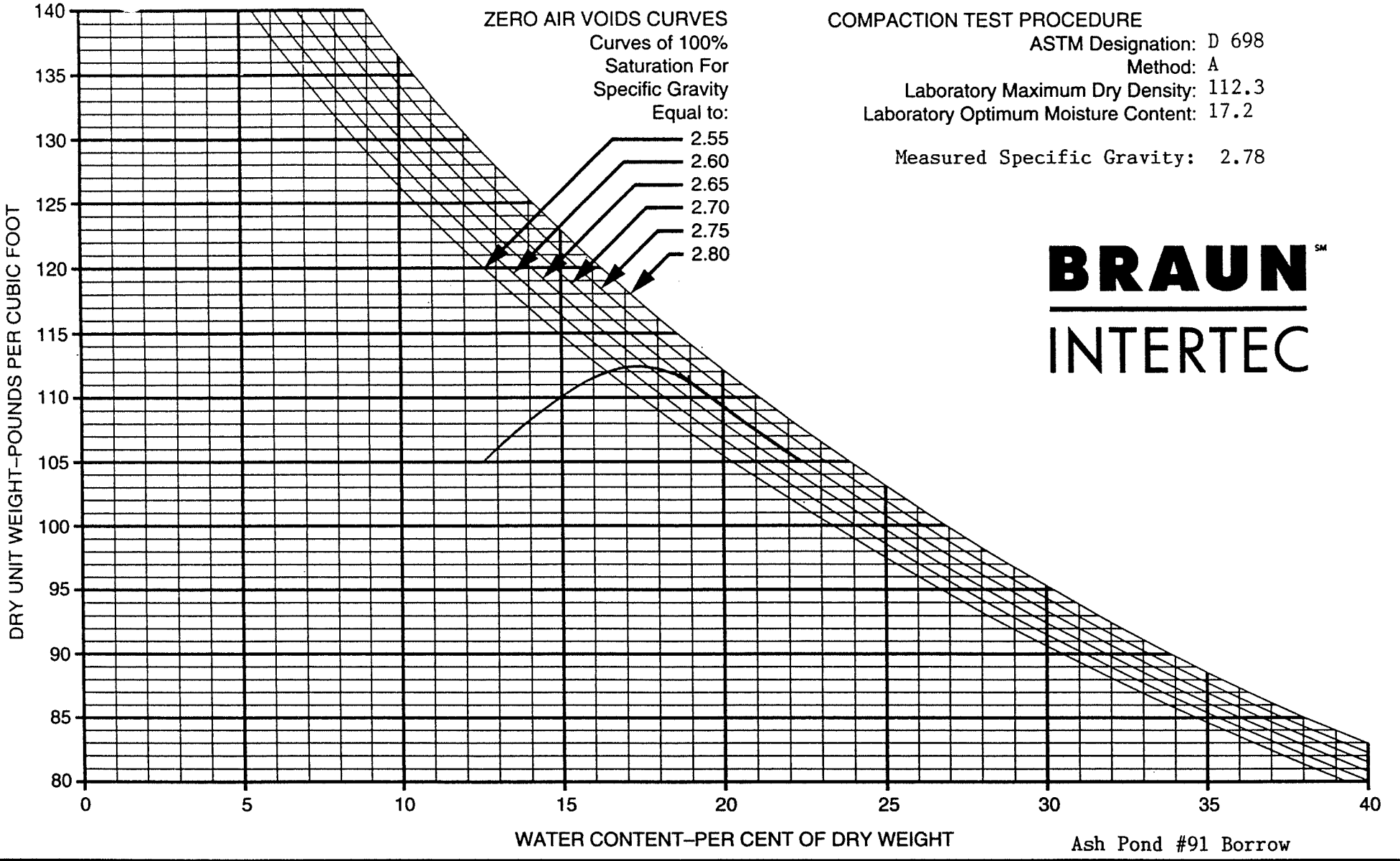
DRAWN BY:

CHECKED BY:

DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 112.3
Laboratory Optimum Moisture Content: 17.2

Measured Specific Gravity: 2.78

BRAUN INTERTEC

Ash Pond #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CLB-CC -529	1898.1	17	26	43	Sandy Lean Clay (CL), dark grayish brown.

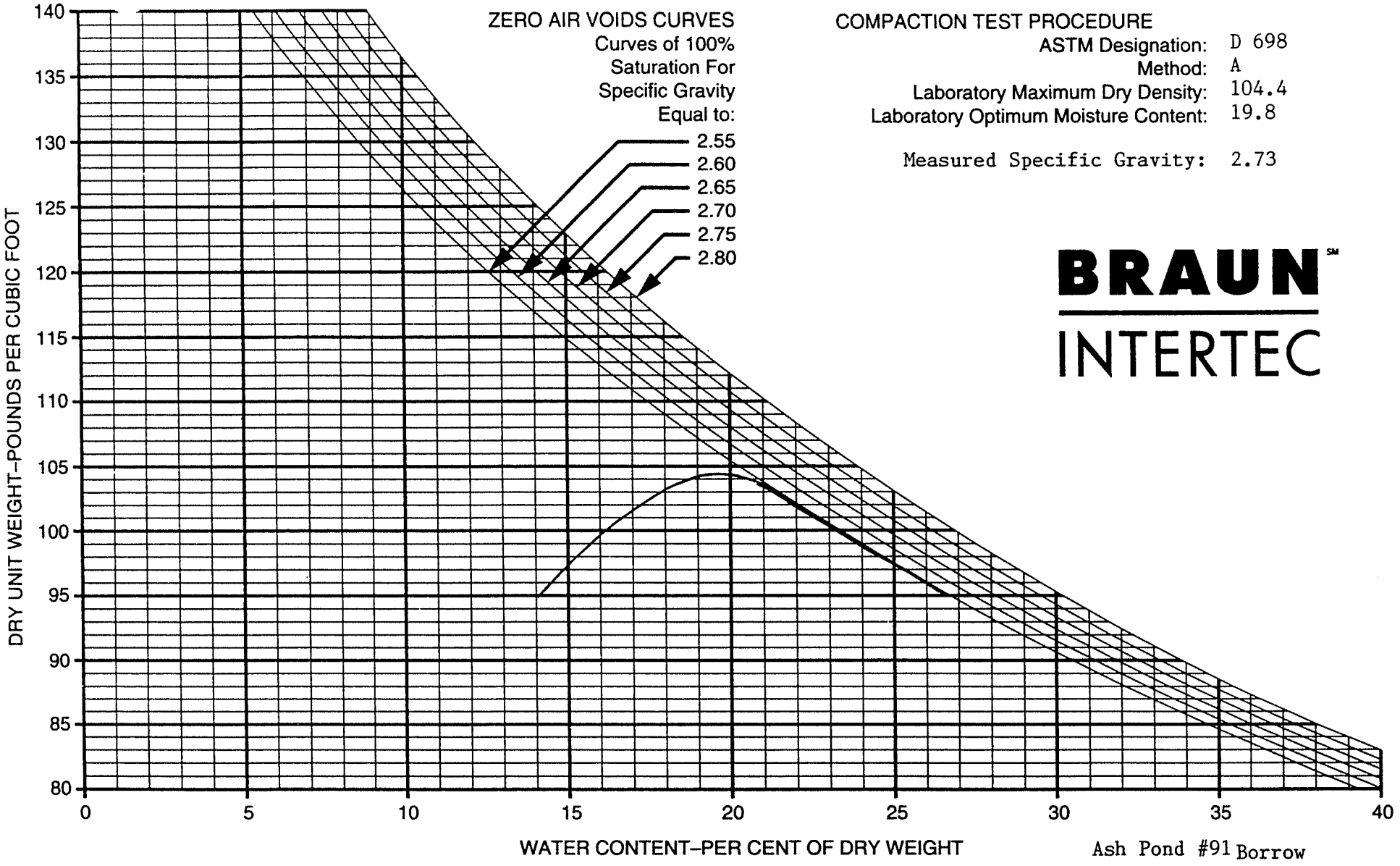
38257N 41301E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation:	D 698
Method:	A
Laboratory Maximum Dry Density:	104.4
Laboratory Optimum Moisture Content:	19.8
Measured Specific Gravity:	2.73

BRAUN INTERTEC

Ash Pond #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CLB-CC -530	1898.2	18	29	47	Sandy Lean Clay (CL), dark grayish brown.

38474N 40997E

COMPACTION TEST

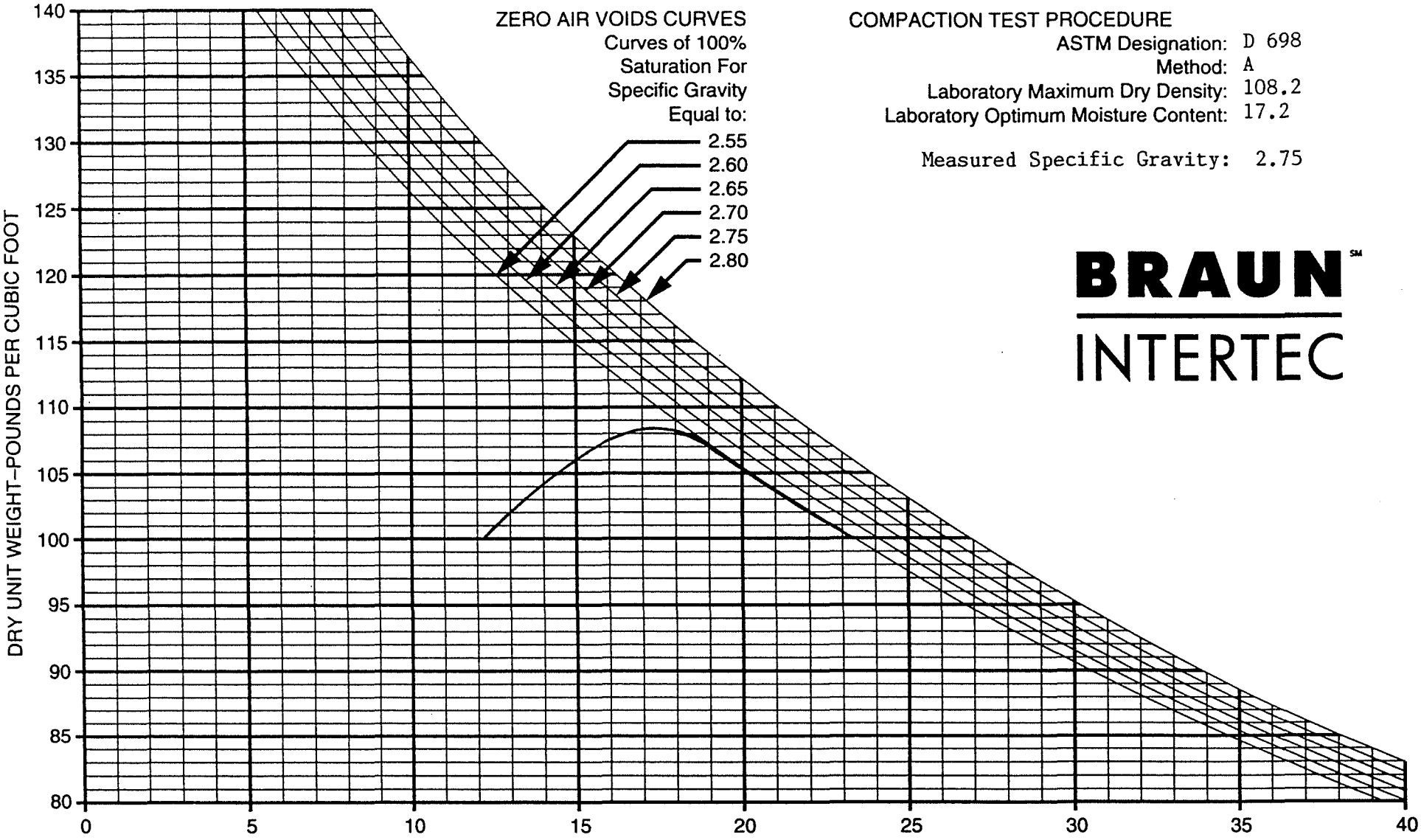
DRAWN BY:

CHECKED BY:

DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 108.2
Laboratory Optimum Moisture Content: 17.2

Measured Specific Gravity: 2.75

BRAUN INTERTEC

Ash Pond #91 Borrow

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CLB-CC -531	1899.4	17	26	43	Sandy Lean Clay (CL), grayish brown

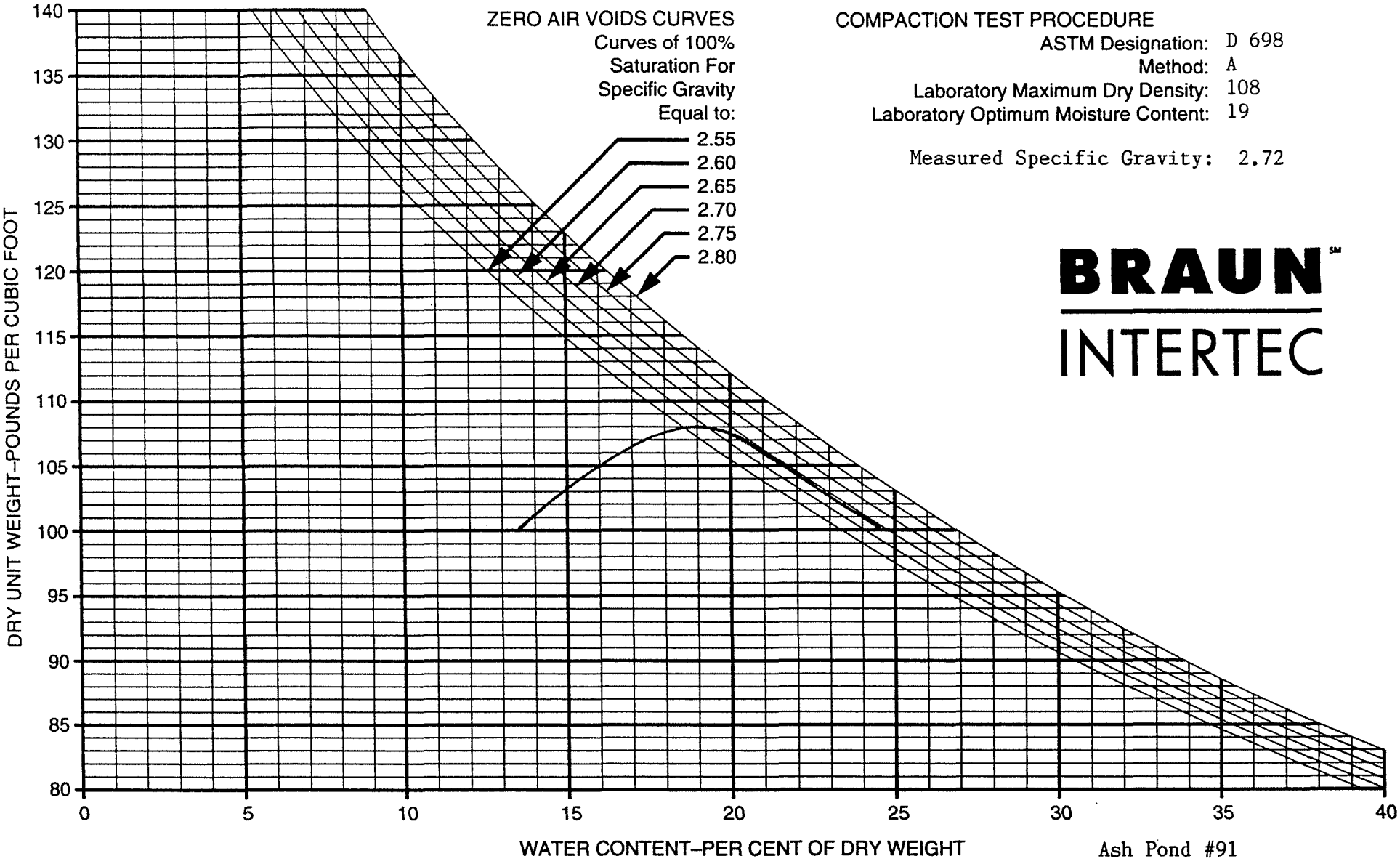
38643N 40700E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 108
Laboratory Optimum Moisture Content: 19

Measured Specific Gravity: 2.72

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST.211	CLB-CC-533	1903.4	16	27	43	Sandy Lean Clay (CL), grayish brown

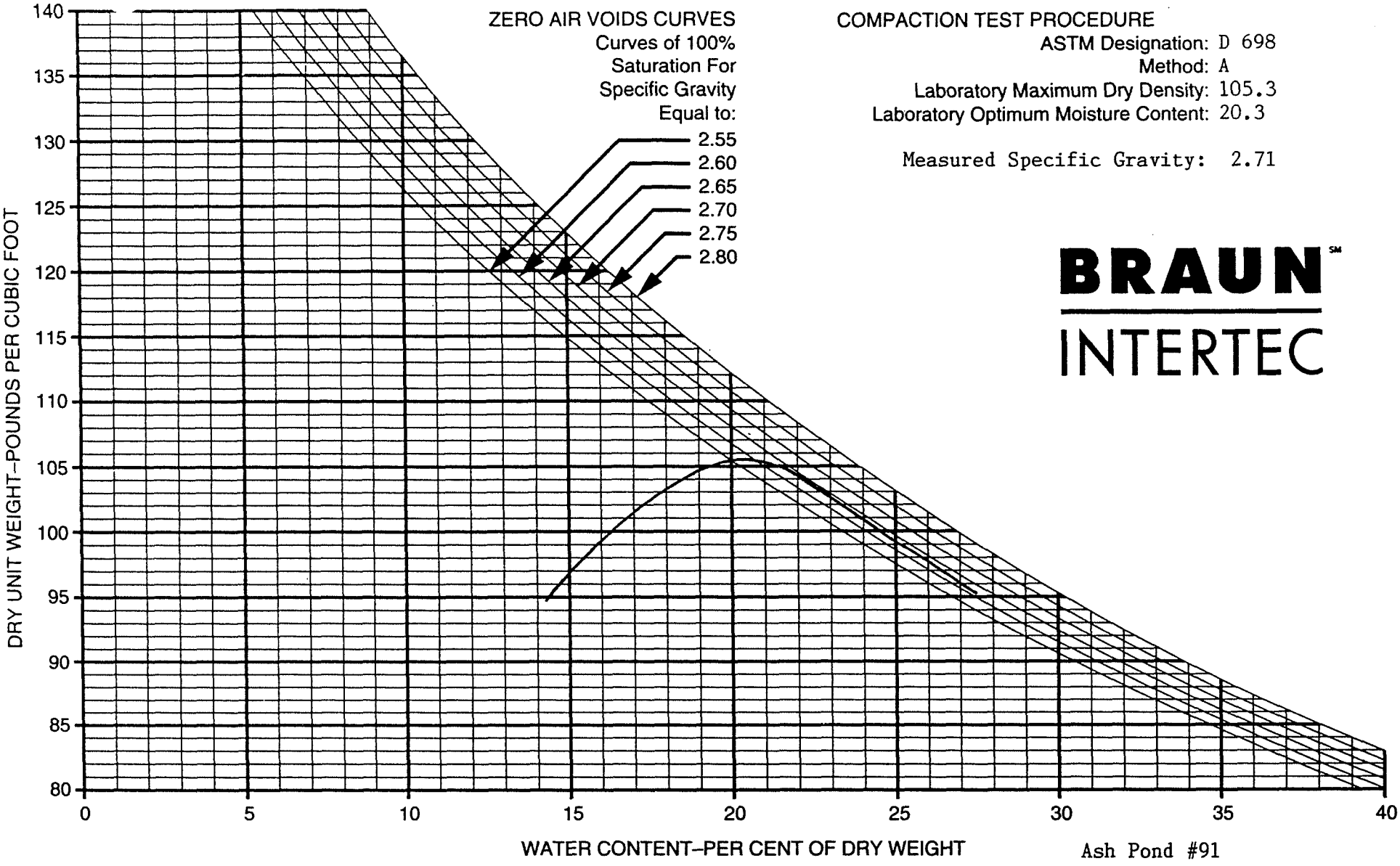
38509N 40197E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 105.3
Laboratory Optimum Moisture Content: 20.3

Measured Specific Gravity: 2.71

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST.219	CLB-CC -541	1901.3	17	28	45	Sandy Lean Clay (CL), grayish brown

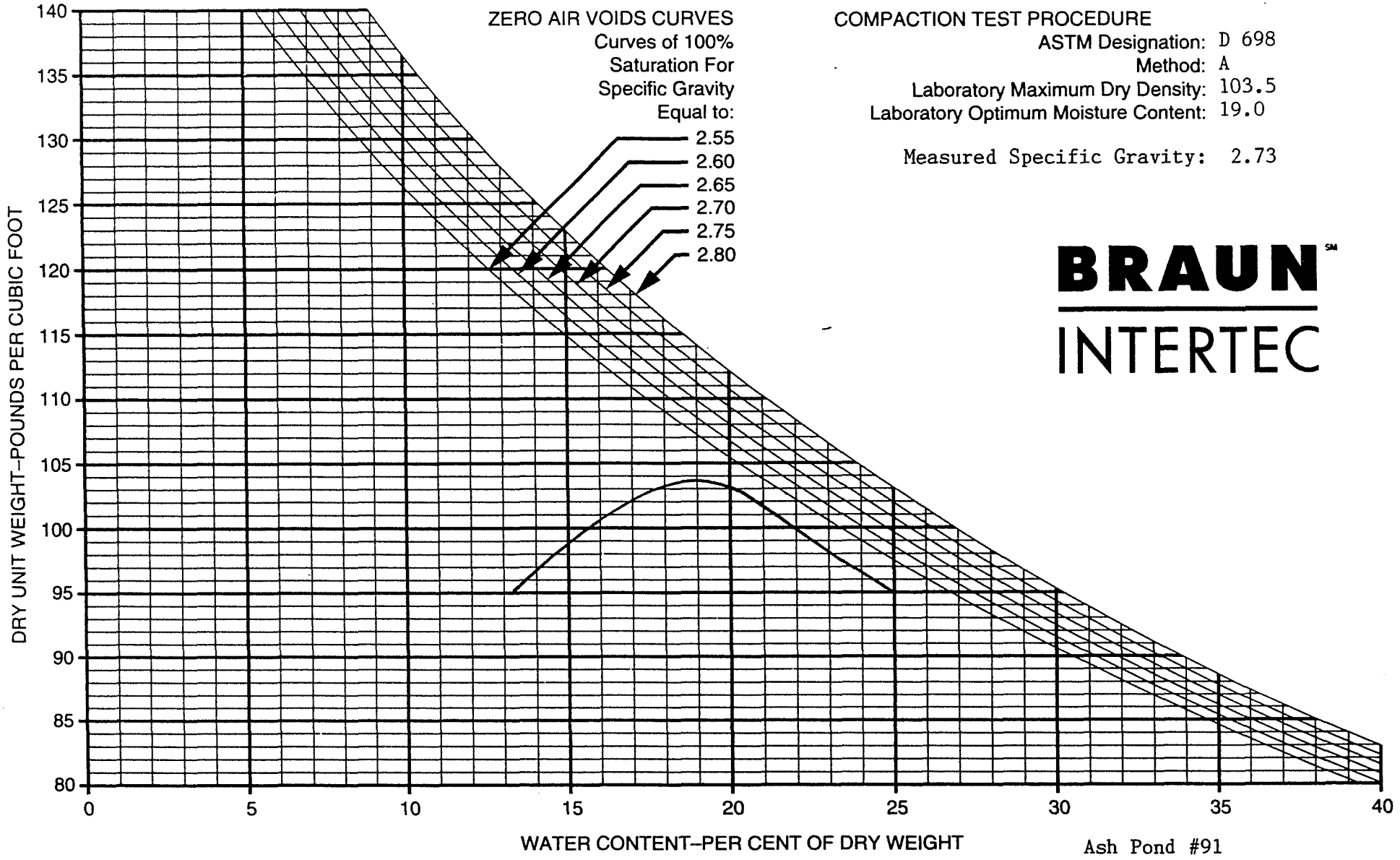
38144N 40930E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 103.5
Laboratory Optimum Moisture Content: 19.0

Measured Specific Gravity: 2.73

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST.224	CLB-CC -546	1898.9	18	27	45	Sandy Lean Clay (CL), dark grayish brown

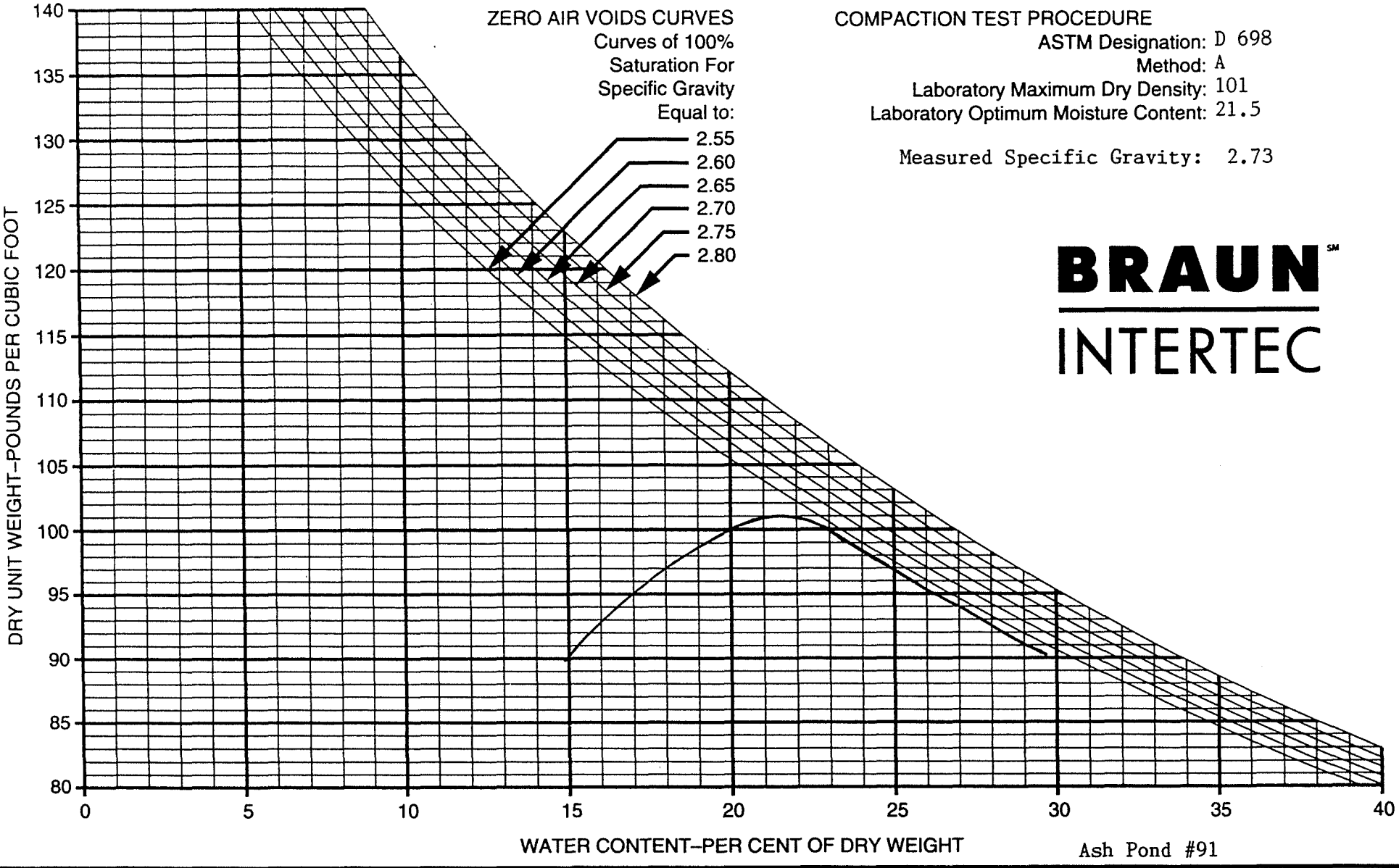
38548N 41001E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 101
Laboratory Optimum Moisture Content: 21.5

Measured Specific Gravity: 2.73

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST.228	CLB-CC -550	1902.3	19	26	45	Sandy Lean Clay (CL), olive brown

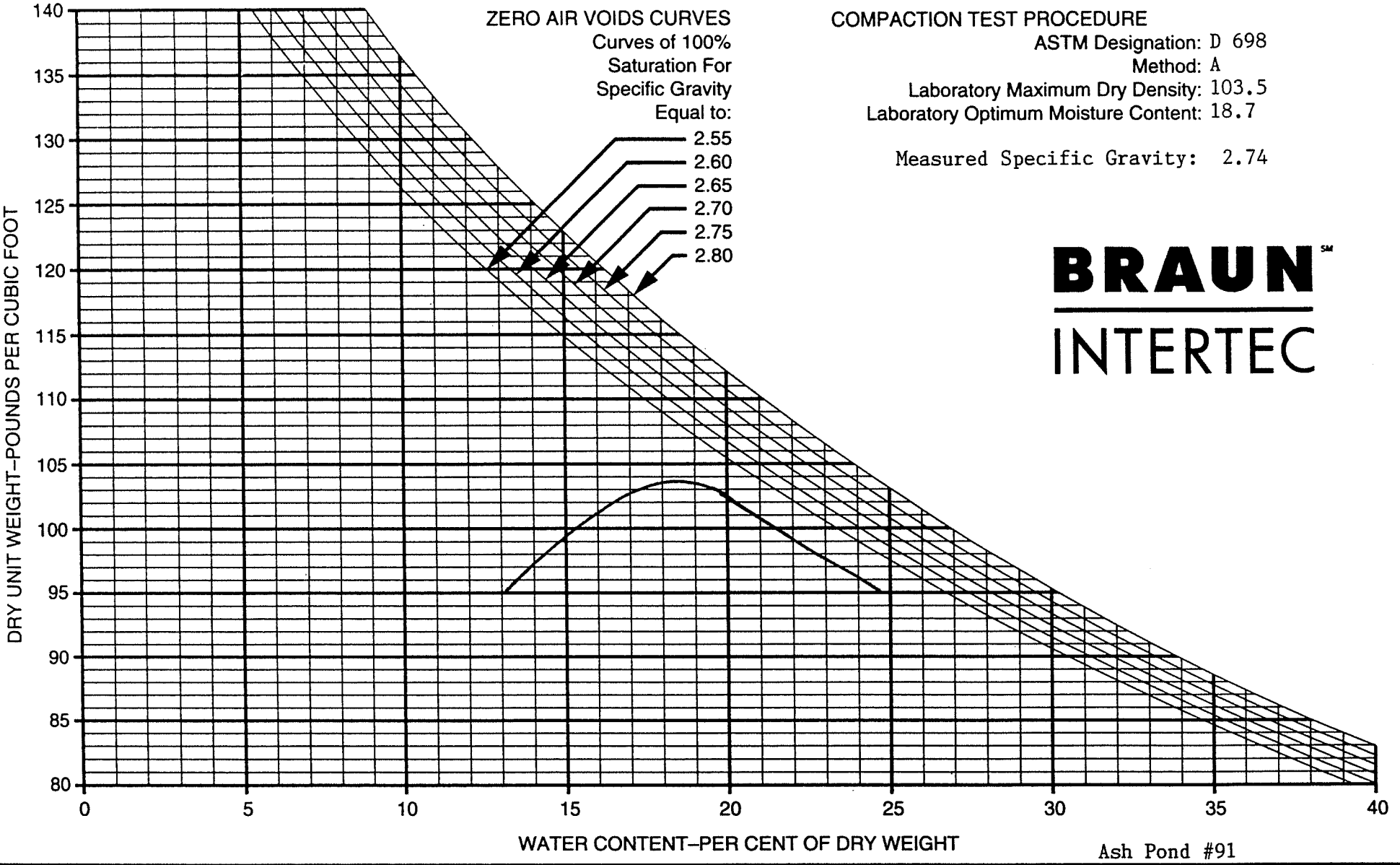
38659N 40181E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 103.5
Laboratory Optimum Moisture Content: 18.7

Measured Specific Gravity: 2.74

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
ST.231	CLB-CC -553	1899.4	16	31	47	Sandy Lean Clay (CL), olive brown

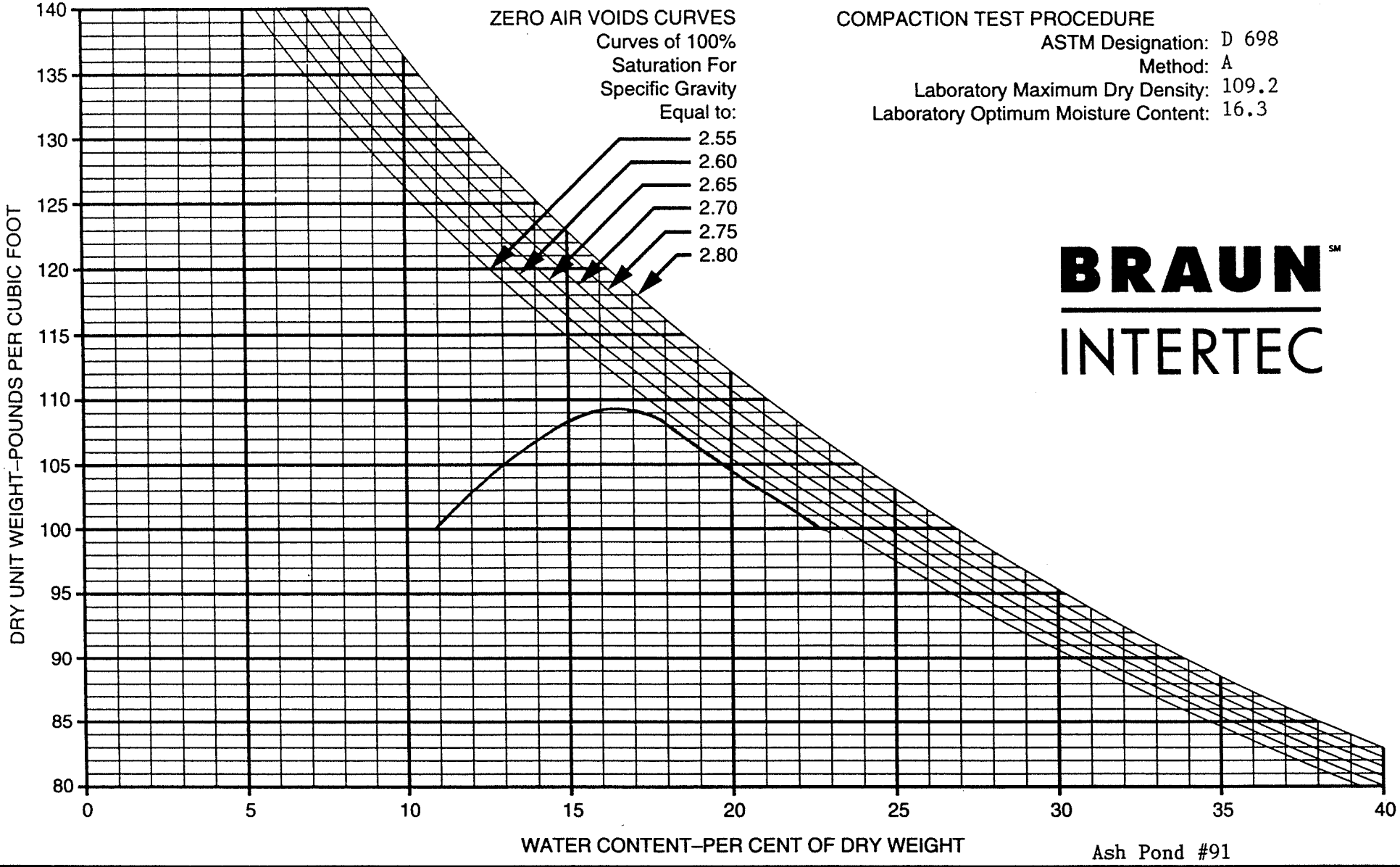
38726N 40728E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE



COMPACTION TEST PROCEDURE

ASTM Designation: D 698
Method: A
Laboratory Maximum Dry Density: 109.2
Laboratory Optimum Moisture Content: 16.3

BRAUN INTERTEC

Ash Pond #91

BORING NO	SAMPLE NO	DEPTH (FEET)	PL	PI	LL	SOIL DESCRIPTION
N/A	CLB-CC -556	1901.5	16	26	42	Sandy Lean Clay (CL), dark grayish brown

38500N 40500E

COMPACTION TEST

DRAWN BY:
CHECKED BY:
DATE:

JOB NO. BFDX-92-018C

PLATE

AP #91

Sand Blanket
Ash Moistures
Subgrade Moistures
Sulfate/Chloride Results
Fly Ash Moistures

Miscellaneous Tests

BRAUN[SM]
INTERTEC

Braun Intertec Corporation
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments[®]

Laboratory Tests of Aggregate

Date: March 24, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Sample No.:	SB-CC-532	Location: AP #91 Holding Pond
Sampled By:	M.Colton	
Date Sampled:	8/20/93	
Proposed Use:	Sand Blanket	Date Received: N/I

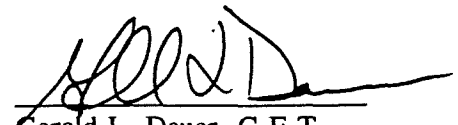
Sieve Analysis:	% Passing	Specifications
3/4"	100	100
1/2"	100	-
#4	94	90-100
#10	80	45-90
#20	60	-
#40	36	15-45
#100	11	-
#200	7.7	0-15

Properties:

Shale & Soft Rock %:	-
L.A. Abrasion:	-
Plasticity Index:	-
Fractured Faces:	-

Remarks:

Braun Intertec Corporation



Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin

cv2/212

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INTERTEC

Braun Intertec Corporation
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments[®]

Laboratory Tests of Aggregate

Date: April 5, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Sample No.:	SB-CC-555	Location: 39200N 39800E
Sampled By:	M.Colton	
Date Sampled:	8/19/93	
Proposed Use:	Sand Blanket	Date Received: 8/20/93

Sieve Analysis:	% Passing	Specifications
3/4"	100	100
#4	90	90-100
#10	68	45-90
#20	46	-
#40	27	15-45
#100	14	-
#200	12	0-15

Properties:

Shale & Soft Rock %:	-
L.A. Abrasion:	-
Plasticity Index:	-
Fractured Faces:	-

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Manager

cv2/248

BRAUN[SM]
INTERTEC

Braun Intertec Corporation
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments®

Laboratory Tests of Aggregate

Date: April 1, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Sample No.:	SB-CC-557	Location: 39300N 40000E
Sampled By:	M.Colton	
Date Sampled:	8/20/93	
Proposed Use:	Sand Blanket	Date Received: 8/20/93

Sieve Analysis:	% Passing	Specifications
3/4"	100	100
#4	91	90-100
#10	75	45-90
#20	55	-
#40	33	15-45
#100	10	-
#200	7.7	0-15

Properties:

Shale & Soft Rock %:	-
L.A. Abrasion:	-
Plasticity Index:	-
Fractured Faces:	-

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Manager

cv2/249

BRAUN INTERTEC

Braun Intertec Corporation
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments®

Laboratory Tests of Aggregate

Date: April 5, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Sample No.:	SB-CC-558	Location: 38900N 39900E
Sampled By:	M.Colton	
Date Sampled:	8/23/93	
Proposed Use:	Sand Blanket	Date Received: 8/24/93

Sieve Analysis:	% Passing	Specifications
3/4"	100	100
#4	92	90-100
#10	75	45-90
#20	52	-
#40	29	15-45
#100	8	-
#200	6	0-15

Properties:

Shale & Soft Rock %:	-
L.A. Abrasion:	-
Plasticity Index:	-
Fractured Faces:	-

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Manager

cv2/250

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INTERTEC

Braun Intertec Corporation
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments®

Laboratory Tests of Aggregate

Date: April 5, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Sample No.:	SB-CC-559	Location: 38000N 40900E
Sampled By:	M.Colton	
Date Sampled:	8/24/93	
Proposed Use:	Sand Blanket	Date Received: 8/25/93

Sieve Analysis:	% Passing	Specifications
3/4"	100	100
#4	87	90-100
#10	66	45-90
#20	50	-
#40	35	15-45
#100	16	-
#200	11	0-15

Properties:

Shale & Soft Rock %:	-
L.A. Abrasion:	-
Plasticity Index:	-
Fractured Faces:	-

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Manager

cv2/251

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INTERTEC

Braun Intertec Corporation
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments®

Laboratory Tests of Aggregate

Date: April 5, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Sample No.:	SB-CC-560	Location: Stockpile
Sampled By:	M.Colton	
Date Sampled:	8/30/93	
Proposed Use:	Sand Blanket	Date Received: 8/31/93

Sieve Analysis:	% Passing	Specifications
3/4"	100	100
#4	87	90-100
#10	69	45-90
#16	57	-
#40	29	15-45
#100	12	-
#200	11	0-15

Properties:

Shale & Soft Rock %:	-
L.A. Abrasion:	-
Plasticity Index:	-
Fractured Faces:	-

Remarks:

Braun Intertec Corporation

cc: Jim Martin

cv2/252

Gerald L. Dauer, C.E.T.
Operations Manager

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Engineers and Scientists Serving the Built and Natural Environments®

Laboratory Tests of Aggregate

Date: April 5, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Sample No.:	SB-CC-564	Location: 38000N 41000E
Sampled By:	M.Colton	
Date Sampled:	9/18/93	
Proposed Use:	Sand Blanket	Date Received: 9/20/93

Sieve Analysis:	% Passing	Specifications
3/4"	100	100
#4	97	90-100
#10	76	45-90
#16	62	-
#40	25	15-45
#100	11	-
#200	9.6	0-15

Properties:

Shale & Soft Rock %:	-
L.A. Abrasion:	-
Plasticity Index:	-
Fractured Faces:	-

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Manager

cv2/254

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Laboratory Tests of Aggregate

Date: April 5, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Sample No.:	SB-CC-565	Location: 38500N 40700E
Sampled By:	M.Colton	
Date Sampled:	9/18/93	
Proposed Use:	Sand Blanket	Date Received: 9/20/93

Sieve Analysis:	% Passing	Specifications
3/4"	100	100
#4	96	90-100
#10	75	45-90
#16	61	-
#40	25	15-45
#100	12	-
#200	11	0-15

Properties:

Shale & Soft Rock %:	-
L.A. Abrasion:	-
Plasticity Index:	-
Fractured Faces:	-

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Manager

cv2/253

MVTL LABORATORIES, Inc.
P.O. BOX 1873, 1411 S. 12th STREET
BISMARCK, ND 58502
PHONE (701) 258-9720 WATS (800) 279-6885 FAX (701) 258-9724

WE ARE AN EQUAL OPPORTUNITY EMPLOYER

FINAL ANALYSIS REPORT

Sample Number: 92-M1620
Client: Braun Engineering
PO Box 2379
Bismarck ND 58502

Attn: Gary Arman

Report Date: 8/17/92
Work Order #: 81-0637
PO #: BFDX92018C
Payment type:

Collection Date: 8/12/92
Collection Time:
Date Received: 8/13/92

CC-132
AP #91 W dike Extention
Sidewall trench excavation

Analyte	Result	Units	Comments
Sulfate	425.	ug/g	
Chloride	14.0	ug/g	

Approved by: Rod Reed

MVTL guarantees the accuracy of the analysis done on the sample submitted for testing. It is not possible for MVTL to guarantee that a test result obtained on a particular sample will be the same on any other sample unless all conditions affecting the sample are the same, including sampling by MVTL. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

AP #91.
BFDX-91-035C
Sludge Moistures.

Sample #	Date Obtained	Location	Moisture Content
CC-15	7 - 19	AP #91	36.3
CC-16	7 - 19	AP #91	39.9
CC-20	7 - 29	AP #91	48.5
CC-23	8 - 01	AP #91	124.1
CC-24	8 - 01	AP #91	99.1
CC-25	8 - 01	AP #91	58.6
CC-26	8 - 01	AP #91	28.5
CC-27	8 - 20	AP #91	36.9
CC-37	8 - 28	AP #91	55.5
CC-38	8 - 28	AP #91	37.4
CC-46	9 - 04	AP #91	30.6
CC-47	9 - 04	AP #91	40.4
CC-50	9 - 10	AP #91	131.0
CC-51	9 - 10	AP #91	36.5
CC-54	9 - 25	Section 16 D.P.	45.0
CC-55	9 - 25	Section 16 D.P.	41.0
CC-57	9 - 30	Section 16 D.P.	35.0
CC-58	9 - 30	Section 16 D.P.	39.0
CC-66	10 - 07	Section 16 D.P.	54.9
CC-67	10 - 07	Section 16 D.P.	51.2
CC-74	10 - 14	Section 16 D.P.	27.9
CC-75	10 - 14	Section 16 D.P.	43.9
CC-80	10 - 18	Section 16 D.P.	57.5
CC-81	10 - 18	Section 16 D.P.	51.1

AP #91 BFDX-92-018C 1992 Sludge Moistures			
Sample #	**Date Obtained**	**Location**	**Moisture Content**
CC-83	3/25/92	Section 16 D.P.	22
CC-84	3/25/92	Section 16 D.P.	24
CC-85	4/2/92	Section 16 D.P.	26
CC-86	4/2/92	Section 16 D.P.	28
CC-87	4/9/92	Section 16 D.P.	26
CC-88	4/9/92	AP #91	75
CC-89	4/15/92	Section 16	21
CC-90	4/15/92	Section 16	22
CC-101	4/22/92	Section 16	30
CC-102	4/22/92	Section 16	32
CC-111	4/22/92	AP #91	101, 103
CC-112	4/27/92	Section 16	32, 32
CC-113	4/27/92	Section 16	35, 37
CC-114	4/29/92	Section 16	24
CC-115	4/29/92	Section 16	25
CC-116	5/5/92	Section 16	31
CC-117	5/5/92	Section 16	32
CC-118	5/11/92	Section 16	19
CC-119	5/11/92	Section 16	28
CC-120	5/19/92	Section 16	36
CC-121	5/19/92	Section 16	42
CC-122	5/27/92	Section 16	24
CC-123	5/27/92	Section 16	24
CC-124	6/1/92	Section 16	26
CC-125	6/1/92	Section 16	25
CC-126	6/9/92	Section 16	28
CC-127	6/9/92	Section 16	24
CC-128	6/22/92	Section 16	37
CC-129	6/22/92	Section 16	23
CC-130	7/20/92	Section 16	28
CC-131	7/20/92	Section 16	40

BFDX-92-018C
Ash Pond #91

Subgrade In-Situ Moistures

Sample No.	Moisture	Date Obtained	Sample No.	Moisture	Date Obtained
CC-91	17.7	4/17/92	CC-162	16.3	8/21/92
CC-92	18.1	4/17/92	CC-163	21.3	8/21/92
CC-133	18.5	8/17/92	CC-164	32	8/21/92
CC-134	19.5	8/17/92	CC-165	18.7	8/21/92
CC-135	18.9	8/17/92	CC-166	22.4	8/21/92
CC-136	17.6	8/17/92	CC-170	18.2	8/26/92
CC-137	17.3	8/17/92	CC-171	15.7	8/26/92
CC-138	16.6	8/17/92	CC-172	19	8/26/92
CC-139	18.3	8/17/92	CC-173	25.5	8/27/92
CC-140	17.7	8/17/92	CC-174	20.9	8/27/92
CC-141	16.3	8/17/92	CC-175	17.9	8/27/92
CC-142	19.4	8/17/92	CC-176	14.9	8/27/92
CC-143	18.4	8/17/92	CC-177	22.4	8/27/92
CC-144	24.7	8/20/92	CC-182	20.4	8/28/92
CC-145	18	8/20/92	CC-183	19.3	8/28/92
CC-146	18.1	8/20/92	CC-184	13.3	8/28/92
CC-147	22.4	8/20/92	CC-185	28.8	8/28/92
CC-148	23.3	8/20/92	CC-186	25	8/28/92
CC-149	21.3	8/20/92	CC-187	25.2	8/28/92
CC-150	19.4	8/20/92	CC-188	25.9	8/28/92
CC-151	16.9	8/20/92	CC-189	20.8	8/28/92
CC-152	27.8	8/20/92	CC-190	14.2	8/28/92
CC-153	22.8	8/20/92	CC-191	26.4	8/28/92
CC-154	16.7	8/20/92	CC-192	26.6	8/28/92
CC-155	24.3	8/20/92	CC-193	21.1	8/28/92
CC-156	24.6	8/20/92	CC-194	22.6	8/29/92
CC-157	23.5	8/20/92	CC-195	19.1	8/29/92
CC-158	24	8/21/92	CC-196	18.5	8/29/92
CC-159	25.7	8/21/92	CC-197	22.4	8/29/92
CC-160	18.6	8/21/92	CC-198	21.1	8/31/92
CC-161	14.4	8/21/92	CC-199	17.6	8/31/92

Sample No.	Moisture	Date Obtained	Sample No.	Moisture	Date Obtained
CC-200	25.1	8/31/92	CC-246	16.9	10/5/92
CC-201	17.9	8/31/92	CC-247	22.1	10/5/92
CC-202	22.2	8/31/92	CC-248	19.1	10/5/92
CC-203	15.7	8/31/92	CC-249	19.1	10/5/92
CC-204	19.7	8/31/92	CC-250	17.7	10/5/92
CC-205	16.8	8/31/92	CC-251	17.6	10/5/92
CC-206	19.3	8/31/92	CC-252	22.3	10/5/92
CC-207	19.5	8/31/92	CC-253	19.6	10/5/92
CC-208	20	8/31/92	CC-254	20	10/5/92
CC-209	18.2	8/31/92	CC-263	21.8	4/20/93
CC-210	15.5	8/31/92	CC-264	22	4/20/93
CC-211	22.2	8/31/92	CC-265	18.8	4/20/93
CC-212	27.3	8/31/92	CC-266	20.2	4/20/93
CC-213	18.4	9/1/92	CC-267	18.7	4/20/93
CC-214	16.3	9/1/92	CC-268	23.6	4/20/93
CC-215	19.2	9/1/92	CC-269	21.5	4/20/93
CC-216	8.6	9/2/92	CC-293	22.2	4/28/93
CC-217	21	9/2/92	CC-294	20.8	4/28/93
CC-218	20.2	9/2/92	CC-295	26.5	4/28/93
CC-219	25	9/2/92	CC-296	22.7	4/28/93
CC-220	28.2	9/2/92	CC-297	26.1	4/28/93
CC-232	16.8	9/17/92	CC-298	20.8	4/28/93
CC-233	17.2	9/17/92	CC-299	23.3	4/28/93
CC-234	18.3	9/17/92	CC-320	17.1	5/11/93
CC-235	21.1	9/17/92	CC-322	16.3	5/11/93
CC-236	24.1	9/17/92	CC-323	24.5	5/11/93
CC-237	21.8	9/17/92	CC-324	23	5/11/93
CC-238	24.2	9/17/92	CC-389	19	6/4/93
CC-239	20	9/17/92	CC-390	19.4	6/4/93
CC-240	20.9	9/17/92	CC-482	17.4	8/9/93
CC-241	25.5	9/17/92	CC-483	16.4	8/9/93
CC-242	20.6	9/17/92	CC-484	19.5	8/9/93
CC-243	21.3	10/5/92	CC-485	21	8/9/93
CC-244	21.6	10/5/92	CC-486	19.7	8/9/93
CC-245	22.6	10/5/92	CC-487	20.9	8/9/93

Sample No.	Moisture	Date Obtained	Sample No.	Moisture	Date Obtained
CC-488	14.6	8/9/93			
CC-489	23.5	8/9/93			
CC-490	26.5	8/9/93			
CC-491	21.2	8/9/93			
CC-499	20.2	8/11/93			
CC-500	22.2	8/11/93			
CC-501	21.7	8/11/93			

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Bismarck, North Dakota 58502-2379
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Engineers and Scientists Serving the Built and Natural Environments®

Fly Ash Moistures

Date: April 14, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
AP #91

Sample No.	Moisture	Date Obtained	Project Specs.
CC-561	10.6	8/30/93	Max. 12
CC-562	10.3	8/30/93	Max. 12
CC-563	13	8/31/93	Max. 12

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cv2/258

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AP #91 Results
Coal Creek Station
Hydrometers

Volume II

Cooperative Power Association
Underwood, North Dakota

Project BFDX-92-018C
April 27, 1994

Braun Intertec Corporation

Engineers and Scientists
Serving the Built and
Natural Environments

Index

Volume II
Set II

Hydrometers

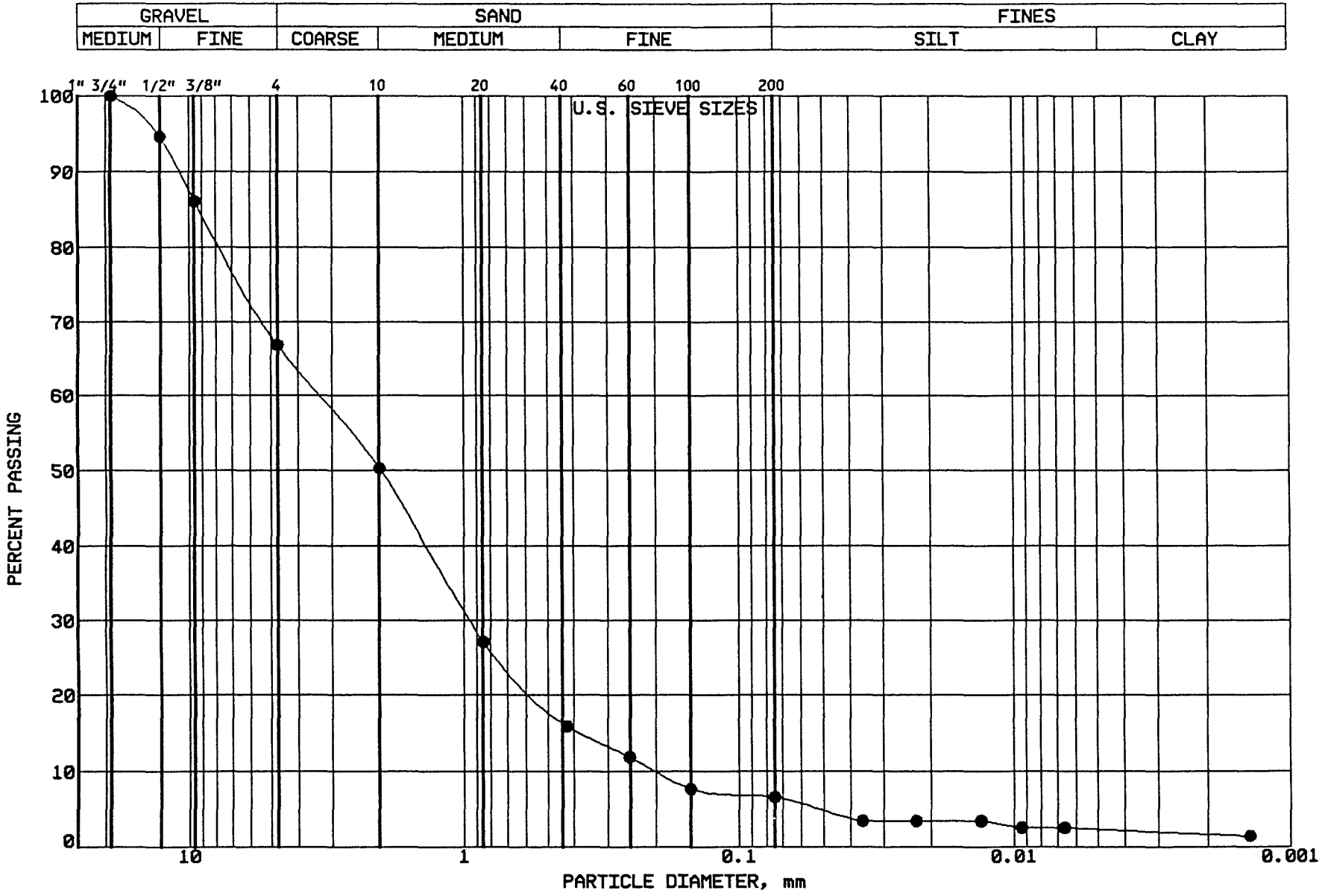
AP #91

Hydrometers/Atterbergs
CC-1 thru CC-302

ABBREVIATIONS --

DE -- Dike Embankment
DC -- Dike Core
CLB -- Clay Liner Base
CLS -- Clay Liner Slope
SG -- Subgrade
SB -- Sand Blanket
CC -- Coal Creek Identifier

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Recycle Pumphouse
UNDERWOOD, ND

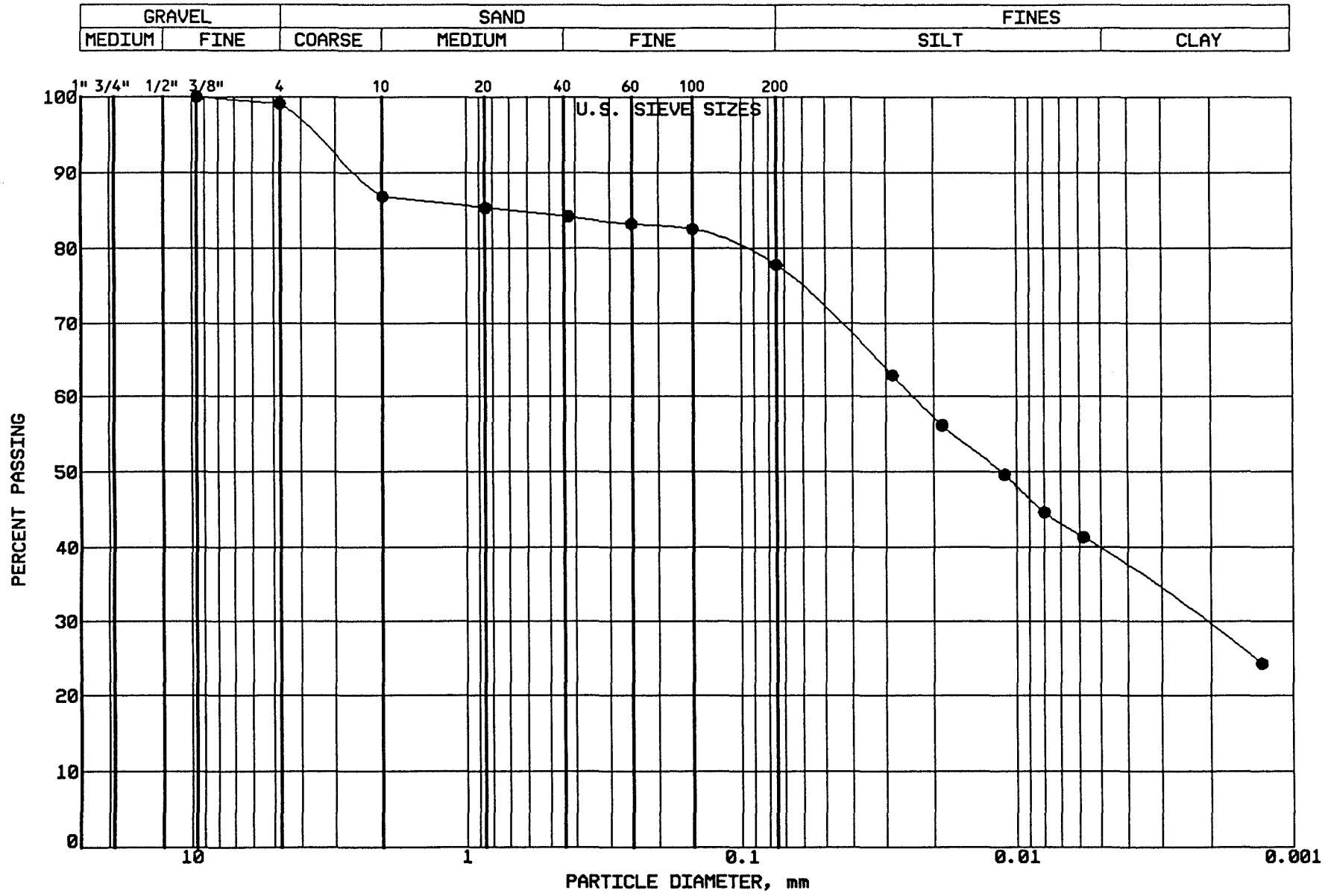
LOCATION: N PILE, E
SAMPLE: CC1 TUBE #:
ELEVATION: 0.0'

GRAVEL	33.2 %
SAND	60.2 %
SILT	4.2 %
CLAY	2.4 %
P 200	6.6 %

SOIL PROPERTIES

LL: NP%
PL: NP%
PI: NP%
CLASS: SP POORLY GRADED SAND w/gr., br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Recycle Pumphouse
UNDERWOOD, ND

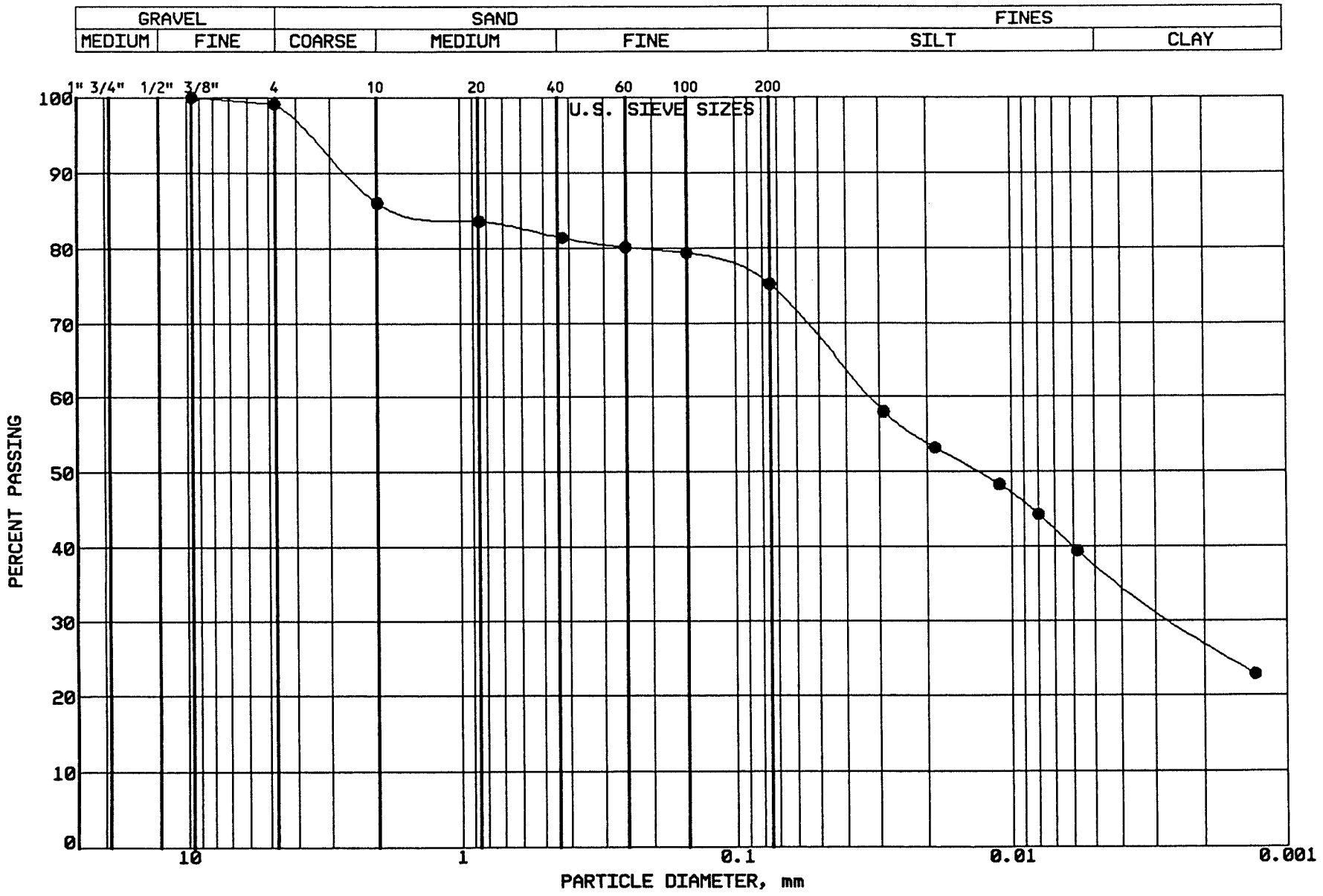
LOCATION: N PILE, E
SAMPLE: CC2 TUBE #:
ELEVATION: 0.0'

GRAVEL	0.9 %
SAND	21.4 %
SILT	38.0 %
CLAY	39.6 %
P 200	77.7 %

SOIL PROPERTIES

LL: 41.0%
PL: 22.0%
PI: 19.0%
CLASS: CL LEAN CLAY w/sand, dark gray

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



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PROJECT: BFDX-91-035C
C.P.A. ASH POND
Recycle Pumphouse
UNDERWOOD, ND

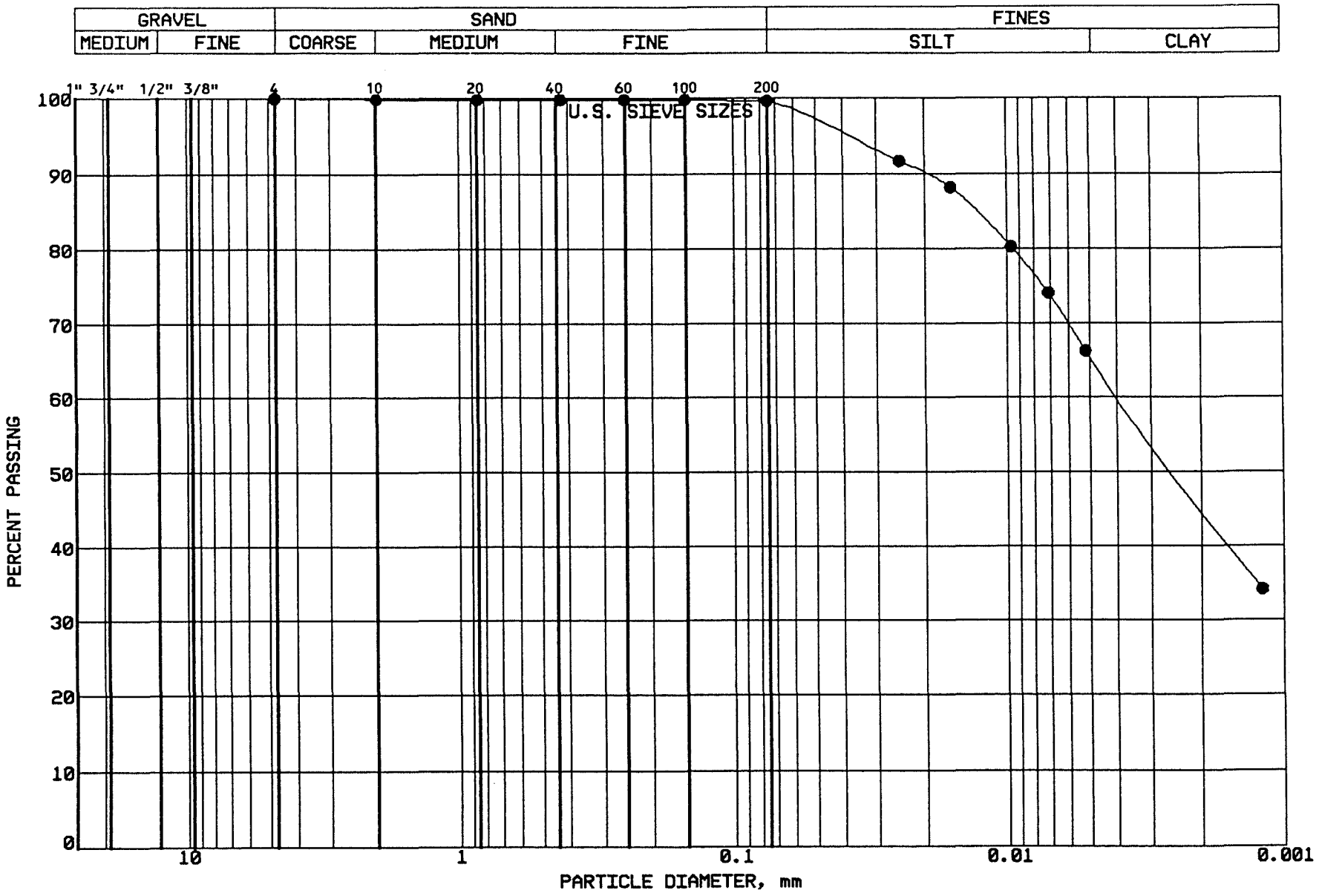
LOCATION: N PILE, E
SAMPLE: CC3 TUBE #:
ELEVATION: 0.0'

GRAVEL	0.9 %
SAND	23.9 %
SILT	37.4 %
CLAY	37.7 %
P 200	75.2 %

SOIL PROPERTIES

LL: 43.0%
PL: 18.0%
PI: 25.0%
CLASS: CL LEAN CLAY w/sand, dark gray

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond #91
UNDERWOOD, ND

LOCATION: N 37500.0, E 40500.0
SAMPLE: CC-4 TUBE #:
ELEVATION: N/A'

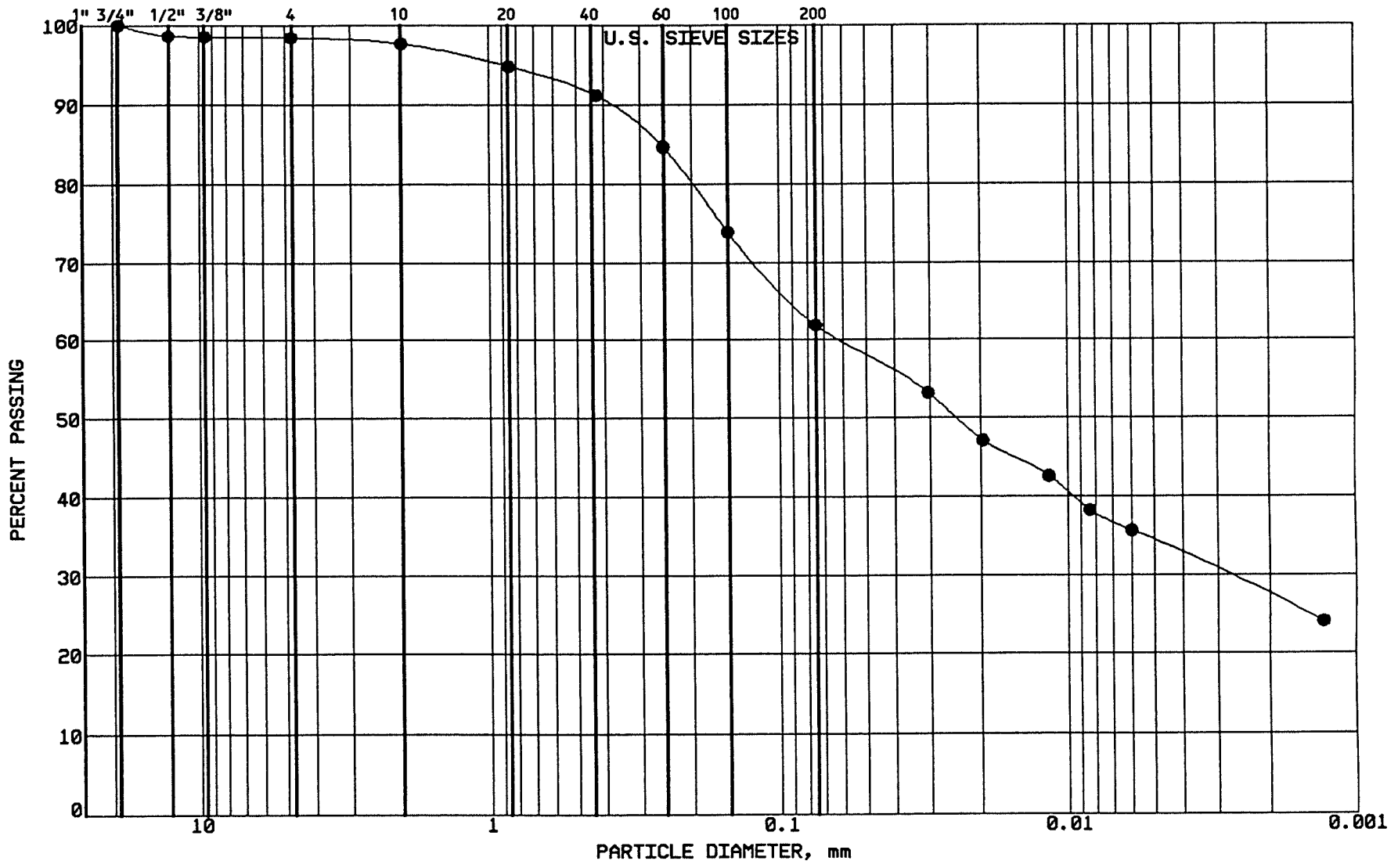
GRAVEL	0.0 %
SAND	0.4 %
SILT	34.2 %
CLAY	65.3 %
P 200	99.6 %

SOIL PROPERTIES

LL: 54.0%
PL: 24.0%
PI: 30.0%
CLASS: CH FAT CLAY, dk gray

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Recycle Pumphouse
UNDERWOOD, ND

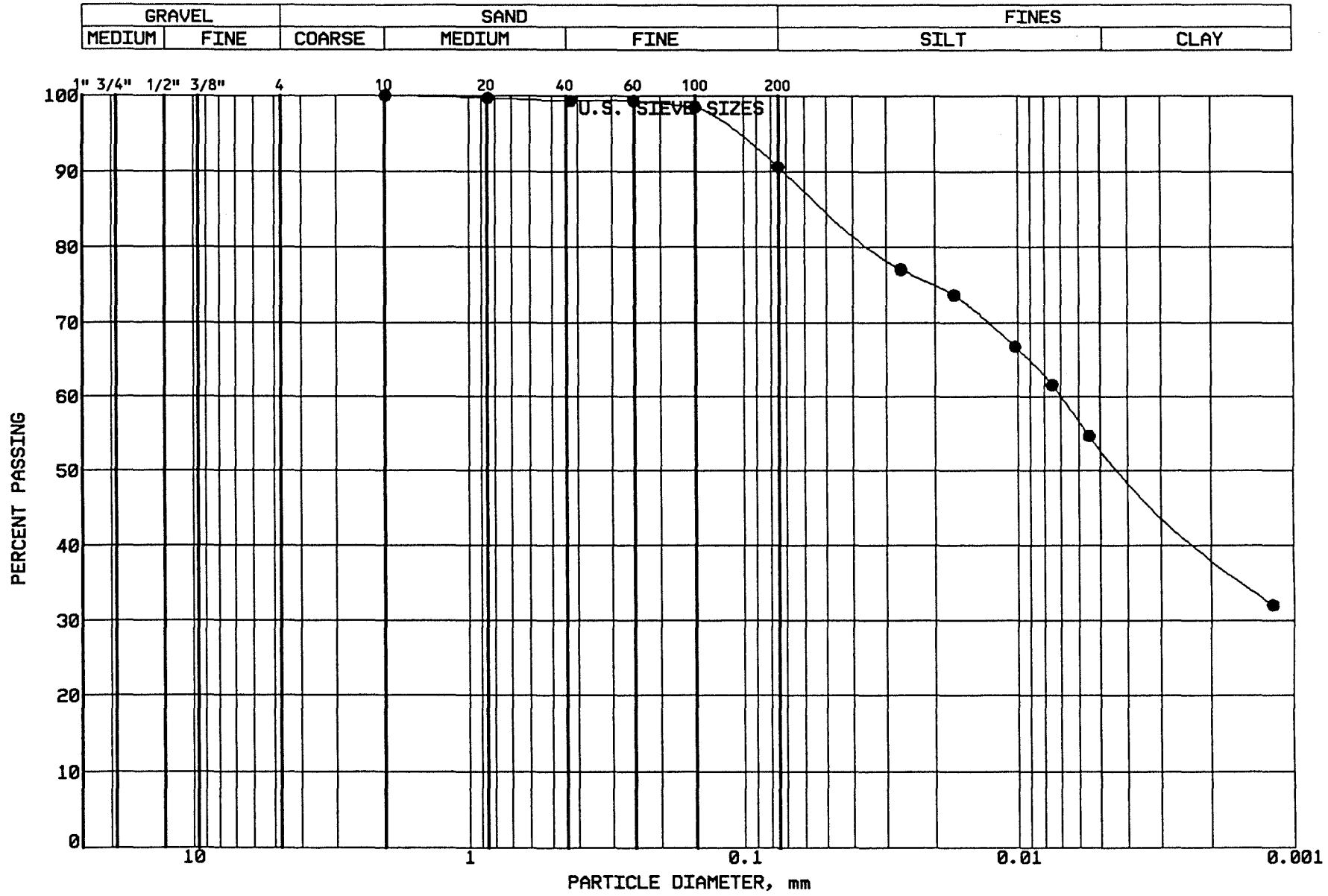
LOCATION: N 0.0, E
SAMPLE: CC-5 TUBE #:
ELEVATION: 0.0'

GRAVEL	1.6 %
SAND	36.5 %
SILT	27.6 %
CLAY	34.2 %
P 200	61.9 %

SOIL PROPERTIES

LL: 39.0%
PL: 12.0%
PI: 27.0%
CLASS: CL SANDY LEAN CLAY, ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



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PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

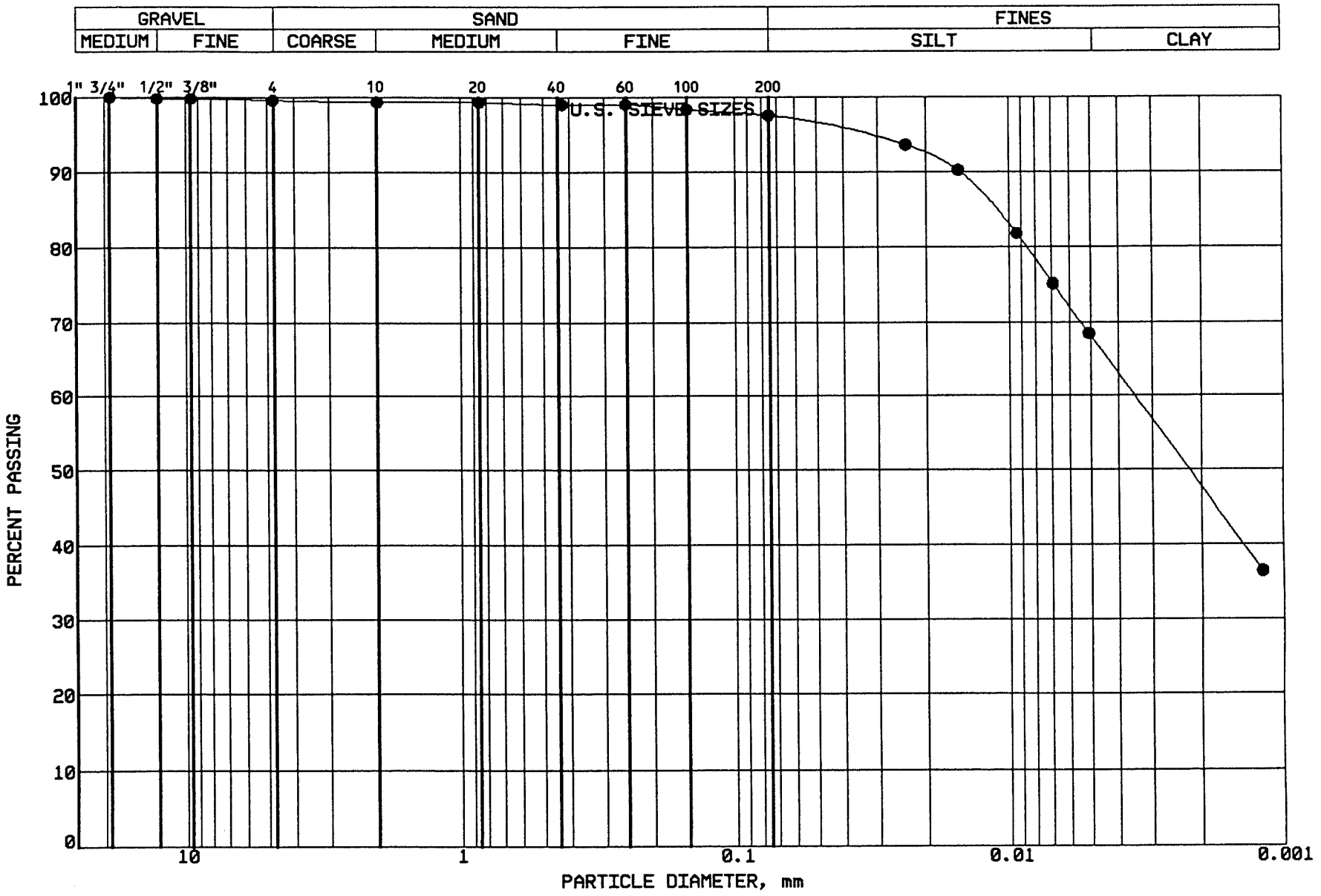
LOCATION: N 37056.0, E 40899.0
SAMPLE: DCCC006 TUBE #:
ELEVATION: 1909.4'

GRAVEL	0.0 %
SAND	9.4 %
SILT	37.3 %
CLAY	53.2 %
P 200	90.6 %

SOIL PROPERTIES

LL: 58.0%
PL: 16.0%
PI: 42.0%
CLASS: CH FAT CLAY, dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond #91
UNDERWOOD, ND

LOCATION: N 37071.0, E 40779.0
SAMPLE: DCCC007 TUBE #:
ELEVATION: 1907.3'

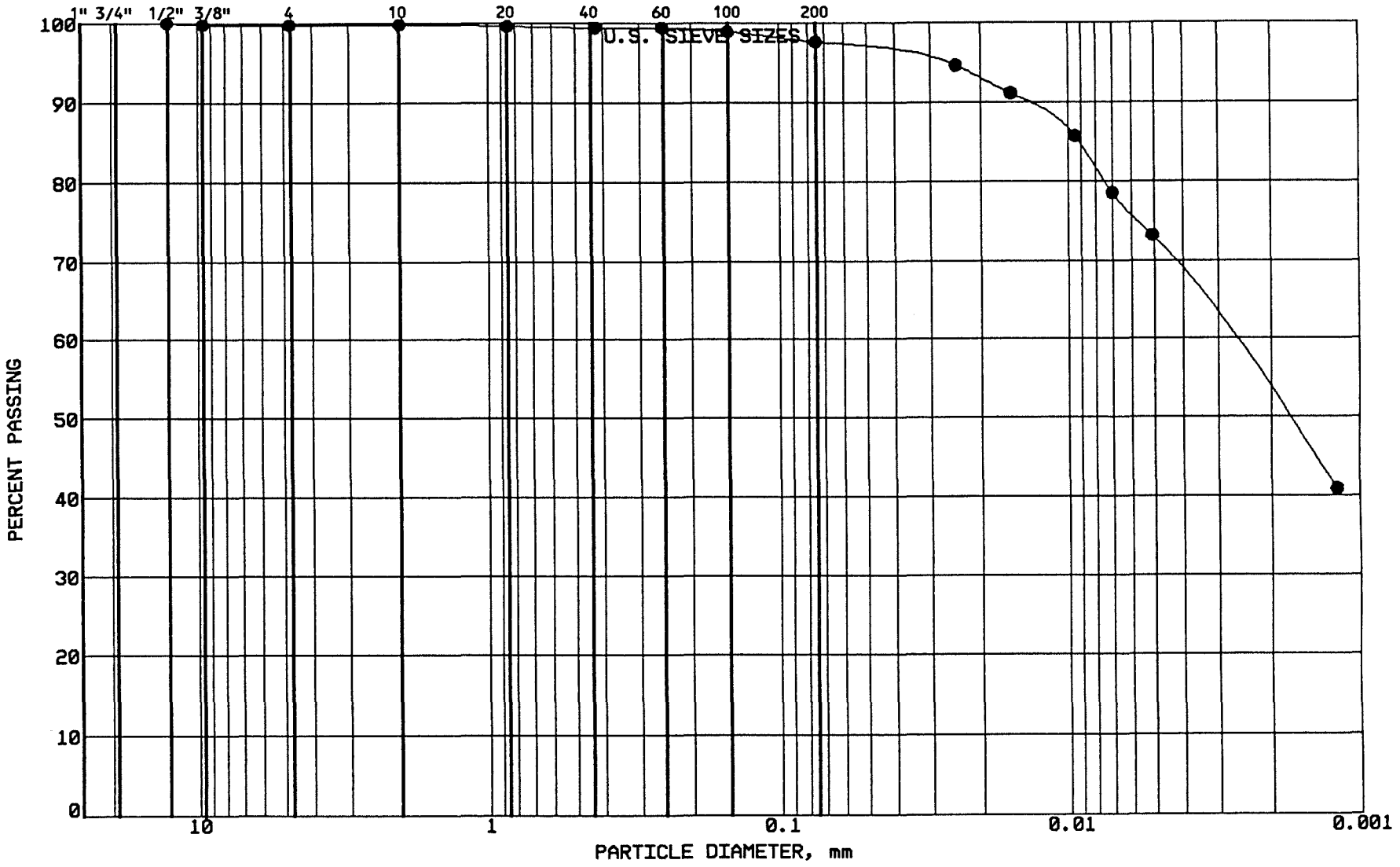
GRAVEL	0.4 %
SAND	2.1 %
SILT	29.5 %
CLAY	67.9 %
P 200	97.5 %

SOIL PROPERTIES

LL: 59.0%
PL: 16.0%
PI: 43.0%
CLASS: CH FAT CLAY, dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



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PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

LOCATION: N 37067.0, E 40429.0
SAMPLE: DCCC008 TUBE #:
ELEVATION: 1909.0'

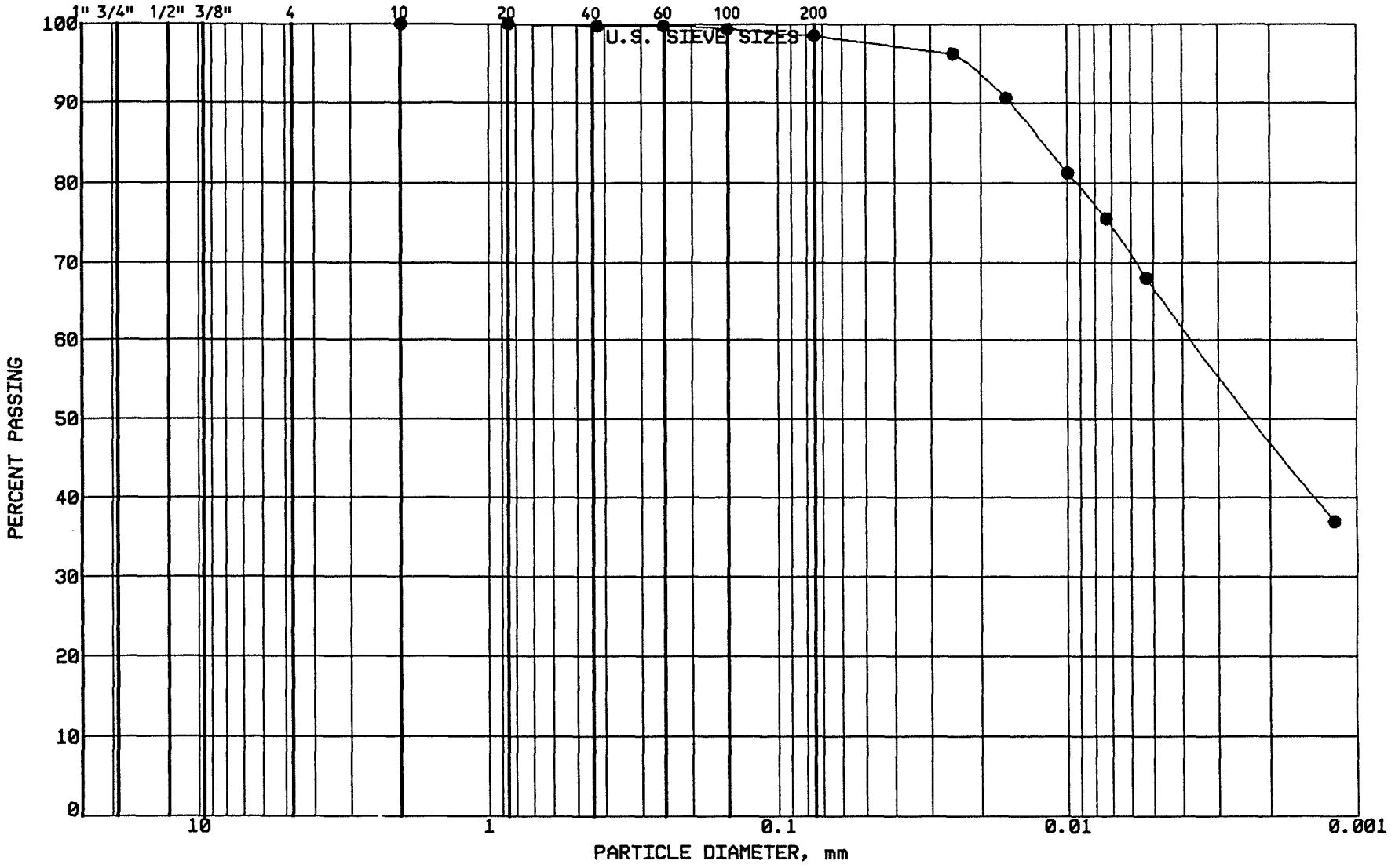
GRAVEL	0.2 %
SAND	2.2 %
SILT	24.8 %
CLAY	72.7 %
P 200	97.6 %

SOIL PROPERTIES

LL: 61.0%
PL: 17.0%
PI: 44.0%
CLASS: CH FAT CLAY, dk gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

LOCATION: N 37070.0, E 40654.0
SAMPLE: DCCC009 TUBE #:
ELEVATION: 1905.9'

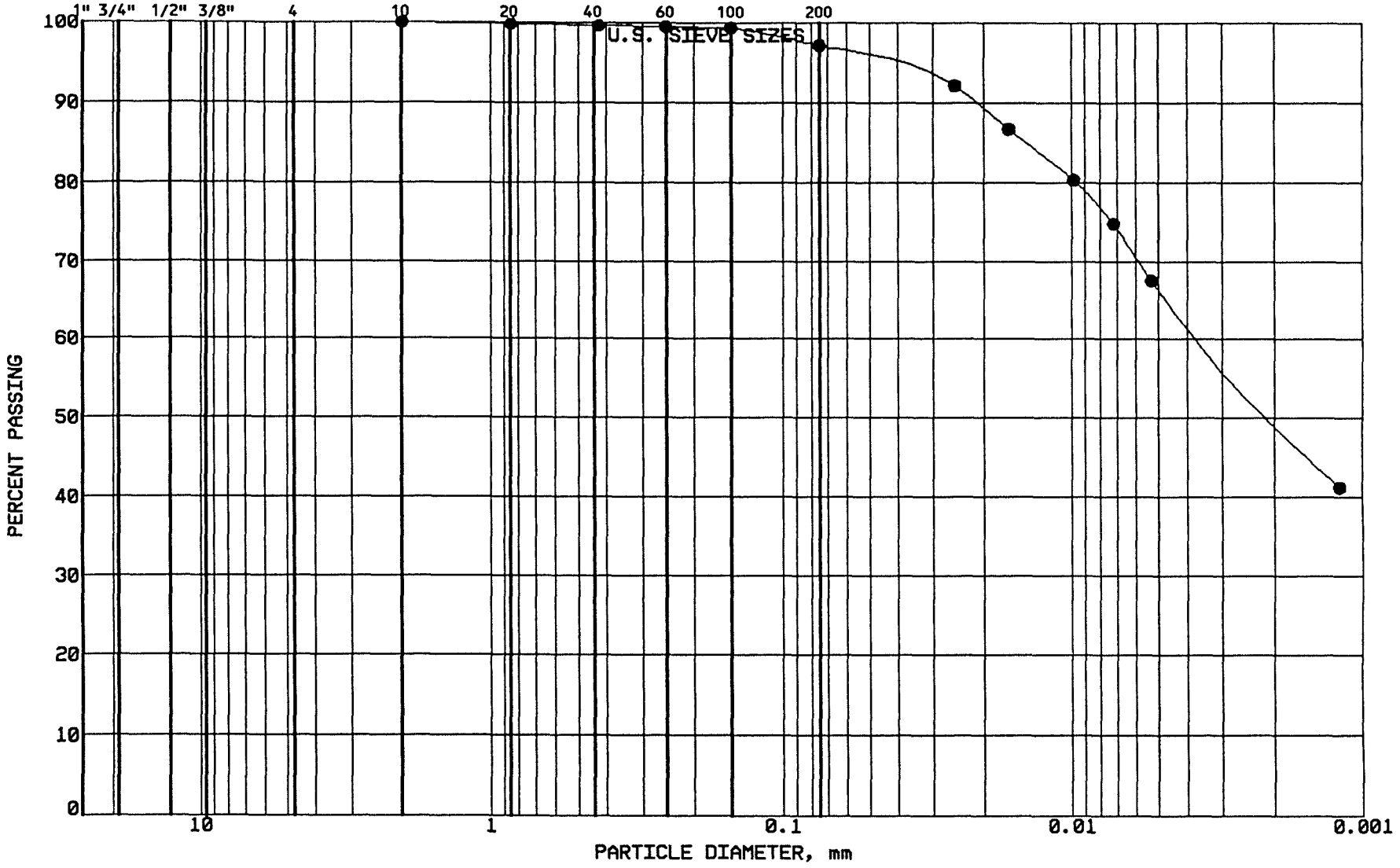
GRAVEL	0.0 %
SAND	1.5 %
SILT	31.7 %
CLAY	66.7 %
P 200	98.5 %

SOIL PROPERTIES

LL: 58.0%
PL: 16.0%
PI: 42.0%
CLASS: CH FAT CLAY, dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

LOCATION: N 37072.0, E 40819.0
SAMPLE: DCCC010 TUBE #:
ELEVATION: 1908.3'

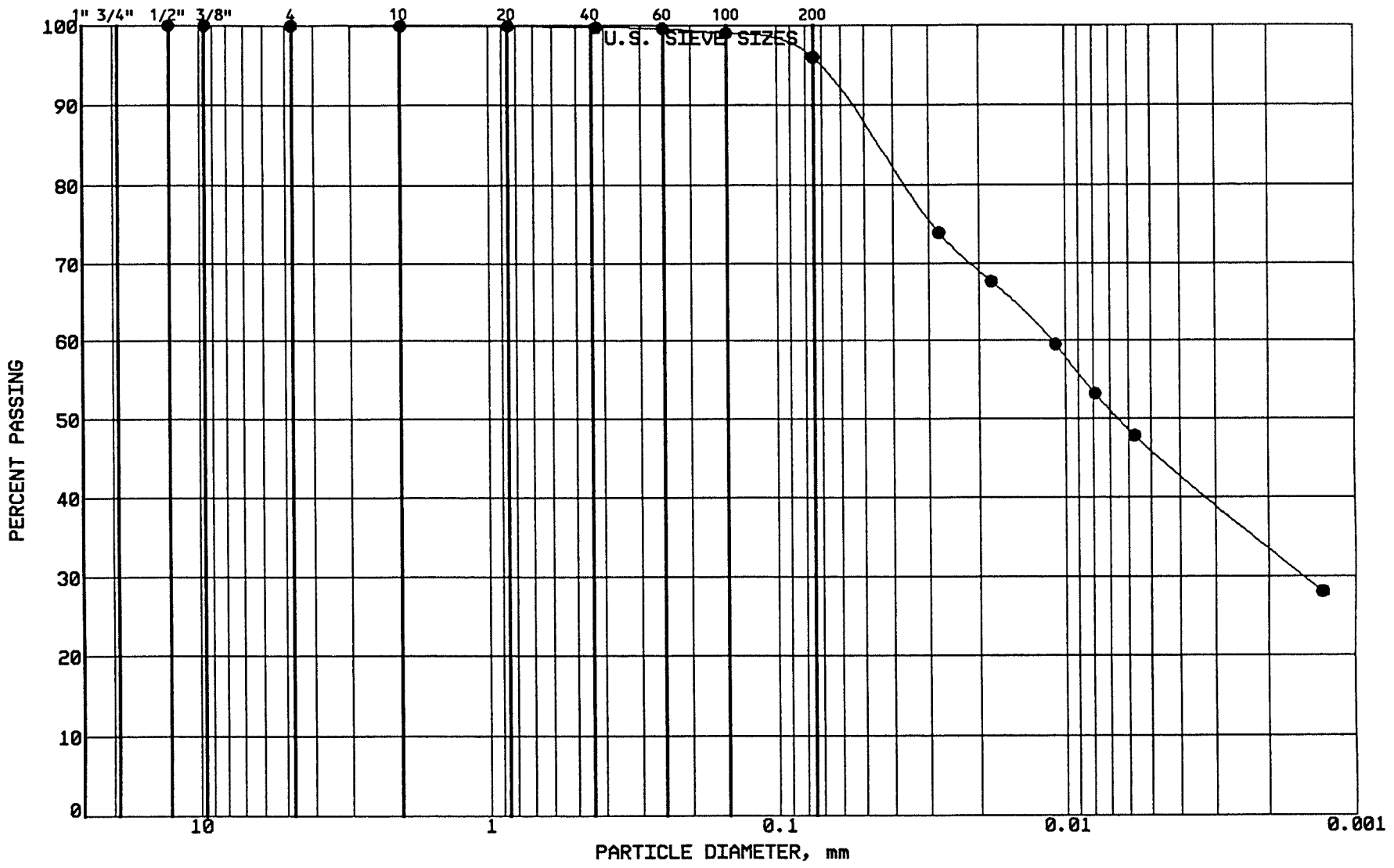
GRAVEL	0.0 %
SAND	2.9 %
SILT	30.6 %
CLAY	66.4 %
P 200	97.1 %

SOIL PROPERTIES

LL: 60.0%
PL: 17.0%
PI: 43.0%
CLASS: CH FAT CLAY, dk ol gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

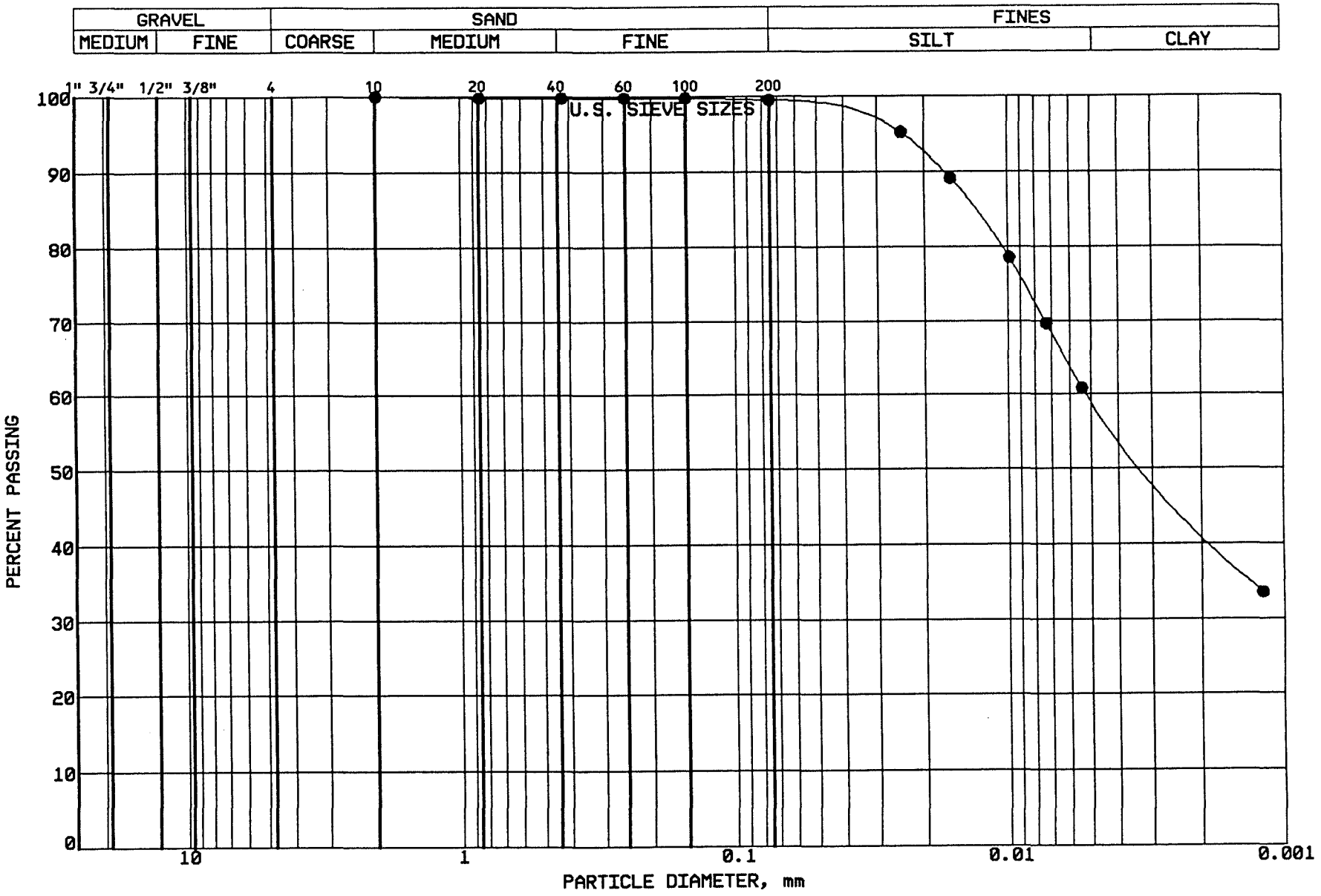
LOCATION: N 37082.0, E 40641.0
SAMPLE: DCCC011 TUBE #:
ELEVATION: 1907.6'

GRAVEL	0.0 %
SAND	4.0 %
SILT	49.9 %
CLAY	46.0 %
P 200	96.0 %

SOIL PROPERTIES

LL: 51.0%
PL: 15.0%
PI: 36.0%
CLASS: CH FAT CLAY, dk ol gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

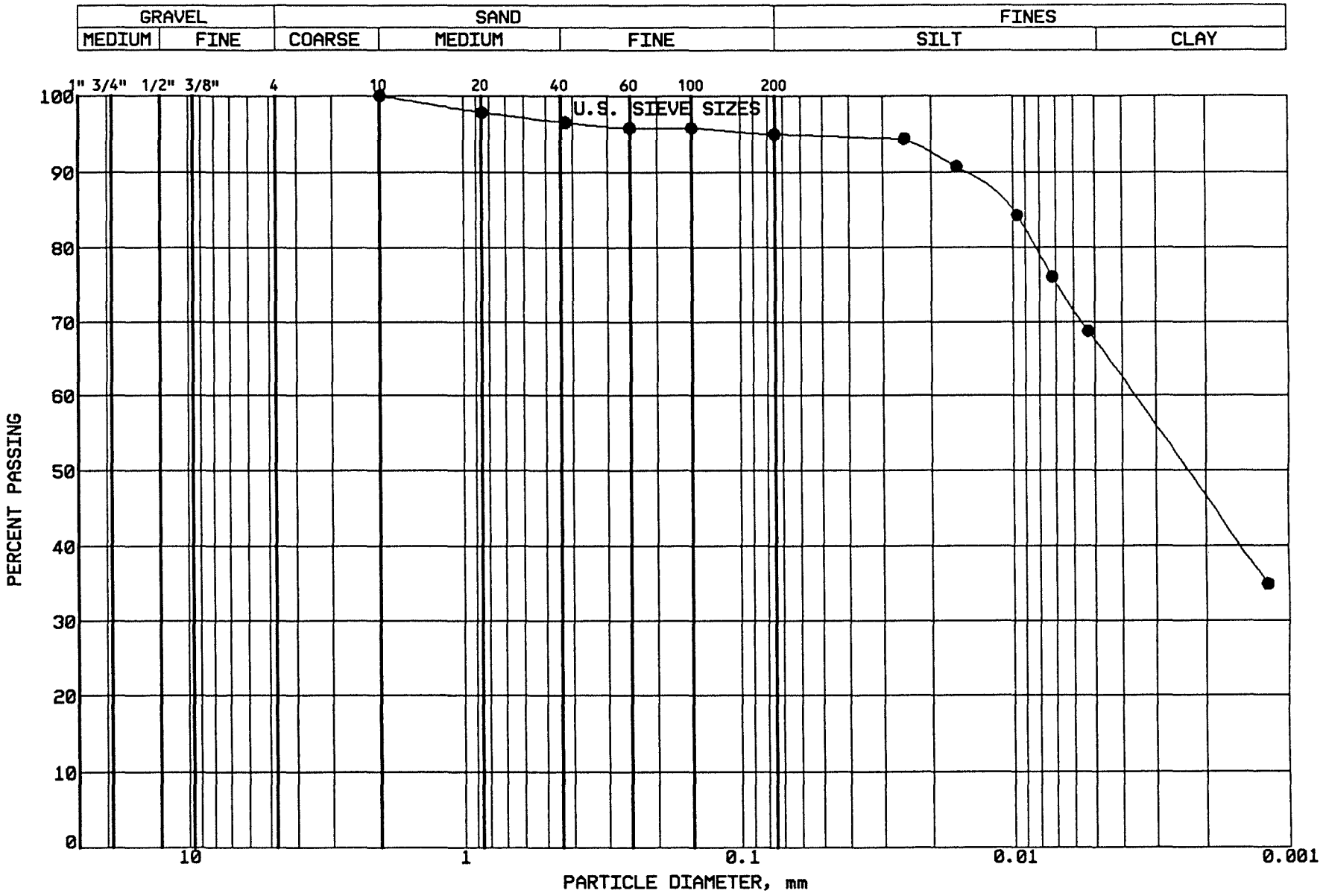
LOCATION: N 37067.0, E 40849.0
SAMPLE: DCCC012 TUBE #: ST-1
ELEVATION: 1910.8'

GRAVEL	0.0 %
SAND	0.5 %
SILT	40.0 %
CLAY	59.4 %
P 200	99.5 %

SOIL PROPERTIES

LL: 52.0%
PL: 20.0%
PI: 32.0%
CLASS: CH FAT CLAY, gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

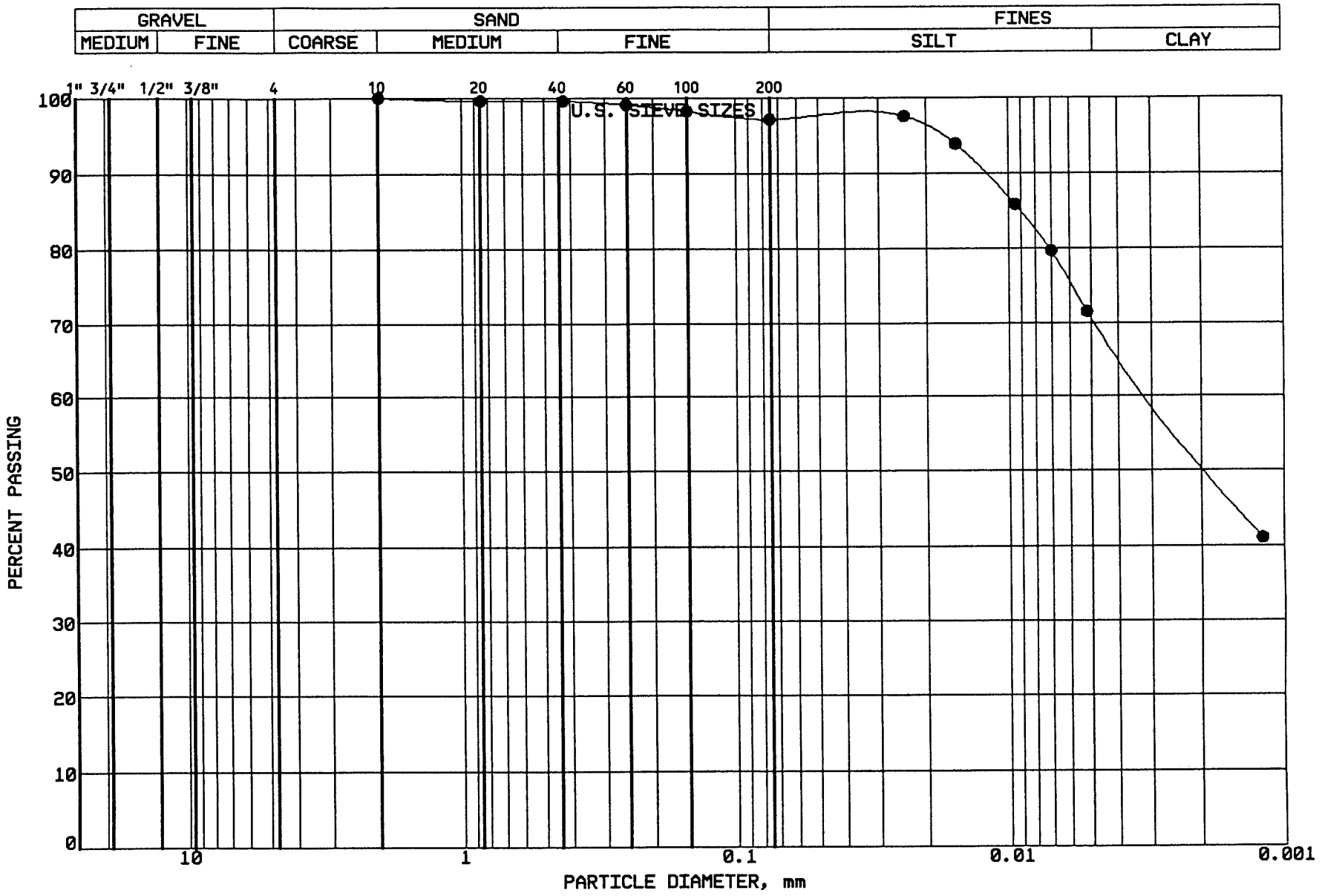
LOCATION: N 37065.0, E 40670.0
SAMPLE: DCCC013 TUBE #: ST-2
ELEVATION: 1909.4'

GRAVEL	0.0 %
SAND	5.0 %
SILT	27.6 %
CLAY	67.3 %
P 200	95.0 %

SOIL PROPERTIES

LL: 54.0%
PL: 21.0%
PI: 33.0%
CLASS: CH FAT CLAY, gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

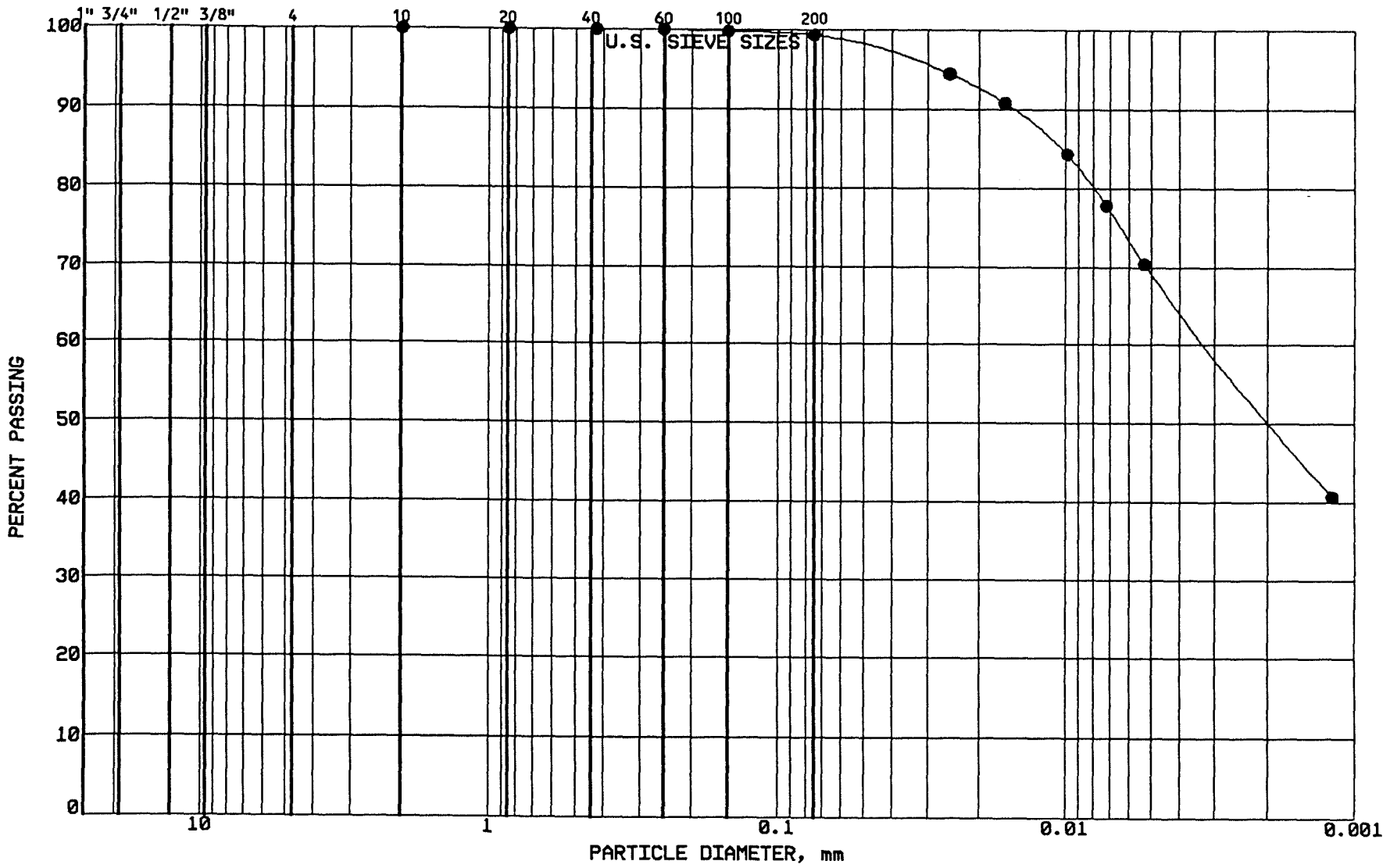
LOCATION: N 37058.0, E 40475.0
SAMPLE: DCCC014 TUBE #: ST-3
ELEVATION: 1910.3'

GRAVEL	0.0 %
SAND	2.9 %
SILT	26.4 %
CLAY	70.6 %
P 200	97.1 %

SOIL PROPERTIES

LL: 57.0%
PL: 21.0%
PI: 36.0%
CLASS: CH FAT CLAY, gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

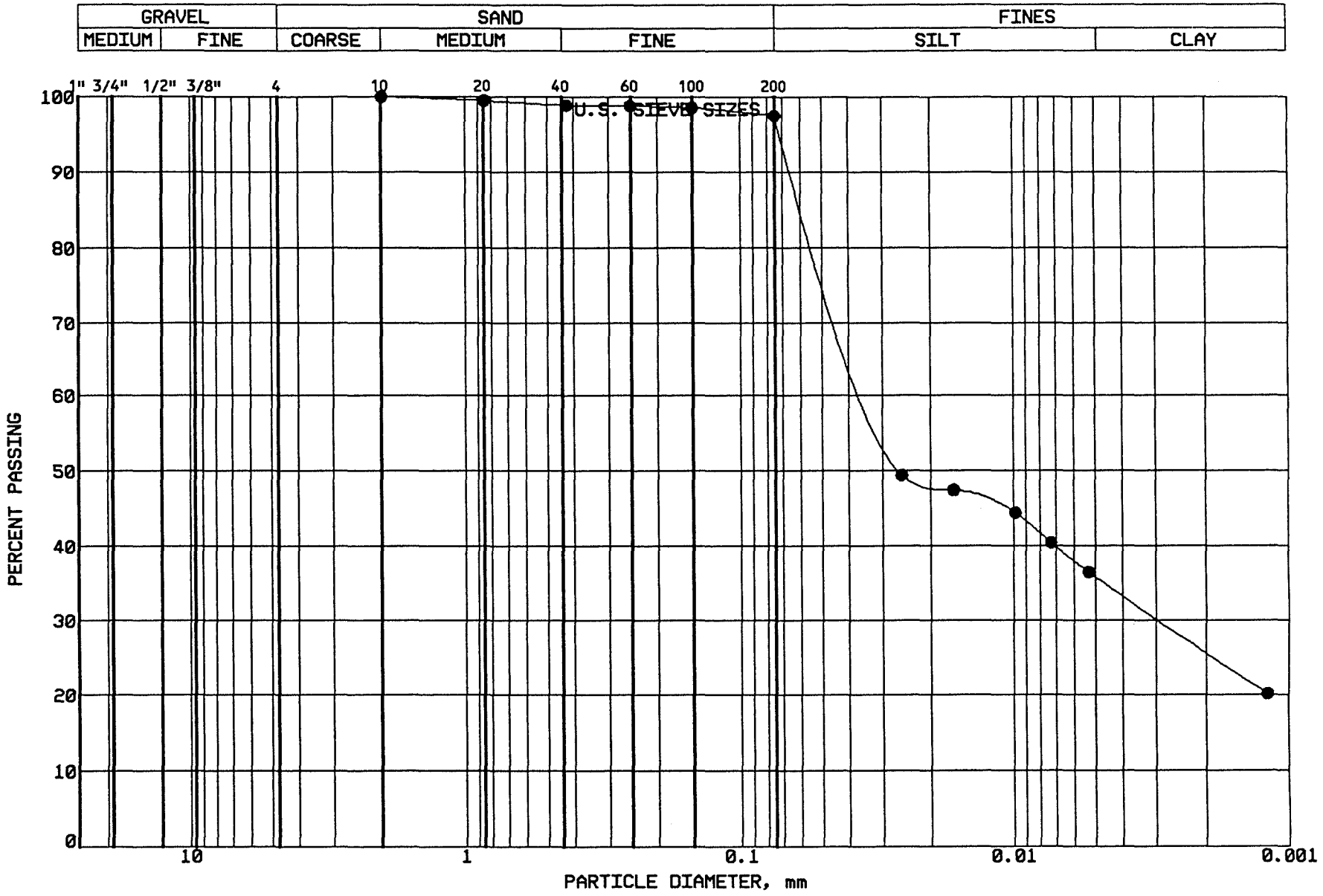
LOCATION: N 37065.0, E 40670.0
SAMPLE: DCCC017 TUBE #: ST-2 RE
ELEVATION: 1909.4'

GRAVEL	0.0 %
SAND	0.7 %
SILT	30.0 %
CLAY	69.2 %
P 200	99.3 %

SOIL PROPERTIES

LL: 59.0%
PL: 25.0%
PI: 34.0%
CLASS: CH FAT CLAY, dk gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond #91
UNDERWOOD, ND

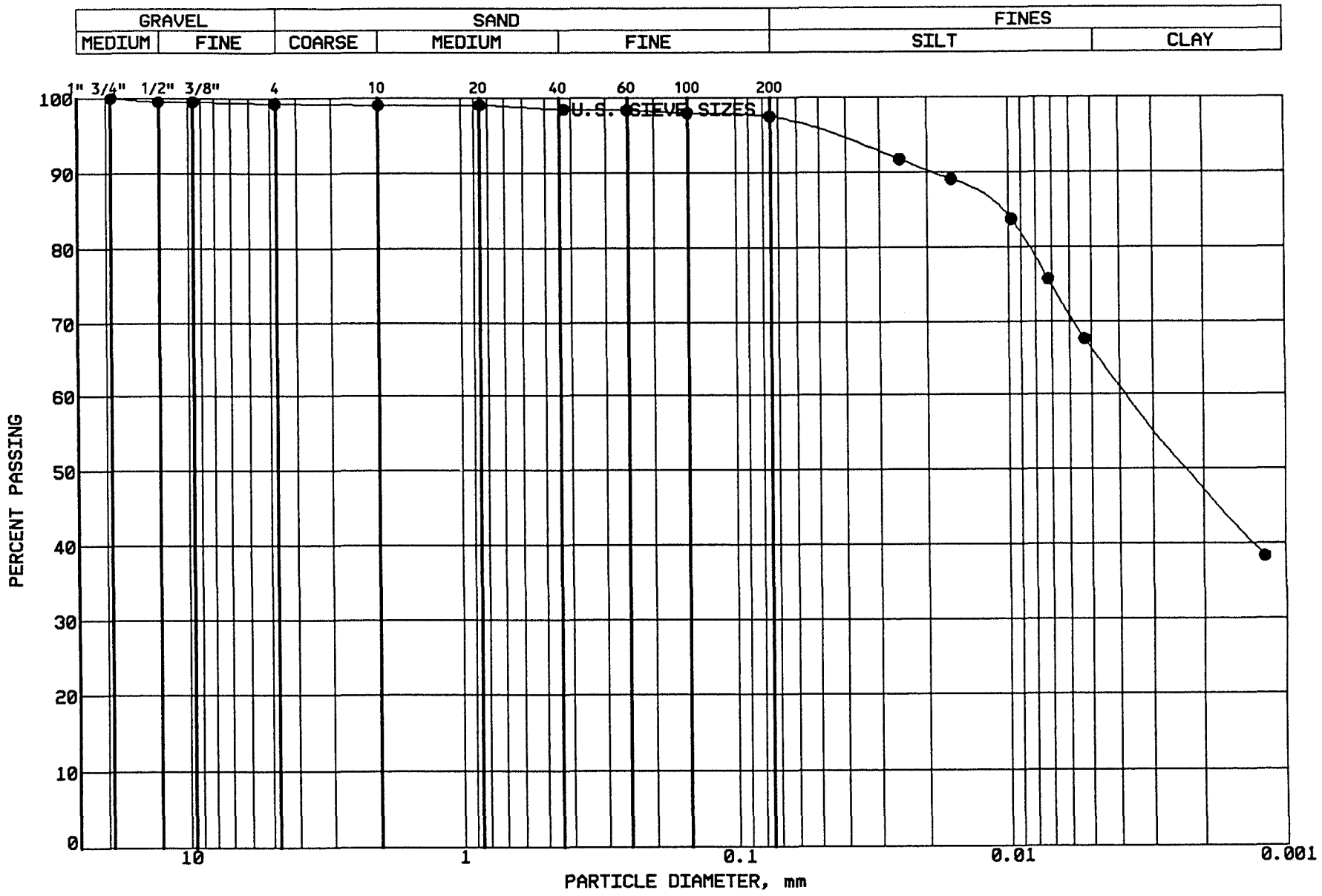
LOCATION: N 37058N, E40475.0
SAMPLE: DCCC18 TUBE #: ST-3BRE
ELEVATION: 1910.3'

GRAVEL	0.0 %
SAND	2.5 %
SILT	61.7 %
CLAY	35.7 %
P 200	97.5 %

SOIL PROPERTIES

LL: 53.0%
PL: 25.0%
PI: 28.0%
CLASS: CH - FAT CLAY, very dark gray

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

LOCATION: N 37068.0, E 40840.0
SAMPLE: DCCC019 TUBE #: ST-4
ELEVATION: 1912.2'

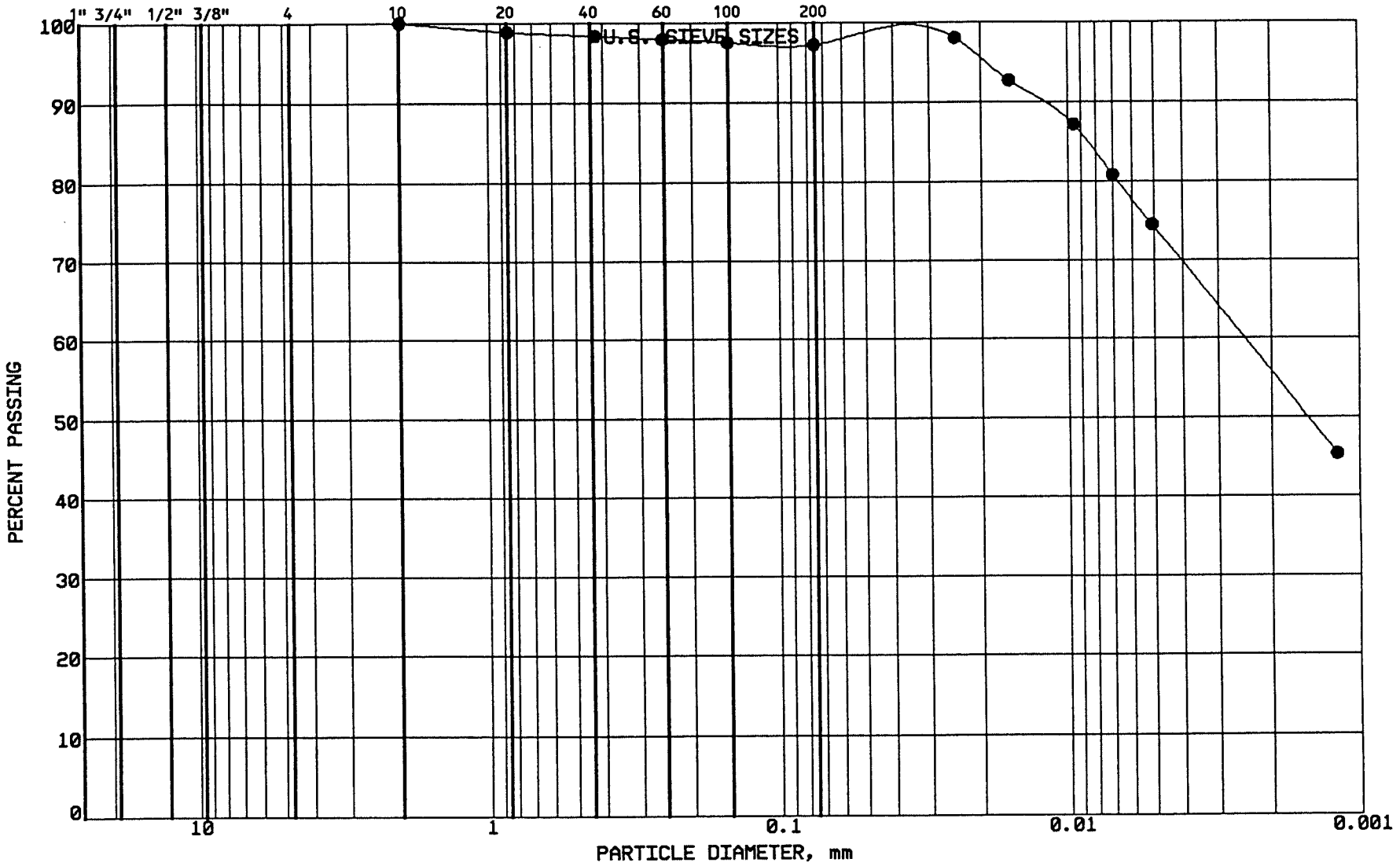
GRAVEL	0.8 %
SAND	1.8 %
SILT	30.9 %
CLAY	66.4 %
P 200	97.4 %

SOIL PROPERTIES

LL: 58.0%
PL: 21.0%
PI: 37.0%
CLASS: CH FAT CLAY, gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

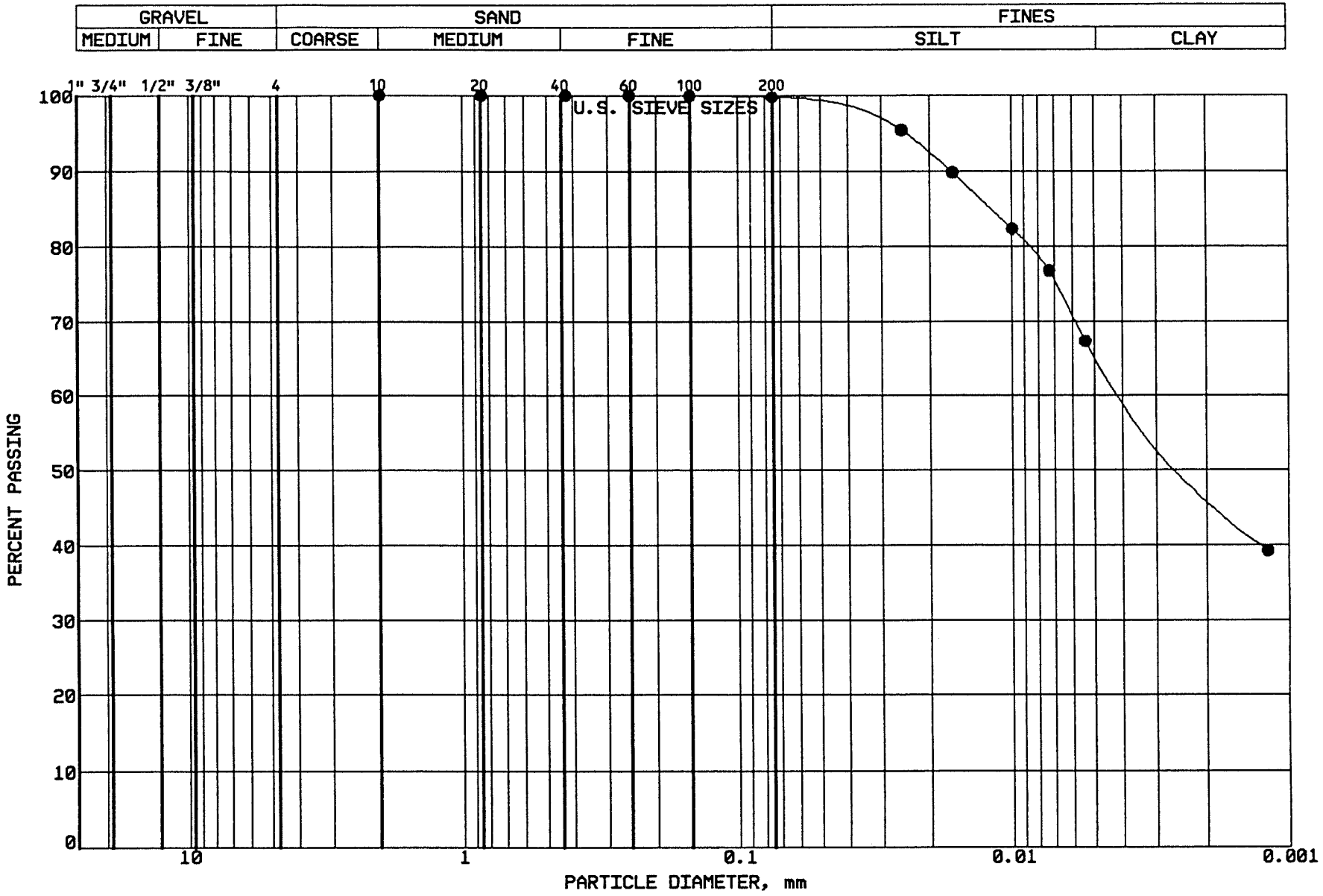
LOCATION: N 37070.0, E 40680.0
SAMPLE: DCCC021 TUBE #: ST-5
ELEVATION: 1912.6'

GRAVEL	0.0 %
SAND	2.7 %
SILT	23.1 %
CLAY	74.1 %
P 200	97.3 %

SOIL PROPERTIES

LL: 60.0%
PL: 22.0%
PI: 38.0%
CLASS: CH FAT CLAY, gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

LOCATION: N 37059.0, E 40491.0
SAMPLE: DCCC022 TUBE #: ST-6
ELEVATION: 1913.0'

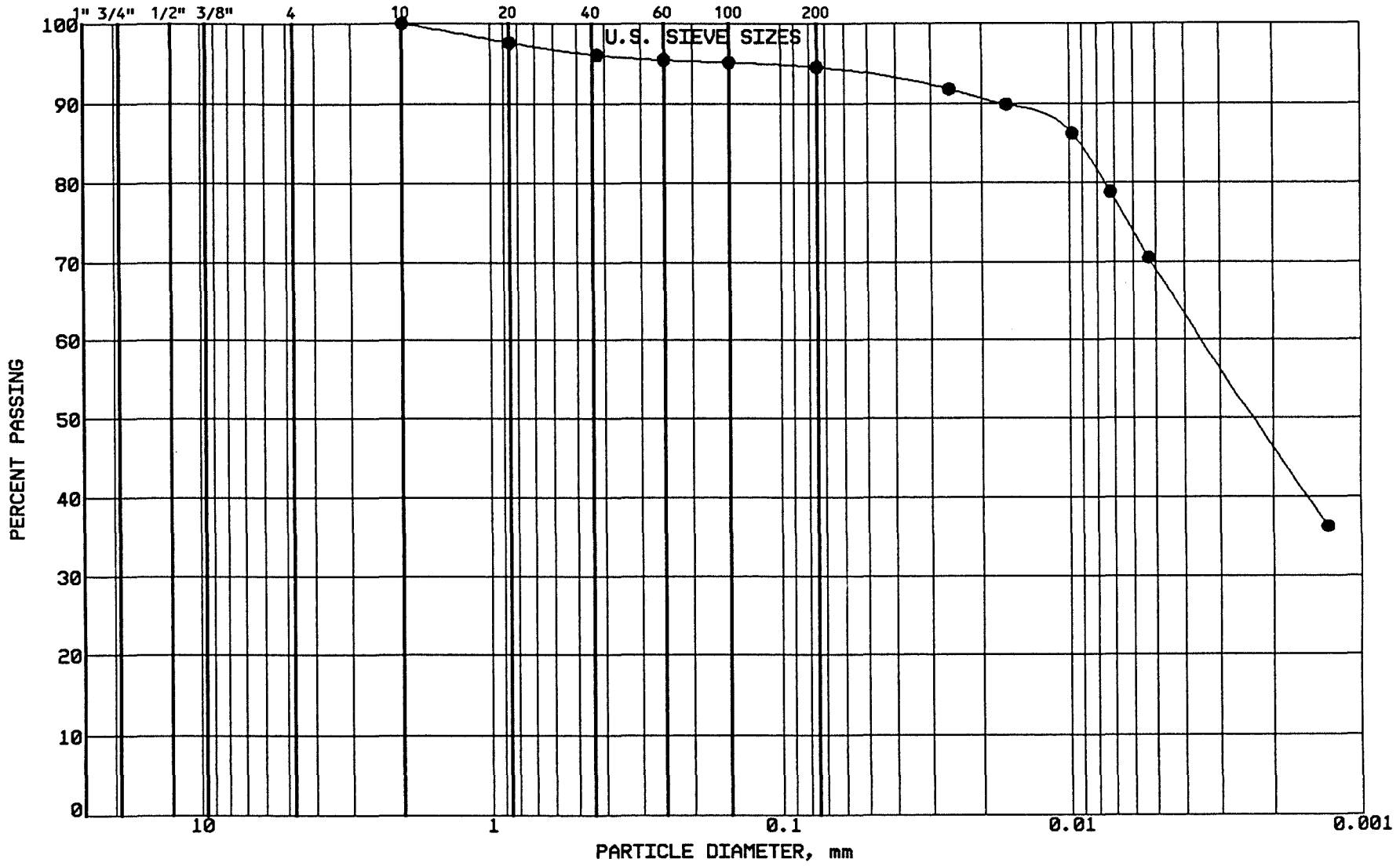
GRAVEL	0.0 %
SAND	0.2 %
SILT	33.9 %
CLAY	65.8 %
P 200	99.8 %

SOIL PROPERTIES

LL: 54.0%
PL: 19.0%
PI: 35.0%
CLASS: CH FAT CLAY, ol

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

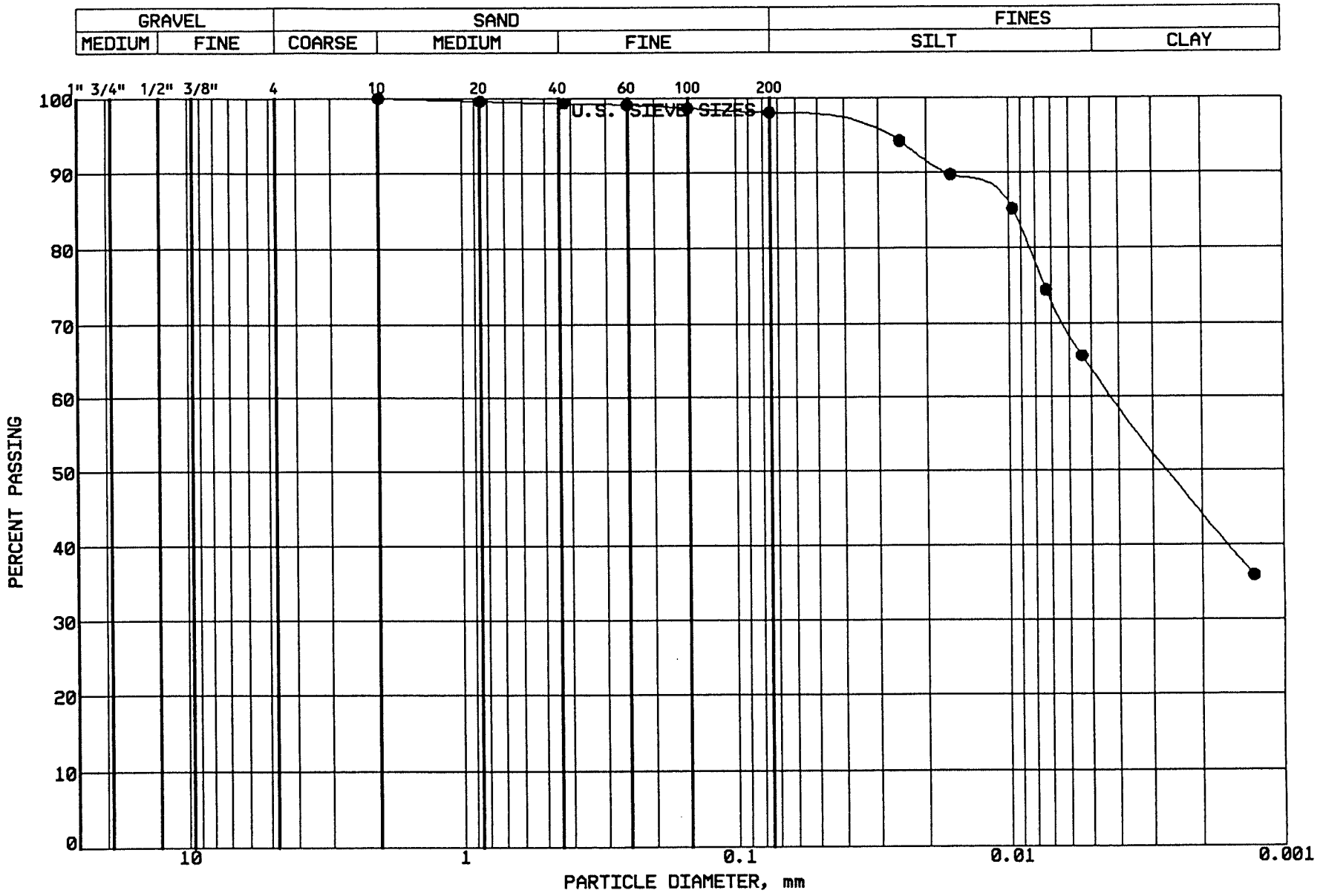
LOCATION: N 37070.0, E 40680.0
SAMPLE: DCCC028 TUBE #: RE-5
ELEVATION: 1912.6'

GRAVEL	0.0 %
SAND	5.4 %
SILT	25.5 %
CLAY	69.0 %
P 200	94.6 %

SOIL PROPERTIES

LL: 61.0%
PL: 22.0%
PI: 39.0%
CLASS: CH FAT CLAY, dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

LOCATION: N 37059.0, E 40491.0
SAMPLE: DCCC029 TUBE #: RE-6
ELEVATION: 1913.0'

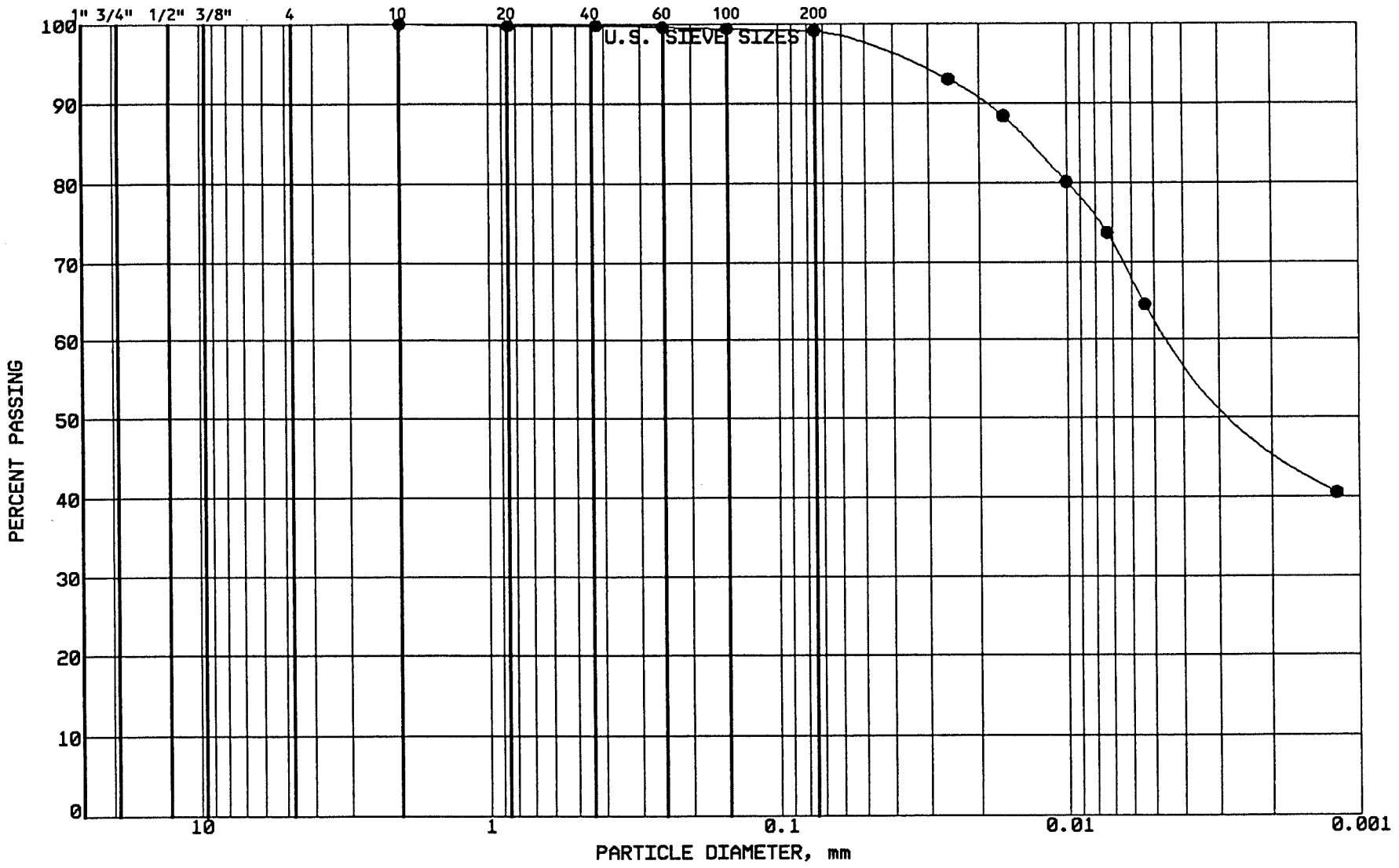
GRAVEL	0.0 %
SAND	2.0 %
SILT	34.0 %
CLAY	63.9 %
P 200	98.0 %

SOIL PROPERTIES

LL: 57.0%
PL: 22.0%
PI: 35.0%
CLASS: CH FAT CLAY, ol

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

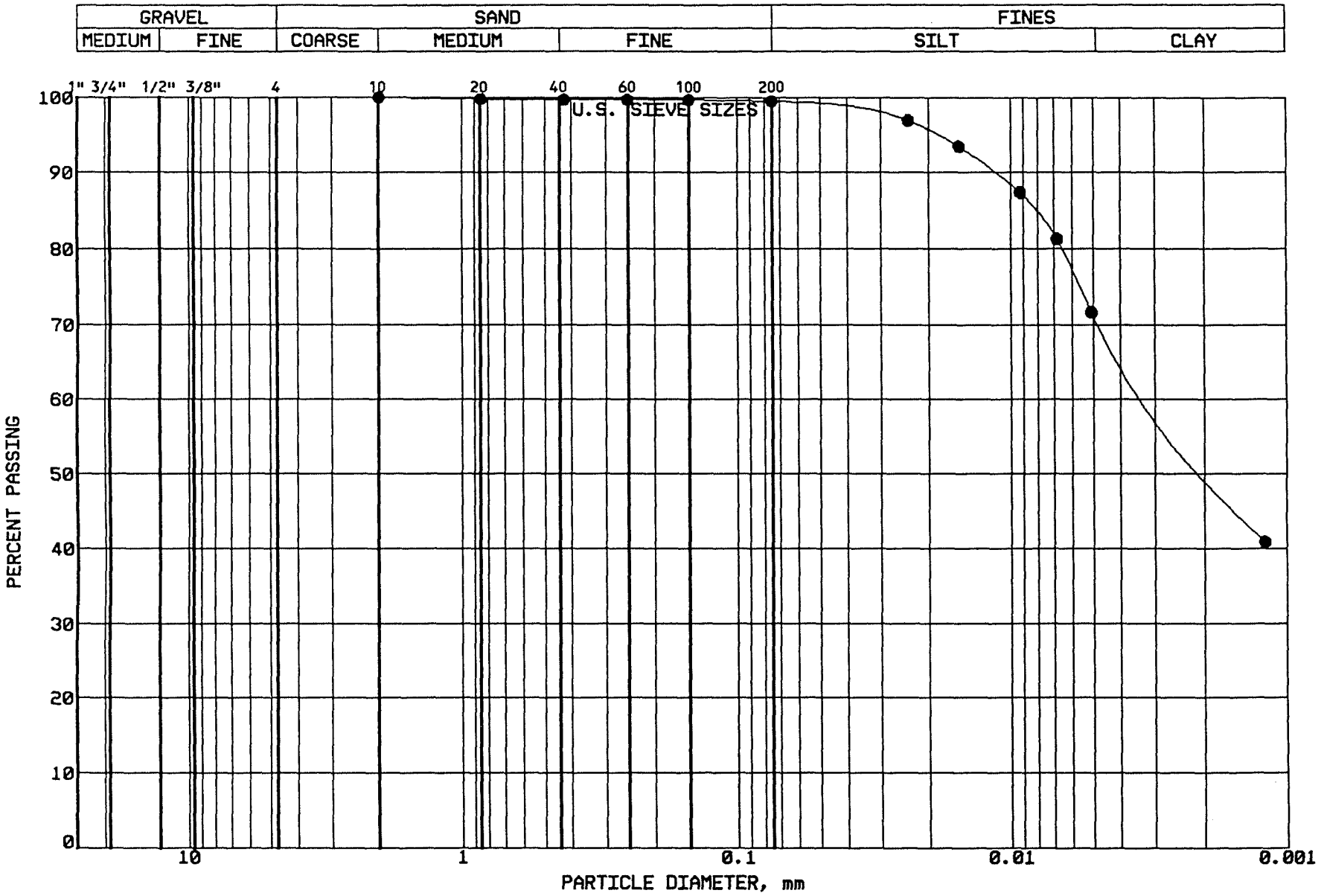
LOCATION: N 37067.0, E 40866.0
SAMPLE: DCCC030 TUBE #: ST-7
ELEVATION: 1914.9'

GRAVEL	0.0 %
SAND	0.9 %
SILT	35.8 %
CLAY	63.2 %
P 200	99.1 %

SOIL PROPERTIES

LL: 62.0%
PL: 23.0%
PI: 39.0%
CLASS: CH FAT CLAY, vy dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

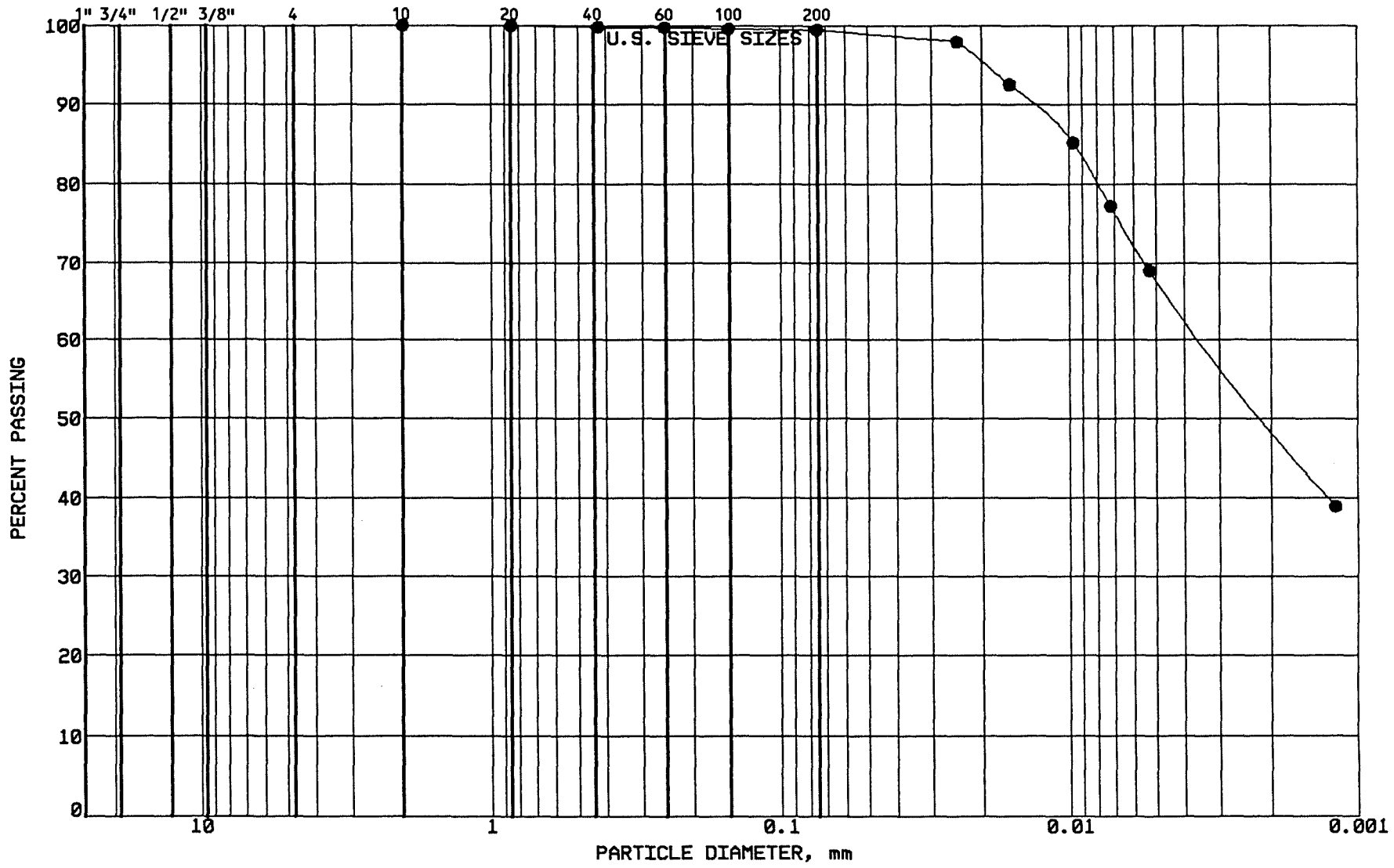
LOCATION: N 37066.0, E 40742.0
SAMPLE: DCCC031 TUBE #: ST-8
ELEVATION: 1914.7'

GRAVEL	0.0 %
SAND	0.5 %
SILT	28.3 %
CLAY	71.1 %
P 200	99.5 %

SOIL PROPERTIES

LL: 62.0%
PL: 24.0%
PI: 38.0%
CLASS: CH FAT CLAY, dk gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

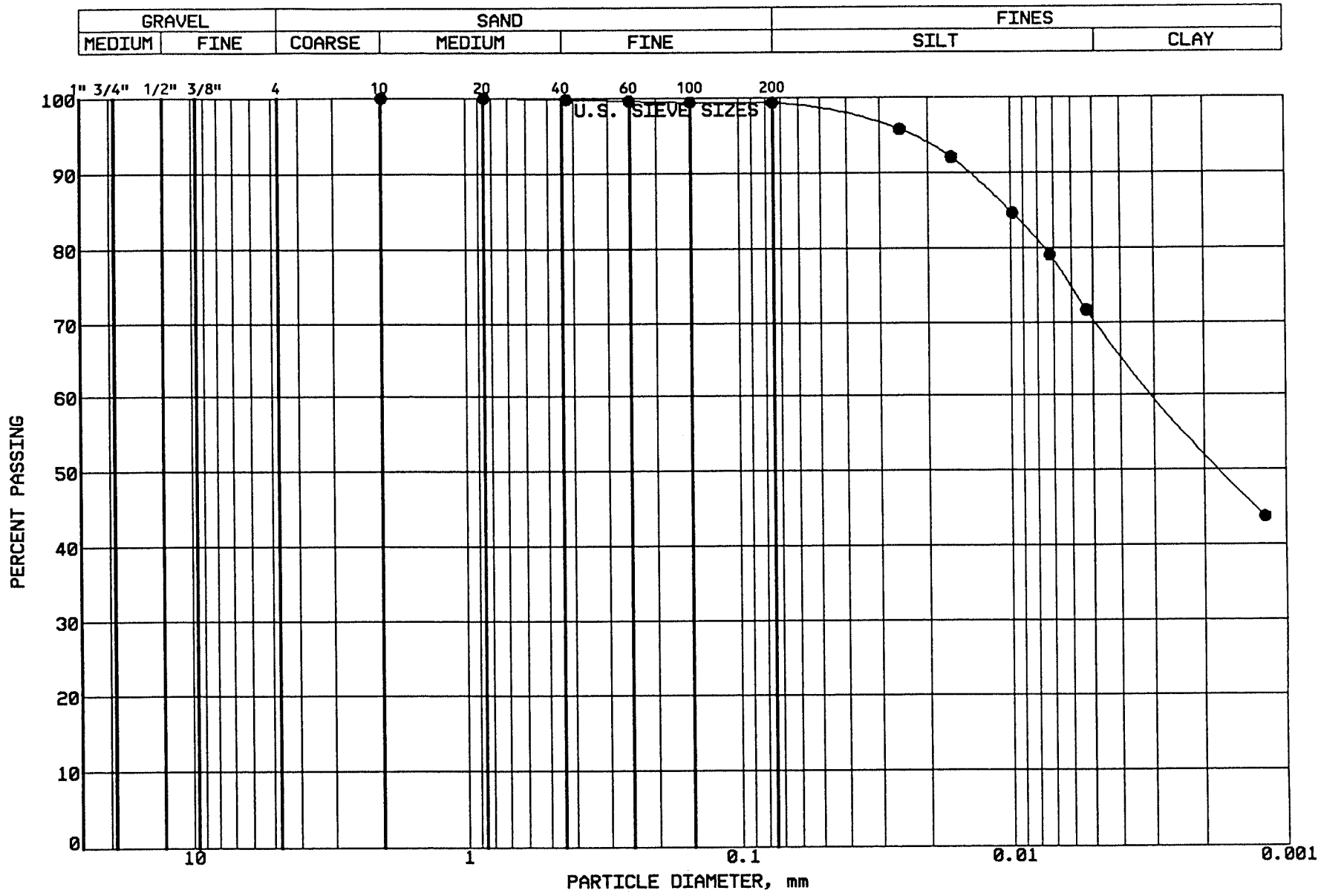
LOCATION: N 37061.0, E 40540.0
SAMPLE: DCCC032 TUBE #: ST-9
ELEVATION: 1914.3'

GRAVEL	0.0 %
SAND	0.5 %
SILT	31.7 %
CLAY	67.7 %
P 200	99.5 %

SOIL PROPERTIES

LL: 59.0%
PL: 22.0%
PI: 37.0%
CLASS: CH FAT CLAY, dk gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

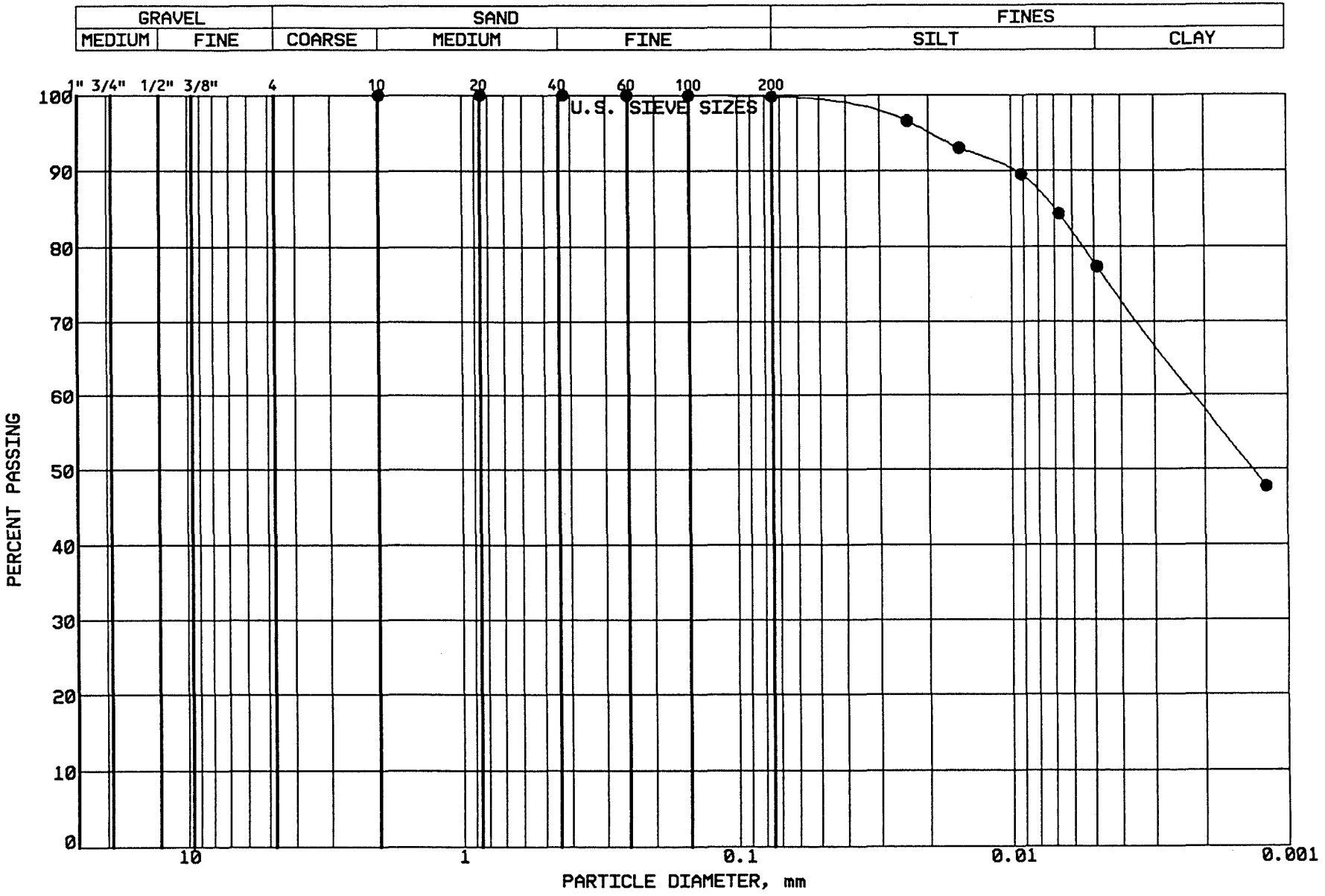
LOCATION: N 37064.0, E 40879.0
SAMPLE: DCCC033 TUBE #:
ELEVATION: 1915.8'

GRAVEL	0.0 %
SAND	0.7 %
SILT	28.7 %
CLAY	70.5 %
P 200	99.3 %

SOIL PROPERTIES

LL: 66.0%
PL: 21.0%
PI: 45.0%
CLASS: CH FAT CLAY, vy dk gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

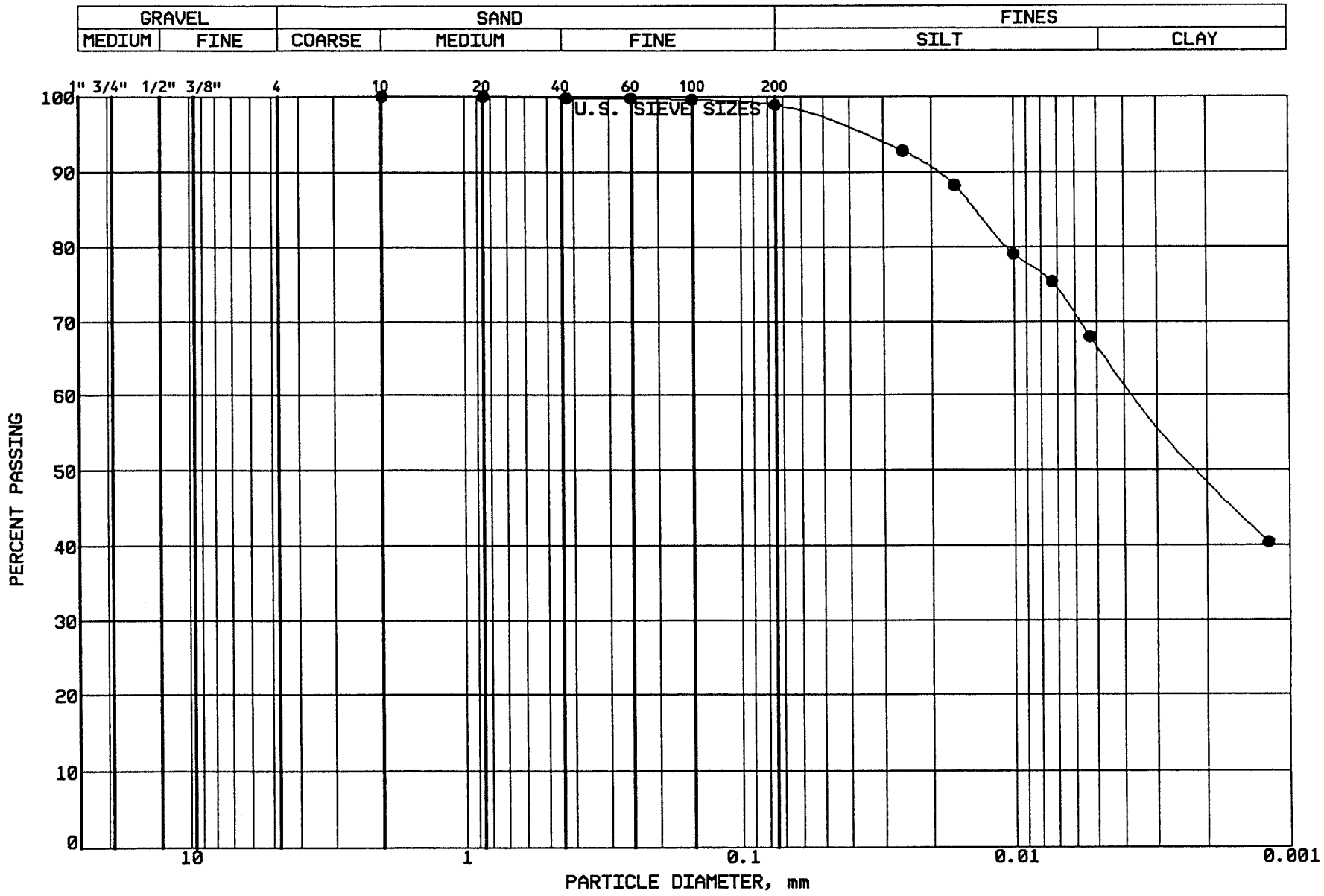
LOCATION: N 37061.0, E 40741.0
SAMPLE: DCCC034 TUBE #: ST-10
ELEVATION: 1916.2'

GRAVEL	0.0 %
SAND	0.2 %
SILT	22.0 %
CLAY	77.7 %
P 200	99.8 %

SOIL PROPERTIES

LL: 64.0%
PL: 23.0%
PI: 41.0%
CLASS: CH FAT CLAY, dk gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

LOCATION: N 37063.0, E 40609.0
SAMPLE: DCCC035 TUBE #: ST-11
ELEVATION: 1915.8'

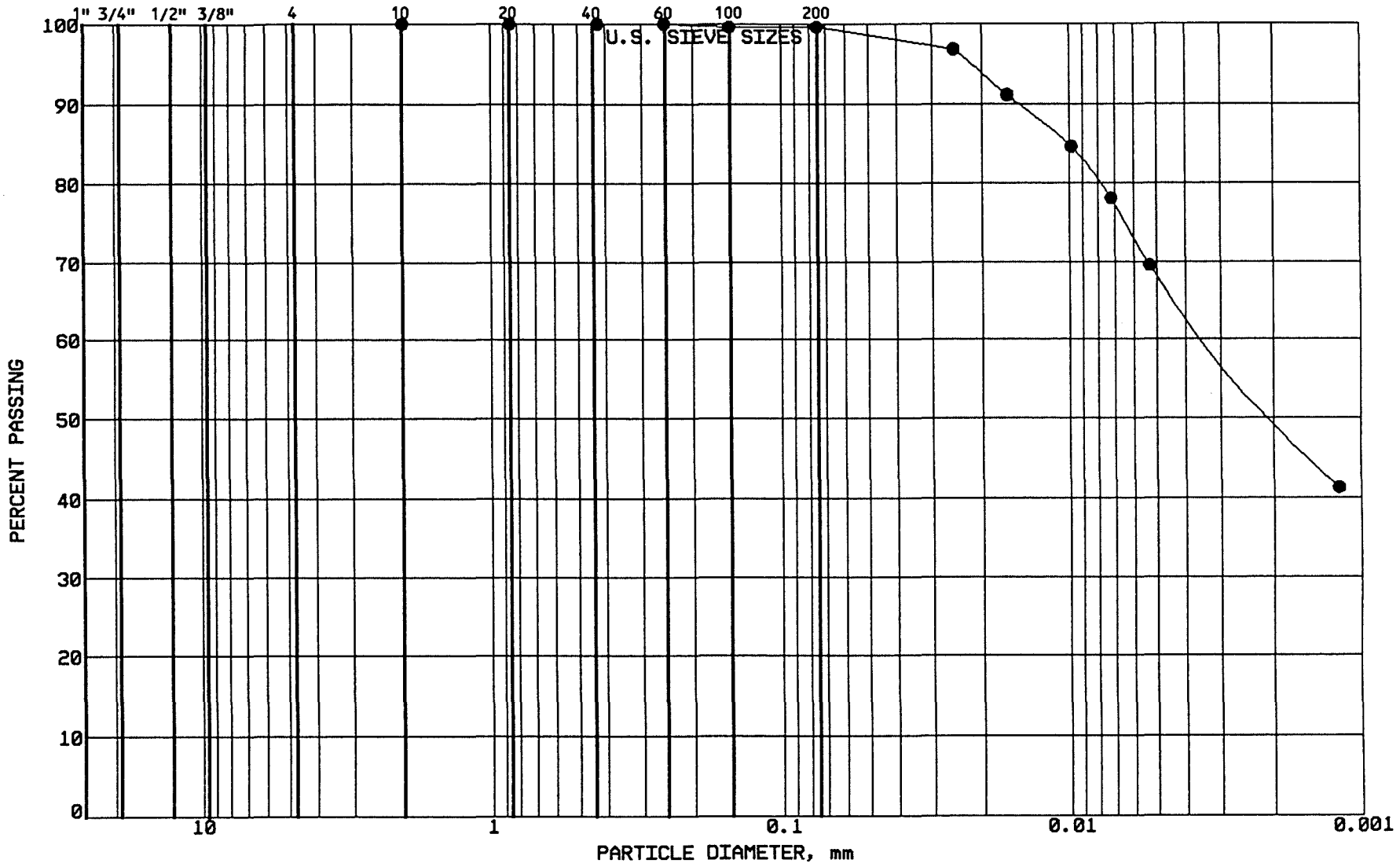
GRAVEL	0.0 %
SAND	1.1 %
SILT	32.0 %
CLAY	66.8 %
P 200	98.9 %

SOIL PROPERTIES

LL: 58.0%
PL: 21.0%
PI: 37.0%
CLASS: CH FAT CLAY, dk gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

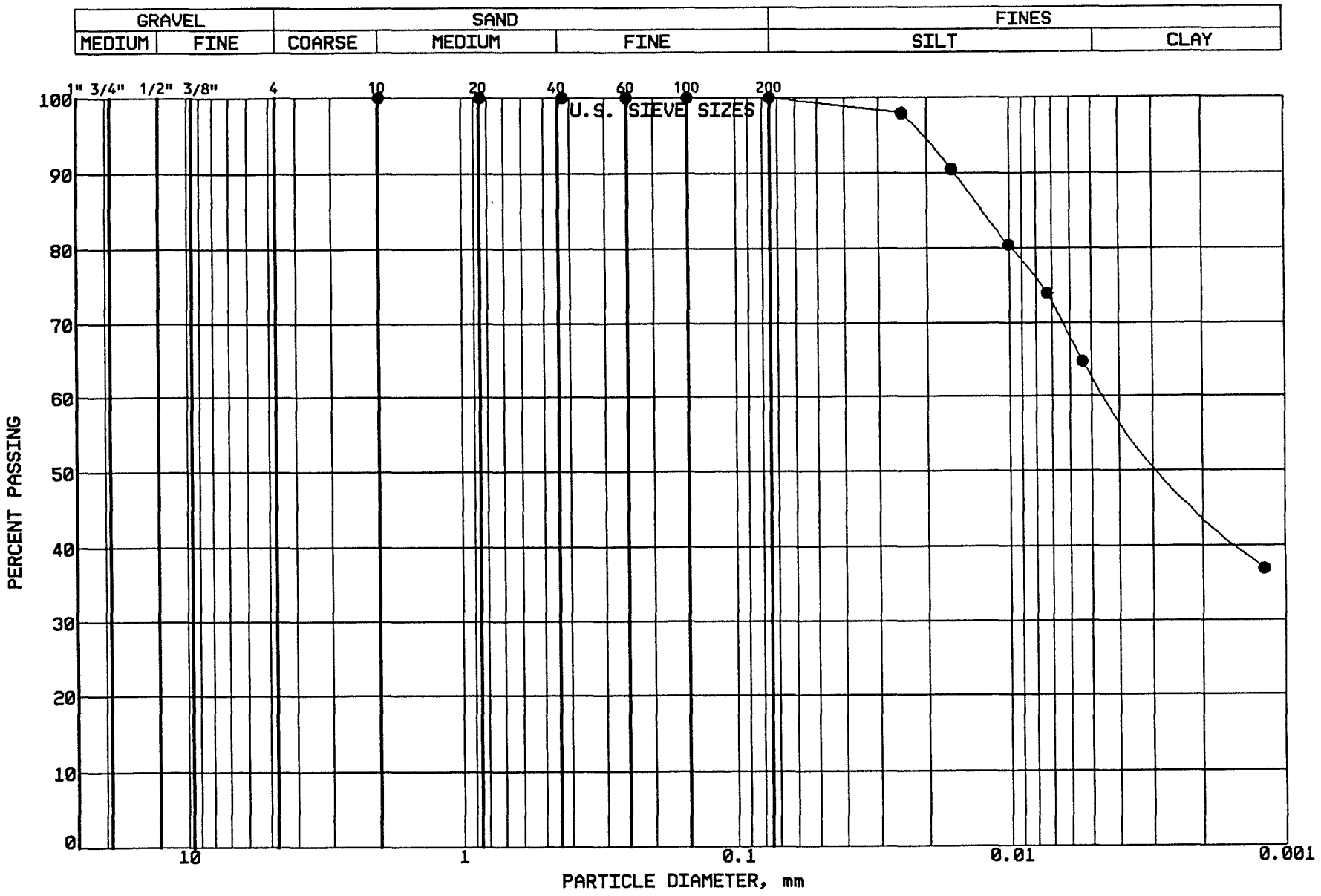
LOCATION: N 37061.0, E 40518.0
SAMPLE: DCCC036 TUBE #: ST-12
ELEVATION: 1916.3'

GRAVEL	0.0 %
SAND	0.4 %
SILT	31.2 %
CLAY	68.3 %
P 200	99.6 %

SOIL PROPERTIES

LL: 61.0%
PL: 23.0%
PI: 38.0%
CLASS: CH FAT CLAY, dk gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

LOCATION: N 37394.0, E 39806.0
SAMPLE: DCCC039 TUBE #: ST-13
ELEVATION: 1909.3'

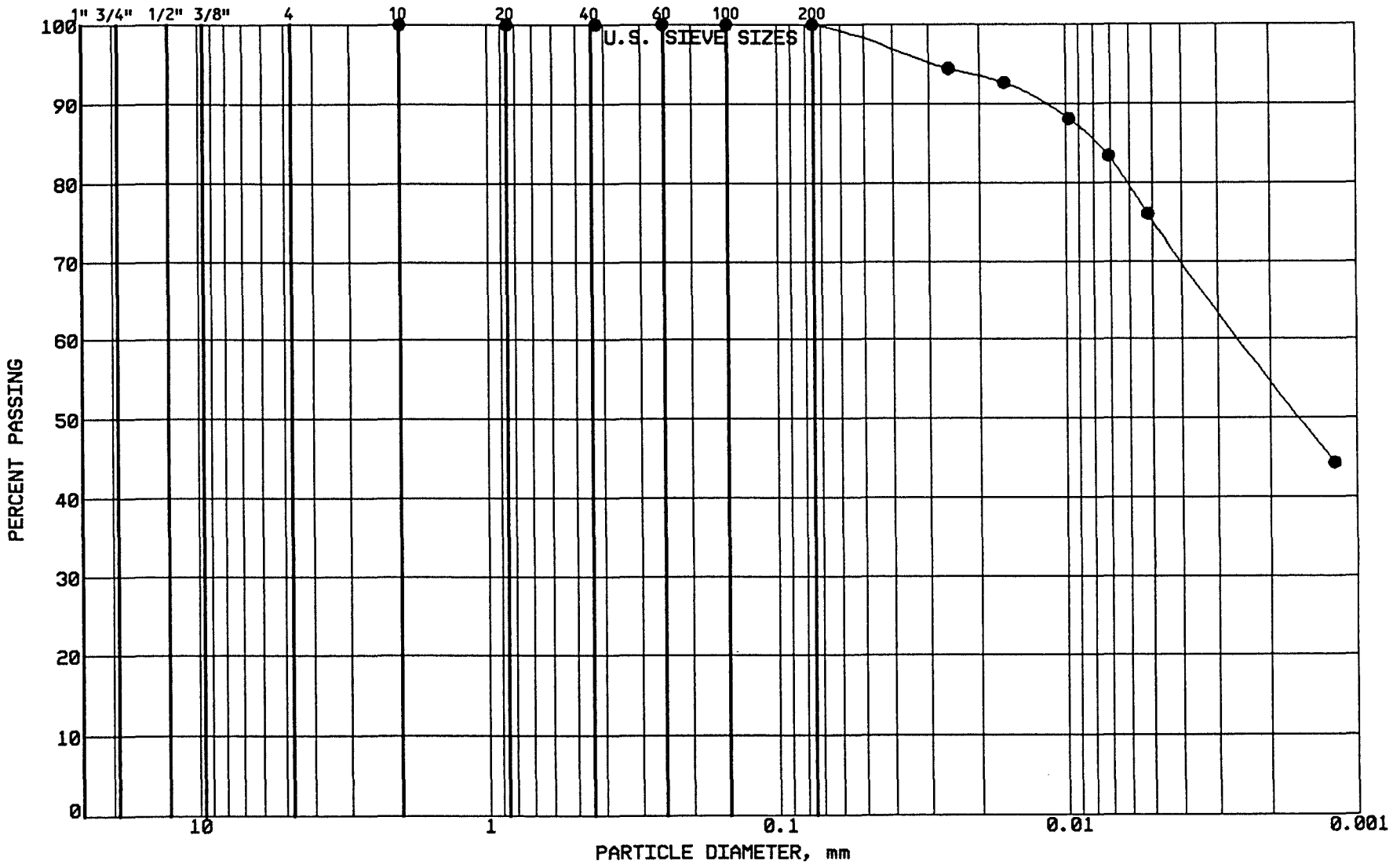
GRAVEL	0.0 %
SAND	0.0 %
SILT	36.7 %
CLAY	63.2 %
P 200	100.0 %

SOIL PROPERTIES

LL: 61.0%
PL: 20.0%
PI: 41.0%
CLASS: CH FAT CLAY, dk gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

LOCATION: N 37328.0, E 39850.0
SAMPLE: DCCC040 TUBE #: ST-14
ELEVATION: 1910.7'

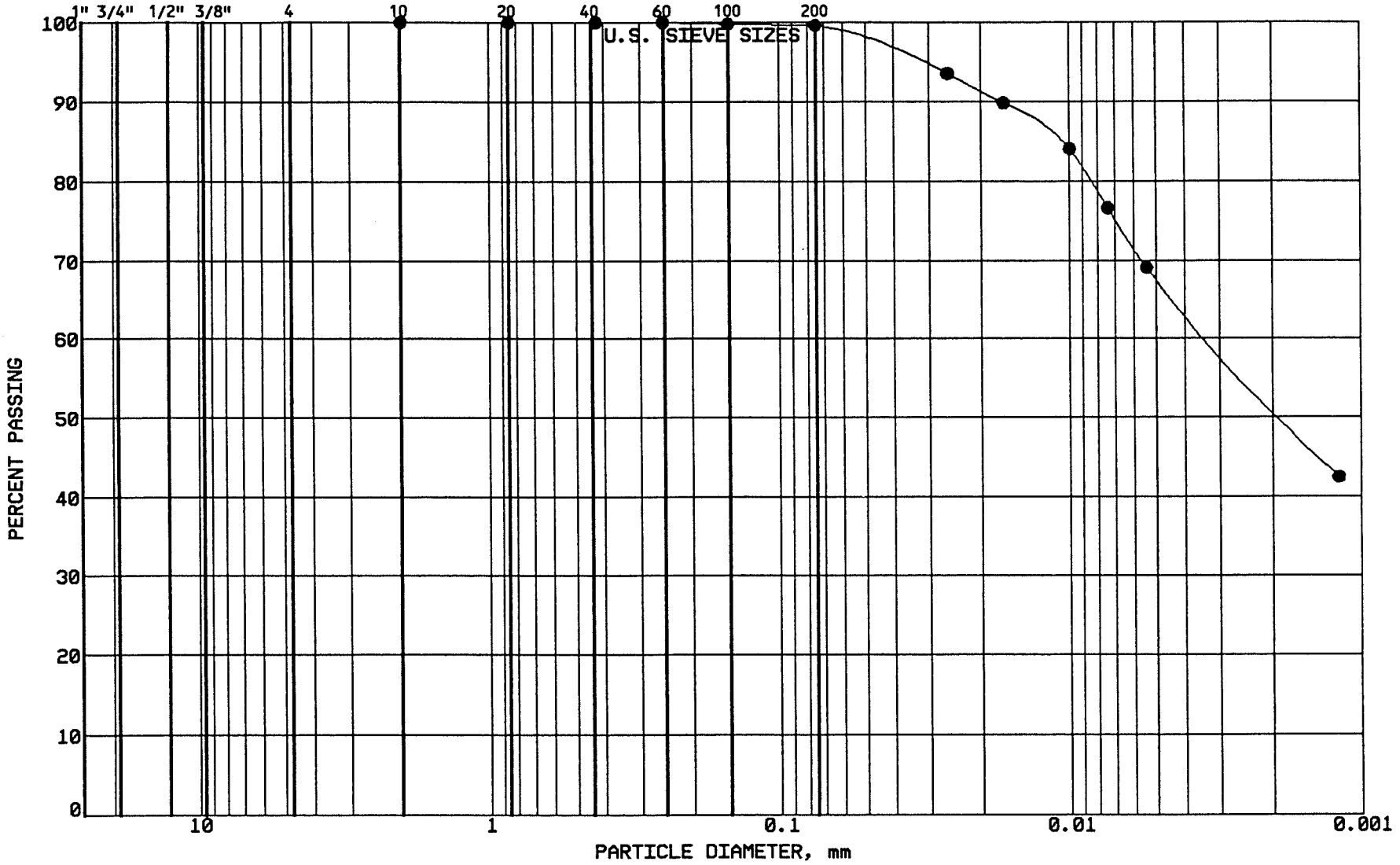
GRAVEL	0.0 %
SAND	0.0 %
SILT	24.8 %
CLAY	75.1 %
P 200	100.0 %

SOIL PROPERTIES

LL: 69.0%
PL: 21.0%
PI: 48.0%
CLASS: CH FAT CLAY, dk gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

LOCATION: N 37189.0, E 40004.0
SAMPLE: DCCC041 TUBE #: ST-15
ELEVATION: 1913.2'

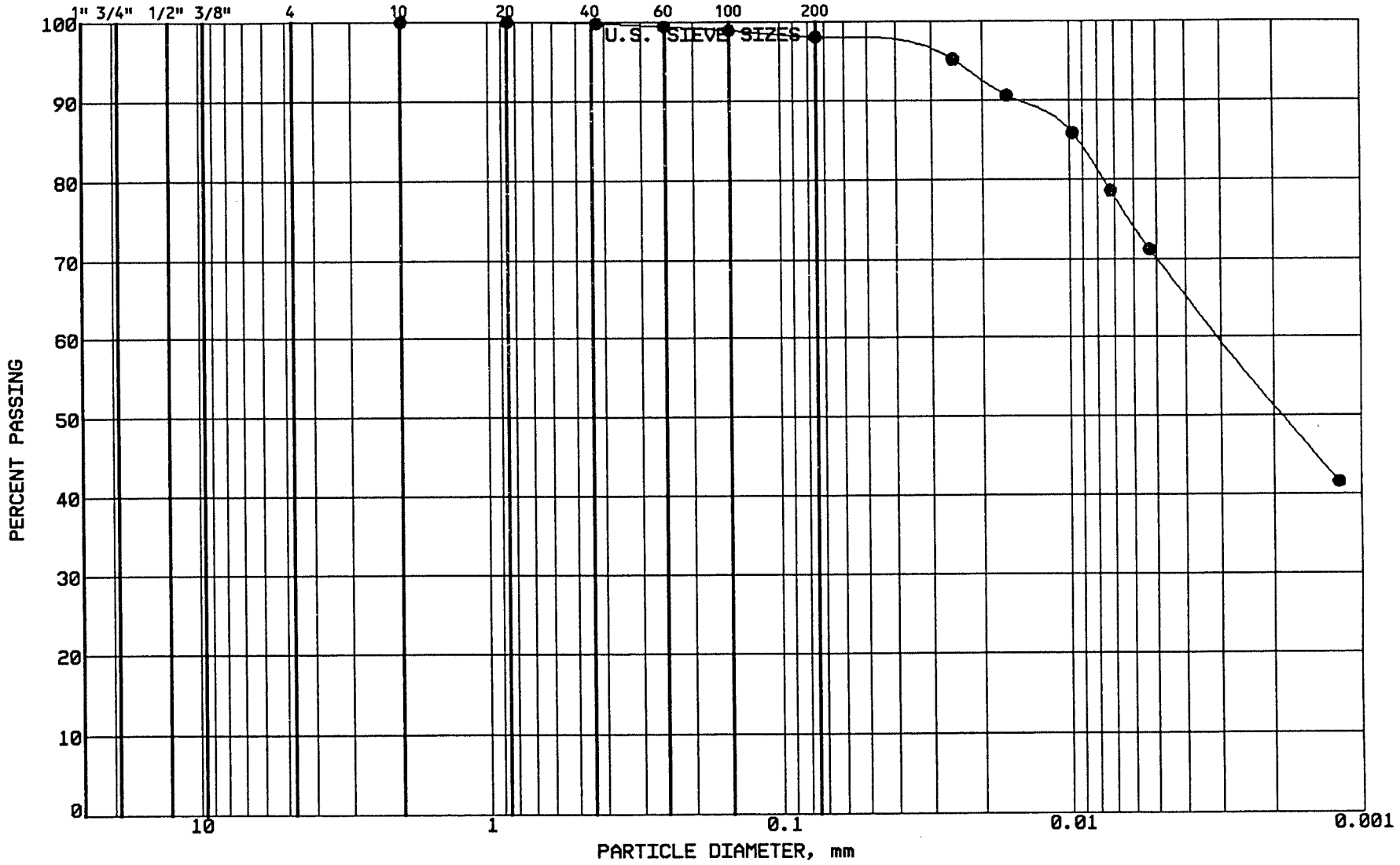
GRAVEL	0.0 %
SAND	0.4 %
SILT	31.9 %
CLAY	67.6 %
P 200	99.6 %

SOIL PROPERTIES

LL: 66.0%
PL: 20.0%
PI: 46.0%
CLASS: CH FAT CLAY, vy dk gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

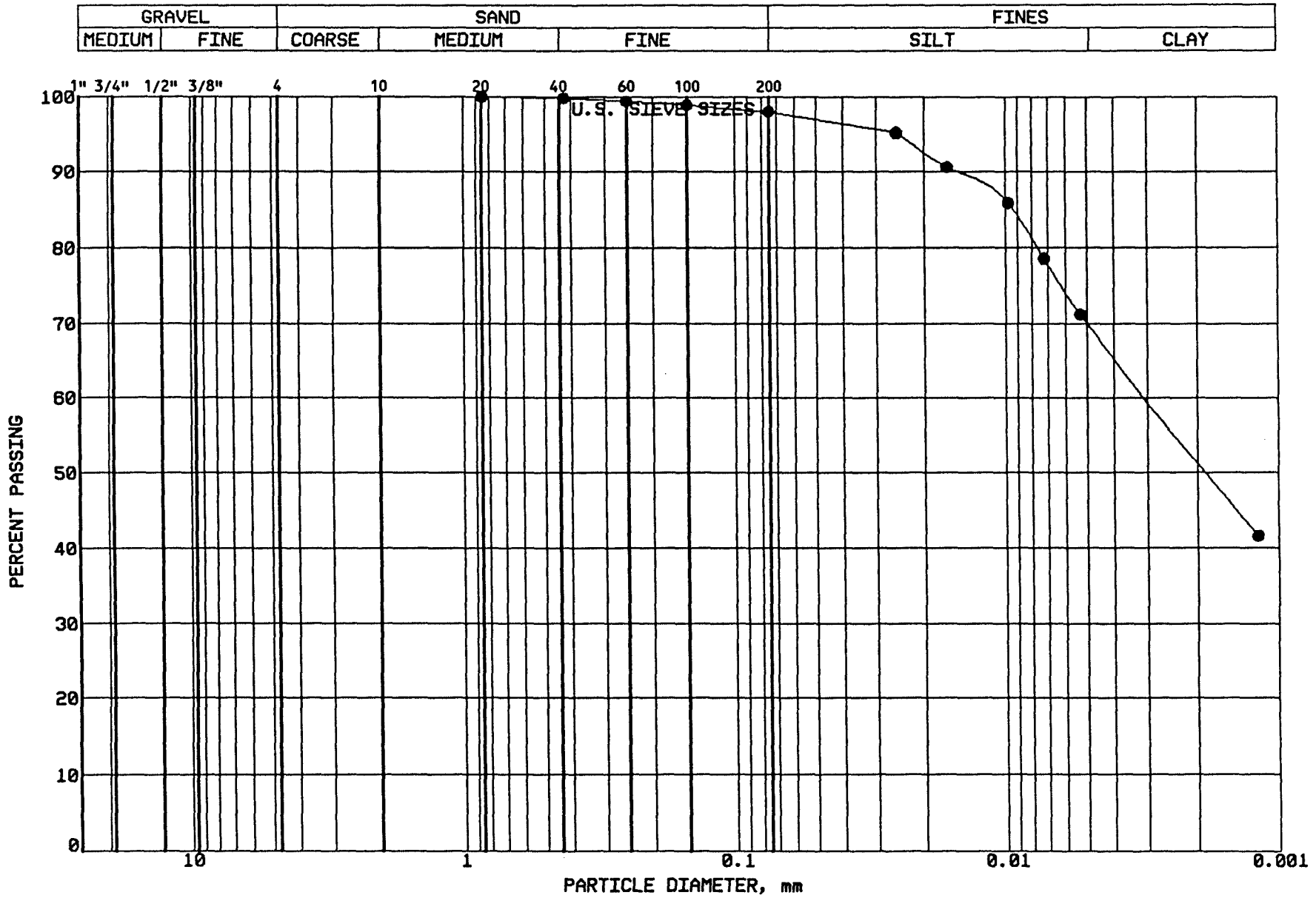
LOCATION: N 37100.0, E 40000.0
SAMPLE: DCCC042 TUBE #:
ELEVATION: 1914.0'

GRAVEL	0.0 %
SAND	2.0 %
SILT	27.9 %
CLAY	70.0 %
P 200	98.0 %

SOIL PROPERTIES

LL: 60.0%
PL: 22.0%
PI: 38.0%
CLASS: CH FAT CLAY, ol gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
AP #91
UNDERWOOD, ND

LOCATION: N 37394.0, E 39806.0
SAMPLE: DCCC-43 TUBE #: R.ST.13
ELEVATION: 1909.3'

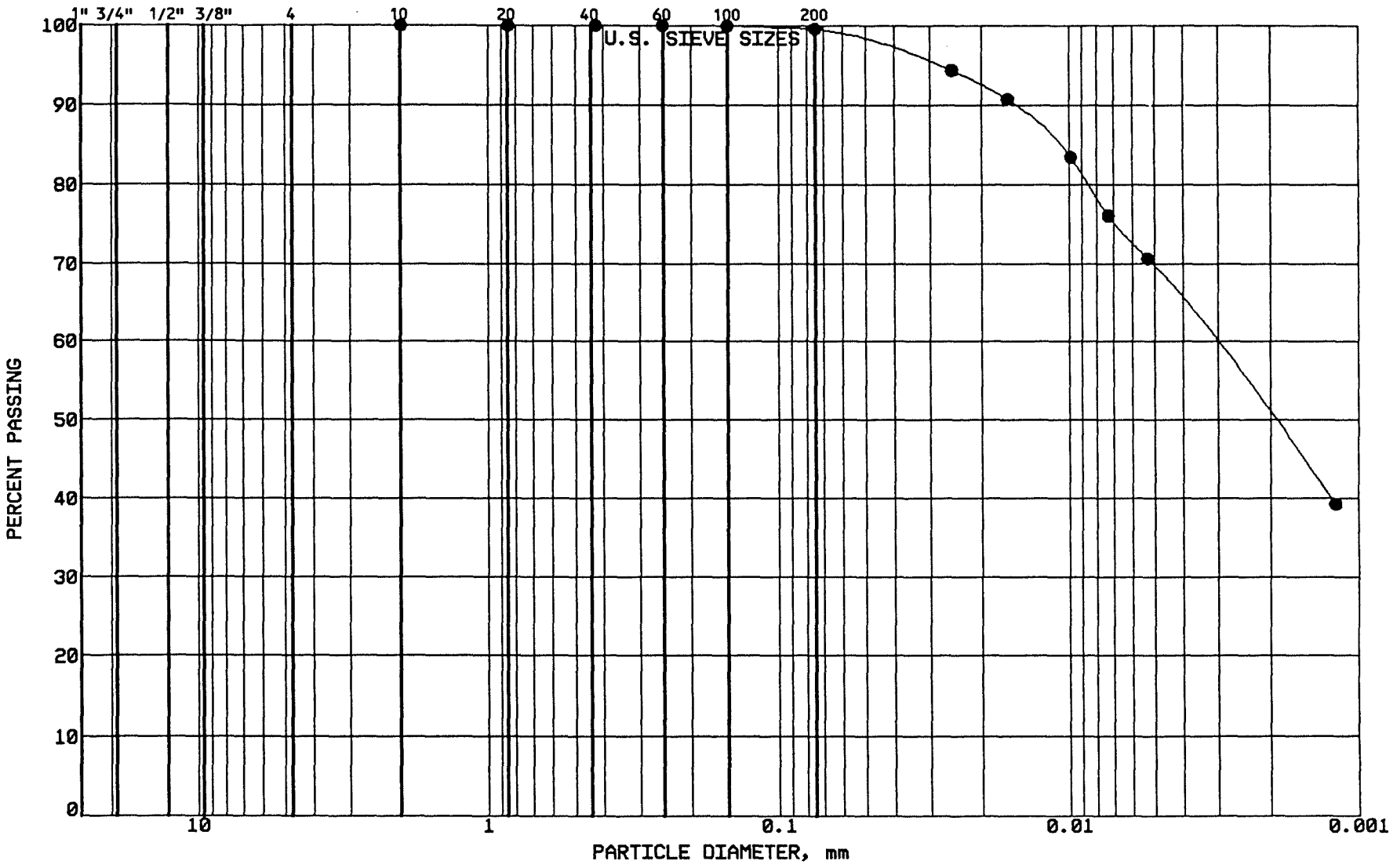
GRAVEL	0.0 %
SAND	2.0 %
SILT	28.0 %
CLAY	70.0 %
P 200	98.0 %

SOIL PROPERTIES

LL: 60.0%
PL: 22.0%
PI: 38.0%
CLASS: Fat Clay (CH), dk gr.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

LOCATION: N 37127.0, E 40114.0
SAMPLE: DCCC044 TUBE #: ST-16
ELEVATION: 1915.5'

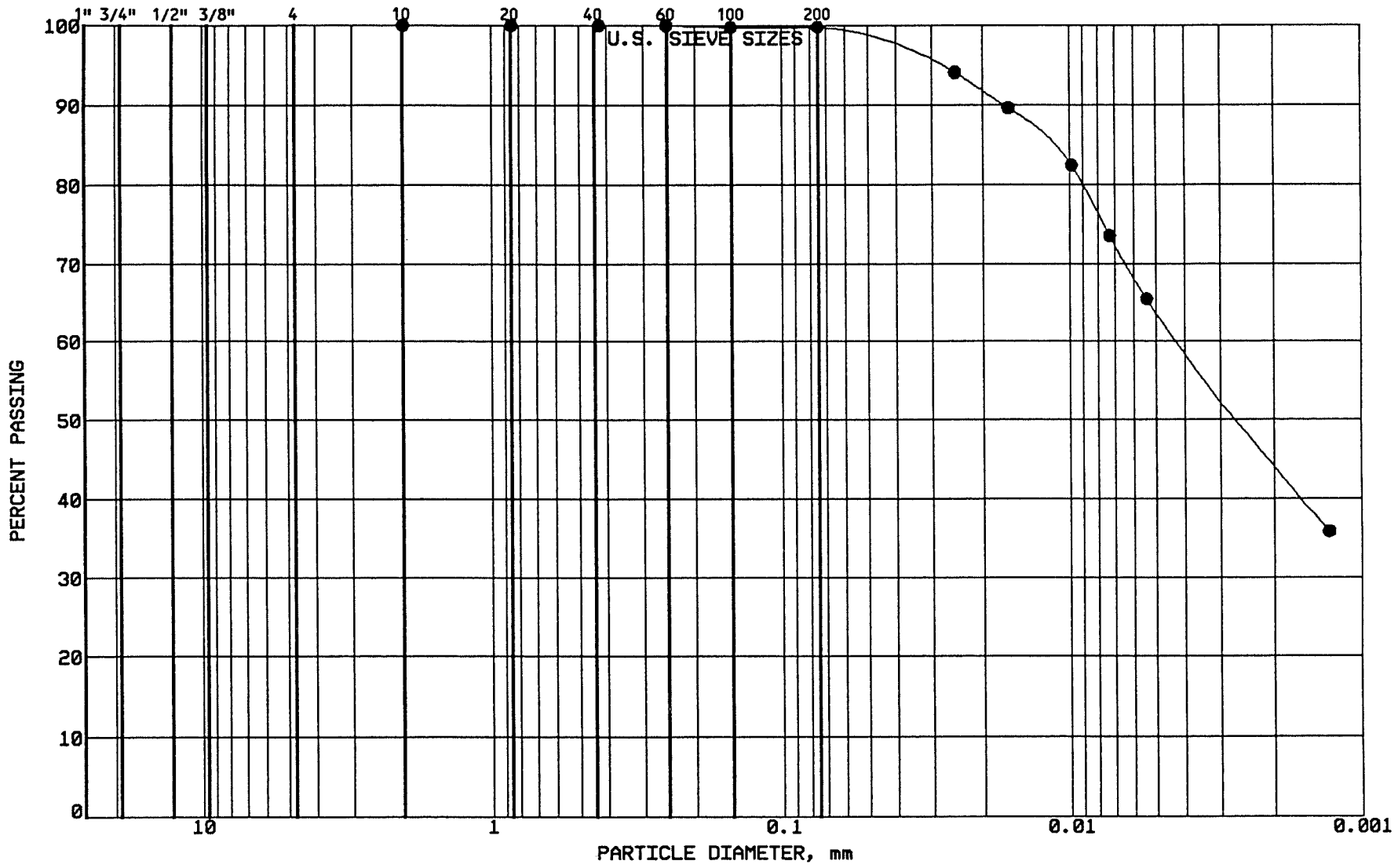
GRAVEL	0.0 %
SAND	0.4 %
SILT	30.2 %
CLAY	69.3 %
P 200	99.6 %

SOIL PROPERTIES

LL: 60.0%
PL: 21.0%
PI: 39.0%
CLASS: CH FAT CLAY, dk gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

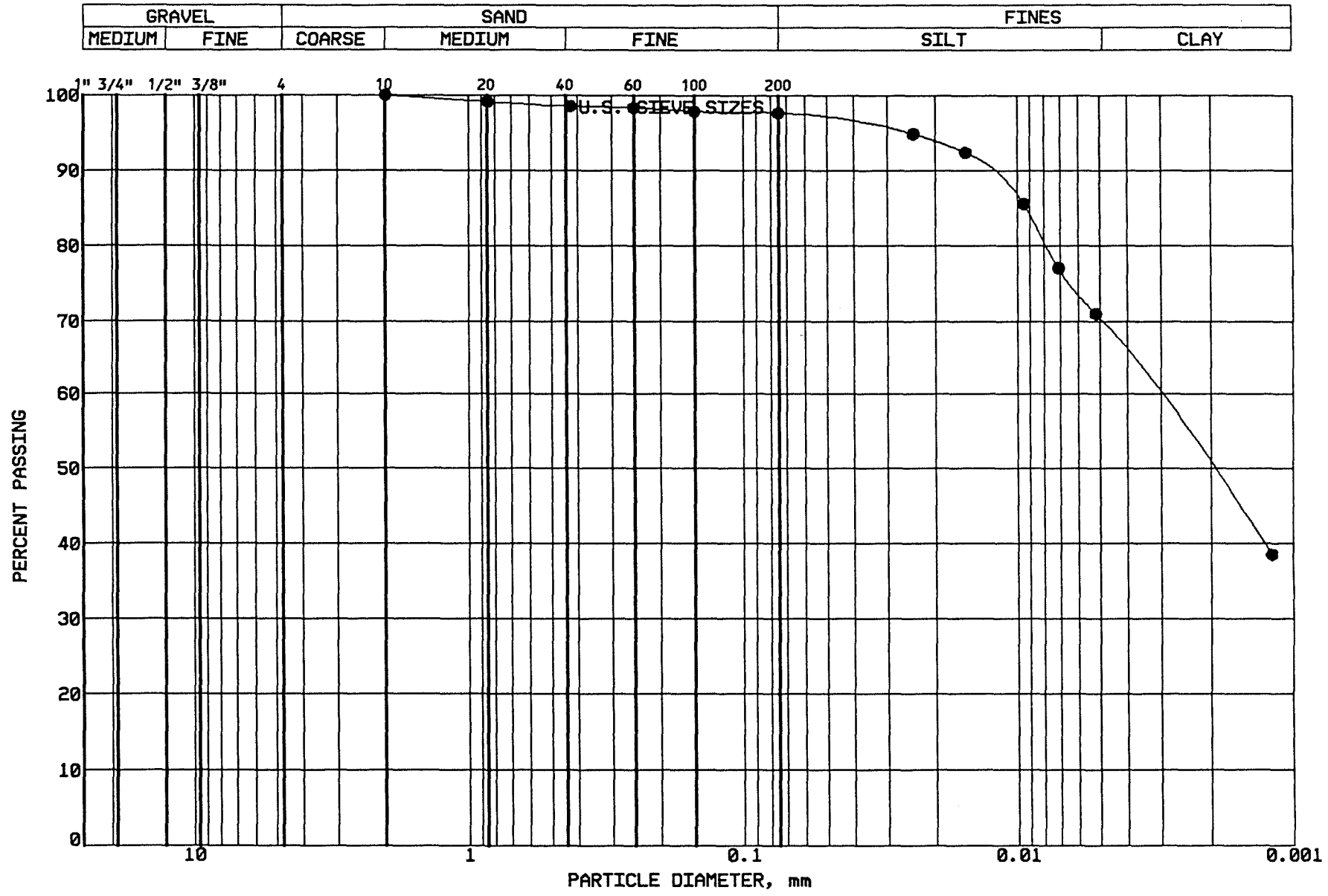
LOCATION: N 37279.0, E 39940.0
SAMPLE: DECC045 TUBE #: ST-17
ELEVATION: 1909.2'

GRAVEL	0.0 %
SAND	0.2 %
SILT	35.9 %
CLAY	63.8 %
P 200	99.8 %

SOIL PROPERTIES

LL: 56.0%
PL: 20.0%
PI: 36.0%
CLASS: CH FAT CLAY, dk gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

LOCATION: N 37406.0, E 39827.0
SAMPLE: DECC048 TUBE #: ST-18
ELEVATION: 1911.6'

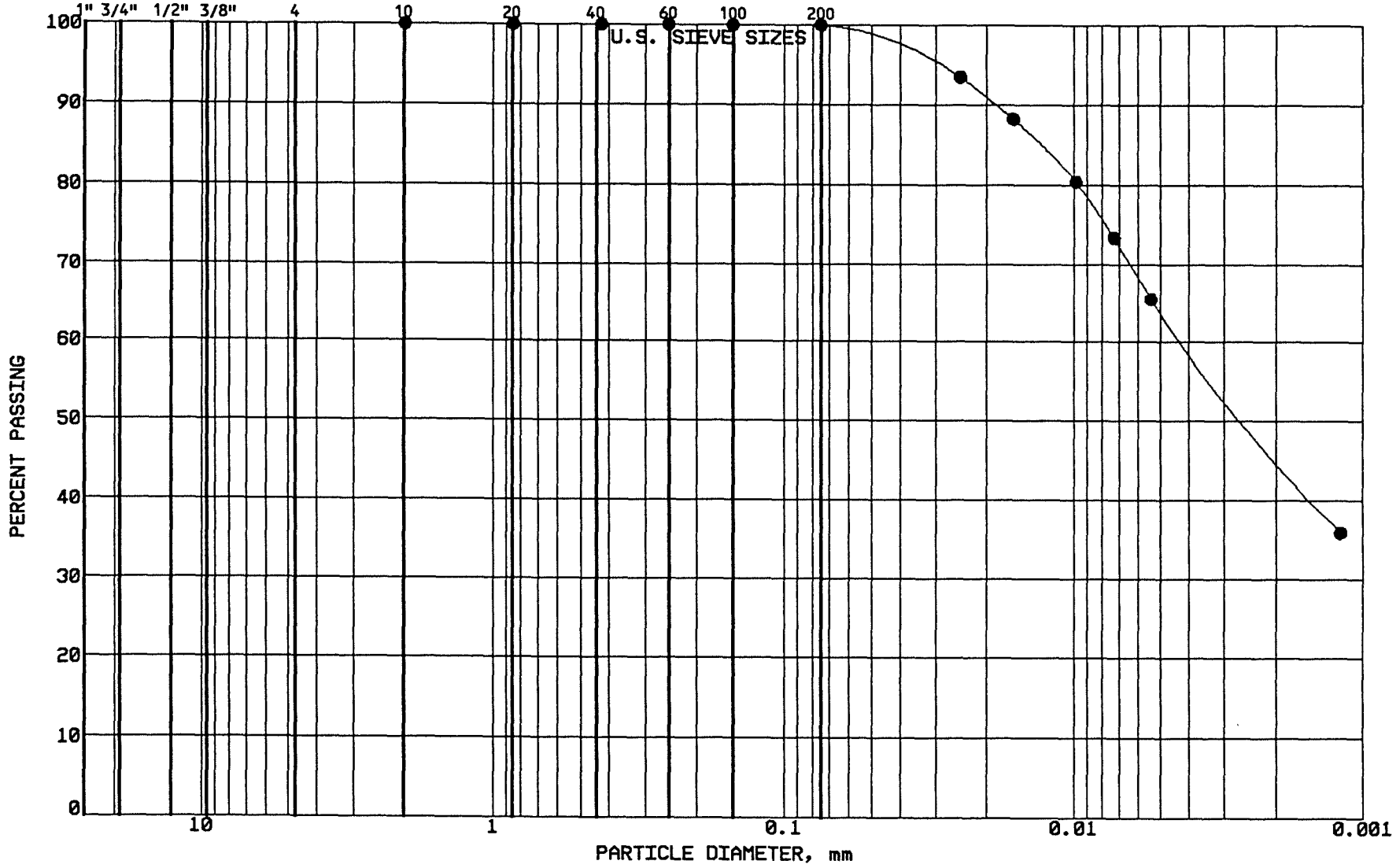
GRAVEL	0.0 %
SAND	2.4 %
SILT	27.4 %
CLAY	70.1 %
P 200	97.6 %

SOIL PROPERTIES

LL: 61.0%
PL: 21.0%
PI: 40.0%
CLASS: CH FAT CLAY, dk gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

LOCATION: N 37520.0, E 39725.0
SAMPLE: DCCC049 TUBE #: ST-19
ELEVATION: 1908.4'

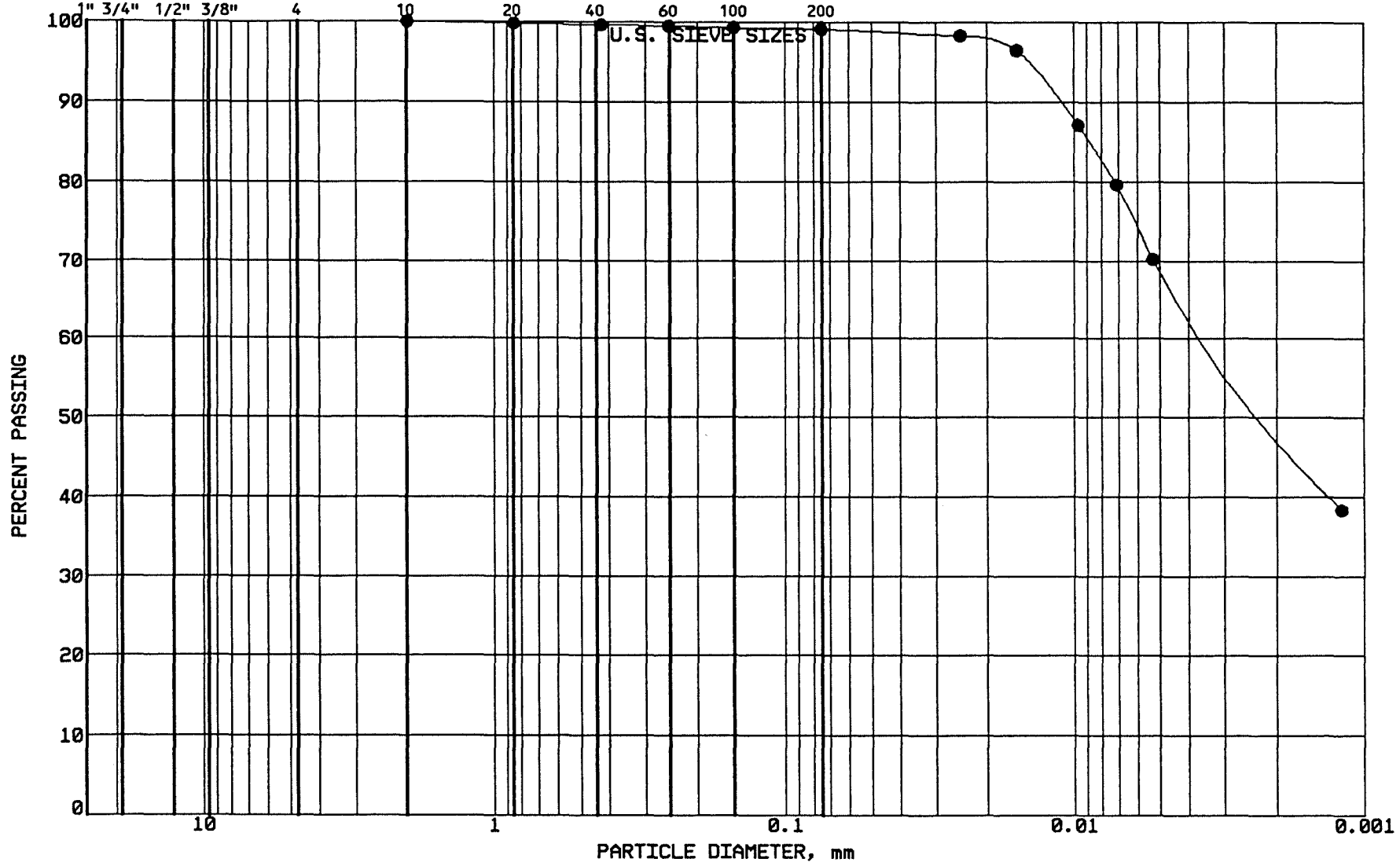
GRAVEL	0.0 %
SAND	0.0 %
SILT	36.0 %
CLAY	63.9 %
P 200	100.0 %

SOIL PROPERTIES

LL: 57.0%
PL: 21.0%
PI: 36.0%
CLASS: CH FAT CLAY, dk gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

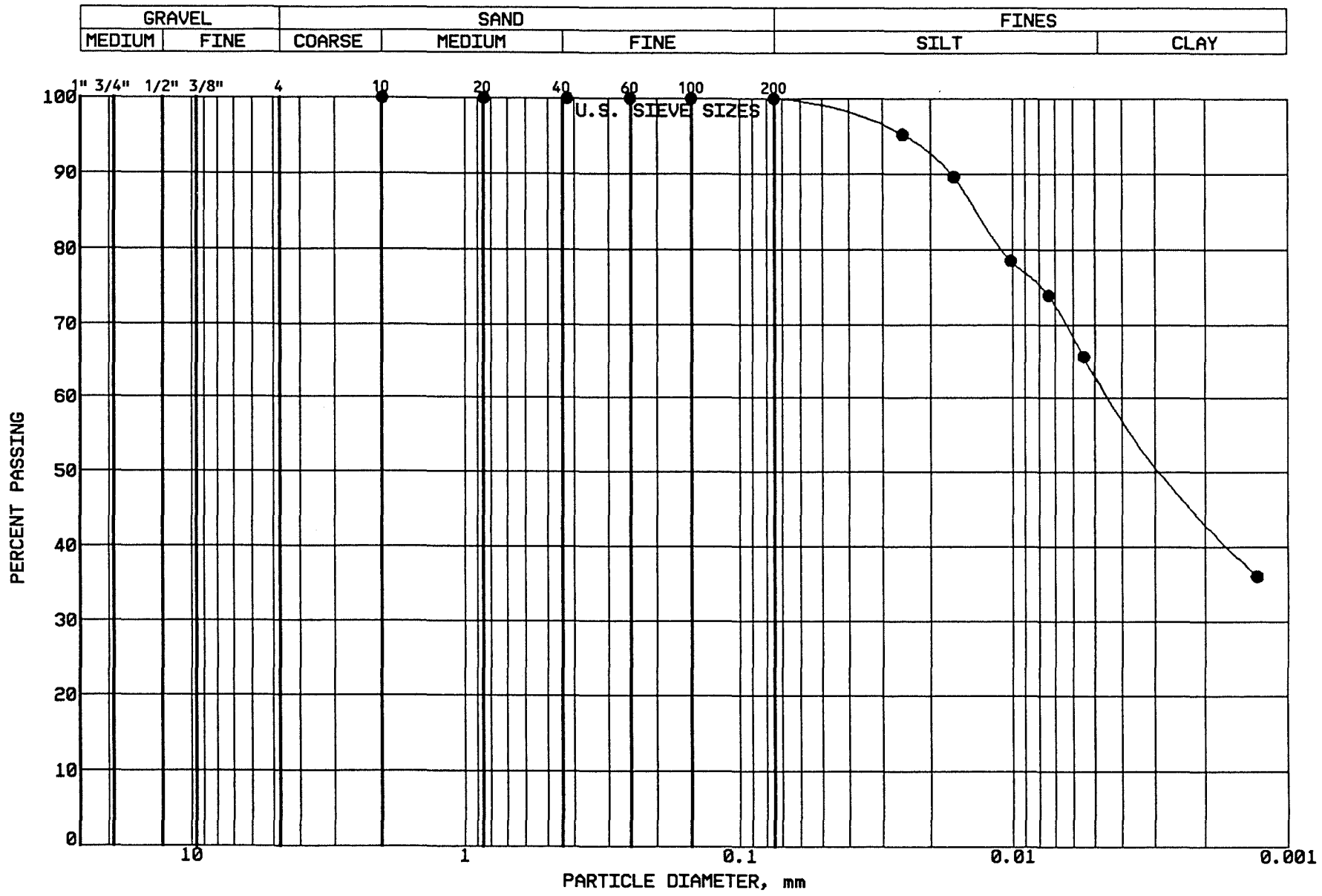
LOCATION: N 37084.0, E 40207.0
SAMPLE: DCCC052 TUBE #: ST-20
ELEVATION: 1910.8'

GRAVEL	0.0 %
SAND	0.9 %
SILT	30.1 %
CLAY	68.9 %
P 200	99.1 %

SOIL PROPERTIES

LL: 53.0%
PL: 20.0%
PI: 33.0%
CLASS: CH FAT CLAY, dk gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

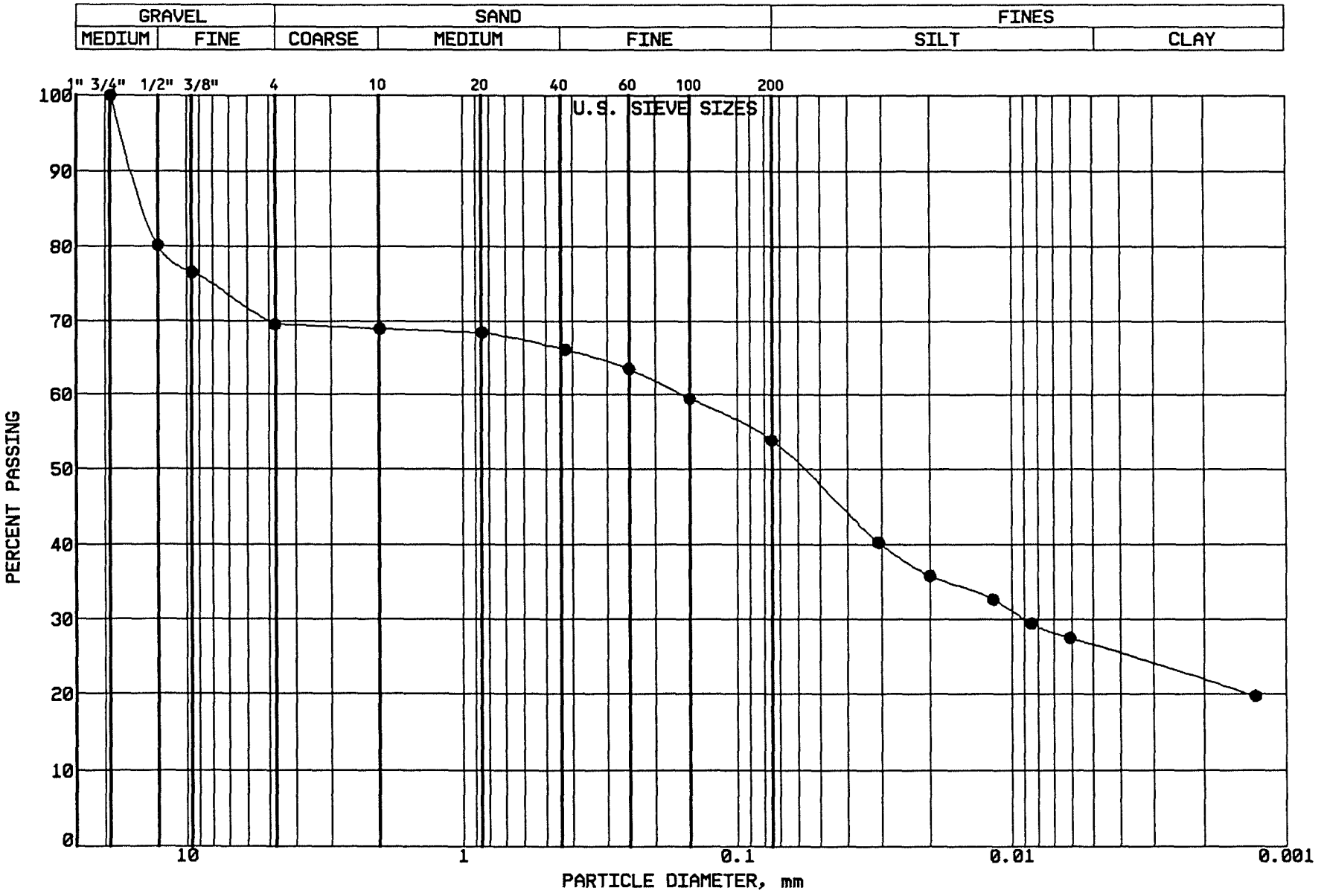
LOCATION: N 37700.0, E 39676.0
SAMPLE: DCCC053 TUBE #: ST-21
ELEVATION: 1910.7'

GRAVEL	0.0 %
SAND	0.0 %
SILT	36.3 %
CLAY	63.6 %
P 200	100.0 %

SOIL PROPERTIES

LL: 58.0%
PL: 20.0%
PI: 38.0%
CLASS: CH FAT CLAY, vy dk gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

LOCATION: N 37900.0, E 39800.0
SAMPLE: DCCC056 TUBE #:
ELEVATION: 0.0'

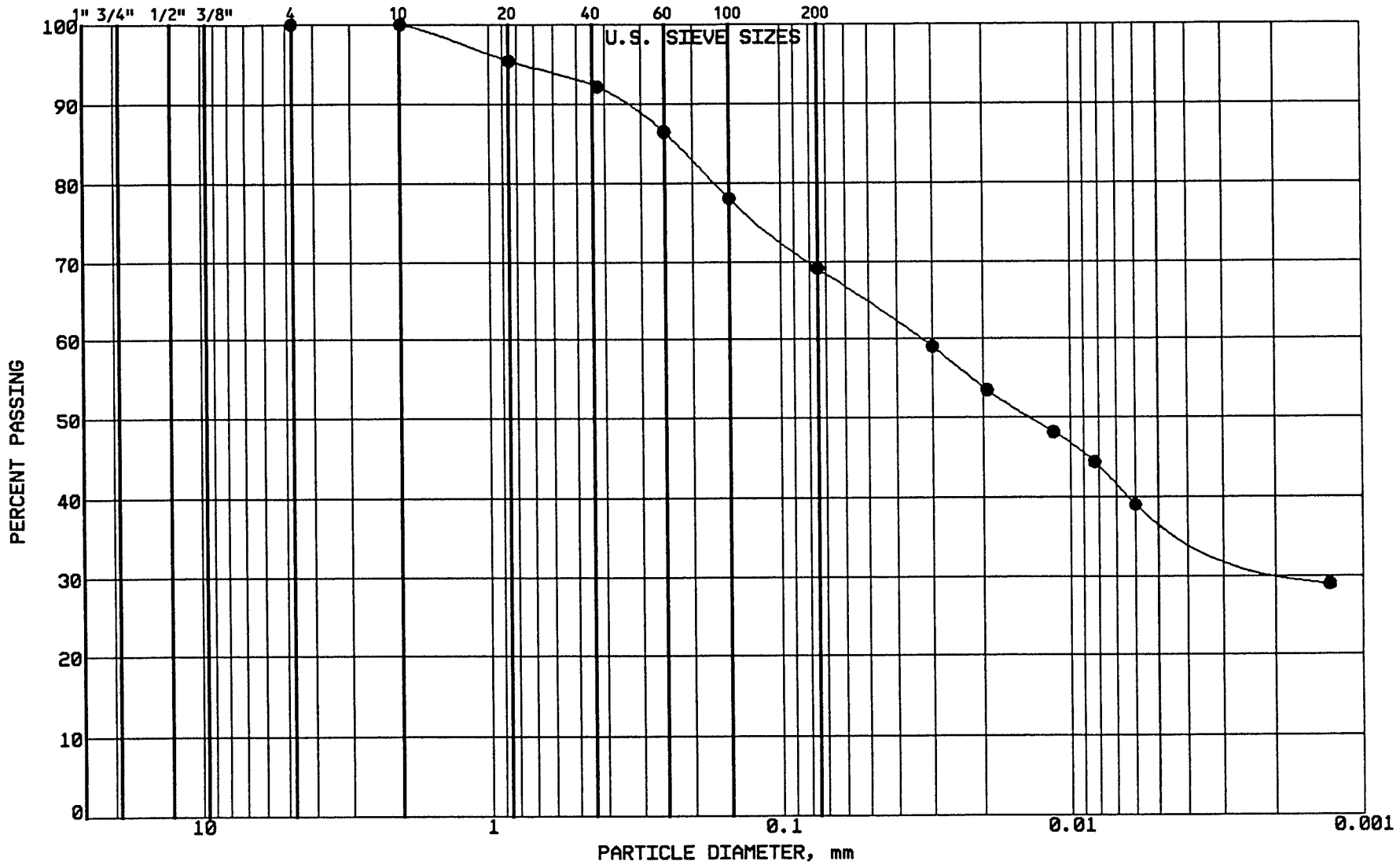
GRAVEL	30.5 %
SAND	15.6 %
SILT	27.3 %
CLAY	26.5 %
P 200	53.9 %

SOIL PROPERTIES

LL: 40.0%
PL: 15.0%
PI: 25.0%
CLASS: CL GRAVELLY LEAN CLAY, ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

LOCATION: N 38281.0, E 39680.0
SAMPLE: DCCC059 TUBE #:
ELEVATION: 1901.6'

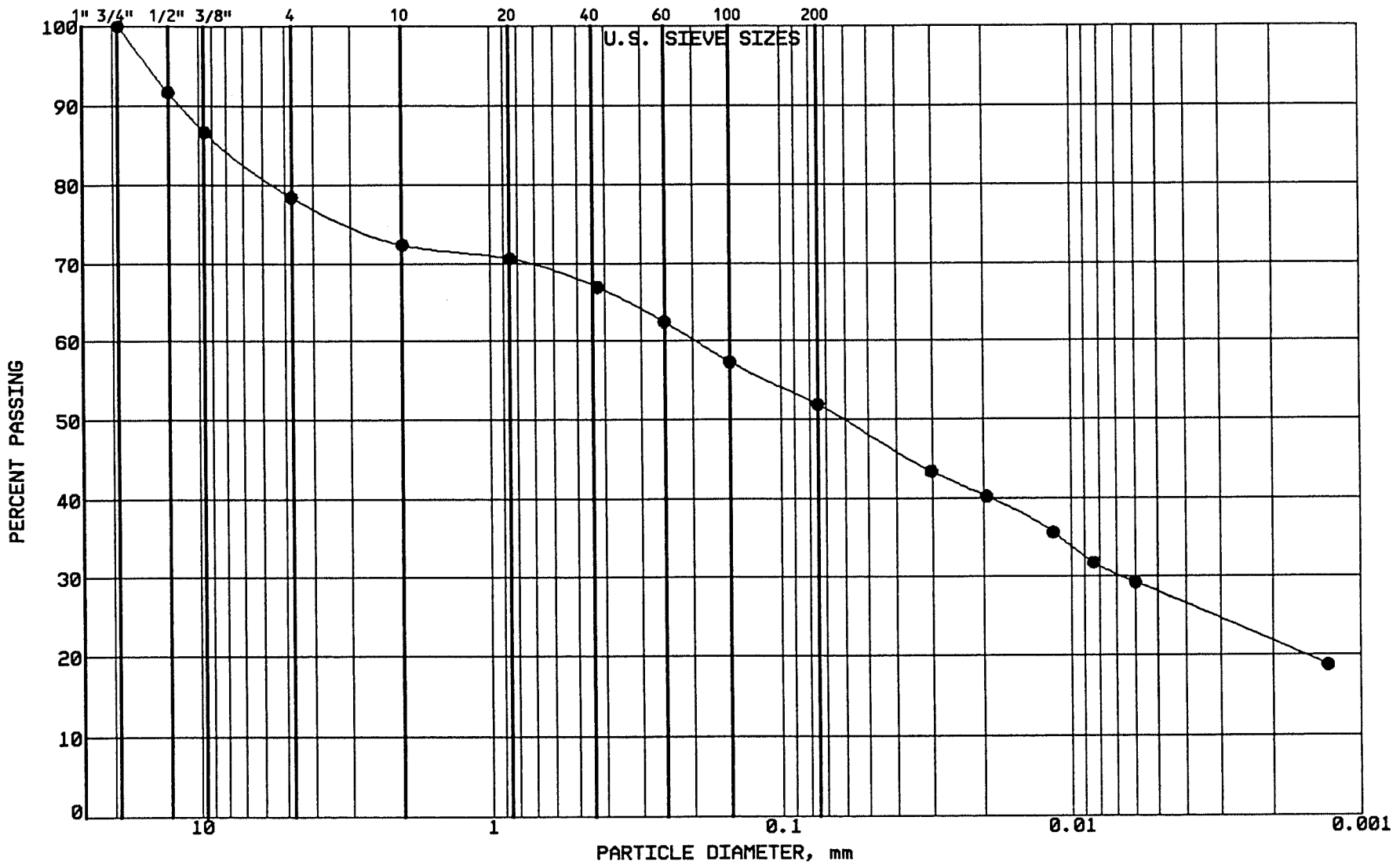
GRAVEL	0.0 %
SAND	30.9 %
SILT	31.2 %
CLAY	37.8 %
P 200	69.1 %

SOIL PROPERTIES

LL: 41.0%
PL: 15.0%
PI: 26.0%
CLASS: CL SANDY LEAN CLAY, ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

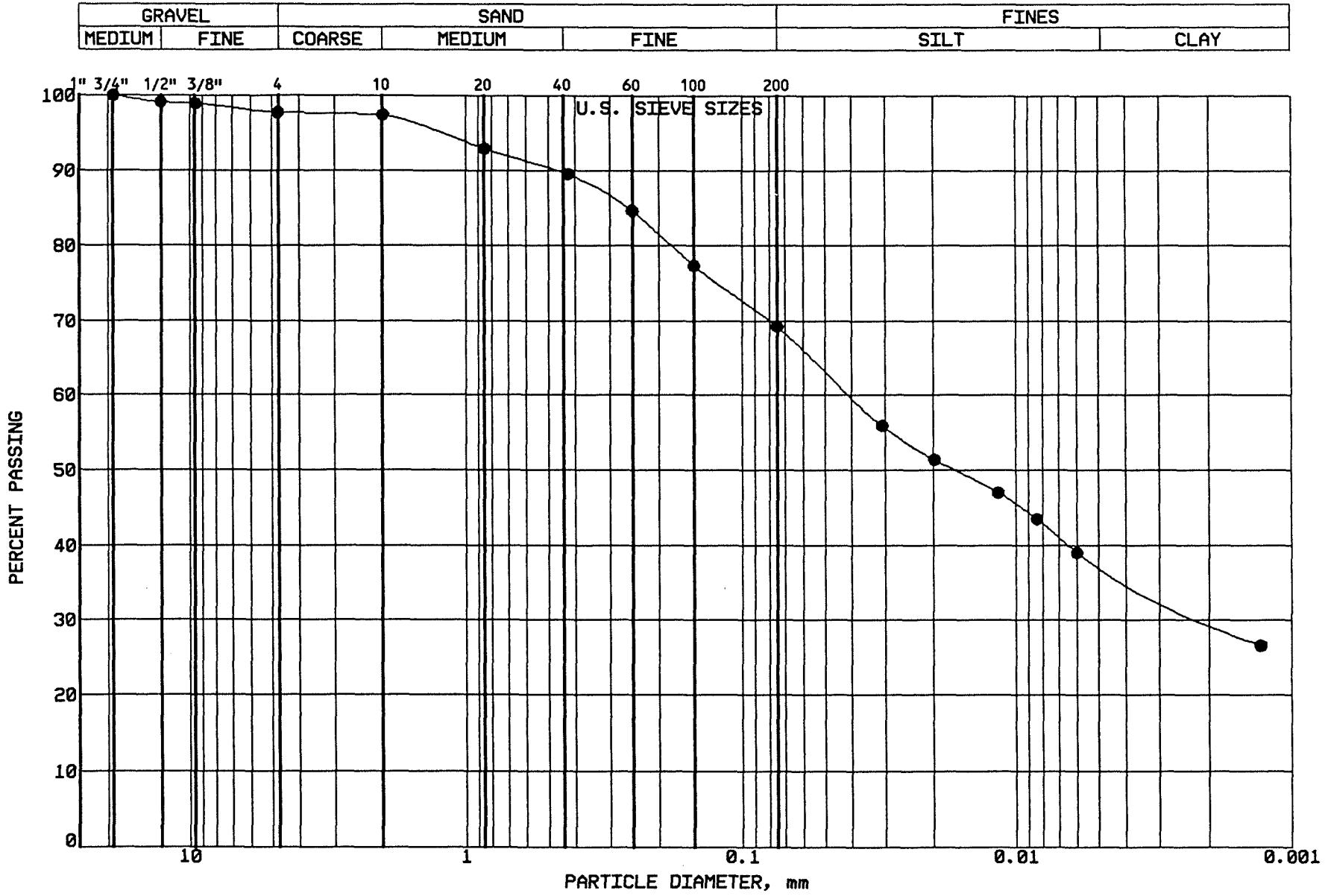
LOCATION: N 38140.0, E 39707.0
SAMPLE: DECC060 TUBE #:
ELEVATION: 1902.1'

GRAVEL	21.6 %
SAND	26.5 %
SILT	23.9 %
CLAY	27.9 %
P 200	51.9 %

SOIL PROPERTIES

LL: 46.0%
PL: 17.0%
PI: 29.0%
CLASS: CL SANDY LEAN CLAY, ol

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

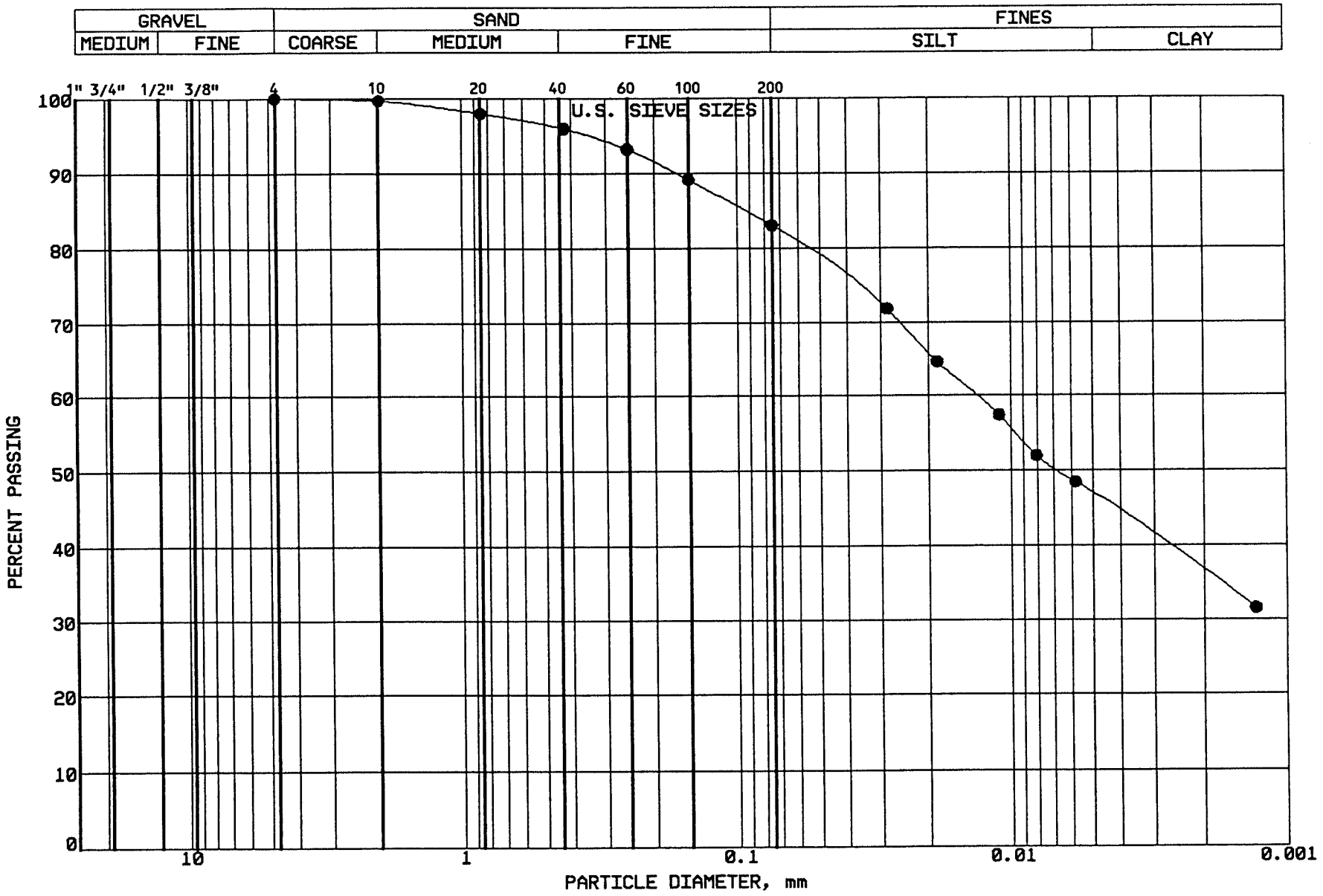
LOCATION: N 38161.0, E 39656.0
SAMPLE: DCCC061 TUBE #: ST-22
ELEVATION: 1903.7'

GRAVEL	2.3 %
SAND	28.5 %
SILT	31.6 %
CLAY	37.5 %
P 200	69.2 %

SOIL PROPERTIES

LL: 44.0%
PL: 16.0%
PI: 28.0%
CLASS: CL SANDY LEAN CLAY, ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

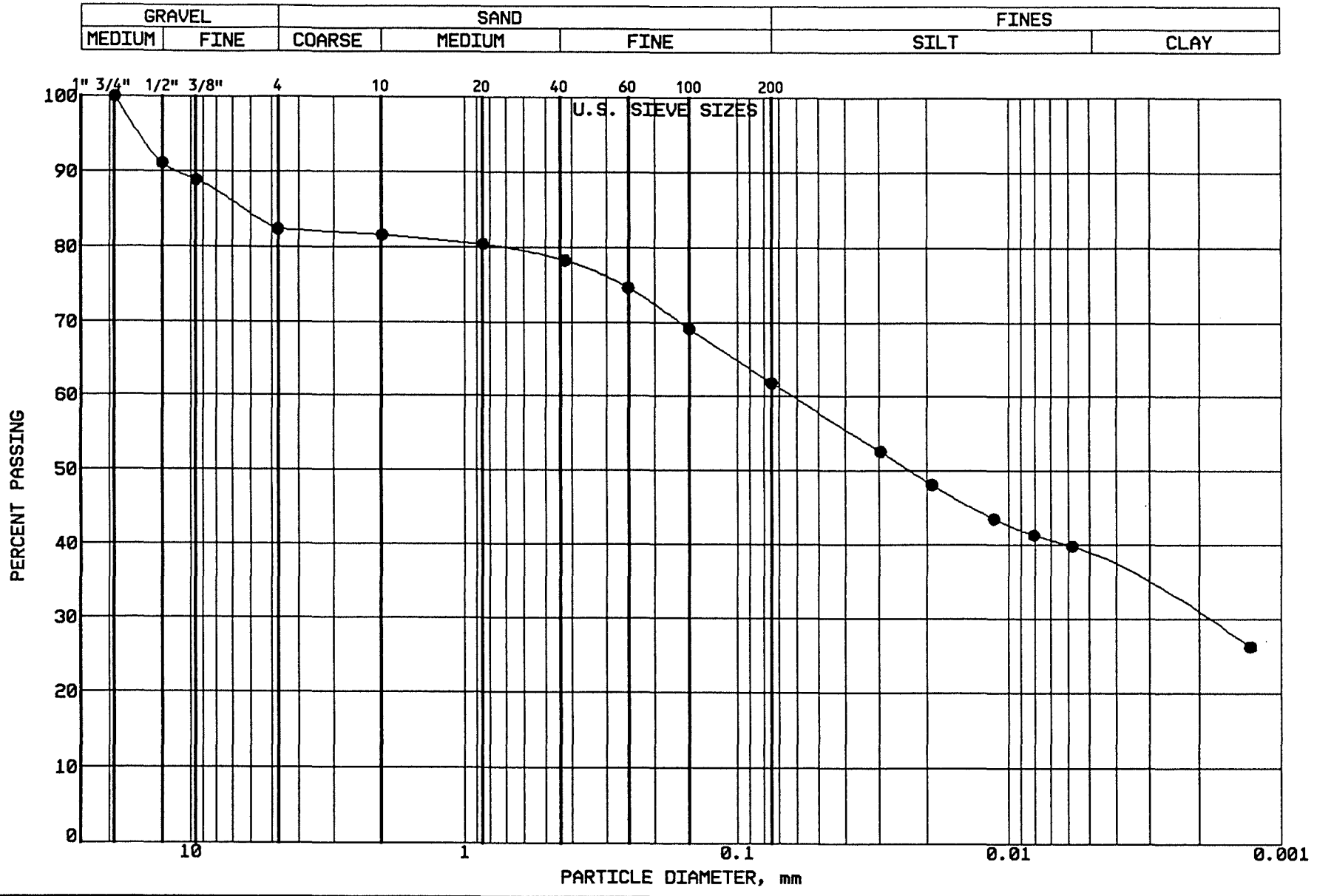
LOCATION: N 38228.0, E 39729.0
SAMPLE: DECC062 TUBE #:
ELEVATION: 1903.1'

GRAVEL	0.0 %
SAND	17.0 %
SILT	36.2 %
CLAY	46.7 %
P 200	83.0 %

SOIL PROPERTIES

LL: 42.0%
PL: 14.0%
PI: 28.0%
CLASS: CL LEAN CLAY W/S, ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

LOCATION: N 38176.0, E 39725.0
SAMPLE: DECC063 TUBE #:
ELEVATION: 1904.3'

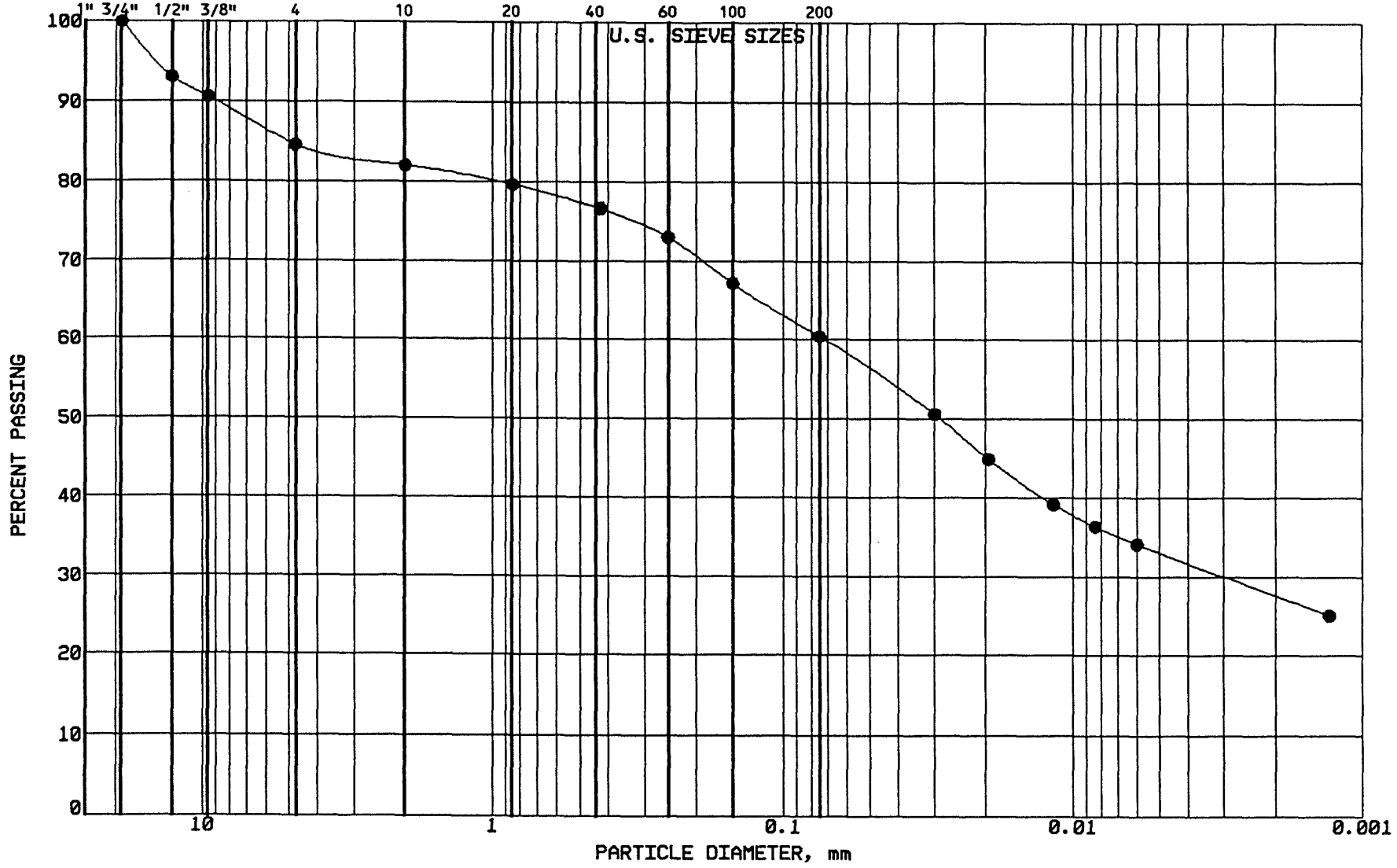
GRAVEL	17.6 %
SAND	20.6 %
SILT	23.3 %
CLAY	38.4 %
P 200	61.8 %

SOIL PROPERTIES

LL: 48.0%
PL: 16.0%
PI: 32.0%
CLASS: CL SANDY LEAN CLAY, vy dk gr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

LOCATION: N 37917.0, E 39708.0
SAMPLE: DECC064 TUBE #:
ELEVATION: 1905.1'

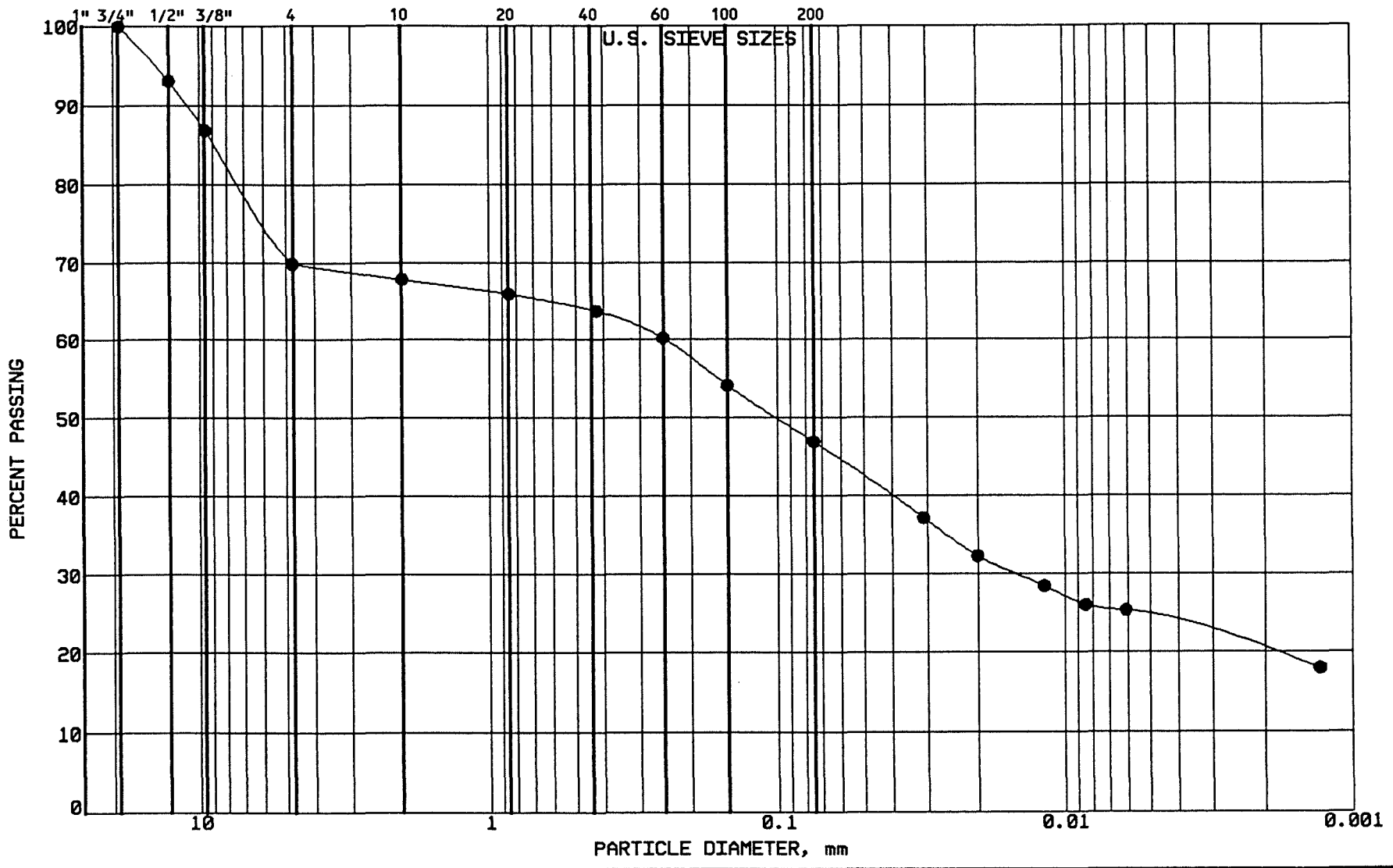
GRAVEL	15.4 %
SAND	24.2 %
SILT	27.3 %
CLAY	33.0 %
P 200	60.4 %

SOIL PROPERTIES

LL: 47.0%
PL: 16.0%
PI: 31.0%
CLASS: CL SANDY LEAN CLAY, ol

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

LOCATION: N 38271.0, E 39670.0
SAMPLE: DECC065 TUBE #:
ELEVATION: 1904.0'

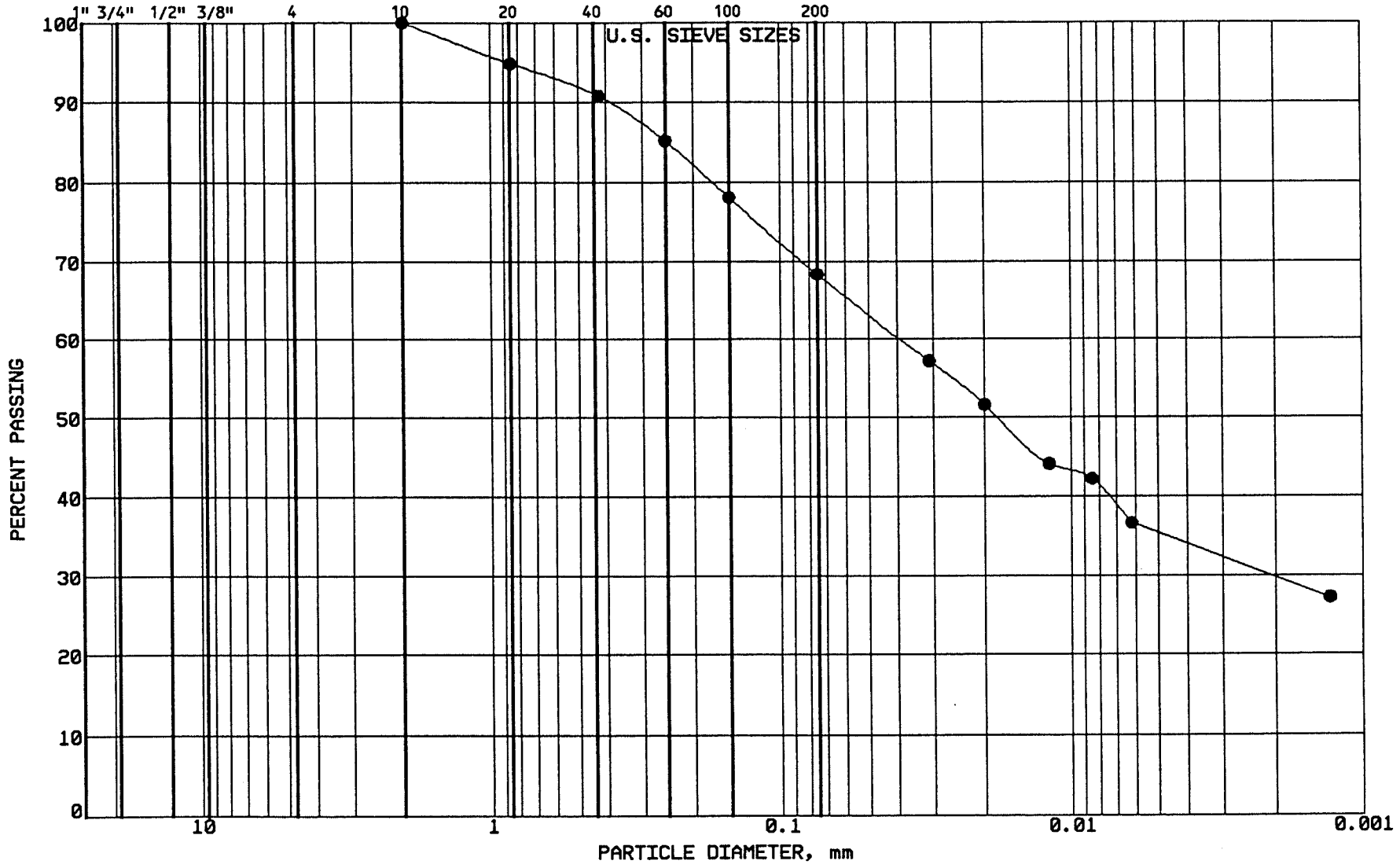
GRAVEL	30.2 %
SAND	22.9 %
SILT	22.5 %
CLAY	24.3 %
P 200	46.9 %

SOIL PROPERTIES

LL: 45.0%
PL: 16.0%
PI: 29.0%
CLASS: SC CLAYEY SAND with GRAVEL, vy dk gray

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

LOCATION: N 38049.0, E 39684.0
SAMPLE: DECC068 TUBE #:
ELEVATION: 1905.8'

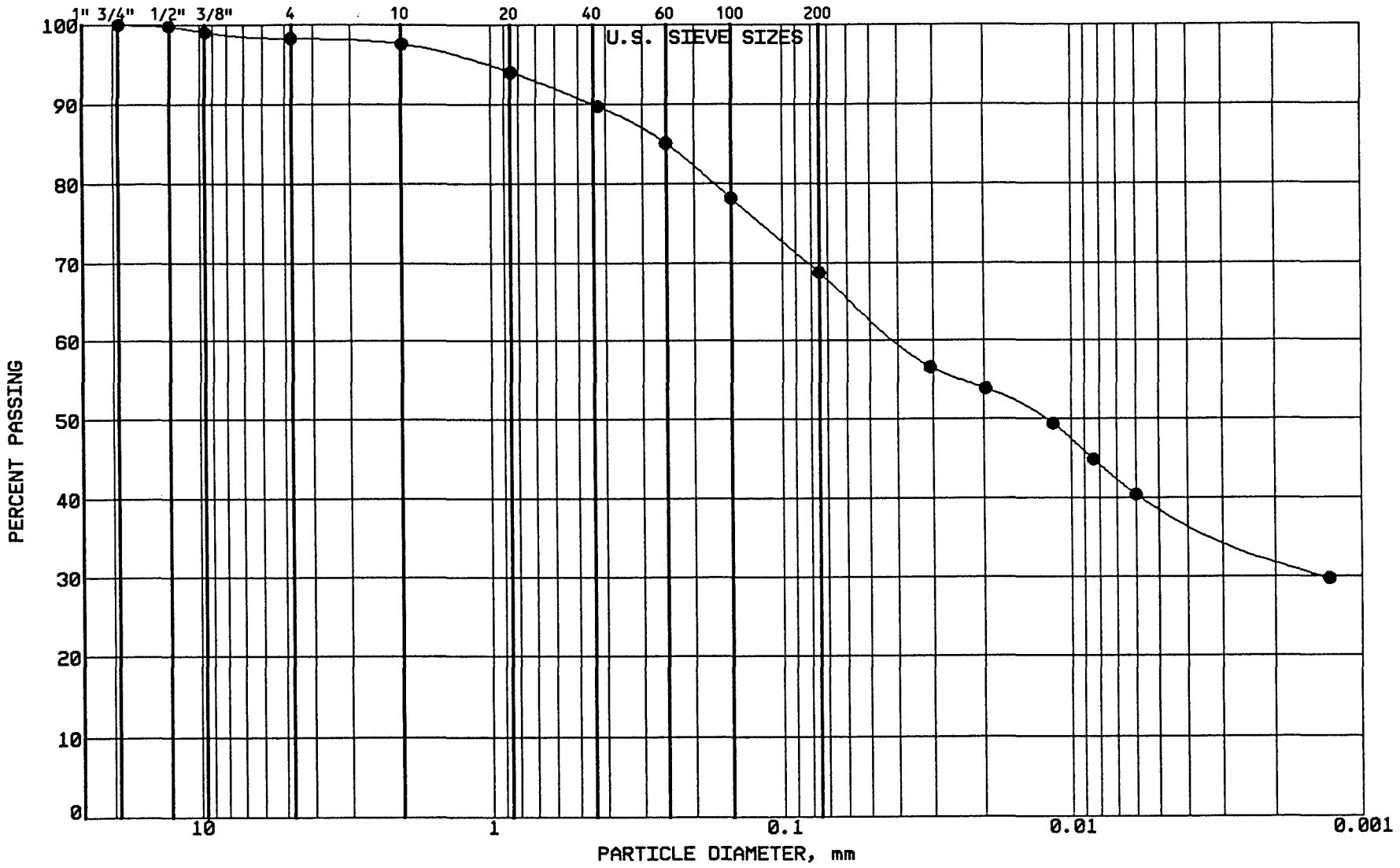
GRAVEL	0.0 %
SAND	31.7 %
SILT	32.9 %
CLAY	35.3 %
P 200	68.3 %

SOIL PROPERTIES

LL: 48.0%
PL: 16.0%
PI: 32.0%
CLASS: CL SANDY LEAN CLAY, ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

LOCATION: N 38015.0, E 39709.0
SAMPLE: DECC069 TUBE #: ST-23
ELEVATION: 1906.3'

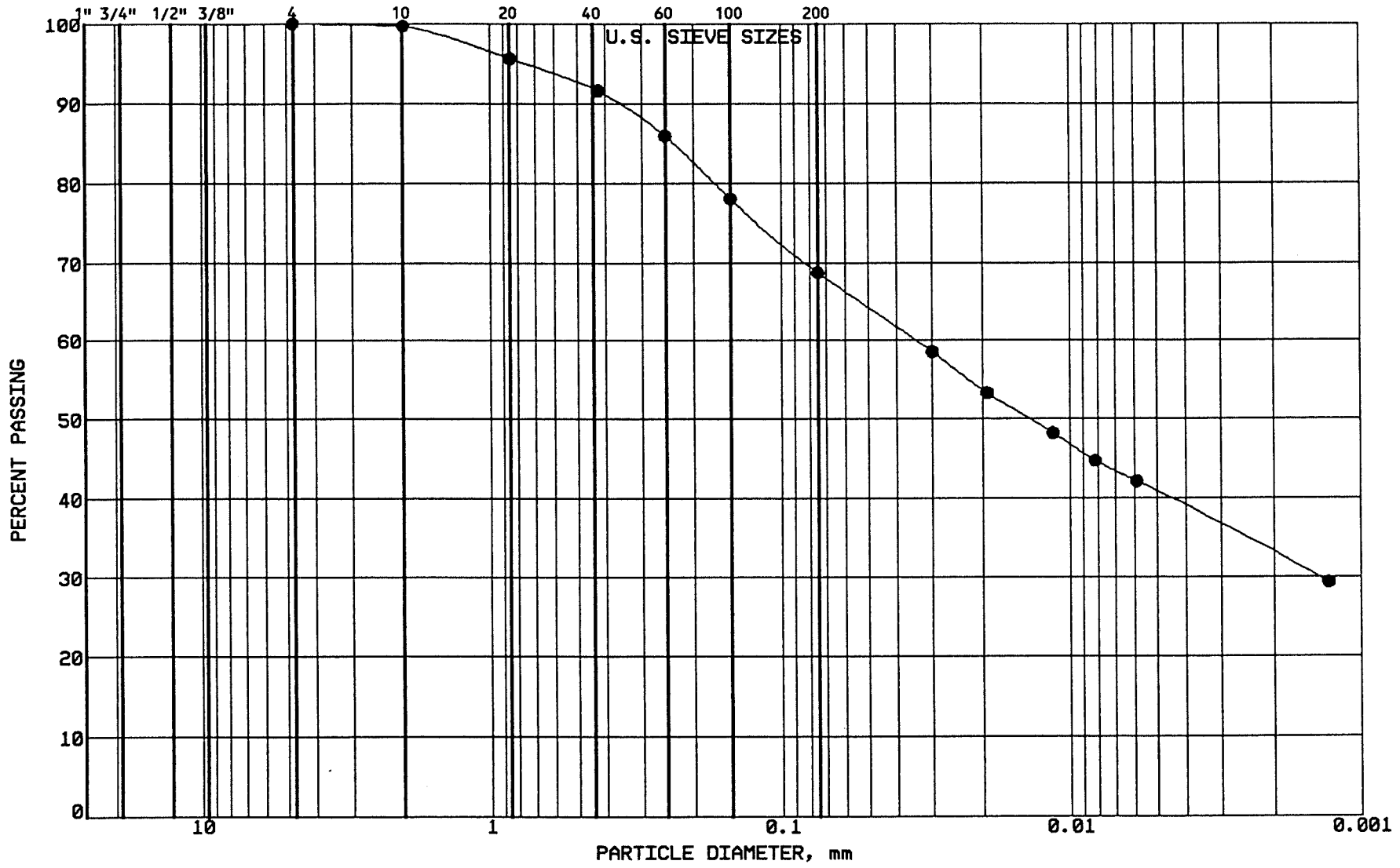
GRAVEL	1.8 %
SAND	29.5 %
SILT	29.5 %
CLAY	39.1 %
P 200	68.7 %

SOIL PROPERTIES

LL: 45.0%
PL: 16.0%
PI: 29.0%
CLASS: CL SANDY LEAN CLAY, ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

LOCATION: N 38228.0, E 39667.0
SAMPLE: DCCC070 TUBE #:
ELEVATION: 1905.3'

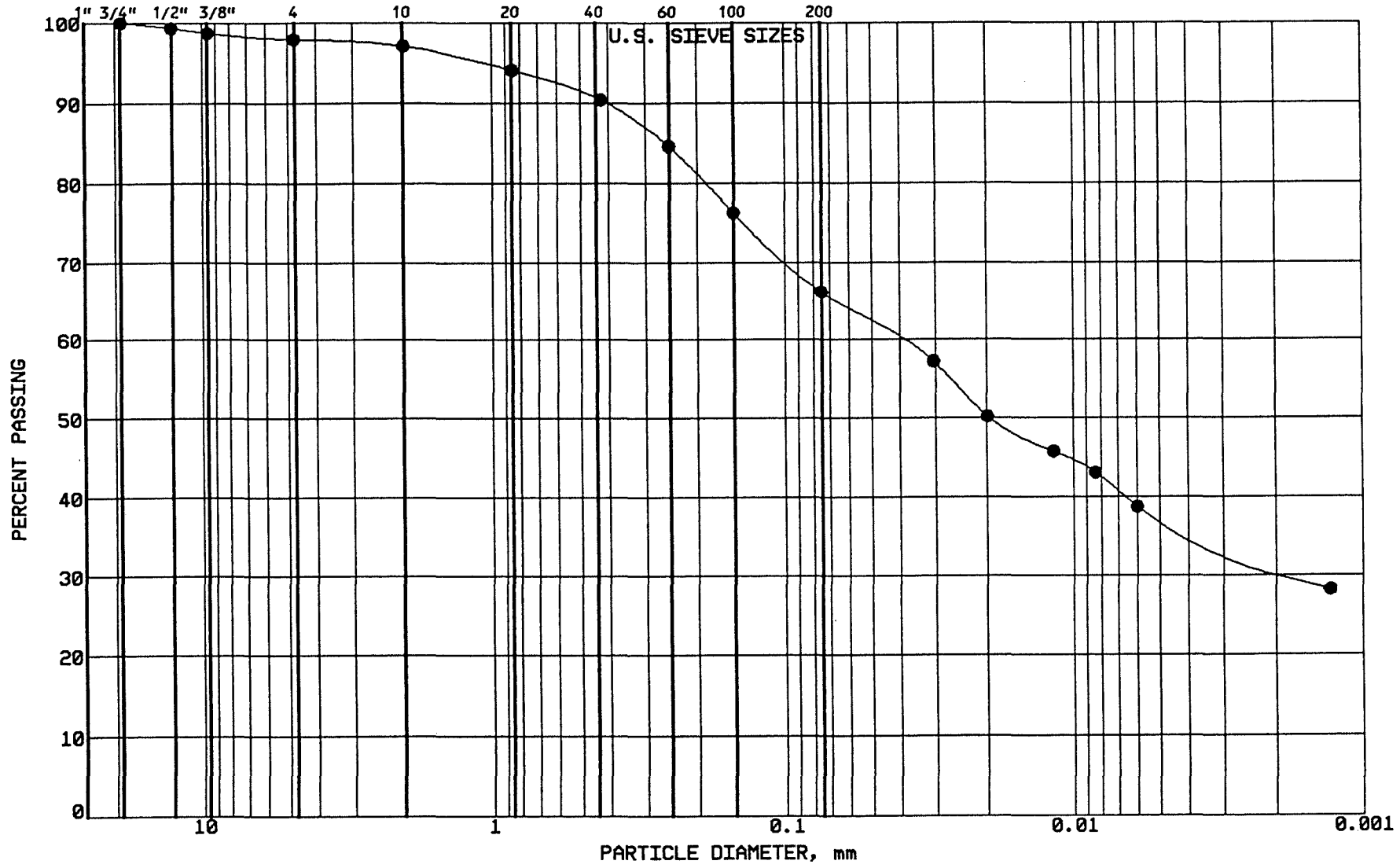
GRAVEL	0.0 %
SAND	31.3 %
SILT	28.0 %
CLAY	40.6 %
P 200	68.7 %

SOIL PROPERTIES

LL: 46.0%
PL: 15.0%
PI: 31.0%
CLASS: CL SANDY LEAN CLAY, ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

LOCATION: N 37881.0, E 39667.0
SAMPLE: DCCC071 TUBE #: ST-24
ELEVATION: 1908.7'

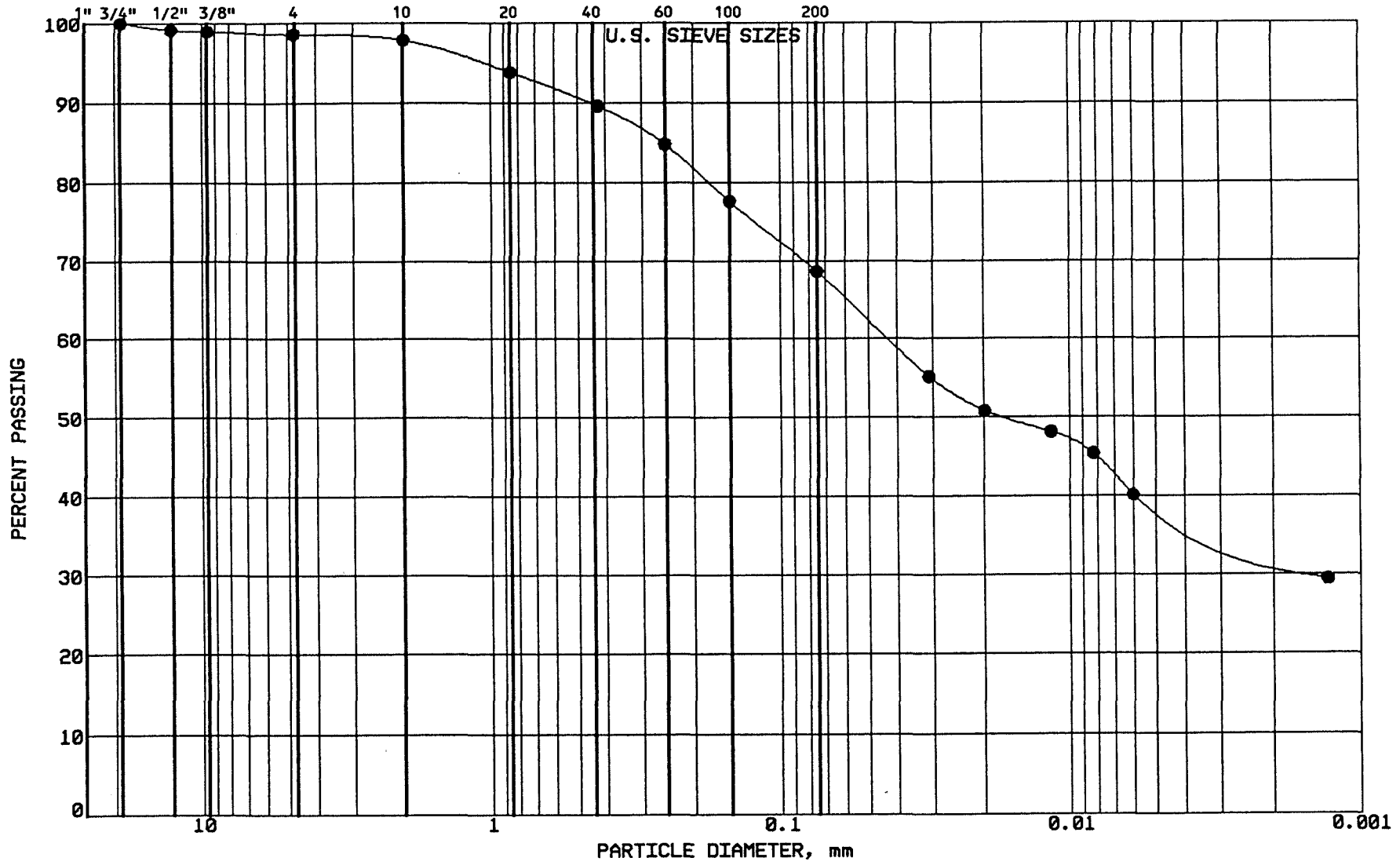
GRAVEL	2.1 %
SAND	31.8 %
SILT	28.6 %
CLAY	37.4 %
P 200	66.1 %

SOIL PROPERTIES

LL: 43.0%
PL: 16.0%
PI: 27.0%
CLASS: CL SANDY LEAN CLAY, ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

LOCATION: N 38300.0, E 39669.0
SAMPLE: DCCC072 TUBE #: ST-25
ELEVATION: 1906.7'

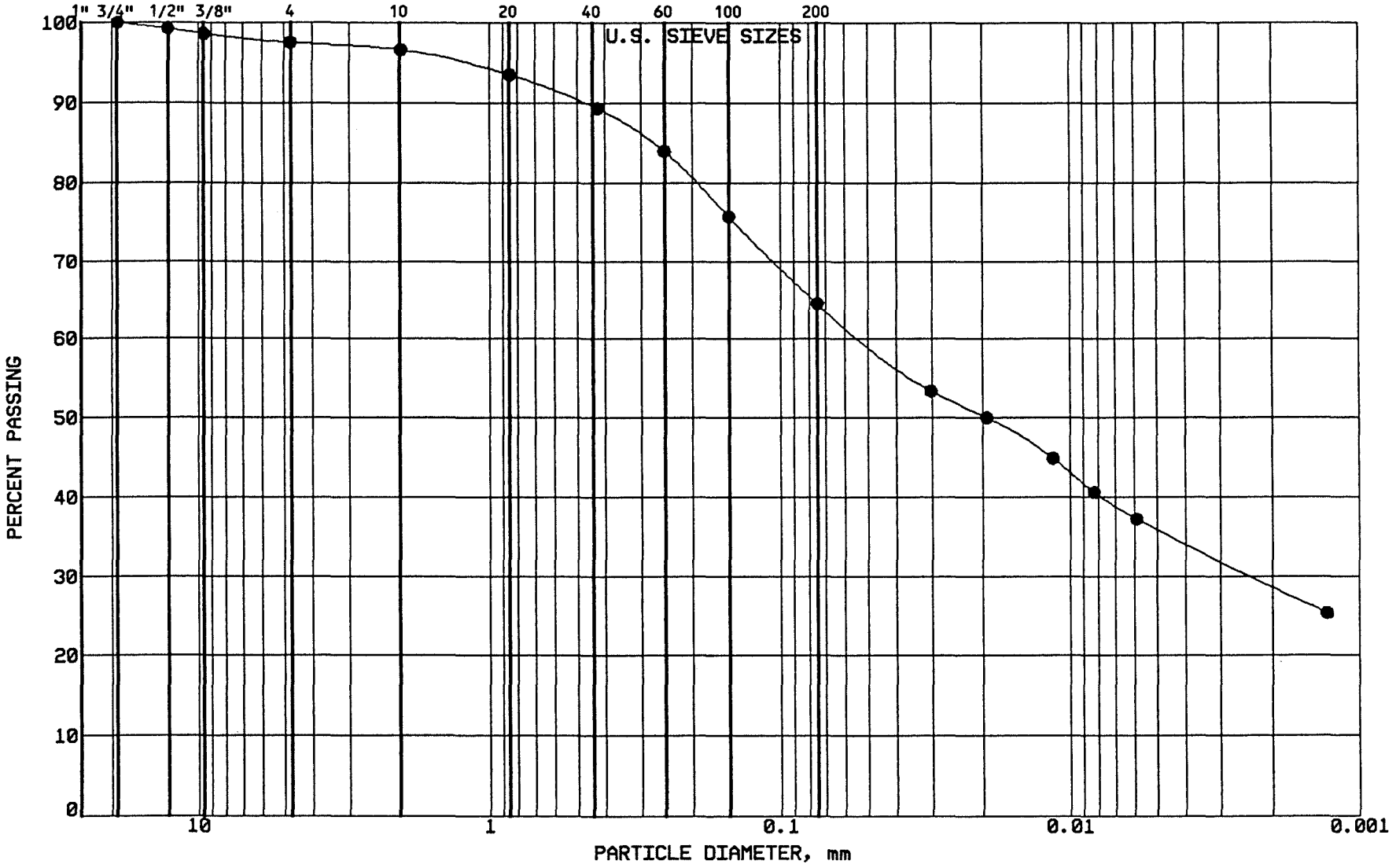
GRAVEL	1.5 %
SAND	29.9 %
SILT	29.7 %
CLAY	38.8 %
P 200	68.6 %

SOIL PROPERTIES

LL: 45.0%
PL: 17.0%
PI: 28.0%
CLASS: CL SANDY LEAN CLAY, ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

LOCATION: N 38300.0, E 39692.0
SAMPLE: DCCC073 TUBE #: ST-26
ELEVATION: 1908.2'

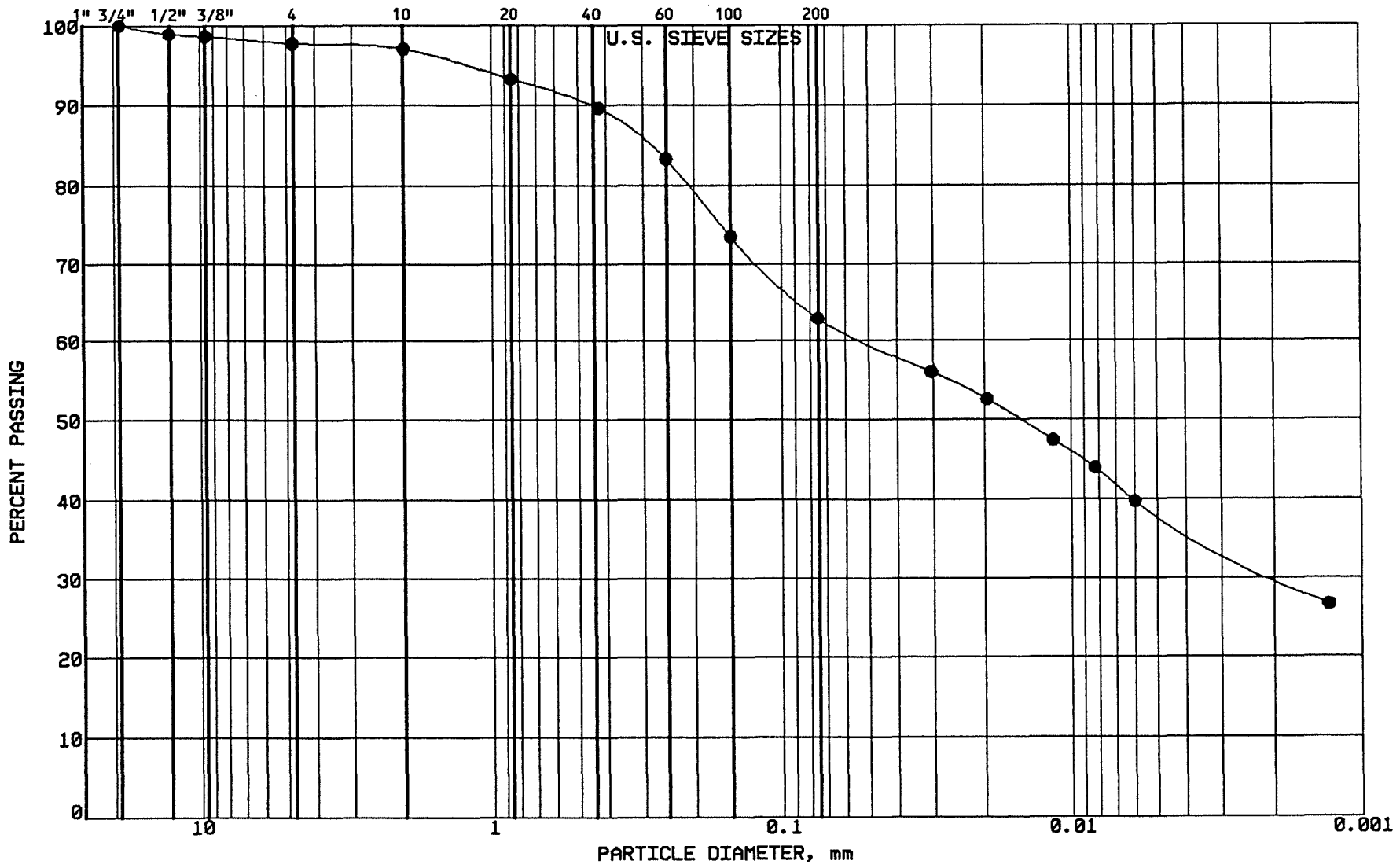
GRAVEL	2.5 %
SAND	33.0 %
SILT	28.5 %
CLAY	35.9 %
P 200	64.5 %

SOIL PROPERTIES

LL: 42.0%
PL: 15.0%
PI: 27.0%
CLASS: CL SANDY LEAN CLAY, ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

LOCATION: N 38092.0, E 39707.0
SAMPLE: DECC076 TUBE #: ST-27
ELEVATION: 1910.2'

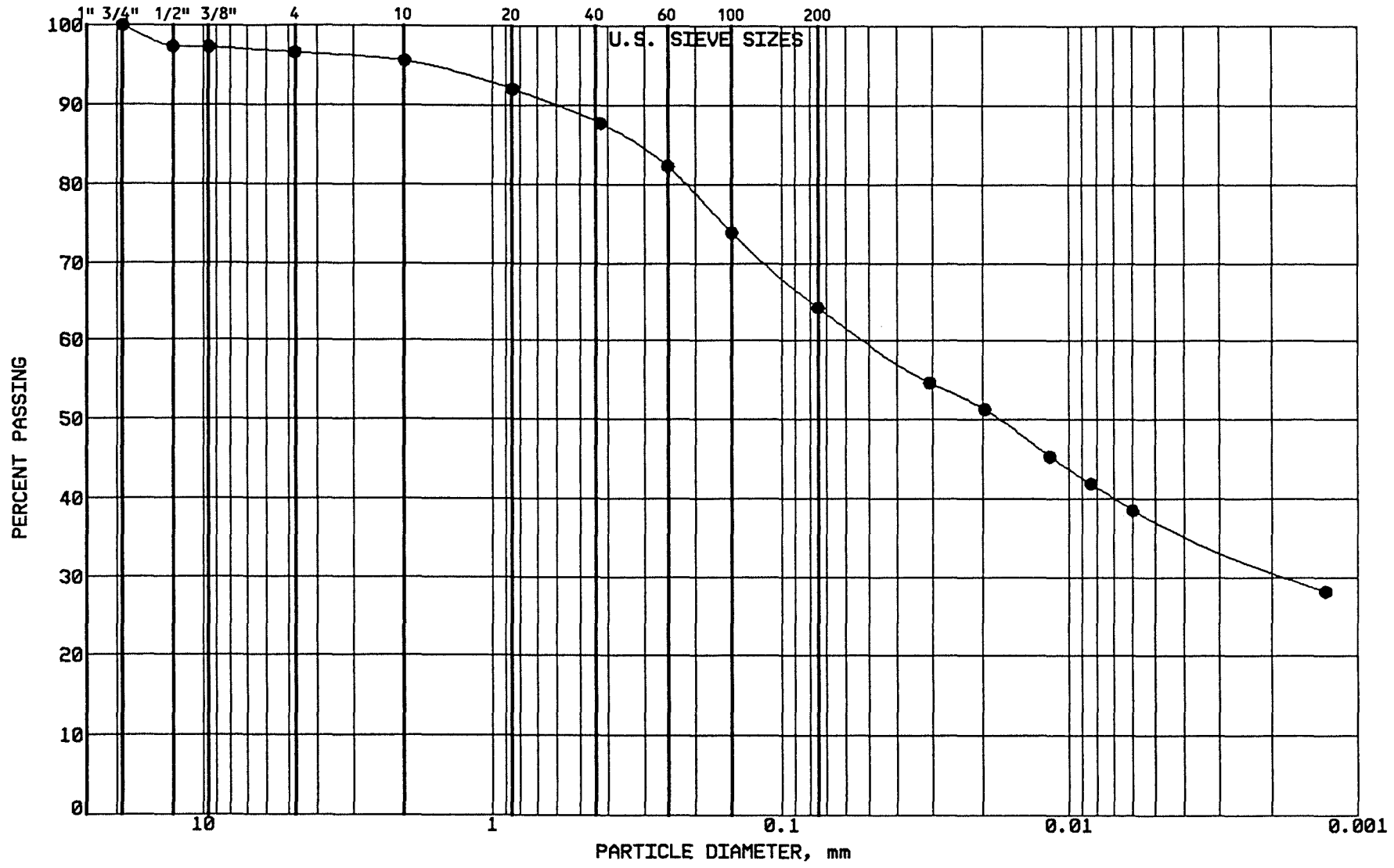
GRAVEL	2.3 %
SAND	34.8 %
SILT	24.7 %
CLAY	38.1 %
P 200	62.9 %

SOIL PROPERTIES

LL: 43.0%
PL: 16.0%
PI: 27.0%
CLASS: CL SANDY LEAN CLAY, ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

LOCATION: N 37871.0, E 39693.0
SAMPLE: DECC077 TUBE #: ST-28
ELEVATION: 1914.2'

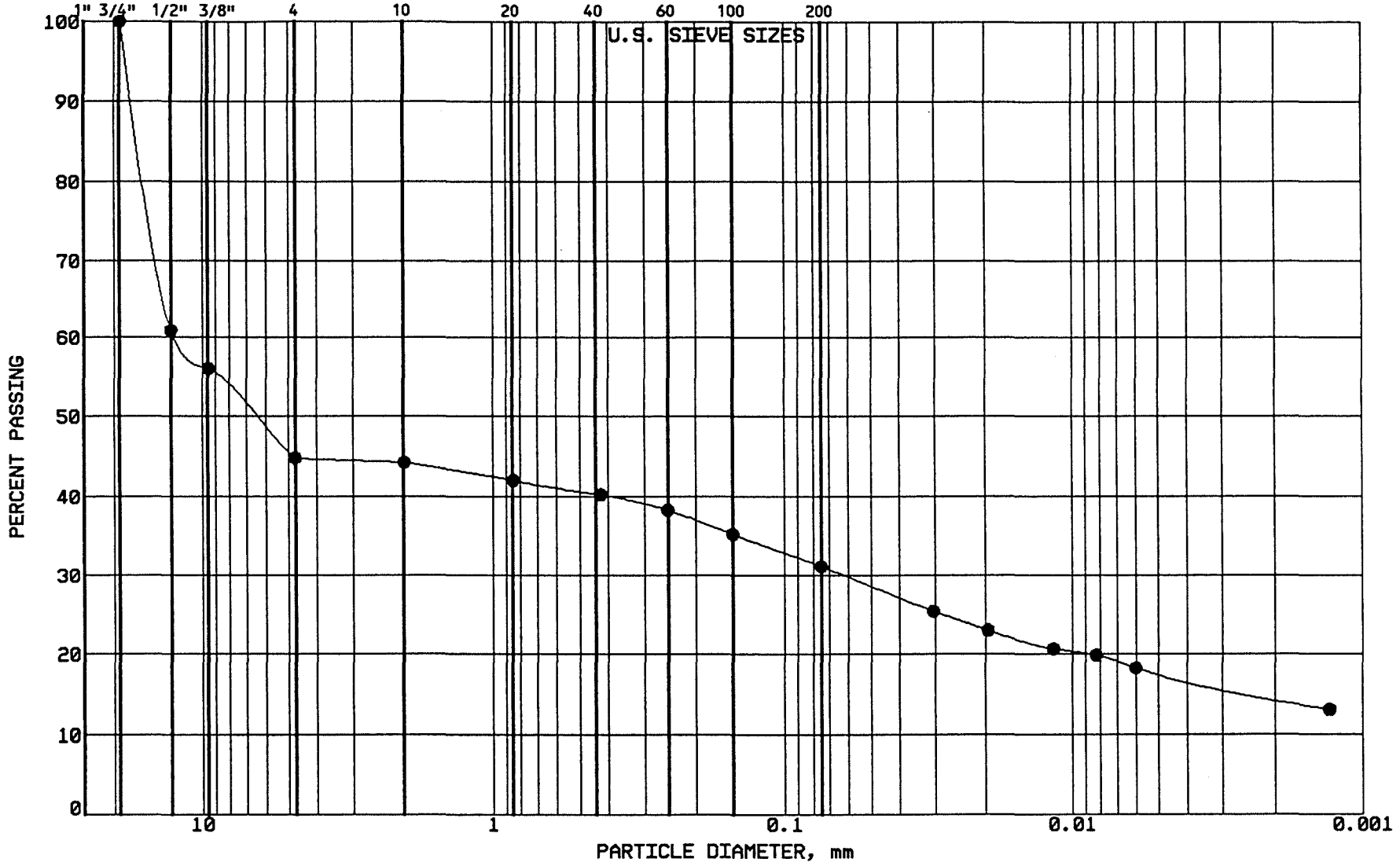
GRAVEL	3.4 %
SAND	32.4 %
SILT	26.9 %
CLAY	37.2 %
P 200	64.2 %

SOIL PROPERTIES

LL: 42.0%
PL: 15.0%
PI: 27.0%
CLASS: CL SANDY LEAN CLAY, ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond #91
UNDERWOOD, ND

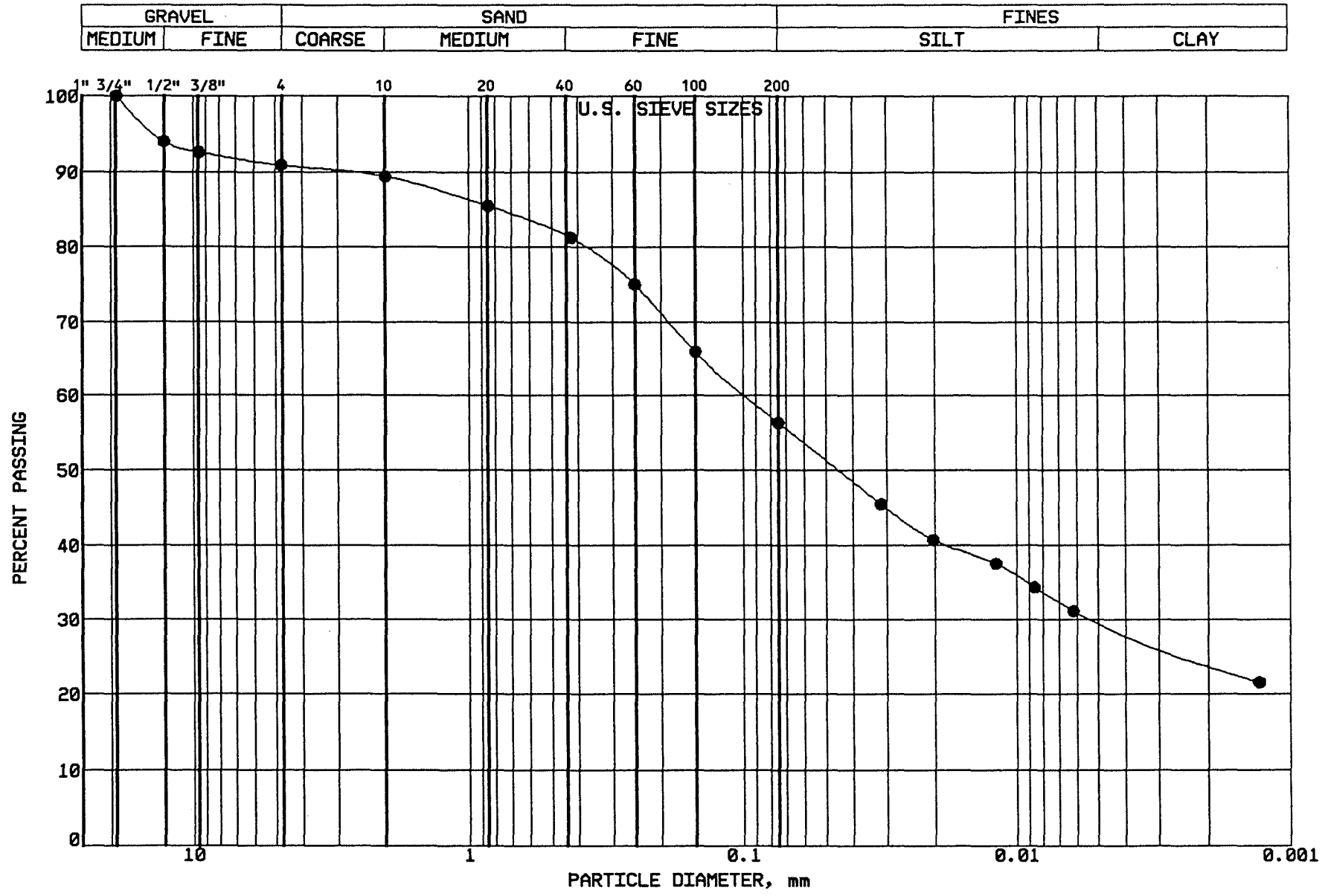
LOCATION: N 38275.0, E 39695.0
SAMPLE: DECC078 TUBE #: ST.29
ELEVATION: 1913.7'

GRAVEL	55.2 %
SAND	13.7 %
SILT	13.4 %
CLAY	17.6 %
P 200	31.1 %

SOIL PROPERTIES

LL: 48.0%
PL: 17.0%
PI: 31.0%
CLASS: GC CLAYEY GRAVEL, ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

LOCATION: N 38300.0, E 39700.0
SAMPLE: DECC079 TUBE #: ST.26-R
ELEVATION: 1908.2'

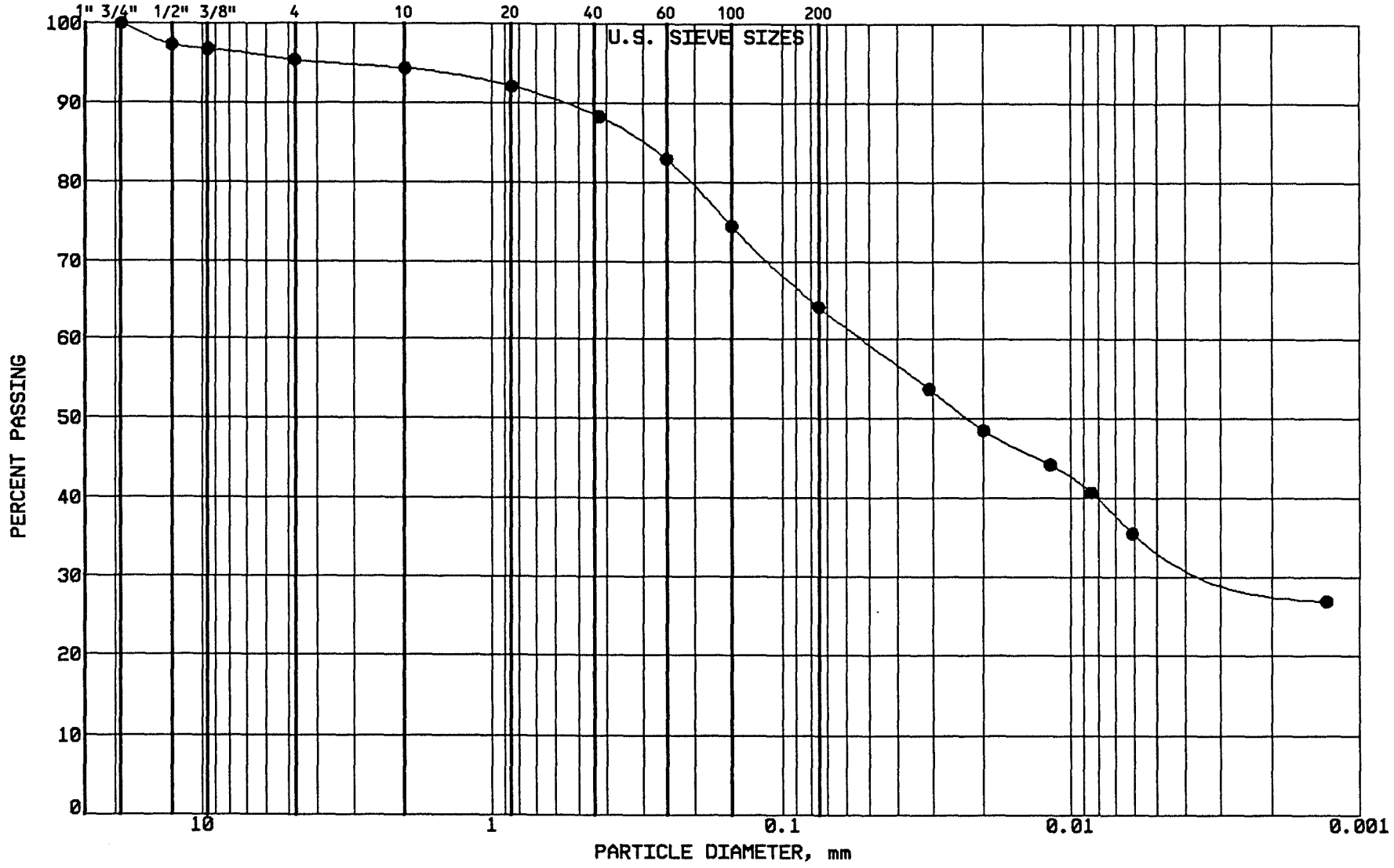
GRAVEL	9.1 %
SAND	34.5 %
SILT	26.6 %
CLAY	29.7 %
P 200	56.4 %

SOIL PROPERTIES

LL: 38.0%
PL: 14.0%
PI: 24.0%
CLASS: CL SANDY LEAN CLAY, ol

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-91-035C
C.P.A. ASH POND
Ash Pond 91
UNDERWOOD, ND

LOCATION: N 38411.0, E 39689.0
SAMPLE: DECC082 TUBE #: ST-30
ELEVATION: 1918.0'

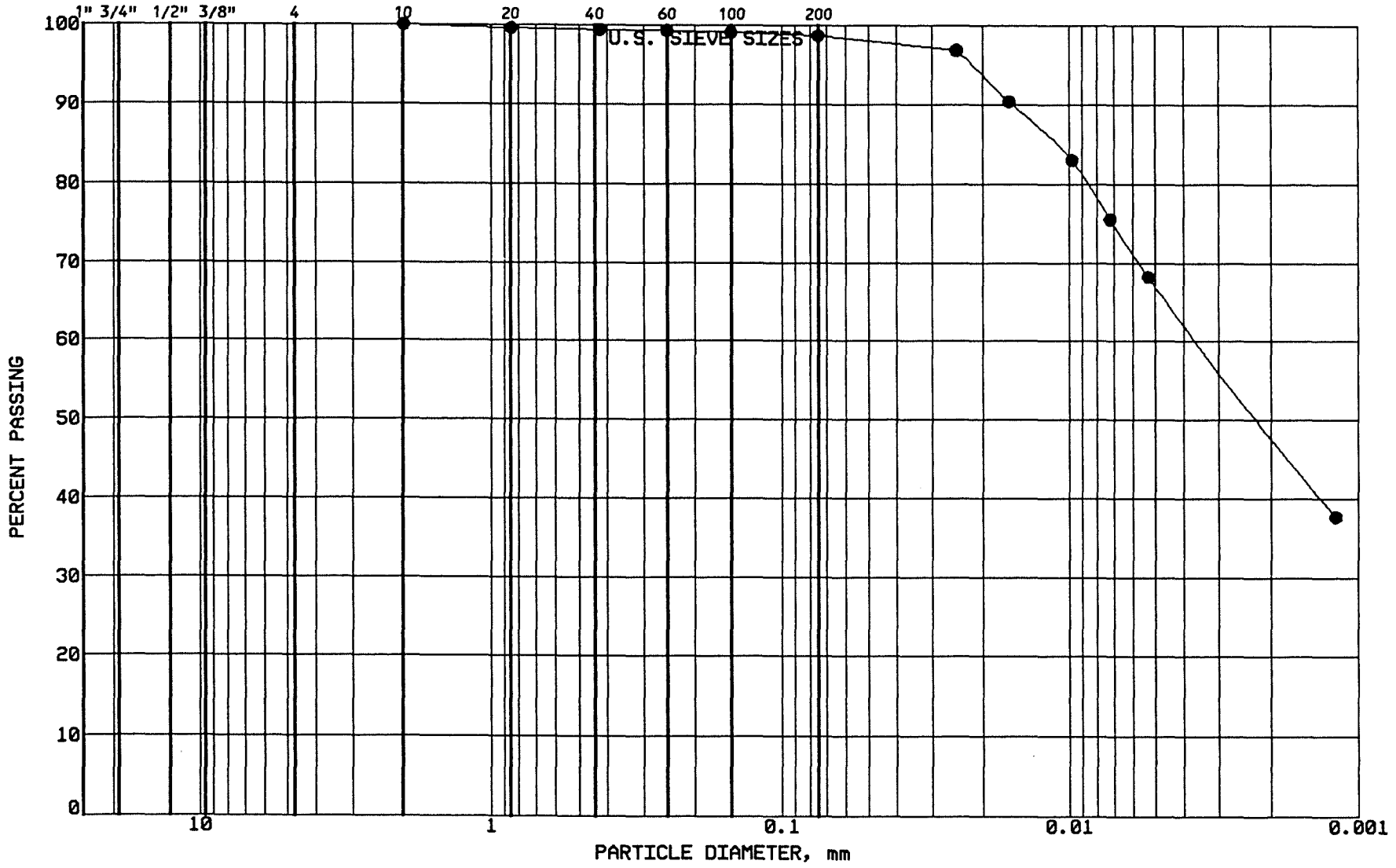
GRAVEL	4.6 %
SAND	31.3 %
SILT	29.7 %
CLAY	34.3 %
P 200	64.1 %

SOIL PROPERTIES

LL: 41.0%
PL: 16.0%
PI: 25.0%
CLASS: CL SANDY LEAN CLAY, ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

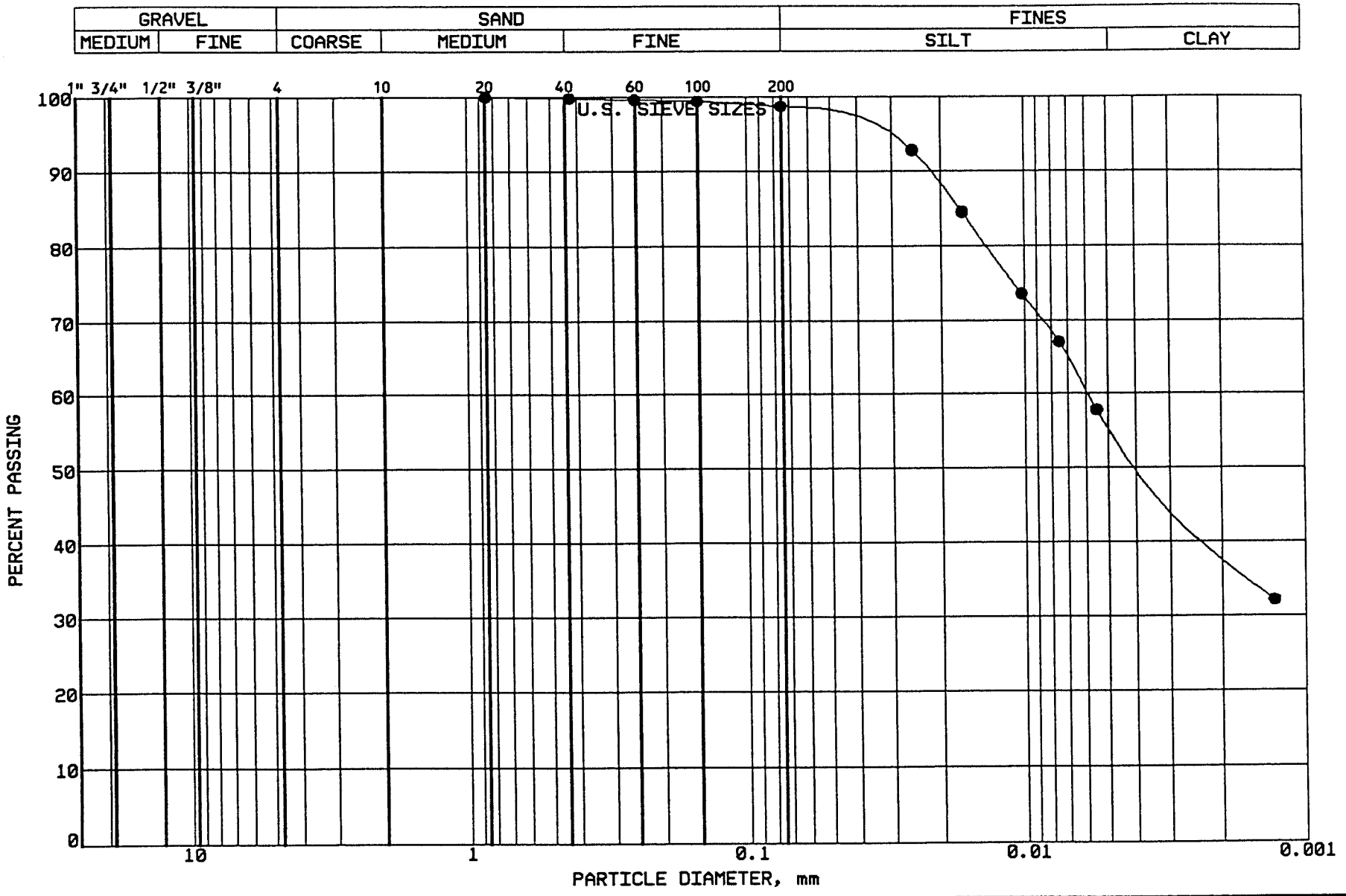
LOCATION: N 38832.0, E 39840.0
SAMPLE: CC-91 TUBE #:
ELEVATION: 1899.8'

GRAVEL	0.0 %
SAND	1.3 %
SILT	31.7 %
CLAY	67.0 %
P 200	98.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CH FAT CLAY, gray

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

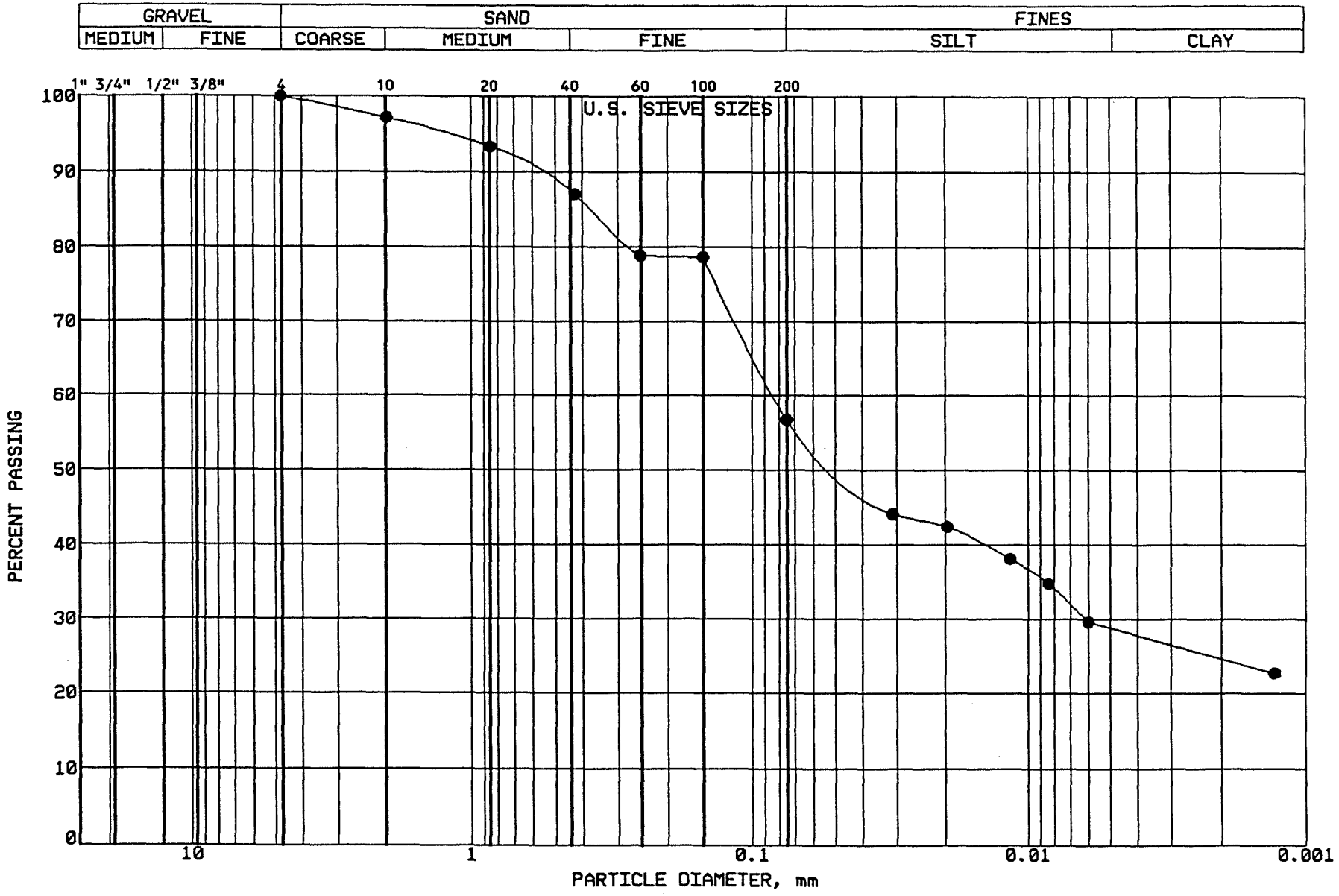
LOCATION: N 38832.0, E 40105.0
SAMPLE: CC-92 TUBE #:
ELEVATION: 1898.5'

GRAVEL	0.0 %
SAND	1.3 %
SILT	42.6 %
CLAY	56.1 %
P 200	98.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: CH FAT CLAY, gray

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

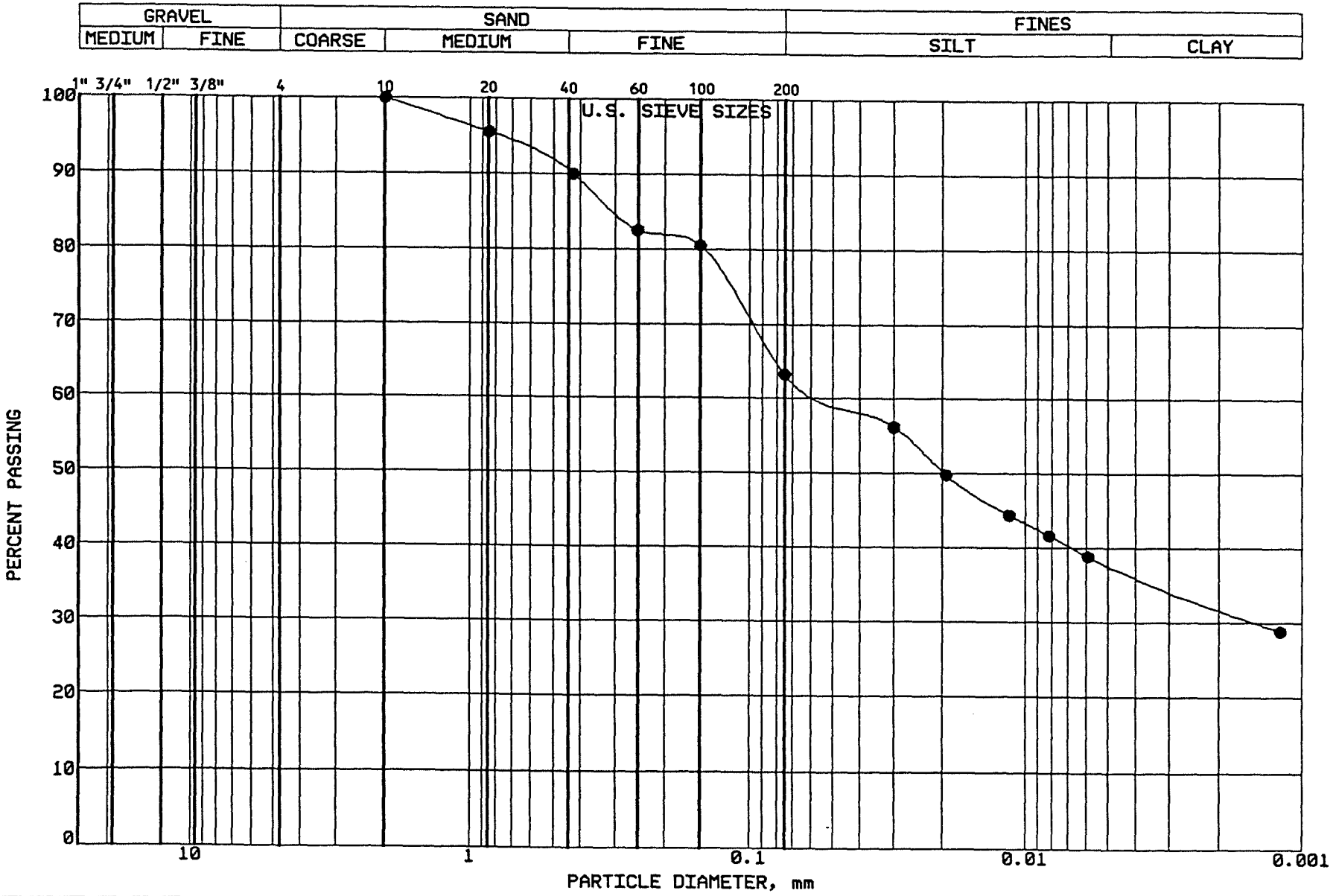
LOCATION: N 37000.0, E 40500.0
SAMPLE: CC-93 TUBE #:
ELEVATION: 1-2'

GRAVEL	0.0 %
SAND	43.3 %
SILT	27.9 %
CLAY	28.8 %
P 200	56.7 %

SOIL PROPERTIES

LL: 32.0%
PL: 14.0%
PI: 18.0%
CLASS: CL SANDY LEAN CLAY, brown

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

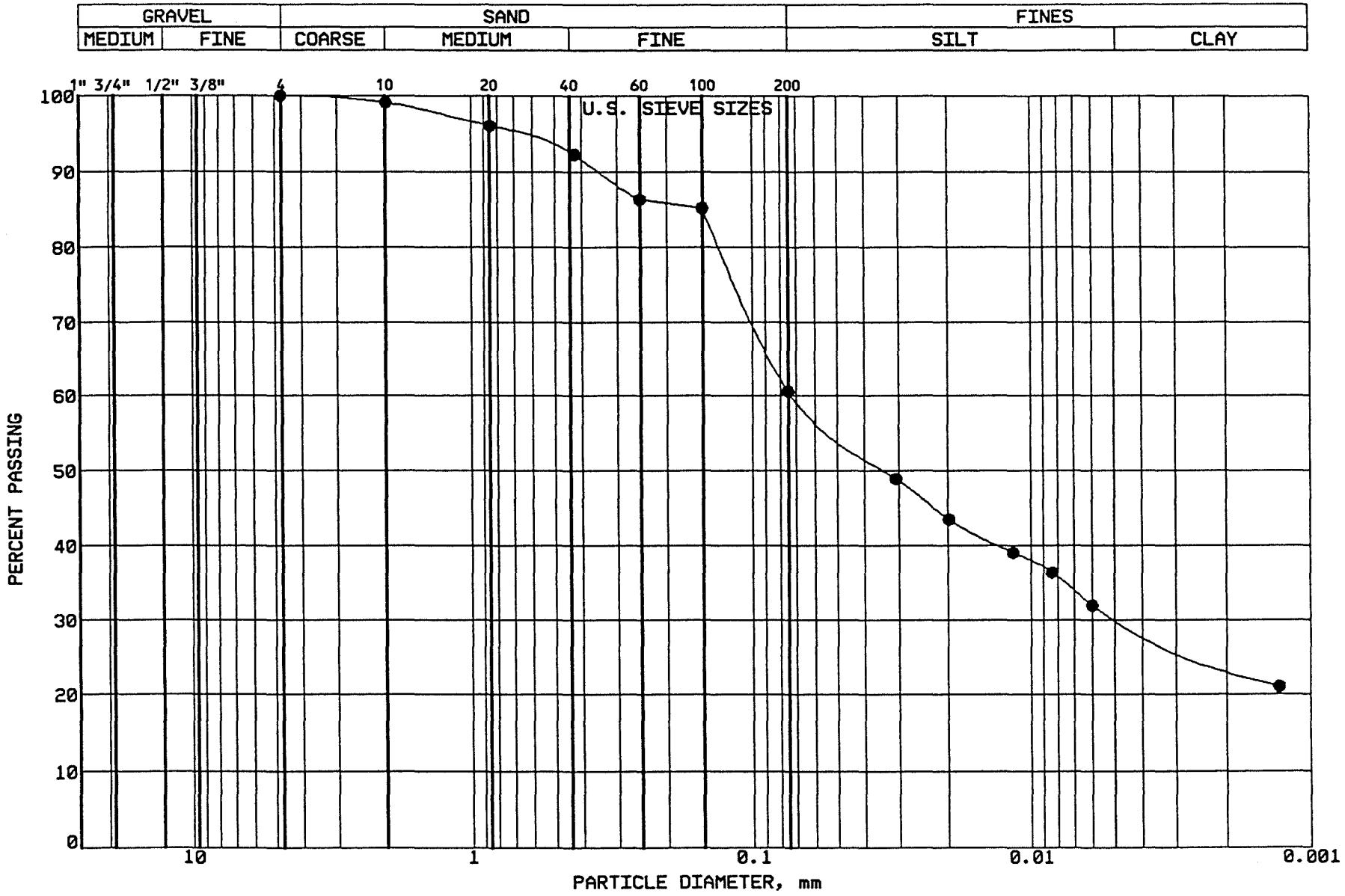
LOCATION: N 36950.0, E 40800.0
SAMPLE: CC-94 TUBE #:
ELEVATION: 1-2'

GRAVEL	0.0 %
SAND	36.8 %
SILT	25.4 %
CLAY	37.8 %
P 200	63.2 %

SOIL PROPERTIES

LL: 38.0%
PL: 16.0%
PI: 22.0%
CLASS: CL SANDY LEAN CLAY, ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

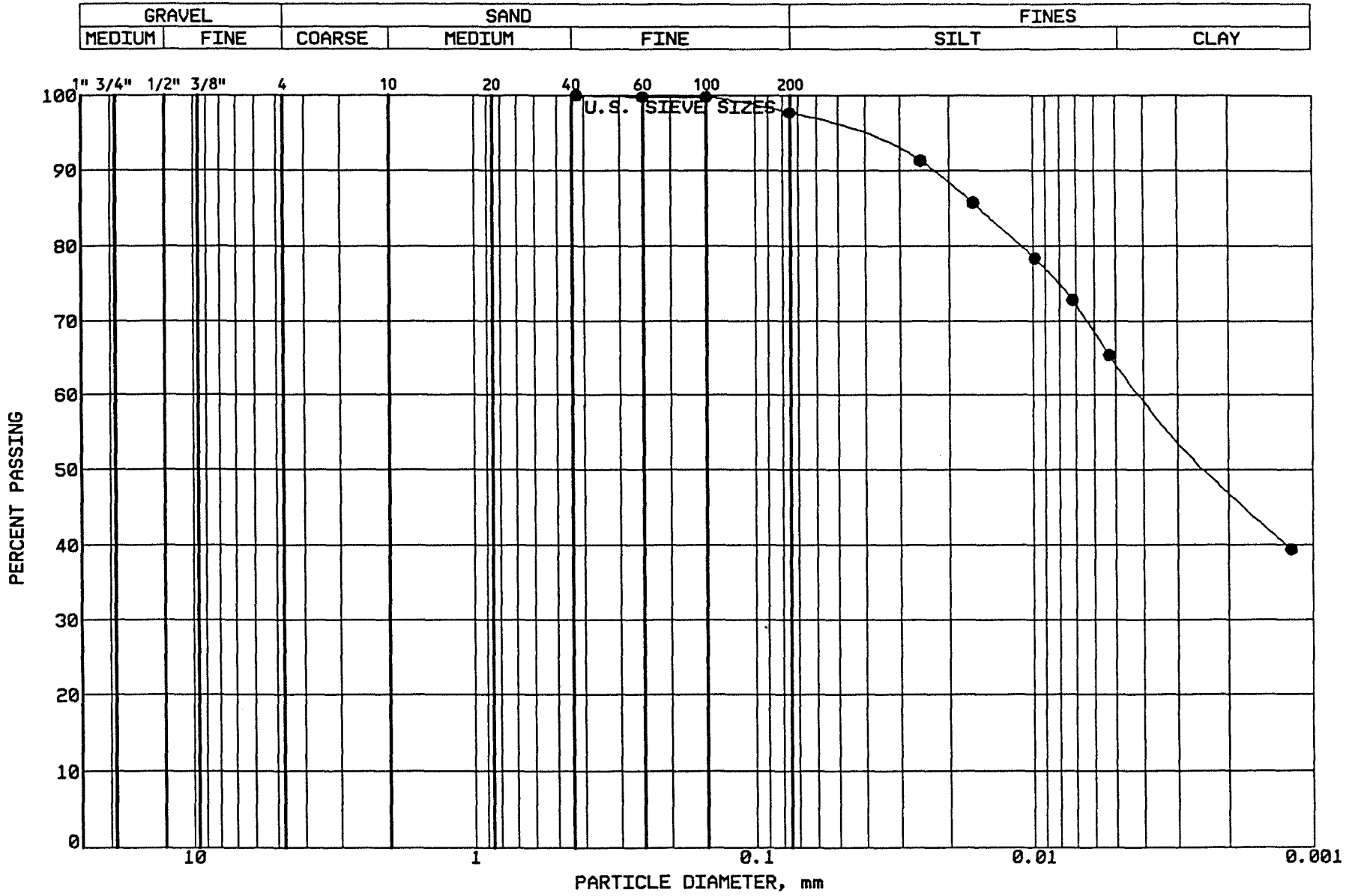
LOCATION: N 36656.0, E 40465.0
SAMPLE: CC-95 TUBE #: TP-2
ELEVATION: 2-6'

GRAVEL	0.0 %
SAND	39.4 %
SILT	30.0 %
CLAY	30.6 %
P 200	60.6 %

SOIL PROPERTIES

LL: 32.0%
PL: 14.0%
PI: 18.0%
CLASS: CL SANDY LEAN CLAY, ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

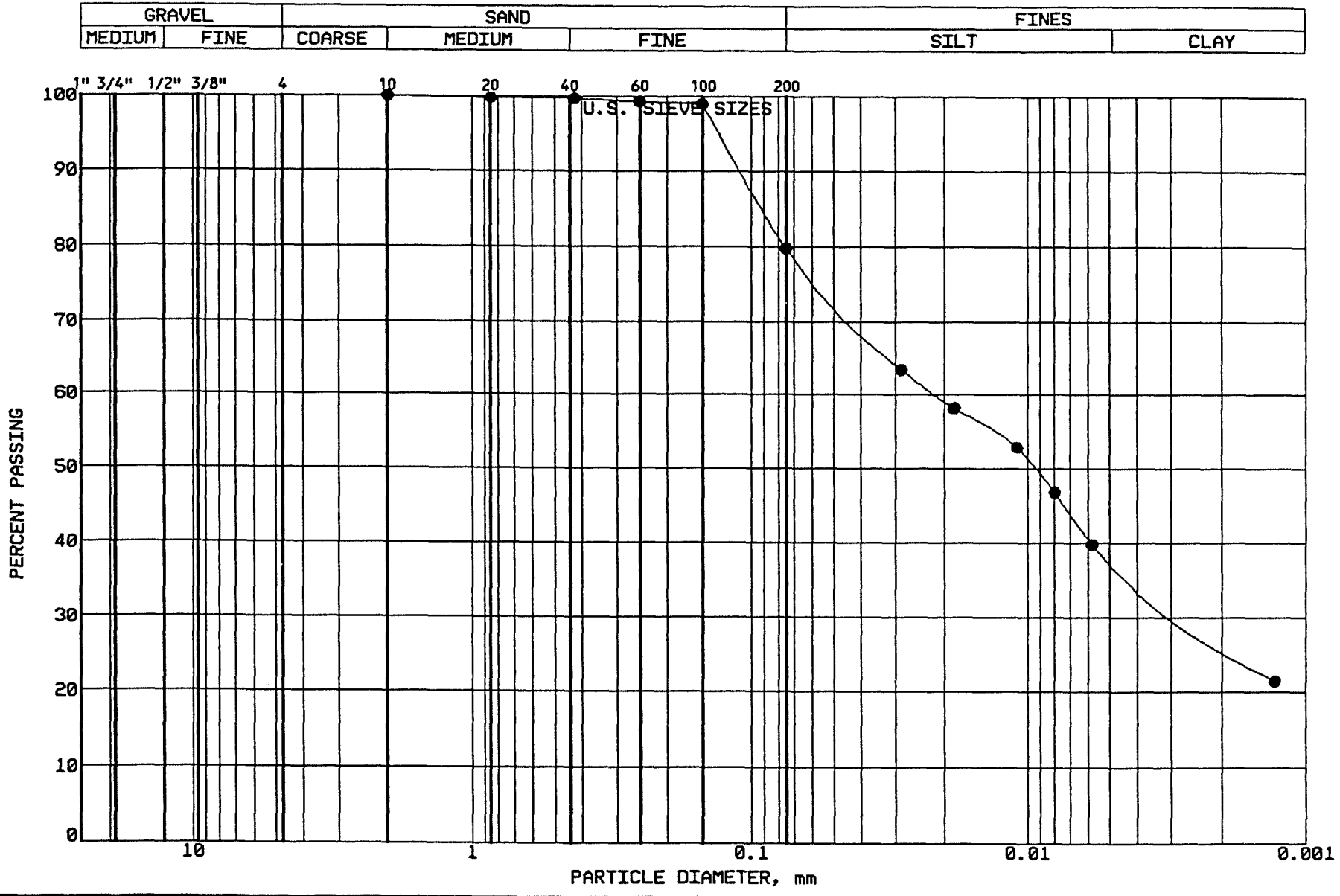
LOCATION: N 36656.0, E 40465.0
SAMPLE: CC-96 TUBE #: TP-2
ELEVATION: 15-20'

GRAVEL	0.0 %
SAND	2.4 %
SILT	33.2 %
CLAY	64.4 %
P 200	97.6 %

SOIL PROPERTIES

LL: 54.0%
PL: 20.0%
PI: 34.0%
CLASS: CH FAT CLAY, ol brown

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

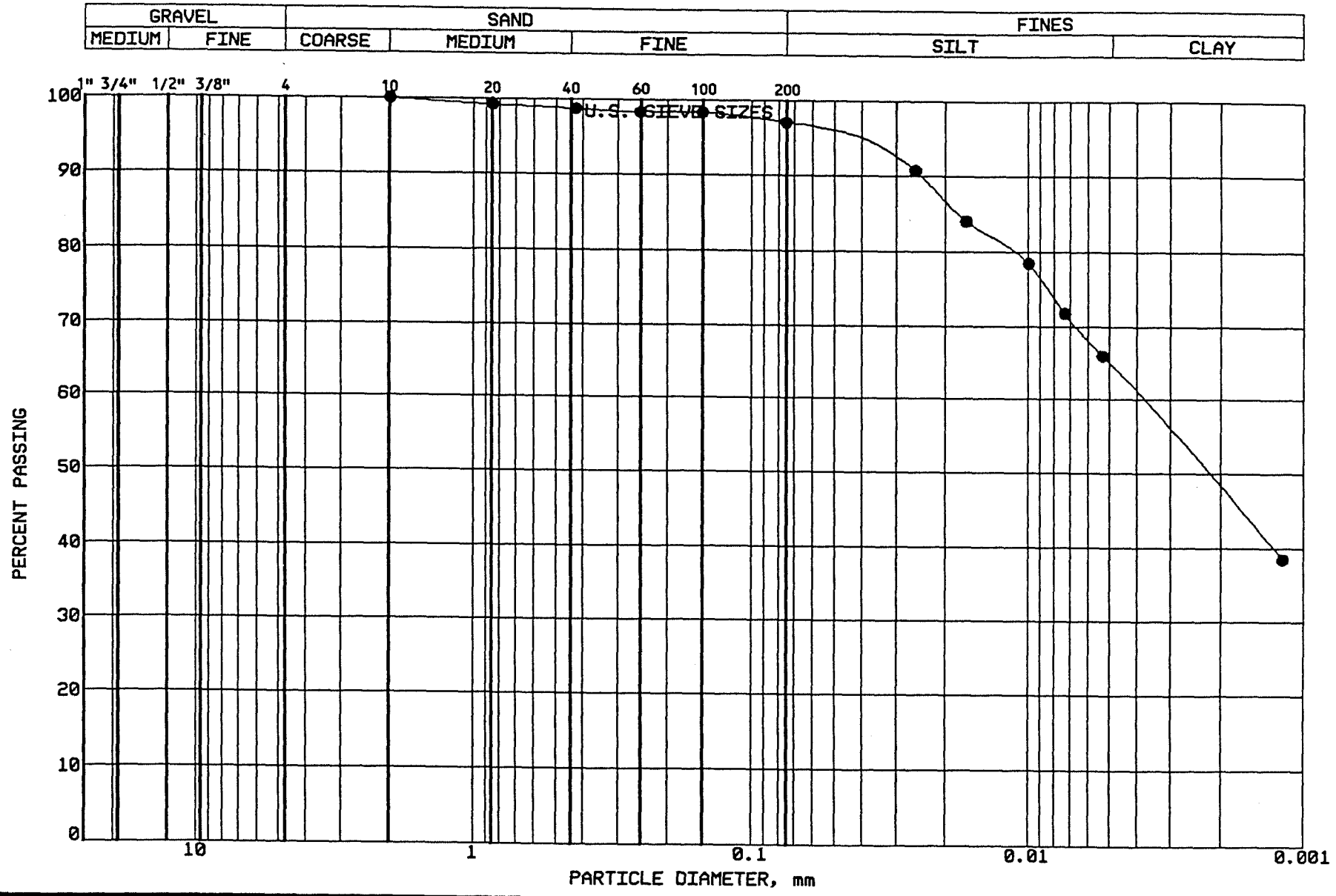
LOCATION: N 36661.0, E 40100.0
SAMPLE: CC-97 TUBE #: TP-3
ELEVATION: 10-20'

GRAVEL	0.0 %
SAND	20.3 %
SILT	41.7 %
CLAY	38.0 %
P 200	79.7 %

SOIL PROPERTIES

LL: 36.0%
PL: 18.0%
PI: 18.0%
CLASS: CL LEAN CLAY W SAND, ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

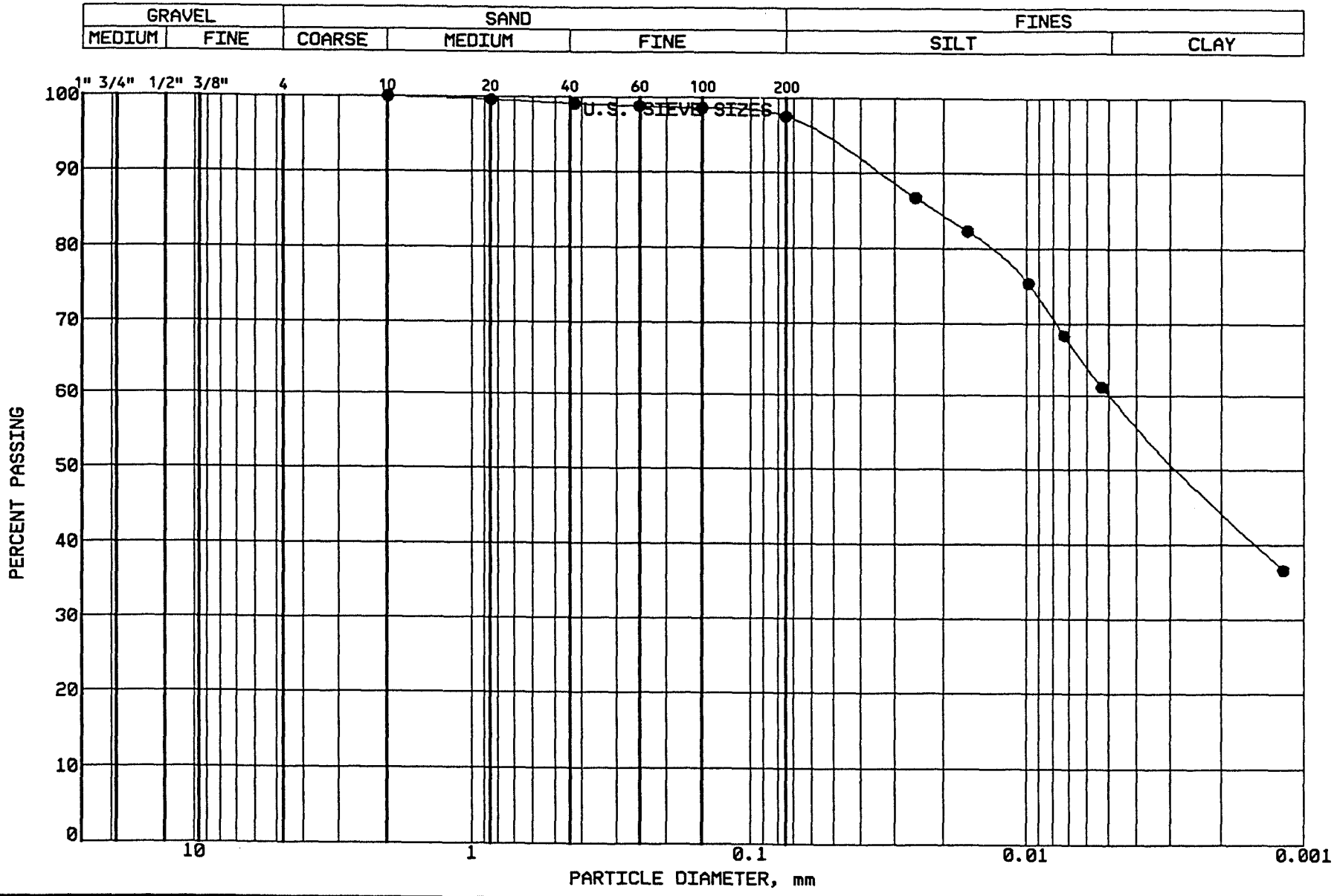
LOCATION: N 36610.0, E 39772.0
SAMPLE: CC-98 TUBE #: TP-4
ELEVATION: 10.0'

GRAVEL	0.0 %
SAND	3.0 %
SILT	32.1 %
CLAY	64.9 %
P 200	97.0 %

SOIL PROPERTIES

LL: 53.0%
PL: 20.0%
PI: 33.0%
CLASS: CH FAT CLAY, ol brown

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

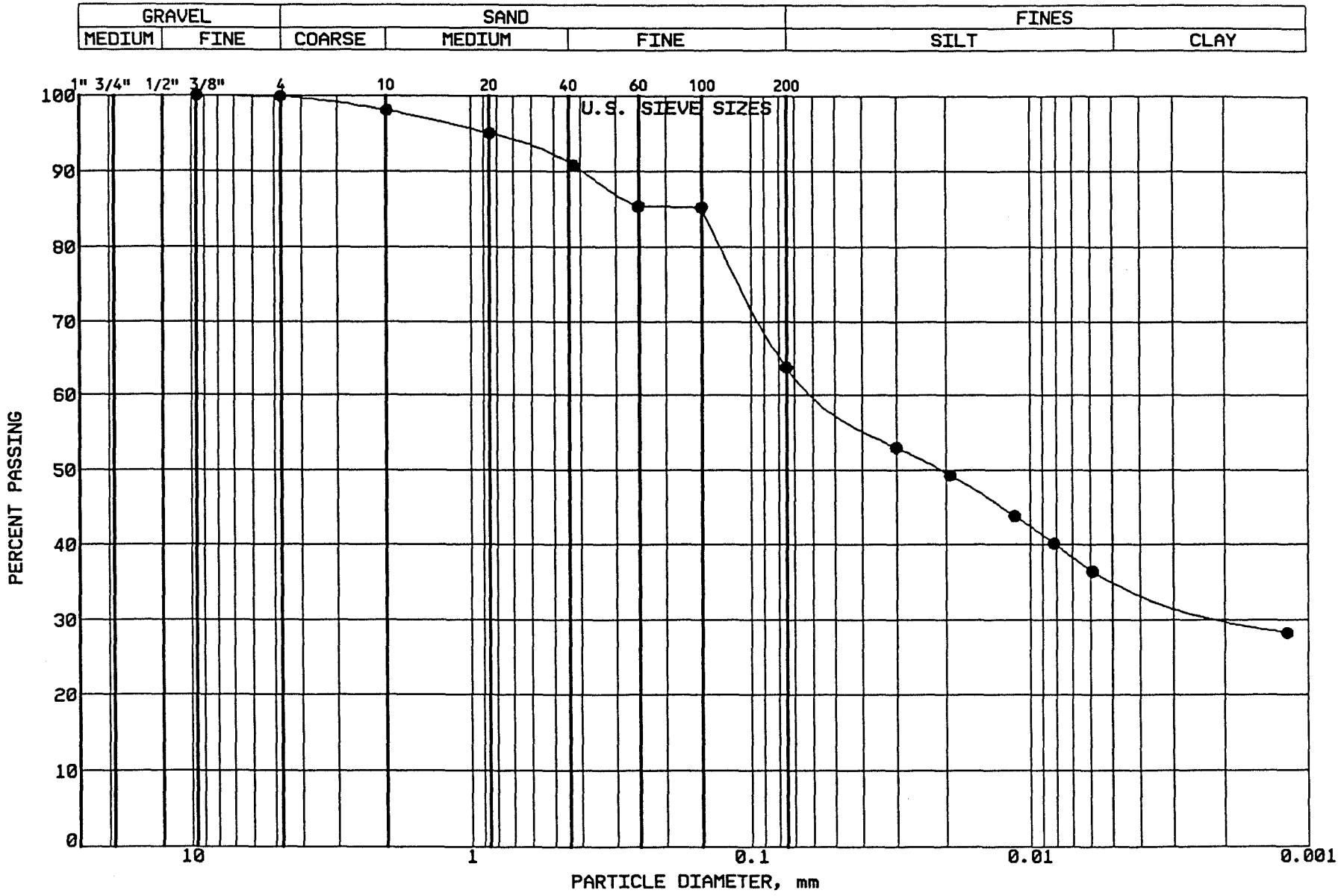
LOCATION: N 36610.0, E 39772.0
SAMPLE: CC-99 TUBE #: TP-4
ELEVATION: 20-22'

GRAVEL	0.0 %
SAND	2.5 %
SILT	37.3 %
CLAY	60.2 %
P 200	97.5 %

SOIL PROPERTIES

LL: 55.0%
PL: 21.0%
PI: 34.0%
CLASS: CH FAT CLAY, ol brown

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

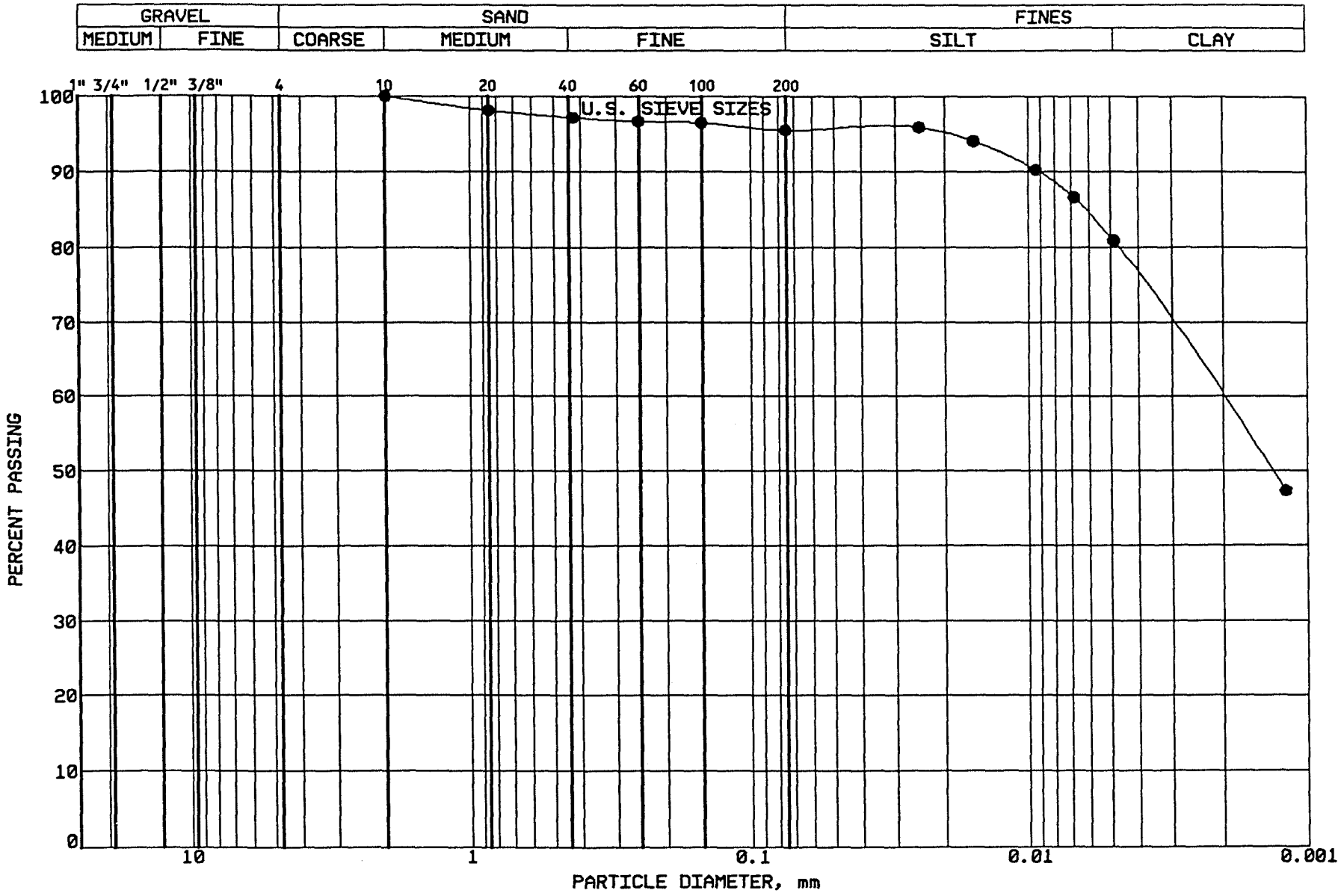
LOCATION: N 36500.0, E 38400.0
SAMPLE: CC-100 TUBE #: TP-5
ELEVATION: 6-8'

GRAVEL	0.1 %
SAND	36.2 %
SILT	28.2 %
CLAY	35.5 %
P 200	63.7 %

SOIL PROPERTIES

LL: 41.0%
PL: 17.0%
PI: 24.0%
CLASS: CL SANDY LEAN CLAY, ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

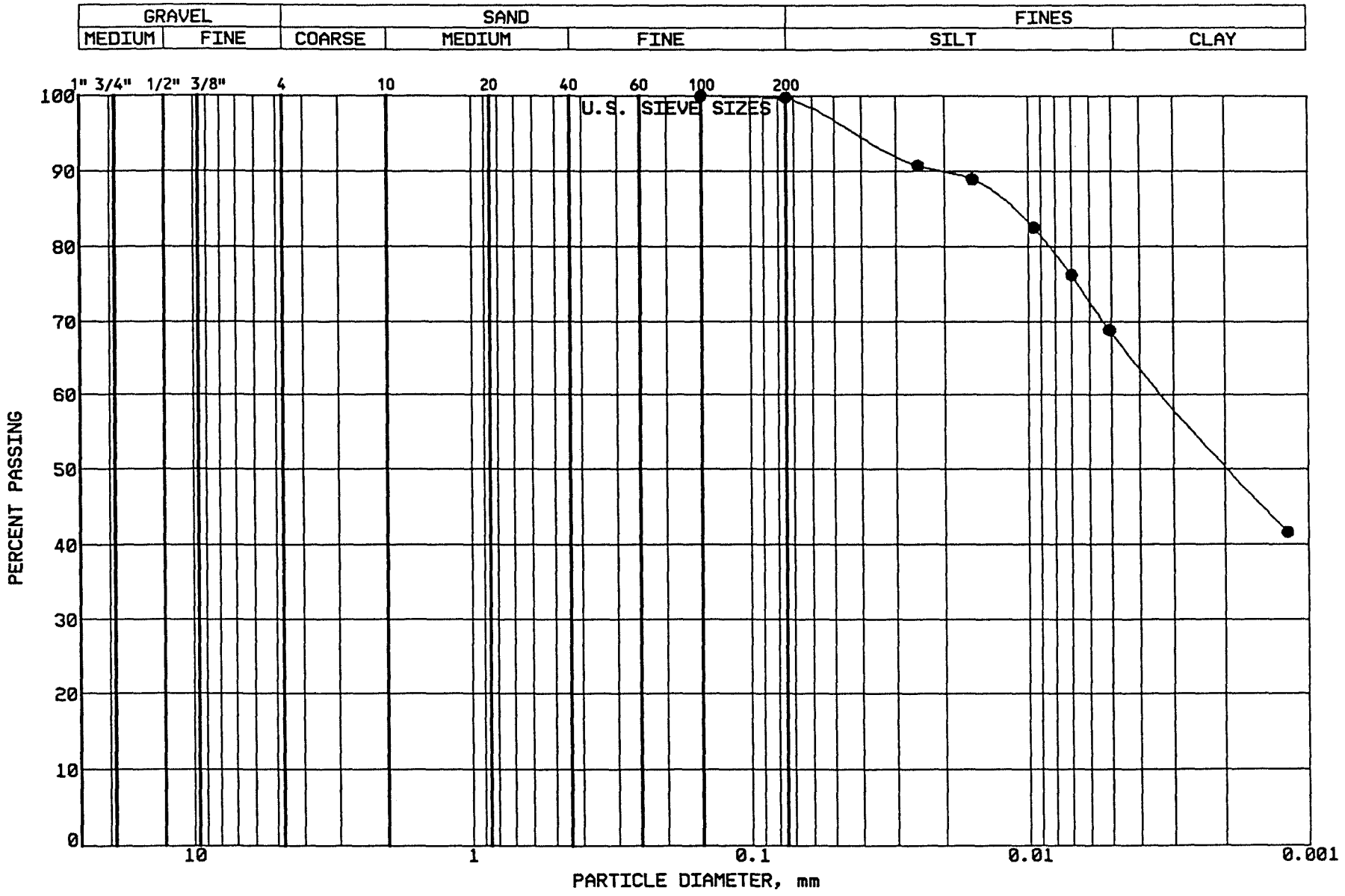
LOCATION: N 36345.0, E 39650.0
SAMPLE: CC-103 TUBE #: TP-6
ELEVATION: 8-15'

GRAVEL	0.0 %
SAND	4.6 %
SILT	14.2 %
CLAY	81.2 %
P 200	95.4 %

SOIL PROPERTIES

LL: 66.0%
PL: 23.0%
PI: 43.0%
CLASS: CH FAT CLAY, ol yellow

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

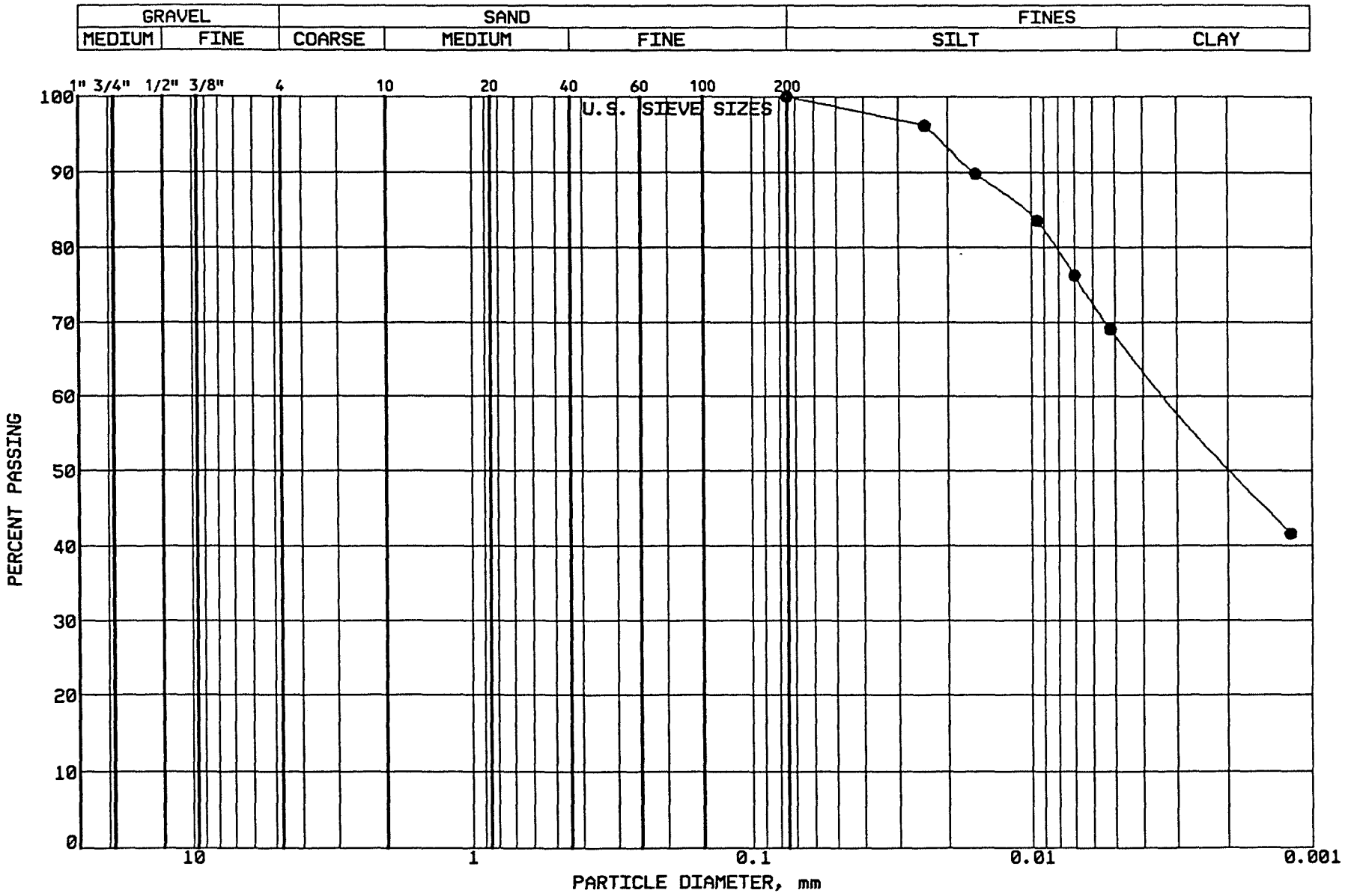
LOCATION: N 36345.0, E 39650.0
SAMPLE: CC-104 TUBE #: TP-6
ELEVATION: 20.0'

GRAVEL	0.0 %
SAND	0.2 %
SILT	31.4 %
CLAY	68.4 %
P 200	99.8 %

SOIL PROPERTIES

LL: 55.0%
PL: 19.0%
PI: 36.0%
CLASS: CH FAT CLAY, gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

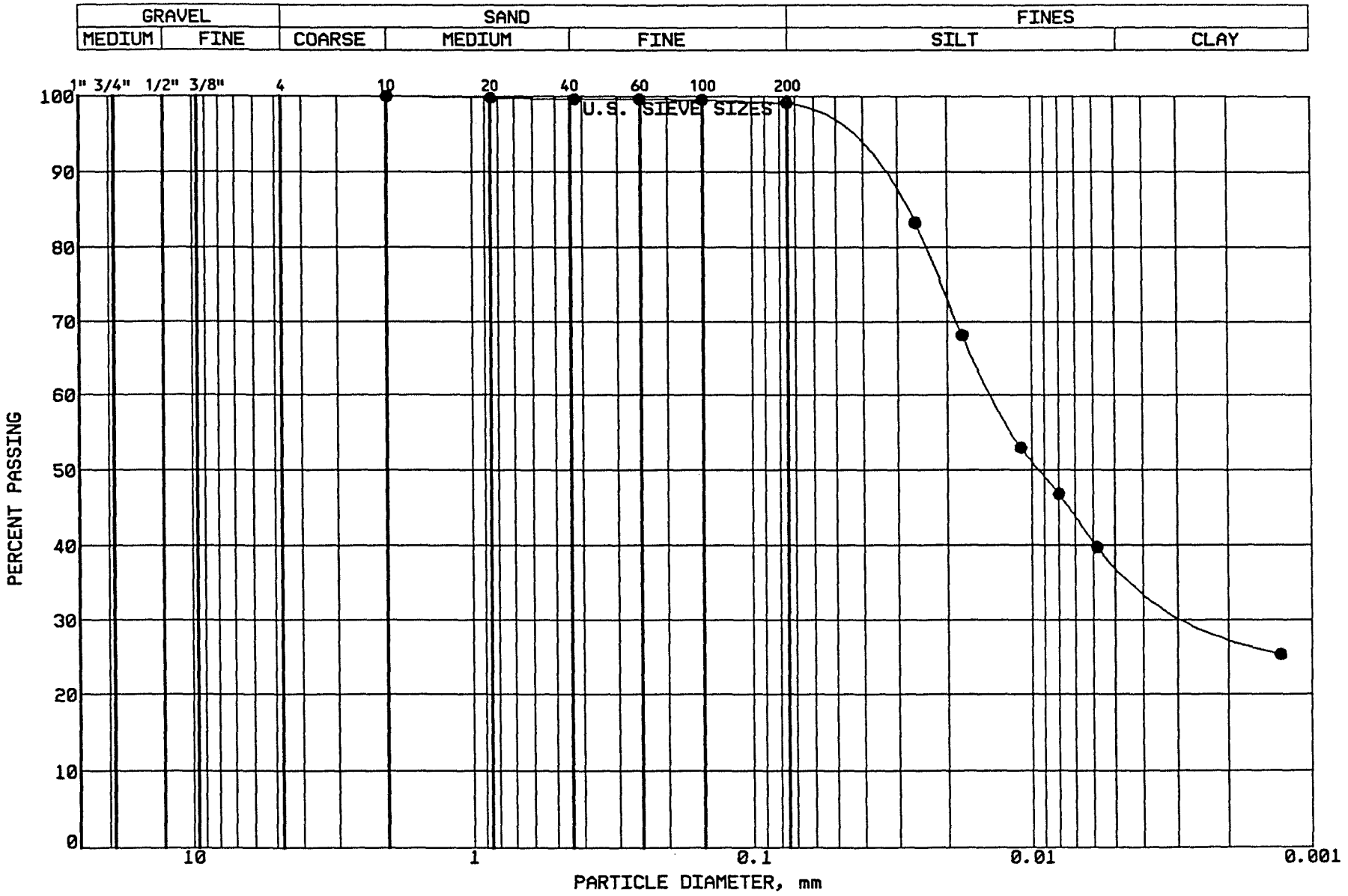
LOCATION: N 36520.0, E 39650.0
SAMPLE: CC-105 TUBE #: TP-7
ELEVATION: 5-10'

GRAVEL	0.0 %
SAND	0.0 %
SILT	31.7 %
CLAY	68.3 %
P 200	100.0 %

SOIL PROPERTIES

LL: 59.0%
PL: 21.0%
PI: 38.0%
CLASS: CH FAT CLAY, dk gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

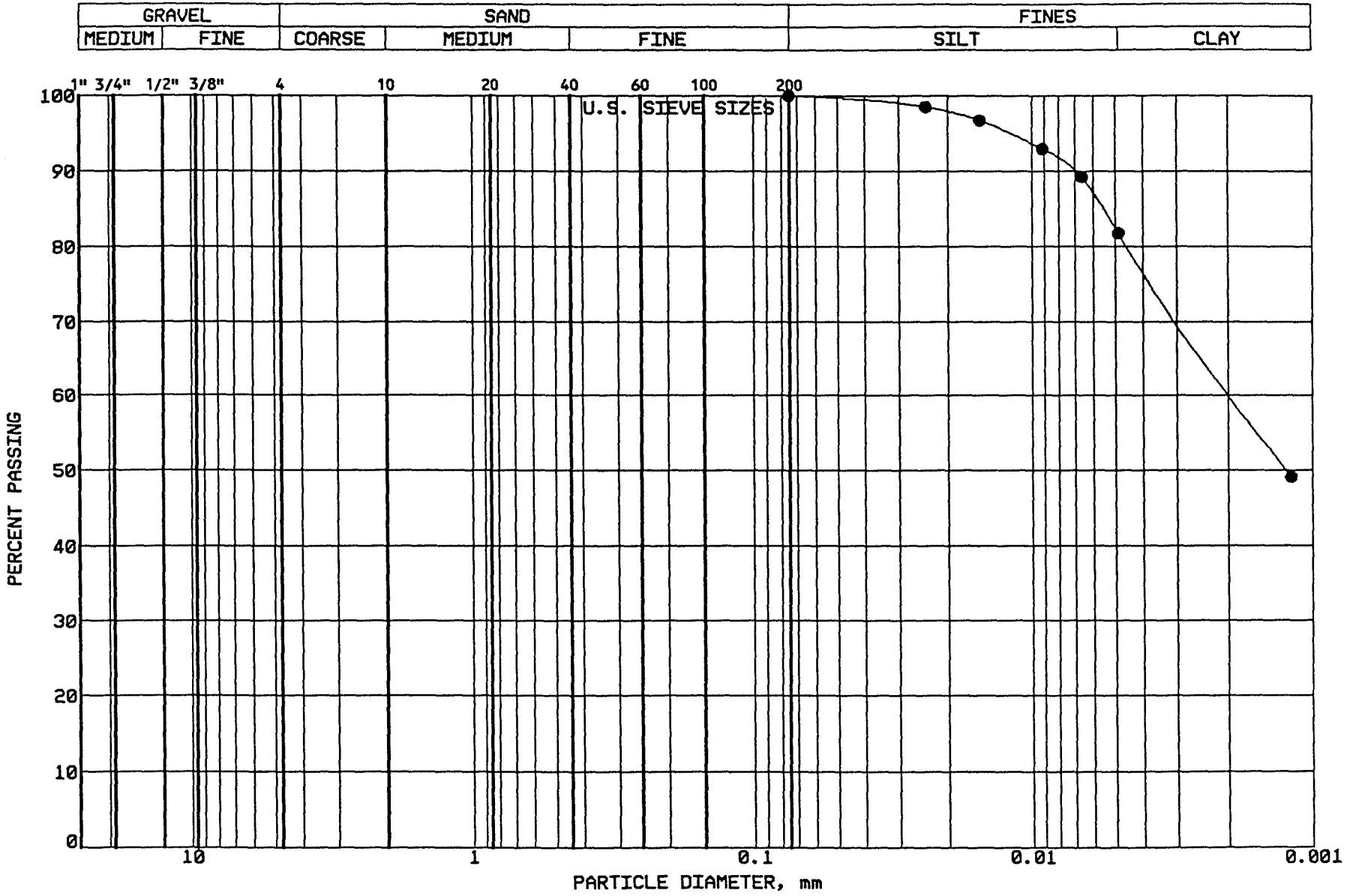
LOCATION: N 36520.0, E 39650.0
SAMPLE: CC-106 TUBE #: TP-7
ELEVATION: 20.0'

GRAVEL	0.0 %
SAND	0.9 %
SILT	60.8 %
CLAY	38.3 %
P 200	99.1 %

SOIL PROPERTIES

LL: 38.0%
PL: 17.0%
PI: 21.0%
CLASS: CL LEAN CLAY, ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

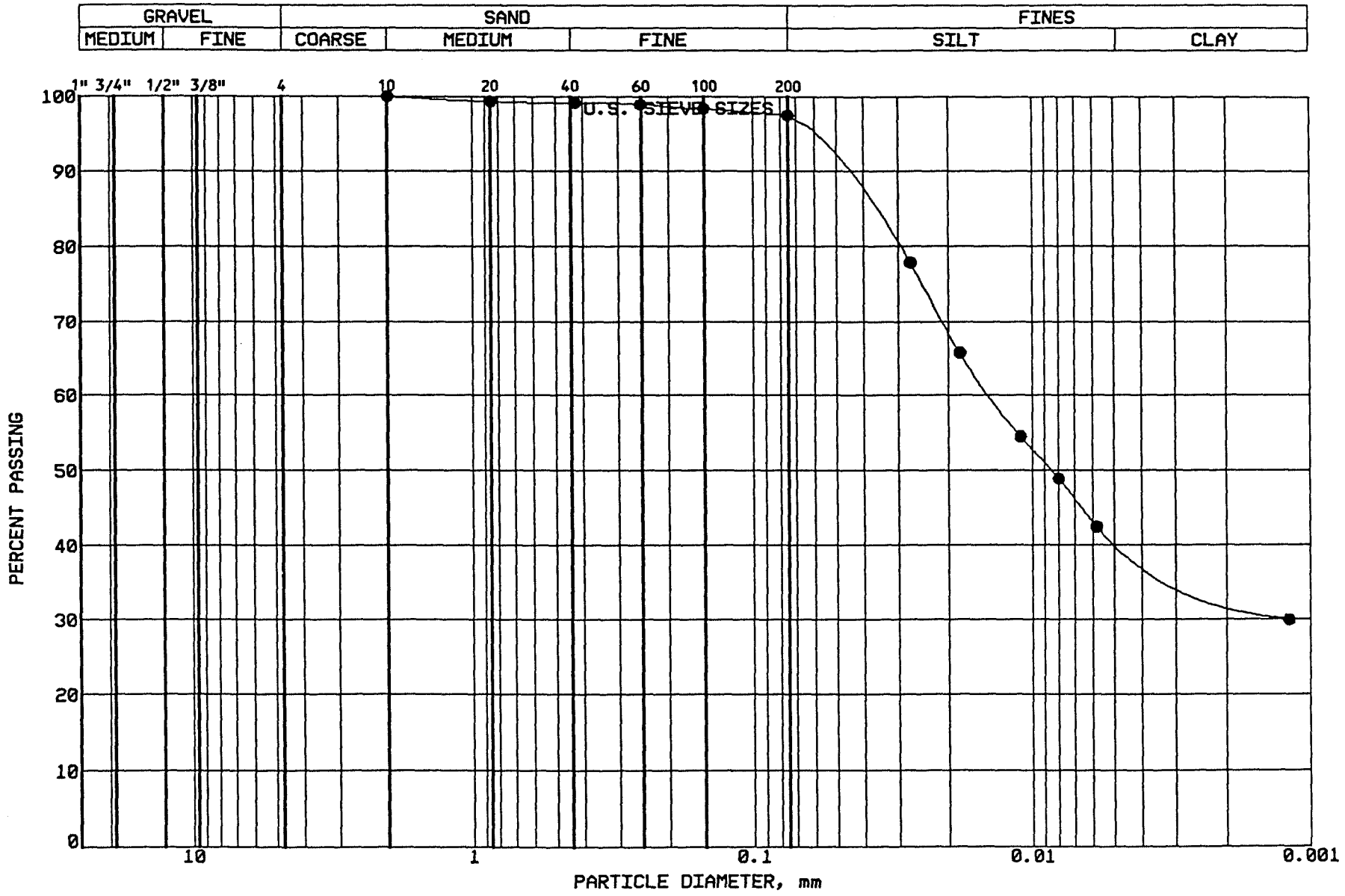
LOCATION: N 36340.0, E 39950.0
SAMPLE: CC-107 TUBE #: TP-8
ELEVATION: 10-15'

GRAVEL	0.0 %
SAND	0.0 %
SILT	17.8 %
CLAY	82.2 %
P 200	100.0 %

SOIL PROPERTIES

LL: 68.0%
PL: 22.0%
PI: 46.0%
CLASS: CH FAT CLAY, olive

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 36531.0, E 40172.0
SAMPLE: CC-108 TUBE #: TP-9
ELEVATION: 10-12'

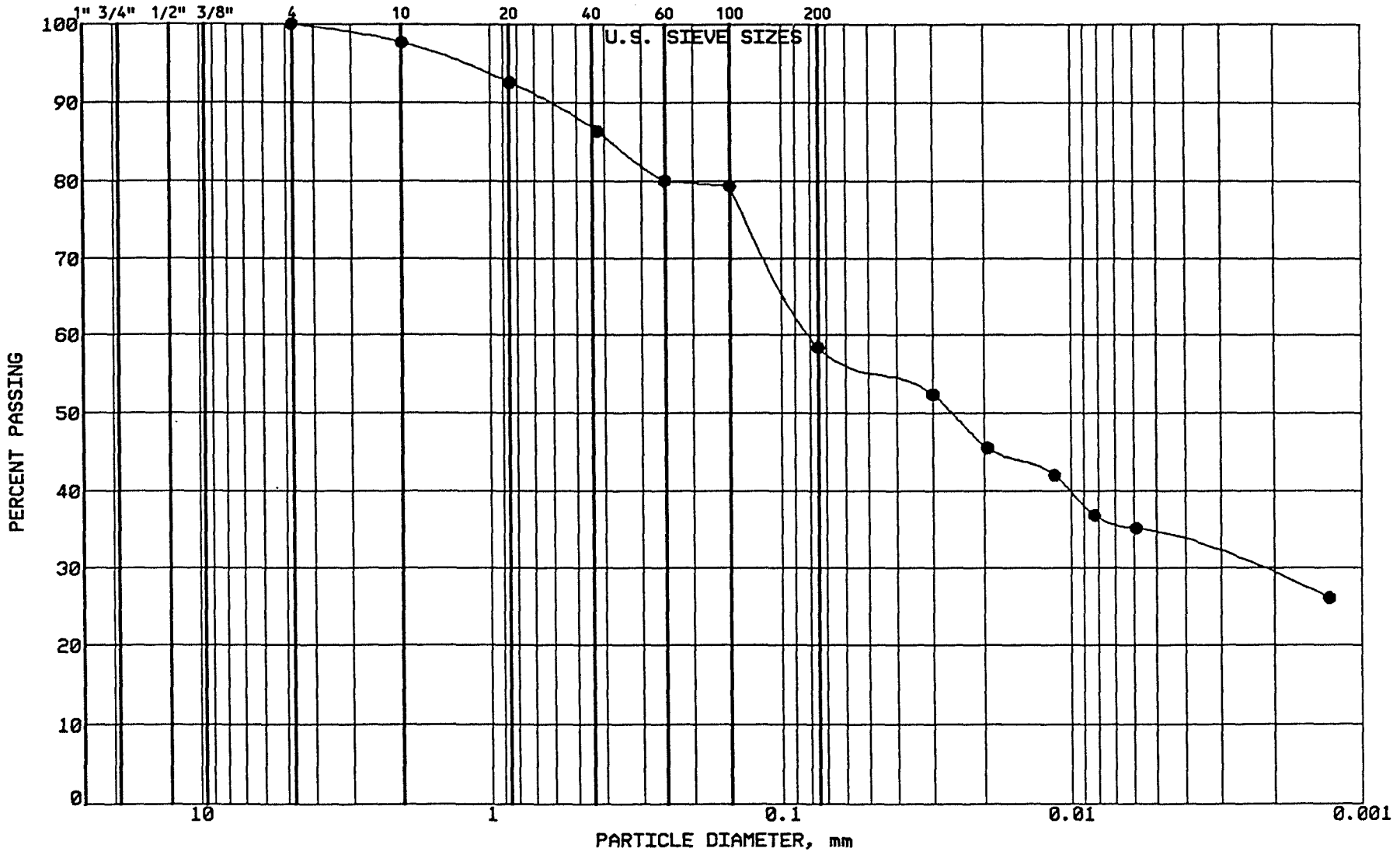
GRAVEL	0.0 %
SAND	2.6 %
SILT	56.2 %
CLAY	41.2 %
P 200	97.4 %

SOIL PROPERTIES

LL: 49.0%
PL: 17.0%
PI: 32.0%
CLASS: CL LEAN CLAY, lt ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

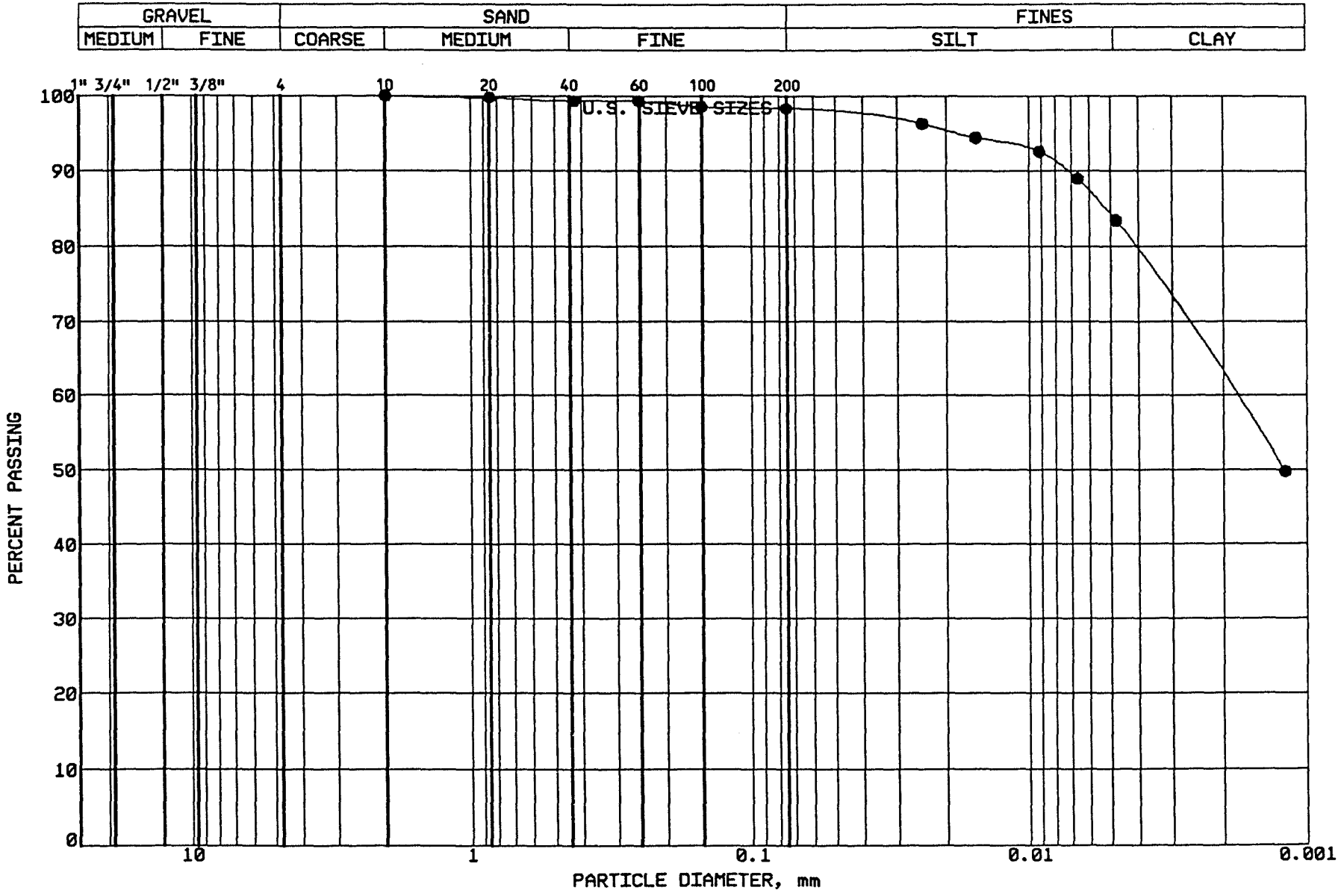
LOCATION: N 36347.0, E 40395.0
SAMPLE: CC-109 TUBE #: TP-10
ELEVATION: 10-12'

GRAVEL	0.0 %
SAND	41.6 %
SILT	24.3 %
CLAY	34.1 %
P 200	58.4 %

SOIL PROPERTIES

LL: 39.0%
PL: 14.0%
PI: 25.0%
CLASS: CL SANDY LEAN CLAY, ol br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

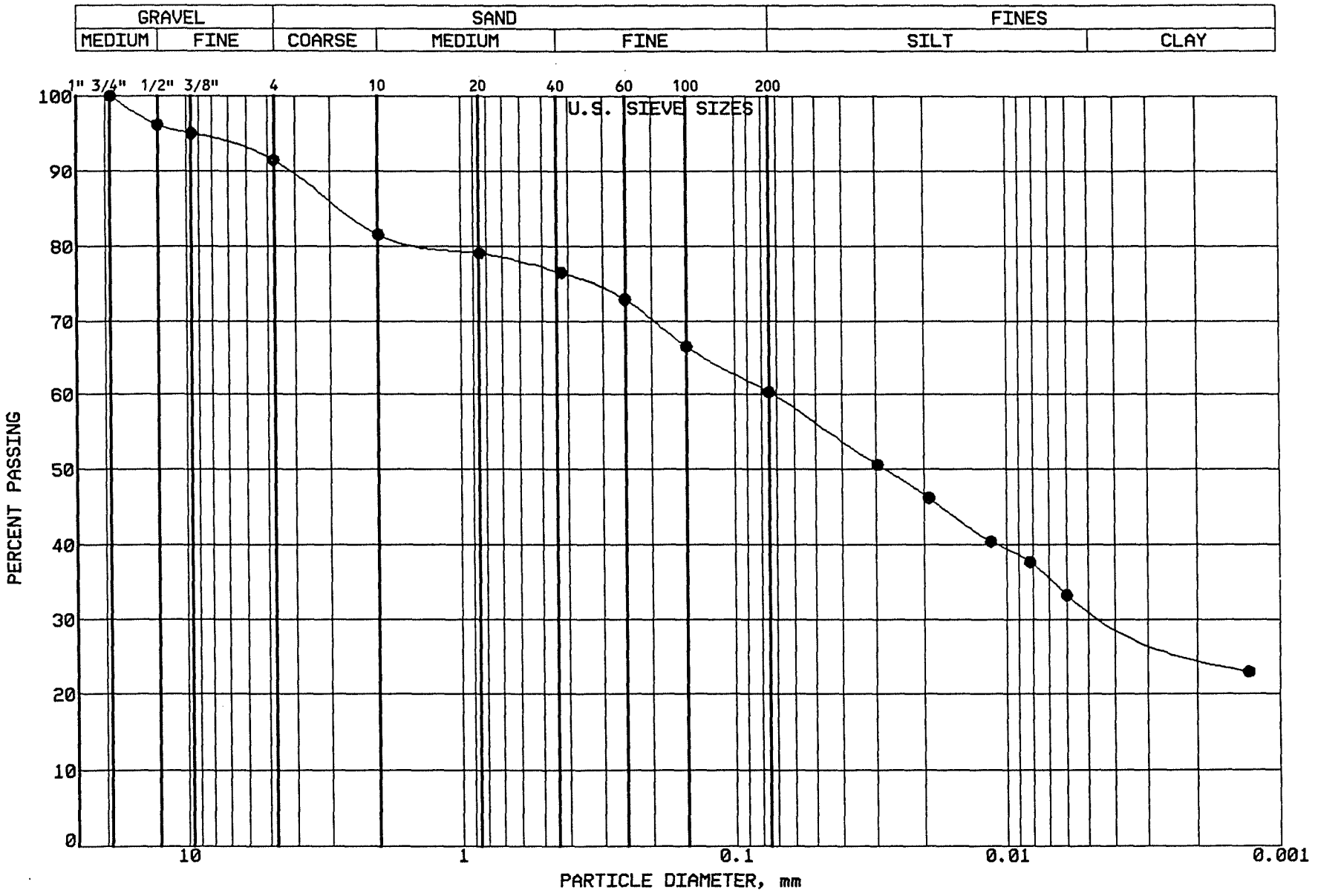
LOCATION: N 36527.0, E 40775.0
SAMPLE: CC-110 TUBE #: TP-11
ELEVATION: 15-20'

GRAVEL	0.0 %
SAND	1.7 %
SILT	14.2 %
CLAY	84.1 %
P 200	98.3 %

SOIL PROPERTIES

LL: 59.0%
PL: 19.0%
PI: 40.0%
CLASS: CH FAT CLAY, lt gr br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38612.0, E 40516.0
SAMPLE: SG-CC133 TUBE #:
ELEVATION: 1896.9'

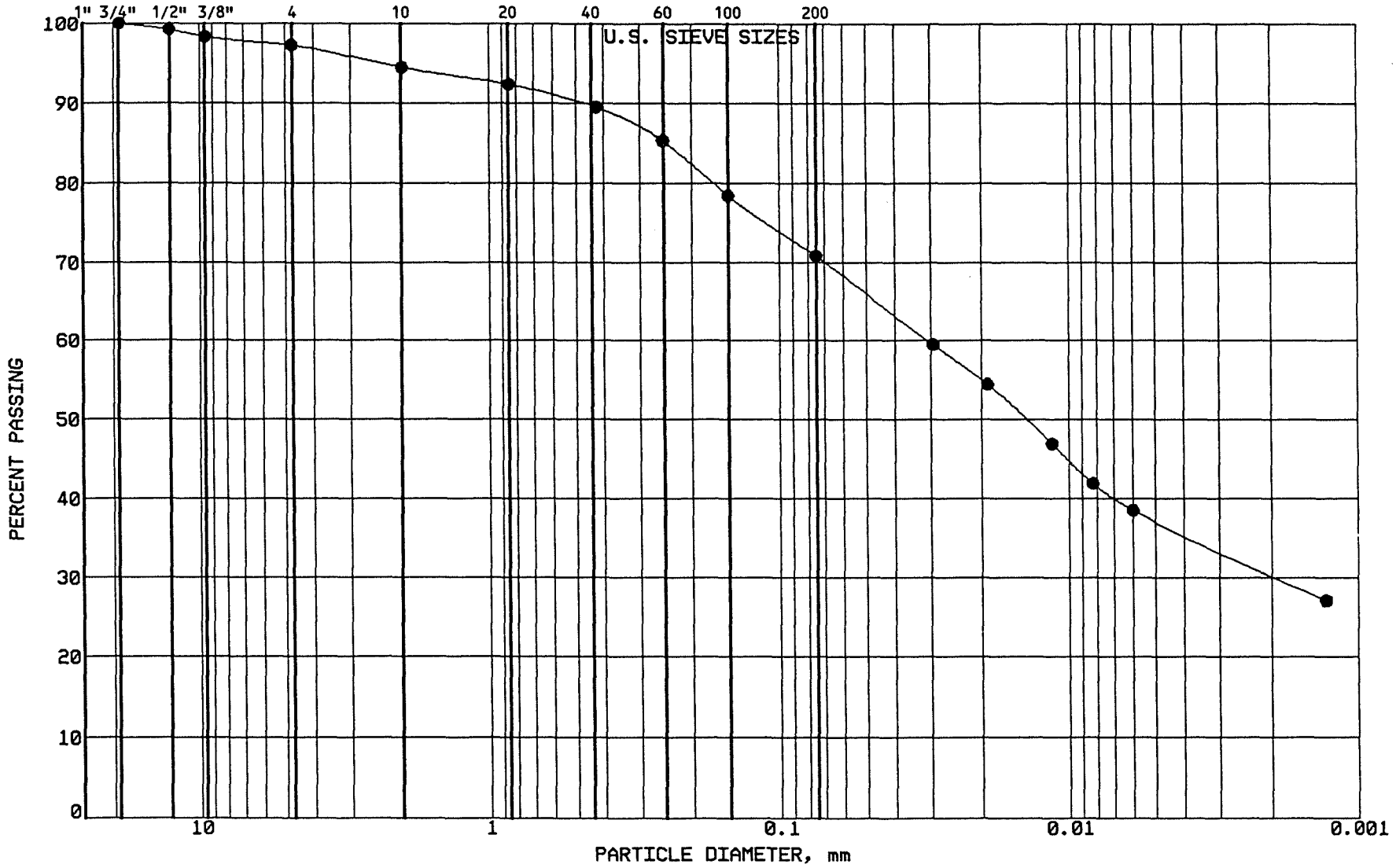
GRAVEL	8.5 %
SAND	31.2 %
SILT	28.3 %
CLAY	32.0 %
P 200	60.3 %

SOIL PROPERTIES

LL: 40.0%
PL: 17.0%
PI: 23.0%
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

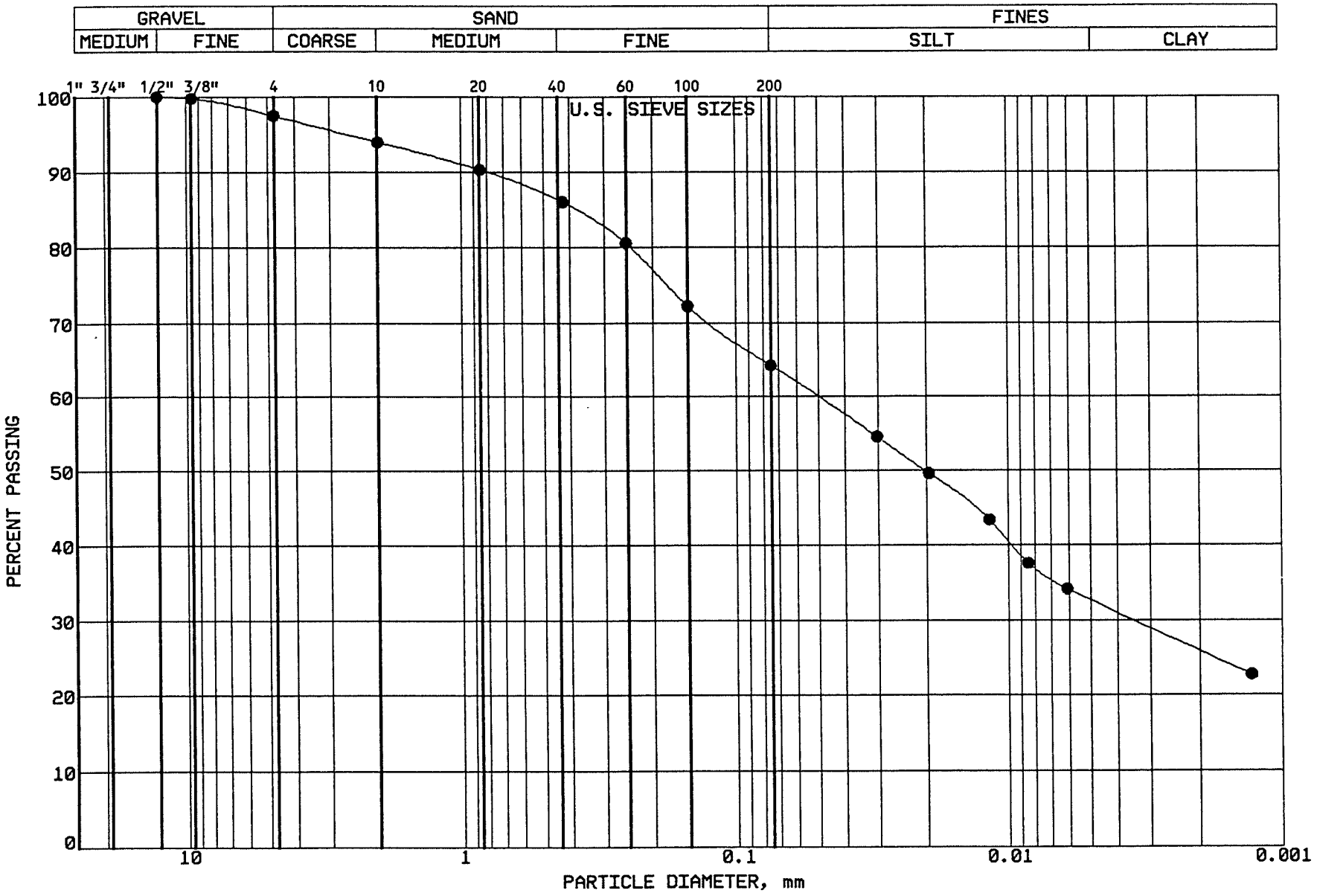
LOCATION: N 38624.0, E 40740.0
SAMPLE: SG-CC134 TUBE #:
ELEVATION: 1896.2'

GRAVEL	2.8 %
SAND	26.4 %
SILT	33.7 %
CLAY	37.1 %
P 200	70.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay(CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38382.0, E 40626.0
SAMPLE: SG-CC135 TUBE #:
ELEVATION: 1895.5'

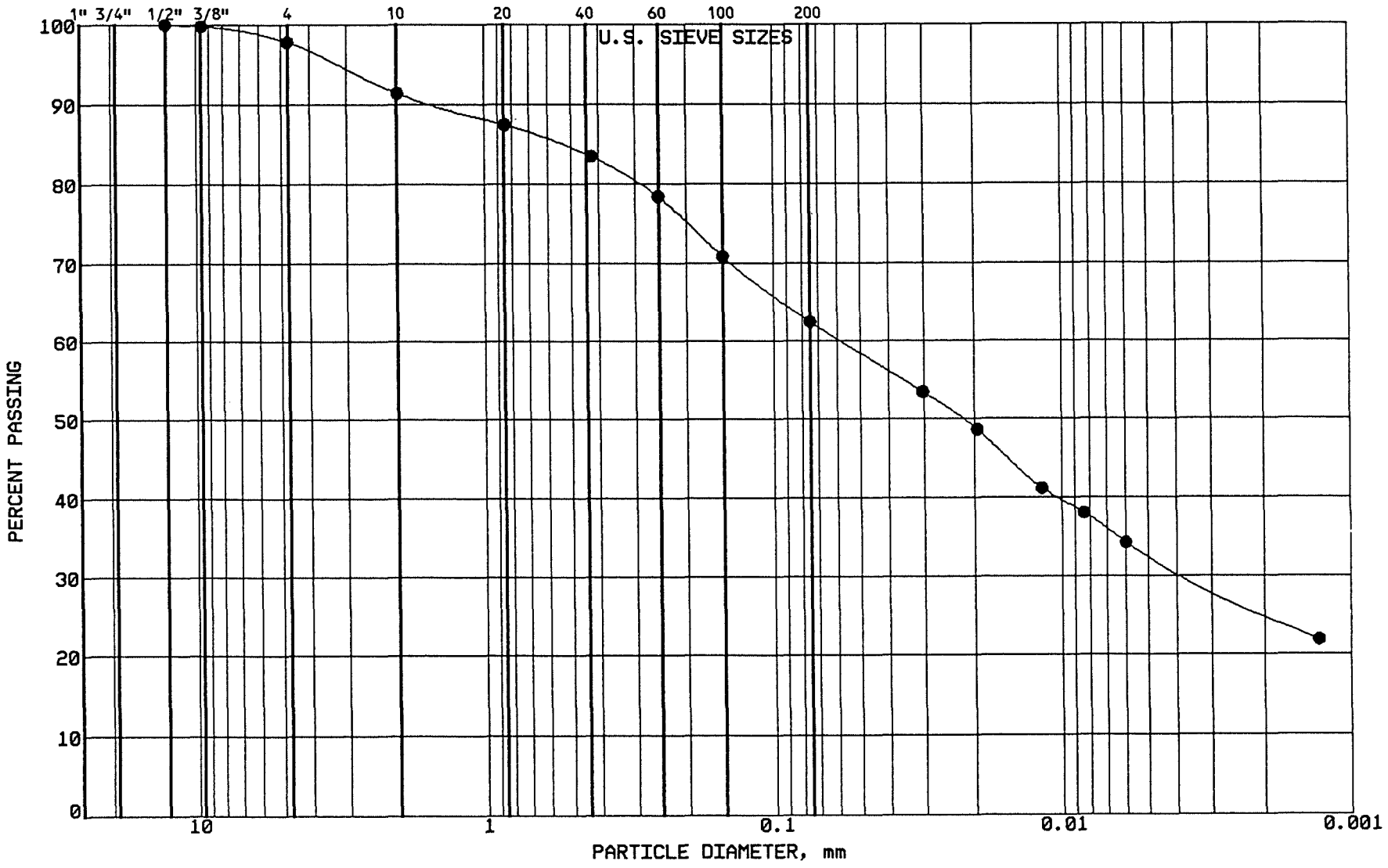
GRAVEL	2.5 %
SAND	33.3 %
SILT	31.6 %
CLAY	32.6 %
P 200	64.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay(CL),vy dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

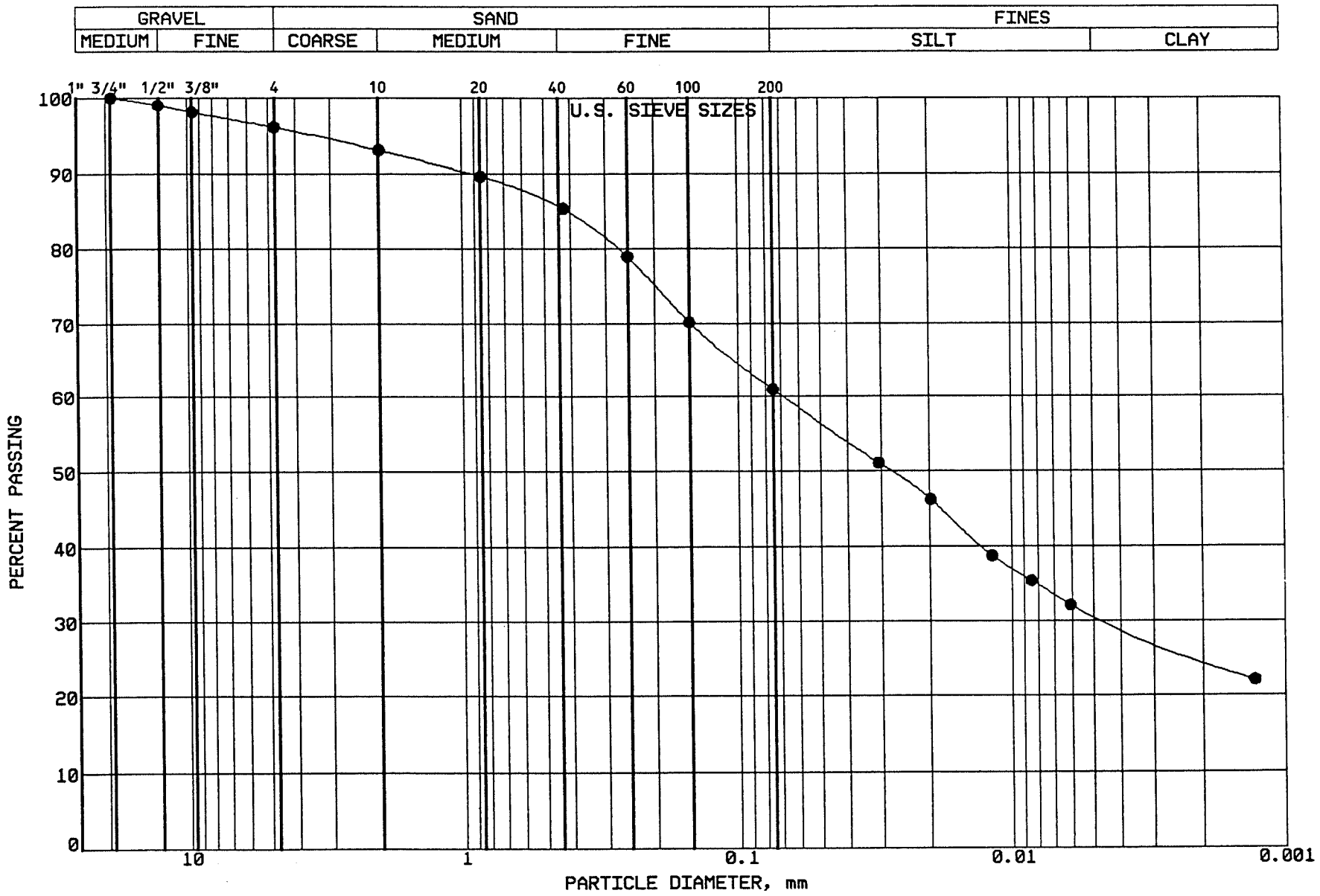
LOCATION: N 38656.0, E 40651.0
SAMPLE: SG-CC136 TUBE #:
ELEVATION: 1896.9'

GRAVEL	2.2 %
SAND	35.3 %
SILT	29.8 %
CLAY	32.7 %
P 200	62.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay(CL),vy dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

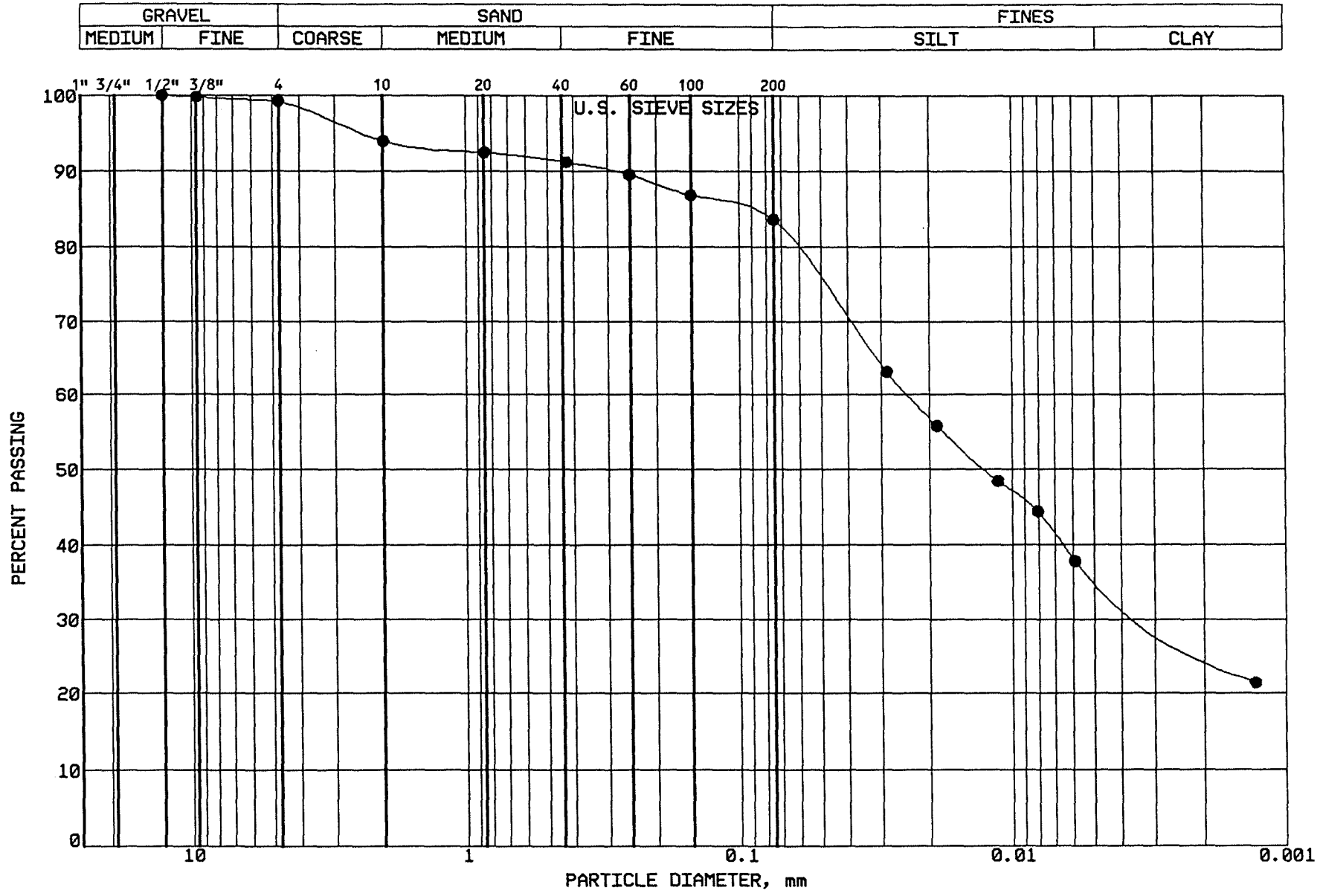
LOCATION: N 38659.0, E 40476.0
SAMPLE: SG-CC137 TUBE #:
ELEVATION: 1898.3'

GRAVEL	3.9 %
SAND	35.1 %
SILT	30.2 %
CLAY	30.8 %
P 200	61.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay(CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38354.0, E 40621.0
SAMPLE: SG-CC138 TUBE #:
ELEVATION: 1896.0'

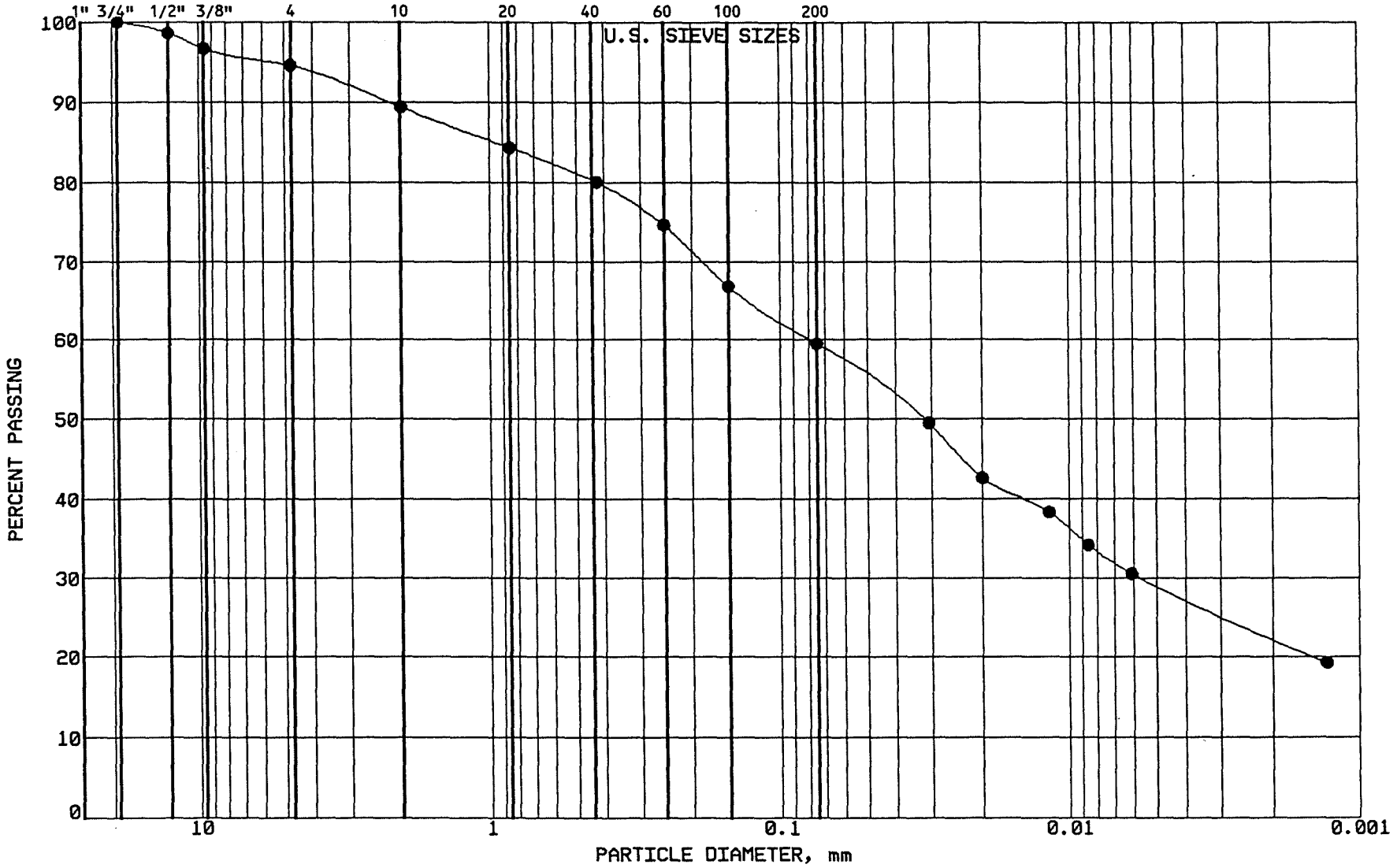
GRAVEL	0.8 %
SAND	15.6 %
SILT	47.6 %
CLAY	36.0 %
P 200	83.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Lean Clay w/Sand (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

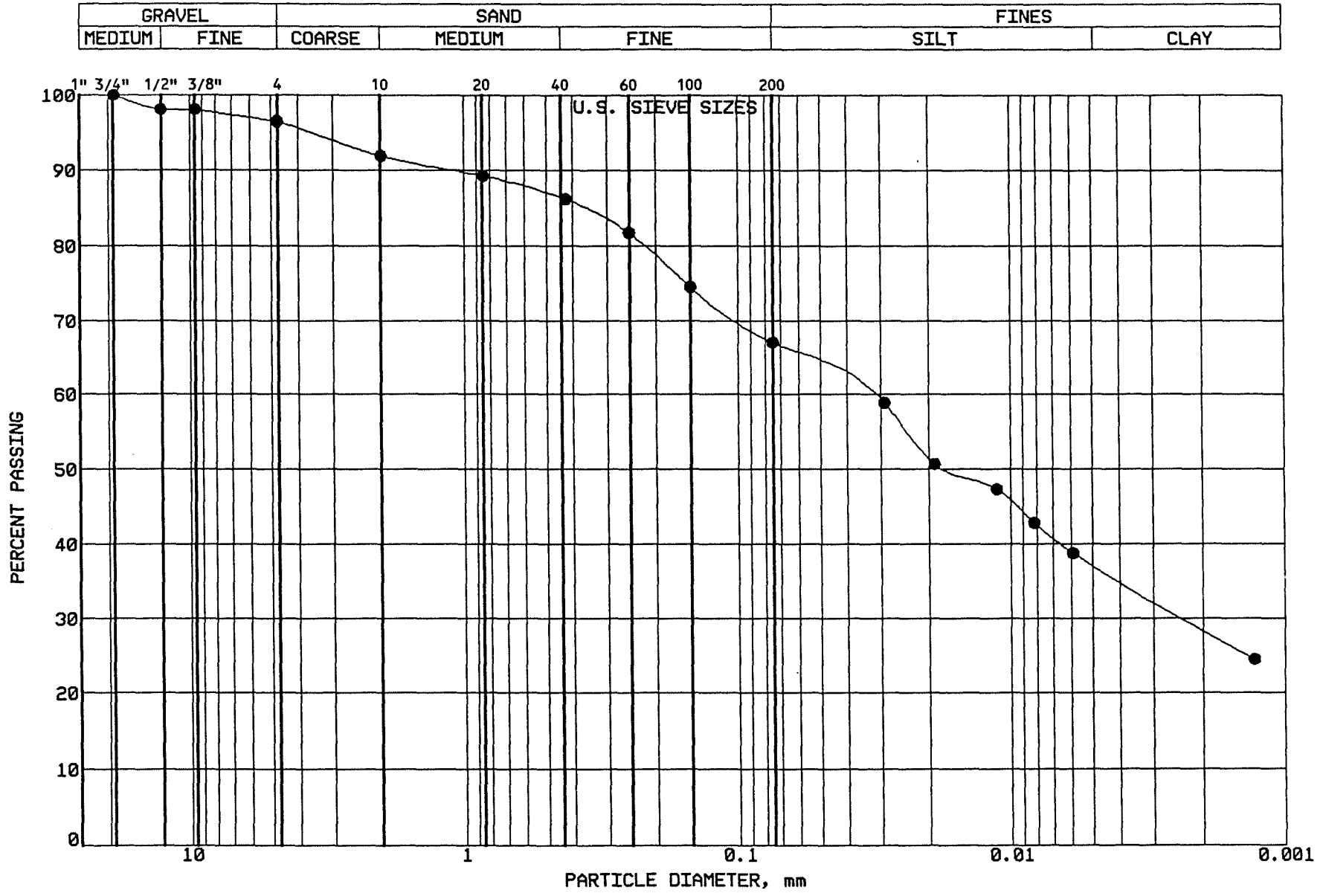
LOCATION: N 38526.0, E 40526.0
SAMPLE: SG-CC139 TUBE #:
ELEVATION: 1896.4'

GRAVEL	5.4 %
SAND	35.1 %
SILT	30.4 %
CLAY	29.1 %
P 200	59.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

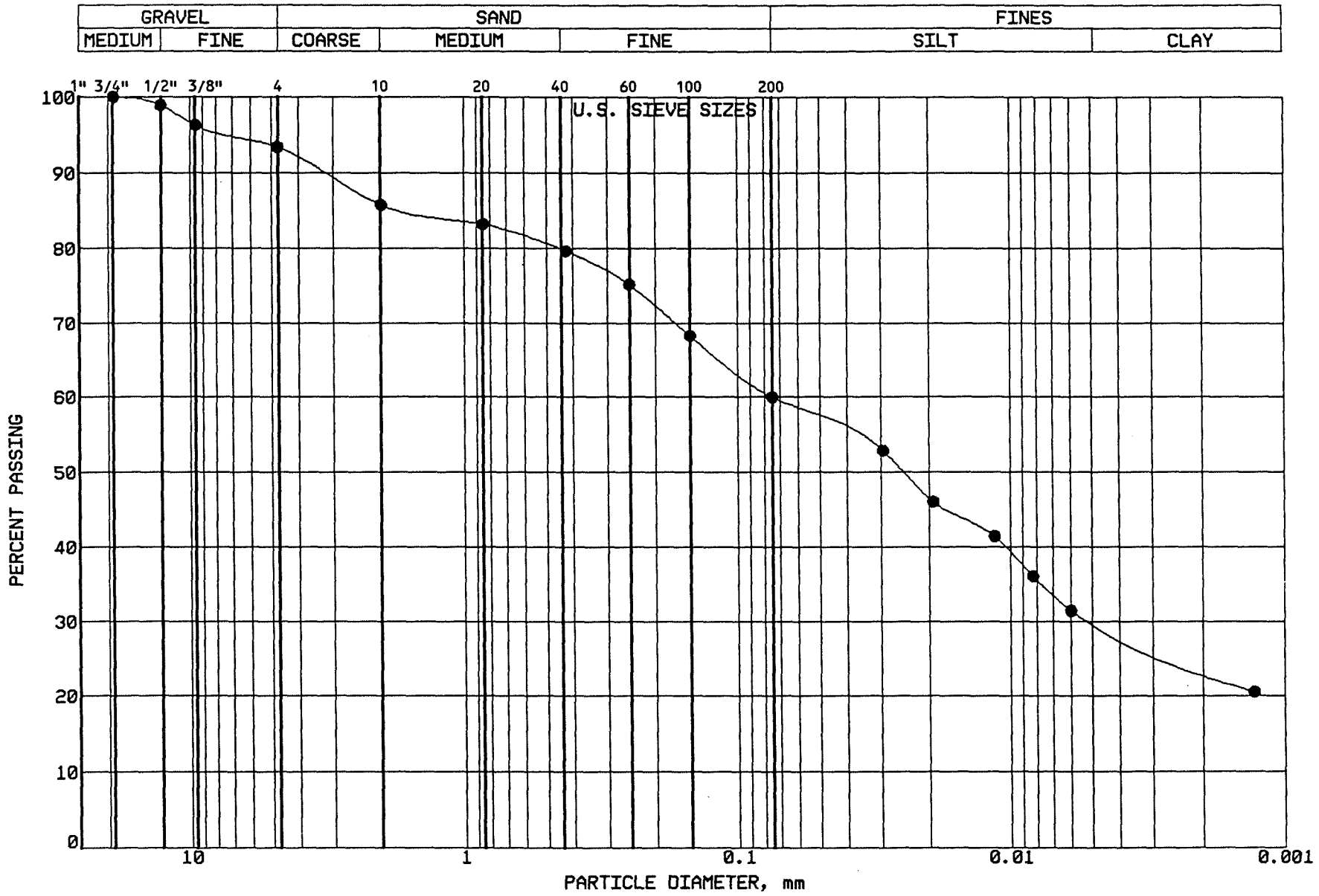
LOCATION: N 38702.0, E 40445.0
SAMPLE: SG-CC140 TUBE #:
ELEVATION: 1898.7'

GRAVEL	3.6 %
SAND	29.4 %
SILT	29.8 %
CLAY	37.2 %
P 200	67.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

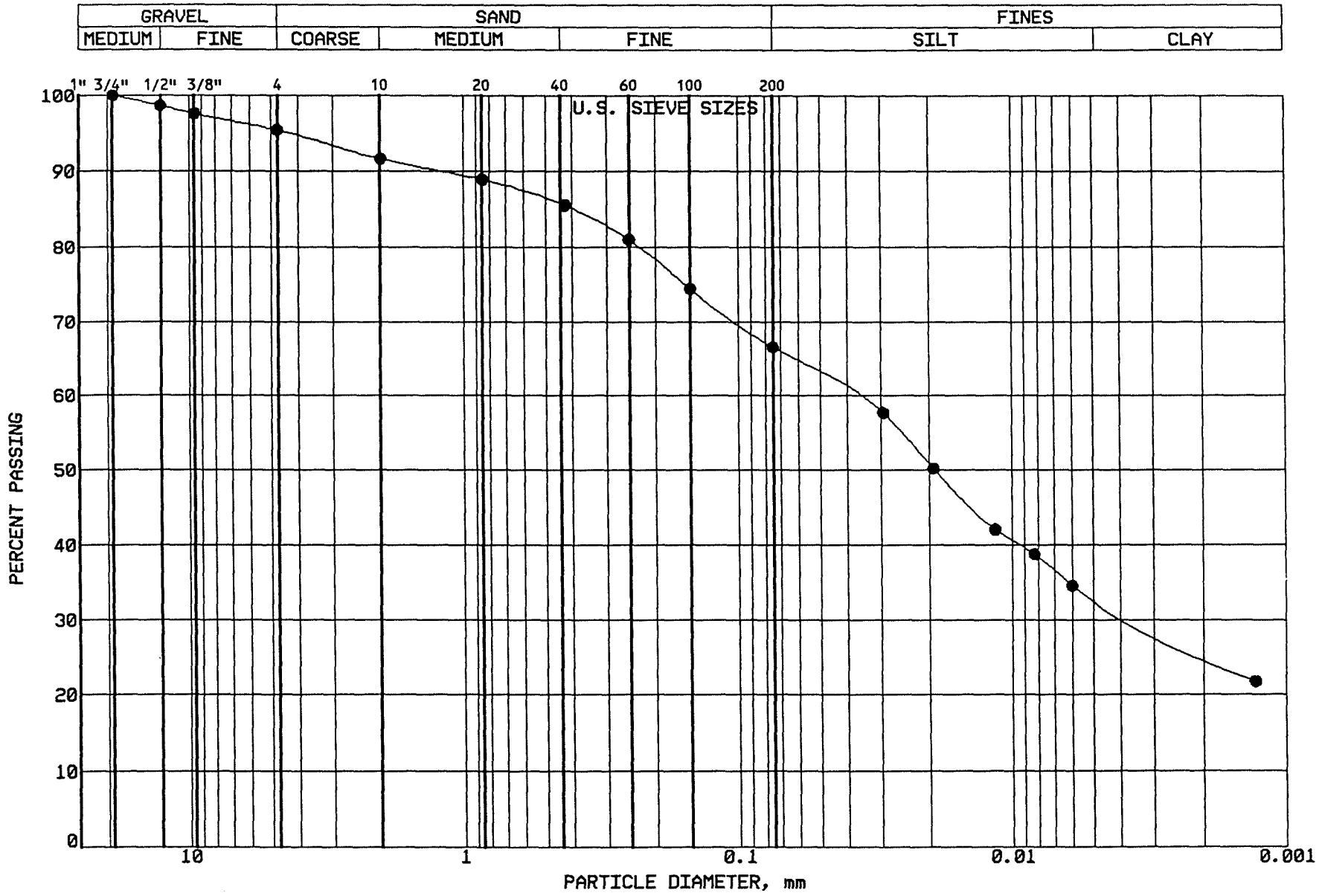
LOCATION: N 38691.0, E 40654.0
SAMPLE: SG-CC141 TUBE #:
ELEVATION: 1897.8'

GRAVEL	6.6 %
SAND	33.4 %
SILT	29.9 %
CLAY	30.1 %
P 200	60.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38515.0, E 40735.0
SAMPLE: SG-CC142 TUBE #:
ELEVATION: 1896.9'

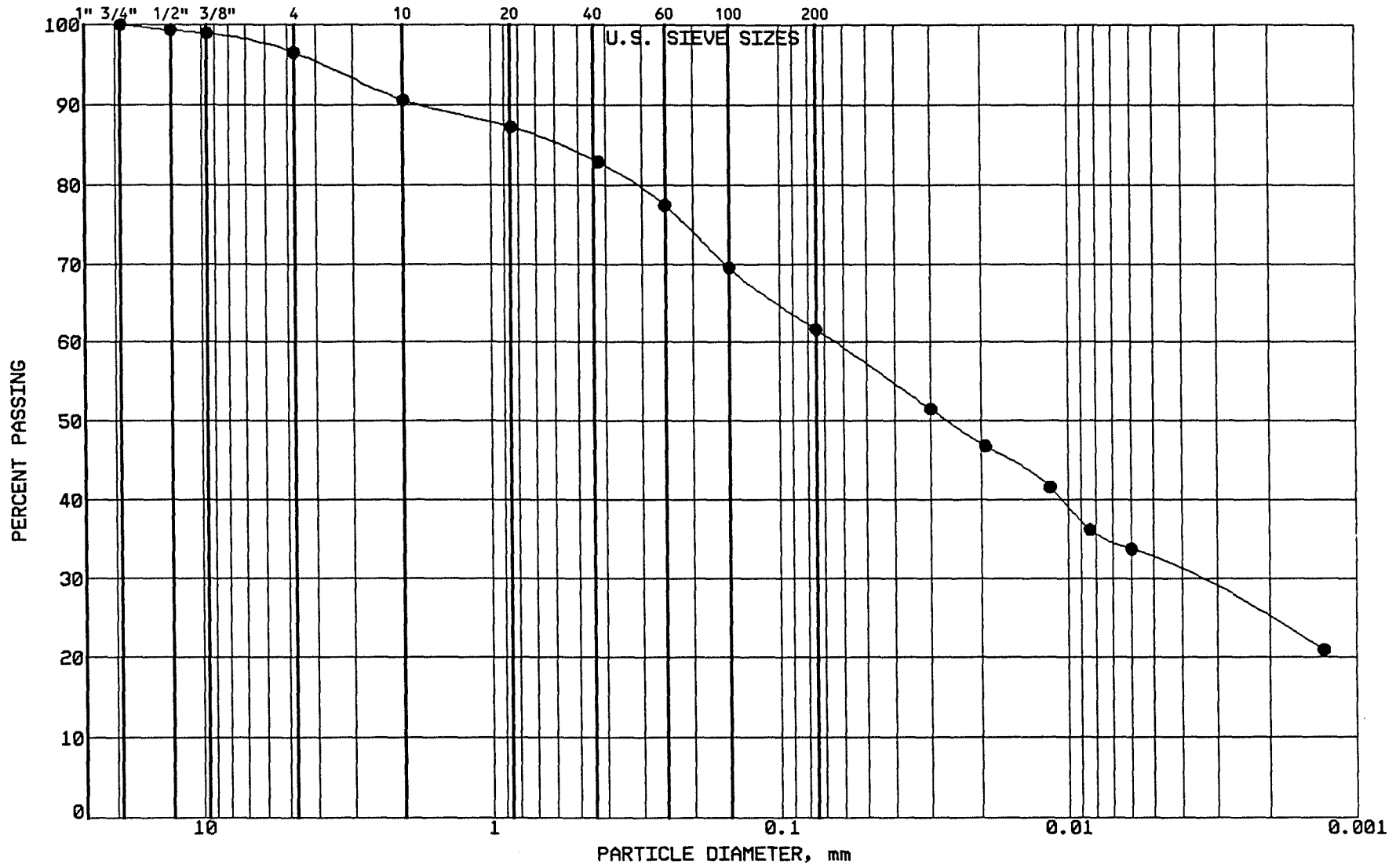
GRAVEL	4.6 %
SAND	28.9 %
SILT	33.5 %
CLAY	33.0 %
P 200	66.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay(CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

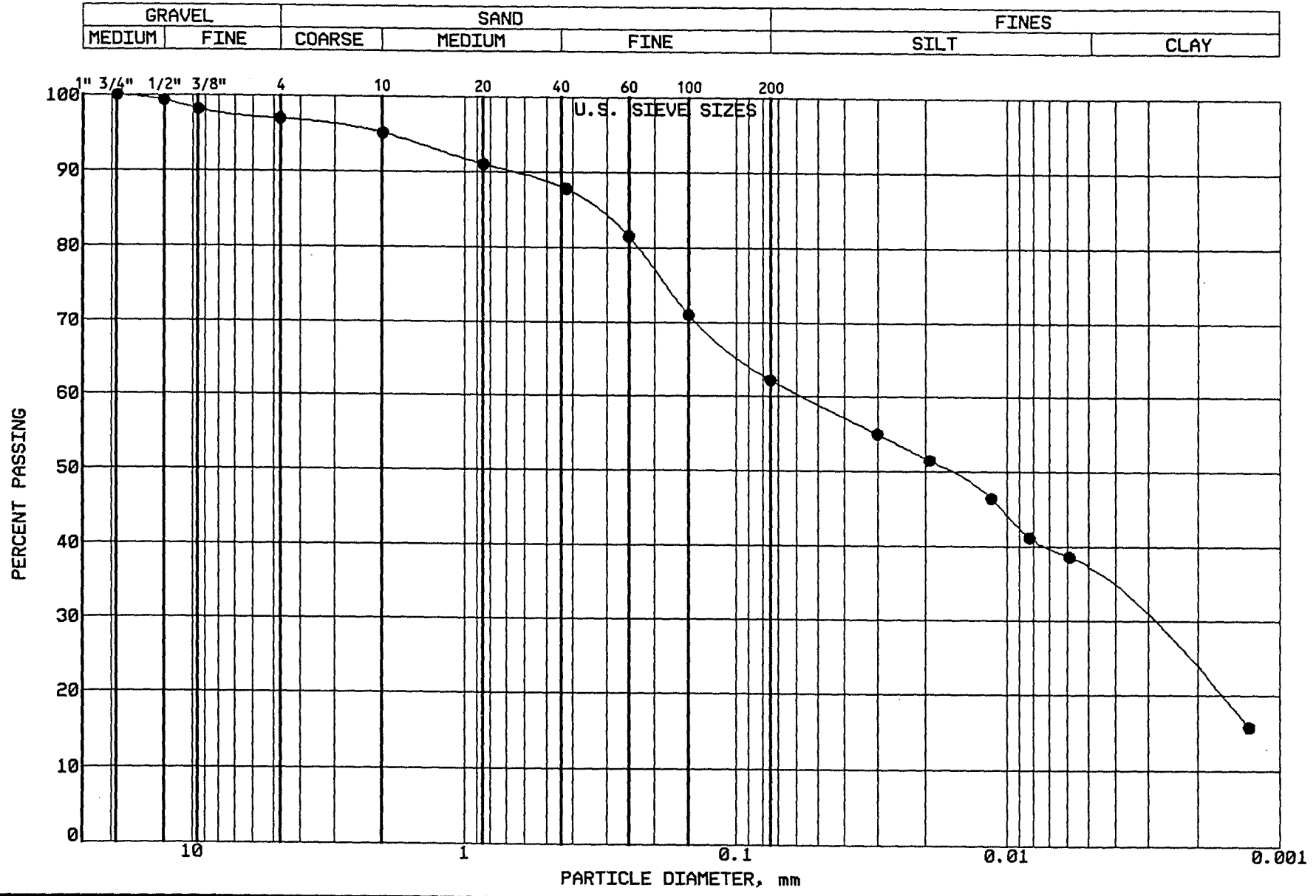
LOCATION: N 38500.0, E 40584.0
SAMPLE: SG-CC143 TUBE #:
ELEVATION: 1897.8'

GRAVEL	3.5 %
SAND	34.9 %
SILT	29.4 %
CLAY	32.2 %
P 200	61.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

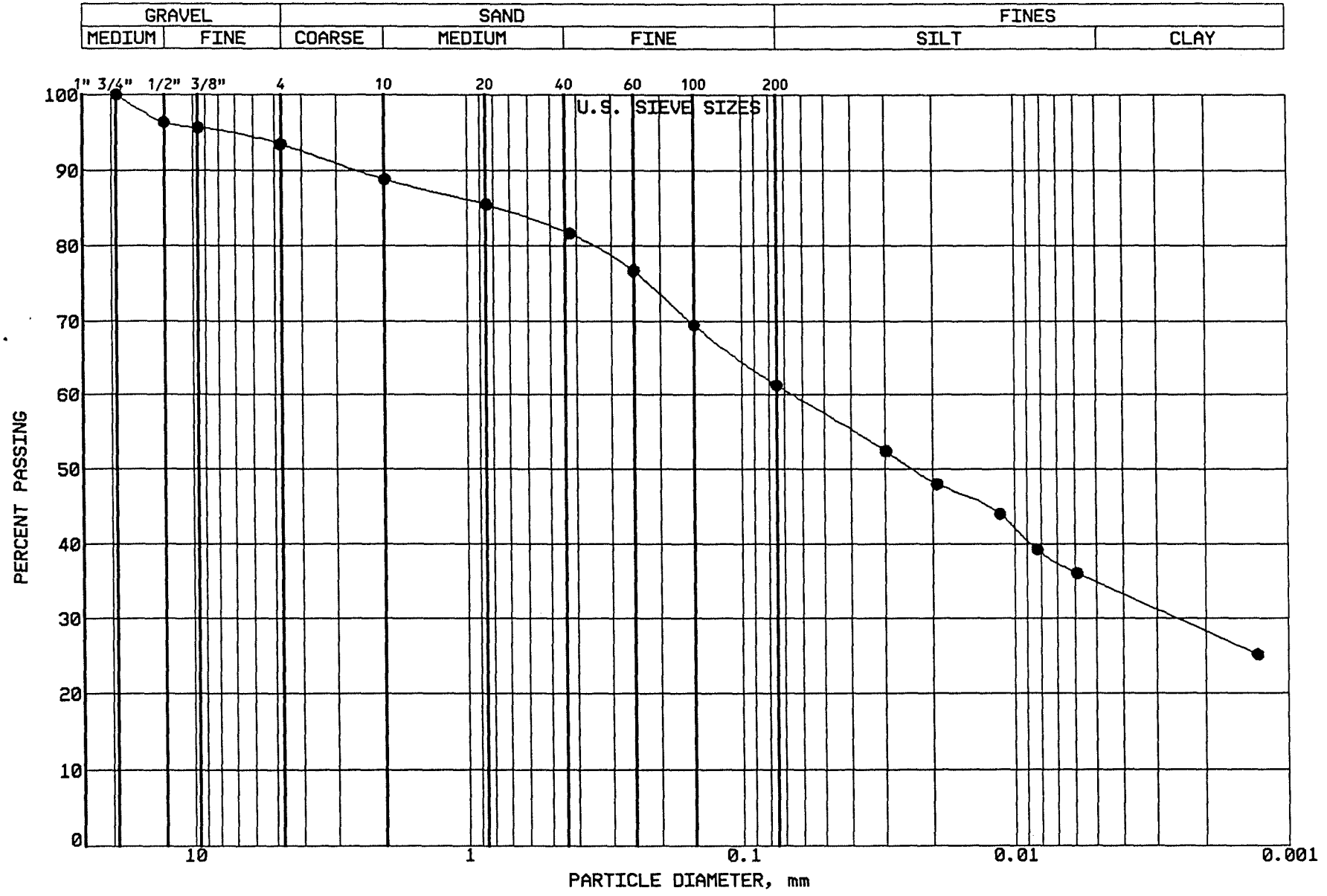
LOCATION: N 37557.0, E 41049.0
SAMPLE: SG-CC144 TUBE #:
ELEVATION: 1899.9'

GRAVEL	3.1 %
SAND	34.7 %
SILT	26.1 %
CLAY	36.1 %
P 200	62.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

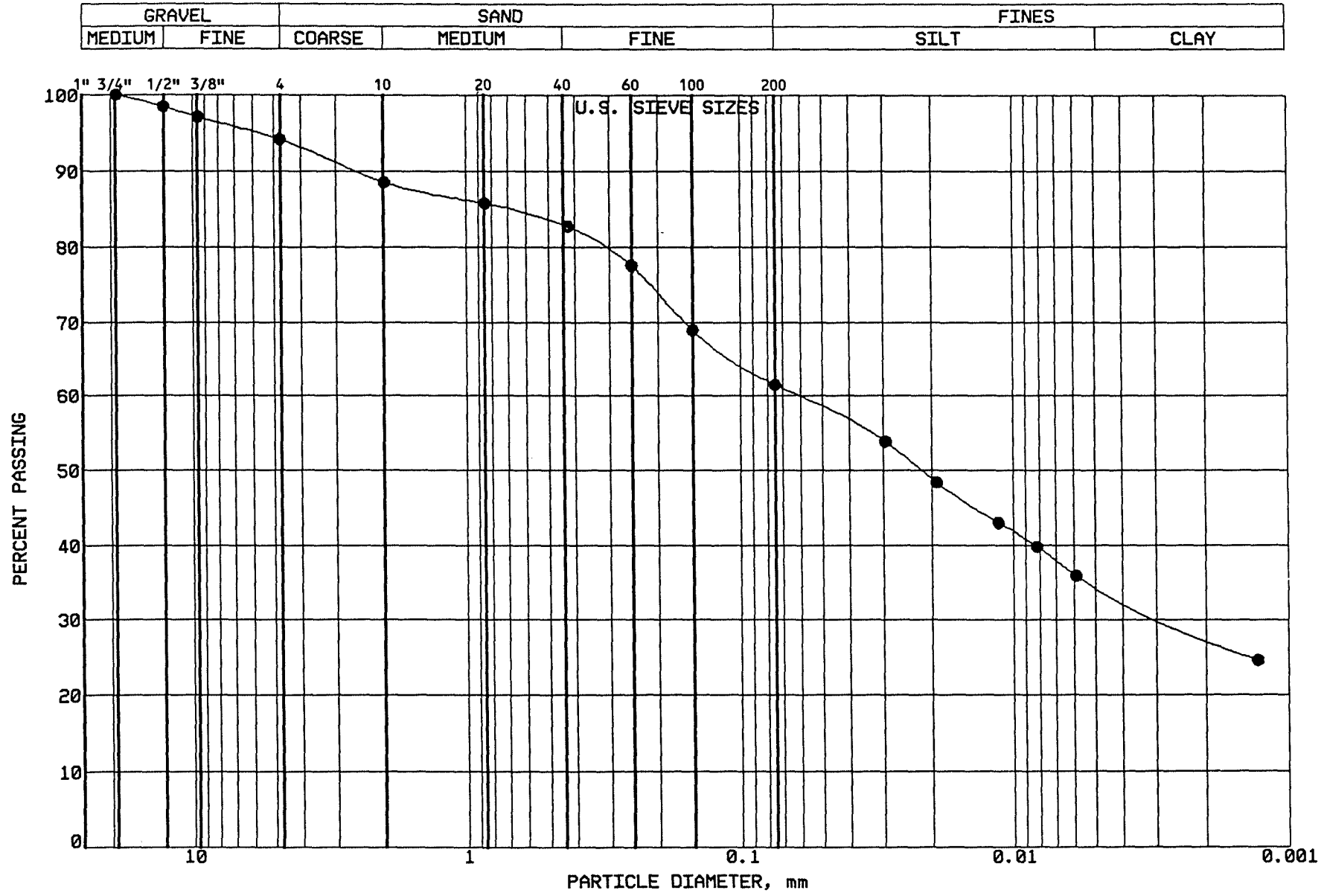
LOCATION: N 37745.0, E 41046.0
SAMPLE: SG-CC145 TUBE #:
ELEVATION: 1898.8'

GRAVEL	6.6 %
SAND	32.1 %
SILT	26.5 %
CLAY	34.8 %
P 200	61.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37742.0, E 41177.0
SAMPLE: SG-CC146 TUBE #:
ELEVATION: 1897.8'

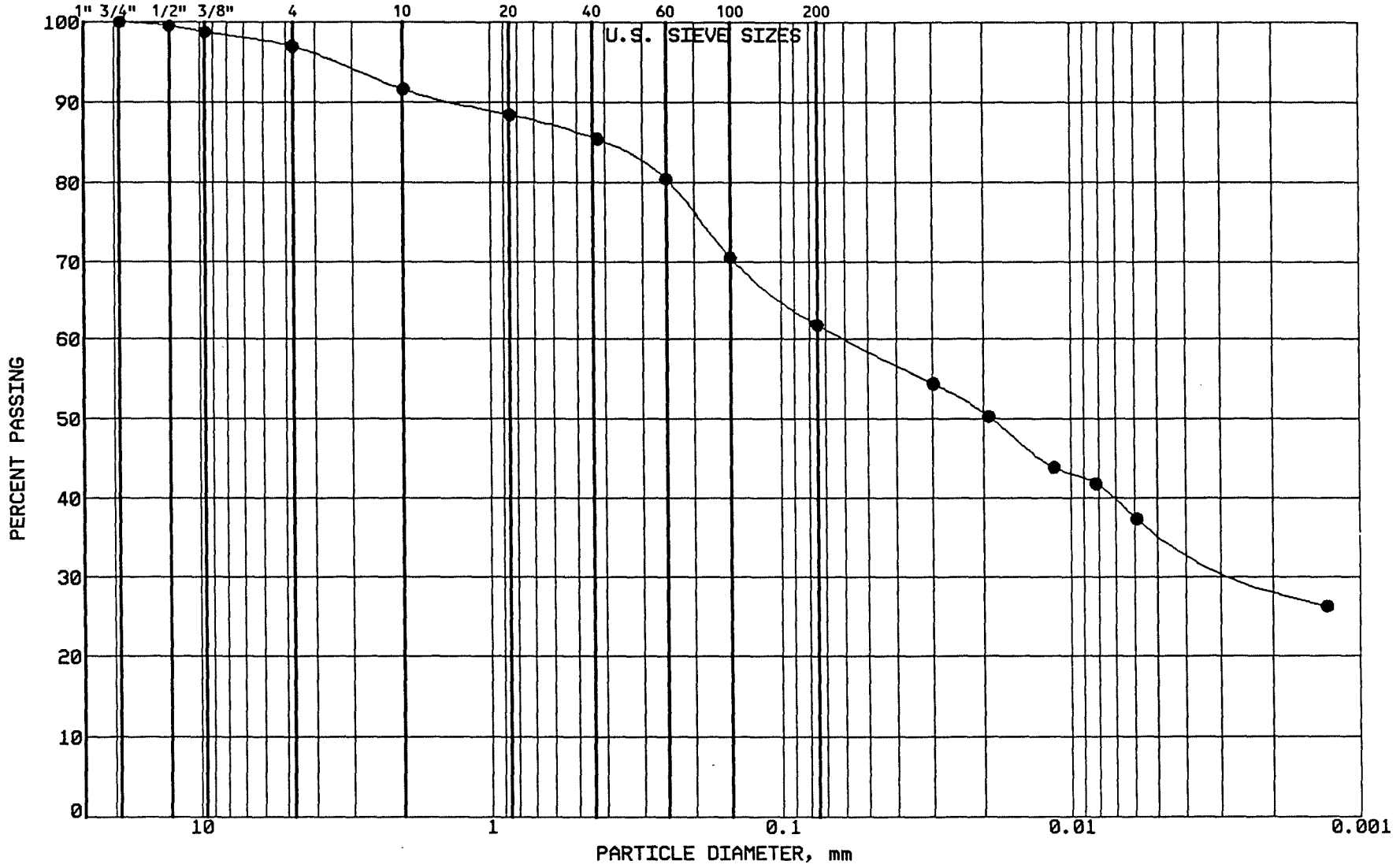
GRAVEL	5.8 %
SAND	32.7 %
SILT	26.8 %
CLAY	34.7 %
P 200	61.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

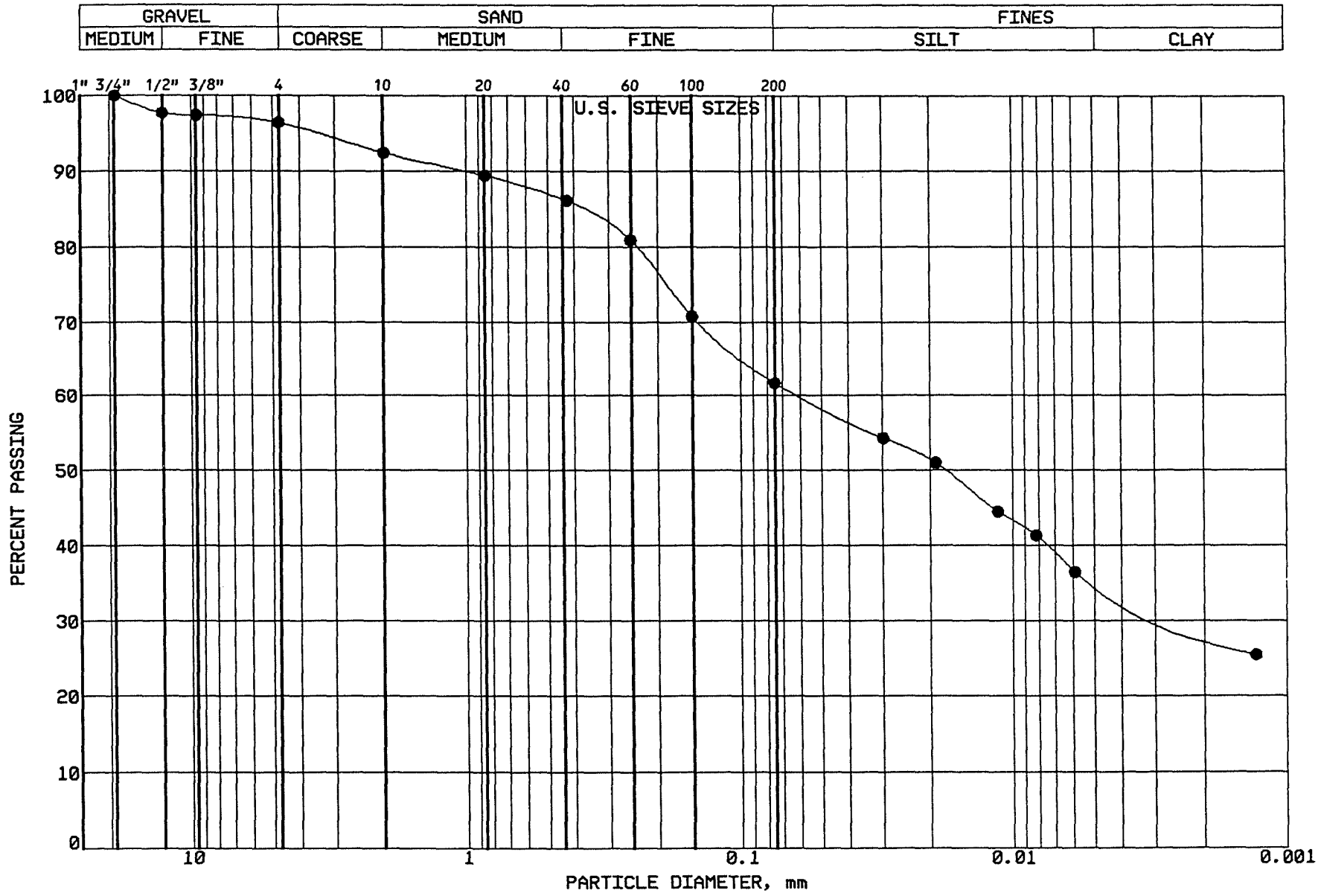
LOCATION: N 37745.0, E 41303.0
SAMPLE: SG-CC147 TUBE #:
ELEVATION: 1897.6'

GRAVEL	3.1 %
SAND	35.1 %
SILT	25.7 %
CLAY	36.1 %
P 200	61.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

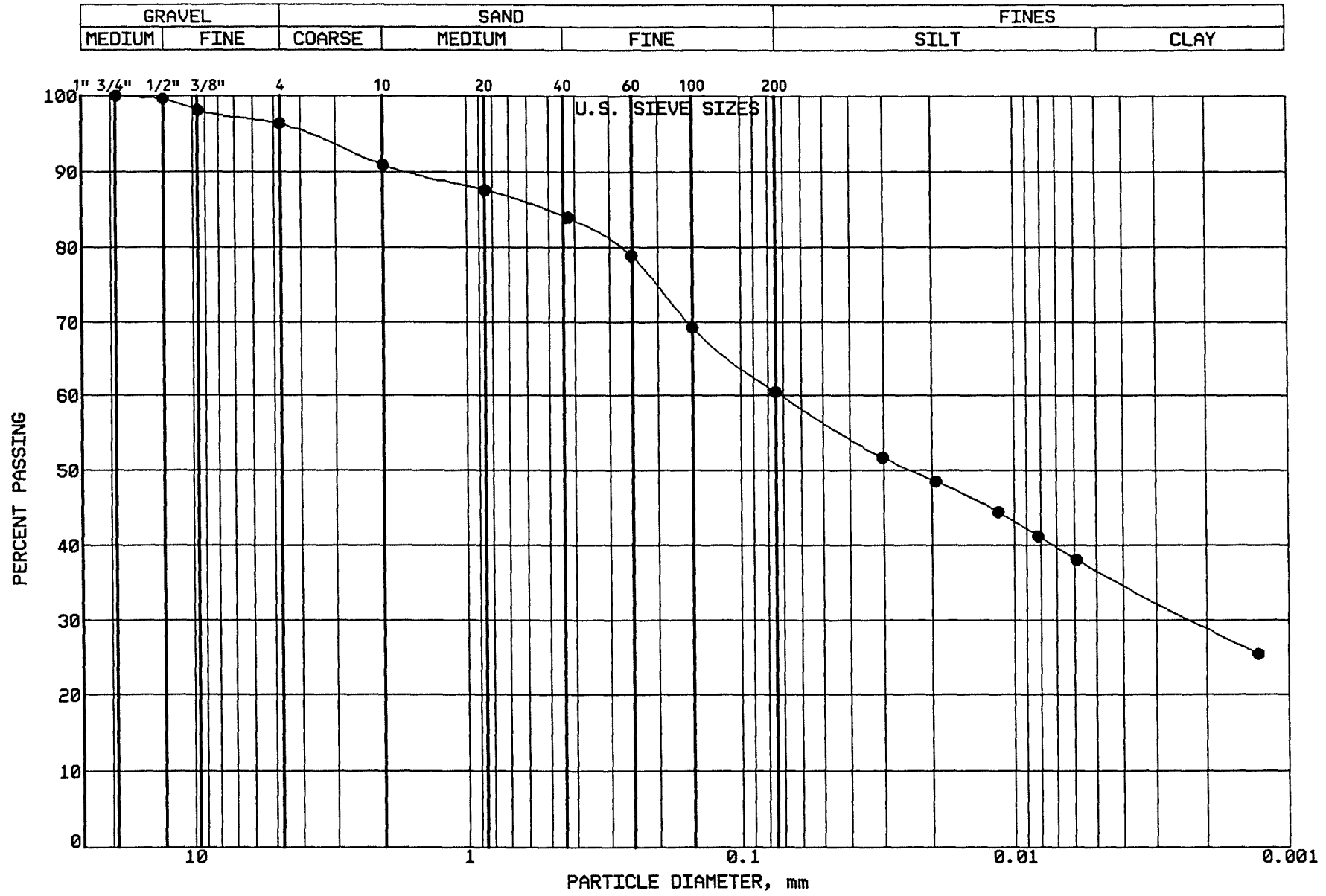
LOCATION: N 37839.0, E 41445.0
SAMPLE: SG-CC148 TUBE #:
ELEVATION: 1898.1'

GRAVEL	3.7 %
SAND	34.6 %
SILT	26.5 %
CLAY	35.2 %
P 200	61.7 %

SOIL PROPERTIES

LL: 44.0%
PL: 19.0%
PI: 25.0%
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

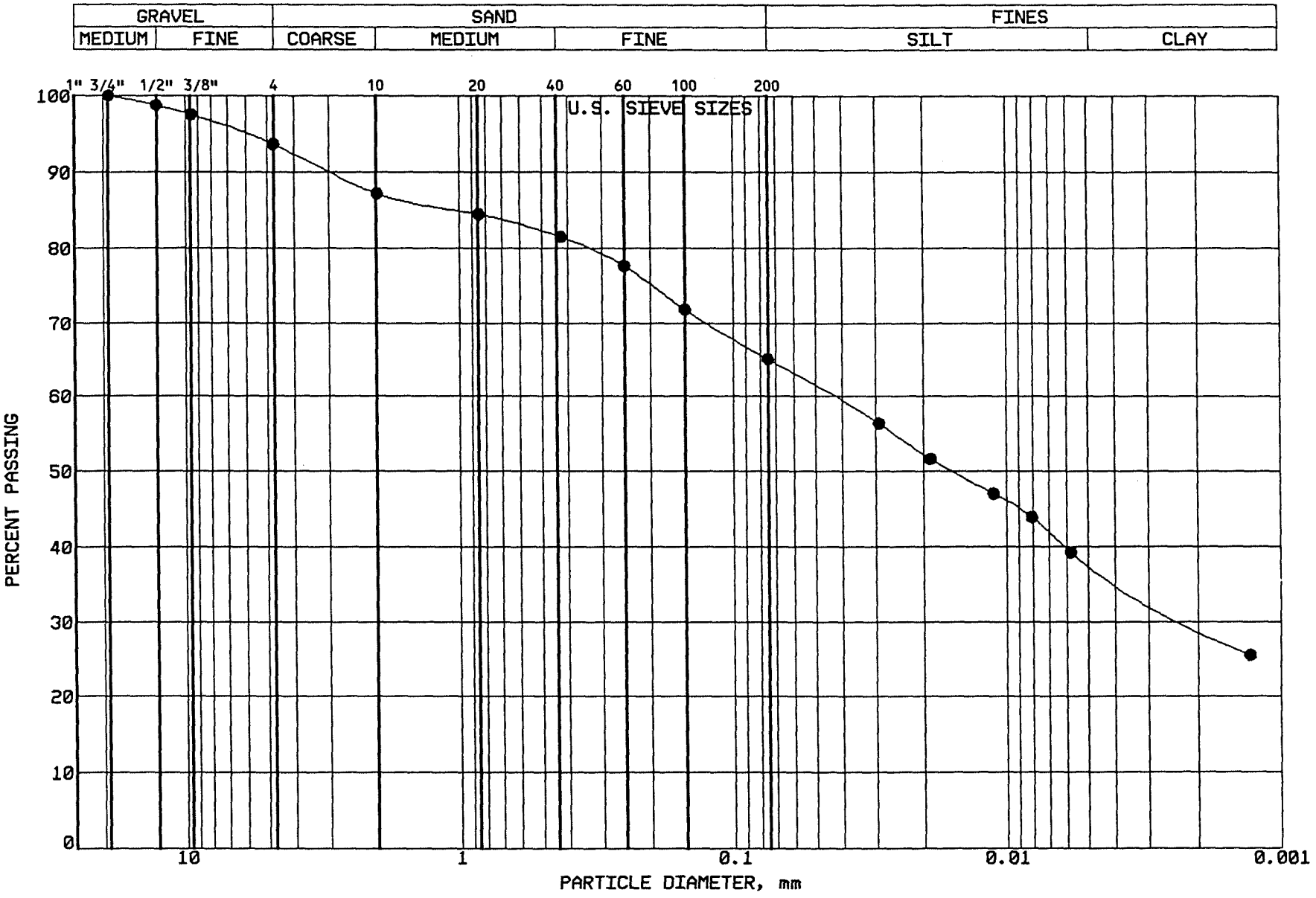
LOCATION: N 37852.0, E 41234.0
SAMPLE: SG-CC149 TUBE #:
ELEVATION: 1897.4'

GRAVEL	3.7 %
SAND	35.8 %
SILT	23.9 %
CLAY	36.6 %
P 200	60.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

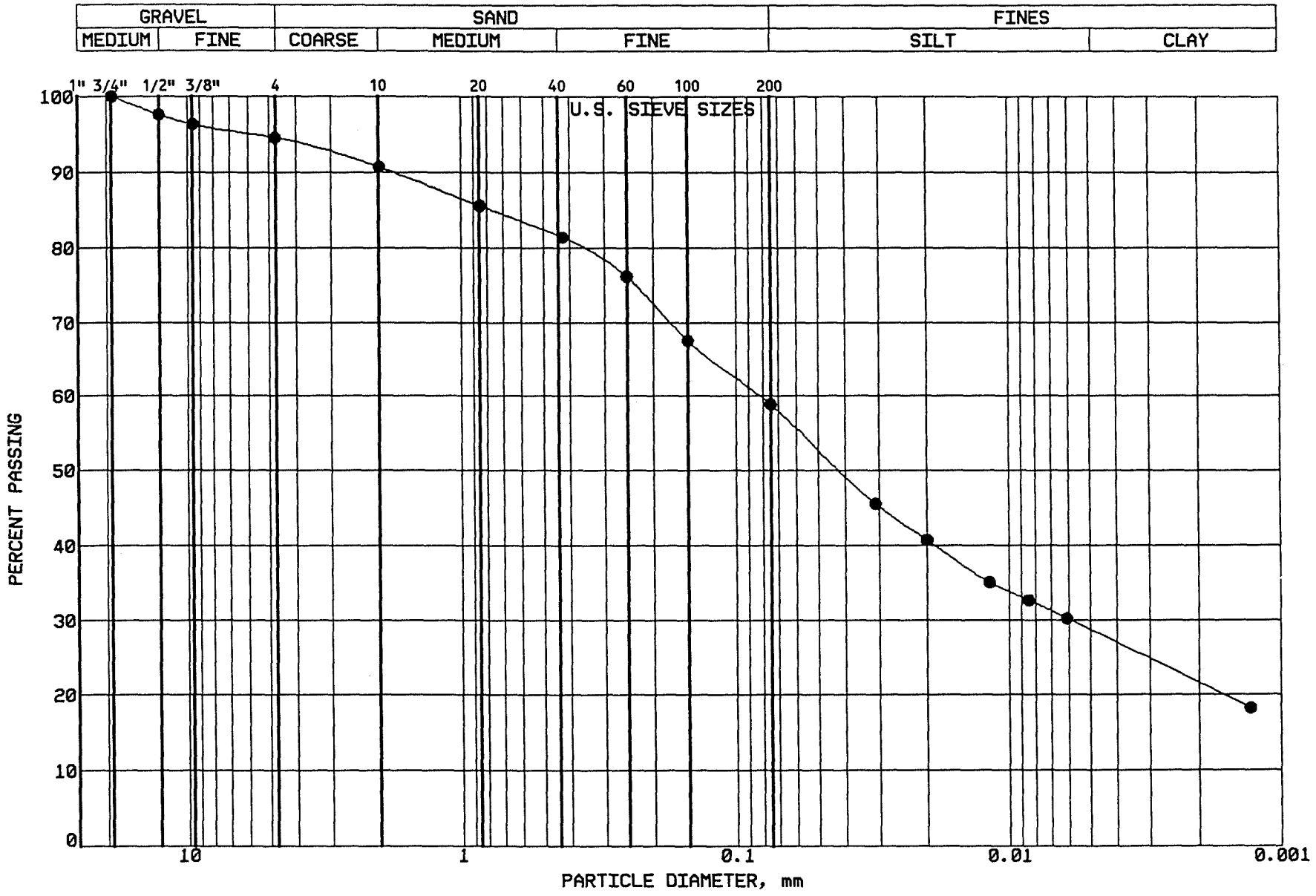
LOCATION: N 37883.0, E 40960.0
SAMPLE: SG-CC150 TUBE #:
ELEVATION: 1897.5'

GRAVEL	6.3 %
SAND	28.6 %
SILT	27.2 %
CLAY	37.9 %
P 200	65.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

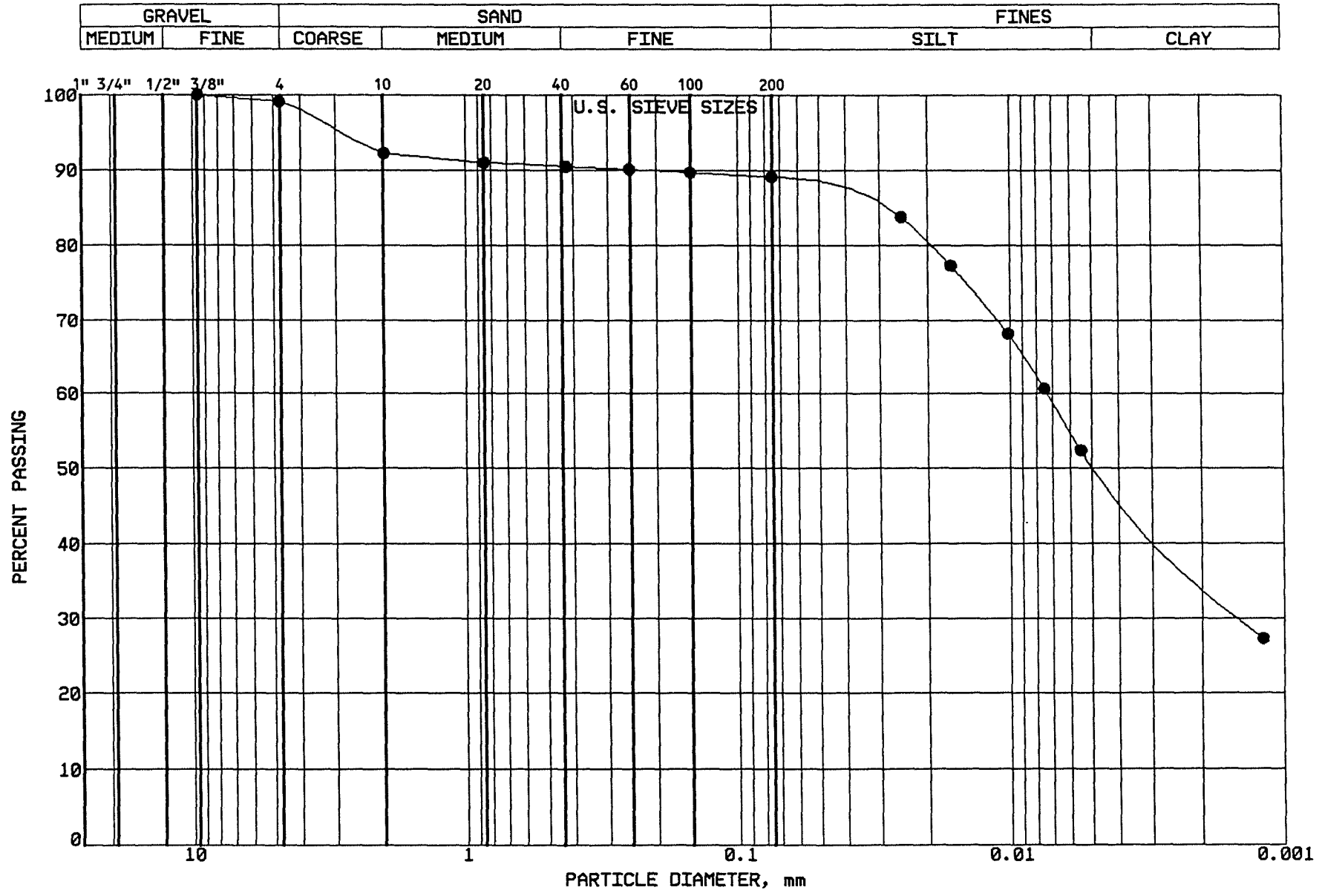
LOCATION: N 37885.0, E 40770.0
SAMPLE: SG-CC151 TUBE #:
ELEVATION: 1898.6'

GRAVEL	5.5 %
SAND	35.6 %
SILT	30.2 %
CLAY	28.7 %
P 200	58.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

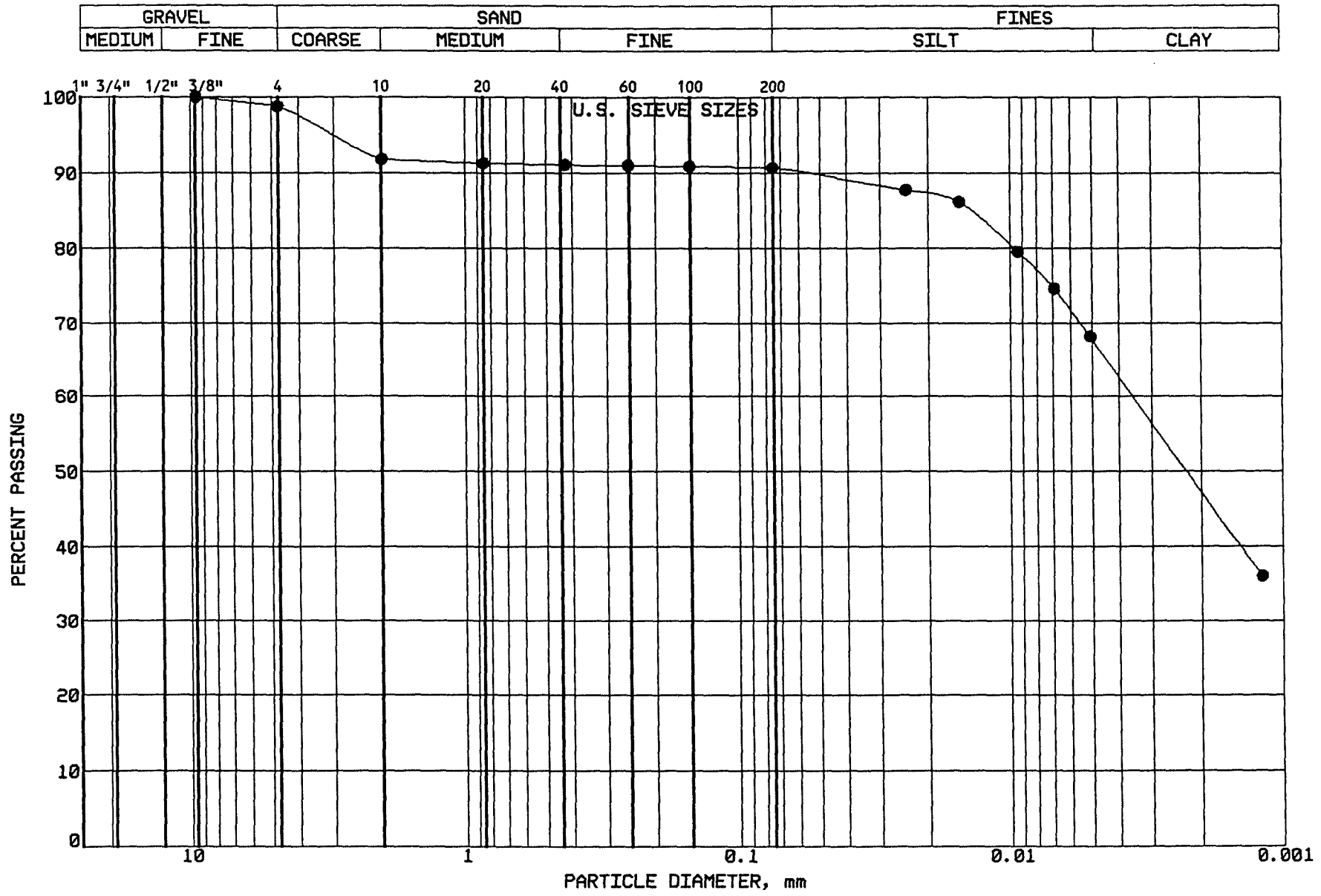
LOCATION: N 38042.0, E 40732.0
SAMPLE: SG-CC152 TUBE #:
ELEVATION: 1896.8'

GRAVEL	0.9 %
SAND	10.0 %
SILT	38.3 %
CLAY	50.8 %
P 200	89.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38035.0, E 40961.0
SAMPLE: SG-CC153 TUBE #:
ELEVATION: 1895.2'

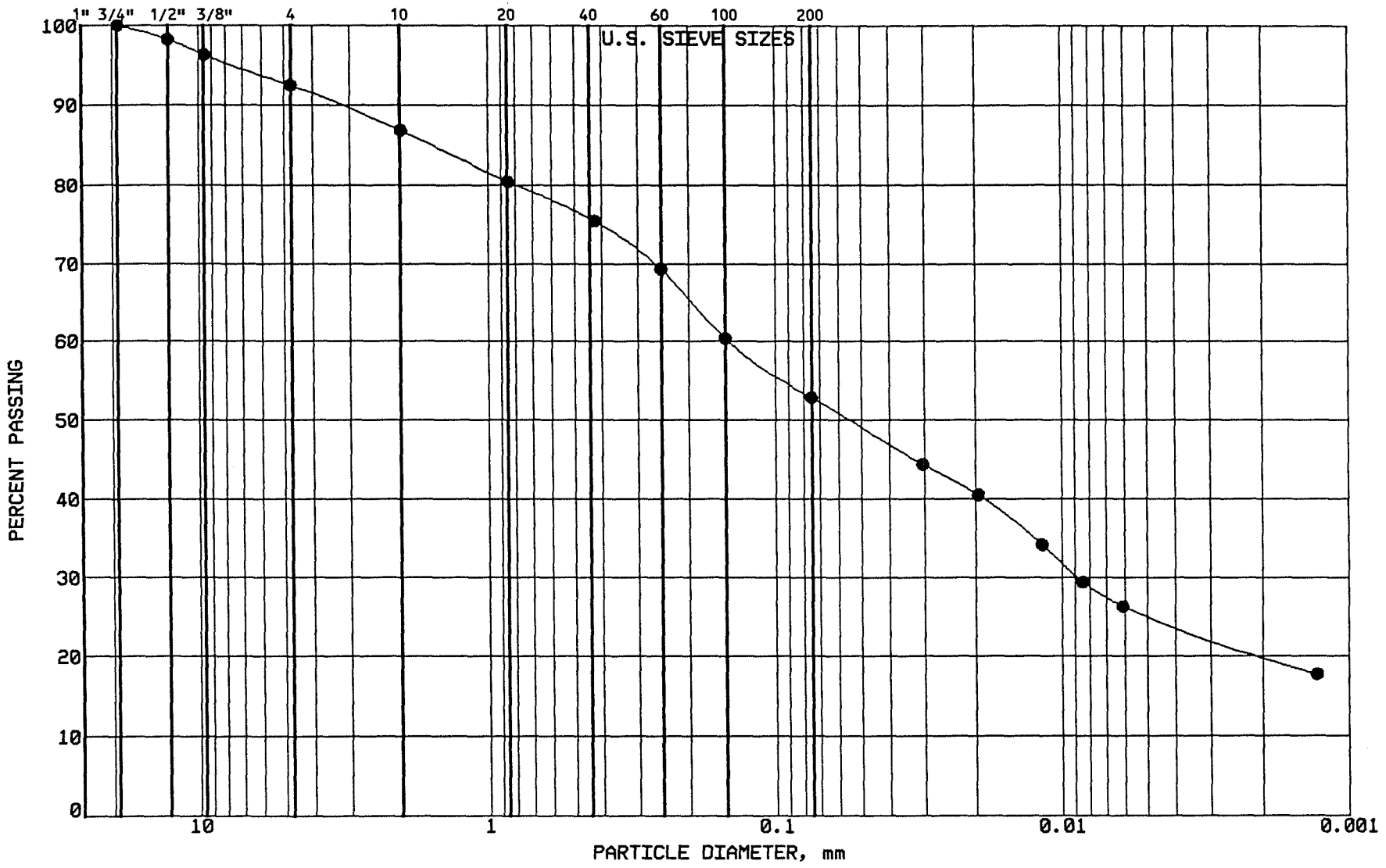
GRAVEL	1.2 %
SAND	8.1 %
SILT	23.0 %
CLAY	67.7 %
P 200	90.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38016.0, E 41266.0
SAMPLE: SG-CC154 TUBE #:
ELEVATION: 1896.7'

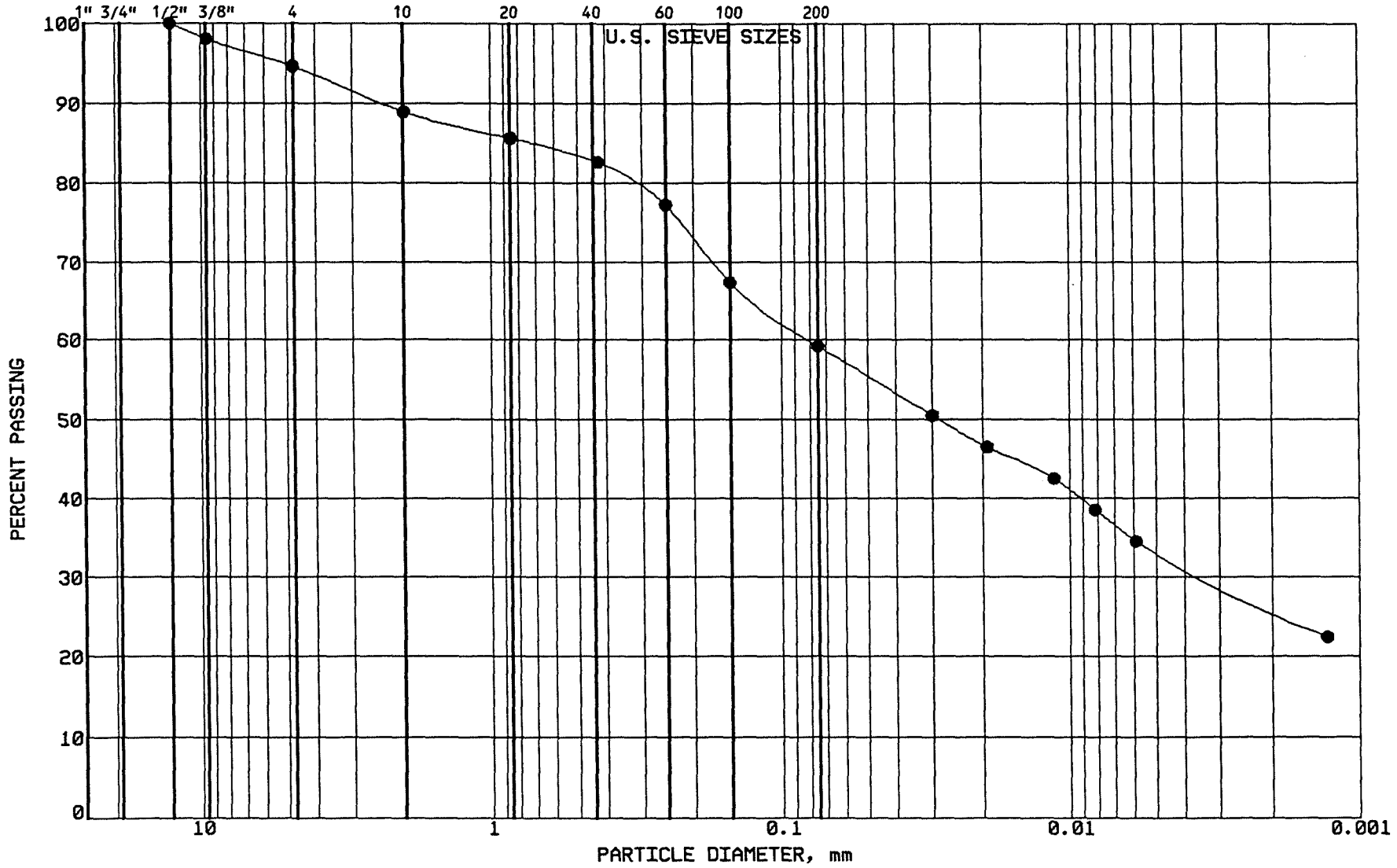
GRAVEL	7.5 %
SAND	39.6 %
SILT	27.7 %
CLAY	25.2 %
P 200	52.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay(CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38096.0, E 40700.0
SAMPLE: SG-CC155 TUBE #:
ELEVATION: 1899.1'

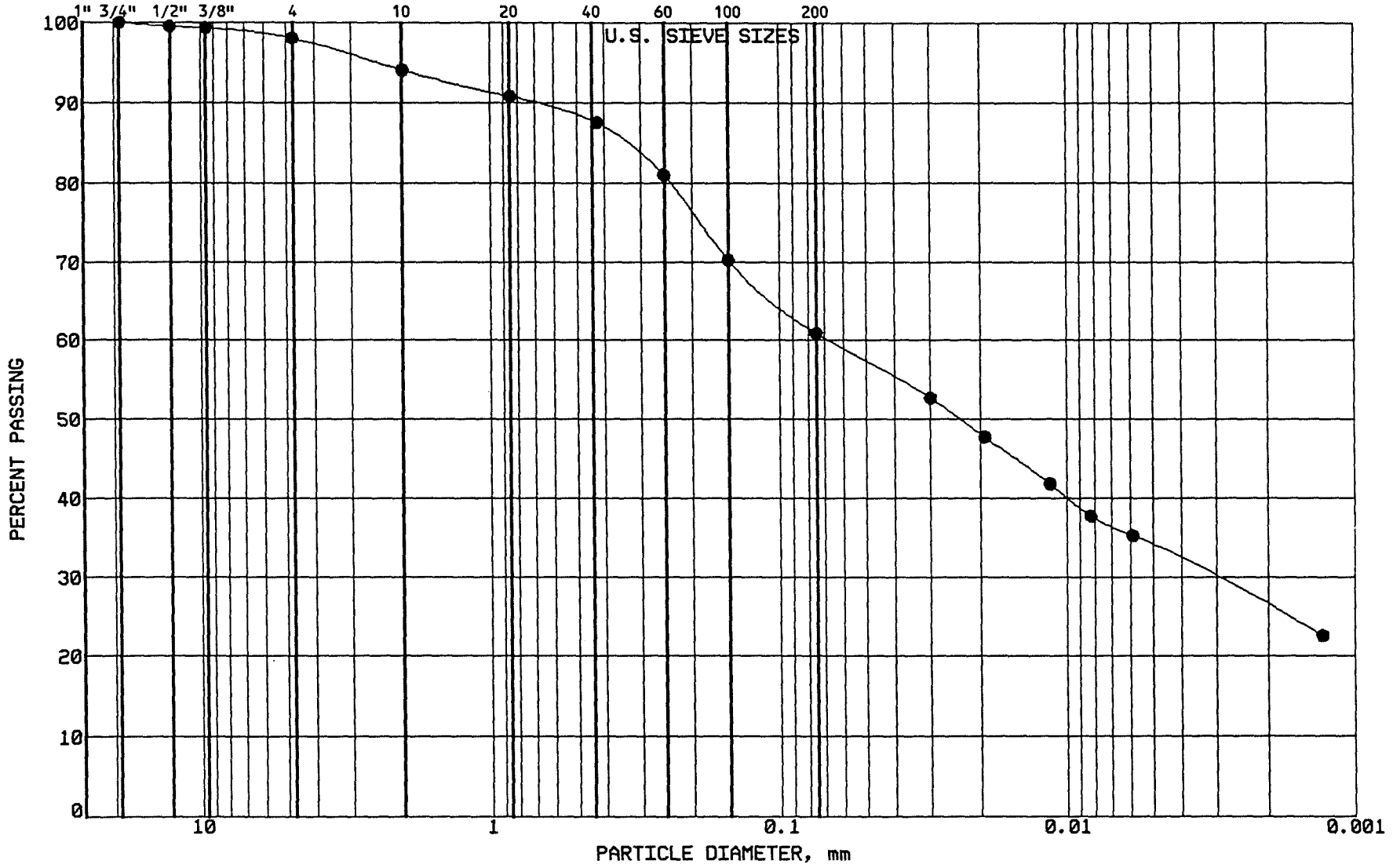
GRAVEL	5.4 %
SAND	35.4 %
SILT	26.0 %
CLAY	33.2 %
P 200	59.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38088.0, E 40811.0
SAMPLE: SG-CC156 TUBE #:
ELEVATION: 1897.2'

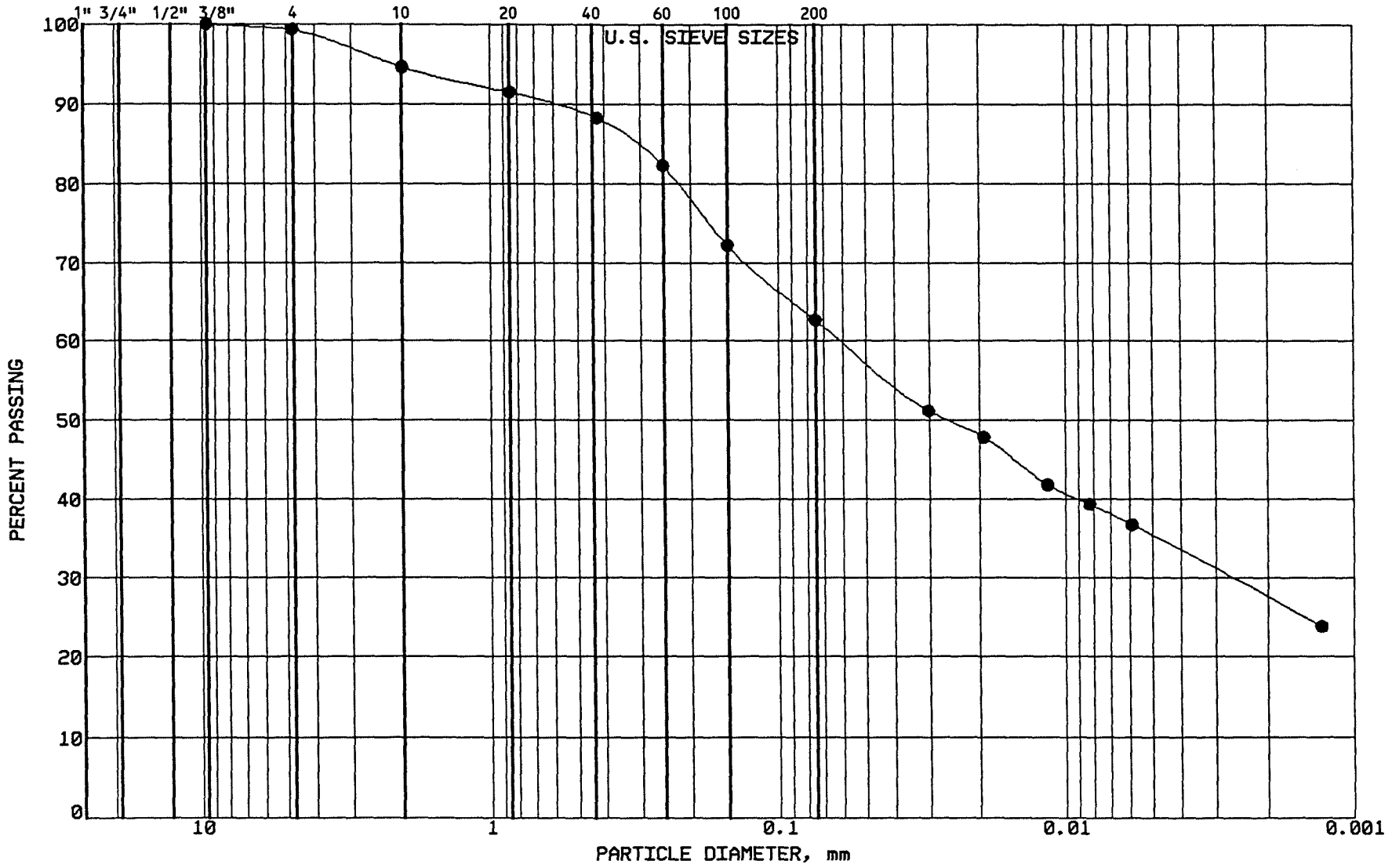
GRAVEL	2.0 %
SAND	37.1 %
SILT	27.1 %
CLAY	33.8 %
P 200	60.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

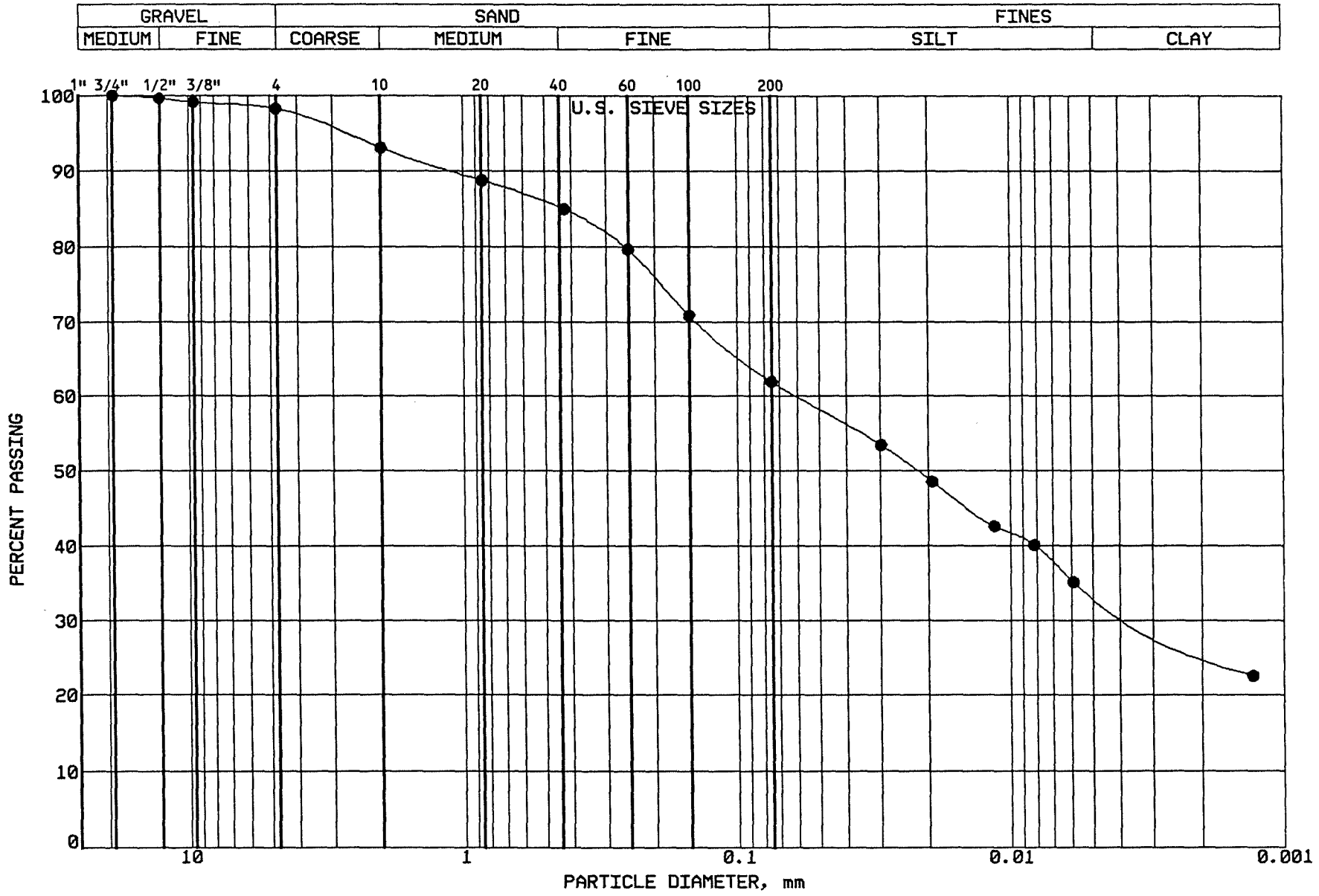
LOCATION: N 38070.0, E 40980.0
SAMPLE: SG-CC157 TUBE #:
ELEVATION: 1896.5'

GRAVEL	0.7 %
SAND	36.6 %
SILT	27.4 %
CLAY	35.3 %
P 200	62.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

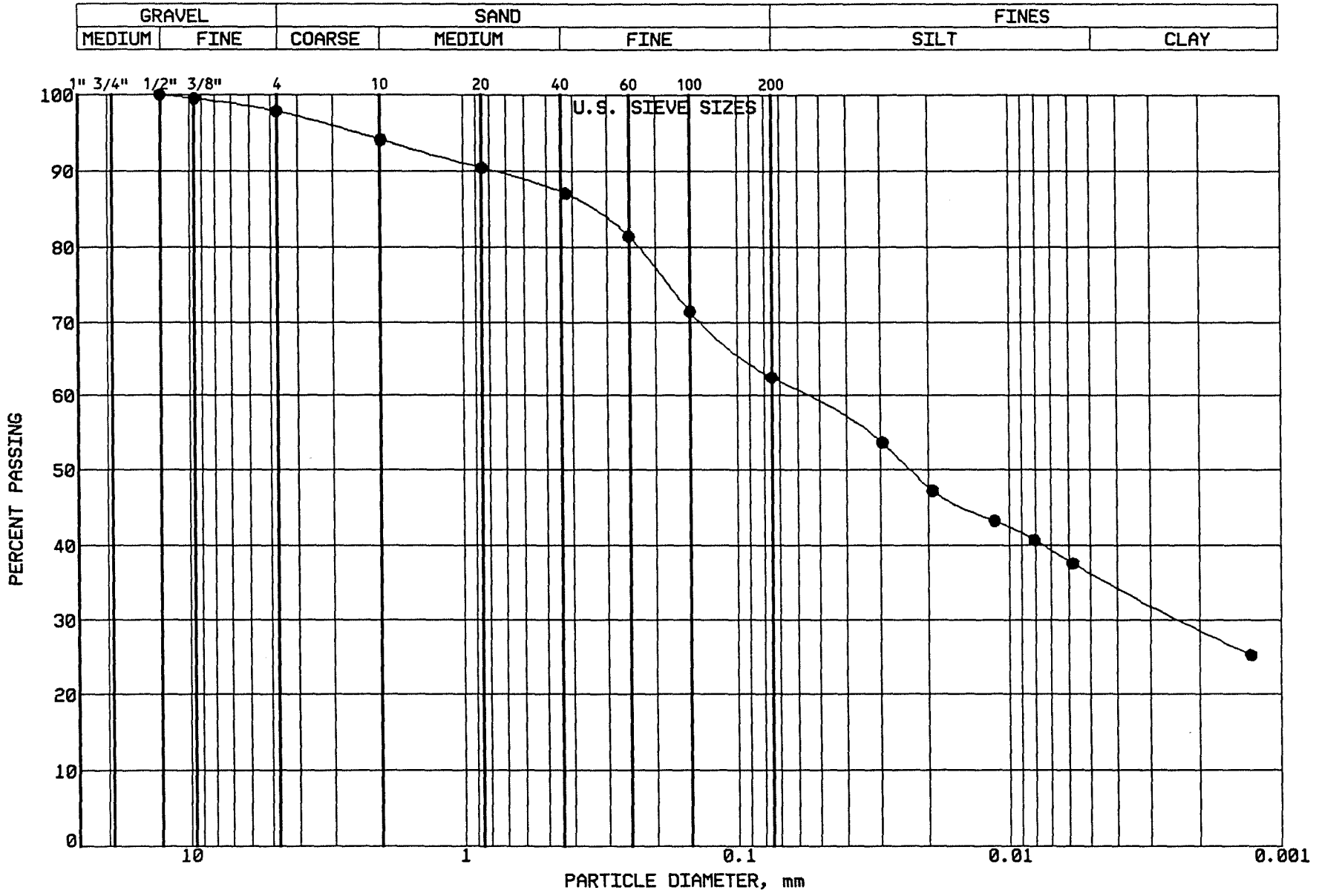
LOCATION: N 37992.0, E 40675.0
SAMPLE: SG-CC158 TUBE #:
ELEVATION: 1900.3'

GRAVEL	1.8 %
SAND	36.3 %
SILT	28.2 %
CLAY	33.7 %
P 200	61.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37983.0, E 40840.0
SAMPLE: SG-CC159 TUBE #:
ELEVATION: 1898.4'

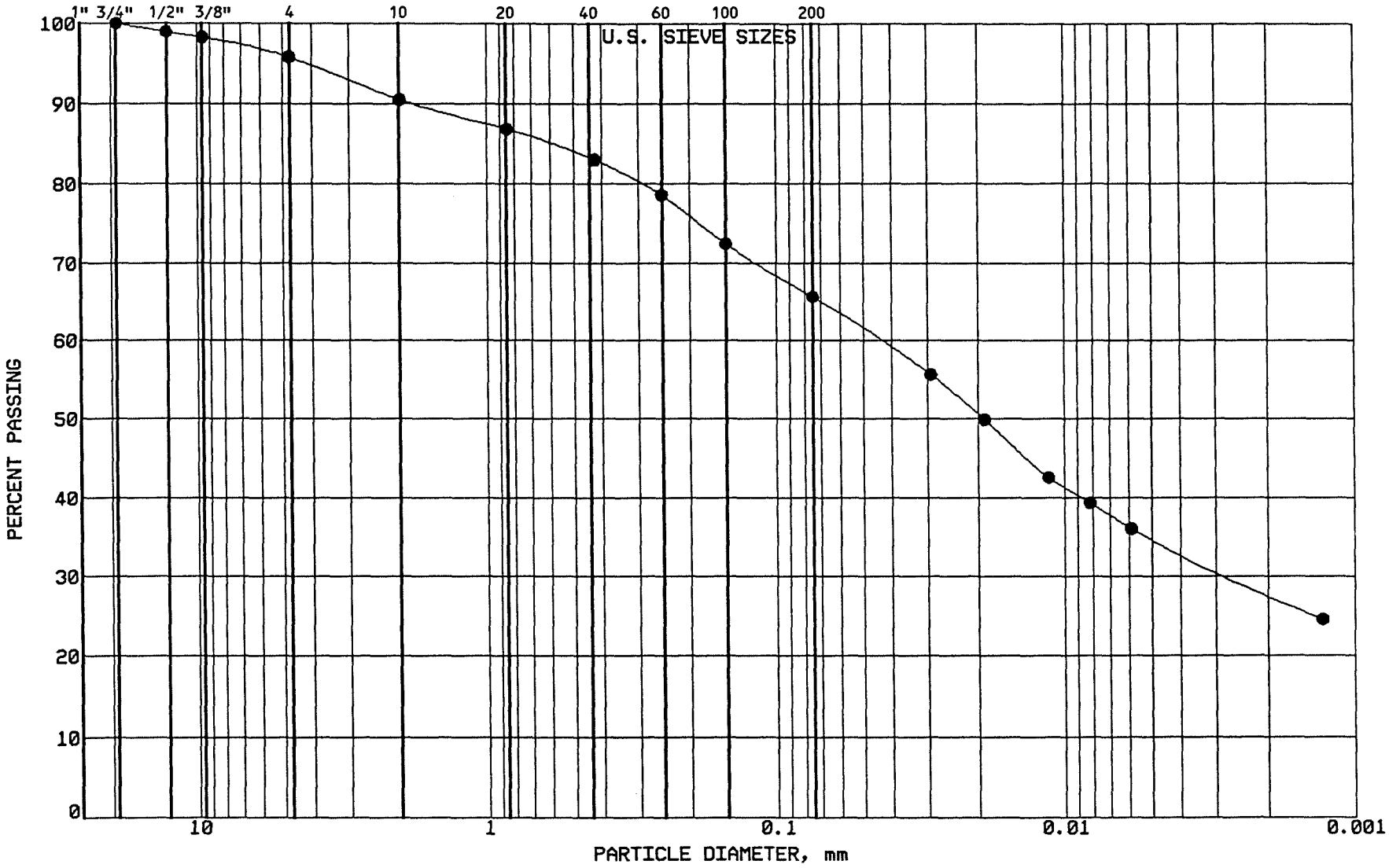
GRAVEL	2.2 %
SAND	35.3 %
SILT	26.2 %
CLAY	36.3 %
P 200	62.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

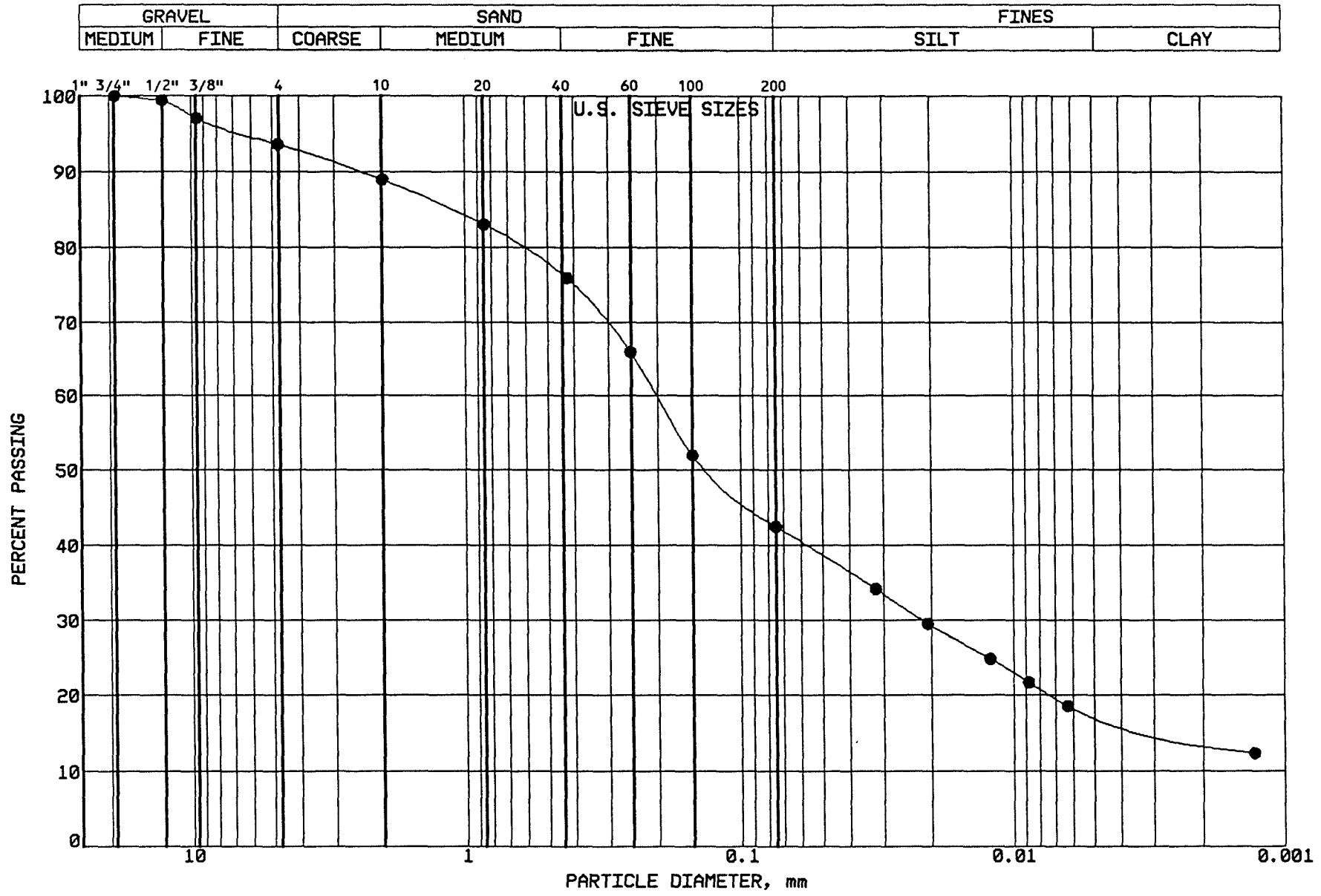
LOCATION: N 37979.0, E 41032.0
SAMPLE: SG-CC160 TUBE #:
ELEVATION: 1897.7'

GRAVEL	4.2 %
SAND	30.2 %
SILT	30.8 %
CLAY	34.8 %
P 200	65.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

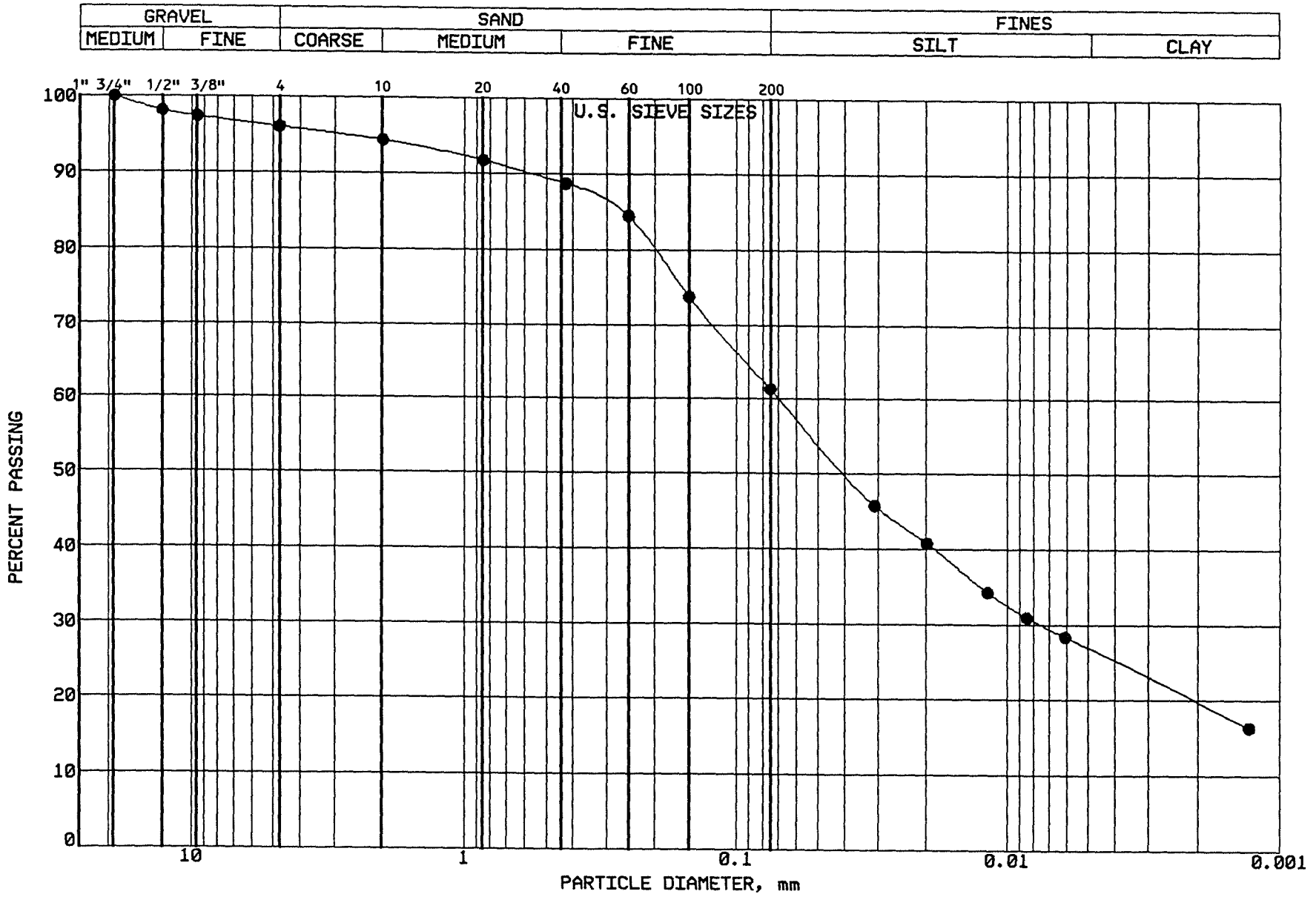
LOCATION: N 38175.0, E 41078.0
SAMPLE: SG-CC161 TUBE #:
ELEVATION: 1895.4'

GRAVEL	6.4 %
SAND	51.1 %
SILT	24.8 %
CLAY	17.7 %
P 200	42.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Clayey Sand (SC),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

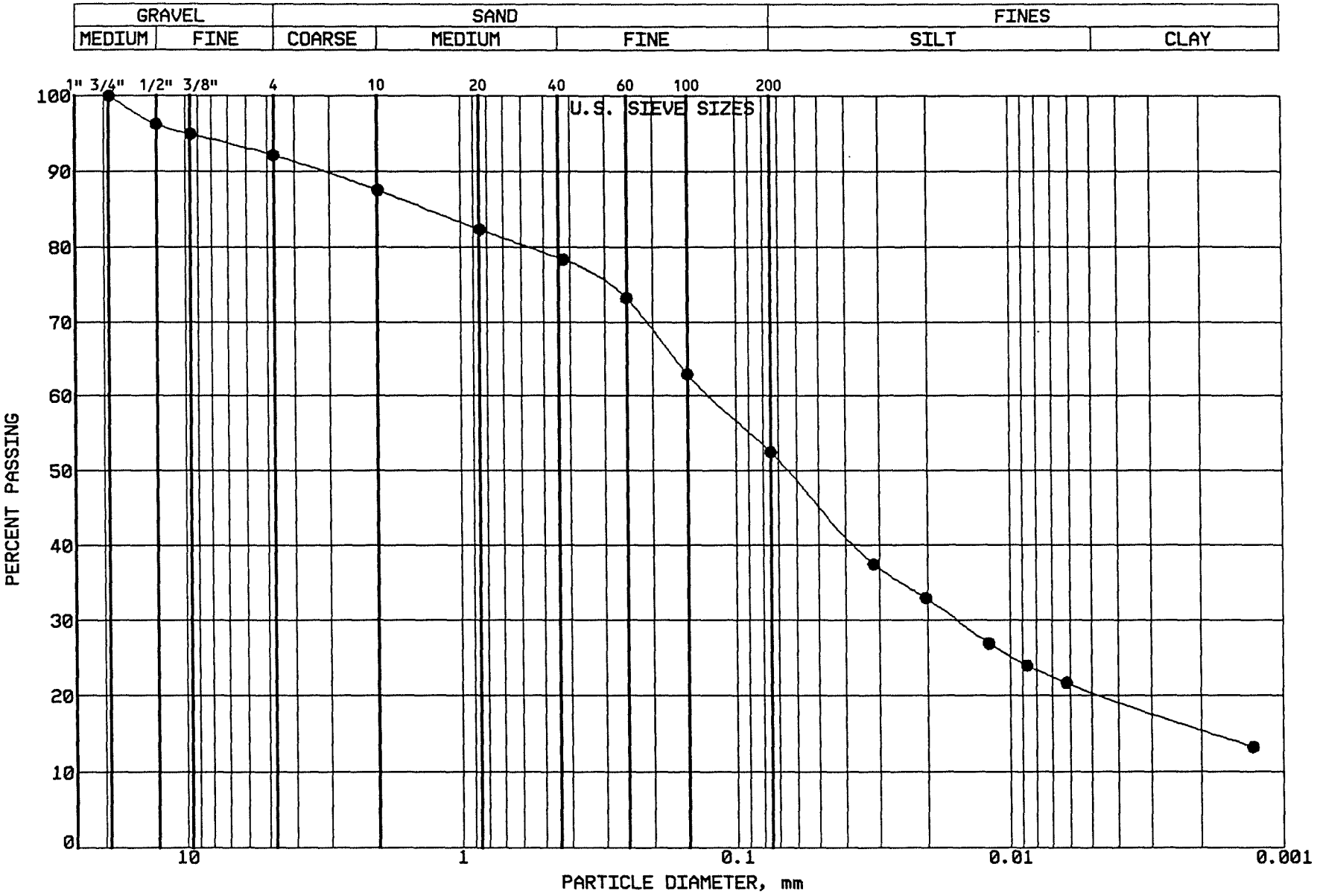
LOCATION: N 38176.0, E 40935.0
SAMPLE: SG-CC162 TUBE #:
ELEVATION: 1897.8'

GRAVEL	3.9 %
SAND	34.8 %
SILT	34.4 %
CLAY	26.9 %
P 200	61.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

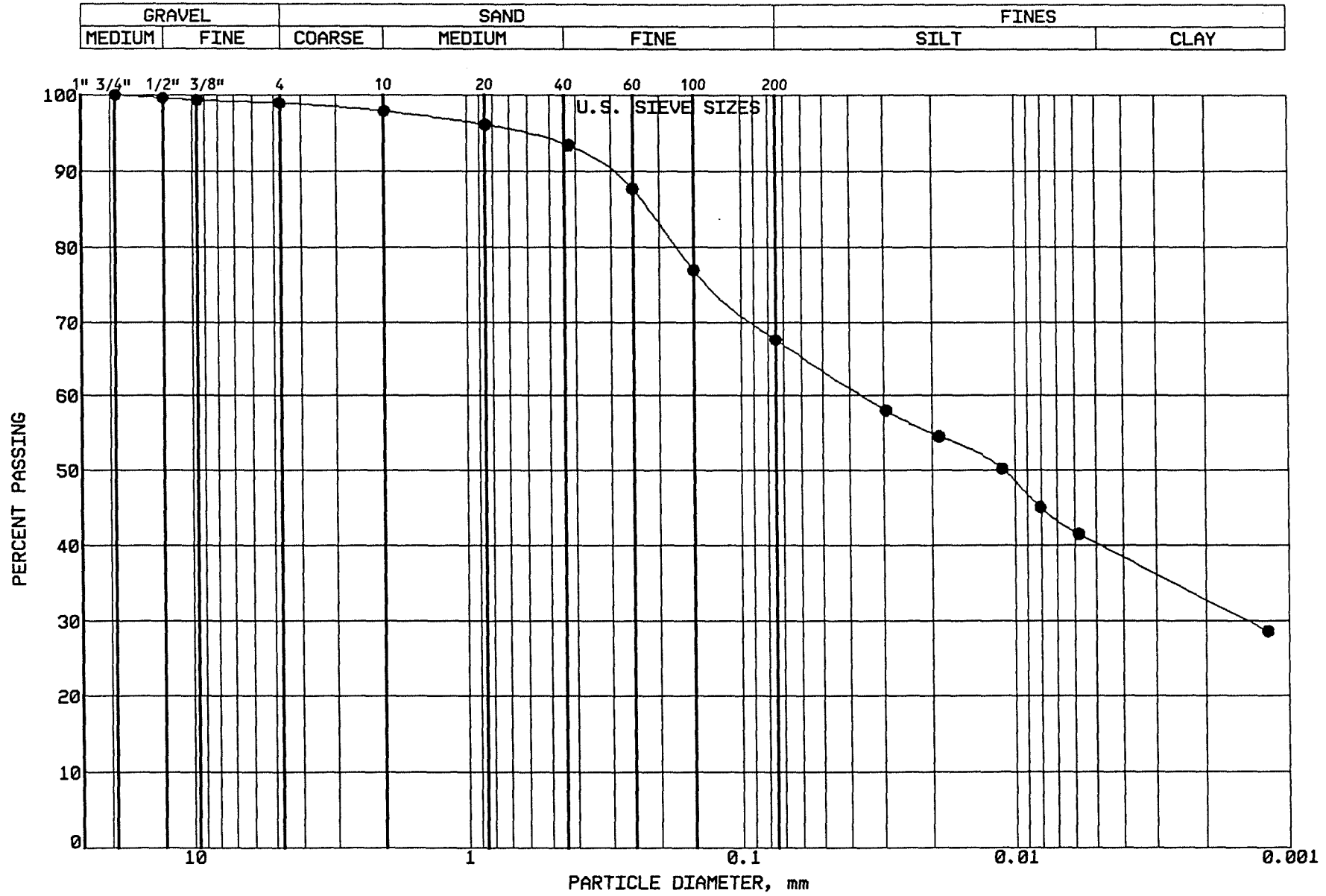
LOCATION: N 38184.0, E 40744.0
SAMPLE: SG-CC163 TUBE #:
ELEVATION: 1900.3'

GRAVEL	7.9 %
SAND	39.6 %
SILT	32.0 %
CLAY	20.5 %
P 200	52.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

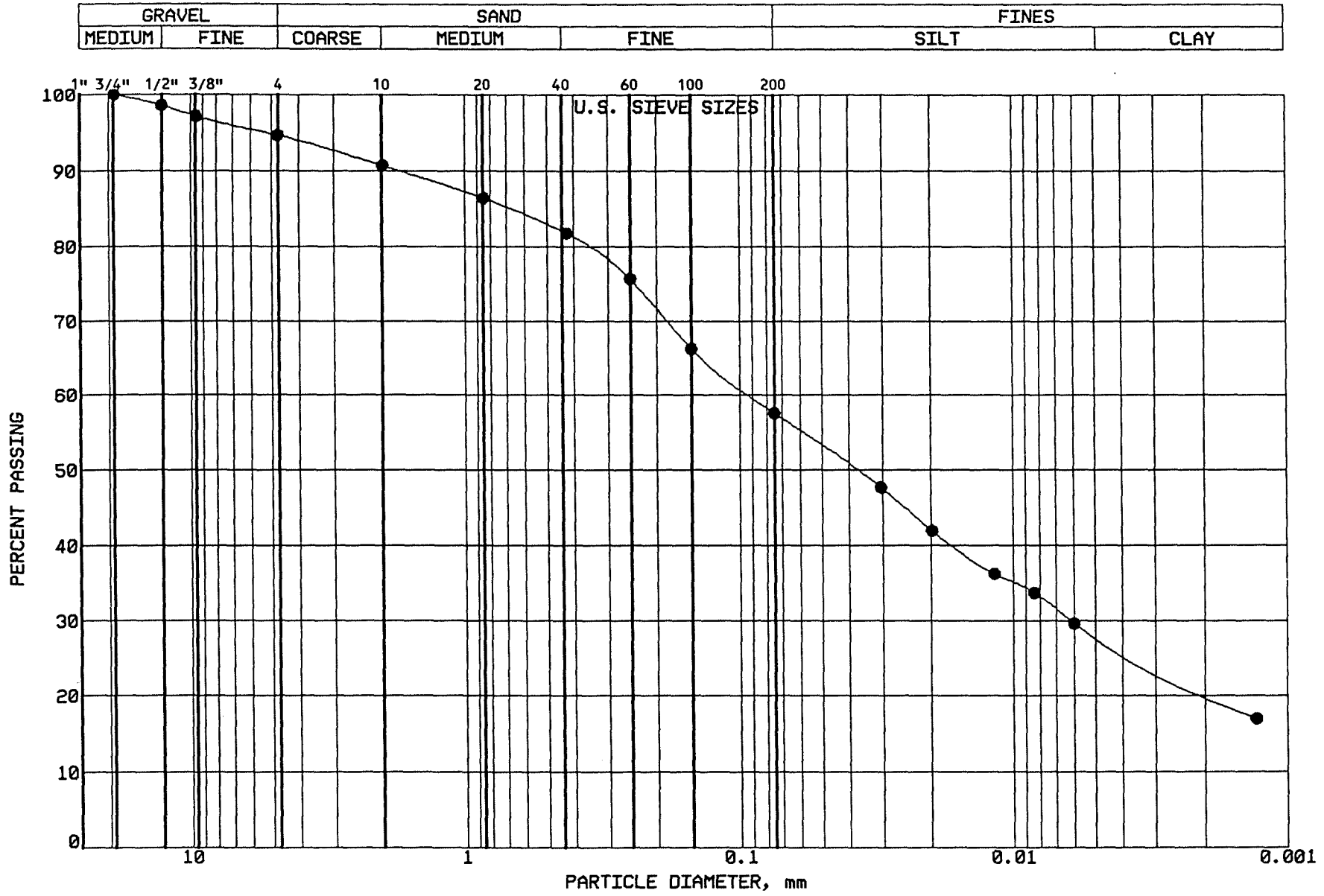
LOCATION: N 37565.0, E 40992.0
SAMPLE: SG-CC164 TUBE #:
ELEVATION: 1901.4'

GRAVEL	1.1 %
SAND	31.3 %
SILT	27.3 %
CLAY	40.3 %
P 200	67.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

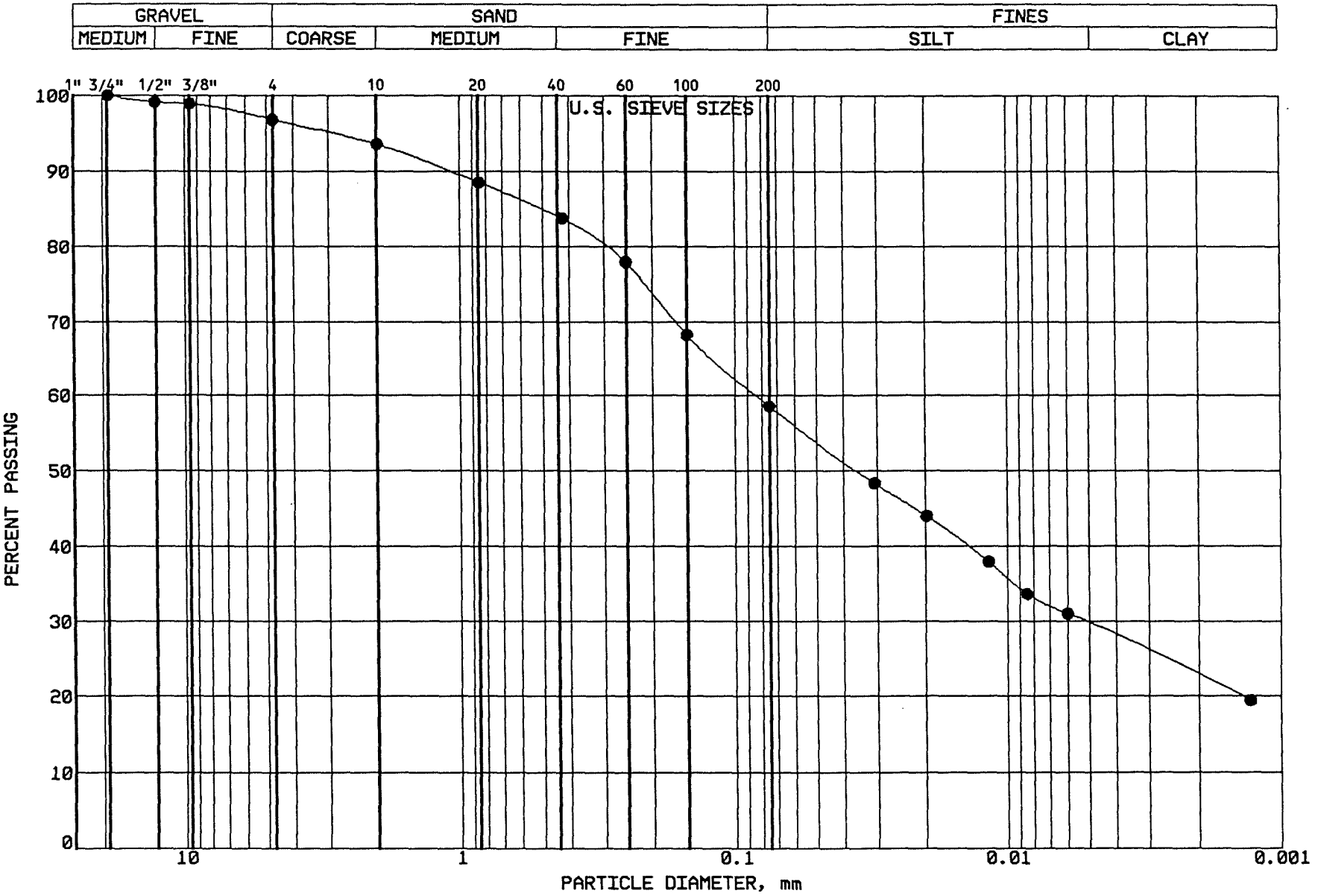
LOCATION: N 37746.0, E 41008.0
SAMPLE: SG-CC165 TUBE #:
ELEVATION: 1899.6'

GRAVEL	5.3 %
SAND	37.1 %
SILT	29.5 %
CLAY	28.1 %
P 200	57.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37741.0, E 41230.0
SAMPLE: SG-CC166 TUBE #:
ELEVATION: 1898.5'

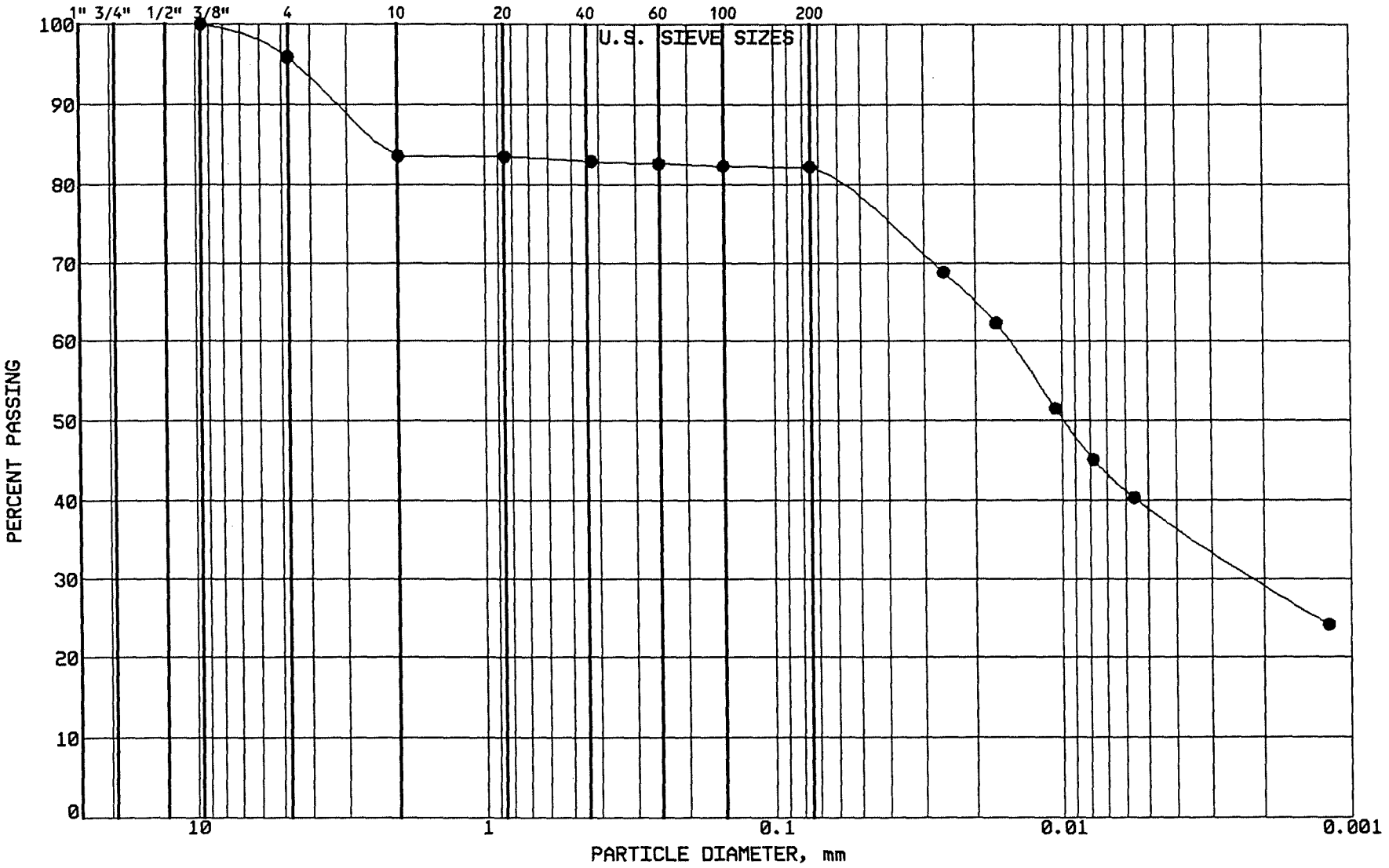
GRAVEL	3.2 %
SAND	38.2 %
SILT	29.0 %
CLAY	29.6 %
P 200	58.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

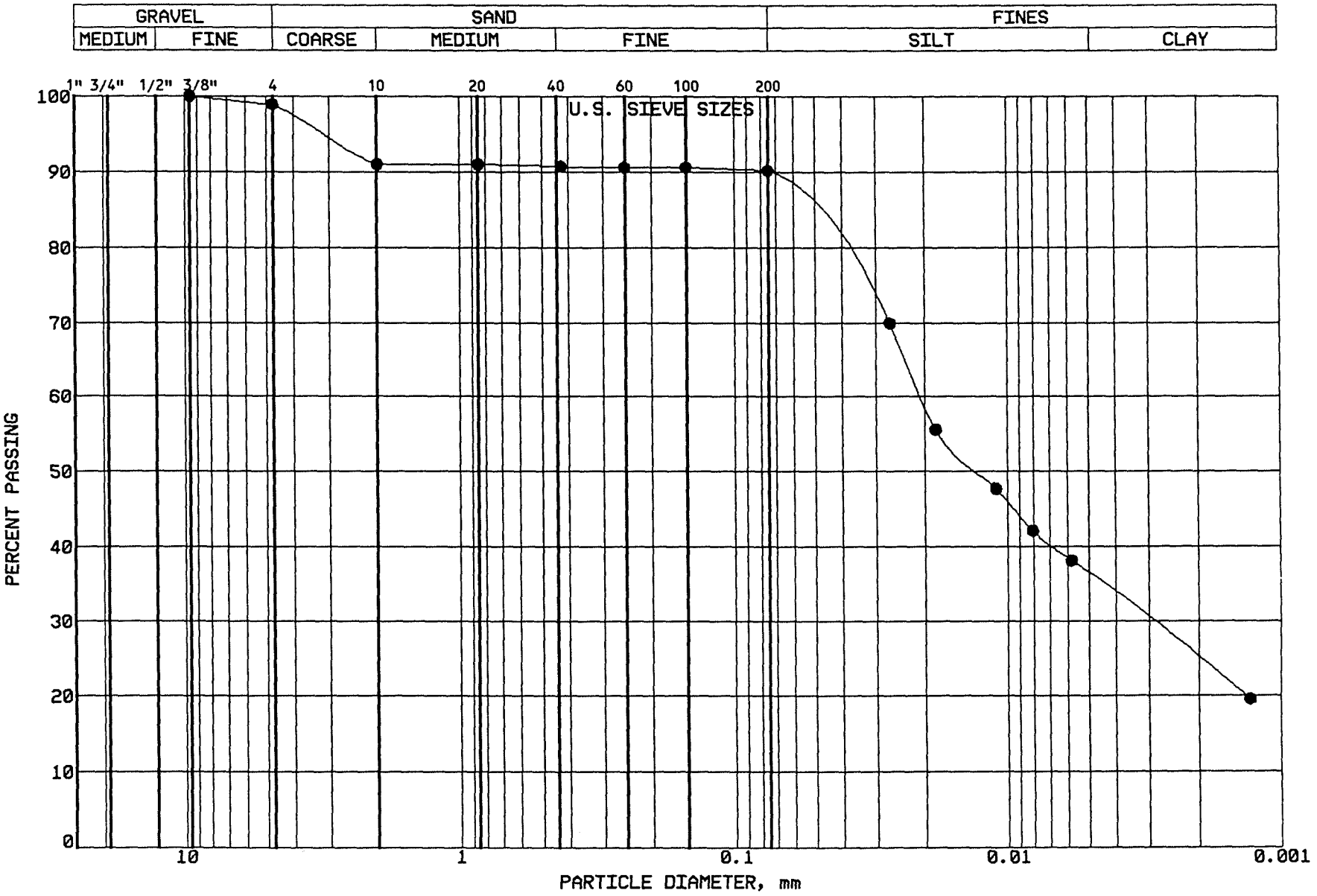
LOCATION: N 37500.0, E 40000.0
SAMPLE: CC-167 TUBE #:
ELEVATION: N/A'

GRAVEL	4.1 %
SAND	13.7 %
SILT	43.1 %
CLAY	39.1 %
P 200	82.2 %

SOIL PROPERTIES

LL: 47.0%
PL: 19.0%
PI: 28.0%
CLASS: Lean Clay (CL), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

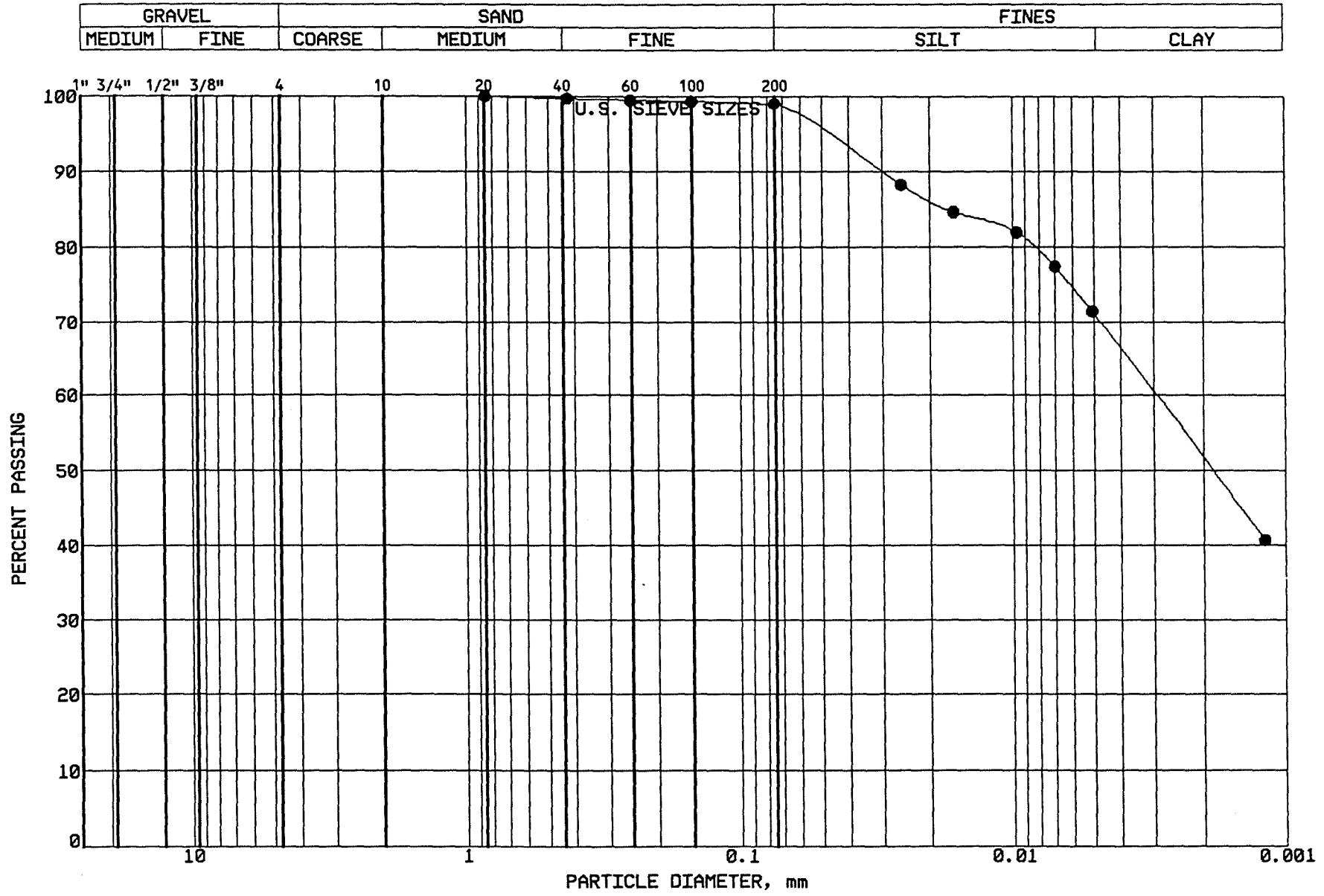
LOCATION: N 37550.0, E 40100.0
SAMPLE: CC-168 TUBE #:
ELEVATION: N/A'

GRAVEL	1.1 %
SAND	8.7 %
SILT	53.9 %
CLAY	36.3 %
P 200	90.2 %

SOIL PROPERTIES

LL: 38.0%
PL: 17.0%
PI: 21.0%
CLASS: Lean Clay (CL),ol gr.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

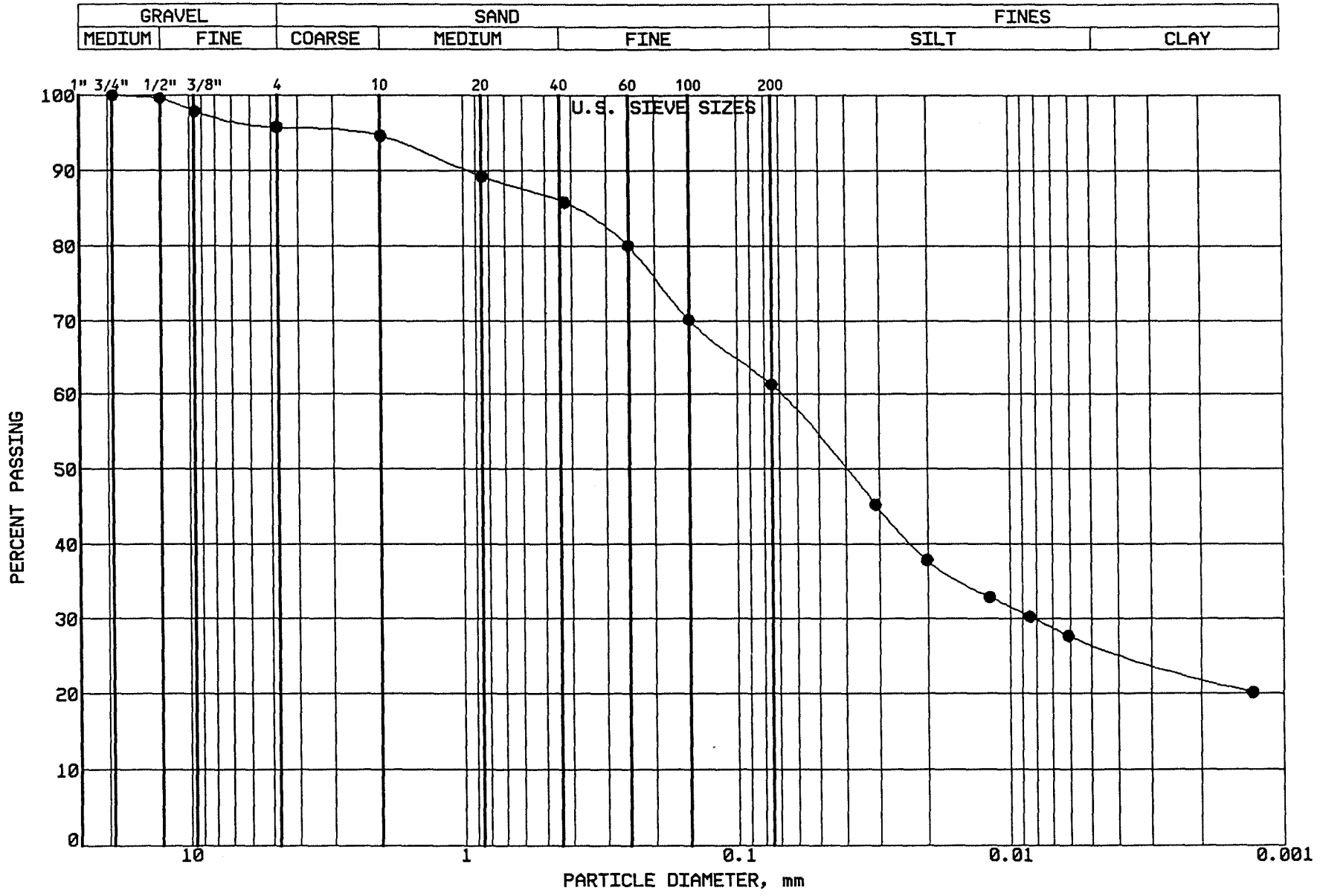
LOCATION: N 37600.0, E 40500.0
SAMPLE: CC-169 TUBE #:
ELEVATION: N/A'

GRAVEL	0.0 %
SAND	1.0 %
SILT	28.0 %
CLAY	71.0 %
P 200	99.0 %

SOIL PROPERTIES

LL: 60.0%
PL: 22.0%
PI: 38.0%
CLASS: Fat Clay (CH), dk gr.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

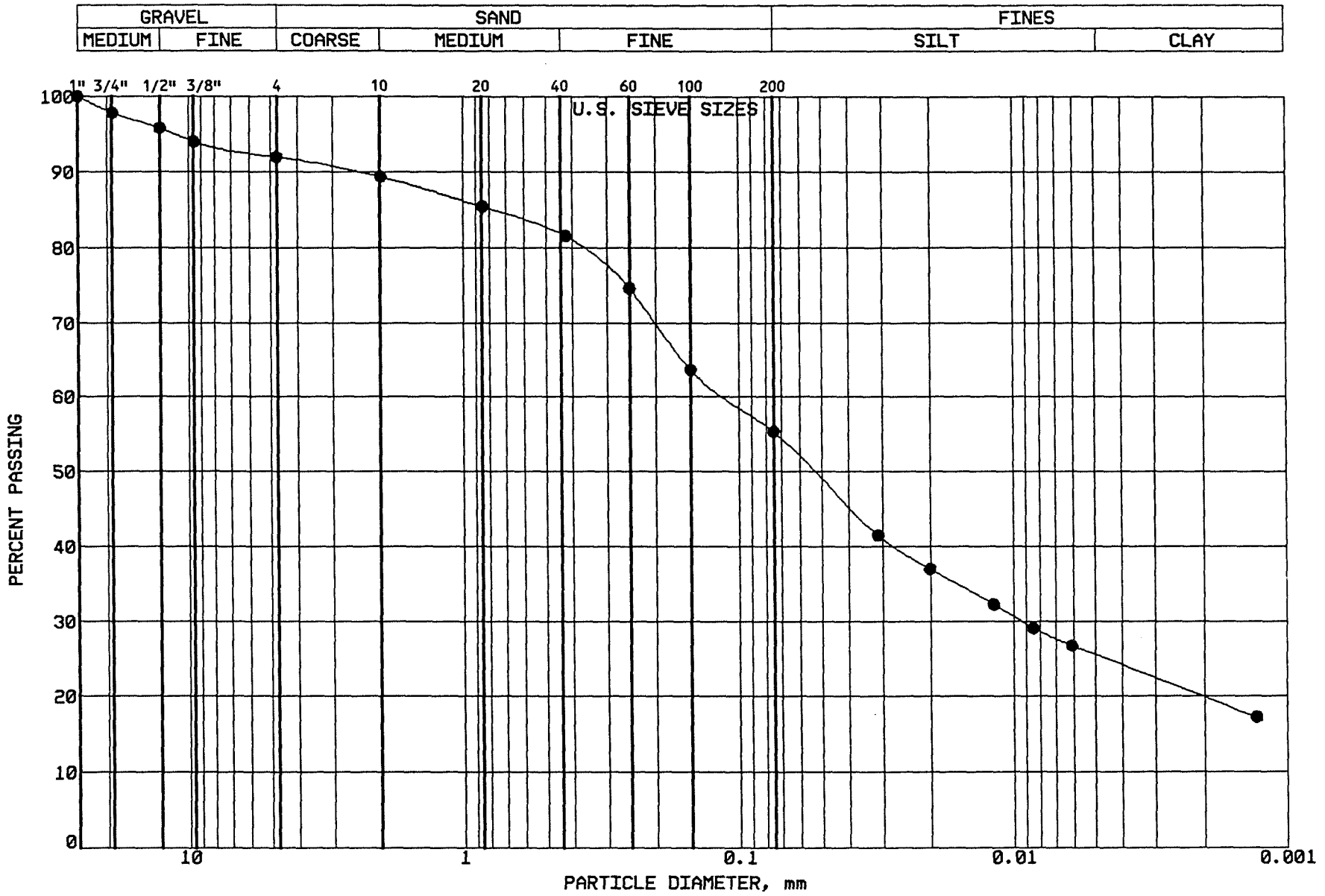
LOCATION: N 37936.0, E 40772.0
SAMPLE: SG-CC170 TUBE #:
ELEVATION: 1899.6'

GRAVEL	4.3 %
SAND	34.4 %
SILT	34.6 %
CLAY	26.7 %
P 200	61.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

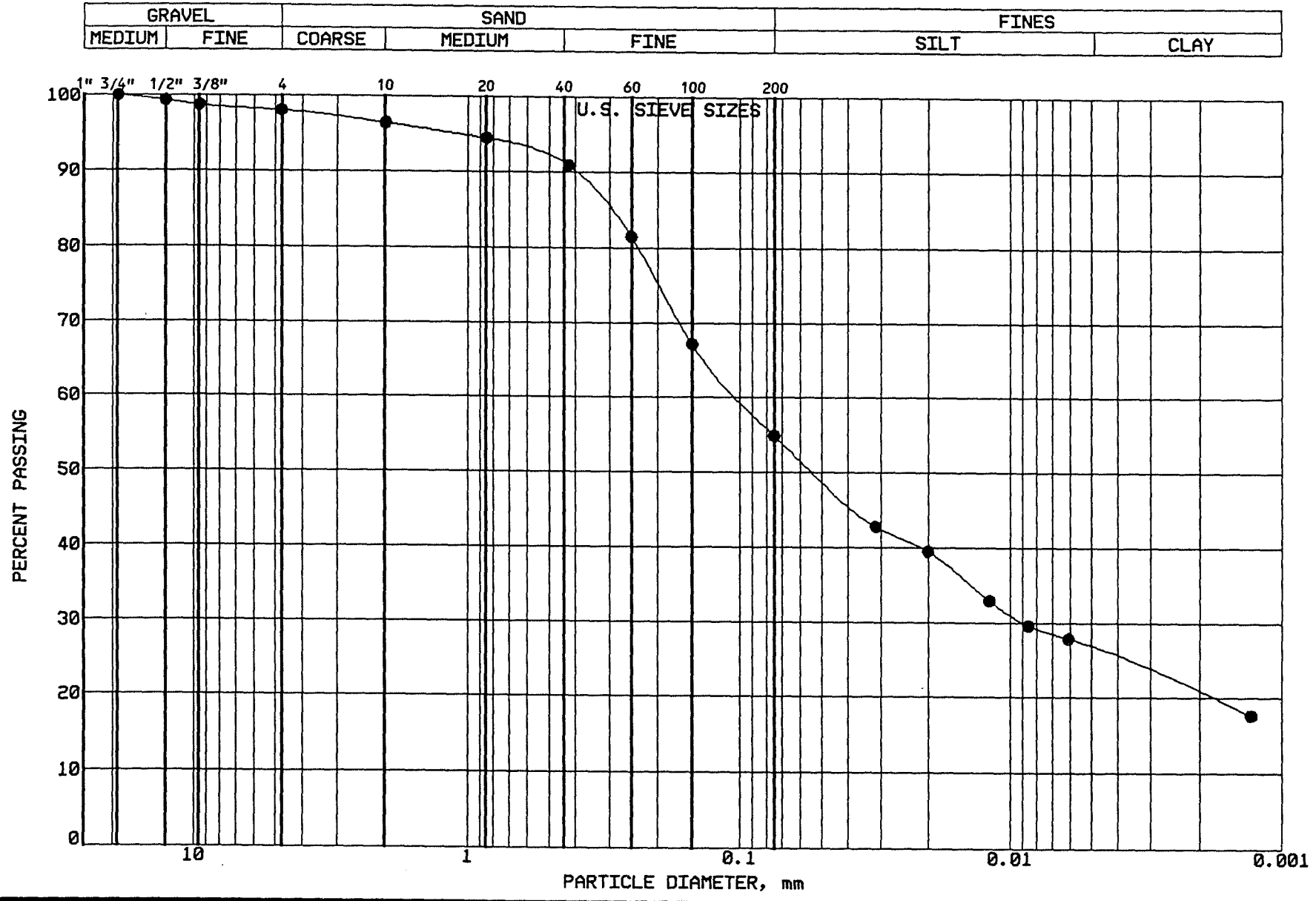
LOCATION: N 37933.0, E 41006.0
SAMPLE: SG-CC171 TUBE #:
ELEVATION: 1898.8'

GRAVEL	8.0 %
SAND	36.6 %
SILT	29.8 %
CLAY	25.6 %
P 200	55.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37929.0, E 41225.0
SAMPLE: SG-CC172 TUBE #:
ELEVATION: 1897.2'

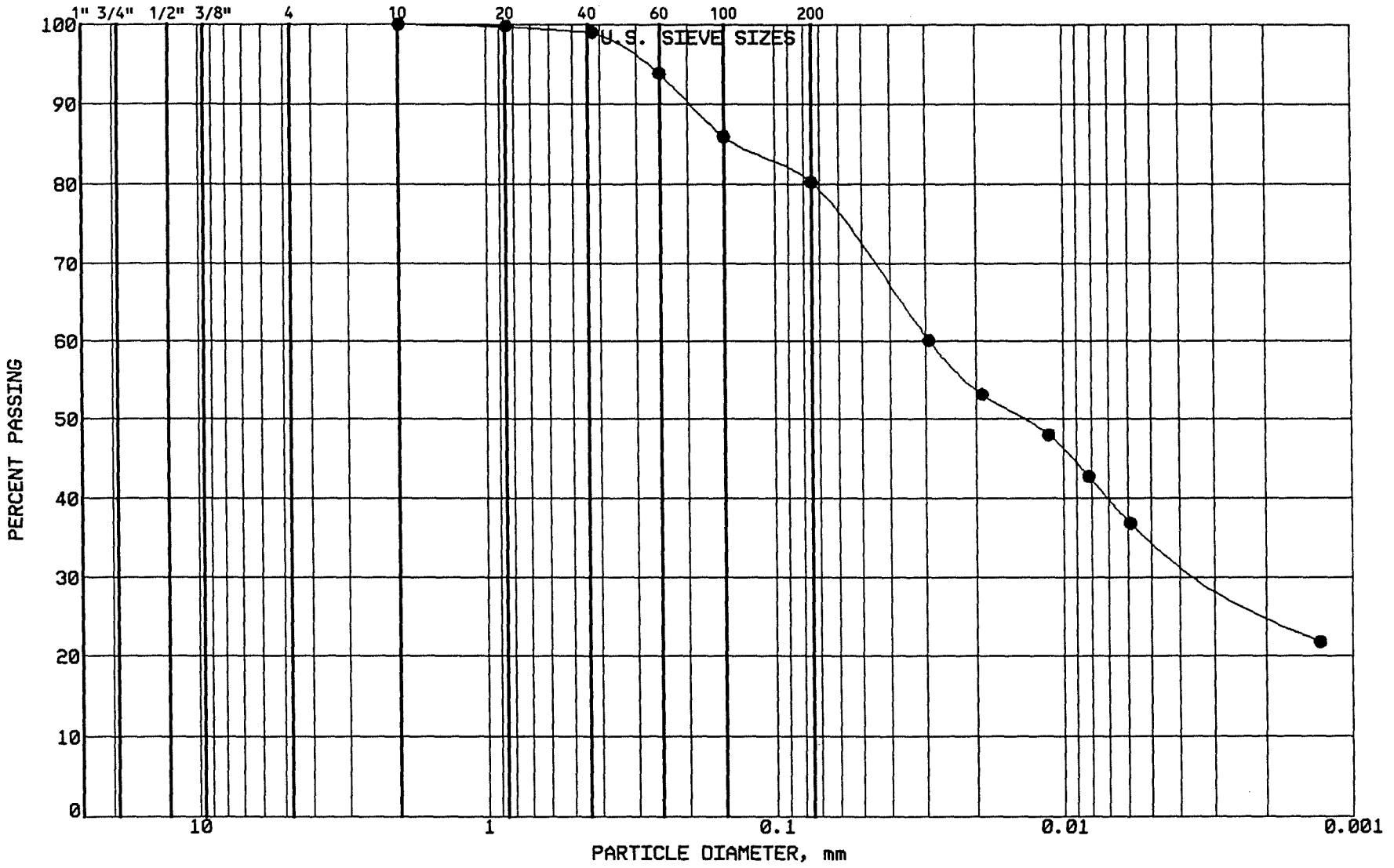
GRAVEL	2.0 %
SAND	43.1 %
SILT	28.3 %
CLAY	26.6 %
P 200	54.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

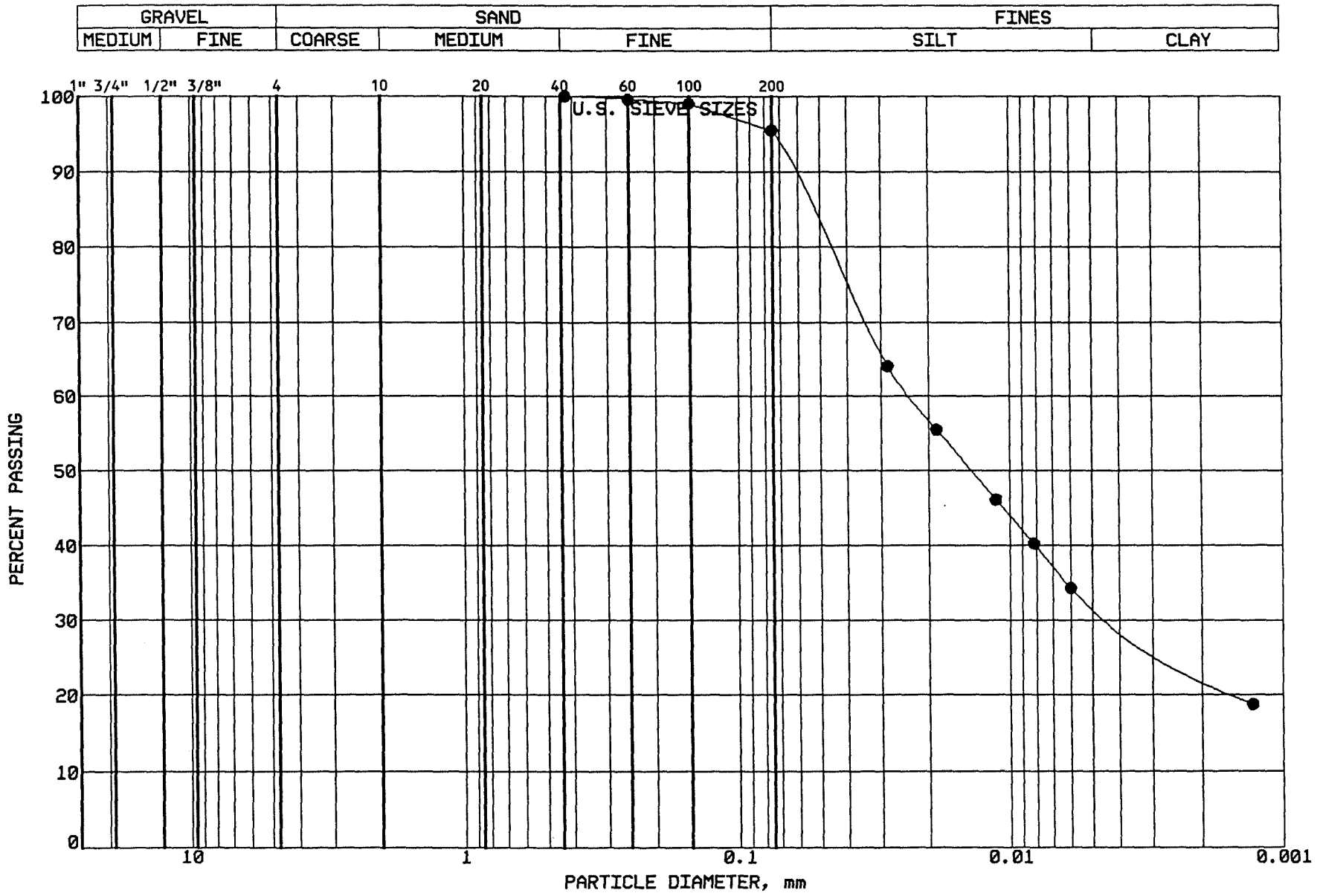
LOCATION: N 38368.0, E 40933.0
SAMPLE: SG-CC173 TUBE #:
ELEVATION: 1894.7'

GRAVEL	0.0 %
SAND	19.8 %
SILT	45.0 %
CLAY	35.2 %
P 200	80.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Lean Clay w/Sand (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38573.0, E 40931.0
SAMPLE: SG-CC174 TUBE #:
ELEVATION: 1890.8'

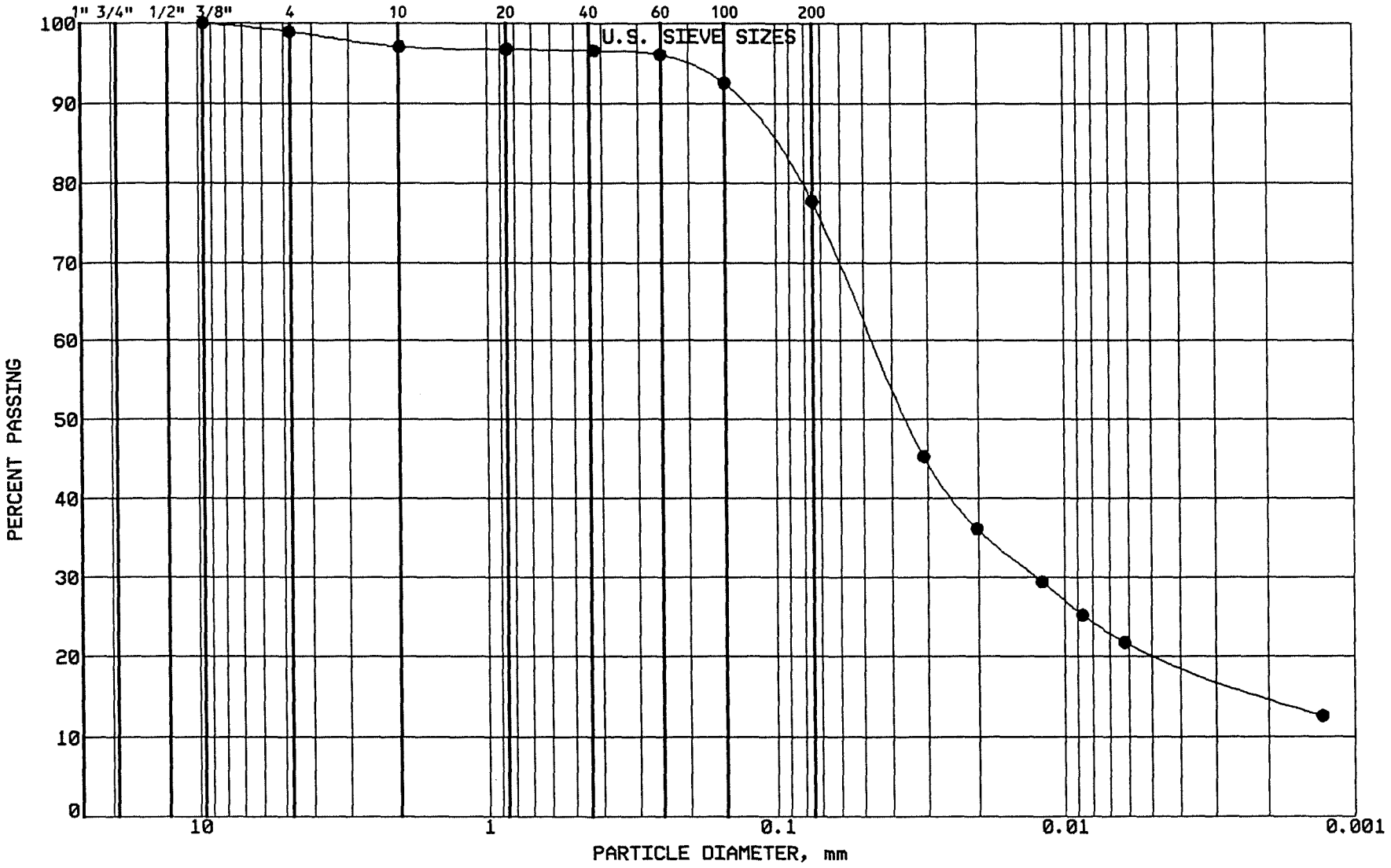
GRAVEL	0.0 %
SAND	4.5 %
SILT	63.1 %
CLAY	32.4 %
P 200	95.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38270.0, E 41065.0
SAMPLE: SG-CC175 TUBE #:
ELEVATION: 1894.3'

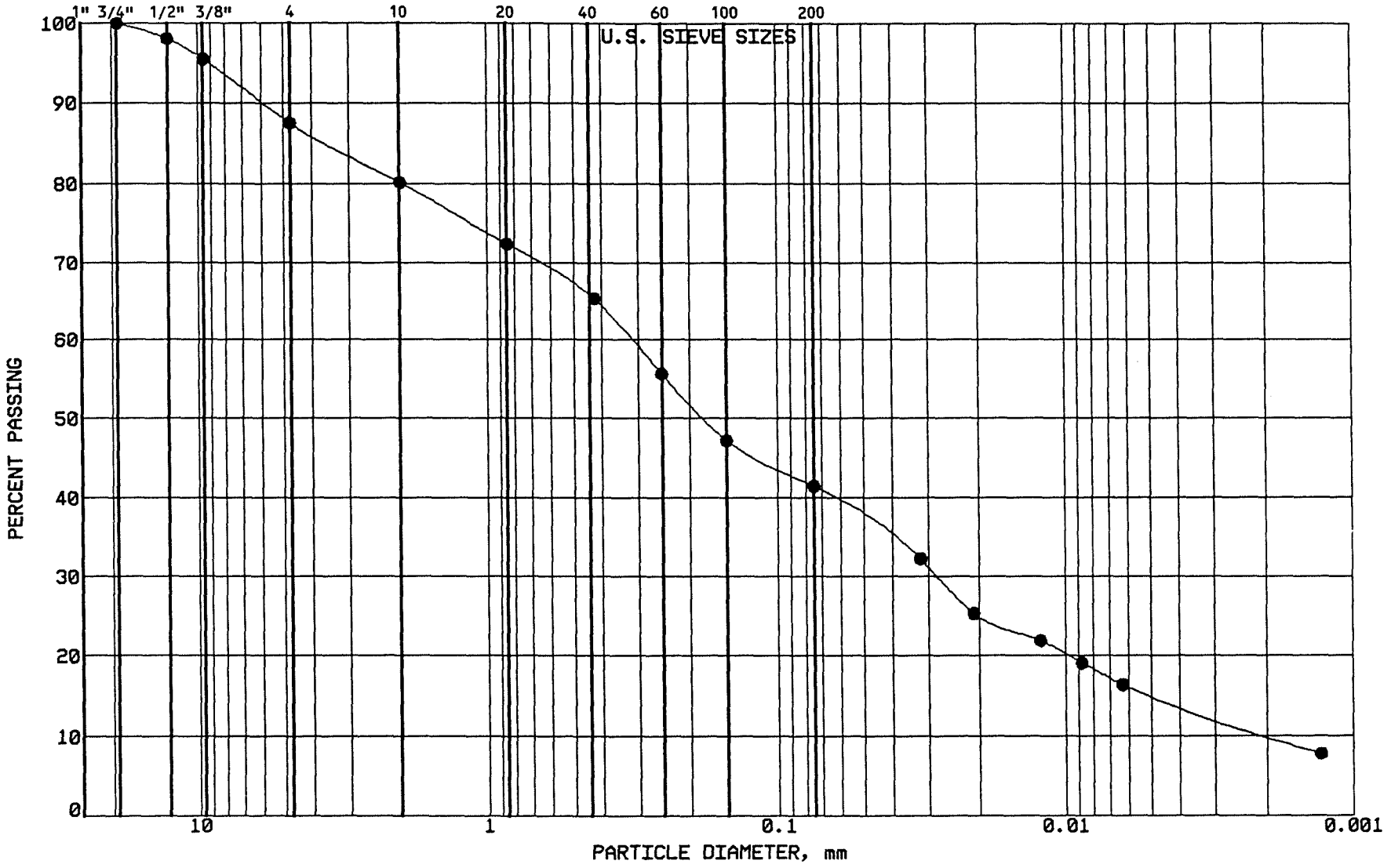
GRAVEL	1.1 %
SAND	21.2 %
SILT	57.2 %
CLAY	20.5 %
P 200	77.7 %

SOIL PROPERTIES

LL: 31.0%
PL: 20.0%
PI: 11.0%
CLASS: Lean Clay w/Sand (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

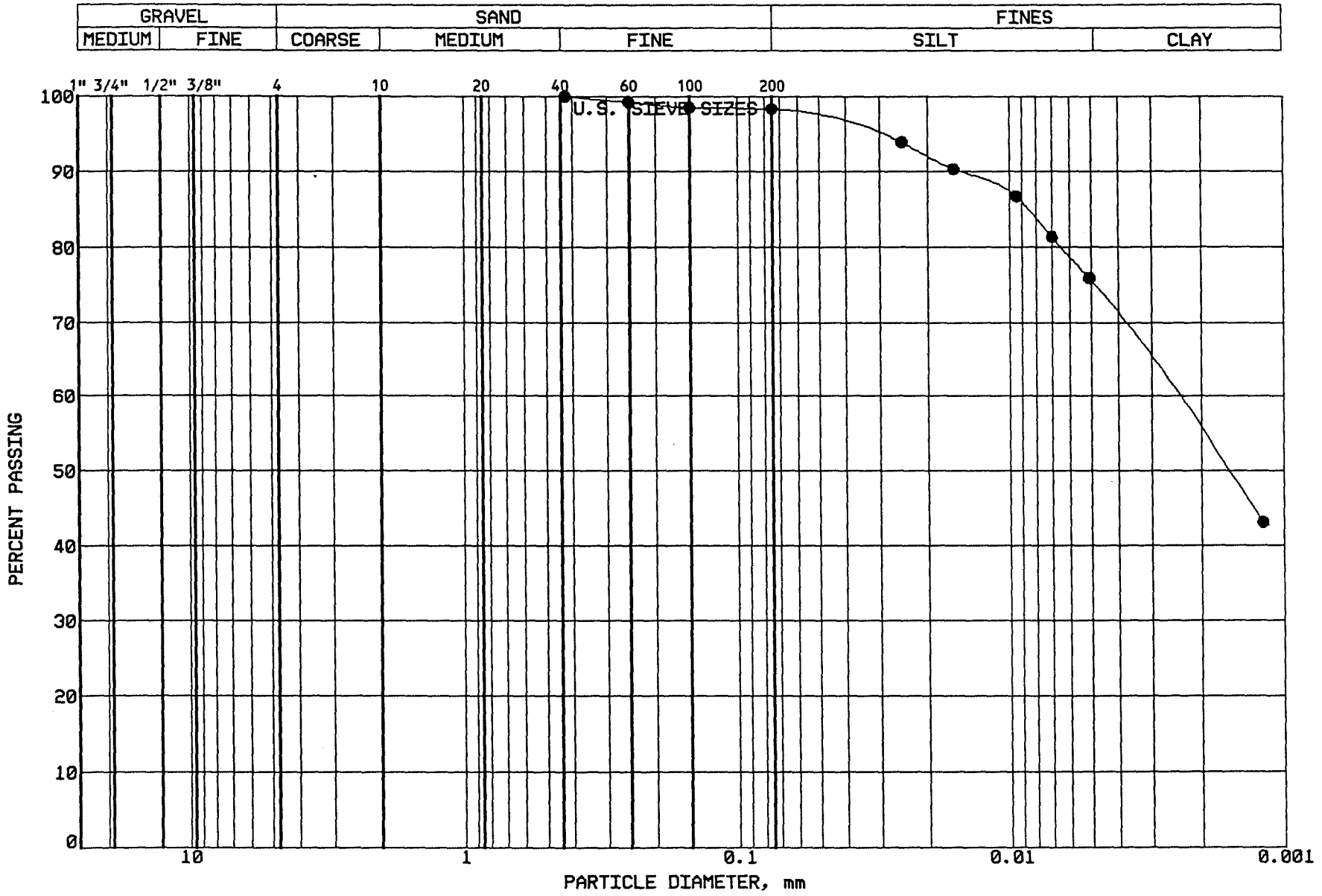
LOCATION: N 38405.0, E 41074.0
SAMPLE: SG-CC176 TUBE #:
ELEVATION: 1893.7'

GRAVEL	12.5 %
SAND	46.1 %
SILT	26.3 %
CLAY	15.1 %
P 200	41.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Silty Sand (SM),dk br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

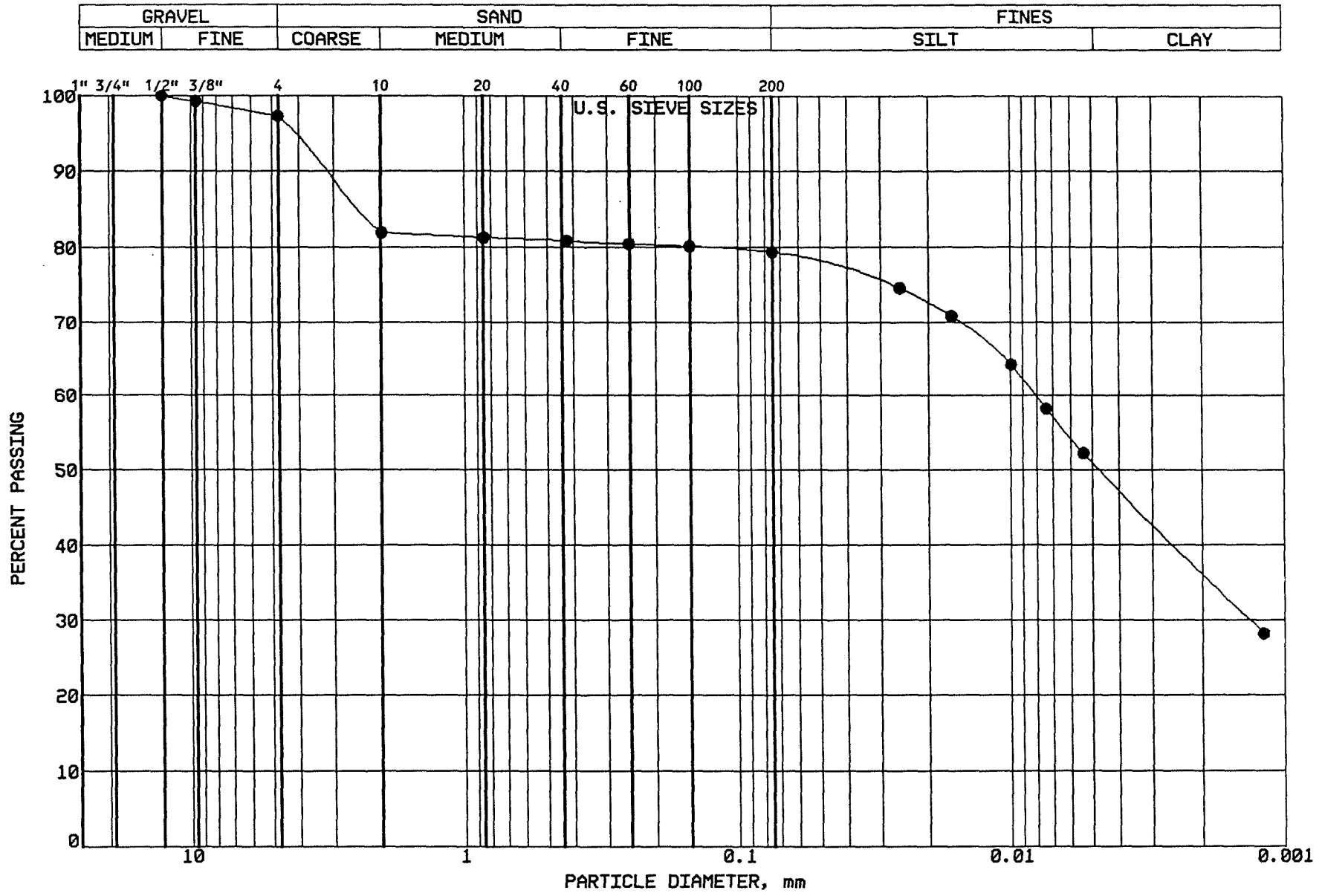
LOCATION: N 38574.0, E 41066.0
SAMPLE: SG-CC177 TUBE #:
ELEVATION: 1891.5'

GRAVEL	0.0 %
SAND	1.7 %
SILT	22.8 %
CLAY	75.5 %
P 200	98.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

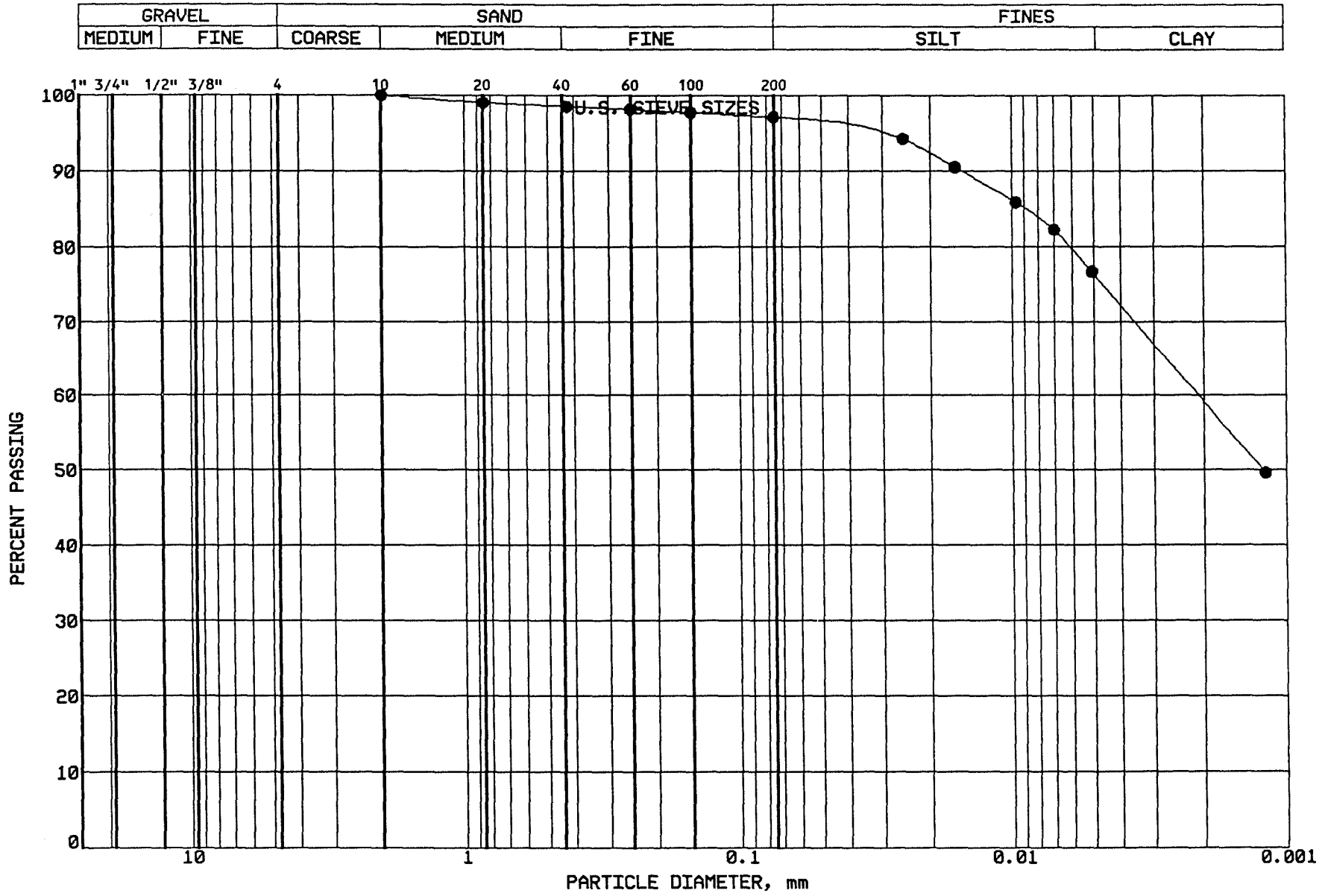
LOCATION: N 37077.0, E 40884.0
SAMPLE: DC-CC178 TUBE #:
ELEVATION: 1919.1'

GRAVEL	2.8 %
SAND	17.9 %
SILT	28.2 %
CLAY	51.1 %
P 200	79.3 %

SOIL PROPERTIES

LL: 50.0%
PL: 21.0%
PI: 29.0%
CLASS: Fat Clay w/Sand (CH),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

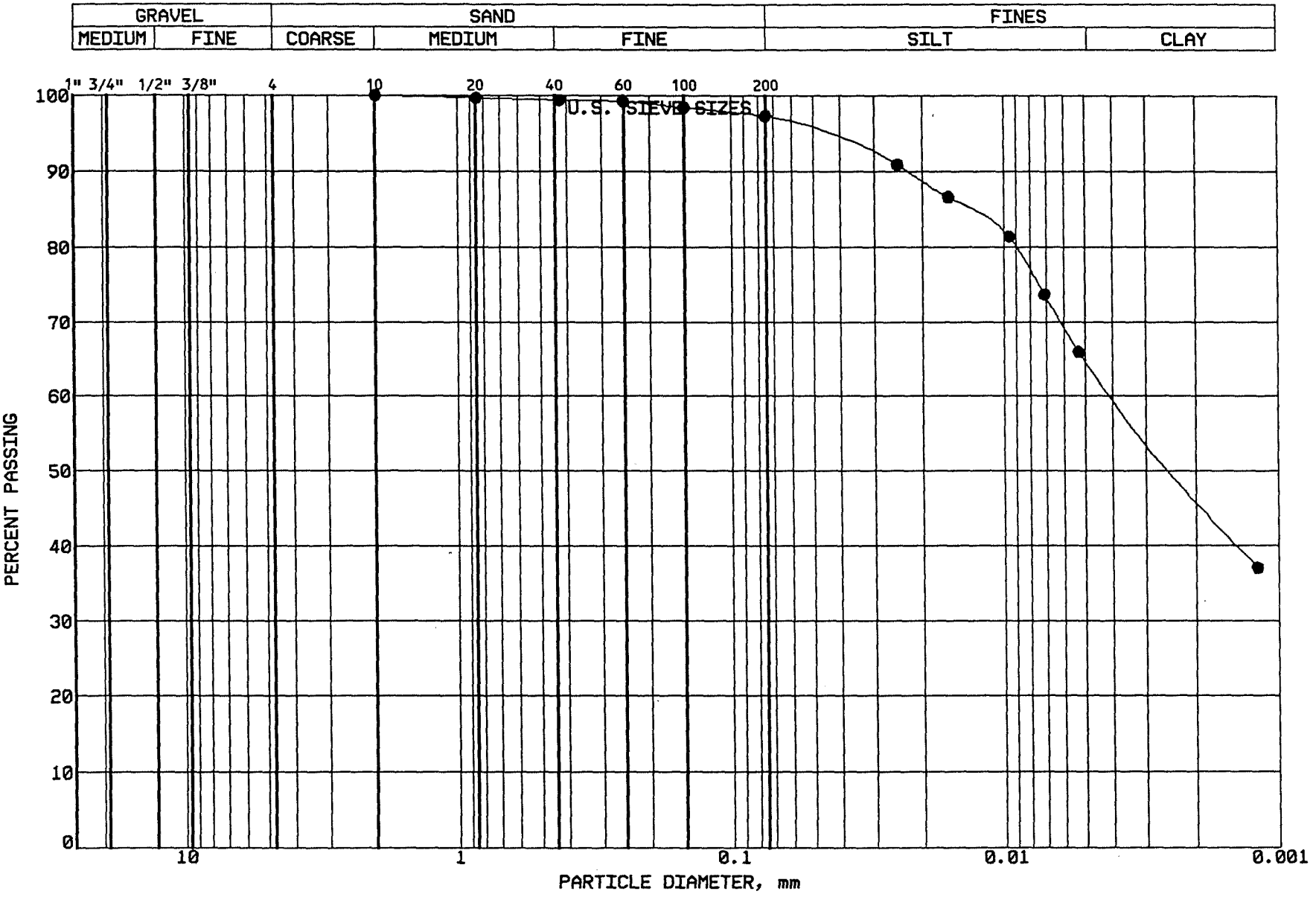
LOCATION: N 37069.0, E 40812.0
SAMPLE: DC-CC179 TUBE #:
ELEVATION: 1919.3'

GRAVEL	0.0 %
SAND	2.9 %
SILT	20.8 %
CLAY	76.3 %
P 200	97.1 %

SOIL PROPERTIES

LL: 63.0%
PL: 22.0%
PI: 41.0%
CLASS: Fat Clay (CH),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

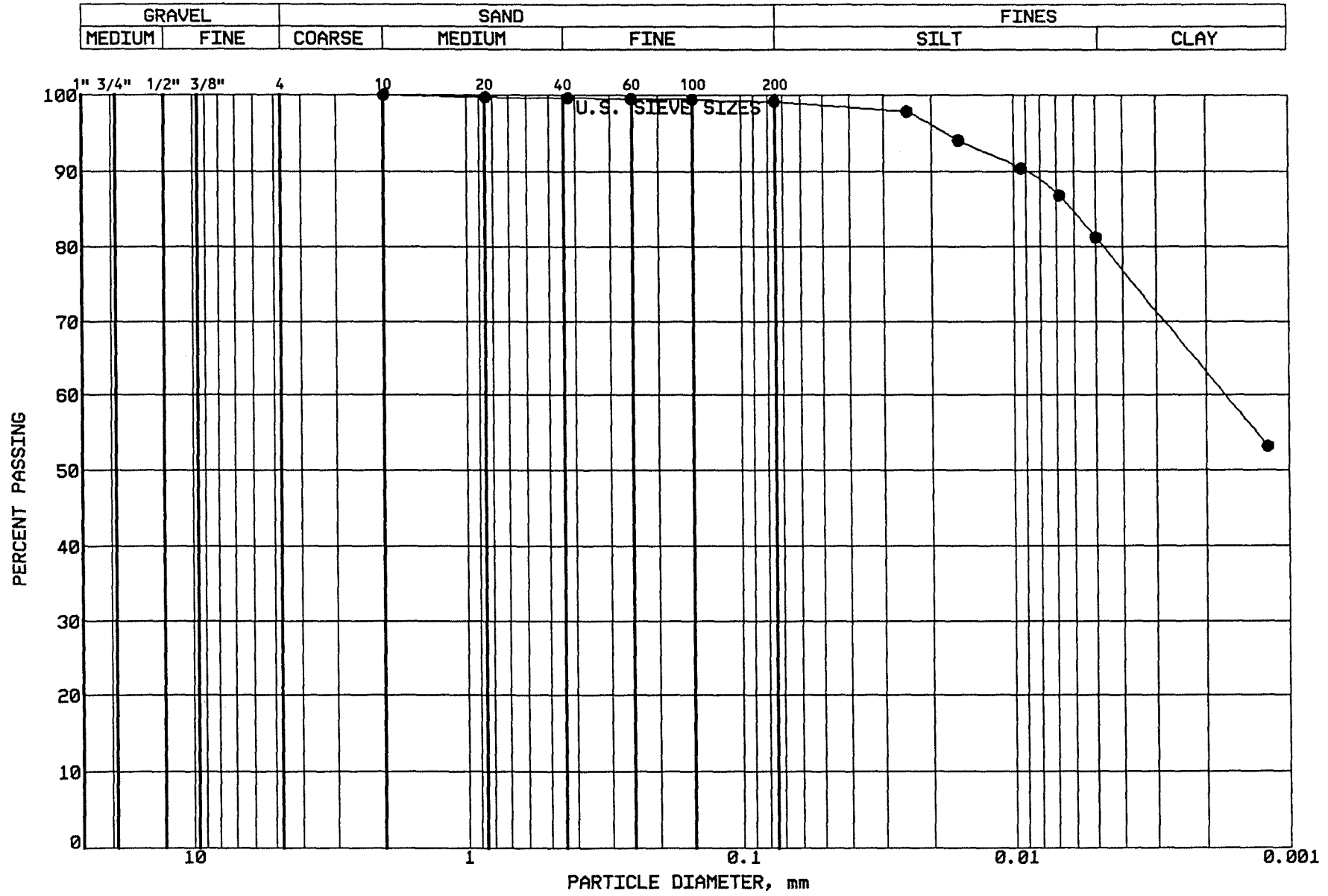
LOCATION: N 37073.0, E 40355.0
SAMPLE: DC-CC180 TUBE #:
ELEVATION: 1919.0'

GRAVEL	0.0 %
SAND	2.7 %
SILT	32.5 %
CLAY	64.8 %
P 200	97.3 %

SOIL PROPERTIES

LL: 52.0%
PL: 19.0%
PI: 33.0%
CLASS: Fat Clay (CH),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

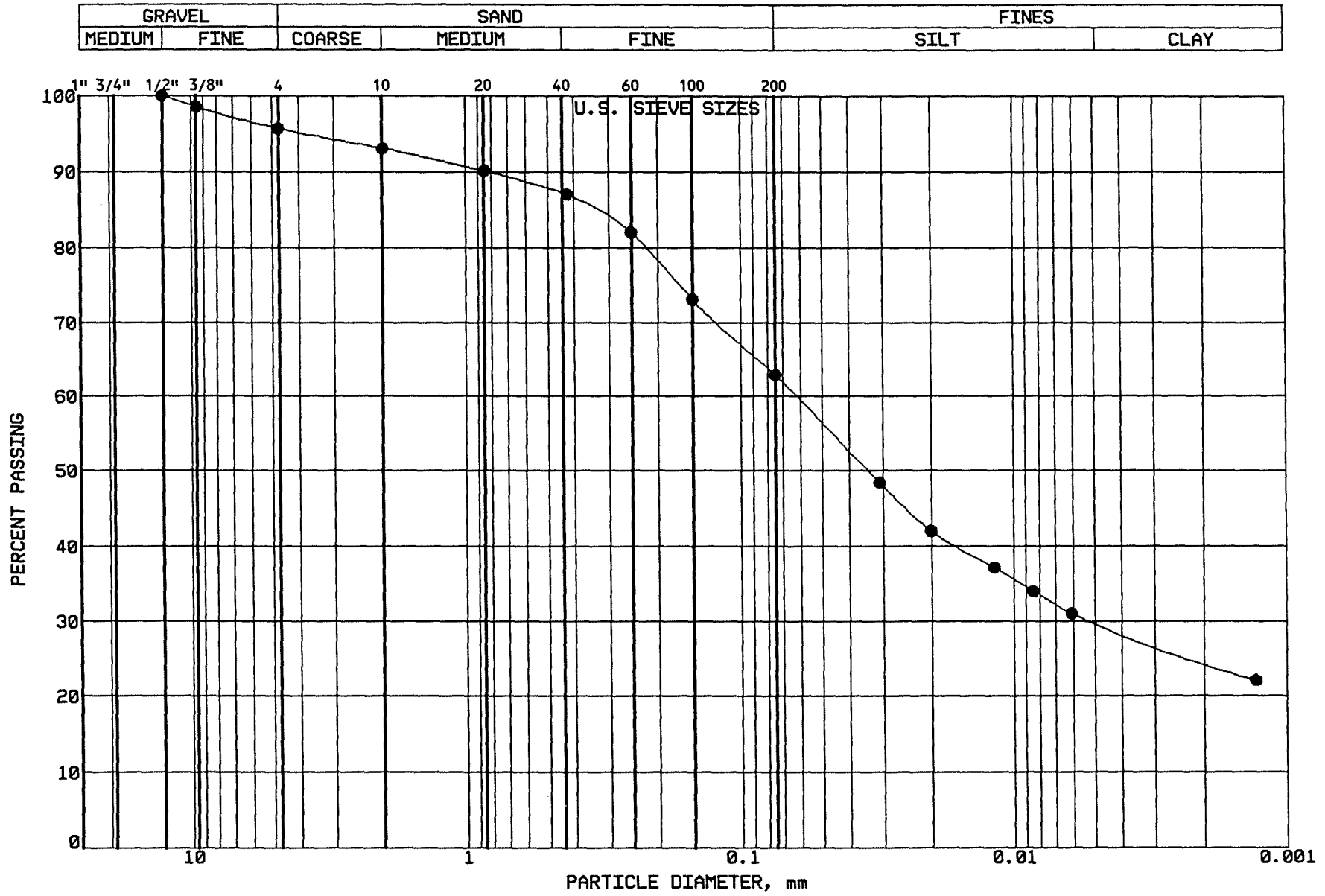
LOCATION: N 37367.0, E 39837.0
SAMPLE: DE-CC181 TUBE #:
ELEVATION: 1919.6'

GRAVEL	0.0 %
SAND	0.9 %
SILT	17.9 %
CLAY	81.2 %
P 200	99.1 %

SOIL PROPERTIES

LL: 64.0%
PL: 24.0%
PI: 40.0%
CLASS: Fat Clay (CH), dk gr.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

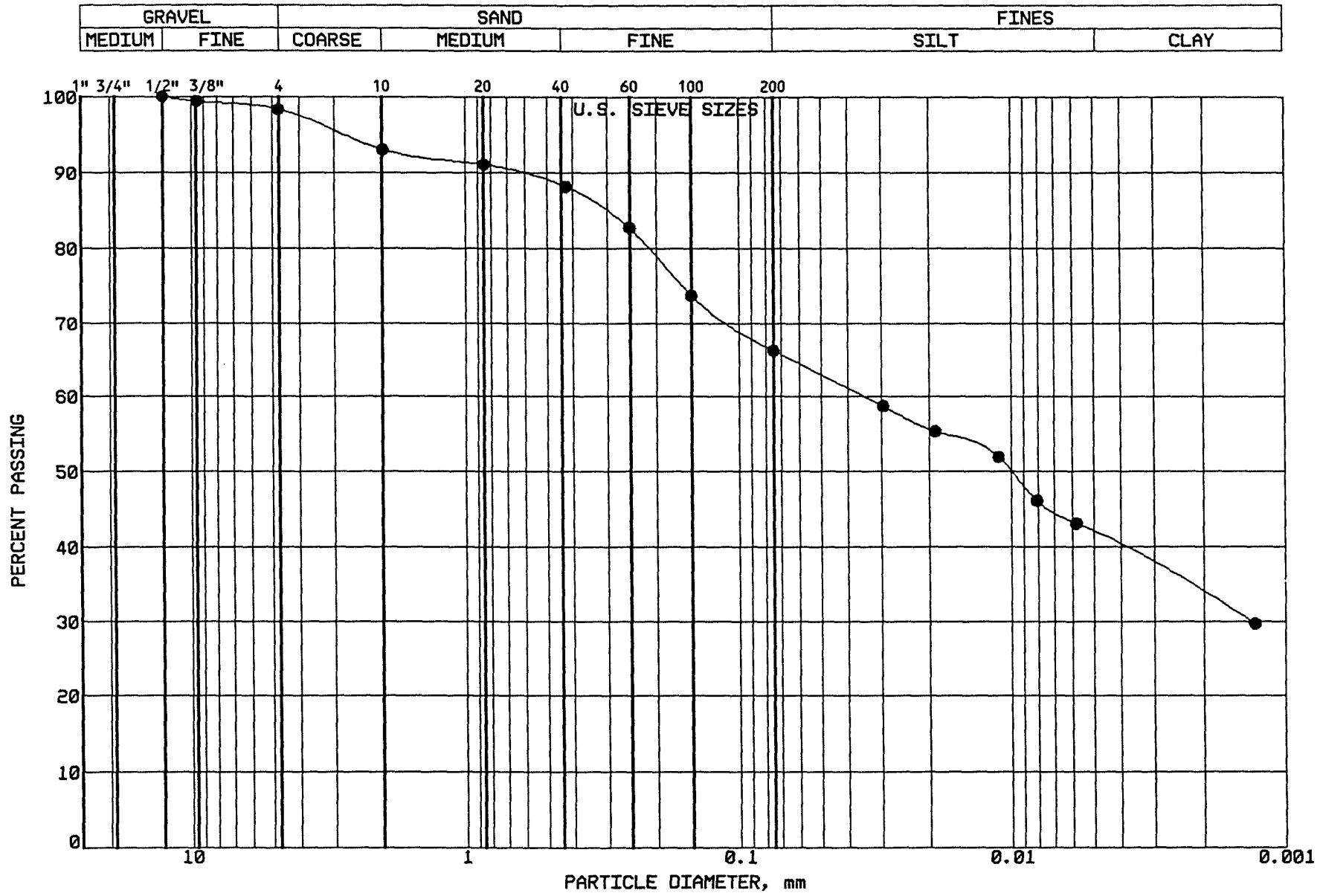
LOCATION: N 38143.0, E 41217.0
SAMPLE: SG-CC182 TUBE #:
ELEVATION: 1896.7'

GRAVEL	4.3 %
SAND	32.8 %
SILT	33.0 %
CLAY	29.9 %
P 200	62.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

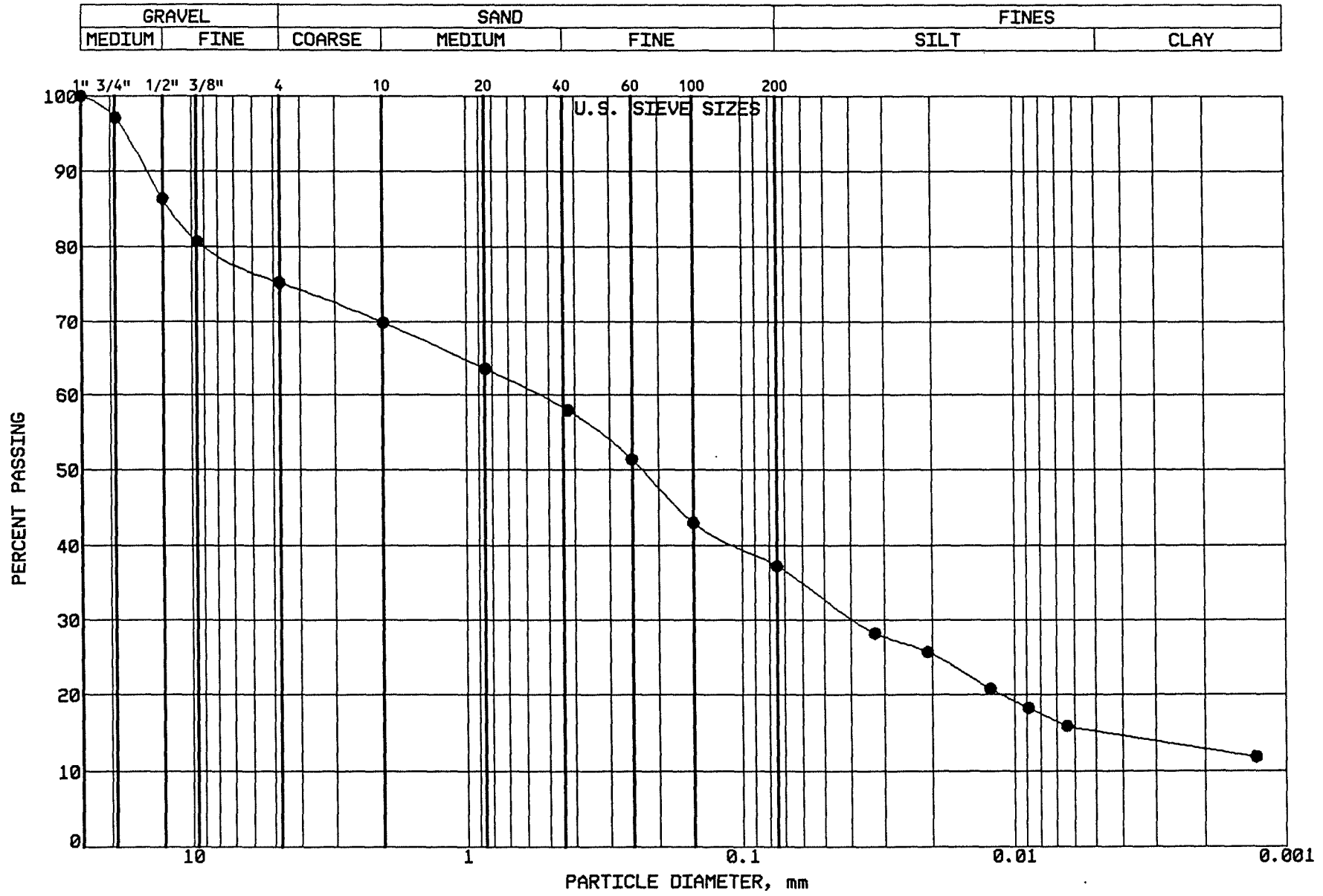
LOCATION: N 38149.0, E 41004.0
SAMPLE: SG-CC183 TUBE #:
ELEVATION: 1897.5'

GRAVEL	1.7 %
SAND	32.1 %
SILT	24.4 %
CLAY	41.8 %
P 200	66.2 %

SOIL PROPERTIES

LL: 47.0%
PL: 17.0%
PI: 30.0%
CLASS: Sandy Lean Clay (CL),dk br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

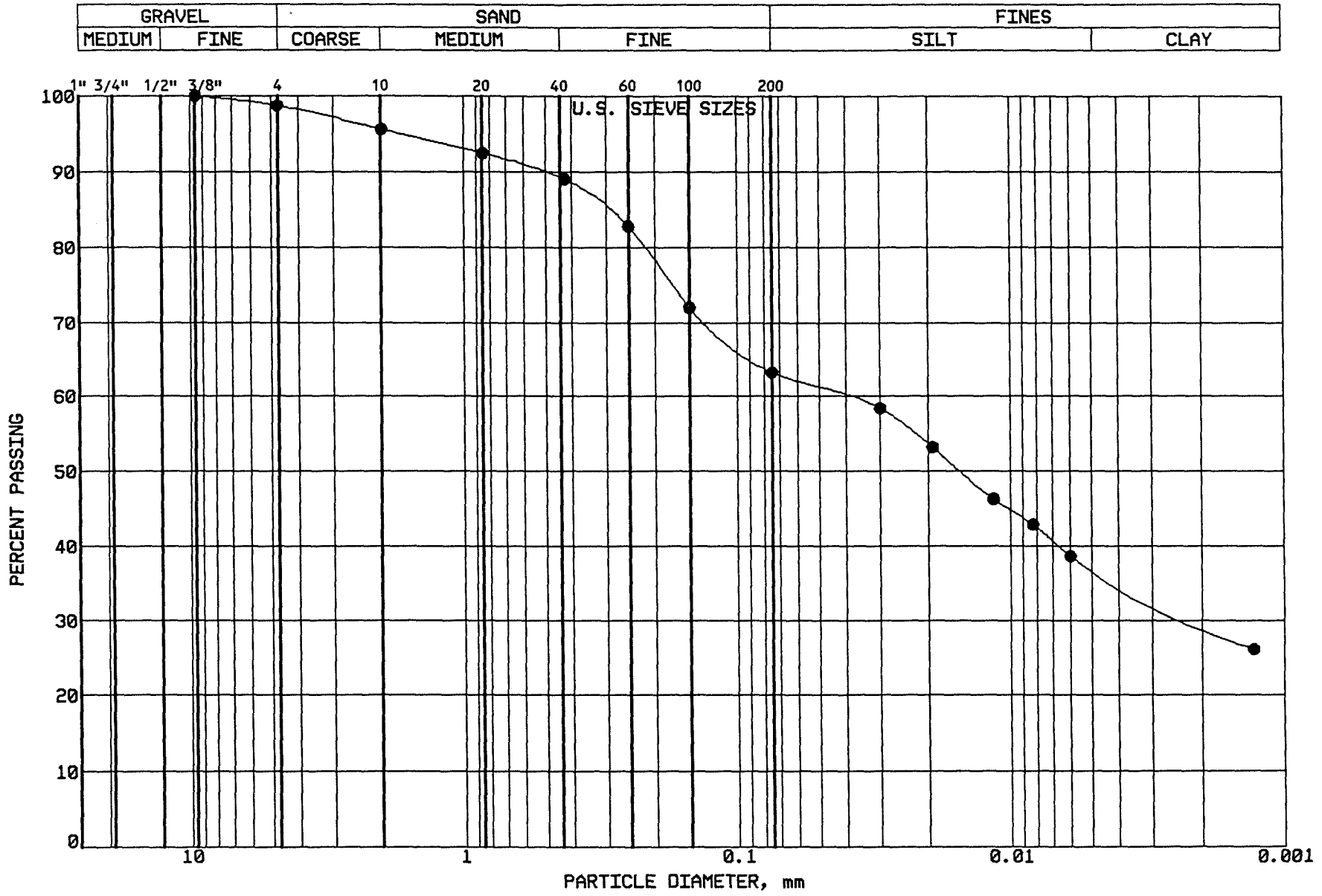
LOCATION: N 38151.0, E 40762.0
SAMPLE: SG-CC184 TUBE #:
ELEVATION: 1898.6'

GRAVEL	24.8 %
SAND	38.0 %
SILT	21.9 %
CLAY	15.3 %
P 200	37.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Silty Sand w/Gr (SM),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

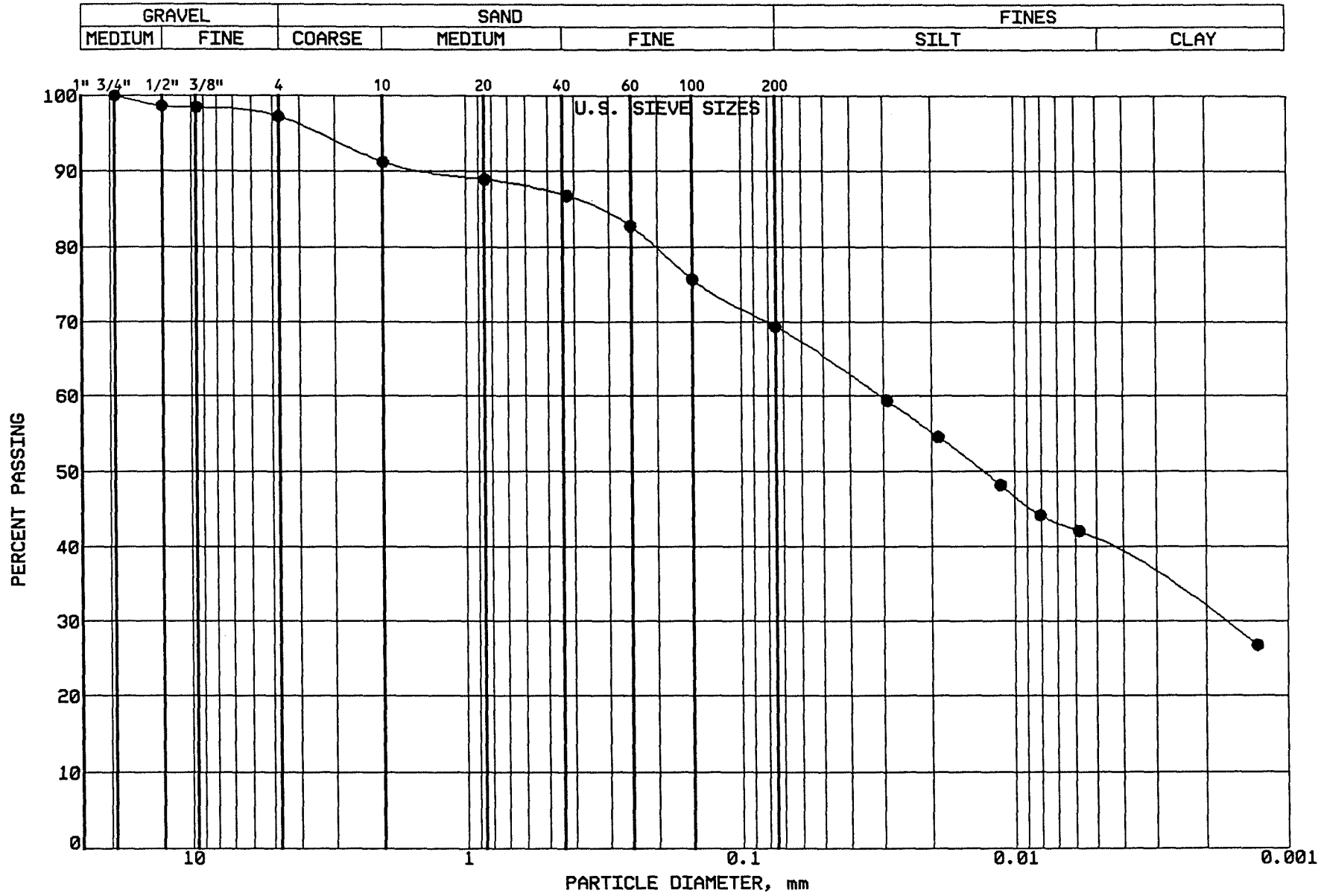
LOCATION: N 38287.0, E 40939.0
SAMPLE: SG-CC185 TUBE #:
ELEVATION: 1897.6'

GRAVEL	1.3 %
SAND	35.5 %
SILT	26.1 %
CLAY	37.1 %
P 200	63.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

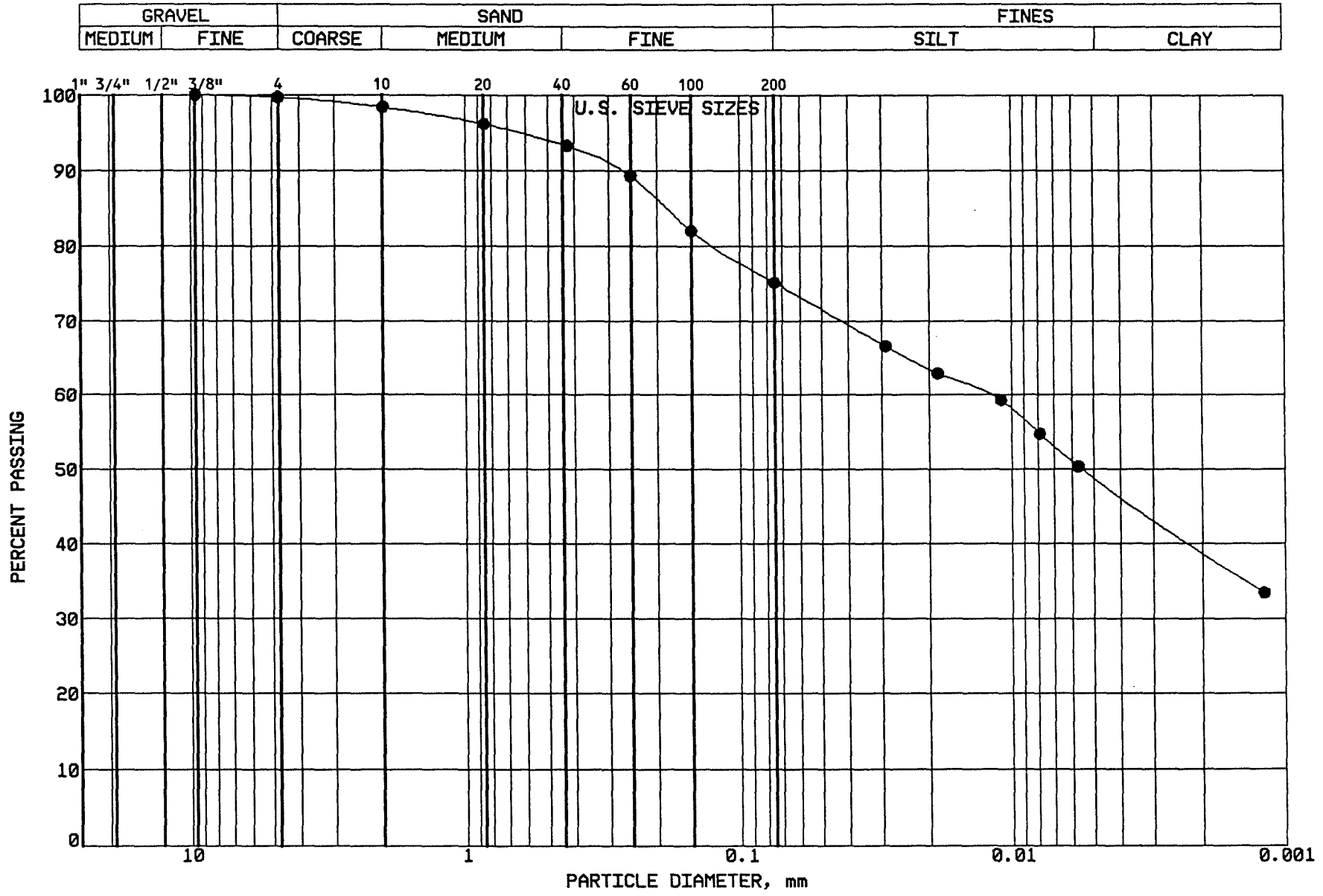
LOCATION: N 38266.0, E 41139.0
SAMPLE: SG-CC186 TUBE #:
ELEVATION: 1896.6'

GRAVEL	2.8 %
SAND	27.9 %
SILT	28.7 %
CLAY	40.6 %
P 200	69.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37670.0, E 40971.0
SAMPLE: SG-CC187 TUBE #:
ELEVATION: 1901.3'

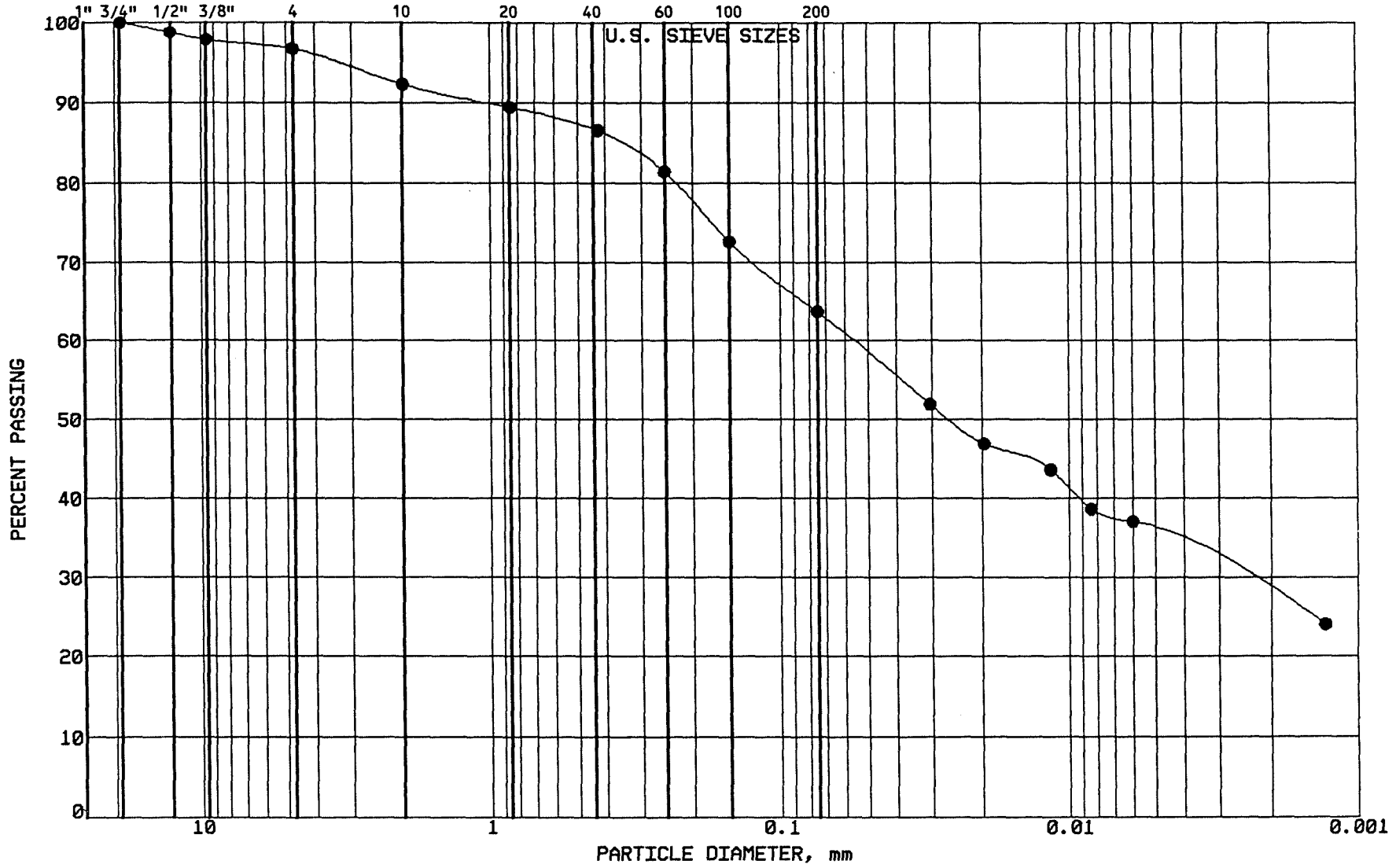
GRAVEL	0.3 %
SAND	24.6 %
SILT	26.1 %
CLAY	49.0 %
P 200	75.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Lean Clay w/Sand (CL),dk br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37665.0, E 41118.0
SAMPLE: SG-CC188 TUBE #:
ELEVATION: 1900.2'

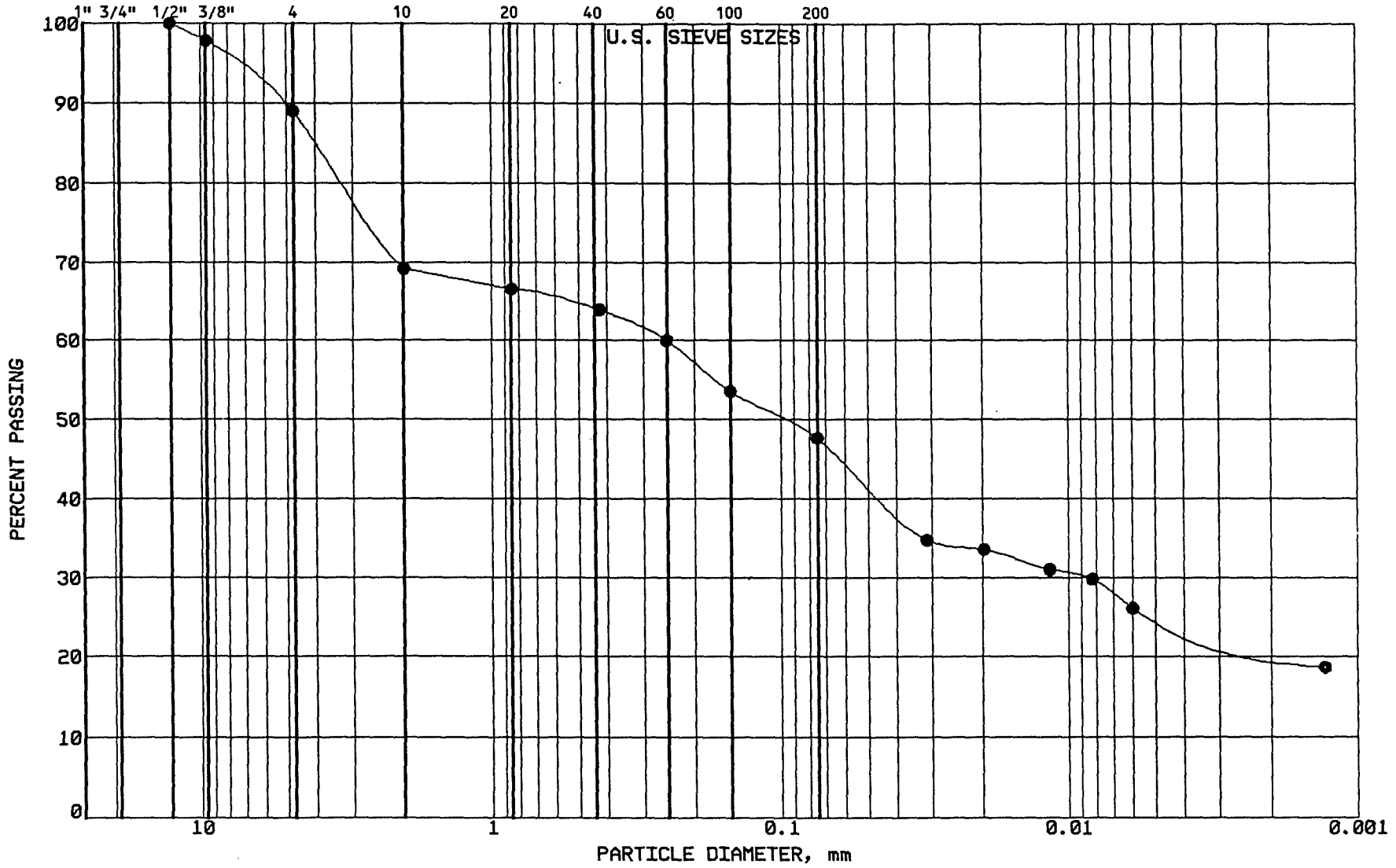
GRAVEL	3.4 %
SAND	32.9 %
SILT	28.2 %
CLAY	35.5 %
P 200	63.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37668.0, E 41267.0
SAMPLE: SG-CC189 TUBE #:
ELEVATION: 1899.4'

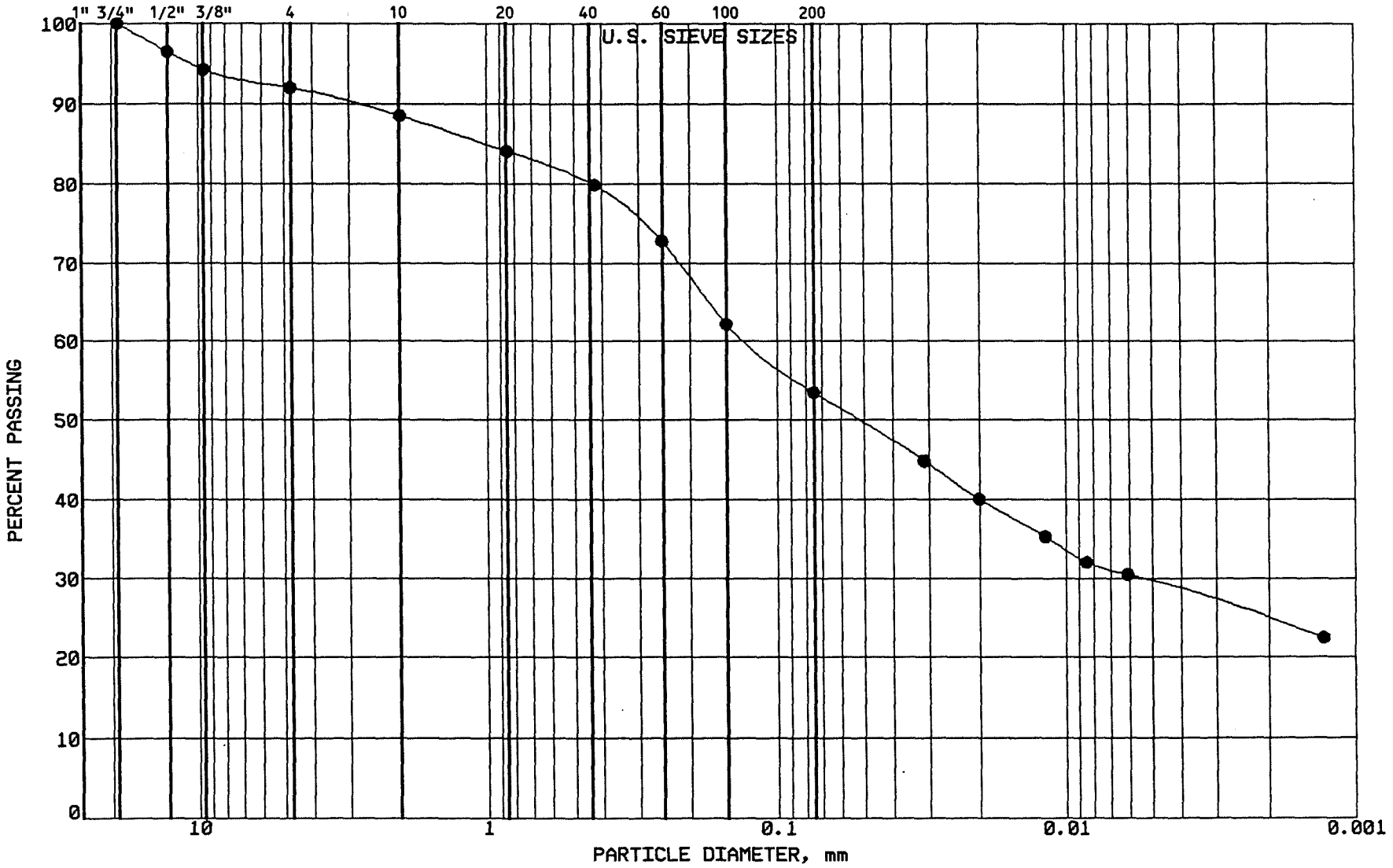
GRAVEL	11.0 %
SAND	41.4 %
SILT	22.4 %
CLAY	25.2 %
P 200	47.6 %

SOIL PROPERTIES

LL: 45.0%
PL: 18.0%
PI: 27.0%
CLASS: Clayey Sand (SC),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

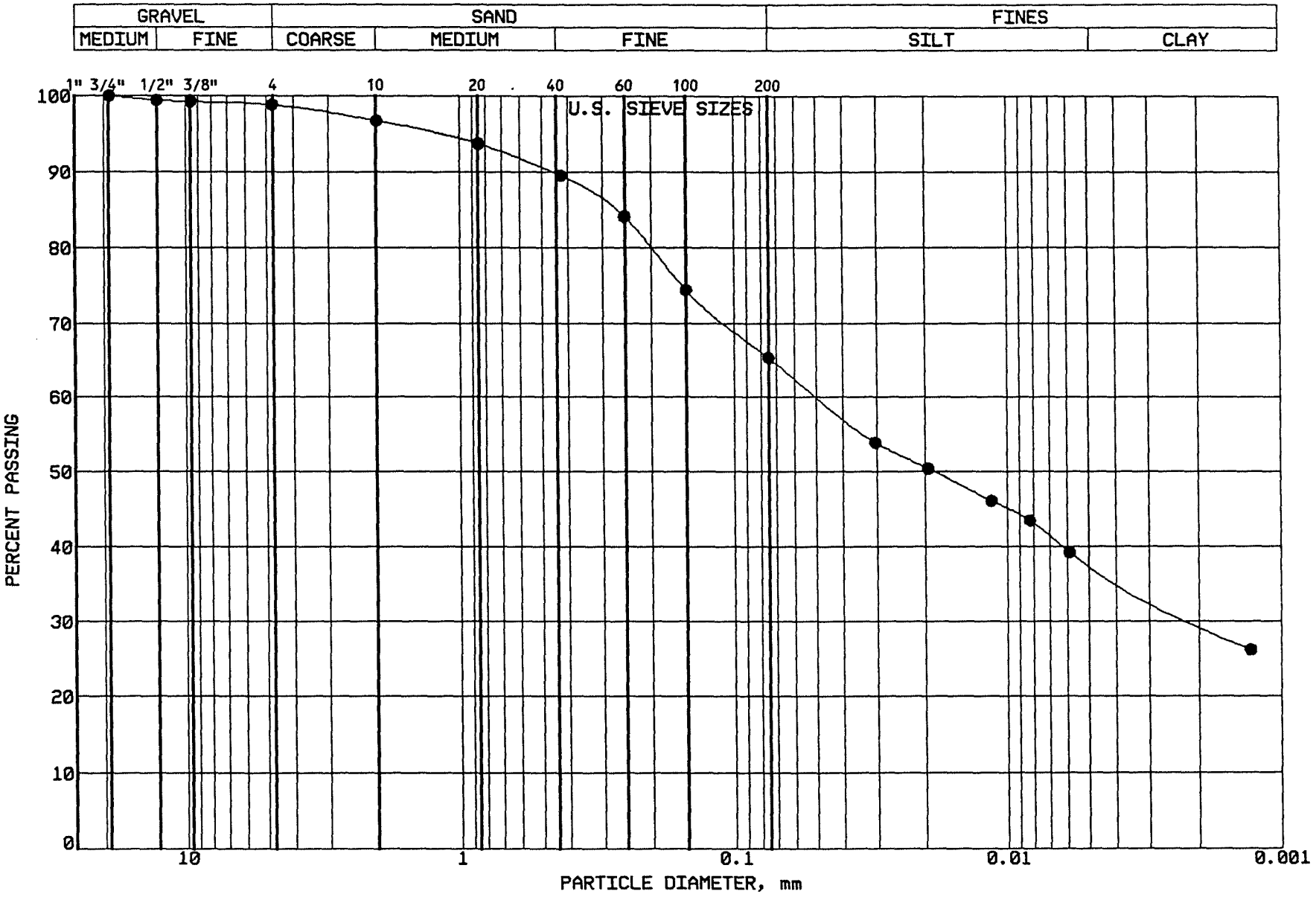
LOCATION: N 37788.0, E 41399.0
SAMPLE: SG-CC190 TUBE #:
ELEVATION: 1898.2'

GRAVEL	8.0 %
SAND	38.5 %
SILT	24.0 %
CLAY	29.5 %
P 200	53.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

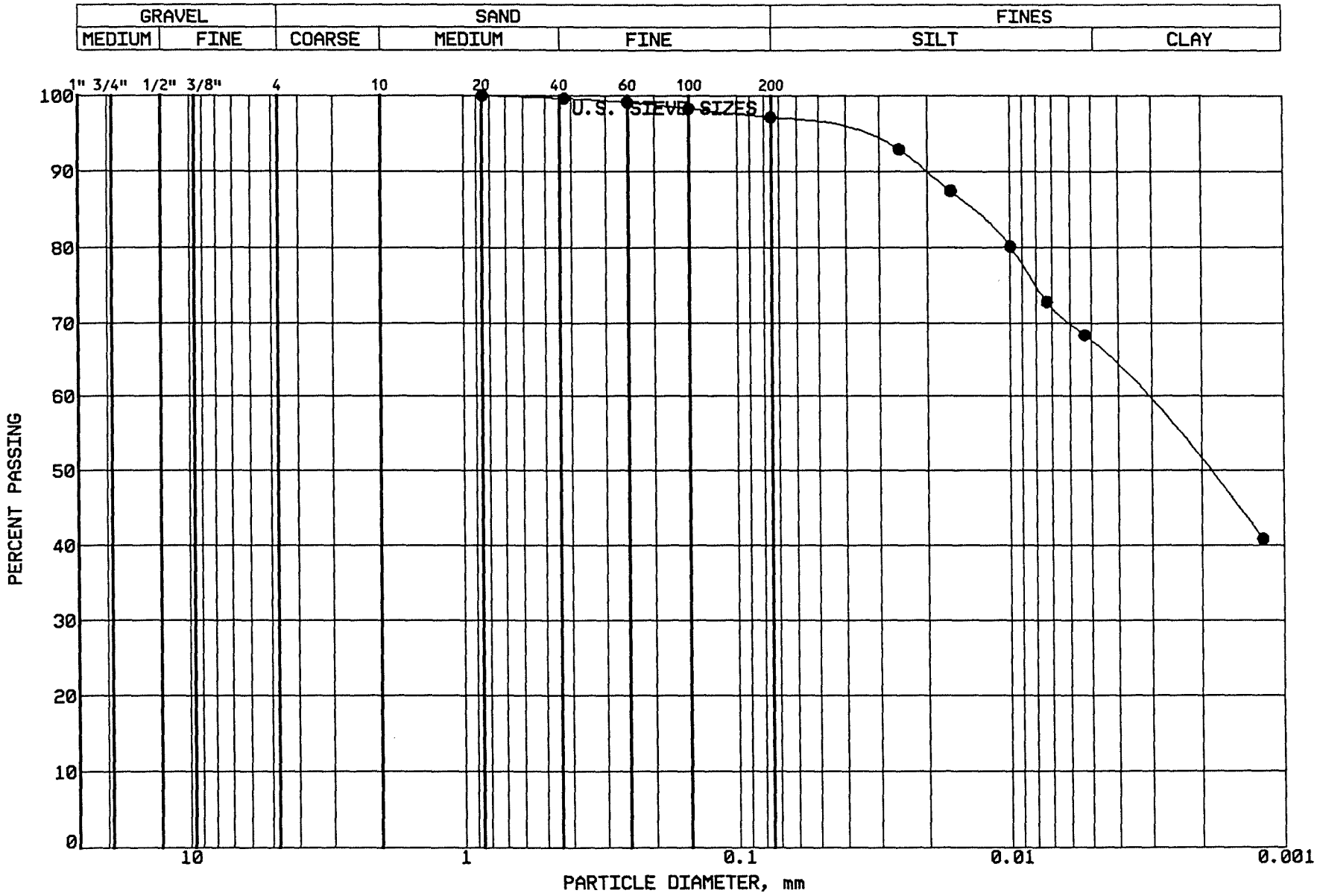
LOCATION: N 37793.0, E 41221.0
SAMPLE: SG-CC191 TUBE #:
ELEVATION: 1899.1'

GRAVEL	1.2 %
SAND	33.5 %
SILT	27.5 %
CLAY	37.8 %
P 200	65.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37802.0, E 41022.0
SAMPLE: SG-CC192 TUBE #:
ELEVATION: 1900.1'

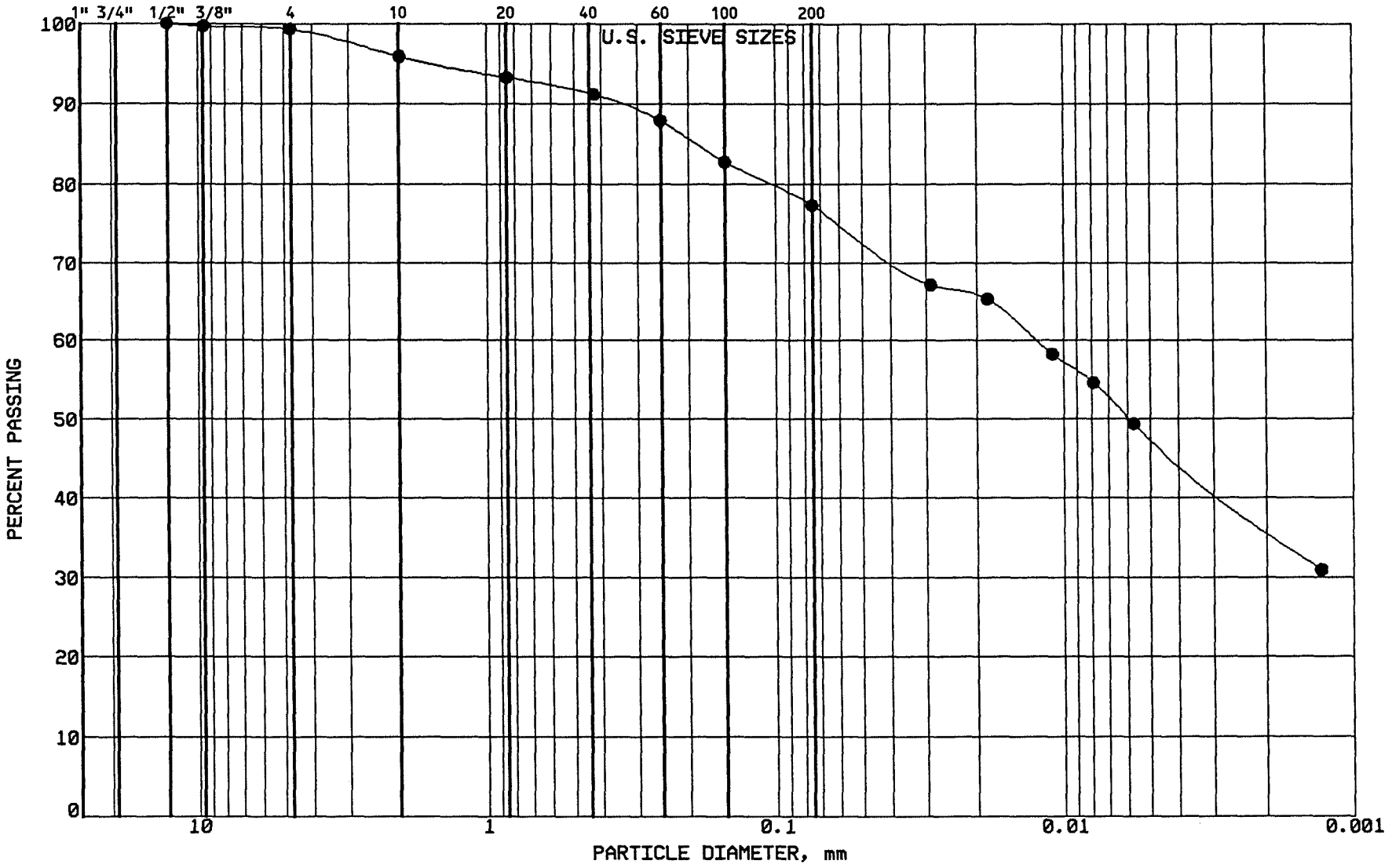
GRAVEL	0.0 %
SAND	2.8 %
SILT	30.0 %
CLAY	67.2 %
P 200	97.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH), gray

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

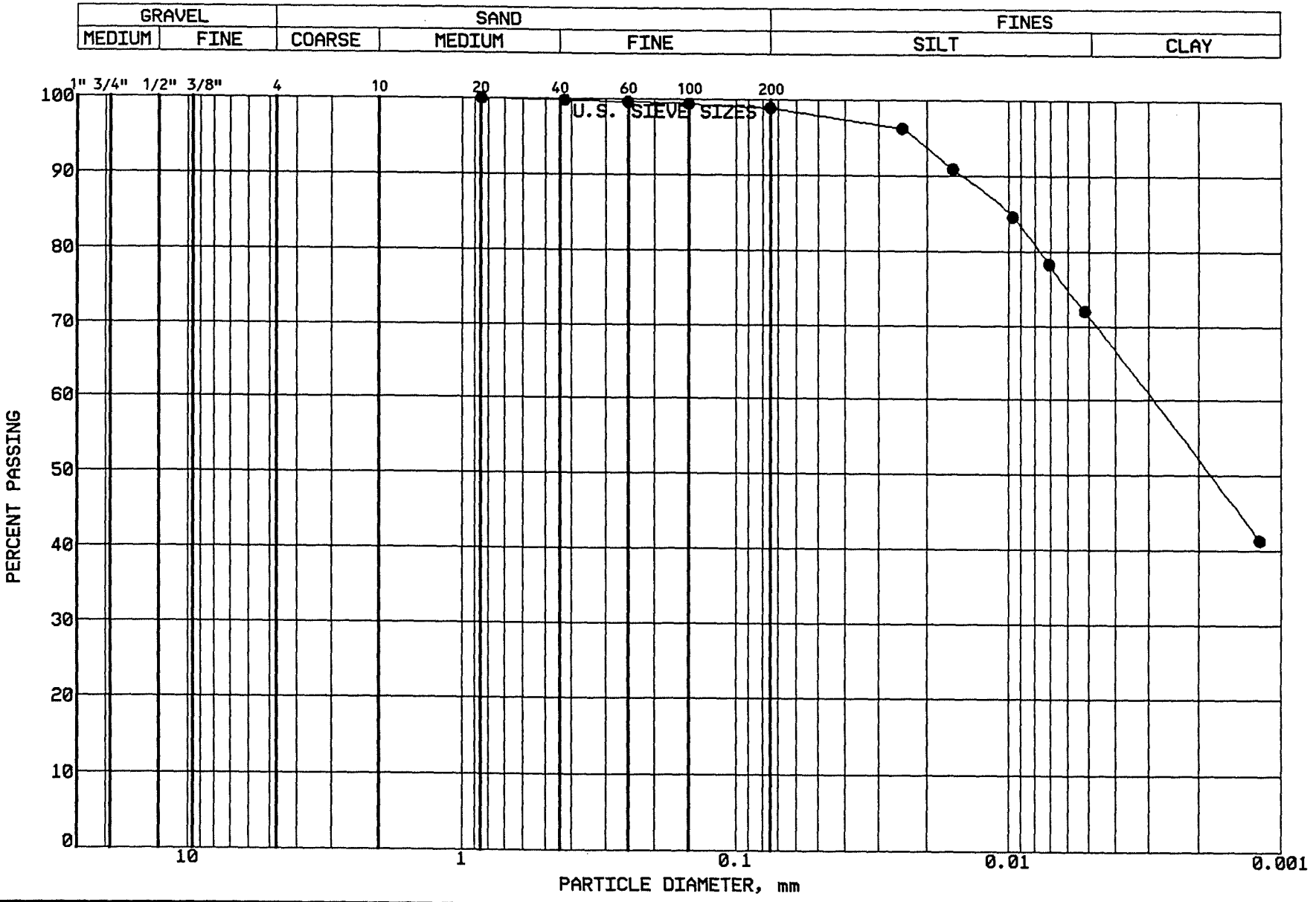
LOCATION: N 37811.0, E 40810.0
SAMPLE: SG-CC193 TUBE #:
ELEVATION: 1900.9'

GRAVEL	0.7 %
SAND	22.0 %
SILT	29.5 %
CLAY	47.8 %
P 200	77.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Lean Clay w/Sand (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37935.0, E 40711.0
SAMPLE: SG-CC194 TUBE #:
ELEVATION: 1901.1'

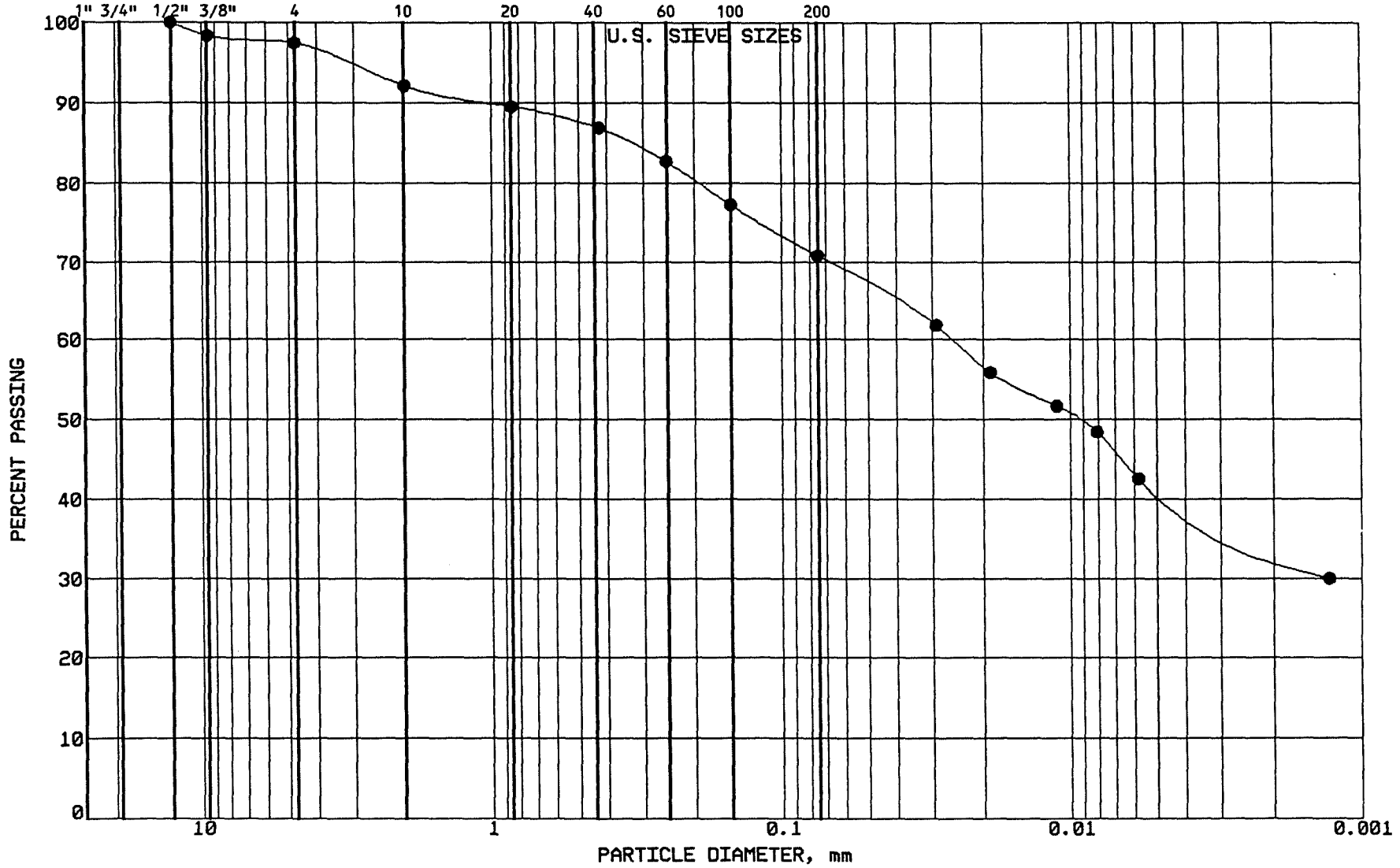
GRAVEL	0.0 %
SAND	1.1 %
SILT	27.7 %
CLAY	71.2 %
P 200	98.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH), gray

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

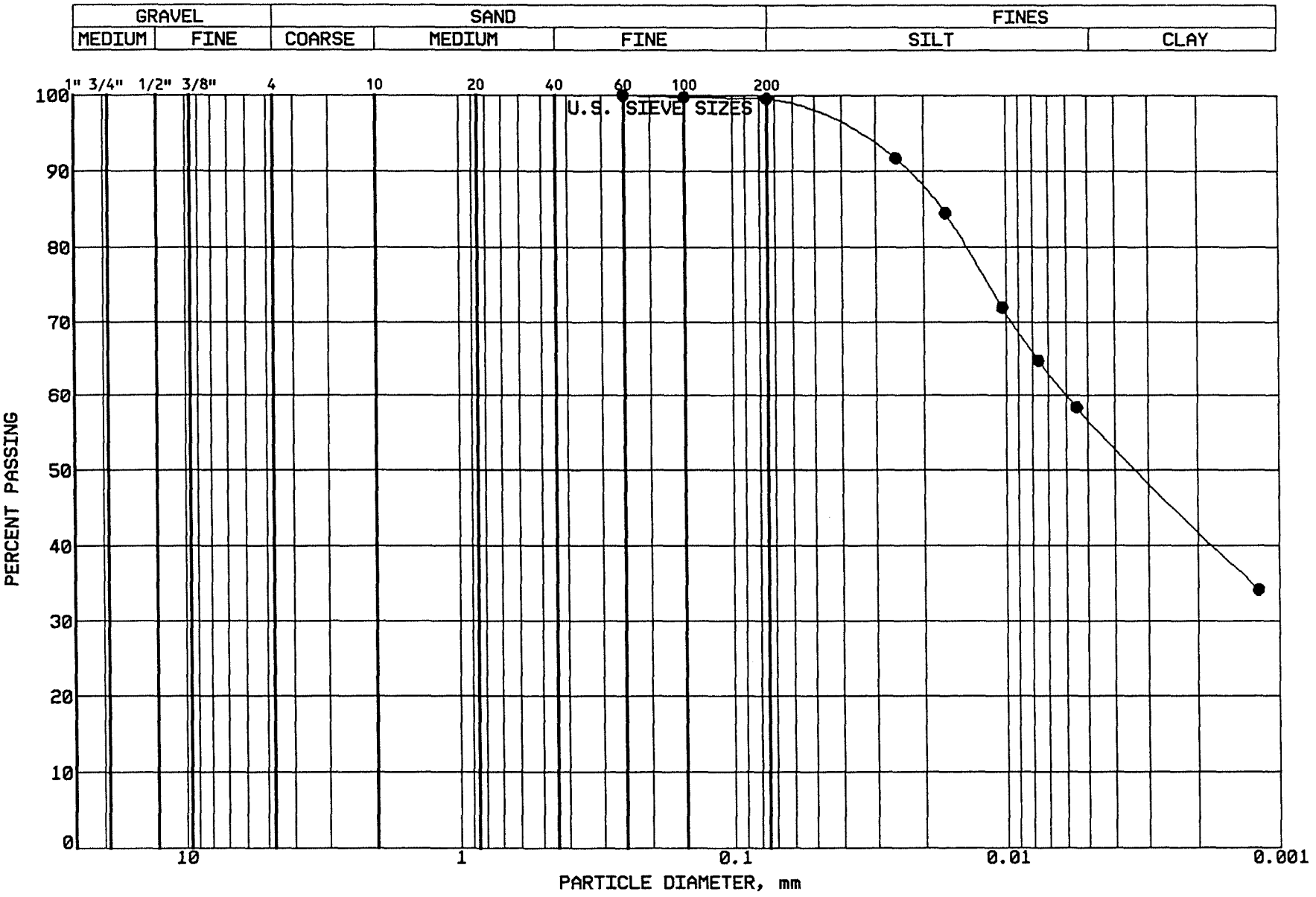
LOCATION: N 37931.0, E 40892.0
SAMPLE: SG-CC195 TUBE #:
ELEVATION: 1900.2'

GRAVEL	2.6 %
SAND	26.6 %
SILT	29.5 %
CLAY	41.3 %
P 200	70.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Lean Clay w/Sand (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

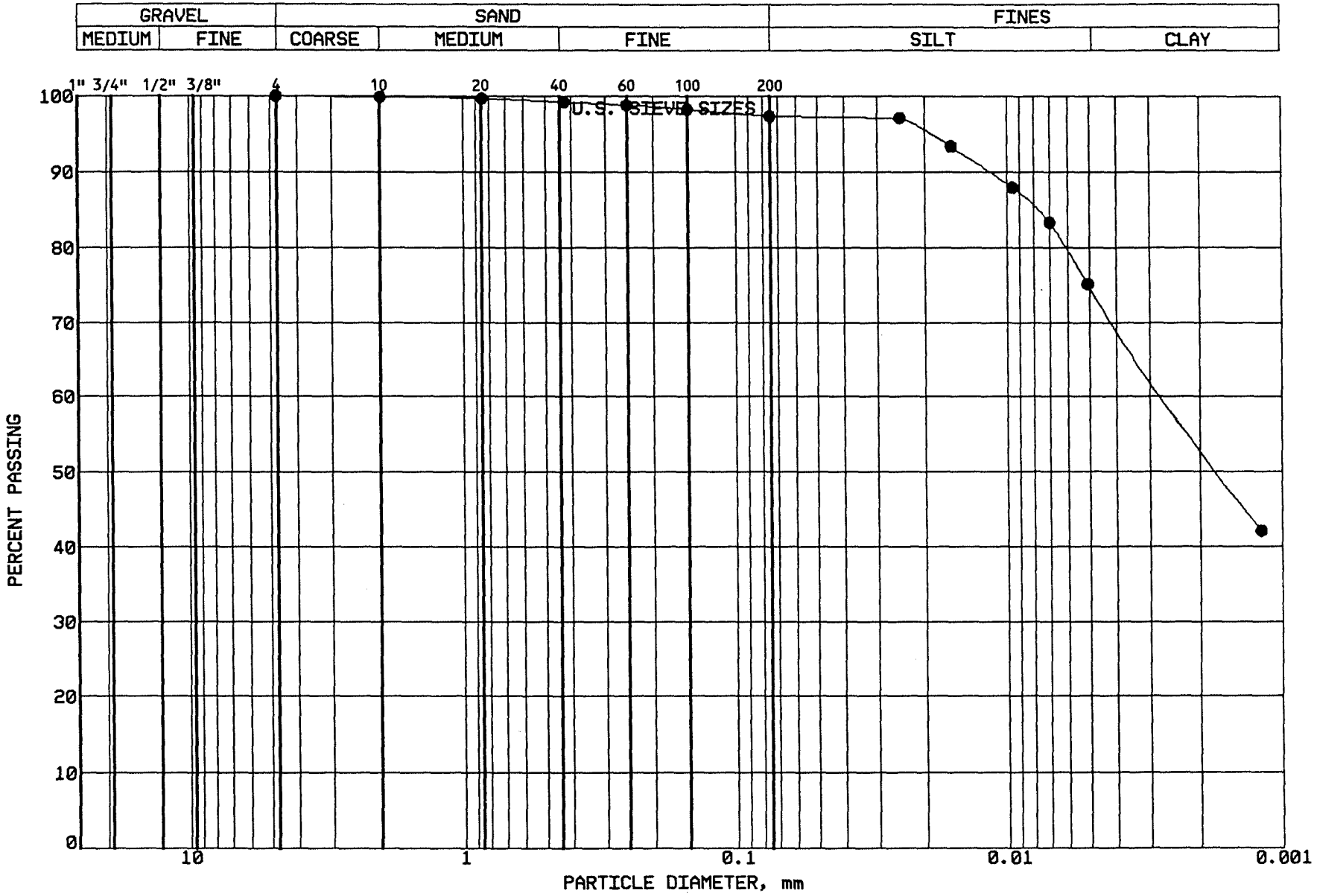
LOCATION: N 37924.0, E 41115.0
SAMPLE: SG-CC196 TUBE #:
ELEVATION: 1898.9'

GRAVEL	0.0 %
SAND	0.4 %
SILT	42.7 %
CLAY	56.9 %
P 200	99.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

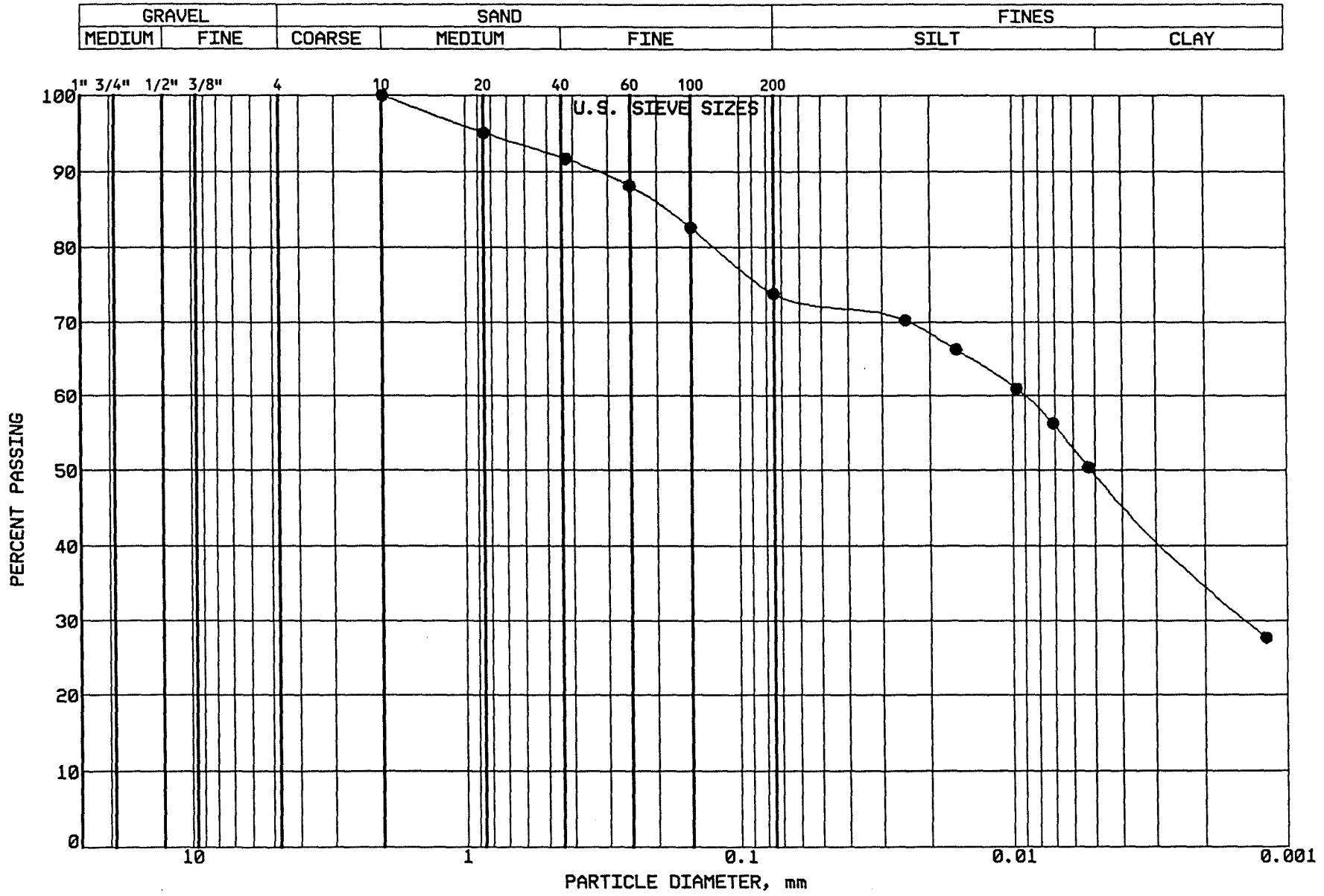
LOCATION: N 37925.0, E 41302.0
SAMPLE: SG-CC197 TUBE #:
ELEVATION: 1898.1'

GRAVEL	0.0 %
SAND	2.7 %
SILT	22.7 %
CLAY	74.6 %
P 200	97.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

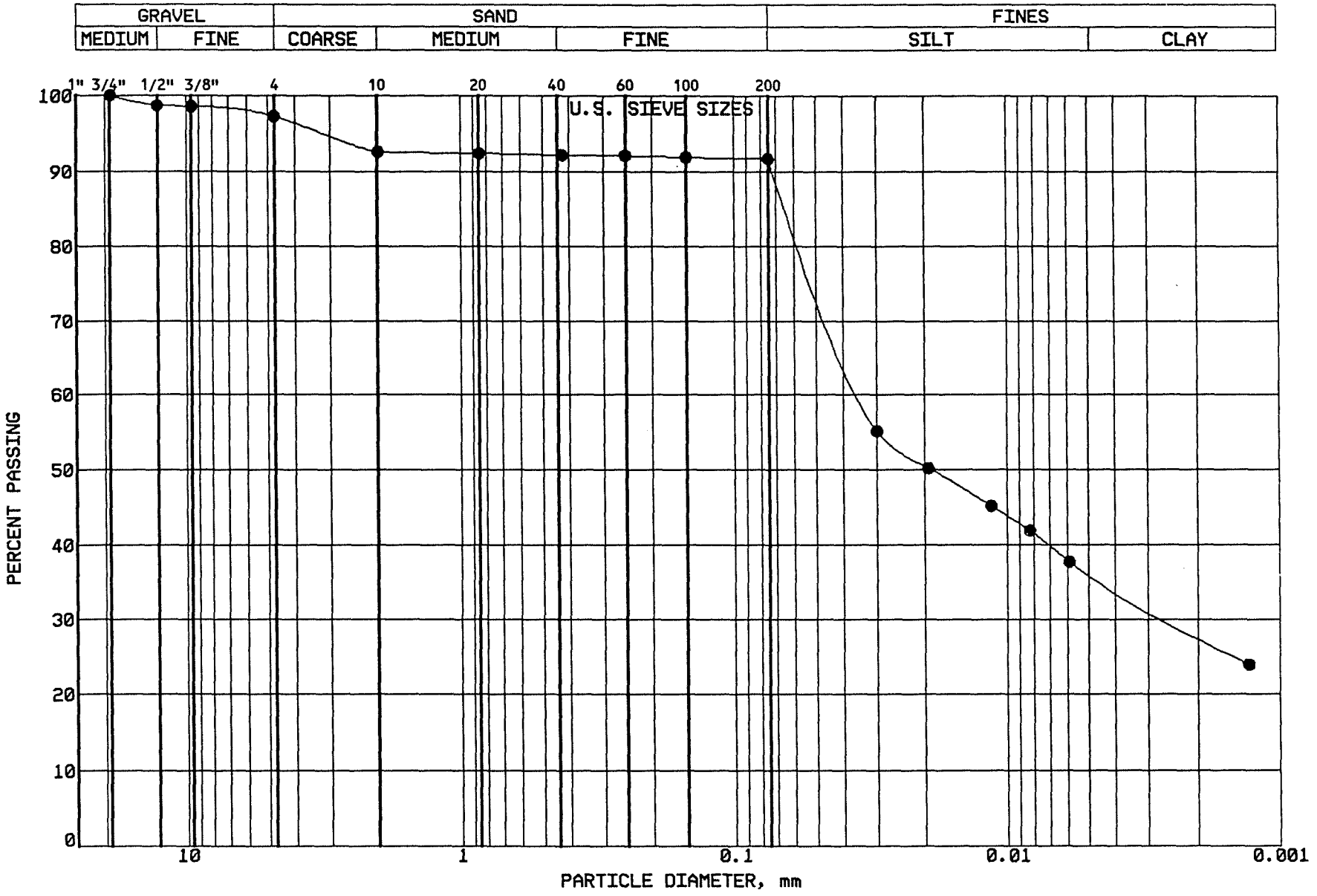
LOCATION: N 37935.0, E 40711.0
SAMPLE: SG-CC198 TUBE #:
ELEVATION: 1901.1'

GRAVEL	0.0 %
SAND	26.2 %
SILT	24.3 %
CLAY	49.5 %
P 200	73.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Lean Clay w/Sand (CL), gr.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37931.0, E 40892.0
SAMPLE: SG-CC199 TUBE #:
ELEVATION: 1900.2'

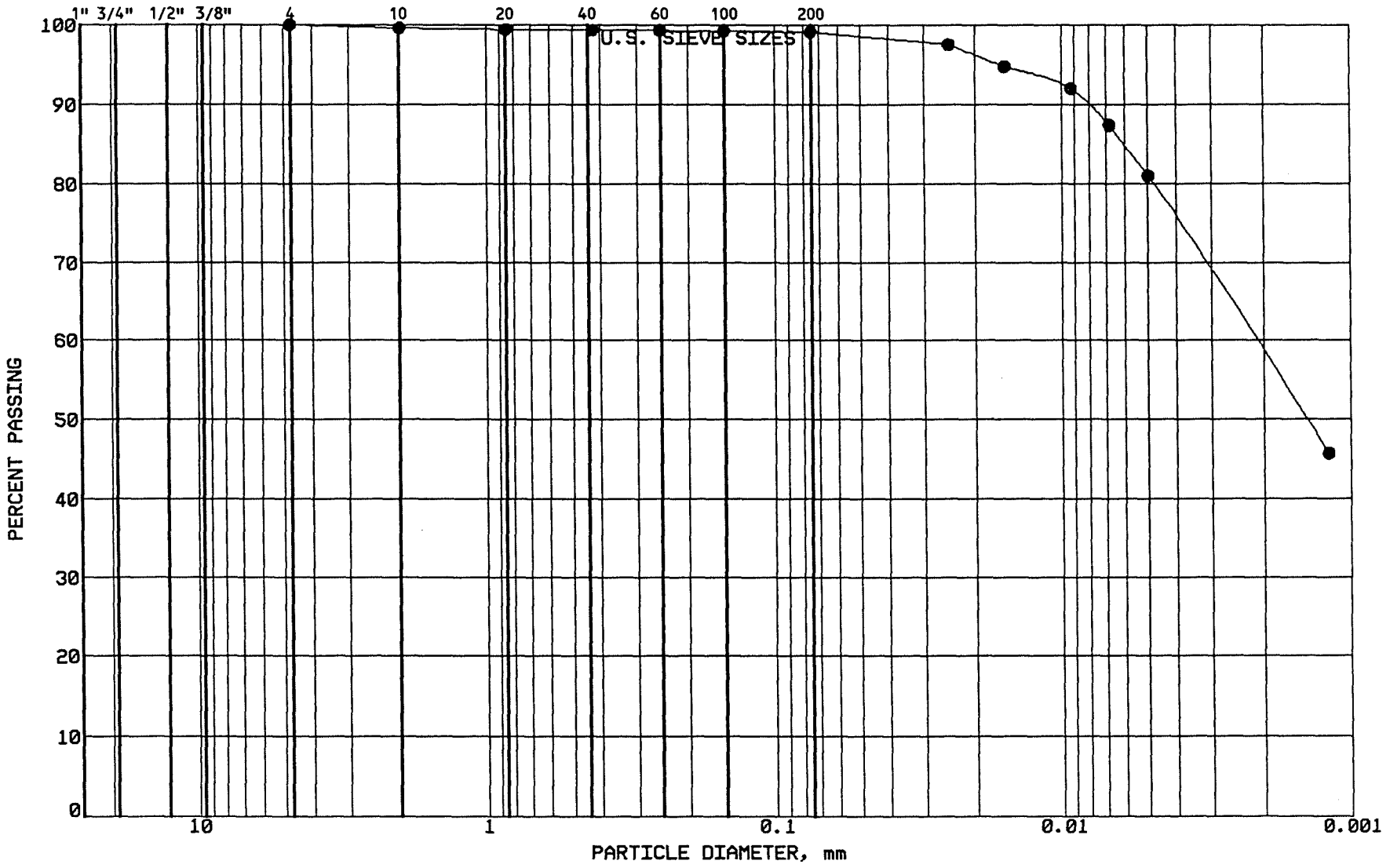
GRAVEL	2.7 %
SAND	5.6 %
SILT	55.5 %
CLAY	36.2 %
P 200	91.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Lean Clay (CL), dk 'br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

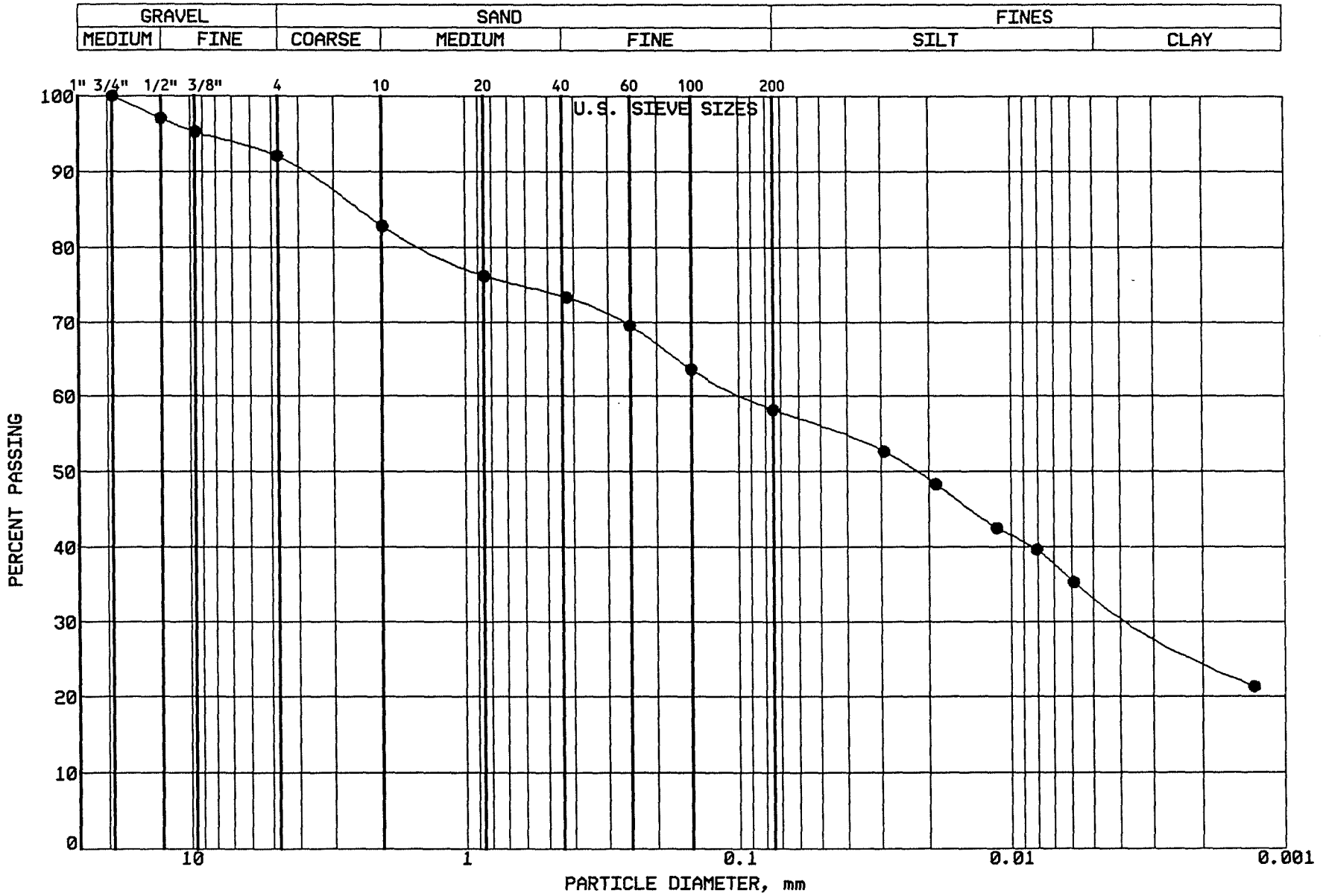
LOCATION: N 37924.0, E 41115.0
SAMPLE: SG-CC200 TUBE #:
ELEVATION: 1898.9'

GRAVEL	0.0 %
SAND	0.9 %
SILT	18.1 %
CLAY	81.0 %
P 200	99.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37925.0, E 41302.0
SAMPLE: SG-CC201 TUBE #:
ELEVATION: 1898.1'

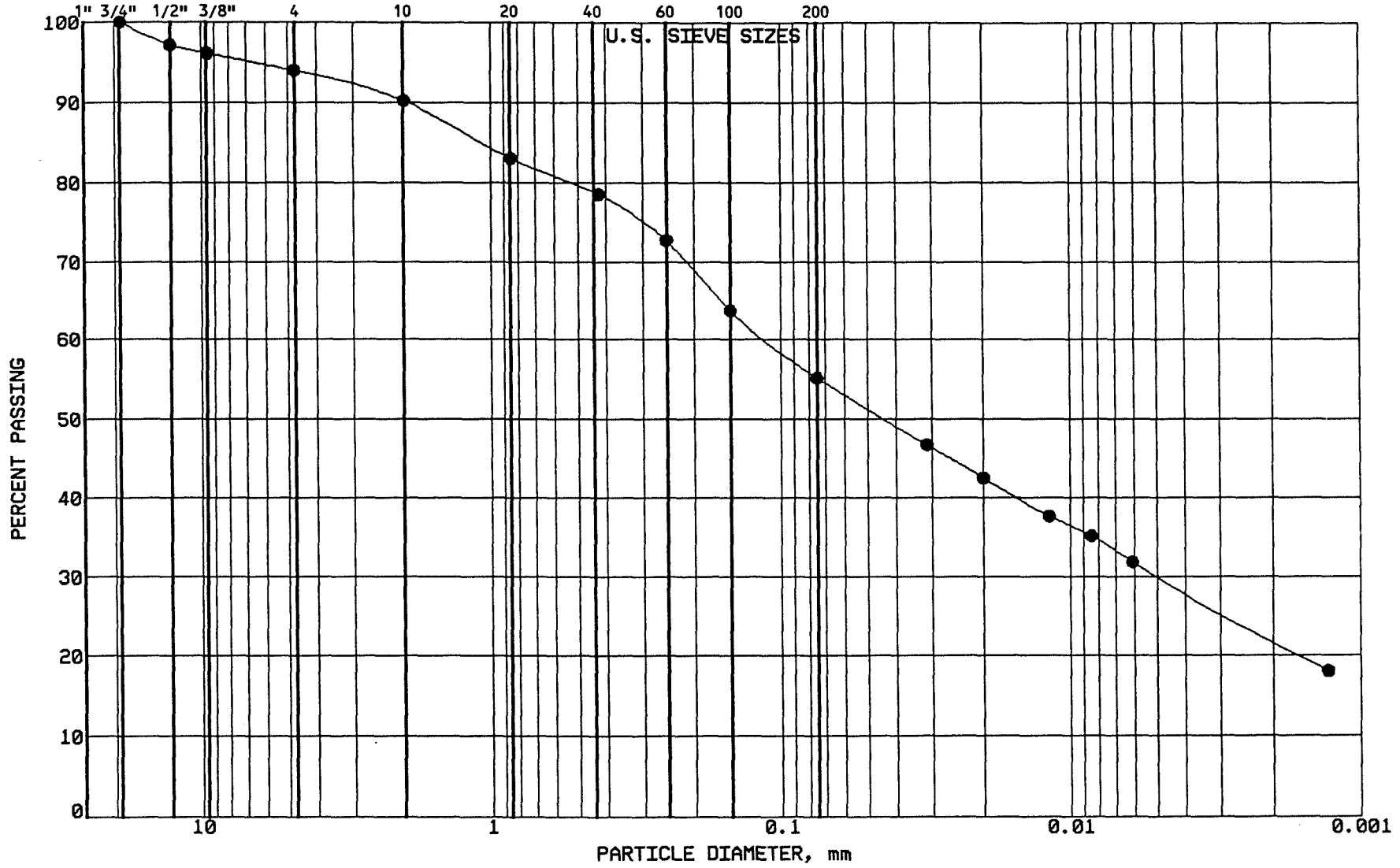
GRAVEL	7.9 %
SAND	33.9 %
SILT	24.5 %
CLAY	33.7 %
P 200	58.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL), dk br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

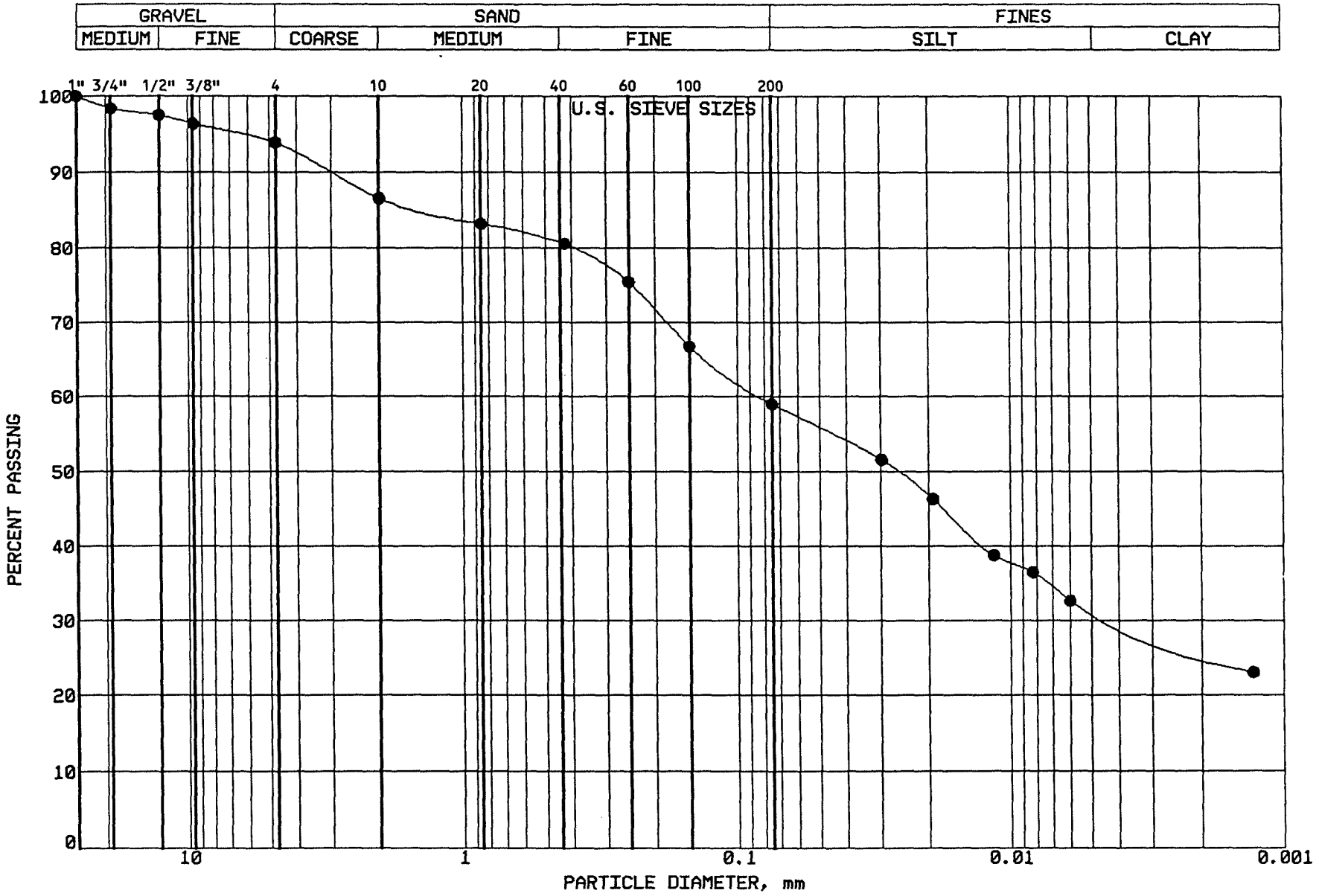
LOCATION: N 38252.0, E 41231.0
SAMPLE: SG-CC202 TUBE #:
ELEVATION: 1896.3'

GRAVEL	6.0 %
SAND	38.8 %
SILT	25.2 %
CLAY	30.0 %
P 200	55.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),dk br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38262.0, E 41054.0
SAMPLE: SG-CC203 TUBE #:
ELEVATION: 1897.4'

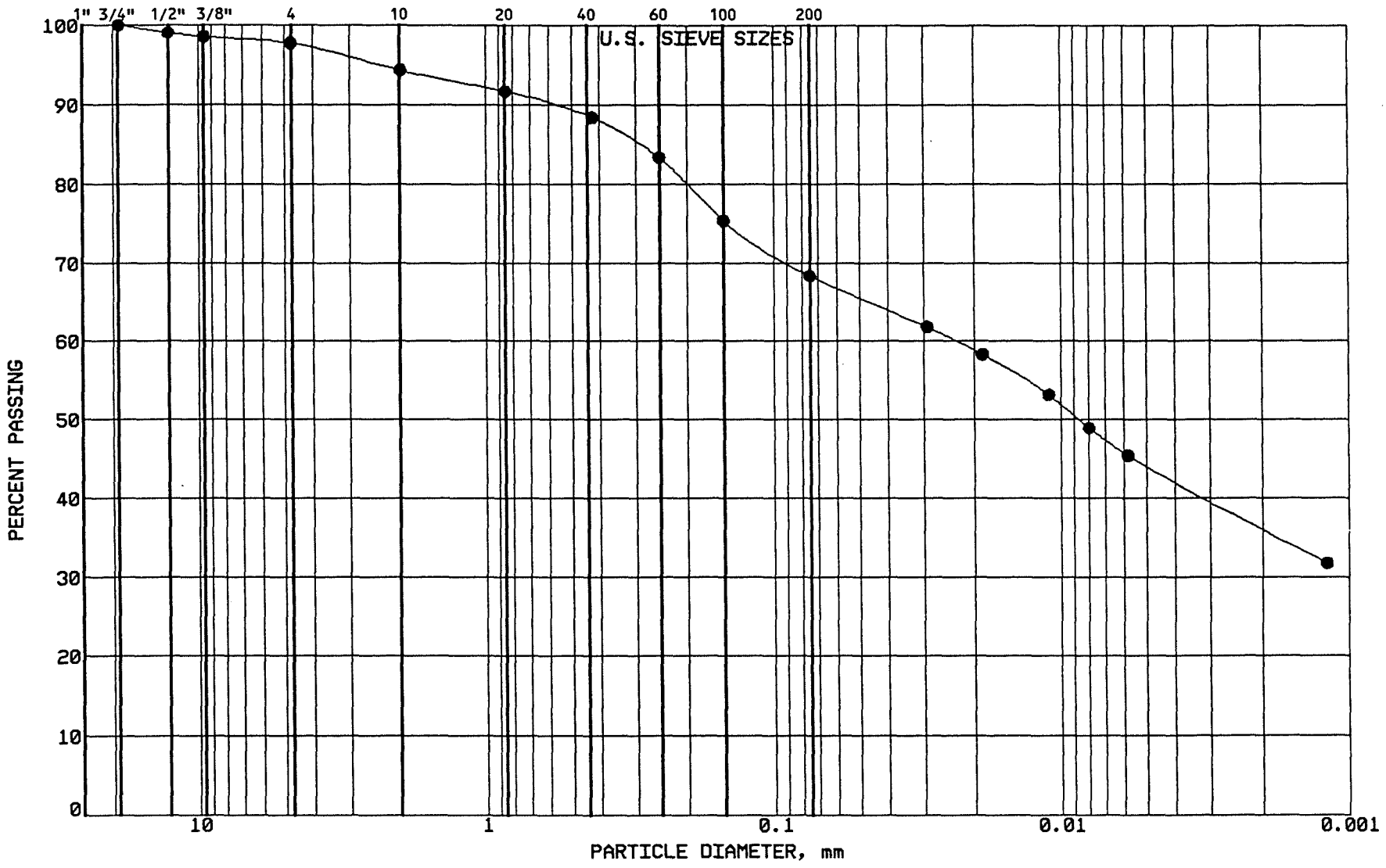
GRAVEL	6.1 %
SAND	34.9 %
SILT	27.5 %
CLAY	31.5 %
P 200	59.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38280.0, E 40889.0
SAMPLE: SG-CC204 TUBE #:
ELEVATION: 1898.2'

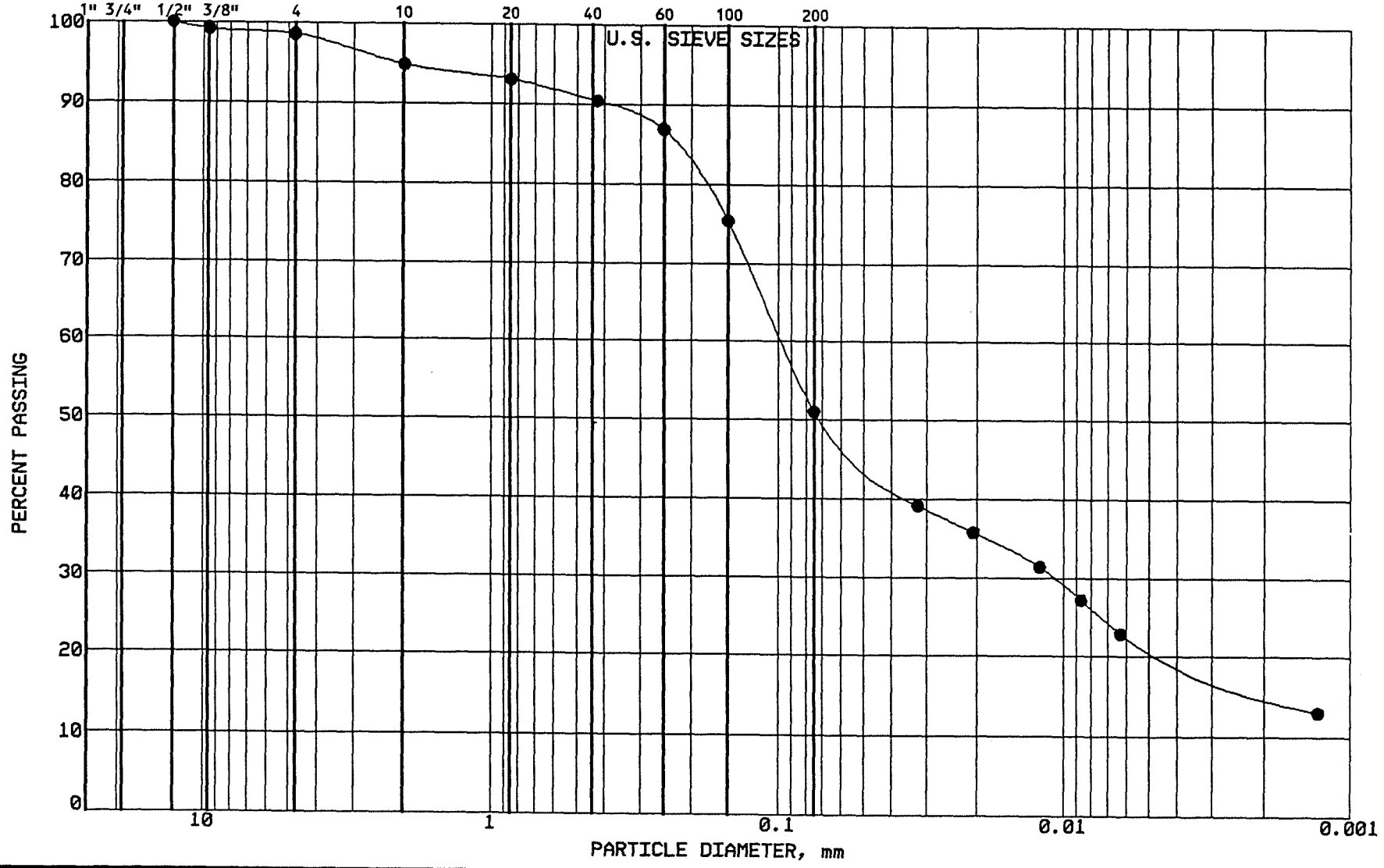
GRAVEL	2.3 %
SAND	29.4 %
SILT	24.2 %
CLAY	44.1 %
P 200	68.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38440.0, E 40889.0
SAMPLE: SG-CC205 TUBE #:
ELEVATION: 1894.7'

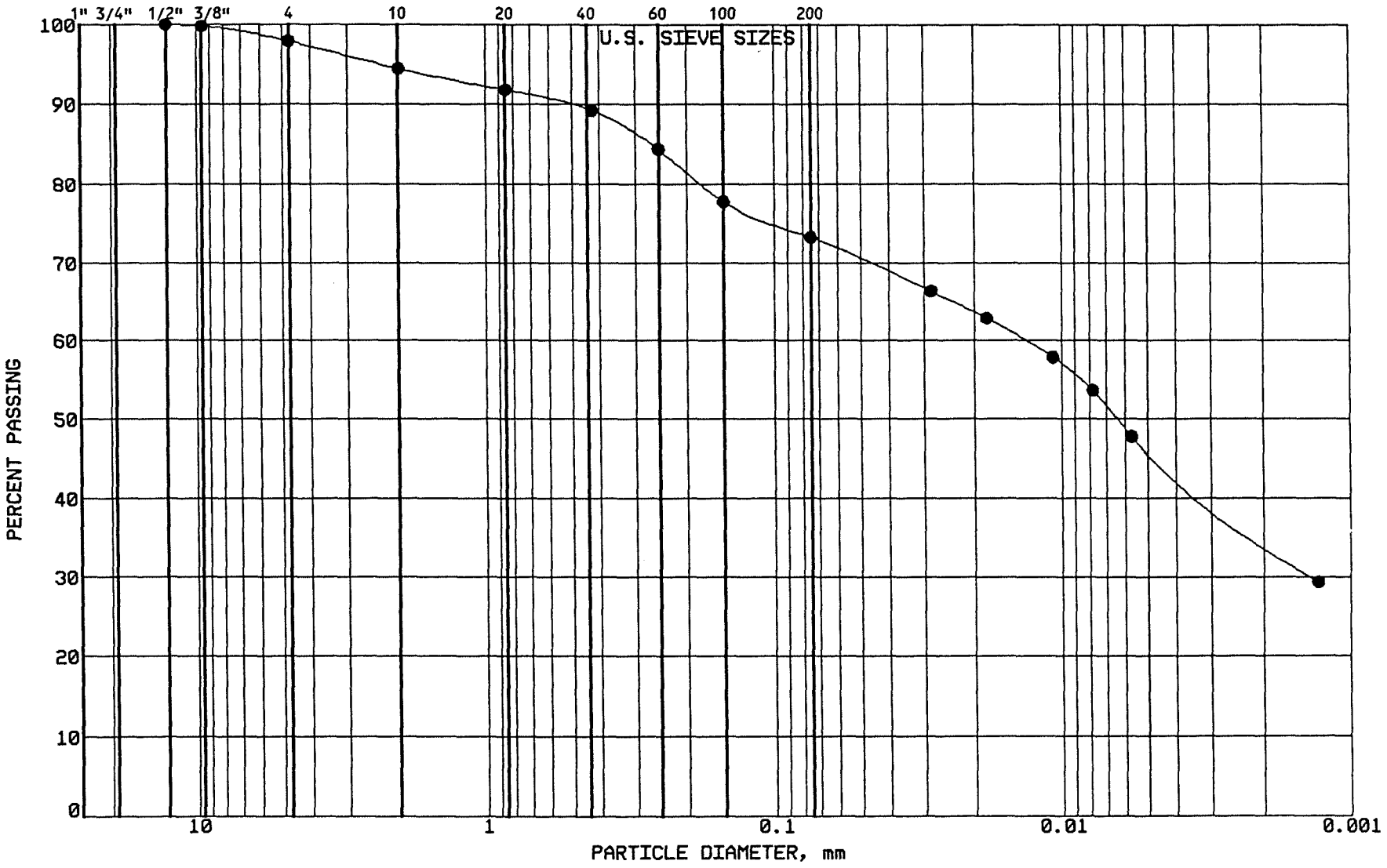
GRAVEL	1.4 %
SAND	47.6 %
SILT	29.5 %
CLAY	21.5 %
P 200	51.0 %

SOIL PROPERTIES

LL: 28.0%
PL: 18.0%
PI: 10.0%
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

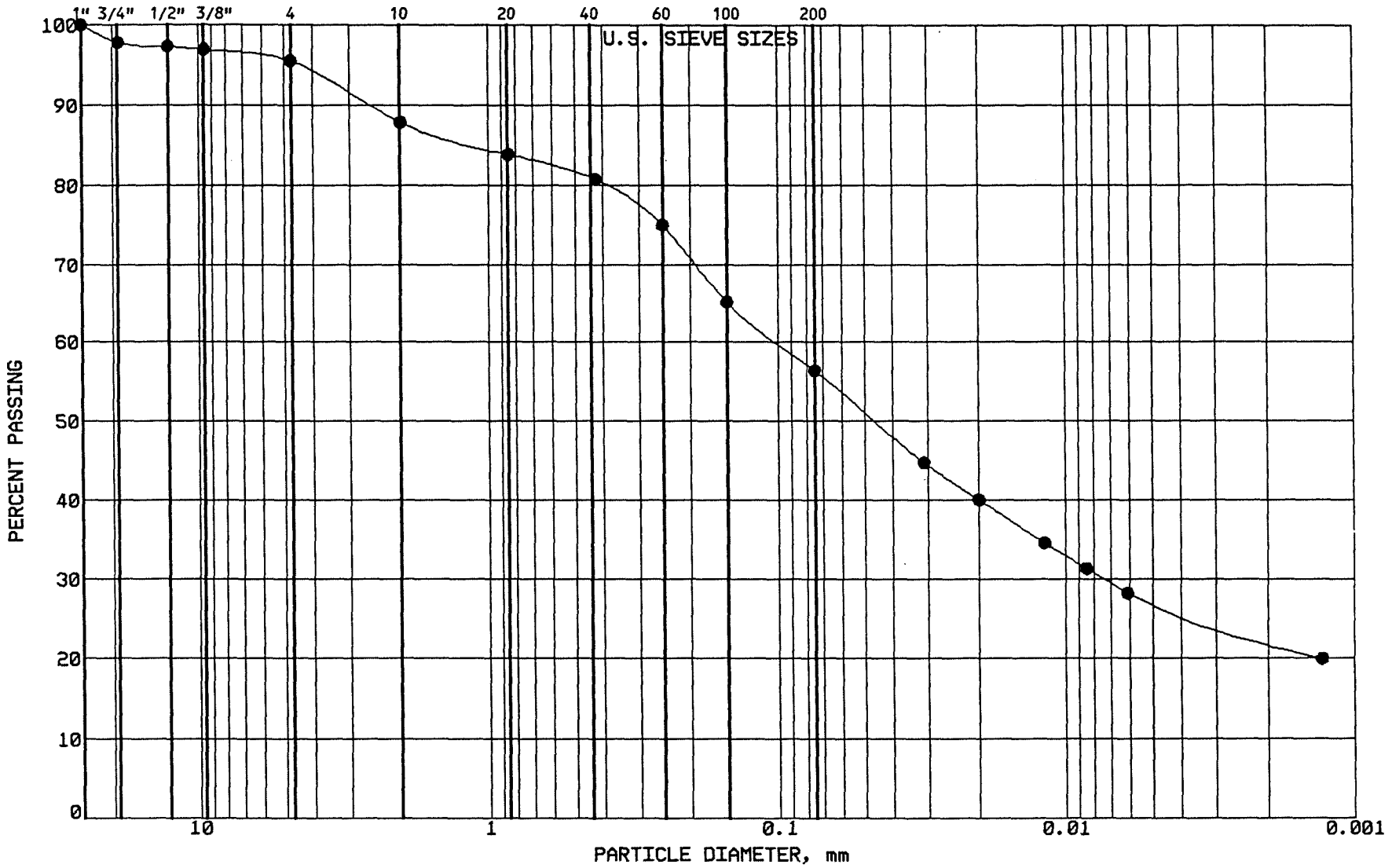
LOCATION: N 38420.0, E 41064.0
SAMPLE: SG-CC206 TUBE #:
ELEVATION: 1893.7'

GRAVEL	2.1 %
SAND	24.7 %
SILT	27.0 %
CLAY	46.2 %
P 200	73.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Lean Clay w/Sand (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

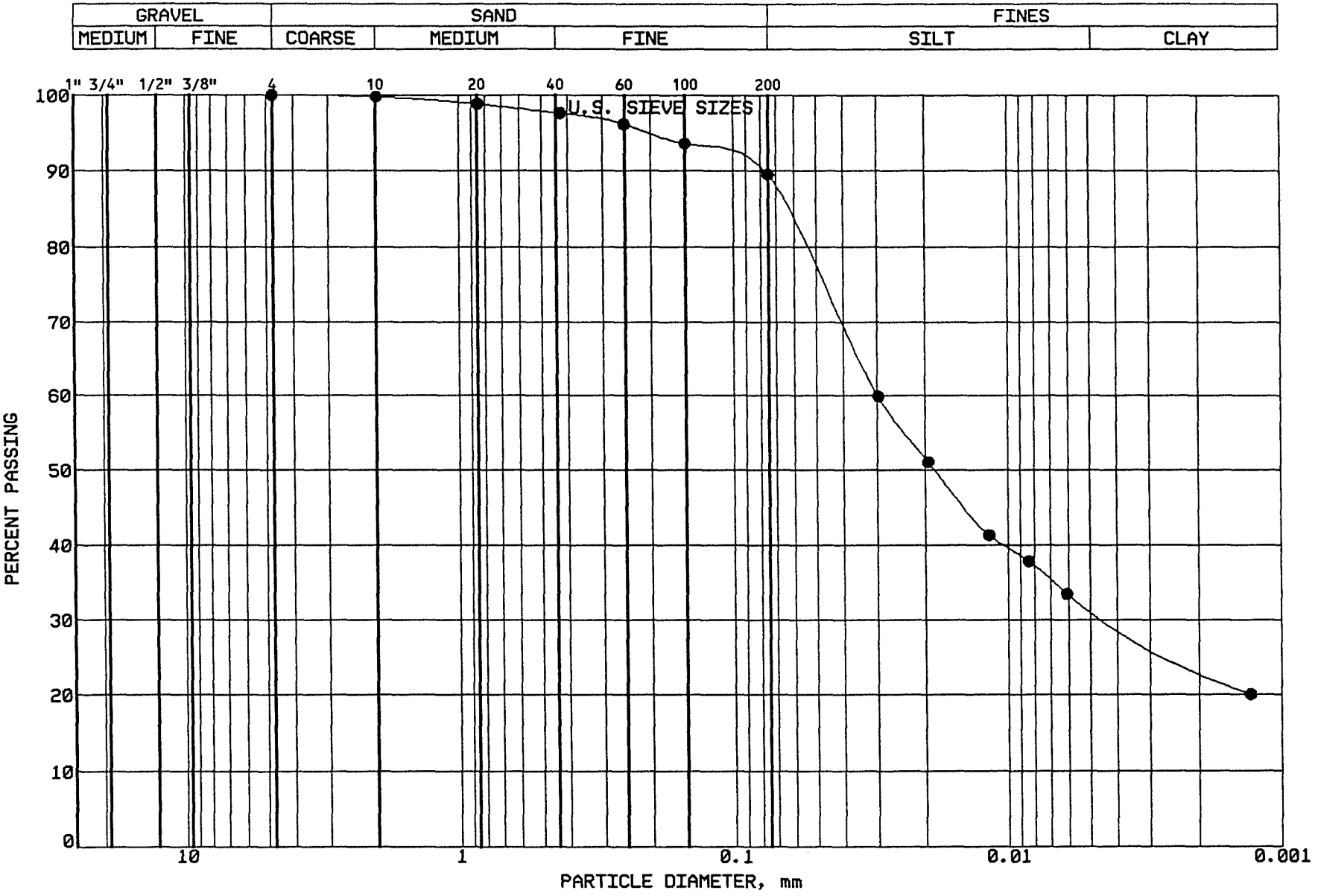
LOCATION: N 38670.0, E 41150.0
SAMPLE: SG-CC207 TUBE #:
ELEVATION: 1892.3'

GRAVEL	4.5 %
SAND	39.1 %
SILT	29.3 %
CLAY	27.1 %
P 200	56.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

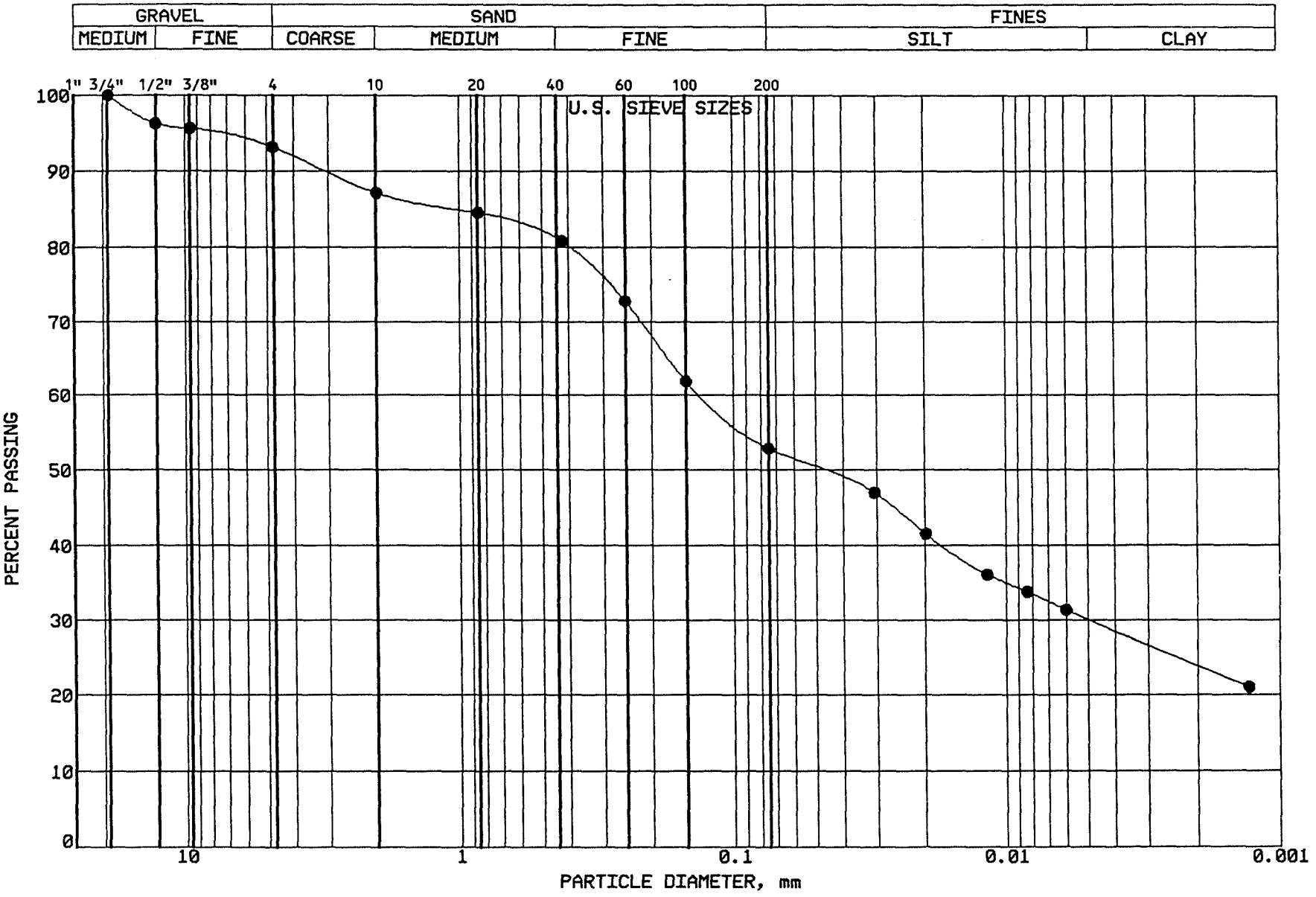
LOCATION: N 38664.0, E 40937.0
SAMPLE: SG-CC208 TUBE #:
ELEVATION: 1891.5'

GRAVEL	0.0 %
SAND	10.5 %
SILT	57.8 %
CLAY	31.7 %
P 200	89.5 %

SOIL PROPERTIES

LL: 28.0%
PL: 23.0%
PI: 5.0%
CLASS: Silty Clay (CL-ML),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38439.0, E 41143.0
SAMPLE: SG-CC209 TUBE #:
ELEVATION: 1895.6'

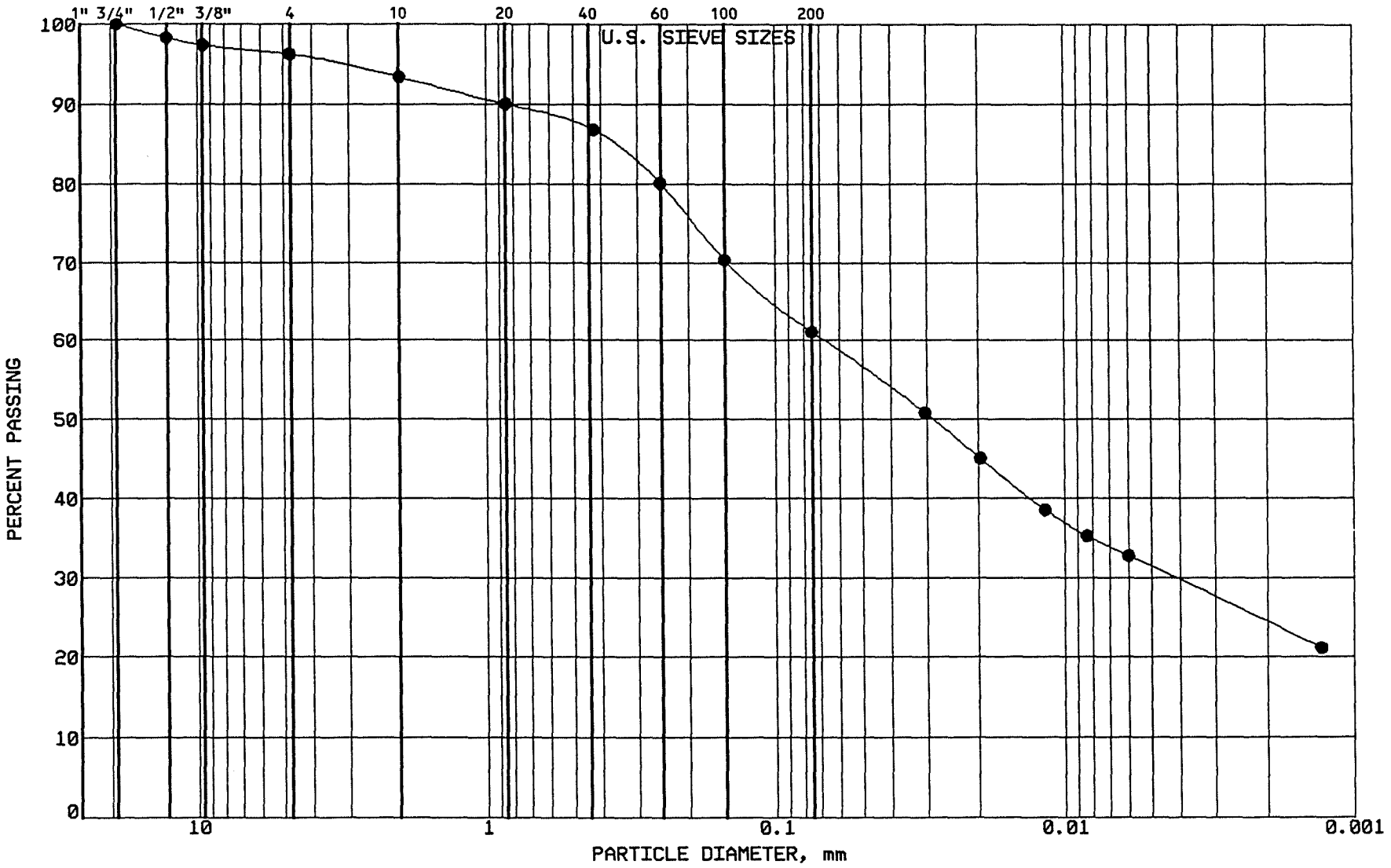
GRAVEL	6.9 %
SAND	40.2 %
SILT	22.8 %
CLAY	30.1 %
P 200	52.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

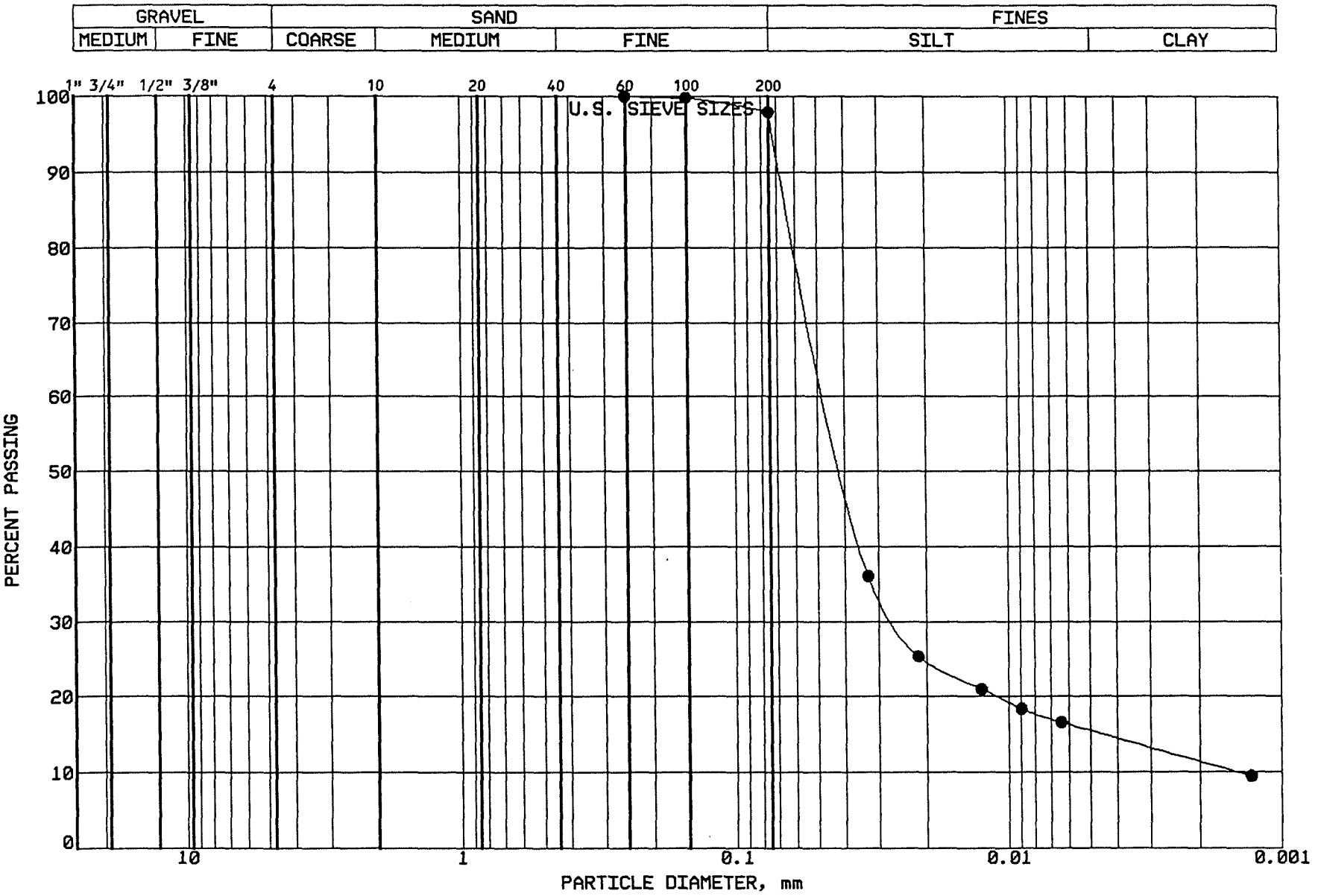
LOCATION: N 38442.0, E 41001.0
SAMPLE: SG-CC210 TUBE #:
ELEVATION: 1894.4'

GRAVEL	3.8 %
SAND	35.1 %
SILT	29.8 %
CLAY	31.3 %
P 200	61.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

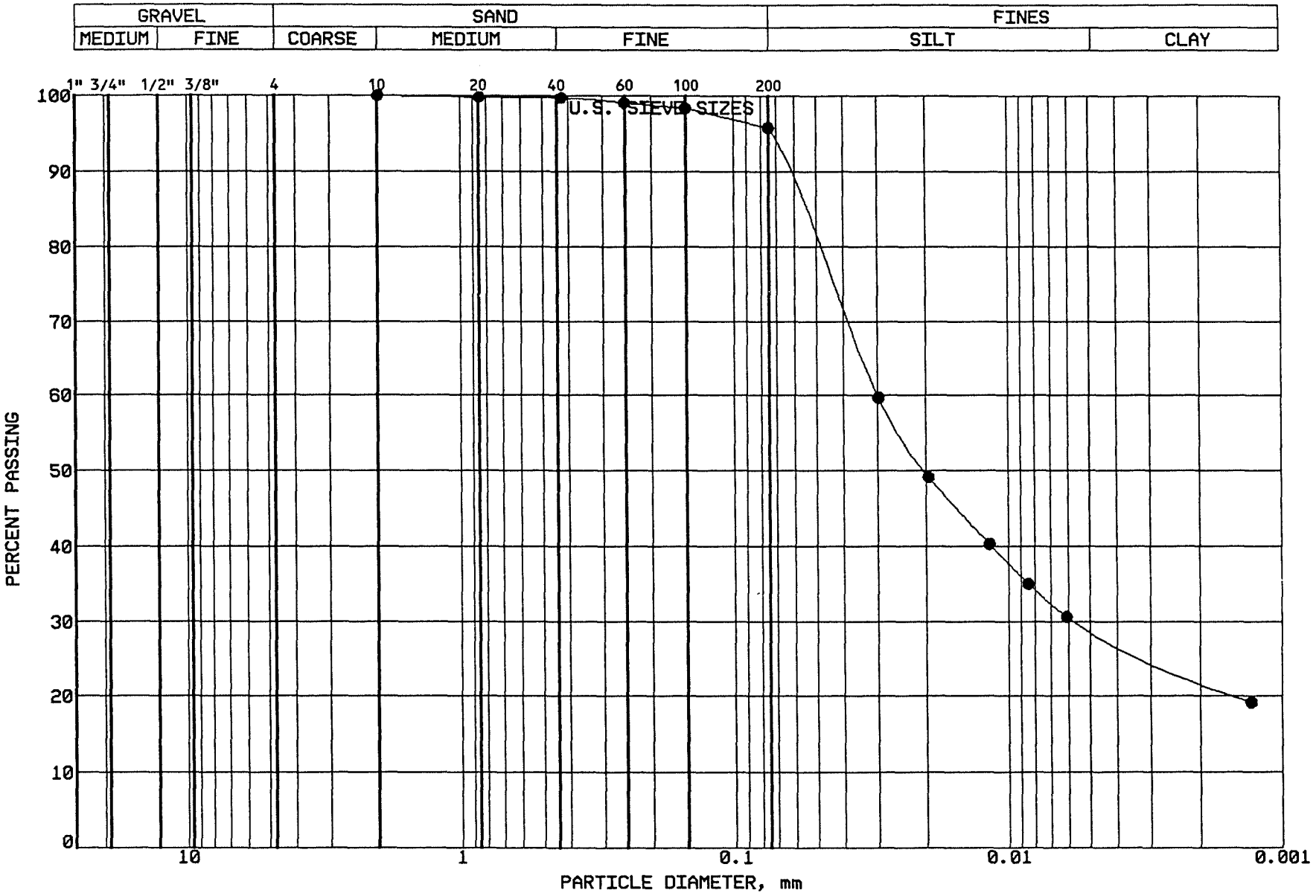
LOCATION: N 38565.0, E 41163.0
SAMPLE: SG-CC211 TUBE #:
ELEVATION: 1893.8'

GRAVEL	0.0 %
SAND	2.1 %
SILT	82.4 %
CLAY	15.5 %
P 200	97.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Silt (ML),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38577.0, E 40953.0
SAMPLE: SG-CC212 TUBE #:
ELEVATION: 1892.8'

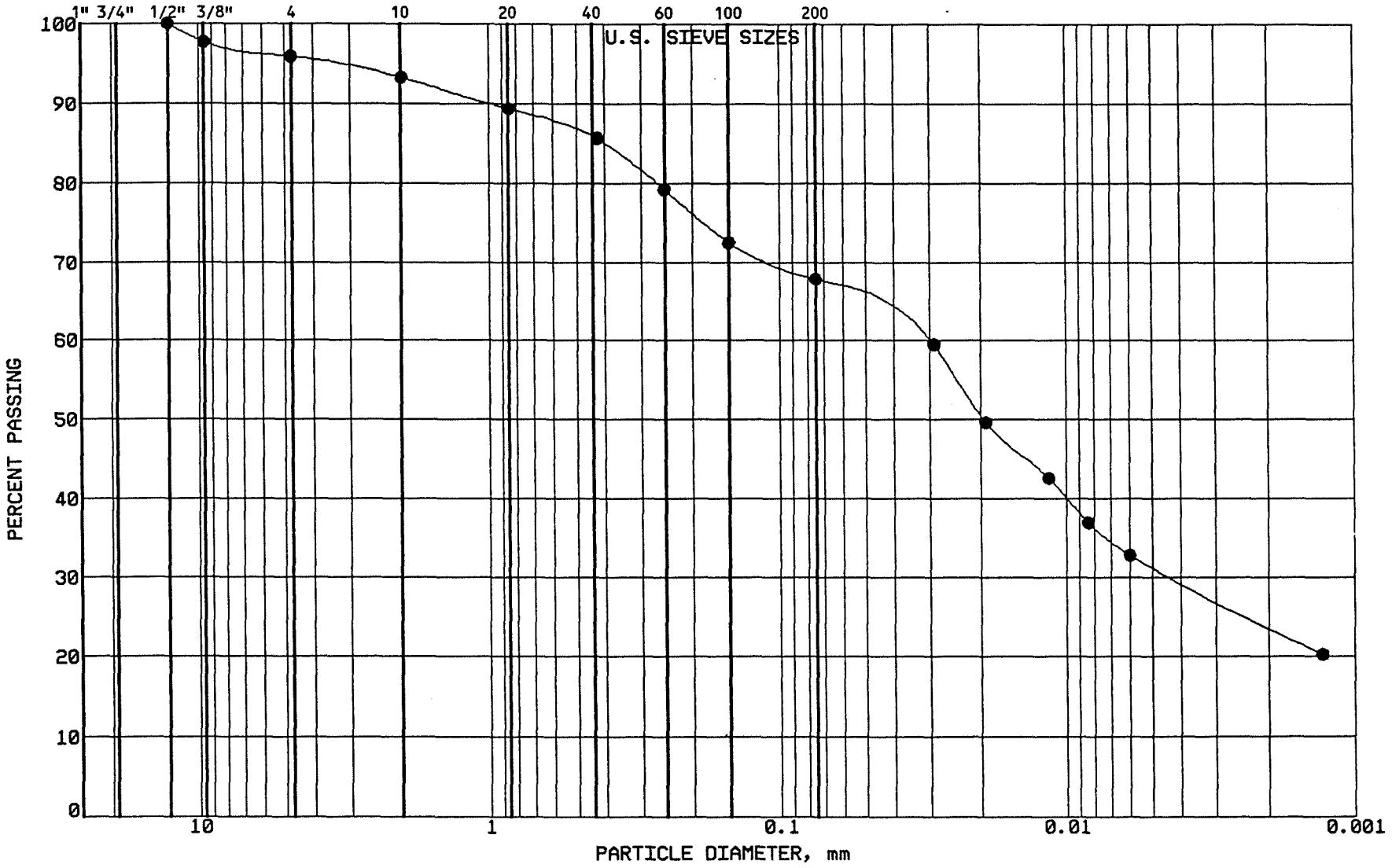
GRAVEL	0.0 %
SAND	4.2 %
SILT	66.7 %
CLAY	29.1 %
P 200	95.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Silt (ML),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

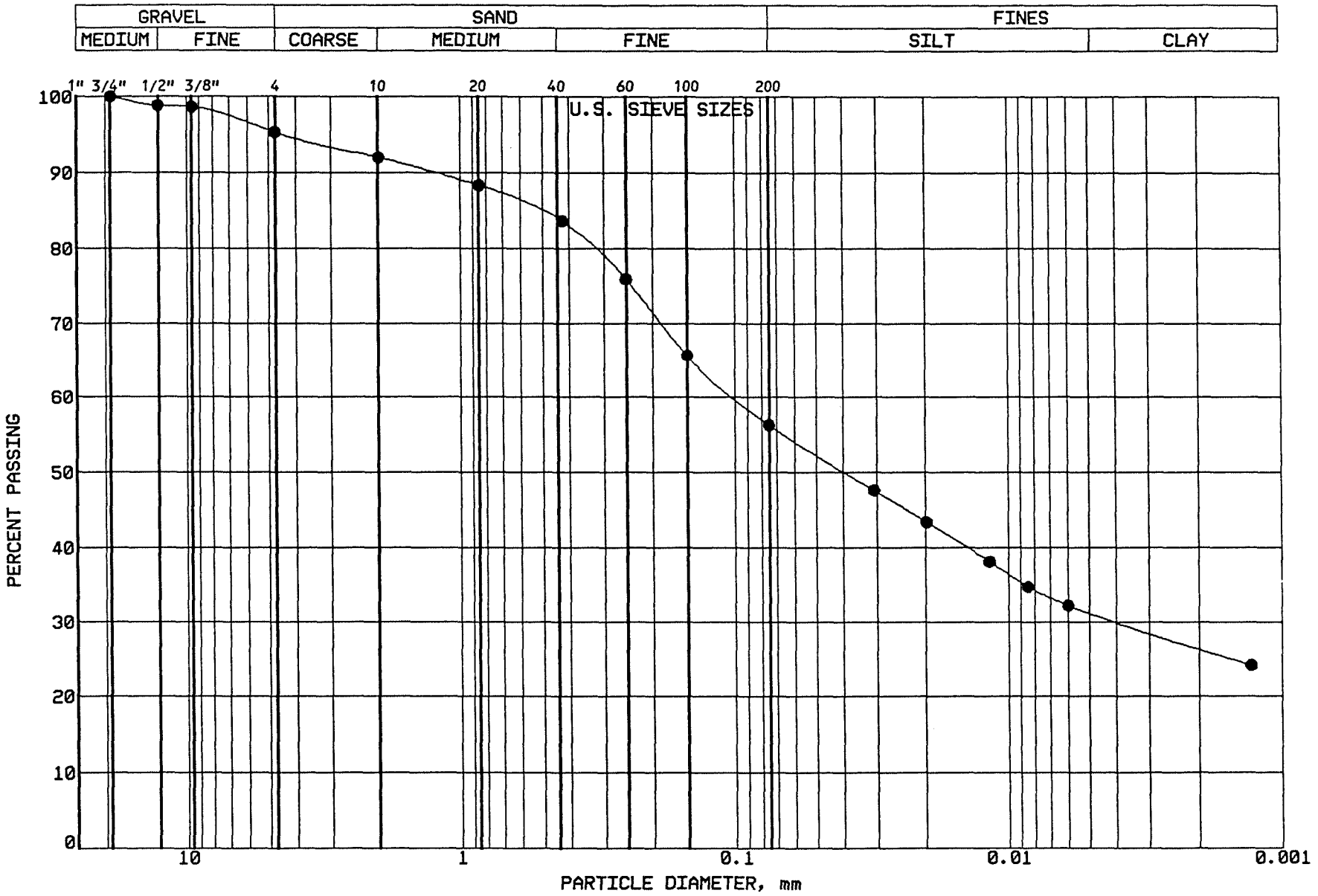
LOCATION: N 38587.0, E 40905.0
SAMPLE: SG-CC213 TUBE #:
ELEVATION: 1894.2'

GRAVEL	4.1 %
SAND	28.1 %
SILT	36.5 %
CLAY	31.3 %
P 200	67.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

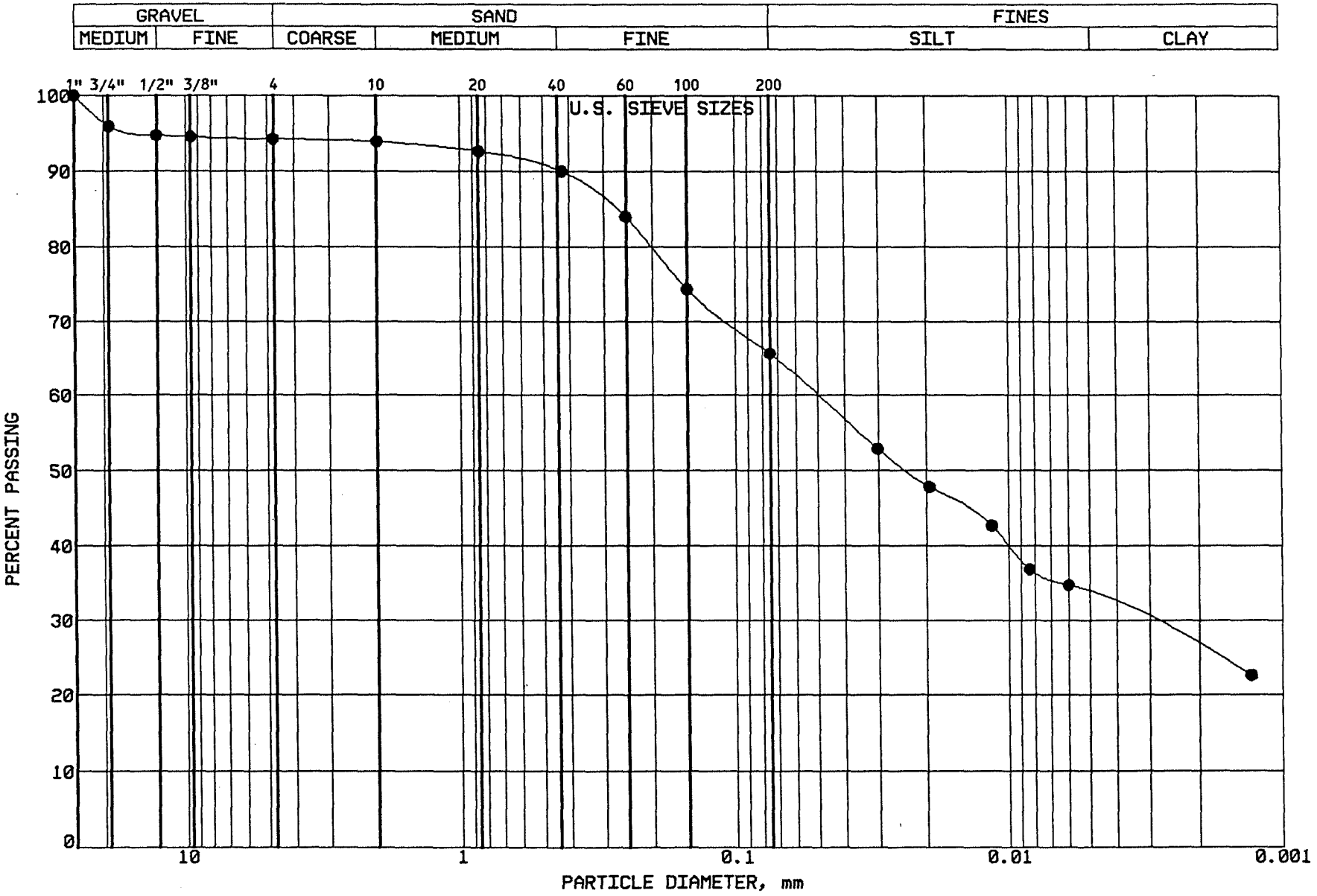
LOCATION: N 38714.0, E 40907.0
SAMPLE: SG-CC214 TUBE #:
ELEVATION: 1893.8'

GRAVEL	4.7 %
SAND	39.0 %
SILT	25.1 %
CLAY	31.2 %
P 200	56.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38703.0, E 41084.0
SAMPLE: SG-CC215 TUBE #:
ELEVATION: 1892.3'

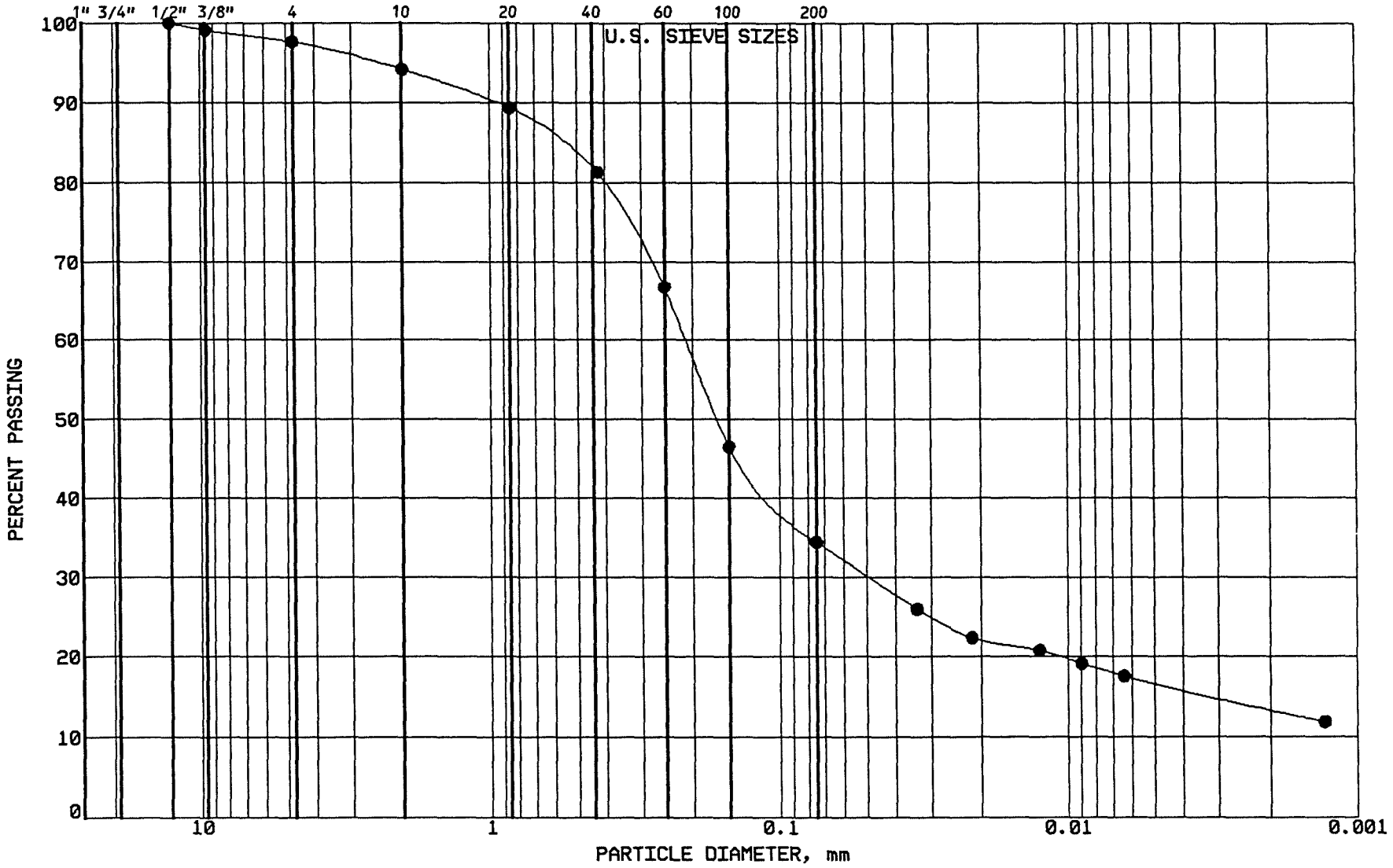
GRAVEL	5.8 %
SAND	28.6 %
SILT	32.3 %
CLAY	33.3 %
P 200	65.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

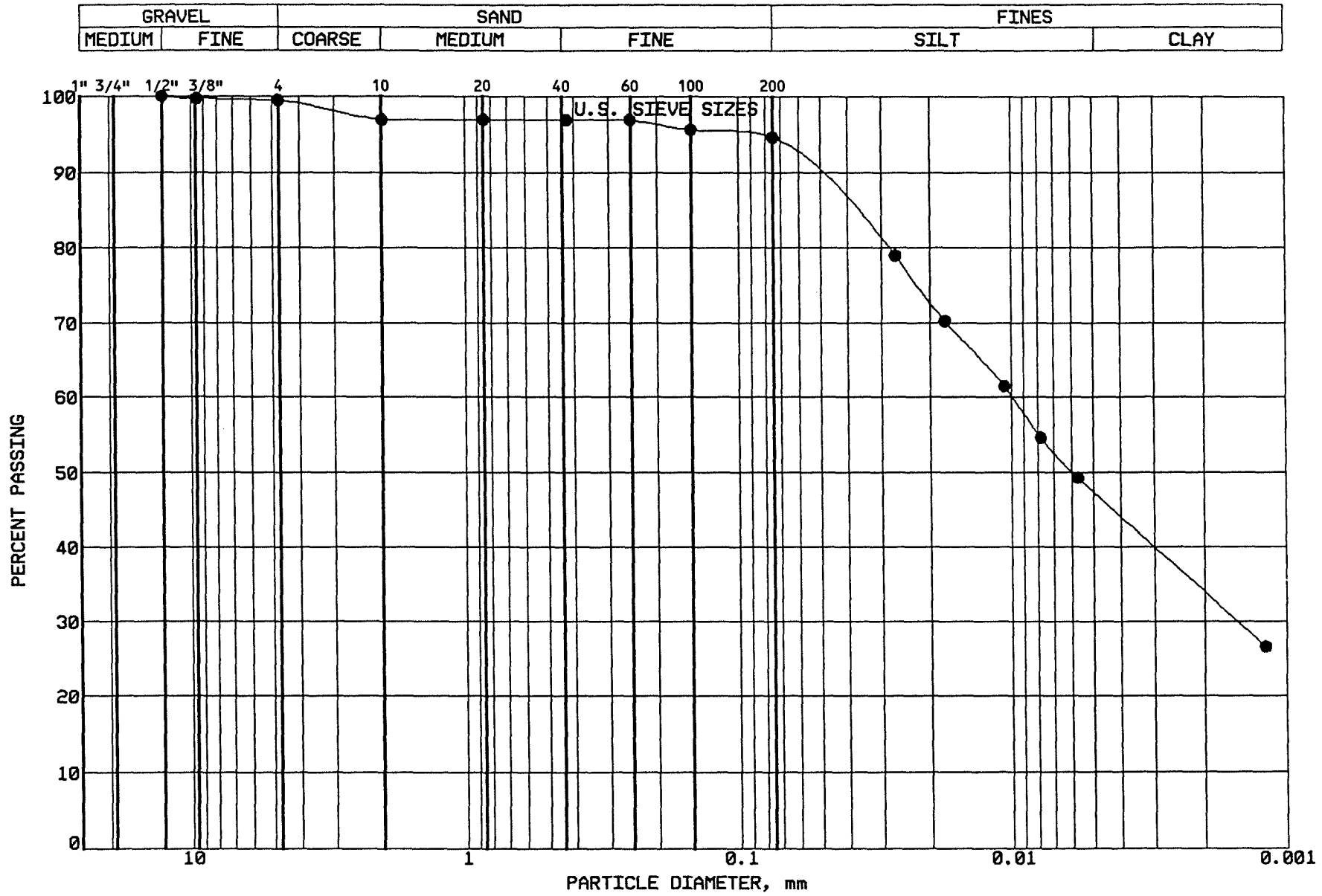
LOCATION: N 38439.0, E 41222.0
SAMPLE: SG-CC216 TUBE #:
ELEVATION: 1895.6'

GRAVEL	2.4 %
SAND	63.2 %
SILT	17.7 %
CLAY	16.7 %
P 200	34.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Clayey Sand (SC),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

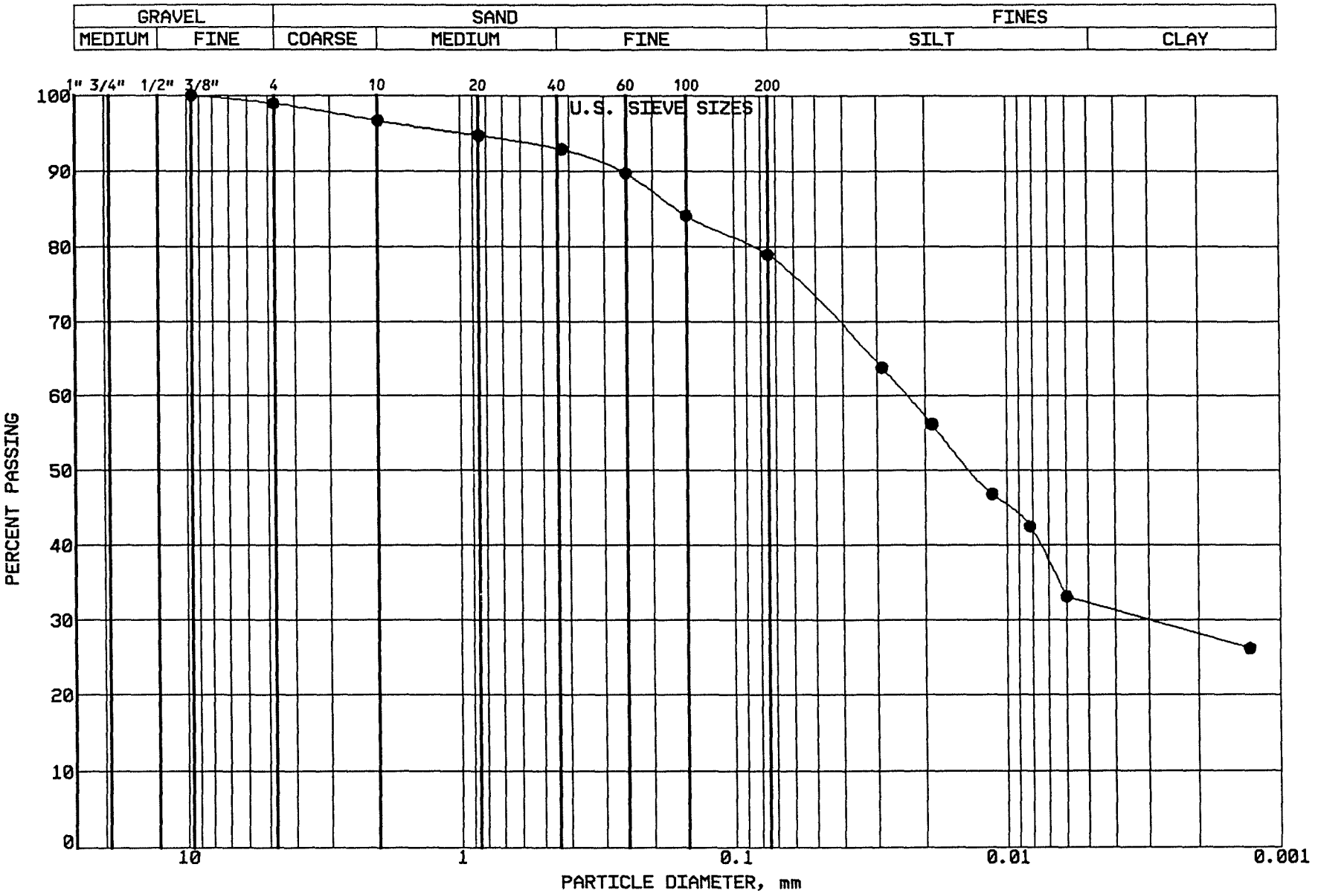
LOCATION: N 38441.0, E 41003.0
SAMPLE: SG-CC217 TUBE #:
ELEVATION: 1896.7'

GRAVEL	0.5 %
SAND	4.9 %
SILT	47.2 %
CLAY	47.4 %
P 200	94.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH),gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

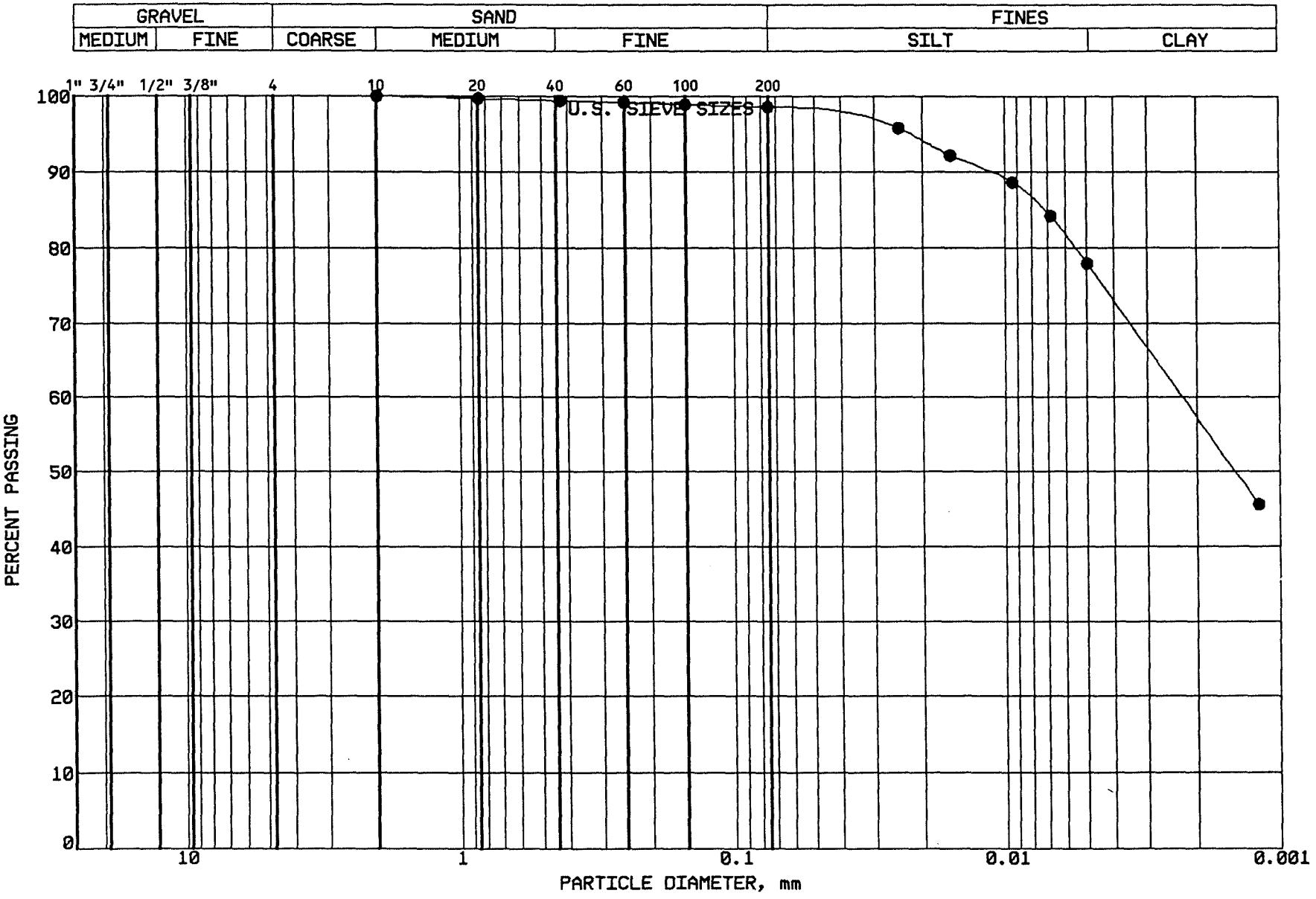
LOCATION: N 38459.0, E 40768.0
SAMPLE: SG-CC218 TUBE #:
ELEVATION: 1898.0'

GRAVEL	1.1 %
SAND	20.0 %
SILT	46.6 %
CLAY	32.3 %
P 200	78.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Lean Clay w/Sand(CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

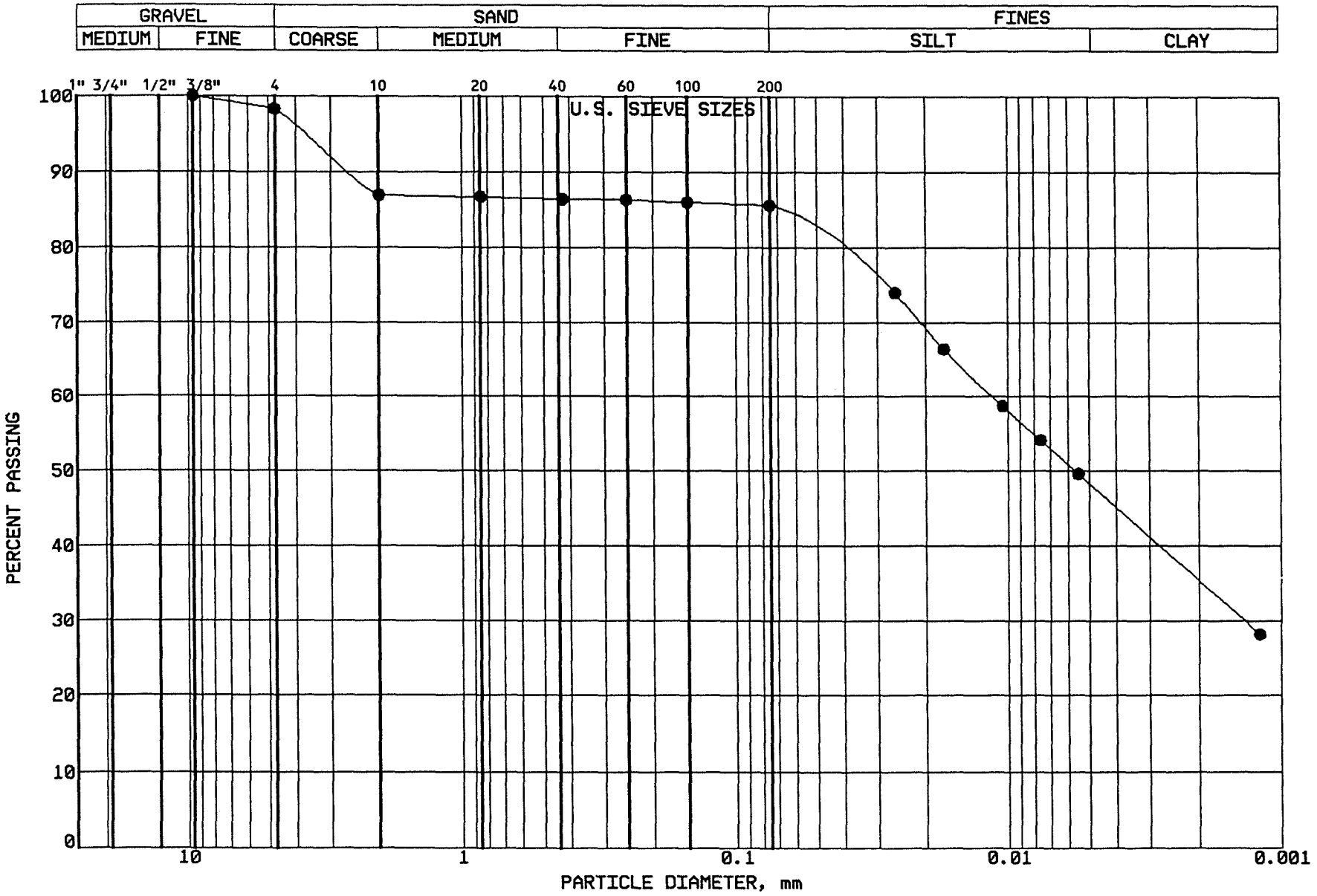
LOCATION: N 38675.0, E 41187.0
SAMPLE: SG-CC219 TUBE #:
ELEVATION: 1894.8'

GRAVEL	0.0 %
SAND	1.4 %
SILT	20.7 %
CLAY	77.9 %
P 200	98.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: FAt Clay (CH),gray.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

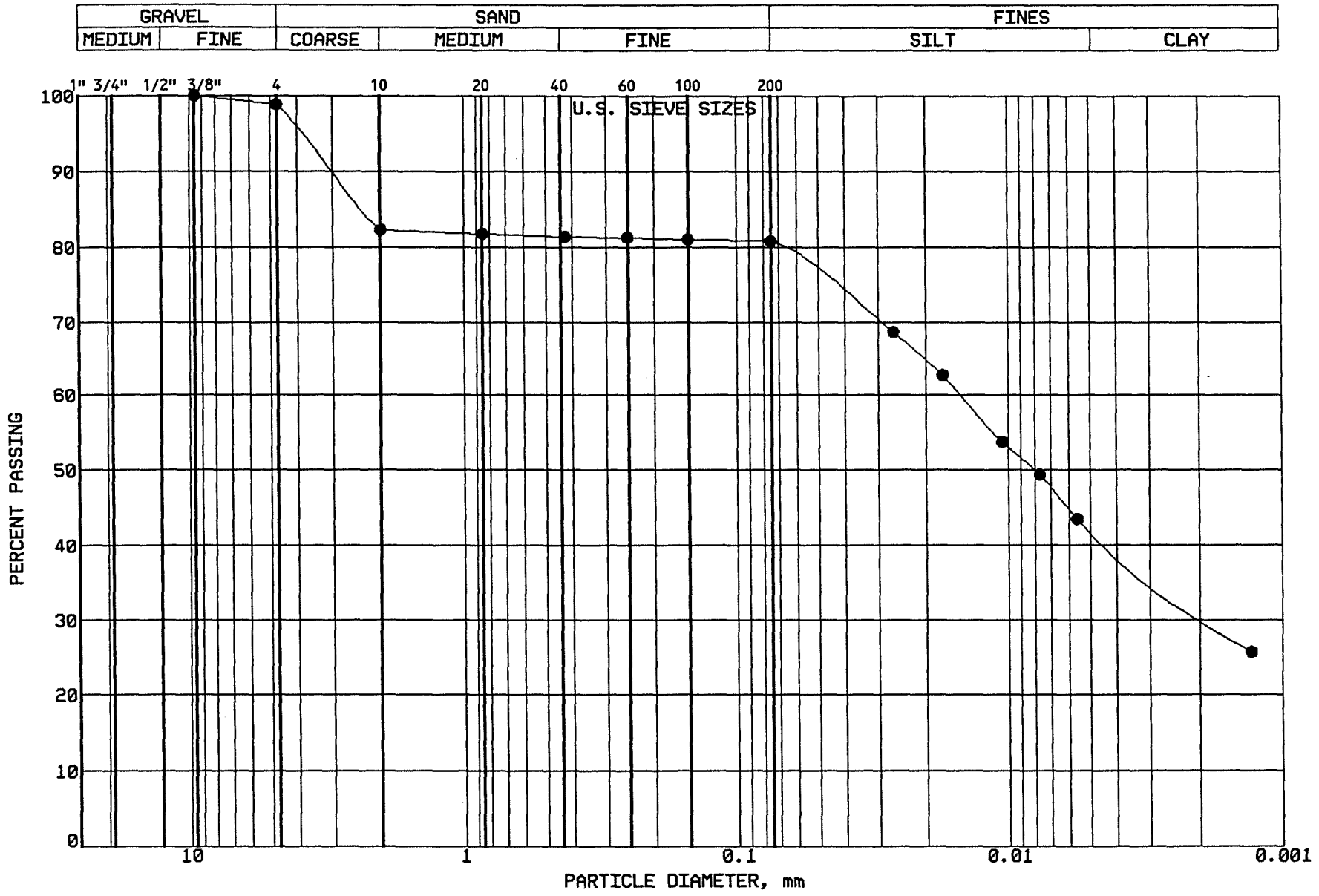
LOCATION: N 38679.0, E 40846.0
SAMPLE: SG-CC220 TUBE #:
ELEVATION: 1885.5'

GRAVEL	1.7 %
SAND	12.7 %
SILT	37.3 %
CLAY	48.3 %
P 200	85.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38837.0, E 40129.0
SAMPLE: DC-CC221 TUBE #:
ELEVATION: 1901.5'

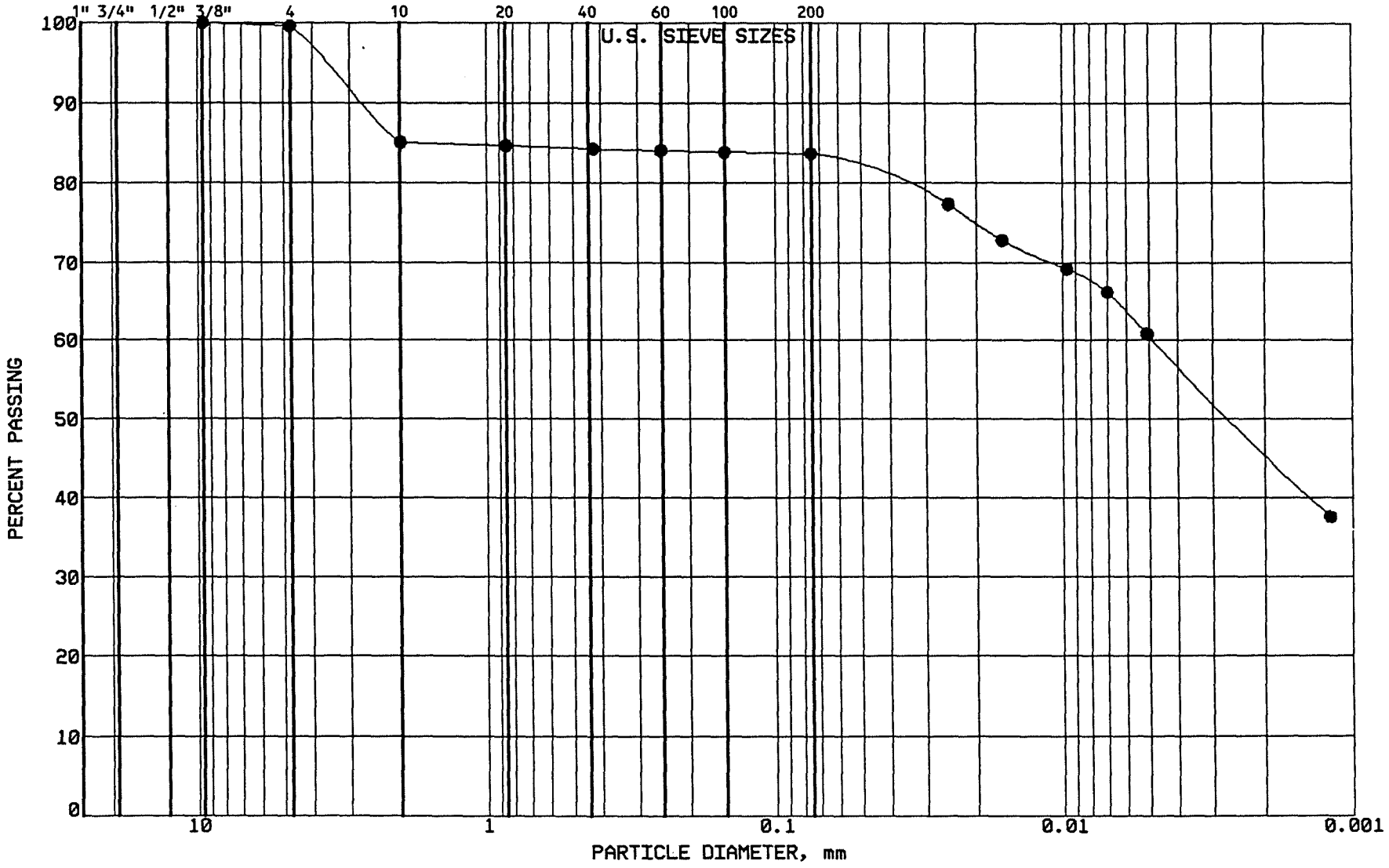
GRAVEL	1.2 %
SAND	18.0 %
SILT	38.7 %
CLAY	42.1 %
P 200	80.8 %

SOIL PROPERTIES

LL: 32.0%
PL: 17.0%
PI: 15.0%
CLASS: Lean Clay w/Sand(CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

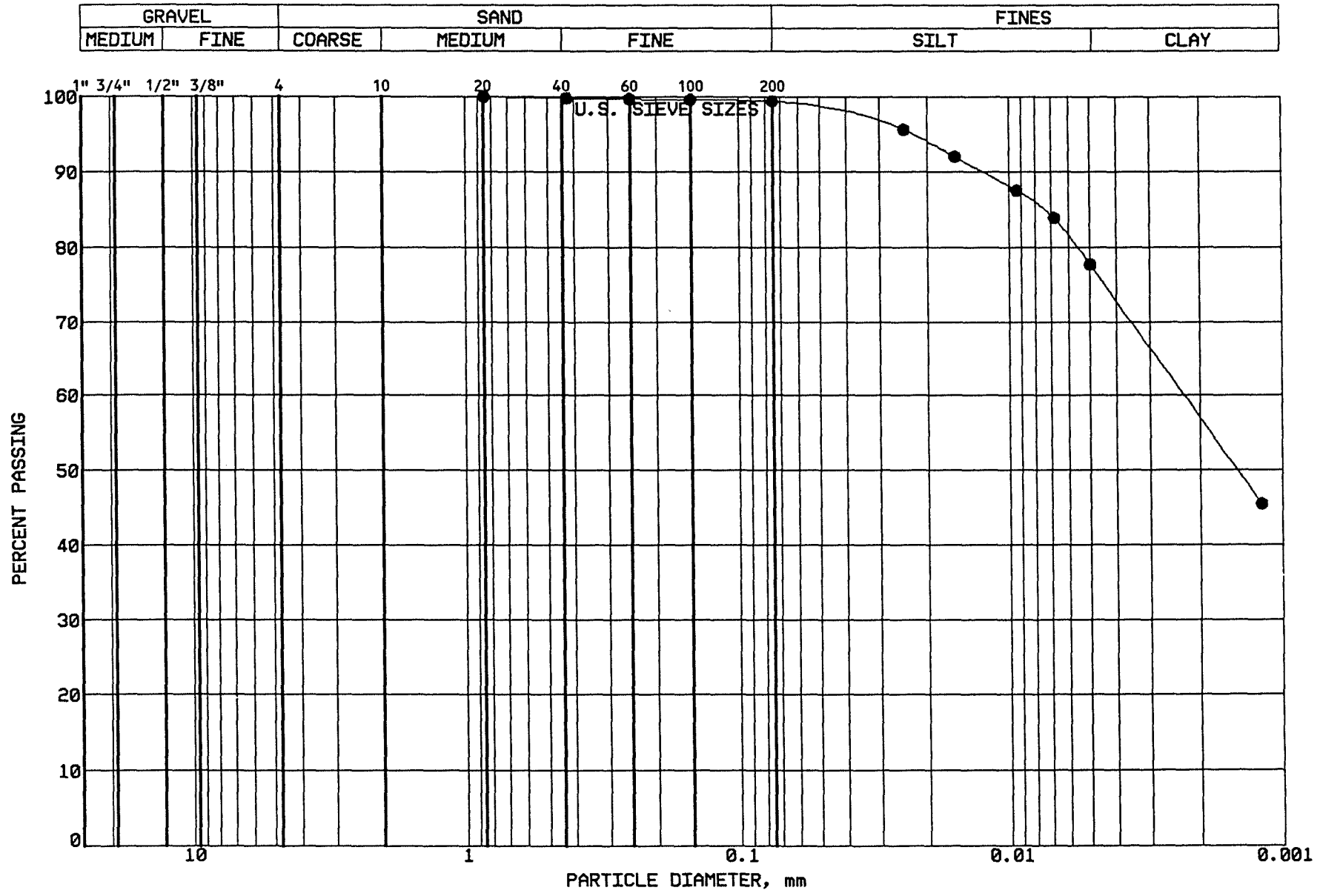
LOCATION: N 38862.0, E 39883.0
SAMPLE: DC-CC222 TUBE #: ST.31
ELEVATION: 1902.9'

GRAVEL	0.4 %
SAND	15.9 %
SILT	23.2 %
CLAY	60.5 %
P 200	83.7 %

SOIL PROPERTIES

LL: 34.0%
PL: 19.0%
PI: 15.0%
CLASS: Lean Clay w/Sand (CL),gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

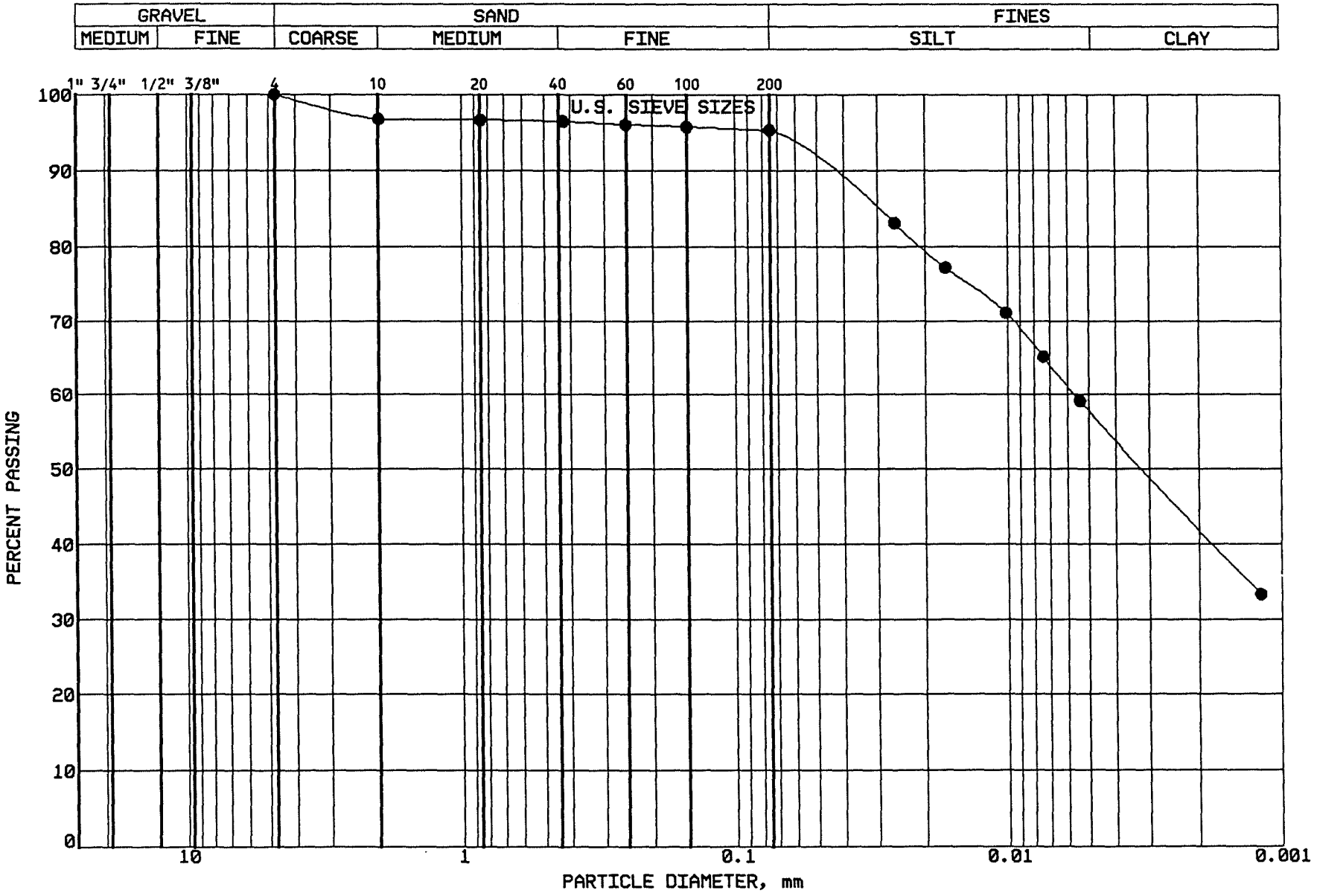
LOCATION: N 38870.0, E 40092.0
SAMPLE: DC-CC223 TUBE #: ST.32
ELEVATION: 1901.6'

GRAVEL	0.0 %
SAND	0.6 %
SILT	21.7 %
CLAY	77.7 %
P 200	99.4 %

SOIL PROPERTIES

LL: 56.0%
PL: 21.0%
PI: 35.0%
CLASS: Fat Clay (CH),gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

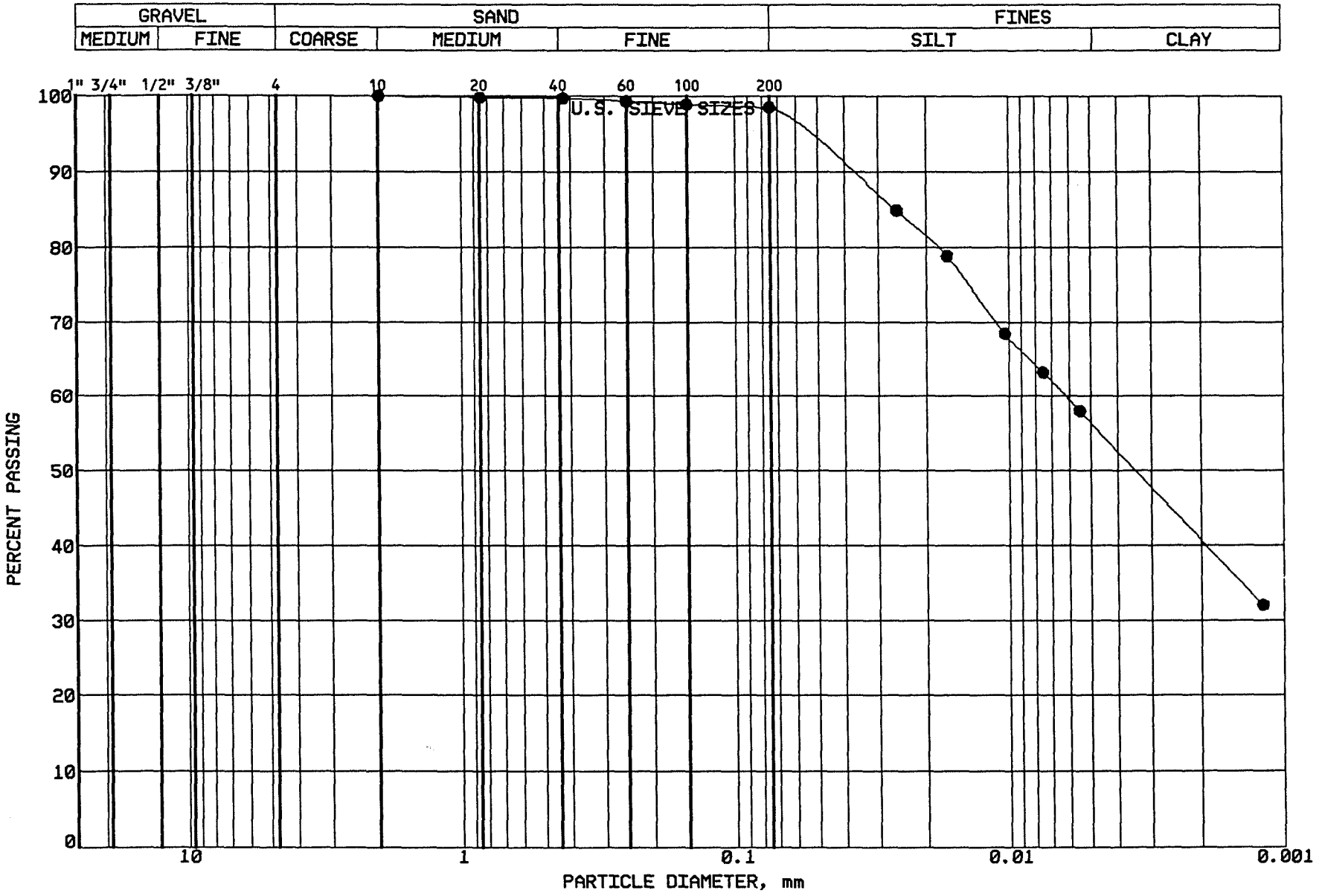
LOCATION: N 38826.0, E 40043.0
SAMPLE: DC-CC224 TUBE #: ST.33
ELEVATION: 1902.9'

GRAVEL	0.0 %
SAND	4.7 %
SILT	37.5 %
CLAY	57.8 %
P 200	95.3 %

SOIL PROPERTIES

LL: 46.0%
PL: 18.0%
PI: 28.0%
CLASS: Lean Clay (CL),gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

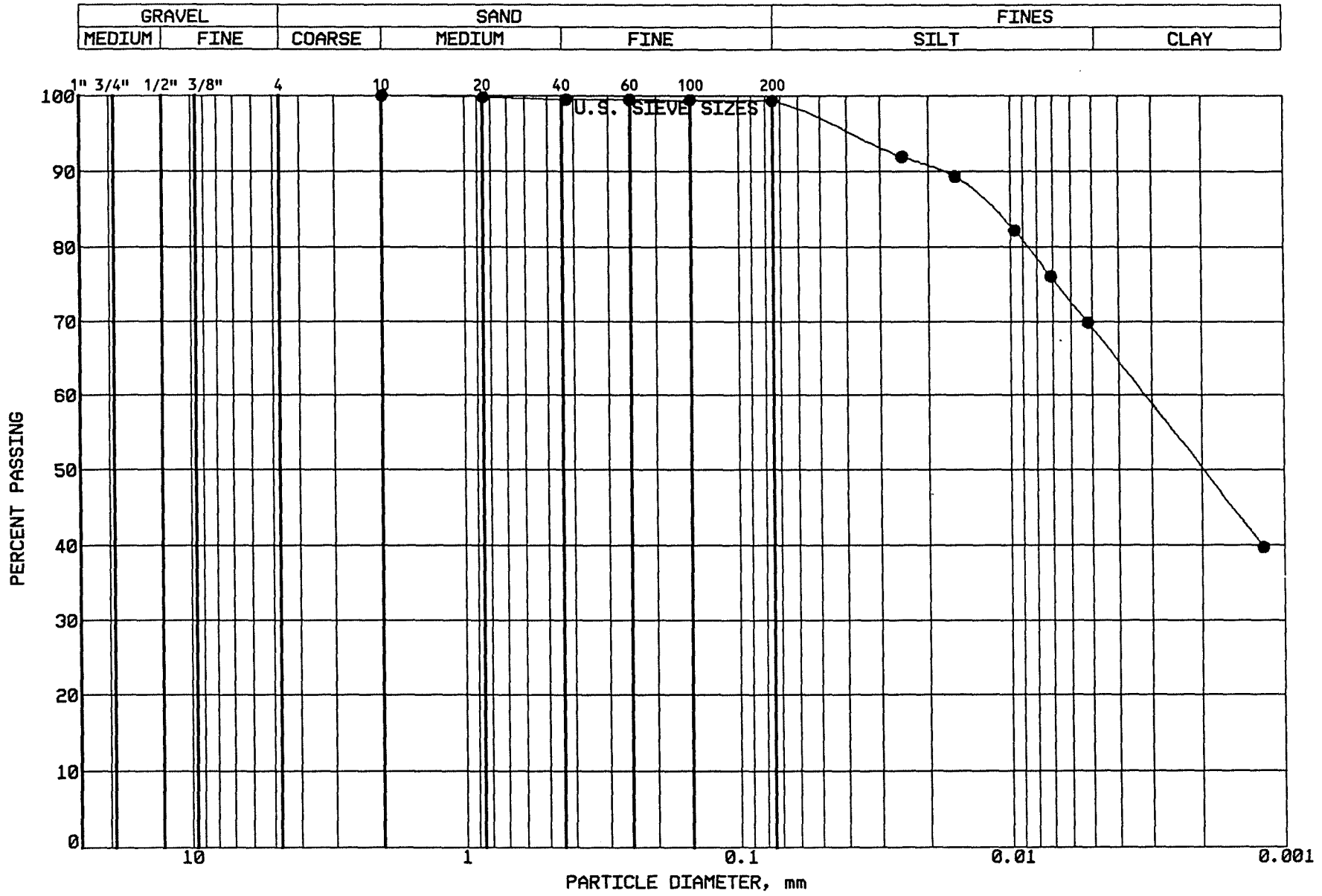
LOCATION: N 38833.0, E 39841.0
SAMPLE: DC-CC225 TUBE #: ST.34
ELEVATION: 1904.2'

GRAVEL	0.0 %
SAND	1.5 %
SILT	42.1 %
CLAY	56.4 %
P 200	98.5 %

SOIL PROPERTIES

LL: 44.0%
PL: 17.0%
PI: 27.0%
CLASS: Lean Clay (CL), gray

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38843.0, E 39956.0
SAMPLE: DC-CC226 TUBE #: ST.35
ELEVATION: 1905.2'

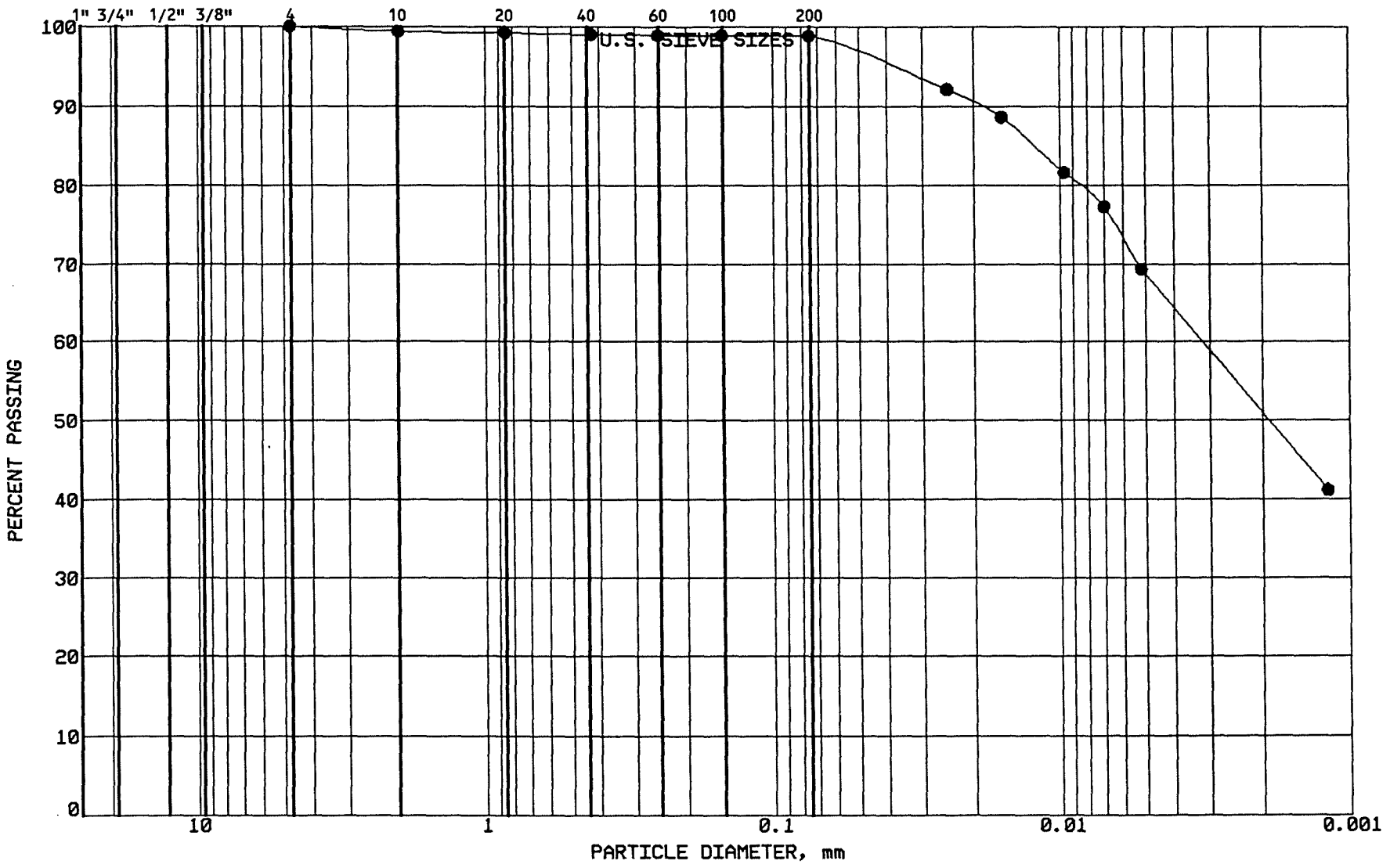
GRAVEL	0.0 %
SAND	0.7 %
SILT	30.3 %
CLAY	69.0 %
P 200	99.3 %

SOIL PROPERTIES

LL: 51.0%
PL: 19.0%
PI: 32.0%
CLASS: Fat Clay (CH), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

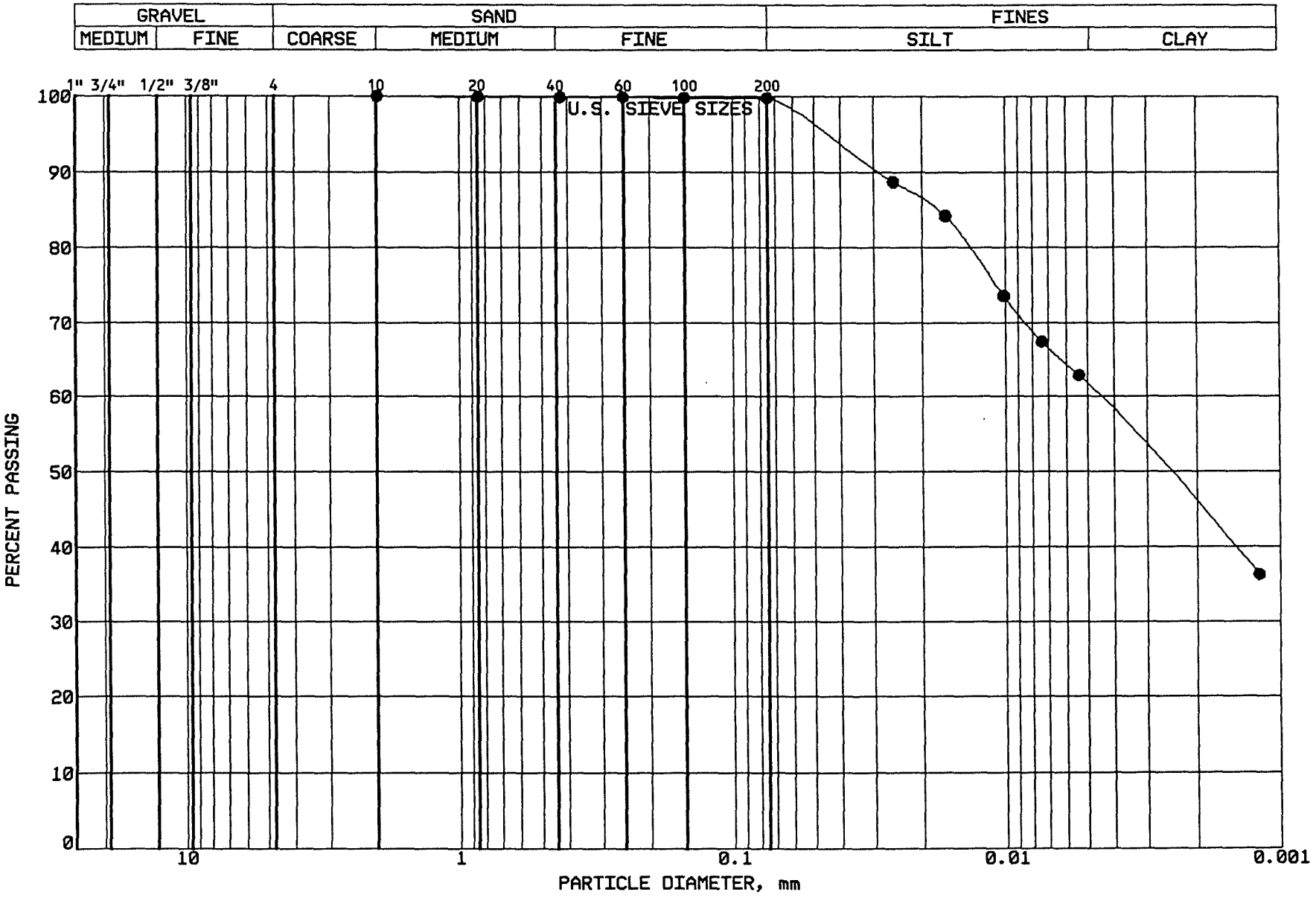
LOCATION: N 38837.0, E 39859.0
SAMPLE: DC-CC227 TUBE #:
ELEVATION: 1908.3'

GRAVEL	0.0 %
SAND	1.2 %
SILT	30.3 %
CLAY	68.5 %
P 200	98.8 %

SOIL PROPERTIES

LL: 60.0%
PL: 22.0%
PI: 38.0%
CLASS: Fat Clay (CH), dk gr.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

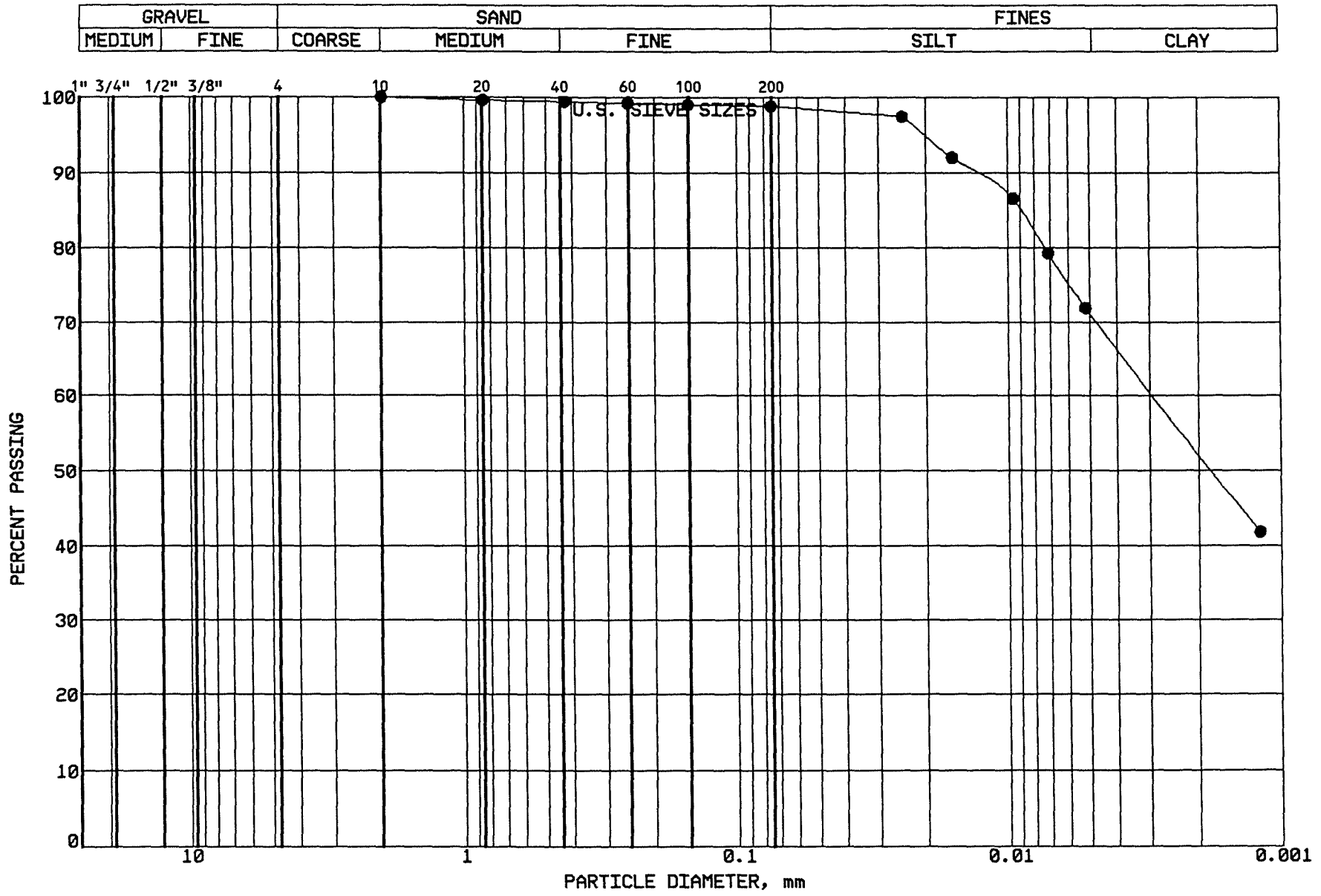
LOCATION: N 38843.0, E 40078.0
SAMPLE: DC-CC228 TUBE #: ST.36
ELEVATION: 1907.9'

GRAVEL	0.0 %
SAND	0.2 %
SILT	38.3 %
CLAY	61.5 %
P 200	99.8 %

SOIL PROPERTIES

LL: 49.0%
PL: 19.0%
PI: 30.0%
CLASS: Lean Clay (CL), gray.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

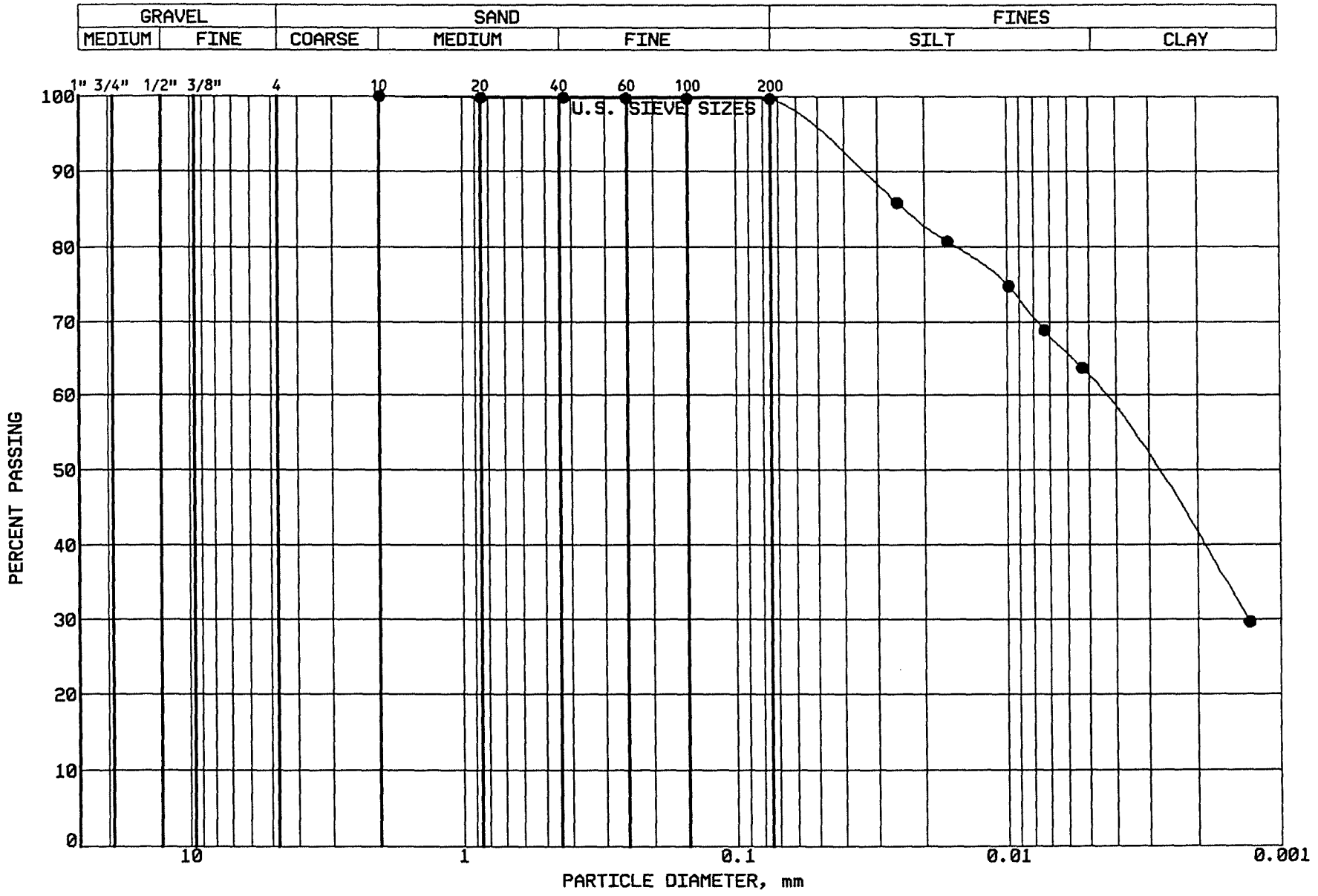
LOCATION: N 38847.0, E 40206.0
SAMPLE: DC-CC229 TUBE #: ST.37
ELEVATION: 1909.6'

GRAVEL	0.0 %
SAND	1.2 %
SILT	27.7 %
CLAY	71.1 %
P 200	98.8 %

SOIL PROPERTIES

LL: 59.0%
PL: 21.0%
PI: 38.0%
CLASS: Fat Clay (CH), vy dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

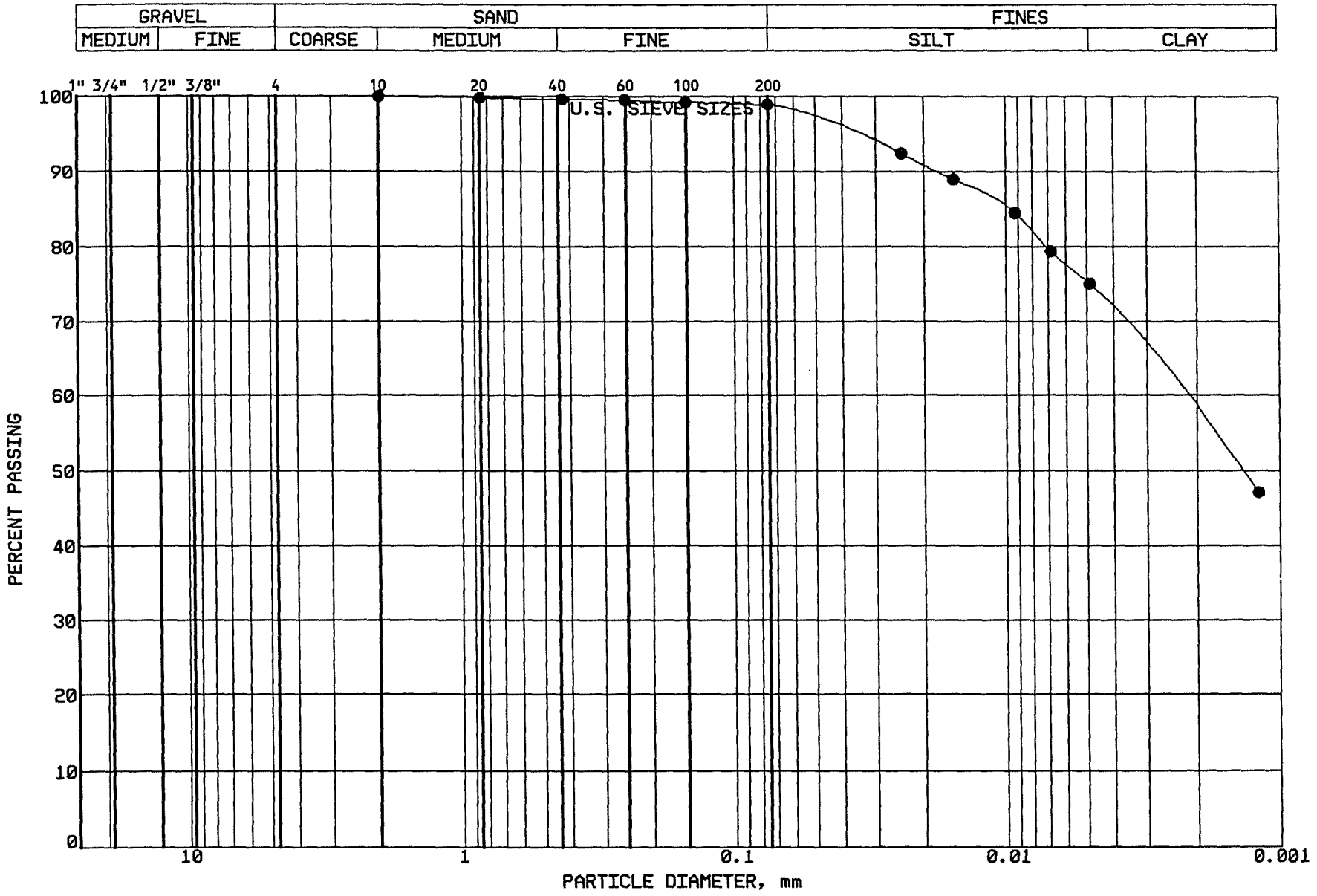
LOCATION: N 38848.0, E 39749.0
SAMPLE: DC-CC230 TUBE #: ST.38
ELEVATION: 1916.2'

GRAVEL	0.0 %
SAND	0.3 %
SILT	37.4 %
CLAY	62.3 %
P 200	99.7 %

SOIL PROPERTIES

LL: 46.0%
PL: 19.0%
PI: 27.0%
CLASS: Lean Clay (CL), vy dk-gr.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

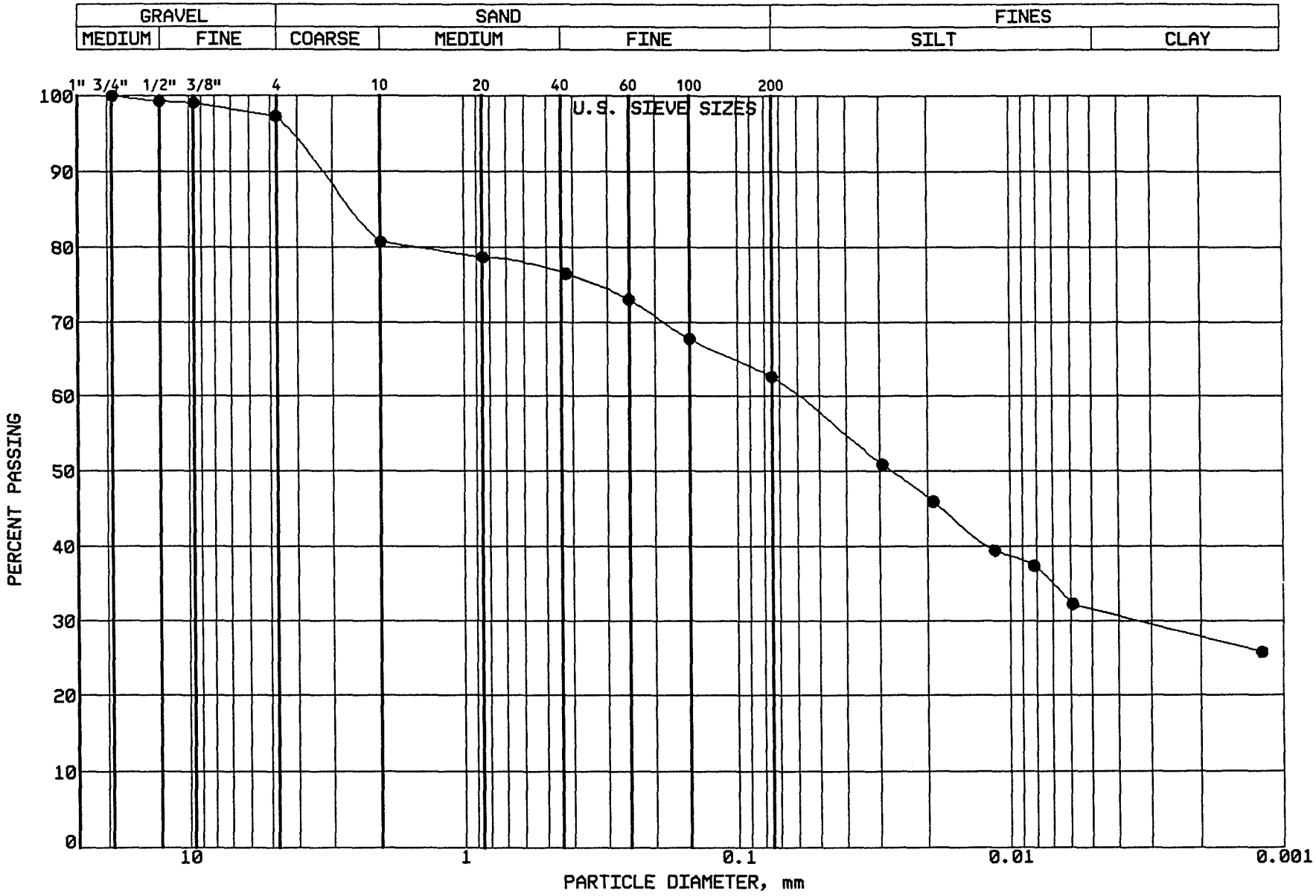
LOCATION: N 38845.0, E 39892.0
SAMPLE: DC-CC231 TUBE #:
ELEVATION: 1914.4'

GRAVEL	0.0 %
SAND	1.1 %
SILT	23.6 %
CLAY	75.3 %
P 200	98.9 %

SOIL PROPERTIES

LL: 64.0%
PL: 24.0%
PI: 40.0%
CLASS: Fat Clay (CH), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

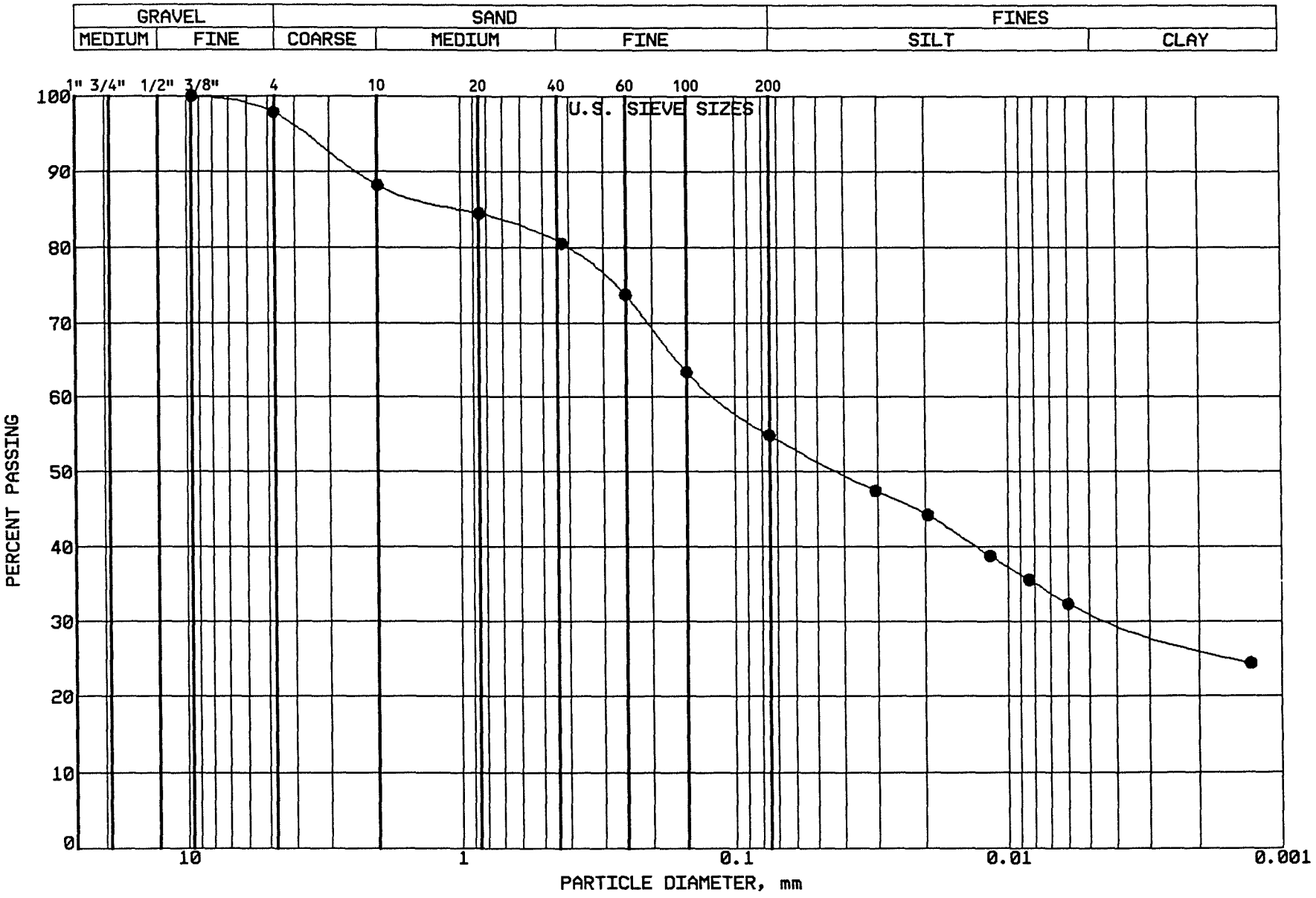
LOCATION: N 38749.0, E 39810.0
SAMPLE: SG-CC232 TUBE #:
ELEVATION: 1901.2'

GRAVEL	2.8 %
SAND	34.6 %
SILT	31.1 %
CLAY	31.5 %
P 200	62.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay(CL), dk br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

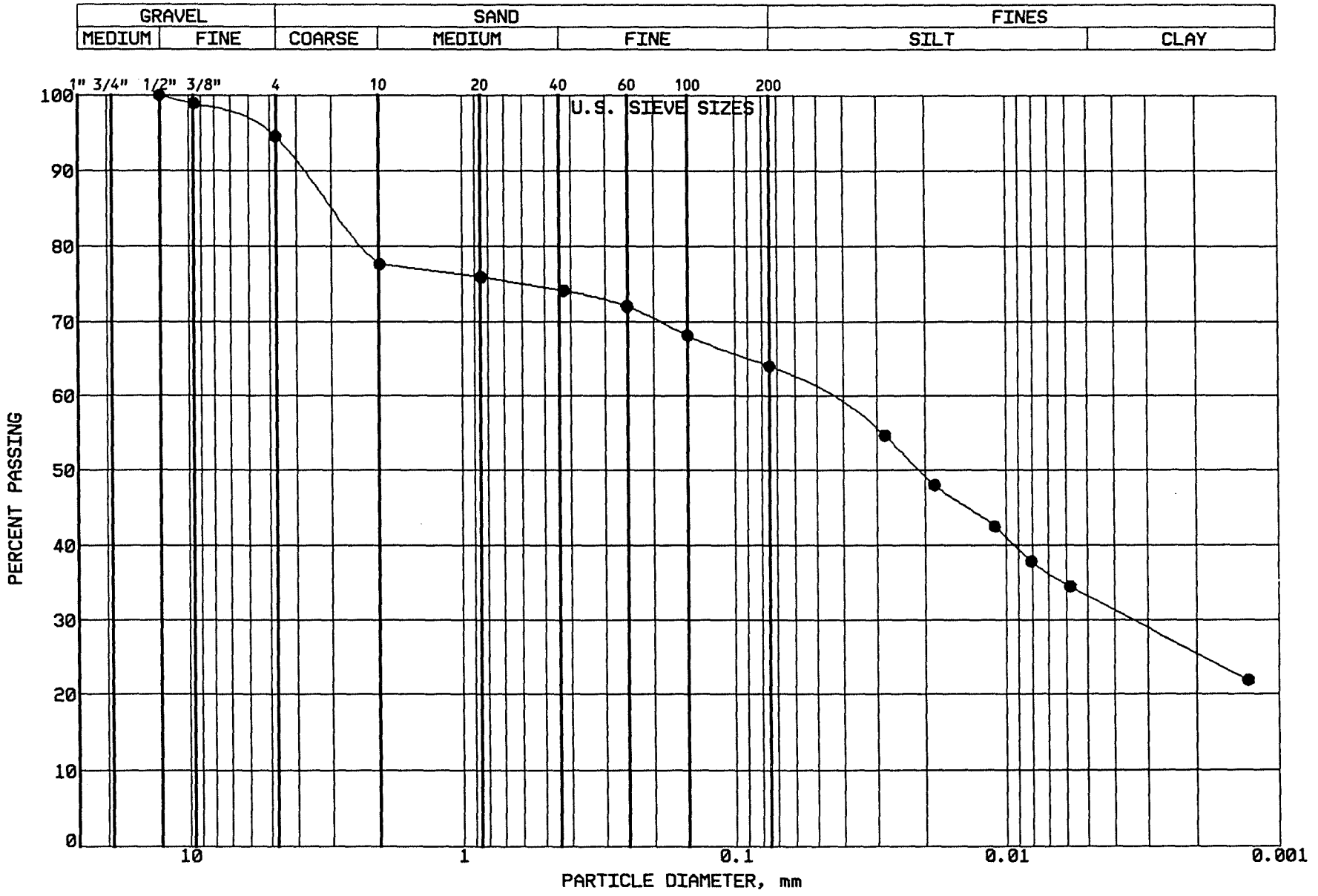
LOCATION: N 38745.0, E 40040.0
SAMPLE: SG-CC233 TUBE #:
ELEVATION: 1900.2'

GRAVEL	2.2 %
SAND	42.9 %
SILT	23.5 %
CLAY	31.4 %
P 200	54.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

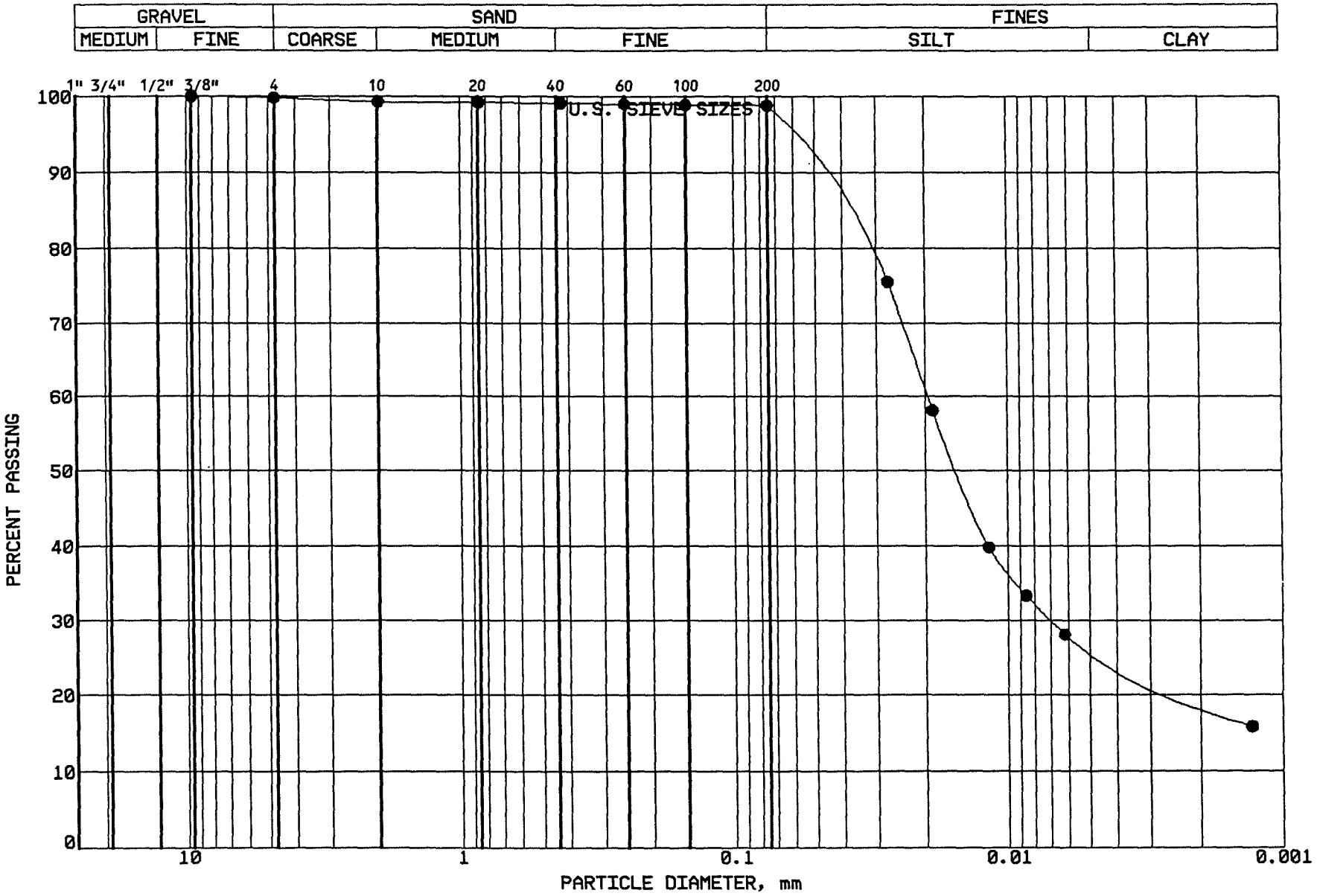
LOCATION: N 38379.0, E 40237.0
SAMPLE: SG-CC234 TUBE #:
ELEVATION: 1899.8'

GRAVEL	5.5 %
SAND	30.5 %
SILT	30.8 %
CLAY	33.2 %
P 200	64.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: SAndy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

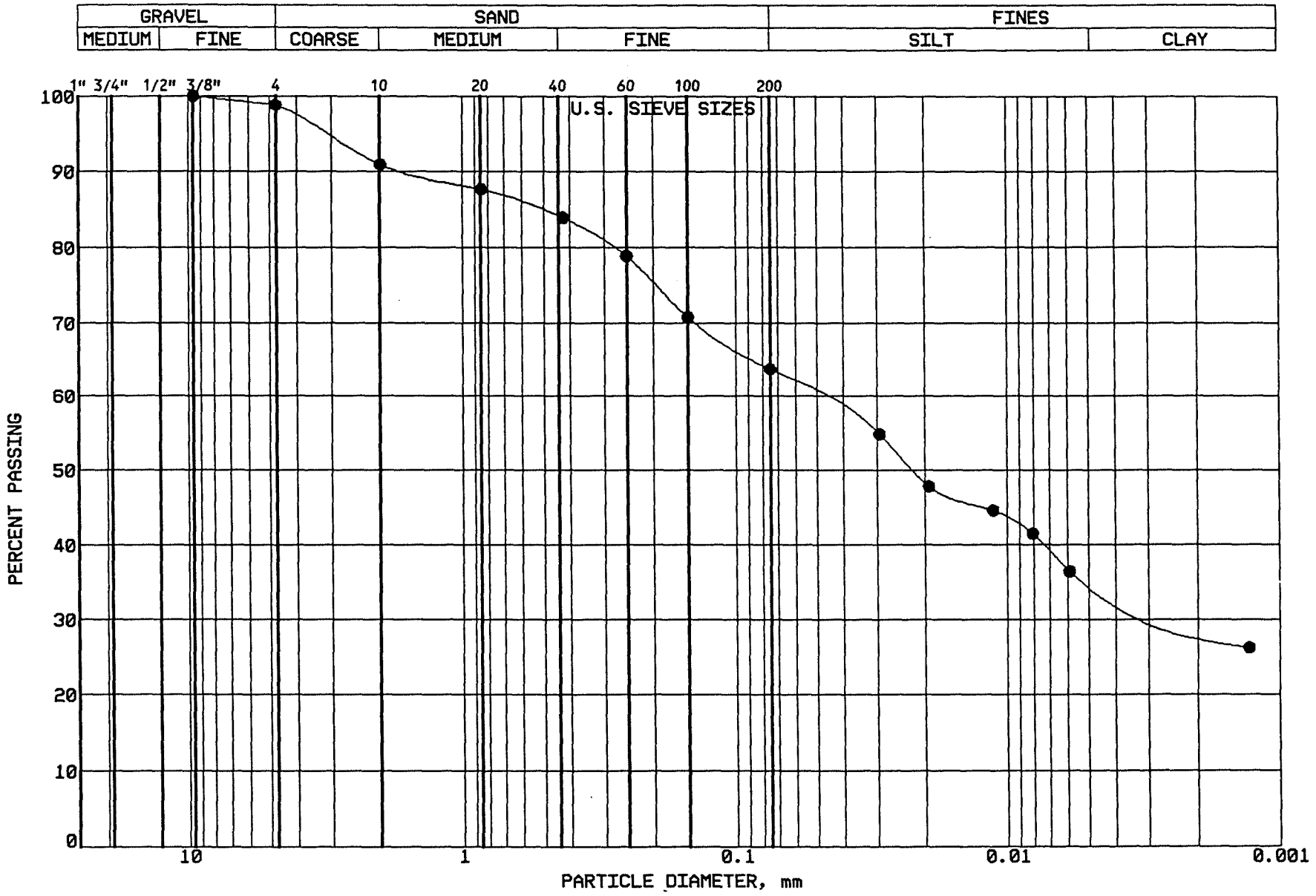
LOCATION: N 38526.0, E 40339.0
SAMPLE: SG-CC235 TUBE #:
ELEVATION: 1900.2'

GRAVEL	0.2 %
SAND	1.0 %
SILT	72.4 %
CLAY	26.4 %
P 200	98.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Silt (ML), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

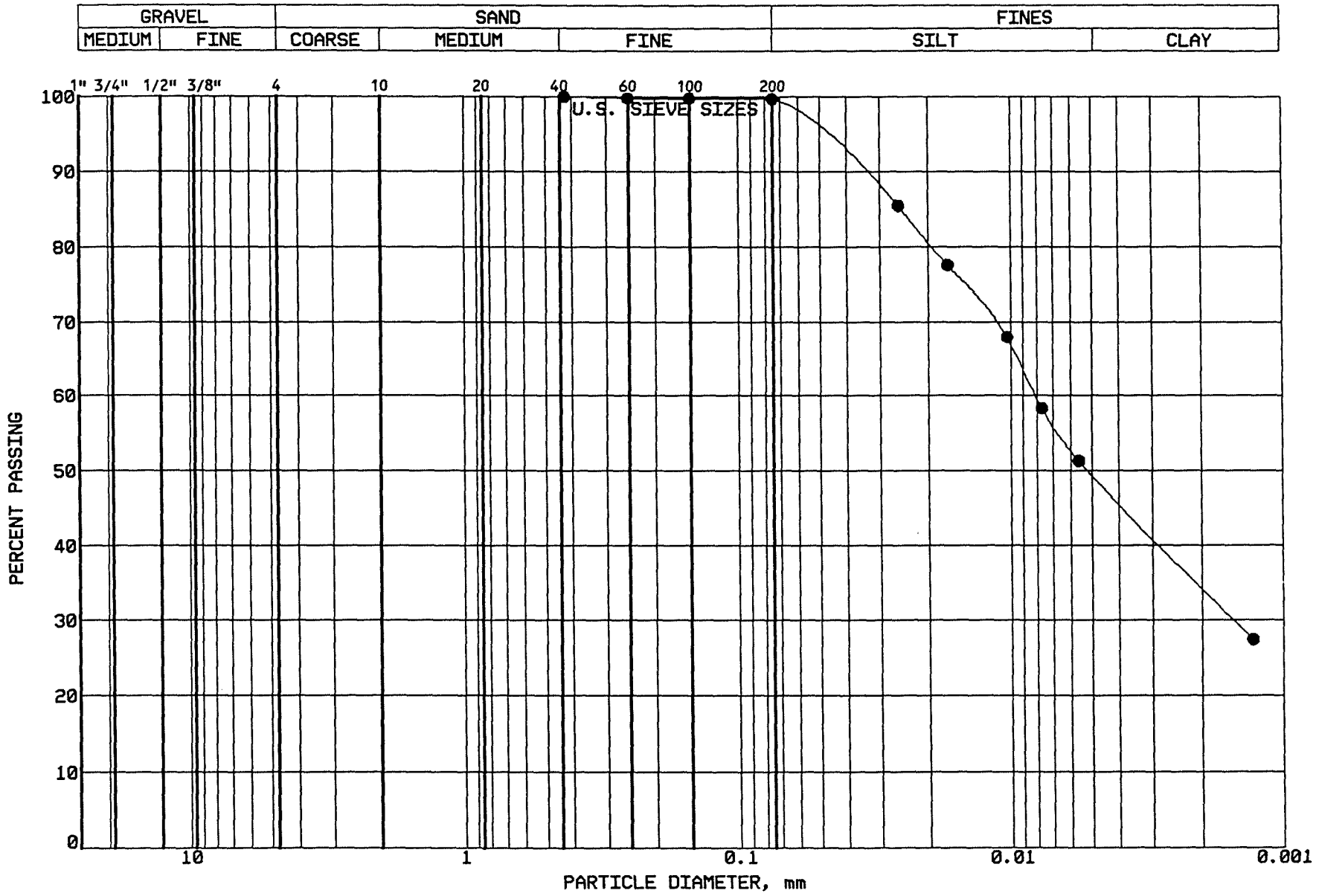
LOCATION: N 38530.0, E 40146.0
SAMPLE: SG-CC236 TUBE #:
ELEVATION: 1901.2'

GRAVEL	1.2 %
SAND	35.1 %
SILT	28.4 %
CLAY	35.3 %
P 200	63.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

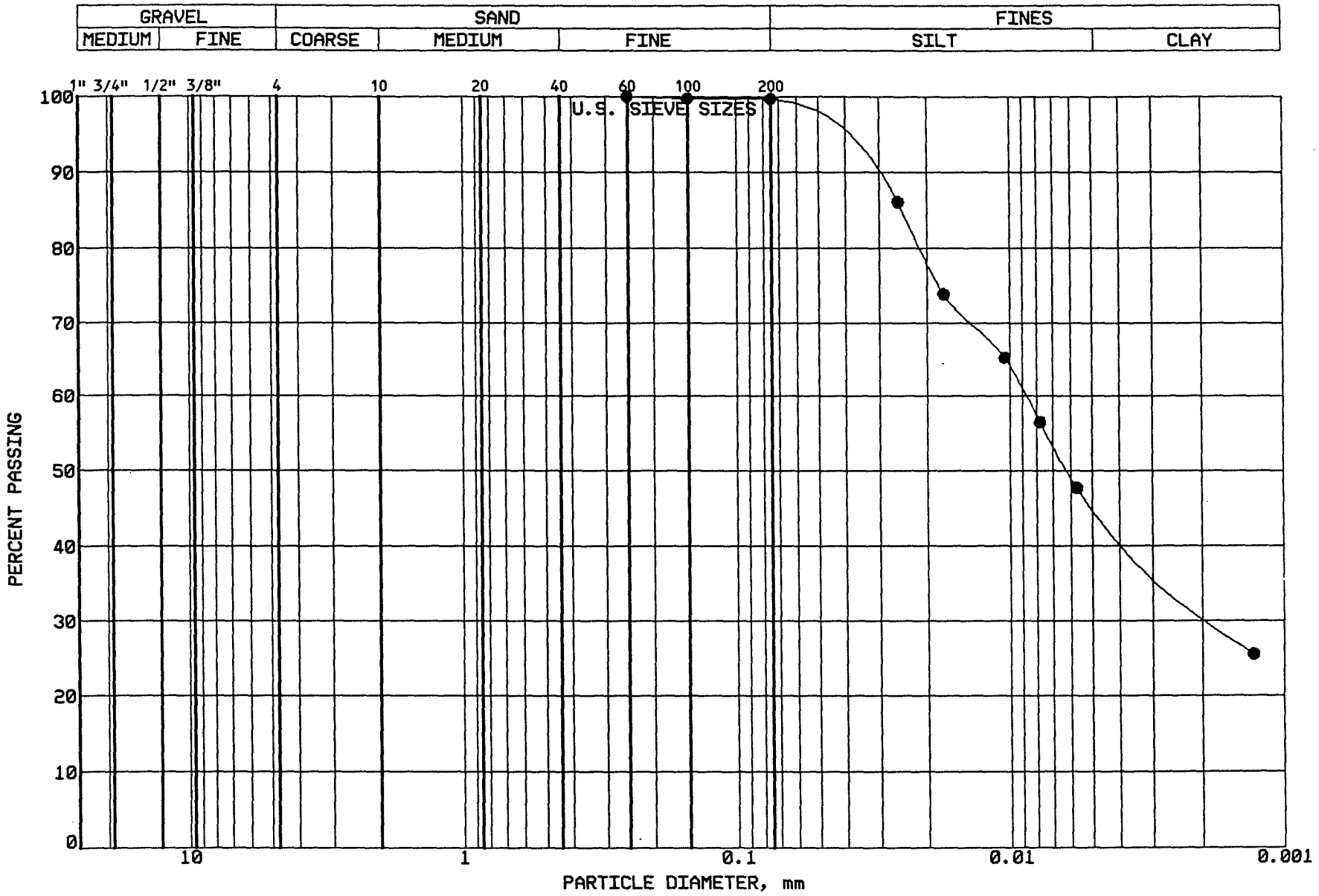
LOCATION: N 38533.0, E 39955.0
SAMPLE: SG-CC237 TUBE #:
ELEVATION: 1901.9'

GRAVEL	0.0 %
SAND	0.3 %
SILT	50.3 %
CLAY	49.4 %
P 200	99.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

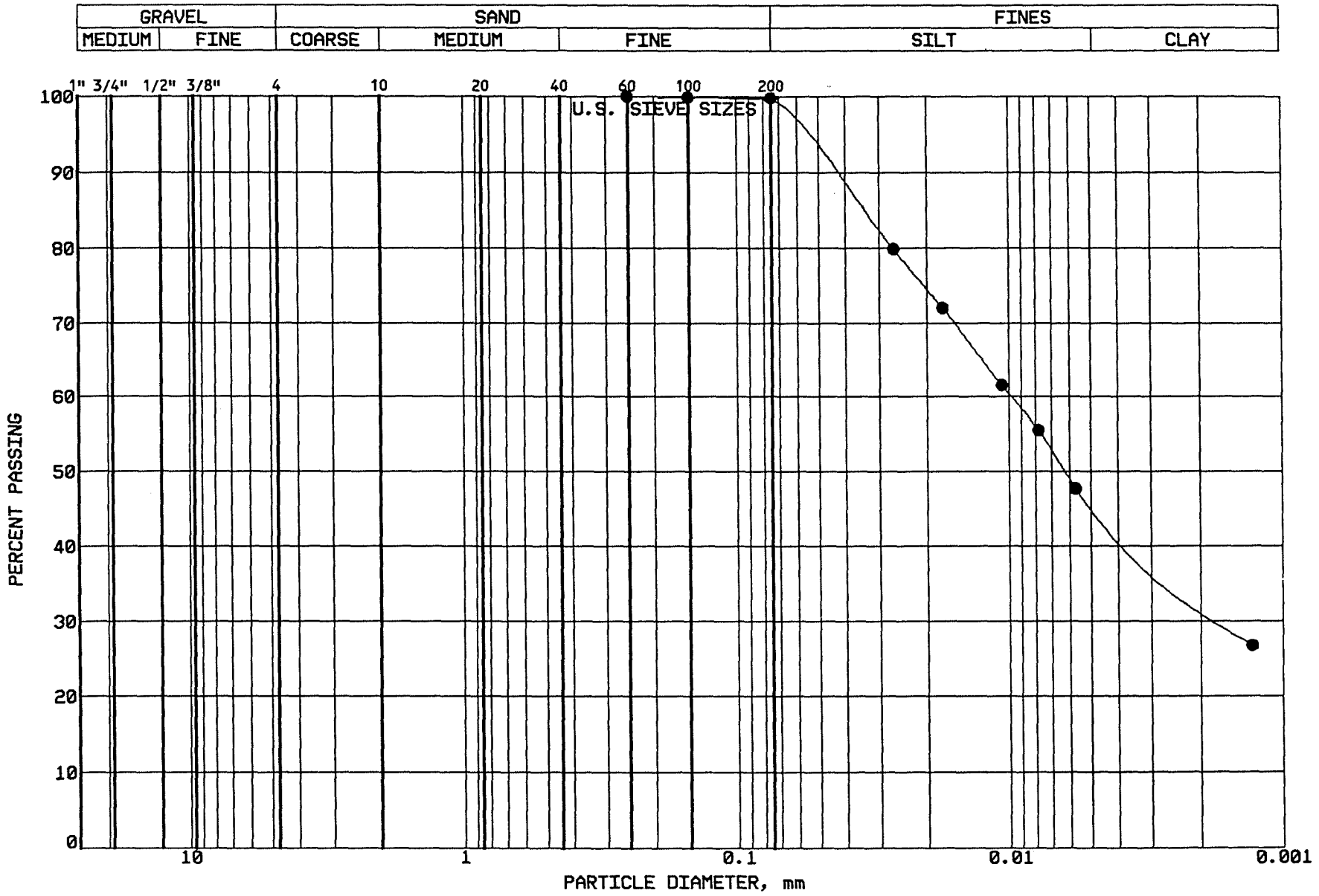
LOCATION: N 38536.0, E 39769.0
SAMPLE: SG-CC238 TUBE #:
ELEVATION: 1902.6'

GRAVEL	0.0 %
SAND	0.3 %
SILT	54.0 %
CLAY	45.7 %
P 200	99.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

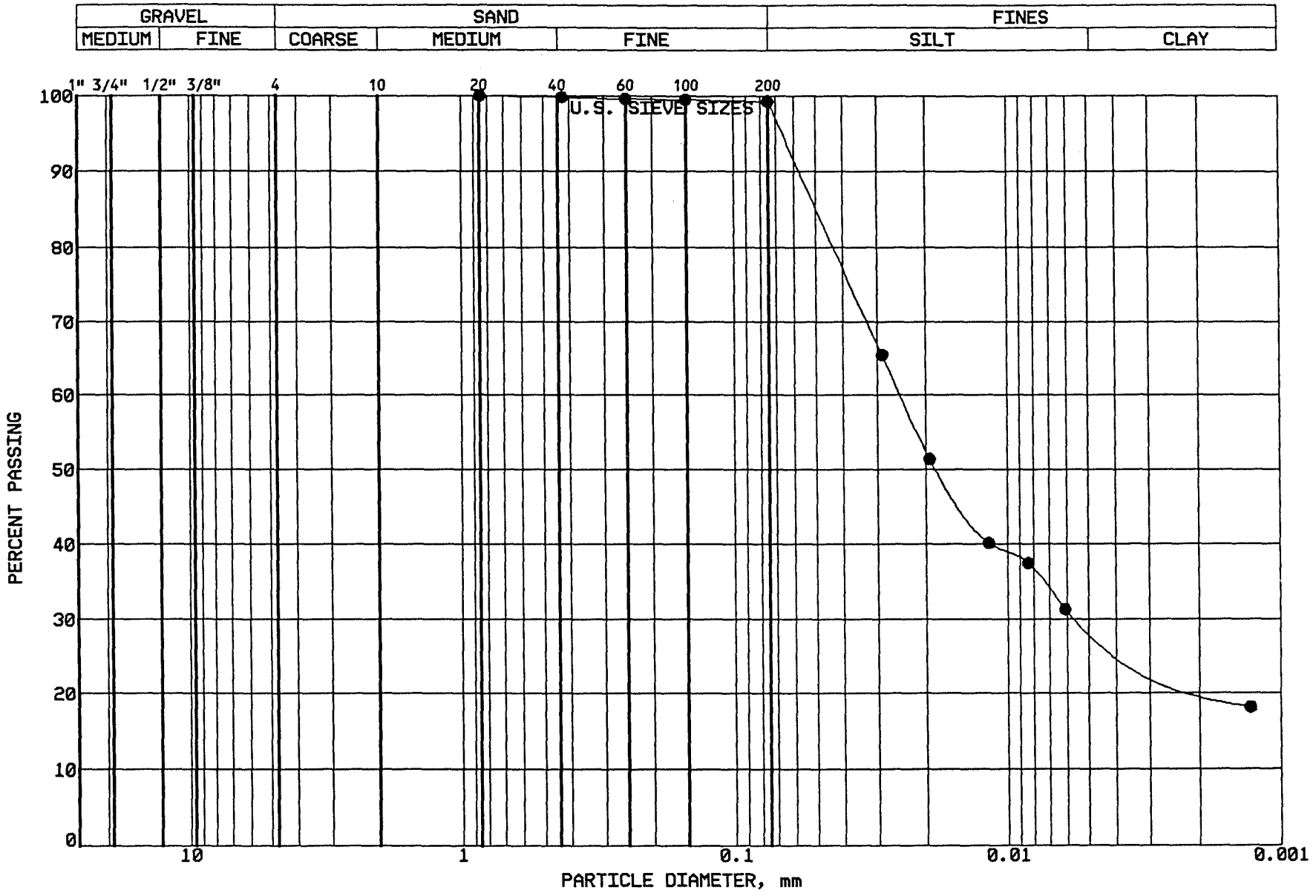
LOCATION: N 38338.0, E 39862.0
SAMPLE: SG-CC239 TUBE #:
ELEVATION: 1903.3'

GRAVEL	0.0 %
SAND	0.2 %
SILT	54.0 %
CLAY	45.8 %
P 200	99.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

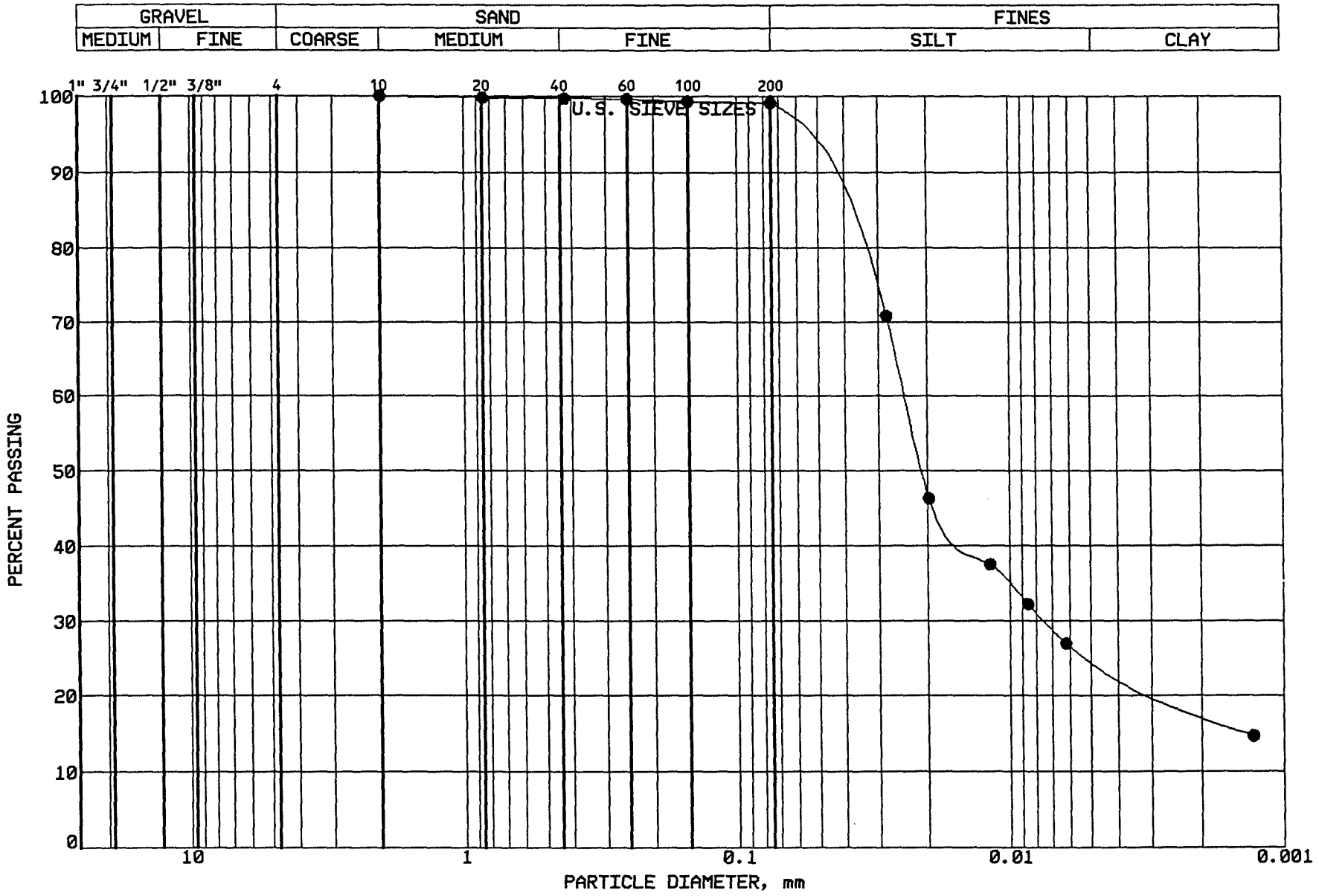
LOCATION: N 38330.0, E 40039.0
SAMPLE: SG-CC240 TUBE #:
ELEVATION: 1902.2'

GRAVEL	0.0 %
SAND	0.8 %
SILT	69.6 %
CLAY	29.6 %
P 200	99.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH), gray

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

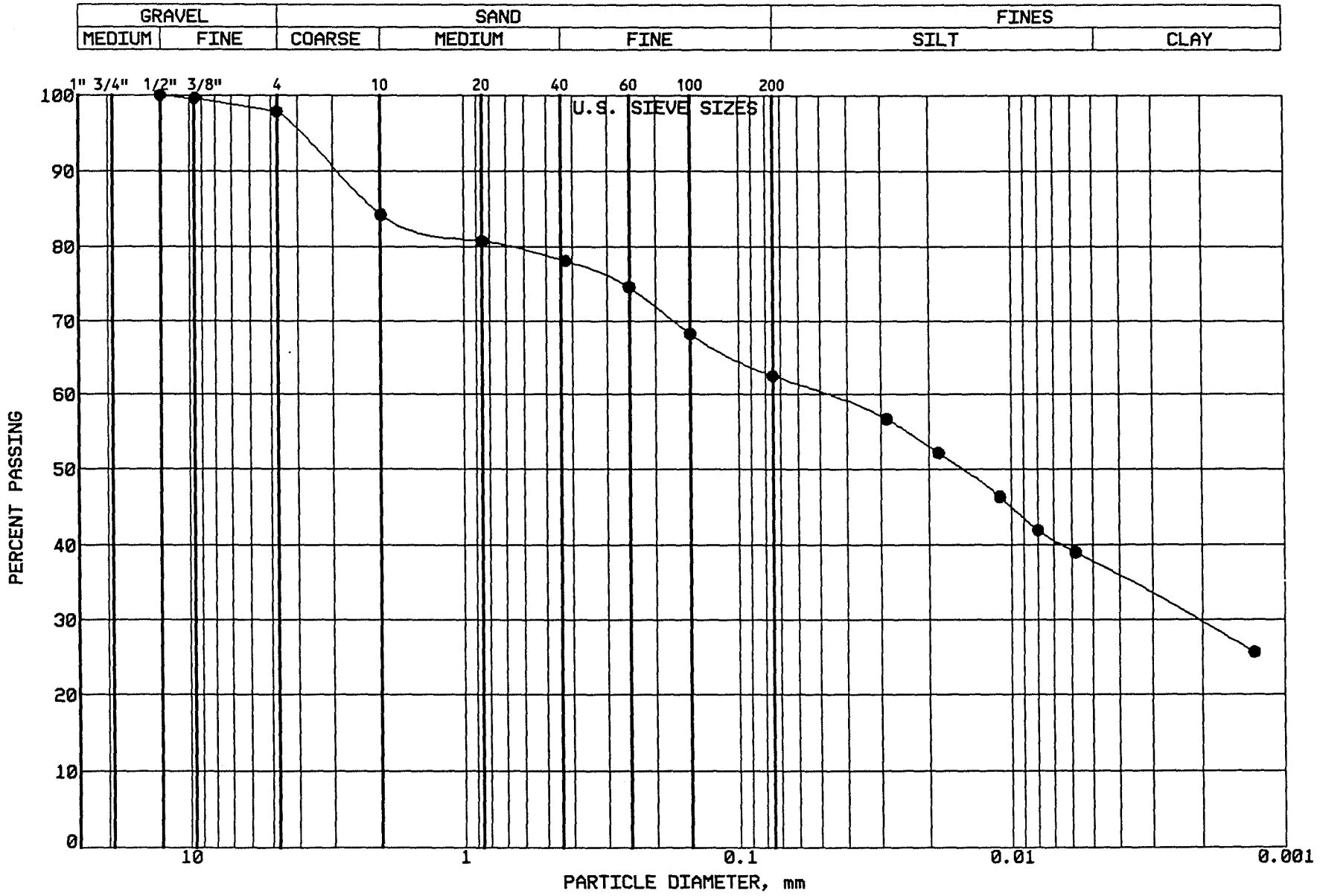
LOCATION: N 38326.0, E 40236.0
SAMPLE: SG-CC241 TUBE #:
ELEVATION: 1901.5'

GRAVEL	0.0 %
SAND	0.9 %
SILT	73.8 %
CLAY	25.3 %
P 200	99.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

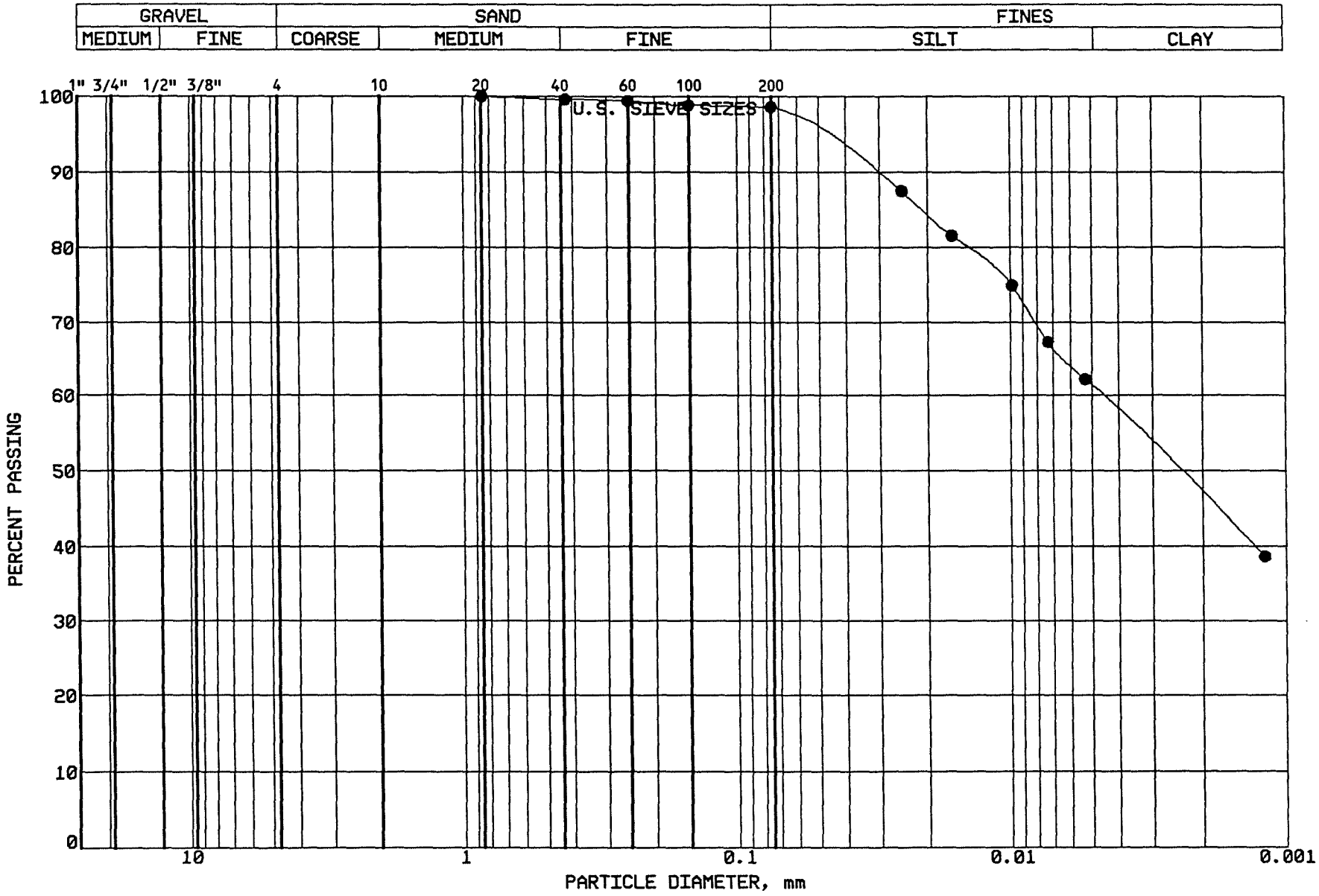
LOCATION: N 38315.0, E 40439.0
SAMPLE: SG-CC242 TUBE #:
ELEVATION: 1900.7'

GRAVEL	2.2 %
SAND	35.3 %
SILT	24.8 %
CLAY	37.7 %
P 200	62.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

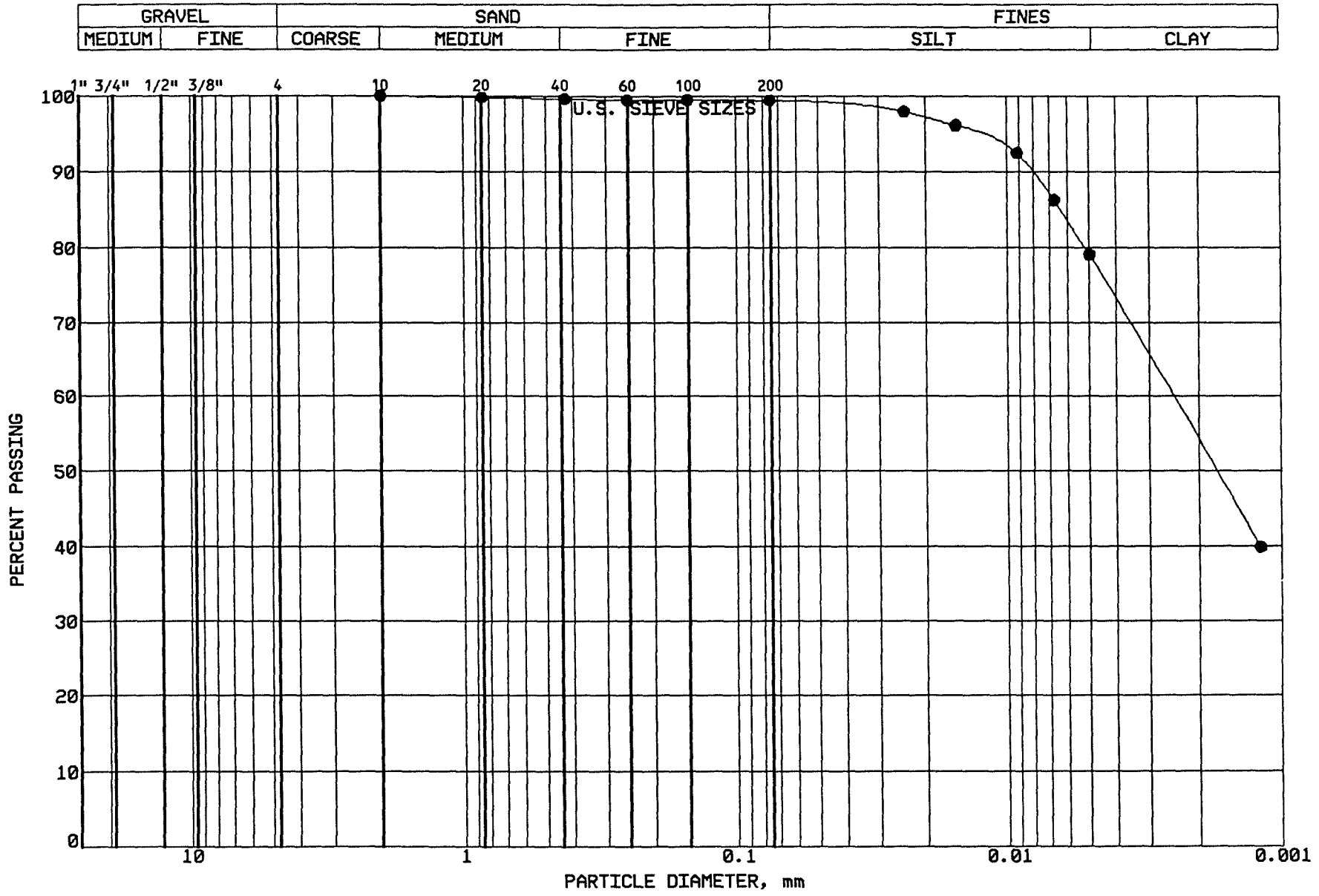
LOCATION: N 38208.0, E 39831.0
SAMPLE: SG-CC243 TUBE #:
ELEVATION: 1904.3'

GRAVEL	0.0 %
SAND	1.4 %
SILT	37.3 %
CLAY	61.3 %
P 200	98.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

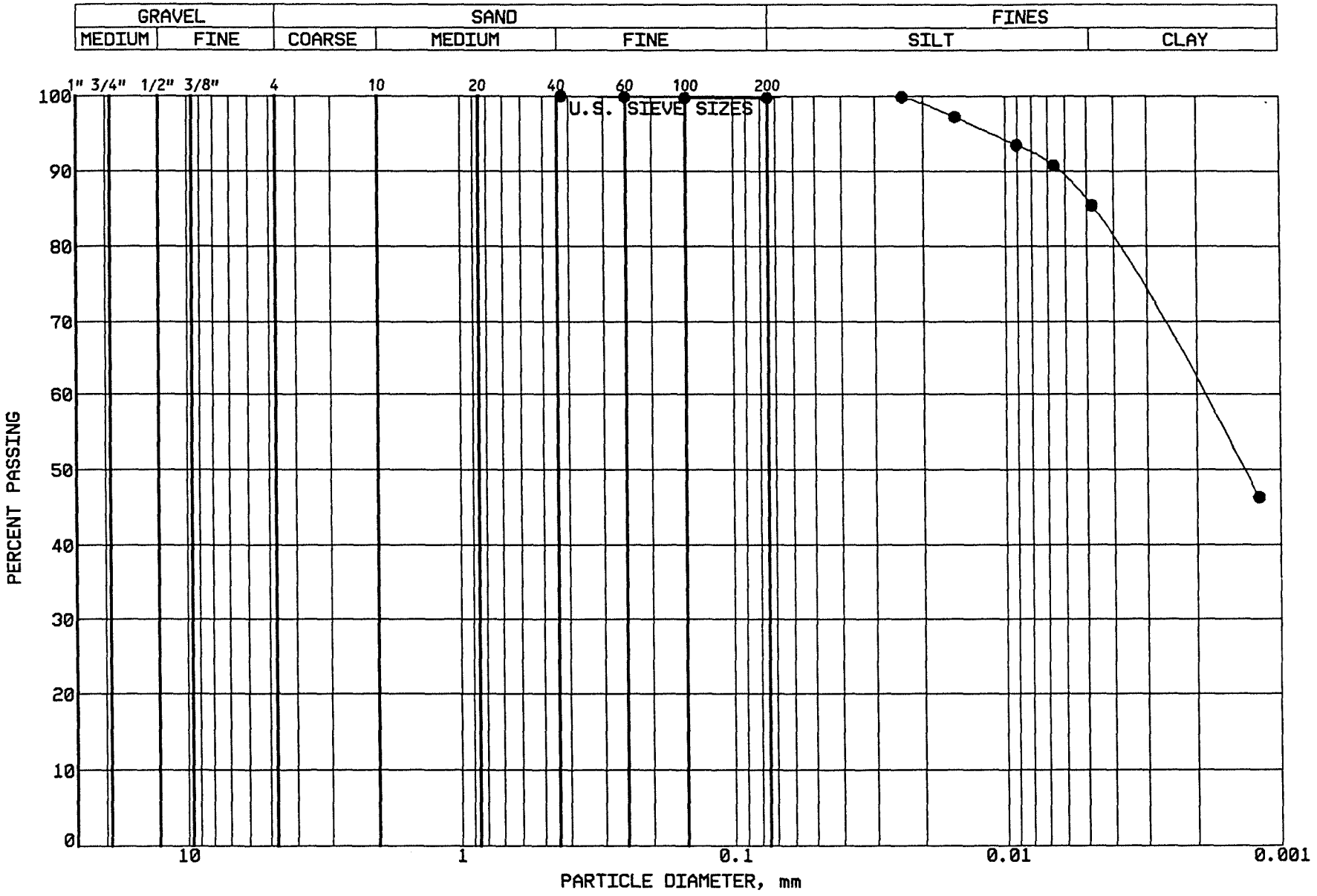
LOCATION: N 38207.0, E 39998.0
SAMPLE: SG-CC244 TUBE #:
ELEVATION: 1902.9'

GRAVEL	0.0 %
SAND	0.6 %
SILT	20.4 %
CLAY	79.0 %
P 200	99.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38209.0, E 40231.0
SAMPLE: SG-CC245 TUBE #:
ELEVATION: 1902.4'

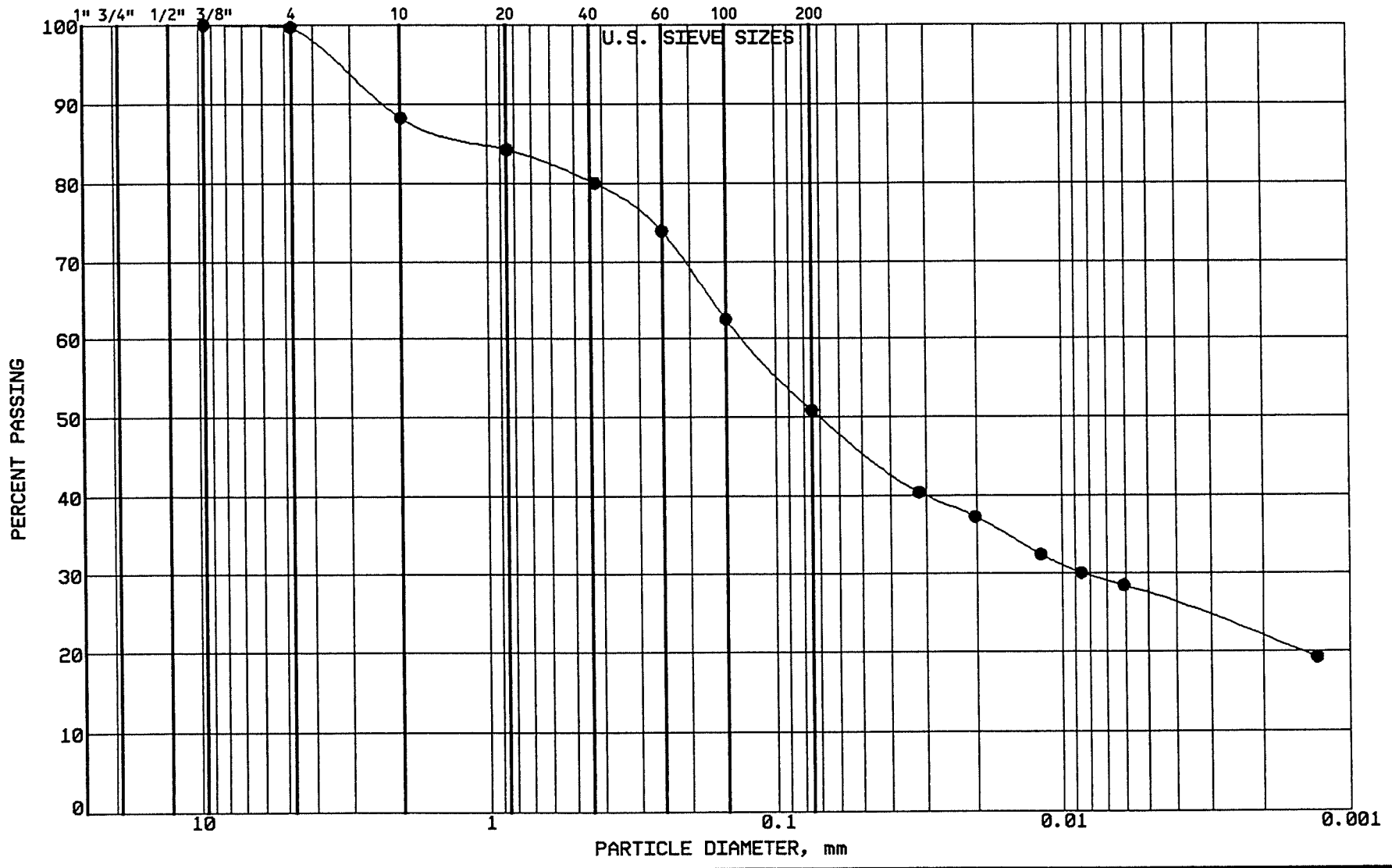
GRAVEL	0.0 %
SAND	0.2 %
SILT	13.7 %
CLAY	86.1 %
P 200	99.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

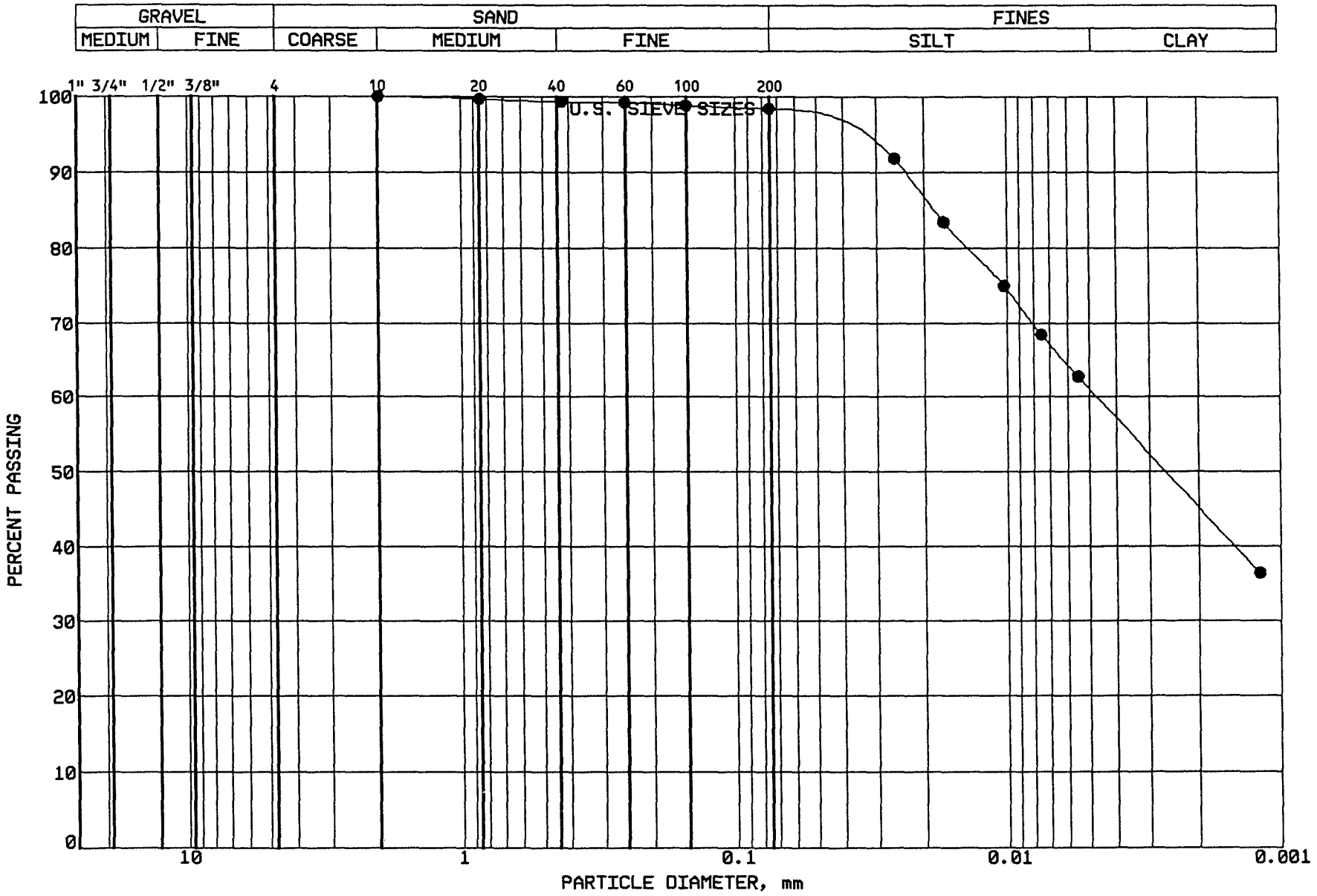
LOCATION: N 38203.0, E 40448.0
SAMPLE: SG-CC246 TUBE #:
ELEVATION: 1901.0'

GRAVEL	0.3 %
SAND	48.8 %
SILT	23.7 %
CLAY	27.2 %
P 200	50.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

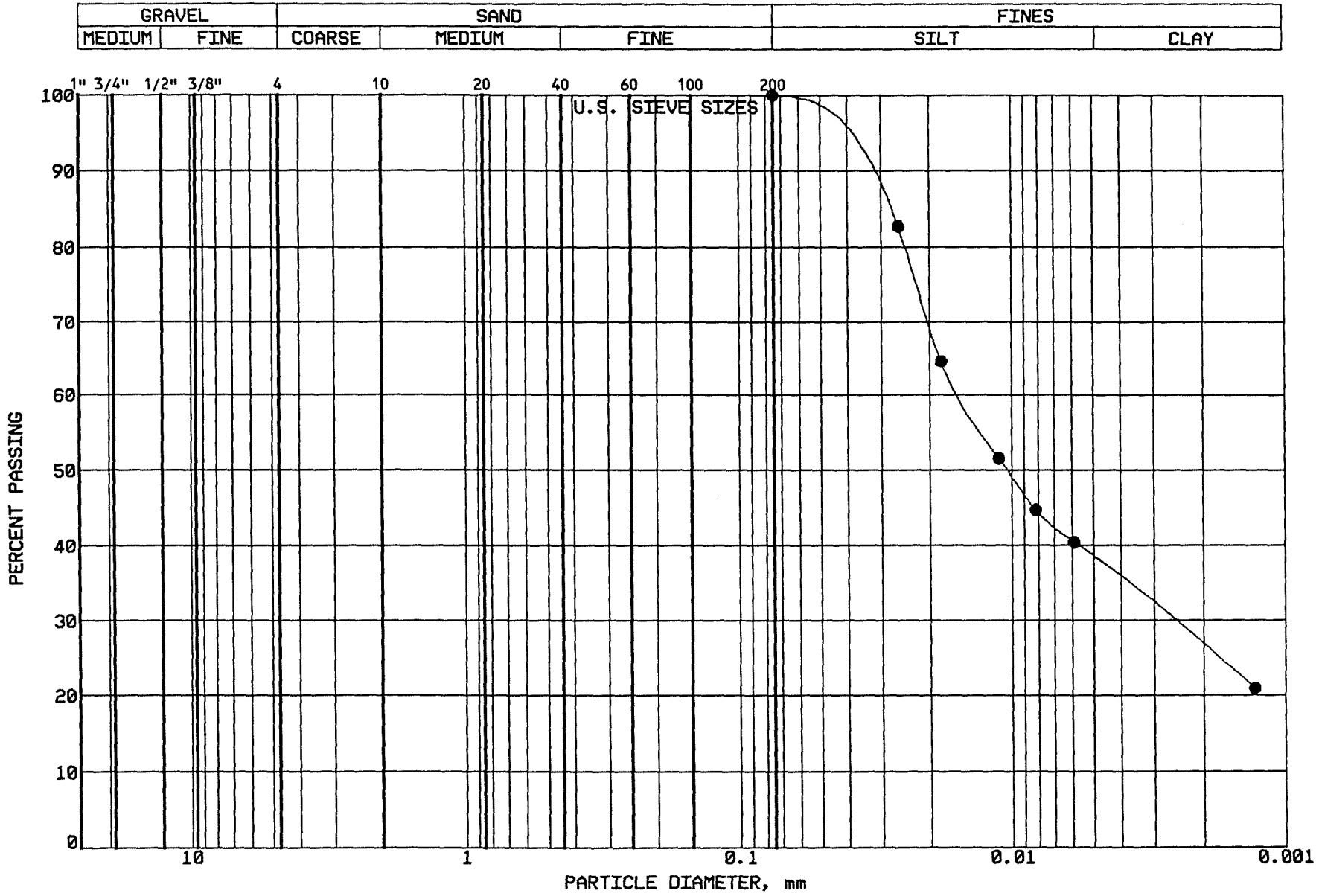
LOCATION: N 38082.0, E 40452.0
SAMPLE: SG-CC247 TUBE #:
ELEVATION: 1901.5'

GRAVEL	0.0 %
SAND	1.6 %
SILT	37.3 %
CLAY	61.1 %
P 200	98.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38082.0, E 40218.0
SAMPLE: SG-CC248 TUBE #:
ELEVATION: 1902.2'

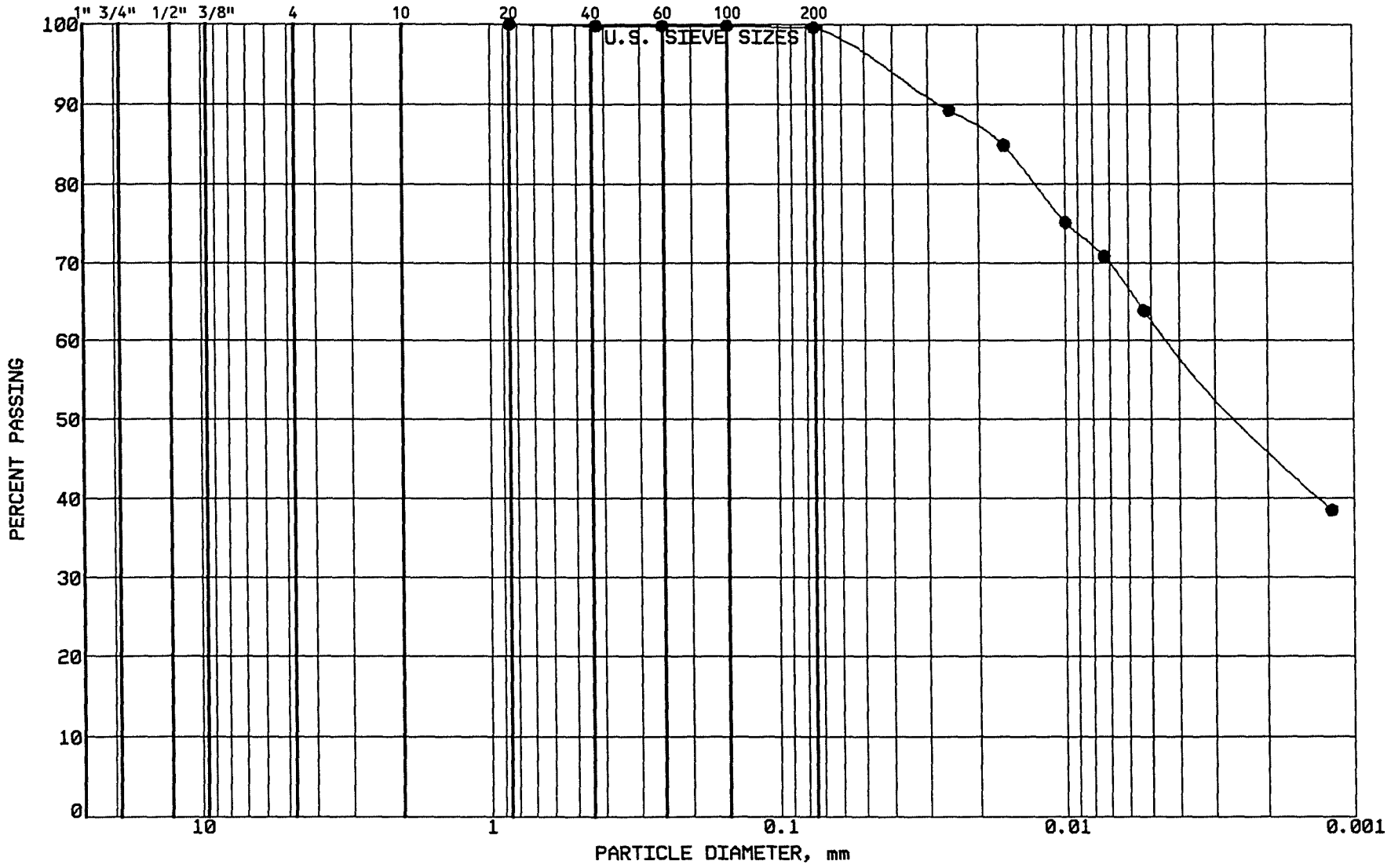
GRAVEL	0.0 %
SAND	0.0 %
SILT	61.7 %
CLAY	38.3 %
P 200	100.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

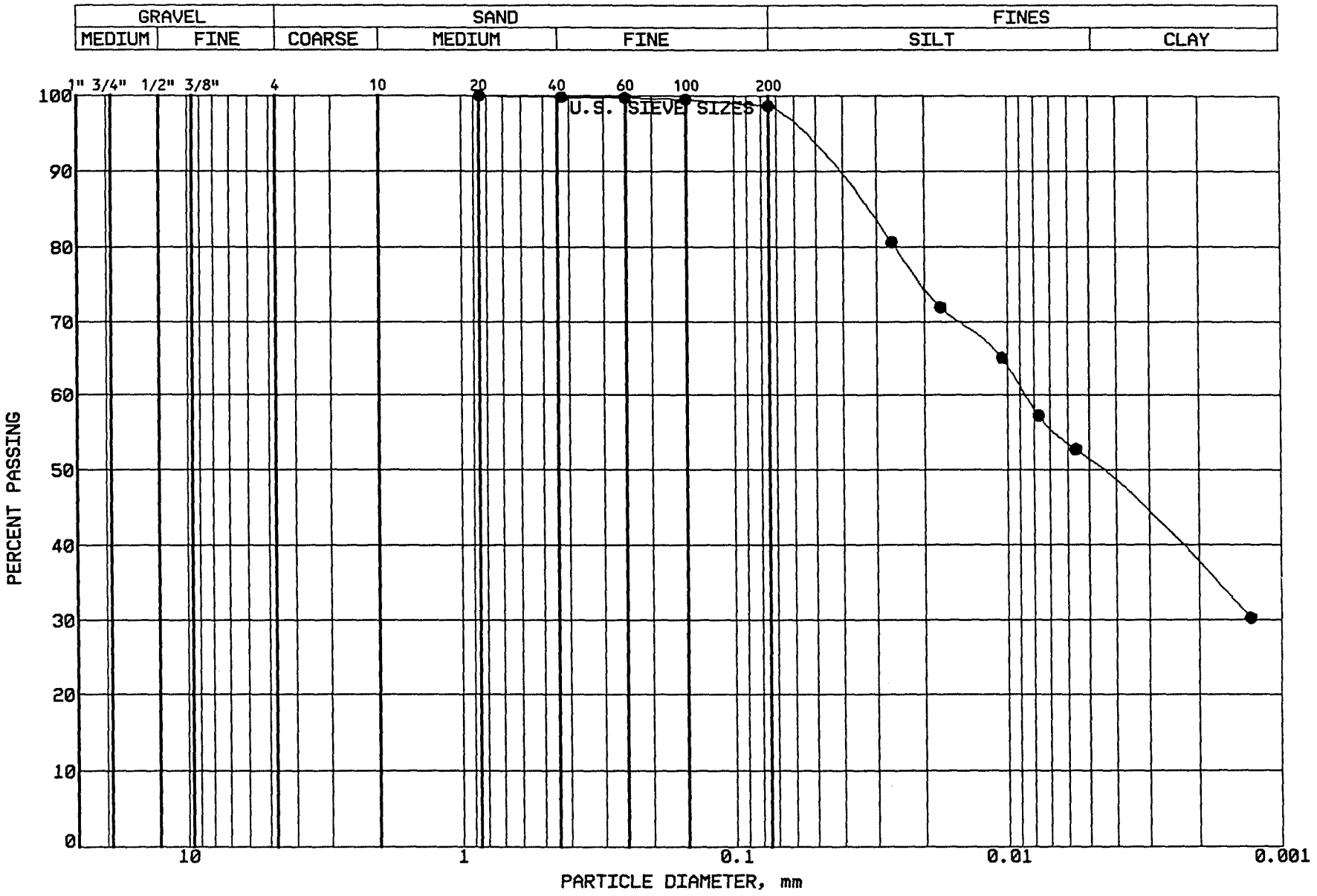
LOCATION: N 38095.0, E 39992.0
SAMPLE: SG-CC249 TUBE #:
ELEVATION: 1904.0'

GRAVEL	0.0 %
SAND	0.4 %
SILT	36.8 %
CLAY	62.8 %
P 200	99.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

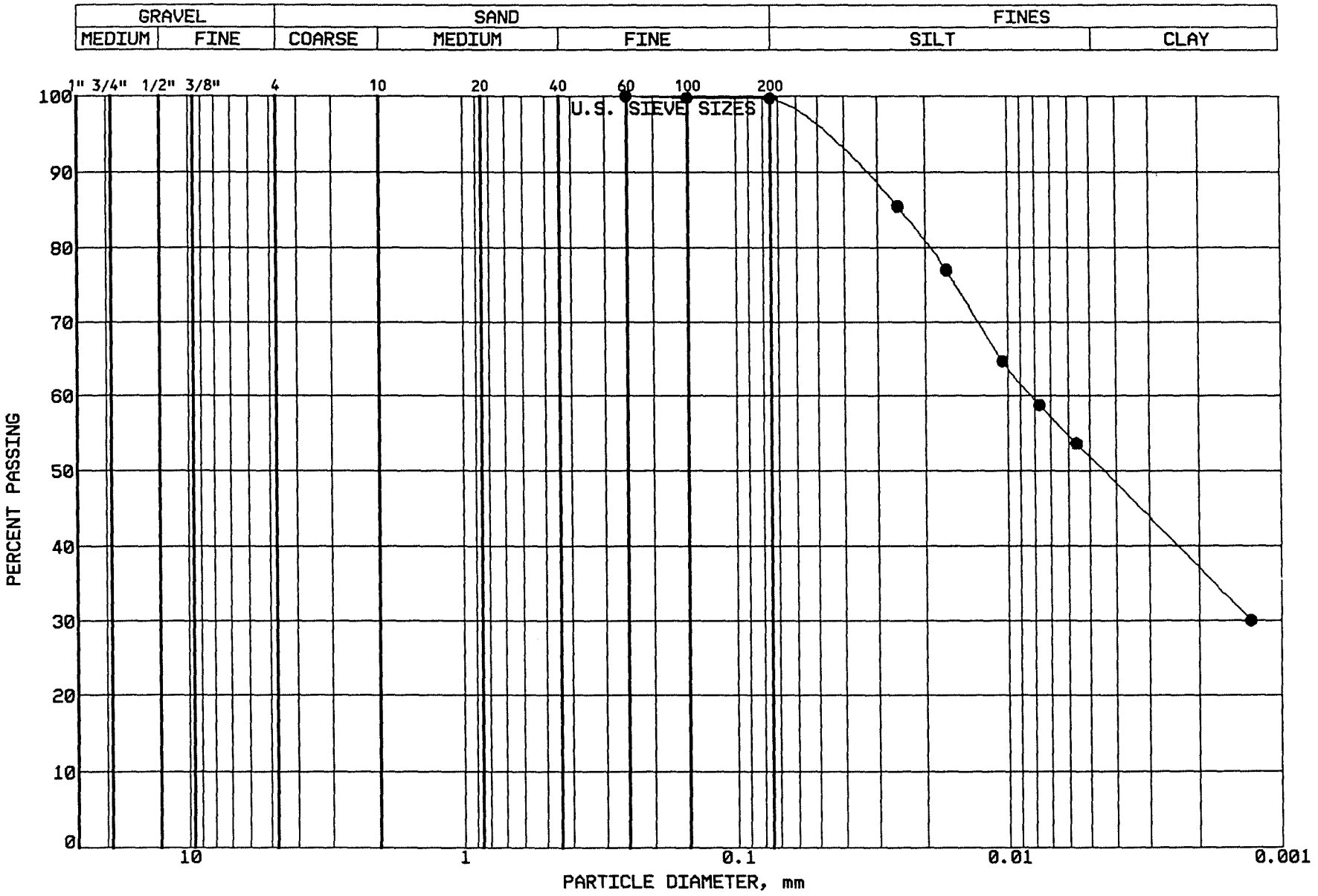
LOCATION: N 38092.0, E 39826.0
SAMPLE: SG-CC250 TUBE #:
ELEVATION: 1904.8'

GRAVEL	0.0 %
SAND	1.4 %
SILT	47.6 %
CLAY	51.0 %
P 200	98.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

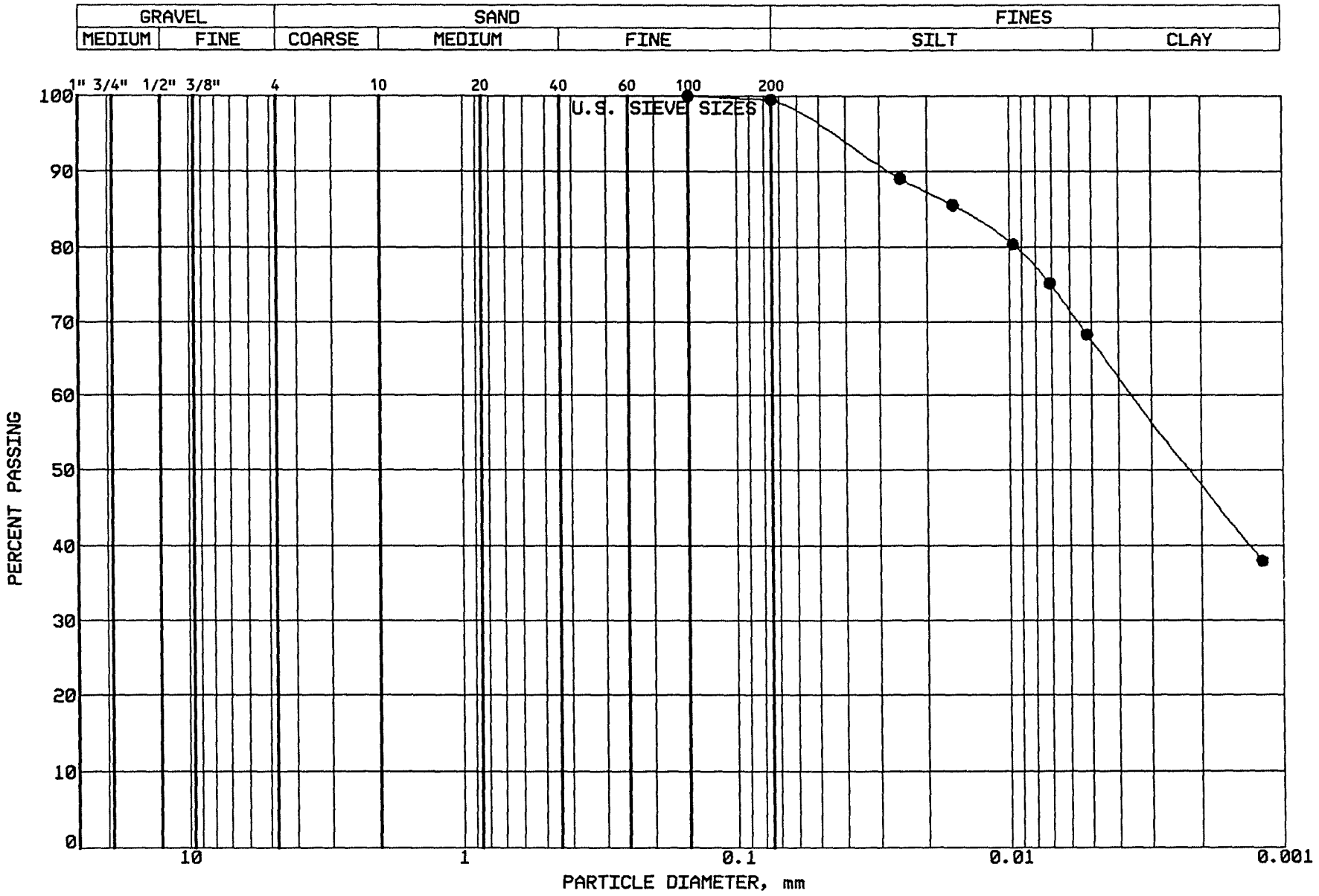
LOCATION: N 38004.0, E 39827.0
SAMPLE: SG-CC251 TUBE #:
ELEVATION: 1904.9'

GRAVEL	0.0 %
SAND	0.3 %
SILT	47.8 %
CLAY	51.9 %
P 200	99.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

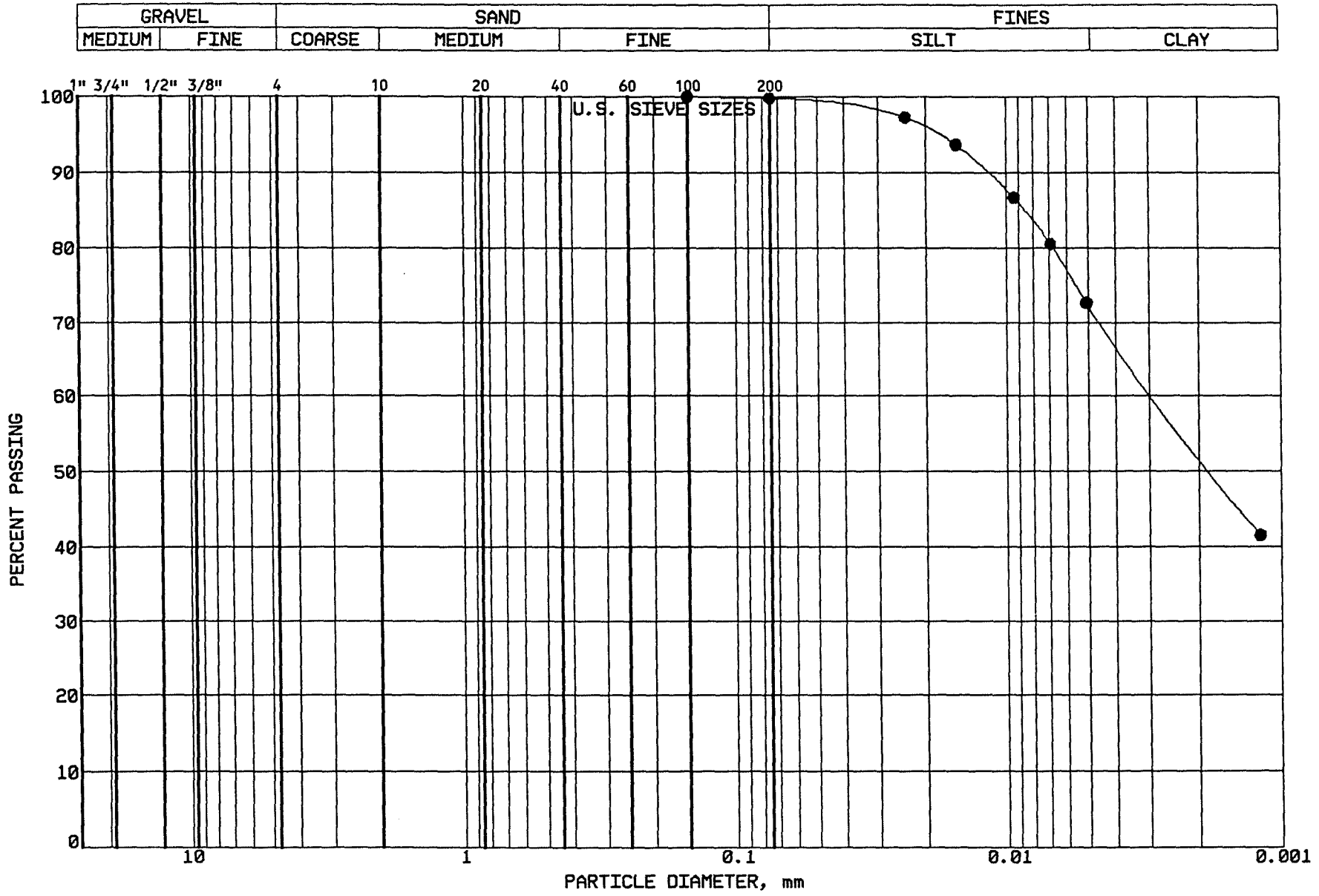
LOCATION: N 38004.0, E 40009.0
SAMPLE: SG-CC252 TUBE #:
ELEVATION: 1904.5'

GRAVEL	0.0 %
SAND	0.5 %
SILT	32.1 %
CLAY	67.4 %
P 200	99.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

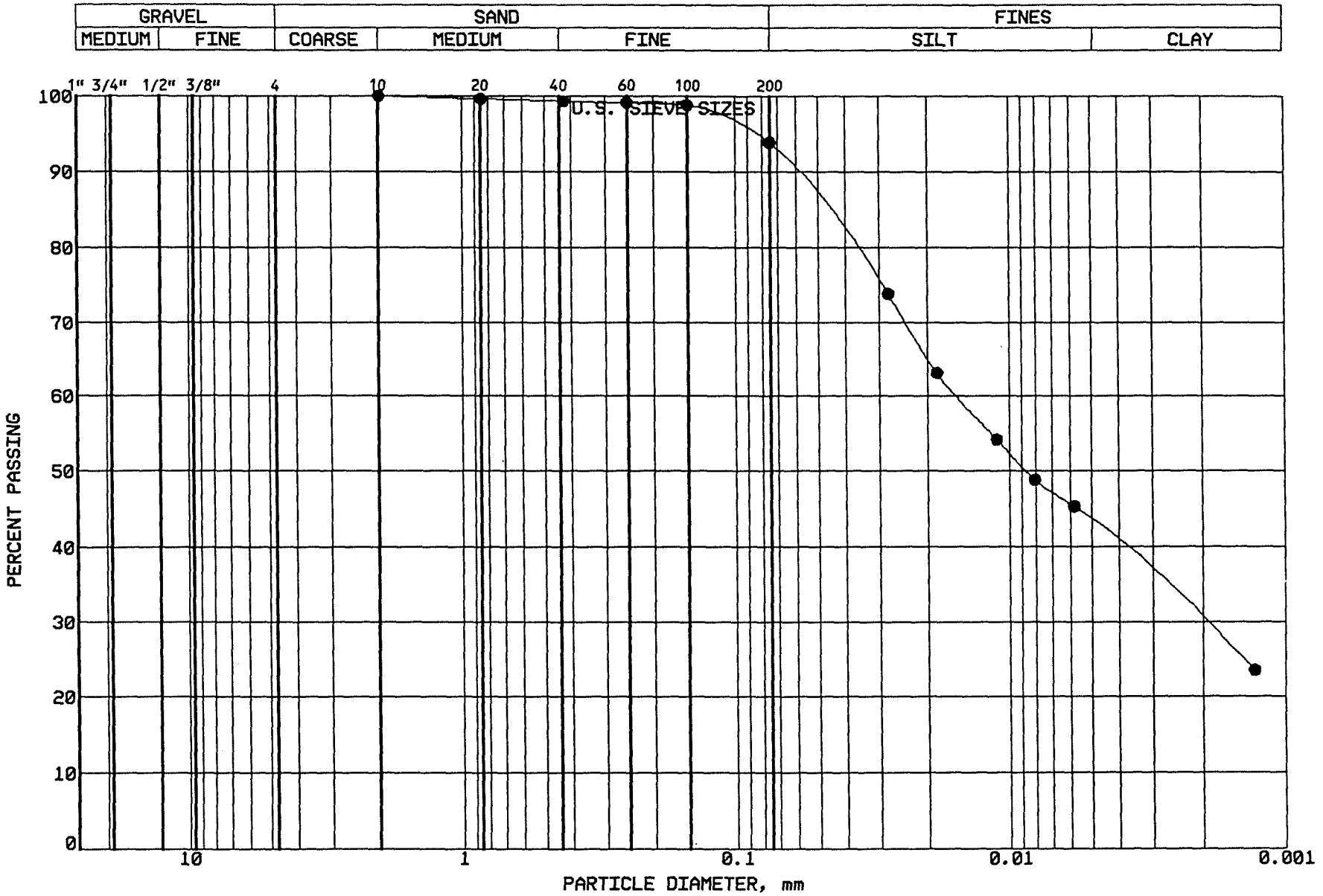
LOCATION: N 37996.0, E 40211.0
SAMPLE: SG-CC253 TUBE #:
ELEVATION: 1902.9'

GRAVEL	0.0 %
SAND	0.2 %
SILT	27.6 %
CLAY	72.2 %
P 200	99.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH), gray.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

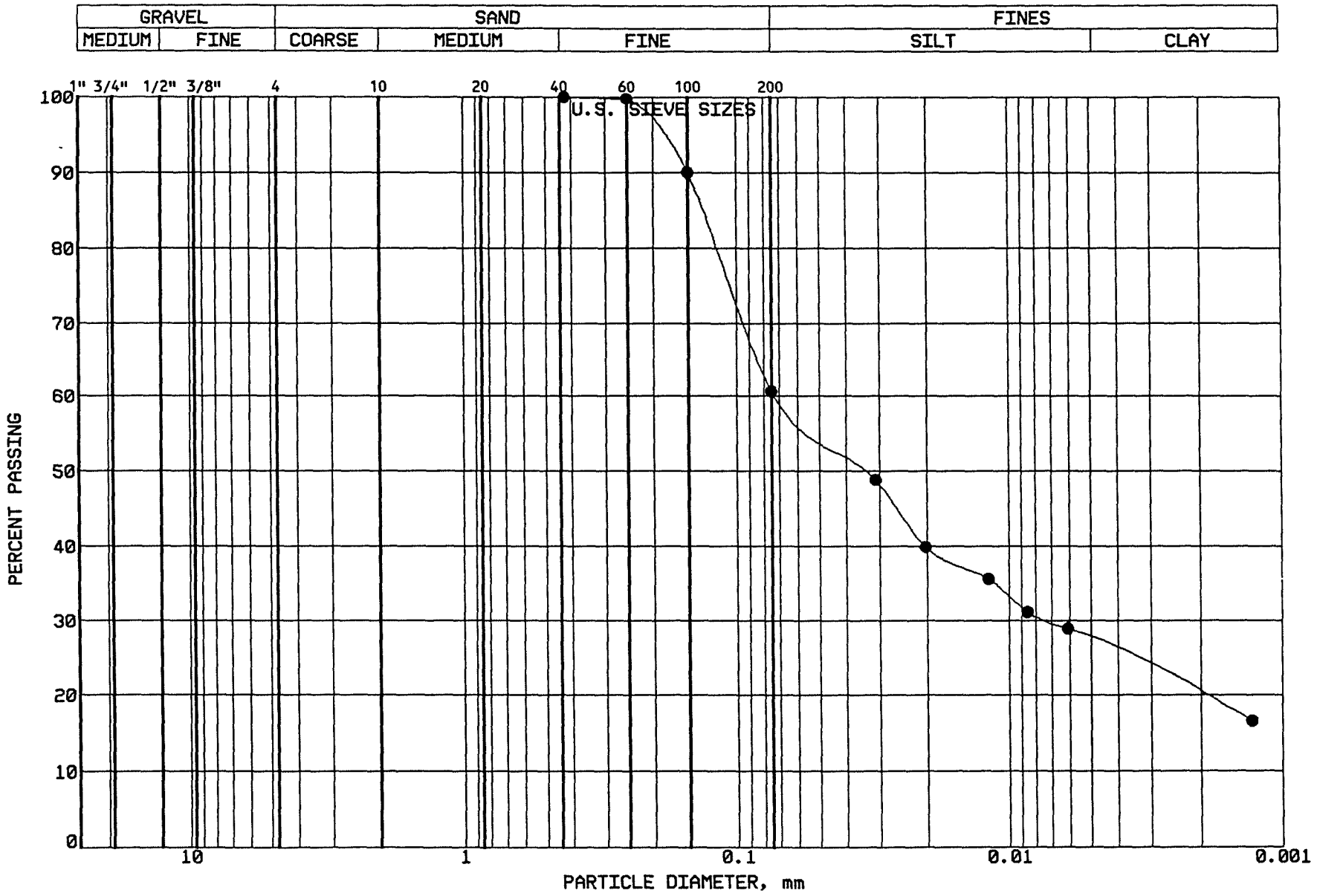
LOCATION: N 37993.0, E 40446.0
SAMPLE: SG-CC254 TUBE #:
ELEVATION: 1901.8'

GRAVEL	0.0 %
SAND	6.1 %
SILT	50.8 %
CLAY	43.1 %
P 200	93.9 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

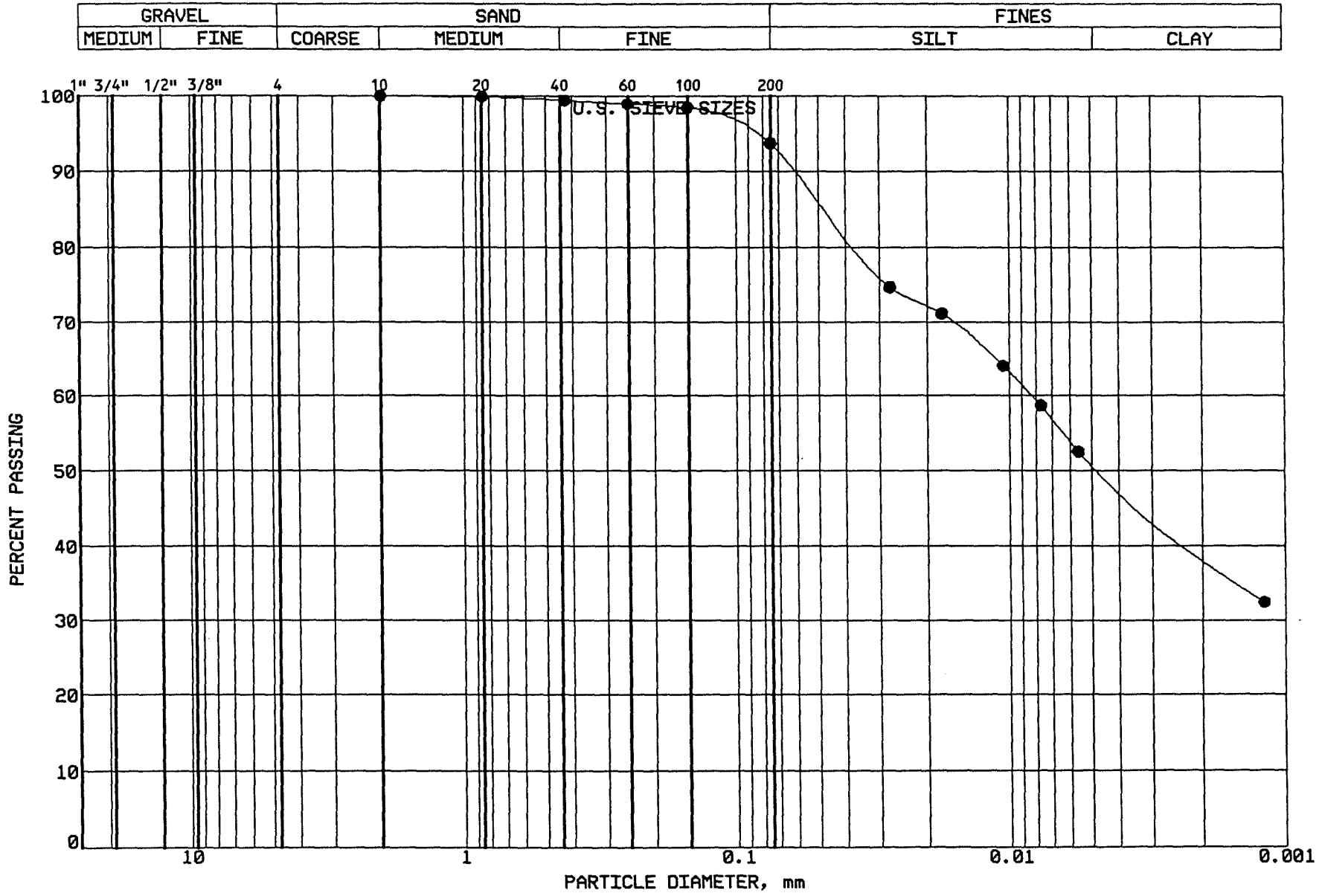
LOCATION: Stockpile N of #94
SAMPLE: CC-255 TUBE #:N/A
ELEVATION: N/A'

GRAVEL	0.0 %
SAND	39.3 %
SILT	33.4 %
CLAY	27.3 %
P 200	60.7 %

SOIL PROPERTIES

LL: 32.0%
PL: 21.0%
PI: 11.0%
CLASS: Sandy Lean Clay (CL), vy dk gr.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

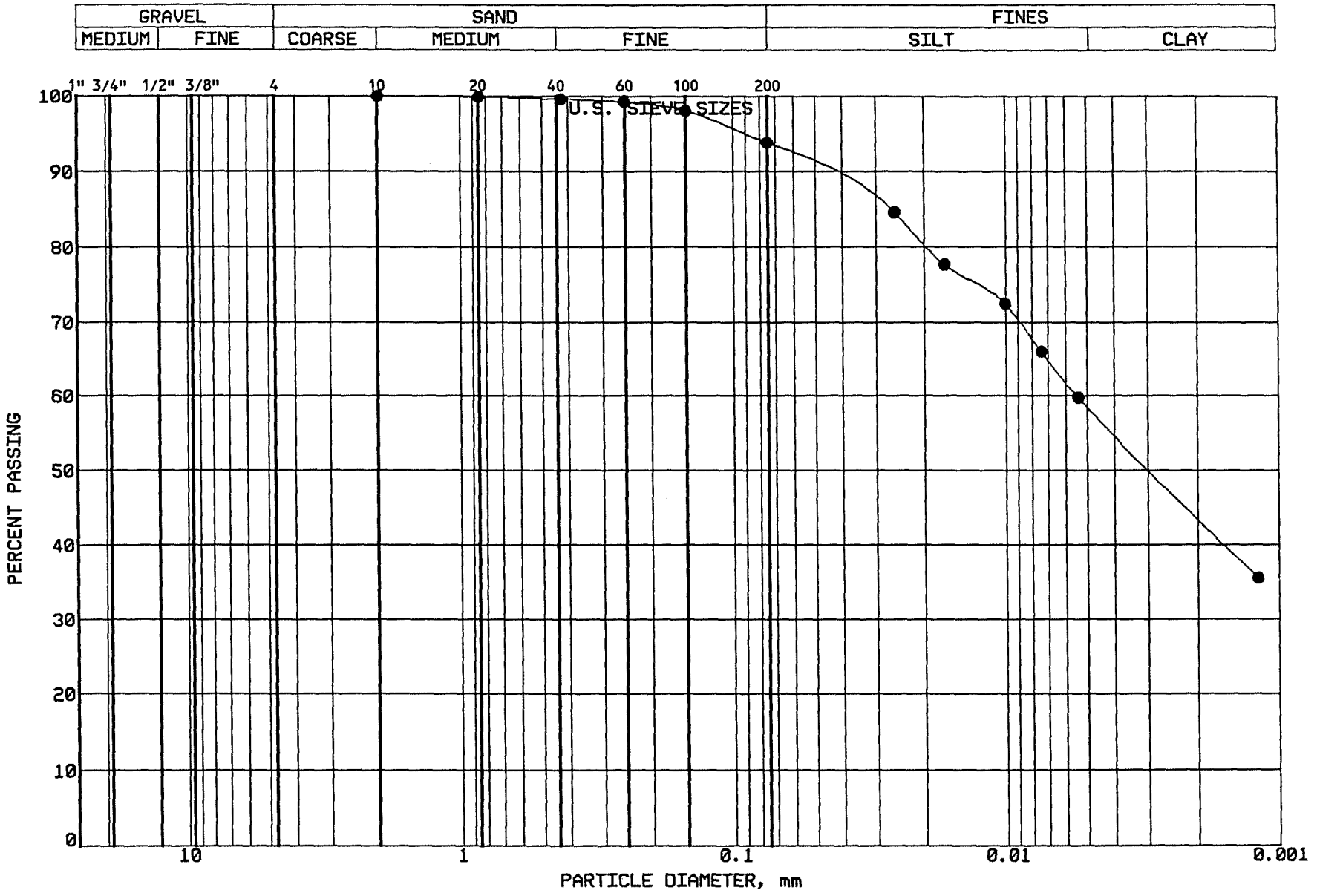
LOCATION: Stockpile N of #94
SAMPLE: CC-256 TUBE #:N/A
ELEVATION: N/A'

GRAVEL	0.0 %
SAND	6.3 %
SILT	42.6 %
CLAY	51.1 %
P 200	93.7 %

SOIL PROPERTIES

LL: 49.0%
PL: 22.0%
PI: 27.0%
CLASS: Lean Clay (CL), vy dk gr.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

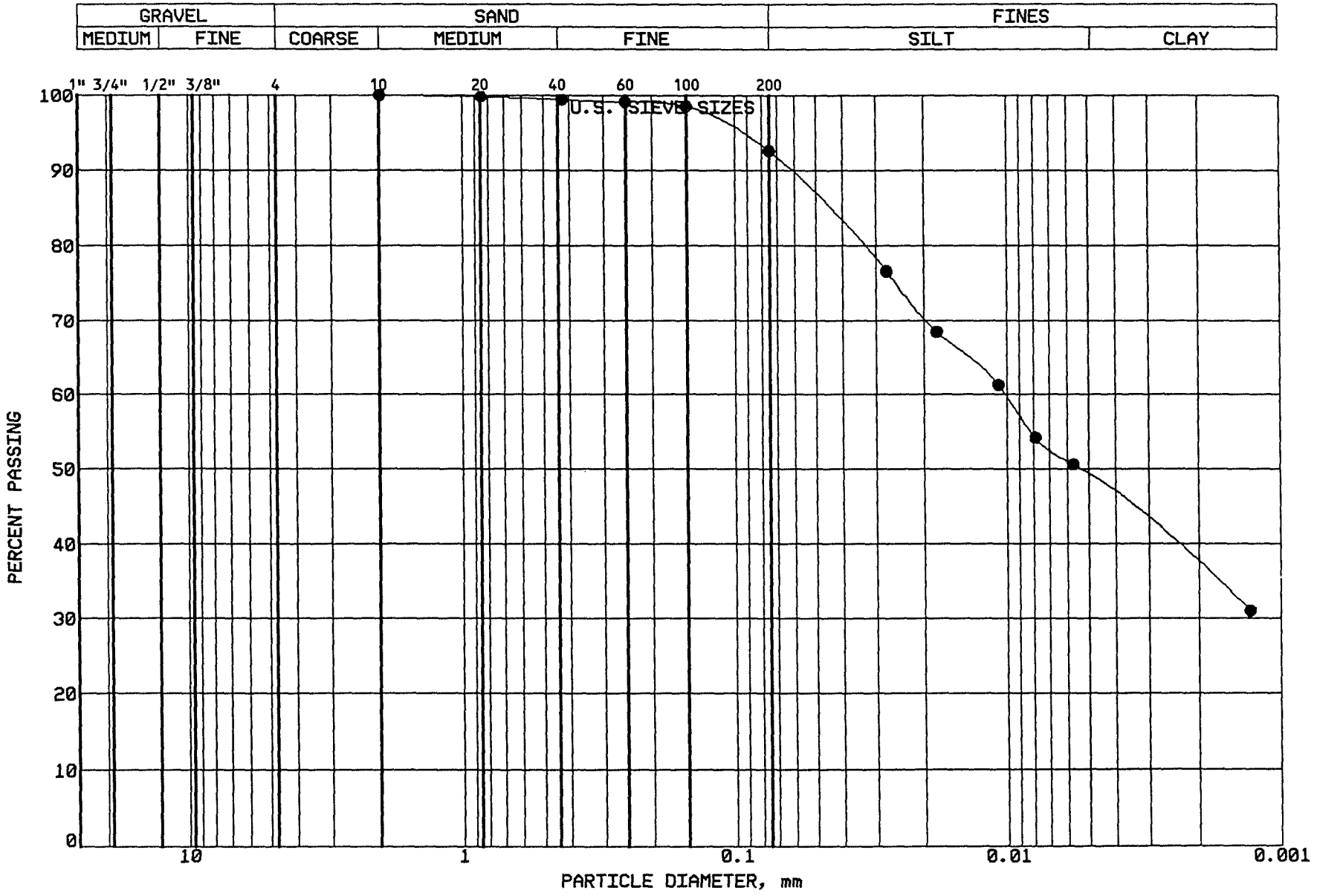
LOCATION: Stockpile N of EP #94
SAMPLE: CC-257 TUBE #:N/A
ELEVATION: N/A'

GRAVEL	0.0 %
SAND	6.2 %
SILT	35.2 %
CLAY	58.6 %
P 200	93.8 %

SOIL PROPERTIES

LL: 54.0%
PL: 21.0%
PI: 33.0%
CLASS: Fat Clay (CH), vy dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

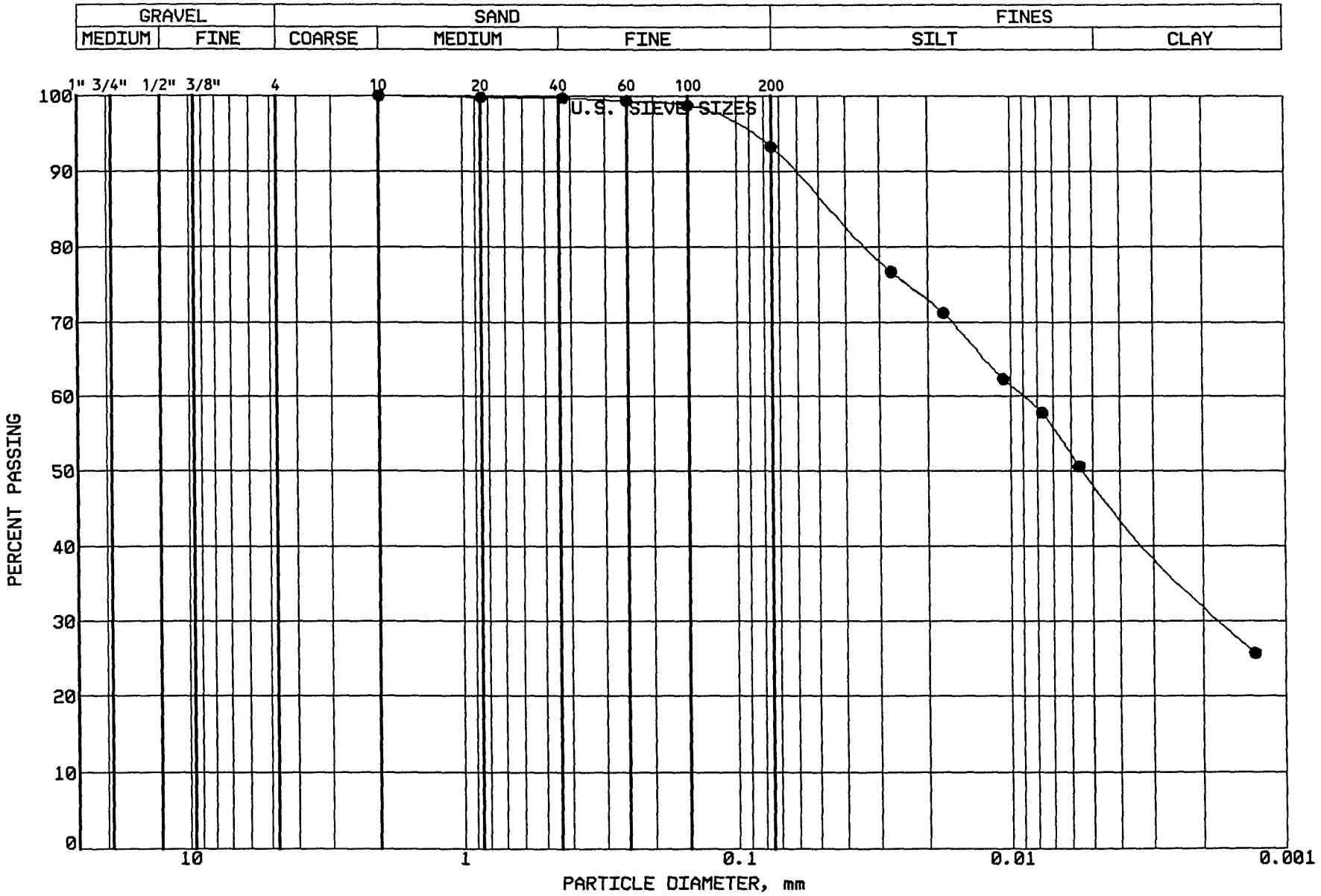
PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA
LOCATION: Stockpile N of EP #94
SAMPLE: CC-258 TUBE #: N/A
ELEVATION: N/A'

GRAVEL	0.0 %
SAND	7.4 %
SILT	43.7 %
CLAY	48.9 %
P 200	92.6 %

SOIL PROPERTIES

LL: 52.0%
PL: 20.0%
PI: 32.0%
CLASS: Fat Clay (CH), black.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

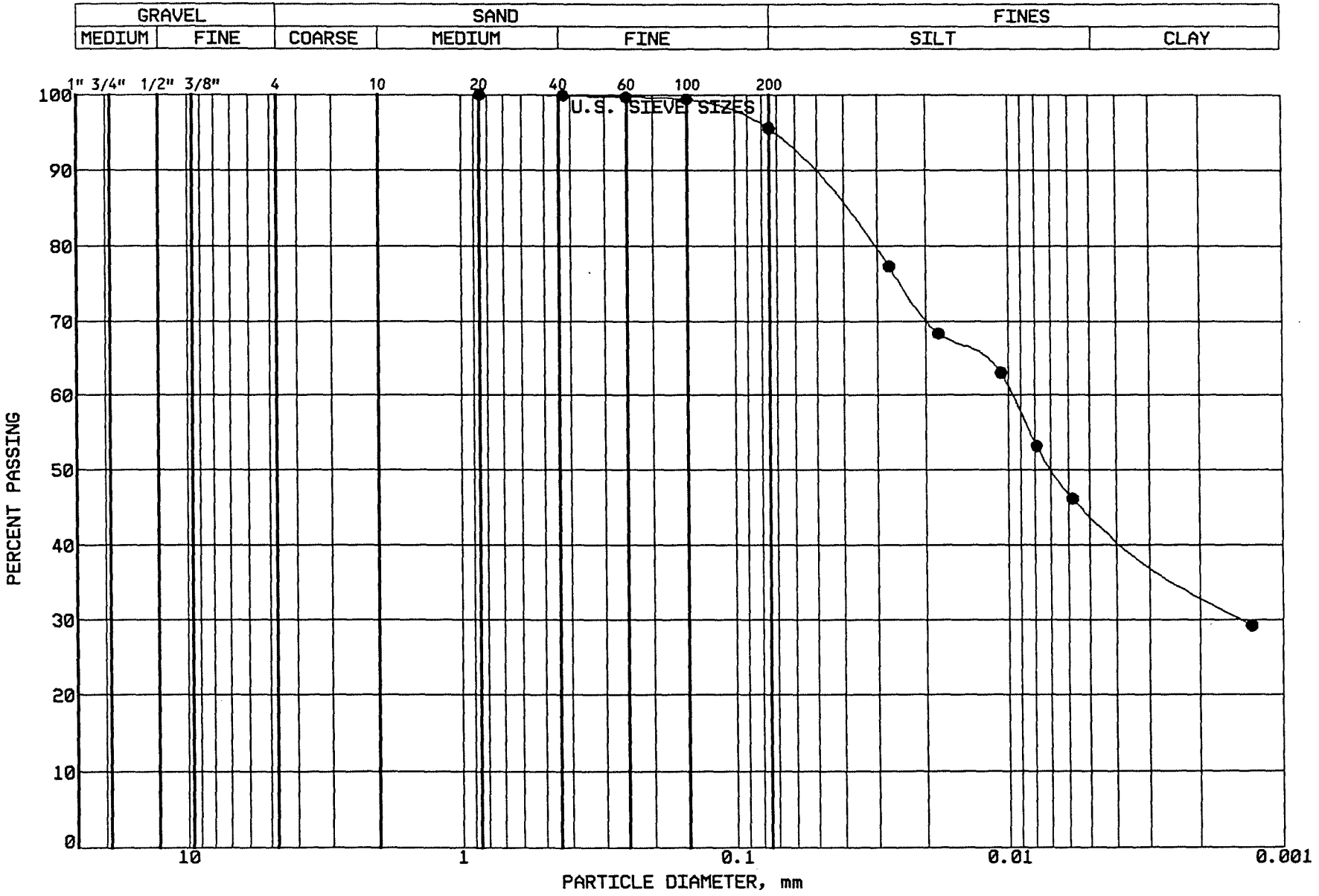
PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA
LOCATION: Stockpile N of EP #94
SAMPLE: CC-259 TUBE #:N/A
ELEVATION: N/A'

GRAVEL	0.0 %
SAND	6.7 %
SILT	44.6 %
CLAY	48.7 %
P 200	93.3 %

SOIL PROPERTIES

LL: 52.0%
PL: 23.0%
PI: 29.0%
CLASS: Fat Clay (CH), black.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

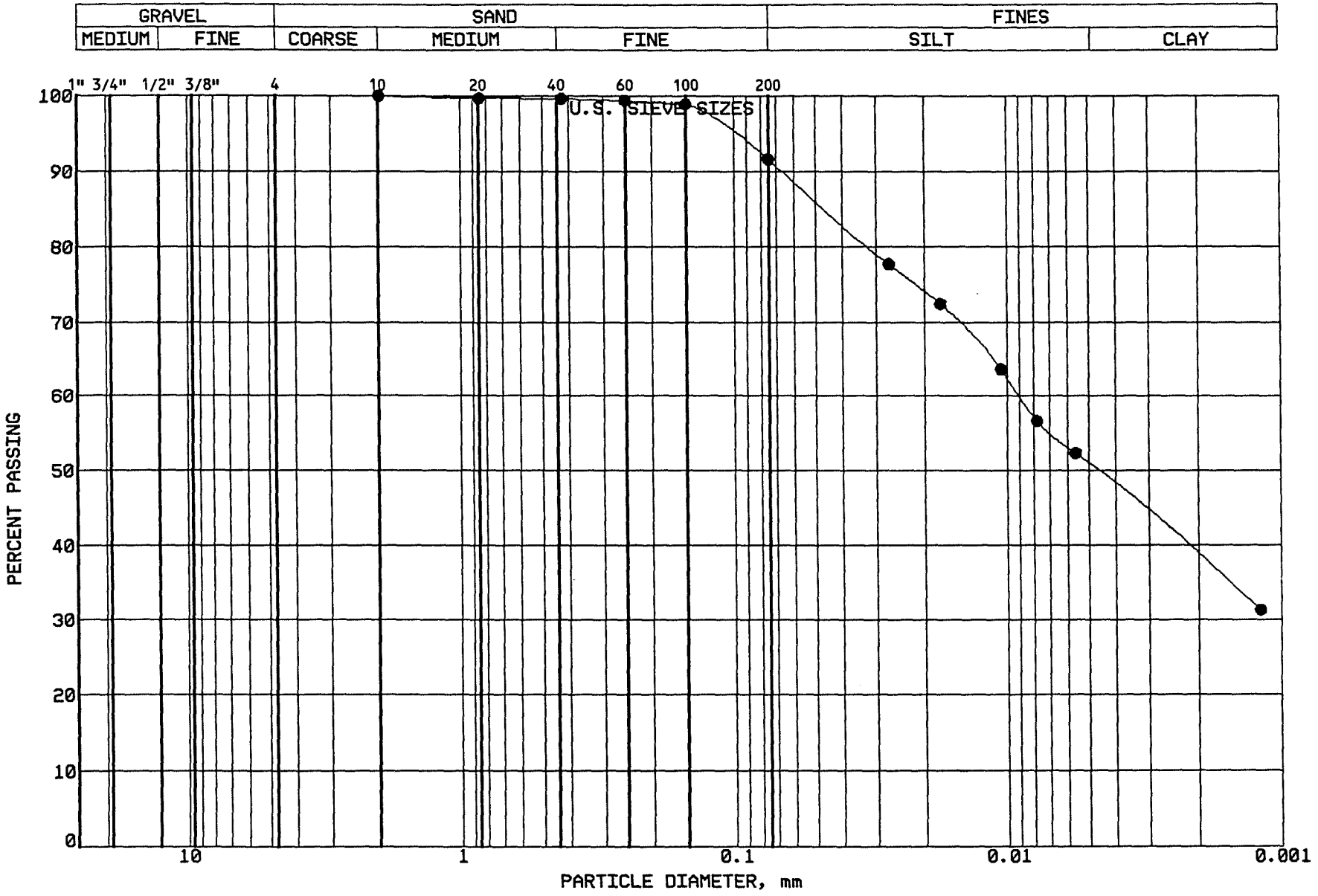
PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA
LOCATION: Stockpile N of EP #94
SAMPLE: CC-260 TUBE #:N/A
ELEVATION: N/A'

GRAVEL	0.0 %
SAND	4.5 %
SILT	51.1 %
CLAY	44.4 %
P 200	95.5 %

SOIL PROPERTIES

LL: 47.0%
PL: 18.0%
PI: 29.0%
CLASS: Lean Clay (CL), vy dk gr.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

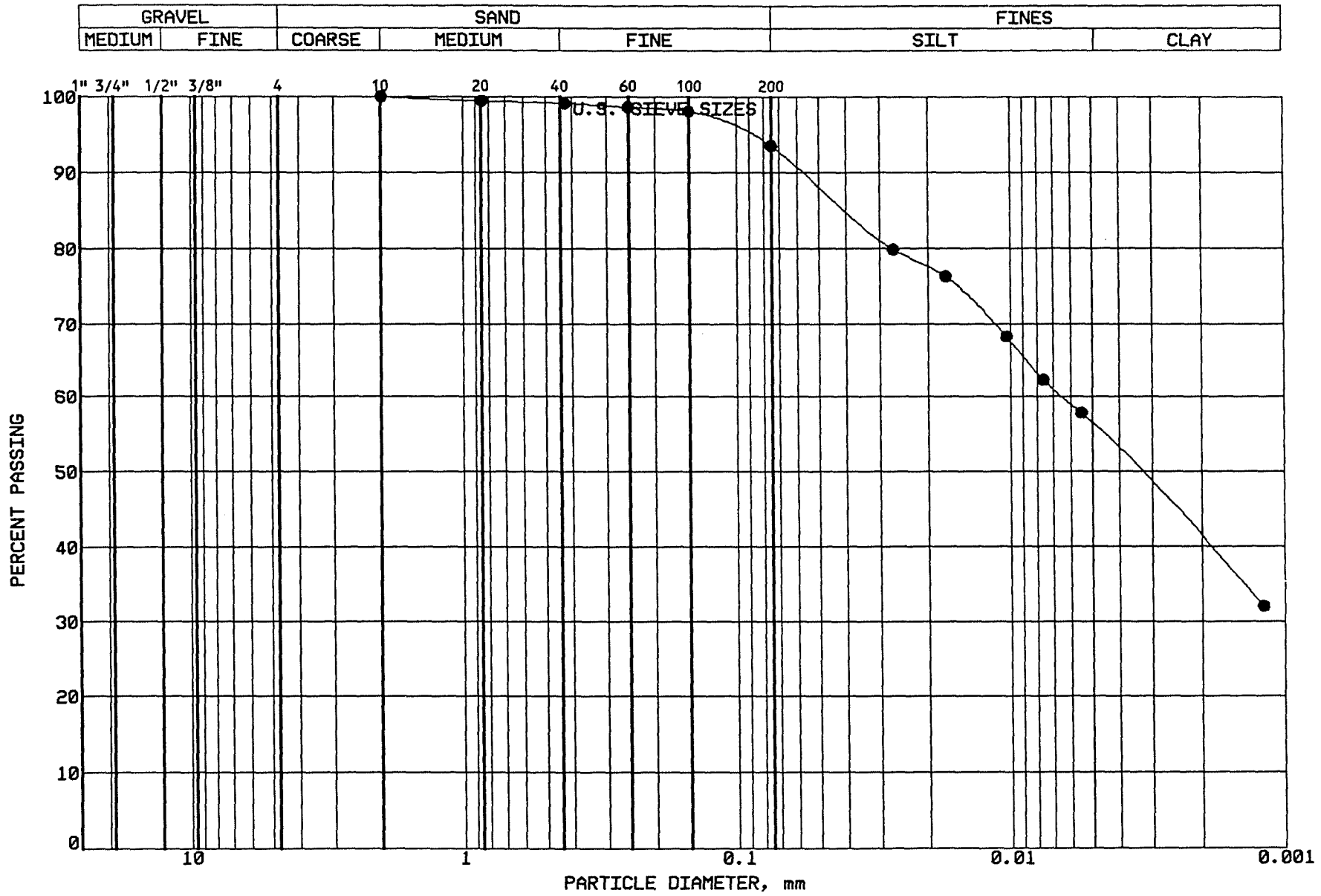
PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA
LOCATION: Stockpile N of EP #94
SAMPLE: CC-261 TUBE #:N/A
ELEVATION: N/A'

GRAVEL	0.0 %
SAND	8.4 %
SILT	40.8 %
CLAY	50.8 %
P 200	91.6 %

SOIL PROPERTIES

LL: 49.0%
PL: 19.0%
PI: 30.0%
CLASS: Lean Clay (CL), vy dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

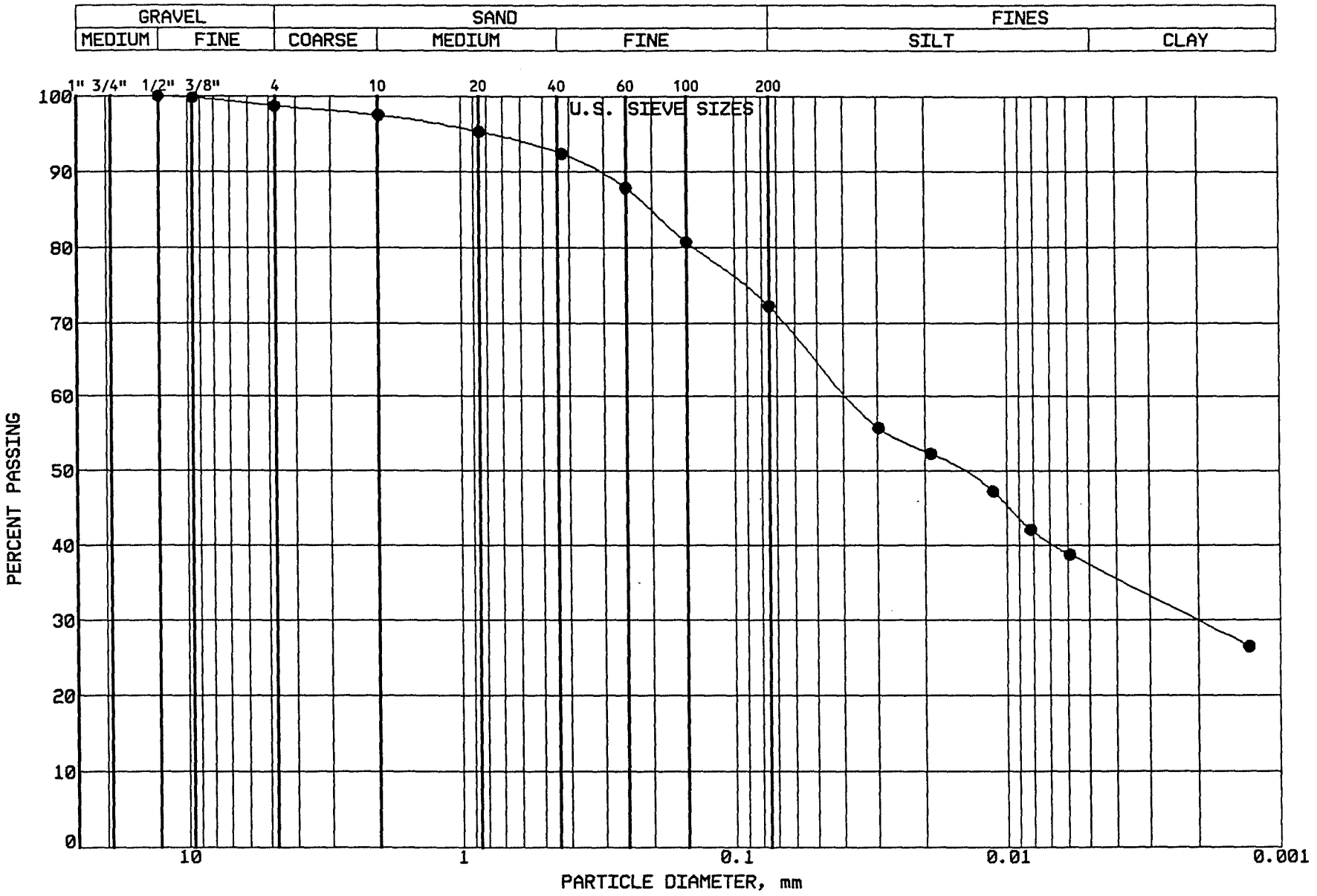
LOCATION: Stockpile N of EP #94
SAMPLE: CC-262 TUBE #:N/A
ELEVATION: N/A'

GRAVEL	0.0 %
SAND	6.5 %
SILT	37.3 %
CLAY	56.2 %
P 200	93.5 %

SOIL PROPERTIES

LL: 52.0%
PL: 20.0%
PI: 32.0%
CLASS: Fat Clay (CH), vy dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

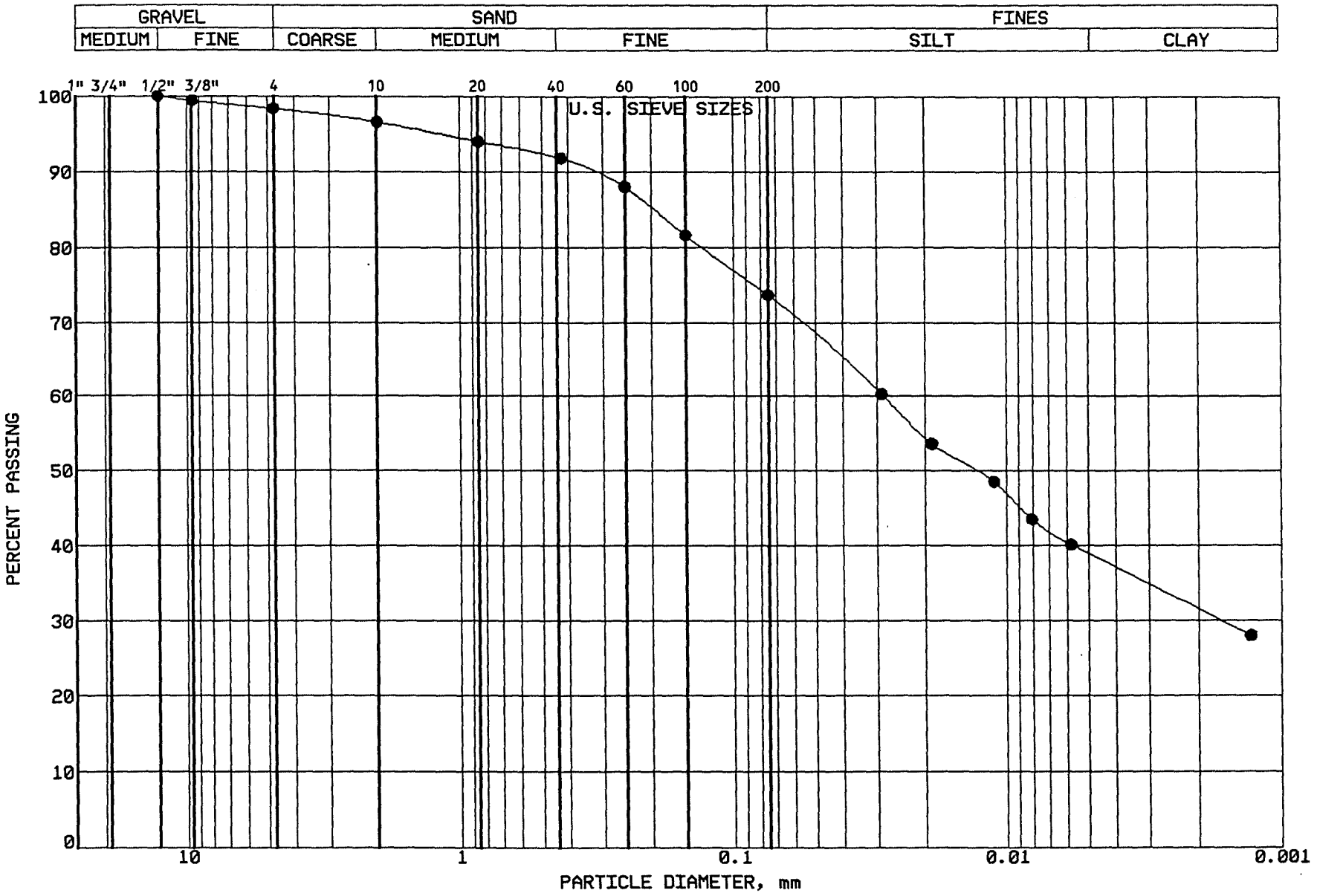
LOCATION: N 38917.0, E 39805.0
SAMPLE: SGCC-263 TUBE #:
ELEVATION: 1900.6'

GRAVEL	1.3 %
SAND	26.5 %
SILT	34.8 %
CLAY	37.4 %
P 200	72.2 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Lean Clay w/Sand (CL),vy dk gr-b

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

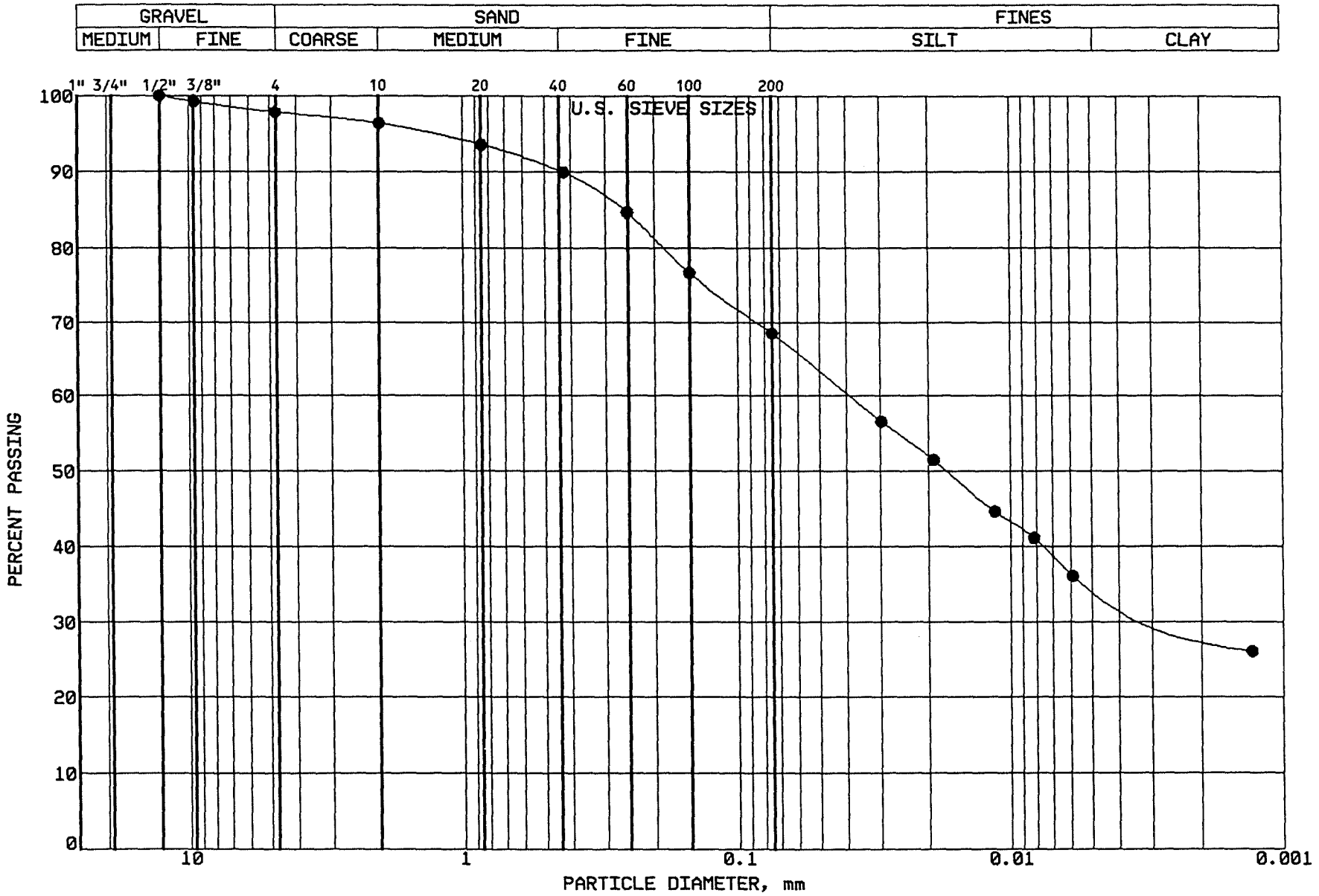
LOCATION: N 38922.0, E 40105.0
SAMPLE: SGCC-264 TUBE #:
ELEVATION: 1899.0'

GRAVEL	1.7 %
SAND	24.6 %
SILT	34.8 %
CLAY	38.9 %
P 200	73.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Lean Clay w/Sand (CL),vy dk gr-br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

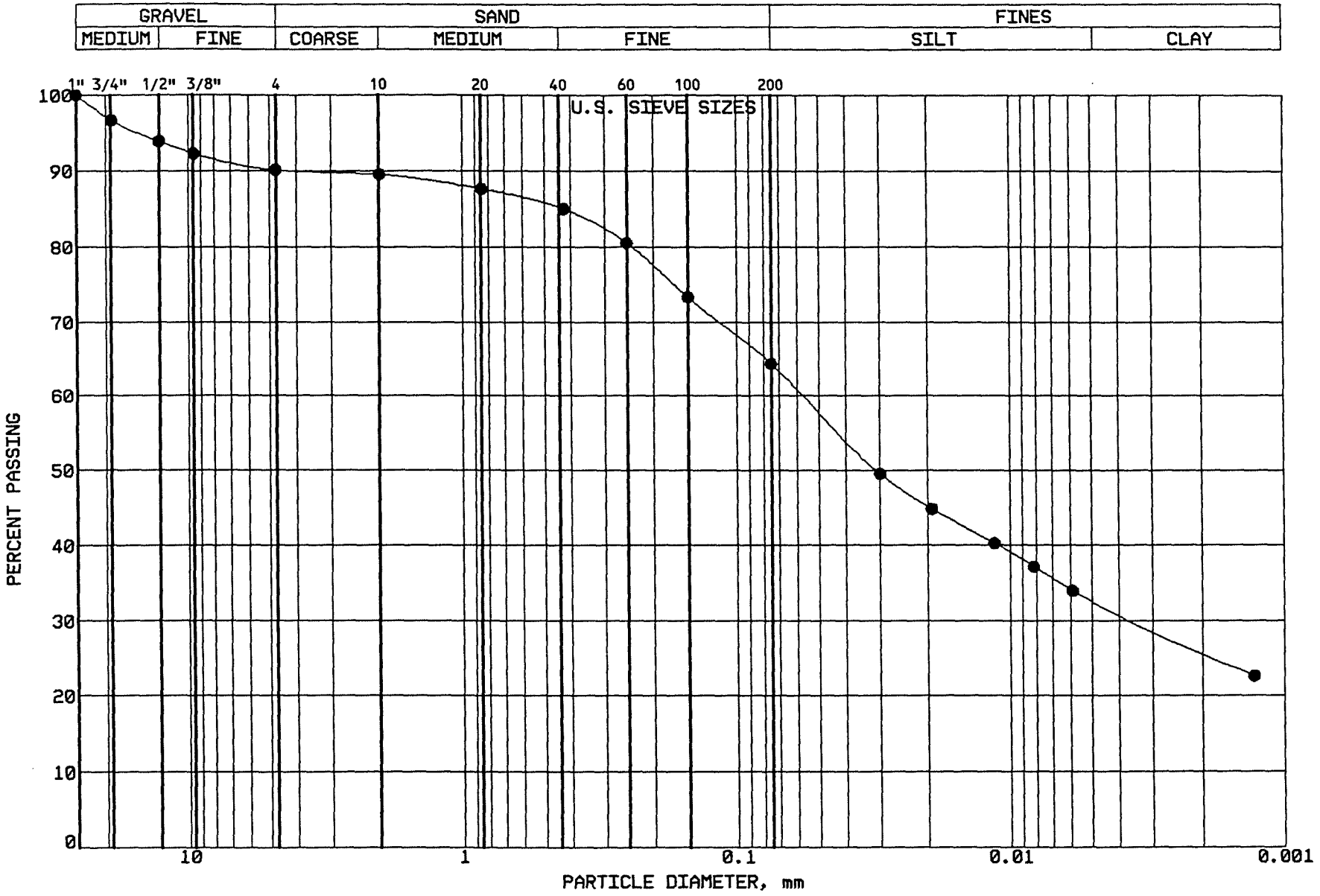
LOCATION: N 38995.0, E 40188.0
SAMPLE: SGCC-265 TUBE #:
ELEVATION: 1897.9'

GRAVEL	2.2 %
SAND	29.3 %
SILT	33.6 %
CLAY	34.9 %
P 200	68.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

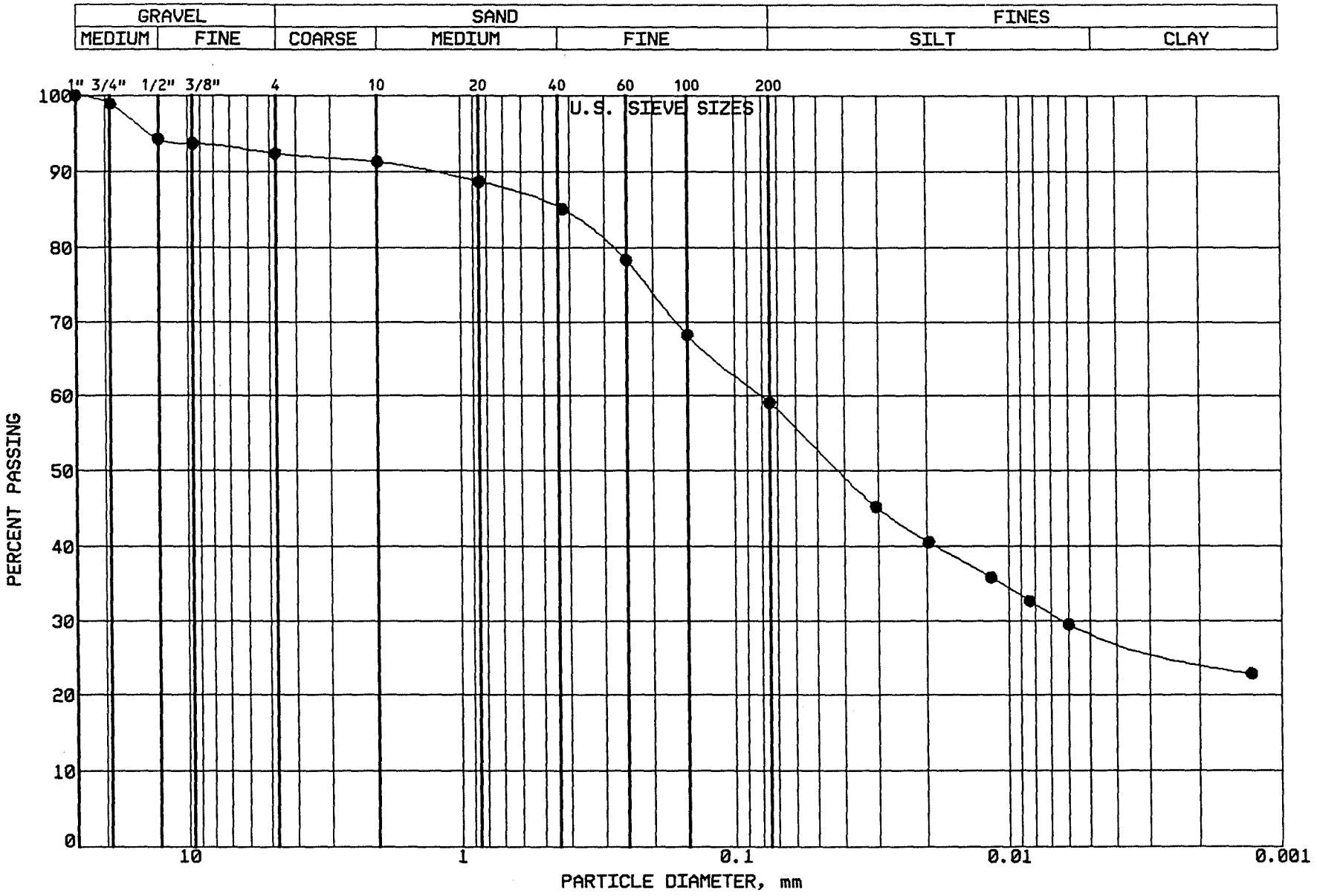
LOCATION: N 39302.0, E 40184.0
SAMPLE: SGCC-266 TUBE #:
ELEVATION: 1896.6'

GRAVEL	9.9 %
SAND	25.8 %
SILT	31.6 %
CLAY	32.7 %
P 200	64.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

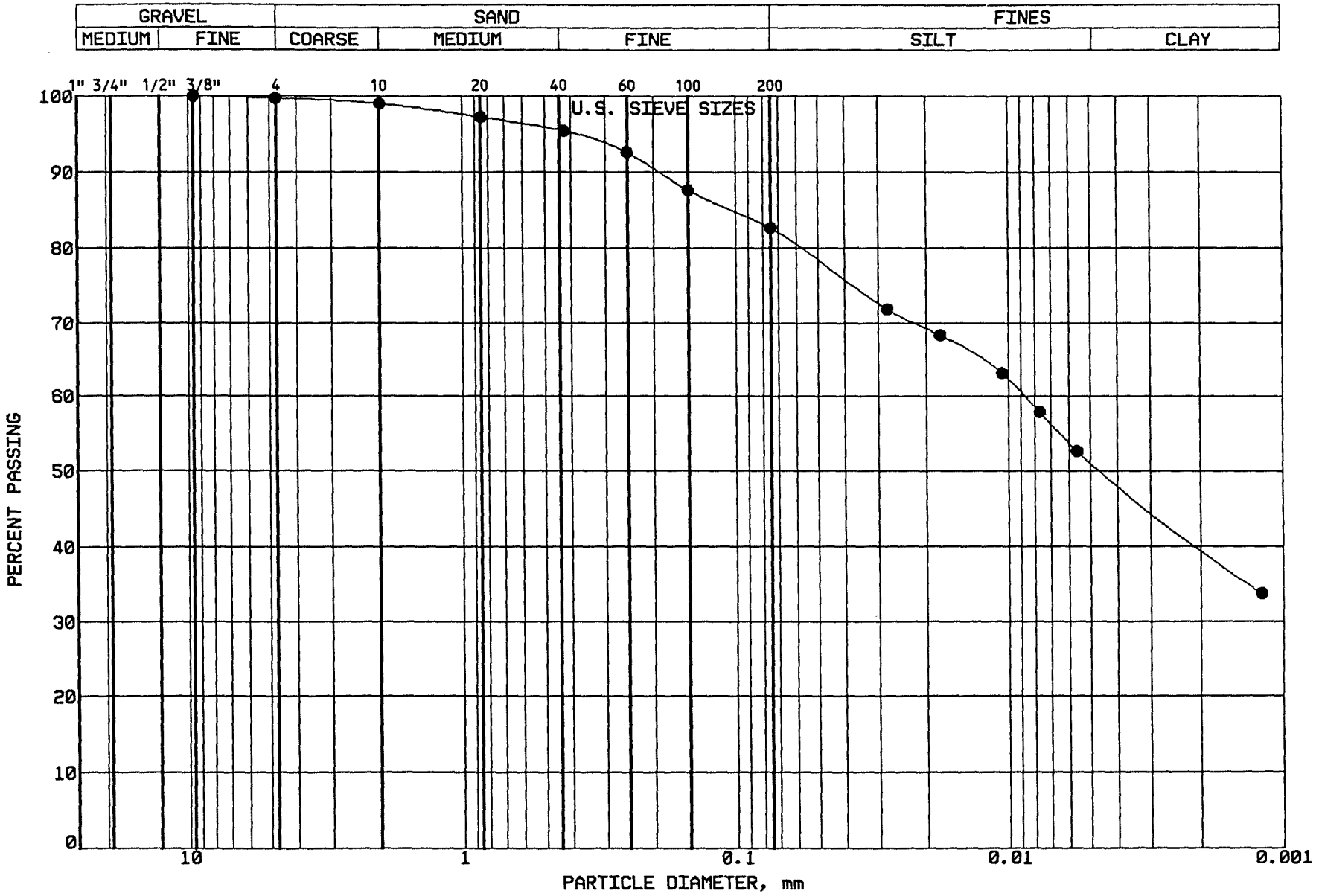
LOCATION: N 39400.0, E 39834.0
SAMPLE: SGCC-267 TUBE #:
ELEVATION: 1898.0'

GRAVEL	7.6 %
SAND	33.3 %
SILT	30.4 %
CLAY	28.7 %
P 200	59.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

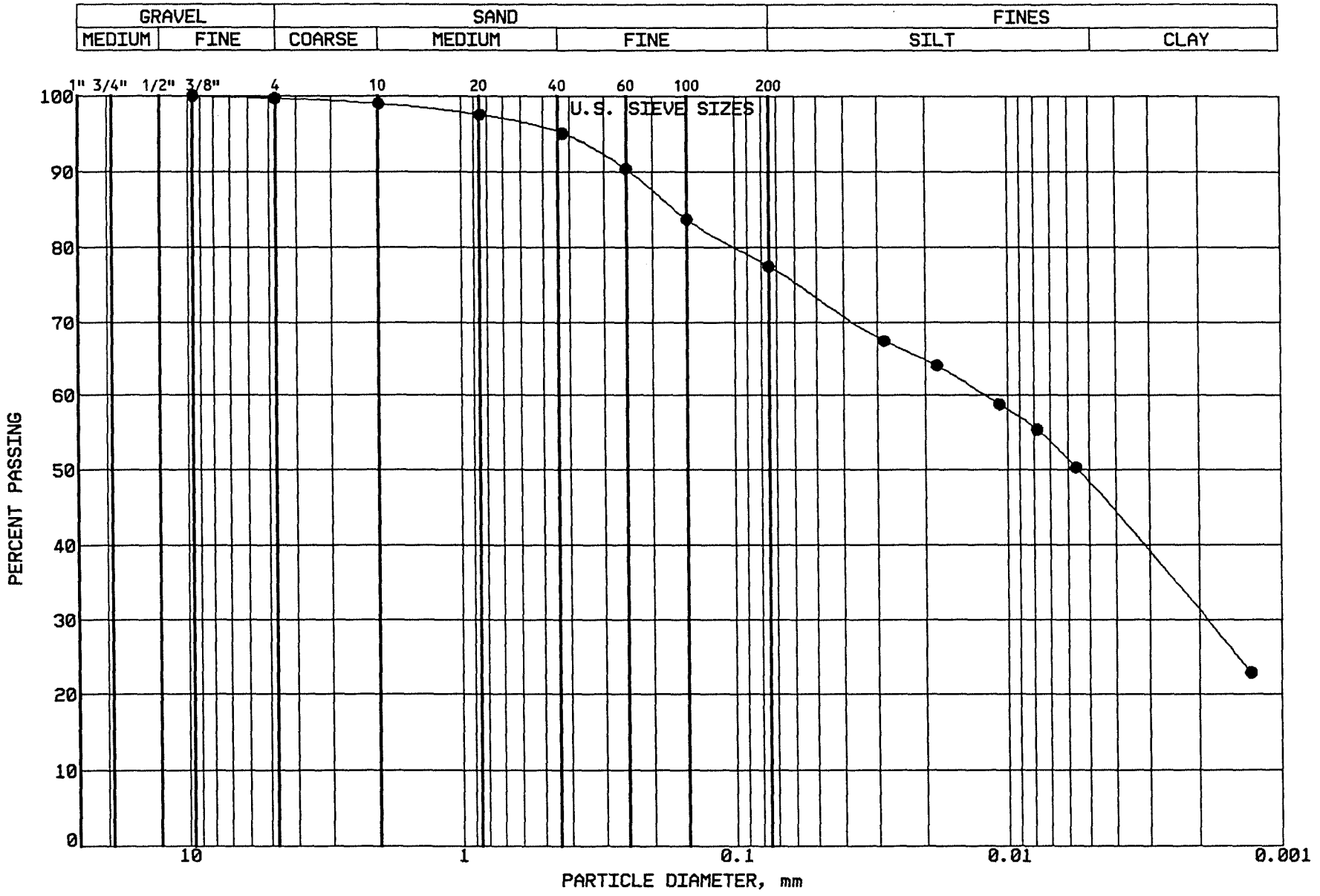
LOCATION: N 39324.0, E 39749.0
SAMPLE: SGCC-268 TUBE #: N/A
ELEVATION: 1898.8'

GRAVEL	0.3 %
SAND	17.1 %
SILT	31.3 %
CLAY	51.3 %
P 200	82.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Lean Clay w/Sand (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

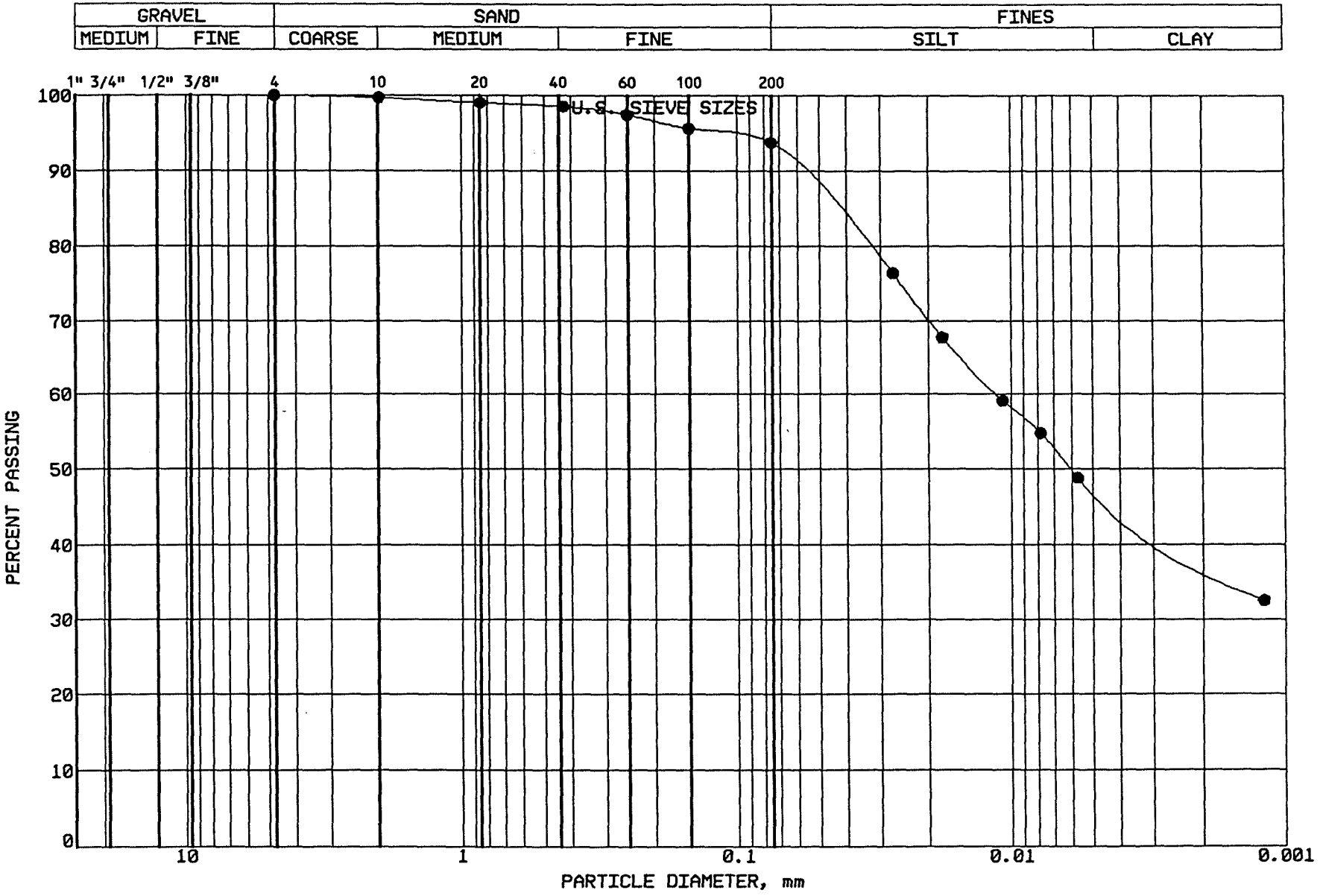
LOCATION: N 39000.0, E 39743.0
SAMPLE: SGCC-269 TUBE #: N/A
ELEVATION: 1900.5'

GRAVEL	0.3 %
SAND	22.3 %
SILT	29.2 %
CLAY	48.2 %
P 200	77.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Lean Clay w/Sand (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

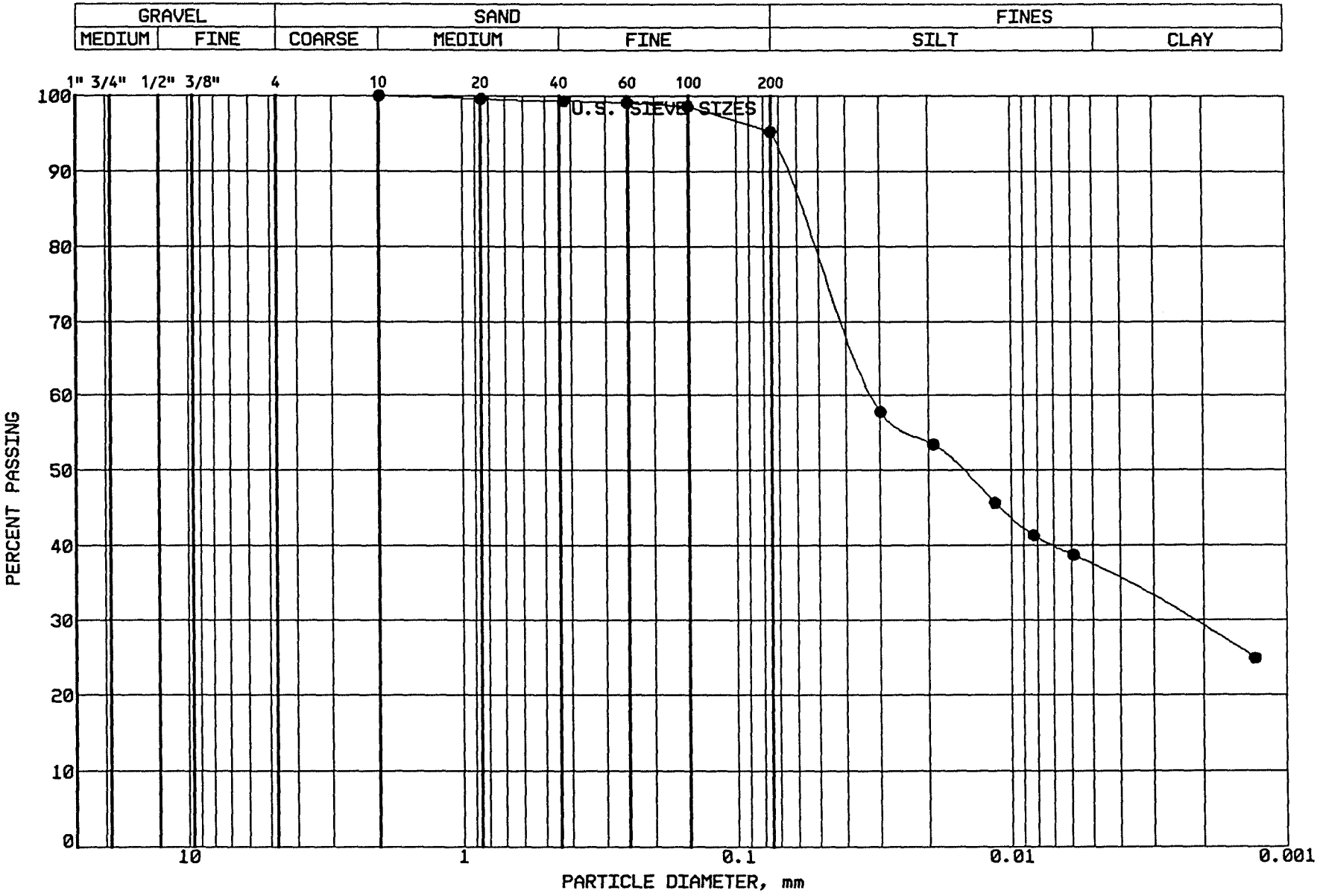
LOCATION: N 38917.0, E 39799.0
SAMPLE: CLSCC270 TUBE #:
ELEVATION: 1901.9'

GRAVEL	0.0 %
SAND	6.2 %
SILT	46.4 %
CLAY	47.4 %
P 200	93.8 %

SOIL PROPERTIES

LL: 52.0%
PL: 19.0%
PI: 33.0%
CLASS: Fat Clay (CH), ol.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

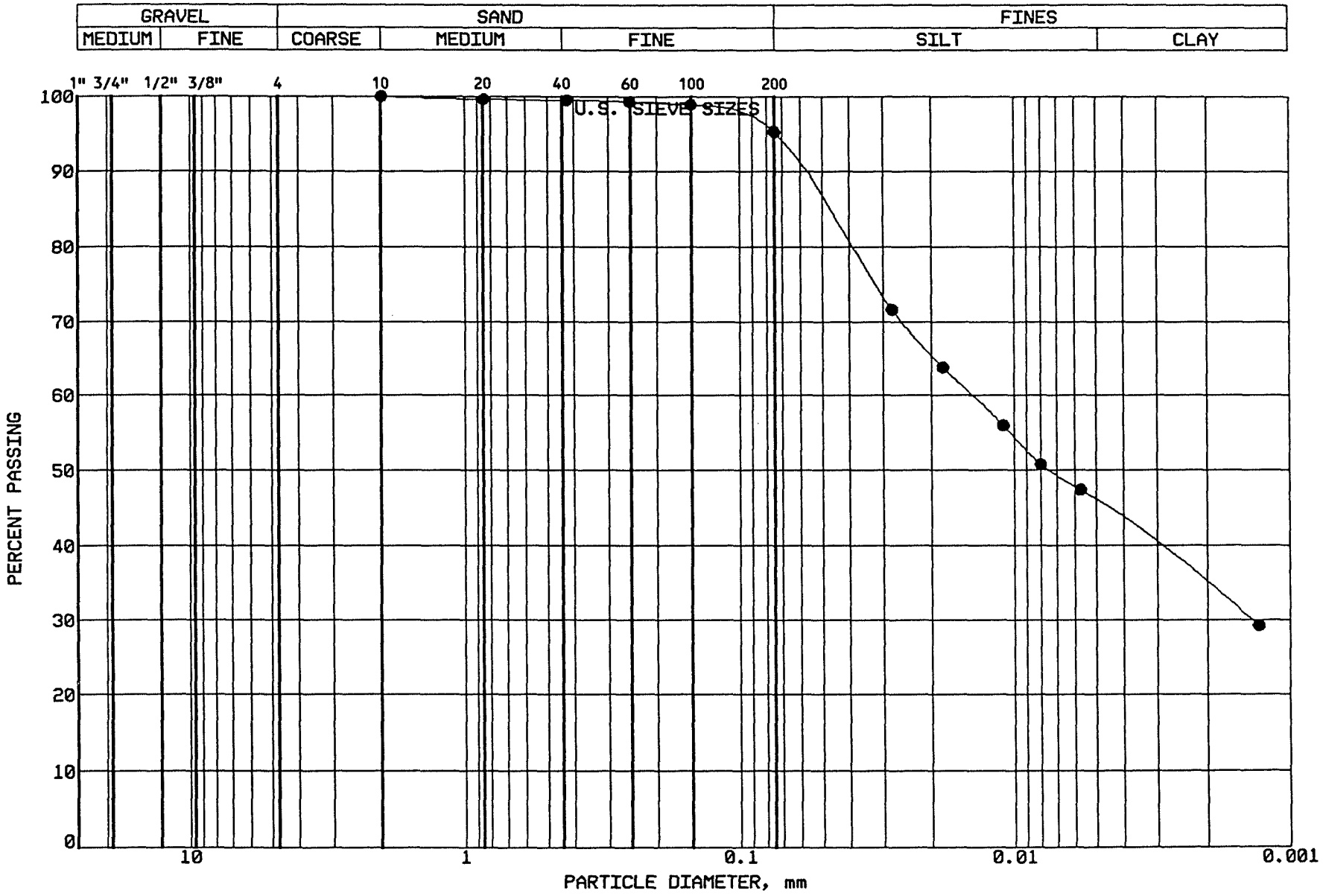
LOCATION: N 39396.0, E 40102.0
SAMPLE: CLSCC271 TUBE #:
ELEVATION: 1897.9'

GRAVEL	0.0 %
SAND	4.8 %
SILT	58.0 %
CLAY	37.2 %
P 200	95.2 %

SOIL PROPERTIES

LL: 41.0%
PL: 15.0%
PI: 26.0%
CLASS: Lean Clay (CL), ol. br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

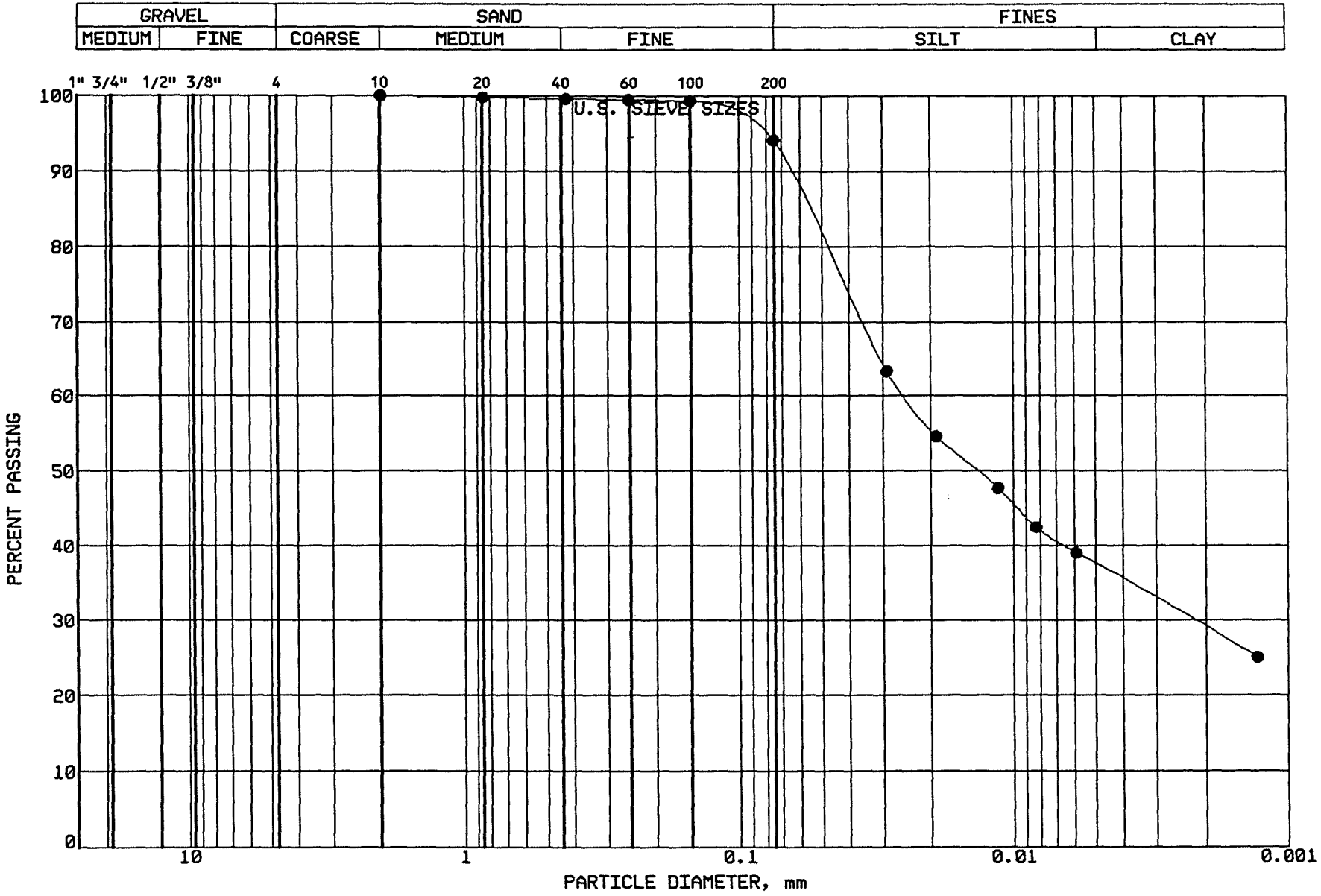
LOCATION: N 39021.0, E 39823.0
SAMPLE: CLBCC272 TUBE #: St.39
ELEVATION: 1901.1'

GRAVEL	0.0 %
SAND	4.7 %
SILT	49.5 %
CLAY	45.8 %
P 200	95.3 %

SOIL PROPERTIES

LL: 48.0%
PL: 18.0%
PI: 30.0%
CLASS: Lean Clay (CL), pale olive

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

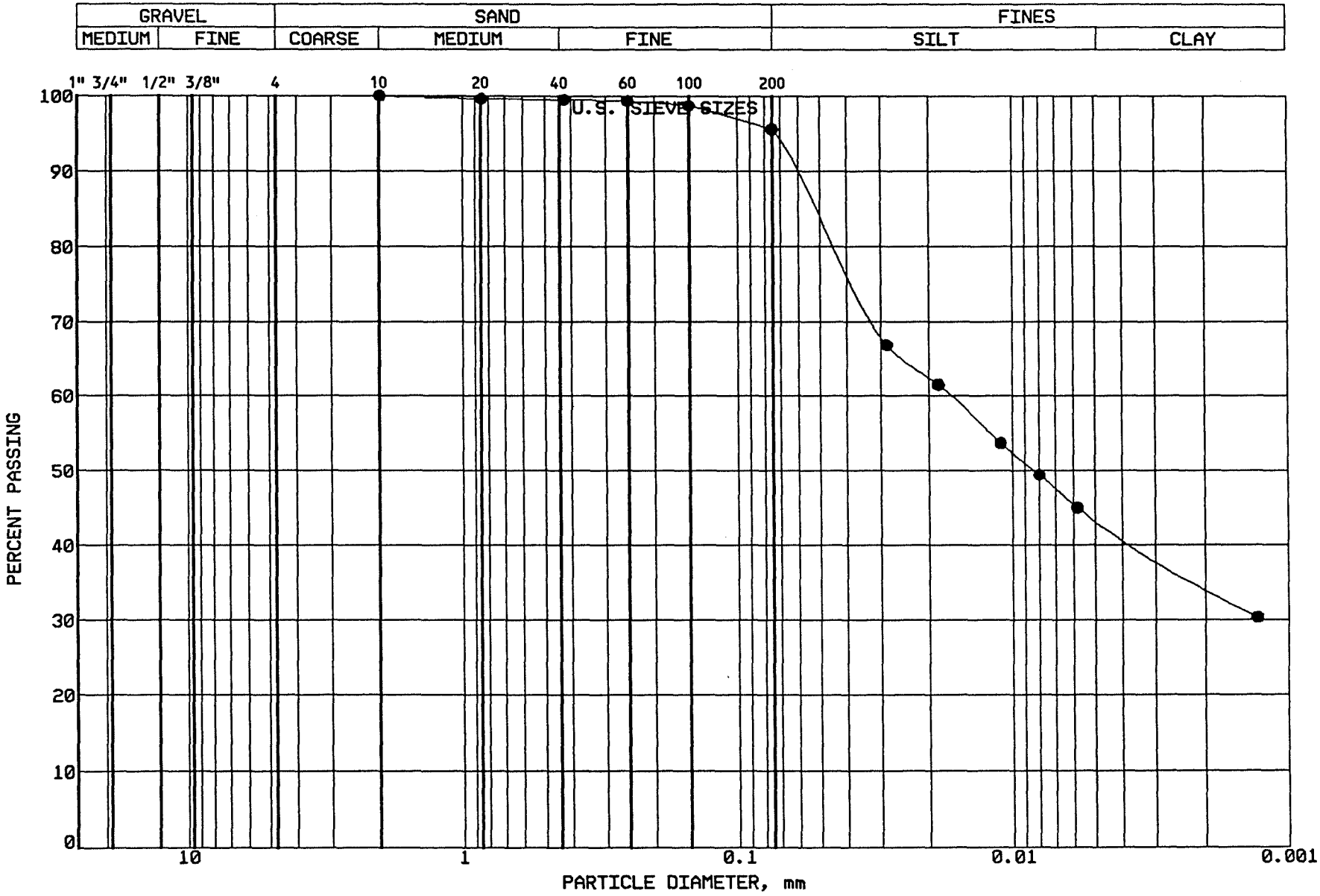
LOCATION: N 39026.0, E 40093.0
SAMPLE: CLBCC273 TUBE #: St.40
ELEVATION: 1899.5'

GRAVEL	0.0 %
SAND	5.9 %
SILT	56.6 %
CLAY	37.5 %
P 200	94.1 %

SOIL PROPERTIES

LL: 45.0%
PL: 16.0%
PI: 29.0%
CLASS: Lean Clay (CL), pale olive

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

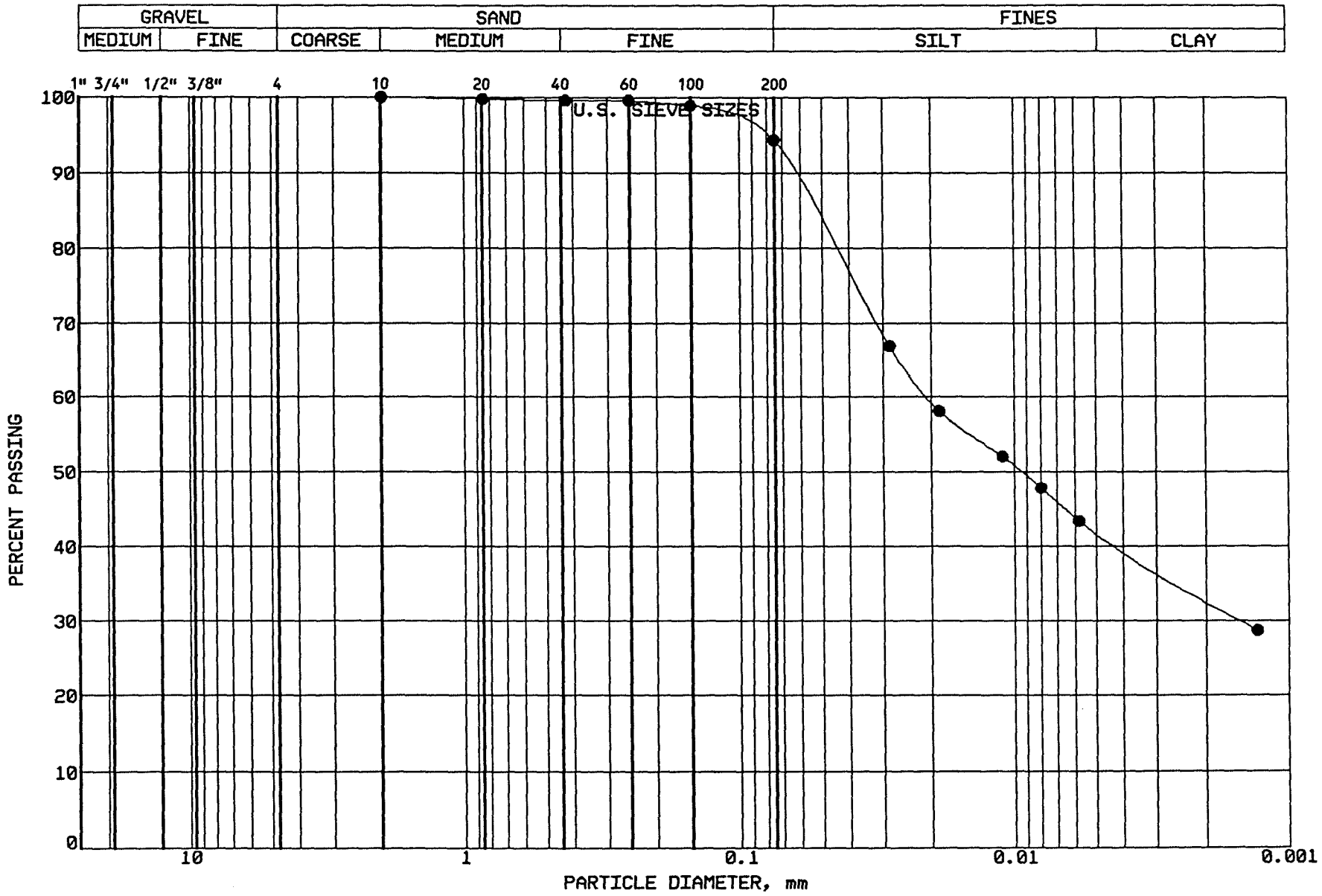
LOCATION: N 39134.0, E 39841.0
SAMPLE: CLBCC274 TUBE #: St.41
ELEVATION: 1900.6'

GRAVEL	0.0 %
SAND	4.5 %
SILT	52.0 %
CLAY	43.5 %
P 200	95.5 %

SOIL PROPERTIES

LL: 47.0%
PL: 17.0%
PI: 30.0%
CLASS: Lean Clay (CL), olive br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

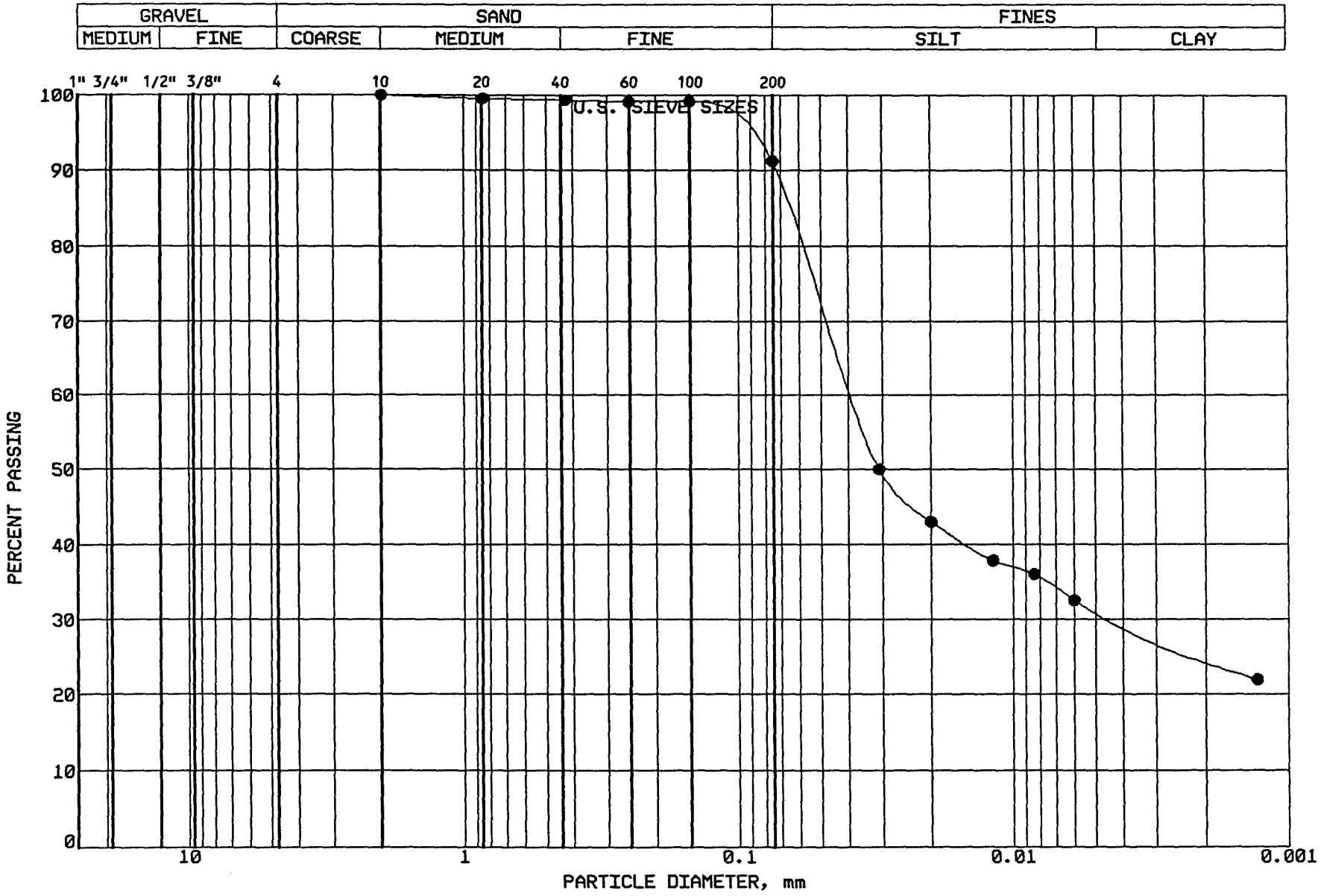
LOCATION: N 39156.0, E 40088.0
SAMPLE: CLBCC275 TUBE #: St.42
ELEVATION: 1899.0'

GRAVEL	0.0 %
SAND	5.7 %
SILT	52.4 %
CLAY	41.9 %
P 200	94.3 %

SOIL PROPERTIES

LL: 45.0%
PL: 15.0%
PI: 30.0%
CLASS: Lean Clay (CL), olive br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

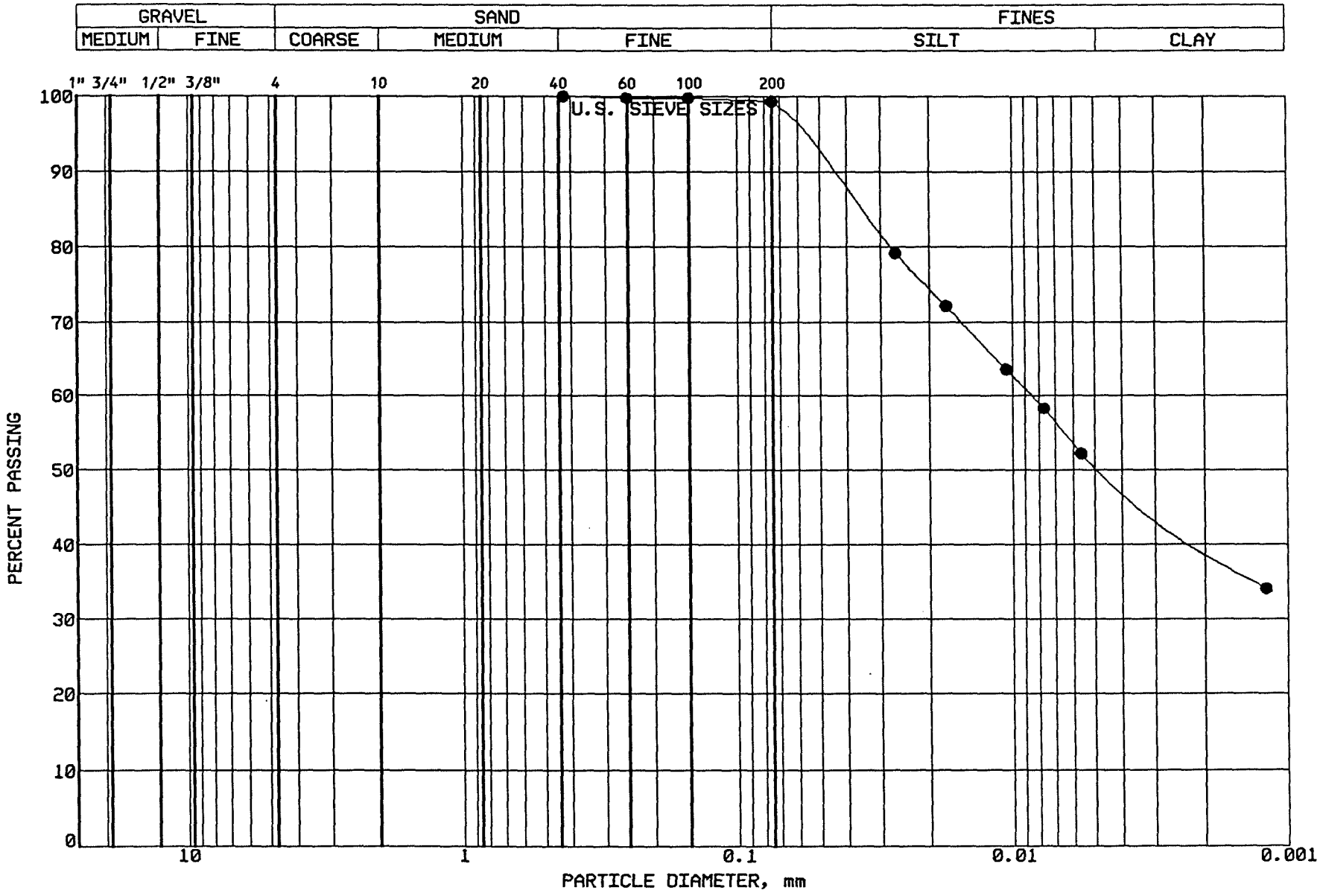
LOCATION: N 39248.0, E 40088.0
SAMPLE: CLBCC276 TUBE #: St.43
ELEVATION: 1899.0'

GRAVEL	0.0 %
SAND	8.8 %
SILT	60.0 %
CLAY	31.2 %
P 200	91.2 %

SOIL PROPERTIES

LL: 41.0%
PL: 16.0%
PI: 25.0%
CLASS: Lean Clay (CL), olive

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

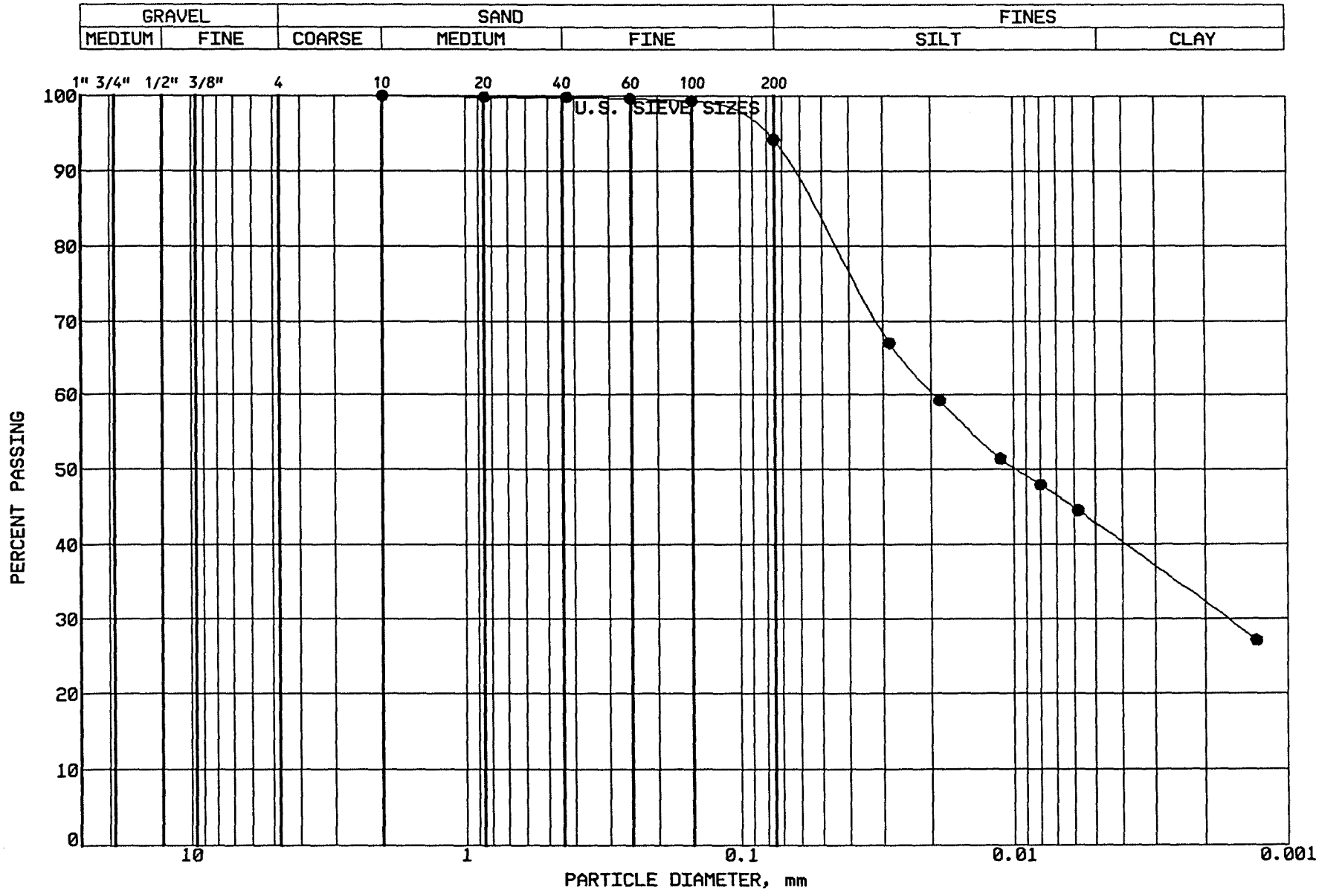
LOCATION: N 39243.0, E 39889.0
SAMPLE: CLBCC277 TUBE #: St.44
ELEVATION: 1899.8'

GRAVEL	0.0 %
SAND	0.7 %
SILT	48.4 %
CLAY	50.9 %
P 200	99.3 %

SOIL PROPERTIES

LL: 55.0%
PL: 17.0%
PI: 38.0%
CLASS: Fat Clay (CH), olive

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

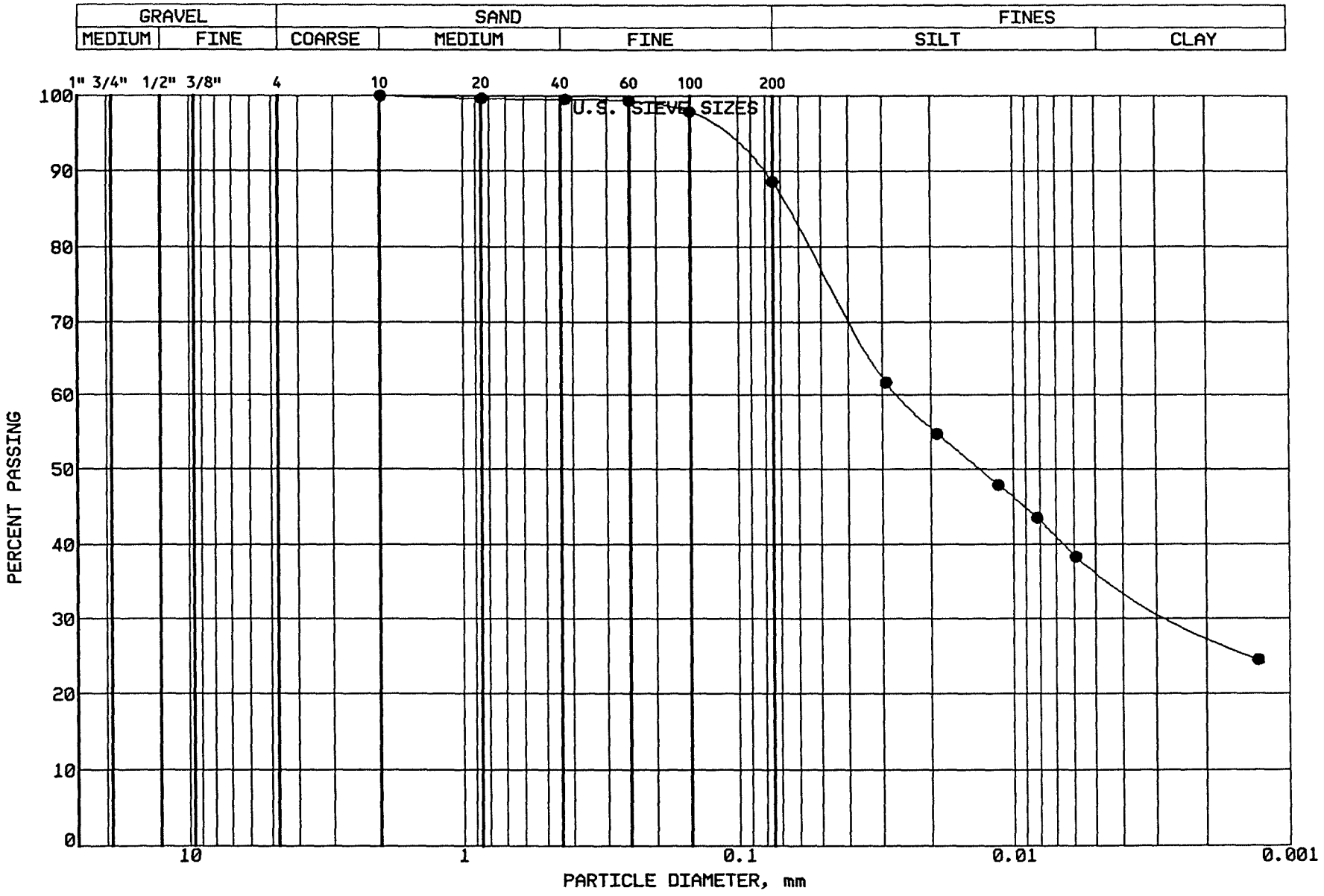
LOCATION: N 39018.0, E 40199.0
SAMPLE: CLSCC278 TUBE #: N/A
ELEVATION: N/A'

GRAVEL	0.0 %
SAND	5.9 %
SILT	51.3 %
CLAY	42.8 %
P 200	94.1 %

SOIL PROPERTIES

LL: 46.0%
PL: 14.0%
PI: 32.0%
CLASS: Lean Clay (CL), olive

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

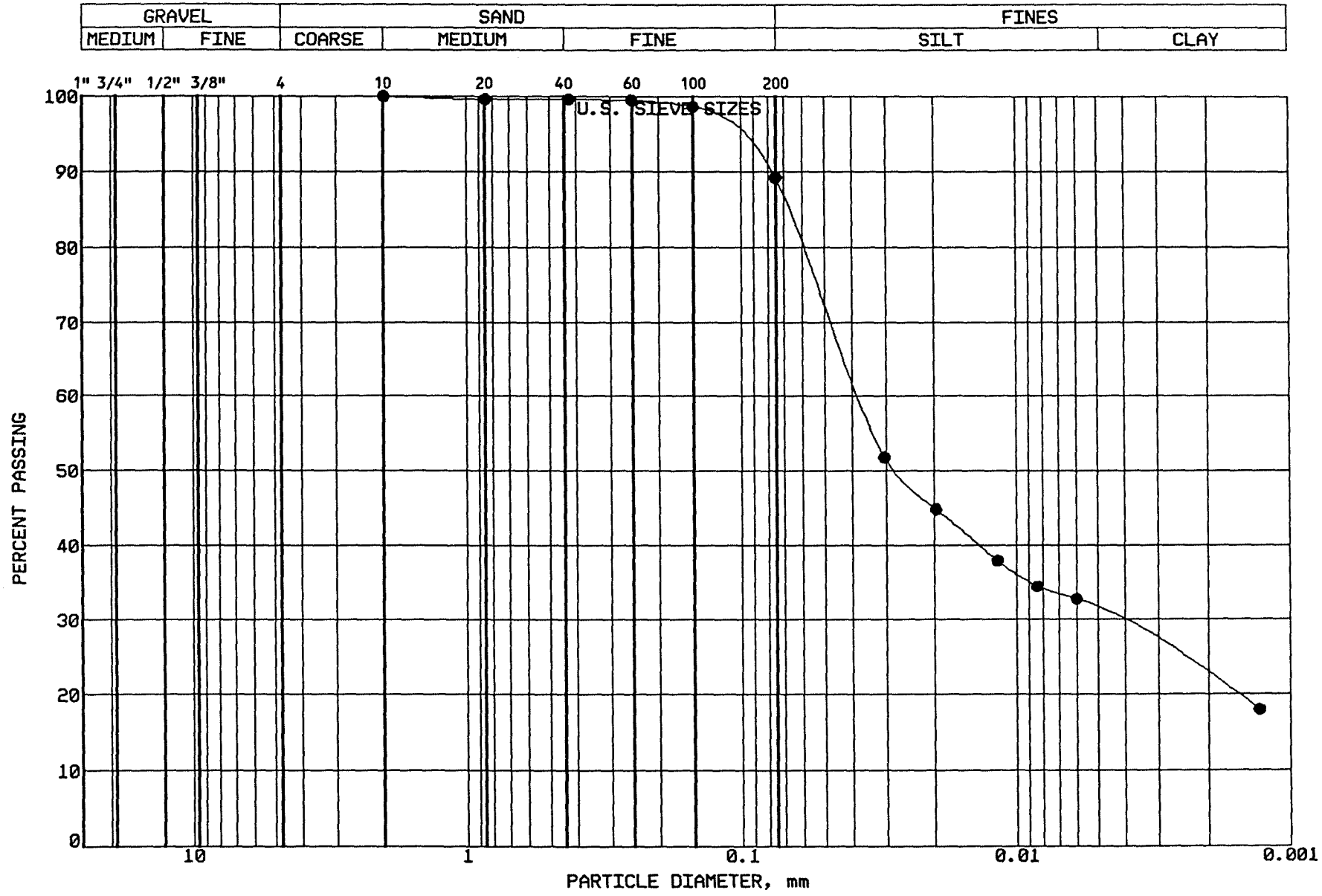
LOCATION: N 39395.0, E 40111.0
SAMPLE: CLSCC279 TUBE #: N/A
ELEVATION: 1898.7'

GRAVEL	0.0 %
SAND	11.4 %
SILT	51.8 %
CLAY	36.8 %
P 200	88.6 %

SOIL PROPERTIES

LL: 46.0%
PL: 15.0%
PI: 31.0%
CLASS: Lean Clay (CL), olive

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

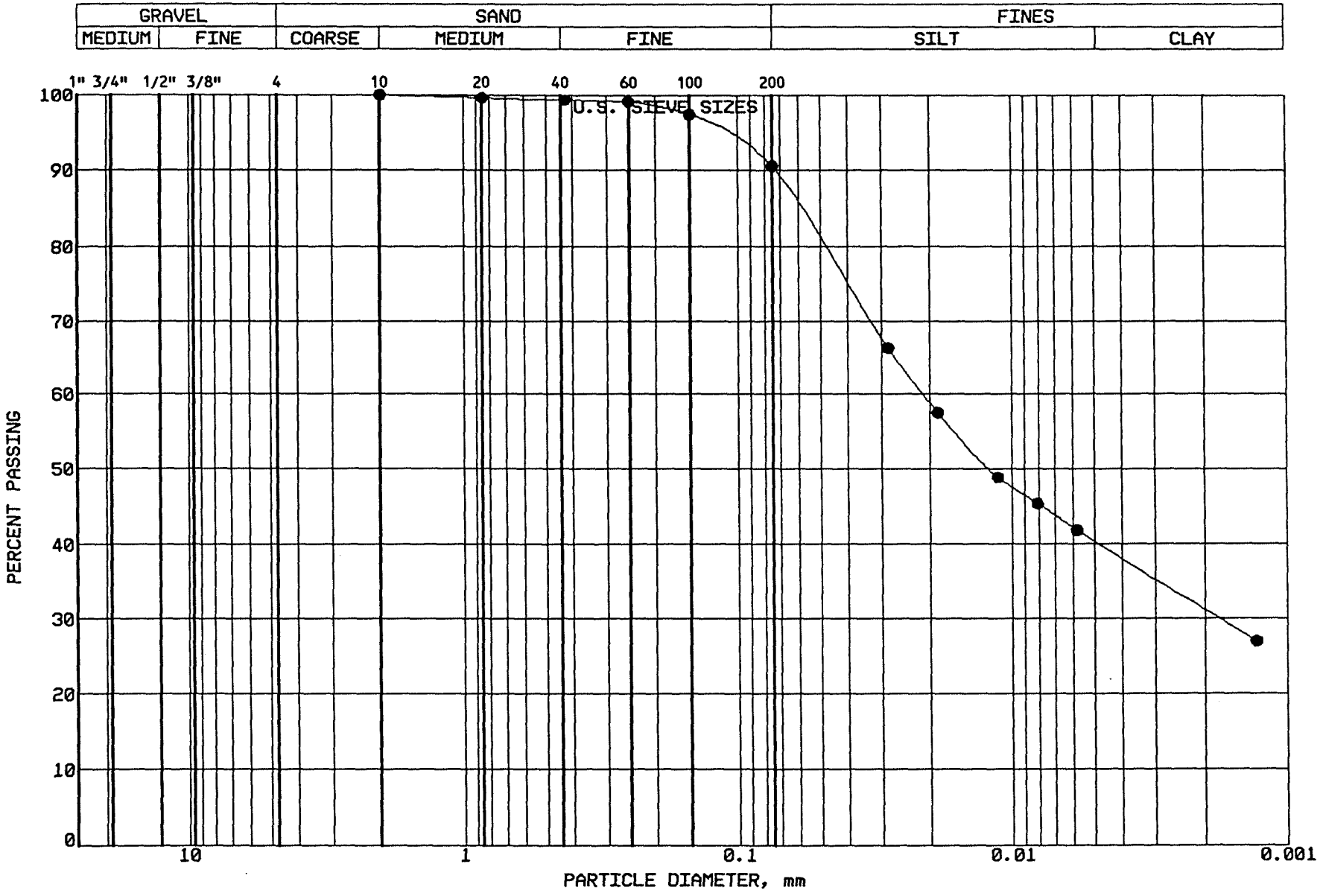
LOCATION: N 39329.0, E 39740.0
SAMPLE: CLSCC280 TUBE #: St.45
ELEVATION: 1900.6'

GRAVEL	0.0 %
SAND	10.8 %
SILT	58.3 %
CLAY	30.9 %
P 200	89.2 %

SOIL PROPERTIES

LL: 39.0%
PL: 16.0%
PI: 23.0%
CLASS: Lean Clay (CL), olive gr.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

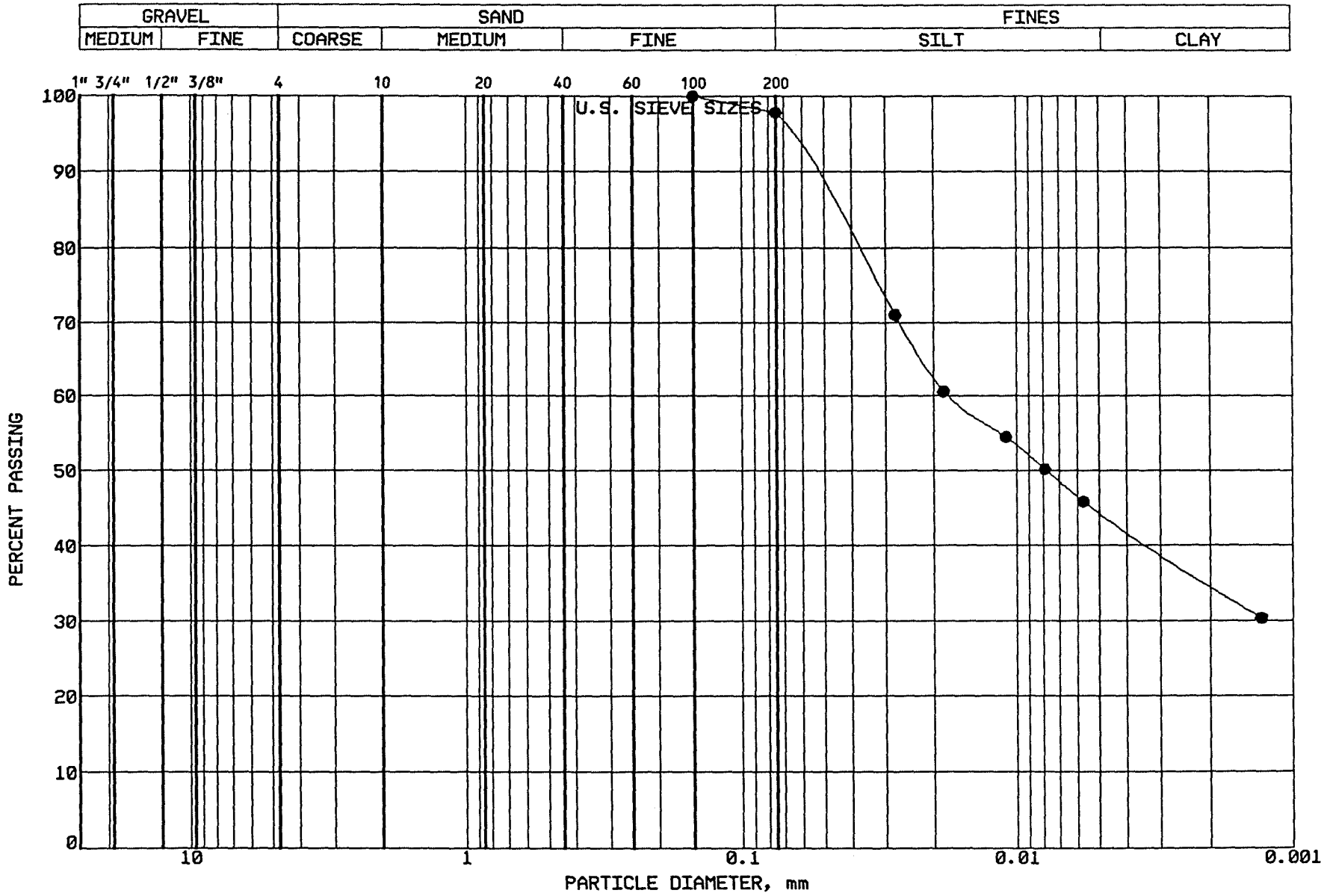
LOCATION: N 39405.0, E 39835.0
SAMPLE: CLSCC281 TUBE #: St.46
ELEVATION: 1900.5'

GRAVEL	0.0 %
SAND	9.5 %
SILT	50.2 %
CLAY	40.3 %
P 200	90.5 %

SOIL PROPERTIES

LL: 47.0%
PL: 15.0%
PI: 32.0%
CLASS: Lean Clay (CL), pale ol.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

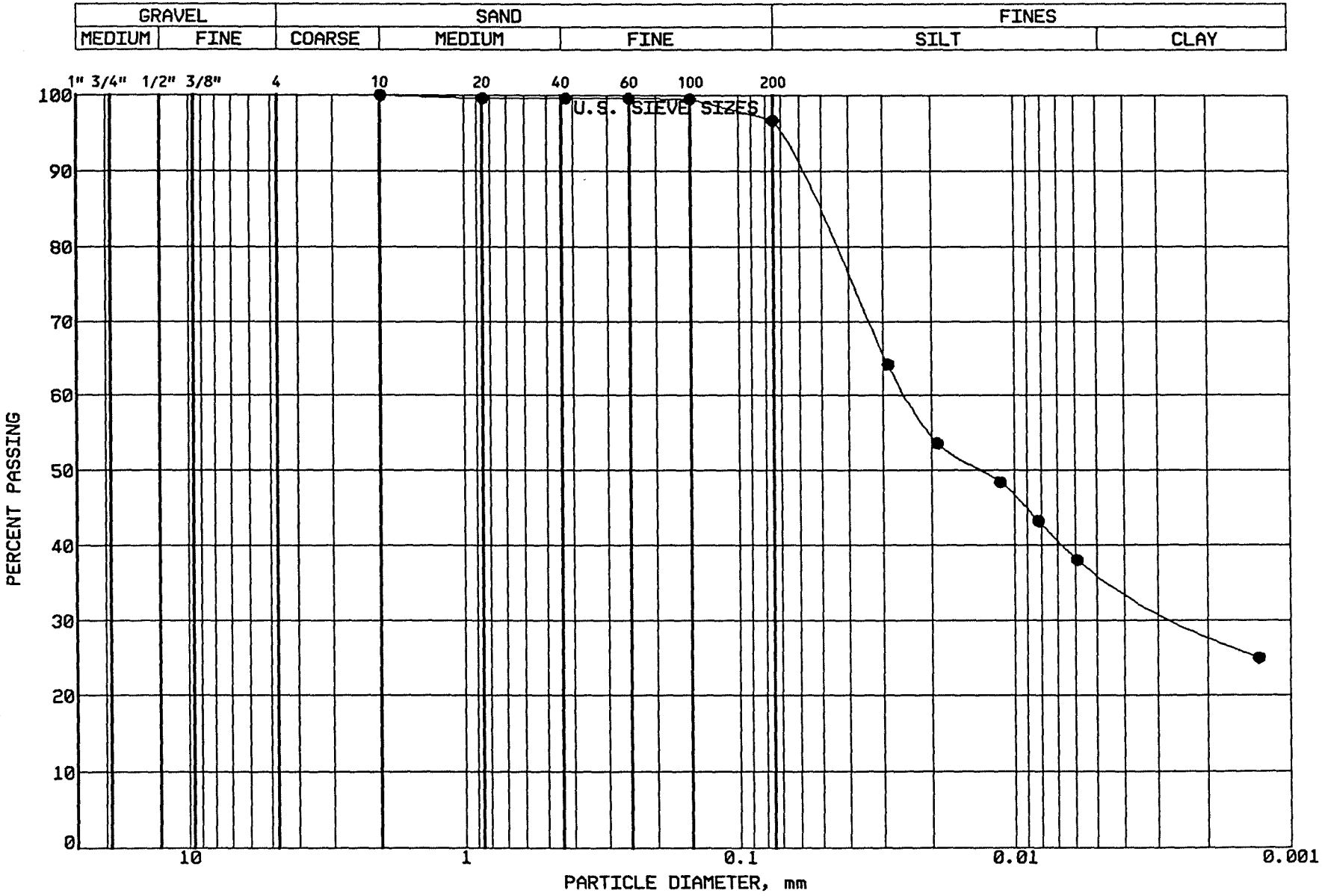
LOCATION: N 38915.0, E 39828.0
SAMPLE: CLSCC282 TUBE #: St.47
ELEVATION: 1902.9'

GRAVEL	0.0 %
SAND	2.3 %
SILT	53.3 %
CLAY	44.4 %
P 200	97.7 %

SOIL PROPERTIES

LL: 50.0%
PL: 15.0%
PI: 35.0%
CLASS: Fat Clay (CH), pale ol.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

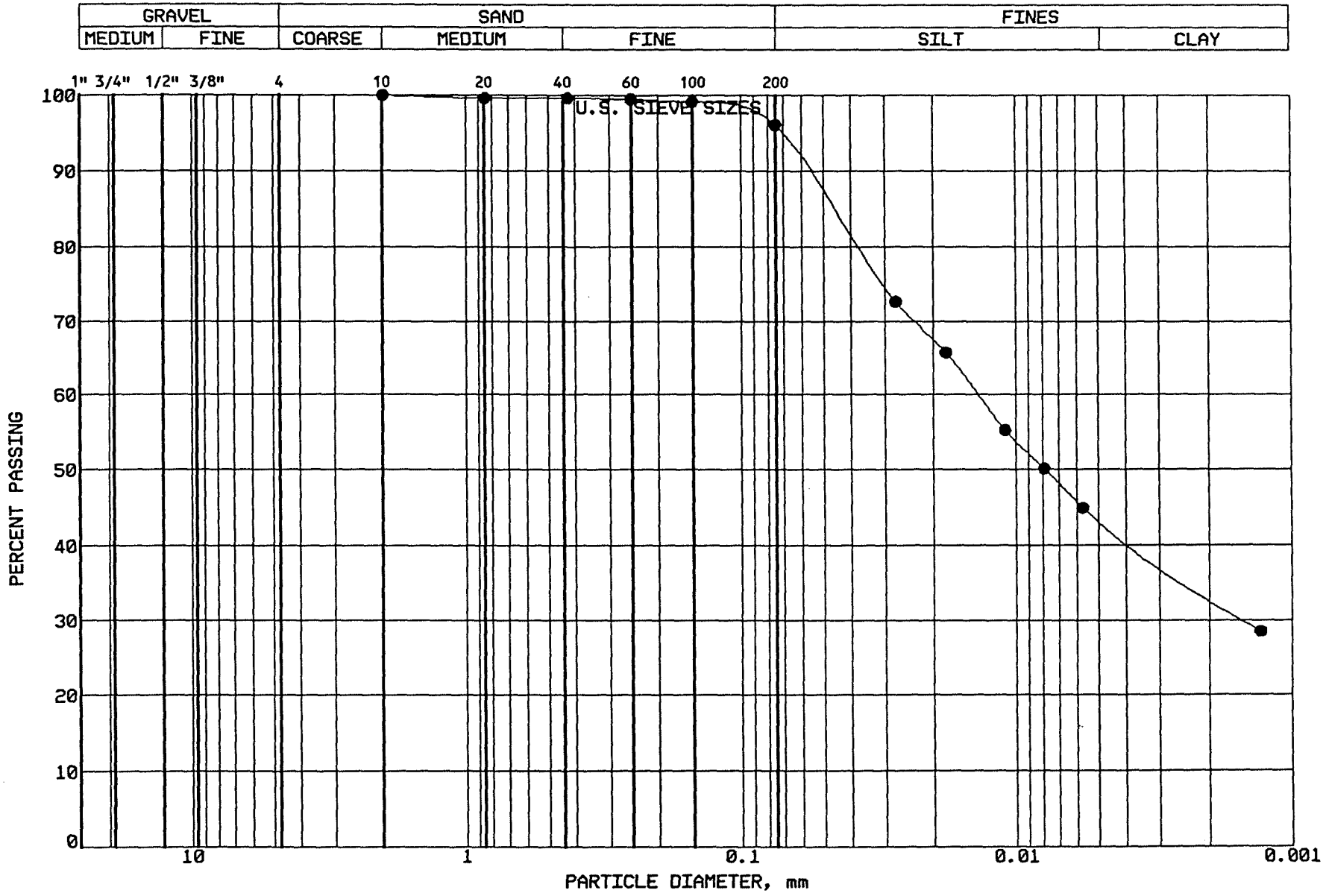
LOCATION: N 38912.0, E 40084.0
SAMPLE: CLSCC283 TUBE #: St.48
ELEVATION: 1902.0'

GRAVEL	0.0 %
SAND	3.4 %
SILT	60.0 %
CLAY	36.6 %
P 200	96.6 %

SOIL PROPERTIES

LL: 45.0%
PL: 16.0%
PI: 29.0%
CLASS: Lean Clay (CL), dk.gray

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

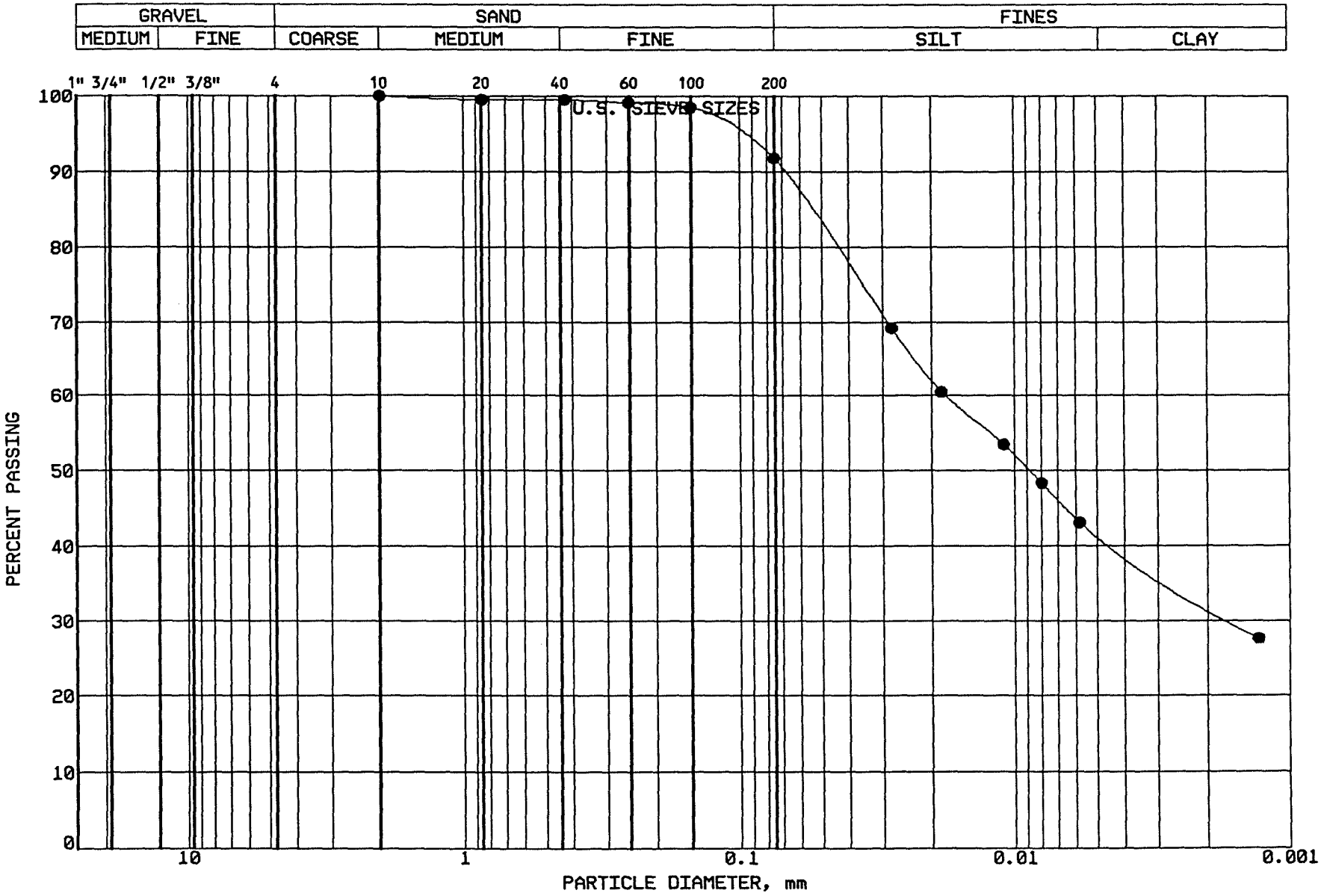
LOCATION: N 39021.0, E 40196.0
SAMPLE: CLSCC284 TUBE #: St.49
ELEVATION: 1900.0'

GRAVEL	0.0 %
SAND	3.9 %
SILT	52.7 %
CLAY	43.4 %
P 200	96.1 %

SOIL PROPERTIES

LL: 51.0%
PL: 17.0%
PI: 34.0%
CLASS: Fat Clay (CH), olive gr.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

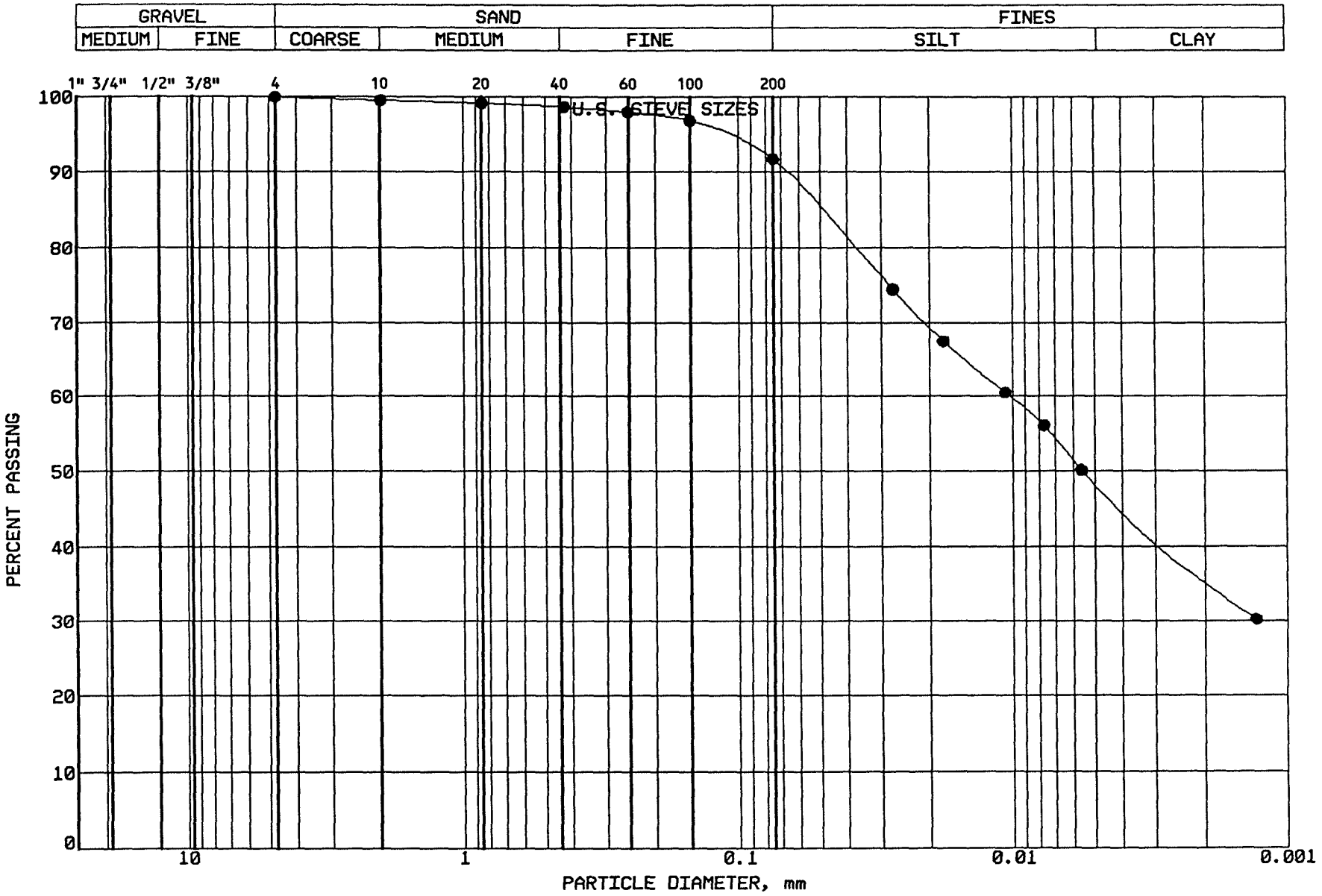
LOCATION: N 39290.0, E 40193.0
SAMPLE: CLSCC285 TUBE #: St.50
ELEVATION: 1899.6'

GRAVEL	0.0 %
SAND	8.2 %
SILT	50.2 %
CLAY	41.6 %
P 200	91.8 %

SOIL PROPERTIES

LL: 47.0%
PL: 16.0%
PI: 31.0%
CLASS: Lean Clay (CL), olive gr.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

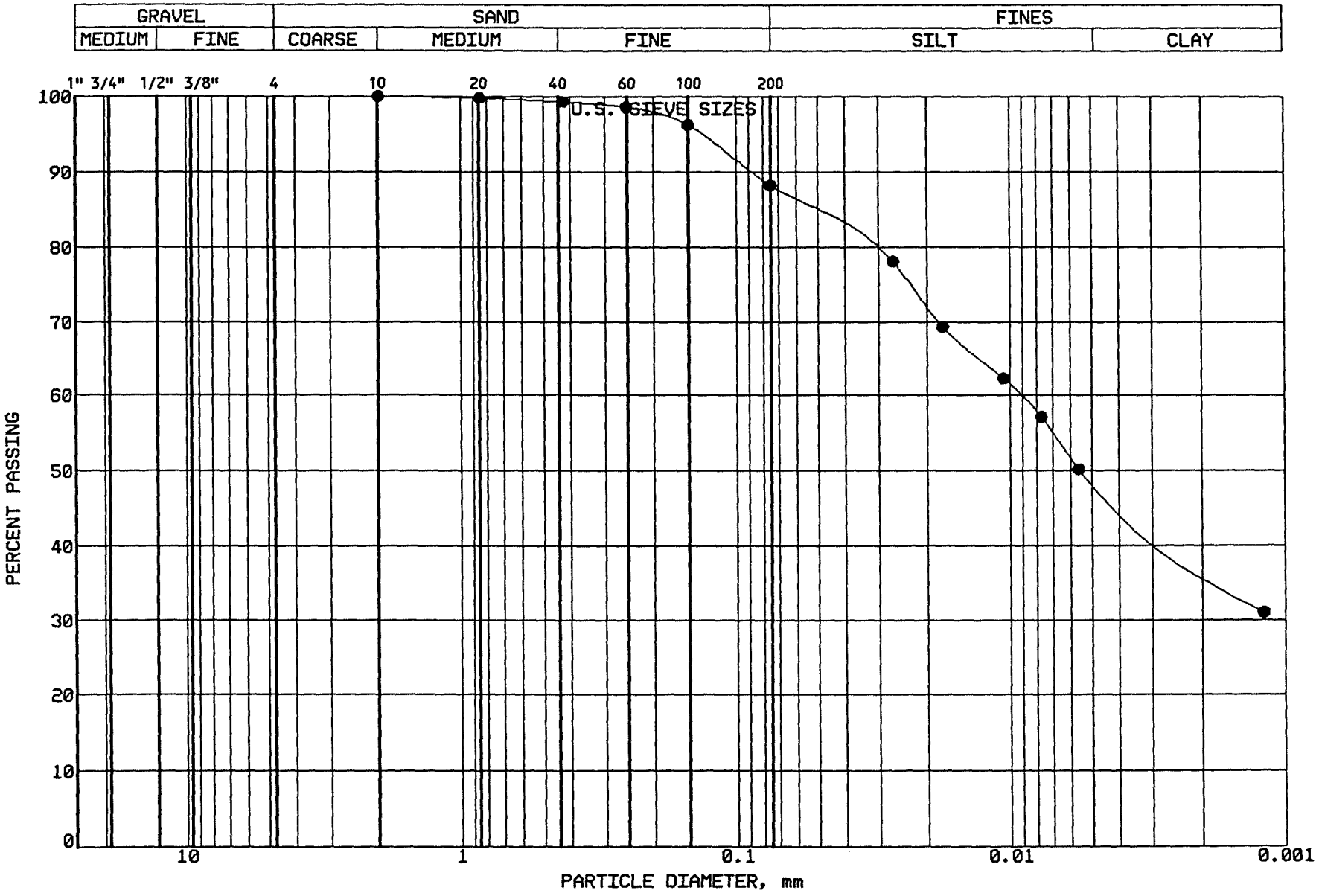
LOCATION: N 38910.0, E 40096.0
SAMPLE: CLSCC286 TUBE #:
ELEVATION: 1903.0'

GRAVEL	%
SAND	8.2 %
SILT	43.1 %
CLAY	48.6 %
P 200	91.7 %

SOIL PROPERTIES

LL: 48.0%
PL: 16.0%
PI: 32.0%
CLASS: Lean Clay (CL), dk. gr.-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

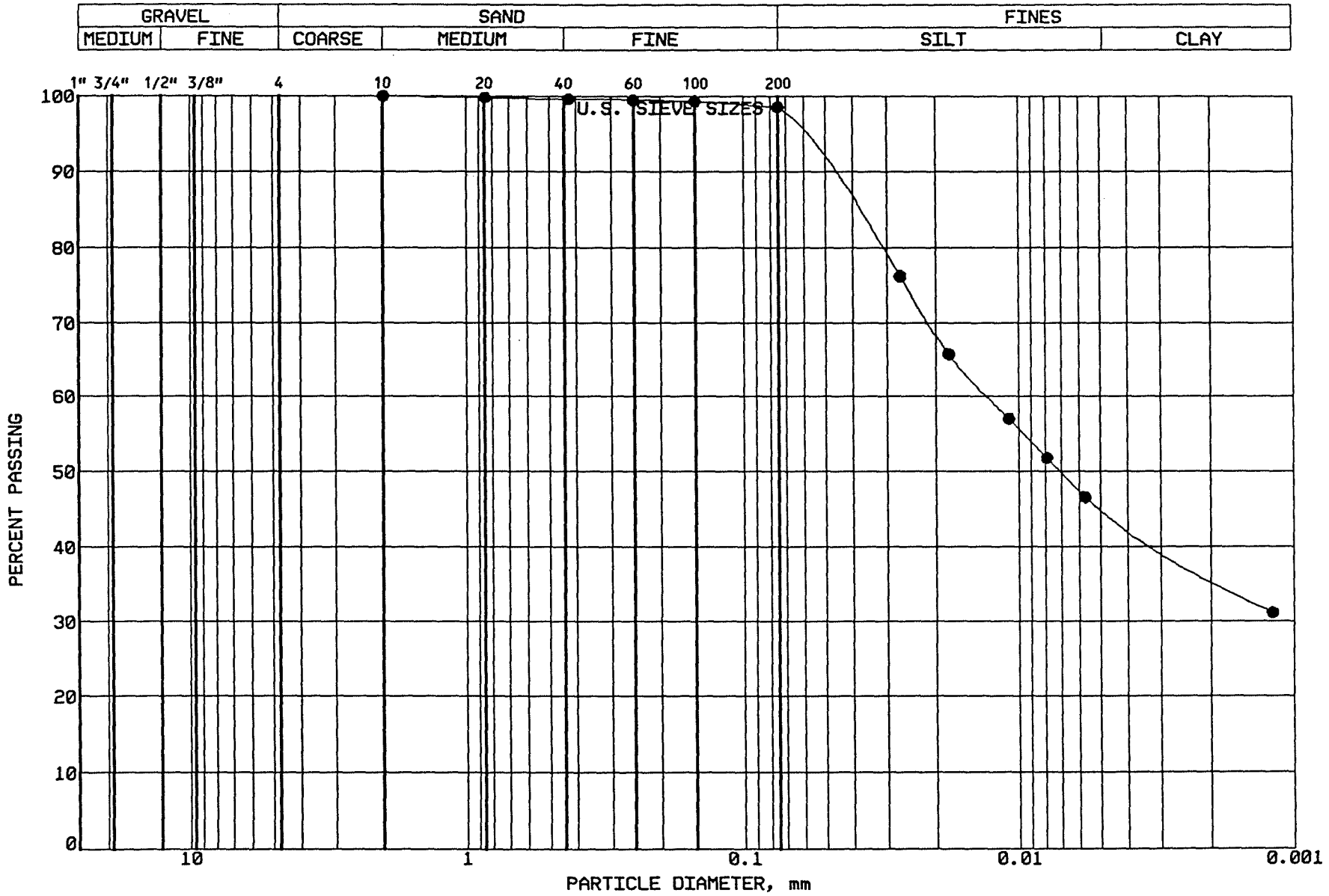
LOCATION: N 39413.0, E 40076.0
SAMPLE: CLSCC287 TUBE #: St.51
ELEVATION: 1901.8'

GRAVEL	0.0 %
SAND	11.8 %
SILT	39.4 %
CLAY	48.8 %
P 200	88.2 %

SOIL PROPERTIES

LL: 49.0%
PL: 16.0%
PI: 33.0%
CLASS: Lean Clay (CL), dk.gr.-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

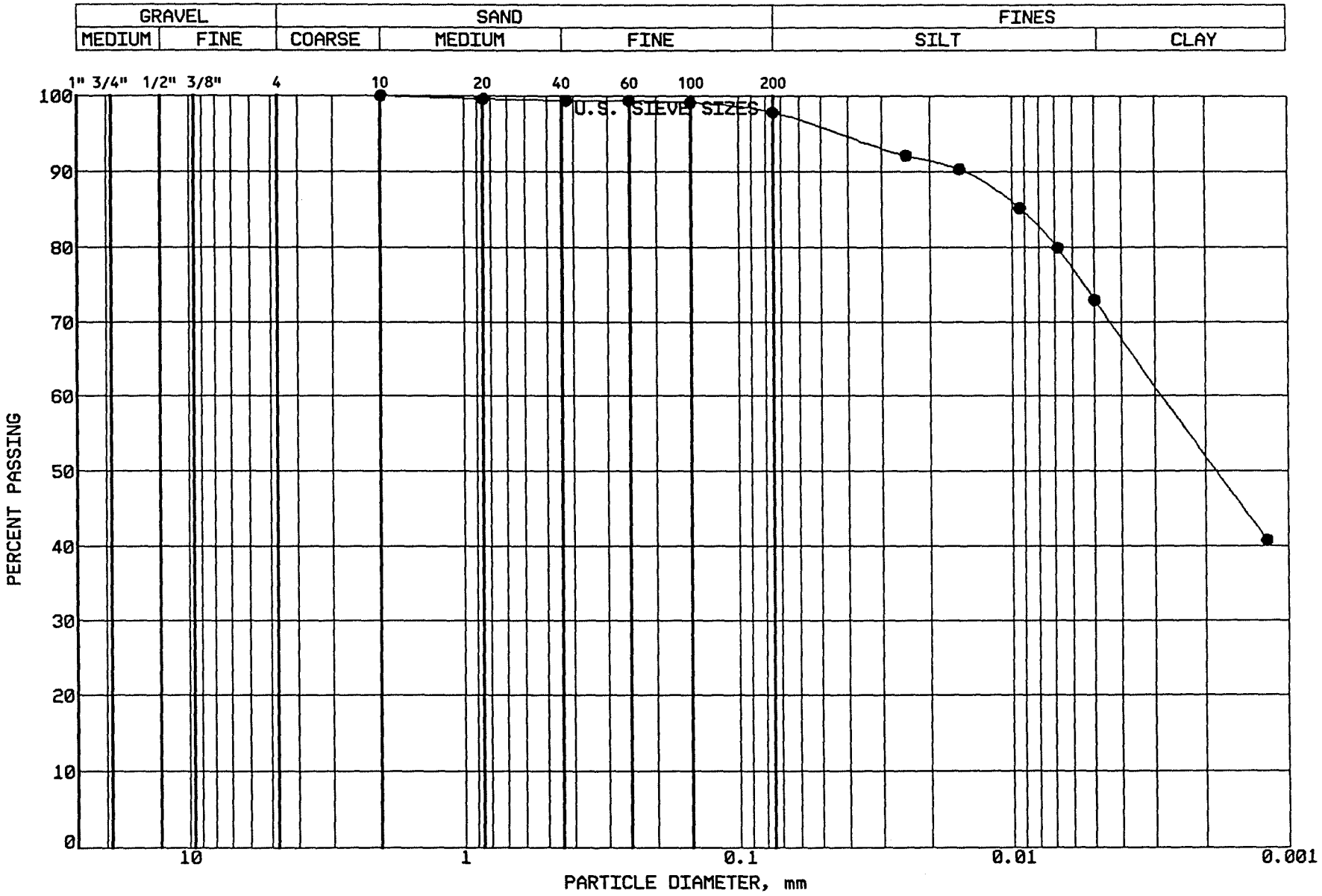
LOCATION: N 38993.0, E 39725.0
SAMPLE: CLSCC288 TUBE #: St.52
ELEVATION: 1905.7'

GRAVEL	0.0 %
SAND	1.5 %
SILT	53.2 %
CLAY	45.3 %
P 200	98.5 %

SOIL PROPERTIES

LL: 54.0%
PL: 16.0%
PI: 38.0%
CLASS: Fat Clay (CH), olive gr.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 39303.0, E 39722.0
SAMPLE: CLSCC289 TUBE #:
ELEVATION: 1906.9'

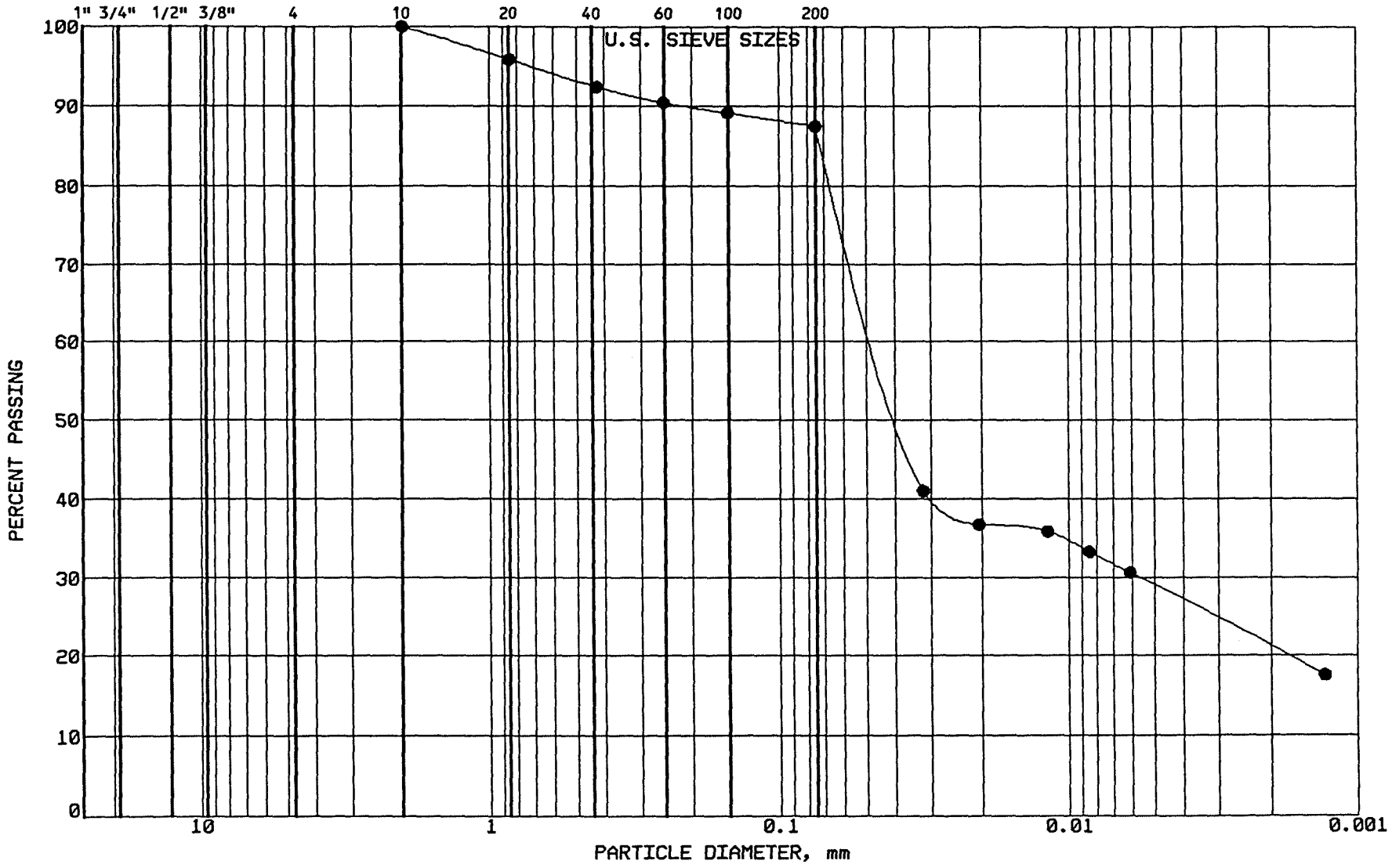
GRAVEL	0.0 %
SAND	2.2 %
SILT	24.9 %
CLAY	72.9 %
P 200	97.8 %

SOIL PROPERTIES

LL: 56.0%
PL: 18.0%
PI: 38.0%
CLASS: Fat Clay (CH), dk.gray

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

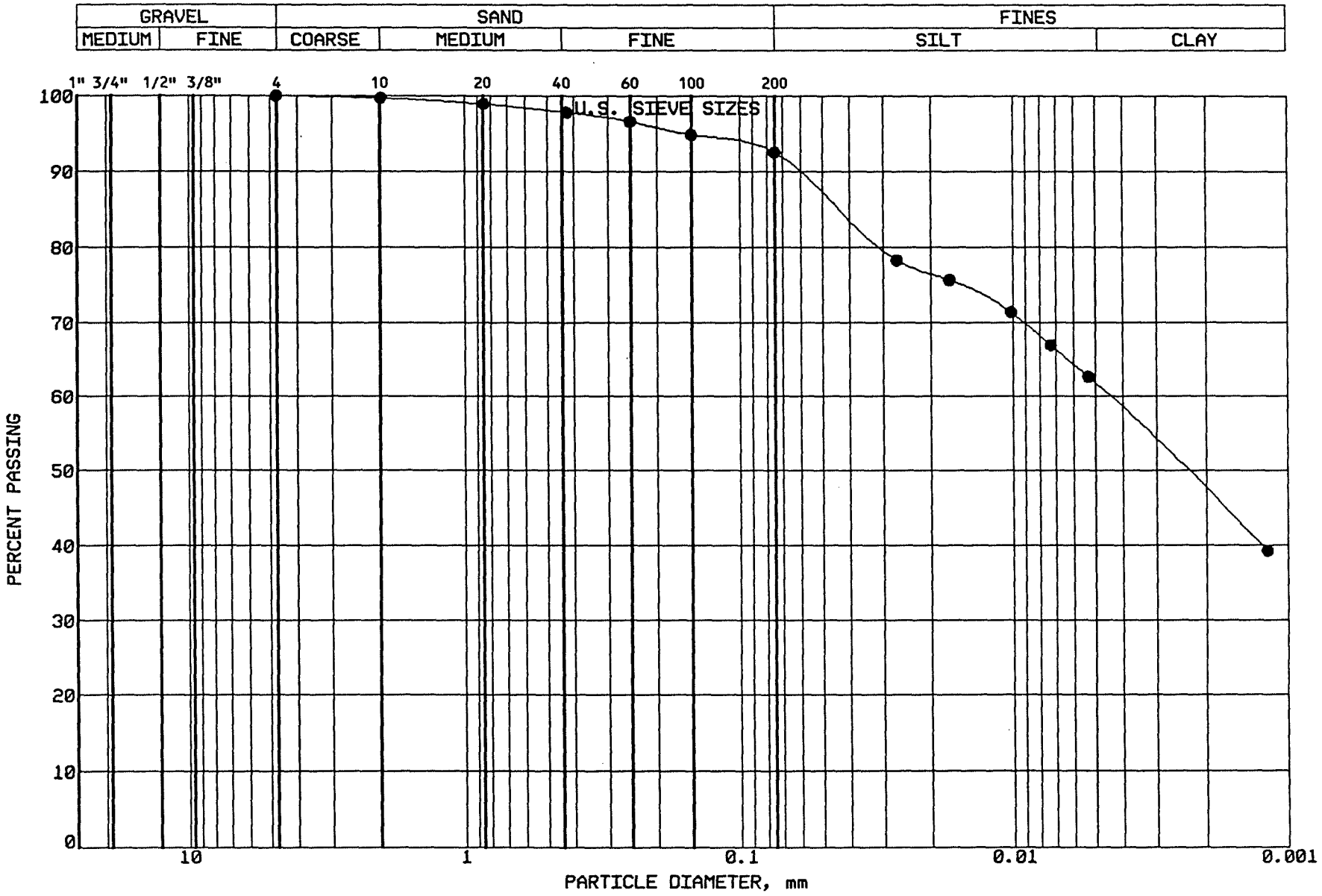
LOCATION: N 38894.0, E 39964.0
SAMPLE: CLSCC290 TUBE #: St.53
ELEVATION: 1910.2'

GRAVEL	0.0 %
SAND	12.6 %
SILT	58.5 %
CLAY	28.9 %
P 200	87.4 %

SOIL PROPERTIES

LL: 49.0%
PL: 27.0%
PI: 22.0%
CLASS: Lean Clay (CL), dk. reddish-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 39136.0, E 40215.0
SAMPLE: CLSCC291 TUBE #: St.54
ELEVATION: 1909.5'

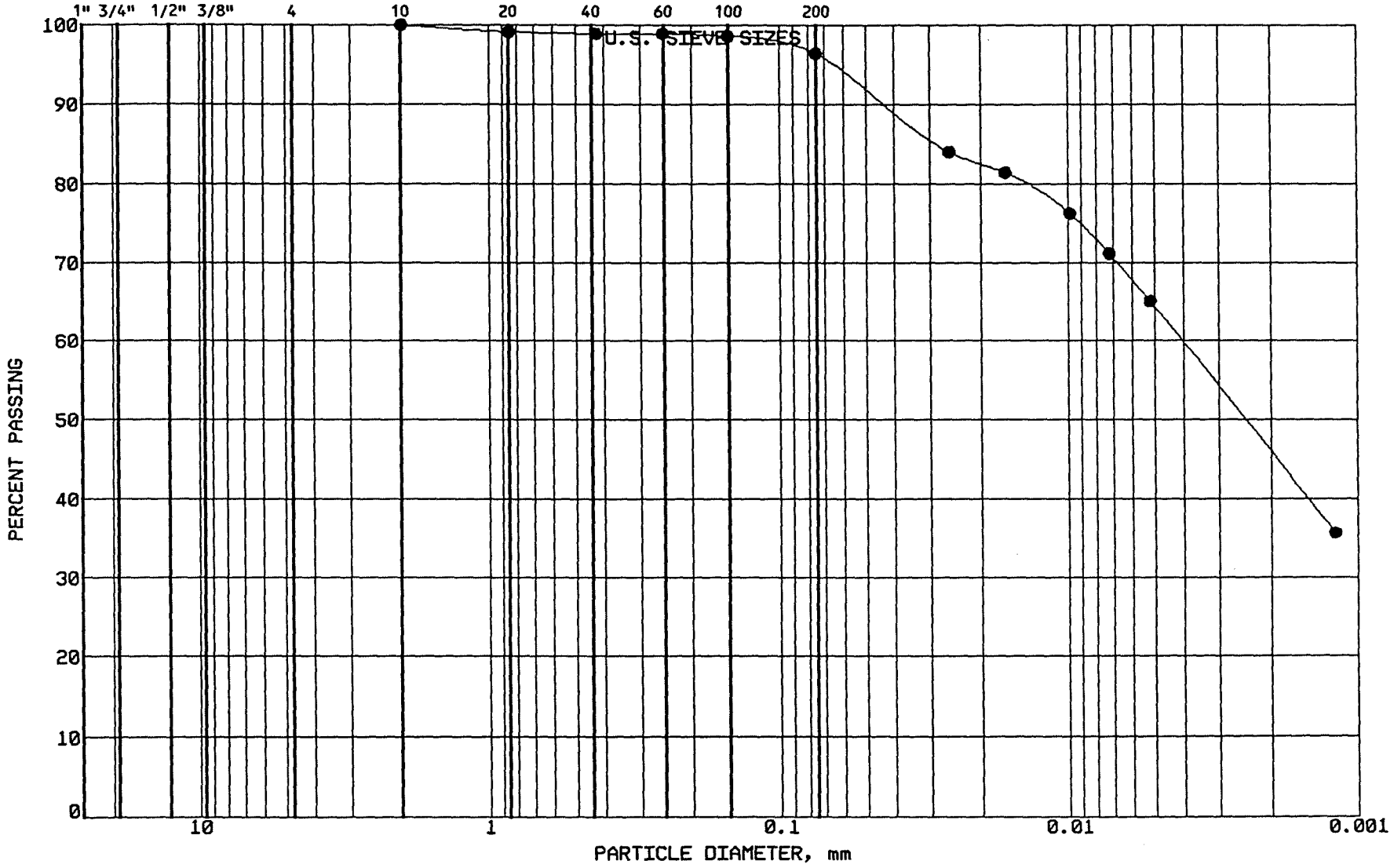
GRAVEL	0.0 %
SAND	7.4 %
SILT	30.9 %
CLAY	61.7 %
P 200	92.6 %

SOIL PROPERTIES

LL: 54.0%
PL: 19.0%
PI: 35.0%
CLASS: Fat Clay (CH), dk.gr.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

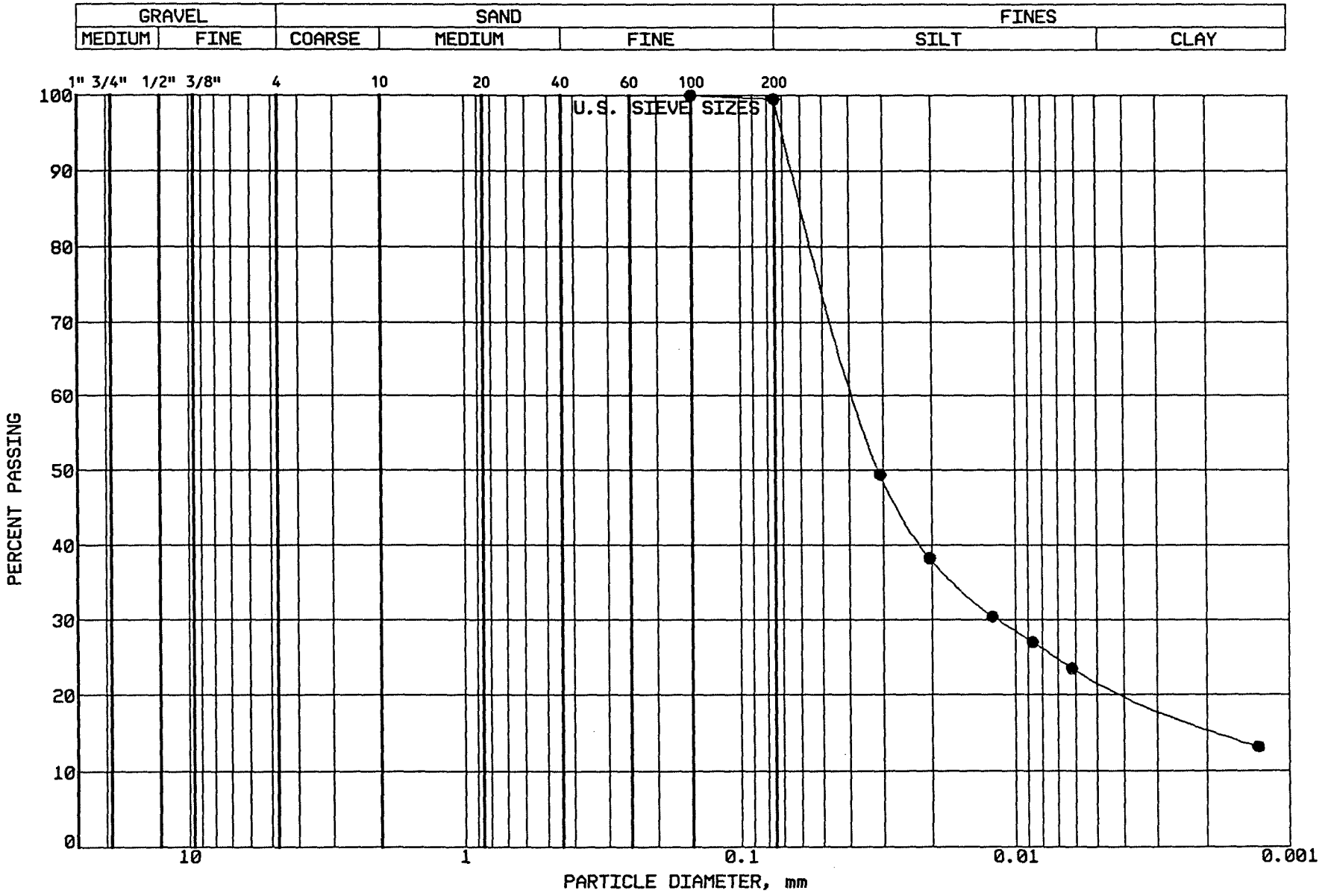
LOCATION: N 39244.0, E 39844.0
SAMPLE: CLBCC292 TUBE #:
ELEVATION: 1900.4'

GRAVEL	0.0 %
SAND	3.6 %
SILT	32.2 %
CLAY	64.2 %
P 200	96.4 %

SOIL PROPERTIES

LL: 55.0%
PL: 19.0%
PI: 36.0%
CLASS: Fat Clay (CH), gr.-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

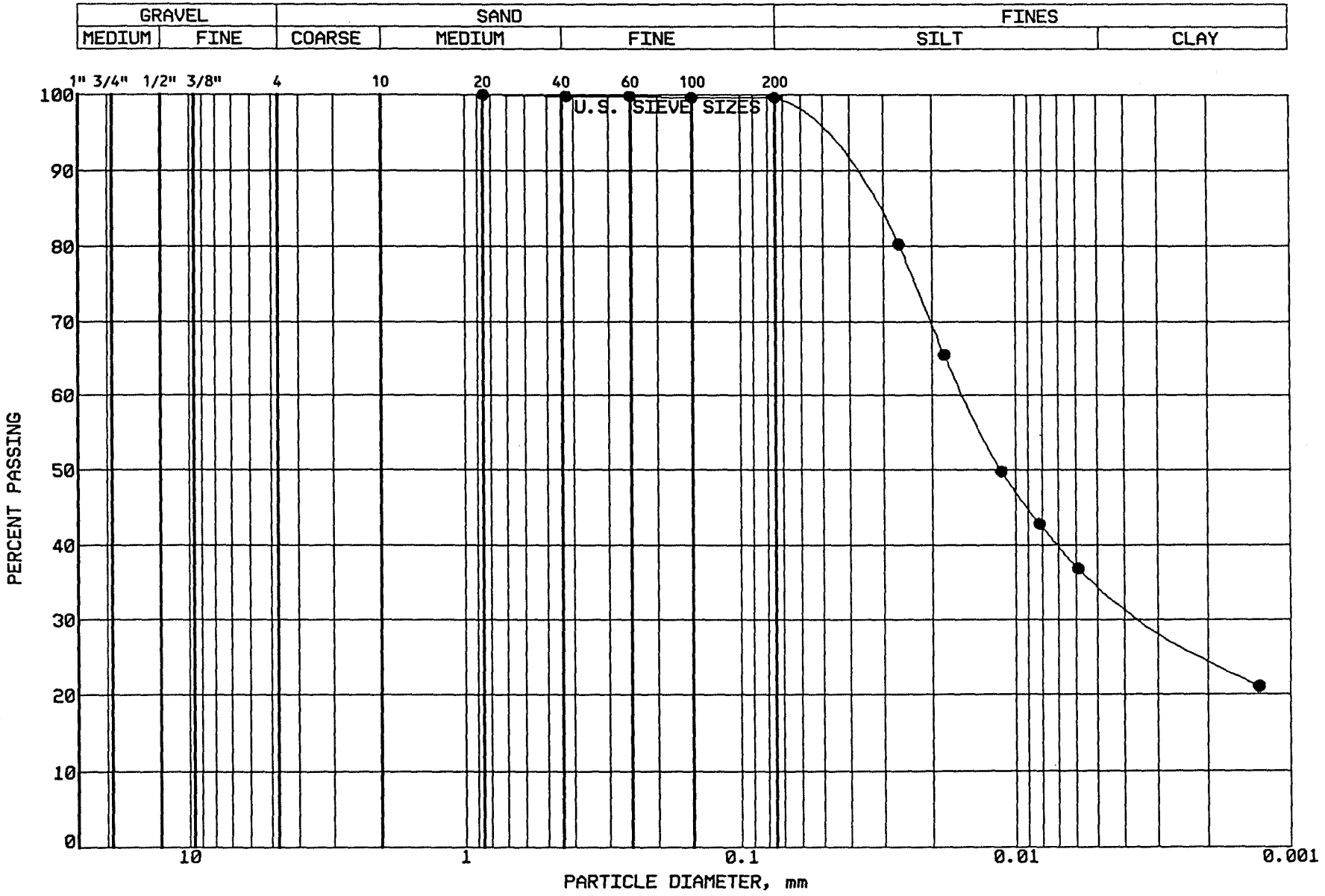
LOCATION: N 37735.0, E 39781.0
SAMPLE: SGCC293 TUBE #:
ELEVATION: 1906.6'

GRAVEL	0.0 %
SAND	0.5 %
SILT	77.4 %
CLAY	22.1 %
P 200	99.5 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Silt (ML), dk.gr.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

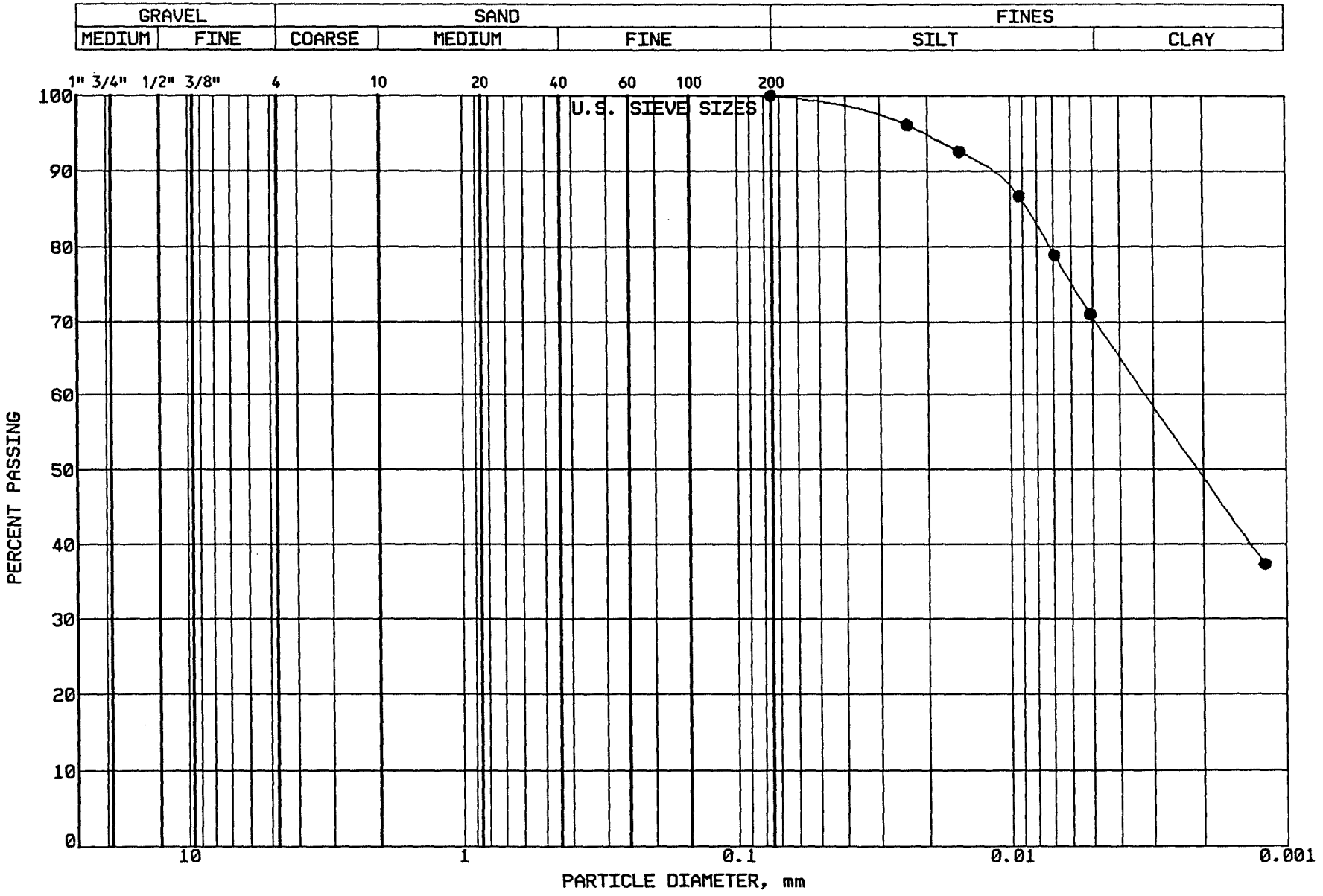
LOCATION: N 37690.0, E 39955.0
SAMPLE: SGCC294 TUBE #:
ELEVATION: 1906.4'

GRAVEL	0.0 %
SAND	0.4 %
SILT	64.5 %
CLAY	35.1 %
P 200	99.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Silt (ML), dk.gr.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

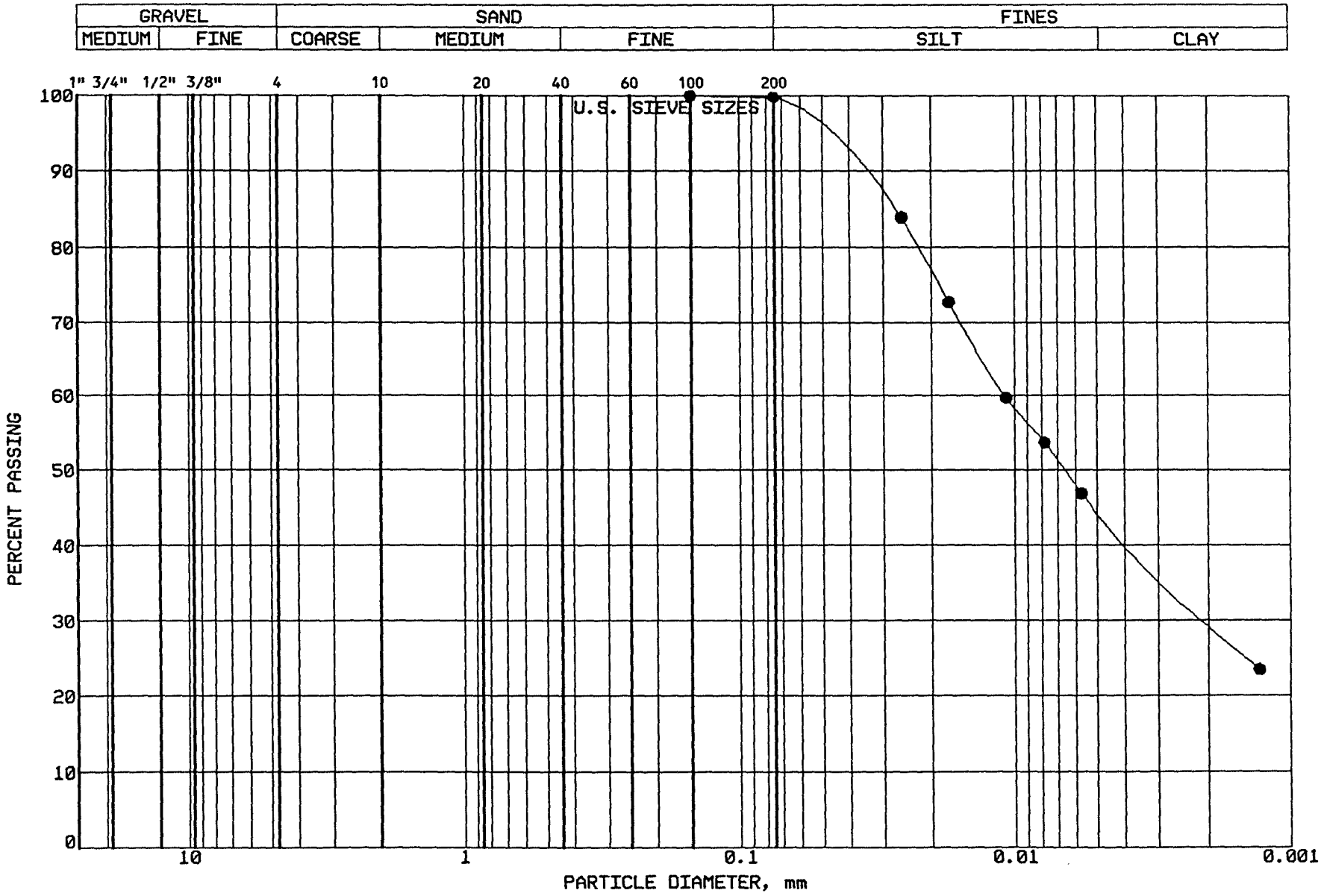
LOCATION: N 37648.0, E 40103.0
SAMPLE: SGCC295 TUBE #:
ELEVATION: 1905.6'

GRAVEL	0.0 %
SAND	0.0 %
SILT	29.5 %
CLAY	70.5 %
P 200	100.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH), dk.gr.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

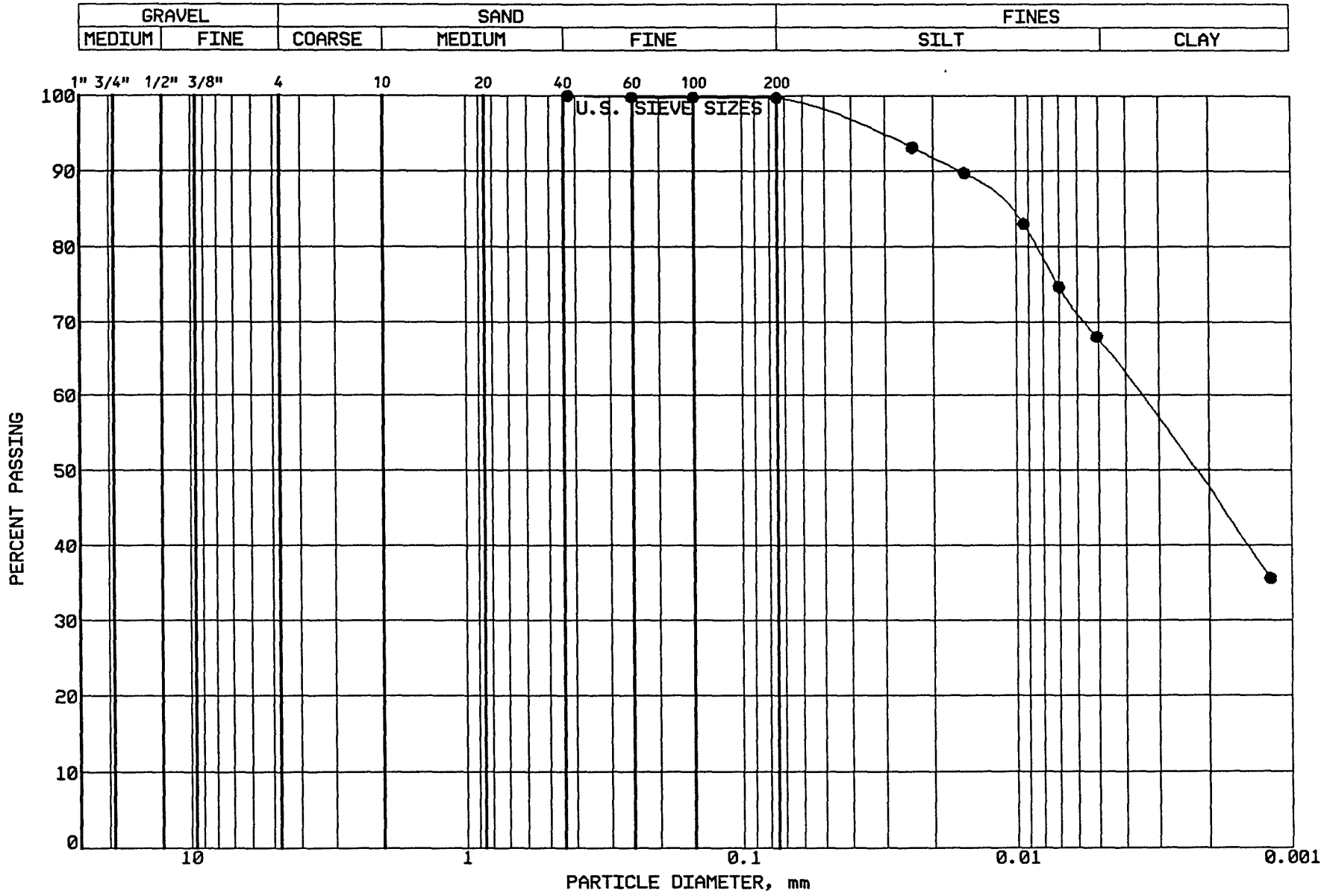
LOCATION: N 37594.0, E 40301.0
SAMPLE: SGCC296 TUBE #:
ELEVATION: 1904.8'

GRAVEL	0.0 %
SAND	0.2 %
SILT	55.1 %
CLAY	44.7 %
P 200	99.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH), dk.gr.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

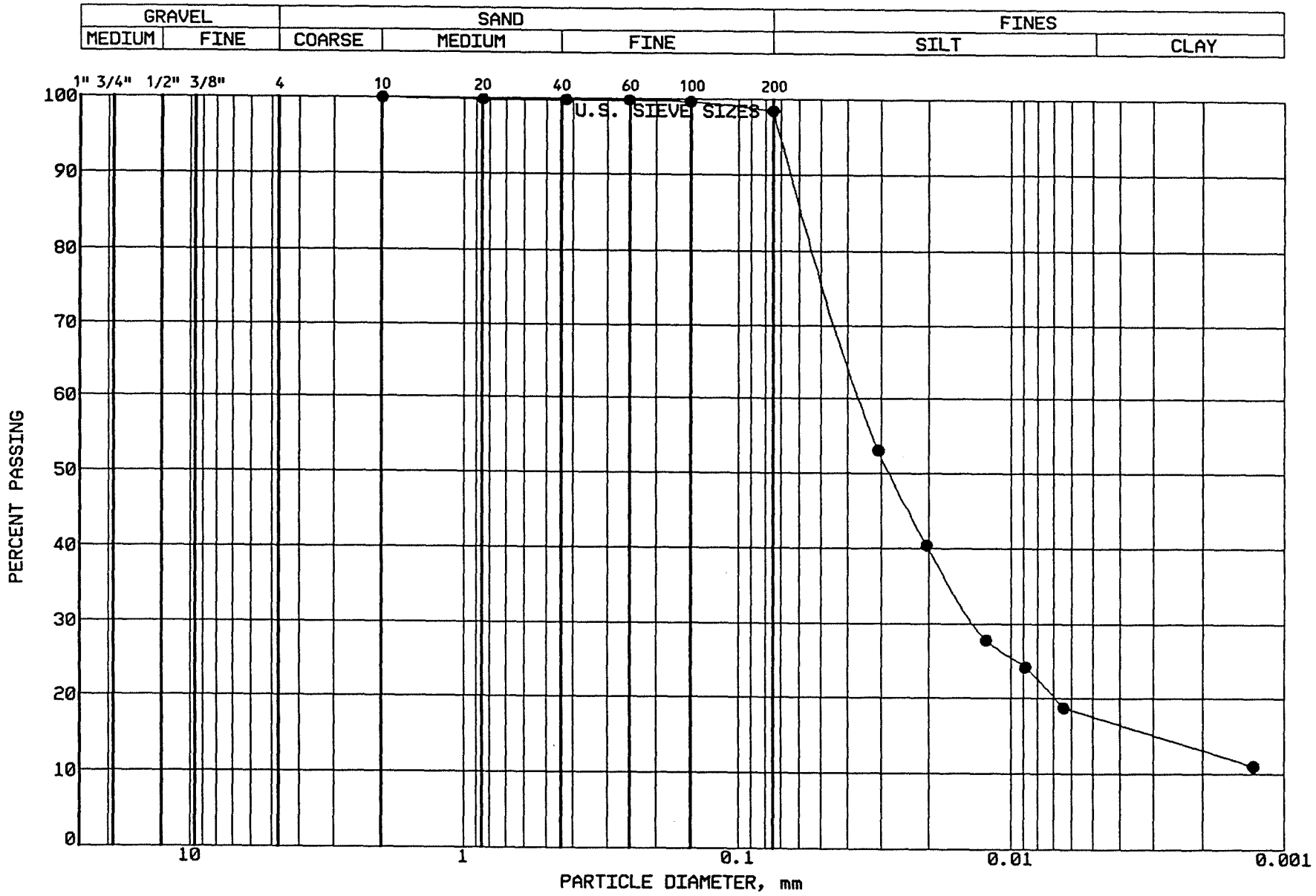
LOCATION: N 37360.0, E 40314.0
SAMPLE: SGCC297 TUBE #:
ELEVATION: 1905.7'

GRAVEL	0.0 %
SAND	0.3 %
SILT	32.2 %
CLAY	67.5 %
P 200	99.7 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH), dk.gr.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

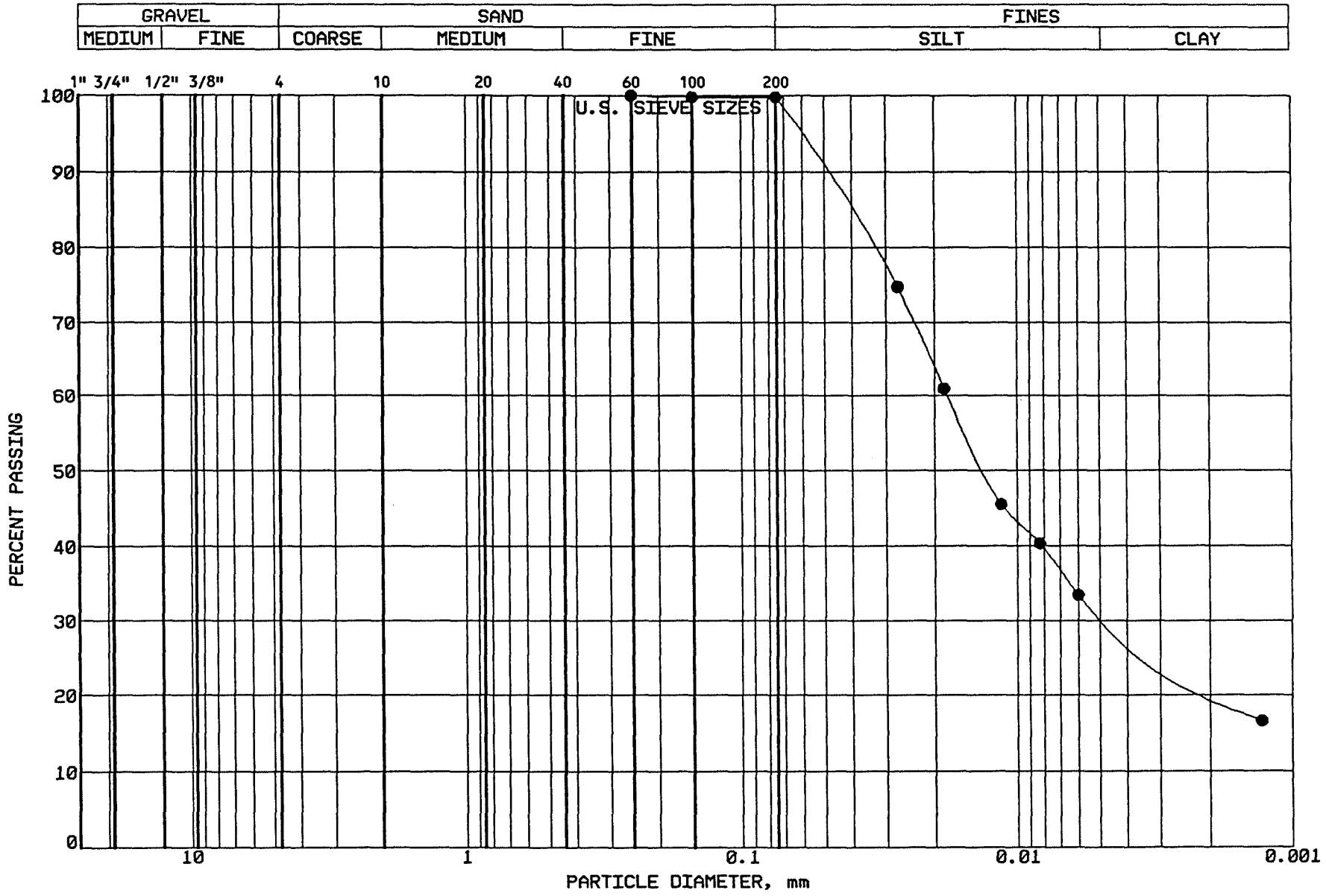
LOCATION: N 37380.0, E 40134.0
SAMPLE: SGCC298 TUBE #:
ELEVATION: 1906.8'

GRAVEL	0.0 %
SAND	1.6 %
SILT	80.8 %
CLAY	17.6 %
P 200	98.4 %

SOIL PROPERTIES

LL: 29.0%
PL: 20.0%
PI: 9.0%
CLASS: Lean Clay (CL), dk.gr.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

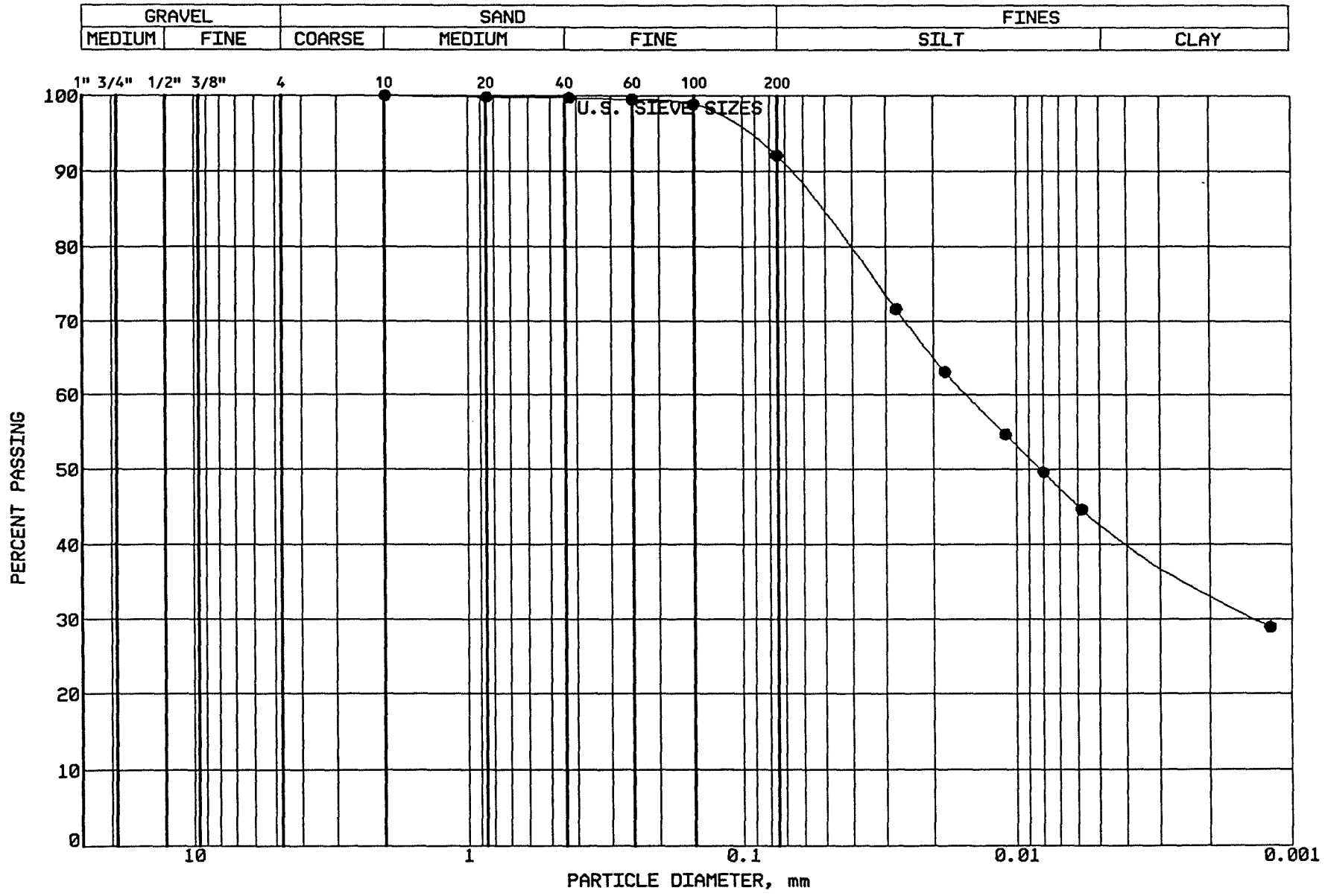
LOCATION: N 37446.0, E 39957.0
SAMPLE: SGCC299 TUBE #:
ELEVATION: 1907.5'

GRAVEL	0.0 %
SAND	0.2 %
SILT	68.4 %
CLAY	31.4 %
P 200	99.8 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Lean Clay (CL), dk.gr.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

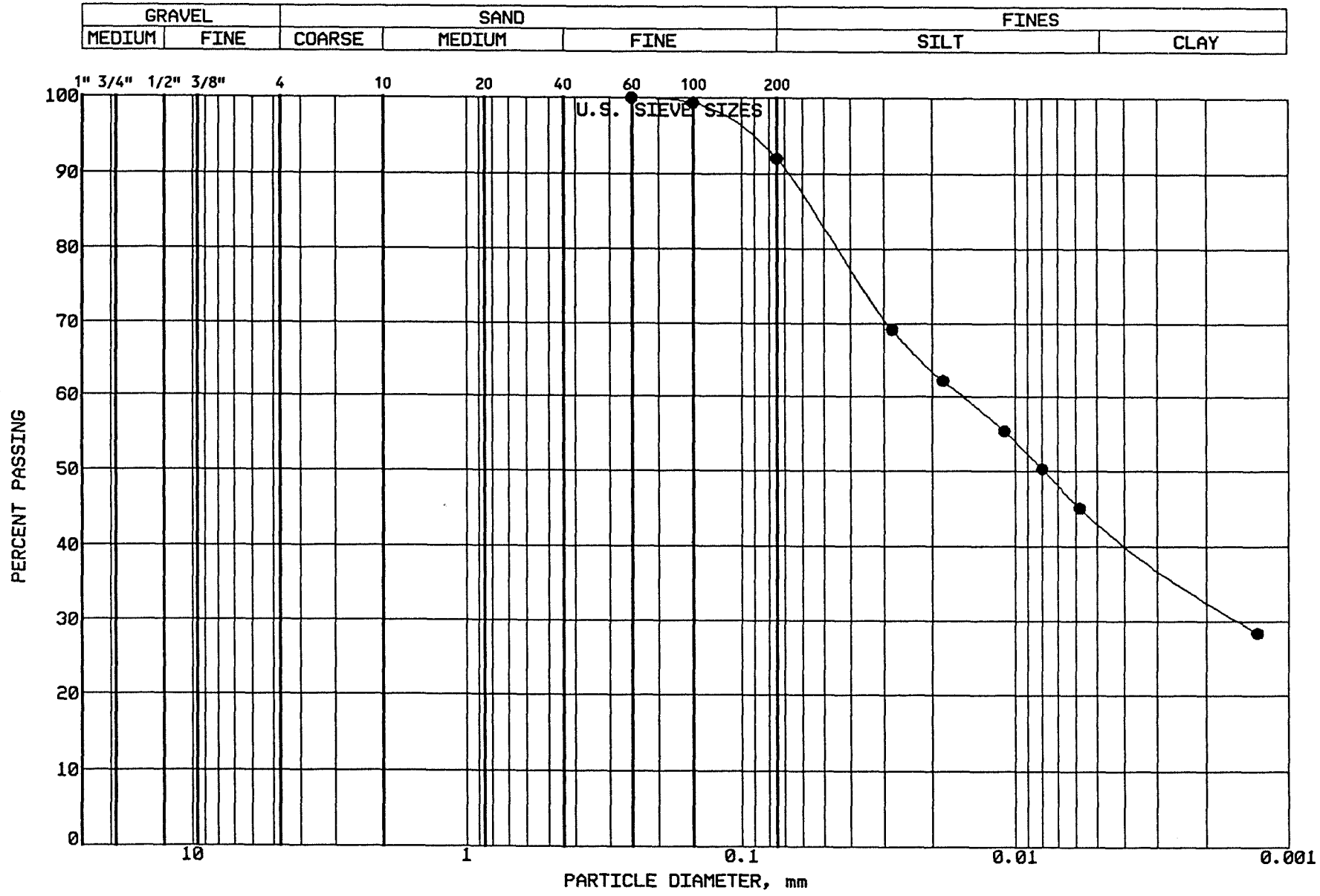
LOCATION: N 38941.0, E 39816.0
SAMPLE: CLBCC300 TUBE #: St.55
ELEVATION: 1902.7'

GRAVEL	0.0 %
SAND	7.9 %
SILT	49.0 %
CLAY	43.1 %
P 200	92.1 %

SOIL PROPERTIES

LL: 49.0%
PL: 14.0%
PI: 35.0%
CLASS: Lean Clay (CL), olive brown

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

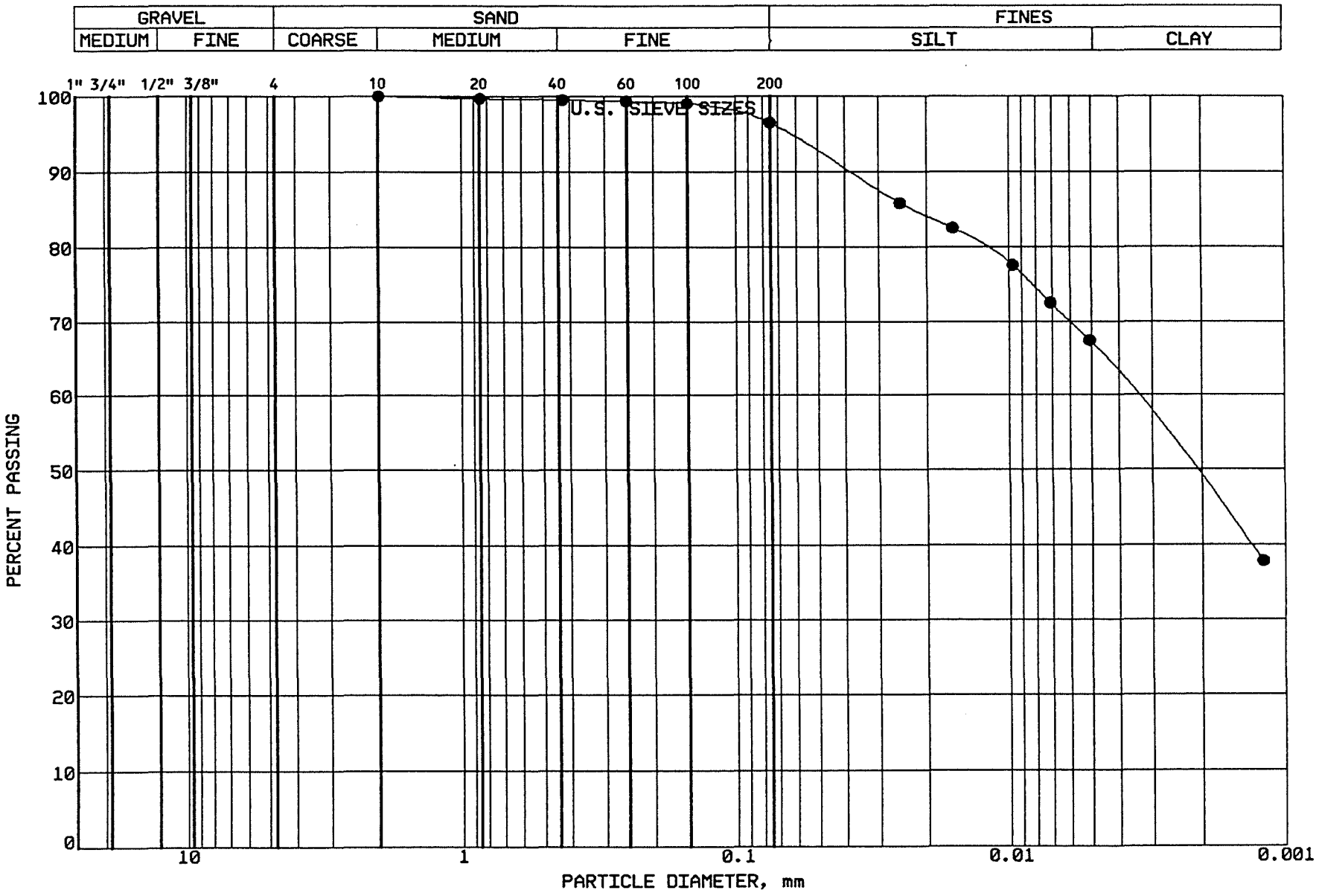
LOCATION: N 38939.0, E 39980.0
SAMPLE: CLBCC301 TUBE #: St.56
ELEVATION: 1901.7'

GRAVEL	0.0 %
SAND	8.0 %
SILT	48.6 %
CLAY	43.4 %
P 200	92.0 %

SOIL PROPERTIES

LL: 48.0%
PL: 13.0%
PI: 35.0%
CLASS: Lean Clay (CL), olive brown

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38944.0, E 40130.0
SAMPLE: CLBCC302 TUBE #: St.57
ELEVATION: 1901.1'

GRAVEL	0.0 %
SAND	3.5 %
SILT	29.5 %
CLAY	67.0 %
P 200	96.5 %

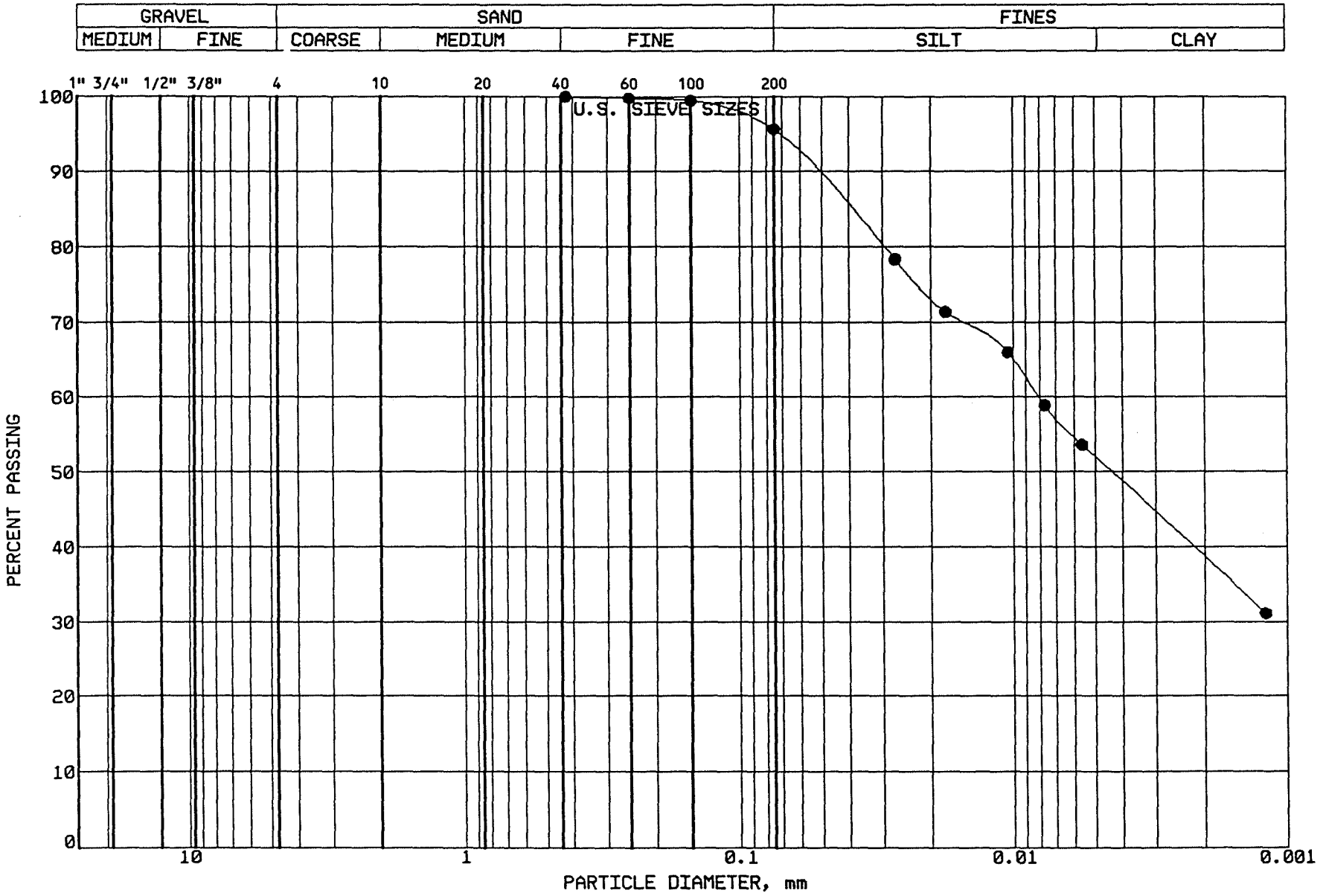
SOIL PROPERTIES

LL: 56.0%
PL: 17.0%
PI: 39.0%
CLASS: Fat Clay (CH), dk.gr.-br.

AP #91

Hydrometers/Atterbergs
CC-303 thru CC-556

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 39110.0, E 40144.0
SAMPLE: CLBCC303 TUBE #: St.58
ELEVATION: 1900.1'

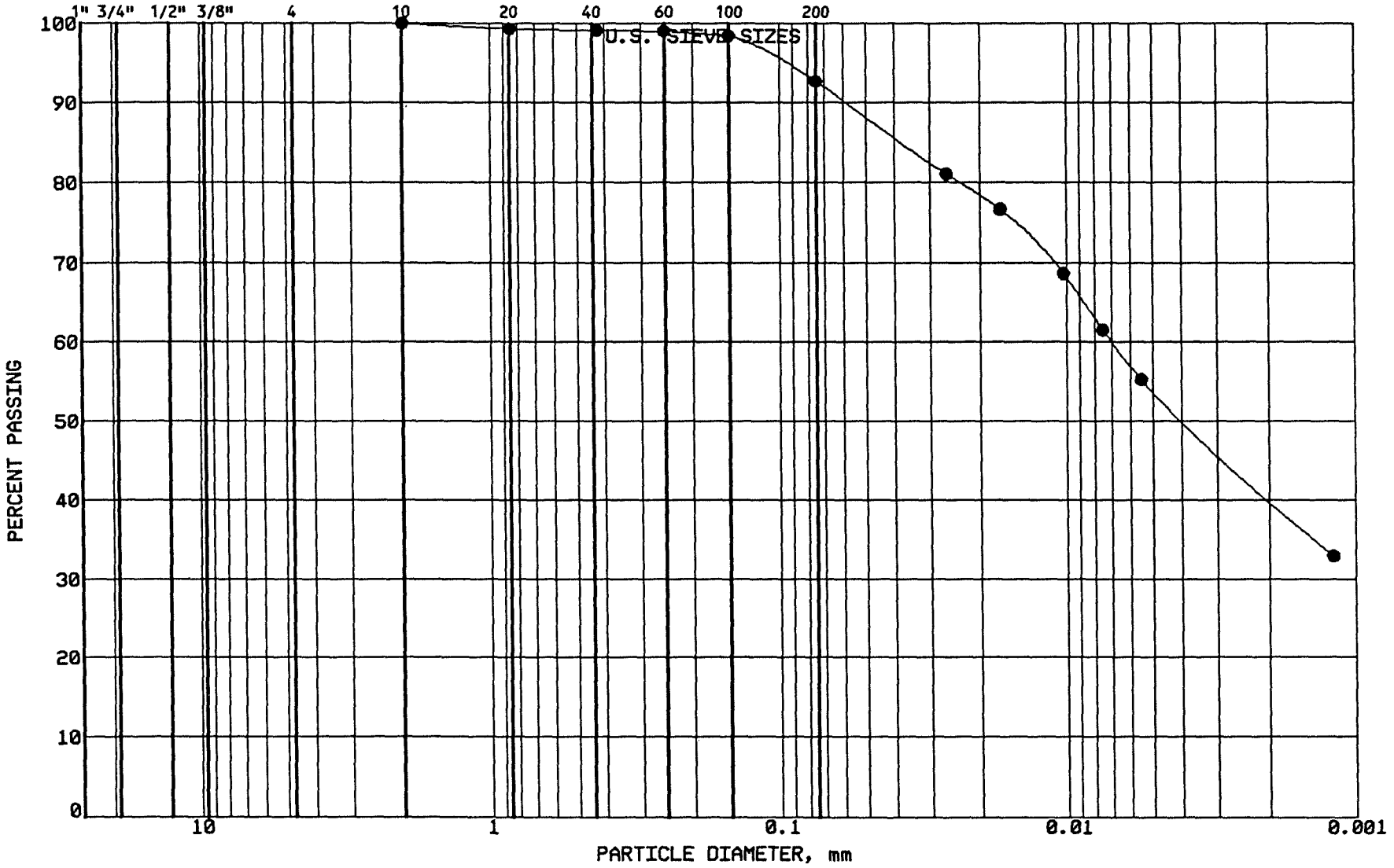
GRAVEL	0.0 %
SAND	4.4 %
SILT	43.7 %
CLAY	51.9 %
P 200	95.6 %

SOIL PROPERTIES

LL: 50.0%
PL: 16.0%
PI: 34.0%
CLASS: Fat Clay (CH), dk.gr.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

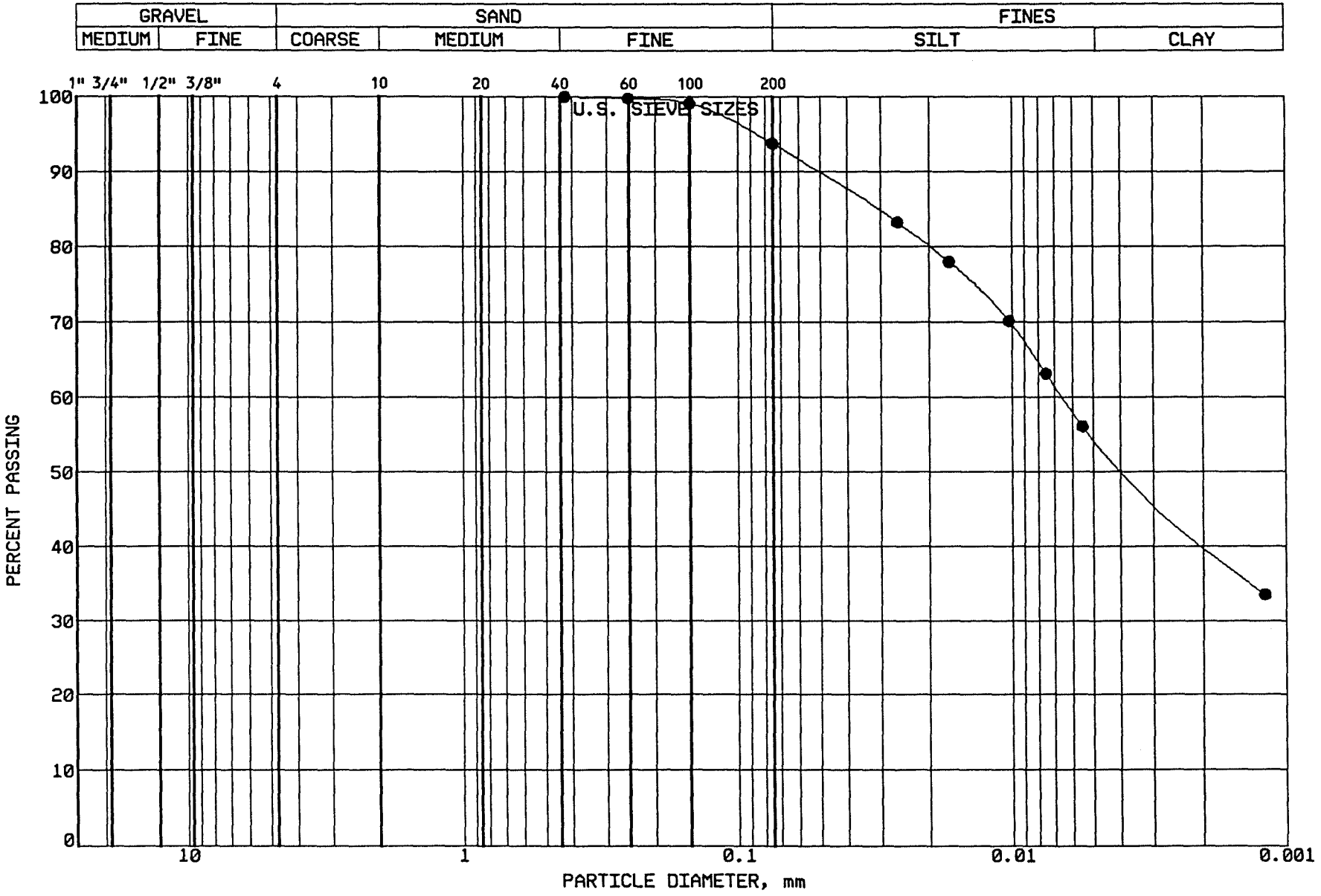
LOCATION: N 39106.0, E 39971.0
SAMPLE: CLBCC304 TUBE #:ST.59
ELEVATION: 1901.2'

GRAVEL	0.0 %
SAND	7.3 %
SILT	38.8 %
CLAY	53.9 %
P 200	92.7 %

SOIL PROPERTIES

LL: 48.0%
PL: 16.0%
PI: 32.0%
CLASS: Lean Clay (CL), olive

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

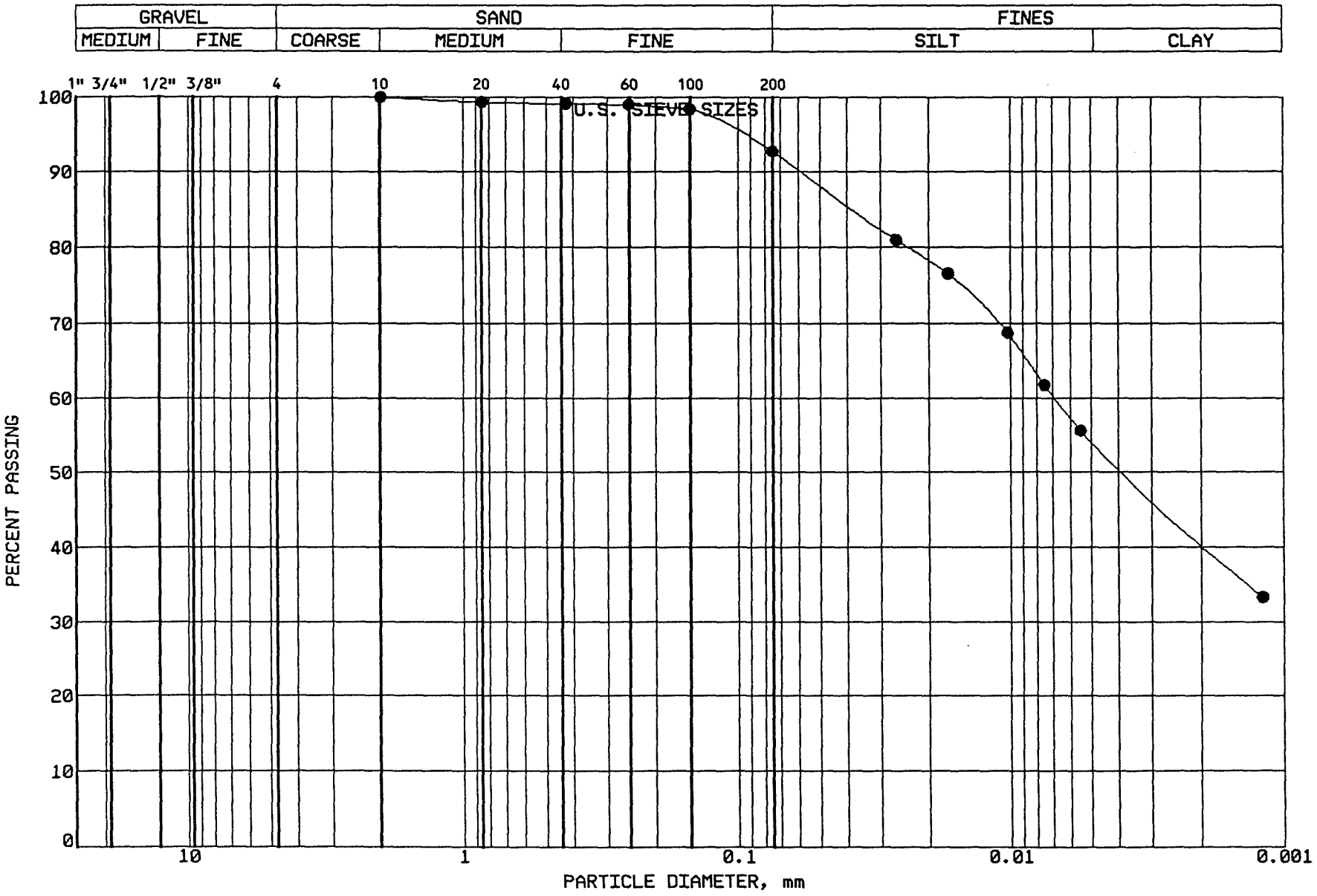
LOCATION: N 39100.0, E 39797.0
SAMPLE: CLBCC305 TUBE #: St.60
ELEVATION: 1902.2'

GRAVEL	0.0 %
SAND	6.3 %
SILT	39.0 %
CLAY	54.7 %
P 200	93.7 %

SOIL PROPERTIES

LL: 44.0%
PL: 16.0%
PI: 28.0%
CLASS: Lean Clay (CL), olive

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

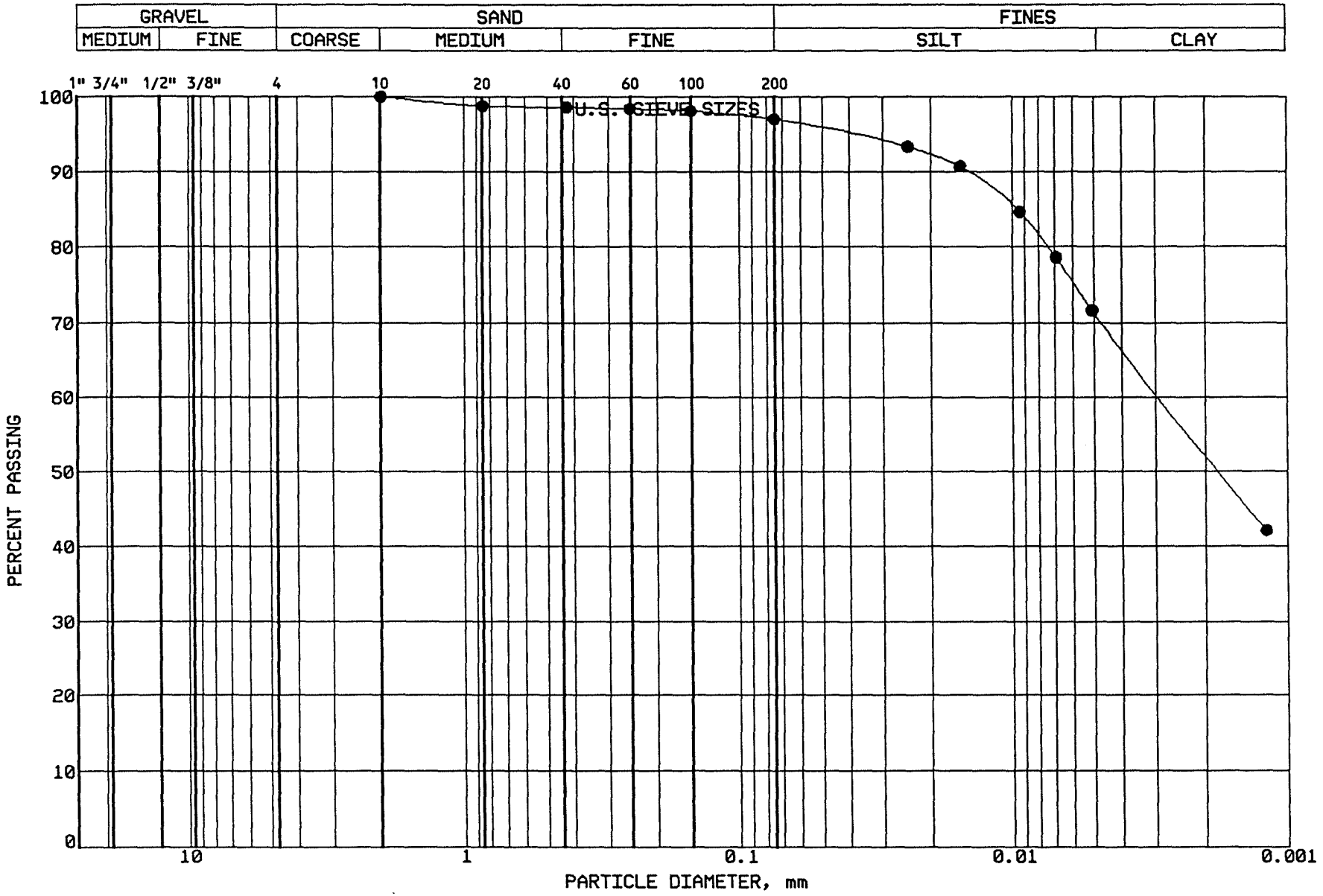
LOCATION: N 39314.0, E 39778.0
SAMPLE: CLBCC306 TUBE #: St.61
ELEVATION: 1901.1'

GRAVEL	0.0 %
SAND	7.3 %
SILT	38.4 %
CLAY	54.3 %
P 200	92.7 %

SOIL PROPERTIES

LL: 47.0%
PL: 16.0%
PI: 31.0%
CLASS: Lean Clay (CL), olive

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

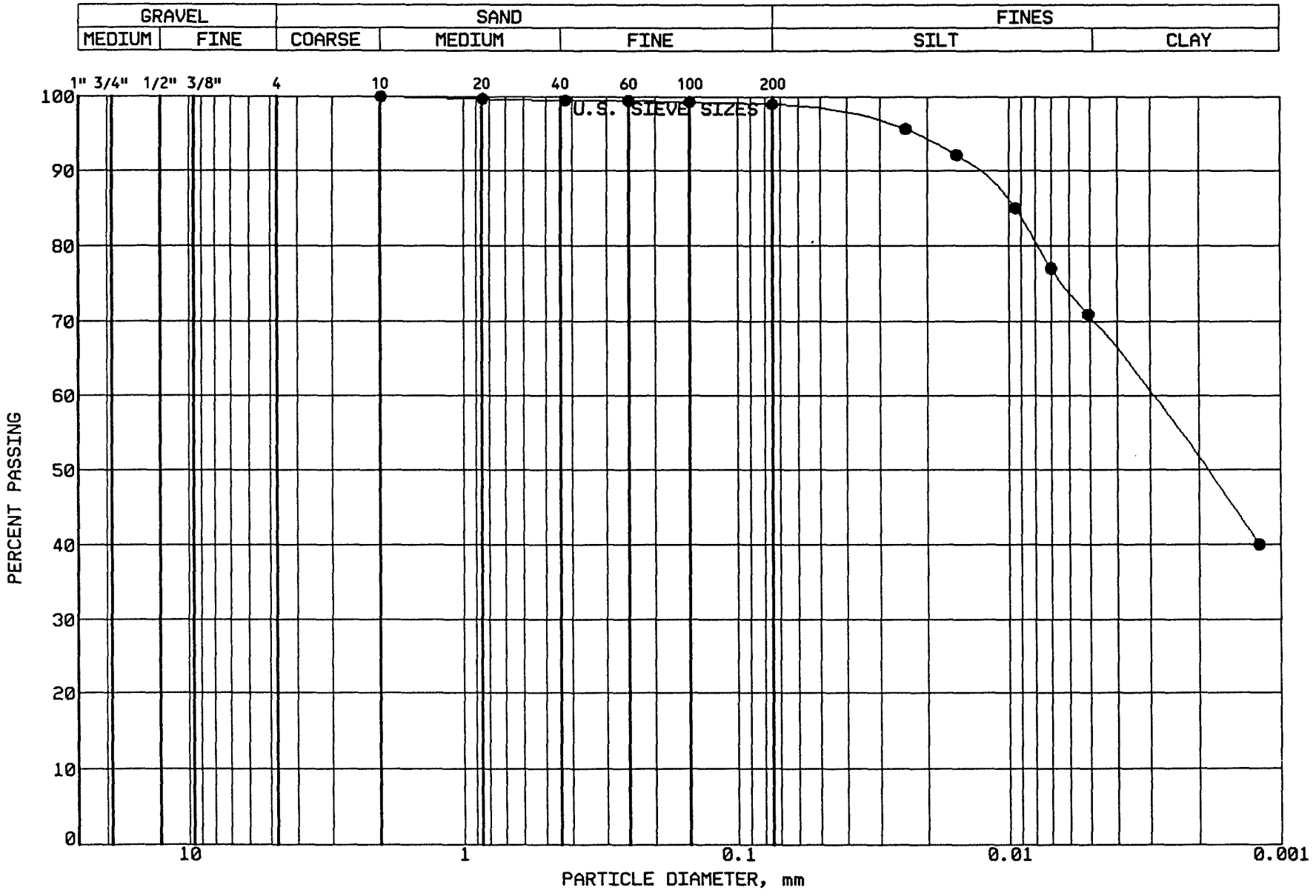
LOCATION: N 39322.0, E 39939.0
SAMPLE: CLBCC307 TUBE #: St.62
ELEVATION: 1900.1'

GRAVEL	0.0 %
SAND	3.0 %
SILT	25.8 %
CLAY	71.2 %
P 200	97.0 %

SOIL PROPERTIES

LL: 58.0%
PL: 17.0%
PI: 41.0%
CLASS: Fat Clay (CH), olive

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

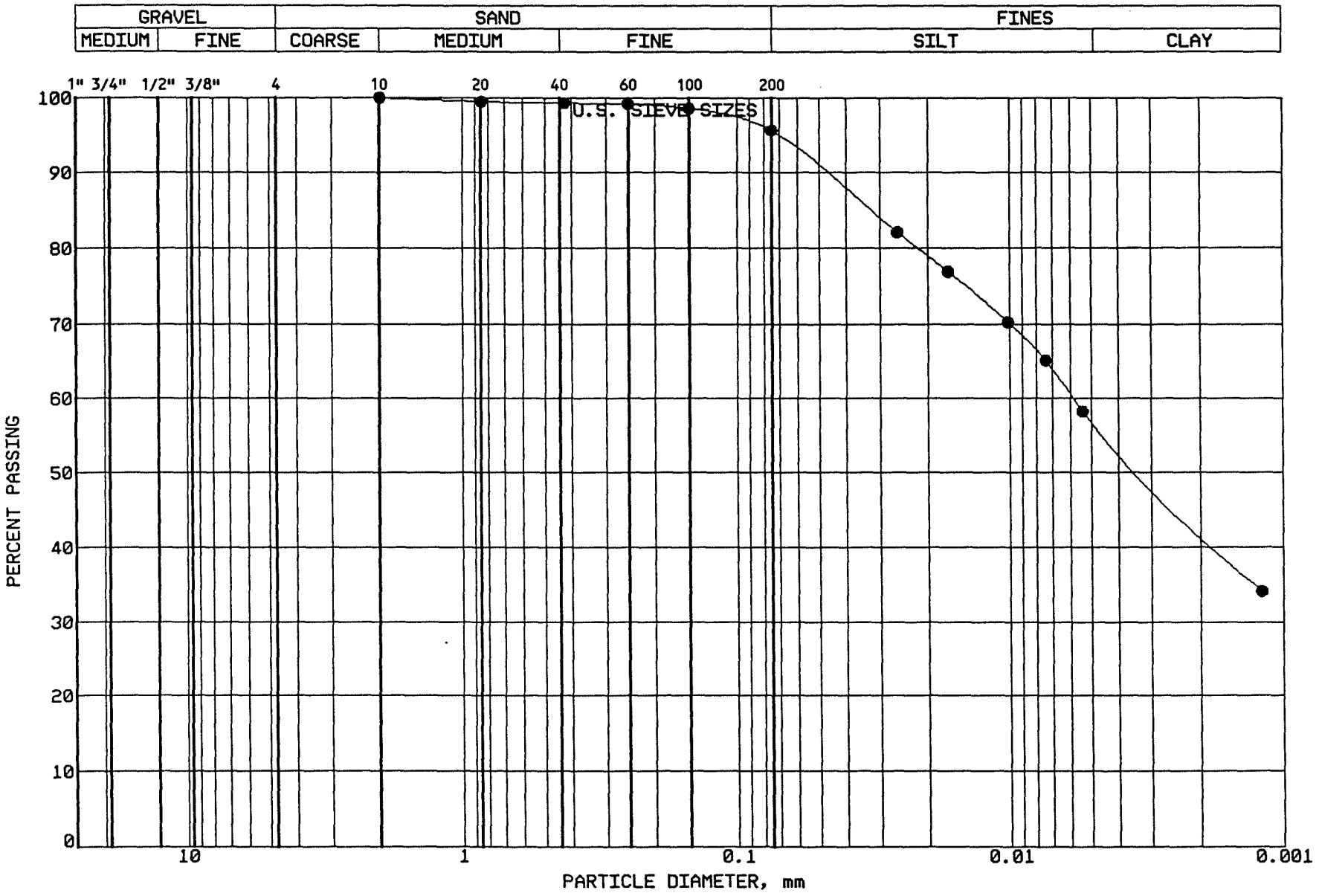
LOCATION: N 39333.0, E 40109.0
SAMPLE: CLBCC308 TUBE #: St.63
ELEVATION: 1899.1'

GRAVEL	0.0 %
SAND	1.0 %
SILT	28.5 %
CLAY	70.5 %
P 200	99.0 %

SOIL PROPERTIES

LL: 55.0%
PL: 17.0%
PI: 38.0%
CLASS: Fat Clay (CH), olive

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

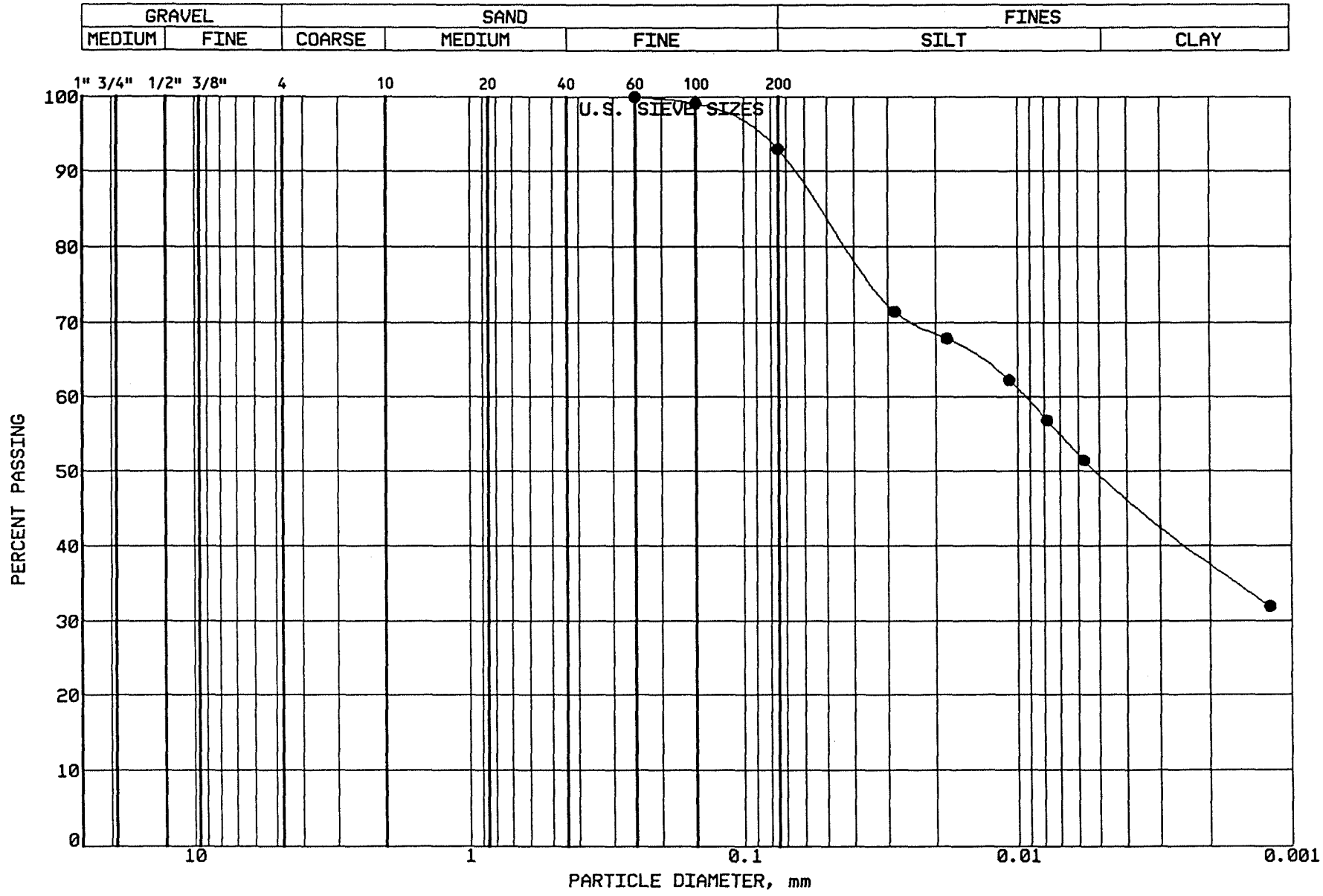
LOCATION: N 39450.0, E 40089.0
SAMPLE: CLSCC309 TUBE #: N/A
ELEVATION: 1914.4'

GRAVEL	0.0 %
SAND	4.4 %
SILT	38.5 %
CLAY	57.1 %
P 200	95.6 %

SOIL PROPERTIES

LL: 48.0%
PL: 15.0%
PI: 33.0%
CLASS: Lean Clay (CL), dk.gr.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

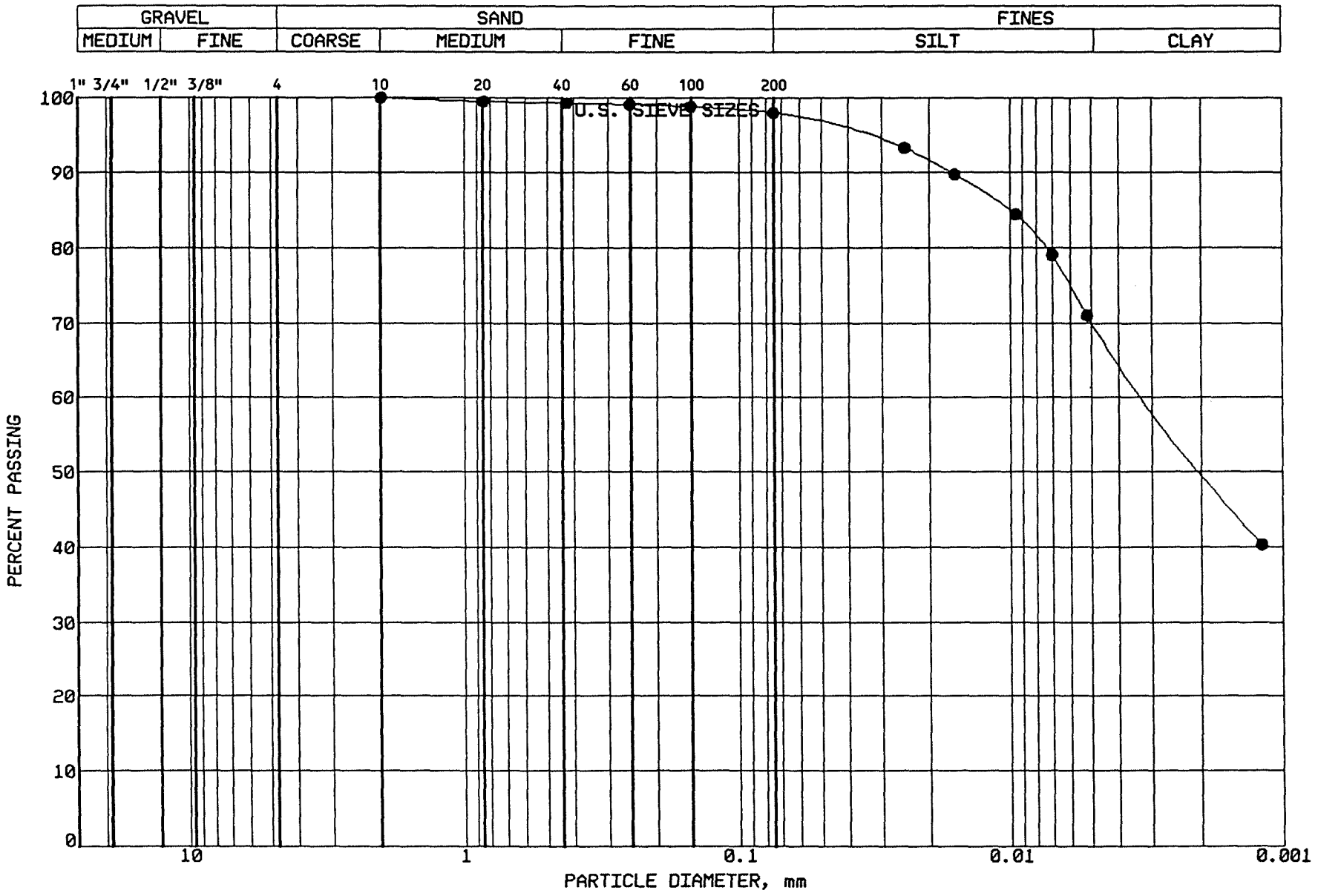
LOCATION: N 39110.0, E 40144.0
SAMPLE: CLBCC310 TUBE #: R.St.58
ELEVATION: 1900.1'

GRAVEL	0.0 %
SAND	7.1 %
SILT	43.0 %
CLAY	49.9 %
P 200	92.9 %

SOIL PROPERTIES

LL: 47.0%
PL: 14.0%
PI: 33.0%
CLASS: Lean Clay (CL), dk.gr.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

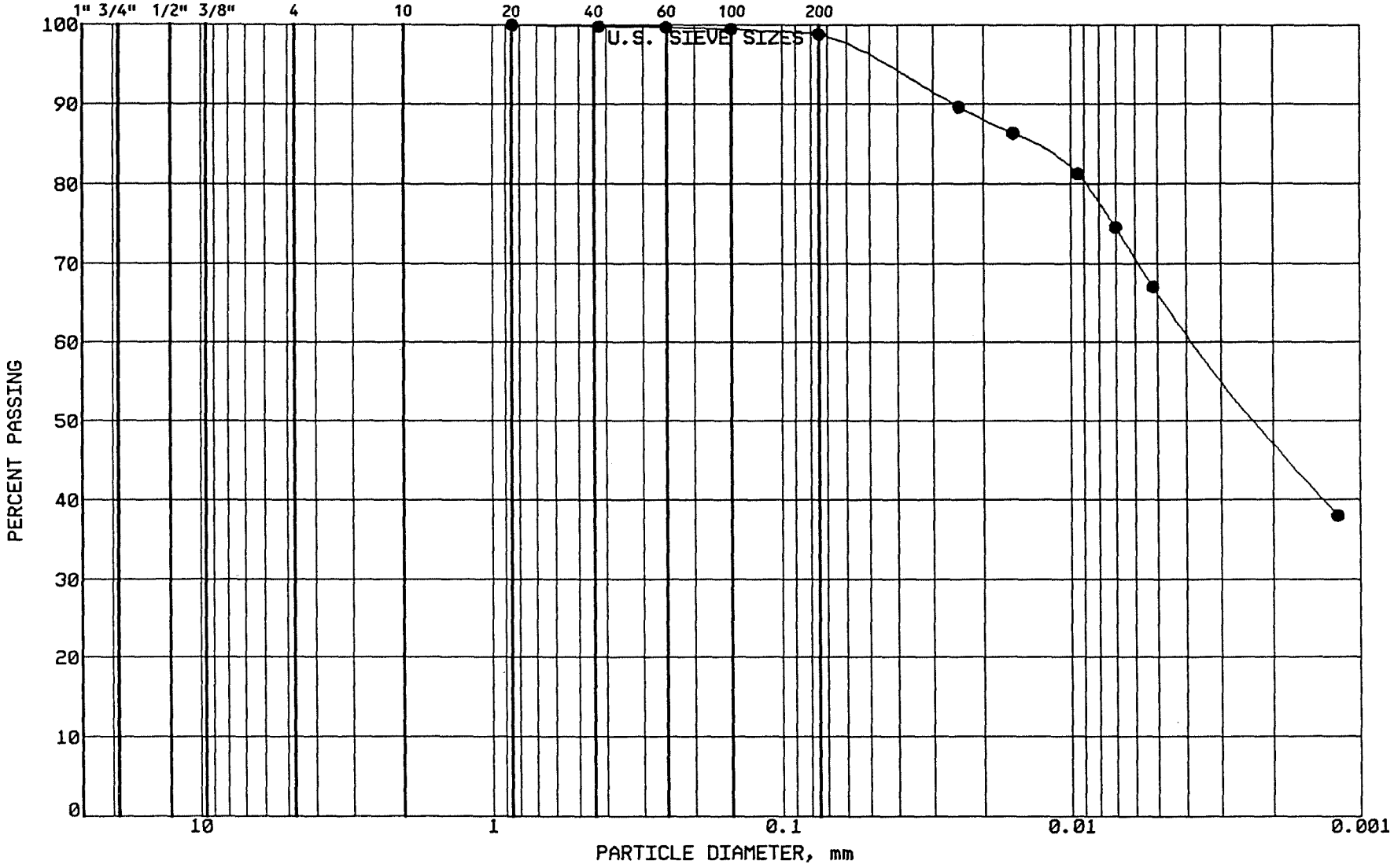
LOCATION: N 37258.0, E 40240.0
SAMPLE: CLBCC311 TUBE #: St.64
ELEVATION: 1908.1'

GRAVEL	0.0 %
SAND	2.0 %
SILT	27.8 %
CLAY	70.2 %
P 200	98.0 %

SOIL PROPERTIES

LL: 55.0%
PL: 16.0%
PI: 39.0%
CLASS: Fat Clay (CH), V. dk.gr.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

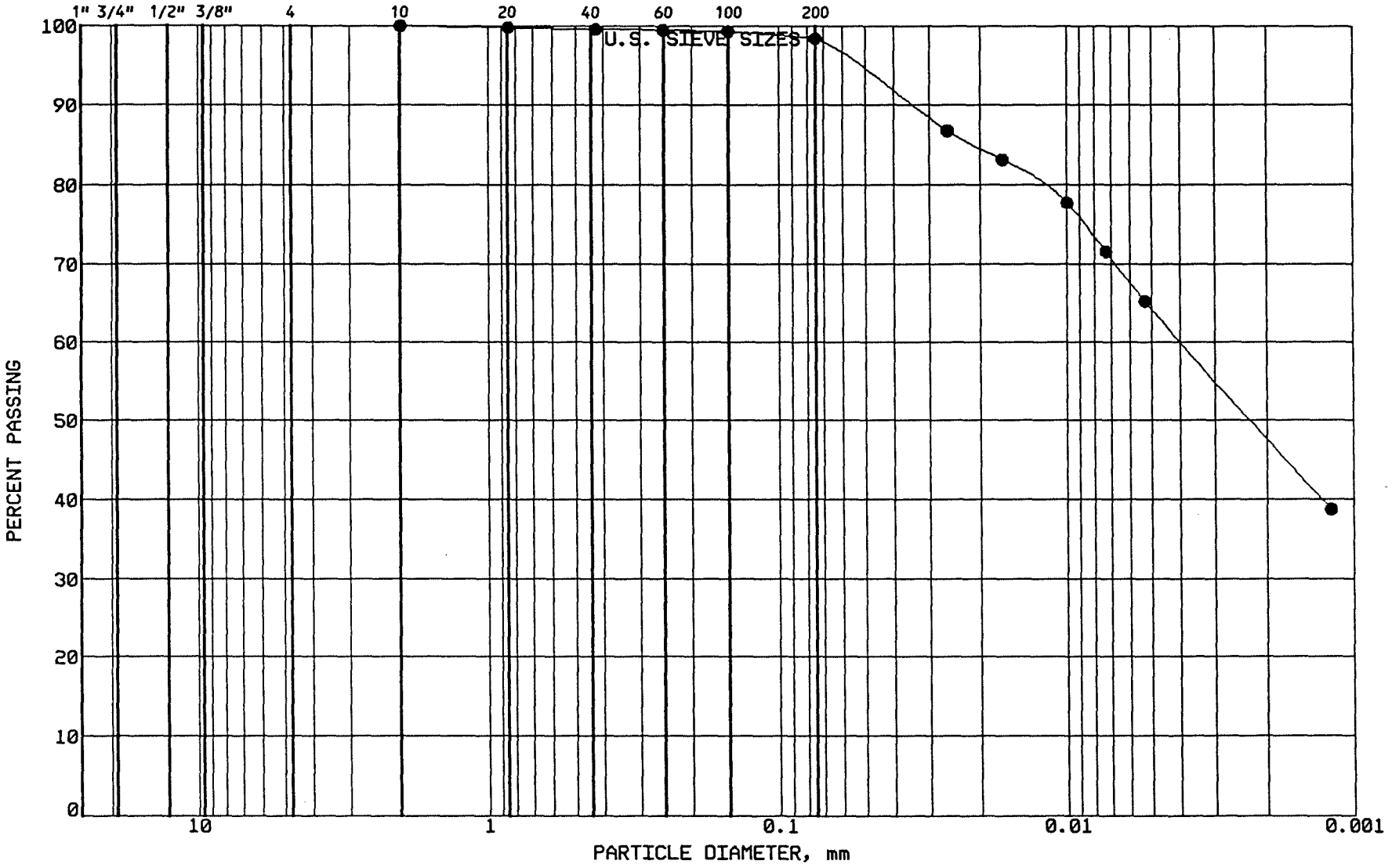
LOCATION: N 37392.0, E 40039.0
SAMPLE: CLBCC312 TUBE #: St.65
ELEVATION: 1908.4'

GRAVEL	0.0 %
SAND	1.2 %
SILT	32.6 %
CLAY	66.2 %
P 200	98.8 %

SOIL PROPERTIES

LL: 54.0%
PL: 17.0%
PI: 37.0%
CLASS: Fat Clay (CH), V. dr.gr.-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

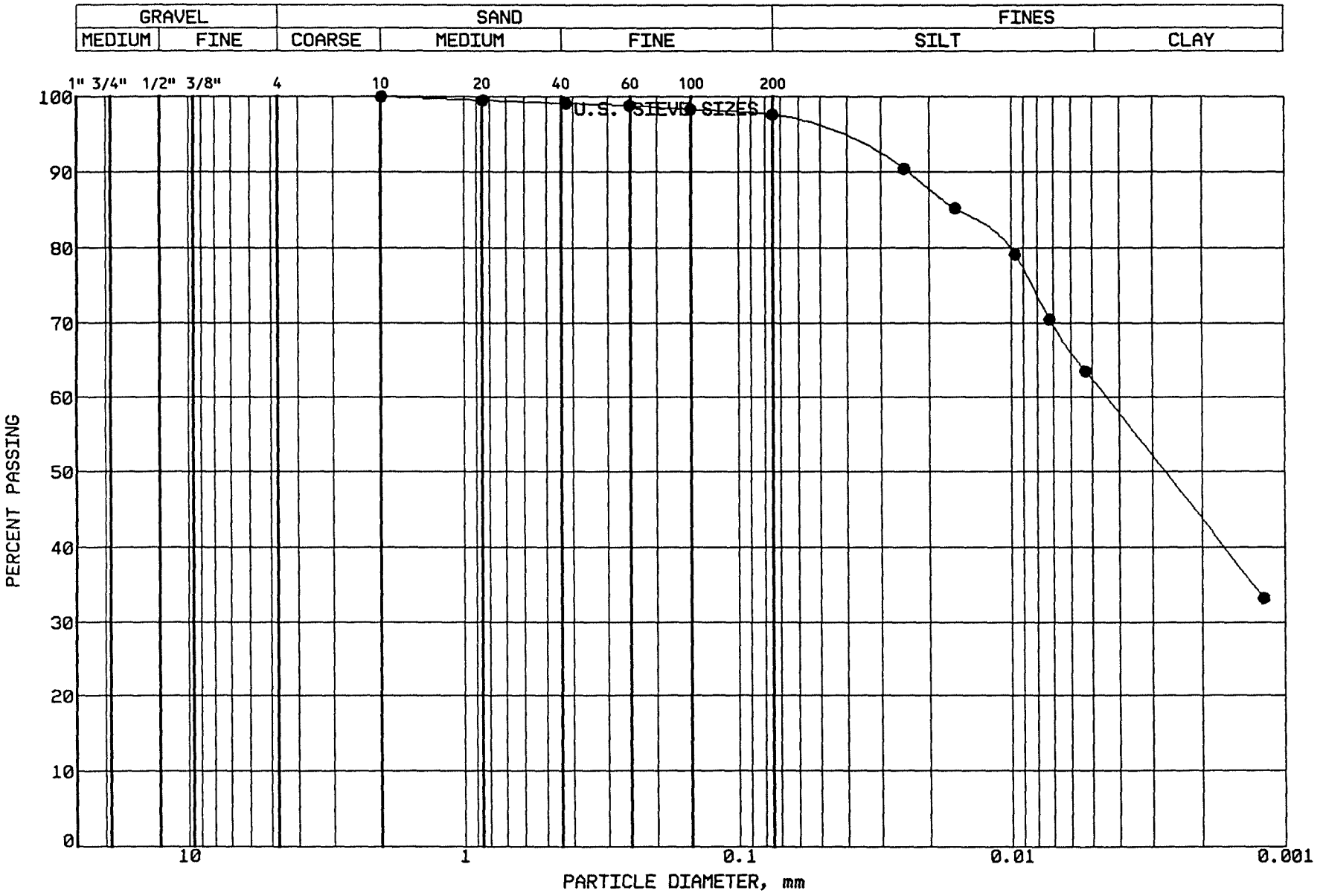
LOCATION: N 37551.0, E 39820.0
SAMPLE: CLBCC313 TUBE #: St.66
ELEVATION: 1908.7'

GRAVEL	0.0 %
SAND	1.6 %
SILT	34.2 %
CLAY	64.2 %
P 200	98.4 %

SOIL PROPERTIES

LL: 55.0%
PL: 17.0%
PI: 38.0%
CLASS: Fat Clay (CH), V.dk.gr.-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

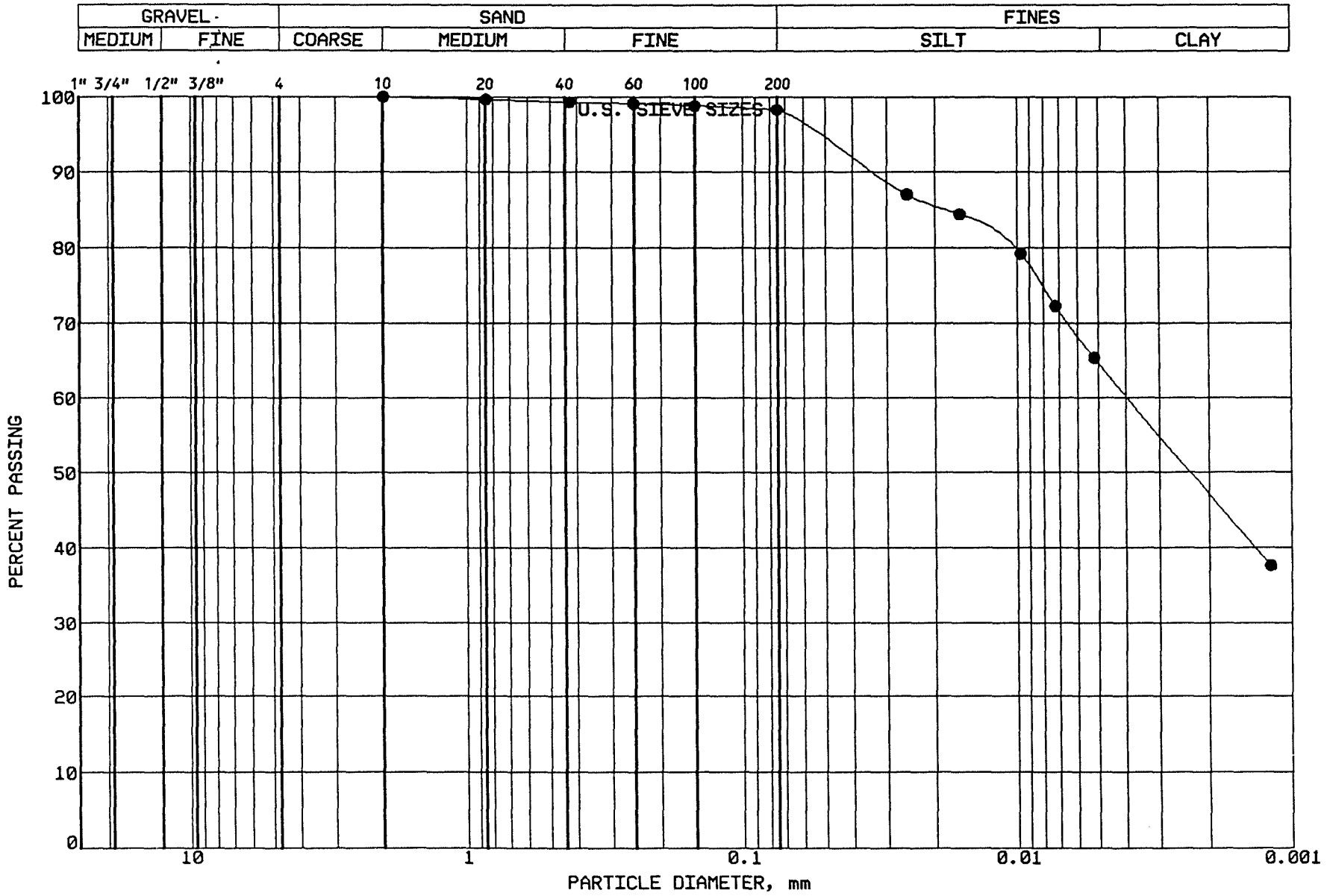
LOCATION: N 37258.0, E 40240.0
SAMPLE: CLBCC314 TUBE #: R.St.64
ELEVATION: 1908.1'

GRAVEL	0.0 %
SAND	2.4 %
SILT	35.3 %
CLAY	62.3 %
P 200	97.6 %

SOIL PROPERTIES

LL: 50.0%
PL: 18.0%
PI: 32.0%
CLASS: Fat Clay (CH) dk.gr.-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

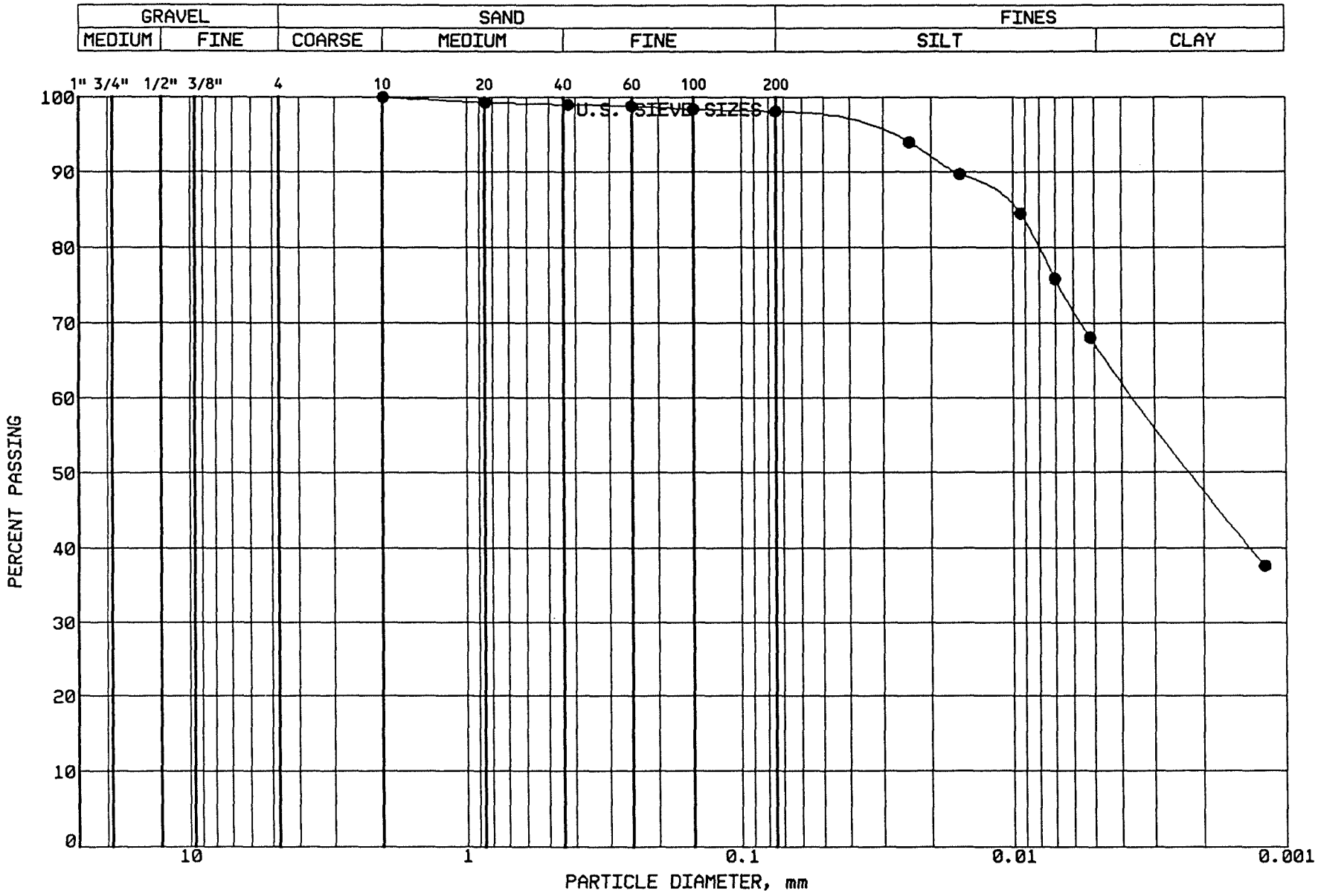
LOCATION: N 37462.0, E 40321.0
SAMPLE: CLBCC315 TUBE #: St.67
ELEVATION: 1906.4'

GRAVEL	0.0 %
SAND	1.7 %
SILT	33.7 %
CLAY	64.6 %
P 200	98.3 %

SOIL PROPERTIES

LL: 56.0%
PL: 17.0%
PI: 39.0%
CLASS: Fat Clay (CH), dk.gr.-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

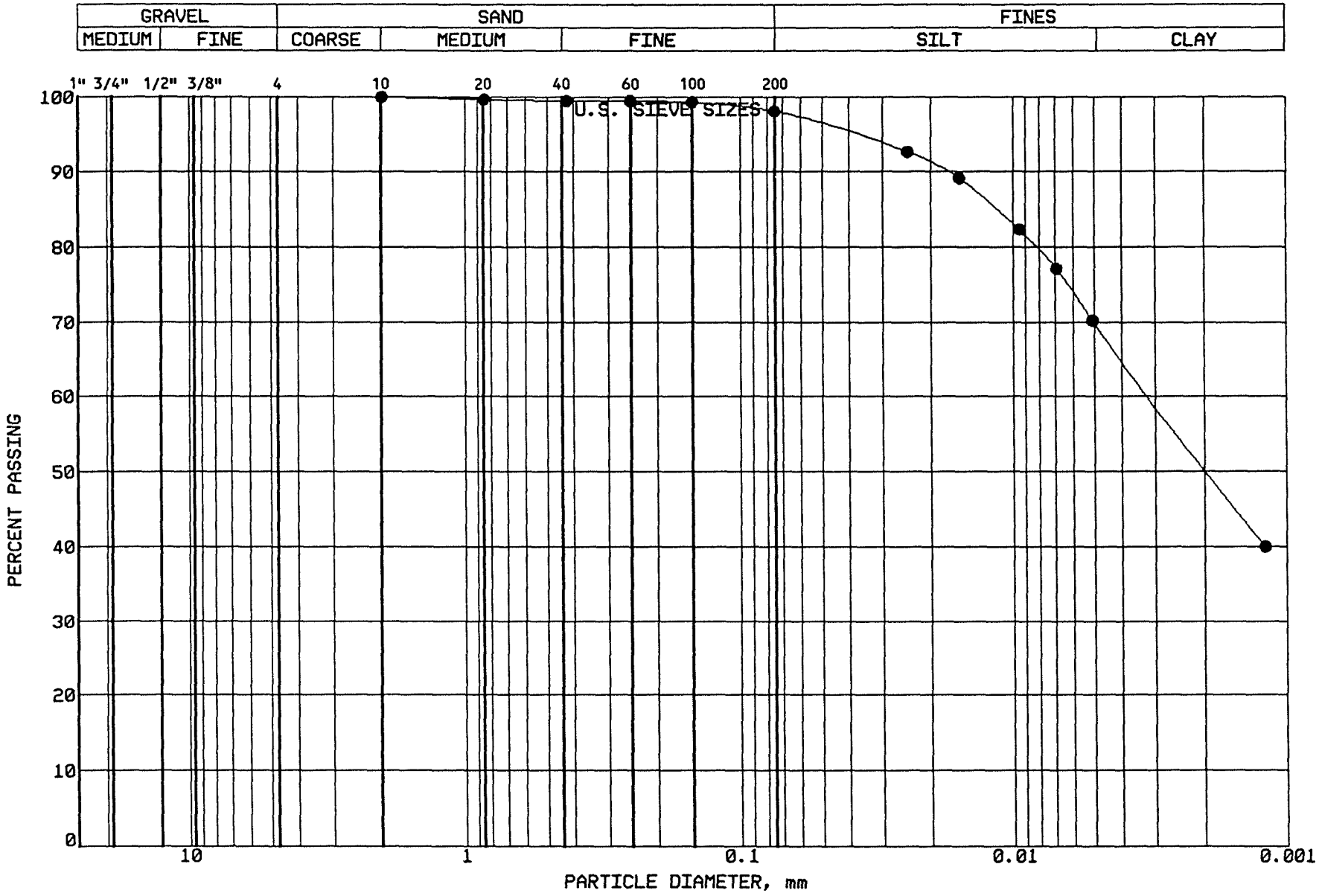
LOCATION: N 37615.0, E 40085.0
SAMPLE: CLBCC316 TUBE #: ST.68
ELEVATION: 1907.0'

GRAVEL	0.0 %
SAND	1.9 %
SILT	30.9 %
CLAY	67.2 %
P 200	98.1 %

SOIL PROPERTIES

LL: 53.0%
PL: 17.0%
PI: 36.0%
CLASS: Fat Clay (CH), dark gr.-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37769.0, E 39859.0
SAMPLE: CLBCC317 TUBE #: ST.69
ELEVATION: 1907.0'

GRAVEL	0.0 %
SAND	1.9 %
SILT	28.3 %
CLAY	69.8 %
P 200	98.1 %

SOIL PROPERTIES

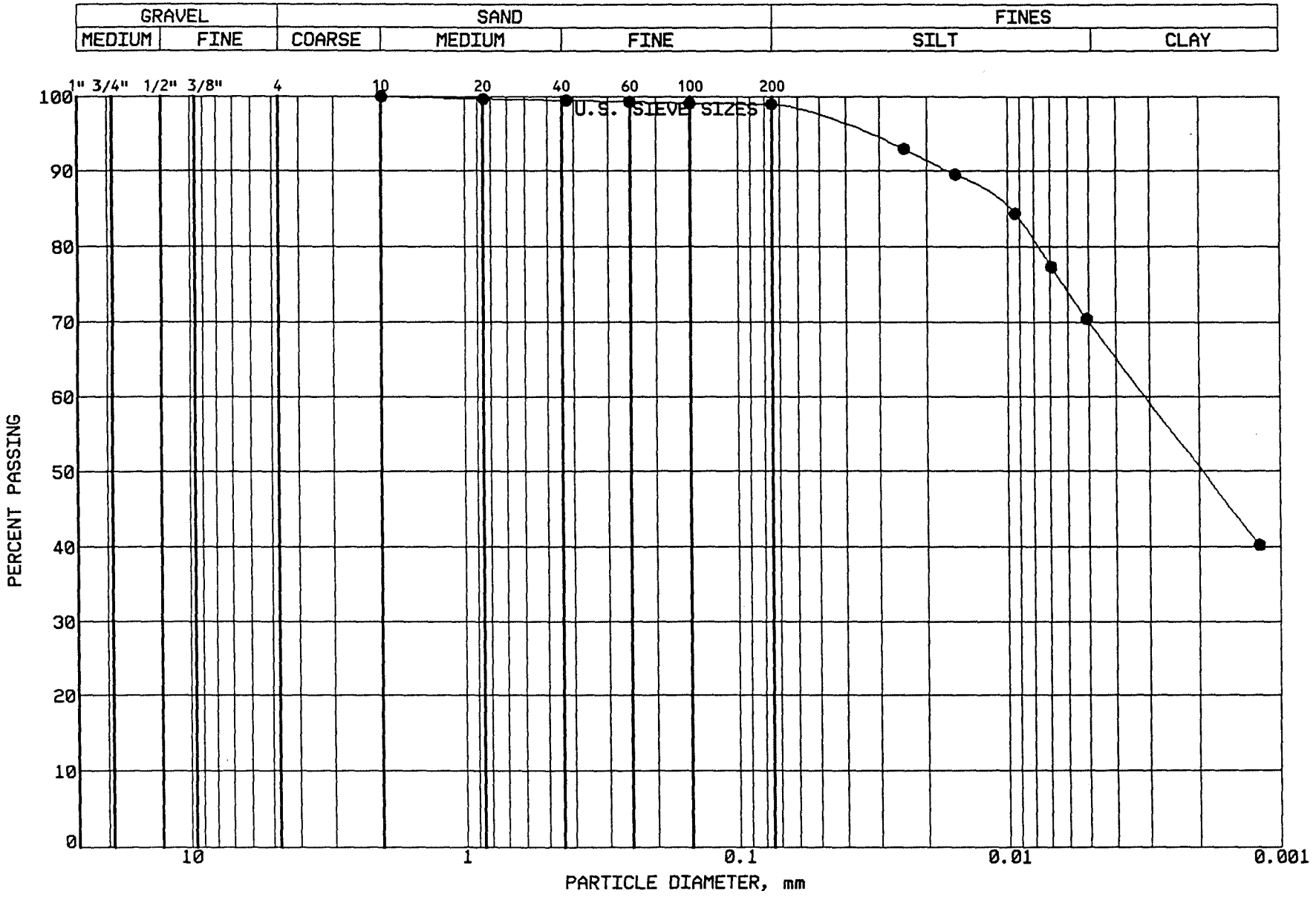
LL: 56.0%

PL: 15.0%

PI: 41.0%

CLASS: Fat Clay (CH), dark gr.-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37610.0, E 40413.0
SAMPLE: CLBCC318 TUBE #: ST.70

GRAVEL	0.0 %
SAND	1.0 %
SILT	29.0 %
CLAY	70.0 %

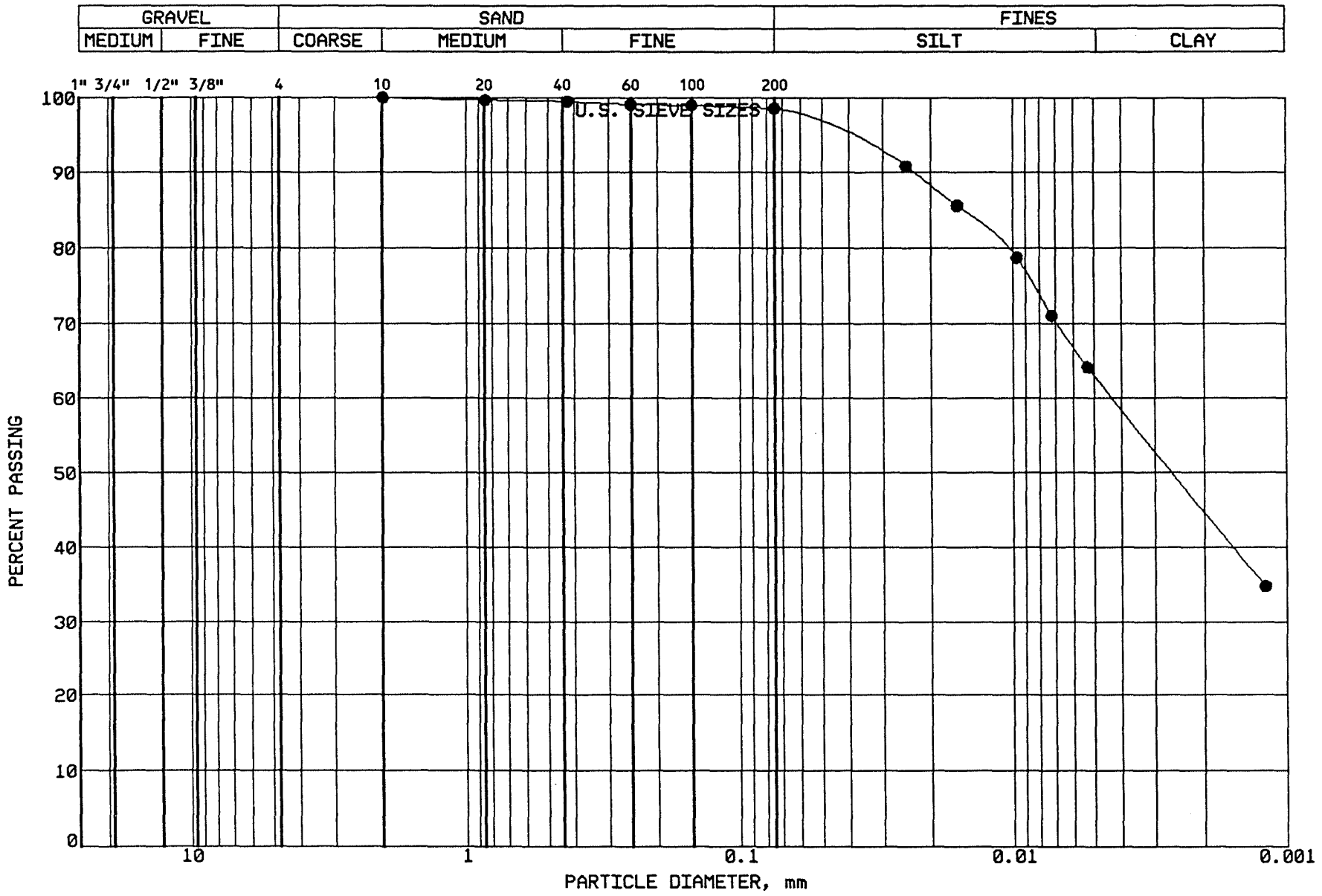
SOIL PROPERTIES

LL: 57.0%

PL: 18.0%

PI: 39.0%

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

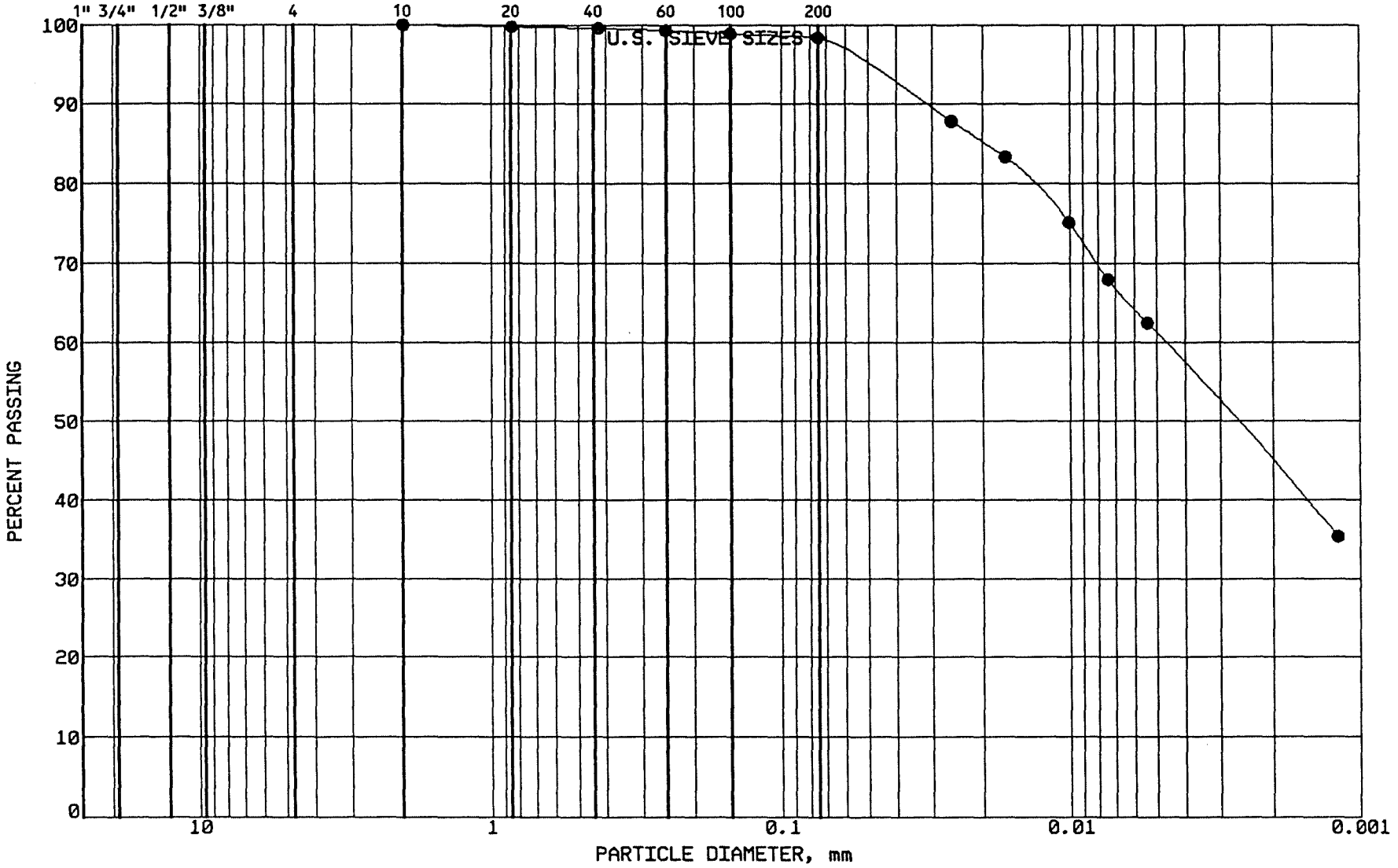
LOCATION: N 37734.0, E 40211.0
SAMPLE: CLBCC319 TUBE #: ST.71
ELEVATION: 1905.7'

GRAVEL	0.0 %
SAND	1.4 %
SILT	35.6 %
CLAY	63.0 %
P 200	98.6 %

SOIL PROPERTIES

LL: 55.0%
PL: 17.0%
PI: 38.0%
CLASS: Fat Clay (CH), dk.gr.-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

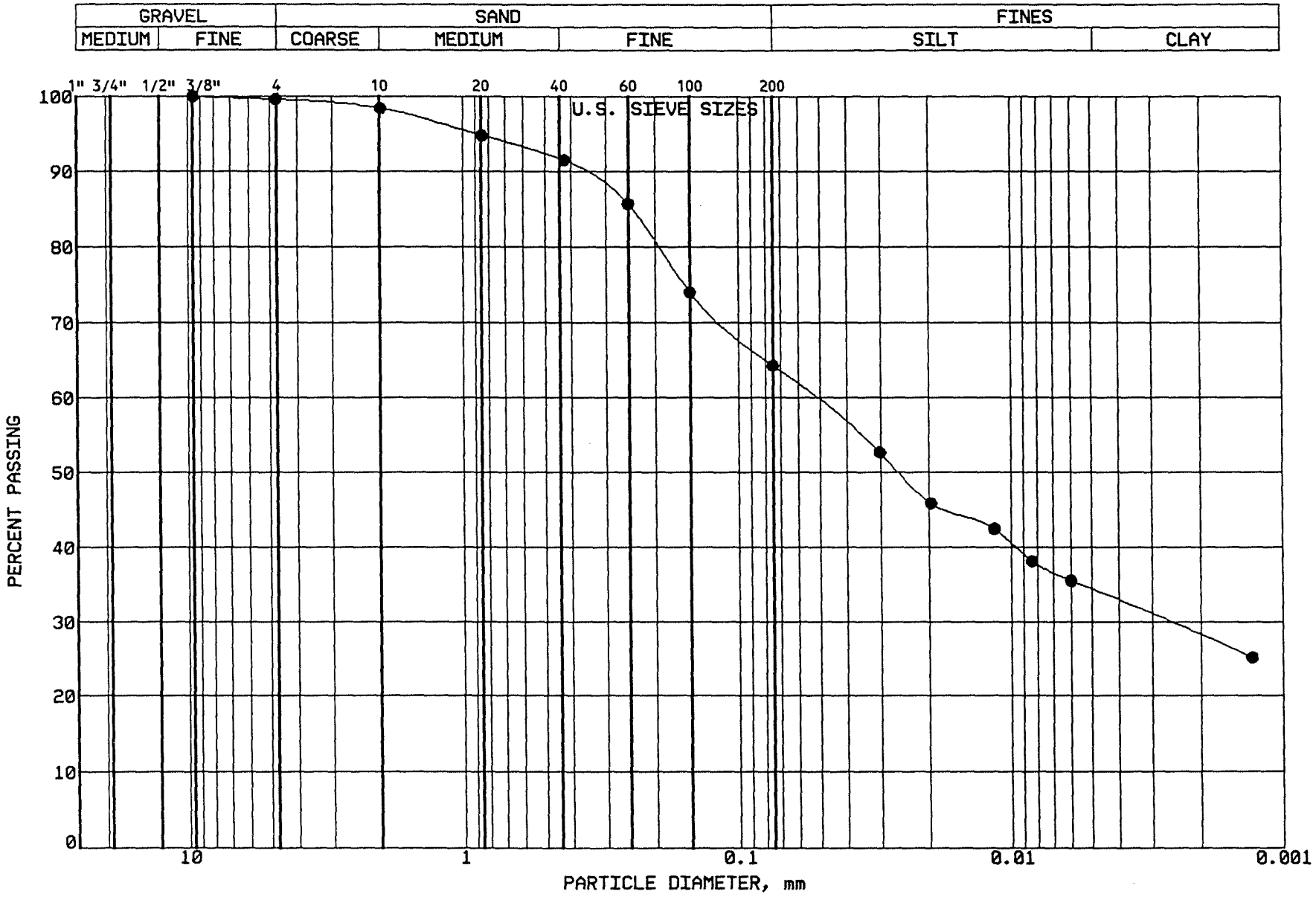
LOCATION: N 37734.0, E 40211.0
SAMPLE: CLBCC320 TUBE #: ST.71R
ELEVATION: 1905.7'

GRAVEL	0.0 %
SAND	1.6 %
SILT	37.3 %
CLAY	61.1 %
P 200	98.4 %

SOIL PROPERTIES

LL: 52.0%
PL: 21.0%
PI: 31.0%
CLASS: Fat Clay (CH), gray

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

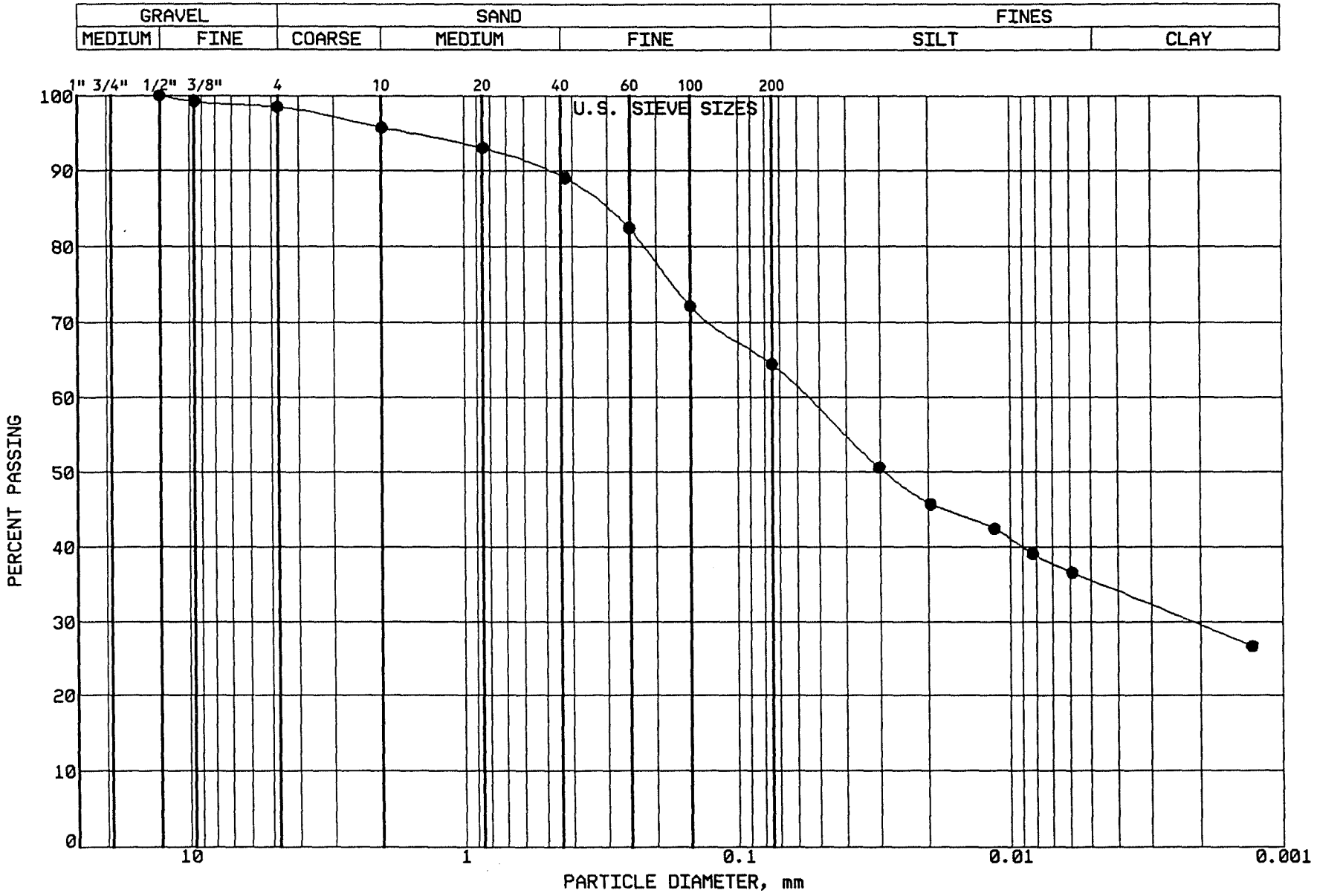
LOCATION: N 37440.0, E 40817.0
SAMPLE: SGCC-321 TUBE #: N/A
ELEVATION: 1804.0'

GRAVEL	0.4 %
SAND	35.3 %
SILT	30.0 %
CLAY	34.3 %
P 200	64.3 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL) dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

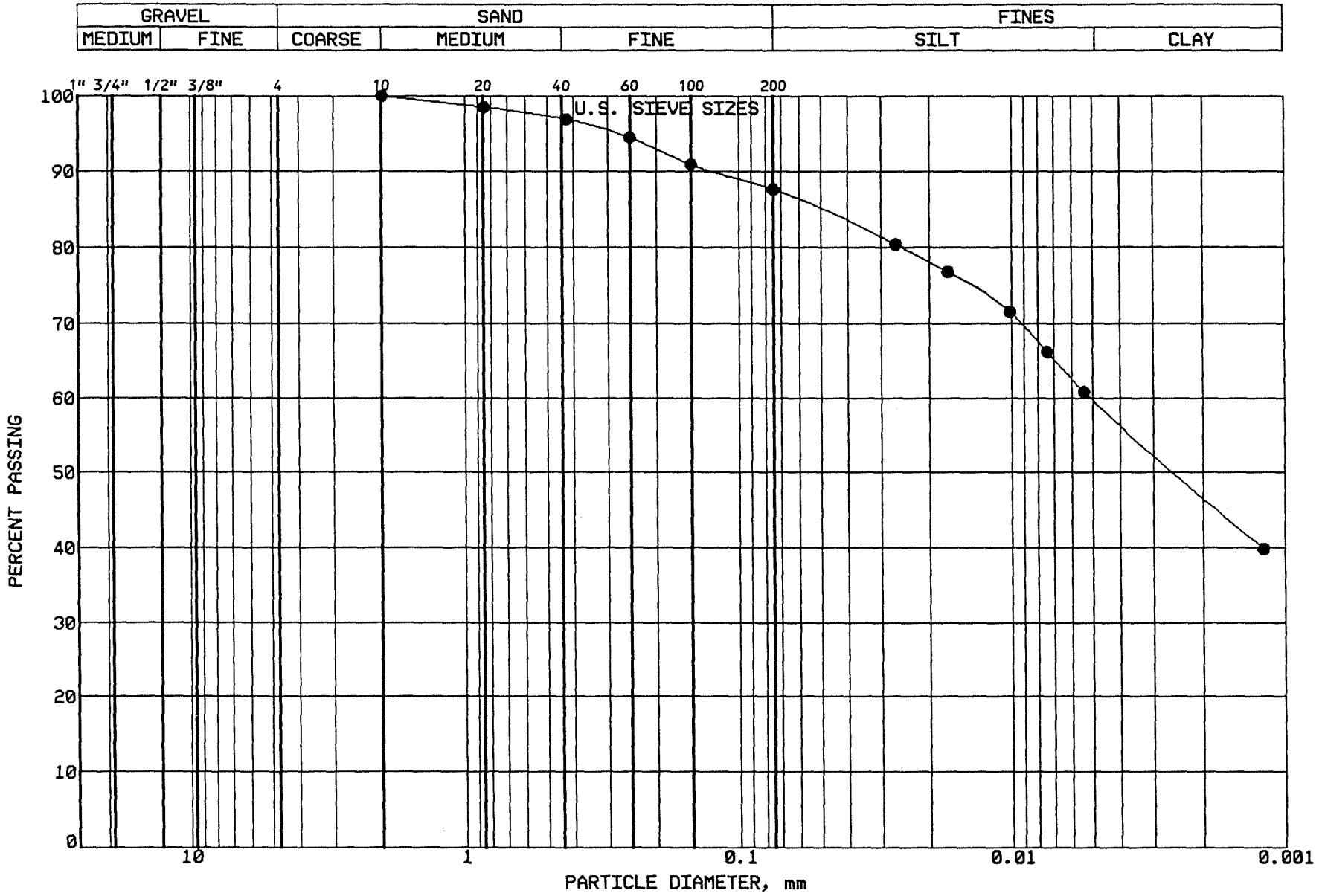
LOCATION: N 37199.0, E 40655.0
SAMPLE: SGCC-322 TUBE #: N/A
ELEVATION: 1905.2'

GRAVEL	1.5 %
SAND	34.1 %
SILT	28.9 %
CLAY	35.5 %
P 200	64.4 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

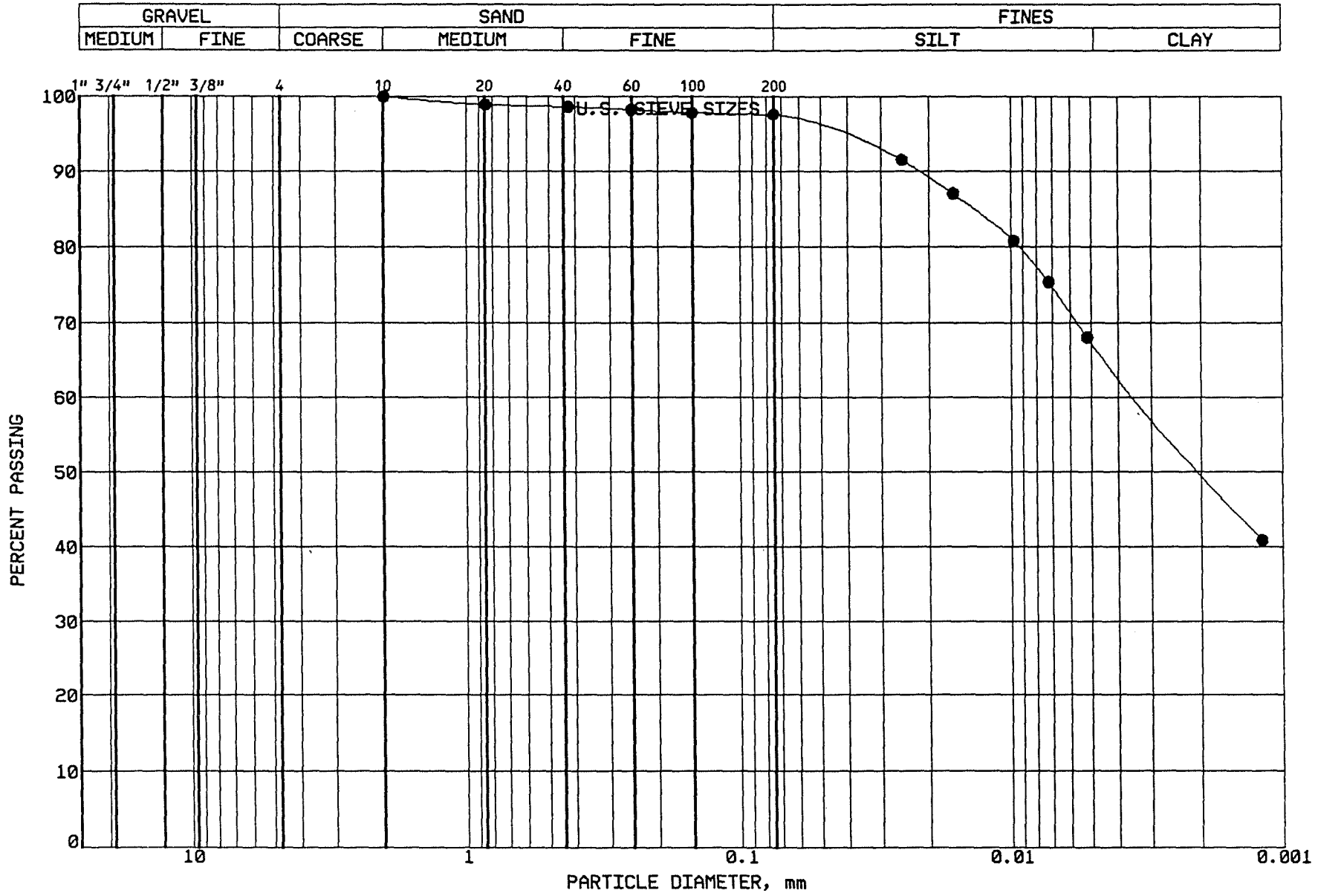
LOCATION: N 37163.0, E 40819.0
SAMPLE: SGCC-323 TUBE #: N/A
ELEVATION: 1904.7'

GRAVEL	0.0 %
SAND	12.4 %
SILT	27.8 %
CLAY	59.8 %
P 200	87.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Lean Clay (CL), vy dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

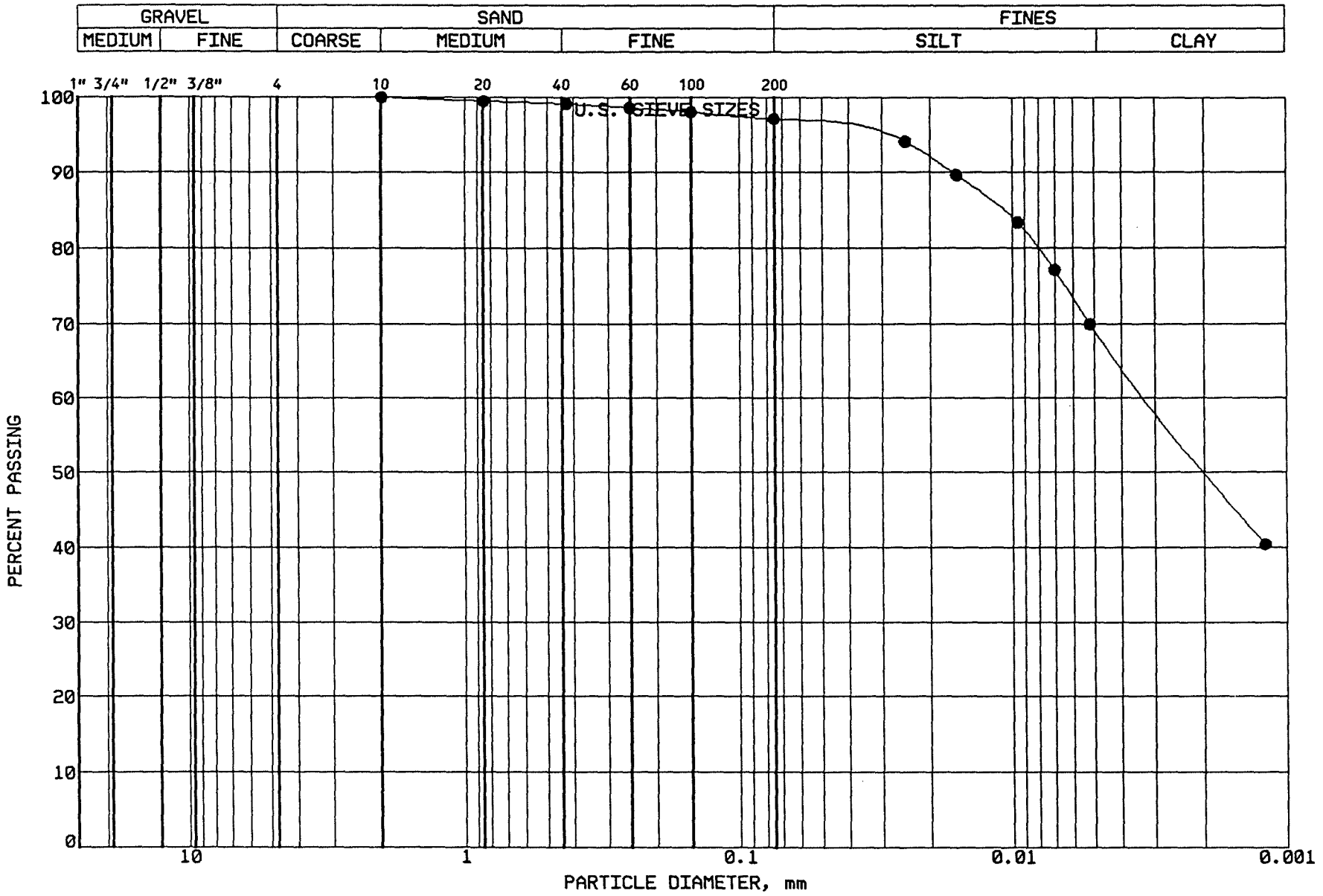
LOCATION: N 37335.0, E 40923.0
SAMPLE: SGCC-324 TUBE #: N/A
ELEVATION: 1903.0'

GRAVEL	0.0 %
SAND	2.4 %
SILT	30.3 %
CLAY	67.3 %
P 200	97.6 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Fat Clay (CH), olive

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

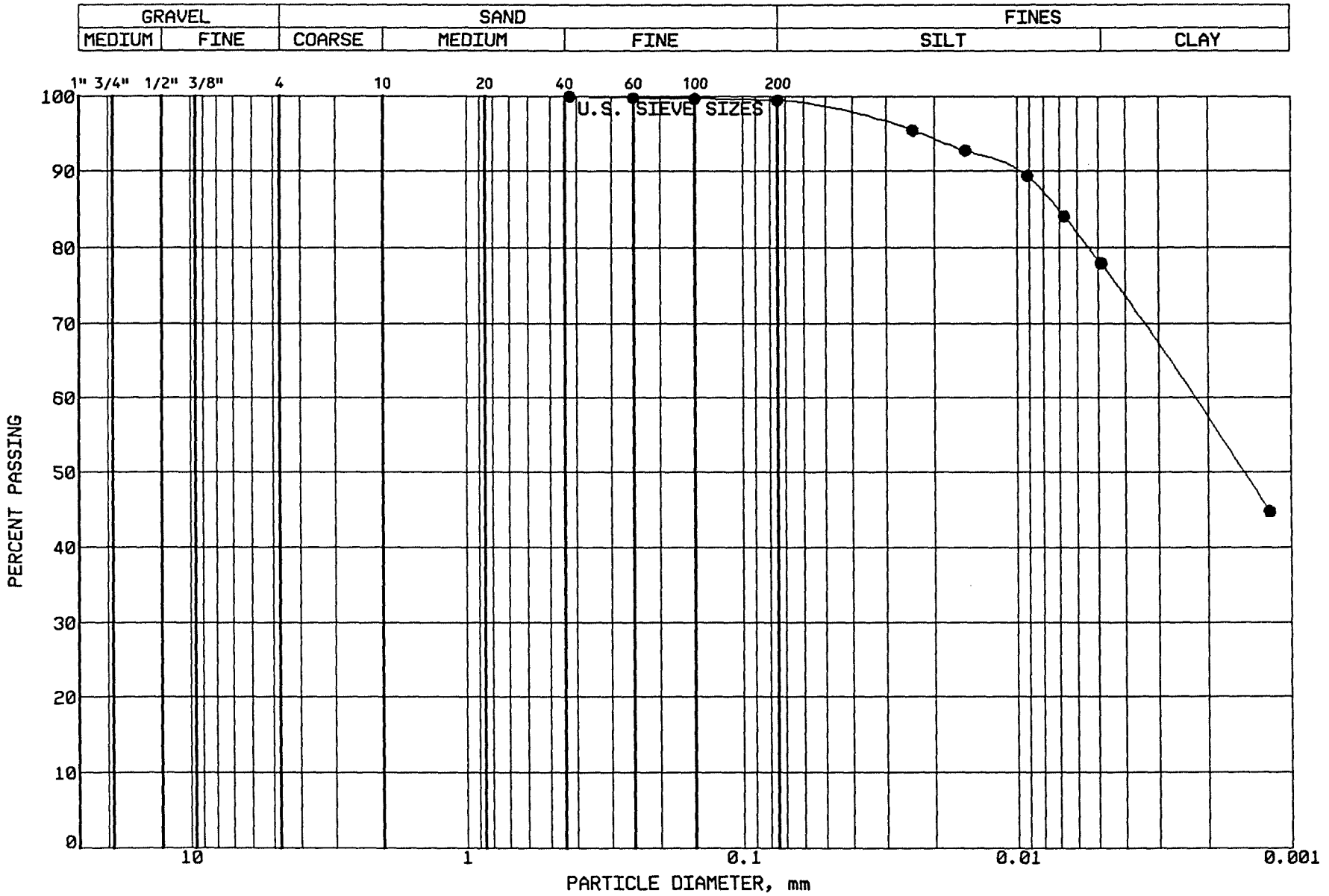
LOCATION: N 37315.0, E 39973.0
SAMPLE: CLBCC325 TUBE #: ST.72
ELEVATION: 1909.7'

GRAVEL	0.0 %
SAND	2.9 %
SILT	28.0 %
CLAY	69.1 %
P 200	97.1 %

SOIL PROPERTIES

LL: 56.0%
PL: 23.0%
PI: 33.0%
CLASS: Fat Clay (CH), olive

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

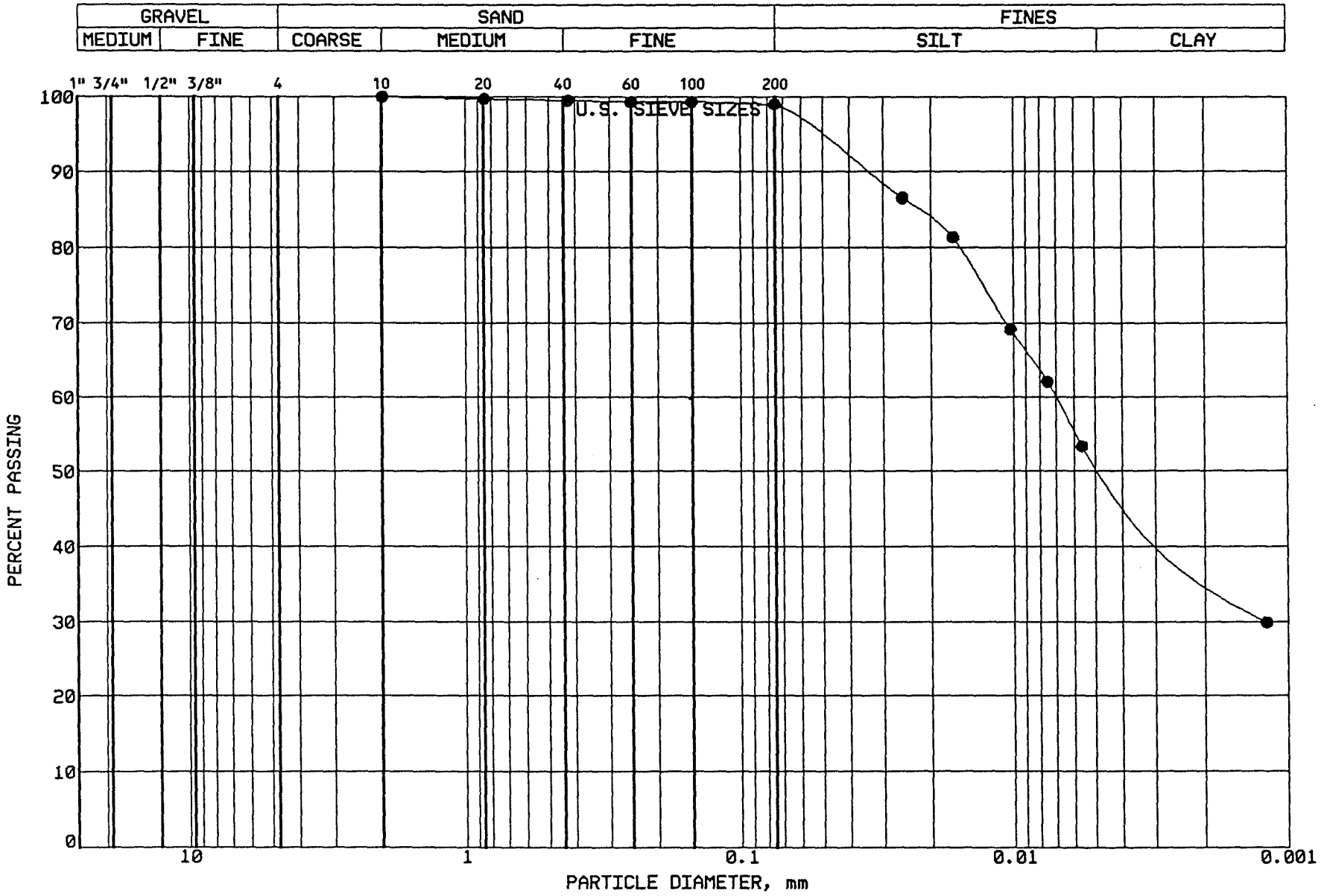
LOCATION: N 37180.0, E 40330.0
SAMPLE: CLBCC326 TUBE #: ST.73
ELEVATION: 1908.7'

GRAVEL	0.0 %
SAND	0.5 %
SILT	21.2 %
CLAY	78.3 %
P 200	99.5 %

SOIL PROPERTIES

LL: 62.0%
PL: 18.0%
PI: 44.0%
CLASS: Fat Clay (CH), olive

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

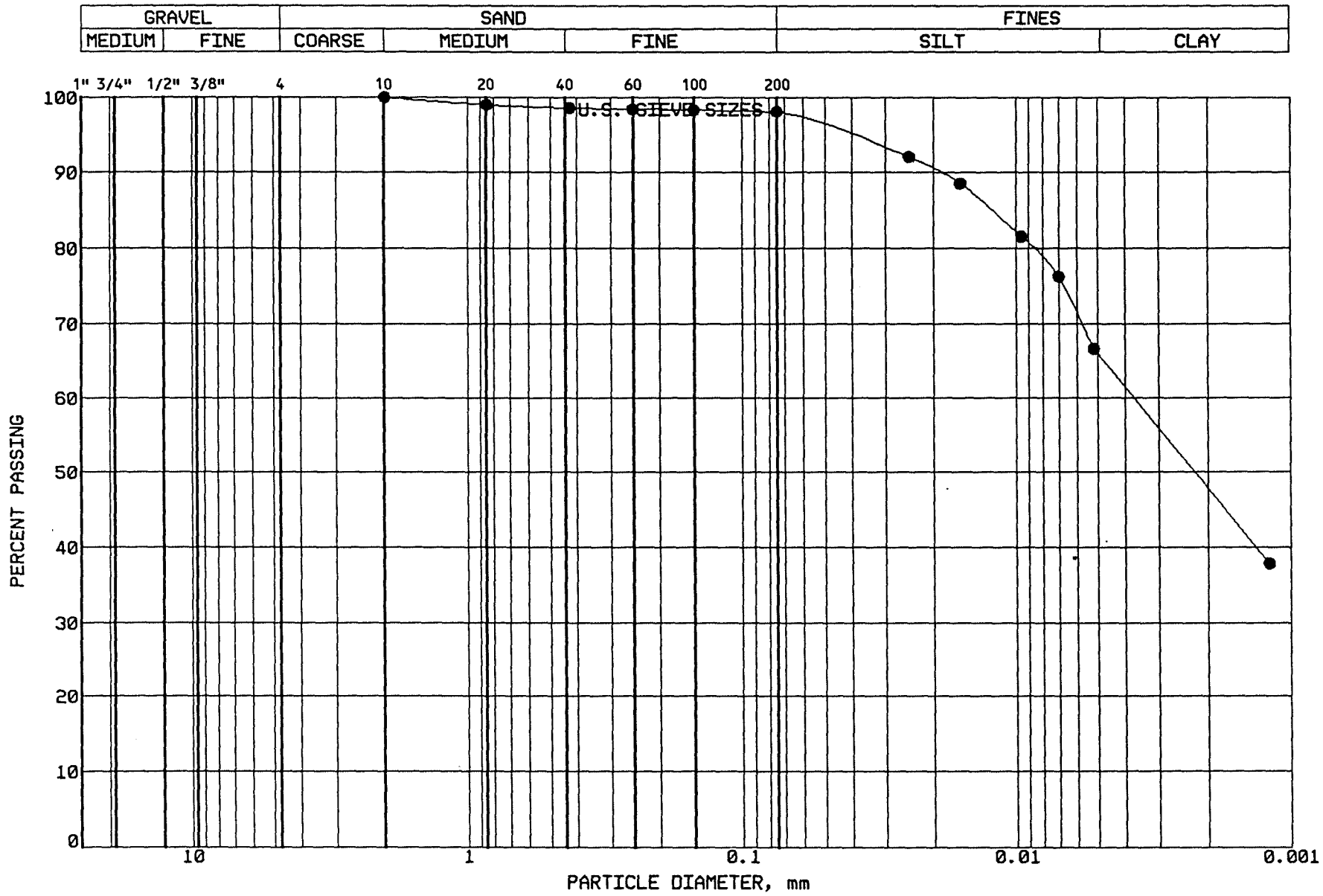
LOCATION: N 37335.0, E 40463.0
SAMPLE: CLBCC327 TUBE #: ST.74
ELEVATION: 1907.3'

GRAVEL	0.0 %
SAND	1.0 %
SILT	47.3 %
CLAY	51.7 %
P 200	99.0 %

SOIL PROPERTIES

LL: 45.0%
PL: 15.0%
PI: 30.0%
CLASS: Lean Clay (CL), olive

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

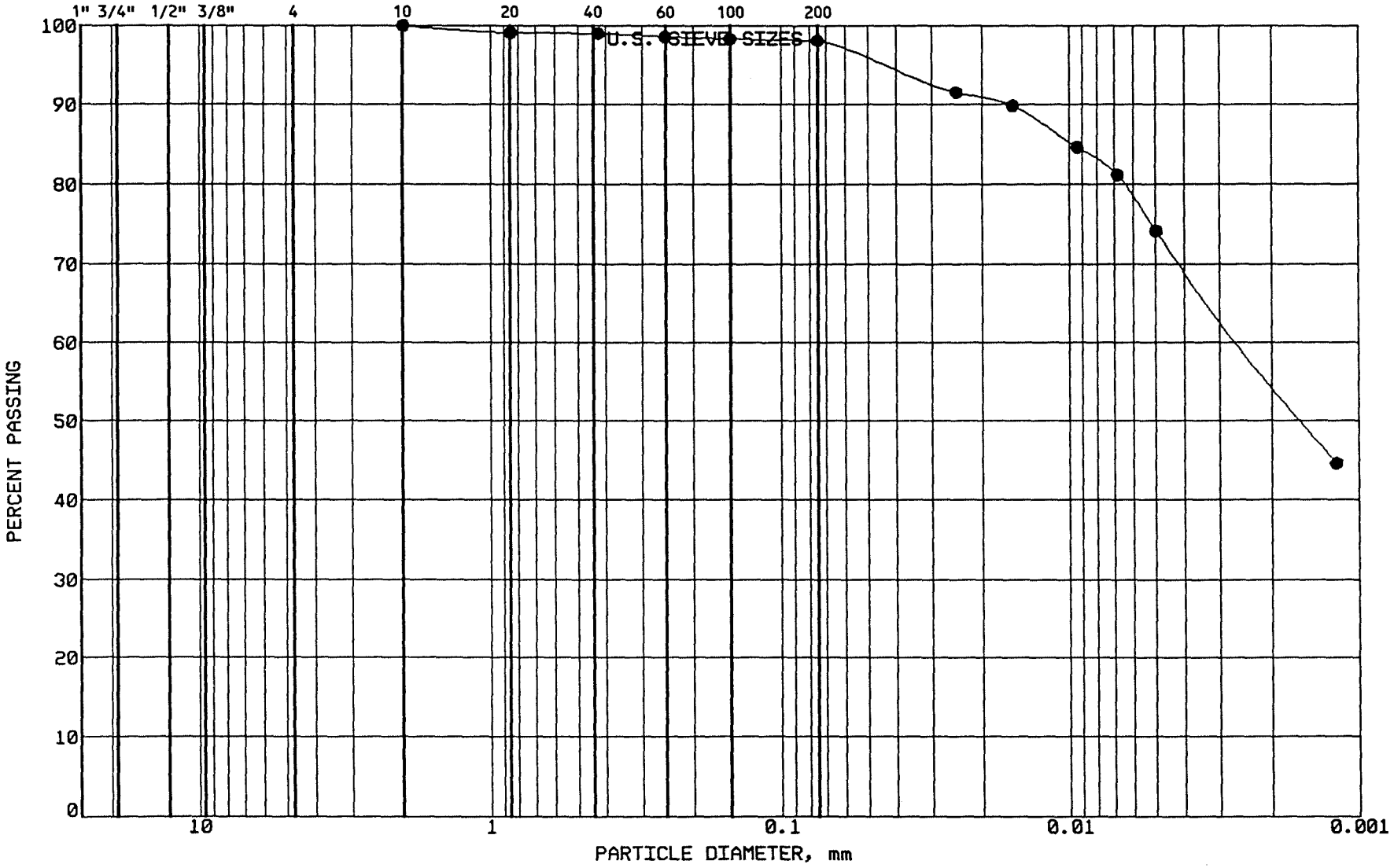
LOCATION: N 37387.0, E 40190.0
SAMPLE: CLBCC328 TUBE #: ST.75
ELEVATION: 1908.4'

GRAVEL	0.0 %
SAND	1.9 %
SILT	32.3 %
CLAY	65.8 %
P 200	98.1 %

SOIL PROPERTIES

LL: 55.0%
PL: 18.0%
PI: 37.0%
CLASS: Fat Clay (CH), olive

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

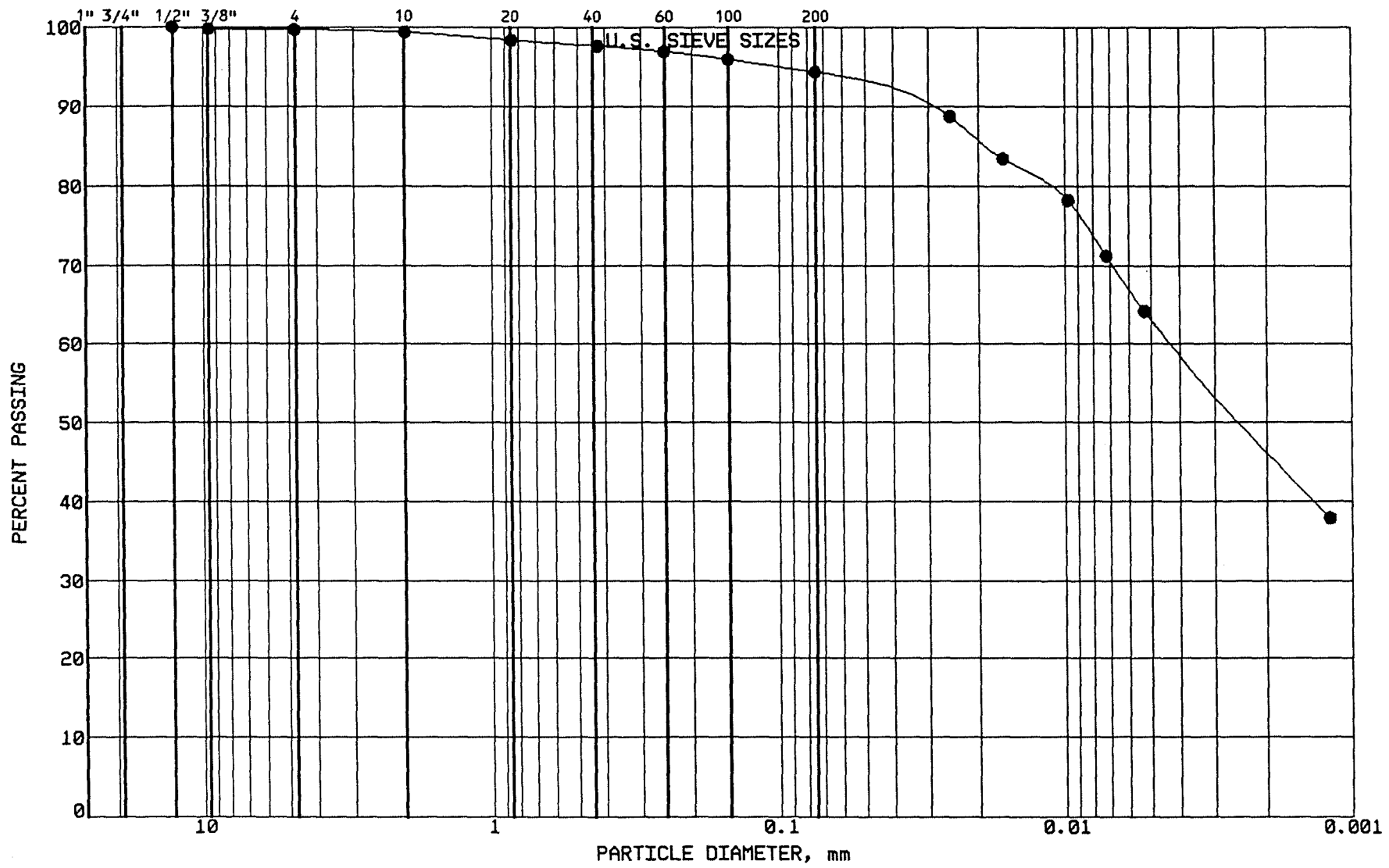
LOCATION: N 37422.0, E 39979.0
SAMPLE: CLBCC329 TUBE #: St.76
ELEVATION: 1909.3'

GRAVEL	0.0 %
SAND	1.9 %
SILT	24.0 %
CLAY	74.1 %
P 200	98.1 %

SOIL PROPERTIES

LL: 60.0%
PL: 19.0%
PI: 41.0%
CLASS: Fat Clay (CH), olive

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

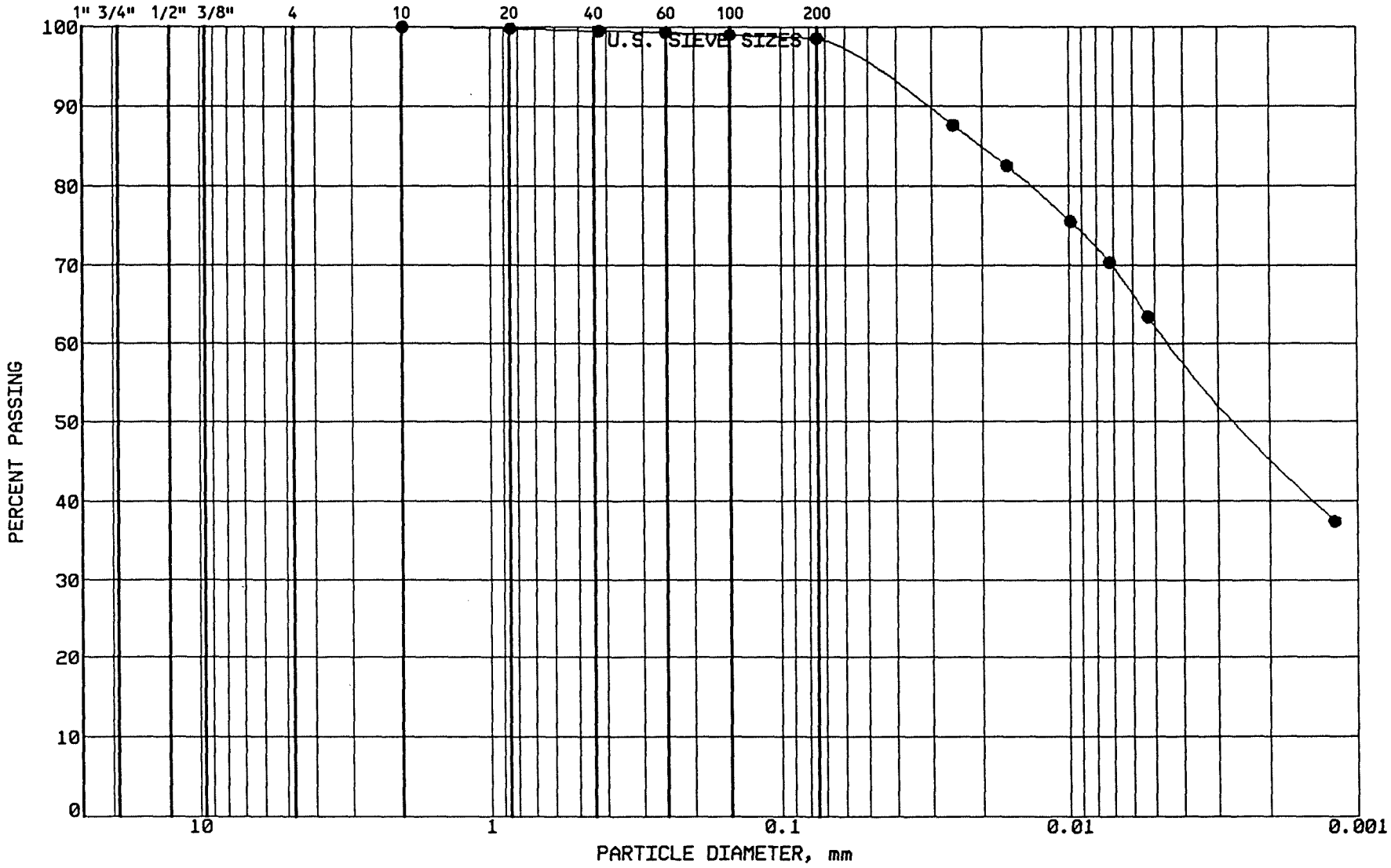
LOCATION: N 37622.0, E 39849.0
SAMPLE: CLBCC330 TUBE #: ST.77
ELEVATION: 1908.9'

GRAVEL	0.3 %
SAND	5.3 %
SILT	31.2 %
CLAY	63.2 %
P 200	94.4 %

SOIL PROPERTIES

LL: 50.0%
PL: 17.0%
PI: 33.0%
CLASS: Fat Clay (CH), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

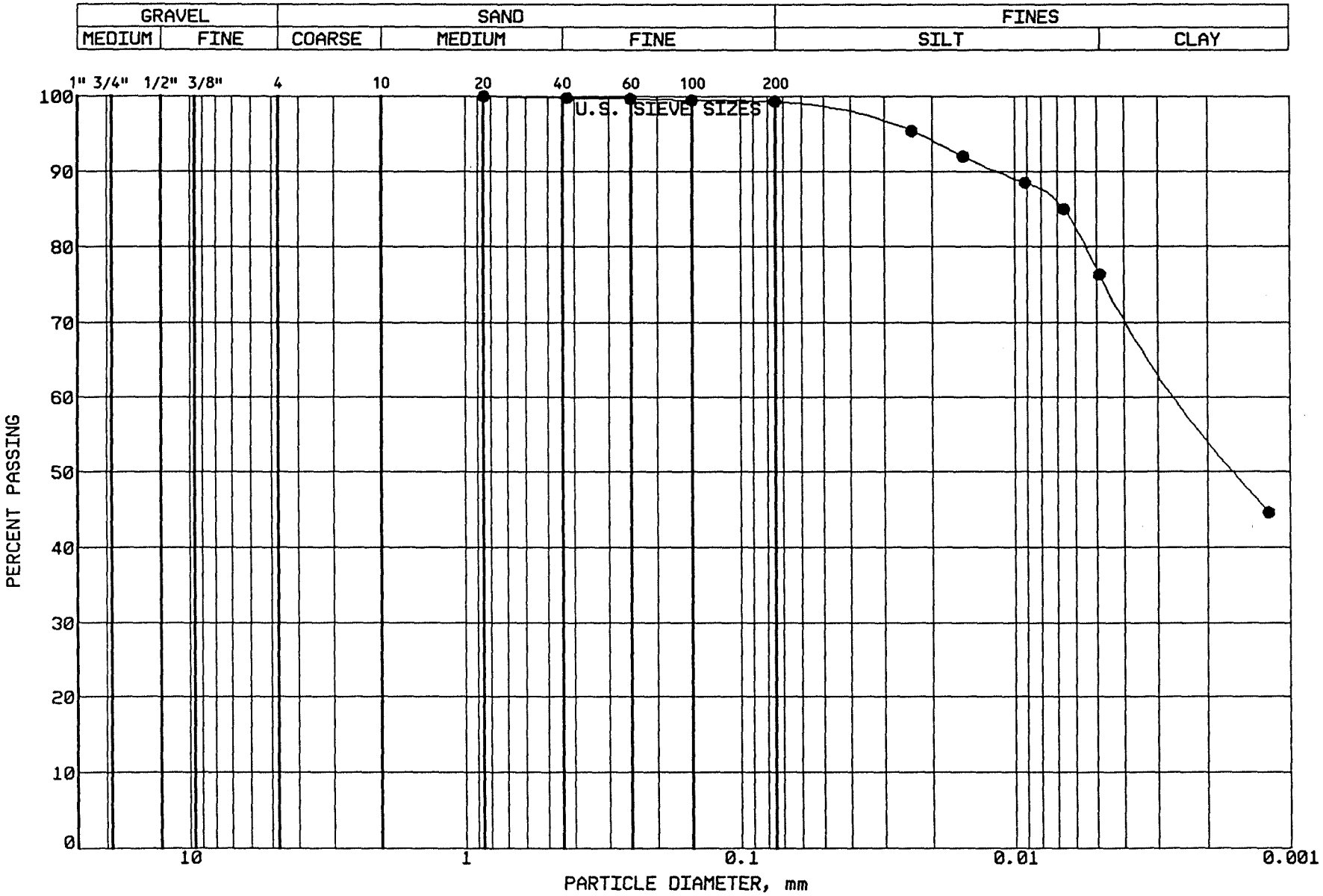
LOCATION: N 37573.0, E 40097.0
SAMPLE: CLBCC331 TUBE #: St.78
ELEVATION: 1908.2'

GRAVEL	0.0 %
SAND	1.4 %
SILT	36.2 %
CLAY	62.4 %
P 200	98.6 %

SOIL PROPERTIES

LL: 54.0%
PL: 17.0%
PI: 37.0%
CLASS: Fat Clay (CH), dark gr.-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

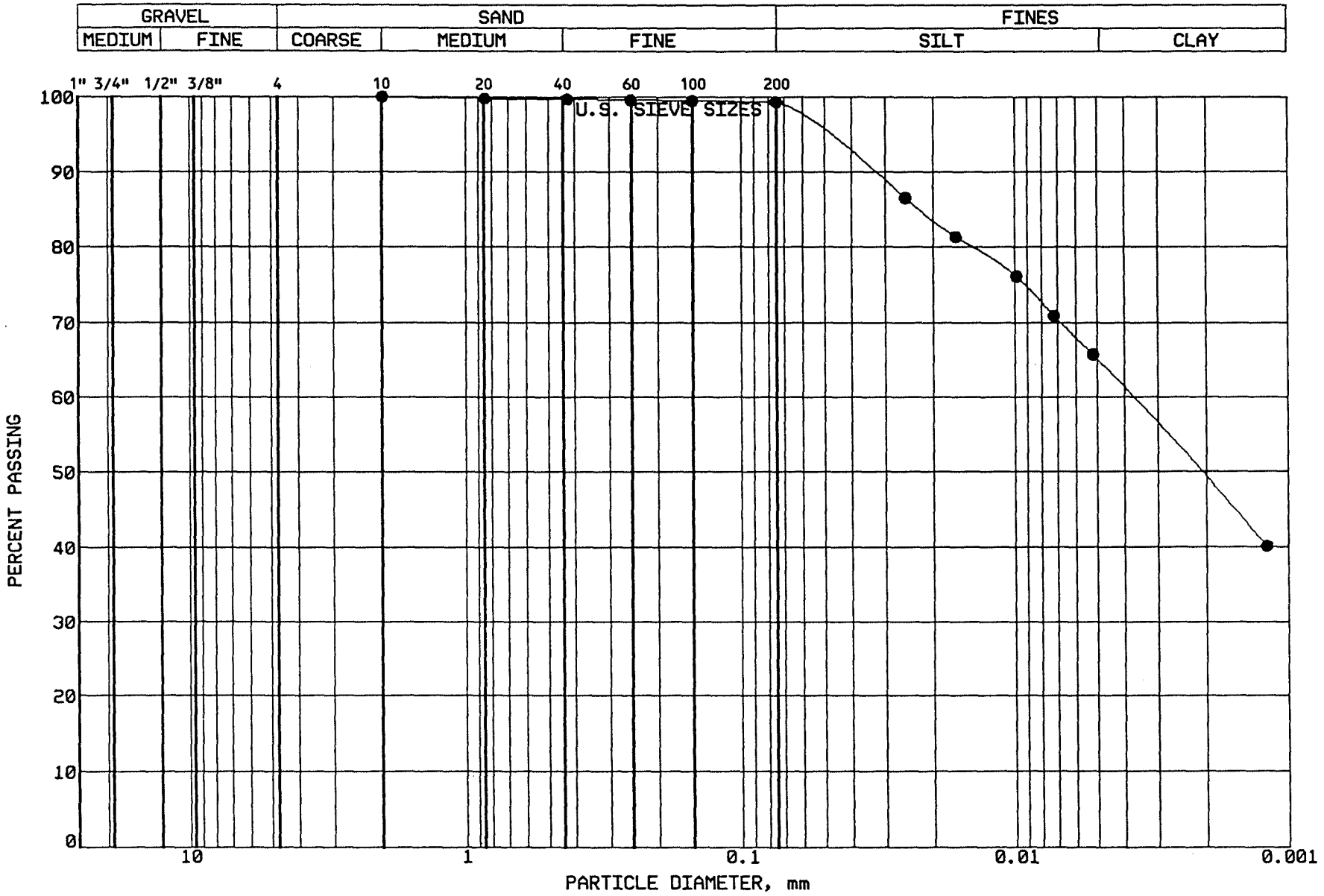
LOCATION: N 37526.0, E 40337.0
SAMPLE: CLBCC332 TUBE #: St.79
ELEVATION: 1907.0'

GRAVEL	0.0 %
SAND	0.7 %
SILT	22.4 %
CLAY	76.9 %
P 200	99.3 %

SOIL PROPERTIES

LL: 59.0%
PL: 18.0%
PI: 41.0%
CLASS: Fat Clay (CH), olive gr.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

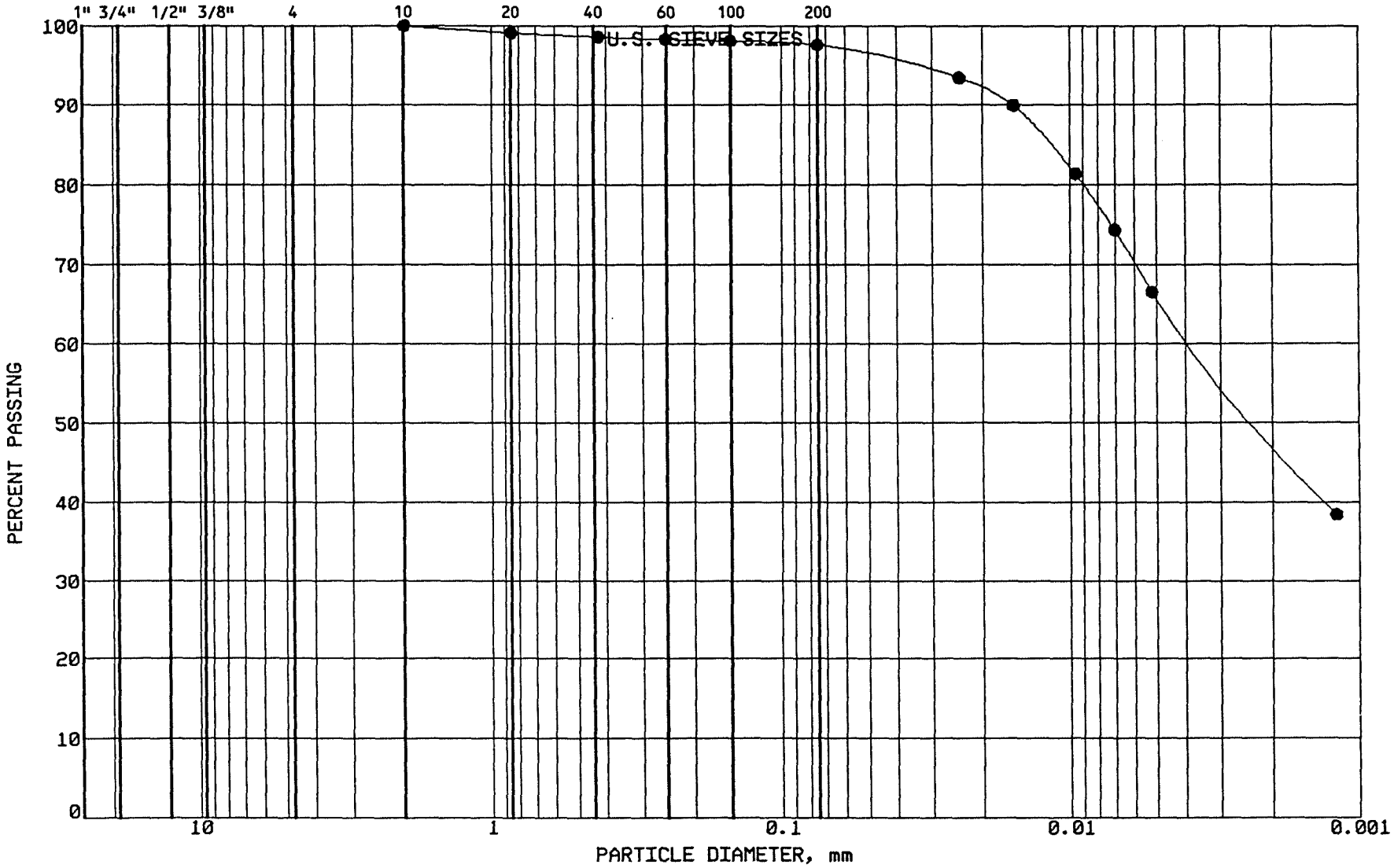
LOCATION: N 37483.0, E 40538.0
SAMPLE: CLBCC333 TUBE #: St.80
ELEVATION: 1906.4'

GRAVEL	0.0 %
SAND	0.7 %
SILT	34.3 %
CLAY	65.0 %
P 200	99.3 %

SOIL PROPERTIES

LL: 57.0%
PL: 18.0%
PI: 39.0%
CLASS: Fat Clay (CH), olive gr.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

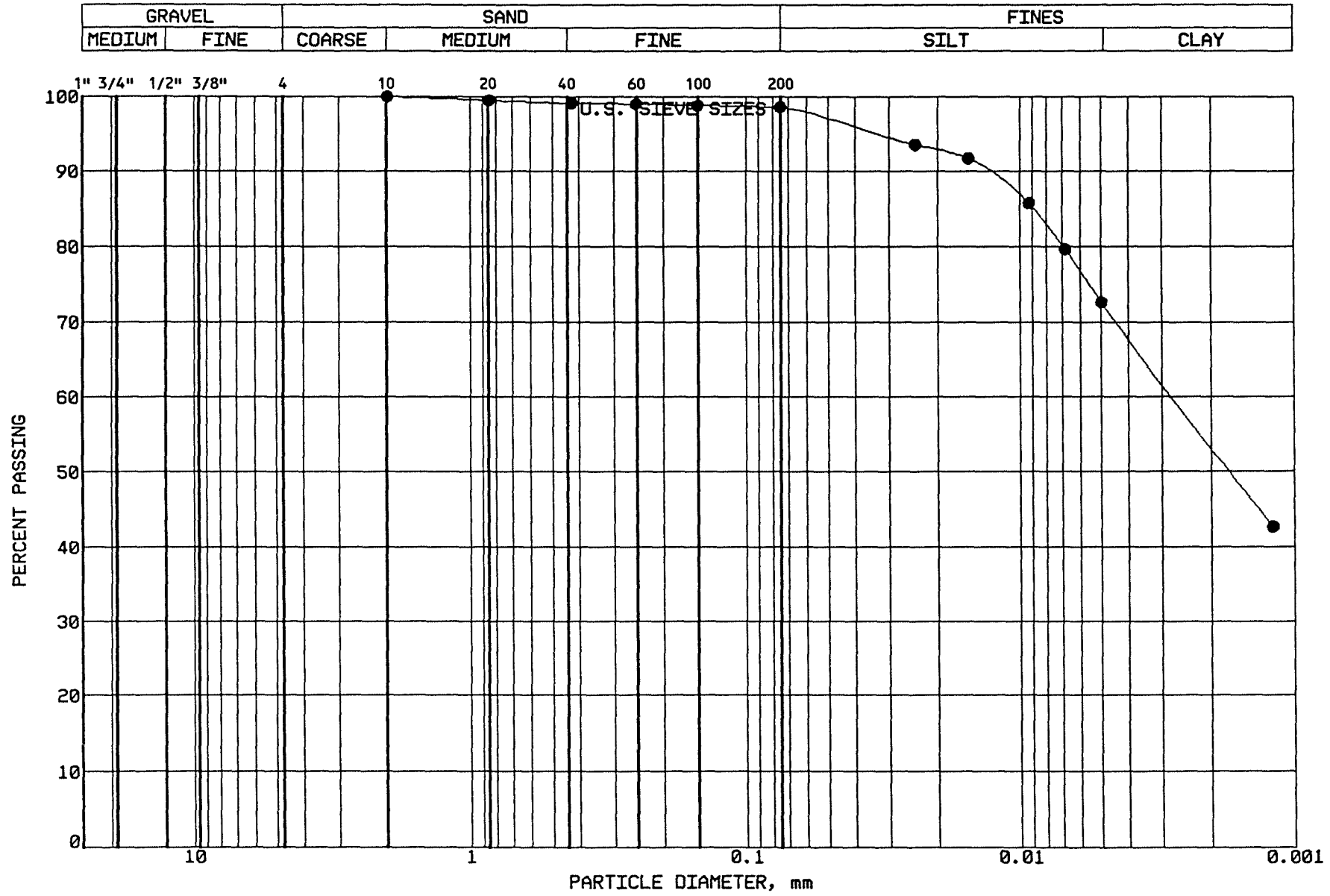
LOCATION: N 37801.0, E 39793.0
SAMPLE: CLBCC334 TUBE #: ST.81
ELEVATION: 1908.4'

GRAVEL	0.0 %
SAND	2.4 %
SILT	31.9 %
CLAY	65.7 %
P 200	97.6 %

SOIL PROPERTIES

LL: 55.0%
PL: 20.0%
PI: 35.0%
CLASS: Fat Clay (CH), dark gr.-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

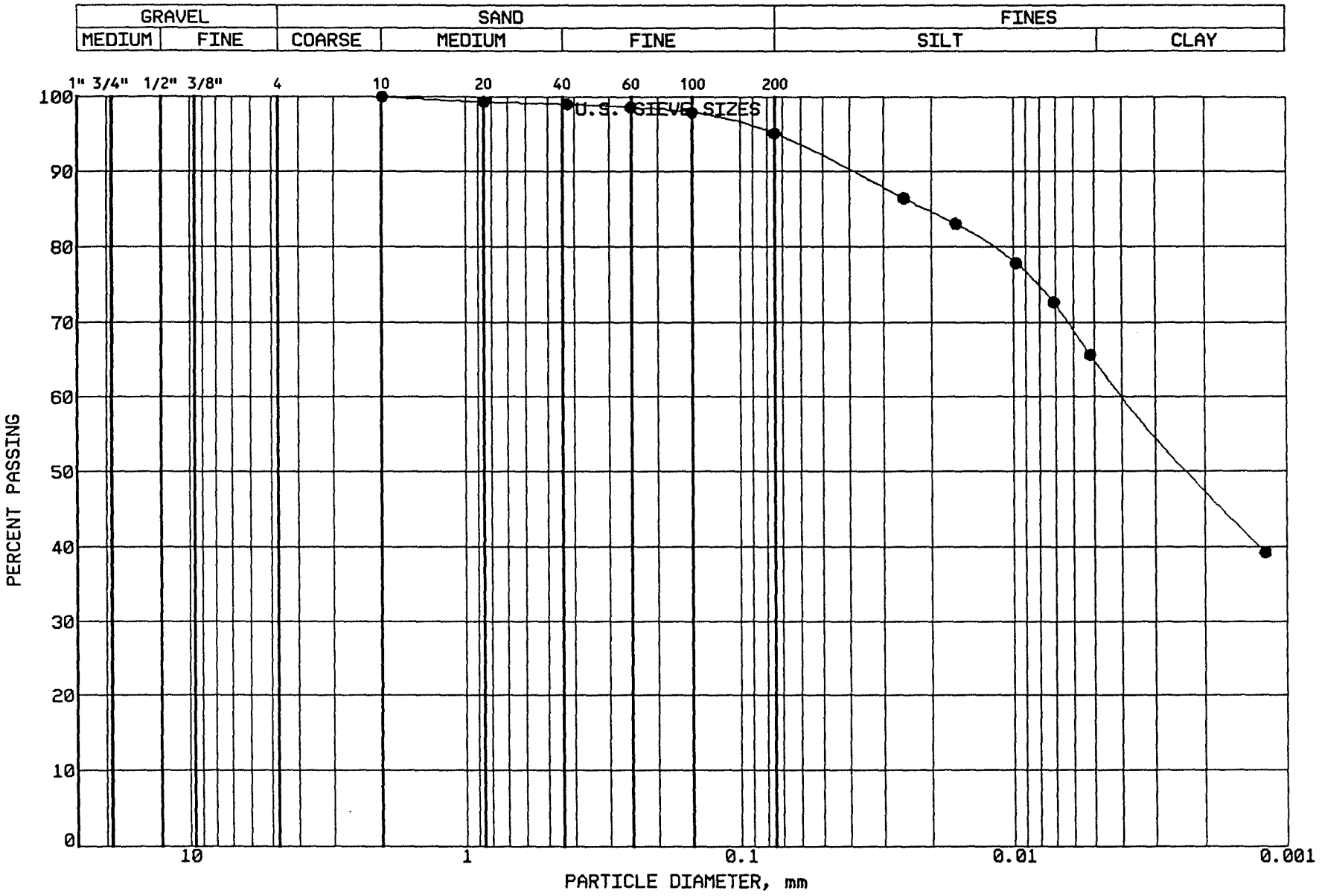
LOCATION: N 37748.0, E 40044.0
SAMPLE: CLBCC335 TUBE #: St.82
ELEVATION: 1907.5'

GRAVEL	0.0 %
SAND	1.4 %
SILT	26.0 %
CLAY	72.6 %
P 200	98.6 %

SOIL PROPERTIES

LL: 58.0%
PL: 22.0%
PI: 36.0%
CLASS: Fat Clay (CH), dark gr.-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

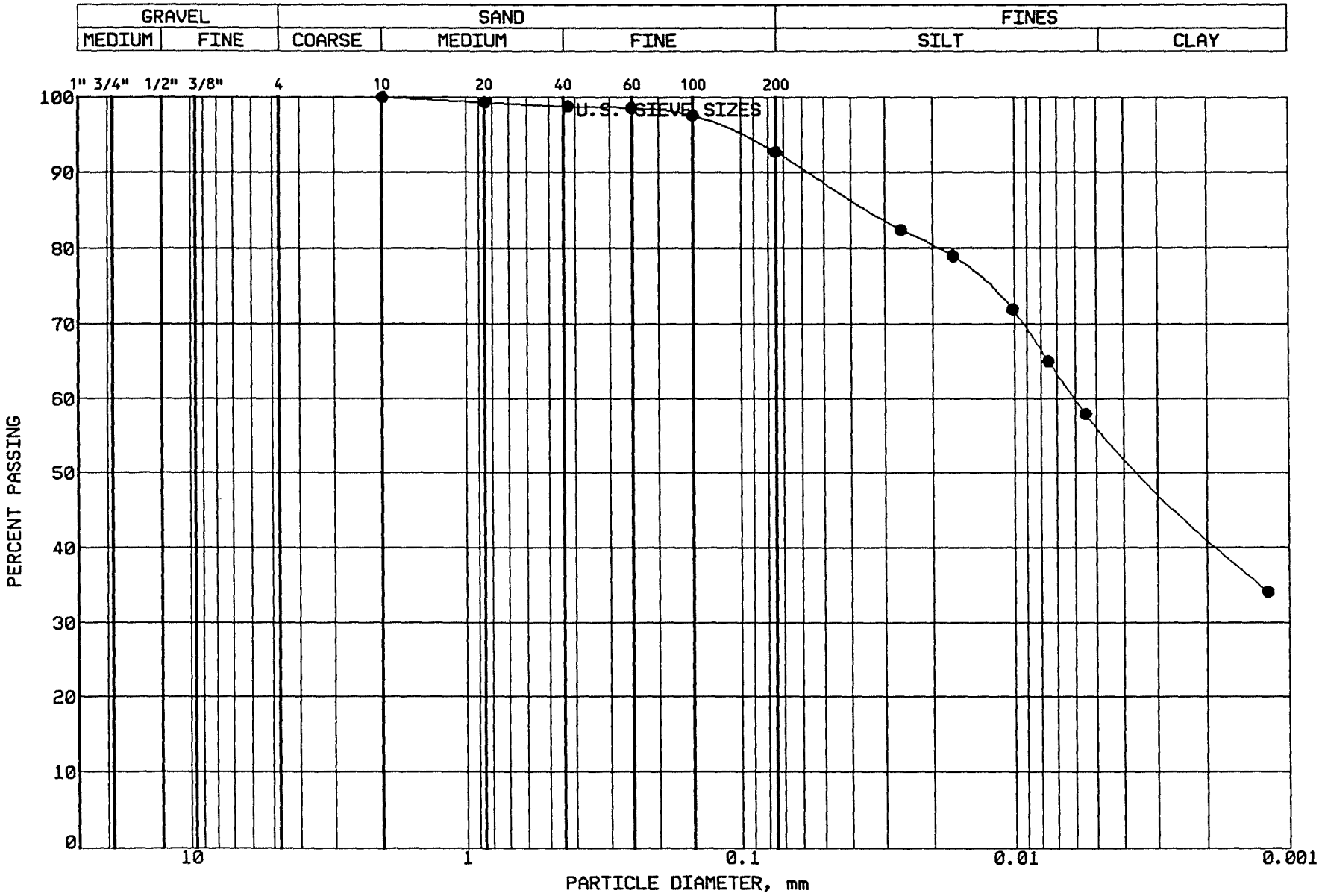
LOCATION: N 37694.0, E 40314.0
SAMPLE: CLBCC336 TUBE #: St.83
ELEVATION: 1906.4'

GRAVEL	0.0 %
SAND	4.9 %
SILT	30.2 %
CLAY	64.9 %
P 200	95.1 %

SOIL PROPERTIES

LL: 51.0%
PL: 21.0%
PI: 30.0%
CLASS: Fat Clay (CH), dark gr.-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

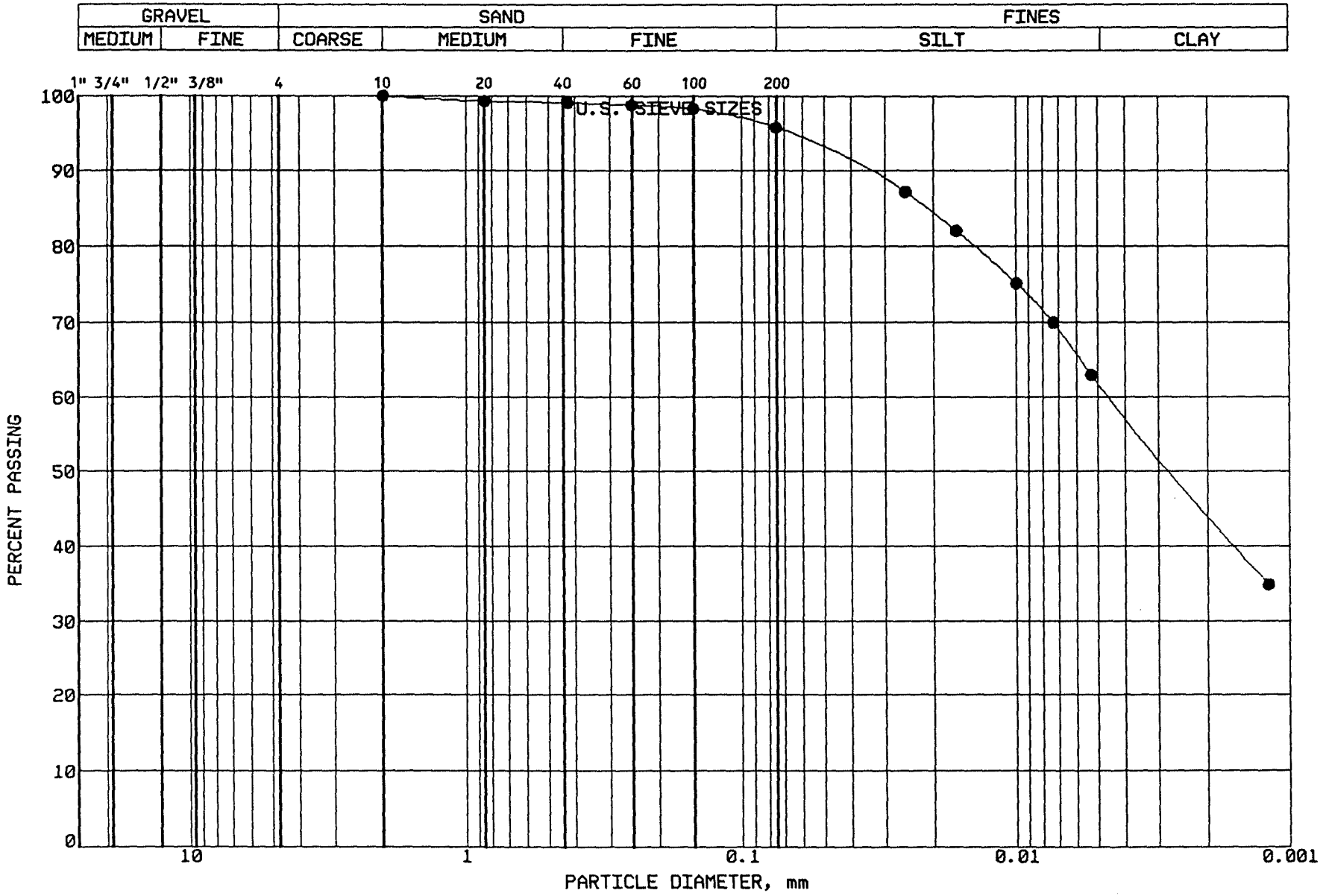
LOCATION: N 37627.0, E 40616.0
SAMPLE: CLBCC337 TUBE #: ST.84
ELEVATION: 1905.1'

GRAVEL	0.0 %
SAND	7.3 %
SILT	36.2 %
CLAY	56.5 %
P 200	92.7 %

SOIL PROPERTIES

LL: 48.0%
PL: 21.0%
PI: 27.0%
CLASS: Lean Clay (CL), dk gr.-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

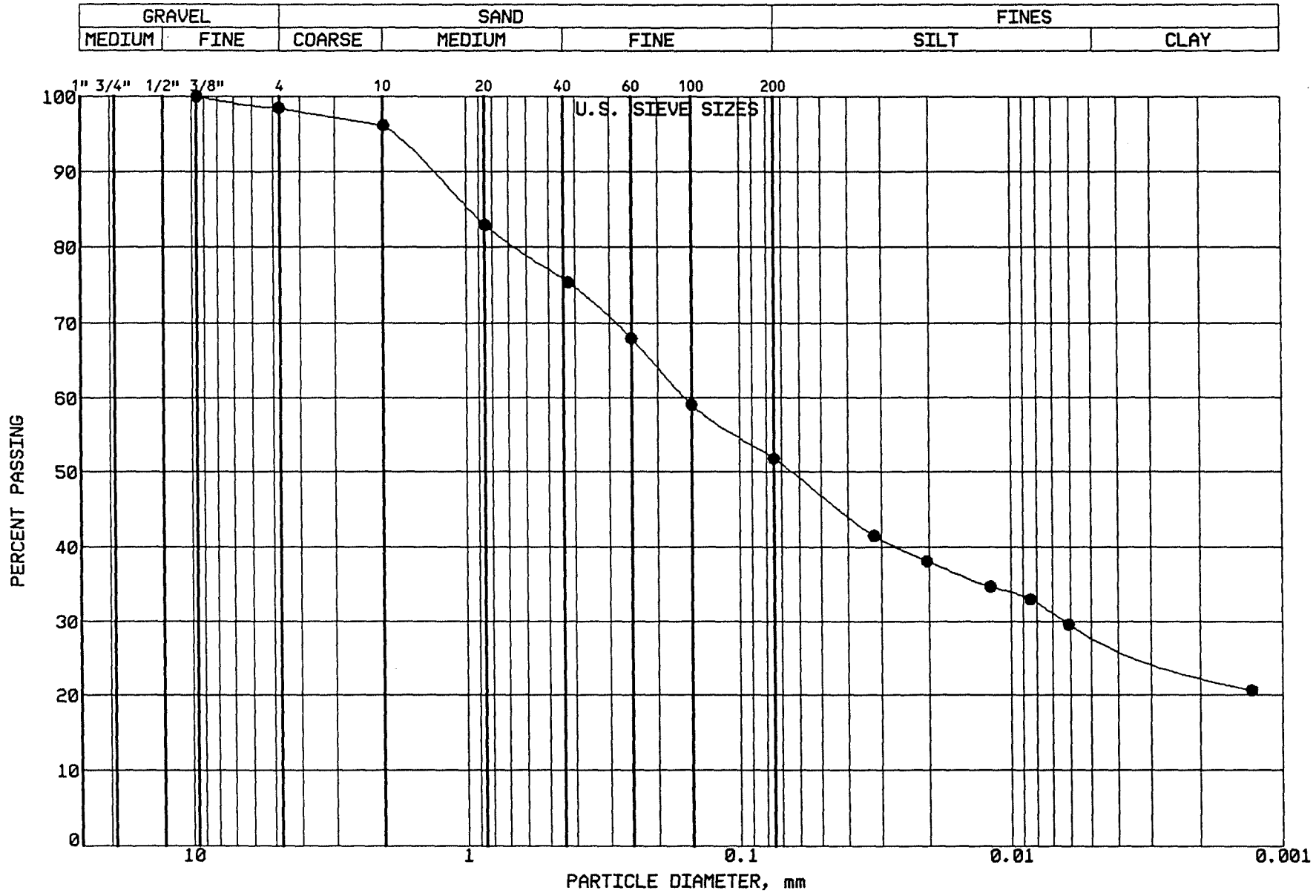
LOCATION: N 39106.0, E 39971.0
SAMPLE: CLBCC338 TUBE #: RST.59B
ELEVATION: 1801.2'

GRAVEL	0.0 %
SAND	4.2 %
SILT	33.9 %
CLAY	61.9 %
P 200	95.8 %

SOIL PROPERTIES

LL: 51.0%
PL: 21.0%
PI: 30.0%
CLASS: Fat Clay (CH), dk.gr.-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

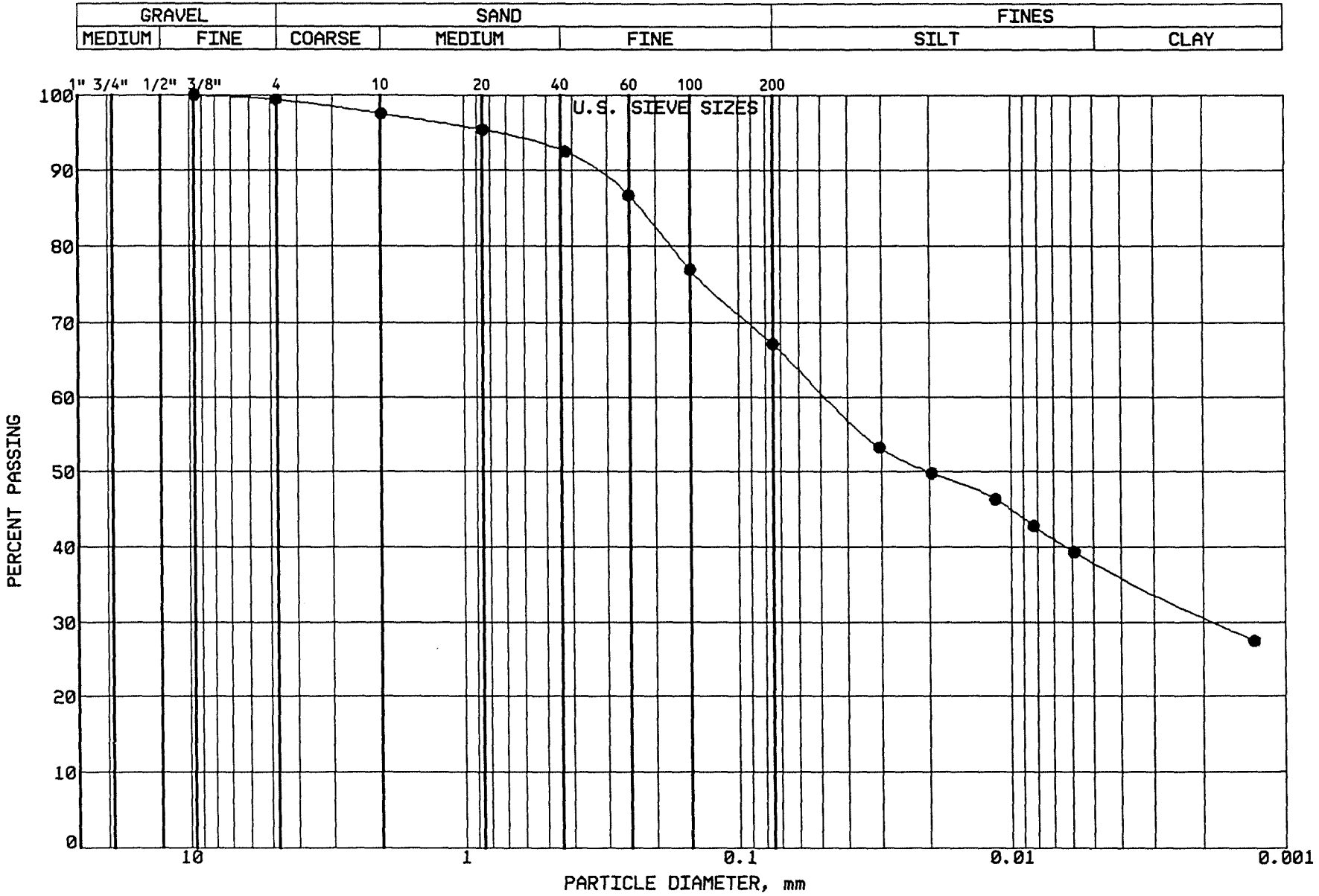
LOCATION: N 38500.0, E 41500.0
SAMPLE: CLSCC339 TUBE #: N/A
ELEVATION: N/A'

GRAVEL	1.5 %
SAND	46.7 %
SILT	23.3 %
CLAY	28.5 %
P 200	51.8 %

SOIL PROPERTIES

LL: 37.0%
PL: 14.0%
PI: 23.0%
CLASS: Sandy Lean Clay (CL), ol hr

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

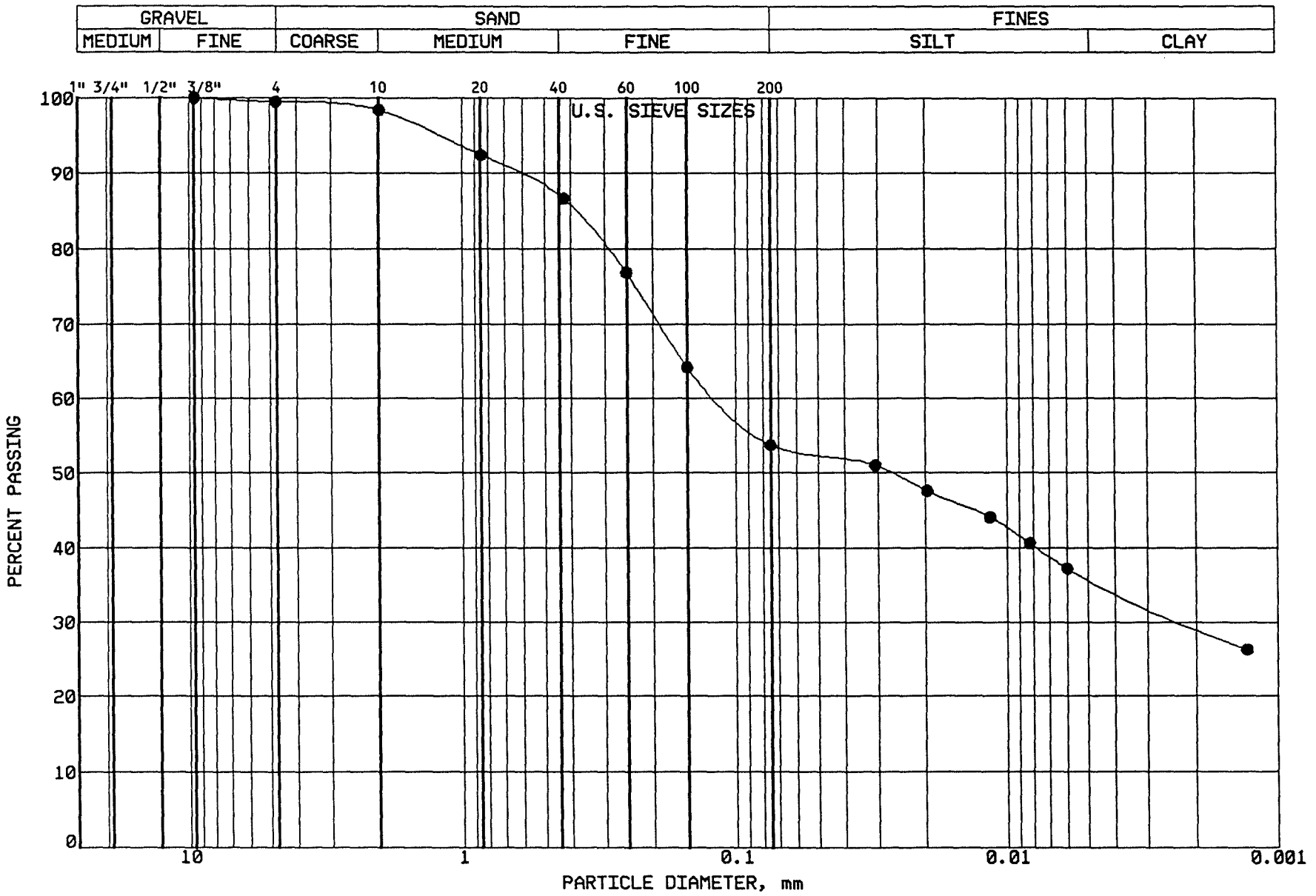
LOCATION: N 38000.0, E 41500.0
SAMPLE: CLSCC340 TUBE #: N/A
ELEVATION: N/A'

GRAVEL	0.6 %
SAND	32.3 %
SILT	29.1 %
CLAY	38.0 %
P 200	67.1 %

SOIL PROPERTIES

LL: 41.0%
PL: 15.0%
PI: 26.0%
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

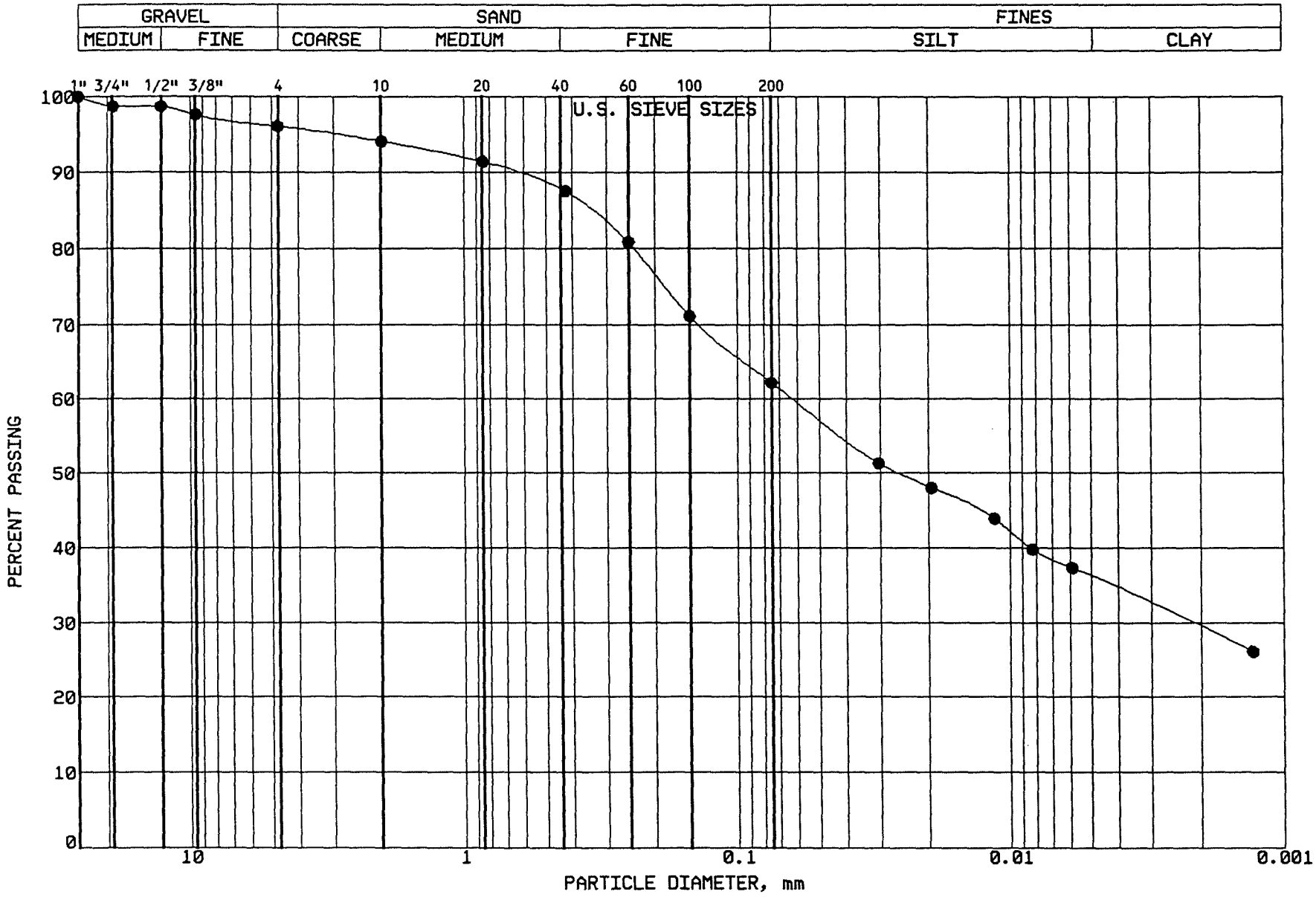
LOCATION: N 38677.0, E 39736.0
SAMPLE: CLSCC341 TUBE #: N/A
ELEVATION: 1904.8'

GRAVEL	0.5 %
SAND	45.7 %
SILT	17.9 %
CLAY	35.9 %
P 200	53.8 %

SOIL PROPERTIES

LL: 38.0%
PL: 16.0%
PI: 22.0%
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

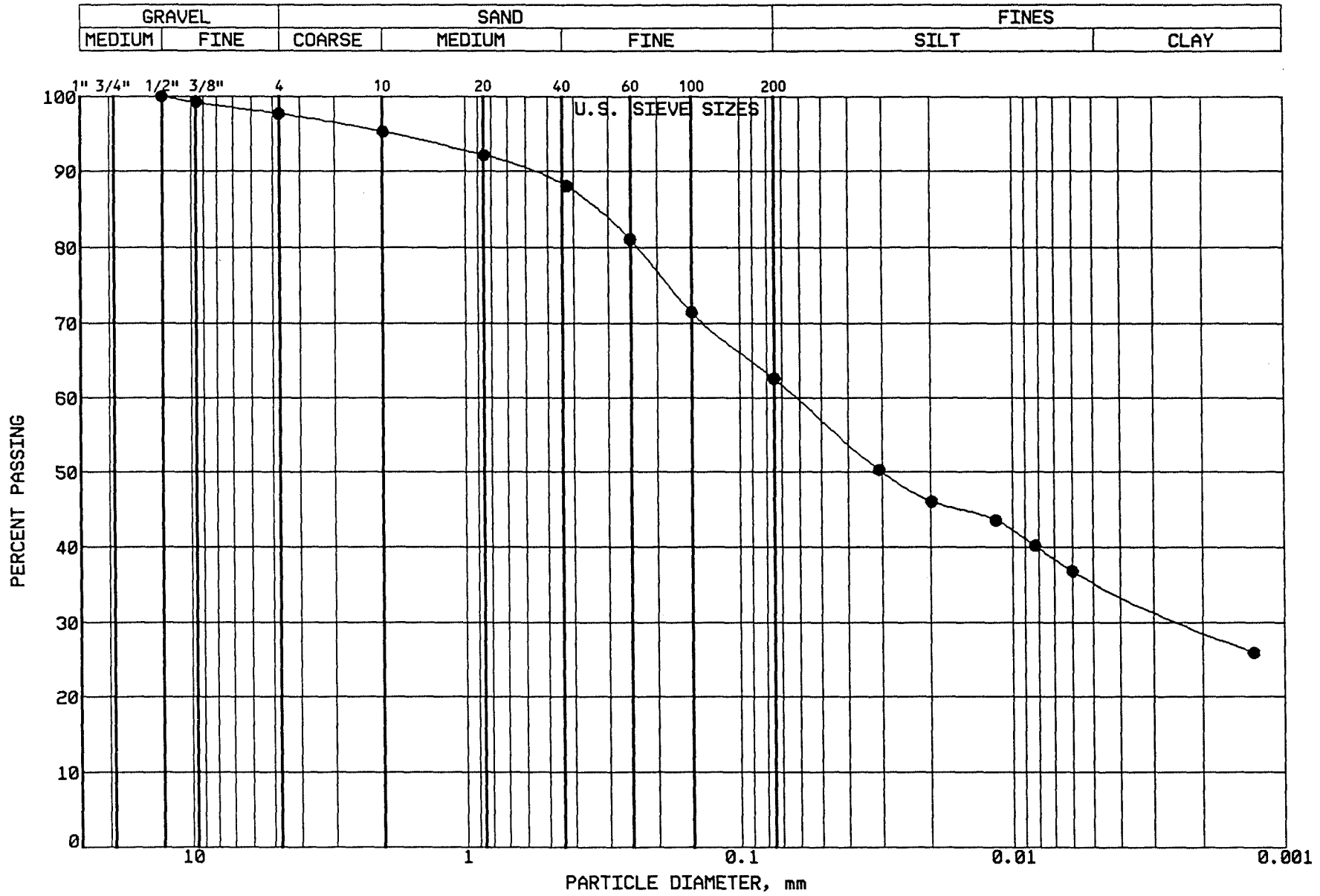
LOCATION: N 38765.0, E 40182.0
SAMPLE: CLSCC342 TUBE #: ST.85
ELEVATION: 1901.3'

GRAVEL	3.9 %
SAND	33.9 %
SILT	26.1 %
CLAY	36.1 %
P 200	62.2 %

SOIL PROPERTIES

LL: 38.0%
PL: 16.0%
PI: 22.0%
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

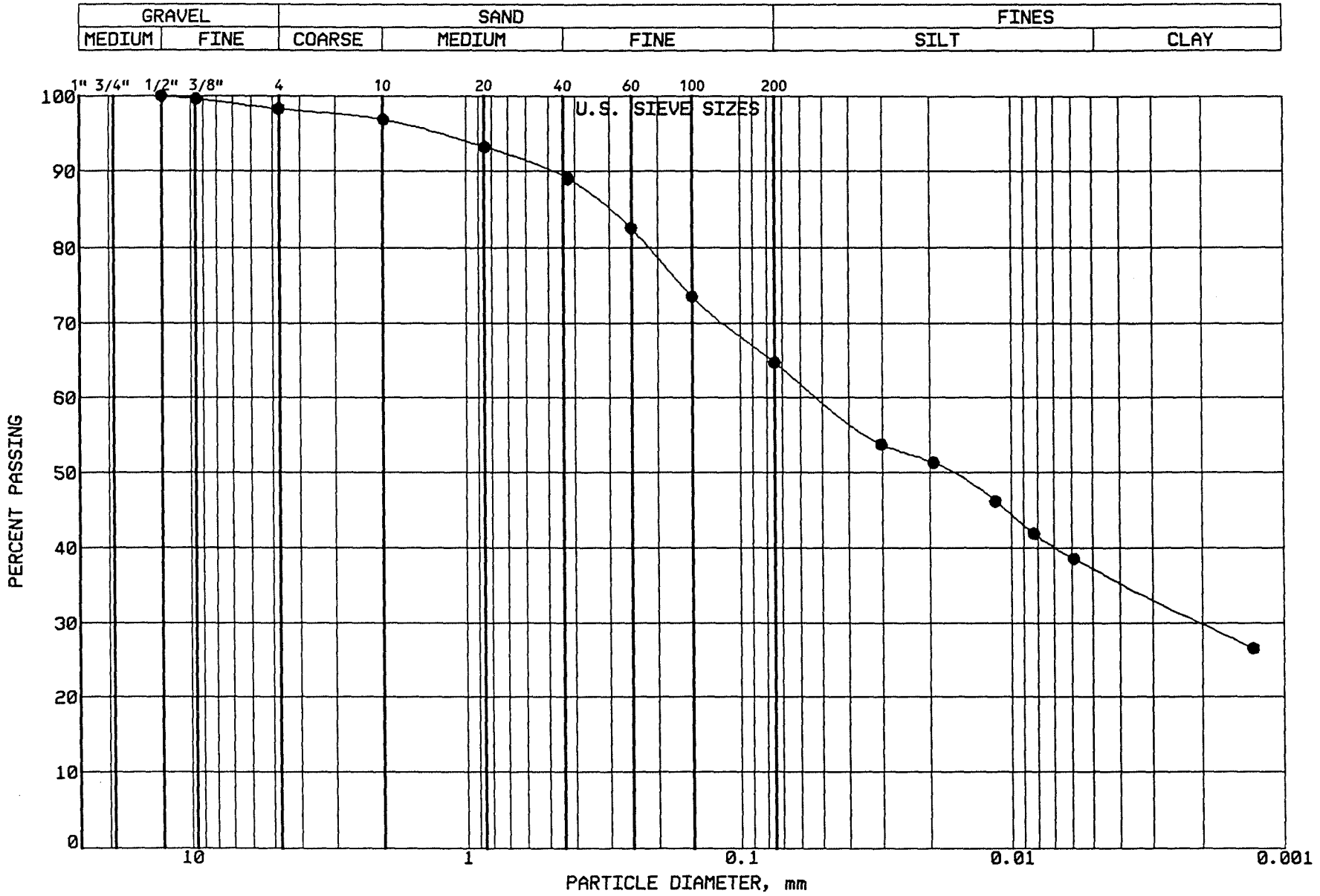
LOCATION: N 38760.0, E 40378.0
SAMPLE: CLSCC343 TUBE #: ST.86
ELEVATION: 1900.9'

GRAVEL	2.3 %
SAND	35.1 %
SILT	27.1 %
CLAY	35.5 %
P 200	62.6 %

SOIL PROPERTIES

LL: 38.0%
PL: 17.0%
PI: 21.0%
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

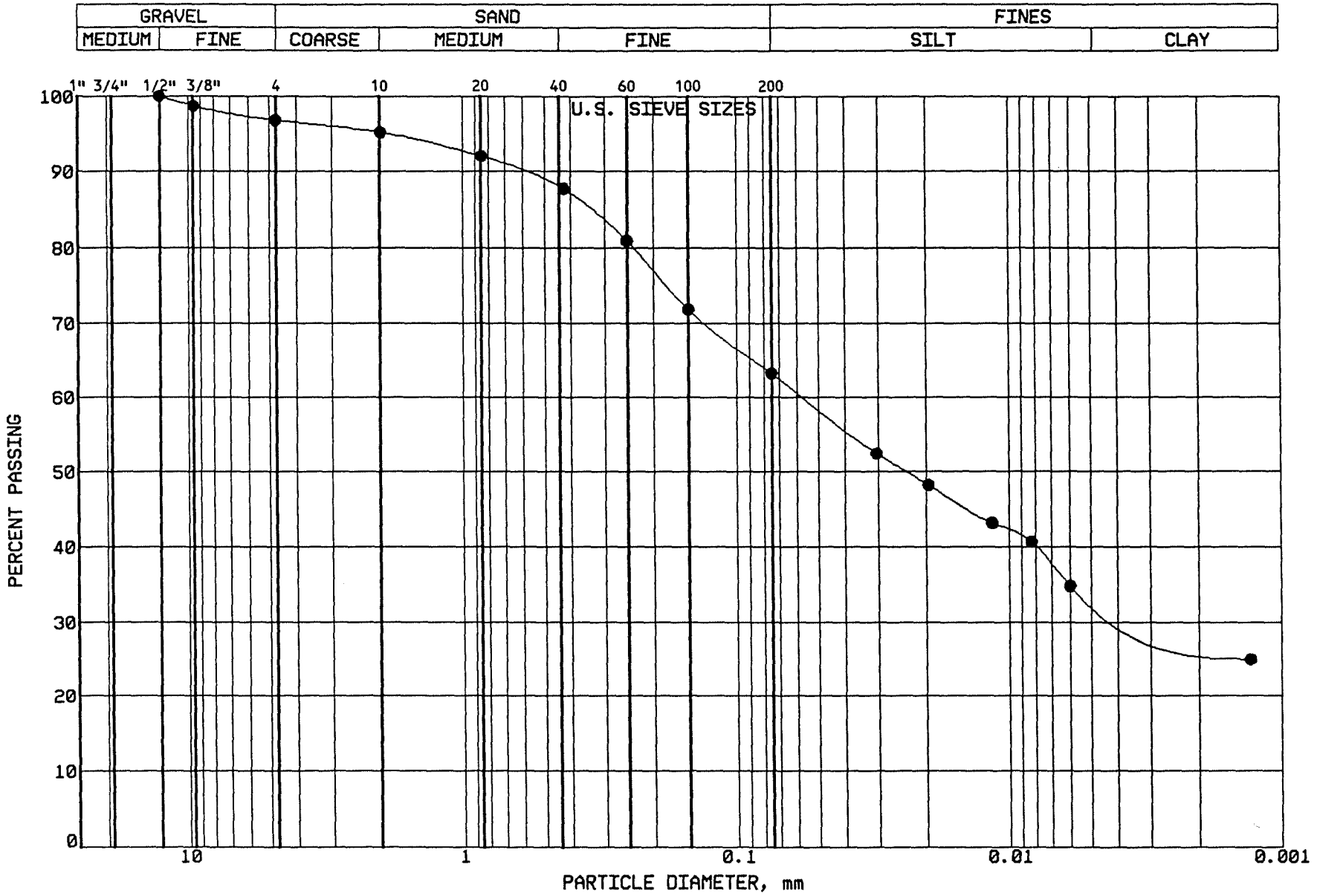
LOCATION: N 38700.0, E 41517.0
SAMPLE: CLSCC344 TUBE #: ST.87
ELEVATION: 1897.5'

GRAVEL	1.7 %
SAND	33.6 %
SILT	27.5 %
CLAY	37.2 %
P 200	64.7 %

SOIL PROPERTIES

LL: 39.0%
PL: 17.0%
PI: 22.0%
CLASS: Sandy Lean Clay (CL) ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

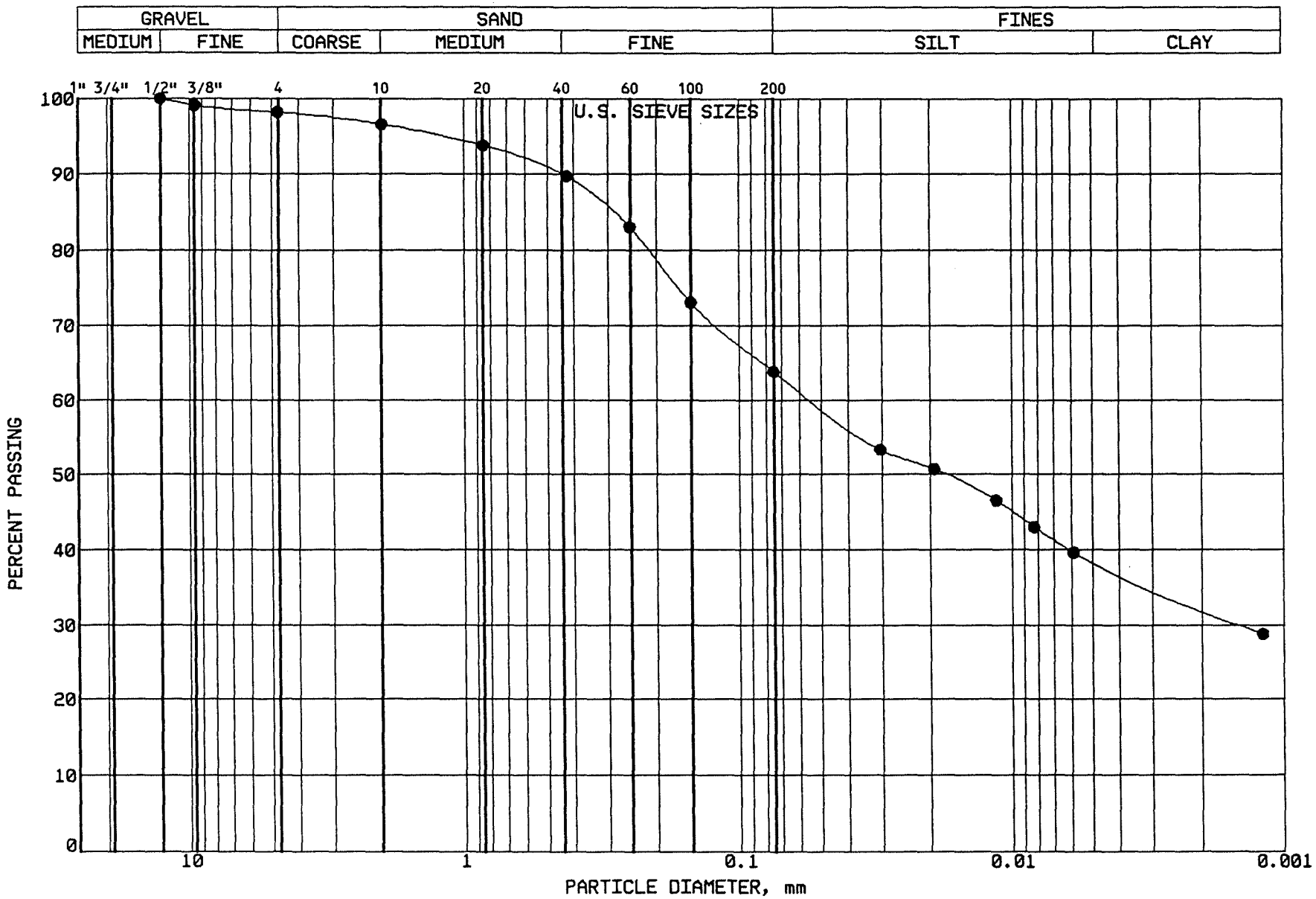
LOCATION: N 38506.0, E 41521.0
SAMPLE: CLSCC345 TUBE #: ST.88
ELEVATION: 1896.8'

GRAVEL	3.2 %
SAND	33.6 %
SILT	29.6 %
CLAY	33.6 %
P 200	63.2 %

SOIL PROPERTIES

LL: 39.0%
PL: 15.0%
PI: 24.0%
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

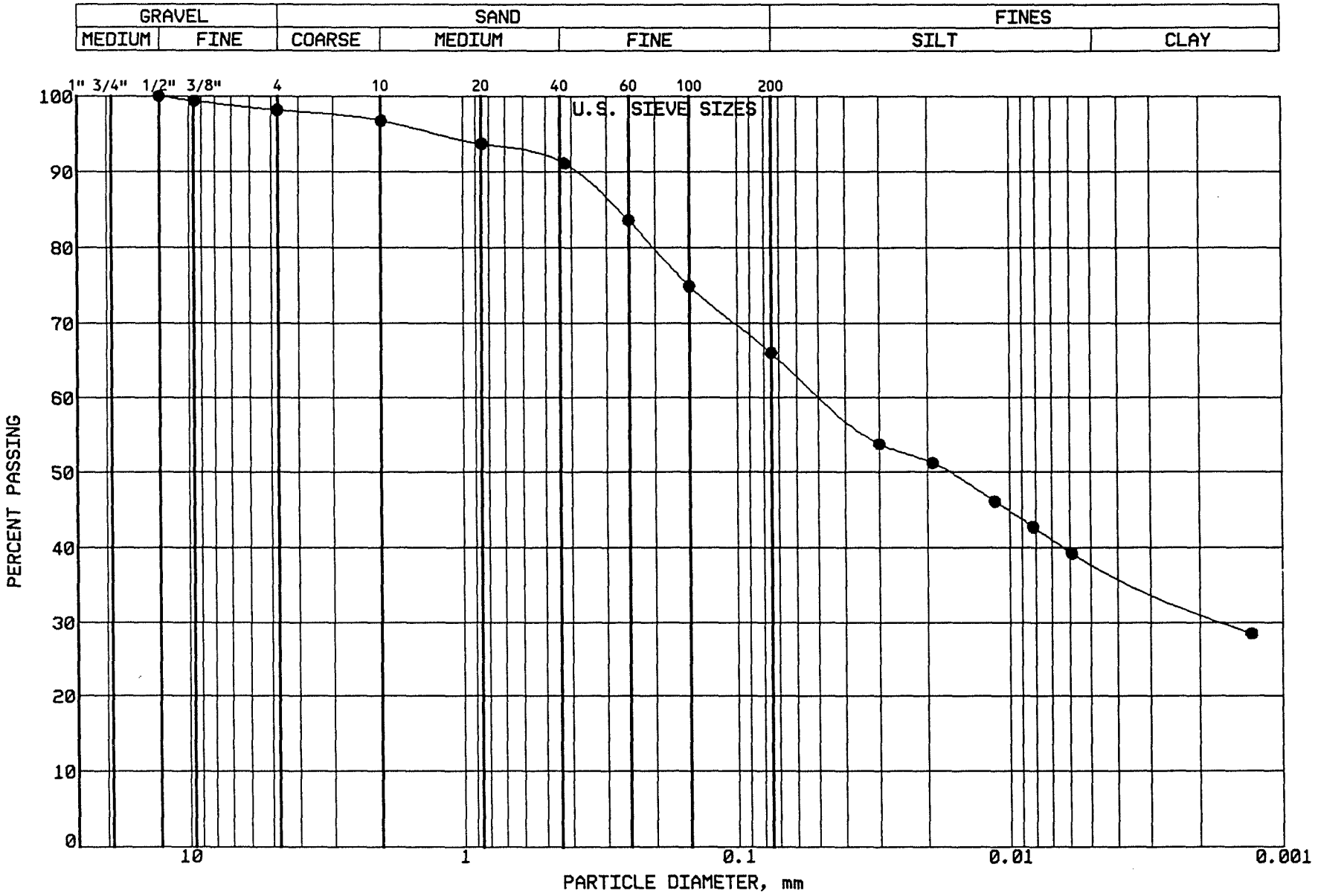
LOCATION: N 38753.0, E 41072.0
SAMPLE: CLSCC346 TUBE #: ST.89
ELEVATION: 1898.5'

GRAVEL	1.8 %
SAND	34.4 %
SILT	25.3 %
CLAY	38.5 %
P 200	63.8 %

SOIL PROPERTIES

LL: 41.0%
PL: 15.0%
PI: 26.0%
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38760.0, E 40876.0
SAMPLE: CLSCC347 TUBE #: ST.90
ELEVATION: 1899.0'

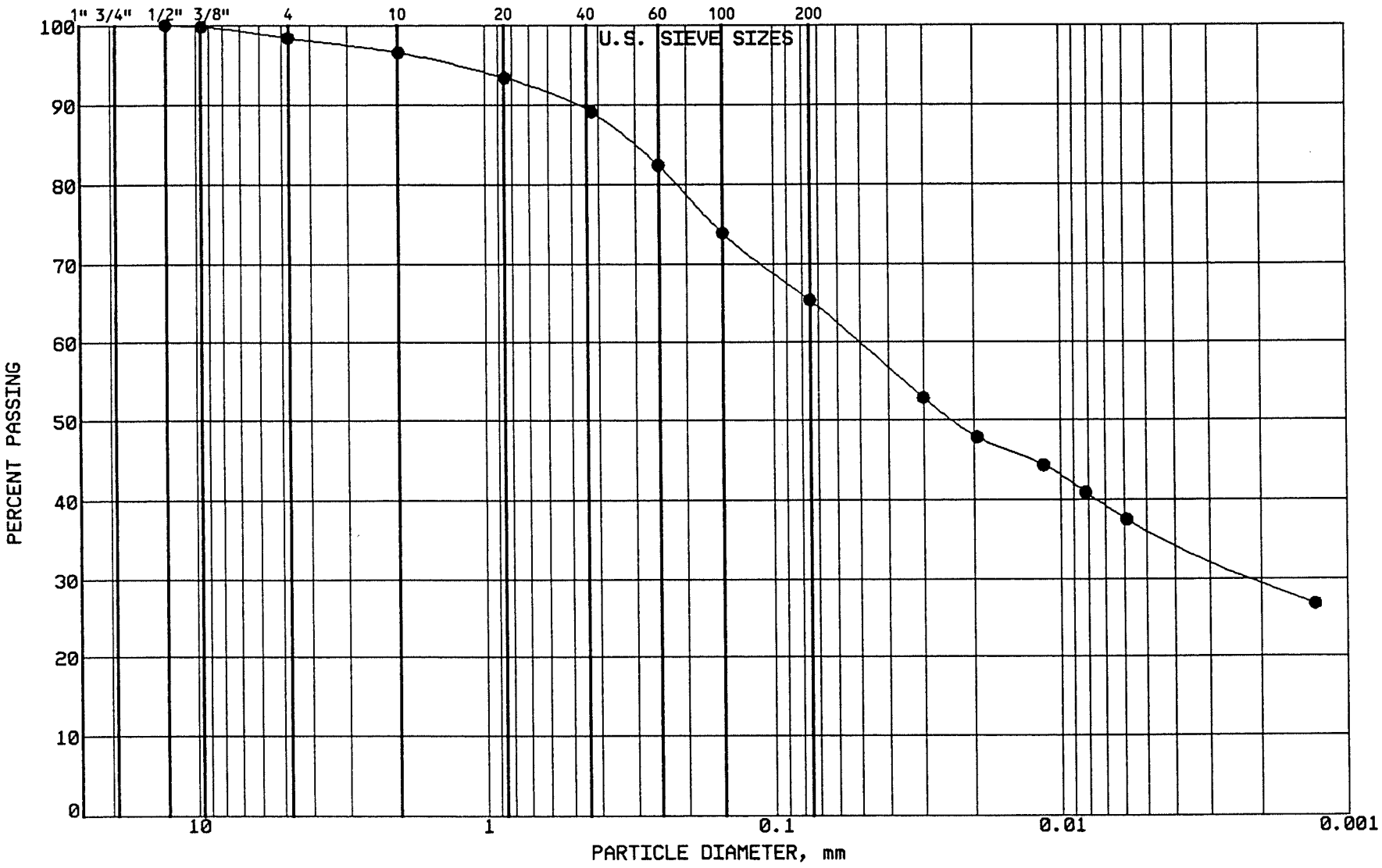
GRAVEL	1.8 %
SAND	32.2 %
SILT	28.0 %
CLAY	38.0 %
P 200	66.0 %

SOIL PROPERTIES

LL: 42.0%
PL: 13.0%
PI: 29.0%
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38107.0, E 41531.0
SAMPLE: CLSCC348 TUBE #: ST.91
ELEVATION: 1899.7'

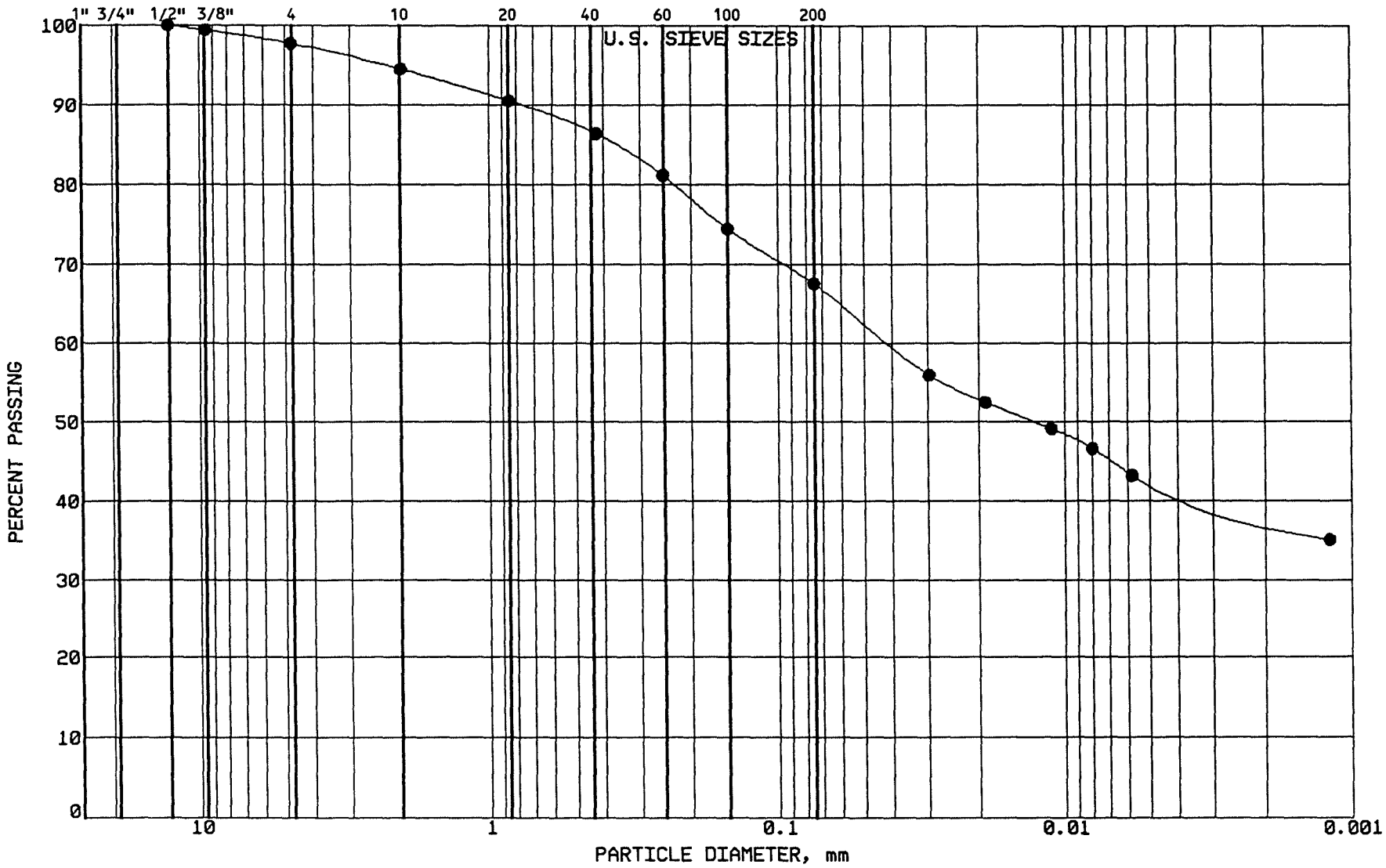
GRAVEL	1.6 %
SAND	33.1 %
SILT	29.0 %
CLAY	36.3 %
P 200	65.3 %

SOIL PROPERTIES

LL: 39.0%
PL: 14.0%
PI: 25.0%
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

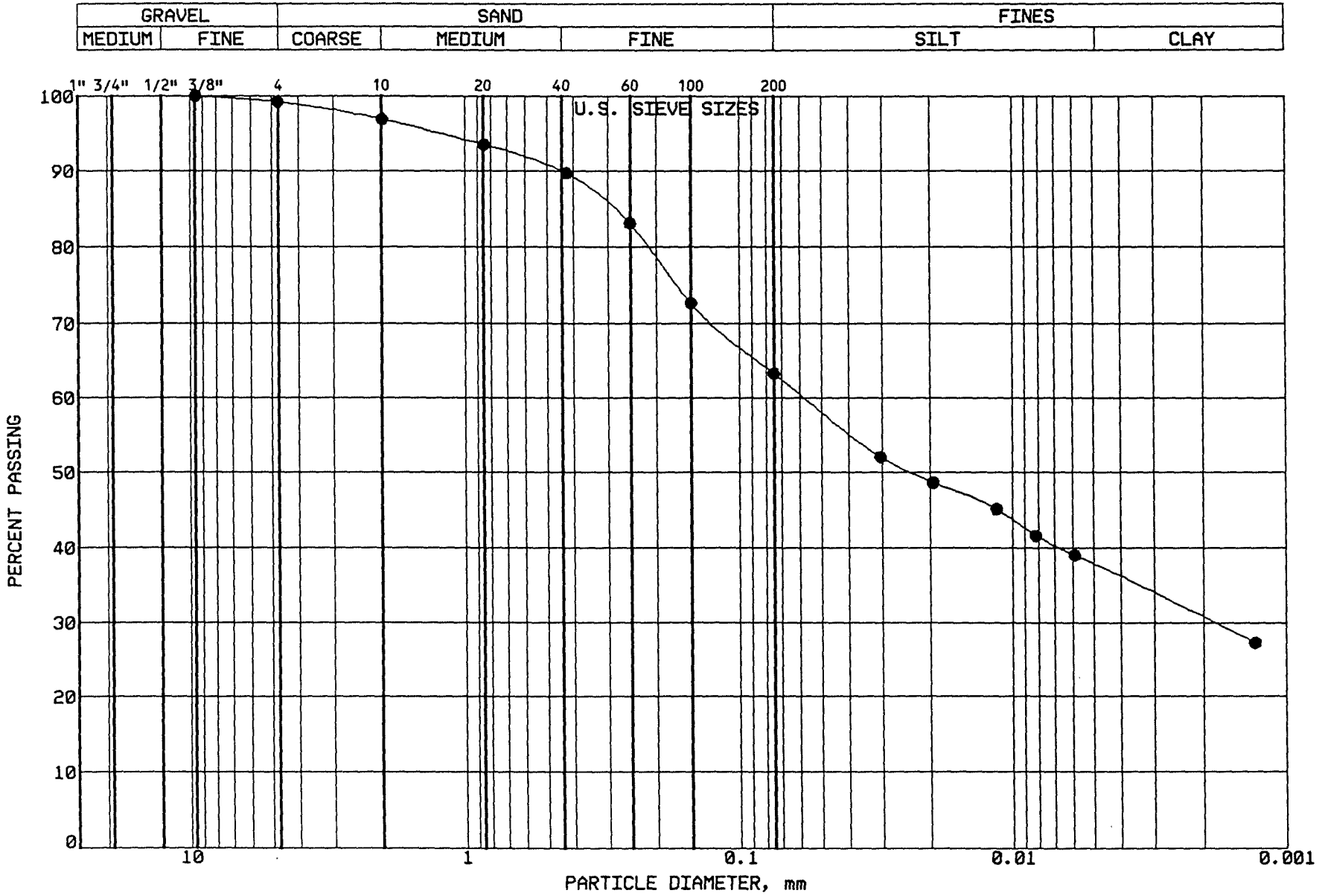
LOCATION: N 387373.0, E 39730.0
SAMPLE: CLSCC349 TUBE #:ST.92
ELEVATION: 1906.4'

GRAVEL	2.3 %
SAND	30.2 %
SILT	25.1 %
CLAY	42.4 %
P 200	67.5 %

SOIL PROPERTIES

LL: 45.0%
PL: 16.0%
PI: 29.0%
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38203.0, E 41533.0
SAMPLE: CLSCC350 TUBE #: ST.93

GRAVEL	0.8 %
SAND	35.9 %
SILT	25.6 %
CLAY	37.7 %
P 200	63.3 %

SOIL PROPERTIES

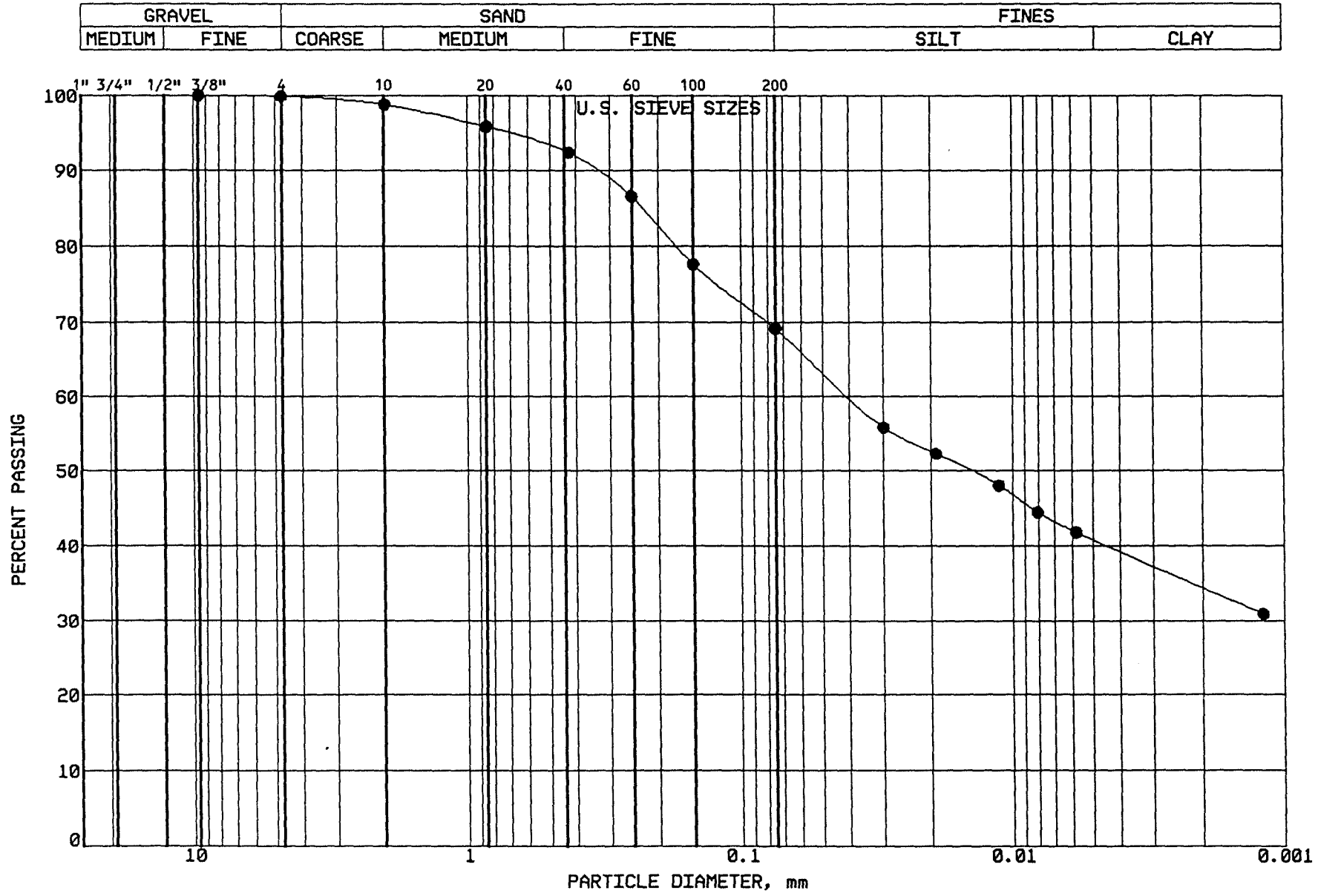
LL: 42.0%

PL: 17.0%

PI: 25.0%

CLASS: Sandy Lean Clay (CL) gl bc

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

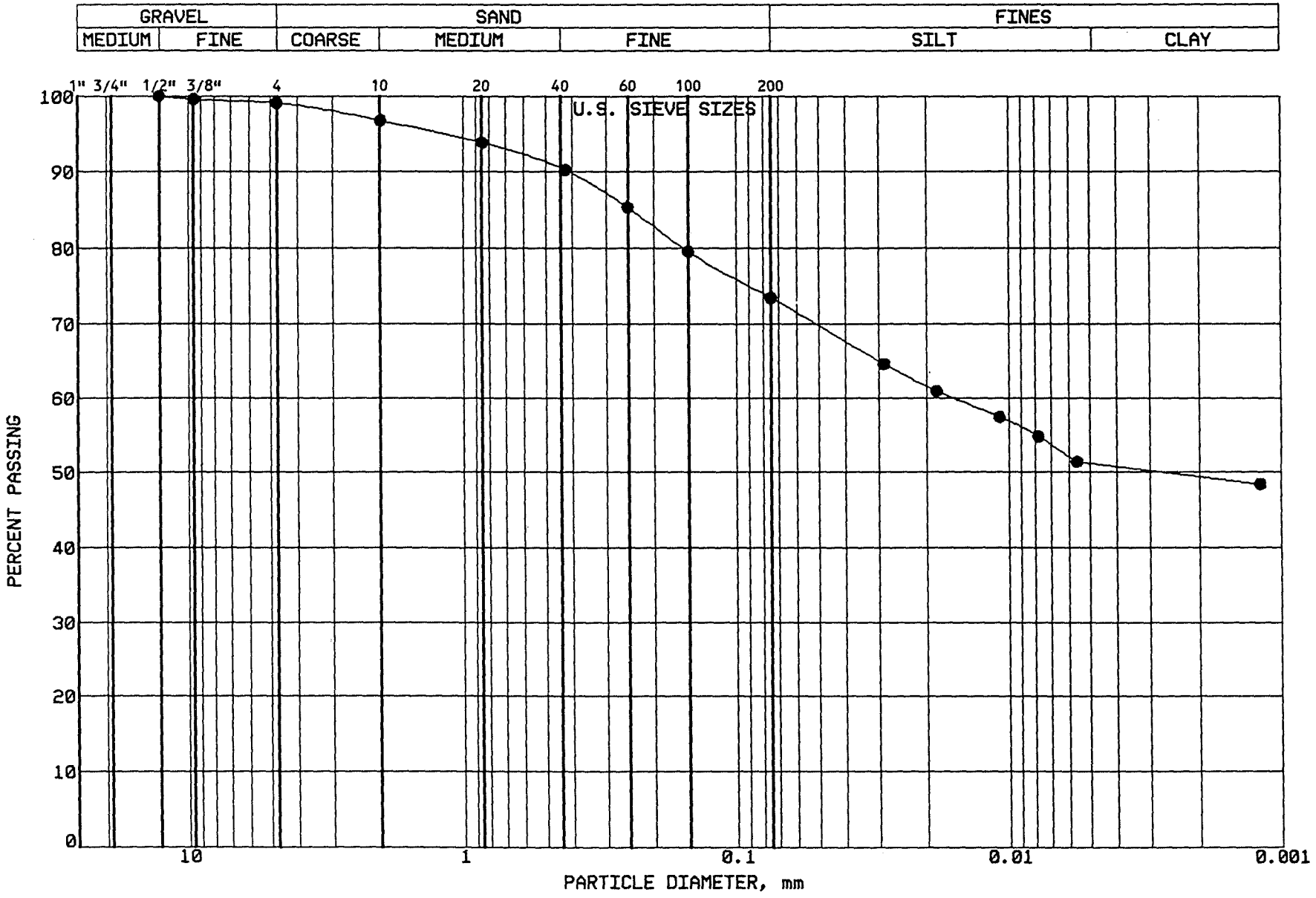
LOCATION: N 38764.0, E 41364.0
SAMPLE: CLSCC351 TUBE #: N/A

GRAVEL	0.1 %
SAND	30.8 %
SILT	28.3 %
CLAY	40.8 %

SOIL PROPERTIES

LL: 41.0%
PL: 13.0%
PI: 28.0%

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

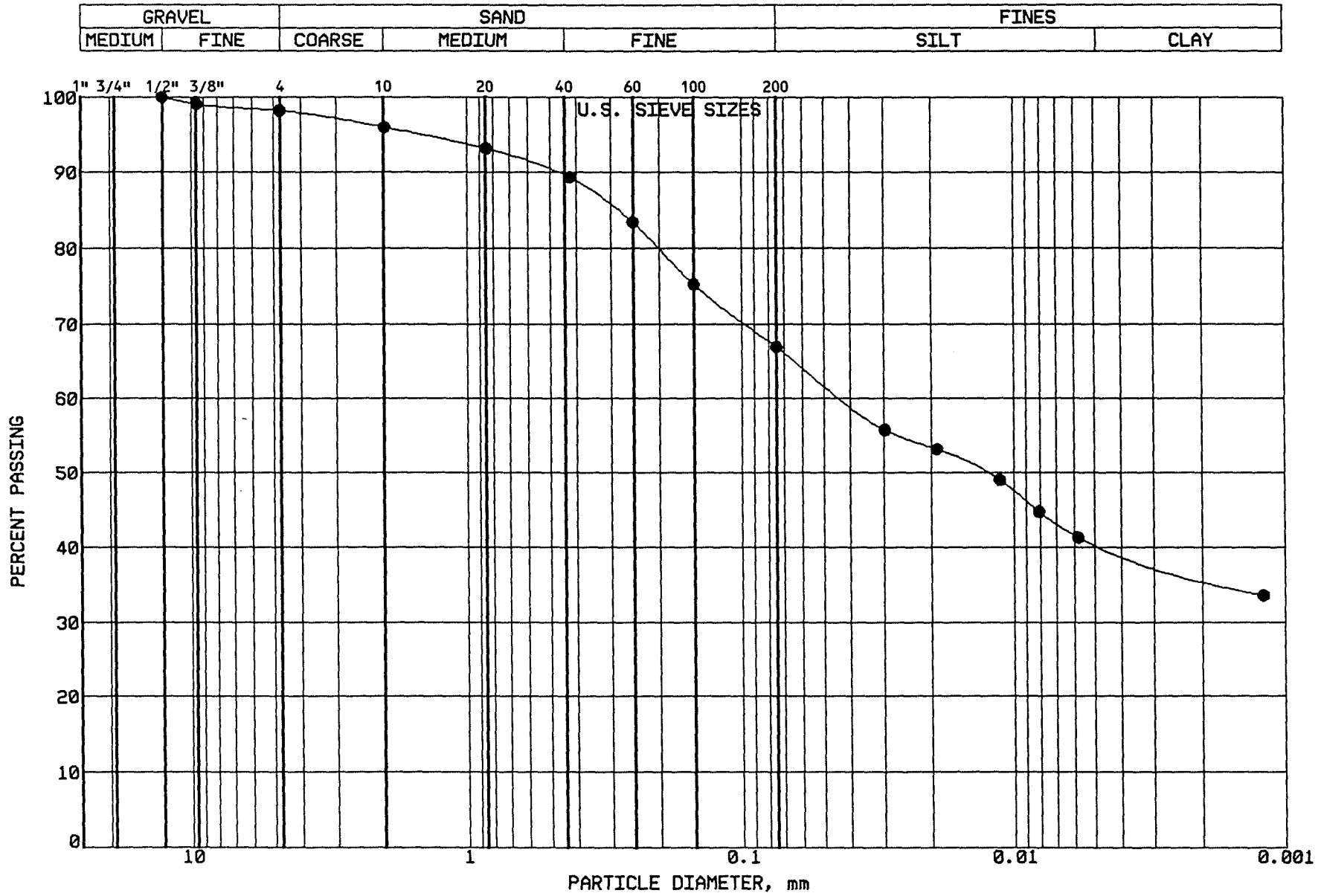
LOCATION: N 38782.0, E 39976.0
SAMPLE: CLSCC352 TUBE #: ST.94

GRAVEL	0.9 %
SAND	25.7 %
SILT	22.2 %
CLAY	51.2 %
P 200	73.4 %

SOIL PROPERTIES

LL: 50.0%
PL: 17.0%
PI: 33.0%
CLASS: Fat Clay w/Sand (CH) gs-hg

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

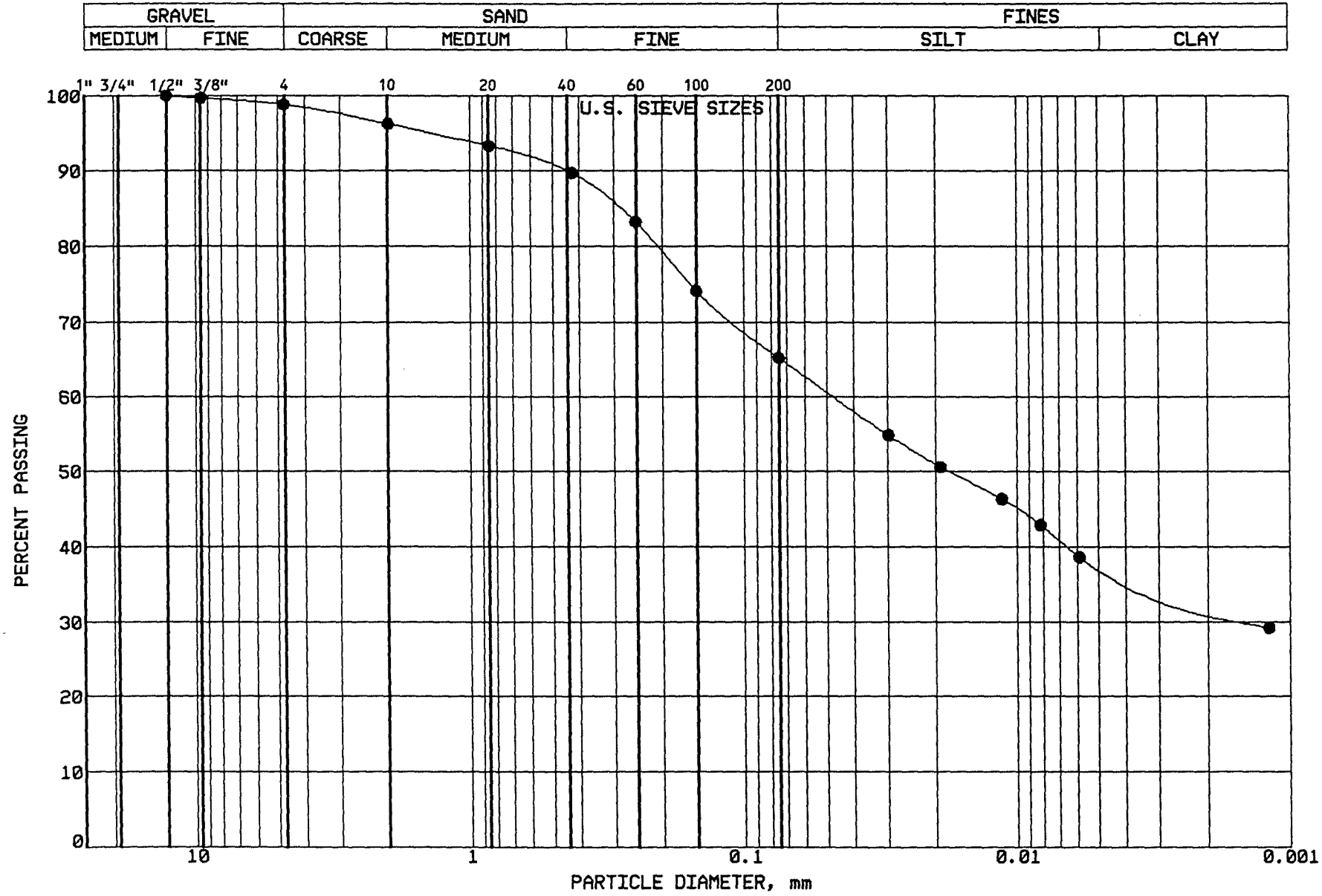
LOCATION: N 38700.0, E 41517.0
SAMPLE: CLSCC353 TUBE #: R.ST.87
ELEVATION: 1897.5'

GRAVEL	1.8 %
SAND	31.3 %
SILT	26.3 %
CLAY	40.6 %
P 200	66.9 %

SOIL PROPERTIES

LL: 43.0%
PL: 15.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL),gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

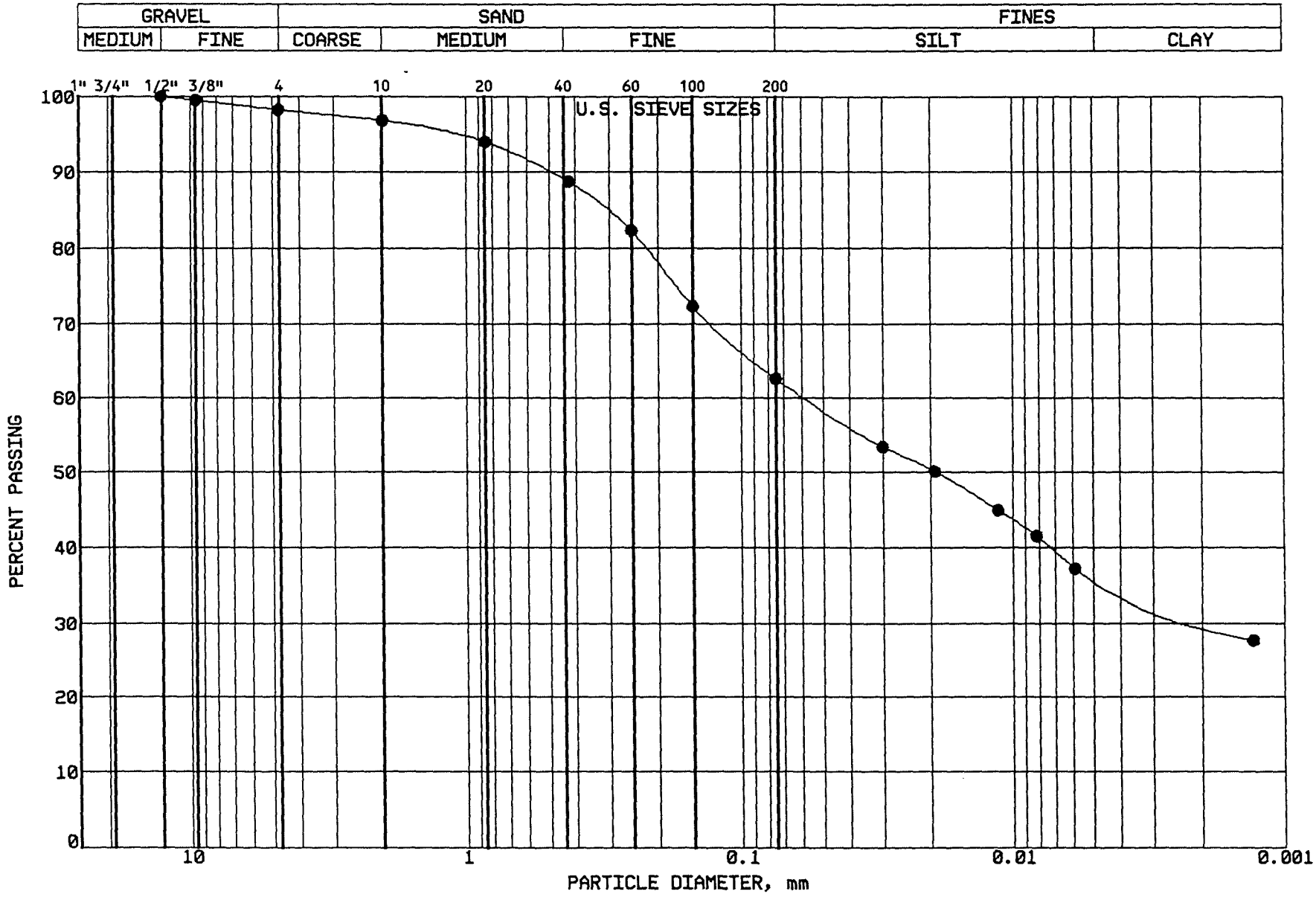
LOCATION: N 38768.0, E 40464.0
SAMPLE: CLSCC354 TUBE #: ST.86R
ELEVATION: 1900.9'

GRAVEL	1.2 %
SAND	33.6 %
SILT	27.6 %
CLAY	37.6 %
P 200	65.2 %

SOIL PROPERTIES

LL: 41.0%
PL: 16.0%
PI: 25.0%
CLASS: Sandy Lean Clay (CL), ol.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

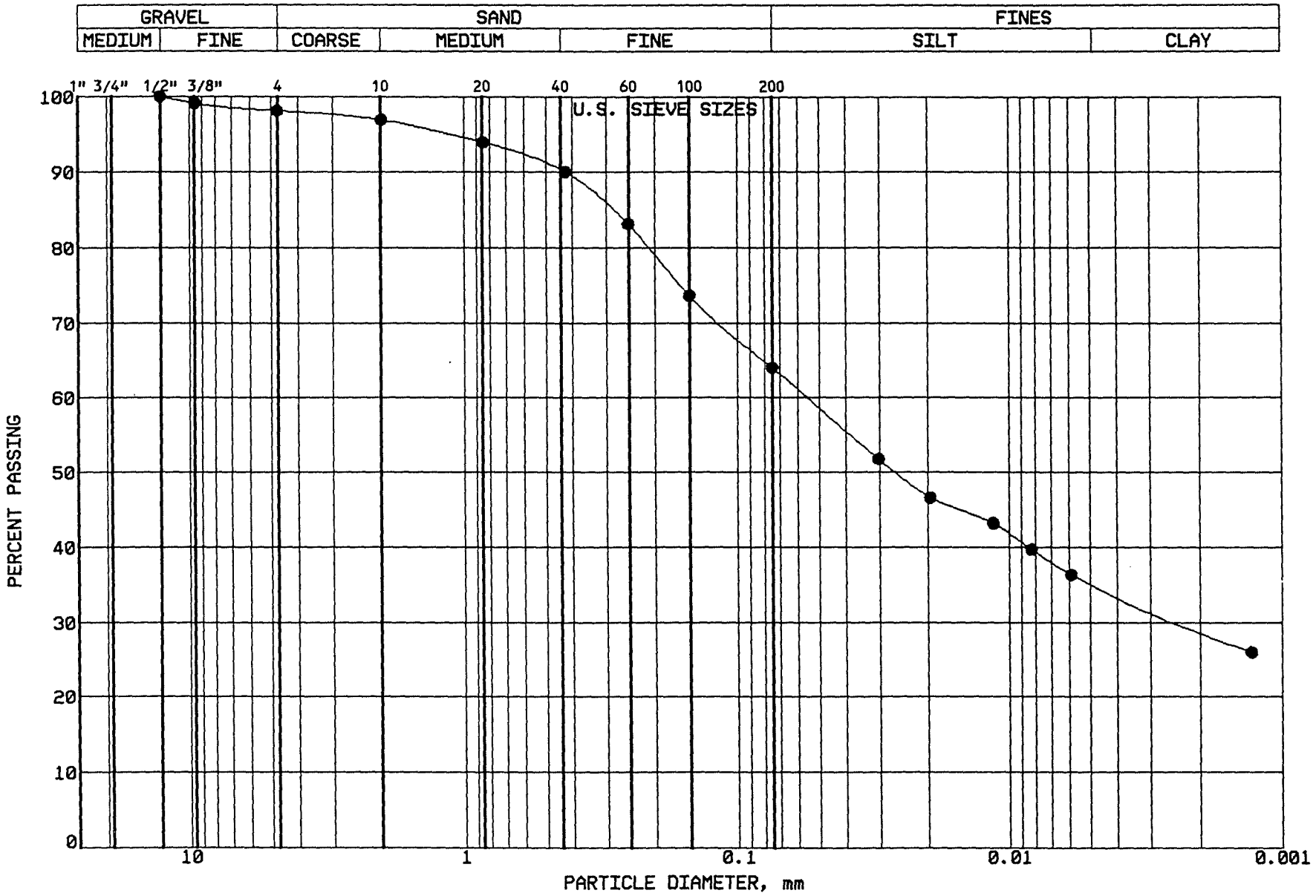
LOCATION: N 37517.0, E 41323.0
SAMPLE: CLSCC355 TUBE #: ST.N/A
ELEVATION: 1903.1'

GRAVEL	1.8 %
SAND	35.6 %
SILT	26.4 %
CLAY	36.2 %
P 200	62.6 %

SOIL PROPERTIES

LL: 41.0%
PL: 16.0%
PI: 25.0%
CLASS: Sandy Lean Clay (CL), ol.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

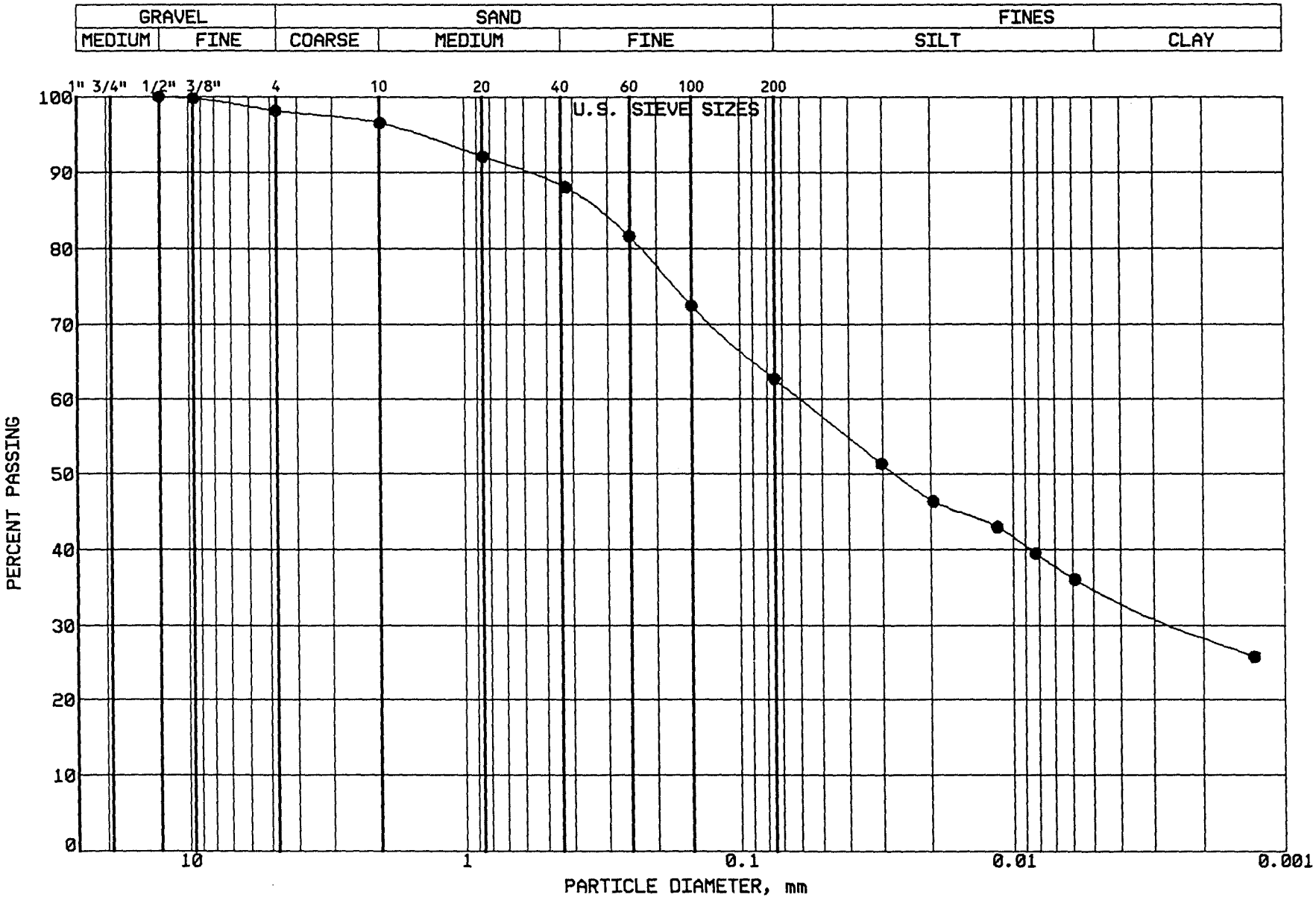
LOCATION: N 37364.0, E 41191.0
SAMPLE: CLSCC356 TUBE #: ST.95
ELEVATION: 1905.0'

GRAVEL	1.9 %
SAND	34.1 %
SILT	28.8 %
CLAY	35.2 %
P 200	64.0 %

SOIL PROPERTIES

LL: 41.0%
PL: 14.0%
PI: 27.0%
CLASS: Sandy Lean Clay (CL), ol.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

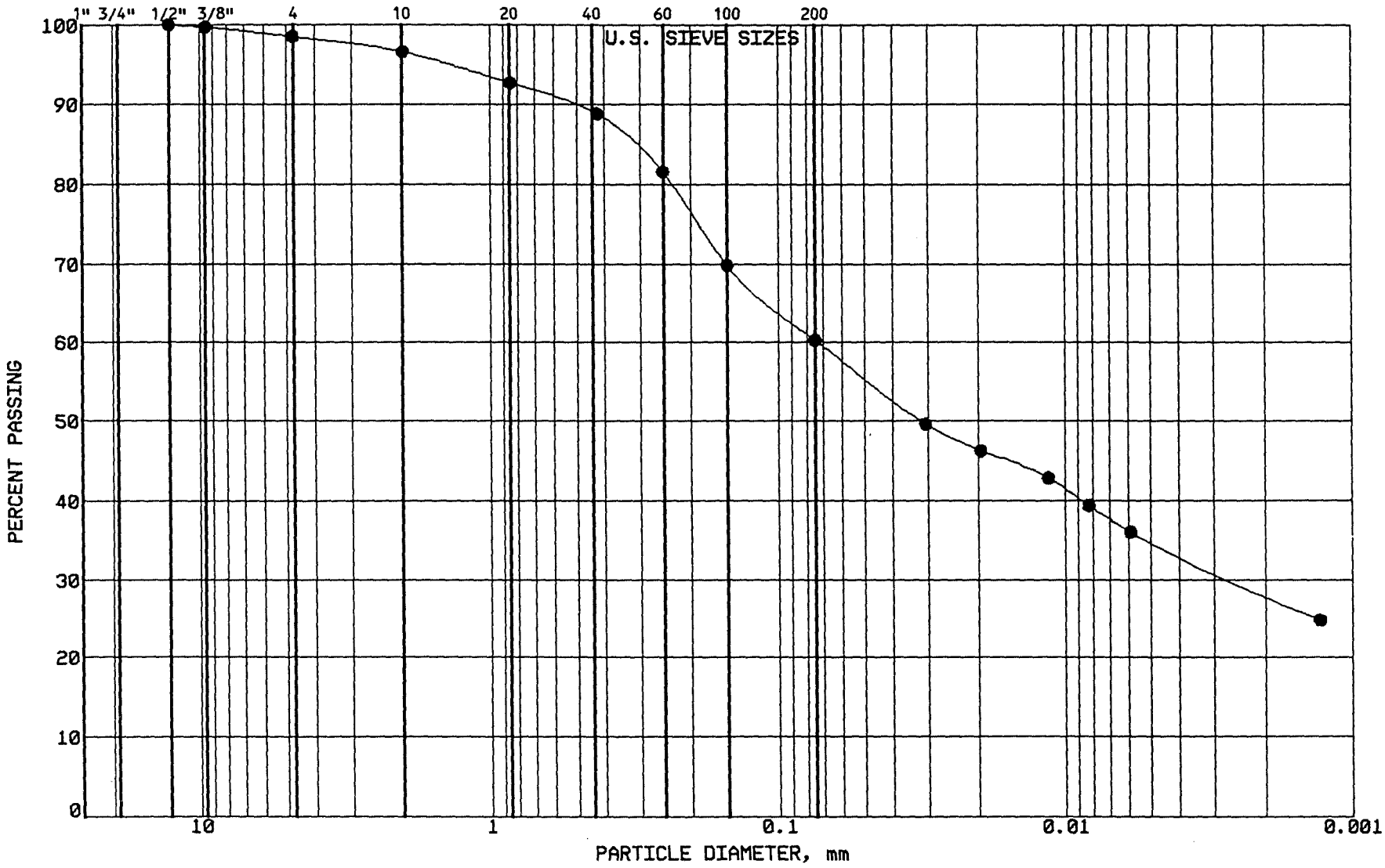
LOCATION: N 38768.0, E 41169.0
SAMPLE: CLSCC357 TUBE #: ST.96
ELEVATION: 1900.2'

GRAVEL	1.9 %
SAND	35.4 %
SILT	27.8 %
CLAY	34.9 %
P 200	62.7 %

SOIL PROPERTIES

LL: 42.0%
PL: 14.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL), ol.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

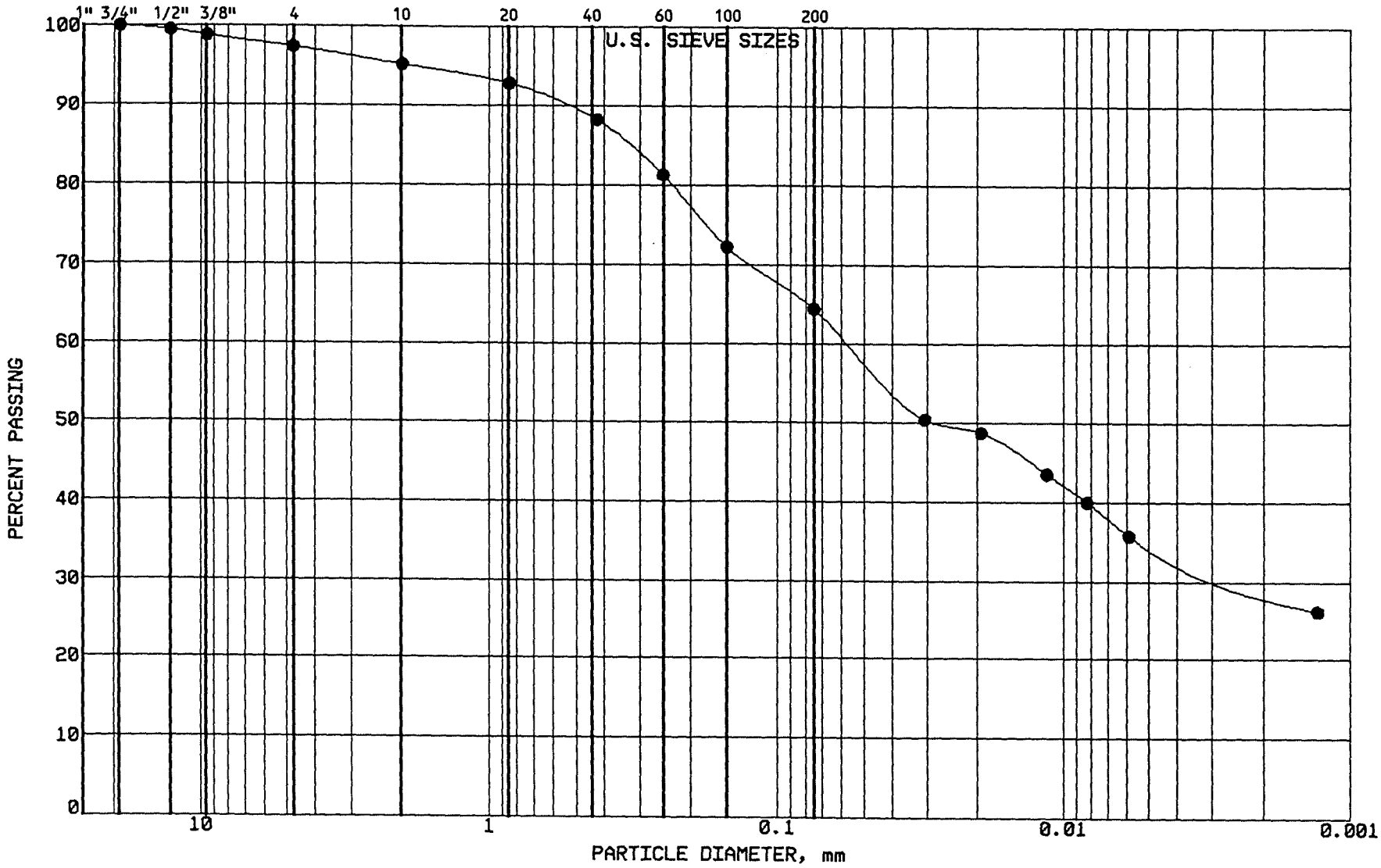
LOCATION: N 37595.0, E 41397.0
SAMPLE: CLSCC358 TUBE #: ST.97
ELEVATION: 1904.8'

GRAVEL	1.5 %
SAND	38.2 %
SILT	25.5 %
CLAY	34.8 %
P 200	60.3 %

SOIL PROPERTIES

LL: 41.0%
PL: 15.0%
PI: 26.0%
CLASS: Sandy Lean Clay (CL), ol.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

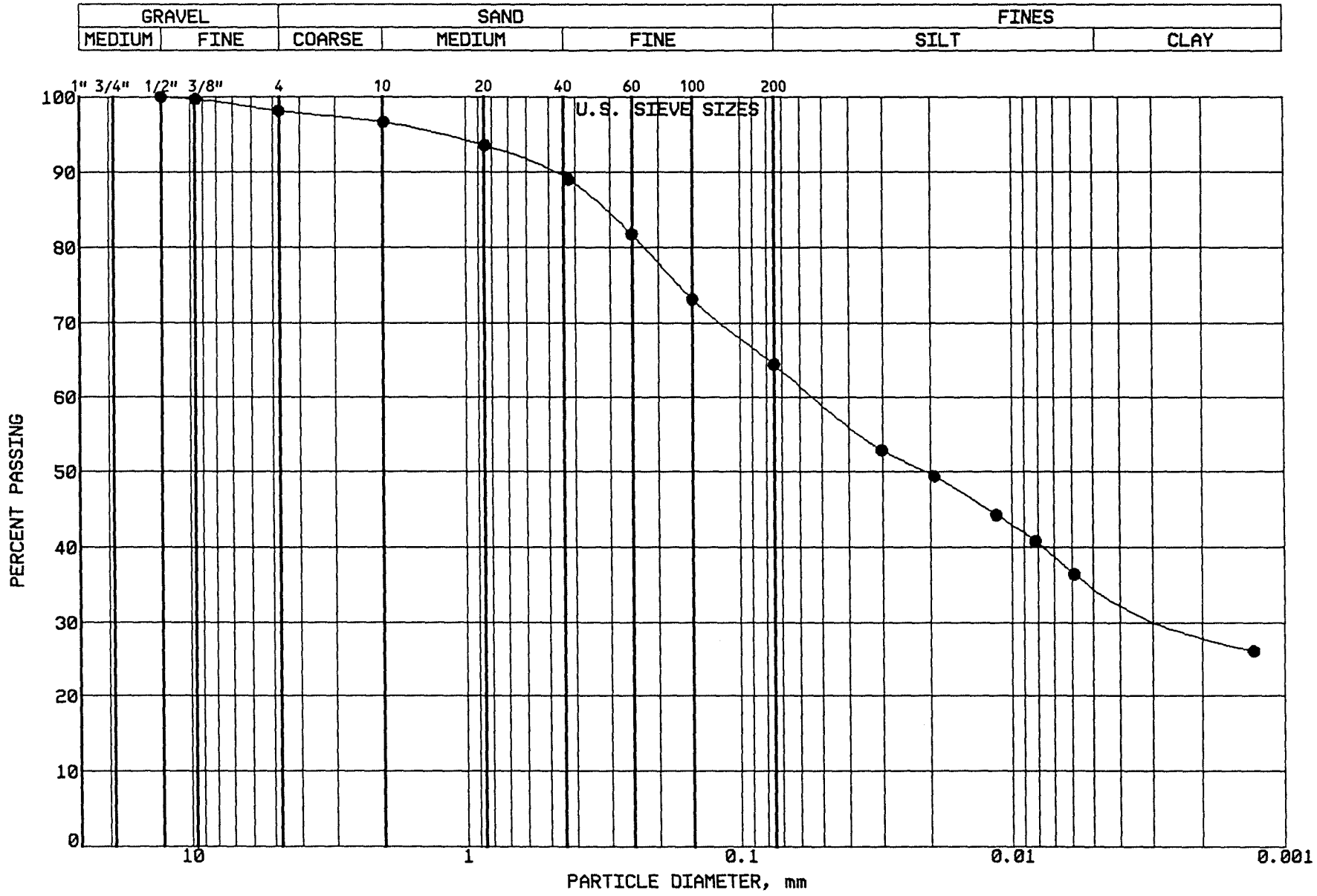
LOCATION: N 38587.0, E 39725.0
SAMPLE: CLSCC359 TUBE #: ST.98
ELEVATION: 1910.1'

GRAVEL	2.6 %
SAND	33.0 %
SILT	29.7 %
CLAY	34.7 %
P 200	64.4 %

SOIL PROPERTIES

LL: 40.0%
PL: 15.0%
PI: 25.0%
CLASS: Sandy Lean Clay (CL), ol.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

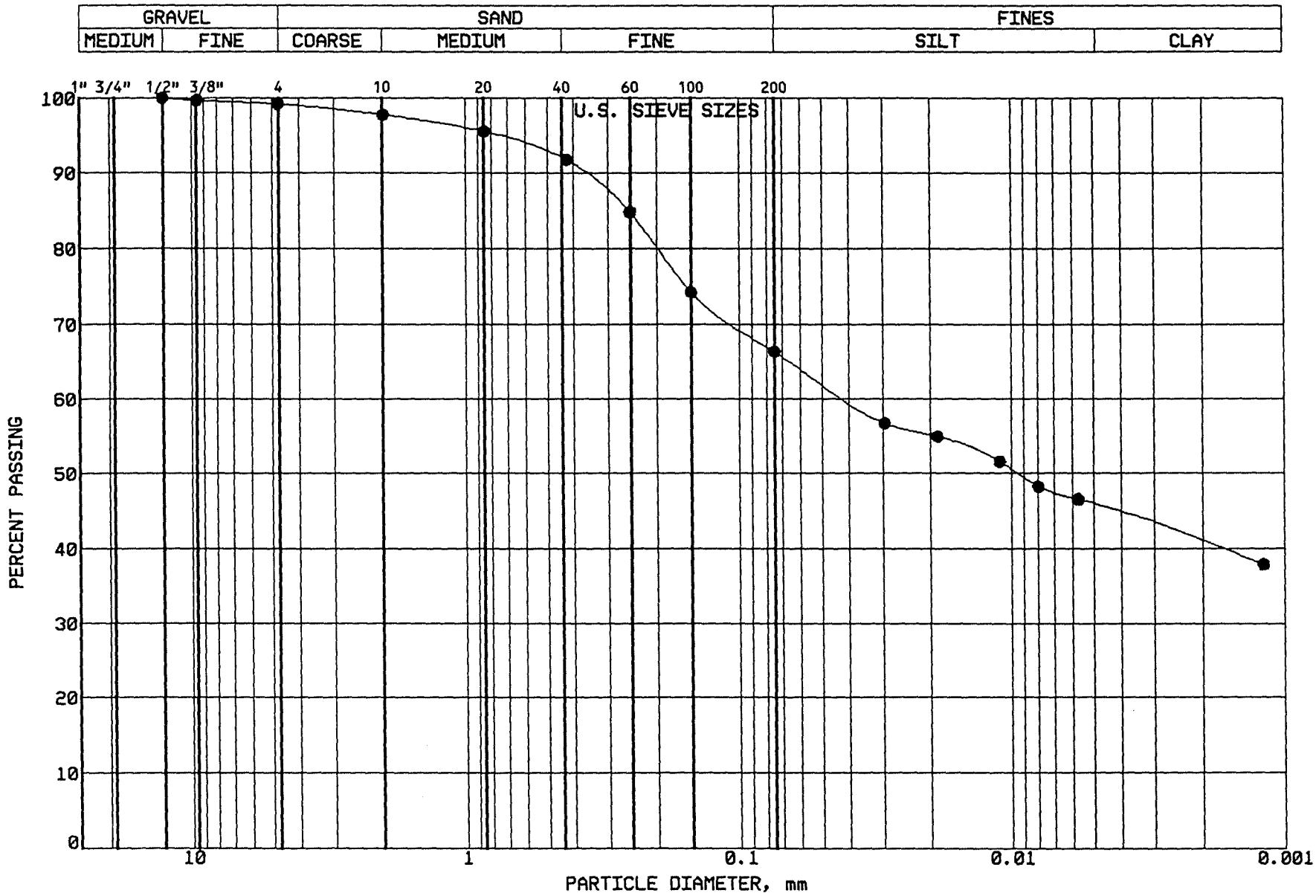
LOCATION: N 38781.0, E 40561.0
SAMPLE: CLSCC360 TUBE #: ST.99
ELEVATION: 1906.2'

GRAVEL	1.9 %
SAND	33.7 %
SILT	29.1 %
CLAY	35.3 %
P 200	64.4 %

SOIL PROPERTIES

LL: 39.0%
PL: 15.0%
PI: 24.0%
CLASS: Sandy Lean Clay (CL), ol.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

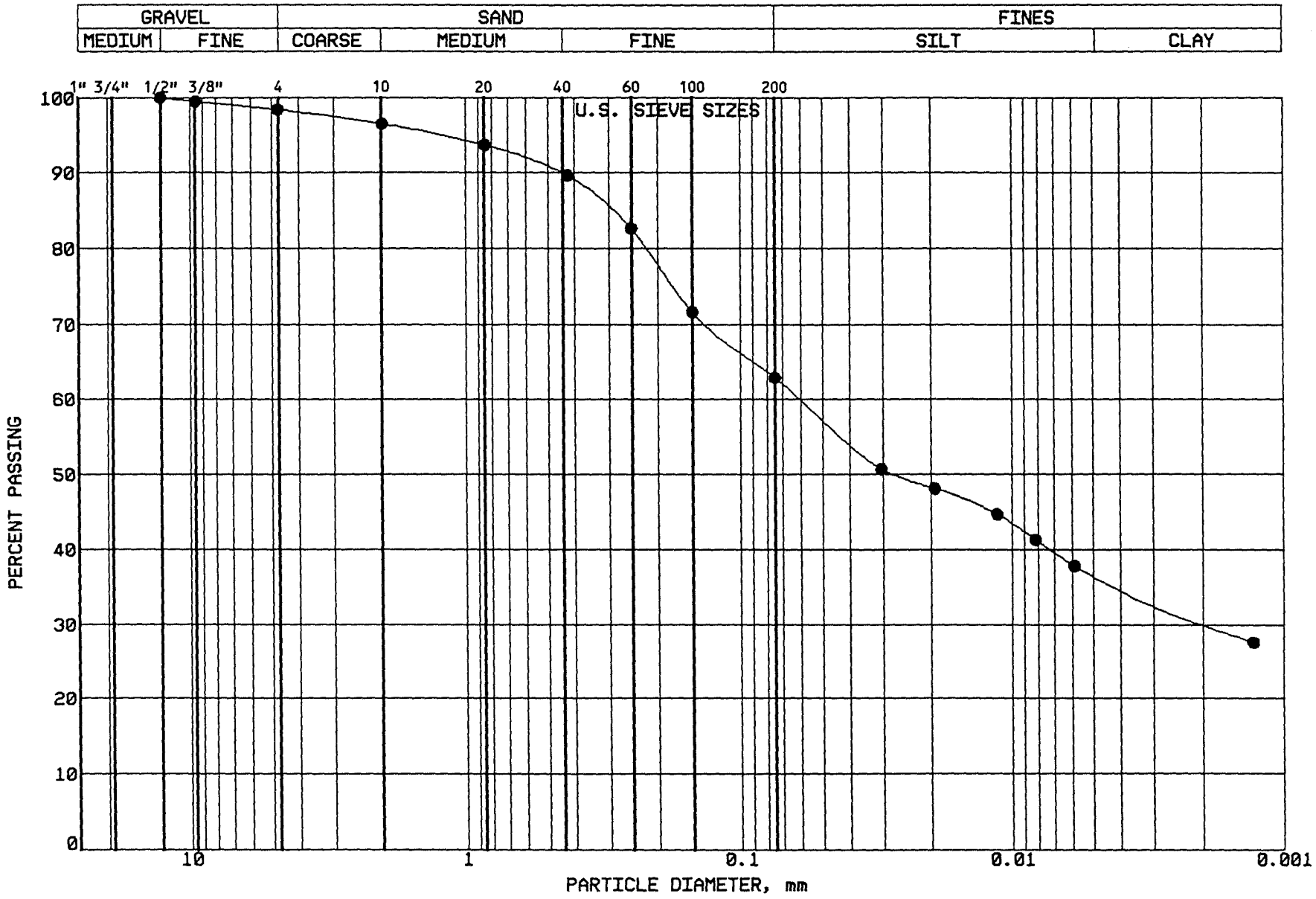
LOCATION: N 38783.0, E 40474.0
SAMPLE: CLSCC361 TUBE #: ST.100
ELEVATION: 1908.1'

GRAVEL	0.8 %
SAND	32.9 %
SILT	20.5 %
CLAY	45.8 %
P 200	66.3 %

SOIL PROPERTIES

LL: 47.0%
PL: 16.0%
PI: 31.0%
CLASS: Sandy Lean Clay (CL), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

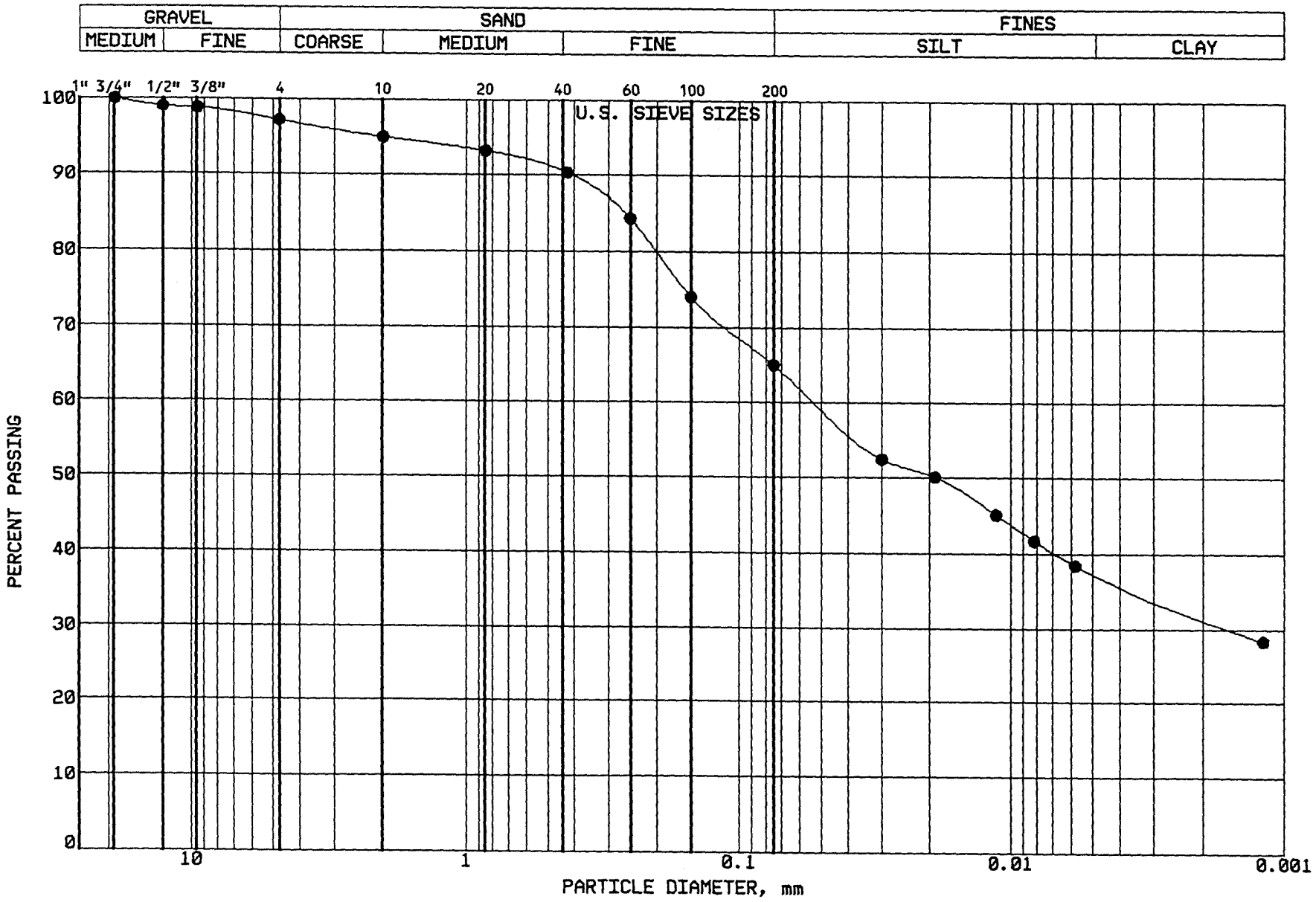
LOCATION: N 38784.0, E 41471.0
SAMPLE: CLSCC362 TUBE #: ST.101
ELEVATION: 1905.2'

GRAVEL	1.6 %
SAND	35.5 %
SILT	26.2 %
CLAY	36.7 %
P 200	62.9 %

SOIL PROPERTIES

LL: 43.0%
PL: 17.0%
PI: 26.0%
CLASS: Sandy Lean Clay (CL), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

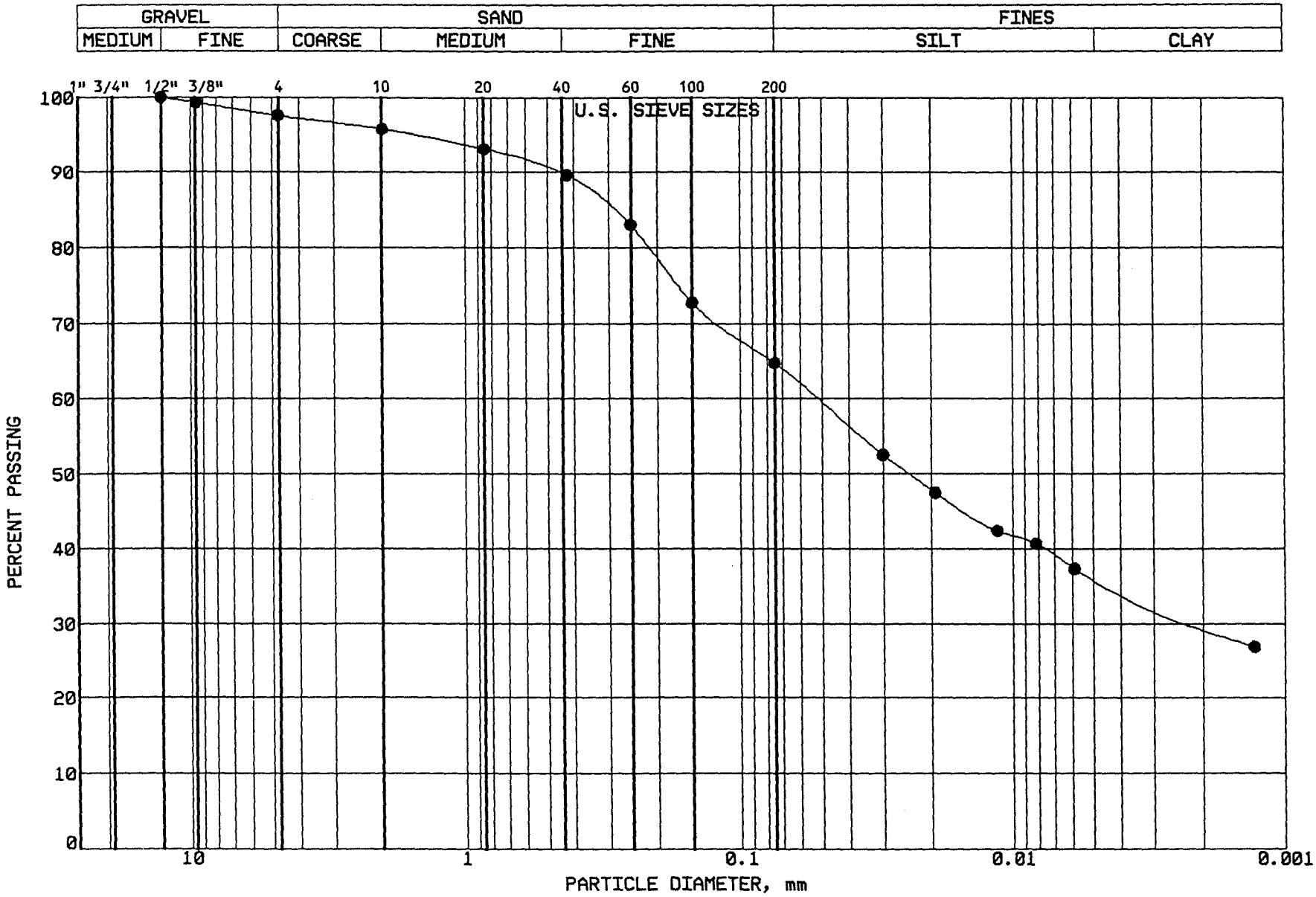
LOCATION: N 38806.0, E 39774.0
SAMPLE: CLSCC363 TUBE #: ST.N/A
ELEVATION: 1913.1'

GRAVEL	2.8 %
SAND	32.2 %
SILT	27.5 %
CLAY	37.5 %
P 200	65.0 %

SOIL PROPERTIES

LL: 42.0%
PL: 16.0%
PI: 26.0%
CLASS: Sandy Lean Clay (CL), dk gy-brs

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38676.0, E 39706.0
SAMPLE: CLSCC364 TUBE #: ST.102
ELEVATION: 1814.2'

GRAVEL	2.4 %
SAND	32.9 %
SILT	28.5 %
CLAY	36.2 %
P 200	64.7 %

SOIL PROPERTIES

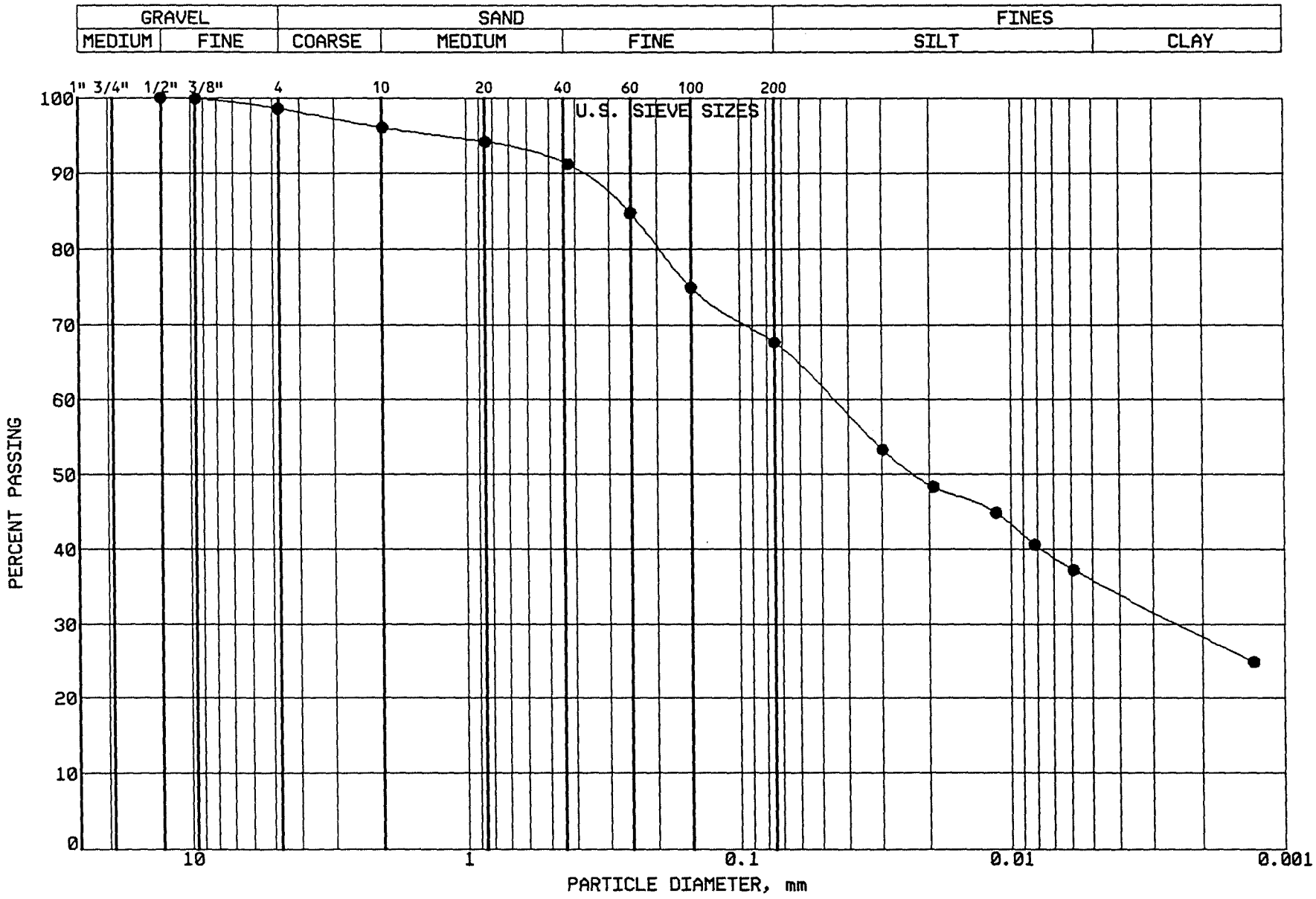
LL: 44.0%

PL: 17.0%

PI: 27.0%

CLASS: Sandy Lean Clay (CL), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

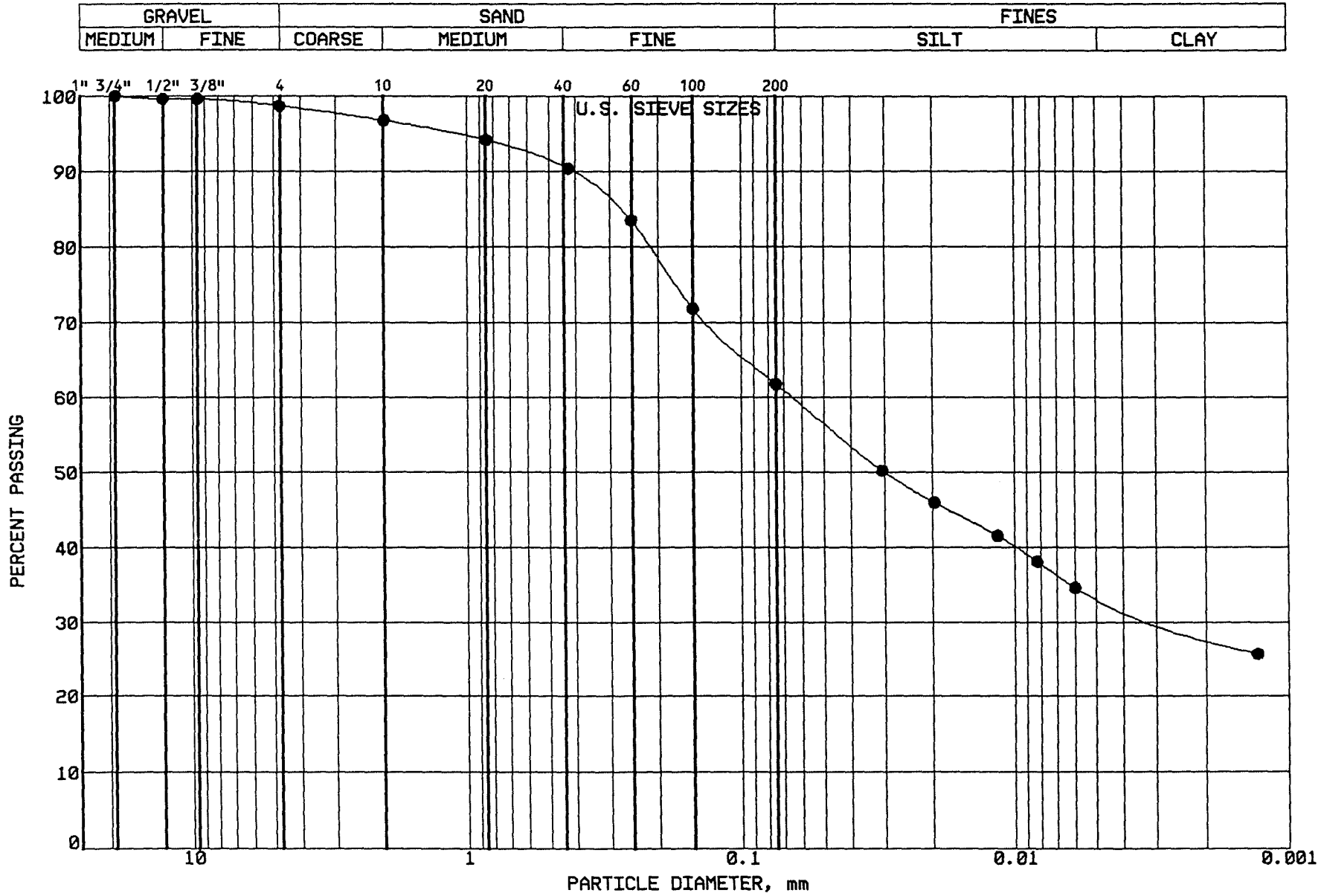
LOCATION: N 38598.0, E 41552.0
SAMPLE: CLSCC365 TUBE #: ST.103
ELEVATION: 1909.3'

GRAVEL	1.4 %
SAND	31.0 %
SILT	31.7 %
CLAY	35.9 %
P 200	67.6 %

SOIL PROPERTIES

LL: 44.0%
PL: 16.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL), ol.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

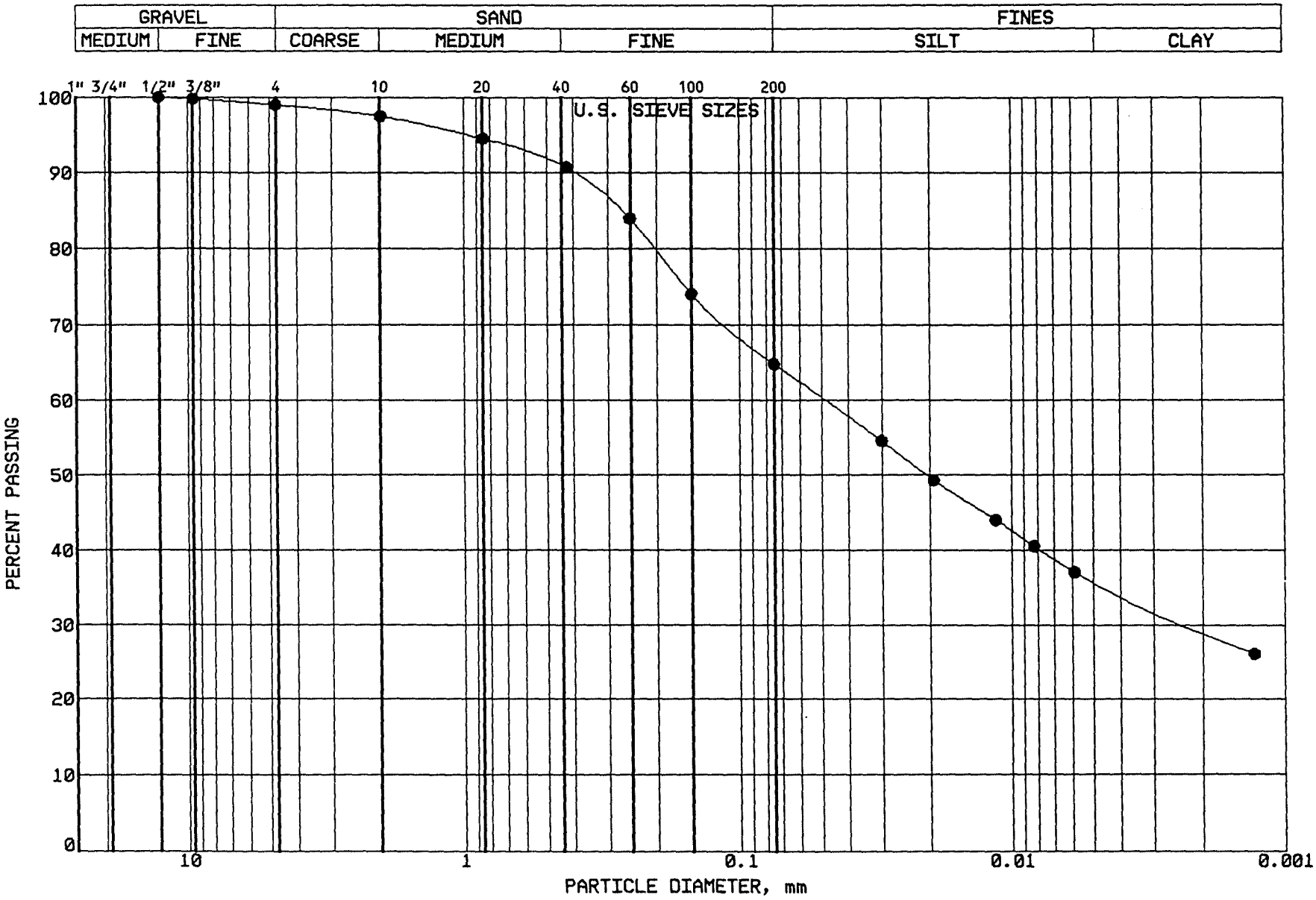
LOCATION: N 38400.0, E 41556.0
SAMPLE: CLSCC366 TUBE #: ST.104
ELEVATION: 1909.8'

GRAVEL	1.3 %
SAND	36.9 %
SILT	28.3 %
CLAY	33.5 %
P 200	61.8 %

SOIL PROPERTIES

LL: 41.0%
PL: 15.0%
PI: 26.0%
CLASS: Sandy Lean Clay (CL), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

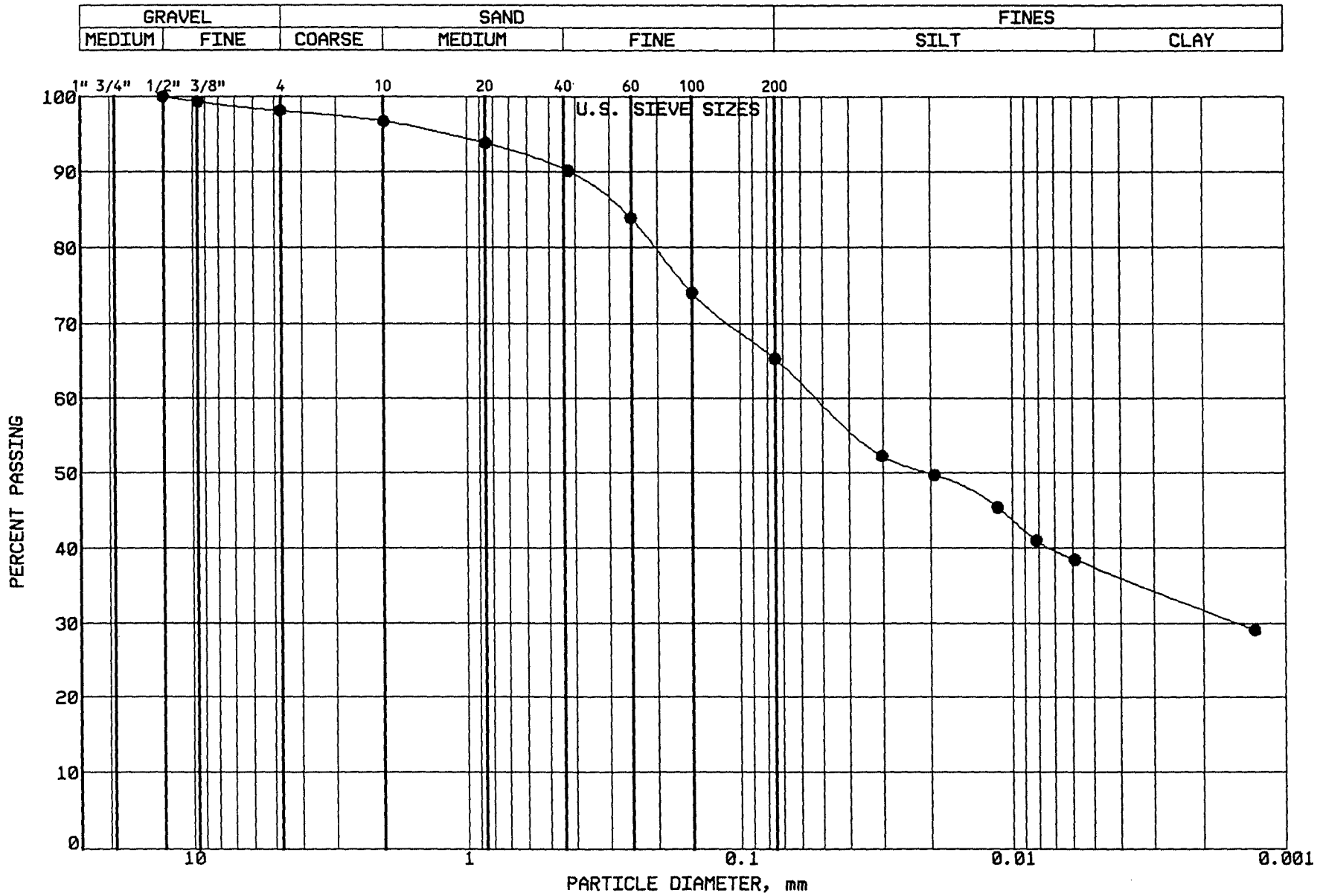
LOCATION: N 38777.0, E 41376.0
SAMPLE: CLSCC367 TUBE #: ST.105
ELEVATION: 1906.5'

GRAVEL	1.0 %
SAND	34.2 %
SILT	29.0 %
CLAY	35.8 %
P 200	64.8 %

SOIL PROPERTIES

LL: 41.0%
PL: 15.0%
PI: 26.0%
CLASS: Sandy Lean Clay (CL), olive brown

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

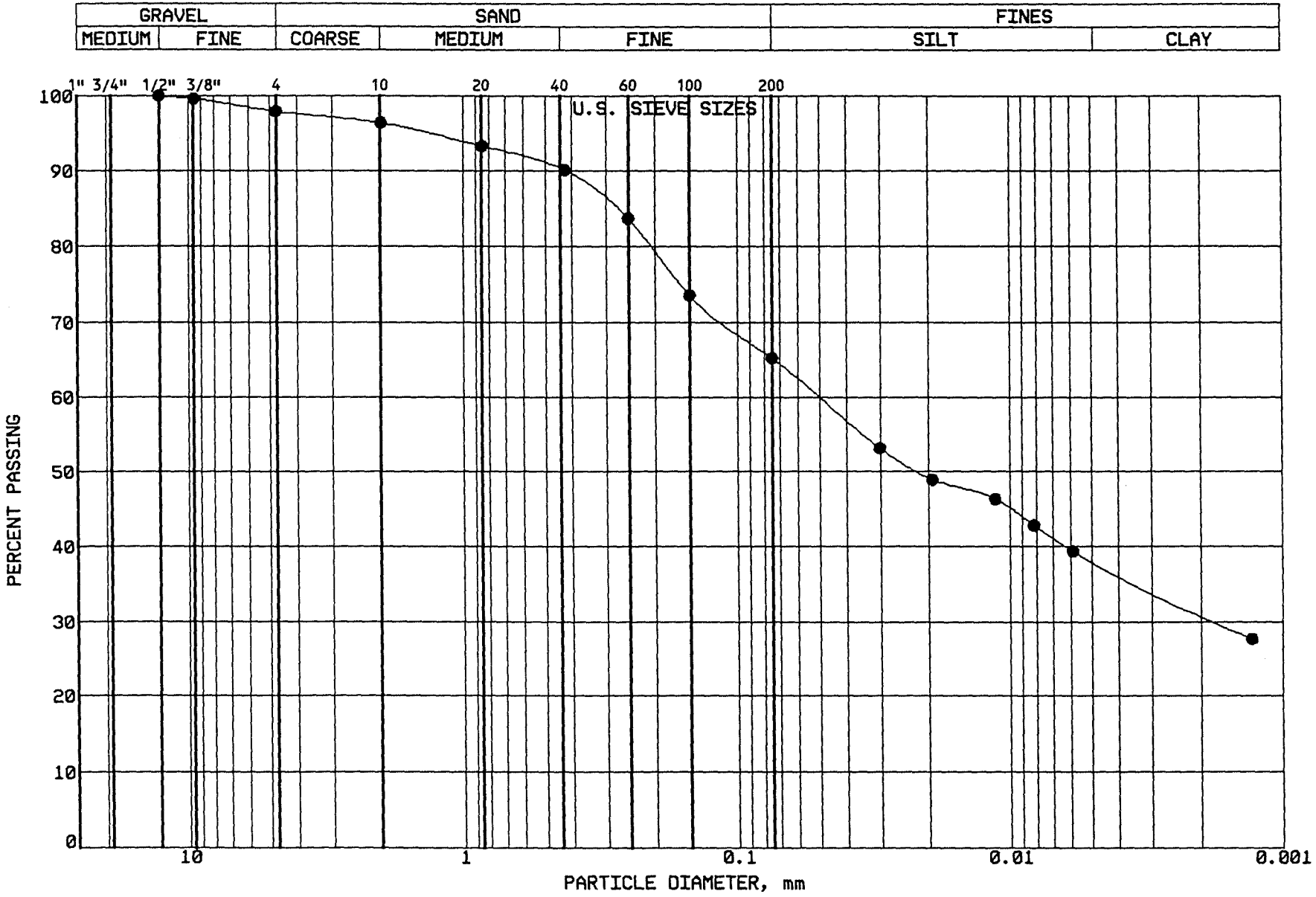
LOCATION: N 38786.0, E 40777.0
SAMPLE: CLSCC368 TUBE #: ST.N/A
ELEVATION: 1908.5'

GRAVEL	1.9 %
SAND	32.8 %
SILT	27.9 %
CLAY	37.4 %
P 200	65.3 %

SOIL PROPERTIES

LL: 43.0%
PL: 14.0%
PI: 29.0%
CLASS: Sandy Lean Clay (CL), ol.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

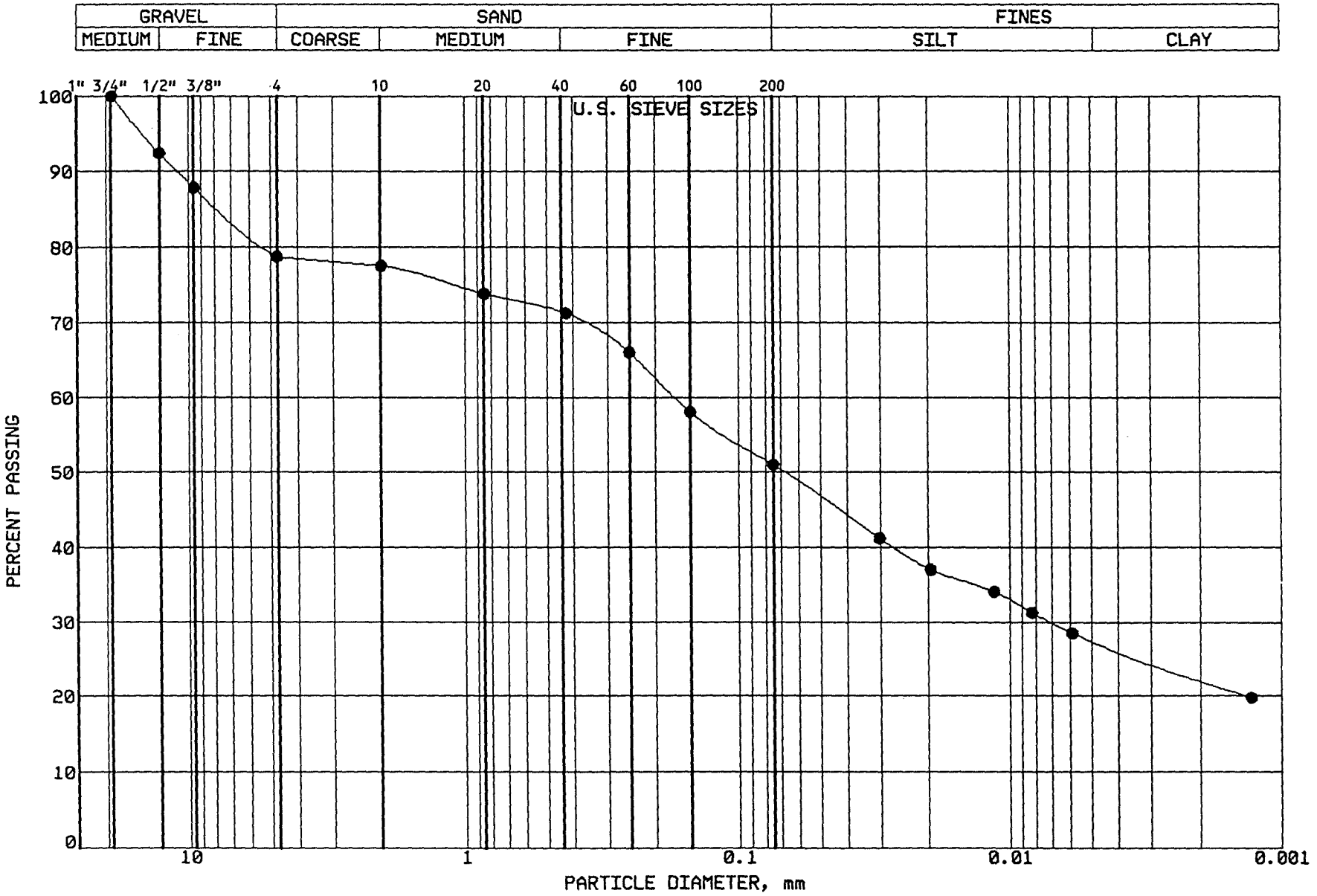
LOCATION: N 37726.0, E 41533.0
SAMPLE: CLSCC369 TUBE #: ST.106
ELEVATION: 1911.9'

GRAVEL	2.1 %
SAND	32.7 %
SILT	27.2 %
CLAY	38.0 %
P 200	65.2 %

SOIL PROPERTIES

LL: 43.0%
PL: 15.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

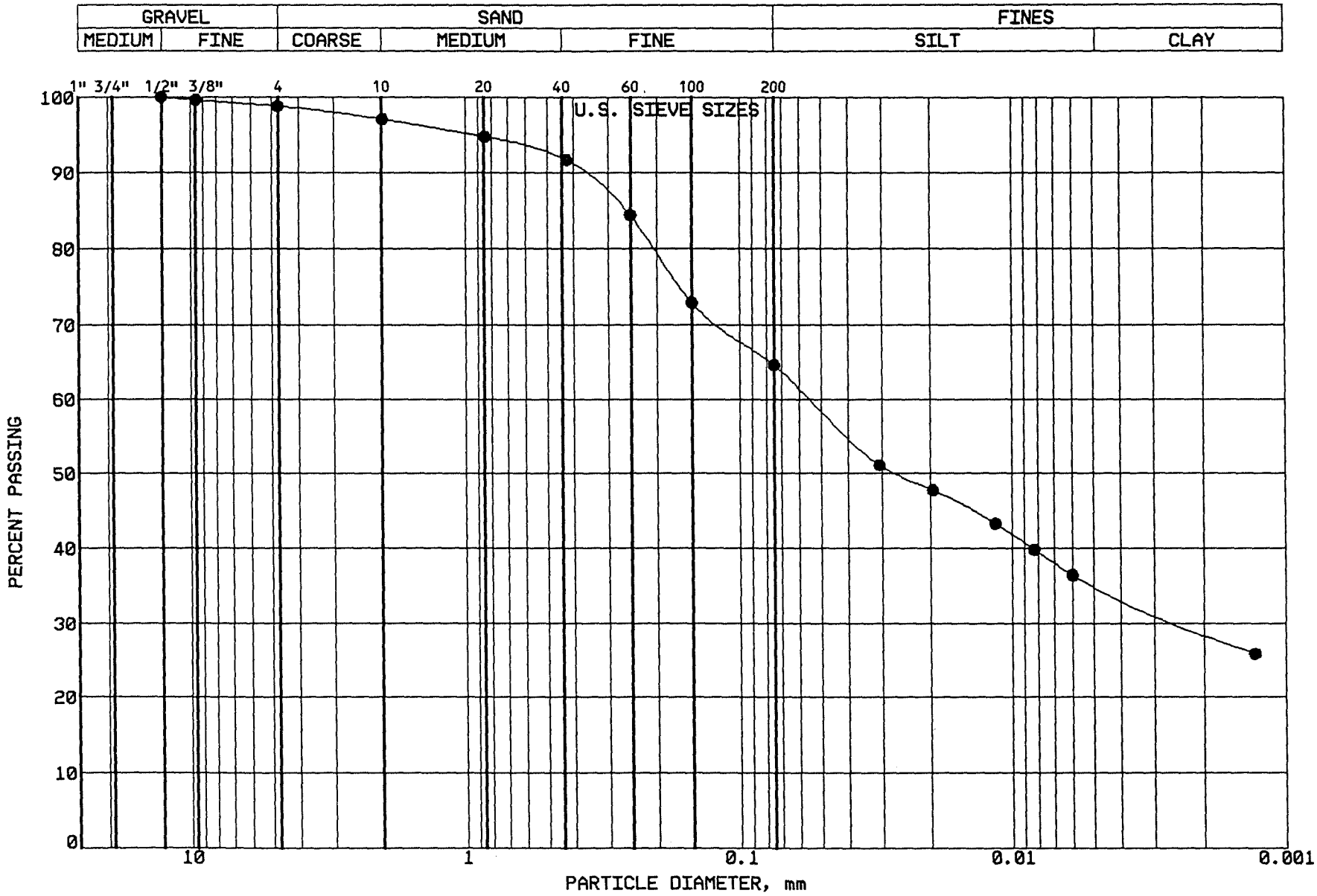
LOCATION: N 38786.0, E 41473.0
SAMPLE: CLSCC370 TUBE #: N/A
ELEVATION: 1899.6'

GRAVEL	21.3 %
SAND	27.7 %
SILT	23.5 %
CLAY	27.5 %
P 200	51.0 %

SOIL PROPERTIES

LL: 43.0%
PL: 15.0%
PI: 28.0%
CLASS: Clayey Sand w/Gr (SC),dk gr-br,

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

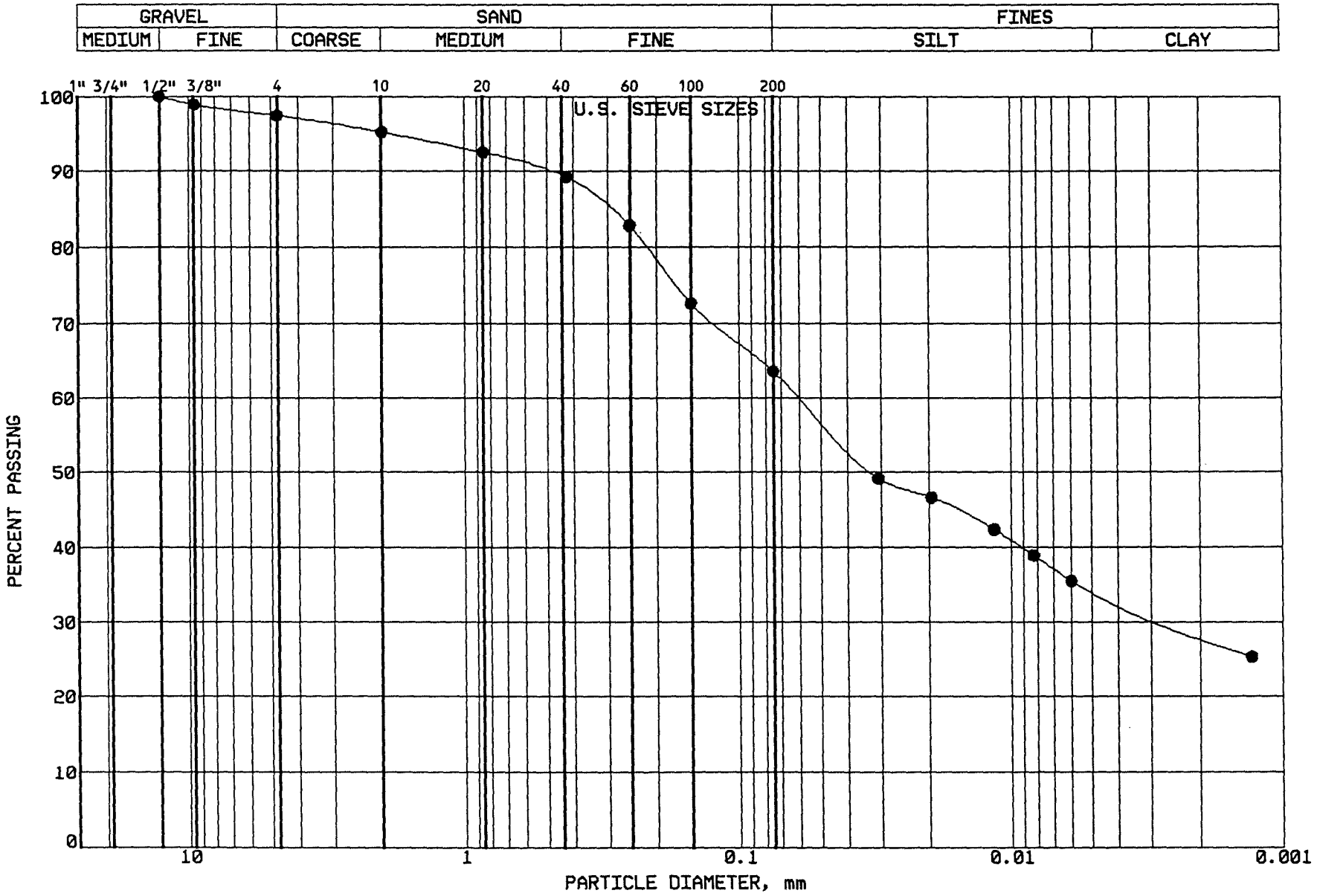
LOCATION: N 38001.0, E 41572.0
SAMPLE: CLSCC371 TUBE #: ST.107
ELEVATION: 1916.2'

GRAVEL	1.2 %
SAND	34.2 %
SILT	29.5 %
CLAY	35.1 %
P 200	64.6 %

SOIL PROPERTIES

LL: 40.0%
PL: 15.0%
PI: 25.0%
CLASS: Sandy Lean Clay (CL), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

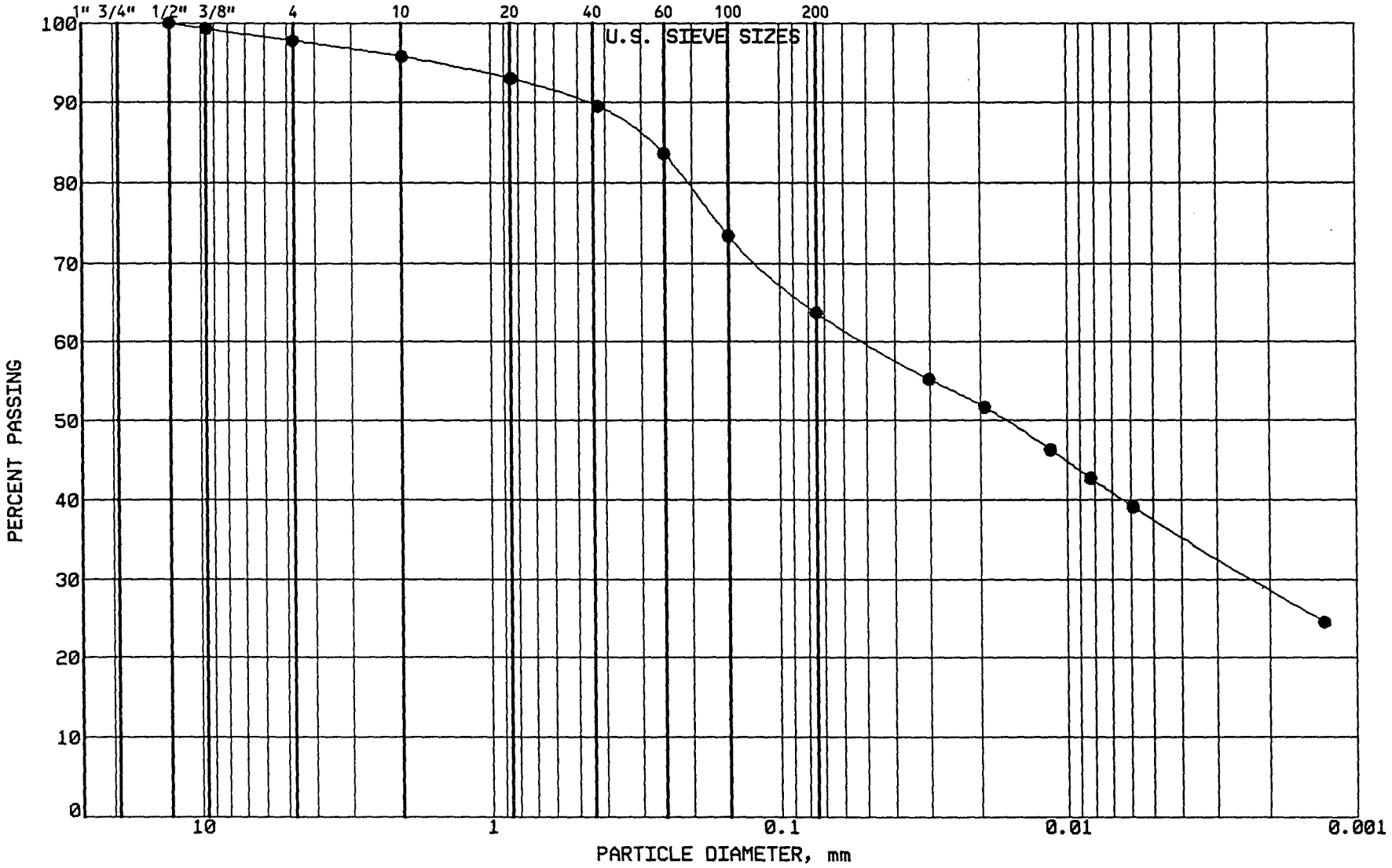
LOCATION: N 38590.0, E 39704.0
SAMPLE: CLSCC372 TUBE #: ST.N/A
ELEVATION: 1818.0'

GRAVEL	2.6 %
SAND	33.8 %
SILT	29.3 %
CLAY	34.3 %
P 200	63.6 %

SOIL PROPERTIES

LL: 43.0%
PL: 15.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

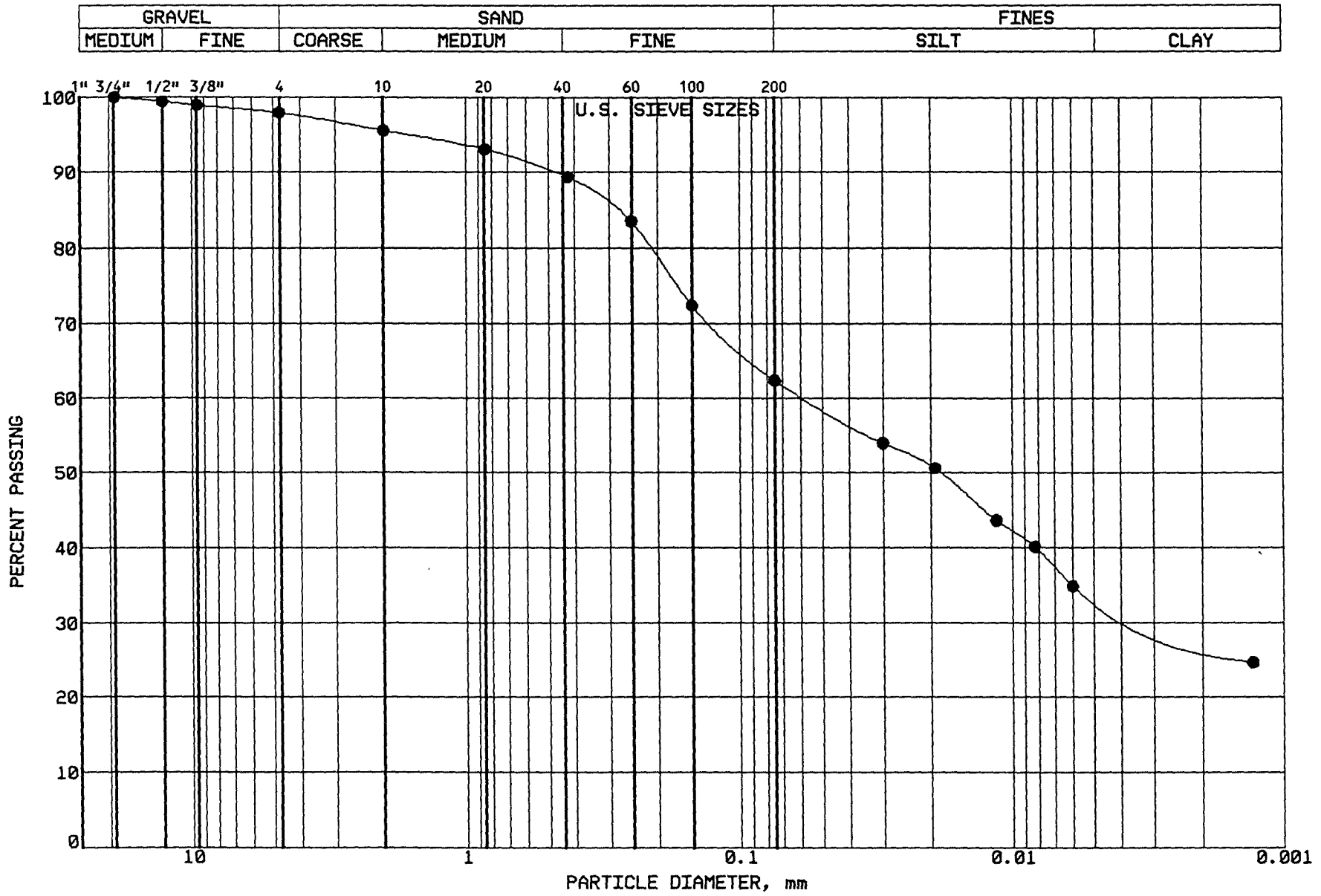
LOCATION: N 40902.0, E 40536.0
SAMPLE: CC-373 TUBE #: TP.1
ELEVATION: 1885.6'

GRAVEL	2.2 %
SAND	34.1 %
SILT	26.2 %
CLAY	37.5 %
P 200	63.7 %

SOIL PROPERTIES

LL: 46.0%
PL: 16.0%
PI: 30.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

TNTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

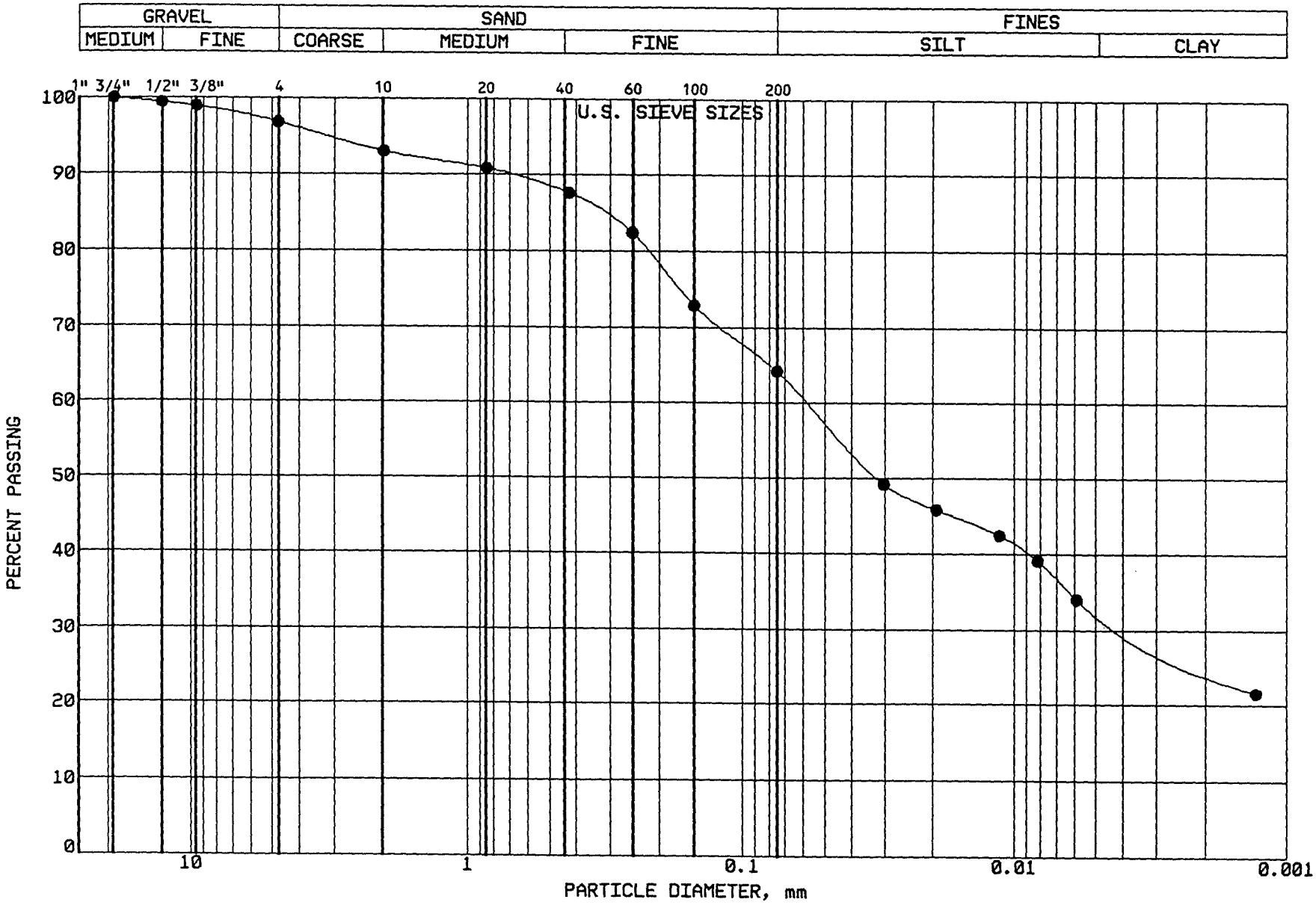
LOCATION: N 40902.0, E 40536.0
SAMPLE: CC-374 TUBE #: TP-1

GRAVEL	2.1 %
SAND	35.5 %
SILT	28.7 %
CLAY	33.7 %
P 200	62.4 %

SOIL PROPERTIES

LL: 48.0%
PL: 21.0%
PI: 27.0%
CLASS: Sandy Lean Clay (CL), ol.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

TNTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

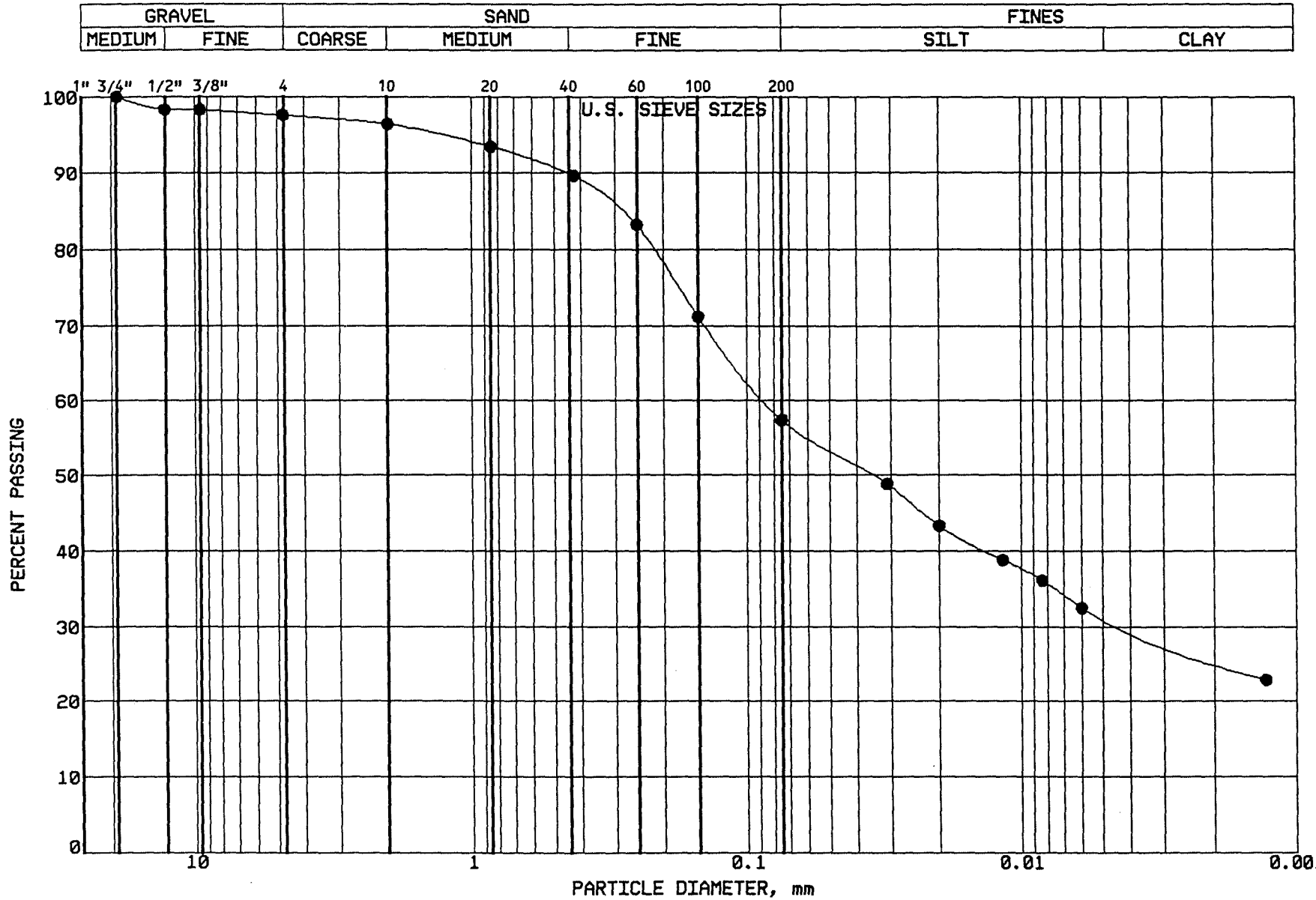
LOCATION: N 40860.0, E 40876.0
SAMPLE: CC-375 TUBE #: TP-2

GRAVEL	3.2 %
SAND	32.6 %
SILT	31.6 %
CLAY	32.6 %
P 200	64.2 %

SOIL PROPERTIES

LL: 45.0%
PL: 19.0%
PI: 26.0%

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

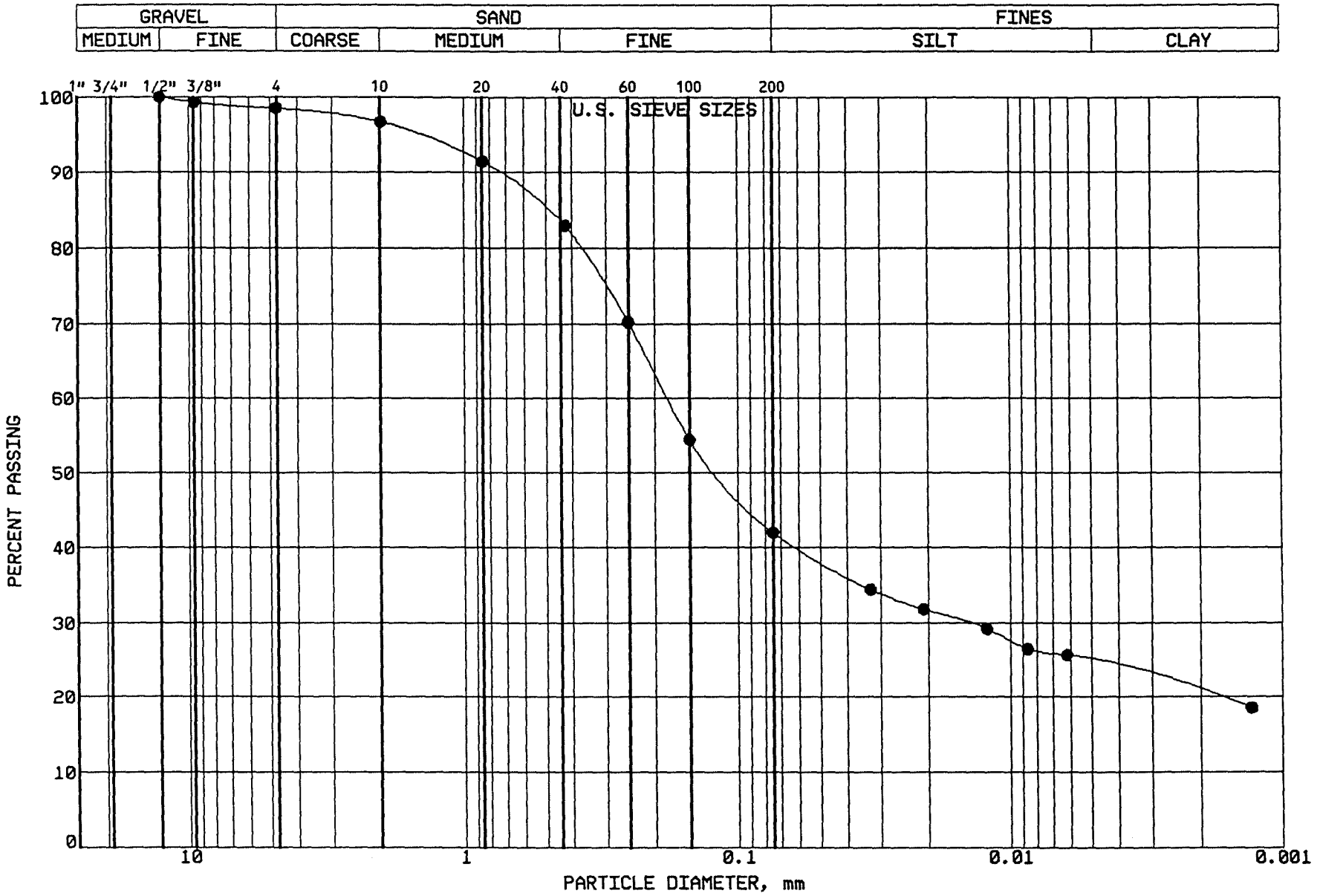
LOCATION: N 41031.0, E 40670.0
SAMPLE: CC-376 TUBE #: TP-4
ELEVATION: 1882.7'

GRAVEL	2.4 %
SAND	40.2 %
SILT	26.0 %
CLAY	31.4 %
P 200	57.4 %

SOIL PROPERTIES

LL: 37.0%
PL: 13.0%
PI: 24.0%
CLASS: Sandy Lean Clay (CL), ol.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

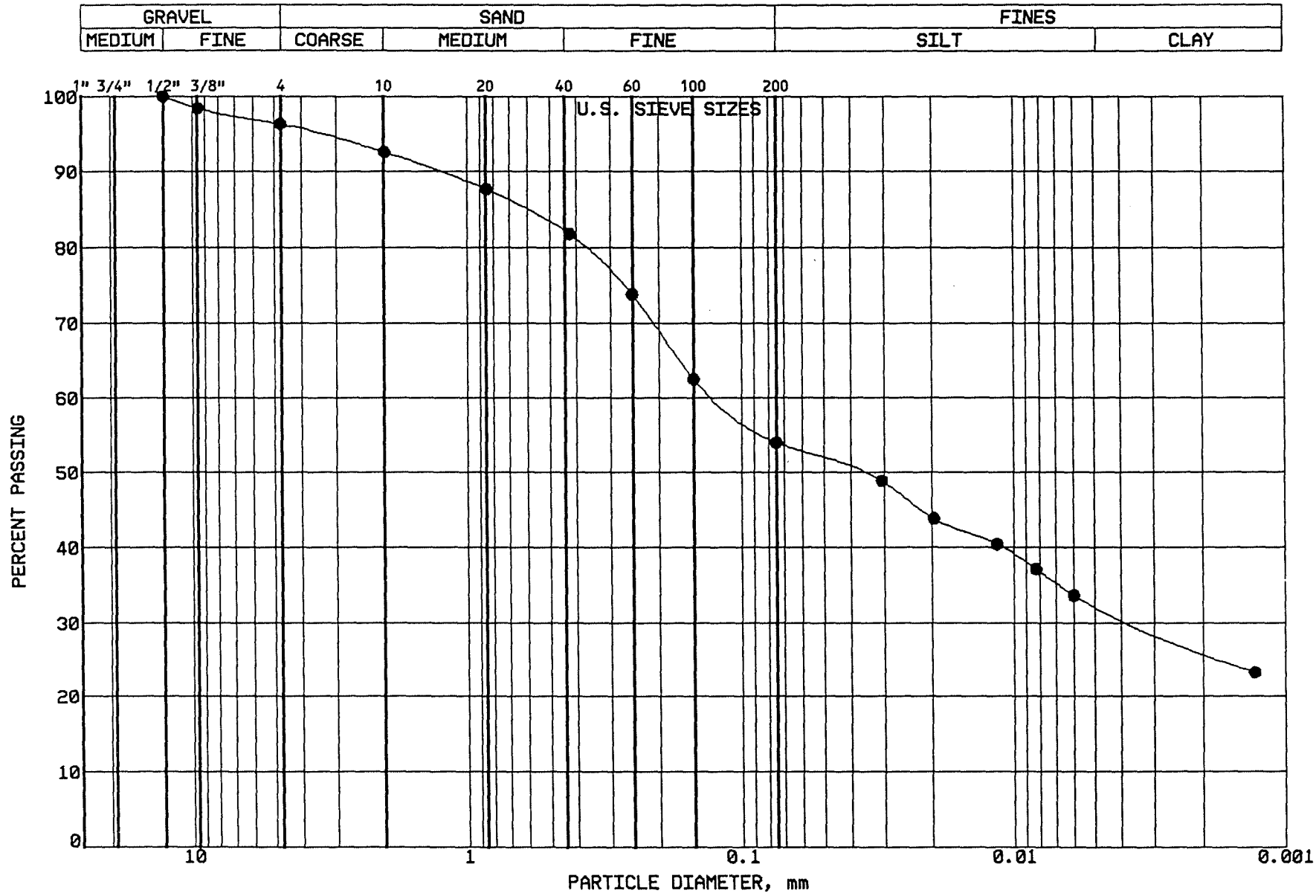
LOCATION: N 41070.0, E 40432.0
SAMPLE: CC-377 TUBE #: TP.3
ELEVATION: 1885.8'

GRAVEL	1.5 %
SAND	56.5 %
SILT	17.3 %
CLAY	24.7 %
P 200	42.0 %

SOIL PROPERTIES

LL: 30.0%
PL: 14.0%
PI: 16.0%
CLASS: Clayey Sand (SC), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 40672.0, E 42098.0
SAMPLE: CC-378 TUBE #: TP-5
ELEVATION: 1886.2'

GRAVEL	3.7 %
SAND	42.3 %
SILT	21.5 %
CLAY	32.5 %
P 200	54.0 %

SOIL PROPERTIES

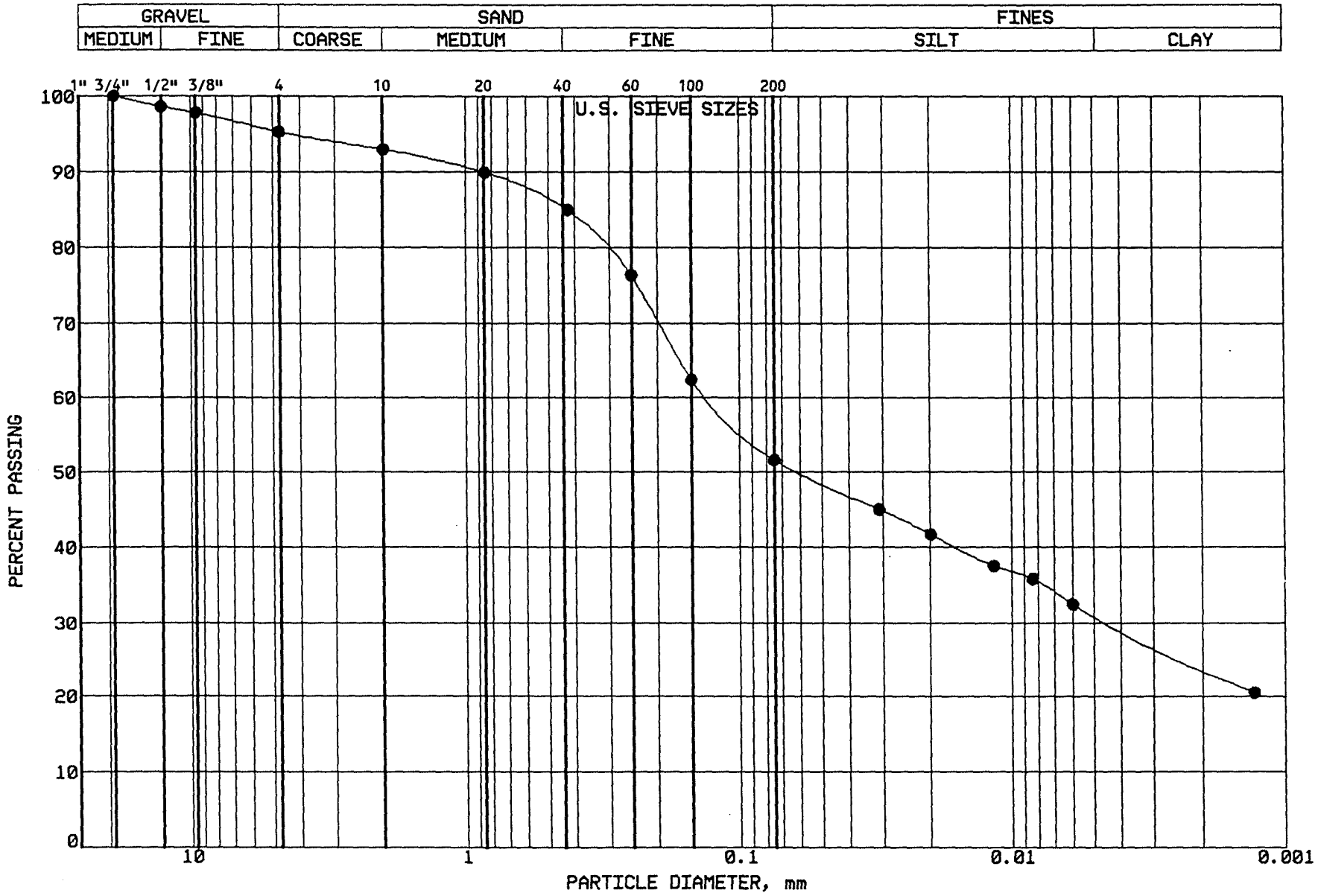
LL: 39.0%

PL: 17.0%

PI: 22.0%

CLASS: Sandy Lean Clay (CL), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

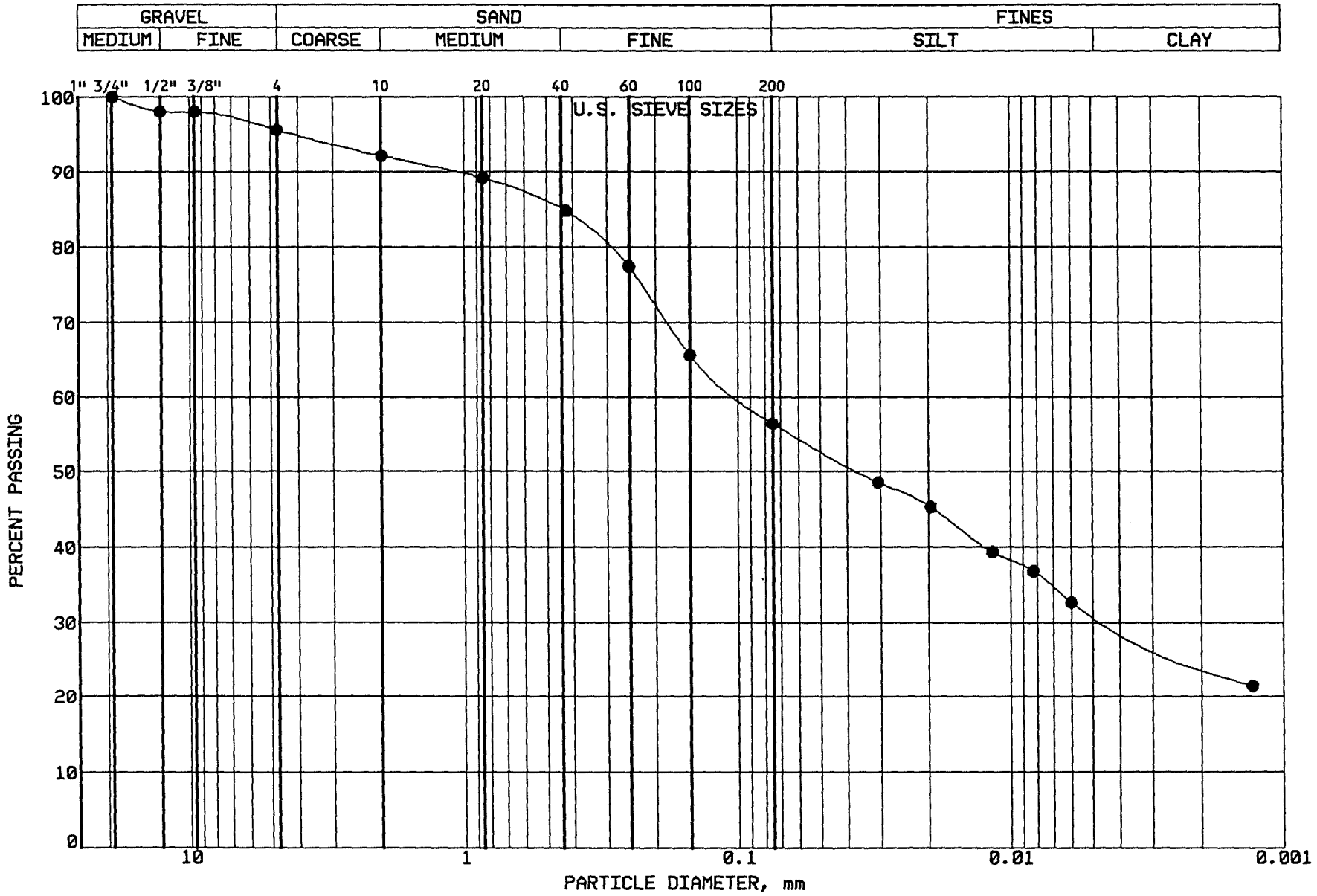
LOCATION: N 40672.0, E 42098.0
SAMPLE: CC-379 TUBE #: TP-5
ELEVATION: 1886.2'

GRAVEL	4.7 %
SAND	43.7 %
SILT	20.5 %
CLAY	31.1 %
P 200	51.6 %

SOIL PROPERTIES

LL: 37.0%
PL: 14.0%
PI: 23.0%
CLASS: Sandy Lean Clay (CL), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

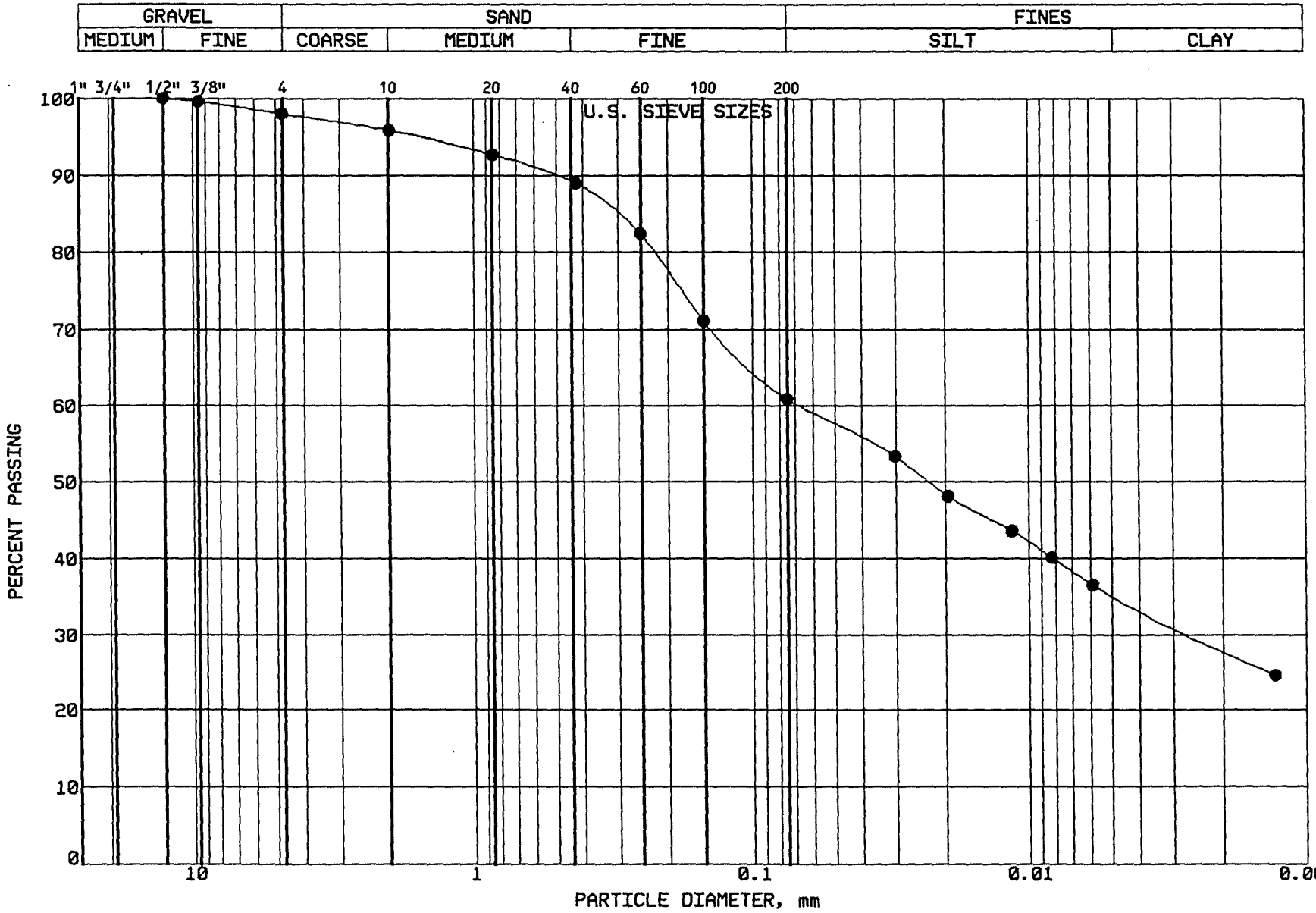
LOCATION: N 40603.0, E 42028.0
SAMPLE: CC-380 TUBE #: TP-6
ELEVATION: 1886.8'

GRAVEL	4.4 %
SAND	39.1 %
SILT	25.1 %
CLAY	31.4 %
P 200	56.5 %

SOIL PROPERTIES

LL: 35.0%
PL: 15.0%
PI: 20.0%
CLASS: Sandy Lean Clay (CL), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

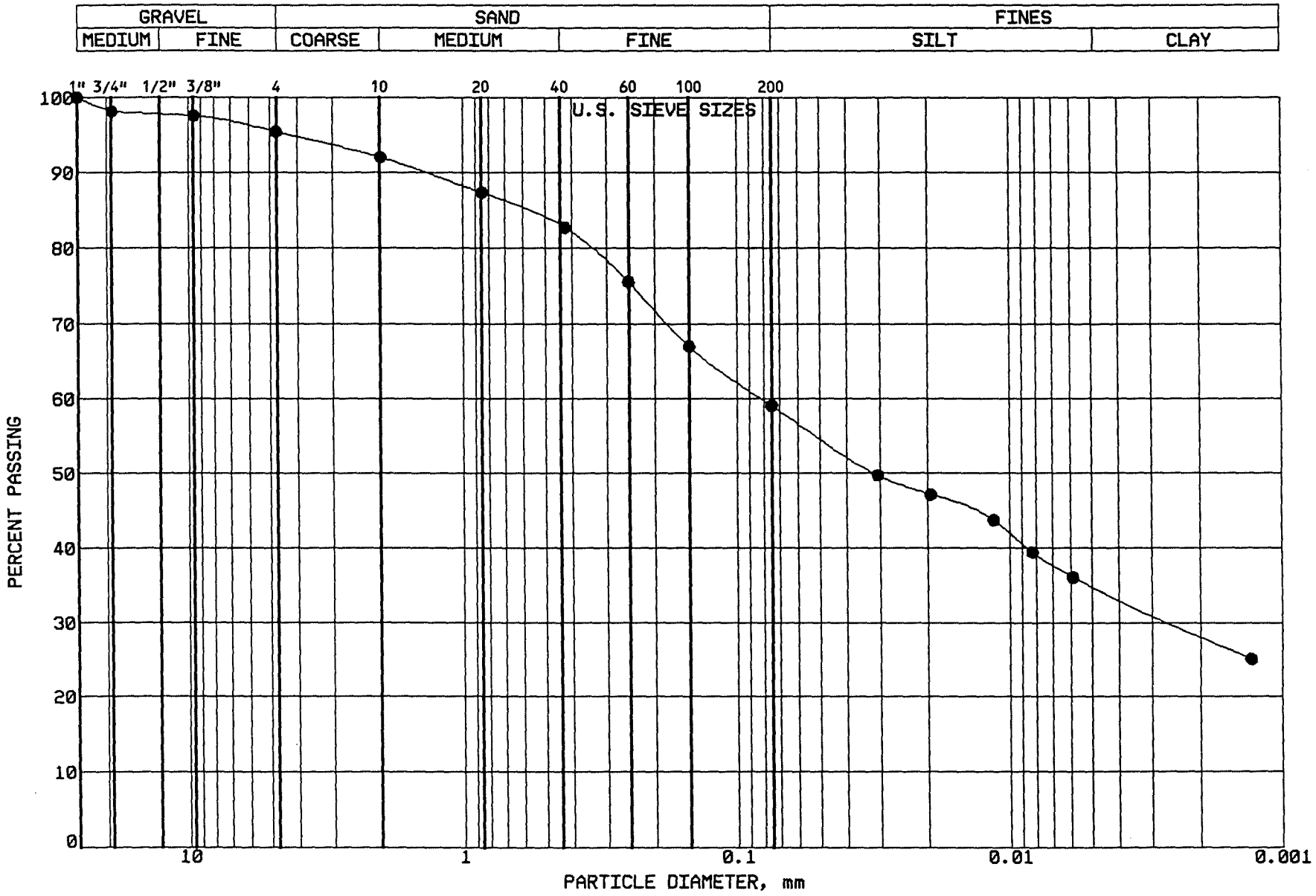
LOCATION: N 40603.0, E 42028.0
SAMPLE: CC-381 TUBE #: TP-6
ELEVATION: 1886.8'

GRAVEL	2.0 %
SAND	37.1 %
SILT	25.7 %
CLAY	35.2 %
P 200	60.9 %

SOIL PROPERTIES

LL: 44.0%
PL: 17.0%
PI: 27.0%
CLASS: Sandy Lean Clay (CL), ol.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

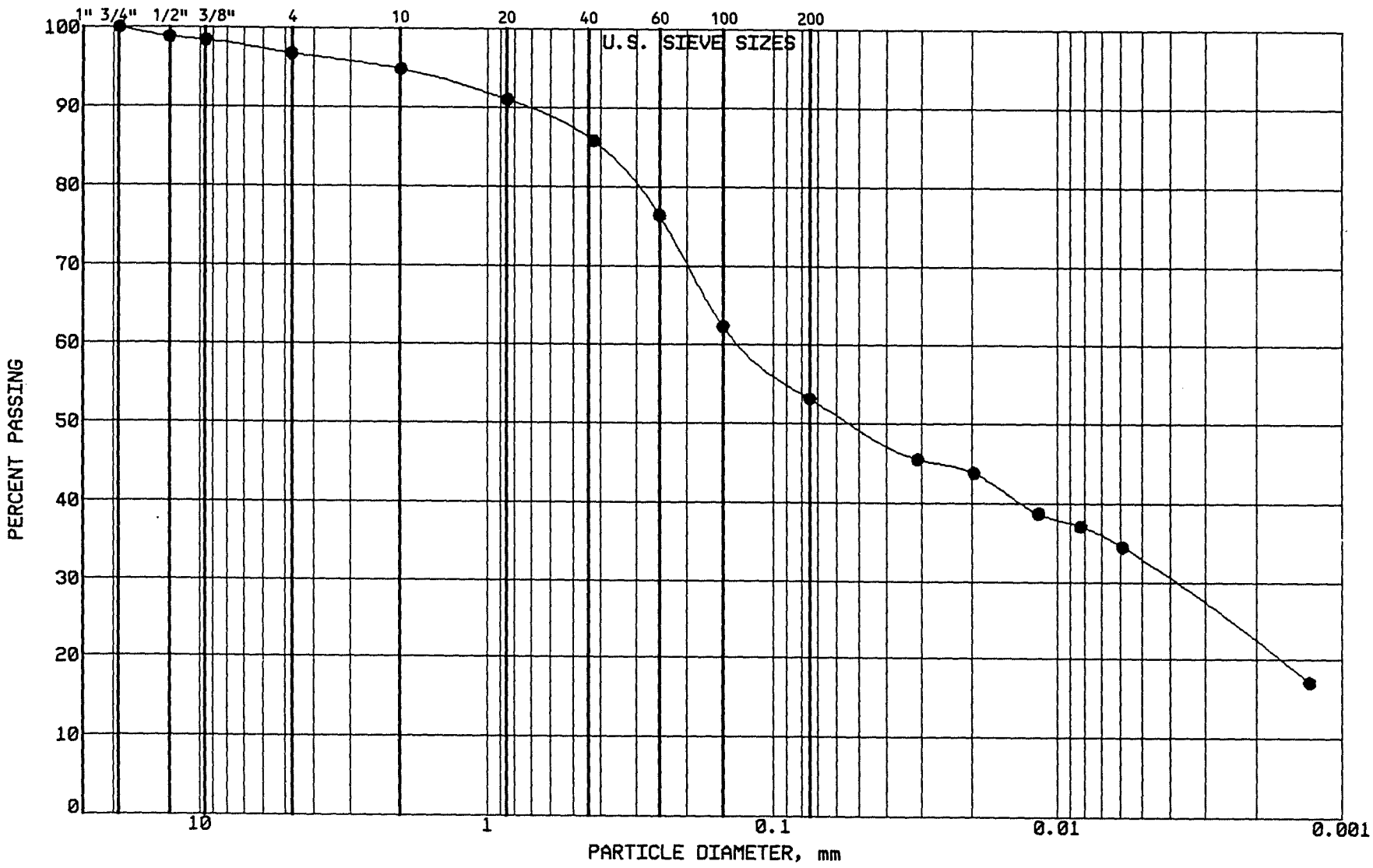
LOCATION: N 40721.0, E 41910.0
SAMPLE: CC-382 TUBE #: TP-7
ELEVATION: 1884.3'

GRAVEL	4.6 %
SAND	36.3 %
SILT	24.3 %
CLAY	34.8 %
P 200	59.1 %

SOIL PROPERTIES

LL: 46.0%
PL: 18.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL), ol.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

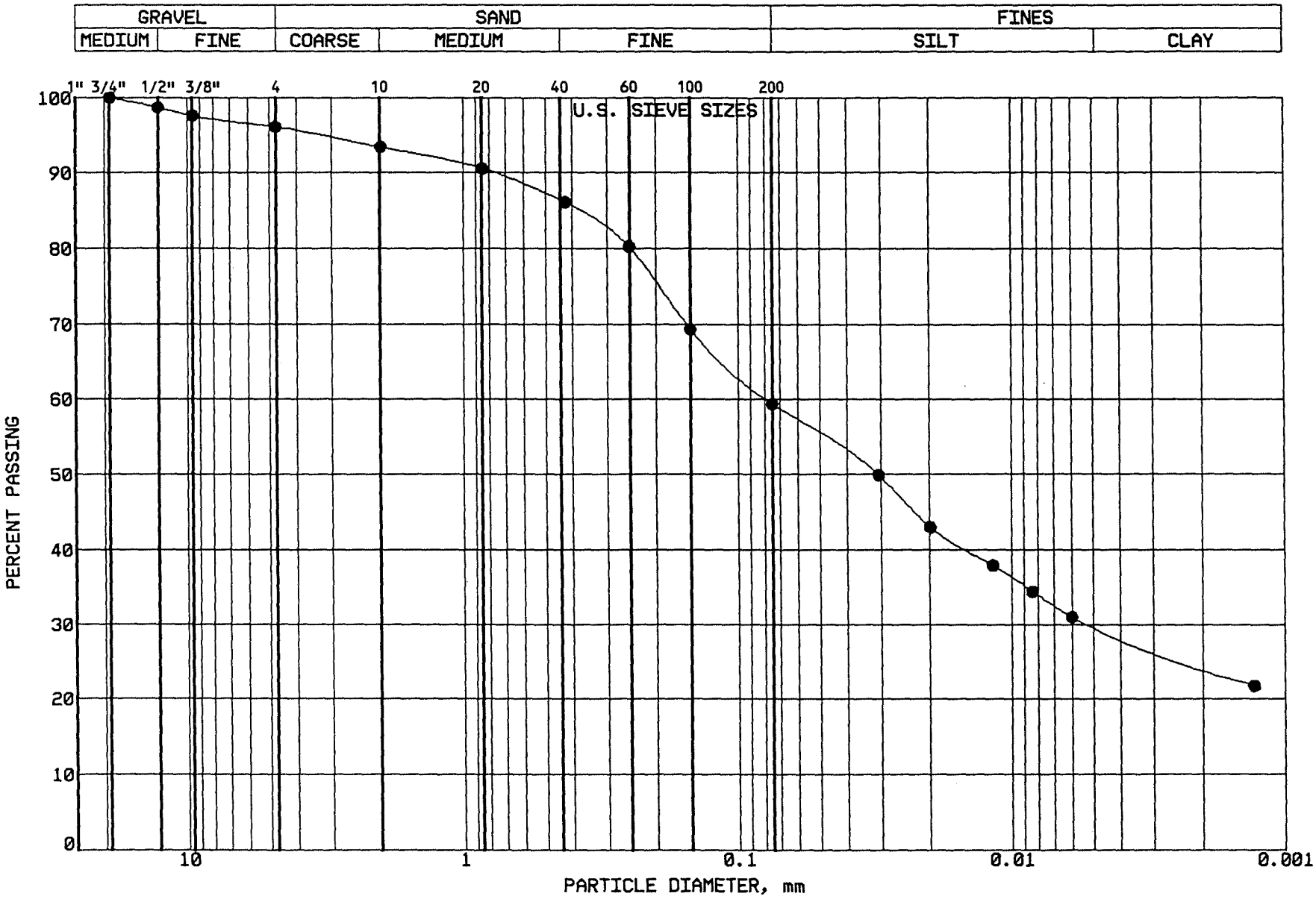
LOCATION: N 40721.0, E 41910.0
SAMPLE: CC-383 TUBE #: TP-7
ELEVATION: 1884.3'

GRAVEL	3.2 %
SAND	43.6 %
SILT	20.6 %
CLAY	32.6 %
P 200	53.2 %

SOIL PROPERTIES

LL: 37.0%
PL: 14.0%
PI: 23.0%
CLASS: Sandy Lean Clay (CL), ol.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

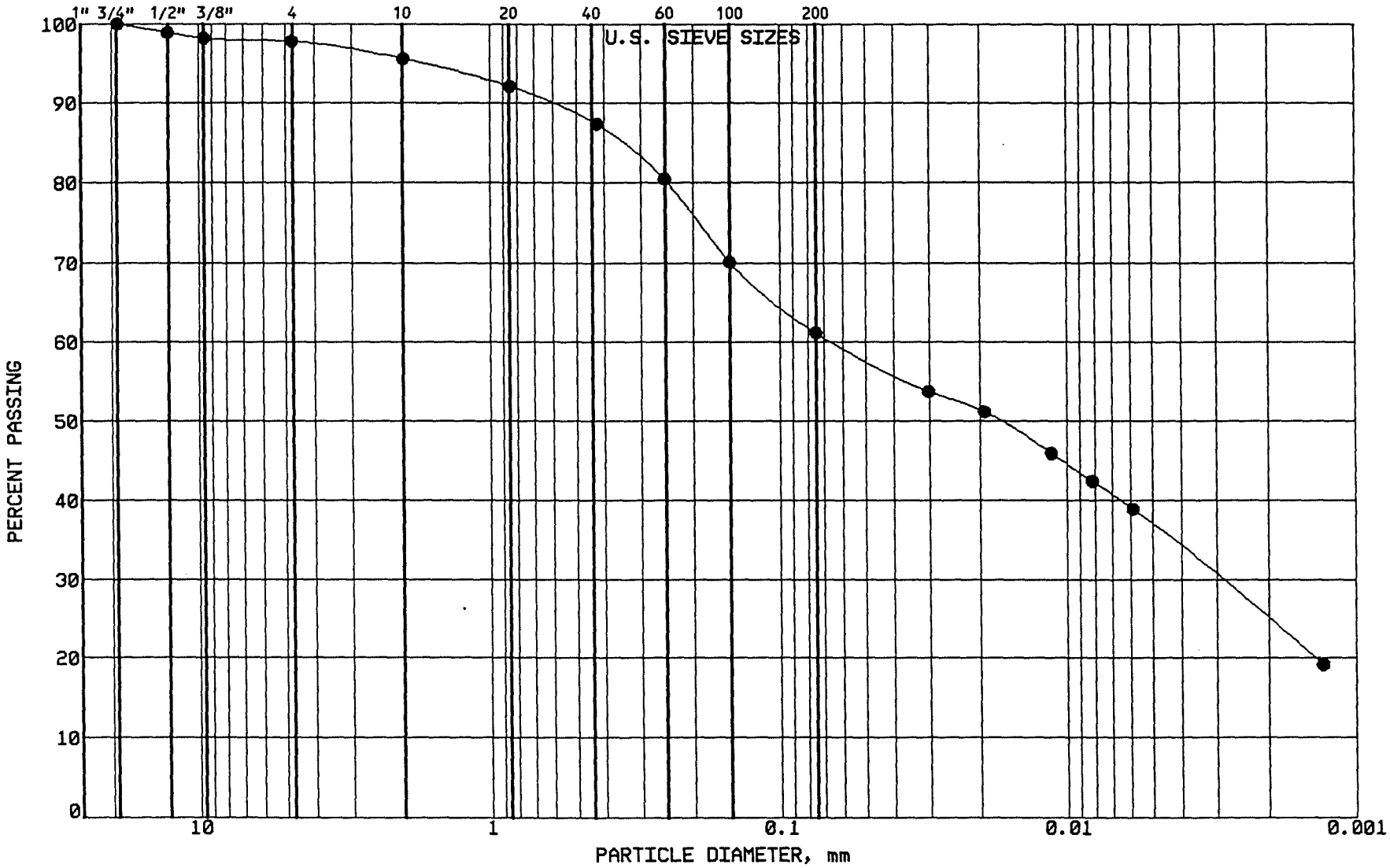
LOCATION: N 40812.0, E 42063.0
SAMPLE: CC-384 TUBE #: TP-8
ELEVATION: 1884.5'

GRAVEL	3.9 %
SAND	36.7 %
SILT	29.5 %
CLAY	29.9 %
P 200	59.4 %

SOIL PROPERTIES

LL: 43.0%
PL: 13.0%
PI: 30.0%
CLASS: Sandy Lean Clay (CL), ol.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

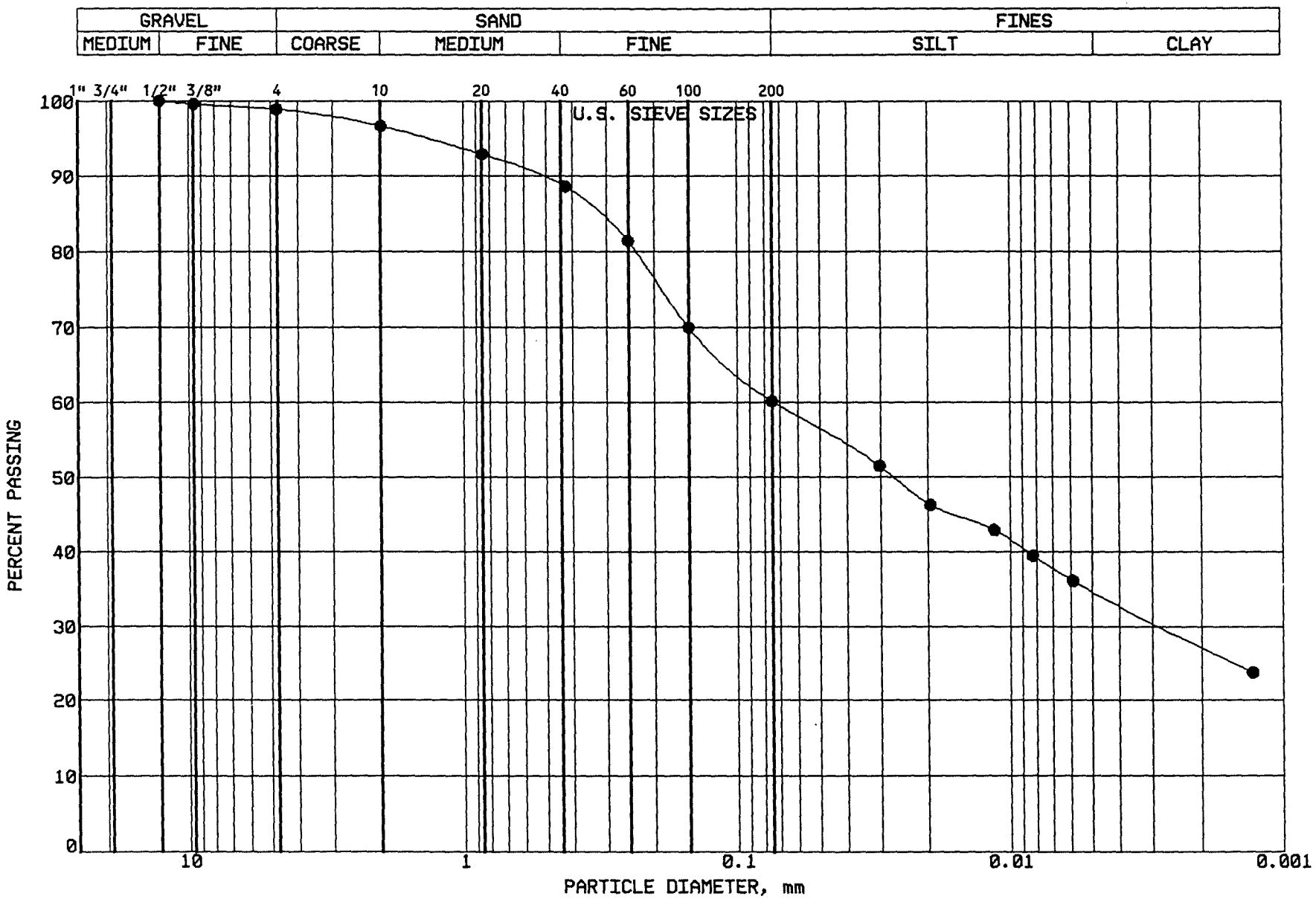
LOCATION: N 40726.0, E 42291.0
SAMPLE: CC-385 TUBE #: TP-9
ELEVATION: 1881.3'

GRAVEL	2.2 %
SAND	36.6 %
SILT	24.5 %
CLAY	36.7 %
P 200	61.2 %

SOIL PROPERTIES

LL: 44.0%
PL: 16.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

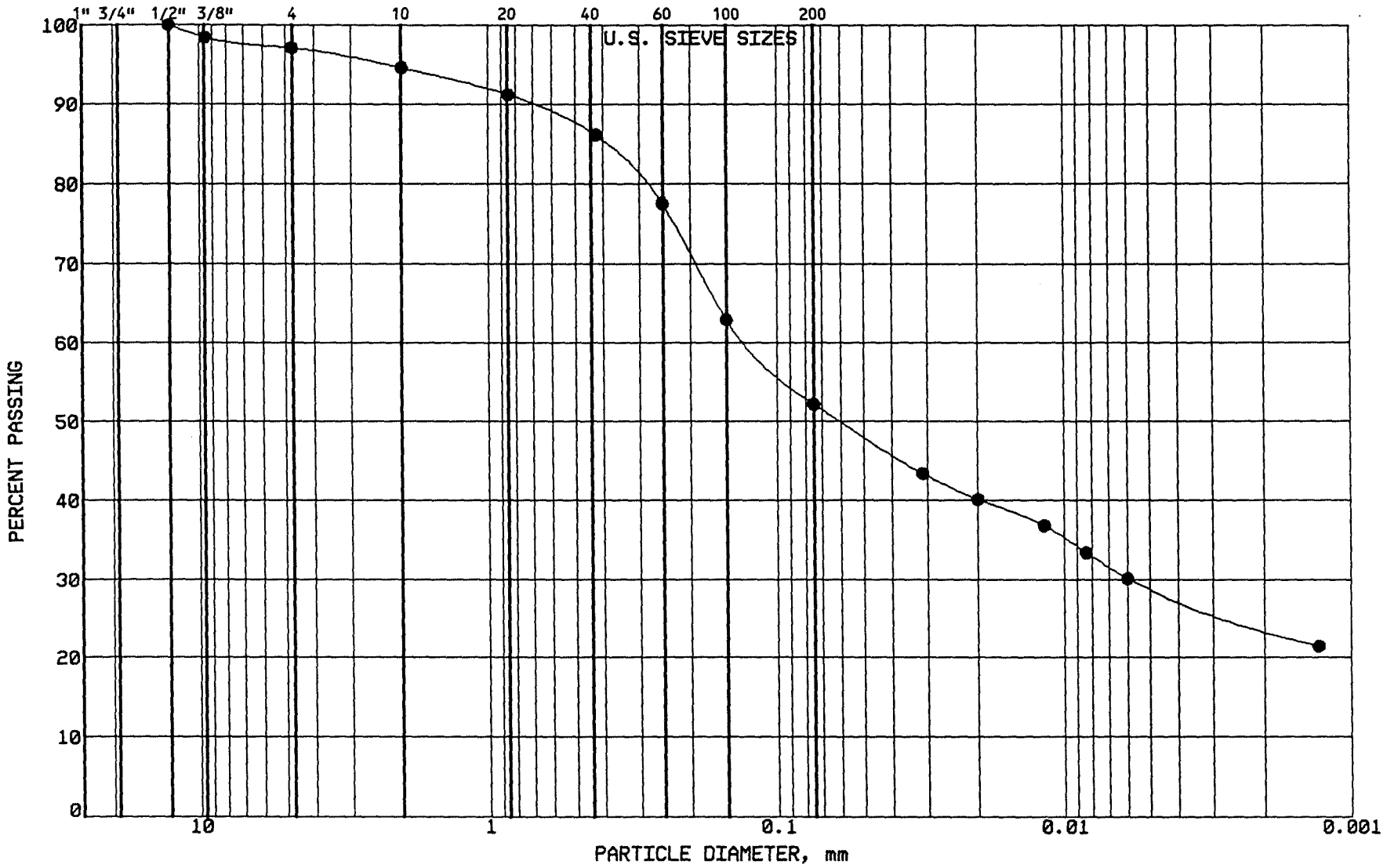
LOCATION: N 40614.0, E 42334.0
SAMPLE: CC-386 TUBE #: TP-10
ELEVATION: 1885.6'

GRAVEL	1.1 %
SAND	38.7 %
SILT	25.4 %
CLAY	34.8 %
P 200	60.2 %

SOIL PROPERTIES

LL: 41.0%
PL: 13.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL), ol.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

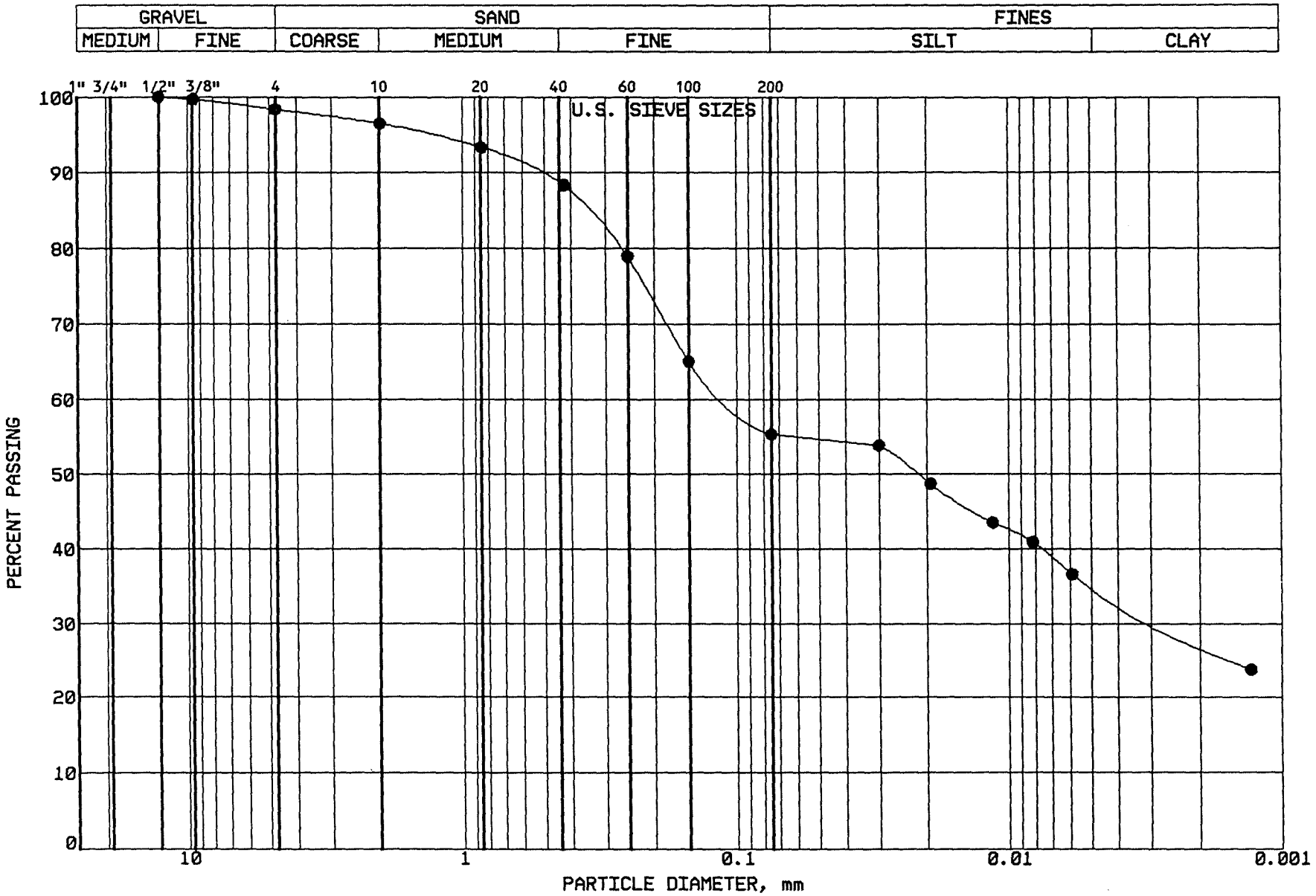
LOCATION: N 40477.0, E 42446.0
SAMPLE: CC-387 TUBE #: TP-11
ELEVATION: 1885.7'

GRAVEL	2.9 %
SAND	44.9 %
SILT	23.1 %
CLAY	29.1 %
P 200	52.2 %

SOIL PROPERTIES

LL: 33.0%
PL: 12.0%
PI: 21.0%
CLASS: Sandy Lean Clay (CL), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

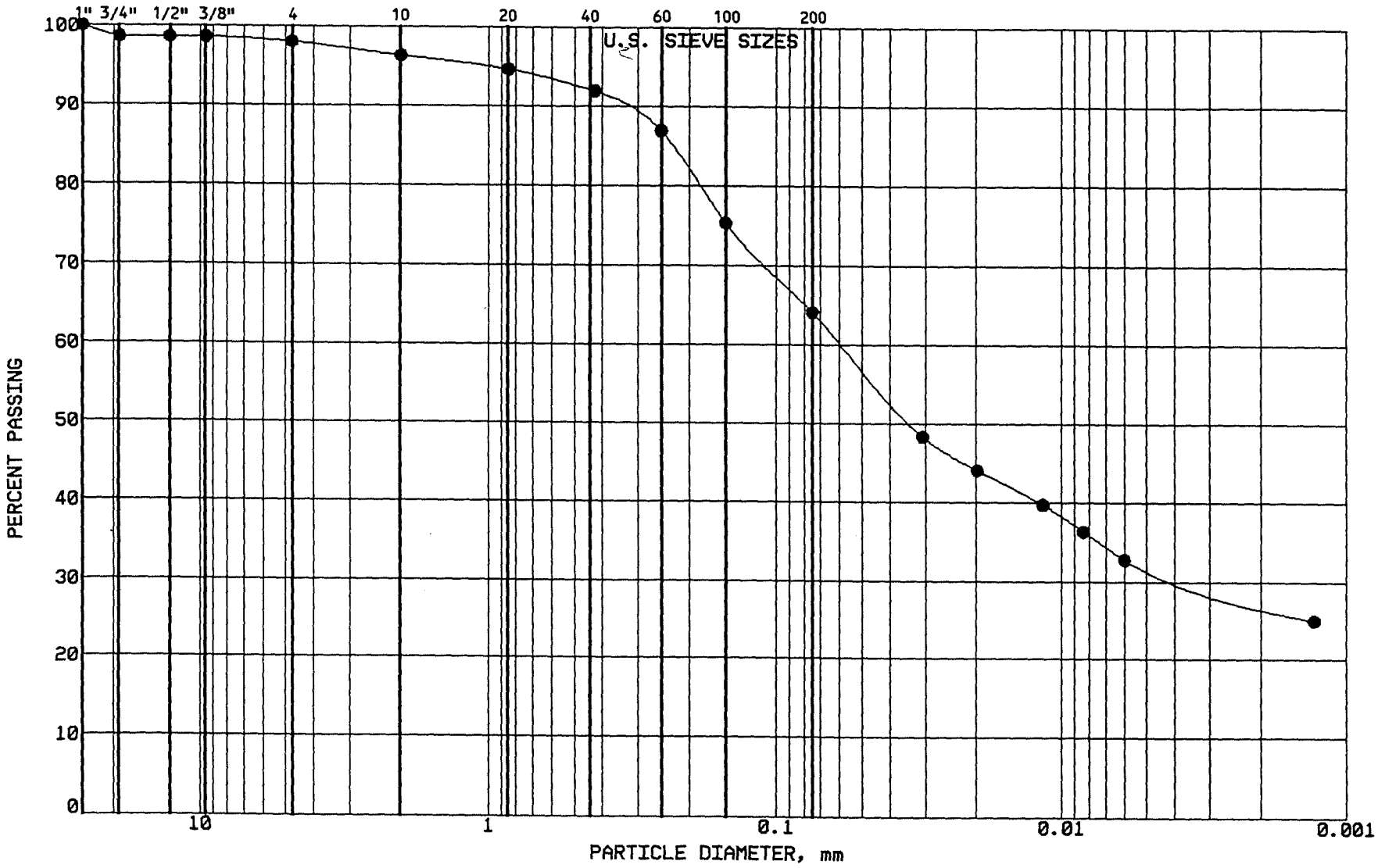
LOCATION: N 41005.0, E 41979.0
SAMPLE: CC-388 TUBE #: TP-12
ELEVATION: 1885.0'

GRAVEL	1.6 %
SAND	43.0 %
SILT	20.2 %
CLAY	35.2 %
P 200	55.4 %

SOIL PROPERTIES

LL: 42.0%
PL: 14.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL), ol.br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

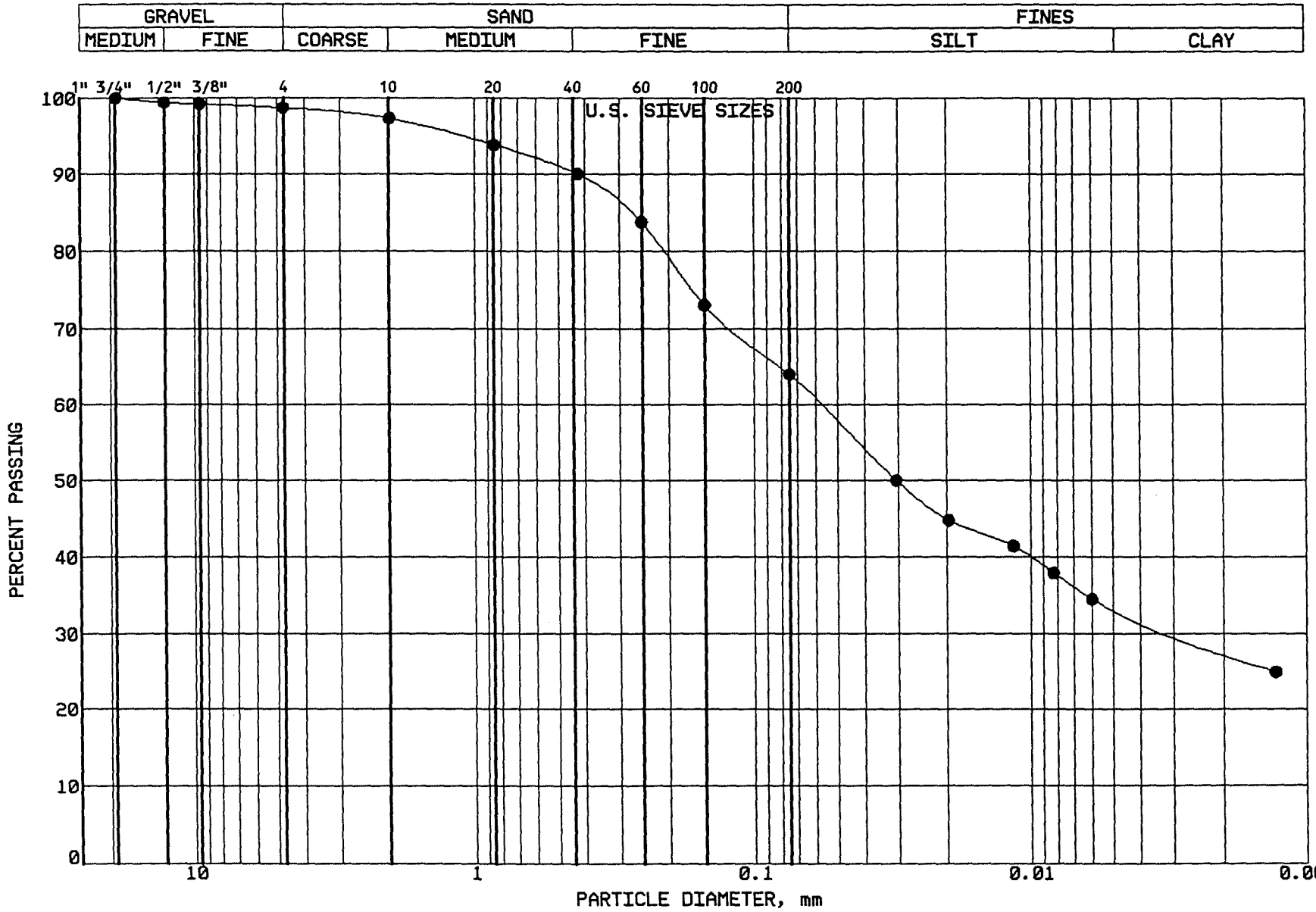
LOCATION: N 37214.0, E 40593.0
SAMPLE: SG-CC389 TUBE #:
ELEVATION: 1905.3'

GRAVEL	2.0 %
SAND	33.9 %
SILT	32.2 %
CLAY	31.9 %
P 200	64.1 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

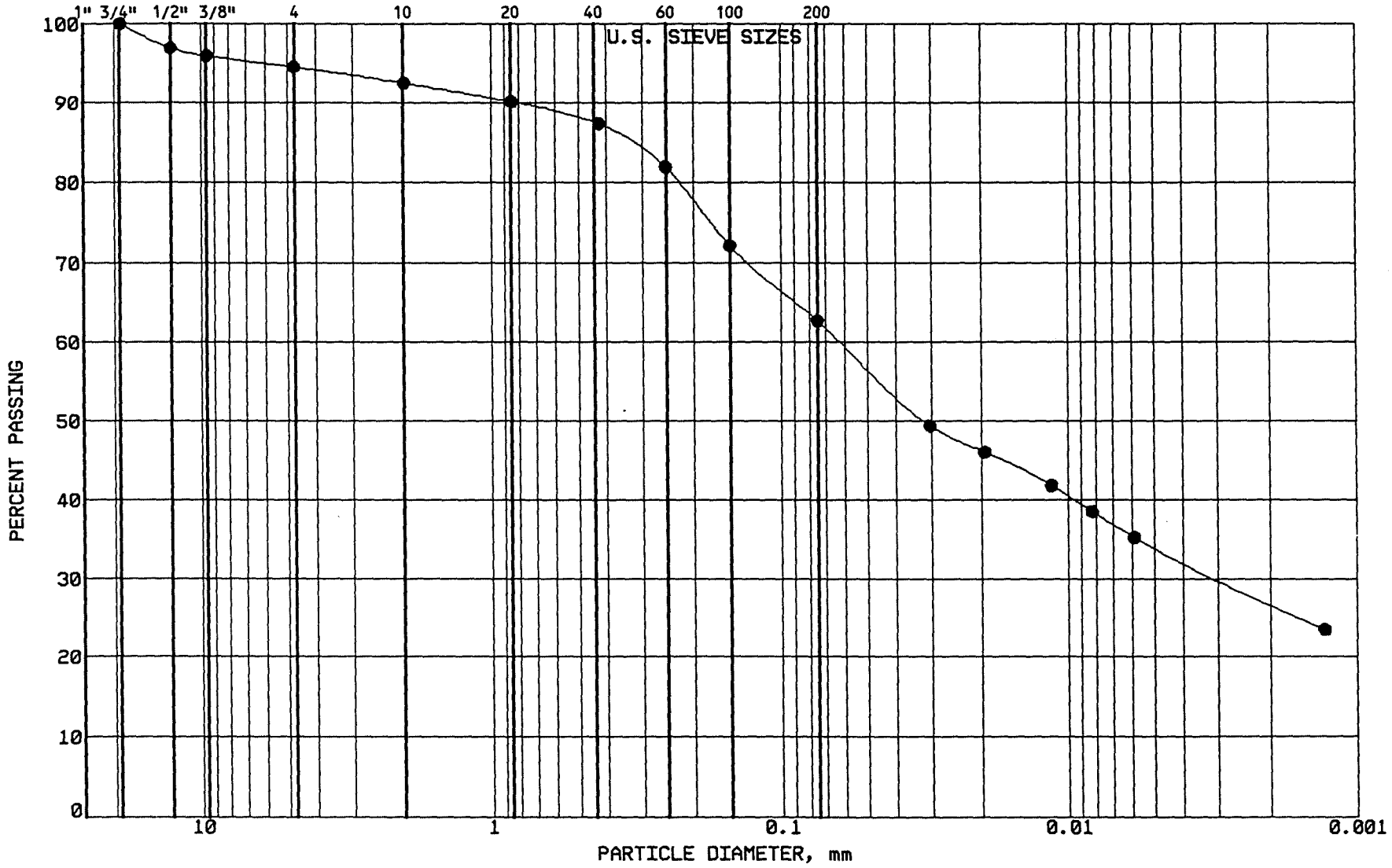
LOCATION: N 37382.0, E 40731.0
SAMPLE: SG-CC390 TUBE #:
ELEVATION: 1904.6'

GRAVEL	1.3 %
SAND	34.7 %
SILT	30.6 %
CLAY	33.4 %
P 200	64.0 %

SOIL PROPERTIES

LL: %
PL: %
PI: %
CLASS: Sandy Lean Clay (CL), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

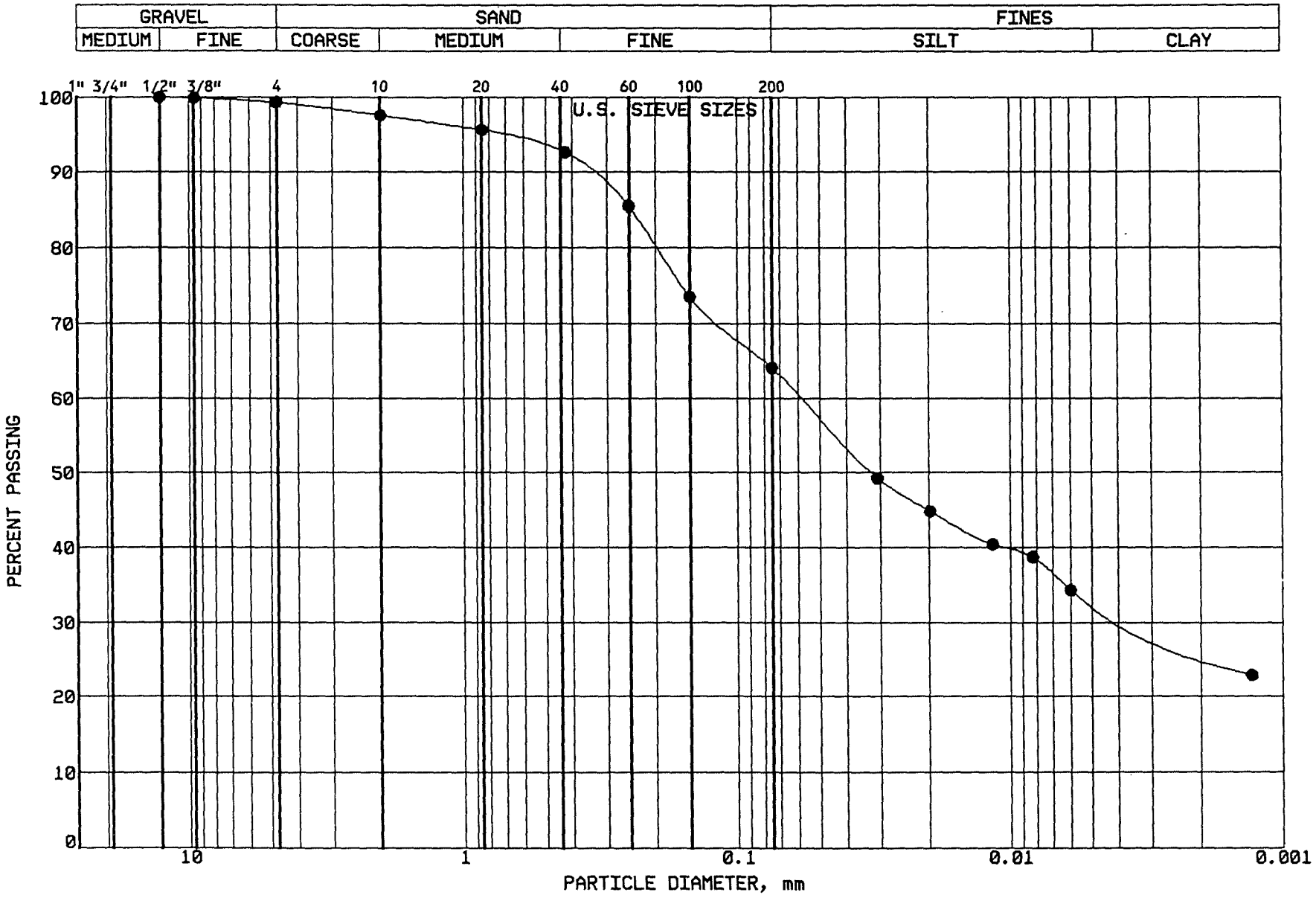
LOCATION: N 37347.0, E 40652.0
SAMPLE: CLBCC391 TUBE #:
ELEVATION: 1905.1'

GRAVEL	5.5 %
SAND	31.8 %
SILT	28.8 %
CLAY	33.9 %
P 200	62.7 %

SOIL PROPERTIES

LL: 41.0%
PL: 15.0%
PI: 26.0%
CLASS: Sandy Lean Clay (CL), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

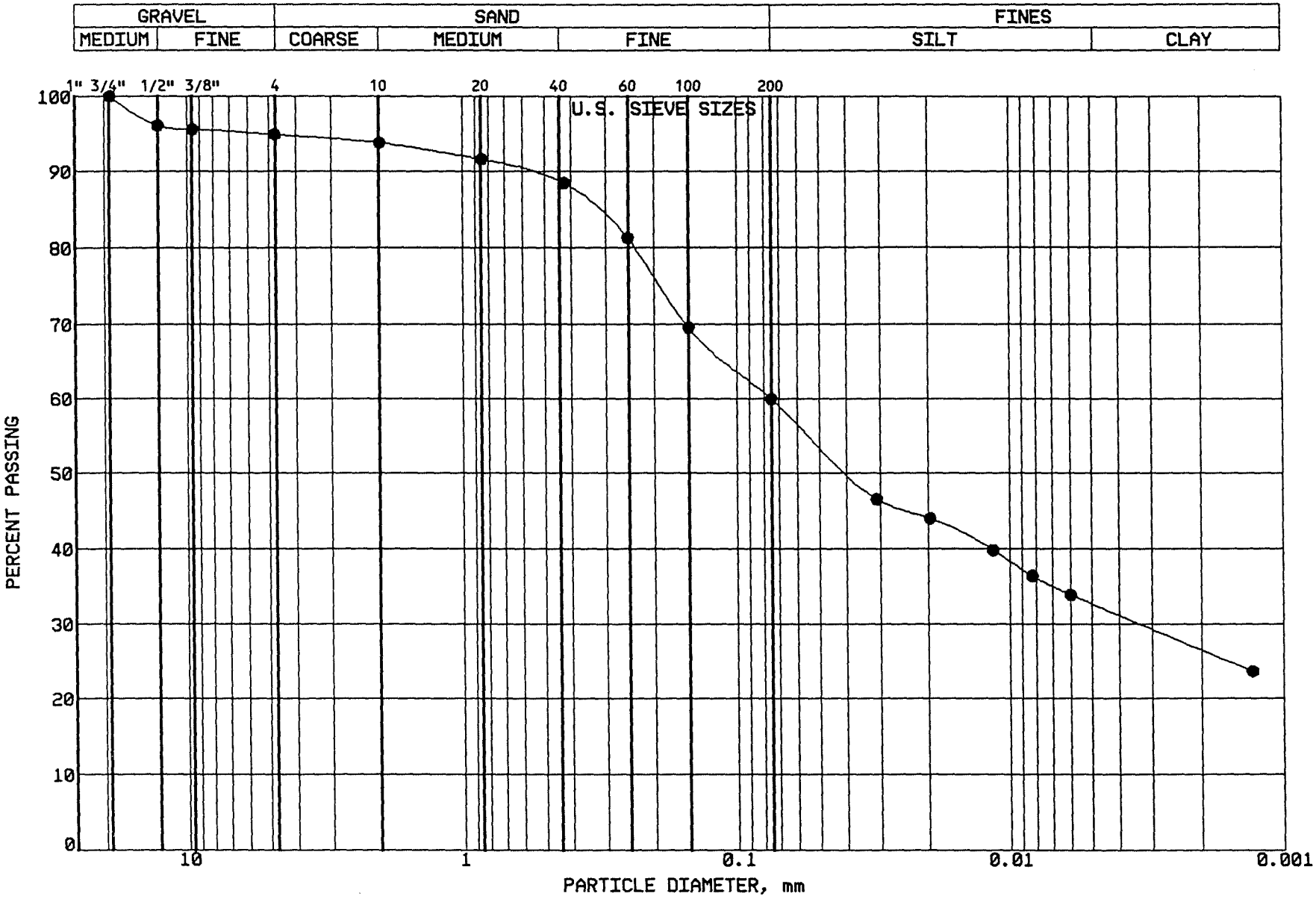
LOCATION: N 37258.0, E 40993.0
SAMPLE: CLBCC392 TUBE #: ST-108
ELEVATION: 1904.2'

GRAVEL	0.7 %
SAND	35.2 %
SILT	31.2 %
CLAY	32.9 %
P 200	64.1 %

SOIL PROPERTIES

LL: 40.0%
PL: 15.0%
PI: 25.0%
CLASS: Sandy Lean Clay (CL), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

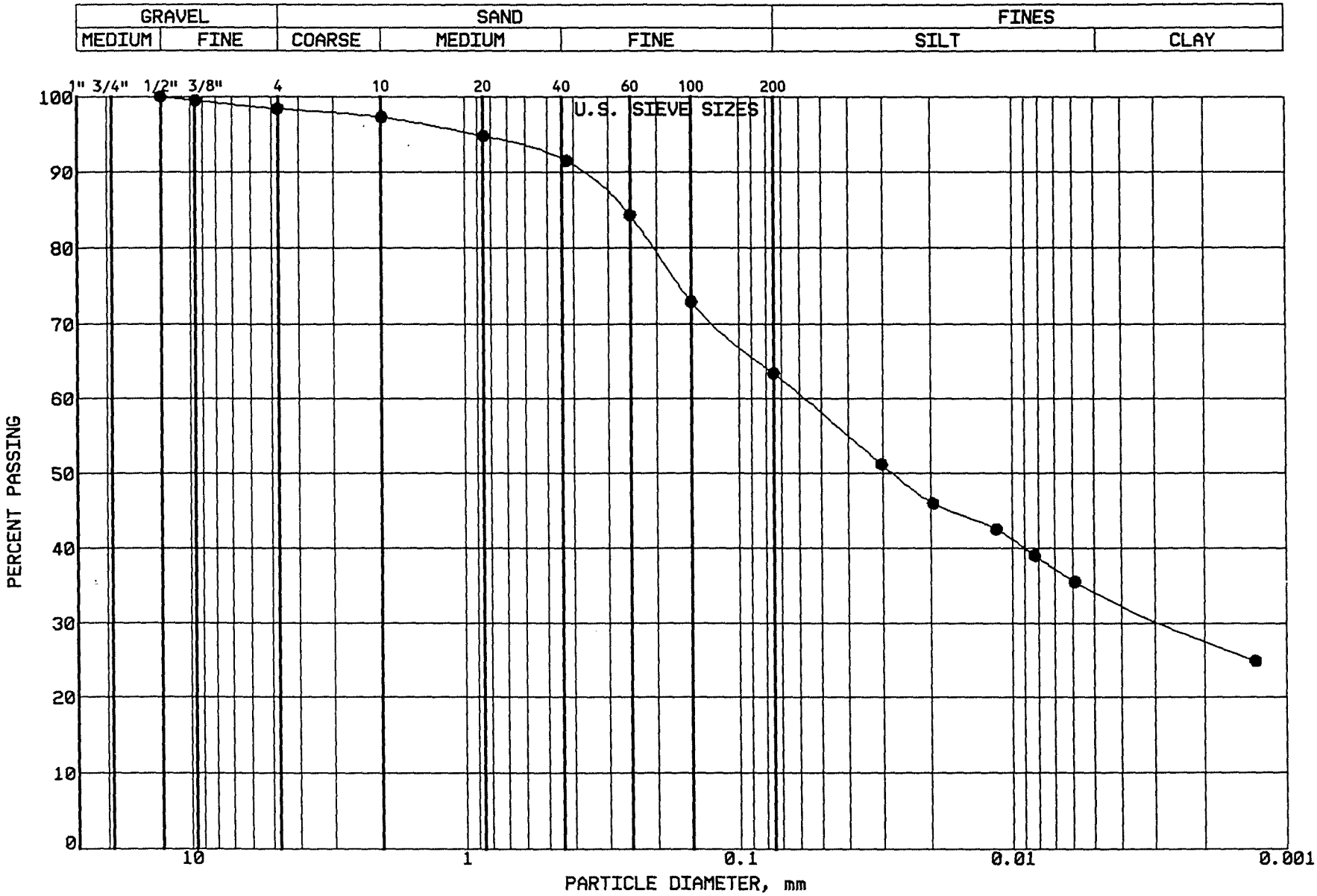
LOCATION: N 37412.0, E 41139.0
SAMPLE: CLBCC393 TUBE #: ST-109
ELEVATION: 1902.7'

GRAVEL	5.1 %
SAND	34.9 %
SILT	27.3 %
CLAY	32.7 %
P 200	60.0 %

SOIL PROPERTIES

LL: 41.0%
PL: 14.0%
PI: 27.0%
CLASS: Sandy Lean Clay (CL), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

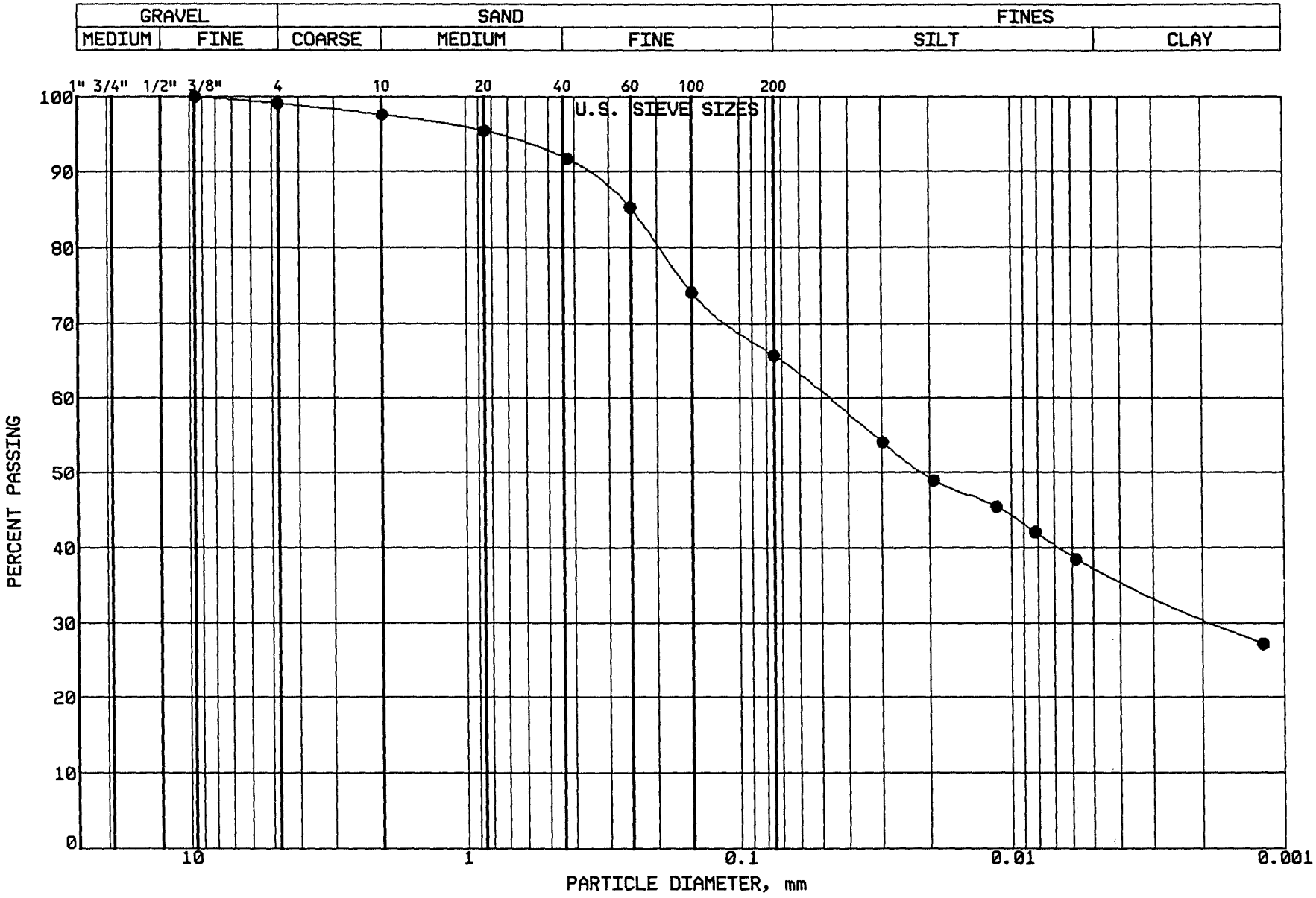
LOCATION: N 37364.0, E 40927.0
SAMPLE: CLBCC394 TUBE #: ST-110
ELEVATION: 1904.2'

GRAVEL	1.6 %
SAND	35.0 %
SILT	29.1 %
CLAY	34.3 %
P 200	63.4 %

SOIL PROPERTIES

LL: 41.0%
PL: 16.0%
PI: 25.0%
CLASS: Sandy Lean Clay (CL), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

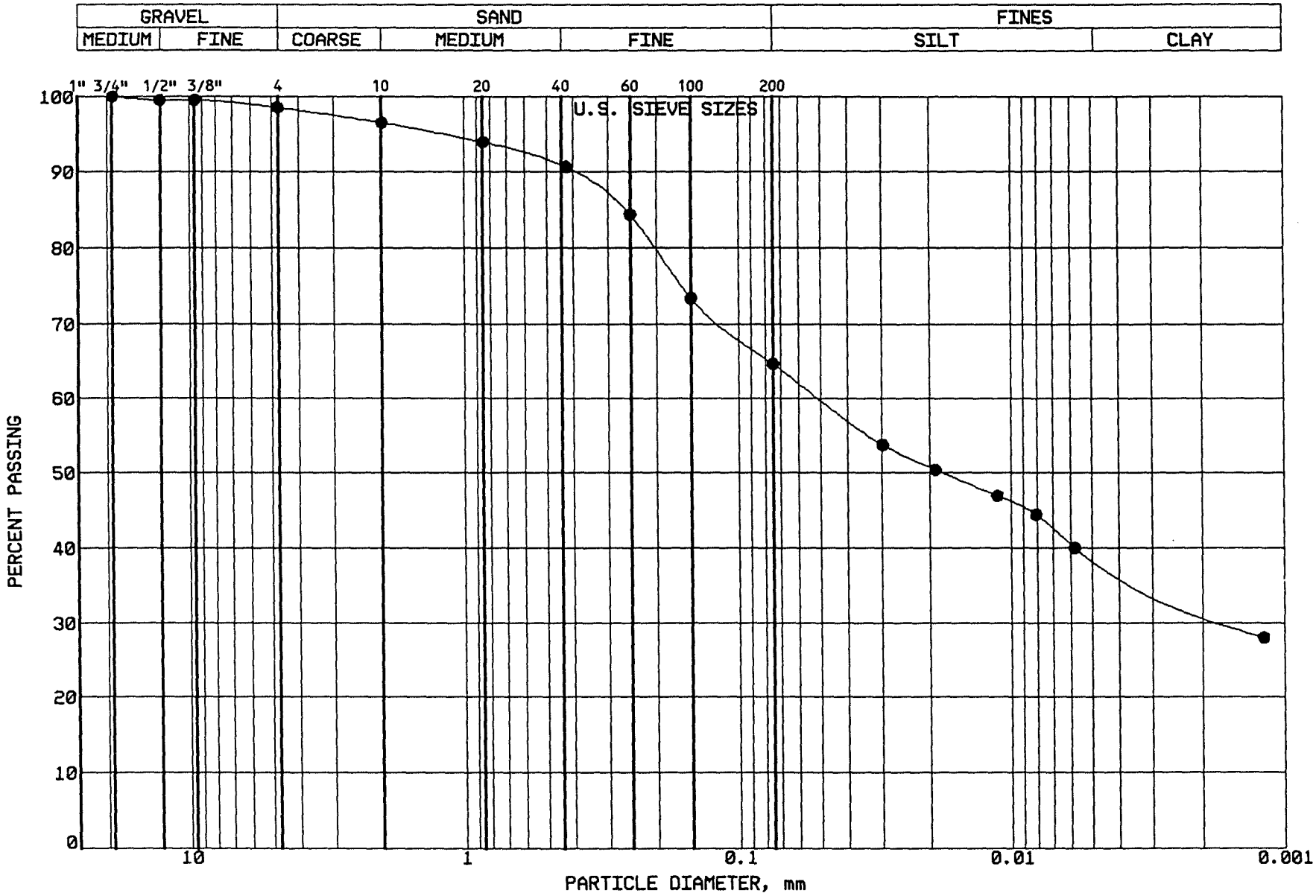
LOCATION: N 37493.0, E 41045.0
SAMPLE: CLBCC395 TUBE #: ST-111
ELEVATION: 1902.9'

GRAVEL	0.9 %
SAND	33.4 %
SILT	28.3 %
CLAY	37.4 %
P 200	65.7 %

SOIL PROPERTIES

LL: 42.0%
PL: 14.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

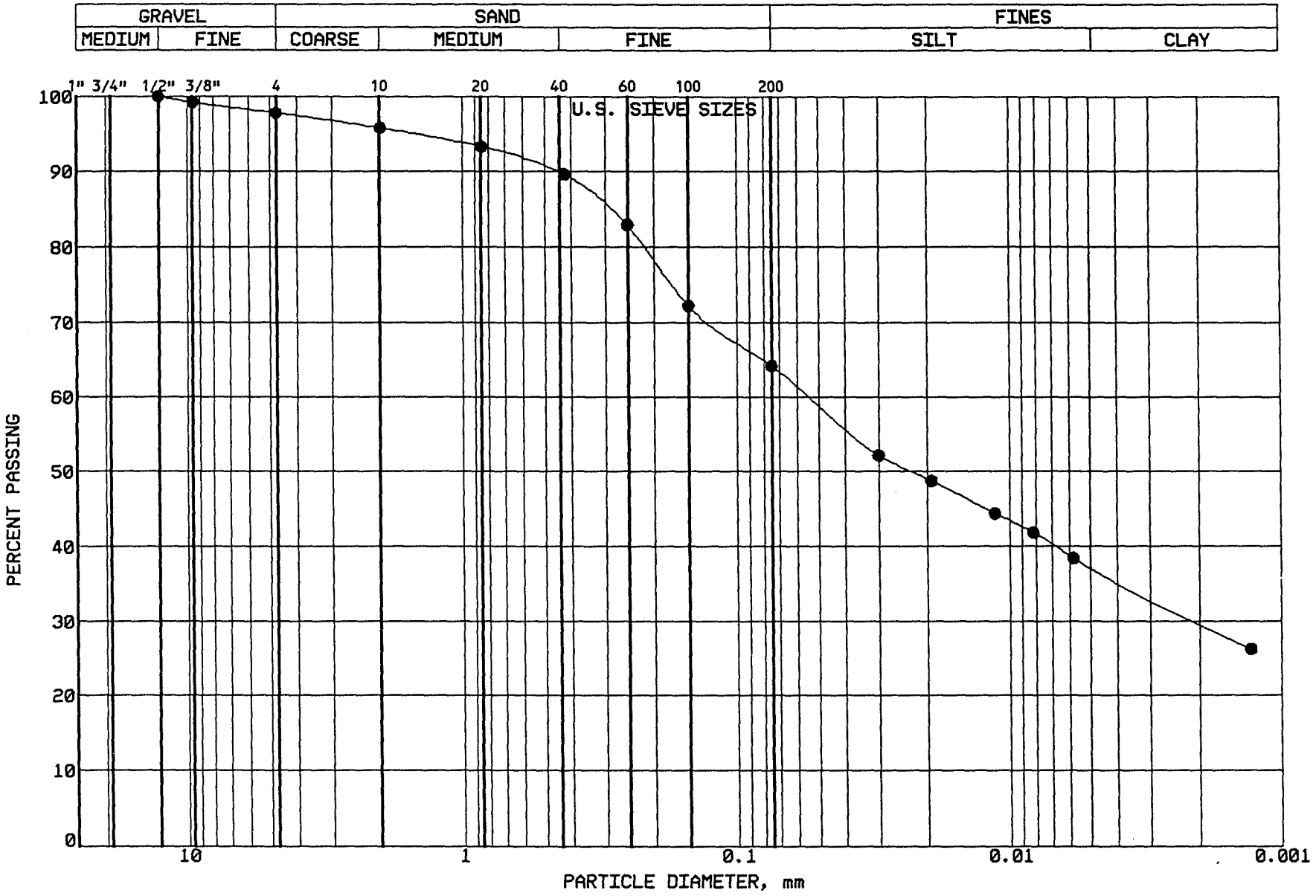
LOCATION: N 37972.0, E 40399.0
SAMPLE: CLBCC396 TUBE #: ST-112
ELEVATION: 1903.3'

GRAVEL	1.5 %
SAND	33.9 %
SILT	25.7 %
CLAY	38.9 %
P 200	64.6 %

SOIL PROPERTIES

LL: 43.0%
PL: 14.0%
PI: 29.0%
CLASS: Sandy Lean Clay (CL), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

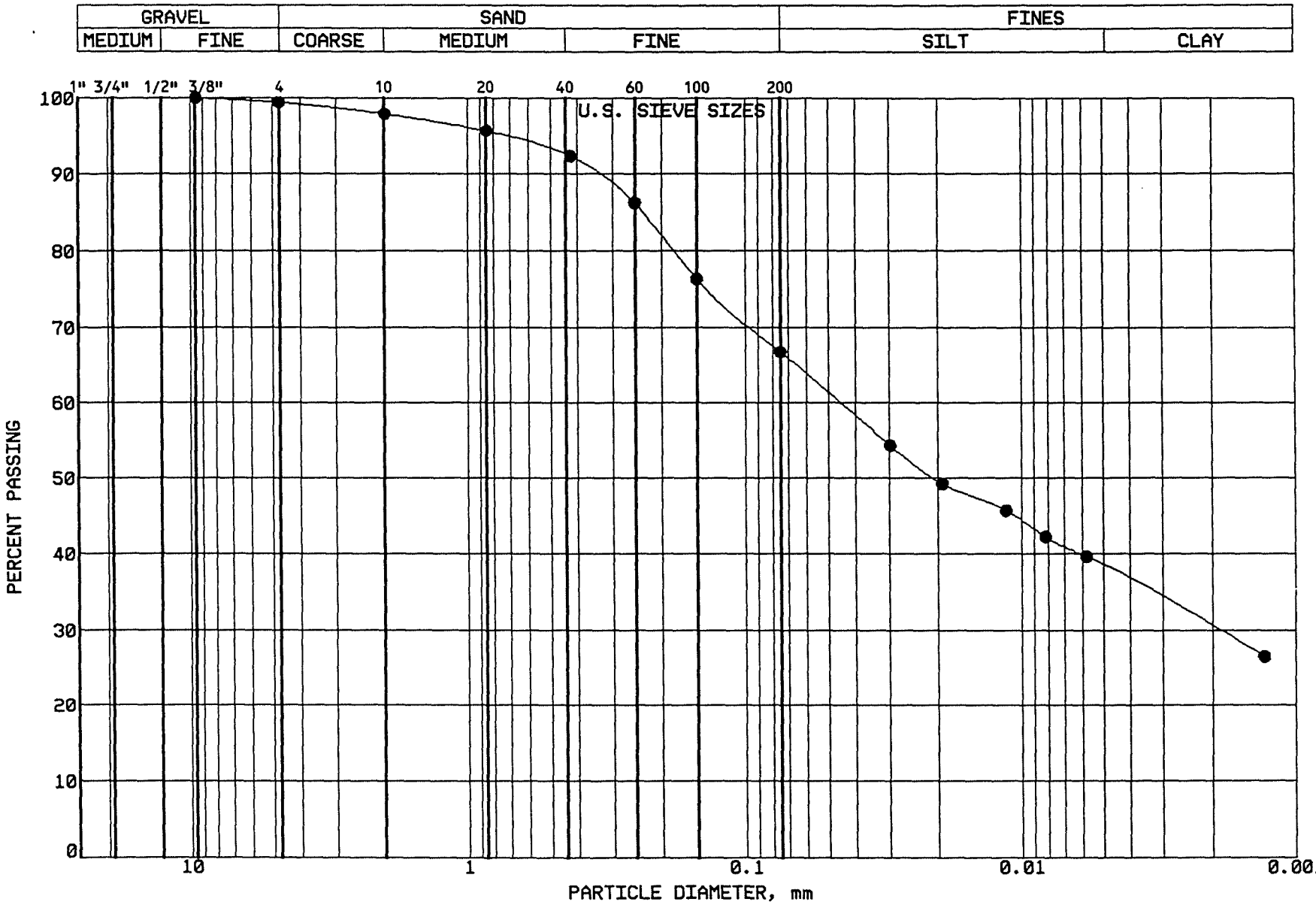
LOCATION: N 38025.0, E 40104.0
SAMPLE: CLBCC397 TUBE #: ST-113
ELEVATION: 1904.6'

GRAVEL	2.2 %
SAND	33.6 %
SILT	27.0 %
CLAY	37.2 %
P 200	64.2 %

SOIL PROPERTIES

LL: 44.0%
PL: 16.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

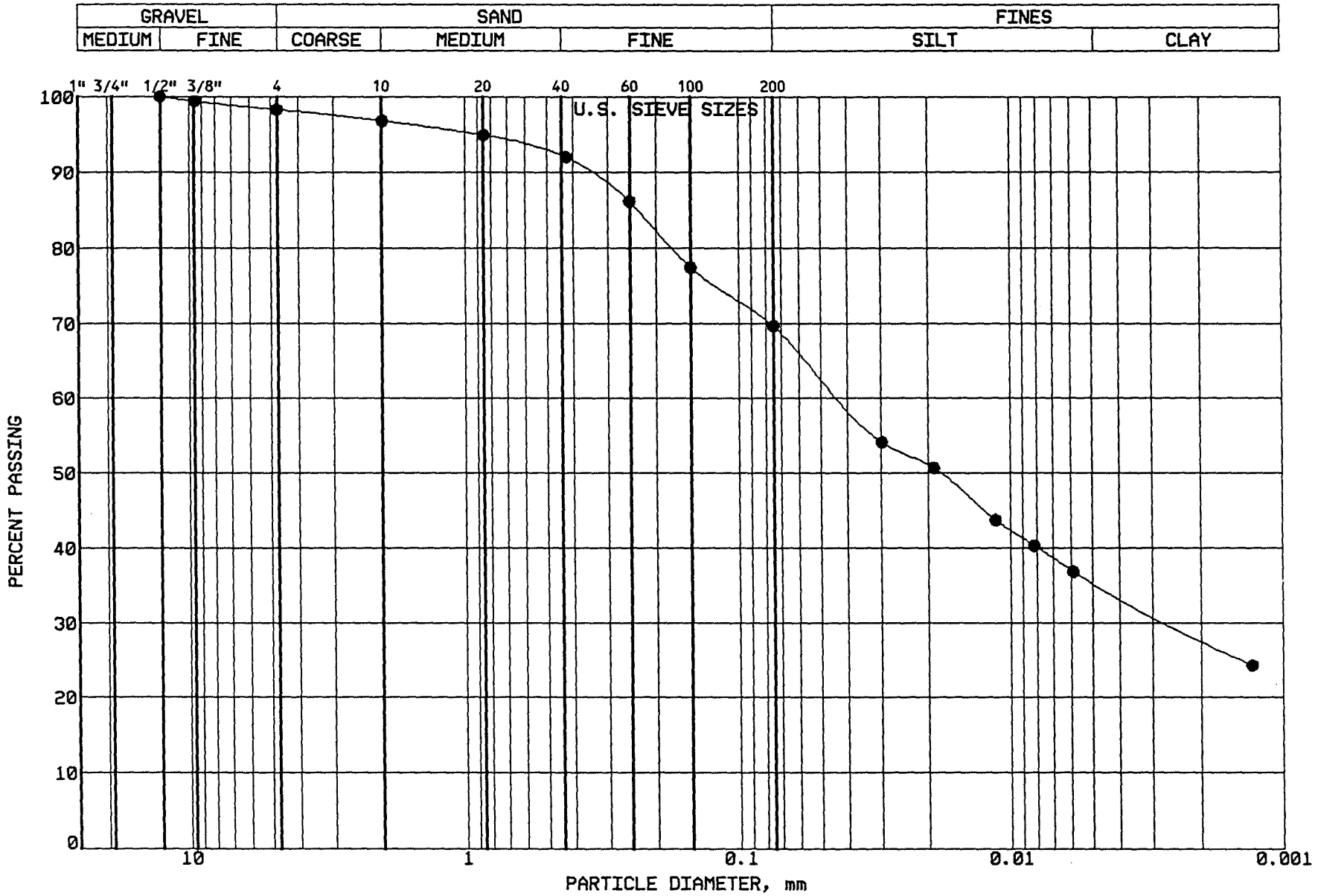
LOCATION: N 38061.0, E 39856.0
SAMPLE: CLBCC398 TUBE #: ST-114
ELEVATION: 1905.9'

GRAVEL	0.6 %
SAND	32.7 %
SILT	28.4 %
CLAY	38.3 %
P 200	66.7 %

SOIL PROPERTIES

LL: 44.0%
PL: 16.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

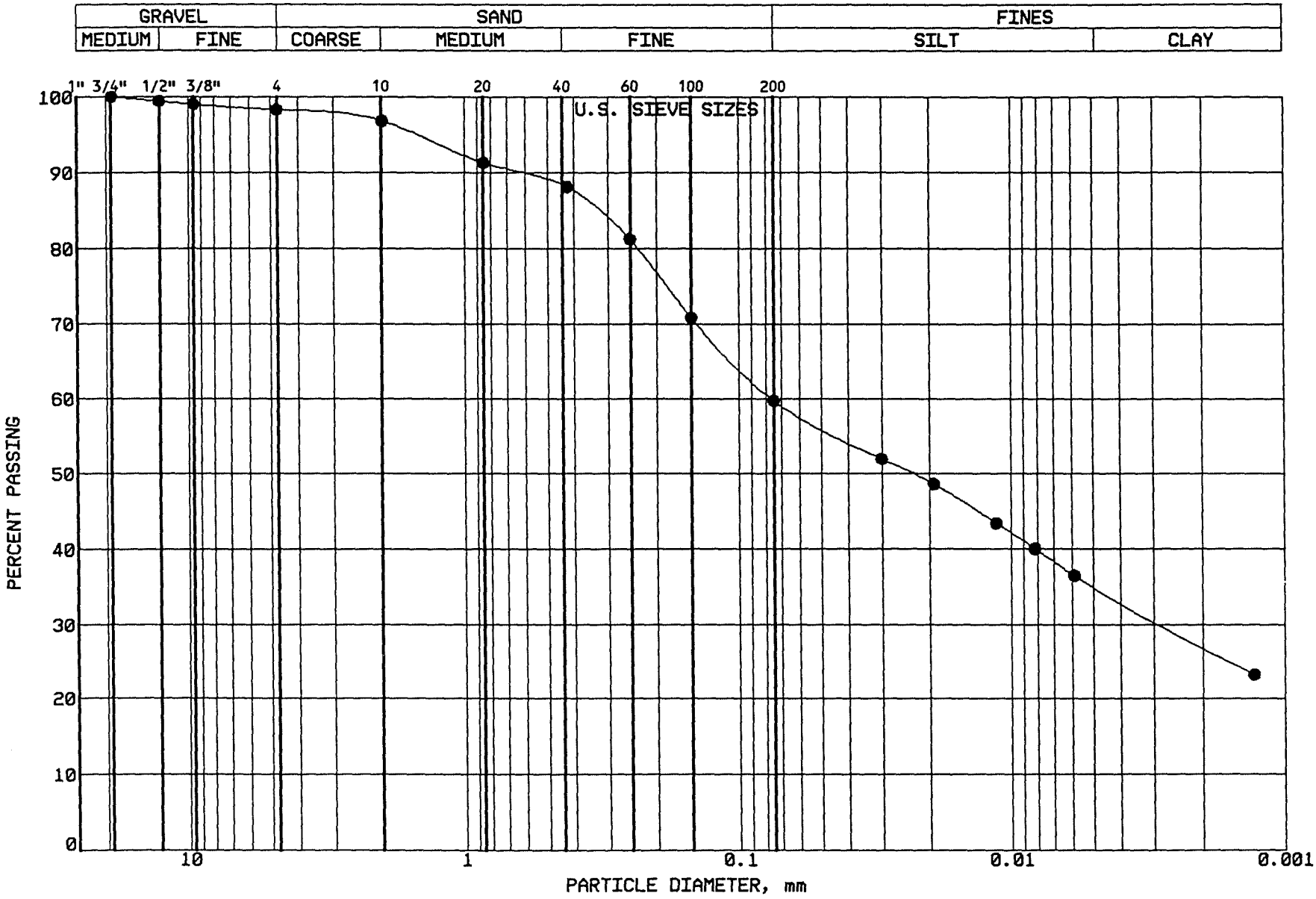
LOCATION: N 37209.0, E 40596.0
SAMPLE: CLBCC399 TUBE #: ST-115
ELEVATION: 1907.0'

GRAVEL	1.7 %
SAND	28.7 %
SILT	34.2 %
CLAY	35.4 %
P 200	69.6 %

SOIL PROPERTIES

LL: 41.0%
PL: 16.0%
PI: 25.0%
CLASS: Sandy Lean Clay (CL), dk gr-br,

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

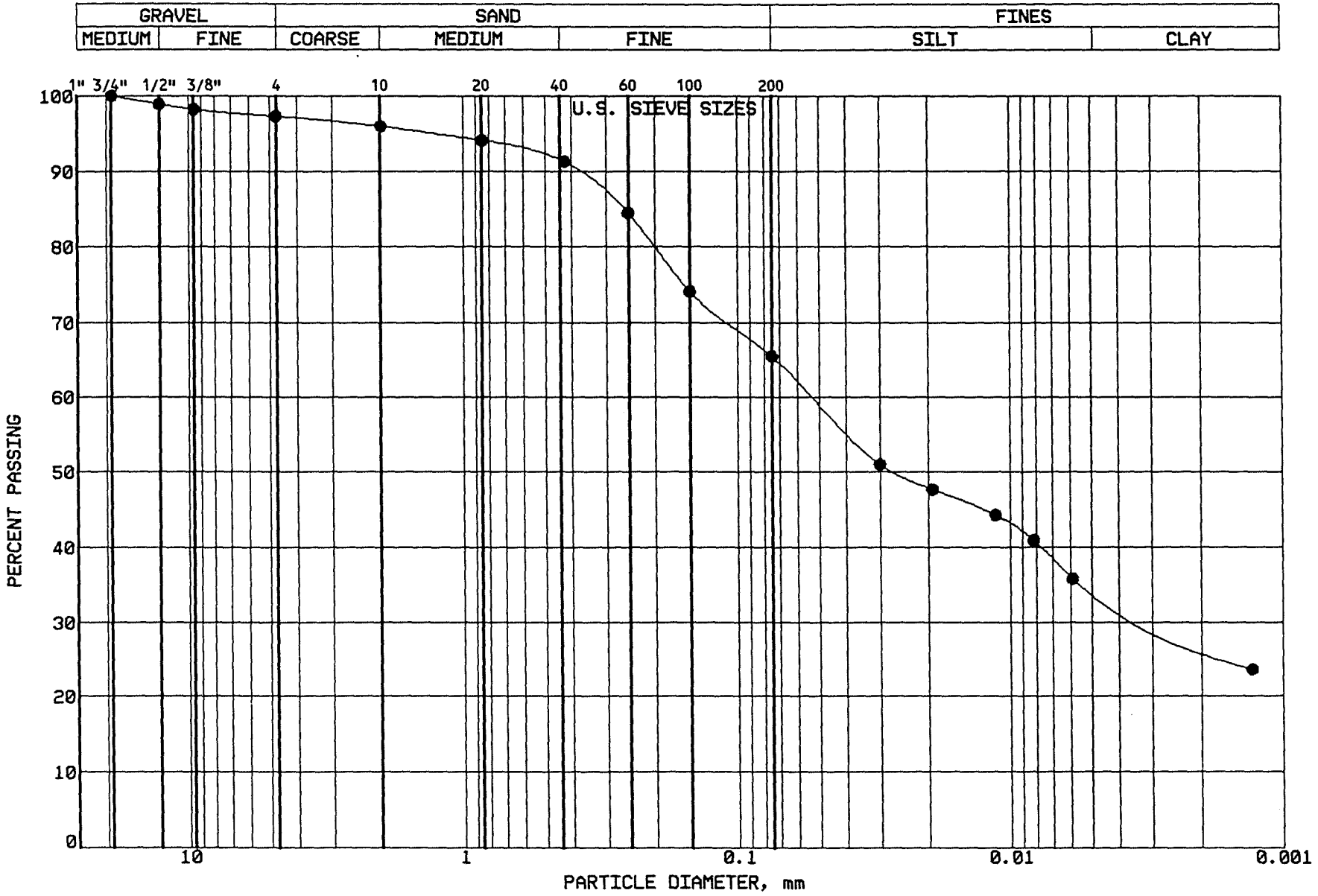
LOCATION: N 37375.0, E 40731.0
SAMPLE: CLBCC400 TUBE #: ST-116
ELEVATION: 1905.4'

GRAVEL	1.7 %
SAND	38.5 %
SILT	24.7 %
CLAY	35.1 %
P 200	59.8 %

SOIL PROPERTIES

LL: 40.0%
PL: 15.0%
PI: 25.0%
CLASS: Sandy Lean Clay (CL), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

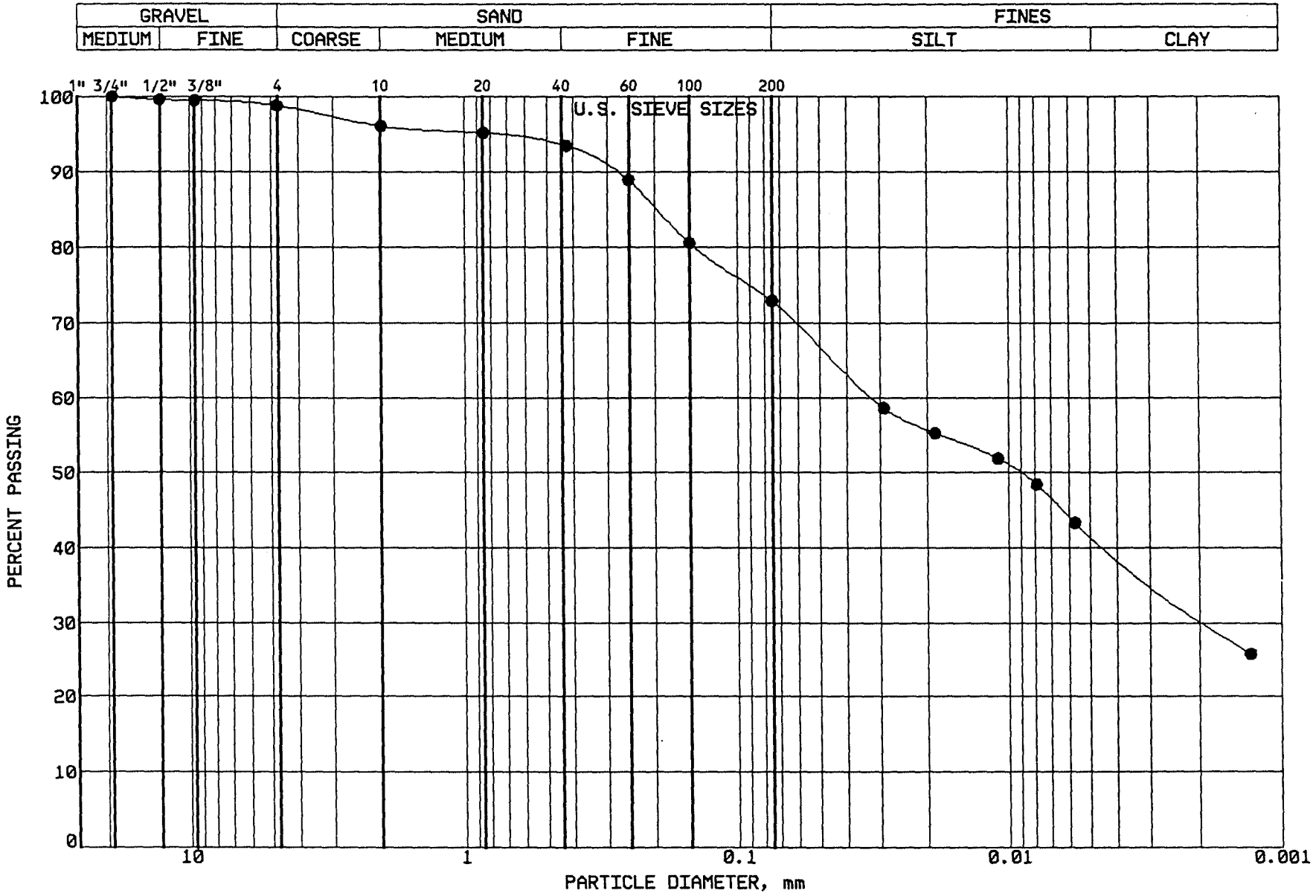
LOCATION: N 37556.0, E 40853.0
SAMPLE: CLBCC401 TUBE #: ST-117
ELEVATION: 1903.9'

GRAVEL	2.7 %
SAND	31.8 %
SILT	31.0 %
CLAY	34.5 %
P 200	65.5 %

SOIL PROPERTIES

LL: 42.0%
PL: 15.0%
PI: 27.0%
CLASS: Sandy Lean Clay (CL), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

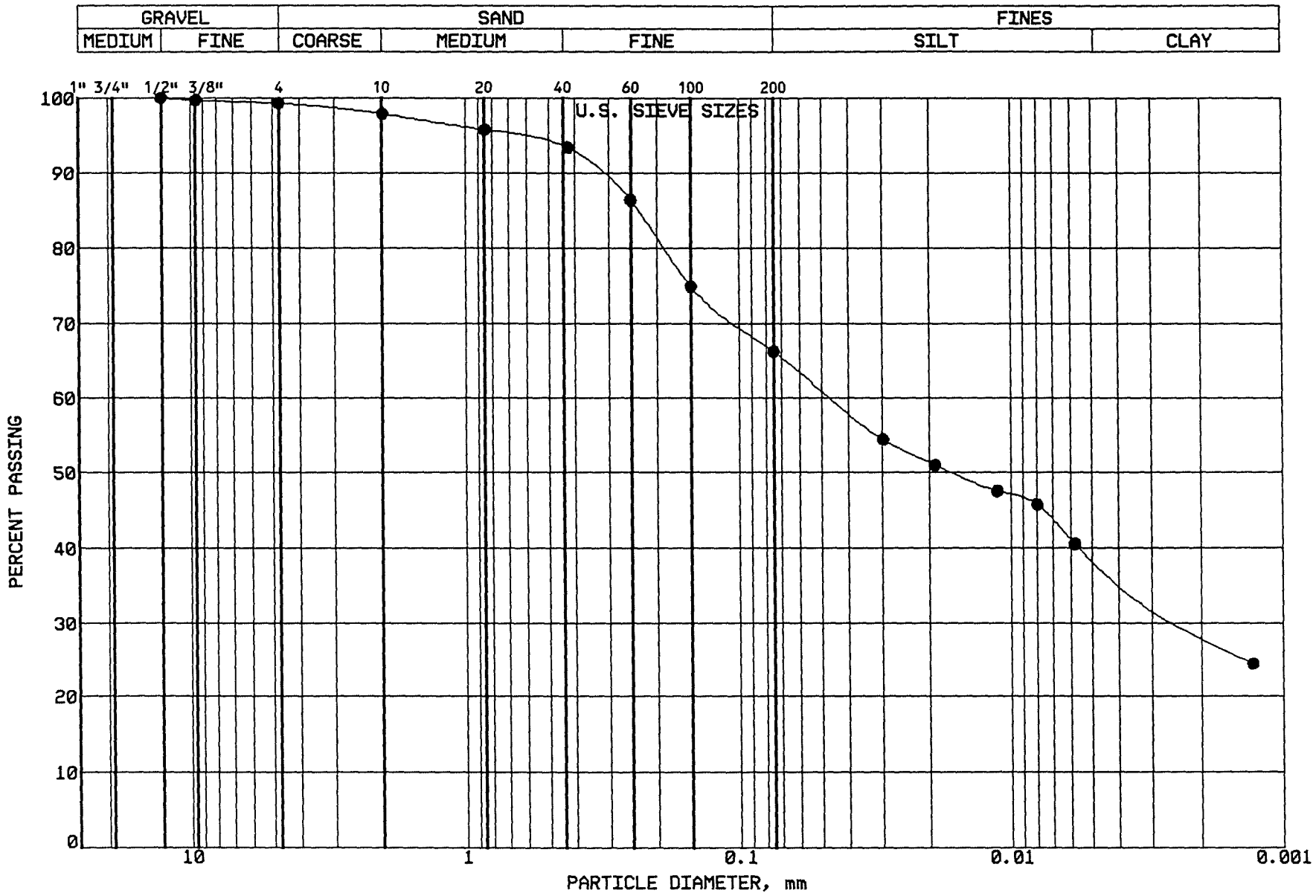
LOCATION: N 37830.0, E 40000.0
SAMPLE: CLBCC402 TUBE #: ST-118
ELEVATION: 1906.4'

GRAVEL	1.2 %
SAND	25.9 %
SILT	31.2 %
CLAY	41.7 %
P 200	72.9 %

SOIL PROPERTIES

LL: 42.0%
PL: 15.0%
PI: 27.0%
CLASS: Lean Clay w/Sand (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

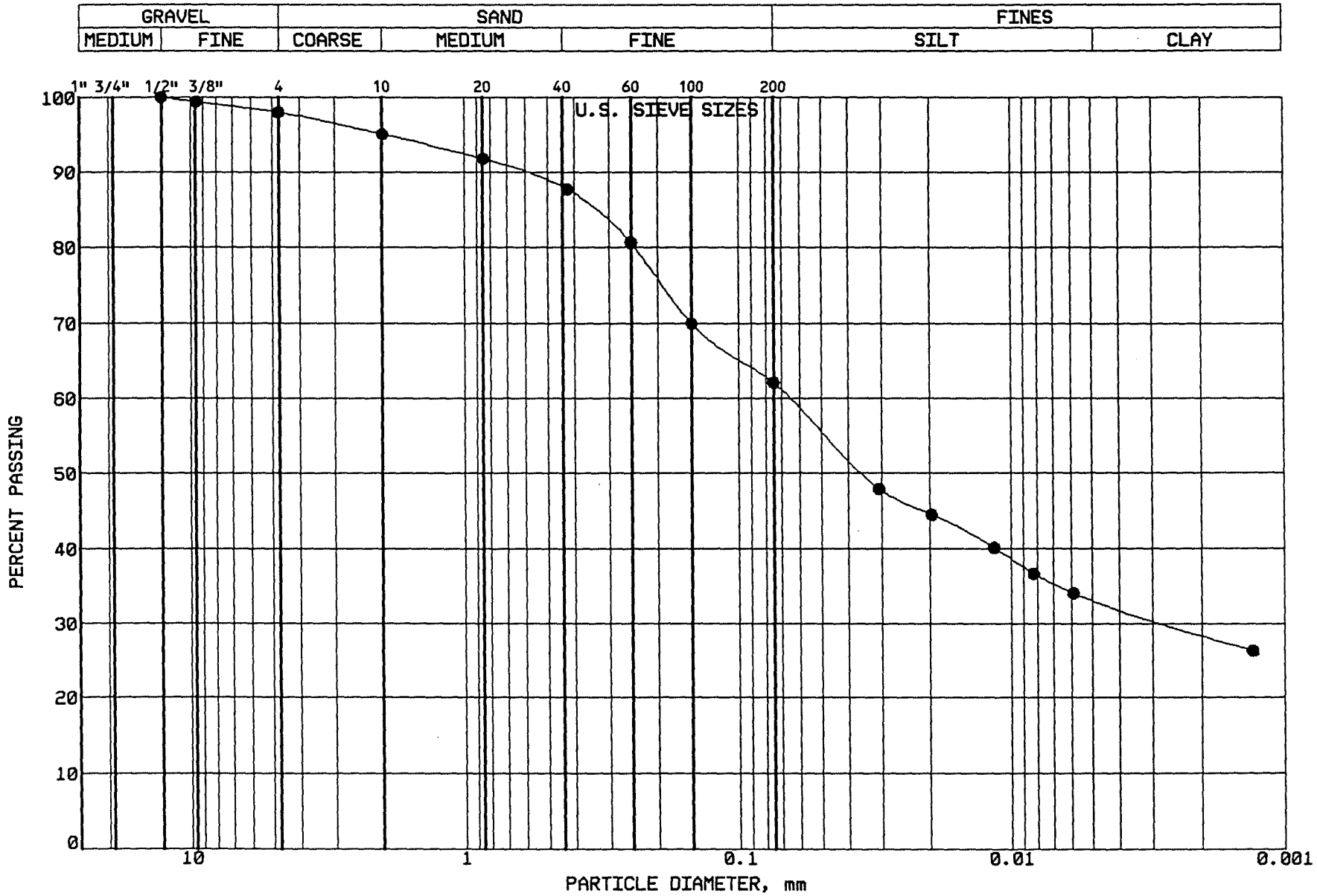
LOCATION: N 37950.0, E 39800.0
SAMPLE: CLBCC403 TUBE #: ST-119
ELEVATION: 1906.6'

GRAVEL	0.7 %
SAND	33.1 %
SILT	27.3 %
CLAY	38.9 %
P 200	66.2 %

SOIL PROPERTIES

LL: 41.0%
PL: 15.0%
PI: 26.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38808.0, E 40243.0
SAMPLE: CLSCC404 TUBE #:
ELEVATION: 1914.5'

GRAVEL	2.0 %
SAND	35.9 %
SILT	28.9 %
CLAY	33.2 %
P 200	62.1 %

SOIL PROPERTIES

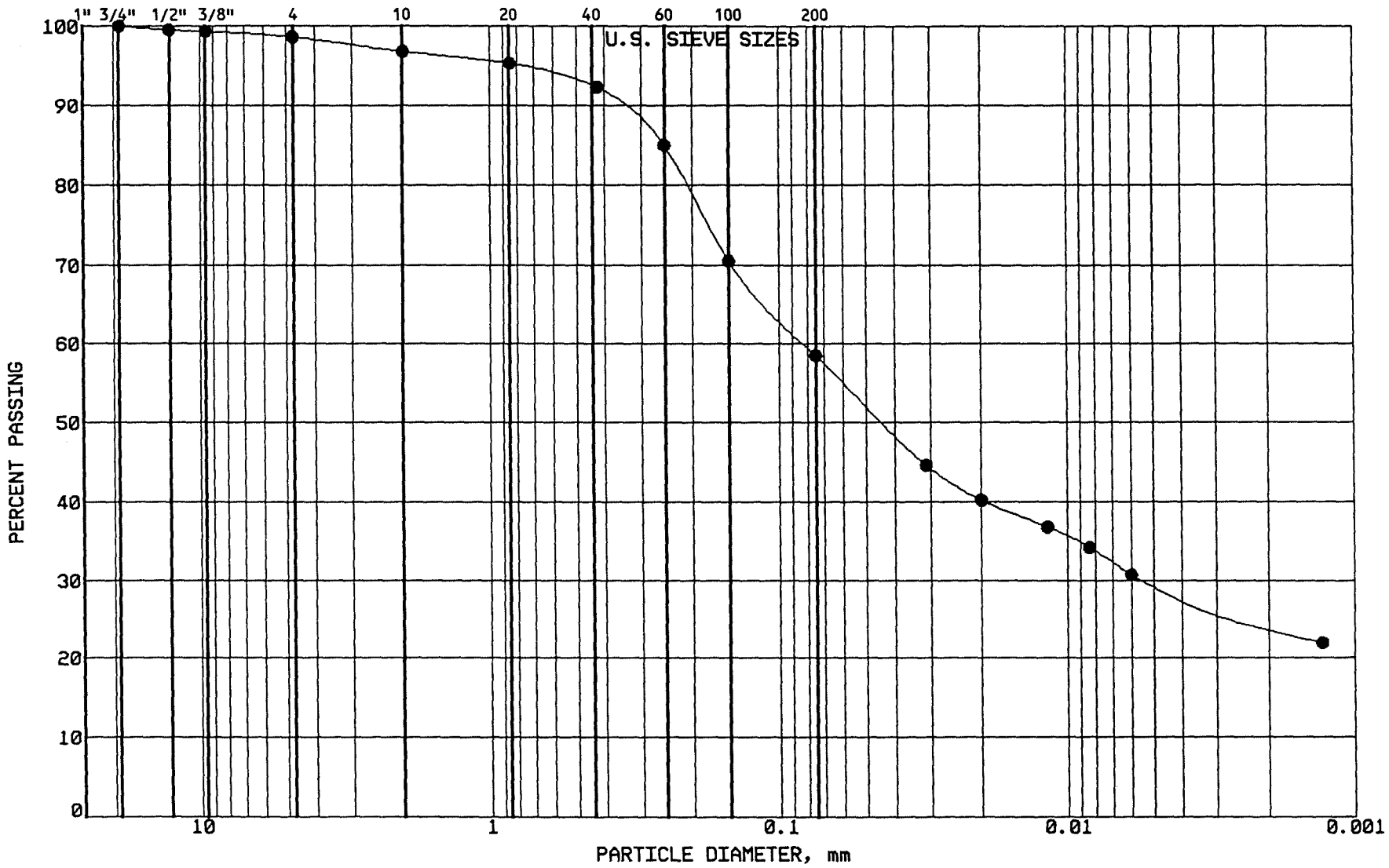
LL: 43.0%

PL: 14.0%

PI: 29.0%

CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

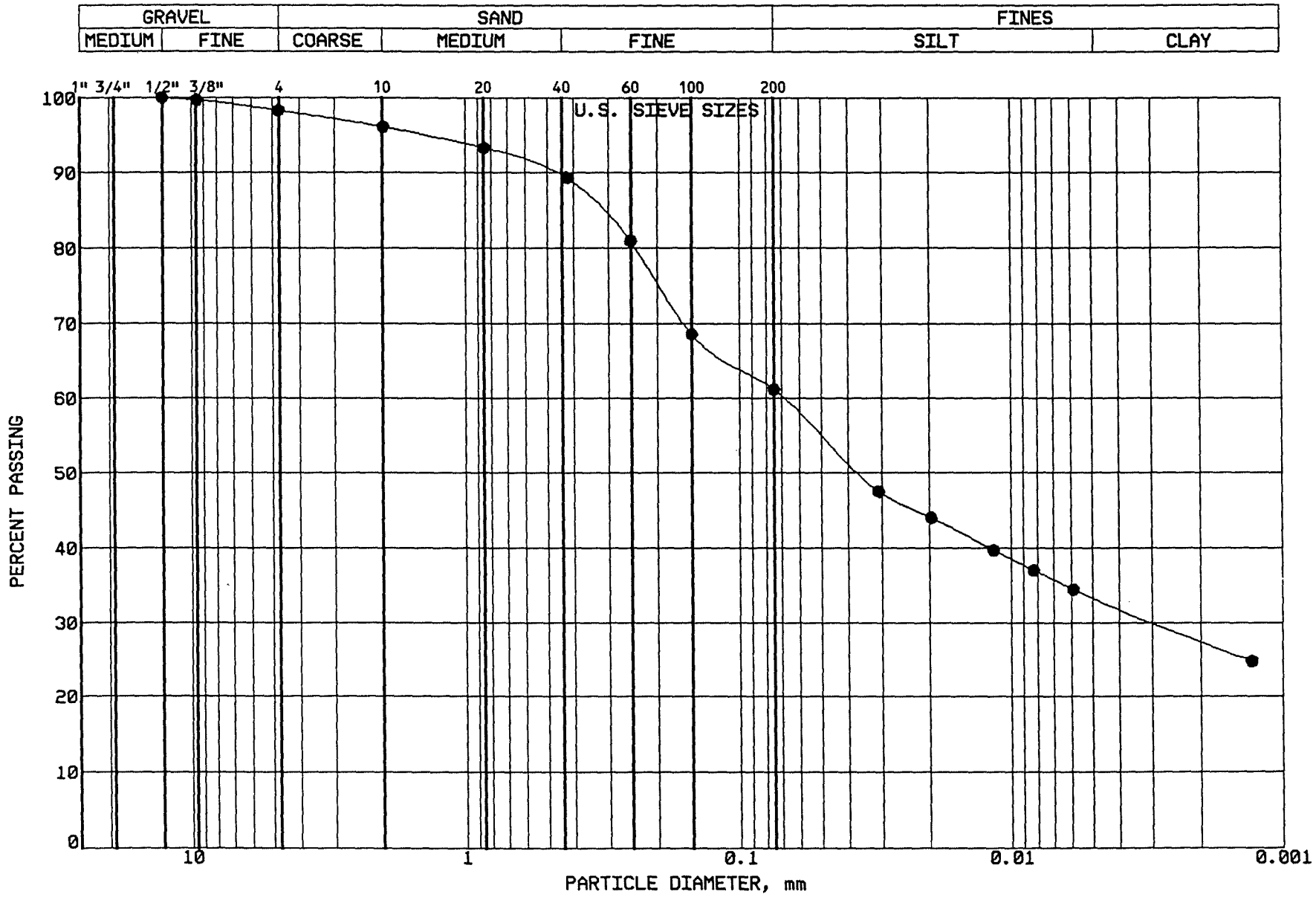
LOCATION: N 38811.0, E 40064.0
SAMPLE: CLSCC405 TUBE #:
ELEVATION: 1916.4'

GRAVEL	1.4 %
SAND	40.1 %
SILT	28.8 %
CLAY	29.7 %
P 200	58.5 %

SOIL PROPERTIES

LL: 39.0%
PL: 13.0%
PI: 26.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

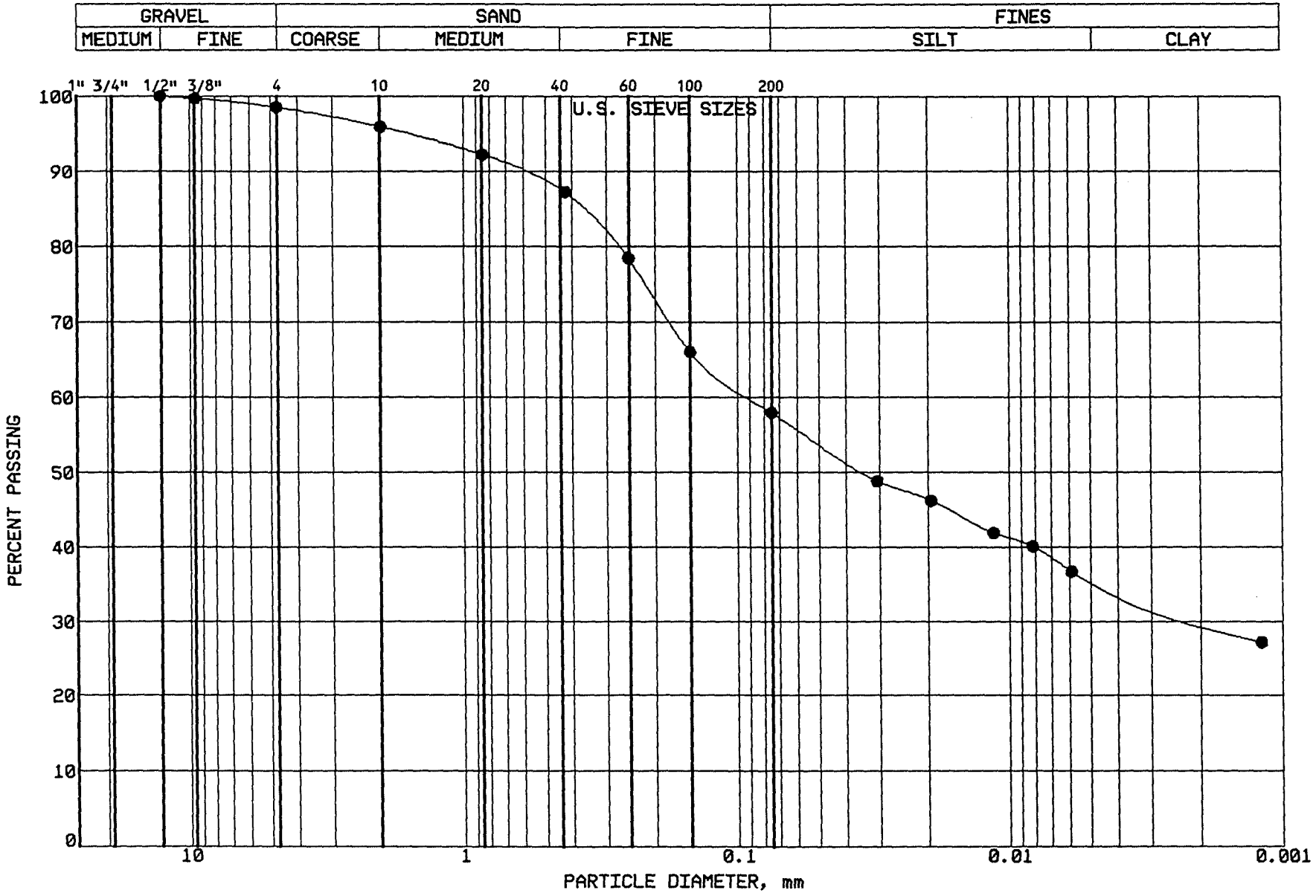
LOCATION: N 37795.0, E 41567.0
SAMPLE: CLSCC406 TUBE #:
ELEVATION: 1915.1'

GRAVEL	1.7 %
SAND	37.1 %
SILT	27.9 %
CLAY	33.3 %
P 200	61.2 %

SOIL PROPERTIES

LL: 40.0%
PL: 13.0%
PI: 27.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

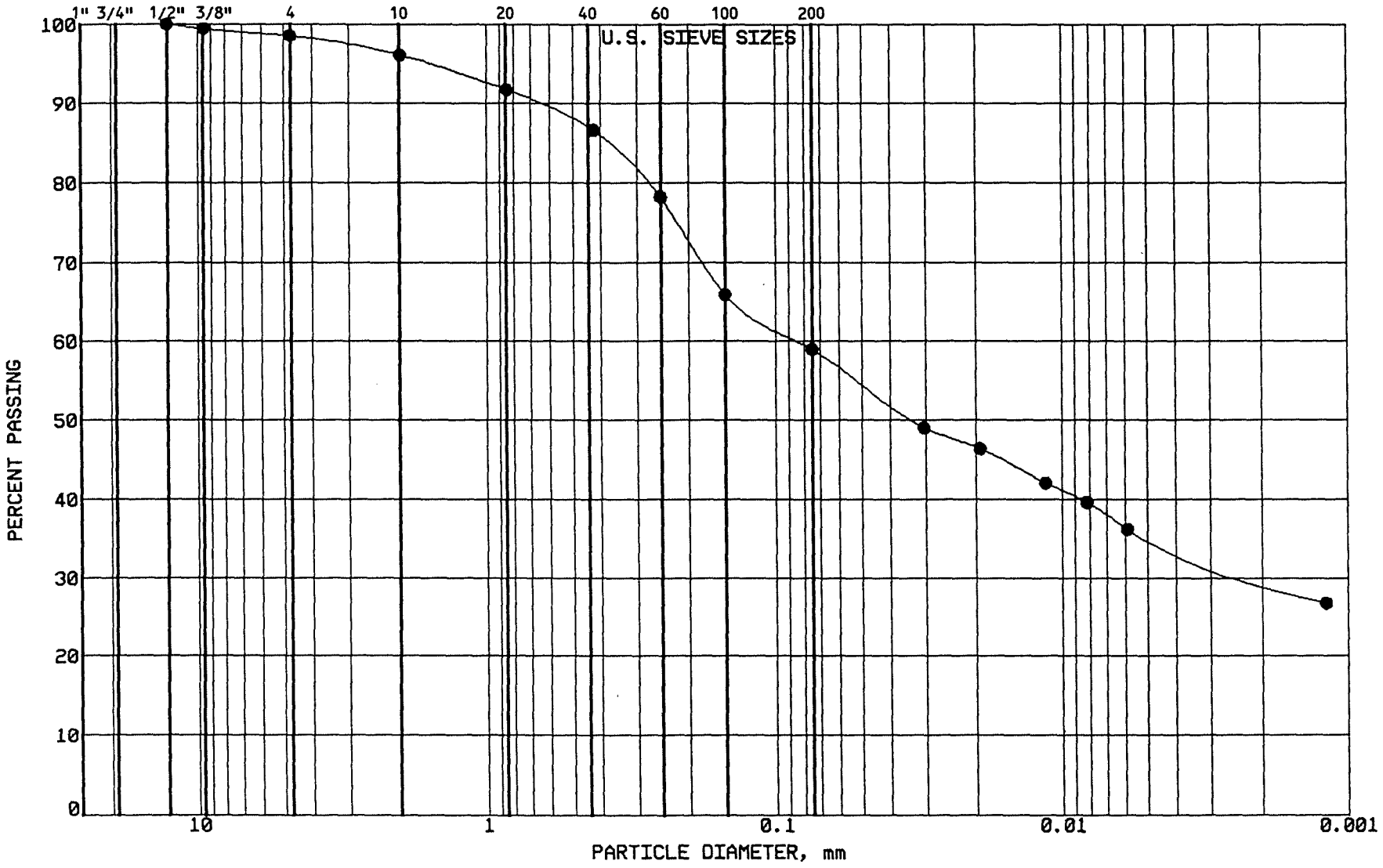
LOCATION: N 37432.0, E 41294.0
SAMPLE: CLSCC407 TUBE #: ST-120
ELEVATION: 1913.9'

GRAVEL	1.5 %
SAND	40.5 %
SILT	22.3 %
CLAY	35.7 %
P 200	58.0 %

SOIL PROPERTIES

LL: 42.0%
PL: 15.0%
PI: 27.0%
CLASS: Sandy Lean Clay (CL), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

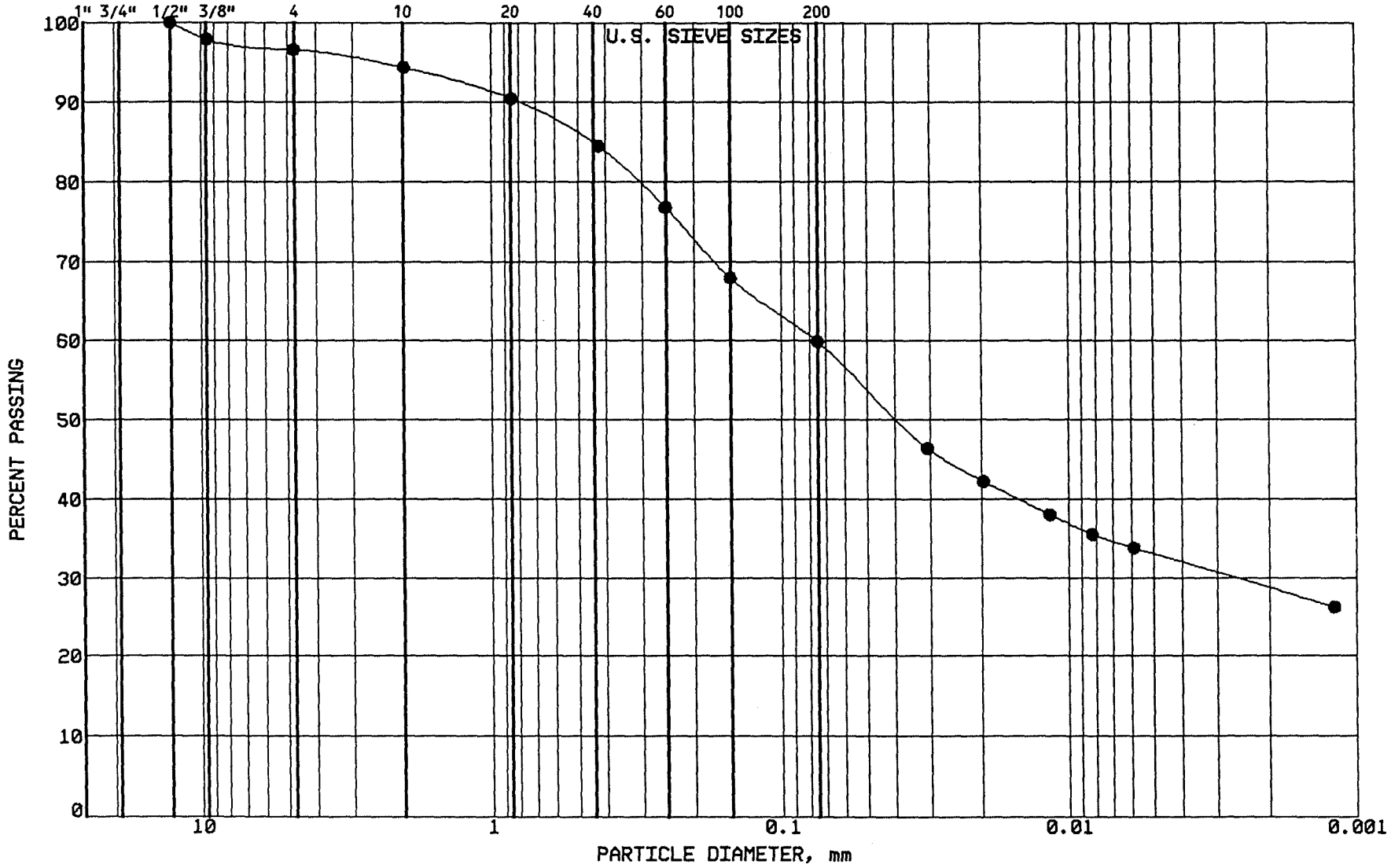
LOCATION: N 37200.0, E 41077.0
SAMPLE: CLSCC408 TUBE #: ST-121
ELEVATION: 1915.5'

GRAVEL	1.5 %
SAND	39.5 %
SILT	23.8 %
CLAY	35.2 %
P 200	59.0 %

SOIL PROPERTIES

LL: 42.0%
PL: 15.0%
PI: 27.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

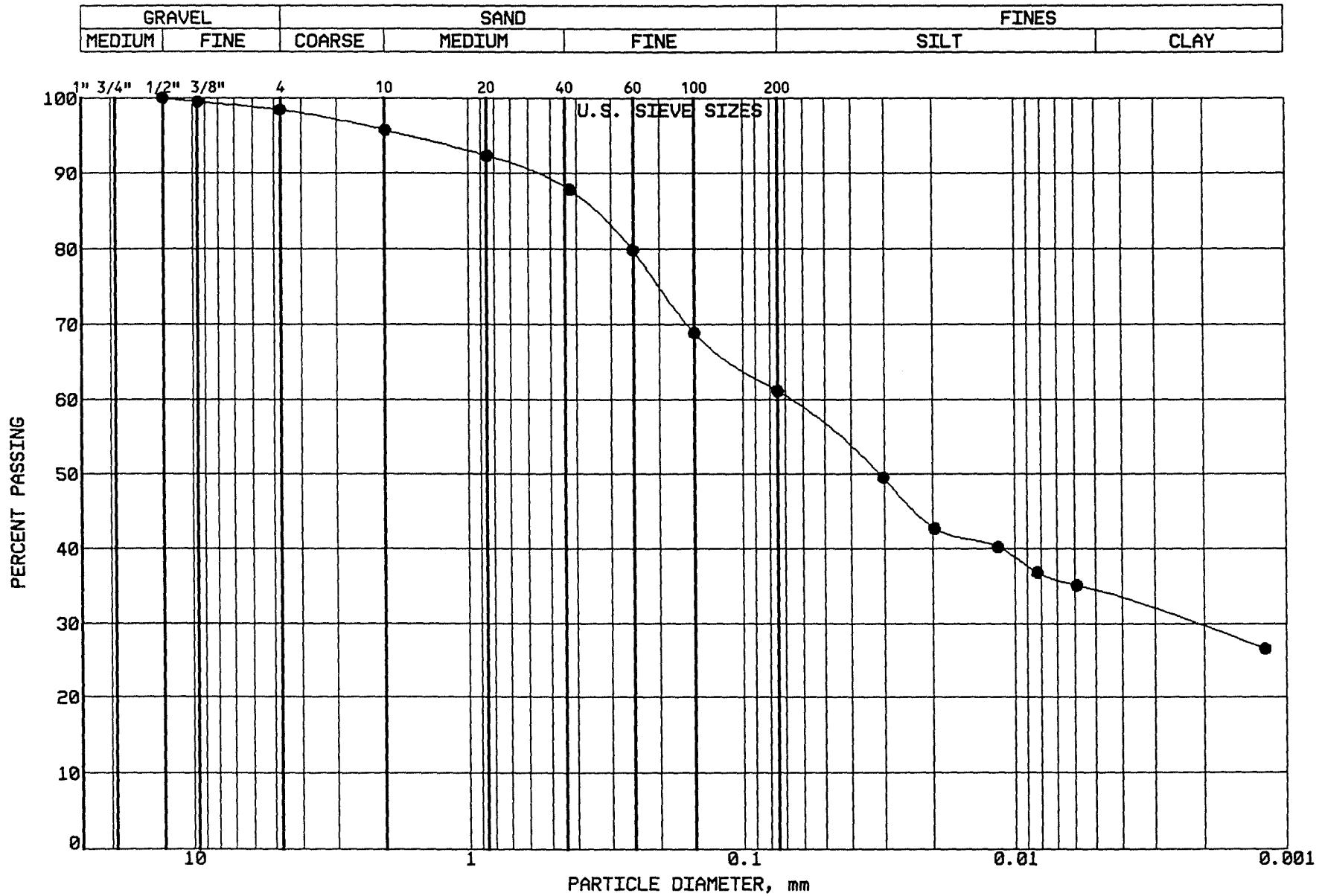
LOCATION: N 38815.0, E 40373.0
SAMPLE: CLSCC409 TUBE #:
ELEVATION: 1917.8'

GRAVEL	3.4 %
SAND	36.7 %
SILT	26.9 %
CLAY	33.0 %
P 200	59.9 %

SOIL PROPERTIES

LL: 45.0%
PL: 14.0%
PI: 31.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

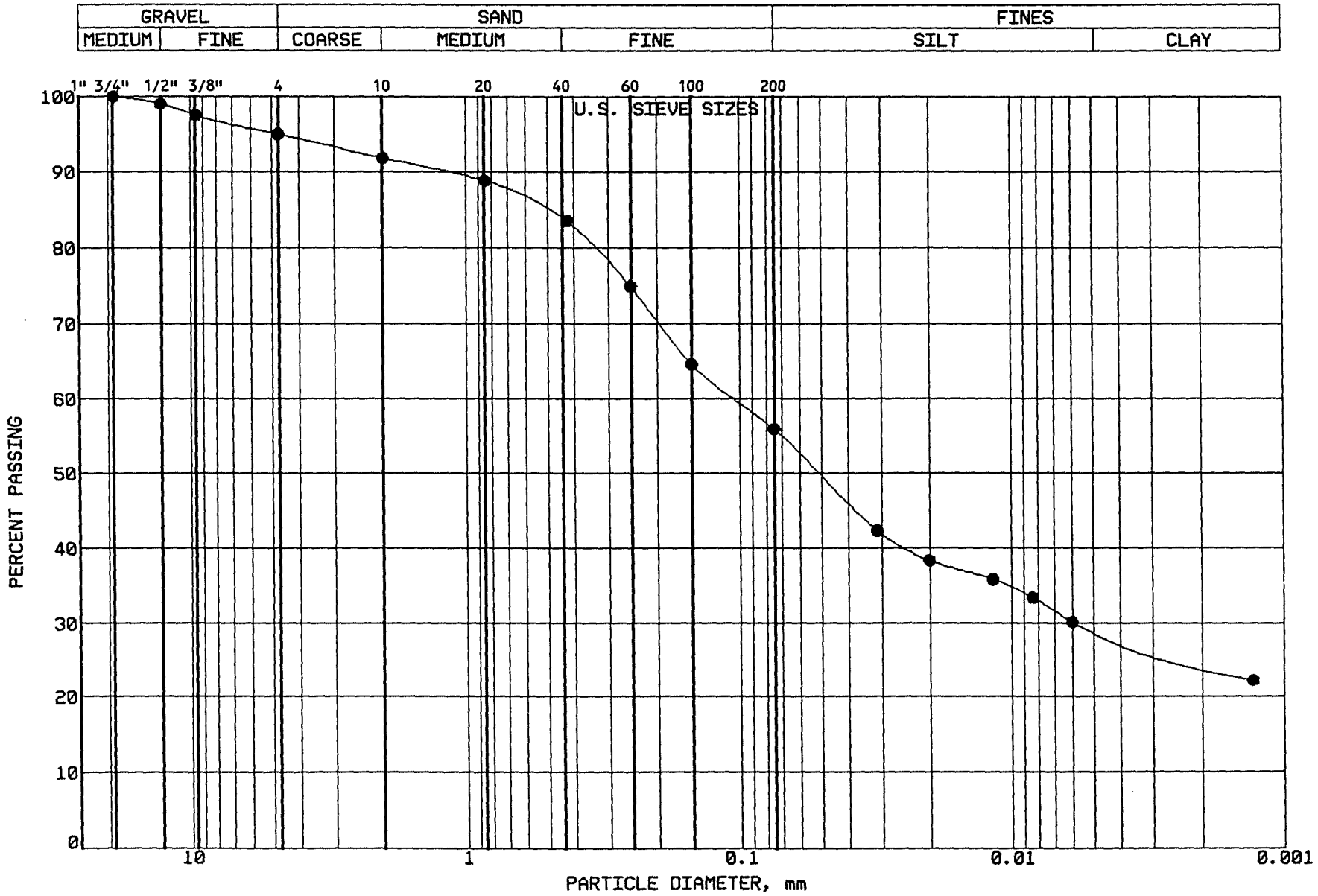
LOCATION: N 37163.0, E 40533.0
SAMPLE: CLBCC410 TUBE #:
ELEVATION: 1908.0'

GRAVEL	1.6 %
SAND	37.2 %
SILT	27.0 %
CLAY	34.2 %
P 200	61.2 %

SOIL PROPERTIES

LL: 40.0%
PL: 14.0%
PI: 26.0%
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

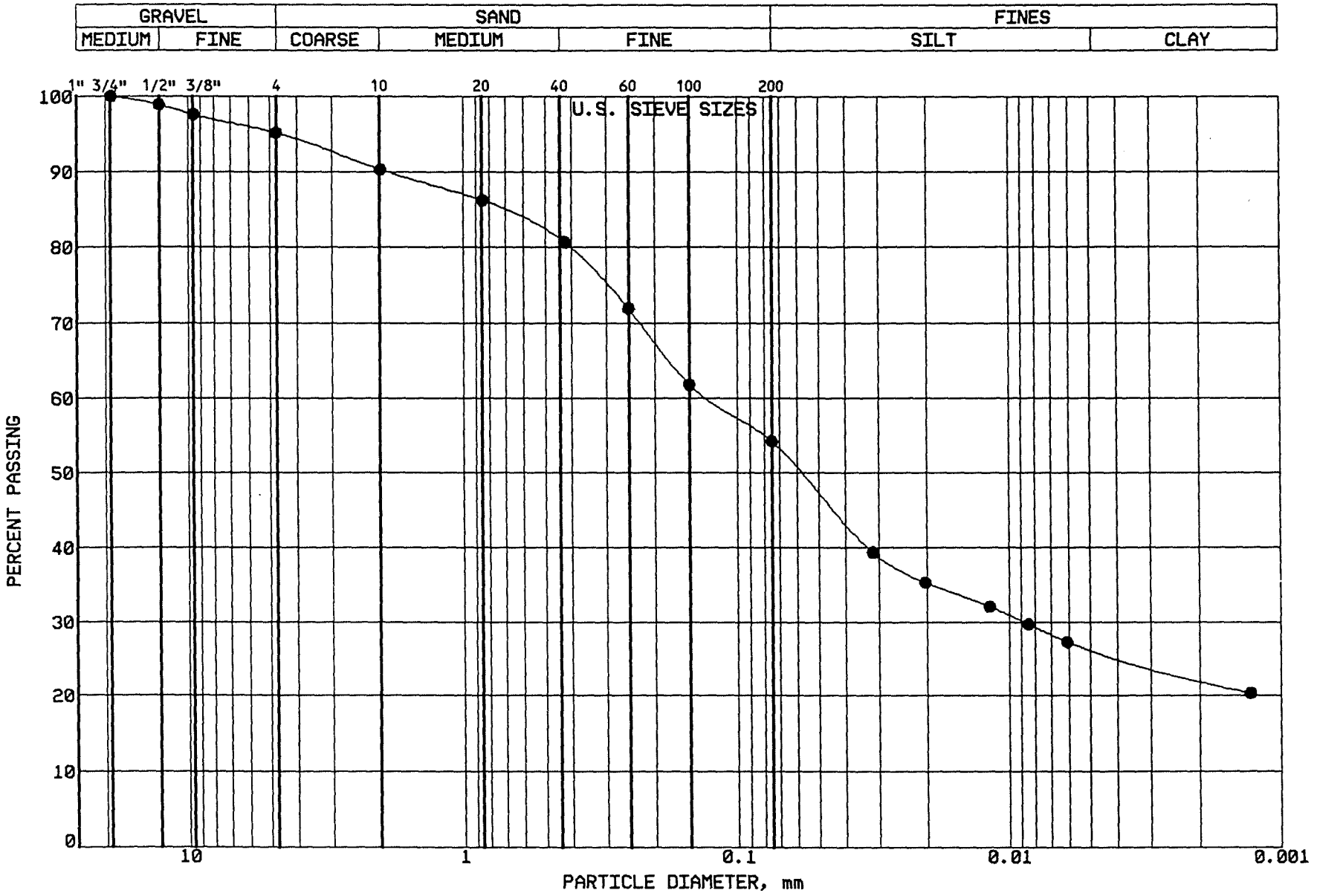
LOCATION: N 37160.0, E 40581.0
SAMPLE: CLBCC411 TUBE #: ST-122
ELEVATION: 1907.7'

GRAVEL	5.0 %
SAND	39.0 %
SILT	26.8 %
CLAY	29.2 %
P 200	56.0 %

SOIL PROPERTIES

LL: 40.0%
PL: 14.0%
PI: 26.0%
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

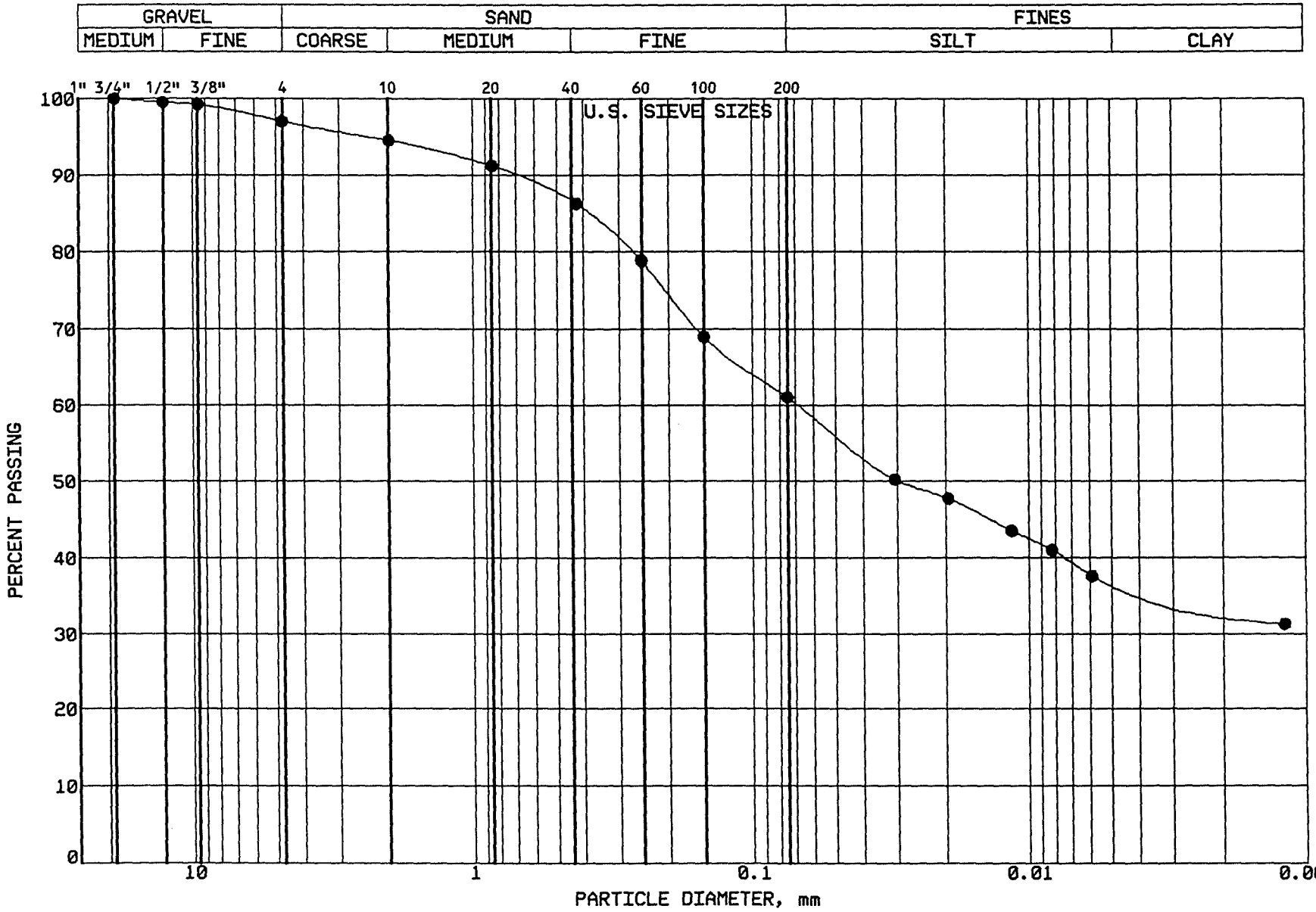
LOCATION: N 37325.0, E 40670.0
SAMPLE: CLBCC412 TUBE #: ST-123
ELEVATION: 1906.4'

GRAVEL	4.8 %
SAND	40.9 %
SILT	27.9 %
CLAY	26.4 %
P 200	54.3 %

SOIL PROPERTIES

LL: 37.0%
PL: 14.0%
PI: 23.0%
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

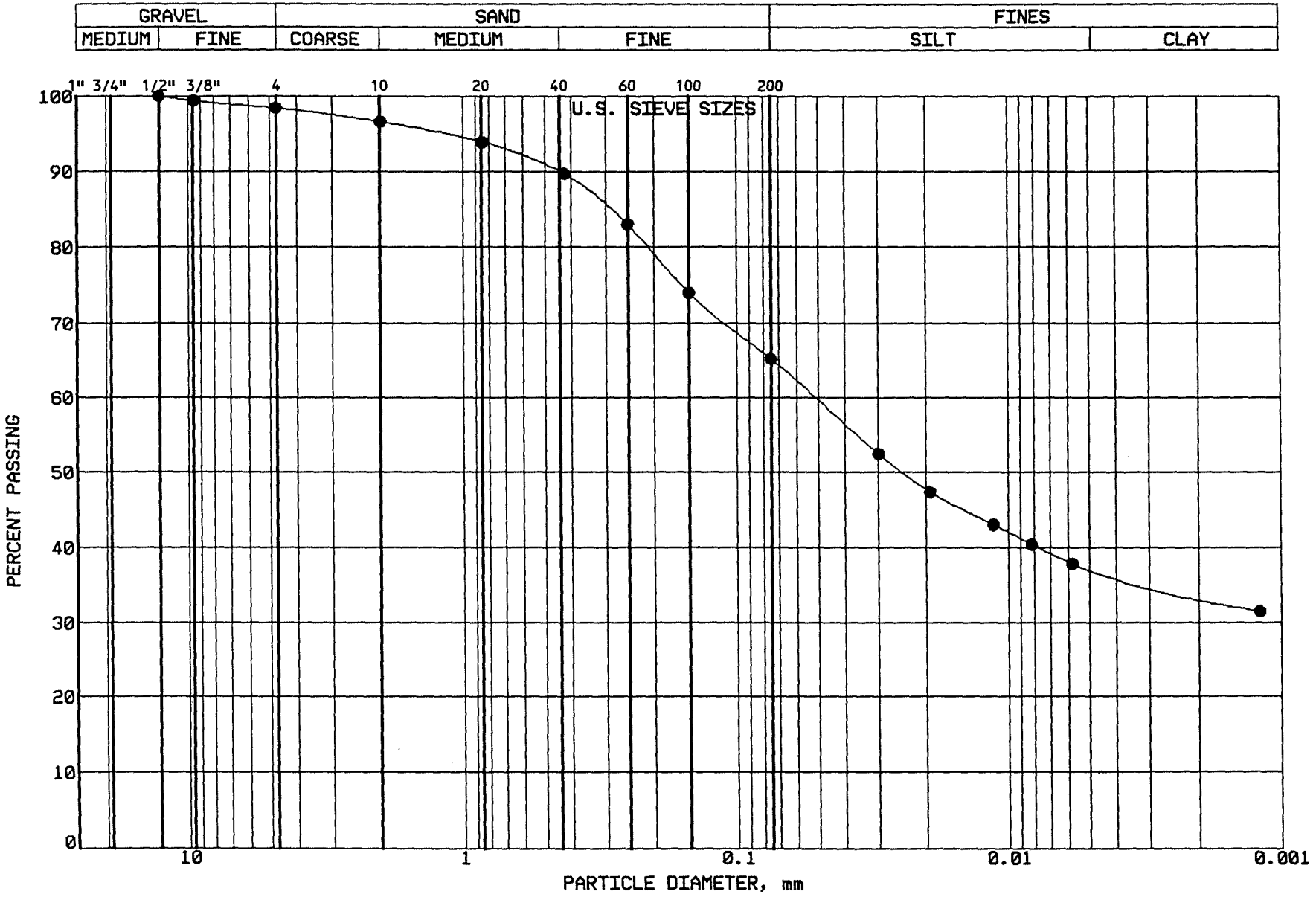
LOCATION: N 37516.0, E 40775.0
SAMPLE: CLBCC413 TUBE #: ST.124
ELEVATION: 1904.9'

GRAVEL	3.0 %
SAND	35.9 %
SILT	24.2 %
CLAY	36.9 %
P 200	61.1 %

SOIL PROPERTIES

LL: 44.0%
PL: 14.0%
PI: 30.0%
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

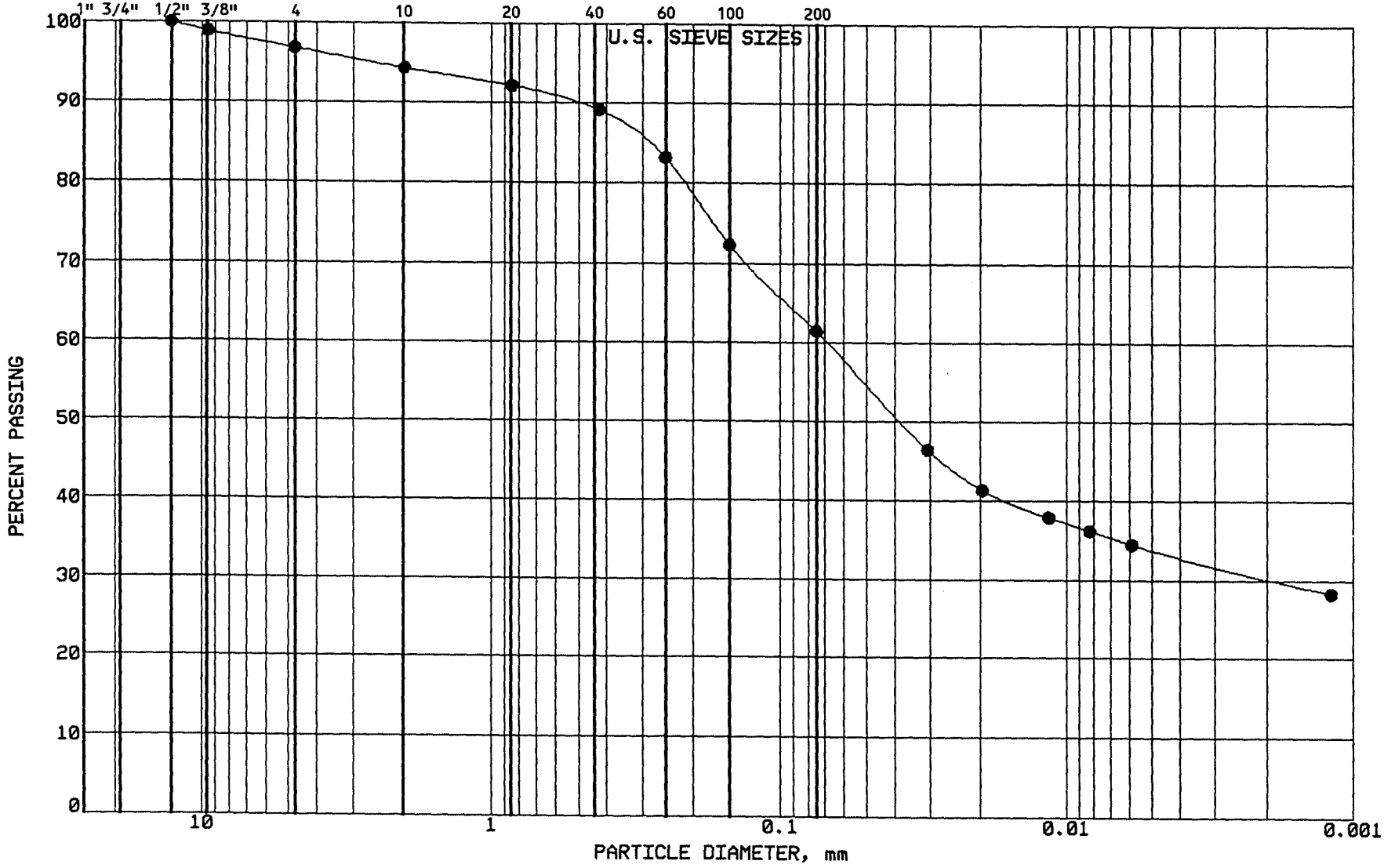
LOCATION: N 37144.0, E 40783.0
SAMPLE: CLBCC414 TUBE #: ST-125
ELEVATION: 1906.8'

GRAVEL	1.6 %
SAND	33.2 %
SILT	28.0 %
CLAY	37.2 %
P 200	65.2 %

SOIL PROPERTIES

LL: 43.0%
PL: 14.0%
PI: 29.0%
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

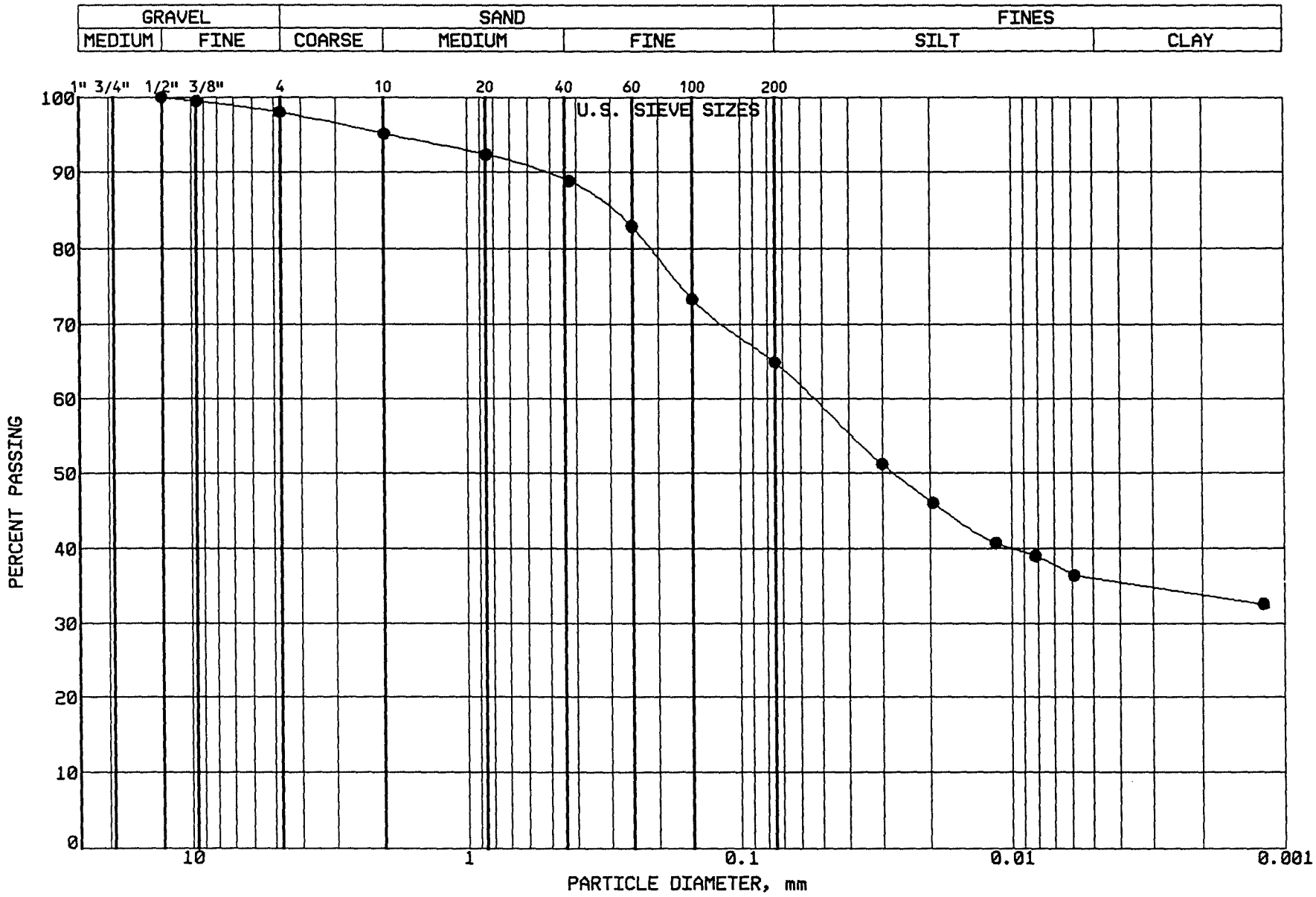
LOCATION: N 37299.0, E 40861.0
SAMPLE: CLBCC415 TUBE #: ST-126
ELEVATION: 1905.9'

GRAVEL	3.2 %
SAND	35.3 %
SILT	27.6 %
CLAY	33.9 %
P 200	61.5 %

SOIL PROPERTIES

LL: 41.0%
PL: 12.0%
PI: 29.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

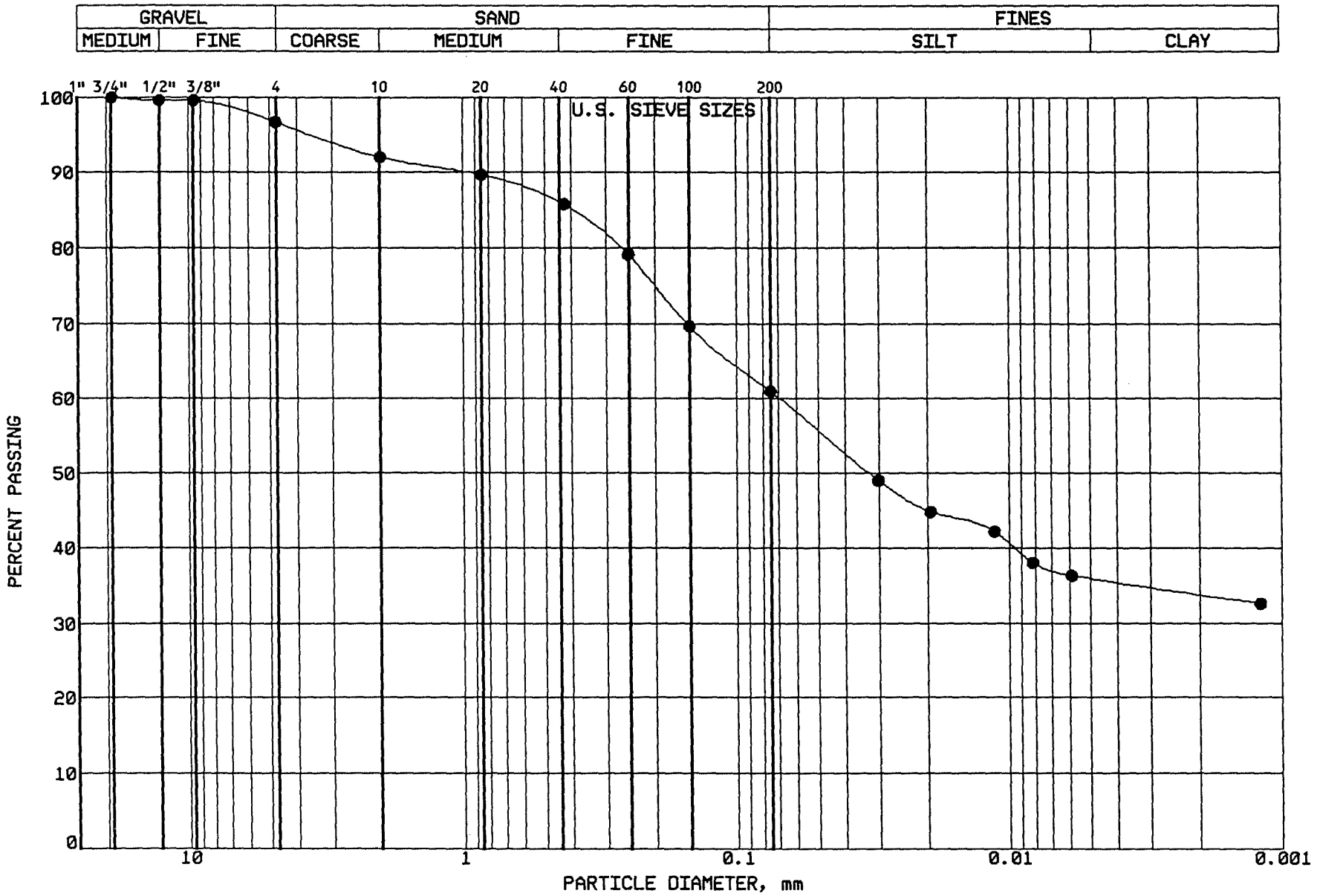
LOCATION: N 37438.0, E 40932.0
SAMPLE: CLBCC416 TUBE #: ST-127
ELEVATION: 1904.5'

GRAVEL	2.0 %
SAND	33.1 %
SILT	28.9 %
CLAY	36.0 %
P 200	64.9 %

SOIL PROPERTIES

LL: 40.0%
PL: 14.0%
PI: 26.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37600.0, E 41010.0
SAMPLE: CLBCC417 TUBE #: ST-128
ELEVATION: 1893.4'

GRAVEL	3.3 %
SAND	35.7 %
SILT	25.1 %
CLAY	35.9 %
P 200	61.0 %

SOIL PROPERTIES

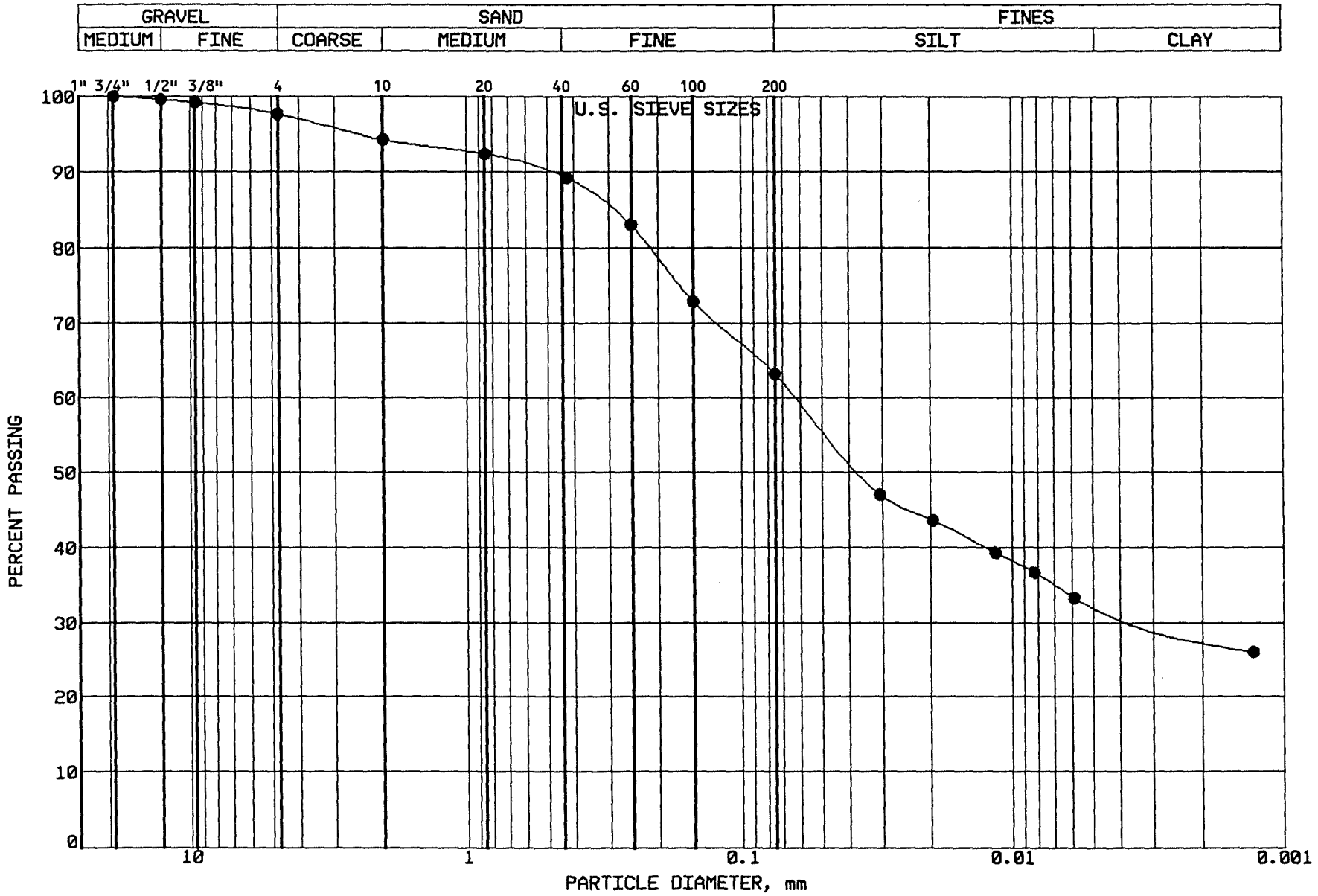
LL: 42.0%

PL: 13.0%

PI: 29.0%

CLASS: Sandy Lean Clay (CL), ol br,

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

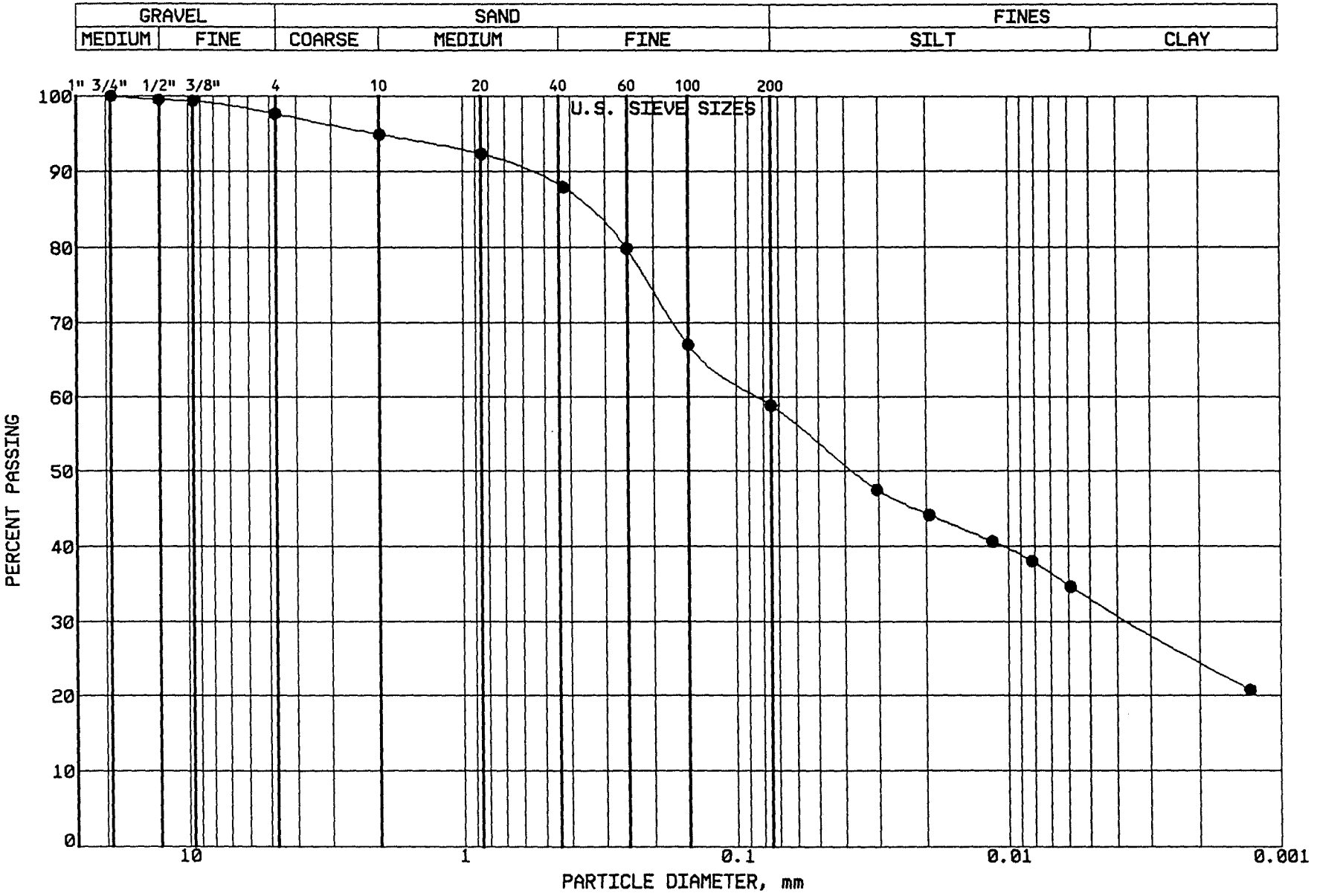
LOCATION: N 37190.0, E 40965.0
SAMPLE: CLBCC418 TUBE #: ST-129
ELEVATION: 1905.8'

GRAVEL	2.3 %
SAND	34.5 %
SILT	30.7 %
CLAY	32.5 %
P 200	63.2 %

SOIL PROPERTIES

LL: 40.0%
PL: 15.0%
PI: 25.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

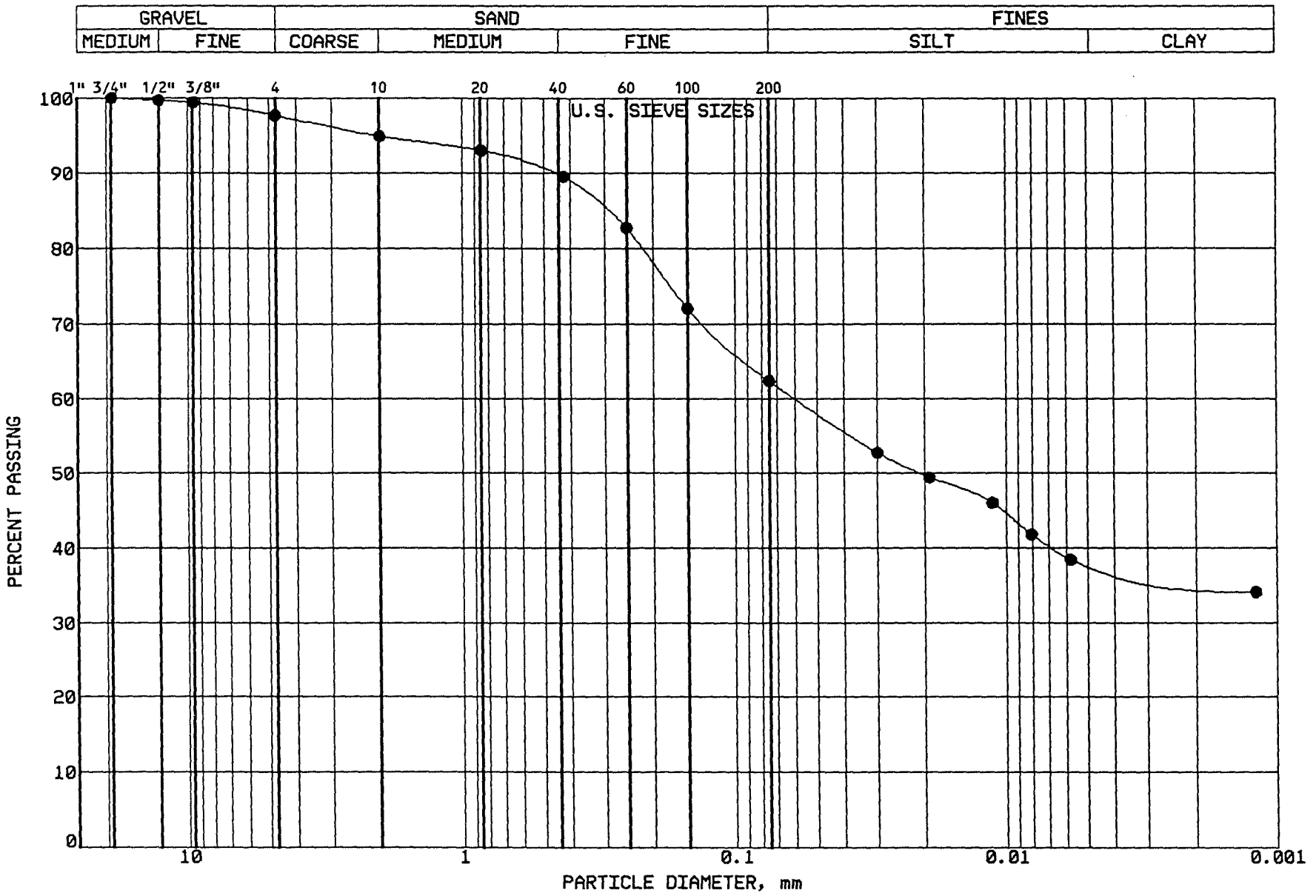
LOCATION: N 37337.0, E 41070.0
SAMPLE: CLBCC419 TUBE #: ST-130

GRAVEL	2.4 %
SAND	38.7 %
SILT	25.8 %
CLAY	33.1 %
P 200	58.9 %

SOIL PROPERTIES

LL: 39.0%
PL: 14.0%
PI: 25.0%
CLASS: Sandy Lean Clay (CL) dk gy-bg

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

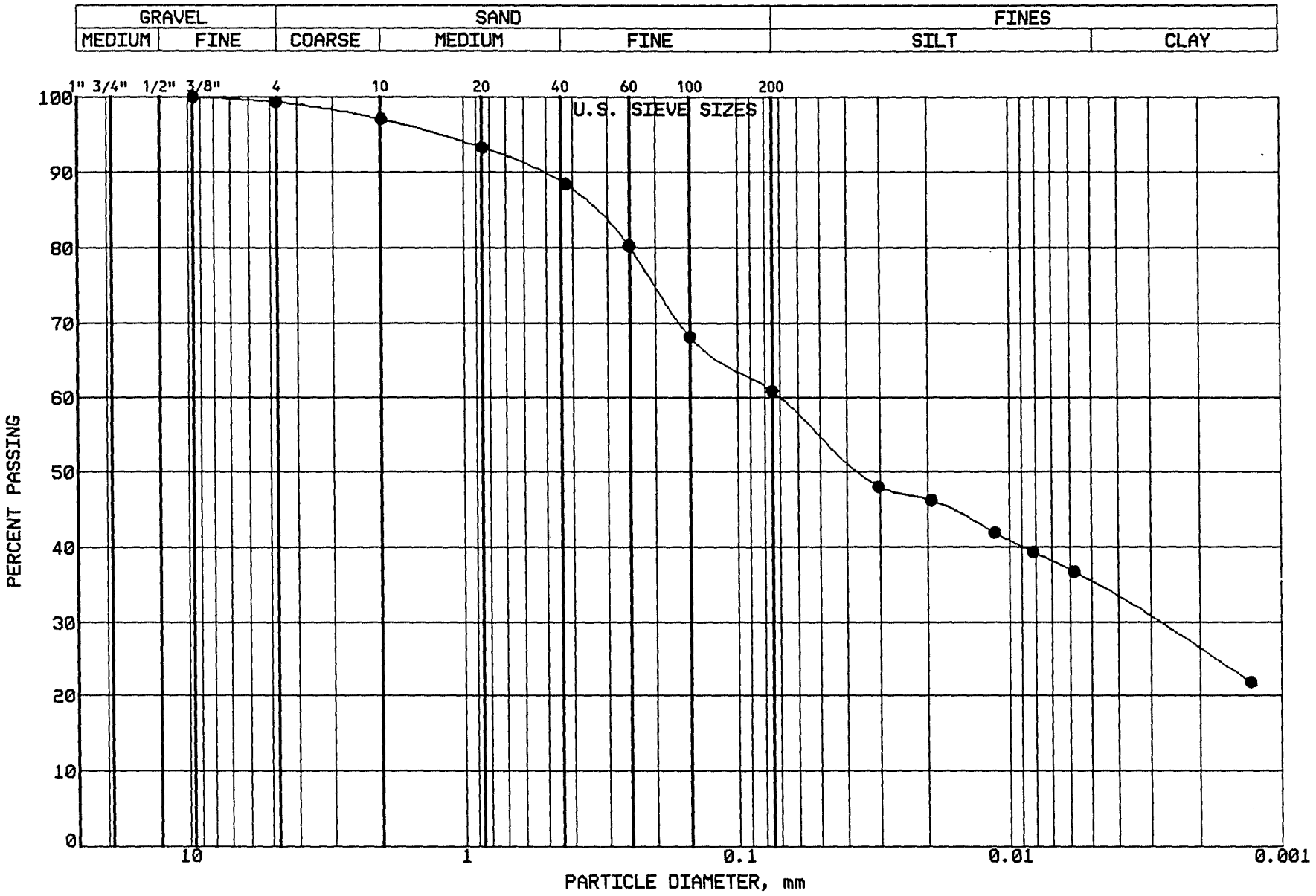
LOCATION: N 37484.0, E 41175.0
SAMPLE: CLBCC420 TUBE #: ST.131
ELEVATION: 1903.3'

GRAVEL	2.3 %
SAND	35.3 %
SILT	24.4 %
CLAY	38.0 %
P 200	62.4 %

SOIL PROPERTIES

LL: 40.0%
PL: 13.0%
PI: 27.0%
CLASS: Sandy Lean Clay (CL), gl br,

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

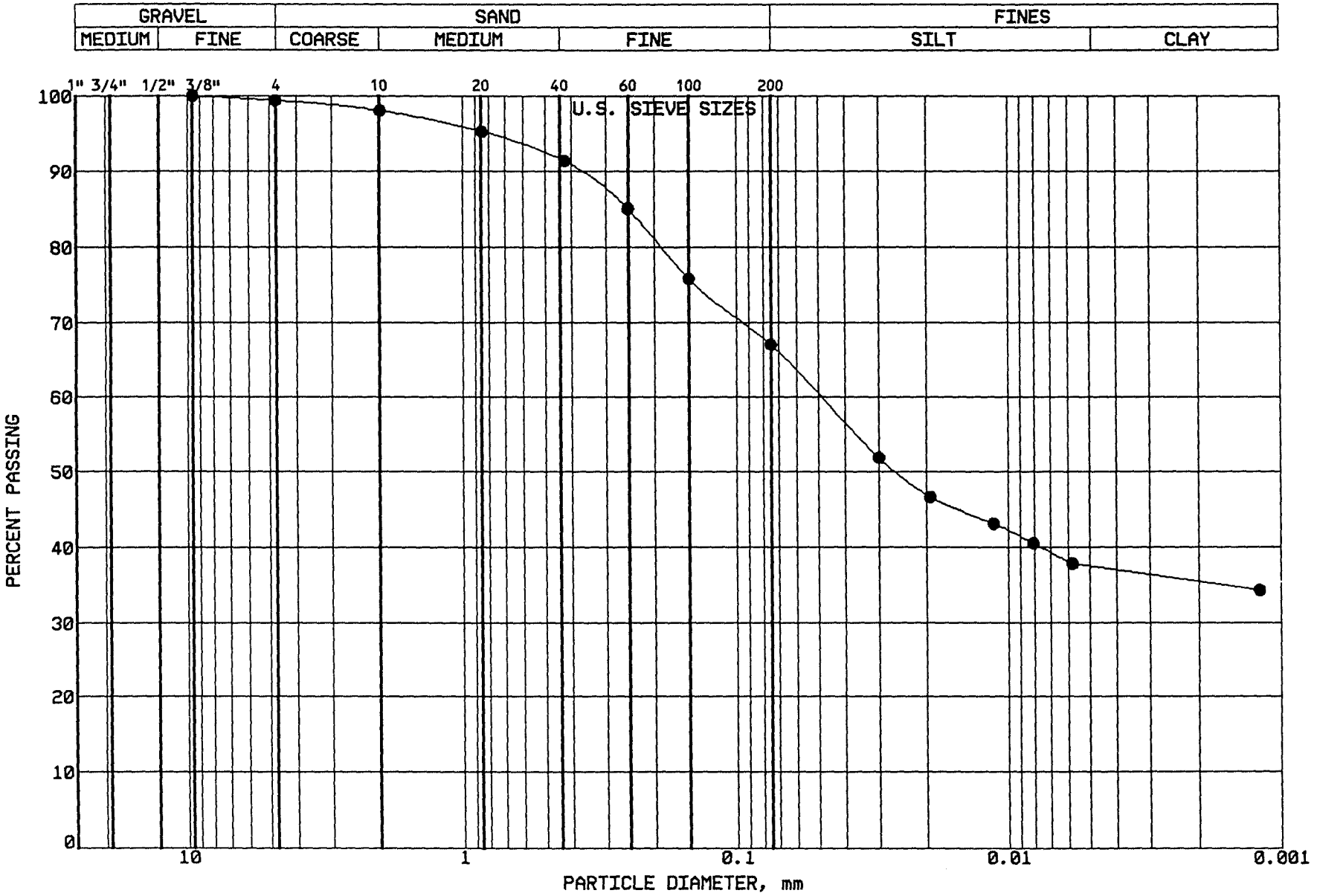
LOCATION: N 37805.0, E 40212.0
SAMPLE: CLBCC421 TUBE #:
ELEVATION: 1905.9'

GRAVEL	0.7 %
SAND	38.4 %
SILT	25.7 %
CLAY	35.2 %
P 200	60.9 %

SOIL PROPERTIES

LL: 42.0%
PL: 17.0%
PI: 25.0%
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

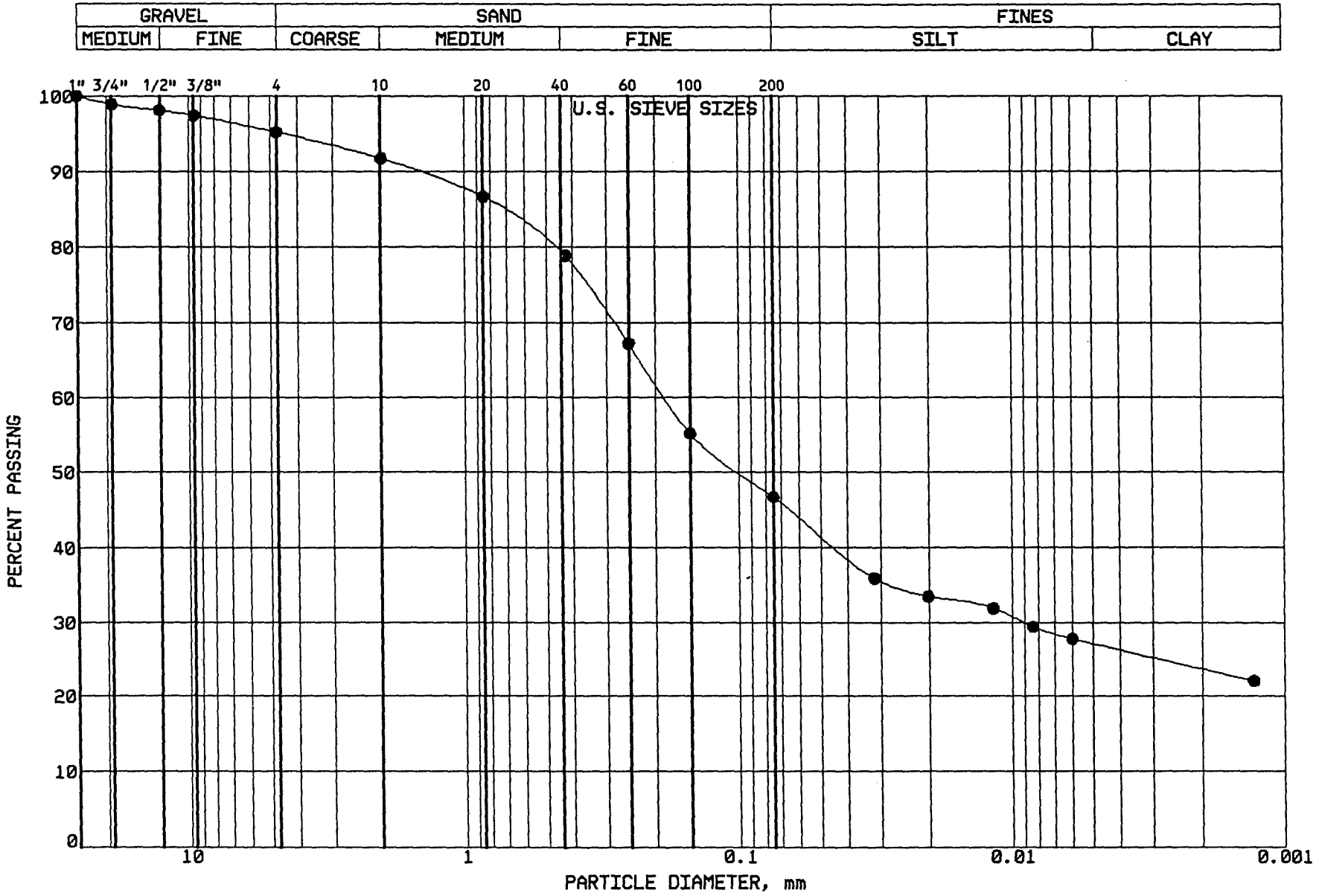
LOCATION: N 37953.0, E 39969.0
SAMPLE: CLBCC422 TUBE #:

GRAVEL	0.6 %
SAND	32.4 %
SILT	29.5 %
CLAY	37.5 %
P 200	67.0 %

SOIL PROPERTIES

LL: 42.0%
PL: 15.0%
PI: 27.0%
CLASS: Sandy Lean Clay (CL) ol bc

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

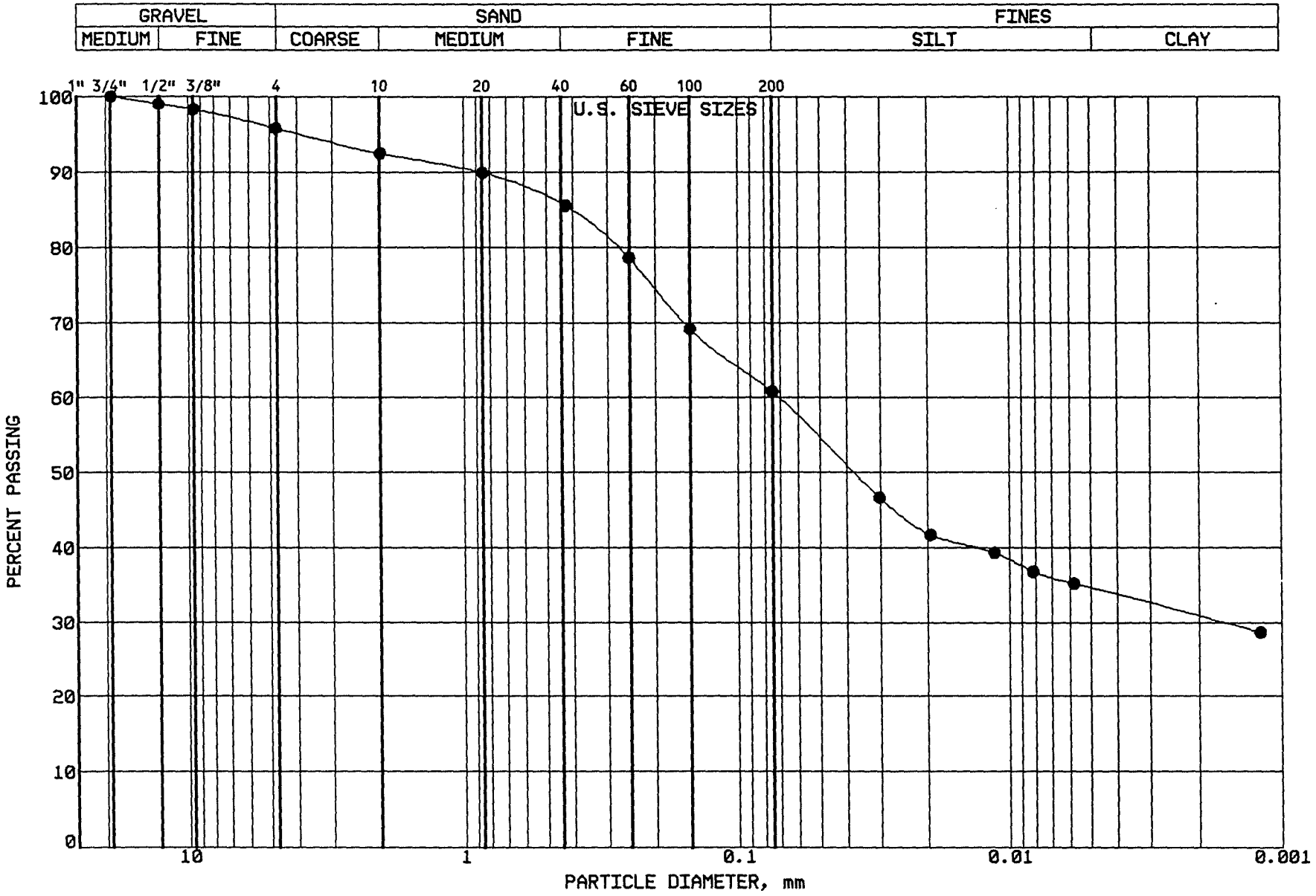
LOCATION: N 37325.0, E 40670.0
SAMPLE: CLBCC423 TUBE #: ST-123R
ELEVATION: 1906.4'

GRAVEL	4.8 %
SAND	48.6 %
SILT	19.5 %
CLAY	27.1 %
P 200	46.6 %

SOIL PROPERTIES

LL: 36.0%
PL: 12.0%
PI: 24.0%
CLASS: Clayey Sand (SC), lt ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

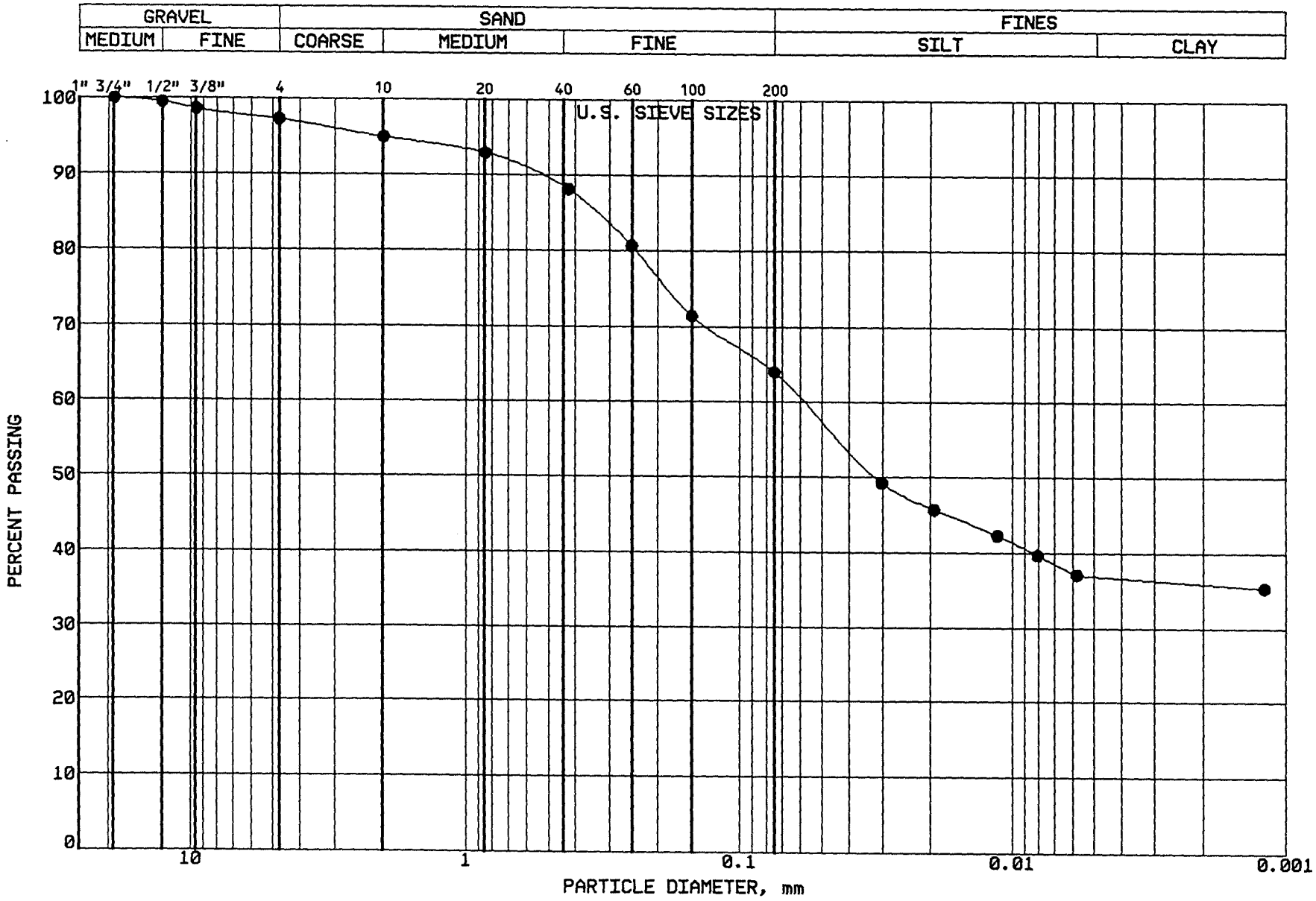
LOCATION: N 37299.0, E 40861.0
SAMPLE: CLBCC424 TUBE #: ST-126R
ELEVATION: 1905.9'

GRAVEL	4.2 %
SAND	35.0 %
SILT	26.2 %
CLAY	34.6 %
P 200	60.8 %

SOIL PROPERTIES

LL: 40.0%
PL: 12.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

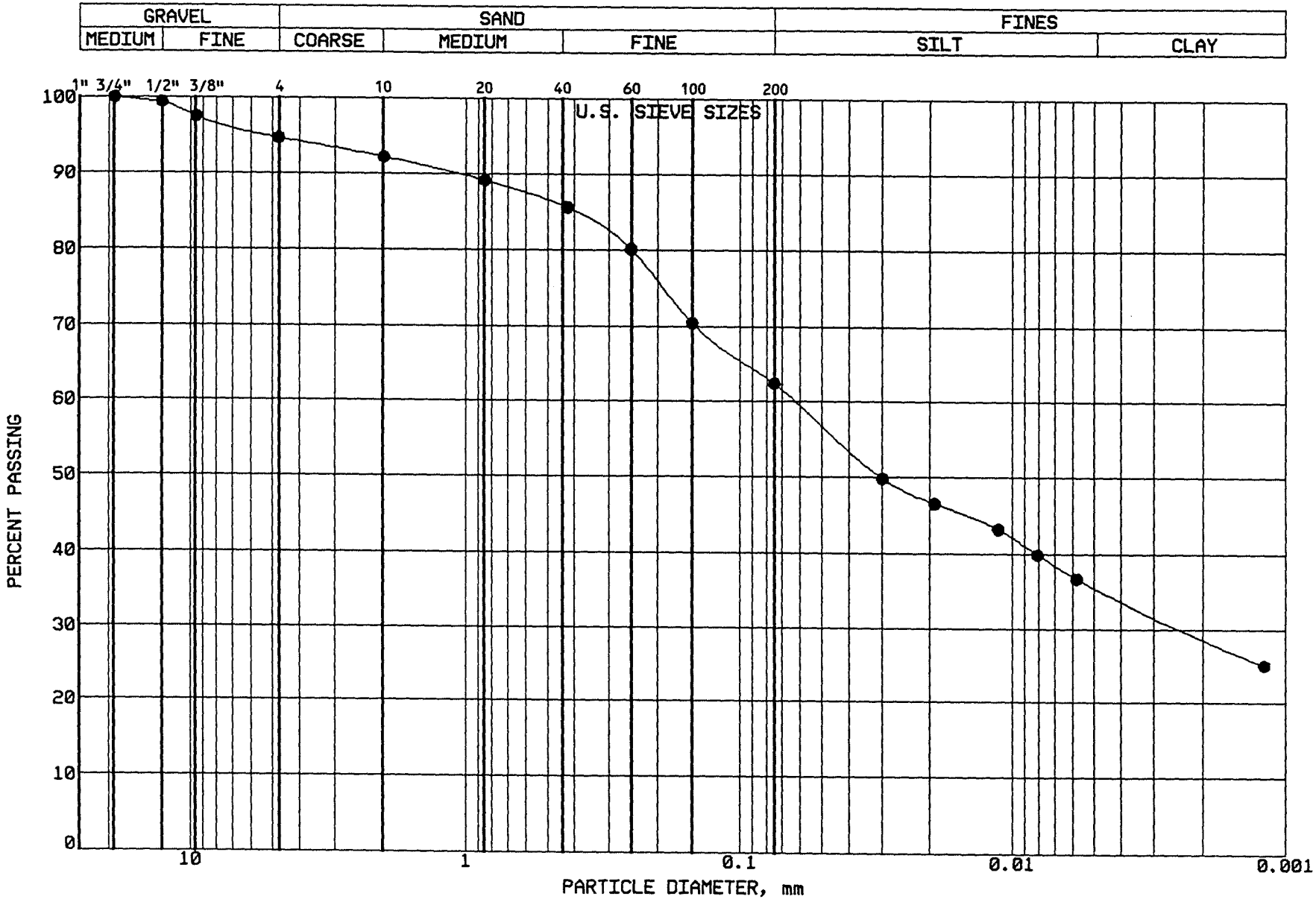
LOCATION: N 37438.0, E 40932.0
SAMPLE: CLBCC425 TUBE #: ST-127R
ELEVATION: 1904.5'

GRAVEL	2.7 %
SAND	33.3 %
SILT	27.1 %
CLAY	36.9 %
P 200	64.0 %

SOIL PROPERTIES

LL: 44.0%
PL: 12.0%
PI: 32.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

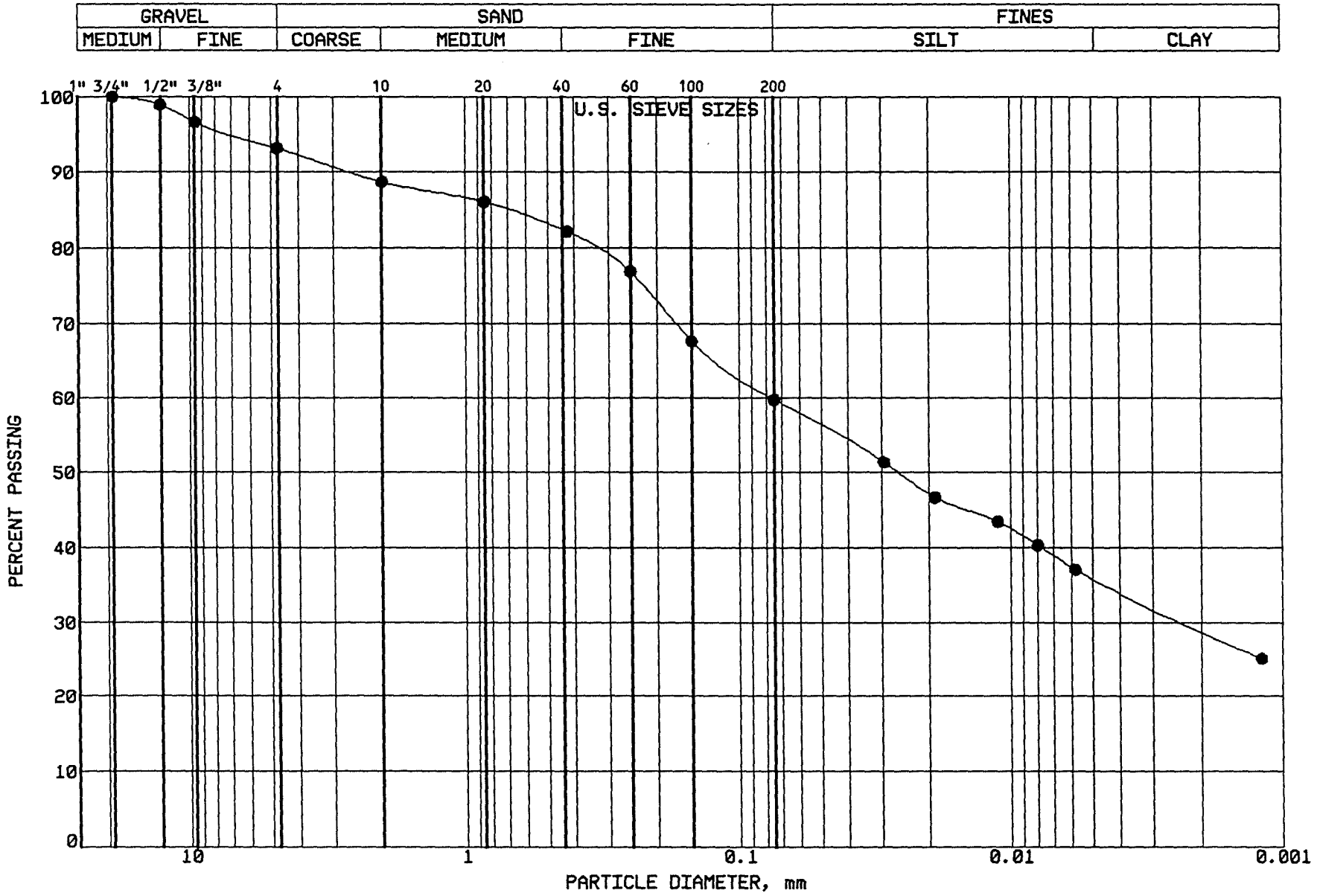
LOCATION: N 38150.0, E 40200.0
SAMPLE: CLBCC426 TUBE #:
ELEVATION: N/A'

GRAVEL	5.3 %
SAND	32.3 %
SILT	26.8 %
CLAY	35.6 %
P 200	62.4 %

SOIL PROPERTIES

LL: 47.0%
PL: 17.0%
PI: 30.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

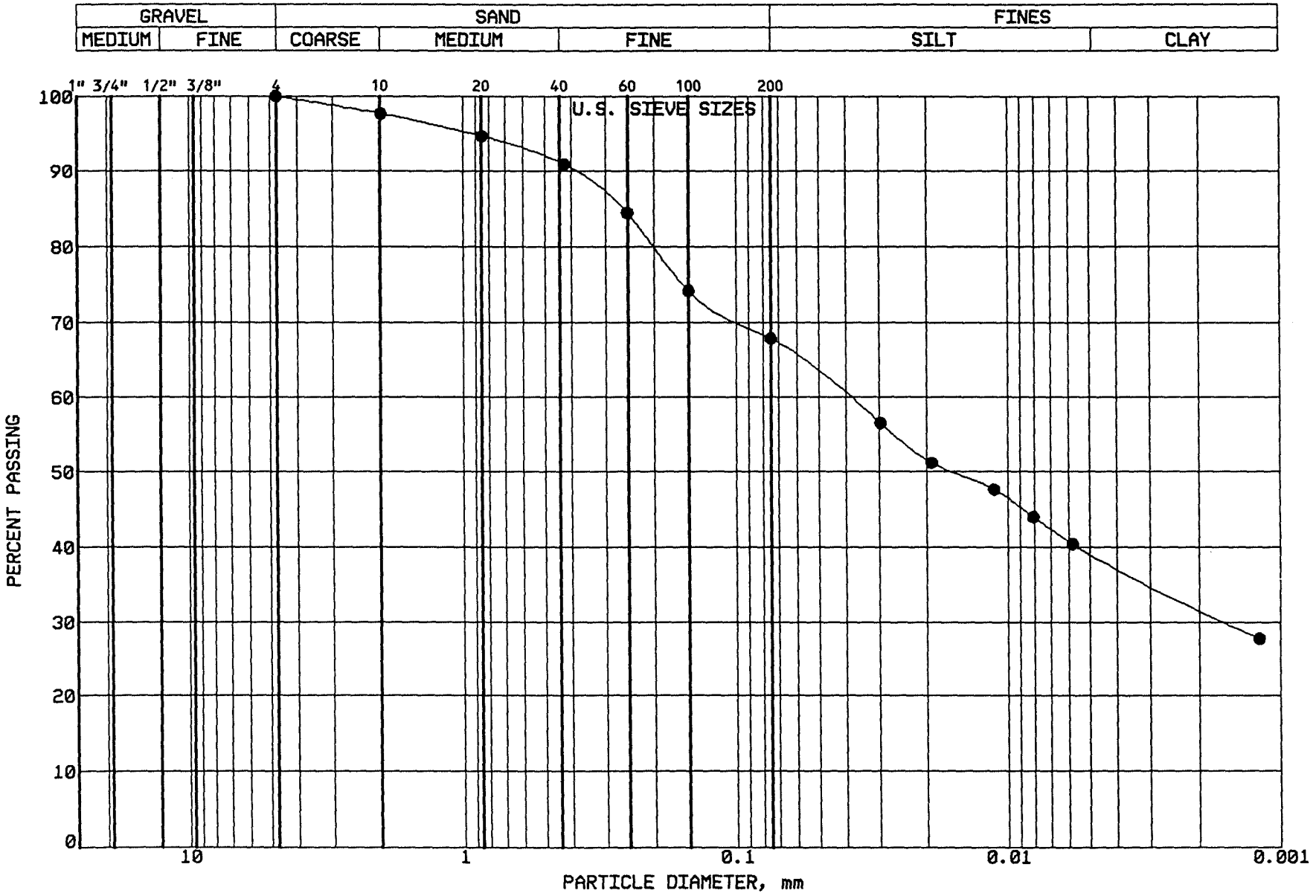
LOCATION: N 38000.0, E 40100.0
SAMPLE: CLBCC427 TUBE #:
ELEVATION: N/A'

GRAVEL	6.9 %
SAND	33.3 %
SILT	23.8 %
CLAY	36.0 %
P 200	59.8 %

SOIL PROPERTIES

LL: 45.0%
PL: 16.0%
PI: 29.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

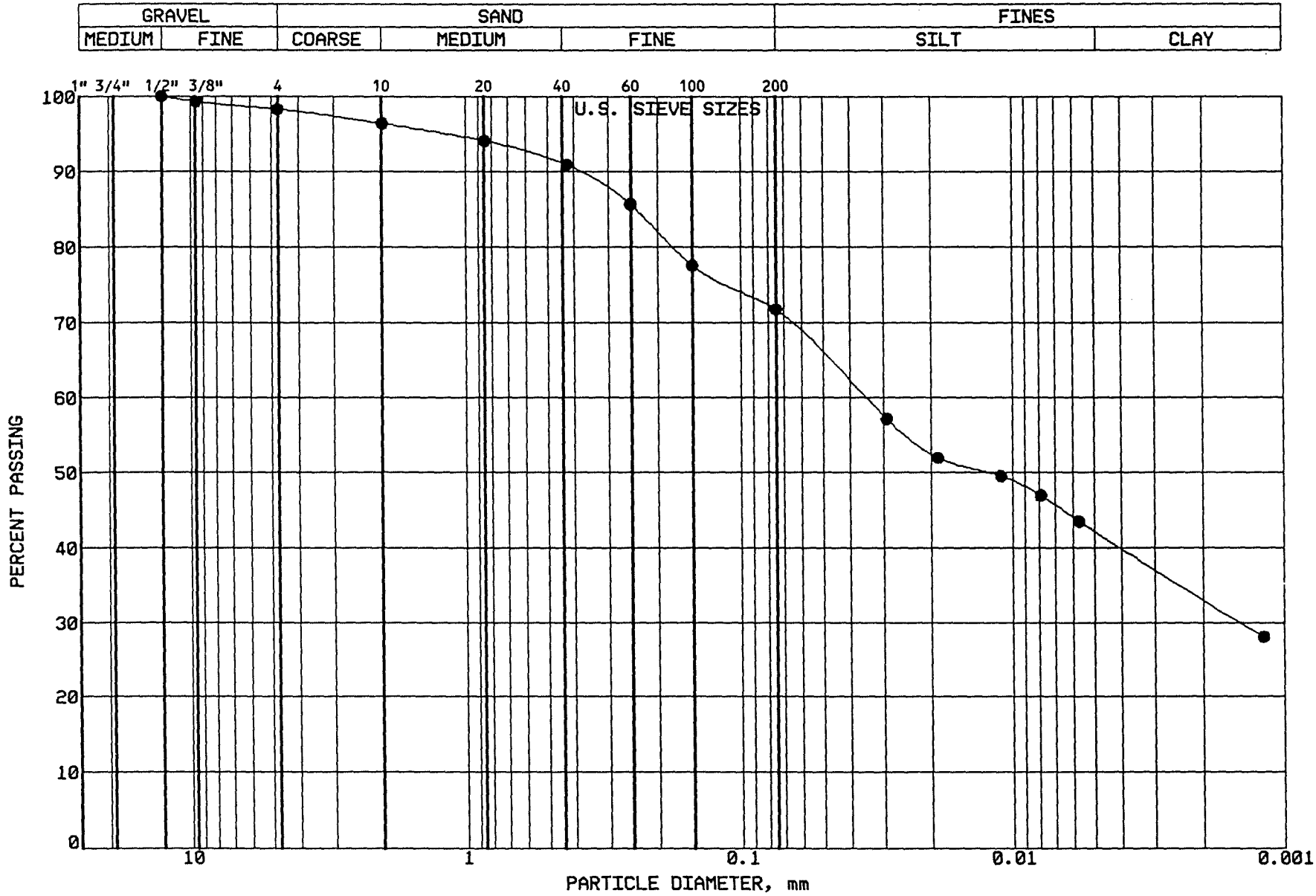
LOCATION: N 38100.0, E 40400.0
SAMPLE: CLBCC428 TUBE #:
ELEVATION: N/A'

GRAVEL	0.0 %
SAND	32.2 %
SILT	28.6 %
CLAY	39.2 %
P 200	67.8 %

SOIL PROPERTIES

LL: 45.0%
PL: 18.0%
PI: 27.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

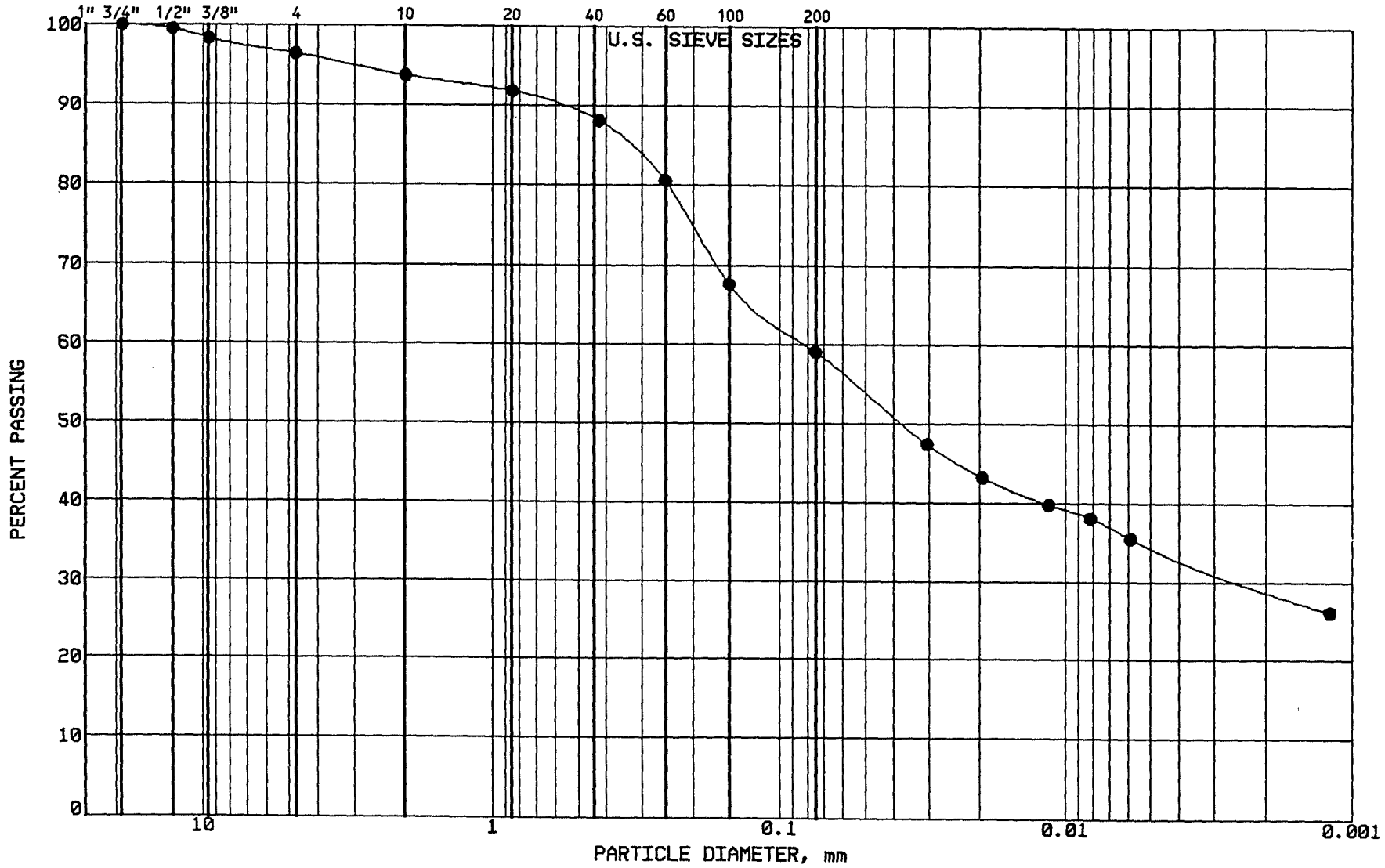
LOCATION: N 38252.0, E 40086.0
SAMPLE: CLBCC429 TUBE #:
ELEVATION: 1903.4'

GRAVEL	1.7 %
SAND	26.6 %
SILT	29.5 %
CLAY	42.2 %
P 200	71.7 %

SOIL PROPERTIES

LL: 46.0%
PL: 17.0%
PI: 29.0%
CLASS: Lean Clay w/Sand (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

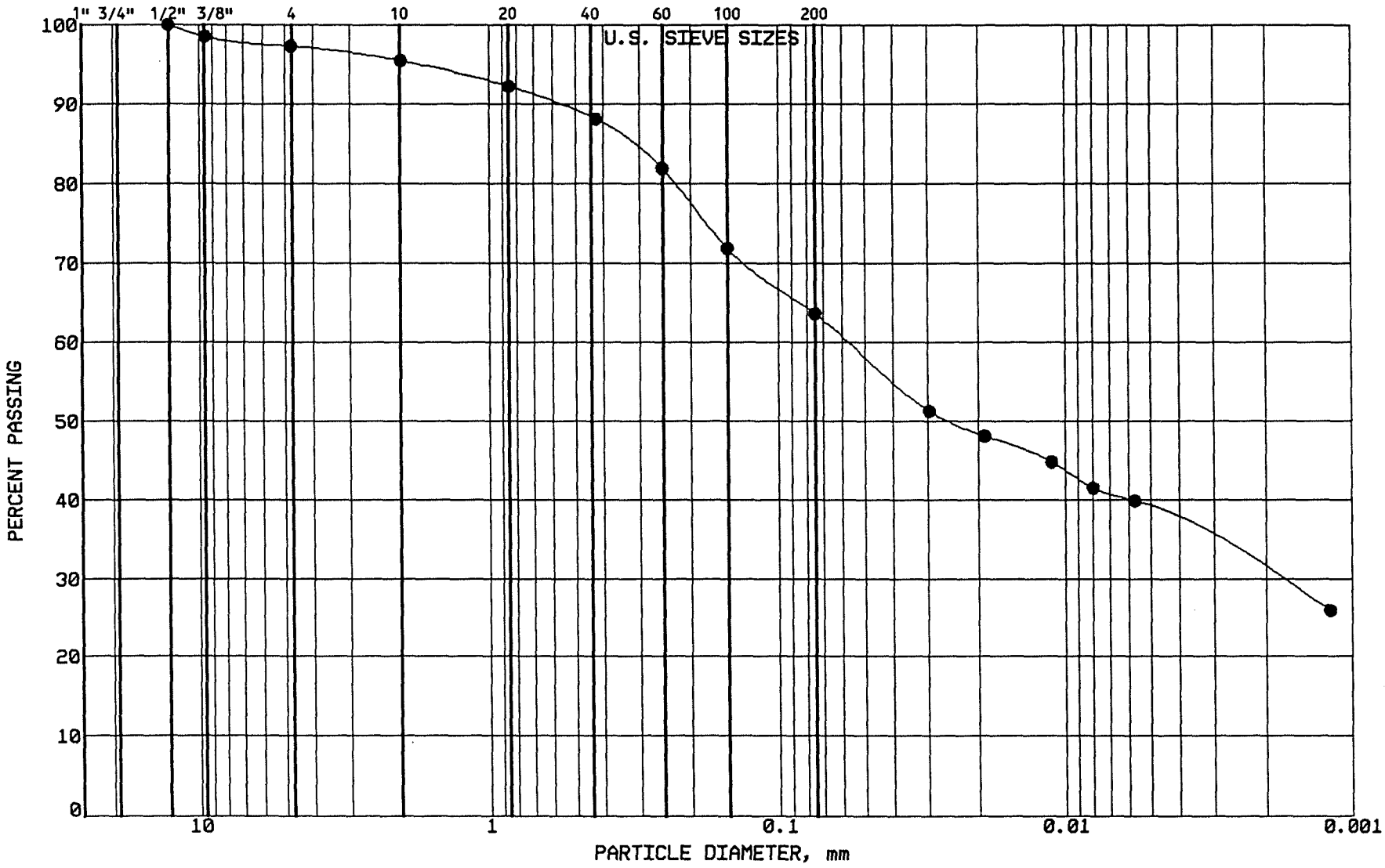
LOCATION: N 37995.0, E 40833.0
SAMPLE: CLBCC430 TUBE #: ST-132
ELEVATION: 1901.1'

GRAVEL	3.6 %
SAND	37.3 %
SILT	24.6 %
CLAY	34.5 %
P 200	59.1 %

SOIL PROPERTIES

LL: 41.0%
PL: 15.0%
PI: 26.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

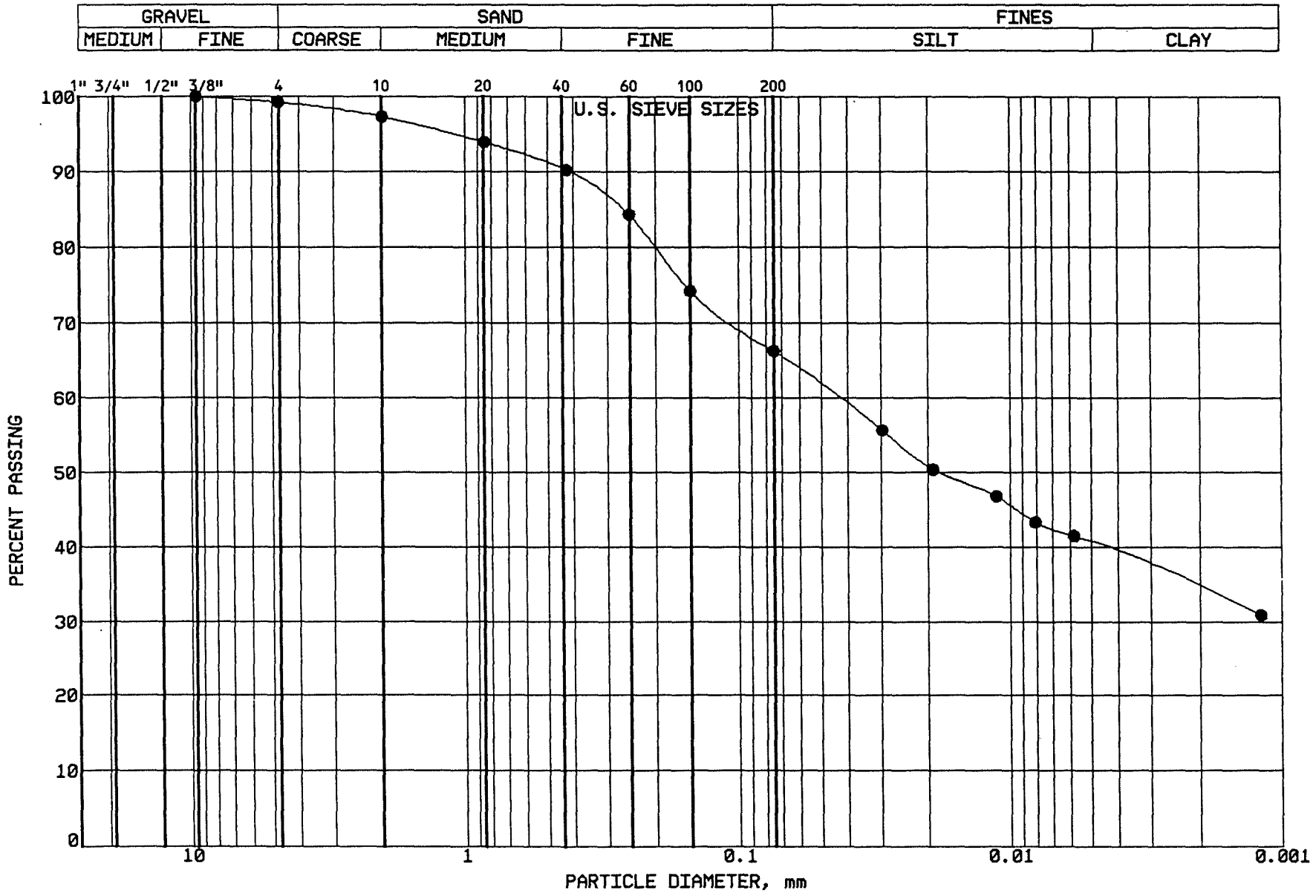
LOCATION: N 37963.0, E 41018.0
SAMPLE: CLBCC431 TUBE #: ST-133
ELEVATION: 1900.7'

GRAVEL	2.7 %
SAND	33.7 %
SILT	24.9 %
CLAY	38.7 %
P 200	63.6 %

SOIL PROPERTIES

LL: 45.0%
PL: 17.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

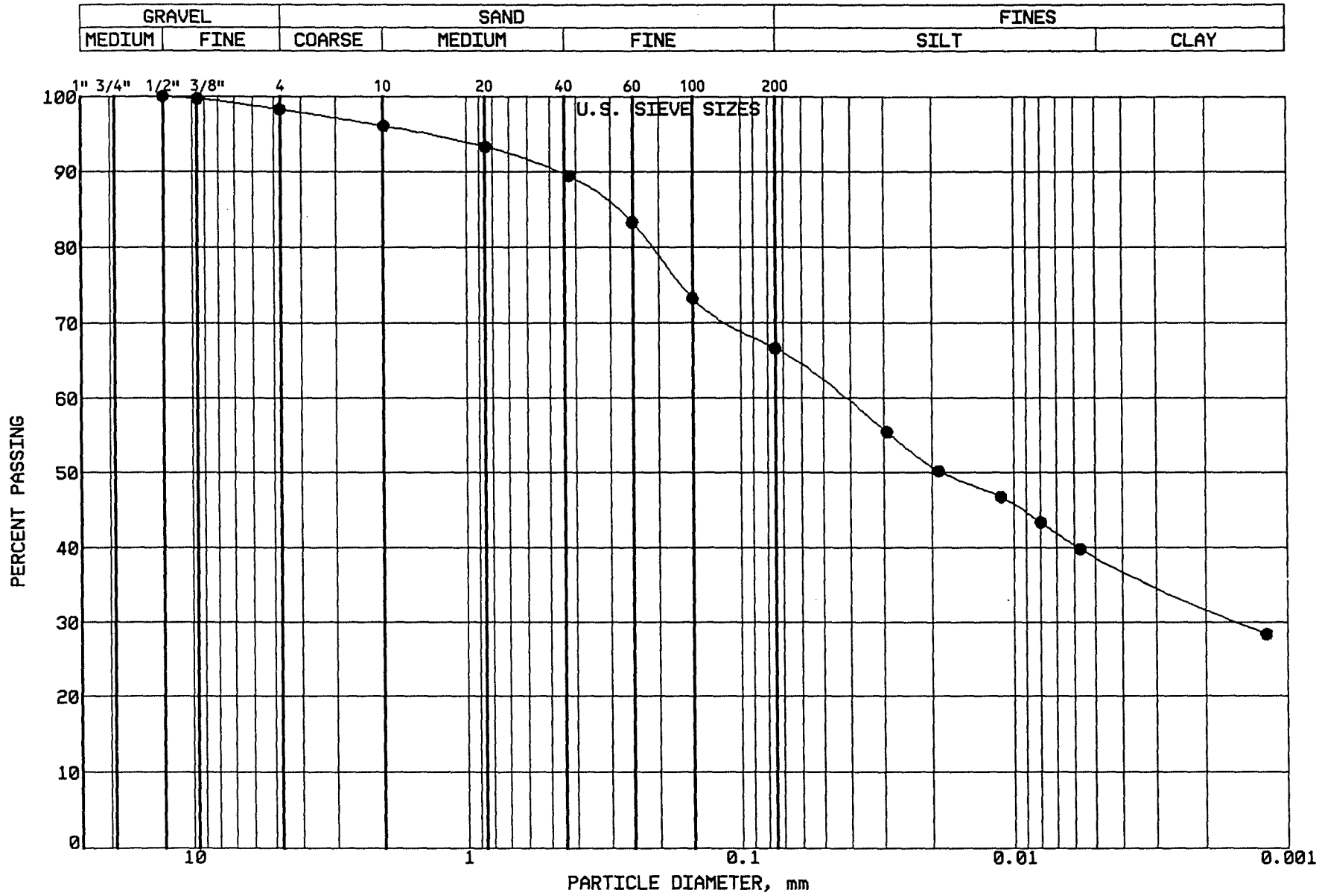
LOCATION: N 37910.0, E 41240.0
SAMPLE: CLBCC432 TUBE #: ST-134
ELEVATION: 1899.5'

GRAVEL	0.8 %
SAND	33.0 %
SILT	25.7 %
CLAY	40.5 %
P 200	66.2 %

SOIL PROPERTIES

LL: 44.0%
PL: 16.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

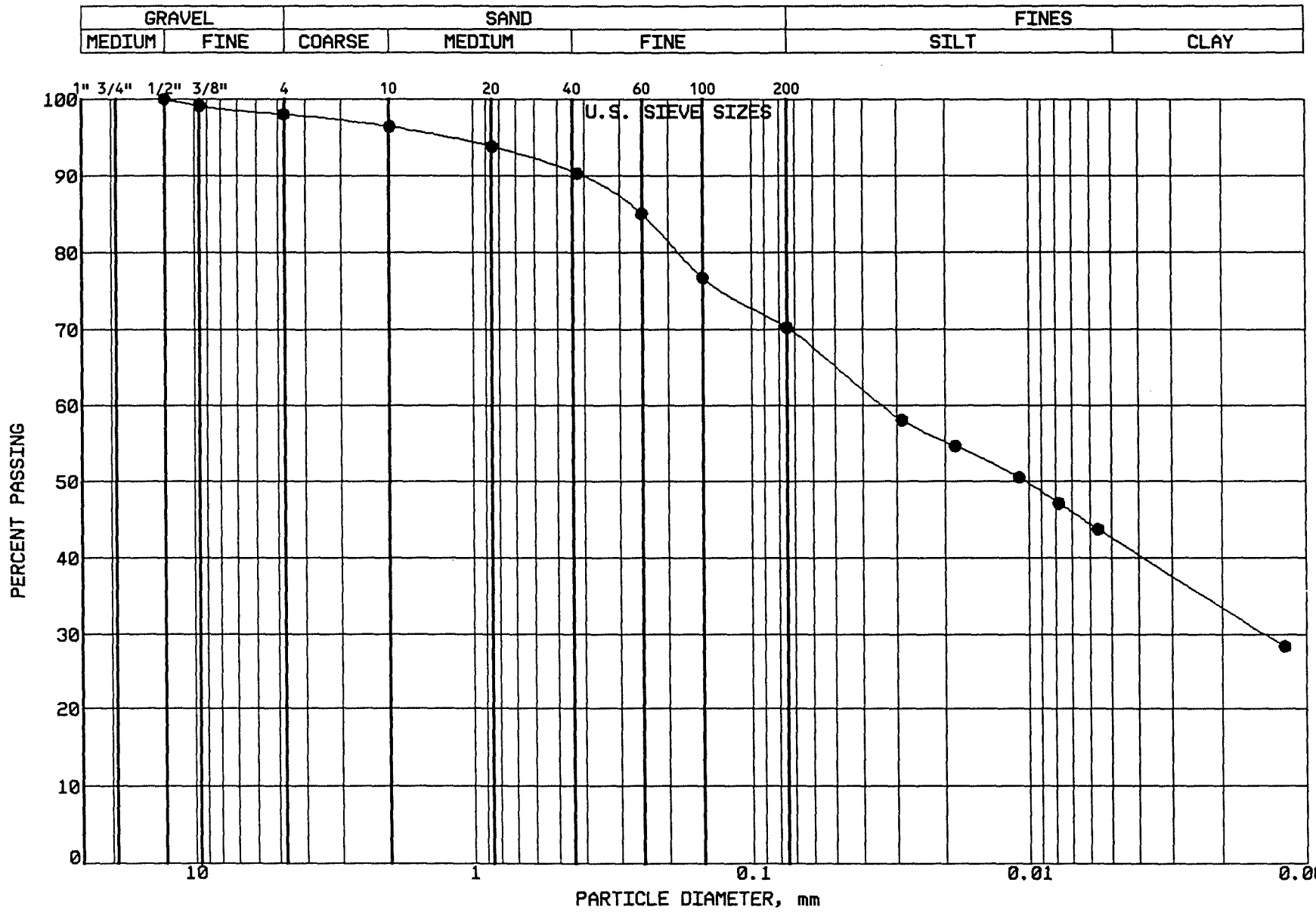
LOCATION: N 37865.0, E 41450.0
SAMPLE: CLBCC433 TUBE #: ST-135
ELEVATION: 1898.8'

GRAVEL	1.7 %
SAND	31.7 %
SILT	27.8 %
CLAY	38.8 %
P 200	66.6 %

SOIL PROPERTIES

LL: 45.0%
PL: 17.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38115.0, E 40708.0
SAMPLE: CLBCC434 TUBE #:ST-136
ELEVATION: 1901.3'

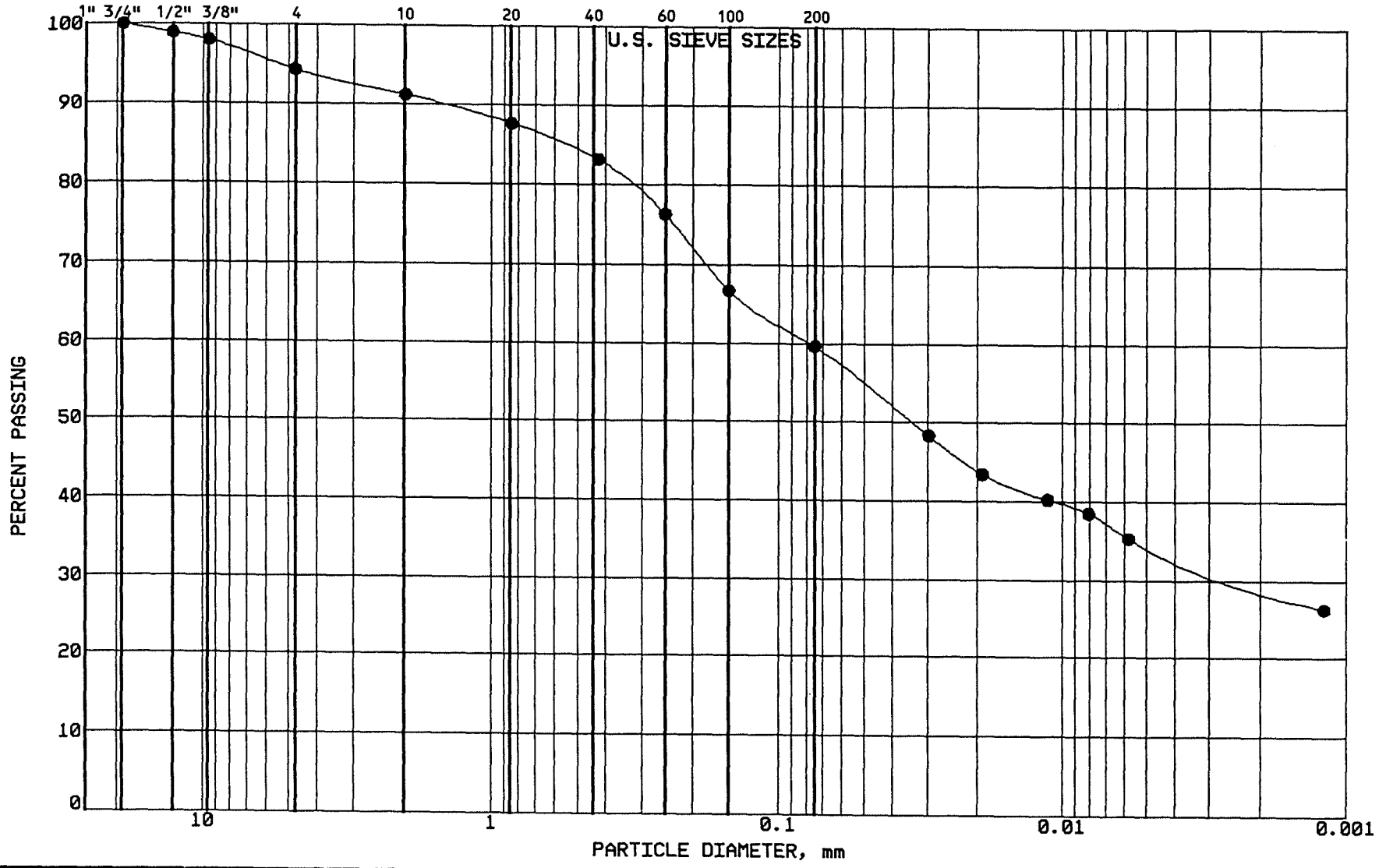
GRAVEL	2.0 %
SAND	27.8 %
SILT	27.6 %
CLAY	42.6 %
P 200	70.2 %

SOIL PROPERTIES

LL: 48.0%
PL: 17.0%
PI: 31.0%
CLASS: Lean Clay w/Sand(CL),vy dk gr-br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

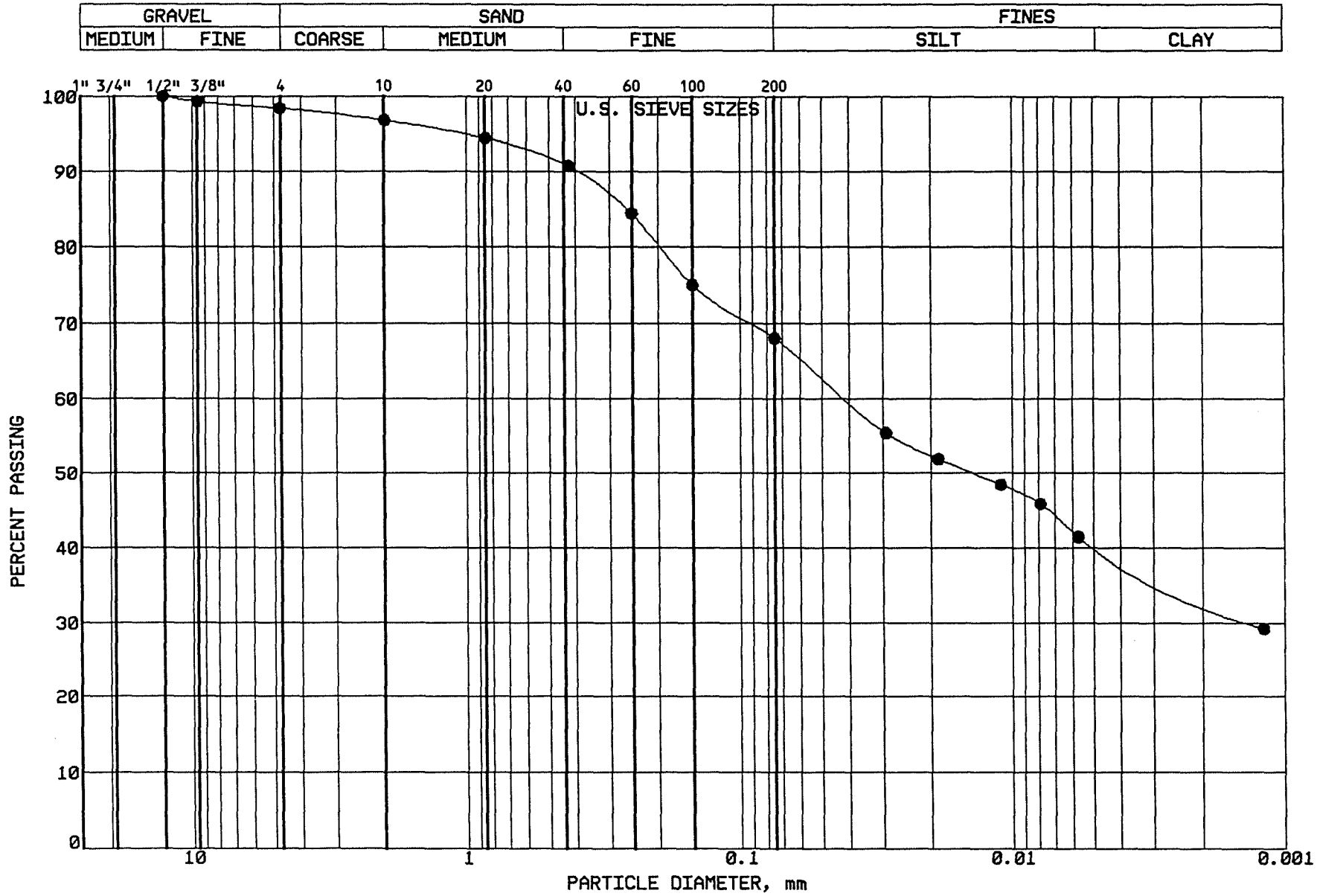
LOCATION: N 38157.0, E 40503.0
SAMPLE: CLBCC435 TUBE #: ST-137
ELEVATION: 1902.4'

GRAVEL	5.7 %
SAND	34.6 %
SILT	25.2 %
CLAY	34.5 %
P 200	59.7 %

SOIL PROPERTIES

LL: 42.0%
PL: 14.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38192.0, E 40278.0
SAMPLE: CLBCC436 TUBE #: ST-138
ELEVATION: 1903.5'

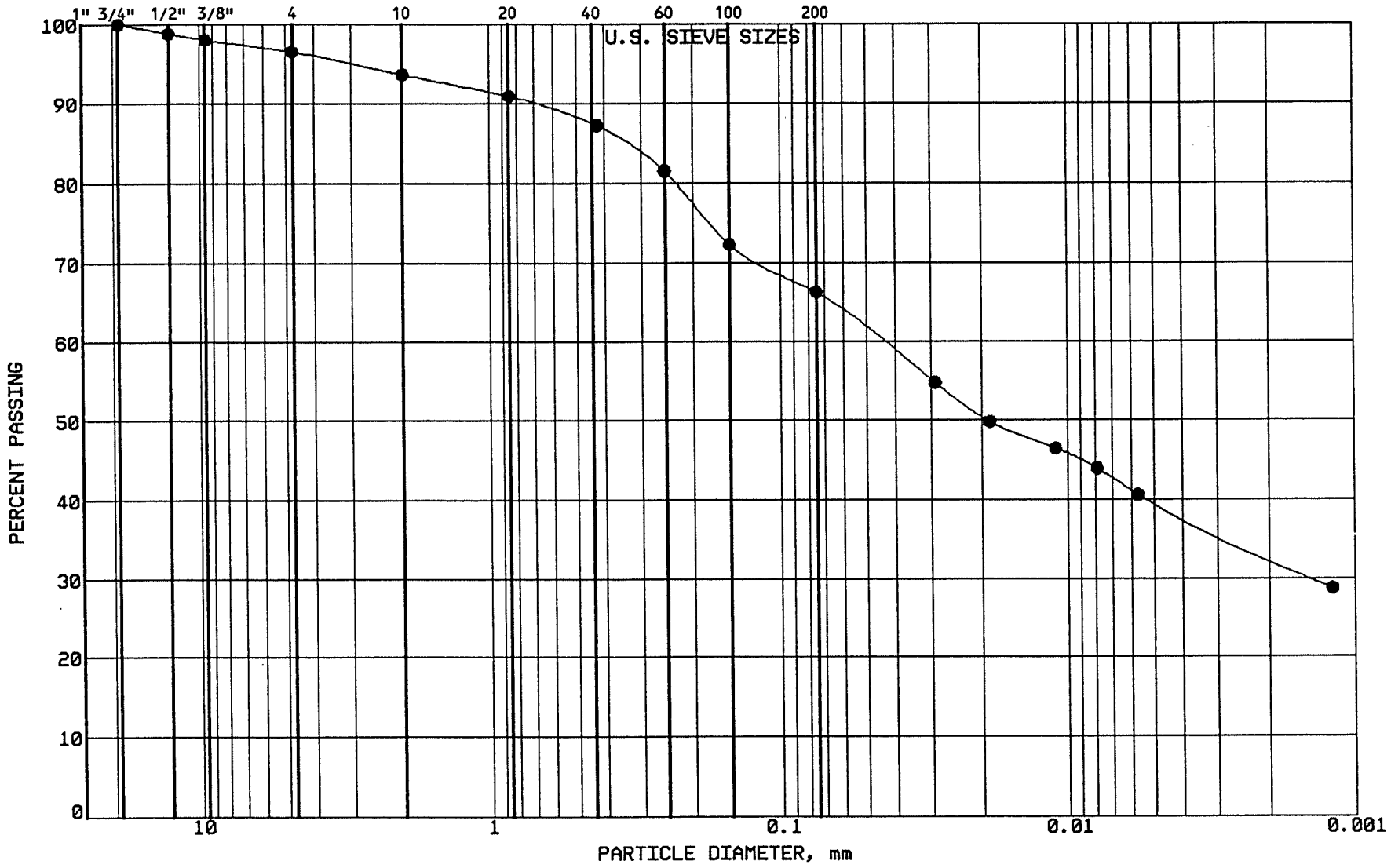
GRAVEL	1.6 %
SAND	30.4 %
SILT	27.6 %
CLAY	40.4 %
P 200	68.0 %

SOIL PROPERTIES

LL: 43.0%
PL: 16.0%
PI: 27.0%
CLASS: Sandy Lean Clay (CL), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

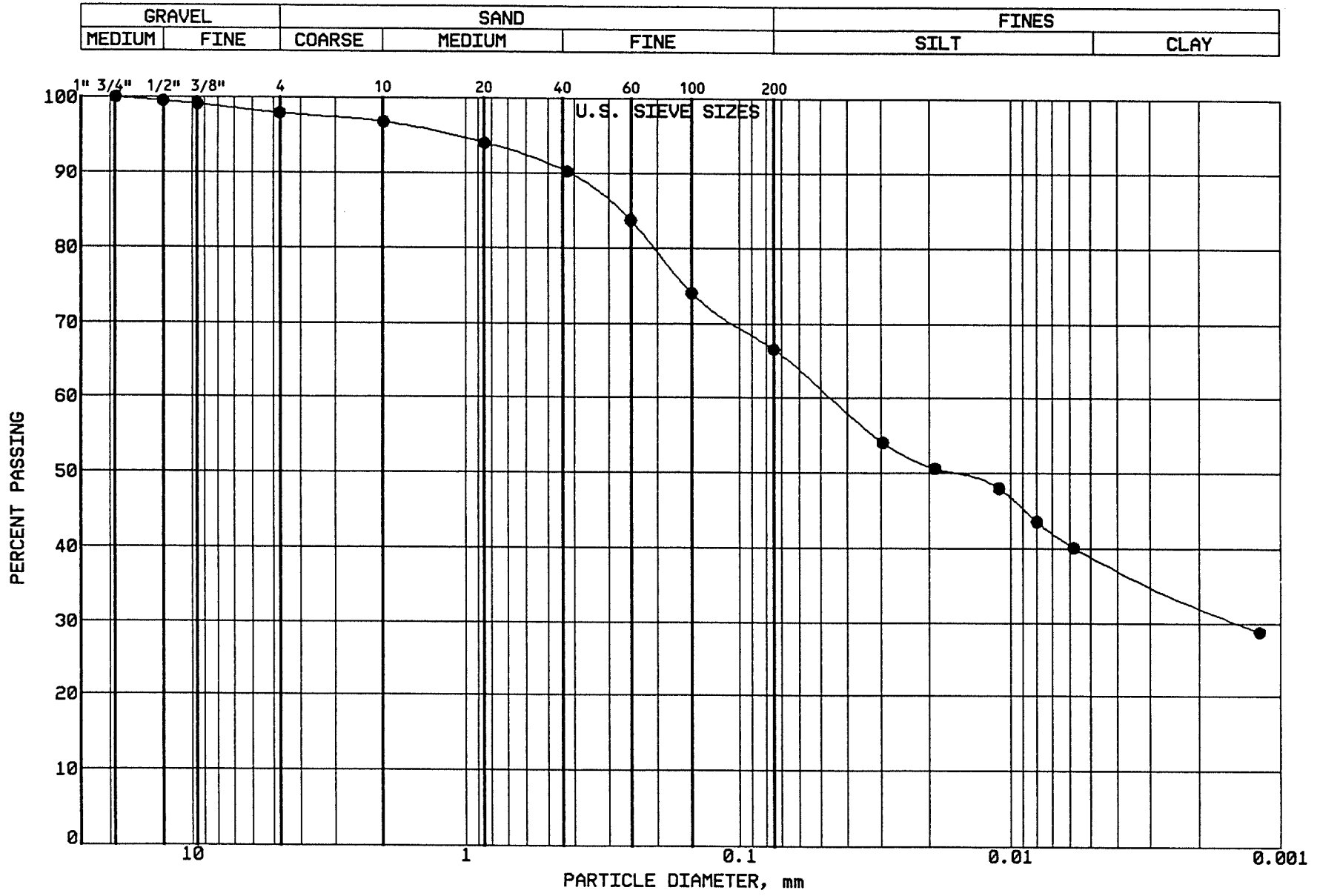
LOCATION: N 38227.0, E 40077.0
SAMPLE: CLBCC437 TUBE #: ST-139
ELEVATION: 1903.9'

GRAVEL	3.5 %
SAND	30.2 %
SILT	26.7 %
CLAY	39.6 %
P 200	66.3 %

SOIL PROPERTIES

LL: 46.0%
PL: 17.0%
PI: 29.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38264.0, E 39851.0
SAMPLE: CLBCC438 TUBE #: ST-140
ELEVATION: 1904.9'

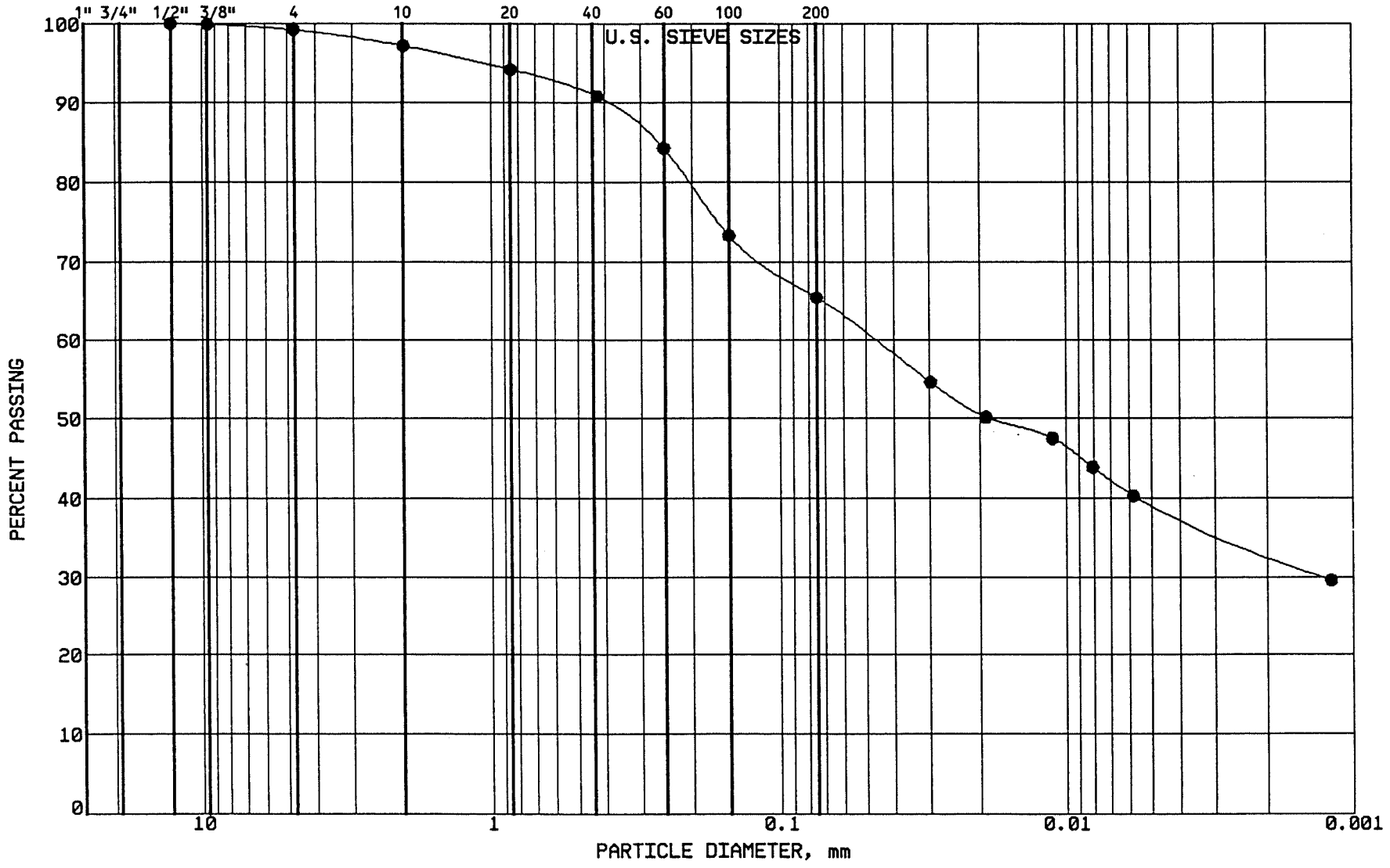
GRAVEL	2.1 %
SAND	31.4 %
SILT	27.5 %
CLAY	39.0 %
P 200	66.5 %

SOIL PROPERTIES

LL: 46.0%
PL: 16.0%
PI: 30.0%
CLASS: Sandy Lean Clay (CL),gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38260.0, E 40736.0
SAMPLE: CLBCC439 TUBE #: ST-141
ELEVATION: 1900.0'

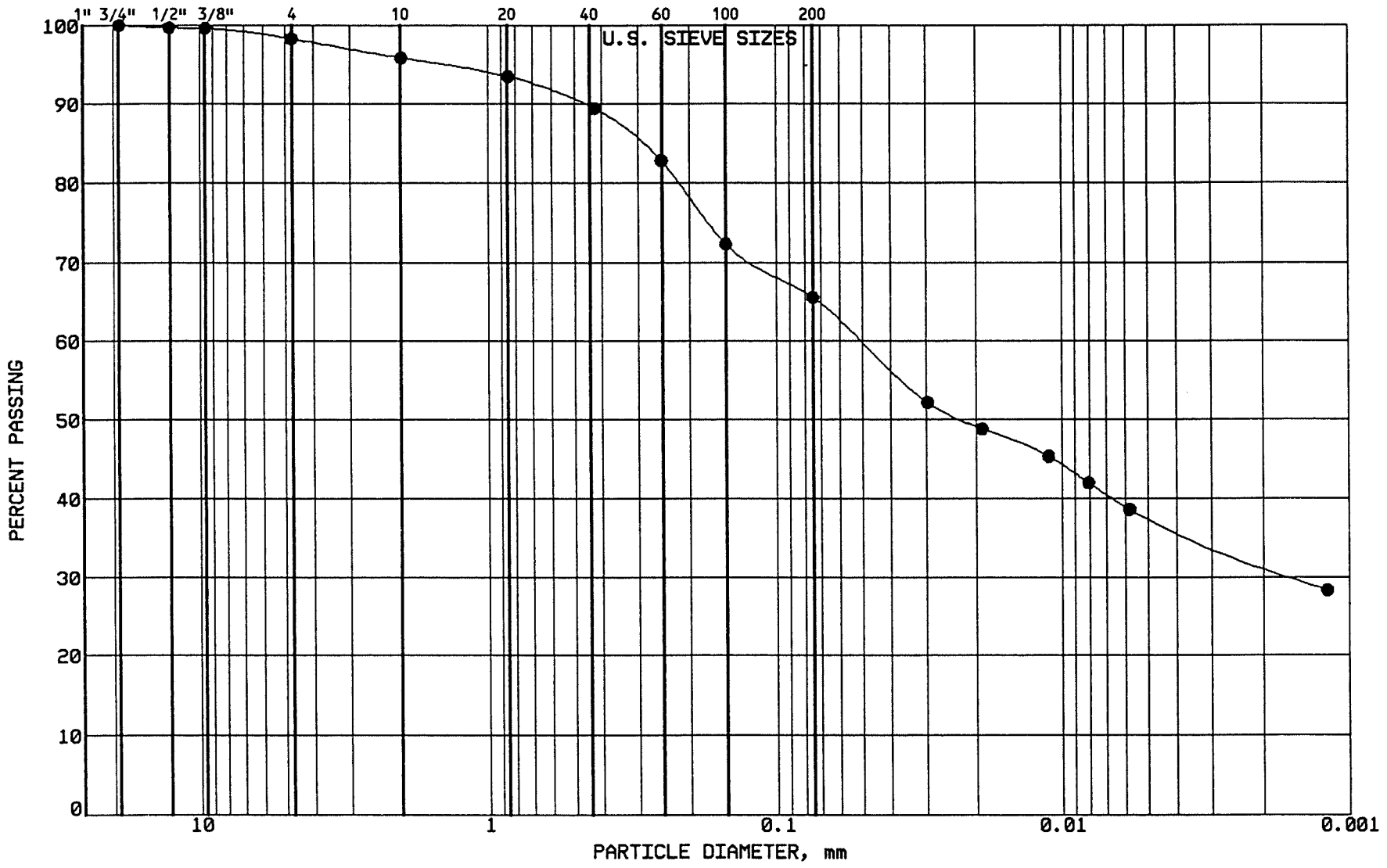
GRAVEL	0.8 %
SAND	33.8 %
SILT	26.1 %
CLAY	39.3 %
P 200	65.4 %

SOIL PROPERTIES

LL: 46.0%
PL: 17.0%
PI: 29.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38288.0, E 40543.0
SAMPLE: CLBCC440 TUBE #: ST-142
ELEVATION: 1901.3'

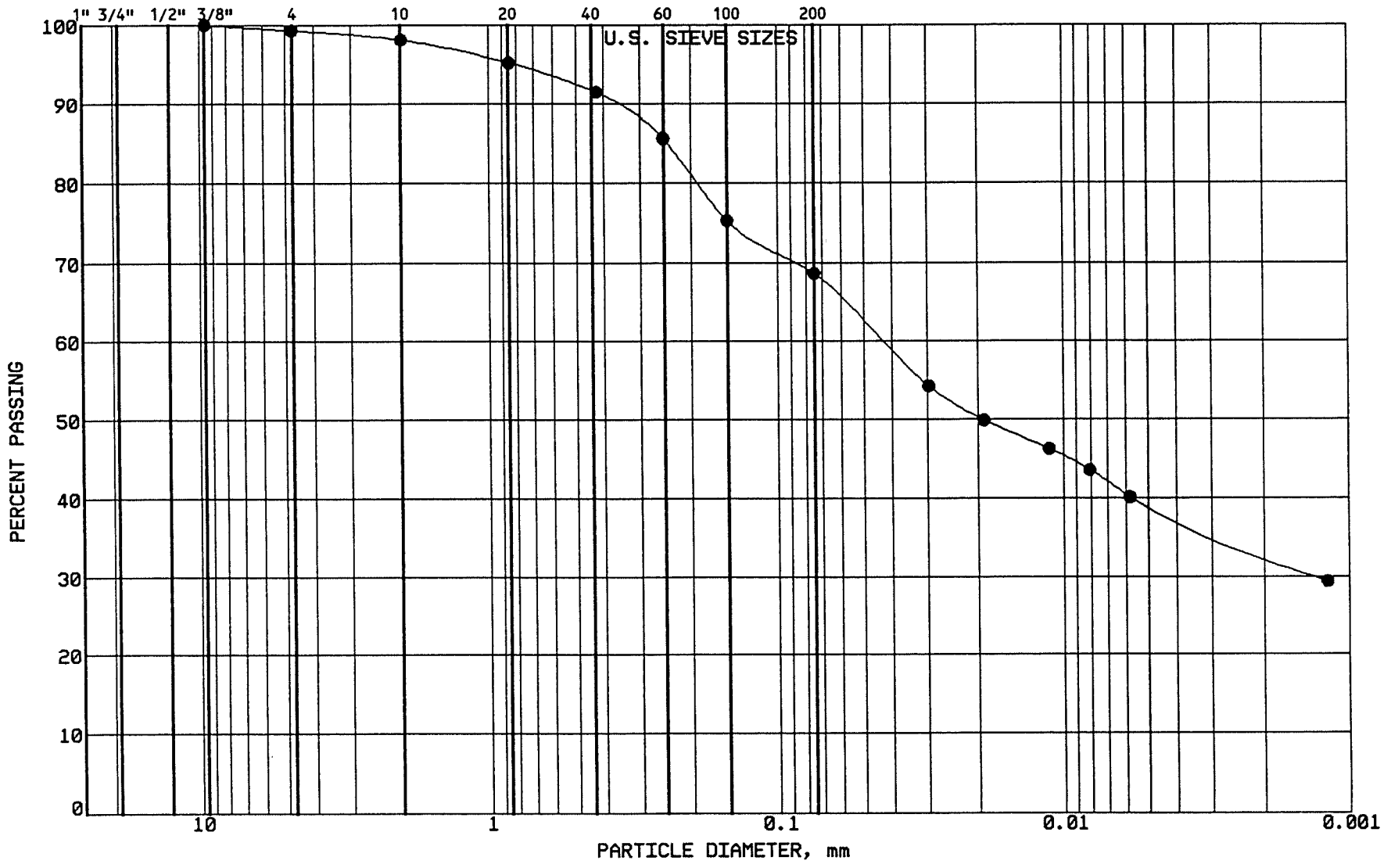
GRAVEL	1.7 %
SAND	32.8 %
SILT	27.9 %
CLAY	37.6 %
P 200	65.5 %

SOIL PROPERTIES

LL: 48.0%
PL: 16.0%
PI: 32.0%
CLASS: Sandy Lean Clay (CL), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

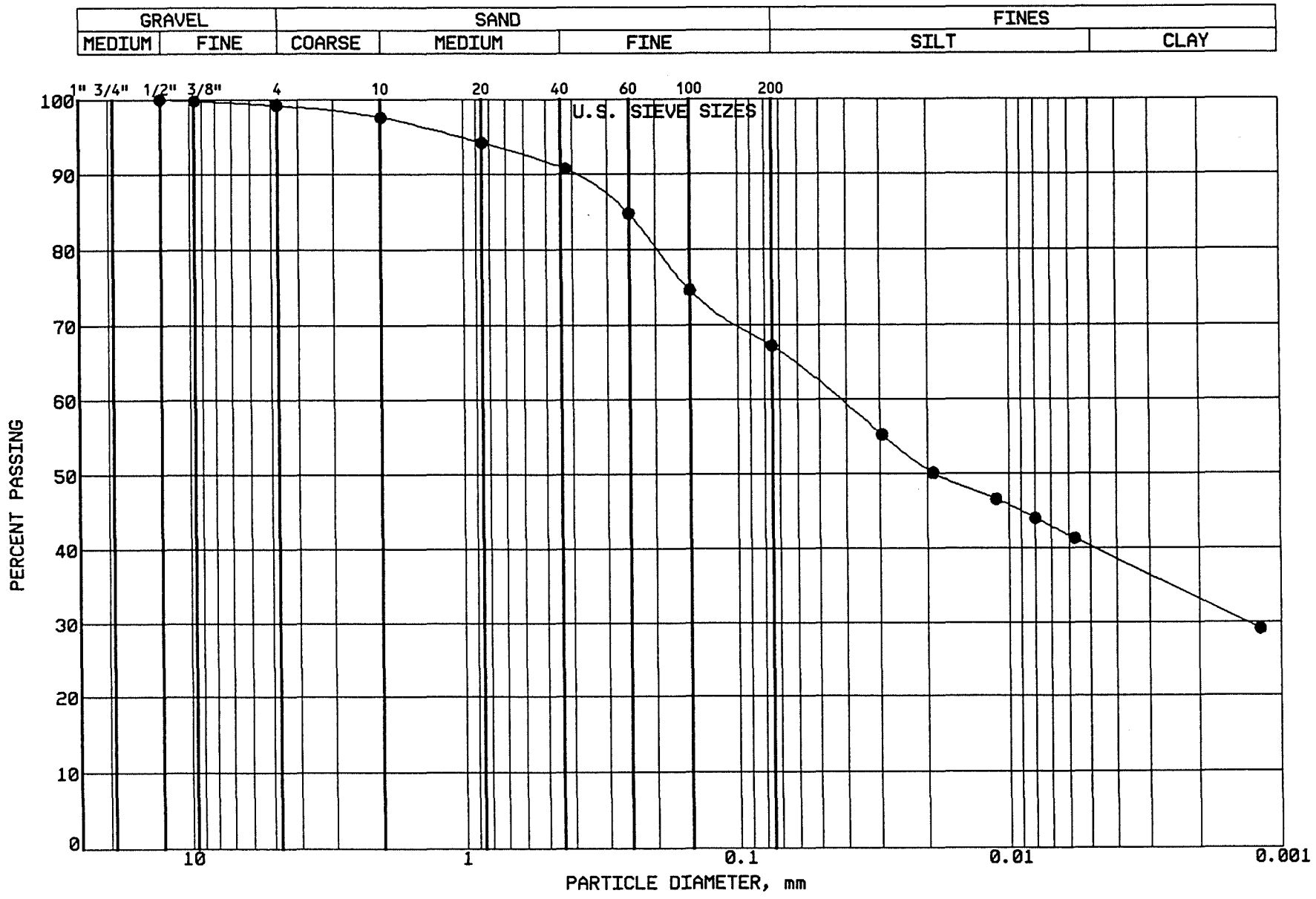
LOCATION: N 38322.0, E 40332.0
SAMPLE: CLBCC441 TUBE #: ST-143
ELEVATION: 1902.3'

GRAVEL	0.7 %
SAND	30.7 %
SILT	29.5 %
CLAY	39.1 %
P 200	68.6 %

SOIL PROPERTIES

LL: 47.0%
PL: 17.0%
PI: 30.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38353.0, E 40125.0
SAMPLE: CLBCC442 TUBE #: ST-144
ELEVATION: 1903.2'

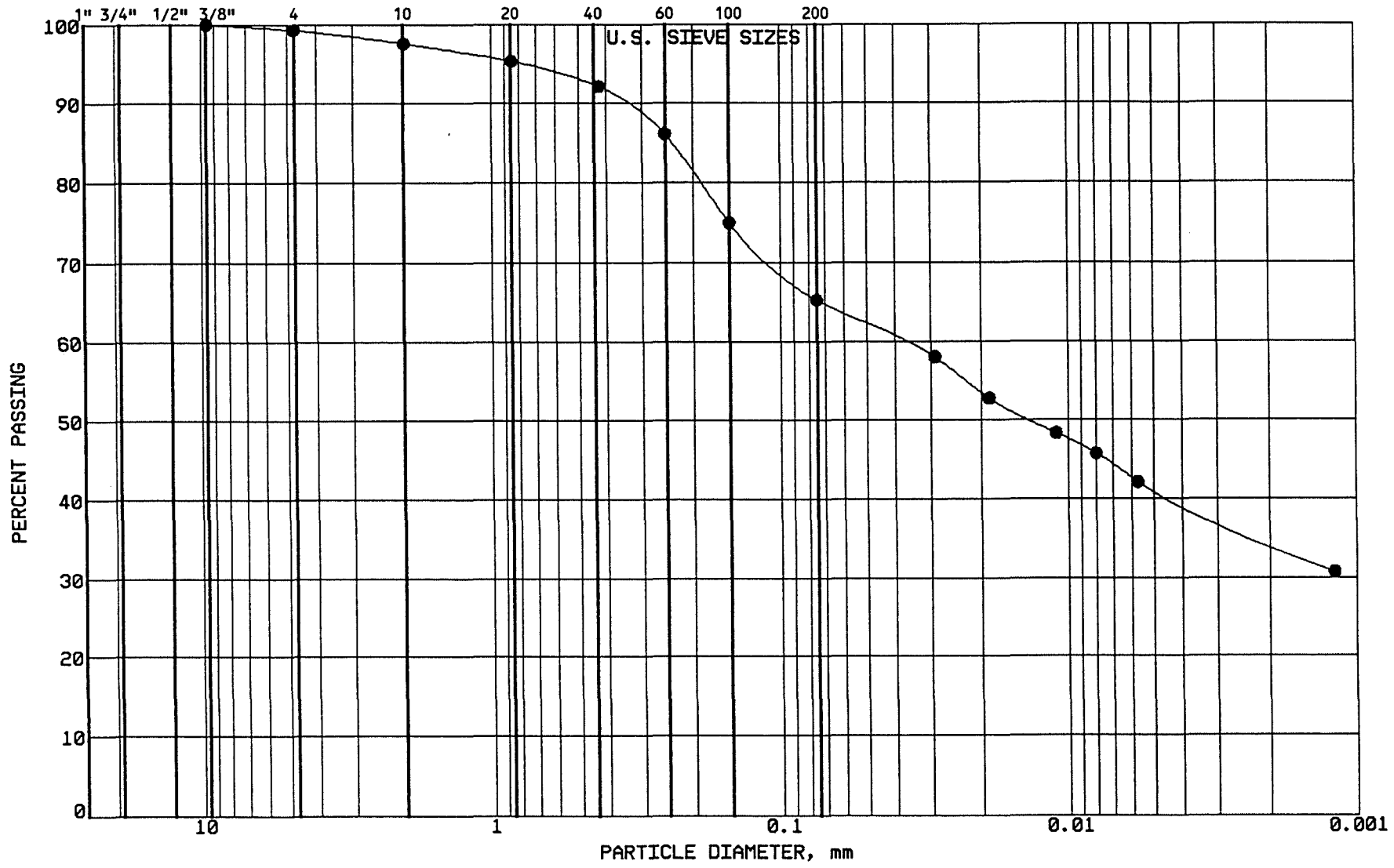
GRAVEL	0.8 %
SAND	32.1 %
SILT	26.8 %
CLAY	40.3 %
P 200	67.1 %

SOIL PROPERTIES

LL: 45.0%
PL: 15.0%
PI: 30.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38391.0, E 39895.0
SAMPLE: CLBCC443 TUBE #: ST-145
ELEVATION: 1904.0'

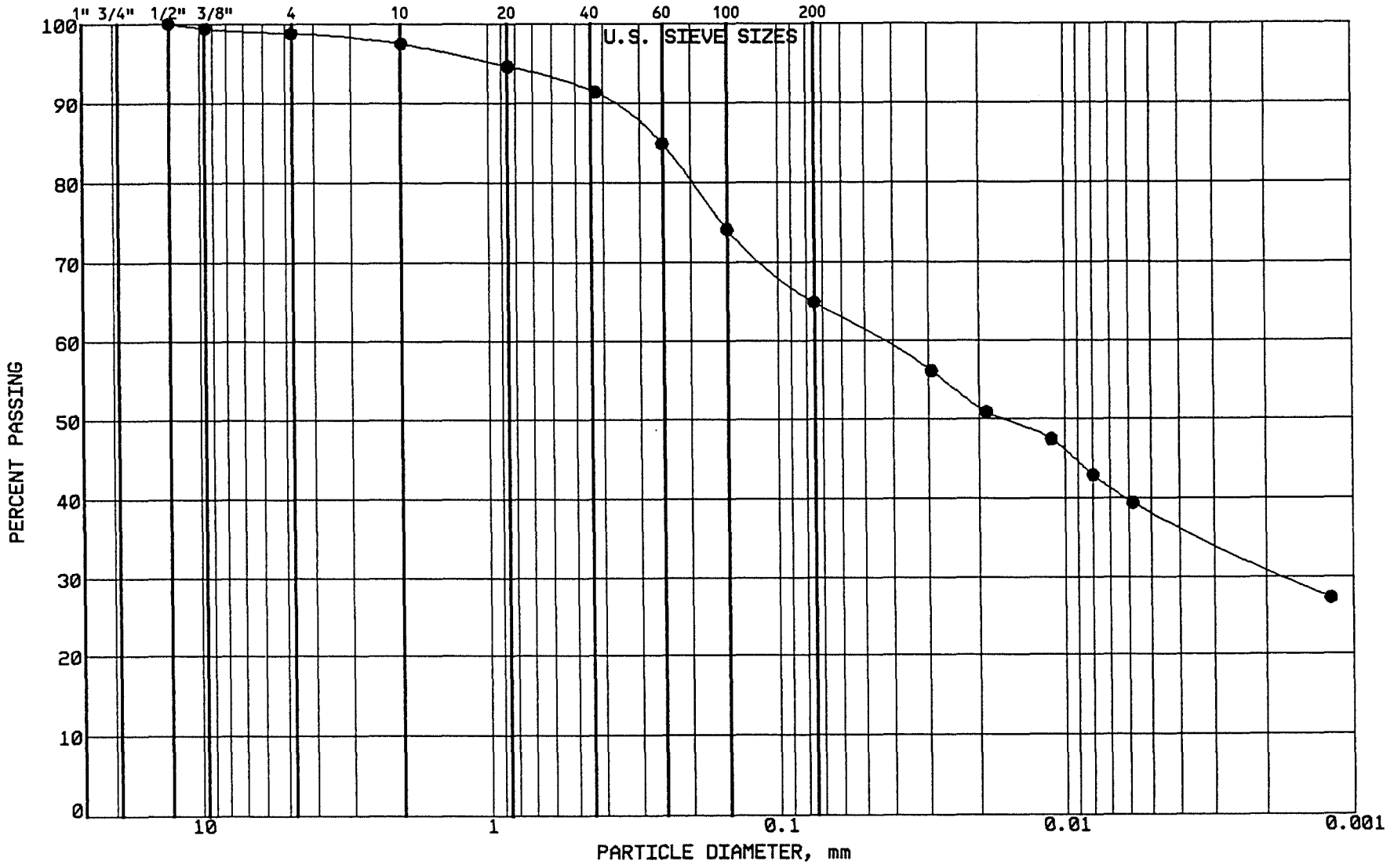
GRAVEL	0.7 %
SAND	34.1 %
SILT	24.1 %
CLAY	41.1 %
P 200	65.2 %

SOIL PROPERTIES

LL: 47.0%
PL: 17.0%
PI: 30.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37664.0, E 41338.0
SAMPLE: CLBCC444 TUBE #: ST-146
ELEVATION: 1900.3'

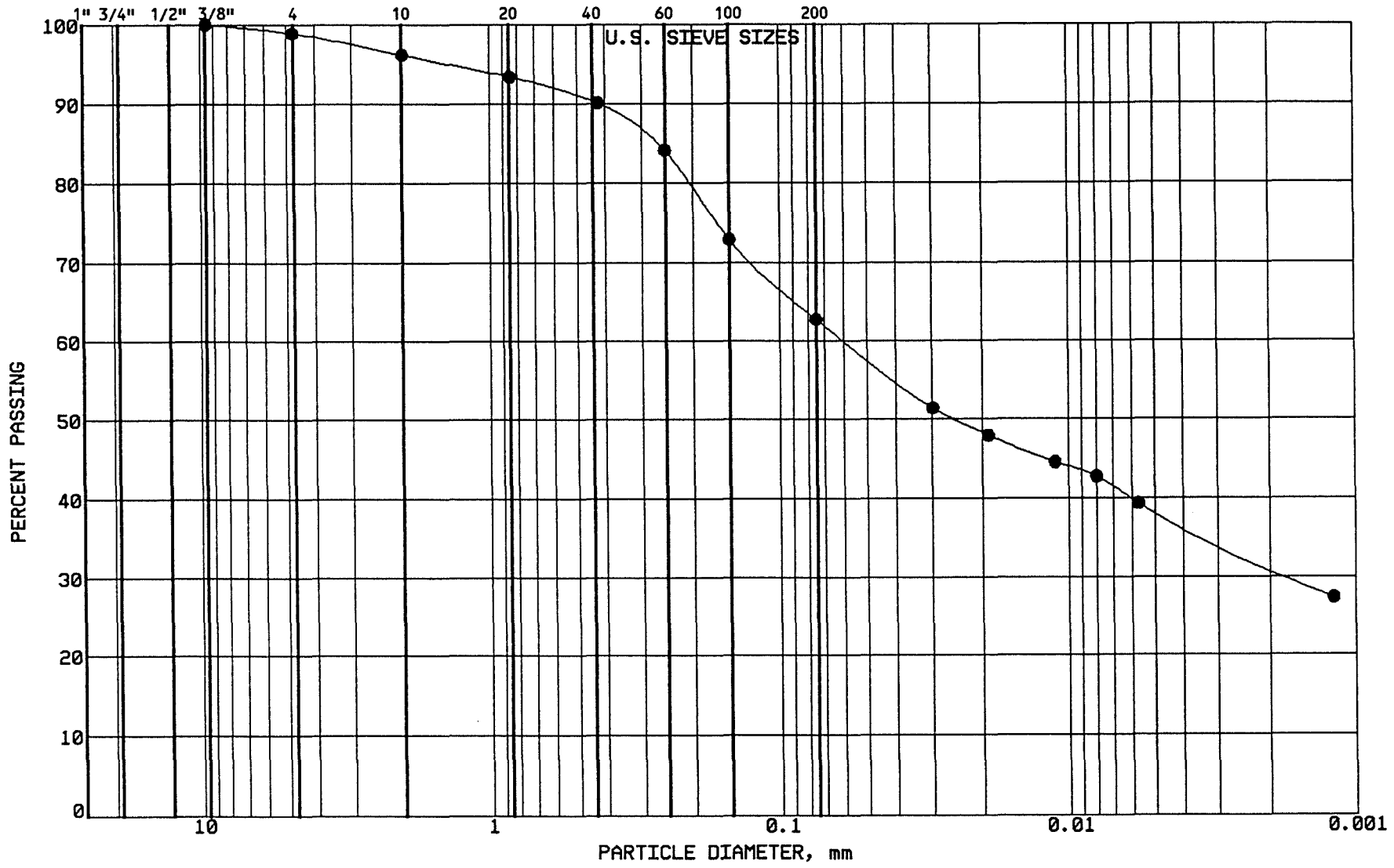
GRAVEL	1.2 %
SAND	33.9 %
SILT	26.6 %
CLAY	38.3 %
P 200	64.9 %

SOIL PROPERTIES

LL: 43.0%
PL: 16.0%
PI: 27.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37700.0, E 41169.0
SAMPLE: CLBCC445 TUBE #: ST-147
ELEVATION: 1901.0'

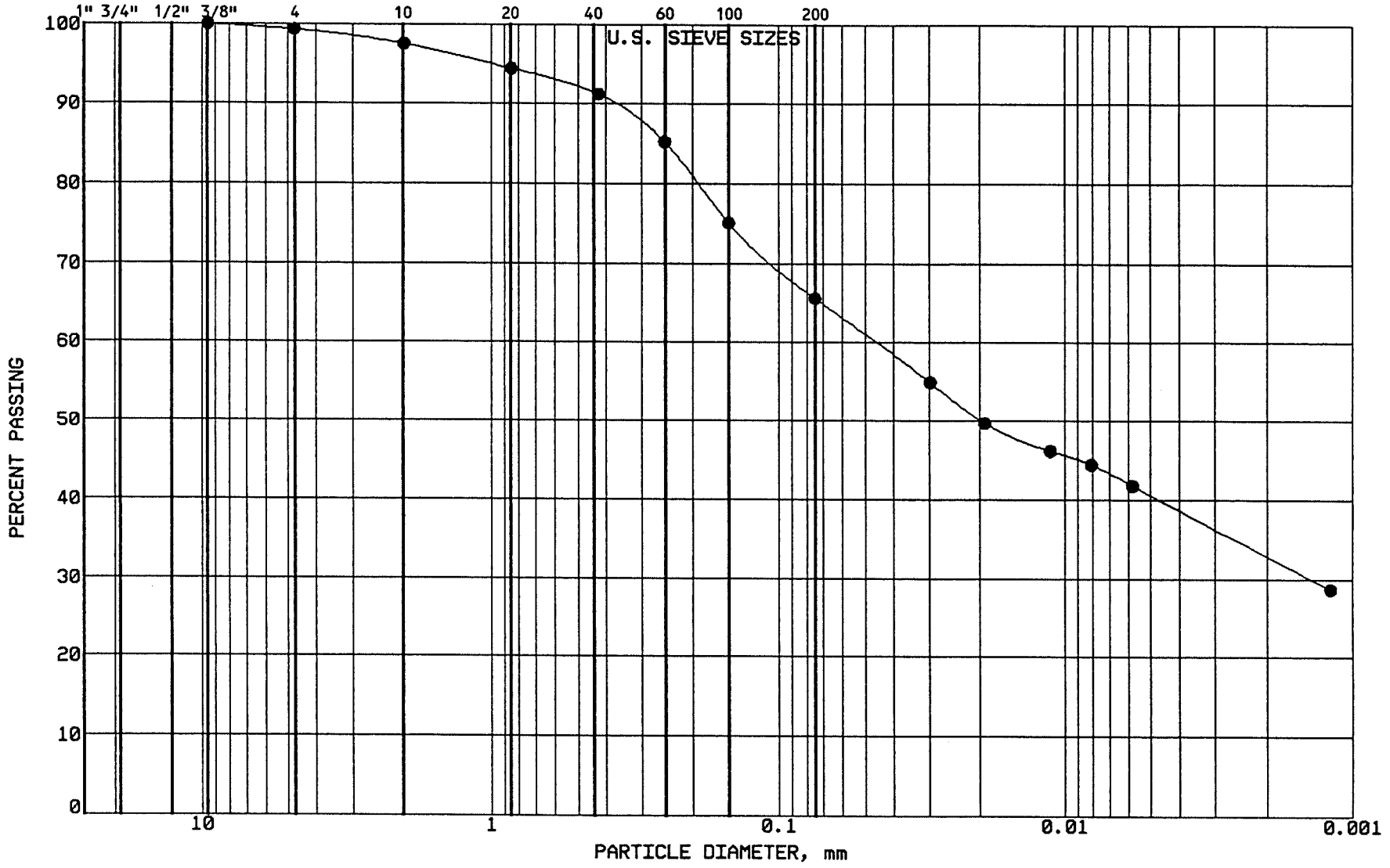
GRAVEL	1.1 %
SAND	36.1 %
SILT	24.5 %
CLAY	38.3 %
P 200	62.8 %

SOIL PROPERTIES

LL: 44.0%
PL: 17.0%
PI: 27.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37746.0, E 40951.0
SAMPLE: CLBCC446 TUBE #: ST.148
ELEVATION: 1901.7'

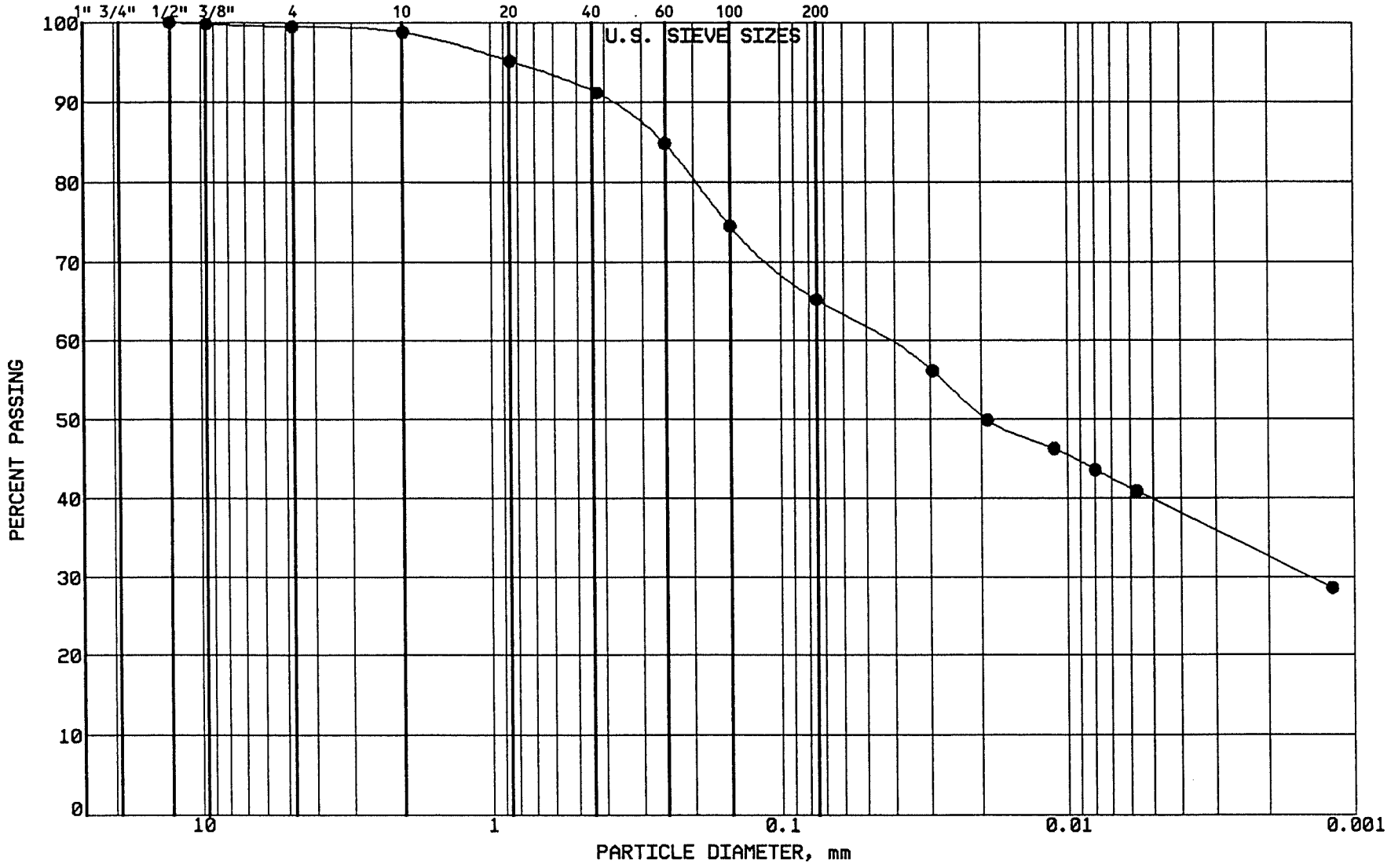
GRAVEL	0.7 %
SAND	33.7 %
SILT	25.0 %
CLAY	40.6 %
P 200	65.6 %

SOIL PROPERTIES

LL: 46.0%
PL: 13.0%
PI: 33.0%
CLASS: Sandy Lean Clay (CL),ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38550.0, E 39818.0
SAMPLE: CLBCC447 TUBE #: ST-149
ELEVATION: 1903.7'

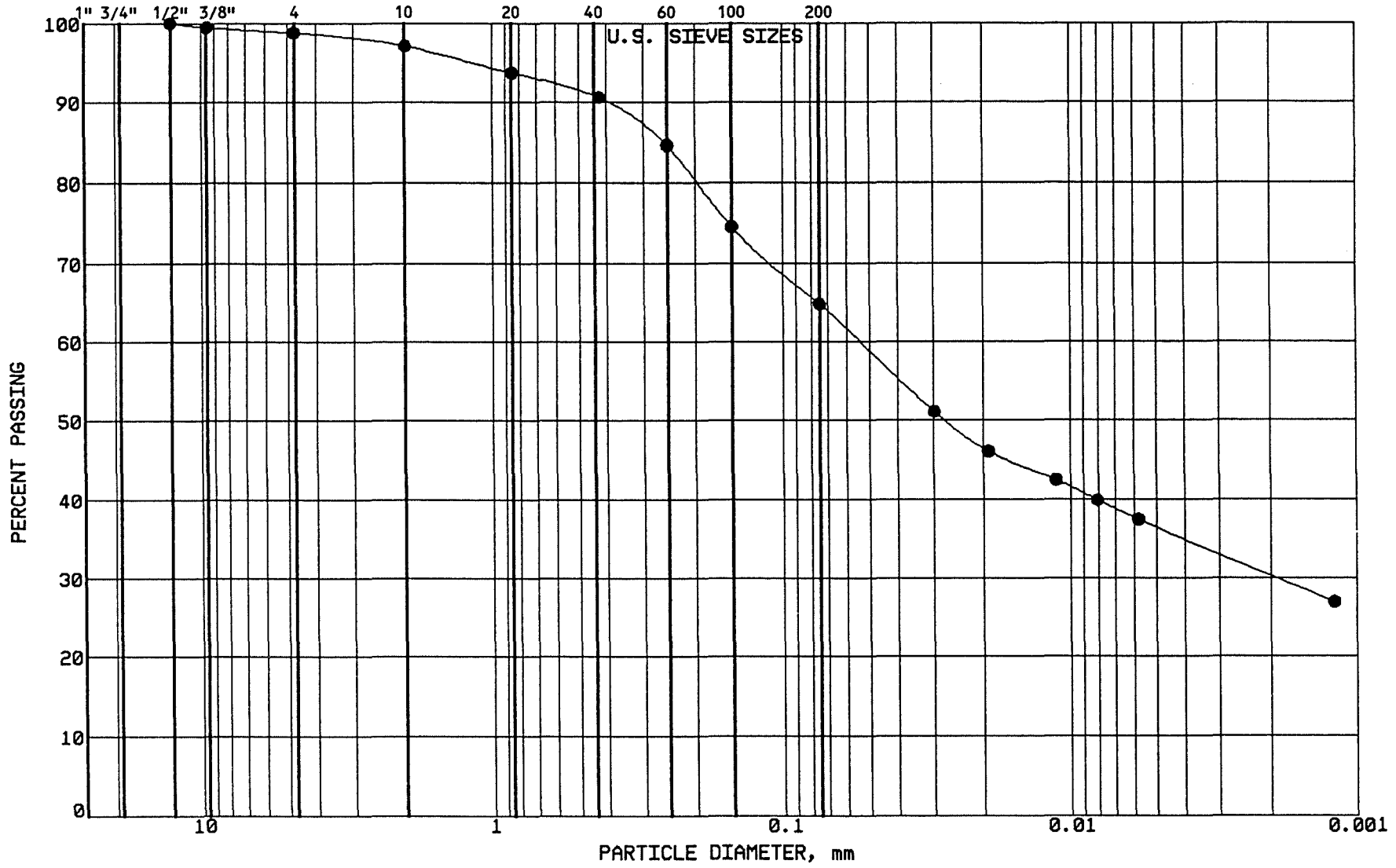
GRAVEL	0.5 %
SAND	34.3 %
SILT	25.3 %
CLAY	39.9 %
P 200	65.2 %

SOIL PROPERTIES

LL: 45.0%
PL: 14.0%
PI: 31.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38518.0, E 40018.0
SAMPLE: CLBCC448 TUBE #: ST-150
ELEVATION: 1903.1'

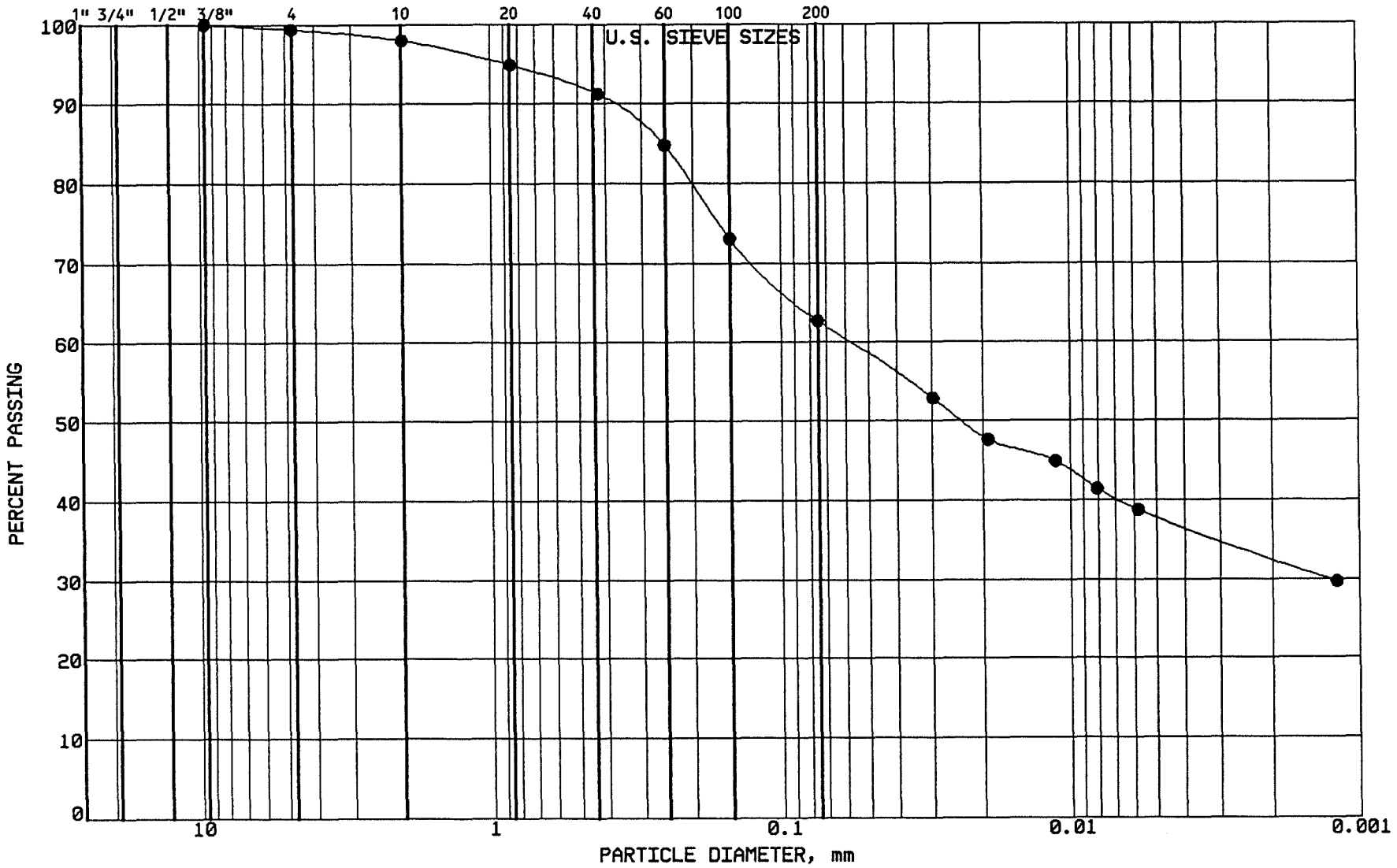
GRAVEL	1.2 %
SAND	34.0 %
SILT	28.4 %
CLAY	36.4 %
P 200	64.8 %

SOIL PROPERTIES

LL: 46.0%
PL: 17.0%
PI: 29.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38479.0, E 40225.0
SAMPLE: CLBCC449 TUBE #: ST-151
ELEVATION: 1902.2'

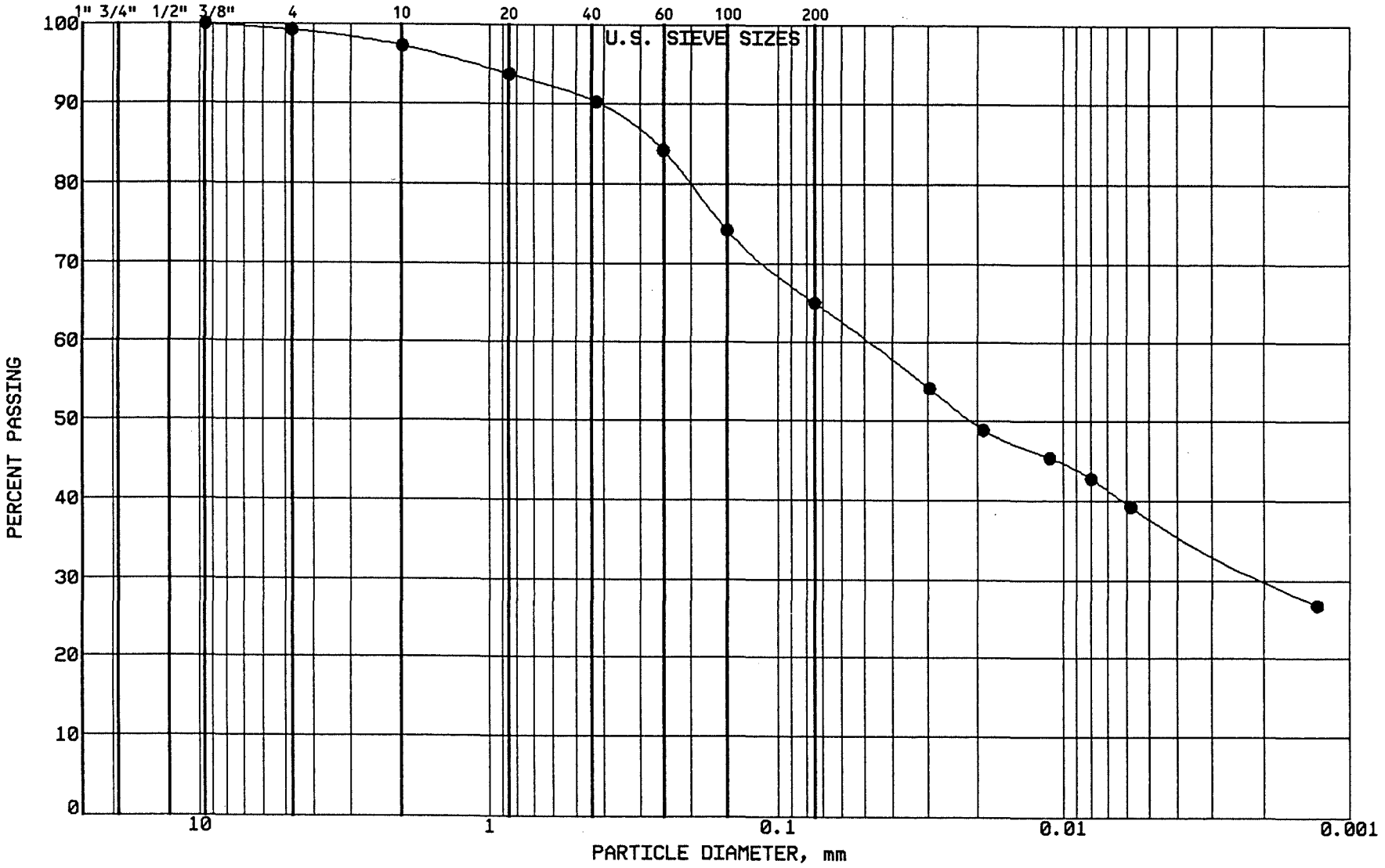
GRAVEL	0.6 %
SAND	36.7 %
SILT	24.8 %
CLAY	37.9 %
P 200	62.7 %

SOIL PROPERTIES

LL: 44.0%
PL: 15.0%
PI: 29.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38431.0, E 40459.0
SAMPLE: CLBCC450 TUBE #: ST-152
ELEVATION: 1901.3'

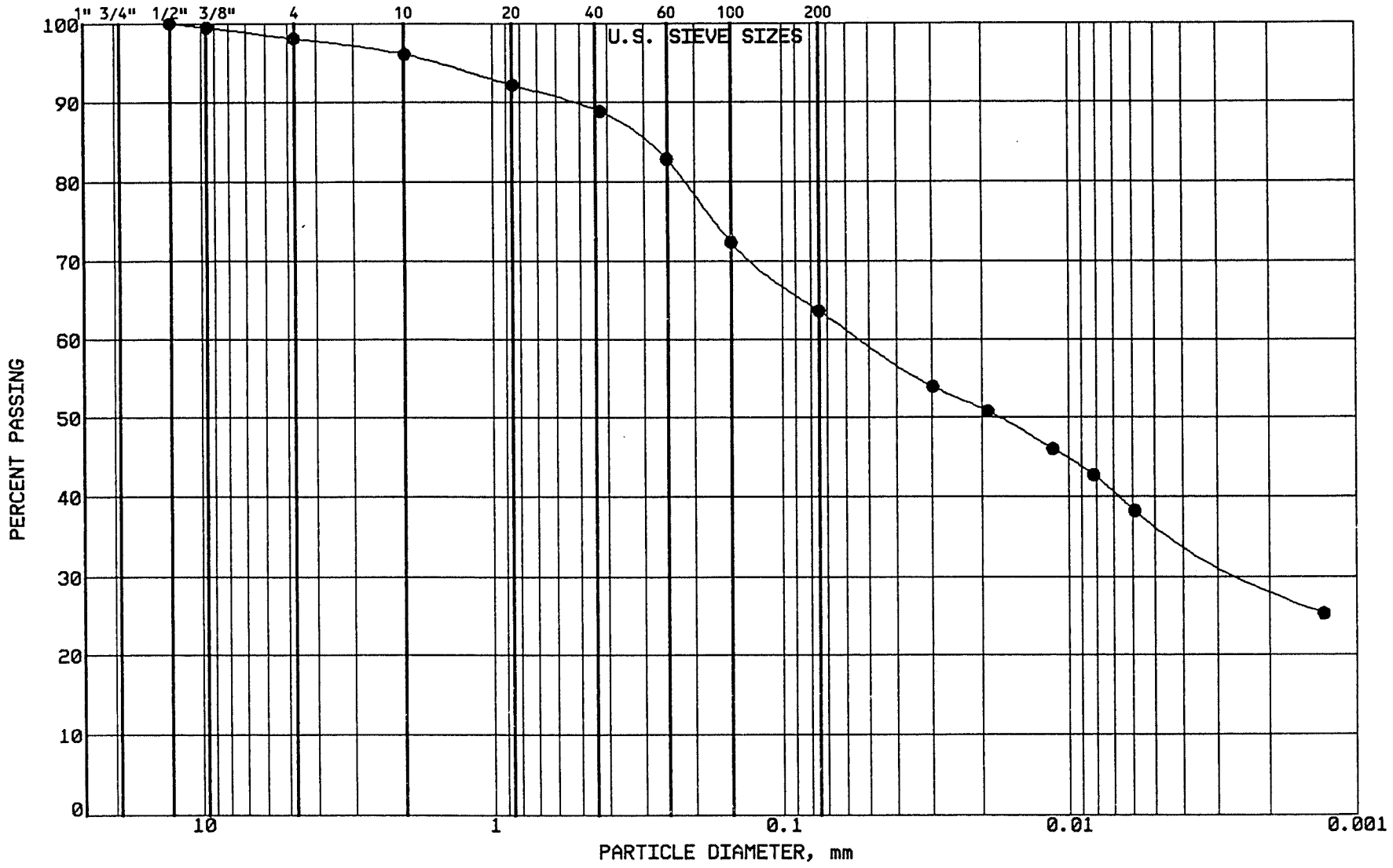
GRAVEL	0.8 %
SAND	34.2 %
SILT	27.0 %
CLAY	38.0 %
P 200	65.0 %

SOIL PROPERTIES

LL: 48.0%
PL: 19.0%
PI: 29.0%
CLASS: Sandy Lean Clay(CL), vy dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38079.0, E 40385.0
SAMPLE: CLBCC456 TUBE #: ST-157
ELEVATION: 1904.4'

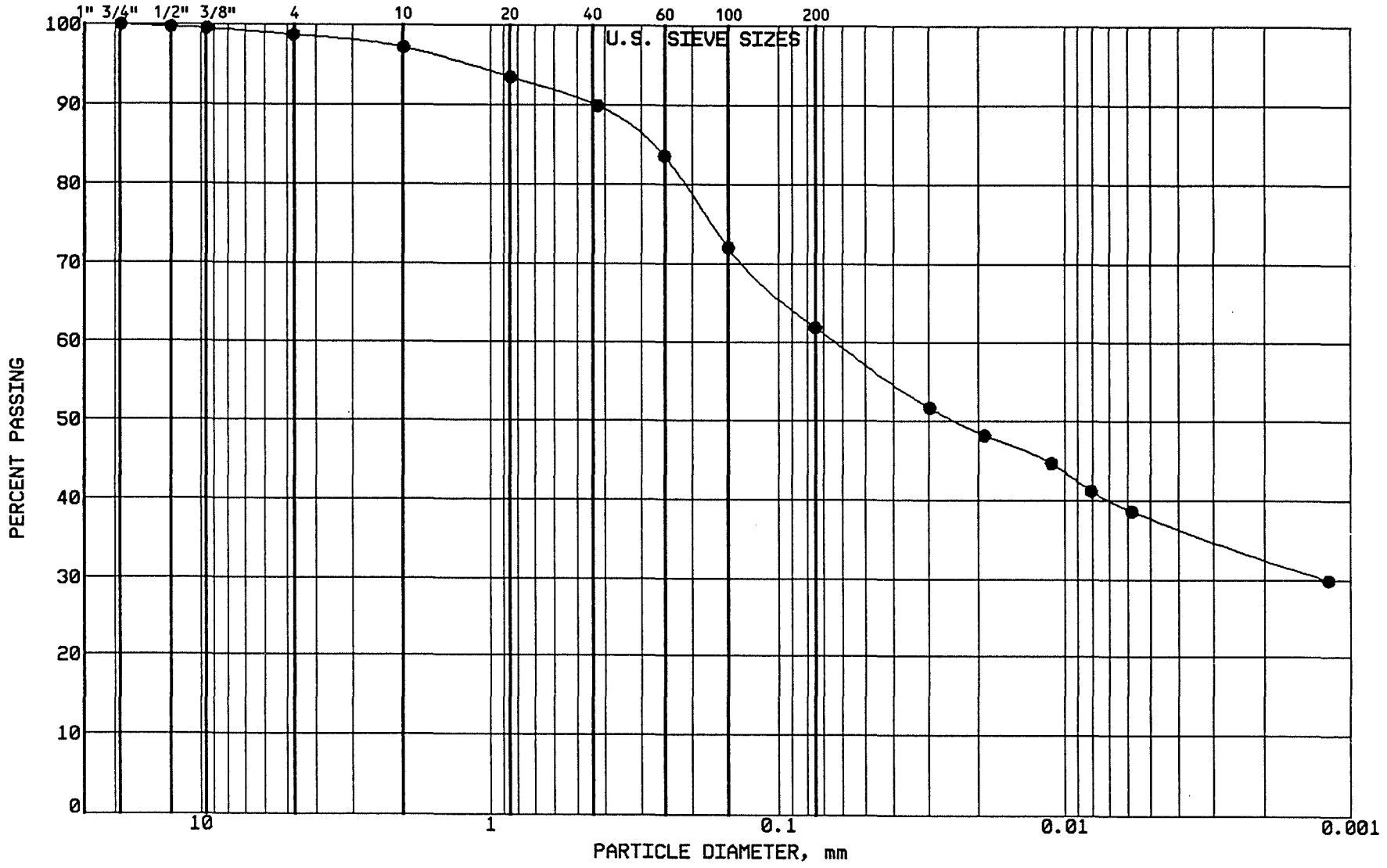
GRAVEL	1.9 %
SAND	34.5 %
SILT	26.8 %
CLAY	36.8 %
P 200	63.6 %

SOIL PROPERTIES

LL: 47.0%
PL: 16.0%
PI: 31.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38381.0, E 40701.0
SAMPLE: CLBCC451 TUBE #: ST-153
ELEVATION: 1900.2'

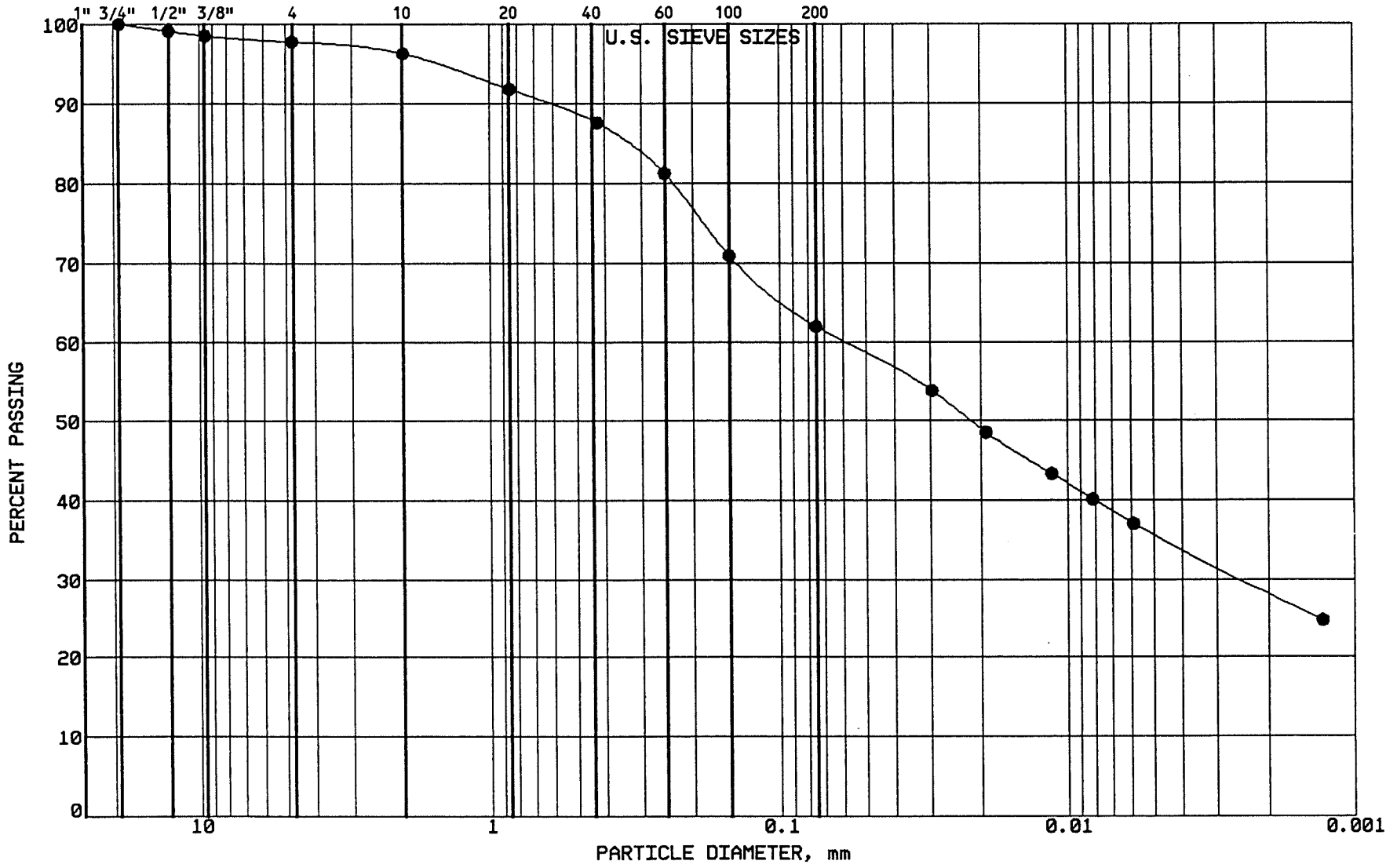
GRAVEL	1.3 %
SAND	36.8 %
SILT	24.1 %
CLAY	37.8 %
P 200	61.9 %

SOIL PROPERTIES

LL: 41.0%
PL: 16.0%
PI: 25.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37735.0, E 40921.0
SAMPLE: CLBCC452 TUBE #:
ELEVATION: 1902.8'

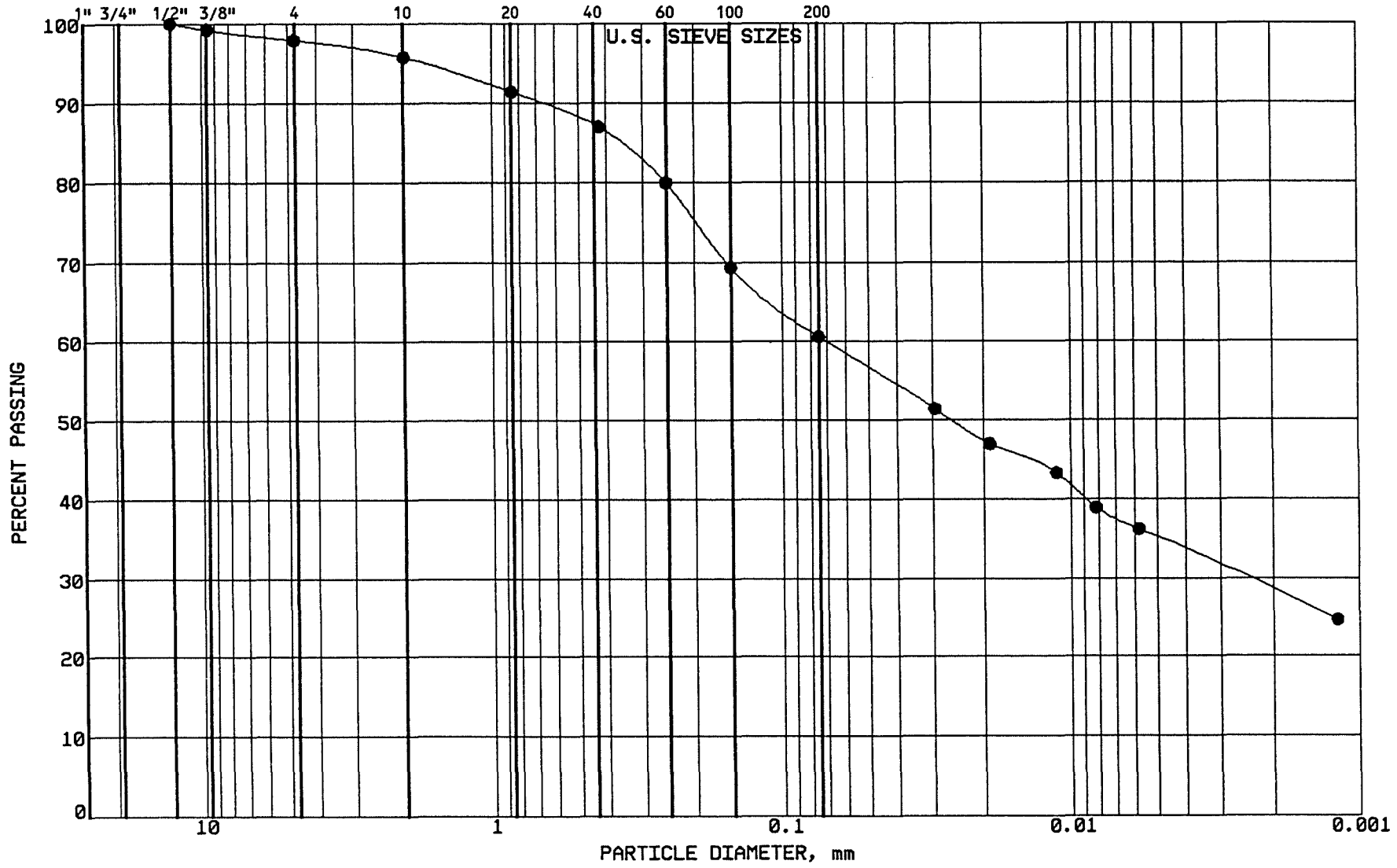
GRAVEL	2.2 %
SAND	35.8 %
SILT	26.3 %
CLAY	35.7 %
P 200	62.0 %

SOIL PROPERTIES

LL: 45.0%
PL: 17.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38192.0, E 39823.0
SAMPLE: CLBCC453 TUBE #: ST-154
ELEVATION: 1906.6'

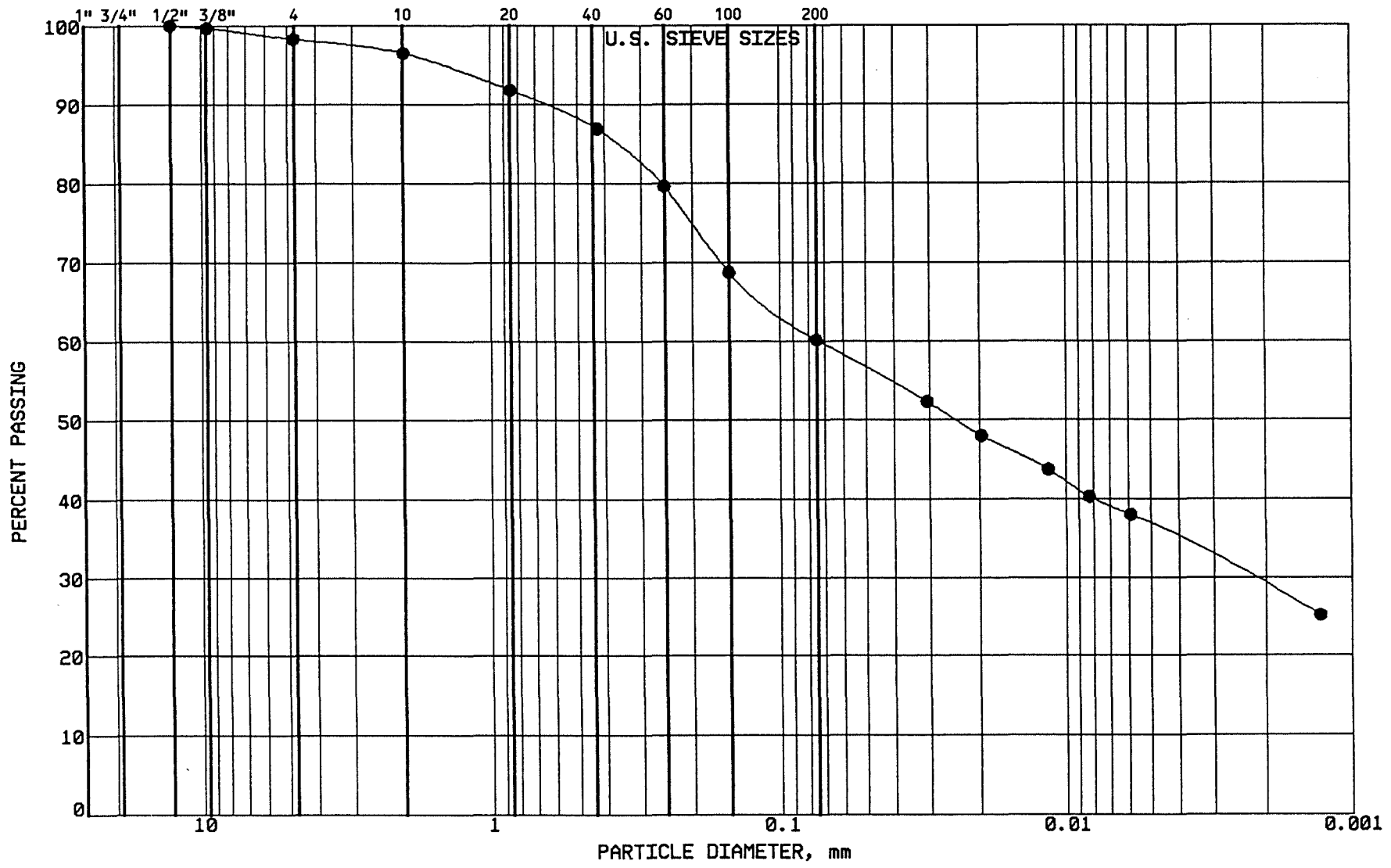
GRAVEL	2.1 %
SAND	37.3 %
SILT	25.5 %
CLAY	35.1 %
P 200	60.6 %

SOIL PROPERTIES

LL: 44.0%
PL: 18.0%
PI: 26.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38157.0, E 40016.0
SAMPLE: CLBCC454 TUBE #: ST-155
ELEVATION: 1905.8'

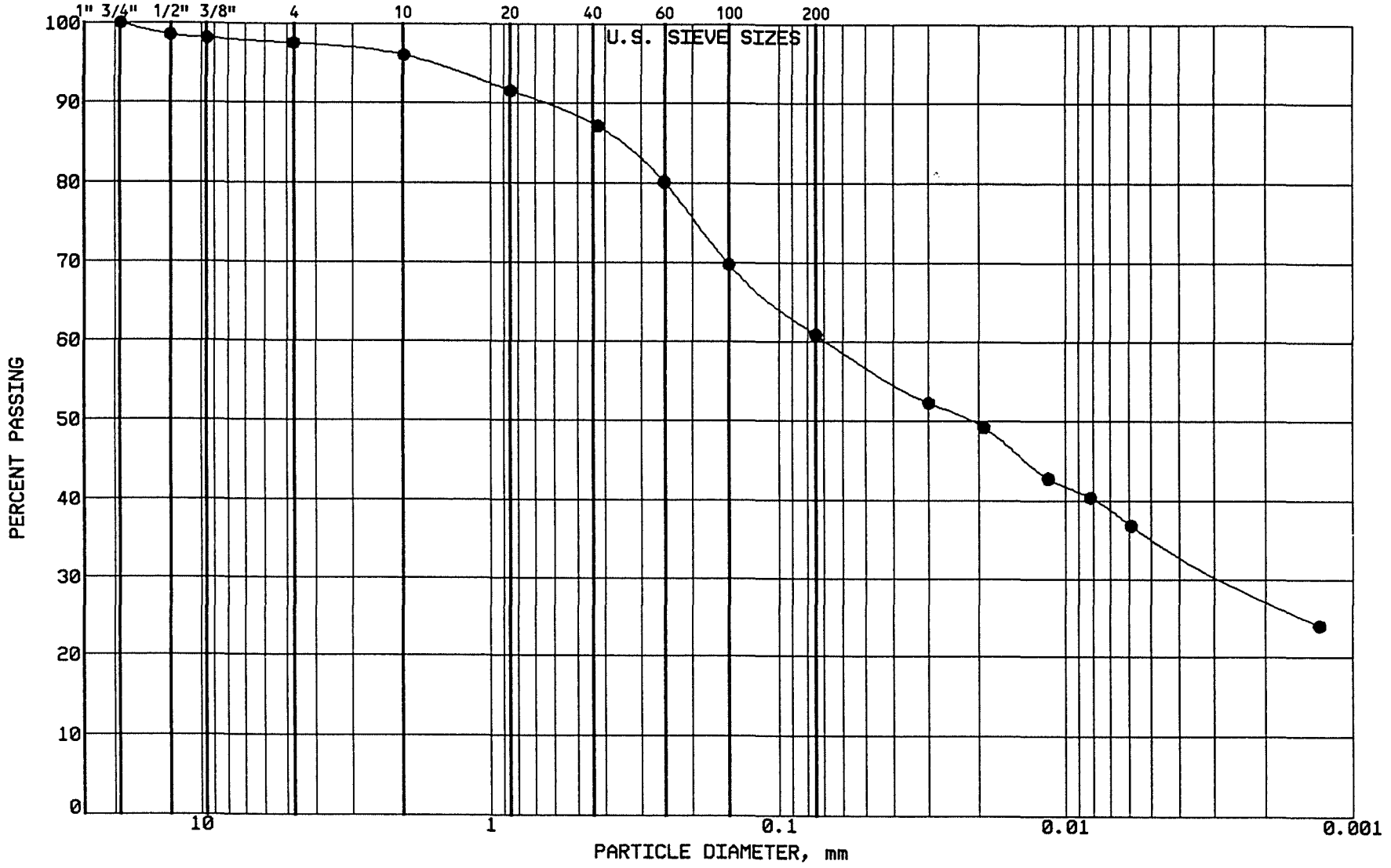
GRAVEL	1.7 %
SAND	38.1 %
SILT	23.6 %
CLAY	36.6 %
P 200	60.2 %

SOIL PROPERTIES

LL: 46.0%
PL: 17.0%
PI: 29.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38118.0, E 40188.0
SAMPLE: CLBCC455 TUBE #: ST-156
ELEVATION: 1905.0'

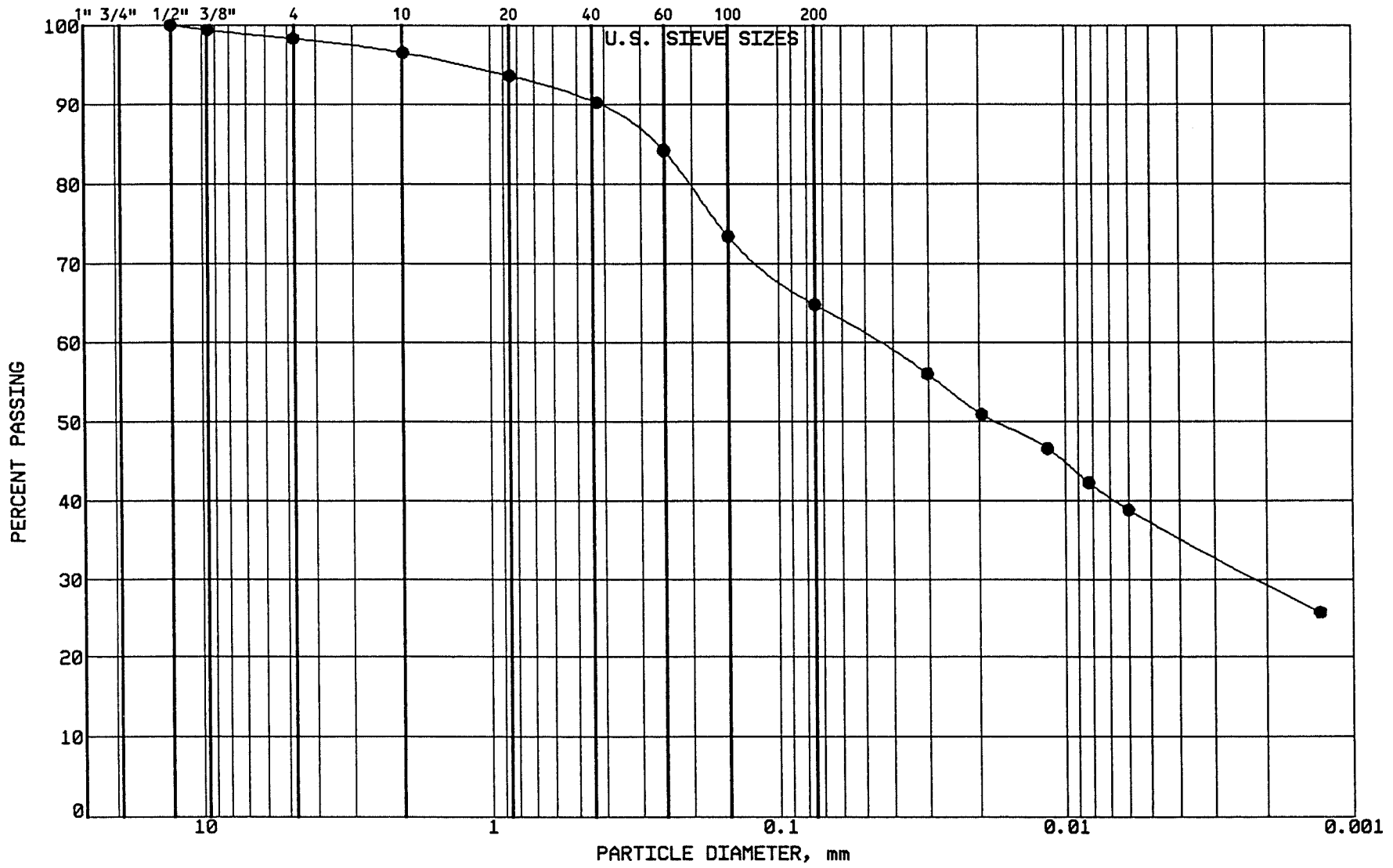
GRAVEL	2.5 %
SAND	36.6 %
SILT	25.5 %
CLAY	35.4 %
P 200	60.9 %

SOIL PROPERTIES

LL: 45.0%
PL: 19.0%
PI: 26.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38040.0, E 40587.0
SAMPLE: CLBCC457 TUBE #: ST.158
ELEVATION: 1904.4'

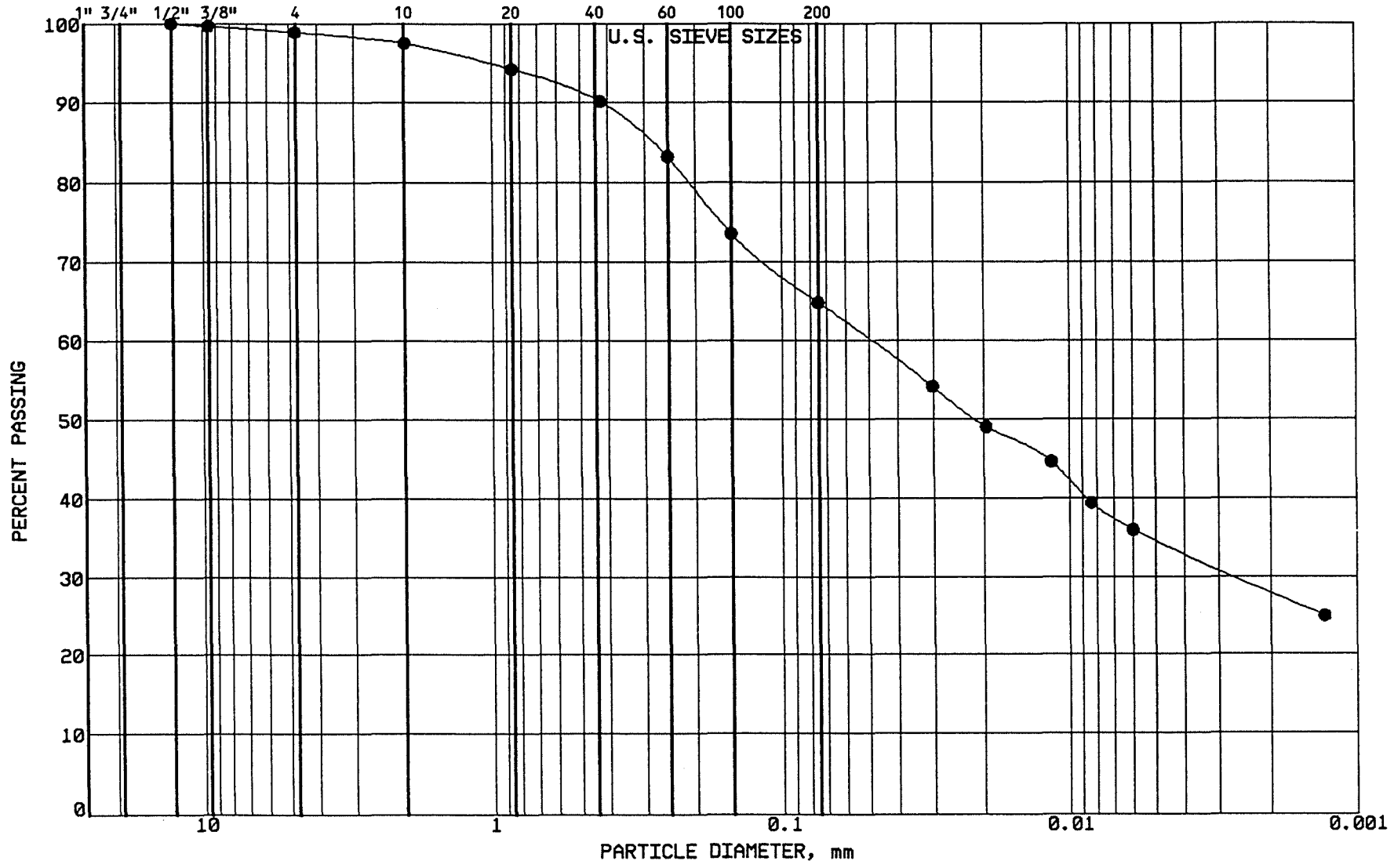
GRAVEL	1.7 %
SAND	33.5 %
SILT	27.5 %
CLAY	37.3 %
P 200	64.8 %

SOIL PROPERTIES

LL: 46.0%
PL: 17.0%
PI: 29.0%
CLASS: Sandy Lean Clay (CL), vy dk gr-br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38136.0, E 40645.0
SAMPLE: CLBCC458 TUBE #: ST-159
ELEVATION: 1902.7'

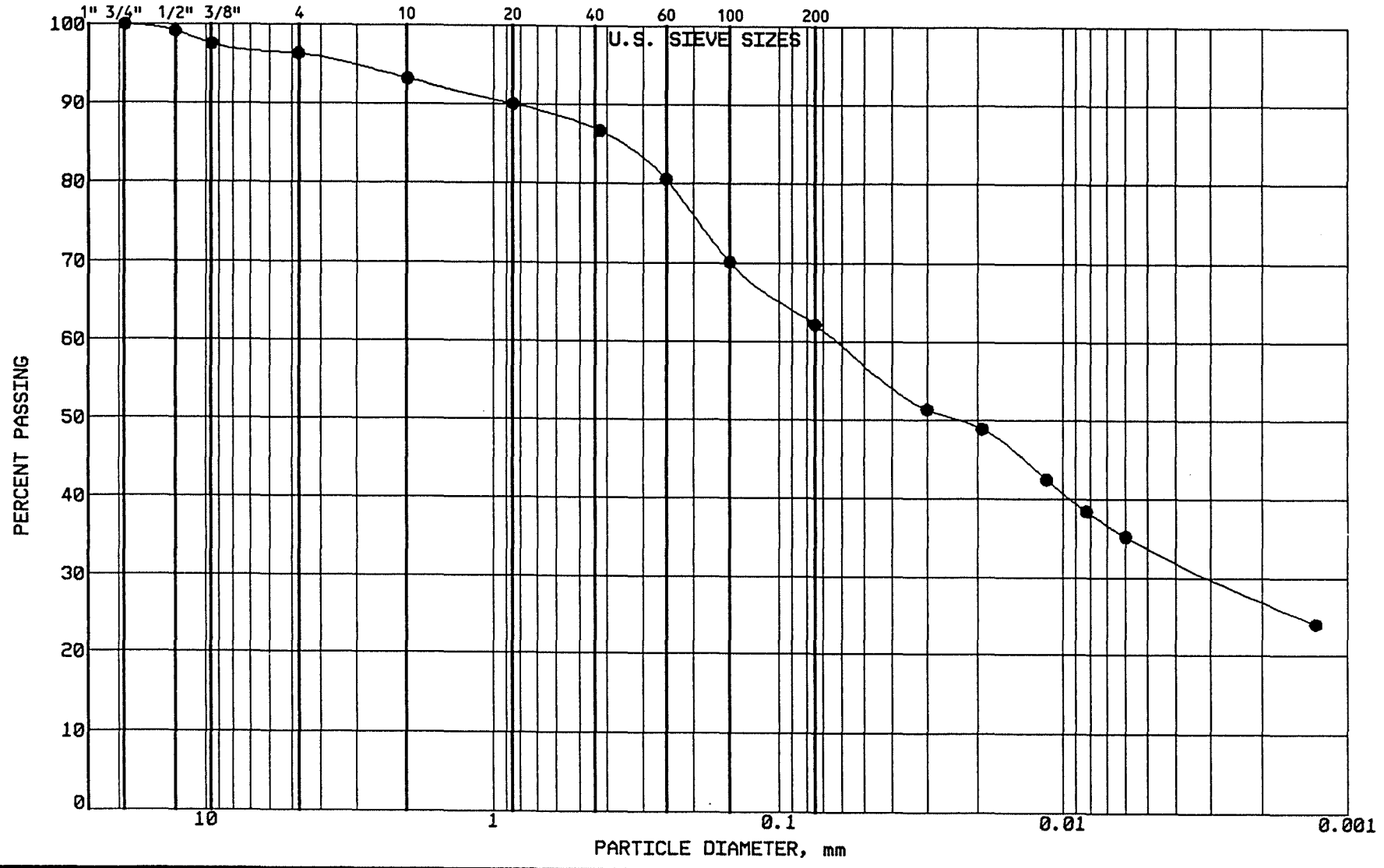
GRAVEL	1.1 %
SAND	34.1 %
SILT	30.2 %
CLAY	34.6 %
P 200	64.8 %

SOIL PROPERTIES

LL: 42.0%
PL: 16.0%
PI: 26.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38184.0, E 40402.0
SAMPLE: CLBCC459 TUBE #: ST-160
ELEVATION: 1903.6'

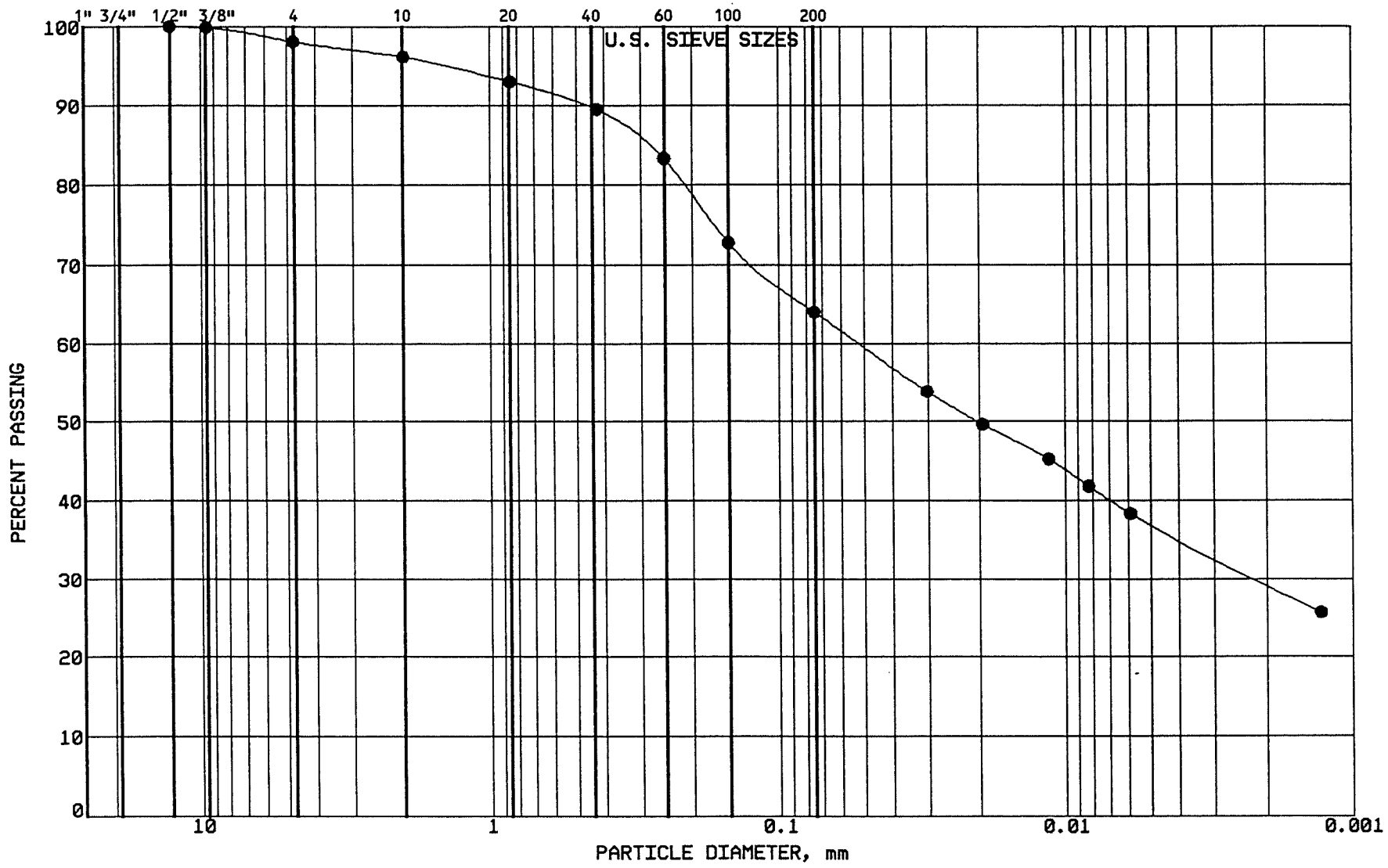
GRAVEL	3.7 %
SAND	34.1 %
SILT	28.3 %
CLAY	33.9 %
P 200	62.2 %

SOIL PROPERTIES

LL: 46.0%
PL: 17.0%
PI: 29.0%
CLASS: Sandy Lean Clay(CL),vy dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38220.0, E 40218.0
SAMPLE: CLBCC460 TUBE #:ST-161
ELEVATION: 1904.4'

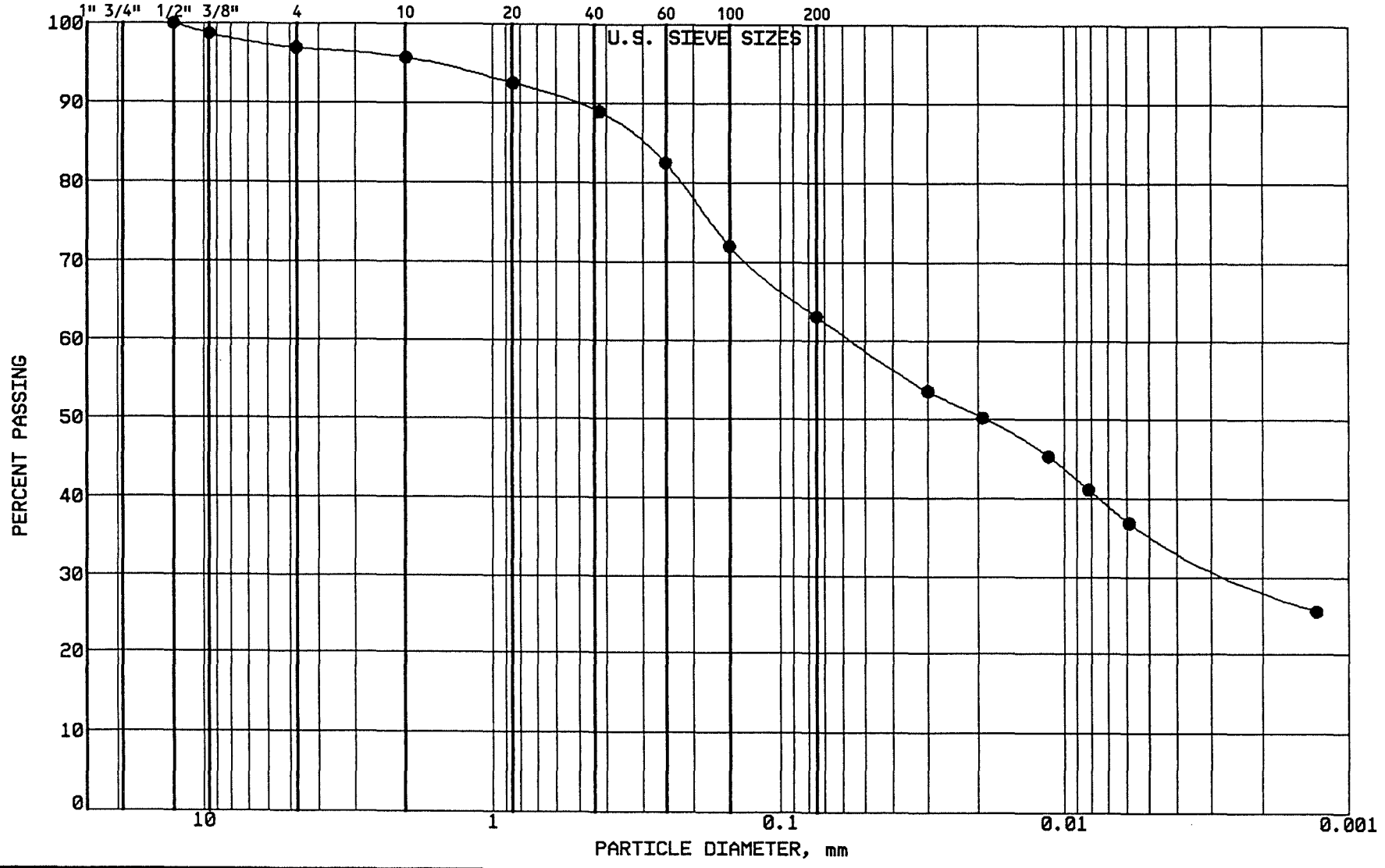
GRAVEL	1.9 %
SAND	34.1 %
SILT	27.1 %
CLAY	36.9 %
P 200	64.0 %

SOIL PROPERTIES

LL: 48.0%
PL: 17.0%
PI: 31.0%
CLASS: Sandy Lean Clay(CL),vy dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38258.0, E 40044.0
SAMPLE: CLBCC461 TUBE #: ST-162
ELEVATION: 1905.2'

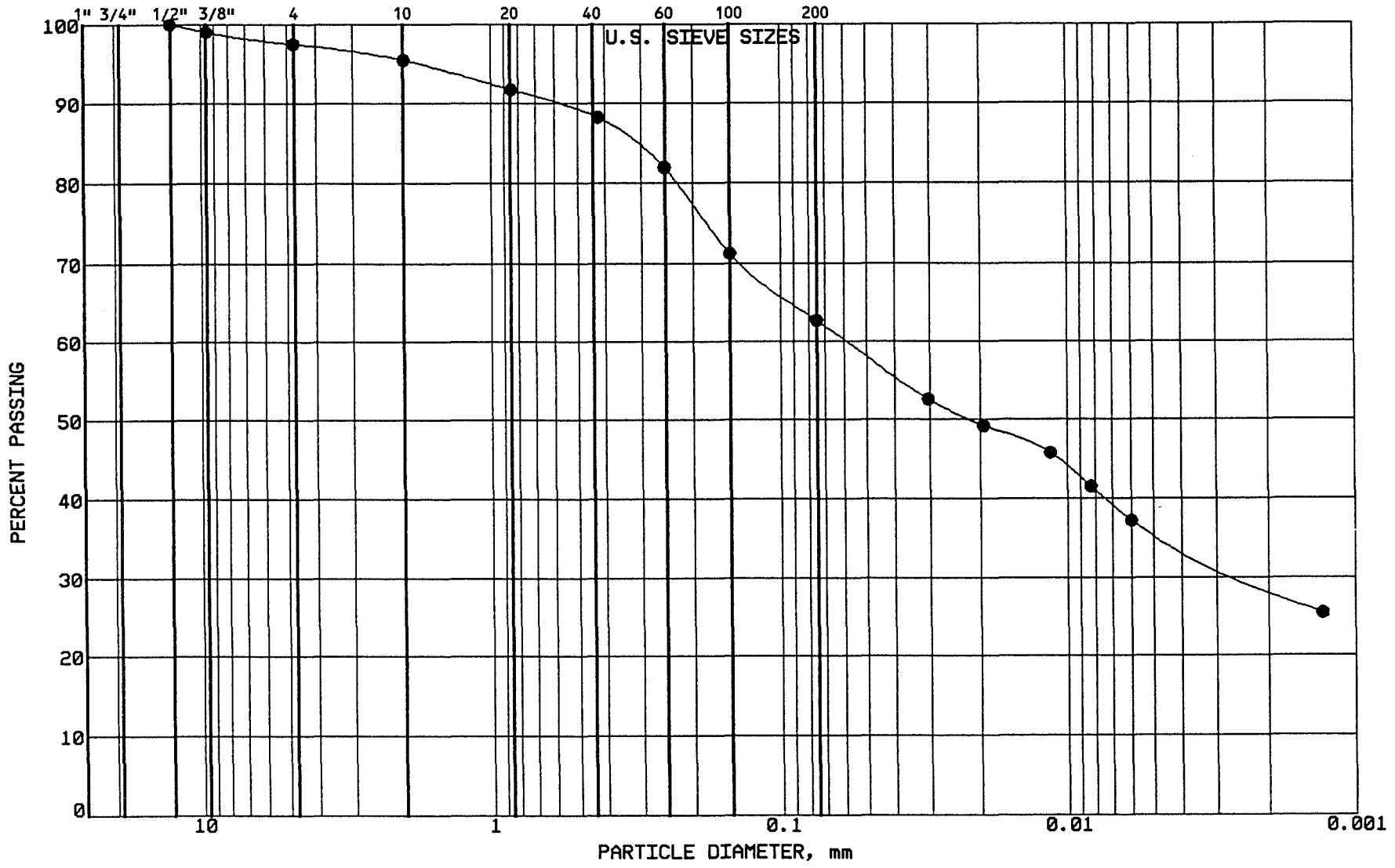
GRAVEL	3.1 %
SAND	33.8 %
SILT	27.4 %
CLAY	35.7 %
P 200	63.1 %

SOIL PROPERTIES

LL: 48.0%
PL: 18.0%
PI: 30.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38295.0, E 39831.0
SAMPLE: CLBCC462 TUBE #: ST-163
ELEVATION: 1905.9'

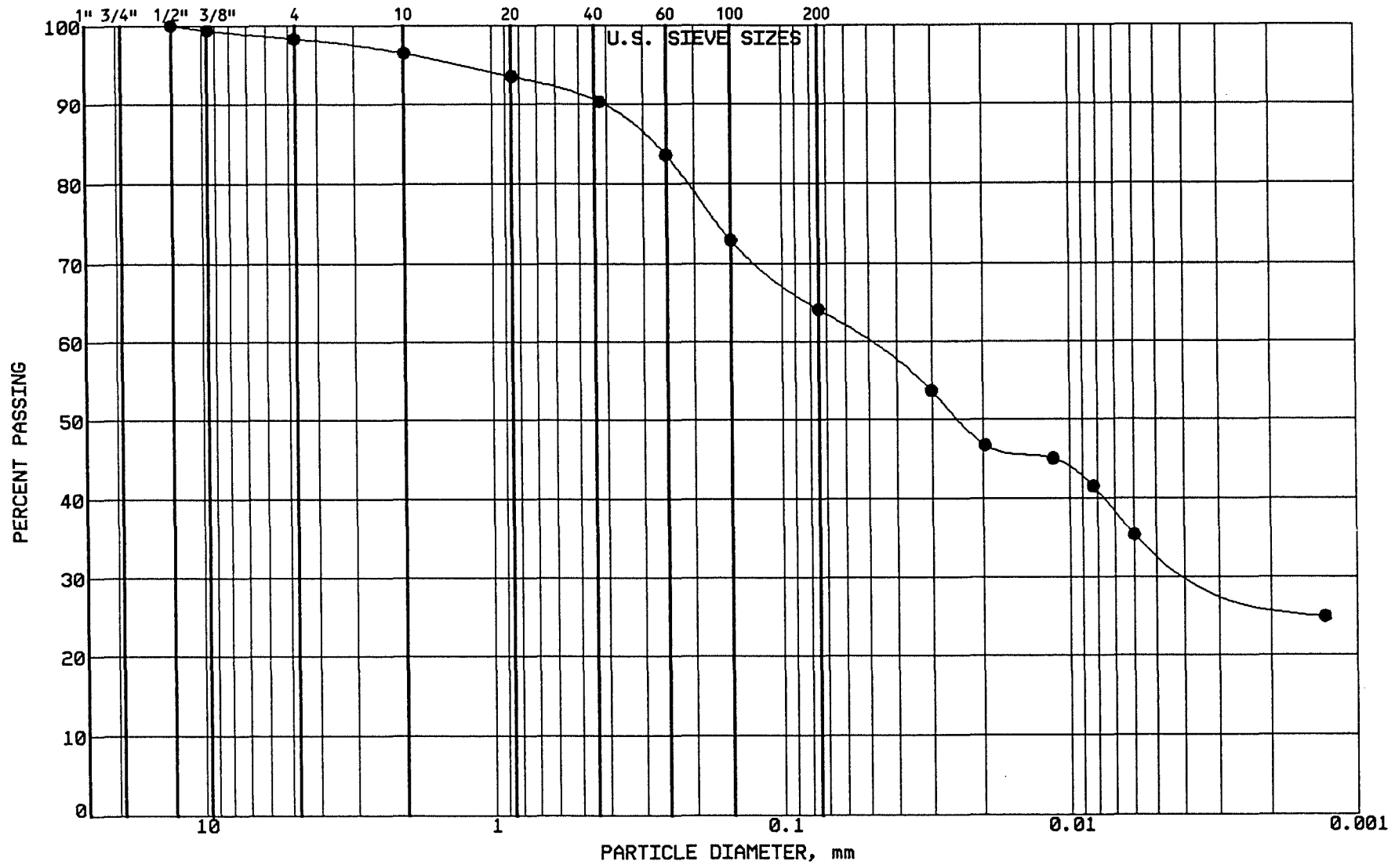
GRAVEL	2.5 %
SAND	34.8 %
SILT	26.9 %
CLAY	35.8 %
P 200	62.7 %

SOIL PROPERTIES

LL: 46.0%
PL: 16.0%
PI: 30.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38411.0, E 39832.0
SAMPLE: CLBCC463 TUBE #: ST-164
ELEVATION: 1905.2'

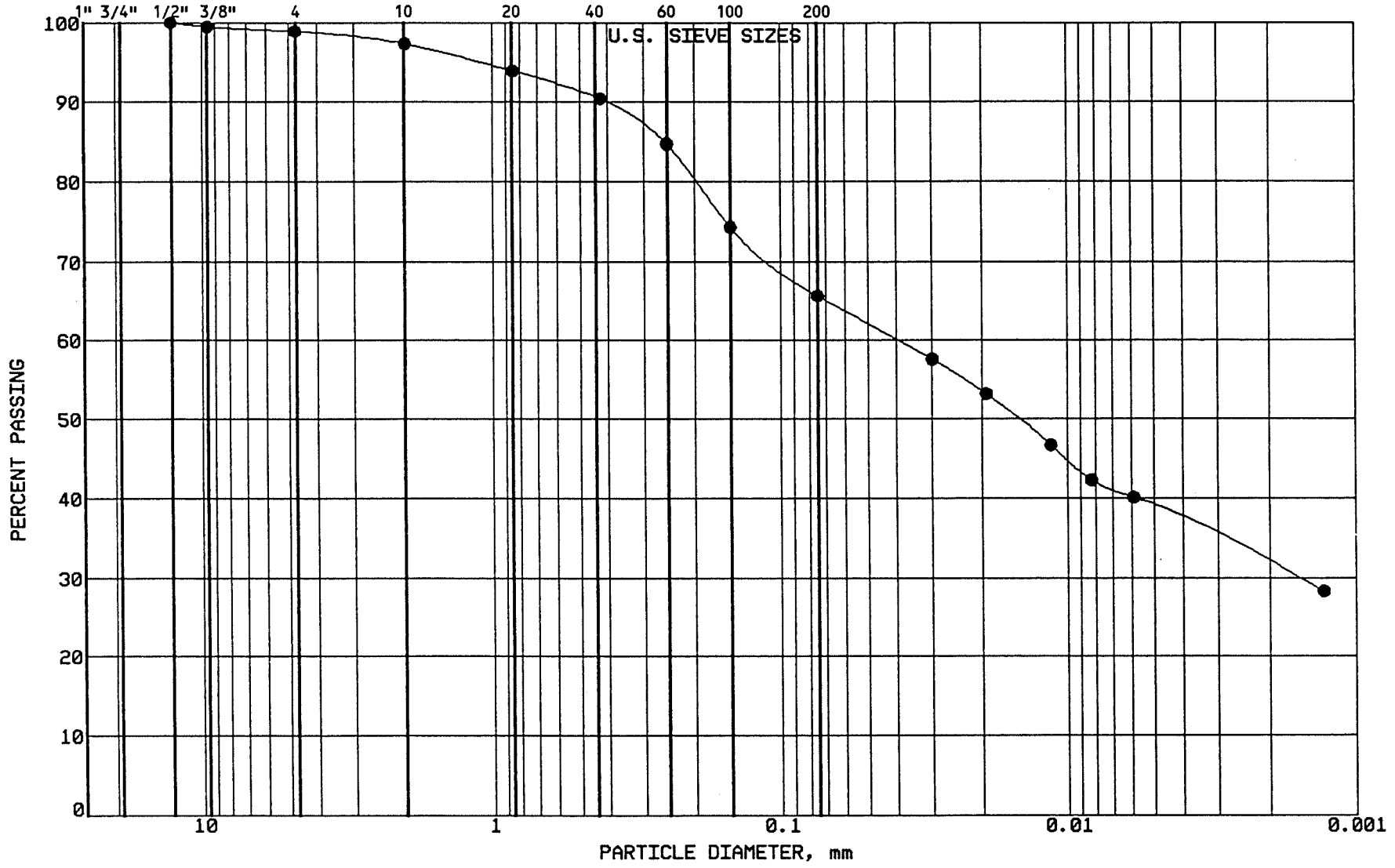
GRAVEL	1.7 %
SAND	34.2 %
SILT	29.9 %
CLAY	34.2 %
P 200	64.1 %

SOIL PROPERTIES

LL: 46.0%
PL: 17.0%
PI: 29.0%
CLASS: Sandy Lean Clay (CL), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38369.0, E 40060.0
SAMPLE: CLBCC464 TUBE #:ST.165
ELEVATION: 1904.4'

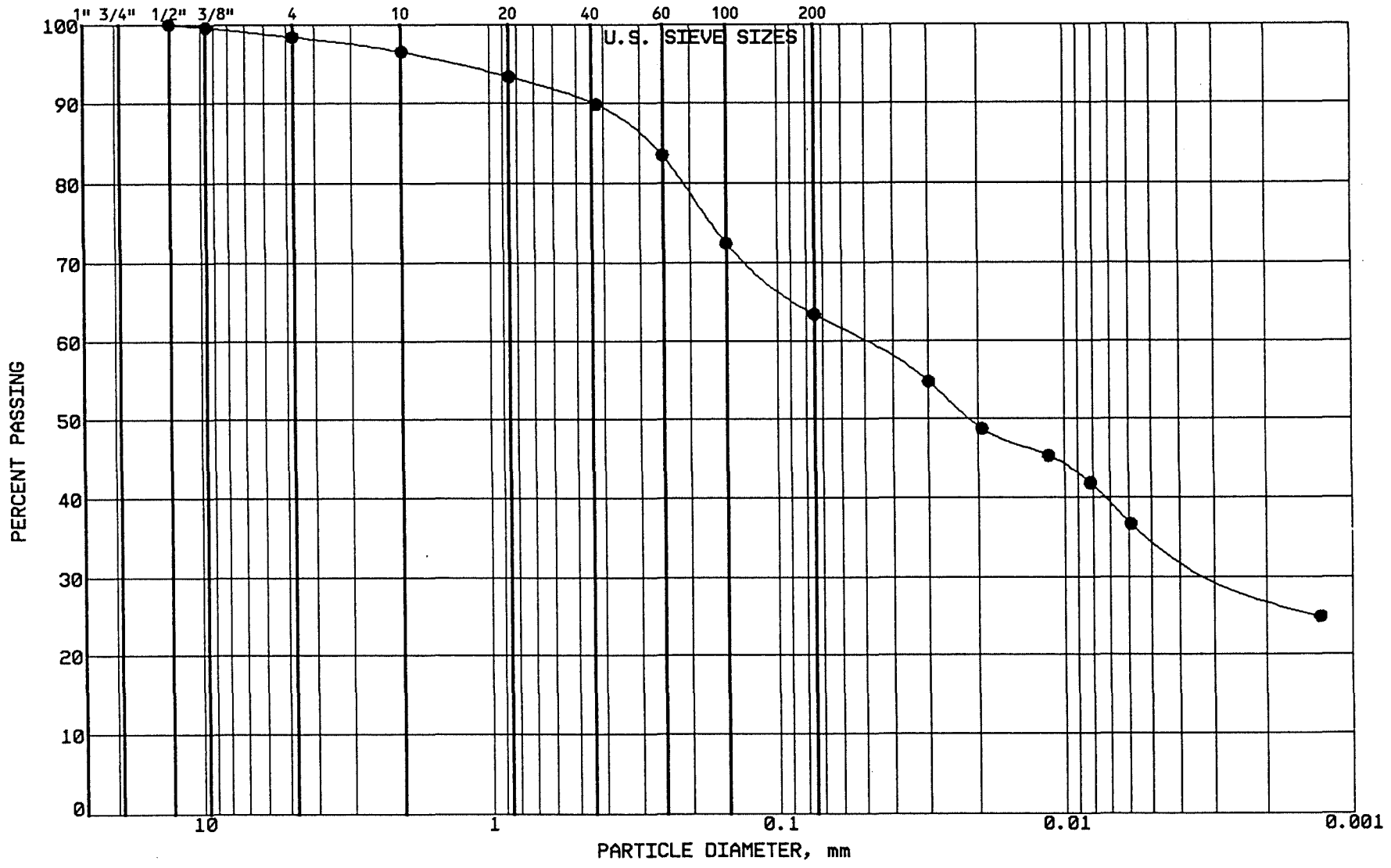
GRAVEL	1.1 %
SAND	33.3 %
SILT	26.8 %
CLAY	38.8 %
P 200	65.6 %

SOIL PROPERTIES

LL: 45.0%
PL: 17.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38332.0, E 40235.0
SAMPLE: CLBCC465 TUBE #:ST-166
ELEVATION: 1903.7'

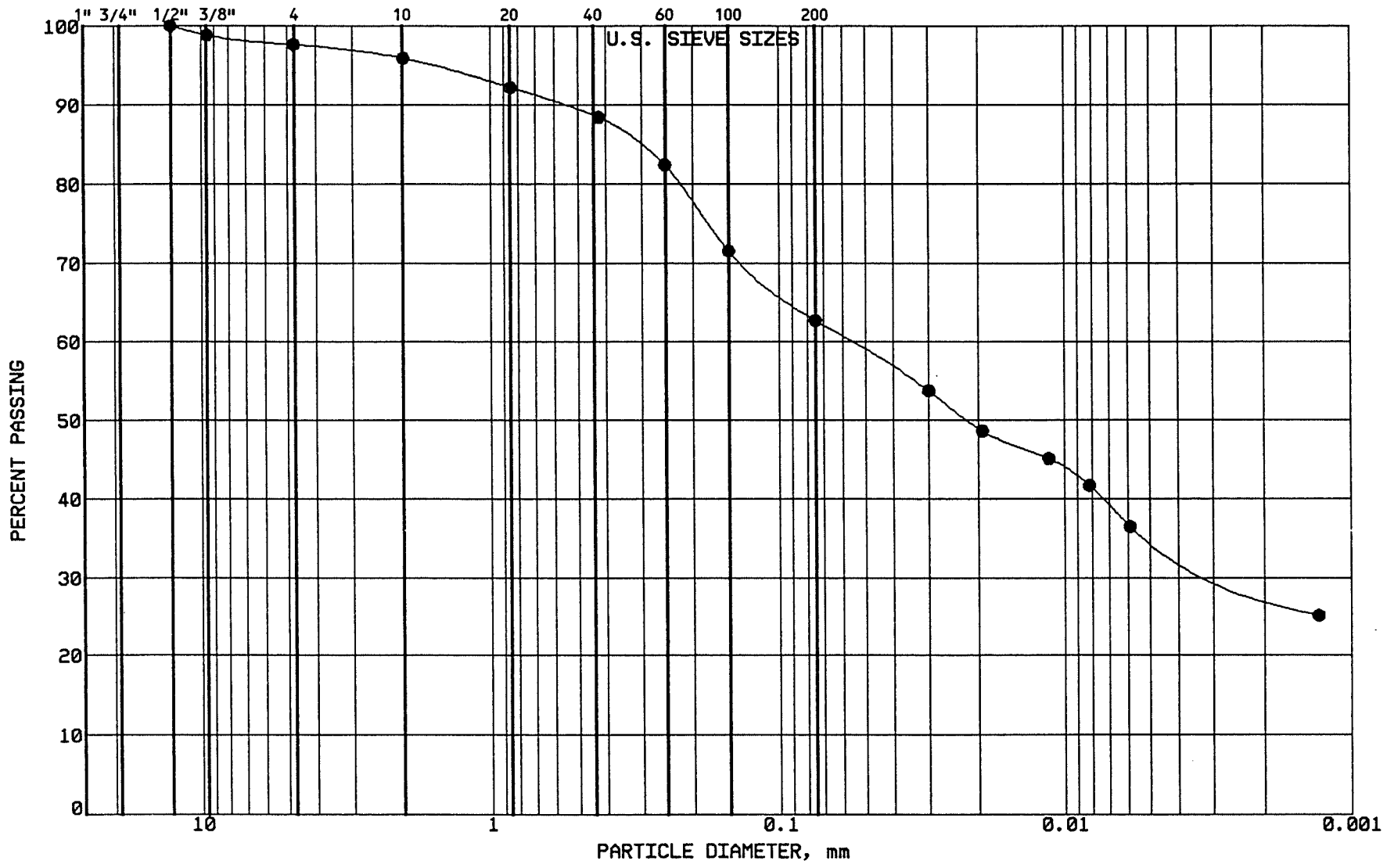
GRAVEL	1.6 %
SAND	35.0 %
SILT	28.1 %
CLAY	35.3 %
P 200	63.4 %

SOIL PROPERTIES

LL: 46.0%
PL: 18.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38293.0, E 40430.0
SAMPLE: CLBCC466 TUBE #: ST-167
ELEVATION: 1902.8'

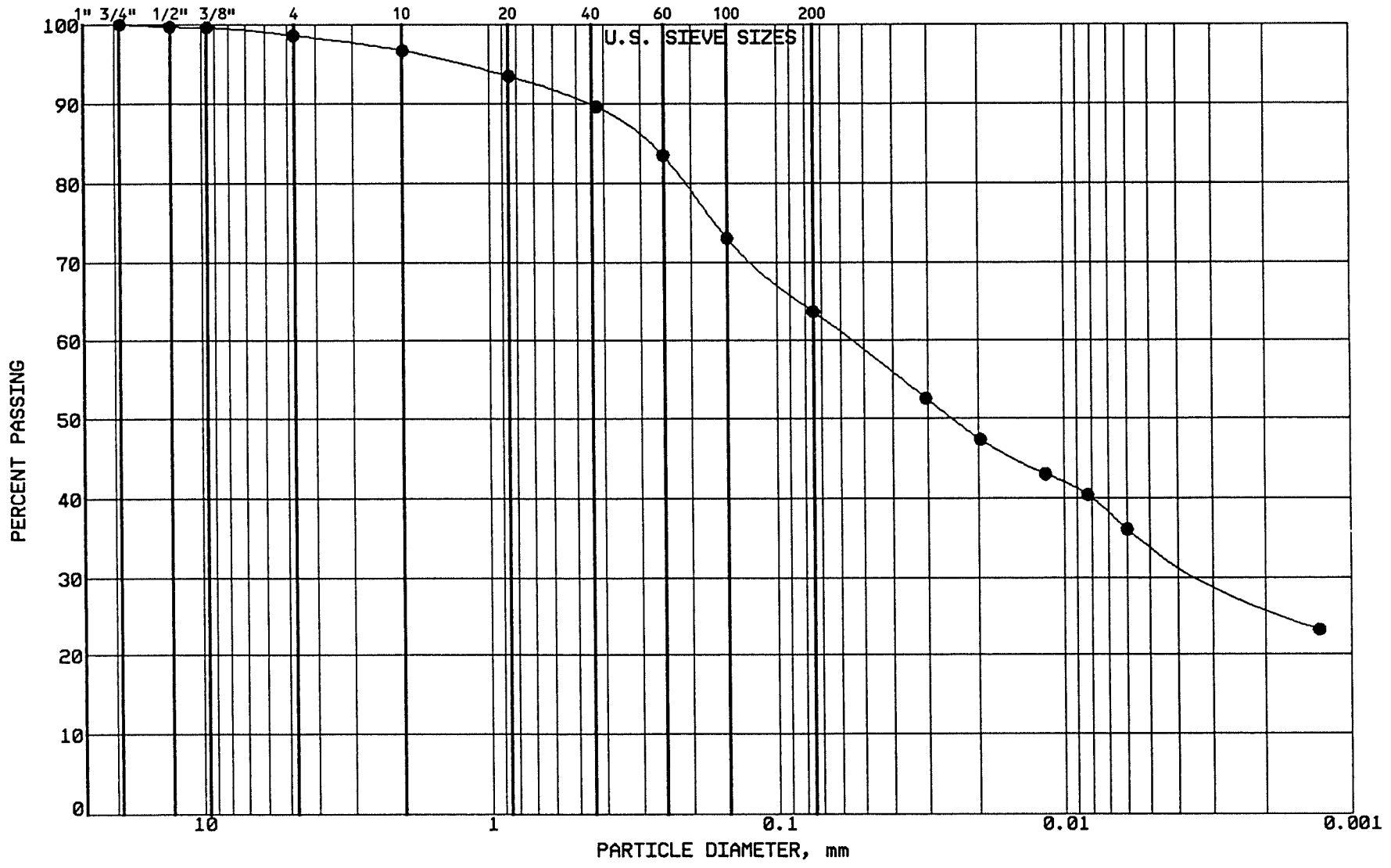
GRAVEL	2.4 %
SAND	34.9 %
SILT	27.4 %
CLAY	35.3 %
P 200	62.7 %

SOIL PROPERTIES

LL: 40.0%
PL: 15.0%
PI: 25.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38242.0, E 40671.0
SAMPLE: CLBCC467 TUBE #:ST-168
ELEVATION: 1901.9'

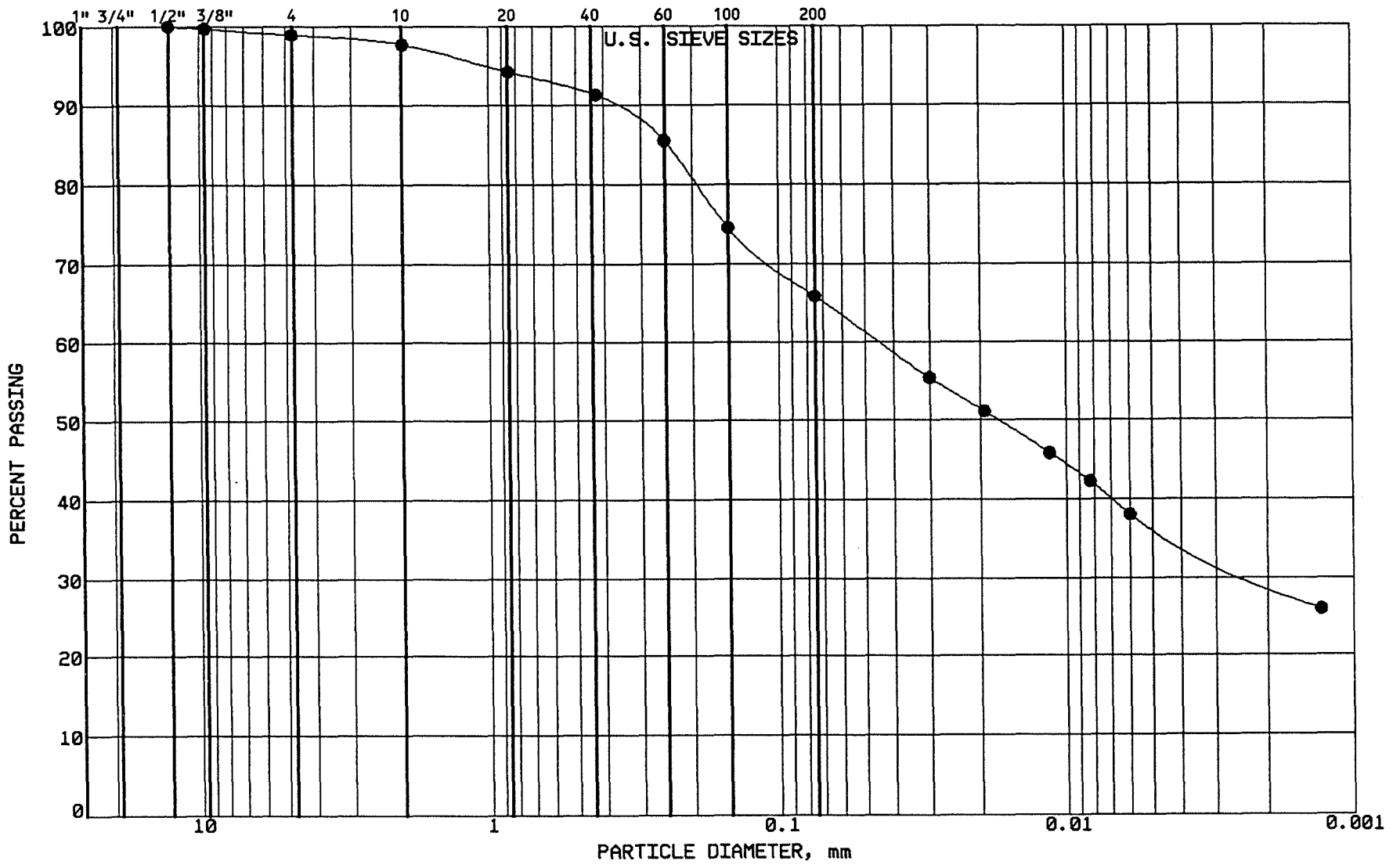
GRAVEL	1.4 %
SAND	34.9 %
SILT	29.2 %
CLAY	34.5 %
P 200	63.7 %

SOIL PROPERTIES

LL: 44.0%
PL: 17.0%
PI: 27.0%
CLASS: Sandy Lean Clay (CL), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37582.0, E 41284.0
SAMPLE: CLBCC468 TUBE #:ST-169
ELEVATION: 1902.3'

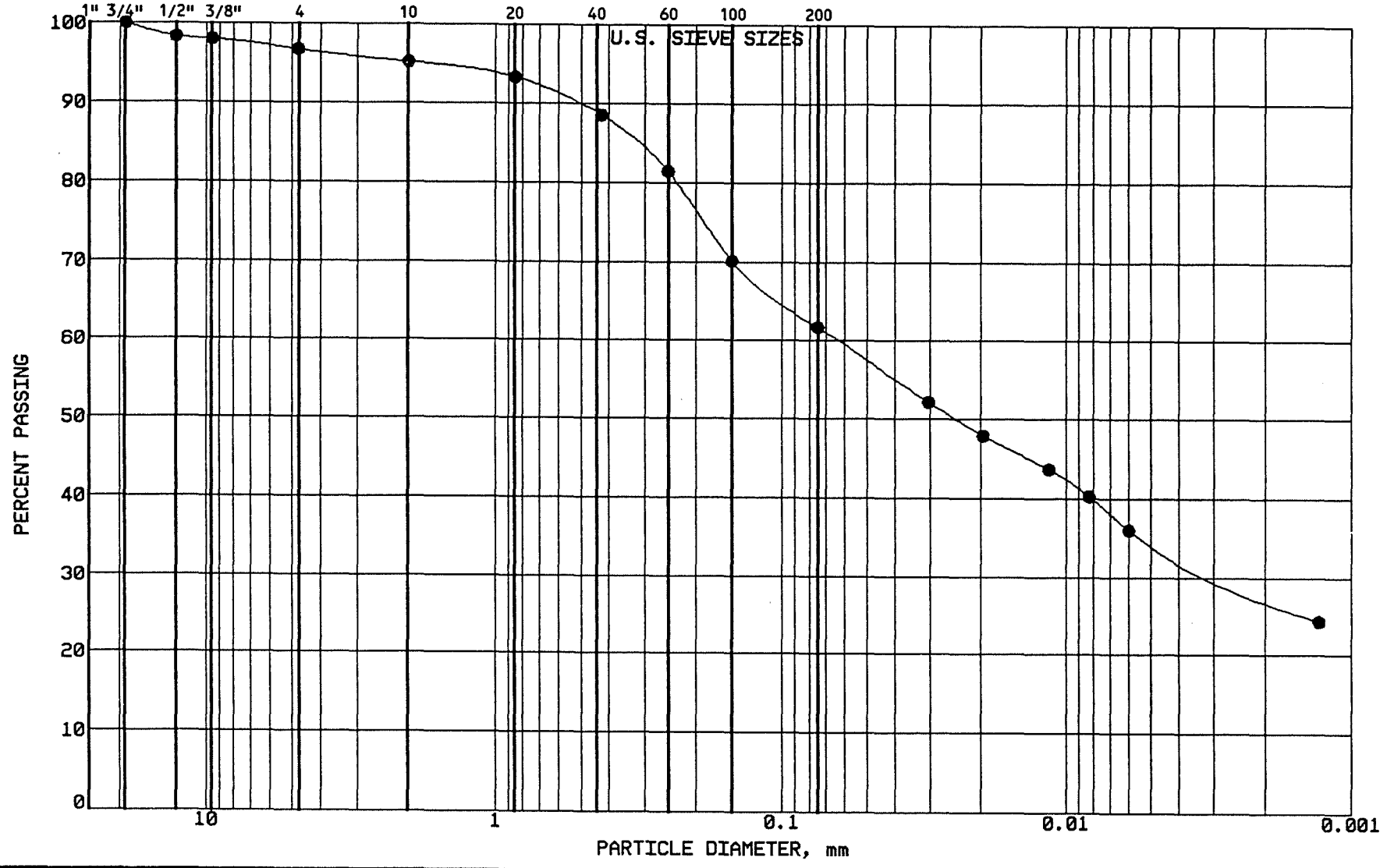
GRAVEL	1.1 %
SAND	33.1 %
SILT	29.2 %
CLAY	36.6 %
P 200	65.8 %

SOIL PROPERTIES

LL: 47.0%
PL: 18.0%
PI: 29.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37626.0, E 41076.0
SAMPLE: CLBCC469 TUBE #: ST-170
ELEVATION: 1903.1'

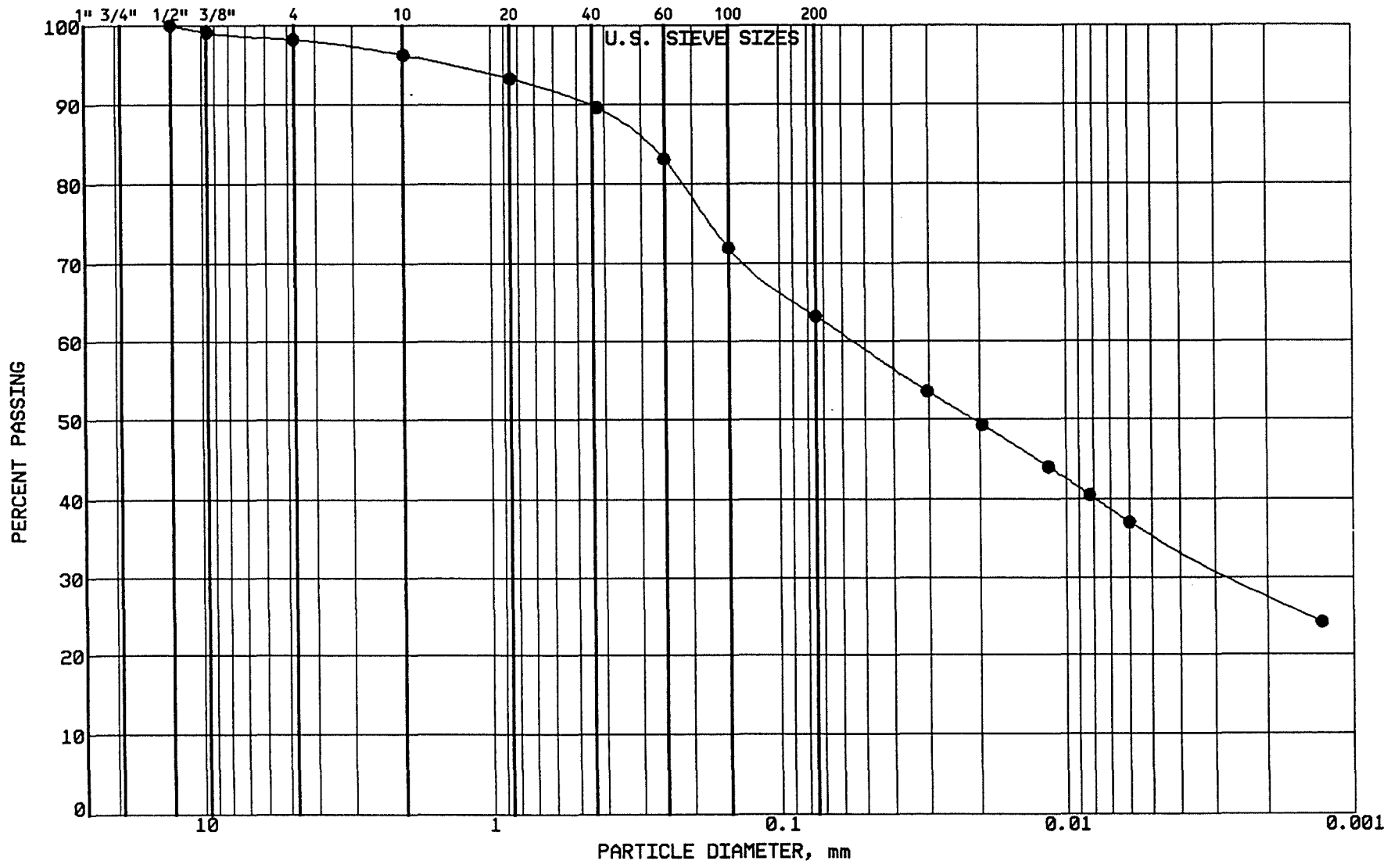
GRAVEL	3.3 %
SAND	35.0 %
SILT	27.1 %
CLAY	34.6 %
P 200	61.7 %

SOIL PROPERTIES

LL: 48.0%
PL: 18.0%
PI: 30.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

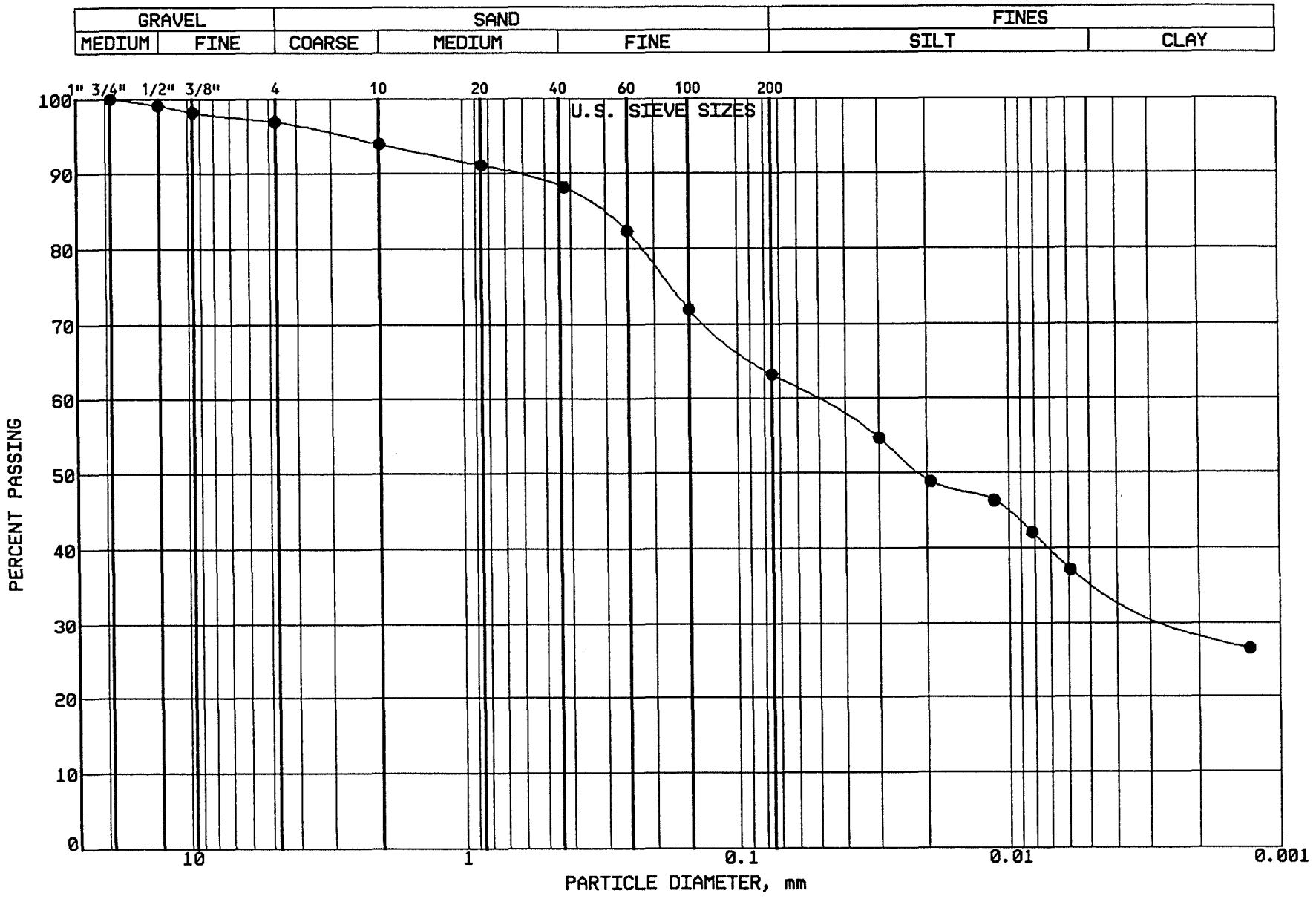
LOCATION: N 37651.0, E 40870.0
SAMPLE: CLBCC470 TUBE #: ST-171
ELEVATION: 1904.1'

GRAVEL	1.8 %
SAND	35.0 %
SILT	27.7 %
CLAY	35.5 %
P 200	63.2 %

SOIL PROPERTIES

LL: 48.0%
PL: 17.0%
PI: 31.0%
CLASS: Sandy Lean Clay (CL), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37676.0, E 40644.0
SAMPLE: CLBCC471 TUBE #: ST-172
ELEVATION: 1904.9'

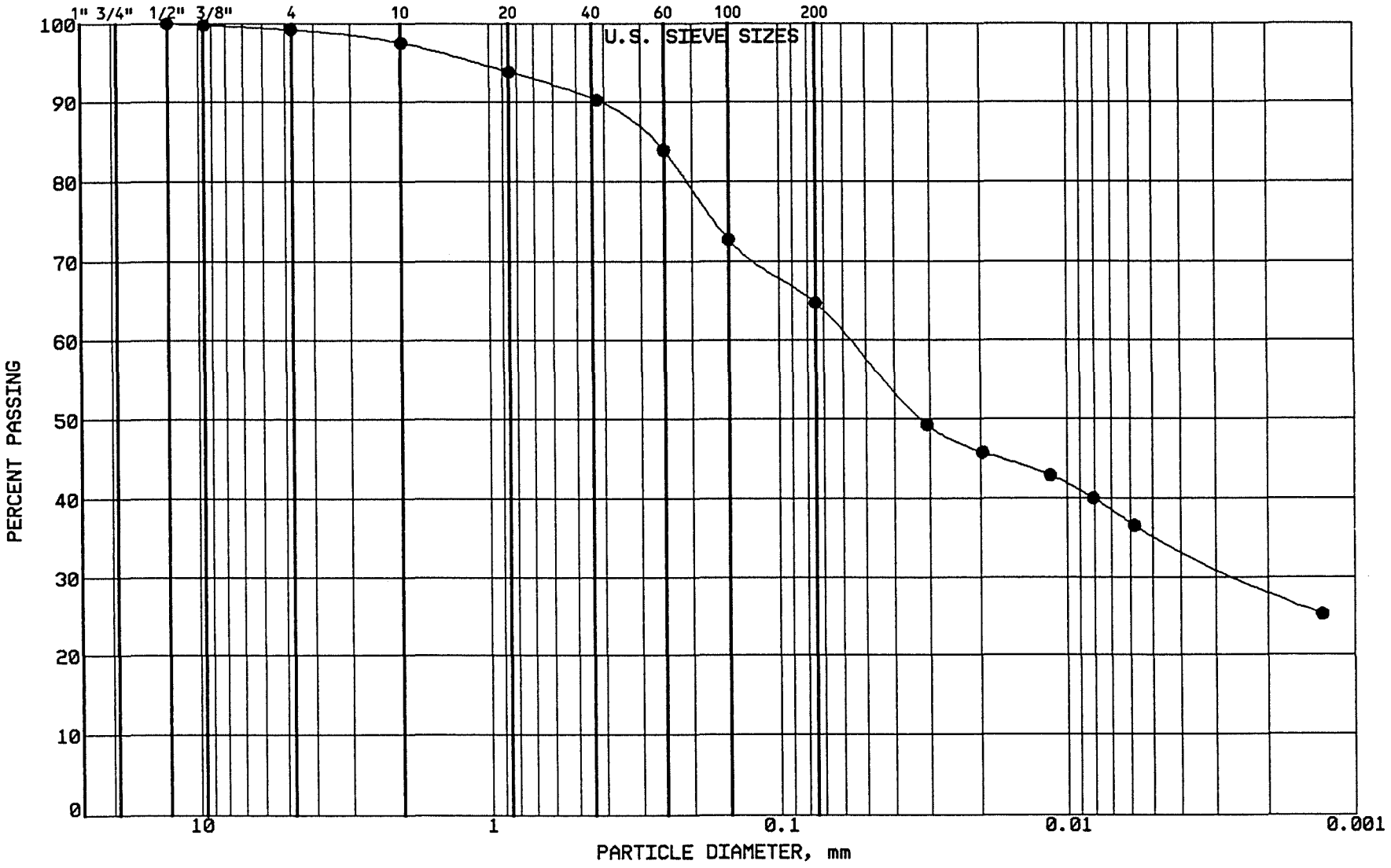
GRAVEL	3.1 %
SAND	33.7 %
SILT	27.3 %
CLAY	35.9 %
P 200	63.2 %

SOIL PROPERTIES

LL: 46.0%
PL: 16.0%
PI: 30.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37888.0, E 40690.0
SAMPLE: CLBCC472 TUBE #: ST-173
ELEVATION: 1903.7'

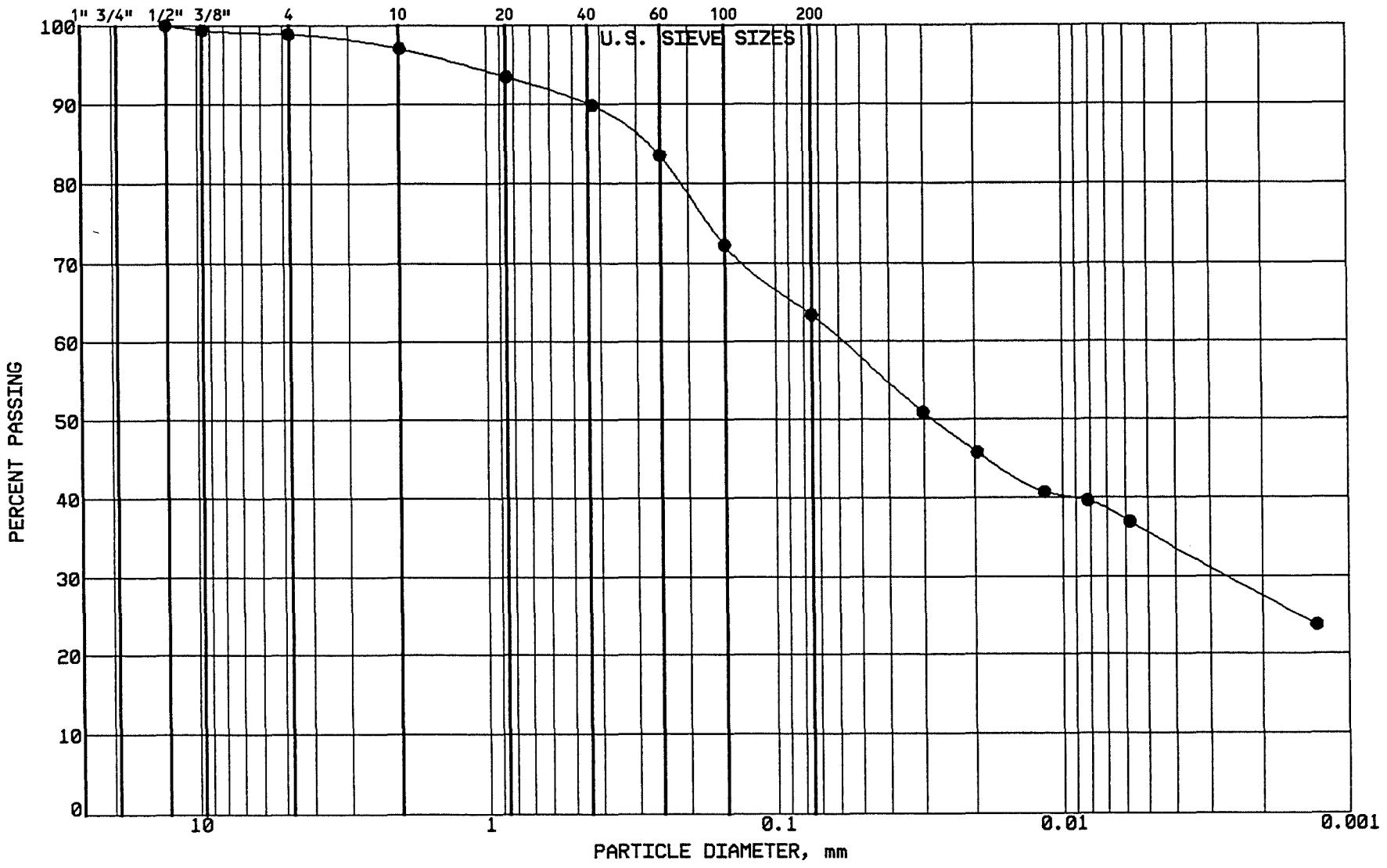
GRAVEL	0.8 %
SAND	34.5 %
SILT	29.3 %
CLAY	35.4 %
P 200	64.7 %

SOIL PROPERTIES

LL: 45.0%
PL: 17.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37861.0, E 40887.0
SAMPLE: CLBCC473 TUBE #: ST-174
ELEVATION: 1903.0'

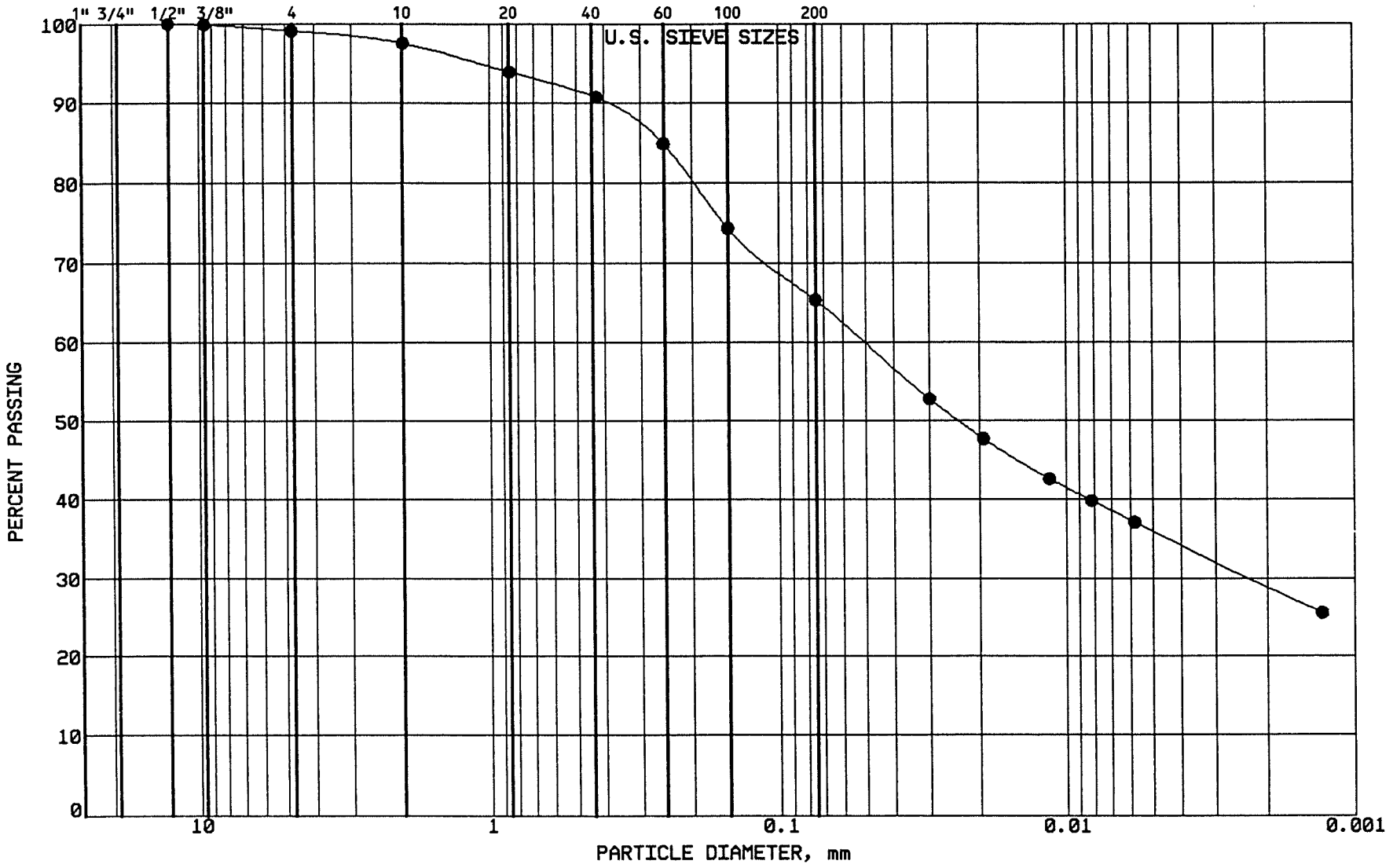
GRAVEL	1.1 %
SAND	35.5 %
SILT	27.8 %
CLAY	35.6 %
P 200	63.4 %

SOIL PROPERTIES

LL: 47.0%
PL: 18.0%
PI: 29.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37831.0, E 41087.0
SAMPLE: CLBCC474 TUBE #: ST-175
ELEVATION: 1902.1'

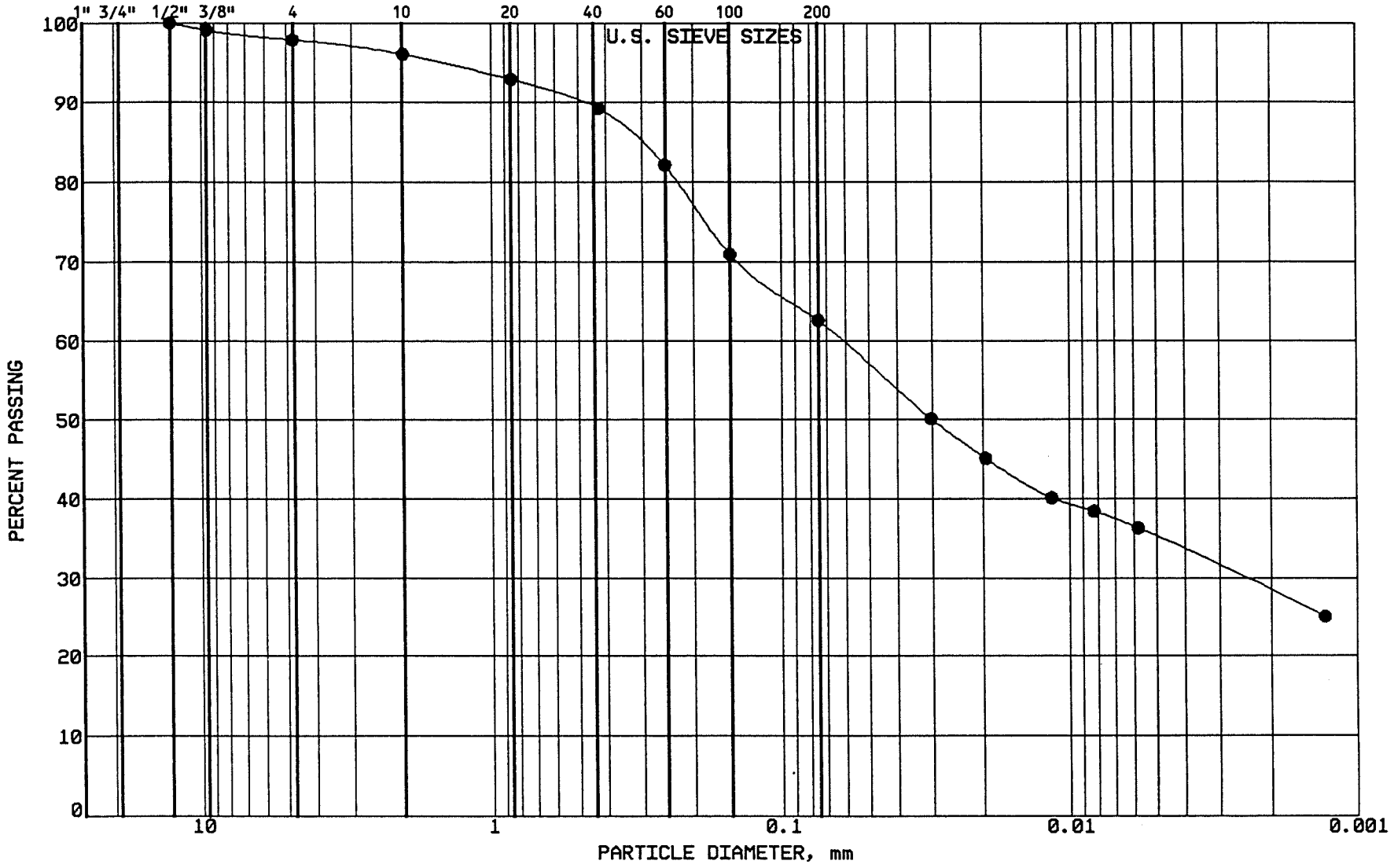
GRAVEL	0.9 %
SAND	33.8 %
SILT	29.4 %
CLAY	35.9 %
P 200	65.3 %

SOIL PROPERTIES

LL: 48.0%
PL: 17.0%
PI: 31.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37792.0, E 41303.0
SAMPLE: CLBCC475 TUBE #: ST-176
ELEVATION: 1901.2'

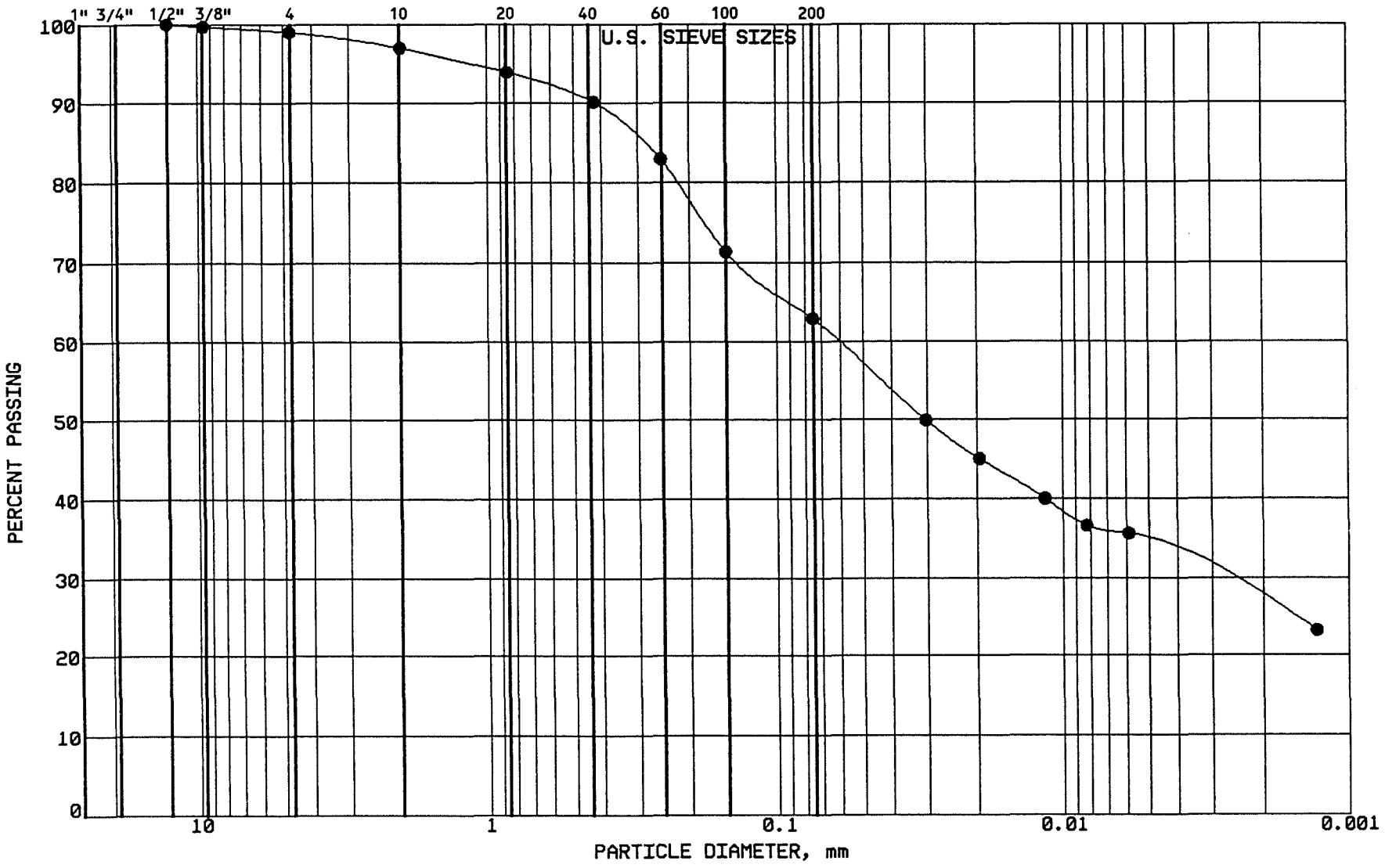
GRAVEL	2.1 %
SAND	35.3 %
SILT	27.4 %
CLAY	35.2 %
P 200	62.6 %

SOIL PROPERTIES

LL: 45.0%
PL: 19.0%
PI: 26.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37760.0, E 41460.0
SAMPLE: CLBCC476 TUBE #: ST-177
ELEVATION: 1900.6'

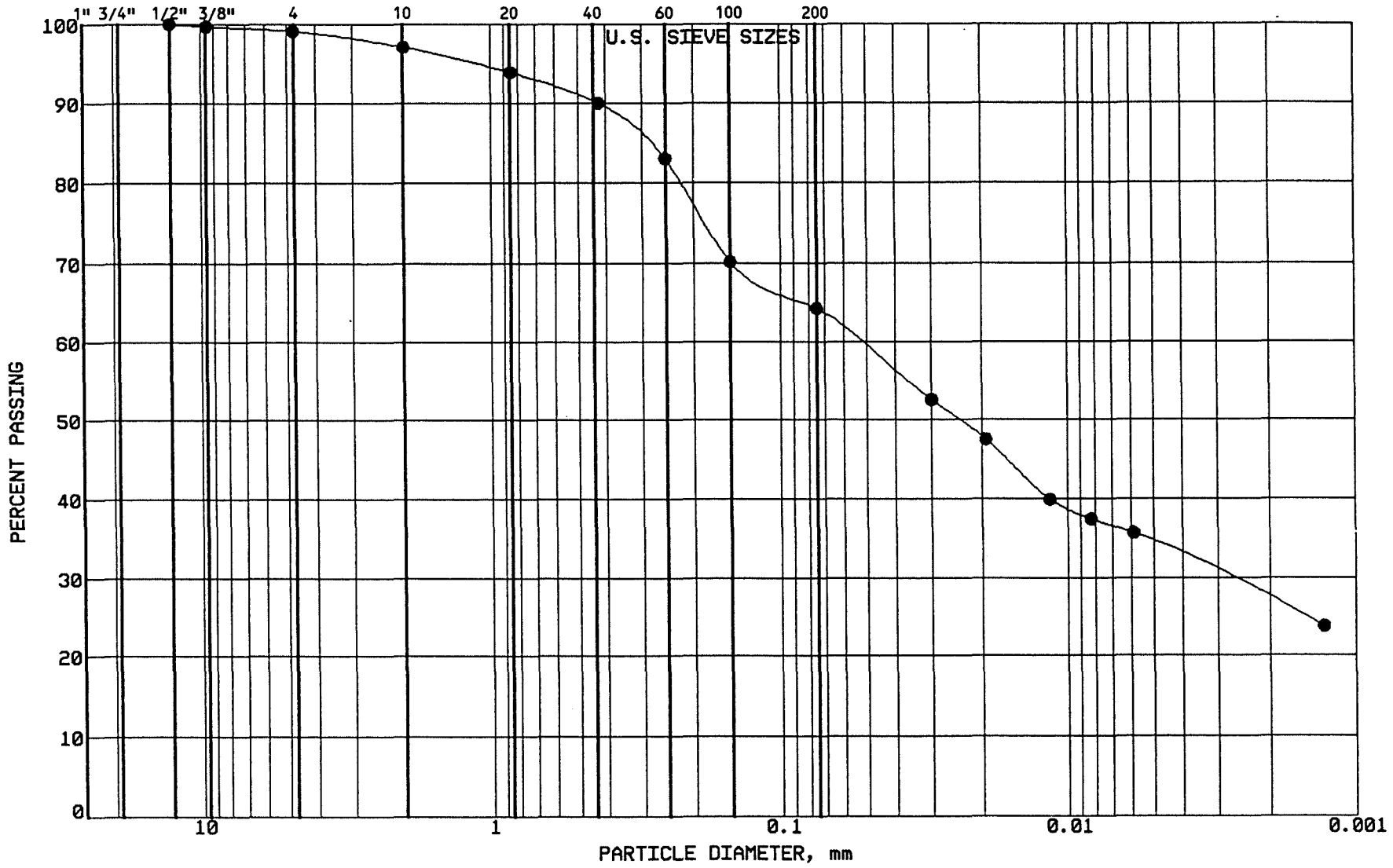
GRAVEL	1.0 %
SAND	36.1 %
SILT	28.6 %
CLAY	34.3 %
P 200	62.9 %

SOIL PROPERTIES

LL: 45.0%
PL: 17.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38020.0, E 40724.0
SAMPLE: CLBCC477 TUBE #: ST-178
ELEVATION: 1902.9'

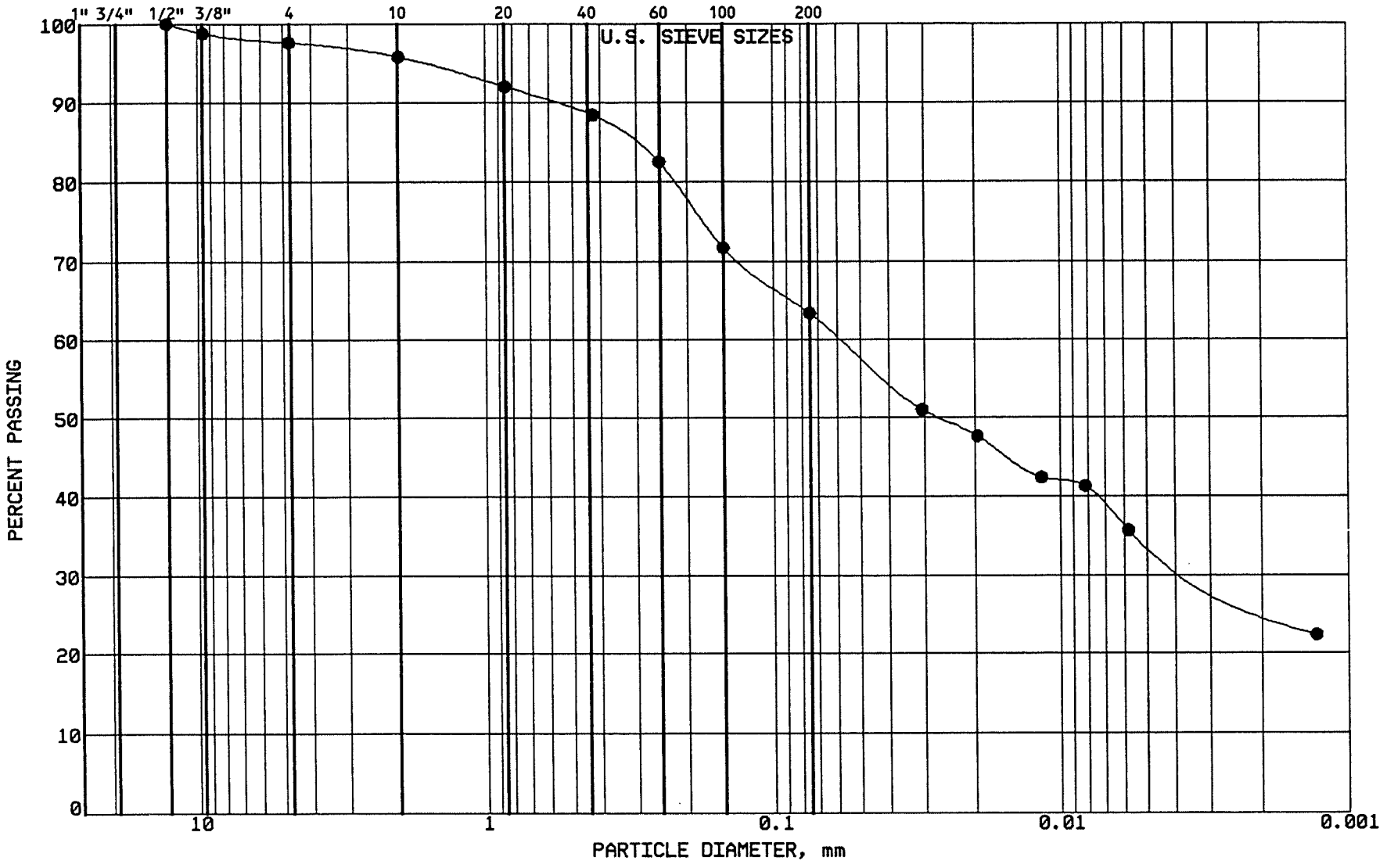
GRAVEL	0.9 %
SAND	34.9 %
SILT	29.8 %
CLAY	34.4 %
P 200	64.2 %

SOIL PROPERTIES

LL: 48.0%
PL: 17.0%
PI: 31.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37993.0, E 40902.0
SAMPLE: CLBCC478 TUBE #: ST-179
ELEVATION: 1902.3'

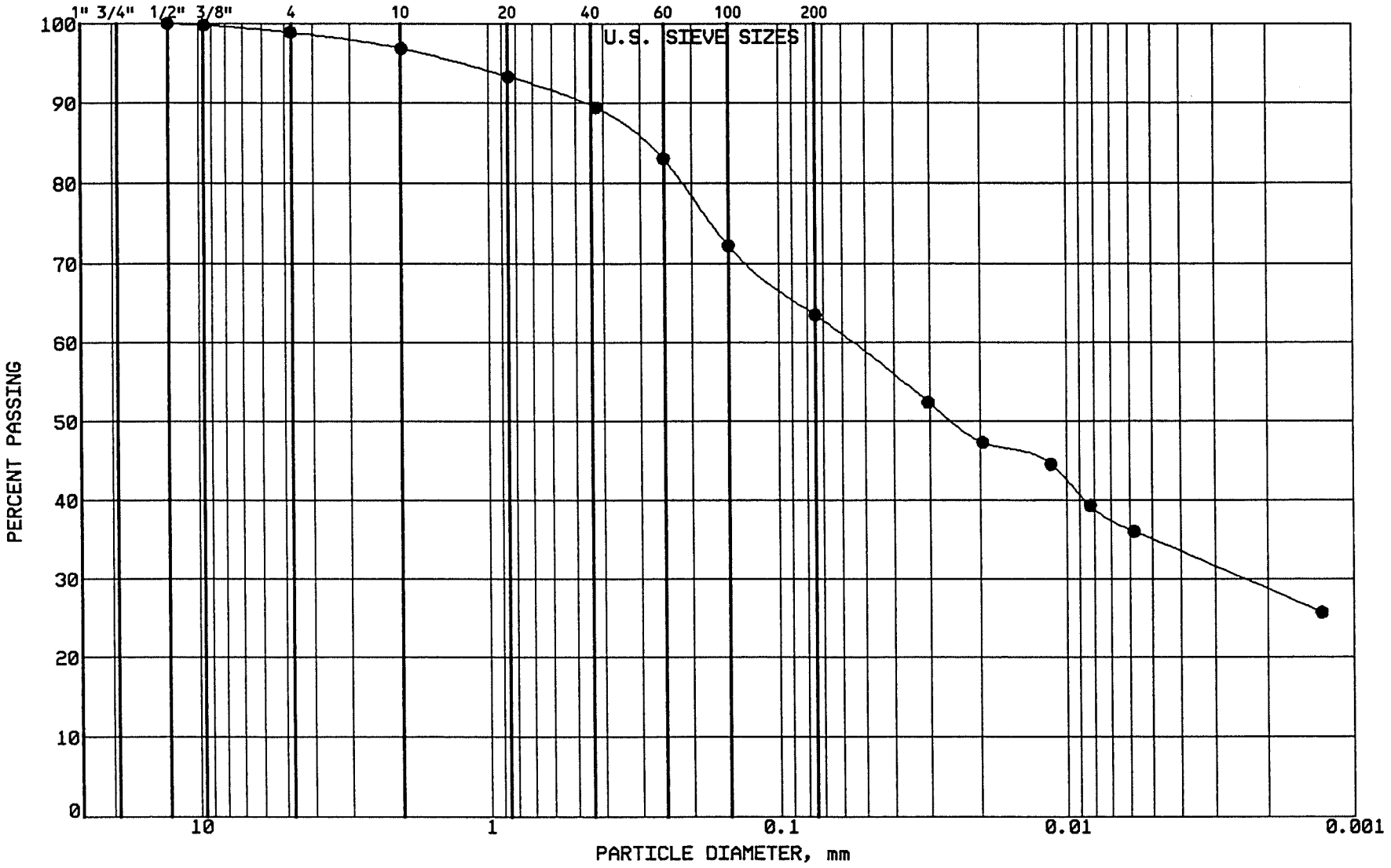
GRAVEL	2.4 %
SAND	34.2 %
SILT	29.0 %
CLAY	34.4 %
P 200	63.4 %

SOIL PROPERTIES

LL: 47.0%
PL: 17.0%
PI: 30.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37960.0, E 41119.0
SAMPLE: CLBCC479 TUBE #: ST-180
ELEVATION: 1901.4'

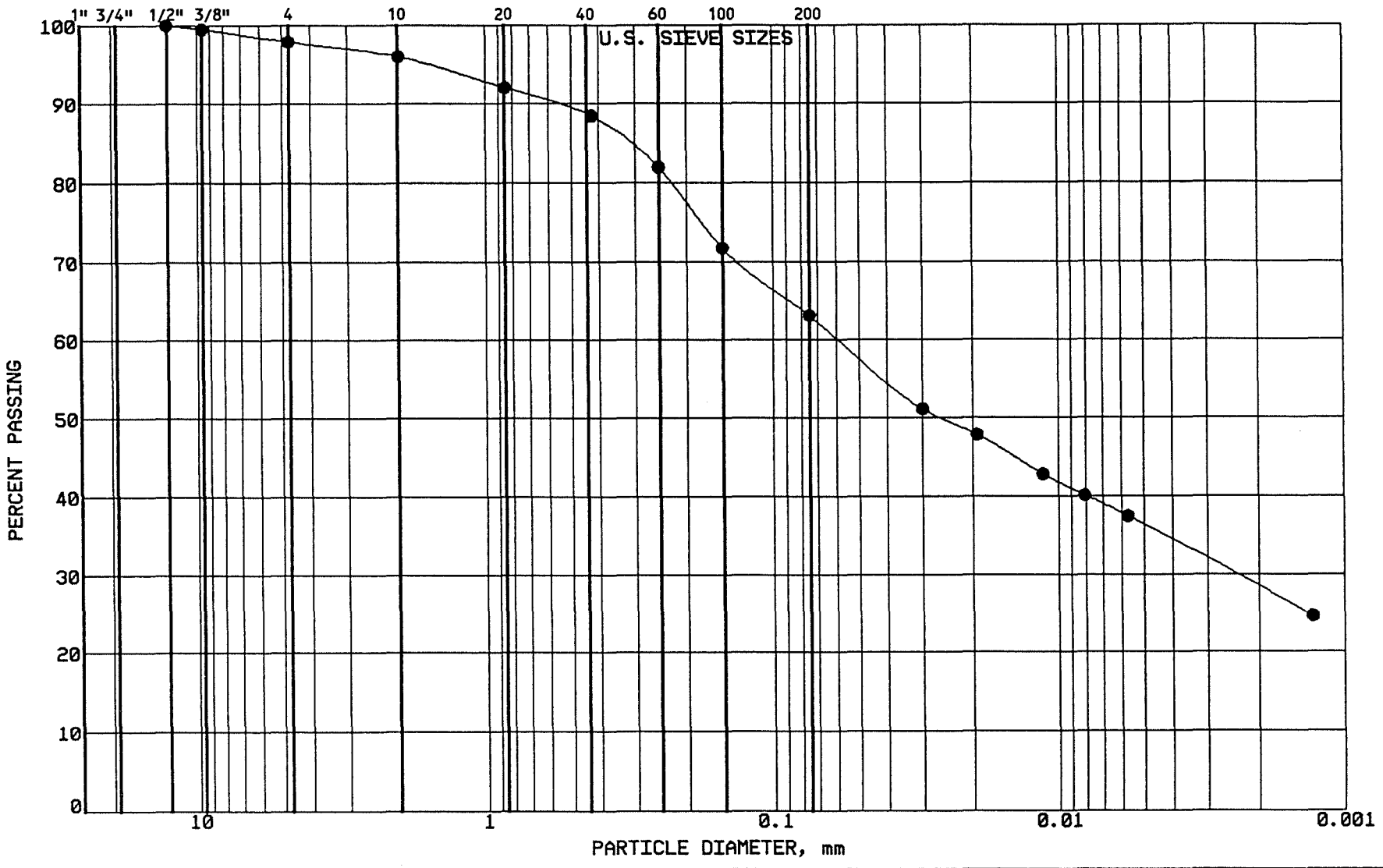
GRAVEL	1.1 %
SAND	35.4 %
SILT	28.5 %
CLAY	35.0 %
P 200	63.5 %

SOIL PROPERTIES

LL: 47.0%
PL: 17.0%
PI: 30.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37922.0, E 41333.0
SAMPLE: CLBCC480 TUBE #: ST-181
ELEVATION: 1900.3'

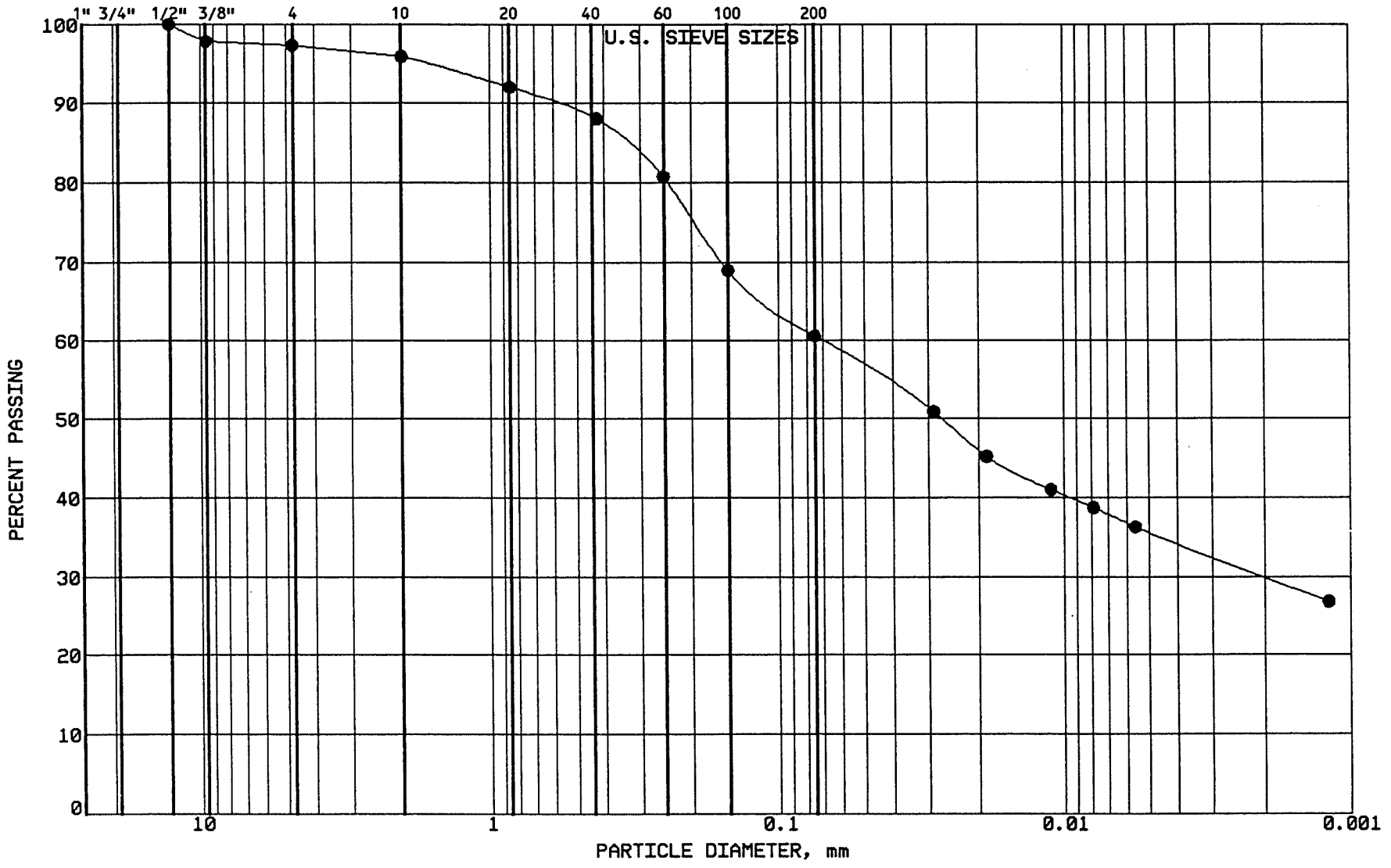
GRAVEL	2.1 %
SAND	34.8 %
SILT	26.8 %
CLAY	36.3 %
P 200	63.1 %

SOIL PROPERTIES

LL: 44.0%
PL: 17.0%
PI: 27.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 37896.0, E 41466.0
SAMPLE: CLBCC481 TUBE #: ST-182
ELEVATION: 1899.9'

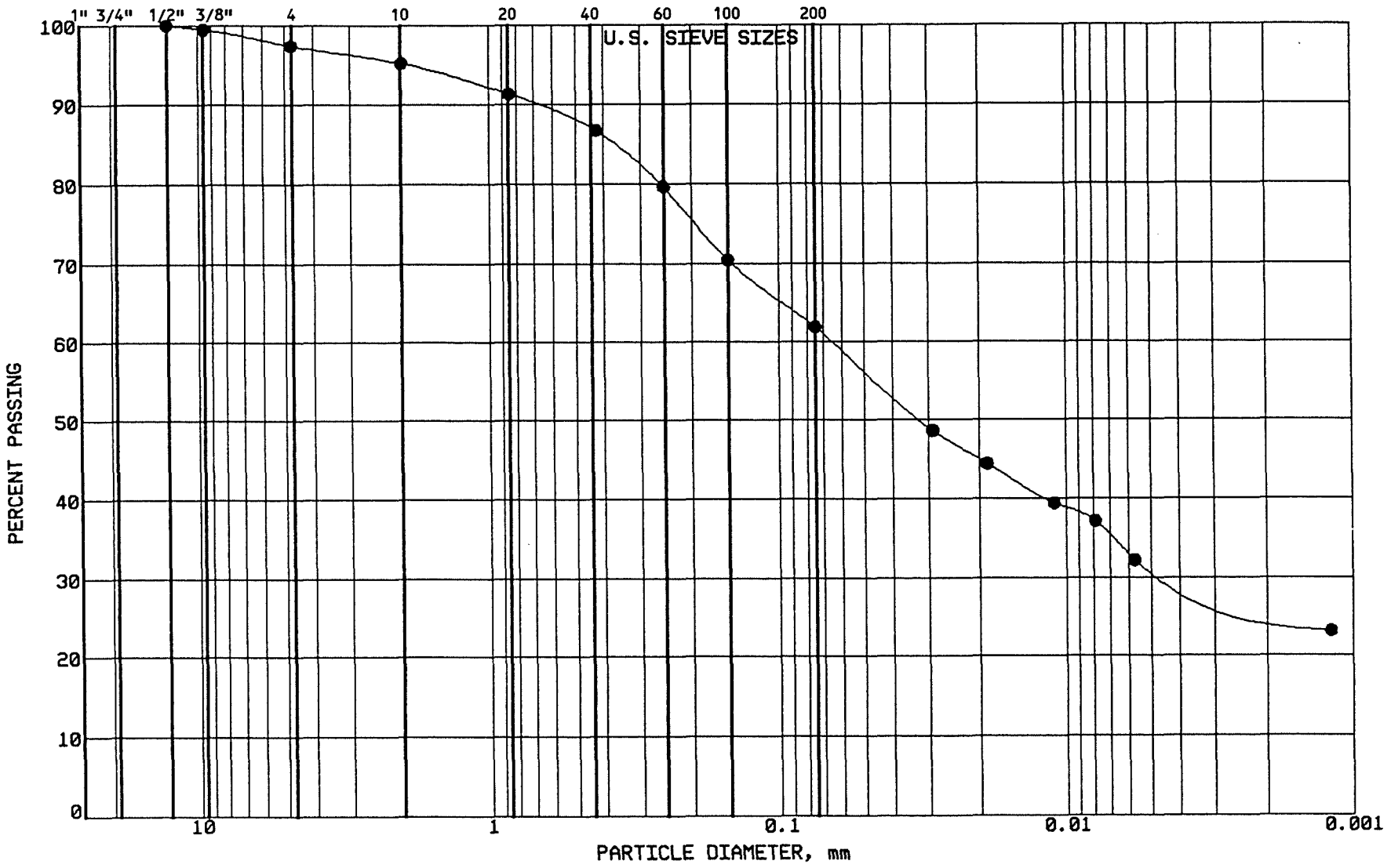
GRAVEL	2.7 %
SAND	36.7 %
SILT	25.0 %
CLAY	35.6 %
P 200	60.6 %

SOIL PROPERTIES

LL: 44.0%
PL: 16.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38225.0, E 41420.0
SAMPLE: SGCC-482 TUBE #:
ELEVATION: 1896.1'

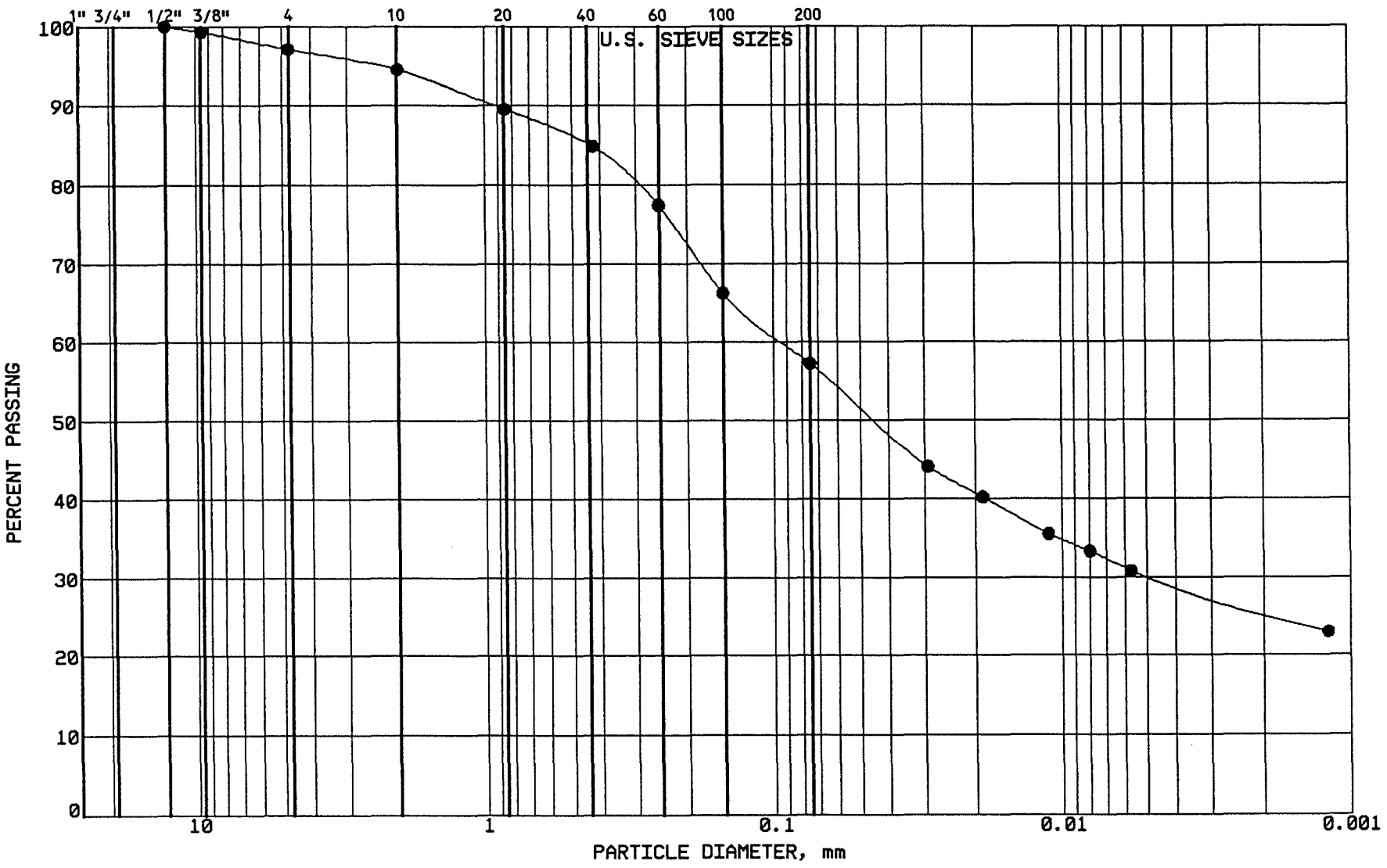
GRAVEL	2.6 %
SAND	35.5 %
SILT	30.5 %
CLAY	31.4 %
P 200	61.9 %

SOIL PROPERTIES

LL: 38.0%
PL: 16.0%
PI: 22.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

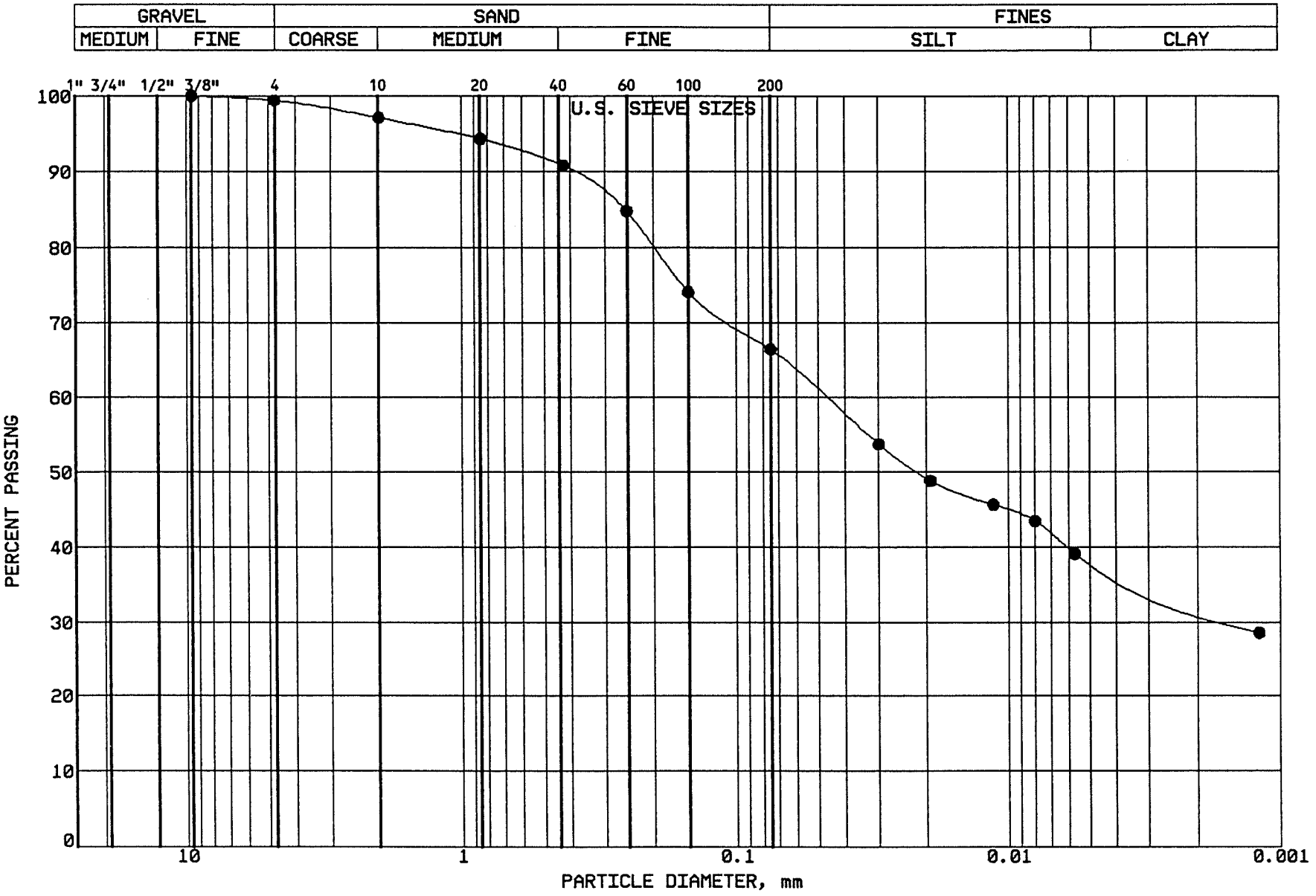
LOCATION: N 38240.0, E 41256.0
SAMPLE: SGCC-483 TUBE #: ST-N/A
ELEVATION: 1896.8'

GRAVEL	2.9 %
SAND	39.8 %
SILT	27.2 %
CLAY	30.1 %
P 200	57.3 %

SOIL PROPERTIES

LL: 38.0%
PL: 16.0%
PI: 22.0%
CLASS: Sandy Lean Clay (CL), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38259.0, E 41086.0
SAMPLE: SGCC-484 TUBE #:
ELEVATION: 1897.5'

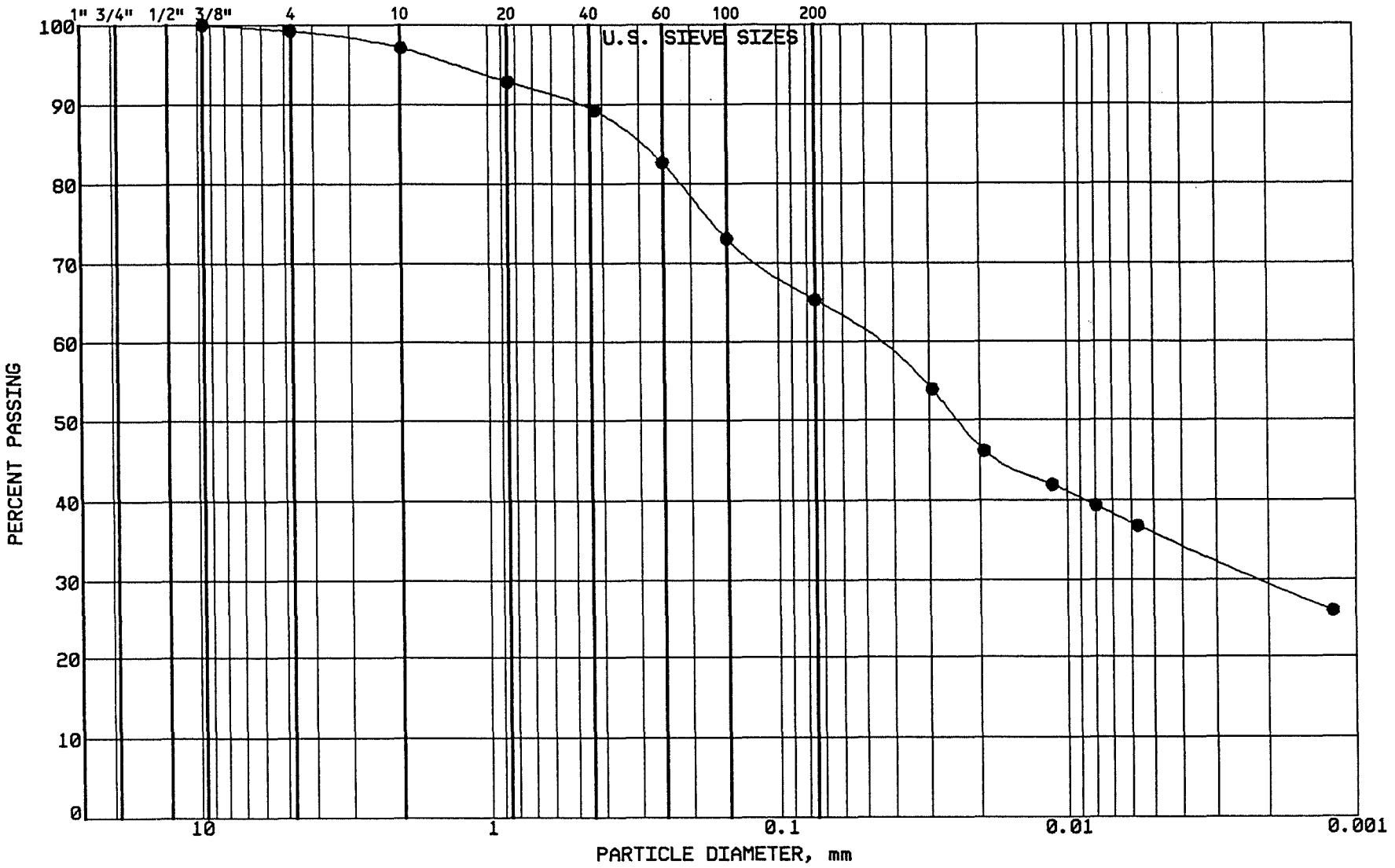
GRAVEL	0.6 %
SAND	33.0 %
SILT	28.2 %
CLAY	38.2 %
P 200	66.4 %

SOIL PROPERTIES

LL: 46.0%
PL: 19.0%
PI: 27.0%
CLASS: Sandy Lean Clay (CL), vy dk gr-br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38280.0, E 40914.0
SAMPLE: SGCC-485 TUBE #:
ELEVATION: 1898.3'

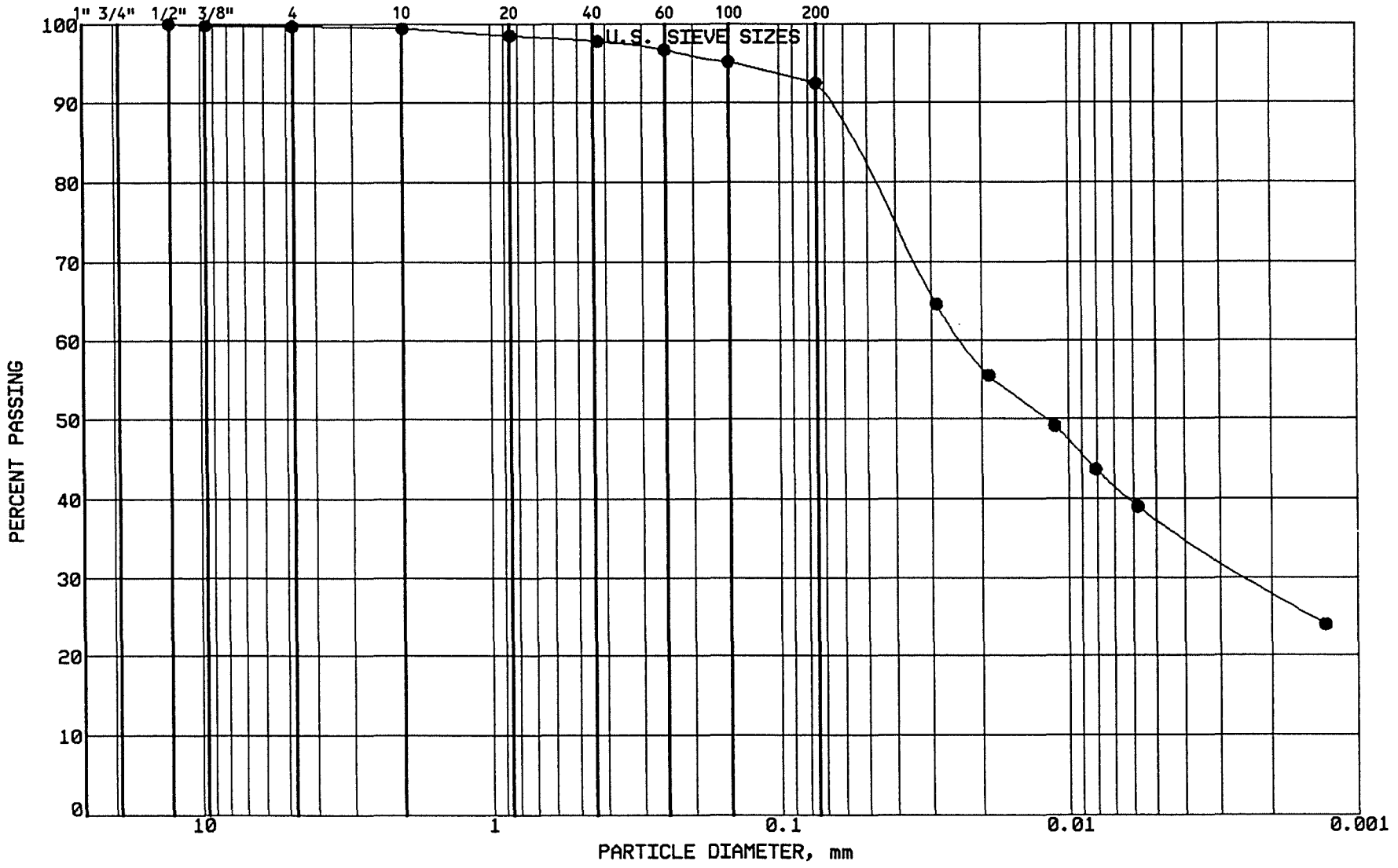
GRAVEL	0.8 %
SAND	33.9 %
SILT	29.5 %
CLAY	35.8 %
P 200	65.3 %

SOIL PROPERTIES

LL: 43.0%
PL: 16.0%
PI: 27.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38458.0, E 40893.0
SAMPLE: SGCC-486 TUBE #:
ELEVATION: 1897.6'

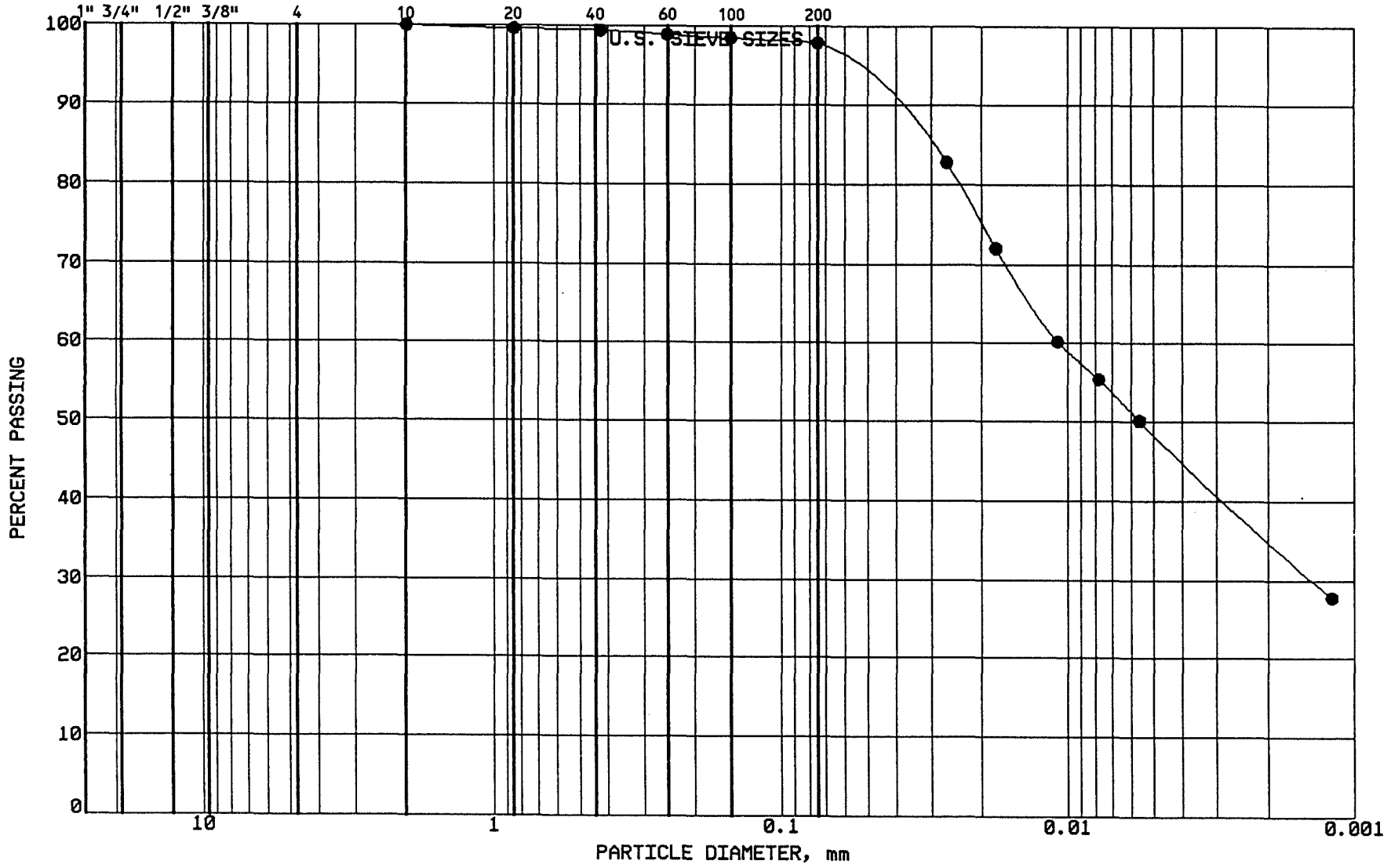
GRAVEL	0.3 %
SAND	7.2 %
SILT	55.0 %
CLAY	37.5 %
P 200	92.5 %

SOIL PROPERTIES

LL: 34.0%
PL: 17.0%
PI: 17.0%
CLASS: Lean Clay (CL), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38445.0, E 41056.0
SAMPLE: SGCC-487 TUBE #:
ELEVATION: 1896.9'

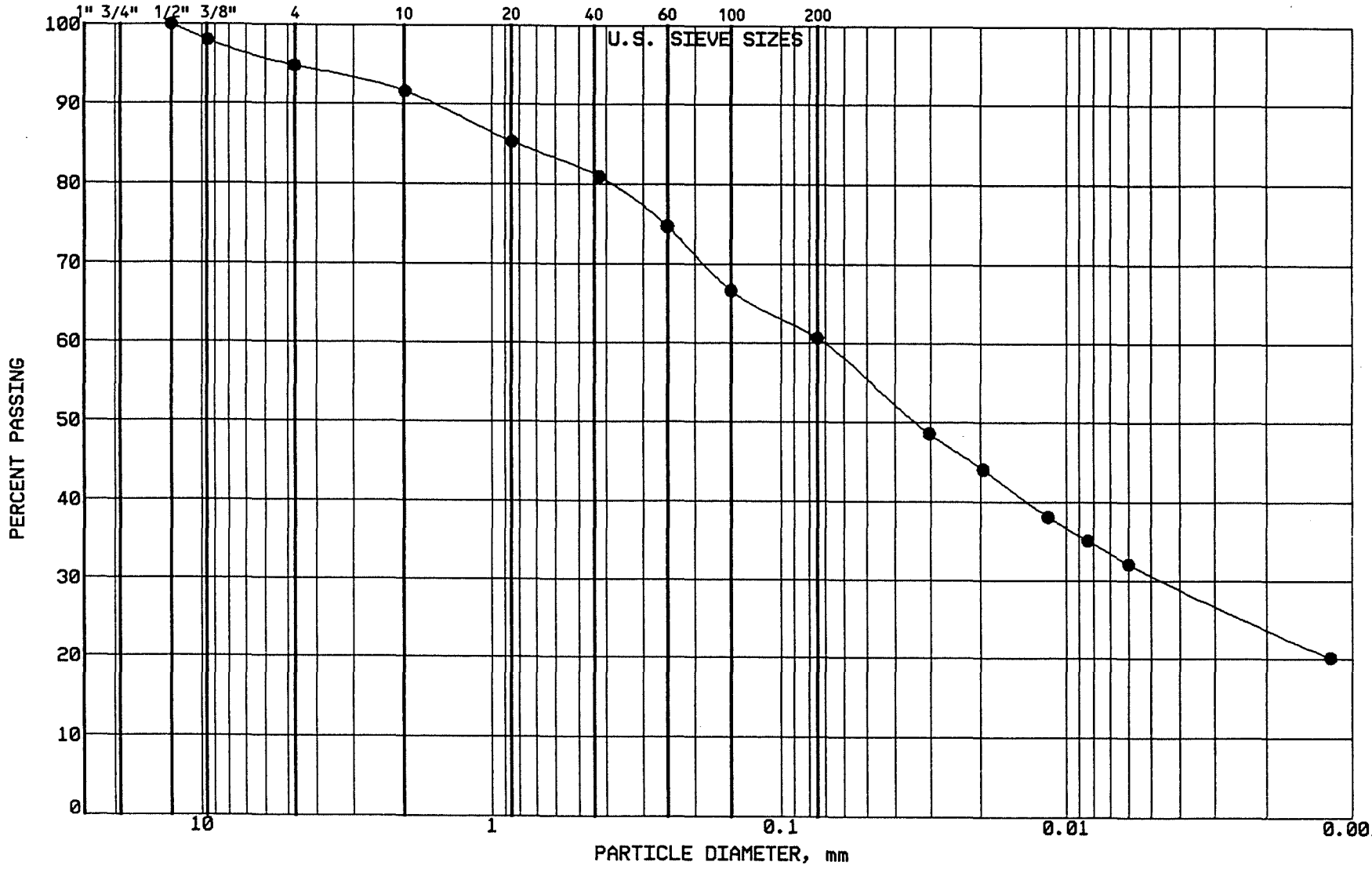
GRAVEL	0.0 %
SAND	2.1 %
SILT	49.4 %
CLAY	48.5 %
P 200	97.9 %

SOIL PROPERTIES

LL: 45.0%
PL: 18.0%
PI: 27.0%
CLASS: Lean Clay (CL), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

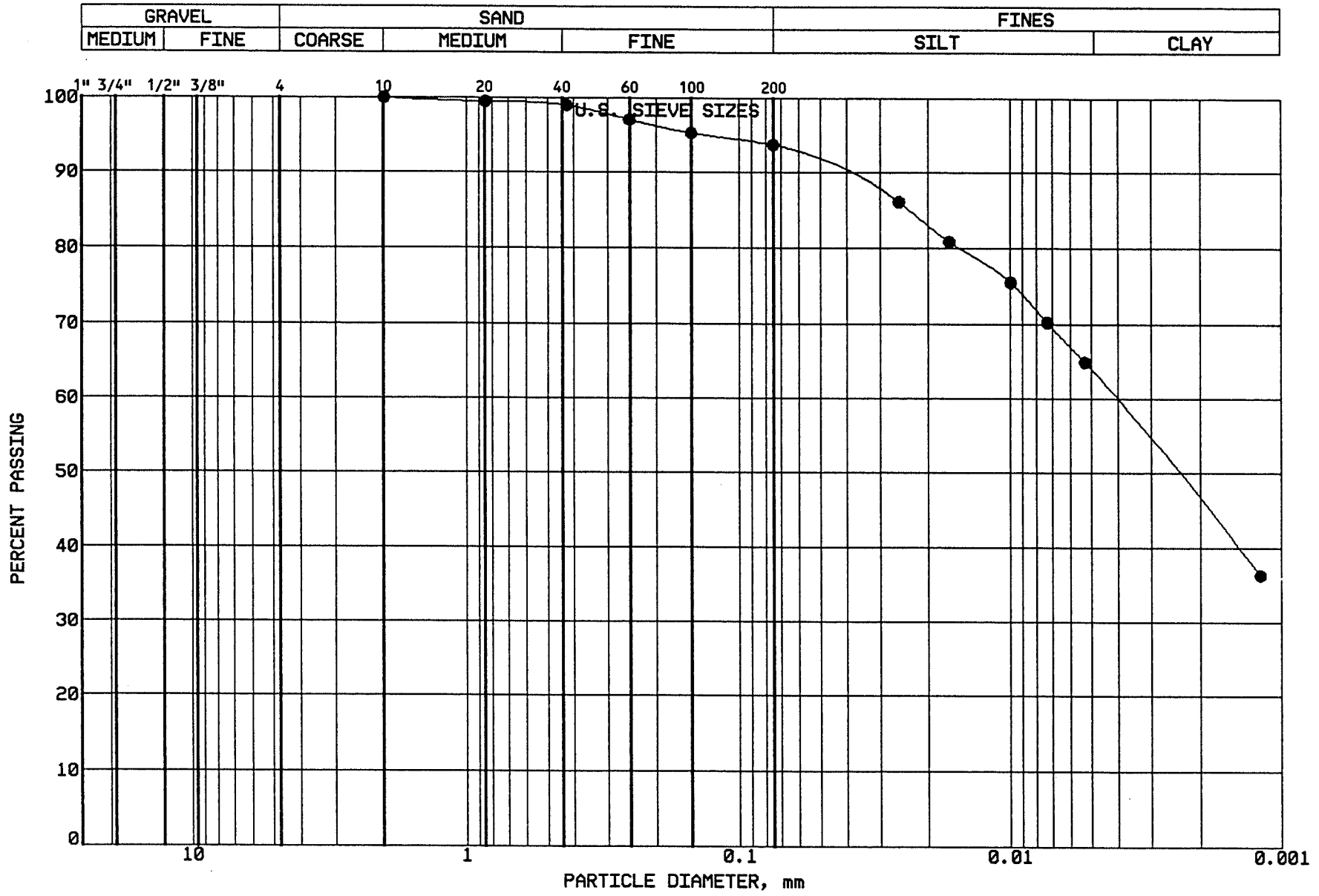
LOCATION: N 38430.0, E 41221.0
SAMPLE: SGCC-488 TUBE #:
ELEVATION: 1896.1'

GRAVEL	5.2 %
SAND	34.1 %
SILT	29.9 %
CLAY	30.8 %
P 200	60.7 %

SOIL PROPERTIES

LL: 29.0%
PL: 15.0%
PI: 14.0%
CLASS: Sandy Lean Clay (CL), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38592.0, E 41228.0
SAMPLE: SGCC-489 TUBE #:
ELEVATION: 1895.3'

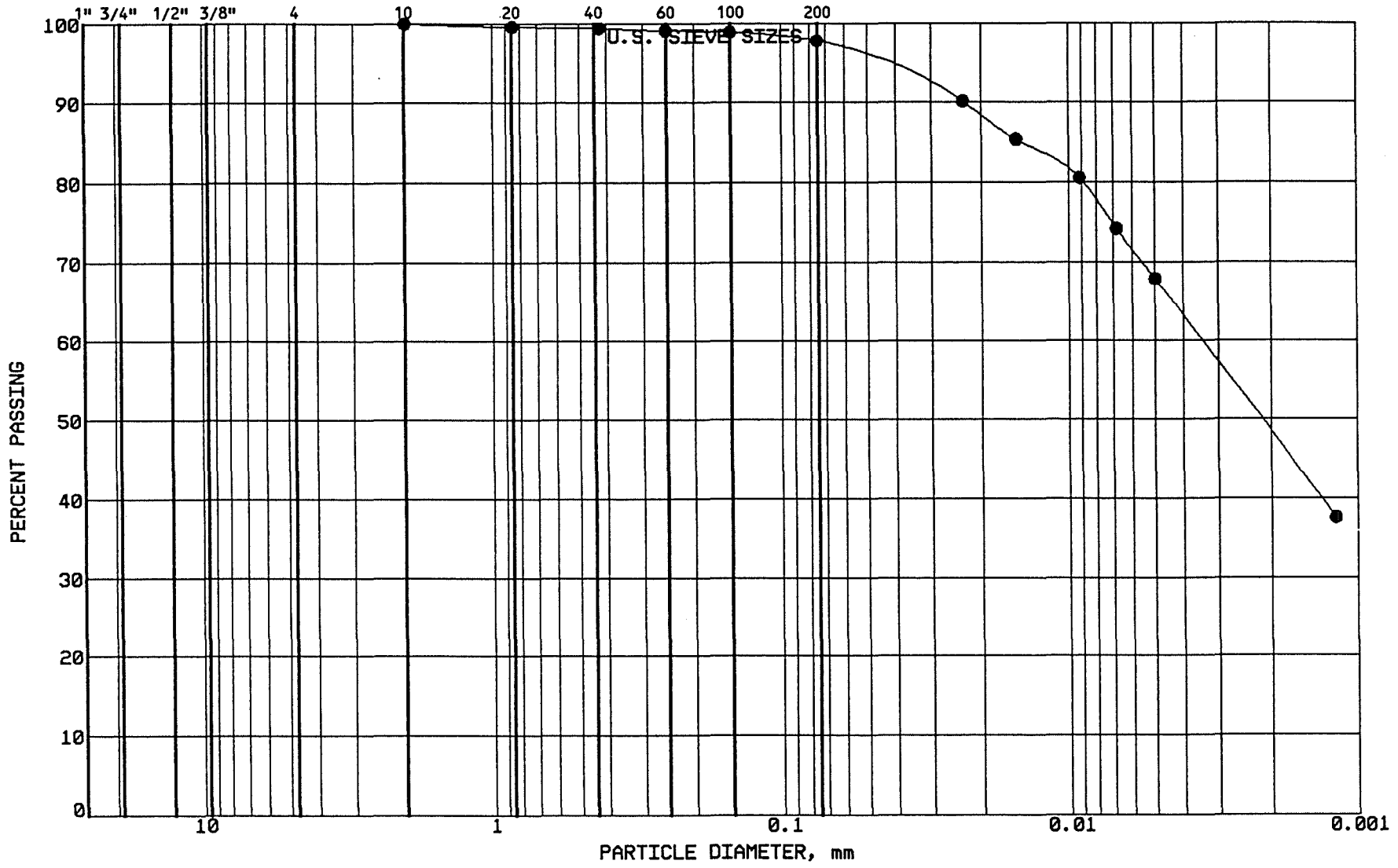
GRAVEL	0.0 %
SAND	6.3 %
SILT	29.9 %
CLAY	63.8 %
P 200	93.7 %

SOIL PROPERTIES

LL: 52.0%
PL: 20.0%
PI: 32.0%
CLASS: Fat Clay (CH), vy dk gr.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38592.0, E 41077.0
SAMPLE: SGCC-490 TUBE #:
ELEVATION: 1896.0'

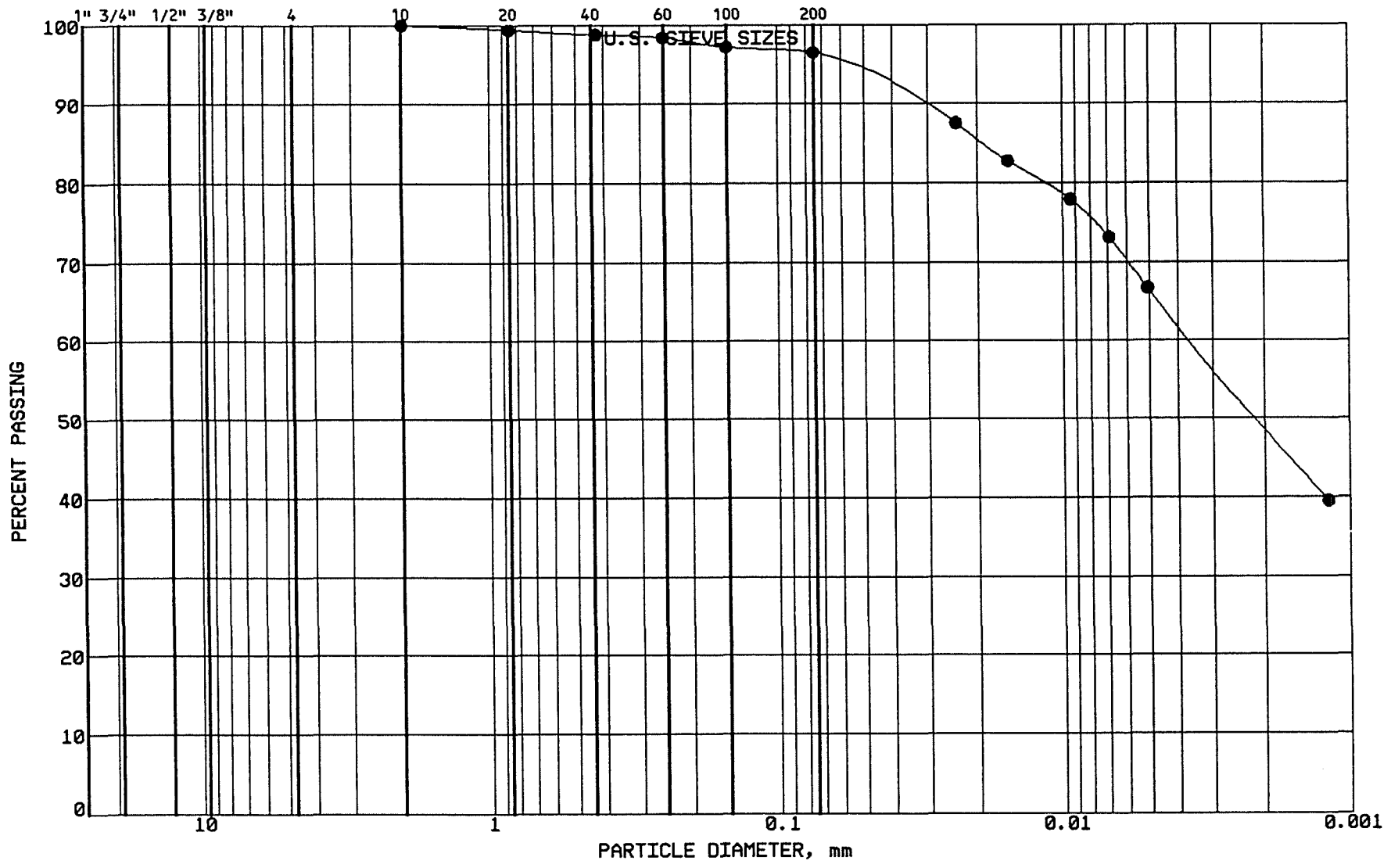
GRAVEL	0.0 %
SAND	2.2 %
SILT	30.0 %
CLAY	67.8 %
P 200	97.8 %

SOIL PROPERTIES

LL: 54.0%
PL: 22.0%
PI: 32.0%
CLASS: Fat Clay (CH), vy dk gr.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38596.0, E 40940.0
SAMPLE: SGCC-491 TUBE #:
ELEVATION: 1896.5'

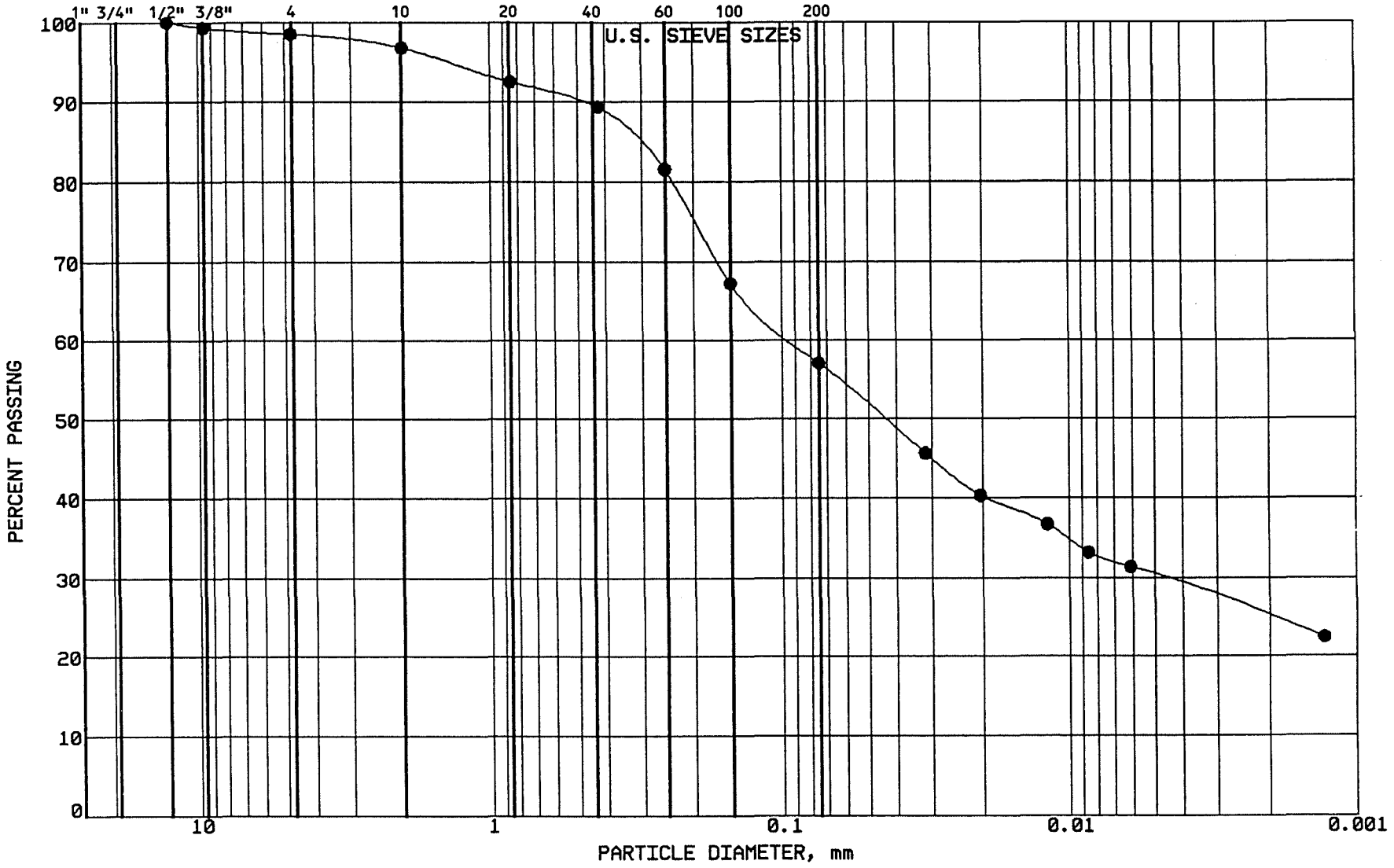
GRAVEL	0.0 %
SAND	3.5 %
SILT	30.2 %
CLAY	66.3 %
P 200	96.5 %

SOIL PROPERTIES

LL: 51.0%
PL: 20.0%
PI: 31.0%
CLASS: Fat Clay (CH),vy dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38076.0, E 41155.0
SAMPLE: CLBCC492 TUBE #:
ELEVATION: 1898.5'

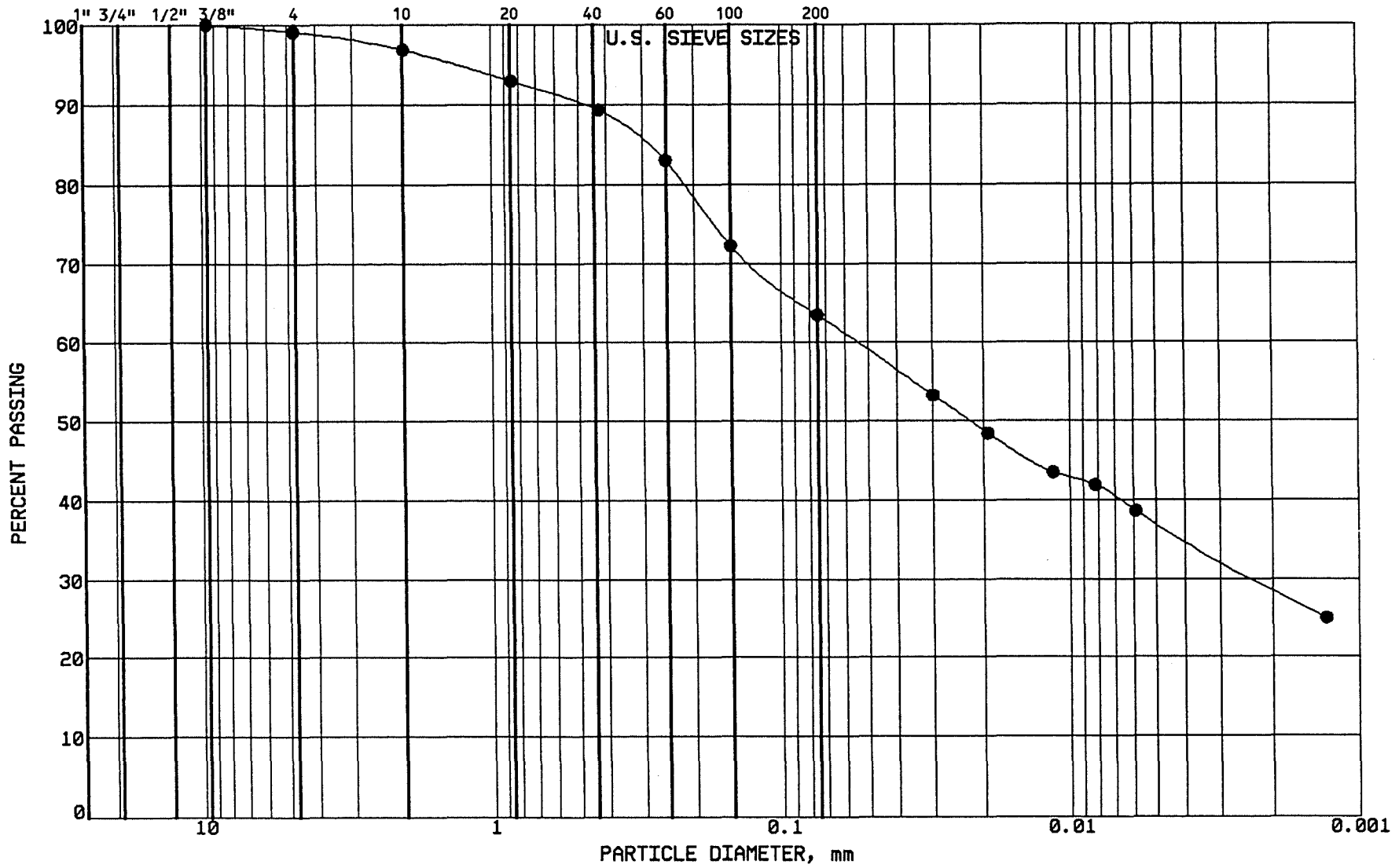
GRAVEL	1.5 %
SAND	41.4 %
SILT	26.8 %
CLAY	30.3 %
P 200	57.1 %

SOIL PROPERTIES

LL: 35.0%
PL: 14.0%
PI: 21.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38707.0, E 39840.0
SAMPLE: CLBCC493 TUBE #: ST-183
ELEVATION: 1903.1'

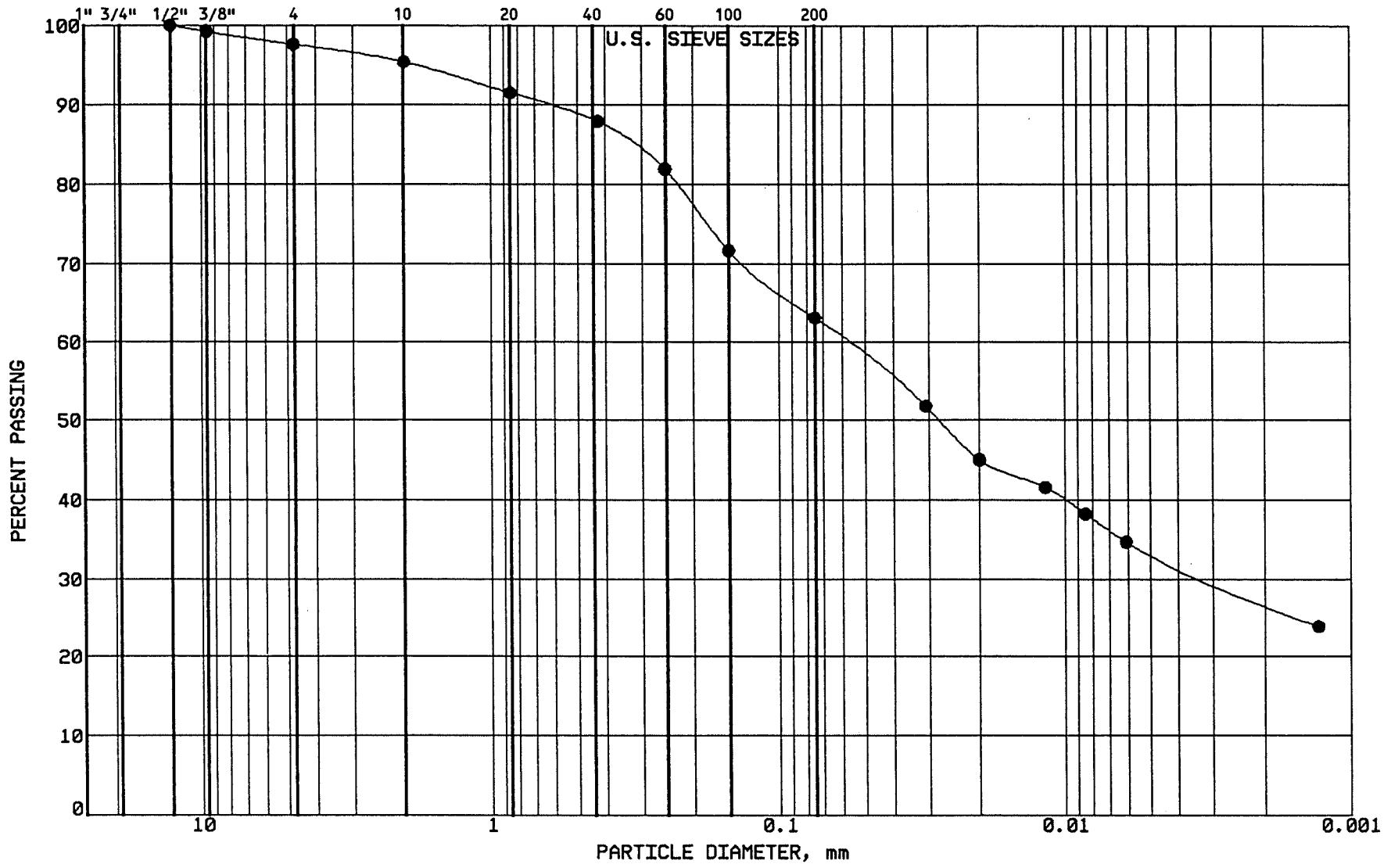
GRAVEL	0.9 %
SAND	35.6 %
SILT	26.4 %
CLAY	37.1 %
P 200	63.5 %

SOIL PROPERTIES

LL: 47.0%
PL: 19.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL),dk ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38692.0, E 40044.0
SAMPLE: CLBCC494 TUBE #:ST-184
ELEVATION: 1902.3'

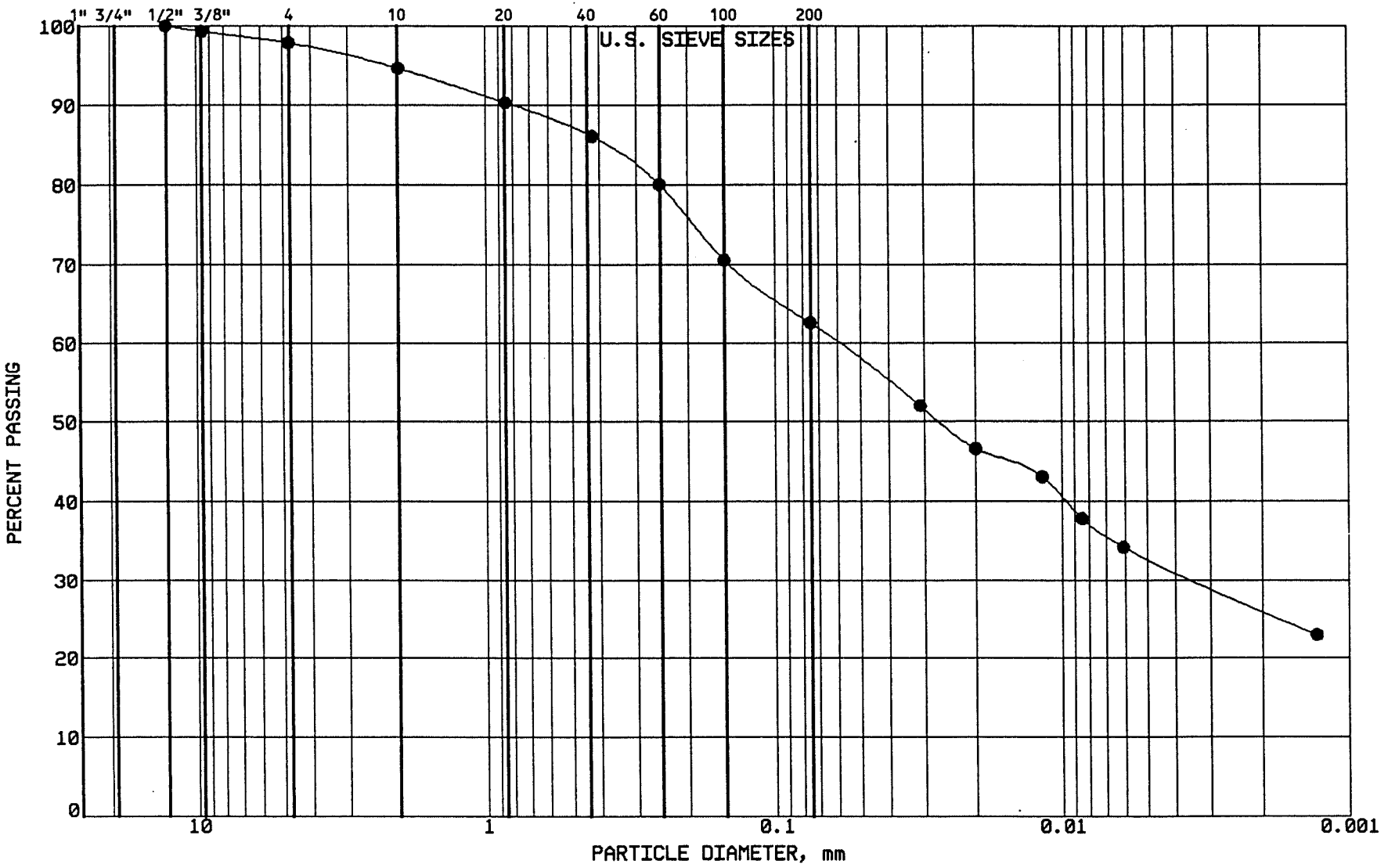
GRAVEL	2.4 %
SAND	34.5 %
SILT	29.8 %
CLAY	33.3 %
P 200	63.1 %

SOIL PROPERTIES

LL: 48.0%
PL: 19.0%
PI: 29.0%
CLASS: Sandy Lean Clay(CL),vy dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38671.0, E 40233.0
SAMPLE: CLBCC495 TUBE #: ST-185
ELEVATION: 1901.1'

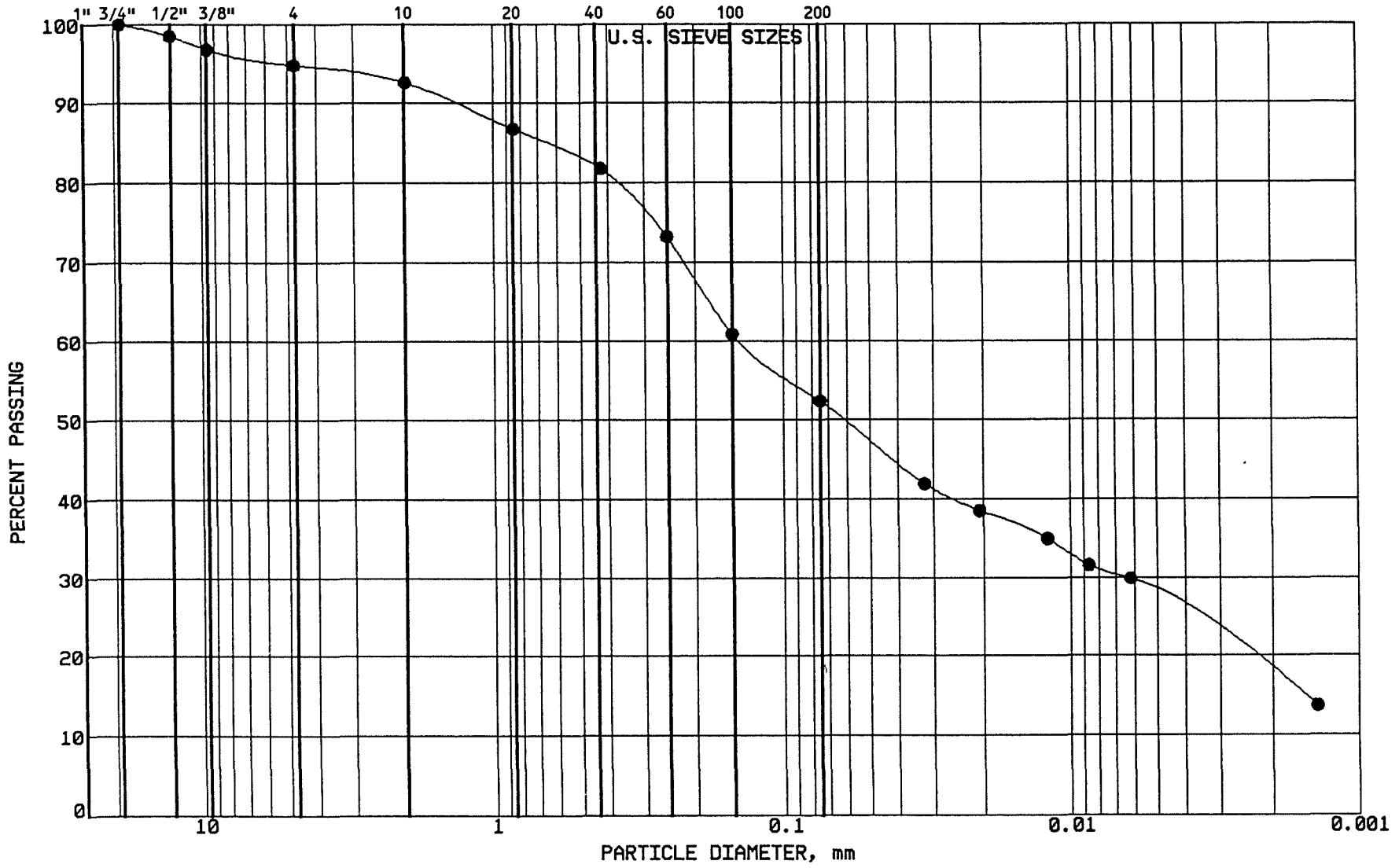
GRAVEL	2.1 %
SAND	35.3 %
SILT	29.8 %
CLAY	32.8 %
P 200	62.6 %

SOIL PROPERTIES

LL: 43.0%
PL: 17.0%
PI: 26.0%
CLASS: Sandy Lean Clay(CL), vy dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

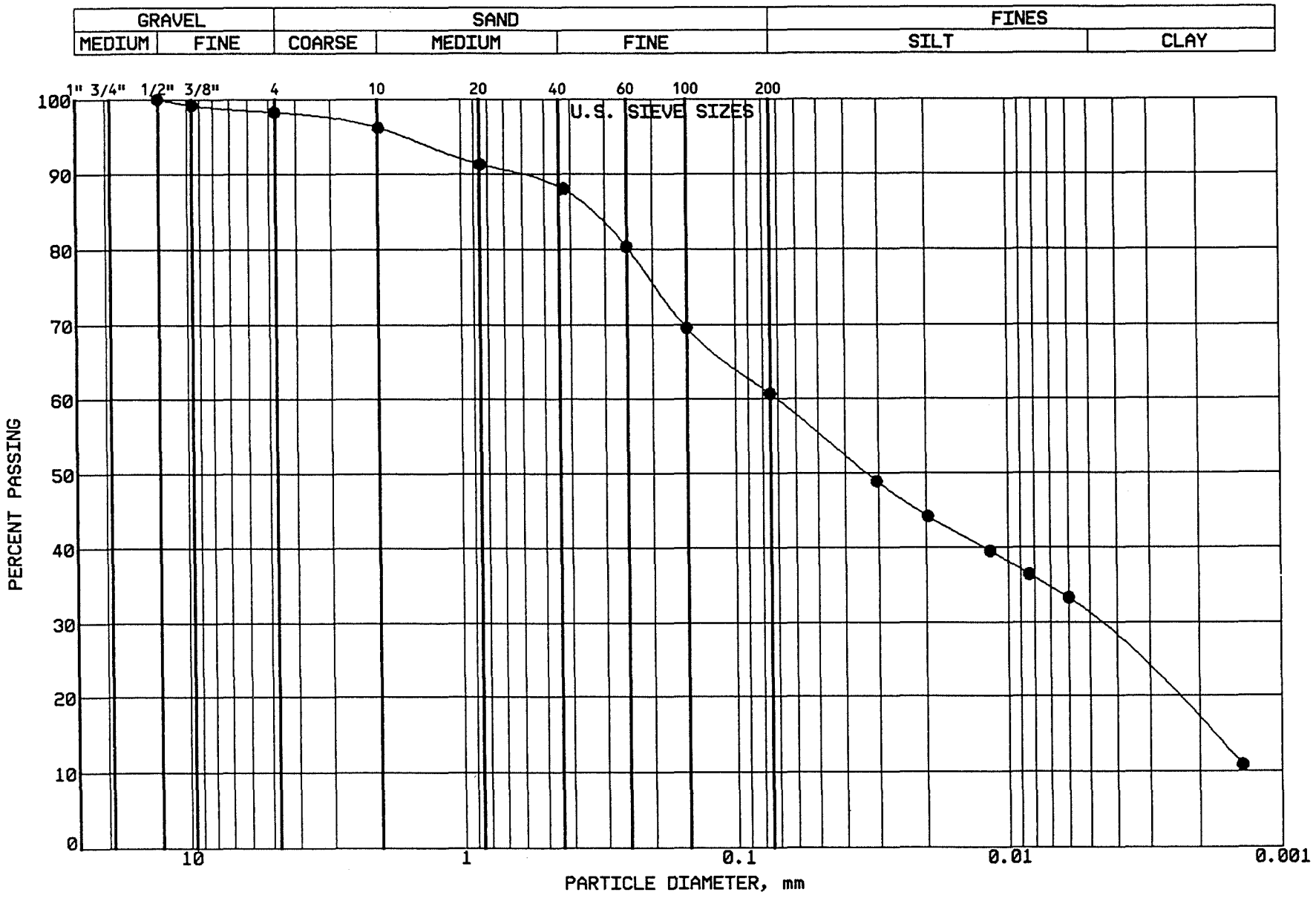
LOCATION: N 38707.0, E 39840.0
SAMPLE: CLBCC496 TUBE #: RST-183
ELEVATION: 1903.1'

GRAVEL	5.2 %
SAND	42.4 %
SILT	24.8 %
CLAY	27.6 %
P 200	52.4 %

SOIL PROPERTIES

LL: 38.0%
PL: 16.0%
PI: 22.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38692.0, E 40044.0
SAMPLE: CLBCC497 TUBE #: RST-184
ELEVATION: 1902.3'

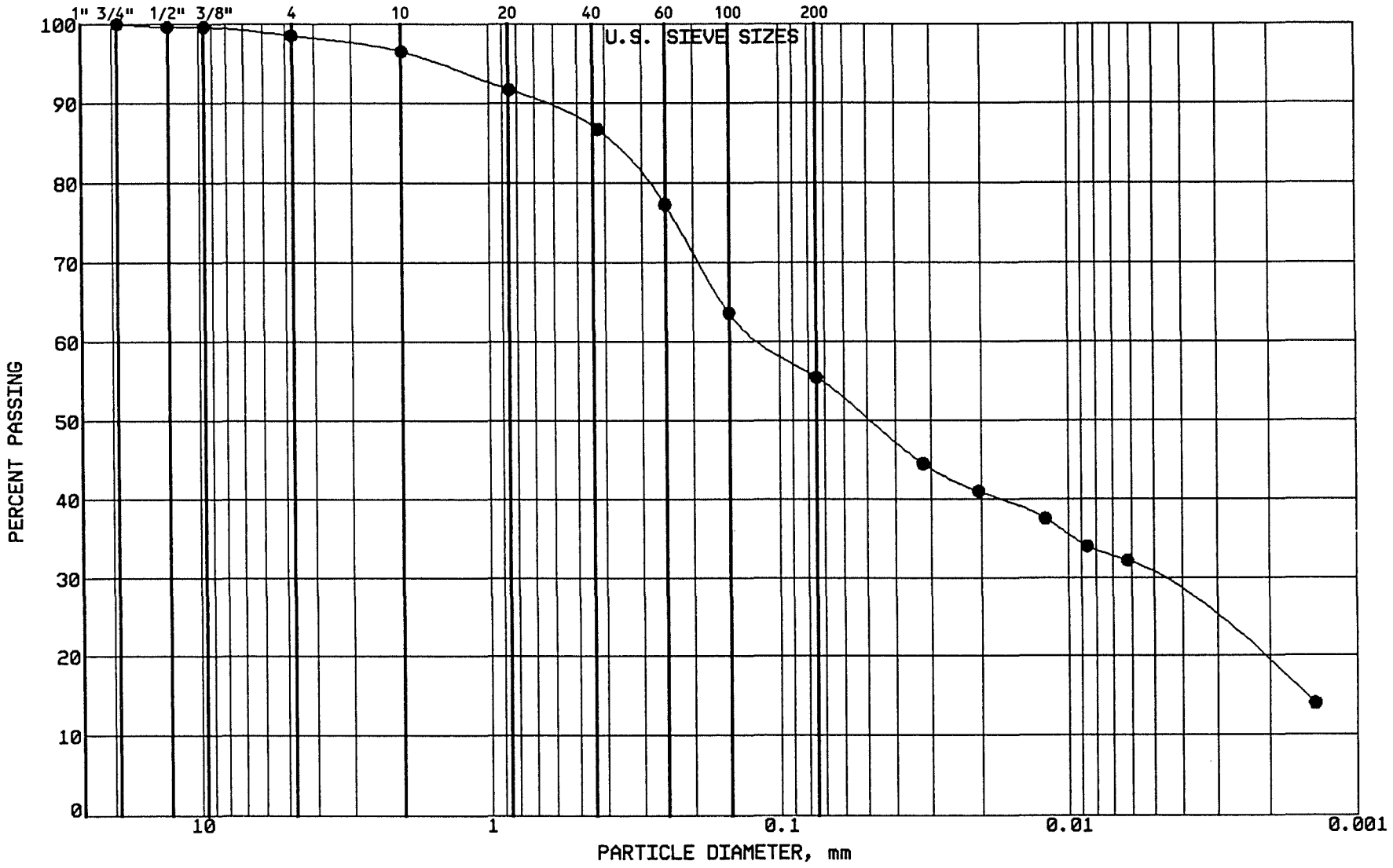
GRAVEL	1.7 %
SAND	37.6 %
SILT	30.2 %
CLAY	30.5 %
P 200	60.7 %

SOIL PROPERTIES

LL: 39.0%
PL: 16.0%
PI: 23.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38671.0, E 40233.0
SAMPLE: CLBCC498 TUBE #: RST-185
ELEVATION: 1901.1'

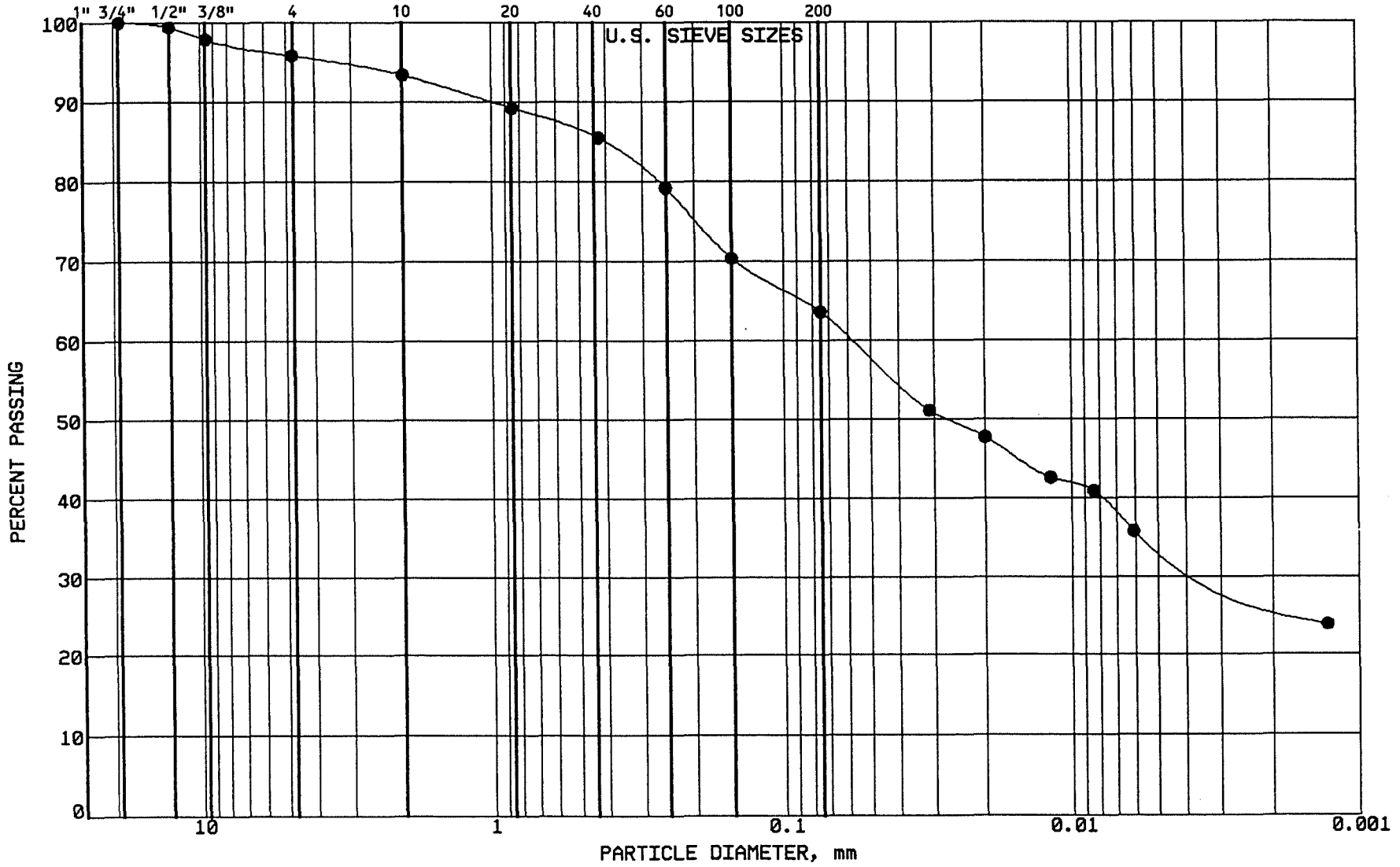
GRAVEL	1.5 %
SAND	43.0 %
SILT	25.9 %
CLAY	29.6 %
P 200	55.5 %

SOIL PROPERTIES

LL: 35.0%
PL: 15.0%
PI: 20.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

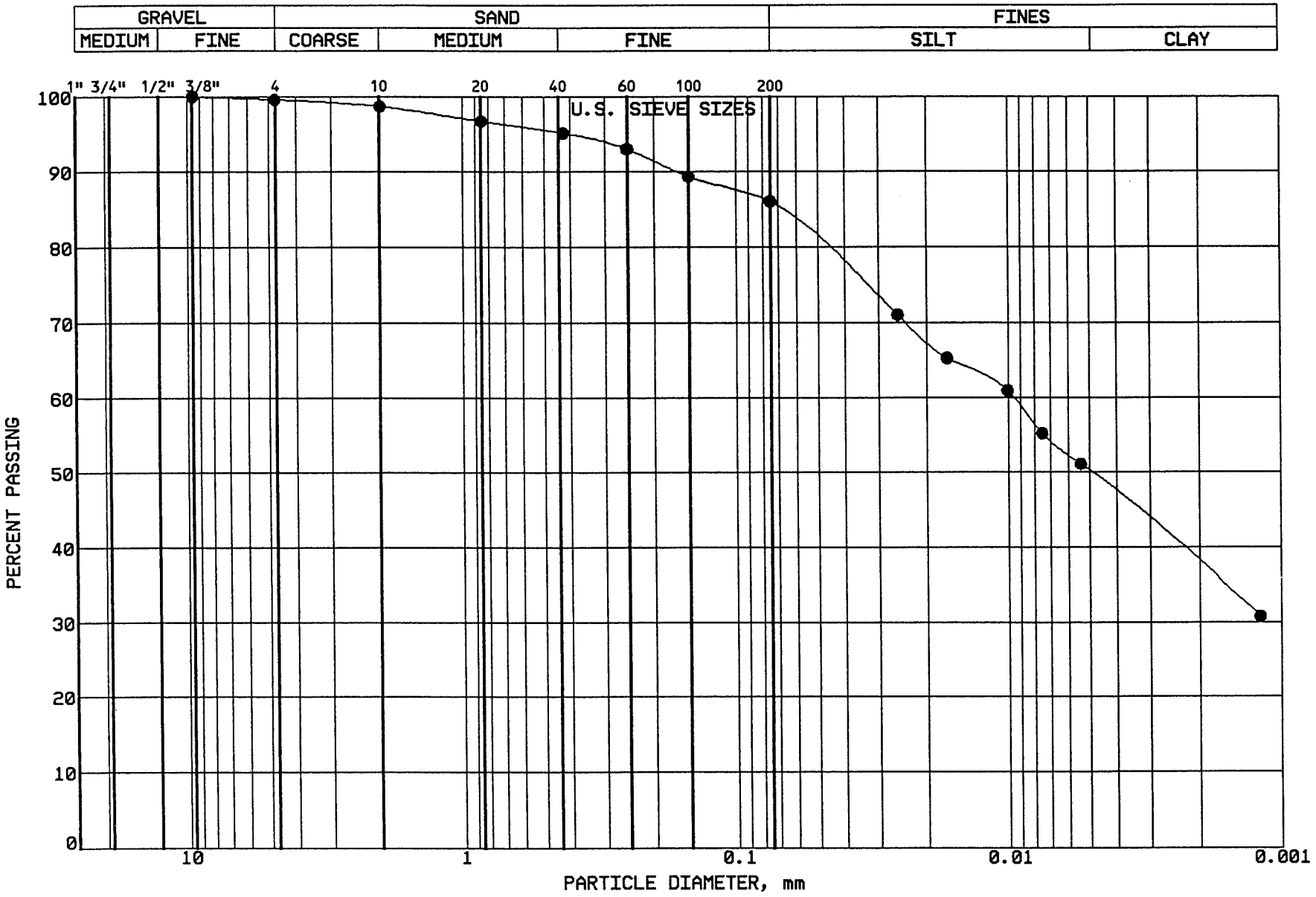
LOCATION: N 38561.0, E 41387.0
SAMPLE: SGCC-499 TUBE #:
ELEVATION: 1894.4'

GRAVEL	4.2 %
SAND	32.2 %
SILT	29.3 %
CLAY	34.3 %
P 200	63.6 %

SOIL PROPERTIES

LL: 40.0%
PL: 15.0%
PI: 25.0%
CLASS: Sandy Lean Clay (CL),dk ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38699.0, E 40966.0
SAMPLE: SGCC-500 TUBE #:
ELEVATION: 1896.0'

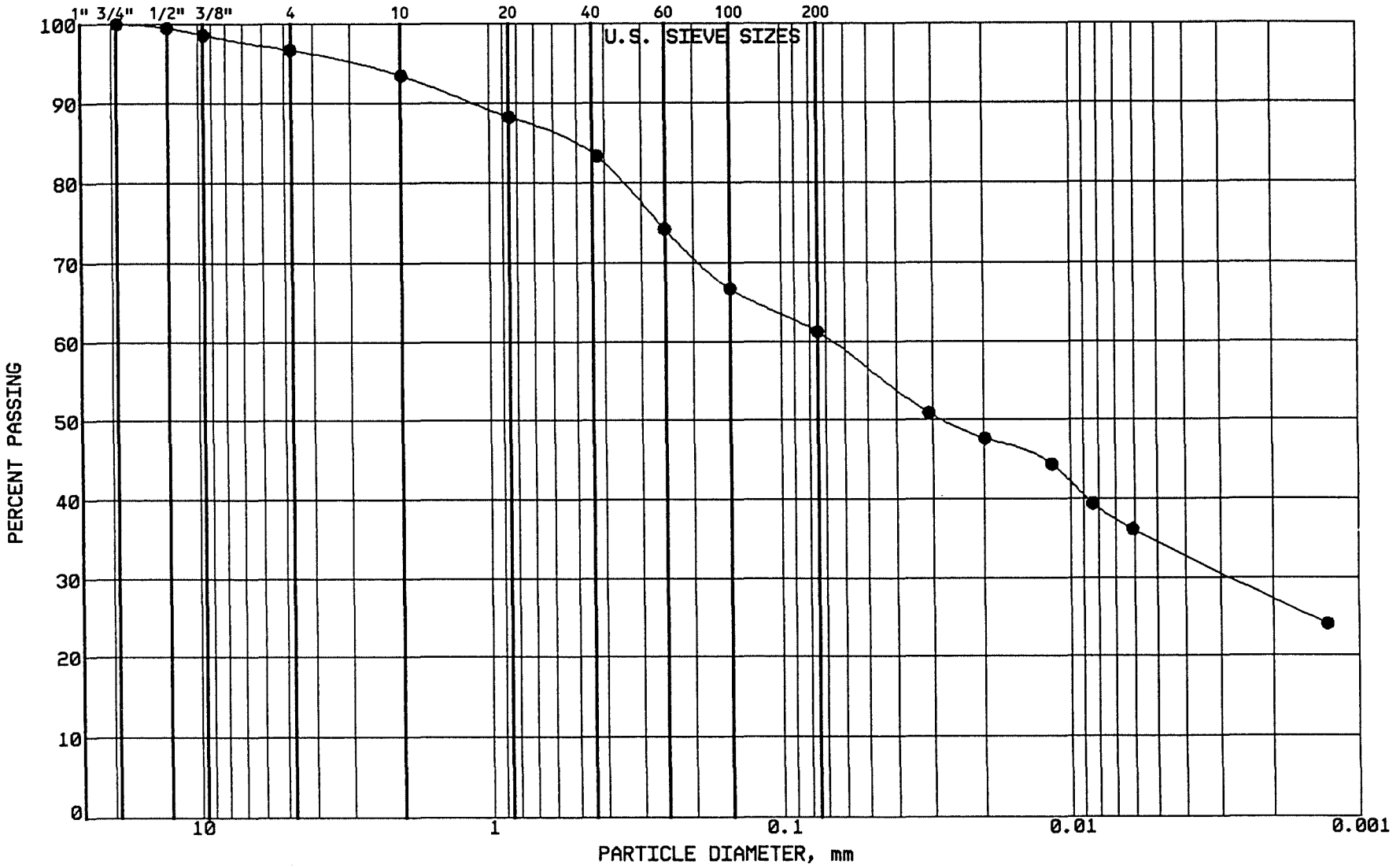
GRAVEL	0.4 %
SAND	13.6 %
SILT	35.9 %
CLAY	50.1 %
P 200	86.0 %

SOIL PROPERTIES

LL: 48.0%
PL: 17.0%
PI: 31.0%
CLASS: Lean Clay (CL), vy dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38682.0, E 41293.0
SAMPLE: SGCC-501 TUBE #:
ELEVATION: 1894.3'

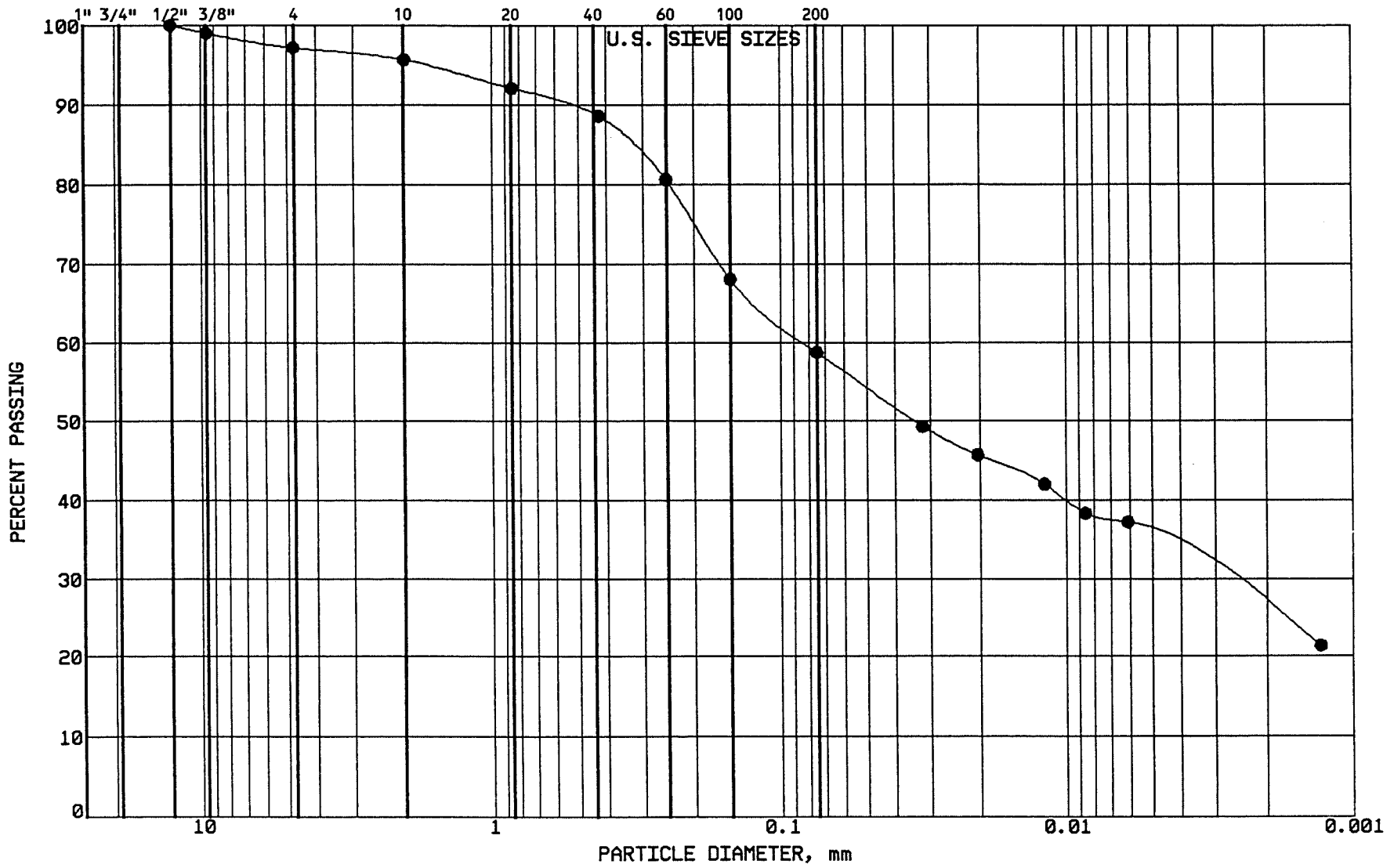
GRAVEL	3.3 %
SAND	35.4 %
SILT	26.7 %
CLAY	34.6 %
P 200	61.3 %

SOIL PROPERTIES

LL: 41.0%
PL: 13.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL),vy dk gr-br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38177.0, E 40802.0
SAMPLE: CLBCC502 TUBE #: ST-186
ELEVATION: 1900.4'

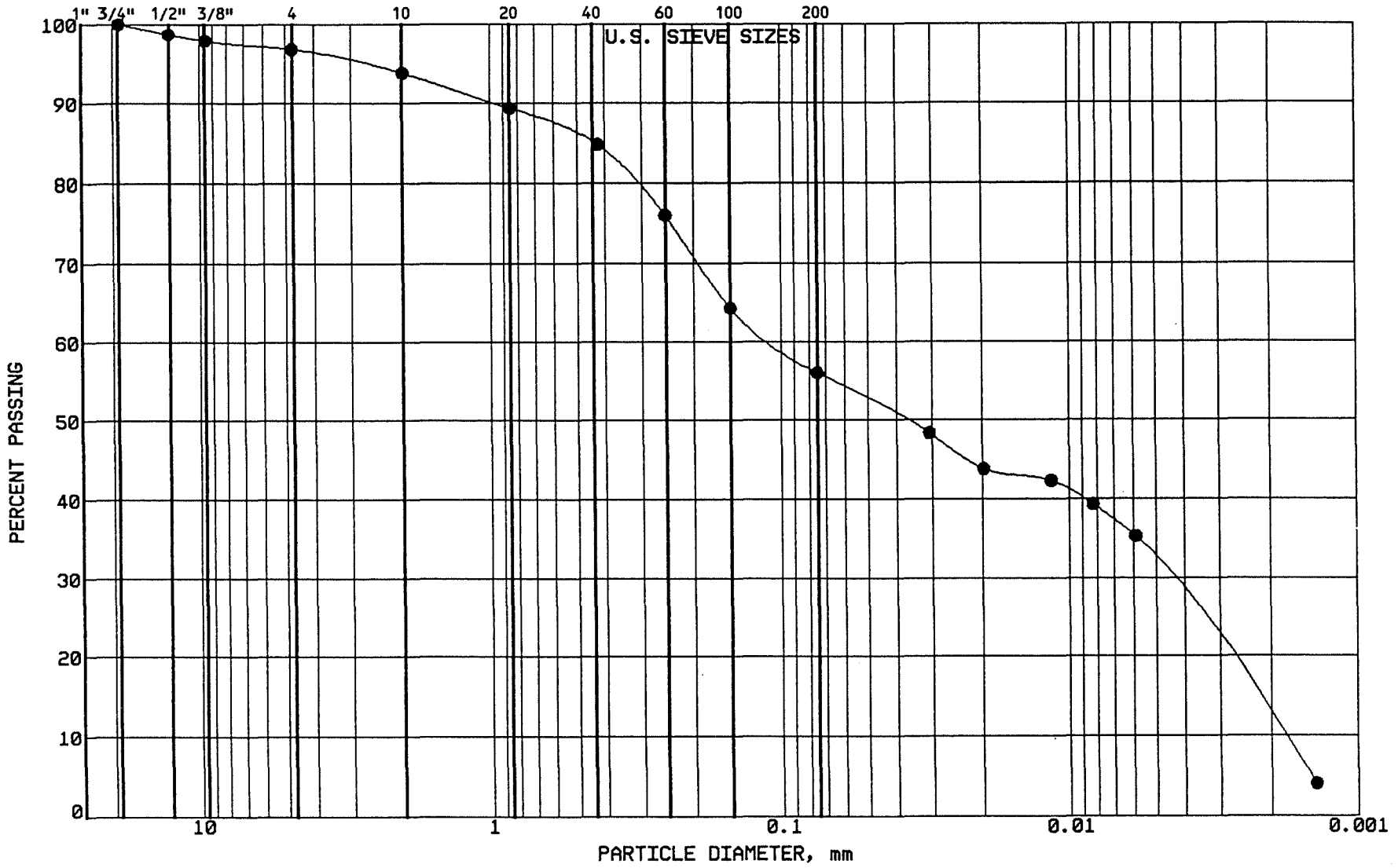
GRAVEL	2.8 %
SAND	38.4 %
SILT	23.6 %
CLAY	35.2 %
P 200	58.8 %

SOIL PROPERTIES

LL: 47.0%
PL: 16.0%
PI: 31.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38140.0, E 41032.0
SAMPLE: CLBCC503 TUBE #: ST-187
ELEVATION: 1899.6'

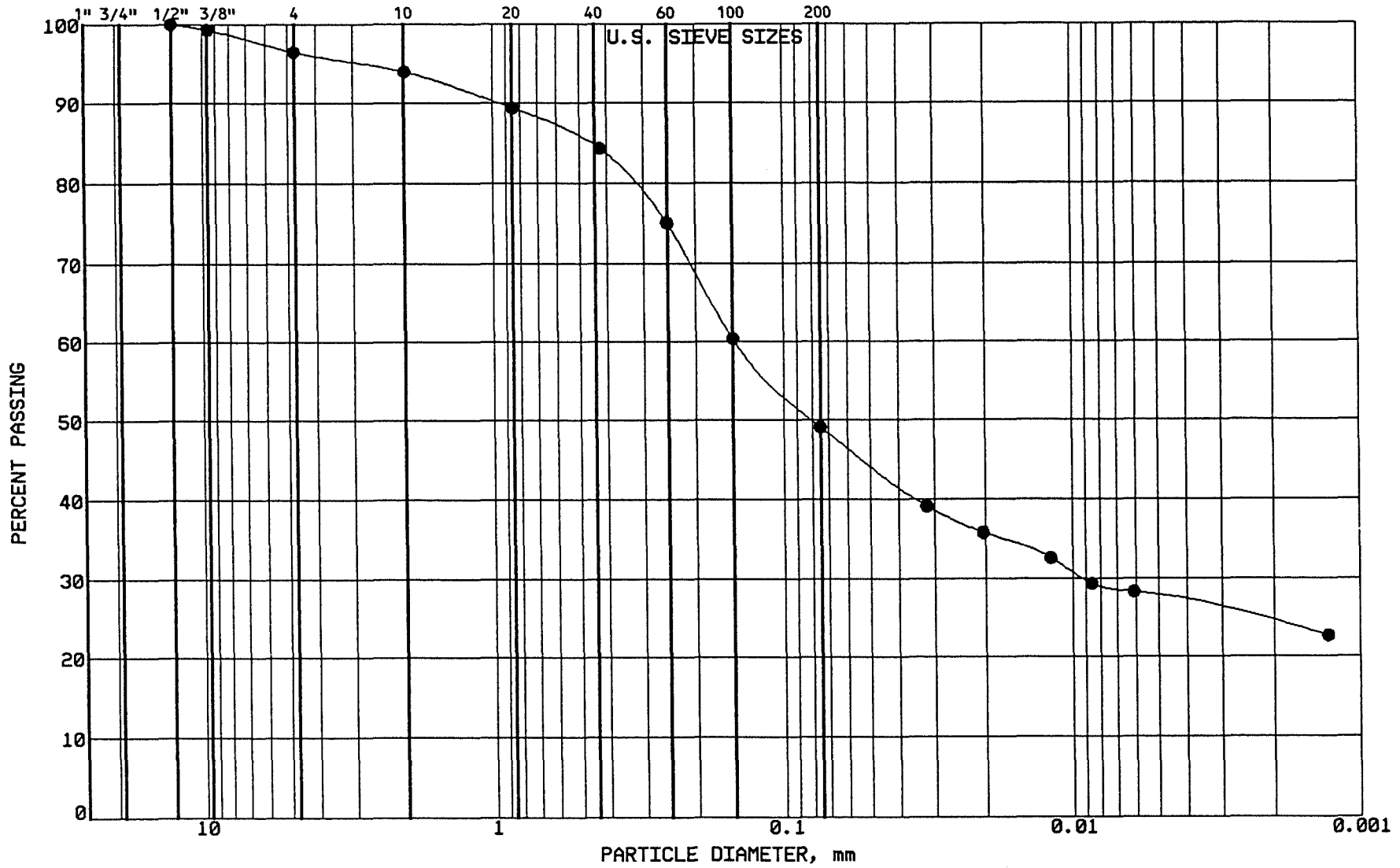
GRAVEL	3.2 %
SAND	40.7 %
SILT	24.4 %
CLAY	31.7 %
P 200	56.1 %

SOIL PROPERTIES

LL: 48.0%
PL: 16.0%
PI: 32.0%
CLASS: Sandy Lean Clay (CL), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38106.0, E 41242.0
SAMPLE: CLBCC504 TUBE #: ST.188
ELEVATION: 1898.5'

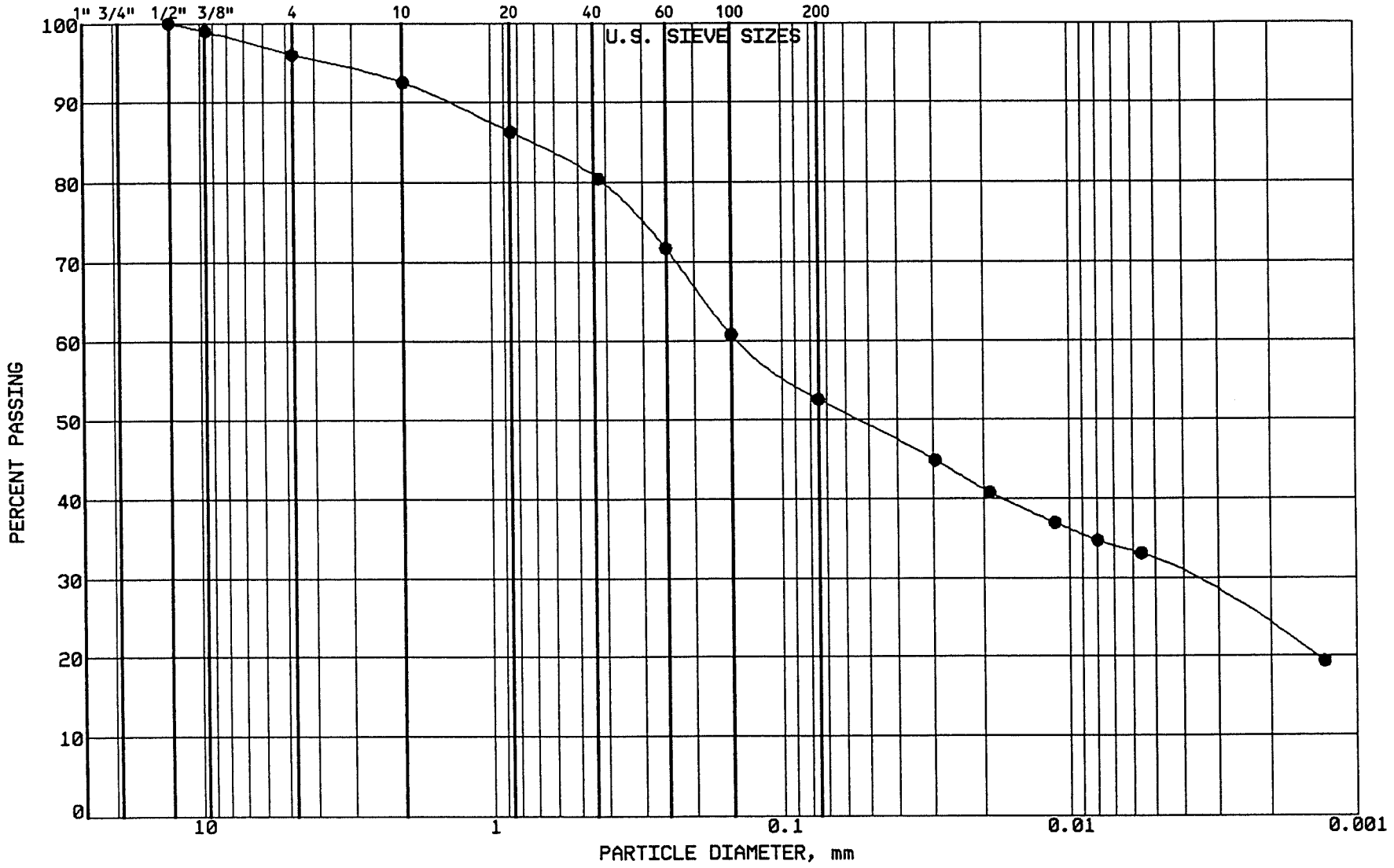
GRAVEL	3.5 %
SAND	47.4 %
SILT	21.5 %
CLAY	27.6 %
P 200	49.1 %

SOIL PROPERTIES

LL: 35.0%
PL: 14.0%
PI: 21.0%
CLASS: Clayey Sand (SC), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38088.0, E 41425.0
SAMPLE: CLBCC505 TUBE #:ST.189
ELEVATION: 1897.8'

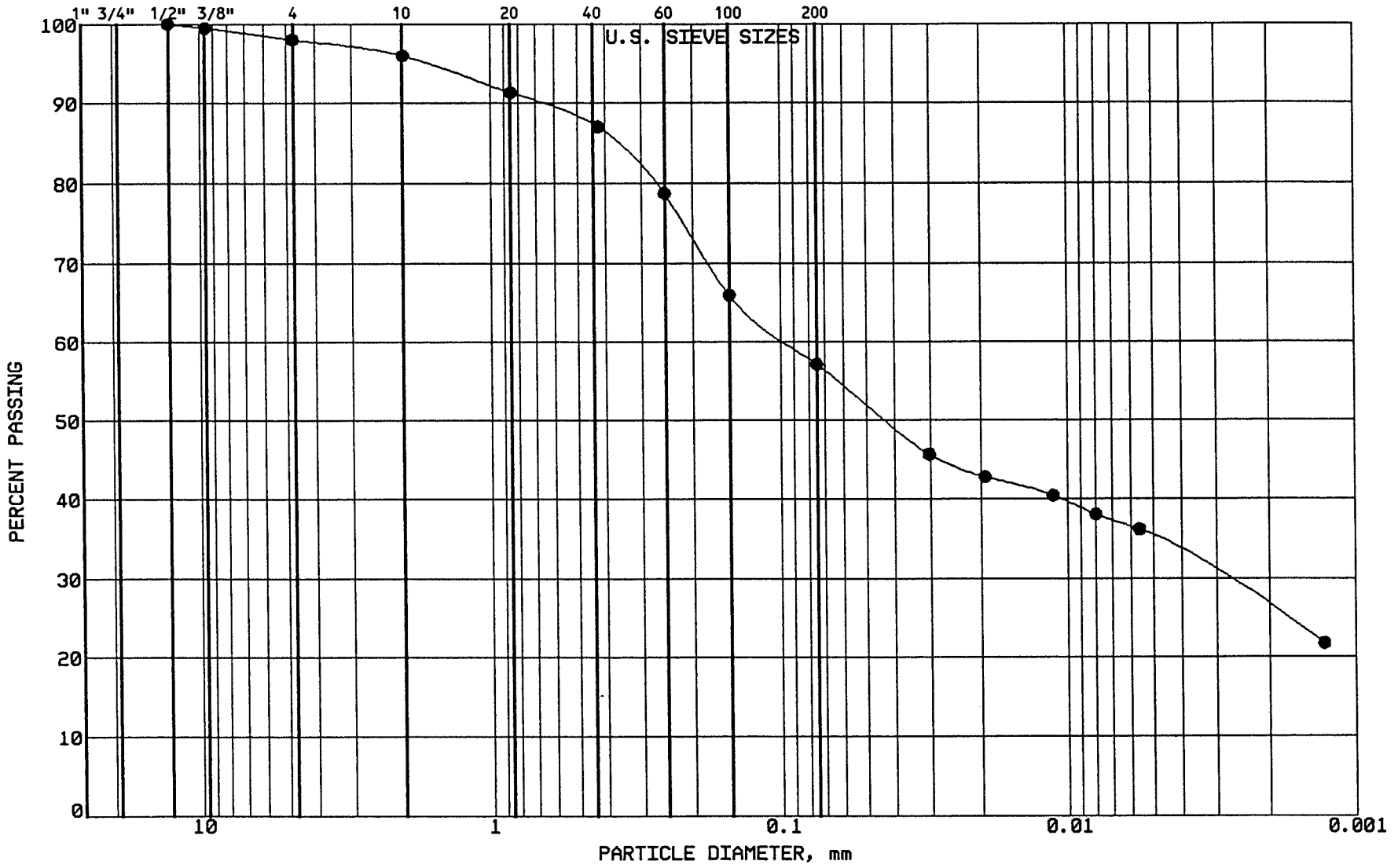
GRAVEL	4.0 %
SAND	43.4 %
SILT	20.6 %
CLAY	32.0 %
P 200	52.6 %

SOIL PROPERTIES

LL: 41.0%
PL: 15.0%
PI: 26.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

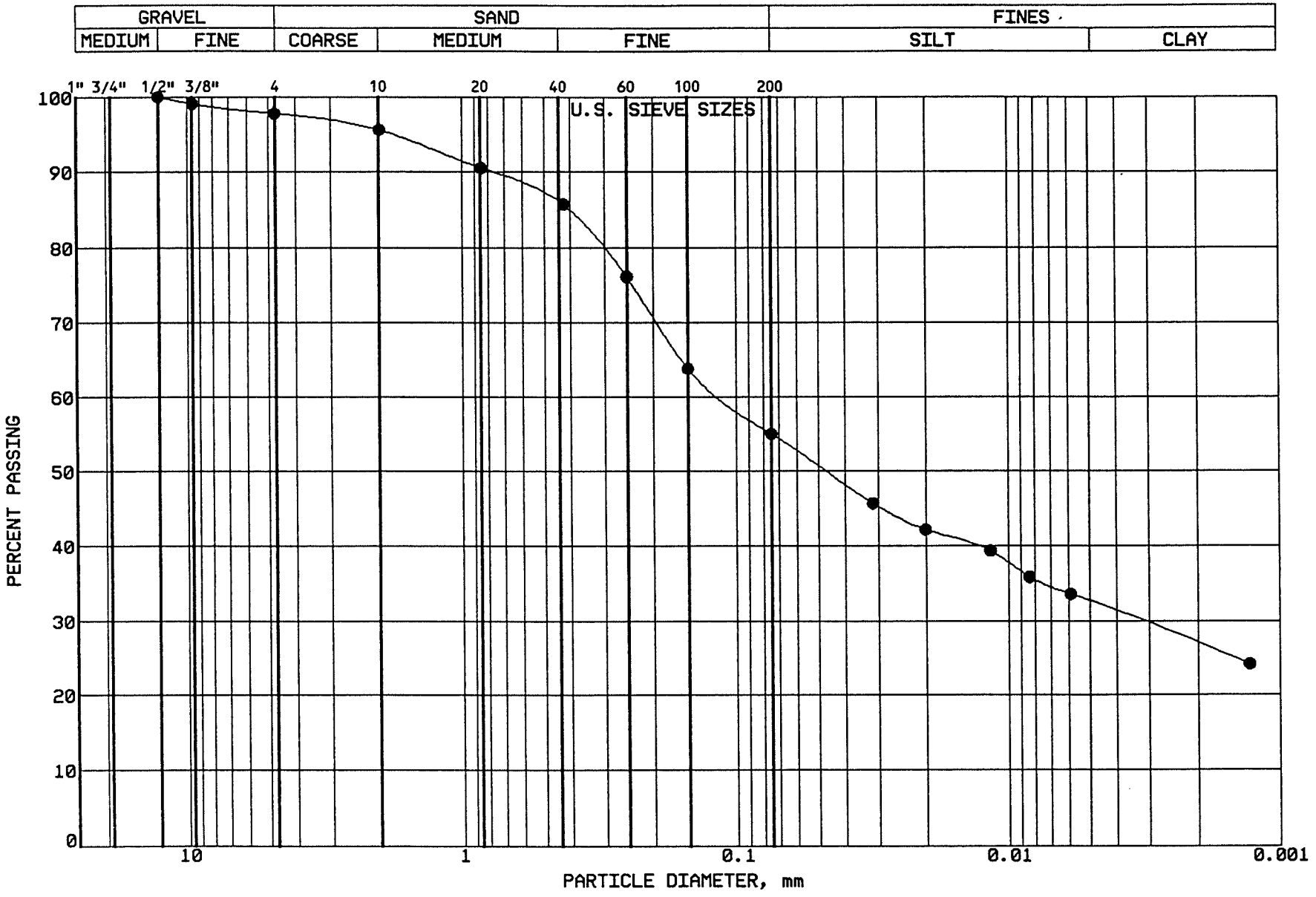
LOCATION: N 38470.0, E 40184.0
SAMPLE: CLBCC506 TUBE #: ST.190
ELEVATION: 1903.2'

GRAVEL	2.0 %
SAND	40.8 %
SILT	22.2 %
CLAY	35.0 %
P 200	57.2 %

SOIL PROPERTIES

LL: 40.0%
PL: 15.0%
PI: 25.0%
CLASS: Sandy Lean Clay(CL),vy dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38504.0, E 40006.0
SAMPLE: CLBCC507 TUBE #: ST.191
ELEVATION: 1903.8'

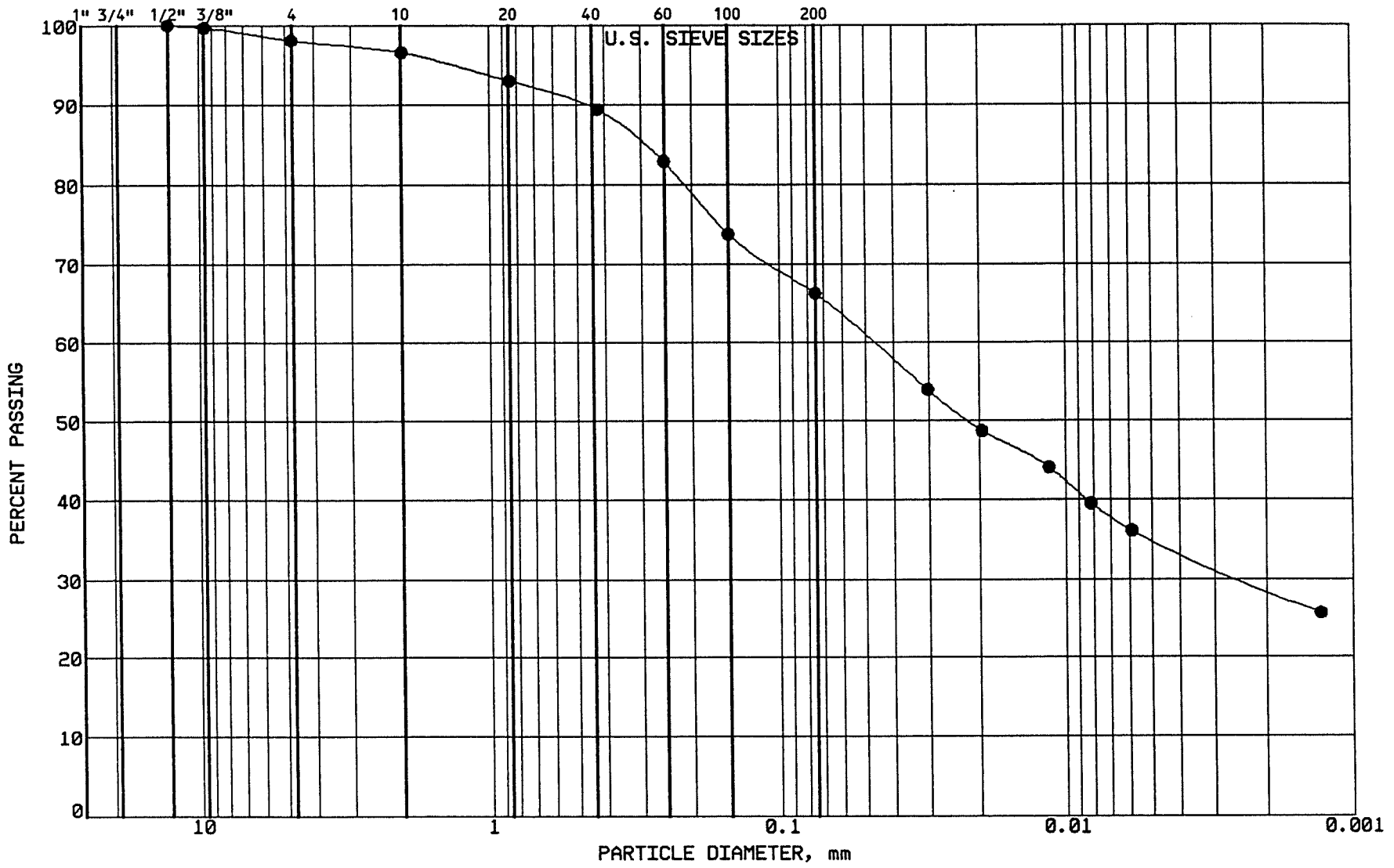
GRAVEL	2.2 %
SAND	42.7 %
SILT	22.5 %
CLAY	32.6 %
P 200	55.1 %

SOIL PROPERTIES

LL: 38.0%
PL: 15.0%
PI: 23.0%
CLASS: Sandy Lean Clay(CL), vy dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38543.0, E 39797.0
SAMPLE: CLBCC508 TUBE #:ST.192
ELEVATION: 1904.8'

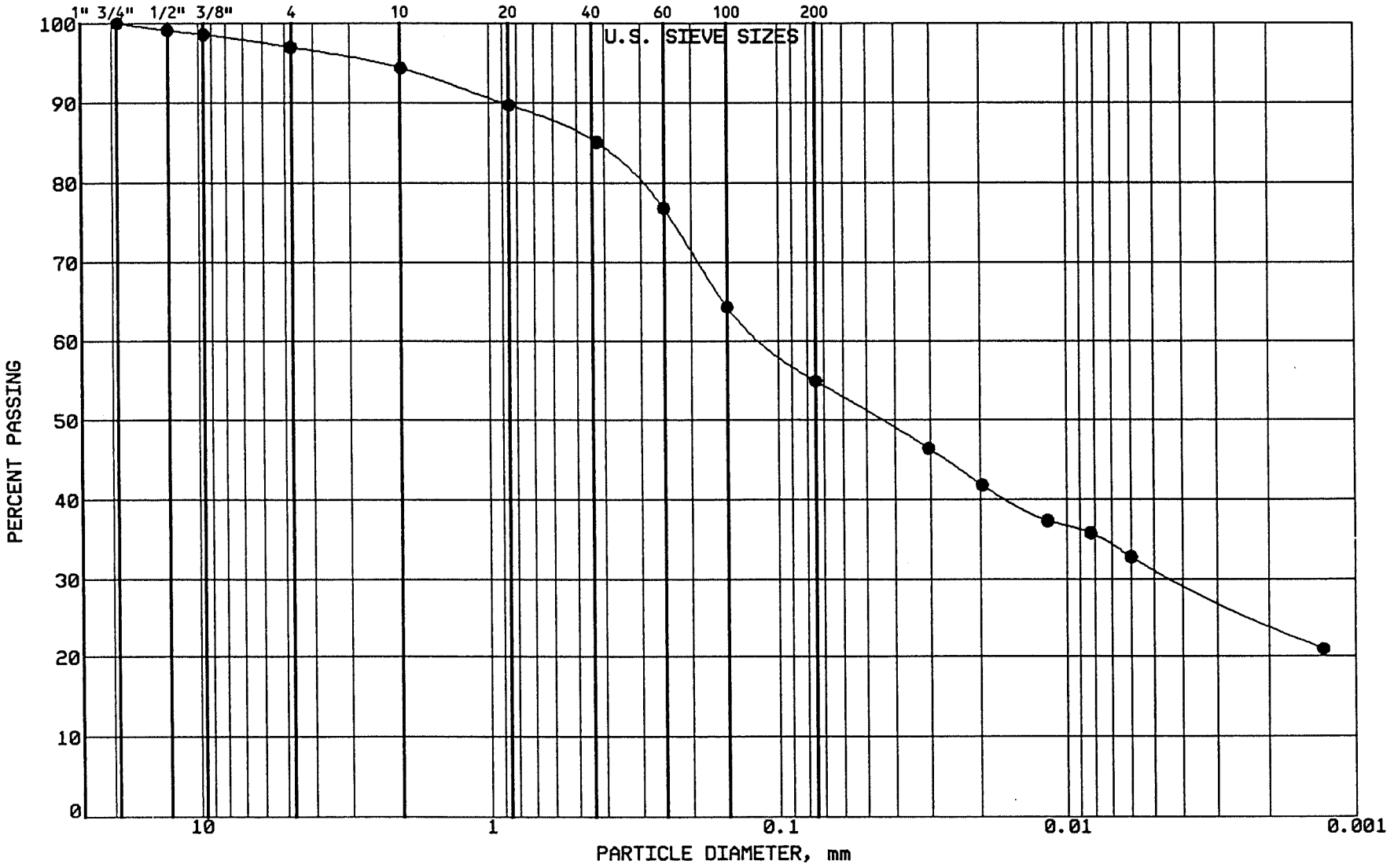
GRAVEL	1.9 %
SAND	31.9 %
SILT	31.2 %
CLAY	35.0 %
P 200	66.2 %

SOIL PROPERTIES

LL: 41.0%
PL: 16.0%
PI: 25.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38647.0, E 39806.0
SAMPLE: CLBCC509 TUBE #: ST.193
ELEVATION: 1904.3'

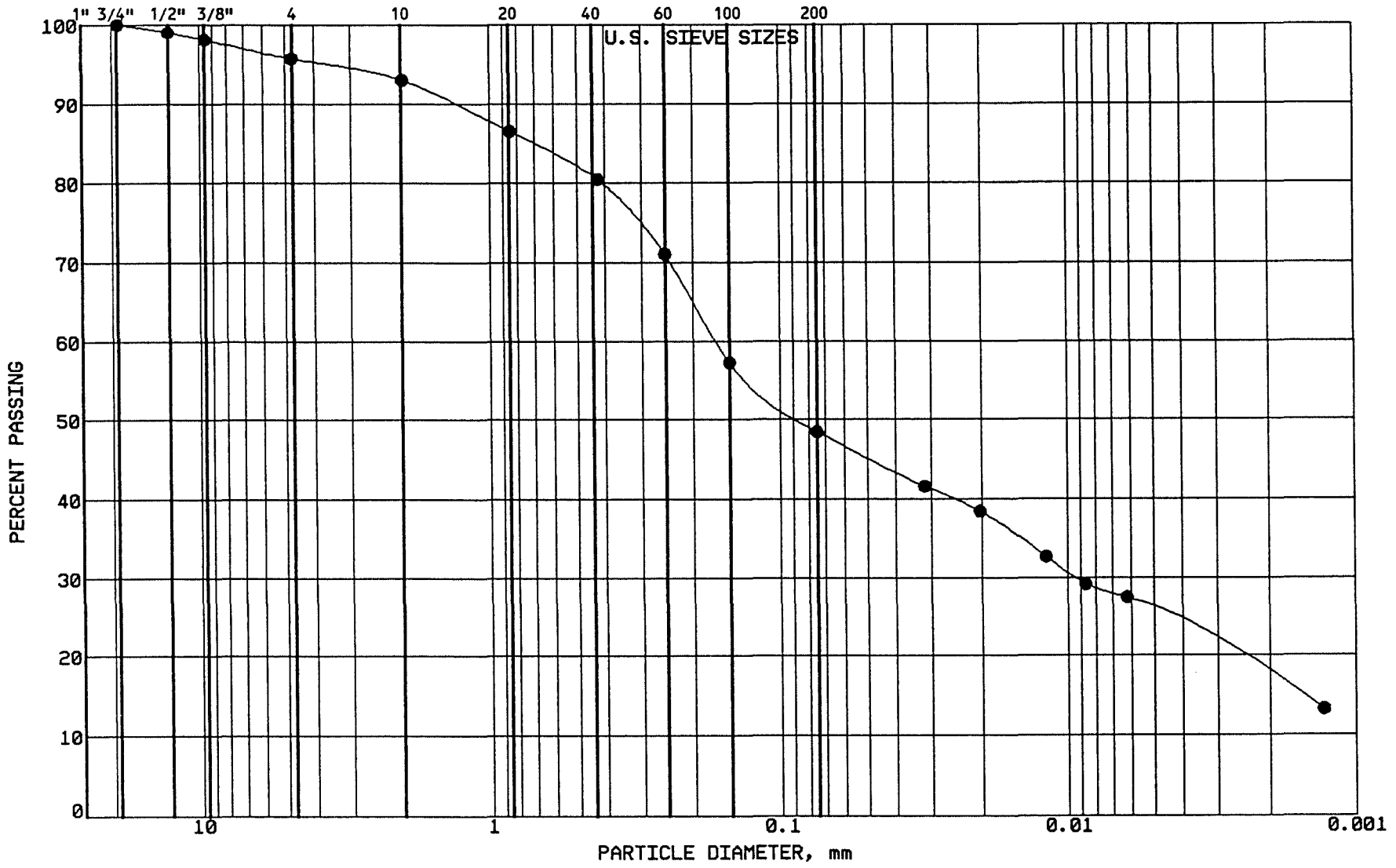
GRAVEL	3.0 %
SAND	42.0 %
SILT	23.6 %
CLAY	31.4 %
P 200	55.0 %

SOIL PROPERTIES

LL: 38.0%
PL: 15.0%
PI: 23.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38613.0, E 39990.0
SAMPLE: CLBCC510 TUBE #: ST.194
ELEVATION: 1903.4'

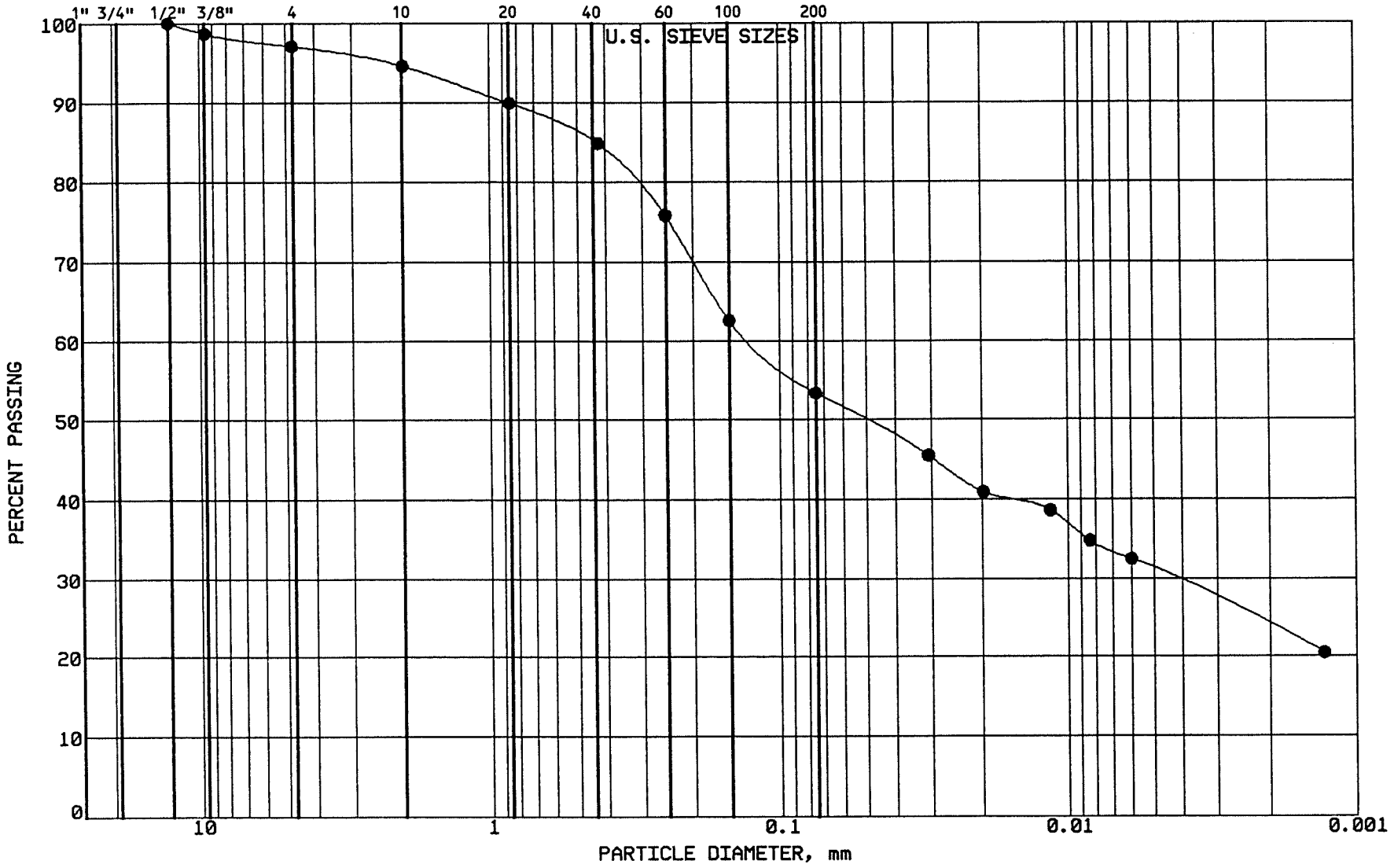
GRAVEL	4.3 %
SAND	47.3 %
SILT	22.9 %
CLAY	25.5 %
P 200	48.4 %

SOIL PROPERTIES

LL: 36.0%
PL: 14.0%
PI: 22.0%
CLASS: Clayey Sand (SC), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38584.0, E 40176.0
SAMPLE: CLBCC511 TUBE #: ST.195
ELEVATION: 1902.7'

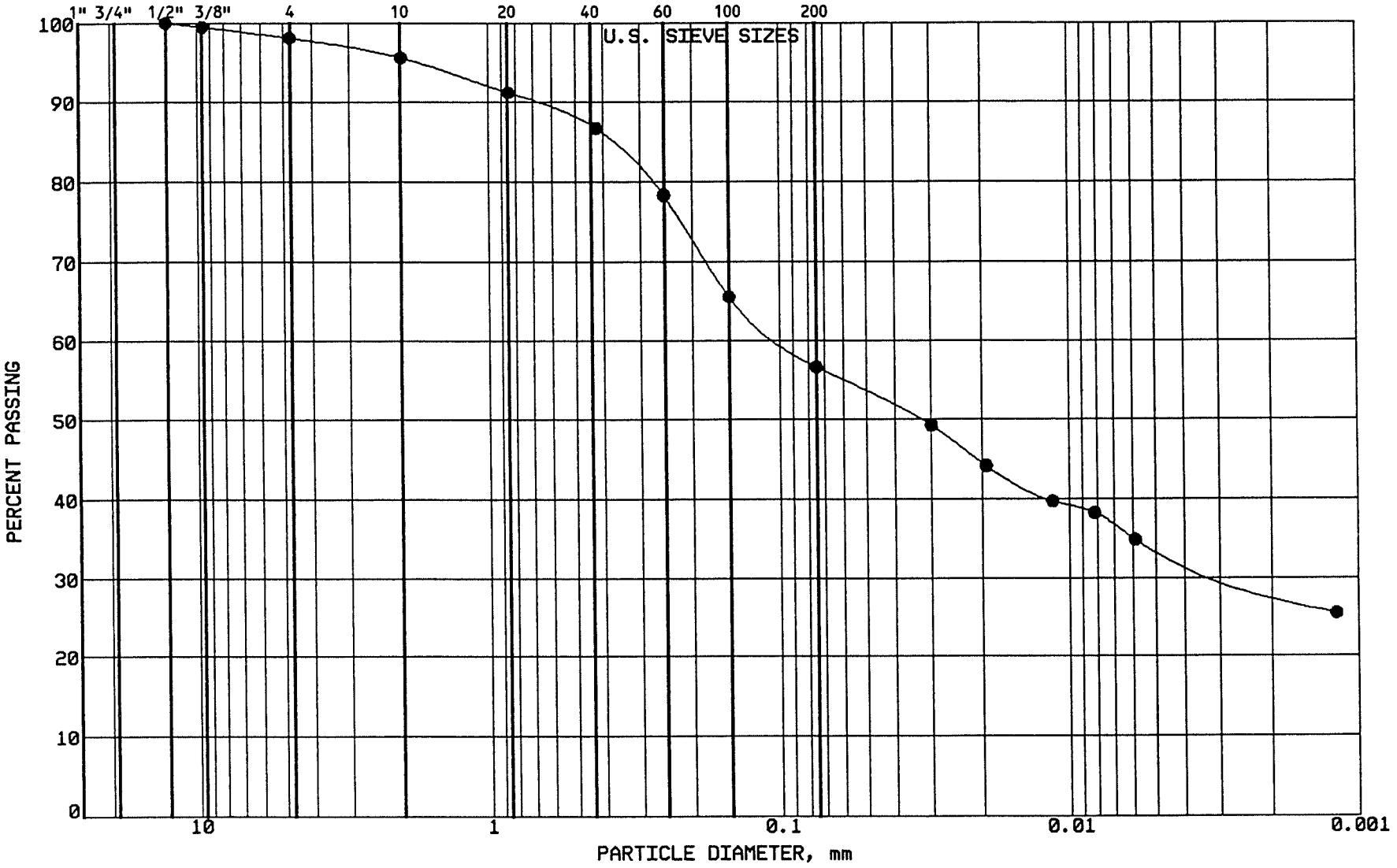
GRAVEL	2.9 %
SAND	43.7 %
SILT	22.3 %
CLAY	31.1 %
P 200	53.4 %

SOIL PROPERTIES

LL: 39.0%
PL: 16.0%
PI: 23.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38567.0, E 40518.0
SAMPLE: CLBCC512 TUBE #: St.196
ELEVATION: 1900.0'

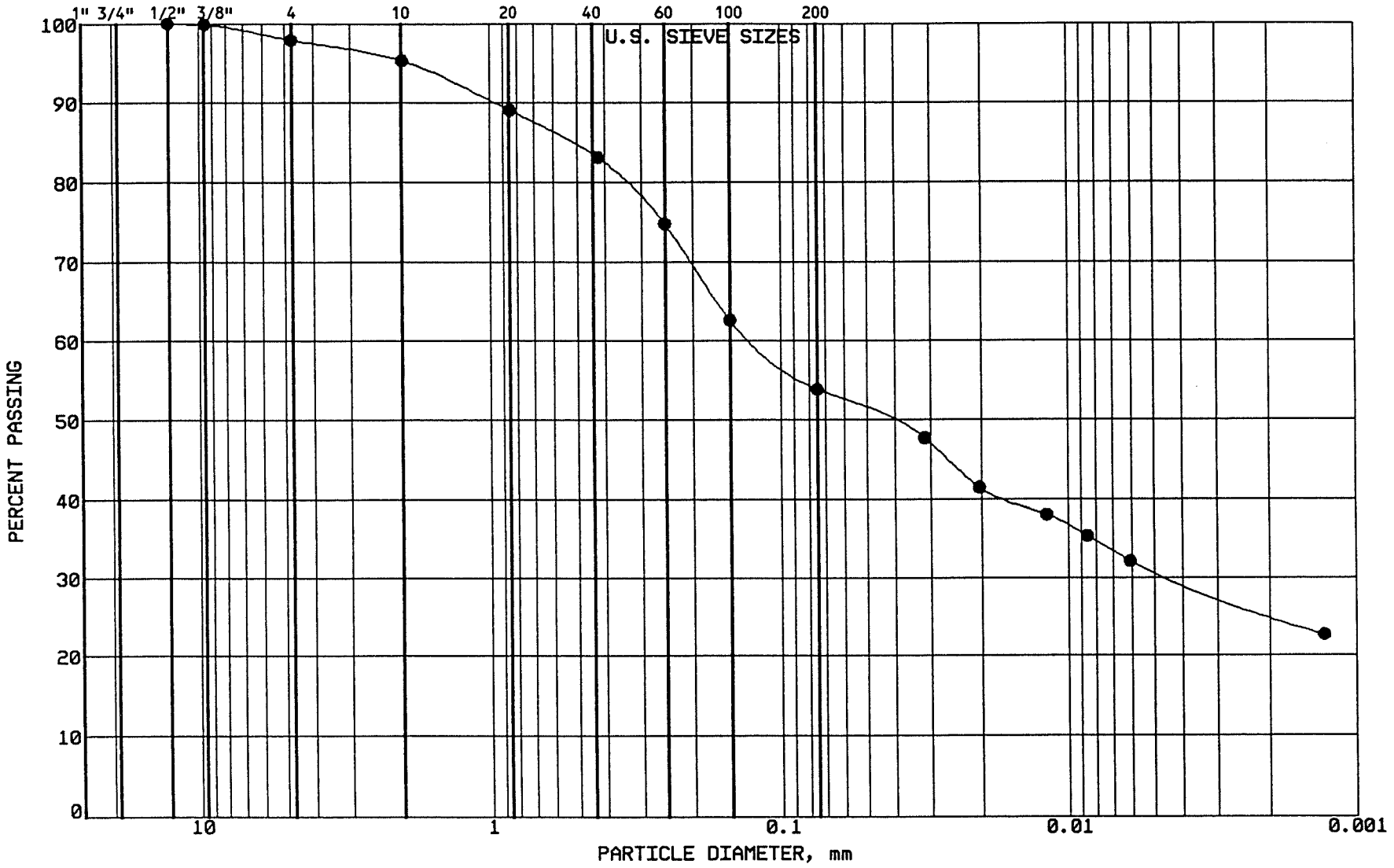
GRAVEL	1.9 %
SAND	41.4 %
SILT	22.9 %
CLAY	33.8 %
P 200	56.7 %

SOIL PROPERTIES

LL: 42.0%
PL: 16.0%
PI: 26.0%
CLASS: Sandy Lean Clay(CL), vy dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38542.0, E 40701.0
SAMPLE: CLBCC513 TUBE #: ST.197
ELEVATION: 1899.0'

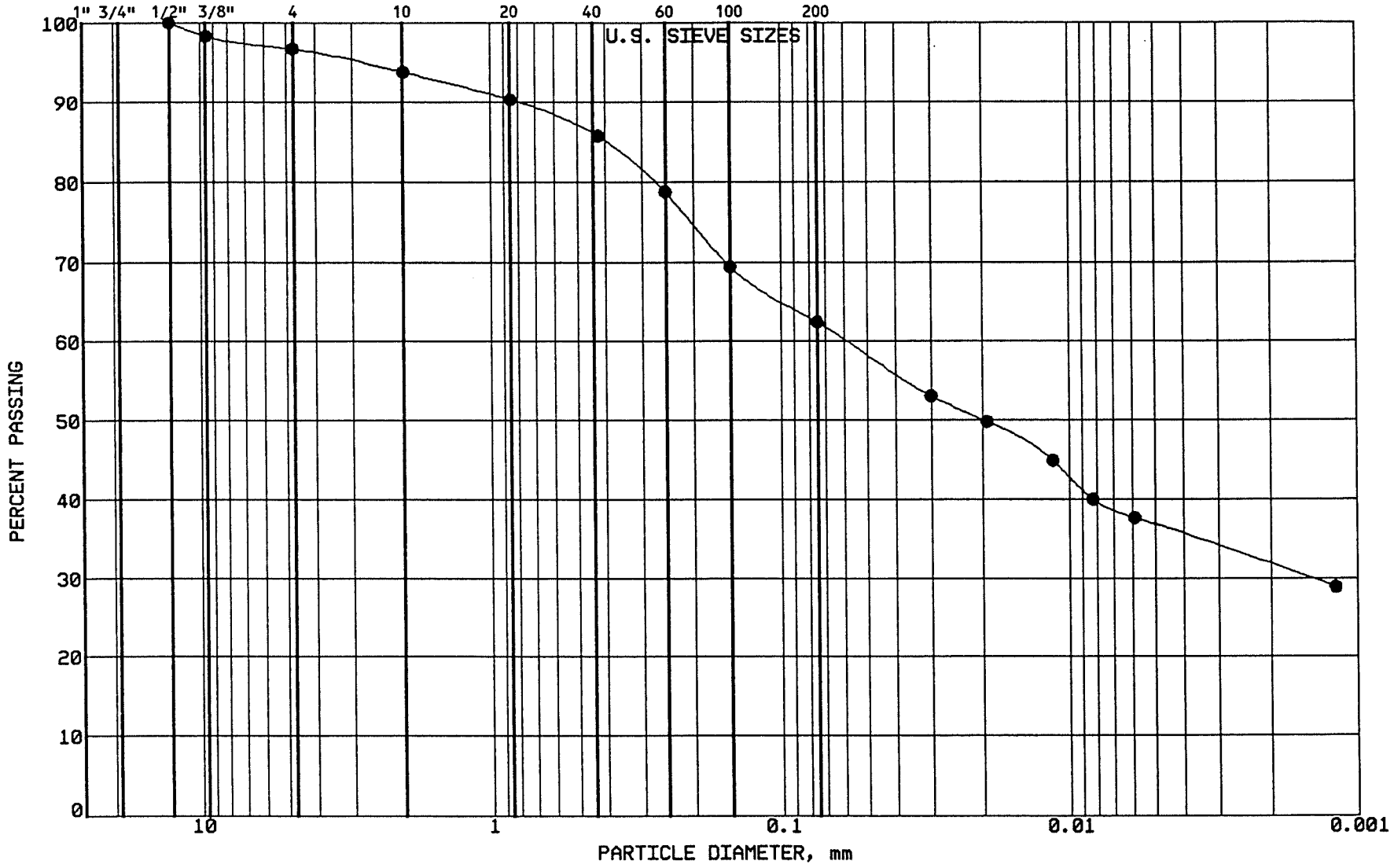
GRAVEL	2.1 %
SAND	44.0 %
SILT	23.0 %
CLAY	30.9 %
P 200	53.9 %

SOIL PROPERTIES

LL: 39.0%
PL: 15.0%
PI: 24.0%
CLASS: Sandy Lean Clay(CL), vy dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38334.0, E 40761.0
SAMPLE: CLBCC514 TUBE #: ST.198
ELEVATION: 1900.0'

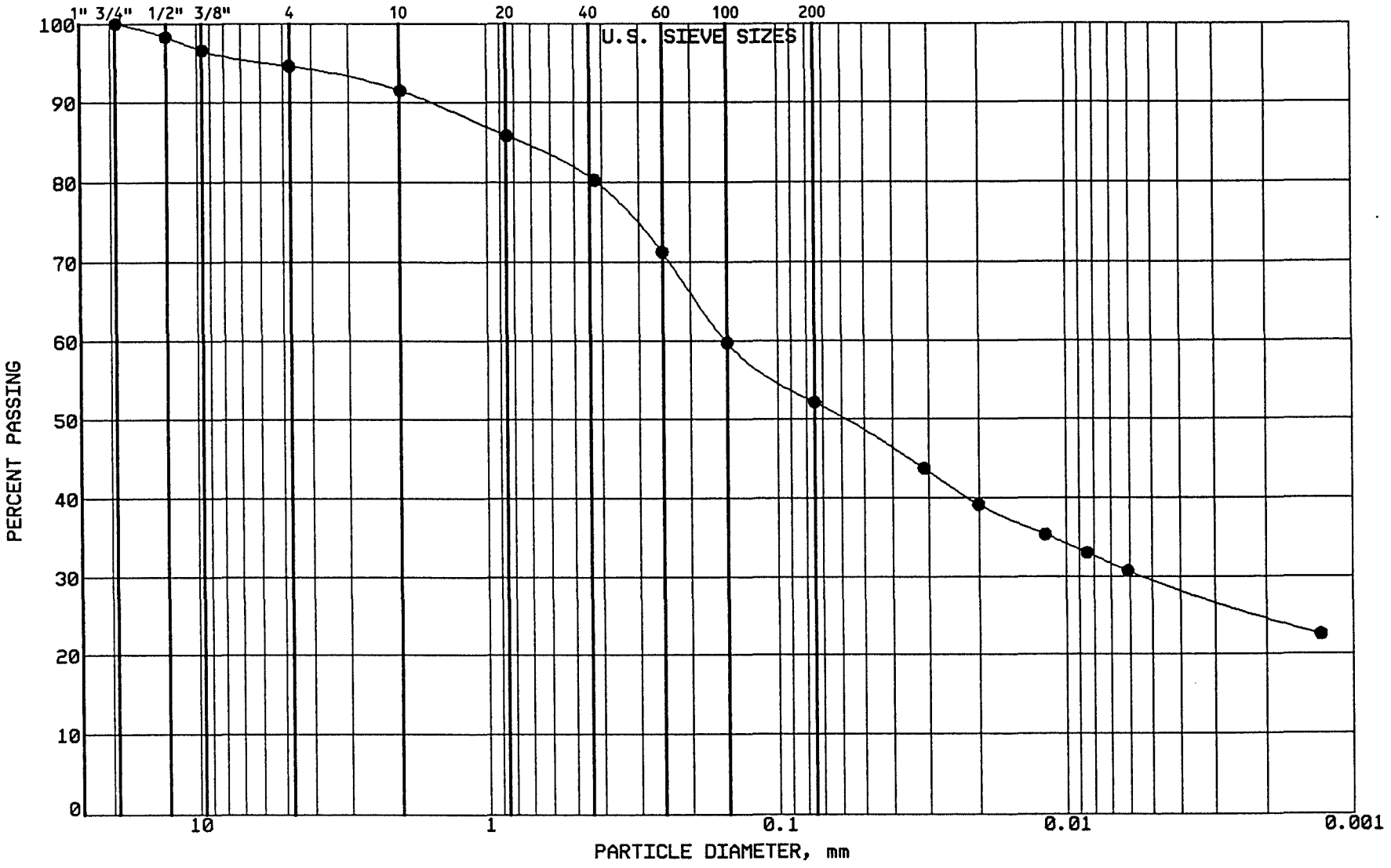
GRAVEL	3.3 %
SAND	34.3 %
SILT	25.7 %
CLAY	36.7 %
P 200	62.4 %

SOIL PROPERTIES

LL: 47.0%
PL: 18.0%
PI: 29.0%
CLASS: Sandy Lean Clay(CL),vy dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38309.0, E 40956.0
SAMPLE: CLBCC515 TUBE #: ST.199
ELEVATION: 1898.9'

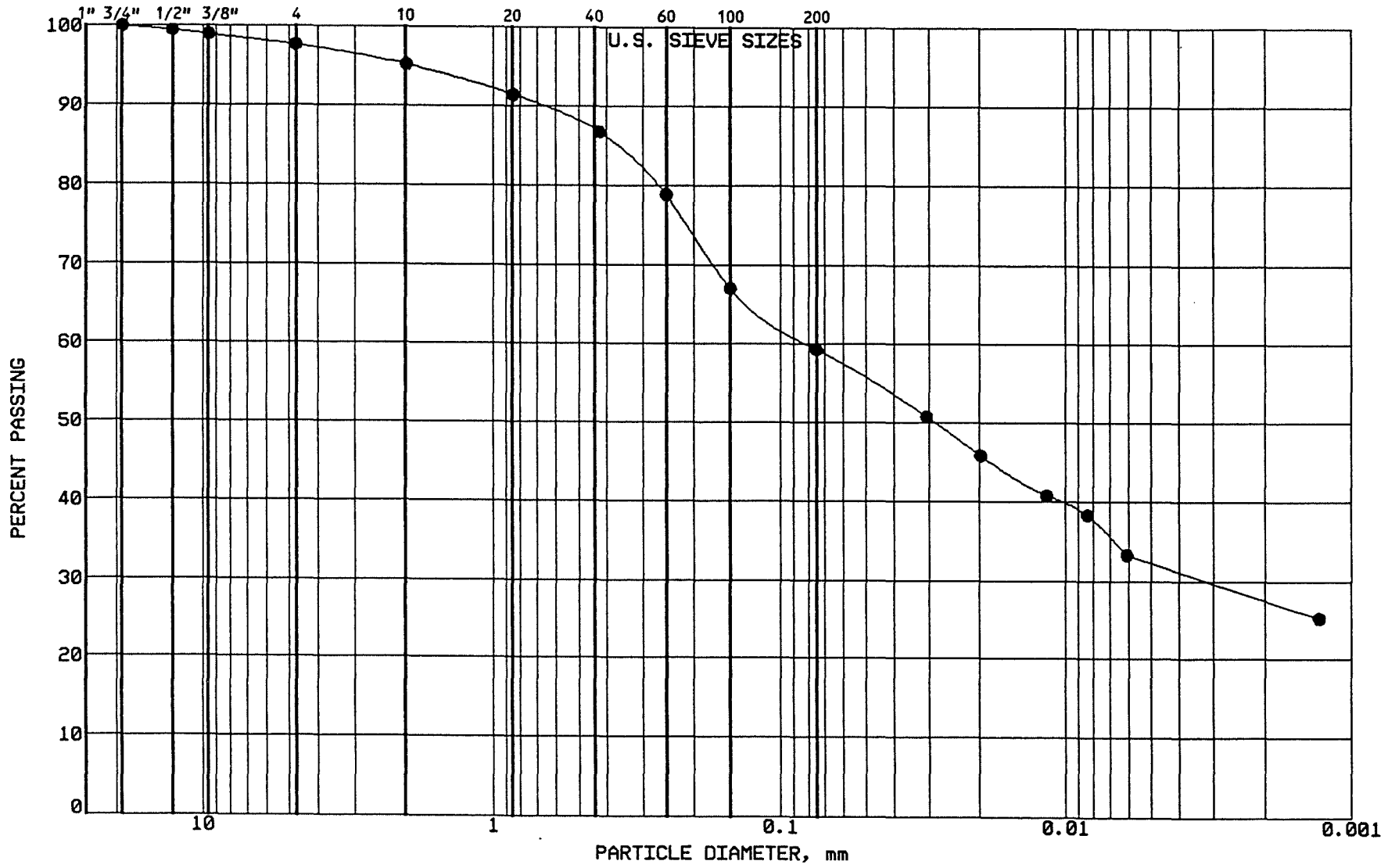
GRAVEL	5.4 %
SAND	42.4 %
SILT	22.5 %
CLAY	29.7 %
P 200	52.2 %

SOIL PROPERTIES

LL: 40.0%
PL: 16.0%
PI: 24.0%
CLASS: Sandy Lean Clay(CL),vy dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38283.0, E 41112.0
SAMPLE: CLBCC516 TUBE #:ST.200
ELEVATION: 1898.4'

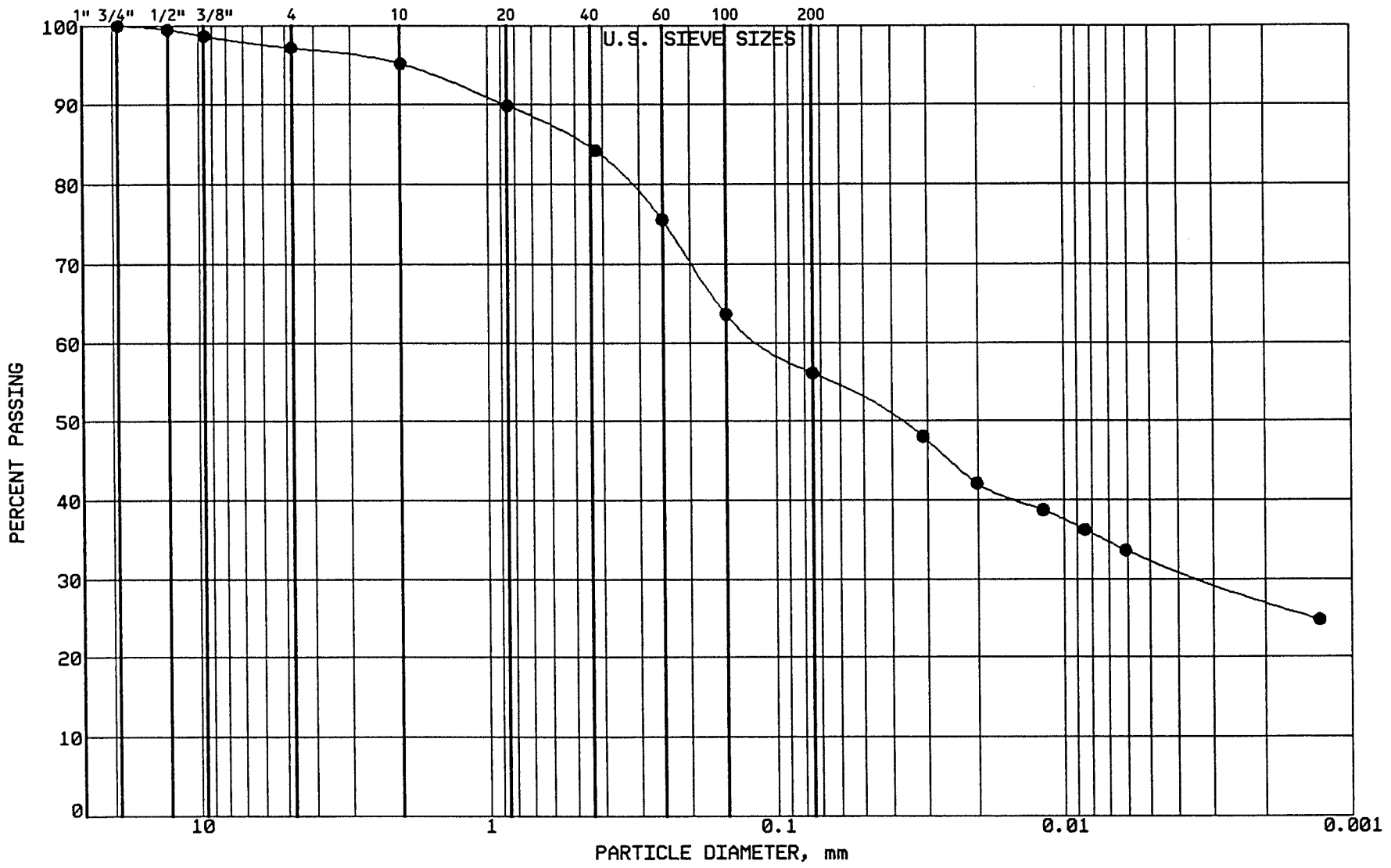
GRAVEL	2.4 %
SAND	38.3 %
SILT	27.0 %
CLAY	32.3 %
P 200	59.3 %

SOIL PROPERTIES

LL: 43.0%
PL: 17.0%
PI: 26.0%
CLASS: Sandy Lean Clay(CL),vy dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38253.0, E 41287.0
SAMPLE: CLBCC517 TUBE #: ST.201
ELEVATION: 1897.6'

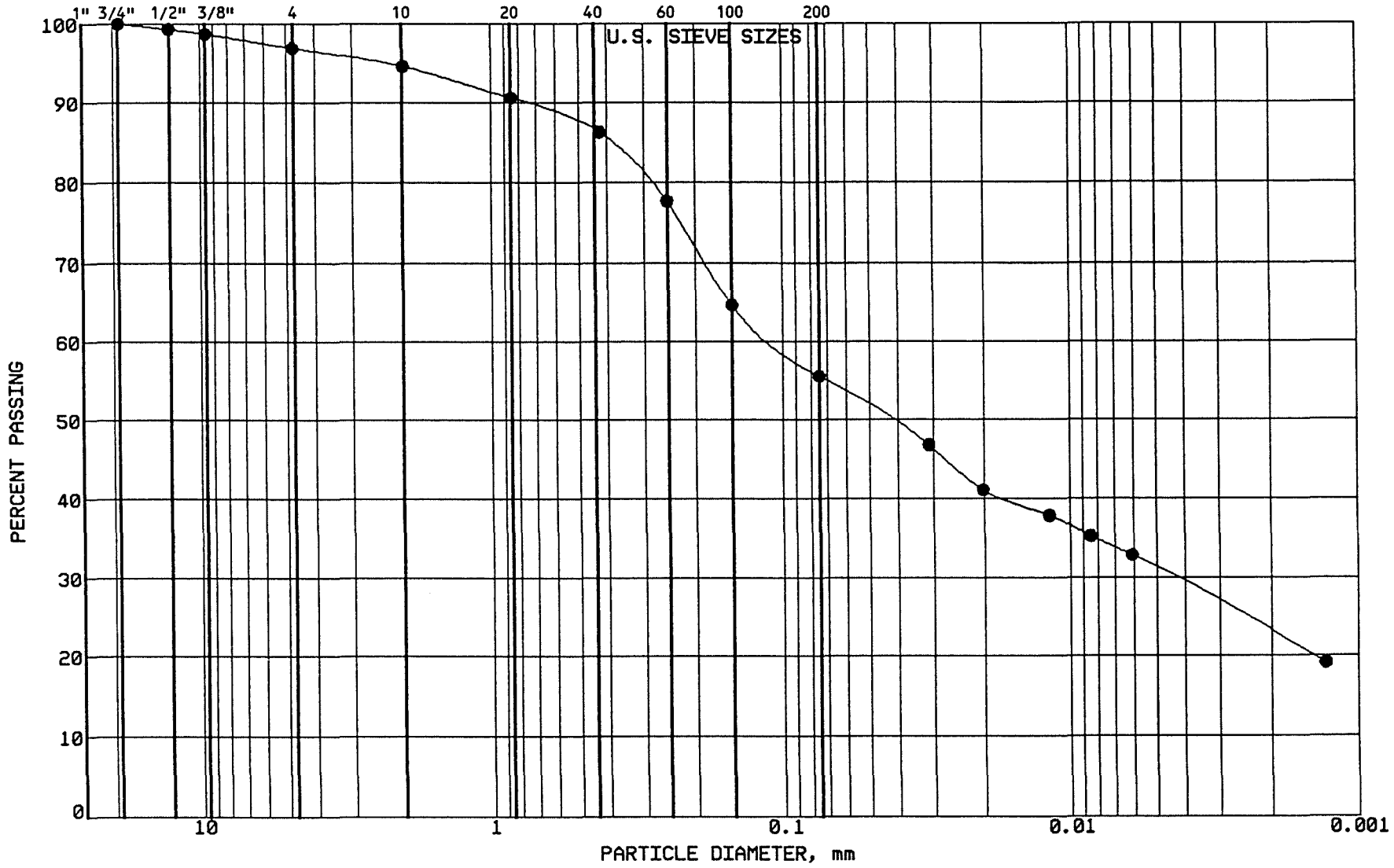
GRAVEL	2.8 %
SAND	41.0 %
SILT	23.7 %
CLAY	32.5 %
P 200	56.2 %

SOIL PROPERTIES

LL: 39.0%
PL: 17.0%
PI: 22.0%
CLASS: Sandy Lean Clay (CL), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38504.0, E 40006.0
SAMPLE: CLBCC518 TUBE #:RST.191
ELEVATION: 1903.8'

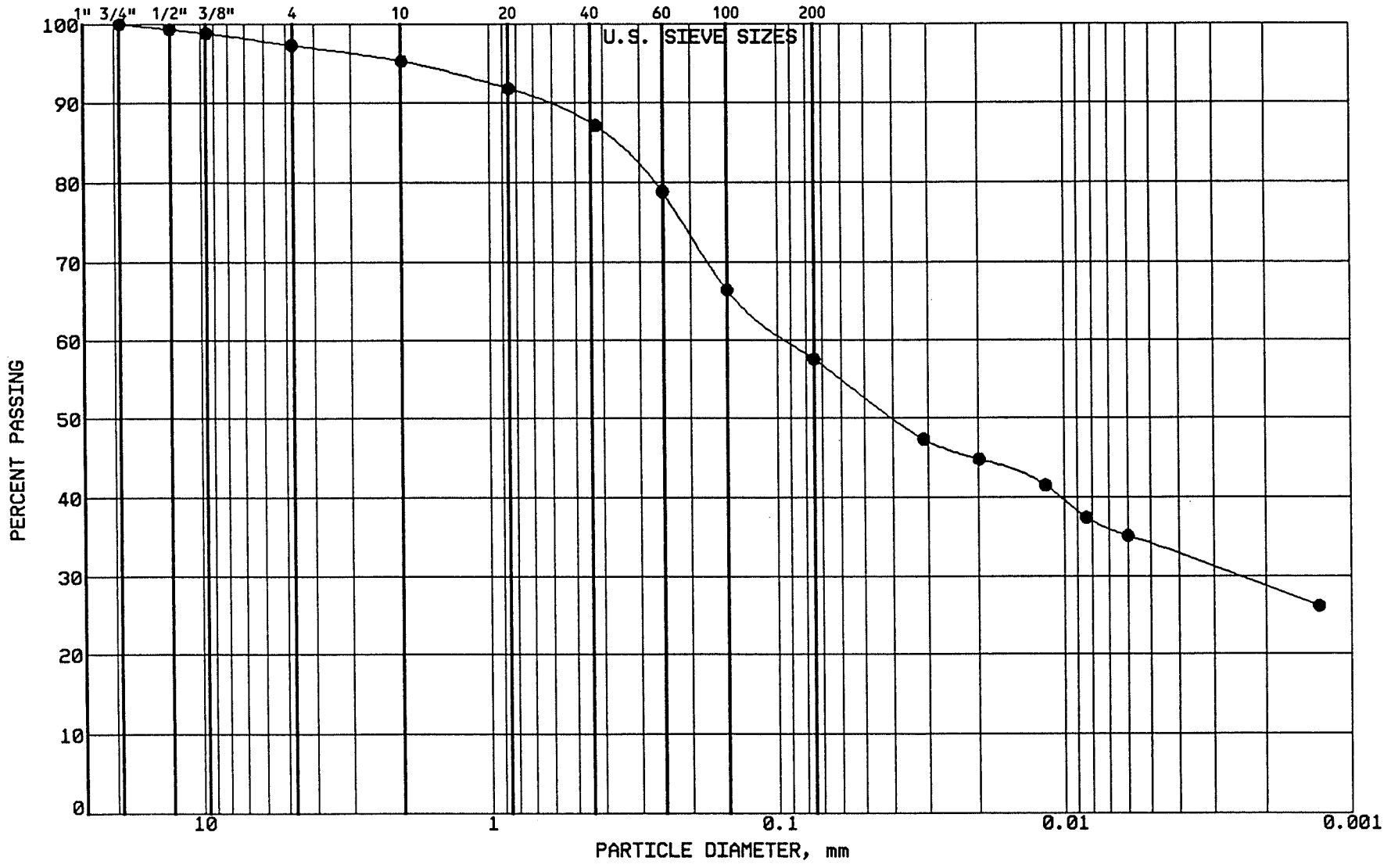
GRAVEL	3.1 %
SAND	41.3 %
SILT	24.5 %
CLAY	31.1 %
P 200	55.6 %

SOIL PROPERTIES

LL: 36.0%
PL: 15.0%
PI: 21.0%
CLASS: Sandy Lean Clay (CL), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38450.0, E 41413.0
SAMPLE: CLBCC519 TUBE #: ST.202
ELEVATION: 1896.0'

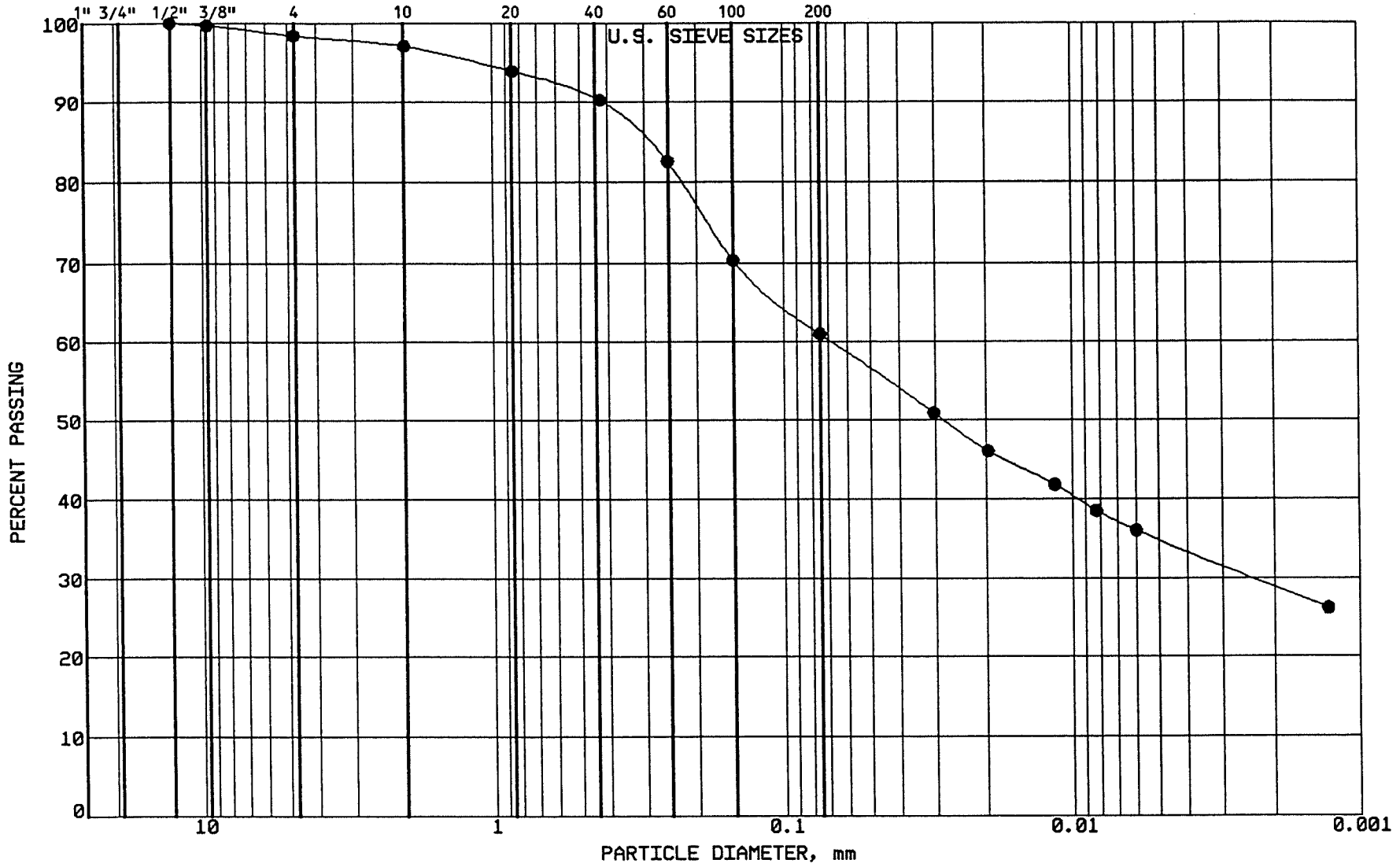
GRAVEL	2.7 %
SAND	39.7 %
SILT	23.6 %
CLAY	34.0 %
P 200	57.6 %

SOIL PROPERTIES

LL: 41.0%
PL: 16.0%
PI: 25.0%
CLASS: Sandy Lean Clay (CL), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C

CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38477.0, E 41204.0
SAMPLE: CLBCC520 TUBE #: ST.203
ELEVATION: 1897.0'

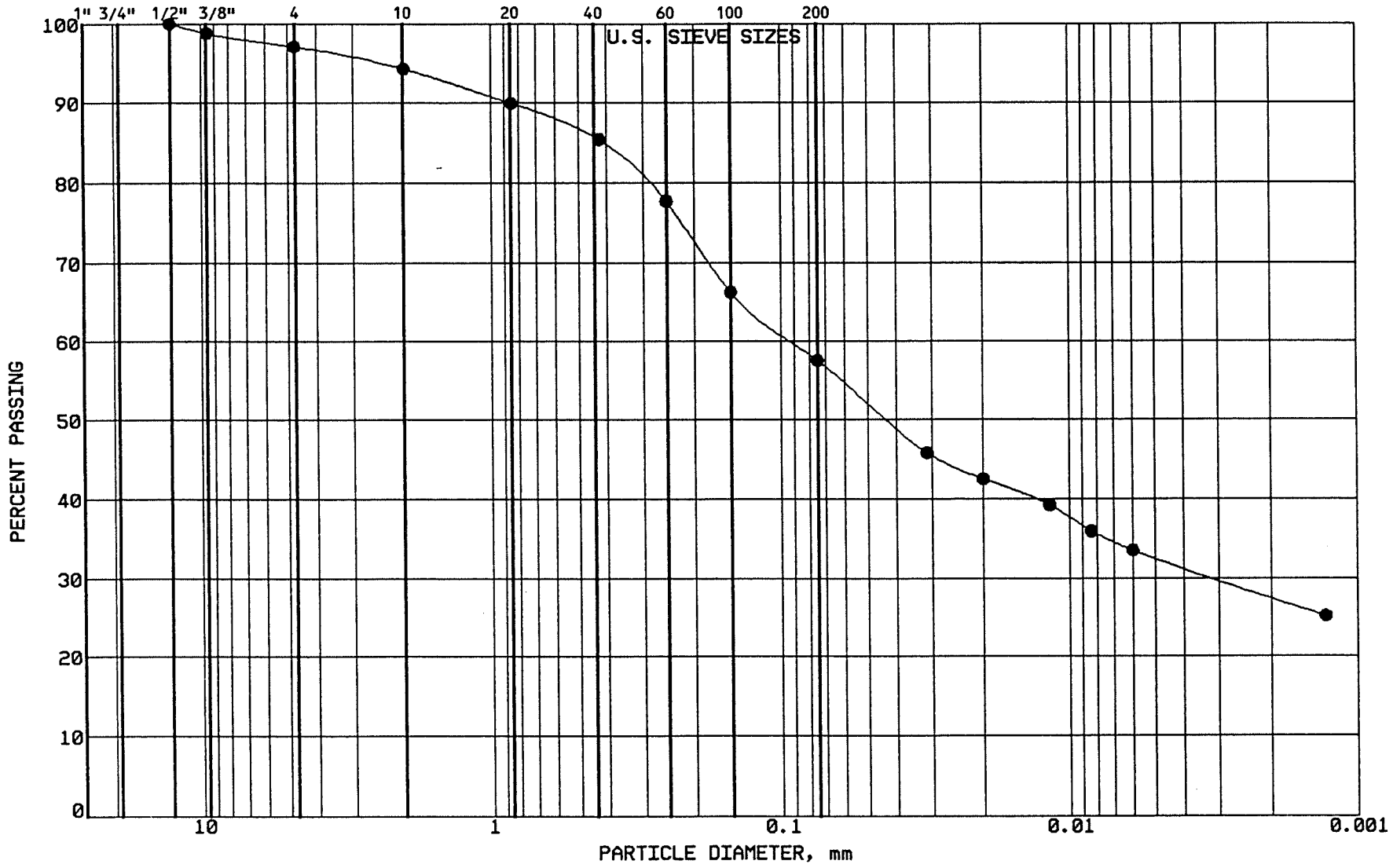
GRAVEL	1.6 %
SAND	37.4 %
SILT	26.2 %
CLAY	34.8 %
P 200	61.0 %

SOIL PROPERTIES

LL: 40.0%
PL: 15.0%
PI: 25.0%
CLASS: Sandy Lean Clay (CL), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38496.0, E 41029.0
SAMPLE: CLBCC521 TUBE #: ST.204
ELEVATION: 1897.7'

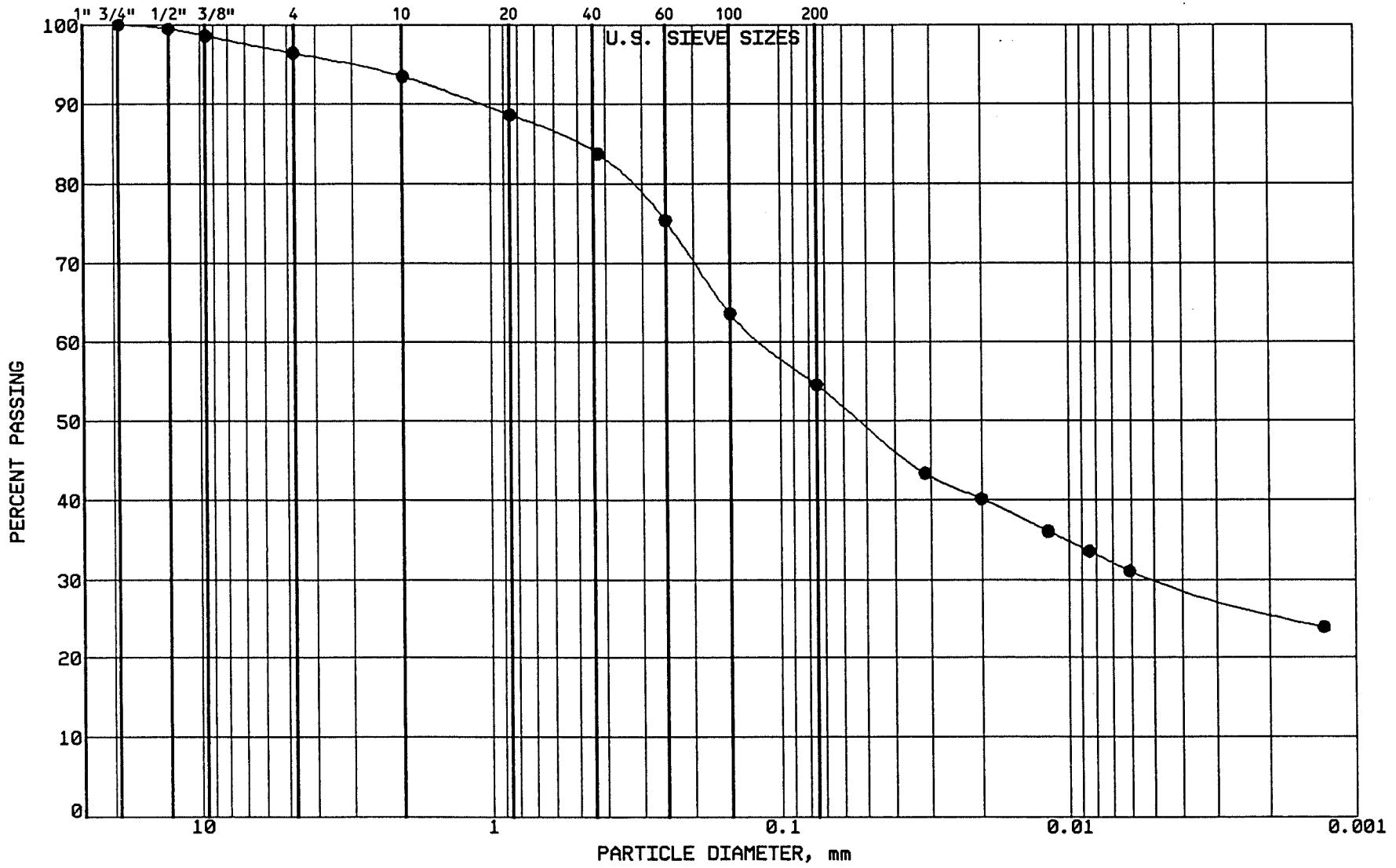
GRAVEL	2.9 %
SAND	39.5 %
SILT	25.1 %
CLAY	32.5 %
P 200	57.6 %

SOIL PROPERTIES

LL: 38.0%
PL: 16.0%
PI: 22.0%
CLASS: Sandy Lean Clay (CL), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38520.0, E 40833.0
SAMPLE: CLBCC522 TUBE #: ST.205
ELEVATION: 1898.5'

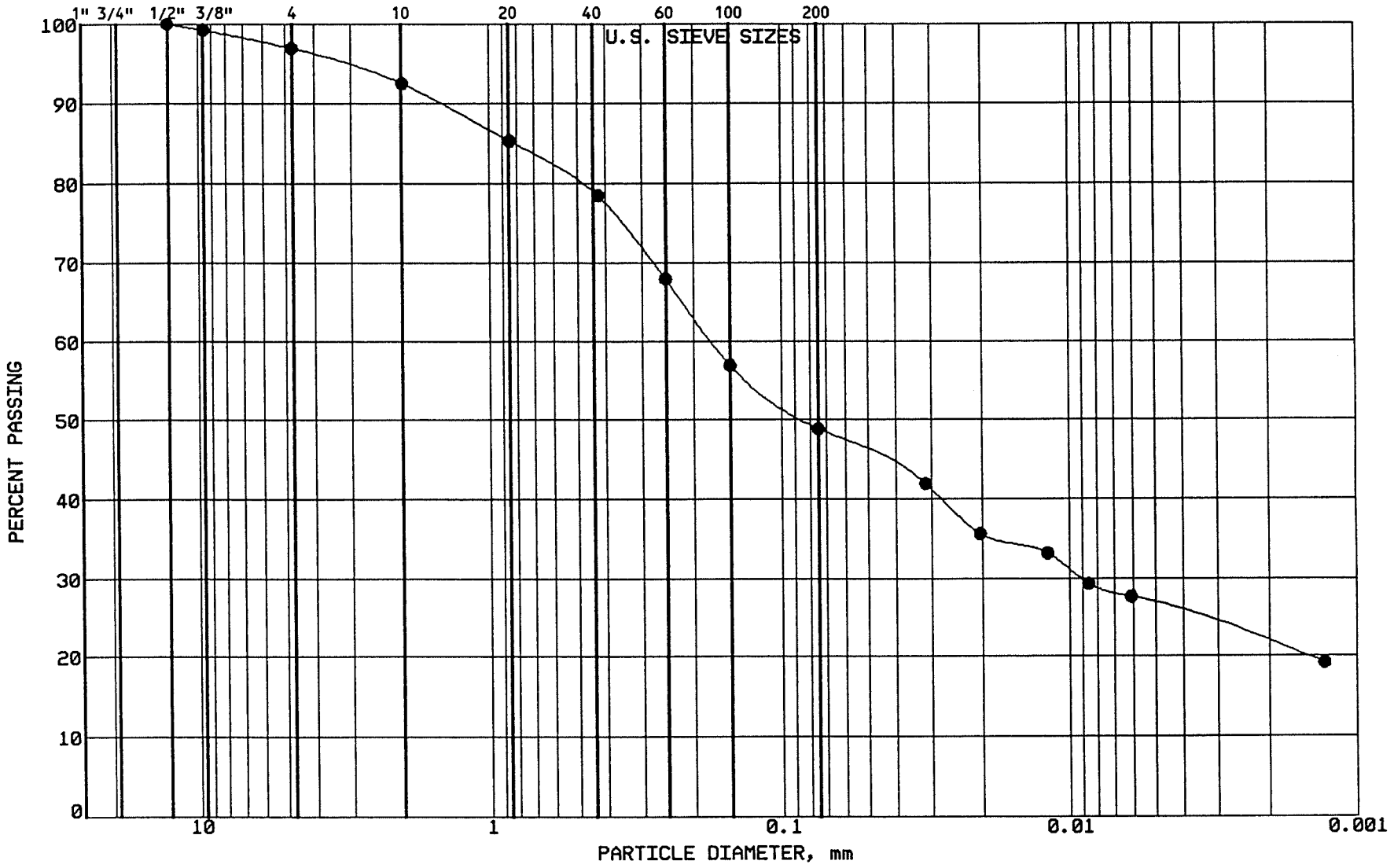
GRAVEL	3.6 %
SAND	41.8 %
SILT	24.4 %
CLAY	30.2 %
P 200	54.6 %

SOIL PROPERTIES

LL: 39.0%
PL: 16.0%
PI: 23.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38681.0, E 40655.0
SAMPLE: CLBCC523 TUBE #: ST.206
ELEVATION: 1898.7'

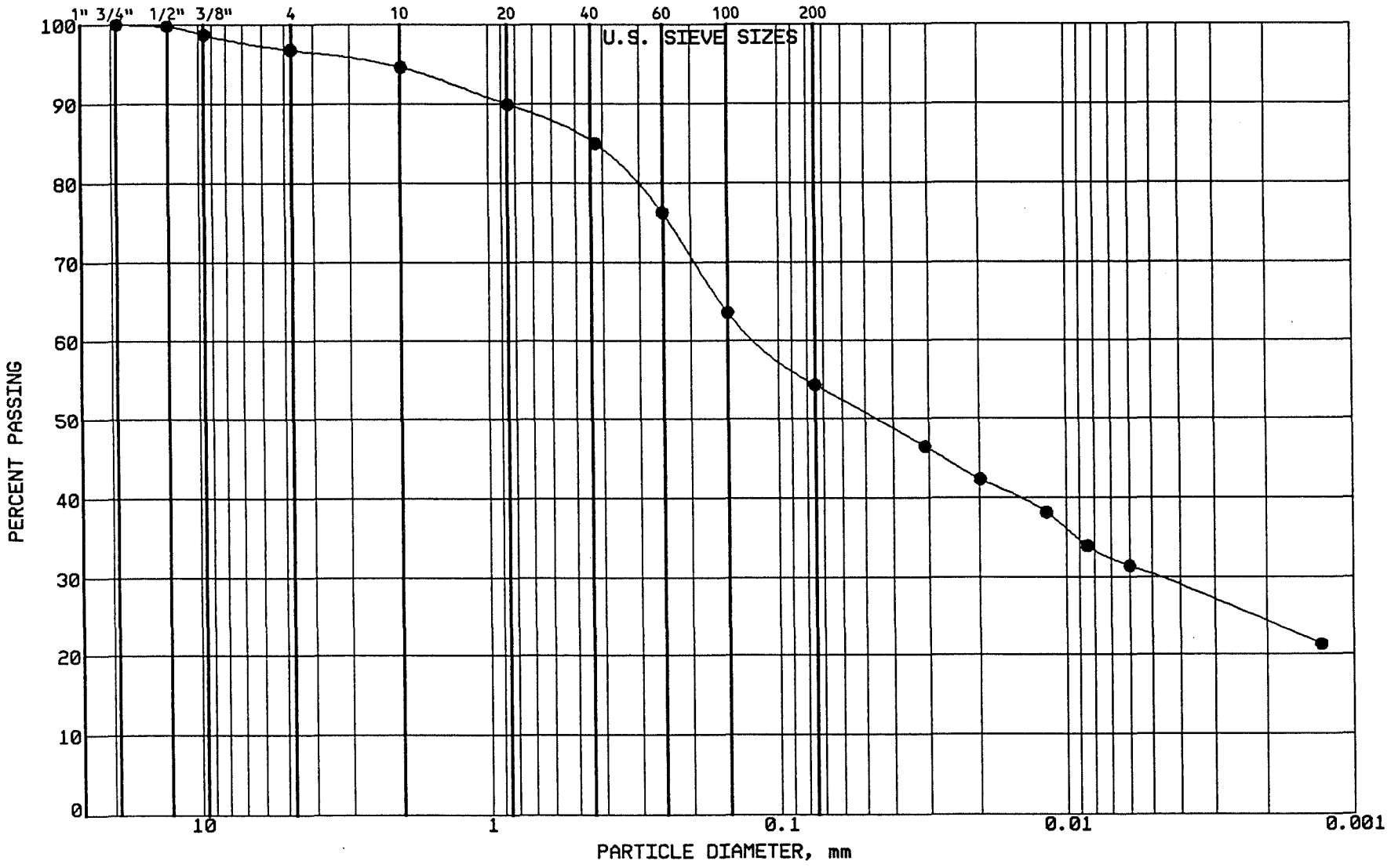
GRAVEL	3.1 %
SAND	48.1 %
SILT	22.2 %
CLAY	26.6 %
P 200	48.8 %

SOIL PROPERTIES

LL: 38.0%
PL: 16.0%
PI: 22.0%
CLASS: Clayey Sand (SC), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38670.0, E 40791.0
SAMPLE: CLBCC524 TUBE #: ST.207
ELEVATION: 1898.1'

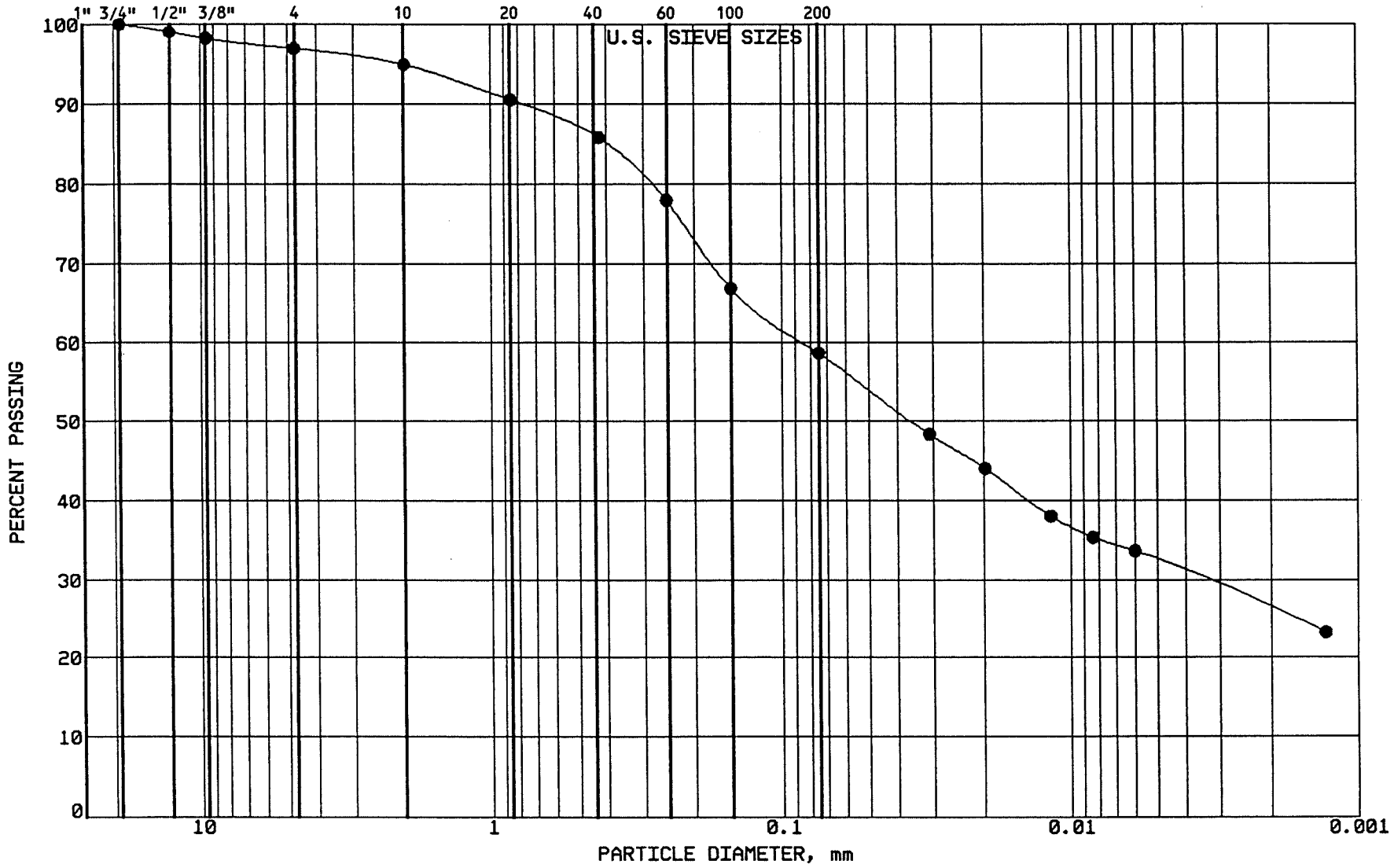
GRAVEL	3.2 %
SAND	42.4 %
SILT	24.2 %
CLAY	30.2 %
P 200	54.4 %

SOIL PROPERTIES

LL: 41.0%
PL: 16.0%
PI: 25.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38652.0, E 40980.0
SAMPLE: CLBCC525 TUBE #: ST.208
ELEVATION: 1897.1'

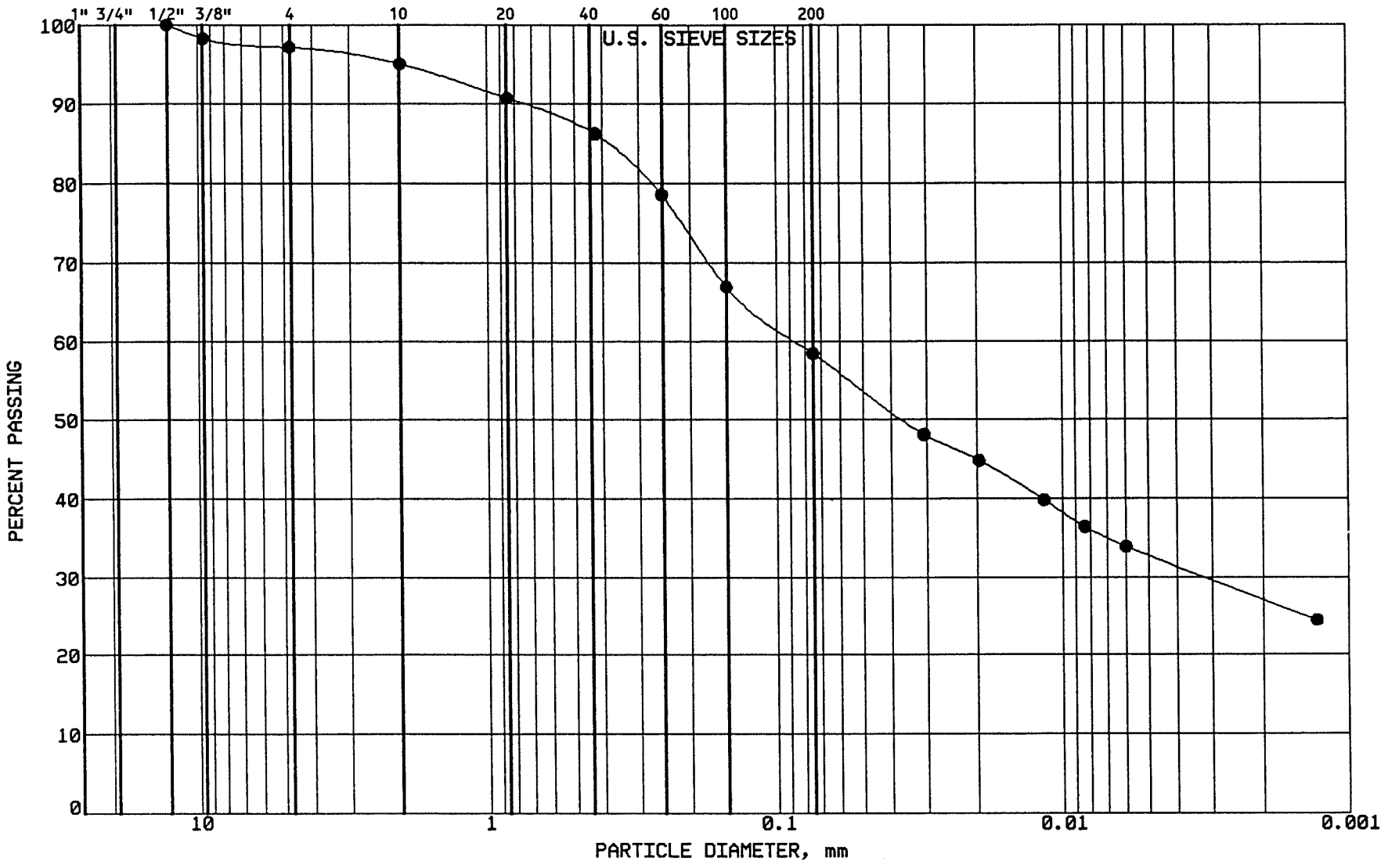
GRAVEL	3.1 %
SAND	38.2 %
SILT	26.2 %
CLAY	32.5 %
P 200	58.7 %

SOIL PROPERTIES

LL: 39.0%
PL: 16.0%
PI: 23.0%
CLASS: Sandy Lean Clay (CL), vy dk gr-br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38635.0, E 41158.0
SAMPLE: CLBCC526 TUBE #: ST.209
ELEVATION: 1896.4'

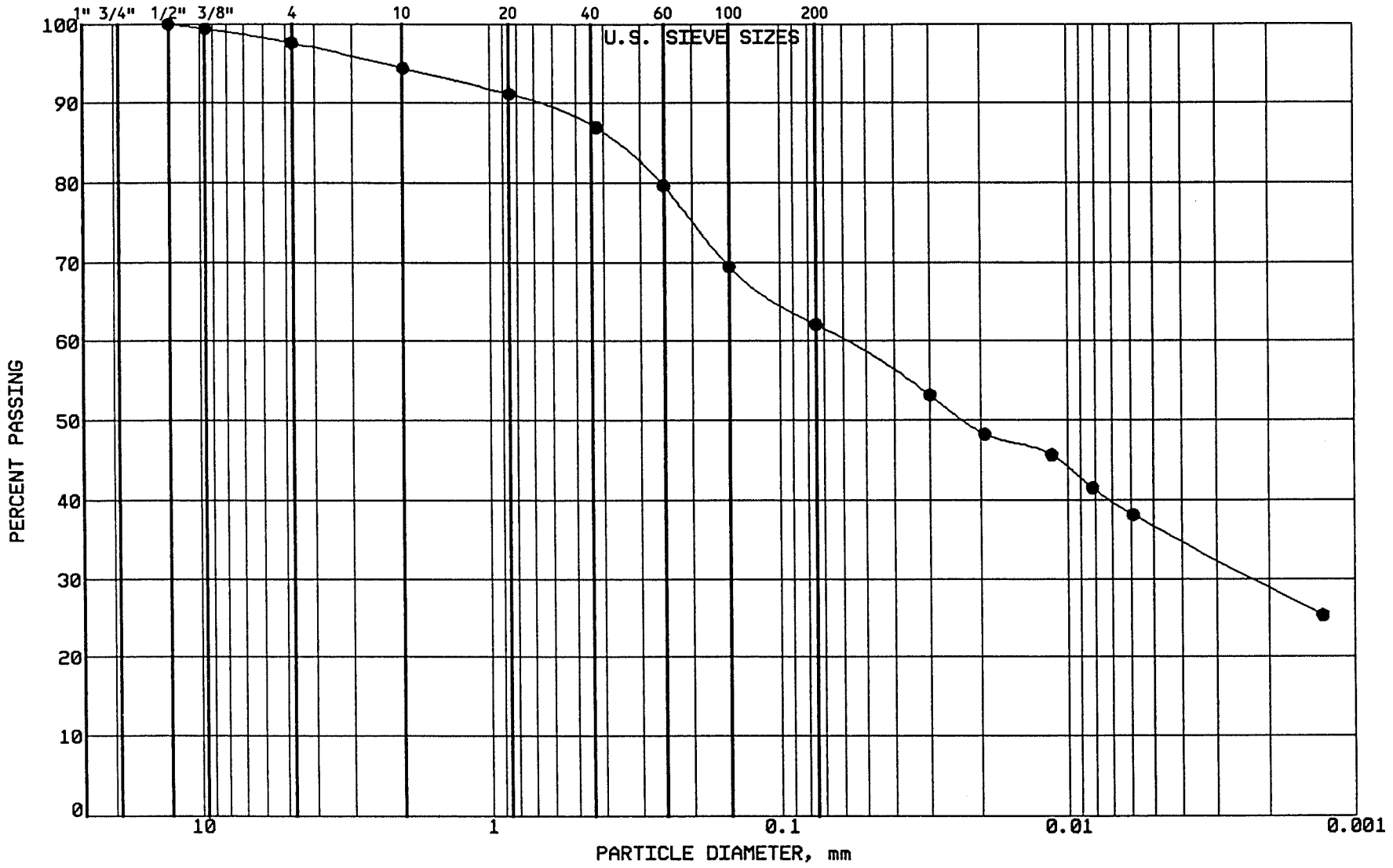
GRAVEL	2.8 %
SAND	38.7 %
SILT	25.7 %
CLAY	32.8 %
P 200	58.5 %

SOIL PROPERTIES

LL: 40.0%
PL: 17.0%
PI: 23.0%
CLASS: Sandy Lean Clay (CL), vy dk gr-br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38619.0, E 41340.0
SAMPLE: CLBCC527 TUBE #: ST.210
ELEVATION: 1895.4'

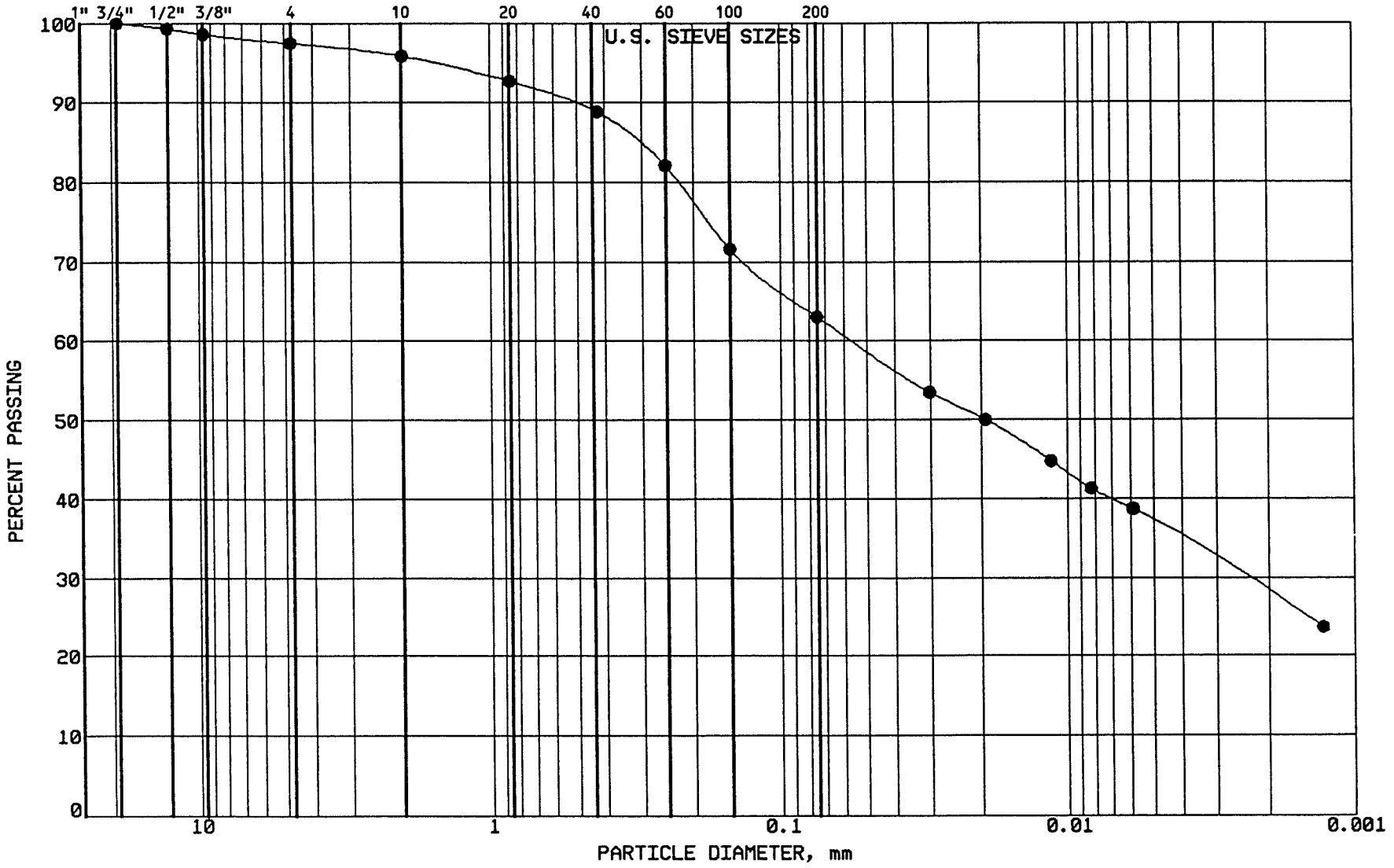
GRAVEL	2.4 %
SAND	35.5 %
SILT	25.4 %
CLAY	36.7 %
P 200	62.1 %

SOIL PROPERTIES

LL: 41.0%
PL: 16.0%
PI: 25.0%
CLASS: Sandy Lean Clay (CL), vy dk gr-br

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38136.0, E 40783.0
SAMPLE: CLBCC528 TUBE #:
ELEVATION: 1901.2'

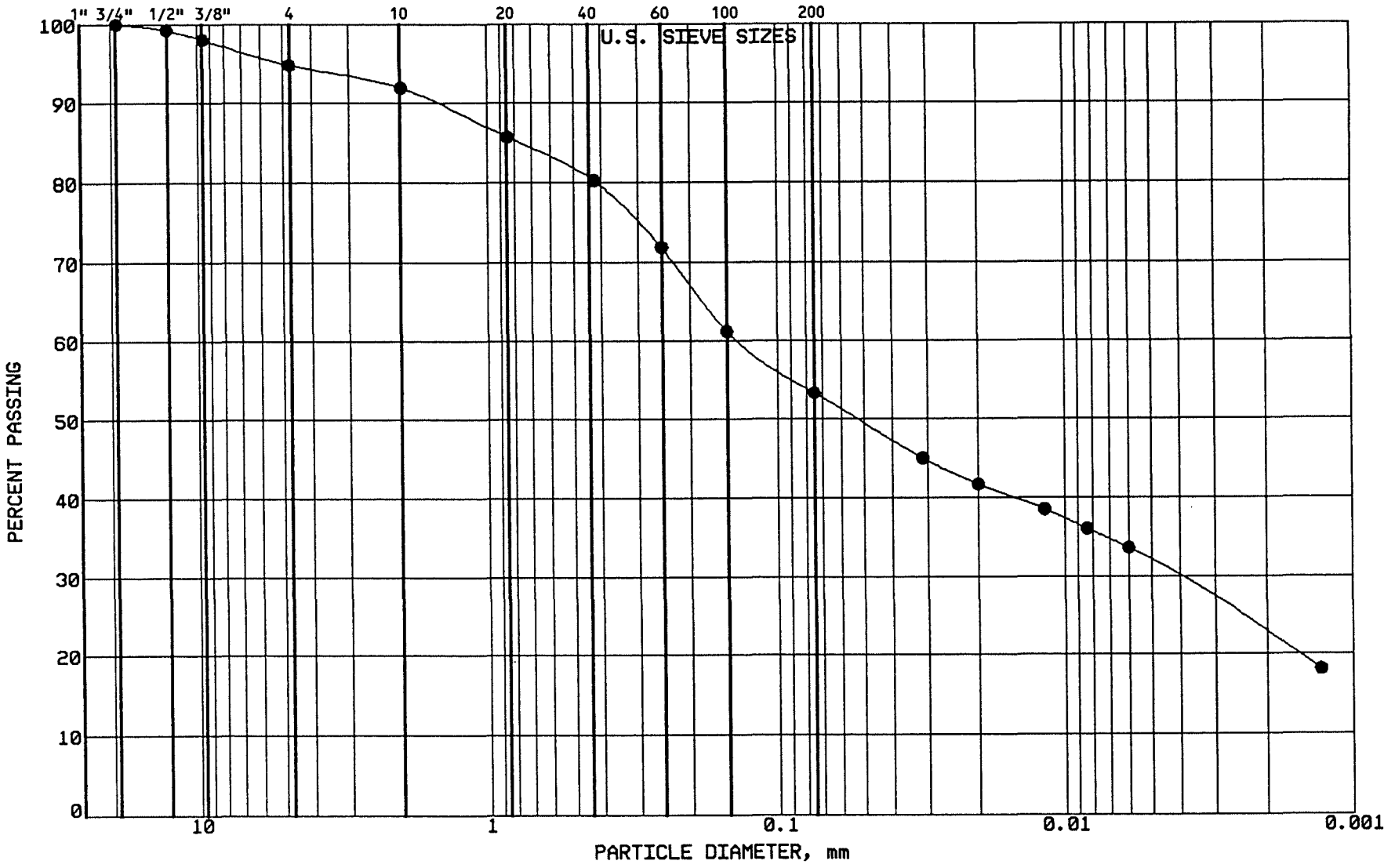
GRAVEL	2.5 %
SAND	34.5 %
SILT	25.9 %
CLAY	37.1 %
P 200	63.0 %

SOIL PROPERTIES

LL: 47.0%
PL: 17.0%
PI: 30.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38257.0, E 41301.0
SAMPLE: CLBCC529 TUBE #: N/A
ELEVATION: 1898.1'

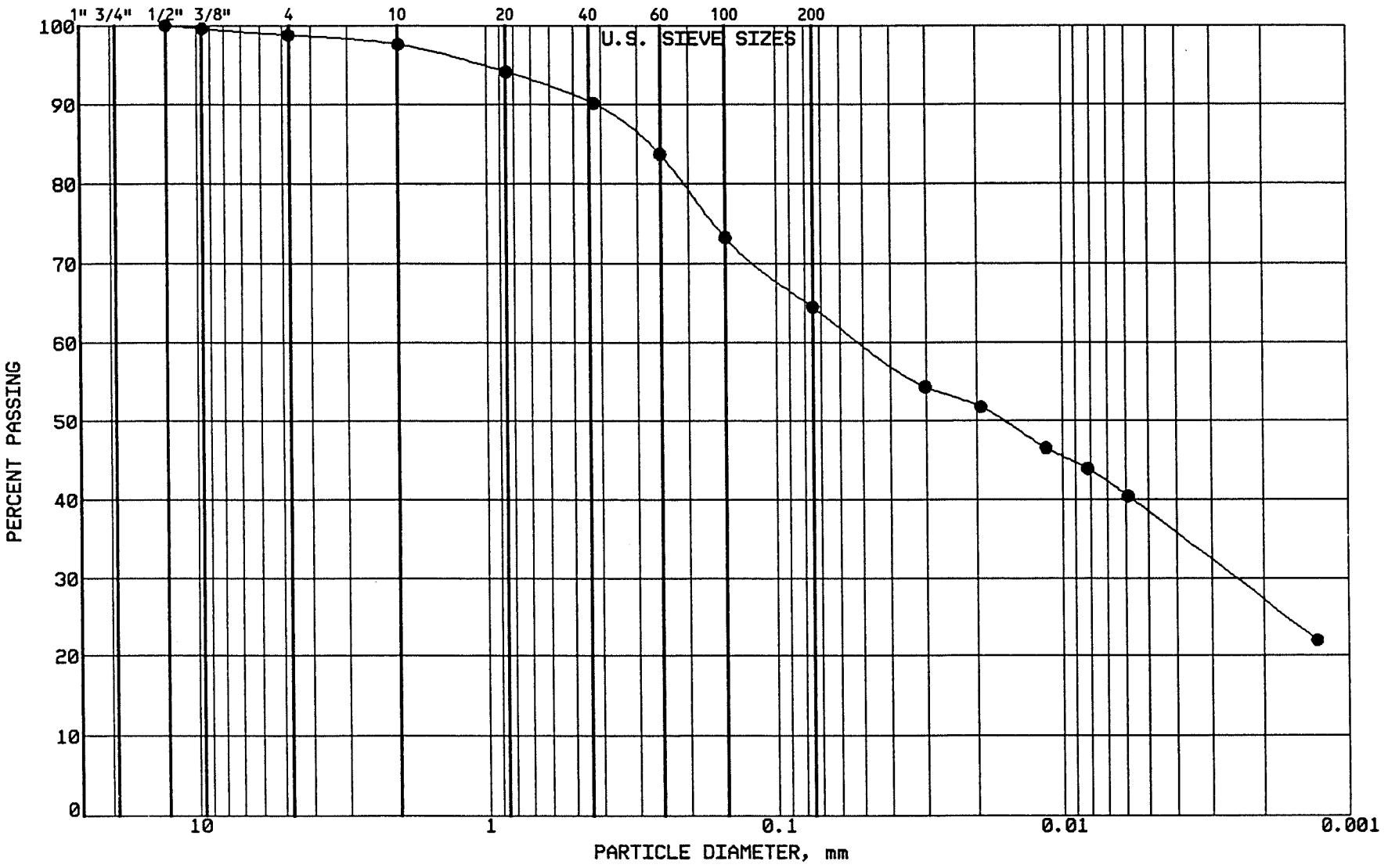
GRAVEL	5.2 %
SAND	41.4 %
SILT	21.6 %
CLAY	31.8 %
P 200	53.4 %

SOIL PROPERTIES

LL: 43.0%
PL: 17.0%
PI: 26.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38474.0, E 40997.0
SAMPLE: CLBCC530 TUBE #: N/A
ELEVATION: 1898.2'

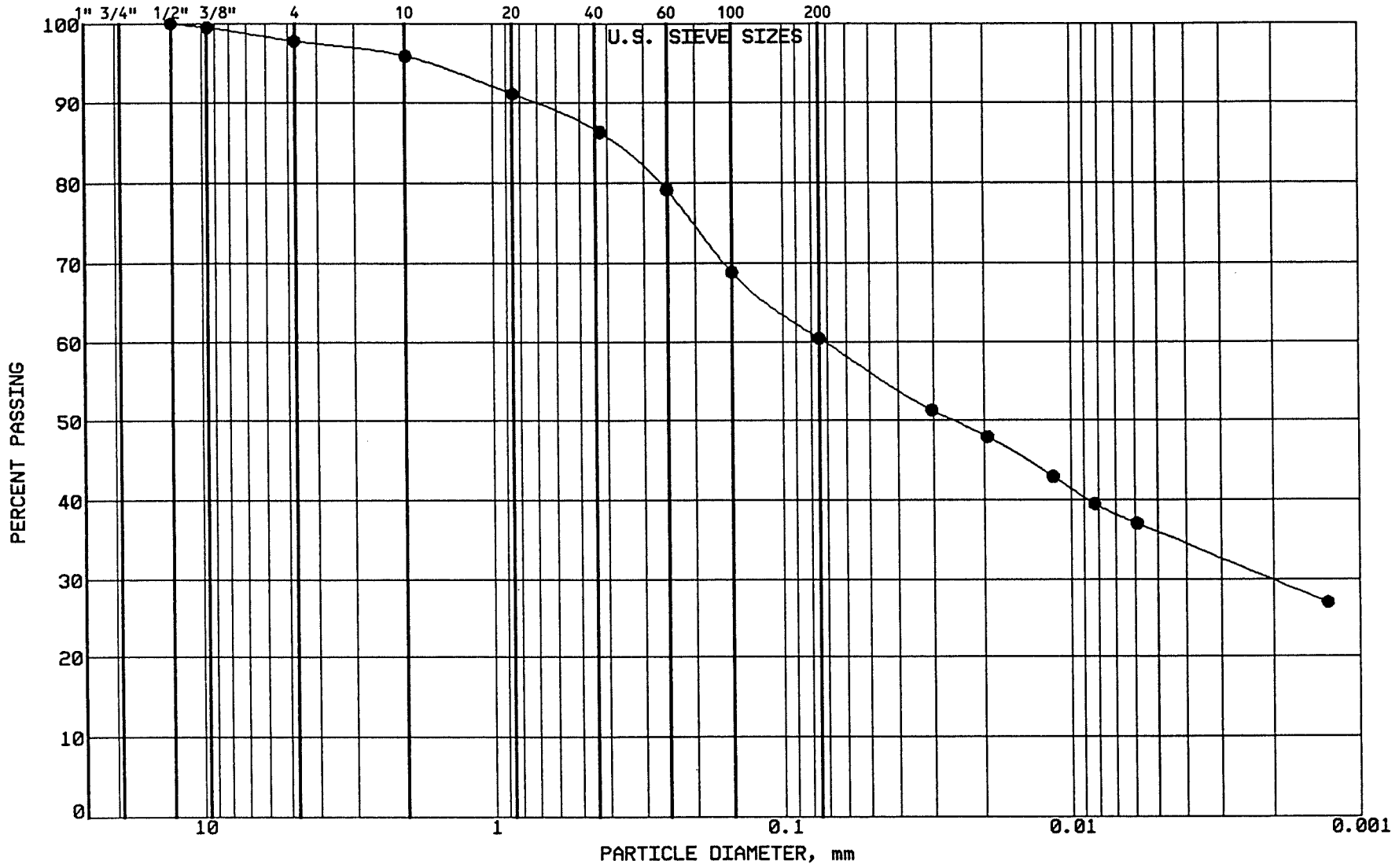
GRAVEL	1.2 %
SAND	34.3 %
SILT	26.1 %
CLAY	38.4 %
P 200	64.5 %

SOIL PROPERTIES

LL: 47.0%
PL: 18.0%
PI: 29.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38643.0, E 40700.0
SAMPLE: CLBCC531 TUBE #: N/A
ELEVATION: 1899.4'

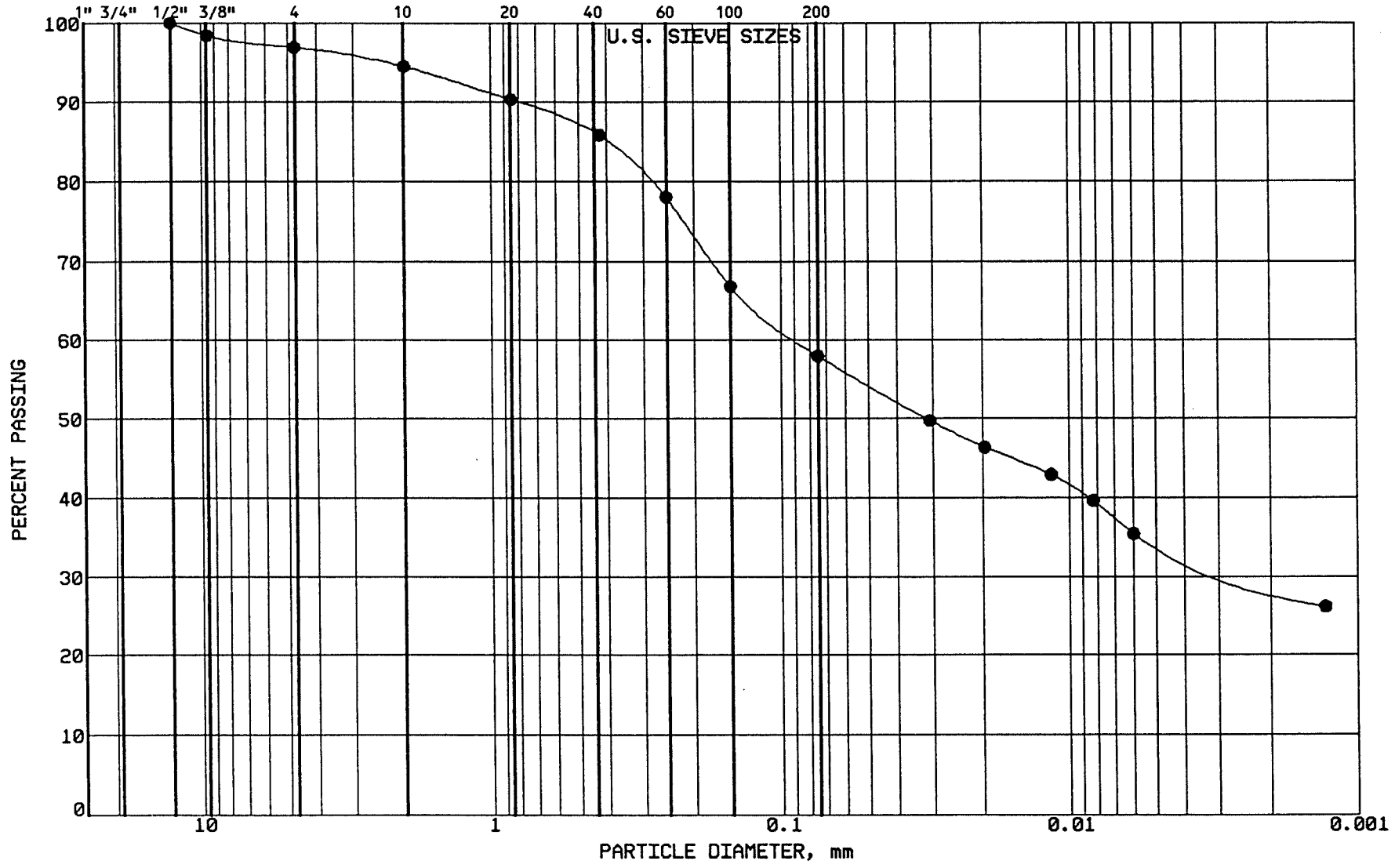
GRAVEL	2.2 %
SAND	37.3 %
SILT	24.6 %
CLAY	35.9 %
P 200	60.5 %

SOIL PROPERTIES

LL: 43.0%
PL: 17.0%
PI: 26.0%
CLASS: Sandy Lean Clay (CL), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38509.0, E 40197.0
SAMPLE: CLBCC533 TUBE #:ST.211
ELEVATION: 1903.4'

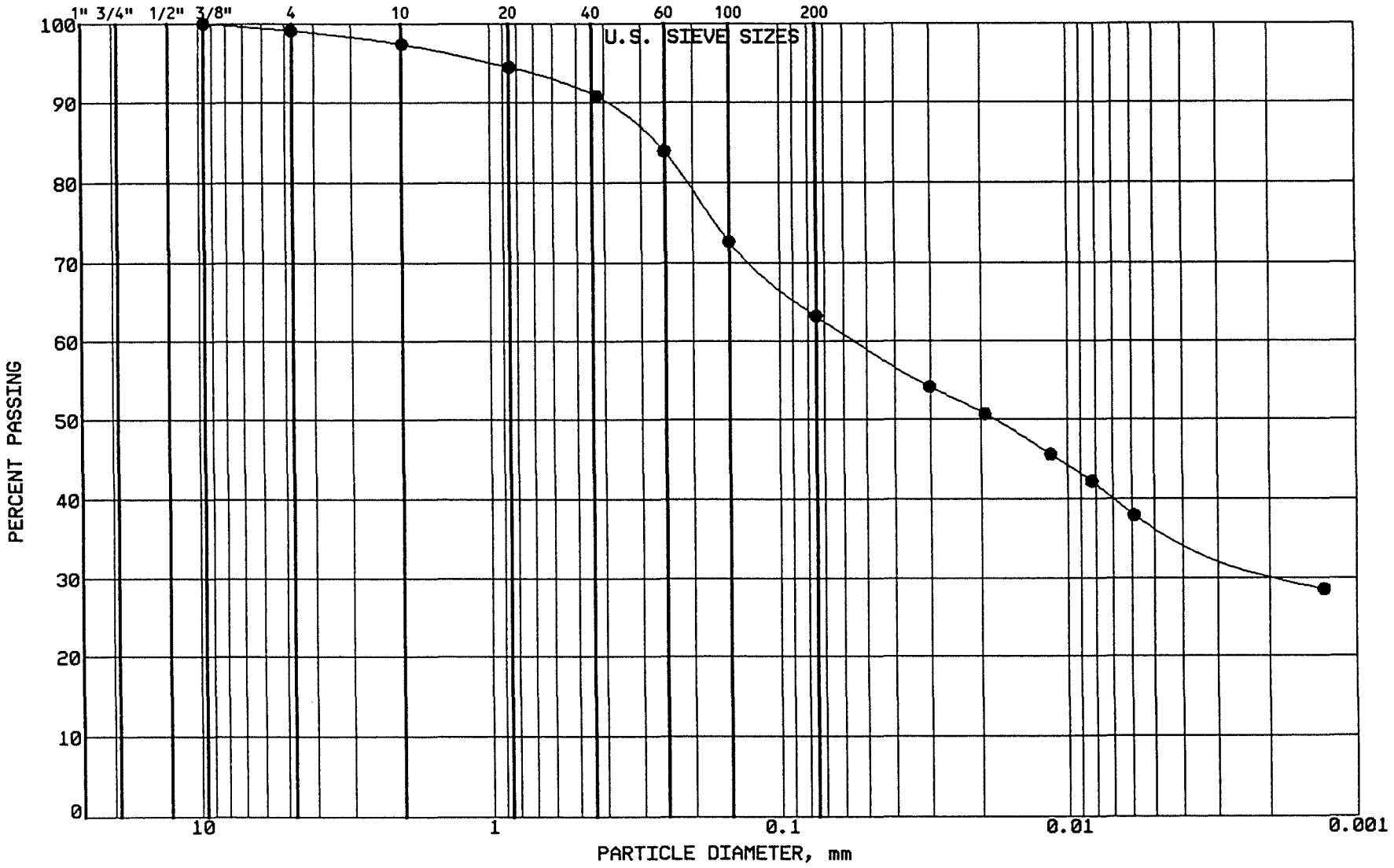
GRAVEL	3.1 %
SAND	38.9 %
SILT	23.7 %
CLAY	34.3 %
P 200	58.0 %

SOIL PROPERTIES

LL: 43.0%
PL: 16.0%
PI: 27.0%
CLASS: Sandy Lean Clay (CL), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38474.0, E 40419.0
SAMPLE: CLBCC534 TUBE #: ST.212
ELEVATION: 1902.3'

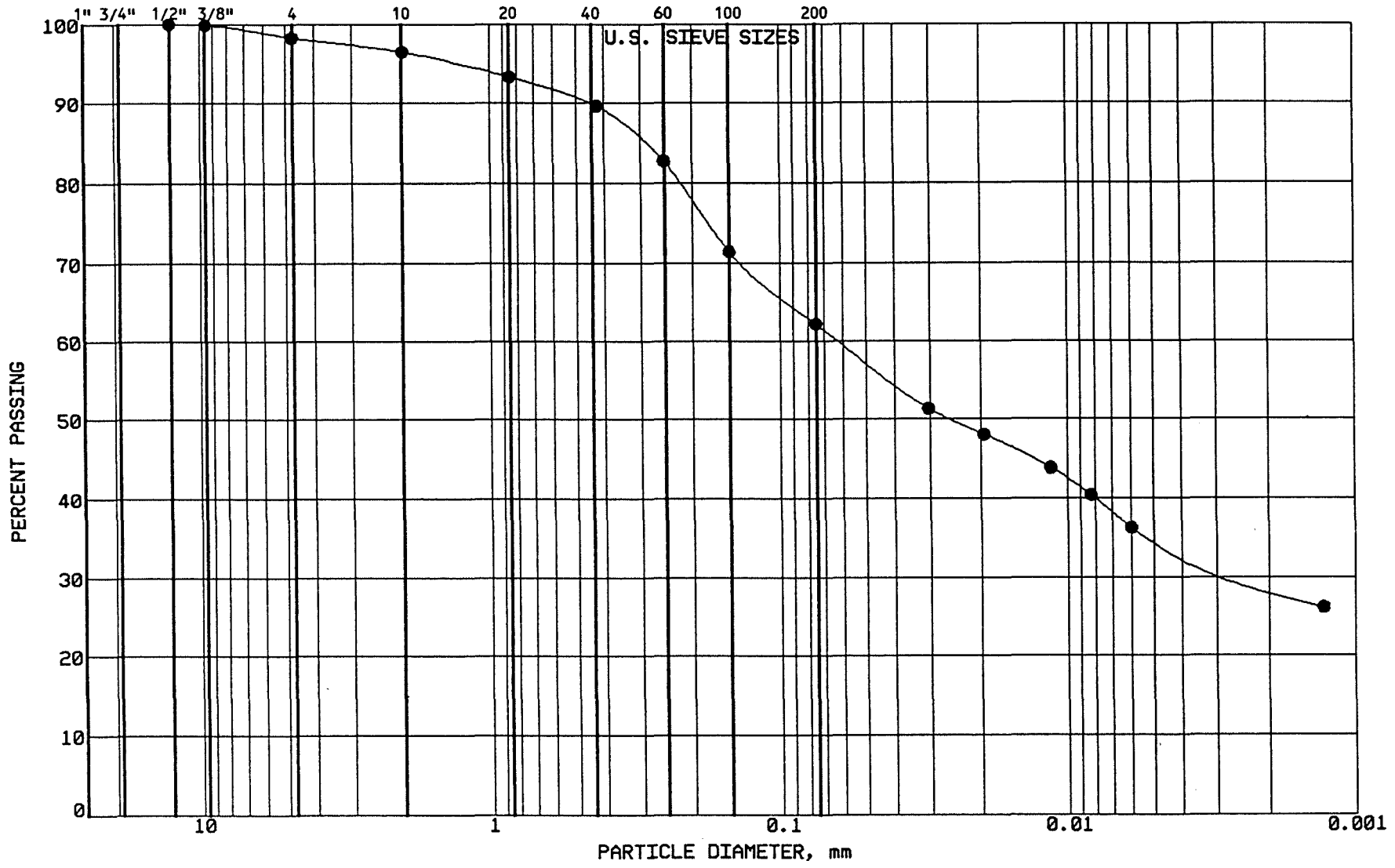
GRAVEL	0.9 %
SAND	35.9 %
SILT	26.3 %
CLAY	36.9 %
P 200	63.2 %

SOIL PROPERTIES

LL: 45.0%
PL: 17.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

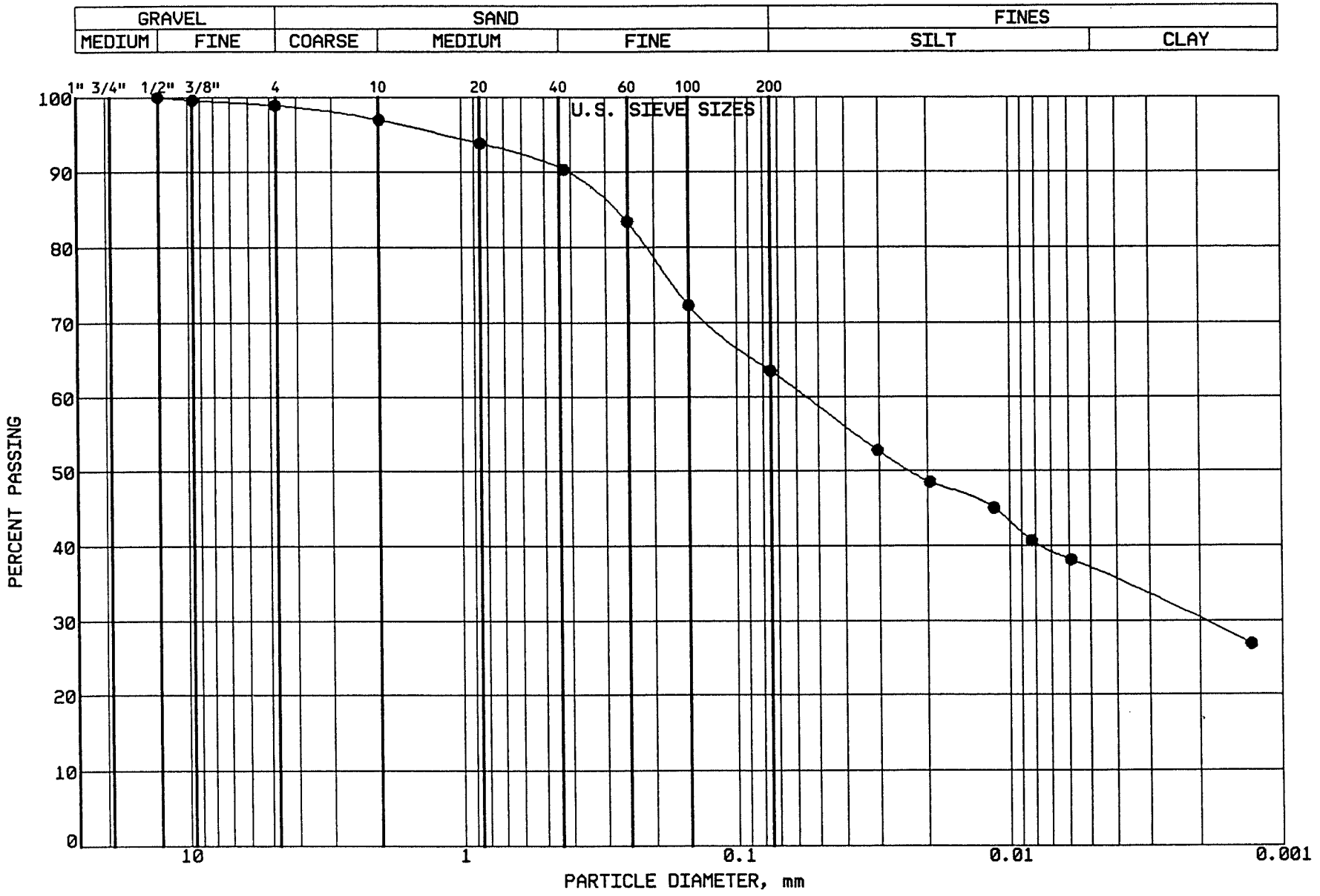
LOCATION: N 38431.0, E 40626.0
SAMPLE: CLBCC535 TUBE #: ST.213
ELEVATION: 1901.5'

GRAVEL	1.7 %
SAND	36.1 %
SILT	27.2 %
CLAY	35.0 %
P 200	62.2 %

SOIL PROPERTIES

LL: 45.0%
PL: 18.0%
PI: 27.0%
CLASS: Sandy Lean Clay (CL), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

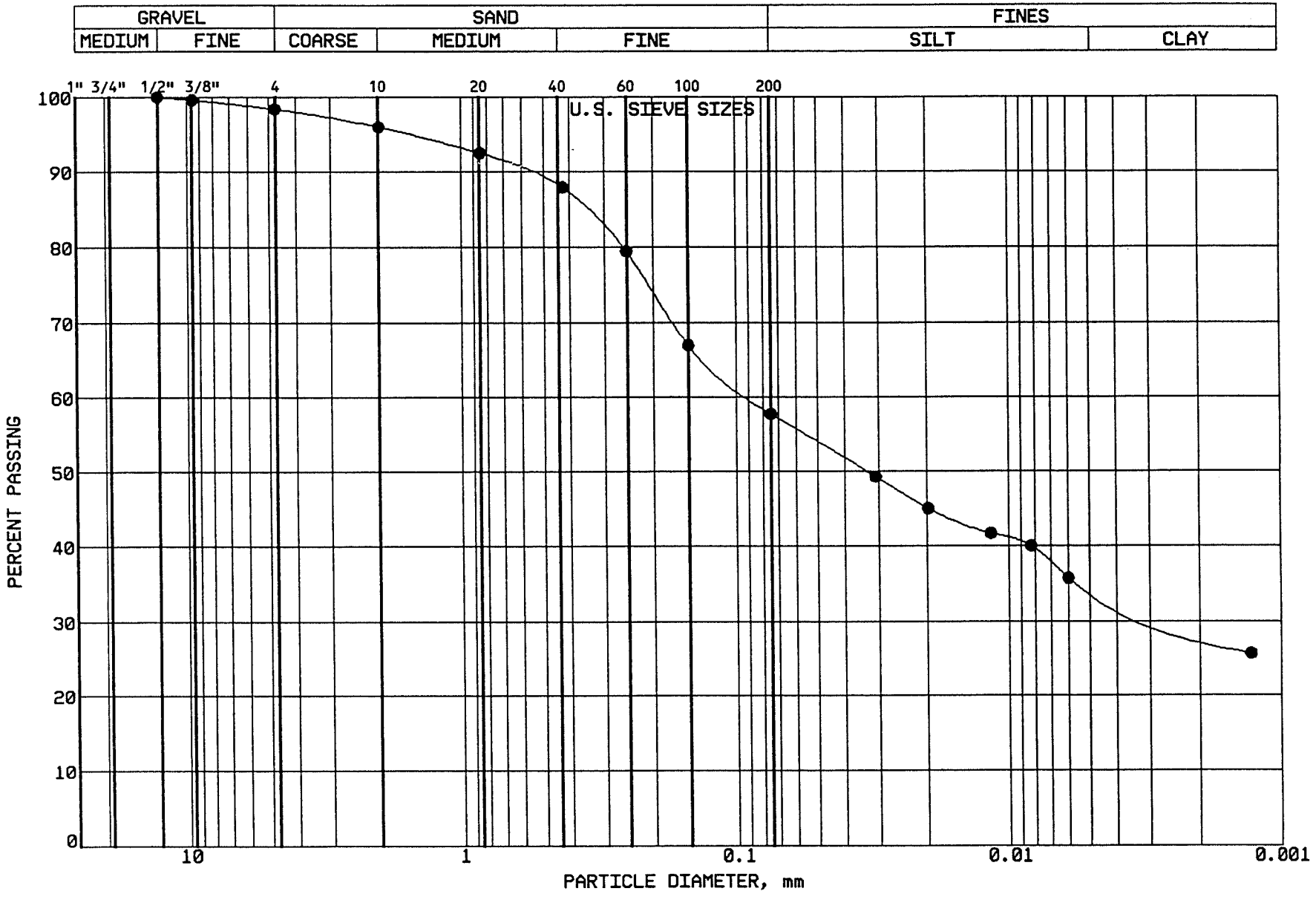
LOCATION: N 38391.0, E 40844.0
SAMPLE: CLBCC536 TUBE #: ST.214
ELEVATION: 1900.6'

GRAVEL	1.1 %
SAND	35.4 %
SILT	26.6 %
CLAY	36.9 %
P 200	63.5 %

SOIL PROPERTIES

LL: 45.0%
PL: 18.0%
PI: 27.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38356.0, E 41054.0
SAMPLE: CLBCC537 TUBE #: ST.215
ELEVATION: 1899.7'

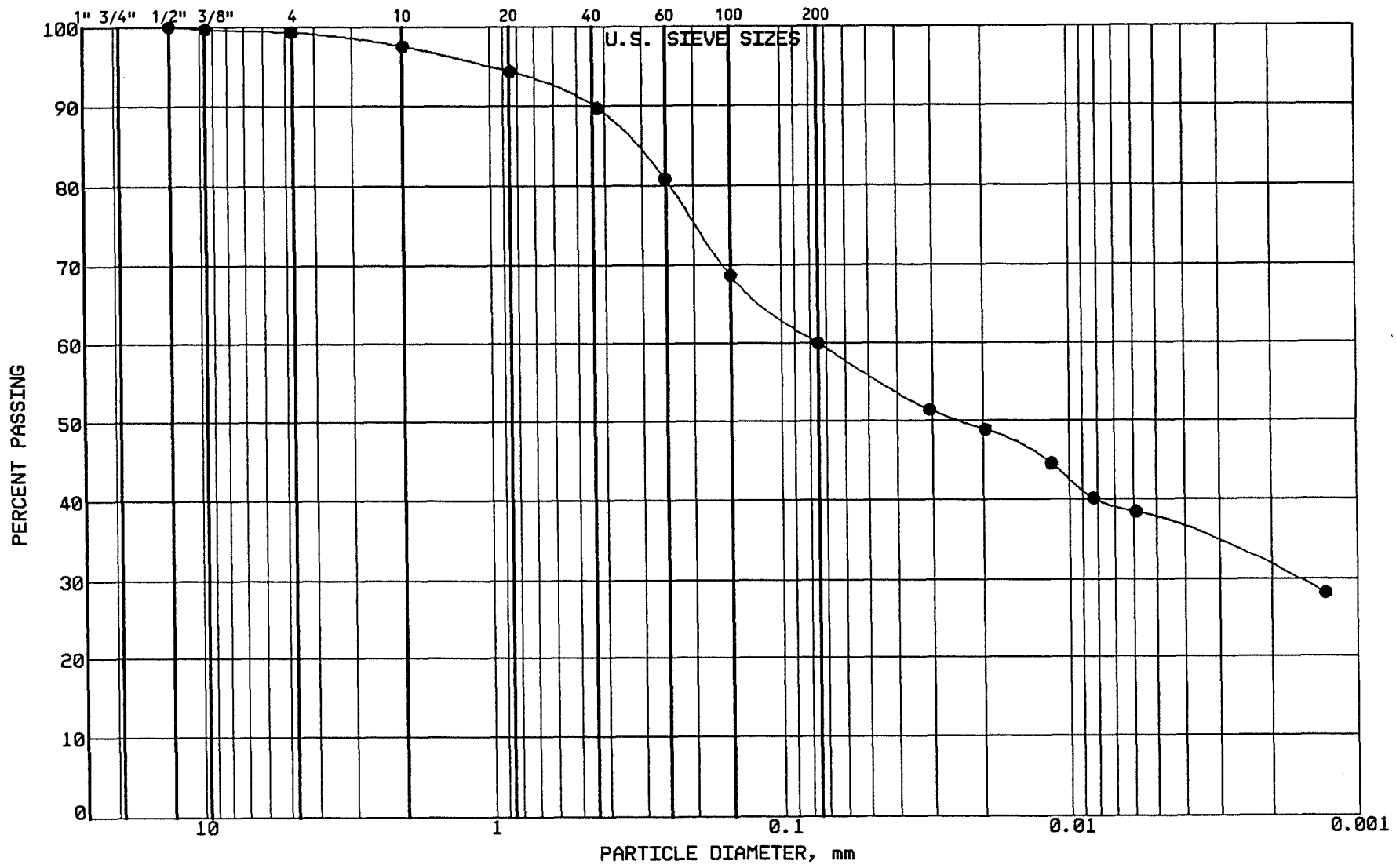
GRAVEL	1.6 %
SAND	40.6 %
SILT	23.3 %
CLAY	34.5 %
P 200	57.8 %

SOIL PROPERTIES

LL: 42.0%
PL: 17.0%
PI: 25.0%
CLASS: Sandy Lean Clay (CL), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

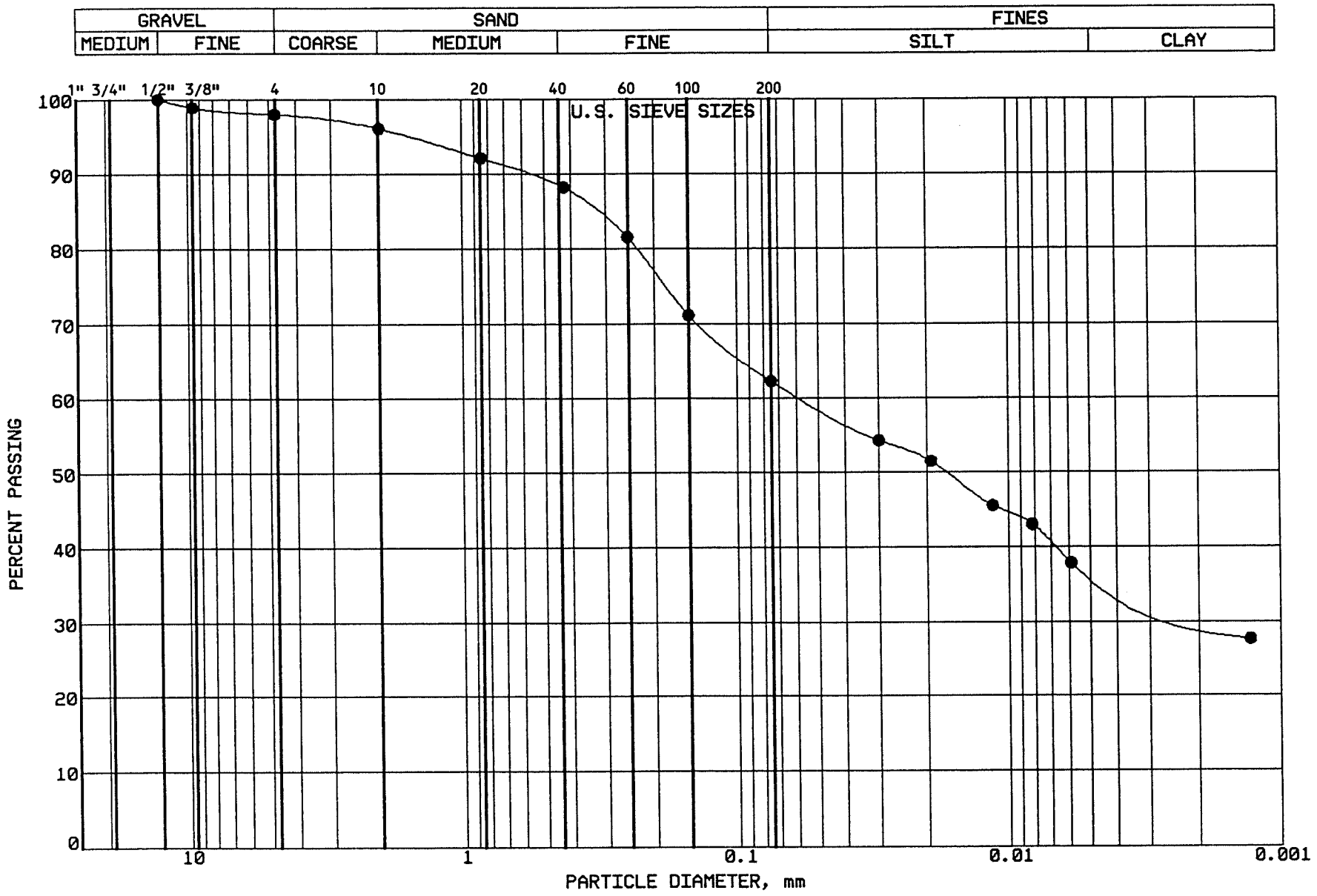
LOCATION: N 38322.0, E 41252.0
SAMPLE: CLBCC538 TUBE #:ST.216
ELEVATION: 1898.9'

GRAVEL	0.7 %
SAND	39.3 %
SILT	22.7 %
CLAY	37.3 %
P 200	60.0 %

SOIL PROPERTIES

LL: 42.0%
PL: 17.0%
PI: 25.0%
CLASS: Sandy Lean Clay (CL), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38294.0, E 41436.0
SAMPLE: CLBCC539 TUBE #: ST.217
ELEVATION: 1898.3'

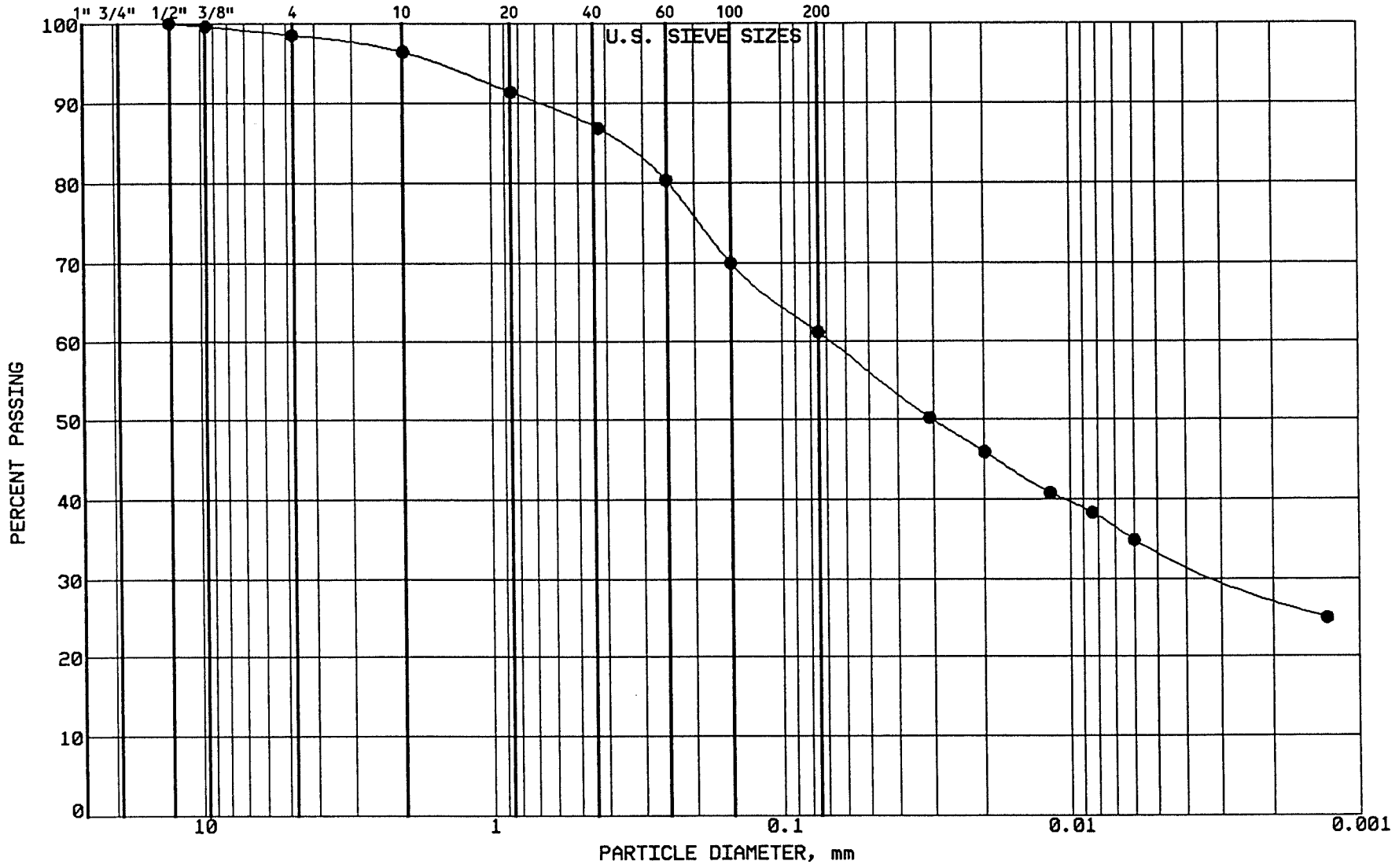
GRAVEL	2.0 %
SAND	35.7 %
SILT	25.6 %
CLAY	36.7 %
P 200	62.3 %

SOIL PROPERTIES

LL: 45.0%
PL: 16.0%
PI: 29.0%
CLASS: Sandy Lean Clay (CL), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38177.0, E 40733.0
SAMPLE: CLBCC540 TUBE #: ST.218
ELEVATION: 1902.1'

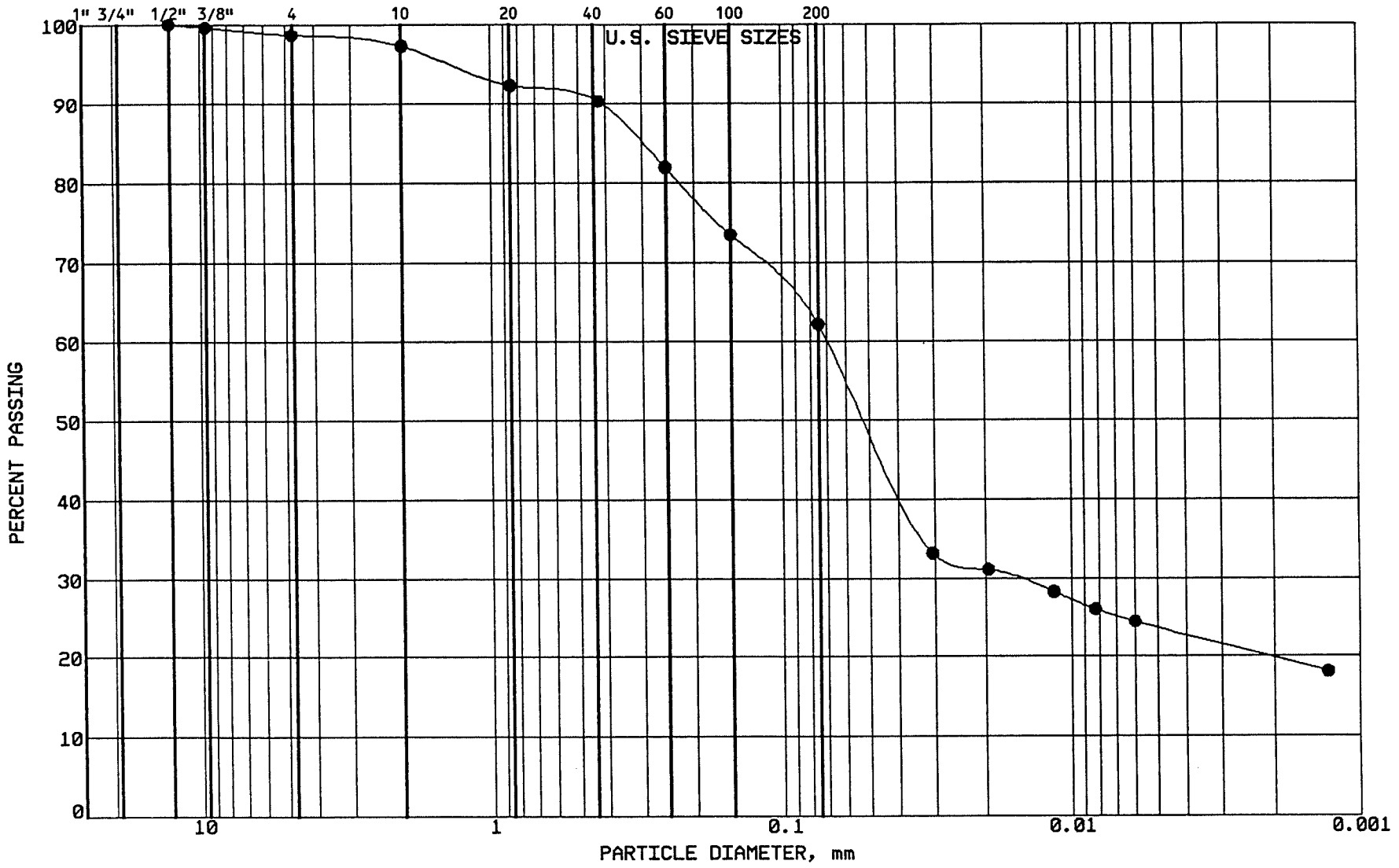
GRAVEL	1.5 %
SAND	37.3 %
SILT	27.5 %
CLAY	33.7 %
P 200	61.2 %

SOIL PROPERTIES

LL: 42.0%
PL: 17.0%
PI: 25.0%
CLASS: Sandy Lean Clay (CL), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38144.0, E 40930.0
SAMPLE: CLBCC541 TUBE #: ST.219
ELEVATION: 1901.3'

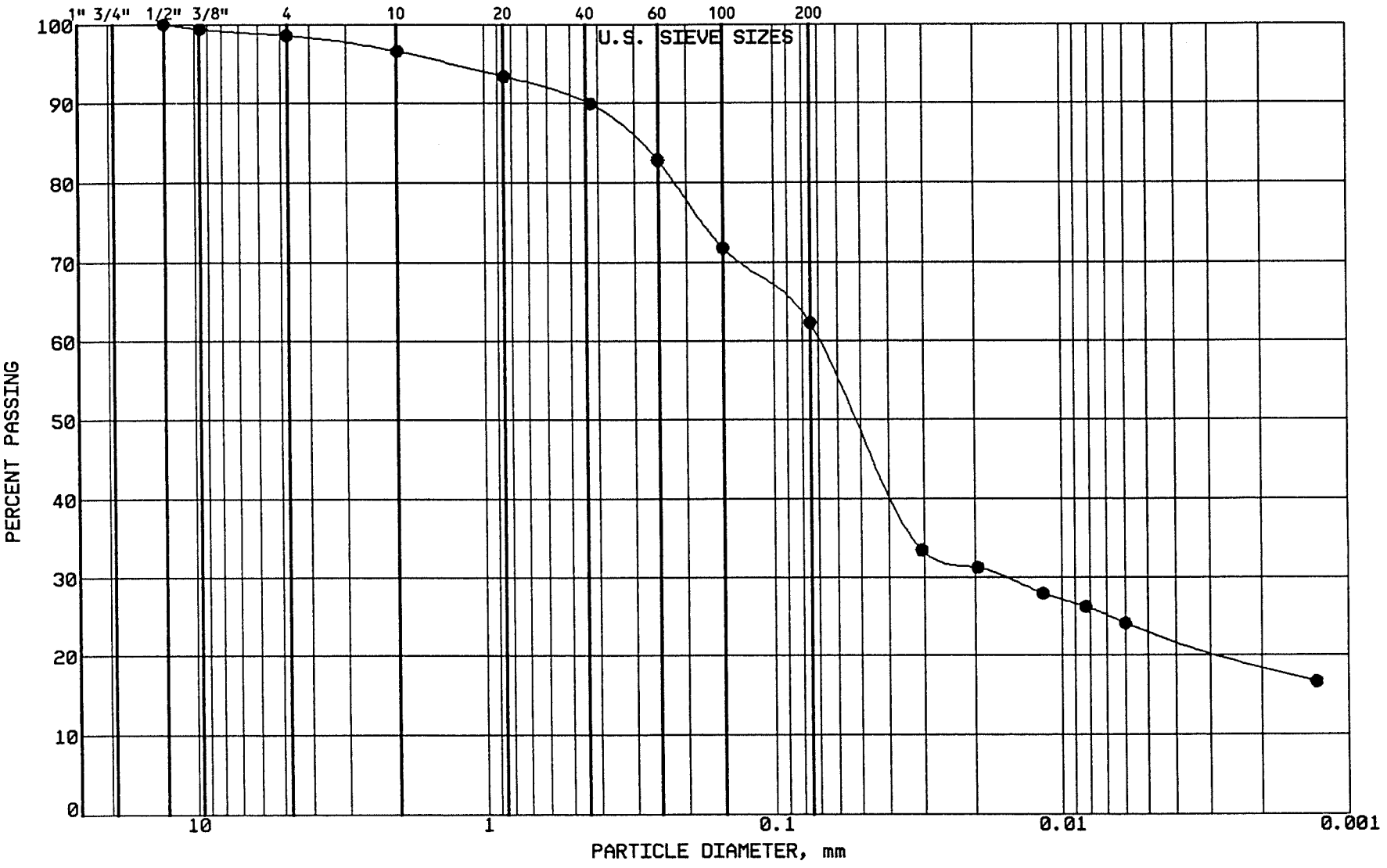
GRAVEL	1.3 %
SAND	36.5 %
SILT	38.5 %
CLAY	23.7 %
P 200	62.2 %

SOIL PROPERTIES

LL: 45.0%
PL: 17.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL), gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38144.0, E 41132.0
SAMPLE: CLBCC542 TUBE #: ST.220
ELEVATION: 1900.5'

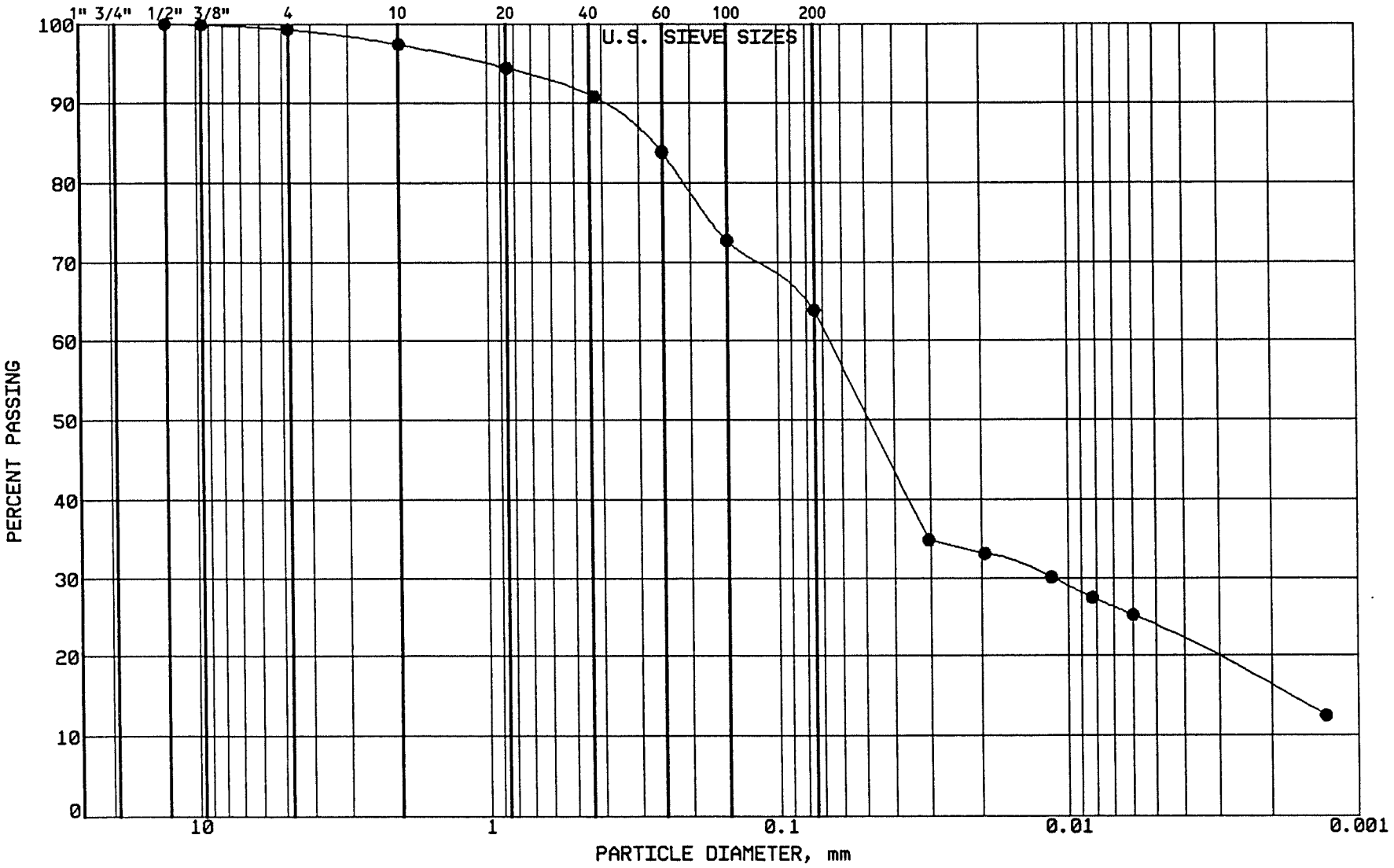
GRAVEL	1.4 %
SAND	36.3 %
SILT	39.1 %
CLAY	23.2 %
P 200	62.3 %

SOIL PROPERTIES

LL: 42.0%
PL: 15.0%
PI: 27.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38082.0, E 41346.0
SAMPLE: CLBCC543 TUBE #: ST.221
ELEVATION: 1899.6'

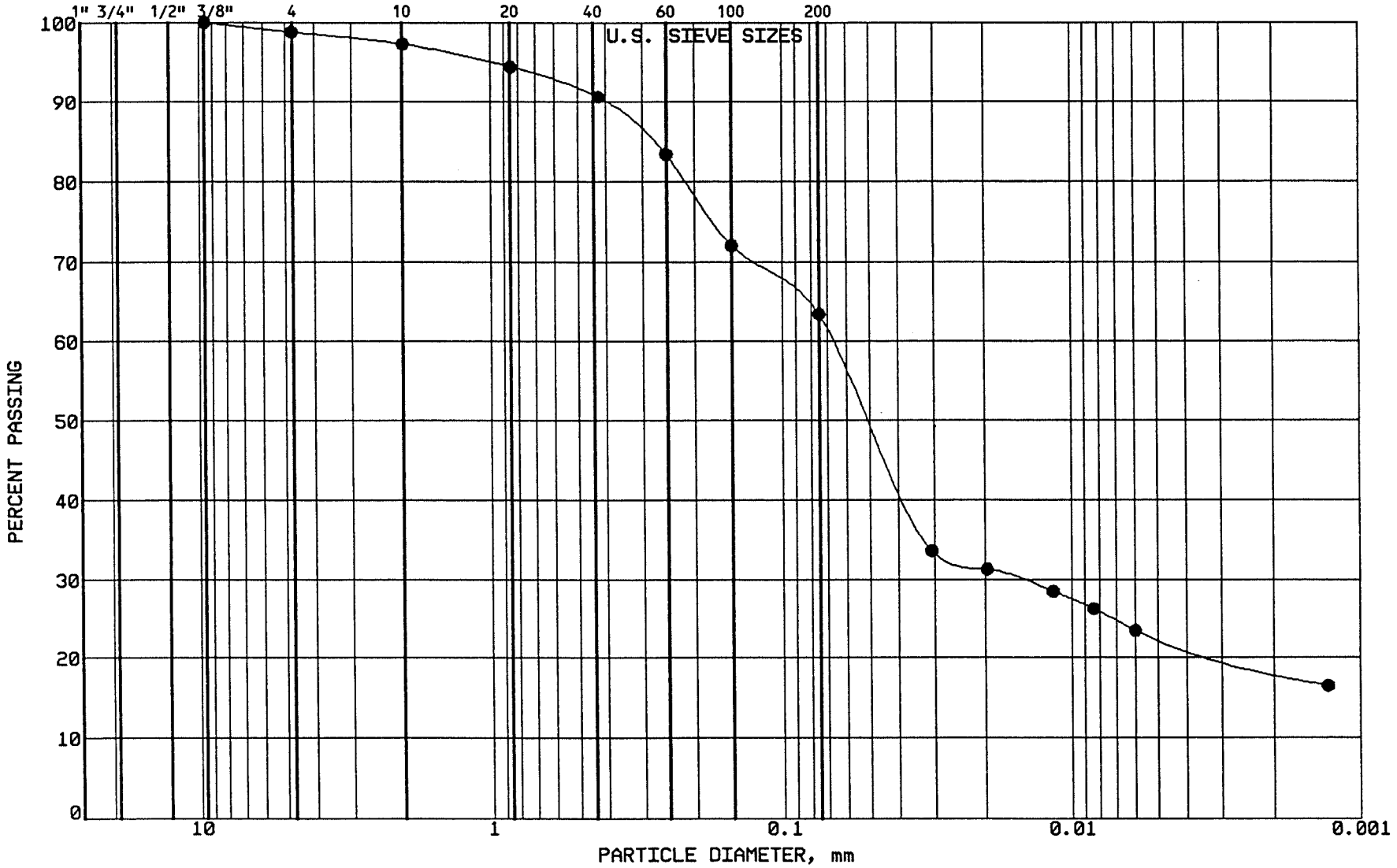
GRAVEL	0.7 %
SAND	35.4 %
SILT	40.1 %
CLAY	23.8 %
P 200	63.9 %

SOIL PROPERTIES

LL: 45.0%
PL: 17.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38492.0, E 41401.0
SAMPLE: CLBCC544 TUBE #: ST.222
ELEVATION: 1896.4'

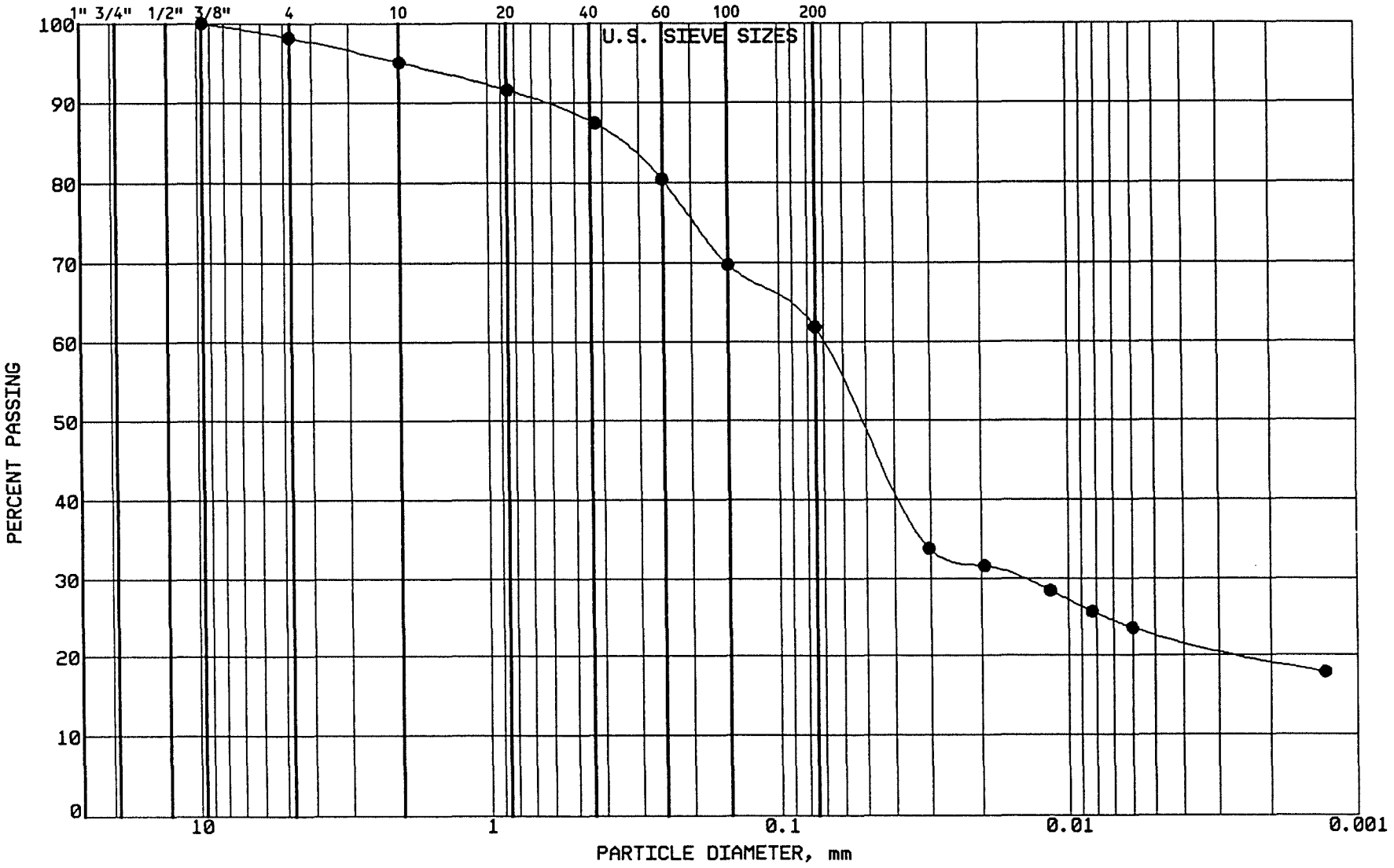
GRAVEL	1.2 %
SAND	35.4 %
SILT	40.7 %
CLAY	22.7 %
P 200	63.4 %

SOIL PROPERTIES

LL: 44.0%
PL: 18.0%
PI: 26.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38512.0, E 41211.0
SAMPLE: CLBCC545 TUBE #: ST.223
ELEVATION: 1898.1'

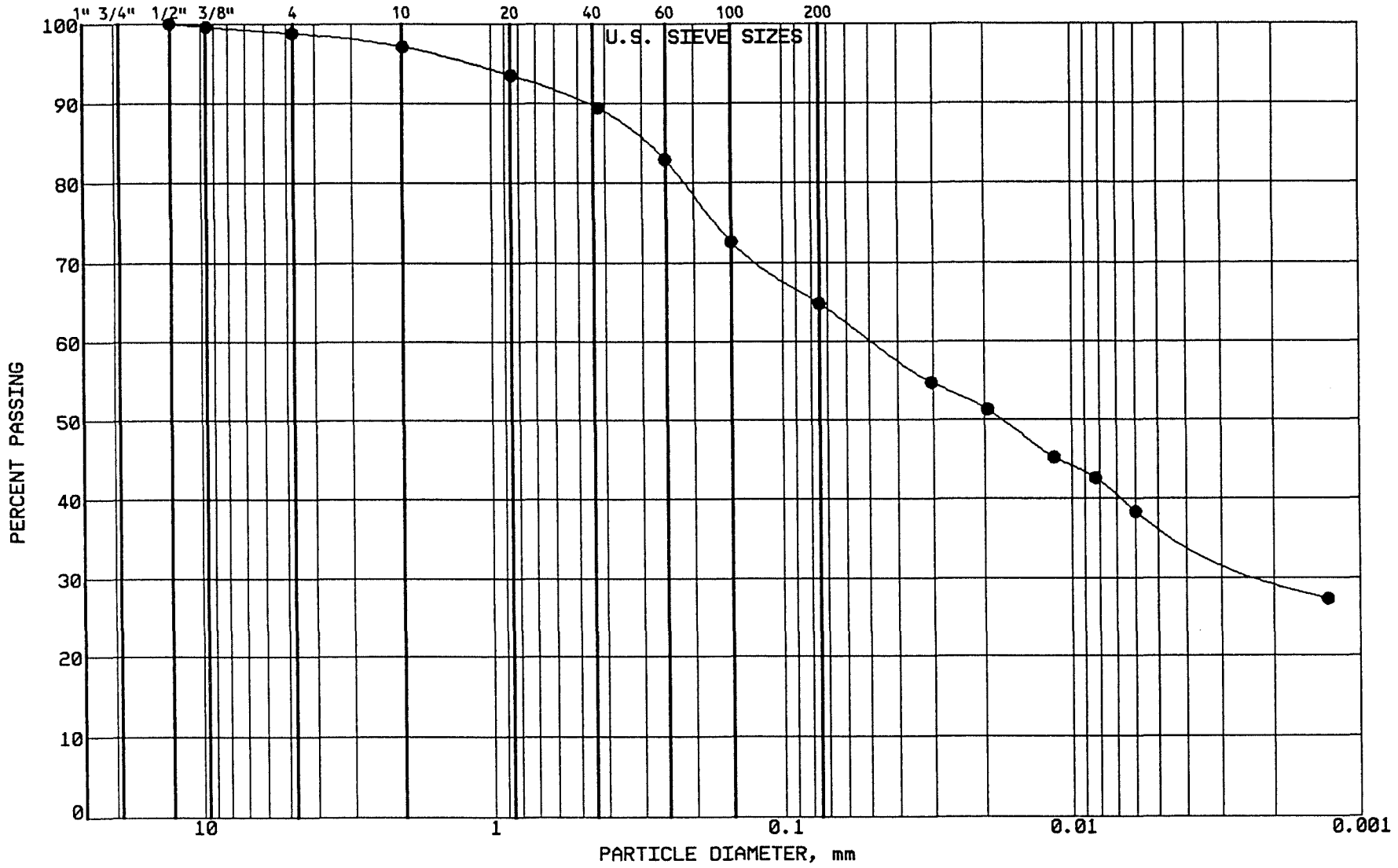
GRAVEL	1.8 %
SAND	36.3 %
SILT	39.0 %
CLAY	22.9 %
P 200	61.9 %

SOIL PROPERTIES

LL: 46.0%
PL: 17.0%
PI: 29.0%
CLASS: Sandy Lean Clay (CL), dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38548.0, E 41001.0
SAMPLE: CLBCC546 TUBE #: ST.224
ELEVATION: 1898.9'

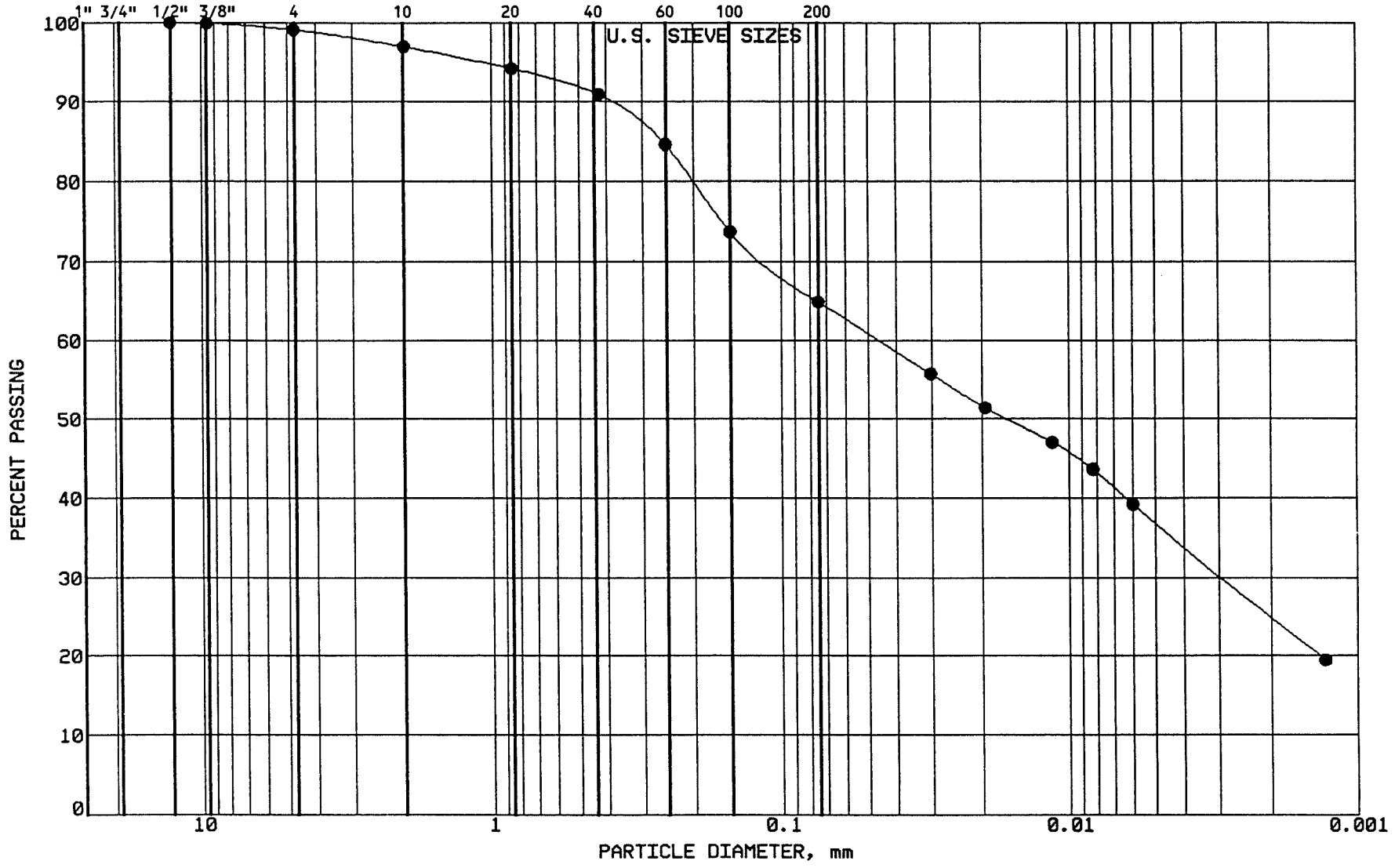
GRAVEL	1.2 %
SAND	34.0 %
SILT	27.8 %
CLAY	37.0 %
P 200	64.8 %

SOIL PROPERTIES

LL: 45.0%
PL: 18.0%
PI: 27.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38577.0, E 40790.0
SAMPLE: CLBCC547 TUBE #: ST.225
ELEVATION: 1900.0'

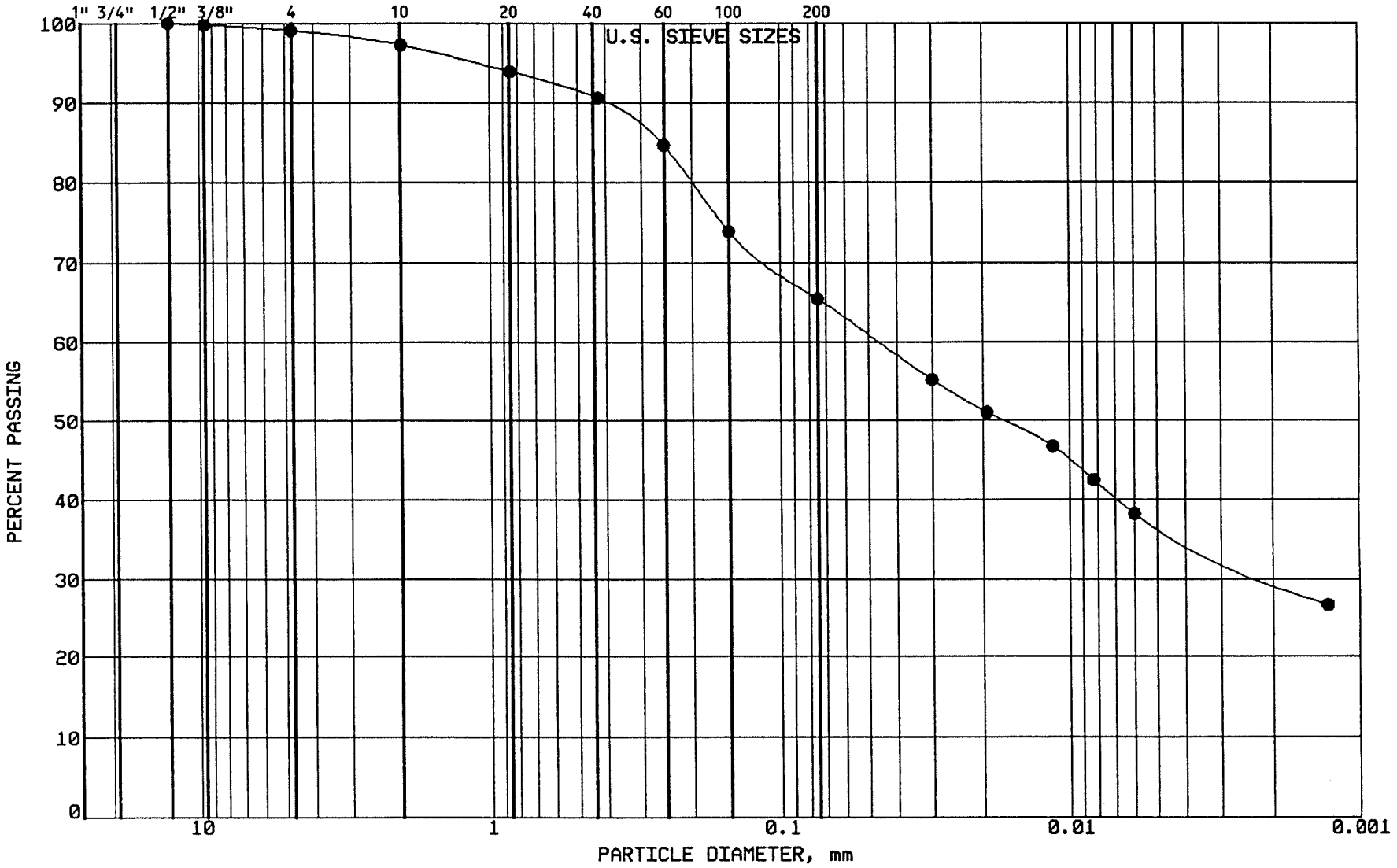
GRAVEL	0.9 %
SAND	34.2 %
SILT	28.0 %
CLAY	36.9 %
P 200	64.9 %

SOIL PROPERTIES

LL: 47.0%
PL: 18.0%
PI: 29.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38609.0, E 40570.0
SAMPLE: CLBCC548 TUBE #: ST.226
ELEVATION: 1900.7'

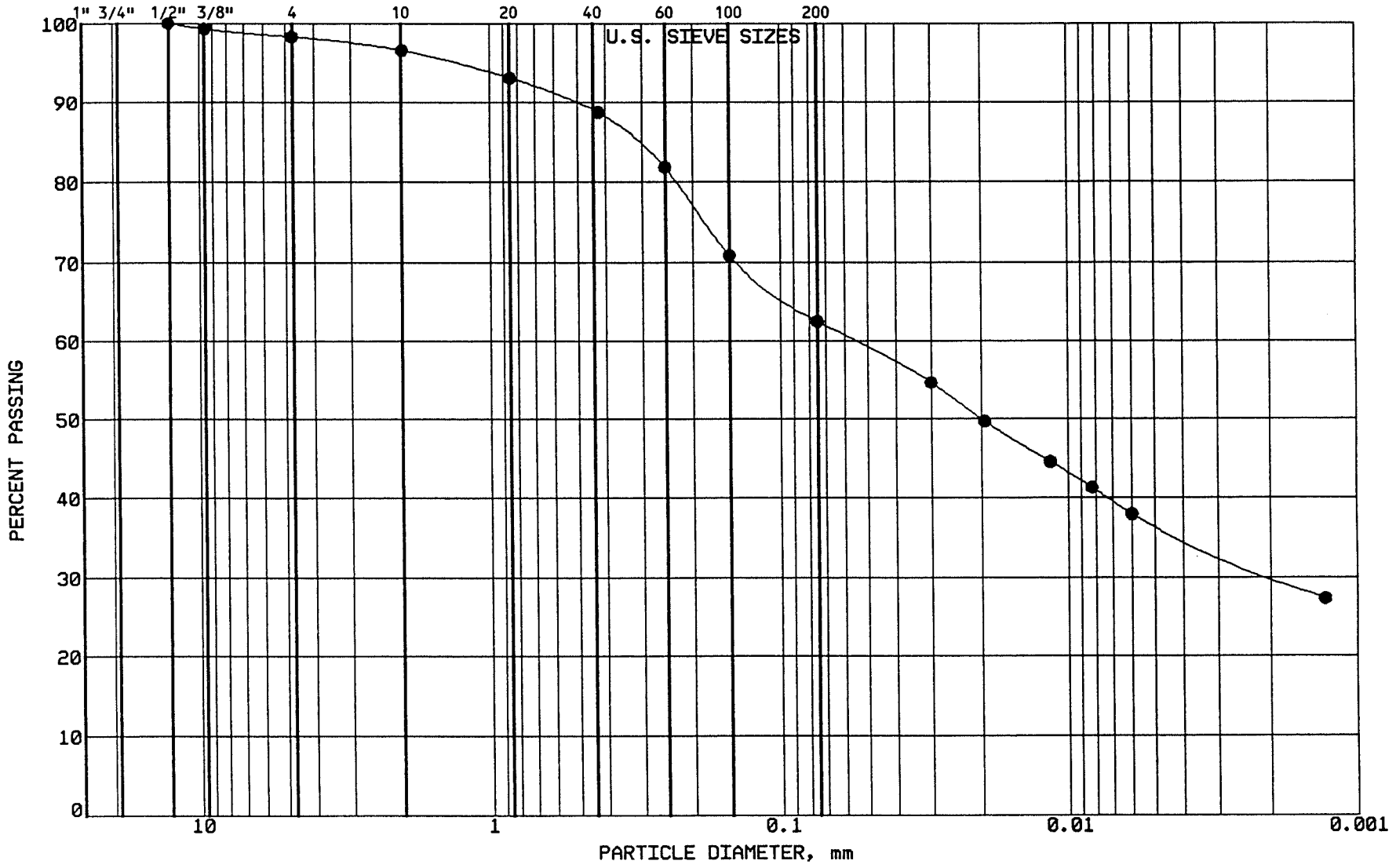
GRAVEL	0.9 %
SAND	33.7 %
SILT	28.6 %
CLAY	36.8 %
P 200	65.4 %

SOIL PROPERTIES

LL: 46.0%
PL: 18.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN

INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38636.0, E 40360.0
SAMPLE: CLBCC549 TUBE #: ST.227
ELEVATION: 1901.7'

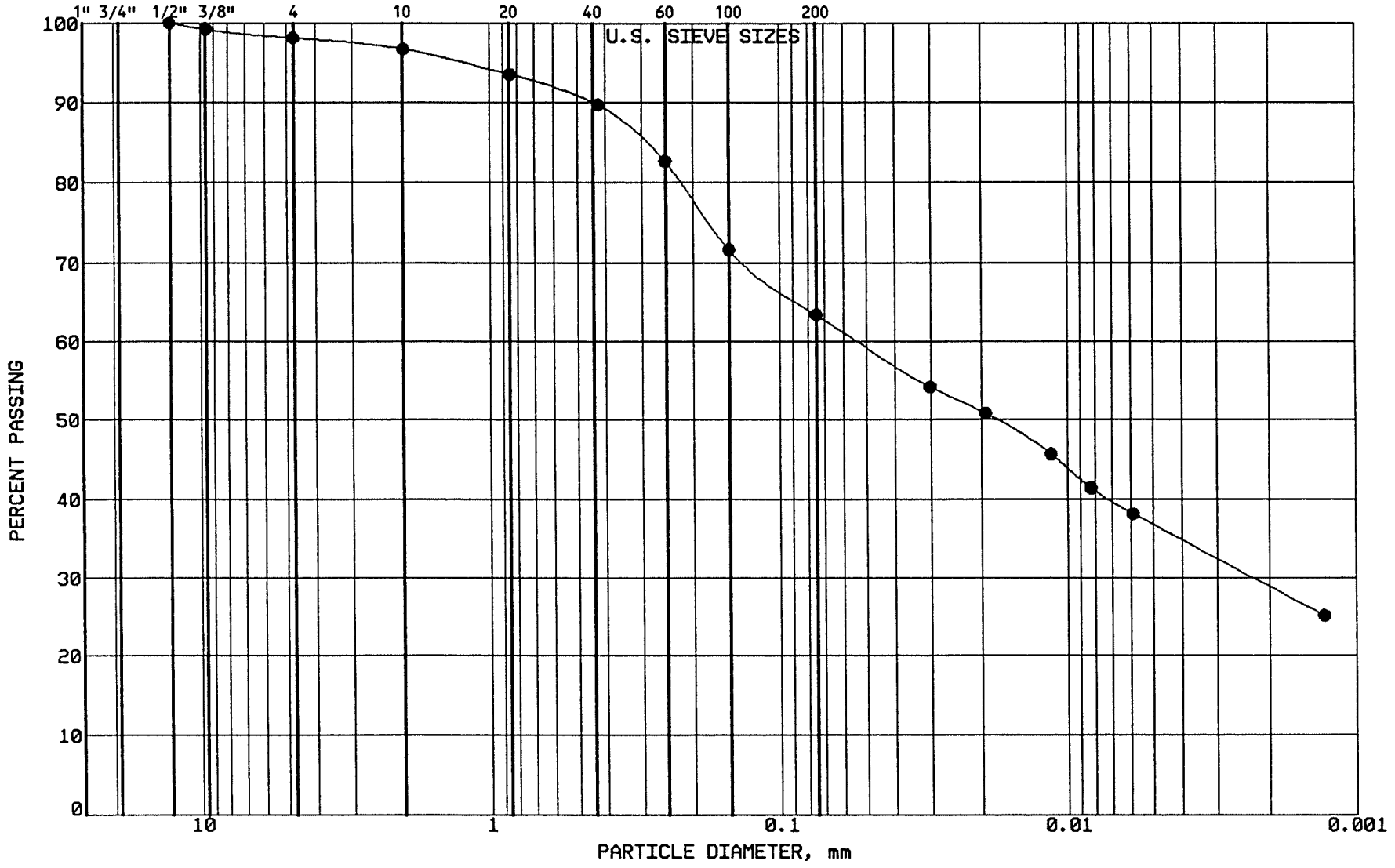
GRAVEL	1.7 %
SAND	35.8 %
SILT	25.9 %
CLAY	36.6 %
P 200	62.5 %

SOIL PROPERTIES

LL: 46.0%
PL: 18.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38659.0, E 40181.0
SAMPLE: CLBCC550 TUBE #: ST.228
ELEVATION: 1902.3'

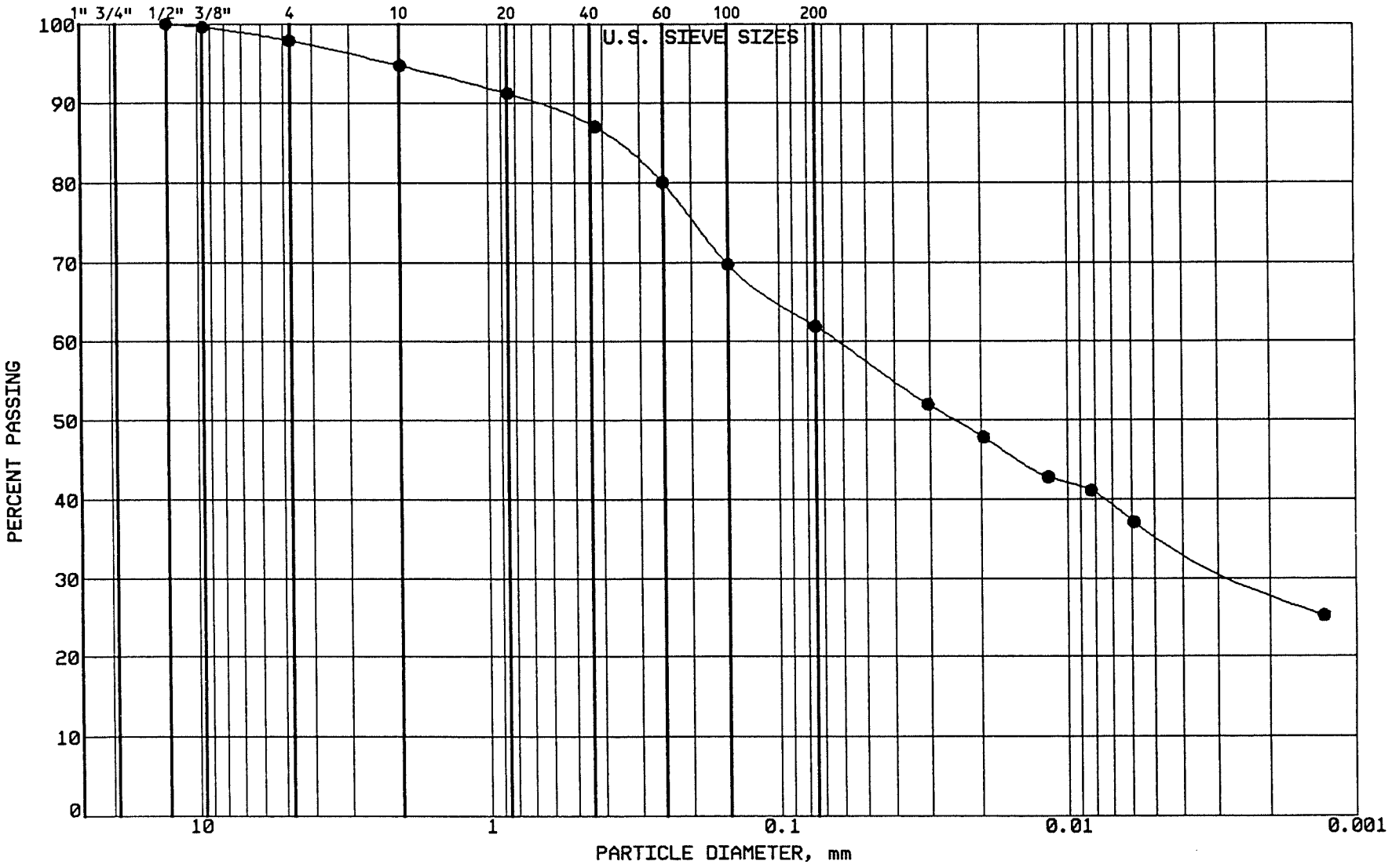
GRAVEL	1.9 %
SAND	34.7 %
SILT	26.7 %
CLAY	36.7 %
P 200	63.4 %

SOIL PROPERTIES

LL: 45.0%
PL: 19.0%
PI: 26.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38699.0, E 41202.0
SAMPLE: CLBCC551 TUBE #: ST.229
ELEVATION: 1897.2'

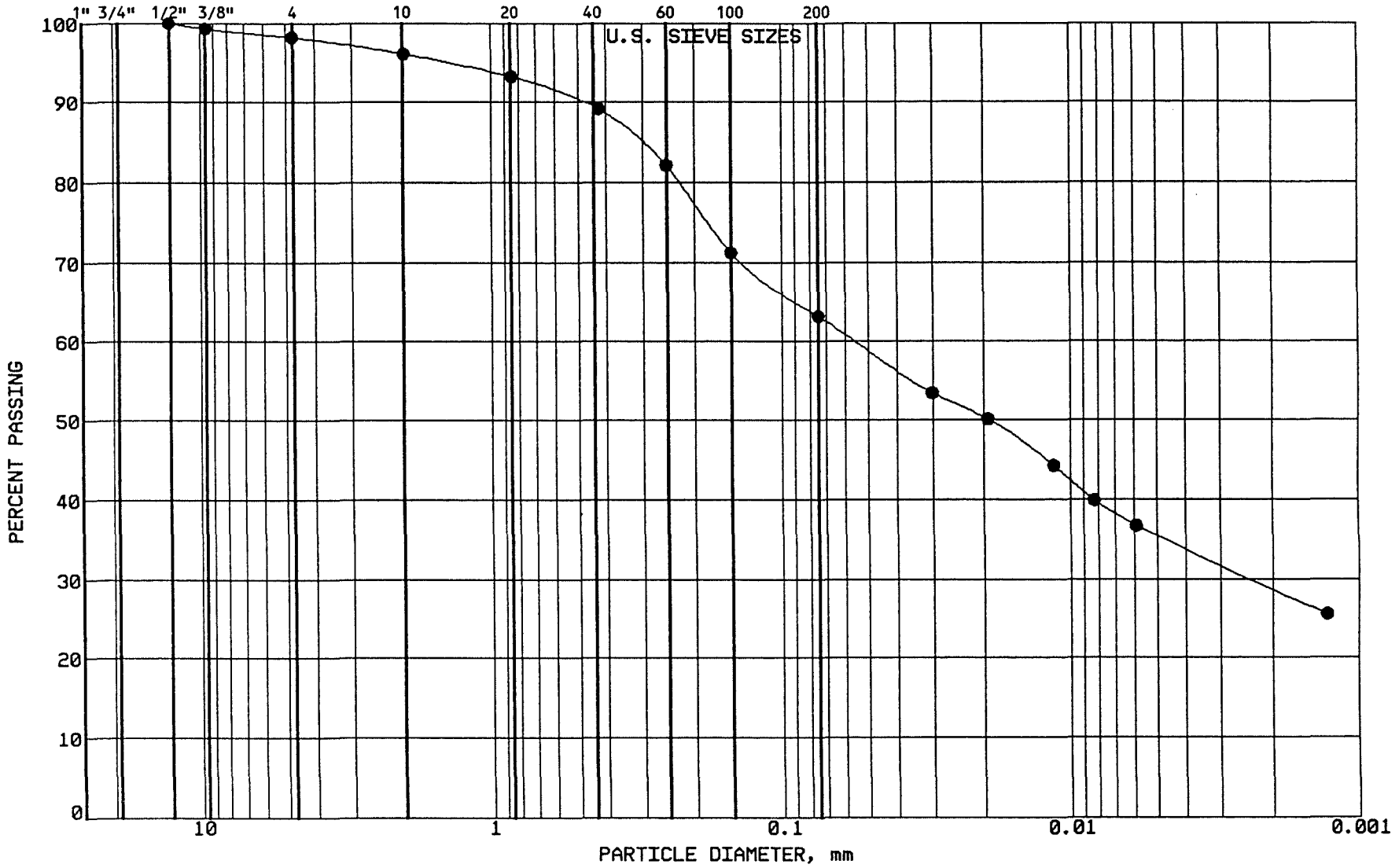
GRAVEL	2.1 %
SAND	36.0 %
SILT	26.1 %
CLAY	35.8 %
P 200	61.9 %

SOIL PROPERTIES

LL: 46.0%
PL: 18.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

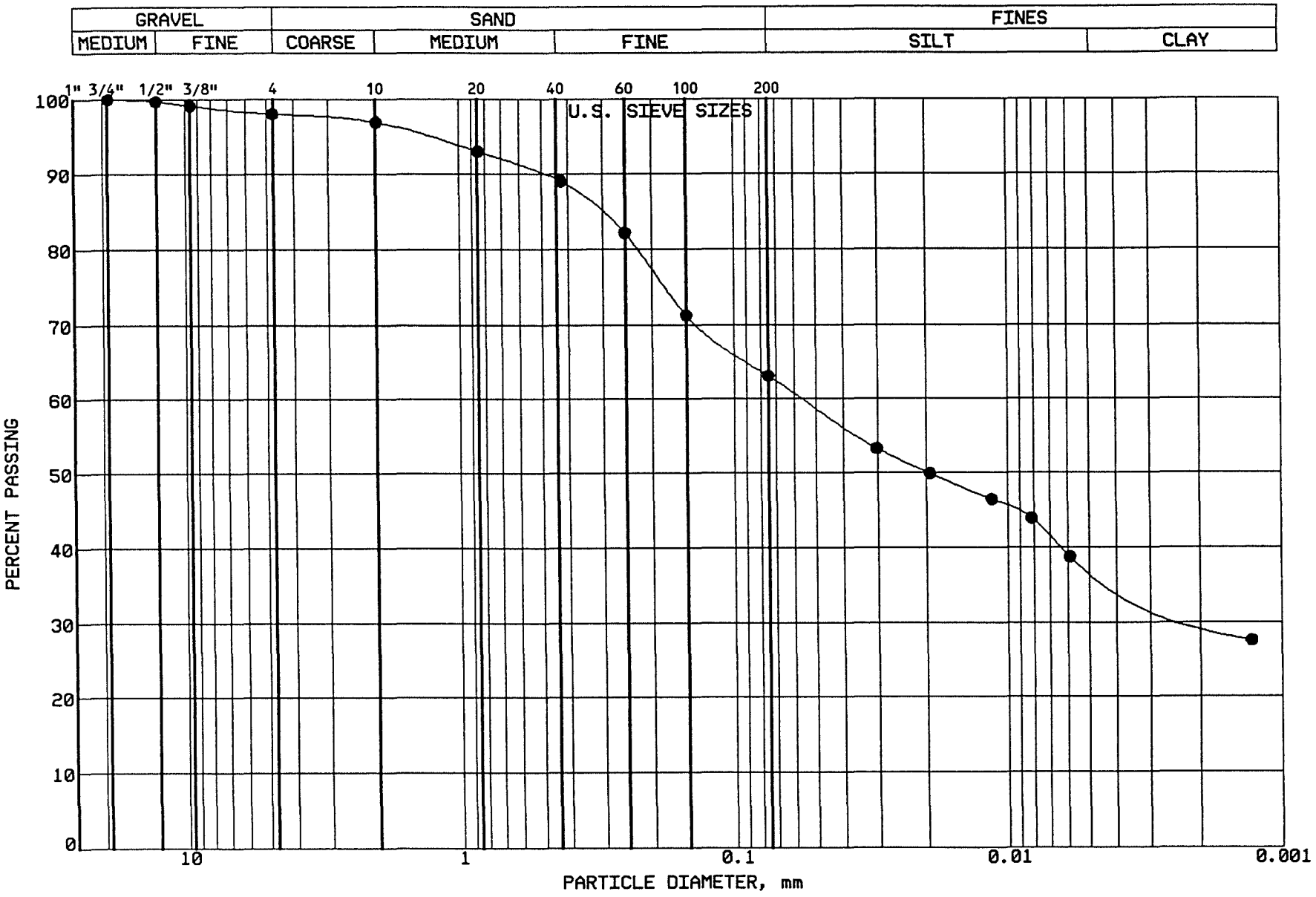
LOCATION: N 38708.0, E 40966.0
SAMPLE: CLBCC552 TUBE #: ST.230
ELEVATION: 1898.4'

GRAVEL	1.8 %
SAND	35.0 %
SILT	27.7 %
CLAY	35.5 %
P 200	63.2 %

SOIL PROPERTIES

LL: 45.0%
PL: 18.0%
PI: 27.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE



BRAUN
INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38726.0, E 40728.0
SAMPLE: CLBCC553 TUBE #: ST.231
ELEVATION: 1899.4'

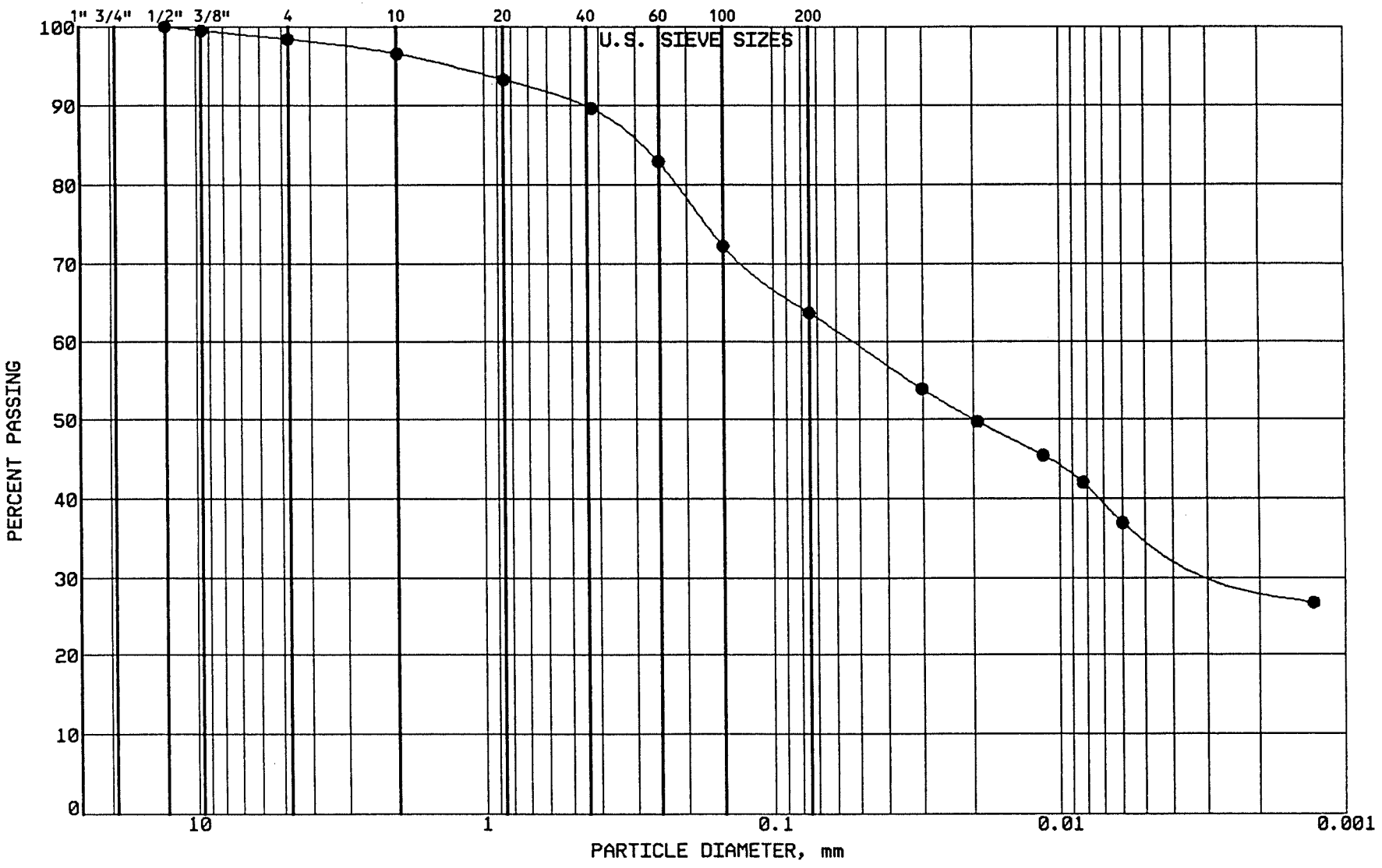
GRAVEL	2.0 %
SAND	34.9 %
SILT	25.6 %
CLAY	37.5 %
P 200	63.1 %

SOIL PROPERTIES

LL: 47.0%
PL: 16.0%
PI: 31.0%
CLASS: Sandy Lean Clay (CL), ol br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38736.0, E 40515.0
SAMPLE: CLBCC554 TUBE #: ST.232
ELEVATION: 1900.5'

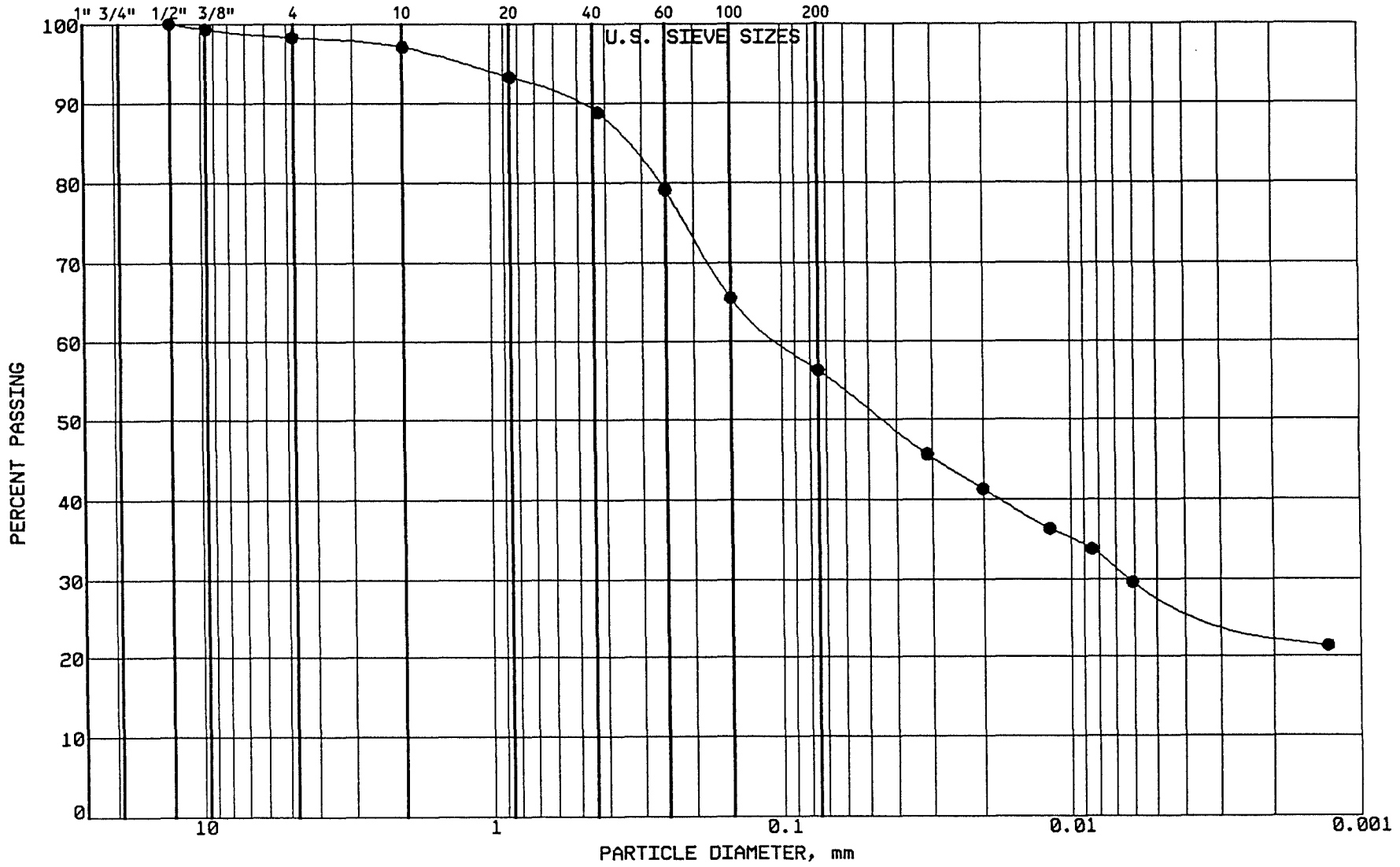
GRAVEL	1.6 %
SAND	34.7 %
SILT	28.0 %
CLAY	35.7 %
P 200	63.7 %

SOIL PROPERTIES

LL: 46.0%
PL: 18.0%
PI: 28.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

GRAIN SIZE - HYDROMETER ANALYSIS CURVE

GRAVEL		SAND			FINES	
MEDIUM	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



BRAUN INTERTEC

PROJECT: BFDX-92-018C
CPA COAL CREEK
AP # 91
UNDERWOOD, NORTH DAKOTA

LOCATION: N 38500.0, E 40500.0
SAMPLE: CLBCC556 TUBE #: N/A
ELEVATION: 1901.5'

GRAVEL	1.7 %
SAND	41.9 %
SILT	27.9 %
CLAY	28.5 %
P 200	56.4 %

SOIL PROPERTIES

LL: 42.0%
PL: 16.0%
PI: 26.0%
CLASS: Sandy Lean Clay (CL),dk gr-br.

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INTERTEC

AP #91 Results
Coal Creek Station
Permeabilities

Volume III

Cooperative Power Association
Underwood, North Dakota

Project BFDX-92-018C
April 27, 1994

Braun Intertec Corporation

Engineers and Scientists
Serving the Built and
Natural Environments

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Volume III
Set III

Permeabilities

AP #91

Permeabilities

ABBREVIATIONS --

DE -- Dike Embankment
DC -- Dike Core
CLB -- Clay Liner Base
CLS -- Clay Liner Slope
SG -- Subgrade
SB -- Sand Blanket
CC -- Coal Creek Identifier

BRAUN INTERTEC

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913 South 18th Street
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Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: December 3, 1991

PROJECT: BFDX-91-035C
AP #91

REPORTED TO:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin-CPA

SAMPLE DATA:

Shelby Tube Number	N/A
Sample Number	DC-CC-4
Location	37500N
Type of Sample	40500E
Depth/Elevation	Bag
Soil Classification (ASTM D 2487)	N/A
	CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	
Max. Dry Density (pcf)	98.8
Optimum Moisture Content (%)	23.7

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Remolded
Dry Density (pcf)	94.2
Percent of Max. Density	95.3
Moisture Content (%)	23.5
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	7.2×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

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PERMEABILITY TESTS

DATE: December 3, 1991

PROJECT: BFDX-91-035C
AP #91

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SAMPLE DATA:

Shelby Tube Number	N/A	N/A
Sample Number	DC-CC-6	DC-CC-7
Location	37056N	37071N
Type of Sample	40899E	40779E
Depth/Elevation	Bag	Bag
Soil Classification (ASTM D 2487)	1909.4 CH	1907.3 CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)		
Max. Dry Density (pcf)	104.5	103.5
Optimum Moisture Content (%)	19	20.5

PERMEABILITY TEST DATA:

Type of Test	Falling Head	Falling Head
Type of Specimen	Remolded	Remolded
Dry Density (pcf)	99.6	97.8
Percent of Max. Density	95.3	94.5
Moisture Content (%)	22	24
Max. Head Differential (ft)	3	3
Confining Pressure (effective-PSI)	4	4
Coefficient of Permeability (cm/sec)	4.7×10^{-8}	4.7×10^{-8}

REMARKS:

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Gerald L. Dauer, C.E.T.
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AP #91

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SAMPLE DATA:

Shelby Tube Number	N/A	N/A
Sample Number	DC-CC-8	DC-CC-9
Location	37067N	37070N
Type of Sample	40429E	40654E
Depth/Elevation	Bag	Bag
Soil Classification (ASTM D 2487)	1909	1905.9
	CH	CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)		
Max. Dry Density (pcf)	100	102
Optimum Moisture Content (%)	24	22.5

PERMEABILITY TEST DATA:

Type of Test	Falling Head	Falling Head
Type of Specimen	Remolded	Remolded
Dry Density (pcf)	94.9	97.2
Percent of Max. Density	94.9	95.3
Moisture Content (%)	27	24
Max. Head Differential (ft)	3	3
Confining Pressure (effective-PSI)	4	4
Coefficient of Permeability (cm/sec)	5.5×10^{-8}	8.2×10^{-8}

REMARKS:

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SAMPLE DATA:

Shelby Tube Number	N/A	N/A
Sample Number	DC-CC-10	DC-CC-11
Location	37072N	37082N
Type of Sample	40819E	40641E
Depth/Elevation	Bag	Bag
Soil Classification (ASTM D 2487)	1908.3 CH	1907.6 CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)		
Max. Dry Density (pcf)	99.1	102
Optimum Moisture Content (%)	24	21

PERMEABILITY TEST DATA:

Type of Test	Falling Head	Falling Head
Type of Specimen	Remolded	Remolded
Dry Density (pcf)	94.2	97.3
Percent of Max. Density	95.1	95.3
Moisture Content (%)	24	22.2
Max. Head Differential (ft)	3	3
Confining Pressure (effective-PSI)	4	4
Coefficient of Permeability (cm/sec)	4.1×10^{-8}	6.5×10^{-8}

REMARKS:

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SAMPLE DATA:

Shelby Tube Number	1A
Sample Number	DC-CC-12
Location	37067N
Type of Sample	40849E
Depth/Elevation	Tube
Soil Classification (ASTM D 2487)	1910.8 CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	104.9
Percent of Max. Density	N/A
Moisture Content (%)	20.5
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	$1x10^{-7}$

REMARKS:

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SAMPLE DATA:

Shelby Tube Number	2A	2B
Sample Number	DC-CC-13	DC-CC-13
Location	37065N	37065N
Type of Sample	40670E	40670E
Depth/Elevation	Tube	Tube
Soil Classification (ASTM D 2487)	1909.4 CH	1909.4 CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)		
Max. Dry Density (pcf)	N/A	N/A
Optimum Moisture Content (%)	N/A	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head	Falling Head
Type of Specimen	Undisturbed	Undisturbed
Dry Density (pcf)	*	*
Percent of Max. Density	N/A	N/A
Moisture Content (%)	*	*
Max. Head Differential (ft)	3	3
Confining Pressure (effective-PSI)	4	4
Coefficient of Permeability (cm/sec)	*	*

REMARKS:

* - Non-recoverable samples

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PERMEABILITY TESTS

DATE: December 4, 1991

PROJECT: BFDX-91-035C
AP #91

REPORTED TO:
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14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin-CPA

SAMPLE DATA:

Shelby Tube Number	Retest of 2A
Sample Number	DC-CC-17
Location	37065N
Type of Sample	40670E
Depth/Elevation	Tube
Soil Classification (ASTM D 2487)	1909.4 CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	100
Percent of Max. Density	N/A
Moisture Content (%)	21.5
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	4.8×10^{-8}

REMARKS:

* - Non-recoverable samples

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PERMEABILITY TESTS

DATE: December 3, 1991

PROJECT: BFDX-91-035C
AP #91

REPORTED TO:
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Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin-CPA

SAMPLE DATA:

Shelby Tube Number	3A	3B
Sample Number	DC-CC-14	DC-CC-14
Location	37058N	37058N
Type of Sample	40475E	40475E
Depth/Elevation	Tube	Tube
Soil Classification (ASTM D 2487)	1910.3 CH	1910.3 CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)		
Max. Dry Density (pcf)	N/A	N/A
Optimum Moisture Content (%)	N/A	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head	Falling Head
Type of Specimen	Undisturbed	Undisturbed
Dry Density (pcf)	*	*
Percent of Max. Density	N/A	N/A
Moisture Content (%)	*	*
Max. Head Differential (ft)	3	3
Confining Pressure (effective-PSI)	4	4
Coefficient of Permeability (cm/sec)	*	*

REMARKS:

* - Non-recoverable samples

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DATE: December 3, 1991

PROJECT: BFDX-91-035C
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REPORTED TO:
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SAMPLE DATA:

Shelby Tube Number	Retest of 3A
Sample Number	DC-CC-18
Location	37058N
Type of Sample	40475E
Depth/Elevation	Tube
Soil Classification (ASTM D 2487)	1910.3 CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	91.4
Percent of Max. Density	N/A
Moisture Content (%)	28.2
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	7.1×10^{-8}

REMARKS:

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PERMEABILITY TESTS

DATE: December 3, 1991

PROJECT: BFDX-91-035C
AP #91

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14615 Lone Oak Road
Eden Prairie, MN 55344-2287

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SAMPLE DATA:

Shelby Tube Number	4A
Sample Number	DC-CC-19
Location	37068N
Type of Sample	40840E
Depth/Elevation	Tube
Soil Classification (ASTM D 2487)	1912.2 CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	103.1
Percent of Max. Density	N/A
Moisture Content (%)	22.6
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	5.9×10^{-8}

REMARKS:

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PERMEABILITY TESTS

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PROJECT: BFDX-91-035C
AP #91

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14615 Lone Oak Road
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COPY TO: Jim Martin-CPA

SAMPLE DATA:

Shelby Tube Number	5A	5B
Sample Number	DC-CC-21	DC-CC-21
Location	37070N	37070N
Type of Sample	40680E	40680E
Depth/Elevation	Tube	Tube
Soil Classification (ASTM D 2487)	1912.6 CH	1912.6 CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)		
Max. Dry Density (pcf)	N/A	N/A
Optimum Moisture Content (%)	N/A	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head	Falling Head
Type of Specimen	Undisturbed	Undisturbed
Dry Density (pcf)	*	*
Percent of Max. Density	N/A	N/A
Moisture Content (%)	*	*
Max. Head Differential (ft)	3	3
Confining Pressure (effective-PSI)	4	4
Coefficient of Permeability (cm/sec)	*	*

REMARKS:

* - Non-recoverable samples

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SAMPLE DATA:

	Retest
Shelby Tube Number	of 5A
Sample Number	DC-CC-28
Location	37070N
Type of Sample	40680E
Depth/Elevation	Tube
Soil Classification (ASTM D 2487)	1912.6 CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	94.8
Percent of Max. Density	N/A
Moisture Content (%)	22.9
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	9.3×10^{-8}

REMARKS:

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SAMPLE DATA:

Shelby Tube Number	6A	6B
Sample Number	DC-CC-22	DC-CC-22
Location	37059N	37059N
Type of Sample	40491E	40491E
Depth/Elevation	Tube	Tube
Soil Classification (ASTM D 2487)	1913 CH	1913 CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)		
Max. Dry Density (pcf)	N/A	N/A
Optimum Moisture Content (%)	N/A	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head	Falling Head
Type of Specimen	Undisturbed	Undisturbed
Dry Density (pcf)	*	*
Percent of Max. Density	N/A	N/A
Moisture Content (%)	*	*
Max. Head Differential (ft)	3	3
Confining Pressure (effective-PSI)	4	4
Coefficient of Permeability (cm/sec)	*	*

REMARKS:

* - Non-recoverable samples

BRAUN INTERTEC ENGINEERING, INC.

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AP #91

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Eden Prairie, MN 55344-2287

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SAMPLE DATA:

	Retest
Shelby Tube Number	of 6A
Sample Number	DC-CC-29
Location	37059N
Type of Sample	40491E
Depth/Elevation	Tube
Soil Classification (ASTM D 2487)	1913
	CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	103.7
Percent of Max. Density	N/A
Moisture Content (%)	20.1
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	8.6×10^{-8}

REMARKS:

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SAMPLE DATA:

Shelby Tube Number	7A	8A
Sample Number	DC-CC-30	DC-CC-31
Location	37067N	37066N
Type of Sample	40866E	40742E
Depth/Elevation	Tube	Tube
Soil Classification (ASTM D 2487)	1914.9 CH	1914.7 CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)		
Max. Dry Density (pcf)	N/A	N/A
Optimum Moisture Content (%)	N/A	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head	Falling Head
Type of Specimen	Undisturbed	Undisturbed
Dry Density (pcf)	102.6	103.5
Percent of Max. Density	N/A	N/A
Moisture Content (%)	21.8	21.8
Max. Head Differential (ft)	3	3
Confining Pressure (effective-PSI)	4	4
Coefficient of Permeability (cm/sec)	8.8×10^{-8}	4.3×10^{-8}

REMARKS:

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Eden Prairie, MN 55344-2287

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SAMPLE DATA:

Shelby Tube Number	9A
Sample Number	DC-CC-32
Location	37061N
Type of Sample	40540E
Depth/Elevation	Tube
Soil Classification (ASTM D 2487)	1914.3 CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	105.5
Percent of Max. Density	N/A
Moisture Content (%)	21.2
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	4.3×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

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PROJECT: BFDX-91-035C
AP #91

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SAMPLE DATA:

Shelby Tube Number	10A	11A
Sample Number	DC-CC-34	DC-CC-35
Location	37061N	37063N
Type of Sample	40741E	40609E
Depth/Elevation	Tube	Tube
Soil Classification (ASTM D 2487)	1916.2 CH	1915.8 CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)		
Max. Dry Density (pcf)	N/A	N/A
Optimum Moisture Content (%)	N/A	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head	Falling Head
Type of Specimen	Undisturbed	Undisturbed
Dry Density (pcf)	106.3	103
Percent of Max. Density	N/A	N/A
Moisture Content (%)	20.8	21.4
Max. Head Differential (ft)	3	3
Confining Pressure (effective-PSI)	4	4
Coefficient of Permeability (cm/sec)	6.1×10^{-8}	7.4×10^{-8}

REMARKS:

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SAMPLE DATA:

Shelby Tube Number	12A
Sample Number	DC-CC-36
Location	37061N
Type of Sample	40518E
Depth/Elevation	Tube
Soil Classification (ASTM D 2487)	1916.3 CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	104.2
Percent of Max. Density	N/A
Moisture Content (%)	21.1
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	$1x10^{-7}$

REMARKS:

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SAMPLE DATA:

Shelby Tube Number	13A	13B
Sample Number	DC-CC-39	DC-CC-39
Location	37394N	37394N
Type of Sample	39806E	39806E
Depth/Elevation	Tube	Tube
Soil Classification (ASTM D 2487)	1909.3	1909.3
	CH	CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)		
Max. Dry Density (pcf)	N/A	N/A
Optimum Moisture Content (%)	N/A	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head	Falling Head
Type of Specimen	Undisturbed	Undisturbed
Dry Density (pcf)	*	*
Percent of Max. Density	N/A	N/A
Moisture Content (%)	*	*
Max. Head Differential (ft)	3	3
Confining Pressure (effective-PSI)	4	4
Coefficient of Permeability (cm/sec)	*	*

REMARKS:

* - Non-recoverable samples

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SAMPLE DATA:

Shelby Tube Number	Retest of 13A
Sample Number	DC-CC-43
Location	37394N
Type of Sample	39806E
Depth/Elevation	Tube
Soil Classification (ASTM D 2487)	1909.3 CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	101
Percent of Max. Density	N/A
Moisture Content (%)	22.5
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	3.4×10^{-8}

REMARKS:

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SAMPLE DATA:

Shelby Tube Number	14A
Sample Number	DC-CC-40
Location	37328N
Type of Sample	39850E
Depth/Elevation	Tube
Soil Classification (ASTM D 2487)	1910.7 CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test.	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	101.2
Percent of Max. Density	N/A
Moisture Content (%)	21.3
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	5.4×10^{-8}

REMARKS:

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SAMPLE DATA:

Shelby Tube Number	15A
Sample Number	DC-CC-41
Location	37189N
Type of Sample	40004E
Depth/Elevation	Tube
Soil Classification (ASTM D 2487)	1913.2 CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	104.7
Percent of Max. Density	N/A
Moisture Content (%)	21.6
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	$1x10^{-7}$

REMARKS:

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SAMPLE DATA:

Shelby Tube Number	16A
Sample Number	DC-CC-44
Location	37127N
Type of Sample	40114E
Depth/Elevation	Tube
Soil Classification (ASTM D 2487)	1915.5 CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	104.3
Percent of Max. Density	N/A
Moisture Content (%)	21.7
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	4.5×10^{-8}

REMARKS:

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SAMPLE DATA:

Shelby Tube Number	17A
Sample Number	DE-CC-45
Location	37279N
Type of Sample	39940E
Depth/Elevation	Tube
Soil Classification (ASTM D 2487)	1909.2 CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	100.4
Percent of Max. Density	N/A
Moisture Content (%)	22.9
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	$1x10^{-7}$

REMARKS:

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SAMPLE DATA:

Shelby Tube Number	18A
Sample Number	DE-CC-48
Location	37406N
Type of Sample	39827E
Depth/Elevation	Tube
Soil Classification (ASTM D 2487)	1911.6 CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	97.6
Percent of Max. Density	N/A
Moisture Content (%)	25.6
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	$1x10^{-7}$

REMARKS:

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SAMPLE DATA:

Shelby Tube Number	19A
Sample Number	DC-CC-49
Location	37520N
Type of Sample	39725E
Depth/Elevation	Tube
Soil Classification (ASTM D 2487)	1908.4 CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	100.4
Percent of Max. Density	N/A
Moisture Content (%)	25
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.8×10^{-8}

REMARKS:

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SAMPLE DATA:

Shelby Tube Number	20A
Sample Number	DC-CC-52
Location	37084N
Type of Sample	40207E
Depth/Elevation	Tube
Soil Classification (ASTM D 2487)	1910.8 CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	100.7
Percent of Max. Density	N/A
Moisture Content (%)	22.4
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	5.4×10^{-8}

REMARKS:

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SAMPLE DATA:

Shelby Tube Number	21A
Sample Number	DC-CC-53
Location	37700N
Type of Sample	39676E
Depth/Elevation	Tube
Soil Classification (ASTM D 2487)	1910.7 CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	96.6
Percent of Max. Density	N/A
Moisture Content (%)	25.3
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	5.7×10^{-8}

REMARKS:

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SAMPLE DATA:

Shelby Tube Number	22A
Sample Number	DC-CC-61
Location	38161N
Type of Sample	39656E
Depth/Elevation	Tube
Soil Classification (ASTM D 2487)	1903.7 CL

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	112.6
Percent of Max. Density	N/A
Moisture Content (%)	17.4
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.3×10^{-8}

REMARKS:

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SAMPLE DATA:

Shelby Tube Number	23A
Sample Number	DE-CC-69
Location	38015N
Type of Sample	39709E
Depth/Elevation	Tube
Soil Classification (ASTM D 2487)	1906.3 CL

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	113.3
Percent of Max. Density	N/A
Moisture Content (%)	17.7
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.4×10^{-8}

REMARKS:

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SAMPLE DATA:

Shelby Tube Number	24B
Sample Number	DC-CC-71
Location	37881N
Type of Sample	39667E
Depth/Elevation	Tube
Soil Classification (ASTM D 2487)	1908.7 CL

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	115.5
Percent of Max. Density	N/A
Moisture Content (%)	17.5
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.8×10^{-8}

REMARKS:

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SAMPLE DATA:

Shelby Tube Number	25A
Sample Number	DC-CC-72
Location	38300N
Type of Sample	39669E
Depth/Elevation	Tube
Soil Classification (ASTM D 2487)	1906.7 CL

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	113.1
Percent of Max. Density	N/A
Moisture Content (%)	16.4
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.9×10^{-8}

REMARKS:

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SAMPLE DATA:

Shelby Tube Number	26A	26B
Sample Number	DE-CC-73	DE-CC-73
Location	38300N	38300N
Type of Sample	39700E	39700E
Depth/Elevation	Tube	Tube
Soil Classification (ASTM D 2487)	1908.2 CL	1908.2 CL

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)		
Max. Dry Density (pcf)	N/A	N/A
Optimum Moisture Content (%)	N/A	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head	Falling Head
Type of Specimen	Undisturbed	Undisturbed
Dry Density (pcf)	*	*
Percent of Max. Density	N/A	N/A
Moisture Content (%)	*	*
Max. Head Differential (ft)	3	3
Confining Pressure (effective-PSI)	4	4
Coefficient of Permeability (cm/sec)	*	*

REMARKS:

* Non-recoverable samples

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SAMPLE DATA:

Shelby Tube Number	Retest of 26A
Sample Number	DE-CC-79
Location	38300N
Type of Sample	39700E
Depth/Elevation	Tube
Soil Classification (ASTM D 2487)	1908.2 CL

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	113.5
Percent of Max. Density	N/A
Moisture Content (%)	17.5
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

BRAUN INTERTEC

Braun Intertec Corporation
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Bismarck, North Dakota 58502-2379
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Engineers and Scientists Serving the Built and Natural Environments®

PERMEABILITY TESTS

DATE: December 3, 1991

PROJECT: BFDX-91-035C
AP #91

REPORTED TO:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin-CPA

SAMPLE DATA:

Shelby Tube Number	27B
Sample Number	DE-CC-76
Location	38092N
Type of Sample	39707E
Depth/Elevation	Tube
Soil Classification (ASTM D 2487)	1910.2 CL

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	114.6
Percent of Max. Density	N/A
Moisture Content (%)	17
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.3×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: December 3, 1991

PROJECT: BFDX-91-035C
AP #91

REPORTED TO:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin-CPA

SAMPLE DATA:

Shelby Tube Number	28A
Sample Number	DE-CC-77
Location	37871N
Type of Sample	39693E
Depth/Elevation	Tube
Soil Classification (ASTM D 2487)	1914.2 CL

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	
Max. Dry Density (pcf)	N/A
Optimum Moisture Content (%)	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Undisturbed
Dry Density (pcf)	110.1
Percent of Max. Density	N/A
Moisture Content (%)	18.1
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.7×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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Bismarck, North Dakota 58502-2379
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PERMEABILITY TESTS

DATE: December 4, 1991

PROJECT: BFDX-91-035C
AP #91

REPORTED TO:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin-CPA

SAMPLE DATA:

Shelby Tube Number	29A	30A
Sample Number	DE-CC-78	DE-CC-82
Location	38275N	38411N
Type of Sample	39695E	39689E
Depth/Elevation	Tube	Tube
Soil Classification (ASTM D 2487)	1913.7 CL	1918.0 CL

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)		
Max. Dry Density (pcf)	N/A	N/A
Optimum Moisture Content (%)	N/A	N/A

PERMEABILITY TEST DATA:

Type of Test	Falling Head	Falling Head
Type of Specimen	Undisturbed	Undisturbed
Dry Density (pcf)	109.3	113.3
Percent of Max. Density	N/A	N/A
Moisture Content (%)	17.4	16.4
Max. Head Differential (ft)	3	3
Confining Pressure (effective-PSI)	4	4
Coefficient of Permeability (cm/sec)	1.6×10^{-8}	2.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: June 10, 1992

PROJECT: BFDX-92-018C
AP #91

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	N/A
Sample Number	CC 93
Location	37000N, 40500E
Type of Sample	Bag
Depth/Elevation	1-2
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	116.9
Optimum Moisture Content (%)	14.0

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Remolded
Dry Density (pcf)	110.7
Percent of Max. Density	94.7
Moisture Content (%)	14
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	5.7×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: June 2, 1992

PROJECT: BFDX-92-018C
AP #91

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	N/A
Sample Number	CC-94
Location	36950N, 40800E
Type of Sample	Bag
Depth/Elevation	1-2
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	110.7
Optimum Moisture Content (%)	16.2

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Remolded
Dry Density (pcf)	103.4
Percent of Max. Density	94
Moisture Content (%)	16.0
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.0×10^{-7}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
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PERMEABILITY TESTS

DATE: June 17, 1992

PROJECT: BFDX-91-018C
AP #91

REPORTED TO:

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Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Boring Number	TP-2
Sample Number	CC-95
Location	36656N, 40465E
Type of Sample	Bag
Depth/Elevation	2' - 6'
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	114
Optimum Moisture Content (%)	15

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Remolded
Dry Density (pcf)	107.8
Percent of Max. Density	94.6
Moisture Content (%)	16
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	3.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: June 22, 1992

PROJECT: BFDX-92-018C
AP #91

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Boring Number	TP-2
Sample Number	CC-96
Location	36656N, 40465E
Type of Sample	Bag
Depth/Elevation	15' - 20'
Soil Classification (ASTM D 2487)	CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	100
Optimum Moisture Content (%)	23

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Remolded
Dry Density (pcf)	95.1
Percent of Max. Density	95.1
Moisture Content (%)	25
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	5.3×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: June 17, 1992

PROJECT: BFDX-92-018C
AP #91

REPORTED TO:

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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Boring Number	TP-3
Sample Number	CC-97
Location	36661N, 40100E
Type of Sample	Bag
Depth/Elevation	10' - 20'
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	104
Optimum Moisture Content (%)	21

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Remolded
Dry Density (pcf)	99.5
Percent of Max. Density	95.7
Moisture Content (%)	23
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.9×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: June 17, 1992

PROJECT: BFDX-92-018C
Ash Pond #91

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Boring Number	TP-4
Sample Number	CC-98
Location	36610N, 39772E
Type of Sample	Bag
Depth/Elevation	10'
Soil Classification (ASTM D 2487)	CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	98.5
Optimum Moisture Content (%)	25

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Remolded
Dry Density (pcf)	93.2
Percent of Max. Density	94.6
Moisture Content (%)	26
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.2×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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PERMEABILITY TESTS

DATE: June 2, 1992

PROJECT: BFDX-92-018C
AP #91

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	TP-4
Sample Number	CC-99
Location	36610N, 39772E
Type of Sample	Bag
Depth/Elevation	20'-22'
Soil Classification (ASTM D 2487)	CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	100
Optimum Moisture Content (%)	23

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Remolded
Dry Density (pcf)	95.6
Percent of Max. Density	96
Moisture Content (%)	24
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	3.0×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
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PERMEABILITY TESTS

DATE: June 2, 1992

PROJECT: BFDX-92-018C
AP #91

REPORTED TO:

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Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	TP-5
Sample Number	CC-100
Location	36500N, 38400E
Type of Sample	Bag
Depth/Elevation	6'-8'
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	107
Optimum Moisture Content (%)	19.2

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Remolded
Dry Density (pcf)	101.5
Percent of Max. Density	94.9
Moisture Content (%)	21
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.2×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

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PERMEABILITY TESTS

DATE: June 2, 1992

PROJECT: BFDX-92-018C
AP #91

REPORTED TO:

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Attn: Mr. Andy Stewart
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Eden Prairie, Mn 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Boring Number	TP-6
Sample Number	CC-103
Location	36345N, 39650E
Type of Sample	Bag
Depth/Elevation	8'-15'
Soil Classification (ASTM D 2487)	CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	100.5
Optimum Moisture Content (%)	23.2

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Remolded
Dry Density (pcf)	100
Percent of Max. Density	99.5
Moisture Content (%)	24.8
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	4.3×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

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Operations Manager

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PERMEABILITY TESTS

DATE: June 10, 1992

PROJECT: BFDX-92-018C
AP #91

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Boring Number	TP-6
Sample Number	CC 104
Location	36345N, 39650E
Type of Sample	Bag
Depth/Elevation	20
Soil Classification (ASTM D 2487)	CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	100.9
Optimum Moisture Content (%)	23

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Remolded
Dry Density (pcf)	95.1
Percent of Max. Density	94.3
Moisture Content (%)	24
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	4.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

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PERMEABILITY TESTS

DATE: June 22, 1992

PROJECT: BFDX-91-018C
AP #91

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Boring Number	TP-7
Sample Number	CC-105
Location	36520N, 39650E
Type of Sample	Bag
Depth/Elevation	5' - 10'
Soil Classification (ASTM D 2487)	CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	99.6
Optimum Moisture Content (%)	23.7

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Remolded
Dry Density (pcf)	94.2
Percent of Max. Density	94.6
Moisture Content (%)	24
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	4.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

P-tp7

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PERMEABILITY TESTS

DATE: June 2, 1992

PROJECT: BFDX-92-018C
AP #91

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	TP-7
Sample Number	CC-106
Location	36520N, 39650E
Type of Sample	Bag
Depth/Elevation	20'
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	108.0
Optimum Moisture Content (%)	17.9

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Remolded
Dry Density (pcf)	103.4
Percent of Max. Density	95.7
Moisture Content (%)	20
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	3.5×10^{-8}

REMARKS:

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Operations Manager

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PERMEABILITY TESTS

DATE: June 17, 1992

PROJECT: BFDX-91-018C
AP #91

REPORTED TO:

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COPY TO: Jim Martin

SAMPLE DATA:

Boring Number	TP-8
Sample Number	CC-107
Location	36340, 39950E
Type of Sample	Bag
Depth/Elevation	10' - 15'
Soil Classification (ASTM D 2487)	CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	99
Optimum Moisture Content (%)	24

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Remolded
Dry Density (pcf)	93.2
Percent of Max. Density	94.1
Moisture Content (%)	25
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.6×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

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Operations Manager

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PERMEABILITY TESTS

DATE: June 22, 1992

PROJECT: BFDX-91-018C
AP #91

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Boring Number	TP-9
Sample Number	CC-108
Location	36531N, 40172E
Type of Sample	Bag
Depth/Elevation	10' - 20'
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	103.5
Optimum Moisture Content (%)	20.5

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Remolded
Dry Density (pcf)	98.1
Percent of Max. Density	94.8
Moisture Content (%)	22
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.4×10^{-8}

REMARKS:

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PERMEABILITY TESTS

DATE: June 2, 1992

PROJECT: BFDX-92-018C
AP #91

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Shelby Tube Number	TP-10
Sample Number	CC-109
Location	36347N, 40395E
Type of Sample	Bag
Depth/Elevation	10'-12'
Soil Classification (ASTM D 2487)	CL

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	110.5
Optimum Moisture Content (%)	16.7

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Remolded
Dry Density (pcf)	104.9
Percent of Max. Density	94.9
Moisture Content (%)	17
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	2.4×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

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Engineers and Scientists Serving the Built and Natural Environments

PERMEABILITY TESTS

DATE: June 16, 1992

PROJECT: BFDX-92-018A
Ash Pond #91

REPORTED TO:

Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

COPY TO: Jim Martin

SAMPLE DATA:

Boring Number	TP-11
Sample Number	CC-110
Location	36527N, 40775E
Type of Sample	Bag
Depth/Elevation	15' - 20'
Soil Classification (ASTM D 2487)	CH

MOISTURE-DENSITY:

Relation of Soil (ASTM D 698)	-
Max. Dry Density (pcf)	95
Optimum Moisture Content (%)	26.5

PERMEABILITY TEST DATA:

Type of Test	Falling Head
Type of Specimen	Remolded
Dry Density (pcf)	89.8
Percent of Max. Density	94.5
Moisture Content (%)	28
Max. Head Differential (ft)	3
Confining Pressure (effective-PSI)	4
Coefficient of Permeability (cm/sec)	1.5×10^{-8}

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

Braun Intertec Corporation
913 South 18th Street
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Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments®

Permeability Tests

Date: March 8, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-31A
Sample Number:	DC-CC-222
Location	38862N 39883E
Type of Sample:	Tube
Depth/Elevation:	1902.9
Soil Classification (ASTM D 2487):	(CL)

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	101.8
Percent of Max. Density:	N/A
Moisture Content (%):	26.8
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.3×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Date: March 8, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-32A
Sample Number:	DC-CC-223
Location	38870N 40092E
Type of Sample:	Tube
Depth/Elevation:	1901.6
Soil Classification (ASTM D 2487):	(CH)

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	102.6
Percent of Max. Density:	N/A
Moisture Content (%):	23.9
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.6×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
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Date: March 8, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-33B
Sample Number:	DC-CC-224
Location	38826N 40043E
Type of Sample:	Tube
Depth/Elevation:	1902.9
Soil Classification (ASTM D 2487):	(CL)

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	105
Percent of Max. Density:	N/A
Moisture Content (%):	24.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	6.5×10^{-8}

Remarks:

Braun Intertec Corporation

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Permeability Tests

Date: March 8, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-34A
Sample Number:	DC-CC-225
Location	38833N 39841E
Type of Sample:	Tube
Depth/Elevation:	1904.2
Soil Classification (ASTM D 2487):	(CL)

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	103.1
Percent of Max. Density:	N/A
Moisture Content (%):	21.3
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.1×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Date: March 8, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-35A
Sample Number:	DC-CC-226
Location	38843N 39956E
Type of Sample:	Tube
Depth/Elevation:	1905.2
Soil Classification (ASTM D 2487):	(CH)

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	97.7
Percent of Max. Density:	N/A
Moisture Content (%):	27.7
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	3.4×10^{-8}

Remarks:

Braun Intertec Corporation

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Date: March 9, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-36B
Sample Number:	DC-CC-228
Location	38843N 40078E
Type of Sample:	Tube
Depth/Elevation:	1907.9
Soil Classification (ASTM D 2487):	(CL)

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	94
Percent of Max. Density:	N/A
Moisture Content (%):	25.1
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.5×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Date: March 9, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-37B
Sample Number:	DC-CC-229
Location	38847N 40206E
Type of Sample:	Tube
Depth/Elevation:	1909.6
Soil Classification (ASTM D 2487):	(CH)

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	99.4
Percent of Max. Density:	N/A
Moisture Content (%):	23.4
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.6×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Date: March 9, 1994

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Client:
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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-38B
Sample Number:	DC-CC-230
Location	38848N 39749E
Type of Sample:	Tube
Depth/Elevation:	1916.2
Soil Classification (ASTM D 2487):	(CL)

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	99.5
Percent of Max. Density:	N/A
Moisture Content (%):	21.4
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.6×10^{-8}

Remarks:

Braun Intertec Corporation

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Date: March 18, 1994

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Client:
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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	N/A
Sample Number:	CC-255
Location	Stockpile N of EP #94
Type of Sample:	Bag
Depth/Elevation:	N/A
Soil Classification (ASTM D 2487):	(CL)

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	100.8
Optimum Moisture Content:	22

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Remolded
Dry Density (pcf):	97
Percent of Max. Density:	96.2
Moisture Content (%):	21.6
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.1×10^{-8}

Remarks:

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Operations Supervisor

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Mr. Andy Stewart
14615 Lone Oak Road
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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	N/A
Sample Number:	CC-256
Location	Stockpile N of EP #94
Type of Sample:	Bag
Depth/Elevation:	N/A
Soil Classification (ASTM D 2487):	(CL)

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	99.5
Optimum Moisture Content:	22.2

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Remolded
Dry Density (pcf):	95.6
Percent of Max. Density:	96.1
Moisture Content (%):	23.9
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	$1x10^{-7}$

Remarks:

Braun Intertec Corporation

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Date: March 18, 1994

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Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	N/A
Sample Number:	CC-257
Location	Stockpile N of EP #94
Type of Sample:	Bag
Depth/Elevation:	N/A
Soil Classification (ASTM D 2487):	(CH)

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	95.3
Optimum Moisture Content:	25

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Remolded
Dry Density (pcf):	94
Percent of Max. Density:	98.6
Moisture Content (%):	26.8
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	9.5×10^{-8}

Remarks:

Braun Intertec Corporation

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Permeability Tests

Date: March 18, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	N/A
Sample Number:	CC-258
Location	Stockpile N of EP #94
Type of Sample:	Bag
Depth/Elevation:	N/A
Soil Classification (ASTM D 2487):	(CH)

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	97.2
Optimum Moisture Content:	23.5

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Remolded
Dry Density (pcf):	92.5
Percent of Max. Density:	95.2
Moisture Content (%):	23.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1×10^{-7}

Remarks:

Braun Intertec Corporation

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Date: March 18, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	N/A
Sample Number:	CC-259
Location	Stockpile N of EP #94
Type of Sample:	Bag
Depth/Elevation:	N/A
Soil Classification (ASTM D 2487):	(CH)

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	93.1
Optimum Moisture Content:	25.7

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Remolded
Dry Density (pcf):	90.2
Percent of Max. Density:	96.9
Moisture Content (%):	26.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	$1x10^{-7}$

Remarks:

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Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	N/A
Sample Number:	CC-260
Location	Stockpile N of EP #94
Type of Sample:	Bag
Depth/Elevation:	N/A
Soil Classification (ASTM D 2487):	(CL)

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	102
Optimum Moisture Content:	22

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Remolded
Dry Density (pcf):	98.5
Percent of Max. Density:	96.6
Moisture Content (%):	22
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	4.8×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	N/A
Sample Number:	CC-261
Location	Stockpile N of EP #94
Type of Sample:	Bag
Depth/Elevation:	N/A
Soil Classification (ASTM D 2487):	(CL)

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	99.7
Optimum Moisture Content:	22.5

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Remolded
Dry Density (pcf):	96.1
Percent of Max. Density:	96.4
Moisture Content (%):	22.6
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	7.4×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Date: March 18, 1994

Project: BFDX-92-018C

Client:
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Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	N/A
Sample Number:	CC-262
Location	Stockpile N of EP #94
Type of Sample:	Bag
Depth/Elevation:	N/A
Soil Classification (ASTM D 2487):	(CH)

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	96.1
Optimum Moisture Content:	25.3

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Remolded
Dry Density (pcf):	96
Percent of Max. Density:	99.9
Moisture Content (%):	23.4
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	4.3×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
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Permeability Tests

Date: July 8, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	39A
Sample Number:	CLB-CC-272
Location	39021N 39823E
Type of Sample:	Tube
Depth/Elevation:	1901.1
Soil Classification (ASTM D 2487):	Lean Clay (CL)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	100.0
Percent of Max. Density:	N/A
Moisture Content (%):	22.2
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.5×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin - CPA

cvp/39

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Date: July 8, 1993

Project: BFDX-92-018C

Client:
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Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344

Project Description:
EP #93

Sample Data:

Shelby Tube Number:	40A
Sample Number:	CLB-CC-273
Location	39026N 40093E
Type of Sample:	Tube
Depth/Elevation:	1899.5
Soil Classification (ASTM D 2487):	Lean Clay (CL)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undistrubed
Dry Density (pcf):	103
Percent of Max. Density:	N/A
Moisture Content (%):	21.1
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	4.6×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

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Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	41B
Sample Number:	CLB-CC-274
Location:	39134N 39841E
Type of Sample:	Tube
Depth/Elevation:	1900.6
Soil Classification (ASTM D 2487):	Lean Clay (CL)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	105.1
Percent of Max. Density:	N/A
Moisture Content (%):	20.0
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.6×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin - CPA

cvp/41

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Permeability Tests

Date: July 8, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	42A
Sample Number:	CLB-CC-275
Location:	39156N 40088E
Type of Sample:	Tube
Depth/Elevation:	1899
Soil Classification (ASTM D 2487):	Lean Clay (CL)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	99.0
Percent of Max. Density:	N/A
Moisture Content (%):	20.7
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	8.4×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin - CPA

cvp/42a

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Date: July 8, 1993

Project: BFDX-92-018C

Client:
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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	43A
Sample Number:	CLB-CC-276
Location:	39248N 40088E
Type of Sample:	Tube
Depth/Elevation:	1899
Soil Classification (ASTM D 2487):	Lean Clay (CL)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	110.2
Percent of Max. Density:	N/A
Moisture Content (%):	14.0
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	8.5×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin - CPA

cvp/43a

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Date: July 8, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	44B
Sample Number:	CLB-CC-277
Location:	39243N 39889E
Type of Sample:	Tube
Depth/Elevation:	1899.8
Soil Classification (ASTM D 2487):	Fat Clay (CH)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	97.9
Percent of Max. Density:	N/A
Moisture Content (%):	26.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	3.5×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin - CPA

cvp/44b

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Date: July 8, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	45A
Sample Number:	CLS-CC-280
Location:	39329N 39740
Type of Sample:	Tube
Depth/Elevation:	1900.6
Soil Classification (ASTM D 2487):	Lean Clay (CL)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	107.1
Percent of Max. Density:	N/A
Moisture Content (%):	18.6
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.4×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Manager

cvp45a

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Date: June 25, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	46A
Sample Number:	CLS-CC-281
Location:	39405N 39835E
Type of Sample:	Tube
Depth/Elevation:	1900.5
Soil Classification (ASTM D 2487):	Lean CLay (CL)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	104.4
Percent of Max. Density:	N/A
Moisture Content (%):	16.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	7.6×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin - CPA

cvp/46a

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Date: June 25, 1993

Project: BFDX-92-018C

Client:
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Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	47A
Sample Number:	CLS-CC-282
Location:	38915N 39828E
Type of Sample:	Tube
Depth/Elevation:	1902.9
Soil Classification (ASTM D 2487):	Fat Clay (CH)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	106.8
Percent of Max. Density:	N/A
Moisture Content (%):	21.8
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.7×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

cc: Jim Martin - CPA

Gerald L. Dauer, C.E.T.
Operations Manager

cvp/47a

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Date: July 8, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	48A
Sample Number:	CLS-CC-283
Location:	38912N 40084E
Type of Sample:	Tube
Depth/Elevation:	1902
Soil Classification (ASTM D 2487):	Lean Clay (CL)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	106.3
Percent of Max. Density:	N/A
Moisture Content (%):	20.4
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.5×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin - CPA

cvp/48a

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Date: June 25, 1993

Project: BFDX-92-018C

Client:
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Attn: Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	49A
Sample Number:	CLS-CC-284
Location:	39021N 40196E
Type of Sample:	Tube
Depth/Elevation:	1900.9
Soil Classification (ASTM D 2487):	Fat Clay (CH)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	98.0
Percent of Max. Density:	N/A
Moisture Content (%):	21.2
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	4.4×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin - CPA

cvp/49a

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Date: July 8, 1993

Project: BFDX-92-018C

Client:
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Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	50A
Sample Number:	CLS-CC-285
Location:	39290N 40193E
Type of Sample:	Tube
Depth/Elevation:	1899.6
Soil Classification (ASTM D 2487):	Lean Clay (CL)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	105.8
Percent of Max. Density:	N/A
Moisture Content (%):	20.7
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.6×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

cc: Jim Martin - CPA

Gerald L. Dauer, C.E.T.
Operations Manager

cvp/50a

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Date: July 8, 1993

Project: BFDX-92-018C

Client:
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14615 Lone Oak Road
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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	51A
Sample Number:	CLS-CC-287
Location:	39413N 40076E
Type of Sample:	Tube
Depth/Elevation:	1901.8
Soil Classification (ASTM D 2487):	Lean Clay (CL)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	105.6
Percent of Max. Density:	N/A
Moisture Content (%):	20.8
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.6×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin - CPA

cvp/51a

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Date: July 8, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	52A
Sample Number:	CLS-CC-288
Location:	38993N 39725E
Type of Sample:	Tube
Depth/Elevation:	1905.7
Soil Classification (ASTM D 2487):	Fat Clay (CH)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	100.5
Percent of Max. Density:	N/A
Moisture Content (%):	22.9
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	5.6×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin - CPA

cvp/52a

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Date: June 25, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	53A
Sample Number:	CLS-CC-290
Location:	38894N
Type of Sample:	39964E
Depth/Elevation:	Tube
Soil Classification (ASTM D 2487):	1910.2 Lean Clay (CL)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	105.8
Percent of Max. Density:	N/A
Moisture Content (%):	26.3
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.6×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin - CPA

cvp/53a

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Date: June 25, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	54B
Sample Number:	CLS-CC-291
Location:	39136N 40215E
Type of Sample:	Tube
Depth/Elevation:	1909.5
Soil Classification (ASTM D 2487):	Fat Clay (CH)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	106.2
Percent of Max. Density:	N/A
Moisture Content (%):	21.7
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.9×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin - CPA

cvp/54b

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Date: June 25, 1993

Project: BFDX-92-018C

Client:
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Attn: Mr. Andy Stewart
14615 Lone Oak Road
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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	55A
Sample Number:	CLB-CC-300
Location:	38941N 39816E
Type of Sample:	Tube
Depth/Elevation:	1902.7
Soil Classification (ASTM D 2487):	Lean Clay (CL)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	110
Percent of Max. Density:	N/A
Moisture Content (%):	19.7
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.2×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin - CPA

cvp/55a

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Date: June 25, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	56A
Sample Number:	CLB-CC-301
Location:	38939N 39980E
Type of Sample:	Tube
Depth/Elevation:	1901.7
Soil Classification (ASTM D 2487):	Lean Clay (CL)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	97.9
Percent of Max. Density:	N/A
Moisture Content (%):	23.2
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.6×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin - CPA

cvp/56a

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Date: June 25, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	57A
Sample Number:	CLB-CC-302
Location:	38944N 40130E
Type of Sample:	Tube
Depth/Elevation:	1901.1
Soil Classification (ASTM D 2487):	Fat Clay (CH)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	107.3
Percent of Max. Density:	N/A
Moisture Content (%):	21.8
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.5×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin - CPA

cvp/57a

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Date: March 23, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST R-58B
Sample Number:	CLB-CC-310
Location	39110N 401443
Type of Sample:	Tube
Depth/Elevation:	1900.1
Soil Classification (ASTM D 2487):	(CL)

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	98.0
Percent of Max. Density:	N/A
Moisture Content (%):	21.4
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	$1x10^{-7}$

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

cvp4/192

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Date: July 8, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	58A	58B
Sample Number:	CLB-CC-303	CLB-CC-303
Location:	39110N 40144E	39110N 40144E
Type of Sample:	Tube	Tube
Depth/Elevation:	1900.1	1900.1
Soil Classification (ASTM D 2487):	Fat Clay (CH)	Fat Clay (CH)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head	Falling Head
Type of Specimen:	Undisturbed	Undisturbed
Dry Density (pcf):	N/A*	N/A*
Percent of Max. Density:	N/A	N/A
Moisture Content (%):	N/A*	N/A*
Max. Head Differential (ft):	3	3
Confining Pressure (effective-PSI):	4	4
Coefficient of Permeability (cm/sec):	N/A*	N/A*

Remarks:

Braun Intertec Engineering, Inc.

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin

* Non-recoverable samples retested by sample CLB-CC-310.

cvp58a&b

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Engineers and Scientists Serving the Built and Natural Environments®

Permeability Tests

Date: June 25, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST.59A
Sample Number:	CLB-CC-304
Location:	39106N 39971E
Type of Sample:	Tube
Depth/Elevation:	1901.2
Soil Classification (ASTM D 2487):	Lean Clay (CL)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	100.6
Percent of Max. Density:	N/A
Moisture Content (%):	21.0
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	$1x10^{-7}$

Remarks:

Braun Intertec Engineering, Inc.

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin - CPA

cv2/59

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Permeability Tests

Date: July 9, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-228

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	Retest 59B
Sample Number:	CLB-CC-338
Location:	39106N 39971E
Type of Sample:	Tube
Depth/Elevation:	1901.2
Soil Classification (ASTM D 2487):	Fat Clay (CH), dark grayish-brown

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	102.3
Percent of Max. Density:	N/A
Moisture Content (%):	21.9
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.3×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin

cvp/r59b

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Permeability Tests

Date: June 25, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	60B
Sample Number:	CLB-CC-305
Location:	39100N 39797E
Type of Sample:	Tube
Depth/Elevation:	1902.2
Soil Classification (ASTM D 2487):	Lean Clay (CL)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	106.3
Percent of Max. Density:	N/A
Moisture Content (%):	21.4
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	3.7×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin - CPA

cvp/60b

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Date: June 25, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	61A
Sample Number:	CLB-CC-306
Location:	39314N 39778E
Type of Sample:	Tube
Depth/Elevation:	1901.1
Soil Classification (ASTM D 2487):	Lean Clay (CL)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	100.8
Percent of Max. Density:	N/A
Moisture Content (%):	24.3
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1×10^{-7}

Remarks:

Braun Intertec Engineering, Inc.

cc: Jim Martin - CPA

Gerald L. Dauer, C.E.T.
Operations Manager

cvp/61a

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Date: June 25, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	62A
Sample Number:	CLB-CC-307
Location:	39322N 39939E
Type of Sample:	Tube
Depth/Elevation:	1900.1
Soil Classification (ASTM D 2487):	Fat Clay (CH)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	106.1
Percent of Max. Density:	N/A
Moisture Content (%):	22.2
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	3.3×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin - CPA

cv2/62a

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Date: July 9, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	63A
Sample Number:	CLB-CC-308
Location:	39333N 40109E
Type of Sample:	Tube
Depth/Elevation:	1899.1
Soil Classification (ASTM D 2487):	Fat Clay (CH)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	103.6
Percent of Max. Density:	N/A
Moisture Content (%):	23.4
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	3.7×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin - CPA

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Date: June 25, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	R-64A
Sample Number:	CLB-CC-314
Location:	37258N 40240E
Type of Sample:	Tube
Depth/Elevation:	1908.1
Soil Classification (ASTM D 2487):	Fat Clay(CH)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	99.4
Percent of Max. Density:	N/A
Moisture Content (%):	22.6
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.8×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

cc: Jim Martin - CPA

Gerald L. Dauer, C.E.T.
Operations Manager

cv2/r64a

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Permeability Tests

Date: July 9, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	64A	64B
Sample Number:	CLB-CC-311	CLB-CC-311
Location:	37258N 40240E	37258N 40240E
Type of Sample:	Tube	Tube
Depth/Elevation:	1908.1	1908.1
Soil Classification (ASTM D 2487):	Fat Clay (CH)	Fat Clay (CH)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head	Falling Head
Type of Specimen:	Undisturbed	Undisturbed
Dry Density (pcf):	N/A*	N/A*
Percent of Max. Density:	N/A*	N/A*
Moisture Content (%):	N/A*	N/A*
Max. Head Differential (ft):	3	3
Confining Pressure (effective-PSI):	4	4
Coefficient of Permeability (cm/sec):	N/A*	N/A*

Remarks:

Braun Intertec Engineering, Inc.

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin

* Non-recoverable samples retested by sample CLB-CC-314.

cvp64a&b

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Permeability Tests

Date: June 25, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	65A
Sample Number:	CLB-CC-312
Location:	37392N 40039E
Type of Sample:	Tube
Depth/Elevation:	1908.4
Soil Classification (ASTM D 2487):	Fat Clay (CH)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	99.5
Percent of Max. Density:	N/A
Moisture Content (%):	25.3
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.1×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin - CPA

cvp/65a

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Permeability Tests

Date: June 25, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	66A
Sample Number:	CLB-CC-313
Location:	37551N 39820E
Type of Sample:	Tube
Depth/Elevation:	1908.7
Soil Classification (ASTM D 2487):	Fat Clay (CH)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	100.5
Percent of Max. Density:	N/A
Moisture Content (%):	23.4
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.1×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin - CPA

cvp/66a

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Permeability Tests

Date: June 25, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	67A
Sample Number:	CLB-CC-315
Location:	37462N 40321E
Type of Sample:	Tube
Depth/Elevation:	1906.4
Soil Classification (ASTM D 2487):	Fat Clay (CH)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	100.7
Percent of Max. Density:	N/A
Moisture Content (%):	23
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.5×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin - CPA

cvp/67a

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Permeability Tests

Date: July 2, 1993

Project: BFDX-92-088A

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	68B
Sample Number:	CLB-CC-316
Location:	37615N 40085E
Type of Sample:	Tube
Depth/Elevation:	1907
Soil Classification (ASTM D 2487):	Fat Clay (CH)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	98.8
Percent of Max. Density:	N/A
Moisture Content (%):	22.4
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	4.5×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin

cvp/68b

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Permeability Tests

Date: June 28, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	69B
Sample Number:	CLB-CC-317
Location:	37769N 39859E
Type of Sample:	Tube
Depth/Elevation:	1907
Soil Classification (ASTM D 2487):	Fat Clay (CH)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	95.9
Percent of Max. Density:	N/A
Moisture Content (%):	25.7
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.5×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

cc: Jim Martin

Gerald E. Dauer, C.E.T.
Operations Manager

cvp/69b

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Date: July 2, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14614 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	70A
Sample Number:	CLB-CC-318
Location:	37610N 40413E
Type of Sample:	Tube
Depth/Elevation:	1905.3
Soil Classification (ASTM D 2487):	Fat Clay (CH)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	99.2
Percent of Max. Density:	N/A
Moisture Content (%):	21.3
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.4×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

Gerald E. Dauer, C.E.T.
Operations Manager

cc: Jim Martin

cvp/70a

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Permeability Tests

Date: March 23, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	71A	71B
Sample Number:	CLB-CC-319	CLB-CC-319
Location	37734N 40211E	37734N 40211E
Type of Sample:	Tube	Tube
Depth/Elevation:	1905.7	1905.7
Soil Classification (ASTM D 2487):	Fat Clay (CH), dark grayish brown.	Fat Clay (CH), dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*		
Max. Dry Density (pcf):	N/A	N/A
Optimum Moisture Content:	N/A	N/A

Permeability Test Data:

Type of Test:	Falling Head	Falling Head
Type of Specimen:	Undisturbed	Undisturbed
Dry Density (pcf):	*	*
Percent of Max. Density:	N/A	N/A
Moisture Content (%):	*	*
Max. Head Differential (ft):	3	3
Confining Pressure (effective-PSI):	4	4
Coefficient of Permeability (cm/sec):	*	*

Remarks:

* Non-recoverable samples. Retested by sample CLB-CC-320.

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

cvp4/195

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Permeability Tests

Date: June 28, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	Retest 71A
Sample Number:	CLB-CC-320
Location:	37734N 40211E
Type of Sample:	Tube
Depth/Elevation:	1905.7
Soil Classification (ASTM D 2487):	Fat Clay (CH)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	104.3
Percent of Max. Density:	N/A
Moisture Content (%):	21.7
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.1×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Manager

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Date: June 28, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, Mn 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	72A
Sample Number:	CLB-CC-325
Location:	37315N 39973E
Type of Sample:	Tube
Depth/Elevation:	1909.7
Soil Classification (ASTM D 2487):	Fat Clay (CH)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	104
Percent of Max. Density:	N/A
Moisture Content (%):	20.1
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	3.4×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin

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Permeability Tests

Date: March 23, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	73A
Sample Number:	CLB-CC-326
Location	37180N 40330E
Type of Sample:	Tube
Depth/Elevation:	1908.7
Soil Classification (ASTM D 2487):	Fat Clay (CH)

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	105.3
Percent of Max. Density:	N/A
Moisture Content (%):	23.9
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.5×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

cvp4/193

BRAUN INTERTEC

Braun Intertec Corporation
913 South 18th Street
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701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

Permeability Tests

Date: June 28, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	74A
Sample Number:	CLB-CC-327
Location:	37335N 40463E
Type of Sample:	Tube
Depth/Elevation:	1907.3
Soil Classification (ASTM D 2487):	Lean Clay (CL)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	107.7
Percent of Max. Density:	N/A
Moisture Content (%):	20.6
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.9×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin

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Engineers and Scientists Serving the Built and Natural Environments

Permeability Tests

Date: March 23, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	75A
Sample Number:	CLB-CC-328
Location	37387N 40190E
Type of Sample:	Tube
Depth/Elevation:	1908.4
Soil Classification (ASTM D 2487):	Fat Clay (CH)

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	96.5
Percent of Max. Density:	N/A
Moisture Content (%):	21.8
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.7×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Permeability Tests

Date: July 1, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	76A
Sample Number:	CLB-CC-329
Location:	37422N 39979E
Type of Sample:	Tube
Depth/Elevation:	1909.3
Soil Classification (ASTM D 2487):	Fat Clay (CH), olive

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	101.2
Percent of Max. Density:	N/A
Moisture Content (%):	23.6
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	4.6×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Manager

cvp/76a

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Permeability Tests

Date: July 1, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	77A
Sample Number:	CLB-CC-330
Location:	37622N 39849E
Type of Sample:	Tube
Depth/Elevation:	1908.9
Soil Classification (ASTM D 2487):	Fat Clay (CH), dark grayish-brown

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	108.3
Percent of Max. Density:	N/A
Moisture Content (%):	20.3
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.4×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Manager

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Permeability Tests

Date: July 9, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	78A
Sample Number:	CLB-CC-331
Location:	37573N 40097E
Type of Sample:	Tube
Depth/Elevation:	1908.2
Soil Classification (ASTM D 2487):	Fat Clay (CH), dark grayish-brown

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	106.2
Percent of Max. Density:	N/A
Moisture Content (%):	23.3
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	3.7×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Manager

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Permeability Tests

Date: July 1, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	79A
Sample Number:	CLB-CC-332
Location:	37526N 40337E
Type of Sample:	Tube
Depth/Elevation:	1907
Soil Classification (ASTM D 2487):	Fat Clay (CH), olive gray

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	108
Percent of Max. Density:	N/A
Moisture Content (%):	22.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	9.5×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Manager

cvp79a

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Date: July 1, 1993

Project: BFDX-92-018C

Client:
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Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	80A
Sample Number:	CLB-CC-333
Location:	37483N 40538E
Type of Sample:	Tube
Depth/Elevation:	1906.4
Soil Classification (ASTM D 2487):	Fat Clay (CH), olive gray

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	103.6
Percent of Max. Density:	N/A
Moisture Content (%):	21.1
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	3.2×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Manager

cvp80a

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Permeability Tests

Date: July 1, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	81A
Sample Number:	CLB-CC-334
Location:	37801N 39793E
Type of Sample:	Tube
Depth/Elevation:	1908.4
Soil Classification (ASTM D 2487):	Fat Clay (CH), dark grayish-brown

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	107.9
Percent of Max. Density:	N/A
Moisture Content (%):	23.7
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	3.5×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

cc: Jim Martin

Gerald E. Dauer, C.E.T.
Operations Manager

cvp/81a

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Permeability Tests

Date: July 1, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	82B
Sample Number:	CLB-CC-335
Location:	37748N 40044E
Type of Sample:	Tube
Depth/Elevation:	1907.5
Soil Classification (ASTM D 2487):	Fat Clay (CH), dark grayish-brown

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	105.6
Percent of Max. Density:	N/A
Moisture Content (%):	23.8
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.7×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Manager

cvp/82b

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Permeability Tests

Date: July 1, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	83A
Sample Number:	CLB-CC-336
Location:	37694N 40314E
Type of Sample:	Tube
Depth/Elevation:	1906.4
Soil Classification (ASTM D 2487):	Fat Clay (CH), dark grayish-brown

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	101.4
Percent of Max. Density:	N/A
Moisture Content (%):	23.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.1×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Manager

cvp/83a

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Permeability Tests

Date: July 9, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Assocation
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	84B
Sample Number:	CLB-CC-337
Location:	37627N 40616E
Type of Sample:	Tube
Depth/Elevation:	1905.1
Soil Classification (ASTM D 2487):	Lean Clay (CL), dark grayish-brown

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	99.2
Percent of Max. Density:	N/A
Moisture Content (%):	22.9
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.6×10^{-8}

Remarks:

Braun Intertec Engineering, Inc.

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Manager

cvp/84b

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Engineers and Scientists Serving the Built and Natural Environments

Permeability Tests

Date: March 24, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	85A
Sample Number:	CLS-CC-342
Location	38765N 40182E
Type of Sample:	Tube
Depth/Elevation:	1901.3
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	103.5
Percent of Max. Density:	N/A
Moisture Content (%):	18.9
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.3×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

cvp4/196

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Permeability Tests

Date: July 15, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Assocication
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	86A	86B
Sample Number:	CLS-CC-343	CLS-CC-343
Location:	38760N 40378E	38760N 40378E
Type of Sample:	Tube	Tube
Depth/Elevation:	1900.9	1900.9
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL)	Sandy Lean Clay (CL)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head	Falling Head
Type of Specimen:	Undisturbed	Undisturbed
Dry Density (pcf):	N/A*	N/A*
Percent of Max. Density:	N/A	N/A
Moisture Content (%):	N/A*	N/A*
Max. Head Differential (ft):	3	3
Confining Pressure (effective-PSI):	4	4
Coefficient of Permeability (cm/sec):	N/A*	NA*

Remarks:

* Non-recoverable samples. Retested by CLS-CC-354.

cc: Jim Martin

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Manager

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Engineers and Scientists Serving the Built and Natural Environments

Permeability Tests

Date: February 15, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	R86A
Sample Number:	CLS-CC-354
Location	38768N 40464E
Type of Sample:	Tube
Depth/Elevation:	1900.9
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	115.1
Percent of Max. Density:	N/A
Moisture Content (%):	16.9
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.3×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Engineers and Scientists Serving the Built and Natural Environments

Permeability Tests

Date: July 15, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	87A	87B
Sample Number:	CLS-CC-344	CLS-CC-344
Location:	38700N 41517E	38700N 41517E
Type of Sample:	Tube	Tube
Depth/Elevation:	1897.5	1897.5
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL)	Sandy Lean Clay (CL)

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head	Falling Head
Type of Specimen:	Undisturbed	Undisturbed
Dry Density (pcf):	N/A*	N/A*
Percent of Max. Density:	N/A	N/A
Moisture Content (%):	N/A*	N/A*
Max. Head Differential (ft):	3	3
Confining Pressure (effective-PSI):	4	4
Coefficient of Permeability (cm/sec):	N/A*	N/A*

Remarks:

* Non-recoverable samples.
Retested by CLS-CC-353.

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin

cvp87a&b

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Permeability Tests

Date: July 13, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	Retest 87A
Sample Number:	CLS-CC-353
Location:	38700N 41517E
Type of Sample:	Tube
Depth/Elevation:	1897.5
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), grayish-brown

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	113.5
Percent of Max. Density:	N/A
Moisture Content (%):	17.2
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.5×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin

cvp/87a

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Permeability Tests

Date: July 13, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	88A
Sample Number:	CLS-CC-345
Location:	38506N 41521E
Type of Sample:	Tube
Depth/Elevation:	1896.8
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	108.9
Percent of Max. Density:	N/A
Moisture Content (%):	19.2
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.4×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin

cvp/88a

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Engineers and Scientists Serving the Built and Natural Environments®

Permeability Tests

Date: July 13, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	89A
Sample Number:	CLS-CC-346
Location:	38753N 41072E
Type of Sample:	Tube
Depth/Elevation:	1898.5
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	110.1
Percent of Max. Density:	N/A
Moisture Content (%):	18.7
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.6×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin

cvp/89a

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Date: July 13, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	90A
Sample Number:	CLS-CC-347
Location:	38760N 40876E
Type of Sample:	Tube
Depth/Elevation:	1899
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	109.9
Percent of Max. Density:	N/A
Moisture Content (%):	18.8
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.6×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin

cvp/90a

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Date: July 13, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	91A
Sample Number:	CLS-CC-348
Location:	38107N 41531E
Type of Sample:	Tube
Depth/Elevation:	1899.7
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	110.7
Percent of Max. Density:	N/A
Moisture Content (%):	18.9
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.3×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin

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Date: July 13, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	92A
Sample Number:	CLS-CC-349
Location:	38737N 39730E
Type of Sample:	Tube
Depth/Elevation:	1906.4
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	108.1
Percent of Max. Density:	N/A
Moisture Content (%):	19.0
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.4×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin

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Date: July 13, 1993

Project: BFDX-92-018C

Client:
Cooperative Power Association
Attn: Mr. Andy Stewart
14614 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	93A
Sample Number:	CLS-CC-350
Location:	38203N 41533E
Type of Sample:	Tube
Depth/Elevation:	1900.9
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	106.5
Percent of Max. Density:	N/A
Moisture Content (%):	19.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.7×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	94A
Sample Number:	CLS-CC-352
Location:	38782N 39976E
Type of Sample:	Tube
Depth/Elevation:	1904.9
Soil Classification (ASTM D 2487):	Fat Clay w/Sand (CH), grayish-brown

Moisture-Density Relation of Soil:

Method:	ASTM D 698
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	111.9
Percent of Max. Density:	N/A
Moisture Content (%):	18.2
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.7×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Manager

cc: Jim Martin

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Date: February 15, 1994

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Client:
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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	95A
Sample Number:	CLS-CC-356
Location	37364N 41191E
Type of Sample:	Tube
Depth/Elevation:	1905
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	108.1
Percent of Max. Density:	N/A
Moisture Content (%):	21.0
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.0×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	96B
Sample Number:	CLS-CC-357
Location	38768N 41169E
Type of Sample:	Tube
Depth/Elevation:	1900.2
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	110.9
Percent of Max. Density:	N/A
Moisture Content (%):	16.4
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.0×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	97A
Sample Number:	CLS-CC-358
Location	37595N 41397E
Type of Sample:	Tube
Depth/Elevation:	1904.8
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	112.1
Percent of Max. Density:	N/A
Moisture Content (%):	16.6
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.9×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	98B
Sample Number:	CLS-CC-359
Location	38587N 39725E
Type of Sample:	Tube
Depth/Elevation:	1910.1
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	109.4
Percent of Max. Density:	N/A
Moisture Content (%):	18.1
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.3×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Date: February 15, 1994

Project: BFDX-92-018C

Client:
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14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	99A
Sample Number:	CLS-CC-360
Location	38781N 40561E
Type of Sample:	Tube
Depth/Elevation:	1906.2
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	111.6
Percent of Max. Density:	N/A
Moisture Content (%):	17.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	3.7×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Date: February 15, 1994

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Client:
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Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	100A
Sample Number:	CLS-CC-361
Location	38783N 40474E
Type of Sample:	Tube
Depth/Elevation:	1908.1
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	110.1
Percent of Max. Density:	N/A
Moisture Content (%):	19.2
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.2×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Permeability Tests

Date: February 15, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	101A
Sample Number:	CLS-CC-362
Location	38784N 41471E
Type of Sample:	Tube
Depth/Elevation:	1905.2
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	107
Percent of Max. Density:	N/A
Moisture Content (%):	20.9
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.3×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Date: February 15, 1994

Project: BFDX-92-018C

Client:
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Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	102A
Sample Number:	CLS-CC-364
Location	38676N 39706E
Type of Sample:	Tube
Depth/Elevation:	1914.2
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	105.4
Percent of Max. Density:	N/A
Moisture Content (%):	21.6
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.4×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Date: March 18, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	103A
Sample Number:	CLS-CC-365
Location	38598N 41552E
Type of Sample:	Tube
Depth/Elevation:	1909.3
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	102.7
Percent of Max. Density:	N/A
Moisture Content (%):	22.6
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.3×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Date: February 15, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	104A
Sample Number:	CLS-CC-366
Location	38400N 41556E
Type of Sample:	Tube
Depth/Elevation:	1909.8
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	107.9
Percent of Max. Density:	N/A
Moisture Content (%):	21.0
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	3.0×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Date: February 16, 1994

Project: BFDX-92-018C

Client:
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Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	105A
Sample Number:	CLS-CC-367
Location	38777N 41376E
Type of Sample:	Tube
Depth/Elevation:	1906.5
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	106.1
Percent of Max. Density:	N/A
Moisture Content (%):	22.1
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.4×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Date: February 16, 1994

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Client:
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Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	106A
Sample Number:	CLS-CC-369
Location	37726N 41533E
Type of Sample:	Tube
Depth/Elevation:	1911.9
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	102.1
Percent of Max. Density:	N/A
Moisture Content (%):	22.4
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.0×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Client:
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14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	107A
Sample Number:	CLS-CC-371
Location	38001N 41572E
Type of Sample:	Tube
Depth/Elevation:	1916.2
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	104.7
Percent of Max. Density:	N/A
Moisture Content (%):	23.8
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.0×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Engineers and Scientists Serving the Built and Natural Environments

Permeability Tests

Date: March 29, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	TP-1
Sample Number:	CC-373
Location	40902N 40536E
Type of Sample:	Bag
Depth/Elevation:	1885.6
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	98
Optimum Moisture Content:	23%

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Remolded
Dry Density (pcf):	97.5
Percent of Max. Density:	99.5
Moisture Content (%):	23.3
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	3.1×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Permeability Tests

Date: March 18, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	TP-1
Sample Number:	CC-374
Location	40902N 40536E
Type of Sample:	Bag
Depth/Elevation:	1885.6
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	97
Optimum Moisture Content:	20%

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Remolded
Dry Density (pcf):	99.5
Percent of Max. Density:	102.5
Moisture Content (%):	21.6
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	4.5×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Client:
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Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	TP-2
Sample Number:	CC-375
Location	40860N 40876E
Type of Sample:	Bag
Depth/Elevation:	1883
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	97.3
Optimum Moisture Content:	21%

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Remolded
Dry Density (pcf):	97.5
Percent of Max. Density:	100.2
Moisture Content (%):	22
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	7.4×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Date: March 18, 1994

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Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	TP-4
Sample Number:	CC-376
Location	41031N 40670E
Type of Sample:	Bag
Depth/Elevation:	1882.7
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	111.0
Optimum Moisture Content:	16%

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Remolded
Dry Density (pcf):	110.3
Percent of Max. Density:	99.4
Moisture Content (%):	17
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.7×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	TP-3
Sample Number:	CC-377
Location	41070N 40432E
Type of Sample:	Bag
Depth/Elevation:	1885.9
Soil Classification (ASTM D 2487):	Clayey Sand (SC), dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	116.0
Optimum Moisture Content:	14%

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Remolded
Dry Density (pcf):	115.3
Percent of Max. Density:	99.4
Moisture Content (%):	15.3
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.5×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Date: February 16, 1994

Project: BFDX-92-018C

Client:
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Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	TP-5
Sample Number:	CC-378
Location	40672N 42098E
Type of Sample:	Bag
Depth/Elevation:	1886.2
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	105.5
Optimum Moisture Content:	18%

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Remolded
Dry Density (pcf):	104.9
Percent of Max. Density:	99.4
Moisture Content (%):	20.3
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.3×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Client:
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14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	TP-5
Sample Number:	CC-379
Location	40672N 42098E
Type of Sample:	Bag
Depth/Elevation:	1886.2
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	111.5
Optimum Moisture Content:	15%

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Remolded
Dry Density (pcf):	110.8
Percent of Max. Density:	99.4
Moisture Content (%):	15.8
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	7.3×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Date: February 16, 1994

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14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	TP-6
Sample Number:	CC-380
Location	40603N 42028E
Type of Sample:	Bag
Depth/Elevation:	1886.8
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	107.5
Optimum Moisture Content:	18.5%

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Remolded
Dry Density (pcf):	105.9
Percent of Max. Density:	98.5
Moisture Content (%):	19.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.5×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Date: February 16, 1994

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Client:
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Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	TP-6
Sample Number:	CC-381
Location	40603N 42028E
Type of Sample:	Bag
Depth/Elevation:	1886.8
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	101.0
Optimum Moisture Content:	20%

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Remolded
Dry Density (pcf):	100.5
Percent of Max. Density:	99.5
Moisture Content (%):	20.1
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	4.4×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Client:
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Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	TP-7
Sample Number:	CC-382
Location	40721N 41910E
Type of Sample:	Bag
Depth/Elevation:	1884.3
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	96.1
Optimum Moisture Content:	24.5%

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Remolded
Dry Density (pcf):	95.6
Percent of Max. Density:	99.5
Moisture Content (%):	24.4
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	4.2×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Date: February 16, 1994

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Client:
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Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	TP-7
Sample Number:	CC-383
Location	40721N 41910E
Type of Sample:	Bag
Depth/Elevation:	1884.3
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	110.7
Optimum Moisture Content:	15.2%

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Remolded
Dry Density (pcf):	110.8
Percent of Max. Density:	100.1
Moisture Content (%):	16
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	6.4×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Date: February 16, 1994

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14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	TP-8
Sample Number:	CC-384
Location	40812N 42063E
Type of Sample:	Bag
Depth/Elevation:	1884.5
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	108.7
Optimum Moisture Content:	15.5%

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Remolded
Dry Density (pcf):	109
Percent of Max. Density:	100.2
Moisture Content (%):	16
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	4.5×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	TP-9
Sample Number:	CC-385
Location	40726N 42291E
Type of Sample:	Bag
Depth/Elevation:	1881.3
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	100.0
Optimum Moisture Content:	20.5%

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Remolded
Dry Density (pcf):	99.5
Percent of Max. Density:	99.5
Moisture Content (%):	22.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.7×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	TP-10
Sample Number:	CC-386
Location	40614N 42334E
Type of Sample:	Bag
Depth/Elevation:	1885.6
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	103.4
Optimum Moisture Content:	19.1%

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Remolded
Dry Density (pcf):	103
Percent of Max. Density:	99.6
Moisture Content (%):	19.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	4.1×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	TP-11
Sample Number:	CC-387
Location	40477N 42446E
Type of Sample:	Bag
Depth/Elevation:	1885
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	111.5
Optimum Moisture Content:	15%

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Remolded
Dry Density (pcf):	110.3
Percent of Max. Density:	98.9
Moisture Content (%):	17
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	3.4×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	TP-12
Sample Number:	CC-388
Location	41005N 41979E
Type of Sample:	Bag
Depth/Elevation:	1885
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	100.5
Optimum Moisture Content:	21.5%

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Remolded
Dry Density (pcf):	100
Percent of Max. Density:	99.5
Moisture Content (%):	23.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.4×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-108A
Sample Number:	CLB-CC-392
Location	37258N 40993E
Type of Sample:	Tube
Depth/Elevation:	1904.2
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	105.5
Percent of Max. Density:	N/A
Moisture Content (%):	22
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.5×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-109A
Sample Number:	CLB-CC-393
Location	37412N 41139E
Type of Sample:	Tube
Depth/Elevation:	1902.7
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	104.9
Percent of Max. Density:	N/A
Moisture Content (%):	20
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.7×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Braun Intertec Corporation
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P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments®

Permeability Tests

Date: February 16, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-110A
Sample Number:	CLB-CC-394
Location	37364N 40927E
Type of Sample:	Tube
Depth/Elevation:	1904.2
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	105.1
Percent of Max. Density:	N/A
Moisture Content (%):	19
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.1×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-111A
Sample Number:	CLB-CC-395
Location	37493N 41045E
Type of Sample:	Tube
Depth/Elevation:	1902.9
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	106.8
Percent of Max. Density:	N/A
Moisture Content (%):	19.2
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.1×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-112A
Sample Number:	CLB-CC-396
Location	37972N 40399E
Type of Sample:	Tube
Depth/Elevation:	1903.3
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	108.2
Percent of Max. Density:	N/A
Moisture Content (%):	20
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.4×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

cvp4/91

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Permeability Tests

Date: February 16, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-113A
Sample Number:	CLB-CC-397
Location	38025N 40104E
Type of Sample:	Tube
Depth/Elevation:	1904.6
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	96.3
Percent of Max. Density:	N/A
Moisture Content (%):	22.2
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.3×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

cvp4/92

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Date: February 16, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-114B
Sample Number:	CLB-CC-398
Location	38061N 39856E
Type of Sample:	Tube
Depth/Elevation:	1905.9
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	104.6
Percent of Max. Density:	N/A
Moisture Content (%):	22.1
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.3×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Permeability Tests

Date: February 16, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-115A
Sample Number:	CLB-CC-399
Location	37209N 40596E
Type of Sample:	Tube
Depth/Elevation:	1907
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	105.2
Percent of Max. Density:	N/A
Moisture Content (%):	22.4
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.6×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

cvp4/94

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Engineers and Scientists Serving the Built and Natural Environments

Permeability Tests

Date: February 16, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-116B
Sample Number:	CLB-CC-400
Location	37375N 40731E
Type of Sample:	Tube
Depth/Elevation:	1905.4
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	105.9
Percent of Max. Density:	N/A
Moisture Content (%):	20.6
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.5×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Engineers and Scientists Serving the Built and Natural Environments

Permeability Tests

Date: March 24, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-117A
Sample Number:	CLB-CC-401
Location	37556N 40853E
Type of Sample:	Tube
Depth/Elevation:	1903.9
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	107.4
Percent of Max. Density:	N/A
Moisture Content (%):	21.1
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.4×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Permeability Tests

Date: February 16, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-118B
Sample Number:	CLB-CC-402
Location	37830N 40000E
Type of Sample:	Tube
Depth/Elevation:	1906.4
Soil Classification (ASTM D 2487):	Lean Clay with Sand (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	104.2
Percent of Max. Density:	N/A
Moisture Content (%):	22.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	3.1×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Permeability Tests

Date: February 16, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-119B
Sample Number:	CLB-CC-403
Location	37950N 39800E
Type of Sample:	Tube
Depth/Elevation:	1906.6
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	106.6
Percent of Max. Density:	N/A
Moisture Content (%):	24.4
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.4×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

cvp4/101

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Permeability Tests

Date: March 24, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-120B
Sample Number:	CLB-CC-407
Location	37432N 41294E
Type of Sample:	Tube
Depth/Elevation:	1913.9
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	105.2
Percent of Max. Density:	N/A
Moisture Content (%):	22.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.7×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

cvp4/102

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Engineers and Scientists Serving the Built and Natural Environments

Permeability Tests

Date: February 16, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-121A
Sample Number:	CLB-CC-408
Location	37200N 41077E
Type of Sample:	Tube
Depth/Elevation:	1915.5
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	105.9
Percent of Max. Density:	N/A
Moisture Content (%):	19.1
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.6×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Permeability Tests

Date: February 16, 1994

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Client:
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Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-122A
Sample Number:	CLB-CC-411
Location	37160N 40581E
Type of Sample:	Tube
Depth/Elevation:	1907.7
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	111.9
Percent of Max. Density:	N/A
Moisture Content (%):	16.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.5×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

cvp4/104

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Permeability Tests

Date: February 16, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-123A	ST-123B
Sample Number:	CLB-CC-412	CLB-CC-412
Location	37325N 40670E	37325N 40670E
Type of Sample:	Tube	Tube
Depth/Elevation:	1906.4	1906.4
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*		
Max. Dry Density (pcf):	N/A	N/A
Optimum Moisture Content:	N/A	N/A

Permeability Test Data:

Type of Test:	Falling Head	Falling Head
Type of Specimen:	Undisturbed	Undisturbed
Dry Density (pcf):	*	*
Percent of Max. Density:	N/A	N/A
Moisture Content (%):	*	*
Max. Head Differential (ft):	3	3
Confining Pressure (effective-PSI):	4	4
Coefficient of Permeability (cm/sec):	*	*

Remarks:

* Non-recoverable samples. Retested by sample CLB-CC-423.

cc: Jim Martin

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Permeability Tests

Date: February 17, 1994

Project: BFDX-92-018C

Client:
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Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	R-ST-123B
Sample Number:	CLB-CC-423
Location	37325N 40670E
Type of Sample:	Tube
Depth/Elevation:	1906.4
Soil Classification (ASTM D 2487):	Clayey Sand (SC), light olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	115.4
Percent of Max. Density:	N/A
Moisture Content (%):	17.3
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.6×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-124A
Sample Number:	CLB-CC-413
Location	37516N 40775E
Type of Sample:	Tube
Depth/Elevation:	1904.9
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	116.0
Percent of Max. Density:	N/A
Moisture Content (%):	18.2
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.5×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Date: February 16, 1994

Project: BFDX-92-018C

Client:
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Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-125A
Sample Number:	CLB-CC-414
Location	37144N 40783E
Type of Sample:	Tube
Depth/Elevation:	1906.8
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	111.9
Percent of Max. Density:	N/A
Moisture Content (%):	17.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.5×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

cvp4/107

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Permeability Tests

Date: February 17, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-126A	ST-126B
Sample Number:	CLB-CC-415	CLB-CC-415
Location	37299N 40861E	37299N 40861E
Type of Sample:	Tube	Tube
Depth/Elevation:	1905.9	1905.9
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*		
Max. Dry Density (pcf):	N/A	N/A
Optimum Moisture Content:	N/A	N/A

Permeability Test Data:

Type of Test:	Falling Head	Falling Head
Type of Specimen:	Undisturbed	Undisturbed
Dry Density (pcf):	*	*
Percent of Max. Density:	N/A	N/A
Moisture Content (%):	*	*
Max. Head Differential (ft):	3	3
Confining Pressure (effective-PSI):	4	4
Coefficient of Permeability (cm/sec):	*	*

Remarks:

* Non-recoverable samples. Retested by sample CLB-CC-424.

cc: Jim Martin

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

Braun Intertec Corporation
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P.O. Box 2379
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701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments®

Permeability Tests

Date: February 17, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	R-ST-126B
Sample Number:	CLB-CC-424
Location	37299N 40861E
Type of Sample:	Tube
Depth/Elevation:	1905.9
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	112.7
Percent of Max. Density:	N/A
Moisture Content (%):	17.3
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.2×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-127A	ST-127B
Sample Number:	CLB-CC-416	CLB-CC-416
Location	37438N 40932E	37438N 40932E
Type of Sample:	Tube	Tube
Depth/Elevation:	1904.5	1904.5
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*		
Max. Dry Density (pcf):	N/A	N/A
Optimum Moisture Content:	N/A	N/A

Permeability Test Data:

Type of Test:	Falling Head	Falling Head
Type of Specimen:	Undisturbed	Undisturbed
Dry Density (pcf):	*	*
Percent of Max. Density:	N/A	N/A
Moisture Content (%):	*	*
Max. Head Differential (ft):	3	3
Confining Pressure (effective-PSI):	4	4
Coefficient of Permeability (cm/sec):	*	*

Remarks:

* Non-recoverable samples. Retested by sample CLB-CC-425.

cc: Jim Martin

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14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	R-ST-127A
Sample Number:	CLB-CC-425
Location	37438N 40932E
Type of Sample:	Tube
Depth/Elevation:	1904.5
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	110.5
Percent of Max. Density:	N/A
Moisture Content (%):	18.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.4×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-128A
Sample Number:	CLB-CC-417
Location	37600N 41010E
Type of Sample:	Tube
Depth/Elevation:	1903.4
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	117.4
Percent of Max. Density:	N/A
Moisture Content (%):	18.8
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	9.4×10^{-9}

Remarks:

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-129B
Sample Number:	CLB-CC-418
Location	37190N 40965E
Type of Sample:	Tube
Depth/Elevation:	1905.8
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	110.2
Percent of Max. Density:	N/A
Moisture Content (%):	18.4
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.0×10^{-8}

Remarks:

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-130A
Sample Number:	CLB-CC-419
Location	37337N 41070E
Type of Sample:	Tube
Depth/Elevation:	1904.5
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	110.5
Percent of Max. Density:	N/A
Moisture Content (%):	18.8
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.0×10^{-8}

Remarks:

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-131A
Sample Number:	CLB-CC-420
Location	37484N 41175E
Type of Sample:	Tube
Depth/Elevation:	1903.3
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	109.6
Percent of Max. Density:	N/A
Moisture Content (%):	19.1
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.7×10^{-8}

Remarks:

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cc: Jim Martin

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-132A
Sample Number:	CLB-CC-430
Location	37995N 40833E
Type of Sample:	Tube
Depth/Elevation:	1901.1
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	99
Percent of Max. Density:	N/A
Moisture Content (%):	24.6
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.6×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-133B
Sample Number:	CLB-CC-431
Location	37963N 41018E
Type of Sample:	Tube
Depth/Elevation:	1900.7
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	98.4
Percent of Max. Density:	N/A
Moisture Content (%):	25.1
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.6×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-134A
Sample Number:	CLB-CC-432
Location	37910N 41240E
Type of Sample:	Tube
Depth/Elevation:	1899.5
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	100
Percent of Max. Density:	N/A
Moisture Content (%):	25.6
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.7×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-135B
Sample Number:	CLB-CC-433
Location	37865N 41450E
Type of Sample:	Tube
Depth/Elevation:	1898.8
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	107.6
Percent of Max. Density:	N/A
Moisture Content (%):	21.3
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.6×10^{-8}

Remarks:

Braun Intertec Corporation

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-136A
Sample Number:	CLB-CC-434
Location	38115N 40708E
Type of Sample:	Tube
Depth/Elevation:	1901.3
Soil Classification (ASTM D 2487):	Lean Clay w/Sand (CL), very dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	99.5
Percent of Max. Density:	N/A
Moisture Content (%):	24.6
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.6×10^{-8}

Remarks:

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-137B
Sample Number:	CLB-CC-435
Location	38157N 40503E
Type of Sample:	Tube
Depth/Elevation:	1902.4
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	108.9
Percent of Max. Density:	N/A
Moisture Content (%):	18.6
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.7×10^{-8}

Remarks:

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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-138B
Sample Number:	CLB-CC-436
Location	38192N 40278E
Type of Sample:	Tube
Depth/Elevation:	1903.5
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	103.6
Percent of Max. Density:	N/A
Moisture Content (%):	20.8
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.8×10^{-8}

Remarks:

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-139A
Sample Number:	CLB-CC-437
Location	38227N 40077E
Type of Sample:	Tube
Depth/Elevation:	1903.9
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	100.8
Percent of Max. Density:	N/A
Moisture Content (%):	21
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.0×10^{-8}

Remarks:

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cc: Jim Martin

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-140A
Sample Number:	CLB-CC-438
Location	38264N 39851E
Type of Sample:	Tube
Depth/Elevation:	1904.9
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	109.6
Percent of Max. Density:	N/A
Moisture Content (%):	19.2
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.6×10^{-8}

Remarks:

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-141B
Sample Number:	CLB-CC-439
Location	38260N 40736E
Type of Sample:	Tube
Depth/Elevation:	1900
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	101
Percent of Max. Density:	N/A
Moisture Content (%):	22.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.2×10^{-8}

Remarks:

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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-142A
Sample Number:	CLB-CC-440
Location	38288N 40543E
Type of Sample:	Tube
Depth/Elevation:	1901.3
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	103.4
Percent of Max. Density:	N/A
Moisture Content (%):	22.9
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.5×10^{-8}

Remarks:

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cc: Jim Martin

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913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments℠

Permeability Tests

Date: February 18, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-143A
Sample Number:	CLB-CC-441
Location	38322N 40332E
Type of Sample:	Tube
Depth/Elevation:	1902.3
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	100.5
Percent of Max. Density:	N/A
Moisture Content (%):	24.6
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.8×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-144A
Sample Number:	CLB-CC-442
Location	38353N 40125E
Type of Sample:	Tube
Depth/Elevation:	1903.2
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	105.7
Percent of Max. Density:	N/A
Moisture Content (%):	21.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.5×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-145A
Sample Number:	CLB-CC-443
Location	38391N 39895E
Type of Sample:	Tube
Depth/Elevation:	1904
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	101.3
Percent of Max. Density:	N/A
Moisture Content (%):	21
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	8.2×10^{-9}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Date: February 18, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-146A
Sample Number:	CLB-CC-444
Location	37664N 41338E
Type of Sample:	Tube
Depth/Elevation:	1900.3
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	107.8
Percent of Max. Density:	N/A
Moisture Content (%):	20.9
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.2×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Date: February 18, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-147A
Sample Number:	CLB-CC-445
Location	37700N 41169E
Type of Sample:	Tube
Depth/Elevation:	1901
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	102.2
Percent of Max. Density:	N/A
Moisture Content (%):	22.4
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	3.1×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Date: March 23, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-148A
Sample Number:	CLB-CC-446
Location	37746N 40951E
Type of Sample:	Tube
Depth/Elevation:	1901.7
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	108.8
Percent of Max. Density:	N/A
Moisture Content (%):	19.8
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.3×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Date: February 18, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-149B
Sample Number:	CLB-CC-447
Location	38550N 39818E
Type of Sample:	Tube
Depth/Elevation:	1903.7
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	107.4
Percent of Max. Density:	N/A
Moisture Content (%):	19.8
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.6×10^{-8}

Remarks:

Braun Intertec Corporation

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cc: Jim Martin

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-150A
Sample Number:	CLB-CC-448
Location	38518N 40018E
Type of Sample:	Tube
Depth/Elevation:	1903.1
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	104
Percent of Max. Density:	N/A
Moisture Content (%):	22.2
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.8×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-151A
Sample Number:	CLB-CC-449
Location	38479N 40225E
Type of Sample:	Tube
Depth/Elevation:	1902.2
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	105.7
Percent of Max. Density:	N/A
Moisture Content (%):	22.4
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.1×10^{-8}

Remarks:

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-152A
Sample Number:	CLB-CC-450
Location	38431N 40459E
Type of Sample:	Tube
Depth/Elevation:	1901.3
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), very dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	100.7
Percent of Max. Density:	N/A
Moisture Content (%):	24.8
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.0×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

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Operations Supervisor

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-153A
Sample Number:	CLB-CC-451
Location	38381N 40701E
Type of Sample:	Tube
Depth/Elevation:	1900.2
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	106.7
Percent of Max. Density:	N/A
Moisture Content (%):	21.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.3×10^{-8}

Remarks:

Braun Intertec Corporation

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-154A
Sample Number:	CLB-CC-453
Location	38192N 39823E
Type of Sample:	Tube
Depth/Elevation:	1906.6
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	102.3
Percent of Max. Density:	N/A
Moisture Content (%):	22.7
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.5×10^{-8}

Remarks:

Braun Intertec Corporation

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Operations Supervisor

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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-155A
Sample Number:	CLB-CC-454
Location	38157N 40016E
Type of Sample:	Tube
Depth/Elevation:	1905.8
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	107.3
Percent of Max. Density:	N/A
Moisture Content (%):	18.3
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.5×10^{-8}

Remarks:

Braun Intertec Corporation

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-156A
Sample Number:	CLB-CC-455
Location	38118N 40188E
Type of Sample:	Tube
Depth/Elevation:	1905
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	110.9
Percent of Max. Density:	N/A
Moisture Content (%):	17.8
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.2×10^{-8}

Remarks:

Braun Intertec Corporation

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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-157B
Sample Number:	CLB-CC-456
Location	38079N 40385E
Type of Sample:	Tube
Depth/Elevation:	1904.4
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	105.2
Percent of Max. Density:	N/A
Moisture Content (%):	17.1
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.9×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-158A
Sample Number:	CLB-CC-457
Location	38040N 40587E
Type of Sample:	Tube
Depth/Elevation:	1904.4
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), very dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	102.5
Percent of Max. Density:	N/A
Moisture Content (%):	21
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.4×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
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cvp4/143

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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-159A
Sample Number:	CLB-CC-458
Location	38136N 40645E
Type of Sample:	Tube
Depth/Elevation:	1902.7
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	104.3
Percent of Max. Density:	N/A
Moisture Content (%):	20.3
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.6×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
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cc: Jim Martin

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BRAUN INTERTEC

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Date: February 18, 1994

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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-160A
Sample Number:	CLB-CC-459
Location	38184N 40402E
Type of Sample:	Tube
Depth/Elevation:	1903.6
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), very dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	105.8
Percent of Max. Density:	N/A
Moisture Content (%):	18.6
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	4.7×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-161A
Sample Number:	CLB-CC-460
Location	38220N 40218E
Type of Sample:	Tube
Depth/Elevation:	1904.4
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), very dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	102.7
Percent of Max. Density:	N/A
Moisture Content (%):	21.6
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.7×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Permeability Tests

Date: February 18, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-162A
Sample Number:	CLB-CC-461
Location	38258N 40044E
Type of Sample:	Tube
Depth/Elevation:	1905.2
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	108
Percent of Max. Density:	N/A
Moisture Content (%):	16.7
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.5×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Date: February 18, 1994

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Client:
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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-163A
Sample Number:	CLB-CC-462
Location	38295N 39831E
Type of Sample:	Tube
Depth/Elevation:	1905.9
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	103.4
Percent of Max. Density:	N/A
Moisture Content (%):	20.6
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.4×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Date: February 18, 1994

Project: BFDX-92-018C

Client:
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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-164A
Sample Number:	CLB-CC-463
Location	38411N 39832E
Type of Sample:	Tube
Depth/Elevation:	1905.2
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	101.6
Percent of Max. Density:	N/A
Moisture Content (%):	20.9
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.3×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-165A
Sample Number:	CLB-CC-464
Location	38369N 40060E
Type of Sample:	Tube
Depth/Elevation:	1904.4
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	104.3
Percent of Max. Density:	N/A
Moisture Content (%):	19.9
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.2×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-166B
Sample Number:	CLB-CC-465
Location	38332N 40235E
Type of Sample:	Tube
Depth/Elevation:	1903.7
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	105
Percent of Max. Density:	N/A
Moisture Content (%):	20.1
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.4×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-167A
Sample Number:	CLB-CC-466
Location	38293N 40430E
Type of Sample:	Tube
Depth/Elevation:	1902.8
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	99.5
Percent of Max. Density:	N/A
Moisture Content (%):	21.9
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	3.4×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Client:
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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-168A
Sample Number:	CLB-CC-467
Location	38242N 40671E
Type of Sample:	Tube
Depth/Elevation:	1901.9
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	100
Percent of Max. Density:	N/A
Moisture Content (%):	22.8
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	5.6×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-169A
Sample Number:	CLB-CC-468
Location	37582N 41284E
Type of Sample:	Tube
Depth/Elevation:	1902.3
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	100.7
Percent of Max. Density:	N/A
Moisture Content (%):	21.6
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.2×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-170B
Sample Number:	CLB-CC-469
Location	37626N 41076E
Type of Sample:	Tube
Depth/Elevation:	1903.1
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	112.3
Percent of Max. Density:	N/A
Moisture Content (%):	18.4
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.7×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

cvp4/155

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-171A
Sample Number:	CLB-CC-470
Location	37651N 40870E
Type of Sample:	Tube
Depth/Elevation:	1904.1
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	110.7
Percent of Max. Density:	N/A
Moisture Content (%):	21.2
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	9.3×10^{-9}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

cvp4/156

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-172
Sample Number:	CLB-CC-471
Location	37676N 40644E
Type of Sample:	Tube
Depth/Elevation:	1904.9
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	101.4
Percent of Max. Density:	N/A
Moisture Content (%):	23.1
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	3.2×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Client:
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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-173A
Sample Number:	CLB-CC-472
Location	37888N 40690E
Type of Sample:	Tube
Depth/Elevation:	1903.7
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	96
Percent of Max. Density:	N/A
Moisture Content (%):	26.3
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.5×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Client:
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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-174A
Sample Number:	CLB-CC-473
Location	37861N 40887E
Type of Sample:	Tube
Depth/Elevation:	1903
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	102.1
Percent of Max. Density:	N/A
Moisture Content (%):	20.7
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.4×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

cvp4/159

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-175A
Sample Number:	CLB-CC-474
Location	37831N 41087E
Type of Sample:	Tube
Depth/Elevation:	1902.1
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	N/I
Percent of Max. Density:	N/A
Moisture Content (%):	24.1
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.2×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Project: BFDX-92-018C

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-176A
Sample Number:	CLB-CC-475
Location	37792N 41303E
Type of Sample:	Tube
Depth/Elevation:	1901.2
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	100.7
Percent of Max. Density:	N/A
Moisture Content (%):	23.6
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.1×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

cvp4/161

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Project: BFDX-92-018C

Client:
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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-177B
Sample Number:	CLB-CC-476
Location	37760N 41460E
Type of Sample:	Tube
Depth/Elevation:	1900.6
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	99.3
Percent of Max. Density:	N/A
Moisture Content (%):	24.7
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.2×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-178A
Sample Number:	CLB-CC-477
Location	38020N 40724E
Type of Sample:	Tube
Depth/Elevation:	1902.9
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	102.6
Percent of Max. Density:	N/A
Moisture Content (%):	21.1
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.4×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

cvp4/163

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-179A
Sample Number:	CLB-CC-478
Location	37993N 40902E
Type of Sample:	Tube
Depth/Elevation:	1902.3
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	99.3
Percent of Max. Density:	N/A
Moisture Content (%):	23.4
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.6×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Engineers and Scientists Serving the Built and Natural Environments

Permeability Tests

Date: February 18, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-180A
Sample Number:	CLB-CC-479
Location	37960N 41119E
Type of Sample:	Tube
Depth/Elevation:	1901.4
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	102
Percent of Max. Density:	N/A
Moisture Content (%):	20.8
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.4×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Engineers and Scientists Serving the Built and Natural Environments

Permeability Tests

Date: February 18, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-181A
Sample Number:	CLB-CC-480
Location	37922N 41333E
Type of Sample:	Tube
Depth/Elevation:	1900.3
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	98.2
Percent of Max. Density:	N/A
Moisture Content (%):	24.2
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.5×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Date: February 18, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-182A
Sample Number:	CLB-CC-481
Location	37896N 41466E
Type of Sample:	Tube
Depth/Elevation:	1899.9
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	105.3
Percent of Max. Density:	N/A
Moisture Content (%):	22.2
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.5×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Permeability Tests

Date: March 24, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-183A	ST-183B
Sample Number:	CLB-CC-493	CLB-CC-493
Location	38707N 39840E	38707N 39840E
Type of Sample:	Tube	Tube
Depth/Elevation:	1903.1	1903.1
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark olive brown.	Sandy Lean Clay (CL), dark olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*		
Max. Dry Density (pcf):	N/A	N/A
Optimum Moisture Content:	N/A	N/A

Permeability Test Data:

Type of Test:	Falling Head	Falling Head
Type of Specimen:	Undisturbed	Undisturbed
Dry Density (pcf):	*	*
Percent of Max. Density:	N/A	N/A
Moisture Content (%):	*	*
Max. Head Differential (ft):	3	3
Confining Pressure (effective-PSI):	4	4
Coefficient of Permeability (cm/sec):	*	*

Remarks:

* Non-recoverable samples. Retested by sample CLB-CC-496.

Braun Intertec Corporation

Gerald E. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Date: February 22, 1994

Project: BFDX-92-018C

Client:
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Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	R-ST-183A
Sample Number:	CLB-CC-496
Location	38707N 39840E
Type of Sample:	Tube
Depth/Elevation:	1903.1
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	110.7
Percent of Max. Density:	N/A
Moisture Content (%):	18.2
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	4.2×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Date: February 22, 1994

Project: BFDX-92-018C

Client:
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Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-184A
Sample Number:	CLB-CC-494
Location	38692N 40044E
Type of Sample:	Tube
Depth/Elevation:	1902.3
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), very dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	104
Percent of Max. Density:	N/A
Moisture Content (%):	20.9
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	3.3×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Date: February 22, 1994

Project: BFDX-92-018C

Client:
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Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	R-ST-184A
Sample Number:	CLB-CC-497
Location	38692N 40044E
Type of Sample:	Tube
Depth/Elevation:	1902.3
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	103.7
Percent of Max. Density:	N/A
Moisture Content (%):	21.3
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	4.2×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Date: February 22, 1994

Project: BFDX-92-018C

Client:
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Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-185A	ST-185B
Sample Number:	CLB-CC-495	CLB-CC-495
Location	38671N 40233E	38671N 40233E
Type of Sample:	Tube	Tube
Depth/Elevation:	1901.1	1901.1
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), very dark grayish-brown.	Sandy Lean Clay (CL), very dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*		
Max. Dry Density (pcf):	N/A	N/A
Optimum Moisture Content:	N/A	N/A

Permeability Test Data:

Type of Test:	Falling Head	Falling Head
Type of Specimen:	Undisturbed	Undisturbed
Dry Density (pcf):	*	*
Percent of Max. Density:	N/A	N/A
Moisture Content (%):	*	*
Max. Head Differential (ft):	3	3
Confining Pressure (effective-PSI):	4	4
Coefficient of Permeability (cm/sec):	*	*

Remarks:

* Non-recoverable samples. Retested by sample CLB-CC-498.

Braun Intertec Corporation

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Project: BFDX-92-018C

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	R-ST-185B
Sample Number:	CLB-CC-498
Location	38671N 40233E
Type of Sample:	Tube
Depth/Elevation:	1901.1
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	110.8
Percent of Max. Density:	N/A
Moisture Content (%):	19.3
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	4.3×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

cvp4/170

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Date: February 22, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-186A
Sample Number:	CLB-CC-502
Location	38177N 40802E
Type of Sample:	Tube
Depth/Elevation:	1900.4
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	109.7
Percent of Max. Density:	N/A
Moisture Content (%):	17.7
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.0×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

cvp4/169

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Permeability Tests

Date: February 22, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	ST-187B
Sample Number:	CLB-CC-503
Location	38140N 41032E
Type of Sample:	Tube
Depth/Elevation:	1899.6
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish-brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	95.3
Percent of Max. Density:	N/A
Moisture Content (%):	26.3
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.2×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Permeability Tests

Date: March 25, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	188A
Sample Number:	CLB-CC-504
Location	38106N 41242E
Type of Sample:	Tube
Depth/Elevation:	1898.5
Soil Classification (ASTM D 2487):	Clayey Sand (SC), dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	108.1
Percent of Max. Density:	N/A
Moisture Content (%):	19.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.5×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Date: March 25, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	189A
Sample Number:	CLB-CC-505
Location	38088N 41425E
Type of Sample:	Tube
Depth/Elevation:	1897.8
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	108.6
Percent of Max. Density:	N/A
Moisture Content (%):	20.1
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.5×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Permeability Tests

Date: March 25, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	190B
Sample Number:	CLB-CC-506
Location	38470N 40184E
Type of Sample:	Tube
Depth/Elevation:	1903.2
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), very dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	111.9
Percent of Max. Density:	N/A
Moisture Content (%):	19.1
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	9.1×10^{-9}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Date: March 25, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	191A	191B
Sample Number:	CLB-CC-507	CLB-CC-507
Location	38504N 40006E	38504N 40006E
Type of Sample:	Tube	Tube
Depth/Elevation:	1903.8	1903.8
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), very dark grayish brown.	Sandy Lean Clay (CL), very dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*		
Max. Dry Density (pcf):	N/A	N/A
Optimum Moisture Content:	N/A	N/A

Permeability Test Data:

Type of Test:	Falling Head	Falling Head
Type of Specimen:	Undisturbed	Undisturbed
Dry Density (pcf):	*	*
Percent of Max. Density:	N/A	N/A
Moisture Content (%):	*	*
Max. Head Differential (ft):	3	3
Confining Pressure (effective-PSI):	4	4
Coefficient of Permeability (cm/sec):	*	*

Remarks:

* Non-recoverable samples. Retested by sample CLB-CC-518.

cc: Jim Martin

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Date: March 25, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	R-191A
Sample Number:	CLB-CC-518
Location	38504N 40006E
Type of Sample:	Tube
Depth/Elevation:	1903.8
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	113.8
Percent of Max. Density:	N/A
Moisture Content (%):	16
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.1×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Date: March 25, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	192B
Sample Number:	CLB-CC-508
Location	38543N 39797E
Type of Sample:	Tube
Depth/Elevation:	1904.8
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	110.2
Percent of Max. Density:	N/A
Moisture Content (%):	20.9
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.3×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
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cc: Jim Martin

cvp4/205

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Permeability Tests

Date: March 25, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	193B
Sample Number:	CLB-CC-509
Location	38647N 39806E
Type of Sample:	Tube
Depth/Elevation:	1904.3
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	108
Percent of Max. Density:	N/A
Moisture Content (%):	17.9
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	6.7×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

cvp4/204

BRAUN INTERTEC

Braun Intertec Corporation
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Permeability Tests

Date: March 25, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	194A
Sample Number:	CLB-CC-510
Location	38613N 39990E
Type of Sample:	Tube
Depth/Elevation:	1903.4
Soil Classification (ASTM D 2487):	Clayey Sand (SC), dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	114.3
Percent of Max. Density:	N/A
Moisture Content (%):	16.9
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.0×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

cvp4/203

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	195B
Sample Number:	CLB-CC-511
Location	38584N 40176E
Type of Sample:	Tube
Depth/Elevation:	1902.7
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	109.6
Percent of Max. Density:	N/A
Moisture Content (%):	18.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.0×10^{-7}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

cvp4/202

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Date: March 25, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	196B
Sample Number:	CLB-CC-512
Location	38567N 40518E
Type of Sample:	Tube
Depth/Elevation:	1900.0
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), very dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	106.8
Percent of Max. Density:	N/A
Moisture Content (%):	18.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	9.0×10^{-9}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

cvp4/201

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Date: March 25, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	197B
Sample Number:	CLB-CC-513
Location	38542N 40701E
Type of Sample:	Tube
Depth/Elevation:	1899.0
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), very dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	105.1
Percent of Max. Density:	N/A
Moisture Content (%):	19.3
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	3.5×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

cvp4/200

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Date: March 25, 1994

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Client:
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14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	198B
Sample Number:	CLB-CC-514
Location	38334N 40761E
Type of Sample:	Tube
Depth/Elevation:	1900.0
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), very dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	107.7
Percent of Max. Density:	N/A
Moisture Content (%):	20.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.8×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Date: March 25, 1994

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Client:
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14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	199A
Sample Number:	CLB-CC-515
Location	38309N 40956E
Type of Sample:	Tube
Depth/Elevation:	1898.9
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), very dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	112.5
Percent of Max. Density:	N/A
Moisture Content (%):	18.2
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	7.9×10^{-9}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Date: March 25, 1994

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Client:
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Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	200A
Sample Number:	CLB-CC-516
Location	38283N 41112E
Type of Sample:	Tube
Depth/Elevation:	1898.4
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), very dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	102.8
Percent of Max. Density:	N/A
Moisture Content (%):	22.8
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.9×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Date: March 25, 1994

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Client:
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Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	201A
Sample Number:	CLB-CC-517
Location	38253N 41287E
Type of Sample:	Tube
Depth/Elevation:	1897.6
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	102.7
Percent of Max. Density:	N/A
Moisture Content (%):	21.1
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.1×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Client:
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14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	202A
Sample Number:	CLB-CC-519
Location	38450N 41413E
Type of Sample:	Tube
Depth/Elevation:	1896.0
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	112.8
Percent of Max. Density:	N/A
Moisture Content (%):	17.6
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.1×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	203A
Sample Number:	CLB-CC-520
Location	38477N 41204E
Type of Sample:	Tube
Depth/Elevation:	1897.0
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	111.8
Percent of Max. Density:	N/A
Moisture Content (%):	18
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.3×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	204B
Sample Number:	CLB-CC-521
Location	38496N 41029E
Type of Sample:	Tube
Depth/Elevation:	1897.7
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	114.4
Percent of Max. Density:	N/A
Moisture Content (%):	17.4
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.2×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	205B
Sample Number:	CLB-CC-522
Location	38520N 40833E
Type of Sample:	Tube
Depth/Elevation:	1898.5
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	115.4
Percent of Max. Density:	N/A
Moisture Content (%):	15.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	8.6×10^{-9}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

cvp4/215

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Date: March 25, 1994

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Client:
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Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	206A
Sample Number:	CLB-CC-523
Location	38681N 40655E
Type of Sample:	Tube
Depth/Elevation:	1898.7
Soil Classification (ASTM D 2487):	Clayey Sand (SC), dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	111.6
Percent of Max. Density:	N/A
Moisture Content (%):	19.3
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	3.6×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

cvp4/216

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Project: BFDX-92-018C

Client:
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Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	207A
Sample Number:	CLB-CC-524
Location	38670N 40791E
Type of Sample:	Tube
Depth/Elevation:	1898.1
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	114.9
Percent of Max. Density:	N/A
Moisture Content (%):	18.7
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.4×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

cvp4/217

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Client:
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Mr. Andy Stewart
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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	208A
Sample Number:	CLB-CC-525
Location	38652N 40980E
Type of Sample:	Tube
Depth/Elevation:	1897.1
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), very dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	110.3
Percent of Max. Density:	N/A
Moisture Content (%):	16.4
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.1×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

cvp4/218

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Client:
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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	209A
Sample Number:	CLB-CC-526
Location	38635N 41158E
Type of Sample:	Tube
Depth/Elevation:	1896.4
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), very dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	108.9
Percent of Max. Density:	N/A
Moisture Content (%):	19.7
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	4.8×10^{-9}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

cvp4/219

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Date: March 25, 1994

Project: BFDX-92-018C

Client:
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Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	210A
Sample Number:	CLB-CC-527
Location	38619N 41340E
Type of Sample:	Tube
Depth/Elevation:	1895.4
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), very dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	106.8
Percent of Max. Density:	N/A
Moisture Content (%):	20.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.2×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald E. Dauer, C.E.T.
Operations Supervisor

cvp4/220

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Engineers and Scientists Serving the Built and Natural Environments

Permeability Tests

Date: March 29, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	211B
Sample Number:	CLB-CC-533
Location	38509N 40197E
Type of Sample:	Tube
Depth/Elevation:	1903.4
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	112.7
Percent of Max. Density:	N/A
Moisture Content (%):	18.3
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.5×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Engineers and Scientists Serving the Built and Natural Environments

Permeability Tests

Date: March 29, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	212
Sample Number:	CLB-CC-534
Location	38474N 40419E
Type of Sample:	Tube
Depth/Elevation:	1902.3
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	107.7
Percent of Max. Density:	N/A
Moisture Content (%):	19.6
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.8×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	213A
Sample Number:	CLB-CC-535
Location	38431N 40626E
Type of Sample:	Tube
Depth/Elevation:	1901.5
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	101.3
Percent of Max. Density:	N/A
Moisture Content (%):	21.3
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.3×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	214B
Sample Number:	CLB-CC-536
Location	38391N 40844E
Type of Sample:	Tube
Depth/Elevation:	1900.6
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	103.5
Percent of Max. Density:	N/A
Moisture Content (%):	22.4
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.6×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Client:
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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	215B
Sample Number:	CLB-CC-537
Location	38356N 41054E
Type of Sample:	Tube
Depth/Elevation:	1899.7
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	104.9
Percent of Max. Density:	N/A
Moisture Content (%):	22.9
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.5×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
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Date: March 29, 1994

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Client:
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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	216A
Sample Number:	CLB-CC-538
Location	38322N 41252E
Type of Sample:	Tube
Depth/Elevation:	1898.9
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	104
Percent of Max. Density:	N/A
Moisture Content (%):	21.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	2.6×10^{-8}

Remarks:

Braun Intertec Corporation

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	217A
Sample Number:	CLB-CC-539
Location	38294N 41436E
Type of Sample:	Tube
Depth/Elevation:	1898.3
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	108.4
Percent of Max. Density:	N/A
Moisture Content (%):	20.1
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.1×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
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Client:
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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	218
Sample Number:	CLB-CC-540
Location	38177N 40733E
Type of Sample:	Tube
Depth/Elevation:	1902.1
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	105.5
Percent of Max. Density:	N/A
Moisture Content (%):	20.7
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.9×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	219A
Sample Number:	CLB-CC-541
Location	38144N 40930E
Type of Sample:	Tube
Depth/Elevation:	1901.3
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	104
Percent of Max. Density:	N/A
Moisture Content (%):	20.9
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	7.4×10^{-9}

Remarks:

Braun Intertec Corporation

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	220A
Sample Number:	CLB-CC-542
Location	38114N 41132E
Type of Sample:	Tube
Depth/Elevation:	1900.5
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	102.5
Percent of Max. Density:	N/A
Moisture Content (%):	21.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	8.2×10^{-9}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	221A
Sample Number:	CLB-CC-543
Location	38082N 41346E
Type of Sample:	Tube
Depth/Elevation:	1899.6
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	96
Percent of Max. Density:	N/A
Moisture Content (%):	20.9
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.1×10^{-8}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Client:
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Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	222A
Sample Number:	CLB-CC-544
Location	38492N 41401E
Type of Sample:	Tube
Depth/Elevation:	1896.4
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	106.3
Percent of Max. Density:	N/A
Moisture Content (%):	20.7
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.7×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	223A
Sample Number:	CLB-CC-545
Location	38512N 41211E
Type of Sample:	Tube
Depth/Elevation:	1898.1
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	101.1
Percent of Max. Density:	N/A
Moisture Content (%):	23
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	8.3×10^{-9}

Remarks:

Braun Intertec Corporation

cc: Jim Martin

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Project: BFDX-92-018C

Client:
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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	224A
Sample Number:	CLB-CC-546
Location	38548N 41001E
Type of Sample:	Tube
Depth/Elevation:	1898.9
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	101.6
Percent of Max. Density:	N/A
Moisture Content (%):	21.8
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.5×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	225A
Sample Number:	CLB-CC-547
Location	38577N 40790E
Type of Sample:	Tube
Depth/Elevation:	1900
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	103.5
Percent of Max. Density:	N/A
Moisture Content (%):	21.7
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.5×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

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Client:
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Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	226A
Sample Number:	CLB-CC-548
Location	38609N 40570E
Type of Sample:	Tube
Depth/Elevation:	1900.7
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	102.6
Percent of Max. Density:	N/A
Moisture Content (%):	21.8
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	9.6×10^{-9}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
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Date: March 29, 1994

Project: BFDX-92-018C

Client:
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14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	227
Sample Number:	CLB-CC-549
Location	38636N 40360E
Type of Sample:	Tube
Depth/Elevation:	1901.7
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	102.1
Percent of Max. Density:	N/A
Moisture Content (%):	22.3
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.6×10^{-8}

Remarks:

Braun Intertec Corporation

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Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	228A
Sample Number:	CLB-CC-550
Location	38659N 40181E
Type of Sample:	Tube
Depth/Elevation:	1902.3
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	103.3
Percent of Max. Density:	N/A
Moisture Content (%):	17
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	8.4×10^{-9}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
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cc: Jim Martin

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Date: March 29, 1994

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Client:
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14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	229
Sample Number:	CLB-CC-551
Location	38699N 41202E
Type of Sample:	Tube
Depth/Elevation:	1897.2
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	102.2
Percent of Max. Density:	N/A
Moisture Content (%):	21.9
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.3×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

cvp4/224

Braun Intertec Corporation
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

Permeability Tests

Date: March 29, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	230
Sample Number:	CLB-CC-552
Location	38708N 40966E
Type of Sample:	Tube
Depth/Elevation:	1898.4
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	100
Percent of Max. Density:	N/A
Moisture Content (%):	24.3
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.2×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

cvp4/223

Braun Intertec Corporation
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments℠

Permeability Tests

Date: March 29, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	231
Sample Number:	CLB-CC-553
Location	38726N 40728E
Type of Sample:	Tube
Depth/Elevation:	1899.4
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), olive brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	105.1
Percent of Max. Density:	N/A
Moisture Content (%):	19.3
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.8×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

cvp4/222

Braun Intertec Corporation
913 South 18th Street
P.O. Box 2379
Bismarck, North Dakota 58502-2379
701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments®

Permeability Tests

Date: April 5, 1994

Project: BFDX-92-018C

Client:
Cooperative Power Association
Mr. Andy Stewart
14615 Lone Oak Road
Eden Prairie, MN 55344-2287

Project Description:
Ash Pond #91

Sample Data:

Shelby Tube Number:	232A
Sample Number:	CLB-CC-554
Location	38736N 40515E
Type of Sample:	Tube
Depth/Elevation:	1900.5
Soil Classification (ASTM D 2487):	Sandy Lean Clay (CL), dark grayish brown.

Moisture-Density Relation of Soil:

Method: ASTM D 698*	
Max. Dry Density (pcf):	N/A
Optimum Moisture Content:	N/A

Permeability Test Data:

Type of Test:	Falling Head
Type of Specimen:	Undisturbed
Dry Density (pcf):	106.7
Percent of Max. Density:	N/A
Moisture Content (%):	21.5
Max. Head Differential (ft):	3
Confining Pressure (effective-PSI):	4
Coefficient of Permeability (cm/sec):	1.0×10^{-8}

Remarks:

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Supervisor

cc: Jim Martin

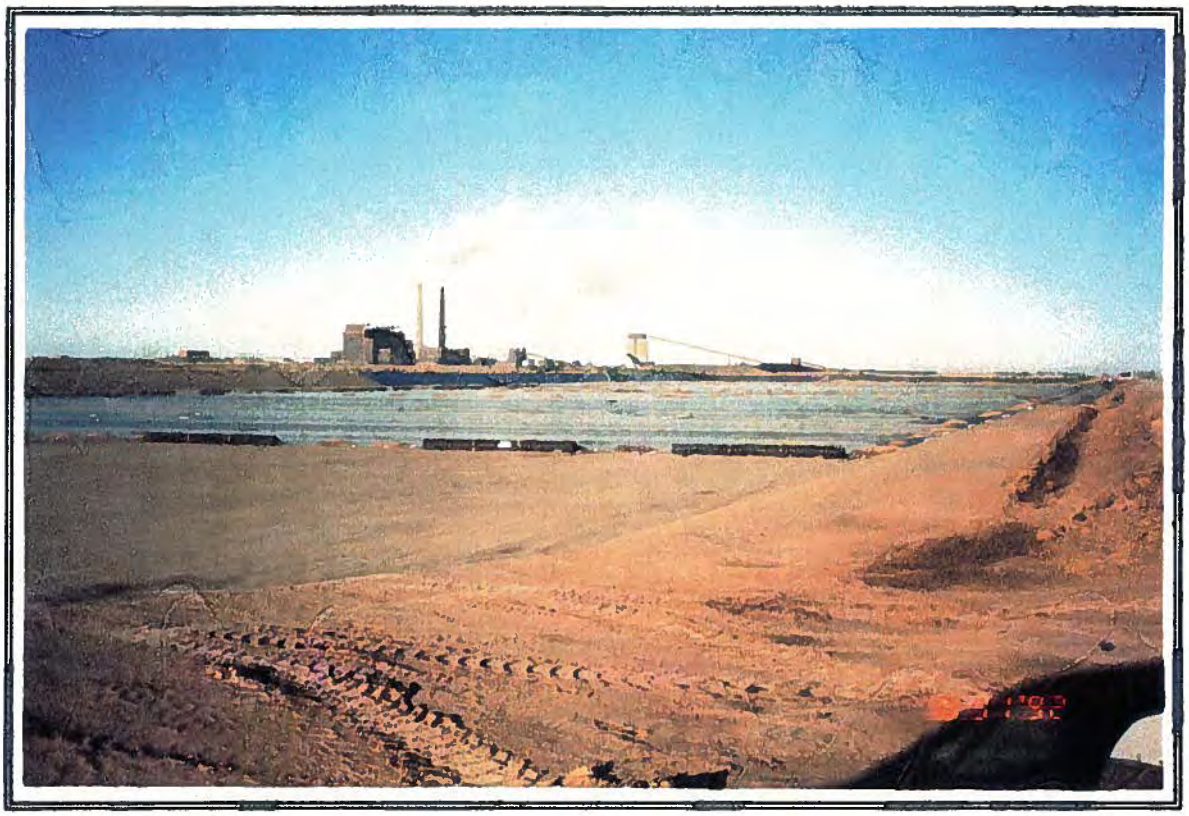
cvp4/221

GEOMEMBRANE
QUALITY ASSURANCE SERVICES
POND 93
COAL CREEK STATION
UNDERWOOD, NORTH DAKOTA

Submitted To:

Cooperative Power Association
14615 Lone Oak Road
Eden Prairie, Minnesota 55344-2287

VOLUME I



GCS

GOLDER CONSTRUCTION SERVICES, INC.

December 1992

927-4003

Golder Construction Services, Inc.
Quality Assurance and Construction Management

December 10, 1992 Our Ref.: 927-4003

Cooperative Power Association
14615 Loan Oak Road
Eden Prairie, Minnesota 55344-2287

Attention: Mr. Andrew W. Stewart P.E.
Manager, Plant Engineering and Construction

RE: GEOMEMBRANE QUALITY ASSURANCE SERVICES, POND 93, COAL CREEK STATION, UNDERWOOD, NORTH DAKOTA

Gentlemen:

Golder Construction Services, Inc. is pleased to present this report summarizing the quality assurance monitoring services performed for the installation of a geomembrane lining system at Pond 93, Coal Creek Station, Underwood, North Dakota. The quality assurance monitoring observations were performed from August 3, 1992 to September 23, 1992 and indicate that the installation of geomembrane liner for this effort is in substantial compliance with the specification guidelines and quality assurance program.

We appreciated the opportunity to work with Cooperative Power Association on this project. Should you have any questions or comments, please contact us.

Sincerely,

GOLDER CONSTRUCTION SERVICES, INC.

David L. O'Sadnick, P.E.
Associate

Mark E. Sebesta, P.E.
Project Engineer

DLO/MES/sjm

PRINTED ON RECYCLED PAPER



Golder Construction Services, Inc.
Quality Assurance and Construction Management

GEOMEMBRANE QUALITY ASSURANCE SERVICES POND 93 COAL CREEK STATION UNDERWOOD, NORTH DAKOTA

VOLUME I

Submitted to:

Cooperative Power Association
14615 Lone Oak Road
Eden Prairie, Minnesota 55344-2287

Distribution:

3 copies - Cooperative Power Association, Eden Prairie, Minnesota
2 copies - Golder Construction Services, Inc., Lakewood, Colorado

December 1992 927-4003

GOLDER CONSTRUCTION SERVICES, INC. • 200 UNION BOULEVARD, SUITE 100 • LAKEWOOD, COLORADO 80228 • TELEPHONE: (303) 980-0540 • FAX: (303) 985-2080

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VOLUME II

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1.0 INTRODUCTION

1.1 Purpose

Golder Construction Services, Inc. (GCS) under contract to Cooperative Power Association (CPA) has performed quality assurance (QA) observation and conformance testing for the construction of a geomembrane liner at Pond 93 at the Coal Creek Station generating facility near Underwood, North Dakota. Specifically, this report provides a summary of our observations and testing associated with the installation of the geomembrane lining system installed over a two-foot thick compacted clay liner system. Quality assurance services during construction of the clay liner were performed independently by Braun Intertec of Bismarck, North Dakota, Inc.

1.2 Scope of Work

GCS was retained to provide full-time quality assurance services for installation of a geomembrane liner for Pond 93 at Coal Creek Station. Specifically, the GCS scope of services involved the following items:

- Provided full-time, on-site personnel to observe construction activities and verification that the completed work complied with the specifications and plans for the project.
- Verification that the materials used in construction were within the construction specifications as developed by the designer.
- Preparation of record documentation of the construction, including daily summary reports with supporting data sheets and record drawings of the geomembrane lining system.
- Preparation of this quality assurance report to summarize our observations and testing results.

Daily field observation reports were submitted to the lead monitor by all field personnel. The on-site lead monitor prepared weekly summary reports which were submitted to CPA. These reports are not included in this document, but are available for review in the projects files at Golder Construction Services, Inc., 200 Union Boulevard, Suite 100, Lakewood, Colorado, and at Coal Creek Station.

1.3 Project Team/Work Schedule

The project team typically consisted of a lead monitor, two monitors from GCS and two to three monitors provided by CPA. The total number of QA monitors typically varied from three to four as required by the installer's level of effort. When available, QA monitors were utilized to enter monitoring data into an on-site computer and generate the record drawing for the final report preparation. The lead monitor or a designated QA monitor was on-site at all times during the installation process. QA monitoring by GCS began on August 3, 1992. The geomembrane installation was complete on September 23, 1992. The installer (Gundle Lining Systems) typically worked an 8 to 10-hour shift, six days per week. A listing of the GCS and installation personnel and their initials used on field and summary documentation is contained in Appendix A. Destructive testing services were performed by Braun Intertec Engineering, Inc. (Braun) of Bismarck, North Dakota.

2.0 PROJECT SPECIFICATIONS

The geomembrane materials were installed under the following documents: Section 02450 of the project specifications, National Sanitation Foundation Standard 54 (May 1991) and the Gundle Quality Assurance Manual for the Installation of Polyethylene Lining Systems.

3.0 IN-PLANT MONITORING OF GEOMEMBRANE MATERIALS

3.1 General

A total of approximately 6,750,000 square feet of 40 mil high-density polyethylene (HDPE) was manufactured in 1992 for Ponds 91 and 93 and shipped to the site in North Dakota. However, only Pond 93 was constructed in 1992. The geomembrane liner used in Pond 93 consisted of approximately 2,925,500 square feet of 40 mil HDPE. The material was manufactured by Gundle Lining Systems Inc. of Houston, Texas. Monitoring of all 6,750,000 square feet of the 40 mil HDPE geomembrane production was performed by GCS at the Gundle manufacturing facility in Houston, Texas. The plant monitoring was authorized by CPA to provide documentation that the geomembrane met the project specifications prior to shipment to the site. Gundle manufactured the rolls on an intermittent basis between March 23, 1992 and April 9, 1992. GCS performed monitoring on a part-time basis.

3.2 Scope of Work

The following monitoring items were performed and documented by GCS during the plant visits.

- Spot thickness measurements were obtained on rolls produced during GCS plant visits.
- Thickness measurements performed by Gundle on rolls produced while GCS was not at the plant were reviewed.
- The condition of the sheet was visually observed for defects including dimples, creases, undispersed raw materials, etc.
- Date and time of roll manufacturing were documented.
- Inventory of rolls accepted and rejected by roll number was documented.

- Gundle Geomembrane Quality Control, Geomembrane Quality Assurance and Resin Quality Control Certificates for the accepted rolls were obtained and reviewed for conformance to the project specifications.

- GCS selected rolls for conformance testing. Conformance samples were subsequently cut and sent to the GCS geosynthetics laboratory in Atlanta, Georgia.

The total number of rolls approved for shipment to the construction site was 301. Appendix B presents the In-Plant Geomembrane Roll Quality Assurance Records for all rolls produced for Ponds 91 and 93.

3.3 Results

The GCS monitor was at the plant on a part-time basis during production of the geomembrane rolls produced for Ponds 91 and 93. Therefore when GCS was at the plant, a portion of the rolls were approved or rejected by GCS and Gundle, and the remainder of the rolls were approved or rejected solely by Gundle when GCS was not at the plant.

For approved rolls, all spot thickness measurement met the project specifications and no major defects were observed during visual monitoring of the sheet during production. Each roll measured 34.5 feet wide by approximately 650 feet long. The base resin materials used during manufacturing were supplied by Quantum Chemical Corporation, Solvay Polymers, and Chevron Chemical Company.

Quality control (QC) documentation submitted by the manufacturers for the geomembrane used on the project is presented in Appendix C. This appendix contains the resin manufacturer's QC documentation that relates the rail car shipments of resin with the geomembrane manufacturer's panel QC certificates and to specific geomembrane roll numbers. Section 1 within Appendix C contains all pertinent Gundle QC/QA documents. Section 2 within Appendix C contains all pertinent resin manufacturer's QC documents.

The geomembrane manufactured for Ponds 91 and 93 was tested by the GCS geosynthetics testing laboratory in Atlanta, Georgia, to verify conformance with the project specifications. Conformance test samples were selected by GCS QA personnel and removed by Gundle at the manufacturing plant at a frequency of approximately one per 100,000 square feet of geomembrane material delivered to the project.

All materials were tested for material characteristics outlined in Section 2.03 of the project specifications using ASTM standard test procedures. Test reports were submitted to the GCS plant monitor for review.

Approximately 6,750,000 square feet of HDPE geomembrane were manufactured for Ponds 91 and 93. A total of 69 rolls of HDPE geomembrane were sampled and tested for conformance with the specifications. This resulted in a testing frequency of one test per 97,800 square feet of deployed geomembrane. All of the tests indicated conformance with the material properties specified except for one portion of one test on roll 06010783. Ten specimens from this roll were tested for break strength -- five in the machine direction and five in the transverse direction. One test in the transverse direction had a value of 129.6 ppi which was lower than the minimum specified value of 158 ppi.

This roll was approved for use since it was believed that this test result would not compromise the integrity of the liner and the roll was used on the project for the following reasons:

- Test results on all other portions of the 69 samples met the specifications;
- Four out of the five tests and the average of the five tests for break strength in the transverse direction for the roll in question met the specified value; and
- The break strength of one specimen is of minor concern since the yield strength for this specimen met the specified value. The yield strength of this roll would be sufficient to maintain

the integrity of the liner up to the designed yield value and thus the break strength of one specimen should be of minor concern assuming the yield strength should never be mobilized.

Geomembrane conformance test results are presented in Appendix D.

4.0 GEOMEMBRANE MONITORING PROCEDURES

The quality assurance activities performed by GCS for geomembrane installation included:

- Observation of geomembrane deployment procedures;
- Observation of trial seam procedures and evaluation of test results;
- Observation and documentation of field seams and seaming operations;
- Identification and documentation of defects and observation of repairs;
- Location of seam strength destructive tests and evaluation of test results; and,
- Observation and documentation of non-destructive seam continuity testing.

A detailed description of each of the above activities is presented in the following sections.

4.1 Geomembrane Deployment Monitoring

Geomembrane panels were visually monitored by GCS personnel as they were deployed from the roll into position on the subgrade. This process required the monitoring of subgrade conditions, sheet anchoring, sheet alignment, sheet overlap with adjacent panels, panel extensions into anchor trenches, sheet surface quality and sheet thickness. Each deployed geomembrane panel was assigned a unique identification number by an GCS monitor and each panel was visually monitored for damage and/or manufacturing imperfections. Defects were marked and documented by GCS monitors and subsequently repaired by the installer.

GCS observed the subgrade surface preparation prior to deployment of the geomembrane for protrusions and deleterious material. Subgrade preparation was performed by Blattner Construction Company using a motor grader and a smooth drum roller. Where necessary,

manual work, such as picking up rocks and clods and filling voids, was then carried out before the subgrade was accepted for installation of the geomembrane by the installer.

Subgrade acceptance certificates for Pond 93 were submitted by the installer and are presented in Appendix E. Surveying was performed by Interstate Engineering to ensure that design lines and grades were achieved prior to geomembrane deployment.

Deployment of each of the HDPE panels was performed by use of a rubber tired front-end loader. A GCS monitor visually monitored each panel as it was deployed. In addition, sheet thickness measurements along each end and on one side of each panel were made and recorded to confirm that the geomembrane used on the project was 40-mil HDPE liner and within project specifications. After deployment, the installer placed loads of sandy cover material with a front end loader and sand bags along panel edges as a temporary loading measure until the panels were joined by fusion welding. Sandbags were similarly used to temporarily secure panels which extended into the anchor trenches. HDPE, which extended into the anchor trench a minimum of 5 to 6 feet, was subsequently secured with clayey backfill.

Geomembrane used on the project was observed to contain some minor handling defects. Geomembrane blemishes, factory defects or areas damaged during deployment were marked by GCS personnel for subsequent repair.

A summary of abbreviations used by the GCS monitors during construction is presented in Appendix F. Tables summarizing the monitoring during deployment of the geomembrane panels are presented in Appendix G. A record drawing of the panel layout for the geomembrane liner is presented in Figure 1.

4.2 Geomembrane Test Seam Monitoring

Test seams were performed as a means of monitoring the performance of the seaming apparatus and operator under actual site conditions. Geomembrane test seams were performed prior to the beginning of each day's seaming operation and at mid-day intervals during the seaming period. Each test seam was sampled and tested twice for peel adhesion (peel) and once for bonded seam strength (shear), with the untested portion of each sample retained for the archives of CPA at Coal Creek Station. Test seam summaries are presented in Appendix H. Destructive sample test codes for extrusion and fusion seaming are presented in Figures 2 and 3, respectively.

4.3 Geomembrane Seaming Procedures and Observations

The principal seaming methods for this project were the Gundle double fusing welding and the manual extrusion process. Seaming operations were observed by the GCS QA monitors on a full-time basis. All seams were inspected for visual quality and seam completion. Monitoring of the seaming techniques consisted of visual observation of trial seam tests, monitoring ambient and seaming equipment temperatures, monitoring speed of seaming equipment, and continuous visual observation of completed seams. Personnel performing the seaming and the equipment used were recorded during monitoring for tracking purposes in the event of a destructive test failure. Weld imperfections were marked by GCS and were subsequently repaired by the installer in accordance with the specifications and Gundle QA manual. Field test seams were typically made twice daily for each welder and piece of seaming equipment to evaluate equipment and operator performance. Geomembrane seam inspection summaries are presented in Appendix I (Fusion Welding) and Appendix J (Extrusion Welding is presented on the geomembrane repair summary).

4.4 Geomembrane Defect and Repair Observations

Geomembrane panels were initially observed, as previously stated, for damage during transportation or deployment. All panels and seams were repeatedly observed for defects until the cover material was placed over the geomembrane layer.

Each defect was documented, assigned a unique identification defect code, marked for repair by GCS on the geomembrane and subsequently repaired by the installer. Summaries of defects and non-destructive testing of repairs, including the approximate location of each repair, are presented in Appendix J.

4.5 Seam Strength Destructive Testing

In accordance with the specifications, seam strength destruction test samples were taken at a minimum frequency of one sample per 500 linear feet of seam. Test locations were selected by the GCS QA monitors based on either the completion of approximately 500 feet of welded seam by a given welding machine and/or welder, working conditions, or a suspicion of a defective weld. In the event of a failing sample, the path of the welder or welding machine was traced in each direction from the failed destructive location at approximately 10-foot intervals. The failing seam would then be bounded by passing destructive tests or the entire seam would be reconstructed. If the first alternative was adopted, the welder's path was capped with another layer of 40 mil HDPE then extrusion welded between the two passing locations. If the second alternative was adopted, the seam was then reconstructed by extrusion welding the outside track of the fusion weld. The location of each destructive test is shown on the record drawing (Figure 1) and the location identified on defective repair logs (Appendix J).

For extrusion welded samples, 6 specimens were removed for destructive testing. Five of the specimens were tested for peel with acceptance criteria being that 5 of the 5 specimens should have a yield strength at least 52 ppi and fail in a film tear bond (FTB) mode. The other

5 specimens from each sample were tested for shear with the acceptance criteria being that 5 out of 5 specimens from each sample must have yield strengths of at least 80 ppi and fail in a FTB mode. For double fusion welds, the above procedures were also followed for destructive testing with the peel tests performed on the inside weld track for 201 specimens. The acceptance criteria for fusion welded test specimens were the same as extrusion welded test specimens.

All destructive sample tests were performed by Braun. Braun reported test results as FTB or peel also listing maximum load achieved before sheet failure.

Destructive sample testing was also performed by Gundle laboratories on each sample. If a destructive test sample failed at either lab, the sample test was considered failing, and the seam or seam section was reconstructed or capped. Summaries of destructive sample test results are presented in Appendix K.

4.6 Non-Destructive Seam Continuity Testing Observations

All non-destructive seam continuity testing was performed by the installer, Gundle Lining Systems, and visually observed by GCS personnel on a full-time basis to verify completeness of the non-destructive testing and the continuity of the tested seam. Two types of non-destructive testing were utilized: vacuum box testing on extrusion welding and air pressure testing on the double fusion welding.

Summary tables of air pressure testing are presented in Appendix L. Vacuum box test results are presented on the geomembrane repair summaries in Appendix J. Dates of the non-destructive testing of each repair are included in the geomembrane repair summaries presented in Appendix J. Any defects located during non-destructive testing were repaired by the installer and retested.

5.0 SUMMARY

GCS was retained by Cooperative Power Association to provide geomembrane material quality assurance monitoring services during the construction of Pond 93 at the Coal Creek Station generating facility near Underwood, North Dakota. The installation of the geomembrane liner was monitored by GCS personnel from August 3, 1992 through September 23, 1992.

The geomembrane installation quality assurance program included monitoring of: geomembrane deployment, trial seaming, field seaming, non-destructive seam continuity testing, seam strength destructive test results, and geomembrane repair procedures.

The observations made by GCS during the monitoring of the geomembrane material installation during construction of Pond 93 indicated that the installation was performed in substantial compliance with the specification guidelines and quality assurance program for this project.

GOLDER CONSTRUCTION SERVICES, INC.

Mark E. Sebesta

Mark E. Sebesta, P.E.
Project Engineer

David L. O'Sadnick

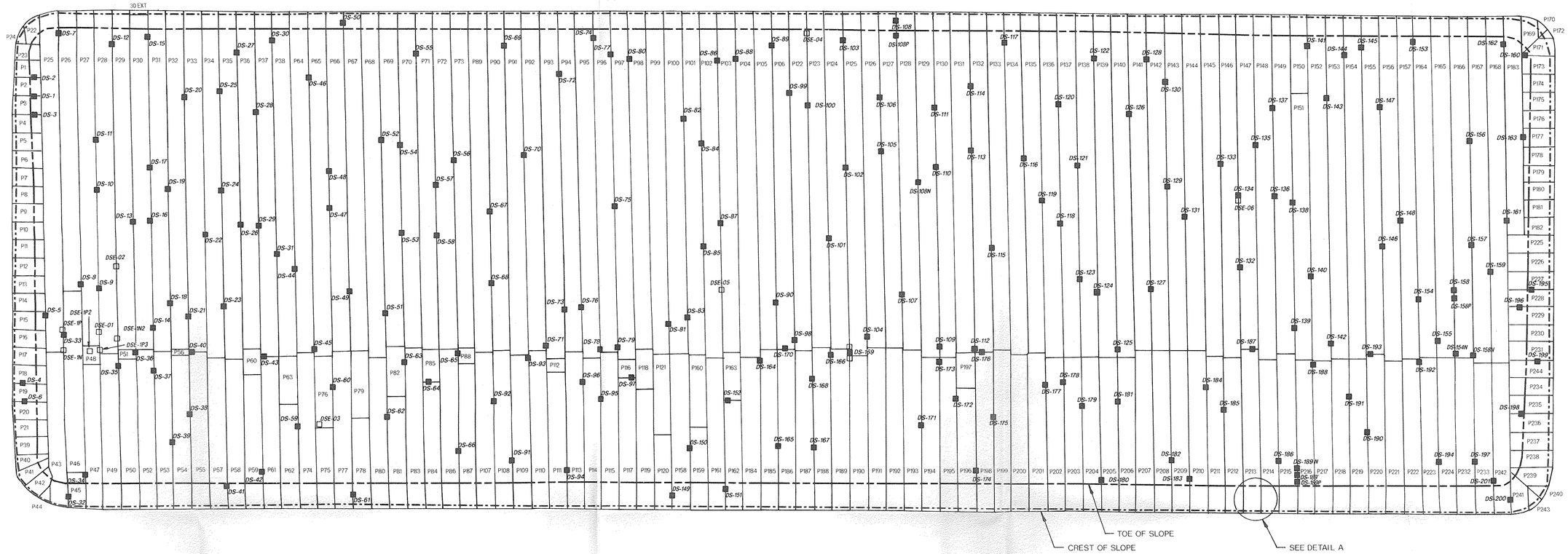
David L. O'Sadnick, P.E.
Associate

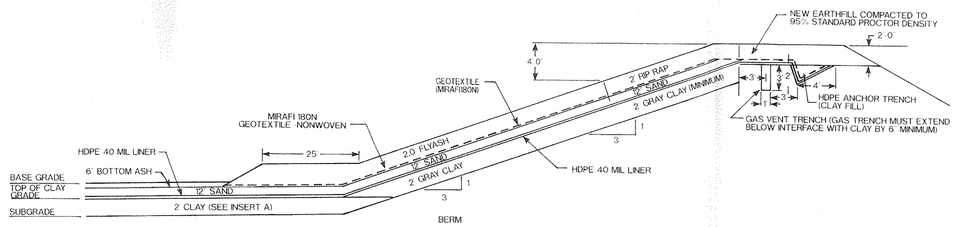


MES/DLO/sjm

FIGURES

POND 93





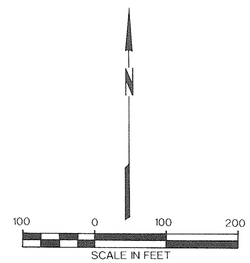
INSERT A

6' GRAY CLAY
18' BROWN CLAY

DETAIL A

TYPICAL BERM & BOTTOM SECTION
EVAPORATION POND 93

NOT TO SCALE



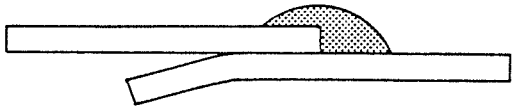
REVISIONS		
DESCRIPTION	BY	DATE

COOPERATIVE POWER ASSOCIATION
COAL CREEK STATION
UNDERWOOD, NORTH DAKOTA

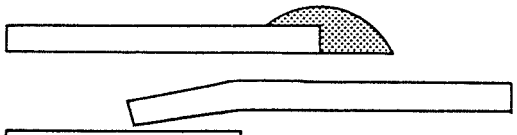
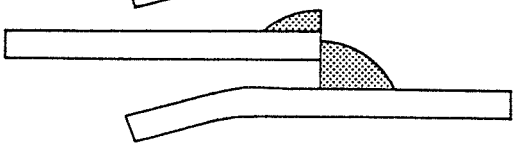
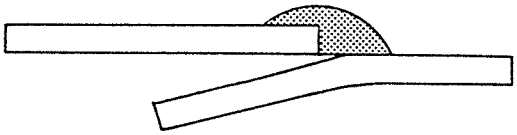
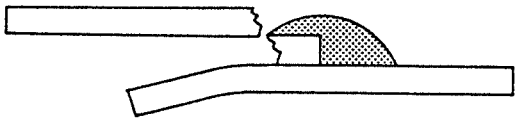
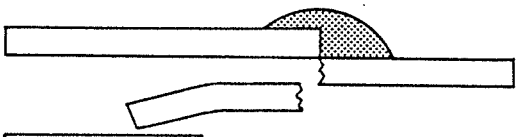
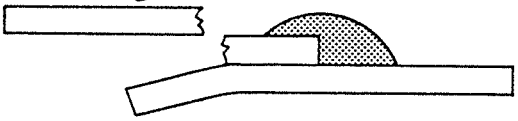
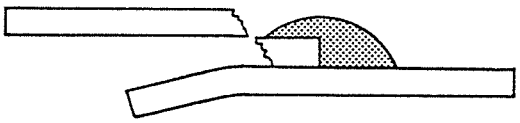
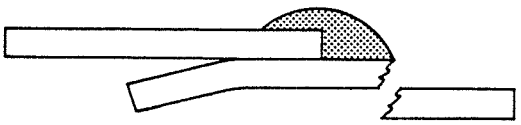
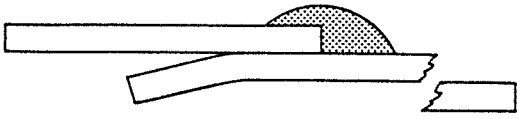
TITLE

RECORD DRAWING
GEOMEMBRANE PANEL LAYOUT
POND 93

DRAWN CPB	SCALE 1"=100'	DATE DEC 1992	
CHECKED JCL	REVIEWED MES	JOB NO. 927 4003	
GCS Geiger Construction Services, Inc.		DWG NO. IC3 2031	
		FIGURE 1	



UNTESTED SPECIMEN
EXTRUSION WELD WITH LEISTER HEAT SEAM

TYPES OF FAILURE	PASS/FAIL CODE	DESCRIPTION
	FAIL 1 (F1)	ADHESION FAILURE
	FAIL 2 (F2)	ADHESION FAILURE
	FAIL 3 (F3)	ADHESION FAILURE
	FAIL 4 (F4)	PARTIAL ADHESION FAILURE
	PASS 1 (P1)	FTB WELDED SEAM EDGE
	PASS 2 (P2)	FTB WELDED SEAM EDGE
	PASS 3 (P3)	FTB HEAT SEAM EDGE
	PASS 4 (P4)	FTB HEAT SEAM EDGE
	PASS 5 (P5)	FTB WELDED SEAM EDGE
	PASS 6 (P6)	FTB IN SHEETING

NOTE: FTB=FILM TEARING BREAK

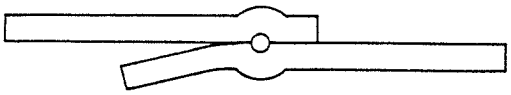
GCS
Golder Construction Services, Inc.

CLIENT/PROJECT
CPA-COAL CREEK STATION
UNDERWOOD, N.D.

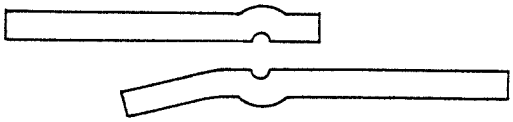
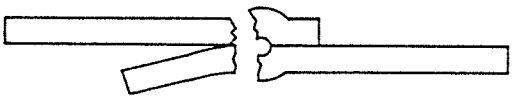
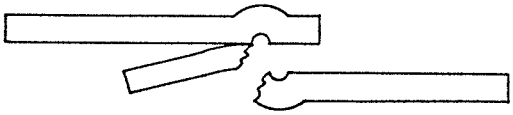
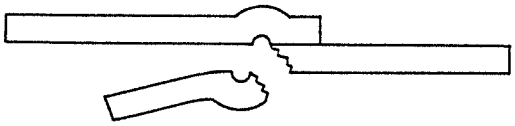
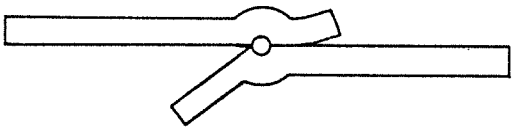
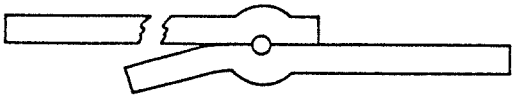
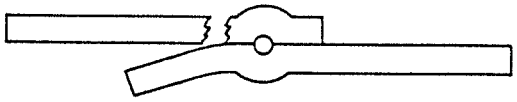
TITLE
DESTRUCTIVE SAMPLE TEST CODES
EXTRUSION WELD
WITH LEISTER HEAT SEAM

DRAWN	CHECKED	REVIEWED	DATE	SCALE	JOB NO.
PH	MES	GMH	DEC 1992	N/A	927-4003

FILE	DWG. NO.	FIGURE
		2



UNTESTED SPECIMEN
DUAL HOT WEDGE FUSION WELD

TYPES OF FAILURE	PASS/FAIL CODE	DESCRIPTION
	FAIL 1 (F1)	ADHESION FAILURE
	FAIL 2 (F2)	FTB HEAT SEAM EDGE
	FAIL 3 (F3)	FTB AT FIRST SEAM EDGE
	FAIL 4 (F4)	FTB AT SECOND SEAM EDGE
	FAIL 5 (F5)	PARTIAL ADHESION FAILURE
	PASS 1 (P1)	FTB IN SHEETING
	PASS (P2)	FTB HEAT SEAM EDGE

NOTE: FTB=FILM TEARING BREAK

GCS
Golder Construction Services, Inc.

CLIENT/PROJECT
CPA-COAL CREEK STATION
UNDERWOOD, N.D.

TITLE
DESTRUCTIVE SAMPLE TEST CODES
DUAL HOT WEDGE FUSION WELD

DRAWN	CHECKED	REVIEWED	DATE	SCALE	JOB NO.
PH	MES	GMH	DEC 1992	N/A	927-4003

FILE	DWG. NO.	FIGURE
		3

APPENDIX A

LISTING OF ON-SITE QUALITY ASSURANCE MONITORING PERSONNEL

December 1992

927-4003

Golder Construction Services, Inc.

APPENDIX A
LISTING OF ON-SITE
QUALITY ASSURANCE
MONITORING PERSONNEL

TITLE	NAME	INITIALS
GCS LEAD MONITORS	CLIFFORD P. BAKER	C.P.B.
GCS QA MONITORS	JEFF IORIO	J.I.
	JIN-CHUAN LIU	J.C.L.
	TERRY MANDZIAK	T.M.
CPA QA MONITORS	TOM DALLMAN	T.D.
	LARRY SUNDERMAN	L.S.
	MARCUS HAMBY	M.H.

APPENDIX A
LISTING OF ON-SITE
GUNDLE PERSONNEL

TITLE	NAME	INITIALS
SUPERVISOR	PETER DYTRYCH	PD
ASSISTANT SUPERVISOR	MARK POOL	MP
C.F. SUPERVISOR	ALLEN VORASANE	AV
TECHNICIAN	SEINKAM PHONSA	SK or SKP
TECHNICIAN	SAVANG PHELVANGSY	SP
TECHNICIAN	PHLENGPHRAK THINAKONE	PT
TECHNICIAN	SONE SIPASEUTH	SS
TECHNICIAN	KHENG TENG	KT
TECHNICIAN	BAN SOUVANNAKOUMMANE	SB
TECHNICIAN	SOMPHANE BOUASYM	BS
TECHNICIAN	IOU KHAMUAN	IOU
TECHNICIAN	KHOY LOUAN	KLV
TECHNICIAN	KHAMMI SAYADETH	KMAI or KS
TECHNICIAN	KHOTPANYA VORASANE	KL
TECHNICIAN TRAINEE	NIPHAVANA VORASANE	VV
TECHNICIAN TRAINEE	SENG NANTHAVONG	SN
TECHNICIAN TRAINEE	T.E. SENCHARUN	TE
TECHNICIAN TRAINEE	BOUABANE PONGKHAMSING	BP

APPENDIX B

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORDS

December 1992

927-4003

Golder Construction Services, Inc.

LINE 6

MARCH – APR._, 1992

927-4003

Coal Creek Generating Station
for COOPERATIVE POWER ASSOC.
CPA/PONDS 91&93/ND
MANUFACTURING ROLL CHECKLIST
IN-PLANT QUALITY ASSURANCE MONITORING
GUNDLE LINING SYSTEMS, INC.

Sheet 1 of 9
LINE 6

Job # 7346-01

Approved by GCS/Golder

ROLL NO.	PROJ. INV. NO.	ACCPTD. AT LINE	CONF. SAMP. TAKEN (ECS)	GUNDLE ROLL QA REQ.	GUNDLE ROLL QA RECD.	GUNDLE ROLL QA CKD.	RAIL CAR	RESIN LETTER RECD.	ECS LAB (PASS/FAIL)	DATE SHIPPED	COMMENTS
0601-0656											
0657	1	✓	inv	✓	✓	✓	PLCX 42413	✓		3/30 ✓	
0658	2	✓		✓	✓		"	✓		3/30 ✓	
0659	3	✓		✓	✓		"	✓		✓	
0660	4	✓		✓	✓		"	✓		✓	
0661	5	✓	1 3/23	✓	✓		"	✓	Passed	3/31 ✓	
0662	6	✓		✓	✓	✓	"	✓		✓	
63	7	✓		✓	✓	✓	"	✓		3/31 ✓	
64	8	✓		✓	✓	✓	"	✓		3/31 ✓	
65	9	✓	2 3/23	✓	✓	✓	"	✓	Passed	3/30 ✓	
66		GLS		X	X	X	"	X			
67	10	✓		✓	✓	✓	"	✓		3/30 ✓	
68		✓		✓	✓	✓	"	✓		3/30 ✓	
69		✓		✓	✓	✓	"	✓		3/30 ✓	Blemish at 3300'
0670		✓	3 3/23	✓	✓	✓	"	✓	Passed	3/30 ✓	
71		✓		✓	✓	✓	"	✓		3/30 ✓	
72		GLS									
73		Scrap									
74	15	✓	4 ✓ 3/23	✓	✓	✓	"	✓	Passed	3/30 ✓	
75		Scrap									
76		Scrap									
77		✓		✓	✓	✓	"	✓		3/30 ✓	
78		✓		✓	✓	✓	"	✓		3/30 ✓	
79		VOID									
0680		✓		✓	✓	✓	"	✓		3/30 ✓	
81		✓		✓	✓	✓	"	✓		3/30 ✓	
82	20	✓		✓	✓	✓	"	✓		3/30 ✓	
83		✓	5 3/24	✓	✓	✓	"	✓	Passed	3/30 ✓	
0601-0684		✓		✓	✓	✓	PLCX 42413	✓		3/30 ✓	

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LINE 6

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927-4003

Coal Creek Generating Station
for COOPERATIVE POWER ASSOC.
CPA/PONDS 91&93/ND
MANUFACTURING ROLL CHECKLIST
IN-PLANT QUALITY ASSURANCE MONITORING
GUNDLE LINING SYSTEMS, INC.

Sheet 2 of 9
LINE 6

Job # 7346-01

DATE sent

Approved by GCS/Golder

ROLL NO.	PROJ. INV. NO.	ACCPTD. AT LINE	CONF. SAMP. TAKEN (ECS)	GUNDLE ROLL QA REQ.	GUNDLE ROLL QA RECD.	GUNDLE ROLL QA CKD.	RAIL CAR	RESIN LETTER RECD.	ECS LAB (PASS/FAIL)	DATE SHIPPED	COMMENTS
0601 - 0685	23-A	✓		✓	✓	✓	PLCX42413	✓		3/30 ✓	
86	24-A	✓		✓	✓	✓	"	✓		3/30 ✓	
87	25-A	✓		✓	✓	✓	"	✓		3/30 ✓	
88	26A	✓	4 3/24	✓	✓	✓	"	✓	Passed	3/30 ✓	
89	27	✓		✓	✓	✓	"	✓		3/31 ✓	
-0690		GLS									
91		✓		✓	✓	✓	"	✓		3/30 ✓	
92		✓		✓	✓	✓	"	✓		3/30 ✓	
93	30	✓	7 ✓ 3/31	✓	✓	✓	"	✓	P/4-2	3/30 ✓	
94		✓		✓	✓	✓	"	✓		3/30 ✓	
95		✓		✓	✓	✓	"	✓		3/30 ✓	
96		GLS		✓	✓	✓		✓			
97		✓	8 X 3/25	✓	✓	✓	"	✓	P/4-2	3/30 ✓	
98		GLS									
-0699		GLS									
-0700		GLS									
01		GLS									
02		GLS									
03		✓		✓	✓	✓	PLCX42413	✓		3/30 ✓	
04		✓		✓	✓	✓	CHVX891174	✓		3/30 ✓	
05		GLS									
06		✓		✓	✓	✓	"	✓		3/30 ✓	
07		✓		✓	✓	✓	"	✓		3/30 ✓	
08	38	✓		✓	✓	✓	"	✓		3/30 ✓	
09		GLS									
0601 -0710		GLS									
0711		GLS									
0712		GLS									
0713		GLS									

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MARCH – APRIL, 1992

Line 6

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Coal Creek Generating Station
for COOPERATIVE POWER ASSOC.
CPA/PONDS 91&93/ND
MANUFACTURING ROLL CHECKLIST
IN-PLANT QUALITY ASSURANCE MONITORING
GUNDLE LINING SYSTEMS, INC.

Job # 7346-01

ROLL NO.	PROJ. INV. NO.	ACCPTD. AT LINE	CONF. SAMP. TAKEN (ECS)	GUNDLE ROLL QA REQ.	GUNDLE ROLL QA RECD.	GUNDLE ROLL QA CKD.	RAIL CAR	RESIN LETTER RECD.	ECS LAB (PASS/FAIL)	DATE SHIPPED	Approved by GCS	COMMENTS
0601-0714		✓				✓	CHVX 891174	✓		3/30	✓	
-0715	40	✓				✓	"	✓		3/30	✓	
-0716		✓				✓				3/30	✓	
0717		✓	9 ✓ 3/30			✓			P / 4-2	3/30	✓	
0718		✓				✓				3/30	✓	
0719		✓				✓				3/30	✓	
0720		✓				✓				3/30	✓	
0721		✓	10 X			✓			P/4-2	3/30	✓	↓3-25-92
0722	47	-	11 X 3/31			✓			R-4-6	3/30	✓	
0723		GLS										
0724		GLS										
0725		GLS										
0726		Swap										
0727		✓				✓				3/30	✓	
0728		✓				✓				3/30	✓	
0729	50	✓	12 ✓ 3/30			✓			P/4-2	3/30	✓	
0601-0730		✓				✓				3/30	✓	
-0731		✓				✓				3/30	✓	
-0732		✓				✓				3/30	✓	
0733		✓	XNot Used			✓				3/30	-	3-26-92
0734		GLS										
0735		GLS										
0736		✓				✓				3/30	✓	
0737		GLS										
0738		✓				✓				3/30	✓	
0739		✓				✓				3/30	✓	
0601-0740		✓				✓				3/30	✓	
-0741		✓				✓				3/30	✓	
-0742	60	-	13 3/31			✓	CHVX 891174	✓	P / 4-6	3/30	✓	

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LINE 6

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Coal Creek Generating Station
for COOPERATIVE POWER ASSOC.
CPA/PONDS 91&93/ND
MANUFACTURING ROLL CHECKLIST
IN-PLANT QUALITY ASSURANCE MONITORING
GUNDLE LINING SYSTEMS, INC.

Job # 7346-01

ROLL NO.	PROJ. INV. NO.	ACCPTD. AT LINE	CONF. SAMP. TAKEN (ECS)	GUNDLE ROLL QA REQ.	GUNDLE ROLL QA RECD.	GUNDLE ROLL QA CKD.	RAIL CAR	RESIN LETTER RECD.	ECS LAB (PASS/FAIL)	DATE SHIPPED		COMMENTS
0601-0743		✓				✓	CHVX-891174	✓		3/30	✓	
44		✓				✓				3/30	✓	
-0745		✓				✓				3/30	✓	
46		GLS										
47		✓	14 3/31			✓			P / 4/6	3/30	✓	
48		✓				✓				3/30	✓	
49	66	✓				✓				3/30	✓	
-0750		GLS										
51		Scrap										
52		GLS										
53		VOID										
54		GLS										
55		✓				✓				3/30	✓	
56		✓	15 3/31			✓			P / 4/6	3/30	✓	
57		VOID										
58	69	✓				✓				3/30	✓	
59	70	✓				✓				3/30	✓	
0760		✓				✓				3/30	✓	
61		✓	16 3/31			✓			P/ 4/6	3/30	✓	
62		✓				✓				3/30	✓	
63		✓				✓				3/30	✓	
64		✓				✓				3/30	✓	
65		✓	17 3/31			✓			P/ 4/6	3/30	✓	
66		✓				✓				3/30	✓	
67		✓				✓	CHVX-891174	✓		3/30	✓	
68		Scrap										
0601-0769	79	✓				✓	CHVX-890068	✓		3/30	✓	
-0770		GLS										

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Coal Creek Generating Station
for COOPERATIVE POWER ASSOC.
CPA/PONDS 91&93/ND
MANUFACTURING ROLL CHECKLIST
IN-PLANT QUALITY ASSURANCE MONITORING
GUNDLE LINING SYSTEMS, INC.

Sheet 5 of 9

Job # 7346-01

Approved for shipment by GCS / G. Ider

ROLL NO.	PROJ. INV. NO.	ACCPTD. AT LINE	CONF. SAMP. TAKEN (ECS)	GUNDLE ROLL QA REQ.	GUNDLE ROLL QA RECD.	GUNDLE ROLL QA CKD.	RAIL CAR	RESIN LETTER RECD.	ECS LAB (PASS/FAIL)	DATE SHIPPED	COMMENTS
0601-0771	80	–	18 – 3/31			✓	CHVX-890068	✓	P/4/6	3/30	
72	–	–				✓				3/30	
73		✓				✓				3/30	
74		✓	19 ✓ 3/31			✓			P/4/6		
75		✓				✓					
76		✓				✓					
77		✓				✓				3/31	
78		GLS	GLS								
79		GLS	GLS								
0780			GLS								
81	–	–				✓				3/31	✓
82	–	–				✓				3/31	✓
83		–	20 ✓	3-31		✓			4/8 /P	3/31	✓
84	90	✓				✓				3/31	✓
85		✓				✓				3/31	✓
86		✓				✓				3/31	✓
87	93	✓	21 ✓	3-31		✓			4/8 /P	3/31	✓
88		✓				✓				3/31	✓
89		✓				✓				3/31	✓ ← LAST Roll Approved on 4/9/92
-0790		✓	22 ✓	3-31		✓			4/8 /P		
91		✓				✓					
92		✓				✓					
93		✓				✓					
94	100	✓				–					
95	–	✓	23 ✓			✓			4/8 /P		
96		✓				✓					
97		✓				✓					
98		✓				✓					
0601-0799	105	✓				–	CHVX-890068	✓			

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Coal Creek Generating Station
for COOPERATIVE POWER ASSOC.
CPA/PONDS 91&93/ND
MANUFACTURING ROLL CHECKLIST
IN-PLANT QUALITY ASSURANCE MONITORING
GUNDLE LINING SYSTEMS, INC.

Approved by GCS

Job # 7346-01

ROLL NO.	PROJ. INV. NO.	ACCPTD. AT LINE	CONF. SAMP. TAKEN (ECS)	GUNDLE ROLL QA REQ.	GUNDLE ROLL QA RECD.	GUNDLE ROLL QA CKD.	RAIL CAR	RESIN LETTER RECD.	ECS LAB (PASS/FAIL)	DATE SHIPPED	COMMENTS
0601-0800		✓	✓24			✓	CHVX-890068	✓	4/8 / P		
801		✓				✓					
802		✓	A-6 ✓25			✓			4/13 / P		
803		✓				✓					
804	110	✓				✓					
805		✓				✓					
806		✓				✓					
807		✓				✓					
808		✓				✓					
809		✓				✓					
0601-0810		✓				✓					
0811		✓				✓					
812		✓				✓					
813		✓				✓					
814	120	✓	A-6 ✓26			✓			4/13 / P		
815		✓				✓					
816		✓	A-6 ✓27			✓			4/12 / P		
817		✓				✓					
818		✓				✓					
819		✓				✓					
0601-0820		✓	A-6 ✓28			✓			P / 4-16		
821		✓				✓					
822		✓				✓					
823		✓			—	✓	CHVX-890068	✓			
824	130	✓	A-6 ✓29			✓			P / 4-16		
825		✓				✓					
826		✓				✓					
827		✓				✓					
0601-0828	134	✓	A-6 ✓30			✓			4/16 / P		

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927-4003

Coal Creek Generating Station
for COOPERATIVE POWER ASSOC.
CPA/PONDS 91&93/ND
MANUFACTURING ROLL CHECKLIST
IN-PLANT QUALITY ASSURANCE MONITORING
GUNDLE LINING SYSTEMS, INC.

Sheet 1 of 9

Job # 7346-01

ROLL NO.	PROJ. INV. NO.	ACCPTD. AT LINE	CONF. SAMP. TAKEN (ECS)	GUNDLE ROLL QA REQ.	GUNDLE ROLL QA RECD.	GUNDLE ROLL QA CKD.	RAIL CAR	RESIN LETTER RECD.	ECS LAB (PASS/FAIL)	DATE SHIPPED	COMMENTS
0601-0829	135	–				✓	CHVX 890062	✓			
30		–				✓	"				
31		GLS		by		Gundle					
32		–				✓	GCCX-55335				
33		–	31 ✓ QC			✓			P – 4/16		
34		–				✓					
35	140	–				✓					
36		–				✓					
37		–				✓					
38		–	32 ✓ QC			✓			4/16 / P		
39		✓				✓					
0601-0840		✓	33 ✓ QC			–			4/16 / P		
41		✓				✓					
42		✓				✓					
43		–				✓					
44		✓				✓					
45	150	✓				✓					
46		–				✓					
47		–				✓					
48		–				✓					
49		–				✓					
0601-0850		✓	34 ✓ QC			✓					
51		✓				✓			4-16 / P		
52		✓				✓					
53		✓				✓					
54		✓				✓					
55	160	✓				✓					
56		✓				✓					
0601-0857	162	✓				✓	GCCX-58335				

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Coal Creek Generating Station
for COOPERATIVE POWER ASSOC.
CPA/PONDS 91&93/ND
MANUFACTURING ROLL CHECKLIST
IN-PLANT QUALITY ASSURANCE MONITORING
GUNDLE LINING SYSTEMS, INC.

Job # 7346-01

ROLL NO.	PROJ. INV. NO.	ACCPTD. AT LINE	CONF. SAMP. TAKEN (ECS)	GUNDLE ROLL QA REQ.	GUNDLE ROLL QA RECD.	GUNDLE ROLL QA CKD.	RAIL CAR	RESIN LETTER RECD.	ECS LAB (PASS/FAIL)	DATE SHIPPED	COMMENTS
0601-0858	163	—			—	✓	GCCX-583355	✓			
59	-	GLS		by Gundlo							
0601-0860	-	-	35 ✓ 46	✓	✓	✓		✓	4-16 / P		
61	-	—				✓					
62	-	—	36 ✓ 46		✓	✓			4-20		
63	-	—				✓					
64						✓					
65		GLS				✓					
66		GLS									
67		GLS									
68	169	✓			—	✓					
69		GLS									
0601-0870	170	✓			—	✓					
71		GLS									
72		GLS									
73		GLS									
74	-	✓	37 ✓		—	✓			4-20		
75		GLS									
76	-	✓	38 ✓			✓			4-21		
77	-	✓				✓					
78	-	✓				✓					
79	-	✓				✓					
0601-0880	-	✓				✓					
81	-	✓				✓					
82	-	✓				✓					
83	-	✓	39 ✓			✓			4-21		
84	180	✓				✓					
85	181	✓				✓					
86		GLS									

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Coal Creek Generating Station
for COOPERATIVE POWER ASSOC.
CPA/PONDS 91&93/ND
MANUFACTURING ROLL CHECKLIST
IN-PLANT QUALITY ASSURANCE MONITORING
GUNDLE LINING SYSTEMS, INC.

Sheet 9 of 9

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Job # 7346-01

ROLL NO.	PROJ. INV. NO.	ACCPTD. AT LINE	CONF. SAMP. TAKEN (ECS)	GUNDLE ROLL QA REQ.	GUNDLE ROLL QA RECD.	GUNDLE ROLL QA CKD.	RAIL CAR	RESIN LETTER RECD.	ECS LAB (PASS/FAIL)	DATE SHIPPED	COMMENTS
0601-0887	—	GLS					GOCX-58335				
88	182	✓	40 ✓			✓			4-21 /P		
89		✓				✓					
0601-0890		✓				✓					
91	—	GLS									
92	—	GLS									
93		—	41 ✓			✓			4-21 /P		
94		—				✓					
95		✓				✓					
96		✓	42 ✓			✓			4-21 /P		
97	—	GLS									
98	—	GLS									
0899	189	✓	43 ✓			✓	CHVX-889518		4-22 /P		
0601-0900	—	GLS									
01	190	✓				✓					
02	91	✓	44 ✓			✓			4-22 /P		
03	192	✓	45 ✓			✓			4-22 /P		
04											
05											
06											
07											
08											
09											
10											
11											
12											
13											
14											
0601-0915											

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LINE 7

927-4003

Coal Creek Generating Station
for COOPERATIVE POWER ASSOC.
CPA/PONDS 91&93/ND
MANUFACTURING ROLL CHECKLIST
IN-PLANT QUALITY ASSURANCE MONITORING
GUNDLE LINING SYSTEMS, INC.

Sheet 1 of 5
LINE 7

Job # 7346-01

DATE SENT

Approved by GCS/Gundle

ROLL NO.	PROJ. INV. NO.	ACCPTD. AT LINE	CONF. SAMP. TAKEN (ECS)	GUNDLE ROLL QA REQ.	GUNDLE ROLL QA RECD.	GUNDLE ROLL QA CKD.	RAIL CAR	RESIN LETTER RECD.	ECS LAB (PASS/FAIL)	DATE SHIPPED		COMMENTS
0700-6820												
6821		✓	1 ✓ 3/31	—	—	—	ACFX 39243	—	Passed 4/6	3/30		
22		✓		—	—	—	"	—		3/31		
23		—		—	—	—	"	—		3/30		
24		—		—	—	—	"	—		3/30		
25		✓		—	—	—	ACFX 39243	—		3/30		
26		—		—	—	—	"	—		3/30		
27		—		—	—	—	"	—		3/30		
28		—		—	—	—	"	—		3/30	✓	
29	✓	—	2 3/23	—	—	—	"	—	Passed	3/30	—	
6830	10	—		—	—	—	"	—	—		—	
31	—	GLS										
32	—	—		—	—	—	"	—		3/30	—	
33	—	—	3 3/23	—	—	—	"	—	Passed		—	
34	—	—		—	—	—	"	—		3/30	—	
35	—	—		—	—	—	"	—		3/30	—	
36	—	—		—	—	—	"	—			—	
37	—	—		—	—	—	"	—		3/30	—	
38	—	—	4 3/23	—	—	—	"	—	Passed		—	
39	—	—		—	—	—	"			3/30	—	
6840	—	—		—	—	—	"	—		3/30	—	
41	— 20	—		—	—	—	"			3/30	—	
42	—	—	5 3/23	—	—	—	"	—	Passed	3/30	—	
43	—	—		—	—	—	"	—		3/30	—	
44	—	—		—	—	—	ACFX-39243	—		3/30	—	
45	—	—		—	—	—	ACFX-66076	—		3/30	—	
46	—	—	6 3/24	—	—	—	"	—	Passed 4-2	3/30	—	
47	—	—		—	—	—	"	—		3/30	—	
0700-6848	— 27	—		—	—	—	~~ACFX 39243~~ ACFX-66076 DIM	—		3/30	—	

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LINE 7

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927-4003

Coal Creek Generating Station
for COOPERATIVE POWER ASSOC.
CPA/PONDS 91&93/ND
MANUFACTURING ROLL CHECKLIST
IN-PLANT QUALITY ASSURANCE MONITORING
GUNDLE LINING SYSTEMS, INC.

Sheet 2 of 5

LINE 7

Approved by GCS/Golden

Job # 7346-01

ROLL NO.	PROJ. INV. NO.	ACCPTD. AT LINE	CONF. SAMP. TAKEN (ECS)	GUNDLE ROLL QA REQ.	GUNDLE ROLL QA RECD.	GUNDLE ROLL QA CKD.	RAIL CAR	RESIN LETTER RECD.	ECS LAB (PASS/FAIL)	DATE SHIPPED	COMMENTS
0700-6849	28	✓		✓	✓	✓	ACFX 66076	✓		3/30	
50	29	✓		✓	✓	✓	"	✓		3/30	
51	30	✓		✓	✓	✓	"	✓		3/30	
52		✓	7 3/24	✓	✓	✓	"	✓	Passed 4-2	3/30	
53		✓		✓	✓	✓	"	✓		3/30	
54	—	GLS									
55	—	GLS									
56		✓		✓	✓	✓	"	✓		3/30	
57		✓		✓	✓	✓	"	✓		3/30	
58		✓		✓	✓	✓	"	✓		3/30	
59		~~GLS~~ ✓	8 X 3/30	✓	✓	✓	"	✓	P/4-2	3/30	3-24
0700-6860		✓		✓	✓	✓	"	✓		3/30	
6861		✓		✓	✓	✓	"	✓		3/30	
6862		✓	9 X 3/30	✓	✓	✓	"	✓	P/4-2	3/30	
6863	40	✓		✓	✓	✓	"	✓		3/30	
6864		✓		✓	✓	✓	"	✓		3/30	
6865		✓		✓	✓	✓	"	✓		3/30	
6866		✓	10 X 3/30	✓	✓	✓	"	✓	P/4-2	3/30	
6867		✓		✓	✓	✓	"	✓		3/30	
6868	45	✓		✓	✓	✓	ACFX-66076	✓		3/30	
6869	—	GLS									
0700 6870	—	GLS									
0700-6871	46	✓	11 X 3/30	✓	✓	✓	ACFX-66076	✓	P/42	3/30	
6872	—	GLS									
6873	—	GLS									
6874	—	GLS									
6875	—	GLS									
~~0700 6893~~		✓		✓	✓	✓		✓			SEE SHEET 3 of ___
~~6894~~		✓	X	✓	✓	✓		✓			"

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LINE 7

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927-4003

Coal Creek Generating Station
for COOPERATIVE POWER ASSOC.
CPA/PONDS 91&93/ND
MANUFACTURING ROLL CHECKLIST
IN-PLANT QUALITY ASSURANCE MONITORING
GUNDLE LINING SYSTEMS, INC.

Sheet 3 of 5

Job # 7346-01

ROLL NO.	PROJ. INV. NO.	ACCPTD. AT LINE	CONF. SAMP. TAKEN (ECS)	GUNDLE ROLL QA REQ.	GUNDLE ROLL QA RECD.	GUNDLE ROLL QA CKD.	RAIL CAR	RESIN LETTER RECD.	ECS LAB (PASS/FAIL)	DATE SHIPPED	COMMENTS
0700-6876											
↓											
other Job											
↓											
0700-6893	47	✓	DH 3/31	—	—	—	CHEX-00161	—		3/30	
6894		✓	✓ 3/31	—	—	—		—		3/30	12th Sample go to Lue 6
95		—				/		—	PASSE/4/6	3/30	
96	50	—				/		—		3/30	
~~97~~		GLS ~~X~~				/					~~Shipped 3/30 GLS due to Appearance~~
98		—				/	CHEX-00161	/		3/30	
6899		—	FAILED		LAB						FAILED LAB
6900		—	FAILED		LAB						Appropriate QA data received - NCR
01		/	FAILED		LAB						Roll Approved
2		GLS									GLS
3		GLS									
4		—	FAILED		LAB						FAILED LAB
05		—				/					
6		—				/	PTLX-41718	/		3/30	
X 7		—	35 / 3/31			—			P / 4-7	3/30	
8		—				/				3/30	
9	~~60~~	—				/				3/30	
-6910		—				/				3/30	
11		GLS									
12		—	14 / 3/31			/			P/4-7	3/30	
13		—				—				3/30	
14	60	—				/				3/30	
0700-6915	~~50~~ 60	—				/				3/30	
6916	~~60~~ 62	/	15 / 3/31			/	PTLX-41718		P/4-7	3/30	

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Coal Creek Generating Station
for COOPERATIVE POWER ASSOC.
CPA/PONDS 91&93/ND
MANUFACTURING ROLL CHECKLIST
IN-PLANT QUALITY ASSURANCE MONITORING
GUNDLE LINING SYSTEMS, INC.

Approved by GCS/Gundle

Job # 7346-01

ROLL NO.	PROJ. INV. NO.	ACCPTD. AT LINE	CONF. SAMP. TAKEN (ECS)	GUNDLE ROLL QA REQ.	GUNDLE ROLL QA RECD.	GUNDLE ROLL QA CKD.	RAIL CAR	RESIN LETTER RECD.	ECS LAB (PASS/FAIL)	DATE SHIPPED	COMMENTS
0700-6917		✓				✓	PTLX-41718	✓		3/30	
18		✓				✓				3/30	
19		✓				✓				3/30	
6920	~~70~~	✓				✓				3/30	
21		✓	16 ✓ 3/31			✓			P / 4-7	3/30	
22		✓				✓				3/30	
23		✓				✓				3/30	
24	70	✓				✓				3/30	
25		✓	17 ✓ 3/31			✓			P / 4/6	3/30	
26	70	✓				✓					
27		✓				✓					
28		✓				✓					
29	~~79~~	✓				✓	PTLX-41718	✓		3/31	
6930		GLS	—								Thickness
31		GLS	—								
32		GLS									
33		Scrap									
34		Scrap									
35		GLS									
36		Scrap									
37		GLS									
38	~~80~~	✓	✓			✓	PTLX-~~42630~~ 42360	✓		3/31	
39		✓	~~18~~ ✓ ~~3/31~~			✓			4/8		
6940		✓	19 ✓ ~~3/31~~			✓			4/8		
41		✓				✓					
42	80	✓				✓					
43		✓				✓					
44		✓				✓					
0700-6945	~~87~~ 83	✓				✓					

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Coal Creek Generating Station
for COOPERATIVE POWER ASSOC.
CPA/PONDS 91&93/ND
MANUFACTURING ROLL CHECKLIST
IN-PLANT QUALITY ASSURANCE MONITORING
GUNDLE LINING SYSTEMS, INC.

Job # 7346-01

Sent X

ROLL NO.	PROJ. INV. NO.	ACCPTD. AT LINE	CONF. SAMP. TAKEN (ECS)	GUNDLE ROLL QA REQ.	GUNDLE ROLL QA RECD.	GUNDLE ROLL QA CKD.	RAIL CAR	RESIN LETTER RECD.	ECS LAB (PASS/FAIL)	DATE SHIPPED	COMMENTS
0700-6946	~~8884~~	✓				✓	PTLX-42360	✓			
47		✓	✓20			✓			4/8		
48	~~90~~	✓				✓					
49		✓	✓21			✓					
0700-6950		✓				✓					
51	—	GLS	—								
52		✓	✓22			✓			4/8		
53	90	✓				✓					
54		✓				✓					
55		✓				✓					
56		✓				✓					
57		✓	✓23			✓			4/8 / P		
58		✓				✓					
59	~~100~~	✓				✓					
0700-6960		✓	4/10 ✓24			✓			4-10		
61		✓				✓					
62	—	GLS	GLS								
63		✓				✓					
64	100	✓				✓					
65		✓				✓					
66	—	Scrap	—								
67		✓				✓					
68		✓				✓	PTLX-42360				
69		✓				✓					
0700-6970		✓				✓					
6971	~~110~~ DKC	✓				✓					HGA
6972		✓	4/10 ✓25			✓			4-20		Last Roll from line 7 - changing to another job · 60 mil 0700-6973
★ 6973	~~108~~	✓				✓				★	
6974											

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JKA

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0656								
PANEL NUMBER —								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.			~~45.84~~ DHG					
ROLL NUMBER -0657								
PANEL NUMBER —								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.			45.84					
ROLL NUMBER -0658								
PANEL NUMBER —								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.85	GLS						
ROLL NUMBER -0659								
PANEL NUMBER —								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.47	GLS						
ROLL NUMBER 0601 - 0660								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.87	GLS						

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

		THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
		LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER	0601-0661								
PANEL NUMBER									
DATE OF PRODUCTION									
START TIME									
QA MONITOR								#1	
AVG.		44.66	GLS						
ROLL NUMBER	0601-0662								
PANEL NUMBER									
DATE OF PRODUCTION									
START TIME									
QA MONITOR									
AVG.		44.54	GLS						
ROLL NUMBER	0601-0663								
PANEL NUMBER									
DATE OF PRODUCTION									
START TIME									
QA MONITOR									
AVG.		43.61	GLS						
ROLL NUMBER	0601-0664								
PANEL NUMBER									
DATE OF PRODUCTION									
START TIME									
QA MONITOR									
AVG.		44.15	GLS						
ROLL NUMBER	0601-0665								
PANEL NUMBER									
DATE OF PRODUCTION									
START TIME									
QA MONITOR								#2	
AVG.		44.21	GLS						

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION				
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	CONF. SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0666								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 0601-0667								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.21	GLS						
ROLL NUMBER 0601-0668								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.21	GLS						
ROLL NUMBER 0601-0669								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.54	GLS						
ROLL NUMBER 0601-0670								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.77	GLS						

IN-PLANT QA

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0671								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	43.56	GLS						
ROLL NUMBER 0601-0672								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 0601-0673								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 0601-0674								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	45.70	GLS						
ROLL NUMBER 0601-0675								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0676								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 0601-0677								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	46.35	GLS						
ROLL NUMBER 0601-0678								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	45.85	GLS						
ROLL NUMBER 0601-0679								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 0601-0680								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	46.14	GLS						

IN-PLANT QA

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0681								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	45.52	6.66						
ROLL NUMBER 0601-0682								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.12	G.L.S						
ROLL NUMBER 0601-0683								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								#5 ✓
AVG.	44.84	G.L.S						
ROLL NUMBER 0601-0684								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.68	G.L.S						
ROLL NUMBER 0601-0685								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	45.05							

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0686								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	45.26							
ROLL NUMBER 0601-0687								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.28							
ROLL NUMBER 0601-0688			45					
PANEL NUMBER			47					
DATE OF PRODUCTION			45					
START TIME			46					
QA MONITOR			47				#6 ✓	
AVG.	46.31							
ROLL NUMBER 0601-0689	45	44		14:54				at 300' Lrg. Blemish
PANEL NUMBER	47	45		16:45	585'			
DATE OF PRODUCTION	45							
START TIME	46							
QA MONITOR	47						Accepted by Inspector	
AVG.								
ROLL NUMBER 0601-0690								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0691								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 42.30								
ROLL NUMBER 0601-0692								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 43.14								
ROLL NUMBER 0601-0693								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR							#1 ✓	
AVG. 42.40								
ROLL NUMBER 0694								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 43.57								
ROLL NUMBER 0695								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 44.0								

IN-PLANT QA

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601 - 0696								
PANEL NUMBER		GLS						
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 0697								
PANEL NUMBER								
DATE OF PRODUCTION							YES	
START TIME		40		7:35	563			
QA MONITOR							#8 ✓	
AVG.								
ROLL NUMBER 0698		40		8:35	200'			Increased at 200 2 cold spots 21&1
PANEL NUMBER								
DATE OF PRODUCTION		GLS						
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 0699		40		10:00	42			Terminated at 11B.
PANEL NUMBER								
DATE OF PRODUCTION		GLS						
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 0700		41		13:30	196			
PANEL NUMBER								
DATE OF PRODUCTION		GLS						Folded at 640'. (Increased)
START TIME								
QA MONITOR								
AVG.								

IN-PLANT QA

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0701		40		14:10	36			
PANEL NUMBER		40		15:40	51.6			
DATE OF PRODUCTION								
START TIME		GLS						
QA MONITOR								
AVG.								
ROLL NUMBER 0702		40		15:20	40			
PANEL NUMBER		40		16:35	148			
DATE OF PRODUCTION								
START TIME		GLS						
QA MONITOR								
AVG.								
ROLL NUMBER 0703								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.6	GLS						
ROLL NUMBER 0704								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	43.2	GLS						
ROLL NUMBER 0705								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR		GLS						
AVG.								

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0706								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	439	GLS						
ROLL NUMBER 0707								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	438	GLS						
ROLL NUMBER 0708								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	442	GLS						
ROLL NUMBER 0709								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	GLS							Machine Down for Repairs
ROLL NUMBER 0710								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	GLS							

IN-PLANT QA

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601 - 0711								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 0712								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 0713		40		3:45	249			
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 0714								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	45.7	CLS						
ROLL NUMBER 0715								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.5	CLS						

IN-PLANT QA

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0716								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.1	6.6						
ROLL NUMBER 0717								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.1	6.5					✓ #9	
ROLL NUMBER 0718								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	43.9	6.5						
ROLL NUMBER 0719								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	43.3	6.5						
ROLL NUMBER 0720								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								

IN-PLANT QA

ENVIRONMENTAL CONSTRUCTION STANDARD

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0721		42	41	10:20	610			some dimples
PANEL NUMBER			43	10:40	650			nothing serious
DATE OF PRODUCTION								
START TIME			41					
QA MONITOR			44					
AVG.								#10
ROLL NUMBER 0601 - 0722	41	43	45	10:55	80			
PANEL NUMBER	43	43	43	11:20	250			
DATE OF PRODUCTION	41		44	12:30	650			
START TIME	41		44					
QA MONITOR	44		43					#11
AVG.								
ROLL NUMBER 0601 - 0723	44	43		12:45	110			
PANEL NUMBER	43							
DATE OF PRODUCTION	44							
START TIME	44							
QA MONITOR	43							
AVG.								
ROLL NUMBER 0601 - 0724	43			14:20	0			
PANEL NUMBER	42	43		14:45	150			Large Blemish
DATE OF PRODUCTION	43							
START TIME	43							
QA MONITOR	43							
AVG.								
ROLL NUMBER -0725								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								

IN-PLANT QA

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601 - 0726								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 0727								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 43.4								
ROLL NUMBER 0728								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 44.6								
ROLL NUMBER 0729								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								#12 ✓
AVG. 43.9								
ROLL NUMBER 0730								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 43.1	44.5							

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0001 - 0731								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	43.6	GLS						
ROLL NUMBER 0732								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.0	GLS						
ROLL NUMBER 0733			42	8:25	650'			3:26
PANEL NUMBER			45					
DATE OF PRODUCTION			43					
START TIME			42					
QA MONITOR			42					
AVG.								
ROLL NUMBER 0734	42	40	42	~~8:45~~	~~650'~~			
PANEL NUMBER	45	41	45	8:45	150'			
DATE OF PRODUCTION	43		43	9:15	325			
START TIME	42		42					
QA MONITOR	42		42					
AVG.								
ROLL NUMBER 0735	~~40~~	40	42	~~8:45~~	~~150'~~			
PANEL NUMBER		40	43	~~9:15~~	~~325~~			
DATE OF PRODUCTION		41	44	9:40	150			
START TIME		42	43	10:20	317			
QA MONITOR		42	41	10:50	505			
AVG.				11:25	650 front			TO front

IN-PLANT QA

ENVIRONMENTAL CONSTRUCTION SERVICES, INC.

GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJE JUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601 0736	42							
PANEL NUMBER	41							
DATE OF PRODUCTION	44							
START TIME	43							
QA MONITOR	41							
AVG.			44.54					
ROLL NUMBER 0737								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.24							
ROLL NUMBER 0738								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.03							
ROLL NUMBER 0739								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	43.85							
ROLL NUMBER 0740								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.00							

IN-PLANT QA

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJEC. .UMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0741								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR							✓	#13 by Gundle
AVG. 42.68								
ROLL NUMBER 42								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 43.59								
ROLL NUMBER 43								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 43.87								
ROLL NUMBER 44								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 43.91								
ROLL NUMBER 0601-0745								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 43.75								

IN-PLANT QA

ENVIRONMENTAL CONSTRUCTION SERVICES, INC.

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0746								
PANEL NUMBER —								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	43.87							
ROLL NUMBER 47		4	43					
PANEL NUMBER —		42	45		190		14 ✓	Few Dimples
DATE OF PRODUCTION 3/28		44	43		320			"
START TIME		45	44		470			"
QA MONITOR DHG		42	42		650			
AVG.								
ROLL NUMBER 0748	43	44	44		120			
PANEL NUMBER —	45	45	48		250			
DATE OF PRODUCTION 3/28	43		42		—			Few Scattered Dimples
START TIME	44	43	43		520			"
QA MONITOR DHG	42		42		650			"
AVG.								
ROLL NUMBER 49	44							
PANEL NUMBER —	48							
DATE OF PRODUCTION 3/28	42							
START TIME	43							
QA MONITOR	42			43.12				
AVG.								
ROLL NUMBER 0601-0750								
PANEL NUMBER —								
DATE OF PRODUCTION 3/28								
START TIME								
QA MONITOR								
AVG.	43.21							

IN-PLANT QA

ENVIRONMENTAL CONSTRUCTION SERVICES, INC.

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT . MBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

ABSENTEE RECORDS
(ABSENT FROM PLANT)

ROLL NUMBER 0601-0751
PANEL NUMBER
DATE OF PRODUCTION
START TIME Scrap
QA MONITOR
AVG. 43.21

ROLL NUMBER 52
PANEL NUMBER
DATE OF PRODUCTION
START TIME GLS
QA MONITOR
AVG. 43.01

ROLL NUMBER 53
PANEL NUMBER
DATE OF PRODUCTION Voided #
START TIME
QA MONITOR
AVG.

ROLL NUMBER 54
PANEL NUMBER
DATE OF PRODUCTION
START TIME GLS
QA MONITOR
AVG. 42.10

ROLL NUMBER 55
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG. 43.91

ROLL NUMBER 0601-0756
PANEL NUMBER
DATE OF PRODUCTION
START TIME Sample for #15
QA MONITOR
AVG. 43.38

ROLL NUMBER 57
PANEL NUMBER
DATE OF PRODUCTION Void BD #1
START TIME
QA MONITOR
AVG.

ROLL NUMBER 58
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG. 43.56

ROLL NUMBER 59
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG. 43.77

ROLL NUMBER 0601-0760
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG. 43.71

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

ABSENTEE RECORDS
(ABSENT FROM PLANT)

ROLL NUMBER 0601-0761
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG. 43.43

Gundle Cut Sample #16

ROLL NUMBER 62
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG. 43.47

ROLL NUMBER 63
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG. 42.85

ROLL NUMBER 64
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG. 43.82

ROLL NUMBER 65
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG. 43.92

Gundle Cut Sample #17

ROLL NUMBER 0601-0766
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG. 43.75

ROLL NUMBER 67
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG. 44.43

ROLL NUMBER 68
PANEL NUMBER
DATE OF PRODUCTION
START TIME Scrap
QA MONITOR
AVG. 44.43

ROLL NUMBER 69
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG. 44.61

ROLL NUMBER 0601-0770
PANEL NUMBER
DATE OF PRODUCTION GLS
START TIME
QA MONITOR
AVG. 44.14

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT: ABER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0771								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR							18 ✓	Gundle Cut
AVG. 43.96								
ROLL NUMBER 72								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 43.26								
ROLL NUMBER 0601-0773								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 43.52								
ROLL NUMBER 0774								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR							19 ✓	Gundle Cut
AVG. 43.56								
ROLL NUMBER 0601-0775								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 43.12								

IN-PLANT QA

ENVIRONMENTAL CONSTRUCTION SERVICES, INC.

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT . ABER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0776			43					
PANEL NUMBER —			42					
DATE OF PRODUCTION			44					
START TIME			43					
QA MONITOR			44					
AVG.			43.2					
ROLL NUMBER 77	43		42					
PANEL NUMBER —	42		44					
DATE OF PRODUCTION 3/30	44		40					
START TIME 10:45	43		41					
QA MONITOR DHG	44		44					
AVG.	43.2		42.2					
ROLL NUMBER 78	42	43	44	1:00	112			Few - Dimples
PANEL NUMBER	44	43	44	1:35	310			"
DATE OF PRODUCTION 3/30	40	42	43	2:10	489	GLS by operator due to Folds		"
START TIME 12:40	41		45	2:35	650			Small Folds
QA MONITOR	44		42					
AVG.	42.2							
ROLL NUMBER 0779	44							
PANEL NUMBER —	44							
DATE OF PRODUCTION 3/30	43							
START TIME ~~12:40~~ 2:40	45					GLS due to wrinkles & folding		
QA MONITOR DHG	42							
AVG.								
ROLL NUMBER 0601-0780								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								

IN-PLANT QA

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT /BER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

ABSENTEE RECORDS
(ABSENT FROM PLANT)

ROLL NUMBER 0601-0781
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG. 43.96

ROLL NUMBER 82
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG. 44.01

ROLL NUMBER 83
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG. 44.15

Gundle cut ↓ 20 Sample

ROLL NUMBER 84
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG. 42.36

ROLL NUMBER 85
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG. 43.86

ROLL NUMBER 0601-0786
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG. 42.8

ROLL NUMBER 87
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG.

ROLL NUMBER 88
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG.

ROLL NUMBER ~~89~~
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG.

ROLL NUMBER ~~90~~
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG.

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

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	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0787								
PANEL NUMBER —								
DATE OF PRODUCTION 3/31								
START TIME 3/31		41		7:20	387			Very Few Dumpbags
QA MONITOR DHG							21 ✓	
AVG.								
ROLL NUMBER 0788								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	43.38							
ROLL NUMBER 89			43					
PANEL NUMBER			44					
DATE OF PRODUCTION			40					
START TIME		41	42	11:28	488			
QA MONITOR			44					
AVG.			42.6					
ROLL NUMBER 0790	43	42	45	1250	276			
PANEL NUMBER	44	42	44	1303	375			
DATE OF PRODUCTION 3-31-92	40	43	42	1321	477			
START TIME 1210	42	44	41	1337	557			
QA MONITOR HGR	44		41				22 ✓	
AVG.	42.6	42.8	42.6					
ROLL NUMBER 0601-0791	45	42	44	1410	100			
PANEL NUMBER	44	46	44	1425	186			
DATE OF PRODUCTION 3-31-92	42	43	42	1449	308			
START TIME 1355	41	42	41	1510	430			
QA MONITOR HGR	41	42	41	1538	582			
AVG.	42.6	43.0	42.4					

IN-PLANT QA

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0792	44	42	42	1610	125			
PANEL NUMBER	44	43	42	1627	218			
DATE OF PRODUCTION 3-31-92	42	42	41	1654	369			
START TIME 1553	41	42	41	1708	453			
QA MONITOR HGR	41	42	43	1726	553			Grease at end of roll o
AVG.	42.4	42.2	41.8					
ROLL NUMBER 93	42	42		1804	115			
PANEL NUMBER	42	41		1823	227			
DATE OF PRODUCTION 3-31-92	41							
START TIME 1745	41							
QA MONITOR	43							
AVG.	41.8			Gundle Ave 42.89				
ROLL NUMBER 94								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.			43.12 Gundle Ave.					
ROLL NUMBER 95								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								Gundle Cut
QA MONITOR						✓		
AVG.			42.45 Gundle Ave					
ROLL NUMBER 96								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.			43.29 Gundle Ave					

IN-PLANT QA

ENVIRONMENTAL CONSTRUCTION SERVICES, INC.

... PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT ... 'BER 927-4003
OWNER ...OOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0797								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.			43.87	Gundle Ave				
ROLL NUMBER 0601-0798								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.			42.96	Gundle Ave.				
ROLL NUMBER 0601-0799								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.			41.91	Gundle Ave.				
ROLL NUMBER 0601-0800			41	0910	~~125~~			
PANEL NUMBER			43		~~125~~			
DATE OF PRODUCTION 4-~~*~~-92			41					
START TIME			44					
QA MONITOR HGR			41				24 ✓	
AVG.			42					
ROLL NUMBER 0601-0801	41	41	46	0910	125			
PANEL NUMBER	43	42	45	0925	225			
DATE OF PRODUCTION 4-1-92	41	42	42	0942	310			
START TIME 8:30	44	42	42	0958	405			
QA MONITOR HGR	41	42	40	1018	528			
AVG.	42	41.8	43					

IN-PLANT QA

IN PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECO

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
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MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0802	46	42	41	1049	61			
PANEL NUMBER	45	42	44	1112	194			
DATE OF PRODUCTION 4-1-92	42	43	41	1130	298			
START TIME 10:45	42	43	46	1211	535			
QA MONITOR HGR	40	43	41	1225	640		25 ✓	
AVG.	43	42.6	42.6					
ROLL NUMBER 0601-0803	41	43	43	1256	144			
PANEL NUMBER	44	44	44	1317	262			
DATE OF PRODUCTION 4-1-92	41	41	40	1335	355			
START TIME 12:35	46	43	42	1352	469			
QA MONITOR HGR	41	42	42	1412	582			
AVG.	42.6	42.6	42.2					
ROLL NUMBER 0601-0804	43	42	40	1440	98			
PANEL NUMBER	44	41	43	1458	204			
DATE OF PRODUCTION 4-1-92	40	42	41	1516	310			
START TIME 2 14:25	42	41	42	1535	413			
QA MONITOR HGR	42	42	44	1603	579			
AVG.	42.2							
ROLL NUMBER 0601-0805	40	42		1635	121			
PANEL NUMBER	43	43		1658	246			
DATE OF PRODUCTION 4-1-92	41	42		1727	415			
START TIME 16:15	42	43		1749	543			
QA MONITOR HGR	44	42		1756	582			
AVG.			43.31	Gundle Avg.				
ROLL NUMBER 0601-0806								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
MONITOR								
AVG.			43.73	Gundle Avg				

QA

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
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SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0807								
PANEL NUMBER								
DATE OF PRODUCTION 4-1-92								
START TIME								
QA MONITOR								
AVG.			43.14	Gundle Avg.				
ROLL NUMBER 0601-0808								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME 4-2-92								
QA MONITOR								
AVG.			43.22	Gundle Avg.				
ROLL NUMBER 0601-0809								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME 4-2-92								
QA MONITOR								
AVG.			43.19	Gundle Avg.				
ROLL NUMBER 0601-0810								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME 4-2-92								
QA MONITOR								
AVG.			44.29	Gundle Avg.				
ROLL NUMBER 0601-0811								
PANEL NUMBER								
DATE OF PRODUCTION 4-2-92								
START TIME								
QA MONITOR								
AVG.			44.12	Gundle Avg.				

GEOMEMBRANE ROLL QUALITY ASSURANCE RECORDS

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0812			42	~~0913~~	~~170~~			
PANEL NUMBER			44					
DATE OF PRODUCTION			42					
START TIME			40					
QA MONITOR			41					
AVG.			41.8					
ROLL NUMBER 0601-0813	42	41	42	0913	170			
PANEL NUMBER	44	41	43	0935	288			
DATE OF PRODUCTION 4-2-92	42	41	44	0954	391			
START TIME 08:35	40	40	43	1013	496			
QA MONITOR HGR	41	42	42	~~1028~~ 1028	580			
AVG.	41.8	41.0	42.8					
ROLL NUMBER 0601-0814	42	40	43	11:01	68			
PANEL NUMBER	43	40	43	11:30	223			
DATE OF PRODUCTION 4-2-92	44	41	42	11:57	369			
START TIME 1045	43	41	44	12 21	494			
QA MONITOR HGR	42	41	43	1245	624		26 ✓	
AVG.	42.8	40.6	43.0					
ROLL NUMBER 0601-0815	43	42	41	1305	76			
PANEL NUMBER	43	42	43	1330	211			
DATE OF PRODUCTION 4-2-92	42	42	42	1357	353			
START TIME 12:50	44	42	43	1421	483			
QA MONITOR HGR	43	42	44	1452	647			
AVG.	43.0	42.0	42.6					
ROLL NUMBER 0601-0816	41	42	42	1459	36			
PANEL NUMBER	43	42	42	1529	198			
DATE OF PRODUCTION 4-2-92	42	41	42	1552	321			
START TIME 14:55	43	42	42	1616	450			
QA MONITOR HGR	44	42	42	1634	557		27 ✓	
AVG.	42.6	41.8	42.0					

IN-PLANT QA

... GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0817	42	42		1714	108			
PANEL NUMBER	42							
DATE OF PRODUCTION 4-2-92	42							
START TIME 16:55	42							
QA MONITOR AGR	42							
AVG.	42.0		43.82	Gundle Avg.				
ROLL NUMBER 0601-0818								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.			44.01	Gundle Avg.				
ROLL NUMBER 0601-0819								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.			43.42	Gundle Avg.				
ROLL NUMBER 0601-0820								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								Gundle Cut
QA MONITOR								
AVG.			43.22	Gundle Avg.				
ROLL NUMBER 0601-0821								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.			43.70	Gundle Avg.				

IN-PLANT QA

... PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD 5

PROJECT NUMBER 927-4003
OWNER ...OOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0822								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.			43.38	Gundle Avg.				
ROLL NUMBER 0601-0823								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.			44.22	Gundle Avg.				
ROLL NUMBER 0601-0824			42					
PANEL NUMBER			44					
DATE OF PRODUCTION 4-3-92		43	42	0811	393			
START TIME		42	42	0834	525			
QA MONITOR		42	45	0850	616		29 ✓	
AVG.		42.3	43.0					
ROLL NUMBER 0601-0825	42	42	43	0915	108			
PANEL NUMBER	44	43	45	0934	213			
DATE OF PRODUCTION 4-3-92	42	42	43	0950	302			
START TIME 0855	42	42	46	1015	445			
QA MONITOR HGR	45	41	43	1039	584			
AVG.	43.0	42.0	44.0					
ROLL NUMBER 0601-0826	43	41	42	1058	42			
PANEL NUMBER	45	42	43	1125	198			
DATE OF PRODUCTION ~~10:50~~ 4-3-92	43	41	42	1151	354			
START TIME 10:50	46	41	42	1208	443			
QA MONITOR HGR	43	41	43	1226	545			
AVG.	44.0	41.2	42.4					

IN-PLANT QA

[illegible] GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER [illegible]OOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

Job # 7346-0

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0827	42	42	42	1303	86			
PANEL NUMBER	43	42	42	1328	229			
DATE OF PRODUCTION 4-3-92	42	42	43	1355	385			
START TIME 12:45	42	41	43	1414	492			
QA MONITOR HGR	43	42	43	1436	620			
AVG.	42.4	41.8	42.6					
ROLL NUMBER 0601-0828	42	42	42	1505	104			
PANEL NUMBER	42	42	41	1525	222			
DATE OF PRODUCTION 4-3-92	43	42	42	1545	336			
START TIME 14:45	43	42	43	1607	459			
QA MONITOR HGR	43	42	42	1638	636			
AVG.	42.6	42.0	42.0					
ROLL NUMBER 0601-0829	42	42		1704	131			
PANEL NUMBER	41	42		1728	265			
DATE OF PRODUCTION 4-3-92	42							
START TIME 16:45	43							
QA MONITOR HGR	42							
AVG.	42.0							
ROLL NUMBER 0601-0830								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 42.82								
ROLL NUMBER 0601-0831								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 42.89								

Accepted by Gundle

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IN-PLANT QA

ENVIRONMENTAL CONSTRUCTION SERVICES, INC.

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0832								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 43.43								
ROLL NUMBER 33								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR							3' ✓	had flow cut sample
AVG. 43.38								
ROLL NUMBER 34								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 43.50								
ROLL NUMBER 35								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 43.42								
ROLL NUMBER 0601-0836								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 43.98								

IN-PLANT QA

GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601- 0837								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 38			46					
PANEL NUMBER —			42					
DATE OF PRODUCTION 4/4/92			41					
START TIME —			43	11:32	569			Few Dimples
QA MONITOR DHG			45	11:45	650			
						32 ✓		
AVG.			43					
ROLL NUMBER 0839	44	43	44	12:10	108			small Blemish
PANEL NUMBER —	42	42	43	12:40	270			Few Dimples
DATE OF PRODUCTION 4/4/92	41	44	40	1:30	540			
START TIME 11:50	43		40					
QA MONITOR DHG	45		42					
AVG.	43		41.8					
ROLL NUMBER 0840	44	42	42	155	55			
PANEL NUMBER —	43	41	44	2:20	190			
DATE OF PRODUCTION 4/4/92	40	42	43	2:50	364			
START TIME 1:45	40	42	44	3:10	498			
QA MONITOR DHG	42		43					
						37 ✓		
AVG.	41.8		43.2					
ROLL NUMBER 0601- 0841	42							
PANEL NUMBER —	44							
DATE OF PRODUCTION 4/4/92	43							
START TIME 3:30	44							
QA MONITOR DHG	43							
AVG.	43.2							

IN-PLANT QA

PLAY GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0842								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 45.38								
ROLL NUMBER 43								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 45.50								
ROLL NUMBER 44								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 45.64								
ROLL NUMBER 45								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 45.21								
ROLL NUMBER 0601-0846								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 44.84								

IN-PLANT QA

ENVIRONMENTAL CONSTRUCTION SERVICES, INC.

GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS LEAD	SIDE	TRAIL	PERIODIC VISUAL OBSERVATION TIME	ELAPSED LENGTH	VISUAL OBSER.	CONF. SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0847								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.36							
ROLL NUMBER 48								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.17							
ROLL NUMBER 49								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.21							
ROLL NUMBER 0601-0850			43					
PANEL NUMBER —			43					
DATE OF PRODUCTION 4-5-92		44	44	10:50	380			Few Dimples
START TIME —		43	44	11:20	542			
QA MONITOR DHG		—	44	11:40	650		34 ✓	
AVG.			43.6					
ROLL NUMBER 0601-0851	43	43		12:15	162			
PANEL NUMBER —	43	44		12:40	295			
DATE OF PRODUCTION 4-5-92	44							
START TIME 11:45	44							
QA MONITOR DHG	44			43.40 Gundle Avg				
AVG.	43.6							

IN-PLANT QA

ENVIRONMENTAL CONSTRUCTION SERVICES, INC.

GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

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OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601 - 0852								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 43.63								
ROLL NUMBER - 53								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 44.42								
ROLL NUMBER 54								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 44.5								
ROLL NUMBER 55								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 44.5								
ROLL NUMBER 0601 - 0856								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 44.5								

IN-PLANT QA

ENVIRONMENTAL CONSTRUCTION SERVICES, INC.

GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601 - 08 57								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 44.6								
ROLL NUMBER 58								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 44.1								
ROLL NUMBER 59								GLS Gundle Inc
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR DHG		—			650			
AVG.								
ROLL NUMBER 60			40					
PANEL NUMBER —		41	41	6:35	110			
DATE OF PRODUCTION 4-6-92		41	40	7:00	260			
START TIME —		40	41	7:30	440			
QA MONITOR DHG		—	41	8:05	650		35 ✓	
AVG.			40.6					
ROLL NUMBER 0601 - 08 61	40		40		~~650~~			Build Up on Pot (Blemish)
PANEL NUMBER —	41		41					
DATE OF PRODUCTION 4-6-92	40		40		Off Site During Back End			
START TIME 8:10	41		43					
QA MONITOR DHG	41		41					
AVG. 40.6			41					

IN-PLANT QA

ENVIRONMENTAL CONSTRUCTION SERVICES, INC.

GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

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OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

		THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
		LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER	0601-0862	40		42					
PANEL NUMBER	—	41	41	44	10:30	158			
DATE OF PRODUCTION	4/6/92	40	42	42	11:00	345			
START TIME	10:05	43	41	41	11:30	531			
QA MONITOR	DHG	41		40	11:50	690		36 ✓	
	AVG.	41		41.8					
ROLL NUMBER	63	42		44	—				
PANEL NUMBER	—	44	41	45	12:20	123			
DATE OF PRODUCTION	4/6/92	42	42	43	12:40	247			
START TIME	11:55	41	42	44	1:15	464			
QA MONITOR	DHG	40	41	44	1:45	650			
	AVG.	41.8		44					
ROLL NUMBER	64	44		40					
PANEL NUMBER	—	45	41	43	2:20	99			
DATE OF PRODUCTION	4/6/92	43	41	42	2:40	285			
START TIME	1:50	44	41	45	3:05	404			
QA MONITOR	DHG	44	41	41	3:40	600			
	AVG.	44							
ROLL NUMBER	65	40	41		4:10				Blemishes, Dumples & Drag spots
PANEL NUMBER	—	43	41		4:30				
DATE OF PRODUCTION	4/6/92	42							
START TIME	3:55	45							
QA MONITOR	DHG	41							
	AVG.								
ROLL NUMBER	66								
PANEL NUMBER	—								
DATE OF PRODUCTION									
START TIME									
QA MONITOR									
	AVG.	42.66							

GLS by Gundle

GLS by Gundle

Dumples too hot

IN-PLANT QA

ENVIRONMENTAL CONSTRUCTION SERVICES, INC.

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0867						GLS by Gundle		
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	42.45							
ROLL NUMBER 68						Accepted by Gundle		
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	43.66							
ROLL NUMBER 69						GLS ✓		Chalk marks
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	43.68							
ROLL NUMBER 70						Accepted		
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	41.96							
ROLL NUMBER 0601-0871			41			GLS by Gundle Low Grade		
PANEL NUMBER —			40					
DATE OF PRODUCTION 3:35 4/7/92		39	41	4:40	384			
START TIME 3:35		40	43	5:00	502			
QA MONITOR DHG		—	42	5:25	650			
AVG.			41.4					

IN-PLANT QA

ENVIRONMENTAL CONSTRUCTION SERVICES, INC.

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

		THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF. SAMPLED	
		LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	YES / NO	REMARKS
ROLL NUMBER	0601-0872	41		40					
PANEL NUMBER	—	40	40	39	6:00	180			
DATE OF PRODUCTION	4/7/92	41	38	38	6:20	300			
START TIME	5:30	43		42			GLS		due to low GAUGE
QA MONITOR	DHG	42		42					
	AVG.	41.4							
ROLL NUMBER	73	40	40		8:00	175			
PANEL NUMBER	—	39	40		8:30	290			
DATE OF PRODUCTION	4/7/92	38	41		9:00	460	GLS		
START TIME	7:25	42							
QA MONITOR	DHG	42					Off Site @ the End		
	AVG.								
ROLL NUMBER	74			42					
PANEL NUMBER	—			41					
DATE OF PRODUCTION	4/7/92			40					
START TIME	9 25		40	41	11:15	630			
QA MONITOR	DHG			42				37 ✓	
	AVG.			41.2					
ROLL NUMBER	75	42	41	42	11:21	125			
PANEL NUMBER	—	41	41	41	12:11	299			Had to cut off making Roll Short
DATE OF PRODUCTION	4-7-92	40	41	43	12:26	387	GLS		
START TIME	11:20	41	41	42	12:45	495			
QA MONITOR	HGR	42	41	41	13:00	577			
	AVG.	41.2	41.0	41.8					
ROLL NUMBER	0601-0876	42	42	42	13:20	40			
PANEL NUMBER	—	41	42	42	13:38	150			
DATE OF PRODUCTION	4-7-92	43	42	40	14:01	284			
START TIME	13:15	42	42	42	1422	399		38 ✓	
QA MONITOR	HGR	41	42	42	1442	519			
	AVG.	41.8	42.0	41.6					

IN-PLANT QA

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
PROJECT TITLE CPA/PONDS 91&93/ND
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
CONTRACTOR GUNDLE LINING SYSTEMS
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUFACTURER GUNDLE LINING SYSTEMS
MANUF. PLANT LOCATION HOUSTON, TEXAS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION				
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	CONF. SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0877	42	41	43	1527	124			
PANEL NUMBER	42	42	43	1555	284			
DATE OF PRODUCTION 4-7-92	40	42	41	1615	400			
START TIME 1510	42	42	42	1632	500			
QA MONITOR HGR	42	42	42	1651	606			
AVG.	41.6	41.8	42.2					
ROLL NUMBER - 78	43							
PANEL NUMBER	43							
DATE OF PRODUCTION 4-7-92	41							
START TIME 1705	42							
QA MONITOR	42							
AVG.	42.2							
ROLL NUMBER 79								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 0601 - 0880								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 0601 - 0881								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

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OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601 – 0882								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 883								
PANEL NUMBER							39	
DATE OF PRODUCTION							✓	
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 884								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 885			43					
PANEL NUMBER			43					
DATE OF PRODUCTION 4-8-92			41					
START TIME			40					
QA MONITOR			40					
AVG.			41.4					
ROLL NUMBER 0601 – 0886	43	41	43	8:22	86			
PANEL NUMBER	43	42	42	8:42	198	GLS		Breaking Early in lab test
DATE OF PRODUCTION 4-8-92	41	42	41	9:09	351			
START TIME 08:10.	40	41	~~40~~ ACP 42	9:40	530		✓	GLS
QA MONITOR HGL	40	40	42	9:55	609			
AVG.	41.4	41.2	41.6					

IN-PLANT QA

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0887	43	40	41	1027	139			
PANEL NUMBER	42	41	42	1055	296	GLS		Breaking early in Lab Test GLS
DATE OF PRODUCTION 4-8-92	41	41	43	1119	430			
START TIME 10:05	40	41	44	1143	563			
QA MONITOR HGR	42	41	43	1155	627			
AVG.	41.6	40.8	42.6					
ROLL NUMBER 0601-0888	41	41	42	1209	54			
PANEL NUMBER	42	41	42	1236	280 HGR			
DATE OF PRODUCTION 4-8-92	43	41	40	1305	365			
START TIME 12:00	44	42	43	1330	504			
QA MONITOR HGR	43	41	42	1350	615		40 ✓	
AVG.	42.6	41.2	41.8					
ROLL NUMBER 0601-0889	42	41		1405	48			
PANEL NUMBER	42							
DATE OF PRODUCTION 4-8-92	40							
START TIME 14:00	43							
QA MONITOR HGR	42							
AVG.	41.8							
ROLL NUMBER 0601-0890								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	43.70							
ROLL NUMBER 0601-0891								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR			GLS					
AVG.	43.38							

43.82

IN-PLANT QA

ENVIRONMENTAL CONSTRUCTION SERVICES, INC.

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

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SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0892								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 43.78								
ROLL NUMBER 93								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR							41 ✓	sample taken
AVG. 43.56								
ROLL NUMBER 94								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 43.35								
ROLL NUMBER 95								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 43.17								
ROLL NUMBER 0601-0896			42	—	—			
PANEL NUMBER		42	41	4:40	336		42 ✓	
DATE OF PRODUCTION 3/4/92		41	42	5:00	448			Very Few Dimples
START TIME 3:40		41	43	5:20	560			Small Drag Spot
QA MONITOR DHG		42	43	5:35	650			
AVG.			42.2					

IN-PLANT QA

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
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MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601-0897	42	41	42	5:55				
PANEL NUMBER —	41	42	44	6:15				
DATE OF PRODUCTION 4/9/92	42	41.5	41	6:40	377			Few Dragspots
START TIME 5:40	43	42	41	7:15	565			More "
QA MONITOR DHG	43	—	43	7:30	650	GCLS by Inspector		too many Drags
AVG.	42.2		42.2					
ROLL NUMBER 0898	42	41		8:05	209			
PANEL NUMBER —	44							
DATE OF PRODUCTION 4/9/92	41							
START TIME 7:35	41			GCLS		too many Drags will clean		
QA MONITOR DHG	43							
AVG.	42.2							
ROLL NUMBER 99								
PANEL NUMBER —								
DATE OF PRODUCTION 4/9/92		42		12:40	320	DHG		
START TIME 9:35								
QA MONITOR DHG							✓	
AVG.								
ROLL NUMBER 0900								
PANEL NUMBER —								
DATE OF PRODUCTION 4/9/92		42		12:60	320			
START TIME 11:35						GCLS by Gundle		
QA MONITOR DHG								
AVG.								
ROLL NUMBER 0601-0901			44					
PANEL NUMBER		41	43	2:20	252			Very Few Dimples
DATE OF PRODUCTION		42	42	2:40	408			
START TIME		42	44	3:10	570			
QA MONITOR DHG			44	3:30	650			
AVG.			43.4					

IN-PLANT QA

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

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SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0601 - 0902	44							
PANEL NUMBER —	43							
DATE OF PRODUCTION 4/9/92	42							
START TIME 3:35	44							
QA MONITOR DHG	44							
AVG.	43.4						✓	
ROLL NUMBER 0903								
PANEL NUMBER —								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	42.45						✓	
ROLL NUMBER 0904								
PANEL NUMBER —								
DATE OF PRODUCTION End of								
START TIME								
QA MONITOR JOB								
AVG.								
ROLL NUMBER 0905								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 0601 - 0906								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								

N-PLANT QA

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
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SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0700- 6820								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 0700- 6821								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	45.84	6.16						
ROLL NUMBER -6822								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	45.58	6.15						
ROLL NUMBER -6823								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	45.47	6.15						
ROLL NUMBER -6824								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	45.42	6.15						

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

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OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0700 6825								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	45.59							
ROLL NUMBER 6827								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	45.84	GLS						
ROLL NUMBER 6828								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	45.89	GLS						
ROLL NUMBER 6829								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	4603	GLS						
ROLL NUMBER 6830								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	45.35	GLS						

IN-PLANT QA

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0700 - 6831								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 6832								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	45.84	GLS						
ROLL NUMBER 6833								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.59	GLS						
ROLL NUMBER 6834								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.15	GLS						
ROLL NUMBER 0700 - 6835								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.43	GLS						

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

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MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0700-6836								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	45.35	GLS						
ROLL NUMBER 0700-6837								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	45.66	GLS						
ROLL NUMBER 0700-6838								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	45.08	GLS						
ROLL NUMBER 6839								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.98	GLS						
ROLL NUMBER 6840								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.57	GLS						

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

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MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0700 - 6841								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	45.31	GLS						
ROLL NUMBER 6842								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.00	GLS						
ROLL NUMBER 6843								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	45.57	GLS						
ROLL NUMBER 6844								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.35	GLS						
ROLL NUMBER 6845								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	45.57	GLS						

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

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PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0700 - 6846								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.95	GLS						
ROLL NUMBER -6847								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.54	GLS						
ROLL NUMBER 6848								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.71	GLS						
ROLL NUMBER 6849								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 0700 - 6850								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

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PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0700-6851								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 6852			42	15:35	650'			
PANEL NUMBER			45					
DATE OF PRODUCTION			41					
START TIME			42					
QA MONITOR			41					
AVG.								
ROLL NUMBER 6853			~~43~~ 44	~~16~~ 16:50	390'			
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 6854								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 0700-6855								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								

IN-PLANT QA

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF. SAMPLED	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	YES / NO	REMARKS
ROLL NUMBER 0700-6856								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 6857								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 6858								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 6859			~~44~~ 44					
PANEL NUMBER			~~44~~ 46					
DATE OF PRODUCTION			44				✓	
START TIME			49					
QA MONITOR			45	7:30	650			
AVG.	~~44~~ 89							
ROLL NUMBER 0700-6860	44	44	~~44~~ 45	8:21	2:58			
PANEL NUMBER	46	44	45	9:35	600			finished 9:55
DATE OF PRODUCTION	44		44	9:55	650 Trail	ok		
START TIME	49		46					
QA MONITOR	45		44					
AVG.								

IN-PLANT QA

ENVIRONMENTAL CONSTRUCTION SERVICES, INC

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

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PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0700-6861	45	45	45	10:05	79	✓		393 Blemish
PANEL NUMBER	46	44	44	10:38	242			Water spot (?)
DATE OF PRODUCTION	44	45	46	11:06	376			
START TIME	46	44	46	11:40	522			
QA MONITOR	44		43	12:20	650			
AVG.								
ROLL NUMBER 6862	45	44	43	13:33	438			
PANEL NUMBER	44		44	14:20	650			
DATE OF PRODUCTION	46		40				✓	
START TIME	46		45					
QA MONITOR	43		44					
AVG.								
ROLL NUMBER 6863	45	45	46	15:40	404			
PANEL NUMBER	44	45	44	16:10	529			
DATE OF PRODUCTION	40		41	16:35	650			
START TIME	45		42					
QA MONITOR	44		46					
AVG.								
ROLL NUMBER 6864	46	44		16:50	72			
PANEL NUMBER	44							
DATE OF PRODUCTION	41							
START TIME	42							
QA MONITOR	46							
AVG.								
ROLL NUMBER 0700-6865								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.5	44.5						

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

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MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0700 - 6866								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	44.9	GLS						
ROLL NUMBER 6867								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	45.7	GLS						
ROLL NUMBER 6868								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.	45.1	GLS						
ROLL NUMBER 6869								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 6870	47	47	47-36					
PANEL NUMBER	45		45					
DATE OF PRODUCTION	45		45					
START TIME	45		45					
QA MONITOR	47		47					
AVG.								

GLS

IN-PLANT QA

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

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CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION				
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	CONF. SAMPLED YES / NO	REMARKS
ROLL NUMBER 0700-6871	42	42	45	9:00	320	✓		O/C
PANEL NUMBER	45	44	44	10:00	617			
DATE OF PRODUCTION	45		46	10:20	656		✓	
START TIME	45		42					
QA MONITOR	47		44					
AVG.								
ROLL NUMBER 0700-6872	45	45		10:45	135			
PANEL NUMBER	44							
DATE OF PRODUCTION	46							
START TIME	42							
QA MONITOR	46							
AVG.								
ROLL NUMBER 0700-6873	44	44		1:00	702			
PANEL NUMBER	44							Blemish at 2.15
DATE OF PRODUCTION	45							
START TIME	46							too many wrinkles
QA MONITOR	44							
AVG.								Last roll for Gundle
ROLL NUMBER 0700-6874		44			345			
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 6875								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

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MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0700-6876								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 6877								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.		Roll 2 -6876 thru 6892						
ROLL NUMBER 6878								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG								
ROLL NUMBER 6879						DHG		
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 6880								
PANEL NUMBER 0700-6892								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								

WHERE RUN FOR ANOTHER Gundle Job &/or Project.!!

IN-PLANT QA

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

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MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0700-068								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 0700-6805			44	0830	8:40			
PANEL NUMBER			45					
DATE OF PRODUCTION			44				✓	
START TIME			47					
QA MONITOR			43					
AVG.								
ROLL NUMBER 0700-6806	44	44	46	9:20	2:03			
PANEL NUMBER	45	44	43	9:45	3:50			Blemish
DATE OF PRODUCTION	44	44	45	10 25	5:10			
START TIME	47		44	11:00	6:50			
QA MONITOR	43		45					
AVG.								

IN-PLANT QA

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

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MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0700 - 6894								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 0700 - 6897	46	47		11:30				
PANEL NUMBER	44							
DATE OF PRODUCTION	43							
START TIME	45							due Dimples
QA MONITOR	46			WAS	Shipped to Side			Approved
AVG.								
ROLL NUMBER 0700 - 6899								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG. 44.52								
ROLL NUMBER 0700 - 6899		74.75		15:30				
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 0700 - 6900								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								

Accepted
FAILED LAB
FAILED LAB

IN-PLANT QA

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

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MANUFACTURER GUNDLE LINING SYSTEMS

ABSENTEE RECORDS
(ABSENT FROM PLANT)

ROLL NUMBER 0700-6901 FAILED LAB
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG.

ROLL NUMBER 6902 GLS 1
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG.

ROLL NUMBER 03 GLS 1
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG.

ROLL NUMBER 04 FAILED LAB 2
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG.

ROLL NUMBER 05 Accepted 1
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG. 46.10

ROLL NUMBER 0700-6906
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG. 45.77

ROLL NUMBER 07
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG.

ROLL NUMBER 08
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG.

ROLL NUMBER 09
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG.

ROLL NUMBER 0700-6910
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG.

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CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0700-6907			45					
PANEL NUMBER —			47					
DATE OF PRODUCTION 3/28			46					
START TIME			46					
QA MONITOR DHG			45					
AVG.								
ROLL NUMBER 08	45		44					
PANEL NUMBER —	47		45					
DATE OF PRODUCTION 3/28	46		46					
START TIME	46		45					
QA MONITOR	45		45					
AVG.								
ROLL NUMBER 09	44							
PANEL NUMBER —	45							
DATE OF PRODUCTION	46							
START TIME	45							
QA MONITOR DHG	45							
AVG.								
ROLL NUMBER 6910								
PANEL NUMBER								
DATE OF PRODUCTION 3/28								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER -6911								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

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MANUFACTURER GUNDLE LINING SYSTEMS

ABSENTEE RECORDS
(ABSENT FROM PLANT)

ROLL NUMBER 0700-6912
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG.

ROLL NUMBER 13
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG.

ROLL NUMBER 14
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG.

ROLL NUMBER 15
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG.

ROLL NUMBER 16
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG.

ROLL NUMBER 0700-6917
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG.

ROLL NUMBER 6918
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG.

ROLL NUMBER 6919
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG.

ROLL NUMBER 6920
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG.

ROLL NUMBER 0700-6921
PANEL NUMBER
DATE OF PRODUCTION
START TIME
QA MONITOR
AVG.

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PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0700-6922								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 23								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 24								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 0700-6925								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0700 - 6926								
PANEL NUMBER —								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 0700 - 6927								
PANEL NUMBER —								
DATE OF PRODUCTION							✓	
START TIME								
QA MONITOR								
AVG.	43,85							
ROLL NUMBER 28			42					
PANEL NUMBER —			45					
DATE OF PRODUCTION			41					
START TIME			42					
QA MONITOR			45	11:00	650			OFF LINE
AVG.			43					
ROLL NUMBER - 69 29	42	~~43~~	40					
PANEL NUMBER —	45	42	44	11:35	144			
DATE OF PRODUCTION 3/30	41	45	43	12:05	241			Few Dimples
START TIME 11:05	42		42					
QA MONITOR DHG	45		41					
AVG.	43		42					
ROLL NUMBER 0700 - 69 30	40	42	46	1:45	120			Very few Dimples
PANEL NUMBER —	44	~~45~~	46					
DATE OF PRODUCTION 3/30	43	45	40	2:05	244			Few Dimples
START TIME 1:20 pm	42	44	38	3:00	525			"Rug" making WAVES (small) @ Cool
QA MONITOR DHG	41	—	~~39~~	3:30	650			
AVG.	42							

IN-PLANT QA

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

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MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0700 - 6931	46		Blisters due to Thickness					
PANEL NUMBER —	46							
DATE OF PRODUCTION 3/30	60							
START TIME 3:35	38							
QA MONITOR DHG	39							
AVG.								
ROLL NUMBER -6932								
PANEL NUMBER —								
DATE OF PRODUCTION 3/30		GLS						
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 6933								
PANEL NUMBER —								
DATE OF PRODUCTION		Scrap						
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 6934								
PANEL NUMBER								
DATE OF PRODUCTION		Scrap						
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 0700 - 6935								
PANEL NUMBER —								
DATE OF PRODUCTION		GLS						
START TIME								
QA MONITOR								
AVG.								

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

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MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0700-6936								
PANEL NUMBER —								
DATE OF PRODUCTION			SCRAP					
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 37								
PANEL NUMBER —								
DATE OF PRODUCTION			GLS					
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 38								
PANEL NUMBER —								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 39			46					
PANEL NUMBER —			46					
DATE OF PRODUCTION			44					
START TIME			46					
QA MONITOR			45					
AVG.			45.4					
ROLL NUMBER 0700-6940	46	44	42	12:51	393			
PANEL NUMBER —	46	43	43	1306	469			
DATE OF PRODUCTION 3-31-92	44	43	46	1329	571			
START TIME 11:30	46	44	46	1346	620			
QA MONITOR HGR	45		47					
AVG.	45.4	43.5	44.8					

IN-PLANT QA

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
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SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

		THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
		LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER	0700 - 6941	42	43	44	1407	100			
PANEL NUMBER		43	43	43	1422	170			
DATE OF PRODUCTION	3-31-92	46	43	42	1445	280			
START TIME	1350	46	44	43	1507	380			
QA MONITOR	HGR	47	43	46	1536	520			
	AVG.	44.8	43.2	43.6					
ROLL NUMBER	42	44	44	44	1625	105			
PANEL NUMBER		43	44	45	1645	203			
DATE OF PRODUCTION	3-31-92	42	44	44	1706	301			
START TIME	1605	43	44	43	1728	409			
QA MONITOR	HGR	46	44	44	1750	513			
	AVG.	43.6	44.0	44.0					
ROLL NUMBER	43	44							
PANEL NUMBER		45							
DATE OF PRODUCTION	3-31-92	44							
START TIME	1820	43							
QA MONITOR	HGR	44							
	AVG.	44.0		44.73	Gundle Ave				
ROLL NUMBER	44								
PANEL NUMBER									
DATE OF PRODUCTION									
START TIME									
QA MONITOR									
	AVG.			45.28	Gundle Ave				
ROLL NUMBER	45								
PANEL NUMBER									
DATE OF PRODUCTION									
START TIME									
QA MONITOR									
	AVG.			45.43	Gundle Ave				

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

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MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0700-6946								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.			45.14	Gundle Avg.				
ROLL NUMBER 0700-6947								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.			46.01	Gundle Avg.				
ROLL NUMBER 0700-6948								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.			45.92	Gundle Avg.				
ROLL NUMBER 0700-6949			45					
PANEL NUMBER		43	47	0918	275			
DATE OF PRODUCTION ~~0830~~ 4-1-92		43	43	0934	350			
START TIME 0830		43	46	0955	445			
QA MONITOR NGR		44	44	1021	562			
AVG.		43.25	45					
ROLL NUMBER 0700-6950	45	43	45	1110	126			
PANEL NUMBER	47	43	45	1132	230			
DATE OF PRODUCTION 4-1-92	43	44	43	1151	328			
START TIME 1047	46	44	46	1210	423			
QA MONITOR NGR	44	43	41	1230	520		✓	
AVG.	45	43.4	44					

IN-PLANT QA

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

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MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0700-6951	45	~~43~~ 43	42	~~0918~~ 1316	~~275~~ 90			
PANEL NUMBER	45	42	43	1337	194			
DATE OF PRODUCTION 4-1-92	43	43	44	1355	283			
START TIME 13:05	46	44	44	1418	393			GSL
QA MONITOR HGR	41	—	46	—	—			Lot of wrinkles
AVG.	44	43	43.8					short Roll
ROLL NUMBER 0700-6952	42	44	42	1503	75			
PANEL NUMBER	43	43	44	1526	190			
DATE OF PRODUCTION 4-1-92	44	44	41	1541	261			~~GSL~~
START TIME 15:00	44	43	42	1605	375			
QA MONITOR HGR	46	44	42	1633	509		✓	
AVG.	43.8							
ROLL NUMBER 0700-6953	42	44		1725	106			
PANEL NUMBER	44	43		1754	241			
DATE OF PRODUCTION 4-1-92	41							
START TIME 17:10	42							
QA MONITOR HGR	42							
AVG.			43.91	Gundle Avg.				
ROLL NUMBER 0700-6954								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.			44.07	Gundle Avg.				
ROLL NUMBER 0700-6955								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.			44.03	Gundle Avg.				

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SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0700-6956								
PANEL NUMBER								
DATE OF PRODUCTION —								
START TIME —								
QA MONITOR								
AVG.			44.77	Gundle Avg				
ROLL NUMBER 0700-6957								
PANEL NUMBER								
DATE OF PRODUCTION —								
START TIME								
QA MONITOR								
AVG.			44.64	Gundle Avg.				
ROLL NUMBER 0700-6958								
PANEL NUMBER								
DATE OF PRODUCTION 4-2-92								
START TIME								
QA MONITOR								
AVG.	1		44.54	Gundle Avg.				
ROLL NUMBER 0700-6959			43					
PANEL NUMBER			42					
DATE OF PRODUCTION 4—2-92			43					
START TIME			46					
QA MONITOR HGR			44					
AVG.			43.6					
ROLL NUMBER 0700-6960	43	42	44	0919	110			
PANEL NUMBER	42	43	45	0940	208			
DATE OF PRODUCTION ~~700~~ 4-2-92	43	42	41	1010	354			
START TIME 0900	46	45	43	1035	472			
QA MONITOR HGR	44	43	43	1058	580		✓	
AVG.	43.6	43.0	43.2					

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

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MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF. SAMPLED	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	YES / NO	REMARKS
ROLL NUMBER 0700-6961	44	43	41	11:32	77			
PANEL NUMBER	45	43	42	11:59	208			
DATE OF PRODUCTION 4-2-92	41	42	42	1223	316			
START TIME 11:15	43	42	43	1247	433			
QA MONITOR HGR	43	42	43	1307	527			
AVG.	43.2	42.4	42.2					
ROLL NUMBER 0700-6962	41	42	43	1355	103			
PANEL NUMBER	42	44	41	1419	216			
DATE OF PRODUCTION 4-2-92	42	43	42	1453	381			GLS
START TIME 13:35	43	44	46	1522	520			Wavie Marks like
QA MONITOR HGR	43	44	45	1550	648		X	material didn't
AVG.	42.2	43.4	43.4					mix
ROLL NUMBER 0700-6963	43	44		1628	146			
PANEL NUMBER	41	45		1638	228			
DATE OF PRODUCTION 4-2-92	42	44		1700	331			
START TIME 1555	46	44		1715	417			
QA MONITOR HGR	45							
AVG.	43.4	44.25	44.07	Gundle Avg.				
ROLL NUMBER 0700-6964								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.			44.01	Gundle Avg.				
ROLL NUMBER 0700-6965								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.			44.31	Gundle Avg.				

IN-PLANT QA

ENVIRONMENTAL CONSTRUCTION SERVICES, INC.

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
OWNER COOPERATIVE POWER ASSOC. @ COAL CREEK GENERATING STATION
SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0700-6966								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME Sarah								
QA MONITOR								
AVG.			~~44.57~~	Gundle Avg.				
ROLL NUMBER 0700-6967								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.			43.71	Gundle Avg.				
ROLL NUMBER 0700-6968								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.			43.75	Gundle Avg.				
ROLL NUMBER 0700-6969								
PANEL NUMBER								
DATE OF PRODUCTION ~~[illegible]~~								
START TIME								
QA MONITOR								
AVG.				Gundle Avg.				
ROLL NUMBER 0700-6970			44					
PANEL NUMBER		43	40	0815	253			
DATE OF PRODUCTION 4-3-92		44	43	0838	360			
START TIME 07:15		43	45	0852	471			
QA MONITOR HGR		43	47	0913	568			
AVG.		43.25	43.8					

IN-PLANT QA

ENVIRONMENTAL CONSTRUCTION SERVICES, INC.

IN-PLANT GEOMEMBRANE ROLL QUALITY ASSURANCE RECORD

PROJECT NUMBER 927-4003
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SITE LOCATION UNDERWOOD, NORTH DAKOTA
MANUF. PLANT LOCATION HOUSTON, TEXAS

PROJECT TITLE CPA/PONDS 91&93/ND
CONTRACTOR GUNDLE LINING SYSTEMS
MANUFACTURER GUNDLE LINING SYSTEMS

	THICKNESS READINGS			PERIODIC VISUAL OBSERVATION			CONF.	
	LEAD	SIDE	TRAIL	TIME	ELAPSED LENGTH	VISUAL OBSER.	SAMPLED YES / NO	REMARKS
ROLL NUMBER 0700-6971	44	43	44	0948	75			
PANEL NUMBER	40	42	43	1012	189			
DATE OF PRODUCTION 4-3-92	43	42	43	1041	317			
START TIME 0935	45	42	43	1102	412			
QA MONITOR HGR	47	43	43	1139	584			
AVG.	43.8	42.4	43.2					
ROLL NUMBER 0700-6972	44	42	46	1218	112			
PANEL NUMBER	43	42	44	1258	295			Last sample + roll from line 7 - Changing to another job
DATE OF PRODUCTION 4-3-92	43	43	43	1331	351			
START TIME 11:55	43	42	44	1326	423			
QA MONITOR HGR	43	42	45	1407	614		✓	
AVG.	43.2	42.2	44.4					
ROLL NUMBER 0700-6973	46	43	46	14:48	151			60 mil
PANEL NUMBER	44	43	44	1507	231			HGR
DATE OF PRODUCTION 4-3-92	43	43	44	1527	330			
START TIME 14:20	44	43	45	1547	424			
QA MONITOR HGR	45	43	44	1616	525		X	0700-6973
AVG.	44.4	43.0	44.6					
ROLL NUMBER 0700-6974								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								
ROLL NUMBER 0700-6975								
PANEL NUMBER								
DATE OF PRODUCTION								
START TIME								
QA MONITOR								
AVG.								

IN-PLANT QA

ENVIRONMENTAL CONSTRUCTION SERVICES, INC.

APPENDIX C

GEOMEMBRANE QUALITY CONTROL DOCUMENTS

December 1992

927-4003

APPENDIX C-1

GUNDLE QUALITY ASSURANCE CERTIFICATES

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032092
ROLL # : 06010657

MANF. DATE : 03/20/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3304	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4810	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	744	
Puncture Resistance (lbs)	2ND ROLL	52 min	95	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	42	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032092
ROLL # : 06010658

MANF. DATE : 03/20/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3304	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4810	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	744	
Puncture Resistance (lbs)	2ND ROLL	52 min	95	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	42	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032092
ROLL # : 06010659

MANF. DATE : 03/20/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3216	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4617	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	750	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	42	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032092
ROLL # : 06010660

MANF. DATE : 03/20/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3216	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4617	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	750	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	42	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032092
ROLL # : 06010661

MANF. DATE : 03/20/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3199	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4360	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	714	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	41	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032092
ROLL # : 06010662

MANF. DATE : 03/20/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-2	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3199	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4360	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	714	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	41	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032192
ROLL # : 06010663

MANF. DATE : 03/21/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-2	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2782	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5679	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	880	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032192
ROLL # : 06010664

MANF. DATE : 03/21/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-2	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2782	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5679	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	880	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032192
ROLL # : 06010665

MANF. DATE : 03/21/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-2	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2774	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5729	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	902	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032192
ROLL # : 06010667

MANF. DATE : 03/21/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER		TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness	(mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black	(%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion		1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index	(g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density	(g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:					
T.S. Yield	(psi)	2ND ROLL	2300 min	2961	D 638
T.S. Break	(psi)	2ND ROLL	4000 min	5463	Type IV
Elong. Yield	%	2ND ROLL	13 min	16	2 ipm
Elong. Break	%	2ND ROLL	700 min	825	
Puncture Resistance	(lbs)	2ND ROLL	52 min	84	FTMS 101,Method 2065
Tear Resistance	(lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness	degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack	hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance		CERTIFIED	100 PPHM		
Dimensional Stability		CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032192
ROLL # : 06010668

MANF. DATE : 03/21/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2961	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5463	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	825	
Puncture Resistance (lbs)	2ND ROLL	52 min	84	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032192
ROLL # : 06010669

MANF. DATE : 03/21/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3450	D 638
T.S. Break (psi)	2ND ROLL	4000 min	6178	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	903	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032192
ROLL # : 06010670

MANF. DATE : 03/21/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3450	D 638
T.S. Break (psi)	2ND ROLL	4000 min	6178	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	903	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032192
ROLL # : 06010671

MANF. DATE : 03/21/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3235	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5749	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	890	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	41	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032292
ROLL # : 06010674

MANF. DATE : 03/22/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2818	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5213	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	838	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032292
ROLL # : 06010677

MANF. DATE : 03/22/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	46	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2878	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5631	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	889	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032292
ROLL # : 06010678

MANF. DATE : 03/22/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2878	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5631	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	889	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032292
ROLL # : 06010680

MANF. DATE : 03/22/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	46	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3398	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5526	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	831	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	41	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032292
ROLL # : 06010681

MANF. DATE : 03/22/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3398	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5526	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	831	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	41	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032292
ROLL # : 06010682

MANF. DATE : 03/22/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3506	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5842	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	813	
Puncture Resistance (lbs)	2ND ROLL	52 min	79	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	43	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032292
ROLL # : 06010683

MANF. DATE : 03/22/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3506	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5842	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	813	
Puncture Resistance (lbs)	2ND ROLL	52 min	79	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	43	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032292
ROLL # : 06010684

MANF. DATE : 03/22/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2900	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5381	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	831	
Puncture Resistance (lbs)	2ND ROLL	52 min	87	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	34	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032392
ROLL # : 06010685

MANF. DATE : 03/23/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2733	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5180	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	834	
Puncture Resistance (lbs)	2ND ROLL	52 min	78	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	33	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032392
ROLL # : 06010686

MANF. DATE : 03/23/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2733	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5180	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	834	
Puncture Resistance (lbs)	2ND ROLL	52 min	78	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	33	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032392
ROLL # : 06010687

MANF. DATE : 03/23/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2670	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5147	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	866	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	34	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032392
ROLL # : 06010688

MANF. DATE : 03/23/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	46	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2670	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5147	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	866	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	34	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032392
ROLL # : 06010689

MANF. DATE : 03/23/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2871	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5319	Type IV
Elong. Yield %	2ND ROLL	13 min	19	2 ipm
Elong. Break %	2ND ROLL	700 min	861	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032392
ROLL # : 06010691

MANF. DATE : 03/23/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3145	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5478	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	831	
Puncture Resistance (lbs)	2ND ROLL	52 min	99	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	42	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032392
ROLL # : 06010692

MANF. DATE : 03/23/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3145	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5478	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	831	
Puncture Resistance (lbs)	2ND ROLL	52 min	99	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	42	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032392
ROLL # : 06010693

MANF. DATE : 03/23/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3104	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5616	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	847	
Puncture Resistance (lbs)	2ND ROLL	52 min	87	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032392
ROLL # : 06010694

MANF. DATE : 03/23/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3104	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5616	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	847	
Puncture Resistance (lbs)	2ND ROLL	52 min	87	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032392
ROLL # : 06010695

MANF. DATE : 03/23/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3136	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5590	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	844	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032492
ROLL # : 06010697

MANF. DATE : 03/24/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2909	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5317	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	862	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R. J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032492
ROLL # : 06010703

MANF. DATE : 03/24/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.941	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3168	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5740	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	835	
Puncture Resistance (lbs)	2ND ROLL	52 min	81	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032492
ROLL # : 06010704

MANF. DATE : 03/24/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.941	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3168	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5740	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	835	
Puncture Resistance (lbs)	2ND ROLL	52 min	81	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032492
ROLL # : 06010706

MANF. DATE : 03/24/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.941	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3117	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5579	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	847	
Puncture Resistance (lbs)	2ND ROLL	52 min	84	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032492
ROLL # : 06010707

MANF. DATE : 03/24/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.941	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3117	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5579	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	847	
Puncture Resistance (lbs)	2ND ROLL	52 min	84	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032492
ROLL # : 06010708

MANF. DATE : 03/24/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER		TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)		EVERY ROLL	40 min	44	D 1593
Carbon Black	(%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion		1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index	(g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density	(g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:					
T.S. Yield	(psi)	2ND ROLL	2300 min	2888	D 638
T.S. Break	(psi)	2ND ROLL	4000 min	5548	Type IV
Elong. Yield	%	2ND ROLL	13 min	15	2 ipm
Elong. Break	%	2ND ROLL	700 min	870	
Puncture Resistance (lbs)		2ND ROLL	52 min	87	FTMS 101,Method 2065
Tear Resistance	(lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF		CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs		CERTIFIED	1500 min		D 1693
Ozone Resistance		CERTIFIED	100 PPHM		
Dimensional Stability		CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032592
ROLL # : 06010714

MANF. DATE : 03/25/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3077	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5335	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	835	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

B.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032592
ROLL # : 06010715

MANF. DATE : 03/25/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44 ✓	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4 ✓	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1 ✓	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13 ✓	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947 ✓	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3077 ✓	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5335 ✓	Type IV
Elong. Yield %	2ND ROLL	13 min	15 ✓	2 ipm
Elong. Break %	2ND ROLL	700 min	835 ✓	
Puncture Resistance (lbs)	2ND ROLL	52 min	89 ✓	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39 ✓	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032592
ROLL # : 06010716

MANF. DATE : 03/25/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3051	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4936	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	790	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032592
ROLL # : 06010717

MANF. DATE : 03/25/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3051	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4936	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	790	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032592
ROLL # : 06010718

MANF. DATE : 03/25/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2921	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5423	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	864	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032592
ROLL # : 06010719

MANF. DATE : 03/25/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43 ✓	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2921	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5423	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	864	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032692
ROLL # : 06010720

MANF. DATE : 03/26/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2780	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5297	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	855	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	34	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032692
ROLL # : 06010721

MANF. DATE : 03/26/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2780	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5297	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	855	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	34	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032692
ROLL # : 06010722

MANF. DATE : 03/26/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2650	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5173	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	856	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032692
ROLL # : 06010727

MANF. DATE : 03/26/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3054	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5838	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL*	700 min	919	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032692
ROLL # : 06010728

MANF. DATE : 03/26/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3054	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5838	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	919	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032692
ROLL # : 06010729

MANF. DATE : 03/26/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3005	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5678	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	888	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032692
ROLL # : 06010730

MANF. DATE : 03/26/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3005	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5678	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	888	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032692
ROLL # : 06010731

MANF. DATE : 03/26/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3034	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5200	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	823	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032692
ROLL # : 06010732

MANF. DATE : 03/26/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3034	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5200	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	823	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032792
ROLL # : 06010733

MANF. DATE : 03/27/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2925	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5770	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	919	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	34	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032792
ROLL # : 06010736

MANF. DATE : 03/27/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.2	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2864	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5149	Type IV
Elong. Yield %	2ND ROLL	13 min	18	2 ipm
Elong. Break %	2ND ROLL	700 min	853	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032792
ROLL # : 06010738

MANF. DATE : 03/27/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3151	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5501	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	835	
Puncture Resistance (lbs)	2ND ROLL	52 min	84	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032792
ROLL # : 06010739

MANF. DATE : 03/27/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3151	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5501	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	835	
Puncture Resistance (lbs)	2ND ROLL	52 min	84	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032792
ROLL # : 06010740

MANF. DATE : 03/27/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3042	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5947	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	922	
Puncture Resistance (lbs)	2ND ROLL	52 min	93	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032792
ROLL # : 06010741

MANF. DATE : 03/27/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3042	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5947	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	922	
Puncture Resistance (lbs)	2ND ROLL	52 min	93	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032792
ROLL # : 06010742

MANF. DATE : 03/27/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.2	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3067	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5635	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	852	
Puncture Resistance (lbs)	2ND ROLL	52 min	93	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032792
ROLL # : 06010743

MANF. DATE : 03/27/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER		TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness	(mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black	(%)	1/SHIFT	2.0 to 3.0	2.2	D 1603
Carbon Black Dispersion		1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index	(g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density	(g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:					
T.S. Yield	(psi)	2ND ROLL	2300 min	3067	D 638
T.S. Break	(psi)	2ND ROLL	4000 min	5635	Type IV
Elong. Yield	%	2ND ROLL	13 min	14	2 ipm
Elong. Break	%	2ND ROLL	700 min	852	
Puncture Resistance	(lbs)	2ND ROLL	52 min	93	FTMS 101,Method 2065
Tear Resistance	(lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness	degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack	hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance		CERTIFIED	100 PPHM		
Dimensional Stability		CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032792
ROLL # : 06010744

MANF. DATE : 03/27/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.2	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3406	D 638
T.S. Break (psi)	2ND ROLL	4000 min	6039	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	877	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032792
ROLL # : 06010745

MANF. DATE : 03/27/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3406	D 638
T.S. Break (psi)	2ND ROLL	4000 min	6039	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	877	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032892
ROLL # : 06010747

MANF. DATE : 03/28/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3136	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4906	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	734	
Puncture Resistance (lbs)	2ND ROLL	52 min	93	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032892
ROLL # : 06010748

MANF. DATE : 03/28/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3136	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4906	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	734	
Puncture Resistance (lbs)	2ND ROLL	52 min	93	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032892
ROLL # : 06010749

MANF. DATE : 03/28/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3080	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5278	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	792	
Puncture Resistance (lbs)	2ND ROLL	52 min	78	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032892
ROLL # : 06010755

MANF. DATE : 03/28/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3349	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5486	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	830	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032892
ROLL # : 06010756

MANF. DATE : 03/28/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3349	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5486	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	830	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032892
ROLL # : 06010758

MANF. DATE : 03/28/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3336	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4918	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	745	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032892
ROLL # : 06010759

MANF. DATE : 03/28/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3336	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4918	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	745	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032992
ROLL # : 06010760

MANF. DATE : 03/29/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3113	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5269	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	787	
Puncture Resistance (lbs)	2ND ROLL	52 min	87	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032992
ROLL # : 06010761

MANF. DATE : 03/29/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43 ✓	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5 ✓	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1 ✓	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946 ✓	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3113	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5269	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	787	
Puncture Resistance (lbs)	2ND ROLL	52 min	87	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032992
ROLL # : 06010762

MANF. DATE : 03/29/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2924	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5032	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	814	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032992
ROLL # : 06010763

MANF. DATE : 03/29/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2924	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5032	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	814	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032992
ROLL # : 06010764

MANF. DATE : 03/29/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2959	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5651	Type IV
Elong. Yield %	2ND ROLL	13 min	19	2 ipm
Elong. Break %	2ND ROLL	700 min	895	
Puncture Resistance (lbs)	2ND ROLL	52 min	73	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032992
ROLL # : 06010765

MANF. DATE : 03/29/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2959	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5651	Type IV
Elong. Yield %	2ND ROLL	13 min	19	2 ipm
Elong. Break %	2ND ROLL	700 min	895	
Puncture Resistance (lbs)	2ND ROLL	52 min	73	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032992
ROLL # : 06010766

MANF. DATE : 03/29/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3013	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5252	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	831	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032992
ROLL # : 06010767

MANF. DATE : 03/29/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3076	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5416	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	840	
Puncture Resistance (lbs)	2ND ROLL	52 min	84	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	41	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 032992
ROLL # : 06010769

MANF. DATE : 03/29/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3016	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5154	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	814	
Puncture Resistance (lbs)	2ND ROLL	52 min	87	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 032992
ROLL # : 06010771

MANF. DATE : 03/29/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3248	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5565	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	866	
Puncture Resistance (lbs)	2ND ROLL	52 min	80	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033092
ROLL # : 06010772

MANF. DATE : 03/30/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3248	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5565	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	866	
Puncture Resistance (lbs)	2ND ROLL	52 min	80	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 032992
ROLL # : 06010773

MANF. DATE : 03/29/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL.	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3383	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5357	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	824	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033092
ROLL # : 06010774

MANF. DATE : 03/30/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3028	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5110	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	785	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033092
ROLL # : 06010775

MANF. DATE : 03/30/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3028	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5110	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	785	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033092
ROLL # : 06010776

MANF. DATE : 03/30/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2794	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5170	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	828	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033092
ROLL # : 06010777

MANF. DATE : 03/30/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2794	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5170	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	828	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033092
ROLL # : 06010781

MANF. DATE : 03/30/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.2	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2824	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5027	Type IV
Elong. Yield %	2ND ROLL	13 min	18	2 ipm
Elong. Break %	2ND ROLL	700 min	825	
Puncture Resistance (lbs)	2ND ROLL	52 min	80	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033092
ROLL # : 06010782

MANF. DATE : 03/30/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.2	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2824	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5027	Type IV
Elong. Yield %	2ND ROLL	13 min	18	2 ipm
Elong. Break %	2ND ROLL	700 min	825	
Puncture Resistance (lbs)	2ND ROLL	52 min	80	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033092
ROLL # : 06010783

MANF. DATE : 03/30/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2880	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5553	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	878	
Puncture Resistance (lbs)	2ND ROLL	52 min	79	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033092
ROLL # : 06010784

MANF. DATE : 03/30/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2880	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5553	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	878	
Puncture Resistance (lbs)	2ND ROLL	52 min	79	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033092
ROLL # : 06010785

MANF. DATE : 03/30/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2871	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5171	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	832	
Puncture Resistance (lbs)	2ND ROLL	52 min	65	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033092
ROLL # : 06010786

MANF. DATE : 03/30/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2871	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5171	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	832	
Puncture Resistance (lbs)	2ND ROLL	52 min	65	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 06010787

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2842	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5278	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	833	
Puncture Resistance (lbs)	2ND ROLL	52 min	84	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 06010788

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43 ✓	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5 ✓	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1 ✓	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12 ✓	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947 ✓	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2842 ✓	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5278 ✓	Type IV
Elong. Yield %	2ND ROLL	13 min	17 ✓	2 ipm
Elong. Break %	2ND ROLL	700 min	833 ✓	
Puncture Resistance (lbs)	2ND ROLL	52 min	84 ✓	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39 ✓	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 06010789

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER		TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)		EVERY ROLL	40 min	43 ✓	D 1593
Carbon Black	(%)	1/SHIFT	2.0 to 3.0	2.4 ✓	D 1603
Carbon Black Dispersion		1/SHIFT	A-1/A-2/B-1	A-1 ✓	D 3015
Melt Index	(g/10 min)	1/SHIFT	0.30 max	0.12 ✓	D 1238 E
Density	(g/cm3)	1/SHIFT	0.940 min	0.947 ✓	D 1505 A
Tensile Properties:					
T.S. Yield	(psi)	2ND ROLL	2300 min	3031	D 638
T.S. Break	(psi)	2ND ROLL	4000 min	5249	Type IV
Elong. Yield	%	2ND ROLL	13 min	16	2 ipm
Elong. Break	%	2ND ROLL	700 min	791	
Puncture Resistance	(lbs)	2ND ROLL	52 min	67	FTMS 101,Method 2065
Tear Resistance	(lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness	degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack	hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance		CERTIFIED	100 PPHM		
Dimensional Stability		CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

B.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 06010790

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3031	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5249	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	791	
Puncture Resistance (lbs)	2ND ROLL	52 min	67	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 06010791

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2664	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4999	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	817	
Puncture Resistance (lbs)	2ND ROLL	52 min	82	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 06010792

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2664	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4999	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	817	
Puncture Resistance (lbs)	2ND ROLL	52 min	82	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 06010793

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3026	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5102	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	770	
Puncture Resistance (lbs)	2ND ROLL	52 min	81	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 06010794

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3026	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5102	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	770	
Puncture Resistance (lbs)	2ND ROLL	52 min	81	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 06010795

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2987	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5270	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
*Elong. Break %	2ND ROLL	700 min	807	
Puncture Resistance (lbs)	2ND ROLL	52 min	84	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 06010796

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2987	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5270	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	807	
Puncture Resistance (lbs)	2ND ROLL	52 min	84	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 06010797

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3116	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5311	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	800	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 06010798

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.944	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3116	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5311	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	800	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 06010799

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	41	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2758	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4849	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	775	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 06010800

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.944	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2729	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5023	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	819	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 06010801

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.944	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2729	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5023	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	819	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 06010802

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.944	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2718	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4800	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	786	
Puncture Resistance (lbs)	2ND ROLL	52 min	82	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 06010803

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.944	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2718	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4800	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	786	
Puncture Resistance (lbs)	2ND ROLL	52 min	82	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 06010804

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2917	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5110	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	784	
Puncture Resistance (lbs)	2ND ROLL	52 min	92	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 06010805

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2917	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5110	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	784	
Puncture Resistance (lbs)	2ND ROLL	52 min	92	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 06010806

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3084	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5120	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	761	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 06010807

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3084	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5120	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	761	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 06010808

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3073	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5420	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	829	
Puncture Resistance (lbs)	2ND ROLL	52 min	87	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 06010809

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3073	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5420	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	829	
Puncture Resistance (lbs)	2ND ROLL	52 min	87	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 06010810

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2996	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5427	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	811	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 06010811

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2996	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5427	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	811	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 06010812

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2956	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4826	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	762	
Puncture Resistance (lbs)	2ND ROLL	52 min	94	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	34	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 06010813

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2956	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4826	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	762	
Puncture Resistance (lbs)	2ND ROLL	52 min	94	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	34	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 06010814

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2883	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4944	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	766	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	33	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 06010815

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2883	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4944	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	766	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	33	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 06010816

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3000	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4919	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	784	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 06010817

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3000	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4919	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	784	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 06010818

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3128	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5046	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	753	
Puncture Resistance (lbs)	2ND ROLL	52 min	91	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 06010819

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3128	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5046	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	753	
Puncture Resistance (lbs)	2ND ROLL	52 min	91	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 06010820

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3084	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4323	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	726	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 06010821

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3084	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4323	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	726	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 06010822

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3100	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4840	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	716	
Puncture Resistance (lbs)	2ND ROLL	52 min	92	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 06010823

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3100	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4840	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	716	
Puncture Resistance (lbs)	2ND ROLL	52 min	92	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 06010824

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45 ✓	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4 ✓	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1 ✓	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10 ✓	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945 ✓	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2746 ✓	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4461 ✓	Type IV
Elong. Yield %	2ND ROLL	13 min	17 ✓	2 ipm
Elong. Break %	2ND ROLL	700 min	740 ✓	
Puncture Resistance (lbs)	2ND ROLL	52 min	78 ✓	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	34 ✓	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 06010825

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2746	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4461	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	740	
Puncture Resistance (lbs)	2ND ROLL	52 min	78	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	34	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 06010826

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2839	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4476	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	725	
Puncture Resistance (lbs)	2ND ROLL	52 min	80	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	34	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 06010827

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2839	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4476	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	725	
Puncture Resistance (lbs)	2ND ROLL	52 min	80	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	34	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 06010828

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44 ✓	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3 ✓	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1 ✓	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11 ✓	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947 ✓	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2919 ✓	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5740 ✓	Type IV
Elong. Yield %	2ND ROLL	13 min	15 ✓	2 ipm
Elong. Break %	2ND ROLL	700 min	878 ✓	
Puncture Resistance (lbs)	2ND ROLL	52 min	74 ✓	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39 ✓	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 06010829

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER		TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness	(mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black	(%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion		1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index	(g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density	(g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:					
T.S. Yield	(psi)	2ND ROLL	2300 min	2919	D 638
T.S. Break	(psi)	2ND ROLL	4000 min	5740	Type IV
Elong. Yield	%	2ND ROLL	13 min	15	2 ipm
Elong. Break	%	2ND ROLL	700 min	878	
Puncture Resistance	(lbs)	2ND ROLL	52 min	74	FTMS 101,Method 2065
Tear Resistance	(lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness	degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack	hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance		CERTIFIED	100 PPHM		
Dimensional Stability		CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 06010830

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3106	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5143	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	792	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 06010832

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3152	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5302	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	812	
Puncture Resistance (lbs)	2ND ROLL	52 min	75	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 06010833

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43 ✓	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3152 ✓	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5302	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	812	
Puncture Resistance (lbs)	2ND ROLL	52 min	75 ✓	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39 ✓	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 06010834

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3098	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5628	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	855	
Puncture Resistance (lbs)	2ND ROLL	52 min	76	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 06010835

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43 ✓	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3 ✓	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1 ✓	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11 ✓	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947 ✓	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3098 ✓	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5628 ✓	Type IV
Elong. Yield %	2ND ROLL	13 min	15 ✓	2 ipm
Elong. Break %	2ND ROLL	700 min	855 ✓	
Puncture Resistance (lbs)	2ND ROLL	52 min	76 ✓	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39 ✓	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040492
ROLL # : 06010836

MANF. DATE : 04/04/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2686	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5295	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	889	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040492
ROLL # : 06010837

MANF. DATE : 04/04/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42 ✓	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3 ✓	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1 ✓	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11 ✓	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947 ✓	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2686 ✓	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5295 ✓	Type IV
Elong. Yield %	2ND ROLL	13 min	15 ✓	2 ipm
Elong. Break %	2ND ROLL	700 min	889	
Puncture Resistance (lbs)	2ND ROLL	52 min	85 ✓	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39 ✓	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040492
ROLL # : 06010838

MANF. DATE : 04/04/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43 ✓	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3 ✓	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947 ✓	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2828 ✓	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4346 ✓	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	764 ✓	
Puncture Resistance (lbs)	2ND ROLL	52 min	100 ✓	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040492
ROLL # : 06010839

MANF. DATE : 04/04/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2828	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4346	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	764	
Puncture Resistance (lbs)	2ND ROLL	52 min	100	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040492
ROLL # : 06010840

MANF. DATE : 04/04/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2777	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5018	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	833	
Puncture Resistance (lbs)	2ND ROLL	52 min	84	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040492
ROLL # : 06010841

MANF. DATE : 04/04/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2777	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5018	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	833	
Puncture Resistance (lbs)	2ND ROLL	52 min	84	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040492
ROLL # : 06010842

MANF. DATE : 04/04/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3198	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5853	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	861	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040492
ROLL # : 06010843

MANF. DATE : 04/04/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45 ✓	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3 ✓	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1 ✓	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947 ✓	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3198 ✓	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5853 ✓	Type IV
Elong. Yield %	2ND ROLL	13 min	15 ✓	2 ipm
Elong. Break %	2ND ROLL	700 min	861 ✓	
Puncture Resistance (lbs)	2ND ROLL	52 min	90 ✓	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40 ✓	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040492
ROLL # : 06010844

MANF. DATE : 04/04/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2827	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5113	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	900	
Puncture Resistance (lbs)	2ND ROLL	52 min	91	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040492
ROLL # : 06010845

MANF. DATE : 04/04/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2827	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5113	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	900	
Puncture Resistance (lbs)	2ND ROLL	52 min	91	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040492
ROLL # : 06010846

MANF. DATE : 04/04/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44 ✓	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5 ✓	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1 ✓	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12 ✓	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947 ✓	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3022 ✓	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5419 ✓	Type IV
Elong. Yield %	2ND ROLL	13 min	16 ✓	2 ipm
Elong. Break %	2ND ROLL	700 min	893 ✓	
Puncture Resistance (lbs)	2ND ROLL	52 min	86 ✓	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39 ✓	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040492
ROLL # : 06010847

MANF. DATE : 04/04/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3022	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5419	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	893	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040592
ROLL # : 06010848

MANF. DATE : 04/05/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2807	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5528	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	894	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040592
ROLL # : 06010849

MANF. DATE : 04/05/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2807	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5528	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	894	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040592
ROLL # : 06010850

MANF. DATE : 04/05/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2879	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5471	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	887	
Puncture Resistance (lbs)	2ND ROLL	52 min	74	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	33	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040592
ROLL # : 06010851

MANF. DATE : 04/05/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2879	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5471	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	887	
Puncture Resistance (lbs)	2ND ROLL	52 min	74	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	33	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040592
ROLL # : 06010852

MANF. DATE : 04/05/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2763	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5263	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	880	
Puncture Resistance (lbs)	2ND ROLL	52 min	76	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040592
ROLL # : 06010853

MANF. DATE : 04/05/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2763	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5263	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	880	
Puncture Resistance (lbs)	2ND ROLL	52 min	76	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040592
ROLL # : 06010854

MANF. DATE : 04/05/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3045	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5449	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	905	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R. J. Schaefer
Quality Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040592
ROLL # : 06010855

MANF. DATE : 04/05/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3045	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5449	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	905	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040592
ROLL # : 06010856

MANF. DATE : 04/05/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3062	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5566	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	919	
Puncture Resistance (lbs)	2ND ROLL	52 min	87	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040592
ROLL # : 06010857

MANF. DATE : 04/05/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3062	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5566	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	919	
Puncture Resistance (lbs)	2ND ROLL	52 min	87	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040592
ROLL # : 06010858

MANF. DATE : 04/05/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2823	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5226	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	896	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040692
ROLL # : 06010860

MANF. DATE : 04/06/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2826	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4834	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	792	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040692
ROLL # : 06010861

MANF. DATE : 04/06/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	41	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2826	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4834	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	792	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040692
ROLL # : 06010862

MANF. DATE : 04/06/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2595	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5203	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	858	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040692
ROLL # : 06010863

MANF. DATE : 04/06/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2595	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5203	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	858	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040692
ROLL # : 06010864

MANF. DATE : 04/06/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2790	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5441	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	895	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

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Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040692
ROLL # : 06010865

MANF. DATE : 04/06/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2790	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5441	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	895	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040692
ROLL # : 06010868

MANF. DATE : 04/06/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2791	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4933	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	860	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040692
ROLL # : 06010870

MANF. DATE : 04/06/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	41	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2905	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5568	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	915	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040792
ROLL # : 06010874

MANF. DATE : 04/07/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2688	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5374	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	897	
Puncture Resistance (lbs)	2ND ROLL	52 min	76	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	33	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040792
ROLL # : 06010876

MANF. DATE : 04/07/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2890	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4866	Type IV
Elong. Yield %	2ND ROLL	13 min	18	2 ipm
Elong. Break %	2ND ROLL	700 min	774	
Puncture Resistance (lbs)	2ND ROLL	52 min	91	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	47	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040792
ROLL # : 06010877

MANF. DATE : 04/07/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.18	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2890	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4866	Type IV
Elong. Yield %	2ND ROLL	13 min	18	2 ipm
Elong. Break %	2ND ROLL	700 min	774	
Puncture Resistance (lbs)	2ND ROLL	52 min	91	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	47	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040792
ROLL # : 06010878

MANF. DATE : 04/07/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.18	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2908	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4851	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	770	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

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Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040792
ROLL # : 06010879

MANF. DATE : 04/07/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.18	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2908	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4851	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	770	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

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Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040792
ROLL # : 06010880

MANF. DATE : 04/07/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43 ✓	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4 ✓	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1 ✓	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.18 ✓	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946 ✓	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2976 ✓	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5192 ✓	Type IV
Elong. Yield %	2ND ROLL	13 min	15 ✓	2 ipm
Elong. Break %	2ND ROLL	700 min	804 ✓	
Puncture Resistance (lbs)	2ND ROLL	52 min	88 ✓	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37 ✓	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

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Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040792
ROLL # : 06010881

MANF. DATE : 04/07/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42 ✓	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3 ✓	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1 ✓	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.18 ✓	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946 ✓	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2976 ✓	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5192 ✓	Type IV
Elong. Yield %	2ND ROLL	13 min	15 ✓	2 ipm
Elong. Break %	2ND ROLL	700 min	804 ✓	
Puncture Resistance (lbs)	2ND ROLL	52 min	88 ✓	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37 ✓	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040792
ROLL # : 06010882

MANF. DATE : 04/07/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER		TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness	(mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black	(%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion		1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index	(g/10 min)	1/SHIFT	0.30 max	0.18	D 1238 E
Density	(g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:					
T.S. Yield	(psi)	2ND ROLL	2300 min	2939	D 638
T.S. Break	(psi)	2ND ROLL	4000 min	5112	Type IV
Elong. Yield	%	2ND ROLL	13 min	15	2 ipm
Elong. Break	%	2ND ROLL	700 min	794	
Puncture Resistance	(lbs)	2ND ROLL	52 min	99	FTMS 101,Method 2065
Tear Resistance	(lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness	degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack	hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance		CERTIFIED	100 PPHM		
Dimensional Stability		CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040792
ROLL # : 06010883

MANF. DATE : 04/07/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.18	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2939	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5112	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	794	
Puncture Resistance (lbs)	2ND ROLL	52 min	99	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040792
ROLL # : 06010884

MANF. DATE : 04/07/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.18	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3016	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5124	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	806	
Puncture Resistance (lbs)	2ND ROLL	52 min	97	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

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Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040892
ROLL # : 06010885

MANF. DATE : 04/08/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2833	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5195	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	825	
Puncture Resistance (lbs)	2ND ROLL	52 min	87	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	34	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040892
ROLL # : 06010888

MANF. DATE : 04/08/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.2	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2813	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4322	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	710	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	32	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040892
ROLL # : 06010889

MANF. DATE : 04/08/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.2	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2874	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4266	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	702	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	32	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040892
ROLL # : 06010890

MANF. DATE : 04/08/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2874	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4266	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	702	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	32	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040892
ROLL # : 06010893

MANF. DATE : 04/08/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2924	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4711	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	760	
Puncture Resistance (lbs)	2ND ROLL	52 min	87	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040892
ROLL # : 06010894

MANF. DATE : 04/08/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2924	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4711	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	760	
Puncture Resistance (lbs)	2ND ROLL	52 min	87	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040892
ROLL # : 06010895

MANF. DATE : 04/08/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2891	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4594	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	740	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040892
ROLL # : 06010896

MANF. DATE : 04/08/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2891	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4594	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	740	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX889518
MATERIAL : HDPE 040 MIL
BATCH # : 040992
ROLL # : 06010899

MANF. DATE : 04/09/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2835	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5286	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	846	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

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Quality Control Certificate

RAILCAR : CHVX889518
MATERIAL : HDPE 040 MIL
BATCH # : 040992
ROLL # : 06010901

MANF. DATE : 04/09/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2735	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4983	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	835	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

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Quality Assurance Certificate

RAILCAR : CHVX889518
MATERIAL : HDPE 040 MIL
BATCH # : 040992
ROLL # : 06010902

MANF. DATE : 04/09/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2735	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4983	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	835	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

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Quality Control Certificate

RAILCAR : CHVX889518
MATERIAL : HDPE 040 MIL
BATCH # : 040992
ROLL # : 06010903

MANF. DATE : 04/09/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER		TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness	(mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black	(%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion		1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index	(g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density	(g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:					
T.S. Yield	(psi)	2ND ROLL	2300 min	2909	D 638
T.S. Break	(psi)	2ND ROLL	4000 min	5319	Type IV
Elong. Yield	%	2ND ROLL	13 min	17	2 ipm
Elong. Break	%	2ND ROLL	700 min	834	
Puncture Resistance	(lbs)	2ND ROLL	52 min	82	FTMS 101,Method 2065
Tear Resistance	(lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness	degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack	hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance		CERTIFIED	100 PPHM		
Dimensional Stability		CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : ACFX39243
MATERIAL : HDPE 040 MIL
BATCH # : 032092
ROLL # : 07006821

MANF. DATE : 03/20/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3367	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4931	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	772	
Puncture Resistance (lbs)	2ND ROLL	52 min	93	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	44	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : ACFX39243
MATERIAL : HDPE 040 MIL
BATCH # : 032092
ROLL # : 07006822

MANF. DATE : 03/20/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3367	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4931	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	772	
Puncture Resistance (lbs)	2ND ROLL	52 min	93	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	44	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : ACFX39243
MATERIAL : HDPE 040 MIL
BATCH # : 032092
ROLL # : 07006823

MANF. DATE : 03/20/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3421	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4888	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	704	
Puncture Resistance (lbs)	2ND ROLL	52 min	93	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	45	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

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Quality Assurance Certificate

RAILCAR : ACFX39243
MATERIAL : HDPE 040 MIL
BATCH # : 032092
ROLL # : 07006824

MANF. DATE : 03/20/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3421	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4888	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	704	
Puncture Resistance (lbs)	2ND ROLL	52 min	93	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	45	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : ACFX39243
MATERIAL : HDPE 040 MIL
BATCH # : 032092
ROLL # : 07006825

MANF. DATE : 03/20/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3213	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4375	Type IV
Elong. Yield %	2ND ROLL	13 min	13	2 ipm
Elong. Break %	2ND ROLL	700 min	704	
Puncture Resistance (lbs)	2ND ROLL	52 min	91	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	44	D 1D04,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

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Quality Control Certificate

RAILCAR : ACFX39243
MATERIAL : HDPE 040 MIL
BATCH # : 032192
ROLL # : 07006826

MANF. DATE : 03/21/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	D.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2693	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5321	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	868	
Puncture Resistance (lbs)	2ND ROLL	52 min	78	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : ACFX39243
MATERIAL : HDPE 040 MIL
BATCH # : 032192
ROLL # : 07006827

MANF. DATE : 03/21/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2693	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5321	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	868	
Puncture Resistance (lbs)	2ND ROLL	52 min	78	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : ACFX39243
MATERIAL : HDPE 040 MIL
BATCH # : 032192
ROLL # : 07006828

MANF. DATE : 03/21/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2567	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5146	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	859	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R. J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : ACFX39243
MATERIAL : HDPE 040 MIL
BATCH # : 032192
ROLL # : 07006829

MANF. DATE : 03/21/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	46	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2567	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5146	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	859	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : ACFX39243
MATERIAL : HDPE 040 MIL
BATCH # : 032192
ROLL # : 07006830

MANF. DATE : 03/21/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2687	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5037	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	835	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : ACFX39243
MATERIAL : HDPE 040 MIL
BATCH # : 032192
ROLL # : 07006832

MANF. DATE : 03/21/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.17	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3102	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5270	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	857	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	44	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : ACFX39243
MATERIAL : HDPE 040 MIL
BATCH # : 032192
ROLL # : 07006833

MANF. DATE : 03/21/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3D15
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.17	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3102	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5270	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	857	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	44	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : ACFX39243
MATERIAL : HDPE 040 MIL
BATCH # : 032192
ROLL # : 07006834

MANF. DATE : 03/21/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.17	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3221	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4776	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	764	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : ACFX39243
MATERIAL : HDPE 040 MIL
BATCH # : 032192
ROLL # : 07006835

MANF. DATE : 03/21/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER		TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness	(mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black	(%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion		1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index	(g/10 min)	1/SHIFT	0.30 max	0.17	D 1238 E
Density	(g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:					
T.S. Yield	(psi)	2ND ROLL	2300 min	3221	D 638
T.S. Break	(psi)	2ND ROLL	4000 min	4776	Type IV
Elong. Yield	%	2ND ROLL	13 min	15	2 ipm
Elong. Break	%	2ND ROLL	700 min	764	
Puncture Resistance	(lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance	(lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness	degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack	hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance		CERTIFIED	100 PPHM		
Dimensional Stability		CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

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Quality Control Certificate

RAILCAR : ACFX39243
MATERIAL : HDPE 040 MIL
BATCH # : 032192
ROLL # : 07006836

MANF. DATE : 03/21/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.17	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3184	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5399	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	852	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : ACFX39243
MATERIAL : HDPE 040 MIL
BATCH # : 032192
ROLL # : 07006837

MANF. DATE : 03/21/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.17	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3184	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5399	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	852	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : ACFX39243
MATERIAL : HDPE 040 MIL
BATCH # : 032292
ROLL # : 07006839

MANF. DATE : 03/22/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.17	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2521	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4903	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	847	
Puncture Resistance (lbs)	2ND ROLL	52 min	72	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	41	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : ACFX39243
MATERIAL : HDPE 040 MIL
BATCH # : 032292
ROLL # : 07006840

MANF. DATE : 03/22/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.17	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2668	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5317	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	882	
Puncture Resistance (lbs)	2ND ROLL	52 min	82	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R. J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : ACFX39243
MATERIAL : HDPE 040 MIL
BATCH # : 032292
ROLL # : 07006841

MANF. DATE : 03/22/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.17	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2668	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5317	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	882	
Puncture Resistance (lbs)	2ND ROLL	52 min	82	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : ACFX39243
MATERIAL : HDPE 040 MIL
BATCH # : 032292
ROLL # : 07006842

MANF. DATE : 03/22/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.15	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2674	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5015	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	844	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : ACFX39243
MATERIAL : HDPE 040 MIL
BATCH # : 032292
ROLL # : 07006843

MANF. DATE : 03/22/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45 ✓	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6 ✓	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1 ✓	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.15 ✓	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947 ✓	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2674 ✓	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5015 ✓	Type IV
Elong. Yield %	2ND ROLL	13 min	17 ✓	2 ipm
Elong. Break %	2ND ROLL	700 min	844 ✓	
Puncture Resistance (lbs)	2ND ROLL	52 min	88 ✓	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38 ✓	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : ACFX39243
MATERIAL : HDPE 040 MIL
BATCH # : 032292
ROLL # : 07006844

MANF. DATE : 03/22/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.15	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3231	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5509	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	833	
Puncture Resistance (lbs)	2ND ROLL	52 min	84	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : ACFX66076
MATERIAL : HDPE 040 MIL
BATCH # : 032292
ROLL # : 07006845

MANF. DATE : 03/22/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.8	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.15	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3231	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5509	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	833	
Puncture Resistance (lbs)	2ND ROLL	52 min	84	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : ACFX66076
MATERIAL : HDPE 040 MIL
BATCH # : 032292
ROLL # : 07006846

MANF. DATE : 03/22/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.15	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3201	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5575	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	852	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	41	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : ACFX66076
MATERIAL : HDPE 040 MIL
BATCH # : 032292
ROLL # : 07006847

MANF. DATE : 03/22/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.15	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3201	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5575	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	852	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	41	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : ACFX66076
MATERIAL : HDPE 040 MIL
BATCH # : 032292
ROLL # : 07006848

MANF. DATE : 03/22/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.15	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2949	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5462	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	829	
Puncture Resistance (lbs)	2ND ROLL	52 min	84	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : ACFX66076
MATERIAL : HDPE 040 MIL
BATCH # : 032392
ROLL # : 07006849

MANF. DATE : 03/23/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.15	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2617	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5356	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	896	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : ACFX66076
MATERIAL : HDPE 040 MIL
BATCH # : 032392
ROLL # : 07006850

MANF. DATE : 03/23/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER		TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness	(mils)	EVERY ROLL	40 min	44 ✓	D 1593
Carbon Black	(%)	1/SHIFT	2.0 to 3.0	2.4 ✓	D 1603
Carbon Black Dispersion		1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index	(g/10 min)	1/SHIFT	0.30 max	0.15	D 1238 E
Density	(g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:					
T.S. Yield	(psi)	2ND ROLL	2300 min	2617	D 638
T.S. Break	(psi)	2ND ROLL	4000 min	5356	Type IV
Elong. Yield	%	2ND ROLL	13 min	17	2 ipm
Elong. Break	%	2ND ROLL	700 min	896	
Puncture Resistance	(lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance	(lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness	degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack	hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance		CERTIFIED	100 PPHM		
Dimensional Stability		CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : ACFX66076
MATERIAL : HDPE 040 MIL
BATCH # : 032392
ROLL # : 07006851

MANF. DATE : 03/23/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.15	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2646	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5235	Type IV
Elong. Yield %	2ND ROLL	13 min	18	2 ipm
Elong. Break %	2ND ROLL	700 min	853	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : ACFX66076
MATERIAL : HDPE 040 MIL
BATCH # : 032392
ROLL # : 07006852

MANF. DATE : 03/23/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.15	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2646	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5235	Type IV
Elong. Yield %	2ND ROLL	13 min	18	2 ipm
Elong. Break %	2ND ROLL	700 min	853	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : ACFX66076
MATERIAL : HDPE 040 MIL
BATCH # : 032392
ROLL # : 07006853

MANF. DATE : 03/23/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2716	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5246	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	838	
Puncture Resistance (lbs)	2ND ROLL	52 min	82	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	34	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : ACFX66076
MATERIAL : HDPE 040 MIL
BATCH # : 032392
ROLL # : 07006856

MANF. DATE : 03/23/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2717	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5312	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	856	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : ACFX66076
MATERIAL : HDPE 040 MIL
BATCH # : 032392
ROLL # : 07006857

MANF. DATE : 03/23/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	46	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2717	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5312	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	856	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : ACFX66076
MATERIAL : HDPE 040 MIL
BATCH # : 032392
ROLL # : 07006858

MANF. DATE : 03/23/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2822	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5134	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	829	
Puncture Resistance (lbs)	2ND ROLL	52 min	84	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : ACFX66076
MATERIAL : HDPE 040 MIL
BATCH # : 032492
ROLL # : 07006859

MANF. DATE : 03/24/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER		TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness	(mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black	(%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion		1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index	(g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density	(g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:					
T.S. Yield	(psi)	2ND ROLL	2300 min	2585	D 638
T.S. Break	(psi)	2ND ROLL	4000 min	4924	Type IV
Elong. Yield	%	2ND ROLL	13 min	16	2 ipm
Elong. Break	%	2ND ROLL	700 min	845	
Puncture Resistance	(lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance	(lbs)	2ND ROLL	30 min	34	D 1004,Die C
Low Temp.Brittleness	degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack	hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance		CERTIFIED	100 PPHM		
Dimensional Stability		CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : ACFX66076
MATERIAL : HDPE 040 MIL
BATCH # : 032492
ROLL # : 07006860

MANF. DATE : 03/24/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2585	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4924	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	845	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	34	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : ACFX66076
MATERIAL : HDPE 040 MIL
BATCH # : 032492
ROLL # : 07006861

MANF. DATE : 03/24/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2584	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5025	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	857	"
Puncture Resistance (lbs)	2ND ROLL	52 min	77	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : ACFX66076
MATERIAL : HDPE 040 MIL
BATCH # : 032492
ROLL # : 07006862

MANF. DATE : 03/24/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	3.0	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2584	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5025	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	857	
Puncture Resistance (lbs)	2ND ROLL	52 min	77	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : ACFX66076
MATERIAL : HDPE 040 MIL
BATCH # : 032492
ROLL # : 07006863

MANF. DATE : 03/24/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	3.0	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2893	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5603	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	908	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : ACFX66076
MATERIAL : HDPE 040 MIL
BATCH # : 032492
ROLL # : 07006864

MANF. DATE : 03/24/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	3.0	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2893	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5603	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	908	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : ACFX66076
MATERIAL : HDPE 040 MIL
BATCH # : 032492
ROLL # : 07006865

MANF. DATE : 03/24/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	3.0	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2692	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5495	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	894	
Puncture Resistance (lbs)	2ND ROLL	52 min	87	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : ACFX66076
MATERIAL : HDPE 040 MIL
BATCH # : 032492
ROLL # : 07006866

MANF. DATE : 03/24/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2692	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5495	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	894	
Puncture Resistance (lbs)	2ND ROLL	52 min	87	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : ACFX66076
MATERIAL : HDPE 040 MIL
BATCH # : 032492
ROLL # : 07006867

MANF. DATE : 03/24/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2855	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5098	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	804	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : ACFX66076
MATERIAL : HDPE 040 MIL
BATCH # : 032492
ROLL # : 07006868

MANF. DATE : 03/24/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2855	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5098	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	804	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : ACFX66076
MATERIAL : HDPE 040 MIL
BATCH # : 032592
ROLL # : 07006871

MANF. DATE : 03/25/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.15	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2631	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5135	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	846	
Puncture Resistance (lbs)	2ND ROLL	52 min	87	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHEX161
MATERIAL : HDPE 040 MIL
BATCH # : 032692
ROLL # : 07006893

MANF. DATE : 03/26/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.15	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2712	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5640	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	911	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R. J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHEX161
MATERIAL : HDPE 040 MIL
BATCH # : 032692
ROLL # : 07006894

MANF. DATE : 03/26/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.15	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2712	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5640	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	911	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHEX161
MATERIAL : HDPE 040 MIL
BATCH # : 032792
ROLL # : 07006895

MANF. DATE : 03/27/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.15	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2624	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4773	Type IV
Elong. Yield %	2ND ROLL	13 min	19	2 ipm
Elong. Break %	2ND ROLL	700 min	800	
Puncture Resistance (lbs)	2ND ROLL	52 min	82	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	34	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHEX161
MATERIAL : HDPE 040 MIL
BATCH # : 032792
ROLL # : 07006896

MANF. DATE : 03/27/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.15	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2624	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4773	Type IV
Elong. Yield %	2ND ROLL	13 min	19	2 ipm
Elong. Break %	2ND ROLL	700 min	800	
Puncture Resistance (lbs)	2ND ROLL	52 min	82	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	34	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHEX161
MATERIAL : HDPE 040 MIL
BATCH # : 032792
ROLL # : 07006897

MANF. DATE : 03/27/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A*1/A*2/B*1	A*1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.15	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2605	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5028	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	820	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHEX161
MATERIAL : HDPE 040 MIL
BATCH # : 032792
ROLL # : 07006898

MANF. DATE : 03/27/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	3.0	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2605	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5028	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	820	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX41718
MATERIAL : HDPE 040 MIL
BATCH # : 032792
ROLL # : 07006905

MANF. DATE : 03/27/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	46	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.15	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2999	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5647	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	840	
Puncture Resistance (lbs)	2ND ROLL	52 min	84	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX41718
MATERIAL : HDPE 040 MIL
BATCH # : 032892
ROLL # : 07006906

MANF. DATE : 03/28/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.15	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2855	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5925	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	888	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX41718
MATERIAL : HDPE 040 MIL
BATCH # : 032892
ROLL # : 07006907

MANF. DATE : 03/28/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.15	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2855	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5925	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	888	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX41718
MATERIAL : HDPE 040 MIL
BATCH # : 032892
ROLL # : 07006908

MANF. DATE : 03/28/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.15	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2920	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5626	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	836	
Puncture Resistance (lbs)	2ND ROLL	52 min	77	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX41718
MATERIAL : HDPE 040 MIL
BATCH # : 032892
ROLL # : 07006909

MANF. DATE : 03/28/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.15	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2920	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5626	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	836	
Puncture Resistance (lbs)	2ND ROLL	52 min	77	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX41718
MATERIAL : HDPE 040 MIL
BATCH # : 032892
ROLL # : 07006910

MANF. DATE : 03/28/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.15	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3136	D 638
T.S. Break (psi)	2ND ROLL	4000 min	6288	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	878	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX41718
MATERIAL : HDPE 040 MIL
BATCH # : 032892
ROLL # : 07006912

MANF. DATE : 03/28/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3227	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5718	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	858	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX41718
MATERIAL : HDPE 040 MIL
BATCH # : 032892
ROLL # : 07006913

MANF. DATE : 03/28/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3227	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5718	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	858	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX41718
MATERIAL : HDPE 040 MIL
BATCH # : 032892
ROLL # : 07006914

MANF. DATE : 03/28/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3455	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5931	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	838	
Puncture Resistance (lbs)	2ND ROLL	52 min	93	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX41718
MATERIAL : HDPE 040 MIL
BATCH # : 032892
ROLL # : 07006915

MANF. DATE : 03/28/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3455	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5931	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	838	
Puncture Resistance (lbs)	2ND ROLL	52 min	93	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX41718
MATERIAL : HDPE 040 MIL
BATCH # : 032992
ROLL # : 07006916

MANF. DATE : 03/29/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER		TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness	(mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black	(%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion		1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index	(g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density	(g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:					
T.S. Yield	(psi)	2ND ROLL	2300 min	2437	D 638
T.S. Break	(psi)	2ND ROLL	4000 min	4255	Type IV
Elong. Yield	%	2ND ROLL	13 min	16	2 ipm
Elong. Break	%	2ND ROLL	700 min	853	
Puncture Resistance	(lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance	(lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness	degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack	hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance		CERTIFIED	100 PPHM		
Dimensional Stability		CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX41718
MATERIAL : HDPE 040 MIL
BATCH # : 032992
ROLL # : 07006917

MANF. DATE : 03/29/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2437	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4255	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	853	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX41718
MATERIAL : HDPE 040 MIL
BATCH # : 032992
ROLL # : 07006918

MANF. DATE : 03/29/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2817	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5356	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	852	
Puncture Resistance (lbs)	2ND ROLL	52 min	91	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX41718
MATERIAL : HDPE 040 MIL
BATCH # : 032992
ROLL # : 07006919

MANF. DATE : 03/29/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2817	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5356	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	852	
Puncture Resistance (lbs)	2ND ROLL	52 min	91	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX41718
MATERIAL : HDPE 040 MIL
BATCH # : 032992
ROLL # : 07006920

MANF. DATE : 03/29/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2884	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5421	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	878	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX41718
MATERIAL : HDPE 040 MIL
BATCH # : 032992
ROLL # : 07006921

MANF. DATE : 03/29/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2884	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5421	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	878	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX41718
MATERIAL : HDPE 040 MIL
BATCH # : 032992
ROLL # : 07006922

MANF. DATE : 03/29/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3035	D 638
T.S. Break (psi)	2ND ROLL	4000 min	6102	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	919	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	43	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX41718
MATERIAL : HDPE 040 MIL
BATCH # : 032992
ROLL # : 07006923

MANF. DATE : 03/29/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3035	D 638
T.S. Break (psi)	2ND ROLL	4000 min	6102	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	919	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	43	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX41718
MATERIAL : HDPE 040 MIL
BATCH # : 032992
ROLL # : 07006924

MANF. DATE : 03/29/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER		TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness	(mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black	(%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion		1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index	(g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density	(g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:					
T.S. Yield	(psi)	2ND ROLL	2300 min	3355	D 638
T.S. Break	(psi)	2ND ROLL	4000 min	5714	Type IV
Elong. Yield	%	2ND ROLL	13 min	15	2 ipm
Elong. Break	%	2ND ROLL	700 min	852	
Puncture Resistance	(lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance	(lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness	degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack	hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance		CERTIFIED	100 PPHM		
Dimensional Stability		CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX41718
MATERIAL : HDPE 040 MIL
BATCH # : 032992
ROLL # : 07006925

MANF. DATE : 03/29/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3355	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5714	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	852	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX41718
MATERIAL : HDPE 040 MIL
BATCH # : 033092
ROLL # : 07006926

MANF. DATE : 03/30/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3010	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5230	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	810	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX41718
MATERIAL : HDPE 040 MIL
BATCH # : 033092
ROLL # : 07006927

MANF. DATE : 03/30/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3010	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5230	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	810	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX41718
MATERIAL : HDPE 040 MIL
BATCH # : 033092
ROLL # : 07006928

MANF. DATE : 03/30/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2736	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4906	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	798	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX41718
MATERIAL : HDPE 040 MIL
BATCH # : 033092
ROLL # : 07006929

MANF. DATE : 03/30/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2736	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4906	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	798	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 07006938

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER		TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness	(mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black	(%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion		1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index	(g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density	(g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:					
T.S. Yield	(psi)	2ND ROLL	2300 min	2758	D 638
T.S. Break	(psi)	2ND ROLL	4000 min	5082	Type IV
Elong. Yield	%	2ND ROLL	13 min	15	2 ipm
Elong. Break	%	2ND ROLL	700 min	798	
Puncture Resistance	(lbs)	2ND ROLL	52 min	91	FTMS 101,Method 2065
Tear Resistance	(lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness	degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack	hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance		CERTIFIED	100 PPHM		
Dimensional Stability		CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 07006939

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2758	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5082	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	798	
Puncture Resistance (lbs)	2ND ROLL	52 min	91	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 07006940

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2882	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4490	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	716	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 07006941

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2882	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4490	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	716	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 07006942

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2987	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5258	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	792	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 07006943

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2987	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5258	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	792	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 07006944

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2982	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5058	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	767	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 07006945

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2982	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5058	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	767	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 07006946

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2905	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5036	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	789	
Puncture Resistance (lbs)	2ND ROLL	52 min	93	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 07006947

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	46 ✓	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6 ✓	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-2 ✓	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.05 ✓	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.944 ✓	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2905 ✓	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5036 ✓	Type IV
Elong. Yield %	2ND ROLL	13 min	15 ✓	2 ipm
Elong. Break %	2ND ROLL	700 min	789 ✓	
Puncture Resistance (lbs)	2ND ROLL	52 min	93 ✓	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38 ✓	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 07006948

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER		TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness	(mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black	(%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion		1/SHIFT	A-1/A-2/B-1	A-2	D 3015
Melt Index	(g/10 min)	1/SHIFT	0.30 max	0.05	D 1238 E
Density	(g/cm3)	1/SHIFT	0.940 min	0.944	D 1505 A
Tensile Properties:					
T.S. Yield	(psi)	2ND ROLL	2300 min	2541	D 638
T.S. Break	(psi)	2ND ROLL	4000 min	4691	Type IV
Elong. Yield	%	2ND ROLL	13 min	15	2 ipm
Elong. Break	%	2ND ROLL	700 min	802	
Puncture Resistance	(lbs)	2ND ROLL	52 min	91	FTMS 101,Method 2065
Tear Resistance	(lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness	degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack	hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance		CERTIFIED	100 PPHM		
Dimensional Stability		CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 07006949

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-2	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.05	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.944	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2541	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4691	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	802	
Puncture Resistance (lbs)	2ND ROLL	52 min	91	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 07006950

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-2	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.05	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.944	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2566	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4912	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	826	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 07006952

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2944	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5149	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	790	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 07006953

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2944	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5149	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	790	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 07006954

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2878	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5358	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	811	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 07006955

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2878	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5358	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	811	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 07006956

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2834	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5032	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	776	
Puncture Resistance (lbs)	2ND ROLL	52 min	87	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 07006957

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.07	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2834	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5032	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	776	
Puncture Resistance (lbs)	2ND ROLL	52 min	87	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 07006958

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.07	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3031	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5473	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	809	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 07006959

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.07	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2665	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4461	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	740	
Puncture Resistance (lbs)	2ND ROLL	52 min	82	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 07006960

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.07	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2665	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4461	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	740	
Puncture Resistance (lbs)	2ND ROLL	52 min	82	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 07006961

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.07	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2794	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4697	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	718	
Puncture Resistance (lbs)	2ND ROLL	52 min	74	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 07006963

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.07	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2948	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4706	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	701	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 07006964

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.07	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2948	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4706	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	701	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 07006965

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.07	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2947	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4631	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	709	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 07006967

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.07	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3013	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4851	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	723	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 07006968

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	B-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.07	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3013	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4851	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	723	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 07006969

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	B-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.07	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2672	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4305	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	718	
Puncture Resistance (lbs)	2ND ROLL	52 min	92	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 07006970

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	B-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.07	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2672	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4305	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	718	
Puncture Resistance (lbs)	2ND ROLL	52 min	92	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 07006971

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	B-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.07	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2769	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4555	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	746	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	34	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 07006972

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	B-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.07	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2769	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4555	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	746	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	34	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 07006973

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2902	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5707	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	862	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

APPENDIX C-2

RESIN CERTIFICATES

December 1992

927-4003

Chevron Chemical Company
P.O. Box 7400, Orange, TX 77631-7400 • Phone (409) 886-7481

Orange Plant

February 11, 1992

Steve Severson
Gundle Lining Systems
1340 E. Richey
Houston, Texas 77073
FAX: (713)875-6010

CERTIFICATE OF ANALYSIS

Following is the data on the subject material as determined by the Quality Control Department:

Product	9642T	Lot Number	B011332
Chevron Order No.	CRN58348	Customer Order No.	134381
Package	PLCX42413	Ship Date	02-10-92
Production Date	01-17-92	Weight	181,200

Property	Value	Units
Melt Index	0.11	gms/10 min
Density	0.9394	gms/cc

The data set forth herein has been carefully compiled by Chevron Chemical Company. However, there is no warranty of any kind, either express or implied, applicable to its use and the user assumes all risk and liability in connection therewith.

Sincerely,

G.G. Bertin
Supervisor
Quality Control

GGB/gc

For inquiry, contact Customer Service at the following number:
Film, Coating, Pipe Applications: 1-800-231-3826
Molding Applications: 1-800-231-3828

Chevron

Chevron Chemical Company
P.O. Box 7400, Orange, TX 77631-7400 • Phone (409) 886-7491

Orange Plant

February 10, 1992

Steve Severson
Gundle Lining Systems
1340 E. Richey
Houston, Texas 77073
FAX: (713)875-6010

CERTIFICATE OF ANALYSIS

Following is the data on the subject material as determined by the Quality Control Department:

Product	9642T	Lot Number	B011309
Chevron Order No.	CRN58347	Customer Order No.	134381
Package	CHVX891174	Ship Date	02-07-92
Production Date	01-15-92	Weight	175,000

Property	Value	Units
Melt Index	0.15	gms/10 min
Density	0.9395	gms/cc

The data set forth herein has been carefully compiled by Chevron Chemical Company. However, there is no warranty of any kind, either express or implied, applicable to its use and the user assumes all risk and liability in connection therewith.

Sincerely,

G.G. Bertin
Supervisor
Quality Control

GGB/gc

For inquiry, contact Customer Service at the following number:
Film, Coating, Pipe Applications: 1-800-231-3826
Molding Applications: 1-800-231-3828

ORIGINAL

Chevron Chemical Company
P.O. Box 7400, Orange, TX 77631-7400 • Phone (409) 886-7491

Orange Plant

February 11, 1992

Steve Severson
Gundle Lining Systems
1340 E. Richey
Houston, Texas 77073
FAX: (713)875-6010

CERTIFICATE OF ANALYSIS

Following is the data on the subject material as determined by the Quality Control Department:

Product	9642T	Lot Number	B011348
Chevron Order No.	CRN58350	Customer Order No.	134381
Package	CHVX890068	Ship Date	02-10-92
Production Date	01-17-92	Weight	169,400

Property	Value	Units
Melt Index	0.15	gms/10 min
Density	0.9384	gms/cc

The data set forth herein has been carefully compiled by Chevron Chemical Company. However, there is no warranty of any kind, either express or implied, applicable to its use and the user assumes all risk and liability in connection therewith.

Sincerely,

G.G. Bertin
Supervisor
Quality Control

GGB/gc

For inquiry, contact Customer Service at the following number:
Film, Coating, Pipe Applications: 1-800-231-3826
Molding Applications: 1-800-231-3828

Chevron Chemical Company
P.O. Box 7400, Orange, TX 77631-7400 • Phone (409) 886 7401

Orange Plant

February 18, 1992

Steve Severson
Gundle Lining Systems
1340 E. Richey
Houston, Texas 77073
FAX: (713)875-6010

CERTIFICATE OF ANALYSIS

Following is the data on the subject material as determined by the Quality Control Department:

Product	9642T	Lot Number	B011391
Chevron Order No.	CRN58352	Customer Order No.	134381
Package	GOCX58935	Ship Date	02-14-92
Production Date	--	Weight	183,100

Property	Value	Units
Melt Index	0.11	gms/10 min
Density	0.9380	gms/cc

The data set forth herein has been carefully compiled by Chevron Chemical Company. However, there is no warranty of any kind, either express or implied, applicable to its use and the user assumes all risk and liability in connection therewith.

Sincerely,

G.G. Bertin
Supervisor
Quality Control

GGB/go

For inquiry, contact Customer Service at the following number:
Film, Coating, Pipe Applications: 1-800-231-3826
Molding Applications: 1-800-231-3828

Chevron Chemical Company
P.O. Box 7400, Orange, TX 77631-7400 • Phone (409) 886-7491

Orange Plant

March 19, 1992

Gundle Lining Systems
19103 Gundle Road
Houston, Texas 77073
FAX: 713-230-6787

Attention: Steve Severson - Gundle Materials Manager

CERTIFICATE OF RAILCAR ANALYSIS

Product Type	9642T
Railcar Number	CHVX889518
Lot Number	B011435
Ship Date	03-18-92
Quantity/Weight	177,100 lbs.
Customer P. O. #	008526
Chevron Order #	CRN60528

Following is the data on the subject material as determined by the Quality Control Department:

TEST RESULTS

Property	ASTM Method	Value	Units
Density	D1505	0.9401	gms/cc
Melt Index	D1238 Cond. E	0.18	gms/10 min.

ESCR incomplete, we will advise after 500 hours.

The data set forth herein has been carefully compiled by Chevron Chemical Company. However, there is no warranty of any kind, either express or implied, applicable to its use and the user assumes all risk and liability in connection therewith.

Sincerely,

G. G. Bertin
Supervisor
Quality Control

GGB\gc

cc: Rick Schaefer - Gundle Lab Manager

For inquiry, contact Customer Service at the following number:
Film, Coating, Pipe Applications: 1-800-231-3826
Molding Applications: 1-800-231-3828

Quantum Chemical Corporation

Quantum

USI Division

3400 Anamosa Road
P.O. Box 2919
Clinton, IA 52733-2919

MARCH 09 1992

FAX: 713-230-6787

ATTENTION: STEVE SEVERSON

CERTIFICATE OF ANALYSIS

ORDER NUMBER: DS50384
SHIPPED DATE: 03/06/92
CUSTOMER P.O. NUMBER: 008530
CUSTOMER NUMBER: 261099

SHIPPED TO: GUNDLE LINING SYSTEMS INC
1340 E RICHEY RD
WESTFIELD TX
77073

PRODUCT: LP510100 PETROTHENE LP5101-00 PRODUCED: 2/22/92
LOT NUMBER: I2DB52 RAILCAR: ACFX39243 WEIGHT SHIPPED: 184950 LI

	TEST RESULT
DENSITY, G/CC @ 23 C	0.938
MELT INDEX, G/10MIN.	0.15

SINCERELY,

DCampbell

QC ENGINEER

Quantum Chemical Corporation

Quantum

USI Division

3400 Anamosa Road
P.O. Box 2919
Clinton, IA 52733-2919

FAX: 713-230-6787

MARCH 12 1992

ATTENTION: STEVE SEVERSON

CERTIFICATE OF ANALYSIS

ORDER NUMBER: DS50385
SHIPPED DATE: 03/11/92
CUSTOMER P.O. NUMBER: 008530
CUSTOMER NUMBER: 261099

SHIPPED TO: GUNDLE LINING SYSTEMS INC
1340 E RICHEY RD
WESTFIELD TX
77073

PRODUCT: LP510100 PETROTHENE LP5101-00
LOT NUMBER: I2DA51 RAILCAR: ACFX66076

PRODUCED: 2/21/92
WEIGHT SHIPPED: 187100 LBS

	TEST RESULT
DENSITY, G/CC @ 23 C	0.938
MELT INDEX, G/10MIN.	0.13

SINCERELY,

D Campbell

QC ENGINEER

Quantum Chemical Corporation

Quantum

USI Division

3400 Anamosa Road
P.O. Box 2919
Clinton, IA 52733-2919

MARCH 18 1992

FAX: 713-230-6787

ATTENTION: STEVE SEVERSON

CERTIFICATE OF ANALYSIS

ORDER NUMBER: DS50387
SHIPPED DATE: 03/17/92
CUSTOMER P.O. NUMBER: 008530
CUSTOMER NUMBER: 261099

SHIPPED TO: GUNDLE LINING SYSTEMS INC
1340 E RICHEY RD
WESTFIELD TX
77073

PRODUCT: LP510100 PETROTHENE LP5101-00 PRODUCED: 2/25/92
LOT NUMBER: I2DE52 RAILCAR: CHEX00161 WEIGHT SHIPPED: 181300

	TEST RESULT
DENSITY, G/CC @ 23 C	0.937
MELT INDEX, G/10MIN.	0.15

SINCERELY,

D Campbell

QC ENGINEER

SOLVAY POLYMERS

Quality Polymers Through Technology and People

February 24, 1992

Gundle Lining Systems
Materials Manager
19103 Gundle Avenue
Houston, TX 77073
2306787

Listed below are the data on XF836 shipments:

Solvay Order Number:	0C5497
Customer PO:	134385
Date Shipped:	02/24/92
Ship To:	WESTFIELD, TX
Lot Number:	C20220F06A
Hopper Car Number:	PLEX 41718
Weight, Lbs.:	182,900
MELT INDEX	0.13
DENSITY	0.938
ESCR	*

*Testing incomplete, we will advise

Sincerely,

Dr. J. Lon Thompson
Quality Administration Manager

sab

SOLVAY POLYMERS

Quality Polymers Through Technology and People

March 5, 1992

Gundle Lining Systems
Materials Manager
19103 Gundle Avenue
Houston, TX 77073
2306787

Listed below are the data on XF836 shipments:

Solvay Order Number:	0C5926
Customer PO:	008532
Date Shipped:	03/05/92
Ship To:	WESTFIELD, TX
Lot Number:	C20221F22A
Hopper Car Number:	PTTX 42360
Weight, Lbs.:	182,700
MELT INDEX	0.08
DENSITY	0.938
ESCR	*

*TESTING INCOMPLETE, WE WILL ADVISE.

Sincerely,

Dr. J. Lon Thompson
Quality Administration Manager

sab

GEOMEMBRANE QUALITY ASSURANCE SERVICES POND 93 COAL CREEK STATION UNDERWOOD, NORTH DAKOTA

Submitted To:

Cooperative Power Association
14615 Lone Oak Road
Eden Prairie, Minnesota 55344-2287

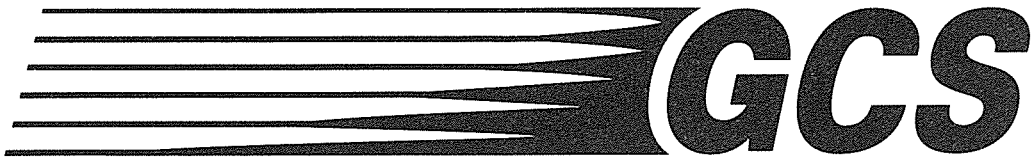
VOLUME II



GCS
GOLDER CONSTRUCTION SERVICES, INC.

December 1992

927-4003



Golder Construction Services, Inc.
Quality Assurance and Construction Management

GEOMEMBRANE QUALITY ASSURANCE SERVICES POND 93 COAL CREEK STATION UNDERWOOD, NORTH DAKOTA

VOLUME II

Submitted to:

Cooperative Power Association
14615 Lone Oak Road
Eden Prairie, Minnesota 55344-2287

Distribution:

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2 copies - Golder Construction Services, Inc., Lakewood, Colorado

December 1992

927-4003

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GEOMEMBRANE CONFORMANCE TEST RESULTS

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Golder Construction Services, Inc.

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SUMMARY OF GEOMEMBRANE CONFORMANCE TEST RESULTS

COOPERATIVE POWER
PONDS 91 & 93
NORTH DAKOTA

927-4003

ROLL DESIGNATION	6846	6852	0697	0717	0721	0729	6693	6859	6862	6866
THICKNESS (mils) ASTM D 374	45.1	44.2	44.4	43.4	43.3	43.5	42.7	46.4	44.2	46.6
SPECIFIC GRAVITY ASTM D 1505	0.949	0.946	0.950	0.949	0.950	0.950	0.950	0.949	0.951	0.949
STRENGTH AT YIELD (ppi)	104.8	106.4	119.0	113.0	108.9	118.1	101.8	101.5	108.8	118.1
MD/TD (1) ASTM D 638	106.6	111.5	122.4	117.7	120.7	122.9	112.3	106.6	112.1	123.4
STRENGTH AT BREAK (ppi)	210.0	195.8	217.8	202.5	205.8	218.9	201.4	204.3	206.4	200.3
MD/TD (1) ASTM D 638	208.6	229.1	230.0	212.7	220.3	216.0	209.9	220.3	208.8	218.4
ELONGATION AT YIELD (%)	20.9	22.7	20.6	22.9	21.7	21.7	19.8	19.5	20.5	20.7
MD/TD (1) ASTM D 638	18.9	19.8	17.9	19.1	19.0	19.2	17.9	18.2	19.1	19.0
ELONGATION AT BREAK (%)	794	750	814	818	818	820	788	822	778	752
MD/TD (1) ASTM D 638	800	860	840	836	832	820	872	870	838	820
CARBON BLACK CONTENT (%) ASTM D 1603	2.48	2.28	2.55	2.31	2.38	2.48	2.55	2.69	2.71	2.66
CARBON BLACK DISPERSION(2) ASTM D 3015	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1

(1) MD/TD corresponds to Machine Direction / Transverse Direction.
(2) Carbon black dispersion was tested according to ASTM D3015 and reported according to the ASTM D2663 dispersion classification chart.

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SUMMARY OF GEOMEMBRANE CONFORMANCE TEST RESULTS

COOPERATIVE POWER
PONDS 91 & 93
NORTH DAKOTA

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ROLL DESIGNATION	0661	0665	0670	0674	0683	0688	6829	6833	6838	6842
THICKNESS (mils) ASTM D 374	46.6	44.2	45.8	46.7	46.3	47.4	46.1	44.5	47.3	45.0
SPECIFIC GRAVITY ASTM D 1505	0.950	0.950	0.951	0.948	0.950	0.950	0.949	0.949	0.950	0.947
STRENGTH AT YIELD (ppi)	116.8	114.4	104.0	117.6	115.3	125.5	100.6	110.8	116.1	107.4
MD/TD (1) ASTM D 638	120.8	119.2	110.9	123.7	117.9	128.8	113.5	110.3	121.4	115.6
STRENGTH AT BREAK (ppi)	214.1	228.4	226.6	234.5	235.0	225.1	192.5	192.5	213.4	214.6
MD/TD (1) ASTM D 638	239.2	228.8	235.6	243.9	251.9	234.3	213.1	224.2	237.3	216.4
ELONGATION AT YIELD (%)	21.0	21.9	20.9	22.0	19.8	22.1	22.1	20.2	21.7	19.7
MD/TD (1) ASTM D 638	18.8	19.9	18.8	19.0	18.8	20.1	19.8	18.0	19.2	20.3
ELONGATION AT BREAK (%)	782	846	866	848	820	808	770	748	802	828
MD/TD (1) ASTM D 638	878	828	838	818	848	820	808	798	844	822
CARBON BLACK CONTENT (%) ASTM D 1603	2.55	2.60	2.59	2.44	2.41	2.34	2.45	2.57	2.75	2.48
CARBON BLACK DISPERSION(2) ASTM D 3015	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1

(1) MD/TD corresponds to Machine Direction / Transverse Direction.
(2) Carbon black dispersion was tested according to ASTM D3015 and reported according to the ASTM D2663 dispersion classification chart.

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SUMMARY OF GEOMEMBRANE CONFORMANCE TEST RESULTS

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COOPERATIVE POWER
PONDS 91 & 93
NORTH DAKOTA

ROLL DESIGNATION	6871	6925	6907	6912	6916	6921	6939	6940	6947	6952
THICKNESS (mils) ASTM D 374	45.4	44.2	45.6	45.2	45.9	43.6	47.5	47.0	47.3	44.2
SPECIFIC GRAVITY ASTM D 1505	0.950	0.949	0.949	0.949	0.949	0.949	0.950	0.950	0.950	0.950
STRENGTH AT YIELD (ppi)	104.8	96.9	97.8	105.4	101.3	95.0	109.8	103.4	111.4	101.0
MD/TD (1)	116.8	109.9	102.7	110.1	107.6	113.7	122.8	114.6	124.3	109.3
ASTM D 638										
STRENGTH AT BREAK (ppi)	195.8	194.3	210.1	212.8	188.8	202.5	208.6	215.0	219.3	200.1
MD/TD (1)	219.8	221.1	227.2	225.1	225.4	220.4	243.1	229.3	228.9	212.7
ASTM D 638										
ELONGATION AT YIELD (%)	21.6	23.1	20.8	20.1	21.7	22.3	22.1	24.0	21.9	27.1
MD/TD (1)	17.6	18.0	19.0	18.2	17.7	18.4	16.9	18.9	18.4	22.5
ASTM D 638										
ELONGATION AT BREAK (%)	768	812	840	858	786	836	836	830	830	810
MD/TD (1)	830	828	916	834	876	862	844	822	814	800
ASTM D 638										
CARBON BLACK CONTENT (%) ASTM D 1603	2.68	2.72	2.50	2.60	2.49	2.60	2.68	2.58	2.58	2.68
CARBON BLACK DISPERSION(2) ASTM D 3015	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1

(1) MD/TD corresponds to Machine Direction / Transverse Direction.

(2) Carbon black dispersion was tested according to ASTM D3015 and reported according to the ASTM D2663 dispersion classification chart.

MARCH 1992

SUMMARY OF GEOMEMBRANE CONFORMANCE TEST RESULTS

COOPERATIVE POWER
PONDS 91 & 93
NORTH DAKOTA

927-4003

ROLL DESIGNATION	0722	0742	0747	0756	0761	0765	0771	0774	6821	6895
THICKNESS (mils) ASTM D 374	43.4	43.7	44.4	44.1	43.5	44.7	43.0	43.9	45.6	44.7
SPECIFIC GRAVITY ASTM D 1505	0.952	0.952	0.950	0.950	0.950	0.950	0.950	0.949	0.950	0.949
STRENGTH AT YIELD (ppi)	109.0	111.4	113.0	110.7	107.6	109.6	110.6	107.8	114.1	99.8
MD/TD (1) ASTM D 638	119.0	118.7	119.8	119.7	115.5	117.3	116.9	112.5	114.4	101.7
STRENGTH AT BREAK (ppi)	209.3	217.5	220.6	200.4	214.0	219.7	217.0	205.5	174.8	200.8
MD/TD (1) ASTM D 638	222.6	218.9	233.9	229.1	235.6	210.9	219.1	211.5	214.9	208.6
ELONGATION AT YIELD (%)	20.9	21.7	20.8	21.9	21.2	21.4	22.6	22.3	21.7	23.9
MD/TD (1) ASTM D 638	18.6	19.0	19.4	19.6	18.9	19.8	19.0	19.8	19.5	19.9
ELONGATION AT BREAK (%)	810	832	832	786	812	834	816	820	702	806
MD/TD (1) ASTM D 638	856	876	850	842	854	830	834	834	828	866
CARBON BLACK CONTENT (%) ASTM D 1603	2.47	2.38	2.41	2.44	2.40	2.55	2.57	2.36	2.44	2.50
CARBON BLACK DISPERSION(2) ASTM D 3015	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1

(1) MD/TD corresponds to Machine Direction / Transverse Direction.
(2) Carbon black dispersion was tested according to ASTM D3015 and reported according to the ASTM D2663 dispersion classification chart.

APRIL 1992

SUMMARY OF GEOMEMBRANE CONFORMANCE TEST RESULTS

COOPERATIVE POWER
PONDS 91 & 93
NORTH DAKOTA

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ROLL DESIGNATION	0783	0787	0790	0795	0800	6957	0802	0814	0816	0820
THICKNESS (mils) ASTM D 374	43.3	43.3	43.7	43.0	42.6	45.8	43.9	44.7	42.5	42.6
SPECIFIC GRAVITY ASTM D 1505	0.949	0.949	0.949	0.950	0.950	0.950	0.951	0.950	0.950	0.949
STRENGTH AT YIELD (ppi)	111.9	109.2	101.9	106.2	99.2	108.9	106.2	110.7	108.4	109.0
MD/TD (1) ASTM D 638	114.2	111.2	106.2	114.3	108.7	120.3	115.5	117.2	115.0	115.5
STRENGTH AT BREAK (ppi)	220.5	215.2	202.2	205.7	199.0	200.5	192.6	224.0	202.7	201.9
MD/TD (1) ASTM D 638	197.5	222.3	232.9	239.9	237.2	231.2	221.6	243.0	227.7	224.7
ELONGATION AT YIELD (%)	20.8	21.8	24.3	23.6	26.8	20.7	21.5	20.5	22.2	27.5
MD/TD (1) ASTM D 638	17.9	19.5	21.2	19.2	21.1	18.1	18.0	17.7	24.0	23.7
ELONGATION AT BREAK (%)	840	832	774	818	804	798	748	834	778	780
MD/TD (1) ASTM D 638	798	864	872	888	886	832	854	860	830	838
CARBON BLACK CONTENT (%) ASTM D 1603	2.36	2.22	2.44	2.44	2.42	2.52	2.55	2.54	2.59	2.47
CARBON BLACK DISPERSION(2) ASTM D 3015	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1

(1) MD/TD corresponds to Machine Direction / Transverse Direction.

(2) Carbon black dispersion was tested according to ASTM D3015 and reported according to the ASTM D2663 dispersion classification chart.

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SUMMARY OF GEOMEMBRANE CONFORMANCE TEST RESULTS

COOPERATIVE POWER
PONDS 91 & 93
NORTH DAKOTA

927--4003

ROLL DESIGNATION	0824	0828	0833	0838	0840	0850	0860	0862	6960	6972
THICKNESS (mils) ASTM D 374	44.2	43.3	43.4	43.8	43.0	43.3	42.5	41.8	44.9	45.7
SPECIFIC GRAVITY ASTM D 1505	0.951	0.947	0.951	0.950	0.950	0.951	0.951	0.951	0.951	0.951
STRENGTH AT YIELD (ppi)	114.2	115.4	112.1	113.5	112.5	110.7	106.6	107.9	110.0	108.3
MD/TD (1) ASTM D 638	121.5	122.2	120.1	117.4	118.4	114.5	115.4	115.4	117.8	120.8
STRENGTH AT BREAK (ppi)	216.0	205.6	197.7	219.3	207.3	228.7	210.0	199.3	211.6	209.9
MD/TD (1) ASTM D 638	239.0	242.1	222.0	232.6	224.9	234.0	211.4	209.6	218.0	258.6
ELONGATION AT YIELD (%)	26.6	26.5	26.5	26.0	27.5	24.9	29.4	26.9	28.8	24.4
MD/TD (1) ASTM D 638	22.5	29.6	27.4	24.8	19.1	26.1	26.8	26.0	23.5	17.4
ELONGATION AT BREAK (%)	786	758	768	812	794	852	814	798	818	818
MD/TD (1) ASTM D 638	848	848	814	842	854	856	838	844	786	842
CARBON BLACK CONTENT (%) ASTM D 1603	2.37	2.55	2.62	2.61	2.60	2.45	2.57	2.48	2.62	2.68
CARBON BLACK DISPERSION(2) ASTM D 3015	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1

(1) MD/TD corresponds to Machine Direction / Transverse Direction.
(2) Carbon black dispersion was tested according to ASTM D3015 and reported according to the ASTM D2663 dispersion classification chart.

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SUMMARY OF GEOMEMBRANE CONFORMANCE TEST RESULTS

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COOPERATIVE POWER
PONDS 91 & 93
NORTH DAKOTA

ROLL DESIGNATION	0874	0876	0883	0888	0893	0896	0899	0902	0903	–
THICKNESS (mils) ASTM D 374	42.1	42.9	43.3	43.4	44.0	43.3	43.8	42.2	42.9	–
SPECIFIC GRAVITY ASTM D 1505	0.951	0.951	0.951	0.950	0.950	0.951	0.951	0.951	0.951	–
STRENGTH AT YIELD (ppi)	106.6	109.1	108.5	109.0	114.0	112.5	112.9	109.4	110.8	–
MD/TD (1) ASTM D 638	111.8	115.3	113.7	116.9	121.0	114.8	117.0	115.6	116.3	–
STRENGTH AT BREAK (ppi)	202.7	191.6	207.1	214.6	224.7	212.6	211.7	215.5	209.7	–
MD/TD (1) ASTM D 638	216.2	210.4	224.9	213.8	222.6	217.8	233.1	208.2	216.7	–
ELONGATION AT YIELD (%)	26.6	27.5	20.3	19.7	20.5	20.0	20.3	22.5	21.7	–
MD/TD (1) ASTM D 638	26.3	22.5	18.7	18.1	19.6	19.6	19.4	20.3	19.2	–
ELONGATION AT BREAK (%)	808	762	862	832	836	844	820	830	828	–
MD/TD (1) ASTM D 638	840	842	886	838	820	846	860	836	852	–
CARBON BLACK CONTENT (%) ASTM D 1603	2.44	2.46	2.43	2.46	2.32	2.41	2.49	2.51	2.54	–
CARBON BLACK DISPERSION(2) ASTM D 3015	A1	A1	A1	A1	A1	A1	A1	A1	A1	–

(1) MD/TD corresponds to Machine Direction / Transverse Direction.

(2) Carbon black dispersion was tested according to ASTM D3015 and reported according to the ASTM D2663 dispersion classification chart.

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0661

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	46.3	0.950	2.57	A1
2.	46.2	0.950	2.53	A1
3.	43.6	0.950		A1
4.	43.0			A1
5.	49.1			A1
6.	42.4			A1
7.	46.8			
8.	46.1			
9.	49.8			
10.	52.5			
AVG	46.6	0.950	2.55	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	116.2	117.6	19.2	18.5	214.2	232.8	790	870
2.	109.2	110.0	21.5	19.2	180.2	220.8	720	840
3.	115.6	125.6	21.5	18.5	218.6	246.0	800	890
4.	124.0	120.2	21.5	19.2	233.8	234.0	820	880
5.	119.0	130.8	21.5	18.5	223.6	262.6	780	910
AVG	116.8	120.8	21.0	18.8	214.1	239.2	782	878

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0665

	THICKNESS (mils)		SPECIFIC GRAVITY		CARBON BLACK CONTENT (%)		CARBON BLACK DISPERSION (rating)
1.	43.0	1.	0.951	1.	2.51	1.	A1
2.	45.9	2.	0.950	2.	2.69	2.	A1
3.	43.7	3.	0.950			3.	A1
4.	44.2					4.	A1
5.	42.8					5.	A1
6.	44.3					6.	A1
7.	45.8						
8.	45.3						
9.	43.6						
10.	43.4						
AVG	44.2		0.950		2.60		A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	115.9	121.6	22.5	19.8	223.4	237.6	830	830
2.	113.6	117.5	22.2	19.6	223.4	254.9	830	880
3.	116.6	118.0	22.5	19.1	237.3	187.3	860	750
4.	116.2	122.7	22.3	20.5	240.5	230.3	850	820
5.	109.5	116.2	20.1	20.5	217.2	233.8	860	860
AVG	114.4	119.2	21.9	19.9	228.4	228.8	846	828

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0670

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	45.0	0.951	2.58	A1
2.	48.1	0.951	2.60	A1
3.	49.2	0.951		A1
4.	44.4			A1
5.	44.7			A1
6.	47.2			A1
7.	46.2			
8.	44.0			
9.	43.8			
10.	45.0			
AVG	45.8	0.951	2.59	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	101.2	108.2	21.5	20.0	225.0	246.2	870	920
2.	107.6	115.6	21.5	17.7	234.4	212.0	830	790
3.	105.2	109.4	20.8	18.5	222.6	233.4	850	820
4.	109.0	118.6	20.0	17.7	231.2	260.4	900	830
5.	97.2	102.8	20.8	20.0	219.8	226.2	880	830
AVG	104.0	110.9	20.9	18.8	226.6	235.6	866	838

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0674

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	48.3	0.948	2.46	A1
2.	46.5	0.949	2.41	A1
3.	48.4	0.948		A1
4.	48.1			A1
5.	44.7			A1
6.	45.0			A1
7.	46.5			
8.	47.0			
9.	45.7			
10.	46.5			
AVG	46.7	0.948	2.44	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	116.0	126.9	22.8	18.5	234.4	232.5	860	780
2.	121.2	127.2	20.8	19.0	241.3	257.6	850	840
3.	113.3	120.7	22.3	18.7	228.3	238.3	850	830
4.	121.4	122.8	21.8	18.6	238.0	252.9	840	830
5.	116.1	120.7	22.5	20.1	230.6	238.1	840	810
AVG	117.6	123.7	22.0	19.0	234.5	243.9	848	818

March 1992 927-4003

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0683

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	46.7	0.950	2.48	A1
2.	47.8	0.950	2.33	A1
3.	45.5	0.950		A1
4.	46.1			A1
5.	47.1			A1
6.	44.5			A1
7.	43.7			
8.	44.9			
9.	48.2			
10.	48.0			
AVG	46.3	0.950	2.41	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	117.8	119.8	20.0	19.2	219.8	246.6	830	840
2.	114.2	116.4	17.7	17.7	240.2	252.4	830	850
3.	114.2	116.4	21.5	20.0	256.4	251.4	900	850
4.	110.0	114.0	20.0	18.5	228.6	240.4	720	830
5.	120.2	123.0	20.0	18.5	229.8	268.6	820	870
AVG	115.3	117.9	19.8	18.8	235.0	251.9	820	848

March 1992 927-4003

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0688

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	47.4	0.950	2.32	A1
2.	45.8	0.950	2.35	A1
3.	49.0	0.949		A1
4.	47.5			A1
5.	50.3			A1
6.	48.9			A1
7.	45.9			
8.	46.4			
9.	46.2			
10.	46.3			
AVG	47.4	0.950	2.34	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	123.1	127.8	22.8	20.1	201.6	168.7	770	700
2.	125.8	133.6	21.0	19.6	209.5	254.5	770	850
3.	129.7	133.0	22.0	20.1	261.9	265.2	860	860
4.	124.7	126.9	22.9	19.2	245.7	227.4	850	810
5.	124.1	122:8	22.0	21.3	206.8	255.7	790	880
AVG	125.5	128.8	22.1	20.1	225.1	234.3	808	820

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March 1992 927-4003

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: ~~6693~~ 0693

	THICKNESS (mils)		SPECIFIC GRAVITY		CARBON BLACK CONTENT (%)		CARBON BLACK DISPERSION (rating)
1.	41.9	1.	0.950	1.	2.54	1.	A1
2.	42.5	2.	0.950	2.	2.56	2.	A1
3.	42.0	3.	0.950			3.	A1
4.	41.3					4.	A1
5.	44.9					5.	A1
6.	43.9					6.	A1
7.	43.9						
8.	42.3						
9.	42.2						
10.	41.8						
AVG	42.7		0.950		2.55		A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	106.8	110.8	16.9	17.7	209.8	210.0	660	890
2.	103.4	108.2	22.3	17.7	214.6	223.6	860	920
3.	93.0	114.6	17.7	17.7	219.4	196.2	860	800
4.	102.8	117.0	21.5	18.5	181.8	198.2	780	840
5.	103.2	110.8	20.8	17.7	181.6	221.4	780	910
AVG	101.8	112.3	19.8	17.9	201.4	209.9	788	872

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0697

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	46.2	0.950	2.56	A1
2.	45.6	0.950	2.54	A1
3.	41.5	0.950		A1
4.	42.8			A1
5.	44.4			A1
6.	44.1			A1
7.	46.0			
8.	45.7			
9.	43.4			
10.	44.2			
AVG	44.4	0.950	2.55	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	124.0	124.8	20.0	16.9	222.8	260.0	800	890
2.	115.4	114.4	20.0	17.7	200.0	184.0	780	770
3.	119.4	124.0	20.0	18.5	211.4	238.6	800	850
4.	123.4	127.4	20.0	17.7	236.6	243.2	870	890
5.	113.0	121.4	23.1	18.5	218.2	224.4	820	800
AVG	119.0	122.4	20.6	17.9	217.8	230.0	814	840

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0717

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	41.4	0.949	2.29	A1
2.	43.3	0.949	2.32	A1
3.	45.3	0.950		A1
4.	45.2			A1
5.	42.0			A1
6.	42.4			A1
7.	42.1			
8.	41.9			
9.	45.9			
10.	44.0			
AVG	43.4	0.949	2.31	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	107.7	114.5	21.5	19.2	204.4	219.9	840	860
2.	114.2	121.7	19.9	18.9	188.4	227.8	770	850
3.	107.7	115.6	22.5	18.2	207.0	214.1	830	860
4.	123.4	116.1	28.0	19.5	203.4	176.3	820	770
5.	112.1	120.4	22.4	19.5	209.4	225.5	830	840
AVG	113.0	117.7	22.9	19.1	202.5	212.7	818	836

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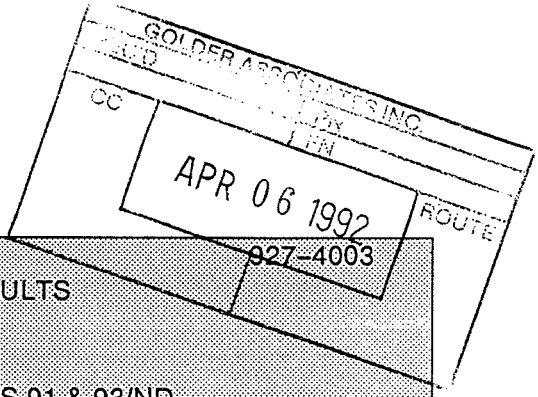
GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0721

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	43.7	0.950	2.38	A1
2.	42.5	0.950	2.38	A1
3.	42.5	0.950		A1
4.	47.4			A1
5.	42.0			A1
6.	42.9			A1
7.	41.8			
8.	42.6			
9.	44.2			
10.	43.1			
AVG	43.3	0.950	2.38	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	109.2	120.6	22.3	18.6	185.4	201.4	760	800
2.	108.0	129.3	21.0	17.9	215.5	257.7	830	880
3.	107.9	117.6	21.7	19.6	204.2	214.6	840	820
4.	107.0	114.9	21.1	19.6	207.9	202.1	820	820
5.	112.2	120.9	22.5	19.2	216.0	225.6	840	840
AVG	108.9	120.7	21.7	19.0	205.8	220.3	818	832



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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0722

	THICKNESS (mils)		SPECIFIC GRAVITY		CARBON BLACK CONTENT (%)		CARBON BLACK DISPERSION (rating)
1.	43.2	1.	0.951	1.	2.48	1.	A1
2.	44.5	2.	0.952	2.	2.45	2.	A1
3.	43.3	3.	0.952			3.	A1
4.	43.4					4.	A1
5.	42.6					5.	A1
6.	43.6					6.	A1
7.	43.7						
8.	41.7						
9.	44.6						
10.	43.5						
AVG	43.4		0.952		2.47		A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	110.2	119.4	23.1	20.8	190.0	223.2	750	860
2.	107.2	117.0	20.8	20.0	212.8	239.4	880	920
3.	107.0	118.6	20.0	17.7	226.0	189.2	830	770
4.	109.8	120.4	19.2	18.5	189.0	224.6	740	860
5.	111.0	119.6	21.5	16.2	228.6	236.4	850	870
AVG	109.0	119.0	20.9	18.6	209.3	222.6	810	856

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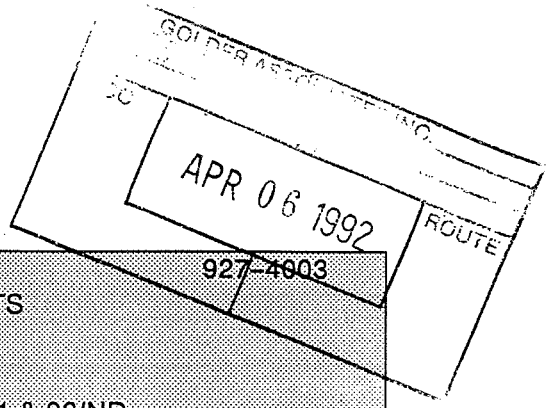
GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0729

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	45.1	0.950	2.46	A1
2.	43.6	0.950	2.49	A1
3.	41.8	0.950		A1
4.	40.5			A1
5.	43.6			A1
6.	42.6			A1
7.	42.2			
8.	42.3			
9.	46.4			
10.	46.5			
AVG	43.5	0.950	2.48	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	119.7	125.3	21.4	19.4	214.4	237.8	800	860
2.	114.2	116.8	21.9	18.7	205.4	159.8	840	740
3.	116.9	118.6	21.9	19.3	216.9	230.6	820	850
4.	111.6	119.5	21.4	19.1	222.1	210.8	840	810
5.	128.1	134.4	21.8	19.6	235.9	241.2	800	840
AVG	118.1	122.9	21.7	19.2	218.9	216.0	820	820



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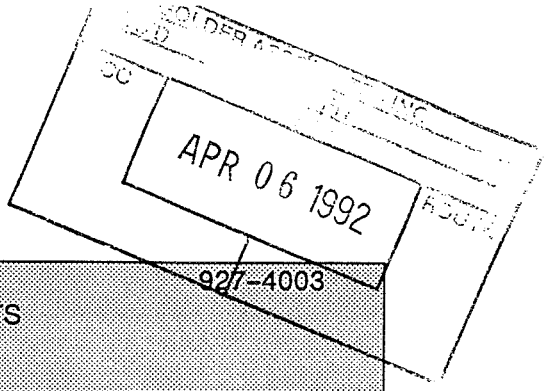
GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0742

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	42.5	0.952	2.40	A1
2.	44.0	0.952	2.36	A1
3.	43.5	0.952		A1
4.	44.7			A1
5.	43.4			A1
6.	42.3			A1
7.	43.1			
8.	42.2			
9.	45.6			
10.	45.5			
AVG	43.7	0.952	2.38	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	109.0	114.7	21.5	19.0	213.2	217.0	840	890
2.	109.4	116.5	20.8	17.9	217.1	222.4	820	950
3.	110.7	120.2	22.1	19.7	221.2	219.9	820	890
4.	110.8	117.0	22.7	19.2	203.0	222.3	840	840
5.	117.0	124.9	21.4	19.4	232.8	212.9	840	810
AVG	111.4	118.7	21.7	19.0	217.5	218.9	832	876



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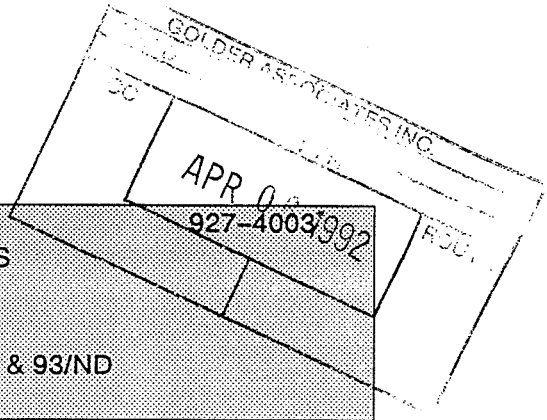
GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0747

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	45.3	0.950	2.38	A1
2.	45.6	0.950	2.44	A1
3.	45.3	0.950		A1
4.	44.1			A1
5.	42.3			A1
6.	44.6			A1
7.	47.4			
8.	44.7			
9.	43.0			
10.	41.7			
AVG	44.4	0.950	2.41	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	116.6	122.8	20.0	19.2	227.0	242.6	850	870
2.	114.2	121.6	20.8	18.5	241.8	254.2	880	880
3.	107.4	112.2	22.3	20.0	220.0	229.6	830	850
4.	120.0	128.2	20.0	18.5	229.0	232.0	820	820
5.	106.8	114.2	20.8	20.8	185.2	211.0	780	830
AVG	113.0	119.8	20.8	19.4	220.6	233.9	832	850



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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0756

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	47.9	0.951	2.43	A1
2.	45.3	0.950	2.45	A1
3.	41.0	0.950		A1
4.	42.0			A1
5.	40.2			A1
6.	42.1			A1
7.	49.1			
8.	42.8			
9.	46.1			
10.	44.2			
AVG	44.1	0.950	2.44	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	117.5	128.3	21.6	19.0	218.1	234.5	790	840
2.	104.4	109.3	21.7	19.7	191.6	186.2	790	780
3.	98.7	107.2	22.5	20.7	205.3	217.9	830	860
4.	118.6	128.3	21.4	19.3	206.8	254.6	780	860
5.	114.4	125.3	22.2	19.4	180.4	252.4	740	870
AVG	110.7	119.7	21.9	19.6	200.4	229.1	786	842

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0761

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	45.4	0.949	2.42	A1
2.	44.8	0.950	2.38	A1
3.	44.4	0.950		A1
4.	43.7			A1
5.	43.1			A1
6.	44.4			A1
7.	43.3			
8.	42.0			
9.	42.5			
10.	41.0			
AVG	43.5	0.950	2.40	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	110.4	116.8	20.0	19.2	223.4	218.0	810	820
2.	108.4	119.6	20.0	19.2	217.2	233.0	820	830
3.	108.8	115.2	21.5	19.2	220.8	238.0	820	860
4.	105.2	113.0	21.5	18.5	216.6	245.6	830	880
5.	105.0	112.8	23.1	18.5	192.2	243.4	780	880
AVG	107.6	115.5	21.2	18.9	214.0	235.6	812	854

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0765

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	46.1	0.949	2.55	A1
2.	45.9	0.950	2.55	A1
3.	42.7	0.950		A1
4.	44.2			A1
5.	42.4			A1
6.	47.4			A1
7.	44.8			
8.	46.2			
9.	43.3			
10.	43.8			
AVG	44.7	0.950	2.55	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	114.2	123.1	20.6	19.6	223.2	199.1	830	790
2.	107.0	110.9	21.2	19.7	219.8	215.5	860	850
3.	109.0	118.1	21.8	19.9	227.6	237.0	840	890
4.	110.6	117.3	21.0	19.5	220.4	174.9	830	740
5.	107.2	116.9	22.2	20.2	207.5	228.1	810	880
AVG	109.6	117.3	21.4	19.8	219.7	210.9	834	830

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0771

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	40.8	0.949	2.57	A1
2.	41.3	0.950	2.56	A1
3.	44.1	0.950		A1
4.	43.1			A1
5.	45.5			A1
6.	45.4			A1
7.	41.7			
8.	43.5			
9.	41.9			
10.	42.9			
AVG	43.0	0.950	2.57	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	101.4	107.7	23.1	18.8	202.6	199.4	830	820
2.	110.4	116.9	21.5	19.9	225.0	217.1	820	840
3.	120.8	118.4	22.3	18.1	233.6	230.8	830	850
4.	109.0	122.0	22.3	19.8	205.2	218.8	780	820
5.	111.2	119.3	23.9	18.6	218.8	229.4	820	840
AVG	110.6	116.9	22.6	19.0	217.0	219.1	816	834

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0774

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	42.7	0.949	2.35	A1
2.	41.6	0.949	2.36	A1
3.	43.3	0.949		A1
4.	42.4			A1
5.	41.7			A1
6.	43.2			A1
7.	42.1			
8.	49.0			
9.	45.4			
10.	47.5			
AVG	43.9	0.949	2.36	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	108.7	113.8	23.2	20.7	205.0	218.8	810	840
2.	107.1	115.2	22.5	19.9	208.1	203.9	820	820
3.	105.7	109.4	21.0	18.7	211.1	224.3	840	850
4.	102.8	106.0	22.8	20.2	188.1	209.9	810	860
5.	114.6	117.9	22.2	19.5	215.4	200.6	820	800
AVG	107.8	112.5	22.3	19.8	205.5	211.5	820	834

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0783

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	41.8	0.949	2.33	A1
2.	43.5	0.949	2.39	A1
3.	42.2	0.949		A1
4.	42.4			A1
5.	44.8			A1
6.	43.7			A1
7.	44.9			
8.	42.6			
9.	43.6			
10.	43.8			
AVG	43.3	0.949	2.36	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	106.2	112.0	19.2	17.7	203.8	217.4	820	870
2.	120.4	115.8	20.0	18.5	252.4	209.4	860	800
3.	116.0	118.6	22.3	17.7	237.2	215.8	880	820
4.	109.0	111.6	22.3	17.7	197.6	129.6	810	660
5.	108.0	112.8	20.0	17.7	211.6	215.2	830	840
AVG	111.9	114.2	20.8	17.9	220.5	197.5	840	798

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0787

	THICKNESS (mils)		SPECIFIC GRAVITY		CARBON BLACK CONTENT (%)		CARBON BLACK DISPERSION (rating)
1.	43.7	1.	0.949	1.	2.24	1.	A1
2.	43.3	2.	0.949	2.	2.19	2.	A1
3.	44.0	3.	0.950			3.	A1
4.	44.1					4.	A1
5.	43.1					5.	A1
6.	44.1					6.	A1
7.	43.0						
8.	43.7						
9.	42.1						
10.	42.2						
AVG	43.3		0.949		2.22		A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	118.0	113.4	21.2	19.5	237.3	230.3	850	870
2.	109.3	116.9	21.6	20.1	223.6	232.2	850	880
3.	105.9	110.1	22.5	19.3	203.6	234.8	810	900
4.	110.8	110.9	20.7	19.4	235.7	203.3	880	810
5.	102.0	104.8	22.9	19.1	175.9	210.9	770	860
AVG	109.2	111.2	21.8	19.5	215.2	222.3	832	864

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0790

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	42.4	0.949	2.41	A1
2.	42.5	0.949	2.46	A1
3.	42.2	0.949		A1
4.	42.5			A1
5.	45.3			A1
6.	45.7			A1
7.	42.7			
8.	43.6			
9.	44.6			
10.	45.4			
AVG	43.7	0.949	2.44	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	101.0	100.4	20.8	22.3	210.6	222.8	800	880
2.	100.6	101.2	26.2	21.5	204.4	214.6	710	860
3.	102.6	109.4	24.6	20.0	206.4	238.2	800	890
4.	102.8	105.4	27.7	22.3	198.8	235.6	780	870
5.	102.6	114.4	22.3	20.0	190.8	253.4	780	860
AVG	101.9	106.2	24.3	21.2	202.2	232.9	774	872

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0795

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	43.9	0.950	2.44	A1
2.	44.4	0.950	2.44	A1
3.	41.3	0.950		A1
4.	41.6			A1
5.	44.9			A1
6.	44.4			A1
7.	42.3			
8.	41.7			
9.	42.5			
10.	42.8			
AVG	43.0	0.950	2.44	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	108.8	118.2	24.5	17.8	231.7	251.9	860	900
2.	102.1	109.6	22.5	19.1	179.6	226.7	770	870
3.	108.9	119.2	23.2	19.8	217.4	248.3	840	890
4.	106.6	110.6	23.2	19.2	187.2	231.5	760	890
5.	104.5	113.8	24.4	20.3	212.7	241.1	860	890
AVG	106.2	114.3	23.6	19.2	205.7	239.9	818	888

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0800

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	42.2	0.950	2.45	A1
2.	41.9	0.950	2.38	A1
3.	43.2	0.950		A1
4.	43.2			A1
5.	41.3			A1
6.	42.5			A1
7.	44.8			
8.	43.8			
9.	41.7			
10.	41.7			
AVG	42.6	0.950	2.42	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	96.8	101.6	26.9	21.5	175.2	235.4	790	910
2.	102.2	108.8	31.5	19.2	209.8	238.0	800	880
3.	97.2	110.0	25.4	20.0	198.6	249.2	820	920
4.	102.0	113.8	26.9	23.1	216.2	233.6	820	850
5.	97.8	109.2	23.1	21.5	195.4	229.8	790	870
AVG	99.2	108.7	26.8	21.1	199.0	237.2	804	886

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0802

	THICKNESS (mils)		SPECIFIC GRAVITY		CARBON BLACK CONTENT (%)		CARBON BLACK DISPERSION (rating)
1.	41.2	1.	0.951	1.	2.57	1.	A1
2.	43.3	2.	0.951	2.	2.53	2.	A1
3.	43.5	3.	0.951			3.	A1
4.	45.0					4.	A1
5.	41.9					5.	A1
6.	42.0					6.	A1
7.	46.3						
8.	49.2						
9.	43.0						
10.	43.6						
AVG	43.9		0.951		2.55		A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	107.0	117.2	22.3	18.5	164.4	211.2	690	860
2.	106.6	114.8	22.3	17.7	184.0	219.4	710	830
3.	99.2	109.4	20.8	17.7	210.2	199.4	830	820
4.	109.6	120.0	20.8	17.7	220.2	242.4	790	860
5.	108.4	116.2	21.5	18.5	184.4	235.4	720	900
AVG	106.2	115.5	21.5	18.0	192.6	221.6	748	854

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0814

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	43.3	0.950	2.45	A1
2.	44.0	0.950	2.62	A1
3.	44.0	0.949		A1
4.	44.8			A1
5.	45.5			A1
6.	45.9			A1
7.	44.6			
8.	44.1			
9.	44.6			
10.	45.8			
AVG	44.7	0.950	2.54	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	107.2	114.4	20.8	17.7	225.0	238.4	880	860
2.	108.2	114.0	20.8	16.9	221.8	233.2	830	850
3.	114.0	120.0	20.0	17.7	252.6	243.0	870	860
4.	112.0	119.4	20.0	18.5	197.4	249.6	770	870
5.	112.0	118.2	20.8	17.7	223.4	250.6	820	860
AVG	110.7	117.2	20.5	17.7	224.0	243.0	834	860

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0816

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	41.2	0.950	2.66	A1
2.	41.6	0.950	2.52	A1
3.	41.7	0.949		A1
4.	41.8			A1
5.	42.4			A1
6.	42.0			A1
7.	45.2			
8.	43.9			
9.	42.1			
10.	43.5			
AVG	42.5	0.950	2.59	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	102.6	112.0	22.3	23.1	191.4	223.4	770	840
2.	108.6	111.2	22.3	24.6	215.4	247.2	840	880
3.	108.2	115.6	25.4	20.8	176.2	188.4	720	740
4.	115.0	122.4	23.1	30.0	203.6	244.0	790	840
5.	107.6	114.0	17.7	21.5	226.8	235.6	770	850
AVG	108.4	115.0	22.2	24.0	202.7	227.7	778	830

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0820

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	43.7	0.949	2.44	A1
2.	41.6	0.948	2.50	A1
3.	44.4	0.950		A1
4.	43.0			A1
5.	42.3			A1
6.	42.5			A1
7.	41.9			
8.	40.7			
9.	43.0			
10.	42.7			
AVG	42.6	0.949	2.47	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	105.6	115.6	28.5	27.7	201.0	250.2	770	890
2.	116.2	120.0	27.7	20.8	241.1	231.6	830	830
3.	108.2	116.6	26.9	26.9	177.8	255.6	750	890
4.	110.0	111.4	26.9	20.8	178.0	182.2	730	770
5.	105.0	113.8	27.7	22.3	211.4	203.8	820	810
AVG	109.0	115.5	27.5	23.7	201.9	224.7	780	838

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0824

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	45.4	0.951	2.40	A1
2.	46.1	0.951	2.34	A1
3.	45.7	0.951		A1
4.	43.7			A1
5.	45.7			A1
6.	40.8			A1
7.	42.3			
8.	43.6			
9.	43.3			
10.	45.3			
AVG	44.2	0.951	2.37	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	115.0	123.0	26.9	19.2	231.8	222.0	810	820
2.	110.6	117.2	24.6	24.6	195.4	248.4	730	890
3.	126.0	127.8	24.6	20.8	245.8	240.2	810	810
4.	108.2	115.0	30.0	23.1	203.2	229.2	800	840
5.	111.4	124.4	26.9	24.6	203.6	255.2	780	880
AVG	114.2	121.5	26.6	22.5	216.0	239.0	786	848

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927–4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0828

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	40.6	0.947	2.60	A1
2.	48.3	0.947	2.50	A1
3.	42.1	0.946		A1
4.	48.7			A1
5.	43.0			A1
6.	41.8			A1
7.	41.3			
8.	41.6			
9.	41.4			
10.	44.1			
AVG	43.3	0.947	2.55	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	104.2	142.6	30.8	26.2	201.0	270.8	760	850
2.	139.4	118.8	24.6	28.5	238.0	229.0	740	850
3.	108.8	119.0	26.2	35.4	196.2	234.4	740	850
4.	114.0	115.8	23.9	30.0	224.0	247.6	840	860
5.	110.4	115.0	26.9	27.7	168.6	228.6	710	830
AVG	115.4	122.2	26.5	29.6	205.6	242.1	758	848

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0833

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	42.8	0.951	2.68	A1
2.	43.4	0.951	2.55	A1
3.	42.8	0.951		A1
4.	44.2			A1
5.	45.9			A1
6.	41.6			A1
7.	43.9			
8.	43.6			
9.	42.9			
10.	43.3			
AVG	43.4	0.951	2.62	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	108.6	119.0	25.4	26.9	190.4	159.2	780	680
2.	114.2	119.0	30.0	23.9	211.2	243.2	760	860
3.	116.8	124.4	24.6	22.3	175.6	253.2	730	870
4.	110.2	119.4	27.7	33.1	224.8	217.6	830	810
5.	110.6	118.6	29.2	26.2	186.4	236.6	740	850
AVG	112.1	120.1	27.4	26.5	197.7	222.0	768	814

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0838

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	44.7	0.950	2.61	A1
2.	44.4	0.950	2.61	A1
3.	42.7	0.951		A1
4.	44.2			A1
5.	42.6			A1
6.	40.9			A1
7.	43.8			
8.	43.6			
9.	45.3			
10.	45.7			
AVG	43.8	0.950	2.61	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	115.4	121.2	30.0	25.4	240.2	248.0	830	870
2.	109.4	114.6	23.1	23.9	228.2	220.4	860	830
3.	113.8	111.4	22.3	26.2	211.6	217.6	810	830
4.	112.4	117.0	28.5	23.1	207.0	230.6	780	830
5.	116.4	122.8	26.2	25.4	209.4	246.2	780	850
AVG	113.5	117.4	26.0	24.8	219.3	232.6	812	842

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0840

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	41.3	0.950	2.67	A1
2.	44.0	0.950	2.52	A1
3.	43.0	0.950		A1
4.	42.4			A1
5.	41.0			A1
6.	41.7			A1
7.	43.8			
8.	43.0			
9.	45.0			
10.	45.0			
AVG	43.0	0.950	2.60	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	106.0	116.0	31.5	25.4	221.2	187.8	840	760
2.	112.0	124.0	33.1	16.9	204.2	242.2	770	880
3.	104.8	112.2	24.6	18.5	213.6	226.2	830	910
4.	112.8	117.4	22.3	17.7	213.6	258.0	820	900
5.	126.8	122.4	26.2	16.9	183.8	210.2	710	820
AVG	112.5	118.4	27.5	19.1	207.3	224.9	794	854

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0850

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	44.8	0.951	2.45	A1
2.	43.5	0.951	2.44	A1
3.	43.6	0.951		A1
4.	43.2			A1
5.	42.2			A1
6.	43.0			A1
7.	42.8			
8.	41.6			
9.	44.8			
10.	43.9			
AVG	43.3	0.951	2.45	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	109.4	117.6	23.1	23.9	233.8	238.2	860	850
2.	109.8	115.2	22.3	31.5	224.8	235.2	830	850
3.	108.0	111.4	27.7	24.6	223.2	224.6	880	850
4.	112.0	111.0	22.3	21.5	234.6	229.2	870	870
5.	114.2	117.4	29.2	29.2	227.2	242.8	820	860
AVG	110.7	114.5	24.9	26.1	228.7	234.0	852	856

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0860

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	42.1	0.951	2.58	A1
2.	42.3	0.951	2.56	A1
3.	44.5	0.951		A1
4.	43.4			A1
5.	41.8			A1
6.	42.4			A1
7.	44.5			
8.	40.6			
9.	41.5			
10.	42.2			
AVG	42.5	0.951	2.57	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	103.2	114.2	32.3	28.5	202.6	216.6	800	850
2.	109.4	114.6	28.5	23.9	206.8	172.8	780	770
3.	105.2	113.4	27.7	26.9	217.0	208.2	840	870
4.	111.2	119.6	26.2	27.7	206.0	248.0	810	880
5.	104.2	115.2	32.3	26.9	217.4	211.6	840	820
AVG	106.6	115.4	29.4	26.8	210.0	211.4	814	838

April 1992 927-4003

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0862

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	42.4	0.951	2.44	A1
2.	41.6	0.951	2.52	A1
3.	42.5	0.950		A1
4.	41.7			A1
5.	42.0			A1
6.	41.3			A1
7.	42.0			
8.	41.1			
9.	41.3			
10.	42.5			
AVG	41.8	0.951	2.48	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	108.2	116.0	26.2	30.0	202.0	219.8	780	870
2.	109.2	118.4	31.5	25.4	170.8	238.0	710	910
3.	110.6	116.4	21.5	27.7	200.0	172.8	840	740
4.	105.4	113.2	26.9	22.3	206.0	231.8	790	910
5.	106.0	112.8	28.5	24.6	217.6	185.6	870	790
AVG	107.9	115.4	26.9	26.0	199.3	209.6	798	844

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0874

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	42.9	0.951	2.46	A1
2.	42.5	0.951	2.42	A1
3.	40.3	0.951		A1
4.	40.5			A1
5.	42.2			A1
6.	42.0			A1
7.	42.5			
8.	43.7			
9.	40.8			
10.	43.8			
AVG	42.1	0.951	2.44	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	109.0	114.8	26.9	25.4	207.2	211.4	820	820
2.	104.2	106.0	22.3	26.9	185.8	194.4	790	800
3.	108.2	113.2	23.1	29.2	210.6	208.4	830	830
4.	108.0	115.2	29.2	26.9	194.2	244.2	780	890
5.	103.6	109.8	31.5	23.1	215.6	222.4	820	860
AVG	106.6	111.8	26.6	26.3	202.7	216.2	808	840

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0876

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	42.6	0.951	2.46	A1
2.	45.0	0.951	2.45	A1
3.	42.0	0.951		A1
4.	42.3			A1
5.	42.2			A1
6.	42.6			A1
7.	41.5			
8.	43.3			
9.	43.3			
10.	44.0			
AVG	42.9	0.951	2.46	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	112.8	117.6	22.3	25.4	180.2	224.4	740	850
2.	110.0	116.0	21.5	26.2	190.4	219.2	770	860
3.	107.0	112.4	30.0	25.3	172.4	211.4	710	820
4.	105.0	112.8	33.9	17.7	201.2	176.2	800	790
5.	110.6	117.6	30.0	17.7	213.6	221.0	790	890
AVG	109.1	115.3	27.5	22.5	191.6	210.4	762	842

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0883

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	41.4	0.951	2.44	A1
2.	42.3	0.951	2.42	A1
3.	43.0	0.951		A1
4.	44.5			A1
5.	42.8			A1
6.	45.3			A1
7.	42.7			
8.	43.8			
9.	43.0			
10.	44.2			
AVG	43.3	0.951	2.43	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	105.6	112.0	17.7	18.5	183.6	189.4	800	810
2.	110.6	114.6	20.7	19.3	225.0	257.0	850	950
3.	109.6	113.2	20.7	18.5	210.0	206.0	860	860
4.	107.6	115.4	22.3	18.5	219.4	234.6	950	920
5.	109.2	113.4	20.0	18.5	197.4	237.6	850	890
AVG	108.5	113.7	20.3	18.7	207.1	224.9	862	886

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0888

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	42.2	0.950	2.46	A1
2.	43.8	0.950	2.45	A1
3.	42.1	0.950		A1
4.	41.6			A1
5.	44.3			A1
6.	45.9			A1
7.	45.4			
8.	42.8			
9.	42.2			
10.	43.7			
AVG	43.4	0.950	2.46	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	107.6	113.8	18.5	17.7	215.8	226.8	830	870
2.	106.4	109.8	20.0	16.9	207.4	180.2	850	770
3.	110.0	119.8	20.0	19.2	189.4	200.4	780	860
4.	114.2	124.8	20.0	17.7	243.0	253.4	860	870
5.	106.6	116.4	20.0	19.2	217.6	208.0	840	820
AVG	109.0	116.9	19.7	18.1	214.6	213.8	832	838

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0893

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	44.2	0.950	2.31	A1
2.	44.3	0.950	2.33	A1
3.	44.7	0.950		A1
4.	44.6			A1
5.	42.5			A1
6.	41.7			A1
7.	43.7			
8.	45.0			
9.	46.8			
10.	42.1			
AVG	44.0	0.950	2.32	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	112.0	121.8	20.0	18.5	231.0	222.6	840	840
2.	112.0	120.8	21.5	20.8	231.6	236.4	840	860
3.	110.6	114.6	20.0	21.5	226.4	170.0	860	730
4.	115.0	121.8	20.8	18.5	221.8	240.4	830	800
5.	120.4	125.8	20.0	18.5	212.8	243.6	810	870
AVG	114.0	121.0	20.5	19.6	224.7	222.6	836	820

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0896

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	45.9	0.951	2.41	A1
2.	45.7	0.951	2.41	A1
3.	41.5	0.951		A1
4.	41.2			A1
5.	41.7			A1
6.	42.1			A1
7.	44.7			
8.	44.0			
9.	43.1			
10.	42.8			
AVG	43.3	0.951	2.41	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	117.0	123.8	19.2	24.6	202.8	255.0	830	880
2.	107.2	108.8	20.0	18.5	211.8	223.4	850	870
3.	110.6	111.2	19.2	18.5	218.2	203.0	870	820
4.	112.4	113.4	20.0	17.7	226.4	204.0	860	850
5.	115.4	117.0	21.5	18.5	203.8	203.6	810	810
AVG	112.5	114.8	20.0	19.6	212.6	217.8	844	846

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927–4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0899

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	43.9	0.951	2.48	A1
2.	44.3	0.951	2.50	A1
3.	43.5	0.951		A1
4.	44.0			A1
5.	41.5			A1
6.	44.2			A1
7.	43.6			
8.	42.9			
9.	44.8			
10.	45.2			
AVG	43.8	0.951	2.49	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	115.6	120.2	20.0	19.2	201.1	242.6	780	870
2.	115.2	116.4	20.0	19.2	225.0	244.9	890	880
3.	107.4	110.6	20.7	19.2	160.0	223.2	710	850
4.	113.4	117.8	20.7	20.0	237.2	221.8	870	850
5.	112.8	120.2	20.0	19.2	235.4	233.0	850	850
AVG	112.9	117.0	20.3	19.4	211.7	233.1	820	860

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0902

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	41.4	0.951	2.50	A1
2.	42.0	0.951	2.52	A1
3.	44.5	0.951		A1
4.	43.0			A1
5.	41.1			A1
6.	40.5			A1
7.	41.3			
8.	42.2			
9.	43.1			
10.	42.4			
AVG	42.2	0.951	2.51	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	109.1	113.9	20.8	22.3	206.3	204.9	820	840
2.	116.4	121.9	22.3	20.0	224.8	198.1	820	790
3.	106.3	112.8	23.1	20.0	218.5	208.6	850	850
4.	106.3	115.8	22.3	20.0	206.0	219.0	810	860
5.	108.7	113.6	23.8	19.2	221.8	210.4	850	840
AVG	109.4	115.6	22.5	20.3	215.5	208.2	830	836

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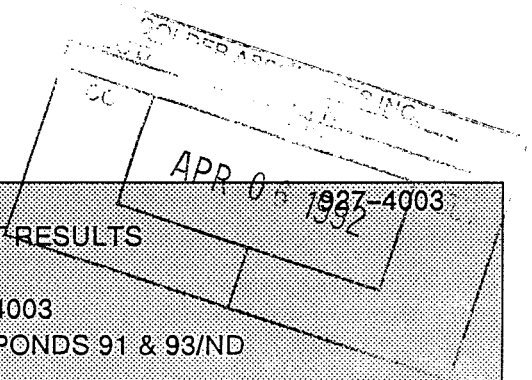
GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0903

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	42.0	0.951	2.53	A1
2.	42.0	0.951	2.55	A1
3.	41.1	0.951		A1
4.	42.3			A1
5.	44.8			A1
6.	40.4			A1
7.	44.6			
8.	43.7			
9.	45.7			
10.	42.7			
AVG	42.9	0.951	2.54	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	110.6	113.0	22.5	17.6	198.6	229.4	830	870
2.	106.5	110.4	22.1	18.2	218.3	220.8	850	880
3.	111.2	121.0	22.6	20.4	211.1	222.6	850	860
4.	114.9	120.5	20.9	19.5	230.4	210.0	830	810
5.	110.6	116.8	20.5	20.2	190.1	200.8	780	840
AVG	110.8	116.3	21.7	19.2	209.7	216.7	828	852



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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6821

	THICKNESS (mils)		SPECIFIC GRAVITY		CARBON BLACK CONTENT (%)		CARBON BLACK DISPERSION (rating)
1.	44.6	1.	0.950	1.	2.42	1.	A1
2.	45.5	2.	0.950	2.	2.45	2.	A1
3.	45.6	3.	0.950			3.	A1
4.	45.4					4.	A1
5.	42.1					5.	A1
6.	49.3					6.	A1
7.	44.0						
8.	45.7						
9.	45.7						
10.	47.7						
AVG	45.6		0.950		2.44		A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	111.4	113.2	21.5	20.0	178.2	203.0	740	800
2.	105.2	112.2	18.5	17.7	180.4	221.8	720	850
3.	112.2	114.6	21.5	20.8	168.2	225.2	690	840
4.	119.0	110.2	23.1	20.0	169.8	186.4	670	790
5.	122.8	121.8	23.9	19.2	177.2	238.0	690	860
AVG	114.1	114.4	21.7	19.5	174.8	214.9	702	828

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6829

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	47.6	0.949	2.49	A1
2.	48.2	0.949	2.41	A1
3.	44.1	0.949		A1
4.	45.0			A1
5.	44.9			A1
6.	44.6			A1
7.	48.1			
8.	49.0			
9.	45.4			
10.	44.4			
AVG	46.1	0.949	2.45	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	101.0	118.6	22.3	20.0	185.0	205.8	750	770
2.	97.0	110.4	23.1	19.8	189.6	228.1	760	860
3.	95.8	110.6	22.3	19.5	195.0	228.6	780	860
4.	102.0	118.2	21.5	19.2	216.4	208.6	820	780
5.	107.0	109.8	21.5	20.6	176.6	194.6	740	770
AVG	100.6	113.5	22.1	19.8	192.5	213.1	770	808

March 1992 927-4003

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6833

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	44.3	0.949	2.56	A1
2.	44.2	0.949	2.57	A1
3.	44.7	0.949		A1
4.	44.5			A1
5.	44.1			A1
6.	45.9			A1
7.	44.5			
8.	44.2			
9.	44.3			
10.	44.7			
AVG	44.5	0.949	2.57	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	111.6	112.8	20.0	19.2	202.4	228.8	780	850
2.	115.8	114.4	20.0	18.5	234.0	227.4	840	840
3.	110.4	106.8	20.8	19.2	197.8	218.2	750	800
4.	110.6	109.6	20.0	14.6	163.8	229.6	690	740
5.	105.8	107.8	20.0	18.5	164.6	216.8	680	760
AVG	110.8	110.3	20.2	18.0	192.5	224.2	748	798

March 1992 927-4003

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6838

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	47.7	0.950	2.76	A1
2.	47.3	0.950	2.74	A1
3.	46.1	0.950		A1
4.	46.5			A1
5.	49.2			A1
6.	49.5			A1
7.	46.0			
8.	47.4			
9.	47.1			
10.	46.3			
AVG	47.3	0.950	2.75	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	117.0	127.2	22.0	18.4	209.7	248.8	800	850
2.	114.4	121.9	22.2	19.9	222.3	245.9	810	870
3.	117.8	121.2	21.4	18.9	224.3	247.4	800	880
4.	120.0	123.4	21.8	19.9	214.9	212.7	780	780
5.	111.2	113.4	21.0	19.1	195.6	231.7	820	840
AVG	116.1	121.4	21.7	19.2	213.4	237.3	802	844

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6842

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	45.2	0.947	2.47	A1
2.	44.9	0.947	2.48	A1
3.	44.1	0.947		A1
4.	45.3			A1
5.	46.4			A1
6.	44.5			A1
7.	46.2			
8.	45.2			
9.	44.2			
10.	43.9			
AVG	45.0	0.947	2.48	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	106.8	115.6	20.0	19.9	185.8	219.5	770	840
2.	108.6	114.8	20.0	19.4	222.2	177.3	830	740
3.	108.4	118.4	19.2	23.1	237.6	234.7	840	860
4.	105.2	115.8	20.0	19.7	198.0	223.8	840	820
5.	108.2	113.3	19.2	19.2	229.4	226.6	860	850
AVG	107.4	115.6	19.7	20.3	214.6	216.4	828	822

March 1992 927-4003

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6846

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	45.0	0.949	2.51	A1
2.	46.2	0.949	2.44	A1
3.	46.5	0.948		A1
4.	46.2			A1
5.	44.9			A1
6.	44.2			A1
7.	44.2			
8.	45.0			
9.	43.7			
10.	45.0			
AVG	45.1	0.949	2.48	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	107.0	109.0	20.8	19.2	226.6	196.0	810	770
2.	107.8	108.6	20.0	19.2	230.4	226.0	840	820
3.	103.0	104.4	20.0	19.2	211.4	219.6	810	830
4.	101.2	104.8	22.3	18.5	176.6	190.8	740	780
5.	105.2	106.2	21.5	18.5	205.0	210.4	770	800
AVG	104.8	106.6	20.9	18.9	210.0	208.6	794	800

March 1992 927-4003

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6852

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	41.7	0.947	2.26	A1
2.	41.8	0.946	2.29	A1
3.	47.2	0.946		A1
4.	47.7			A1
5.	45.6			A1
6.	45.2			A1
7.	43.5			
8.	44.5			
9.	41.4			
10.	43.0			
AVG	44.2	0.946	2.28	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	105.7	105.7	22.8	19.4	206.0	208.1	780	830
2.	110.1	118.2	22.5	20.0	217.9	244.0	820	850
3.	106.0	111.5	22.8	19.4	201.7	229.3	790	850
4.	104.4	111.5	22.8	20.0	183.4	231.6	700	880
5.	105.7	110.6	22.8	20.1	169.8	232.7	660	890
AVG	106.4	111.5	22.7	19.8	195.8	229.1	750	860

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6859

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	47.5	0.949	2.70	A1
2.	46.4	0.949	2.67	A1
3.	45.3	0.949		A1
4.	45.5			A1
5.	47.3			A1
6.	48.5			A1
7.	46.2			
8.	45.8			
9.	46.0			
10.	45.9			
AVG	46.4	0.949	2.69	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	106.4	111.6	19.2	17.7	212.6	241.4	830	900
2.	97.6	102.6	19.2	19.2	188.0	207.6	790	840
3.	104.6	109.0	19.2	17.7	218.8	226.2	830	900
4.	98.2	106.8	20.0	17.7	208.4	217.2	850	870
5.	100.6	103.2	20.0	18.5	193.6	209.2	810	840
AVG	101.5	106.6	19.5	18.2	204.3	220.3	822	870

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6862

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	43.4	0.951	2.69	A1
2.	44.8	0.951	2.73	A1
3.	45.0	0.951		A1
4.	47.2			A1
5.	45.2			A1
6.	44.3			A1
7.	41.6			
8.	42.0			
9.	44.1			
10.	44.0			
AVG	44.2	0.951	2.71	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	107.2	110.8	21.5	20.8	204.0	211.2	760	870
2.	114.4	117.6	20.0	17.7	187.4	192.0	720	770
3.	111.0	116.2	20.8	19.2	209.8	207.0	840	830
4.	100.8	104.2	21.5	17.7	213.4	211.6	860	870
5.	110.8	111.8	18.5	20.0	217.2	222.4	710	850
AVG	108.8	112.1	20.5	19.1	206.4	208.8	778	838

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6866

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	49.5	0.949	2.64	A1
2.	47.3	0.949	2.67	A1
3.	47.8	0.949		A1
4.	44.6			A1
5.	43.3			A1
6.	44.8			A1
7.	49.2			
8.	49.1			
9.	45.1			
10.	44.8			
AVG	46.6	0.949	2.66	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	125.4	129.1	20.9	19.2	211.3	240.0	760	850
2.	115.6	123.9	20.5	18.1	193.9	187.9	720	760
3.	108.2	116.9	21.3	19.2	159.5	210.7	650	830
4.	127.4	130.7	20.1	19.1	244.6	242.2	820	840
5.	114.0	116.5	20.7	19.2	192.2	211.4	810	820
AVG	118.1	123.4	20.7	19.0	200.3	218.4	752	820

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6871

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	45.3	0.950	2.67	A1
2.	45.6	0.950	2.68	A1
3.	46.6	0.950		A1
4.	44.3			A1
5.	45.2			A1
6.	46.4			A1
7.	43.9			
8.	43.0			
9.	47.0			
10.	47.1			
AVG	45.4	0.950	2.68	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	105.0	115.2	20.8	17.9	204.0	215.4	810	810
2.	106.4	118.6	20.8	18.2	198.4	237.6	790	840
3.	104.6	116.7	20.8	19.2	188.0	201.9	740	790
4.	96.4	111.0	23.1	15.3	183.4	199.3	720	820
5.	111.8	122.5	22.3	17.4	205.0	244.7	780	890
AVG	104.8	116.8	21.6	17.6	195.8	219.8	768	830

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6895

	THICKNESS (mils)		SPECIFIC GRAVITY		CARBON BLACK CONTENT (%)		CARBON BLACK DISPERSION (rating)
1.	43.2	1.	0.949	1.	2.49	1.	A1
2.	43.0	2.	0.949	2.	2.50	2.	A1
3.	44.9	3.	0.949			3.	A1
4.	45.2					4.	A1
5.	43.8					5.	A1
6.	44.2					6.	A1
7.	44.1						
8.	45.4						
9.	45.8						
10.	47.5						
AVG	44.7		0.949		2.50		A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	99.4	95.2	23.1	20.0	211.4	213.6	850	860
2.	99.4	101.6	23.1	21.5	215.6	219.8	860	870
3.	97.6	101.4	25.4	19.3	191.2	215.4	780	900
4.	100.0	98.4	23.9	19.3	174.8	159.8	720	790
5.	102.4	111.8	23.9	19.3	211.0	234.6	820	910
AVG	99.8	101.7	23.9	19.9	200.8	208.6	806	866

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6907

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	45.6	0.949	2.50	A1
2.	47.5	0.949	2.50	A1
3.	44.3	0.949		A1
4.	47.6			A1
5.	45.6			A1
6.	48.0			A1
7.	44.1			
8.	43.3			
9.	45.2			
10.	44.6			
AVG	45.6	0.949	2.50	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	101.0	105.0	19.3	18.5	186.2	202.6	780	850
2.	97.6	101.6	21.5	18.5	217.6	233.2	850	950
3.	99.6	102.8	20.0	19.3	223.6	236.0	880	950
4.	96.4	103.0	20.7	19.3	212.4	228.0	840	910
5.	94.2	101.0	22.3	19.3	210.6	236.2	850	920
AVG	97.8	102.7	20.8	19.0	210.1	227.2	840	916

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6912

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	45.6	0.949	2.60	A1
2.	42.4	0.949	2.60	A1
3.	46.6	0.949		A1
4.	45.8			A1
5.	44.6			A1
6.	44.4			A1
7.	44.0			
8.	46.3			
9.	47.3			
10.	45.4			
AVG	45.2	0.949	2.60	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	110.2	107.6	20.8	17.7	223.0	203.2	880	790
2.	107.2	111.6	19.2	16.9	209.6	249.6	870	880
3.	101.4	108.2	21.5	18.5	208.4	208.8	870	800
4.	100.6	109.6	20.0	19.2	208.8	226.0	840	850
5.	107.6	113.6	19.2	18.5	214.0	238.0	830	850
AVG	105.4	110.1	20.1	18.2	212.8	225.1	858	834

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6916

	THICKNESS (mils)		SPECIFIC GRAVITY		CARBON BLACK CONTENT (%)		CARBON BLACK DISPERSION (rating)
1.	44.6	1.	0.949	1.	2.49	1.	A1
2.	46.0	2.	0.949	2.	2.49	2.	A1
3.	46.3	3.	0.949			3.	A1
4.	44.5					4.	A1
5.	44.1					5.	A1
6.	47.5					6.	A1
7.	47.0						
8.	47.3						
9.	47.3						
10.	44.5						
AVG	45.9		0.949		2.49		A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	100.0	105.6	23.1	17.7	204.6	234.8	840	920
2.	102.2	108.8	20.0	16.9	212.6	236.4	820	920
3.	103.6	105.0	20.8	17.7	160.6	240.4	680	910
4.	104.0	111.8	22.3	18.5	169.8	196.0	740	790
5.	96.6	107.0	22.3	17.7	196.6	219.4	850	840
AVG	101.3	107.6	21.7	17.7	188.8	225.4	786	876

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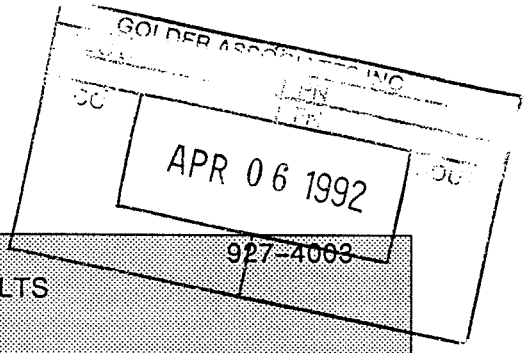
GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6921

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	44.7	0.949	2.58	A1
2.	43.3	0.949	2.61	A1
3.	41.7	0.949		A1
4.	44.0			A1
5.	43.9			A1
6.	42.7			A1
7.	44.5			
8.	41.8			
9.	44.6			
10.	45.1			
AVG	43.6	0.949	2.60	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	97.8	115.9	22.3	17.5	210.6	201.4	860	820
2.	94.2	109.8	24.6	19.1	191.6	215.3	880	890
3.	90.4	116.8	20.0	20.2	205.4	247.6	720	880
4.	95.4	111.2	22.3	17.5	192.4	214.1	870	820
5.	97.0	114.9	22.3	17.9	212.6	223.4	850	900
AVG	95.0	113.7	22.3	18.4	202.5	220.4	836	862



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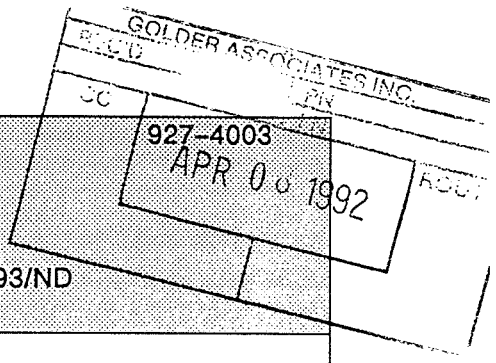
GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6925

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	43.4	0.949	2.72	A1
2.	44.7	0.949	2.71	A1
3.	41.7	0.950		A1
4.	42.7			A1
5.	46.9			A1
6.	47.5			A1
7.	43.9			
8.	43.7			
9.	43.0			
10.	44.2			
AVG	44.2	0.949	2.72	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	96.2	112.6	23.1	17.7	185.8	223.3	780	870
2.	98.4	108.2	23.1	18.5	180.6	224.6	760	850
3.	99.8	116.8	23.9	18.5	210.4	218.4	840	790
4.	94.4	109.6	23.9	18.5	195.2	215.8	820	790
5.	94.0	102.4	21.5	16.9	199.4	223.6	860	840
AVG	96.6	109.9	23.1	18.0	194.3	221.1	812	828



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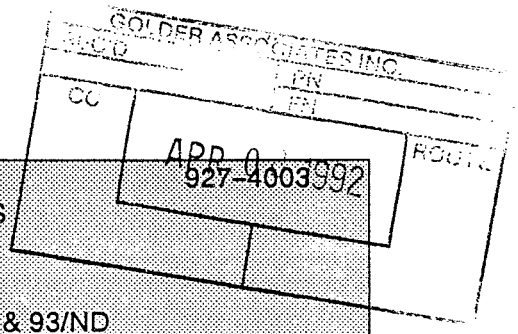
GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6939

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	47.6	0.950	2.67	A1
2.	46.8	0.950	2.68	A1
3.	49.5	0.950		A1
4.	47.5			A1
5.	48.2			A1
6.	47.5			A1
7.	47.1			
8.	46.3			
9.	47.6			
10.	46.4			
AVG	47.5	0.950	2.68	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	112.5	124.8	22.5	17.4	226.8	254.6	880	880
2.	108.0	123.0	21.5	17.5	227.4	270.1	850	850
3.	114.2	124.9	21.6	16.8	183.3	223.6	790	820
4.	106.1	120.0	22.2	16.4	207.8	212.7	840	790
5.	108.1	121.4	22.7	16.6	197.9	254.4	820	880
AVG	109.8	122.8	22.1	16.9	208.6	243.1	836	844



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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6940

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	49.9	0.950	2.58	A1
2.	46.3	0.950	2.58	A1
3.	44.0	0.950		A1
4.	47.3			A1
5.	47.5			A1
6.	48.5			A1
7.	48.7			
8.	46.0			
9.	46.2			
10.	46.0			
AVG	47.0	0.950	2.58	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	104.8	113.4	23.9	20.0	206.4	227.4	790	820
2.	94.8	109.0	24.6	17.7	203.8	215.4	880	820
3.	109.6	119.0	25.4	20.8	250.0	222.0	860	800
4.	105.2	117.4	23.9	17.7	197.0	218.0	780	780
5.	102.4	114.0	22.3	18.5	217.6	263.6	840	890
AVG	103.4	114.6	24.0	18.9	215.0	229.3	830	822

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6947

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	45.1	0.950	2.59	A1
2.	46.5	0.950	2.57	A1
3.	46.5	0.950		A1
4.	46.8			A1
5.	50.0			A1
6.	47.9			A1
7.	47.6			
8.	47.2			
9.	46.5			
10.	49.2			
AVG	47.3	0.950	2.58	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	110.0	122.4	20.8	18.2	220.8	202.1	850	790
2.	108.6	122.5	22.5	22.2	210.5	251.4	830	860
3.	119.4	134.4	21.5	16.4	240.6	269.1	820	850
4.	109.4	120.2	21.5	18.1	206.8	236.0	790	830
5.	109.4	121.8	23.2	16.9	217.9	185.9	860	740
AVG	111.4	124.3	21.9	18.4	219.3	228.9	830	814

April 1992 927-4003

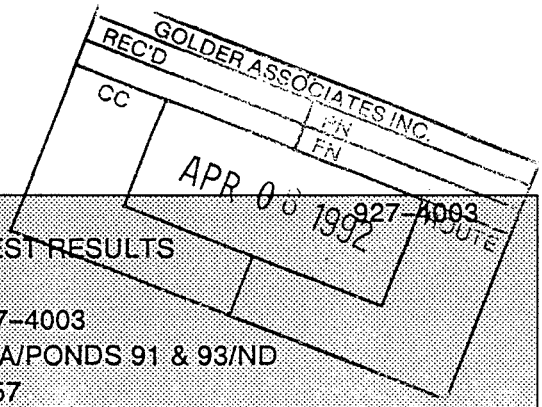
GEOMEMBRANE TEST RESULTS

APR 0 3 1992

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/NID
ROLL DESIGNATION: 6952

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	44.0	0.950	2.68	A1
2.	42.0	0.950	2.68	A1
3.	41.0	0.950		A1
4.	43.0			A1
5.	43.6			A1
6.	45.3			A1
7.	45.0			
8.	46.3			
9.	46.2			
10.	45.7			
AVG	44.2	0.950	2.68	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	96.4	106.8	26.9	26.9	162.2	221.2	720	820
2.	101.4	103.8	29.2	20.0	210.0	209.2	850	820
3.	102.8	111.6	25.4	24.6	207.2	218.6	830	800
4.	101.6	109.8	23.9	20.0	218.2	218.0	850	820
5.	103.0	114.4	30.0	20.8	203.0	196.4	800	740
AVG	101.0	109.3	27.1	22.5	200.1	212.7	810	800



April 1992

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6957

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	47.9	0.950	2.52	A1
2.	46.0	0.950	2.52	A1
3.	43.0	0.950		A1
4.	44.4			A1
5.	45.7			A1
6.	45.4			A1
7.	47.7			
8.	44.2			
9.	46.8			
10.	47.3			
AVG	45.8	0.950	2.52	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	114.6	126.2	20.0	18.2	197.6	242.8	770	850
2.	100.1	115.1	19.2	19.5	177.2	196.8	780	780
3.	107.8	114.0	20.9	17.2	205.8	240.4	830	880
4.	112.8	121.6	20.9	18.0	206.4	227.2	780	820
5.	109.2	124.7	22.5	17.6	215.5	248.6	830	830
AVG	108.9	120.3	20.7	18.1	200.5	231.2	798	832

April 1992 927-4003

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6960

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	44.5	0.951	2.60	A1
2.	43.4	0.951	2.63	A1
3.	42.4	0.951		A1
4.	44.5			A1
5.	44.5			A1
6.	44.2			A1
7.	46.1			
8.	45.5			
9.	46.1			
10.	47.4			
AVG	44.9	0.951	2.62	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	107.8	117.4	30.0	27.7	213.0	208.2	850	760
2.	105.8	112.4	25.4	21.5	221.0	234.6	860	840
3.	106.0	118.0	26.9	21.5	198.0	203.4	800	780
4.	113.8	119.8	30.0	25.4	199.2	249.6	770	820
5.	116.4	121.6	31.5	21.5	226.8	194.2	810	730
AVG	110.0	117.8	28.8	23.5	211.6	218.0	818	786

April 1992 927-4003

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6972

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	44.3	0.951	2.65	A1
2.	47.2	0.951	2.71	A1
3.	43.7	0.951		A1
4.	47.2			A1
5.	47.7			A1
6.	43.9			A1
7.	47.5			
8.	44.9			
9.	44.3			
10.	45.8			
AVG	45.7	0.951	2.68	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	111.4	115.4	27.7	16.9	166.8	255.0	680	870
2.	105.0	122.4	30.0	17.7	210.6	270.0	820	840
3.	107.2	123.8	21.5	17.7	220.6	251.2	900	810
4.	113.0	123.6	21.5	17.7	227.2	275.6	860	860
5.	105.0	119.0	21.5	16.9	224.4	241.4	830	830
AVG	108.3	120.8	24.4	17.4	209.9	258.6	818	842

April 1992 927-4003

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0820

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	43.7	0.949	2.44	A1
2.	41.6	0.948	2.50	A1
3.	44.4	0.950		A1
4.	43.0			A1
5.	42.3			A1
6.	42.5			A1
7.	41.9			
8.	40.7			
9.	43.0			
10.	42.7			
AVG	42.6	0.949	2.47	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	105.6	115.6	28.5	27.7	201.0	250.2	770	890
2.	116.2	120.0	27.7	20.8	241.1	231.6	830	830
3.	108.2	116.6	26.9	26.9	177.8	255.6	750	890
4.	110.0	111.4	26.9	20.8	178.0	182.2	730	770
5.	105.0	113.8	27.7	22.3	211.4	203.8	820	810
AVG	109.0	115.5	27.5	23.7	201.9	224.7	780	838

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April 1992 927-4003

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0824

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	45.4	0.951	2.40	A1
2.	46.1	0.951	2.34	A1
3.	45.7	0.951		A1
4.	43.7			A1
5.	45.7			A1
6.	40.8			A1
7.	42.3			
8.	43.6			
9.	43.3			
10.	45.3			
AVG	44.2	0.951	2.37	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	115.0	123.0	26.9	19.2	231.8	222.0	810	820
2.	110.6	117.2	24.6	24.6	195.4	248.4	730	890
3.	126.0	127.8	24.6	20.8	245.8	240.2	810	810
4.	108.2	115.0	30.0	23.1	203.2	229.2	800	840
5.	111.4	124.4	26.9	24.6	203.6	255.2	780	880
AVG	114.2	121.5	26.6	22.5	216.0	239.0	786	848

APPENDIX E

SUBGRADE ACCEPTANCE CERTIFICATES

December 1992

927-4003

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

GEOSYNTHETIC INSTALLER		PROJECT	
COMPANY	Gundle	LOCATION	Underwood, ND
ADDRESS	19103 Gundle Rd Houston, TX 77073	PROJECT	Pond 93
		OWNER	Cooperative Power

I, the Undersigned, the duly authorized representative of Gundle Lining Const. Co.

do hereby accept the area of soil surface bounded by and covered by panels P1 thru P25 on the west slope and the north west corner of Pond 93. Approximate area is 79,799 sq ft.

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
PETER SUTRYCH		PROJECT SUPV.	8/5/92

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
Cliff Baker	Clifford P. Baker	QA Const. Mgr	8/5/92

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
Jim Martin		Supt.	8-5-92

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

GEOSYNTHETIC INSTALLER

COMPANY Gundle

ADDRESS 19103 Gundle Rd

Houston Tx

77073

PROJECT

LOCATION [illegible]

PROJECT [illegible]

OWNER [illegible]

I, the Undersigned, the duly authorized representative of Gundle Lining Construction Corp

do hereby accept the area of soil surface bounded by [illegible]

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
PETER DITRICH	[signature]	PROJ. SUPV	8/6/92

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
[illegible]	[illegible]	[illegible]	

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
Jim Martin	[signature]	Const. & Sch. Supt.	8-6-92

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

GEOSYNTHETIC INSTALLER

COMPANY Gundle
ADDRESS 19103 Gundle Rd
Houston, TX
77073

PROJECT

LOCATION Underwood, ND
PROJECT Pond 93
OWNER Cooperative Power

I, the Undersigned, the duly authorized representative of Gundle Lining Const. Co. do hereby accept the area of soil surface bounded by and covered by panels P31 thru P35 on the floor northwest section of Pond 93. The approximate area is 116,000 sq.ft

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
PETER DITRICH		PROJ. SUPV.	8/7/92

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
Cliff Baker	Clifford P Baker	QA Const. Mgr	8-7-92

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
Jim Martin		Const. & Safety Supt	8-7-92

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

GEOSYNTHETIC INSTALLER		PROJECT	
COMPANY	Gundle	LOCATION	Underwood ND
ADDRESS	19103 Gundle Rd Houston TX 77073	PROJECT	Pond 93
		OWNER	Cooperative Power

I, the Undersigned, the duly authorized representative of Gundle Lining Const. Co. do hereby accept the area of soil surface bounded by and covered by panels P36 thru P38 on the floor in the north west section of Pond 93. The approximate area is 69,655 sq

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
PETER DUTRYCH	[signature]	PROJECT SUPV	8/8/9

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
Cliff Baker	Clifford P. Baker	QA Const Mgr.	8-8-92

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
Jim Martin	Jim Martin	Const & Sched Supt	8-8-92

GCS FORM: G4

(JUNE 1992)

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

GEOSYNTHETIC INSTALLER

COMPANY Gundle
ADDRESS 19103 Gundle Rd
Houston TX
77073

PROJECT

LOCATION Underwood ND
PROJECT Pond 93
OWNER Cooperative Power

I, the Undersigned, the duly authorized representative of Gundle Lining Const Co.
do hereby accept the area of soil surface bounded by and covered by panels P39 thru P52 in the south west corner of Pond 93. On the West and South slope and on the floor. The approximate area is 84,000 sq ft.

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
PETER DITRICH		PROJECT SUPV.	8/10/9

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
Clifford P. Baker	Clifford P. Baker	QA Const. Mgr	8-10-92

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
Jim Martin	Jim Martin	Const. & Sch'l Supt.	8-10-92

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

GEOSYNTHETIC INSTALLER

COMPANY Gundle
ADDRESS Gundle Rd
Houston TX
77073

PROJECT

LOCATION Underwood ND
PROJECT Pond 93
OWNER Cooperative Power

I, the Undersigned, the duly authorized representative of Gundle Lining Const. Co
do hereby accept the area of soil surface bounded by and covered by Panels P53 thru P63 in the southwest section of Pond 93. The approximate area is 54,200 sq ft

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
PETER DITTRICH		PROJECT SUPV	8/11/92

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
Clifford P. Baker	Clifford P Baker	QA Const Mgr	8-11-92

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
Jim Martin	Jim Martin	Const. Site Supt.	8-11-92

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

GEOSYNTHETIC INSTALLER

COMPANY: Gundle
ADDRESS: 19103 Gundle Rd
Houston TX
77073

PROJECT

LOCATION: Underwood ND
PROJECT: Pond 93
OWNER: Cooperative Power

I, the Undersigned, the duly authorized representative of Gundle Lining Const. Co. do hereby accept the area of soil surface bounded by and covered by Panels P64 thru P72 in Pond 93. The approximate area covered is 205,965 sq ft.

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
PETER DITRICH		PROJECT SUPV.	8/12/92

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
Clifford P. Baker	Clifford P. Baker	QA Const. Mgr.	8.12.92

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
Jim Martin		Const. & Sch. Mgr.	8-12-92

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

GEOSYNTHETIC INSTALLER

COMPANY: Gundle Lining Const.
ADDRESS: 19103 Gundle Rd
Houston TX
77073

PROJECT

LOCATION: Underwood, ND
PROJECT: Pond 93
OWNER: Cooperative Power

I, the Undersigned, the duly authorized representative of Gundle Lining Const. Co.

do hereby accept the area of soil surface bounded by and coverd by panels P73 thru P83 in the north west section of Pond 93. This area is approximately 98,877 sq ft.

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
PETER DUTRYCH		PROJECT SUPV.	8/13/

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
Cliff Baker		QA Const. Mgr.	8.13.92

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
F. Jim Martin		Const. & Schd Sgt	8-13-92

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

GEOSYNTHETIC INSTALLER		PROJECT	
COMPANY	Gundle Lining Const.	LOCATION	Underwood, ND
ADDRESS	19103 Gundle Rd Houston TX 77073	PROJECT	Pond 93
		OWNER	Cooperative Power

I, the Undersigned, the duly authorized representative of Gundle Lining Const. Co.

do hereby accept the area of soil surface bounded by and covered by panels P84 thru P88 in the south west section of Pond 93. The area is approximately 32,500 sq ft.

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
PETER DITRYCH		PROJECT SUPV	8/14/92

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
Clifford P. Baker	Clifford P Baker	QA Const. Mgr	8-14-92

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
F. Jim Martin	F Jim Martin	Const. & Eld Syst.	8-14-92

GCS FORM: G4

(JUNE 1992)

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

GEOSYNTHETIC INSTALLER

COMPANY: Gundle Lining Const.
ADDRESS: 19103 Gundle Rd
Houston TX
77073

PROJECT

LOCATION: Underwood, ND
PROJECT: Pond 93
OWNER: Cooperative Power

I, the Undersigned, the duly authorized representative of Gundle Lining Const. Co.

do hereby accept the area of soil surface bounded by and covered by panels P89 thru P97. Pond 93. The approximate area is 210,174 sq ft.

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
PETER DITRICH		PROJECT SUPV	8/17/9

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
Clifford P Baker	Clifford P. Baker	QA Const. Mgr	8.17.92

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
F. Jim Manton	F Jim Manton	Const. & Schl Supt.	8-17-92

GCS FORM: 04
(JUNE 1992)

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

GEOSYNTHETIC INSTALLER		PROJECT	
COMPANY	Gundle Lining Const.	LOCATION	Underwood, ND
ADDRESS	19103 Gundle Rd	PROJECT	Pond 93
	Houston TX	OWNER	Cooperative Power
	77073		

I, the Undersigned, the duly authorized representative of Gundle Lining Const. Co.

do hereby accept the area of soil surface bounded by and covered by panels P98 thru P106. The approximate sq ft is 207,655.

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
PETER DUTZYCH		PROJECT SUPV	8/10/

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
Cliff Baker	Clifford P. Baker	QA Const. Mgr.	8-18-92

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
F. Jim Martin	F Jim Martin	Const. & Sch. Supt	8-18-92

GCS FORM: 04

(JUNE 1992)

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

GEOSYNTHETIC INSTALLER

COMPANY Gundle Lining Const.
ADDRESS 19103 Gundle Rd
Houston TX
77073

PROJECT

LOCATION Underwood, ND
PROJECT Pond 93
OWNER Cooperative Power

I, the Undersigned, the duly authorized representative of Gundle Lining Const. Co.

do hereby accept the area of soil surface bounded by and covered by Panels P107 to P121 on the south slope and floor. The approximate area is 118,404 sq ft.

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
PETER DUTRUCH		PROJECT SUPV	8/19/92

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
Clifford P. Baker	Clifford P. Baker	QA Const. Mgr	8-19-92

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
F Jim Martin	F Jim Martin	Const & Sched Supt.	8-19-92

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

GEOSYNTHETIC INSTALLER

COMPANY: Gundle Lining Const.
ADDRESS: 19103 Gundle Rd
Houston TX
77073

PROJECT

LOCATION: Underwood, ND
PROJECT: Pond 93
OWNER: Cooperative Power

I, the Undersigned, the duly authorized representative of Gundle Lining Const. Co.

do hereby accept the area of soil surface bounded by and covered by Panels P122 thru P125 on the north slope and floor. The area covered is approximately 91,154 sq ft.

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
PETER DUTRYCH		PROJECT SUPV.	8/20/92

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
Clifford P. Baker	Clifford P. Baker	QA Const Mgr.	8.20.92

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
F. Jim Martin	F. Jim Martin	Const & Sch. Supt.	8-20-92

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

GEOSYNTHETIC INSTALLER

COMPANY: Gundle Lining Const.
ADDRESS: 19103 Gundle Rd
Houston TX
77073

PROJECT

LOCATION: Underwood, ND
PROJECT: Pond 93
OWNER: Cooperative Power

I, the Undersigned, the duly authorized representative of Gundle Lining Const. Co.

do hereby accept the area of soil surface bounded by and covered by panels P126 thru P132 on the north slope and floor. The area is approximately 159,769 sq ft.

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
PETER DUTRYCH		PROJECT SUPV	8/21/92

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
Clifford P. Baker	Clifford P. Baker	QA Const. Mgr.	8-21-92

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
F. Jim Martin	F. Jim Martin	Const. & Sch. Supt.	8-21-92

GCS FORM: G4
(JUNE 1992)

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

GEOSYNTHETIC INSTALLER		PROJECT	
COMPANY	Gundle Lining Const.	LOCATION	Underwood, ND
ADDRESS	19103 Gundle Rd	PROJECT	Pond 93
	Houston TX	OWNER	Cooperative Power
	77073		

I, the Undersigned, the duly authorized representative of Gundle Lining Const. Co.

do hereby accept the area of soil surface bounded by and covered by panels P133 thru P142 on the north slope and the floor area in the north section of Pond 93. the approximate sq ft is 231,000 sq ft.

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
PETER DUTRUCH	[signature]	PROJECT SUPV.	8/26/

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
Cliff Baker	Clifford P. Baker	QA Const. Mgr	8-26-92

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
F Jim Martin	F Jim Martin	Const. & Sched Supt.	8-26-9

GCS FORM: G4

(JUNE 1992)

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

GEOSYNTHETIC INSTALLER

COMPANY Gundle Lining Const.
ADDRESS 19103 Gundle Rd
Houston TX
77073

PROJECT

LOCATION Underwood, ND
PROJECT Pond 93
OWNER Cooperative Power

I, the Undersigned, the duly authorized representative of Gundle Lining Const. Co.

do hereby accept the area of soil surface bounded by and covered by panels P143 thru P152 in the north east section of Pond 93. The approximate area covered is 206,450 sq ft.

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
Peter Dutrich		Project Supv.	8/27/92

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
Cliff Baker	Clifford P. Baker	QA Const. Mgr.	8-27-92

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
F. Jim Martin	F. Jim Martin	Const. & Solid. Supt.	8-27-92

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

GEOSYNTHETIC INSTALLER

COMPANY Gundle Lining Const.
ADDRESS 19103 Gundle Rd
Houston TX
77073

PROJECT

LOCATION Underwood, ND
PROJECT Pond 93
OWNER Cooperative Power

I, the Undersigned, the duly authorized representative of Gundle Lining Const. Co.

do hereby accept the area of soil surface bounded by and covered by panels P153 thru P163 in Pond 93
the area covered is approximately 159,114 sq ft.

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
PETER DITRICH		PROJECT SUPV.	8/28/92

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
Cliff Baker	Clifford P. Baker	QA Const. Mgr.	8-28-92

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
F. Jim Martin	F. Jim Martin	Const. & Sched. Supt.	8-28-92

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

GEOSYNTHETIC INSTALLER		PROJECT	
COMPANY	Gundle Lining Const.	LOCATION	Underwood, ND
ADDRESS	19103 Gundle Rd	PROJECT	Pond 93
	Houston TX	OWNER	Cooperative Power
	77073		

I, the Undersigned, the duly authorized representative of Gundle Lining Const. Co.

do hereby accept the area of soil surface bounded by and covered by Panels P164 & P165 in the northeast section of Pond 93. The area covered was approximately 46,506 sq ft.

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
PETER DUTRUCH	[signature]	PROJECT SUPV.	9/1/92

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
Clifford P. Baker	Clifford P. Baker	QA Const. Mgr.	9-1-92

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
F. Jim Martin	F. Jim Martin	Const. & Sched. Supt.	9-1-92

GCS FORM: G4

(JUNE 1992)

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

GEOSYNTHETIC INSTALLER

COMPANY: Gundle Lining Const.
ADDRESS: 19103 Gundle Rd
Houston TX
77073

PROJECT

LOCATION: Underwood, ND
PROJECT: Pond 93
OWNER: Cooperative Power

I, the Undersigned, the duly authorized representative of Gundle Lining Const. Co.

do hereby accept the area of soil surface bounded by and covered by panels P166 thru P179 in the north east corner of Pond 93. The approximate area covered was 93,332 sq. ft.

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
PETER DUTRUCH		PROJ. SUPV.	9/3/92

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
Clifford P. Baker	Clifford P. Baker	QA Const. Mgr.	9-3-92

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
F. Jim Martin	F. Jim Martin	Const. & Schd. Supt.	9-3-92

GCS FORM: G4

(JUNE 1992)

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

GEOSYNTHETIC INSTALLER

COMPANY: Gundle Lining Const.
ADDRESS: 19103 Gundle Rd
Houston TX
77073

PROJECT

LOCATION: Underwood, ND
PROJECT: Pond 93
OWNER: Cooperative Power

I, the Undersigned, the duly authorized representative of Gundle Lining Const. Co.

do hereby accept the area of soil surface bounded by and covered by panels P180 thru P187 in the north east section and along the south slope of Pond 93.
the approximate area cover was 65,560 sq ft.

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
PETER DUTRYCH		PROJ. SUPV.	9/4/92

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
Clifford P. Baker	Clifford P. Baker	QA Const. Mgr	9-4-92

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
F. Jim Martin	F. Jim Martin	Const. & Sched. Supt.	9-4-92

GCS FORM: 04
(JUNE 1992)

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

GEOSYNTHETIC INSTALLER

COMPANY: Gundle Lining Const.
ADDRESS: 19103 Gundle Rd
Houston TX
77073

PROJECT

LOCATION: Underwood, ND
PROJECT: Pond 93
OWNER: Cooperative Power

I, the Undersigned, the duly authorized representative of Gundle Lining Const. Co.

do hereby accept the area of soil surface bounded by and cover by panels P188 thru P203 in the south east section of Pond 93. The approximate area covered is 164,289 sq ft.

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
PETER DITRICH		PROJ. SUPV.	9/11/92

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
Clifford P. Baker	Clifford P. Baker	QA Const. Mgr.	9-11-92

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
F. Jim Martin	F. Jim Martin	Const. & Sched Supt.	9-11-92

GCS FORM: G4
(JUNE 1992)

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

GEOSYNTHETIC INSTALLER

COMPANY: Gundle Lining Const.
ADDRESS: 19103 Gundle Rd
Houston TX
77073

PROJECT

LOCATION: Underwood, ND
PROJECT: Pond 93
OWNER: Cooperative Power

I, the Undersigned, the duly authorized representative of Gundle Lining Const. Co.

do hereby accept the area of soil surface bounded by and covered by panels P204 thru P215 in the south east section of Pond 93. The area covered is approximately 121,465 sq ft.

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
PETER DITRYCH		PROJ. SUPV.	9/12/9

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
Clifford P. Baker	Clifford P. Baker	QA Const Mgr	9-12-92

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
F. Jim Martin	F. Jim Martin	Const. & Sched. Supt.	9-12-92

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

GEOSYNTHETIC INSTALLER

COMPANY: Gundle Lining Const.
ADDRESS: 19103 Gundle Rd
Houston TX
77073

PROJECT

LOCATION: Underwood, ND
PROJECT: Pond 93
OWNER: Cooperative Power

I, the Undersigned, the duly authorized representative of Gundle Lining Const. Co.

do hereby accept the area of soil surface bounded by

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
PETER DITRICH		PROJ. SUPV.	9/15/9

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
F. Jon Martin	F. Jon Martin	Const. & Sched Supt.	9-15-92

GCS FORM: 04
(JUNE 1992)

CERTIFICATE OF ACCEPTANCE OF SOIL SURFACE

GEOSYNTHETIC INSTALLER

COMPANY Gundle Lining Const.
ADDRESS 19103 Gundle Rd
Houston TX
77073

PROJECT

LOCATION Underwood, ND
PROJECT Pond 93
OWNER Cooperative Power

I, the Undersigned, the duly authorized representative of Gundle Lining Const. Co.

do hereby accept the area of soil surface bounded by and covered by Panels P232 thru P244 in the south east corner of Pond 93. The approximate area is 60,996 sq ft.

and shall be responsible for maintaining its integrity and suitability in accordance with the project specifications from this date to the completion of the installation.

NAME	SIGNATURE	TITLE	DATE
PETER DITRYCH		PROJ. SUPV.	9/16/92

CERTIFICATE OF ACCEPTANCE RECEIVED BY QA / QC MANAGER

NAME	SIGNATURE	TITLE	DATE
Cliff Baker	Cliff Baker	QA Const Mgr	9-16-92

CERTIFICATE OF ACCEPTANCE RECEIVED BY OWNER

NAME	SIGNATURE	TITLE	DATE
F. Jim Martin	F Jim Martin	Const. Engr.	9-16-92

GCS FORM: 04
(JUNE 1992)

APPENDIX F

ABBREVIATIONS

December 1992

927-4003

APPENDIX F
ABBREVIATIONS

P*	PANEL # OR PATCH
P	PATCH
DS	DESTRUCTIVE ON FUSION SEAM
DSE	DESTRUCTIVE ON EXTRUSION SEAM
H	PIN HOLE
GW	GRIND AND WELD
C	CAP
BO	BURN OUT
PTF or PFS	PRESSURE TEST FAILURE
D	INSTALLATION DAMAGE
BS	BOOT/SKIRT FOR FML PENETRATION
WS	WELD RESTART
CR	CREASE
IO	INSUFFICIENT OVERLAP
VL	VACUUM LEAK
SI	SUBGRADE IRREGULARITY
WR	WRINKLE
FS	FAILED SEAM LENGTH
RS	RECONSTRUCTED SEAM
DTF	DESTRUCTIVE TEST FAILURE
FM	FISHMOUTH
CO	CHANGE OF OVERLAP
MD	MANUFACTURER'S/DELIVERY DAMAGE
OG	OVERGRIND
OCA	OUTSIDE CERTIFIED AREA
EE	EARTHWORK EQUIPMENT DAMAGE
FTS	FIELD TEST STRIP
HT	HEAT TACK BURN
C/FUS	CAP BY FUSION WELD
N	NORTH
S	SOUTH
E	EAST
W	WEST
NT	NORTH TOE
ST	SOUTH TOE
AT	ANCHOR TRENCH
NAT	NORTH ANCHOR TRENCH
SAT	SOUTH ANCHOR TRENCH
EAT	EAST ANCHOR TRENCH
WAT	WEST ANCHOR TRENCH
INT/T	INTERSECTION OF 3 OR MORE PANELS
ENT	ENTIRE SEAM
SNAT	SOUTH OF NORTH ANCHOR TRENCH
NSAT	NORTH OF SOUTH ANCHOR TRENCH

APPENDIX F
ABBREVIATIONS

EWAT	EAST OF WEST ANCHOR TRENCH
WEAT	WEST OF EAST ANCHOR TRENCH
STOE	SOUTH OF TOE
NTOE	NORTH OF TOE
ETOE	EAST OF TOE
WTOE	WAST OF TOE
EOS	END OF SEAM
SEOS	SOUTH END OF SEAM
NEOS	NORTH END OF SEAM
WEOS	WEST END OF SEAM
EEOS	EAST END OF SEAM
SNEOS	SOUTH OF NORTH END OF SEAM
NSEOS	NORTH OF SOUTH END OF SEAM
EWEOS	EAST OF WEST END OF SEAM
WEEOS	WEST OF EAST END OF SEAM
PT	PRESSURE TEST HOLE
/	SEAM OF TWO PANELS

APPENDIX G

GEOMEMBRANE DEPLOYMENT SUMMARIES

December 1992

927-4003

Golder Construction Services, Inc.

APPENDIX G
POND 93
GEOMEMBRANE PANEL DEPLOYMENT SUMMARY

PANEL NO.	ROLL NUMBER	DATE	OVERLAP (INCHES)	APPROX. LENGTH (FT)	AVERAGE EDGE THICKNESS (mils)			QA MONITOR	VISUAL PANEL INSPECTION/REMARKS
					LEAD	SIDE	TRAIL		
1	6894	08/05/92	4	64	44.2	44.6	42.8	TD	OK
2	6894	08/05/92	4	64	45.0	44.1	44.2	TD	SLIGHT DAMAGE
3	6894	08/05/92	4	64	44.2	44.4	45.0	TD	OK
4	6894	08/05/92	4	65	44.8	44.5	44.2	TD	SLIGHT DAMAGE
5	6894	08/05/92	4	66	43.3	43.9	44.8	TD	SLIGHT DAMAGE
6	6894	08/05/92	4	66	44.5	43.0	43.3	TD	OK
7	6894	08/05/92	4	67	44.9	44.0	44.5	TD	OK
8	6894	08/05/92	4	68	44.3	44.1	44.9	TD	OK
9	6894	08/05/92	4	68	44.6	43.8	44.3	TD	OK
10	0730	08/05/92	4	70	43.7	43.4	43.4	TD	SLIGHT DAMAGE
11	0730	08/05/92	4	72	43.8	41.9	43.7	TD	SLIGHT DAMAGE
12	0730	08/05/92	4	71	43.0	41.8	43.8	TD	SLIGHT DAMAGE
13	0730	08/05/92	4	74	43.0	41.5	42.3	TD	OK
14	0730	08/05/92	4	73	42.8	41.6	43.0	TD	OK
15	0730	08/05/92	4	73	41.8	41.6	42.8	TD	OK
16	0730	08/05/92	4	74	42.7	41.7	41.8	TD	OK
17	0730	08/05/92	4	75	43.5	41.9	42.7	TD	OK
18	0730	08/05/92	4	78	42.5	42.2	43.5	TD	OK
19	6896	08/05/92	4	78	45.4	44.0	44.0	TD	OK
20	6896	08/05/92	4	79	44.2	44.8	45.4	TD	OK
21	6896	08/05/92	4	79	44.2	43.4	42.4	TD	OK
22	6896	08/05/92	4	64	44.2	43.8	44.2	TD	OK
23	6896	08/05/92	4	70	45.2	41.6	44.2	TD	OK
24	6896	08/05/92	4	34	43.2	45.0	45.2	TD	OK
25	6895	08/05/92	4	661	41.2	42.8	44.8	TD	OK
26	6897	08/06/92	4	542	42.4	41.4	44.4	TD	OK
27	6852	08/06/92	4	658	43.6	44.8	40.6	TD	OK
28	0694	08/06/92	4	669	44.8	47.0	45.2	TD	OK

Golder Construction Services, Inc.

APPENDIX G
POND 93
GEOMEMBRANE PANEL DEPLOYMENT SUMMARY

PANEL NO.	ROLL NUMBER	DATE	OVERLAP (INCHES)	APPROX. LENGTH (FT)	AVERAGE EDGE THICKNESS (mils)			QA MONITOR	VISUAL PANEL INSPECTION/REMARKS
					LEAD	SIDE	TRAIL		
29	6858	08/06/92	4	655	46.4	41.6	44.4	TD	OK BUT PULLED OUT OF A.T.
30	0688	08/06/92	4	652	43.2	44.8	42.0	TD	OK BUT PULLED OUT OF A.T.
31	0731	08/07/92	4	668	42.7	45.7	45.5	TD	OK
32	6845	08/07/92	4	662	46.0	42.6	41.8	TD	OK
33	6893	08/07/92	4	670	42.8	42.7	42.7	JCL	OK
34	0720	08/07/92	4	682	43.7	40.8	41.5	JCL	OK
35	0681	08/07/92	4	682	44.0	42.9	43.6	JCL	OK
36	6856	08/08/92	4	665	45.3	42.9	45.6	JCL	OK
37	0693	08/08/92	4	675	42.3	40.6	41.7	JCL	OK
38	0695	08/08/92	4	679	42.3	40.5	43.0	JCL	OK
39	0727	08/10/92	4	84	43.2	42.4	41.8	LS	OK
40	0727	08/10/92	4	90	44.0	45.6	43.2	LS	OK
41	0727	08/10/92	4	15 X 64	42.2	45.0	46.0	LS	CUT FROM PANEL P40
42	0727	08/10/92	4	109	43.4	42.8	43.6	LS	OK
43	0727	08/10/92	4	315	42.8	43.0	44.4	LS	OK
44	0727	08/10/92	4	15 X 32	44.0	41.0	43.0	LS	CUT FROM PANEL P42
45	0727	08/10/92	4	81	46.2	44.2	44.4	LS	OK
46	6836	08/10/92	4	361	43.2	45.0	48.0	LS	OK
47	6836	08/10/92	4	293	43.8	43.6	42.8	LS	OK
48	6838	08/10/92	4	38	42.8	44.2	43.6	LS	OK
49	6838	08/10/92	4	321	42.8	43.6	43.4	LS	SLIGHT WIND DANAGE
50	6838	08/10/92	4	306	42.6	43.6	44.0	LS	OK
51	6894	08/10/92	4	20	43.6	43.4	43.0	LS	OK
52	6849	08/10/92	4	318	42.8	43.8	43.6	LS	OK
53	6849	08/11/92	4	314	42.8	42.0	43.4	LS	OK
54	6847	08/11/92	4	310	43.6	45.6	42.8	LS	OK
55	6847	08/11/92	4	316	42.8	44.4	42.6	LS	OK
56	6847	08/11/92	4	13	44.2	43.4	45.4	LS	OK

Golder Construction Services, Inc.

APPENDIX G
POND 93
GEOMEMBRANE PANEL DEPLOYMENT SUMMARY

PANEL NO.	ROLL NUMBER	DATE	OVERLAP (INCHES)	APPROX. LENGTH (FT)	AVERAGE EDGE THICKNESS (mils)			QA MONITOR	VISUAL PANEL INSPECTION/REMARKS
					LEAD	SIDE	TRAIL		
57	6853	08/11/92	4	301	45.0	44.0	45.0	LS	OK
58	6853	08/11/92	4	307	44.6	43.4	44.0	LS	OK
59	0668	08/11/92	4	274	42.8	42.6	41.8	LS	OK
60	6853	08/11/92	4	50	42.4	42.6	42.0	LS	OK
61	0668	08/11/92	4	307	43.0	43.2	44.4	LS	SLIGHT WIND DAMAGE
62	6828	08/11/92	4	211	42.2	43.4	43.0	LS	OK
63	0668	08/11/92	4	96	42.8	42.6	42.8	LS	OK
64	0683	08/12/92	4	665	44.2	42.6	43.3	LS	OK
65	0684	08/12/92	4	670	42.0	41.7	44.2	LS	OK
66	6850	08/12/92	4	660	42.6	44.4	43.6	LS	OK
67	6844	08/12/92	4	660	44.3	44.7	43.2	LS	OK
68	0760	08/12/92	4	670	42.6	43.0	42.2	LS	OK
69	6827	08/12/92	4	653	44.7	46.1	42.3	LS	OK
70	6859	08/12/92	4	665	42.9	46.9	43.3	LS	OK
71	6848	08/12/92	4	664	43.2	44.6	43.5	LS	OK
72	6833	08/12/92	4	663	43.5	42.5	43.1	LS	OK
73	0682	08/13/92	4	670	42.0	42.5	42.5	LS	FACTORY CREASE/CAPPED
74	6828	08/13/92	4	309	42.7	42.8	42.9	LS	OK
75	6821	08/13/92	4	162	42.5	42.5	43.5	LS	OK
76	6828	08/13/92	4	145	43.5	42.7	42.9	LS	OK
77	6821	08/13/92	4	318	44.7	45.5	45.1	LS	OK
78	6821	08/13/92	4	186	44.3	44.8	44.3	LS	OK
79	6843	08/13/92	4	130	44.1	44.2	43.9	LS	OK
80	6843	08/13/92	4	300	43.3	44.3	44.3	LS	OK
81	6843	08/13/92	4	229	43.5	43.9	44.1	LS	OK
82	0687	08/13/92	4	97	43.1	43.4	42.7	LS	OK
83	0687	08/13/92	4	320	42.6	43.3	43.3	LS	OK
84	0687	08/14/92	4	256	42.3	42.9	42.9	LS	OK

APPENDIX G
POND 93
GEOMEMBRANE PANEL DEPLOYMENT SUMMARY

PANEL NO.	ROLL NUMBER	DATE	OVERLAP (INCHES)	APPROX. LENGTH (FT)	AVERAGE EDGE THICKNESS (mils)			QA MONITOR	VISUAL PANEL INSPECTION/REMARKS
					LEAD	SIDE	TRAIL		
85	6825	08/14/92	4	64	45.2	45.5	43.1	LS	OK
86	6825	08/14/92	4	308	44.2	44.6	43.4	LS	OK
87	6825	08/14/92	4	285	45.2	45.3	44.9	LS	OK
88	6849	08/14/92	4	30	43.8	43.8	42.7	LS	OK
89	0658	08/17/92	4	680	42.8	42.4	45.0	LS	OK
90	6824	08/17/92	4	674	42.8	45.0	45.0	LS	OK
91	0665	08/17/92	4	678	44.6	44.8	41.6	LS	OK
92	6917	08/17/92	4	673	43.0	44.6	44.4	LS	OK
93	0657	08/17/92	4	688	45.6	43.4	45.0	LS	OK
94	6823	08/17/92	4	675	44.4	45.0	42.2	LS	OK
95	0703	08/17/92	4	678	42.2	45.4	45.0	LS	OK
96	6924	08/17/92	4	667	45.4	44.8	44.2	LS	OK
97	0769	08/17/92	4	679	45.0	44.6	42.2	LS	OK
98	6851	08/18/92	4	658	45.2	44.6	44.9	LS	OK
99	0777	08/18/92	4	668	49.2	43.1	43.7	LS	OK
100	0765	08/18/92	4	670	42.6	42.9	42.9	LS	OK
101	0766	08/18/92	4	670	42.7	42.0	42.2	LS	OK
102	0745	08/18/92	4	675	40.4	41.3	41.8	LS	OK
103	6910	08/18/92	4	665	42.8	42.1	42.4	LS	OK
104	0771	08/18/92	4	678	44.1	43.8	43.7	LS/CPB	OK
105	6919	08/18/92	4	670	43.9	44.4	43.6	CPB	OK
106	6866	08/18/92	4	665	43.4	44.2	44.5	CPB	OK
107	6922	08/19/92	4	311	43.7	44.6	43.9	LS	OK
108	6922	08/19/92	4	312	44.1	44.3	43.6	LS	OK
109	6857	08/19/92	4	310	44.4	44.3	44.0	LS	OK
110	6857	08/19/92	4	315	44.9	44.6	43.9	LS	OK
111	0733	08/19/92	4	274	42.5	43.3	43.0	LS	OK
112	6922	08/19/92	4	30	43.8	43.9	44.0	LS	OK

APPENDIX G
POND 93
GEOMEMBRANE PANEL DEPLOYMENT SUMMARY

PANEL NO.	ROLL NUMBER	DATE	OVERLAP (INCHES)	APPROX. LENGTH (FT)	AVERAGE EDGE THICKNESS (mils)			QA MONITOR	VISUAL PANEL INSPECTION/REMARKS
					LEAD	SIDE	TRAIL		
113	0733	08/19/92	4	315	42.6	43.0	42.6	LS	OK
114	6835	08/19/92	4	307	43.3	43.9	43.0	LS	OK
115	6835	08/19/92	4	317	43.3	43.5	43.1	LS	OK
116	6835	08/19/92	4	38	43.4	42.8	43.2	LS	OK
117	6846	08/19/92	4	264	43.9	43.8	44.0	LS	OK
118	0733	08/19/92	4	80	42.6	42.1	42.5	LS	OK
119	6846	08/19/92	4	240	43.2	43.6	43.5	LS	OK
120	6846	08/19/92	4	157	43.6	43.3	43.5	LS	OK
121	0738	08/19/92	4	162	40.2	40.9	41.3	LS	OK
122	0784	08/20/92	4	670	41.6	41.2	43.1	LS	OK
123	6920	08/20/92	4	670	43.2	43.5	42.6	LS	OK
124	6914	08/20/92	4	666	42.4	43.4	46.6	LS	OK
125	0749	08/20/92	4	675	40.6	40.6	42.8	LS	OK
126	6925	08/21/92	4	655	44.0	43.8	43.8	LS	OK
127	6912	08/21/92	4	656	44.2	44.1	44.2	LS	OK
128	6898	08/21/92	4	655	44.3	43.8	44.5	LS	OK
129	0741	08/21/92	4	667	43.0	43.8	43.5	LS	OK
130	0744	08/21/92	4	668	40.0	40.0	40.2	LS	OK
131	6915	08/21/92	4	665	43.2	44.0	43.1	LS	OK
132	6916	08/21/92	4	665	43.8	43.8	44.0	LS	OK
133	6842	08/26/92	4	658	44.1	44.5	44.4	LS	OK
134	6830	08/26/92	4	670	44.9	45.0	44.9	LS	OK
135	6840	08/26/92	4	663	44.3	44.5	44.3	LS	OK
136	0781	08/26/92	4	675	43.1	42.8	43.1	LS	OK
137	0739	08/26/92	4	675	43.1	40.1	42.1	LS	OK
138	0661	08/26/92	4	675	43.4	42.7	43.1	LS	OK
139	0785	08/26/92	4	674	42.2	41.5	42.9	LS	OK
140	0782	08/26/92	4	680	43.8	43.1	43.1	LS	OK

Golder Construction Services, Inc.

APPENDIX G
POND 93
GEOMEMBRANE PANEL DEPLOYMENT SUMMARY

PANEL NO.	ROLL NUMBER	DATE	OVERLAP (INCHES)	APPROX. LENGTH (FT)	AVERAGE EDGE THICKNESS (mils)			QA MONITOR	VISUAL PANEL INSPECTION/REMARKS
					LEAD	SIDE	TRAIL		
141	6841	08/26/92	4	663	43.7	42.8	43.0	LS	OK
142	6861	08/26/92	4	664	42.4	43.4	43.1	LS	OK
143	6862	08/27/92	4	656	43.9	43.8	43.8	LS	OK
144	6863	08/27/92	4	659	42.8	42.5	42.5	LS	OK
145	0692	08/27/92	4	665	43.4	43.2	43.6	LS	OK
146	0691	08/27/92	4	670	42.2	43.0	42.8	LS	OK
147	6860	08/27/92	4	651	43.6	42.9	43.7	LS	OK
148	0686	08/27/92	4	672	44.1	43.9	43.9	LS	OK
149	6907	08/27/92	4	661	43.6	43.6	43.6	LS	OK
150	0758	08/27/92	4	161	43.5	42.8	43.4	LS	SLIGHT WIND DAMAGE
151	0758	08/27/92	4	515	43.4	42.8	43.4	LS	SLIGHT WIND DAMAGE
152	0748	08/27/92	4	674	43.1	42.7	43.2	LS	OK
153	0740	08/28/92	4	671	43.3	42.9	43.2	LS	OK
154	0773	08/28/92	4	673	43.9	43.4	43.2	LS	OK
155	6913	08/28/92	4	662	43.5	42.4	42.8	LS	OK
156	0670	08/28/92	4	677	43.0	42.9	43.1	LS	OK
157	0762	08/28/92	4	672	43.8	43.1	43.6	LS	OK
158	6864	08/28/92	4	315	43.4	42.1	42.5	LS	OK
159	6864	08/28/92	4	170	43.2	41.6	41.9	LS	OK
160	0772	08/28/92	4	143	42.4	41.7	42.7	LS	OK
161	0772	08/28/92	4	309	42.2	41.9	42.6	LS	OK
162	0772	08/28/92	4	225	43.2	43.0	43.1	LS	OK
163	6918	08/28/92	4	95	43.2	43.0	43.1	LS	OK
164	0839	09/01/92	4	673	42.6	42.6	42.4	LS	OK
165	0764	09/01/92	4	675	43.7	42.8	43.1	LS	OK
166	0837	09/03/92	4	669	42.1	40.8	42.1	LS	OK
167	0767	09/03/92	4	675	42.6	42.0	42.2	LS	OK
168	0763	09/03/92	4	675	43.1	42.9	42.5	LS	OK

Golder Construction Services, Inc.

APPENDIX G
POND 93
GEOMEMBRANE PANEL DEPLOYMENT SUMMARY

PANEL NO.	ROLL NUMBER	DATE	OVERLAP (INCHES)	APPROX. LENGTH (FT)	AVERAGE EDGE THICKNESS (mils)			QA MONITOR	VISUAL PANEL INSPECTION/REMARKS
					LEAD	SIDE	TRAIL		
169	0809	09/03/92	4	90	42.1	41.9	41.9	LS	OK
170	0809	09/03/92	4	20X34	42.1	41.9	42.0	LS	CUT FROM PANEL P169
171	0809	09/03/92	4	84	42.4	41.8	42.4	LS	OK
172	0809	09/03/92	4	20X34	42.3	41.8	42.4	LS	CUT FROM PANEL P171
173	0809	09/03/92	4	76	42.3	42.0	41.9	LS	OK
174	0809	09/03/92	4	75	41.3	41.9	42.2	LS	OK
175	0809	09/03/92	4	74	41.9	42.3	42.9	LS	OK
176	0809	09/03/92	4	78	42.1	42.1	42.0	LS	OK
177	0809	09/03/92	4	74	41.8	42.0	41.8	LS	OK
178	0809	09/03/92	4	72	42.0	41.5	42.1	LS	OK
179	0809	09/03/92	4	63	42.2	41.4	42.5	LS	OK
180	6868	09/03/92	4	68	43.6	43.5	43.9	LS	OK
181	6868	09/03/92	4	70	44.4	43.4	43.8	LS	OK
182	6868	09/03/92	4	68	44.4	43.7	44.0	LS	OK
183	6868	09/03/92	4	437	43.6	43.5	44.0	LS	OK
184	0851	09/03/92	4	311	42.9	41.9	41.9	LS	OK
185	0851	09/03/92	4	318	42.6	41.3	41.8	LS	OK
186	6956	09/03/92	4	317	41.9	42.0	41.0	LS	OK
187	6956	09/03/92	4	320	42.0	42.0	42.1	LS	OK
188	7346	09/11/92	4	329	41.9	41.8	41.9	LS	OK
189	0742	09/11/92	4	326	41.1	41.0	41.3	LS	OK
190	0742	09/11/92	4	312	42.0	41.0	41.6	LS	OK
191	0786	09/11/92	4	326	42.8	41.9	42.7	LS	OK
192	0786	09/11/92	4	326	42.7	41.9	42.4	LS	OK
193	6832	09/11/92	4	319	42.9	42.4	42.4	LS	OK
194	6832	09/11/92	4	308	42.8	42.5	42.2	LS	OK
195	6978	09/11/92	4	322	44.1	43.9	43.6	LS	OK
196	6978	09/11/92	4	247	44.1	43.8	44.1	LS	OK

Golder Construction Services, Inc.

APPENDIX G
POND 93
GEOMEMBRANE PANEL DEPLOYMENT SUMMARY

PANEL NO.	ROLL NUMBER	DATE	OVERLAP (INCHES)	APPROX. LENGTH (FT)	AVERAGE EDGE THICKNESS (mils)			QA MONITOR	VISUAL PANEL INSPECTION/REMARKS
					LEAD	SIDE	TRAIL		
197	7346	09/11/92	4	70	41.9	41.8	41.8	LS	OK
198	0736	09/11/92	4	307	43.0	42.1	42.0	LS	OK
199	0736	09/11/92	4	322	42.9	42.4	42.1	LS	OK
200	0759	09/11/92	4	311	41.1	40.8	40.9	LS	OK
201	0759	09/11/92	4	317	41.2	40.9	40.9	LS	OK
202	0697	09/11/92	4	312	40.9	40.7	40.9	LS	OK
203	0697	09/11/92	4	308	41.2	41.0	41.5	LS	OK
204	6906	09/12/92	4	310	42.6	42.1	42.8	LS	OK
205	6906	09/12/92	4	313	42.8	42.1	42.1	LS	OK
206	6909	09/12/92	4	310	44.0	43.4	43.5	LS	OK
207	6909	09/12/92	4	323	44.2	43.7	44.0	LS	OK
208	0685	09/12/92	4	323	42.3	41.4	42.8	LS	OK
209	0685	09/12/92	4	323	42.4	41.7	42.5	LS	OK
210	6864	09/12/92	4	324	42.0	41.9	41.9	LS	OK
211	6864	09/12/92	4	315	42.1	41.9	42.6	LS	OK
212	0678	09/12/92	4	310	43.8	43.2	43.8	LS	OK
213	0743	09/12/92	4	329	42.8	42.3	42.6	LS	OK
214	0743	09/12/92	4	311	42.6	42.3	42.2	LS	OK
215	6837	09/12/92	4	319	43.2	42.7	42.6	LS	OK
216	6837	09/15/92	4	304	42.7	42.1	42.6	LS	OK
217	0732	09/15/92	4	307	40.8	40.8	40.8	LS	OK
218	0732	09/15/92	4	314	40.9	40.9	41.5	LS	OK
219	0813	09/15/92	4	309	41.1	41.0	41.1	LS	OK
220	0813	09/15/92	4	320	41.1	41.2	41.7	LS	OK
221	0761	09/15/92	4	307	42.8	42.7	42.9	LS	OK
222	0761	09/15/92	4	314	42.5	42.2	42.4	LS	OK
223	0680	09/15/92	4	317	42.6	41.9	42.6	LS	OK
224	0680	09/15/92	4	315	42.4	42.9	42.3	LS	OK

Golder Construction Services, Inc.

APPENDIX G
POND 93
GEOMEMBRANE PANEL DEPLOYMENT SUMMARY

PANEL NO.	ROLL NUMBER	DATE	OVERLAP (INCHES)	APPROX. LENGTH (FT)	AVERAGE EDGE THICKNESS (mils)			QA MONITOR	VISUAL PANEL INSPECTION/REMARKS
					LEAD	SIDE	TRAIL		
225	0747	09/15/92	4	104	42.3	42.2	42.3	LS	OK
226	0747	09/15/92	4	100	42.3	42.3	42.4	LS	OK
227	0747	09/15/92	4	100	42.2	42.6	42.1	LS	OK
228	0747	09/15/92	4	100	42.7	41.3	42.1	LS	OK
229	0747	09/15/92	4	100	42.3	41.9	41.8	LS	OK
230	0747	09/15/92	4	100	42.3	41.5	42.2	LS	OK
231	0678	09/15/92	4	104	43.7	42.9	43.2	LS	OK
232	6831	09/16/92	4	319	43.7	44.2	44.2	LS	OK
233	6831	09/16/92	4	305	44.1	43.8	44.2	LS	OK
234	6923	09/16/92	4	97	42.6	42.2	42.5	LS	OK
235	6923	09/16/92	4	99	42.8	42.7	42.6	LS	OK
236	6923	09/16/92	4	95	42.7	42.2	42.4	LS	OK
237	6923	09/16/92	4	97	42.8	41.9	42.8	LS	OK
238	6923	09/16/92	4	102	42.6	42.2	42.4	LS	OK
239	6923	09/16/92	4	97	42.6	42.2	42.9	LS	OK
240	6923	09/16/92	4	34	42.5	42.4	42.0	LS	CUT FROM PANEL P239
241	0756	09/16/92	4	95	42.0	42.0	42.7	LS	OK
242	0756	09/16/92	4	307	42.6	42.0	42.9	LS	OK
243	0678	09/16/92	4	56	42.3	42.4	42.2	LS	OK
244	0756	09/16/92	4	99	42.2	42.0	42.9	LS	OK

Golder Construction Services, Inc.

APPENDIX H

TRIAL SEAM SUMMARIES

December 1992

927-4003

Golder Construction Services, Inc.

APPENDIX H
TRIAL SEAM SUMMARY
POND 93 – EXTRUSION WELDING

RECORD NUMBER	TRIAL SEAM NUMBER	DATE	TIME	WELDER ID		AMBIENT TEMP. (°F)	MACH. TEMP. (°C)		RESULTS		QA MONITOR	REMARKS
				MACH	TECH		SET/BAR	ACT/NOZ	PEEL	SHEAR		
1	TX-1	08/07/92	1007	227	KT	60	220	240	P2/P2	P6	TD	PASS
2	TX-2	08/07/92	1013	227	SB	60	220	240	P2/P2	P6	TD	PASS
3	TX-3	08/07/92	1352	227	SB	75	215	225	P2/P2	P6	TD	PASS
4	TX-4	08/07/92	1355	227	KT	75	215	225	P2/P2	P6	TD	PASS
5	TX-1	08/08/92	853	227	KT	70	225	250	P2/P2	P6	TD	PASS
6	TX-2	08/08/92	856	227	SB	70	225	250	P2/P2	P6	TD	PASS
7	TX-3	08/08/92	923	162	SN	75	209	230	P2/P2	P6	TD	PASS
8	TX-4	08/08/92	1300	227	KT	80	220	235	P2/P2	P6	TD	PASS
9	TX-5	08/08/92	1305	227	SB	80	220	235	P2/P2	P6	TD	PASS
10	TX-6	08/08/92	1309	162	SN	80	206	220	P2/P2	P6	TD	PASS
11	TX-7	08/08/92	1410	158	SKP	90	210	220	P2/P2	P6	TD	PASS
12	TX-1	08/10/92	740	227	SB	60	220	250	P2/P2	P6	JCL	PASS
13	TX-2	08/10/92	745	227	KT	60	220	250	P2/P2	P6	JCL	PASS
14	TX-3	08/10/92	840	162	SN	63	210	230	P2/P2	P6	JCL	PASS
15	TX-4	08/10/92	1300	227	KT	75	220	240	P2/P2	P6	JCL	PASS
16	TX-5	08/10/92	1304	227	SB	75	220	240	P2/P2	P6	JCL	PASS
17	TX-6	08/10/92	1308	162	SN	75	207	211	P2/P2	P6	JCL	PASS
18	TX-1	08/11/92	805	227	SB	62	220	250	P2/P2	P6	JCL	PASS
19	TX-2	08/11/92	810	227	KT	62	220	250	P2/P2	P6	JCL	PASS
20	TX-3	08/11/92	823	162	SN	62	213	239	P2/P2	P6	JCL	PASS
21	TX-4	08/11/92	825	162	BS	62	213	239	P2/P2	P6	JCL	PASS
22	TX-5	08/11/92	1254	162	SN	70	213	240	P2/P2	P6	JCL	PASS
23	TX-6	08/11/92	1255	227	KT	70	220	250	P2/P2	P6	JCL	PASS
24	TX-7	08/11/92	1300	227	SB	70	220	250	P2/P2	P6	JCL	PASS
25	TX-1	08/12/92	757	162	PT	40	215	245	P2/P2	P6	JCL	PASS

APPENDIX H
TRIAL SEAM SUMMARY
POND 93 – EXTRUSION WELDING

RECORD NUMBER	TRIAL SEAM NUMBER	DATE	TIME	WELDER ID		AMBIENT TEMP. (°F)	MACH. TEMP. (°C)		RESULTS		QA MONITOR	REMARKS
				MACH.	TECH.		SET/BAR	ACT/NOZ	PEEL	SHEAR		
26	TX-2	08/12/92	759	162	SN	40	215	245	P2/P2	P6	JCL	PASS
27	TX-3	08/12/92	1305	162	PT	65	207	225	P2/P2	P6	JCL	PASS
28	TX-4	08/12/92	1308	162	SN	65	207	225	P2/P2	P6	JCL	PASS
29	TX-1	08/13/92	825	162	SN	65	215	227	P2/P2	P6	JCL	PASS
30	TX-2	08/13/92	828	162	PT	65	215	227	P2/P2	P6	JCL	PASS
31	TX-3	08/13/92	938	227	BS	68	212	224	P2/P2	P6	JCL	PASS
32	TX-4	08/13/92	1256	227	BS	74	208	231	P2/P2	P6	JCL	PASS
33	TX-5	08/13/92	1258	162	PT	74	205	220	P2/P2	P6	JCL	PASS
34	TX-6	08/13/92	1300	162	SN	74	205	220	P2/P2	P6	JCL	PASS
35	TX-1	08/14/92	751	162	SN	55	210	225	P2/P2	P6	JCL	PASS
36	TX-2	08/14/92	756	162	PT	55	210	225	P2/P2	P6	JCL	PASS
37	TX-3	08/14/92	1306	162	PT	70	215	230	P2/P2	P6	JCL	PASS
38	TX-4	08/14/92	1320	158	SP	70	210	220	P2/P2	P6	JCL	PASS
39	TX-5	08/14/92	1323	158	IOU	70	210	220	P2/P2	P6	JCL	PASS
40	TX-6	08/14/92	1435	227	BS	74	212	227	P2/P2	P6	JCL	PASS
41	TX-1	08/15/92	815	158	IOU	55	210	220	P2/P2	P6	JCL	PASS
42	TX-2	08/15/92	823	158	SP	55	210	220	P2/P2	P6	JCL	PASS
43	TX-3	08/15/92	830	227	BS	55	212	227	P2/P2	P6	JCL	PASS
44	TX-4	08/15/92	835	162	PT	55	215	230	P2/P2	P6	JCL	PASS
45	TX-5	08/15/92	1306	158	SP	75	210	220	P2/P2	P6	JCL	PASS
46	TX-6	08/15/92	1311	162	SN	75	215	230	P2/P2	P6	JCL	PASS
47	TX-7	08/15/92	1313	162	PT	75	215	230	P2/P2	P6	JCL	PASS
48	TX-1	08/17/92	800	162	BS	65	210	227	P2/P2	P6	LS	PASS
49	TX-2	08/17/92	855	158	SB	65	220	245	P2/P2	P6	LS	PASS
50	TX-3	08/17/92	900	158	KT	65	220	245	P2/P2	P6	LS	PASS

APPENDIX H
TRIAL SEAM SUMMARY
POND 93 – EXTRUSION WELDING

RECORD NUMBER	TRIAL SEAM NUMBER	DATE	TIME	WELDER ID		AMBIENT TEMP.	MACH. TEMP. (°C)		RESULTS		QA	REMARKS
				MACH.	TECH.	(°F)	SET/BAR	ACT/NOZ	PEEL	SHEAR	MONITOR	
51	TX-4	08/17/92	1300	162	BS	80	208	224	P2/P2	P6	LS	PASS
52	TX-5	08/17/92	1335	158	SB	80	220	235	P2/P2	P6	LS	PASS
53	TX-6	08/17/92	1320	158	KT	80	220	235	P2/P2	P6	LS	PASS
54	TX-1	08/18/92	750	162	BS	65	211	228	P2/P2	P6	TD	PASS
55	TX-2	08/18/92	830	4	KT	65	220	235	P2/P2	P6	TD	PASS
56	TX-3	08/18/92	835	4	SB	65	220	235	P2/P2	P6	TD	PASS
57	TX-4	08/18/92	1020	158	KT	75	210	225	P2/P2	P6	TD	PASS
58	TX-5	08/18/92	1025	158	SB	75	210	225	P2/P2	P6	TD	PASS
59	TX-6	08/18/92	1300	162	KL	80	205	221	P2/P2	P6	TD	PASS
60	TX-7	08/18/92	1350	158	KT	80	210	225	P2/P2	P6	TD	PASS
61	TX-8	08/18/92	1350	158	SB	80	210	225	P2/P2	P6	TD	PASS
62	TX-1	08/19/92	820	158	SB	70	215	225	P2/P2	P6	TD	PASS
63	TX-2	08/19/92	835	162	KL	70	210	227	P2/P2	P6	TD	PASS
64	TX-3	08/19/92	900	260	K-MAI	70	215	225	P2/P2	P6	TD	PASS
65	TX-4	08/19/92	915	158	KT	70	215	225	P2/P2	P6	TD	PASS
66	TX-5	08/19/92	918	260	KLV	70	225	235	P2/P2	P6	TD	PASS
67	TX-6	08/19/92	1306	162	KL	75	207	227	P2/P2	P6	TD	PASS
68	TX-7	08/19/92	1309	260	SP	75	215	220	P2/P2	P6	TD	PASS
69	TX-8	08/19/92	1315	260	KLV	75	215	220	P2/P2	P5	TD	PASS
70	TX-9	08/19/92	1318	158	KT	75	215	225	P2/P2	P6	TD	PASS
71	TX-10	08/19/92	1320	158	SB	75	215	225	P2/P2	P6	TD	PASS
72	TX-1	08/20/92	819	162	KL	60	209	227	P2/P2	P6	JI	PASS
73	TX-2	08/20/92	828	260	KLV	60	210	215	P2/P2	P6	JI	PASS
74	TX-3	08/20/92	832	260	SP	60	210	215	P2/P2	P6	JI	PASS
75	TX-4	08/20/92	848	158	KT	65	215	225	P2/P2	P6	TD	PASS

Golder Construction Services, Inc.

APPENDIX H
TRIAL SEAM SUMMARY
POND 93 – EXTRUSION WELDING

RECORD NUMBER	TRIAL SEAM NUMBER	DATE	TIME	WELDER ID		AMBIENT TEMP. (°F)	MACH. TEMP. (°C)		RESULTS		QA MONITOR	REMARKS
				MACH.	TECH.		SET/BAR	ACT/NOZ	PEEL	SHEAR		
76	TX-5	08/20/92	852	158	SB	65	215	225	P2/P2	P6	TD	PASS
77	TX-6	08/20/92	930	4	SN	65	215	225	P2/P2	P6	MH	PASS
78	TX-7	08/20/92	930	4	PT	65	215	225	P2/P2	P6	MH	PASS
79	TX-8	08/20/92	1300	162	KL	70	210	229	P2/P2	P6	MH	PASS
80	TX-9	08/20/92	1305	260	KLV	70	220	225	P2/P2	P6	MH	PASS
81	TX-1	08/21/92	805	260	SP	50	215	220	P2/P2	P6	MH	PASS
82	TX-2	08/21/92	810	260	KLV	50	215	220	P2/P2	P6	MH	PASS
83	TX-3	08/21/92	820	158	KT	50	220	230	P2/P2	P6	MH	PASS
84	TX-4	08/21/92	825	158	SB	50	220	230	P2/P2	P6	MH	PASS
85	TX-5	08/21/92	835	162	KL	50	212	223	P2/P2	P6	MH	PASS
86	TX-6	08/21/92	900	4	SN	54	215	225	P2/P2	P6	MH	PASS
87	TX-7	08/21/92	900	4	PT	54	215	225	P2/P2	P6	MH	PASS
88	TX-8	08/21/92	1306	162	KL	70	210	230	P2/P2	P6	MH	FAIL
89	TX-8R1	08/21/92	1411	162	KL	70	210	230	P2/P2	P6	MH	PASS
90	TX-9	08/21/92	1308	260	KLV	70	215	220	P2/P2	P6	MH	PASS
91	TX-10	08/21/92	1310	4	PT	70	215	225	P2/P2	P6	MH	PASS
92	TX-11	08/21/92	1311	4	SN	70	215	225	P2/P2	P6	MH	PASS
93	TX-12	08/21/92	1312	260	SP	70	215	220	P2/P2	P6	MH	PASS
94	TX-13	08/21/92	1314	158	KT	70	215	225	P2/P2	P6	MH	PASS
95	TX-14	08/21/92	1316	158	SB	70	220	225	P2/P2	P6	MH	PASS
96	TX-1	08/22/92	807	158	KT	60	220	230	P2/P2	P6	TD	PASS
97	TX-2	08/22/92	810	158	SB	60	220	230	P2/P2	P6	TD	PASS
98	TX-3	08/22/92	812	162	KL	60	213	234	P2/P2	P6	TD	PASS
99	TX-4	08/22/92	900	4	IOU	60	210	220	P2/P2	P6	JI	PASS
100	TX-5	08/22/92	1015	260	AV	65	215	235	P2/P2	P6	JI	PASS

APPENDIX H
TRIAL SEAM SUMMARY
POND 93 – EXTRUSION WELDING

RECORD NUMBER	TRIAL SEAM NUMBER	DATE	TIME	WELDER ID		AMBIENT TEMP. (°F)	MACH. TEMP. (°C)		RESULTS		QA MONITOR	REMARKS
				MACH.	TECH.		SET/BAR	ACT/NOZ	PEEL	SHEAR		
101	TX-6	08/22/92	1016	260	VV	65	215	235	P2/P2	P6	JI	PASS
102	TX-7	08/22/92	1250	4	IOU	80	210	220	P2/P2	P6	LS	PASS
103	TX-8	08/22/92	1255	260	AV	80	215	245	P2/P2	P6	JI	PASS
104	TX-9	08/22/92	1258	260	VV	80	215	245	P2/P2	P6	JI	PASS
105	TX-10	08/22/92	1300	158	SB	80	220	230	P2/P2	P6	JI	PASS
106	TX-11	08/22/92	1302	158	KT	80	220	230	P2/P2	P6	JI	PASS
107	TX-12	08/22/92	1303	162	KL	80	213	231	P2/P2	P6	JI	PASS
108	TX-1	08/25/92	1010	4	IOU	55	215	220	P2/P2	P6	MH	PASS
109	TX-2	08/25/92	1020	158	KT	55	220	230	P2/P2	P6	MH	PASS
110	TX-3	08/25/92	1030	158	SB	55	220	230	P2/P2	P6	MH	PASS
111	TX-4	08/25/92	1040	162	KL	55	216	239	P2/P2	P6	MH	PASS
112	TX-5	08/25/92	1045	260	TE	55	216	236	P2/P2	P6	MH	PASS
113	TX-6	08/25/92	1100	260	BP	55	215	235	P2/P2	P6	MH	PASS
114	TX-7	08/25/92	1120	8	PT	55	215	225	P2/P2	P6	MH	PASS
115	TX-8	08/25/92	1120	8	AV	55	215	225	P2/P2	P5	MH	PASS
116	TX-9	08/25/92	1250	4	IOU	55	210	215	P2/P2	P6	MH	PASS
117	TX-10	08/25/92	1255	158	KT	55	215	220	P2/P2	P6	MH	PASS
118	TX-11	08/25/92	1255	158	SB	55	215	220	P2/P2	P6	MH	PASS
119	TX-12	08/25/92	1305	260	BP	55	235	250	P2/P2	P6	MH	PASS
120	TX-13	08/25/92	1305	260	TE	55	235	250	P2/P2	P6	MH	PASS
121	TX-14	08/25/92	1310	162	KL	55	218	236	P2/P2	P6	MH	PASS
122	TX-15	08/25/92	1310	8	PT	55	215	225	P2/P2	P6	MH	PASS
123	TX-16	08/25/92	1320	8	AV	55	215	230	P2/P2	P6	MH	PASS
124	TX-1	08/26/92	813	158	KT	40	215	220	P2/P2	P6	JCL	PASS
125	TX-2	08/26/92	813	158	SB	40	215	220	P2/P2	P6	JCL	PASS

APPENDIX H
TRIAL SEAM SUMMARY
POND 93 - EXTRUSION WELDING

RECORD NUMBER	TRIAL SEAM NUMBER	DATE	TIME	WELDER ID		AMBIENT TEMP. (°F)	MACH. TEMP. (°C)		RESULTS		QA MONITOR	REMARKS
				MACH.	TECH.		SET/BAR	ACT/NOZ	PEEL	SHEAR		
126	TX-3	08/26/92	817	162	KL	40	215	241	P2/P2	P6	JCL	PASS
127	TX-4	08/26/92	819	4	BP	40	235	250	P2/P2	P6	JCL	PASS
128	TX-5	08/26/92	1307	162	KL	65	215	240	P2/P2	P6	JCL	PASS
129	TX-6	08/26/92	1309	4	TE	65	230	240	P2/P2	P6	JCL	PASS
130	TX-1	08/27/92	805	162	KL	48	216	242	P2/P2	P6	MH	PASS
131	TX-2	08/27/92	810	158	KT	48	220	230	P2/P2	P6	MH	PASS
132	TX-3	08/27/92	815	158	SB	48	220	230	P2/P2	P6	MH	PASS
133	TX-4	08/27/92	900	4	BP	48	201	235	P2/P2	P6	MH	PASS
134	TX-5	08/27/92	1240	158	KT	65	215	220	P2/P2	P6	MH	PASS
135	TX-6	08/27/92	1245	158	SB	65	215	220	P2/P2	P6	MH	PASS
136	TX-7	08/27/92	1255	4	TE	65	235	250	P2/P2	P6	MH	PASS
137	TX-8	08/27/92	1300	4	BP	65	235	250	P2/P2	P6	MH	PASS
138	TX-9	08/27/92	1320	162	KL	65	215	240	P2/P2	P6	MH	PASS
139	TX-1	08/28/92	905	158	KT	55	220	230	P2/P2	P6	MH	PASS
140	TX-2	08/28/92	907	158	SB	55	220	230	P2/P2	P6	MH	PASS
141	TX-3	08/28/92	1315	158	KT	75	210	215	P2/P2	P6	MH	PASS
142	TX-4	08/28/92	1320	158	SB	75	210	215	P2/P2	P6	MH	PASS
143	TX-1	08/29/92	835	162	KL	50	223	254	P2/P2	P6	MH	PASS
144	TX-2	08/29/92	840	8	IOU	50	220	223	P2/P2	P6	MH	PASS
145	TX-3	08/29/92	845	158	SP	50	220	223	P2/P2	P6	MH	PASS
146	TX-1	08/31/92	835	158	KT	60	220	230	P2/P2	P6	LS	PASS
147	TX-2	08/31/92	840	158	SB	60	220	230	P2/P2	P6	LS	PASS
148	TX-3	08/31/92	845	162	KL	60	217	253	P2/P2	P6	LS	PASS
149	TX-4	08/31/92	846	8	SN	60	215	225	P2/P2	P6	LS	PASS
150	TX-5	08/31/92	847	8	PT	60	215	225	P2/P2	P6	LS	PASS

APPENDIX H
TRIAL SEAM SUMMARY
POND 93 – EXTRUSION WELDING

RECORD NUMBER	TRIAL SEAM NUMBER	DATE	TIME	WELDER ID		AMBIENT TEMP. (°F)	MACH. TEMP. (°C)		RESULTS		QA MONITOR	REMARKS
				MACH.	TECH.		SET/BAR	ACT/NOZ	PEEL	SHEAR		
151	TX-6	08/31/92	1258	162	KL	70	217	250	P2/P2	P6	TM	PASS
152	TX-7	08/31/92	1300	158	SB	70	215	220	P2/P2	P6	TM	PASS
153	TX-8	08/31/92	1301	158	KT	70	215	220	P2/P2	P6	TM	PASS
154	TX-9	08/31/92	1302	8	SN	70	215	220	P2/P2	P6	TM	PASS
155	TX-10	08/31/92	1304	8	PT	70	215	220	P2/P2	P6	TM	PASS
156	TX-11	08/31/92	1315	4	SS	70	210	220	P2/P2	P6	LS	PASS
157	TX-1	09/02/92	805	162	KL	60	219	251	P2/P2	P6	LS	PASS
158	TX-2	09/02/92	820	8	SK	60	220	225	P2/P2	P6	TM	PASS
159	TX-3	09/02/92	825	158	KT	60	220	230	P2/P2	P6	TM	PASS
160	TX-4	09/02/92	826	158	SB	60	220	230	P2/P2	P6	TM	PASS
161	TX-5	09/02/92	930	8	SS	65	220	225	P2/P2	P6	TM	PASS
162	TX-6	09/02/92	1300	158	SB	75	220	225	P2/P2	P6	TM	PASS
163	TX-7	09/02/92	1300	158	KT	75	220	225	P2/P2	P6	TM	PASS
164	TX-8	09/02/92	1305	162	KL	75	219	250	P2/P2	P6	TM	PASS
165	TX-9	09/02/92	1307	8	SKP	75	220	225	P2/P2	P6	TM	PASS
166	TX-1	09/03/92	827	158	KT	60	220	230	P2/P2	P6	TM	PASS
167	TX-2	09/03/92	829	158	SB	60	220	230	P2/P2	P6	TM	PASS
168	TX-3	09/03/92	1304	158	SB	70	210	215	P2/P2	P6	TM	PASS
169	TX-4	09/03/92	1300	158	KT	70	210	215	P2/P2	P6	TM	PASS
170	TX-1	09/04/92	830	8	SN	60	217	227	P2/P2	P6	TM	PASS
171	TX-2	09/04/92	859	158	SB	60	220	230	P2/P2	P6	TM	PASS
712	TX-3	09/04/92	900	158	KT	60	220	230	P2/P2	P6	TM	PASS
173	TX-4	09/04/92	1321	8	SN	60	220	230	P2/P2	P6	TM	PASS
174	TX-5	09/04/92	1324	8	PT	60	220	230	P2/P2	P6	TM	PASS
175	TX-6	09/04/92	1328	158	KT	60	220	230	P2/P2	P6	TM	PASS

APPENDIX H
TRIAL SEAM SUMMARY
POND 93 - EXTRUSION WELDING

RECORD NUMBER	TRIAL SEAM NUMBER	DATE	TIME	WELDER ID		AMBIENT TEMP. (°F)	MACH. TEMP. (°C)		RESULTS		QA MONITOR	REMARKS
				MACH.	TECH.		SET/BAR	ACT/NOZ	PEEL	SHEAR		
176	TX-7	09/04/92	1330	158	SB	60	220	230	P2/P2	P6	TM	PASS
177	TX-8	09/04/92	914	8	PT	60	217	227	P2/P2	P6	MH	PASS
178	TX-1	09/08/92	830	158	KT	40	230	240	P2/P2	P6	JCL	PASS
179	TX-2	09/08/92	835	158	SB	40	230	240	P2/P2	P6	JCL	PASS
180	TX-3	09/08/92	845	8	IOU	40	220	235	P2/P2	P6	JCL	PASS
181	TX-4	09/08/92	900	162	KL	40	227	261	P2/P2	P6	LS	PASS
182	TX-5	09/08/92	1250	8	IOU	60	220	235	P2/P2	P6	LS	PASS
183	TX-6	09/08/92	1305	162	KL	60	227	259	P2/P2	P6	LS	PASS
184	TX-7	09/08/92	1330	158	KT	60	230	240	P2/P2	P6	JCL	PASS
185	TX-8	09/08/92	1333	158	SB	60	230	240	P2/P2	P6	JCL	PASS
186	TX-1	09/09/92	755	162	KL	49	225	260	P2/P2	P6	LS	PASS
187	TX-2	09/09/92	800	8	IOU	49	220	235	P2/P2	P6	LS	PASS
188	TX-3	09/09/92	802	158	KT	49	230	240	P2/P2	P6	LS	PASS
189	TX-4	09/09/92	804	158	SB	49	230	240	P2/P2	P6	LS	PASS
190	TX-1	09/10/92	746	8	IOU	43	220	235	P2/P2	P6	JCL	PASS
191	TX-2	09/10/92	748	162	KL	43	231	260	P2/P2	P6	JCL	PASS
192	TX-3	09/10/92	751	158	KT	43	235	245	P2/P2	P6	JCL	PASS
193	TX-4	09/10/92	753	158	SB	43	235	245	P2/P2	P6	JCL	PASS
194	TX-5	09/10/92	1256	8	IOU	65	220	235	P2/P2	P6	JCL	PASS
195	TX-6	09/10/92	1258	162	SN	65	229	269	P2/P2	P6	JCL	PASS
196	TX-7	09/10/92	1300	162	KL	65	229	269	P2/P2	P6	JCL	PASS
197	TX-8	09/10/92	1306	158	KT	65	220	230	P2/P2	P6	JCL	PASS
198	TX-9	09/10/92	1309	158	SB	65	220	230	P2/P2	P6	JCL	PASS
199	TX-1	09/11/92	900	158	KT	50	220	230	P2/P2	P6	MH	PASS
200	TX-2	09/11/92	900	158	SB	50	220	230	P2/P2	P6	MH	PASS

APPENDIX H
TRIAL SEAM SUMMARY
POND 93 – EXTRUSION WELDING

RECORD NUMBER	TRIAL SEAM NUMBER	DATE	TIME	WELDER ID		AMBIENT TEMP. (°F)	MACH. TEMP. (°C)		RESULTS		QA MONITOR	REMARKS
				MACH.	TECH.		SET/BAR	ACT/NOZ	PEEL	SHEAR		
201	TX-3	09/11/92	1310	158	KT	80	215	225	P2/P2	P6	MH	PASS
202	TX-4	09/11/92	1318	158	SB	80	215	225	P2/P2	P6	MH	PASS
203	TX-1	09/12/92	815	162	KL	50	226	260	P2/P2	P6	MH	PASS
204	TX-2	09/12/92	815	162	SN	50	226	260	P2/P2	P6	MH	PASS
205	TX-3	09/12/92	830	158	KT	50	220	230	P2/P2	P6	MH	PASS
206	TX-4	09/12/92	830	158	SB	50	220	230	P2/P2	P6	MH	PASS
207	TX-5	09/12/92	1315	158	SB	65	220	230	P2/P2	P6	MH	PASS
208	TX-6	09/12/92	1330	162	KL	65	226	261	P2/P2	P6	MH	PASS
209	TX-7	09/12/92	1330	162	SN	65	226	261	P2/P2	P6	MH	PASS
210	TX-1	09/14/92	815	8	IOU	39	220	235	P2/P2	P6	MH	PASS
211	TX-2	09/14/92	845	162	KL	39	224	260	P2/P2	P6	MH	PASS
212	TX-3	09/14/92	855	227	SN	39	222	232	P2/P2	P6	MH	PASS
213	TX-4	09/14/92	900	227	PT	39	222	232	P2/P2	P6	MH	PASS
214	TX-5	09/14/92	910	158	SB	45	230	240	P2/P2	P6	MH	PASS
215	TX-6	09/14/92	910	158	KT	45	230	240	P2/P2	P6	MH	PASS
216	TX-7	09/14/92	1250	162	KL	60	229	260	P2/P2	P6	MH	PASS
217	TX-8	09/14/92	1255	8	IOU	60	220	235	P2/P2	P6	MH	PASS
218	TX-9	09/14/92	1300	227	SN	60	222	232	P2/P2	P6	MH	PASS
219	TX10	09/14/92	1310	158	KT	60	220	230	P2/P2	P6	MH	PASS
220	TX-11	09/14/92	1320	158	SB	60	220	230	P2/P2	P6	MH	PASS
221	TX-12	09/14/92	1325	227	PT	60	222	232	P2/P2	P6	MH	PASS
222	TX-1	09/15/92	815	158	KT	60	230	240	P2/P2	P6	MH	PASS
223	TX-2	09/15/92	815	158	SB	60	230	240	P2/P2	P6	MH	PASS
224	TX-3	09/15/92	820	227	SN	60	225	237	P2/P2	P6	MH	PASS
225	TX-4	09/15/92	820	227	PT	60	225	237	P2/P2	P6	MH	PASS

APPENDIX H
TRIAL SEAM SUMMARY
POND 93 - EXTRUSION WELDING

RECORD NUMBER	TRIAL SEAM NUMBER	DATE	TIME	WELDER ID		AMBIENT TEMP. (°F)	MACH. TEMP. (°C)		RESULTS		QA MONITOR	REMARKS
				MACH.	TECH.		SET/BAR	ACT/NOZ	PEEL	SHEAR		
226	TX-5	09/15/92	1300	227	PT	70	222	232	P2/P2	P6	MH	PASS
227	TX-6	09/15/92	1310	227	SN	70	222	232	P2/P2	P6	MH	PASS
228	TX-7	09/15/92	1315	158	KT	70	210	215	P2/P2	P6	MH	PASS
229	TX-8	09/15/92	1315	158	SB	70	210	215	P2/P2	P6	MH	PASS
230	TX-1	09/16/92	800	158	KT	50	225	235	P2/P2	P6	MH	PASS
231	TX-2	09/16/92	800	158	SB	50	225	235	P2/P2	P6	MH	PASS
232	TX-3	09/16/92	815	8	SP	50	225	240	P2/P2	P6	MH	PASS
233	TX-4	09/16/92	815	162	KL	50	226	260	P2/P2	P6	MH	PASS
234	TX-5	09/16/92	820	8	SKP	50	225	240	P2/P2	P6	MH	PASS
235	TX-6	09/16/92	830	227	PT	50	230	240	P2/P2	P6	MH	PASS
236	TX-7	09/16/92	830	227	SN	50	230	240	P2/P2	P6	MH	PASS
237	TX-8	09/16/92	1250	227	SN	60	230	240	P2/P2	P6	MH	PASS
238	TX-9	09/16/92	1250	227	PT	60	230	240	P2/P2	P6	MH	PASS
239	TX-10	09/16/92	1300	158	KT	60	220	230	P2/P2	P6	MH	PASS
240	TX-11	09/16/92	1300	158	SB	60	220	230	P2/P2	P6	MH	PASS
241	TX-12	09/16/92	1645	8	SP	60	215	225	P2/P2	P6	MH	PASS
242	TX-1	09/17/92	800	158	SB	50	225	235	P2/P2	P6	LS	PASS
243	TX-2	09/17/92	803	158	KT	50	225	235	P2/P2	P6	LS	PASS
244	TX-3	09/17/92	805	162	KL	50	226	260	P2/P2	P6	LS	PASS
245	TX-4	09/17/92	810	8	SS	50	215	225	P2/P2	P6	LS	PASS
246	TX-5	09/17/92	815	8	SKP	50	215	225	P2/P2	P6	LS	PASS
247	TX-6	09/17/92	817	227	PT	50	227	237	P2/P2	P6	LS	PASS
248	TX-7	09/17/92	820	227	SN	50	227	237	P2/P2	P6	LS	PASS
249	TX-8	09/17/92	1246	227	SN	60	225	235	P2/P2	P6	LS	PASS
250	TX-9	09/17/92	1248	227	PT	60	225	235	P2/P2	P6	LS	PASS

APPENDIX H
TRIAL SEAM SUMMARY
POND 93 – EXTRUSION WELDING

RECORD NUMBER	TRIAL SEAM NUMBER	DATE	TIME	WELDER ID		AMBIENT TEMP. (°F)	MACH. TEMP. (°C)		RESULTS		QA MONITOR	REMARKS
				MACH.	TECH.		SET/BAR	ACT/NOZ	PEEL	SHEAR		
251	TX-10	09/17/92	1252	8	SS	60	215	225	P2/P2	P6	LS	PASS
252	TX-11	09/17/92	1255	162	KL	60	226	260	P2/P2	P6	LS	PASS
253	TX-12	09/17/92	1258	8	SKP	60	215	225	P2/P2	P6	LS	PASS
254	TX-13	09/17/92	1259	158	KT	60	220	230	P2/P2	P6	LS	PASS
255	TX-14	09/17/92	1302	158	SB	60	220	230	P2/P2	P6	LS	PASS
256	TX-1	09/18/92	820	158	KT	39	230	240	P2/P2	P6	MH	PASS
257	TX-2	09/18/92	820	158	SB	39	230	240	P2/P2	P6	MH	PASS
258	TX-3	09/18/92	830	162	KL	39	226	260	P2/P2	P6	MH	PASS
259	TX-4	09/18/92	835	8	SS	39	220	225	P2/P2	P6	MH	PASS
260	TX-5	09/18/92	835	8	SKP	39	220	225	P2/P2	P6	MH	PASS
261	TX-6	09/18/92	840	227	SN	39	230	245	P2/P2	P6	MH	PASS
262	TX-7	09/18/92	840	227	PT	39	230	245	P2/P2	P6	MH	PASS
263	TX-8	09/18/92	1305	227	PT	55	235	255	P2/P2	P6	MH	PASS
264	TX-9	09/18/92	1315	8	SS	55	220	225	P2/P2	P6	MH	PASS
265	TX-10	09/18/92	1320	162	KL	55	226	260	P2/P2	P6	MH	PASS
266	TX-11	09/18/92	1305	158	SB	55	220	230	P2/P2	P6	MH	PASS
267	TX-12	09/18/92	1300	158	KT	55	220	230	P2/P2	P6	MH	PASS
268	TX-1	09/19/92	755	158	SP	40	225	235	P2/P2	P6	LS	PASS
269	TX-2	09/19/92	758	162	SN	40	227	255	P2/P2	P6	LS	PASS
270	TX-3	09/19/92	800	162	PT	40	227	255	P2/P2	P6	LS	PASS
271	TX-4	09/19/92	830	8	VV	40	225	245	P2/P2	P6	LS	PASS
272	TX-5	09/19/92	832	8	AV	40	225	245	P2/P2	P6	LS	PASS
273	TX-6	09/19/92	1252	162	IOU	70	220	230	P2/P2	P6	LS	PASS
274	TX-7	09/19/92	1300	8	VV	70	220	245	P2/P2	P6	LS	PASS
275	TX-8	09/19/92	1302	8	AV	70	220	245	P2/P2	P6	LS	PASS

APPENDIX H
TRIAL SEAM SUMMARY
POND 93 - EXTRUSION WELDING

RECORD NUMBER	TRIAL SEAM NUMBER	DATE	TIME	WELDER ID		AMBIENT TEMP. (°F)	MACH. TEMP. (°C)		RESULTS		QA MONITOR	REMARKS
				MACH.	TECH.		SET/BAR	ACT/NOZ	PEEL	SHEAR		
276	TX-1	09/21/92	835	8	VV	58	225	250	P2/P2	P6	LS	PASS
277	TX-2	09/21/92	840	8	AV	58	225	250	P2/P2	P6	LS	PASS
278	TX-3	09/21/92	905	162	SN	60	230	250	P2/P2	P6	LS	PASS
279	TX-4	09/21/92	908	162	PT	60	230	250	P2/P2	P6	LS	PASS
280	TX-5	09/21/92	910	158	IOU	60	225	235	P2/P2	P6	LS	PASS
281	TX-6	09/21/92	1250	158	IOU	60	225	235	P2/P2	P6	LS	PASS
282	TX-7	09/21/92	1255	8	AV	60	220	250	P2/P2	P6	LS	PASS
283	TX-8	09/21/92	1257	8	VV	60	220	250	P2/P2	P6	LS	PASS
284	TX-9	09/21/92	1300	162	PT	60	230	245	P2/P2	P6	LS	PASS
285	TX-1	09/22/92	805	8	AV	40	220	250	P2/P2	P6	LS	PASS
286	TX-2	09/22/92	807	8	VV	40	220	250	P2/P2	P6	LS	PASS
287	TX-3	09/22/92	910	162	IOU	40	230	240	P2/P2	P6	LS	PASS
288	TX-4	09/22/92	1245	8	AV	55	220	250	P2/P2	P6	LS	PASS
289	TX-5	09/22/92	1247	8	VV	55	220	250	P2/P2	P6	LS	PASS
290	TX-6	09/22/92	1250	162	IOU	55	230	240	P2/P2	P6	LS	PASS
291	TX-1	09/23/92	850	162	IOU	60	230	240	P2/P2	P6	LS	PASS
292	TX-2	09/23/92	853	8	VV	60	220	250	P2/P2	P6	LS	PASS
293	TX-3	09/23/92	855	8	AV	60	220	250	P2/P2	P6	LS	PASS
294	TX-4	09/23/92	1050	158	PT	70	225	245	P2/P2	P6	LS	PASS
295	TX-5	09/23/92	1250	162	IOU	75	225	235	P2/P2	P6	LS	PASS
296	TX-6	09/23/92	1255	8	VV	75	220	250	P2/P2	P6	LS	PASS
297	TX-7	09/23/92	1257	8	AV	75	220	250	P2/P2	P6	LS	PASS
298	TX-8	09/23/92	1305	152	PT	75	220	235	P2/P2	P6	LS	PASS

Golder Construction Services, Inc.

APPENDIX H
TRIAL SEAM SUMMARY
POND 93 – FUSION WELDING

RECORD NUMBER	TRIAL SEAM NUMBER	DATE	TIME	WELDER I.D.		AMBIENT TEMP. (°F)	MACH. SETTING		INSIDE PEEL	OUTSIDE PEEL	SHEAR	QA MONITOR	REMARKS
				MACH.	TECH.		SPEED	TEMP.(C)					
1	TF-1	08/05/92	810	220	IOU	44	2.35	410	P2/P2	P2/P2	P1	LS	PASS
2	TF-2	08/05/92	820	246	SS	44	1.60	410	P2/P2	P2/P2	P1	LS	PASS
3	TF-3	08/05/92	830	210	BS	44	2.60	409	P2/P2	P2/P2	P1	LS	PASS
4	TF-4	08/05/92	1308	246	SS	70	1.60	410	P2/P2	P2/P2	P1	LS	PASS
5	TF-5	08/05/92	1315	210	BS	70	2.80	403	P2/P2	P2/P2	P1	LS	PASS
6	TF-6	08/05/92	1330	220	IOU	70	2.35	410	F4	F4	P1	LS	FAIL
7	TF-6R1	08/05/92	1345	220	IOU	70	2.35	410	P2/P2	P2/P2	P1	LS	PASS
8	TF-7	08/06/92	751	246	SS	60	1.50	410	P2/P2	P2/P2	P1	TD	PASS
9	TF-8	08/06/92	753	220	IOU	60	2.35	410	P2/P2	P2/P2	P1	TD	PASS
10	TF-9	08/06/92	801	210	BS	60	2.80	409	P2/P2	P2/P2	P1	TD	PASS
11	TF-10	08/06/92	1257	246	SS	65	1.50	410	P2/P2	P2/P2	P1	TD	PASS
12	TF-11	08/06/92	1301	220	IOU	65	2.35	410	P2/P2	P2/P2	P1	TD	PASS
13	TF-12	08/06/92	1304	210	BS	65	2.80	409	P2/P2	F4		TD	FAIL
14	TF-12R1	08/06/92	1322	210	BS	65	2.75	415	P2/P2	P2/P2	P1	TD	PASS
15	TF-1	08/07/92	838	246	SS	60	1.50	410	P2/P2	F1		TD	FAIL
16	TF-1R1	08/07/92	853	246	SS	60	1.50	410	P2/P2	P2/P2	P6	TD	PASS
17	TF-2	08/07/92	858	220	IOU	60	2.35	415	P2/P2	P2/P2	P6	TD	PASS
18	TF-3	08/07/92	911	210	BS	60	2.75	412	P2/P2	F1		TD	FAIL
19	TF-3R1	08/07/92	929	210	BS	60	2.75	416	P2/P2	F1		TD	FAIL
20	TF-3R2	08/07/92	1026	210	BS	60	2.70	413	P2/P2	P2/P2	P6	TD	PASS
21	TF-3R3	08/07/92	1031	210	BS	60	2.70	413	P2/P2	P2/P2	P6	TD	PASS
22	TF-4	08/07/92	1258	220	IOU	75	2.35	400	P2/P2	P2/P2	P6	TD	PASS
23	TF-5	08/07/92	1301	246	SS	75	1.50	410	P2/P2	P2/P2	P6	TD	PASS
24	TF-6	08/07/92	1305	210	BS	75	2.70	408	P2/P2	P2/P2	P6	TD	PASS
25	TF-1	08/08/92	754	220	IOU	65	2.35	410	P2/P2	P2/P2	P6	TD	PASS
26	TF-2	08/08/92	801	246	SS	65	1.50	410	P2/P2	P2/P2	P6	TD	PASS

Golder Construction Services, Inc.

APPENDIX H
TRIAL SEAM SUMMARY
POND 93 – FUSION WELDING

RECORD NUMBER	TRIAL SEAM NUMBER	DATE	TIME	WELDER I.D.		AMBIENT TEMP.	MACH. SETTING		INSIDE PEEL	OUTSIDE PEEL	SHEAR	QA MONITOR	REMARKS
				MACH.	TECH.	(°F)	SPEED	TEMP.(C)					
27	TF-3	08/08/92	1245	220	IOU	80	2.35	400	P2/P2	P2/P2	P6	TD	PASS
28	TF-1	08/10/92	750	246	SS	60	1.55	410	P2/P2	P2/P2	P1	JCL	PASS
29	TF-2	08/10/92	755	220	IOU	60	2.35	410	P2/P2	P2/P2	P1	JCL	PASS
30	TF-3	08/10/92	1250	220	IOU	75	2.35	410	P2/P2	P2/P2	P1	JCL	PASS
31	TF-4	08/10/92	1255	246	SS	75	1.55	410	P2/P2	P2/P2	P1	JCL	PASS
32	TF-5	08/10/92	1440	210	AV	78	2.20	385	P2/P2	P2/P2	P1	JCL	PASS
33	TF-1	08/11/92	750	220	IOU	60	2.35	410	P2/P2	P2/P2	P1	JCL	PASS
34	TF-2	08/11/92	800	246	SS	60	1.50	410	F4	P2	P1	JCL	FAIL
35	TF-2R1	08/11/92	808	246	SS	63	1.50	410	P2/P2	P2/P2	P1	JCL	PASS
36	TF-3	08/11/92	1250	220	IOU	70	2.35	410	P2/P2	P2/P2	P1	JCL	PASS
37	TF-4	08/11/92	1258	246	SS	70	1.50	410	P2/P2	P2/P2	P1	JCL	PASS
38	TF-1	08/12/92	753	220	IOU	40	2.35	410	P2/P2	P2/P2	P1	JCL	PASS
39	TF-2	08/12/92	802	246	SS	40	1.50	410	P2/P2	P2/P2	P1	JCL	PASS
40	TF-3	08/12/92	845	223	BS	40	2.40	417	P2/P2	P2/P2	P1	JCL	PASS
41	TF-4	08/12/92	852	64	SKP	40	2.50	415	P2/P2	P2/P2	P1	JCL	PASS
42	TF-5	08/12/92	1255	220	IOU	65	2.50	410	P2/P2	P2/P2	P1	JCL	PASS
43	TF-6	08/12/92	1304	223	BS	65	2.50	395	P2/P2	P2/P2	P1	JCL	PASS
44	TF-7	08/12/92	1309	64	SKP	65	3.50	400	P2/P2	P2/P2	P1	JCL	PASS
45	TF-8	08/12/92	1314	246	SS	65	1.65	410	P2/P2	P2/P2	P1	JCL	PASS
46	TF-1	08/13/92	750	220	IOU	63	2.50	410	P2/P2	P2/P2	P1	JCL	PASS
47	TF-2	08/13/92	755	64	SKP	63	2.50	415	P2/P2	P2/P2	P1	JCL	PASS
48	TF-3	08/13/92	802	246	SS	63	1.44	410	P2/P2	P2/P2	P1	JCL	PASS
49	TF-4	08/13/92	903	246	SS	65	1.46	410	P2/P2	P2/P2	P1	JCL	PASS
50	TF-5	08/13/92	905	220	IOU	65	2.50	410	P2/P2	P2/P2	P1	JCL	PASS
51	TF-6	08/13/92	1038	220	IOU	68	2.30	410	P2/P2	P2/P2	P1	JCL	PASS
52	TF-7	08/13/92	1039	64	SKP	68	2.50	410	P2/P2	P2/P2	P1	JCL	PASS

APPENDIX H
TRIAL SEAM SUMMARY
POND 93 – FUSION WELDING

RECORD NUMBER	TRIAL SEAM NUMBER	DATE	TIME	WELDER I.D.		AMBIENT TEMP. (°F)	MACH. SETTING		INSIDE PEEL	OUTSIDE PEEL	SHEAR	QA MONITOR	REMARKS
				MACH.	TECH.		SPEED	TEMP (C)					
53	TF-8	08/13/92	1044	246	SS	68	1.50	410	P2/P2	P2/P2	P1	JCL	PASS
54	TF-9	08/13/92	1243	220	IOU	72	2.30	410	P2/P2	P2/P2	P1	JCL	PASS
55	TF-10	08/13/92	1245	246	SS	72	1.58	410	P2/P2	P2/P2	P1	JCL	PASS
56	TF-11	08/13/92	1248	64	SKP	72	2.50	400	P2/P2	P2/P2	P1	JCL	PASS
57	TF-1	08/14/92	749	220	IOU	55	2.30	410	P2/P2	P2/P2	P1	JCL	PASS
58	TF-2	08/14/92	846	64	SKP	58	2.20	400	P2/P2	P2/P2	P1	JCL	PASS
59	TF-1	08/17/92	800	246	SS	65	1.45	410	P2/P2	P2/P2	P1	LS	PASS
60	TF-2	08/17/92	805	220	IOU	65	2.30	410	P2/P2	P2/P2	P1	LS	PASS
61	TF-3	08/17/92	815	64	SKP	65	2.30	400	P2/P2	P2/P2	P1	LS	PASS
62	TF-4	08/17/92	825	223	K-MAI	65	3.00	415	P2/P2	P2/P2	P1	LS	PASS
63	TF-5	08/17/92	1250	64	SKP	80	1.25	400	P2/P2	P2/P2	P1	LS	PASS
64	TF-6	08/17/92	1300	246	SS	80	1.50	410	P2/P2	P2/P2	P1	LS	PASS
65	TF-7	08/17/92	1305	220	IOU	80	2.30	410	P2/P2	P2/P2	P1	LS	PASS
66	TF-8	08/17/92	1310	223	K-MAI	80	2.90	410	P2/P2	P2/P2	P1	LS	PASS
67	TF-9	08/17/92	1600	220	IOU	80	2.50	410	P2/P2	P2/P2	P1	LS	PASS
68	TF-1	08/18/92	750	246	SS	65	2.48	415	P2/P2	F1		TD	FAIL
69	TF-2	08/18/92	758	223	K-MAI	65	3.00	415	P2/P2	P2/P2	P1	TD	PASS
70	TF-3	08/18/92	805	220	IOU	65	2.50	410	P2/P2	P2/P2	P1	TD	PASS
71	TF-4	08/18/92	806	64	SKP	65	2.50	400	P2/P2	P2/P2	P1	TD	PASS
72	TF-1R1	08/18/92	815	246	SS	65	1.48	415	P2/P2	P2/P2	P1	TD	PASS
73	TF-5	08/18/92	1130	246	SS	65	2.60	410	P2/P2	P2/P2	P1	JI	PASS
74	TF-6	08/18/92	1255	220	IOU	75	3.10	410	P2/P2	P2/P2	P1	JI	PASS
75	TF-7	08/18/92	1258	64	SKP	75	2.70	400	P2/P2	P2/P2	P1	JI	PASS
76	TF-8	08/18/92	1302	223	K-MAI	75	2.80	410	P2/P2	P2/P2	P1	JI	PASS
77	TF-9	08/18/92	1315	246	SS	75	2.78	415	P2/P2	P2/P2	P1	JI	PASS
78	TF-1	08/19/92	805	223	K-MAI	75	2.80	410	P2/P2	P2/P2	P6	TD	PASS

Golder Construction Services, Inc.

APPENDIX H
TRIAL SEAM SUMMARY
POND 93 – FUSION WELDING

RECORD NUMBER	TRIAL SEAM NUMBER	DATE	TIME	WELDER I.D.		AMBIENT TEMP.	MACH. SETTING		INSIDE PEEL	OUTSIDE PEEL	SHEAR	QA MONITOR	REMARKS
				MACH.	TECH.	(°F)	SPEED	TEMP.(C)					
79	TF-2	08/19/92	808	220	IOU	70	2.50	410	P2/P2	P2/P2	P6	TD	PASS
80	TF-3	08/19/92	815	64	SME	70	2.40	415	P2/P2	P2/P2	P6	TD	PASS
81	TF-4	08/19/92	1100	220	IOU	70	3.00	410	P2/P2	P2/P2	P6	JI	PASS
82	TF-5	08/19/92	1305	64	SS	75	2.60	415	P2/P2	P2/P2	P6	MH	PASS
83	TF-6	08/19/92	1307	223	K-MAI	75	2.80	420	P2/P2	P2/P2	P6	MH	PASS
84	TF-7	08/19/92	1316	220	SP	75	3.20	410	P2/P2	P2/P2	P6	MH	PASS
85	TF-1	08/20/92	818	64	SS	60	2.40	415	P2/P2	P2/P2	P2	JI	PASS
86	TF-2	08/20/92	821	220	IOU	60	3.40	410	P2/P2	P2/P2	P1	JI	PASS
87	TF-3	08/20/92	825	223	K-MAI	60	2.70	420	P2/P2	P2/P2	P1	JI	PASS
88	TF-4	08/20/92	1251	220	IOU	65	3.40	410	P2/P2	P2/P2	P6	MH	PASS
89	TF-5	08/20/92	1305	223	K-MAI	60	2.60	420	P2/P2	P2/P2	P6	MH	PASS
90	TF-6	08/20/92	1315	246	SS	60	1.70	415	P2/P2	P2/P2	P6	MH	PASS
91	TF-1	08/21/92	800	223	K-MAI	50	2.70	425	P2/P2	P2/P2	P6	MH	PASS
92	TF-2	08/21/92	805	246	SS	50	1.90	415	P2/P2	P2/P2	P6	MH	PASS
93	TF-3	08/21/92	819	220	IOU	55	3.40	410	P2/P2	P2/P2	P6	MH	PASS
94	TF-4	08/21/92	1330	64	SS	70	2.40	410	P2/P2	P2/P2	P6	MH	PASS
95	TF-5	08/21/92	1340	223	K-MAI	70	2.70	415	P2/P2	P2/P2	P6	MH	PASS
96	TF-6	08/21/92	1345	220	IOU	70	3.60	410	P2/P2	P2/P2	P6	MH	PASS
97	TF-1	08/26/92	750	220	IOU	40	3.60	410	F1	--	--	JCL	FAIL
98	TF-2	08/26/92	753	223	SS	40	1.90	415	P2/P2	P2/P2	P1	JCL	PASS
99	TF-1R1	08/26/92	758	220	IOU	40	3.30	410	P2/P2	P2/P2	P1	JCL	PASS
100	TF-3	08/26/92	804	246	KS	40	----	420	P2/F1	P2/F1	--	JCL	FAIL
101	TF-4	08/26/92	806	64	SKP	40	2.50	415	P2/P2	P2/P2	P1	JCL	PASS
102	TF-3R1	08/26/92	816	246	KS	40	2.60	420	P2/P2	P2/P2	P1	JCL	PASS
103	TF-5	08/26/92	1300	220	IOU	65	3.50	410	P2/P2	P2/P2	P1	JCL	PASS
104	TF-6	08/26/92	1313	246	KS	65	2.20	410	P2/P2	F1/F1	--	JCL	FAIL

APPENDIX H
TRIAL SEAM SUMMARY
POND 93 – FUSION WELDING

RECORD NUMBER	TRIAL SEAM NUMBER	DATE	TIME	WELDER I.D.		AMBIENT TEMP. (°F)	MACH. SETTING		INSIDE PEEL	OUTSIDE PEEL	SHEAR	QA MONITOR	REMARKS
				MACH	TECH		SPEED	TEMP.(C)					
105	TF-7	08/26/92	1316	64	SKP	65	2.50	400	P2/P2	P2/P2	P1	JCL	PASS
106	TF-8	08/26/92	1320	223	SS	65	2.10	415	P2/P2	P2/P2	P1	JCL	PASS
107	TF-6R1	08/26/92	1325	246	KS	65	2.00	410	P2/P2	P2/P2	P1	JCL	PASS
108	TF-1	08/27/92	805	220	IOU	48	3.00	410	P2/P2	P2/P2	P1	MH	PASS
109	TF-2	08/27/92	810	223	SS	48	2.00	415	P2/P2	P2/P2	P1	MH	PASS
110	TF-3	08/27/92	815	64	SKP	48	2.50	415	P2/P2	P2/P2	P1	MH	PASS
111	TF-4	08/27/92	830	246	KS	48	2.20	410	P2/P2	P2/P2	P1	MH	PASS
112	TF-5	08/27/92	1250	223	SS	65	2.10	415	P2/P2	P2/P2	P1	MH	PASS
113	TF-6	08/27/92	1250	220	IOU	65	3.40	410	P2/P2	P2/P2	P1	MH	PASS
114	TF-7	08/27/92	1305	246	KS	65	2.20	410	P2/P2	P2/P2	P1	MH	PASS
115	TF-8	08/27/92	1357	64	SKP	75	2.50	410	P2/P2	P2/P2	P1	JI	PASS
116	TF-1	08/28/92	745	223	SS	55	2.10	415	P2/P2	P2/P2	P1	MH	PASS
117	TF-2	08/28/92	800	64	SKP	55	2.40	415	P2/P2	P2/P2	P1	MH	PASS
118	TF-3	08/28/92	805	220	IOU	55	3.50	410	P2/P2	P2/P2	P1	MH	PASS
119	TF-4	08/28/92	850	146	BS	60	2.70	422	P2/P2	P2/P2	P1	MH	PASS
120	TF-5	08/28/92	1355	223	SS	80	2.40	415	P2/P2	P2/P2	P1	MH	PASS
121	TF-6	08/28/92	1530	146	BS	85	2.50	419	P2/P2	P2/P2	P1	MH	PASS
122	TF-7	08/28/92	1330	220	SKP	86	3.40	400	P2/P2	P2/P2	P1	MH	PASS
123	TF-1	09/01/92	753	223	SS	50	1.90	415	P2/P2	P2/P2	P1	TM	PASS
124	TF-2	09/01/92	804	220	SKP	50	3.50	410	P2/P2	P2/P2	P1	TM	PASS
125	TF-3	09/01/92	845	246	BS	50	2.50	432	P2/P2	P2/P2	P1	TM	PASS
126	TF-1	09/03/92	1100	220	SKP	70	3.30	410	P2/P2	P2/P2	P1	LS	PASS
127	TF-2	09/03/92	1115	246	BS	65	2.40	432	P2/P2	P2/P2	P1	MH	PASS
128	TF-3	09/03/92	1050	223	SS	65	1.60	415	P2/P2	P2/P2	P1	MH	PASS
129	TF-4	09/03/92	1300	223	SS	70	2.10	415	P2/P2	P2/P2	P1	TM	PASS
130	TF-5	09/03/92	1309	220	SKP	70	3.50	400	P2/P2	P2/P2	P1	TM	PASS

APPENDIX H
TRIAL SEAM SUMMARY
POND 93 – FUSION WELDING

RECORD NUMBER	TRIAL SEAM NUMBER	DATE	TIME	WELDER I.D.		AMBIENT TEMP. (°F)	MACH. SETTING		INSIDE PEEL	OUTSIDE PEEL	SHEAR	QA MONITOR	REMARKS
				MACH.	TECH.		SPEED	TEMP.(C)					
131	TF-6	09/03/92	1313	246	BS	70	2.50	430	P2/P2	P2/P2	P1	TM	PASS
132	TF-1	09/04/92	757	223	SS	55	1.90	415	P2/P2	P2/P2	P1	TM	PASS
133	TF-2	09/04/92	800	220	SKP	55	3.30	410	P2/P2	P2/P2	P1	TM	PASS
134	TF-3	09/04/92	815	246	BS	55	2.60	426	P2/P2	P2/P2	P1	TM	PASS
135	TF-4	09/04/92	1117	246	BS	55	2.70	419	P2/P2	P2/P2	P1	TM	PASS
136	TF-5	09/04/92	1119	220	SKP	55	3.30	410	P2/P2	P2/P2	P1	TM	PASS
137	TF-6	09/04/92	1132	223	SS	55	1.90	415	P2/P2	P2/P2	P1	TM	PASS
138	TF-7	09/04/92	1320	223	SS	60	1.90	415	P2/P2	P2/P2	P1	TM	PASS
139	TF-8	09/04/92	1324	246	BS	60	2.60	410	P2/P2	P2/P2	P1	TM	PASS
140	TF-9	09/04/92	1331	220	SKP	60	3.30	410	P2/P2	P2/P2	P1	TM	PASS
141	TF-1	09/11/92	805	223	SS	48	1.80	415	P2/P2	P2/P2	P1	JCL	PASS
142	TF-2	09/11/92	810	220	IOU	48	3.30	410	P2/P2	P2/P2	P1	JCL	PASS
143	TF-3	09/11/92	815	246	BS	48	2.70	430	P2/P2	P2/P2	P1	JCL	PASS
144	TF-4	09/11/92	818	64	SKP	48	2.50	415	P2/P2	P2/P2	P1	JCL	PASS
145	TF-5	09/11/92	1251	64	SKP	80	2.60	400	P2/P2	P2/P2	P1	MH	PASS
146	TF-6	09/11/92	1300	220	IOU	80	3.80	410	P2/P2	P2/P2	P1	MH	PASS
147	TF-7	09/11/92	1315	246	BS	80	2.70	412	P2/P2	P2/P2	P1	MH	PASS
148	TF-8	09/11/92	1340	223	SS	80	2.00	415	P2/P2	P2/P2	P1	MH	PASS
149	TF-1	09/12/92	750	223	SS	50	1.80	415	P2/P2	P2/P2	P1	MH	PASS
150	TF-2	09/12/92	750	220	IOU	50	3.30	410	P2/P2	P2/P2	P1	MH	PASS
151	TF-3	09/12/92	755	246	BS	50	2.70	426	P2/P2	P2/P2	P1	MH	PASS
152	TF-4	09/12/92	800	246	PT	50	2.70	426	P2/P2	P2/P2	P1	MH	PASS
153	TF-5	09/12/92	1310	220	IOU	65	3.20	415	P2/P2	P2/P2	P1	MH	PASS
154	TF-6	09/12/92	1310	246	BS	65	2.70	420	P2/P2	P2/P2	P1	MH	PASS
155	TF-7	09/12/92	1300	223	SS	65	2.00	415	P2/P2	P2/P2	P1	MH	PASS
156	TF-1	09/15/92	825	220	IOU	60	3.30	415	P2/P2	P2/P2	P1	MH	PASS

Golder Construction Services, Inc.

APPENDIX H
TRIAL SEAM SUMMARY
POND 93 – FUSION WELDING

RECORD NUMBER	TRIAL SEAM NUMBER	DATE	TIME	WELDER I.D.		AMBIENT TEMP.	MACH. SETTING		INSIDE PEEL	OUTSIDE PEEL	SHEAR	QA MONITOR	REMARKS
				MACH.	TECH.	(°F)	SPEED	TEMP.(C)					
157	TF-2	09/15/92	800	223	SS	60	1.80	415	P2/P2	P2/P2	P1	MH	PASS
158	TF-3	09/15/92	800	64	BS	60	2.70	426	P2/P2	P2/P2	P1	MH	PASS
159	TF-4	09/15/92	1300	223	SS	70	2.40	420	P2/P2	P2/P2	P1	MH	PASS
160	TF-5	09/15/92	1305	220	IOU	70	3.30	415	P2/P2	P2/P2	P1	MH	PASS
161	TF-6	09/15/92	1310	64	BS	70	2.70	416	P2/P2	P2/P2	P1	MH	PASS
162	TF-1	09/16/92	1100	223	SS	55	1.80	420	P2/P2	P2/P2	P1	MH	PASS
163	TF-2	09/16/92	1245	64	SKP	60	3.50	410	P2/P2	P2/P2	P1	MH	PASS
164	TF-3	09/16/92	1305	223	SS	60	1.80	420	P2/P2	P2/P2	P1	MH	PASS
165	TF-4	09/16/92	1320	220	BS	60	2.70	421	P2/P2	P2/P2	P1	MH	PASS

Golder Construction Services, Inc.

APPENDIX I

FUSION WELDING SUMMARIES

December 1992

927-4003

Golder Construction Services, Inc.

APPENDIX I
POND 93
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	LOCATION
					WELDER I.D.		MACH. TEMP (°F)					
					TECH.	MACH	SET.	ACT.				
1	1 / 2	08/05/92	835	44	IOU	220	410	410	64	DS-02	JI	--
2	1 / 23	08/05/92	1340	69	SS	246	410	409	70	--	JI	--
3	1 / 25	08/05/92	1600	68	SS	246	410	406	34	--	JI	--
4	2 / 3	08/05/92	825	44	SS	246	410	408	64	DS-01	JI	--
5	2 / 25	08/05/92	1701	68	IOU	220	410	411	34	--	JI	--
6	3 / 4	08/05/92	850	44	BS	210	409	407	65	DS-03	JI	--
7	3 / 25	08/05/92	1652	68	IOU	220	410	408	34	--	JI	--
8	4 / 5	08/05/92	845	50	SS	246	410	406	66	--	JI	--
9	4 / 25	08/05/92	1641	68	IOU	220	410	409	34	--	JI	--
10	5 / 6	08/05/92	855	50	IOU	220	410	409	66	--	JI	--
11	5 / 25	08/05/92	1633	68	IOU	220	410	408	34	--	JI	--
12	6 / 7	08/05/92	909	55	BS	210	409	400	67	--	JI	--
13	6 / 25	08/05/92	1627	68	IOU	220	410	407	34	--	JI	--
14	7 / 8	08/05/92	905	55	SS	246	410	407	68	--	JI	--
15	7 / 25	08/05/92	1617	68	IOU	220	410	408	34	--	JI	--
16	8 / 9	08/05/92	920	55	IOU	220	410	407	68	--	JI	--
17	8 / 25	08/05/92	1610	68	IOU	220	410	409	34	--	JI	--
18	9 / 10	08/05/92	951	60	SS	246	410	406	69	--	JI	--
19	9 / 25	08/05/92	1650	68	SS	246	410	408	34	--	JI	--
20	10 / 11	08/05/92	950	60	BS	210	409	398	71	--	JI	--
21	10 / 25	08/05/92	1635	68	SS	246	410	407	34	--	JI	--
22	11 / 12	08/05/92	1003	60	IOU	220	410	404	72	--	JI	--
23	11 / 25	08/05/92	1650	68	BS	210	406	403	34	--	JI	--
24	12 / 13	08/05/92	1005	60	SS	246	410	407	74	--	JI	--
25	12 / 25	08/05/92	1642	68	BS	210	406	404	34	--	JI	--
26	13 / 14	08/05/92	1015	60	BS	210	409	400	73	--	JI	--
27	13 / 25	08/05/92	1635	69	BS	210	406	402	34	--	JI	--

APPENDIX I
POND 93
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	LOCATION
					WELDER I.D.		MACH. TEMP (°F)					
					TECH.	MACH	SET	ACT.				
28	14 / 15	08/05/92	1025	65	IOU	220	410	406	73	--	JI	--
29	14 / 25	08/05/92	1622	69	BS	210	406	403	34	--	JI	--
30	15 / 16	08/05/92	1030	65	SS	246	410	408	74	--	JI	--
31	15 / 25	08/05/92	1611	69	BS	210	406	400	34	DS-05	JI	--
32	16 / 17	08/05/92	1046	65	IOU	220	410	409	73	--	JI	--
33	16 / 25	08/05/92	1602	69	BS	210	406	402	34	--	JI	--
34	17 / 18	08/05/92	1100	65	BS	210	409	406	35	--	JI	--
35	17 / 18	08/05/92	1130	65	BS	210	409	400	43	--	JI	--
36	17 / 25	08/05/92	1600	69	BS	210	406	401	4	--	JI	RS ENTIRE SEAM
37	17 / 43	08/10/92	1051	67	SS	246	410	406	30	--	JI	--
38	18 / 19	08/05/92	1118	68	SS	246	410	409	78	DS-04	JI	--
39	18 / 43	08/10/92	1043	67	SS	246	410	408	34	--	JI	--
40	19 / 20	08/05/92	1145	65	IOU	220	410	408	74	DS-06	JI	--
41	19 / 43	08/10/92	1035	67	SS	246	410	407	34	--	JI	--
42	20 / 21	08/05/92	1145	68	SS	246	410	408	79	--	JI	--
43	20 / 43	08/10/92	1027	67	SS	246	410	406	34	--	JI	--
44	21 / 39	08/10/92	815	62	SS	246	410	406	72	--	JI	--
45	21 / 43	08/10/92	1017	67	SS	246	410	409	34	--	JI	--
46	22 / 23	08/05/92	1420	69	IOU	220	410	408	28	--	JI	--
47	22 / 24	08/05/92	1525	69	BS	210	406	400	37	--	JI	--
48	22 / 25	08/05/92	1615	68	SS	246	410	408	61	--	JI	--
49	23 / 24	08/05/92	1425	69	SS	246	410	407	23	--	JI	--
50	23 / 25	08/05/92	1608	68	SS	246	410	409	34	--	JI	--
51	25 / 26	08/06/92	900	62	BS	210	409	406	197	--	JI	538'S TO 341'S
52	25 / 26	08/06/92	843	62	IOU	220	410	407	141	--	JI	341'S TO 200'S
53	25 / 26	08/06/92	830	62	SS	246	410	408	200	DS-07	JI	NEOS TO 200'S
54	25 / 43	08/10/92	1105	67	SS	246	410	408	34	--	JI	--

Golder Construction Services, Inc.

APPENDIX I
POND 93
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	LOCATION
					WELDER I.D.		MACH. TEMP (°F)					
					TECH.	MACH	SET.	ACT.				
55	25 / 46	08/10/92	1130	67	SS	246	410	406	113	DS-33	JI	--
56	26 / 12F	08/10/92	1425	80	SS	246	410	409	34	--	JI	--
57	26 / 27	08/06/92	920	65	SS	246	410	410	205	--	JI	205'S TO NEOS
58	26 / 27	08/06/92	925	65	IOU	220	410	408	329	DS-08	JI	534'S TO 205'S
59	27 / 12C	08/10/92	1340	75	SS	246	410	407	101	--	JI	--
60	27 / 28	08/06/92	1032	65	SS	246	410	409	340	DS-11	JI	340'S TO NEOS
61	27 / 28	08/06/92	1051	65	BS	210	409	408	170	DS-09	JI	645'S TO 475'S
62	27 / 28	08/06/92	1055	65	IOU	220	410	406	135	DS-10	JI	475'S TO 340'S
63	27 / 48	08/10/92	1413	75	IOU	220	410	409	34	--	JI	--
64	28 / 29	08/06/92	1340	65	BS	210	415	406	191	--	JI	653'S TO 462'S
65	28 / 29	08/06/92	1310	65	IOU	220	410	409	197	--	JI	462'S TO 265'S
66	28 / 29	08/06/92	1310	65	SS	246	410	407	265	DS-12	JI	265'S TO NEOS
67	28 / 48	08/10/92	1535	80	SS	246	410	407	15	--	JI	--
68	28 / 49	08/10/92	1515	80	SS	246	410	407	23	--	JI	--
69	29 / 30	08/06/92	1420	65	SS	246	410	409	262	--	JI	NEOS TO 262'S
70	29 / 30	08/06/92	1437	65	IOU	220	410	413	254	DS-13	JI	645'S TO 400'S
71	29 / 30	08/06/92	1500	65	BS	210	415	407	138	--	JI	400'S TO 262'S
72	29 / 51	08/10/92	1545	80	SS	246	410	410	34	--	JI	--
73	30 / 30ext	08/07/92	910	65	SS	246	410	407	34	--	JI	--
74	30 / 31	08/07/92	920	65	SS	246	410	407	341	DS-15/DS-17	JI	NEOS TO 341'S
75	30 / 31	08/07/92	915	65	IOU	220	415	413	305	DS-14/DS-16	JI	646'S TO 341'S
76	30 / 52	08/10/92	1705	82	SS	246	410	406	34	--	JI	--
77	31 / 32	08/07/92	1055	69	BS	210	413	410	164	DS-19	JI	405'S TO 241'S
78	31 / 32	08/07/92	1100	69	IOU	220	415	403	248	DS-18	JI	653'S TO 405'S
79	31 / 32	08/07/92	1040	69	SS	246	410	404	241	--	JI	241'S TO NEOS
80	31 / 53	08/11/92	833	65	SS	246	410	406	34	--	JI	--
81	32 / 33	08/07/92	1320	73	SS	246	410	408	244	DS-20	JI	NEOS TO 244'S

APPENDIX I
POND 93
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	LOCATION
					WELDER I.D.		MACH. TEMP (°F)					
					TECH.	MACH	SET.	ACT.				
82	32 / 33	08/07/92	1335	72	IOU	220	400	396	213	DS-21	JI	439'S TO 652'S
83	32 / 33	08/07/92	1325	72	BS	210	408	406	195	--	JI	244'S TO 439'S
84	32 / 56	08/11/92	1054	65	IOU	220	410	407	34	--	JI	--
85	33 / 34	08/07/92	1535	77	SS	246	410	409	70	--	JI	342'S TO 412'S
86	33 / 34	08/07/92	1440	77	SS	246	410	408	237	--	JI	NEOS TO 237'S
87	33 / 34	08/07/92	1455	77	IOU	220	400	395	225	--	JI	434'S TO 659'S
88	33 / 34	08/07/92	1435	77	BS	210	408	407	105	--	JI	237'S TO 342'S
89	33 / 34	08/07/92	1510	77	BS	210	408	406	22	DS-22	JI	434'S TO 412'S
90	33 / 55	08/11/92	1310	70	SS	246	410	405	34	DS-40	JI	--
91	34 / 35	08/07/92	1550	78	SS	246	410	398	407	DS-24/DS-25	JI	407'S TO NEOS
92	34 / 35	08/07/92	1555	78	IOU	220	400	398	264	DS-23	JI	407'S TO 671'S
93	34 / 57	08/11/92	1325	70	SS	246	410	409	34	--	JI	--
94	35 / 36	08/08/92	815	70	SS	246	410	409	362	DS-27	JI	NEOS TO 362'S
95	35 / 36	08/08/92	817	70	IOU	220	410	407	232	--	JI	665'S TO 423'S
96	35 / 36	08/08/92	810	70	IOU	220	410	406	61	DS-26	JI	362'S TO 423'S
97	35 / 58	08/11/92	1345	70	SS	246	410	407	34	--	JI	--
98	35 / 60	08/11/92	1415	70	SS	246	410	409	17	--	JI	--
99	36 / 37	08/08/92	1000	71	SS	246	410	408	360	DS-28	JI	360'S TO NEOS
100	36 / 37	08/08/92	1005	75	IOU	220	410	408	295	DS-29	JI	655'S TO 360'S
101	36 / 60	08/11/92	1410	70	SS	246	410	408	34	--	JI	--
102	37 / 21B	08/11/92	1655	70	SS	246	410	408	16	--	JI	--
103	37 / 38	08/08/92	1246	90	IOU	220	400	398	192	DS-31	JI	507'S TO 315'S
104	37 / 38	08/08/92	1115	75	SS	246	410	407	315	DS-30	JI	315'S TO NEOS
105	37 / 38	08/08/92	1120	85	IOU	220	410	406	161	--	JI	668'S TO 507'S
106	37 / 61	08/11/92	1644	70	SS	246	410	409	34	DS-43	JI	--
107	38 / 63	08/11/92	1636	70	SS	246	410	410	34	--	JI	--
108	38 / 64	08/12/92	827	47	IOU	220	410	405	437	DS-44	JI	SEOS TO 226'SNEOS

Golder Construction Services, Inc.

APPENDIX I
POND 93
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	LOCATION
					WELDER I.D.		MACH. TEMP (°F)					
					TECH.	MACH	SET.	ACT.				
109	38 / 64	08/12/92	825	46	SS	246	410	407	225	--	JI	NEOS TO 225'S
110	39 / 40	08/10/92	830	62	IOU	220	410	408	72	--	JI	--
111	39 / 43	08/10/92	1001	67	SS	246	410	408	34	--	JI	--
112	40 / 41	08/10/92	840	62	IOU	220	410	407	77	--	JI	--
113	40 / 43	08/10/92	1000	67	SS	246	410	407	6	--	JI	--
114	41 / 42	08/10/92	920	65	IOU	220	410	408	65	--	JI	--
115	41 / 43	08/10/92	1016	67	IOU	220	410	409	5	--	JI	--
116	42 / 43	08/10/92	1010	67	IOU	220	410	407	51	--	JI	--
117	42 / 44	08/10/92	1000	67	IOU	220	410	408	30	--	JI	--
118	43 / 44	08/10/92	950	67	IOU	220	410	409	32	--	JI	--
119	43 / 45	08/10/92	1030	67	IOU	220	410	408	71	DS-32	JI	--
120	43 / 46	08/10/92	1052	67	IOU	220	410	406	58	--	JI	SEOS TO 127'N
121	43 / 46	08/10/92	1100	67	IOU	220	410	406	183	--	JI	NEOS TO 127'S
122	45 / 46	08/10/92	1140	67	IOU	220	410	407	34	--	JI	--
123	45 / 47	08/10/92	1345	75	IOU	220	410	408	74	DS-34	JI	--
124	46 / 12C	08/10/92	1310	75	SS	246	410	408	101	--	JI	--
125	46 / 12F	08/10/92	1440	80	SS	246	410	407	34	--	JI	--
126	46 / 47	08/10/92	1305	75	IOU	220	410	407	135	--	JI	--
127	46 / 48	08/10/92	1420	75	IOU	220	410	407	35	--	JI	--
128	47 / 48	08/10/92	1405	75	IOU	220	410	407	34	--	JI	--
129	47 / 49	08/10/92	1430	80	IOU	220	410	408	284	--	JI	--
130	48 / 49	08/10/92	1455	80	SS	246	410	406	25	--	JI	--
131	49 / 50	08/10/92	1530	82	IOU	220	410	407	290	DS-35	JI	--
132	49 / 51	08/10/92	1605	82	SS	246	410	408	12	--	JI	--
133	50 / 51	08/10/92	1612	82	SS	246	410	409	34	--	JI	--
134	50 / 52	08/10/92	1635	82	IOU	220	410	405	141	--	JI	141'N TO SEOS
135	50 / 52	08/10/92	1630	82	SS	246	410	407	151	--	JI	NEOS TO 141'S

APPENDIX I
POND 93
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	LOCATION
					WELDER I.D.		MACH. TEMP (°F)					
					TECH.	MACH	SET.	ACT.				
136	51 / 52	08/10/92	1624	82	SS	246	410	406	17	DS-36	JI	--
137	52 / 53	08/11/92	825	65	IOU	220	410	408	301	DS-37	JI	--
138	53 / 54	08/11/92	909	65	SS	246	410	407	298	DS-39	JI	--
139	53 / 56	08/11/92	1050	65	IOU	220	410	408	7	--	JI	--
140	54 / 55	08/11/92	940	65	IOU	220	410	407	300	DS-38	JI	--
141	54 / 56	08/11/92	1042	65	IOU	220	410	407	34	--	JI	--
142	55 / 56	08/11/92	1040	65	IOU	220	410	409	6	--	JI	--
143	55 / 57	08/11/92	1030	65	SS	246	410	408	294	--	JI	--
144	57 / 58	08/11/92	1105	65	IOU	220	410	407	293	--	JI	NEOS TO 60'NSEOS
145	57 / 58	08/11/92	1300	70	IOU	220	410	408	60	DS-41	JI	60'NSEOS TO SEOS
146	58 / 59	08/11/92	1400	70	IOU	220	410	406	258	--	JI	--
147	58 / 60	08/11/92	1340	70	IOU	220	410	407	33	--	JI	--
148	59 / 60	08/11/92	1350	70	IOU	220	410	405	34	--	JI	--
149	59 / 61	08/11/92	1503	70	SS	246	410	408	105	--	JI	NEOS TO 155'NSEOS
150	59 / 61	08/11/92	1455	70	IOU	220	410	406	155	DS-42	JI	155'NSEOS TO SEOS
151	60 / 21B	08/11/92	1659	70	SS	246	410	407	16	--	JI	--
152	60 / 61	08/11/92	1455	70	SS	246	410	409	34	--	JI	--
153	61 / 62	08/11/92	1555	70	IOU	220	410	407	205	--	JI	--
154	61 / 63	08/11/92	1540	70	SS	246	410	407	88	--	JI	--
155	62 / 63	08/11/92	1614	70	SS	246	410	408	34	--	JI	--
156	62 / 74	08/13/92	1105	68	IOU	220	410	409	204	DS-59	JI	--
157	63 / 74	08/13/92	1054	67	IOU	220	410	408	89	--	JI	--
158	64 / 65	08/12/92	900	47	SKP	64	415	408	342	DS-45	JI	SEOS TO 317'SNEOS
159	64 / 65	08/12/92	910	47	SS	246	410	408	317	DS-46	JI	317'S TO NEOS
160	64 / 74	08/13/92	1111	67	SKP	64	415	410	34	--	JI	--
161	65 / 66	08/12/92	1006	52	IOU	220	410	408	125	--	JI	SEOS TO 531'SNEOS
162	65 / 66	08/12/92	1100	65	BS	223	417	402	215	DS-48	JI	315'S TO 100'SNEOS

APPENDIX I
POND 93
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	LOCATION
					WELDER I.D.		MACH. TEMP (°F)					
					TECH.	MACH	SET.	ACT.				
163	65 / 66	08/12/92	1030	52	IOU	220	410	404	216	DS-47	JI	315'S TO 531'SNEOS
164	65 / 66	08/12/92	1310	75	BS	223	395	390	100	--	JI	100'SNEOS TO NEOS
165	65 / 76	08/13/92	1255	72	SKP	64	400	400	34	--	JI	--
166	65 / 77	08/13/92	1417	75	SS	246	410	408	7	--	JI	--
167	66 / 67	08/12/92	1045	52	SKP	64	415	406	312	DS-49	JI	SEOS TO 343'SNEOS
168	66 / 67	08/12/92	1100	52	SS	246	410	407	343	DS-50	JI	343'S TO NEOS
169	66 / 77	08/13/92	1400	75	SKP	64	400	395	34	--	JI	--
170	67 / 68	08/12/92	1320	75	SS	246	410	407	360	--	JI	NEOS TO 360'S
171	67 / 68	08/12/92	1302	75	IOU	220	410	407	196	--	JI	360'SNEOS TO SEOS
172	67 / 79	08/13/92	1500	80	SKP	64	400	398	34	--	JI	--
173	68 / 69	08/12/92	1330	75	SKP	64	400	400	327	DS051	JI	323'SNEOS TO SEOS
174	68 / 69	08/12/92	1415	75	BS	223	395	394	258	DS-52	JI	323'SNEOS TO 65'S
175	68 / 69	08/12/92	1355	75	BS	223	395	392	65	--	JI	NEOS TO 65'SNEOS
176	68 / 79	08/13/92	1527	80	SS	246	410	409	13	--	JI	--
177	68 / 80	08/13/92	1542	80	SKP	64	400	397	34	--	JI	RS ENTIRE SEAM
178	68 / 82	08/13/92	1555	80	SS	246	410	409	17	--	JI	--
179	69 / 70	08/12/92	1450	75	SS	246	410	406	323	DS-54	JI	323'S TO NEOS
180	69 / 70	08/12/92	1423	75	IOU	220	410	405	327	DS-53	JI	323'SNEOS TO SEOS
181	69 / 82	08/13/92	1630	80	SKP	64	400	399	34	--	JI	--
182	70 / 71	08/12/92	1550	75	BS	223	400	400	353	DS-55	JI	353'S TO NEOS
183	70 / 71	08/12/92	1525	75	SKP	64	400	400	297	--	JI	353'S TO 650'SNEOS
184	70 / 83	08/13/92	1705	80	SKP	64	400	399	34	--	JI	--
185	71 / 72	08/12/92	1614	75	IOU	220	410	407	263	DS-58	JI	SEOS TO 390'SNEOS
186	71 / 72	08/12/92	1625	75	SS	246	410	409	197	--	JI	NEOS TO 197'SNEOS
187	71 / 72	08/12/92	1630	75	SKP	64	400	397	193	DS-57	JI	197'S TO 390'SNEOS
188	71 / 85	08/14/92	900	60	SKP	64	400	399	34	--	JI	--
189	72 / 73	08/13/92	823	53	SS	246	410	407	72	DS-56	JI	330'S TO 258'SNEOS

Golder Construction Services, Inc.

APPENDIX I
POND 93
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	LOCATION
					WELDER I.D.		MACH. TEMP (°F)					
					TECH.	MACH	SET.	ACT.				
190	72 / 73	08/13/92	840	60	IOU	220	410	406	325	--	JI	SEOS TO 330'SNEOS
191	72 / 73	08/13/92	911	60	SS	246	410	408	258	--	JI	--
192	72 / 86	08/14/92	1010	65	SKP	64	400	399	34	--	JI	--
193	73 / 88	08/14/92	1100	65	SKP	64	400	398	34	--	JI	--
194	73 / 89	08/17/92	840	65	IOU	220	410	406	256	--	JI	400'SNEOS TO SEOS
195	73 / 89	08/17/92	840	65	SS	246	410	407	185	--	JI	NEOS TO 185'S
196	73 / 89	08/17/92	846	65	SKP	64	400	396	215	--	JI	185'S TO 400'SNEOS
197	74 / 75	08/13/92	1305	72	IOU	220	410	408	156	--	JI	--
198	74 / 76	08/13/92	1257	72	SS	246	410	408	141	--	JI	--
199	75 / 76	08/13/92	1320	72	SKP	64	400	398	34	--	JI	--
200	75 / 77	08/13/92	1340	75	IOU	220	410	407	157	--	JI	--
201	76 / 77	08/13/92	1341	75	SS	246	410	407	139	DS-60	JI	--
202	77 / 78	08/13/92	1415	75	IOU	220	410	409	175	DS-61	JI	--
203	77 / 79	08/13/92	1430	75	SS	246	410	409	130	--	JI	--
204	78 / 79	08/13/92	1440	80	SKP	64	400	400	34	--	JI	--
205	78 / 80	08/13/92	1450	80	IOU	220	410	407	176	--	JI	--
206	79 / 80	08/13/92	1459	80	SS	246	410	408	114	--	JI	--
207	80 / 81	08/13/92	1520	80	IOU	220	410	405	218	DS-62	JI	--
208	80 / 82	08/13/92	1535	80	SS	246	410	408	72	--	JI	--
209	81 / 25M	08/13/92	1606	80	SS	246	410	408	34	--	JI	--
210	81 / 83	08/13/92	1640	80	IOU	220	410	407	217	--	JI	--
211	82 / 25M	08/13/92	1622	80	SS	246	410	409	34	--	JI	--
212	82 / 83	08/13/92	1634	80	SS	246	410	407	83	DS-63	JI	--
213	83 / 84	08/14/92	805	60	IOU	220	410	406	242	--	JI	--
214	83 / 85	08/14/92	905	60	IOU	220	410	408	64	--	JI	--
215	84 / 85	08/14/92	852	60	IOU	220	410	407	34	DS-64	JI	--
216	84 / 86	08/14/92	950	65	IOU	220	410	407	245	--	JI	--

APPENDIX I
POND 93
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	LOCATION
					WELDER I.D.		MACH. TEMP (°F)					
					TECH.	MACH	SET.	ACT.				
217	85 / 86	08/14/92	950	65	SKP	64	400	398	58	--	JI	--
218	86 / 87	08/14/92	1040	65	IOU	220	410	405	277	DS-66	JI	--
219	86 / 88	08/14/92	1045	65	SKP	64	400	398	23	DS-65	JI	--
220	87 / 88	08/14/92	1055	65	SKP	64	400	399	34	--	JI	--
221	87 / 107	08/19/92	820	70	IOU	220	410	405	277	--	JI	--
222	88 / 89	08/17/92	920	65	IOU	220	410	408	8	--	JI	--
223	88 / 107	08/19/92	819	70	K-MAI	223	410	409	23	--	JI	--
224	89 / 90	08/17/92	934	65	IOU	220	410	408	267	DS-68	JI	395'SNEOS TO SEOS
225	89 / 90	08/17/92	935	65	K-MAI	223	415	412	395	DS-67	JI	395'SNEOS TO NEOS
226	89 / 107	08/19/92	830	70	K-MAI	223	410	408	34	--	JI	--
227	90 / 91	08/17/92	955	65	SS	246	410	408	315	DS-69	JI	315'SNEOS TO NEOS
228	90 / 91	08/17/92	1015	65	SKP	64	400	398	189	--	JI	504'S TO 315'SNEOS
229	90 / 91	08/17/92	1015	65	IOU	220	410	406	156	--	JI	SEOS TO 504'SNEOS
230	90 / 108	08/19/92	845	70	K-MAI	223	410	409	34	--	JI	--
231	91 / 92	08/17/92	1057	70	IOU	220	410	409	270	--	JI	SEOS TO 390'SNEOS
232	91 / 92	08/17/92	1050	65	K-MAI	223	415	411	390	DS-70	JI	390'SNEOS TO NEOS
233	91 / 109	08/19/92	930	70	K-MAI	223	410	408	34	--	JI	--
234	91 / 110	08/19/92	940	70	K-MAI	223	410	409	8	--	JI	--
235	92 / 93	08/17/92	1320	80	SS	246	410	409	165	--	JI	330'S TO 165'SNEOS
236	92 / 93	08/17/92	1400	80	SS	246	410	407	165	--	JI	NEOS TO 165'S
237	92 / 93	08/17/92	1320	80	IOU	220	410	408	335	DS-71	JI	SEOS TO 330'SNEOS
238	92 / 110	08/19/92	945	70	K-MAI	223	410	409	34	--	JI	--
239	93 / 38H	08/19/92	1030	70	K-MAI	223	410	409	18	--	JI	--
240	93 / 94	08/17/92	1425	80	IOU	220	410	407	325	DS-73	JI	SEOS TO 345'SNEOS
241	93 / 94	08/17/92	1335	80	K-MAI	223	410	407	345	DS-72	JI	345'SNEOS TO NEOS
242	93 / 112	08/19/92	1000	70	K-MAI	223	410	408	34	--	JI	--
243	93 / 113	08/19/92	1318	75	K-MAI	223	420	415	13	--	JI	--

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FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	LOCATION
					WELDER I.D.		MACH. TEMP (°F)					
					TECH.	MACH	SET.	ACT.				
244	94 / 95	08/17/92	1510	80	SS	246	410	407	324	DS-76	JI	SEOS TO 341'SNEOS
245	94 / 95	08/17/92	1500	80	K-MAI	223	410	406	341	--	JI	341'SNEOS TO NEOS
246	94 / 113	08/19/92	1324	75	K-MAI	223	420	416	34	--	JI	--
247	95 / 41C	08/19/92	1400	75	K-MAI	223	420	416	10	--	JI	--
248	95 / 96	08/17/92	1605	80	IOU	220	410	408	248	--	JI	344'S TO 592'SNEOS
249	95 / 96	08/17/92	1535	80	IOU	220	410	406	76	DS-78	JI	SEOS TO 592'SNEOS
250	95 / 96	08/17/92	1615	80	K-MAI	223	410	405	344	DS-74	JI	NEOS TO 344'S
251	95 / 113	08/19/92	1331	75	K-MAI	223	420	415	12	--	JI	--
252	95 / 114	08/19/92	1347	75	K-MAI	223	420	416	34	--	JI	--
253	96 / 97	08/17/92	1641	80	SKP	64	400	398	160	DS-75	JI	361'S TO 521'SNEOS
254	96 / 97	08/17/92	1620	80	SS	246	410	408	361	DS-77	JI	361'SNEOS TO NEOS
255	96 / 97	08/17/92	1655	80	IOU	220	410	407	136	DS-79	JI	521'SNEOS TO SEOS
256	96 / 115	08/19/92	1420	75	K-MAI	223	420	415	34	--	JI	--
257	97 / 98	08/18/92	837	65	K-MAI	223	415	411	297	DS-80	JI	297'SNEOS TO NEOS
258	97 / 98	08/18/92	835	65	IOU	220	410	406	353	--	JI	SEOS TO 297'SNEOS
259	97 / 115	08/19/92	1423	75	K-MAI	223	420	416	14	--	JI	--
260	97 / 116	08/19/92	1450	75	K-MAI	223	420	416	34	--	JI	--
261	97 / 118	08/19/92	1500	80	K-MAI	223	420	415	19	--	JI	--
262	98 / 99	08/18/92	900	65	SS	246	415	413	294	--	JI	NEOS TO 294'SNEOS
263	98 / 99	08/18/92	920	65	SKP	64	400	398	274	--	LS	568'S TO 294'SNEOS
264	98 / 99	08/18/92	940	70	IOU	220	410	407	81	--	JI	SEOS TO 568'SNEOS
265	98 / 118	08/19/92	1505	80	K-MAI	223	420	417	34	--	JI	--
266	99 / 100	08/18/92	945	65	K-MAI	223	410	405	312	--	JI	312'SNEOS TO NEOS
267	99 / 100	08/18/92	1003	70	IOU	220	410	405	347	DS-81	JI	SEOS TO 312'SNEOS
268	99 / 118	08/19/92	1655	80	K-MAI	223	420	417	10	--	JI	--
269	99 / 121	08/19/92	1646	80	K-MAI	223	420	416	34	--	JI	--
270	100 / 101	08/18/92	1045	70	K-MAI	223	410	405	350	DS-82	JI	350'SNEOS TO NEOS

APPENDIX I
POND 93
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	LOCATION
					WELDER I.D.		MACH. TEMP (°F)					
					TECH.	MACH	SET.	ACT.				
271	100 / 101	08/18/92	1045	75	SKP	64	400	398	308	DS-83	LS	SEOS TO 350'SNAT
272	100 / 158	08/28/92	1534	75	BS	246	419	415	34	--	JI	--
273	101 / 102	08/18/92	1305	80	IOU	220	410	407	288	DS-85	JI	SEOS TO 375'SNEOS
274	101 / 102	08/18/92	1325	80	SS	246	415	414	325	DS-84	JI	325'SNEOS TO NEOS
275	101 / 102	08/18/92	1140	70	SS	246	415	412	50	--	JI	375'S TO 325'SNEOS
276	101 / 160	08/28/92	1550	75	BS	246	419	416	34	--	JI	--
277	102 / 103	08/18/92	1340	80	K-MAI	223	410	406	344	DS-86	JI	344'SNEOS TO NEOS
278	102 / 103	08/18/92	1330	80	SKP	64	400	399	321	DS-87	LS/CPB	SEOS TO 344'SNAT
279	102 / 161	08/28/92	1700	75	BS	246	419	415	34	--	JI	--
280	103 / 104	08/18/92	1435	80	IOU	220	410	406	316	--	JI	SEOS TO 343'SNEOS
281	103 / 104	08/18/92	1440	80	SS	246	415	411	343	DS-88	JI	343'SNEOS TO NEOS
282	103 / 163	09/04/92	1440	65	SKP	220	410	409	34	--	JI	RECON. 67P & 67N
283	104 / 65R	09/04/92	1450	65	SS	223	415	412	12	--	JI	--
284	104 / 105	08/18/92	1510	80	K-MAI	223	410	407	318	--	JI	318'SNEOS TO NEOS
285	104 / 105	08/18/92	1530	80	SKP	64	400	398	352	--	CPB	SEOS TO 318'SNAT
286	104 / 184	09/04/92	1410	65	SKP	220	410	407	34	--	JI	--
287	105 / 106	08/18/92	1630	80	SS	246	415	413	191	--	JI	341'S TO 150'SNEOS
288	105 / 106	08/18/92	1600	80	K-MAI	223	410	408	150	DS-89	JI	150'SNEOS TO NEOS
289	105 / 106	08/18/92	1625	80	IOU	220	410	407	324	DS-90	JI	SEOS TO 341'SNEOS
290	105 / 185	09/04/92	1530	65	SKP	220	410	409	34	--	JI	--
291	106 / 68F	09/11/92	915	50	SKP	64	415	414	34	DS-170	CPB	--
292	106 / 122	08/20/92	845	60	IOU	220	410	407	242	DS-98	JI	SEOS TO 411'SNAT
293	106 / 122	08/20/92	850	60	K-MAI	223	420	417	203	--	JI	411'S TO 208'SNAT
294	106 / 122	08/20/92	840	60	SS	64	415	413	208	DS-99	JI	208'SNEOS TO NEOS
295	107 / 108	08/19/92	840	70	SS	64	415	413	300	DS-92	JI	--
296	108 / 109	08/19/92	920	70	IOU	220	410	407	58	DS-91	JI	SEOS TO 58'NSEOS
297	108 / 109	08/19/92	1100	70	IOU	220	410	405	242	--	JI	58'NSEOS TO 300'N

Golder Construction Services, Inc.

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FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	LOCATION
					WELDER I.D.		MACH. TEMP (°F)					
					TECH.	MACH	SET.	ACT.				
298	109 / 110	08/19/92	950	70	SS	64	415	412	300	DS-93	JI	--
299	110 / 38H	08/19/92	1015	70	K-MAI	223	410	409	18	--	JI	--
300	110 / 111	08/19/92	1115	70	SS	64	415	413	255	--	JI	SEOS TO 255'NSEOS
301	110 / 112	08/19/92	951	70	K-MAI	223	410	408	30	--	JI	--
302	111 / 112	08/19/92	1100	70	K-MAI	223	410	408	34	--	JI	--
303	111 / 113	08/19/92	1115	70	K-MAI	223	410	415	265	DS-94	JI	--
304	112 / 113	08/19/92	1312	75	K-MAI	223	420	414	25	--	JI	--
305	113 / 114	08/19/92	1330	75	SS	64	415	412	295	DS-96	JI	--
306	114 / 115	08/19/92	1335	75	IOU	220	410	409	295	DS-95	JI	--
307	115 / 41C	08/19/92	1405	75	K-MAI	223	420	417	10	--	JI	--
308	115 / 116	08/19/92	1425	75	K-MAI	223	420	417	34	--	JI	--
309	115 / 117	08/19/92	1420	75	SS	64	415	411	252	--	JI	--
310	116 / 117	08/19/92	1549	80	K-MAI	223	420	416	34	DS-97	JI	--
311	116 / 118	08/19/92	1510	80	K-MAI	223	420	416	34	--	JI	--
312	117 / 118	08/19/92	1527	80	K-MAI	223	420	415	20	--	JI	--
313	117 / 119	08/19/92	1520	80	IOU	220	410	409	233	--	JI	--
314	118 / 119	08/19/92	1534	80	K-MAI	223	420	415	34	--	JI	--
315	118 / 121	08/19/92	1630	85	IOU	220	410	409	68	--	JI	--
316	119 / 120	08/19/92	1530	80	SS	64	415	414	147	--	JI	--
317	119 / 121	08/19/92	1645	85	IOU	220	410	410	90	--	JI	--
318	120 / 121	08/19/92	1630	80	K-MAI	223	420	415	34	--	JI	--
319	120 / 158	08/28/92	1345	75	SKP	220	400	398	144	DS-149	JI	--
320	121 / 158	08/28/92	1410	75	SKP	220	400	399	159	--	JI	--
321	122 / 68R	09/11/92	1020	55	SKP	64	415	415	34	--	CPB	--
322	122 / 123	08/20/92	957	65	IOU	220	410	406	245	--	JI	395'SNAT TO SEOS
323	122 / 123	08/20/92	950	65	K-MAI	223	420	417	395	DS-100	JI	NEOS TO 395'SNAT
324	123 / 124	08/20/92	1040	65	IOU	220	410	406	254	DS-101	JI	396'SNAT TO SEOS

APPENDIX I
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FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	LOCATION
					WELDER I.D.		MACH. TEMP (°F)					
					TECH.	MACH	SET	ACT.				
325	123 / 124	08/20/92	1050	65	K-MAI	223	420	417	214	--	JI	182'S TO 396'SNAT
326	123 / 124	08/20/92	1035	65	SS	64	415	413	182	--	JI	NEOS TO 180'SNAT
327	123 / 188	09/11/92	1100	55	SKP	64	415	410	34	--	CPB	--
328	124 / 125	08/20/92	1120	65	SS	64	415	414	215	DS-103	JI	215'SNAT TO NEOS
329	124 / 125	08/20/92	1125	65	IOU	220	410	407	122	--	JI	403'S TO 525'SNAT
330	124 / 125	08/20/92	1125	65	K-MAI	223	420	417	188	DS-102	JI	403'S TO 215'SNAT
331	124 / 125	08/20/92	1255	65	IOU	220	410	408	132	--	JI	525'SNAT TO SEOS
332	124 / 189	09/11/92	1120	60	SKP	64	415	412	34	--	CPB	--
333	125 / 71I	09/11/92	1314	60	SKP	64	415	411	8	--	JI	--
334	125 / 126	08/21/92	825	50	SS	246	415	413	190	--	JI	NEOS TO 190'S
335	125 / 126	08/21/92	815	50	K-MAI	223	425	422	242	--	JI	432'S TO 190'SNEOS
336	125 / 126	08/21/92	825	50	IOU	220	410	408	218	DS-104	JI	SEOS TO 432'SNEOS
337	125 / 190	09/11/92	1315	65	SKP	64	400	400	34	--	JI	--
338	125 / 191	09/11/92	1335	65	SKP	64	400	400	13	--	JI	--
339	126 / 127	08/21/92	845	50	K-MAI	223	425	423	250	DS-105	JI	440'S TO 190'SNEOS
340	126 / 127	08/21/92	910	60	SS	246	418	416	190	DS-106	JI	190'S TO NEOS
341	126 / 127	08/21/92	900	60	IOU	220	410	407	204	--	JI	440'SNEOS TO SEOS
342	126 / 191	09/11/92	1355	65	SKP	64	400	395	34	--	JI	--
343	127 / 128	08/21/92	910	60	K-MAI	223	425	421	440	DS-108	JI	440'SNEOS TO NEOS
344	127 / 128	08/21/92	940	60	IOU	220	410	407	206	DS-107	JI	SEOS TO 440'SNEOS
345	127 / 192	09/11/92	1430	65	SKP	64	400	398	34	--	JI	--
346	128 / 129	08/21/92	1045	60	IOU	220	410	409	325	--	JI	SEOS TO 325'SNEOS
347	128 / 129	08/21/92	1045	60	K-MAI	223	425	423	325	--	JI	325'SNEOS TO NEOS
348	128 / 193	09/11/92	1445	65	SKP	64	400	397	34	--	JI	--
349	129 / 73E	09/11/92	1525	65	SKP	64	400	398	13	--	JI	--
350	129 / 130	08/21/92	1410	75	SS	64	410	408	195	DS-111	JI	195'SNEOS TO NEOS
351	129 / 130	08/21/92	1430	75	IOU	220	410	407	258	DS-109	JI	SEOS TO 405'SNEOS

APPENDIX I
POND 93
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	LOCATION
					WELDER I.D.		MACH. TEMP (°F)					
					TECH.	MACH	SET.	ACT.				
352	129 / 130	08/21/92	1405	75	K-MAI	223	415	411	210	DS-110	JI	405'S TO 195'SNEOS
353	129 / 194	09/11/92	1545	65	SKP	64	400	399	34	--	JI	--
354	130 / 131	08/21/92	1510	75	SS	64	410	407	207	--	JI	207'SNEOS TO NEOS
355	130 / 131	08/21/92	1500	75	K-MAI	223	410	406	213	--	JI	420'S TO 207'SNEOS
356	130 / 131	08/21/92	1520	75	IOU	220	410	408	218	--	JI	SEOS TO 420'SNEOS
357	130 / 195	09/11/92	1630	65	SKP	64	400	398	34	--	JI	--
358	131 / 132	08/21/92	1610	75	IOU	220	410	408	256	DS-112	JI	SEOS TO 400'SNEOS
359	131 / 132	08/21/92	1600	75	SS	64	410	409	200	DS-114	JI	200'SNEOS TO NEOS
360	131 / 132	08/21/92	1600	75	K-MAI	223	410	410	200	DS-113	JI	400'S TO 200'SNEOS
361	131 / 197	09/11/92	1700	65	SKP	64	400	397	34	--	JI	--
362	132 / 133	08/26/92	855	40	IOU	220	410	406	336	DS-115	JI	SEOS TO 314'SNEOS
363	132 / 133	08/26/92	830	40	SS	223	415	413	314	--	JI	314'SNEOS TO NEOS
364	132 / 198	09/11/92	1735	65	SKP	64	400	399	34	DS-176	JI	--
365	133 / 134	08/26/92	915	40	KS	246	420	415	300	DS-117	JI	300'SNEOS TO NEOS
366	133 / 134	08/26/92	920	40	SKP	64	415	413	349	--	JI	SEOS TO 300'SNEOS
367	133 / 199	09/11/92	1800	65	SKP	64	400	398	34	--	JI	--
368	134 / 73S	09/11/92	1819	65	SKP	64	400	397	10	--	JI	--
369	134 / 135	08/26/92	930	50	SS	223	415	413	350	DS-116	JI	350'SNEOS TO NEOS
370	134 / 135	08/26/92	1020	50	IOU	220	410	407	303	--	JI	350'SNEOS TO SEOS
371	134 / 200	09/11/92	1825	65	SKP	64	400	399	34	--	JI	--
372	135 / 136	08/26/92	1115	50	KS	246	420	414	315	--	JI	NEOS TO 315'SNEOS
373	135 / 136	08/26/92	1055	50	SKP	64	415	414	337	DS-119	JI	315'SNEOS TO SEOS
374	135 / 201	09/11/92	1850	65	SKP	64	400	398	34	--	JI	--
375	136 / 74A	09/11/92	1857	65	SKP	64	400	399	6	--	JI	--
376	136 / 137	08/26/92	1120	50	SS	223	415	414	335	DS-120	JI	NEOS TO 335'SNEOS
377	136 / 137	08/26/92	1120	50	IOU	220	410	406	165	DS-118	JI	335'S TO 500'SNEOS
378	136 / 137	08/26/92	1310	65	IOU	220	410	409	162	--	JI	500'SNEOS TO SEOS

Golder Construction Services, Inc.

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RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	LOCATION
					WELDER I.D.		MACH. TEMP (°F)					
					TECH.	MACH	SET.	ACT.				
379	136 / 202	09/11/92	1905	65	SKP	64	400	399	34	--	JI	--
380	137 / 138	08/26/92	1345	65	SS	223	415	413	350	DS-121	JI	NEOS TO 350'SNEOS
381	137 / 138	08/26/92	1320	65	SKP	64	415	413	316	DS-123	JI	350'SNEOS TO SEOS
382	137 / 203	09/11/92	1927	65	SKP	64	400	397	34	--	JI	--
383	138 / 139	08/26/92	1405	65	IOU	220	410	408	321	DS-124	JI	344'SNEOS TO SEOS
384	138 / 139	08/26/92	1410	65	KS	246	410	409	344	DS-122	JI	NEOS TO 344'SNEOS
385	138 / 204	09/12/92	900	55	PT	246	425	419	34	--	JI	--
386	139 / 74H	09/12/92	1050	55	BS	246	425	420	8	--	JI	--
387	139 / 140	08/26/92	1530	70	SS	223	415	412	350	--	JI	NEOS TO 350'SNEOS
388	139 / 140	08/26/92	1515	70	SKP	64	415	414	316	DS-125	JI	350'SNEOS TO SEOS
389	139 / 205	09/12/92	940	55	PT	246	425	420	34	--	JI	--
390	140 / 74H	09/12/92	1040	55	BS	246	425	418	8	--	JI	--
391	140 / 141	08/26/92	1600	70	KS	246	410	407	350	DS-126	JI	NEOS TO 350'SNEOS
392	140 / 141	08/26/92	1535	70	IOU	220	410	406	304	--	JI	350'SNEOS TO SEOS
393	140 / 206	09/12/92	1010	55	BS	246	425	419	34	--	JI	--
394	141 / 142	08/26/92	1617	70	SS	223	415	413	350	DS-128	JI	NEOS TO 350'SNEOS
395	141 / 142	08/26/92	1620	70	SKP	64	415	412	160	--	JI	350'S TO 510'SNEOS
396	141 / 142	08/26/92	1635	70	IOU	220	410	407	143	DS-127	JI	510'SNEOS TO SEOS
397	141 / 207	09/12/92	1130	55	BS	246	425	422	34	--	JI	--
398	142 / 143	08/27/92	830	50	SS	223	415	412	318	DS-130	JI	318'SNEOS TO NEOS
399	142 / 143	08/27/92	835	50	IOU	220	410	409	334	DS-129	JI	SEOS TO 318'SNEOS
400	142 / 208	09/12/92	1400	65	BS	246	425	419	34	--	JI	--
401	143 / 144	08/27/92	910	50	SKP	64	415	411	348	DS-131	JI	SEOS TO 300'SNEOS
402	143 / 144	08/27/92	910	50	KS	246	410	409	300	--	JI	300'SNEOS TO NEOS
403	143 / 209	09/12/92	1430	65	BS	246	425	420	34	--	JI	--
404	144 / 145	08/27/92	950	50	IOU	220	410	407	300	--	JI	SEOS TO 350'SNEOS
405	144 / 145	08/27/92	930	50	SS	223	415	411	350	--	JI	350'SNEOS TO NEOS

APPENDIX I
POND 93
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	LOCATION
					WELDER I.D.		MACH. TEMP (°F)					
					TECH.	MACH	SET.	ACT.				
406	144 / 210	09/12/92	1520	65	SS	223	420	416	34	--	JI	--
407	145 / 77C	09/12/92	1635	65	BS	246	425	421	10	--	JI	--
408	145 / 146	08/27/92	1000	60	KS	246	410	408	300	DS-133	JI	300'SNEOS TO NEOS
409	145 / 146	08/27/92	1035	60	SKP	64	415	411	359	--	JI	SEOS TO 300'SNEOS
410	145 / 211	09/12/92	1600	65	BS	246	425	419	34	--	JI	--
411	146 / 147	08/27/92	1055	60	IOU	220	410	409	295	DS-132	JI	350'SNEOS TO NEOS
412	146 / 147	08/27/92	1100	60	SS	223	415	413	350	DS-134	JI	350'SNEOS TO NEOS
413	146 / 212	09/12/92	1650	65	BS	246	419	413	34	--	JI	--
414	146 / 213	09/12/92	1740	65	IOU	220	415	412	16	--	JI	--
415	147 / 148	08/27/92	1315	75	IOU	220	410	406	295	--	JI	SEOS TO 350'SNEOS
416	147 / 148	08/27/92	1312	75	SS	223	415	412	350	DS-135	JI	350'SNEOS TO NEOS
417	147 / 213	09/12/92	1710	65	BS	246	419	414	34	DS-187	JI	--
418	148 / 149	08/27/92	1420	75	IOU	220	410	406	310	DS-136	JI	340'SNEOS TO NEOS
419	148 / 149	08/27/92	1350	75	KS	246	410	406	340	DS-137	JI	NEOS TO 340'SNEOS
420	148 / 213	09/12/92	1729	65	IOU	220	415	412	20	--	JI	--
421	148 / 214	09/12/92	1745	65	BS	246	419	415	34	--	JI	--
422	148 / 215	09/15/92	1130	55	BS	64	420	417	10	--	JI	--
423	149 / 56E	08/27/92	1650	75	KS	246	410	409	20	--	JI	--
424	149 / 81D	09/15/92	1030	55	BS	64	420	415	34	--	JI	--
425	149 / 150	08/27/92	1600	75	KS	246	410	407	154	--	JI	--
426	149 / 151	08/27/92	1600	75	SKP	64	415	352	302	DS-138	JI	350'SNEOS TO SEOS
427	149 / 151	08/27/92	1515	75	SS	223	415	414	173	--	JI	177'S TO 350'SNEOS
428	150 / 152	08/27/92	1615	75	SS	223	415	413	154	DS-141	JI	--
429	150 / 56E	08/27/92	1640	75	KS	246	410	408	20	--	JI	--
430	150 / 81H	09/15/92	1145	55	BS	64	420	418	9	--	JI	--
431	151 / 152	08/27/92	1630	75	SS	223	415	408	196	--	JI	NEOS TO 350'SNEOS
432	151 / 152	08/27/92	1630	75	IOU	220	410	407	200	DS-140	JI	350'S TO 550'SNEOS

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FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	LOCATION
					WELDER I.D.		MACH. TEMP (°F)					
					TECH.	MACH	SET.	ACT.				
433	151 / 152	08/27/92	1645	75	SKP	64	415	359	119	--	JI	550'SNEOS TO SEOS
434	151 / 216	09/15/92	1330	75	BS	64	417	414	34	--	JI	--
435	152 / 153	08/28/92	830	60	SKP	64	415	359	328	DS-142	JI	SEOS TO 335'SNEOS
436	152 / 153	08/28/92	825	60	SS	223	415	412	335	DS-143	JI	NEOS TO 335'SNEOS
437	152 / 217	09/15/92	1400	75	BS	64	417	415	34	--	JI	--
438	153 / 154	08/28/92	900	65	BS	246	422	418	350	DS-144	JI	NEOS TO 350'SNEOS
439	153 / 154	08/28/92	840	60	IOU	220	410	406	312	--	JI	350'SNEOS TO SEOS
440	153 / 218	09/15/92	1427	75	BS	64	413	409	34	--	JI	--
441	154 / 155	08/28/92	1000	65	SKP	64	415	338	131	--	JI	319'S TO 450'SNEOS
442	154 / 155	08/28/92	1120	70	IOU	220	410	408	205	--	JI	450'SNEOS TO SEOS
443	154 / 155	08/28/92	945	65	SS	223	415	411	319	DS-145	JI	319'SNEOS TO NEOS
444	154 / 219	09/15/92	1520	75	BS	64	413	410	34	--	JI	--
445	154 / 220	09/15/92	1537	75	BS	64	413	411	8	--	JI	--
446	155 / 156	08/28/92	1025	65	IOU	220	410	407	305	DS-146	JI	350'SNEOS TO SEOS
447	155 / 156	08/28/92	1100	70	BS	246	422	418	350	DS-147	JI	NEOS TO 350'SNEOS
448	155 / 220	09/15/92	1542	75	BS	64	413	409	34	DS-193	JI	--
449	156 / 82D	09/15/92	1557	75	BS	64	413	412	9	--	JI	--
450	156 / 157	08/28/92	1045	65	SS	223	415	413	666	DS-148	JI	--
451	156 / 221	09/15/92	1600	75	BS	64	413	408	34	--	JI	--
452	157 / 164	09/01/92	950	50	SKP	220	410	407	338	DS-154	JI	SEOS TO 325'SNEOS
453	157 / 164	09/01/92	930	50	SS	223	415	411	325	DS-153	JI	325'SNEOS TO NEOS
454	157 / 222	09/15/92	1615	75	BS	64	413	409	34	--	JI	--
455	158 / 159	08/28/92	1440	75	SS	223	415	412	161	DS-150	JI	--
456	158 / 160	08/28/92	1400	75	SS	223	415	413	133	--	JI	--
457	159 / 160	08/28/92	1520	75	SS	223	415	411	34	--	JI	--
458	159 / 161	08/28/92	1607	75	SS	223	415	411	159	--	JI	--
459	160 / 161	08/28/92	1545	75	SS	223	415	410	139	--	JI	--

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FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	LOCATION
					WELDER I.D.		MACH. TEMP (°F)					
					TECH.	MACH	SET.	ACT.				
460	161 / 162	08/28/92	1600	75	SKP	220	400	398	214	DS-151	JI	--
461	161 / 163	08/28/92	1615	75	BS	246	419	414	85	--	JI	--
462	162 / 163	08/28/92	1641	75	SS	223	415	411	34	DS-152	JI	--
463	162 / 184	09/04/92	1130	55	SKP	220	410	409	82	--	JI	135'NSEOS TO NEOS
464	162 / 184	09/04/92	1129	55	BS	246	426	427	135	--	JI	SEOS TO 135'NSEOS
465	163 / 184	09/04/92	1140	55	SKP	220	410	410	95	--	JI	--
466	164 / 165	09/01/92	1030	50	SKP	220	410	408	150	--	JI	300'S TO 150'SNEOS
467	164 / 165	09/01/92	1000	50	BS	246	432	429	363	DS-155	JI	SEOS TO 300'SNEOS
468	164 / 165	09/01/92	1035	50	SS	223	415	412	150	--	JI	150'SNEOS TO NEOS
469	164 / 223	09/15/92	1545	75	SS	223	420	418	34	--	JI	--
470	165 / 166	09/03/92	1130	54	BS	246	432	428	167	--	JI	404'S TO 237'SNEOS
471	165 / 166	09/03/92	1140	54	SS	223	415	412	237	--	JI	NEOS TO 237'SNEOS
472	165 / 166	09/03/92	1140	54	SKP	220	410	405	253	DS-158	JI	SEOS TO 404'SNEOS
473	165 / 224	09/15/92	1530	75	SS	223	420	417	34	--	JI	--
474	166 / 167	09/03/92	1325	65	BS	246	431	422	150	DS-157	JI	450'S TO 300'SNEOS
475	166 / 167	09/03/92	1320	65	SKP	220	400	397	209	--	JI	SEOS TO 450'SNEOS
476	166 / 167	09/03/92	1310	65	SS	223	415	411	300	DS-156	JI	300'SNEOS TO NEOS
477	166 / 232	09/16/92	1410	60	SKP	64	410	408	34	--	CPB	--
478	167 / 168	09/03/92	1415	65	BS	246	431	423	200	--	JI	400'S TO 200'SNEOS
479	167 / 168	09/03/92	1417	65	SS	223	415	412	200	--	JI	200'SNEOS TO NEOS
480	167 / 168	09/03/92	1430	65	SKP	220	400	398	264	DS-159	JI	SEOS TO 400'SNEOS
481	167 / 232	09/16/92	1500	60	SKP	64	410	410	8	--	CPB	--
482	167 / 233	09/16/92	1435	60	SKP	64	410	410	34	--	CPB	--
483	168 / 183	09/04/92	840	50	SKP	220	410	406	200	DS-162	JI	200'SNEOS TO NEOS
484	168 / 183	09/04/92	835	50	BS	246	426	427	222	DS-161	JI	SEOS TO 200'SNEOS
485	168 / 225	09/15/92	1640	75	BS	64	413	407	34	--	JI	--
486	168 / 226	09/15/92	1647	75	BS	64	413	410	34	--	JI	--

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RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	LOCATION
					WELDER I.D.		MACH. TEMP (°F)					
					TECH.	MACH	SET.	ACT.				
487	168 / 227	09/15/92	1655	75	BS	64	413	407	34	--	JI	--
488	168 / 228	09/15/92	1750	75	BS	64	413	410	34	--	JI	--
489	168 / 229	09/15/92	1801	75	BS	64	413	411	34	--	JI	--
490	168 / 230	09/15/92	1806	75	BS	64	420	417	34	--	JI	--
491	168 / 231	09/15/92	1816	75	BS	64	420	418	34	--	JI	--
492	168 / 242	09/16/92	1710	65	SS	223	420	416	34	--	CPB	--
493	169 / 170	09/03/92	1500	65	SS	223	415	411	35	--	JI	--
494	169 / 171	09/03/92	1505	65	BS	246	431	422	48	--	JI	--
495	169 / 183	09/04/92	936	55	SKP	220	410	408	75	--	JI	--
496	170 / 172	09/03/92	1518	65	BS	246	431	421	29	--	JI	--
497	171 / 172	09/03/92	1514	65	SS	223	415	414	30	--	JI	--
498	171 / 173	09/03/92	1525	65	SS	223	415	411	68	DS-160	JI	--
499	171 / 183	09/04/92	950	55	SKP	220	410	409	3	--	JI	--
500	173 / 174	09/03/92	1530	65	SKP	220	400	399	67	--	JI	--
501	173 / 183	09/04/92	951	55	SKP	220	410	410	34	--	JI	--
502	174 / 175	09/03/92	1547	65	SS	223	415	412	67	--	JI	--
503	174 / 183	09/04/92	959	55	SKP	220	410	410	34	--	JI	--
504	175 / 176	09/03/92	1545	65	BS	246	431	422	67	--	JI	--
505	175 / 183	09/04/92	845	50	SS	223	415	413	34	--	JI	--
506	176 / 177	09/03/92	1555	65	SKP	220	400	397	65	--	JI	--
507	176 / 183	09/04/92	902	50	SS	223	415	414	34	--	JI	--
508	177 / 178	09/03/92	1600	65	SS	223	415	413	65	--	JI	--
509	177 / 183	09/04/92	908	50	SS	223	415	412	34	DS-163	JI	--
510	178 / 179	09/03/92	1610	65	BS	246	431	424	26	--	JI	WEOS TO 35'W OF EEOS
511	178 / 179	09/03/92	1615	65	SS	223	415	412	35	--	JI	EEOS TO 35'W OF EEOS
512	178 / 183	09/04/92	916	55	SS	223	415	415	34	--	JI	--
513	179 / 180	09/04/92	805	50	SS	223	415	412	68	--	JI	--

APPENDIX I
POND 93
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS WELDER I.D. TECH.	WELDING APPARATUS WELDER I.D. MACH	MACH. TEMP (°F) SET	MACH. TEMP (°F) ACT	LENGTH (FT)	DEST. NUMBER	QA MONITOR	LOCATION
514	179 / 183	09/04/92	924	55	SS	223	415	414	34	--	JI	--
515	180 / 181	09/04/92	810	50	SKP	220	410	410	68	--	JI	--
516	180 / 183	09/04/92	1002	55	SS	223	415	414	34	--	JI	--
517	181 / 182	09/04/92	825	50	SS	223	415	411	68	--	JI	--
518	181 / 183	09/04/92	1010	55	SS	223	415	415	34	--	JI	--
519	182 / 183	09/04/92	1018	55	SS	223	415	415	34	--	JI	--
520	182 / 225	09/15/92	1618	75	IOU	220	415	412	60	--	JI	--
521	183 / 225	09/15/92	1610	75	IOU	220	415	415	34	--	JI	--
522	184 / 185	09/04/92	1340	65	SS	223	415	412	300	DS-164	JI	--
523	185 / 65R	09/04/92	1445	65	SS	223	415	411	12	--	JI	--
524	185 / 186	09/04/92	1400	65	BS	246	419	417	310	DS-165	JI	--
525	186 / 68F	09/11/92	855	50	SKP	64	415	415	34	--	CPB	--
526	186 / 187	09/04/92	1530	65	SS	223	415	411	304	--	JI	--
527	187 / 68M	09/11/92	1030	55	SS	223	415	413	65	--	CPB	--
528	187 / 68R	09/11/92	1000	55	SKP	64	415	414	34	--	CPB	--
529	187 / 188	09/11/92	1020	55	SS	223	415	411	35	DS-167	CPB	90'N TO 125'NSEOS
530	187 / 188	09/11/92	945	55	BS	246	430	428	185	DS-168	CPB	125'NSEOS TO NEOS
531	187 / 188	09/11/92	850	50	SS	223	415	415	50	--	CPB	SEOS TO 50'NSEOS
532	188 / 68M	09/11/92	950	55	SS	223	415	414	65	--	CPB	--
533	188 / 189	09/11/92	906	50	IOU	220	410	404	317	DS-166	CPB	--
534	189 / 71I	09/11/92	1050	55	IOU	220	410	406	8	DS-169	JI	--
535	189 / 190	09/11/92	1010	55	IOU	220	410	405	305	--	CPB	--
536	190 / 191	09/11/92	1110	60	BS	246	430	423	253	--	CPB	SEOS TO 253'NSEOS
537	190 / 191	09/11/92	1233	60	SS	223	415	414	50	--	CPB	NEOS TO 253'NSEOS
538	191 / 192	09/11/92	1110	60	SS	223	415	415	320	--	CPB	--
539	192 / 193	09/11/92	1330	65	IOU	220	410	406	315	--	JI	--
540	193 / 73E	09/11/92	1520	65	SKP	64	400	399	13	--	JI	--

APPENDIX I
POND 93
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	LOCATION
					WELDER I.D.		MACH. TEMP (°F)					
					TECH.	MACH	SET.	ACT.				
541	193 / 194	09/11/92	1345	65	BS	246	412	409	300	DS-171	JI	--
542	194 / 195	09/11/92	1420	65	SS	223	415	411	298	DS-173	JI	--
543	195 / 196	09/11/92	1455	65	IOU	220	410	408	239	DS-172	JI	--
544	195 / 197	09/11/92	1520	65	BS	246	412	410	61	--	JI	--
545	196 / 197	09/11/92	1540	65	BS	246	412	409	34	--	JI	--
546	196 / 198	09/11/92	1600	65	SS	223	415	410	240	DS-174	JI	--
547	197 / 198	09/11/92	1600	65	BS	246	412	410	67	--	JI	--
548	198 / 72E	09/12/92	800	55	SS	223	420	416	34	--	JI	--
549	198 / 199	09/11/92	1635	65	BS	246	412	410	306	DS-175	JI	--
550	199 / 73S	09/11/92	1810	65	SS	223	415	412	10	--	JI	--
551	199 / 200	09/11/92	1730	65	SS	223	415	413	302	--	JI	--
552	200 / 201	09/11/92	1645	65	BS	246	412	407	302	--	JI	--
553	201 / 74A	09/11/92	1855	65	SKP	64	400	399	6	--	JI	--
554	201 / 202	09/11/92	1840	65	SS	223	415	412	302	DS-177	JI	--
555	202 / 203	09/11/92	1845	65	IOU	220	410	404	245	--	JI	SEOS TO 245'N
556	202 / 203	09/11/92	1915	65	BS	246	412	408	55	DS-178	JI	245'NSEOS TO NEOS
557	203 / 204	09/12/92	830	55	SS	223	420	415	300	DS-179	JI	--
558	204 / 205	09/12/92	845	55	IOU	220	410	406	300	DS-180	JI	--
559	205 / 206	09/12/92	950	55	IOU	220	410	407	300	DS-181	JI	--
560	206 / 207	09/12/92	950	55	SS	223	420	414	300	--	JI	--
561	207 / 208	09/12/92	1050	55	IOU	220	415	413	312	--	JI	--
562	208 / 209	09/12/92	1100	55	SS	223	420	416	312	DS-182	JI	--
563	209 / 210	09/12/92	1340	65	IOU	220	415	410	315	DS-183	JI	--
564	210 / 77C	09/12/92	1630	65	BS	246	425	420	10	--	JI	--
565	210 / 211	09/12/92	1400	65	SS	223	420	415	307	DS-184	JI	--
566	211 / 212	09/12/92	1455	65	IOU	220	415	411	305	DS-185	JI	--
567	212 / 213	09/12/92	1550	65	SS	223	420	417	304	--	JI	--

APPENDIX I
POND 93
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	LOCATION
					WELDER I.D.		MACH. TEMP (°F)					
					TECH.	MACH	SET.	ACT.				
568	213 / 214	09/12/92	1630	65	IOU	220	415	409	300	--	JI	--
569	214 / 215	09/12/92	1705	65	SS	223	420	418	300	DS-186	JI	--
570	215 / 81D	09/15/92	1120	55	BS	64	420	416	34	--	JI	--
571	215 / 81H	09/15/92	1150	55	BS	64	420	417	9	--	JI	--
572	215 / 216	09/15/92	855	55	IOU	220	425	421	300	DS-189	JI	--
573	216 / 217	09/15/92	915	55	SS	223	420	416	297	DS-188	JI	--
574	217 / 218	09/15/92	1020	55	SS	223	420	413	300	--	JI	--
575	218 / 219	09/15/92	1103	55	IOU	220	425	416	300	DS-191	JI	--
576	219 / 220	09/15/92	1125	55	SS	223	420	415	302	DS-190	JI	--
577	220 / 82D	09/15/92	1550	75	BS	64	413	411	9	--	JI	--
578	220 / 221	09/15/92	1340	75	IOU	220	415	412	300	--	JI	--
579	221 / 222	09/15/92	1350	75	SS	223	420	415	300	--	JI	--
580	222 / 223	09/15/92	1430	75	SS	223	420	416	300	DS-192	JI	--
581	223 / 224	09/15/92	1455	75	IOU	220	415	414	300	DS-194	JI	--
582	224 / 232	09/16/92	1108	55	SS	223	420	411	300	--	CPB	--
583	225 / 226	09/15/92	1638	75	IOU	220	415	411	92	--	JI	--
584	226 / 227	09/15/92	1640	75	SS	223	420	417	91	--	JI	--
585	227 / 228	09/15/92	1655	75	SS	223	420	417	90	DS-195	JI	--
586	228 / 229	09/15/92	1710	75	IOU	220	415	412	91	DS-196	JI	--
587	229 / 230	09/15/92	1730	75	SS	223	420	417	90	--	JI	--
588	230 / 231	09/15/92	1800	75	IOU	220	415	411	88	--	JI	--
589	231 / 244	09/16/92	1625	65	BS	220	421	418	95	DS-199	CPB	--
590	232 / 233	09/16/92	1300	60	SKP	64	410	410	300	DS-197	CPB	--
591	233 / 242	09/16/92	1645	65	SS	223	420	420	40	--	CPB	SEOS TO 40'N
592	233 / 242	09/16/92	1535	60	SKP	64	410	409	252	DS-201	CPB	NEOS TO 40'NSEOS
593	234 / 235	09/16/92	1320	60	SS	223	420	417	92	DS-198	CPB	--
594	234 / 242	09/16/92	1540	60	SS	223	420	420	34	--	CPB	--

APPENDIX I
POND 93
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	LOCATION
					WELDER I.D.		MACH. TEMP (°F)					
					TECH.	MACH	SET.	ACT.				
595	234 / 244	09/16/92	1645	65	BS	220	421	420	95	--	CPB	--
596	235 / 236	09/16/92	1340	60	SS	223	420	420	95	--	CPB	--
597	235 / 236	09/16/92	1335	60	BS	220	421	420	95	--	CPB	--
598	235 / 242	09/16/92	1546	60	SS	223	420	419	34	--	CPB	--
599	236 / 237	09/16/92	1340	60	SS	223	420	420	95	--	CPB	--
600	236 / 242	09/16/92	1553	60	SS	223	420	420	34	--	CPB	--
601	237 / 238	09/16/92	1400	60	BS	220	421	419	98	--	CPB	--
602	237 / 242	09/16/92	1603	60	SS	223	420	418	34	--	CPB	--
603	238 / 239	09/16/92	1405	60	SS	223	420	419	95	--	CPB	--
604	238 / 242	09/16/92	1608	60	SS	223	420	417	34	--	CPB	--
605	239 / 240	09/16/92	1500	60	BS	220	421	420	41	--	CPB	--
606	239 / 241	09/16/92	1455	60	SS	223	420	418	47	--	CPB	--
607	239 / 242	09/16/92	1628	65	SS	223	420	420	9	--	CPB	--
608	240 / 243	09/16/92	1605	65	BS	220	421	420	45	--	CPB	--
609	241 / 242	09/16/92	1632	65	SS	223	420	419	86	DS-200	CPB	--
610	241 / 243	09/16/92	1550	65	BS	220	421	418	55	--	CPB	--
611	242 / 244	09/16/92	1722	65	SS	223	420	417	34	--	CPB	--

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARIES

December 1992

927-4003

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
1 A	1 / 23	1'EWAT	PT	08/11/92	P	1X1	KT	227	JCL	OCA	--
1 B	16 / 17	INT W/25	T	08/11/92	P	2X2	SN	162	JCL	08/15/92	JCL
1 C	15 / 16	INT W/25	T	08/11/92	P	1X1	SN	162	JCL	08/15/92	JCL
1 D	14 / 15	INT W/25	T	08/07/92	P	1X1	KT	227	TD	08/15/92	JCL
1 E	13 / 14	INT W/25	T	08/11/92	P	1X1	SN	162	JCL	08/15/92	JCL
1 F	12 / 13	INT W/25	T	08/11/92	P	1X1	SN	162	JCL	08/15/92	JCL
1 G	11 / 12	INT W/25	T	08/11/92	P	1X1	SN	162	JCL	08/15/92	JCL
1 H	10 / 11	INT W/25	T	08/11/92	P	3X3	SN	162	JCL	08/15/92	JCL
1 I	9 / 10	INT W/25	T	08/11/92	P	2X2	SN	162	JCL	08/15/92	JCL
1 J	8 / 9	INT W/25	T	08/11/92	P	2X2	SN	162	JCL	08/15/92	JCL
1 K	7 / 8	INT W/25	T	08/11/92	P	2X3	SN	162	JCL	08/15/92	JCL
1 M	6 / 7	INT W/25	T	08/10/92	P	3X5	SN	162	JCL	08/15/92	JCL
1 N	5 / 6	INT W/25	T	08/10/92	P	2X3	SN	162	JCL	08/15/92	JCL
1 P	4 / 5	INT W/25	T	08/10/92	P	2X2	SN	162	JCL	08/15/92	JCL
1 Q	3 / 4	INT W/25	T	08/10/92	P	2X1	SN	162	JCL	08/15/92	JCL
1 R	2 / 3	INT W/25	T	08/10/92	P	2X4	SN	162	JCL	08/15/92	JCL
1 S	1 / 2	INT W/25	T	08/10/92	P	2X3	SN	162	JCL	08/15/92	JCL
2 A	1 / 2	1'EWAT	PT	08/11/92	P	1X2	BS	227	JCL	OCA	--
2 B	5 / 6	9'WTOE	PT	08/11/92	P	2X5	SN	162	JCL	08/15/92	JCL
2 C	5 / 6	1'EWAT	PT	08/11/92	P	2X2	BS	227	JCL	OCA	--
2 D	6 / 7	1'EWAT	PT	08/11/92	P	2X2	KT	227	JCL	OCA	--
2 E	10 / 11	1'EWAT	PT	08/11/92	P	1X1	KT	227	JCL	OCA	--
2 F	11 / 12	1'EWAT	PT	08/11/92	P	1X1	BS	227	JCL	OCA	--
2 G	12 / 13	1'EWAT	PT	08/11/92	P	1X1	KT	227	JCL	OCA	--
2 H	13 / 14	23'WTOE	PT	08/11/92	P	2X3	KT	227	JCL	08/15/92	JCL
2 I	14 / 15	1'EWAT	PT	08/11/92	P	1X1	KT	227	JCL	OCA	--
2 J	15 / 16	28'WTOE	PT	08/11/92	P	1X3	KT	227	JCL	08/15/92	JCL
2 K	15 / 16	1'EWAT	PT	08/11/92	P	1X1	KT	227	JCL	OCA	--

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY - POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
2 M	16 / 17	< COVERED BY 5I >	FS	--	--	--	--	--	--	--	--
2 N	17 / 18	1'EWAT	PT	08/11/92	P	1X1	KT	227	JCL	OCA	--
2 P	18 / 19	1'EWAT	PT	08/11/92	P	1X1	BS	227	JCL	OCA	--
2 Q	20 / 21	9'WTOE	PT	08/11/92	P	1X2	BS	227	JCL	08/17/92	MH
2 R	20 / 21	1'EWAT	PT	08/12/92	P	1X1	PT	162	CPB	OCA	--
2 S	20 / 21	1'E OF CREST	PT	08/12/92	P	2X2	PT	162	CPB	OCA	--
2 T	23 / 24	INT W/22	PT	08/10/92	P	4X4	KT	227	JCL	08/15/92	JCL
2 W	23 / 24	1'EWAT	PT	08/10/92	P	4X4	BS	227	JCL	OCA	--
2 X	22 / 23	7'WEEOS	PT	08/10/92	P	2X4	SN	162	JCL	08/15/92	JCL
3 A	17 / 18	18' TO 35'EWAT	BO	08/11/92	P	3X16	KT	227	JCL	08/15/92	JCL
3 B	19 / 20	13'E OF TOE	BO	08/11/92	P	2X3	SN	162	JCL	08/17/92	MH
3 C	19 / 20	10' TO 19'WTOE	BO	08/11/92	P	2X10	KT	227	JCL	08/17/92	MH
3 D	--	< VOID >	--	--	--	--	--	--	--	--	--
3 E	--	< VOID >	--	--	--	--	--	--	--	--	--
3 F	20 / 21	16'E OF CREST	BO	08/11/92	P	1X1	BS	227	JCL	08/17/92	MH
3 G	22 / 24	22/23/24 TO 23'N	IO	08/10/92	P	3X28	KT	227	JCL	08/15/92	JCL
3 H	2 / 3	9'WEEOS	DS-01	08/08/92	P	3X5	BS	227	TD	08/15/92	JCL
3 I	1 / 2	9'WEEOS	DS-02	08/08/92	P	3X5	KT	227	TD	08/15/92	JCL
3 J	18 / 19	44'WEEOS	DS-04	08/07/92	P	2X5	BS	227	TD	08/17/92	MH
3 K	19 / 20	43'WEEOS	DS-06	08/07/92	P	2X5	KT	227	TD	08/17/92	MH
3 M	15 / 25	3'S OF 14/15/25	DS-05	08/07/92	P	3X6	BS	227	TD	08/15/92	JCL
3 N	3 / 4	9'WEEOS	DS-03	08/08/92	P	3X5	KT	227	TD	08/15/92	JCL
3 P	25 / 26	47'SNEOS	DS-07	08/08/92	P	3X5	BS	227	TD	08/15/92	JCL
3 Q	26 / 27	522'SNEOS	DS-08	08/07/92	P	3X5	KT	227	TD	08/15/92	JCL
3 R	27 / 28	531'SNEOS	DS-09	08/07/92	P	3X5	BS	227	TD	08/17/92	MH
3 S	27 / 28	345'SNEOS	DS-10	08/08/92	P	3X5	KT	227	TD	08/17/92	MH
3 T	27 / 28	248'SNEOS	DS-11	08/08/92	P	3X5	BS	227	TD	08/17/92	MH
3 W	28 / 29	63'SNEOS	DS-12	08/08/92	P	3X5	KT	227	TD	08/15/92	JCL

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
4 A	22 / 23	1'WTOE	PT	08/10/92	P	3X4	BS	227	JCL	08/15/92	JCL
4 B	22 / 23	INT W/25	PT	08/10/92	P	2X5	SN	162	JCL	08/15/92	JCL
4 C	22 / 23	2X TO 4B	FS	08/10/92	GW	6"	SN	162	JCL	08/15/92	JCL
4 D	22 / 25	1'SNAT	PT	08/10/92	P	1X2	KT	227	JCL	OCA	--
4 E	1 / 23	INT W/25	T	08/10/92	P	3X3	SN	162	JCL	08/15/92	JCL
4 F	10 / 25	21'S OF 9/10/25	PT	08/11/92	P	2X2	SN	162	JCL	08/15/92	JCL
4 G	20 / 21	2R TO 2S	FS	08/12/92	RS	6'	PT	162	CPB	OCA	--
4 H	--	< VOID >	--	--	--	--	--	--	--	--	--
4 I	25 / 26	6'SNAT	PT	08/10/92	P	2X2	BS	227	JCL	OCA	--
4 J	25 / 26	4I TO NAT	FS	08/10/92	GW	6"	BS	227	JCL	OCA	--
4 K	25 / 26	341'SNAT	PT	08/13/92	P	3X3	BS	227	JCL	08/15/92	JCL
4 M	25 / 26	396'SNAT	PT	08/13/92	P	3X4	BS	227	JCL	08/15/92	JCL
4 N	25 / 26	538'SNAT	PT	08/13/92	P	2X6	BS	227	JCL	08/15/92	JCL
4 P	26 / 27	536'SNAT	PT	08/13/92	P	5X6	BS	227	JCL	08/15/92	JCL
4 Q	26 / 27	518'SNAT	PT	08/13/92	P	2X2	BS	227	JCL	08/15/92	JCL
4 R	26 / 27	340' TO 344'SNAT	FS	08/13/92	P	2X10	BS	227	JCL	08/15/92	JCL
4 S	26 / 27	362'SNAT	PT	08/13/92	P	2X3	BS	227	JCL	08/15/92	JCL
4 T	26 / 27	403'SNAT	PT	08/13/92	P	2X3	BS	227	JCL	08/15/92	JCL
4 W	26 / 27	426'SNAT	PT	08/13/92	P	2X2	BS	227	JCL	08/15/92	JCL
4 X	26 / 27	251'SNAT	PT	08/13/92	P	3X4	BS	227	JCL	08/15/92	JCL
5 A	26 / 27	244'SNAT	PT	08/13/92	P	2X3	BS	227	JCL	08/15/92	JCL
5 B	26 / 27	205'SNAT	PT	08/13/92	P	2X3	BS	227	JCL	08/15/92	JCL
5 C	26 / 27	1'SNAT	PT	08/10/92	P	1X2	KT	227	JCL	OCA	--
5 D	27 / 28	645'SNAT	PT	08/13/92	P	2x6	SN	162	JCL	08/17/92	MH
5 E	27 / 28	620'SNAT	PT	08/13/92	P	3X7	PT	162	JCL	08/17/92	MH
5 F	27 / 28	475'SNAT	PT	08/13/92	P	3X3	BS	227	JCL	08/17/92	MH
5 G	27 / 28	340'SNAT	PT	08/13/92	P	3X4	BS	227	JCL	08/17/92	MH
5 H	27 / 28	1'SNAT	PT	08/10/92	P	2X2	BS	227	JCL	OCA	--

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
5 I	16 / 17	WAT TO 12'E	FS	08/11/92	P	2X13	KT	227	JCL	08/15/92	JCL
5 J	28 / 29	265'SNAT	PT	08/13/92	P	3X4	BS	227	JCL	08/17/92	MH
5 K	28 / 29	238'SNAT	PT	08/13/92	P	3X5	BS	227	JCL	08/17/92	MH
5 M	28 / 29	195'SNAT	PT	08/13/92	P	2X2	BS	227	JCL	08/17/92	MH
5 N	28 / 29	407'SNAT	PT	08/13/92	P	2X5	BS	227	JCL	08/17/92	MH
5 P	28 / 29	462'SNAT	PT	08/13/92	P	2X2	BS	227	JCL	08/17/92	MH
5 Q	28 / 29	382'SNAT	PT	08/13/92	P	2X2	BS	227	JCL	08/17/92	MH
5 R	28 / 29	315'SNAT	PT	08/13/92	P	1X2	BS	227	JCL	08/17/92	MH
5 S	28 / 29	308'SNAT	PT	08/13/92	P	1X2	BS	227	JCL	08/17/92	MH
5 T	28 / 29	485'SNAT	PT	08/13/92	P	2X6	BS	227	JCL	08/17/92	MH
5 W	28 / 29	653'SNAT	PT	08/13/92	P	2X3	SN	162	JCL	08/17/92	MH
5 X	28 / 29	470'SNAT	PT	08/13/92	P	2X2	BS	227	JCL	08/17/92	MH
6 A	28 / 29	77'SNAT	PT	08/13/92	P	2X3	BS	227	JCL	08/15/92	JCL
6 B	28 / 29	4'SNAT	PT	08/10/92	P	3X4	KT	227	JCL	OCA	--
6 C	29 / 30	INT W/30EXT	PT	08/10/92	P	3X4	BS	227	JCL	OCA	--
6 D	29 / 30	262'SNAT	PT	08/14/92	P	3X5	BS	227	TD	08/17/92	MH
6 E	29 / 30	400'SNAT	PT	08/14/92	P	3X5	BS	227	TD	08/17/92	MH
6 F	29 / 30	< COVERED BY 17X >	--	--	--	--	--	--	--	--	--
6 G	30 / 31	341'SNAT	PT	08/14/92	P	2X2	BS	227	TD	08/17/92	MH
6 H	30 / 31	221'SNAT	PT	08/14/92	P	1X1	BS	227	TD	08/17/92	MH
6 I	30 / 31	INT W/30ext	PT	08/10/92	P	2X3	KT	227	JCL	OCA	--
6 J	31 / 32	1'SNAT	PT	08/10/92	P	1X2	SN	162	JCL	OCA	--
6 K	31 / 32	18'SNAT	PT	08/10/92	P	2X3	SN	162	JCL	08/18/92	TD
6 M	31 / 32	36'SNAT	PT	08/17/92	P	3X3	BS	162	LS	08/18/92	TD
6 N	31 / 32	96'SNAT	PT	08/14/92	P	4X4	BS	227	TD	08/18/92	TD
6 P	31 / 32	107'SNAT	PT	08/14/92	P	1X1	BS	227	TD	08/18/92	TD
6 Q	31 / 32	132'SNAT	PT	08/14/92	P	1X1	BS	227	TD	08/17/92	MH
6 R	31 / 32	241'SNAT	PT	08/15/92	P	3X3	SP	158	TD	08/17/92	MH

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
6 S	31 / 32	401'SNAT	PT	08/14/92	P	2X7	SP	158	TD	08/17/92	MH
6 T	31 / 32	422'SNAT	PT	08/14/92	P	3X4	SP	158	TD	08/17/92	MH
6 W	31 / 32	422'S TO 427'SNAT	FS	08/14/92	RS	5'	SP	158	TD	08/17/92	MH
6 X	31 / 32	427'SNAT	PT	08/14/92	P	2X2	SP	158	TD	08/17/92	MH
7 A	30 / 31	607'SNEOS	DS-14	08/14/92	P	2X6	SN	162	JCL	08/17/92	MH
7 B	30 / 31	53'SNEOS	DS-15	08/08/92	P	3X5	BS	227	TD	08/18/92	TD
7 C	30 / 31	400'SNEOS	DS-16	08/08/92	P	3X6	KT	227	TD	08/17/92	MH
7 D	30 / 31	300'SNEOS	DS-17	08/08/92	P	3X5	SN	162	TD	08/17/92	MH
7 E	31 / 32	557'SNEOS	DS-18	08/14/92	P	3X6	SP	158	TD	08/17/92	MH
7 F	31 / 32	340'SNEOS	DS-19	08/08/92	P	2X6	SN	162	TD	08/17/92	MH
7 G	32 / 33	168'SNEOS	DS-20	08/08/92	P	3X5	SN	162	TD	08/17/92	MH
7 H	29 / 30	403'SNEOS	DS-13	08/07/92	P	3X5	KT	227	TD	08/17/92	MH
7 I	32 / 33	583'SNEOS	DS-21	08/14/92	P	3X6	SP	158	TD	08/17/92	MH
7 J	33 / 34	426'SNEOS	DS-22	08/08/92	P	3X5	SN	162	TD	08/18/92	TD
7 K	34 / 35	563'SNEOS	DS-23	08/08/92	P	3X5	SN	162	TD	08/18/92	TD
7 M	34 / 35	340'SNEOS	DS-24	08/08/92	P	3X5	SN	162	TD	08/18/92	TD
7 N	34 / 35	155'SNEOS	DS-25	08/08/92	P	3X5	SN	162	TD	08/18/92	TD
7 P	35 / 36	405'SNEOS	DS-26	08/08/92	P	3X5	SN	162	TD	08/18/92	TD
7 Q	35 / 36	80'SNEOS	DS-27	08/08/92	P	3X5	SN	162	TD	08/18/92	TD
7 R	36 / 37	192'SNEOS	DS-28	08/08/92	P	3X5	SN	162	TD	08/18/92	TD
7 S	36 / 37	410'SNEOS	DS-29	08/08/92	P	3X5	SN	162	TD	08/18/92	TD
7 T	37 / 38	57'SNEOS	DS-30	08/08/92	P	3X6	SKP	158	JCL	08/18/92	TD
7 W	37 / 38	464'SNEOS	DS-31	08/08/92	P	3X5	SN	162	TD	08/18/92	TD
8 A	37	85'SNAT,10'E	BS	08/08/92	P	7X12	SKP	158	JCL	08/26/92	MH
8 B	37	80'SNAT,10'E	BS	08/22/92	C	6X6	KL	162	JI	08/26/92	MH
8 C	21 / 40	@ TOE	PT	08/11/92	P	2X5	SN	162	JCL	08/17/92	MH
8 D	21 / 40	5'E OF AT	PT	08/12/92	P	1X1	PT	162	CPB	OCA	--
8 E	21 / 40	AT TO 5'E	FS	08/12/92	RS	8'	PT	162	CPB	OCA	--

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
8 F	39 / 40	5'E OF AT	PT	08/12/92	P	1X1	PT	162	CPB	OCA	--
8 G	39 / 40	1'E OF AT	PT	08/12/92	P	1X1	PT	162	CPB	OCA	--
8 H	39 / 40	5' TO 1'E OF AT	FS	08/12/92	RS	24"	PT	162	CPB	OCA	--
8 I	42 / 44	@ AT	PT	08/12/92	P	2X3	PT	162	CPB	OCA	--
8 J	41 / 42	30'E OF AT	PT	08/12/92	P	2X3	PT	162	CPB	08/17/92	MH
8 K	43 / 44	2'N OF AT	PT	08/12/92	P	3X7	PT	162	CPB	OCA	--
8 M	42 / 43	INT W/44	T	08/12/92	P	2X2	PT	162	CPB	08/17/92	MH
8 N	43 / 44	2'N OF AT TO AT	FS	08/12/92	RS	6'	PT	162	CPB	OCA	--
8 P	43 / 44	< COVERED BY 8K >	--	--	--	--	--	--	--	--	--
8 Q	17 / 25	INT W/43	T	08/11/92	P	3X4	SN	162	JCL	08/15/92	JCL
8 R	25 / 43	INT W/46	T	08/13/92	P	3X5	PT	162	JCL	08/15/92	JCL
8 S	43 / 46	127'N OF AT	PT	08/11/92	P	2X2	SN	162	JCL	08/17/92	MH
8 T	43 / 45	INT W/46	T	08/11/92	P	4X4	SN	162	JCL	08/17/92	MH
8 W	43 / 45	@ TOE	PT	08/13/92	P	2X3	PT	162	JCL	08/17/92	MH
8 X	43 / 45	@ AT	PT	08/12/92	P	2X4	PT	162	CPB	OCA	--
9 A	31 / 32	450'SNAT	PT	08/14/92	P	2X4	SP	158	TD	08/17/92	MH
9 B	31 / 32	492'SNAT	PT	08/14/92	P	2X2	SP	158	TD	08/17/92	MH
9 C	--	< VOID >	--	--	--	--	--	--	--	--	--
9 D	31 / 32	533'SNAT	PT	08/14/92	P	1X1	SP	158	TD	08/17/92	MH
9 E	31 / 32	533'S TO 539'SNAT	FS	08/14/92	RS	5'	SP	158	TD	08/17/92	MH
9 F	31 / 32	539'SNAT	PT	08/14/92	P	3X3	SP	158	TD	08/17/92	MH
9 G	31 / 32	578'SNAT	FM	08/14/92	P	3X6	SP	158	TD	08/17/92	MH
9 H	31 / 32	550'SNAT	PT	08/14/92	P	1X1	SP	158	TD	08/17/92	MH
9 I	31 / 32	589'SNAT	PT	08/14/92	P	2X2	SP	158	TD	08/17/92	MH
9 J	31 / 32	620'SNAT	PT	08/14/92	P	2X2	SP	158	TD	08/17/92	MH
9 K	32 / 33	550'SNAT	PT	08/14/92	P	2X2	SP	158	TD	08/17/92	MH
9 M	32 / 33	439'SNAT	PT	08/15/92	P	1X1	SP	158	TD	08/17/92	MH
9 N	32 / 33	420'SNAT	FM	08/15/92	P	3X3	SP	158	TD	08/17/92	MH

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
9 P	32 / 33	400'SNAT	FM	08/15/92	P	4X4	SP	158	TD	08/17/92	MH
9 Q	32 / 33	350'SNAT	FS	08/15/92	P	3X6	SP	158	TD	08/17/92	MH
9 R	32 / 33	285'SNAT	FS	08/15/92	P	3X7	SP	158	TD	08/17/92	MH
9 S	32 / 33	244'SNAT	PT	08/15/92	P	2X2	SP	158	TD	08/17/92	MH
9 T	33 / 34	7'SNAT	PT	08/10/92	P	1X1	SN	162	JCL	OCA	--
9 W	33 / 34	NAT TO 7'SNAT	FS	08/10/92	RS	7'	SN	162	JCL	OCA	--
9 X	33 / 34	237'SNAT	PT	08/15/92	P	3X3	SP	158	TD	08/18/92	TD
10 A	34 / 35	407'SNAT	PT	08/15/92	P	2X2	SP	158	TD	08/18/92	TD
10 B	34 / 35	11'SNAT	PT	08/10/92	P	2X2	SN	162	JCL	08/18/92	TD
10 C	34 / 35	NAT TO 11'S	FS	08/10/92	GW	6"	SN	162	JCL	OCA	--
10 D	34 / 35	620'SNAT	PT	08/17/92	P	1X2	BS	162	LS	08/18/92	TD
10 E	35 / 36	382'SNAT	PT	08/15/92	P	2X6	SP	158	TD	08/18/92	TD
10 F	35 / 36	423'SNAT	PT	08/15/92	P	2X2	SP	158	TD	08/18/92	TD
10 G	35 / 36	362'SNAT	PT	08/15/92	P	3X3	SP	158	TD	08/18/92	TD
10 H	35 / 36	NAT TO 7'S	FS	08/10/92	GW	6"	SN	162	JCL	OCA	--
10 I	35 / 36	7'SNAT	PT	08/10/92	P	1X1	SN	162	JCL	08/18/92	TD
10 J	36 / 37	360'SNAT	PT	08/15/92	P	3X3	SP	158	TD	08/18/92	TD
10 K	36 / 37	1'SNAT	PT	08/10/92	P	1X1	SN	162	JCL	OCA	--
10 M	37 / 38	314'SNAT	PT	08/17/92	P	3X3	BS	162	LS	08/18/92	TD
10 N	37 / 38	1'SNAT	PT	08/10/92	P	1X1	SN	162	JCL	OCA	--
10 P	37 / 38	343'SNAT	PT	08/17/92	P	1X1	BS	162	LS	08/18/92	TD
10 Q	37 / 38	465'SNAT	PT	08/17/92	P	2X4	BS	162	LS	08/18/92	TD
10 R	37 / 38	387'SNAT	PT	08/17/92	P	1X1	BS	162	LS	08/18/92	TD
10 S	37 / 38	359'SNAT	FS	08/17/92	P	2X3	BS	162	LS	08/18/92	TD
10 T	32 / 33	35'SNAT	HT	08/18/92	P	2X5	BS	162	TD	08/18/92	TD
10 W	31 / 32	646'SNAT	BO	08/14/92	RS	6"	SP	158	TD	08/17/92	MH
10 X	31 / 32	597'SNAT	BO	08/14/92	P	1X1	SP	158	TD	08/17/92	MH
11 A	33 / 34	4'SNAT	PT	08/10/92	P	2X2	SN	162	JCL	OCA	--

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
11 B	33 / 34	NAT TO 4'S	FS	08/10/92	RS	4'	SN	162	JCL	OCA	--
11 C	34 / 35	NAT TO 4'S	FS	08/10/92	P	2X1	SN	162	JCL	OCA	--
11 D	35 / 36	NAT TO 1'S	FS	08/10/92	P	1X1	SN	162	JCL	OCA	--
11 E	25 / 26	NAT TO 2'S	FS	08/10/92	P	2X2	BS	227	JCL	OCA	--
11 F	22	NW CORNER @ AT	EXT	08/10/92	C	4X12	BS	227	JCL	OCA	--
11 G	25	NW CORNER @ AT	EXT	08/10/92	C	5X23	BS	227	JCL	OCA	--
11 H	26 / 27	NAT	FS	08/10/92	RS	2'	BS	227	JCL	OCA	--
11 I	29	NAT	EXT	08/10/92	C	8X35	BS	227	JCL	OCA	--
11 J	33	NAT 6"S	EE	08/10/92	P	1X1	SN	162	JCL	OCA	--
11 K	33	6'SNAT	D	08/10/92	P	1X2	SN	162	JCL	OCA	--
11 M	33	12'SNAT	D	08/10/92	P	1X1	SN	162	JCL	08/18/92	TD
11 N	29 / 30	13'SNAT	PT	08/10/92	P	2X3	BS	227	JCL	08/18/92	TD
11 P	30	7'SNAT/EXT	EXT	08/21/92	P	2X34	SN	4	MH	OCA	--
11 Q	28 / 29	1'SNAT	PT	08/10/92	P	1X1	KT	227	JCL	OCA	--
11 R	30 / 31	NAT TO 6'S	PT	08/10/92	GW	6"	KT	227	JCL	OCA	--
11 S	29 / 30	NAT TO 6'S	PT	08/10/92	GW	6"	BS	227	JCL	OCA	--
11 T	28 / 29	NAT TO 6'S	PT	08/10/92	GW	6"	BS	227	JCL	OCA	--
11 W	26 / 27	4'SNAT	PT	08/10/92	GW	6"	KT	227	JCL	OCA	--
11 X	26 / 27	7'SNAT	PT	08/10/92	P	2X2	KT	227	JCL	OCA	--
12 A	43 / 45	19'NSEOS	DS-32	08/13/92	P	2X6	PT	162	JCL	08/17/92	MH
12 B	25 / 46	619'SNEOS	DS-33	08/13/92	P	2X7	SN	162	JCL	08/15/92	JCL
12 C	27 / 46	425' TO 324'NSEOS	IO	08/10/92	C	2X101	SS	246	JI	08/10/92	TD
12 D	45 / 47	65'NSEOS	DS-34	08/13/92	P	2X5	SN	162	JCL	08/17/92	MH
12 E	27 / 46	INT W/48 TO 6'N	IO	08/13/92	C	3X9	PT	162	JCL	08/15/92	JCL
12 F	26 / 46	ENTIRE SEAM	IO	08/10/92	C	4X34	SS	246	JI	08/10/92	TD
12 G	49 / 50	< VOID >	--	--	--	--	--	--	--	--	--
12 H	51 / 52	300'NSEOS	DS-36	08/14/92	P	2X6	PT	162	JCL	08/17/92	MH
12 I	50 / 52	62'NSEOS	BO	08/14/92	P	2X4	PT	162	JCL	08/17/92	MH

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY - POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
12 J	50 / 52	80'NSEOS	BO	08/14/92	P	1X1	PT	162	JCL	08/17/92	MH
12 K	52 / 53	268'NSEOS	DS-37	08/14/92	P	2X6	SN	162	JCL	08/17/92	MH
12 M	54 / 55	182'NSEOS	DS-38	08/14/92	P	2X2	PT	162	JCL	08/17/92	MH
12 N	53 / 54	129'NSEOS	DS-39	08/14/92	P	2X4	PT	162	JCL	08/17/92	MH
12 P	33 / 55	7'E OF 33/55/56	DS-40	08/14/92	P	2X5	PT	162	LS	08/17/92	MH
12 Q	33	658'SNEOS, 4'W	D	08/14/92	P	1X1	PT	162	LS	08/17/92	MH
12 R	57 / 58	42'NSEOS	DS-41	08/15/92	P	2X5	PT	162	LS	08/18/92	TD
12 S	59 / 61	72'NSEOS	DS-42	08/15/92	P	2X4	PT	162	LS	08/17/92	MH
12 T	63	205'NSEOS, 7'E	D	08/17/92	P	1X1	KT	158	LS	08/18/92	TD
12 W	62 / 63	17'EWEOS	BO	08/17/92	P	1X1	SB	158	LS	08/18/92	TD
12 X	37	669'SNEOS, 9'E	D	08/17/92	P	1X1	KT	158	LS	08/17/92	MH
13 A	43 / 45	30'N OF AT	PT	08/13/92	P	3X3	PT	162	JCL	08/17/92	MH
13 B	12C / 46	285'N OF AT	PT	08/13/92	P	4X4	PT	162	JCL	08/15/92	JCL
13 C	12C / 46	315'N OF AT	PT	08/13/92	P	4X5	SN	162	JCL	08/15/92	JCL
13 D	27 / 48	23'W OF 27/46/48	PT	08/13/92	P	2X3	SN	162	JCL	08/15/92	JCL
13 E	47 / 48	INT W/49	T	08/13/92	P	2X3	PT	162	JCL	08/17/92	MH
13 F	46 / 47	INT W/48	T	08/13/92	P	2X2	PT	162	JCL	08/17/92	MH
13 G	45 / 46	INT W/47	T	08/13/92	P	2X3	SN	162	JCL	08/17/92	MH
13 H	45 / 47	@ AT	PT	08/12/92	P/RS	2X2/6'	PT	162	CPB	OCA	--
13 I	47 / 49	85'N OF AT	PT	08/13/92	P	1X2	PT	162	JCL	08/17/92	MH
13 J	47 / 49	17'S OF 47/48/49	PT	08/13/92	P	2X3	SN	162	JCL	08/17/92	MH
13 K	28 / 48	INT W/49	PT	08/13/92	P	3X3	SN	162	JCL	08/17/92	MH
13 M	49 / 50	INT W/51	PT	08/13/92	P	2X7	SN	162	JCL	08/17/92	MH
13 N	29 / 51	INT W/52	PT	08/14/92	P	2X5	SN	162	JCL	08/17/92	MH
13 P	49 / 50	@ AT	PT	08/12/92	P/RS	2X3/3'	PT	162	CPB	OCA	--
13 Q	49 / 50	@ TOE	PT	08/14/92	P	2X3	PT	162	JCL	08/17/92	MH
13 R	47 / 49	11'N OF AT	PT	08/12/92	P	1X2	PT	162	CPB	08/17/92	MH
13 S	47 / 49	@ AT	PT	08/12/92	P	2X3	PT	162	CPB	OCA	--

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
13 T	50 / 51	INT W/52	PT	08/14/92	P	1X1	PT	162	JCL	08/17/92	MH
13 W	50 / 52	141'N OF AT	PT	08/14/92	P	2X4	PT	162	JCL	08/17/92	MH
13 X	50 / 52	@ AT	PT	08/12/92	P	4X4	SS	162	TD	OCA	--
14 A	66 / 67	420'SNAT	PT	08/20/92	P	1X1	KT	158	TD	08/22/92	TD
14 B	66 / 67	370'SNAT	PT	08/20/92	P	3X12	KT	158	TD	08/22/92	TD
14 C	66 / 67	343'SNAT	PT	08/20/92	P	3X4	SB	158	TD	08/22/92	TD
14 D	65 / 66	315'SNAT	PT	08/21/92	P	2X3	SB	158	MH	08/22/92	TD
14 E	65 / 66	245'SNAT	PT	08/21/92	P	3X5	SB	158	MH	08/22/92	TD
14 F	65 / 66	180'SNAT	PT	08/21/92	P	3X10	KL	162	TD	08/22/92	MH
14 G	65 / 66	147'SNAT	PT	08/21/92	P	3X10	KL	162	TD	08/22/92	MH
14 H	65 / 66	120'SNAT	PT	08/21/92	P	3X6	KL	162	TD	08/22/92	MH
14 I	65 / 66	100' TO 120'SNAT	FS	08/21/92	RS	13'	KL	162	TD	08/22/92	MH
14 J	65 / 66	100'SNAT	PT	08/21/92	P	2X5	KL	162	TD	08/22/92	MH
14 K	66 / 67	@ NAT	PT	08/18/92	P	1X1	BS	162	TD	OCA	--
14 M	65 / 66	@ NAT	PT	08/18/92	P	2X4	BS	162	TD	OCA	--
14 N	65 / 66	30'SNAT	PT	08/21/92	P	3X4	KL	162	TD	08/22/92	MH
14 P	65 / 66	70'SNAT	PT	08/21/92	P	3X5	KL	162	TD	08/22/92	MH
14 Q	67 / 68	360'SNAT	PT	08/20/92	P	2X2	SB	158	TD	08/22/92	TD
14 R	68 / 69	323'SNAT	PT	08/20/92	P	2X3	SB	158	TD	08/22/92	TD
14 S	68 / 69	347'SNAT	PT	08/20/92	P	2X3	KT	158	TD	08/22/92	TD
14 T	68 / 69	365'SNAT	PT	08/20/92	P	3X6	SB	158	TD	08/22/92	TD
14 W	68 / 69	440'SNAT	PT	08/21/92	P	2X2	KT	158	MH	08/22/92	TD
14 X	68 / 69	440' TO 445'SNAT	FS	08/21/92	RS	4'	SB	158	MH	08/22/92	TD
15 A	33 / 34	267'SNAT	PT	08/15/92	P	2X2	SP	158	TD	08/18/92	TD
15 B	33 / 34	332'SNAT	PT	08/15/92	P	3X4	SP	158	TD	08/18/92	TD
15 C	33 / 34	342'SNAT	PT	08/15/92	P	3X3	SP	158	TD	08/18/92	TD
15 D	33 / 34	412'SNAT	PT	08/15/92	P	3X3	SP	158	LS	08/18/92	TD
15 E	33 / 34	434'SNAT	PT	08/15/92	P	2X2	SP	158	TD	08/18/92	TD

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
15 F	31 / 32	523'S OF ANT	BO	08/14/92	P	1X1	SP	158	TD	08/17/92	MH
15 G	31 / 32	509'SNAT	BO	08/14/92	P	1X1	SP	158	TD	08/17/92	MH
15 H	34 / 35	585'SNAT	BO	08/17/92	P	1X1	BS	162	LS	08/18/92	TD
15 I	34 / 35	592'SNAT	BO	08/17/92	P	1X2	BS	162	LS	08/18/92	TD
15 J	34 / 35	595'SNAT	BO	08/17/92	P	1X1	BS	162	LS	08/18/92	TD
15 K	34 / 35	604'SNAT	BO	08/17/92	P	1X1	BS	162	LS	08/18/92	TD
15 M	36	475'SNAT,6'E	SI	08/15/92	P	1X1	SP	158	TD	08/18/92	TD
15 N	17 / 18	INT W/43	PT	08/11/92	P	2X3	SN	162	JCL	08/15/92	JCL
15 P	18 / 19	INT W/43	PT	08/11/92	P	2X2	SN	162	JCL	08/17/92	MH
15 Q	18 / 19	INT W/43	PT	08/11/92	P	3X3	SN	162	JCL	08/17/92	MH
15 R	20 / 21	INT W/43	PT	08/11/92	P	2X3	SN	162	JCL	08/17/92	MH
15 S	21 / 39	INT W/43	PT	08/11/92	P	2X3	SN	162	JCL	08/17/92	MH
15 T	39 / 43	125'NSAT	PT	08/11/92	P	1X1	SN	162	JCL	08/17/92	MH
15 W	39 / 40	INT W/43	PT	08/11/92	P	1X1	SN	162	JCL	08/17/92	MH
16 A	25	3'SNAT,4'E	PT	08/10/92	P	1X1	BS	227	JCL	OCA	--
16 B	25	1'SNAT,16'E	PT	08/10/92	P	2X2	KT	227	JCL	OCA	--
16 C	25	9'SNAT,16'E	MD	08/10/92	P	2X2	KT	227	JCL	OCA	--
16 D	32 / 33	3'SNAT	MD	08/10/92	P	3X5	SN	162	JCL	OCA	--
16 E	32 / 33	NAT TO 3'S	MD	08/10/92	GW	6"	SN	162	JCL	OCA	--
16 F	1	48'EWAT,16'N	PT	08/21/92	GW	1'	PT	4	MH	08/22/92	TD
16 G	25	110'SNAT,16'E	FS	08/10/92	P	3X12	SN	162	JCL	08/15/92	JCL
16 H	25	90'SNAT,6'E	D	08/10/92	GW	6"	SN	162	JCL	08/15/92	JCL
16 I	9 / 10	8'EWAT	BO	08/11/92	P	1X1	BS	227	JCL	OCA	--
16 J	24	30'SE OF NWAT,3'N	D	08/10/92	P	1X1	KT	227	JCL	08/15/92	JCL
16 K	17 / 25	ENTIRE SEAM	FS	08/11/92	GW	18"	SN	162	JCL	08/15/92	JCL
16 M	40 / 41	INT W/43	PT	08/11/92	P	2X2	SN	162	JCL	08/17/92	MH
16 N	41 / 42	INT W/43	PT	08/11/92	P	2X2	SN	162	JCL	08/17/92	MH
16 P	39 / 40	48'EWAT	PT	08/11/92	P	1X1	SN	162	JCL	08/17/92	MH

Golder Construction Services, Inc.

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GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
16 Q	39 / 40	40'EWAT	PT	08/11/92	P	1X1	SN	162	JCL	08/17/92	MH
16 R	46 / 47	149'NSAT	D	08/11/92	P	1X1	SN	162	JCL	08/17/92	MH
16 S	46 / 47	121'NSAT	PT	08/11/92	P	2X4	SN	162	JCL	08/17/92	MH
17 A	29 / 51	< COVERED BY 5W >	--	--	--	--	--	--	--	--	--
17 B	28 / 51	ENTIRE SEAM	FS	08/13/92	GW	4'	SN	162	JCL	08/17/92	MH
17 C	28 / 49	INT W/51	PT	08/13/92	P	3X3	SN	162	JCL	08/17/92	MH
17 D	28 / 49	17C TO 17E	FS	08/13/92	P	3X5	SN	162	JCL	08/17/92	MH
17 E	28 / 49	9'WEEOS	D	08/13/92	P	2X4	SN	162	JCL	08/17/92	MH
17 F	28 / 49	18'WEEOS	D	08/13/92	P	1X2	PT	162	JCL	08/17/92	MH
17 G	28 / 49	6'EWEOS	D	08/13/92	RS	4'	SN	162	JCL	08/17/92	MH
17 H	58 / 59	SAT TO 4'N	FS	08/12/92	RS	3'	SS	162	TD	OCA	--
17 I	59 / 61	SAT TO 2'N	FS	08/12/92	RS	1'	SS	162	TD	OCA	--
17 J	45	1'S OF 46,12'W	ID	08/13/92	P	2X3	SN	162	JCL	08/17/92	MH
17 K	46 / 47	162'S OF AT	BO	08/13/92	P	1X1	SN	162	JCL	08/17/92	MH
17 M	46 / 47	178'S OF AT	BO	08/13/92	P	1X1	SN	162	JCL	08/17/92	MH
17 N	76	168'S OF AT,7'W	D	08/18/92	P	2X2	SB	158	MH	08/18/92	TD
17 P	76	160'S OF AT,1'E	D	08/18/92	P	1X1	SB	158	TD	08/18/92	TD
17 Q	76	158'S OF AT,1'E	D	08/18/92	P	1X1	KT	158	TD	08/18/92	TD
17 R	76	156'S OF AT,1'E	PT/D	08/18/92	P	2X8	KT	158	TD	08/18/92	TD
17 S	61	150'S OF AT,6'E	D	08/15/92	P	1X1	PT	162	LS	08/17/92	MH
17 T	28 / 48	310'S OF AT	FS	08/13/92	RS	10'	SN	162	JCL	08/17/92	MH
17 W	49 / 50	276'S OF AT	DS-35	08/13/92	P	2X5	SN	162	JCL	08/17/92	MH
17 X	29 / 30	516'N OF AT	PT	08/13/92	P	2X4	BS	227	JCL	08/17/92	MH
18 A	68 / 69	445'SNAT	PT	08/21/92	P	2X3	KT	158	MH	08/22/92	TD
18 B	67 / 68	@ NAT	PT	08/18/92	P	2X2	BS	162	TD	OCA	--
18 C	68 / 69	@ NAT	PT	08/18/92	P	2X2	BS	162	TD	OCA	--
18 D		< VOID >	--	--	--	--	--	--	--	--	--
18 E	68 / 69	25'SNAT	PT	08/21/92	P	3X6	KL	162	TD	08/22/92	MH

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY - POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
18 F	68 / 69	45'SNAT	PT	08/21/92	P	3X7	KL	162	TD	08/22/92	MH
18 G	68 / 69	100' TO 105'SNAT	FS	08/21/92	P	3X7	KL	162	TD	08/22/92	MH
18 H	68 / 69	105'SNAT	PT	08/21/92	P	2X6	KL	162	TD	08/28/92	TM
18 I	68 / 69	100'SNAT	PT	08/21/92	P	2X4	KL	162	TD	08/22/92	MH
18 J	68 / 69	65'SNAT	PT	08/21/92	P	3X6	KL	162	TD	08/22/92	MH
18 K	68 / 69	55' TO 65'SNAT	FS	08/21/92	RS	5'	KL	162	TD	08/22/92	MH
18 M	68 / 69	55'SNAT	PT	08/21/92	P	3X6	KL	162	TD	08/22/92	MH
18 N	69 / 70	323'SNAT	PT	08/20/92	P	3X3	KT	158	TD	08/22/92	TD
18 P	69 / 70	16' TO 20'SNAT	FS	08/22/92	GW	2'	KL	162	JI	08/25/92	JCL
18 Q	69 / 70	20'SNAT	PT	08/22/92	P	2X2	KL	162	JI	08/25/92	JCL
18 R	69 / 70	16'SNAT	PT	08/22/92	P	2X3	KL	162	JI	08/25/92	JCL
18 S	69 / 70	@ NAT	PT	08/18/92	P	2X2	KL	162	MH	OCA	--
18 T	70 / 71	353'SNAT	PT	08/21/92	P	2X3	SB	158	MH	08/22/92	TD
18 W	70 / 71	< COVERED BY 18X >	--	--	--	--	--	--	--	--	--
18 X	70 / 71	610' TO 615'SNAT	FS	08/22/92	P	2X6	KT	158	LS	08/28/92	TM
19 A	30 / 31	INT W/52	T	08/14/92	P	3X10	SN	162	JCL	08/17/92	MH
19 B	52 / 53	280'NSAT	PT	08/14/92	P	2X4	SN	162	JCL	08/17/92	MH
19 C	52 / 53	213'NSAT	PT	08/14/92	P	2X2	PT	162	JCL	08/17/92	MH
19 D	52 / 53	67'NSAT	PT	08/14/92	P	1X1	PT	162	JCL	08/17/92	MH
19 E	52 / 53	@ SAT	PT	08/12/92	P	2X3	SS	162	TD	OCA	--
19 F	28 / 48	SEOS TO NEOS	FS	08/13/92	P/P	3X8/1X1	SN	162	JCL	08/17/92	MH
19 G	53 / 54	112'NSAT	PT	08/14/92	P	2X4	PT	162	JCL	08/17/92	MH
19 H	53 / 54	40'NSAT	PT	08/14/92	P	2X3	PT	162	JCL	08/17/92	MH
19 I	53 / 54	@ SAT	PT	08/12/92	P	2X2	SS	162	TD	OCA	--
19 J	54 / 55	@ SAT	PT	08/12/92	P	1X1	SS	162	TD	OCA	--
19 K	55 / 57	55'NSAT	PT	08/15/92	P	2X2	PT	162	LS	08/17/92	MH
19 M	55 / 57	@ SAT	PT	08/12/92	P	1X1	SS	162	TD	OCA	--
19 N	53 / 54	INT W/56	T	08/14/92	P	2X4	SP	158	TD	08/17/92	MH

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APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
19 P	54 / 55	INT W/56	T	08/14/92	P	2X2	PT	162	LS	08/17/92	MH
19 Q	55 / 56	SEOS TO NEOS	FS	08/14/92	RS	18"	PT	162	LS	08/17/92	MH
19 R	32 / 33	INT W/56	T	08/14/92	P	3X10	PT	162	LS	08/17/92	MH
19 S	31 / 32	INT W/56	T	08/14/92	P	5X5	SP	158	TD	08/17/92	MH
19 T	53 / 56	SEOS TO NEOS	FS	08/14/92	RS	6'	SP	158	TD	08/17/92	MH
19 W	34 / 35	INT W/57/58	T	08/14/92	P	3X5	PT	162	LS	08/17/92	MH
19 X	57 / 58	60'NSAT	PT	08/15/92	P	2X2	PT	162	LS	08/17/92	MH
20 A	57 / 58	45'NSAT	PT	08/15/92	P	2X3	PT	162	LS	08/18/92	TD
20 B	57 / 58	10'NSAT	PT	08/15/92	P	2X2	PT	162	LS	OCA	--
20 C	57 / 58	@ SAT	PT	08/12/92	P	2X2	SS	162	TD	OCA	--
20 D	34 / 55	NEOS TO SEOS	IO	08/14/92	C	2X13	PT	162	LS	08/17/92	MH
20 E	35 / 58	INT W/60	T	08/15/92	P	3X3	PT	162	LS	08/17/92	MH
20 F	35 / 58	22'W OF 35/58/60	PT	08/15/92	P	3X5	PT	162	LS	08/17/92	MH
20 G	35 / 58	35/57/58 TO 12'E	FS	08/15/92	P	7'	PT	162	LS	08/17/92	MH
20 H	35 / 36	INT W/60	T	08/15/92	P	2X2	PT	162	LS	08/17/92	MH
20 I	58 / 59	INT W/60	T	08/15/92	P	2X2	PT	162	LS	08/17/92	MH
20 J	58 / 59	215'NSAT	PT	08/15/92	P	1X2	PT	162	LS	08/17/92	MH
20 K	58 / 59	185'NSAT	PT	08/15/92	P	1X2	PT	162	LS	08/17/92	MH
20 M	58 / 59	5'NSAT	PT	08/12/92	P	2X2	SS	162	TD	OCA	--
20 N	59 / 60	INT W/61	T	08/17/92	P	1X1	SB	158	LS	08/17/92	MH
20 P	59 / 61	155'NSAT	PT	08/15/92	P	2X4	PT	162	LS	08/17/92	MH
20 Q	59 / 61	195'NSAT	PT	08/17/92	P	1X4	SB	158	LS	08/17/92	MH
20 R	59 / 61	230'NSAT	PT	08/17/92	P	1X1	SB	158	LS	08/17/92	MH
20 S	59 / 61	190' TO 195'NSAT	FS	08/17/92	RS	3'	SB	158	LS	08/17/92	MH
20 T	59 / 61	190'NSAT	PT	08/15/92	P	1X2	PT	162	LS	08/17/92	MH
20 W	59 / 61	160'NSAT	PT	08/15/92	P	1X2	PT	162	LS	08/17/92	MH
20 X	59 / 61	@ SAT	PT	08/12/92	P	2X2	SS	162	TD	OCA	--
21 A	36 / 60	17'EWEOS	BO	08/17/92	P	1X1	SB	158	LS	08/17/92	MH

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GEOMEMBRANE REPAIR SUMMARY - POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
21 B	37 / 60	293' TO 309'NSEOS	IO	08/11/92	C	1X16	SS	246	JI	08/17/92	MH
21 C	37 / 21B	298'NSEOS	BO	08/17/92	P	1X1	KT	158	LS	08/17/92	MH
21 D	37 / 61	5'EWEOS	DS-43	08/17/92	P	2X4	SB	158	LS	08/17/92	MH
21 E	38 / 64	490'SNEOS	DS-44	08/17/92	P	2X4	SB	158	LS	08/18/92	TD
21 F	64 / 65	646'SNEOS	DS-45	08/17/92	P	2X4	SB	158	LS	08/18/92	TD
21 G	64 / 65	129'SNEOS	DS-46	08/26/92	P	2X5	SB	158	MH	08/26/92	MH
21 H	65 / 66	376'SNEOS	DS-47	08/21/92	P	2X4	KT	158	MH	08/22/92	TD
21 I	65 / 66	305'SNEOS	DS-48	08/21/92	P	2X4	KT	158	MH	08/22/92	TD
21 J	66 / 67	537'SNEOS	DS-49	08/17/92	P	2X4	SB	158	LS	08/19/92	TD
21 K	66 / 67	74'SNEOS	D	08/21/92	P	1X1	KL	162	TD	08/22/92	MH
21 M	66 / 67	22'SNEOS	DS-50	08/21/92	P	3X6	KL	162	TD	08/22/92	MH
21 N	68 / 69	579'SNEOS	DS-51	08/22/92	P	2X5	SB	158	LS	08/28/92	TM
21 P	68 / 69	243'SNEOS	DS-52	08/21/92	P	3X4	KT	158	MH	08/22/92	TD
21 Q	69 / 70	632' TO 650'SNEOS	IO	08/19/92	P	3X35	KT	158	MH	08/19/92	TD
21 R	69 / 70	422'SNEOS	DS-53	08/21/92	P	2X5	KT	158	MH	08/22/92	TD
21 S	69 / 70	255'SNEOS	DS-54	08/21/92	P	2X4	KT	158	MH	08/22/92	TD
21 T	70 / 71	81'SNEOS	DS-55	08/22/92	P	2X5	KL	162	JI	08/22/92	MH
21 W	71 / 72	195'SNEOS	FS	08/20/92	P	3X8	KL	162	TD	08/22/92	MH
21 X	71 / 72	329'SNEOS	DS-57	08/21/92	P	2X4	KT	158	MH	08/22/92	TD
22 A	59 / 61	250'NSAT	PT	08/17/92	P	2X2	SB	158	LS	08/17/92	MH
22 B	61 / 62	INT W/63	T	08/17/92	P	2X2	KT	158	LS	08/18/92	TD
22 C	61 / 62	@ SAT	PT	08/12/92	P	2X2	SS	162	TD	OCA	--
22 D	37 / 38	INT W/61/63	T	08/17/92	P	3X3	KT	158	LS	08/18/92	TD
22 E	21B / 37	INT W/61	T	08/17/92	P	2X4	SB	158	LS	08/17/92	MH
22 F	36 / 37	INT W/21B	T	08/17/92	P	3X4	KT	158	LS	08/17/92	MH
22 G	21B / 37	SEOS TO 5'N	FS	08/17/92	RS	3'	SB	158	LS	08/17/92	MH
22 H	38 / 64	225'SNAT	PT	08/17/92	P	2X4	BS	162	LS	08/18/92	TD
22 I	38 / 64	@ NAT	PT	08/18/92	P	1X1	BS	162	TD	OCA	--

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
22 J	34	4'S TO NAT,12'W	MD	08/18/92	P	1X1	BS	162	TD	OCA	--
22 K	64 / 65	545'SNAT	PT	08/17/92	P	2X6	BS	162	LS	08/18/92	TD
22 M	64 / 65	460'SNAT	PT	08/17/92	P	2X3	BS	162	LS	08/18/92	TD
22 N	64 / 65	420'SNAT	PT	08/17/92	P	1X2	BS	162	LS	08/18/92	TD
22 P	64 / 65	317'SNAT	PT	08/17/92	P	2X3	BS	162	LS	08/18/92	TD
22 Q	64 / 65	385' TO 395'SNAT	FS	08/17/92	P	2X10	BS	162	LS	08/18/92	TD
22 R	64 / 65	395'SNAT	PT	08/17/92	P	2X9	BS	162	LS	08/18/92	TD
22 S	64 / 65	385'SNAT	PT	08/17/92	P	2X9	BS	162	LS	08/18/92	TD
22 T	64 / 65	@ NAT	PT	08/18/92	P	1X2	BS	162	TD	OCA	--
22 W	65 / 66	531'SNAT	PT	08/17/92	P	2X2	SB	158	LS	08/19/92	TD
22 X	66 / 67	625'SNAT	PT	08/17/92	P	2X3	KT	158	LS	08/19/92	TD
23 A	70 / 71	< COVERED BY 18X >	--	--	--	--	--	--	--	--	--
23 B	71 / 72	636'SNAT	PT	08/19/92	P	2X4	SP	260	MH	08/19/92	TD
23 C	70 / 71	< COVERED BY 23E >	--	--	--	--	--	--	--	--	--
23 D	70 / 71	< COVERED BY 23E >	--	--	--	--	--	--	--	--	--
23 E	70 / 71	156'SNAT	PT	08/22/92	P	2X5	VV	260	LS	08/22/92	MH
23 F	70 / 71	90'SNAT	PT	08/22/92	P	2X3	KL	162	JI	08/22/92	MH
23 G	47	< COVERED BY 23E >	--	--	--	--	--	--	--	--	--
23 H	70 / 71	@ NAT	PT	08/19/92	RS	1'	KL	162	MH	OCA	--
23 I	70 / 71	20'SNAT	PT	08/22/92	P	2X4	KL	162	JI	08/22/92	MH
23 J	71 / 72	315'SNAT	PT	08/20/92	P	1X1	KL	162	TD	08/22/92	TD
23 K	71 / 72	350'SNAT	PT	08/21/92	P	1X1	SB	158	MH	08/22/92	TD
23 M	71 / 72	377' TO 395'SNAT	FS	08/21/92	P	3X30	KT	158	MH	08/22/92	TD
23 N	72 / 73	330'SNAT	PT	08/21/92	P	1X2	SB	158	MH	08/22/92	TD
23 P	72 / 73	260'SNAT	PT	08/21/92	P	2X3	SB	158	MH	08/22/92	TD
23 Q	72 / 73	640'SNAT	PT	08/19/92	P	2X3	KL	260	MH	08/19/92	TD
23 R	72 / 73	@ NAT	PT	08/18/92	P	1X1	KL	162	MH	OCA	--
23 S	38 / 63	INT W/74 TO 7'N	FS	08/17/92	RS	4'	KT	158	LS	08/18/92	TD

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
23 T	64 / 74	EEOS TO 5'W	FS	08/17/92	P	2X5	SB	158	LS	08/18/92	TD
23 W	62 / 63	INT W/74	T	08/17/92	P	1X2	KT	158	LS	08/18/92	TD
23 X	62 / 74	120'NSAT	PT	08/17/92	P	2X3	SB	158	LS	08/18/92	TD
24 A	--	< VOID >	--	--	--	--	--	--	--	--	--
24 B	48	316'NSAT,7'W	D	08/13/92	P	1X1	SN	162	JCL	08/17/92	MH
24 C	49	310'NSAT,7'W	D	08/13/92	P	1X1	SN	162	JCL	08/17/92	MH
24 D	45	< COVERED BY 17J >	--	--	--	--	--	--	--	--	--
24 E	43	6'NSAT,12'E	PT	08/12/92	P	1X1	SS	162	TD	OCA	--
24 F	41 / 42	3'NSAT	PT	08/12/92	P	1X1	PH	162	TD	OCA	--
24 G	41 / 42	@ AT TO 1'W OF SAT	PT	08/12/92	P	1X1	PH	162	TD	OCA	--
24 H	47	263'NSAT,13'W	EE	08/13/92	P	1X1	PT	162	JCL	08/17/92	MH
24 I	47	255'NSAT,5'E	EE	08/13/92	GW	6"	PT	162	JCL	08/17/92	MH
24 J	61	47'NSAT,17'E	EE	08/15/92	P	1X1	PT	162	LS	08/18/92	TD
24 K	71 / 72	135'SNAT	PT	08/20/92	P	2X2	KL	162	TD	08/22/92	MH
24 M	71 / 72	170'SNAT	PT	08/20/92	P	1X1	KL	162	TD	08/22/92	MH
24 N	71 / 72	575'SNAT	BO	08/22/92	P	2X2	SB	158	LS	08/28/92	TM
24 P	70 / 71	110'SNAT	BO	08/22/92	P	2X2	KL	162	JI	08/22/92	MH
24 Q	69 / 70	< COVERED BY 21R >	--	--	--	--	--	--	--	--	--
24 R	69 / 70	435'SNAT	BO	08/21/92	P	2X3	SB	158	MH	08/22/92	TD
24 S	69	458'SNAT,9'W	SI	08/21/92	P	2X2	SB	158	MH	08/22/92	TD
24 T	68 / 69	645'SNAT	PT	08/19/92	P	2X4	SB	158	MH	08/19/92	TD
24 W	65 / 66	90'SNAT	BO	08/21/92	P	1X1	KL	162	TD	08/22/92	MH
24 X	64 / 65	512'SNAT,10W	D	08/17/92	P	1X1	BS	162	LS	08/18/92	TD
25 A	71 / 72	431'SNEOS	DS-58	08/21/92	P	3X5	SB	158	MH	08/22/92	TD
25 B	72 / 73	282'SNEOS	DS-56	08/21/92	P	2X4	KT	158	MH	08/22/92	TD
25 C	71 / 72	135' TO 196'SNEOS	FTS	08/20/92	RS	30'	KL	162	TD	08/22/92	MH
25 D	62 / 74	42'NSEOS	HT	08/17/92	P	2X6	KT	158	LS	08/18/92	TD
25 E	62 / 74	159'NSEOS	DS-59	08/17/92	P	2X4	SB	158	LS	08/18/92	TD

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
25 F	76 / 77	234'NSEOS	DS-60	08/18/92	P	3X6	KT	158	TD	08/18/92	TD
25 G	77 / 78	27'NSEOS	DS-61	08/27/92	P	2X5	KL	162	MH	08/28/92	TM
25 H	78	7'SNEOS,3'E	D	08/18/92	P	2X2	KT	158	MH	08/18/92	TD
25 I	78 / 80	38'NSEOS	BO	08/27/92	P	2X2	KL	162	MH	08/28/92	TM
25 J	78 / 80	4'NSEOS	BO	08/27/92	P	2X2	KL	162	MH	08/28/92	TM
25 K	79 / 80	201'NSEOS	BO	08/19/92	P	2X3	KT	158	MH	08/19/92	TD
25 M	81 / 82	219'NSEOS	IO	08/13/92	C	2X34	SN	162	MH	08/13/92	TD
25 N	80 / 81	177'NSEOS	DS-62	08/18/92	P	2X4	KT	158	MH	08/18/92	TD
25 P	82 / 25M	9'WEEOS	BO	08/19/92	P	2X3	KLV	260	MH	08/19/92	TD
25 Q	82 / 83	283'NSEOS	DS-63	08/19/92	P	2X5	KT	158	MH	08/19/92	TD
25 R	81 / 83	200'NSEOS	FM	08/19/92	P	3X3	KLV	260	MH	08/19/92	TD
25 S	81 / 83	70'NSEOS	BO	08/26/92	P	1X1	BP	4	MH	08/28/92	TM
26 A	62 / 74	@ SAT	PT	08/19/92	P	2X4	SP	260	MH	OCA	--
26 B	65 / 76	INT W/74 TO 7'N	FS	08/17/92	P	2X9	KT	158	LS	08/18/92	TD
26 C	74 / 76	190'N OF SAT	PT	08/18/92	P	2X2	SB	158	TD	08/18/92	TD
26 D	74 / 75	INT W/76	T/FS	08/18/92	P	3X7	SB	158	TD	08/18/92	TD
26 E	74 / 75	50'N OF SAT	PT	08/18/92	P	2X3	KT	158	MH	08/18/92	TD
26 F	74 / 75	@ SAT	PT	08/20/92	P	1X2	PT	4	MH	OCA	--
26 G	75 / 76	INT W/77 TO 10'W	T/FS	08/18/92	2/P	3X3/2X7	KT	158	TD	08/18/92	TD
26 H	65 / 66	INT W/77	T	08/18/92	P	3X4	SB	4	TD	08/18/92	TD
26 I	65 / 66	INT W/77	T	08/18/92	P	3X3	KT	4	TD	08/18/92	TD
26 J	77 / 78	INT W/79	T	08/18/92	P	2X3	SM	158	MH	08/18/92	TD
26 K	66 / 67	INT W/77/79	T	08/18/92	P	3X3	SB	4	TD	08/18/92	TD
26 M	78 / 79	INT W/80	T	08/18/92	P	3X3	SM	158	MH	08/18/92	TD
26 N	77 / 78	@ SAT	PT	08/20/92	P	3X4	PT	4	MH	OCA	--
26 P	75 / 77	@ SAT	PT	08/20/92	P	2X3	PT	4	MH	OCA	--
26 Q	67 / 68	INT W/79	T	08/19/92	C	3X4	SB	158	MH	09/02/92	TM
26 R	--	<<<< VOID >>>>	--	--	--	--	--	--	--	--	--
26 S	79 / 81	<<< COVERED BY 26T >>>	--	--	--	--	--	--	--	--	--

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
26 T	68 / 80	INT W/82 TO 34'W	FS	08/19/92	P	2X24	KT	158	MH	08/19/92	TD
26 W	80 / 81	195' TO 200'N OF SAT	FS	08/19/92	P	2X7	KLV	260	MH	08/19/92	TD
26 X	80 / 81	20'N OF SAT	PT	08/27/92	P	1X2	KL	162	MH	09/28/92	TM
27 A	80 / 81	@ SAT	PT	08/27/92	P	1X3	KL	162	MH	OCA	--
27 B	25M / 82	INT W/83	T	08/19/92	P	4X6	KLV	260	MH	08/19/92	TD
27 C	25M / 80	INT W/81	T	08/19/92	P	2X4	KL	260	MH	08/19/92	TD
27 D	68 / 69	INT W/82	T	08/19/92	P	4X4	KT	158	MH	08/19/92	TD
27 E	71 / 72	NAT TO 3'S	PT	08/18/92	P	1X1	KL	162	MH	OCA	--
27 F	81 / 83	@ SAT	PT	08/27/92	P	1X1	KL	162	MH	OCA	--
27 G	83 / 84	SAT TO 50'N	PT	08/26/92	P	1X2	BP	4	MH	08/28/92	TM
27 H	83 / 84	INT W/85	T	08/19/92	P	3X4	SP	260	MH	08/19/92	TD
27 I	70 / 71	INT W/83/85	T	08/19/92	P	3X5	KL	260	MH	08/19/92	TD
27 J	71 / 72	TO 85/86	FS	08/19/92	P	2X6	KL	260	MH	08/19/92	TD
27 K	84 / 85	INT W/86	T	08/19/92	P	2X5	KL	260	MH	08/19/92	TD
27 M	84 / 86	@ SAT	PT	08/27/92	P	1X2	KL	162	MH	OCA	--
27 N	72 / 73	INT W/86/88	T	08/19/92	P	3X4	SP	260	MH	08/19/92	TD
27 P	86 / 87	INT W/88	T	08/19/92	P	3X4	KLV	260	MH	08/19/92	TD
27 Q	86 / 87	@ SAT	PT	08/27/92	P	1X2	KL	162	MH	OCA	--
27 R	35 / 36	420'S OF NAT	PT	08/15/92	P	1X1	SP	158	TD	08/18/92	TD
27 S	12B / 25	36'N OF P43	DSE-1P	08/18/92	P	2X4	KT	158	MH	08/18/92	TD
27 T	8R / 46	INT W/25/43/46	DSE-1N	08/18/92	P	2X4	SB	158	MH	08/18/92	TD
27 W	27 / 28	24'N OF 48	CAP	08/18/92	P	3X5	KT	158	MH	08/18/92	TD
28 A	30 / 31	647'N OF NAT	PT	08/14/92	P	2X3	SN	162	JCL	08/17/92	MH
28 B	50 / 52	10'S OF NAT	BO	08/14/92	P	1X2	PT	162	JCL	08/17/92	MH
28 C	25 / 26	205'S OF NAT	PT	08/13/92	P	2X2	BS	227	JCL	08/15/92	JCL
28 D	73 / 89	398'SOF NAT	PT	08/21/92	P	2X2	SP	260	TD	08/22/92	TD
28 E	73 / 88	INT W/89	PT	08/19/92	P	2X8	SP	260	MH	08/19/92	TD
28 F	89 / 90	665'N OF SAT	PT/IO	08/19/92	P	4X5	KL	158	MH	09/19/92	TM
28 G	89 / 90	@ NAT	PT	08/18/92	P	2X2	KL	162	MH	OCA	--

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
28 H	90 / 91	1'N OF SAT	PT	08/18/92	P	1X1	KL	162	MH	OCA	--
28 I	73 / 89	NAT TO 4'S	PT/FS	08/18/92	RS	4'	KL	162	MH	OCA	--
28 J	91 / 92	88'N OF SAT	PT	08/21/92	P	2X2	SP	260	TD	08/22/92	MH
28 K	90 / 91	317'N OF SAT	PT	08/20/92	P	4X6	SP	260	TD	08/22/92	TD
28 M	91 / 92	390'N OF SAT	PT	08/21/92	P	4X4	SP	260	TD	08/22/92	TD
28 N	92 / 93	625'N OF SAT	PT	08/22/92	P	2X4	IOU	4	JCL	08/28/92	TM
28 P	91 / 92	412'N OF SAT	PT	08/21/92	P	2X2	KLV	260	TD	08/22/92	TD
28 Q	91 / 92	475'N OF SAT	PT	08/21/92	P	1X2	KLV	260	TD	08/22/92	TD
28 R	91 / 92	488'N OF SAT	PT	08/21/92	P	1X1	KLV	260	TD	08/28/92	TM
28 S	91 / 92	488' TO 492'N OF SAT	FS	08/22/92	RS	2'	IOU	4	JCL	08/28/92	TM
28 T	91 / 92	492'N OF SAT	PT	08/22/92	P	1X1	IOU	4	JCL	08/28/92	TM
28 W	93 / 94	438'N OF SAT	PT	08/22/92	P	2X2	SB	158	TD	08/22/92	TD
28 X	93 / 94	564'N OF SAT	BO	08/27/92	RS	4'	KL	162	MH	09/08/92	MH
29 A	84 / 85	12'EWEOS	DS-64	08/19/92	P	2X5	SP	158	MH	09/19/92	TM
29 B	84 / 86	85'NSEOS	BO	08/26/92	P	2X3	BP	4	MH	08/28/92	TM
29 C	84 / 86	50'NSEOS	BO	08/26/92	P	2X3	BP	4	MH	08/28/92	TM
29 D	27 / 28	616'SNEOS	DSE-01	08/14/92	P	2X5	PT	162	JCL	08/17/92	MH
29 E	28 / 29	479'SNEOS	DSE-02	08/17/92	P	2X4	BS	162	LS	08/17/92	MH
29 F	86 / 87	250'NSEOS	IO	08/19/92	P	2X4	KLV	260	MH	08/19/92	TD
29 G	86 / 88	295'NSEOS	DS-65	08/19/92	P	1X2	SP	260	MH	08/19/92	TD
29 H	53	141'NSEOS,6'W	SI	08/14/92	P	1X1	PT	162	JCL	08/17/92	MH
29 I	86 / 87	110'NSEOS	DS-66	08/26/92	P	2X5	BP	4	MH	08/28/92	TM
29 J	30	<<< VOID >>>	--	--	--	--	--	--	--	--	--
29 K	73 / 89	45'SNEOS	FM	08/22/92	P	2X3	VV	260	LS	08/22/92	MH
29 M	73 / 89	229'SNEOS	FM	08/22/92	P	3X3	SB	158	JCL	08/28/92	TM
29 N	73 / 89	185'SNEOS	PT	08/22/92	P	2X2	VV	260	LS	08/22/92	TD
29 P	89 / 90	395'SNEOS	PT	08/21/92	P	2X3	SP	260	TD	08/22/92	TD
29 Q	89 / 90	313'SNEOS	BO	08/21/92	P	2X2	KLV	260	TD	08/22/92	TD
29 R	89 / 90	295'SNEOS	BO	08/21/92	P	2X3	SP	260	TD	08/22/92	TD

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
29 S	89 / 90	281'SNEOS	BO	08/21/92	P	2X2	SP	260	TD	08/22/92	TD
29 T	89 / 90	385'SNEOS	DS-67	08/21/92	P	3X6	KLV	260	TD	08/22/92	TD
29 W	89 / 90	521'SNEOS	DS-68	08/22/92	P	2X4	KT	158	JCL	08/28/92	TM
29 X	90 / 91	504'SNEOS	WS	08/22/92	P	3X3	SB	158	JCL	08/28/92	TM
30 A	103	140'S OF NAT,21'W	D	08/25/92	P	1X1	KL	162	JI	08/25/92	JCL
30 B	103	145'S OF NAT,21'W	D	08/25/92	P	1X1	KL	162	JI	08/25/92	JCL
30 C	104	35'S OF NAT,35'W	D	08/25/92	P	2X2	TE	260	JI	08/25/92	JCL
30 D	102 / 103	533'S OF NAT	BO	08/25/92	P	2X6	IOU	4	LS	08/25/92	JCL
30 E	102 / 103	450'S OF NAT	IO	08/25/92	P	2X5	SB	158	LS	08/25/92	JCL
30 F	102 / 103	440'S OF NAT	BO	08/25/92	P	3X8	KT	158	LS	08/25/92	JCL
30 G	102 / 103	417'S OF NAT	BO	08/25/92	P	2X4	SB	158	LS	08/25/92	JCL
30 H	102 / 103	400'S OF NAT	DS-87	08/25/92	P	2X5	KT	158	LS	08/25/92	JCL
30 I	104 / 105	630'S OF NAT	BO	08/25/92	P	2X6	IOU	4	LS	08/25/92	JCL
30 J	104 / 105	550'S OF NAT	FM	08/25/92	P	2X5	IOU	4	LS	08/25/92	JCL
30 K	104 / 105	<<< COVERED BY 30M >>>	--	--	--	--	--	--	--	--	--
30 M	104 / 105	466'S OF NAT	BO	08/25/92	P	2X7	KT	158	LS	08/25/92	JCL
30 N	104 / 105	457'S OF NAT	PT	08/25/92	P	2X4	SB	158	LS	08/25/92	JCL
30 P	104 / 105	398'S OF NAT	BO	08/25/92	P	2X4	SB	158	LS	08/25/92	JCL
30 Q	117 / 119	70'N OF SAT	BO	08/27/92	P	2X4	BP	4	MH	08/28/92	TM
30 R	120	6'N OF SAT	SI	08/27/92	P	1X2	BP	4	MH	OCA	--
30 S	119	140'N OF SAT,1'W	SI	08/27/92	GW	1'	BP	4	MH	08/28/92	TM
30 T	118 / 121	268'N OF SAT	BO	08/28/92	P	2X3	SB	158	MH	08/28/92	TM
30 W	118 / 121	244'N OF SAT	FM	08/27/92	P	2X4	TE	4	MH	08/28/92	TM
30 X	119 / 121	235'N OF SAT	FS	08/27/92	P	3X10	BP	4	MH	08/28/92	TM
31 A	91 / 92	435'SNEOS	SI	08/21/92	P	1X1	KLV	260	TD	08/22/92	TD
31 B	97 / 98	586'SNEOS	BO	08/22/92	P	2X5	IOU	4	JCL	08/29/92	TM
31 C	97 / 98	34'SNEOS	BO	08/22/92	P	2X3	AV	260	LS	08/22/92	MH
31 D	98 / 99	59'SNEOS	BO	08/22/92	P	1X2	VV	260	LS	08/22/92	MH
31 E	97 / 98	357'SNEOS	BO	08/22/92	P	2X3	SB	158	JCL	08/22/92	TD

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
31 F	97 / 98	91'SNEOS	DS-80	08/22/92	P	2X5	VV	260	LS	08/22/92	MH
31 G	99 / 100	312'SNEOS	WS	08/22/92	P	3X4	KT	158	JCL	08/22/92	TD
31 H	99 / 100	428'SNEOS	BO	08/25/92	GW	6"	IOU	4	LS	08/29/92	TM
31 I	99 / 100	405'SNEOS	BO	09/08/92	GW	6"	KL	162	LS	09/08/92	MH
31 J	100 / 101	300'SNEOS	WS	08/22/92	P	3X4	KT	158	JCL	08/22/92	TD
31 K	99 / 100	600'SNEOS	DS-81	08/25/92	P	2X5	IOU	4	LS	08/25/92	JCL
31 M	101	625'SNEOS,1'E	D	09/11/92	P	2X2	KT	158	MH	09/14/92	JI
31 N	100 / 101	258'SNEOS	FM	08/25/92	P	3X4	KL	162	MH	08/25/92	JCL
31 P	100 / 101	203'SNEOS	DS-82	08/22/92	P	2X5	KL	162	JI	08/26/92	MH
31 Q	100 / 101	586'SNEOS	DS-83	08/25/92	P	2X5	IOU	4	LS	08/25/92	JCL
31 R	101 / 102	375'SNEOS	WS	08/25/92	P	2X2	SB	158	LS	08/25/92	JCL
31 S	101 / 102	325'SNEOS	WS	08/22/92	P	3X3	SB	158	TD	08/22/92	TD
31 T	102 / 103	344'SNEOS	WS	08/25/92	P	2X3	SB	158	LS	08/25/92	JCL
31 W	101 / 102	250'SNEOS	DS-84	08/25/92	P	3X6	KL	162	MH	08/25/92	JCL
31 X	101 / 102	451'SNEOS	DS-85	08/25/92	P	2X5	IOU	4	LS	08/25/92	JCL
32 A	102	373'SNEOS,9'W	D	08/25/92	P	1X1	KT	158	LS	08/25/92	JCL
32 B	102 / 103	97'SNEOS	DS-86	08/25/92	P	3X5	BP	260	JI	08/25/92	JCL
32 C	103	30'SNEOS,2'E	D	08/25/92	C	1X1	BP	260	MH	08/25/92	JCL
32 D	102 / 103	138'SNEOS	FM	08/22/92	P	2X3	KL	162	JI	08/25/92	JCL
32 E	102 / 103	181'SNEOS	FM	08/22/92	P	2X3	KL	162	JI	08/22/92	TD
32 F	103 / 104	343'SNEOS	WS	08/25/92	P	2X3	KL	162	MH	09/11/92	MH
32 G	104 / 105	318'SNEOS	WS	08/25/92	P	2X3	KL	162	MH	08/25/92	JCL
32 H	104 / 105	283'SNEOS	IO	08/25/92	P	2X4	KL	162	MH	08/25/92	JCL
32 I	104 / 105	272'SNEOS	IO	08/25/92	P	2X5	KL	162	MH	08/25/92	JCL
32 J	104 / 105	225'SNEOS	I	08/25/92	P	2X10	KL	162	JI	08/25/92	JCL
32 K	104 / 105	295'SNEOS	WS	08/25/92	P	2X3	AV	8	JI	08/25/92	JCL
32 M	103 / 104	93'SNEOS	DS-88	08/25/92	P	3X5	TE	260	JI	08/25/92	JCL
32 N	104 / 105	158'SNEOS	IO	08/25/92	P	2X4	PT	8	JI	08/25/92	JCL
32 P	104 / 105	136' TO 143'SNEOS	IO	08/25/92	P	2X8	PT	8	JI	08/25/92	JCL

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
32 Q	105 / 106	341'SNEOS	WS	08/25/92	P	2X2	KL	162	MH	08/25/92	JCL
32 R	105 / 106	153'SNEOS	WS	08/25/92	P	2X3	PT	8	JI	08/25/92	JCL
32 S	105 / 106	65'SNEOS	DS-89	08/25/92	P	2X5	BP	260	MH	09/08/92	MH
32 T	105 / 106	557'SNEOS	DS-90	08/25/92	P	2X5	IOU	4	LS	08/25/92	JCL
32 W	105 / 106	360'SNEOS	BO	08/25/92	P	2X3	KL	162	MH	08/25/92	JCL
33 A	37 / 38	420'S OF NAT	BO	08/17/92	GW	4"	BS	162	LS	08/18/92	TD
33 B	37 / 38	508'S OF NAT	PT	08/17/92	P	2X3	BS	162	LS	08/18/92	TD
33 C	37 / 38	521'S OF NAT	PT	08/17/92	P	2X4	BS	162	LS	08/18/92	TD
33 D	37 / 38	528'S OF NAT	FS	08/17/92	P	1X2	BS	162	LS	08/18/92	TD
33 E	33 / 34	620'S OF NAT	BO	08/14/92	P	1X1	PT	162	LS	08/18/92	TD
33 F	31 / 32	116'S OF NAT	BO	08/14/92	P	1X1	BS	227	TD	08/18/92	TD
33 G	30 / 31	418'S OF NAT	PT	08/14/92	P	1X1	BS	227	TD	08/17/92	MH
33 H	57 / 58	20'S OF NAT	PT	08/15/92	P	1X1	PT	162	LS	08/18/92	TD
33 I	63 / 74	INT W/38	PT	08/17/92	P	2X2	KT	158	LS	08/18/92	TD
33 J	38 / 64	INT W/74	PT	08/17/92	P	2X3	KT	158	LS	08/18/92	TD
33 K	62	151'N OF SAT,1'W	SI	08/17/92	P	1X2	KT	158	LS	08/18/92	TD
33 M	30	228'S OF NAT,5'W	SI	08/17/92	P	1X1	BS	162	LS	08/17/92	MH
33 N	98 / 99	568'S OF NAT	WS	08/22/92	P	2X2	IOU	4	JCL	09/02/92	MH
33 P	98 / 99	294'S OF NAT	WS	08/22/92	P	3X3	SB	158	JCL	08/22/92	TD
33 Q	100 / 101	577'S OF NAT	BO	08/25/92	P	2X2	IOU	4	LS	08/25/92	JCL
33 R	101 / 102	505'S OF NAT	BO	08/25/92	P	2X3	IOU	4	LS	08/25/92	JCL
33 S	101 / 102	649'S OF NAT	BO	09/19/92	P	1X1	VV	8	LS	09/22/92	JCL
33 T	101 / 102	577'S OF NAT	BO	08/25/92	P	2X2	IOU	4	LS	09/11/92	MH
33 W	103	4'S OF NAT,5'W	D	08/19/92	P	2X2	KL	162	MH	09/11/92	MH
33 X	103	11'S OF NAT,5'W	D	09/10/92	P	1X1	SB	158	JI	09/11/92	MH
34 A	32 / 33	400'S OF NAT	PT	08/18/92	GW	4"	KL	162	MH	08/18/92	TD
34 B	32 / 33	418'S OF NAT	PT	08/18/92	GW	4"	KL	162	MH	08/18/92	TD
34 C	67	5'S OF NAT,10'W	MD	08/18/92	P	1X1	BS	162	TD	OCA	--
34 D	67	10'S OF NAT,10'W	MD	08/18/92	P	1X1	BS	162	TD	08/22/92	MH

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
34 E	68	3'S OF NAT,10'E	MD	08/18/92	P	1X2	BS	162	TD	OCA	--
34 F	68	8'S OF NAT,10'E	MD	08/18/92	P	1X1	BS	162	TD	08/22/92	MH
34 G	71	1'S OF NAT,10'E	MD	08/18/92	P	1X1	KL	162	MH	OCA	--
34 H	96	1'S OF NAT,1'W	MD	08/18/92	P	1X1	KL	162	MH	OCA	--
34 I	28 / 29	INT W/51	DSE-1N	08/19/92	P	4X4	SB	158	MH	08/19/92	TD
34 J	48	4'S OF 27,8'W	DSE-1P	08/19/92	P	4X4	KT	158	MH	08/19/92	TD
34 K	97	1'S OF NAT,34'E TO W	EXT	08/19/92	EXT	34'	KL	162	MH	OCA	--
34 M	72	1'S OF NAT,34'E TO W	EXT	08/19/92	EXT	34'	KL	162	MH	OCA	--
34 N	68	1'S OF NAT,34'E TO W	EXT	08/19/92	EXT	40'	KL	162	MH	OCA	--
34 P	103	1'S OF NAT,4'W	MD	08/19/92	P	2X3	KL	162	MH	OCA	--
34 Q	95	2'S OF NAT,34'E TO W	EXT	08/20/92	EXT	34'	KL	162	TD	OCA	--
34 R	97	1'S OF NAT,34'E TO W	EXT	08/20/92	P	1X1	KL	162	TD	OCA	--
34 S	78	4'N OF SAT,3'E	MD	08/20/92	P	2X2	PT	4	MH	08/31/92	TM
34 T	75	1'N O FSAT,34'E TO W	EXT	08/20/92	EXT	34'	SP	4	MH	OCA	--
35 A	89 / 90	112'SNEOS	BO	08/21/92	P	3X3	SP	260	MH	08/22/92	MH
35 B	90 / 91	66'SNEOS	DS-69	08/20/92	P	3X6	SP	260	TD	08/22/92	MH
35 C	91 / 92	505'S TO 518'SNEOS	FS	08/22/92	C	2X14	IOU	4	JCL	08/28/92	TM
35 D	91 / 92	560'SNEOS	BO	08/22/92	P	2X3	IOU	4	JCL	08/28/92	TM
35 E	91 / 92	457'SNEOS	FTS	08/21/92	P	1X1	KLV	260	TD	08/22/92	TD
35 F	91 / 92	275'SNEOS	DS-70	08/20/92	P	3X6	KLV	260	TD	08/22/92	TD
35 G	92 / 93	330'SNEOS	WS	08/20/92	P	4X6	SP	260	TD	08/22/92	TD
35 H	92 / 93	590'SNEOS	FM	08/22/92	P	3X3	IOU	4	JCL	08/28/92	TM
35 I	92 / 93	532'SNEOS	BO	08/22/92	P	2X3	IOU	4	JCL	08/28/92	TM
35 J	92 / 93	520'SNEOS	FM	08/22/92	P	3X4	IOU	4	JCL	08/28/92	TM
35 K	93 / 94	345'SNEOS	WS	08/20/92	P	2X2	KLV	260	TD	08/22/92	TD
35 M	92 / 93	165'SNEOS	FM	08/21/92	P	3X3	KLV	260	TD	08/22/92	MH
35 N	92 / 93	406'SNEOS	FM	08/21/92	2/P	3X10/2X6	SP	260	TD	08/22/92	TD
35 P	93 / 94	110'SNEOS	WS	08/19/92	P	2X3	KLV	260	MH	08/22/92	MH
35 Q	92 / 93	<<< COVERED BY 37M >>>	--	--	--	--	--	--	--	--	--

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY - POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
35 R	93 / 94	120'SNEOS	DS-72	08/21/92	P	3X7	SP	260	TD	08/22/92	MH
35 S	93 / 94	572'SNEOS	DS-73	08/22/92	P	2X5	IOU	4	JCL	08/28/92	TM
35 T	94 / 95	341'SNEOS	WS	08/20/92	P	3X3	KLV	260	TD	08/22/92	TD
35 W	94 / 95	150'SNEOS	FM	08/21/92	P	3X7	KLV	260	TD	08/22/92	MH
35 X	94 / 95	165'SNEOS	BO	08/20/92	P	2X2	SP	260	TD	08/22/92	MH
36 A	94 / 95	635'SNEOS	D	08/28/92	P	2X2	SB	158	TM	08/28/92	TM
36 B	91 / 92	411'S TO 505'SNEOS	FS	08/21/92	RS	246'	KLV	260	TD	08/22/92	TD
36 C	91 / 92	515'S TO 560'SNEOS	FS	08/22/92	RS	40'	IOU	4	JCL	08/28/92	TM
36 D	93	564'SNEOS,5'E	SI	08/22/92	P	1X4	IOU	4	JCL	08/28/92	TM
36 E	92 / 93	640'SNEOS	DS-71	08/22/92	P	2X5	IOU	4	JCL	08/28/92	TM
36 F	95 / 96	344'SNEOS	WS	08/22/92	P	2X3	KT	158	JCL	08/22/92	TD
36 G	95 / 96	562'SNEOS	BO	08/22/92	P	2X2	SB	158	JCL	08/22/92	TD
36 H	95 / 96	568'SNEOS	BO	08/22/92	P	1X1	KT	158	JCL	08/22/92	TD
36 I	96 / 97	361'SNEOS	WS	08/22/92	P	3X3	SB	158	JCL	08/22/92	TD
36 J	95 / 96	50'SNEOS	DS-74	08/22/92	P	2X5	VV	260	LS	08/22/92	MH
36 K	96 / 97	373'SNEOS	DS-75	08/22/92	P	2X4	KT	158	JCL	08/22/92	TD
36 M	94 / 95	561'SNEOS	DS-76	08/22/92	P	2X5	IOU	4	JCL	08/28/92	TM
36 N	96 / 97	81'SNEOS	DS-77	08/22/92	P	2X5	VV	260	LS	08/22/92	MH
36 P	95 / 96	650'SNEOS	DS-78	08/22/92	P	3X6	KL	162	JI	08/22/92	TD
36 Q	96 / 97	650'SNEOS	DS-79	08/26/92	P	2X5	TE	4	MH	08/28/92	TM
36 R	64	CREST OF AT,13'W	D	08/26/92	P	1X1	KT	158	MH	OCA	--
36 S	87 / 88	INT W/107	T	08/19/92	P	3X3	SP	260	MH	08/28/92	TM
36 T	91	670'SNEOS,9'E	D	08/26/92	P	1X1	KL	162	MH	08/28/92	TM
36 W	107	247'NSEOS,18'W	D	08/26/92	P	1X2	KL	162	MH	08/28/92	TM
36 X	107 / 108	136'NSEOS	FM	08/27/92	P	3X4	BP	158	MH	08/28/92	TM
37 A	94 / 95	<<< CIVERED BY 35W >>>	--	--	--	--	--	--	--	--	--
37 B	94 / 95	<<< CIVERED BY 35W >>>	--	--	--	--	--	--	--	--	--
37 C	91 / 92	NAT TO 4'S	FS/PT	08/18/92	P	1X2	KL	162	MH	OCA	--
37 D	92 / 93	NAT TO 4'S	FS/PT	08/18/92	P	1X2	KL	162	MH	OCA	--

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
37 E	93 / 94	NAT TO 4'S	FS/PT	08/18/92	P	2X2	KL	162	MH	OCA	--
37 F	94 / 95	NAT TO 4'S	FS/PT	08/18/92	P	1X2	KL	162	MH	OCA	--
37 G	92 / 93	75'S OF NAT	PT	08/21/92	P	2X4	KLV	260	TD	08/22/92	MH
37 H	96 / 97	521'S OF NAT	PT	08/22/92	P	2X2	IOU	4	JCL	08/29/92	TM
37 I	95 / 96	592'S OF NAT	PT	08/22/92	P	3X3	IOU	4	JCL	08/28/92	TM
37 J	95 / 96	651'S TO 656'S OF NAT	FS	09/02/92	GW	6"	KL	162	TM	09/02/92	MH
37 K	92 / 93	4'S TO 44'S OF NAT	FS	08/21/92	RS	45'	SP	260	TD	08/22/92	MH
37 M	92 / 93	44'S TO 57'S OF NAT	FS	08/21/92	P	3X15	KLV	260	TD	08/22/92	MH
37 N	92 / 93	57'S TO 71'S OF NAT	FS	08/21/92	RS	25'	KLV	260	TD	08/22/92	MH
37 P	92 / 93	<<< COVERED BY 37G >>>	--	--	--	--	--	--	--	--	--
37 Q	95 / 96	NAT TO 5'S	FS/PT	08/18/92	P	1X2	KL	162	MH	OCA	--
37 R	96	2'S OF NAT,6'E	D	08/18/92	P	1X1	KL	162	MH	OCA	--
37 S	96 / 97	NAT TO 5'S	FS/PT	08/18/92	P	2X2	KL	162	MH	OCA	--
37 T	97 / 98	NAT TO 3'S	FS/PT	08/18/92	P	1X2	KL	162	MH	OCA	--
37 W	98 / 99	NAT TO 2'S	FS/PT	08/19/92	P	1X2	KL	162	MH	OCA	--
37 X	97 / 98	297'S OF NAT	PT	08/22/92	P	3X3	KT	158	JCL	08/22/92	TD
38 A	92	662'SNEOS,7'E	D	08/26/92	P	2X2	KL	162	MH	08/28/92	TM
38 B	92	662'SNEOS,7'W	D	08/26/92	P	2X3	KL	162	MH	08/28/92	TM
38 C	91 / 92	INT W/110	T	08/26/92	P	3X4	KL	162	MH	08/28/92	TM
38 D	108 / 109	58'NSEOS	BO	08/27/92	P	3X4	KL	162	MH	08/31/92	TM
38 E	108 / 109	10'NSEOS	DS-91	08/27/92	P	3X5	KL	162	MH	08/28/92	TM
38 F	93	682'SNEOS,9'E	D	08/26/92	P	1X3	KL	162	MH	08/28/92	TM
38 G	107 / 108	203'NSEOS	DS-92	08/26/92	P	2X2	KL	162	MH	08/28/92	TM
38 H	93 / 110	288'N TO 306'NSEOS	IO	08/19/92	RS	1X20	K-MAI	4	MH	08/19/92	JCL
38 I	93 / 110	INT W/112	T	08/26/92	P	3X4	KL	162	MH	08/28/92	TM
38 J	109 / 110	150'NSEOS	BO	08/26/92	P	2X4	BP	4	MH	08/28/92	TM
38 K	109 / 110	251'NSEOS	BO	08/26/92	P	3X4	KL	162	MH	08/28/92	TM
38 M	109 / 110	297'NSEOS	DS-93	08/26/92	P	3X10	KL	162	MH	08/28/92	TM
38 N	111 / 112	INT W/113	T	08/26/92	C	3X8	KL	162	MH	08/28/92	TM

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
38 P	108 / 109	172'NSEOS	IO	08/26/92	P	1X3	BP	4	MH	08/28/92	TM
38 Q	111 / 113	136'NSEOS	WS	08/26/92	P	2X5	BP	4	MH	08/28/92	TM
38 R	110 / 111	255'N TO 265'NSEOS	FS	08/26/92	C	3X12	KL	162	MH	08/28/92	TM
38 S	93 / 112	INT W/113	T	08/26/92	P	2X3	KL	162	MH	08/28/92	TM
38 T	110	258'NSEOS,5'W	D	08/26/92	P	1X1	KL	162	MH	08/28/92	TM
38 W	95 / 113	INT W/114	T	08/26/92	P	3X3	TE	4	MH	08/28/92	TM
38 X	95 / 114	8'E OF 113	D	08/26/92	P	2X3	TE	4	MH	08/28/92	TM
39 A	99 / 100	NAT TO 2'S	FS/PT	08/19/92	P	1X2	KL	162	MH	OCA	--
39 B	100 / 101	445'S OF NAT	BO/PT	08/25/92	P	2X4	IOU	4	LS	08/25/92	JCL
39 C	100 / 101	316'S OF NAT	PT	08/22/92	P	2X3	SB	158	TD	08/22/92	TD
39 D	101 / 102	517'S OF NAT	BO/PT	08/25/92	P	2X4	IOU	4	LS	08/25/92	JCL
39 E	101 / 102	416'S OF NAT	BO/PT	08/25/92	P	2X3	IOU	4	LS	08/25/92	JCL
39 F	100 / 101	<<< COVERED BY 39H >>>	--	--	--	--	--	--	--	--	--
39 G	100 / 101	31' TO 34'S OF NAT	FS	09/11/92	P	2X4	AV	158	LS	09/11/92	MH
39 H	100 / 101	31'S OF NAT	PT	08/22/92	P	2X4	AV	260	LS	08/22/92	MH
39 I	102 / 103	NAT TO 3'S	PT/FS	08/19/92	P	2X2	KL	162	MH	OCA	--
39 J	101 / 102	NAT TO 4'S	BO/PT	08/19/92	P	2X3	KL	162	MH	OCA	--
39 K	101 / 102	31'S OF NAT	PT	08/25/92	P	2X4	BP	260	MH	08/25/92	JCL
39 M	102 / 103	34'S OF NAT	BO/PT	08/25/92	P	3X5	BP	260	MH	08/25/92	JCL
39 N	100 / 101	9' TO 12'S OF NAT	BO/PT	08/19/92	P	2X4	KL	162	MH	09/11/92	MH
39 P	100 / 101	NAT TO 3'S	PT/FS	08/19/92	P	2X3	KL	162	MH	OCA	--
39 Q	102 / 103	67' TO 75'S OF NAT	PT/FS	08/22/92	P	1X12	VV	260	LS	08/22/92	MH
39 R	102 / 103	442' TO 448'S OF NAT	FS	08/25/92	RS	7'	SB	158	LS	08/25/92	JCL
39 S	103 / 104	455'S OF NAT	PT/FS	08/25/92	P	2X3	KT	158	LS	09/19/92	JCL
39 T	104 / 105	NAT TO 3'S	PT/FS	08/19/92	P	2X3	KL	162	MH	OCA	--
40 A	104 / 105	274' TO 281'S OF NAT	FS	08/25/92	RS	10'	KL	162	MH	08/25/92	JCL
40 B	104 / 105	<<< VOID >>>	--	--	--	--	--	--	--	--	--
40 C	105 / 106	590'S OF NAT	BO/PT	08/25/92	P	1X1	IOU	4	LS	08/25/92	JCL
40 D	105 / 106	640'S OF NAT	PT	09/21/92	P/RS	1X1/10'	VV	8	LS	09/21/92	JI

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				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
40 E	105 / 106	NAT TO 5'S	FS/PT	08/19/92	P	3X4	KL	162	MH	OCA	--
40 F	103 / 104	3'S OF NAT	PT	09/10/92	P	2X2	KT	158	JI	OCA	--
40 G	102 / 103	518'S OF NAT	BO/PT	08/25/92	P	1X2	IOU	4	LS	08/25/92	JCL
40 H	102 / 103	490'S OF NAT	BO/PT	08/25/92	P	2X3	IOU	4	LS	08/25/92	JCL
40 I	89 / 107	INT W/88	FS/PT	08/19/92	P	2X8	SP	4	MH	09/19/92	TM
40 J	90 / 108	INT W/91/109	PT	08/26/92	P	2X8	KL	162	MH	08/28/92	TM
40 K	94 / 113	INT W/95	PT	08/26/92	P	2X4	TE	4	MH	08/28/92	TM
40 M	91 / 109	INT W/110	PT	08/27/92	P	2X2	KL	162	MH	08/28/92	TM
40 N	107 / 108	148'N OF SAT	BO/PT	08/26/92	P	3X5	KL	162	MH	08/28/92	TM
40 P	107 / 108	179'N OF SAT	BO/PT	08/26/92	P	3X5	KL	162	MH	08/28/92	TM
40 Q	87 / 107	SAT TO 2'N	FS/PT	08/27/92	P	1X1	KL	162	MH	OCA	--
40 R	107 / 108	SAT TO 2'N	FS/PT	08/27/92	P	1X1	KL	162	MH	OCA	--
40 S	108 / 109	SAT TO 2'N	FS/PT	08/27/92	P	1X1	KL	162	MH	OCA	--
40 T	109 / 110	SAT TO 2'N	FS/PT	08/27/92	P	1X1	KL	162	MH	OCA	--
40 W	108 / 109	259'N OF SAT	BO/PT	08/26/92	P	1X3	KL	162	MH	08/28/92	TM
40 X	94 / 113	INT W/93	PT	08/26/92	P	3X3	KL	162	MH	08/28/92	TM
41 A	111 / 113	75'NSEOS	DS-94	08/28/92	P	3X5	SB	158	MH	08/28/92	TM
41 B	113 / 114	53'NSEOS	FM	08/28/92	P	4X8	KT	158	MH	08/28/92	TM
41 C	95 / 115	295' TO 305'NSEOS	IO	08/19/92	RS	1X10	K-MAI	4	MH	08/19/92	JCL
41 D	114 / 115	210'NSEOS	DS-95	08/26/92	P	2X5	TE	4	MH	08/28/92	TM
41 E	113 / 114	242'NSEOS	DS-96	08/26/92	P	2X5	TE	4	MH	08/28/92	TM
41 F	97 / 98	INT W/118	T	08/27/92	P	3X4	TE	4	MH	08/28/92	TM
41 G	117 / 118	241'NSEOS	WS	08/27/92	P	3X5	TE	4	MH	08/28/92	TM
41 H	118	233'NSEOS,7'E	D	08/27/92	P	1X2	TE	4	MH	08/28/92	TM
41 I	117 / 118	INT W/119	T	08/27/92	P	3X3	TE	4	MH	08/28/92	TM
41 J	116 / 117	4'W OF 118	DS-97	08/28/92	P	3X6	KT	158	TM	09/14/92	JI
41 K	119 / 120	16'NSEOS	D	08/27/92	P	2X2	BP	4	MH	09/14/92	JI
41 M	99 / 118	INT W/121	T	08/27/92	P	4X4	BP	4	MH	08/28/92	TM
41 N	98 / 99	INT W/118	T	08/27/92	P	3X5	BP	4	MH	08/28/92	TM

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GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
41 P	119 / 121	207'NSEOS	FM	08/27/92	P	3X4	BP	4	MH	08/28/92	TM
41 Q	106 / 122	208'SNEOS	WS	08/25/92	P	2X4	AV	8	JI	08/25/92	JCL
41 R	106 / 122	411'SNEOS	WS	08/25/92	P	2X2	KT	158	LS	08/25/92	JCL
41 S	75 / 76	7'E OF 74	DSE-03	08/27/92	P	3X4	KL	162	MH	08/28/92	TM
41 T	125 / 126	432'SNEOS	WS	08/25/92	P	2X2	SB	158	LS	08/29/92	TM
41 W	125 / 126	190'SNEOS	WS	08/25/92	P	1X2	BP	260	MH	08/29/92	TM
41 X	125 / 126	621'SNEOS	DS-104	09/14/92	P	2X5	IOU	8	LS	09/19/92	JCL
42 A	113 / 114	<<< COVERED BY 41B >>>	--	--	--	--	--	--	--	--	--
42 B	113 / 114	<<< COVERED BY 41B >>>	--	--	--	--	--	--	--	--	--
42 C	95 / 41C	INT W/114/115	T	08/26/92	P	2X3	TE	4	MH	08/28/92	TM
42 D	96 / 115	INT W/95	T	08/26/92	P	3X4	TE	4	MH	08/28/92	TM
42 E	96 / 115	INT W/97	T	08/26/92	P	3X4	TE	4	MH	08/28/92	TM
42 F	97 / 116	INT W/115	T	08/27/92	P	3X3	TE	4	MH	08/28/92	TM
42 G	116 / 117	INT W/115	T	08/27/92	P	4X6	TE	4	MH	08/28/92	TM
42 H	116 / 117	INT W/118	T	08/27/92	P	3X4	TE	4	MH	08/28/92	TM
42 I	97 / 116	INT W/118	T	08/27/92	P	3X4	TE	4	MH	08/28/92	TM
42 J	120 / 121	INT W/119	T	08/27/92	P	3X4	BP	4	MH	08/28/92	TM
42 K	119 / 120	<<< VOID >>>	--	--	--	--	--	--	--	--	--
42 M	117 / 119	SAT TO 2'N	PT/FS	08/27/92	P	1X2	BP	4	MH	OCA	--
42 N	115 / 117	SAT TO 2'N	PT/FS	08/27/92	P	2X2	BP	4	MH	OCA	--
42 P	114 / 115	SAT TO 2'N	PT/FS	08/28/92	P	1X1	KT	158	MH	OCA	--
42 Q	113 / 114	SAT TO 2'N	PT/FS	08/28/92	P	1X1	SB	158	MH	OCA	--
42 R	111 / 113	SAT TO 2'N	PT/FS	08/28/92	P	1X2	KT	158	MH	OCA	--
42 S	110 / 111	SAT TO 2'N	PT/FS	08/27/92	RS	5'	KL	162	MH	OCA	--
42 T	106 / 122	10'S OF NAT	PT	08/25/92	P	2X2	AV	8	JI	08/25/92	JCL
42 W	122 / 123	NAT TO 10'S	PT/FS	08/27/92	P	2X2	KT	158	MH	OCA	--
42 X	123 / 124	NAT TO 10'S	PT/FS	08/27/92	P	2X4	SB	158	MH	OCA	--
43 A	124 / 125	NAT TO 3'S	FS/PT	08/27/92	P	2X2	KT	158	MH	OCA	--
43 B	106 / 122	NAT TO 3'S	FS/PT	08/27/92	P	1X2	SB	158	MH	OCA	--

Golder Construction Services, Inc.

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
43 C	106 / 122	85'S OF NAT	PT	08/25/92	P	1X1	TE	260	MH	08/25/92	JCL
43 D	106 / 122	38'S OF NAT	PT	08/25/92	P	3X3	TE	260	MH	08/25/92	JCL
43 E	127 / 128	36'S OF NAT	BO/PT	08/31/92	P	2X2	KL	162	MH	09/02/92	MH
43 F	127 / 128	NAT TO 4'S	FS/PT	08/27/92	P	3X3	SB	158	MH	OCA	--
43 G	125 / 126	NAT TO 4'S	FS/PT	08/27/92	P	3X3	SB	158	MH	OCA	--
43 H	128 / 129	425'S OF NAT	BO/PT	09/02/92	P	2X2	SB	158	LS	09/02/92	MH
43 I	129 / 130	380'S OF NAT	BO/PT	08/31/92	P	2X2	SB	158	LS	09/02/92	MH
43 J	129 / 130	405' TO 413'S OF NAT	BO/PT	09/02/92	P	3X12	KT	158	LS	09/02/92	MH
43 K	129 / 130	584' TO 591'S OF NAT	BO/PT	09/14/92	P	2X3	IOU	8	LS	09/19/92	JCL
43 M	129 / 130	591' TO 594'S OF NAT	FS	09/14/92	P	1X2	IOU	8	LS	09/19/92	JCL
43 N	129 / 130	596'S OF NAT	BO/PT	09/14/92	P	2X3	IOU	8	LS	09/19/92	JCL
43 P	129 / 130	605'S OF NAT	BO/PT	09/14/92	P	1X1	IOU	8	LS	09/19/92	JCL
43 Q	129 / 130	605' TO 612'S OF NAT	FS	09/14/92	RS	6'	IOU	8	LS	09/19/92	JCL
43 R	129 / 130	612' TO 619'S OF NAT	IO	09/14/92	P	2X8	IOU	8	LS	09/19/92	JCL
43 S	129 / 130	NAT TO 3'S	FS/PT	08/27/92	P	1X1	KT	158	MH	09/11/92	MH
43 T	97	180'N OF AT,2'W	D	08/22/92	P	1X1	KL	162	JI	08/22/92	TD
44 A	125 / 126	169'SNEOS	BO	08/25/92	P	2X4	BP	260	MH	08/29/92	TM
44 B	126 / 127	264'SNEOS	DS-105	08/25/92	P	2X5	PT	8	JI	09/02/92	MH
44 C	127 / 128	440'SNEOS	WS	09/02/92	P	2X3	KT	158	LS	09/02/92	MH
44 D	126 / 127	164'SNEOS	DS-106	08/31/92	P	2X5	KT	158	LS	09/02/92	MH
44 E	127 / 128	603'SNEOS	BO	09/14/92	P	1X2	IOU	8	LS	09/19/92	JCL
44 F	127 / 128	178' TO 186'SNEOS	FS	08/31/92	RS	9'	KT	158	LS	09/02/92	MH
44 G	127 / 128	539'SNEOS	DS-107	09/14/92	P	2X4	IOU	8	LS	09/19/92	JCL
44 H	127 / 128	533'SNEOS	FM	09/14/92	P	2X3	IOU	8	LS	09/19/92	JCL
44 I	128 / 129	325'SNEOS	WS	08/25/92	P	2X3	PT	8	JI	09/02/92	MH
44 J	127 / 128	14'SNEOS	DS-108	08/31/92	P	3X5	KL	162	LS	09/02/92	MH
44 K	129 / 130	195'SNEOS	WS	08/31/92	P	2X2	SB	158	LS	09/02/92	MH
44 M	129 / 130	183'SNEOS	BO	08/31/92	P	2X2	KT	158	LS	09/02/92	MH
44 N	129 / 130	227'SNEOS	BO	08/31/92	P	2X3	KT	158	LS	09/02/92	MH

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
44 P	129 / 130	285'SNEOS	BO	08/31/92	P	2X2	SB	158	LS	09/02/92	MH
44 Q	129 / 130	312'SNEOS	BO	08/31/92	P	2X3	SB	158	LS	09/02/92	MH
44 R	129 / 130	336'SNEOS	BO	08/31/92	P	2X2	KT	158	LS	09/02/92	MH
44 S	129 / 130	478'SNEOS	BO	09/02/92	P	2X3	KT	158	LS	09/02/92	MH
44 T	129 / 130	518'SNEOS	FM	09/02/92	P	2X3	KT	158	LS	09/02/92	MH
44 W	130 / 131	420'SNEOS	WS	09/02/92	P	3X4	SB	158	LS	09/02/92	MH
44 X	130 / 131	396'SNEOS	BO	08/31/92	P	2X3	SB	158	LS	09/02/92	MH
45 A	106 / 122	629'S OF NAT	DS-98	09/14/92	P	2X5	IOU	8	LS	09/19/92	JCL
45 B	106 / 122	302'S OF NAT	FS	08/25/92	P	2X4	KL	162	MH	08/25/92	JCL
45 C	106 / 122	160'S OF NAT	DS-99	08/25/92	P	3X6	AV	8	JI	08/25/92	JCL
45 D	122 / 123	395'S OF NAT	WS	08/25/92	P	1X2	SB	158	LS	08/29/92	TM
45 E	122 / 123	40'S OF NAT	FM	08/25/92	P	3X10	BP	260	MH	08/25/92	JCL
45 F	122 / 123	180'S OF NAT	DS-100	08/25/92	P	2X5	PT	8	JI	08/25/92	JCL
45 G	123 / 124	396'S OF NAT	WS	08/25/92	P	2X3	KT	158	LS	08/29/92	TM
45 H	123 / 124	433'S OF NAT	DS-101	08/25/92	P	2X5	SB	158	LS	08/29/92	TM
45 I	123 / 124	182'S OF NAT	WS	08/25/92	P	2X3	PT	8	JI	08/29/92	TM
45 J	123 / 124	350'S OF NAT	FS	08/25/92	P	2X4	KL	162	MH	08/29/92	TM
45 K	124 / 125	215'S OF NAT	WS	08/25/92	P	2X3	BP	260	MH	08/25/92	JCL
45 M	124 / 125	403'S OF NAT	WS	08/25/92	P	2X2	KT	158	LS	08/29/92	TM
45 N	124 / 125	297'S OF NAT	DS-102	08/25/92	P	2X5	PT	8	JI	08/25/92	JCL
45 P	124 / 125	55'S OF NAT	DS-103	08/25/92	P	2X5	BP	260	MH	08/29/92	TM
45 Q	126 / 127	440'S OF NAT	WS	09/02/92	P	2X2	SB	158	LS	09/02/92	MH
45 R	126 / 127	190'S OF NAT	WS	08/31/92	P	2X2	SB	158	LS	09/02/92	MH
45 S	128	2'S OF NAT,3'E	D	08/27/92	P	3X4	KT	158	MH	OCA	--
45 T	128	8'S OF NAT,3'E	D	08/31/92	P	1X1	KL	162	LS	09/02/92	MH
45 W	126 / 127	134'S OF NAT	BO	08/31/92	P	2X4	KT	158	LS	09/02/92	MH
45 X	129	2'S OF NAT,15'W	D	08/27/92	P	1X1	KT	158	MH	09/11/92	MH
46 A	28 / 49	17'E OF 28/48/49	P	08/21/92	P	4X4	PT	4	MH	08/21/92	MH
46 B	28 / 49	28/49/51 TO 12'W	C	08/21/92	P	4X12	PT	4	MH	08/21/92	MH

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
46 C	49 / 50	INT W/51	C	08/21/92	P	4X8	PT	4	MH	08/21/92	MH
46 D	49 / 50	15'S OF 49/50/51	C	08/21/92	P	4X5	PT	4	MH	08/21/92	MH
46 E	28 / 48	NEOS TO SEOS	C	08/21/92	P	3X10	PT	4	MH	08/21/92	MH
46 F	48	12'S OF 27/48,10'W	P	08/21/92	P	3X3	SN	4	MH	08/21/92	MH
46 G	27 / 48	12'W OF 27/28/48	P	08/21/92	P	4X5	PT	4	MH	08/21/92	MH
46 H	91 / 92	455'S OF NAT	P	08/21/92	P	1X1	KLV	260	TD	08/22/92	TD
46 I	91 / 92	475'S OF NAT,3'W	P	08/21/92	P	1X1	KLV	260	TD	08/22/92	TD
46 J	72 / 73	320'S OF NAT	P	08/21/92	P	1X1	SB	158	TD	08/22/92	TD
46 K	64 / 65	<<< VOID >>>	--	--	--	--	--	--	--	--	--
46 M	65 / 66	315' TO 305'SNEOS	FS	08/26/92	RS	8'	SB	158	MH	08/26/92	MH
46 N	65 / 66	300' TO 290'SNEOS	FS	08/26/92	RS	13'	SB	158	MH	08/26/92	MH
46 P	65 / 66	290'SNEOS	DS-48N	08/26/92	P	2X5	KT	158	MH	08/26/92	MH
46 Q	122 / 123	180'SNEOS	D	08/25/92	P	2X4	BP	260	MH	08/25/92	JCL
46 R	127 / 128	186'SNEOS	PT	08/31/92	P	2X2	SB	158	LS	09/02/92	MH
46 S	127 / 128	178'SNEOS	PT	08/31/92	P	2X2	KT	158	LS	09/02/92	MH
46 T	132 / 133	314'SNEOS	WS	08/26/92	P	2X3	BL	162	MH	08/29/92	TM
46 W	132 / 133	345'SNEOS	WS	08/26/92	P	2X3	BL	162	MH	08/29/92	TM
46 X	132 / 133	450'SNEOS	DS-115	09/19/92	P	2X6	PT	162	JCL	09/19/92	JCL
47 A	89 / 90	125'S OF NAT	D	08/21/92	P	3X4	SP	260	MH	08/22/92	MH
47 B	106 / 122	121'S OF NAT	D	08/25/92	P	2X5	TE	260	MH	08/25/92	JCL
47 C	84 / 86	50'S OF NAT	D	08/26/92	P	2X2	BP	4	MH	08/28/92	TM
47 D	36 / 37	3'S OF NAT	D	08/26/92	P	2X2	SB	158	MH	OCA	--
47 E	92 / 93	INT W/110	D	08/26/92	P	4X4	KL	162	MH	08/28/92	TM
47 F	112 / 113	245'S OF NAT	D	08/26/92	P	2X2	KL	162	MH	08/28/92	TM
47 G	78 / 80	2'N OF SAT	D	08/27/92	P	3X4	KL	162	MH	OCA	--
47 H	151 / 152	550'S OF NAT	PT	09/09/92	P	2X3	IOU	8	MH	09/10/92	MH
47 I	150 / 151	INT W/152	PT	09/09/92	P	2X3	SB	158	LS	09/10/92	MH
47 J	150 / 152	2'S OF NAT	PT	08/31/92	P	2X2	PT	8	TM	OCA	--
47 K	150 / 152	15'S OF NAT	PT	09/15/92	P	2X4	SB	158	MH	09/15/92	MH

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
47 M	152 / 153	670'S OF NAT	PT	09/17/92	RS	2'	PT	227	LS	09/22/92	JCL
47 N	152 / 153	1'S OF NAT	PT	08/31/92	P	2X2	PT	8	TM	OCA	--
47 P	120 / 158	1'N OF SAT	PT	08/31/92	P	2X2	SS	4	TM	OCA	--
47 Q	120 / 158	55'N OF SAT	PT	09/11/92	P	3X5	SB	158	MH	09/14/92	JI
47 R	159 / 160	INT W/161	PT	09/11/92	P	2X2	KT	158	MH	09/14/92	JI
47 S	121 / 158	245' TO 300'N OF SAT	FS	09/02/92	RS	40'	KL	162	MH	09/14/92	JI
47 T	--	<<< VOID >>>	--	--	--	--	--	--	--	--	--
47 W	158 / 159	70'N OF SAT	PT	09/11/92	P	3X3	KT	158	MH	09/14/92	JI
47 X	158 / 159	66'N OF SAT	PT	09/11/92	P	3X3	SB	158	MH	09/14/92	JI
48 A	129	10'S OF NAT,15'W	D	09/12/92	P	1X1	KT	158	MH	09/12/92	MH
48 B	130 / 131	65'S OF NAT	BO	08/31/92	P	2X2	KL	162	LS	09/02/92	MH
48 C	130 / 131	56'S OF NAT	BO	08/31/92	P	2X5	KL	162	MH	09/02/92	MH
48 D	130 / 131	37'S OF NAT	FM	08/31/92	P	2X6	KL	162	LS	09/02/92	MH
48 E	132	1'S OF NAT,5'W	D	08/27/92	P	1X1	KT	158	MH	OCA	--
48 F	73 / 89	548'S OF NAT	FS	08/22/92	P	2X6	SB	158	JCL	08/28/92	TM
48 G	73	45'S OF NAT,21'W	FM	08/22/92	RS	21'	VV	260	LS	08/22/92	MH
48 H	73	45'S OF NAT,21'W	FM	08/22/92	P	1X1	VV	260	LS	08/22/92	MH
48 I	73 / 89	135'S OF NAT	BO	08/22/92	P	1X1	VV	260	LS	08/22/92	MH
48 J	135	5'S OF NAT,19'W	D	08/27/92	P	2X2	SB	158	MH	09/11/92	MH
48 K	135	7'S OF NAT,20'W	D	08/27/92	P	2X2	KT	158	MH	09/11/92	MH
48 M	135	2'S OF NAT,12'W	D	08/27/92	P	1X2	SB	158	MH	OCA	--
48 N	136	5'S OF NAT,20'W	D	08/27/92	P	1X1	SB	158	MH	OCA	--
48 P	136	11'S OF NAT,20'W	D	09/12/92	P	1X1	SB	158	MH	09/12/92	MH
48 Q	148 / 149	38'S OF NAT	FM	09/09/92	P	2X6	KL	162	LS	09/10/92	MH
48 R	--	<<< VOID >>>	--	--	--	--	--	--	--	--	--
48 S	147 / 148	35'S OF NAT TO NAT	CO	09/14/92	C	2X40	SB/KT	158	MH	09/15/92	MH
48 T	--	<<< VOID >>>	--	--	--	--	--	--	--	--	--
48 W	122 / 123	40'S OF NAT(45E)	DSE-4	09/10/92	P	3X6	SB	158	JI	09/11/92	MH
48 X	102 / 103	533'S OF NAT(30D)	DSE-5	09/10/92	P	2X6	SB	158	JI	09/11/92	MH

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
49 A	130 / 131	207'SNEOS	WS	08/29/92	P	4X4	SP	158	MH	08/29/92	TM
49 B	129 / 130	637'SNEOS	DS-109	09/14/92	P	2X5	IOU	8	LS	09/19/92	JCL
49 C	129 / 130	294'SNEOS	DS-110	08/31/92	P	2X5	KT	158	LS	09/02/92	MH
49 D	129 / 130	180'SNEOS	DS-111	08/31/92	P	2X5	SB	158	LS	09/02/92	MH
49 E	130 / 131	215'SNEOS	BO	08/29/92	P	3X5	SP	158	MH	08/29/92	TM
49 F	130	318'SNEOS,3'W	D	08/31/92	P	1X1	KT	158	LS	09/08/92	MH
49 G	130 / 131	542'SNEOS	BO	09/02/92	P	2X2	SB	158	LS	09/02/92	MH
49 H	130 / 131	562'SNEOS	BO	09/14/92	P	2X2	IOU	8	LS	09/19/92	JCL
49 I	130 / 131	655'SNEOS	PT	09/14/92	P/RS	2X6/6'	IOU	8	LS	09/22/92	JCL
49 J	131 / 132	400'SNEOS	WS	08/31/92	P	2X2	SB	158	LS	09/02/92	MH
49 K	130 / 131	437'SNEOS	BO	09/02/92	P	2X2	SB	158	LS	09/02/92	MH
49 M	131 / 132	200'SNEOS	WS	08/29/92	P	2X2	SP	158	MH	08/29/92	TM
49 N	131 / 132	175'SNEOS	BO	08/31/92	P	1X2	KL	162	LS	09/08/92	MH
49 P	131 / 132	274'SNEOS	WS	08/29/92	P	2X3	IOU	8	MH	08/29/92	TM
49 Q	131 / 132	650'SNEOS	DS-112	09/19/92	P	2X6	SP	158	LS	09/19/92	JCL
49 R	131 / 132	262'SNEOS	DS-113	08/29/92	P	2X5	IOU	8	MH	08/29/92	TM
49 S	131 / 132	137'SNEOS	DS-114	08/31/92	P	3X5	KL	162	LS	09/08/92	MH
49 T	72 / 73	60'SNEOS	D	08/22/92	P	1X1	VV	260	JI	08/22/92	MH
49 W	68 / 69	133'SNEOS	D	08/22/92	P	2X2	KL	162	JI	08/25/92	JCL
49 X	68 / 69	115'SNEOS	D	08/22/92	P	1X1	KL	162	JI	08/25/92	JCL
50 A	105 / 106	590'S OF NAT	VL	08/25/92	GW	8'	KT	158	LS	09/21/92	JI
50 B	104 / 105	550'S OF NAT	VL	08/25/92	P	1X1	KT	158	LS	08/29/92	TM
50 C	122 / 123	180'S OF NAT	VL	08/26/92	GW	2'	BL	162	MH	08/29/92	TM
50 D	131 / 132	NAT TO 3'S	FS/PT	08/27/92	P	1X2	KT	158	MH	OCA	--
50 E	130 / 131	NAT TO 1'S	FS	08/27/92	P	2X3	SB	158	MH	OCA	--
50 F	133 / 134	94'S OF NAT	PT	08/31/92	P	2X2	KL	162	LS	09/08/92	MH
50 G	133 / 134	50'S OF NAT	PT	08/31/92	P	2X2	PT	8	TM	09/08/92	MH
50 H	133 / 134	33'S OF NAT	PT	08/31/92	P	1X2	KL	162	LS	09/08/92	MH
50 I	133 / 134	28'S OF NAT	PT	08/31/92	P	1X2	KL	162	LS	09/08/92	MH

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY - POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
50 J	133 / 134	NAT TO 5'S	PT	08/27/92	P	3X5	KT	158	MH	09/08/92	MH
50 K	133 / 134	5' TO 28'S OF NAT	FS	08/31/92	RS	25'	KL	162	LS	09/08/92	MH
50 M	133 / 134	28'S OF NAT	PT	08/31/92	P	4'	KL	162	LS	09/08/92	MH
50 N	133 / 134	28' TO 33'S OF NAT	FS	08/31/92	RS	8'	KL	162	JCL	09/08/92	MH
50 P	135 / 136	83'S OF NAT	PT	09/02/92	P	2X2	SS	8	LS	09/08/92	MH
50 Q	135 / 136	213'S OF NAT	BO	09/02/92	P	2X5	SS	8	LS	09/08/92	MH
50 R	140 / 141	480' TO 488'S OF NAT	FS	09/08/92	RS	8'	IOU	8	JCL	09/09/92	JCL
50 S	141 / 142	NAT TO 3'S	FS	08/31/92	P	2X2	PT	8	TM	OCA	--
50 T	140 / 141	NAT TO 5'S	FS	08/27/92	P	2X2	KT	158	TM	OCA	--
50 W	138 / 139	NAT TO 4'S	FS	08/27/92	P	1X1	SB	158	MH	OCA	--
50 X	137 / 138	NAT TO 3'S	FS	08/27/92	P	1X1	KT	158	MH	OCA	--
51 A	133 / 134	300'SNEOS	WS	08/31/92	P	2X4	KT	158	LS	09/08/92	MH
51 B	133 / 134	194'SNEOS	BO	08/31/92	P	2X2	KL	162	LS	09/11/92	MH
51 C	134 / 135	350'SNEOS	WS	09/02/92	P	2X3	KT	158	LS	09/09/92	JCL
51 D	135 / 136	315'SNEOS	WS	09/02/92	P	2X3	SB	158	LS	09/09/92	JCL
51 E	134 / 135	276'SNEOS	DS-116	09/02/92	P	2X5	SKP	8	LS	09/08/92	MH
51 F	135 / 136	51'SNEOS	IO	09/02/92	P	2X4	SS	8	LS	09/08/92	MH
51 G	133 / 134	57'SNEOS	DS-117	08/31/92	P	2X5	KL	162	LS	09/08/92	MH
51 H	136 / 137	397'SNEOS	BO	09/12/92	P	3X4	SB	158	MH	09/11/92	MH
51 I	136 / 137	335' TO 397'SNEOS	FS	09/12/92	P	60'	SB	158	MH	09/11/92	MH
51 J	135 / 136	359'SNEOS	DS-119	09/02/92	GW	2X2	SB	158	LS	09/09/92	JCL
51 K	135 / 136	540'SNEOS	BO	09/19/92	P	1X1	PT	162	JCL	09/19/92	JCL
51 M	135 / 136	554'SNEOS	BO	09/19/92	P	1X1	PT	162	JCL	09/19/92	JCL
51 N	135 / 136	591' TO 603'SNEOS	D	09/19/92	C	1X13	PT	162	JCL	09/19/92	JCL
51 P	135 / 136	625'SNEOS	WS	09/19/92	P	2X2	PT	162	JCL	09/19/92	JCL
51 Q	136 / 137	174'SNEOS	DS-120	09/08/92	P	2X5	IOU	8	LS	09/09/92	JCL
51 R	136 / 137	500'SNEOS	WS	09/19/92	P	3X4	PT	162	JCL	09/19/92	JCL
51 S	136 / 137	629'SNEOS	FM	09/18/92	P	3X3	KL	162	MH	09/19/92	JCL

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY - POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
51 T	137 / 138	350'SNEOS	WS	09/02/92	P	2X2	SKP	8	LS	09/09/92	JCL
51 W	138 / 139	35' TO 50'SNEOS	IO	09/08/92	RS	15'	KL	162	JCL	09/09/92	JCL
51 X	137 / 138	307'SNEOS	FM	09/02/92	P	2X3	SKP	8	LS	09/09/92	JCL
52 A	137 / 138	553'SNEOS	IO	09/18/92	P	2X3	KL	162	MH	09/19/92	JCL
52 B	137 / 138	588'SNEOS	FM	09/18/92	P	2X3	KL	162	MH	09/28/92	TM
52 C	137 / 138	623'SNEOS	BO	09/18/92	P	1X1	KL	162	MH	09/19/92	JCL
52 D	138 / 139	630'SNEOS	BO	09/18/92	P	2X6	PT	227	MH	09/19/92	JCL
52 E	137 / 138	607'SNEOS	BO	09/18/92	P	1X1	KL	162	MH	09/19/92	JCL
52 F	138 / 139	623'SNEOS	BO	09/18/92	P	1X1	PT	227	MH	09/19/92	JCL
52 G	138 / 139	549'SNEOS	IO	09/18/92	GW	12"	KL	162	MH	09/19/92	JCL
52 H	138 / 139	344'SNEOS	WS	09/02/92	P	2X3	SKP	8	LS	09/09/92	JCL
52 I	138 / 139	205'SNEOS	BO	09/08/92	P	2X4	IOU	8	LS	09/09/92	JCL
52 J	137 / 138	289'SNEOS	DS-121	09/02/92	P	2X5	SKP	8	LS	09/09/92	JCL
52 K	138 / 139	85'SNEOS	DS-122	09/08/92	P	2X5	IOU	8	LS	09/09/92	JCL
52 M	137 / 138	507'SNEOS	DS-123	09/18/92	P	2X5	KL	162	MH	09/19/92	JCL
52 N	136 / 137	401'SNEOS	DS-118	09/12/92	P	3X5	KT	158	MH	09/19/92	JCL
52 P	138 / 139	532'SNEOS	DS-124	09/18/92	P	2X5	KL	162	MH	09/19/92	JCL
52 Q	139 / 140	641'SNEOS	DS-125	09/18/92	P	2X5	KL	162	MH	09/19/92	JCL
52 R	140 / 141	45'SNEOS	CR	09/14/92	P	3X3	SB	158	MH	09/14/92	MH
52 S	140 / 141	191'SNEOS	DS-126	09/08/92	P	2X5	KL	162	LS	09/09/92	JCL
52 T	140 / 141	488'SNEOS	IO	09/08/92	P	1X1	IOU	8	JCL	09/09/92	JCL
52 W	140 / 141	331'SNEOS	BO	09/02/92	P	1X1	SKP	8	LS	09/09/92	JCL
52 X	141 / 142	350'SNEOS	WS	09/08/92	P	1X3	IOU	8	JCL	09/09/92	JCL
53 A	141 / 142	398'SNEOS	BO	09/08/92	P	2X3	IOU	8	JCL	09/09/92	JCL
53 B	141 / 142	510'SNEOS	WS	09/08/92	P	2X2	IOU	8	LS	09/09/92	JCL
53 C	141 / 142	635'SNEOS	BO	09/19/92	P	2X3	SS	162	JCL	09/19/92	JCL
53 D	141 / 142	523'SNEOS	DS-127	09/08/92	P	2X5	IOU	8	LS	09/09/92	JCL
53 E	141 / 142	89'SNEOS	DS-128	09/08/92	P	2X5	KL	162	LS	09/09/92	JCL

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
53 F	142 / 143	318'SNEOS	WS	09/08/92	P	2X3	KL	162	JCL	09/09/92	JCL
53 G	142 / 143	330'SNEOS	DS-129	09/08/92	P	2X5	KL	162	LS	09/09/92	JCL
53 H	142 / 143	129'SNEOS	DS-130	09/08/92	P	2X6	KL	162	JCL	09/09/92	JCL
53 I	143 / 144	22'SNEOS	BO	09/14/92	P	2X4	KT	158	MH	09/14/92	MH
53 J	144 / 145	350'SNEOS	WS	09/08/92	P	2X2	KL	162	LS	09/09/92	JCL
53 K	143 / 144	383'SNEOS	DS-131	09/08/92	P	2X5	IOU	8	LS	09/09/92	JCL
53 M	145 / 146	300'SNEOS	WS	09/08/92	P	3X6	KL	162	LS	09/09/92	JCL
53 N	145 / 146	278'SNEOS	BO	09/08/92	P	2X2	KL	162	LS	09/09/92	JCL
53 P	145 / 146	612'SNEOS	BO	09/08/92	P	2X5	IOU	8	LS	09/19/92	JCL
53 Q	145 / 146	290'SNEOS	DS-133	09/08/92	P	2X5	KL	162	LS	09/09/92	JCL
53 R	146 / 147	350'SNEOS	WS	09/08/92	P	2X9	IOU	8	LS	09/09/92	JCL
53 S	145 / 146	529'SNEOS	FM	09/08/92	P	2X5	IOU	8	LS	09/09/92	JCL
53 T	146 / 147	486'SNEOS	DS-132	09/08/92	P	2X5	IOU	8	LS	09/10/92	MH
53 W	145 / 146	437'SNEOS	FM	09/08/92	P	3X5	IOU	8	LS	09/09/92	JCL
53 X	145 / 146	42'SNEOS	BO	08/31/92	P	2X2	PT	8	TM	09/10/92	MH
54 A	136 / 137	NAT TO 4'S	FS	08/27/92	P	1X2	SB	158	MH	OCA	--
54 B	135 / 136	NAT TO 3'S	FS	08/27/92	P	2X2	KT	158	MH	OCA	--
54 C	132 / 133	14'SNAT	PT	09/02/92	P	1X2	SKP	8	LS	09/08/92	MH
54 D	132 / 133	3' TO 14'SNAT	FS	09/02/92	P	1X2	SS	8	LS	09/08/92	MH
54 E	132 / 133	NAT TO 3'S	FS	08/27/92	P	2X3	SB	158	MH	OCA	--
54 F	142 / 143	NAT TO 3'S	FS	08/31/92	P	2X2	PT	8	TM	OCA	--
54 G	143 / 144	NAT TO 3'S	FS	08/31/92	P	2X2	PT	8	TM	OCA	--
54 H	143 / 144	300'SNAT	PT	09/09/92	P	2X2	KL	162	JCL	09/09/92	JCL
54 I	146 / 147	30'SNAT	PT	09/08/92	P	3X5	KL	162	JCL	09/10/92	MH
54 J	146 / 147	NAT TO 3'S	FS	08/31/92	P	2X2	PT	8	TM	OCA	--
54 K	145 / 146	NAT TO 3'S	FS	08/31/92	P	2X2	PT	8	TM	OCA	--
54 M	144 / 145	NAT TO 3'S	FS	08/31/92	P	2X2	PT	8	TM	OCA	--
54 N	148 / 149	189' TO 196'SNAT	BO	09/09/92	P	2X12	KT	158	LS	09/10/92	MH

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
54 P	148 / 149	506' TO 510'SNAT	FS	09/11/92	GW	2'	IOU	158	LS	09/10/92	MH
54 Q	148 / 149	510'SNAT	PT	09/11/92	P	1X2	IOU	158	LS	09/10/92	MH
54 R	149 / 150	337'SNAT	PT	09/09/92	P	3X3	IOU	8	MH	09/10/92	MH
54 S	149 / 150	250'SNAT	PT	09/11/92	P	1X2	KT	158	LS	09/10/92	MH
54 T	149 / 150	88'SNAT	PT	09/09/92	P	2X3	KL	162	JCL	09/10/92	MH
54 W	149 / 150	NAT TO 3'S	FS	08/31/92	P	2X2	PT	8	TM	OCA	--
54 X	148 / 149	NAT TO 3'S	FS	08/31/92	P	2X2	PT	8	TM	OCA	--
55 A	145 / 146	30'SNEOS	BO	09/08/92	P	2X5	KL	162	JCL	09/10/92	MH
55 B	146 / 147	< COVERED BY 53R >	DS-134	--	--	--	--	--	--	--	--
55 C	146 / 147	522'SNEOS	BO	09/08/92	P	2X3	IOU	8	LS	09/10/92	MH
55 D	145 / 146	406' TO 415'SNEOS	IO	09/08/92	P	2X12	IOU	8	LS	09/09/92	JCL
55 E	147 / 148	350'SNEOS	WS	09/08/92	P	2X2	IOU	8	LS	09/09/92	JCL
55 F	147 / 148	450'SNEOS	BO	09/08/92	P	1X2	IOU	8	LS	09/10/92	MH
55 G	147 / 148	249'SNEOS	DS-135	09/09/92	P	2X5	KT	158	LS	09/10/92	MH
55 H	148 / 149	340'SNEOS	WS	09/08/92	P	2X3	KT	158	LS	09/10/92	MH
55 I	148 / 149	350'SNEOS	DS-136	09/08/92	P	2X6	SB	158	LS	09/10/92	MH
55 J	148 / 149	506'SNEOS	BO	09/08/92	P	3X4	IOU	8	LS	09/10/92	MH
55 K	148 / 149	533'SNEOS	BO	09/08/92	P	1X1	IOU	8	LS	09/10/92	MH
55 M	148 / 149	592'SNEOS	BO	09/08/92	P	2X2	IOU	8	LS	09/10/92	MH
55 N	148 / 149	300'SNEOS	WS	09/08/92	P	2X3	SB	158	LS	09/10/92	MH
55 P	148 / 149	232' TO 250'SNEOS	IO	09/08/92	C	2X24	KT	158	LS	09/10/92	MH
55 Q	148 / 149	203'SNEOS	FM	09/09/92	P	2X3	SB	158	LS	09/10/92	MH
55 R	148 / 149	196' TO 203'SNEOS	FS	09/09/92	RS	4'	SB	158	LS	09/10/92	MH
55 S	148 / 149	180'SNEOS	DS-137	09/09/92	P	2X3	IOU	8	LS	09/10/92	MH
55 T	149 / 151	350' TO 357'SNEOS	FS	09/09/92	P	3X7	IOU	8	MH	09/10/92	MH
55 W	149 / 151	468'SNEOS	BO	09/08/92	P	2X3	IOU	8	LS	09/10/92	MH
55 X	149 / 151	482'SNEOS	BO	09/08/92	P	2X3	IOU	8	LS	09/10/92	MH
56 A	149 / 150	55' TO 58'SNEOS	FS	09/08/92	P	2X6	KL	162	JCL	09/10/92	MH

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
56 B	149 / 150	95'SNEOS	BO	09/09/92	P	1X2	KL	162	JCL	09/10/92	MH
56 C	149 / 150	121'SNEOS	BO	09/09/92	P	2X5	KL	162	LS	09/10/92	MH
56 D	149 / 150	140'SNEOS	BO	09/09/92	P	2X3	KL	162	LS	09/10/92	MH
56 E	149 / 151	154' TO 174'SNEOS	FS	09/09/92	C	2X20	KL	162	LS	09/10/92	MH
56 F	151 / 152	283'SNEOS	D	09/10/92	P	1X1	SB	158	LS	09/15/92	MH
56 G	151 / 152	350'SNEOS	WS	09/09/92	P	2X3	IOU	8	MH	09/15/92	MH
56 H	151 / 152	528'SNEOS	BO	09/09/92	P	2X2	IOU	8	MH	09/10/92	MH
56 I	151 / 152	535'SNEOS	BO	09/09/92	P	2X2	IOU	8	MH	09/10/92	MH
56 J	149 / 151	531'SNEOS	FM	09/08/92	P	2X2	IOU	8	LS	09/10/92	MH
56 K	149 / 151	505'SNEOS	BO	09/08/92	P	2X2	IOU	8	LS	09/10/92	MH
56 M	149 / 150	81'SNEOS	PT	09/09/92	P	2X3	KL	162	JCL	09/10/92	MH
56 N	149 / 151	358'SNEOS	DS-138	09/09/92	P	3X5	IOU	8	MH	09/10/92	MH
56 P	149 / 151	600'SNEOS	DS-139	09/08/92	P	3X5	IOU	8	LS	09/10/92	MH
56 Q	151 / 152	500'SNEOS	DS-140	09/09/92	P	2X5	IOU	8	MH	09/10/92	MH
56 R	150 / 152	60'SNEOS	DS-141	09/09/92	P	2X5	KL	162	LS	09/10/92	MH
56 S	152 / 153	335'SNEOS	WS	09/09/92	P	2X5	IOU	8	MH	09/15/92	MH
56 T	152 / 153	626'SNEOS	DS-142	09/17/92	P	2X5	PT	227	LS	09/19/92	JCL
56 W	152 / 153	331'SNEOS	BO	09/09/92	P	2X2	KL	162	LS	09/19/92	LS
56 X	152 / 153	160'SNEOS	DS-143	09/10/92	P	2X5	KL	162	MH	09/10/92	MH
57 A	156	495'SNAT,18'E	D	09/10/92	P	2X2	IOU	8	LS	09/10/92	MH
57 B	156	495'SNAT,12'E	D	09/10/92	P	1X1	IOU	8	LS	09/10/92	MH
57 C	156	499'SNAT,12'E	D	09/10/92	P	1X1	IOU	8	LS	09/10/92	MH
57 D	156	503'SNAT,12'E	D	09/10/92	P	1X1	IOU	8	LS	09/10/92	MH
57 E	156	499'SNAT,18'E	D	09/10/92	P	1X1	IOU	8	LS	09/10/92	MH
57 F	131 / 132	250'SNAT	BO	08/31/92	P	2X2	SB	158	LS	09/02/92	TM
57 G	149 / 150	INT W/151	FS	09/09/92	P	2X5	SB	158	LS	09/10/92	MH
57 H	149 / 151	INT W/150	PT	09/09/92	P	2X3	KT	158	LS	09/10/92	MH
57 I	150 / 151	3'E OF 149	FS	09/09/92	RS	7'	SB	158	LS	09/10/92	MH

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
57 J	150 / 151	9'E OF 149	FS	09/09/92	P	1X3	SB	158	LS	09/10/92	MH
57 K	150 / 151	16'E OF 149	FS	09/09/92	RS	5'	SB	158	LS	09/10/92	MH
57 M	150 / 151	19'E OF 149	FS	09/09/92	P	2X2	KT	158	LS	09/10/92	MH
57 N	150 / 151	21'E TO EEOS	FS	09/09/92	RS	15'	KT	158	LS	09/10/92	MH
57 P	150	90'SNAT,15'W	D	09/09/92	P	1X1	KL	162	LS	09/10/92	MH
57 Q	157 / 164	650'SNAT	FS	09/10/92	RS	2'	KT	158	JI	09/10/92	MH
57 R	190	200'SNAT,9'W	D	09/21/92	P	1X1	VV	8	LS	09/22/92	JCL
57 S	203	6'SNAT,16'W	D	09/15/92	P	1X1	PT	227	MH	OCA	--
57 T	205	< COVERED BY 87F >	--	--	--	--	--	--	--	--	--
57 W	205	< VOID >	--	--	--	--	--	--	--	--	--
57 X	208	275'SNAT,9'E	D	09/23/92	C	2X45	VV	8	LS	09/22/92	LS
58 A	92 / 93	590'SNEOS	VL	09/02/92	GW	4'	SKP	8	LS	09/02/92	MH
58 B	167 / 168	455'SNAT	BO	09/17/92	P	2X3	KL	162	MH	09/18/92	LS
58 C	167 / 168	400'SNAT	WS	09/17/92	P	2X2	SB	158	MH	09/18/92	LS
58 D	167 / 168	200'SNAT	PT	09/17/92	P	3X3	SB	158	MH	09/18/92	LS
58 E	167 / 168	22'SNAT	BO	09/17/92	P	1X2	KT	158	MH	09/18/92	LS
58 F	167 / 168	2'SNAT	PT	09/17/92	P	2X2	KT	158	MH	OCA	--
58 G	169 / 170	29'SNAT	T	09/17/92	P	4X4	SB	158	MH	09/18/92	LS
58 H	169 / 170	@ NAT	PT	09/04/92	P	1X1	SN	8	MH	OCA	--
58 I	170 / 172	@ NAT	PT	09/04/92	P	1X1	PT	8	MH	OCA	--
58 J	171 / 172	@ EAT	PT	09/04/92	P	1X1	PT	8	MH	OCA	--
58 K	173 / 174	@ EAT	PT	09/18/92	P	1X1	KT	158	LS	OCA	--
58 M	176 / 177	@ EAT	PT	09/04/92	P	2X2	SN	8	MH	OCA	--
58 N	173 / 174	@ EAT	PT	09/04/92	P	2X2	PT	8	MH	OCA	--
58 P	164 / 165	300'SNAT	WS	09/10/92	P	2X5	KL	162	LS	09/17/92	MH
58 Q	164 / 165	150'SNAT	PT	09/10/92	P	2X4	KL	162	MH	09/17/92	MH
58 R	157 / 164	325'SNAT	FS	09/10/92	RS	9'	KT	158	MH	09/17/92	MH
58 S	157 / 164	336' TO 350'SNAT	C	09/10/92	C	3X16	SB	158	MH	09/17/92	MH

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
58 T	157 / 164	350' TO 360'SNAT	FS	09/10/92	RS	10'	KT	158	MH	09/17/92	MH
58 W	157 / 164	360'SNAT	PT	09/10/92	P	2X4	KT	158	MH	09/17/92	MH
58 X	157 / 164	360' TO 380'SNAT	FS	09/10/92	RS	24'	IOU	8	LS	09/17/92	MH
59 A	153 / 154	NEOS TO 7'S	FS	08/31/92	P	2X2	PT	8	TM	OCA	--
59 B	153 / 154	37' TO 46'SNEOS	FS	09/15/92	P	3X10	SB	158	MH	09/15/92	MH
59 C	153 / 154	76'SNEOS	DS-144	09/10/92	P	2X5	KL	162	MH	09/15/92	MH
59 D	154 / 155	319'SNEOS	WS	09/09/92	P	2X2	IOU	8	MH	09/15/92	MH
59 E	155 / 156	350'SNEOS	WS	09/09/92	P	3X4	IOU	8	MH	09/15/92	MH
59 F	153 / 154	307'SNEOS	BO	09/09/92	P	2X5	IOU	8	MH	09/15/92	MH
59 G	154 / 155	30'SNEOS	BO	09/15/92	P	3X5	KT	158	MH	09/15/92	MH
59 H	154 / 155	60'SNEOS	DS-145	09/10/92	P	2X5	KL	162	MH	09/15/92	MH
59 I	154 / 155	450'SNEOS	WS	09/09/92	P	2X4	IOU	8	MH	09/10/92	MH
59 J	155 / 156	535' TO 540'SNEOS	D	09/09/92	P	1X6	IOU	8	MH	09/10/92	MH
59 K	155 / 156	438'SNEOS	DS-146	09/10/92	P	2X5	IOU	8	LS	09/10/92	MH
59 M	154 / 155	576'SNEOS	BO	09/09/92	P	2X3	IOU	8	MH	09/10/92	MH
59 N	154 / 155	583'SNEOS	BO	09/09/92	P	2X3	IOU	8	MH	09/10/92	MH
59 P	155 / 156	176'SNEOS	DS-147	09/10/92	P	2X5	KT	158	MH	09/15/92	MH
59 Q	156 / 157	390'SNEOS	DS-148	09/10/92	P	2X5	IOU	8	LS	09/10/92	MH
59 R	156 / 157	555'SNEOS	BO	09/10/92	P	2X3	IOU	8	LS	09/10/92	MH
59 S	156 / 157	593' TO 598'SNEOS	IO	09/10/92	P	2X9	IOU	8	LS	09/10/92	MH
59 T	156 / 157	602'SNEOS	BO	09/10/92	P	1X1	IOU	8	LS	09/10/92	MH
59 W	121	185'NSEOS,1'W	D	08/28/92	P	2X2	KT	158	MH	09/14/92	JCL
59 X	121 / 158	69'NSEOS	BO	09/11/92	P	2X2	SB	158	MH	09/14/92	JCL
60 A	121 / 158	< COVERED BY 60B >	--	09/02/92	P	2X14	KL	162	MH	--	--
60 B	121 / 158	241'NSEOS	BO	09/02/92	P	2X14	KL	162	MH	09/14/92	JCL
60 C	120 / 158	< VOID >	--	--	--	--	--	--	--	--	--
60 D	100 / 160	8'E OF 158	BO	09/11/92	P	3X4	SB	158	MH	09/14/92	JCL
60 E	161 / 162	156'NSEOS	BO	09/14/92	P	2X2	KL	162	LS	09/14/92	JCL

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
60 F	161 / 162	119'NSEOS	FM	09/14/92	P	2X3	KL	162	LS	09/14/92	JCL
60 G	158 / 159	120'NSEOS	DS-150	09/11/92	P	3X5	KT	158	MH	09/14/92	JCL
60 H	161 / 162	39'NSEOS	DS-151	09/14/92	P	2X5	KL	162	LS	09/14/92	JCL
60 I	162 / 163	8'EWEOS	DS-152	09/14/92	P	2X5	KL	162	LS	09/14/92	JCL
60 J	102	663'SNEOS,8'E	D	09/14/92	P	1X1	KL	162	LS	09/22/92	JCL
60 K	157 / 164	325'SNEOS	WS	09/10/92	P	3X3	KT	158	MH	09/17/92	MH
60 M	157 / 164	218'SNEOS	BO	09/10/92	P	2X2	SB	158	MH	09/19/92	JCL
60 N	157 / 164	577'SNEOS	FM	09/10/92	P	2X2	KT	158	MH	09/19/92	JCL
60 P	127 / 128	14' TO 24'SNEOS	FS	09/10/92	RS	20'	SB	158	JI	09/11/92	MH
60 Q	128 / 129	320' TO 325'SNEOS	FS	09/02/92	RS	6'	KT	158	LS	09/02/92	MH
60 R	64 / 65	480'SNEOS	D	09/03/92	P	2X3	KT	158	TM	09/03/92	TM
60 S	64 / 65	576'SNEOS	D	09/03/92	P	2X2	KT	158	TM	09/03/92	TM
60 T	68	30'SNEOS,12'E	D	09/03/92	P	1X1	KT	158	TM	09/03/92	TM
60 W	68	15'SNEOS,7'E	D	09/03/92	P	1X1	KT	158	TM	09/03/92	TM
60 X	69 / 70	NEOS TO 2'S	FS	09/03/92	GW	2'	KT	158	TM	OCA	--
61 A	155 / 156	NAT TO 5'S	FS	08/31/92	RS	6'	PT	8	TM	08/31/92	MH
61 B	155 / 156	5'SNAT	PT	08/31/92	P	2X2	PT	8	TM	08/31/92	MH
61 C	156 / 157	425'SNAT	PT	09/10/92	P	2X2	IOU	8	LS	09/10/92	MH
61 D	156 / 157	507'SNAT	PT	09/09/92	P	2X3	IOU	8	MH	09/10/92	MH
61 E	156 / 157	515'SNAT	PT	09/09/92	P	1XZ	IOU	8	MH	09/10/92	MH
61 F	156 / 157	598' TO 602'SNAT	FS	09/10/92	RS	3'	IOU	8	LS	09/10/92	MH
61 G	99 / 100	INT W/121/158	T	09/02/92	P	4X12	KL	162	MH	09/14/92	JCL
61 H	120 / 121	INT W/158	T	09/11/92	P	3X5	SB	158	MH	09/14/92	JCL
61 I	121 / 158	192'SNAT	BO	08/29/92	P	3X10	KL	162	LS	09/14/92	JCL
61 J	159 / 160	INT W/158	T	09/11/92	P	3X5	SB	158	MH	09/14/92	JCL
61 K	100 / 101	INT W/158/160	T	09/11/92	P	3X17	SB	158	MH	09/14/92	JCL
61 M	158 / 160	294' TO NEOS	FS	09/11/92	P	2X10	KT	158	MH	09/14/92	JCL
61 N	101 / 160	INT W/102/161	FS	09/14/92	P	2X7	KL	162	LS	09/22/92	JCL

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
61 P	121 / 158	280'NSAT	BO	09/02/92	P	1X1	KL	162	MH	09/14/92	JCL
61 Q	132 / 133	8' TO 10'SNAT	FS	09/02/92	RS	5'	SS	8	LS	09/08/92	MH
61 R	139 / 140	350'SNAT	PT	09/02/92	P	2X2	SKP	8	LS	09/09/92	JCL
61 S	140 / 141	350'SNAT	PT	09/02/92	P	2X2	SKP	8	LS	09/09/92	JCL
61 T	184	4'NSAT,12'W	D	09/14/92	P	1X1	PT	227	JCL	OCA	--
61 W	184	4'SNAT,14'W	D	09/14/92	P	2X2	PT	227	JCL	OCA	--
61 X	162 / 184	156'NSAT	IO	09/14/92	P	2X3	KL	162	LS	09/14/92	JCL
62 A	147 / 148	1'SNEOS	CO	08/31/92	P	6X13	PT	8	TM	OCA	--
62 B	165	7'SNEOS,12'W	D	09/16/92	P	1X1	SB	158	MH	09/17/92	MH
62 C	150 / 151	1'SNEOS	CO	08/31/92	P	6X13	PT	8	TM	OCA	--
62 D	158 / 159	1'NSEOS	PT	08/31/92	P	2X2	SS	4	TM	OCA	--
62 E	165	4'SNEOS,12'W	D	09/16/92	P	1X1	SB	158	MH	OCA	--
62 F	153 / 154	1'SNEOS	CO	08/31/92	P	2X4	PT	8	TM	OCA	--
62 G	156 / 157	1'SNEOS	PT	08/31/92	P	2X2	PT	8	TM	OCA	--
62 H	165	4'SNEOS,12'E	D	09/16/92	P	1X1	KT	158	MH	OCA	--
62 I	165	7'SNEOS,12'E	D	09/16/92	P	1X1	KT	158	MH	09/17/92	MH
62 J	157 / 164	42'SNEOS	BO	09/15/92	P	2X2	SB	158	MH	09/17/92	MH
62 K	127 / 128	25'SNEOS	DS-108	09/12/92	P	2X5	SB	158	MH	09/12/92	MH
62 M	127 / 128	10'SNEOS TO NEOS	FS	09/10/92	RS	10'	KT	158	JI	09/11/92	MH
62 N	128 / 129	320'SNEOS	DS-108	09/02/92	P/RS	2X5/10'	KT	158	LS	09/02/92	MH
62 P	131 / 132	175'SNAT	PT	09/12/92	P	2X2	SB	158	MH	09/11/92	MH
62 Q	135 / 136	40'SNAT	PT	09/11/92	P	3X3	SB	158	MH	09/12/92	MH
62 R	73	255'S TO 305'SNAT	MD	09/08/92	C	2X50	KT/SB	158	MH	09/08/92	MH
62 S	153 / 154	350'SNAT	D	09/09/92	P	3X3	IOU	8	MH	09/15/92	MH
62 T	149 / 150	147'SNAT	PT	09/15/92	RS	2'	KT	158	MH	09/15/92	MH
62 W	151 / 152	550'SNAT	PT	09/15/92	P	2X2	PT	227	MH	09/21/92	JI
62 X	154 / 155	580'SNAT	PT	09/11/92	P	2X2	SB	158	MH	09/21/92	JI
63 A	155 / 156	153'NSAT	PT	09/09/92	P	2X3	IOU	8	MH	09/10/92	MH

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
63 B	154 / 155	650'NSAT	PT	09/10/92	P	2X2	KT	158	JI	09/19/92	JCL
63 C	154 / 155	583' TO 576'NSAT	PT	09/09/92	P	2X6	IOU	8	MH	09/10/92	MH
63 D	154 / 161	@ SAT	PT	08/31/92	P	2X10	SS	4	TM	OCA	--
63 E	161 / 162	@ SAT	PT	08/31/92	P	2X2	SS	4	TM	OCA	--
63 F	161 / 162	INT W/163	PT	09/14/92	P	2X5	KL	162	LS	09/14/92	JI
63 G	161 / 163	214'NSAT	PT	09/14/92	P	2X9	KL	162	LS	09/14/92	JI
63 H	129 / 130	40'SNAT	PT	08/31/92	P	1X2	KL	162	MH	09/02/92	MH
63 I	164 / 165	580'SNAT	C	09/10/92	C	1X8	IOU	8	LS	09/18/92	JCL
63 J	--	< VOID >	--	--	--	--	--	--	--	--	--
63 K	157 / 164	1'SNAT	PT	09/03/92	P	2X2	PT	162	JCL	OCA	--
63 M	165 / 166	215' TO 220'SNAT	PT	09/16/92	GW	5'	SB	158	MH	09/18/92	LS
63 N	166 / 167	1'SNAT	PT	09/16/92	P	1X1	KT	158	MH	OCA	--
63 P	166 / 167	40'SNAT	PT	09/17/92	P	4X4	KT	158	MH	09/18/92	LS
63 Q	166 / 167	300'SNAT	PT	09/17/92	P	3X3	KT	158	MH	09/18/92	LS
63 R	166 / 167	475'SNAT	PT	09/17/92	P/RS	3X3/3'	KL	162	LS	09/18/92	LS
63 S	166 / 167	548'SNAT	BO	09/17/92	P	3X3	KL	162	LS	09/18/92	LS
63 T	166 / 167	557'SNAT	BO	09/17/92	P	2X2	KL	162	LS	09/18/92	LS
63 W	166 / 167	597'SNAT	BO	09/17/92	P	2X2	KL	162	LS	09/18/92	LS
63 X	166 / 167	607'SNAT	BO	09/17/92	P	2X3	KL	162	LS	09/18/92	LS
64 A	165 / 166	404'SNEOS	WS	09/17/92	P	2X5	KT	158	MH	09/18/92	LS
64 B	165 / 166	27'SNEOS	BO	09/16/92	P	1X2	KT	158	MH	09/18/92	LS
64 C	165 / 166	50'SNEOS	BO	09/16/92	P	2X6	SB	158	MH	09/18/92	LS
64 D	165 / 166	284'SNEOS	BO	09/17/92	P	1X1	SB	158	MH	09/18/92	LS
64 E	165 / 166	532'SNEOS	BO	09/17/92	P	2X3	KL	162	LS	09/18/92	JCL
64 F	165 / 166	237'SNEOS	WS	09/17/92	P	2X2	KL	162	LS	09/17/92	LS
64 G	165 / 166	122'SNEOS	BO	09/16/92	P	1X2	SB	158	MH	09/18/92	LS
64 H	165 / 166	143'SNEOS	BO	09/16/92	P	1X1	KT	158	MH	09/18/92	LS
64 I	165 / 166	175'SNEOS	BO	09/16/92	P	2X2	SB	158	MH	09/18/92	LS

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
64 J	165 / 166	190'SNEOS	BO	09/16/92	P	1X2	KT	158	MH	09/18/92	LS
64 K	165 / 166	195'SNEOS	BO	09/16/92	P	1X2	SB	158	MH	09/18/92	LS
64 M	165 / 166	200'SNEOS	BO	09/16/92	P	1X2	KT	158	MH	09/18/92	LS
64 N	165 / 166	490'SNEOS	BO	09/17/92	P	1X1	KL	162	LS	09/18/92	JCL
64 P	165 / 166	211'SNEOS	BO	09/16/92	P	2X10	KT	158	MH	09/18/92	LS
64 Q	165 / 166	222'SNEOS	BO	09/16/92	P	2X7	SB	158	MH	09/18/92	LS
64 R	166 / 167	237'SNEOS	DS-156	09/17/92	P	2X5	SB	158	MH	09/18/92	LS
64 S	166 / 167	434'SNEOS	DS-157	09/17/92	P	2X5	KL	162	LS	09/18/92	LS
64 T	165 / 166	522'SNEOS	DS-158	09/17/92	P	2X5	KL	162	LS	09/18/92	JCL
64 W	169	52'SNEOS,14'W	D	09/17/92	P	1X1	KT	158	MH	09/18/92	LS
64 X	169	53'SNEOS,15'W	D	09/17/92	P	2X2	SB	158	MH	09/18/92	LS
65 A	180 / 181	@CREST OF E SLOPE	BO	09/18/92	P	2X2	KT	158	LS	09/18/92	LS
65 B	168 / 183	390'SNEOS	DS-161	09/17/92	P	2X5	SS	8	MH	09/18/92	LS
65 C	177 / 183	20'N OF 178	DS-163	09/17/92	P	2X5	KT	158	MH	09/18/92	LS
65 D	168 / 183	50'SNEOS	DS-162	09/17/92	P	2X5	KT	158	MH	09/18/92	LS
65 E	179 / 180	INT W/183	BO	09/17/92	P	2X2	SS	8	MH	09/18/92	LS
65 F	179 / 183	17'N OF 180	BO	09/17/92	P	2X4	SS	8	MH	09/18/92	LS
65 G	176 / 177	INT W/183	PT	09/17/92	P	1X1	SB	158	MH	09/18/92	LS
65 H	174 / 175	INT W/183	PT	09/17/92	P	3X5	SB	158	MH	09/18/92	LS
65 I	169 / 171	INT W/183	BO	09/17/92	P	2X3	KT	158	MH	09/18/92	LS
65 J	162 / 184	@ CREST OF AT	WS	09/14/92	P	2X2	PT	227	JCL	09/14/92	JI
65 K	162 / 184	87'NSEOS	WS	09/04/92	P	2X2	SB	158	TM	09/14/92	JI
65 M	162 / 184	50' TO 87'NSEOS	FS	09/04/92	P	2X6	KT	158	TM	09/14/92	JI
65 N	162 / 184	135'NSEOS	PT	09/14/92	P	2X2	KL	162	LS	09/14/92	JI
65 P	162 / 163	INT W/184	T	09/14/92	P	2X3	KL	162	LS	09/22/92	JCL
65 Q	185 / 186	55'NSEOS	FM	09/04/92	P	2X5	PT	8	MH	09/22/92	JCL
65 R	104 / 185	300' TO 312'NSEOS	IO	09/04/92	C	2X12	SS	223	JI	09/22/92	JCL
65 S	184 / 185	290'NSEOS	DS-164	09/19/92	P	2X5	VV	8	LS	09/22/92	JCL

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
65 T	185 / 186	275'NSEOS	BO	09/21/92	P	1X2	VV	8	LS	09/22/92	JCL
65 W	185 / 186	280'NSEOS	D	09/21/92	P/RS	1X2/2'	VV	8	LS	09/22/92	JCL
65 X	186 / 187	43'NSEOS	WS	09/21/92	P	1X2	IOU	158	JI	09/22/92	JCL
66 A	167 / 168	491'SNEOS	DS-159	09/17/92	P	2X5	KL	162	LS	09/18/92	LS
66 B	171 / 173	65'WEEOS	DS-160	09/17/92	P	2X6	SB	158	MH	09/18/92	LS
66 C	173 / 174	10'WEEOS	BO	09/18/92	P	2X2	SS	8	MH	09/18/92	LS
66 D	174 / 175	10'WEEOS	BO	09/18/92	P	1X1	SB	158	LS	09/18/92	LS
66 E	178 / 179	35'WEEOS	FM	09/18/92	P	4X6	KT	158	MH	09/18/92	LS
66 F	157 / 164	54'SNEOS	BO	09/10/92	P	1X1	KL	162	MH	09/17/92	MH
66 G	157 / 164	540'SNEOS	DS-154	09/10/92	P	2X5	IOU	8	LS	09/19/92	JCL
66 H	164 / 165	620'SNEOS	DS-155	09/10/92	P	2X5	IOU	8	LS	09/18/92	JCL
66 I	157 / 164	50'SNEOS	DS-153	09/10/92	P	2X5	KL	162	MH	09/17/92	MH
66 J	157 / 164	380' TO 385'SNAT	FS	09/10/92	C	1X5	IOU	8	LS	09/19/92	LS
66 K	157 / 164	385' TO 465'SNAT	FS	09/10/92	RS	81'	IOU	8	LS	09/19/92	JCL
66 M	157 / 164	465' TO 480'SNAT	FS	09/10/92	C	1X2	IOU	8	LS	09/17/92	MH
66 N	157 / 164	480' TO 520'SNAT	FS	09/10/92	RS	30'	IOU	8	LS	09/19/92	JCL
66 P	157 / 164	566'SNAT TO SEOS	FS	09/10/92	P/RS	1X2/77'	IOU	8	LS	09/19/92	JCL
66 Q	157 / 164	650'SNAT	PT	09/10/92	P	2X2	SB	158	JI	09/19/92	JCL
66 R	164 / 165	580'SNAT TO NEOS	FS	09/10/92	RS	70'	KL	162	MH	09/17/92	MH
66 S	164 / 165	560'SNAT	FM	09/10/92	P	2X2	IOU	8	LS	09/18/92	JCL
66 T	164 / 165	2'SNAT	PT	09/04/92	P	2X3	PT	8	MH	09/17/92	MH
66 W	165 / 166	2'SNAT	PT	09/04/92	P	2X2	PT	8	MH	OCA	--
66 X	180 / 181	1'WEAT	PT	09/04/92	P	1X1	PT	8	MH	OCA	--
67 A	175 / 176	INT W/183	PT	09/17/92	P	1X1	SB	158	MH	09/18/92	LS
67 B	168 / 183	205'SNAT	PT	09/17/92	P	3X3	SB	158	MH	09/18/92	LS
67 C	169 / 183	@ NAT	PT	09/04/92	P	2X3	PT	8	MH	OCA	--
67 D	173 / 174	INT W/183	PT	09/17/92	P	1X2	KT	158	MH	09/18/92	LS
67 E	178 / 179	INT W/183	PT	09/17/92	P	1X2	SB	158	MH	09/18/92	LS

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
67 F	177 / 178	INT W/183	PT	09/17/92	P	1X2	KT	158	MH	09/18/92	LS
67 G	180 / 181	INT W/183	PT	09/18/92	P	1X2	SB	158	LS	09/18/92	LS
67 H	181 / 182	INT W/183	PT	09/17/92	P	2X2	SS	8	MH	09/18/92	LS
67 I	162 / 184	60'SNAT	PT	09/04/92	P	2X2	SB	158	TM	09/14/92	JI
67 J	--	< VOID >	--	--	--	--	--	--	--	--	--
67 K	163 / 184	INT W/103/104	FS	09/19/92	P	3X12	VV	8	LS	09/22/92	JCL
67 M	185 / 186	@ SAT	PT	09/14/92	P	1X2	PT	227	JCL	OCA	--
67 N	103 / 163	WEOS TO 17'E	WS	09/19/92	P	2X15	VV	8	LS	09/22/92	JCL
67 P	103 / 163	17'E TO EEOS	FS	09/19/92	RS	18'	VV	8	LS	09/22/92	JCL
67 Q	104 / 184	INT W/163	CO	09/19/92	P	3X3	VV	8	LS	09/22/92	JCL
67 R	104 / 185	NEOS TO SEOS	WS	09/19/92	RS	9'	VV	8	LS	09/22/92	JCL
67 S	104 / 185	INT W/105	CO	09/19/92	P/RS	4X6/6'	VV	8	LS	09/22/92	JCL
67 T	105 / 185	10'WEEOS	PT	09/19/92	P	1X2	VV	8	LS	09/22/92	JCL
67 W	119 / 120	140'NSAT	SI	09/11/92	P	2X2	KT	158	MH	09/14/92	JI
67 X	120 / 158	30'NSAT	DS-149	09/11/92	P	3X5	KT	158	MH	09/14/92	JI
68 A	186 / 187	57'NSEOS	FM	09/12/92	P	5X5	KL	162	MH	09/22/92	JCL
68 B	106 / 186	< VOID >	IO	--	--	--	--	--	--	--	--
68 C	185 / 186	123'NSEOS	DS-165	09/21/92	P	2X5	VV	8	LS	09/22/92	JCL
68 D	152 / 153	330'SNEOS	D	09/09/92	P	1X1	IOU	8	MH	09/15/92	LS
68 E	146 / 147	344'SNEOS	DSE-06	09/15/92	P	3X5	KT	158	MH	09/19/92	JCL
68 F	106 / 186	ENTIRE SEAM	IO	09/11/92	C/FUS	4X36	SKP	64	JI	09/11/92	JCL
68 G	186 / 68F	10'W OF 187	BO	09/19/92	P	2X2	IOU	162	LS	09/22/92	JCL
68 H	187 / 188	140'NSEOS	FM	09/21/92	P	2X3	IOU	158	JI	09/22/92	JCL
68 I	187 / 188	@ AT	WS	09/14/92	P	2X2	SN	227	JCL	OCA	--
68 J	185 / 186	INT W/105/68F	T	09/19/92	P/RS	3X4/2'	IOU	162	LS	09/22/92	JCL
68 K	188 / 189	83'NSEOS	BO	09/21/92	P	1X2	IOU	158	JI	09/22/92	JCL
68 M	187 / 188	50' TO 75'NSEOS	IO	09/11/92	C/FUS	3X65	SS	223	JI	09/22/92	JCL
68 N	188 / 68M	30'NTOE	BO	09/12/92	P	3X3	KL	162	MH	09/22/92	JCL

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY - POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
68 P	187 / 188	175'NSEOS	FM	09/21/92	P	2X4	VV	8	LS	09/22/92	JCL
68 Q	187 / 188	206'NSEOS	FM	09/21/92	P	2X4	VV	8	LS	09/22/92	JCL
68 R	122 / 187	ENTIRE SEAM	IO	09/11/92	C/FUS	4X34	SKP	64	JI	09/11/92	JCL
68 S	187 / 188	227'NSEOS	BO	09/21/92	P	1X8	VV	8	LS	09/22/92	JCL
68 T	188 / 189	300'NSEOS	DS-166	09/19/92	P	2X6	IOU	162	LS	09/22/92	JCL
68 W	189	@ AT,15'E	D	09/14/92	P	1X1	PT	227	JCL	OCA	--
68 X	189	@ AT,24'E	D	09/14/92	P	1X1	PT	227	JCL	OCA	--
69 A	148 / 149	52'SNAT	BO	09/08/92	P	1XZ	KL	162	JCL	09/10/92	MH
69 B	150	50'SNAT,11'E	D	09/09/92	P	1X3	KL	162	LS	09/10/92	MH
69 C	187	295'NSAT,5'W	D	09/14/92	P	5X6	IOU	8	LS	09/22/92	JCL
69 D	187 / 188	255' TO 270'NSAT	FS	09/12/92	P	2X2	KL	162	MH	09/22/92	JCL
69 E	187 / 188	290'NSAT	PT	09/14/92	P	1X3	IOU	8	LS	09/22/92	JCL
69 F	187 / 188	INT W/68M	PT	09/12/92	P	4X5	SN	162	MH	09/22/92	JCL
69 G	187 / 68M	NEOS TO 8'SNEOS	FS	09/12/92	P	2X5	KL	162	MH	09/22/92	JCL
69 H	189 / 190	69'NSEOS TO NEOS	FS	09/21/92	P/RS	2X2/225'	IOU/VV	158/8	JI	09/22/92	JCL
69 I	190 / 191	49' TO 52'NSAT	PT	09/12/92	P	3X6	KL	162	MH	09/22/92	JCL
69 J	125 / 190	INT W/191	PT	09/19/92	P	2X3	SP	158	LS	09/22/92	JCL
69 K	190 / 191	20'NSAT	PT	09/21/92	P	1X1	IOU	158	JI	09/22/92	LS
69 M	189 / 190	2'NSAT	PT	09/14/92	P	1X1	PT	227	JCL	OCA	--
69 N	188 / 189	2'NSAT	PT	09/14/92	P	1X1	SN	227	JCL	OCA	--
69 P	193 / 194	93'NSAT	PT	09/12/92	P	2X3	KL	162	MH	09/22/92	JCL
69 Q	193 / 194	54'NSAT	PT	09/12/92	P	2X4	KL	162	MH	09/22/92	JCL
69 R	193 / 194	SAT TO 15'NSAT	FS	09/21/92	P/RS	1X2/12'	IOU	158	JI	09/22/92	JCL
69 S	196 / 197	INT W/195	T	09/21/92	P	4X4	SN	162	JCL	09/22/92	JCL
69 T	196 / 197	INT W/198	T	09/21/92	P	2X4	PT	162	JCL	09/22/92	JCL
69 W	124 / 125	INT W/189/71I	T	09/19/92	P	2X4	IOU	162	LS	09/22/92	JCL
69 X	126 / 191	INT W/125	T	09/19/92	P	3X3	SP	158	LS	09/22/92	JCL
70 A	128 / 129	INT W/193/73E	T	09/19/92	P	3X7	SN	162	JCL	09/22/92	JCL

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
70 B	129 / 193	INT W/194/73E	T	09/19/92	P	5X6	SP	158	LS	09/22/92	JCL
70 C	129 / 130	INT W/194/195	T	09/19/92	P	3X7	SP	158	LS	09/22/92	JCL
70 D	130 / 131	< VOID >	-	--	--	--	--	--	--	--	--
70 E	131 / 132	INT W/197/198	T	09/19/92	P	3X4	SP	158	LS	09/22/92	JCL
70 F	132 / 133	INT W/198/199	T	09/19/92	RS	2X2/8'	SP	158	LS	09/22/92	JCL
70 G	199 / 200	AT TO 10'NSAT	PT	09/15/92	P	2X8	PT	227	MH	OCA	--
70 H	199 / 200	INT W/134/73S	T	09/19/92	P	4X5	SP	158	LS	09/22/92	JCL
70 I	133 / 199	INT W/134/73S	T	09/19/92	P	4X4	SP	158	LS	09/22/92	JCL
70 J	187 / 188	100'NSAT	D	09/12/92	P	2X3	KL	162	MH	09/22/92	JCL
70 K	136 / 147	335'SNAT	D	09/12/92	P	2X2	SB	158	MH	09/11/92	MH
70 M	188	55'NSAT,1'E	D	09/12/92	P	2X2	KL	162	MH	09/22/92	JCL
70 N	211 / 212	INT W/145/146	T	09/18/92	P	2X5	SKP	8	MH	09/22/92	JCL
70 P	212 / 213	1'NSAT	PT	09/16/92	P	1X1	SN	227	MH	OCA	--
70 Q	201 / 202	1'NSAT	PT	09/15/92	P	2X4	PT	227	MH	OCA	--
70 R	208 / 209	1'NSAT	PT	09/16/92	P	2X3	PT	227	JCL	OCA	--
70 S	209 / 210	1'NSAT	PT	09/16/92	P	1X1	SN	227	JCL	OCA	--
70 T	210 / 211	1'NSAT	PT	09/16/92	P	1X1	PT	227	JCL	OCA	--
70 W	148	70'SNAT	D	09/15/92	P	1X1	KT	158	MH	09/15/92	MH
70 X	149	60'SNAT	D	09/15/92	P	2X2	SB	158	MH	09/15/92	MH
71 A	189 / 190	55'NSEOS	BO	09/12/92	P	2X7	KL	162	MH	09/22/92	JCL
71 B	187 / 188	120'NSEOS	DS-167	09/21/92	P	2X5	VV	8	LS	09/22/92	JCL
71 C	187 / 188	250'NSEOS	DS-168	09/14/92	P	2X17	IOU	8	LS	09/22/92	JCL
71 D	187 / 188	50'NSEOS	WS	09/12/92	P	4X5	KL	162	MH	09/22/92	JCL
71 E	190 / 191	@ AT	FS	09/14/92	P/RS	2X3/3'	PT	227	JCL	OCA	--
71 F	191	10'NSEOS,16'E	D	09/15/92	P	1X1	SN	227	MH	OCA	--
71 G	191 / 192	@ AT	WS	09/15/92	P	2X3	PT	227	MH	OCA	--
71 H	188 / 189	INT W/123/124	T	09/19/92	P	3X6	IOU	162	LS	09/22/92	JCL
71 I	189 / 190	INT W/124/125	T	09/11/92	C/FUS	3X8	SKP	64	JI	09/11/92	JCL

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY - POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
71 J	189 / 71I	308'NSEOS	DS-169	09/19/92	P	4X6	IOU	162	LS	09/22/92	JCL
71 K	191 / 192	70'NSEOS	WS	09/12/92	P	2X2	KL	162	MH	09/22/92	JCL
71 M	190 / 191	253'NSEOS	WS	09/21/92	P	2X5	VV	8	LS	09/22/92	JCL
71 N	191 / 192	285'NSEOS	BO	09/21/92	P	2X3	VV	8	LS	09/22/92	JCL
71 P	106 / 68F	17'WEEOS	DS-170	09/19/92	P	2X5	IOU	162	LS	09/22/92	JCL
71 Q	187	175'NSEOS,7'W	D	09/22/92	P	2X3	IOU	162	LS	09/23/92	JCL
71 R	125 / 190	6'WEEOS	D	09/19/92	P	2X3	IOU	162	LS	09/22/92	JCL
71 S	192 / 193	258'NSEOS	BO	09/21/92	P	2X3	PT	162	JCL	09/22/92	JCL
71 T	126 / 191	12'EWEOS	BO	09/19/92	P	1X3	SN	162	JCL	09/22/92	JCL
71 W	192 / 193	148'NSEOS	BO	09/21/92	P	2X2	PT	162	JCL	09/22/92	JCL
71 X	192 / 193	56'NSEOS	BO	09/12/92	P	2X2	KL	162	MH	09/22/92	JCL
72 A	126 / 127	INT W/191/192	T	09/19/92	P	4X5	SN	162	JCL	09/22/92	JCL
72 B	127 / 128	INT W/192/193	T	09/19/92	P	4X7	SP	158	LS	09/22/92	JCL
72 C	194 / 195	1'NSAT	FS	09/15/92	P	2X4	SN	227	MH	OCA	--
72 D	195 / 196	5'NSAT	FS	09/15/92	P	1X1	PT	227	MH	OCA	--
72 E	198	@ SAT	EXT	09/15/92	C	3X34	SN/PT	227	MH	OCA	--
72 F	198 / 199	SAT TO 12'N	FS	09/15/92	P	2X3	SN	227	MH	OCA	--
72 G	106 / 122	< COVERED BY 72H >	--	--	--	--	--	--	--	--	--
72 H	186 / 187	240'NSEOS TO NEOS	FS	09/19/92	P	2X12	IOU	162	LS	09/22/92	JCL
72 I	186 / 187	SEOS TO 5'N	FS	09/14/92	P	2X2	PT	227	JCL	OCA	--
72 J	184 / 185	NSAT 3'	FS	09/14/92	P	2X2	PT	227	JCL	OCA	--
72 K	192 / 193	NSAT 2'	FS	09/15/92	P	2X2	PT	227	MH	OCA	--
72 M	193	17'NSAT,15'E	D	09/21/92	P	1X1	IOU	158	JI	09/22/92	JCL
72 N	193	13'NSAT,15'E	D	09/21/92	P	1X1	IOU	158	JI	09/22/92	JCL
72 P	193	8'NSAT,15'E	D	09/21/92	P	1X1	IOU	158	JI	09/22/92	JCL
72 Q	193	2'NSAT,15'E	D	09/15/92	P	1X1	PT	227	MH	OCA	--
72 R	196 / 198	5'NSAT	IO	09/15/92	P	2X2	SN	227	MH	OCA	--
72 S	200 / 201	3'NSAT	FS	09/15/92	P	2X2	SN	227	MH	OCA	--

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
72 T	134 / 135	INT W/200/201	FS	09/19/92	P/RS	2X4/5'	VV	8	LS	09/22/92	JCL
72 W	135 / 74A	INT W/136/201	FS	09/19/92	P/RS	2X2/3'	VV	8	LS	09/22/92	JCL
72 X	202 / 74A	INT W/136/201	FS	09/19/92	P	2X9	VV	8	LS	09/22/92	JCL
73 A	193 / 194	163'NSEOS	DS-171	09/21/92	P	2X6	PT	162	JCL	09/22/92	JCL
73 B	195 / 196	216'NSEOS	DS-172	09/21/92	P	2X9	PT	162	JCL	09/22/92	JCL
73 C	127 / 192	9'EWEOS	BO	09/19/92	P	2X3	SP	158	LS	09/22/92	JCL
73 D	194 / 195	288'NSEOS	DS-173	09/19/92	P	2X5	SP	158	LS	09/22/92	JCL
73 E	128 / 193	ENTIRE SEAM	IO	09/11/92	C/FUS	3X13	SKP	64	JI	09/11/92	JCL
73 F	129 / 194	7'EWEOS	D	09/19/92	P	2X2	SP	158	LS	09/22/92	JCL
73 G	196 / 198	16'NSEOS	BO	09/21/92	P	1X1	IOU	158	JI	09/22/92	JCL
73 H	196 / 198	37'NSEOS	BO	09/22/92	P	2X2	IOU	162	LS	09/23/92	JCL
73 I	196 / 198	56'NSEOS	FM	09/12/92	P	3X3	KL	162	MH	09/22/92	JCL
73 J	196 / 198	62'NSEOS	IO	09/22/92	P/RS	1X2/3'	IOU	162	LS	09/22/92	JCL
73 K	196 / 198	78'N OF SOS	DS-174	09/21/92	P	2X6	PT	162	JCL	09/23/92	LS
73 M	198 / 199	232'NSEOS	BO	09/21/92	GW	6"	PT	162	JCL	09/22/92	JCL
73 N	199 / 200	57'NSEOS	FM	09/21/92	P	3X4	PT	162	JCL	09/22/92	JCL
73 P	198 / 199	181'NSEOS	DS-175	09/21/92	P	2X6	PT	162	JCL	09/22/92	JCL
73 Q	132 / 198	12'EWEOS	DS-176	09/19/92	P	2X5	SP	158	LS	09/22/92	JCL
73 R	132 / 198	9'WEEOS	IO	09/19/92	P	3X5	SP	158	LS	09/22/92	JCL
73 S	134 / 199	ENTIRE SEAM	IO	09/11/92	C/FUS	3X10	SKP	64	JI	09/11/92	JCL
73 T	200 / 201	35'NSEOS	IO	09/23/92	P	2X3	PT	158	JCL	09/23/92	LS
73 W	200 / 201	30'NSEOS	D	09/23/92	P	1X1	PT	158	JCL	09/23/92	LS
73 X	200 / 201	25'NSEOS	BO	09/23/92	P	1X2	PT	158	JCL	09/23/92	LS
74 A	136 / 201	ENTIRE SEAM	IO	09/11/92	C/FUS	3X6	SKP	64	JI	09/12/92	JCL
74 B	202 / 203	< COVERED BY 74D >	--	--	--	--	--	--	--	--	--
74 C	201 / 202	242'NSEOS	DS-177	09/22/92	P	2X5	VV	8	LS	09/22/92	JCL
74 D	202 / 203	247'NSEOS	DS-178	09/21/92	P	2X11	PT	162	JCL	09/22/92	JCL
74 E	139 / 205	13'WEEOS	BO	09/19/92	P	2X3	SP	158	LS	09/22/92	JCL

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
74 F	203 / 204	200'NSEOS	DS-179	09/21/92	P	2X11	PT	162	JCL	09/22/92	JCL
74 G	204 / 205	60'NSEOS	DS-180	09/22/92	P	2X5	VV	8	LS	09/22/92	JCL
74 H	139 / 140	655' TO 663'SNEOS	IO	09/12/92	C/FUS	2X8	BS	246	JI	09/12/92	JCL
74 I	205 / 206	210'NSEOS	DS-181	09/22/92	P	2X5	VV	8	LS	09/22/92	JCL
74 J	208 / 209	100'NSEOS	DS-182	09/22/92	P	2X5	VV	8	LS	09/22/92	JCL
74 K	208 / 209	227'NSEOS	BO	09/22/92	P	2X3	VV	8	LS	09/22/92	JCL
74 M	208 / 209	236'NSEOS	BO	09/22/92	P	1X2	VV	8	LS	09/22/92	JCL
74 N	209 / 210	203'NSEOS	BO	09/22/92	P	1X1	VV	8	LS	09/22/92	JCL
74 P	209 / 210	209'NSEOS	BO	09/22/92	P/RS	2X3/6'	VV	8	LS	09/22/92	JCL
74 Q	209 / 210	61'NSEOS	FM	09/22/92	P	3X4	VV	8	LS	09/22/92	JCL
74 R	134 / 209	6'WEEOS	WS	09/18/92	P	1X1	SS	8	MH	09/22/92	JCL
74 S	143 / 209	8'EWEOS	BO	09/18/92	P	1X2	SS	8	MH	09/22/92	JCL
74 T	209 / 210	62'NSEOS	DS-183	09/22/92	P	2X5	VV	8	LS	09/22/92	JCL
74 W	210 / 211	238'NSEOS	DS-184	09/23/92	P	2X5	VV	8	LS	09/22/92	LS
74 X	211 / 212	57'NSEOS	BO	09/23/92	P	2X3	VV	8	LS	09/23/92	LS
75 A	136 / 137	INT W/202/203	T	09/19/92	P	4X4	VV	8	LS	09/22/92	JCL
75 B	204 / 205	SAT TO 2'N	PT	09/15/92	P	2X2	PT	227	MH	OCA	--
75 C	203 / 204	SAT TO 2'N	PT	09/15/92	P	2X2	PT	227	MH	OCA	--
75 D	202 / 203	SAT TO 4'N	PT	09/15/92	P	2X2	SN	227	MH	OCA	--
75 E	205 / 206	SAT TO 5'N	FS	09/15/92	P	2X3	SN	227	MH	OCA	--
75 F	207 / 208	SAT TO 2'N	PT	09/15/92	P	1X2	PT	227	MH	OCA	--
75 G	207 / 208	25'NSAT	PT	09/22/92	P	1X3	PT	158	LS	09/23/92	LS
75 H	206 / 74H	INT W/205/139/140	T	09/18/92	P	3X5	SS	8	MH	09/22/92	JCL
75 I	204 / 205	INT W/138/139	T	09/18/92	P	3X6	PT	227	MH	09/22/92	JCL
75 J	138 / 204	INT W/137/203	T	09/19/92	P/RS	2X3/3'	VV	8	LS	09/22/92	JCL
75 K	203 / 204	140'NSAT	PT	09/22/92	P	1X4	VV	8	LS	09/22/92	JCL
75 M	203 / 204	242'NSAT	PT	09/22/92	P	1X2	VV	8	LS	09/22/92	JCL
75 N	141 / 142	INT W/207/208	T	09/18/92	P	4X4	SS	8	MH	09/22/92	JCL

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
75 P	139 / 140	INT W/74H	T	09/19/92	P	2X3	SP	158	LS	09/22/92	JCL
75 Q	140 / 206	INT W/207	T	09/18/92	P	2X2	SS	8	MH	09/22/92	JCL
75 R	140 / 207	ENTIRE SEAM	FS	09/18/92	P	3X5	SS	8	MH	09/22/92	JCL
75 S	140 / 141	647'SNAT TO SEOS	PT	09/18/92	P	1X1	SS	8	MH	09/19/92	JCL
75 T	142 / 143	INT W/208/209	T	09/18/92	P	2X3	SS	8	MH	09/22/92	JCL
75 W	206 / 207	SAT TO 2'N	FS	09/15/92	P	1X1	PT	227	MH	OCA	--
75 X	143 / 144	INT W/209/210	T	09/18/92	P	2X4	SS	8	MH	09/22/92	JCL
76 A	145 / 211	INT W/77C/210	T	09/18/92	P	3X4	SS	8	MH	09/22/92	JCL
76 B	144 / 145	INT W/77C/210	T	09/18/92	P	3X4	SS	8	MH	09/22/92	JCL
76 C	211 / 212	SAT TO 4'N	PT	09/16/92	P/RS	1X1/1'	PT	227	JCL	OCA	--
76 D	146 / 212	INT W/213	PT/FS	09/18/92	P	2X6	PT	227	MH	09/22/92	JCL
76 E	124 / 125	525'SNAT	PT	09/14/92	P	2X4	IOU	8	LS	09/19/92	JCL
76 F	161	50'NSAT,9'E	D	09/14/92	P	1X1	KL	162	LS	09/22/92	JCL
76 G	187 / 188	INT W/68R	PT	09/14/92	P	2X4	IOU	8	LS	09/22/92	JCL
76 H	122 / 188	648'SNAT	FS	09/14/92	RS	3'	IOU	8	LS	09/22/92	JCL
76 I	122 / 123	INT W/188	PT	09/14/92	P	3X5	IOU	8	LS	09/22/92	JCL
76 J	102 / 103	INT W/161/163	PT	09/14/92	P	5X18	KL	162	LS	09/22/92	JCL
76 K	233 / 242	65'NSEOS	DS-201	09/16/92	P	2X5	PT	227	MH	09/16/92	JCL
76 M	234 / 244	@ AT	WS	09/17/92	P	1X1	KL	162	LS	OCA	--
76 N	166 / 167	450'SNAT	D	09/17/92	P	2X4	KL	162	LS	09/18/92	LS
76 P	166 / 167	475'SNAT	D	09/17/92	P	3X3	KL	162	LS	09/18/92	LS
76 Q	165 / 166	530'SNAT	D	09/17/92	P	1X1	KL	162	LS	09/18/92	JCL
76 R	175 / 176	INT W/183	T	09/17/92	P	1X1	KT	158	MH	09/18/92	LS
76 S	176	< VOID >	--	--	--	--	--	--	--	--	--
76 T	165 / 166	535'SNEOS	DS-158	09/18/92	P	2X6	KL	162	MH	09/18/92	JCL
76 W	166 / 167	@ SEOS	DS-158	09/18/92	P	2X5	KL	162	MH	09/18/92	LS
76 X	165 / 166	535' TO 515'SNEOS	FS	09/18/92	RS	120'	KL	162	MH	09/18/92	JCL
77 A	211 / 212	67'NSEOS	BO	09/23/92	P	2X7	VV	8	LS	09/23/92	LS

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
77 B	211 / 212	200'NSEOS	DS-185	09/23/92	P	2X5	VV	8	LS	09/22/92	LS
77 C	145 / 210	ENTIRE SEAM	IO	09/12/92	C/FUS	3X10	BS	246	JI	09/12/92	JCL
77 D	212 / 213	< COVERED BY 77E >	--	--	--	--	--	--	--	--	--
77 E	212 / 213	84'NSEOS	BO	09/23/92	P/RS	2X7/5'	VV	8	LS	09/22/92	LS
77 F	146 / 213	INT W/146	T	09/18/92	P	3X5	PT	227	MH	09/22/92	JCL
77 G	214 / 215	100'NSEOS	DS-186	09/23/92	P	2X2	IOU	162	LS	09/22/92	LS
77 H	147 / 213	7'WEEOS	DS-187	09/18/92	P	2X5	PT	227	MH	09/22/92	JCL
77 I	157 / 164	520' TO 535'SNEOS	FS	09/17/92	RS	12'	KL	162	LS	09/19/92	JCL
77 J	157 / 164	535' TO 566'SNEOS	FS	09/18/92	RS	30'	KL	162	MH	09/19/92	JCL
77 K	165 / 166	645'S OF ENEOS	DS-154	09/17/92	P	2X5	KL	162	LS	09/18/92	LS
77 M	165 / 166	645' TO 658'SNEOS	FS	09/17/92	RS	12'	KL	162	LS	09/18/92	LS
77 N	161 / 162	SEOS TO 40'N	FS	09/22/92	RS	36'	IOU	162	LS	09/22/92	JCL
77 P	216 / 217	235'NSEOS	FM	09/23/92	P	2X3	IOU	162	LS	09/23/92	LS
77 Q	216 / 217	78'NSEOS	FM	09/23/92	P	1X1	IOU	162	LS	09/23/92	LS
77 R	215 / 216	57'NSEOS	FM	09/23/92	C	2X23	IOU	162	LS	09/23/92	LS
77 S	215 / 216	< COVERED BY 77R >	--	--	--	--	--	--	--	--	--
77 T	215 / 216	< COVERED BY 77R >	--	--	--	--	--	--	--	--	--
77 W	215 / 216	< COVERED BY 85S >	--	--	--	--	--	--	--	--	--
77 X	215 / 216	103'NSEOS	BO	09/23/92	P	1X1	VV	8	LS	09/22/92	LS
78 A	201 / 202	152'NSEOS TO NEOS	FS	09/22/92	RS	200'	VV	8	LS	09/22/92	JCL
78 B	201 / 202	SEOS TO 87'N	FS	09/23/92	RS	87'	PT	158	LS	09/23/92	LS
78 C	147 / 213	INT W/148	T	09/18/92	P	2X3	SN	227	MH	09/22/92	JCL
78 D	148 / 214	INT W/213	T	09/18/92	P	2X4	SN	227	MH	09/22/92	JCL
78 E	148 / 214	INT W/215	T	09/18/92	P	3X3	SN	227	MH	09/22/92	JCL
78 F	214 / 215	58'NSAT	PT	09/23/92	P	2X2	IOU	162	LS	09/23/92	LS
78 G	214 / 215	110'NSAT TO NEOS	FS	09/23/92	P/RS	2X6/150'	VV	8	LS	09/22/92	LS
78 H	213 / 214	SAT TO 5'N	FS	09/16/92	P	1X1	PT	227	MH	OCA	--
78 I	214 / 215	SAT TO 5'N	FS	09/16/92	P	1X2	SN	227	MH	OCA	--

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
78 J	212 / 213	SAT TO 62'N	FS	09/23/92	P/RS	1X2/6'	VV	8	LS	09/22/92	LS
78 K	212 / 213	< COVERED BY 77E >	--	--	--	--	--	--	--	--	--
78 M	182 225	EAT TO 2'W	FS	09/18/92	P	1X1	SB	158	LS	OCA	--
78 N	208 / 209	96'NSAT	PT	09/22/92	P	2X2	VV	8	LS	09/22/92	JCL
78 P	208 / 209	SAT TO 53'N	FS	09/23/92	P/RS	2X3/50'	PT	158	LS	09/23/92	LS
78 Q	203 / 204	140' TO 156'NSAT	FS	09/22/92	P/RS	1X1/16'	VV	8	LS	09/22/92	JCL
78 R	186	EXT IN SAT	EXT	09/14/92	C	6X35	SN	227	JCL	OCA	--
78 S	193	EXT IN SAT	EXT	09/14/92	C	5X34	PT	227	MH	OCA	--
78 T	187	2'NSAT,2'W	SI	09/14/92	P	2X2	PT	227	JCL	OCA	--
78 W	187	2'NSAT,8'W	SI	09/14/92	P	2X2	PT	227	JCL	OCA	--
78 X	187	2'NSAT,18'W	SI	09/14/92	P	2X2	PT	227	JCL	OCA	--
79 A	138 / 139	40'NSAT	D	09/14/92	C	3X16	KT	158	MH	09/14/92	MH
79 B	191	10'NSAT	D	09/21/92	P	1X1	IOU	158	JI	09/22/92	LS
79 C	212 / 213	3'NSAT	D	09/16/92	P	1X1	SN	227	MH	OCA	--
79 D	166 / 232	17'E OF 224	D	09/16/92	P	2X3	SB	158	MH	09/16/92	LS
79 E	237 / 238	INT W/242	T	09/16/92	P	2X3	PT	227	MH	09/16/92	JCL
79 F	233 / 242	145'NSEOS	BO	09/16/92	P	2X4	SP	8	MH	09/16/92	LS
79 G	233 / 242	INT W/167/168	T	09/16/92	P	3X6	SP	8	MH	09/16/92	JCL
79 H	231 / 244	@ AT	WS	09/17/92	P	1X1	KL	162	LS	OCA	--
79 I	231 / 244	30'WEEOS	DS-199	09/17/92	P	2X5	SS	8	MH	09/18/92	LS
79 J	238 / 239	INT W/242	T	09/16/92	P	2X3	PT	227	MH	09/16/92	JCL
79 K	239 / 241	INT W/242	T	09/16/92	P	3X3	PT	227	MH	09/16/92	JCL
79 M	233 / 242	40'NSEOS	BO	09/16/92	P	2X2	SB	158	MH	09/16/92	JCL
79 N	241 / 242	60'NSEOS	BO	09/16/92	P	3X4	PT	227	MH	09/16/92	JCL
79 P	234 / 244	INT W/242	T	09/16/92	P	3X5	SP	8	MH	09/16/92	JCL
79 Q	231 / 244	50'WEEOS	FM	09/16/92	P	3X6	PT	227	MH	09/18/92	LS
79 R	242 / 244	INT W/231/168	T	09/16/92	P	5X5	SP	8	MH	09/16/92	JCL
79 S	241 / 242	24'NSEOS	DS-200	09/17/92	P	2X5	KL	162	LS	09/18/92	JCL

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
79 T	241 / 242	@ AT	WS	09/17/92	P	1X2	KL	162	LS	OCA	--
79 W	242	@ AT,4'E	D	09/17/92	P	1X2	KL	162	LS	OCA	--
79 X	165 / 166	237'SNAT	D	09/17/92	P	3X4	SB	158	MH	09/18/92	LS
80 A	217	263'NSAT,1'E	D	09/23/92	P	1X1	IOU	162	LS	09/23/92	LS
80 B	216	EXT. FOR ENTIRE AT	EXT	09/17/92	C	6X17	SN	227	LS	OCA	--
80 C	215 / 216	SAT TO 3'N	FS	09/16/92	P	2X2	PT	227	MH	OCA	--
80 D	215 / 216	180'N TO NEOS	FS	09/23/92	P/RS	2X5/100'	IOU	162	LS	09/23/92	LS
80 E	217 / 218	232'NSAT	PT	09/23/92	P	1X1	IOU	162	LS	09/23/92	LS
80 F	218 / 219	SAT TO 4'N	FS	09/17/92	P	1X1	SN	227	LS	OCA	--
80 G	217 / 218	SAT TO 4'N	FS	09/17/92	P	2X2	SN	227	LS	OCA	--
80 H	216 / 217	SAT TO 4'N	FS	09/17/92	P	1X2	SN	227	LS	OCA	--
80 I	221	4'NSAT,11'W	D	09/17/92	P	1X1	SN	227	LS	OCA	--
80 J	220	3'NSAT,11'W	D	09/17/92	P	1X1	PT	227	LS	OCA	--
80 K	149 / 81D	INT W/215/148	T	09/18/92	P	3X5	PT	227	MH	09/22/92	JCL
80 M	149 / 81D	INT W/215/151	T	09/18/92	P	3X4	PT	227	MH	09/22/92	JCL
80 N	215 / 81H	INT W/151/216	T	09/18/92	P	3X3	PT	227	MH	09/23/92	LS
80 P	215 / 81D	15'WEEOS	PT	09/18/92	P	2X3	PT	227	MH	09/22/92	JCL
80 Q	151 / 216	INT W/152/217	T	09/17/92	P	2X3	PT	227	LS	09/22/92	JCL
80 R	152 / 217	INT W/153/218	T	09/17/92	P	2X3	PT	227	LS	09/22/92	JCL
80 S	220 / 221	236'NSAT	PT	09/18/92	P	2X2	SB	158	MH	09/22/92	JCL
80 T	220 / 221	242'NSAT	PT	09/18/92	P	1X2	KT	158	MH	09/22/92	JCL
80 W	223 / 224	77'NSAT	PT	09/16/92	P	1X2	PT	227	MH	09/22/92	JCL
80 X	223 / 224	67'NSAT	PT	09/16/92	P	2X3	PT	227	MH	09/22/92	JCL
81 A	215 / 216	133'NSEOS	BO	09/23/92	P	2X6	IOU	162	LS	09/22/92	LS
81 B	148 / 214	ENTIRE SEAM	FS	09/18/92	RS	34'	PT/SN	227	MH	09/22/92	JCL
81 C	216 / 217	292'NSEOS	DS-188	09/17/92	P	2X5	PT	227	LS	09/22/92	JCL
81 D	149 / 215	ENTIRE SEAM	IO	09/15/92	C/FUS	3X34	BS	64	JI	09/15/92	JCL
81 E	217 / 218	218'NSEOS	BO	09/23/92	P	1X2	IOU	162	LS	09/23/92	LS

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
81 F	215 / 216	< COVERED BY 77R >	DS-189	--	--	--	--	--	--	--	--
81 G	218 / 219	101'NSEOS	BO	09/23/92	P	2X3	IOU	162	LS	09/23/92	LS
81 H	151 / 215	ENTIRE SEAM	IO	09/15/92	C/FUS	3X9	BS	64	JI	09/15/92	JCL
81 I	218 / 219	237'NSEOS	BO	09/23/92	P	1X2	IOU	162	LS	09/23/92	LS
81 J	218 / 219	285'NSEOS	BO	09/23/92	P	1X3	IOU	162	LS	09/23/92	LS
81 K	219 / 220	157'NSEOS	DS-190	09/21/92	P	2X6	PT	162	JCL	09/21/92	JCL
81 M	151 / 216	14'EWEOS	BO	09/17/92	P	1X1	PT	227	LS	09/22/92	JCL
81 N	218 / 219	225'NSEOS	DS-191	09/18/92	P	3X4	PT	227	MH	09/22/92	JCL
81 P	220 / 221	265'NSEOS	BO	09/18/92	P	1X1	SB	158	MH	09/22/92	JCL
81 Q	220 / 221	101'NSEOS	BO	09/18/92	P	1X2	KT	158	MH	09/22/92	JCL
81 R	221 / 222	62'NSEOS	FM	09/18/92	P	4X5	KT	158	MH	09/22/92	JCL
81 S	221 / 222	173'NSEOS	FM	09/18/92	P	5X5	SB	158	MH	09/22/92	JCL
81 T	220 / 221	50'NSEOS	FM	09/18/92	P	3X5	SB	158	MH	09/22/92	JCL
81 W	220 / 221	64'NSEOS	BO	09/18/92	C	2X7	KT	158	MH	09/22/92	JCL
81 X	220 / 221	74'NSEOS	BO	09/18/92	P	2X3	SB	158	MH	09/22/92	JCL
82 A	222 / 223	295'NSEOS	DS-192	09/16/92	P	2X4	SB	158	MH	09/22/92	JCL
82 B	223 / 224	118'NSEOS	BO	09/16/92	P	1X1	SN	227	MH	09/22/92	JCL
82 C	223 / 224	123'NSEOS	BO	09/16/92	P	2X5	PT	227	MH	09/22/92	JCL
82 D	156 / 220	ENTIRE SEAM	IO	09/15/92	C/FUS	3X9	BS	64	JI	09/15/92	JCL
82 E	165 / 224	12'EWEOS	BO	09/16/92	P	1X2	SB	158	MH	09/22/92	JCL
82 F	155 / 220	8'EWEOS	DS-193	09/17/92	P	2X5	PT	227	LS	09/22/92	JCL
82 G	223 / 224	100'NSEOS	DS-194	09/16/92	P	2X5	PT	227	MH	09/22/92	JCL
82 H	185 / 225	58'WEEOS	T	09/17/92	P	3X4	SS	8	MH	09/18/92	LS
82 I	185 / 225	47'WEEOS	FM	09/17/92	P	3X5	SS	8	MH	09/18/92	LS
82 J	185 / 225	33'WEEOS	BO	09/17/92	P	1X2	SS	8	MH	09/18/92	LS
82 K	185 / 225	29'WEEOS	BO	09/17/92	P	1X1	SS	8	MH	09/18/92	LS
82 M	227 / 228	40'WEEOS	DS-195	09/17/92	P	2X5	SS	8	MH	09/18/92	LS
82 N	227 / 228	55'WEEOS	FTS	09/17/92	P	1X2	SS	8	MH	09/18/92	LS

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
82 P	227 / 228	45'WEEOS TO WEOS	FS	09/17/92	RS	43'	SKP	8	MH	09/18/92	LS
82 Q	228 / 229	55'WEEOS	FM	09/17/92	P	4X5	SS	8	MH	09/18/92	LS
82 R	228 / 229	66'WEEOS	DS-196	09/17/92	P	2X5	SS	8	MH	09/18/92	LS
82 S	230 / 231	24'WEEOS	IO	09/17/92	P	2X3	SS	8	MH	09/18/92	LS
82 T	230 / 231	11'WEEOS	BO	09/17/92	P	1X3	KL	162	LS	09/18/92	LS
82 W	224 / 232	@ AT	FS	09/17/92	P	2X2	PT	227	LS	OCA	--
82 X	224 / 232	56'NSEOS	BO	09/16/92	P	2X3	PT	227	MH	09/16/92	LS
83 A	223 / 224	56'NSAT	PT	09/16/92	P	1X2	PT	227	MH	09/22/92	JCL
83 B	223 / 224	SAT TO 3'N	FS	09/17/92	P	2X2	PT	227	LS	OCA	--
83 C	222 / 223	SAT TO 3'N	FS	09/17/92	P	1X2	PT	227	LS	OCA	--
83 D	221 / 222	SAT TO 3'N	FS	09/17/92	P	1X1	PT	227	LS	OCA	--
83 E	220 / 221	SAT TO 2'N	FS	09/17/92	P	2X2	PT	227	LS	OCA	--
83 F	219 / 220	SAT TO 3'N	FS	09/17/92	P	2X2	SN	227	LS	OCA	--
83 G	223 / 224	INT W/164/165	T	09/16/92	P	3X4	KT	158	MH	09/22/92	JCL
83 H	164	1'NSEOS,8'W	D	09/16/92	P	1X1	SB	158	MH	09/22/92	JCL
83 I	152 / 218	SEOS TO NEOS	FS	09/17/92	P	1X2	PT	227	LS	09/22/92	JCL
83 J	153 / 154	INT W218/219	T	09/17/92	P	3X4	PT	227	LS	09/22/92	JCL
83 K	154 / 219	INT W/220	T	09/17/92	P	3X3	PT	227	LS	09/22/92	JCL
83 M	154 / 155	INT W/220	T	09/17/92	P	2X3	PT	227	LS	09/22/92	JCL
83 N	155 / 220	INT W/82D/156	T	09/16/92	P	5X5	KT	158	MH	09/22/92	JCL
83 P	156 / 221	INT W/82D/220	T	09/16/92	P	4X6	SB	158	MH	09/22/92	JCL
83 Q	154 / 155	4'NSEOS	PT	09/17/92	P	1X1	PT	227	LS	09/22/92	JCL
83 R	157 / 164	INT W/222/223	T	09/16/92	P	4X6	KT	158	MH	09/22/92	JCL
83 S	156 / 157	INT W/221/222	T	09/16/92	P	4X4	KT	158	MH	09/22/92	JCL
83 T	226	4'EWEOS,12'S	SI	09/16/92	P	2X2	SP	8	LS	09/23/92	LS
83 W	225 / 226	INT W/168	T	09/16/92	P	1X2	SP	8	LS	09/23/92	LS
83 X	226 / 227	INT W/168	T	09/16/92	P	2X2	SP	8	LS	09/23/92	LS
84 A	232 / 233	55'NSEOS	FM	09/16/92	P	2X2	PT	227	MH	09/16/92	LS

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
84 B	232 / 233	77'NSEOS	FM	09/16/92	P	2X3	PT	227	MH	09/16/92	LS
84 C	224 / 232	INT W/165/166	T	09/16/92	P	2X6	KT	158	MH	09/16/92	LS
84 D	236 / 237	@ AT	WS	09/17/92	P	1X1	KL	162	LS	OCA	--
84 E	235 / 236	@ AT	WS	09/17/92	P	1X1	KL	162	LS	OCA	--
84 F	234 / 235	@ AT	WS	09/17/92	P	1X1	KL	162	LS	OCA	--
84 G	235 / 236	65'WEEOS	FM	09/16/92	P	3X4	SB	158	MH	09/16/92	JCL
84 H	232 / 233	100'NSEOS	DS-197	09/16/92	P	2X5	PT	227	MH	09/16/92	LS
84 I	235 / 236	60'WEEOS	DS-198	09/16/92	P	2X6	KT	158	MH	09/16/92	JCL
84 J	237 / 238	@ AT	WS	09/17/92	P	1X1	KL	162	LS	OCA	--
84 K	238 / 239	@ AT	WS	09/17/92	P	1X1	KL	162	LS	OCA	--
84 M	237 / 238	60'WEEOS	FM	09/16/92	P	2X4	SN	227	MH	09/16/92	JCL
84 N	239 / 240	@ AT	EXT	09/17/92	P	6X15	KL	162	LS	OCA	--
84 P	232 / 233	INT W/167	T	09/16/92	P	3X4	SB	158	MH	09/23/92	LS
84 Q	166 / 167	INT W/232	T	09/16/92	P	3X5	KT	158	MH	09/23/92	LS
84 R	239 / 241	15'EWEOS	BO	09/16/92	P	2X4	PT	227	MH	09/16/92	JCL
84 S	234 / 235	INT W/242	T	09/16/92	P	1X2	KT	158	MH	09/16/92	JCL
84 T	241 / 243	@ AT	WS	09/17/92	P	1X1	KL	162	LS	OCA	--
84 W	236 / 237	INT W/242	T	09/16/92	P	2X2	SB	158	MH	09/16/92	JCL
84 X	235 / 236	INT W/242	T	09/16/92	P	2X3	SP	8	MH	09/16/92	JCL
85 A	165 / 166	521'SNEOS	FTS	09/18/92	P	1X1	KL	162	MH	09/18/92	JCL
85 B	165 / 166	518'SNEOS	FTS	09/18/92	P	1X1	KL	162	MH	09/18/92	JCL
85 C	165 / 166	514'SNEOS	FTS	09/18/92	P	1X1	KL	162	MH	09/18/92	JCL
85 D	165 / 166	485'SNEOS	FTS	09/18/92	P	1X1	KL	162	MH	09/18/92	JCL
85 E	165 / 166	468'SNEOS	FTS	09/18/92	P	1X1	KL	162	MH	09/18/92	JCL
85 F	165 / 166	450'SNEOS	FTS	09/18/92	P	1X1	KL	162	MH	09/18/92	JCL
85 G	103 / 104	INT W/163	T	09/19/92	P	4X4	VV	8	LS	09/22/92	JCL
85 H	187 / 188	125'NSEOS	PT	09/21/92	P	2X2	VV	8	LS	09/22/92	JCL
85 I	188	80'NSEOS,12'W	D	09/12/92	P	1X1	KL	162	MH	09/22/92	JCL

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY - POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
85 J	189 / 190	100'NSEOS	PT	09/21/92	P	2X3	IOU	158	JI	09/22/92	JCL
85 K	198 / 199	9' TO 13'NSEOS	FS	09/21/92	RS	4'	IOU	158	JI	09/22/92	JCL
85 M	201 / 202	242'NSEOS	FTS	09/21/92	P	2X5	VV	8	LS	09/22/92	JCL
85 N	117	250'NSEOS	EE	09/22/92	C	21X35	IOU	162	LS	09/23/92	JCL
85 P	215 / 216	< COVERED BY 77R >	DS-189	--	--	--	--	--	--	--	--
85 Q	215 / 216	< COVERED BY 77R >	--	--	--	--	--	--	--	--	--
85 R	215 / 216	75' TO 85'NSEOS	FS	09/23/92	RS	10'	IOU	162	LS	09/23/92	LS
85 S	215 / 216	85'NSEOS	DS-189	09/23/92	P	2X12	VV	8	LS	09/23/92	LS
85 T	187	263'NSEOS,6'W	D	09/22/92	P	1X2	IOU	162	LS	09/23/92	JCL
86 A	183 / 225	INT W/168	T	09/16/92	P	3X5	SS	8	MH	09/18/92	LS
86 B	227 / 228	INT W/168	T	09/16/92	P	2X3	SP	8	LS	09/18/92	LS
86 C	228 / 229	INT W/168	T	09/16/92	P	2X3	SP	8	LS	09/18/92	LS
86 D	229 / 230	INT W/168	T	09/17/92	P	3X3	SS	8	MH	09/23/92	LS
86 E	230 / 231	INT W/168	T	09/17/92	P	2X3	SS	8	MH	09/18/92	LS
86 F	230 / 231	EAT TO 4'W	FS	09/17/92	P	2X2	KL	162	LS	OCA	--
86 G	229 / 230	EAT TO 4'W	FS	09/16/92	P	1X1	KL	162	MH	OCA	--
86 H	228 / 229	EAT TO 4'W	FS	09/16/92	P	1X1	KL	162	MH	OCA	--
86 I	227 / 228	EAT TO 4'W	FS	09/16/92	P	1X1	KL	162	MH	OCA	--
86 J	226 / 227	EAT TO 4'W	FS	09/18/92	P	1X1	KT	158	LS	OCA	--
86 K	225 / 226	EAT TO 4'W	FS	09/16/92	P	1X1	KL	162	LS	OCA	--
86 M	232	2'NSAT,1'W	D	09/17/92	P	2X2	PT	227	LS	OCA	--
86 N	232	8'NSAT,1'W	D	09/17/92	P	1X1	PT	227	LS	09/18/92	JCL
86 P	232	15'NSAT,1'W	D	09/17/92	P	1X1	PT	227	LS	09/18/92	JCL
86 Q	232	20'NSAT,1'W	D	09/17/92	P	1X1	PT	227	LS	09/18/92	JCL
86 R	239 / 240	INT W/241	T	09/16/92	P	5X5	KT	158	MH	09/16/92	JCL
86 S	233 / 242	172'NSAT	PT	09/16/92	P	2X5	SP	8	MH	09/16/92	LS
86 T	241 / 242	AT TO 2'NW	FS	09/17/92	P	1X2	KL	162	LS	OCA	--
86 W	233 / 242	SAT TO 3'N	FS	09/17/92	P	2X3	PT	227	LS	OCA	--

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY - POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
86 X	168 / 231	< VOID >	--	--	--	--	--	--	--	--	--
87 A	201 / 202	87'NSAT	PT	09/22/92	P	1X2	VV	8	LS	09/22/92	JCL
87 B	201 / 202	87'NSAT TO SAT	FS	09/23/92	RS	80'	PT	158	LS	09/22/92	JCL
87 C	201 / 202	152'NSAT	PT	09/22/92	P	1X1	VV	8	LS	09/22/92	JCL
87 D	201 / 202	234'NSAT	PT	09/21/92	P	2X2	VV	8	LS	09/22/92	JCL
87 E	201 / 202	270'NSAT	PT	09/22/92	P	1X2	VV	8	LS	09/22/92	JCL
87 F	205	240'NSAT,12'W	EE	09/22/92	P	5X7	VV	8	LS	09/22/92	JCL
87 G	184	65'NSAT,17'W	D	09/22/92	P	1X1	IOU	162	LS	09/23/92	JCL
87 H	185	55'NSAT,15'W	D	09/22/92	P	2X6	IOU	162	LS	09/23/92	JCL
87 I	185	60'NSAT,12'W	D	09/22/92	P	1X	IOU	162	LS	09/23/92	JCL
87 J	186	60'NSAT,6'E	D	09/22/92	P	1X1	IOU	162	LS	09/23/92	JCL
87 K	187	60'NSAT,6'E	D	09/22/92	P	1X1	IOU	162	LS	09/23/92	JCL
87 M	188	60'NSAT,3'E	D	09/22/92	P	1X1	IOU	162	LS	09/23/92	JCL
87 N	193	60'NSAT,18'W	D	09/22/92	P	2X2	IOU	162	LS	09/23/92	JCL
87 P	196	60'NSAT,10'E	D	09/22/92	P	1X	IOU	162	LS	09/23/92	JCL
87 Q	215	85'NSAT,15'E	D	09/22/92	P	1X1	IOU	162	LS	09/22/92	LS
87 R	214	8O'NSAT,15'W	D	09/22/92	P	1X1	IOU	162	LS	09/22/92	LS
87 S	210	295'NSAT,1'E	D	09/23/92	P	1X1	VV	8	LS	09/22/92	LS
87 T	188	40'NSAT,17'E	D	09/23/92	P	1X1	PT	158	LS	09/23/92	LS
87 W	214 / 215	68'NSAT	PT	09/23/92	P	2X2	IOU	162	LS	09/22/92	LS
87 X	214 / 215	111'NSAT	PT	09/23/92	P	2X2	IOU	162	LS	09/22/92	LS

APPENDIX J

GEOMEMBRANE REPAIR SUMMARIES

December 1992

927-4003

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
1 A	1 / 23	1'EWAT	PT	08/11/92	P	1X1	KT	227	JCL	OCA	--
1 B	16 / 17	INT W/25	T	08/11/92	P	2X2	SN	162	JCL	08/15/92	JCL
1 C	15 / 16	INT W/25	T	08/11/92	P	1X1	SN	162	JCL	08/15/92	JCL
1 D	14 / 15	INT W/25	T	08/07/92	P	1X1	KT	227	TD	08/15/92	JCL
1 E	13 / 14	INT W/25	T	08/11/92	P	1X1	SN	162	JCL	08/15/92	JCL
1 F	12 / 13	INT W/25	T	08/11/92	P	1X1	SN	162	JCL	08/15/92	JCL
1 G	11 / 12	INT W/25	T	08/11/92	P	1X1	SN	162	JCL	08/15/92	JCL
1 H	10 / 11	INT W/25	T	08/11/92	P	3X3	SN	162	JCL	08/15/92	JCL
1 I	9 / 10	INT W/25	T	08/11/92	P	2X2	SN	162	JCL	08/15/92	JCL
1 J	8 / 9	INT W/25	T	08/11/92	P	2X2	SN	162	JCL	08/15/92	JCL
1 K	7 / 8	INT W/25	T	08/11/92	P	2X3	SN	162	JCL	08/15/92	JCL
1 M	6 / 7	INT W/25	T	08/10/92	P	3X5	SN	162	JCL	08/15/92	JCL
1 N	5 / 6	INT W/25	T	08/10/92	P	2X3	SN	162	JCL	08/15/92	JCL
1 P	4 / 5	INT W/25	T	08/10/92	P	2X2	SN	162	JCL	08/15/92	JCL
1 Q	3 / 4	INT W/25	T	08/10/92	P	2X1	SN	162	JCL	08/15/92	JCL
1 R	2 / 3	INT W/25	T	08/10/92	P	2X4	SN	162	JCL	08/15/92	JCL
1 S	1 / 2	INT W/25	T	08/10/92	P	2X3	SN	162	JCL	08/15/92	JCL
2 A	1 / 2	1'EWAT	PT	08/11/92	P	1X2	BS	227	JCL	OCA	--
2 B	5 / 6	9'WTOE	PT	08/11/92	P	2X5	SN	162	JCL	08/15/92	JCL
2 C	5 / 6	1'EWAT	PT	08/11/92	P	2X2	BS	227	JCL	OCA	--
2 D	6 / 7	1'EWAT	PT	08/11/92	P	2X2	KT	227	JCL	OCA	--
2 E	10 / 11	1'EWAT	PT	08/11/92	P	1X1	KT	227	JCL	OCA	--
2 F	11 / 12	1'EWAT	PT	08/11/92	P	1X1	BS	227	JCL	OCA	--
2 G	12 / 13	1'EWAT	PT	08/11/92	P	1X1	KT	227	JCL	OCA	--
2 H	13 / 14	23'WTOE	PT	08/11/92	P	2X3	KT	227	JCL	08/15/92	JCL
2 I	14 / 15	1'EWAT	PT	08/11/92	P	1X1	KT	227	JCL	OCA	--
2 J	15 / 16	28'WTOE	PT	08/11/92	P	1X3	KT	227	JCL	08/15/92	JCL
2 K	15 / 16	1'EWAT	PT	08/11/92	P	1X1	KT	227	JCL	OCA	--

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY - POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
2 M	16 / 17	< COVERED BY 5I >	FS	--	--	--	--	--	--	--	--
2 N	17 / 18	1'EWAT	PT	08/11/92	P	1X1	KT	227	JCL	OCA	--
2 P	18 / 19	1'EWAT	PT	08/11/92	P	1X1	BS	227	JCL	OCA	--
2 Q	20 / 21	9'WTOE	PT	08/11/92	P	1X2	BS	227	JCL	08/17/92	MH
2 R	20 / 21	1'EWAT	PT	08/12/92	P	1X1	PT	162	CPB	OCA	--
2 S	20 / 21	1'E OF CREST	PT	08/12/92	P	2X2	PT	162	CPB	OCA	--
2 T	23 / 24	INT W/22	PT	08/10/92	P	4X4	KT	227	JCL	08/15/92	JCL
2 W	23 / 24	1'EWAT	PT	08/10/92	P	4X4	BS	227	JCL	OCA	--
2 X	22 / 23	7'WEEOS	PT	08/10/92	P	2X4	SN	162	JCL	08/15/92	JCL
3 A	17 / 18	18' TO 35'EWAT	BO	08/11/92	P	3X16	KT	227	JCL	08/15/92	JCL
3 B	19 / 20	13'E OF TOE	BO	08/11/92	P	2X3	SN	162	JCL	08/17/92	MH
3 C	19 / 20	10' TO 19'WTOE	BO	08/11/92	P	2X10	KT	227	JCL	08/17/92	MH
3 D	--	< VOID >	--	--	--	--	--	--	--	--	--
3 E	--	< VOID >	--	--	--	--	--	--	--	--	--
3 F	20 / 21	16'E OF CREST	BO	08/11/92	P	1X1	BS	227	JCL	08/17/92	MH
3 G	22 / 24	22/23/24 TO 23'N	IO	08/10/92	P	3X28	KT	227	JCL	08/15/92	JCL
3 H	2 / 3	9'WEEOS	DS-01	08/08/92	P	3X5	BS	227	TD	08/15/92	JCL
3 I	1 / 2	9'WEEOS	DS-02	08/08/92	P	3X5	KT	227	TD	08/15/92	JCL
3 J	18 / 19	44'WEEOS	DS-04	08/07/92	P	2X5	BS	227	TD	08/17/92	MH
3 K	19 / 20	43'WEEOS	DS-06	08/07/92	P	2X5	KT	227	TD	08/17/92	MH
3 M	15 / 25	3'S OF 14/15/25	DS-05	08/07/92	P	3X6	BS	227	TD	08/15/92	JCL
3 N	3 / 4	9'WEEOS	DS-03	08/08/92	P	3X5	KT	227	TD	08/15/92	JCL
3 P	25 / 26	47'SNEOS	DS-07	08/08/92	P	3X5	BS	227	TD	08/15/92	JCL
3 Q	26 / 27	522'SNEOS	DS-08	08/07/92	P	3X5	KT	227	TD	08/15/92	JCL
3 R	27 / 28	531'SNEOS	DS-09	08/07/92	P	3X5	BS	227	TD	08/17/92	MH
3 S	27 / 28	345'SNEOS	DS-10	08/08/92	P	3X5	KT	227	TD	08/17/92	MH
3 T	27 / 28	248'SNEOS	DS-11	08/08/92	P	3X5	BS	227	TD	08/17/92	MH
3 W	28 / 29	63'SNEOS	DS-12	08/08/92	P	3X5	KT	227	TD	08/15/92	JCL

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
4 A	22 / 23	1'WTOE	PT	08/10/92	P	3X4	BS	227	JCL	08/15/92	JCL
4 B	22 / 23	INT W/25	PT	08/10/92	P	2X5	SN	162	JCL	08/15/92	JCL
4 C	22 / 23	2X TO 4B	FS	08/10/92	GW	6"	SN	162	JCL	08/15/92	JCL
4 D	22 / 25	1'SNAT	PT	08/10/92	P	1X2	KT	227	JCL	OCA	--
4 E	1 / 23	INT W/25	T	08/10/92	P	3X3	SN	162	JCL	08/15/92	JCL
4 F	10 / 25	21'S OF 9/10/25	PT	08/11/92	P	2X2	SN	162	JCL	08/15/92	JCL
4 G	20 / 21	2R TO 2S	FS	08/12/92	RS	6'	PT	162	CPB	OCA	--
4 H	--	< VOID >	--	--	--	--	--	--	--	--	--
4 I	25 / 26	6'SNAT	PT	08/10/92	P	2X2	BS	227	JCL	OCA	--
4 J	25 / 26	4I TO NAT	FS	08/10/92	GW	6"	BS	227	JCL	OCA	--
4 K	25 / 26	341'SNAT	PT	08/13/92	P	3X3	BS	227	JCL	08/15/92	JCL
4 M	25 / 26	396'SNAT	PT	08/13/92	P	3X4	BS	227	JCL	08/15/92	JCL
4 N	25 / 26	538'SNAT	PT	08/13/92	P	2X6	BS	227	JCL	08/15/92	JCL
4 P	26 / 27	536'SNAT	PT	08/13/92	P	5X6	BS	227	JCL	08/15/92	JCL
4 Q	26 / 27	518'SNAT	PT	08/13/92	P	2X2	BS	227	JCL	08/15/92	JCL
4 R	26 / 27	340' TO 344'SNAT	FS	08/13/92	P	2X10	BS	227	JCL	08/15/92	JCL
4 S	26 / 27	362'SNAT	PT	08/13/92	P	2X3	BS	227	JCL	08/15/92	JCL
4 T	26 / 27	403'SNAT	PT	08/13/92	P	2X3	BS	227	JCL	08/15/92	JCL
4 W	26 / 27	426'SNAT	PT	08/13/92	P	2X2	BS	227	JCL	08/15/92	JCL
4 X	26 / 27	251'SNAT	PT	08/13/92	P	3X4	BS	227	JCL	08/15/92	JCL
5 A	26 / 27	244'SNAT	PT	08/13/92	P	2X3	BS	227	JCL	08/15/92	JCL
5 B	26 / 27	205'SNAT	PT	08/13/92	P	2X3	BS	227	JCL	08/15/92	JCL
5 C	26 / 27	1'SNAT	PT	08/10/92	P	1X2	KT	227	JCL	OCA	--
5 D	27 / 28	645'SNAT	PT	08/13/92	P	2x6	SN	162	JCL	08/17/92	MH
5 E	27 / 28	620'SNAT	PT	08/13/92	P	3X7	PT	162	JCL	08/17/92	MH
5 F	27 / 28	475'SNAT	PT	08/13/92	P	3X3	BS	227	JCL	08/17/92	MH
5 G	27 / 28	340'SNAT	PT	08/13/92	P	3X4	BS	227	JCL	08/17/92	MH
5 H	27 / 28	1'SNAT	PT	08/10/92	P	2X2	BS	227	JCL	OCA	--

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
5 I	16 / 17	WAT TO 12'E	FS	08/11/92	P	2X13	KT	227	JCL	08/15/92	JCL
5 J	28 / 29	265'SNAT	PT	08/13/92	P	3X4	BS	227	JCL	08/17/92	MH
5 K	28 / 29	238'SNAT	PT	08/13/92	P	3X5	BS	227	JCL	08/17/92	MH
5 M	28 / 29	195'SNAT	PT	08/13/92	P	2X2	BS	227	JCL	08/17/92	MH
5 N	28 / 29	407'SNAT	PT	08/13/92	P	2X5	BS	227	JCL	08/17/92	MH
5 P	28 / 29	462'SNAT	PT	08/13/92	P	2X2	BS	227	JCL	08/17/92	MH
5 Q	28 / 29	382'SNAT	PT	08/13/92	P	2X2	BS	227	JCL	08/17/92	MH
5 R	28 / 29	315'SNAT	PT	08/13/92	P	1X2	BS	227	JCL	08/17/92	MH
5 S	28 / 29	308'SNAT	PT	08/13/92	P	1X2	BS	227	JCL	08/17/92	MH
5 T	28 / 29	485'SNAT	PT	08/13/92	P	2X6	BS	227	JCL	08/17/92	MH
5 W	28 / 29	653'SNAT	PT	08/13/92	P	2X3	SN	162	JCL	08/17/92	MH
5 X	28 / 29	470'SNAT	PT	08/13/92	P	2X2	BS	227	JCL	08/17/92	MH
6 A	28 / 29	77'SNAT	PT	08/13/92	P	2X3	BS	227	JCL	08/15/92	JCL
6 B	28 / 29	4'SNAT	PT	08/10/92	P	3X4	KT	227	JCL	OCA	--
6 C	29 / 30	INT W/30EXT	PT	08/10/92	P	3X4	BS	227	JCL	OCA	--
6 D	29 / 30	262'SNAT	PT	08/14/92	P	3X5	BS	227	TD	08/17/92	MH
6 E	29 / 30	400'SNAT	PT	08/14/92	P	3X5	BS	227	TD	08/17/92	MH
6 F	29 / 30	< COVERED BY 17X >	--	--	--	--	--	--	--	--	--
6 G	30 / 31	341'SNAT	PT	08/14/92	P	2X2	BS	227	TD	08/17/92	MH
6 H	30 / 31	221'SNAT	PT	08/14/92	P	1X1	BS	227	TD	08/17/92	MH
6 I	30 / 31	INT W/30ext	PT	08/10/92	P	2X3	KT	227	JCL	OCA	--
6 J	31 / 32	1'SNAT	PT	08/10/92	P	1X2	SN	162	JCL	OCA	--
6 K	31 / 32	18'SNAT	PT	08/10/92	P	2X3	SN	162	JCL	08/18/92	TD
6 M	31 / 32	36'SNAT	PT	08/17/92	P	3X3	BS	162	LS	08/18/92	TD
6 N	31 / 32	96'SNAT	PT	08/14/92	P	4X4	BS	227	TD	08/18/92	TD
6 P	31 / 32	107'SNAT	PT	08/14/92	P	1X1	BS	227	TD	08/18/92	TD
6 Q	31 / 32	132'SNAT	PT	08/14/92	P	1X1	BS	227	TD	08/17/92	MH
6 R	31 / 32	241'SNAT	PT	08/15/92	P	3X3	SP	158	TD	08/17/92	MH

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
6 S	31 / 32	401'SNAT	PT	08/14/92	P	2X7	SP	158	TD	08/17/92	MH
6 T	31 / 32	422'SNAT	PT	08/14/92	P	3X4	SP	158	TD	08/17/92	MH
6 W	31 / 32	422'S TO 427'SNAT	FS	08/14/92	RS	5'	SP	158	TD	08/17/92	MH
6 X	31 / 32	427'SNAT	PT	08/14/92	P	2X2	SP	158	TD	08/17/92	MH
7 A	30 / 31	607'SNEOS	DS-14	08/14/92	P	2X6	SN	162	JCL	08/17/92	MH
7 B	30 / 31	53'SNEOS	DS-15	08/08/92	P	3X5	BS	227	TD	08/18/92	TD
7 C	30 / 31	400'SNEOS	DS-16	08/08/92	P	3X6	KT	227	TD	08/17/92	MH
7 D	30 / 31	300'SNEOS	DS-17	08/08/92	P	3X5	SN	162	TD	08/17/92	MH
7 E	31 / 32	557'SNEOS	DS-18	08/14/92	P	3X6	SP	158	TD	08/17/92	MH
7 F	31 / 32	340'SNEOS	DS-19	08/08/92	P	2X6	SN	162	TD	08/17/92	MH
7 G	32 / 33	168'SNEOS	DS-20	08/08/92	P	3X5	SN	162	TD	08/17/92	MH
7 H	29 / 30	403'SNEOS	DS-13	08/07/92	P	3X5	KT	227	TD	08/17/92	MH
7 I	32 / 33	583'SNEOS	DS-21	08/14/92	P	3X6	SP	158	TD	08/17/92	MH
7 J	33 / 34	426'SNEOS	DS-22	08/08/92	P	3X5	SN	162	TD	08/18/92	TD
7 K	34 / 35	563'SNEOS	DS-23	08/08/92	P	3X5	SN	162	TD	08/18/92	TD
7 M	34 / 35	340'SNEOS	DS-24	08/08/92	P	3X5	SN	162	TD	08/18/92	TD
7 N	34 / 35	155'SNEOS	DS-25	08/08/92	P	3X5	SN	162	TD	08/18/92	TD
7 P	35 / 36	405'SNEOS	DS-26	08/08/92	P	3X5	SN	162	TD	08/18/92	TD
7 Q	35 / 36	80'SNEOS	DS-27	08/08/92	P	3X5	SN	162	TD	08/18/92	TD
7 R	36 / 37	192'SNEOS	DS-28	08/08/92	P	3X5	SN	162	TD	08/18/92	TD
7 S	36 / 37	410'SNEOS	DS-29	08/08/92	P	3X5	SN	162	TD	08/18/92	TD
7 T	37 / 38	57'SNEOS	DS-30	08/08/92	P	3X6	SKP	158	JCL	08/18/92	TD
7 W	37 / 38	464'SNEOS	DS-31	08/08/92	P	3X5	SN	162	TD	08/18/92	TD
8 A	37	85'SNAT,10'E	BS	08/08/92	P	7X12	SKP	158	JCL	08/26/92	MH
8 B	37	80'SNAT,10'E	BS	08/22/92	C	6X6	KL	162	JI	08/26/92	MH
8 C	21 / 40	@ TOE	PT	08/11/92	P	2X5	SN	162	JCL	08/17/92	MH
8 D	21 / 40	5'E OF AT	PT	08/12/92	P	1X1	PT	162	CPB	OCA	--
8 E	21 / 40	AT TO 5'E	FS	08/12/92	RS	8'	PT	162	CPB	OCA	--

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
8 F	39 / 40	5'E OF AT	PT	08/12/92	P	1X1	PT	162	CPB	OCA	--
8 G	39 / 40	1'E OF AT	PT	08/12/92	P	1X1	PT	162	CPB	OCA	--
8 H	39 / 40	5' TO 1'E OF AT	FS	08/12/92	RS	24"	PT	162	CPB	OCA	--
8 I	42 / 44	@ AT	PT	08/12/92	P	2X3	PT	162	CPB	OCA	--
8 J	41 / 42	30'E OF AT	PT	08/12/92	P	2X3	PT	162	CPB	08/17/92	MH
8 K	43 / 44	2'N OF AT	PT	08/12/92	P	3X7	PT	162	CPB	OCA	--
8 M	42 / 43	INT W/44	T	08/12/92	P	2X2	PT	162	CPB	08/17/92	MH
8 N	43 / 44	2'N OF AT TO AT	FS	08/12/92	RS	6'	PT	162	CPB	OCA	--
8 P	43 / 44	< COVERED BY 8K >	--	--	--	--	--	--	--	--	--
8 Q	17 / 25	INT W/43	T	08/11/92	P	3X4	SN	162	JCL	08/15/92	JCL
8 R	25 / 43	INT W/46	T	08/13/92	P	3X5	PT	162	JCL	08/15/92	JCL
8 S	43 / 46	127'N OF AT	PT	08/11/92	P	2X2	SN	162	JCL	08/17/92	MH
8 T	43 / 45	INT W/46	T	08/11/92	P	4X4	SN	162	JCL	08/17/92	MH
8 W	43 / 45	@ TOE	PT	08/13/92	P	2X3	PT	162	JCL	08/17/92	MH
8 X	43 / 45	@ AT	PT	08/12/92	P	2X4	PT	162	CPB	OCA	--
9 A	31 / 32	450'SNAT	PT	08/14/92	P	2X4	SP	158	TD	08/17/92	MH
9 B	31 / 32	492'SNAT	PT	08/14/92	P	2X2	SP	158	TD	08/17/92	MH
9 C	--	< VOID >	--	--	--	--	--	--	--	--	--
9 D	31 / 32	533'SNAT	PT	08/14/92	P	1X1	SP	158	TD	08/17/92	MH
9 E	31 / 32	533'S TO 539'SNAT	FS	08/14/92	RS	5'	SP	158	TD	08/17/92	MH
9 F	31 / 32	539'SNAT	PT	08/14/92	P	3X3	SP	158	TD	08/17/92	MH
9 G	31 / 32	578'SNAT	FM	08/14/92	P	3X6	SP	158	TD	08/17/92	MH
9 H	31 / 32	550'SNAT	PT	08/14/92	P	1X1	SP	158	TD	08/17/92	MH
9 I	31 / 32	589'SNAT	PT	08/14/92	P	2X2	SP	158	TD	08/17/92	MH
9 J	31 / 32	620'SNAT	PT	08/14/92	P	2X2	SP	158	TD	08/17/92	MH
9 K	32 / 33	550'SNAT	PT	08/14/92	P	2X2	SP	158	TD	08/17/92	MH
9 M	32 / 33	439'SNAT	PT	08/15/92	P	1X1	SP	158	TD	08/17/92	MH
9 N	32 / 33	420'SNAT	FM	08/15/92	P	3X3	SP	158	TD	08/17/92	MH

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
9 P	32 / 33	400'SNAT	FM	08/15/92	P	4X4	SP	158	TD	08/17/92	MH
9 Q	32 / 33	350'SNAT	FS	08/15/92	P	3X6	SP	158	TD	08/17/92	MH
9 R	32 / 33	285'SNAT	FS	08/15/92	P	3X7	SP	158	TD	08/17/92	MH
9 S	32 / 33	244'SNAT	PT	08/15/92	P	2X2	SP	158	TD	08/17/92	MH
9 T	33 / 34	7'SNAT	PT	08/10/92	P	1X1	SN	162	JCL	OCA	--
9 W	33 / 34	NAT TO 7'SNAT	FS	08/10/92	RS	7'	SN	162	JCL	OCA	--
9 X	33 / 34	237'SNAT	PT	08/15/92	P	3X3	SP	158	TD	08/18/92	TD
10 A	34 / 35	407'SNAT	PT	08/15/92	P	2X2	SP	158	TD	08/18/92	TD
10 B	34 / 35	11'SNAT	PT	08/10/92	P	2X2	SN	162	JCL	08/18/92	TD
10 C	34 / 35	NAT TO 11'S	FS	08/10/92	GW	6"	SN	162	JCL	OCA	--
10 D	34 / 35	620'SNAT	PT	08/17/92	P	1X2	BS	162	LS	08/18/92	TD
10 E	35 / 36	382'SNAT	PT	08/15/92	P	2X6	SP	158	TD	08/18/92	TD
10 F	35 / 36	423'SNAT	PT	08/15/92	P	2X2	SP	158	TD	08/18/92	TD
10 G	35 / 36	362'SNAT	PT	08/15/92	P	3X3	SP	158	TD	08/18/92	TD
10 H	35 / 36	NAT TO 7'S	FS	08/10/92	GW	6"	SN	162	JCL	OCA	--
10 I	35 / 36	7'SNAT	PT	08/10/92	P	1X1	SN	162	JCL	08/18/92	TD
10 J	36 / 37	360'SNAT	PT	08/15/92	P	3X3	SP	158	TD	08/18/92	TD
10 K	36 / 37	1'SNAT	PT	08/10/92	P	1X1	SN	162	JCL	OCA	--
10 M	37 / 38	314'SNAT	PT	08/17/92	P	3X3	BS	162	LS	08/18/92	TD
10 N	37 / 38	1'SNAT	PT	08/10/92	P	1X1	SN	162	JCL	OCA	--
10 P	37 / 38	343'SNAT	PT	08/17/92	P	1X1	BS	162	LS	08/18/92	TD
10 Q	37 / 38	465'SNAT	PT	08/17/92	P	2X4	BS	162	LS	08/18/92	TD
10 R	37 / 38	387'SNAT	PT	08/17/92	P	1X1	BS	162	LS	08/18/92	TD
10 S	37 / 38	359'SNAT	FS	08/17/92	P	2X3	BS	162	LS	08/18/92	TD
10 T	32 / 33	35'SNAT	HT	08/18/92	P	2X5	BS	162	TD	08/18/92	TD
10 W	31 / 32	646'SNAT	BO	08/14/92	RS	6"	SP	158	TD	08/17/92	MH
10 X	31 / 32	597'SNAT	BO	08/14/92	P	1X1	SP	158	TD	08/17/92	MH
11 A	33 / 34	4'SNAT	PT	08/10/92	P	2X2	SN	162	JCL	OCA	--

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GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
11 B	33 / 34	NAT TO 4'S	FS	08/10/92	RS	4'	SN	162	JCL	OCA	--
11 C	34 / 35	NAT TO 4'S	FS	08/10/92	P	2X1	SN	162	JCL	OCA	--
11 D	35 / 36	NAT TO 1'S	FS	08/10/92	P	1X1	SN	162	JCL	OCA	--
11 E	25 / 26	NAT TO 2'S	FS	08/10/92	P	2X2	BS	227	JCL	OCA	--
11 F	22	NW CORNER @ AT	EXT	08/10/92	C	4X12	BS	227	JCL	OCA	--
11 G	25	NW CORNER @ AT	EXT	08/10/92	C	5X23	BS	227	JCL	OCA	--
11 H	26 / 27	NAT	FS	08/10/92	RS	2'	BS	227	JCL	OCA	--
11 I	29	NAT	EXT	08/10/92	C	8X35	BS	227	JCL	OCA	--
11 J	33	NAT 6"S	EE	08/10/92	P	1X1	SN	162	JCL	OCA	--
11 K	33	6'SNAT	D	08/10/92	P	1X2	SN	162	JCL	OCA	--
11 M	33	12'SNAT	D	08/10/92	P	1X1	SN	162	JCL	08/18/92	TD
11 N	29 / 30	13'SNAT	PT	08/10/92	P	2X3	BS	227	JCL	08/18/92	TD
11 P	30	7'SNAT/EXT	EXT	08/21/92	P	2X34	SN	4	MH	OCA	--
11 Q	28 / 29	1'SNAT	PT	08/10/92	P	1X1	KT	227	JCL	OCA	--
11 R	30 / 31	NAT TO 6'S	PT	08/10/92	GW	6"	KT	227	JCL	OCA	--
11 S	29 / 30	NAT TO 6'S	PT	08/10/92	GW	6"	BS	227	JCL	OCA	--
11 T	28 / 29	NAT TO 6'S	PT	08/10/92	GW	6"	BS	227	JCL	OCA	--
11 W	26 / 27	4'SNAT	PT	08/10/92	GW	6"	KT	227	JCL	OCA	--
11 X	26 / 27	7'SNAT	PT	08/10/92	P	2X2	KT	227	JCL	OCA	--
12 A	43 / 45	19'NSEOS	DS-32	08/13/92	P	2X6	PT	162	JCL	08/17/92	MH
12 B	25 / 46	619'SNEOS	DS-33	08/13/92	P	2X7	SN	162	JCL	08/15/92	JCL
12 C	27 / 46	425' TO 324'NSEOS	IO	08/10/92	C	2X101	SS	246	JI	08/10/92	TD
12 D	45 / 47	65'NSEOS	DS-34	08/13/92	P	2X5	SN	162	JCL	08/17/92	MH
12 E	27 / 46	INT W/48 TO 6'N	IO	08/13/92	C	3X9	PT	162	JCL	08/15/92	JCL
12 F	26 / 46	ENTIRE SEAM	IO	08/10/92	C	4X34	SS	246	JI	08/10/92	TD
12 G	49 / 50	< VOID >	--	--	--	--	--	--	--	--	--
12 H	51 / 52	300'NSEOS	DS-36	08/14/92	P	2X6	PT	162	JCL	08/17/92	MH
12 I	50 / 52	62'NSEOS	BO	08/14/92	P	2X4	PT	162	JCL	08/17/92	MH

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GEOMEMBRANE REPAIR SUMMARY - POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
12 J	50 / 52	80'NSEOS	BO	08/14/92	P	1X1	PT	162	JCL	08/17/92	MH
12 K	52 / 53	268'NSEOS	DS-37	08/14/92	P	2X6	SN	162	JCL	08/17/92	MH
12 M	54 / 55	182'NSEOS	DS-38	08/14/92	P	2X2	PT	162	JCL	08/17/92	MH
12 N	53 / 54	129'NSEOS	DS-39	08/14/92	P	2X4	PT	162	JCL	08/17/92	MH
12 P	33 / 55	7'E OF 33/55/56	DS-40	08/14/92	P	2X5	PT	162	LS	08/17/92	MH
12 Q	33	658'SNEOS, 4'W	D	08/14/92	P	1X1	PT	162	LS	08/17/92	MH
12 R	57 / 58	42'NSEOS	DS-41	08/15/92	P	2X5	PT	162	LS	08/18/92	TD
12 S	59 / 61	72'NSEOS	DS-42	08/15/92	P	2X4	PT	162	LS	08/17/92	MH
12 T	63	205'NSEOS, 7'E	D	08/17/92	P	1X1	KT	158	LS	08/18/92	TD
12 W	62 / 63	17'EWEOS	BO	08/17/92	P	1X1	SB	158	LS	08/18/92	TD
12 X	37	669'SNEOS, 9'E	D	08/17/92	P	1X1	KT	158	LS	08/17/92	MH
13 A	43 / 45	30'N OF AT	PT	08/13/92	P	3X3	PT	162	JCL	08/17/92	MH
13 B	12C / 46	285'N OF AT	PT	08/13/92	P	4X4	PT	162	JCL	08/15/92	JCL
13 C	12C / 46	315'N OF AT	PT	08/13/92	P	4X5	SN	162	JCL	08/15/92	JCL
13 D	27 / 48	23'W OF 27/46/48	PT	08/13/92	P	2X3	SN	162	JCL	08/15/92	JCL
13 E	47 / 48	INT W/49	T	08/13/92	P	2X3	PT	162	JCL	08/17/92	MH
13 F	46 / 47	INT W/48	T	08/13/92	P	2X2	PT	162	JCL	08/17/92	MH
13 G	45 / 46	INT W/47	T	08/13/92	P	2X3	SN	162	JCL	08/17/92	MH
13 H	45 / 47	@ AT	PT	08/12/92	P/RS	2X2/6'	PT	162	CPB	OCA	--
13 I	47 / 49	85'N OF AT	PT	08/13/92	P	1X2	PT	162	JCL	08/17/92	MH
13 J	47 / 49	17'S OF 47/48/49	PT	08/13/92	P	2X3	SN	162	JCL	08/17/92	MH
13 K	28 / 48	INT W/49	PT	08/13/92	P	3X3	SN	162	JCL	08/17/92	MH
13 M	49 / 50	INT W/51	PT	08/13/92	P	2X7	SN	162	JCL	08/17/92	MH
13 N	29 / 51	INT W/52	PT	08/14/92	P	2X5	SN	162	JCL	08/17/92	MH
13 P	49 / 50	@ AT	PT	08/12/92	P/RS	2X3/3'	PT	162	CPB	OCA	--
13 Q	49 / 50	@ TOE	PT	08/14/92	P	2X3	PT	162	JCL	08/17/92	MH
13 R	47 / 49	11'N OF AT	PT	08/12/92	P	1X2	PT	162	CPB	08/17/92	MH
13 S	47 / 49	@ AT	PT	08/12/92	P	2X3	PT	162	CPB	OCA	--

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
13 T	50 / 51	INT W/52	PT	08/14/92	P	1X1	PT	162	JCL	08/17/92	MH
13 W	50 / 52	141'N OF AT	PT	08/14/92	P	2X4	PT	162	JCL	08/17/92	MH
13 X	50 / 52	@ AT	PT	08/12/92	P	4X4	SS	162	TD	OCA	--
14 A	66 / 67	420'SNAT	PT	08/20/92	P	1X1	KT	158	TD	08/22/92	TD
14 B	66 / 67	370'SNAT	PT	08/20/92	P	3X12	KT	158	TD	08/22/92	TD
14 C	66 / 67	343'SNAT	PT	08/20/92	P	3X4	SB	158	TD	08/22/92	TD
14 D	65 / 66	315'SNAT	PT	08/21/92	P	2X3	SB	158	MH	08/22/92	TD
14 E	65 / 66	245'SNAT	PT	08/21/92	P	3X5	SB	158	MH	08/22/92	TD
14 F	65 / 66	180'SNAT	PT	08/21/92	P	3X10	KL	162	TD	08/22/92	MH
14 G	65 / 66	147'SNAT	PT	08/21/92	P	3X10	KL	162	TD	08/22/92	MH
14 H	65 / 66	120'SNAT	PT	08/21/92	P	3X6	KL	162	TD	08/22/92	MH
14 I	65 / 66	100' TO 120'SNAT	FS	08/21/92	RS	13'	KL	162	TD	08/22/92	MH
14 J	65 / 66	100'SNAT	PT	08/21/92	P	2X5	KL	162	TD	08/22/92	MH
14 K	66 / 67	@ NAT	PT	08/18/92	P	1X1	BS	162	TD	OCA	--
14 M	65 / 66	@ NAT	PT	08/18/92	P	2X4	BS	162	TD	OCA	--
14 N	65 / 66	30'SNAT	PT	08/21/92	P	3X4	KL	162	TD	08/22/92	MH
14 P	65 / 66	70'SNAT	PT	08/21/92	P	3X5	KL	162	TD	08/22/92	MH
14 Q	67 / 68	360'SNAT	PT	08/20/92	P	2X2	SB	158	TD	08/22/92	TD
14 R	68 / 69	323'SNAT	PT	08/20/92	P	2X3	SB	158	TD	08/22/92	TD
14 S	68 / 69	347'SNAT	PT	08/20/92	P	2X3	KT	158	TD	08/22/92	TD
14 T	68 / 69	365'SNAT	PT	08/20/92	P	3X6	SB	158	TD	08/22/92	TD
14 W	68 / 69	440'SNAT	PT	08/21/92	P	2X2	KT	158	MH	08/22/92	TD
14 X	68 / 69	440' TO 445'SNAT	FS	08/21/92	RS	4'	SB	158	MH	08/22/92	TD
15 A	33 / 34	267'SNAT	PT	08/15/92	P	2X2	SP	158	TD	08/18/92	TD
15 B	33 / 34	332'SNAT	PT	08/15/92	P	3X4	SP	158	TD	08/18/92	TD
15 C	33 / 34	342'SNAT	PT	08/15/92	P	3X3	SP	158	TD	08/18/92	TD
15 D	33 / 34	412'SNAT	PT	08/15/92	P	3X3	SP	158	LS	08/18/92	TD
15 E	33 / 34	434'SNAT	PT	08/15/92	P	2X2	SP	158	TD	08/18/92	TD

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GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
15 F	31 / 32	523'S OF ANT	BO	08/14/92	P	1X1	SP	158	TD	08/17/92	MH
15 G	31 / 32	509'SNAT	BO	08/14/92	P	1X1	SP	158	TD	08/17/92	MH
15 H	34 / 35	585'SNAT	BO	08/17/92	P	1X1	BS	162	LS	08/18/92	TD
15 I	34 / 35	592'SNAT	BO	08/17/92	P	1X2	BS	162	LS	08/18/92	TD
15 J	34 / 35	595'SNAT	BO	08/17/92	P	1X1	BS	162	LS	08/18/92	TD
15 K	34 / 35	604'SNAT	BO	08/17/92	P	1X1	BS	162	LS	08/18/92	TD
15 M	36	475'SNAT,6'E	SI	08/15/92	P	1X1	SP	158	TD	08/18/92	TD
15 N	17 / 18	INT W/43	PT	08/11/92	P	2X3	SN	162	JCL	08/15/92	JCL
15 P	18 / 19	INT W/43	PT	08/11/92	P	2X2	SN	162	JCL	08/17/92	MH
15 Q	18 / 19	INT W/43	PT	08/11/92	P	3X3	SN	162	JCL	08/17/92	MH
15 R	20 / 21	INT W/43	PT	08/11/92	P	2X3	SN	162	JCL	08/17/92	MH
15 S	21 / 39	INT W/43	PT	08/11/92	P	2X3	SN	162	JCL	08/17/92	MH
15 T	39 / 43	125'NSAT	PT	08/11/92	P	1X1	SN	162	JCL	08/17/92	MH
15 W	39 / 40	INT W/43	PT	08/11/92	P	1X1	SN	162	JCL	08/17/92	MH
16 A	25	3'SNAT,4'E	PT	08/10/92	P	1X1	BS	227	JCL	OCA	--
16 B	25	1'SNAT,16'E	PT	08/10/92	P	2X2	KT	227	JCL	OCA	--
16 C	25	9'SNAT,16'E	MD	08/10/92	P	2X2	KT	227	JCL	OCA	--
16 D	32 / 33	3'SNAT	MD	08/10/92	P	3X5	SN	162	JCL	OCA	--
16 E	32 / 33	NAT TO 3'S	MD	08/10/92	GW	6"	SN	162	JCL	OCA	--
16 F	1	48'EWAT,16'N	PT	08/21/92	GW	1'	PT	4	MH	08/22/92	TD
16 G	25	110'SNAT,16'E	FS	08/10/92	P	3X12	SN	162	JCL	08/15/92	JCL
16 H	25	90'SNAT,6'E	D	08/10/92	GW	6"	SN	162	JCL	08/15/92	JCL
16 I	9 / 10	8'EWAT	BO	08/11/92	P	1X1	BS	227	JCL	OCA	--
16 J	24	30'SE OF NWAT,3'N	D	08/10/92	P	1X1	KT	227	JCL	08/15/92	JCL
16 K	17 / 25	ENTIRE SEAM	FS	08/11/92	GW	18"	SN	162	JCL	08/15/92	JCL
16 M	40 / 41	INT W/43	PT	08/11/92	P	2X2	SN	162	JCL	08/17/92	MH
16 N	41 / 42	INT W/43	PT	08/11/92	P	2X2	SN	162	JCL	08/17/92	MH
16 P	39 / 40	48'EWAT	PT	08/11/92	P	1X1	SN	162	JCL	08/17/92	MH

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GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
16 Q	39 / 40	40'EWAT	PT	08/11/92	P	1X1	SN	162	JCL	08/17/92	MH
16 R	46 / 47	149'NSAT	D	08/11/92	P	1X1	SN	162	JCL	08/17/92	MH
16 S	46 / 47	121'NSAT	PT	08/11/92	P	2X4	SN	162	JCL	08/17/92	MH
17 A	29 / 51	< COVERED BY 5W >	--	--	--	--	--	--	--	--	--
17 B	28 / 51	ENTIRE SEAM	FS	08/13/92	GW	4'	SN	162	JCL	08/17/92	MH
17 C	28 / 49	INT W/51	PT	08/13/92	P	3X3	SN	162	JCL	08/17/92	MH
17 D	28 / 49	17C TO 17E	FS	08/13/92	P	3X5	SN	162	JCL	08/17/92	MH
17 E	28 / 49	9'WEEOS	D	08/13/92	P	2X4	SN	162	JCL	08/17/92	MH
17 F	28 / 49	18'WEEOS	D	08/13/92	P	1X2	PT	162	JCL	08/17/92	MH
17 G	28 / 49	6'EWEOS	D	08/13/92	RS	4'	SN	162	JCL	08/17/92	MH
17 H	58 / 59	SAT TO 4'N	FS	08/12/92	RS	3'	SS	162	TD	OCA	--
17 I	59 / 61	SAT TO 2'N	FS	08/12/92	RS	1'	SS	162	TD	OCA	--
17 J	45	1'S OF 46,12'W	ID	08/13/92	P	2X3	SN	162	JCL	08/17/92	MH
17 K	46 / 47	162'S OF AT	BO	08/13/92	P	1X1	SN	162	JCL	08/17/92	MH
17 M	46 / 47	178'S OF AT	BO	08/13/92	P	1X1	SN	162	JCL	08/17/92	MH
17 N	76	168'S OF AT,7'W	D	08/18/92	P	2X2	SB	158	MH	08/18/92	TD
17 P	76	160'S OF AT,1'E	D	08/18/92	P	1X1	SB	158	TD	08/18/92	TD
17 Q	76	158'S OF AT,1'E	D	08/18/92	P	1X1	KT	158	TD	08/18/92	TD
17 R	76	156'S OF AT,1'E	PT/D	08/18/92	P	2X8	KT	158	TD	08/18/92	TD
17 S	61	150'S OF AT,6'E	D	08/15/92	P	1X1	PT	162	LS	08/17/92	MH
17 T	28 / 48	310'S OF AT	FS	08/13/92	RS	10'	SN	162	JCL	08/17/92	MH
17 W	49 / 50	276'S OF AT	DS-35	08/13/92	P	2X5	SN	162	JCL	08/17/92	MH
17 X	29 / 30	516'N OF AT	PT	08/13/92	P	2X4	BS	227	JCL	08/17/92	MH
18 A	68 / 69	445'SNAT	PT	08/21/92	P	2X3	KT	158	MH	08/22/92	TD
18 B	67 / 68	@ NAT	PT	08/18/92	P	2X2	BS	162	TD	OCA	--
18 C	68 / 69	@ NAT	PT	08/18/92	P	2X2	BS	162	TD	OCA	--
18 D		< VOID >	--	--	--	--	--	--	--	--	--
18 E	68 / 69	25'SNAT	PT	08/21/92	P	3X6	KL	162	TD	08/22/92	MH

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY - POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
18 F	68 / 69	45'SNAT	PT	08/21/92	P	3X7	KL	162	TD	08/22/92	MH
18 G	68 / 69	100' TO 105'SNAT	FS	08/21/92	P	3X7	KL	162	TD	08/22/92	MH
18 H	68 / 69	105'SNAT	PT	08/21/92	P	2X6	KL	162	TD	08/28/92	TM
18 I	68 / 69	100'SNAT	PT	08/21/92	P	2X4	KL	162	TD	08/22/92	MH
18 J	68 / 69	65'SNAT	PT	08/21/92	P	3X6	KL	162	TD	08/22/92	MH
18 K	68 / 69	55' TO 65'SNAT	FS	08/21/92	RS	5'	KL	162	TD	08/22/92	MH
18 M	68 / 69	55'SNAT	PT	08/21/92	P	3X6	KL	162	TD	08/22/92	MH
18 N	69 / 70	323'SNAT	PT	08/20/92	P	3X3	KT	158	TD	08/22/92	TD
18 P	69 / 70	16' TO 20'SNAT	FS	08/22/92	GW	2'	KL	162	JI	08/25/92	JCL
18 Q	69 / 70	20'SNAT	PT	08/22/92	P	2X2	KL	162	JI	08/25/92	JCL
18 R	69 / 70	16'SNAT	PT	08/22/92	P	2X3	KL	162	JI	08/25/92	JCL
18 S	69 / 70	@ NAT	PT	08/18/92	P	2X2	KL	162	MH	OCA	--
18 T	70 / 71	353'SNAT	PT	08/21/92	P	2X3	SB	158	MH	08/22/92	TD
18 W	70 / 71	< COVERED BY 18X >	--	--	--	--	--	--	--	--	--
18 X	70 / 71	610' TO 615'SNAT	FS	08/22/92	P	2X6	KT	158	LS	08/28/92	TM
19 A	30 / 31	INT W/52	T	08/14/92	P	3X10	SN	162	JCL	08/17/92	MH
19 B	52 / 53	280'NSAT	PT	08/14/92	P	2X4	SN	162	JCL	08/17/92	MH
19 C	52 / 53	213'NSAT	PT	08/14/92	P	2X2	PT	162	JCL	08/17/92	MH
19 D	52 / 53	67'NSAT	PT	08/14/92	P	1X1	PT	162	JCL	08/17/92	MH
19 E	52 / 53	@ SAT	PT	08/12/92	P	2X3	SS	162	TD	OCA	--
19 F	28 / 48	SEOS TO NEOS	FS	08/13/92	P/P	3X8/1X1	SN	162	JCL	08/17/92	MH
19 G	53 / 54	112'NSAT	PT	08/14/92	P	2X4	PT	162	JCL	08/17/92	MH
19 H	53 / 54	40'NSAT	PT	08/14/92	P	2X3	PT	162	JCL	08/17/92	MH
19 I	53 / 54	@ SAT	PT	08/12/92	P	2X2	SS	162	TD	OCA	--
19 J	54 / 55	@ SAT	PT	08/12/92	P	1X1	SS	162	TD	OCA	--
19 K	55 / 57	55'NSAT	PT	08/15/92	P	2X2	PT	162	LS	08/17/92	MH
19 M	55 / 57	@ SAT	PT	08/12/92	P	1X1	SS	162	TD	OCA	--
19 N	53 / 54	INT W/56	T	08/14/92	P	2X4	SP	158	TD	08/17/92	MH

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
19 P	54 / 55	INT W/56	T	08/14/92	P	2X2	PT	162	LS	08/17/92	MH
19 Q	55 / 56	SEOS TO NEOS	FS	08/14/92	RS	18"	PT	162	LS	08/17/92	MH
19 R	32 / 33	INT W/56	T	08/14/92	P	3X10	PT	162	LS	08/17/92	MH
19 S	31 / 32	INT W/56	T	08/14/92	P	5X5	SP	158	TD	08/17/92	MH
19 T	53 / 56	SEOS TO NEOS	FS	08/14/92	RS	6'	SP	158	TD	08/17/92	MH
19 W	34 / 35	INT W/57/58	T	08/14/92	P	3X5	PT	162	LS	08/17/92	MH
19 X	57 / 58	60'NSAT	PT	08/15/92	P	2X2	PT	162	LS	08/17/92	MH
20 A	57 / 58	45'NSAT	PT	08/15/92	P	2X3	PT	162	LS	08/18/92	TD
20 B	57 / 58	10'NSAT	PT	08/15/92	P	2X2	PT	162	LS	OCA	--
20 C	57 / 58	@ SAT	PT	08/12/92	P	2X2	SS	162	TD	OCA	--
20 D	34 / 55	NEOS TO SEOS	IO	08/14/92	C	2X13	PT	162	LS	08/17/92	MH
20 E	35 / 58	INT W/60	T	08/15/92	P	3X3	PT	162	LS	08/17/92	MH
20 F	35 / 58	22'W OF 35/58/60	PT	08/15/92	P	3X5	PT	162	LS	08/17/92	MH
20 G	35 / 58	35/57/58 TO 12'E	FS	08/15/92	P	7'	PT	162	LS	08/17/92	MH
20 H	35 / 36	INT W/60	T	08/15/92	P	2X2	PT	162	LS	08/17/92	MH
20 I	58 / 59	INT W/60	T	08/15/92	P	2X2	PT	162	LS	08/17/92	MH
20 J	58 / 59	215'NSAT	PT	08/15/92	P	1X2	PT	162	LS	08/17/92	MH
20 K	58 / 59	185'NSAT	PT	08/15/92	P	1X2	PT	162	LS	08/17/92	MH
20 M	58 / 59	5'NSAT	PT	08/12/92	P	2X2	SS	162	TD	OCA	--
20 N	59 / 60	INT W/61	T	08/17/92	P	1X1	SB	158	LS	08/17/92	MH
20 P	59 / 61	155'NSAT	PT	08/15/92	P	2X4	PT	162	LS	08/17/92	MH
20 Q	59 / 61	195'NSAT	PT	08/17/92	P	1X4	SB	158	LS	08/17/92	MH
20 R	59 / 61	230'NSAT	PT	08/17/92	P	1X1	SB	158	LS	08/17/92	MH
20 S	59 / 61	190' TO 195'NSAT	FS	08/17/92	RS	3'	SB	158	LS	08/17/92	MH
20 T	59 / 61	190'NSAT	PT	08/15/92	P	1X2	PT	162	LS	08/17/92	MH
20 W	59 / 61	160'NSAT	PT	08/15/92	P	1X2	PT	162	LS	08/17/92	MH
20 X	59 / 61	@ SAT	PT	08/12/92	P	2X2	SS	162	TD	OCA	--
21 A	36 / 60	17'EWEOS	BO	08/17/92	P	1X1	SB	158	LS	08/17/92	MH

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GEOMEMBRANE REPAIR SUMMARY - POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
21 B	37 / 60	293' TO 309'NSEOS	IO	08/11/92	C	1X16	SS	246	JI	08/17/92	MH
21 C	37 / 21B	298'NSEOS	BO	08/17/92	P	1X1	KT	158	LS	08/17/92	MH
21 D	37 / 61	5'EWEOS	DS-43	08/17/92	P	2X4	SB	158	LS	08/17/92	MH
21 E	38 / 64	490'SNEOS	DS-44	08/17/92	P	2X4	SB	158	LS	08/18/92	TD
21 F	64 / 65	646'SNEOS	DS-45	08/17/92	P	2X4	SB	158	LS	08/18/92	TD
21 G	64 / 65	129'SNEOS	DS-46	08/26/92	P	2X5	SB	158	MH	08/26/92	MH
21 H	65 / 66	376'SNEOS	DS-47	08/21/92	P	2X4	KT	158	MH	08/22/92	TD
21 I	65 / 66	305'SNEOS	DS-48	08/21/92	P	2X4	KT	158	MH	08/22/92	TD
21 J	66 / 67	537'SNEOS	DS-49	08/17/92	P	2X4	SB	158	LS	08/19/92	TD
21 K	66 / 67	74'SNEOS	D	08/21/92	P	1X1	KL	162	TD	08/22/92	MH
21 M	66 / 67	22'SNEOS	DS-50	08/21/92	P	3X6	KL	162	TD	08/22/92	MH
21 N	68 / 69	579'SNEOS	DS-51	08/22/92	P	2X5	SB	158	LS	08/28/92	TM
21 P	68 / 69	243'SNEOS	DS-52	08/21/92	P	3X4	KT	158	MH	08/22/92	TD
21 Q	69 / 70	632' TO 650'SNEOS	IO	08/19/92	P	3X35	KT	158	MH	08/19/92	TD
21 R	69 / 70	422'SNEOS	DS-53	08/21/92	P	2X5	KT	158	MH	08/22/92	TD
21 S	69 / 70	255'SNEOS	DS-54	08/21/92	P	2X4	KT	158	MH	08/22/92	TD
21 T	70 / 71	81'SNEOS	DS-55	08/22/92	P	2X5	KL	162	JI	08/22/92	MH
21 W	71 / 72	195'SNEOS	FS	08/20/92	P	3X8	KL	162	TD	08/22/92	MH
21 X	71 / 72	329'SNEOS	DS-57	08/21/92	P	2X4	KT	158	MH	08/22/92	TD
22 A	59 / 61	250'NSAT	PT	08/17/92	P	2X2	SB	158	LS	08/17/92	MH
22 B	61 / 62	INT W/63	T	08/17/92	P	2X2	KT	158	LS	08/18/92	TD
22 C	61 / 62	@ SAT	PT	08/12/92	P	2X2	SS	162	TD	OCA	--
22 D	37 / 38	INT W/61/63	T	08/17/92	P	3X3	KT	158	LS	08/18/92	TD
22 E	21B / 37	INT W/61	T	08/17/92	P	2X4	SB	158	LS	08/17/92	MH
22 F	36 / 37	INT W/21B	T	08/17/92	P	3X4	KT	158	LS	08/17/92	MH
22 G	21B / 37	SEOS TO 5'N	FS	08/17/92	RS	3'	SB	158	LS	08/17/92	MH
22 H	38 / 64	225'SNAT	PT	08/17/92	P	2X4	BS	162	LS	08/18/92	TD
22 I	38 / 64	@ NAT	PT	08/18/92	P	1X1	BS	162	TD	OCA	--

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
22 J	34	4'S TO NAT,12'W	MD	08/18/92	P	1X1	BS	162	TD	OCA	--
22 K	64 / 65	545'SNAT	PT	08/17/92	P	2X6	BS	162	LS	08/18/92	TD
22 M	64 / 65	460'SNAT	PT	08/17/92	P	2X3	BS	162	LS	08/18/92	TD
22 N	64 / 65	420'SNAT	PT	08/17/92	P	1X2	BS	162	LS	08/18/92	TD
22 P	64 / 65	317'SNAT	PT	08/17/92	P	2X3	BS	162	LS	08/18/92	TD
22 Q	64 / 65	385' TO 395'SNAT	FS	08/17/92	P	2X10	BS	162	LS	08/18/92	TD
22 R	64 / 65	395'SNAT	PT	08/17/92	P	2X9	BS	162	LS	08/18/92	TD
22 S	64 / 65	385'SNAT	PT	08/17/92	P	2X9	BS	162	LS	08/18/92	TD
22 T	64 / 65	@ NAT	PT	08/18/92	P	1X2	BS	162	TD	OCA	--
22 W	65 / 66	531'SNAT	PT	08/17/92	P	2X2	SB	158	LS	08/19/92	TD
22 X	66 / 67	625'SNAT	PT	08/17/92	P	2X3	KT	158	LS	08/19/92	TD
23 A	70 / 71	< COVERED BY 18X >	--	--	--	--	--	--	--	--	--
23 B	71 / 72	636'SNAT	PT	08/19/92	P	2X4	SP	260	MH	08/19/92	TD
23 C	70 / 71	< COVERED BY 23E >	--	--	--	--	--	--	--	--	--
23 D	70 / 71	< COVERED BY 23E >	--	--	--	--	--	--	--	--	--
23 E	70 / 71	156'SNAT	PT	08/22/92	P	2X5	VV	260	LS	08/22/92	MH
23 F	70 / 71	90'SNAT	PT	08/22/92	P	2X3	KL	162	JI	08/22/92	MH
23 G	47	< COVERED BY 23E >	--	--	--	--	--	--	--	--	--
23 H	70 / 71	@ NAT	PT	08/19/92	RS	1'	KL	162	MH	OCA	--
23 I	70 / 71	20'SNAT	PT	08/22/92	P	2X4	KL	162	JI	08/22/92	MH
23 J	71 / 72	315'SNAT	PT	08/20/92	P	1X1	KL	162	TD	08/22/92	TD
23 K	71 / 72	350'SNAT	PT	08/21/92	P	1X1	SB	158	MH	08/22/92	TD
23 M	71 / 72	377' TO 395'SNAT	FS	08/21/92	P	3X30	KT	158	MH	08/22/92	TD
23 N	72 / 73	330'SNAT	PT	08/21/92	P	1X2	SB	158	MH	08/22/92	TD
23 P	72 / 73	260'SNAT	PT	08/21/92	P	2X3	SB	158	MH	08/22/92	TD
23 Q	72 / 73	640'SNAT	PT	08/19/92	P	2X3	KL	260	MH	08/19/92	TD
23 R	72 / 73	@ NAT	PT	08/18/92	P	1X1	KL	162	MH	OCA	--
23 S	38 / 63	INT W/74 TO 7'N	FS	08/17/92	RS	4'	KT	158	LS	08/18/92	TD

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
23 T	64 / 74	EEOS TO 5'W	FS	08/17/92	P	2X5	SB	158	LS	08/18/92	TD
23 W	62 / 63	INT W/74	T	08/17/92	P	1X2	KT	158	LS	08/18/92	TD
23 X	62 / 74	120'NSAT	PT	08/17/92	P	2X3	SB	158	LS	08/18/92	TD
24 A	--	< VOID >	--	--	--	--	--	--	--	--	--
24 B	48	316'NSAT,7'W	D	08/13/92	P	1X1	SN	162	JCL	08/17/92	MH
24 C	49	310'NSAT,7'W	D	08/13/92	P	1X1	SN	162	JCL	08/17/92	MH
24 D	45	< COVERED BY 17J >	--	--	--	--	--	--	--	--	--
24 E	43	6'NSAT,12'E	PT	08/12/92	P	1X1	SS	162	TD	OCA	--
24 F	41 / 42	3'NSAT	PT	08/12/92	P	1X1	PH	162	TD	OCA	--
24 G	41 / 42	@ AT TO 1'W OF SAT	PT	08/12/92	P	1X1	PH	162	TD	OCA	--
24 H	47	263'NSAT,13'W	EE	08/13/92	P	1X1	PT	162	JCL	08/17/92	MH
24 I	47	255'NSAT,5'E	EE	08/13/92	GW	6"	PT	162	JCL	08/17/92	MH
24 J	61	47'NSAT,17'E	EE	08/15/92	P	1X1	PT	162	LS	08/18/92	TD
24 K	71 / 72	135'SNAT	PT	08/20/92	P	2X2	KL	162	TD	08/22/92	MH
24 M	71 / 72	170'SNAT	PT	08/20/92	P	1X1	KL	162	TD	08/22/92	MH
24 N	71 / 72	575'SNAT	BO	08/22/92	P	2X2	SB	158	LS	08/28/92	TM
24 P	70 / 71	110'SNAT	BO	08/22/92	P	2X2	KL	162	JI	08/22/92	MH
24 Q	69 / 70	< COVERED BY 21R >	--	--	--	--	--	--	--	--	--
24 R	69 / 70	435'SNAT	BO	08/21/92	P	2X3	SB	158	MH	08/22/92	TD
24 S	69	458'SNAT,9'W	SI	08/21/92	P	2X2	SB	158	MH	08/22/92	TD
24 T	68 / 69	645'SNAT	PT	08/19/92	P	2X4	SB	158	MH	08/19/92	TD
24 W	65 / 66	90'SNAT	BO	08/21/92	P	1X1	KL	162	TD	08/22/92	MH
24 X	64 / 65	512'SNAT,10W	D	08/17/92	P	1X1	BS	162	LS	08/18/92	TD
25 A	71 / 72	431'SNEOS	DS-58	08/21/92	P	3X5	SB	158	MH	08/22/92	TD
25 B	72 / 73	282'SNEOS	DS-56	08/21/92	P	2X4	KT	158	MH	08/22/92	TD
25 C	71 / 72	135' TO 196'SNEOS	FTS	08/20/92	RS	30'	KL	162	TD	08/22/92	MH
25 D	62 / 74	42'NSEOS	HT	08/17/92	P	2X6	KT	158	LS	08/18/92	TD
25 E	62 / 74	159'NSEOS	DS-59	08/17/92	P	2X4	SB	158	LS	08/18/92	TD

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
25 F	76 / 77	234'NSEOS	DS-60	08/18/92	P	3X6	KT	158	TD	08/18/92	TD
25 G	77 / 78	27'NSEOS	DS-61	08/27/92	P	2X5	KL	162	MH	08/28/92	TM
25 H	78	7'SNEOS,3'E	D	08/18/92	P	2X2	KT	158	MH	08/18/92	TD
25 I	78 / 80	38'NSEOS	BO	08/27/92	P	2X2	KL	162	MH	08/28/92	TM
25 J	78 / 80	4'NSEOS	BO	08/27/92	P	2X2	KL	162	MH	08/28/92	TM
25 K	79 / 80	201'NSEOS	BO	08/19/92	P	2X3	KT	158	MH	08/19/92	TD
25 M	81 / 82	219'NSEOS	IO	08/13/92	C	2X34	SN	162	MH	08/13/92	TD
25 N	80 / 81	177'NSEOS	DS-62	08/18/92	P	2X4	KT	158	MH	08/18/92	TD
25 P	82 / 25M	9'WEEOS	BO	08/19/92	P	2X3	KLV	260	MH	08/19/92	TD
25 Q	82 / 83	283'NSEOS	DS-63	08/19/92	P	2X5	KT	158	MH	08/19/92	TD
25 R	81 / 83	200'NSEOS	FM	08/19/92	P	3X3	KLV	260	MH	08/19/92	TD
25 S	81 / 83	70'NSEOS	BO	08/26/92	P	1X1	BP	4	MH	08/28/92	TM
26 A	62 / 74	@ SAT	PT	08/19/92	P	2X4	SP	260	MH	OCA	--
26 B	65 / 76	INT W/74 TO 7'N	FS	08/17/92	P	2X9	KT	158	LS	08/18/92	TD
26 C	74 / 76	190'N OF SAT	PT	08/18/92	P	2X2	SB	158	TD	08/18/92	TD
26 D	74 / 75	INT W/76	T/FS	08/18/92	P	3X7	SB	158	TD	08/18/92	TD
26 E	74 / 75	50'N OF SAT	PT	08/18/92	P	2X3	KT	158	MH	08/18/92	TD
26 F	74 / 75	@ SAT	PT	08/20/92	P	1X2	PT	4	MH	OCA	--
26 G	75 / 76	INT W/77 TO 10'W	T/FS	08/18/92	2/P	3X3/2X7	KT	158	TD	08/18/92	TD
26 H	65 / 66	INT W/77	T	08/18/92	P	3X4	SB	4	TD	08/18/92	TD
26 I	65 / 66	INT W/77	T	08/18/92	P	3X3	KT	4	TD	08/18/92	TD
26 J	77 / 78	INT W/79	T	08/18/92	P	2X3	SM	158	MH	08/18/92	TD
26 K	66 / 67	INT W/77/79	T	08/18/92	P	3X3	SB	4	TD	08/18/92	TD
26 M	78 / 79	INT W/80	T	08/18/92	P	3X3	SM	158	MH	08/18/92	TD
26 N	77 / 78	@ SAT	PT	08/20/92	P	3X4	PT	4	MH	OCA	--
26 P	75 / 77	@ SAT	PT	08/20/92	P	2X3	PT	4	MH	OCA	--
26 Q	67 / 68	INT W/79	T	08/19/92	C	3X4	SB	158	MH	09/02/92	TM
26 R	--	<<<< VOID >>>>	--	--	--	--	--	--	--	--	--
26 S	79 / 81	<<< COVERED BY 26T >>>	--	--	--	--	--	--	--	--	--

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
26 T	68 / 80	INT W/82 TO 34'W	FS	08/19/92	P	2X24	KT	158	MH	08/19/92	TD
26 W	80 / 81	195' TO 200'N OF SAT	FS	08/19/92	P	2X7	KLV	260	MH	08/19/92	TD
26 X	80 / 81	20'N OF SAT	PT	08/27/92	P	1X2	KL	162	MH	09/28/92	TM
27 A	80 / 81	@ SAT	PT	08/27/92	P	1X3	KL	162	MH	OCA	--
27 B	25M / 82	INT W/83	T	08/19/92	P	4X6	KLV	260	MH	08/19/92	TD
27 C	25M / 80	INT W/81	T	08/19/92	P	2X4	KL	260	MH	08/19/92	TD
27 D	68 / 69	INT W/82	T	08/19/92	P	4X4	KT	158	MH	08/19/92	TD
27 E	71 / 72	NAT TO 3'S	PT	08/18/92	P	1X1	KL	162	MH	OCA	--
27 F	81 / 83	@ SAT	PT	08/27/92	P	1X1	KL	162	MH	OCA	--
27 G	83 / 84	SAT TO 50'N	PT	08/26/92	P	1X2	BP	4	MH	08/28/92	TM
27 H	83 / 84	INT W/85	T	08/19/92	P	3X4	SP	260	MH	08/19/92	TD
27 I	70 / 71	INT W/83/85	T	08/19/92	P	3X5	KL	260	MH	08/19/92	TD
27 J	71 / 72	TO 85/86	FS	08/19/92	P	2X6	KL	260	MH	08/19/92	TD
27 K	84 / 85	INT W/86	T	08/19/92	P	2X5	KL	260	MH	08/19/92	TD
27 M	84 / 86	@ SAT	PT	08/27/92	P	1X2	KL	162	MH	OCA	--
27 N	72 / 73	INT W/86/88	T	08/19/92	P	3X4	SP	260	MH	08/19/92	TD
27 P	86 / 87	INT W/88	T	08/19/92	P	3X4	KLV	260	MH	08/19/92	TD
27 Q	86 / 87	@ SAT	PT	08/27/92	P	1X2	KL	162	MH	OCA	--
27 R	35 / 36	420'S OF NAT	PT	08/15/92	P	1X1	SP	158	TD	08/18/92	TD
27 S	12B / 25	36'N OF P43	DSE-1P	08/18/92	P	2X4	KT	158	MH	08/18/92	TD
27 T	8R / 46	INT W/25/43/46	DSE-1N	08/18/92	P	2X4	SB	158	MH	08/18/92	TD
27 W	27 / 28	24'N OF 48	CAP	08/18/92	P	3X5	KT	158	MH	08/18/92	TD
28 A	30 / 31	647'N OF NAT	PT	08/14/92	P	2X3	SN	162	JCL	08/17/92	MH
28 B	50 / 52	10'S OF NAT	BO	08/14/92	P	1X2	PT	162	JCL	08/17/92	MH
28 C	25 / 26	205'S OF NAT	PT	08/13/92	P	2X2	BS	227	JCL	08/15/92	JCL
28 D	73 / 89	398'SOF NAT	PT	08/21/92	P	2X2	SP	260	TD	08/22/92	TD
28 E	73 / 88	INT W/89	PT	08/19/92	P	2X8	SP	260	MH	08/19/92	TD
28 F	89 / 90	665'N OF SAT	PT/IO	08/19/92	P	4X5	KL	158	MH	09/19/92	TM
28 G	89 / 90	@ NAT	PT	08/18/92	P	2X2	KL	162	MH	OCA	--

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
28 H	90 / 91	1'N OF SAT	PT	08/18/92	P	1X1	KL	162	MH	OCA	--
28 I	73 / 89	NAT TO 4'S	PT/FS	08/18/92	RS	4'	KL	162	MH	OCA	--
28 J	91 / 92	88'N OF SAT	PT	08/21/92	P	2X2	SP	260	TD	08/22/92	MH
28 K	90 / 91	317'N OF SAT	PT	08/20/92	P	4X6	SP	260	TD	08/22/92	TD
28 M	91 / 92	390'N OF SAT	PT	08/21/92	P	4X4	SP	260	TD	08/22/92	TD
28 N	92 / 93	625'N OF SAT	PT	08/22/92	P	2X4	IOU	4	JCL	08/28/92	TM
28 P	91 / 92	412'N OF SAT	PT	08/21/92	P	2X2	KLV	260	TD	08/22/92	TD
28 Q	91 / 92	475'N OF SAT	PT	08/21/92	P	1X2	KLV	260	TD	08/22/92	TD
28 R	91 / 92	488'N OF SAT	PT	08/21/92	P	1X1	KLV	260	TD	08/28/92	TM
28 S	91 / 92	488' TO 492'N OF SAT	FS	08/22/92	RS	2'	IOU	4	JCL	08/28/92	TM
28 T	91 / 92	492'N OF SAT	PT	08/22/92	P	1X1	IOU	4	JCL	08/28/92	TM
28 W	93 / 94	438'N OF SAT	PT	08/22/92	P	2X2	SB	158	TD	08/22/92	TD
28 X	93 / 94	564'N OF SAT	BO	08/27/92	RS	4'	KL	162	MH	09/08/92	MH
29 A	84 / 85	12'EWEOS	DS-64	08/19/92	P	2X5	SP	158	MH	09/19/92	TM
29 B	84 / 86	85'NSEOS	BO	08/26/92	P	2X3	BP	4	MH	08/28/92	TM
29 C	84 / 86	50'NSEOS	BO	08/26/92	P	2X3	BP	4	MH	08/28/92	TM
29 D	27 / 28	616'SNEOS	DSE-01	08/14/92	P	2X5	PT	162	JCL	08/17/92	MH
29 E	28 / 29	479'SNEOS	DSE-02	08/17/92	P	2X4	BS	162	LS	08/17/92	MH
29 F	86 / 87	250'NSEOS	IO	08/19/92	P	2X4	KLV	260	MH	08/19/92	TD
29 G	86 / 88	295'NSEOS	DS-65	08/19/92	P	1X2	SP	260	MH	08/19/92	TD
29 H	53	141'NSEOS,6'W	SI	08/14/92	P	1X1	PT	162	JCL	08/17/92	MH
29 I	86 / 87	110'NSEOS	DS-66	08/26/92	P	2X5	BP	4	MH	08/28/92	TM
29 J	30	<<< VOID >>>	--	--	--	--	--	--	--	--	--
29 K	73 / 89	45'SNEOS	FM	08/22/92	P	2X3	VV	260	LS	08/22/92	MH
29 M	73 / 89	229'SNEOS	FM	08/22/92	P	3X3	SB	158	JCL	08/28/92	TM
29 N	73 / 89	185'SNEOS	PT	08/22/92	P	2X2	VV	260	LS	08/22/92	TD
29 P	89 / 90	395'SNEOS	PT	08/21/92	P	2X3	SP	260	TD	08/22/92	TD
29 Q	89 / 90	313'SNEOS	BO	08/21/92	P	2X2	KLV	260	TD	08/22/92	TD
29 R	89 / 90	295'SNEOS	BO	08/21/92	P	2X3	SP	260	TD	08/22/92	TD

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
29 S	89 / 90	281'SNEOS	BO	08/21/92	P	2X2	SP	260	TD	08/22/92	TD
29 T	89 / 90	385'SNEOS	DS-67	08/21/92	P	3X6	KLV	260	TD	08/22/92	TD
29 W	89 / 90	521'SNEOS	DS-68	08/22/92	P	2X4	KT	158	JCL	08/28/92	TM
29 X	90 / 91	504'SNEOS	WS	08/22/92	P	3X3	SB	158	JCL	08/28/92	TM
30 A	103	140'S OF NAT,21'W	D	08/25/92	P	1X1	KL	162	JI	08/25/92	JCL
30 B	103	145'S OF NAT,21'W	D	08/25/92	P	1X1	KL	162	JI	08/25/92	JCL
30 C	104	35'S OF NAT,35'W	D	08/25/92	P	2X2	TE	260	JI	08/25/92	JCL
30 D	102 / 103	533'S OF NAT	BO	08/25/92	P	2X6	IOU	4	LS	08/25/92	JCL
30 E	102 / 103	450'S OF NAT	IO	08/25/92	P	2X5	SB	158	LS	08/25/92	JCL
30 F	102 / 103	440'S OF NAT	BO	08/25/92	P	3X8	KT	158	LS	08/25/92	JCL
30 G	102 / 103	417'S OF NAT	BO	08/25/92	P	2X4	SB	158	LS	08/25/92	JCL
30 H	102 / 103	400'S OF NAT	DS-87	08/25/92	P	2X5	KT	158	LS	08/25/92	JCL
30 I	104 / 105	630'S OF NAT	BO	08/25/92	P	2X6	IOU	4	LS	08/25/92	JCL
30 J	104 / 105	550'S OF NAT	FM	08/25/92	P	2X5	IOU	4	LS	08/25/92	JCL
30 K	104 / 105	<<< COVERED BY 30M >>>	--	--	--	--	--	--	--	--	--
30 M	104 / 105	466'S OF NAT	BO	08/25/92	P	2X7	KT	158	LS	08/25/92	JCL
30 N	104 / 105	457'S OF NAT	PT	08/25/92	P	2X4	SB	158	LS	08/25/92	JCL
30 P	104 / 105	398'S OF NAT	BO	08/25/92	P	2X4	SB	158	LS	08/25/92	JCL
30 Q	117 / 119	70'N OF SAT	BO	08/27/92	P	2X4	BP	4	MH	08/28/92	TM
30 R	120	6'N OF SAT	SI	08/27/92	P	1X2	BP	4	MH	OCA	--
30 S	119	140'N OF SAT,1'W	SI	08/27/92	GW	1'	BP	4	MH	08/28/92	TM
30 T	118 / 121	268'N OF SAT	BO	08/28/92	P	2X3	SB	158	MH	08/28/92	TM
30 W	118 / 121	244'N OF SAT	FM	08/27/92	P	2X4	TE	4	MH	08/28/92	TM
30 X	119 / 121	235'N OF SAT	FS	08/27/92	P	3X10	BP	4	MH	08/28/92	TM
31 A	91 / 92	435'SNEOS	SI	08/21/92	P	1X1	KLV	260	TD	08/22/92	TD
31 B	97 / 98	586'SNEOS	BO	08/22/92	P	2X5	IOU	4	JCL	08/29/92	TM
31 C	97 / 98	34'SNEOS	BO	08/22/92	P	2X3	AV	260	LS	08/22/92	MH
31 D	98 / 99	59'SNEOS	BO	08/22/92	P	1X2	VV	260	LS	08/22/92	MH
31 E	97 / 98	357'SNEOS	BO	08/22/92	P	2X3	SB	158	JCL	08/22/92	TD

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
31 F	97 / 98	91'SNEOS	DS-80	08/22/92	P	2X5	VV	260	LS	08/22/92	MH
31 G	99 / 100	312'SNEOS	WS	08/22/92	P	3X4	KT	158	JCL	08/22/92	TD
31 H	99 / 100	428'SNEOS	BO	08/25/92	GW	6"	IOU	4	LS	08/29/92	TM
31 I	99 / 100	405'SNEOS	BO	09/08/92	GW	6"	KL	162	LS	09/08/92	MH
31 J	100 / 101	300'SNEOS	WS	08/22/92	P	3X4	KT	158	JCL	08/22/92	TD
31 K	99 / 100	600'SNEOS	DS-81	08/25/92	P	2X5	IOU	4	LS	08/25/92	JCL
31 M	101	625'SNEOS,1'E	D	09/11/92	P	2X2	KT	158	MH	09/14/92	JI
31 N	100 / 101	258'SNEOS	FM	08/25/92	P	3X4	KL	162	MH	08/25/92	JCL
31 P	100 / 101	203'SNEOS	DS-82	08/22/92	P	2X5	KL	162	JI	08/26/92	MH
31 Q	100 / 101	586'SNEOS	DS-83	08/25/92	P	2X5	IOU	4	LS	08/25/92	JCL
31 R	101 / 102	375'SNEOS	WS	08/25/92	P	2X2	SB	158	LS	08/25/92	JCL
31 S	101 / 102	325'SNEOS	WS	08/22/92	P	3X3	SB	158	TD	08/22/92	TD
31 T	102 / 103	344'SNEOS	WS	08/25/92	P	2X3	SB	158	LS	08/25/92	JCL
31 W	101 / 102	250'SNEOS	DS-84	08/25/92	P	3X6	KL	162	MH	08/25/92	JCL
31 X	101 / 102	451'SNEOS	DS-85	08/25/92	P	2X5	IOU	4	LS	08/25/92	JCL
32 A	102	373'SNEOS,9'W	D	08/25/92	P	1X1	KT	158	LS	08/25/92	JCL
32 B	102 / 103	97'SNEOS	DS-86	08/25/92	P	3X5	BP	260	JI	08/25/92	JCL
32 C	103	30'SNEOS,2'E	D	08/25/92	C	1X1	BP	260	MH	08/25/92	JCL
32 D	102 / 103	138'SNEOS	FM	08/22/92	P	2X3	KL	162	JI	08/25/92	JCL
32 E	102 / 103	181'SNEOS	FM	08/22/92	P	2X3	KL	162	JI	08/22/92	TD
32 F	103 / 104	343'SNEOS	WS	08/25/92	P	2X3	KL	162	MH	09/11/92	MH
32 G	104 / 105	318'SNEOS	WS	08/25/92	P	2X3	KL	162	MH	08/25/92	JCL
32 H	104 / 105	283'SNEOS	IO	08/25/92	P	2X4	KL	162	MH	08/25/92	JCL
32 I	104 / 105	272'SNEOS	IO	08/25/92	P	2X5	KL	162	MH	08/25/92	JCL
32 J	104 / 105	225'SNEOS	I	08/25/92	P	2X10	KL	162	JI	08/25/92	JCL
32 K	104 / 105	295'SNEOS	WS	08/25/92	P	2X3	AV	8	JI	08/25/92	JCL
32 M	103 / 104	93'SNEOS	DS-88	08/25/92	P	3X5	TE	260	JI	08/25/92	JCL
32 N	104 / 105	158'SNEOS	IO	08/25/92	P	2X4	PT	8	JI	08/25/92	JCL
32 P	104 / 105	136' TO 143'SNEOS	IO	08/25/92	P	2X8	PT	8	JI	08/25/92	JCL

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APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
32 Q	105 / 106	341'SNEOS	WS	08/25/92	P	2X2	KL	162	MH	08/25/92	JCL
32 R	105 / 106	153'SNEOS	WS	08/25/92	P	2X3	PT	8	JI	08/25/92	JCL
32 S	105 / 106	65'SNEOS	DS-89	08/25/92	P	2X5	BP	260	MH	09/08/92	MH
32 T	105 / 106	557'SNEOS	DS-90	08/25/92	P	2X5	IOU	4	LS	08/25/92	JCL
32 W	105 / 106	360'SNEOS	BO	08/25/92	P	2X3	KL	162	MH	08/25/92	JCL
33 A	37 / 38	420'S OF NAT	BO	08/17/92	GW	4"	BS	162	LS	08/18/92	TD
33 B	37 / 38	508'S OF NAT	PT	08/17/92	P	2X3	BS	162	LS	08/18/92	TD
33 C	37 / 38	521'S OF NAT	PT	08/17/92	P	2X4	BS	162	LS	08/18/92	TD
33 D	37 / 38	528'S OF NAT	FS	08/17/92	P	1X2	BS	162	LS	08/18/92	TD
33 E	33 / 34	620'S OF NAT	BO	08/14/92	P	1X1	PT	162	LS	08/18/92	TD
33 F	31 / 32	116'S OF NAT	BO	08/14/92	P	1X1	BS	227	TD	08/18/92	TD
33 G	30 / 31	418'S OF NAT	PT	08/14/92	P	1X1	BS	227	TD	08/17/92	MH
33 H	57 / 58	20'S OF NAT	PT	08/15/92	P	1X1	PT	162	LS	08/18/92	TD
33 I	63 / 74	INT W/38	PT	08/17/92	P	2X2	KT	158	LS	08/18/92	TD
33 J	38 / 64	INT W/74	PT	08/17/92	P	2X3	KT	158	LS	08/18/92	TD
33 K	62	151'N OF SAT,1'W	SI	08/17/92	P	1X2	KT	158	LS	08/18/92	TD
33 M	30	228'S OF NAT,5'W	SI	08/17/92	P	1X1	BS	162	LS	08/17/92	MH
33 N	98 / 99	568'S OF NAT	WS	08/22/92	P	2X2	IOU	4	JCL	09/02/92	MH
33 P	98 / 99	294'S OF NAT	WS	08/22/92	P	3X3	SB	158	JCL	08/22/92	TD
33 Q	100 / 101	577'S OF NAT	BO	08/25/92	P	2X2	IOU	4	LS	08/25/92	JCL
33 R	101 / 102	505'S OF NAT	BO	08/25/92	P	2X3	IOU	4	LS	08/25/92	JCL
33 S	101 / 102	649'S OF NAT	BO	09/19/92	P	1X1	VV	8	LS	09/22/92	JCL
33 T	101 / 102	577'S OF NAT	BO	08/25/92	P	2X2	IOU	4	LS	09/11/92	MH
33 W	103	4'S OF NAT,5'W	D	08/19/92	P	2X2	KL	162	MH	09/11/92	MH
33 X	103	11'S OF NAT,5'W	D	09/10/92	P	1X1	SB	158	JI	09/11/92	MH
34 A	32 / 33	400'S OF NAT	PT	08/18/92	GW	4"	KL	162	MH	08/18/92	TD
34 B	32 / 33	418'S OF NAT	PT	08/18/92	GW	4"	KL	162	MH	08/18/92	TD
34 C	67	5'S OF NAT,10'W	MD	08/18/92	P	1X1	BS	162	TD	OCA	--
34 D	67	10'S OF NAT,10'W	MD	08/18/92	P	1X1	BS	162	TD	08/22/92	MH

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
34 E	68	3'S OF NAT,10'E	MD	08/18/92	P	1X2	BS	162	TD	OCA	--
34 F	68	8'S OF NAT,10'E	MD	08/18/92	P	1X1	BS	162	TD	08/22/92	MH
34 G	71	1'S OF NAT,10'E	MD	08/18/92	P	1X1	KL	162	MH	OCA	--
34 H	96	1'S OF NAT,1'W	MD	08/18/92	P	1X1	KL	162	MH	OCA	--
34 I	28 / 29	INT W/51	DSE-1N	08/19/92	P	4X4	SB	158	MH	08/19/92	TD
34 J	48	4'S OF 27,8'W	DSE-1P	08/19/92	P	4X4	KT	158	MH	08/19/92	TD
34 K	97	1'S OF NAT,34'E TO W	EXT	08/19/92	EXT	34'	KL	162	MH	OCA	--
34 M	72	1'S OF NAT,34'E TO W	EXT	08/19/92	EXT	34'	KL	162	MH	OCA	--
34 N	68	1'S OF NAT,34'E TO W	EXT	08/19/92	EXT	40'	KL	162	MH	OCA	--
34 P	103	1'S OF NAT,4'W	MD	08/19/92	P	2X3	KL	162	MH	OCA	--
34 Q	95	2'S OF NAT,34'E TO W	EXT	08/20/92	EXT	34'	KL	162	TD	OCA	--
34 R	97	1'S OF NAT,34'E TO W	EXT	08/20/92	P	1X1	KL	162	TD	OCA	--
34 S	78	4'N OF SAT,3'E	MD	08/20/92	P	2X2	PT	4	MH	08/31/92	TM
34 T	75	1'N O FSAT,34'E TO W	EXT	08/20/92	EXT	34'	SP	4	MH	OCA	--
35 A	89 / 90	112'SNEOS	BO	08/21/92	P	3X3	SP	260	MH	08/22/92	MH
35 B	90 / 91	66'SNEOS	DS-69	08/20/92	P	3X6	SP	260	TD	08/22/92	MH
35 C	91 / 92	505'S TO 518'SNEOS	FS	08/22/92	C	2X14	IOU	4	JCL	08/28/92	TM
35 D	91 / 92	560'SNEOS	BO	08/22/92	P	2X3	IOU	4	JCL	08/28/92	TM
35 E	91 / 92	457'SNEOS	FTS	08/21/92	P	1X1	KLV	260	TD	08/22/92	TD
35 F	91 / 92	275'SNEOS	DS-70	08/20/92	P	3X6	KLV	260	TD	08/22/92	TD
35 G	92 / 93	330'SNEOS	WS	08/20/92	P	4X6	SP	260	TD	08/22/92	TD
35 H	92 / 93	590'SNEOS	FM	08/22/92	P	3X3	IOU	4	JCL	08/28/92	TM
35 I	92 / 93	532'SNEOS	BO	08/22/92	P	2X3	IOU	4	JCL	08/28/92	TM
35 J	92 / 93	520'SNEOS	FM	08/22/92	P	3X4	IOU	4	JCL	08/28/92	TM
35 K	93 / 94	345'SNEOS	WS	08/20/92	P	2X2	KLV	260	TD	08/22/92	TD
35 M	92 / 93	165'SNEOS	FM	08/21/92	P	3X3	KLV	260	TD	08/22/92	MH
35 N	92 / 93	406'SNEOS	FM	08/21/92	2/P	3X10/2X6	SP	260	TD	08/22/92	TD
35 P	93 / 94	110'SNEOS	WS	08/19/92	P	2X3	KLV	260	MH	08/22/92	MH
35 Q	92 / 93	<<< COVERED BY 37M >>>	--	--	--	--	--	--	--	--	--

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY - POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
35 R	93 / 94	120'SNEOS	DS-72	08/21/92	P	3X7	SP	260	TD	08/22/92	MH
35 S	93 / 94	572'SNEOS	DS-73	08/22/92	P	2X5	IOU	4	JCL	08/28/92	TM
35 T	94 / 95	341'SNEOS	WS	08/20/92	P	3X3	KLV	260	TD	08/22/92	TD
35 W	94 / 95	150'SNEOS	FM	08/21/92	P	3X7	KLV	260	TD	08/22/92	MH
35 X	94 / 95	165'SNEOS	BO	08/20/92	P	2X2	SP	260	TD	08/22/92	MH
36 A	94 / 95	635'SNEOS	D	08/28/92	P	2X2	SB	158	TM	08/28/92	TM
36 B	91 / 92	411'S TO 505'SNEOS	FS	08/21/92	RS	246'	KLV	260	TD	08/22/92	TD
36 C	91 / 92	515'S TO 560'SNEOS	FS	08/22/92	RS	40'	IOU	4	JCL	08/28/92	TM
36 D	93	564'SNEOS,5'E	SI	08/22/92	P	1X4	IOU	4	JCL	08/28/92	TM
36 E	92 / 93	640'SNEOS	DS-71	08/22/92	P	2X5	IOU	4	JCL	08/28/92	TM
36 F	95 / 96	344'SNEOS	WS	08/22/92	P	2X3	KT	158	JCL	08/22/92	TD
36 G	95 / 96	562'SNEOS	BO	08/22/92	P	2X2	SB	158	JCL	08/22/92	TD
36 H	95 / 96	568'SNEOS	BO	08/22/92	P	1X1	KT	158	JCL	08/22/92	TD
36 I	96 / 97	361'SNEOS	WS	08/22/92	P	3X3	SB	158	JCL	08/22/92	TD
36 J	95 / 96	50'SNEOS	DS-74	08/22/92	P	2X5	VV	260	LS	08/22/92	MH
36 K	96 / 97	373'SNEOS	DS-75	08/22/92	P	2X4	KT	158	JCL	08/22/92	TD
36 M	94 / 95	561'SNEOS	DS-76	08/22/92	P	2X5	IOU	4	JCL	08/28/92	TM
36 N	96 / 97	81'SNEOS	DS-77	08/22/92	P	2X5	VV	260	LS	08/22/92	MH
36 P	95 / 96	650'SNEOS	DS-78	08/22/92	P	3X6	KL	162	JI	08/22/92	TD
36 Q	96 / 97	650'SNEOS	DS-79	08/26/92	P	2X5	TE	4	MH	08/28/92	TM
36 R	64	CREST OF AT,13'W	D	08/26/92	P	1X1	KT	158	MH	OCA	--
36 S	87 / 88	INT W/107	T	08/19/92	P	3X3	SP	260	MH	08/28/92	TM
36 T	91	670'SNEOS,9'E	D	08/26/92	P	1X1	KL	162	MH	08/28/92	TM
36 W	107	247'NSEOS,18'W	D	08/26/92	P	1X2	KL	162	MH	08/28/92	TM
36 X	107 / 108	136'NSEOS	FM	08/27/92	P	3X4	BP	158	MH	08/28/92	TM
37 A	94 / 95	<<< CIVERED BY 35W >>>	--	--	--	--	--	--	--	--	--
37 B	94 / 95	<<< CIVERED BY 35W >>>	--	--	--	--	--	--	--	--	--
37 C	91 / 92	NAT TO 4'S	FS/PT	08/18/92	P	1X2	KL	162	MH	OCA	--
37 D	92 / 93	NAT TO 4'S	FS/PT	08/18/92	P	1X2	KL	162	MH	OCA	--

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
37 E	93 / 94	NAT TO 4'S	FS/PT	08/18/92	P	2X2	KL	162	MH	OCA	--
37 F	94 / 95	NAT TO 4'S	FS/PT	08/18/92	P	1X2	KL	162	MH	OCA	--
37 G	92 / 93	75'S OF NAT	PT	08/21/92	P	2X4	KLV	260	TD	08/22/92	MH
37 H	96 / 97	521'S OF NAT	PT	08/22/92	P	2X2	IOU	4	JCL	08/29/92	TM
37 I	95 / 96	592'S OF NAT	PT	08/22/92	P	3X3	IOU	4	JCL	08/28/92	TM
37 J	95 / 96	651'S TO 656'S OF NAT	FS	09/02/92	GW	6"	KL	162	TM	09/02/92	MH
37 K	92 / 93	4'S TO 44'S OF NAT	FS	08/21/92	RS	45'	SP	260	TD	08/22/92	MH
37 M	92 / 93	44'S TO 57'S OF NAT	FS	08/21/92	P	3X15	KLV	260	TD	08/22/92	MH
37 N	92 / 93	57'S TO 71'S OF NAT	FS	08/21/92	RS	25'	KLV	260	TD	08/22/92	MH
37 P	92 / 93	<<< COVERED BY 37G >>>	--	--	--	--	--	--	--	--	--
37 Q	95 / 96	NAT TO 5'S	FS/PT	08/18/92	P	1X2	KL	162	MH	OCA	--
37 R	96	2'S OF NAT,6'E	D	08/18/92	P	1X1	KL	162	MH	OCA	--
37 S	96 / 97	NAT TO 5'S	FS/PT	08/18/92	P	2X2	KL	162	MH	OCA	--
37 T	97 / 98	NAT TO 3'S	FS/PT	08/18/92	P	1X2	KL	162	MH	OCA	--
37 W	98 / 99	NAT TO 2'S	FS/PT	08/19/92	P	1X2	KL	162	MH	OCA	--
37 X	97 / 98	297'S OF NAT	PT	08/22/92	P	3X3	KT	158	JCL	08/22/92	TD
38 A	92	662'SNEOS,7'E	D	08/26/92	P	2X2	KL	162	MH	08/28/92	TM
38 B	92	662'SNEOS,7'W	D	08/26/92	P	2X3	KL	162	MH	08/28/92	TM
38 C	91 / 92	INT W/110	T	08/26/92	P	3X4	KL	162	MH	08/28/92	TM
38 D	108 / 109	58'NSEOS	BO	08/27/92	P	3X4	KL	162	MH	08/31/92	TM
38 E	108 / 109	10'NSEOS	DS-91	08/27/92	P	3X5	KL	162	MH	08/28/92	TM
38 F	93	682'SNEOS,9'E	D	08/26/92	P	1X3	KL	162	MH	08/28/92	TM
38 G	107 / 108	203'NSEOS	DS-92	08/26/92	P	2X2	KL	162	MH	08/28/92	TM
38 H	93 / 110	288'N TO 306'NSEOS	IO	08/19/92	RS	1X20	K-MAI	4	MH	08/19/92	JCL
38 I	93 / 110	INT W/112	T	08/26/92	P	3X4	KL	162	MH	08/28/92	TM
38 J	109 / 110	150'NSEOS	BO	08/26/92	P	2X4	BP	4	MH	08/28/92	TM
38 K	109 / 110	251'NSEOS	BO	08/26/92	P	3X4	KL	162	MH	08/28/92	TM
38 M	109 / 110	297'NSEOS	DS-93	08/26/92	P	3X10	KL	162	MH	08/28/92	TM
38 N	111 / 112	INT W/113	T	08/26/92	C	3X8	KL	162	MH	08/28/92	TM

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
38 P	108 / 109	172'NSEOS	IO	08/26/92	P	1X3	BP	4	MH	08/28/92	TM
38 Q	111 / 113	136'NSEOS	WS	08/26/92	P	2X5	BP	4	MH	08/28/92	TM
38 R	110 / 111	255'N TO 265'NSEOS	FS	08/26/92	C	3X12	KL	162	MH	08/28/92	TM
38 S	93 / 112	INT W/113	T	08/26/92	P	2X3	KL	162	MH	08/28/92	TM
38 T	110	258'NSEOS,5'W	D	08/26/92	P	1X1	KL	162	MH	08/28/92	TM
38 W	95 / 113	INT W/114	T	08/26/92	P	3X3	TE	4	MH	08/28/92	TM
38 X	95 / 114	8'E OF 113	D	08/26/92	P	2X3	TE	4	MH	08/28/92	TM
39 A	99 / 100	NAT TO 2'S	FS/PT	08/19/92	P	1X2	KL	162	MH	OCA	--
39 B	100 / 101	445'S OF NAT	BO/PT	08/25/92	P	2X4	IOU	4	LS	08/25/92	JCL
39 C	100 / 101	316'S OF NAT	PT	08/22/92	P	2X3	SB	158	TD	08/22/92	TD
39 D	101 / 102	517'S OF NAT	BO/PT	08/25/92	P	2X4	IOU	4	LS	08/25/92	JCL
39 E	101 / 102	416'S OF NAT	BO/PT	08/25/92	P	2X3	IOU	4	LS	08/25/92	JCL
39 F	100 / 101	<<< COVERED BY 39H >>>	--	--	--	--	--	--	--	--	--
39 G	100 / 101	31' TO 34'S OF NAT	FS	09/11/92	P	2X4	AV	158	LS	09/11/92	MH
39 H	100 / 101	31'S OF NAT	PT	08/22/92	P	2X4	AV	260	LS	08/22/92	MH
39 I	102 / 103	NAT TO 3'S	PT/FS	08/19/92	P	2X2	KL	162	MH	OCA	--
39 J	101 / 102	NAT TO 4'S	BO/PT	08/19/92	P	2X3	KL	162	MH	OCA	--
39 K	101 / 102	31'S OF NAT	PT	08/25/92	P	2X4	BP	260	MH	08/25/92	JCL
39 M	102 / 103	34'S OF NAT	BO/PT	08/25/92	P	3X5	BP	260	MH	08/25/92	JCL
39 N	100 / 101	9' TO 12'S OF NAT	BO/PT	08/19/92	P	2X4	KL	162	MH	09/11/92	MH
39 P	100 / 101	NAT TO 3'S	PT/FS	08/19/92	P	2X3	KL	162	MH	OCA	--
39 Q	102 / 103	67' TO 75'S OF NAT	PT/FS	08/22/92	P	1X12	VV	260	LS	08/22/92	MH
39 R	102 / 103	442' TO 448'S OF NAT	FS	08/25/92	RS	7'	SB	158	LS	08/25/92	JCL
39 S	103 / 104	455'S OF NAT	PT/FS	08/25/92	P	2X3	KT	158	LS	09/19/92	JCL
39 T	104 / 105	NAT TO 3'S	PT/FS	08/19/92	P	2X3	KL	162	MH	OCA	--
40 A	104 / 105	274' TO 281'S OF NAT	FS	08/25/92	RS	10'	KL	162	MH	08/25/92	JCL
40 B	104 / 105	<<< VOID >>>	--	--	--	--	--	--	--	--	--
40 C	105 / 106	590'S OF NAT	BO/PT	08/25/92	P	1X1	IOU	4	LS	08/25/92	JCL
40 D	105 / 106	640'S OF NAT	PT	09/21/92	P/RS	1X1/10'	VV	8	LS	09/21/92	JI

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
40 E	105 / 106	NAT TO 5'S	FS/PT	08/19/92	P	3X4	KL	162	MH	OCA	--
40 F	103 / 104	3'S OF NAT	PT	09/10/92	P	2X2	KT	158	JI	OCA	--
40 G	102 / 103	518'S OF NAT	BO/PT	08/25/92	P	1X2	IOU	4	LS	08/25/92	JCL
40 H	102 / 103	490'S OF NAT	BO/PT	08/25/92	P	2X3	IOU	4	LS	08/25/92	JCL
40 I	89 / 107	INT W/88	FS/PT	08/19/92	P	2X8	SP	4	MH	09/19/92	TM
40 J	90 / 108	INT W/91/109	PT	08/26/92	P	2X8	KL	162	MH	08/28/92	TM
40 K	94 / 113	INT W/95	PT	08/26/92	P	2X4	TE	4	MH	08/28/92	TM
40 M	91 / 109	INT W/110	PT	08/27/92	P	2X2	KL	162	MH	08/28/92	TM
40 N	107 / 108	148'N OF SAT	BO/PT	08/26/92	P	3X5	KL	162	MH	08/28/92	TM
40 P	107 / 108	179'N OF SAT	BO/PT	08/26/92	P	3X5	KL	162	MH	08/28/92	TM
40 Q	87 / 107	SAT TO 2'N	FS/PT	08/27/92	P	1X1	KL	162	MH	OCA	--
40 R	107 / 108	SAT TO 2'N	FS/PT	08/27/92	P	1X1	KL	162	MH	OCA	--
40 S	108 / 109	SAT TO 2'N	FS/PT	08/27/92	P	1X1	KL	162	MH	OCA	--
40 T	109 / 110	SAT TO 2'N	FS/PT	08/27/92	P	1X1	KL	162	MH	OCA	--
40 W	108 / 109	259'N OF SAT	BO/PT	08/26/92	P	1X3	KL	162	MH	08/28/92	TM
40 X	94 / 113	INT W/93	PT	08/26/92	P	3X3	KL	162	MH	08/28/92	TM
41 A	111 / 113	75'NSEOS	DS-94	08/28/92	P	3X5	SB	158	MH	08/28/92	TM
41 B	113 / 114	53'NSEOS	FM	08/28/92	P	4X8	KT	158	MH	08/28/92	TM
41 C	95 / 115	295' TO 305'NSEOS	IO	08/19/92	RS	1X10	K-MAI	4	MH	08/19/92	JCL
41 D	114 / 115	210'NSEOS	DS-95	08/26/92	P	2X5	TE	4	MH	08/28/92	TM
41 E	113 / 114	242'NSEOS	DS-96	08/26/92	P	2X5	TE	4	MH	08/28/92	TM
41 F	97 / 98	INT W/118	T	08/27/92	P	3X4	TE	4	MH	08/28/92	TM
41 G	117 / 118	241'NSEOS	WS	08/27/92	P	3X5	TE	4	MH	08/28/92	TM
41 H	118	233'NSEOS,7'E	D	08/27/92	P	1X2	TE	4	MH	08/28/92	TM
41 I	117 / 118	INT W/119	T	08/27/92	P	3X3	TE	4	MH	08/28/92	TM
41 J	116 / 117	4'W OF 118	DS-97	08/28/92	P	3X6	KT	158	TM	09/14/92	JI
41 K	119 / 120	16'NSEOS	D	08/27/92	P	2X2	BP	4	MH	09/14/92	JI
41 M	99 / 118	INT W/121	T	08/27/92	P	4X4	BP	4	MH	08/28/92	TM
41 N	98 / 99	INT W/118	T	08/27/92	P	3X5	BP	4	MH	08/28/92	TM

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
41 P	119 / 121	207'NSEOS	FM	08/27/92	P	3X4	BP	4	MH	08/28/92	TM
41 Q	106 / 122	208'SNEOS	WS	08/25/92	P	2X4	AV	8	JI	08/25/92	JCL
41 R	106 / 122	411'SNEOS	WS	08/25/92	P	2X2	KT	158	LS	08/25/92	JCL
41 S	75 / 76	7'E OF 74	DSE-03	08/27/92	P	3X4	KL	162	MH	08/28/92	TM
41 T	125 / 126	432'SNEOS	WS	08/25/92	P	2X2	SB	158	LS	08/29/92	TM
41 W	125 / 126	190'SNEOS	WS	08/25/92	P	1X2	BP	260	MH	08/29/92	TM
41 X	125 / 126	621'SNEOS	DS-104	09/14/92	P	2X5	IOU	8	LS	09/19/92	JCL
42 A	113 / 114	<<< COVERED BY 41B >>>	--	--	--	--	--	--	--	--	--
42 B	113 / 114	<<< COVERED BY 41B >>>	--	--	--	--	--	--	--	--	--
42 C	95 / 41C	INT W/114/115	T	08/26/92	P	2X3	TE	4	MH	08/28/92	TM
42 D	96 / 115	INT W/95	T	08/26/92	P	3X4	TE	4	MH	08/28/92	TM
42 E	96 / 115	INT W/97	T	08/26/92	P	3X4	TE	4	MH	08/28/92	TM
42 F	97 / 116	INT W/115	T	08/27/92	P	3X3	TE	4	MH	08/28/92	TM
42 G	116 / 117	INT W/115	T	08/27/92	P	4X6	TE	4	MH	08/28/92	TM
42 H	116 / 117	INT W/118	T	08/27/92	P	3X4	TE	4	MH	08/28/92	TM
42 I	97 / 116	INT W/118	T	08/27/92	P	3X4	TE	4	MH	08/28/92	TM
42 J	120 / 121	INT W/119	T	08/27/92	P	3X4	BP	4	MH	08/28/92	TM
42 K	119 / 120	<<< VOID >>>	--	--	--	--	--	--	--	--	--
42 M	117 / 119	SAT TO 2'N	PT/FS	08/27/92	P	1X2	BP	4	MH	OCA	--
42 N	115 / 117	SAT TO 2'N	PT/FS	08/27/92	P	2X2	BP	4	MH	OCA	--
42 P	114 / 115	SAT TO 2'N	PT/FS	08/28/92	P	1X1	KT	158	MH	OCA	--
42 Q	113 / 114	SAT TO 2'N	PT/FS	08/28/92	P	1X1	SB	158	MH	OCA	--
42 R	111 / 113	SAT TO 2'N	PT/FS	08/28/92	P	1X2	KT	158	MH	OCA	--
42 S	110 / 111	SAT TO 2'N	PT/FS	08/27/92	RS	5'	KL	162	MH	OCA	--
42 T	106 / 122	10'S OF NAT	PT	08/25/92	P	2X2	AV	8	JI	08/25/92	JCL
42 W	122 / 123	NAT TO 10'S	PT/FS	08/27/92	P	2X2	KT	158	MH	OCA	--
42 X	123 / 124	NAT TO 10'S	PT/FS	08/27/92	P	2X4	SB	158	MH	OCA	--
43 A	124 / 125	NAT TO 3'S	FS/PT	08/27/92	P	2X2	KT	158	MH	OCA	--
43 B	106 / 122	NAT TO 3'S	FS/PT	08/27/92	P	1X2	SB	158	MH	OCA	--

Golder Construction Services, Inc.

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
43 C	106 / 122	85'S OF NAT	PT	08/25/92	P	1X1	TE	260	MH	08/25/92	JCL
43 D	106 / 122	38'S OF NAT	PT	08/25/92	P	3X3	TE	260	MH	08/25/92	JCL
43 E	127 / 128	36'S OF NAT	BO/PT	08/31/92	P	2X2	KL	162	MH	09/02/92	MH
43 F	127 / 128	NAT TO 4'S	FS/PT	08/27/92	P	3X3	SB	158	MH	OCA	--
43 G	125 / 126	NAT TO 4'S	FS/PT	08/27/92	P	3X3	SB	158	MH	OCA	--
43 H	128 / 129	425'S OF NAT	BO/PT	09/02/92	P	2X2	SB	158	LS	09/02/92	MH
43 I	129 / 130	380'S OF NAT	BO/PT	08/31/92	P	2X2	SB	158	LS	09/02/92	MH
43 J	129 / 130	405' TO 413'S OF NAT	BO/PT	09/02/92	P	3X12	KT	158	LS	09/02/92	MH
43 K	129 / 130	584' TO 591'S OF NAT	BO/PT	09/14/92	P	2X3	IOU	8	LS	09/19/92	JCL
43 M	129 / 130	591' TO 594'S OF NAT	FS	09/14/92	P	1X2	IOU	8	LS	09/19/92	JCL
43 N	129 / 130	596'S OF NAT	BO/PT	09/14/92	P	2X3	IOU	8	LS	09/19/92	JCL
43 P	129 / 130	605'S OF NAT	BO/PT	09/14/92	P	1X1	IOU	8	LS	09/19/92	JCL
43 Q	129 / 130	605' TO 612'S OF NAT	FS	09/14/92	RS	6'	IOU	8	LS	09/19/92	JCL
43 R	129 / 130	612' TO 619'S OF NAT	IO	09/14/92	P	2X8	IOU	8	LS	09/19/92	JCL
43 S	129 / 130	NAT TO 3'S	FS/PT	08/27/92	P	1X1	KT	158	MH	09/11/92	MH
43 T	97	180'N OF AT,2'W	D	08/22/92	P	1X1	KL	162	JI	08/22/92	TD
44 A	125 / 126	169'SNEOS	BO	08/25/92	P	2X4	BP	260	MH	08/29/92	TM
44 B	126 / 127	264'SNEOS	DS-105	08/25/92	P	2X5	PT	8	JI	09/02/92	MH
44 C	127 / 128	440'SNEOS	WS	09/02/92	P	2X3	KT	158	LS	09/02/92	MH
44 D	126 / 127	164'SNEOS	DS-106	08/31/92	P	2X5	KT	158	LS	09/02/92	MH
44 E	127 / 128	603'SNEOS	BO	09/14/92	P	1X2	IOU	8	LS	09/19/92	JCL
44 F	127 / 128	178' TO 186'SNEOS	FS	08/31/92	RS	9'	KT	158	LS	09/02/92	MH
44 G	127 / 128	539'SNEOS	DS-107	09/14/92	P	2X4	IOU	8	LS	09/19/92	JCL
44 H	127 / 128	533'SNEOS	FM	09/14/92	P	2X3	IOU	8	LS	09/19/92	JCL
44 I	128 / 129	325'SNEOS	WS	08/25/92	P	2X3	PT	8	JI	09/02/92	MH
44 J	127 / 128	14'SNEOS	DS-108	08/31/92	P	3X5	KL	162	LS	09/02/92	MH
44 K	129 / 130	195'SNEOS	WS	08/31/92	P	2X2	SB	158	LS	09/02/92	MH
44 M	129 / 130	183'SNEOS	BO	08/31/92	P	2X2	KT	158	LS	09/02/92	MH
44 N	129 / 130	227'SNEOS	BO	08/31/92	P	2X3	KT	158	LS	09/02/92	MH

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
44 P	129 / 130	285'SNEOS	BO	08/31/92	P	2X2	SB	158	LS	09/02/92	MH
44 Q	129 / 130	312'SNEOS	BO	08/31/92	P	2X3	SB	158	LS	09/02/92	MH
44 R	129 / 130	336'SNEOS	BO	08/31/92	P	2X2	KT	158	LS	09/02/92	MH
44 S	129 / 130	478'SNEOS	BO	09/02/92	P	2X3	KT	158	LS	09/02/92	MH
44 T	129 / 130	518'SNEOS	FM	09/02/92	P	2X3	KT	158	LS	09/02/92	MH
44 W	130 / 131	420'SNEOS	WS	09/02/92	P	3X4	SB	158	LS	09/02/92	MH
44 X	130 / 131	396'SNEOS	BO	08/31/92	P	2X3	SB	158	LS	09/02/92	MH
45 A	106 / 122	629'S OF NAT	DS-98	09/14/92	P	2X5	IOU	8	LS	09/19/92	JCL
45 B	106 / 122	302'S OF NAT	FS	08/25/92	P	2X4	KL	162	MH	08/25/92	JCL
45 C	106 / 122	160'S OF NAT	DS-99	08/25/92	P	3X6	AV	8	JI	08/25/92	JCL
45 D	122 / 123	395'S OF NAT	WS	08/25/92	P	1X2	SB	158	LS	08/29/92	TM
45 E	122 / 123	40'S OF NAT	FM	08/25/92	P	3X10	BP	260	MH	08/25/92	JCL
45 F	122 / 123	180'S OF NAT	DS-100	08/25/92	P	2X5	PT	8	JI	08/25/92	JCL
45 G	123 / 124	396'S OF NAT	WS	08/25/92	P	2X3	KT	158	LS	08/29/92	TM
45 H	123 / 124	433'S OF NAT	DS-101	08/25/92	P	2X5	SB	158	LS	08/29/92	TM
45 I	123 / 124	182'S OF NAT	WS	08/25/92	P	2X3	PT	8	JI	08/29/92	TM
45 J	123 / 124	350'S OF NAT	FS	08/25/92	P	2X4	KL	162	MH	08/29/92	TM
45 K	124 / 125	215'S OF NAT	WS	08/25/92	P	2X3	BP	260	MH	08/25/92	JCL
45 M	124 / 125	403'S OF NAT	WS	08/25/92	P	2X2	KT	158	LS	08/29/92	TM
45 N	124 / 125	297'S OF NAT	DS-102	08/25/92	P	2X5	PT	8	JI	08/25/92	JCL
45 P	124 / 125	55'S OF NAT	DS-103	08/25/92	P	2X5	BP	260	MH	08/29/92	TM
45 Q	126 / 127	440'S OF NAT	WS	09/02/92	P	2X2	SB	158	LS	09/02/92	MH
45 R	126 / 127	190'S OF NAT	WS	08/31/92	P	2X2	SB	158	LS	09/02/92	MH
45 S	128	2'S OF NAT,3'E	D	08/27/92	P	3X4	KT	158	MH	OCA	--
45 T	128	8'S OF NAT,3'E	D	08/31/92	P	1X1	KL	162	LS	09/02/92	MH
45 W	126 / 127	134'S OF NAT	BO	08/31/92	P	2X4	KT	158	LS	09/02/92	MH
45 X	129	2'S OF NAT,15'W	D	08/27/92	P	1X1	KT	158	MH	09/11/92	MH
46 A	28 / 49	17'E OF 28/48/49	P	08/21/92	P	4X4	PT	4	MH	08/21/92	MH
46 B	28 / 49	28/49/51 TO 12'W	C	08/21/92	P	4X12	PT	4	MH	08/21/92	MH

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
46 C	49 / 50	INT W/51	C	08/21/92	P	4X8	PT	4	MH	08/21/92	MH
46 D	49 / 50	15'S OF 49/50/51	C	08/21/92	P	4X5	PT	4	MH	08/21/92	MH
46 E	28 / 48	NEOS TO SEOS	C	08/21/92	P	3X10	PT	4	MH	08/21/92	MH
46 F	48	12'S OF 27/48,10'W	P	08/21/92	P	3X3	SN	4	MH	08/21/92	MH
46 G	27 / 48	12'W OF 27/28/48	P	08/21/92	P	4X5	PT	4	MH	08/21/92	MH
46 H	91 / 92	455'S OF NAT	P	08/21/92	P	1X1	KLV	260	TD	08/22/92	TD
46 I	91 / 92	475'S OF NAT,3'W	P	08/21/92	P	1X1	KLV	260	TD	08/22/92	TD
46 J	72 / 73	320'S OF NAT	P	08/21/92	P	1X1	SB	158	TD	08/22/92	TD
46 K	64 / 65	<<< VOID >>>	--	--	--	--	--	--	--	--	--
46 M	65 / 66	315' TO 305'SNEOS	FS	08/26/92	RS	8'	SB	158	MH	08/26/92	MH
46 N	65 / 66	300' TO 290'SNEOS	FS	08/26/92	RS	13'	SB	158	MH	08/26/92	MH
46 P	65 / 66	290'SNEOS	DS-48N	08/26/92	P	2X5	KT	158	MH	08/26/92	MH
46 Q	122 / 123	180'SNEOS	D	08/25/92	P	2X4	BP	260	MH	08/25/92	JCL
46 R	127 / 128	186'SNEOS	PT	08/31/92	P	2X2	SB	158	LS	09/02/92	MH
46 S	127 / 128	178'SNEOS	PT	08/31/92	P	2X2	KT	158	LS	09/02/92	MH
46 T	132 / 133	314'SNEOS	WS	08/26/92	P	2X3	BL	162	MH	08/29/92	TM
46 W	132 / 133	345'SNEOS	WS	08/26/92	P	2X3	BL	162	MH	08/29/92	TM
46 X	132 / 133	450'SNEOS	DS-115	09/19/92	P	2X6	PT	162	JCL	09/19/92	JCL
47 A	89 / 90	125'S OF NAT	D	08/21/92	P	3X4	SP	260	MH	08/22/92	MH
47 B	106 / 122	121'S OF NAT	D	08/25/92	P	2X5	TE	260	MH	08/25/92	JCL
47 C	84 / 86	50'S OF NAT	D	08/26/92	P	2X2	BP	4	MH	08/28/92	TM
47 D	36 / 37	3'S OF NAT	D	08/26/92	P	2X2	SB	158	MH	OCA	--
47 E	92 / 93	INT W/110	D	08/26/92	P	4X4	KL	162	MH	08/28/92	TM
47 F	112 / 113	245'S OF NAT	D	08/26/92	P	2X2	KL	162	MH	08/28/92	TM
47 G	78 / 80	2'N OF SAT	D	08/27/92	P	3X4	KL	162	MH	OCA	--
47 H	151 / 152	550'S OF NAT	PT	09/09/92	P	2X3	IOU	8	MH	09/10/92	MH
47 I	150 / 151	INT W/152	PT	09/09/92	P	2X3	SB	158	LS	09/10/92	MH
47 J	150 / 152	2'S OF NAT	PT	08/31/92	P	2X2	PT	8	TM	OCA	--
47 K	150 / 152	15'S OF NAT	PT	09/15/92	P	2X4	SB	158	MH	09/15/92	MH

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
47 M	152 / 153	670'S OF NAT	PT	09/17/92	RS	2'	PT	227	LS	09/22/92	JCL
47 N	152 / 153	1'S OF NAT	PT	08/31/92	P	2X2	PT	8	TM	OCA	--
47 P	120 / 158	1'N OF SAT	PT	08/31/92	P	2X2	SS	4	TM	OCA	--
47 Q	120 / 158	55'N OF SAT	PT	09/11/92	P	3X5	SB	158	MH	09/14/92	JI
47 R	159 / 160	INT W/161	PT	09/11/92	P	2X2	KT	158	MH	09/14/92	JI
47 S	121 / 158	245' TO 300'N OF SAT	FS	09/02/92	RS	40'	KL	162	MH	09/14/92	JI
47 T	--	<<< VOID >>>	--	--	--	--	--	--	--	--	--
47 W	158 / 159	70'N OF SAT	PT	09/11/92	P	3X3	KT	158	MH	09/14/92	JI
47 X	158 / 159	66'N OF SAT	PT	09/11/92	P	3X3	SB	158	MH	09/14/92	JI
48 A	129	10'S OF NAT,15'W	D	09/12/92	P	1X1	KT	158	MH	09/12/92	MH
48 B	130 / 131	65'S OF NAT	BO	08/31/92	P	2X2	KL	162	LS	09/02/92	MH
48 C	130 / 131	56'S OF NAT	BO	08/31/92	P	2X5	KL	162	MH	09/02/92	MH
48 D	130 / 131	37'S OF NAT	FM	08/31/92	P	2X6	KL	162	LS	09/02/92	MH
48 E	132	1'S OF NAT,5'W	D	08/27/92	P	1X1	KT	158	MH	OCA	--
48 F	73 / 89	548'S OF NAT	FS	08/22/92	P	2X6	SB	158	JCL	08/28/92	TM
48 G	73	45'S OF NAT,21'W	FM	08/22/92	RS	21'	VV	260	LS	08/22/92	MH
48 H	73	45'S OF NAT,21'W	FM	08/22/92	P	1X1	VV	260	LS	08/22/92	MH
48 I	73 / 89	135'S OF NAT	BO	08/22/92	P	1X1	VV	260	LS	08/22/92	MH
48 J	135	5'S OF NAT,19'W	D	08/27/92	P	2X2	SB	158	MH	09/11/92	MH
48 K	135	7'S OF NAT,20'W	D	08/27/92	P	2X2	KT	158	MH	09/11/92	MH
48 M	135	2'S OF NAT,12'W	D	08/27/92	P	1X2	SB	158	MH	OCA	--
48 N	136	5'S OF NAT,20'W	D	08/27/92	P	1X1	SB	158	MH	OCA	--
48 P	136	11'S OF NAT,20'W	D	09/12/92	P	1X1	SB	158	MH	09/12/92	MH
48 Q	148 / 149	38'S OF NAT	FM	09/09/92	P	2X6	KL	162	LS	09/10/92	MH
48 R	--	<<< VOID >>>	--	--	--	--	--	--	--	--	--
48 S	147 / 148	35'S OF NAT TO NAT	CO	09/14/92	C	2X40	SB/KT	158	MH	09/15/92	MH
48 T	--	<<< VOID >>>	--	--	--	--	--	--	--	--	--
48 W	122 / 123	40'S OF NAT(45E)	DSE-4	09/10/92	P	3X6	SB	158	JI	09/11/92	MH
48 X	102 / 103	533'S OF NAT(30D)	DSE-5	09/10/92	P	2X6	SB	158	JI	09/11/92	MH

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
49 A	130 / 131	207'SNEOS	WS	08/29/92	P	4X4	SP	158	MH	08/29/92	TM
49 B	129 / 130	637'SNEOS	DS-109	09/14/92	P	2X5	IOU	8	LS	09/19/92	JCL
49 C	129 / 130	294'SNEOS	DS-110	08/31/92	P	2X5	KT	158	LS	09/02/92	MH
49 D	129 / 130	180'SNEOS	DS-111	08/31/92	P	2X5	SB	158	LS	09/02/92	MH
49 E	130 / 131	215'SNEOS	BO	08/29/92	P	3X5	SP	158	MH	08/29/92	TM
49 F	130	318'SNEOS,3'W	D	08/31/92	P	1X1	KT	158	LS	09/08/92	MH
49 G	130 / 131	542'SNEOS	BO	09/02/92	P	2X2	SB	158	LS	09/02/92	MH
49 H	130 / 131	562'SNEOS	BO	09/14/92	P	2X2	IOU	8	LS	09/19/92	JCL
49 I	130 / 131	655'SNEOS	PT	09/14/92	P/RS	2X6/6'	IOU	8	LS	09/22/92	JCL
49 J	131 / 132	400'SNEOS	WS	08/31/92	P	2X2	SB	158	LS	09/02/92	MH
49 K	130 / 131	437'SNEOS	BO	09/02/92	P	2X2	SB	158	LS	09/02/92	MH
49 M	131 / 132	200'SNEOS	WS	08/29/92	P	2X2	SP	158	MH	08/29/92	TM
49 N	131 / 132	175'SNEOS	BO	08/31/92	P	1X2	KL	162	LS	09/08/92	MH
49 P	131 / 132	274'SNEOS	WS	08/29/92	P	2X3	IOU	8	MH	08/29/92	TM
49 Q	131 / 132	650'SNEOS	DS-112	09/19/92	P	2X6	SP	158	LS	09/19/92	JCL
49 R	131 / 132	262'SNEOS	DS-113	08/29/92	P	2X5	IOU	8	MH	08/29/92	TM
49 S	131 / 132	137'SNEOS	DS-114	08/31/92	P	3X5	KL	162	LS	09/08/92	MH
49 T	72 / 73	60'SNEOS	D	08/22/92	P	1X1	VV	260	JI	08/22/92	MH
49 W	68 / 69	133'SNEOS	D	08/22/92	P	2X2	KL	162	JI	08/25/92	JCL
49 X	68 / 69	115'SNEOS	D	08/22/92	P	1X1	KL	162	JI	08/25/92	JCL
50 A	105 / 106	590'S OF NAT	VL	08/25/92	GW	8'	KT	158	LS	09/21/92	JI
50 B	104 / 105	550'S OF NAT	VL	08/25/92	P	1X1	KT	158	LS	08/29/92	TM
50 C	122 / 123	180'S OF NAT	VL	08/26/92	GW	2'	BL	162	MH	08/29/92	TM
50 D	131 / 132	NAT TO 3'S	FS/PT	08/27/92	P	1X2	KT	158	MH	OCA	--
50 E	130 / 131	NAT TO 1'S	FS	08/27/92	P	2X3	SB	158	MH	OCA	--
50 F	133 / 134	94'S OF NAT	PT	08/31/92	P	2X2	KL	162	LS	09/08/92	MH
50 G	133 / 134	50'S OF NAT	PT	08/31/92	P	2X2	PT	8	TM	09/08/92	MH
50 H	133 / 134	33'S OF NAT	PT	08/31/92	P	1X2	KL	162	LS	09/08/92	MH
50 I	133 / 134	28'S OF NAT	PT	08/31/92	P	1X2	KL	162	LS	09/08/92	MH

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APPENDIX J

GEOMEMBRANE REPAIR SUMMARY - POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
50 J	133 / 134	NAT TO 5'S	PT	08/27/92	P	3X5	KT	158	MH	09/08/92	MH
50 K	133 / 134	5' TO 28'S OF NAT	FS	08/31/92	RS	25'	KL	162	LS	09/08/92	MH
50 M	133 / 134	28'S OF NAT	PT	08/31/92	P	4'	KL	162	LS	09/08/92	MH
50 N	133 / 134	28' TO 33'S OF NAT	FS	08/31/92	RS	8'	KL	162	JCL	09/08/92	MH
50 P	135 / 136	83'S OF NAT	PT	09/02/92	P	2X2	SS	8	LS	09/08/92	MH
50 Q	135 / 136	213'S OF NAT	BO	09/02/92	P	2X5	SS	8	LS	09/08/92	MH
50 R	140 / 141	480' TO 488'S OF NAT	FS	09/08/92	RS	8'	IOU	8	JCL	09/09/92	JCL
50 S	141 / 142	NAT TO 3'S	FS	08/31/92	P	2X2	PT	8	TM	OCA	--
50 T	140 / 141	NAT TO 5'S	FS	08/27/92	P	2X2	KT	158	TM	OCA	--
50 W	138 / 139	NAT TO 4'S	FS	08/27/92	P	1X1	SB	158	MH	OCA	--
50 X	137 / 138	NAT TO 3'S	FS	08/27/92	P	1X1	KT	158	MH	OCA	--
51 A	133 / 134	300'SNEOS	WS	08/31/92	P	2X4	KT	158	LS	09/08/92	MH
51 B	133 / 134	194'SNEOS	BO	08/31/92	P	2X2	KL	162	LS	09/11/92	MH
51 C	134 / 135	350'SNEOS	WS	09/02/92	P	2X3	KT	158	LS	09/09/92	JCL
51 D	135 / 136	315'SNEOS	WS	09/02/92	P	2X3	SB	158	LS	09/09/92	JCL
51 E	134 / 135	276'SNEOS	DS-116	09/02/92	P	2X5	SKP	8	LS	09/08/92	MH
51 F	135 / 136	51'SNEOS	IO	09/02/92	P	2X4	SS	8	LS	09/08/92	MH
51 G	133 / 134	57'SNEOS	DS-117	08/31/92	P	2X5	KL	162	LS	09/08/92	MH
51 H	136 / 137	397'SNEOS	BO	09/12/92	P	3X4	SB	158	MH	09/11/92	MH
51 I	136 / 137	335' TO 397'SNEOS	FS	09/12/92	P	60'	SB	158	MH	09/11/92	MH
51 J	135 / 136	359'SNEOS	DS-119	09/02/92	GW	2X2	SB	158	LS	09/09/92	JCL
51 K	135 / 136	540'SNEOS	BO	09/19/92	P	1X1	PT	162	JCL	09/19/92	JCL
51 M	135 / 136	554'SNEOS	BO	09/19/92	P	1X1	PT	162	JCL	09/19/92	JCL
51 N	135 / 136	591' TO 603'SNEOS	D	09/19/92	C	1X13	PT	162	JCL	09/19/92	JCL
51 P	135 / 136	625'SNEOS	WS	09/19/92	P	2X2	PT	162	JCL	09/19/92	JCL
51 Q	136 / 137	174'SNEOS	DS-120	09/08/92	P	2X5	IOU	8	LS	09/09/92	JCL
51 R	136 / 137	500'SNEOS	WS	09/19/92	P	3X4	PT	162	JCL	09/19/92	JCL
51 S	136 / 137	629'SNEOS	FM	09/18/92	P	3X3	KL	162	MH	09/19/92	JCL

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY - POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
51 T	137 / 138	350'SNEOS	WS	09/02/92	P	2X2	SKP	8	LS	09/09/92	JCL
51 W	138 / 139	35' TO 50'SNEOS	IO	09/08/92	RS	15'	KL	162	JCL	09/09/92	JCL
51 X	137 / 138	307'SNEOS	FM	09/02/92	P	2X3	SKP	8	LS	09/09/92	JCL
52 A	137 / 138	553'SNEOS	IO	09/18/92	P	2X3	KL	162	MH	09/19/92	JCL
52 B	137 / 138	588'SNEOS	FM	09/18/92	P	2X3	KL	162	MH	09/28/92	TM
52 C	137 / 138	623'SNEOS	BO	09/18/92	P	1X1	KL	162	MH	09/19/92	JCL
52 D	138 / 139	630'SNEOS	BO	09/18/92	P	2X6	PT	227	MH	09/19/92	JCL
52 E	137 / 138	607'SNEOS	BO	09/18/92	P	1X1	KL	162	MH	09/19/92	JCL
52 F	138 / 139	623'SNEOS	BO	09/18/92	P	1X1	PT	227	MH	09/19/92	JCL
52 G	138 / 139	549'SNEOS	IO	09/18/92	GW	12"	KL	162	MH	09/19/92	JCL
52 H	138 / 139	344'SNEOS	WS	09/02/92	P	2X3	SKP	8	LS	09/09/92	JCL
52 I	138 / 139	205'SNEOS	BO	09/08/92	P	2X4	IOU	8	LS	09/09/92	JCL
52 J	137 / 138	289'SNEOS	DS-121	09/02/92	P	2X5	SKP	8	LS	09/09/92	JCL
52 K	138 / 139	85'SNEOS	DS-122	09/08/92	P	2X5	IOU	8	LS	09/09/92	JCL
52 M	137 / 138	507'SNEOS	DS-123	09/18/92	P	2X5	KL	162	MH	09/19/92	JCL
52 N	136 / 137	401'SNEOS	DS-118	09/12/92	P	3X5	KT	158	MH	09/19/92	JCL
52 P	138 / 139	532'SNEOS	DS-124	09/18/92	P	2X5	KL	162	MH	09/19/92	JCL
52 Q	139 / 140	641'SNEOS	DS-125	09/18/92	P	2X5	KL	162	MH	09/19/92	JCL
52 R	140 / 141	45'SNEOS	CR	09/14/92	P	3X3	SB	158	MH	09/14/92	MH
52 S	140 / 141	191'SNEOS	DS-126	09/08/92	P	2X5	KL	162	LS	09/09/92	JCL
52 T	140 / 141	488'SNEOS	IO	09/08/92	P	1X1	IOU	8	JCL	09/09/92	JCL
52 W	140 / 141	331'SNEOS	BO	09/02/92	P	1X1	SKP	8	LS	09/09/92	JCL
52 X	141 / 142	350'SNEOS	WS	09/08/92	P	1X3	IOU	8	JCL	09/09/92	JCL
53 A	141 / 142	398'SNEOS	BO	09/08/92	P	2X3	IOU	8	JCL	09/09/92	JCL
53 B	141 / 142	510'SNEOS	WS	09/08/92	P	2X2	IOU	8	LS	09/09/92	JCL
53 C	141 / 142	635'SNEOS	BO	09/19/92	P	2X3	SS	162	JCL	09/19/92	JCL
53 D	141 / 142	523'SNEOS	DS-127	09/08/92	P	2X5	IOU	8	LS	09/09/92	JCL
53 E	141 / 142	89'SNEOS	DS-128	09/08/92	P	2X5	KL	162	LS	09/09/92	JCL

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
53 F	142 / 143	318'SNEOS	WS	09/08/92	P	2X3	KL	162	JCL	09/09/92	JCL
53 G	142 / 143	330'SNEOS	DS-129	09/08/92	P	2X5	KL	162	LS	09/09/92	JCL
53 H	142 / 143	129'SNEOS	DS-130	09/08/92	P	2X6	KL	162	JCL	09/09/92	JCL
53 I	143 / 144	22'SNEOS	BO	09/14/92	P	2X4	KT	158	MH	09/14/92	MH
53 J	144 / 145	350'SNEOS	WS	09/08/92	P	2X2	KL	162	LS	09/09/92	JCL
53 K	143 / 144	383'SNEOS	DS-131	09/08/92	P	2X5	IOU	8	LS	09/09/92	JCL
53 M	145 / 146	300'SNEOS	WS	09/08/92	P	3X6	KL	162	LS	09/09/92	JCL
53 N	145 / 146	278'SNEOS	BO	09/08/92	P	2X2	KL	162	LS	09/09/92	JCL
53 P	145 / 146	612'SNEOS	BO	09/08/92	P	2X5	IOU	8	LS	09/19/92	JCL
53 Q	145 / 146	290'SNEOS	DS-133	09/08/92	P	2X5	KL	162	LS	09/09/92	JCL
53 R	146 / 147	350'SNEOS	WS	09/08/92	P	2X9	IOU	8	LS	09/09/92	JCL
53 S	145 / 146	529'SNEOS	FM	09/08/92	P	2X5	IOU	8	LS	09/09/92	JCL
53 T	146 / 147	486'SNEOS	DS-132	09/08/92	P	2X5	IOU	8	LS	09/10/92	MH
53 W	145 / 146	437'SNEOS	FM	09/08/92	P	3X5	IOU	8	LS	09/09/92	JCL
53 X	145 / 146	42'SNEOS	BO	08/31/92	P	2X2	PT	8	TM	09/10/92	MH
54 A	136 / 137	NAT TO 4'S	FS	08/27/92	P	1X2	SB	158	MH	OCA	--
54 B	135 / 136	NAT TO 3'S	FS	08/27/92	P	2X2	KT	158	MH	OCA	--
54 C	132 / 133	14'SNAT	PT	09/02/92	P	1X2	SKP	8	LS	09/08/92	MH
54 D	132 / 133	3' TO 14'SNAT	FS	09/02/92	P	1X2	SS	8	LS	09/08/92	MH
54 E	132 / 133	NAT TO 3'S	FS	08/27/92	P	2X3	SB	158	MH	OCA	--
54 F	142 / 143	NAT TO 3'S	FS	08/31/92	P	2X2	PT	8	TM	OCA	--
54 G	143 / 144	NAT TO 3'S	FS	08/31/92	P	2X2	PT	8	TM	OCA	--
54 H	143 / 144	300'SNAT	PT	09/09/92	P	2X2	KL	162	JCL	09/09/92	JCL
54 I	146 / 147	30'SNAT	PT	09/08/92	P	3X5	KL	162	JCL	09/10/92	MH
54 J	146 / 147	NAT TO 3'S	FS	08/31/92	P	2X2	PT	8	TM	OCA	--
54 K	145 / 146	NAT TO 3'S	FS	08/31/92	P	2X2	PT	8	TM	OCA	--
54 M	144 / 145	NAT TO 3'S	FS	08/31/92	P	2X2	PT	8	TM	OCA	--
54 N	148 / 149	189' TO 196'SNAT	BO	09/09/92	P	2X12	KT	158	LS	09/10/92	MH

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
54 P	148 / 149	506' TO 510'SNAT	FS	09/11/92	GW	2'	IOU	158	LS	09/10/92	MH
54 Q	148 / 149	510'SNAT	PT	09/11/92	P	1X2	IOU	158	LS	09/10/92	MH
54 R	149 / 150	337'SNAT	PT	09/09/92	P	3X3	IOU	8	MH	09/10/92	MH
54 S	149 / 150	250'SNAT	PT	09/11/92	P	1X2	KT	158	LS	09/10/92	MH
54 T	149 / 150	88'SNAT	PT	09/09/92	P	2X3	KL	162	JCL	09/10/92	MH
54 W	149 / 150	NAT TO 3'S	FS	08/31/92	P	2X2	PT	8	TM	OCA	--
54 X	148 / 149	NAT TO 3'S	FS	08/31/92	P	2X2	PT	8	TM	OCA	--
55 A	145 / 146	30'SNEOS	BO	09/08/92	P	2X5	KL	162	JCL	09/10/92	MH
55 B	146 / 147	< COVERED BY 53R >	DS-134	--	--	--	--	--	--	--	--
55 C	146 / 147	522'SNEOS	BO	09/08/92	P	2X3	IOU	8	LS	09/10/92	MH
55 D	145 / 146	406' TO 415'SNEOS	IO	09/08/92	P	2X12	IOU	8	LS	09/09/92	JCL
55 E	147 / 148	350'SNEOS	WS	09/08/92	P	2X2	IOU	8	LS	09/09/92	JCL
55 F	147 / 148	450'SNEOS	BO	09/08/92	P	1X2	IOU	8	LS	09/10/92	MH
55 G	147 / 148	249'SNEOS	DS-135	09/09/92	P	2X5	KT	158	LS	09/10/92	MH
55 H	148 / 149	340'SNEOS	WS	09/08/92	P	2X3	KT	158	LS	09/10/92	MH
55 I	148 / 149	350'SNEOS	DS-136	09/08/92	P	2X6	SB	158	LS	09/10/92	MH
55 J	148 / 149	506'SNEOS	BO	09/08/92	P	3X4	IOU	8	LS	09/10/92	MH
55 K	148 / 149	533'SNEOS	BO	09/08/92	P	1X1	IOU	8	LS	09/10/92	MH
55 M	148 / 149	592'SNEOS	BO	09/08/92	P	2X2	IOU	8	LS	09/10/92	MH
55 N	148 / 149	300'SNEOS	WS	09/08/92	P	2X3	SB	158	LS	09/10/92	MH
55 P	148 / 149	232' TO 250'SNEOS	IO	09/08/92	C	2X24	KT	158	LS	09/10/92	MH
55 Q	148 / 149	203'SNEOS	FM	09/09/92	P	2X3	SB	158	LS	09/10/92	MH
55 R	148 / 149	196' TO 203'SNEOS	FS	09/09/92	RS	4'	SB	158	LS	09/10/92	MH
55 S	148 / 149	180'SNEOS	DS-137	09/09/92	P	2X3	IOU	8	LS	09/10/92	MH
55 T	149 / 151	350' TO 357'SNEOS	FS	09/09/92	P	3X7	IOU	8	MH	09/10/92	MH
55 W	149 / 151	468'SNEOS	BO	09/08/92	P	2X3	IOU	8	LS	09/10/92	MH
55 X	149 / 151	482'SNEOS	BO	09/08/92	P	2X3	IOU	8	LS	09/10/92	MH
56 A	149 / 150	55' TO 58'SNEOS	FS	09/08/92	P	2X6	KL	162	JCL	09/10/92	MH

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
56 B	149 / 150	95'SNEOS	BO	09/09/92	P	1X2	KL	162	JCL	09/10/92	MH
56 C	149 / 150	121'SNEOS	BO	09/09/92	P	2X5	KL	162	LS	09/10/92	MH
56 D	149 / 150	140'SNEOS	BO	09/09/92	P	2X3	KL	162	LS	09/10/92	MH
56 E	149 / 151	154' TO 174'SNEOS	FS	09/09/92	C	2X20	KL	162	LS	09/10/92	MH
56 F	151 / 152	283'SNEOS	D	09/10/92	P	1X1	SB	158	LS	09/15/92	MH
56 G	151 / 152	350'SNEOS	WS	09/09/92	P	2X3	IOU	8	MH	09/15/92	MH
56 H	151 / 152	528'SNEOS	BO	09/09/92	P	2X2	IOU	8	MH	09/10/92	MH
56 I	151 / 152	535'SNEOS	BO	09/09/92	P	2X2	IOU	8	MH	09/10/92	MH
56 J	149 / 151	531'SNEOS	FM	09/08/92	P	2X2	IOU	8	LS	09/10/92	MH
56 K	149 / 151	505'SNEOS	BO	09/08/92	P	2X2	IOU	8	LS	09/10/92	MH
56 M	149 / 150	81'SNEOS	PT	09/09/92	P	2X3	KL	162	JCL	09/10/92	MH
56 N	149 / 151	358'SNEOS	DS-138	09/09/92	P	3X5	IOU	8	MH	09/10/92	MH
56 P	149 / 151	600'SNEOS	DS-139	09/08/92	P	3X5	IOU	8	LS	09/10/92	MH
56 Q	151 / 152	500'SNEOS	DS-140	09/09/92	P	2X5	IOU	8	MH	09/10/92	MH
56 R	150 / 152	60'SNEOS	DS-141	09/09/92	P	2X5	KL	162	LS	09/10/92	MH
56 S	152 / 153	335'SNEOS	WS	09/09/92	P	2X5	IOU	8	MH	09/15/92	MH
56 T	152 / 153	626'SNEOS	DS-142	09/17/92	P	2X5	PT	227	LS	09/19/92	JCL
56 W	152 / 153	331'SNEOS	BO	09/09/92	P	2X2	KL	162	LS	09/19/92	LS
56 X	152 / 153	160'SNEOS	DS-143	09/10/92	P	2X5	KL	162	MH	09/10/92	MH
57 A	156	495'SNAT,18'E	D	09/10/92	P	2X2	IOU	8	LS	09/10/92	MH
57 B	156	495'SNAT,12'E	D	09/10/92	P	1X1	IOU	8	LS	09/10/92	MH
57 C	156	499'SNAT,12'E	D	09/10/92	P	1X1	IOU	8	LS	09/10/92	MH
57 D	156	503'SNAT,12'E	D	09/10/92	P	1X1	IOU	8	LS	09/10/92	MH
57 E	156	499'SNAT,18'E	D	09/10/92	P	1X1	IOU	8	LS	09/10/92	MH
57 F	131 / 132	250'SNAT	BO	08/31/92	P	2X2	SB	158	LS	09/02/92	TM
57 G	149 / 150	INT W/151	FS	09/09/92	P	2X5	SB	158	LS	09/10/92	MH
57 H	149 / 151	INT W/150	PT	09/09/92	P	2X3	KT	158	LS	09/10/92	MH
57 I	150 / 151	3'E OF 149	FS	09/09/92	RS	7'	SB	158	LS	09/10/92	MH

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
57 J	150 / 151	9'E OF 149	FS	09/09/92	P	1X3	SB	158	LS	09/10/92	MH
57 K	150 / 151	16'E OF 149	FS	09/09/92	RS	5'	SB	158	LS	09/10/92	MH
57 M	150 / 151	19'E OF 149	FS	09/09/92	P	2X2	KT	158	LS	09/10/92	MH
57 N	150 / 151	21'E TO EEOS	FS	09/09/92	RS	15'	KT	158	LS	09/10/92	MH
57 P	150	90'SNAT,15'W	D	09/09/92	P	1X1	KL	162	LS	09/10/92	MH
57 Q	157 / 164	650'SNAT	FS	09/10/92	RS	2'	KT	158	JI	09/10/92	MH
57 R	190	200'SNAT,9'W	D	09/21/92	P	1X1	VV	8	LS	09/22/92	JCL
57 S	203	6'SNAT,16'W	D	09/15/92	P	1X1	PT	227	MH	OCA	--
57 T	205	< COVERED BY 87F >	--	--	--	--	--	--	--	--	--
57 W	205	< VOID >	--	--	--	--	--	--	--	--	--
57 X	208	275'SNAT,9'E	D	09/23/92	C	2X45	VV	8	LS	09/22/92	LS
58 A	92 / 93	590'SNEOS	VL	09/02/92	GW	4'	SKP	8	LS	09/02/92	MH
58 B	167 / 168	455'SNAT	BO	09/17/92	P	2X3	KL	162	MH	09/18/92	LS
58 C	167 / 168	400'SNAT	WS	09/17/92	P	2X2	SB	158	MH	09/18/92	LS
58 D	167 / 168	200'SNAT	PT	09/17/92	P	3X3	SB	158	MH	09/18/92	LS
58 E	167 / 168	22'SNAT	BO	09/17/92	P	1X2	KT	158	MH	09/18/92	LS
58 F	167 / 168	2'SNAT	PT	09/17/92	P	2X2	KT	158	MH	OCA	--
58 G	169 / 170	29'SNAT	T	09/17/92	P	4X4	SB	158	MH	09/18/92	LS
58 H	169 / 170	@ NAT	PT	09/04/92	P	1X1	SN	8	MH	OCA	--
58 I	170 / 172	@ NAT	PT	09/04/92	P	1X1	PT	8	MH	OCA	--
58 J	171 / 172	@ EAT	PT	09/04/92	P	1X1	PT	8	MH	OCA	--
58 K	173 / 174	@ EAT	PT	09/18/92	P	1X1	KT	158	LS	OCA	--
58 M	176 / 177	@ EAT	PT	09/04/92	P	2X2	SN	8	MH	OCA	--
58 N	173 / 174	@ EAT	PT	09/04/92	P	2X2	PT	8	MH	OCA	--
58 P	164 / 165	300'SNAT	WS	09/10/92	P	2X5	KL	162	LS	09/17/92	MH
58 Q	164 / 165	150'SNAT	PT	09/10/92	P	2X4	KL	162	MH	09/17/92	MH
58 R	157 / 164	325'SNAT	FS	09/10/92	RS	9'	KT	158	MH	09/17/92	MH
58 S	157 / 164	336' TO 350'SNAT	C	09/10/92	C	3X16	SB	158	MH	09/17/92	MH

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
58 T	157 / 164	350' TO 360'SNAT	FS	09/10/92	RS	10'	KT	158	MH	09/17/92	MH
58 W	157 / 164	360'SNAT	PT	09/10/92	P	2X4	KT	158	MH	09/17/92	MH
58 X	157 / 164	360' TO 380'SNAT	FS	09/10/92	RS	24'	IOU	8	LS	09/17/92	MH
59 A	153 / 154	NEOS TO 7'S	FS	08/31/92	P	2X2	PT	8	TM	OCA	--
59 B	153 / 154	37' TO 46'SNEOS	FS	09/15/92	P	3X10	SB	158	MH	09/15/92	MH
59 C	153 / 154	76'SNEOS	DS-144	09/10/92	P	2X5	KL	162	MH	09/15/92	MH
59 D	154 / 155	319'SNEOS	WS	09/09/92	P	2X2	IOU	8	MH	09/15/92	MH
59 E	155 / 156	350'SNEOS	WS	09/09/92	P	3X4	IOU	8	MH	09/15/92	MH
59 F	153 / 154	307'SNEOS	BO	09/09/92	P	2X5	IOU	8	MH	09/15/92	MH
59 G	154 / 155	30'SNEOS	BO	09/15/92	P	3X5	KT	158	MH	09/15/92	MH
59 H	154 / 155	60'SNEOS	DS-145	09/10/92	P	2X5	KL	162	MH	09/15/92	MH
59 I	154 / 155	450'SNEOS	WS	09/09/92	P	2X4	IOU	8	MH	09/10/92	MH
59 J	155 / 156	535' TO 540'SNEOS	D	09/09/92	P	1X6	IOU	8	MH	09/10/92	MH
59 K	155 / 156	438'SNEOS	DS-146	09/10/92	P	2X5	IOU	8	LS	09/10/92	MH
59 M	154 / 155	576'SNEOS	BO	09/09/92	P	2X3	IOU	8	MH	09/10/92	MH
59 N	154 / 155	583'SNEOS	BO	09/09/92	P	2X3	IOU	8	MH	09/10/92	MH
59 P	155 / 156	176'SNEOS	DS-147	09/10/92	P	2X5	KT	158	MH	09/15/92	MH
59 Q	156 / 157	390'SNEOS	DS-148	09/10/92	P	2X5	IOU	8	LS	09/10/92	MH
59 R	156 / 157	555'SNEOS	BO	09/10/92	P	2X3	IOU	8	LS	09/10/92	MH
59 S	156 / 157	593' TO 598'SNEOS	IO	09/10/92	P	2X9	IOU	8	LS	09/10/92	MH
59 T	156 / 157	602'SNEOS	BO	09/10/92	P	1X1	IOU	8	LS	09/10/92	MH
59 W	121	185'NSEOS,1'W	D	08/28/92	P	2X2	KT	158	MH	09/14/92	JCL
59 X	121 / 158	69'NSEOS	BO	09/11/92	P	2X2	SB	158	MH	09/14/92	JCL
60 A	121 / 158	< COVERED BY 60B >	--	09/02/92	P	2X14	KL	162	MH	--	--
60 B	121 / 158	241'NSEOS	BO	09/02/92	P	2X14	KL	162	MH	09/14/92	JCL
60 C	120 / 158	< VOID >	--	--	--	--	--	--	--	--	--
60 D	100 / 160	8'E OF 158	BO	09/11/92	P	3X4	SB	158	MH	09/14/92	JCL
60 E	161 / 162	156'NSEOS	BO	09/14/92	P	2X2	KL	162	LS	09/14/92	JCL

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
60 F	161 / 162	119'NSEOS	FM	09/14/92	P	2X3	KL	162	LS	09/14/92	JCL
60 G	158 / 159	120'NSEOS	DS-150	09/11/92	P	3X5	KT	158	MH	09/14/92	JCL
60 H	161 / 162	39'NSEOS	DS-151	09/14/92	P	2X5	KL	162	LS	09/14/92	JCL
60 I	162 / 163	8'EWEOS	DS-152	09/14/92	P	2X5	KL	162	LS	09/14/92	JCL
60 J	102	663'SNEOS,8'E	D	09/14/92	P	1X1	KL	162	LS	09/22/92	JCL
60 K	157 / 164	325'SNEOS	WS	09/10/92	P	3X3	KT	158	MH	09/17/92	MH
60 M	157 / 164	218'SNEOS	BO	09/10/92	P	2X2	SB	158	MH	09/19/92	JCL
60 N	157 / 164	577'SNEOS	FM	09/10/92	P	2X2	KT	158	MH	09/19/92	JCL
60 P	127 / 128	14' TO 24'SNEOS	FS	09/10/92	RS	20'	SB	158	JI	09/11/92	MH
60 Q	128 / 129	320' TO 325'SNEOS	FS	09/02/92	RS	6'	KT	158	LS	09/02/92	MH
60 R	64 / 65	480'SNEOS	D	09/03/92	P	2X3	KT	158	TM	09/03/92	TM
60 S	64 / 65	576'SNEOS	D	09/03/92	P	2X2	KT	158	TM	09/03/92	TM
60 T	68	30'SNEOS,12'E	D	09/03/92	P	1X1	KT	158	TM	09/03/92	TM
60 W	68	15'SNEOS,7'E	D	09/03/92	P	1X1	KT	158	TM	09/03/92	TM
60 X	69 / 70	NEOS TO 2'S	FS	09/03/92	GW	2'	KT	158	TM	OCA	--
61 A	155 / 156	NAT TO 5'S	FS	08/31/92	RS	6'	PT	8	TM	08/31/92	MH
61 B	155 / 156	5'SNAT	PT	08/31/92	P	2X2	PT	8	TM	08/31/92	MH
61 C	156 / 157	425'SNAT	PT	09/10/92	P	2X2	IOU	8	LS	09/10/92	MH
61 D	156 / 157	507'SNAT	PT	09/09/92	P	2X3	IOU	8	MH	09/10/92	MH
61 E	156 / 157	515'SNAT	PT	09/09/92	P	1XZ	IOU	8	MH	09/10/92	MH
61 F	156 / 157	598' TO 602'SNAT	FS	09/10/92	RS	3'	IOU	8	LS	09/10/92	MH
61 G	99 / 100	INT W/121/158	T	09/02/92	P	4X12	KL	162	MH	09/14/92	JCL
61 H	120 / 121	INT W/158	T	09/11/92	P	3X5	SB	158	MH	09/14/92	JCL
61 I	121 / 158	192'SNAT	BO	08/29/92	P	3X10	KL	162	LS	09/14/92	JCL
61 J	159 / 160	INT W/158	T	09/11/92	P	3X5	SB	158	MH	09/14/92	JCL
61 K	100 / 101	INT W/158/160	T	09/11/92	P	3X17	SB	158	MH	09/14/92	JCL
61 M	158 / 160	294' TO NEOS	FS	09/11/92	P	2X10	KT	158	MH	09/14/92	JCL
61 N	101 / 160	INT W/102/161	FS	09/14/92	P	2X7	KL	162	LS	09/22/92	JCL

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
61 P	121 / 158	280'NSAT	BO	09/02/92	P	1X1	KL	162	MH	09/14/92	JCL
61 Q	132 / 133	8' TO 10'SNAT	FS	09/02/92	RS	5'	SS	8	LS	09/08/92	MH
61 R	139 / 140	350'SNAT	PT	09/02/92	P	2X2	SKP	8	LS	09/09/92	JCL
61 S	140 / 141	350'SNAT	PT	09/02/92	P	2X2	SKP	8	LS	09/09/92	JCL
61 T	184	4'NSAT,12'W	D	09/14/92	P	1X1	PT	227	JCL	OCA	--
61 W	184	4'SNAT,14'W	D	09/14/92	P	2X2	PT	227	JCL	OCA	--
61 X	162 / 184	156'NSAT	IO	09/14/92	P	2X3	KL	162	LS	09/14/92	JCL
62 A	147 / 148	1'SNEOS	CO	08/31/92	P	6X13	PT	8	TM	OCA	--
62 B	165	7'SNEOS,12'W	D	09/16/92	P	1X1	SB	158	MH	09/17/92	MH
62 C	150 / 151	1'SNEOS	CO	08/31/92	P	6X13	PT	8	TM	OCA	--
62 D	158 / 159	1'NSEOS	PT	08/31/92	P	2X2	SS	4	TM	OCA	--
62 E	165	4'SNEOS,12'W	D	09/16/92	P	1X1	SB	158	MH	OCA	--
62 F	153 / 154	1'SNEOS	CO	08/31/92	P	2X4	PT	8	TM	OCA	--
62 G	156 / 157	1'SNEOS	PT	08/31/92	P	2X2	PT	8	TM	OCA	--
62 H	165	4'SNEOS,12'E	D	09/16/92	P	1X1	KT	158	MH	OCA	--
62 I	165	7'SNEOS,12'E	D	09/16/92	P	1X1	KT	158	MH	09/17/92	MH
62 J	157 / 164	42'SNEOS	BO	09/15/92	P	2X2	SB	158	MH	09/17/92	MH
62 K	127 / 128	25'SNEOS	DS-108	09/12/92	P	2X5	SB	158	MH	09/12/92	MH
62 M	127 / 128	10'SNEOS TO NEOS	FS	09/10/92	RS	10'	KT	158	JI	09/11/92	MH
62 N	128 / 129	320'SNEOS	DS-108	09/02/92	P/RS	2X5/10'	KT	158	LS	09/02/92	MH
62 P	131 / 132	175'SNAT	PT	09/12/92	P	2X2	SB	158	MH	09/11/92	MH
62 Q	135 / 136	40'SNAT	PT	09/11/92	P	3X3	SB	158	MH	09/12/92	MH
62 R	73	255'S TO 305'SNAT	MD	09/08/92	C	2X50	KT/SB	158	MH	09/08/92	MH
62 S	153 / 154	350'SNAT	D	09/09/92	P	3X3	IOU	8	MH	09/15/92	MH
62 T	149 / 150	147'SNAT	PT	09/15/92	RS	2'	KT	158	MH	09/15/92	MH
62 W	151 / 152	550'SNAT	PT	09/15/92	P	2X2	PT	227	MH	09/21/92	JI
62 X	154 / 155	580'SNAT	PT	09/11/92	P	2X2	SB	158	MH	09/21/92	JI
63 A	155 / 156	153'NSAT	PT	09/09/92	P	2X3	IOU	8	MH	09/10/92	MH

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
63 B	154 / 155	650'NSAT	PT	09/10/92	P	2X2	KT	158	JI	09/19/92	JCL
63 C	154 / 155	583' TO 576'NSAT	PT	09/09/92	P	2X6	IOU	8	MH	09/10/92	MH
63 D	154 / 161	@ SAT	PT	08/31/92	P	2X10	SS	4	TM	OCA	--
63 E	161 / 162	@ SAT	PT	08/31/92	P	2X2	SS	4	TM	OCA	--
63 F	161 / 162	INT W/163	PT	09/14/92	P	2X5	KL	162	LS	09/14/92	JI
63 G	161 / 163	214'NSAT	PT	09/14/92	P	2X9	KL	162	LS	09/14/92	JI
63 H	129 / 130	40'SNAT	PT	08/31/92	P	1X2	KL	162	MH	09/02/92	MH
63 I	164 / 165	580'SNAT	C	09/10/92	C	1X8	IOU	8	LS	09/18/92	JCL
63 J	--	< VOID >	--	--	--	--	--	--	--	--	--
63 K	157 / 164	1'SNAT	PT	09/03/92	P	2X2	PT	162	JCL	OCA	--
63 M	165 / 166	215' TO 220'SNAT	PT	09/16/92	GW	5'	SB	158	MH	09/18/92	LS
63 N	166 / 167	1'SNAT	PT	09/16/92	P	1X1	KT	158	MH	OCA	--
63 P	166 / 167	40'SNAT	PT	09/17/92	P	4X4	KT	158	MH	09/18/92	LS
63 Q	166 / 167	300'SNAT	PT	09/17/92	P	3X3	KT	158	MH	09/18/92	LS
63 R	166 / 167	475'SNAT	PT	09/17/92	P/RS	3X3/3'	KL	162	LS	09/18/92	LS
63 S	166 / 167	548'SNAT	BO	09/17/92	P	3X3	KL	162	LS	09/18/92	LS
63 T	166 / 167	557'SNAT	BO	09/17/92	P	2X2	KL	162	LS	09/18/92	LS
63 W	166 / 167	597'SNAT	BO	09/17/92	P	2X2	KL	162	LS	09/18/92	LS
63 X	166 / 167	607'SNAT	BO	09/17/92	P	2X3	KL	162	LS	09/18/92	LS
64 A	165 / 166	404'SNEOS	WS	09/17/92	P	2X5	KT	158	MH	09/18/92	LS
64 B	165 / 166	27'SNEOS	BO	09/16/92	P	1X2	KT	158	MH	09/18/92	LS
64 C	165 / 166	50'SNEOS	BO	09/16/92	P	2X6	SB	158	MH	09/18/92	LS
64 D	165 / 166	284'SNEOS	BO	09/17/92	P	1X1	SB	158	MH	09/18/92	LS
64 E	165 / 166	532'SNEOS	BO	09/17/92	P	2X3	KL	162	LS	09/18/92	JCL
64 F	165 / 166	237'SNEOS	WS	09/17/92	P	2X2	KL	162	LS	09/17/92	LS
64 G	165 / 166	122'SNEOS	BO	09/16/92	P	1X2	SB	158	MH	09/18/92	LS
64 H	165 / 166	143'SNEOS	BO	09/16/92	P	1X1	KT	158	MH	09/18/92	LS
64 I	165 / 166	175'SNEOS	BO	09/16/92	P	2X2	SB	158	MH	09/18/92	LS

Golder Construction Services, Inc.

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
64 J	165 / 166	190'SNEOS	BO	09/16/92	P	1X2	KT	158	MH	09/18/92	LS
64 K	165 / 166	195'SNEOS	BO	09/16/92	P	1X2	SB	158	MH	09/18/92	LS
64 M	165 / 166	200'SNEOS	BO	09/16/92	P	1X2	KT	158	MH	09/18/92	LS
64 N	165 / 166	490'SNEOS	BO	09/17/92	P	1X1	KL	162	LS	09/18/92	JCL
64 P	165 / 166	211'SNEOS	BO	09/16/92	P	2X10	KT	158	MH	09/18/92	LS
64 Q	165 / 166	222'SNEOS	BO	09/16/92	P	2X7	SB	158	MH	09/18/92	LS
64 R	166 / 167	237'SNEOS	DS-156	09/17/92	P	2X5	SB	158	MH	09/18/92	LS
64 S	166 / 167	434'SNEOS	DS-157	09/17/92	P	2X5	KL	162	LS	09/18/92	LS
64 T	165 / 166	522'SNEOS	DS-158	09/17/92	P	2X5	KL	162	LS	09/18/92	JCL
64 W	169	52'SNEOS,14'W	D	09/17/92	P	1X1	KT	158	MH	09/18/92	LS
64 X	169	53'SNEOS,15'W	D	09/17/92	P	2X2	SB	158	MH	09/18/92	LS
65 A	180 / 181	@CREST OF E SLOPE	BO	09/18/92	P	2X2	KT	158	LS	09/18/92	LS
65 B	168 / 183	390'SNEOS	DS-161	09/17/92	P	2X5	SS	8	MH	09/18/92	LS
65 C	177 / 183	20'N OF 178	DS-163	09/17/92	P	2X5	KT	158	MH	09/18/92	LS
65 D	168 / 183	50'SNEOS	DS-162	09/17/92	P	2X5	KT	158	MH	09/18/92	LS
65 E	179 / 180	INT W/183	BO	09/17/92	P	2X2	SS	8	MH	09/18/92	LS
65 F	179 / 183	17'N OF 180	BO	09/17/92	P	2X4	SS	8	MH	09/18/92	LS
65 G	176 / 177	INT W/183	PT	09/17/92	P	1X1	SB	158	MH	09/18/92	LS
65 H	174 / 175	INT W/183	PT	09/17/92	P	3X5	SB	158	MH	09/18/92	LS
65 I	169 / 171	INT W/183	BO	09/17/92	P	2X3	KT	158	MH	09/18/92	LS
65 J	162 / 184	@ CREST OF AT	WS	09/14/92	P	2X2	PT	227	JCL	09/14/92	JI
65 K	162 / 184	87'NSEOS	WS	09/04/92	P	2X2	SB	158	TM	09/14/92	JI
65 M	162 / 184	50' TO 87'NSEOS	FS	09/04/92	P	2X6	KT	158	TM	09/14/92	JI
65 N	162 / 184	135'NSEOS	PT	09/14/92	P	2X2	KL	162	LS	09/14/92	JI
65 P	162 / 163	INT W/184	T	09/14/92	P	2X3	KL	162	LS	09/22/92	JCL
65 Q	185 / 186	55'NSEOS	FM	09/04/92	P	2X5	PT	8	MH	09/22/92	JCL
65 R	104 / 185	300' TO 312'NSEOS	IO	09/04/92	C	2X12	SS	223	JI	09/22/92	JCL
65 S	184 / 185	290'NSEOS	DS-164	09/19/92	P	2X5	VV	8	LS	09/22/92	JCL

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
65 T	185 / 186	275'NSEOS	BO	09/21/92	P	1X2	VV	8	LS	09/22/92	JCL
65 W	185 / 186	280'NSEOS	D	09/21/92	P/RS	1X2/2'	VV	8	LS	09/22/92	JCL
65 X	186 / 187	43'NSEOS	WS	09/21/92	P	1X2	IOU	158	JI	09/22/92	JCL
66 A	167 / 168	491'SNEOS	DS-159	09/17/92	P	2X5	KL	162	LS	09/18/92	LS
66 B	171 / 173	65'WEEOS	DS-160	09/17/92	P	2X6	SB	158	MH	09/18/92	LS
66 C	173 / 174	10'WEEOS	BO	09/18/92	P	2X2	SS	8	MH	09/18/92	LS
66 D	174 / 175	10'WEEOS	BO	09/18/92	P	1X1	SB	158	LS	09/18/92	LS
66 E	178 / 179	35'WEEOS	FM	09/18/92	P	4X6	KT	158	MH	09/18/92	LS
66 F	157 / 164	54'SNEOS	BO	09/10/92	P	1X1	KL	162	MH	09/17/92	MH
66 G	157 / 164	540'SNEOS	DS-154	09/10/92	P	2X5	IOU	8	LS	09/19/92	JCL
66 H	164 / 165	620'SNEOS	DS-155	09/10/92	P	2X5	IOU	8	LS	09/18/92	JCL
66 I	157 / 164	50'SNEOS	DS-153	09/10/92	P	2X5	KL	162	MH	09/17/92	MH
66 J	157 / 164	380' TO 385'SNAT	FS	09/10/92	C	1X5	IOU	8	LS	09/19/92	LS
66 K	157 / 164	385' TO 465'SNAT	FS	09/10/92	RS	81'	IOU	8	LS	09/19/92	JCL
66 M	157 / 164	465' TO 480'SNAT	FS	09/10/92	C	1X2	IOU	8	LS	09/17/92	MH
66 N	157 / 164	480' TO 520'SNAT	FS	09/10/92	RS	30'	IOU	8	LS	09/19/92	JCL
66 P	157 / 164	566'SNAT TO SEOS	FS	09/10/92	P/RS	1X2/77'	IOU	8	LS	09/19/92	JCL
66 Q	157 / 164	650'SNAT	PT	09/10/92	P	2X2	SB	158	JI	09/19/92	JCL
66 R	164 / 165	580'SNAT TO NEOS	FS	09/10/92	RS	70'	KL	162	MH	09/17/92	MH
66 S	164 / 165	560'SNAT	FM	09/10/92	P	2X2	IOU	8	LS	09/18/92	JCL
66 T	164 / 165	2'SNAT	PT	09/04/92	P	2X3	PT	8	MH	09/17/92	MH
66 W	165 / 166	2'SNAT	PT	09/04/92	P	2X2	PT	8	MH	OCA	--
66 X	180 / 181	1'WEAT	PT	09/04/92	P	1X1	PT	8	MH	OCA	--
67 A	175 / 176	INT W/183	PT	09/17/92	P	1X1	SB	158	MH	09/18/92	LS
67 B	168 / 183	205'SNAT	PT	09/17/92	P	3X3	SB	158	MH	09/18/92	LS
67 C	169 / 183	@ NAT	PT	09/04/92	P	2X3	PT	8	MH	OCA	--
67 D	173 / 174	INT W/183	PT	09/17/92	P	1X2	KT	158	MH	09/18/92	LS
67 E	178 / 179	INT W/183	PT	09/17/92	P	1X2	SB	158	MH	09/18/92	LS

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
67 F	177 / 178	INT W/183	PT	09/17/92	P	1X2	KT	158	MH	09/18/92	LS
67 G	180 / 181	INT W/183	PT	09/18/92	P	1X2	SB	158	LS	09/18/92	LS
67 H	181 / 182	INT W/183	PT	09/17/92	P	2X2	SS	8	MH	09/18/92	LS
67 I	162 / 184	60'SNAT	PT	09/04/92	P	2X2	SB	158	TM	09/14/92	JI
67 J	--	< VOID >	--	--	--	--	--	--	--	--	--
67 K	163 / 184	INT W/103/104	FS	09/19/92	P	3X12	VV	8	LS	09/22/92	JCL
67 M	185 / 186	@ SAT	PT	09/14/92	P	1X2	PT	227	JCL	OCA	--
67 N	103 / 163	WEOS TO 17'E	WS	09/19/92	P	2X15	VV	8	LS	09/22/92	JCL
67 P	103 / 163	17'E TO EEOS	FS	09/19/92	RS	18'	VV	8	LS	09/22/92	JCL
67 Q	104 / 184	INT W/163	CO	09/19/92	P	3X3	VV	8	LS	09/22/92	JCL
67 R	104 / 185	NEOS TO SEOS	WS	09/19/92	RS	9'	VV	8	LS	09/22/92	JCL
67 S	104 / 185	INT W/105	CO	09/19/92	P/RS	4X6/6'	VV	8	LS	09/22/92	JCL
67 T	105 / 185	10'WEEOS	PT	09/19/92	P	1X2	VV	8	LS	09/22/92	JCL
67 W	119 / 120	140'NSAT	SI	09/11/92	P	2X2	KT	158	MH	09/14/92	JI
67 X	120 / 158	30'NSAT	DS-149	09/11/92	P	3X5	KT	158	MH	09/14/92	JI
68 A	186 / 187	57'NSEOS	FM	09/12/92	P	5X5	KL	162	MH	09/22/92	JCL
68 B	106 / 186	< VOID >	IO	--	--	--	--	--	--	--	--
68 C	185 / 186	123'NSEOS	DS-165	09/21/92	P	2X5	VV	8	LS	09/22/92	JCL
68 D	152 / 153	330'SNEOS	D	09/09/92	P	1X1	IOU	8	MH	09/15/92	LS
68 E	146 / 147	344'SNEOS	DSE-06	09/15/92	P	3X5	KT	158	MH	09/19/92	JCL
68 F	106 / 186	ENTIRE SEAM	IO	09/11/92	C/FUS	4X36	SKP	64	JI	09/11/92	JCL
68 G	186 / 68F	10'W OF 187	BO	09/19/92	P	2X2	IOU	162	LS	09/22/92	JCL
68 H	187 / 188	140'NSEOS	FM	09/21/92	P	2X3	IOU	158	JI	09/22/92	JCL
68 I	187 / 188	@ AT	WS	09/14/92	P	2X2	SN	227	JCL	OCA	--
68 J	185 / 186	INT W/105/68F	T	09/19/92	P/RS	3X4/2'	IOU	162	LS	09/22/92	JCL
68 K	188 / 189	83'NSEOS	BO	09/21/92	P	1X2	IOU	158	JI	09/22/92	JCL
68 M	187 / 188	50' TO 75'NSEOS	IO	09/11/92	C/FUS	3X65	SS	223	JI	09/22/92	JCL
68 N	188 / 68M	30'NTOE	BO	09/12/92	P	3X3	KL	162	MH	09/22/92	JCL

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY - POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
68 P	187 / 188	175'NSEOS	FM	09/21/92	P	2X4	VV	8	LS	09/22/92	JCL
68 Q	187 / 188	206'NSEOS	FM	09/21/92	P	2X4	VV	8	LS	09/22/92	JCL
68 R	122 / 187	ENTIRE SEAM	IO	09/11/92	C/FUS	4X34	SKP	64	JI	09/11/92	JCL
68 S	187 / 188	227'NSEOS	BO	09/21/92	P	1X8	VV	8	LS	09/22/92	JCL
68 T	188 / 189	300'NSEOS	DS-166	09/19/92	P	2X6	IOU	162	LS	09/22/92	JCL
68 W	189	@ AT,15'E	D	09/14/92	P	1X1	PT	227	JCL	OCA	--
68 X	189	@ AT,24'E	D	09/14/92	P	1X1	PT	227	JCL	OCA	--
69 A	148 / 149	52'SNAT	BO	09/08/92	P	1XZ	KL	162	JCL	09/10/92	MH
69 B	150	50'SNAT,11'E	D	09/09/92	P	1X3	KL	162	LS	09/10/92	MH
69 C	187	295'NSAT,5'W	D	09/14/92	P	5X6	IOU	8	LS	09/22/92	JCL
69 D	187 / 188	255' TO 270'NSAT	FS	09/12/92	P	2X2	KL	162	MH	09/22/92	JCL
69 E	187 / 188	290'NSAT	PT	09/14/92	P	1X3	IOU	8	LS	09/22/92	JCL
69 F	187 / 188	INT W/68M	PT	09/12/92	P	4X5	SN	162	MH	09/22/92	JCL
69 G	187 / 68M	NEOS TO 8'SNEOS	FS	09/12/92	P	2X5	KL	162	MH	09/22/92	JCL
69 H	189 / 190	69'NSEOS TO NEOS	FS	09/21/92	P/RS	2X2/225'	IOU/VV	158/8	JI	09/22/92	JCL
69 I	190 / 191	49' TO 52'NSAT	PT	09/12/92	P	3X6	KL	162	MH	09/22/92	JCL
69 J	125 / 190	INT W/191	PT	09/19/92	P	2X3	SP	158	LS	09/22/92	JCL
69 K	190 / 191	20'NSAT	PT	09/21/92	P	1X1	IOU	158	JI	09/22/92	LS
69 M	189 / 190	2'NSAT	PT	09/14/92	P	1X1	PT	227	JCL	OCA	--
69 N	188 / 189	2'NSAT	PT	09/14/92	P	1X1	SN	227	JCL	OCA	--
69 P	193 / 194	93'NSAT	PT	09/12/92	P	2X3	KL	162	MH	09/22/92	JCL
69 Q	193 / 194	54'NSAT	PT	09/12/92	P	2X4	KL	162	MH	09/22/92	JCL
69 R	193 / 194	SAT TO 15'NSAT	FS	09/21/92	P/RS	1X2/12'	IOU	158	JI	09/22/92	JCL
69 S	196 / 197	INT W/195	T	09/21/92	P	4X4	SN	162	JCL	09/22/92	JCL
69 T	196 / 197	INT W/198	T	09/21/92	P	2X4	PT	162	JCL	09/22/92	JCL
69 W	124 / 125	INT W/189/71I	T	09/19/92	P	2X4	IOU	162	LS	09/22/92	JCL
69 X	126 / 191	INT W/125	T	09/19/92	P	3X3	SP	158	LS	09/22/92	JCL
70 A	128 / 129	INT W/193/73E	T	09/19/92	P	3X7	SN	162	JCL	09/22/92	JCL

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
70 B	129 / 193	INT W/194/73E	T	09/19/92	P	5X6	SP	158	LS	09/22/92	JCL
70 C	129 / 130	INT W/194/195	T	09/19/92	P	3X7	SP	158	LS	09/22/92	JCL
70 D	130 / 131	< VOID >	-	--	--	--	--	--	--	--	--
70 E	131 / 132	INT W/197/198	T	09/19/92	P	3X4	SP	158	LS	09/22/92	JCL
70 F	132 / 133	INT W/198/199	T	09/19/92	RS	2X2/8'	SP	158	LS	09/22/92	JCL
70 G	199 / 200	AT TO 10'NSAT	PT	09/15/92	P	2X8	PT	227	MH	OCA	--
70 H	199 / 200	INT W/134/73S	T	09/19/92	P	4X5	SP	158	LS	09/22/92	JCL
70 I	133 / 199	INT W/134/73S	T	09/19/92	P	4X4	SP	158	LS	09/22/92	JCL
70 J	187 / 188	100'NSAT	D	09/12/92	P	2X3	KL	162	MH	09/22/92	JCL
70 K	136 / 147	335'SNAT	D	09/12/92	P	2X2	SB	158	MH	09/11/92	MH
70 M	188	55'NSAT,1'E	D	09/12/92	P	2X2	KL	162	MH	09/22/92	JCL
70 N	211 / 212	INT W/145/146	T	09/18/92	P	2X5	SKP	8	MH	09/22/92	JCL
70 P	212 / 213	1'NSAT	PT	09/16/92	P	1X1	SN	227	MH	OCA	--
70 Q	201 / 202	1'NSAT	PT	09/15/92	P	2X4	PT	227	MH	OCA	--
70 R	208 / 209	1'NSAT	PT	09/16/92	P	2X3	PT	227	JCL	OCA	--
70 S	209 / 210	1'NSAT	PT	09/16/92	P	1X1	SN	227	JCL	OCA	--
70 T	210 / 211	1'NSAT	PT	09/16/92	P	1X1	PT	227	JCL	OCA	--
70 W	148	70'SNAT	D	09/15/92	P	1X1	KT	158	MH	09/15/92	MH
70 X	149	60'SNAT	D	09/15/92	P	2X2	SB	158	MH	09/15/92	MH
71 A	189 / 190	55'NSEOS	BO	09/12/92	P	2X7	KL	162	MH	09/22/92	JCL
71 B	187 / 188	120'NSEOS	DS-167	09/21/92	P	2X5	VV	8	LS	09/22/92	JCL
71 C	187 / 188	250'NSEOS	DS-168	09/14/92	P	2X17	IOU	8	LS	09/22/92	JCL
71 D	187 / 188	50'NSEOS	WS	09/12/92	P	4X5	KL	162	MH	09/22/92	JCL
71 E	190 / 191	@ AT	FS	09/14/92	P/RS	2X3/3'	PT	227	JCL	OCA	--
71 F	191	10'NSEOS,16'E	D	09/15/92	P	1X1	SN	227	MH	OCA	--
71 G	191 / 192	@ AT	WS	09/15/92	P	2X3	PT	227	MH	OCA	--
71 H	188 / 189	INT W/123/124	T	09/19/92	P	3X6	IOU	162	LS	09/22/92	JCL
71 I	189 / 190	INT W/124/125	T	09/11/92	C/FUS	3X8	SKP	64	JI	09/11/92	JCL

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY - POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
71 J	189 / 71I	308'NSEOS	DS-169	09/19/92	P	4X6	IOU	162	LS	09/22/92	JCL
71 K	191 / 192	70'NSEOS	WS	09/12/92	P	2X2	KL	162	MH	09/22/92	JCL
71 M	190 / 191	253'NSEOS	WS	09/21/92	P	2X5	VV	8	LS	09/22/92	JCL
71 N	191 / 192	285'NSEOS	BO	09/21/92	P	2X3	VV	8	LS	09/22/92	JCL
71 P	106 / 68F	17'WEEOS	DS-170	09/19/92	P	2X5	IOU	162	LS	09/22/92	JCL
71 Q	187	175'NSEOS,7'W	D	09/22/92	P	2X3	IOU	162	LS	09/23/92	JCL
71 R	125 / 190	6'WEEOS	D	09/19/92	P	2X3	IOU	162	LS	09/22/92	JCL
71 S	192 / 193	258'NSEOS	BO	09/21/92	P	2X3	PT	162	JCL	09/22/92	JCL
71 T	126 / 191	12'EWEOS	BO	09/19/92	P	1X3	SN	162	JCL	09/22/92	JCL
71 W	192 / 193	148'NSEOS	BO	09/21/92	P	2X2	PT	162	JCL	09/22/92	JCL
71 X	192 / 193	56'NSEOS	BO	09/12/92	P	2X2	KL	162	MH	09/22/92	JCL
72 A	126 / 127	INT W/191/192	T	09/19/92	P	4X5	SN	162	JCL	09/22/92	JCL
72 B	127 / 128	INT W/192/193	T	09/19/92	P	4X7	SP	158	LS	09/22/92	JCL
72 C	194 / 195	1'NSAT	FS	09/15/92	P	2X4	SN	227	MH	OCA	--
72 D	195 / 196	5'NSAT	FS	09/15/92	P	1X1	PT	227	MH	OCA	--
72 E	198	@ SAT	EXT	09/15/92	C	3X34	SN/PT	227	MH	OCA	--
72 F	198 / 199	SAT TO 12'N	FS	09/15/92	P	2X3	SN	227	MH	OCA	--
72 G	106 / 122	< COVERED BY 72H >	--	--	--	--	--	--	--	--	--
72 H	186 / 187	240'NSEOS TO NEOS	FS	09/19/92	P	2X12	IOU	162	LS	09/22/92	JCL
72 I	186 / 187	SEOS TO 5'N	FS	09/14/92	P	2X2	PT	227	JCL	OCA	--
72 J	184 / 185	NSAT 3'	FS	09/14/92	P	2X2	PT	227	JCL	OCA	--
72 K	192 / 193	NSAT 2'	FS	09/15/92	P	2X2	PT	227	MH	OCA	--
72 M	193	17'NSAT,15'E	D	09/21/92	P	1X1	IOU	158	JI	09/22/92	JCL
72 N	193	13'NSAT,15'E	D	09/21/92	P	1X1	IOU	158	JI	09/22/92	JCL
72 P	193	8'NSAT,15'E	D	09/21/92	P	1X1	IOU	158	JI	09/22/92	JCL
72 Q	193	2'NSAT,15'E	D	09/15/92	P	1X1	PT	227	MH	OCA	--
72 R	196 / 198	5'NSAT	IO	09/15/92	P	2X2	SN	227	MH	OCA	--
72 S	200 / 201	3'NSAT	FS	09/15/92	P	2X2	SN	227	MH	OCA	--

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
72 T	134 / 135	INT W/200/201	FS	09/19/92	P/RS	2X4/5'	VV	8	LS	09/22/92	JCL
72 W	135 / 74A	INT W/136/201	FS	09/19/92	P/RS	2X2/3'	VV	8	LS	09/22/92	JCL
72 X	202 / 74A	INT W/136/201	FS	09/19/92	P	2X9	VV	8	LS	09/22/92	JCL
73 A	193 / 194	163'NSEOS	DS-171	09/21/92	P	2X6	PT	162	JCL	09/22/92	JCL
73 B	195 / 196	216'NSEOS	DS-172	09/21/92	P	2X9	PT	162	JCL	09/22/92	JCL
73 C	127 / 192	9'EWEOS	BO	09/19/92	P	2X3	SP	158	LS	09/22/92	JCL
73 D	194 / 195	288'NSEOS	DS-173	09/19/92	P	2X5	SP	158	LS	09/22/92	JCL
73 E	128 / 193	ENTIRE SEAM	IO	09/11/92	C/FUS	3X13	SKP	64	JI	09/11/92	JCL
73 F	129 / 194	7'EWEOS	D	09/19/92	P	2X2	SP	158	LS	09/22/92	JCL
73 G	196 / 198	16'NSEOS	BO	09/21/92	P	1X1	IOU	158	JI	09/22/92	JCL
73 H	196 / 198	37'NSEOS	BO	09/22/92	P	2X2	IOU	162	LS	09/23/92	JCL
73 I	196 / 198	56'NSEOS	FM	09/12/92	P	3X3	KL	162	MH	09/22/92	JCL
73 J	196 / 198	62'NSEOS	IO	09/22/92	P/RS	1X2/3'	IOU	162	LS	09/22/92	JCL
73 K	196 / 198	78'N OF SOS	DS-174	09/21/92	P	2X6	PT	162	JCL	09/23/92	LS
73 M	198 / 199	232'NSEOS	BO	09/21/92	GW	6"	PT	162	JCL	09/22/92	JCL
73 N	199 / 200	57'NSEOS	FM	09/21/92	P	3X4	PT	162	JCL	09/22/92	JCL
73 P	198 / 199	181'NSEOS	DS-175	09/21/92	P	2X6	PT	162	JCL	09/22/92	JCL
73 Q	132 / 198	12'EWEOS	DS-176	09/19/92	P	2X5	SP	158	LS	09/22/92	JCL
73 R	132 / 198	9'WEEOS	IO	09/19/92	P	3X5	SP	158	LS	09/22/92	JCL
73 S	134 / 199	ENTIRE SEAM	IO	09/11/92	C/FUS	3X10	SKP	64	JI	09/11/92	JCL
73 T	200 / 201	35'NSEOS	IO	09/23/92	P	2X3	PT	158	JCL	09/23/92	LS
73 W	200 / 201	30'NSEOS	D	09/23/92	P	1X1	PT	158	JCL	09/23/92	LS
73 X	200 / 201	25'NSEOS	BO	09/23/92	P	1X2	PT	158	JCL	09/23/92	LS
74 A	136 / 201	ENTIRE SEAM	IO	09/11/92	C/FUS	3X6	SKP	64	JI	09/12/92	JCL
74 B	202 / 203	< COVERED BY 74D >	--	--	--	--	--	--	--	--	--
74 C	201 / 202	242'NSEOS	DS-177	09/22/92	P	2X5	VV	8	LS	09/22/92	JCL
74 D	202 / 203	247'NSEOS	DS-178	09/21/92	P	2X11	PT	162	JCL	09/22/92	JCL
74 E	139 / 205	13'WEEOS	BO	09/19/92	P	2X3	SP	158	LS	09/22/92	JCL

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
74 F	203 / 204	200'NSEOS	DS-179	09/21/92	P	2X11	PT	162	JCL	09/22/92	JCL
74 G	204 / 205	60'NSEOS	DS-180	09/22/92	P	2X5	VV	8	LS	09/22/92	JCL
74 H	139 / 140	655' TO 663'SNEOS	IO	09/12/92	C/FUS	2X8	BS	246	JI	09/12/92	JCL
74 I	205 / 206	210'NSEOS	DS-181	09/22/92	P	2X5	VV	8	LS	09/22/92	JCL
74 J	208 / 209	100'NSEOS	DS-182	09/22/92	P	2X5	VV	8	LS	09/22/92	JCL
74 K	208 / 209	227'NSEOS	BO	09/22/92	P	2X3	VV	8	LS	09/22/92	JCL
74 M	208 / 209	236'NSEOS	BO	09/22/92	P	1X2	VV	8	LS	09/22/92	JCL
74 N	209 / 210	203'NSEOS	BO	09/22/92	P	1X1	VV	8	LS	09/22/92	JCL
74 P	209 / 210	209'NSEOS	BO	09/22/92	P/RS	2X3/6'	VV	8	LS	09/22/92	JCL
74 Q	209 / 210	61'NSEOS	FM	09/22/92	P	3X4	VV	8	LS	09/22/92	JCL
74 R	134 / 209	6'WEEOS	WS	09/18/92	P	1X1	SS	8	MH	09/22/92	JCL
74 S	143 / 209	8'EWEOS	BO	09/18/92	P	1X2	SS	8	MH	09/22/92	JCL
74 T	209 / 210	62'NSEOS	DS-183	09/22/92	P	2X5	VV	8	LS	09/22/92	JCL
74 W	210 / 211	238'NSEOS	DS-184	09/23/92	P	2X5	VV	8	LS	09/22/92	LS
74 X	211 / 212	57'NSEOS	BO	09/23/92	P	2X3	VV	8	LS	09/23/92	LS
75 A	136 / 137	INT W/202/203	T	09/19/92	P	4X4	VV	8	LS	09/22/92	JCL
75 B	204 / 205	SAT TO 2'N	PT	09/15/92	P	2X2	PT	227	MH	OCA	--
75 C	203 / 204	SAT TO 2'N	PT	09/15/92	P	2X2	PT	227	MH	OCA	--
75 D	202 / 203	SAT TO 4'N	PT	09/15/92	P	2X2	SN	227	MH	OCA	--
75 E	205 / 206	SAT TO 5'N	FS	09/15/92	P	2X3	SN	227	MH	OCA	--
75 F	207 / 208	SAT TO 2'N	PT	09/15/92	P	1X2	PT	227	MH	OCA	--
75 G	207 / 208	25'NSAT	PT	09/22/92	P	1X3	PT	158	LS	09/23/92	LS
75 H	206 / 74H	INT W/205/139/140	T	09/18/92	P	3X5	SS	8	MH	09/22/92	JCL
75 I	204 / 205	INT W/138/139	T	09/18/92	P	3X6	PT	227	MH	09/22/92	JCL
75 J	138 / 204	INT W/137/203	T	09/19/92	P/RS	2X3/3'	VV	8	LS	09/22/92	JCL
75 K	203 / 204	140'NSAT	PT	09/22/92	P	1X4	VV	8	LS	09/22/92	JCL
75 M	203 / 204	242'NSAT	PT	09/22/92	P	1X2	VV	8	LS	09/22/92	JCL
75 N	141 / 142	INT W/207/208	T	09/18/92	P	4X4	SS	8	MH	09/22/92	JCL

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
75 P	139 / 140	INT W/74H	T	09/19/92	P	2X3	SP	158	LS	09/22/92	JCL
75 Q	140 / 206	INT W/207	T	09/18/92	P	2X2	SS	8	MH	09/22/92	JCL
75 R	140 / 207	ENTIRE SEAM	FS	09/18/92	P	3X5	SS	8	MH	09/22/92	JCL
75 S	140 / 141	647'SNAT TO SEOS	PT	09/18/92	P	1X1	SS	8	MH	09/19/92	JCL
75 T	142 / 143	INT W/208/209	T	09/18/92	P	2X3	SS	8	MH	09/22/92	JCL
75 W	206 / 207	SAT TO 2'N	FS	09/15/92	P	1X1	PT	227	MH	OCA	--
75 X	143 / 144	INT W/209/210	T	09/18/92	P	2X4	SS	8	MH	09/22/92	JCL
76 A	145 / 211	INT W/77C/210	T	09/18/92	P	3X4	SS	8	MH	09/22/92	JCL
76 B	144 / 145	INT W/77C/210	T	09/18/92	P	3X4	SS	8	MH	09/22/92	JCL
76 C	211 / 212	SAT TO 4'N	PT	09/16/92	P/RS	1X1/1'	PT	227	JCL	OCA	--
76 D	146 / 212	INT W/213	PT/FS	09/18/92	P	2X6	PT	227	MH	09/22/92	JCL
76 E	124 / 125	525'SNAT	PT	09/14/92	P	2X4	IOU	8	LS	09/19/92	JCL
76 F	161	50'NSAT,9'E	D	09/14/92	P	1X1	KL	162	LS	09/22/92	JCL
76 G	187 / 188	INT W/68R	PT	09/14/92	P	2X4	IOU	8	LS	09/22/92	JCL
76 H	122 / 188	648'SNAT	FS	09/14/92	RS	3'	IOU	8	LS	09/22/92	JCL
76 I	122 / 123	INT W/188	PT	09/14/92	P	3X5	IOU	8	LS	09/22/92	JCL
76 J	102 / 103	INT W/161/163	PT	09/14/92	P	5X18	KL	162	LS	09/22/92	JCL
76 K	233 / 242	65'NSEOS	DS-201	09/16/92	P	2X5	PT	227	MH	09/16/92	JCL
76 M	234 / 244	@ AT	WS	09/17/92	P	1X1	KL	162	LS	OCA	--
76 N	166 / 167	450'SNAT	D	09/17/92	P	2X4	KL	162	LS	09/18/92	LS
76 P	166 / 167	475'SNAT	D	09/17/92	P	3X3	KL	162	LS	09/18/92	LS
76 Q	165 / 166	530'SNAT	D	09/17/92	P	1X1	KL	162	LS	09/18/92	JCL
76 R	175 / 176	INT W/183	T	09/17/92	P	1X1	KT	158	MH	09/18/92	LS
76 S	176	< VOID >	--	--	--	--	--	--	--	--	--
76 T	165 / 166	535'SNEOS	DS-158	09/18/92	P	2X6	KL	162	MH	09/18/92	JCL
76 W	166 / 167	@ SEOS	DS-158	09/18/92	P	2X5	KL	162	MH	09/18/92	LS
76 X	165 / 166	535' TO 515'SNEOS	FS	09/18/92	RS	120'	KL	162	MH	09/18/92	JCL
77 A	211 / 212	67'NSEOS	BO	09/23/92	P	2X7	VV	8	LS	09/23/92	LS

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
77 B	211 / 212	200'NSEOS	DS-185	09/23/92	P	2X5	VV	8	LS	09/22/92	LS
77 C	145 / 210	ENTIRE SEAM	IO	09/12/92	C/FUS	3X10	BS	246	JI	09/12/92	JCL
77 D	212 / 213	< COVERED BY 77E >	--	--	--	--	--	--	--	--	--
77 E	212 / 213	84'NSEOS	BO	09/23/92	P/RS	2X7/5'	VV	8	LS	09/22/92	LS
77 F	146 / 213	INT W/146	T	09/18/92	P	3X5	PT	227	MH	09/22/92	JCL
77 G	214 / 215	100'NSEOS	DS-186	09/23/92	P	2X2	IOU	162	LS	09/22/92	LS
77 H	147 / 213	7'WEEOS	DS-187	09/18/92	P	2X5	PT	227	MH	09/22/92	JCL
77 I	157 / 164	520' TO 535'SNEOS	FS	09/17/92	RS	12'	KL	162	LS	09/19/92	JCL
77 J	157 / 164	535' TO 566'SNEOS	FS	09/18/92	RS	30'	KL	162	MH	09/19/92	JCL
77 K	165 / 166	645'S OF ENEOS	DS-154	09/17/92	P	2X5	KL	162	LS	09/18/92	LS
77 M	165 / 166	645' TO 658'SNEOS	FS	09/17/92	RS	12'	KL	162	LS	09/18/92	LS
77 N	161 / 162	SEOS TO 40'N	FS	09/22/92	RS	36'	IOU	162	LS	09/22/92	JCL
77 P	216 / 217	235'NSEOS	FM	09/23/92	P	2X3	IOU	162	LS	09/23/92	LS
77 Q	216 / 217	78'NSEOS	FM	09/23/92	P	1X1	IOU	162	LS	09/23/92	LS
77 R	215 / 216	57'NSEOS	FM	09/23/92	C	2X23	IOU	162	LS	09/23/92	LS
77 S	215 / 216	< COVERED BY 77R >	--	--	--	--	--	--	--	--	--
77 T	215 / 216	< COVERED BY 77R >	--	--	--	--	--	--	--	--	--
77 W	215 / 216	< COVERED BY 85S >	--	--	--	--	--	--	--	--	--
77 X	215 / 216	103'NSEOS	BO	09/23/92	P	1X1	VV	8	LS	09/22/92	LS
78 A	201 / 202	152'NSEOS TO NEOS	FS	09/22/92	RS	200'	VV	8	LS	09/22/92	JCL
78 B	201 / 202	SEOS TO 87'N	FS	09/23/92	RS	87'	PT	158	LS	09/23/92	LS
78 C	147 / 213	INT W/148	T	09/18/92	P	2X3	SN	227	MH	09/22/92	JCL
78 D	148 / 214	INT W/213	T	09/18/92	P	2X4	SN	227	MH	09/22/92	JCL
78 E	148 / 214	INT W/215	T	09/18/92	P	3X3	SN	227	MH	09/22/92	JCL
78 F	214 / 215	58'NSAT	PT	09/23/92	P	2X2	IOU	162	LS	09/23/92	LS
78 G	214 / 215	110'NSAT TO NEOS	FS	09/23/92	P/RS	2X6/150'	VV	8	LS	09/22/92	LS
78 H	213 / 214	SAT TO 5'N	FS	09/16/92	P	1X1	PT	227	MH	OCA	--
78 I	214 / 215	SAT TO 5'N	FS	09/16/92	P	1X2	SN	227	MH	OCA	--

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
78 J	212 / 213	SAT TO 62'N	FS	09/23/92	P/RS	1X2/6'	VV	8	LS	09/22/92	LS
78 K	212 / 213	< COVERED BY 77E >	--	--	--	--	--	--	--	--	--
78 M	182 225	EAT TO 2'W	FS	09/18/92	P	1X1	SB	158	LS	OCA	--
78 N	208 / 209	96'NSAT	PT	09/22/92	P	2X2	VV	8	LS	09/22/92	JCL
78 P	208 / 209	SAT TO 53'N	FS	09/23/92	P/RS	2X3/50'	PT	158	LS	09/23/92	LS
78 Q	203 / 204	140' TO 156'NSAT	FS	09/22/92	P/RS	1X1/16'	VV	8	LS	09/22/92	JCL
78 R	186	EXT IN SAT	EXT	09/14/92	C	6X35	SN	227	JCL	OCA	--
78 S	193	EXT IN SAT	EXT	09/14/92	C	5X34	PT	227	MH	OCA	--
78 T	187	2'NSAT,2'W	SI	09/14/92	P	2X2	PT	227	JCL	OCA	--
78 W	187	2'NSAT,8'W	SI	09/14/92	P	2X2	PT	227	JCL	OCA	--
78 X	187	2'NSAT,18'W	SI	09/14/92	P	2X2	PT	227	JCL	OCA	--
79 A	138 / 139	40'NSAT	D	09/14/92	C	3X16	KT	158	MH	09/14/92	MH
79 B	191	10'NSAT	D	09/21/92	P	1X1	IOU	158	JI	09/22/92	LS
79 C	212 / 213	3'NSAT	D	09/16/92	P	1X1	SN	227	MH	OCA	--
79 D	166 / 232	17'E OF 224	D	09/16/92	P	2X3	SB	158	MH	09/16/92	LS
79 E	237 / 238	INT W/242	T	09/16/92	P	2X3	PT	227	MH	09/16/92	JCL
79 F	233 / 242	145'NSEOS	BO	09/16/92	P	2X4	SP	8	MH	09/16/92	LS
79 G	233 / 242	INT W/167/168	T	09/16/92	P	3X6	SP	8	MH	09/16/92	JCL
79 H	231 / 244	@ AT	WS	09/17/92	P	1X1	KL	162	LS	OCA	--
79 I	231 / 244	30'WEEOS	DS-199	09/17/92	P	2X5	SS	8	MH	09/18/92	LS
79 J	238 / 239	INT W/242	T	09/16/92	P	2X3	PT	227	MH	09/16/92	JCL
79 K	239 / 241	INT W/242	T	09/16/92	P	3X3	PT	227	MH	09/16/92	JCL
79 M	233 / 242	40'NSEOS	BO	09/16/92	P	2X2	SB	158	MH	09/16/92	JCL
79 N	241 / 242	60'NSEOS	BO	09/16/92	P	3X4	PT	227	MH	09/16/92	JCL
79 P	234 / 244	INT W/242	T	09/16/92	P	3X5	SP	8	MH	09/16/92	JCL
79 Q	231 / 244	50'WEEOS	FM	09/16/92	P	3X6	PT	227	MH	09/18/92	LS
79 R	242 / 244	INT W/231/168	T	09/16/92	P	5X5	SP	8	MH	09/16/92	JCL
79 S	241 / 242	24'NSEOS	DS-200	09/17/92	P	2X5	KL	162	LS	09/18/92	JCL

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
79 T	241 / 242	@ AT	WS	09/17/92	P	1X2	KL	162	LS	OCA	--
79 W	242	@ AT,4'E	D	09/17/92	P	1X2	KL	162	LS	OCA	--
79 X	165 / 166	237'SNAT	D	09/17/92	P	3X4	SB	158	MH	09/18/92	LS
80 A	217	263'NSAT,1'E	D	09/23/92	P	1X1	IOU	162	LS	09/23/92	LS
80 B	216	EXT. FOR ENTIRE AT	EXT	09/17/92	C	6X17	SN	227	LS	OCA	--
80 C	215 / 216	SAT TO 3'N	FS	09/16/92	P	2X2	PT	227	MH	OCA	--
80 D	215 / 216	180'N TO NEOS	FS	09/23/92	P/RS	2X5/100'	IOU	162	LS	09/23/92	LS
80 E	217 / 218	232'NSAT	PT	09/23/92	P	1X1	IOU	162	LS	09/23/92	LS
80 F	218 / 219	SAT TO 4'N	FS	09/17/92	P	1X1	SN	227	LS	OCA	--
80 G	217 / 218	SAT TO 4'N	FS	09/17/92	P	2X2	SN	227	LS	OCA	--
80 H	216 / 217	SAT TO 4'N	FS	09/17/92	P	1X2	SN	227	LS	OCA	--
80 I	221	4'NSAT,11'W	D	09/17/92	P	1X1	SN	227	LS	OCA	--
80 J	220	3'NSAT,11'W	D	09/17/92	P	1X1	PT	227	LS	OCA	--
80 K	149 / 81D	INT W/215/148	T	09/18/92	P	3X5	PT	227	MH	09/22/92	JCL
80 M	149 / 81D	INT W/215/151	T	09/18/92	P	3X4	PT	227	MH	09/22/92	JCL
80 N	215 / 81H	INT W/151/216	T	09/18/92	P	3X3	PT	227	MH	09/23/92	LS
80 P	215 / 81D	15'WEEOS	PT	09/18/92	P	2X3	PT	227	MH	09/22/92	JCL
80 Q	151 / 216	INT W/152/217	T	09/17/92	P	2X3	PT	227	LS	09/22/92	JCL
80 R	152 / 217	INT W/153/218	T	09/17/92	P	2X3	PT	227	LS	09/22/92	JCL
80 S	220 / 221	236'NSAT	PT	09/18/92	P	2X2	SB	158	MH	09/22/92	JCL
80 T	220 / 221	242'NSAT	PT	09/18/92	P	1X2	KT	158	MH	09/22/92	JCL
80 W	223 / 224	77'NSAT	PT	09/16/92	P	1X2	PT	227	MH	09/22/92	JCL
80 X	223 / 224	67'NSAT	PT	09/16/92	P	2X3	PT	227	MH	09/22/92	JCL
81 A	215 / 216	133'NSEOS	BO	09/23/92	P	2X6	IOU	162	LS	09/22/92	LS
81 B	148 / 214	ENTIRE SEAM	FS	09/18/92	RS	34'	PT/SN	227	MH	09/22/92	JCL
81 C	216 / 217	292'NSEOS	DS-188	09/17/92	P	2X5	PT	227	LS	09/22/92	JCL
81 D	149 / 215	ENTIRE SEAM	IO	09/15/92	C/FUS	3X34	BS	64	JI	09/15/92	JCL
81 E	217 / 218	218'NSEOS	BO	09/23/92	P	1X2	IOU	162	LS	09/23/92	LS

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
81 F	215 / 216	< COVERED BY 77R >	DS-189	--	--	--	--	--	--	--	--
81 G	218 / 219	101'NSEOS	BO	09/23/92	P	2X3	IOU	162	LS	09/23/92	LS
81 H	151 / 215	ENTIRE SEAM	IO	09/15/92	C/FUS	3X9	BS	64	JI	09/15/92	JCL
81 I	218 / 219	237'NSEOS	BO	09/23/92	P	1X2	IOU	162	LS	09/23/92	LS
81 J	218 / 219	285'NSEOS	BO	09/23/92	P	1X3	IOU	162	LS	09/23/92	LS
81 K	219 / 220	157'NSEOS	DS-190	09/21/92	P	2X6	PT	162	JCL	09/21/92	JCL
81 M	151 / 216	14'EWEOS	BO	09/17/92	P	1X1	PT	227	LS	09/22/92	JCL
81 N	218 / 219	225'NSEOS	DS-191	09/18/92	P	3X4	PT	227	MH	09/22/92	JCL
81 P	220 / 221	265'NSEOS	BO	09/18/92	P	1X1	SB	158	MH	09/22/92	JCL
81 Q	220 / 221	101'NSEOS	BO	09/18/92	P	1X2	KT	158	MH	09/22/92	JCL
81 R	221 / 222	62'NSEOS	FM	09/18/92	P	4X5	KT	158	MH	09/22/92	JCL
81 S	221 / 222	173'NSEOS	FM	09/18/92	P	5X5	SB	158	MH	09/22/92	JCL
81 T	220 / 221	50'NSEOS	FM	09/18/92	P	3X5	SB	158	MH	09/22/92	JCL
81 W	220 / 221	64'NSEOS	BO	09/18/92	C	2X7	KT	158	MH	09/22/92	JCL
81 X	220 / 221	74'NSEOS	BO	09/18/92	P	2X3	SB	158	MH	09/22/92	JCL
82 A	222 / 223	295'NSEOS	DS-192	09/16/92	P	2X4	SB	158	MH	09/22/92	JCL
82 B	223 / 224	118'NSEOS	BO	09/16/92	P	1X1	SN	227	MH	09/22/92	JCL
82 C	223 / 224	123'NSEOS	BO	09/16/92	P	2X5	PT	227	MH	09/22/92	JCL
82 D	156 / 220	ENTIRE SEAM	IO	09/15/92	C/FUS	3X9	BS	64	JI	09/15/92	JCL
82 E	165 / 224	12'EWEOS	BO	09/16/92	P	1X2	SB	158	MH	09/22/92	JCL
82 F	155 / 220	8'EWEOS	DS-193	09/17/92	P	2X5	PT	227	LS	09/22/92	JCL
82 G	223 / 224	100'NSEOS	DS-194	09/16/92	P	2X5	PT	227	MH	09/22/92	JCL
82 H	185 / 225	58'WEEOS	T	09/17/92	P	3X4	SS	8	MH	09/18/92	LS
82 I	185 / 225	47'WEEOS	FM	09/17/92	P	3X5	SS	8	MH	09/18/92	LS
82 J	185 / 225	33'WEEOS	BO	09/17/92	P	1X2	SS	8	MH	09/18/92	LS
82 K	185 / 225	29'WEEOS	BO	09/17/92	P	1X1	SS	8	MH	09/18/92	LS
82 M	227 / 228	40'WEEOS	DS-195	09/17/92	P	2X5	SS	8	MH	09/18/92	LS
82 N	227 / 228	55'WEEOS	FTS	09/17/92	P	1X2	SS	8	MH	09/18/92	LS

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
82 P	227 / 228	45'WEEOS TO WEOS	FS	09/17/92	RS	43'	SKP	8	MH	09/18/92	LS
82 Q	228 / 229	55'WEEOS	FM	09/17/92	P	4X5	SS	8	MH	09/18/92	LS
82 R	228 / 229	66'WEEOS	DS-196	09/17/92	P	2X5	SS	8	MH	09/18/92	LS
82 S	230 / 231	24'WEEOS	IO	09/17/92	P	2X3	SS	8	MH	09/18/92	LS
82 T	230 / 231	11'WEEOS	BO	09/17/92	P	1X3	KL	162	LS	09/18/92	LS
82 W	224 / 232	@ AT	FS	09/17/92	P	2X2	PT	227	LS	OCA	--
82 X	224 / 232	56'NSEOS	BO	09/16/92	P	2X3	PT	227	MH	09/16/92	LS
83 A	223 / 224	56'NSAT	PT	09/16/92	P	1X2	PT	227	MH	09/22/92	JCL
83 B	223 / 224	SAT TO 3'N	FS	09/17/92	P	2X2	PT	227	LS	OCA	--
83 C	222 / 223	SAT TO 3'N	FS	09/17/92	P	1X2	PT	227	LS	OCA	--
83 D	221 / 222	SAT TO 3'N	FS	09/17/92	P	1X1	PT	227	LS	OCA	--
83 E	220 / 221	SAT TO 2'N	FS	09/17/92	P	2X2	PT	227	LS	OCA	--
83 F	219 / 220	SAT TO 3'N	FS	09/17/92	P	2X2	SN	227	LS	OCA	--
83 G	223 / 224	INT W/164/165	T	09/16/92	P	3X4	KT	158	MH	09/22/92	JCL
83 H	164	1'NSEOS,8'W	D	09/16/92	P	1X1	SB	158	MH	09/22/92	JCL
83 I	152 / 218	SEOS TO NEOS	FS	09/17/92	P	1X2	PT	227	LS	09/22/92	JCL
83 J	153 / 154	INT W218/219	T	09/17/92	P	3X4	PT	227	LS	09/22/92	JCL
83 K	154 / 219	INT W/220	T	09/17/92	P	3X3	PT	227	LS	09/22/92	JCL
83 M	154 / 155	INT W/220	T	09/17/92	P	2X3	PT	227	LS	09/22/92	JCL
83 N	155 / 220	INT W/82D/156	T	09/16/92	P	5X5	KT	158	MH	09/22/92	JCL
83 P	156 / 221	INT W/82D/220	T	09/16/92	P	4X6	SB	158	MH	09/22/92	JCL
83 Q	154 / 155	4'NSEOS	PT	09/17/92	P	1X1	PT	227	LS	09/22/92	JCL
83 R	157 / 164	INT W/222/223	T	09/16/92	P	4X6	KT	158	MH	09/22/92	JCL
83 S	156 / 157	INT W/221/222	T	09/16/92	P	4X4	KT	158	MH	09/22/92	JCL
83 T	226	4'EWEOS,12'S	SI	09/16/92	P	2X2	SP	8	LS	09/23/92	LS
83 W	225 / 226	INT W/168	T	09/16/92	P	1X2	SP	8	LS	09/23/92	LS
83 X	226 / 227	INT W/168	T	09/16/92	P	2X2	SP	8	LS	09/23/92	LS
84 A	232 / 233	55'NSEOS	FM	09/16/92	P	2X2	PT	227	MH	09/16/92	LS

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY – POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
84 B	232 / 233	77'NSEOS	FM	09/16/92	P	2X3	PT	227	MH	09/16/92	LS
84 C	224 / 232	INT W/165/166	T	09/16/92	P	2X6	KT	158	MH	09/16/92	LS
84 D	236 / 237	@ AT	WS	09/17/92	P	1X1	KL	162	LS	OCA	--
84 E	235 / 236	@ AT	WS	09/17/92	P	1X1	KL	162	LS	OCA	--
84 F	234 / 235	@ AT	WS	09/17/92	P	1X1	KL	162	LS	OCA	--
84 G	235 / 236	65'WEEOS	FM	09/16/92	P	3X4	SB	158	MH	09/16/92	JCL
84 H	232 / 233	100'NSEOS	DS-197	09/16/92	P	2X5	PT	227	MH	09/16/92	LS
84 I	235 / 236	60'WEEOS	DS-198	09/16/92	P	2X6	KT	158	MH	09/16/92	JCL
84 J	237 / 238	@ AT	WS	09/17/92	P	1X1	KL	162	LS	OCA	--
84 K	238 / 239	@ AT	WS	09/17/92	P	1X1	KL	162	LS	OCA	--
84 M	237 / 238	60'WEEOS	FM	09/16/92	P	2X4	SN	227	MH	09/16/92	JCL
84 N	239 / 240	@ AT	EXT	09/17/92	P	6X15	KL	162	LS	OCA	--
84 P	232 / 233	INT W/167	T	09/16/92	P	3X4	SB	158	MH	09/23/92	LS
84 Q	166 / 167	INT W/232	T	09/16/92	P	3X5	KT	158	MH	09/23/92	LS
84 R	239 / 241	15'EWEOS	BO	09/16/92	P	2X4	PT	227	MH	09/16/92	JCL
84 S	234 / 235	INT W/242	T	09/16/92	P	1X2	KT	158	MH	09/16/92	JCL
84 T	241 / 243	@ AT	WS	09/17/92	P	1X1	KL	162	LS	OCA	--
84 W	236 / 237	INT W/242	T	09/16/92	P	2X2	SB	158	MH	09/16/92	JCL
84 X	235 / 236	INT W/242	T	09/16/92	P	2X3	SP	8	MH	09/16/92	JCL
85 A	165 / 166	521'SNEOS	FTS	09/18/92	P	1X1	KL	162	MH	09/18/92	JCL
85 B	165 / 166	518'SNEOS	FTS	09/18/92	P	1X1	KL	162	MH	09/18/92	JCL
85 C	165 / 166	514'SNEOS	FTS	09/18/92	P	1X1	KL	162	MH	09/18/92	JCL
85 D	165 / 166	485'SNEOS	FTS	09/18/92	P	1X1	KL	162	MH	09/18/92	JCL
85 E	165 / 166	468'SNEOS	FTS	09/18/92	P	1X1	KL	162	MH	09/18/92	JCL
85 F	165 / 166	450'SNEOS	FTS	09/18/92	P	1X1	KL	162	MH	09/18/92	JCL
85 G	103 / 104	INT W/163	T	09/19/92	P	4X4	VV	8	LS	09/22/92	JCL
85 H	187 / 188	125'NSEOS	PT	09/21/92	P	2X2	VV	8	LS	09/22/92	JCL
85 I	188	80'NSEOS,12'W	D	09/12/92	P	1X1	KL	162	MH	09/22/92	JCL

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY - POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
85 J	189 / 190	100'NSEOS	PT	09/21/92	P	2X3	IOU	158	JI	09/22/92	JCL
85 K	198 / 199	9' TO 13'NSEOS	FS	09/21/92	RS	4'	IOU	158	JI	09/22/92	JCL
85 M	201 / 202	242'NSEOS	FTS	09/21/92	P	2X5	VV	8	LS	09/22/92	JCL
85 N	117	250'NSEOS	EE	09/22/92	C	21X35	IOU	162	LS	09/23/92	JCL
85 P	215 / 216	< COVERED BY 77R >	DS-189	--	--	--	--	--	--	--	--
85 Q	215 / 216	< COVERED BY 77R >	--	--	--	--	--	--	--	--	--
85 R	215 / 216	75' TO 85'NSEOS	FS	09/23/92	RS	10'	IOU	162	LS	09/23/92	LS
85 S	215 / 216	85'NSEOS	DS-189	09/23/92	P	2X12	VV	8	LS	09/23/92	LS
85 T	187	263'NSEOS,6'W	D	09/22/92	P	1X2	IOU	162	LS	09/23/92	JCL
86 A	183 / 225	INT W/168	T	09/16/92	P	3X5	SS	8	MH	09/18/92	LS
86 B	227 / 228	INT W/168	T	09/16/92	P	2X3	SP	8	LS	09/18/92	LS
86 C	228 / 229	INT W/168	T	09/16/92	P	2X3	SP	8	LS	09/18/92	LS
86 D	229 / 230	INT W/168	T	09/17/92	P	3X3	SS	8	MH	09/23/92	LS
86 E	230 / 231	INT W/168	T	09/17/92	P	2X3	SS	8	MH	09/18/92	LS
86 F	230 / 231	EAT TO 4'W	FS	09/17/92	P	2X2	KL	162	LS	OCA	--
86 G	229 / 230	EAT TO 4'W	FS	09/16/92	P	1X1	KL	162	MH	OCA	--
86 H	228 / 229	EAT TO 4'W	FS	09/16/92	P	1X1	KL	162	MH	OCA	--
86 I	227 / 228	EAT TO 4'W	FS	09/16/92	P	1X1	KL	162	MH	OCA	--
86 J	226 / 227	EAT TO 4'W	FS	09/18/92	P	1X1	KT	158	LS	OCA	--
86 K	225 / 226	EAT TO 4'W	FS	09/16/92	P	1X1	KL	162	LS	OCA	--
86 M	232	2'NSAT,1'W	D	09/17/92	P	2X2	PT	227	LS	OCA	--
86 N	232	8'NSAT,1'W	D	09/17/92	P	1X1	PT	227	LS	09/18/92	JCL
86 P	232	15'NSAT,1'W	D	09/17/92	P	1X1	PT	227	LS	09/18/92	JCL
86 Q	232	20'NSAT,1'W	D	09/17/92	P	1X1	PT	227	LS	09/18/92	JCL
86 R	239 / 240	INT W/241	T	09/16/92	P	5X5	KT	158	MH	09/16/92	JCL
86 S	233 / 242	172'NSAT	PT	09/16/92	P	2X5	SP	8	MH	09/16/92	LS
86 T	241 / 242	AT TO 2'NW	FS	09/17/92	P	1X2	KL	162	LS	OCA	--
86 W	233 / 242	SAT TO 3'N	FS	09/17/92	P	2X3	PT	227	LS	OCA	--

APPENDIX J

GEOMEMBRANE REPAIR SUMMARY - POND 93

DEFECT CODE	SEAM OR PANEL NO.	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MONITOR
86 X	168 / 231	< VOID >	--	--	--	--	--	--	--	--	--
87 A	201 / 202	87'NSAT	PT	09/22/92	P	1X2	VV	8	LS	09/22/92	JCL
87 B	201 / 202	87'NSAT TO SAT	FS	09/23/92	RS	80'	PT	158	LS	09/22/92	JCL
87 C	201 / 202	152'NSAT	PT	09/22/92	P	1X1	VV	8	LS	09/22/92	JCL
87 D	201 / 202	234'NSAT	PT	09/21/92	P	2X2	VV	8	LS	09/22/92	JCL
87 E	201 / 202	270'NSAT	PT	09/22/92	P	1X2	VV	8	LS	09/22/92	JCL
87 F	205	240'NSAT,12'W	EE	09/22/92	P	5X7	VV	8	LS	09/22/92	JCL
87 G	184	65'NSAT,17'W	D	09/22/92	P	1X1	IOU	162	LS	09/23/92	JCL
87 H	185	55'NSAT,15'W	D	09/22/92	P	2X6	IOU	162	LS	09/23/92	JCL
87 I	185	60'NSAT,12'W	D	09/22/92	P	1X	IOU	162	LS	09/23/92	JCL
87 J	186	60'NSAT,6'E	D	09/22/92	P	1X1	IOU	162	LS	09/23/92	JCL
87 K	187	60'NSAT,6'E	D	09/22/92	P	1X1	IOU	162	LS	09/23/92	JCL
87 M	188	60'NSAT,3'E	D	09/22/92	P	1X1	IOU	162	LS	09/23/92	JCL
87 N	193	60'NSAT,18'W	D	09/22/92	P	2X2	IOU	162	LS	09/23/92	JCL
87 P	196	60'NSAT,10'E	D	09/22/92	P	1X	IOU	162	LS	09/23/92	JCL
87 Q	215	85'NSAT,15'E	D	09/22/92	P	1X1	IOU	162	LS	09/22/92	LS
87 R	214	8O'NSAT,15'W	D	09/22/92	P	1X1	IOU	162	LS	09/22/92	LS
87 S	210	295'NSAT,1'E	D	09/23/92	P	1X1	VV	8	LS	09/22/92	LS
87 T	188	40'NSAT,17'E	D	09/23/92	P	1X1	PT	158	LS	09/23/92	LS
87 W	214 / 215	68'NSAT	PT	09/23/92	P	2X2	IOU	162	LS	09/22/92	LS
87 X	214 / 215	111'NSAT	PT	09/23/92	P	2X2	IOU	162	LS	09/22/92	LS

APPENDIX K

DESTRUCTIVE TEST SUMMARIES

December 1992

927-4003

Golder Construction Services, Inc.

APPENDIX K-1

DESTRUCTIVE TEST SUMMARY

December 1992

927-4003

Golder Construction Services, Inc.

APPENDIX K
DESTRUCTIVE SAMPLE SUMMARY
POND 93 - FUSION WELDING

SAMPLE NUMBER	SEAM NUMBER	MACH. NO.	DATE REMOVED	QA MONITOR	LAB RESULTS	REMARKS
DS-01	2 / 3	246	08/08/92	TD	PASS	--
DS-02	1 / 2	220	08/08/92	TD	PASS	--
DS-03	3 / 4	210	08/08/92	TD	PASS	--
DS-04	18 / 19	246	08/07/92	TD	PASS	--
DS-05	15 / 25	210	08/07/92	TD	PASS	--
DS-06	19 / 20	220	08/07/92	TD	PASS	--
DS-07	25 / 26	246	08/08/92	TD	PASS	--
DS-08	26 / 27	220	08/07/92	TD	PASS	--
DS-09	27 / 28	210	08/07/92	TD	PASS	--
DS-10	27 / 28	220	08/08/92	TD	PASS	--
DS-11	27 / 28	246	08/08/92	TD	PASS	--
DS-12	28 / 29	246	08/08/92	TD	PASS	--
DS-13	29 / 30	220	08/07/92	TD	PASS	--
DS-14	30 / 31	220	08/08/92	TD	PASS	--
DS-15	30 / 31	246	08/08/92	TD	PASS	--
DS-16	30 / 31	220	08/08/92	TD	PASS	--
DS-17	30 / 31	246	08/08/92	TD	PASS	--
DS-18	31 / 32	220	08/12/92	TD	PASS	--
DS-19	31 / 32	210	08/08/92	TD	PASS	--
DS-20	32 / 33	246	08/08/92	TD	PASS	--
DS-21	32 / 33	220	08/12/92	TD	PASS	--
DS-22	33 / 34	210	08/08/92	TD	PASS	--
DS-23	34 / 35	220	08/08/92	TD	PASS	--
DS-24	34 / 35	246	08/08/92	TD	PASS	--
DS-25	34 / 35	246	08/08/92	TD	PASS	--
DS-26	35 / 36	220	08/08/92	TD	PASS	--
DS-27	35 / 36	246	08/08/92	TD	PASS	--
DS-28	36 / 37	246	08/08/92	TD	PASS	--
DS-29	36 / 37	220	08/08/92	TD	PASS	--
DS-30	37 / 38	246	08/08/92	TD	PASS	--
DS-31	37 / 38	220	08/08/92	TD	PASS	--
DS-32	43 / 45	220	08/13/92	JCL	PASS	--
DS-33	25 / 46	246	08/13/92	JCL	PASS	--
DS-34	45 / 47	220	08/13/92	JCL	PASS	--
DS-35	49 / 50	220	08/13/92	JCL	PASS	--
DS-36	51 / 52	246	08/14/92	JCL	PASS	--
DS-37	52 / 53	220	08/14/92	JCL	PASS	--
DS-38	54 / 55	220	08/14/92	JCL	PASS	--
DS-39	53 / 54	246	08/14/92	JCL	PASS	--
DS-40	33 / 55	246	08/14/92	JCL	PASS	--
DS-41	57 / 58	220	08/14/92	JCL	PASS	--
DS-42	59 / 61	220	08/14/92	JCL	PASS	--
DS-43	37 / 61	246	08/14/92	JCL	PASS	--
DS-44	38 / 64	220	08/18/92	TD	PASS	--
DS-45	64 / 65	64	08/18/92	TD	PASS	--
DS-46	64 / 65	246	08/21/92	JI	PASS	--
DS-47	65 / 66	220	08/21/92	JI	PASS	--
DS-48	65 / 66	223	08/21/92	JI	FAIL	DS-48P OVER TF-3 8/12/92 (PASSED)

APPENDIX K
DESTRUCTIVE SAMPLE SUMMARY
POND 93 – FUSION WELDING

SAMPLE NUMBER	SEAM NUMBER	MACH. NO.	DATE REMOVED	QA MONITOR	LAB RESULTS	REMARKS
DS-48N	65 / 66	223	08/27/92	CPB	PASS	--
DS-49	66 / 67	64	08/25/92	JI	PASS	--
DS-50	66 / 67	246	08/21/92	JI	PASS	--
DS-51	68 / 69	64	08/22/92	JI	PASS	--
DS-52	68 / 69	223	08/21/92	JI	PASS	--
DS-53	69 / 70	220	08/21/92	JI	PASS	--
DS-54	69 / 70	246	08/20/92	JI	PASS	--
DS-55	70 / 71	223	08/22/92	JI	PASS	--
DS-56	72 / 73	246	08/21/92	JI	PASS	--
DS-57	71 / 72	64	08/20/92	JI	PASS	--
DS-58	71 / 72	220	08/21/92	JI	PASS	--
DS-59	62 / 74	220	08/14/92	JCL	PASS	--
DS-60	76 / 77	246	08/14/92	JCL	PASS	--
DS-61	77 / 78	220	08/27/92	JI	PASS	--
DS-62	80 / 81	220	08/19/92	CPB	PASS	--
DS-63	82 / 83	246	08/20/92	TD	PASS	--
DS-64	84 / 85	220	08/20/92	TD	PASS	--
DS-65	86 / 88	64	08/20/92	TD	PASS	--
DS-66	86 / 87	220	08/27/92	JI	PASS	--
DS-67	89 / 90	223	08/21/92	JI	PASS	--
DS-68	89 / 90	220	08/23/92	JI	PASS	--
DS-69	90 / 91	246	08/20/92	TD	PASS	--
DS-70	91 / 92	223	08/20/92	TD	PASS	--
DS-71	92 / 93	220	08/23/92	JI	PASS	--
DS-72	93 / 94	223	08/20/92	TD	PASS	--
DS-73	93 / 94	220	08/23/92	JI	PASS	--
DS-74	95 / 96	223	08/23/92	JI	PASS	--
DS-75	96 / 97	64	08/23/92	JI	PASS	--
DS-76	94 / 95	246	08/23/92	JCL	PASS	--
DS-77	96 / 97	246	08/23/92	JCL	PASS	--
DS-78	95 / 96	220	08/26/92	JCL	PASS	--
DS-79	96 / 97	220	08/26/92	JCL	PASS	--
DS-80	97 / 98	223	08/23/92	JCL	PASS	--
DS-81	99 / 100	220	08/25/92	JCL	PASS	--
DS-82	100 / 101	223	08/23/92	JCL	PASS	--
DS-83	100 / 101	64	08/25/92	JCL	PASS	--
DS-84	101 / 102	246	08/22/92	JCL	PASS	--
DS-85	101 / 102	220	08/25/92	JCL	PASS	--
DS-86	102 / 103	223	08/22/92	JCL	PASS	--
DS-87	102 / 103	64	08/25/92	JCL	PASS	--
DS-88	103 / 104	246	08/22/92	JCL	PASS	--
DS-89	105 / 106	223	08/25/92	JCL	PASS	--
DS-90	105 / 106	220	08/25/92	JCL	PASS	--
DS-91	108 / 109	220	08/27/92	JCL	PASS	--
DS-92	107 / 108	64	08/27/92	JCL	PASS	--
DS-93	109 / 110	64	08/27/92	JCL	PASS	--
DS-94	111 / 113	223	08/29/92	CPB	PASS	--
DS-95	114 / 115	220	08/26/92	JCL	PASS	--

APPENDIX K
DESTRUCTIVE SAMPLE SUMMARY
POND 93 – FUSION WELDING

SAMPLE NUMBER	SEAM NUMBER	MACH. NO.	DATE REMOVED	QA MONITOR	LAB RESULTS	REMARKS
DS-96	113 / 114	64	08/26/92	JCL	PASS	--
DS-97	116 / 117	223	08/29/92	CPB	PASS	--
DS-98	106 / 122	220	09/14/92	JCL	PASS	--
DS-99	106 / 122	64	08/25/92	JCL	PASS	--
DS-100	122 / 123	223	08/25/92	JCL	PASS	--
DS-101	122 / 123	220	08/25/92	JCL	PASS	--
DS-102	123 / 124	223	08/25/92	JCL	PASS	--
DS-103	124 / 125	64	08/25/92	JCL	PASS	--
DS-104	125 / 126	220	08/25/92	JCL	PASS	--
DS-105	126 / 127	223	08/25/92	JCL	PASS	--
DS-106	126 / 127	246	08/25/92	JCL	PASS	--
DS-107	127 / 128	220	09/15/92	JCL	PASS	--
DS-108	127 / 128	223	09/01/92	JCL	FAIL	--
DS-108P	127 / 128	223	09/10/92	JI	PASS	--
DS-108N	128 / 129	223	09/02/92	CPB	PASS	--
DS-109	129 / 130	220	09/14/92	JCL	PASS	--
DS-110	129 / 130	223	08/25/92	JCL	PASS	--
DS-111	129 / 130	64	08/25/92	JCL	PASS	--
DS-112	131 / 132	220	09/19/92	CPB	PASS	--
DS-113	131 / 132	223	08/29/92	CPB	PASS	--
DS-114	131 / 132	64	08/29/92	CPB	PASS	--
DS-115	132 / 133	220	09/19/92	CPB	PASS	--
DS-116	134 / 135	223	09/02/92	CPB	PASS	--
DS-117	133 / 134	246	08/31/92	CPB	PASS	--
DS-118	136 / 137	220	09/15/92	JCL	PASS	--
DS-119	135 / 136	64	09/02/92	CPB	PASS	--
DS-120	136 / 137	223	09/08/92	JI	PASS	--
DS-121	137 / 138	223	09/02/92	JI	PASS	--
DS-122	138 / 139	246	09/08/92	JI	PASS	--
DS-123	137 / 138	64	09/18/92	CPB	PASS	--
DS-124	138 / 139	220	09/18/92	CPB	PASS	--
DS-125	139 / 140	64	09/18/92	CPB	PASS	--
DS-126	140 / 141	246	09/08/92	JI	PASS	--
DS-127	141 / 142	220	09/08/92	JI	PASS	--
DS-128	141 / 142	223	09/08/92	JI	PASS	--
DS-129	142 / 143	220	09/08/92	JI	PASS	--
DS-130	142 / 143	223	09/08/92	JI	PASS	--
DS-131	143 / 144	64	09/08/92	JI	PASS	--
DS-132	146 / 147	220	09/08/92	JI	PASS	--
DS-133	145 / 146	246	09/08/92	JI	PASS	--
DS-134	146 / 147	223	09/08/92	JI	PASS	--
DS-135	147 / 148	223	09/08/92	JI	PASS	--
DS-136	148 / 149	220	09/08/92	JI	PASS	--
DS-137	148 / 149	246	09/08/92	JI	PASS	--
DS-138	149 / 151	64	09/08/92	JI	PASS	--
DS-139	149 / 151	64	09/08/92	JI	PASS	WEDGE TEMP. DIFFERENCE
DS-140	151 / 152	220	09/08/92	MH	PASS	--
DS-141	150 / 152	223	09/09/92	MH	PASS	--

APPENDIX K
DESTRUCTIVE SAMPLE SUMMARY
POND 93 – FUSION WELDING

SAMPLE NUMBER	SEAM NUMBER	MACH. NO.	DATE REMOVED	QA MONITOR	LAB RESULTS	REMARKS
DS-142	152 / 153	64	09/17/92	CPB	PASS	--
DS-143	152 / 153	223	09/08/92	MH	PASS	--
DS-144	153 / 154	246	09/09/92	MH	PASS	--
DS-145	154 / 155	223	09/09/92	MH	PASS	--
DS-146	155 / 156	220	09/10/92	JI	PASS	--
DS-147	155 / 156	246	09/09/92	MH	PASS	--
DS-148	156 / 157	223	09/10/92	JI	PASS	--
DS-149	120 / 158	220	09/14/92	JI	PASS	--
DS-150	158 / 159	223	09/14/92	JI	PASS	--
DS-151	161 / 162	220	09/10/92	JI	PASS	--
DS-152	162 / 163	223	09/10/92	JI	PASS	--
DS-153	157 / 164	223	09/10/92	JI	PASS	--
DS-154	157 / 164	220	09/10/92	JI	FAIL	DS-154P BOUND BY DS-151
DS-154N	165 / 166	220	09/17/92	CPB	PASS	--
DS-155	164 / 165	246	09/10/92	JI	PASS	--
DS-156	166 / 167	223	09/17/92	CPB	PASS	--
DS-157	166 / 167	246	09/17/92	CPB	PASS	--
DS-158	165 / 166	220	09/17/92	CPB	FAIL	--
DS-158N	165 / 166	220	09/18/92	CPB	PASS	--
DS-158P	165 / 166	220	09/18/92	CPB	PASS	--
DS-159	167 / 168	220	09/17/92	CPB	PASS	--
DS-160	171 / 173	223	09/17/92	CPB	PASS	--
DS-161	168 / 183	246	09/17/92	CPB	PASS	--
DS-162	168 / 183	220	09/17/92	CPB	PASS	--
DS-163	177 / 183	223	09/17/92	CPB	PASS	--
DS-164	184 / 185	223	09/10/92	JI	PASS	--
DS-165	185 / 186	246	09/21/92	JCL	PASS	--
DS-166	188 / 189	220	09/19/92	CPB	PASS	--
DS-167	187 / 188	223	09/14/92	JI	PASS	--
DS-168	187 / 188	246	09/14/92	JI	PASS	--
DS-169	189 / 190	220	09/19/92	CPB	PASS	--
DS-170	106 / 68F	64	09/19/92	CPB	PASS	--
DS-171	193 / 194	246	09/21/92	JI	PASS	--
DS-172	195 / 196	220	09/21/92	JI	PASS	--
DS-173	194 / 195	223	09/19/92	CPB	PASS	--
DS-174	196 / 198	223	09/21/92	JI	PASS	--
DS-175	198 / 199	246	09/21/92	JI	PASS	--
DS-176	132 / 198	64	09/19/92	CPB	PASS	--
DS-177	201 / 202	223	09/22/92	JI	PASS	--
DS-178	202 / 203	246	09/21/92	JI	PASS	--
DS-179	203 / 204	223	09/21/92	JI	PASS	--
DS-180	204 / 205	220	09/22/92	JI	PASS	--
DS-181	205 / 206	220	09/22/92	JI	PASS	--
DS-182	208 / 209	223	09/22/92	JI	PASS	--
DS-183	209 / 210	220	09/22/92	JI	PASS	--
DS-184	210 / 211	223	09/17/92	CPB	PASS	--
DS-185	211 / 212	220	09/17/92	CPB	PASS	--
DS-186	214 / 215	223	09/17/92	CPB	PASS	--

APPENDIX K
DESTRUCTIVE SAMPLE SUMMARY
POND 93 – FUSION WELDING

SAMPLE NUMBER	SEAM NUMBER	MACH. NO.	DATE REMOVED	QA MONITOR	LAB RESULTS	REMARKS
DS-187	148 / 214	246	09/17/92	CPB	PASS	--
DS-188	216 / 217	223	09/17/92	CPB	PASS	--
DS-189	215 / 216	220	09/17/92	CPB	FAIL	--
DS-189N	215 / 216	220	09/22/92	CPB	PASS	--
DS-189P	215 / 216	220	09/22/92	CPB	PASS	--
DS-190	219 / 220	223	09/17/92	CPB	PASS	--
DS-191	218 / 219	220	09/17/92	CPB	PASS	--
DS-192	222 / 223	223	09/16/92	CPB	PASS	--
DS-193	155 / 220	64	09/17/92	CPB	PASS	--
DS-194	223 / 224	220	09/16/92	CPB	PASS	--
DS-195	227 / 228	223	09/17/92	CPB	PASS	--
DS-196	228 / 229	220	09/17/92	CPB	PASS	--
DS-197	232 / 233	64	09/16/92	CPB	PASS	--
DS-198	235 / 236	223	09/16/92	CPB	PASS	--
DS-199	231 / 244	220	09/17/92	CPB	PASS	--
DS-200	241 / 242	223	09/18/92	CPB	PASS	--
DS-201	233 / 242	64	09/16/92	CPB	PASS	--

APPENDIX K
DESTRUCTIVE SAMPLE SUMMARY
POND 93 – EXTRUSION WELDING

SAMPLE NUMBER	SEAM NUMBER	MACH. NO.	DATE REMOVED	QA MONITOR	LAB RESULTS	REMARKS
DSE-1	27 / 28	162	08/14/92	JCL	FAIL	ON PATCH 5E
DSE-1N	8R / 46	162	08/18/92	CPB	FAIL	ON PATCH 8R
DSE-1P	12B / 25	162	08/18/92	CPB	FAIL	ON PATCH 12B
DSE-1N2	5W / 29	162	08/19/92	CPB	FAIL	ON PATCH 5W
DSE-1P2	24B / 48	162	08/19/92	CPB	FAIL	ON PATCH 24B
DSE-1N3	TX - 2	162	08/14/92	JI	PASS	ON TRIAL SEAM TX-2
DSE-1P3	19F / 48	162	08/20/92	JI	PASS	ON PATCH 19F
DSE-2	28 / 29	227	08/18/92	CPB	PASS	ON PATCH 5T
DSE-3	75 / 76	158	08/27/92	JI	PASS	ON PATCH 17R
DSE-4	122 / 123	260	09/10/92	JI	PASS	ON PATCH 45E
DSE-5	102 / 103	4	09/10/92	JI	PASS	ON PATCH 30D
DSE-6	146 / 147	8	09/15/92	JCL	PASS	ON PATCH 53R

APPENDIX K-2

DESTRUCTIVE TEST RESULTS

December 1992

927-4003

BRAUN INTERTEC

Braun Intertec Engineering, Inc.
913 South 18th Street
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701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 01
Project Description:	EP #93 Liner	Date Sampled:	8/8/92
Seam Number:	DS 01	Date Tested:	8/9/92
Welder Number:	-	Tested By:	Jon Austin

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	124	80	FT
3	123	80	FT
4	124	80	FT
5	125	80	FT
Average	124		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	76	52	FT
2	80	52	FT
3	90	52	FT
4	78	52	FT
5	81	52	FT
Average	81		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	43	0.040	
2	42	0.040	
3	43	0.040	
4	43	0.040	
5	43	0.040	
Average	43		

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

cv/ds01

BRAUN INTERTEC

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Engineers and Scientists Serving the Built and Natural Environments

H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 02
Project Description:	EP #93 Liner	Date Sampled:	8/8/92
Seam Number:	DS 02	Date Tested:	8/9/92
Welder Number:	-	Tested By:	Jon Austin

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	120	80	FT
2	122	80	FT
3	122	80	FT
4	121	80	FT
5	120	80	FT
Average	121		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	82	52	FT
2	88	52	FT
3	100	52	FT
4	93	52	FT
5	94	52	FT
Average	91		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	43	0.040	
2	43	0.040	
3	43	0.040	
4	43	0.040	
5	43	0.040	
Average	43		

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

cv/ds02

BRAUN INTERTEC

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Engineers and Scientists Serving the Built and Natural Environments

H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 03
Project Description:	EP #93 Liner	Date Sampled:	8/8/92
Seam Number:	DS 03	Date Tested:	8/9/92
Welder Number:	-	Tested By:	Jon Austin

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	118	80	FT
3	124	80	FT
4	121	80	FT
5	120	80	FT
Average	121		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	95	52	FT
2	88	52	FT
3	86	52	FT
4	98	52	FT
5	96	52	FT
Average	93		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	42	0.040	
2	42	0.040	
3	42	0.040	
4	43	0.040	
5	43	0.040	
Average	42		

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

cv/ds03

BRAUN INTERTEC

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H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 04
Project Description:	EP #93 Plastic Liner	Date Sampled:	8/7/92
Seam Number:	DS 04	Date Tested:	8/8/92
Welder Number:	-	Tested By:	Jon Austin

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	126	80	FT
2	128	80	FT
3	125	80	FT
4	127	80	FT
5	115	80	FT
Average	124		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	83	52	FT
2	93	52	FT
3	79	52	FT
4	82	52	FT
5	93	52	FT
Average	86		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	43	0.040	
2	43	0.040	
3	43	0.040	
4	43	0.040	
5	43	0.040	
Average	43		

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
Operations Manager

cv/ds04

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Engineers and Scientists Serving the Built and Natural Environments

H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 05
Project Description:	EP #93 Liner	Date Sampled:	8/7/92
Seam Number:	DS 05	Date Tested:	8/8/92
Welder Number:	-	Tested By:	Jon Austin

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	125	80	FT
2	121	80	FT
3	117	80	FT
4	124	80	FT
5	119	80	FT
Average	121		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	100	52	FT
2	96	52	FT
3	93	52	FT
4	97	52	FT
5	100	52	FT
Average	97		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	43	0.040	
2	43	0.040	
3	44	0.040	
4	43	0.040	
5	43	0.040	
Average	43		

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

Gerald L. Dauer, C.E.T.
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H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 06
Project Description:	EP #93 Liner	Date Sampled:	8/7/92
Seam Number:	DS 06	Date Tested:	8/8/92
Welder Number:	-	Tested By:	Jon Austin

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	125	80	FT
2	125	80	FT
3	124	80	FT
4	124	80	FT
5	120	80	FT
Average	123		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	93	52	FT
2	82	52	FT
3	85	52	FT
4	97	52	FT
5	88	52	FT
Average	89		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	43	0.040	
2	43	0.040	
3	43	0.040	
4	43	0.040	
5	43	0.040	
Average	43		

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

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H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 07
Project Description:	EP #93 Liner	Date Sampled:	8/8/92
Seam Number:	DS 07	Date Tested:	8/9/92
Welder Number:	-	Tested By:	Jon Austin

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	120	80	FT
2	124	80	FT
3	120	80	FT
4	123	80	FT
5	119	80	FT
Average	121		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	85	52	FT
2	97	52	Ft
3	76	52	FT
4	94	52	FT
5	90	52	FT
Average	88		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	42	0.040	
2	42	0.040	
3	42	0.040	
4	42	0.040	
5	44	0.040	
Average	42		

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

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H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 08
Project Description:	EP #93 Liner	Date Sampled:	8/7/92
Seam Number:	DS 08	Date Tested:	8/8/92
Welder Number:	-	Tested By:	Jon Austin

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	122	80	FT
3	123	80	FT
4	124	80	FT
5	124	80	FT
Average	123		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	101	52	FT
2	99	52	Ft
3	99	52	FT
4	100	52	FT
5	100	52	FT
Average	100		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	43	0.040	
2	43	0.040	
3	43	0.040	
4	43	0.040	
5	43	0.040	
Average	43		

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

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H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 09
Project Description:	EP #93 Liner	Date Sampled:	8/7/92
Seam Number:	DS 09	Date Tested:	8/8/92
Welder Number:	-	Tested By:	Jon Austin

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	126	80	FT
2	122	80	FT
3	125	80	FT
4	124	80	FT
5	127	80	FT
Average	125		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	87	52	FT
2	91	52	FT
3	86	52	FT
4	91	52	FT
5	87	52	FT
Average	88		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	42	0.040	
2	43	0.040	
3	43	0.040	
4	43	0.040	
5	43	0.040	
Average	43		

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

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H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 10
Project Description:	EP #93 Liner	Date Sampled:	8/8/92
Seam Number:	DS 10	Date Tested:	8/9/92
Welder Number:	-	Tested By:	Jon Austin

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	131	80	FT
3	125	80	FT
4	128	80	FT
5	128	80	FT
Average	127		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	97	52	FT
2	83	52	FT
3	92	52	FT
4	100	52	FT
5	97	52	FT
Average	94		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	43	0.040	
2	43	0.040	
3	42	0.040	
4	43	0.040	
5	43	0.040	
Average	43		

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

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H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 11
Project Description:	EP #93 Liner	Date Sampled:	8/8/92
Seam Number:	DS 11	Date Tested:	8/9/92
Welder Number:	-	Tested By:	Jon Austin

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	132	80	FT
3	128	80	FT
4	130	80	FT
5	126	80	FT
Average	129		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	90	52	FT
2	98	52	FT
3	89	52	FT
4	97	52	FT
5	91	52	FT
Average	93		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	43	0.040	
2	43	0.040	
3	43	0.040	
4	43	0.040	
5	43	0.040	
Average	43		

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

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H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 12
Project Description:	EP #93 Liner	Date Sampled:	8/8/92
Seam Number:	DS 12	Date Tested:	8/9/92
Welder Number:	-	Tested By:	Jon Austin

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	123	80	FT
3	124	80	FT
4	122	80	FT
5	126	80	FT
Average	123		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	82	52	FT
2	91	52	FT
3	87	52	FT
4	84	52	FT
5	87	52	FT
Average	86		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	41	0.040	
2	41	0.040	
3	41	0.040	
4	41	0.040	
5	41	0.040	
Average	41		

REMARKS:

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H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 13
Project Description:	Plastic Liner	Date Sampled:	8/7/92
Seam Number:	DS 13	Date Tested:	8/8/92
Welder Number:	-	Tested By:	Jon Austin

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	134	80	FT
2	125	80	FT
3	137	80	FT
4	134	80	FT
5	131	80	FT
Average	132		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	94	52	FT
2	93	52	Ft
3	105	52	FT
4	103	52	FT
5	104	52	FT
Average	100		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	43	0.040	
2	43	0.040	
3	44	0.040	
4	44	0.040	
5	44	0.040	
Average	44		

REMARKS:

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H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 14
Project Description:	EP #93 Coal Creek	Date Sampled:	8/8/92
Seam Number:	DS 14	Date Tested:	8/10/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	116	80	FT
2	130	80	FT
3	129	80	FT
4	124	80	FT
5	129	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	91	52	FT
2	98	52	FT
3	96	52	FT
4	90	52	FT
5	100	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	41	0.040	
2	41	0.040	
3	40	0.040	
4	40	0.040	
5	41	0.040	
Average	41		

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

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H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 15
Project Description:	EP #93 Coal Creek	Date Sampled:	8/8/92
Seam Number:	DS 15	Date Tested:	8/10/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	126	80	FT
2	134	80	FT
3	122	80	FT
4	127	80	FT
5	130	80	FT
Average	128		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	77	52	FT
2	70	52	FT
3	93	52	FT
4	85	52	FT
5	84	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	41	0.040	
2	42	0.040	
3	41	0.040	
4	42	0.040	
5	42	0.040	
Average	42		

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

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H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 16
Project Description:	EP #93 Liner	Date Sampled:	8/8/92
Seam Number:	DS 16	Date Tested:	8/9/92
Welder Number:	-	Tested By:	Jon Austin

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	126	80	FT
2	124	80	FT
3	122	80	FT
4	131	80	FT
5	128	80	FT
Average	126		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	94	52	FT
2	92	52	FT
3	86	52	FT
4	92	52	FT
5	91	52	FT
Average	91		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	41	0.040	
2	42	0.040	
3	41	0.040	
4	41	0.040	
5	42	0.040	
Average	41		

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

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H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 17
Project Description:	EP #93 Liner	Date Sampled:	8/8/92
Seam Number:	DS 17	Date Tested:	8/9/92
Welder Number:	-	Tested By:	Jon Austin

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	126	80	FT
3	131	80	FT
4	126	80	FT
5	131	80	FT
Average	129		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	95	52	FT
2	95	52	FT
3	82	52	FT
4	88	52	FT
5	85	52	FT
Average	89		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	42	0.040	
2	42	0.040	
3	42	0.040	
4	42	0.040	
5	42	0.040	
Average	42		

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

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H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 18
Project Description:	EP #93 Coal Creek	Date Sampled:	N/I
Seam Number:	DS 18	Date Tested:	8/12/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	115	80	FT
2	118	80	FT
3	116	80	FT
4	118	80	FT
5	117	80	FT
Average	117		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	76	52	FT
2	87	52	FT
3	88	52	FT
4	90	52	FT
5	89	52	FT
Average	86		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.042	0.040	
3	.041	0.040	
4	.042	0.040	
5	.042	0.040	
Average	.042		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds18

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H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 19
Project Description:	EP #93 Liner	Date Sampled:	8/8/92
Seam Number:	DS 19	Date Tested:	8/9/92
Welder Number:	-	Tested By:	Jon Austin

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	120	80	FT
3	123	80	FT
4	123	80	FT
5	120	80	FT
Average	122		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	94	52	FT
2	93	52	FT
3	97	52	FT
4	101	52	FT
5	93	52	FT
Average	96		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	42	0.040	
2	41	0.040	
3	41	0.040	
4	41	0.040	
5	41	0.040	
Average	41		

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

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H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 20
Project Description:	EP #93 Liner	Date Sampled:	8/8/92
Seam Number:	DS 20	Date Tested:	8/9/92
Welder Number:	-	Tested By:	Jon Austin

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	117	80	FT
2	117	80	FT
3	119	80	FT
4	118	80	FT
5	119	80	FT
Average	118		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	64	52	FT
2	78	52	FT
3	88	52	FT
4	78	52	FT
5	77	52	FT
Average	77		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	42	0.040	
2	42	0.040	
3	42	0.040	
4	42	0.040	
5	42	0.040	
Average	42		

REMARKS:

BRAUN INTERTEC ENGINEERING, INC.

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H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 21
Project Description:	EP #93 Coal Creek	Date Sampled:	N/I
Seam Number:	DS 21	Date Tested:	8/12/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	119	80	FT
2	118	80	FT
3	117	80	FT
4	121	80	FT
5	120	80	FT
Average	119		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	86	52	FT
2	78	52	FT
3	94	52	FT
4	100	52	FT
5	86	52	FT
Average	89		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.042	0.040	
3	.042	0.040	
4	.042	0.040	
5	.042	0.040	
Average	.042		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds21

BRAUN INTERTEC ENGINEERING, INC.

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H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 22
Project Description:	EP #93 Liner	Date Sampled:	8/8/92
Seam Number:	DS 22	Date Tested:	8/9/92
Welder Number:	-	Tested By:	Jon Austin

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	118	80	FT
3	116	80	FT
4	121	80	FT
5	118	80	FT
Average	119		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	98	52	FT
2	93	52	FT
3	85	52	FT
4	100	52	FT
5	103	52	FT
Average	96		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	41	0.040	
2	41	0.040	
3	41	0.040	
4	41	0.040	
5	41	0.040	
Average	41		

REMARKS:

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H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 23
Project Description:	EP #93 Coal Creek	Date Sampled:	8/8/92
Seam Number:	DS 23	Date Tested:	8/10/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	120	80	FT
2	125	80	FT
3	123	80	FT
4	127	80	FT
5	118	80	FT
Average	123		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	80	52	FT
2	86	52	FT
3	80	52	FT
4	84	52	FT
5	85	52	FT
Average	83		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	40	0.040	
2	40	0.040	
3	40	0.040	
4	41	0.040	
5	41	0.040	
Average	40		

REMARKS:

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H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 24
Project Description:	EP #93 Coal Creek	Date Sampled:	8/8/92
Seam Number:	DS 24	Date Tested:	8/10/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	133	80	FT
2	123	80	FT
3	134	80	Ft
4	135	80	FT
5	133	80	FT
Average	132		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	81	52	FT
2	76	52	FT
3	67	52	FT
4	87	52	FT
5	83	52	FT
Average	79		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	41	0.040	
2	41	0.040	
3	41	0.040	
4	41	0.040	
5	41	0.040	
Average	41		

REMARKS:

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H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 25
Project Description:	EP #93 Liner	Date Sampled:	8/8/92
Seam Number:	DS 25	Date Tested:	8/9/92
Welder Number:	-	Tested By:	Jon Austin

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	129	80	FT
3	124	80	FT
4	127	80	FT
5	122	80	FT
Average	126		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	81	52	FT
2	110	52	FT
3	93	52	FT
4	100	52	FT
5	85	52	FT
Average	94		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	43	0.040	
2	43	0.040	
3	43	0.040	
4	43	0.040	
5	43	0.040	
Average	41		

REMARKS:

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H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 26
Project Description:	EP #93 Liner	Date Sampled:	8/8/92
Seam Number:	DS 26	Date Tested:	8/9/92
Welder Number:	-	Tested By:	Jon Austin

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	126	80	FT
2	123	80	FT
3	121	80	FT
4	121	80	FT
5	123	80	FT
Average	123		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	98	52	FT
2	92	52	FT
3	92	52	FT
4	85	52	FT
5	99	52	FT
Average	93		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	41	0.040	
2	41	0.040	
3	41	0.040	
4	41	0.040	
5	41	0.040	
Average	41		

REMARKS:

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H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 27
Project Description:	EP #93 Liner	Date Sampled:	8/8/92
Seam Number:	DS 27	Date Tested:	8/9/92
Welder Number:	-	Tested By:	Jon Austin

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	133	80	FT
2	122	80	FT
3	122	80	FT
4	130	80	FT
5	126	80	FT
Average	127		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	96	52	FT
2	89	52	FT
3	91	52	FT
4	101	52	FT
5	92	52	FT
Average	94		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	44	0.040	
2	44	0.040	
3	44	0.040	
4	43	0.040	
5	43	0.040	
Average	44		

REMARKS:

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H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 28
Project Description:	EP #93 Coal Creek	Date Sampled:	8/8/92
Seam Number:	DS 28	Date Tested:	8/10/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	132	80	FT
2	120	80	FT
3	139	80	Ft
4	141	80	FT
5	133	80	FT
Average	133		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	75	52	FT
2	83	52	FT
3	78	52	FT
4	83	52	FT
5	74	52	FT
Average	79		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	43	0.040	
2	43	0.040	
3	43	0.040	
4	43	0.040	
5	42	0.040	
Average	43		

REMARKS:

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H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 29
Project Description:	EP #93 Liner	Date Sampled:	8/8/92
Seam Number:	DS 29	Date Tested:	8/9/92
Welder Number:	-	Tested By:	Jon Austin

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	133	80	FT
3	128	80	FT
4	128	80	FT
5	128	80	FT
Average	129		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	104	52	FT
2	87	52	FT
3	90	52	FT
4	91	52	FT
5	83	52	FT
Average	91		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	43	0.040	
2	43	0.040	
3	44	0.040	
4	44	0.040	
5	44	0.040	
Average	44		

REMARKS:

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H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 30
Project Description:	EP #93 Coal Creek	Date Sampled:	8/8/92
Seam Number:	DS 30	Date Tested:	8/10/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	137	80	FT
3	121	80	FT
4	140	80	FT
5	128	80	FT
Average	130		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	80	52	FT
2	94	52	Ft
3	87	52	FT
4	104	52	FT
5	85	52	FT
Average	90		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	39	0.040	
2	40	0.040	
3	39	0.040	
4	40	0.040	
5	40	0.040	
Average	40		

REMARKS:

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 30A
Project Description:	EP #93 Coal Creek	Date Sampled:	8/8/92
Seam Number:	DS 30A	Date Tested:	8/27/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	137	80	FT
3	121	80	FT
4	140	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	80	52	FT
2	94	52	FT
3	87	52	FT
4	104	52	FT
5	85	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0402	.040	
2	.040	.040	
3	.0404	.040	
4	.040	.040	
5	.040	.040	
Average			

REMARKS:

FT = Film Tear
BT = Bond Tear
Retest of DS 30
cvds30a

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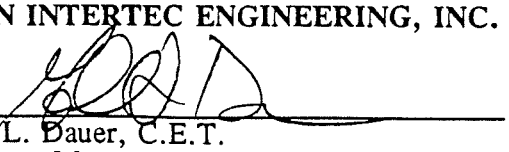

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H.D.P.E. LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 31
Project Description:	EP #93 Coal Creek	Date Sampled:	8/8/92
Seam Number:	DS 31	Date Tested:	8/10/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	128	80	FT
3	121	80	FT
4	128	80	FT
5	135	80	FT
Average	127		

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	100	52	FT
2	70	52	Ft
3	92	52	FT
4	79	52	FT
5	85	52	FT
Average	85		

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	40	0.040	
2	40	0.040	
3	40	0.040	
4	40	0.040	
5	40	0.040	
Average	40		

REMARKS:

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS - 32
Project Description:	EP #93	Date Sampled:	N/I
Seam Number:	DS - 32	Date Tested:	8/13/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	134	80	FT
2	133	80	FT
3	134	80	FT
4	134	80	FT
5	134	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	92	52	FT
2	83	52	FT
3	83	52	FT
4	91	52	FT
5	87	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0410	.040	
2	.0419	.040	
3	.0418	.040	
4	.0420	.040	
5	.0425	.040	
Average	.0418		

REMARKS:

FT = Film Tear
BT = Bond Tear

cvds32

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS - 33
Project Description:	EP #93	Date Sampled:	N/I
Seam Number:	DS - 33	Date Tested:	8/13/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	120	80	FT
3	119	80	FT
4	124	80	FT
5	125	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	87	52	FT
2	89	52	FT
3	84	52	FT
4	85	52	FT
5	80	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0431	.040	
2	.0430	.040	
3	.0426	.040	
4	.0431	.040	
5	.0426	.040	
Average	.0429		

REMARKS:

FT = Film Tear
BT = Bond Tear

cvds33

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS - 34
Project Description:	EP #93	Date Sampled:	N/I
Seam Number:	DS - 34	Date Tested:	8/13/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	128	80	FT
3	131	80	FT
4	128	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	103	52	FT
2	99	52	FT
3	86	52	FT
4	100	52	FT
5	84	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0430	.040	
2	.0426	.040	
3	.0430	.040	
4	.0427	.040	
5	.0434	.040	
Average	.0430		

REMARKS:

FT = Film Tear
BT = Bond Tear

cvds34

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS - 35
Project Description:	EP #93	Date Sampled:	N/I
Seam Number:	DS - 35	Date Tested:	8/13/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	119	80	FT
2	121	80	FT
3	117	80	FT
4	120	80	FT
5	125	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	84	52	FT
2	78	52	FT
3	87	52	FT
4	78	52	FT
5	79	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0428	.040	
2	.0427	.040	
3	.0430	.040	
4	.0431	.040	
5	.0428	.040	
Average	.0429		

REMARKS:

FT = Film Tear
BT = Bond Tear

cvds35

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 36
Project Description:	EP #93 Coal Creek	Date Sampled:	8/14/92
Seam Number:	DS 36	Date Tested:	8/15/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	121	80	FT
3	123	80	FT
4	120	80	FT
5	118	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	77	52	FT
2	83	52	FT
3	91	52	FT
4	87	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0426	.040	
2	.0427	.040	
3	.0428	.040	
4	.0424	.040	
5	.0426	.040	
Average	.0426		

REMARKS:

FT = Film Tear
BT = Bond Tear

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 37
Project Description:	EP #93 Coal Creek	Date Sampled:	8/14/92
Seam Number:	DS 37	Date Tested:	8/15/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	120	80	FT
2	119	80	FT
3	117	80	FT
4	118	80	FT
5	116	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	83	52	FT
2	86	52	FT
3	85	52	FT
4	70	52	FT
5	70	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0421	.040	
2	.0429	.040	
3	.0423	.040	
4	.0424	.040	
5	.0423	.040	
Average	.0424		

REMARKS:

FT = Film Tear
BT = Bond Tear
cvds37

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 38
Project Description:	EP #93 Coal Creek	Date Sampled:	8/14/92
Seam Number:	DS 38	Date Tested:	8/15/92
Welder Number:	-	Tested By:	-

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	120	80	FT
2	118	80	FT
3	122	80	FT
4	125	80	FT
5	122	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	94	52	FT
2	102	52	FT
3	96	52	FT
4	94	52	FT
5	98	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0425	.040	
2	.0425	.040	
3	.0426	.040	
4	.0425	.040	
5	.0422	.040	
Average	.0425		

REMARKS:

FT = Film Tear
BT = Bond Tear
cv/ds38

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 39
Project Description:	EP #93 Coal Creek	Date Sampled:	8/14/92
Seam Number:	DS 39	Date Tested:	8/15/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	127	80	FT
3	122	80	FT
4	126	80	FT
5	116	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	87	52	FT
2	88	52	FT
3	85	52	FT
4	90	52	FT
5	78	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0426	.040	
2	.0426	.040	
3	.0429	.040	
4	.0424	.040	
5	.0424	.040	
Average	.0426		

REMARKS:

FT = Film Tear
BT = Bond Tear
cvds39

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 40
Project Description:	EP #93 Coal Creek	Date Sampled:	8/14/92
Seam Number:	DS 40	Date Tested:	8/15/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	115	80	FT
2	117	80	FT
3	116	80	FT
4	120	80	FT
5	118	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	93	52	FT
2	100	52	FT
3	96	52	FT
4	101	52	FT
5	102	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0438	.040	
2	.0421	.040	
3	.0428	.040	
4	.0428	.040	
5	.0427	.040	
Average	.0428		

REMARKS:

FT = Film Tear
BT = Bond Tear
cvds40

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 41
Project Description:	EP #93 Coal Creek	Date Sampled:	8/14/92
Seam Number:	DS 41	Date Tested:	8/15/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	130	80	FT
3	129	80	FT
4	128	80	FT
5	132	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	71	52	FT
2	94	52	FT
3	88	52	FT
4	89	52	FT
5	101	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0453	.040	
2	.0450	.040	
3	.0450	.040	
4	.0442	.040	
5	.0448	.040	
Average	.0449		

REMARKS:

FT = Film Tear
BT = Bond Tear
cv/ds41

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 42
Project Description:	EP #93 Coal Creek	Date Sampled:	8/14/92
Seam Number:	DS 42	Date Tested:	8/15/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	119	80	fT
2	124	80	FT
3	125	80	FT
4	126	80	FT
5	122	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	99	52	FT
2	84	52	FT
3	84	52	FT
4	87	52	FT
5	80	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0409	.040	
2	.0406	.040	
3	.0411	.040	
4	.0408	.040	
5	.0409	.040	
Average	.0409		

REMARKS:

FT = Film Tear
BT = Bond Tear
cv/ds42

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 43
Project Description:	EP #93 Coal Creek	Date Sampled:	8/14/92
Seam Number:	DS 43	Date Tested:	8/15/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	118	80	FT
2	118	80	FT
3	119	80	FT
4	120	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	81	52	FT
2	94	52	FT
3	99	52	FT
4	81	52	FT
5	96	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0422	.040	
2	.0425	.040	
3	.0418	.040	
4	.0417	.040	
5	.0416	.040	
Average	.0420		

REMARKS:

FT = Film Tear
BT = Bond Tear
cv/ds43

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Project Number:	BFDX-92-019C	Sample Number:	DS 44
Project Description:	EP #93 Coal Creek	Date Sampled:	N/I
Seam Number:	DS 44	Date Tested:	8/17/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	136	80	FT
2	133	80	FT
3	135	80	FT
4	135	80	FT
5	136	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	103	52	FT
2	100	52	FT
3	90	52	FT
4	98	52	FT
5	97	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0415	.040	
2	.0418	.040	
3	.0416	.040	
4	.0414	.040	
5	.0413	.040	
Average	.0415		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds44

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Project Number:	BFDX-92-019C	Sample Number:	DS 45
Project Description:	EP #93 Coal Creek	Date Sampled:	8/27/92
Seam Number:	DS 45	Date Tested:	8/27/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	126	80	FT
3	126	80	FT
4	127	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	81	52	FT
2	80	52	FT
3	73	52	FT
4	80	52	FT
5	77	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0408	.040	
2	.0406	.040	
3	.0407	.040	
4	.0405	.040	
5	.0405	.040	
Average	.0406		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds45

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 46
Project Description:	EP #93 Coal Creek	Date Sampled:	8/21/92
Seam Number:	DS 46	Date Tested:	8/22/92
Welder Number:	-	Tested By:	LL

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	128	80	FT
3	116	80	FT
4	123	80	FT
5	132	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	95	52	FT
2	95	52	FT
3	81	52	FT
4	84	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0401	.040	
2	.0406	.040	
3	.0406	.040	
4	.0408	.040	
5	.0406	.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

cvds46

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 47
Project Description:	EP #93 Coal Creek	Date Sampled:	8/21/92
Seam Number:	DS 47	Date Tested:	8/22/92
Welder Number:	-	Tested By:	JA

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	116	80	FT
2	117	80	FT
3	124	80	FT
4	125	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	101	52	FT
2	89	52	FT
3	95	52	FT
4	102	52	FT
5	95	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0419	.040	
2	.0419	.040	
3	.0418	.040	
4	.0420	.040	
5	.0420	.040	
Average	.0419		

REMARKS:

FT = Film Tear
BT = Bond Tear

cvds47

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 48
Project Description:	EP #93 Coal Creek	Date Sampled:	8/21/92
Seam Number:	DS 48	Date Tested:	8/22/92
Welder Number:	-	Tested By:	JA

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	118	80	FT
2	117	80	FT
3	117	80	FT
4	116	80	FT
5	118	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	90	52	FT
2	86	52	FT
3	62	52	BT
4	49	52	BT
5	86	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0406	.040	
2	.0409	.040	
3	.0403	.040	
4	.0410	.040	
5	.0411	.040	
Average	.0408		

REMARKS:

FT = Film Tear
BT = Bond Tear

cvds48

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 48P
Project Description:	EP #93 Coal Creek	Date Sampled:	8/25/92
Seam Number:	DS 48P	Date Tested:	8/26/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	109	80	FT
2	109	80	FT
3	110	80	FT
4	109	80	FT
5	109	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	93	52	FT
2	88	52	FT
3	90	52	FT
4	88	52	FT
5	84	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0416	.040	
2	.0413	.040	
3	.0416	.040	
4	.0411	.040	
5	.0416	.040	
Average	.0414		

REMARKS:

FT = Film Tear
BT = Bond Tear

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 48N1
Project Description:	EP #93 Coal Creek	Date Sampled:	8/27/92
Seam Number:	DS 48N1	Date Tested:	8/27/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	124	80	FT
3	122	80	FT
4	122	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	83	52	FT
2	84	52	FT
3	83	52	FT
4	82	52	FT
5	88	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0407	.040	
2	.0407	.040	
3	.0407	.040	
4	.0407	.040	
5	.0407	.040	
Average	.0407		

REMARKS:

FT = Film Tear
BT = Bond Tear

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 49
Project Description:	EP #93 Coal Creek	Date Sampled:	8/17/92
Seam Number:	DS 49	Date Tested:	8/17/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	123	80	FT
3	122	80	FT
4	124	80	FT
5	122	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	85	52	FT
2	93	52	FT
3	77	52	FT
4	81	52	FT
5	84	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0426	.040	
2	.0427	.040	
3	.0427	.040	
4	.0430	.040	
5	.0423	.040	
Average	.0427		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds49

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 50
Project Description:	EP #93 Coal Creek	Date Sampled:	8/21/92
Seam Number:	DS 50	Date Tested:	8/22/92
Welder Number:	-	Tested By:	JA

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	126	80	FT
2	123	80	FT
3	125	80	FT
4	124	80	FT
5	125	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	87	52	FT
2	84	52	FT
3	82	52	FT
4	93	52	FT
5	91	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0430	.040	
2	.0430	.040	
3	.0430	.040	
4	.0430	.040	
5	.0440	.040	
Average	.0430		

REMARKS:

FT = Film Tear
BT = Bond Tear

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cvds50

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 51
Project Description:	EP #93 Coal Creek	Date Sampled:	N/I
Seam Number:	DS 51	Date Tested:	8/24/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	117	80	FT
2	125	80	FT
3	120	80	FT
4	126	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	80	52	FT
2	73	52	FT
3	85	52	FT
4	78	52	FT
5	80	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0426	.040	
2	.0429	.040	
3	.0427	.040	
4	.0428	.040	
5	.0429	.040	
Average	.0428		

REMARKS:

FT = Film Tear
BT = Bond Tear

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gw/ds51

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 52
Project Description:	EP #93 Coal Creek	Date Sampled:	8/21/92
Seam Number:	DS 52	Date Tested:	8/22/92
Welder Number:	-	Tested By:	N/I

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	126	80	FT
3	127	80	FT
4	125	80	FT
5	125	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	91	52	FT
2	86	52	FT
3	91	52	FT
4	90	52	FT
5	92	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0411	.040	
2	.0415	.040	
3	.0414	.040	
4	.0414	.040	
5	.0410	.040	
Average	.0412		

REMARKS:

FT = Film Tear
BT = Bond Tear

cyds52

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 53
Project Description:	EP #93 Coal Creek	Date Sampled:	8/21/92
Seam Number:	DS 53	Date Tested:	8/22/92
Welder Number:	-	Tested By:	SD

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	124	80	FT
3	118	80	FT
4	125	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	95	52	FT
2	102	52	FT
3	100	52	FT
4	88	52	FT
5	96	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0433	.040	
2	.0435	.040	
3	.0433	.040	
4	.0436	.040	
5	.0434	.040	
Average	.0434		

REMARKS:

FT = Film Tear
BT = Bond Tear

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 54
Project Description:	EP #93 Coal Creek	Date Sampled:	8/20/92
Seam Number:	DS 54	Date Tested:	8/20/92
Welder Number:	-	Tested By:	N/I

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	134	80	FT
2	135	80	FT
3	130	80	FT
4	139	80	FT
5	122	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	73	52	FT
2	95	52	FT
3	96	52	FT
4	86	52	FT
5	86	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0440	.040	
2	.0460	.040	
3	.0450	.040	
4	.0450	.040	
5	.0450	.040	
Average	.0450		

REMARKS:

FT = Film Tear
BT = Bond Tear

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 55
Project Description:	EP #93 Coal Creek	Date Sampled:	N/I
Seam Number:	DS 55	Date Tested:	8/24/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	123	80	FT
3	122	80	FT
4	123	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	82	52	FT
2	80	52	FT
3	86	52	FT
4	78	52	FT
5	94	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0434	.040	
2	.0431	.040	
3	.0434	.040	
4	.0434	.040	
5	.0436	.040	
Average	.0434		

REMARKS:

FT = Film Tear
BT = Bond Tear

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 56
Project Description:	EP #93 Coal Creek	Date Sampled:	8/21/92
Seam Number:	DS 56	Date Tested:	8/22/92
Welder Number:	-	Tested By:	SD

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	126	80	FT
2	127	80	FT
3	119	80	FT
4	125	80	FT
5	122	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	89	52	FT
2	74	52	FT
3	80	52	FT
4	85	52	FT
5	90	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0420	.040	
2	.0421	.040	
3	.0422	.040	
4	.0422	.040	
5	.0423	.040	
Average	.0422		

REMARKS:

FT = Film Tear
BT = Bond Tear

cyds56

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 57
Project Description:	EP #93 Coal Creek	Date Sampled:	8/20/92
Seam Number:	DS 57	Date Tested:	8/20/92
Welder Number:	-	Tested By:	N/I

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	119	80	FT
3	122	80	FT
4	118	80	FT
5	118	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	90	52	FT
2	95	52	FT
3	78	52	FT
4	84	52	FT
5	91	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0431	.040	
2	.0428	.040	
3	.0430	.040	
4	.0426	.040	
5	.0430	.040	
Average	.0429		

REMARKS:

FT = Film Tear
BT = Bond Tear

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 58
Project Description:	EP #93 Coal Creek	Date Sampled:	8/21/92
Seam Number:	DS 58	Date Tested:	8/22/92
Welder Number:	-	Tested By:	SD

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	120	80	FT
2	123	80	FT
3	116	80	FT
4	123	80	FT
5	118	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	97	52	FT
2	85	52	FT
3	76	52	FT
4	88	52	FT
5	80	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0428	.040	
2	.0427	.040	
3	.0426	.040	
4	.0425	.040	
5	.0422	.040	
Average	.0426		

REMARKS:

FT = Film Tear
BT = Bond Tear

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 59
Project Description:	EP #93 Coal Creek	Date Sampled:	8/14/92
Seam Number:	DS 59	Date Tested:	8/15/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	129	80	FT
3	129	80	FT
4	129	80	FT
5	130	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	86	52	FT
2	84	52	FT
3	91	52	FT
4	90	52	FT
5	78	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0438	.040	
2	.0440	.040	
3	.0433	.040	
4	.0434	.040	
5	.0431	.040	
Average	.0435		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Project Number:	BFDX-92-019C	Sample Number:	DS 60
Project Description:	EP #93 Coal Creek	Date Sampled:	8/14/92
Seam Number:	DS 60	Date Tested:	8/15/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	fT
2	129	80	FT
3	128	80	FT
4	126	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	105	52	FT
2	106	52	FT
3	85	52	FT
4	88	52	FT
5	85	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0449	.040	
2	.0451	.040	
3	.0451	.040	
4	.0451	.040	
5	.0449	.040	
Average	.0450		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds60

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 61
Project Description:	EP #93 Coal Creek	Date Sampled:	8/27/92
Seam Number:	DS 61	Date Tested:	8/28/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	133	80	FT
2	135	80	FT
3	134	80	FT
4	138	80	FT
5	134	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	98	52	FT
2	88	52	FT
3	100	52	FT
4	102	52	FT
5	90	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0458	.040	
2	.0457	.040	
3	.0457	.040	
4	.0457	.040	
5	.0458	.040	
Average	.0457		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Project Number:	BFDX-92-019C	Sample Number:	DS 62
Project Description:	EP #93 Coal Creek	Date Sampled:	8/18/92
Seam Number:	DS 62	Date Tested:	8/18/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	124	80	FT
3	125	80	FT
4	125	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	86	52	FT
2	88	52	FT
3	93	52	FT
4	87	52	FT
5	80	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0422	.040	
2	.0425	.040	
3	.0424	.040	
4	.0423	.040	
5	.0443	.040	
Average			

REMARKS:

FT = Film Tear
BT = Bond Tear

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 63
Project Description:	EP #93 Coal Creek	Date Sampled:	8/19/92
Seam Number:	DS 63	Date Tested:	8/19/92
Welder Number:	-	Tested By:	LL

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	125	80	FT
3	123	80	FT
4	124	80	FT
5	122	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	81	52	FT
2	84	52	FT
3	70	52	FT
4	90	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0400	.040	
2	.0400	.040	
3	.0400	.040	
4	.0400	.040	
5	.0400	.040	
Average	.0400		

REMARKS:

FT = Film Tear
BT = Bond Tear

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 64
Project Description:	EP #93 Coal Creek	Date Sampled:	8/19/92
Seam Number:	DS 64	Date Tested:	8/19/92
Welder Number:	-	Tested By:	LL

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	125	80	FT
2	126	80	FT
3	131	80	FT
4	131	80	FT
5	129	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	101	52	FT
2	93	52	FT
3	99	52	FT
4	99	52	FT
5	100	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0452	.040	
2	.0470	.040	
3	.0450	.040	
4	.0450	.040	
5	.0455	.040	
Average	.0455		

REMARKS:

FT = Film Tear
BT = Bond Tear

cvds64

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 65
Project Description:	EP #93 Coal Creek	Date Sampled:	8/19/92
Seam Number:	DS 65	Date Tested:	8/19/92
Welder Number:	-	Tested By:	N/I

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	131	80	FT
2	127	80	FT
3	126	80	FT
4	124	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	92	52	FT
2	99	52	FT
3	89	52	FT
4	93	52	FT
5	105	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0430	.040	
2	.0440	.040	
3	.0440	.040	
4	.0420	.040	
5	.0430	.040	
Average	.0432		

REMARKS:

FT = Film Tear
BT = Bond Tear

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 66
Project Description:	EP #93 Coal Creek	Date Sampled:	8/27/92
Seam Number:	DS 66	Date Tested:	8/27/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	132	80	FT
3	131	80	FT
4	133	80	FT
5	132	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	101	52	FT
2	109	52	FT
3	105	52	FT
4	106	52	FT
5	97	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0452	.040	
2	.0454	.040	
3	.0452	.040	
4	.0452	.040	
5	.0452	.040	
Average	.0452		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Project Number:	BFDX-92-019C	Sample Number:	DS 67
Project Description:	EP #93 Coal Creek	Date Sampled:	8/21/92
Seam Number:	DS 67	Date Tested:	8/22/92
Welder Number:	-	Tested By:	N/I

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	122	80	FT
3	129	80	FT
4	131	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	74	52	FT
2	80	52	FT
3	95	52	FT
4	90	52	FT
5	85	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0429	.040	
2	.0428	.040	
3	.0430	.040	
4	.0428	.040	
5	.0426	.040	
Average	.0428		

REMARKS:

FT = Film Tear
BT = Bond Tear

cvds67

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 68
Project Description:	EP #93 Coal Creek	Date Sampled:	N/I
Seam Number:	DS 68	Date Tested:	8/24/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	126	80	FT
3	127	80	FT
4	125	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	99	52	FT
2	103	52	FT
3	96	52	FT
4	97	52	FT
5	103	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0448	.040	
2	.0447	.040	
3	.0451	.040	
4	.0450	.040	
5	.0426	.040	
Average	.0444		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds68

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 69
Project Description:	EP #93 Coal Creek	Date Sampled:	8/20/92
Seam Number:	DS 69	Date Tested:	8/20/92
Welder Number:	-	Tested By:	JA

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	129	80	FT
3	133	80	FT
4	129	80	FT
5	125	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	74	52	FT
2	84	52	FT
3	85	52	FT
4	85	52	FT
5	74	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0461	.040	
2	.0458	.040	
3	.0457	.040	
4	.0462	.040	
5	.0456	.040	
Average	.0459		

REMARKS:

FT = Film Tear
BT = Bond Tear

cvds69

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 70
Project Description:	EP #93 Coal Creek	Date Sampled:	8/20/92
Seam Number:	DS 70	Date Tested:	8/20/92
Welder Number:	-	Tested By:	JA

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	125	80	FT
2	123	80	FT
3	119	80	FT
4	114	80	FT
5	125	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	86	52	FT
2	78	52	FT
3	82	52	FT
4	73	52	FT
5	94	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0424	.040	
2	.0423	.040	
3	.0421	.040	
4	.0423	.040	
5	.0420	.040	
Average	.0422		

REMARKS:

FT = Film Tear
BT = Bond Tear

cvds70

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 71
Project Description:	EP #93 Coal Creek	Date Sampled:	N/I
Seam Number:	DS 71	Date Tested:	8/24/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	129	80	FT
3	131	80	FT
4	126	80	FT
5	131	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	105	52	FT
2	99	52	FT
3	103	52	FT
4	98	52	FT
5	99	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0431	.040	
2	.0430	.040	
3	.0431	.040	
4	.0432	.040	
5	.0434	.040	
Average	.0432		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds71

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 72
Project Description:	EP #93 Coal Creek	Date Sampled:	8/20/92
Seam Number:	DS 72	Date Tested:	8/20/92
Welder Number:	-	Tested By:	JA

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	121	80	FT
3	125	80	FT
4	126	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	94	52	FT
2	83	52	FT
3	89	52	FT
4	101	52	FT
5	83	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0432	.040	
2	.0435	.040	
3	.0435	.040	
4	.0435	.040	
5	.0432	.040	
Average	.0434		

REMARKS:

FT = Film Tear
BT = Bond Tear

cvds72

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 73
Project Description:	EP #93 Coal Creek	Date Sampled:	N/I
Seam Number:	DS 73	Date Tested:	8/24/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	131	80	FT
2	129	80	FT
3	132	80	FT
4	131	80	FT
5	132	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	94	52	FT
2	94	52	FT
3	98	52	FT
4	96	52	FT
5	100	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0429	.040	
2	.0432	.040	
3	.0433	.040	
4	.0432	.040	
5	.0434	.040	
Average	.0432		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds73

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Project Number:	BFDX-92-019C	Sample Number:	DS 74
Project Description:	EP #93 Coal Creek	Date Sampled:	N/I
Seam Number:	DS 74	Date Tested:	8/24/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	129	80	FT
3	129	80	FT
4	130	80	FT
5	129	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	76	52	FT
2	78	52	FT
3	86	52	FT
4	83	52	FT
5	75	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0408	.040	
2	.0409	.040	
3	.0407	.040	
4	.0409	.040	
5	.0409	.040	
Average	.0408		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds74

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 75
Project Description:	EP #93 Coal Creek	Date Sampled:	N/I
Seam Number:	DS 75	Date Tested:	8/24/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	126	80	FT
2	127	80	FT
3	126	80	FT
4	126	80	FT
5	129	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	93	52	FT
2	82	52	FT
3	95	52	FT
4	91	52	FT
5	83	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0422	.040	
2	.0415	.040	
3	.0415	.040	
4	.0416	.040	
5	.0413	.040	
Average	.0416		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds75

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 76
Project Description:	EP #93 Coal Creek	Date Sampled:	N/I
Seam Number:	DS 76	Date Tested:	8/24/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	140	80	FT
2	136	80	FT
3	136	80	FT
4	133	80	FT
5	140	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	87	52	FT
2	91	52	FT
3	85	52	FT
4	89	52	FT
5	87	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0444	.040	
2	.0440	.040	
3	.0441	.040	
4	.0443	.040	
5	.0440	.040	
Average	.0442		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds76

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Project Number:	BFDX-92-019C	Sample Number:	DS 77
Project Description:	EP #93 Coal Creek	Date Sampled:	N/I
Seam Number:	DS 77	Date Tested:	8/24/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	121	80	FT
3	122	80	FT
4	124	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	97	52	FT
2	98	52	FT
3	96	52	FT
4	90	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0417	.040	
2	.0416	.040	
3	.0417	.040	
4	.0416	.040	
5	.0417	.040	
Average	.0417		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds77

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 78
Project Description:	EP #93 Coal Creek	Date Sampled:	8/26/92
Seam Number:	DS 78	Date Tested:	8/27/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	120	80	FT
2	123	80	FT
3	120	80	FT
4	124	80	FT
5	121	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	90	52	FT
2	85	52	FT
3	86	52	FT
4	86	52	FT
5	80	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0414	.040	
2	.0416	.040	
3	.0415	.040	
4	.0415	.040	
5	.0416	.040	
Average	.0415		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds78

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 79
Project Description:	EP #93 Coal Creek	Date Sampled:	8/26/92
Seam Number:	DS 79	Date Tested:	8/27/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	127	80	FT
3	125	80	FT
4	127	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	96	52	FT
2	103	52	FT
3	83	52	FT
4	86	52	FT
5	94	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0426	.040	
2	.0425	.040	
3	.0425	.040	
4	.0425	.040	
5	.0425	.040	
Average	.0425		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds79

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 80
Project Description:	EP #93 Coal Creek	Date Sampled:	N/I
Seam Number:	DS 80	Date Tested:	8/24/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	119	80	FT
3	120	80	FT
4	116	80	FT
5	121	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	84	52	FT
2	80	52	FT
3	88	52	FT
4	89	52	FT
5	84	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0415	.040	
2	.0414	.040	
3	.0417	.040	
4	.0414	.040	
5	.0414	.040	
Average	.0415		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds80

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 81
Project Description:	EP #93 Coal Creek	Date Sampled:	8/25/92
Seam Number:	DS 81	Date Tested:	8/26/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	126	80	FT
3	127	80	FT
4	130	80	FT
5	130	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	94	52	FT
2	87	52	FT
3	80	52	FT
4	81	52	FT
5	80	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0413	.040	
2	.0414	.040	
3	.0413	.040	
4	.0413	.040	
5	.0413	.040	
Average	.0413		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds81

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 82
Project Description:	EP #93 Coal Creek	Date Sampled:	N/I
Seam Number:	DS 82	Date Tested:	8/24/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	117	80	FT
2	120	80	FT
3	123	80	FT
4	129	80	FT
5	130	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	94	52	FT
2	82	52	FT
3	81	52	FT
4	84	52	FT
5	83	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0417	.040	
2	.0417	.040	
3	.0414	.040	
4	.0414	.040	
5	.0416	.040	
Average	.0416		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds82

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 83
Project Description:	EP #93 Coal Creek	Date Sampled:	8/25/92
Seam Number:	DS 83	Date Tested:	8/26/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	119	80	FT
2	117	80	FT
3	120	80	FT
4	124	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	96	52	FT
2	80	52	FT
3	93	52	FT
4	72	52	FT
5	87	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0412	.040	
2	.0412	.040	
3	.0412	.040	
4	.0411	.040	
5	.0412	.040	
Average	.0412		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds83

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 84
Project Description:	EP #93 Coal Creek	Date Sampled:	N/I
Seam Number:	DS 84	Date Tested:	8/24/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	132	80	FT
2	130	80	FT
3	131	80	FT
4	133	80	FT
5	131	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	82	52	FT
2	82	52	FT
3	82	52	FT
4	77	52	FT
5	88	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0410	.040	
2	.0410	.040	
3	.0412	.040	
4	.0412	.040	
5	.0412	.040	
Average	.0411		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds84

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 85
Project Description:	EP #93 Coal Creek	Date Sampled:	8/25/92
Seam Number:	DS 85	Date Tested:	8/26/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	128	80	FT
3	129	80	FT
4	130	80	FT
5	130	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	96	52	FT
2	93	52	FT
3	87	52	FT
4	96	52	FT
5	80	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0408	.040	
2	.0407	.040	
3	.0407	.040	
4	.0407	.040	
5	.0408	.040	
Average	.0407		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds85

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 86
Project Description:	EP #93 Coal Creek	Date Sampled:	N/I
Seam Number:	DS 86	Date Tested:	8/24/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	121	80	FT
3	121	80	FT
4	126	80	FT
5	120	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	83	52	FT
2	83	52	FT
3	77	52	FT
4	88	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0414	.040	
2	.0417	.040	
3	.0409	.040	
4	.0411	.040	
5	.0413	.040	
Average	.0413		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds86

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 87
Project Description:	EP #93 Coal Creek	Date Sampled:	8/25/92
Seam Number:	DS 87	Date Tested:	8/26/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	130	80	FT
2	130	80	FT
3	129	80	FT
4	131	80	FT
5	130	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	91	52	FT
2	79	52	FT
3	84	52	FT
4	77	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0414	.040	
2	.0415	.040	
3	.0416	.040	
4	.0415	.040	
5	.0414	.040	
Average			

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds87

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 88
Project Description:	EP #93 Coal Creek	Date Sampled:	N/I
Seam Number:	DS 88	Date Tested:	8/24/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	132	80	FT
3	127	80	FT
4	130	80	FT
5	129	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	91	52	FT
2	87	52	FT
3	87	52	FT
4	83	52	FT
5	87	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0433	.040	
2	.0432	.040	
3	.0433	.040	
4	.0430	.040	
5	.0420	.040	
Average	.0431		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds88

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 89
Project Description:	EP #93 Coal Creek	Date Sampled:	8/25/92
Seam Number:	DS 89	Date Tested:	8/26/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	135	80	FT
2	137	80	FT
3	135	80	FT
4	137	80	FT
5	135	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	84	52	FT
2	86	52	FT
3	90	52	FT
4	86	52	FT
5	84	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0436	.040	
2	.0438	.040	
3	.0438	.040	
4	.0437	.040	
5	.0436	.040	
Average	.0437		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds89

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 90
Project Description:	EP #93 Coal Creek	Date Sampled:	8/25/92
Seam Number:	DS 90	Date Tested:	8/26/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	131	80	FT
2	133	80	FT
3	129	80	FT
4	131	80	FT
5	134	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	80	52	FT
2	83	52	FT
3	85	52	FT
4	80	52	FT
5	82	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0436	.040	
2	.0435	.040	
3	.0437	.040	
4	.0435	.040	
5	.0436	.040	
Average	.0436		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds90

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 91
Project Description:	EP #93 Coal Creek	Date Sampled:	8/27/92
Seam Number:	DS 91	Date Tested:	8/28/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	130	80	FT
3	128	80	FT
4	128	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	99	52	FT
2	91	52	FT
3	87	52	FT
4	90	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.043	.040	
2	.0429	.040	
3	.043	.040	
4	.043	.040	
5	.0429	.040	
Average	.043		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds91

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 92
Project Description:	EP #93 Coal Creek	Date Sampled:	8/27/92
Seam Number:	DS 92	Date Tested:	8/27/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	123	80	FT
3	124	80	FT
4	125	80	FT
5	122	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	88	52	FT
2	98	52	FT
3	95	52	FT
4	96	52	FT
5	99	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0419	.040	
2	.042	.040	
3	.0419	.040	
4	.0419	.040	
5	.042	.040	
Average	.0419		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds92

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Project Number:	BFDX-92-019C	Sample Number:	DS 93
Project Description:	EP #93 Coal Creek	Date Sampled:	8/27/92
Seam Number:	DS 93	Date Tested:	8/27/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	125	80	FT
3	127	80	FT
4	124	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	85	52	FT
2	87	52	FT
3	87	52	FT
4	89	52	FT
5	83	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0436	.040	
2	.0435	.040	
3	.0434	.040	
4	.0435	.040	
5	.0435	.040	
Average	.0435		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds93

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 94
Project Description:	EP #93 Coal Creek	Date Sampled:	N/I
Seam Number:	DS 94	Date Tested:	8/31/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	124	80	FT
3	127	80	FT
4	124	80	FT
5	125	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	82	52	FT
2	77	52	FT
3	74	52	FT
4	78	52	FT
5	76	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0401	.040	
2	.0402	.040	
3	.0402	.040	
4	.0402	.040	
5	.0403	.040	
Average	.0402		

REMARKS:

FT = Film Tear
BT = Bond Tear

cvds/94

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 95
Project Description:	EP #93 Coal Creek	Date Sampled:	8/26/92
Seam Number:	DS 95	Date Tested:	8/27/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	121	80	FT
3	122	80	FT
4	119	80	FT
5	122	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	99	52	FT
2	78	52	FT
3	78	52	FT
4	71	52	FT
5	78	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.043	.040	
2	.043	.040	
3	.043	.040	
4	.043	.040	
5	.043	.040	
Average	.043		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds95

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 96
Project Description:	EP #93 Coal Creek	Date Sampled:	8/26/92
Seam Number:	DS 96	Date Tested:	8/27/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	121	80	FT
3	120	80	FT
4	122	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	88	52	FT
2	91	52	FT
3	91	52	FT
4	101	52	FT
5	92	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0417	.040	
2	.0417	.040	
3	.0418	.040	
4	.0419	.040	
5	.0418	.040	
Average	.0418		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds96

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 97
Project Description:	EP #93 Coal Creek	Date Sampled:	N/I
Seam Number:	DS 97	Date Tested:	8/31/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	109	80	FT
2	112	80	FT
3	108	80	FT
4	108	80	FT
5	109	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	80	52	FT
2	80	52	FT
3	82	52	FT
4	76	52	FT
5	80	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0408	.040	
2	.0412	.040	
3	.0419	.040	
4	.0419	.040	
5	.0409	.040	
Average	.0413		

REMARKS:

FT = Film Tear
BT = Bond Tear

cvds/97

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 98
Project Description:	EP #93 Coal Creek	Date Sampled:	9/14/92
Seam Number:	DS 98	Date Tested:	9/15/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	130	80	FT
2	126	80	FT
3	124	80	FT
4	130	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	85	52	FT
2	81	52	FT
3	91	52	FT
4	94	52	FT
5	77	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0432	.040	
2	.0432	.040	
3	.0432	.040	
4	.0433	.040	
5	.0432	.040	
Average	.0432		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds98

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 99
Project Description:	EP #93 Coal Creek	Date Sampled:	8/25/92
Seam Number:	DS 99	Date Tested:	8/26/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	133	80	FT
2	134	80	FT
3	131	80	FT
4	134	80	FT
5	131	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	86	52	FT
2	100	52	FT
3	101	52	FT
4	85	52	FT
5	80	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0434	.040	
2	.0434	.040	
3	.0434	.040	
4	.0435	.040	
5	.0434	.040	
Average	.0434		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds99

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 100
Project Description:	EP #93 Coal Creek	Date Sampled:	8/25/92
Seam Number:	DS 100	Date Tested:	8/26/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	131	80	FT
2	131	80	FT
3	132	80	FT
4	131	80	FT
5	133	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	93	52	FT
2	100	52	FT
3	90	52	FT
4	94	52	FT
5	102	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0415	.040	
2	.0416	.040	
3	.0417	.040	
4	.0417	.040	
5	.0416	.040	
Average	.0416		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds100

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Engineers and Scientists Serving the Built and Natural Environments

HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 101
Project Description:	EP #93 Coal Creek	Date Sampled:	8/25/92
Seam Number:	DS 101	Date Tested:	8/26/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	126	80	FT
3	125	80	FT
4	124	80	FT
5	125	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	84	52	FT
2	87	52	FT
3	82	52	FT
4	88	52	FT
5	85	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0417	.040	
2	.0416	.040	
3	.0416	.040	
4	.0417	.040	
5	.0417	.040	
Average	.0417		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds101

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 102
Project Description:	EP #93 Coal Creek	Date Sampled:	8/25/92
Seam Number:	DS 102	Date Tested:	8/26/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	116	80	FT
2	118	80	FT
3	119	80	FT
4	119	80	FT
5	117	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	89	52	FT
2	98	52	FT
3	76	52	FT
4	78	52	FT
5	77	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0416	.040	
2	.0415	.040	
3	.0412	.040	
4	.0409	.040	
5	.0416	.040	
Average	.0414		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds102

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 103
Project Description:	EP #93 Coal Creek	Date Sampled:	8/25/92
Seam Number:	DS 103	Date Tested:	8/26/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	118	80	FT
2	117	80	FT
3	119	80	FT
4	116	80	FT
5	118	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	85	52	FT
2	81	52	FT
3	86	52	FT
4	95	52	FT
5	92	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0417	.040	
2	.0417	.040	
3	.0413	.040	
4	.0415	.040	
5	.0410	.040	
Average	.0414		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds103

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 104
Project Description:	EP #93 Coal Creek	Date Sampled:	8/25/92
Seam Number:	DS 104	Date Tested:	8/26/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	118	80	FT
2	119	80	FT
3	121	80	FT
4	123	80	FT
5	119	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	97	52	FT
2	91	52	FT
3	84	52	FT
4	88	52	FT
5	79	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0407	.040	
2	.0406	.040	
3	.0406	.040	
4	.0405	.040	
5	.0405	.040	
Average	.0406		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds104

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 105
Project Description:	EP #93 Coal Creek	Date Sampled:	8/25/92
Seam Number:	DS 105	Date Tested:	8/26/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	119	80	FT
2	119	80	FT
3	123	80	FT
4	118	80	FT
5	121	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	89	52	FT
2	81	52	FT
3	76	52	FT
4	88	52	FT
5	81	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0417	.040	
2	.0417	.040	
3	.0417	.040	
4	.0417	.040	
5	.0415	.040	
Average	.0417		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds105

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 106
Project Description:	EP #93 Coal Creek	Date Sampled:	8/25/92
Seam Number:	DS 106	Date Tested:	8/26/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	119	80	FT
3	118	80	FT
4	120	80	FT
5	120	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	91	52	FT
2	84	52	FT
3	89	52	FT
4	94	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0417	.040	
2	.0416	.040	
3	.0414	.040	
4	.0417	.040	
5	.0415	.040	
Average	.0416		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds106

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 107
Project Description:	EP #93 Coal Creek	Date Sampled:	9/15/92
Seam Number:	DS 107	Date Tested:	9/15/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	125	80	FT
2	124	80	FT
3	125	80	FT
4	123	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	81	52	FT
2	86	52	FT
3	91	52	FT
4	86	52	FT
5	85	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0422	.040	
2	.0423	.040	
3	.0422	.040	
4	.0422	.040	
5	.0422	.040	
Average	.0422		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds107

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 108
Project Description:	EP #93 Coal Creek	Date Sampled:	8/31/92
Seam Number:	DS 108	Date Tested:	9/1/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	121	80	FT
3	121	80	FT
4	122	80	FT
5	121	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	15	52	BT
2	16	52	BT
3	16	52	BT
4	14	52	BT
5	17	52	BT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0423	.040	
2	.0423	.040	
3	.0424	.040	
4	.0423	.040	
5	.0424	.040	
Average	.0423		

REMARKS:

FT = Film Tear
BT = Bond Tear

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 108P
Project Description:	EP #93 Coal Creek	Date Sampled:	9/10/92
Seam Number:	DS 108P	Date Tested:	9/11/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	130	80	FT
3	127	80	FT
4	125	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	86	52	FT
2	98	52	FT
3	81	52	FT
4	80	52	FT
5	85	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0429	.040	
2	.0429	.040	
3	.0428	.040	
4	.0428	.040	
5	.0428	.040	
Average	.0428		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds108P

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 108N
Project Description:	EP #93 Coal Creek	Date Sampled:	9/2/92
Seam Number:	DS 108N	Date Tested:	9/3/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	120	80	FT
2	125	80	FT
3	122	80	FT
4	125	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	82	52	FT
2	77	52	FT
3	88	52	FT
4	87	52	FT
5	84	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0414	.040	
2	.0415	.040	
3	.0414	.040	
4	.0414	.040	
5	.0416	.040	
Average	.0415		

REMARKS:

FT = Film Tear
BT = Bond Tear

csds/108N

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 109
Project Description:	EP #93 Coal Creek	Date Sampled:	9/14/92
Seam Number:	DS 109	Date Tested:	9/15/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	126	80	FT
3	120	80	FT
4	127	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	78	52	FT
2	78	52	FT
3	85	52	FT
4	77	52	FT
5	78	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0403	.040	
2	.0403	.040	
3	.0403	.040	
4	.0402	.040	
5	.0404	.040	
Average	.0403		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds109

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 110
Project Description:	EP #93 Coal Creek	Date Sampled:	8/25/92
Seam Number:	DS 110	Date Tested:	8/26/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	126	80	FT
2	127	80	FT
3	126	80	FT
4	127	80	FT
5	129	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	84	52	FT
2	86	52	FT
3	80	52	FT
4	81	52	FT
5	85	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	.040	
2	.0405	.040	
3	.0404	.040	
4	.0405	.040	
5	.0404	.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds110

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 111
Project Description:	EP #93 Coal Creek	Date Sampled:	8/25/92
Seam Number:	DS 111	Date Tested:	8/26/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	120	80	FT
2	120	80	FT
3	121	80	FT
4	121	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	77	52	FT
2	91	52	FT
3	78	52	FT
4	77	52	FT
5	83	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0404	.040	
2	.0404	.040	
3	.0405	.040	
4	.0404	.040	
5	.0404	.040	
Average	.0404		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds111

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 112
Project Description:	EP #93 Coal Creek	Date Sampled:	9/19/92
Seam Number:	DS 112	Date Tested:	9/21/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	125	80	FT
3	127	80	FT
4	129	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	91	52	FT
2	83	52	FT
3	81	52	FT
4	90	52	FT
5	95	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	.040	
2	.0405	.040	
3	.0405	.040	
4	.0405	.040	
5	.0405	.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds112

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 113
Project Description:	EP #93 Coal Creek	Date Sampled:	N/I
Seam Number:	DS 113	Date Tested:	8/31/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	126	80	FT
3	126	80	FT
4	124	80	FT
5	125	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	97	52	FT
2	93	52	FT
3	90	52	FT
4	91	52	FT
5	101	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	.040	
2	.042	.040	
3	.0421	.040	
4	.042	.040	
5	.0421	.040	
Average	.0420		

REMARKS:

FT = Film Tear
BT = Bond Tear

cvds/113

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 114
Project Description:	EP #93 Coal Creek	Date Sampled:	N/I
Seam Number:	DS 114	Date Tested:	8/31/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	121	80	FT
3	126	80	FT
4	120	80	FT
5	119	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	71	52	FT
2	77	52	FT
3	88	52	FT
4	85	52	FT
5	82	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0416	.040	
2	.0416	.040	
3	.0417	.040	
4	.0417	.040	
5	.0414	.040	
Average	.0416		

REMARKS:

FT = Film Tear
BT = Bond Tear

cvds/114

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 115
Project Description:	EP #93 Coal Creek	Date Sampled:	9/19/92
Seam Number:	DS 115	Date Tested:	9/21/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	121	80	FT
3	122	80	FT
4	124	80	FT
5	121	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	83	52	FT
2	92	52	FT
3	101	52	FT
4	97	52	FT
5	97	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0425	.040	
2	.0425	.040	
3	.0425	.040	
4	.0425	.040	
5	.0425	.040	
Average	.0425		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds115

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 116
Project Description:	EP #93 Coal Creek	Date Sampled:	9/2/92
Seam Number:	DS 116	Date Tested:	9/3/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	126	80	FT
2	125	80	FT
3	123	80	FT
4	126	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	82	52	FT
2	79	52	FT
3	78	52	FT
4	92	52	FT
5	80	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0438	.040	
2	.0436	.040	
3	.0438	.040	
4	.0438	.040	
5	.0437	.040	
Average	.0437		

REMARKS:

FT = Film Tear
BT = Bond Tear

csds/116

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 117
Project Description:	EP #93 Coal Creek	Date Sampled:	8/31/92
Seam Number:	DS 117	Date Tested:	9/1/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	126	80	FT
2	124	80	FT
3	125	80	FT
4	129	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	82	52	FT
2	81	52	FT
3	82	52	FT
4	84	52	FT
5	83	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0432	.040	
2	.0432	.040	
3	.0431	.040	
4	.0432	.040	
5	.0431	.040	
Average	.0432		

REMARKS:

FT = Film Tear
BT = Bond Tear

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 118
Project Description:	EP #93 Coal Creek	Date Sampled:	9/15/92
Seam Number:	DS 118	Date Tested:	9/15/92
Welder Number:	-	Tested By:	SD

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	124	80	FT
3	122	80	FT
4	125	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	82	52	FT
2	82	52	FT
3	83	52	FT
4	84	52	FT
5	86	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0404	.040	
2	.0402	.040	
3	.0405	.040	
4	.0406	.040	
5	.0406	.040	
Average	.0404		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds118

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 119
Project Description:	EP #93 Coal Creek	Date Sampled:	9/2/92
Seam Number:	DS 119	Date Tested:	9/3/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	125	80	FT
3	126	80	FT
4	128	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	91	52	FT
2	83	52	FT
3	89	52	FT
4	85	52	FT
5	92	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0434	.040	
2	.0432	.040	
3	.0434	.040	
4	.0432	.040	
5	.0432	.040	
Average	.0433		

REMARKS:

FT = Film Tear
BT = Bond Tear

csds/119

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 120
Project Description:	EP #93 Coal Creek	Date Sampled:	9/8/92
Seam Number:	DS 120	Date Tested:	9/8/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	125	80	FT
3	126	80	FT
4	125	80	FT
5	129	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	89	52	FT
2	82	52	FT
3	82	52	FT
4	85	52	FT
5	86	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0403	.040	
2	.0402	.040	
3	.0402	.040	
4	.0403	.040	
5	.0402	.040	
Average	.0402		

REMARKS:

FT = Film Tear
BT = Bond Tear

ds120

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 121
Project Description:	EP #93 Coal Creek	Date Sampled:	9/2/92
Seam Number:	DS 121	Date Tested:	9/3/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	126	80	FT
2	129	80	FT
3	125	80	FT
4	127	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	78	52	FT
2	79	52	FT
3	70	52	FT
4	83	52	FT
5	78	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0408	.040	
2	.0408	.040	
3	.0407	.040	
4	.0407	.040	
5	.0408	.040	
Average	.0408		

REMARKS:

FT = Film Tear
BT = Bond Tear

csds/121

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Project Number:	BFDX-92-019C	Sample Number:	DS 122
Project Description:	EP #93 Coal Creek	Date Sampled:	9/8/92
Seam Number:	DS 122	Date Tested:	9/8/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	126	80	FT
2	127	80	FT
3	127	80	FT
4	127	80	FT
5	130	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	94	52	FT
2	89	52	FT
3	82	52	FT
4	92	52	FT
5	87	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	.040	
2	.0403	.040	
3	.0403	.040	
4	.0403	.040	
5	.0404	.040	
Average	.0404		

REMARKS:

FT = Film Tear
BT = Bond Tear

ds122

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 123
Project Description:	EP #93 Coal Creek	Date Sampled:	9/18/92
Seam Number:	DS 123	Date Tested:	9/20/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	123	80	FT
3	126	80	FT
4	126	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	75	52	FT
2	80	52	FT
3	92	52	FT
4	91	52	FT
5	77	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	.040	
2	.0405	.040	
3	.0405	.040	
4	.0405	.040	
5	.0405	.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds123

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Project Number:	BFDX-92-019C	Sample Number:	DS 124
Project Description:	EP #93 Coal Creek	Date Sampled:	N/I
Seam Number:	DS 124	Date Tested:	N/I
Welder Number:	-	Tested By:	N/I

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	127	80	FT
3	126	80	FT
4	128	80	FT
5	125	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	85	52	FT
2	82	52	FT
3	85	52	FT
4	91	52	FT
5	86	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0403	.040	
2	.0403	.040	
3	.0404	.040	
4	.0404	.040	
5	.0404	.040	
Average	.0404		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds124

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 125
Project Description:	EP #93 Coal Creek	Date Sampled:	9/18/92
Seam Number:	DS 125	Date Tested:	9/20/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	121	80	FT
3	124	80	FT
4	126	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	92	52	FT
2	95	52	FT
3	91	52	FT
4	88	52	FT
5	88	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0403	.040	
2	.0403	.040	
3	.0403	.040	
4	.0403	.040	
5	.0403	.040	
Average	.0403		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds125

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 126
Project Description:	EP #93 Coal Creek	Date Sampled:	9/8/92
Seam Number:	DS 126	Date Tested:	9/8/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	123	80	FT
3	122	80	FT
4	123	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	86	52	FT
2	92	52	FT
3	86	52	FT
4	87	52	FT
5	82	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0419	.040	
2	.0417	.040	
3	.0417	.040	
4	.0418	.040	
5	.0417	.040	
Average	.0418		

REMARKS:

FT = Film Tear
BT = Bond Tear

ds126

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 127
Project Description:	EP #93 Coal Creek	Date Sampled:	9/8/92
Seam Number:	DS 127	Date Tested:	9/9/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	123	80	FT
3	123	80	FT
4	125	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	81	52	FT
2	71	52	FT
3	88	52	FT
4	81	52	FT
5	70	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0437	.040	
2	.0437	.040	
3	.0437	.040	
4	.0437	.040	
5	.0437	.040	
Average	.0437		

REMARKS:

FT = Film Tear
BT = Bond Tear

ds127

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 128
Project Description:	EP #93 Coal Creek	Date Sampled:	9/8/92
Seam Number:	DS 128	Date Tested:	9/8/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	124	80	FT
3	123	80	FT
4	123	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	72	52	FT
2	76	52	FT
3	97	52	FT
4	99	52	FT
5	76	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0434	.040	
2	.0434	.040	
3	.0433	.040	
4	.0432	.040	
5	.0433	.040	
Average	.0433		

REMARKS:

FT = Film Tear
BT = Bond Tear

ds128

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 129
Project Description:	EP #93 Coal Creek	Date Sampled:	9/8/92
Seam Number:	DS 129	Date Tested:	9/9/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	124	80	FT
3	125	80	FT
4	124	80	FT
5	122	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	83	52	FT
2	82	52	FT
3	82	52	FT
4	85	52	FT
5	82	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0427	.040	
2	.0428	.040	
3	.0428	.040	
4	.0428	.040	
5	.0427	.040	
Average	.0428		

REMARKS:

FT = Film Tear
BT = Bond Tear

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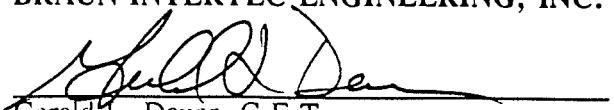

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 130
Project Description:	EP #93 Coal Creek	Date Sampled:	9/8/92
Seam Number:	DS 130	Date Tested:	9/8/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	121	80	FT
3	124	80	FT
4	122	80	FT
5	120	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	87	52	FT
2	86	52	FT
3	83	52	FT
4	86	52	FT
5	84	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0430	.040	
2	.0430	.040	
3	.0430	.040	
4	.0430	.040	
5	.0430	.040	
Average	.0430		

REMARKS:

FT = Film Tear
BT = Bond Tear

ds130

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 131
Project Description:	EP #93 Coal Creek	Date Sampled:	9/8/92
Seam Number:	DS 131	Date Tested:	9/9/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	125	80	FT
3	127	80	FT
4	126	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	93	52	FT
2	84	52	FT
3	82	52	FT
4	85	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0433	.040	
2	.0433	.040	
3	.0430	.040	
4	.0432	.040	
5	.0432	.040	
Average	.0432		

REMARKS:

FT = Film Tear
BT = Bond Tear

ds131

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 132
Project Description:	EP #93 Coal Creek	Date Sampled:	9/8/92
Seam Number:	DS 132	Date Tested:	9/9/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	130	80	FT
2	125	80	FT
3	127	80	FT
4	126	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	79	52	FT
2	78	52	FT
3	74	52	FT
4	75	52	FT
5	77	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0412	.040	
2	.0412	.040	
3	.0413	.040	
4	.0412	.040	
5	.0412	.040	
Average	.0412		

REMARKS:

FT = Film Tear
BT = Bond Tear

da132

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 133
Project Description:	EP #93 Coal Creek	Date Sampled:	9/8/92
Seam Number:	DS 133	Date Tested:	9/9/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	131	80	FT
2	134	80	FT
3	127	80	FT
4	127	80	FT
5	131	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	95	52	FT
2	89	52	FT
3	89	52	FT
4	87	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0402	.040	
2	.0401	.040	
3	.0402	.040	
4	.0401	.040	
5	.0401	.040	
Average	.0401		

REMARKS:

FT = Film Tear
BT = Bond Tear

ds133

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 134
Project Description:	EP #93 Coal Creek	Date Sampled:	9/8/92
Seam Number:	DS 134	Date Tested:	9/9/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	122	80	FT
3	122	80	FT
4	127	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	81	52	FT
2	78	52	FT
3	83	52	FT
4	89	52	FT
5	84	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0406	.040	
2	.0406	.040	
3	.0406	.040	
4	.0406	.040	
5	.0406	.040	
Average	.0406		

REMARKS:

FT = Film Tear
BT = Bond Tear

ds134

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 135
Project Description:	EP #93 Coal Creek	Date Sampled:	9/8/92
Seam Number:	DS 135	Date Tested:	9/9/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	126	80	FT
3	124	80	FT
4	126	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	84	52	FT
2	80	52	FT
3	81	52	FT
4	80	52	FT
5	80	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0421	.040	
2	.0422	.040	
3	.0421	.040	
4	.0421	.040	
5	.0421	.040	
Average	.0421		

REMARKS:

FT = Film Tear
BT = Bond Tear

ds135

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 136
Project Description:	EP #93 Coal Creek	Date Sampled:	9/8/92
Seam Number:	DS 136	Date Tested:	9/9/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	130	80	FT
2	128	80	FT
3	127	80	FT
4	127	80	FT
5	129	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	81	52	FT
2	84	52	FT
3	98	52	FT
4	99	52	FT
5	86	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0409	.040	
2	.0408	.040	
3	.0408	.040	
4	.0408	.040	
5	.0408	.040	
Average	.0408		

REMARKS:

FT = Film Tear
BT = Bond Tear

ds136

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Project Number:	BFDX-92-019C	Sample Number:	DS 137
Project Description:	EP #93 Coal Creek	Date Sampled:	9/8/92
Seam Number:	DS 137	Date Tested:	9/9/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	127	80	FT
3	128	80	FT
4	126	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	88	52	FT
2	88	52	FT
3	93	52	FT
4	78	52	FT
5	85	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0410	.040	
2	.0410	.040	
3	.0410	.040	
4	.0410	.040	
5	.0410	.040	
Average	.0410		

REMARKS:

FT = Film Tear
BT = Bond Tear

ds137

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Project Number:	BFDX-92-019C	Sample Number:	DS 138
Project Description:	EP #93 Coal Creek	Date Sampled:	9/8/92
Seam Number:	DS 138	Date Tested:	9/9/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	120	80	FT
3	129	80	FT
4	129	80	FT
5	129	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	87	52	FT
2	76	52	FT
3	78	52	FT
4	78	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0410	.040	
2	.0411	.040	
3	.0410	.040	
4	.0410	.040	
5	.0404	.040	
Average	.0410		

REMARKS:

FT = Film Tear
BT = Bond Tear

ds138

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Project Number:	BFDX-92-019C	Sample Number:	DS 139
Project Description:	EP #93 Coal Creek	Date Sampled:	9/8/92
Seam Number:	DS 139	Date Tested:	9/9/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	123	80	FT
3	122	80	FT
4	121	80	FT
5	122	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	85	52	FT
2	85	52	FT
3	86	52	FT
4	90	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0410	.040	
2	.0410	.040	
3	.0410	.040	
4	.0410	.040	
5	.0410	.040	
Average	.0410		

REMARKS:

FT = Film Tear
BT = Bond Tear

ds139

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Project Number:	BFDX-92-019C	Sample Number:	DS 140
Project Description:	EP #93 Coal Creek	Date Sampled:	9/8/92
Seam Number:	DS 140	Date Tested:	9/9/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	125	80	FT
2	128	80	FT
3	126	80	FT
4	128	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	73	52	FT
2	74	52	FT
3	69	52	FT
4	70	52	FT
5	78	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	.040	
2	.0405	.040	
3	.0405	.040	
4	.0406	.040	
5	.0405	.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

ds140

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 141
Project Description:	EP #93 Coal Creek	Date Sampled:	9/9/92
Seam Number:	DS 141	Date Tested:	9/10/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	122	80	FT
3	126	80	FT
4	122	80	FT
5	125	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	81	52	FT
2	81	52	FT
3	83	52	FT
4	68	52	FT
5	80	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0402	.040	
2	.0401	.040	
3	.0402	.040	
4	.0402	.040	
5	.0402	.040	
Average	.0402		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds141

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 142
Project Description:	EP #93 Coal Creek	Date Sampled:	9/17/92
Seam Number:	DS 142	Date Tested:	9/17/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	123	80	FT
3	126	80	FT
4	125	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	94	52	FT
2	94	52	FT
3	93	52	FT
4	90	52	FT
5	95	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0402	.040	
2	.0401	.040	
3	.0402	.040	
4	.0401	.040	
5	.0402	.040	
Average	.0402		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds142

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DSE 6
Project Description:	EP #93 Coal Creek	Date Sampled:	9/15/92
Seam Number:	DSE 6	Date Tested:	9/16/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	121	80	FT
3	118	80	FT
4	119	80	FT
5	118	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	74	52	FT
2	58	52	FT
3	62	52	FT
4	61	52	FT
5	64	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0410	.040	
2	.0413	.040	
3	.0410	.040	
4	.0413	.040	
5	.0410	.040	
Average	.0410		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/dse6

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 143
Project Description:	EP #93 Coal Creek	Date Sampled:	9/8/92
Seam Number:	DS 143	Date Tested:	9/9/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	131	80	FT
2	131	80	FT
3	129	80	FT
4	130	80	FT
5	131	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	84	52	FT
2	78	52	FT
3	81	52	FT
4	86	52	FT
5	76	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	.040	
2	.0405	.040	
3	.0405	.040	
4	.0405	.040	
5	.0405	.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

ds143

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 144
Project Description:	EP #93 Coal Creek	Date Sampled:	9/9/92
Seam Number:	DS 144	Date Tested:	9/10/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	131	80	FT
3	129	80	FT
4	130	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	79	52	FT
2	77	52	FT
3	85	52	FT
4	91	52	FT
5	79	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0403	.040	
2	.0403	.040	
3	.0403	.040	
4	.0403	.040	
5	.0403	.040	
Average	.0403		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds144

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 145
Project Description:	EP #93 Coal Creek	Date Sampled:	9/9/92
Seam Number:	DS 145	Date Tested:	9/10/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	129	80	FT
3	131	80	FT
4	127	80	FT
5	129	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	102	52	FT
2	93	52	FT
3	92	52	FT
4	102	52	FT
5	92	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0417	.040	
2	.0418	.040	
3	.0418	.040	
4	.0418	.040	
5	.0417	.040	
Average	.0418		

REMARKS:

FT = Film Tear
BT = Bond Tear

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 146
Project Description:	EP #93 Coal Creek	Date Sampled:	9/10/92
Seam Number:	DS 146	Date Tested:	9/11/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	126	80	FT
3	124	80	FT
4	126	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	88	52	FT
2	87	52	FT
3	86	52	FT
4	92	52	FT
5	84	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0411	.040	
2	.0411	.040	
3	.0411	.040	
4	.0411	.040	
5	.0411	.040	
Average	.0411		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds146

BRAUN INTERTEC ENGINEERING, INC.

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Operations Manager

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 147
Project Description:	EP #93 Coal Creek	Date Sampled:	9/9/92
Seam Number:	DS 147	Date Tested:	9/10/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	120	80	FT
2	120	80	FT
3	119	80	FT
4	120	80	FT
5	120	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	76	52	FT
2	79	52	FT
3	89	52	FT
4	88	52	FT
5	86	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0401	.040	
2	.0401	.040	
3	.0401	.040	
4	.0402	.040	
5	.0402	.040	
Average	.0402		

REMARKS:

FT = Film Tear
BT = Bond Tear

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gw/ds147

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 148
Project Description:	EP #93 Coal Creek	Date Sampled:	9/10/92
Seam Number:	DS 148	Date Tested:	9/11/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	118	80	FT
2	123	80	FT
3	122	80	FT
4	120	80	FT
5	121	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	86	52	FT
2	72	52	FT
3	90	52	FT
4	89	52	FT
5	91	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0407	.040	
2	.0407	.040	
3	.0407	.040	
4	.0407	.040	
5	.0407	.040	
Average	.0407		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds148

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 149
Project Description:	EP #93 Coal Creek	Date Sampled:	9/14/92
Seam Number:	DS 149	Date Tested:	9/15/92
Welder Number:	-	Tested By:	SD

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	120	80	FT
2	126	80	FT
3	115	80	FT
4	123	80	FT
5	120	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	84	52	FT
2	88	52	FT
3	84	52	FT
4	84	52	FT
5	86	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	.040	
2	.0405	.040	
3	.0405	.040	
4	.0405	.040	
5	.0405	.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds149

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 150
Project Description:	EP #93 Coal Creek	Date Sampled:	9/14/92
Seam Number:	DS 150	Date Tested:	9/15/92
Welder Number:	-	Tested By:	SD

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	118	80	FT
3	118	80	FT
4	118	80	FT
5	120	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	94	52	FT
2	96	52	FT
3	97	52	FT
4	89	52	FT
5	74	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0400	.040	
2	.0400	.040	
3	.0400	.040	
4	.0400	.040	
5	.0400	.040	
Average	.0400		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds150

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 151
Project Description:	EP #93 Coal Creek	Date Sampled:	9/10/92
Seam Number:	DS 151	Date Tested:	9/11/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	133	80	FT
2	132	80	FT
3	128	80	FT
4	127	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	90	52	FT
2	81	52	FT
3	80	52	FT
4	84	52	FT
5	82	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0409	.040	
2	.0409	.040	
3	.0409	.040	
4	.0401	.040	
5	.0409	.040	
Average	.0409		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds151

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 152
Project Description:	EP #93 Coal Creek	Date Sampled:	9/10/92
Seam Number:	DS 152	Date Tested:	9/11/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	115	80	FT
2	121	80	FT
3	118	80	FT
4	116	80	FT
5	115	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	90	52	FT
2	80	52	FT
3	89	52	FT
4	82	52	FT
5	86	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0429	.040	
2	.0429	.040	
3	.0430	.040	
4	.0430	.040	
5	.0429	.040	
Average	.0429		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds152

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 153
Project Description:	EP #93 Coal Creek	Date Sampled:	9/10/92
Seam Number:	DS 153	Date Tested:	9/11/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	129	80	FT
3	127	80	FT
4	129	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	100	52	FT
2	95	52	FT
3	98	52	FT
4	90	52	FT
5	97	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0410	.040	
2	.0410	.040	
3	.0410	.040	
4	.0410	.040	
5	.0410	.040	
Average	.0410		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds153

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 154
Project Description:	EP #93 Coal Creek	Date Sampled:	9/10/92
Seam Number:	DS 154	Date Tested:	9/11/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	128	80	FT
3	130	80	FT
4	130	80	FT
5	130	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	83	52	FT
2	65	52	BT
3	75	52	FT
4	71	52	FT
5	81	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0412	.040	
2	.0412	.040	
3	.0412	.040	
4	.0412	.040	
5	.0412	.040	
Average	.0412		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds154

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 154N
Project Description:	EP #93 Coal Creek	Date Sampled:	9/17/92
Seam Number:	DS 154N	Date Tested:	9/17/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	126	80	FT
3	123	80	FT
4	127	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	84	52	FT
2	87	52	FT
3	84	52	FT
4	80	52	FT
5	83	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0412	.040	
2	.0411	.040	
3	.0411	.040	
4	.0412	.040	
5	.0412	.040	
Average	.0412		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds154N

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 155
Project Description:	EP #93 Coal Creek	Date Sampled:	9/10/92
Seam Number:	DS 155	Date Tested:	9/11/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	126	80	FT
2	125	80	FT
3	125	80	FT
4	123	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	88	52	FT
2	83	52	FT
3	79	52	FT
4	79	52	FT
5	76	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0412	.040	
2	.0412	.040	
3	.0412	.040	
4	.0412	.040	
5	.0412	.040	
Average	.0412		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds155

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 156
Project Description:	EP #93 Coal Creek	Date Sampled:	9/17/92
Seam Number:	DS 156	Date Tested:	9/17/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	125	80	FT
2	127	80	FT
3	126	80	FT
4	126	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	94	52	FT
2	88	52	FT
3	88	52	FT
4	88	52	FT
5	92	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0410	.040	
2	.0411	.040	
3	.0411	.040	
4	.0412	.040	
5	.0411	.040	
Average	.0411		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds156

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 157
Project Description:	EP #93 Coal Creek	Date Sampled:	9/17/92
Seam Number:	DS 157	Date Tested:	9/17/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	122	80	FT
3	123	80	FT
4	124	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	84	52	BT
2	84	52	FT
3	90	52	BT
4	91	52	FT
5	91	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	.040	
2	.0405	.040	
3	.0405	.040	
4	.0405	.040	
5	.0405	.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds157

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 158
Project Description:	EP #93 Coal Creek	Date Sampled:	9/17/92
Seam Number:	DS 158	Date Tested:	9/17/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	131	80	FT
2	132	80	FT
3	133	80	FT
4	133	80	FT
5	133	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	55	52	BT
2	79	52	FT
3	64	52	BT
4	75	52	FT
5	81	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0407	.040	
2	.0407	.040	
3	.0407	.040	
4	.0407	.040	
5	.0408	.040	
Average	.0407		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds158

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 158N
Project Description:	EP #93 Coal Creek	Date Sampled:	9/18/92
Seam Number:	DS 158N	Date Tested:	9/18/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	125	80	FT
2	128	80	FT
3	123	80	FT
4	125	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	82	52	FT
2	85	52	FT
3	79	52	FT
4	84	52	FT
5	76	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0407	.040	
2	.0408	.040	
3	.0408	.040	
4	.0407	.040	
5	.0407	.040	
Average	.0407		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds158N

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 158P
Project Description:	EP #93 Coal Creek	Date Sampled:	9/18/92
Seam Number:	DS 158P	Date Tested:	9/18/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	126	80	FT
2	127	80	FT
3	127	80	FT
4	126	80	FT
5	129	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	101	52	FT
2	71	52	FT
3	101	52	FT
4	65	52	FT
5	92	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0418	.040	
2	.0417	.040	
3	.0418	.040	
4	.0418	.040	
5	.0417	.040	
Average	.0418		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds158P

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 159
Project Description:	EP #93 Coal Creek	Date Sampled:	9/17/92
Seam Number:	DS 159	Date Tested:	9/17/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	125	80	FT
3	125	80	FT
4	124	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	91	52	FT
2	92	52	FT
3	92	52	FT
4	94	52	FT
5	80	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	.040	
2	.0405	.040	
3	.0406	.040	
4	.0405	.040	
5	.0406	.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds159

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 160
Project Description:	EP #93 Coal Creek	Date Sampled:	9/17/92
Seam Number:	DS 160	Date Tested:	9/17/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	130	80	FT
3	128	80	FT
4	129	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	85	52	FT
2	90	52	FT
3	94	52	FT
4	96	52	FT
5	91	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	.040	
2	.0405	.040	
3	.0406	.040	
4	.0406	.040	
5	.0405	.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds160

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 161
Project Description:	EP #93 Coal Creek	Date Sampled:	9/17/92
Seam Number:	DS 161	Date Tested:	9/17/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	118	80	FT
2	120	80	FT
3	120	80	FT
4	119	80	FT
5	118	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	68	52	FT
2	72	52	FT
3	92	52	FT
4	89	52	FT
5	85	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0410	.040	
2	.0411	.040	
3	.0411	.040	
4	.0411	.040	
5	.0411	.040	
Average	.0411		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds161

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 162
Project Description:	EP #93 Coal Creek	Date Sampled:	9/17/92
Seam Number:	DS 162	Date Tested:	9/17/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	129	80	FT
3	127	80	FT
4	128	80	FT
5	125	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	85	52	FT
2	86	52	FT
3	89	52	FT
4	84	52	FT
5	90	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0412	.040	
2	.0411	.040	
3	.0412	.040	
4	.0412	.040	
5	.0411	.040	
Average	.0412		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds162

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 163
Project Description:	EP #93 Coal Creek	Date Sampled:	9/17/92
Seam Number:	DS 163	Date Tested:	9/17/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	119	80	FT
2	122	80	FT
3	120	80	FT
4	118	80	FT
5	118	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	87	52	FT
2	91	52	FT
3	80	52	FT
4	72	52	FT
5	92	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0418	.040	
2	.0417	.040	
3	.0417	.040	
4	.0417	.040	
5	.0417	.040	
Average	.0417		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds163

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 164
Project Description:	EP #93 Coal Creek	Date Sampled:	9/10/92
Seam Number:	DS 164	Date Tested:	9/11/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	131	80	FT
2	132	80	FT
3	132	80	FT
4	129	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	90	52	FT
2	87	52	FT
3	76	52	FT
4	75	52	FT
5	76	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0407	.040	
2	.0407	.040	
3	.0407	.040	
4	.0407	.040	
5	.0407	.040	
Average	.0407		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds164

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 165
Project Description:	EP #93 Coal Creek	Date Sampled:	9/21/92
Seam Number:	DS 165	Date Tested:	9/21/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	124	80	FT
3	127	80	FT
4	126	80	FT
5	125	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	90	52	FT
2	87	52	FT
3	87	52	FT
4	74	52	FT
5	88	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	.040	
2	.0405	.040	
3	.0405	.040	
4	.0405	.040	
5	.0405	.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 166
Project Description:	EP #93 Coal Creek	Date Sampled:	9/19/92
Seam Number:	DS 166	Date Tested:	9/21/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	125	80	FT
2	125	80	FT
3	126	80	FT
4	124	80	FT
5	122	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	80	52	FT
2	85	52	FT
3	80	52	FT
4	78	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	.040	
2	.0405	.040	
3	.0405	.040	
4	.0405	.040	
5	.0405	.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds166

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 167
Project Description:	EP #93 Coal Creek	Date Sampled:	9/14/92
Seam Number:	DS 167	Date Tested:	9/15/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	125	80	FT
3	128	80	FT
4	128	80	FT
5	122	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	98	52	FT
2	91	52	FT
3	91	52	FT
4	89	52	FT
5	102	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	.040	
2	.0405	.040	
3	.0405	.040	
4	.0405	.040	
5	.0405	.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds167

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Project Number:	BFDX-92-019C	Sample Number:	DS 168
Project Description:	EP #93 Coal Creek	Date Sampled:	9/14/92
Seam Number:	DS 168	Date Tested:	9/15/92
Welder Number:	-	Tested By:	SD

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	125	80	FT
2	126	80	FT
3	127	80	FT
4	122	80	FT
5	122	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	91	52	FT
2	85	52	FT
3	92	52	FT
4	80	52	FT
5	79	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0418	.040	
2	.0417	.040	
3	.0418	.040	
4	.0418	.040	
5	.0418	.040	
Average	.0418		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds168

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Project Number:	BFDX-92-019C	Sample Number:	DS 169
Project Description:	EP #93 Coal Creek	Date Sampled:	9/19/92
Seam Number:	DS 169	Date Tested:	9/21/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	123	80	FT
3	120	80	FT
4	120	80	FT
5	121	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	88	52	FT
2	83	52	FT
3	96	52	FT
4	93	52	FT
5	82	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0415	.040	
2	.0415	.040	
3	.0415	.040	
4	.0415	.040	
5	.0415	.040	
Average	.0415		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds169

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 170
Project Description:	EP #93 Coal Creek	Date Sampled:	9/19/92
Seam Number:	DS 170	Date Tested:	9/21/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	116	80	FT
2	112	80	FT
3	112	80	FT
4	114	80	FT
5	115	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	75	52	FT
2	80	52	FT
3	80	52	FT
4	71	52	FT
5	78	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0425	.040	
2	.0425	.040	
3	.0425	.040	
4	.0425	.040	
5	.0403	.040	
Average	.0426		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds170

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 171
Project Description:	EP #93 Coal Creek	Date Sampled:	9/21/92
Seam Number:	DS 171	Date Tested:	9/21/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	125	80	FT
2	125	80	FT
3	126	80	FT
4	124	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	81	52	FT
2	83	52	FT
3	81	52	FT
4	86	52	FT
5	82	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0430	.040	
2	.0430	.040	
3	.0430	.040	
4	.0430	.040	
5	.0430	.040	
Average	.0430		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds171

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Project Number:	BFDX-92-019C	Sample Number:	DS 172
Project Description:	EP #93 Coal Creek	Date Sampled:	9/21/92
Seam Number:	DS 172	Date Tested:	9/22/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	129	80	FT
3	130	80	FT
4	130	80	FT
5	129	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	103	52	FT
2	101	52	FT
3	97	52	FT
4	96	52	FT
5	99	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0425	.040	
2	.0424	.040	
3	.0425	.040	
4	.0424	.040	
5	.0425	.040	
Average	.0425		

REMARKS:

FT = Film Tear
BT = Bond Tear

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gw/ds172

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 173
Project Description:	EP #93 Coal Creek	Date Sampled:	9/19/92
Seam Number:	DS 173	Date Tested:	9/21/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	116	80	FT
2	118	80	FT
3	121	80	FT
4	124	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	90	52	FT
2	75	52	FT
3	76	52	FT
4	90	52	FT
5	91	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0425	.040	
2	.0425	.040	
3	.0425	.040	
4	.0425	.040	
5	.0425	.040	
Average	.0425		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds173

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 174
Project Description:	EP #93 Coal Creek	Date Sampled:	9/21/92
Seam Number:	DS 174	Date Tested:	9/22/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	131	80	FT
2	130	80	FT
3	132	80	FT
4	130	80	FT
5	133	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	81	52	FT
2	87	52	FT
3	89	52	FT
4	84	52	FT
5	79	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0419	.040	
2	.0419	.040	
3	.0419	.040	
4	.0418	.040	
5	.0419	.040	
Average	.0419		

REMARKS:

FT = Film Tear
BT = Bond Tear

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 175
Project Description:	EP #93 Coal Creek	Date Sampled:	9/21/92
Seam Number:	DS 175	Date Tested:	9/22/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	131	80	FT
2	131	80	FT
3	132	80	FT
4	133	80	FT
5	131	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	78	52	FT
2	79	52	FT
3	83	52	FT
4	85	52	FT
5	80	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0407	.040	
2	.0407	.040	
3	.0407	.040	
4	.0408	.040	
5	.0408	.040	
Average	.0407		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds175

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 176
Project Description:	EP #93 Coal Creek	Date Sampled:	9/19/92
Seam Number:	DS 176	Date Tested:	9/21/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	125	80	FT
3	120	80	FT
4	124	80	FT
5	120	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	79	52	FT
2	84	52	FT
3	93	52	FT
4	89	52	FT
5	96	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0415	.040	
2	.0415	.040	
3	.0415	.040	
4	.0415	.040	
5	.0415	.040	
Average	.0415		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds176

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 177
Project Description:	EP #93 Coal Creek	Date Sampled:	9/22/92
Seam Number:	DS 177	Date Tested:	9/22/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	115	80	FT
2	121	80	FT
3	123	80	FT
4	124	80	FT
5	121	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	75	52	FT
2	75	52	FT
3	80	52	FT
4	80	52	FT
5	77	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0400	.040	
2	.0400	.040	
3	.0400	.040	
4	.0401	.040	
5	.0402	.040	
Average	.0401		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds177

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 178
Project Description:	EP #93 Coal Creek	Date Sampled:	9/21/92
Seam Number:	DS 178	Date Tested:	9/22/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	130	80	FT
2	127	80	FT
3	127	80	FT
4	129	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	68	52	FT
2	66	52	FT
3	86	52	FT
4	88	52	FT
5	70	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0402	.040	
2	.0403	.040	
3	.0403	.040	
4	.0402	.040	
5	.0402	.040	
Average	.0402		

REMARKS:

FT = Film Tear
BT = Bond Tear

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 179
Project Description:	EP #93 Coal Creek	Date Sampled:	9/21/92
Seam Number:	DS 179	Date Tested:	9/22/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	132	80	FT
2	130	80	FT
3	128	80	FT
4	131	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	88	52	FT
2	83	52	FT
3	87	52	FT
4	91	52	FT
5	90	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	.040	
2	.0405	.040	
3	.0405	.040	
4	.0405	.040	
5	.0405	.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 180
Project Description:	EP #93 Coal Creek	Date Sampled:	9/22/92
Seam Number:	DS 180	Date Tested:	9/22/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	120	80	FT
2	122	80	FT
3	123	80	FT
4	123	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	81	52	FT
2	88	52	FT
3	98	52	FT
4	96	52	FT
5	96	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0410	.040	
2	.0410	.040	
3	.0410	.040	
4	.0410	.040	
5	.0410	.040	
Average	.0410		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds180

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HDPE LINER REPORTS

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Project Number:	BFDX-92-019C	Sample Number:	DS 181
Project Description:	EP #93 Coal Creek	Date Sampled:	9/22/92
Seam Number:	DS 181	Date Tested:	9/22/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	130	80	FT
2	132	80	FT
3	131	80	FT
4	132	80	FT
5	132	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	96	52	FT
2	90	52	FT
3	88	52	FT
4	87	52	FT
5	96	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0410	.040	
2	.0410	.040	
3	.0410	.040	
4	.0410	.040	
5	.0410	.040	
Average	.0410		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds181

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 182
Project Description:	EP #93 Coal Creek	Date Sampled:	9/22/92
Seam Number:	DS 182	Date Tested:	9/22/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	120	80	FT
3	124	80	FT
4	125	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	88	52	FT
2	83	52	FT
3	93	52	FT
4	82	52	FT
5	85	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0407	.040	
2	.0407	.040	
3	.0407	.040	
4	.0407	.040	
5	.0408	.040	
Average	.0407		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds182

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 183
Project Description:	EP #93 Coal Creek	Date Sampled:	9/22/92
Seam Number:	DS 183	Date Tested:	9/22/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	131	80	FT
3	128	80	FT
4	128	80	FT
5	132	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	98	52	FT
2	94	52	FT
3	93	52	FT
4	99	52	FT
5	101	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0415	.040	
2	.0415	.040	
3	.0415	.040	
4	.0415	.040	
5	.0415	.040	
Average	.0415		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds183

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 184
Project Description:	EP #93 Coal Creek	Date Sampled:	9/17/92
Seam Number:	DS 184	Date Tested:	9/17/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	120	80	FT
2	120	80	FT
3	122	80	FT
4	119	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	94	52	FT
2	86	52	FT
3	95	52	FT
4	81	52	FT
5	74	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0427	.040	
2	.0428	.040	
3	.0427	.040	
4	.0427	.040	
5	.0427	.040	
Average			

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds184

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Project Number:	BFDX-92-019C	Sample Number:	DS 185
Project Description:	EP #93 Coal Creek	Date Sampled:	9/17/92
Seam Number:	DS 185	Date Tested:	9/18/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	125	80	FT
3	124	80	FT
4	123	80	FT
5	125	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	78	52	FT
2	77	52	FT
3	85	52	FT
4	82	52	FT
5	86	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0417	.040	
2	.0416	.040	
3	.0417	.040	
4	.0416	.040	
5	.0416	.040	
Average	.0416		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds185

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 186
Project Description:	EP #93 Coal Creek	Date Sampled:	9/17/92
Seam Number:	DS 186	Date Tested:	9/18/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	131	80	FT
2	124	80	FT
3	126	80	FT
4	127	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	77	52	FT
2	75	52	FT
3	90	52	FT
4	73	52	FT
5	80	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0415	.040	
2	.0415	.040	
3	.0415	.040	
4	.0415	.040	
5	.0415	.040	
Average	.0415		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds186

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 187
Project Description:	EP #93 Coal Creek	Date Sampled:	9/17/92
Seam Number:	DS 187	Date Tested:	9/18/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	128	80	FT
3	129	80	FT
4	132	80	FT
5	130	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	85	52	FT
2	88	52	FT
3	89	52	FT
4	88	52	FT
5	86	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0416	.040	
2	.0417	.040	
3	.0417	.040	
4	.0417	.040	
5	.0416	.040	
Average	.0417		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds187

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 188
Project Description:	EP #93 Coal Creek	Date Sampled:	9/17/92
Seam Number:	DS 188	Date Tested:	9/18/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	121	80	FT
3	122	80	FT
4	120	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	90	52	FT
2	88	52	FT
3	90	52	FT
4	84	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0410	.040	
2	.0410	.040	
3	.0410	.040	
4	.0410	.040	
5	.0410	.040	
Average	.0410		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds188

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 189
Project Description:	EP #93 Coal Creek	Date Sampled:	9/17/92
Seam Number:	DS 189	Date Tested:	9/18/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	127	80	FT
3	124	80	FT
4	123	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	79	52	FT
2	67	52	FT
3	36	52	BT
4	73	52	BT
5	74	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0430	.040	
2	.0430	.040	
3	.0430	.040	
4	.0429	.040	
5	.0429	.040	
Average	.0430		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds189

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 189N
Project Description:	EP #93 Coal Creek	Date Sampled:	9/22/92
Seam Number:	DS 189N	Date Tested:	9/22/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	125	80	FT
2	130	80	FT
3	131	80	FT
4	130	80	FT
5	129	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	75	52	FT
2	89	52	FT
3	88	52	FT
4	86	52	FT
5	86	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0425	.040	
2	.0425	.040	
3	.0425	.040	
4	.0425	.040	
5	.0425	.040	
Average	.0425		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds189N

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 189P
Project Description:	EP #93 Coal Creek	Date Sampled:	9/22/92
Seam Number:	DS 189P	Date Tested:	9/22/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	130	80	FT
2	127	80	FT
3	129	80	FT
4	131	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	88	52	FT
2	90	52	FT
3	92	52	FT
4	90	52	FT
5	90	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0430	.040	
2	.0430	.040	
3	.0430	.040	
4	.0430	.040	
5	.0430	.040	
Average	.0430		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds189P

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 190
Project Description:	EP #93 Coal Creek	Date Sampled:	9/17/92
Seam Number:	DS 190	Date Tested:	9/18/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	123	80	FT
3	123	80	FT
4	120	80	FT
5	121	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	75	52	FT
2	77	52	FT
3	78	52	FT
4	79	52	FT
5	80	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0402	.040	
2	.0402	.040	
3	.0402	.040	
4	.0403	.040	
5	.0403	.040	
Average	.0402		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds190

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Operations Manager

BRAUN INTERTEC

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913 South 18th Street
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701-255-7180 Fax: 255-7208

Engineers and Scientists Serving the Built and Natural Environments

HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 191
Project Description:	EP #93 Coal Creek	Date Sampled:	9/17/92
Seam Number:	DS 191	Date Tested:	9/18/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	120	80	FT
2	122	80	FT
3	123	80	FT
4	125	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	78	52	FT
2	80	52	FT
3	88	52	FT
4	84	52	FT
5	86	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0403	.040	
2	.0403	.040	
3	.0403	.040	
4	.0403	.040	
5	.0403	.040	
Average	.0403		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds191

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 192
Project Description:	EP #93 Coal Creek	Date Sampled:	9/16/92
Seam Number:	DS 192	Date Tested:	9/17/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	127	80	FT
3	126	80	FT
4	123	80	FT
5	125	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	77	52	FT
2	81	52	FT
3	98	52	FT
4	78	52	FT
5	83	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	.040	
2	.0406	.040	
3	.0406	.040	
4	.0406	.040	
5	.0406	.040	
Average	.0406		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds192

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 193
Project Description:	EP #93 Coal Creek	Date Sampled:	9/17/92
Seam Number:	DS 193	Date Tested:	9/18/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	119	80	FT
2	119	80	FT
3	118	80	FT
4	118	80	FT
5	119	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	93	52	FT
2	97	52	FT
3	86	52	FT
4	98	52	FT
5	95	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0420	.040	
2	.0420	.040	
3	.0420	.040	
4	.0420	.040	
5	.0419	.040	
Average	.0420		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds193

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 194
Project Description:	EP #93 Coal Creek	Date Sampled:	9/16/92
Seam Number:	DS 194	Date Tested:	9/17/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	127	80	FT
3	131	80	FT
4	128	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	95	52	FT
2	89	52	FT
3	89	52	FT
4	89	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0403	.040	
2	.0403	.040	
3	.0403	.040	
4	.0403	.040	
5	.0403	.040	
Average	.0403		

REMARKS:

FT = Film Tear
BT = Bond Tear

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cv/ds194

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 195
Project Description:	EP #93 Coal Creek	Date Sampled:	9/17/92
Seam Number:	DS 195	Date Tested:	9/18/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	122	80	FT
3	123	80	FT
4	121	80	FT
5	120	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	82	52	FT
2	81	52	FT
3	80	52	FT
4	84	52	FT
5	82	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0401	.040	
2	.0403	.040	
3	.0403	.040	
4	.0403	.040	
5	.0403	.040	
Average	.0403		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds195

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 196
Project Description:	EP #93 Coal Creek	Date Sampled:	9/17/92
Seam Number:	DS 196	Date Tested:	9/18/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	121	80	FT
3	120	80	FT
4	118	80	FT
5	121	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	98	52	FT
2	85	52	FT
3	85	52	FT
4	82	52	FT
5	90	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0403	.040	
2	.0403	.040	
3	.0403	.040	
4	.0403	.040	
5	.0404	.040	
Average	.0403		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds196

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 197
Project Description:	EP #93 Coal Creek	Date Sampled:	9/16/92
Seam Number:	DS 197	Date Tested:	9/17/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	131	80	FT
2	130	80	FT
3	131	80	FT
4	131	80	FT
5	131	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	93	52	FT
2	82	52	FT
3	87	52	FT
4	88	52	FT
5	92	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0420	.040	
2	.0420	.040	
3	.0420	.040	
4	.0420	.040	
5	.0420	.040	
Average	.0420		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds197

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 198
Project Description:	EP #93 Coal Creek	Date Sampled:	9/16/92
Seam Number:	DS 198	Date Tested:	9/17/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	131	80	FT
2	133	80	FT
3	131	80	FT
4	130	80	FT
5	133	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	88	52	FT
2	83	52	FT
3	82	52	FT
4	85	52	FT
5	86	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0422	.040	
2	.0422	.040	
3	.0422	.040	
4	.0422	.040	
5	.0422	.040	
Average	.0422		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds198

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 199
Project Description:	EP #93 Coal Creek	Date Sampled:	9/17/92
Seam Number:	DS 199	Date Tested:	9/18/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	122	80	FT
3	123	80	FT
4	121	80	FT
5	121	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	83	52	FT
2	93	52	FT
3	93	52	FT
4	85	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0410	.040	
2	.0410	.040	
3	.0410	.040	
4	.0410	.040	
5	.0410	.040	
Average	.0410		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds199

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 200
Project Description:	EP #93 Coal Creek	Date Sampled:	9/18/92
Seam Number:	DS 200	Date Tested:	9/18/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	128	80	FT
3	124	80	FT
4	126	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	83	52	FT
2	84	52	FT
3	78	52	FT
4	82	52	FT
5	83	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0410	.040	
2	.0410	.040	
3	.0410	.040	
4	.0410	.040	
5	.0410	.040	
Average	.0410		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds200

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DS 201
Project Description:	EP #93 Coal Creek	Date Sampled:	9/16/92
Seam Number:	DS 201	Date Tested:	9/17/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	133	80	FT
2	127	80	FT
3	124	80	FT
4	123	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	87	52	FT
2	79	52	FT
3	76	52	FT
4	74	52	FT
5	75	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0412	.040	
2	.0412	.040	
3	.0412	.040	
4	.0412	.040	
5	.0413	.040	
Average	.0412		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/ds201

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DSE 1
Project Description:	EP #93 Coal Creek	Date Sampled:	8/14/92
Seam Number:	DSE 1	Date Tested:	8/15/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	126	80	FT
3	122	80	FT
4	124	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	57	52	FT
2	62	52	FT
3	53	52	FT
4	48	52	FT
5	54	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0421	.040	
2	.0418	.040	
3	.0417	.040	
4	.0416	.040	
5	.0418	.040	
Average	.0418		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/dse1

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DSE - 01N
Project Description:	EP #93 Coal Creek	Date Sampled:	8/18/92
Seam Number:	DSE - 01N	Date Tested:	8/18/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	126	80	FT
3	121	80	FT
4	126	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	66	52	FT
2	49	52	FT
3	56	52	FT
4	70	52	FT
5	48	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0433	.040	
2	.0430	.040	
3	.0432	.040	
4	.0433	.040	
5	.0434	.040	
Average			

REMARKS:

FT = Film Tear
BT = Bond Tear

cvdseo1n

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DSE - 01P
Project Description:	EP #93 Coal Creek	Date Sampled:	8/18/92
Seam Number:	DSE - 01P	Date Tested:	8/18/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	120	80	FT
3	122	80	FT
4	121	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	52	52	FT
2	59	52	FT
3	38	52	FT
4	41	52	FT
5	50	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0428	.040	
2	.0423	.040	
3	.0424	.040	
4	.0422	.040	
5	.0426	.040	
Average	.0425		

REMARKS:

FT = Film Tear
BT = Bond Tear

cvdse01p

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DSE - 01N2
Project Description:	EP #93 Coal Creek	Date Sampled:	8/19/92
Seam Number:	DSE - 01N2	Date Tested:	8/19/92
Welder Number:	-	Tested By:	LL

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	118	80	FT
2	121	80	FT
3	124	80	FT
4	135	80	FT
5	118	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	47	52	FT
2	74	52	FT
3	56	52	FT
4	64	52	FT
5	55	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0400	.040	
2	.0430	.040	
3	.0410	.040	
4	.0430	.040	
5	.0400	.040	
Average	.0414		

REMARKS:

FT = Film Tear
BT = Bond Tear

cvdse01n2

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DSE - 01N2 Retest
Project Description:	EP #93 Coal Creek	Date Sampled:	8/19/92
Seam Number:	DSE - 01N2 **Retest**	Date Tested:	8/20/92
Welder Number:	-	Tested By:	LL

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1		80	
2		80	
3		80	
4		80	
5		80	
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	46	52	
2	49	52	FT
3		52	
4		52	
5		52	
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0414	.040	
2	.0421	.040	
3		.040	
4		.040	
5		.040	
Average			

REMARKS:

FT = Film Tear
BT = Bond Tear

cvds012nr

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DSE - 01P2
Project Description:	EP #93 Coal Creek	Date Sampled:	8/19/92
Seam Number:	DSE - 01P2	Date Tested:	8/19/92
Welder Number:	-	Tested By:	LL

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	124	80	FT
3	114	80	FT
4	119	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	90	52	FT
2	66	52	FT
3	73	52	FT
4	42	52	FT
5	68	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0430	.040	
2	.0420	.040	
3	.0430	.040	
4	.0440	.040	
5	.0420	.040	
Average	.0428		

REMARKS:

FT = Film Tear
BT = Bond Tear

cvdse01p2

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DSE - 01P2 Retest
Project Description:	EP #93 Coal Creek	Date Sampled:	8/19/92
Seam Number:	DSE - 01P2 **Retest**	Date Tested:	8/20/92
Welder Number:	-	Tested By:	LL

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1		80	
2		80	
3		80	
4		80	
5		80	
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	20	52	FT
2	34	52	FT
3		52	
4		52	
5		52	
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0441	.040	
2	.0442	.040	
3		.040	
4		.040	
5		.040	
Average			

REMARKS:

FT = Film Tear
BT = Bond Tear

cvds012pr

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DSE 1N3
Project Description:	EP #93 Coal Creek	Date Sampled:	8/21/92
Seam Number:	DSE 1N3	Date Tested:	8/21/92
Welder Number:	-	Tested By:	LL

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	109	80	FT
3	109	80	FT
4	109	80	FT
5	112	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	57	52	FT
2	76	52	FT
3	54	52	FT
4	69	52	FT
5	73	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0409	.040	
2	.0441	.040	
3	.0419	.040	
4	.0408	.040	
5	.0421	.040	
Average	.0420		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/dse1n3

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DSE 1P3
Project Description:	EP #93 Coal Creek	Date Sampled:	8/21/92
Seam Number:	DSE 1P3	Date Tested:	8/21/92
Welder Number:	-	Tested By:	LL

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	130	80	FT
2	132	80	FT
3	121	80	FT
4	134	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	80	52	FT
2	64	52	FT
3	79	52	FT
4	57	52	FT
5	65	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0451	.040	
2	.0445	.040	
3	.0446	.040	
4	.0448	.040	
5	.0444	.040	
Average	.0447		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/dse1p3

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DX 2
Project Description:	EP #93 Coal Creek	Date Sampled:	8/18/92
Seam Number:	DX 2	Date Tested:	8/18/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	113	80	FT
2	117	80	FT
3	112	80	FT
4	119	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	94	52	FT
2	81	52	FT
3	96	52	FT
4	95	52	FT
5	82	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0436	.040	
2	.0435	.040	
3	.0436	.040	
4	.0418	.040	
5	.0438	.040	
Average			

REMARKS:

FT = Film Tear
BT = Bond Tear

cvdx2

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DSE 03
Project Description:	EP #93 Coal Creek	Date Sampled:	8/27/92
Seam Number:	DSE 03	Date Tested:	8/28/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	124	80	FT
3	129	80	FT
4	125	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	92	52	FT
2	103	52	FT
3	77	52	FT
4	100	52	FT
5	103	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0431	.040	
2	.0429	.040	
3	.0429	.040	
4	.043	.040	
5	.0431	.040	
Average	.043		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/dse03

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DSE 4
Project Description:	EP #93 Coal Creek	Date Sampled:	9/10/92
Seam Number:	DSE 4	Date Tested:	9/11/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	125	80	FT
2	121	80	FT
3	126	80	FT
4	128	80	FT
5	125	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	57	52	FT
2	67	52	FT
3	66	52	FT
4	69	52	FT
5	72	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0423	.040	
2	.0420	.040	
3	.0421	.040	
4	.0422	.040	
5	.0421	.040	
Average	.0421		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/dse4

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HDPE LINER REPORTS

Project Number:	BFDX-92-019C	Sample Number:	DSE 5
Project Description:	EP #93 Coal Creek	Date Sampled:	9/10/92
Seam Number:	DSE 5	Date Tested:	9/11/92
Welder Number:	-	Tested By:	JC

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	131	80	FT
2	125	80	FT
3	131	80	FT
4	129	80	FT
5	129	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	83	52	FT
2	81	52	FT
3	64	52	FT
4	73	52	FT
5	58	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0419	.040	
2	.0419	.040	
3	.0417	.040	
4	.0419	.040	
5	.0418	.040	
Average	.0418		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv/dse5

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APPENDIX L

PRESSURE TEST SUMMARIES

December 1992

927-4003

APPENDIX L
POND 93
PRESSURE TEST SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	END TIME	PRESSURE (psi) START	PRESSURE (psi) END	QA MONITOR	LOCATION	COMPLETE NO / YES
1	1 / 2	08/05/92	907	912	31	30	LS	--	YES
2	1 / 23	08/05/92	1430	1435	36	36	LS	--	YES
3	1 / 25	08/05/92	1610	1615	40	38	LS	--	YES
4	2 / 3	08/05/92	850	855	31	31	LS	--	YES
5	2 / 25	08/06/92	849	854	31	30	LS	--	YES
6	3 / 4	08/05/92	916	921	36	34	LS	--	YES
7	3 / 25	08/06/92	842	847	31	31	LS	--	YES
8	4 / 5	08/05/92	927	932	31	31	LS	--	YES
9	4 / 25	08/06/92	835	840	32	32	LS	--	YES
10	5 / 6	08/05/92	934	939	41	40	LS	EEOS TO 2B	NO
11	5 / 6	08/05/92	941	946	34	33	LS	2B TO WEOS	YES
12	5 / 25	08/06/92	825	830	31	31	LS	--	YES
13	6 / 7	08/05/92	955	960	31	30	LS	--	YES
14	6 / 25	08/06/92	816	821	32	32	LS	--	YES
15	7 / 8	08/05/92	1005	1010	32	31	LS	--	YES
16	7 / 25	08/06/92	806	811	31	31	LS	--	YES
17	8 / 9	08/05/92	1012	1017	36	36	LS	--	YES
18	8 / 25	08/06/92	758	803	36	36	LS	--	YES
19	9 / 10	08/05/92	1019	1024	38	37	LS	--	YES
20	9 / 25	08/06/92	751	756	32	31	LS	--	YES
21	10 / 11	08/05/92	1029	1034	36	33	LS	--	YES
22	10 / 25	08/06/92	745	750	31	31	LS	4F TO SEOS	YES
23	10 / 25	08/06/92	738	743	30	29	LS	INT 9/10 TO 21'S	NO
24	11 / 12	08/05/92	1040	1045	32	30	LS	--	YES
25	11 / 25	08/06/92	730	735	31	31	LS	--	YES
26	12 / 13	08/05/92	1049	1054	31	31	LS	--	YES
27	12 / 25	08/05/92	1712	1717	31	30	LS	--	YES
28	13 / 14	08/05/92	1058	1063	34	32	LS	EEOS TO 2H	NO
29	13 / 14	08/05/92	1107	1112	38	37	LS	2H TO WEOS	YES
30	13 / 25	08/05/92	1704	1709	32	30	LS	--	YES
31	14 / 15	08/05/92	1116	1121	30	29	LS	--	YES
32	14 / 25	08/05/92	1657	1702	32	30	LS	--	YES
33	15 / 16	08/05/92	1125	1130	40	39	LS	EEOS TO 2J	NO
34	15 / 16	08/05/92	1132	1137	40	38	LS	2J TO WEOS	YES
35	15 / 25	08/05/92	1649	1654	36	35	LS	--	YES
36	16 / 17	08/05/92	1141	1146	36	35	LS	EEOS TO 13' EAT	YES
37	16 / 25	08/05/92	1641	1646	40	40	LS	--	YES
38	17 / 18	08/05/92	1150	1155	32	32	LS	EEOS TO 3A	NO
39	17 / 18	08/05/92	1251	1256	41	41	LS	3A TO WEOS	YES
40	17 / 43	08/10/92	1127	1132	32	32	TD	--	YES
41	18 / 19	08/05/92	1258	1263	38	38	LS	--	YES
42	18 / 43	08/10/92	1126	1131	30	30	TD	--	YES
43	19 / 20	08/05/92	1313	1318	32	32	LS	3B TO 3C	NO
44	19 / 20	08/05/92	1306	1311	32	31	LS	EEOS TO 3B	NO

APPENDIX L
POND 93
PRESSURE TEST SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	END TIME	PRESSURE (psi) START	PRESSURE (psi) END	QA MONITOR	LOCATION	COMPLETE NO / YES
45	19 / 20	08/05/92	1322	1327	38	36	LS	3C TO WEOS	YES
46	19 / 43	08/10/92	1110	1115	31	30	TD	--	YES
47	20 / 21	08/05/92	1342	1347	31	31	LS	2Q TO 3F	NO
48	20 / 21	08/05/92	1335	1340	36	36	LS	EEOS TO 2Q	NO
49	20 / 21	08/05/92	1358	1403	41	39	LS	3F TO 2S	NO
50	20 / 21	08/05/92	1405	1410	36	--	LS	2S TO 2R	YES
51	20 / 43	08/10/92	1113	1118	30	30	TD	--	YES
52	21 / 39	08/10/92	908	913	35	34	TD	50'E TO WEOS	YES
53	21 / 39	08/10/92	855	860	34	32	TD	50' EWEOS TO 50'W	NO
54	21 / 39	08/10/92	902	907	32	--	TD	50'E TO WEOS	NO
55	21 / 43	08/10/92	1102	1107	30	30	TD	--	YES
56	22 / 23	08/05/92	1453	1458	40	40	LS	2X TO 4A	NO
57	22 / 23	08/05/92	1506	1511	36	36	LS	4A TO 2T	YES
58	22 / 24	08/05/92	1558	1603	30	30	LS	--	YES
59	22 / 25	08/05/92	1628	1633	30	30	LS	--	YES
60	23 / 24	08/05/92	1435	1440	40	39	LS	--	YES
61	23 / 25	08/05/92	1616	1621	32	32	LS	--	YES
62	25 / 26	08/06/92	926	931	31	31	LS	200'S TO NEOS	NO
63	25 / 26	08/06/92	932	937	40	38	LS	200'S TO 4K	NO
64	25 / 26	08/06/92	950	955	34	32	LS	4M TO 4N	YES
65	25 / 26	08/06/92	942	947	39	36	LS	4K TO 4M	NO
66	25 / 43	08/10/92	1137	1142	32	30	TD	--	YES
67	25 / 46	08/10/92	1255	1260	34	32	TD	--	YES
68	26 / 12F	08/10/92	1507	1512	30	30	TD	--	YES
69	26 / 27	08/06/92	1034	1039	32	31	LS	4T TO 4W	NO
70	26 / 27	08/06/92	1017	1022	30	30	LS	4R TO 4S	NO
71	26 / 27	08/06/92	958	1003	32	32	LS	4P TO 4Q	NO
72	26 / 27	08/06/92	1107	1112	32	32	LS	5A TO 5B	NO
73	26 / 27	08/06/92	1026	1031	32	30	LS	4S TO 4T	NO
74	26 / 27	08/06/92	1048	1053	32	31	LS	4R TO 4X	NO
75	26 / 27	08/06/92	1115	1120	34	34	LS	5B TO 5C	YES
76	26 / 27	08/06/92	1057	1102	32	32	LS	4X TO 5A	NO
77	26 / 27	08/06/92	1040	1045	30	29	LS	4Q TO 4W	NO
78	27 / 12C	08/10/92	1411	1416	32	30	TD	360' TO 393'NSEOS	NO
79	27 / 12C	08/10/92	1418	1423	30	30	TD	393' TO 425'NSEOS	YES
80	27 / 12C	08/10/92	1413	1418	30	30	TD	324' TO 360'NSEOS	NO
81	27 / 28	08/06/92	1128	1133	36	36	LS	SEOS TO 5E	NO
82	27 / 28	08/06/92	1135	1140	30	30	LS	5E TO 5F	NO
83	27 / 28	08/06/92	1255	1260	30	30	LS	5G TO NEOS	YES
84	27 / 28	08/06/92	1247	1252	30	29	LS	5F TO 5G	NO
85	27 / 48	08/10/92	1434	1439	30	30	TD	EEOS TO 23'W	YES
86	27 / 48	08/10/92	1433	1438	29	29	TD	WEOS TO 23'E	NO
87	28 / 29	08/06/92	1352	1357	36	36	LS	5N TO 5Q	NO
88	28 / 29	08/06/92	1415	1420	30	27	LS	5S TO 5J	NO

APPENDIX L
POND 93
PRESSURE TEST SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	END TIME	PRESSURE (psi) START	PRESSURE (psi) END	QA MONITOR	LOCATION	COMPLETE NO / YES
89	28 / 29	08/06/92	1438	1443	32	32	LS	5X TO 5P	NO
90	28 / 29	08/06/92	1328	1333	36	36	LS	5J TO 5K	NO
91	28 / 29	08/06/92	1336	1341	36	36	LS	5K TO 5M	NO
92	28 / 29	08/06/92	1432	1437	30	28	LS	5T TO 5X	NO
93	28 / 29	08/06/92	1458	1503	36	36	LS	6A TO NEOS	YES
94	28 / 29	08/06/92	1345	1350	32	30	LS	5N TO 5P	NO
95	28 / 29	08/06/92	1447	1452	32	30	LS	5M TO 6A	NO
96	28 / 29	08/06/92	1425	1430	34	34	LS	5T TO SEOS	NO
97	28 / 29	08/06/92	1359	1404	34	34	LS	5Q TO 5R	NO
98	28 / 29	08/06/92	1407	1412	44	44	LS	5R TO 5S	NO
99	28 / 48	08/11/92	1000	1005	--	--	TD	--	YES
100	28 / 49	08/10/92	1609	1614	29	27	TD	WEOS TO 24'E	YES
101	29 / 30	08/07/92	1022	1027	30	30	LS	400' TO 517'SNAT	NO
102	29 / 30	08/07/92	841	846	30	30	LS	262' TO 400'SNAT	NO
103	29 / 30	08/07/92	830	835	30	30	LS	6C TO 262'SNAT	NO
104	29 / 30	08/07/92	1030	1035	30	30	LS	517'S TO SEOS	YES
105	29 / 51	08/10/92	1626	1631	30	30	TD	--	YES
106	30 / 30ext	08/07/92	1108	1113	30	30	LS	--	YES
107	30 / 31	08/07/92	1051	1056	30	28	LS	221' TO 341'SNAT	NO
108	30 / 31	08/07/92	1059	1104	32	29	LS	NEOS TO 221'SNAT	YES
109	30 / 31	08/07/92	1044	1049	30	28	LS	341'S TO SEOS	NO
110	30 / 52	08/11/92	748	753	33	32	TD	--	YES
111	31 / 32	08/07/92	1320	1325	32	32	LS	96' TO 107'SNAT	NO
112	31 / 32	08/07/92	1445	1450	36	34	LS	578' TO 589'SNAT	NO
113	31 / 32	08/07/92	1326	1331	30	30	LS	107' TO 132'SNAT	NO
114	31 / 32	08/07/92	1451	1456	32	32	LS	589' TO 620'SNAT	NO
115	31 / 32	08/07/92	1352	1357	36	36	LS	401' TO 422'SNAT	NO
116	31 / 32	08/07/92	1345	1350	30	30	LS	241' TO 401'SNAT	NO
117	31 / 32	08/07/92	1302	1307	30	30	LS	18' TO 36'SNAT	NO
118	31 / 32	08/07/92	1424	1429	32	32	LS	539' TO 550'SNAT	NO
119	31 / 32	08/07/92	1309	1314	29	29	LS	36' TO 96'SNAT	NO
120	31 / 32	08/07/92	1500	1505	29	29	LS	620' TO SEOS	YES
121	31 / 32	08/07/92	1438	1443	30	30	LS	550' TO 578'SNAT	NO
122	31 / 32	08/07/92	1336	1341	29	29	LS	132' TO 241'SNAT	NO
123	31 / 32	08/07/92	1250	1255	30	29	LS	18' TO NAT	NO
124	31 / 32	08/07/92	1358	1403	40	40	LS	427' TO 450'SNAT	NO
125	31 / 32	08/07/92	1414	1419	32	32	LS	492' TO 533'SNAT	NO
126	31 / 32	08/07/92	1405	1410	40	40	LS	450' TO 492'SNAT	NO
127	31 / 53	08/11/92	849	854	32	31	TD	--	YES
128	32 / 33	08/07/92	1536	1541	34	33	LS	420' TO 400'SNAT	NO
129	32 / 33	08/07/92	1555	1560	30	30	LS	285' TO 244'SNAT	NO
130	32 / 33	08/07/92	1520	1525	30	28	LS	550' TO 439'SNAT	NO
131	32 / 33	08/07/92	1529	1534	36	35	LS	439' TO 420'SNAT	NO
132	32 / 33	08/07/92	1513	1518	32	32	LS	SEOS TO 550'S	NO

APPENDIX L
POND 93
PRESSURE TEST SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	END TIME	PRESSURE (psi) START	PRESSURE (psi) END	QA MONITOR	LOCATION	COMPLETE NO / YES
133	32 / 33	08/07/92	1542	1547	32	30	LS	400' TO 350'SNAT	NO
134	32 / 33	08/07/92	1549	1554	34	34	LS	350' TO 285'SNAT	NO
135	32 / 33	08/07/92	1605	1610	32	32	LS	244'S TO NEOS	YES
136	32 / 56	08/11/92	1106	1111	30	30	TD	--	YES
137	33 / 34	08/07/92	1641	1646	38	38	LS	332' TO 342'SNAT	NO
138	33 / 34	08/07/92	1649	1654	36	34	LS	342' TO 412'SNAT	NO
139	33 / 34	08/07/92	1632	1637	34	32	LS	267' TO 332'SNAT	NO
140	33 / 34	08/07/92	1616	1621	30	28	LS	NEOS TO 237'S	NO
141	33 / 34	08/07/92	1701	1706	38	36	LS	412' TO 434'SNAT	NO
142	33 / 34	08/07/92	1622	1627	34	34	LS	237' TO 267'SNAT	NO
143	33 / 34	08/07/92	1710	1715	32	32	LS	434' TO SEOS	YES
144	33 / 55	08/11/92	1341	1346	30	30	TD	--	YES
145	34 / 35	08/08/92	--	--	--	--	LS	NAT TO 11'S	NO
146	34 / 35	08/08/92	809	814	34	32	LS	407' TO 620'SNAT	NO
147	34 / 35	08/08/92	820	825	36	34	LS	620' TO SEOS	YES
148	34 / 35	08/08/92	750	755	32	32	LS	11' TO 407'SNAT	NO
149	34 / 57	08/11/92	1338	1343	30	30	TD	--	YES
150	35 / 36	08/08/92	920	925	30	27	LS	423' TO SEOS	NO
151	35 / 36	08/08/92	938	943	30	28	LS	7' TO 362'SNAT	YES
152	35 / 36	08/08/92	912	917	38	36	LS	382' TO 362'SNAT	NO
153	35 / 36	08/08/92	848	853	31	29	LS	382' TO 423'SNAT	NO
154	35 / 58	08/11/92	1403	1408	32	30	TD	EEOS TO 22'W	YES
155	35 / 60	08/11/92	1433	1438	28	28	TD	--	YES
156	36 / 37	08/08/92	1125	1130	28	26	LS	SNAT TO 360'S	YES
157	36 / 37	08/08/92	1047	1052	34	32	LS	360' TO SEOS	NO
158	36 / 60	08/11/92	1414	1419	31	30	TD	--	YES
159	37 / 21B	08/12/92	735	740	34	32	TD	NEOS TO 11'S	NO
160	37 / 21B	08/12/92	--	--	--	--	TD	SEOS TO 5'N	YES
161	37 / 38	08/08/92	1346	1351	32	30	LS	315' TO 359'SNAT	YES
162	37 / 38	08/08/92	1315	1320	30	30	LS	520' TO 507'SNAT	NO
163	37 / 38	08/08/92	1340	1345	32	30	LS	359' TO 387'SNAT	NO
164	37 / 38	08/08/92	1330	1335	34	32	LS	465' TO 507'SNAT	NO
165	37 / 38	08/08/92	1332	1337	29	27	LS	387' TO 465'SNAT	NO
166	37 / 38	08/08/92	1320	1325	32	30	LS	520' TO SEOS	NO
167	37 / 38	08/08/92	1302	1307	32	30	LS	SNAT TO 315'S	NO
168	37 / 61	08/11/92	1655	1660	30	29	TD	--	YES
169	38 / 63	08/11/92	1653	1658	31	30	TD	--	YES
170	38 / 64	08/12/92	937	942	32	30	TD	225'SNEOS TO SEOS	YES
171	38 / 64	08/12/92	928	933	32	32	TD	NEOS TO 225'S	NO
172	39 / 40	08/10/92	948	953	31	31	TD	--	YES
173	39 / 43	08/10/92	1051	1056	30	30	TD	SEOS TO 117'N	NO
174	39 / 43	08/10/92	1053	1058	30	30	TD	117'N TO NEOS	YES
175	40 / 41	08/10/92	943	948	35	35	TD	--	YES
176	40 / 43	08/10/92	1033	1038	30	30	TD	--	YES

APPENDIX L
POND 93
PRESSURE TEST SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	END TIME	PRESSURE (psi) START	PRESSURE (psi) END	QA MONITOR	LOCATION	COMPLETE NO / YES
177	41 / 42	08/10/92	1001	1006	31	31	TD	WEOS TO 30'E	YES
178	41 / 42	08/10/92	956	961	31	31	TD	5'W TO 30'W	NO
179	41 / 42	08/10/92	955	960	31	--	TD	EEOS TO 5'W	NO
180	41 / 43	08/10/92	1034	1039	30	30	TD	--	YES
181	42 / 43	08/10/92	1035	1040	30	28	TD	--	YES
182	42 / 44	08/10/92	1018	1023	32	30	TD	WEOS TO 30'E	YES
183	43 / 44	08/10/92	1020	1025	32	30	TD	SEOS TO 33'N	YES
184	43 / 45	08/10/92	1341	1346	32	32	TD	50' TO 30'NSEOS	YES
185	43 / 45	08/10/92	1333	1338	32	30	TD	SEOS TO 30'N	NO
186	43 / 45	08/10/92	1314	1319	32	30	TD	NEOS TO 50'NSEOS	NO
187	43 / 46	08/10/92	1252	1257	32	30	TD	127'N TO NEOS	NO
188	43 / 46	08/10/92	1315	1320	32	31	TD	SEOS TO 127'N	YES
189	45 / 46	08/10/92	1314	1319	32	32	TD	--	YES
190	45 / 47	08/10/92	1539	1544	30	30	TD	--	YES
191	46 / 12C	08/10/92	1419	1424	29	29	TD	393' TO 425'NSEOS	YES
192	46 / 12C	08/10/92	1403	1408	30	30	TD	324' TO 360'NSEOS	NO
193	46 / 12C	08/10/92	1403	1408	31	31	TD	360' TO 393'NSEOS	NO
194	46 / 12F	08/10/92	1507	1512	30	30	TD	--	YES
195	46 / 47	08/10/92	1453	1458	30	30	TD	121' TO 283'NSEOS	NO
196	46 / 47	08/10/92	1520	1525	32	30	TD	SEOS TO 121'N	YES
197	46 / 48	08/10/92	1432	1437	30	30	TD	318' TO 283'NSEOS	YES
198	47 / 48	08/10/92	1455	1500	29	27	TD	--	YES
199	47 / 49	08/10/92	1553	1558	32	32	TD	85' TO 274'NSEOS	YES
200	47 / 49	08/10/92	1553	1558	30	30	TD	10' TO 85'NSEOS	NO
201	47 / 49	08/10/92	1455	1460	30	30	TD	284' TO 274'NSEOS	NO
202	48 / 49	08/10/92	1608	1613	32	32	TD	--	YES
203	49 / 50	08/10/92	1652	1657	30	30	TD	SEOS TO 50'N	NO
204	49 / 50	08/10/92	1653	1658	30	28	TD	50'N TO NEOS	YES
205	49 / 51	08/10/92	1623	1628	34	32	TD	SEOS TO 10'N	YES
206	50 / 51	08/10/92	1626	1631	32	32	TD	--	YES
207	50 / 52	08/10/92	1715	1720	32	30	TD	SEOS TO 60'N	YES
208	50 / 52	08/10/92	1712	1717	30	30	TD	60' TO 141'NSEOS	NO
209	50 / 52	08/10/92	1707	1712	32	32	TD	141'N TO NEOS	NO
210	51 / 52	08/10/92	1638	1643	30	30	TD	--	YES
211	52 / 53	08/11/92	859	904	30	30	TD	213' TO 280'NSEOS	NO
212	52 / 53	08/11/92	922	927	30	30	TD	SEOS TO 67'N	YES
213	52 / 53	08/11/92	842	847	30	28	TD	280'N TO NEOS	NO
214	52 / 53	08/11/92	911	916	30	30	TD	67' TO 213'NSEOS	NO
215	53 / 54	08/11/92	1033	1038	34	32	TD	SEOS TO 40'N	YES
216	53 / 54	08/11/92	1018	1023	32	32	TD	112'N TO NEOS	NO
217	53 / 54	08/11/92	1022	1027	30	30	TD	40' TO 112'NSEOS	NO
218	53 / 56	08/11/92	--	--	--	--	TD	--	YES
219	54 / 55	08/11/92	1042	1047	30	30	TD	--	YES
220	54 / 56	08/11/92	1105	1110	34	32	TD	--	YES

APPENDIX L
POND 93
PRESSURE TEST SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	END TIME	PRESSURE (psi) START	PRESSURE (psi) END	QA MONITOR	LOCATION	COMPLETE NO / YES
221	55 / 56	08/11/92	--	--	--	--	TD	--	YES
222	55 / 57	08/11/92	1052	1057	32	32	TD	SEOS TO 55'N	NO
223	55 / 57	08/11/92	1254	1259	30	30	TD	55'N TO NEOS	YES
224	57 / 58	08/11/92	1311	1316	32	30	TD	45' TO 60'NSEOS	NO
225	57 / 58	08/11/92	1319	1324	30	30	TD	10' TO 45'NSEOS	YES
226	57 / 58	08/11/92	1255	1260	30	30	TD	60'N TO NEOS	NO
227	58 / 59	08/11/92	1423	1428	30	30	TD	NEOS TO 215'NSEOS	NO
228	58 / 59	08/11/92	1451	1456	30	30	TD	5' TO 185'NSEOS	YES
229	58 / 59	08/11/92	1442	1447	30	28	TD	185' TO 215'NSEOS	NO
230	58 / 60	08/11/92	1422	1427	34	32	TD	--	YES
231	59 / 60	08/11/92	1422	1427	30	30	TD	--	YES
232	59 / 61	08/11/92	1623	1628	29	27	TD	250'N TO NEOS	YES
233	59 / 61	08/11/92	1543	1548	30	30	TD	195' TO 230'NSEOS	NO
234	59 / 61	08/11/92	--	--	--	--	TD	190' TO 195'NSEOS	NO
235	59 / 61	08/11/92	1616	1621	30	30	TD	230' TO 250'NSEOS	NO
236	59 / 61	08/11/92	1549	1554	34	32	TD	160' TO 190'NSEOS	NO
237	59 / 61	08/11/92	1555	1560	30	30	TD	SEOS TO 155'NSEOS	NO
238	59 / 61	08/11/92	1554	1559	30	30	TD	155' TO 160'NSEOS	NO
239	60 / 21B	08/12/92	735	740	29	29	TD	--	YES
240	60 / 61	08/11/92	1506	1511	29	28	TD	--	YES
241	61 / 62	08/11/92	1644	1649	32	30	TD	--	YES
242	61 / 63	08/11/92	1636	1641	30	28	TD	--	YES
243	62 / 63	08/11/92	1632	1637	32	30	TD	--	YES
244	62 / 74	08/13/92	1247	1252	30	30	TD	NEOS TO 120'NSAT	NO
245	62 / 74	08/13/92	1257	1302	34	34	TD	40' TO 120'NSAT	NO
246	62 / 74	08/13/92	1301	1306	30	30	TD	SAT TO 40'NSAT	YES
247	63 / 74	08/13/92	1112	1117	30	30	TD	NEOS TO SEOS	YES
248	64 / 65	08/12/92	--	--	--	--	TD	385' TO 395'SNEOS	NO
249	64 / 65	08/12/92	953	958	33	33	TD	545'SNEOS TO SEOS	NO
250	64 / 65	08/12/92	1015	1020	32	31	TD	420' TO 460'SNEOS	NO
251	64 / 65	08/12/92	1038	1043	30	30	TD	317' TO 385'SNEOS	NO
252	64 / 65	08/12/92	1039	1044	30	30	TD	395' TO 420'SNEOS	NO
253	64 / 65	08/12/92	1007	1012	32	32	TD	460' TO 545'SNEOS	NO
254	64 / 65	08/12/92	1054	1059	30	30	TD	NEOS TO 317'S	YES
255	64 / 74	08/13/92	1125	1130	34	32	TD	WEOS TO 30'E	YES
256	65 / 66	08/12/92	1348	1353	32	30	TD	70' TO 100'SNEOS	NO
257	65 / 66	08/12/92	1305	1310	30	30	TD	120' TO 147'SNEOS	NO
258	65 / 66	08/12/92	1300	1305	30	30	TD	180' TO 245'SNEOS	NO
259	65 / 66	08/12/92	1112	1117	30	30	TD	531' TO SEOS	NO
260	65 / 66	08/12/92	--	--	--	--	TD	100' TO 120'SNEOS	NO
261	65 / 66	08/12/92	1108	1113	32	30	TD	315' TO 531'SNEOS	NO
262	65 / 66	08/12/92	1348	1353	30	30	TD	30' TO 70'SNEOS	YES
263	65 / 66	08/12/92	1340	1345	30	30	TD	NEOS TO 30'SNEOS	NO
264	65 / 66	08/12/92	1250	1255	30	30	TD	245' TO 315'SNEOS	NO

APPENDIX L
POND 93
PRESSURE TEST SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	END TIME	PRESSURE (psi) START	PRESSURE (psi) END	QA MONITOR	LOCATION	COMPLETE NO / YES
265	65 / 66	08/12/92	1316	1321	29	29	TD	147' TO 180'SNEOS	NO
266	65 / 76	08/13/92	1320	1325	32	32	TD	WEOS TO EEOS	YES
267	65 / 77	08/13/92	1434	1439	34	32	TD	NEOS TO SEOS	YES
268	66 / 67	08/12/92	1144	1149	30	30	TD	343' TO 370'SNEOS	NO
269	66 / 67	08/12/92	1135	1140	30	30	TD	370' TO 420'SNEOS	NO
270	66 / 67	08/12/92	1330	1335	30	30	TD	NEOS TO 343'S	YES
271	66 / 67	08/12/92	1127	1132	32	31	TD	420' TO 625'SNEOS	NO
272	66 / 67	08/12/92	1122	1127	32	30	TD	625' TO SEOS	NO
273	66 / 77	08/13/92	1430	1435	30	30	TD	WEOS TO EEOS	YES
274	67 / 68	08/12/92	1444	1449	30	30	TD	NEOS TO 360'S	YES
275	67 / 68	08/12/92	1400	1405	30	30	TD	360'SNEOS TO SEOS	NO
276	67 / 79	08/13/92	1519	1524	30	30	TD	WEOS TO EEOS	YES
277	68 / 69	08/12/92	1502	1507	29	29	TD	NEOS TO 25'S	NO
278	68 / 69	08/12/92	1420	1425	29	29	TD	323' TO 347'SNEOS	NO
279	68 / 69	08/12/92	1421	1426	30	30	TD	347' TO 365'SNEOS	NO
280	68 / 69	08/12/92	1434	1439	30	30	TD	445' TO SEOS	NO
281	68 / 69	08/12/92	--	--	--	--	TD	100' TO 105'SNEOS	NO
282	68 / 69	08/12/92	1523	1528	30	30	TD	45' TO 55'SNEOS	NO
283	68 / 69	08/12/92	1428	1433	30	30	TD	365' TO 440'SNEOS	NO
284	68 / 69	08/12/92	1521	1526	32	30	TD	25' TO 45'SNEOS	NO
285	68 / 69	08/12/92	--	--	--	--	TD	440' TO 445'SNEOS	NO
286	68 / 69	08/12/92	1515	1520	30	30	TD	65' TO 100'SNEOS	NO
287	68 / 69	08/12/92	1511	1516	29	29	TD	105' TO 323'SNEOS	NO
288	68 / 69	08/12/92	--	--	--	--	TD	55' TO 65'SNEOS	YES
289	68 / 79	08/13/92	1537	1542	30	30	TD	NEOS TO SEOS	YES
290	68 / 82	08/13/92	1606	1611	30	30	TD	NEOS TO SEOS	YES
291	69 / 70	08/12/92	1605	1610	30	30	TD	20' TO 323'SNEOS	NO
292	69 / 70	08/12/92	--	--	--	--	TD	16' TO 20'SNEOS	YES
293	69 / 70	08/12/92	1534	1539	30	30	TD	323' TO 625'SNEOS	NO
294	69 / 70	08/12/92	1610	1615	32	32	TD	0' TO 16'SNEOS	NO
295	69 / 82	08/13/92	1702	1707	34	34	TD	EEOS TO WEOS	YES
296	70 / 71	08/12/92	--	--	--	--	TD	156' TO 160'SNEOS	NO
297	70 / 71	08/12/92	1635	1640	30	30	TD	615' TO SEOS	NO
298	70 / 71	08/13/92	737	742	30	30	TD	20' TO 90'SNAT	YES
299	70 / 71	08/13/92	732	737	32	30	TD	NAT TO 20'SNAT	NO
300	70 / 71	08/12/92	1654	1659	32	31	TD	90' TO 156'SNEOS	NO
301	70 / 71	08/12/92	1651	1656	32	30	TD	160' TO 353'SNEOS	NO
302	70 / 71	08/12/92	1620	1625	30	30	TD	353' TO 610'SNEOS	NO
303	70 / 71	08/12/92	--	--	--	--	TD	610' TO 615'SNEOS	NO
304	70 / 83	08/14/92	740	745	32	32	TD	WEOS TO EEOS	YES
305	71 / 72	08/13/92	813	818	34	32	TD	350' TO 377'SNAT	NO
306	71 / 72	08/13/92	800	805	34	34	TD	197' TO 315'SNAT	NO
307	71 / 72	08/12/92	1640	1645	30	30	TD	636' TO 653'SNEOS	NO
308	71 / 72	08/12/92	1710	1715	30	29	TD	393' TO 636'SNEOS	NO

APPENDIX L
POND 93
PRESSURE TEST SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	END TIME	PRESSURE (psi) START	PRESSURE (psi) END	QA MONITOR	LOCATION	COMPLETE NO / YES
309	71 / 72	08/13/92	808	813	32	32	TD	315' TO 350'SNAT	NO
310	71 / 72	08/14/92	725	730	38	38	TD	NAT TO 135'SNAT	YES
311	71 / 85	08/14/92	924	929	30	30	TD	WEOS TO EEOS	YES
312	72 / 73	08/13/92	946	951	34	32	TD	640'SNAT TO SEOS	NO
313	72 / 73	08/13/92	1011	1016	32	32	TD	NAT TO 260'SNAT	YES
314	72 / 73	08/13/92	1000	1005	30	30	TD	330' TO 640'SNAT	NO
315	72 / 73	08/13/92	848	853	30	30	TD	260' TO 330'SNAT	NO
316	72 / 86	08/14/92	1006	1011	32	30	TD	WEOS TO EEOS	YES
317	73 / 88	08/14/92	1115	1120	32	30	TD	WEOS TO EEOS	YES
318	73 / 89	08/17/92	958	1003	32	30	JCL	528'NAT TO 656'S	YES
319	73 / 89	08/17/92	927	932	33	33	JCL	50'NAT TO 185'S	N0
320	73 / 89	08/17/92	937	942	32	29	JCL	185'NAT TO 398'S	N0
321	73 / 89	08/17/92	939	944	32	31	JCL	398'SNAT TO 528'S	N0
322	73 / 89	08/17/92	925	930	32	32	JCL	2'NAT TO 50'S	N0
323	74 / 75	08/13/92	1340	1345	30	30	TD	50'NSAT TO NEOS	NO
324	74 / 75	08/13/92	1359	1404	32	30	TD	SAT TO 50'N	YES
325	74 / 76	08/13/92	1328	1333	32	30	TD	190'NSAT TO NEOS	NO
326	74 / 76	08/13/92	1339	1344	32	30	TD	190'NSAT TO SEOS	YES
327	75 / 76	08/13/92	1340	1345	30	30	TD	10'WEOS TO 10' EEOS	YES
328	75 / 77	08/13/92	1422	1427	32	30	TD	NEOS TO SEOS	YES
329	76 / 77	08/13/92	1420	1425	30	30	TD	NEOS TO SEOS	YES
330	77 / 78	08/13/92	1441	1446	30	30	TD	NEOS TO SEOS	YES
331	77 / 79	08/13/92	1459	1504	30	30	TD	SEOS TO NEOS	YES
332	78 / 79	08/13/92	1457	1502	34	32	TD	WEOS TO EEOS	YES
333	78 / 80	08/13/92	1530	1535	30	30	TD	SEOS TO NEOS	YES
334	79 / 80	08/13/92	1537	1542	32	32	TD	200'NSAT TO SEOS	YES
335	79 / 80	08/13/92	1528	1533	30	30	TD	SEOS TO 200'N	NO
336	80 / 81	08/13/92	--	--	--	--	TD	195' TO 200'NSAT	NO
337	80 / 81	08/13/92	1638	1643	30	30	TD	SAT TO 20'NSAT	YES
338	80 / 81	08/13/92	1630	1635	32	30	TD	20' TO 195'NSAT	NO
339	80 / 81	08/13/92	1624	1629	30	30	TD	NEOS TO 200'NSAT	NO
340	80 / 82	08/13/92	1603	1608	32	32	TD	NEOS TO SEOS	YES
341	81 / 25M	08/13/92	1650	1655	32	32	TD	WEOS TO EEOS	YES
342	81 / 83	08/14/92	804	809	30	30	TD	200'NSAT TO NEOS	NO
343	81 / 83	08/14/92	805	810	32	32	TD	SAT TO 70'NSAT	YES
344	81 / 83	08/14/92	805	810	30	30	TD	70' TO 200'NSAT	NO
345	82 / 25M	08/13/92	1650	1655	32	32	TD	WEOS TO 24' E	NO
346	82 / 25M	08/13/92	1653	1658	32	30	TD	EEOS TO 10' W	YES
347	82 / 83	08/14/92	740	745	32	32	TD	NEOS TO SEOS	YES
348	83 / 84	08/14/92	900	905	32	30	TD	50' TO NEOS	YES
349	83 / 84	08/14/92	850	855	30	30	TD	SAT TO 50'NSAT	NO
350	83 / 85	08/14/92	925	930	30	30	TD	SEOS TO NEOS	YES
351	84 / 85	08/14/92	903	908	32	32	TD	WEOS TO EEOS	YES
352	84 / 86	08/14/92	1028	1033	30	30	TD	85'NSAT TO NEOS	NO

APPENDIX L
POND 93
PRESSURE TEST SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	END TIME	PRESSURE (psi) START	PRESSURE (psi) END	QA MONITOR	LOCATION	COMPLETE NO / YES
353	84 / 86	08/14/92	1037	1042	30	30	TD	SEOS TO 50'N	NO
354	84 / 86	08/14/92	1037	1042	30	30	TD	50' TO 85'NSAT	YES
355	85 / 86	08/14/92	1028	1033	34	34	TD	SEOS TO NEOS	YES
356	86 / 87	08/14/92	1103	1108	32	32	TD	250'NSAT TO NEOS	NO
357	86 / 87	08/14/92	1127	1132	32	30	TD	SAT TO 250'NSAT	YES
358	86 / 88	08/14/92	1055	1100	30	30	TD	NEOS TO SEOS	YES
359	87 / 88	08/14/92	1102	1107	32	30	TD	WEOS TO EEOS	YES
360	87 / 107	08/19/92	1021	1026	30	27	JCL	SEOS TO NEOS	YES
361	88 / 89	08/17/92	959	1004	30	30	JCL	NEOS TO SEOS	YES
362	88 / 107	08/19/92	1023	1028	32	29	JCL	SEOS TO NEOS	YES
363	89 / 90	08/17/92	1037	1042	32	31	JCL	295'NAT TO 313'S	NO
364	89 / 90	08/17/92	1259	1304	32	30	JCL	2'NAT TO 112'S	YES
365	89 / 90	08/17/92	1015	1020	30	27	JCL	313'NAT 396'S	NO
366	89 / 90	08/17/92	1040	1045	30	30	JCL	281'NAT TO 295'S	NO
367	89 / 90	08/17/92	1258	1303	30	28	JCL	112'NAT TO 281'S	NO
368	89 / 90	08/17/92	1016	1021	32	30	JCL	396'NAT TO 665'S	NO
369	89 / 107	08/19/92	1032	1037	30	27	JCL	EEOS TO WEOS	YES
370	90 / 91	08/17/92	1053	1058	31	28	JCL	317'NAT TO 505'S	NO
371	90 / 91	08/17/92	1051	1056	34	32	JCL	505'NAT TO 665'S	NO
372	90 / 91	08/17/92	1110	1115	30	29	JCL	1'NAT TO 317'S	YES
373	90 / 108	08/19/92	1040	1045	30	27	JCL	EEOS TO WEOS	YES
374	91 / 92	08/17/92	1308	1313	32	30	JCL	2'NAT TO 88'S	NO
375	91 / 92	08/17/92	1452	1457	30	27	JCL	390'NAT TO 412'S	NO
376	91 / 92	08/17/92	1327	1332	32	29	JCL	560'NAT TO 660'S	NO
377	91 / 92	08/17/92	--	--	--	--	JCL	504'NAT TO 518'S	YES
378	91 / 92	08/17/92	1450	1455	30	27	JCL	492'NAT TO 504'S	NO
379	91 / 92	08/17/92	1448	1453	30	27	JCL	475'NAT TO 488'S	NO
380	91 / 92	08/17/92	1446	1451	30	28	JCL	412'NAT TO 475'S	NO
381	91 / 92	08/17/92	1304	1309	30	27	JCL	88'NAT TO 390'S	NO
382	91 / 92	08/17/92	1329	1334	30	30	JCL	518'NAT TO 560'S	NO
383	91 / 109	08/19/92	1041	1046	30	27	JCL	EEOS TO WEOS	YES
384	91 / 110	08/19/92	1357	1402	30	27	JCL	SEOS TO NEOS	YES
385	92 / 93	08/17/92	1517	1522	32	31	JCL	523'NAT TO 532'S	NO
386	92 / 93	08/17/92	1548	1553	31	29	JCL	330'NAT TO 406'S	NO
387	92 / 93	08/17/92	1342	1347	32	30	JCL	532'NAT TO 590'S	NO
388	92 / 93	08/17/92	1346	1351	30	29	JCL	625'NAT TO 665'S	NO
389	92 / 93	08/19/92	--	--	--	--	JCL	NEOS TO 75'S	YES
390	92 / 93	08/17/92	1547	1552	31	28	JCL	165'NAT TO 330'S	NO
391	92 / 93	08/17/92	1703	1708	32	30	JCL	75'NAT TO 165'S	NO
392	92 / 93	08/17/92	1345	1350	30	28	JCL	590'NAT TO 625'S	NO
393	92 / 93	08/17/92	1518	1523	32	30	JCL	406'NAT TO 523'S	NO
394	92 / 110	08/19/92	1355	1400	32	32	JCL	EEOS TO WEOS	YES
395	93 / 38H	08/19/92	1420	1425	33	30	JCL	SEOS TO NEOS	YES
396	93 / 94	08/17/92	1519	1524	31	28	JCL	438'NAT TO 669'S	NO

APPENDIX L
POND 93
PRESSURE TEST SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	END TIME	PRESSURE (psi) START	PRESSURE (psi) END	QA MONITOR	LOCATION	COMPLETE NO / YES
397	93 / 94	08/17/92	1620	1625	32	30	JCL	2'NAT TO 110'S	YES
398	93 / 94	08/17/92	1551	1556	31	28	JCL	345'NAT TO 438'S	NO
399	93 / 94	08/17/92	1602	1607	32	30	JCL	110'NAT TO 345'S	NO
400	93 / 112	08/19/92	1414	1419	30	29	JCL	EEOS TO WEOS	YES
401	93 / 113	08/19/92	1516	1521	32	30	JCL	SEOS TO NEOS	YES
402	94 / 95	08/17/92	1640	1645	29	27	JCL	2'NAT TO 146'S	NO
403	94 / 95	08/17/92	1646	1651	32	31	JCL	153'NAT TO 167'S	NO
404	94 / 95	08/17/92	1612	1617	32	30	JCL	167'NAT TO 341'S	YES
405	94 / 95	08/17/92	1606	1611	31	30	JCL	341'NAT TO 665'S	NO
406	94 / 113	08/19/92	1517	1522	30	27	JCL	EEOS TO WEOS	YES
407	95 / 41C	08/19/92	1618	1623	32	32	JCL	SEOS TO NEOS	YES
408	95 / 96	08/18/92	830	835	30	27	JCL	592'NAT TO 651'S	YES
409	95 / 96	08/18/92	750	755	30	29	JCL	5'NAT TO 344'S	NO
410	95 / 96	08/18/92	813	818	32	30	JCL	362'NAT TO 592'S	NO
411	95 / 96	08/18/92	757	762	31	30	JCL	344'NAT TO 362'S	NO
412	95 / 113	08/19/92	1552	1557	30	27	JCL	SEOS TO NEOS	YES
413	95 / 114	08/19/92	1554	1559	30	27	JCL	10' E TO EEOS	YES
414	95 / 114	08/19/92	1553	1558	33	30	JCL	10' E TO WEOS	NO
415	96 / 97	08/18/92	753	758	32	31	JCL	361'NAT TO 521'S	NO
416	96 / 97	08/18/92	825	830	32	31	JCL	521'NAT TO 657'S	YES
417	96 / 97	08/18/92	752	757	31	30	JCL	4'NAT TO 361'S	NO
418	96 / 115	08/19/92	1621	1626	30	29	JCL	EEOS TO WEOS	YES
419	97 / 98	08/18/92	954	959	31	29	JCL	586'NAT TO 650'S	YES
420	97 / 98	08/18/92	922	927	31	29	JCL	34'NAT 297'S	NO
421	97 / 98	08/18/92	945	950	33	30	JCL	297'NAT TO 357'S	NO
422	97 / 98	08/18/92	924	929	30	27	JCL	3'NAT TO 34'S	NO
423	97 / 98	08/18/92	948	953	31	29	JCL	357'NAT TO 586'S	NO
424	97 / 115	08/20/92	803	808	32	31	JCL	SEOS TO NEOS	YES
425	97 / 116	08/20/92	804	809	32	31	JCL	WEOS TO EEOS	YES
426	97 / 118	08/20/92	906	911	33	30	JCL	SEOS TO NEOS	YES
427	98 / 99	08/18/92	1005	1010	32	29	JCL	568'NAT TO 650'S	NO
428	98 / 99	08/18/92	933	938	33	32	JCL	2'NAT TO 59'S	NO
429	98 / 99	08/18/92	1017	1022	31	28	JCL	294'NAT TO 568'S	YES
430	98 / 99	08/18/92	1017	1022	30	28	JCL	59'NAT TO 294'S	NO
431	98 / 118	08/20/92	907	912	30	30	JCL	WEOS TO EEOS	YES
432	99 / 100	08/18/92	1058	1103	32	30	JCL	2'NAT TO 312'S	NO
433	99 / 100	08/18/92	1059	1104	32	29	JCL	312'NAT TO 658'S	YES
434	99 / 118	08/20/92	908	913	32	29	JCL	NEOS TO SEOS	YES
435	99 / 121	08/20/92	940	945	30	28	JCL	WEOS TO EEOS	YES
436	100 / 101	08/18/92	1422	1427	32	30	JCL	34'NAT TO 258'S	NO
437	100 / 101	08/18/92	1309	1314	34	32	JCL	316'NAT TO 350'S	NO
438	100 / 101	08/18/92	--	--	--	--	JCL	31'NAT TO 34'S	NO
439	100 / 101	08/18/92	1321	1326	34	31	JCL	445'NAT TO 577'S	NO
440	100 / 101	08/18/92	1442	1447	36	33	JCL	2'NAT TO 9'S	NO

APPENDIX L
POND 93
PRESSURE TEST SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	END TIME	PRESSURE (psi) START	PRESSURE (psi) END	QA MONITOR	LOCATION	COMPLETE NO / YES
441	100 / 101	08/18/92	--	--	--	--	JCL	9'NAT TO 12'S	YES
442	100 / 101	08/18/92	1133	1138	32	29	JCL	258'NAT TO 316'S	NO
443	100 / 101	08/18/92	1329	1334	32	30	JCL	577'NAT TO 659'S	NO
444	100 / 101	08/18/92	1258	1303	33	30	JCL	350'NAT TO 445'S	NO
445	100 / 101	08/18/92	1420	1425	30	30	JCL	12'NAT TO 31'S	NO
446	100 / 158	08/28/92	1642	1647	31	29	MH	--	YES
447	101 / 102	08/18/92	1426	1431	31	29	JCL	32'NAT TO 325'S	NO
448	101 / 102	08/18/92	1409	1414	33	31	JCL	325'NAT TO 375'S	NO
449	101 / 102	08/18/92	1335	1340	30	28	JCL	517'NAT TO 662 'S	NO
450	101 / 102	08/18/92	1449	1454	30	28	JCL	4'NAT 32'S	YES
451	101 / 102	08/18/92	1408	1413	33	30	JCL	375'NAT TO 416'S	NO
452	101 / 102	08/18/92	1357	1402	29	27	JCL	505'NAT TO 517'S	NO
453	101 / 102	08/18/92	1401	1406	32	30	JCL	416'NAT TO 505'S	NO
454	101 / 160	08/31/92	851	856	30	29	MH	24'E TO EEOS	YES
455	101 / 160	08/31/92	845	850	30	30	MH	WEOS TO 24'E	NO
456	102 / 103	08/18/92	1532	1537	31	29	JCL	32'NAT TO 67'S	NO
457	102 / 103	08/18/92	1612	1617	30	28	JCL	532'NAT TO 656'S	NO
458	102 / 103	08/18/92	1550	1555	31	28	JCL	344'NAT TO 417'S	NO
459	102 / 103	08/18/92	1558	1603	32	30	JCL	417'NAT TO 439'S	NO
460	102 / 103	08/18/92	--	--	--	--	JCL	67'NAT TO 75'S	NO
461	102 / 103	08/18/92	1525	1530	31	29	JCL	138'NAT TO 181'S	NO
462	102 / 103	08/18/92	1524	1529	31	28	JCL	75'NAT TO 138'S	NO
463	102 / 103	08/18/92	1544	1549	29	26	JCL	181'NAT TO 344'S	NO
464	102 / 103	08/18/92	--	--	--	--	JCL	439'NAT TO 454'S	NO
465	102 / 103	08/18/92	1444	1449	32	30	JCL	2'NAT TO 32'S	NO
466	102 / 103	08/19/92	955	960	30	30	JCL	454'NAT TO 490'S	YES
467	102 / 103	08/19/92	952	957	31	30	JCL	490'NAT TO 518'S	NO
468	102 / 103	08/19/92	948	953	32	30	JCL	518'NAT TO 532'S	NO
469	102 / 161	08/31/92	858	903	33	30	MH	--	YES
470	103 / 104	08/18/92	1624	1629	31	30	JCL	343'NAT TO 455'S	NO
471	103 / 104	08/18/92	1648	1653	31	28	JCL	0'NAT TO 343'S	YES
472	103 / 104	08/18/92	1625	1630	32	30	JCL	455'NAT TO 656'S	NO
473	103 / 163	09/04/92	--	--	--	--	MH	17'E TO EEOS	YES
474	103 / 163	09/04/92	--	--	--	--	MH	WEOS TO 17'E	NO
475	104 / 65R	09/04/92	1501	1506	32	29	MH	--	YES
476	104 / 105	08/19/92	916	921	33	32	JCL	632'NAT TO SEOS	YES
477	104 / 105	08/19/92	--	--	--	--	JCL	270'NAT TO 284'S	NO
478	104 / 105	08/19/92	808	813	32	30	JCL	159'NAT TO 194'S	NO
479	104 / 105	08/19/92	836	841	32	30	JCL	398'NAT TO 457'S	NO
480	104 / 105	08/19/92	824	829	32	31	JCL	284'NAT TO 318'S	NO
481	104 / 105	08/18/92	1659	1704	30	27	JCL	142'NAT TO 159'S	NO
482	104 / 105	08/18/92	--	--	--	--	JCL	135'NAT TO 142'S	NO
483	104 / 105	08/19/92	854	859	32	31	JCL	457'NAT TO 464'S	NO
484	104 / 105	08/19/92	834	839	30	28	JCL	318'NAT TO 398'S	NO

APPENDIX L
POND 93
PRESSURE TEST SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	END TIME	PRESSURE (psi) START	PRESSURE (psi) END	QA MONITOR	LOCATION	COMPLETE NO / YES
485	104 / 105	08/19/92	848	853	30	28	JCL	471'NAT TO 550'S	NO
486	104 / 105	08/19/92	807	812	32	30	JCL	194'NAT TO 222'S	NO
487	104 / 105	08/18/92	1657	1702	31	28	JCL	2'NAT TO 135'S	NO
488	104 / 105	08/19/92	--	--	--	--	JCL	464'NAT TO 471'S	NO
489	104 / 105	08/19/92	823	828	30	27	JCL	229'NAT TO 270'S	NO
490	104 / 105	08/19/92	859	904	30	30	JCL	550'NAT TO 632'S	NO
491	104 / 105	08/19/92	--	--	--	--	JCL	222'NAT TO 229'S	NO
492	104 / 184	09/04/92	1421	1426	34	32	MH	--	YES
493	105 / 106	08/19/92	924	929	30	29	JCL	360'NAT TO 590'S	NO
494	105 / 106	08/19/92	804	809	30	28	JCL	153'NAT TO 341'S	NO
495	105 / 106	08/19/92	837	842	30	29	JCL	341'NAT TO 360'S	NO
496	105 / 106	08/19/92	805	810	30	30	JCL	4'NAT TO 153'S	NO
497	105 / 106	08/19/92	--	--	--	--	JCL	640'NAT TO SEOS	YES
498	105 / 106	08/19/92	932	937	32	29	JCL	590'NAT TO 640'S	NO
499	105 / 185	09/04/92	--	--	--	--	MH	WEOS TO 24'E	NO
500	105 / 185	09/04/92	1544	1549	32	29	MH	10'W TO EEOS	YES
501	106 / 68F	09/11/92	1040	1045	30	30	JCL	--	YES
502	106 / 122	08/20/92	1101	1106	35	32	JCL	208' TO 170'SNAT	NO
503	106 / 122	08/21/92	749	754	32	31	JCL	85' TO 38'SNAT	NO
504	106 / 122	08/20/92	1030	1035	30	28	JCL	411'NAT TO SEOS	NO
505	106 / 122	08/21/92	748	753	32	30	JCL	NEOS TO 38'NAT	NO
506	106 / 122	08/20/92	1045	1050	30	28	JCL	208' TO 303'SNAT	NO
507	106 / 122	08/21/92	750	755	33	32	JCL	170' TO 85'SNAT	YES
508	106 / 122	08/20/92	1031	1036	33	30	JCL	411' TO 303'SNAT	NO
509	107 / 108	08/19/92	1048	1053	30	28	JCL	2'NAT TO 136'S	NO
510	107 / 108	08/19/92	1101	1106	32	30	JCL	179'NAT TO 300'S	YES
511	107 / 108	08/19/92	1100	1105	33	32	JCL	148'NAT TO 179'S	NO
512	107 / 108	08/19/92	1055	1100	32	32	JCL	136'NAT TO 148'S	NO
513	108 / 109	08/19/92	1333	1338	34	31	JCL	58'NAT TO 172'S	NO
514	108 / 109	08/19/92	1344	1349	32	32	JCL	259'NAT TO NEOS	YES
515	108 / 109	08/19/92	1110	1115	30	27	JCL	2'NAT TO 58'S	NO
516	108 / 109	08/19/92	1341	1346	31	28	JCL	172'NAT TO 259'S	NO
517	109 / 110	08/19/92	1113	1118	30	28	JCL	2'NAT TO 150'S	NO
518	109 / 110	08/19/92	1319	1324	32	29	JCL	253'NAT TO 300'S	YES
519	109 / 110	08/19/92	1315	1320	31	29	JCL	150'NAT TO 253'S	NO
520	110 / 38H	08/19/92	1413	1418	30	27	JCL	SEOS TO NEOS	YES
521	110 / 111	08/19/92	--	--	--	--	JCL	253'SAT TO 270'N	YES
522	110 / 111	08/19/92	1431	1436	32	29	JCL	1'SAT TO 253'N	NO
523	110 / 112	08/19/92	1415	1420	30	29	JCL	SEOS TO NEOS	YES
524	111 / 112	08/19/92	1429	1434	32	31	JCL	EEOS TO WEOS	YES
525	111 / 113	08/19/92	1433	1438	29	27	JCL	136'SAT TO 260'N	NO
526	111 / 113	08/19/92	1532	1537	30	28	JCL	1'SAT TO 136'N	YES
527	112 / 113	08/20/92	750	755	34	31	JCL	284' TO 292'NSAT	NO
528	112 / 113	08/20/92	--	--	--	--	JCL	266' TO 272'NSAT	YES

APPENDIX L
POND 93
PRESSURE TEST SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	END TIME	PRESSURE (psi) START	PRESSURE (psi) END	QA MONITOR	LOCATION	COMPLETE NO / YES
529	112 / 113	08/20/92	753	758	32	32	JCL	272' TO 284'NSAT	NO
530	113 / 114	08/19/92	1535	1540	33	31	JCL	1'SAT TO 49'N	NO
531	113 / 114	08/19/92	1551	1556	30	27	JCL	54'SAT TO 290'N	YES
532	113 / 114	08/19/92	--	--	--	--	JCL	49'SAT TO 54'N	NO
533	114 / 115	08/19/92	1617	1622	30	29	JCL	1'SAT TO 293'N	YES
534	115 / 41C	08/19/92	1618	1623	34	34	JCL	SEOS TO NEOS	YES
535	115 / 116	08/20/92	805	810	30	28	JCL	NEOS TO SEOS	YES
536	115 / 117	08/19/92	1642	1647	31	30	JCL	2'SAT TO NEOS	YES
537	116 / 117	08/20/92	807	812	32	32	JCL	WEOS TO EEOS	YES
538	116 / 118	08/20/92	905	910	33	32	JCL	NEOS TO SEOS	YES
539	117 / 118	08/20/92	931	936	32	31	JCL	SEOS TO 243'SAT	YES
540	117 / 118	08/20/92	929	934	34	32	JCL	243'SAT TO NEOS	NO
541	117 / 119	08/19/92	1650	1655	32	31	JCL	1'SAT TO 70'N	NO
542	117 / 119	08/20/92	927	932	34	32	JCL	NEOS TO 70'NSAT	YES
543	118 / 119	08/20/92	928	933	33	32	JCL	WEOS TO EEOS	YES
544	118 / 121	08/20/92	941	946	32	30	JCL	NEOS TO 244'NSAT	NO
545	118 / 121	08/20/92	950	955	32	31	JCL	SEOS TO 244'NSAT	YES
546	119 / 120	08/19/92	1710	1715	32	31	JCL	1'SAT TO 20'N	NO
547	119 / 120	08/19/92	1648	1653	30	30	JCL	20'SAT TO 144'N	NO
548	119 / 121	08/20/92	952	957	30	28	JCL	SEOS TO 207'SAT	YES
549	119 / 121	08/20/92	--	--	--	--	JCL	228'SAT TO NEOS	YES
550	119 / 121	08/20/92	951	956	32	30	JCL	228' TO 207'NSAT	NO
551	120 / 121	08/20/92	953	958	32	31	JCL	WEOS TO EEOS	YES
552	120 / 158	08/28/92	1451	1456	31	28	JCL	55'N TO SEOS	NO
553	120 / 158	08/28/92	1615	1620	30	28	JCL	NEOS TO 55'N	NO
554	121 / 158	08/28/92	1628	1633	32	29	JCL	236'N TO 192'N	NO
555	121 / 158	08/28/92	1620	1625	30	29	MH	144'N TO 192'N	NO
556	121 / 158	08/28/92	--	--	--	--	MH	245'N TO NEOS	YES
557	121 / 158	08/28/92	--	--	--	--	MH	236'N TO 245'N	NO
558	122 / 68R	09/11/92	1051	1056	33	31	JCL	--	YES
559	122 / 123	08/20/92	1108	1113	32	30	JCL	38' TO NEOS	NO
560	122 / 123	08/20/92	1125	1130	32	30	JCL	395'NAT TO SEOS	YES
561	122 / 123	08/20/92	1123	1128	32	30	JCL	395' TO 38'SNAT	NO
562	123 / 124	08/21/92	823	828	32	29	JCL	350' TO 396'SNAT	NO
563	123 / 124	08/20/92	1304	1309	36	33	JCL	182' TO NEOS	NO
564	123 / 124	08/21/92	832	837	30	29	JCL	396'NAT TO SEOS	YES
565	123 / 124	08/21/92	824	829	31	29	JCL	350' TO 182'SNAT	NO
566	123 / 188	09/11/92	1116	1121	34	32	JCL	--	YES
567	124 / 125	08/21/92	851	856	32	31	JCL	215' TO 403'SNAT	NO
568	124 / 125	08/21/92	908	913	31	30	JCL	525'NAT TO SEOS	YES
569	124 / 125	08/21/92	904	909	30	29	JCL	525' TO 403'SNAT	NO
570	124 / 125	08/20/92	1306	1311	30	28	JCL	215' TO NEOS	NO
571	124 / 189	09/11/92	1626	1631	32	30	JCL	--	YES
572	125 / 711	09/11/92	1629	1634	33	31	JCL	--	YES

APPENDIX L
POND 93
PRESSURE TEST SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	END TIME	PRESSURE (psi) START	PRESSURE (psi) END	QA MONITOR	LOCATION	COMPLETE NO / YES
573	125 / 126	08/21/92	924	929	32	31	JCL	432'NAT TO SEOS	NO
574	125 / 126	08/21/92	952	957	32	29	JCL	169'NAT TO NEOS	NO
575	125 / 126	08/21/92	925	930	29	26	JCL	432' TO 190'SNAT	NO
576	125 / 126	08/21/92	953	958	30	30	JCL	169' TO 190'SNAT	YES
577	125 / 190	09/11/92	--	--	--	--	JCL	7'WEEOS TO EEOS	YES
578	125 / 190	09/11/92	1631	1636	31	29	JCL	WEOS TO 7'WEEOS	NO
579	125 / 191	09/11/92	1635	1640	34	34	JCL	--	YES
580	126 / 127	08/21/92	1026	1031	32	30	JCL	440'NAT TO SEOS	YES
581	126 / 127	08/21/92	1025	1030	32	30	JCL	440' TO 190'SNAT	NO
582	126 / 127	08/21/92	1008	1013	32	30	JCL	134' TO 190'SNAT	NO
583	126 / 127	08/21/92	1007	1012	30	27	JCL	134'NAT TO NEOS	NO
584	126 / 191	09/11/92	1638	1643	30	29	JCL	12'EWEOS TO EEOS	YES
585	126 / 191	09/11/92	1636	1641	30	29	JCL	WEOS TO 12'EWEOS	NO
586	127 / 128	08/21/92	1050	1055	30	28	JCL	603'NAT TO SEOS	NO
587	127 / 128	08/21/92	1047	1052	30	29	JCL	603' TO 533'SNAT	NO
588	127 / 128	08/21/92	--	--	--	--	JCL	178' TO 186'SNAT	NO
589	127 / 128	08/21/92	1101	1106	32	30	JCL	440' TO 533'SNAT	NO
590	127 / 128	08/21/92	1114	1119	32	29	JCL	36' TO 178'SNAT	YES
591	127 / 128	08/21/92	1113	1118	30	28	JCL	36'NAT TO NEOS	NO
592	127 / 128	08/21/92	1102	1107	30	28	JCL	440' TO 186'SNAT	NO
593	127 / 192	09/11/92	1645	1650	30	28	JCL	12'EWEOS TO EEOS	YES
594	127 / 192	09/11/92	1641	1646	31	30	JCL	WEOS TO 12'EWEOS	NO
595	128 / 129	08/21/92	1316	1321	29	26	JCL	425'NAT TO SEOS	YES
596	128 / 129	08/21/92	1308	1313	31	30	JCL	325' TO 425'SNAT	NO
597	128 / 129	08/21/92	1306	1311	30	28	JCL	325'NAT TO NEOS	NO
598	128 / 193	09/11/92	1650	1655	32	32	JCL	--	YES
599	129 / 73E	09/11/92	1655	1700	30	30	JCL	--	YES
600	129 / 130	08/21/92	--	--	--	--	JCL	605' TO 619'SNAT	YES
601	129 / 130	08/21/92	1546	1551	36	35	JCL	596' TO 605'SNAT	NO
602	129 / 130	08/21/92	1506	1511	32	29	JCL	227' TO 195'SNAT	NO
603	129 / 130	08/21/92	1532	1537	30	29	JCL	478' TO 413'SNAT	NO
604	129 / 130	08/21/92	1514	1519	29	27	JCL	183'NAT TO NEOS	NO
605	129 / 130	08/21/92	1548	1553	34	32	JCL	619'NAT TO SEOS	NO
606	129 / 130	08/21/92	--	--	--	--	JCL	584' TO 596'SNAT	NO
607	129 / 130	08/21/92	1458	1463	29	28	JCL	312' TO 285'SNAT	NO
608	129 / 130	08/21/92	1502	1507	30	29	JCL	312' TO 336'SNAT	NO
609	129 / 130	08/21/92	1507	1512	30	28	JCL	227' TO 285'SNAT	NO
610	129 / 130	08/21/92	1448	1453	31	30	JCL	380' TO 405'SNAT	NO
611	129 / 130	08/21/92	1514	1519	31	30	JCL	183' TO 195'SNAT	NO
612	129 / 130	08/21/92	--	--	--	--	JCL	405' TO 413'SNAT	NO
613	129 / 130	08/21/92	1542	1547	32	29	JCL	584' TO 518'SNAT	NO
614	129 / 130	08/21/92	1534	1539	34	31	JCL	478' TO 518'SNAT	NO
615	129 / 130	08/21/92	1447	1452	30	29	JCL	380' TO 336'SNAT	NO
616	129 / 194	09/11/92	1700	1705	30	27	JCL	--	YES

APPENDIX L
POND 93
PRESSURE TEST SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	END TIME	PRESSURE (psi) START	PRESSURE (psi) END	QA MONITOR	LOCATION	COMPLETI NO / YES
617	130 / 131	08/21/92	1639	1644	32	29	JCL	396' TO 218'SNAT	NO
618	130 / 131	08/21/92	1701	1706	32	30	JCL	39'NAT TO NEOS	YES
619	130 / 131	08/21/92	--	--	--	--	JCL	215' TO 218'SNAT	NO
620	130 / 131	08/21/92	--	--	--	--	JCL	420' TO 425'SNAT	NO
621	130 / 131	08/21/92	1604	1609	32	30	JCL	578' TO 562'SNAT	NO
622	130 / 131	08/21/92	1657	1702	29	29	JCL	59' TO 39'SNAT	NO
623	130 / 131	08/21/92	1646	1651	30	29	JCL	207' TO 215'SNAT	NO
624	130 / 131	08/21/92	1647	1652	30	28	JCL	207' TO 66'SNAT	NO
625	130 / 131	08/21/92	1603	1608	32	29	JCL	578'NAT TO SEOS	NO
626	130 / 131	08/21/92	1611	1616	32	29	JCL	542' TO 425'SNAT	NO
627	130 / 131	08/21/92	1658	1703	35	34	JCL	59' TO 66'SNAT	NO
628	130 / 131	08/21/92	1613	1618	32	30	JCL	542' TO 562'SNAT	NO
629	130 / 131	08/21/92	1638	1643	33	30	JCL	396' TO 420'SNAT	NO
630	130 / 195	09/11/92	1705	1710	31	30	JCL	--	YES
631	130 / 197	09/11/92	--	--	--	--	JCL	--	YES
632	131 / 132	08/22/92	738	743	34	32	JCL	175'NAT TO NEOS	NO
633	131 / 132	08/22/92	803	808	30	27	JCL	400'NAT TO SEOS	YES
634	131 / 132	08/22/92	751	756	33	33	JCL	274' TO 400'SNAT	NO
635	131 / 132	08/22/92	740	745	33	32	JCL	175' TO 200'SNAT	NO
636	131 / 132	08/22/92	750	755	32	31	JCL	274' TO 200'SNAT	NO
637	131 / 197	09/11/92	1706	1711	32	32	JCL	--	YES
638	132 / 133	08/26/92	957	1002	31	28	JCL	314'NAT TO NEOS	NO
639	132 / 133	08/26/92	1005	1010	30	27	JCL	345'NAT TO SEOS	NO
640	132 / 133	08/26/92	1006	1011	31	28	JCL	314' TO 345'SNAT	YES
641	132 / 198	09/11/92	1850	1855	29	29	JCL	EEOS TO 8'WEEOS	NO
642	132 / 199	09/11/92	--	--	--	--	JCL	--	YES
643	132 / 198	09/11/92	1855	1900	30	29	JCL	8'WEEOS TO WEOS	YES
644	133 / 134	08/26/92	1031	1036	31	30	JCL	94' TO 50'SNAT	NO
645	133 / 134	08/26/92	1030	1035	30	27	JCL	94' TO 194'SNAT	NO
646	133 / 134	08/26/92	1018	1023	39	36	JCL	300' TO 194'SNAT	NO
647	133 / 134	08/26/92	1040	1045	32	29	JCL	50' TO 33'SNAT	NO
648	133 / 134	08/26/92	1116	1121	30	29	JCL	300'NAT TO SEOS	YES
649	133 / 134	08/27/92	--	--	--	--	JCL	NEOS TO 33'S	NO
650	133 / 199	09/11/92	1840	1845	33	31	JCL	--	YES
651	134 / 73S	09/11/92	1832	1837	31	30	JCL	--	YES
652	134 / 135	08/26/92	1130	1135	30	29	JCL	350'NAT TO SEOS	YES
653	134 / 135	08/26/92	1117	1122	32	32	JCL	350'NAT TO NEOS	NO
654	134 / 200	09/12/92	900	905	33	33	JCL	--	YES
655	135 / 136	08/26/92	1403	1408	33	31	JCL	83' TO 213'SNAT	NO
656	135 / 136	08/26/92	1433	1438	31	29	JCL	625'NAT TO SEOS	YES
657	135 / 136	08/26/92	1342	1347	30	28	JCL	28'NAT TO NEOS	NO
658	135 / 136	08/26/92	1420	1425	33	31	JCL	554' TO 591'SNAT	NO
659	135 / 136	08/26/92	1322	1327	29	28	JCL	315' TO 540'SNAT	NO
660	135 / 136	08/26/92	1419	1424	30	30	JCL	540' TO 554'SNAT	NO

APPENDIX L
POND 93
PRESSURE TEST SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	END TIME	PRESSURE (psi) START	PRESSURE (psi) END	QA MONITOR	LOCATION	COMPLETE NO / YES
661	135 / 136	08/26/92	--	--	--	--	JCL	591' TO 602'SNAT	NO
662	135 / 136	08/26/92	1315	1320	30	28	JCL	315' TO 213'SNAT	NO
663	135 / 136	08/26/92	1346	1351	31	29	JCL	28' TO 83'SNAT	NO
664	135 / 136	08/26/92	1430	1435	31	28	JCL	625' TO 602'SNAT	NO
665	135 / 201	09/12/92	850	855	30	30	JCL	--	YES
666	136 / 74A	09/12/92	936	941	32	32	JCL	--	YES
667	136 / 137	08/26/92	1320	1325	30	28	JCL	335'NAT TO NEOS	NO
668	136 / 137	08/26/92	1453	1458	32	31	JCL	500' TO 629'SNAT	NO
669	136 / 137	08/26/92	1454	1459	33	31	JCL	500' TO 398'SNAT	NO
670	136 / 137	08/26/92	--	--	--	--	JCL	335' TO 398'SNAT	YES
671	136 / 137	08/26/92	1442	1447	35	35	JCL	629'NAT TO SEOS	NO
672	136 / 202	09/12/92	955	1000	34	31	JCL	--	YES
673	137 / 138	08/26/92	1537	1542	28	27	JCL	307'NAT TO NEOS	YES
674	137 / 138	08/26/92	1516	1521	31	28	JCL	350' TO 553'SNAT	NO
675	137 / 138	08/26/92	1524	1529	32	31	JCL	350' TO 307'SNAT	NO
676	137 / 138	08/26/92	1508	1513	32	30	JCL	588' TO 553'SNAT	NO
677	137 / 138	08/26/92	1506	1511	33	30	JCL	588'NAT TO SEOS	NO
678	137 / 203	09/12/92	1010	1015	34	34	JCL	--	YES
679	138 / 139	08/26/92	1625	1630	35	33	JCL	630'NAT TO SEOS	NO
680	138 / 139	08/26/92	1558	1603	28	28	JCL	205' TO 50'SNAT	NO
681	138 / 139	08/26/92	1545	1550	30	28	JCL	31'NAT TO NEOS	NO
682	138 / 139	08/26/92	--	--	--	--	JCL	31' TO 50'SNAT	YES
683	138 / 139	08/26/92	1615	1620	30	28	JCL	344' TO 630'SNAT	NO
684	138 / 139	08/26/92	1605	1610	30	28	JCL	205' TO 344'SNAT	NO
685	138 / 204	09/12/92	1119	1124	32	31	JCL	--	YES
686	139 / 74H	09/12/92	1358	1403	32	31	JCL	--	YES
687	139 / 140	08/26/92	1636	1641	30	28	JCL	350'NAT TO NEOS	YES
688	139 / 140	08/26/92	1634	1639	32	31	JCL	350'NAT TO SEOS	NO
689	139 / 205	09/12/92	1349	1354	34	33	JCL	16'EWEOS TO WEOS	YES
690	139 / 205	09/12/92	1345	1350	29	26	JCL	16'EWEOS TO EEOS	NO
691	140 / 74H	09/12/92	1357	1402	33	30	JCL	--	YES
692	140 / 141	08/27/92	--	--	--	--	JCL	480'S TO 488'S	YES
693	140 / 141	08/27/92	801	806	39	38	JCL	488'S TO SEOS	NO
694	140 / 141	08/26/92	1706	1711	33	33	JCL	350' TO 480'SNAT	NO
695	140 / 141	08/26/92	1655	1700	30	29	JCL	350'NAT TO NEOS	NO
696	140 / 206	09/12/92	1404	1409	32	29	JCL	--	YES
697	141 / 142	08/27/92	800	805	30	30	JCL	350'S TO NEOS	NO
698	141 / 142	08/27/92	808	813	33	31	JCL	510'S TO 350'S	NO
699	141 / 142	08/27/92	811	816	32	32	JCL	510'S TO SEOS	YES
700	141 / 207	09/12/92	1416	1421	32	32	JCL	--	YES
701	142 / 143	08/27/92	926	931	30	30	JCL	318'S TO NEOS	NO
702	142 / 143	08/27/92	933	938	31	31	JCL	318'S TO SEOS	YES
703	142 / 208	09/12/92	1419	1424	34	34	JCL	--	YES
704	143 / 144	08/27/92	1003	1008	33	32	JCL	NEOS TO 22'S	NO

APPENDIX L
POND 93
PRESSURE TEST SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	END TIME	PRESSURE (psi) START	PRESSURE (psi) END	QA MONITOR	LOCATION	COMPLETI NO / YES
705	143 / 144	08/27/92	956	1001	30	28	JCL	300'S TO 22'S	NO
706	143 / 144	08/27/92	1022	1027	29	29	JCL	300'S TO SEOS	YES
707	143 / 209	09/12/92	1501	1506	30	28	JCL	10'EWEOS TO WEOS	NO
708	143 / 209	09/12/92	1500	1505	30	29	JCL	10'EWEOS TO 6'W	NO
709	143 / 209	09/12/92	1508	1513	30	28	JCL	6'WEEOS TO EEOS	YES
710	144 / 145	08/27/92	1050	1055	30	30	JCL	350'S TO SEOS	YES
711	144 / 145	08/27/92	1040	1045	30	30	JCL	350'S TO NEOS	NO
712	144 / 210	09/12/92	1529	1534	30	30	JCL	--	YES
713	145 / 77C	09/12/92	1638	1643	30	29	JCL	--	YES
714	145 / 146	08/27/92	1126	1131	31	28	JCL	30'S TO NEOS	NO
715	145 / 146	08/27/92	--	--	--	--	JCL	406'S TO 415'S	NO
716	145 / 146	08/27/92	1336	1341	28	28	JCL	612'S TO SEOS	YES
717	145 / 146	08/27/92	1321	1326	31	29	JCL	437'S TO 529'S	NO
718	145 / 146	08/27/92	1123	1128	32	31	JCL	42'S TO 30'S	NO
719	145 / 146	08/27/92	1305	1310	30	29	JCL	300'S TO 406'S	NO
720	145 / 146	08/27/92	1100	1105	32	32	JCL	300'S TO 278'S	NO
721	145 / 146	08/27/92	1328	1333	33	31	JCL	529'S TO 612'S	NO
722	145 / 146	08/27/92	1316	1321	31	30	JCL	415'S TO 437'S	NO
723	145 / 146	08/27/92	1114	1119	32	29	JCL	278'S TO 42'S	NO
724	145 / 211	09/12/92	1620	1625	30	29	JCL	--	YES
725	146 / 147	08/27/92	1345	1350	33	30	JCL	522'S TO SEOS	NO
726	146 / 147	08/27/92	1256	1301	33	33	JCL	30'S TO NEOS	NO
727	146 / 147	08/27/92	1353	1358	30	29	JCL	522'S TO 350'S	NO
728	146 / 147	08/27/92	1400	1405	30	28	JCL	350'S TO 30'S	YES
729	146 / 212	09/12/92	1718	1723	32	31	JCL	--	YES
730	146 / 213	09/14/92	824	829	32	29	JCL	--	YES
731	147 / 148	08/27/92	1407	1412	30	27	JCL	350'S TO 35'S	NO
732	147 / 148	08/27/92	1418	1423	32	30	JCL	350'S TO SEOS	YES
733	147 / 148	08/27/92	--	--	--	--	JCL	NEOS TO 35'S	NO
734	147 / 213	09/14/92	825	830	32	30	JCL	--	YES
735	148 / 149	08/27/92	1524	1529	34	32	JCL	340'S TO 506'S	NO
736	148 / 149	08/27/92	1536	1541	33	32	JCL	510'S TO 592'S	NO
737	148 / 149	08/27/92	--	--	--	--	JCL	506'S TO 510'S	NO
738	148 / 149	08/27/92	1457	1502	30	27	JCL	42'S TO 196'S	NO
739	148 / 149	08/27/92	--	--	--	--	JCL	232'S TO 248'S	NO
740	148 / 149	08/27/92	--	--	--	--	JCL	196'S TO 203'S	NO
741	148 / 149	08/27/92	1521	1526	32	30	JCL	340'S TO 300'S	NO
742	148 / 149	08/27/92	--	--	--	--	JCL	35'S TO 42'S	NO
743	148 / 149	08/27/92	1503	1508	30	28	JCL	203'S TO 232'S	NO
744	148 / 149	08/27/92	1450	1455	32	32	JCL	NEOS TO 35'S	NO
745	148 / 149	08/27/92	1541	1546	34	32	JCL	592'S TO SEOS	YES
746	148 / 149	08/27/92	1514	1519	33	31	JCL	248'S TO 300'S	NO
747	148 / 213	09/14/92	833	838	30	30	JCL	--	YES
748	148 / 214	09/14/92	835	840	32	32	JCL	--	YES

APPENDIX L
POND 93
PRESSURE TEST SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	END TIME	PRESSURE (psi) START	PRESSURE (psi) END	QA MONITOR	LOCATION	COMPLETE NO / YES
749	148 / 215	09/15/92	1350	1355	30	28	JCL	--	YES
750	149 / 56E	08/28/92	835	840	32	29	JCL	--	YES
751	149 / 81D	09/15/92	1355	1400	32	32	JCL	--	YES
752	149 / 150	08/28/92	821	826	31	31	JCL	140'S TO 154'S	NO
753	149 / 150	08/28/92	820	825	30	30	JCL	140'S TO 121'S	NO
754	149 / 150	08/27/92	1705	1710	32	30	JCL	88'S TO 81'S	NO
755	149 / 150	08/27/92	1640	1645	30	29	JCL	55'S TO NEOS	NO
756	149 / 150	08/27/92	--	--	--	--	JCL	55'S TO 58'S	NO
757	149 / 150	08/28/92	959	1004	34	31	MH	58'S TO 81'S	YES
758	149 / 150	08/27/92	1654	1659	33	31	JCL	121'S TO 88'S	NO
759	149 / 151	08/28/92	--	--	--	--	JCL	350'S TO 356'S	YES
760	149 / 151	08/28/92	852	857	33	32	JCL	468'S TO 356'S	NO
761	149 / 151	08/27/92	1547	1552	34	32	JCL	350'S TO 337'S	NO
762	149 / 151	08/28/92	907	912	32	30	JCL	600'S TO SEOS	NO
763	149 / 151	08/28/92	906	911	32	31	JCL	531'S TO 600'S	NO
764	149 / 151	08/27/92	1604	1609	32	32	JCL	248'S TO NEOS	NO
765	149 / 151	08/28/92	853	858	32	30	JCL	468'S TO 482'S	NO
766	149 / 151	08/28/92	905	910	32	32	JCL	531'S TO 482'S	NO
767	149 / 151	08/27/92	1555	1600	32	31	JCL	337'S TO 248'S	NO
768	150 / 56E	08/28/92	836	841	30	28	JCL	--	YES
769	150 / 81H	09/15/92	1404	1409	32	32	JCL	--	YES
770	150 / 152	08/28/92	940	945	30	30	MH	SEOS TO 20'S	NO
771	150 / 152	08/28/92	945	950	31	31	MH	NEOS TO 20'S	YES
772	151 / 152	08/28/92	916	921	30	29	MH	550'S TO 350'S	NO
773	151 / 152	08/28/92	915	920	30	29	MH	550'N TO SEOS	YES
774	151 / 152	08/28/92	955	1000	31	30	MH	160'S TO 350'S	NO
775	151 / 216	09/15/92	1412	1417	33	31	JCL	--	YES
776	152 / 153	08/28/92	1012	1017	32	30	MH	330'S TO NEOS	YES
777	152 / 153	08/28/92	1011	1016	29	28	MH	335'S TO SEOS	NO
778	152 / 217	09/15/92	1414	1419	30	28	JCL	--	YES
779	153 / 154	08/28/92	1106	1111	30	29	JCL	350'S TO SEOS	NO
780	153 / 154	08/28/92	--	--	--	--	JCL	46'S TO 37'S	NO
781	153 / 154	08/28/92	1053	1058	32	31	JCL	307'S TO 350'S	NO
782	153 / 154	08/28/92	1054	1059	30	27	JCL	307'S TO 46'S	NO
783	153 / 154	08/28/92	1031	1036	30	28	MH	37'N TO NEOS	YES
784	153 / 218	09/15/92	1642	1647	32	30	JCL	--	YES
785	154 / 155	08/31/92	816	821	32	29	MH	576'S TO 450'S	NO
786	154 / 155	08/31/92	817	822	32	30	MH	583'S TO SEOS	YES
787	154 / 155	08/28/92	1254	1259	32	30	JCL	319'S TO 30'S	NO
788	154 / 155	08/28/92	1130	1135	30	28	JCL	319'S TO 450'S	NO
789	154 / 155	08/28/92	1308	1313	29	28	JCL	30'S TO NEOS	NO
790	154 / 155	08/31/92	--	--	--	--	MH	576'N TO 583'N	NO
791	154 / 219	09/15/92	1643	1648	30	28	JCL	--	YES
792	154 / 220	09/15/92	1650	1655	30	30	JCL	--	YES

APPENDIX L
POND 93
PRESSURE TEST SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	END TIME	PRESSURE (psi) START	PRESSURE (psi) END	QA MONITOR	LOCATION	COMPLETE NO / YES
793	155 / 156	08/28/92	1256	1301	31	29	JCL	350'S TO NEOS	NO
794	155 / 156	08/31/92	--	--	--	--	MH	490'N TO 500'N	NO
795	155 / 156	08/31/92	813	818	32	31	MH	490'N TO 350'N	NO
796	155 / 156	08/31/92	815	820	32	29	MH	535'S TO 500'S	NO
797	155 / 156	08/31/92	834	839	34	32	MH	SEOS TO 540'S	YES
798	155 / 156	08/31/92	--	--	--	--	MH	535'N TO 540'N	NO
799	155 / 220	09/15/92	1649	1654	30	28	JCL	--	YES
800	156 / 82D	09/15/92	1705	1710	29	29	JCL	--	YES
801	156 / 157	08/28/92	1414	1419	34	31	JCL	593'S TO 555'S	NO
802	156 / 157	08/28/92	1345	1350	30	28	JCL	425'S TO NEOS	NO
803	156 / 157	08/28/92	1400	1405	34	31	JCL	515'S TO 507'S	NO
804	156 / 157	08/28/92	1418	1423	33	30	JCL	SEOS TO 602'S	YES
805	156 / 157	08/28/92	--	--	--	--	JCL	593'S TO 602'S	NO
806	156 / 157	08/28/92	1358	1403	34	31	JCL	507'S TO 425'S	NO
807	156 / 157	08/28/92	1406	1411	32	29	JCL	555'S TO 515'S	NO
808	156 / 221	09/15/92	1706	1711	30	30	JCL	--	YES
809	157 / 164	09/02/92	748	753	31	30	MH	40'S TO NEOS	NO
810	157 / 164	09/02/92	756	801	32	30	MH	218'S TO 40'S	NO
811	157 / 164	09/02/92	--	--	--	--	MH	325'S TO 361'S	NO
812	157 / 164	09/03/92	--	--	--	--	MH	SEOS TO 571'S	YES
813	157 / 164	09/02/92	--	--	--	--	MH	520'S TO 465'S	NO
814	157 / 164	09/02/92	--	--	--	--	MH	465'S TO 361'S	NO
815	157 / 164	09/02/92	825	830	34	33	MH	566'S TO 520'S	NO
816	157 / 164	09/02/92	--	--	--	--	MH	571'S TO 566'S	NO
817	157 / 164	09/02/92	805	810	33	31	MH	325'S TO 218'S	NO
818	157 / 222	09/15/92	1718	1723	30	27	JCL	--	YES
819	158 / 159	08/28/92	1700	1705	32	30	JCL	NEOS TO 70'N	NO
820	158 / 159	08/28/92	1702	1707	30	29	JCL	70'N TO 66'N	NO
821	158 / 159	08/28/92	1705	1710	34	32	JCL	66'N TO SEOS	YES
822	158 / 160	08/28/92	1532	1537	31	30	JCL	--	YES
823	159 / 160	08/28/92	1531	1536	34	32	JCL	--	YES
824	159 / 161	08/31/92	917	922	32	31	MH	--	YES
825	160 / 161	08/31/92	905	910	30	29	MH	--	YES
826	161 / 162	08/31/92	932	937	31	30	MH	119'N TO 156'N	NO
827	161 / 162	08/31/92	925	930	30	30	MH	119'N TO SEOS	NO
828	161 / 162	08/31/92	945	950	30	29	MH	156'N TO NEOS	YES
829	161 / 163	08/31/92	953	958	30	28	MH	--	YES
830	162 / 163	09/04/92	1322	1327	36	34	MH	--	YES
831	162 / 184	09/04/92	--	--	--	--	MH	60'N TO 86'N	NO
832	162 / 184	09/04/92	1309	1314	33	33	MH	135'N TO 86'N	NO
833	162 / 184	09/04/92	1302	1307	31	29	MH	60'N TO SEOS	NO
834	162 / 184	09/04/92	1311	1316	34	31	MH	135'N TO 153'N	NO
835	162 / 184	09/04/92	1330	1335	32	29	MH	153'N TO NEOS	YES
836	163 / 184	09/04/92	1337	1342	30	29	MH	--	YES

APPENDIX L
POND 93
PRESSURE TEST SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	END TIME	PRESSURE (psi) START	PRESSURE (psi) END	QA MONITOR	LOCATION	COMPLETE NO / YES
837	164 / 165	09/02/92	--	--	--	--	MH	NEOS TO 150'S	YES
838	164 / 165	09/02/92	--	--	--	--	MH	305'S TO 580'S	NO
839	164 / 165	09/02/92	852	857	32	31	MH	580'S TO SEOS	NO
840	164 / 165	09/02/92	--	--	--	--	MH	150'S TO 305'S	NO
841	164 / 223	09/15/92	1620	1625	30	27	JCL	--	YES
842	165 / 166	09/03/92	1400	1405	32	30	MH	200'S TO 210'S	NO
843	165 / 166	09/03/92	1334	1339	29	29	MH	532'S TO NEOS	NO
844	165 / 166	09/03/92	--	--	--	--	MH	237'S TO 235'S	NO
845	165 / 166	09/03/92	1435	1440	30	29	MH	122'S TO 175'S	YES
846	165 / 166	09/03/92	1349	1354	29	28	MH	237'S TO 410'S	NO
847	165 / 166	09/03/92	1348	1353	31	29	MH	235'S TO 224'S	NO
848	165 / 166	09/03/92	--	--	--	--	MH	200'S TO 190'S	NO
849	165 / 166	09/03/92	1341	1346	28	28	MH	532'S TO 410'S	NO
850	165 / 166	09/03/92	--	--	--	--	MH	224'S TO 210'S	NO
851	165 / 166	09/03/92	1309	1314	33	30	MH	45'S TO 27'S	NO
852	165 / 166	09/03/92	1419	1424	32	30	MH	27'S TO NEOS	NO
853	165 / 166	09/03/92	1413	1418	30	29	MH	45'S TO 122'S	NO
854	165 / 166	09/03/92	1400	1405	34	32	MH	190'S TO 175'S	NO
855	165 / 224	09/15/92	1723	1728	32	29	JCL	10'E TO EEOS	YES
856	165 / 224	09/15/92	1618	1623	28	25	JCL	WEOS TO 10'E	NO
857	166 / 167	09/03/92	1305	1310	30	30	MH	480'S TO 548'S	NO
858	166 / 167	09/03/92	1524	1529	28	28	MH	597'S TO 607'S	NO
859	166 / 167	09/03/92	1526	1531	32	29	MH	607'S TO SEOS	YES
860	166 / 167	09/03/92	1457	1502	29	28	MH	475'S TO 450'S	NO
861	166 / 167	09/03/92	1512	1517	32	31	MH	548'S TO 557'S	NO
862	166 / 167	09/03/92	1515	1520	32	32	MH	557'S TO 597'S	NO
863	166 / 167	09/03/92	--	--	--	--	MH	475'S TO 480'S	NO
864	166 / 167	09/03/92	1428	1433	30	29	MH	NEOS TO 40'S	NO
865	166 / 167	09/03/92	1442	1447	31	30	MH	300'S TO 40'S	NO
866	166 / 167	09/03/92	1449	1454	30	29	MH	300'S TO 450'S	NO
867	166 / 232	09/16/92	1500	1505	30	29	JCL	16'E TO WEOS	NO
868	166 / 232	09/16/92	1458	1503	30	28	JCL	EEOS TO 16'W	YES
869	167 / 168	09/03/92	1532	1537	34	31	MH	200'S TO 400'S	NO
870	167 / 168	09/03/92	1535	1540	31	31	MH	445'S TO 400'S	NO
871	167 / 168	09/03/92	1600	1605	34	32	MH	200'S TO 22'S	NO
872	167 / 168	09/03/92	1607	1612	32	30	MH	22'S TO NEOS	YES
873	167 / 168	09/03/92	1540	1545	32	31	MH	445'S TO SEOS	NO
874	167 / 232	09/16/92	1507	1512	36	34	JCL	--	YES
875	167 / 233	09/16/92	1511	1516	32	29	JCL	--	YES
876	168 / 183	09/04/92	925	930	29	28	MH	200'N TO NEOS	YES
877	168 / 183	09/04/92	925	930	31	31	MH	200'N TO SEOS	NO
878	168 / 225	09/16/92	745	750	30	29	JCL	--	YES
879	168 / 226	09/16/92	746	751	30	28	JCL	--	YES
880	168 / 227	09/16/92	810	815	33	32	JCL	--	YES

APPENDIX L
POND 93
PRESSURE TEST SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	END TIME	PRESSURE (psi) START	PRESSURE (psi) END	QA MONITOR	LOCATION	COMPLETE NO / YES
881	168 / 228	09/16/92	926	931	32	29	JCL	--	YES
882	168 / 229	09/16/92	825	830	36	33	JCL	--	YES
883	168 / 230	09/16/92	829	834	36	35	JCL	--	YES
884	168 / 231	09/16/92	831	836	34	31	JCL	--	YES
885	168 / 242	09/16/92	1748	1753	32	31	JCL	--	YES
886	169 / 170	09/03/92	1626	1631	29	28	MH	--	YES
887	169 / 171	09/03/92	1635	1640	31	30	MH	--	YES
888	169 / 183	09/04/92	955	1000	31	31	MH	--	YES
889	170 / 172	09/03/92	1623	1628	29	28	MH	--	YES
890	171 / 172	09/03/92	1625	1630	29	28	MH	--	YES
891	171 / 173	09/03/92	1637	1642	31	30	MH	--	YES
892	173 / 174	09/03/92	1642	1647	29	29	MH	WEOS TO 10'WEEOS	NO
893	173 / 174	09/03/92	1646	1651	30	29	MH	10'WEEOS TO EEOS	YES
894	173 / 183	09/04/92	1031	1036	31	30	MH	INCLUDES 171/183	YES
895	174 / 175	09/03/92	1642	1647	29	29	MH	--	YES
896	174 / 183	09/04/92	1026	1031	29	28	MH	--	YES
897	175 / 176	09/03/92	1645	1650	34	33	MH	--	YES
898	175 / 183	09/04/92	915	920	30	28	MH	INCLUDES 176/183	YES
899	176 / 177	09/03/92	1652	1657	30	29	MH	--	YES
900	177 / 178	09/03/92	1653	1658	30	29	MH	--	YES
901	177 / 183	09/04/92	1058	1103	30	29	MH	--	YES
902	178 / 179	09/03/92	1700	1705	30	29	MH	35'E TO EEOS	YES
903	178 / 179	09/03/92	1654	1659	30	29	MH	WEOS TO 35'E	NO
904	178 / 183	09/04/92	1100	1105	32	31	MH	--	YES
905	179 / 180	09/04/92	830	835	32	30	MH	--	YES
906	179 / 183	09/04/92	1117	1122	32	31	MH	SEOS TO 300'S	YES
907	179 / 183	09/04/92	1048	1053	32	31	MH	300'S TO NEOS	NO
908	180 / 181	09/04/92	832	837	34	32	MH	10'E TO WEOS	YES
909	180 / 181	09/04/92	831	836	36	34	MH	EEOS TO 10'E	NO
910	180 / 183	09/04/92	1123	1128	30	30	MH	--	YES
911	181 / 182	09/04/92	842	847	34	34	MH	--	YES
912	181 / 183	09/04/92	1128	1133	32	31	MH	--	YES
913	182 / 183	09/04/92	1136	1141	30	29	MH	--	YES
914	182 / 225	09/16/92	939	944	31	29	JCL	WEOS TO 47'W	NO
915	182 / 225	09/16/92	945	950	30	30	JCL	33'W TO EEOS	YES
916	182 / 225	09/16/92	940	945	32	32	JCL	47'W TO 33'W	NO
917	183 / 225	09/16/92	936	941	31	29	JCL	--	YES
918	184 / 185	09/04/92	1456	1501	30	29	MH	--	YES
919	185 / 65R	09/04/92	--	--	--	--	MH	--	YES
920	185 / 186	09/04/92	1519	1524	32	31	MH	275'N TO 55'N	NO
921	185 / 186	09/04/92	1520	1525	34	32	MH	275'N TO NEOS	YES
922	185 / 186	09/04/92	1433	1438	34	31	MH	SEOS TO 55'N	NO
923	186 / 68F	09/11/92	1038	1043	30	30	JCL	EEOS TO 11'WEEOS	YES
924	186 / 68F	09/11/92	1036	1041	31	28	JCL	11'WEEOS TO WEOS	NO

APPENDIX L
POND 93
PRESSURE TEST SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	END TIME	PRESSURE (psi) START	PRESSURE (psi) END	QA MONITOR	LOCATION	COMPLETI NO / YES
925	186 / 187	09/12/92	--	--	--	--	JCL	240'N TO NEOS	NO
926	186 / 187	09/12/92	746	751	32	29	JCL	240'N TO 57'N	NO
927	186 / 187	09/04/92	1604	1609	29	29	MH	57'N TO 43'N	NO
928	186 / 187	09/12/92	803	808	31	30	JCL	5'N TO 43'N	NO
929	187 / 68M	09/11/92	1138	1143	32	29	JCL	--	YES
930	187 / 68R	09/11/92	1050	1055	31	30	JCL	--	YES
931	187 / 188	09/11/92	1121	1126	31	30	JCL	290'N TO 270'N	NO
932	187 / 188	09/11/92	1015	1020	30	28	JCL	175'N TO 206'N	NO
933	187 / 188	09/11/92	--	--	--	--	JCL	38'N TO 42'N	NO
934	187 / 188	09/11/92	1105	1110	31	30	JCL	NEOS TO 290'N	NO
935	187 / 188	09/11/92	1025	1030	33	32	JCL	206'N TO 227'N	NO
936	187 / 188	09/11/92	1125	1130	32	31	JCL	125'N TO 100'N	NO
937	187 / 188	09/11/92	1010	1015	36	34	JCL	125'N TO 175'N	NO
938	187 / 188	09/11/92	1127	1132	34	31	JCL	100'N TO 90'N	NO
939	187 / 188	09/11/92	--	--	--	--	JCL	227'N TO 232'N	NO
940	187 / 188	09/11/92	1026	1031	32	30	JCL	232'N TO 255'N	NO
941	187 / 188	09/11/92	1140	1145	30	30	JCL	50'N TO 42'N	NO
942	187 / 188	09/11/92	1251	1256	32	31	JCL	SEOS TO 38N	YES
943	187 / 188	09/11/92	--	--	--	--	JCL	255'N TO 270'N	NO
944	188 / 68M	09/11/92	1136	1141	34	34	JCL	8'SNEOS TO SEOS	YES
945	188 / 68M	09/11/92	1131	1136	32	31	JCL	NEOS TO 8'SNEOS	NO
946	188 / 189	09/11/92	1301	1306	30	30	JCL	83'N TO SEOS	NO
947	188 / 189	09/11/92	1302	1307	30	28	JCL	83'N TO NEOS	YES
948	189 / 71I	09/11/92	1625	1630	30	29	JCL	--	YES
949	189 / 190	09/11/92	--	--	--	--	JCL	50'N TO 55'N	YES
950	189 / 190	09/11/92	--	--	--	--	JCL	69'N TO NEOS	NO
951	189 / 190	09/11/92	1315	1320	29	26	JCL	55'N TO 69'N	NO
952	189 / 190	09/11/92	1330	1335	33	33	JCL	50'N TO SEOS	NO
953	190 / 191	09/11/92	1416	1421	30	27	JCL	49'N TO 20'N	NO
954	190 / 191	09/11/92	1350	1355	29	28	JCL	253'N TO 52'N	NO
955	190 / 191	09/11/92	--	--	--	--	JCL	49'N TO 52'N	NO
956	190 / 191	09/11/92	--	--	--	--	JCL	SEOS TO 7'N	YES
957	190 / 191	09/11/92	1427	1432	32	29	JCL	7'N TO 20'N	NO
958	190 / 191	09/11/92	1356	1401	31	30	JCL	253'N TO NEOS	NO
959	191 / 192	09/11/92	1432	1437	32	30	JCL	70'N TO SEOS	NO
960	191 / 192	09/11/92	1444	1449	31	30	JCL	285'N TO NEOS	YES
961	191 / 192	09/11/92	1433	1438	32	30	JCL	70'N TO 285'N	NO
962	192 / 193	09/11/92	1509	1514	34	33	JCL	258'N TO NEOS	YES
963	192 / 193	09/11/92	1506	1511	33	30	JCL	54'N TO SEOS	NO
964	192 / 193	09/11/92	1455	1500	34	31	JCL	150'N TO 54'N	NO
965	192 / 193	09/11/92	1504	1509	31	30	JCL	150'N TO 258'N	NO
966	193 / 73E	09/11/92	1653	1658	34	32	JCL	--	YES
967	193 / 194	09/11/92	1542	1547	34	33	JCL	93'N TO 54'N	NO
968	193 / 194	09/11/92	1546	1551	31	29	JCL	54'N TO 15'N	NO

APPENDIX L
POND 93
PRESSURE TEST SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	END TIME	PRESSURE (psi) START	PRESSURE (psi) END	QA MONITOR	LOCATION	COMPLETE NO / YES
969	193 / 194	09/11/92	1513	1518	31	30	JCL	NEOS TO 93'N	NO
970	193 / 194	09/11/92	--	--	--	--	JCL	SEOS TO 15'N	YES
971	194 / 195	09/11/92	1555	1600	30	30	JCL	--	YES
972	195 / 196	09/11/92	1600	1705	32	32	JCL	216'N TO SEOS	NO
973	195 / 196	09/11/92	1602	1607	33	32	JCL	216'N TO NEOS	YES
974	195 / 197	09/11/92	1606	1611	32	29	JCL	--	YES
975	196 / 197	09/11/92	1608	1613	32	31	JCL	--	YES
976	196 / 198	09/11/92	1740	1745	31	30	JCL	37'N TO 16'N	NO
977	196 / 198	09/11/92	1730	1735	29	27	JCL	NEOS TO 64'N	NO
978	196 / 198	09/11/92	1742	1747	32	30	JCL	SEOS TO 16'N	YES
979	196 / 198	09/11/92	--	--	--	--	JCL	56'N TO 64'N	NO
980	196 / 198	09/11/92	1735	1740	31	29	JCL	56'N TO 37'N	NO
981	197 / 198	09/11/92	1615	1620	32	30	JCL	--	YES
982	198 / 72E	09/12/92	813	818	30	28	JCL	--	YES
983	198 / 199	09/11/92	--	--	--	--	JCL	SEOS TO 12'N	YES
984	198 / 199	09/11/92	1750	1755	30	30	JCL	12'N TO NEOS	NO
985	199 / 73S	09/11/92	1831	1836	35	34	JCL	--	YES
986	199 / 200	09/11/92	1828	1833	32	31	JCL	57'N TO NEOS	NO
987	199 / 200	09/11/92	1755	1800	32	30	JCL	57'N TO 10'N	NO
988	199 / 200	09/11/92	--	--	--	--	JCL	SEOS TO 10'N	YES
989	200 / 201	09/12/92	839	844	31	30	JCL	35'N TO 25'N	NO
990	200 / 201	09/12/92	845	850	34	31	JCL	NEOS TO 35'N	YES
991	200 / 201	09/12/92	826	831	31	29	JCL	SEOS TO 25'N	NO
992	201 / 74A	09/12/92	935	940	32	32	JCL	--	YES
993	201 / 202	09/14/92	--	--	--	--	JCL	268'N TO NEOS	NO
994	201 / 202	09/14/92	--	--	--	--	JCL	234'N TO 152'N	YES
995	201 / 202	09/14/92	816	821	34	34	JCL	152'N TO 87'N	NO
996	201 / 202	09/14/92	--	--	--	--	JCL	234'N TO 242'N	NO
997	201 / 202	09/14/92	--	--	--	--	JCL	242'N TO 268'N	NO
998	201 / 202	09/14/92	--	--	--	--	JCL	SEOS T0 87'N	NO
999	202 / 203	09/12/92	1005	1010	32	30	JCL	245'N TO SEOS	YES
1000	202 / 203	09/12/92	1004	1009	32	31	JCL	245'N TO NEOS	NO
1001	203 / 204	09/14/92	1031	1036	32	32	JCL	200'N TO 156'N	NO
1002	203 / 204	09/12/92	1130	1135	32	32	JCL	242'N TO 200'N	NO
1003	203 / 204	09/12/92	1043	1048	30	28	JCL	SEOS TO 140'N	NO
1004	203 / 204	09/14/92	1033	--	--	--	JCL	140'N TO 156'N	YES
1005	203 / 204	09/12/92	1126	1131	32	31	JCL	NEOS TO 242'N	NO
1006	204 / 205	09/12/92	1023	1028	32	29	JCL	--	YES
1007	205 / 206	09/12/92	1056	1101	33	30	JCL	4'N TO NEOS	NO
1008	205 / 206	09/12/92	--	--	--	--	JCL	SEOS TO 4'N	YES
1009	206 / 207	09/12/92	1310	1315	30	28	JCL	--	YES
1010	207 / 208	09/12/92	1339	1344	30	28	JCL	NEOS TO 25'N	YES
1011	207 / 208	09/12/92	1105	1110	29	29	JCL	SEOS TO 25'N	NO
1012	208 / 209	09/12/92	1322	1327	32	29	JCL	236'N TO NEOS	NO

APPENDIX L
POND 93
PRESSURE TEST SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	END TIME	PRESSURE (psi) START	PRESSURE (psi) END	QA MONITOR	LOCATION	COMPLET NO / YES
1013	208 / 209	09/14/92	1010	1015	36	34	JCL	227'N TO 96'N	NO
1014	208 / 209	09/14/92	1015	1020	34	32	JCL	53'N TO 96'N	NO
1015	208 / 209	09/14/92	1012	--	--	--	JCL	SEOS T0 53'N	YES
1016	208 / 209	09/14/92	956	1001	34	34	JCL	227'N TO 236'N	NO
1017	209 / 210	09/12/92	--	--	--	--	JCL	204'N TO 209'N	YES
1018	209 / 210	09/12/92	1438	1443	34	32	JCL	61'N TO SEOS	NO
1019	209 / 210	09/12/92	1456	1501	32	29	JCL	209'N TO NEOS	NO
1020	209 / 210	09/12/92	1455	1500	32	30	JCL	204'N TO 61'N	NO
1021	210 / 77C	09/12/92	1638	1643	32	30	JCL	--	YES
1022	210 / 211	09/12/92	1517	1522	32	31	JCL	--	YES
1023	211 / 212	09/12/92	--	--	--	--	JCL	65'N TO 69'N	NO
1024	211 / 212	09/12/92	1540	1545	32	30	JCL	SEOS TO 57'N	YES
1025	211 / 212	09/12/92	1610	1615	32	30	JCL	NEOS TO 69'N	NO
1026	211 / 212	09/12/92	1604	1609	32	30	JCL	65'N TO 57'N	NO
1027	212 / 213	09/12/92	--	--	--	--	JCL	4'S TO NEOS	NO
1028	212 / 213	09/14/92	--	--	--	--	JCL	78'N TO 84'N	NO
1029	212 / 213	09/14/92	930	935	30	30	JCL	62'N TO 78'N	NO
1030	212 / 213	09/14/92	--	--	--	--	JCL	SEOS TO 62'N	YES
1031	212 / 213	09/12/92	1727	1732	30	27	JCL	4'SNEOS TO 84'N	NO
1032	213 / 214	09/14/92	--	--	--	--	JCL	SEOS TO 5'NSEOS	NO
1033	213 / 214	09/14/92	857	902	32	31	JCL	NEOS TO 5'NSEOS	YES
1034	214 / 215	09/14/92	913	918	32	30	JCL	58'N TO 5'N	NO
1035	214 / 215	09/14/92	923	928	32	30	JCL	58'N TO 66'N	NO
1036	214 / 215	09/14/92	922	927	31	29	JCL	66'N TO 110'N	NO
1037	214 / 215	09/15/92	810	815	33	32	JCL	150'N TO 110'N	NO
1038	214 / 215	09/14/92	--	--	--	--	JCL	150'N TO NEOS	YES
1039	214 / 215	09/14/92	--	--	--	--	JCL	SEOS TO 5'NSEOS	NO
1040	215 / 81D	09/15/92	1350	1355	35	32	JCL	15'WEEOS TO EEOS	YES
1041	215 / 81D	09/15/92	1357	1402	28	25	JCL	WEOS TO 15'WEEOS	NO
1042	215 / 81H	09/15/92	1405	1410	34	33	JCL	--	YES
1043	215 / 216	09/15/92	1045	1050	30	28	JCL	180'N TO 136'N	NO
1044	215 / 216	09/15/92	1000	1005	30	27	JCL	89'N TO 70'N	NO
1045	215 / 216	09/15/92	--	--	--	--	JCL	180'N TO 215'N	NO
1046	215 / 216	09/15/92	--	--	--	--	JCL	132'N TO 136'N	NO
1047	215 / 216	09/15/92	--	--	--	--	JCL	89'N TO 98'N	NO
1048	215 / 216	09/15/92	947	952	30	28	JCL	57'N TO SEOS	NO
1049	215 / 216	09/15/92	1007	1012	30	28	JCL	132'N TO 98'N	NO
1050	215 / 216	09/15/92	1054	1059	30	30	JCL	215'N TO NEOS	YES
1051	215 / 216	09/15/92	950	955	30	30	JCL	57'N TO 70'N	NO
1052	216 / 217	09/15/92	1016	1021	30	30	JCL	235'N TO 78'N	NO
1053	216 / 217	09/15/92	1018	1023	28	28	JCL	235'N TO NEOS	NO
1054	216 / 217	09/15/92	1031	1036	30	30	JCL	78'N TO SEOS	YES
1055	217 / 218	09/15/92	1111	1116	30	27	JCL	218'N TO 232'N	NO
1056	217 / 218	09/15/92	1103	1108	28	26	JCL	218'N TO SEOS	NO

APPENDIX L
POND 93
PRESSURE TEST SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	END TIME	PRESSURE (psi) START	PRESSURE (psi) END	QA MONITOR	LOCATION	COMPLETE NO / YES
1057	217 / 218	09/15/92	1113	1118	32	31	JCL	232'N TO NEOS	YES
1058	218 / 219	09/15/92	1328	1333	30	28	JCL	237'N TO NEOS	YES
1059	218 / 219	09/15/92	1322	1327	29	27	JCL	237'N TO 100'N	NO
1060	218 / 219	09/15/92	1135	1140	30	28	JCL	SEOS TO 100'N	NO
1061	219 / 220	09/15/92	1341	1346	30	30	JCL	--	YES
1062	220 / 82D	09/15/92	1710	1715	34	32	JCL	--	YES
1063	220 / 221	09/15/92	1456	1501	32	29	JCL	52'N TO SEOS	NO
1064	220 / 221	09/15/92	--	--	--	--	JCL	60'N TO 67'N	NO
1065	220 / 221	09/15/92	1421	1426	30	30	JCL	236'N TO 242'N	NO
1066	220 / 221	09/15/92	1500	1505	30	30	JCL	67'N TO 74'N	NO
1067	220 / 221	09/15/92	1455	1500	30	28	JCL	60'N TO 52'N	NO
1068	220 / 221	09/15/92	1423	1428	31	28	JCL	242'N TO NEOS	NO
1069	220 / 221	09/15/92	1503	1508	30	28	JCL	74'N TO 236'N	YES
1070	221 / 222	09/15/92	1523	1528	30	28	JCL	173'N TO 62'N	NO
1071	221 / 222	09/15/92	1510	1515	30	28	JCL	62'N TO SEOS	NO
1072	221 / 222	09/15/92	1522	1527	32	29	JCL	173'N TO NEOS	YES
1073	222 / 223	09/15/92	1532	1537	32	29	JCL	--	YES
1074	223 / 224	09/15/92	1612	1617	30	29	JCL	NEOS TO 123'N	YES
1075	223 / 224	09/15/92	1555	1600	33	30	JCL	77'N TO 67'N	NO
1076	223 / 224	09/15/92	1553	1558	33	30	JCL	56'N TO SEOS	NO
1077	223 / 224	09/15/92	1551	1556	29	26	JCL	67'N TO 56'N	NO
1078	223 / 224	09/15/92	1606	1611	28	27	JCL	123'N TO 77'N	NO
1079	224 / 232	09/16/92	1255	1300	32	30	JCL	57'N TO SEOS	NO
1080	224 / 232	09/16/92	1300	1305	30	28	JCL	57'N TO NEOS	YES
1081	225 / 226	09/15/92	1750	1755	30	30	JCL	--	YES
1082	226 / 227	09/15/92	1752	1757	32	30	JCL	--	YES
1083	227 / 228	09/15/92	--	--	--	--	JCL	43'W TO WEOS	YES
1084	227 / 228	09/15/92	1800	1805	34	31	JCL	43'W TO EEOS	NO
1085	228 / 229	09/16/92	822	827	36	33	JCL	WEOS TO 54'W	YES
1086	228 / 229	09/16/92	820	825	34	31	JCL	54'W TO EEOS	NO
1087	229 / 230	09/15/92	1807	1812	30	29	JCL	--	YES
1088	230 / 231	09/16/92	840	845	30	28	JCL	EEOS TO 11'W	YES
1089	230 / 231	09/16/92	842	847	32	29	JCL	11'W TO 24'W	NO
1090	230 / 231	09/16/92	833	838	34	31	JCL	WEOS TO 24'W	NO
1091	231 / 244	09/16/92	1731	1736	30	28	JCL	48'W TO EEOS	NO
1092	231 / 244	09/16/92	1753	1758	30	29	JCL	WEOS TO 48'W	YES
1093	232 / 233	09/16/92	1335	1340	30	28	JCL	55'N TO SEOS	NO
1094	232 / 233	09/16/92	1340	1345	34	31	JCL	77'N TO 55'N	NO
1095	232 / 233	09/16/92	1357	1402	32	30	JCL	NEOS TO 77'N	YES
1096	233 / 242	09/16/92	1656	1701	30	27	JCL	154'N TO 40'N	NO
1097	233 / 242	09/16/92	1610	1615	32	30	JCL	172'N TO NEOS	NO
1098	233 / 242	09/16/92	1714	1719	32	29	JCL	SEOS TO 40'N	YES
1099	233 / 242	09/16/92	1703	1708	33	30	JCL	154'N TO 172'N	NO
1100	234 / 235	09/16/92	1422	1427	33	32	JCL	--	YES

APPENDIX L
POND 93
PRESSURE TEST SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	END TIME	PRESSURE (psi) START	PRESSURE (psi) END	QA MONITOR	LOCATION	COMPLETE NO / YES
1101	234 / 242	09/16/92	1607	1612	34	32	JCL	--	YES
1102	234 / 244	09/16/92	1732	1737	32	30	JCL	--	YES
1103	235 / 236	09/16/92	1427	1432	32	30	JCL	WEOS TO 66'W	NO
1104	235 / 236	09/16/92	1429	1434	32	31	JCL	66'W TO EEOS	YES
1105	235 / 242	09/16/92	1606	1611	32	30	JCL	--	YES
1106	236 / 237	09/16/92	1432	1437	35	35	JCL	--	YES
1107	236 / 242	09/16/92	1640	1645	30	29	JCL	--	YES
1108	237 / 238	09/16/92	1439	1444	30	30	JCL	57'W TO EEOS	YES
1109	237 / 238	09/16/92	1438	1443	34	31	JCL	57'W TO WEOS	NO
1110	237 / 242	09/16/92	1641	1646	28	27	JCL	--	YES
1111	238 / 239	09/16/92	1450	1455	28	26	JCL	--	YES
1112	238 / 242	09/16/92	1642	1647	34	32	JCL	--	YES
1113	239 / 240	09/16/92	1536	1541	35	34	JCL	--	YES
1114	239 / 241	09/16/92	1537	1542	34	31	JCL	12'NW TO SEEOS	NO
1115	239 / 241	09/16/92	1539	1544	30	28	JCL	12'SE TO NWEOS	YES
1116	239 / 242	09/16/92	1643	1648	28	26	JCL	--	YES
1117	240 / 243	09/16/92	1927	1932	32	31	JCL	--	YES
1118	241 / 242	09/16/92	1706	1711	32	31	JCL	NEOS TO 60'N	NO
1119	241 / 242	09/16/92	1711	1716	30	28	JCL	SEOS TO 60'N	YES
1120	241 / 243	09/16/92	1617	1622	30	28	JCL	--	YES
1121	242 / 244	09/16/92	1733	1738	30	28	JCL	--	YES

GEOMEMBRANE QUALITY ASSURANCE SERVICES ASH POND 91 AND DRAINS POND COAL CREEK STATION UNDERWOOD, NORTH DAKOTA

Submitted To:

Cooperative Power Association
14615 Lone Oak Road
Eden Prairie, Minnesota 55344-2287



GCS

Golder Construction Services, Inc.

November 1993

937-4207

Golder Construction Services, Inc.
Quality Assurance and Construction Management

GEOMEMBRANE QUALITY ASSURANCE SERVICES ASH POND 91 AND DRAINS POND COAL CREEK STATION UNDERWOOD, NORTH DAKOTA

Submitted to:

Cooperative Power Association
14615 Lone Oak Road
Eden Prairie, Minnesota 55344-2287

JUL 1995
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1 Copy - Cooperative Power Association, Coal Creek Station, North Dakota

November 1993

937-4207

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Golder Construction Services, Inc.
Quality Assurance and Construction Management

November 22, 1993

Our Ref.: 937-4207

Cooperative Power Association
14615 Loan Oak Road
Eden Prairie, Minnesota 55344-2287

Attention: Mr. Andrew W. Stewart P.E.
Manager, Plant Engineering and Construction

RE: GEOMEMBRANE QUALITY ASSURANCE SERVICES, ASH POND 91 AND THE DRAINS POND, COAL CREEK STATION, UNDERWOOD, NORTH DAKOTA

Gentlemen:

Golder Construction Services, Inc. is pleased to present this report summarizing the quality assurance monitoring services performed for the installation of a geomembrane lining system at Ash Pond 91 and the Drains Pond, Coal Creek Station, Underwood, North Dakota. The quality assurance monitoring observations were performed from July 2, 1993 to September 20, 1993 and indicate that the installation of geomembrane liner for this effort is in substantial compliance with the specification guidelines and quality assurance program.

We appreciated the opportunity to work with Cooperative Power Association on this project. Should you have any questions or comments, please contact us.

Sincerely,

GOLDER CONSTRUCTION SERVICES, INC.

Ronald J. Uhle, P.E.
Senior Engineer

David L. O'Sadnick, P.E.
Associate

DLO/RJU/sjm

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1.0 INTRODUCTION

Golder Construction Services, Inc. (GCS) under contract to Cooperative Power Association (CPA) has performed quality assurance (QA) observation and conformance testing for the construction of a geomembrane liner at Ash Pond 91 and the Drains Pond at the Coal Creek Station generating facility near Underwood, North Dakota. Specifically, this report provides a summary of our observations and testing associated with the installation of the geomembrane lining system installed over a 2-foot thick compacted clay liner system.

1.1 Background

Cooperative Power Association (CPA) and United Power Association (UPA) own and operate Coal Creek Station located near Underwood, North Dakota (Figure 1). Coal Creek Station is a two unit, 1100 megawatt lignite fueled power plant and is permitted as a zero discharge facility. The facility was constructed with two ash ponds, four evaporation ponds, a recycle pond, an extended basin for cooling water storage, and a river basin for storage of raw water. Since 1980, CPA has been remediating the existing pond clay liner systems by installing a geomembrane liner system over the clay liner. In October 1990, CPA completed construction of a 3.9 million square foot geomembrane liner in the Lower North Evaporation Pond (GCS, 1990). A 1.3 and 2.9 million square foot geomembrane liner was installed in Evaporation Ponds 92 and 94, respectively, during the period of July 1991 through October 1991 (GCS, 1991). During the period of August 1992 through September 1992, CPA completed the construction of a 2.9 million square foot geomembrane liner in Evaporation Pond 93 (GCS, 1992).

1.2 Project Description

Ash Pond 91 and the Drains Pond construction was accomplished using two primary contractors. Earthwork was performed by D.H. Blattner Construction (Blattner) of

Minneapolis, Minnesota. Geosynthetic installation was performed by Gundle Lining Systems, Inc. (Gundle) of Houston, Texas.

Quality assurance services during construction of the clay liner were performed independently by Braun Intertec Engineering, Inc. (Braun) of Bismarck, North Dakota. Surveying was performed by Interstate Engineering of Jamestown, North Dakota to ensure that design lines and grades were achieved prior to geomembrane deployment.

A summary of the geomembrane construction tasks is provided below:

- Installation of approximately 3.1 million square feet of 40 mil high density polyethylene (HDPE) geomembrane in Ash Pond 91; and
- Installation of approximately 350,000 square feet of 40 mil HDPE geomembrane in the Drains Pond.

1.3 Quality Assurance

GCS, a wholly owned subsidiary of Golder Associates, Inc. (Golder), was retained to provide full-time quality assurance services for installation of a geomembrane liner for Ash Pond 91 and the Drains Pond at Coal Creek Station. Specifically, the GCS scope of services involved the following items:

- Provide full-time, on-site personnel to observe construction activities and verification that the completed work complied with the specifications and plans for the project;
- Verification that the materials used in construction were within the construction specifications as developed by the designer;
- Preparation of record documentation of the construction, including daily summary reports with supporting data sheets and record drawings of the geomembrane lining system; and

- Preparation of this quality assurance report to summarize our observations and testing results.

1.4 Project Coordination

All QA activities were directed by Ron Uhle, P.E., the GCS Project Manager. A summary of the GCS QA staff which were on-site during the construction period is presented in Appendix A.

The GCS QA staff consisted of a lead monitor (Cliff Baker), two monitors from GCS, and one to two monitors provided by CPA. The total number of QA monitors typically varied from three to four as required by the Installer's level of effort. When available, QA monitors were utilized to enter monitoring data into an on-site computer and generate the record drawing for the final report preparation. The lead monitor or a designated QA monitor was on-site at all times during the installation process. QA monitoring by GCS began on July 2, 1993. The geomembrane installation was completed on September 20, 1993. The Installer typically worked an 8 to 10-hour shift, six days per week.

Construction scheduling issues and specification/design clarifications were discussed in a pre-construction meeting held on July 7, 1993. Minutes from this meeting are presented in Appendix B. Weekly construction coordination meetings were conducted throughout the construction period with representatives of CPA, GCS, Blattner, and Gundle. A listing of Gundle's installation personnel is presented in Appendix C-1.

1.4.1 Daily Construction Summary Reports

Photographic documentation and daily summary reports were prepared throughout the construction sequence to formally document the key elements of construction and the QA activities which occurred. Construction activities were discussed on a weekly basis between GCS on-site QA personnel and the GCS Project Manager. In addition, daily observation

reports were prepared by all QA field personnel and submitted to the lead monitor. The on-site lead monitor prepared weekly summary reports which were submitted to the CPA Project Manager (Jim Martin). Daily observation reports and documenting photographs are not included in this report, but are available for review at Coal Creek Station or at the GCS office in Lakewood, Colorado.

1.5 Project Specifications

All work was performed according to the design plans and specifications, which are presented in the following documents:

- "Contract for 1992 Liner Installation for Evaporation Pond 93 and Ash Pond 91, Coal Creek Station", prepared by CPA and UPA, dated January 10, 1992;
- "Construction Drawings for 1992 Ash Disposal, Coal Creek Station", prepared by CPA, dated January 1992;
- "Quality Assurance Manual for the Installation of Polyethylene Lining Systems", prepared by Gundle, dated July 1990; and
- "NSF 54 - Flexible Membrane Liners", prepared by National Sanitation Foundation, dated May 1991.

2.0 IN-PLANT MONITORING OF GEOMEMBRANE MATERIALS

In 1992, Gundle manufactured approximately 6.75 million square feet of 40 mil HDPE geomembrane for Ash Pond 91 and Evaporation Pond 93. Gundle manufactured the HDPE geomembrane on an intermittent basis between March 23, 1992 and April 9, 1992. Monitoring of the HDPE geomembrane production was performed by GCS on a part-time basis at the Gundle manufacturing facility in Houston, Texas. The plant monitoring was authorized by CPA to provide documentation that the geomembrane met the project specifications prior to shipment to the site.

A total of 301 rolls of HDPE geomembrane were approved for shipment to the construction site. In-Plant Geomembrane Roll Quality Assurance Records for all rolls produced for Ash Pond 91 and Evaporation Pond 93 are presented in the QA report for Evaporation Pond 93 (GCS, 1992).

2.1 Scope of Work

Quality assurance activities conducted by GCS during the plant visits consisted, in general, of the following:

- Spot thickness measurements were obtained on rolls produced during GCS plant visits;
- Thickness measurements performed by Gundle on rolls produced while GCS was not at the plant were reviewed;
- The condition of the sheet was visually observed for defects including dimples, creases, undispersed raw materials, etc.;
- Date and time of roll manufacturing were documented;
- Inventory of rolls accepted and rejected by roll number was documented;

- Gundle geomembrane roll quality control and assurance certificates and resin quality control certificates for the accepted rolls were obtained and reviewed for conformance to the project specifications; and

- GCS selected rolls for conformance testing. Conformance samples were subsequently cut and sent to the GCS geosynthetics laboratory in Atlanta, Georgia.

2.2 In-Plant Monitoring Observations

A GCS monitor was at the plant on a part-time basis during production of the geomembrane rolls produced for Ash Pond 91 and Evaporation Pond 93. Therefore when GCS was at the plant, a portion of the rolls were approved or rejected by GCS and Gundle, and the remainder of the rolls were approved or rejected solely by Gundle when GCS was not at the plant.

For approved rolls, all spot thickness measurements met the project specifications and no major defects were observed during visual monitoring of the sheet during production. Each roll measured 34.5 feet wide by approximately 650 feet long. The base resin materials used during manufacturing were supplied by Quantum Chemical Corporation, Solvay Polymers, and Chevron Chemical Company.

2.3 Review of Geomembrane Quality Control Documents

Quality control documents submitted by Gundle included HDPE polymer resin quality control certificates, geomembrane roll quality control certificates, and welding rod quality control certificates. Documents were reviewed to verify that the required quality control testing frequency and the material property requirements stated in the project specifications were met.

2.3.1 Resin Quality Control Certificates

Polymer raw material certificates were provided by the resin manufacturer at a frequency of one per rail car shipment. These certificates were reviewed to verify that the density and melt index of the materials met the requirements of the project. A copy of each resin quality control certificate for geomembrane used in Ash Pond 91 and the Drains Pond is presented in Appendix C-2.

2.3.2 Roll Quality Control Certificates

Roll quality control and assurance certificates were reviewed to verify conformance of the materials to the requirements of the project. For rolls used in Ash Pond 91 and the Drains Pond, a copy of each roll quality control or assurance certificate is presented in Appendix C-3.

2.3.3 Welding Rod Quality Control Certificates

Welding rod certification included the quality control certificates for the rod and the resin used to make the rod. The welding rod quality control certificates are presented in Appendix C-4.

2.4 Conformance Testing

Conformance test samples were selected by GCS QA personnel and removed by Gundle at the manufacturing plant at a frequency of approximately one per 100,000 square feet of geomembrane material delivered to the project. Sixty-nine rolls of the 40 mil HDPE geomembrane were sampled and tested for conformance with the project specifications (Appendix D-1). The testing frequency resulted in approximately one test per 97,800 square feet of delivered geomembrane, which exceeded the minimum project requirements of one test per 100,000 square feet. Conformance testing was performed by the GCS geosynthetic

laboratory located in Duluth, Georgia. Results of the conformance tests for geomembrane used in Ash Pond 91 and the Drains Pond are presented in Appendix D-2. Test results indicated that all of the geomembrane materials delivered to the site met or exceeded the project's required material properties.

3.0 RESULTS OF GEOMEMBRANE INSTALLATION QUALITY ASSURANCE TESTING AND MONITORING

Quality assurance activities conducted during the installation of the geomembrane consisted, in general, of the following:

- Observation of the underlying surface;
- Observation and documentation of HDPE geomembrane deployment and measurement of sheet thickness;
- Observation of pre-weld sample testing and documentation of results supplied by Gundle;
- Observation and documentation of field seams prior to and following seaming;
- Location, testing, and documentation of seam strength destructive test samples; and
- Observation and documentation of non-destructive seam continuity testing.

A detailed description of each of the above activities is presented in the following sections.

3.1 Geomembrane Deployment

Geomembrane panels were visually monitored by GCS personnel as they were deployed from the roll into position on the subgrade. This process required the monitoring of subgrade conditions, sheet anchoring, sheet alignment, sheet overlap with adjacent panels, panel extensions into anchor trenches, sheet surface quality and sheet thickness. Each deployed geomembrane panel was assigned a unique identification number by a GCS monitor and each panel was visually monitored for damage and/or manufacturing imperfections. Defects were marked and documented by GCS monitors and subsequently repaired by Gundle.

Prior to geomembrane deployment, GCS QA personnel and Gundle verified that the surface to be lined had been rolled and compacted so as to be free of irregularities, protrusions, loose soil, and abrupt changes in grade; did not contain stones which may be damaging to the geomembrane; and did not contain shrinkage cracks or areas softened by high water content. Gundle certified in writing that the surface on which the geomembrane would be installed was acceptable. The subgrade acceptance certificates are presented in Appendix E.

The panels were deployed in general conformance with the HDPE panel layout as supplied by Gundle prior to deployment. The record drawings showing the approximate location of the Ash Pond 91 and the Drains Pond geomembrane panel layouts are presented on Figures 2 and 3, respectively.

The thickness monitoring program included measuring the sheet thickness using a machinist's micrometer at five locations across the lead and trail edge of each roll of material. At times, additional panel edge thicknesses were also measured at the discretion of the GCS QA monitor to confirm that the geomembrane used on the project was 40 mil and within project specifications.

The length of each panel was measured by GCS personnel using a measuring wheel. GCS personnel also recorded the panel length of each panel. The panel lengths recorded were approximate and did not reflect any trimming or adjustments for final placement. All lengths were measured from the inboard crest of the anchor trench.

GCS personnel observed the surface of each panel. Any defects or blemishes noted were recorded and were also reported to Gundle for corrective action.

The overlap of each panel with adjacent panels was also observed to verify that overlap was sufficient for seaming. Insufficient overlap areas were brought to the attention of Gundle for correction.

After deployment, Gundle placed loads of sandy cover material with a front end loader and sand bags along panel edges as a temporary loading measure until the panels were joined by fusion welding. Sandbags were similarly used to temporarily secure panels which extended into the anchor trenches a minimum of 5 to 6 feet.

A summary of abbreviations used by the GCS monitors during construction is presented in Appendix F. Deployment observations are presented in Appendix G.

3.2 Geomembrane Seaming

The principal seaming method for this project was the Gundle double wedge fusion weld. The fusion seaming (welding) process of the geomembrane liner ran concurrently with deployment. Extrusion welds were allowed during the seaming of the geomembrane for repairs and in areas where double wedge fusion welding was not practical. Monitoring of the seaming techniques consisted of visual observation of trial seam tests, monitoring ambient and seaming equipment temperatures, monitoring speed of seaming equipment, and continuous visual observation of completed seams.

3.2.1 Trial Seam Monitoring

Trial seams were performed as a means of monitoring the performance of the seaming apparatus and operator under actual site conditions. Trial seams were made by each welding apparatus/operator combination prior to the beginning of each day's seaming operation and at mid-day intervals during the seaming period. Samples were cut from the trial seams and quantitatively tested using a field tensiometer. Each trial seam was tested twice for peel adhesion (peel) and once for bonded seam strength (shear), with the untested portion of each sample retained for the archives of CPA at Coal Creek Station. GCS personnel observed the testing of pre-weld samples and documented the test results. The tensile testing of specimens taken from pre-weld samples was observed to verify that specimens did not fail

within the seam (film tear bond). GCS personnel verified that retesting was conducted in the event of a failing test.

One of the trial seams failed the pre-weld field testing. The welder and welding apparatus associated with the failed seams were not allowed to weld on the liner until passing trial seams were made in accordance with the project specifications. The trial seam results are presented in Appendix H.

3.2.2 Seam Procedures and Observations

Seaming operations were observed by the GCS QA monitors on a full-time basis. GCS personnel observed seams before and after welding. Each seam lap was checked for adequate overlap prior to seaming and also to verify that the seam area was clean and dry. Any concerns were brought to the attention of Gundle.

Personnel performing the seaming and the equipment used were recorded during monitoring for tracking purposes in the event of a destructive test failure. Following the completion of seaming and routine repair work, the full length of each seam was observed to verify that no additional repairs were required. All seams were inspected for visual quality and seam completion. Weld imperfections were marked by GCS and were subsequently repaired by Gundle in accordance with the specifications and Gundle QA manual.

The results of observations before and after seaming were recorded by GCS personnel. Seaming observations for fusion and extrusion welding are presented in Appendices I and J, respectively.

3.2.3 Geomembrane Defect and Repair Observations

Geomembrane panels were initially observed for damage which could have occurred during transportation and/or deployment as discussed in Section 3.1. All panels and seams were

repeatedly observed for defects until the cover material was placed over the geomembrane layer.

Each defect was documented, assigned a unique identification defect code, marked for repair by GCS on the geomembrane, and subsequently repaired by Gundle. Summaries of defects and non-destructive testing of repairs, including the approximate location of each repair, are presented in Appendix K.

3.3 Destructive Testing

In accordance with the project specifications, destructive samples were obtained from the seams of the geomembrane at a frequency of one destructive test sample per 500 linear feet of weld. The test locations were selected by GCS personnel based either on the completion of approximately 500 feet of welding by a given machine and/or welder, working conditions, or on seaming observations (e.g. suspicion of a defective weld).

A total of 25 and 222 destructive samples were obtained from the Drains Pond and Ash Pond 91 geomembrane liner, respectively, and were tested in Braun's geosynthetic laboratory, located in Bismarck, North Dakota, in accordance with ASTM D-638.

From each sample taken to the laboratory, ten specimens (1-inch wide) were removed for testing. Five specimens were tested for adhesion (peel) with the specified acceptance criteria being that five out of the five specimens must have yield strengths of at least 52 pounds per inch and fail in a film tear bond (FTB). For fusion welding, peel tests were performed on the inside weld track. Five specimens were also tested for bonded strength (shear) with the specified acceptance criteria being that five out of the five must have yield strengths greater than 80 pounds per inch and fail in a FTB.

In the event of a failing sample, the path of the welder or welding machine was traced in each direction from the failed destructive location at approximately 10-foot intervals. The

failing seam would then be bounded by passing destructive tests or the entire seam would be reconstructed. If the first alternative was adopted, the welder's path was capped with another layer of 40 mil HDPE then extrusion welded between the two passing locations. If the second alternative was adopted, the seam was then reconstructed by extrusion welding the outside track of the fusion weld.

The location of each destructive test sample is presented on the record drawings (Figures 2 and 3) and is identified on repair summaries (Appendix K). Failure modes for test specimens were reported based on the pass/fail codes shown on Figures 4 and 5. A summary of destructive test results is presented in Appendix L.

3.4 Non-destructive Testing

The non-destructive seam continuity testing was performed by Gundle and observed by GCS personnel. The non-destructive testing included pressure testing of double fusion welded seams and vacuum box testing of the extrusion welded seams. Documentation summarizing observation of the continuity testing is included on the fusion welding summaries (Appendix I) and the repair summaries (Appendix K).

4.0 CONCLUSIONS

Golder Construction Services, Inc. was retained by Cooperative Power Association to perform quality assurance observation and conformance testing for the construction of a geomembrane liner at Ash Pond 91 and the Drains Pond at the Coal Creek Station generating facility near Underwood, North Dakota. The quality assurance monitoring and testing program covered by this work included:

- On-site quality assurance monitoring and testing of geosynthetic installation;
- Verification that all geosynthetic materials used in construction were within specifications as developed by the designer of the facility; and
- Preparation of the construction documentation report, including field report summaries, test data summaries, and record survey drawings, written and signed by a North Dakota Registered Professional Engineer.

The results of testing and observations made by Golder Construction Services, Inc. while monitoring the construction of Ash Pond 91 and the Drains Pond indicated that the installation of the geomembrane materials was performed in substantial compliance with the project plans, specifications, and quality assurance program.

GOLDER CONSTRUCTION SERVICES, INC.

Ronald J. Uhle

Ronald J. Uhle, P.E.
Project Manager

David L. O'Sadnick

David L. O'Sadnick, P.E.
Associate



RJU\DLO\sjm

5.0 REFERENCES

Cooperative Power Association, 1992. "Contract for 1992 Liner Installation for Evaporation Pond 93 and Ash Pond 91, Coal Creek Station", dated January 10, 1992.

Cooperative Power Association, 1992. "Construction Drawings for 1992 Ash Disposal, Coal Creek Station", dated January 1992.

GCS (see Golder Construction Services, Inc.)

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Gundle Lining Systems, Inc., 1990. "Quality Assurance Manual for the Installation of Polyethylene Lining Systems", dated July 1990.

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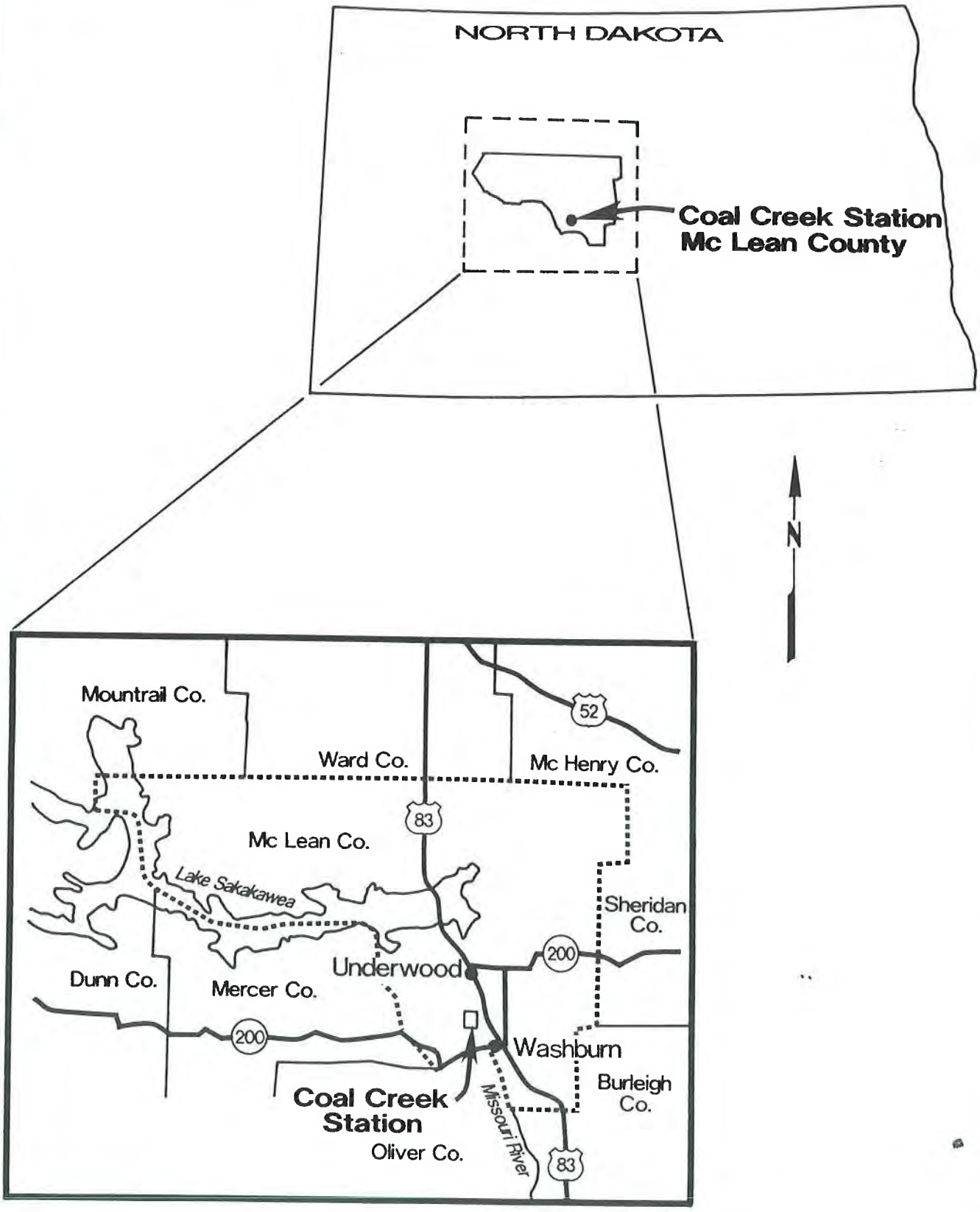
FIGURES



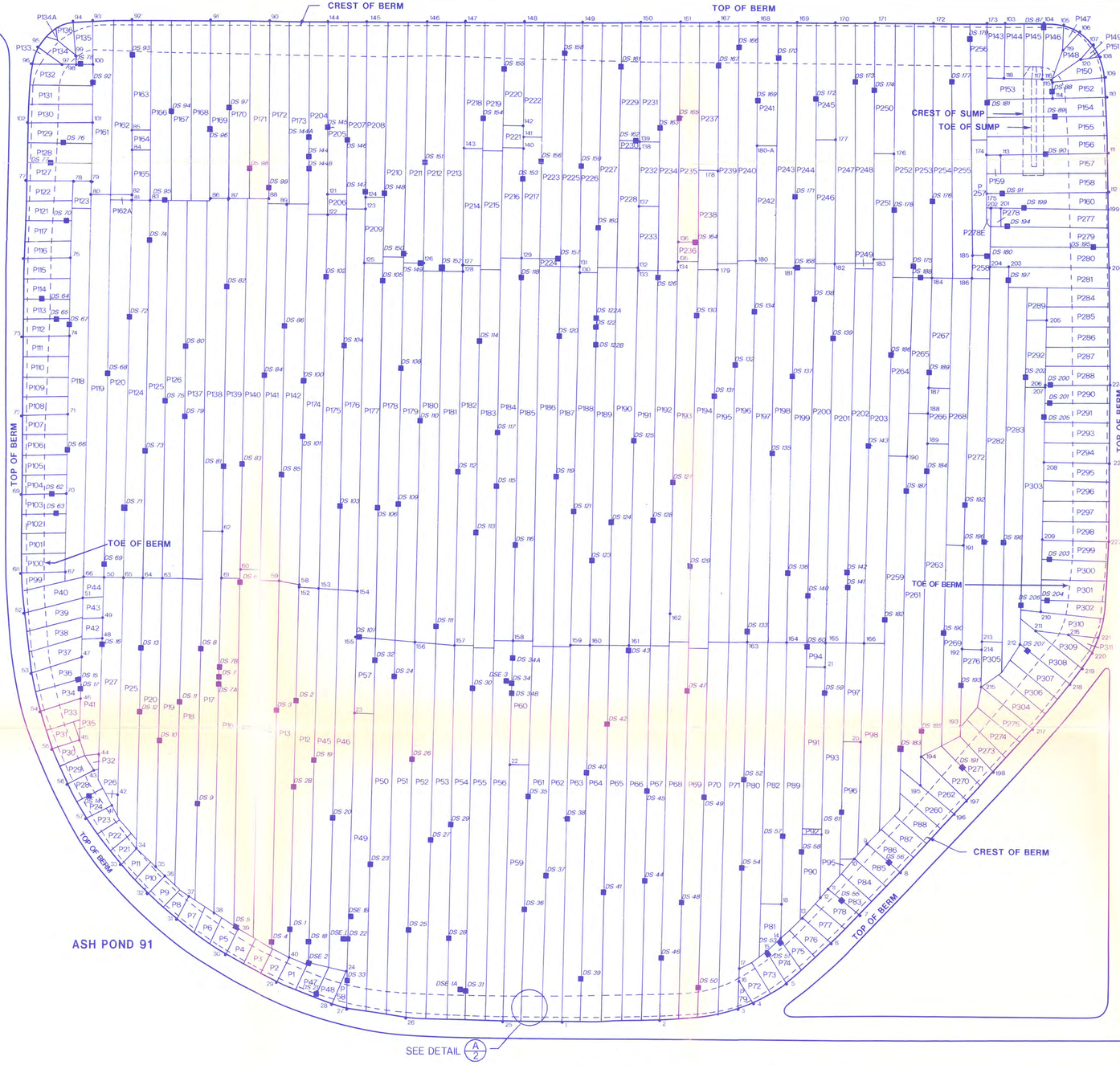
GCS
Golder Construction Services, Inc.
Quality Assurance and Construction Management

TITLE

SITE LOCATION MAP

CLIENT/PROJECT
COOPERATIVE POWER ASSOCIATION
CQA ASH POND 91
COAL CREEK STATION

DRAWN BDL	DATE NOVEMBER 1993	JOB NO. 937-4207
CHECKED RJU	SCALE NTS	DWG NO./REV. NO.
REVIEWED DLO	FILE NO.	FIGURE NO. 1



Geomembrane Panel Record Survey Point Data

Point No.	Northing	Easting
1	37068.41	40628.78
2	37071.68	40799.60
3	37091.03	40937.21
4	37100.37	40962.48
5	37134.73	41021.39
6	37205.88	41098.66
7	37254.80	41146.73
8	37329.26	41219.39
9	37379.18	41161.06
10	37352.67	41139.05
11	37300.08	41094.05
12	37285.05	41079.39
13	37249.23	41048.41
14	37212.83	41009.56
15	37189.17	40986.24
16	37138.00	40938.68
17	37159.96	40939.73
18	37272.89	41011.25
19	37394.33	41082.15
20	37556.50	41153.71
21	37688.80	41086.68
22	37516.26	40536.12
23	37606.38	40264.24
24	37154.16	40252.10
25	37067.33	40526.40
26	37073.61	40355.80
27	37091.24	40253.12
28	37097.56	40226.74
29	37135.38	40131.13
30	37183.87	40040.58
31	37243.27	39954.68
32	37288.00	39903.39
33	37338.16	39856.28
34	37367.75	39883.06
35	37335.20	39916.88
36	37320.74	39933.47
37	37284.30	39974.63
38	37256.49	40017.74
39	37227.71	40061.58
40	37178.66	40151.76
41	37443.31	39840.61
42	37462.27	39850.49
43	37504.65	39809.14
44	37531.57	39817.43
45	37558.13	39783.51
46	37630.67	39784.64
47	37703.46	39786.14
48	37737.25	39821.46
49	37771.66	39822.12
50	37843.39	39823.73
51	37808.74	39788.41
52	37760.24	39686.25
53	37676.32	39699.24
54	37608.69	39714.48
55	37542.96	39735.17
56	37480.93	39761.43
57	37421.05	39795.53
58	37829.52	40165.41
59	37837.87	40131.53
60	37857.69	40063.84
61	37841.02	40029.36
62	37924.10	40030.93
63	37841.25	39926.72
64	37842.10	39892.33
65	37842.41	39857.94
66	37843.83	39789.17
67	37852.19	39756.78
68	37849.69	39683.25
69	37987.74	39681.23
70	37990.15	39758.77
71	38127.83	39760.31
72	38125.50	39681.99
73	38262.60	39682.46
74	38264.91	39762.12
75	38401.25	39763.88
76	38399.48	39684.20
77	38535.28	39686.27
78	38536.34	39767.80
79	38536.83	39801.56
80	38511.95	39800.94
81	38501.69	39870.90
82	38508.76	39780.96
83	38503.17	39902.15
84	38591.83	39871.28
85	38626.13	39871.42
86	38502.64	40006.94
87	38503.07	40038.84
88	38505.35	40109.63
89	38498.04	40141.52
90	38816.91	40109.79
91	38817.34	40006.98
92	38817.71	39870.00
93	38816.65	39800.65
94	38813.22	39767.47
95	38768.90	39706.86
96	38740.39	39696.43
97	38741.21	39749.15
98	38741.62	39772.38
99	38756.75	39771.84
100	38741.67	39802.04
101	38639.33	39802.15
102	38637.65	39688.97
103	38815.93	41396.73
104	38816.35	41465.01
105	38814.14	41488.99
106	38802.92	41527.62
107	38779.55	41551.81
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109	38724.39	41570.81
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117	38721.84	41463.10
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121	38514.69	40213.03
122	38479.07	40212.59
123	38488.85	41278.81
124	38509.64	40281.56
125	38394.17	40277.51
126	38392.21	40380.98
127	38390.37	40449.75
128	38378.27	40448.94
129	38402.81	40553.09
130	38378.91	40654.28
131	38388.26	40655.66
132	38386.85	40758.12
133	38383.56	40757.13
134	38383.05	40826.24
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145	38816.12	40280.90
146	38816.49	40384.52
147	38817.33	40452.64
148	38816.98	40555.33
149	38816.29	40657.96
150	38816.82	40760.16
151	38816.80	40826.23
152	37828.97	40166.37
153	37825.33	40199.71
154	37819.72	40267.90
155	37739.36	40266.83
156	37729.93	40368.32
157	37725.44	40436.95
158	37733.21	40539.55
159	37723.42	40641.36
160	37725.06	40675.48
161	37726.69	40743.84
162	37773.79	40814.66
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165	37729.44	41086.56
166	37731.01	41154.95
167	38816.55	40896.67
168	38816.29	40964.20
169	38816.83	41032.82
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171	38816.92	41169.78
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173	38815.57	41366.61
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175	38519.23	41367.55
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185	38410.42	41340.80
186	38371.91	41340.15
187	38179.04	41265.70
188	38133.03	41264.87
189	38079.77	41263.69
190	38056.96	41228.51
191	37902.30	41328.71
192	37719.54	41325.85
193	37586.69	41324.21
194	37532.35	41255.49
195	37479.31	41254.17
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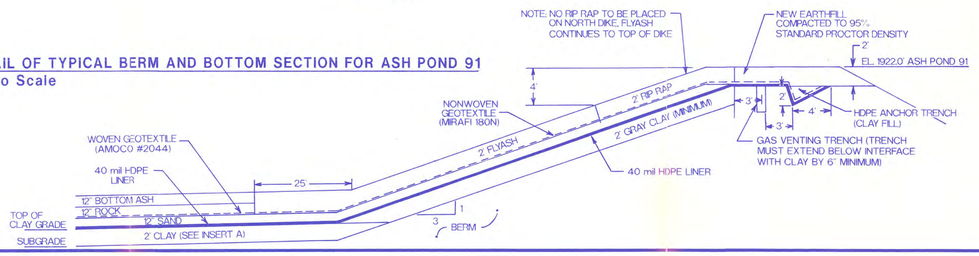
203	38390.64	41399.42
204	38391.44	41371.79
205	38297.19	41472.62
206	38184.36	41470.70
207	38179.44	41470.53
208	38048.92	41468.46
209	37912.60	41466.48
210	37786.81	41464.10
211	37753.04	41455.49
212	37729.78	41430.89
213	37733.53	41360.50
214	37719.06	41359.97
215	37655.82	41359.45
216	37746.21	41513.43
217	37582.12	41450.18
218	37660.27	41516.13
219	37688.15	41536.21
220	37716.77	41553.46
221	37740.25	41564.19
222	37909.88	41581.39
223	38046.75	41582.74
224	38183.68	41582.85

SCALE IN FEET: 0, 100, 200

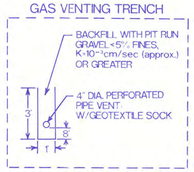
LEGEND

- DS-54 ■ Destructive test location and test number (Fusion welds)
- DSE-2 ■ Destructive test location and test number (Extrusion welds)
- P22 Geomembrane liner panel location and numbers
- Grade/slope change
- •17 Reference survey point as depicted on drawing

A/2 DETAIL OF TYPICAL BERM AND BOTTOM SECTION FOR ASH POND 91
Not to Scale



GAS VENTING TRENCH



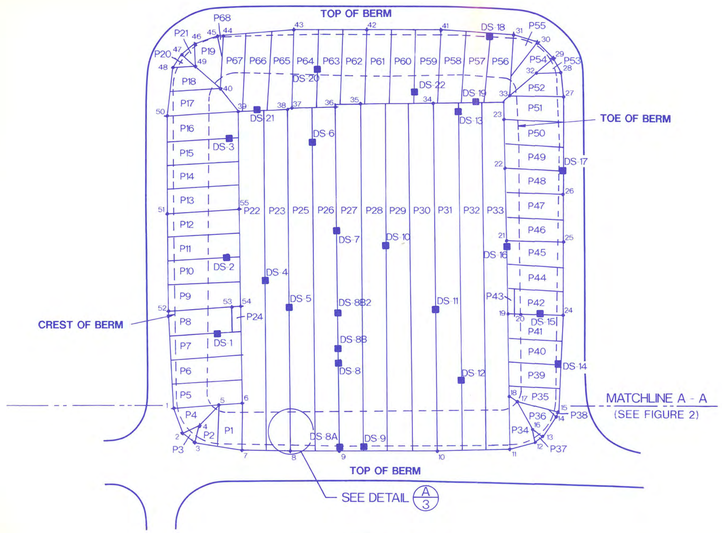
NOTE:
1. PROVIDE PERFORATED PIPE VENTS (PVC-SHED40), EACH APPROX. 120' LONG AND 4" DIA. IN THE GAS VENTING TRENCHES. THE EXACT LENGTHS TO BE DETERMINED BY SITE REPRESENTATIVE.
2. THE EXPOSED ENDS OF 4" DIA. GAS VENTING PIPE SHALL BE PROTECTED WITH BOTH A 1/2" STAINLESS STEEL SCREEN AND REGULAR SCREENING MATERIALS.

CLIENT/PROJECT: COOPERATIVE POWER ASSOCIATION
COAL CREEK STATION
UNDERWOOD, NORTH DAKOTA

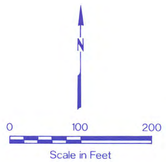
TITLE: ASH POND 91 GEOMEMBRANE PANEL AND DESTRUCTIVE TEST LOCATIONS RECORD DRAWING

Golder Construction Services, Inc.

DRAWN: EJB	DATE: NOVEMBER 1993
CHECKED: RJU	SCALE: 1"=100'
REVIEWED:	JOB NO.: 937-4207
APPROVED: DLO	DWG. NO.:
FILE NO.:	FIGURE: 2



DRAINS POND



LEGEND

- DS-9 ■ DESTRUCTIVE TEST LOCATION AND TEST NUMBER (FUSION WELDS)
- P12 GEOMEMBRANE PANEL LOCATION AND NUMBER
- — — GRADE/SLOPE CHANGE
- •20 REFERENCED SURVEY POINT AS DEPICTED ON DRAWING

Geomembrane Panel Record Survey Point Data

Point No.	Northing	Easting
1	38926.07	39695.82
2	38892.85	39709.67
3	38879.50	39726.32
4	38902.54	39732.29
5	38930.51	39760.09
6	38933.30	39792.90
7	38869.02	39792.64
8	38868.20	39861.27
9	38867.40	39929.65
10	38866.99	40067.32
11	38868.53	40170.03
12	38877.96	40203.38
13	38885.83	40215.41
14	38914.19	40234.72
15	38919.73	40236.99
16	38895.31	40202.77
17	38935.60	40179.79
18	38942.71	40168.99
19	39059.04	40168.77
20	39058.89	40175.53
21	39161.67	40167.05
22	39263.73	40165.37
23	39331.91	40164.10
24	39056.26	40244.00
25	39158.82	40244.17
26	39227.37	40244.43
27	39363.72	40245.22
28	39397.19	40241.08
29	39419.01	40231.06
30	39440.61	40208.36
31	39451.88	40175.57
32	39336.82	40205.59
33	39365.59	40169.14
34	39355.08	40061.72
35	39354.32	39959.83
36	39350.75	39924.53
37	39349.60	39863.15
38	39347.50	39856.06
39	39344.04	39787.46
40	39376.86	39762.19
41	39458.70	40072.20
42	39459.49	39968.60
43	39459.45	39866.10
44	39450.67	39764.08
45	39450.04	39759.06
46	39438.35	39725.90
47	39424.20	39707.71
48	39406.08	39696.61
49	39407.93	39727.25
50	39337.39	39688.17
51	39200.37	39689.01
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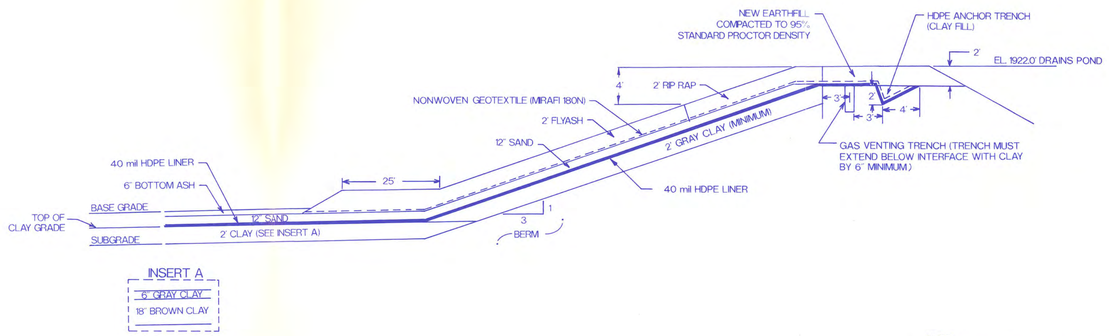
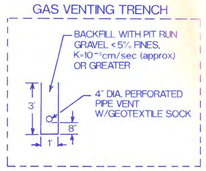


GAS VENTING TRENCH



NOTE:
1. PROVIDE PERFORATED PIPE VENTS (PVC-SHED 40) EACH APPROX. 120' LONG AND 4" DIA. IN THE GAS VENTING TRENCHES. THE EXACT LENGTHS TO BE DETERMINED BY SITE REPRESENTATIVE.
2. THE EXPOSED ENDS OF 4" DIA. GAS VENTING PIPE SHALL BE PROTECTED WITH BOTH A 1/2" STAINLESS STEEL SCREEN AND REGULAR SCREENING MATERIALS.

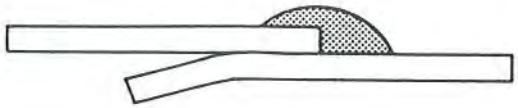
A/3 DETAIL OF TYPICAL BERM AND BOTTOM SECTION FOR DRAINS POND
Not to Scale

CLIENT/PROJECT
COOPERATIVE POWER ASSOCIATION
COAL CREEK STATION
UNDERWOOD, NORTH DAKOTA

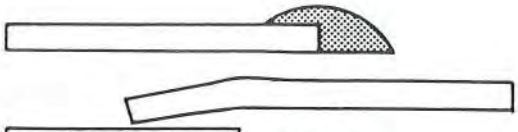
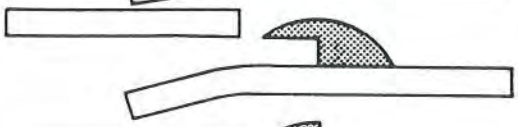
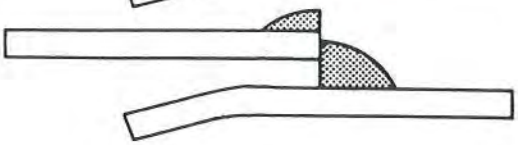
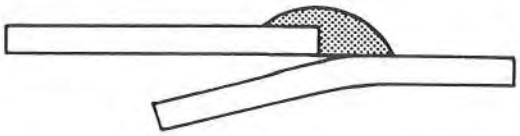
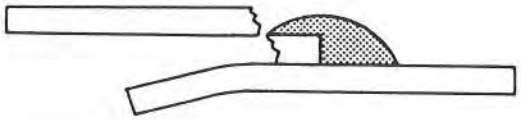
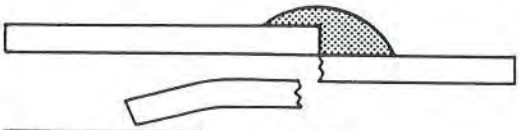
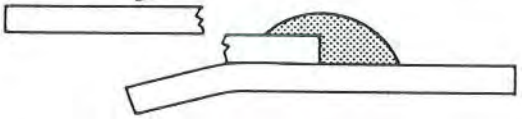
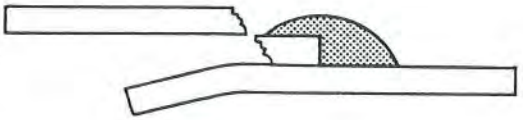
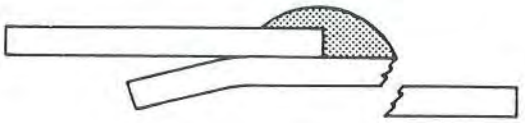
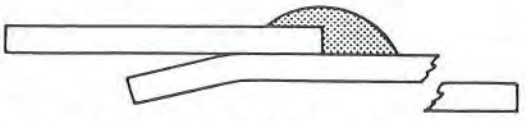
TITLE
DRAINS POND GEOMEMBRANE AND DESTRUCTIVE TEST LOCATIONS RECORD DRAWING

Golder Construction Services, Inc.

DRAWN		DATE	NOV 1993
CHECKED	RJU	SCALE	1"=100'
REVIEWED	DLO	JOB NO.	933-4207
APPROVED		DWG. NO.	
FILE NO.		FIGURE	3



UNTESTED SPECIMEN
EXTRUSION WELD WITH LEISTER HEAT SEAM

TYPES OF FAILURE	PASS/FAIL CODE	DESCRIPTION
	BREAK 1	ADHESION FAILURE
	BREAK 2	ADHESION FAILURE
	BREAK 3	ADHESION FAILURE
	BREAK 4	PARTIAL ADHESION FAILURE
	BREAK 5	FTB WELDED SEAM EDGE
	BREAK 6	FTB WELDED SEAM EDGE
	BREAK 7	FTB HEAT SEAM EDGE
	BREAK 8	FTB HEAT SEAM EDGE
	BREAK 9	FTB WELDED SEAM EDGE
	BREAK 10	FTB IN SHEETING

NOTE: FTB=FILM TEARING BREAK

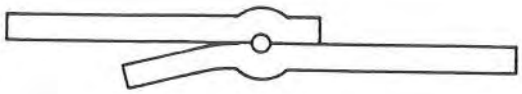
GCS
Golder Construction Services, Inc.

CLIENT/PROJECT COOPERATIVE POWER ASSOCIATION
CQA ASH POND 91
COAL CREEK STATION

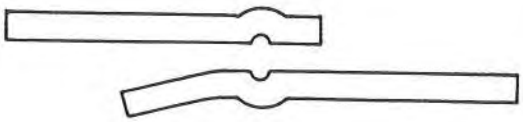
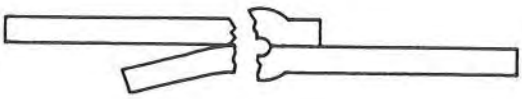
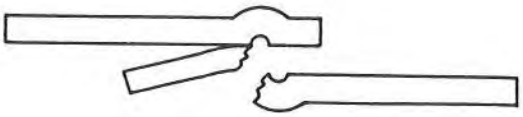
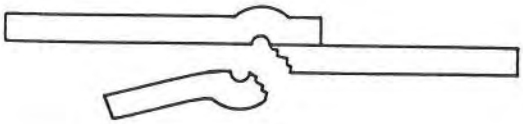
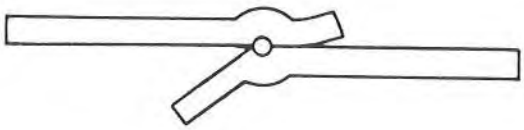
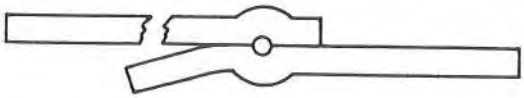
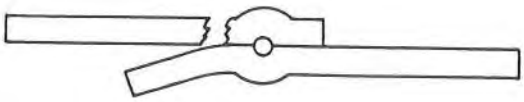
TITLE
DESTRUCTIVE SAMPLE TEST CODES
EXTRUSION WELD
WITH LEISTER HEAT SEAM

DRAWN	CHECKED	REVIEWED	DATE	SCALE	JOB NO.
PH	RJU	DLO	NOVEMBER 1993	NTS	937-4207

FILE	DWG. NO.	FIGURE
		4



UNTESTED SPECIMEN
DUAL HOT WEDGE FUSION WELD

TYPES OF FAILURE	PASS/FAIL CODE	DESCRIPTION
	BREAK 1	ADHESION FAILURE
	BREAK 2	FTB HEAT SEAM EDGE
	BREAK 3	FTB AT FIRST SEAM EDGE
	BREAK 4	FTB AT SECOND SEAM EDGE
	BREAK 5	PARTIAL ADHESION FAILURE
	BREAK 6	FTB IN SHEETING
	BREAK 7	FTB HEAT SEAM EDGE

NOTE: FTB=FILM TEARING BREAK

GCS
Golder Construction Services, Inc.

CLIENT/PROJECT: COOPERATIVE POWER ASSOCIATION
CQA ASH POND 91
COAL CREEK STATION

TITLE: DESTRUCTIVE SAMPLE TEST CODES
DUAL HOT WEDGE FUSION WELD

DRAWN	CHECKED	REVIEWED	DATE	SCALE	JOB NO.
PH	RJU	DLO	NOVEMBER 1993	NTS	937-4207

FILE	DWG. NO.	FIGURE
		5

APPENDIX A

ON-SITE QUALITY ASSURANCE MONITORING PERSONNEL SCHEDULE

GCS AND CPA ON-SITE QUALITY ASSURANCE PERSONNEL
CPA/ASH POND 91/ND
937-4207

PERSON	JULY 1993				AUGUST 1993					SEPTEMBER 1993			
	5	12	19	26	2	9	16	23	30	6	13	20	27
Geosynthetic Monitoring													
C. Baker - GCS	P	P	P	F	F	F	F	F	F	F	F	P	
D. Becker - GCS						P	P						
T. Dallman - CPA	P		P	F	F	F	F	F	F	F	F	P	
M. Hamby - CPA						F	F	F	F	F	F	P	
S. Hutsell - GCS	P					P	F	F	F	F			
J. Iorio - GCS	P				F	F	F	F	F	F	F	P	
Project Management													
R. Uhle								P			P		

F = On-site for entire week
P = On-site for a portion of the week

APPENDIX B

PRECONSTRUCTION MEETING MINUTES

MEMORANDUM

TO: Andy Stewart - CPA
Jim Martin - CPA
Dave O'Sadnick - GCS
Cliff Baker - GCS
David Herreth - Gundle
Myron Colton - Braun Intertec
Leroy Kautz - Interstate Engineering
John Kaiser - Interstate Engineering
Ralph Lipelt - D.H. Blattner
Kit Blattner - D.H. Blattner

DATE: July 7, 1993

FR: Dave O'Sadnick

PROJECT: 937-4207

RE: PRE-CONSTRUCTION MEETING MINUTES FOR GEOMEMBRANE INSTALLATION AT POND 91 AND DRAINAGE POND, COAL CREEK STATION

A preconstruction meeting was held with Gundle Lining Construction Corp. at the Coal Creek Station construction office on July 7, 1993. The meeting began at 10:00 a.m. Mr. Jim Martin of Cooperative Power presided over the meeting. The purpose of the meeting was to discuss project organization, schedule, manpower, Gundle construction methods, project Quality Assurance QA requirements, project safety, and working rules at the Coal Creek Station. Minutes from the meeting are presented as follows:

Introductions were made with the following persons in attendance:

Jim Martin, CPA (on-site construction supervisor)
Dave O'Sadnick, GCS (Project Manager)
Cliff Baker, GCS (Resident Manager)
Jeff Iorio, GCS (Monitor)
Scott Hutsell, GCS (Monitor)
David Herreth, Gundle
Leroy Kautz, Interstate
John Kaiser, Interstate
Myron Colton, Braun Intertec
Ralph Lipelt, D.H. Blattner Construction
Kit Blattner, D.H. Blattner Construction

The scope of work includes the installation of about 66 acres of 40-mil HDPE in Pond 91 and about 10 acres of 40-mil HDPE in the plant drainage pond.

Jim Martin will be the focal point of all on-site communications. Andy Stewart, with CPA is the overall project manager.

In-plant monitoring was performed by GCS in the spring of 1992. All rolls shipped to the site have been pre-approved. GCS only has to perform roll inventory to verify that the rolls approved for shipment to the site were the same as those approved at the plant.

There should be enough 40 mil HDPE on site to complete the two ponds, even with the minor design changes made.

GCS described their role in the project as the third party QA consultant as per section 1.04 of the specifications. Specifically, GCS will:

- Provide one lead monitor (Cliff Baker) and two additional on-site monitors during installation. Three to four other monitors will be supplied by CPA;
- Monitor installation of geomembrane including deployment, material, and seam quality;
- Monitor and document non-destructive seam testing;
- Perform roll inventory and assurance that roll certificates match materials on-site;
- Monitor and document all geomembrane repairs and testing of repairs;
- Monitor and document all destructive tests of completed seams performed by Braun Intertec;
- Interpret and report geomembrane trial seam and destructive test results;
- Prepare a record drawing of the panel layout; and
- Prepare a final report documenting the installation of the 40-mil HDPE geomembrane.

A progress/safety meeting will be held each Thursday at 10:45 a.m. followed by a weekly construction meeting. Informal daily meetings will be held at the start of each working day somewhere near the construction area.

Any safety concerns should be reported to Jim Martin or any on-site CPA representative. An EMT and ambulance are on-site 24 hours a day and available at all times. To contact them, anyone can call security or contact any contractor on-site who has a radio. The contractors should limit access of their personnel to their own construction areas as much as possible for safety reasons since there is a large amount of activity at the site.

GCS will set up cones to mark areas where QA procedures have been completed. All personnel on-site will take care not to enter these areas or move the cones.

Non-destructive air pressure tests will be performed by pressurizing the seam between 25 and 30 psi for five minutes. A pressure loss of 3 psi or less will indicate an acceptable weld.

During non-destructive testing with the vacuum box, the vacuum will be held for a minimum of five seconds.

If a hot wedge seam is not acceptable, as determined from destructive or non-destructive testing, Gundle will locate and cap the faulty area using extrusion methods.

Protective layer sand will be placed in the center area of a panel soon after deployment to help protect against wind damage to the liner.

A single roll will be designated as patch material as specified. CPA will buy this roll as a separate cost item.

Braun Intertec will perform destructive sample testing. If any coupon from the test results fail, the section of seam that fails will be capped or reconstructed. Gundle will perform a field test using an on site tensiometer before sending samples to Braun.

Gundle agreed to weld through the anchor trench. Repairs will be made to the crest of the anchor trench. QA monitoring and testing will be made to the top crest of the interior slope of the pond.

Gundle was reminded that the specifications state that the liner shall be at least 40-mil thick with no exceptions. If any thickness values of less than 40 mil are measured by GCS, the values will be brought to the attention of CPA who will determine if that panel is acceptable.

Hard hats, safety glasses and shirts with sleeves will be required for all workers. Steel-toed shoes are not required.

CPA requested that Gundle supply them with any material safety data sheets (MSDS) for any of their construction supplies.

Gundle will have eight technicians, one supervisor (Al Kern) and a quality control officer (Mike Ruggerio). They will hire local labor as needed.

Gundle will have on site three fusion welding devices, at least two extrusion welding devices, two vacuum boxes and three pressure test devices.

Gundle will number all panels during deployment.

Gundle will use yellow markers on the liner, GCS will use white colored markers. Spray paint will not be used on the liner.

Gundle indicated that the work schedule will consist of 6 days per week, 10 hours per day with specific days and hours depending on weather delays.

Any work to be done on Sunday or a holiday has to be approved ahead of time through D.H. Blattner Const.

Work is scheduled to begin July 13, 1993. Pending weather.

The meeting adjourned at 11:15 a.m.

APPENDIX C

GEOMEMBRANE QUALITY CONTROL DOCUMENTS AND INVENTORY

APPENDIX C-1

LISTING OF INSTALLATION PERSONNEL

APPENDIX C-1
LISTING OF ON-SITE
GUNDLE QUALITY CONTROL PERSONNEL

TITLE	NAME	INITIALS
SUPERVISOR	AL KERN	A.K.
ASSISTANT SUPERVISOR	MICHAEL RUGGERO	M.R.
CONSTRUCTION FOREMAN	SAY KIAOSOUATH	S.K.
CONSTRUCTION FOREMAN	CHAN WHOUANG	C.W.
TECHNICIAN	KHAM CHANTHABOUM	K.K.
TECHNICIAN	BOUNPHILOM THILAVANH	B.T.
TECHNICIAN	VONG NORAUONG	V.N.
TECHNICIAN	PHOUSAUANH PHOUTHAVOMG	P.P.
TECHNICIAN	SAI OUNKEO	S.O.
TECHNICIAN	BOUNNA NGN	B.N.
TECHNICIAN	JEFF SCWICKRATH	J.S.
TECHNICIAN	SORN DOAK	S.D.
TECHNICIAN	SOMPHANE BOUASYN	S.B.

APPENDIX C-2

GEOMEMBRANE RESIN
QUALITY CONTROL CERTIFICATES

Chevron

Chevron Chemical Company
P.O. Box 7400, Orange, TX 77631-7400 • Phone (409) 886-7491

Orange Plant

February 10, 1992

Steve Severson
Gundle Lining Syetems
1340 E. Richey
Houston, Texas 77073
FAX: (713)875-6010

CERTIFICATE OF ANALYSIS

Following is the data on the subject material as determined by the Quality Control Department:

Product	9642T	Lot Number	B011309
Chevron Order No.	CRN58347	Customer Order No.	134381
Package	CHVX891174	Ship Date	02-07-92
Production Date	01-15-92	Weight	175,000

Property	Value	Units
Melt Index	0.15	gms/10 min
Density	0.9395	gms/cc

The data set forth herein has been carefully compiled by Chevron Chemical Company. However, there is no warranty of any kind, either express or implied, applicable to its use and the user assumes all risk and liability in connection therewith.

Sincerely,

G.G. Bertin
Supervisor
Quality Control

GGB/gc

For inquiry, contact Customer Service at the following number:
Film, Coating, Pipe Applications: 1-800-231-3826
Molding Applications: 1-800-231-3828

ORIGINAL

Chevron Chemical Company
P.O. Box 7400, Orange, TX 77631-7400 • Phone (409) 886-7481

Orange Plant

February 11, 1992

Steve Severson
Gundle Lining Systems
1340 E. Richey
Houston, Texas 77073
FAX: (713)875-6010

CERTIFICATE OF ANALYSIS

Following is the data on the subject material as determined by the Quality Control Department:

Product	9642T	Lot Number	B011332
Chevron Order No.	CRN58349	Customer Order No.	134381
Package	PLCX42413	Ship Date	02-10-92
Production Date	01-17-92	Weight	181,200

Property	Value	Units
Melt Index	0.11	gms/10 min
Density	0.9394	gms/cc

The data set forth herein has been carefully compiled by Chevron Chemical Company. However, there is no warranty of any kind, either express or implied, applicable to its use and the user assumes all risk and liability in connection therewith.

Sincerely,

G.G. Bertin
Supervisor
Quality Control

GGB/gc

For inquiry, contact Customer Service at the following number:
Film, Coating, Pipe Applications: 1-800-231-3826
Molding Applications: 1-800-231-3828

Chevron

Chevron Chemical Company
P.O. Box 7400, Orange, TX 77631-7400 • Phone (409) 886-7491

Orange Plant

February 11, 1992

Steve Severson
Gundle Lining Systems
1340 E. Richey
Houston, Texas 77073
FAX: (713)875-6010

CERTIFICATE OF ANALYSIS

Following is the data on the subject material as determined by the Quality Control Department:

Product	9642T	Lot Number	E011348
Chevron Order No.	CRN58350	Customer Order No.	134381
Package	CHVX890068	Ship Date	02-10-92
Production Date	01-17-92	Weight	169,400

Property	Value	Units
Melt Index	0.15	gms/10 min
Density	0.9384	gms/cc

The data set forth herein has been carefully compiled by Chevron Chemical Company. However, there is no warranty of any kind, either express or implied, applicable to its use and the user assumes all risk and liability in connection therewith.

Sincerely,

G.G. Bertin
Supervisor
Quality Control

GGB/gc

For inquiry, contact Customer Service at the following number:
Film, Coating, Pipe Applications: 1-800-231-3826
Molding Applications: 1-800-231-3828

Chevron Chemical Company
P.O. Box 7400, Orange, TX 77631-7400 • Phone (409) 886 7401

Orange Plant

February 18, 1992

Steve Severson
Gundle Lining Systems
1340 E. Richey
Houston, Texas 77073
FAX: (713)875-6010

CERTIFICATE OF ANALYSIS

Following is the data on the subject material as determined by the Quality Control Department:

Product	9642T	Lot Number	B011391
Chevron Order No.	CRN58352	Customer Order No.	134381
Package	GOCX58935	Ship Date	02-14-92
Production Date	--	Weight	163,100

Property	Value	Units
Melt Index	0.11	gms/10 min
Density	0.9390	gms/cc

The data set forth herein Has been carefully compiled by Chevron Chemical Company. However, there is no warranty of any kind, either express or implied, applicable to its use and the user assumes all risk and liability in connection therewith.

Sincerely,

G.G. Bertin
Supervisor
Quality Control

GGB/go

For inquiry, contact Customer Service at the following number:
Film, Coating, Pipe Applications: 1-800-231-3826
Molding Applications: 1-800-231-3828

SOLVAY POLYMERS

Quality Polymers Through Technology and People

February 24, 1992

Gundle Lining Systems
Materials Manager
19103 Gundle Avenue
Houston, TX 77073
2306787

Listed below are the data on XF836 shipments:

Solvay Order Number:	0C5497
Customer PO:	134385
Date Shipped:	02/24/92
Ship To:	WESTFIELD, TX
Lot Number:	C20220F06A
Hopper Car Number:	PTLX 41718
Weight, Lbs.:	182,900

MELT INDEX	0.13
DENSITY	0.938
ESCR	*

*Testing incomplete, we will advise

Sincerely,

Dr. J. Lon Thompson
Quality Administration Manager

sab

SOLVAY POLYMERS

Quality Polymers Through Technology and People

March 5, 1992

Gundle Lining Systems
Materials Manager
19103 Gundle Avenue
Houston, TX 77073
2306787

Listed below are the data on XF836 shipments:

Solvay Order Number:	0C5926
Customer PO:	008532
Date Shipped:	03/05/92
Ship To:	WESTFIELD, TX
Lot Number:	C20221F22A
Hopper Car Number:	PTLX 42360
Weight, Lbs.:	182,700
MELT INDEX	0.08
DENSITY	0.938
ESCR	*

*TESTING INCOMPLETE, WE WILL ADVISE.

Sincerely,

Dr. J. Lon Thompson
Quality Administration Manager

sab

Quantum Chemical Corporation

Quantum

USI Division

3400 Anamosa Road
P.O. Box 2919
Clinton, IA 52733-2919

MARCH 09 1992

FAX: 713-230-6787

ATTENTION: STEVE SEVERSON

CERTIFICATE OF ANALYSIS

ORDER NUMBER: DS50384
SHIPPED DATE: 03/06/92
CUSTOMER P.O. NUMBER: 008530
CUSTOMER NUMBER: 261099

SHIPPED TO: GUNDLE LINING SYSTEMS INC
1340 E RICHEY RD
WESTFIELD TX
77073

PRODUCT: LP510100 PETROTHENE LP5101-00 PRODUCED: 2/22/92
LOT NUMBER: I2DB52 RAILCAR: ACFX39243 WEIGHT SHIPPED: 184950 LB

	TEST RESULT
DENSITY, G/CC @ 23 C	0.938
MELT INDEX, G/10MIN.	0.15

SINCERELY,

DCampbell

QC ENGINEER

Quantum Chemical Corporation

Quantum

USI Division

3400 Anamosa Road
P.O. Box 2919
Clinton, IA 52733-2919

FAX: 713-230-6787

MARCH 12 1992

ATTENTION: STEVE SEVERSON

C E R T I F I C A T E O F A N A L Y S I S

ORDER NUMBER: DS50385
SHIPPED DATE: 03/11/92
CUSTOMER P.O. NUMBER: 008530
CUSTOMER NUMBER: 261099

SHIPPED TO: GUNDLE LINING SYSTEMS INC
1340 E RICHEY RD
WESTFIELD TX
77073

RODUCT: LP510100 PETROTHENE LP5101-00 PRODUCED: 2/21/92
OT NUMBER: I2DA51 RAILCAR: ACFX66076 WEIGHT SHIPPED: 187100 LBS

	TEST RESULT
DENSITY, G/CC @ 23 C	0.938
MELT INDEX, G/10MIN.	0.13

SINCERELY,

D Campbell

QC ENGINEER

Chevron

Chevron Chemical Company
P.O. Box 7400, Orange, TX 77631-7400 • Phone (409) 886-7491

Orange Plant

March 19, 1992

Gundle Lining Systems
19103 Gundle Road
Houston, Texas 77073
FAX: 713-230-6787

Attention: Steve Severson - Gundle Materials Manager

CERTIFICATE OF RAILCAR ANALYSIS

Product Type	9642T
Railcar Number	CHVX889518
Lot Number	B011435
Ship Date	03-18-92
Quantity/Weight	177,100 lbs.
Customer P. O. #	008526
Chevron Order #	CRN60528

Following is the data on the subject material as determined by the Quality Control Department:

TEST RESULTS

Property	ASTM Method	Value	Units
Density	D1505	0.9401	gms/cc
Melt Index	D1238 Cond. E	0.18	gms/10 min.

ESCR incomplete, we will advise after 500 hours.

The data set forth herein has been carefully compiled by Chevron Chemical Company. However, there is no warranty of any kind, either express or implied, applicable to its use and the user assumes all risk and liability in connection therewith.

Sincerely,

G. G. Bertin
Supervisor
Quality Control

GGB\gc

cc: Rick Schaefer - Gundle Lab Manager

APPENDIX C-3

GEOMEMBRANE ROLL QUALITY CONTROL CERTIFICATES AND ASSURANCE CERTIFICATES

November 1993

937-4207

Golder Construction Services, Inc.

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032092
ROLL # : 06010659

MANF. DATE : 03/20/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3216	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4617	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	750	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	42	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032092
ROLL # : 06010660

MANF. DATE : 03/20/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3216	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4617	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	750	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	42	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032092
ROLL # : 06010662

MANF. DATE : 03/20/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-2	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3199	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4360	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	714	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	41	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032192
ROLL # : 06010663

MANF. DATE : 03/21/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-2	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2782	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5679	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	880	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032192
ROLL # : 06010664

MANF. DATE : 03/21/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-2	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2782	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5679	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	880	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032192
ROLL # : 06010667

MANF. DATE : 03/21/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2961 ✓	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5463	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	835	
Puncture Resistance (lbs)	2ND ROLL	52 min	84	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032192
ROLL # : 06010669

MANF. DATE : 03/21/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3450	D 638
T.S. Break (psi)	2ND ROLL	4000 min	6178	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	903	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032192
ROLL # : 06010671

MANF. DATE : 03/21/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3235	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5749	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	890	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	41	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032292
ROLL # : 06010674

MANF. DATE : 03/22/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2818	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5213	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	838	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032292
ROLL # : 06010677

MANF. DATE : 03/22/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	46	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2878	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5631	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	889	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PLCX42413
MATERIAL : HDPE 040 MIL
BATCH # : 032392
ROLL # : 06010689

MANF. DATE : 03/23/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2871	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5319	Type IV
Elong. Yield %	2ND ROLL	13 min	19	2 ipm
Elong. Break %	2ND ROLL	700 min	861	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032492
ROLL # : 06010704

MANF. DATE : 03/24/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.941	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3168	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5740	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	835	
Puncture Resistance (lbs)	2ND ROLL	52 min	81	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032492
ROLL # : 06010706

MANF. DATE : 03/24/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.941	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3117	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5579	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	847	
Puncture Resistance (lbs)	2ND ROLL	52 min	84	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R. J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032492
ROLL # : 06010707

MANF. DATE : 03/24/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.941	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3117	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5579	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	847	
Puncture Resistance (lbs)	2ND ROLL	52 min	84	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032592
ROLL # : 06010714

MANF. DATE : 03/25/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3077	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5335	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	835	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032592
ROLL # : 06010715

MANF. DATE : 03/25/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3077	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5335	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	835	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032592
ROLL # : 06010716

MANF. DATE : 03/25/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3051	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4936	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	790	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032592
ROLL # : 06010717

MANF. DATE : 03/25/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3051	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4936	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	790	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032592
ROLL # : 06010718

MANF. DATE : 03/25/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2921	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5423	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	864	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032592
ROLL # : 06010719

MANF. DATE : 03/25/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43 ✓	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2921	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5423	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	864	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032692
ROLL # : 06010721

MANF. DATE : 03/26/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2780	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5297	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	855	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	34	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032692
ROLL # : 06010722

MANF. DATE : 03/26/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2650	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5173	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	856	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032692
ROLL # : 06010728

MANF. DATE : 03/26/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3054	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5838	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	919	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032692
ROLL # : 06010729

MANF. DATE : 03/26/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3005	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5678	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	888	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032892
ROLL # : 06010746

MANF. DATE : 03/28/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3085	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5558	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	851	
Puncture Resistance (lbs)	2ND ROLL	52 min	78	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032892
ROLL # : 06010756

MANF. DATE : 03/28/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3349	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5486	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	830	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX891174
MATERIAL : HDPE 040 MIL
BATCH # : 032992
ROLL # : 06010766

MANF. DATE : 03/29/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3013	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5252	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	831	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033092
ROLL # : 06010774

MANF. DATE : 03/30/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3028	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5110	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	785	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033092
ROLL # : 06010775

MANF. DATE : 03/30/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3028	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5110	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	785	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033092
ROLL # : 06010776

MANF. DATE : 03/30/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2794	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5170	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	828	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 06010787

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2842	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5278	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	833	
Puncture Resistance (lbs)	2ND ROLL	52 min	84	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 06010788

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER		TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness	(mils)	EVERY ROLL	40 min	43 ✓	D 1593
Carbon Black	(%)	1/SHIFT	2.0 to 3.0	2.5 ✓	D 1603
Carbon Black Dispersion		1/SHIFT	A-1/A-2/B-1	A-1 ✓	D 3015
Melt Index	(g/10 min)	1/SHIFT	0.30 max	0.12 ✓	D 1238 E
Density	(g/cm3)	1/SHIFT	0.940 min	0.947 ✓	D 1505 A
Tensile Properties:					
T.S. Yield	(psi)	2ND ROLL	2300 min	2842 ✓	D 638
T.S. Break	(psi)	2ND ROLL	4000 min	5278 ✓	Type IV
Elong. Yield	%	2ND ROLL	13 min	17 ✓	2 ipm
Elong. Break	%	2ND ROLL	700 min	833	
Puncture Resistance	(lbs)	2ND ROLL	52 min	84	FTMS 101,Method 2065
Tear Resistance	(lbs)	2ND ROLL	30 min	39 ✓	D 1004,Die C
Low Temp.Brittleness	degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack	hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance		CERTIFIED	100 PPHM		
Dimensional Stability		CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 06010789

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3031	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5249	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	791	
Puncture Resistance (lbs)	2ND ROLL	52 min	67	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

B.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 06010790

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3031	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5249	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	791	
Puncture Resistance (lbs)	2ND ROLL	52 min	67	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 06010791

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2664	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4999	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	817	
Puncture Resistance (lbs)	2ND ROLL	52 min	82	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 06010792

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2664	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4999	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	817	
Puncture Resistance (lbs)	2ND ROLL	52 min	82	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 06010793

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3026	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5102	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	770	
Puncture Resistance (lbs)	2ND ROLL	52 min	81	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 06010794

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3026	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5102	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	770	
Puncture Resistance (lbs)	2ND ROLL	52 min	81	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 06010795

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2987	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5270	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	807	
Puncture Resistance (lbs)	2ND ROLL	52 min	84	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 06010796

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2987	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5270	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	807	
Puncture Resistance (lbs)	2ND ROLL	52 min	84	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 06010797

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3116	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5311	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	800	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 06010798

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.944	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3116	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5311	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	800	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 06010799

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	41	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2758	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4849	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	775	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 06010800

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER		TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)		EVERY ROLL	40 min	43	D 1593
Carbon Black	(%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion		1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index	(g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density	(g/cm3)	1/SHIFT	0.940 min	0.944	D 1505 A
Tensile Properties:					
T.S. Yield	(psi)	2ND ROLL	2300 min	2729	D 638
T.S. Break	(psi)	2ND ROLL	4000 min	5023	Type IV
Elong. Yield	%	2ND ROLL	13 min	17	2 ipm
Elong. Break	%	2ND ROLL	700 min	819	
Puncture Resistance	(lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance	(lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness	degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack	hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance		CERTIFIED	100 PPHM		
Dimensional Stability		CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 06010802

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.944	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2718	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4800	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	786	
Puncture Resistance (lbs)	2ND ROLL	52 min	82	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 06010804

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2917	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5110	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	784	
Puncture Resistance (lbs)	2ND ROLL	52 min	92	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 06010805

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2917	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5110	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	784	
Puncture Resistance (lbs)	2ND ROLL	52 min	92	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 06010806

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3084	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5120	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	761	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 06010807

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3084	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5120	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	761	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 06010808

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3073	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5420	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	829	
Puncture Resistance (lbs)	2ND ROLL	52 min	87	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 06010810

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2996	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5427	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	811	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 06010811

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2996	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5427	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	811	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 06010812

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2956	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4826	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	762	
Puncture Resistance (lbs)	2ND ROLL	52 min	94	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	34	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 06010814

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2883	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4944	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	766	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	33	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 06010815

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2883	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4944	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	766	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	33	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 06010816

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3000	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4919	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	784	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 06010817

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3000	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4919	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	784	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 06010818

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3128	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5046	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	753	
Puncture Resistance (lbs)	2ND ROLL	52 min	91	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

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Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 06010819

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3128	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5046	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	753	
Puncture Resistance (lbs)	2ND ROLL	52 min	91	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 06010820

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3084	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4323	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	726	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 06010822

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3100	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4840	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	716	
Puncture Resistance (lbs)	2ND ROLL	52 min	92	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 06010823

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3100	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4840	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	716	
Puncture Resistance (lbs)	2ND ROLL	52 min	92	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 06010824

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45 ✓	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4 ✓	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10 ✓	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945 ✓	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2746 ✓	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4461 ✓	Type IV
Elong. Yield %	2ND ROLL	13 min	17 ✓	2 ipm
Elong. Break %	2ND ROLL	700 min	740 ✓	
Puncture Resistance (lbs)	2ND ROLL	52 min	78 ✓	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	34 ✓	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 06010825

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2746	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4461	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	740	
Puncture Resistance (lbs)	2ND ROLL	52 min	78	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	34	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 06010826

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2839	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4476	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	725	
Puncture Resistance (lbs)	2ND ROLL	52 min	80	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	34	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

B.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 06010827

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43 ✓	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3 ✓	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1 ✓	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2839 ✓	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4476 ✓	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	725	
Puncture Resistance (lbs)	2ND ROLL	52 min	80	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	34 ✓	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 06010828

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44 ✓	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3 ✓	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1 ✓	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11 ✓	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947 ✓	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2919 ✓	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5740	Type IV
Elong. Yield %	2ND ROLL	13 min	15 ✓	2 ipm
Elong. Break %	2ND ROLL	700 min	878 ✓	
Puncture Resistance (lbs)	2ND ROLL	52 min	74 ✓	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39 ✓	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 06010829

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2919	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5740	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	878	"
Puncture Resistance (lbs)	2ND ROLL	52 min	74	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX890068
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 06010830

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3106	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5143	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	792	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 06010832

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3152	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5302	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	812	
Puncture Resistance (lbs)	2ND ROLL	52 min	75	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 06010833

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43 ✓	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3152 ✓	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5302	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	812	
Puncture Resistance (lbs)	2ND ROLL	52 min	75	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 06010835

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43 ✓	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3 ✓	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1 ✓	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11 ✓	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947 ✓	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3098 ✓	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5628 ✓	Type IV
Elong. Yield %	2ND ROLL	13 min	15 ✓	2 ipm
Elong. Break %	2ND ROLL	700 min	855 ✓	
Puncture Resistance (lbs)	2ND ROLL	52 min	76 ✓	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39 ✓	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040492
ROLL # : 06010836

MANF. DATE : 04/04/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43 ✓	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3 ✓	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1 ✓	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11 ✓	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947 ✓	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2686	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5295	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	889	
Puncture Resistance (lbs)	2ND ROLL	52 min	85 ✓	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040492
ROLL # : 06010838

MANF. DATE : 04/04/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43 ✓	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3 ✓	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947 ✓	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2828 ✓	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4346 ✓	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	764	
Puncture Resistance (lbs)	2ND ROLL	52 min	100 ✓	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040492
ROLL # : 06010840

MANF. DATE : 04/04/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2777	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5018	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	833	
Puncture Resistance (lbs)	2ND ROLL	52 min	84	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040492
ROLL # : 06010841

MANF. DATE : 04/04/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER		TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness	(mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black	(%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion		1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index	(g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density	(g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:					
T.S. Yield	(psi)	2ND ROLL	2300 min	2777	D 638
T.S. Break	(psi)	2ND ROLL	4000 min	5018	Type IV
Elong. Yield	%	2ND ROLL	13 min	16	2 ipm
Elong. Break	%	2ND ROLL	700 min	833	
Puncture Resistance	(lbs)	2ND ROLL	52 min	84	FTMS 101,Method 2065
Tear Resistance	(lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness	degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack	hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance		CERTIFIED	100 PPHM		
Dimensional Stability		CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040492
ROLL # : 06010842

MANF. DATE : 04/04/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3198	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5853	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	861	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040492
ROLL # : 06010843

MANF. DATE : 04/04/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45 ✓	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3 ✓	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1 ✓	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3198 ✓	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5853 ✓	Type IV
Elong. Yield %	2ND ROLL	13 min	15 ✓	2 ipm
Elong. Break %	2ND ROLL	700 min	861 ✓	
Puncture Resistance (lbs)	2ND ROLL	52 min	90 ✓	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40 ✓	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040492
ROLL # : 06010844

MANF. DATE : 04/04/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2827	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5113	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	900	
Puncture Resistance (lbs)	2ND ROLL	52 min	91	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040492
ROLL # : 06010845

MANF. DATE : 04/04/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45 ✓	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947 ✓	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2827 ✓	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5113	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	900	
Puncture Resistance (lbs)	2ND ROLL	52 min	91	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040492
ROLL # : 06010846

MANF. DATE : 04/04/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3022	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5419	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	893	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040492
ROLL # : 06010847

MANF. DATE : 04/04/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3022	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5419	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	893	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040592
ROLL # : 06010848

MANF. DATE : 04/05/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2807	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5528	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	894	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040592
ROLL # : 06010849

MANF. DATE : 04/05/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER		TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness	(mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black	(%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion		1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index	(g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density	(g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:					
T.S. Yield	(psi)	2ND ROLL	2300 min	2807	D 638
T.S. Break	(psi)	2ND ROLL	4000 min	5528	Type IV
Elong. Yield	%	2ND ROLL	13 min	17	2 ipm
Elong. Break	%	2ND ROLL	700 min	894	
Puncture Resistance	(lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance	(lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness	degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack	hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance		CERTIFIED	100 PPHM		
Dimensional Stability		CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040592
ROLL # : 06010850

MANF. DATE : 04/05/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2879	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5471	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	887	
Puncture Resistance (lbs)	2ND ROLL	52 min	74	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	33	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040592
ROLL # : 06010852

MANF. DATE : 04/05/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2763	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5263	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	880	
Puncture Resistance (lbs)	2ND ROLL	52 min	76	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040592
ROLL # : 06010853

MANF. DATE : 04/05/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2763	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5263	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	880	
Puncture Resistance (lbs)	2ND ROLL	52 min	76	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040592
ROLL # : 06010854

MANF. DATE : 04/05/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3045	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5449	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	905	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R. J. Schaefer
Quality Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040592
ROLL # : 06010855

MANF. DATE : 04/05/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3045	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5449	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	905	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040592
ROLL # : 06010856

MANF. DATE : 04/05/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3062	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5566	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	919	
Puncture Resistance (lbs)	2ND ROLL	52 min	87	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040592
ROLL # : 06010857

MANF. DATE : 04/05/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3062	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5566	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	919	
Puncture Resistance (lbs)	2ND ROLL	52 min	87	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040592
ROLL # : 06010858

MANF. DATE : 04/05/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2823	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5226	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	896	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040692
ROLL # : 06010860

MANF. DATE : 04/06/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2826	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4834	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	792	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040692
ROLL # : 06010861

MANF. DATE : 04/06/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	41	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2826	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4834	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	792	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040692
ROLL # : 06010863

MANF. DATE : 04/06/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2595	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5203	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	858	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040692
ROLL # : 06010864

MANF. DATE : 04/06/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2790	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5441	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	895	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040692
ROLL # : 06010865

MANF. DATE : 04/06/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2790	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5441	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	895	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040692
ROLL # : 06010868

MANF. DATE : 04/06/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2791	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4933	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	860	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040692
ROLL # : 06010870

MANF. DATE : 04/06/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	41	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2905	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5568	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	915	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040792
ROLL # : 06010877

MANF. DATE : 04/07/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.18	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2890	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4866	Type IV
Elong. Yield %	2ND ROLL	13 min	18	2 ipm
Elong. Break %	2ND ROLL	700 min	774	
Puncture Resistance (lbs)	2ND ROLL	52 min	91	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	47	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040792
ROLL # : 06010878

MANF. DATE : 04/07/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.18	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2908	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4851	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	770	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040792
ROLL # : 06010879

MANF. DATE : 04/07/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.18	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2908	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4851	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	770	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040792
ROLL # : 06010884

MANF. DATE : 04/07/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.3	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.18	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3016	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5124	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	806	
Puncture Resistance (lbs)	2ND ROLL	52 min	97	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040892
ROLL # : 06010885

MANF. DATE : 04/08/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2833	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5195	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	825	
Puncture Resistance (lbs)	2ND ROLL	52 min	87	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	34	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040892
ROLL # : 06010888

MANF. DATE : 04/08/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.2	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2813	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4322	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	710	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	32	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040892
ROLL # : 06010889

MANF. DATE : 04/08/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.2	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.12	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2874	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4266	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	702	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	32	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040892
ROLL # : 06010890

MANF. DATE : 04/08/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2874	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4266	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	702	
Puncture Resistance (lbs)	2ND ROLL	52 min	83	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	32	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040892
ROLL # : 06010894

MANF. DATE : 04/08/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2924	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4711	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	760	
Puncture Resistance (lbs)	2ND ROLL	52 min	87	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040892
ROLL # : 06010895

MANF. DATE : 04/08/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2891	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4594	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	740	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Assurance Certificate

RAILCAR : GOCX58335
MATERIAL : HDPE 040 MIL
BATCH # : 040892
ROLL # : 06010896

MANF. DATE : 04/08/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2891	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4594	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	740	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Control Certificate

RAILCAR : CHVX889518
MATERIAL : HDPE 040 MIL
BATCH # : 040992
ROLL # : 06010899

MANF. DATE : 04/09/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2835	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5286	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	846	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	36	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Quality Manager

Gundle®

Quality Assurance Certificate

RAILCAR : ACFX39243
MATERIAL : HDPE 040 MIL
BATCH # : 032092
ROLL # : 07006822

MANF. DATE : 03/20/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3367	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4931	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	772	
Puncture Resistance (lbs)	2ND ROLL	52 min	93	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	44	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : ACFX39243
MATERIAL : HDPE 040 MIL
BATCH # : 032192
ROLL # : 07006826

MANF. DATE : 03/21/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2693	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5321	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	868	
Puncture Resistance (lbs)	2ND ROLL	52 min	78	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : ACFX39243
MATERIAL : HDPE 040 MIL
BATCH # : 032192
ROLL # : 07006829

MANF. DATE : 03/21/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	46 ✓	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4 ✓	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.13	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2567	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5146	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	859	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : ACFX39243
MATERIAL : HDPE 040 MIL
BATCH # : 032192
ROLL # : 07006834

MANF. DATE : 03/21/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.17	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3221	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4776	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	764	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : ACFX39243
MATERIAL : HDPE 040 MIL
BATCH # : 032292
ROLL # : 07006839

MANF. DATE : 03/22/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.17	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2521	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4903	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	847	
Puncture Resistance (lbs)	2ND ROLL	52 min	72	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	41	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : ACFX66076
MATERIAL : HDPE 040 MIL
BATCH # : 032492
ROLL # : 07006865

MANF. DATE : 03/24/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	3.0	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2692	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5495	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	894	
Puncture Resistance (lbs)	2ND ROLL	52 min	87	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : ACFX66076
MATERIAL : HDPE 040 MIL
BATCH # : 032492
ROLL # : 07006867

MANF. DATE : 03/24/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.14	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2855	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5098	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	804	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : ACFX66076
MATERIAL : HDPE 040 MIL
BATCH # : 032592
ROLL # : 07006871

MANF. DATE : 03/25/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.15	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2631	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5135	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	846	
Puncture Resistance (lbs)	2ND ROLL	52 min	87	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX41718
MATERIAL : HDPE 040 MIL
BATCH # : 033092
ROLL # : 07006926

MANF. DATE : 03/30/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3010	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5230	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	810	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX41718
MATERIAL : HDPE 040 MIL
BATCH # : 033092
ROLL # : 07006927

MANF. DATE : 03/30/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3010	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5230	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	810	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX41718
MATERIAL : HDPE 040 MIL
BATCH # : 033092
ROLL # : 07006928

MANF. DATE : 03/30/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2736	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4906	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	798	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX41718
MATERIAL : HDPE 040 MIL
BATCH # : 033092
ROLL # : 07006929

MANF. DATE : 03/30/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.09	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2736	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4906	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	798	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 07006938

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2758	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5082	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	798	
Puncture Resistance (lbs)	2ND ROLL	52 min	91	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 07006939

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2758	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5082	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	798	
Puncture Resistance (lbs)	2ND ROLL	52 min	91	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 07006940

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2882	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4490	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL •	700 min	716	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 07006941

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2882	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4490	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	716	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 07006942

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2987	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5258	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	792	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 07006943

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2987	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5258	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	792	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 07006944

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER		TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)		EVERY ROLL	40 min	45	D 1593
Carbon Black	(%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion		1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index	(g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density	(g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:					
T.S. Yield	(psi)	2ND ROLL	2300 min	2982	D 638
T.S. Break	(psi)	2ND ROLL	4000 min	5058	Type IV
Elong. Yield	%	2ND ROLL	13 min	14	2 ipm
Elong. Break	%	2ND ROLL	700 min	767	
Puncture Resistance (lbs)		2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance	(lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF		CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs		CERTIFIED	1500 min		D 1693
Ozone Resistance		CERTIFIED	100 PPHM		
Dimensional Stability		CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 07006945

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2982	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5058	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	767	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 07006946

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.4	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.945	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2905	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5036	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	789	
Puncture Resistance (lbs)	2ND ROLL	52 min	93	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 033192
ROLL # : 07006947

MANF. DATE : 03/31/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	46	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-2	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.05	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.944	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2905	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5036	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	789	
Puncture Resistance (lbs)	2ND ROLL	52 min	93	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 07006948

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-2	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.05	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.944	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2541	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4691	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	802	
Puncture Resistance (lbs)	2ND ROLL	52 min	91	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 07006949

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	45	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-2	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.05	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.944	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2541	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4691	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	802	
Puncture Resistance (lbs)	2ND ROLL	52 min	91	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 07006950

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-2	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.05	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.944	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2566	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4912	Type IV
Elong. Yield %	2ND ROLL	13 min	17	2 ipm
Elong. Break %	2ND ROLL	700 min	826	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 07006952

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2944	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5149	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	790	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 07006954

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2878	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5358	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	811	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 07006955

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2878	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5358	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	811	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040192
ROLL # : 07006958

MANF. DATE : 04/01/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.07	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3031	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5473	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	809	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 07006959

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.07	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2665	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4461	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	740	
Puncture Resistance (lbs)	2ND ROLL	52 min	82	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 07006960

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.07	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2665	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4461	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	740	
Puncture Resistance (lbs)	2ND ROLL	52 min	82	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 07006961

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER		TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness	(mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black	(%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion		1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index	(g/10 min)	1/SHIFT	0.30 max	0.07	D 1238 E
Density	(g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:					
T.S. Yield	(psi)	2ND ROLL	2300 min	2794	D 638
T.S. Break	(psi)	2ND ROLL	4000 min	4697	Type IV
Elong. Yield	%	2ND ROLL	13 min	15	2 ipm
Elong. Break	%	2ND ROLL	700 min	718	
Puncture Resistance	(lbs)	2ND ROLL	52 min	74	FTMS 101,Method 2065
Tear Resistance	(lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness	degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack	hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance		CERTIFIED	100 PPHM		
Dimensional Stability		CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 07006963

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.07	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2948	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4706	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	701	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 07006964

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.07	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2948	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4706	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	701	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 07006965

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.07	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2947	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4631	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	709	
Puncture Resistance (lbs)	2ND ROLL	52 min	89	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 07006967

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.07	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3013	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4851	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	723	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040292
ROLL # : 07006968

MANF. DATE : 04/02/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	43	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	B-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.07	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3013	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4851	Type IV
Elong. Yield %	2ND ROLL	13 min	14	2 ipm
Elong. Break %	2ND ROLL	700 min	723	
Puncture Resistance (lbs)	2ND ROLL	52 min	88	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	38	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 07006969

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.7	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	B-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.07	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2672	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4305	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	718	
Puncture Resistance (lbs)	2ND ROLL	52 min	92	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Assurance Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 07006970

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER		TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness	(mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black	(%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion		1/SHIFT	A-1/A-2/B-1	B-1	D 3015
Melt Index	(g/10 min)	1/SHIFT	0.30 max	0.07	D 1238 E
Density	(g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:					
T.S. Yield	(psi)	2ND ROLL	2300 min	2672	D 638
T.S. Break	(psi)	2ND ROLL	4000 min	4305	Type IV
Elong. Yield	%	2ND ROLL	13 min	16	2 ipm
Elong. Break	%	2ND ROLL	700 min	718	
Puncture Resistance	(lbs)	2ND ROLL	52 min	92	FTMS 101,Method 2065
Tear Resistance	(lbs)	2ND ROLL	30 min	39	D 1004,Die C
Low Temp.Brittleness	degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack	hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance		CERTIFIED	100 PPHM		
Dimensional Stability		CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 07006971

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	B-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.07	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.947	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2769	D 638
T.S. Break (psi)	2ND ROLL	4000 min	4555	Type IV
Elong. Yield %	2ND ROLL	13 min	15	2 ipm
Elong. Break %	2ND ROLL	700 min	746	
Puncture Resistance (lbs)	2ND ROLL	52 min	86	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	34	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

R.J. Schaefer
Lab Manager

Gundle®

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 040392
ROLL # : 07006973

MANF. DATE : 04/03/1992
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	44	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.08	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2902	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5707	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	862	
Puncture Resistance (lbs)	2ND ROLL	52 min	85	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	40	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance	CERTIFIED	100 PPHM		
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

B.J. Schaefer
Lab Manager

®

Quality Assurance Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 090793
ROLL # : 9990907931

MANF. DATE : 09/07/93
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	42	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.6	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.10	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.948	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	2907	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5079	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	816	
Puncture Resistance (lbs)	2ND ROLL	52 min	90	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	37	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance(100PPHM)	CERTIFIED	100 PPHM		D 1149
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

Darlene PhouangSavanh
Project Supervisor

®

(2)

Quality Control Certificate

RAILCAR : PTLX42360
MATERIAL : HDPE 040 MIL
BATCH # : 090793
ROLL # : 9990907932

MANF. DATE : 09/07/93
PROJECT NAME : COOP POWER ASH EVAP
MR NUMBER : 7346-01 PROJECT # : G147
LOCATION : AVON MN

TEST PARAMETER	TESTING FREQUENCY	REQUIRED SPECIFICATIONS	TEST RESULTS	ASTM METHOD
Average Thickness (mils)	EVERY ROLL	40 min	40	D 1593
Carbon Black (%)	1/SHIFT	2.0 to 3.0	2.5	D 1603
Carbon Black Dispersion	1/SHIFT	A-1/A-2/B-1	A-1	D 3015
Melt Index (g/10 min)	1/SHIFT	0.30 max	0.11	D 1238 E
Density (g/cm3)	1/SHIFT	0.940 min	0.946	D 1505 A
Tensile Properties:				
T.S. Yield (psi)	2ND ROLL	2300 min	3045	D 638
T.S. Break (psi)	2ND ROLL	4000 min	5025	Type IV
Elong. Yield %	2ND ROLL	13 min	16	2 ipm
Elong. Break %	2ND ROLL	700 min	801	
Puncture Resistance (lbs)	2ND ROLL	52 min	80	FTMS 101,Method 2065
Tear Resistance (lbs)	2ND ROLL	30 min	35	D 1004,Die C
Low Temp.Brittleness degF	CERTIFIED	-112 max		D 746
Environ.Stress Crack hrs	CERTIFIED	1500 min		D 1693
Ozone Resistance(100PPHM)	CERTIFIED	100 PPHM		D 1149
Dimensional Stability	CERTIFIED	-1 to 1		D 1204 (212F,1 hour)

CERTIFIED BY:

Darlene PhouangSavanh
Project Supervisor

APPENDIX C-4

WELDING ROD QUALITY CONTROL CERTIFICATES

PHILLIPS 66 COMPANY
A DIVISION OF PHILLIPS PETROLEUM COMPANY
PASADENA, TEXAS 77501-0792
BOX 792 PHONE: 713-475-5666

PHILLIPS PLASTICS RESINS
Houston Chemical Complex

May 11, 1993

JHV# 4249-93

FAX: 713 443 4627

Gundle Lining Systems Inc.
1340 East Richey Road
Houston, TX 77073

ATTN: Rick Schaefer

This letter will certify that the Marlex* resin shown below, as supplied by Phillips 66 Company, conforms to our manufacturing specification.

Type:	K304
Lot Number:	7130369
P.O. Number:	S021569
Date shipped:	05/10/93
Package:	PSPX 5776
Quantity:	176800 lbs.
Melt Index:	.12 gm/10 min.
Density:	.939 gm/cc

J. H. Vaden
Quality Assurance Manager
PHILLIPS 66 COMPANY

JHV:PSN:ad

* Reg. U.S. Pat. Off.

cc: QA-File-RC.
E. E. Fogle

Gundle®

GUNDLE LABORATORY
MELT INDEX / DENSITY

DATE TEST: 05/14/93
RAIL CAR # PSPX5776
PRODUCT CODE: KS04
MANUFACTURER: PHILLIPS

	MELT INDEX ASTM D1238,E (G/10MIN.) TEST RESULTS	DENSITY ASTM D1505 (G/CC) TEST RESULTS
1.	0.12	0.936
2.	0.12	0.936
3.	0.12	0.935
4.	0.13	0.936
5.	0.12	0.936
6.	0.13	0.937
7.	0.13	0.936
8.	0.13	0.936
AVG.	0.125	0.936
STD.		

RATIO (N/E): 125

Gundle®

GUNDLE LABORATORY
WELDING ROD

DATE TEST: 05/18/93
HATCH NO#: 051893
HAILCAR NO#: PSPX5776

MELT INDEX	DENSITY	CARBON BLACK CONTENT
ASTM D1238,E	ASTM D1505	ASTM D1603
(G/10MIN)	(G/CC)	(%)
TEST RESULT	TEST RESULT	TEST RESULT
0.13	0.944	2.0

10/18/93 14:04 8875 6010 GUNDLE LINING ••• COLDER-CCS 009

Chevron

June 11, 1993

Chevron Chemical Company
Orange Plant
P.O. Box 7400
Orange, TX 77631-7400
Phone 409 886 7401

GUNDLE LINING SYSTEM
19103 GUNDLE ROAD
HOUSTON TX 77073

Attention: Don Bohac

CERTIFICATE OF RAILCAR ANALYSIS

Product Type	0642
Railcar Number	GOCX058495
Lot Number	C061085
Ship Date	6-10-93
Quantity/Weight	179,800
Customer P. O. #	S022212
Chevron Order #	CRN76244

Following is the data on the subject material as determined by the Quality Control Department:

TEST RESULTS

Property	ASTM Method	Value	Units
Density	D1505	0.9410	gms/cc
Melt Index	D1238 Cond. E	0.10	gms/10 min.
HLMI		18.1	gms/10 min.
HLMI/MI RATIO (Melt Flow)		100.6	

The data set forth herein has been carefully compiled by Chevron Chemical Company. However, there is no warranty of any kind, either express or implied, applicable to its use and the user assumes all risk and liability in connection therewith.

Sincerely,

G. G. Bertin
Supervisor
Quality Control

FAX: 713-443-4627

For inquiry, contact Customer Service at the following number:
Film, Coating, Pipe Applications: 1-800-231-3626
Molding Applications: 1-800-231-3626

Gundle®

GUNDLE LABORATORY
MELT INDEX / DENSITY

DATE TEST: 06/24/93
RAIL CAR #: GOCX58495
PRODUCT CODE: 9642
MANUFACTURER: CHEVRON

	MELT INDEX ASTM D1238,E (G/10MIN.) TEST RESULTS	DENSITY ASTM D1505 (G/CC) TEST RESULTS
1.	0.18	0.936
2.	0.18	0.935
3.	0.19	0.936
4.	0.18	0.936
5.	0.19	0.935
6.	0.18	0.935
7.	0.18	0.936
8.	0.19	0.936
AVG.	0.1	0.936
STD.		

RATIO (N/E): 80.44%

LOUIS MOORE
LAB MANAGER

10/18/93 14:03 ☎875 6010 GUNDLE LINING --- COLDER-CCS 007

Gundle®

GUNDLE LABORATORY
WELDING ROD

DATE TEST: 07/07/93
BATCH NO#: 070793
RAIL CAR NO#: GOCX58495

MELT INDEX ASTM D1238,E (G/10MIN)	DENSITY ASTM D1505 (G/CC)	CARBON BLACK CONTENT ASTM D1603 (%)
TEST RESULT	TEST RESULT	TEST RESULT
0.17	0.947	2.9

10/18/93 14:03 8875 6010 GUNDLE LINING --- COLDER-CCS 005

APPENDIX D

GEOMEMBRANE CONFORMANCE TEST RESULTS

APPENDIX D-1

GEOMEMBRANE MATERIAL SPECIFICATIONS

November 1993

937-4207

Golder Construction Services, Inc.

FML SPECIFICATIONS – 40 MIL HDPE

Property	Test Method	Value
Thickness, minimum certifiable, mils	ASTM D751	40
Density (minimum)	ASTM D792 Method A	0.94
Melt Flow Index (g/10 min., maximum)	ASTM D1238 Condition E (190° C, 2.16 kg)	0.40
Minimum Tensile Properties (Each direction)	ASTM D638	
1. Tensile Strength at Break (pounds/inch width)		152.00
2. Tensile Strength at Yield (pounds/inch width)		84.00
3. Elongation at Break (percent)		560.00
4. Elongation at Yield (percent)		12.00
Tear Resistance Initiation (lbs. min.)	ASTM D1004 Die C	26.00
Low Temperature/Brittleness	ASTM D746 Procedure B	-60°
Dimensional Stability (Each direction, % change max.)	ASTM D1204 212′ 15 min.	± 2
Ozone Resistance	ASTM D1149 7 days 100 pphm, 104°F Magnification	No Cracks 7 x
Environmental Stress Crack (Minimum Hours)	ASTM D1693 Condition C (100°C)	1000
Bonded Seam Shear Strength (lb/in)	ASTM D4437	80
Seam Peel Adhesion (lb/in minimum)	ASTM D4437	52,FTB[1]
Carbon Black Dispersion Acceptable Levels	ASTM D3015 (as modified in Apprendix A)	A-1,A-2 or B-1
Puncture Resistance, Minimum, Pounds	FTMS 101, Method 2065	48
Elevated Temperature 158°F 25% Bonded Seam Load	See NSF Std. Appendix A	Pass

[1]FTB – Film Tear Bond (No sample shall fail in Peel or Shear)

APPENDIX D-2

CONFORMANCE TEST RESULTS

MARCH 1992

SUMMARY OF GEOMEMBRANE CONFORMANCE TEST RESULTS

COOPERATIVE POWER
PONDS 91 & 93
NORTH DAKOTA

927-4003

ROLL DESIGNATION	6846	6852	0697	0717	0721	0729	6693	6859	6862	6866
THICKNESS (mils) ASTM D 374	45.1	44.2	44.4	43.4	43.3	43.5	42.7	46.4	44.2	46.6
SPECIFIC GRAVITY ASTM D 1505	0.949	0.946	0.950	0.949	0.950	0.950	0.950	0.949	0.951	0.949
STRENGTH AT YIELD (ppi)	104.8	106.4	119.0	113.0	108.9	118.1	101.8	101.5	108.8	118.1
MD/TD (1)	106.6	111.5	122.4	117.7	120.7	122.9	112.3	106.6	112.1	123.4
ASTM D 638										
STRENGTH AT BREAK (ppi)	210.0	195.8	217.8	202.5	205.8	218.9	201.4	204.3	206.4	200.3
MD/TD (1)	208.6	229.1	230.0	212.7	220.3	216.0	209.9	220.3	208.8	218.4
ASTM D 638										
ELONGATION AT YIELD (%)	20.9	22.7	20.6	22.9	21.7	21.7	19.8	19.5	20.5	20.7
MD/TD (1)	18.9	19.8	17.9	19.1	19.0	19.2	17.9	18.2	19.1	19.0
ASTM D 638										
ELONGATION AT BREAK (%)	794	750	814	818	818	820	788	822	778	752
MD/TD (1)	800	860	840	836	832	820	872	870	838	820
ASTM D 638										
CARBON BLACK CONTENT (%) ASTM D 1603	2.48	2.28	2.55	2.31	2.38	2.48	2.55	2.69	2.71	2.66
CARBON BLACK DISPERSION(2) ASTM D 3015	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1

(1) MD/TD corresponds to Machine Direction / Transverse Direction.

(2) Carbon black dispersion was tested according to ASTM D3015 and reported according to the ASTM D2663 dispersion classification chart.

MARCH 1992

SUMMARY OF GEOMEMBRANE CONFORMANCE TEST RESULTS

COOPERATIVE POWER
PONDS 91 & 93
NORTH DAKOTA

927-4003

ROLL DESIGNATION	0661	0665	0670	0674	0683	0688	6829	6833	6838	6842
THICKNESS (mils) ASTM D 374	46.6	44.2	45.8	46.7	46.3	47.4	46.1	44.5	47.3	45.0
SPECIFIC GRAVITY ASTM D 1505	0.950	0.950	0.951	0.948	0.950	0.950	0.949	0.949	0.950	0.947
STRENGTH AT YIELD (ppi)	116.8	114.4	104.0	117.6	115.3	125.5	100.6	110.8	116.1	107.4
MD/TD (1) ASTM D 638	120.8	119.2	110.9	123.7	117.9	128.8	113.5	110.3	121.4	115.6
STRENGTH AT BREAK (ppi)	214.1	228.4	226.6	234.5	235.0	225.1	192.5	192.5	213.4	214.6
MD/TD (1) ASTM D 638	239.2	228.8	235.6	243.9	251.9	234.3	213.1	224.2	237.3	216.4
ELONGATION AT YIELD (%)	21.0	21.9	20.9	22.0	19.8	22.1	22.1	20.2	21.7	19.7
MD/TD (1) ASTM D 638	18.8	19.9	18.8	19.0	18.8	20.1	19.8	18.0	19.2	20.3
ELONGATION AT BREAK (%)	782	846	866	848	820	808	770	748	802	828
MD/TD (1) ASTM D 638	878	828	838	818	848	820	808	798	844	822
CARBON BLACK CONTENT (%) ASTM D 1603	2.55	2.60	2.59	2.44	2.41	2.34	2.45	2.57	2.75	2.48
CARBON BLACK DISPERSION(2) ASTM D 3015	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1

(1) MD/TD corresponds to Machine Direction / Transverse Direction.

(2) Carbon black dispersion was tested according to ASTM D3015 and reported according to the ASTM D2663 dispersion classification chart.

APRIL 1992

SUMMARY OF GEOMEMBRANE CONFORMANCE TEST RESULTS

COOPERATIVE POWER
PONDS 91 & 93
NORTH DAKOTA

927-4003

ROLL DESIGNATION	6871	6925	6907	6912	6916	6921	6939	6940	6947	6952
THICKNESS (mils) ASTM D 374	45.4	44.2	45.6	45.2	45.9	43.6	47.5	47.0	47.3	44.2
SPECIFIC GRAVITY ASTM D 1505	0.950	0.949	0.949	0.949	0.949	0.949	0.950	0.950	0.950	0.950
STRENGTH AT YIELD (ppi)	104.8	98.9	97.8	105.4	101.3	95.0	109.8	103.4	111.4	101.0
MD/TD (1) ASTM D 638	116.8	109.9	102.7	110.1	107.6	113.7	122.8	114.6	124.3	109.3
STRENGTH AT BREAK (ppi)	195.8	194.3	210.1	212.8	188.8	202.5	208.6	215.0	219.3	200.1
MD/TD (1) ASTM D 638	219.8	221.1	227.2	225.1	225.4	220.4	243.1	229.3	228.9	212.7
ELONGATION AT YIELD (%)	21.6	23.1	20.8	20.1	21.7	22.3	22.1	24.0	21.9	27.1
MD/TD (1) ASTM D 638	17.6	18.0	19.0	18.2	17.7	18.4	16.9	18.9	18.4	22.5
ELONGATION AT BREAK (%)	768	812	840	858	786	836	836	830	830	810
MD/TD (1) ASTM D 638	830	828	916	834	876	862	844	822	814	800
CARBON BLACK CONTENT (%) ASTM D 1603	2.68	2.72	2.50	2.60	2.49	2.60	2.68	2.58	2.58	2.68
CARBON BLACK DISPERSION(2) ASTM D 3015	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1

(1) MD/TD corresponds to Machine Direction / Transverse Direction.

(2) Carbon black dispersion was tested according to ASTM D3015 and reported according to the ASTM D2663 dispersion classification chart.

MARCH 1992

SUMMARY OF GEOMEMBRANE CONFORMANCE TEST RESULTS

COOPERATIVE POWER
PONDS 91 & 93
NORTH DAKOTA

927-4003

ROLL DESIGNATION	0722	0742	0747	0756	0761	0765	0771	0774	6821	6895
THICKNESS (mils) ASTM D 374	43.4	43.7	44.4	44.1	43.5	44.7	43.0	43.9	45.6	44.7
SPECIFIC GRAVITY ASTM D 1505	0.952	0.952	0.950	0.950	0.950	0.950	0.950	0.949	0.950	0.949
STRENGTH AT YIELD (ppi)	109.0	111.4	113.0	110.7	107.6	109.6	110.6	107.8	114.1	99.8
MD/TD (1) ASTM D 638	119.0	118.7	119.8	119.7	115.5	117.3	116.9	112.5	114.4	101.7
STRENGTH AT BREAK (ppi)	209.3	217.5	220.6	200.4	214.0	219.7	217.0	205.5	174.8	200.8
MD/TD (1) ASTM D 638	222.6	218.9	233.9	229.1	235.6	210.9	219.1	211.5	214.9	208.6
ELONGATION AT YIELD (%)	20.9	21.7	20.8	21.9	21.2	21.4	22.6	22.3	21.7	23.9
MD/TD (1) ASTM D 638	18.6	19.0	19.4	19.6	18.9	19.8	19.0	19.8	19.5	19.9
ELONGATION AT BREAK (%)	810	832	832	786	812	834	816	820	702	806
MD/TD (1) ASTM D 638	856	876	850	842	854	830	834	834	828	866
CARBON BLACK CONTENT (%) ASTM D 1603	2.47	2.38	2.41	2.44	2.40	2.55	2.57	2.36	2.44	2.50
CARBON BLACK DISPERSION(2) ASTM D 3015	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1

(1) MD/TD corresponds to Machine Direction / Transverse Direction.

(2) Carbon black dispersion was tested according to ASTM D3015 and reported according to the ASTM D2663 dispersion classification chart.

APRIL 1992

SUMMARY OF GEOMEMBRANE CONFORMANCE TEST RESULTS

COOPERATIVE POWER
PONDS 91 & 93
NORTH DAKOTA

927–4003

ROLL DESIGNATION	0783	0787	0790	0795	0800	6957	0802	0814	0816	0820
THICKNESS (mils) ASTM D 374	43.3	43.3	43.7	43.0	42.6	45.8	43.9	44.7	42.5	42.6
SPECIFIC GRAVITY ASTM D 1505	0.949	0.949	0.949	0.950	0.950	0.950	0.951	0.950	0.950	0.949
STRENGTH AT YIELD (ppi)	111.9	109.2	101.9	106.2	99.2	108.9	106.2	110.7	108.4	109.0
MD/TD (1) ASTM D 638	114.2	111.2	106.2	114.3	108.7	120.3	115.5	117.2	115.0	115.5
STRENGTH AT BREAK (ppi)	220.5	215.2	202.2	205.7	199.0	200.5	192.6	224.0	202.7	201.9
MD/TD (1) ASTM D 638	197.5	222.3	232.9	239.9	237.2	231.2	221.6	243.0	227.7	224.7
ELONGATION AT YIELD (%)	20.8	21.8	24.3	23.6	26.8	20.7	21.5	20.5	22.2	27.5
MD/TD (1) ASTM D 638	17.9	19.5	21.2	19.2	21.1	18.1	18.0	17.7	24.0	23.7
ELONGATION AT BREAK (%)	840	832	774	818	804	798	748	834	778	780
MD/TD (1) ASTM D 638	798	864	872	888	886	832	854	860	830	838
CARBON BLACK CONTENT (%) ASTM D 1603	2.36	2.22	2.44	2.44	2.42	2.52	2.55	2.54	2.59	2.47
CARBON BLACK DISPERSION(2) ASTM D 3015	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1

(1) MD/TD corresponds to Machine Direction / Transverse Direction.

(2) Carbon black dispersion was tested according to ASTM D3015 and reported according to the ASTM D2663 dispersion classification chart.

APRIL 1992

SUMMARY OF GEOMEMBRANE CONFORMANCE TEST RESULTS

927-4003

COOPERATIVE POWER
PONDS 91 & 93
NORTH DAKOTA

ROLL DESIGNATION	0824	0828	0833	0838	0840	0850	0860	0862	6960	6972
THICKNESS (mils) ASTM D 374	44.2	43.3	43.4	43.8	43.0	43.3	42.5	41.8	44.9	45.7
SPECIFIC GRAVITY ASTM D 1505	0.951	0.947	0.951	0.950	0.950	0.951	0.951	0.951	0.951	0.951
STRENGTH AT YIELD (ppi)	114.2	115.4	112.1	113.5	112.5	110.7	106.6	107.9	110.0	108.3
MD/TD (1) ASTM D 638	121.5	122.2	120.1	117.4	118.4	114.5	115.4	115.4	117.8	120.8
STRENGTH AT BREAK (ppi)	216.0	205.6	197.7	219.3	207.3	228.7	210.0	199.3	211.6	209.9
MD/TD (1) ASTM D 638	239.0	242.1	222.0	232.6	224.9	234.0	211.4	209.6	218.0	258.6
ELONGATION AT YIELD (%)	26.6	26.5	26.5	26.0	27.5	24.9	29.4	26.9	28.8	24.4
MD/TD (1) ASTM D 638	22.5	29.6	27.4	24.8	19.1	26.1	26.8	26.0	23.5	17.4
ELONGATION AT BREAK (%)	786	758	768	812	794	852	814	798	818	818
MD/TD (1) ASTM D 638	848	848	814	842	854	856	838	844	786	842
CARBON BLACK CONTENT (%) ASTM D 1603	2.37	2.55	2.62	2.61	2.60	2.45	2.57	2.48	2.62	2.68
CARBON BLACK DISPERSION(2) ASTM D 3015	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1

(1) MD/TD corresponds to Machine Direction / Transverse Direction.

(2) Carbon black dispersion was tested according to ASTM D3015 and reported according to the ASTM D2663 dispersion classification chart.

APRIL 1992

SUMMARY OF GEOMEMBRANE CONFORMANCE TEST RESULTS

COOPERATIVE POWER
PONDS 91 & 93
NORTH DAKOTA

927-4003

ROLL DESIGNATION	0874	0876	0883	0888	0893	0896	0899	0902	0903	–
THICKNESS (mils) ASTM D 374	42.1	42.9	43.3	43.4	44.0	43.3	43.8	42.2	42.9	–
SPECIFIC GRAVITY ASTM D 1505	0.951	0.951	0.951	0.950	0.950	0.951	0.951	0.951	0.951	–
STRENGTH AT YIELD (ppi)	106.6	109.1	108.5	109.0	114.0	112.5	112.9	109.4	110.8	–
MD/TD (1) ASTM D 638	111.8	115.3	113.7	116.9	121.0	114.8	117.0	115.6	116.3	–
STRENGTH AT BREAK (ppi)	202.7	191.6	207.1	214.6	224.7	212.6	211.7	215.5	209.7	–
MD/TD (1) ASTM D 638	216.2	210.4	224.9	213.8	222.6	217.8	233.1	208.2	216.7	–
ELONGATION AT YIELD (%)	26.6	27.5	20.3	19.7	20.5	20.0	20.3	22.5	21.7	–
MD/TD (1) ASTM D 638	26.3	22.5	18.7	18.1	19.6	19.6	19.4	20.3	19.2	–
ELONGATION AT BREAK (%)	808	762	862	832	836	844	820	830	828	–
MD/TD (1) ASTM D 638	840	842	886	838	820	846	860	836	852	–
CARBON BLACK CONTENT (%) ASTM D 1603	2.44	2.46	2.43	2.46	2.32	2.41	2.49	2.51	2.54	–
CARBON BLACK DISPERSION(2) ASTM D 3015	A1	A1	A1	A1	A1	A1	A1	A1	A1	–

(1) MD/TD corresponds to Machine Direction / Transverse Direction.
(2) Carbon black dispersion was tested according to ASTM D3015 and reported according to the ASTM D2663 dispersion classification chart.

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0674

	THICKNESS (mils)		SPECIFIC GRAVITY		CARBON BLACK CONTENT (%)		CARBON BLACK DISPERSION (rating)
1.	48.3	1.	0.948	1.	2.46	1.	A1
2.	46.5	2.	0.949	2.	2.41	2.	A1
3.	48.4	3.	0.948			3.	A1
4.	48.1					4.	A1
5.	44.7					5.	A1
6.	45.0					6.	A1
7.	46.5						
8.	47.0						
9.	45.7						
10.	46.5						
AVG	46.7		0.948		2.44		A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	116.0	126.9	22.8	18.5	234.4	232.5	860	780
2.	121.2	127.2	20.8	19.0	241.3	257.6	850	840
3.	113.3	120.7	22.3	18.7	228.3	238.3	850	830
4.	121.4	122.8	21.8	18.6	238.0	252.9	840	830
5.	116.1	120.7	22.5	20.1	230.6	238.1	840	810
AVG	117.6	123.7	22.0	19.0	234.5	243.9	848	818

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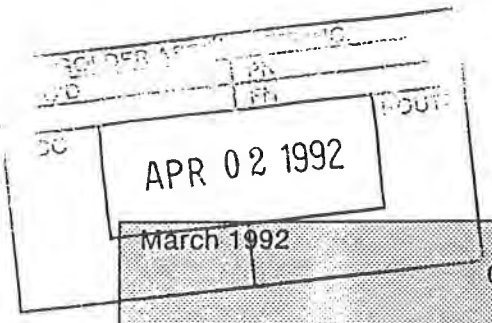
GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0717

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	41.4	0.949	2.29	A1
2.	43.3	0.949	2.32	A1
3.	45.3	0.950		A1
4.	45.2			A1
5.	42.0			A1
6.	42.4			A1
7.	42.1			
8.	41.9			
9.	45.9			
10.	44.0			
AVG	43.4	0.949	2.31	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	107.7	114.5	21.5	19.2	204.4	219.9	840	860
2.	114.2	121.7	19.9	18.9	188.4	227.8	770	850
3.	107.7	115.6	22.5	18.2	207.0	214.1	830	860
4.	123.4	116.1	28.0	19.5	203.4	176.3	820	770
5.	112.1	120.4	22.4	19.5	209.4	225.5	830	840
AVG	113.0	117.7	22.9	19.1	202.5	212.7	818	836



March 1992 927-4003

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0721

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	43.7	0.950	2.38	A1
2.	42.5	0.950	2.38	A1
3.	42.5	0.950		A1
4.	47.4			A1
5.	42.0			A1
6.	42.9			A1
7.	41.8			
8.	42.6			
9.	44.2			
10.	43.1			
AVG	43.3	0.950	2.38	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	109.2	120.6	22.3	18.6	185.4	201.4	760	800
2.	108.0	129.3	21.0	17.9	215.5	257.7	830	880
3.	107.9	117.6	21.7	19.6	204.2	214.6	840	820
4.	107.0	114.9	21.1	19.6	207.9	202.1	820	820
5.	112.2	120.9	22.5	19.2	216.0	225.6	840	840
AVG	108.9	120.7	21.7	19.0	205.8	220.3	818	832



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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0722

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	43.2	0.951	2.48	A1
2.	44.5	0.952	2.45	A1
3.	43.3	0.952		A1
4.	43.4			A1
5.	42.6			A1
6.	43.6			A1
7.	43.7			
8.	41.7			
9.	44.6			
10.	43.5			
AVG	43.4	0.952	2.47	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	110.2	119.4	23.1	20.8	190.0	223.2	750	860
2.	107.2	117.0	20.8	20.0	212.8	239.4	880	920
3.	107.0	118.6	20.0	17.7	226.0	189.2	830	770
4.	109.8	120.4	19.2	18.5	189.0	224.6	740	860
5.	111.0	119.6	21.5	16.2	228.6	236.4	850	870
AVG	109.0	119.0	20.9	18.6	209.3	222.6	810	856

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0729

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	45.1	0.950	2.46	A1
2.	43.6	0.950	2.49	A1
3.	41.8	0.950		A1
4.	40.5			A1
5.	43.6			A1
6.	42.6			A1
7.	42.2			
8.	42.3			
9.	46.4			
10.	46.5			
AVG	43.5	0.950	2.48	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	119.7	125.3	21.4	19.4	214.4	237.8	800	860
2.	114.2	116.8	21.9	18.7	205.4	159.8	840	740
3.	116.9	118.6	21.9	19.3	216.9	230.6	820	850
4.	111.6	119.5	21.4	19.1	222.1	210.8	840	810
5.	128.1	134.4	21.8	19.6	235.9	241.2	800	840
AVG	118.1	122.9	21.7	19.2	218.9	216.0	820	820



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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0756

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	47.9	0.951	2.43	A1
2.	45.3	0.950	2.45	A1
3.	41.0	0.950		A1
4.	42.0			A1
5.	40.2			A1
6.	42.1			A1
7.	49.1			
8.	42.8			
9.	46.1			
10.	44.2			
AVG	44.1	0.950	2.44	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	117.5	128.3	21.6	19.0	218.1	234.5	790	840
2.	104.4	109.3	21.7	19.7	191.6	186.2	790	780
3.	98.7	107.2	22.5	20.7	205.3	217.9	830	860
4.	118.6	128.3	21.4	19.3	206.8	254.6	780	860
5.	114.4	125.3	22.2	19.4	180.4	252.4	740	870
AVG	110.7	119.7	21.9	19.6	200.4	229.1	786	842

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0774

	THICKNESS (mils)		SPECIFIC GRAVITY		CARBON BLACK CONTENT (%)		CARBON BLACK DISPERSION (rating)
1.	42.7	1.	0.949	1.	2.35	1.	A1
2.	41.6	2.	0.949	2.	2.36	2.	A1
3.	43.3	3.	0.949			3.	A1
4.	42.4					4.	A1
5.	41.7					5.	A1
6.	43.2					6.	A1
7.	42.1						
8.	49.0						
9.	45.4						
10.	47.5						
AVG	43.9		0.949		2.36		A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	108.7	113.8	23.2	20.7	205.0	218.8	810	840
2.	107.1	115.2	22.5	19.9	208.1	203.9	820	820
3.	105.7	109.4	21.0	18.7	211.1	224.3	840	850
4.	102.8	106.0	22.8	20.2	188.1	209.9	810	860
5.	114.6	117.9	22.2	19.5	215.4	200.6	820	800
AVG	107.8	112.5	22.3	19.8	205.5	211.5	820	834

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0787

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	43.7	0.949	2.24	A1
2.	43.3	0.949	2.19	A1
3.	44.0	0.950		A1
4.	44.1			A1
5.	43.1			A1
6.	44.1			A1
7.	43.0			
8.	43.7			
9.	42.1			
10.	42.2			
AVG	43.3	0.949	2.22	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	118.0	113.4	21.2	19.5	237.3	230.3	850	870
2.	109.3	116.9	21.6	20.1	223.6	232.2	850	880
3.	105.9	110.1	22.5	19.3	203.6	234.8	810	900
4.	110.8	110.9	20.7	19.4	235.7	203.3	880	810
5.	102.0	104.8	22.9	19.1	175.9	210.9	770	860
AVG	109.2	111.2	21.8	19.5	215.2	222.3	832	864

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0790

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	42.4	0.949	2.41	A1
2.	42.5	0.949	2.46	A1
3.	42.2	0.949		A1
4.	42.5			A1
5.	45.3			A1
6.	45.7			A1
7.	42.7			
8.	43.6			
9.	44.6			
10.	45.4			
AVG	43.7	0.949	2.44	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	101.0	100.4	20.8	22.3	210.6	222.8	800	880
2.	100.6	101.2	26.2	21.5	204.4	214.6	710	860
3.	102.6	109.4	24.6	20.0	206.4	238.2	800	890
4.	102.8	105.4	27.7	22.3	198.8	235.6	780	870
5.	102.6	114.4	22.3	20.0	190.8	253.4	780	860
AVG	101.9	106.2	24.3	21.2	202.2	232.9	774	872

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0795

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	43.9	0.950	2.44	A1
2.	44.4	0.950	2.44	A1
3.	41.3	0.950		A1
4.	41.6			A1
5.	44.9			A1
6.	44.4			A1
7.	42.3			
8.	41.7			
9.	42.5			
10.	42.8			
AVG	43.0	0.950	2.44	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	108.8	118.2	24.5	17.8	231.7	251.9	860	900
2.	102.1	109.6	22.5	19.1	179.6	226.7	770	870
3.	108.9	119.2	23.2	19.8	217.4	248.3	840	890
4.	106.6	110.6	23.2	19.2	187.2	231.5	760	890
5.	104.5	113.8	24.4	20.3	212.7	241.1	860	890
AVG	106.2	114.3	23.6	19.2	205.7	239.9	818	888

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0800

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	42.2	0.950	2.45	A1
2.	41.9	0.950	2.38	A1
3.	43.2	0.950		A1
4.	43.2			A1
5.	41.3			A1
6.	42.5			A1
7.	44.8			
8.	43.8			
9.	41.7			
10.	41.7			
AVG	42.6	0.950	2.42	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	96.8	101.6	26.9	21.5	175.2	235.4	790	910
2.	102.2	108.8	31.5	19.2	209.8	238.0	800	880
3.	97.2	110.0	25.4	20.0	198.6	249.2	820	920
4.	102.0	113.8	26.9	23.1	216.2	233.6	820	850
5.	97.8	109.2	23.1	21.5	195.4	229.8	790	870
AVG	99.2	108.7	26.8	21.1	199.0	237.2	804	886

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927–4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0802

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	41.2	0.951	2.57	A1
2.	43.3	0.951	2.53	A1
3.	43.5	0.951		A1
4.	45.0			A1
5.	41.9			A1
6.	42.0			A1
7.	46.3			
8.	49.2			
9.	43.0			
10.	43.6			
AVG	43.9	0.951	2.55	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	107.0	117.2	22.3	18.5	164.4	211.2	690	860
2.	106.6	114.8	22.3	17.7	184.0	219.4	710	830
3.	99.2	109.4	20.8	17.7	210.2	199.4	830	820
4.	109.6	120.0	20.8	17.7	220.2	242.4	790	860
5.	108.4	116.2	21.5	18.5	184.4	235.4	720	900
AVG	106.2	115.5	21.5	18.0	192.6	221.6	748	854

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0814

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	43.3	0.950	2.45	A1
2.	44.0	0.950	2.62	A1
3.	44.0	0.949		A1
4.	44.8			A1
5.	45.5			A1
6.	45.9			A1
7.	44.6			
8.	44.1			
9.	44.6			
10.	45.8			
AVG	44.7	0.950	2.54	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	107.2	114.4	20.8	17.7	225.0	238.4	880	860
2.	108.2	114.0	20.8	16.9	221.8	233.2	830	850
3.	114.0	120.0	20.0	17.7	252.6	243.0	870	860
4.	112.0	119.4	20.0	18.5	197.4	249.6	770	870
5.	112.0	118.2	20.8	17.7	223.4	250.6	820	860
AVG	110.7	117.2	20.5	17.7	224.0	243.0	834	860

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0816

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	41.2	0.950	2.66	A1
2.	41.6	0.950	2.52	A1
3.	41.7	0.949		A1
4.	41.8			A1
5.	42.4			A1
6.	42.0			A1
7.	45.2			
8.	43.9			
9.	42.1			
10.	43.5			
AVG	42.5	0.950	2.59	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	102.6	112.0	22.3	23.1	191.4	223.4	770	840
2.	108.6	111.2	22.3	24.6	215.4	247.2	840	880
3.	108.2	115.6	25.4	20.8	176.2	188.4	720	740
4.	115.0	122.4	23.1	30.0	203.6	244.0	790	840
5.	107.6	114.0	17.7	21.5	226.8	235.6	770	850
AVG	108.4	115.0	22.2	24.0	202.7	227.7	778	830

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0820

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	43.7	0.949	2.44	A1
2.	41.6	0.948	2.50	A1
3.	44.4	0.950		A1
4.	43.0			A1
5.	42.3			A1
6.	42.5			A1
7.	41.9			
8.	40.7			
9.	43.0			
10.	42.7			
AVG	42.6	0.949	2.47	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	105.6	115.6	28.5	27.7	201.0	250.2	770	890
2.	116.2	120.0	27.7	20.8	241.1	231.6	830	830
3.	108.2	116.6	26.9	26.9	177.8	255.6	750	890
4.	110.0	111.4	26.9	20.8	178.0	182.2	730	770
5.	105.0	113.8	27.7	22.3	211.4	203.8	820	810
AVG	109.0	115.5	27.5	23.7	201.9	224.7	780	838

April 1992 927-4003

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0824

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	45.4	0.951	2.40	A1
2.	46.1	0.951	2.34	A1
3.	45.7	0.951		A1
4.	43.7			A1
5.	45.7			A1
6.	40.8			A1
7.	42.3			
8.	43.6			
9.	43.3			
10.	45.3			
AVG	44.2	0.951	2.37	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	115.0	123.0	26.9	19.2	231.8	222.0	810	820
2.	110.6	117.2	24.6	24.6	195.4	248.4	730	890
3.	126.0	127.8	24.6	20.8	245.8	240.2	810	810
4.	108.2	115.0	30.0	23.1	203.2	229.2	800	840
5.	111.4	124.4	26.9	24.6	203.6	255.2	780	880
AVG	114.2	121.5	26.6	22.5	216.0	239.0	786	848

April 1992 927-4003

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0828

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	40.6	0.947	2.60	A1
2.	48.3	0.947	2.50	A1
3.	42.1	0.946		A1
4.	48.7			A1
5.	43.0			A1
6.	41.8			A1
7.	41.3			
8.	41.6			
9.	41.4			
10.	44.1			
AVG	43.3	0.947	2.55	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	104.2	142.6	30.8	26.2	201.0	270.8	760	850
2.	139.4	118.8	24.6	28.5	238.0	229.0	740	850
3.	108.8	119.0	26.2	35.4	196.2	234.4	740	850
4.	114.0	115.8	23.9	30.0	224.0	247.6	840	860
5.	110.4	115.0	26.9	27.7	168.6	228.6	710	830
AVG	115.4	122.2	26.5	29.6	205.6	242.1	758	848

April 1992 927–4003

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927–4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0833

	THICKNESS (mils)		SPECIFIC GRAVITY		CARBON BLACK CONTENT (%)		CARBON BLACK DISPERSION (rating)
1.	42.8	1.	0.951	1.	2.68	1.	A1
2.	43.4	2.	0.951	2.	2.55	2.	A1
3.	42.8	3.	0.951			3.	A1
4.	44.2					4.	A1
5.	45.9					5.	A1
6.	41.6					6.	A1
7.	43.9						
8.	43.6						
9.	42.9						
10.	43.3						
AVG	43.4		0.951		2.62		A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	108.6	119.0	25.4	26.9	190.4	159.2	780	680
2.	114.2	119.0	30.0	23.9	211.2	243.2	760	860
3.	116.8	124.4	24.6	22.3	175.6	253.2	730	870
4.	110.2	119.4	27.7	33.1	224.8	217.6	830	810
5.	110.6	118.6	29.2	26.2	186.4	236.6	740	850
AVG	112.1	120.1	27.4	26.5	197.7	222.0	768	814

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April 1992 927-4003

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0838

	THICKNESS (mils)		SPECIFIC GRAVITY		CARBON BLACK CONTENT (%)		CARBON BLACK DISPERSION (rating)
1.	44.7	1.	0.950	1.	2.61	1.	A1
2.	44.4	2.	0.950	2.	2.61	2.	A1
3.	42.7	3.	0.951			3.	A1
4.	44.2					4.	A1
5.	42.6					5.	A1
6.	40.9					6.	A1
7.	43.8						
8.	43.6						
9.	45.3						
10.	45.7						
AVG	43.8		0.950		2.61		A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	115.4	121.2	30.0	25.4	240.2	248.0	830	870
2.	109.4	114.6	23.1	23.9	228.2	220.4	860	830
3.	113.8	111.4	22.3	26.2	211.6	217.6	810	830
4.	112.4	117.0	28.5	23.1	207.0	230.6	780	830
5.	116.4	122.8	26.2	25.4	209.4	246.2	780	850
AVG	113.5	117.4	26.0	24.8	219.3	232.6	812	842

April 1992 927-4003

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0840

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	41.3	0.950	2.67	A1
2.	44.0	0.950	2.52	A1
3.	43.0	0.950		A1
4.	42.4			A1
5.	41.0			A1
6.	41.7			A1
7.	43.8			
8.	43.0			
9.	45.0			
10.	45.0			
AVG	43.0	0.950	2.60	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	106.0	116.0	31.5	25.4	221.2	187.8	840	760
2.	112.0	124.0	33.1	16.9	204.2	242.2	770	880
3.	104.8	112.2	24.6	18.5	213.6	226.2	830	910
4.	112.8	117.4	22.3	17.7	213.6	258.0	820	900
5.	126.8	122.4	26.2	16.9	183.8	210.2	710	820
AVG	112.5	118.4	27.5	19.1	207.3	224.9	794	854

April 1992 927-4003

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0850

	THICKNESS (mils)		SPECIFIC GRAVITY		CARBON BLACK CONTENT (%)		CARBON BLACK DISPERSION (rating)
1.	44.8	1.	0.951	1.	2.45	1.	A1
2.	43.5	2.	0.951	2.	2.44	2.	A1
3.	43.6	3.	0.951			3.	A1
4.	43.2					4.	A1
5.	42.2					5.	A1
6.	43.0					6.	A1
7.	42.8						
8.	41.6						
9.	44.8						
10.	43.9						
AVG	43.3		0.951		2.45		A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	109.4	117.6	23.1	23.9	233.8	238.2	860	850
2.	109.8	115.2	22.3	31.5	224.8	235.2	830	850
3.	108.0	111.4	27.7	24.6	223.2	224.6	880	850
4.	112.0	111.0	22.3	21.5	234.6	229.2	870	870
5.	114.2	117.4	29.2	29.2	227.2	242.8	820	860
AVG	110.7	114.5	24.9	26.1	228.7	234.0	852	856

April 1992 927-4003

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0860

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	42.1	0.951	2.58	A1
2.	42.3	0.951	2.56	A1
3.	44.5	0.951		A1
4.	43.4			A1
5.	41.8			A1
6.	42.4			A1
7.	44.5			
8.	40.6			
9.	41.5			
10.	42.2			
AVG	42.5	0.951	2.57	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	103.2	114.2	32.3	28.5	202.6	216.6	800	850
2.	109.4	114.6	28.5	23.9	206.8	172.8	780	770
3.	105.2	113.4	27.7	26.9	217.0	208.2	840	870
4.	111.2	119.6	26.2	27.7	206.0	248.0	810	880
5.	104.2	115.2	32.3	26.9	217.4	211.6	840	820
AVG	106.6	115.4	29.4	26.8	210.0	211.4	814	838

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GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0888

	THICKNESS (mils)		SPECIFIC GRAVITY		CARBON BLACK CONTENT (%)		CARBON BLACK DISPERSION (rating)
1.	42.2	1.	0.950	1.	2.46	1.	A1
2.	43.8	2.	0.950	2.	2.45	2.	A1
3.	42.1	3.	0.950			3.	A1
4.	41.6					4.	A1
5.	44.3					5.	A1
6.	45.9					6.	A1
7.	45.4						
8.	42.8						
9.	42.2						
10.	43.7						
AVG	43.4		0.950		2.46		A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	107.6	113.8	18.5	17.7	215.8	226.8	830	870
2.	106.4	109.8	20.0	16.9	207.4	180.2	850	770
3.	110.0	119.8	20.0	19.2	189.4	200.4	780	860
4.	114.2	124.8	20.0	17.7	243.0	253.4	860	870
5.	106.6	116.4	20.0	19.2	217.6	208.0	840	820
AVG	109.0	116.9	19.7	18.1	214.6	213.8	832	838

April 1992 927-4003

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0896

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	45.9	0.951	2.41	A1
2.	45.7	0.951	2.41	A1
3.	41.5	0.951		A1
4.	41.2			A1
5.	41.7			A1
6.	42.1			A1
7.	44.7			
8.	44.0			
9.	43.1			
10.	42.8			
AVG	43.3	0.951	2.41	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	117.0	123.8	19.2	24.6	202.8	255.0	830	880
2.	107.2	108.8	20.0	18.5	211.8	223.4	850	870
3.	110.6	111.2	19.2	18.5	218.2	203.0	870	820
4.	112.4	113.4	20.0	17.7	226.4	204.0	860	850
5.	115.4	117.0	21.5	18.5	203.8	203.6	810	810
AVG	112.5	114.8	20.0	19.6	212.6	217.8	844	846

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April 1992 927-4003

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 0899

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	43.9	0.951	2.48	A1
2.	44.3	0.951	2.50	A1
3.	43.5	0.951		A1
4.	44.0			A1
5.	41.5			A1
6.	44.2			A1
7.	43.6			
8.	42.9			
9.	44.8			
10.	45.2			
AVG	43.8	0.951	2.49	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	115.6	120.2	20.0	19.2	201.1	242.6	780	870
2.	115.2	116.4	20.0	19.2	225.0	244.9	890	880
3.	107.4	110.6	20.7	19.2	160.0	223.2	710	850
4.	113.4	117.8	20.7	20.0	237.2	221.8	870	850
5.	112.8	120.2	20.0	19.2	235.4	233.0	850	850
AVG	112.9	117.0	20.3	19.4	211.7	233.1	820	860

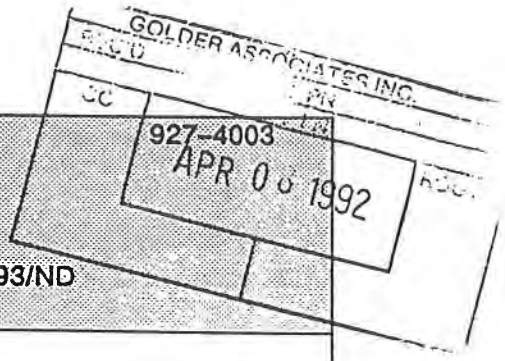
March 1992 927-4003

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6829

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	47.6	0.949	2.49	A1
2.	48.2	0.949	2.41	A1
3.	44.1	0.949		A1
4.	45.0			A1
5.	44.9			A1
6.	44.6			A1
7.	48.1			
8.	49.0			
9.	45.4			
10.	44.4			
AVG	46.1	0.949	2.45	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	101.0	118.6	22.3	20.0	185.0	205.8	750	770
2.	97.0	110.4	23.1	19.8	189.6	228.1	760	860
3.	95.8	110.6	22.3	19.5	195.0	228.6	780	860
4.	102.0	118.2	21.5	19.2	216.4	208.6	820	780
5.	107.0	109.8	21.5	20.6	176.6	194.6	740	770
AVG	100.6	113.5	22.1	19.8	192.5	213.1	770	808



April 1992

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6939

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	47.6	0.950	2.67	A1
2.	46.8	0.950	2.68	A1
3.	49.5	0.950		A1
4.	47.5			A1
5.	48.2			A1
6.	47.5			A1
7.	47.1			
8.	46.3			
9.	47.6			
10.	46.4			
AVG	47.5	0.950	2.68	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	112.5	124.8	22.5	17.4	226.8	254.6	880	880
2.	108.0	123.0	21.5	17.5	227.4	270.1	850	850
3.	114.2	124.9	21.6	16.8	183.3	223.6	790	820
4.	106.1	120.0	22.2	16.4	207.8	212.7	840	790
5.	108.1	121.4	22.7	16.6	197.9	254.4	820	880
AVG	109.8	122.8	22.1	16.9	208.6	243.1	836	844



April 1992

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6940

	THICKNESS (mils)		SPECIFIC GRAVITY		CARBON BLACK CONTENT (%)		CARBON BLACK DISPERSION (rating)
1.	49.9	1.	0.950	1.	2.58	1.	A1
2.	46.3	2.	0.950	2.	2.58	2.	A1
3.	44.0	3.	0.950			3.	A1
4.	47.3					4.	A1
5.	47.5					5.	A1
6.	48.5					6.	A1
7.	48.7						
8.	46.0						
9.	46.2						
10.	46.0						
AVG	47.0		0.950		2.58		A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	104.8	113.4	23.9	20.0	206.4	227.4	790	820
2.	94.8	109.0	24.6	17.7	203.8	215.4	880	820
3.	109.6	119.0	25.4	20.8	250.0	222.0	860	800
4.	105.2	117.4	23.9	17.7	197.0	218.0	780	780
5.	102.4	114.0	22.3	18.5	217.6	263.6	840	890
AVG	103.4	114.6	24.0	18.9	215.0	229.3	830	822

April 1992 927-4003

GEOMEMBRANE TEST RESULTS

APR 03 1992

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6952

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	44.0	0.950	2.68	A1
2.	42.0	0.950	2.68	A1
3.	41.0	0.950		A1
4.	43.0			A1
5.	43.6			A1
6.	45.3			A1
7.	45.0			
8.	46.3			
9.	46.2			
10.	45.7			
AVG	44.2	0.950	2.68	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	96.4	106.8	26.9	26.9	162.2	221.2	720	820
2.	101.4	103.8	29.2	20.0	210.0	209.2	850	820
3.	102.8	111.6	25.4	24.6	207.2	218.6	830	800
4.	101.6	109.8	23.9	20.0	218.2	218.0	850	820
5.	103.0	114.4	30.0	20.8	203.0	196.4	800	740
AVG	101.0	109.3	27.1	22.5	200.1	212.7	810	800

GOLDER ASSOCIATES INC
APR 02 1992

April 1992 927-4003

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6871

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	45.3	0.950	2.67	A1
2.	45.6	0.950	2.68	A1
3.	46.6	0.950		A1
4.	44.3			A1
5.	45.2			A1
6.	46.4			A1
7.	43.9			
8.	43.0			
9.	47.0			
10.	47.1			
AVG	45.4	0.950	2.68	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	105.0	115.2	20.8	17.9	204.0	215.4	810	810
2.	106.4	118.6	20.8	18.2	198.4	237.6	790	840
3.	104.6	116.7	20.8	19.2	188.0	201.9	740	790
4.	96.4	111.0	23.1	15.3	183.4	199.3	720	820
5.	111.8	122.5	22.3	17.4	205.0	244.7	780	890
AVG	104.8	116.8	21.6	17.6	195.8	219.8	768	830

GOLDER ASSOCIATES INC.
CC
APR 08 1992

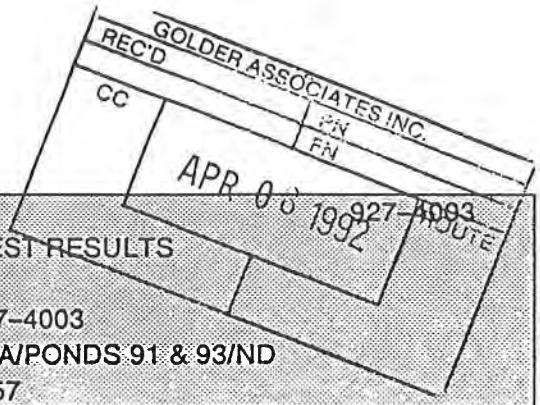
April 1992 927-4003

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6947

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	45.1	0.950	2.59	A1
2.	46.5	0.950	2.57	A1
3.	46.5	0.950		A1
4.	46.8			A1
5.	50.0			A1
6.	47.9			A1
7.	47.6			
8.	47.2			
9.	46.5			
10.	49.2			
AVG	47.3	0.950	2.58	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	110.0	122.4	20.8	18.2	220.8	202.1	850	790
2.	108.6	122.5	22.5	22.2	210.5	251.4	830	860
3.	119.4	134.4	21.5	16.4	240.6	269.1	820	850
4.	109.4	120.2	21.5	18.1	206.8	236.0	790	830
5.	109.4	121.8	23.2	16.9	217.9	185.9	860	740
AVG	111.4	124.3	21.9	18.4	219.3	228.9	830	814



April 1992

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6957

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	47.9	0.950	2.52	A1
2.	46.0	0.950	2.52	A1
3.	43.0	0.950		A1
4.	44.4			A1
5.	45.7			A1
6.	45.4			A1
7.	47.7			
8.	44.2			
9.	46.8			
10.	47.3			
AVG	45.8	0.950	2.52	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	114.6	126.2	20.0	18.2	197.6	242.8	770	850
2.	100.1	115.1	19.2	19.5	177.2	196.8	780	780
3.	107.8	114.0	20.9	17.2	205.8	240.4	830	880
4.	112.8	121.6	20.9	18.0	206.4	227.2	780	820
5.	109.2	124.7	22.5	17.6	215.5	248.6	830	830
AVG	108.9	120.3	20.7	18.1	200.5	231.2	798	832

April 1992 927-4003

GEOMEMBRANE TEST RESULTS

PROJECT NUMBER: 927-4003
PROJECT NAME: CPA/PONDS 91 & 93/ND
ROLL DESIGNATION: 6960

	THICKNESS (mils)	SPECIFIC GRAVITY	CARBON BLACK CONTENT (%)	CARBON BLACK DISPERSION (rating)
1.	44.5	0.951	2.60	A1
2.	43.4	0.951	2.63	A1
3.	42.4	0.951		A1
4.	44.5			A1
5.	44.5			A1
6.	44.2			A1
7.	46.1			
8.	45.5			
9.	46.1			
10.	47.4			
AVG	44.9	0.951	2.62	A1

	YIELD STRENGTH (lb/in. width)		ELONGATION AT YIELD (%)		BREAK STRENGTH (lb/in. width)		ELONGATION AT BREAK (%)	
	MD	TD	MD	TD	MD	TD	MD	TD
1.	107.8	117.4	30.0	27.7	213.0	208.2	850	760
2.	105.8	112.4	25.4	21.5	221.0	234.6	860	840
3.	106.0	118.0	26.9	21.5	198.0	203.4	800	780
4.	113.8	119.8	30.0	25.4	199.2	249.6	770	820
5.	116.4	121.6	31.5	21.5	226.8	194.2	810	730
AVG	110.0	117.8	28.8	23.5	211.6	218.0	818	786

APPENDIX E

SUBGRADE ACCEPTANCE CERTIFICATES

Gundle®

SUBGRADE SURFACE ACCEPTANCE

PROJECT: Co-op JOB NUMBER: G147

LOCATION: Underwood ND DATE: 9-20-93

I, the undersigned duly authorized representative of Gundle Lining Construction Corporation, certify that upon visual inspection the subgrade surface described below meets criteria for installation of a 40 mil flexible membrane liner. By signing below, however, Gundle acknowledges no responsibility for the subgrade design, degree of moisture or compaction, integrity, elevation, or maintenance thereof, in any way.

Approximate size of area: 348,000

Description of area: DRAINS POND - INCLUDES SLOPES + ALL FLOOR.

GUNDLE REPRESENTATIVE | OWNER/CONTRACTOR | INSPECTOR

Jim Martin

Cliff Bohn / GCS, Inc

FORM NO. 05250 PROUDLY PRINTED IN TEXAS BY SOUTHWEST DATA CORP. 713-465-4900

Gundle®

SUBGRADE SURFACE ACCEPTANCE

PROJECT: Co-OP JOB NUMBER: G147

LOCATION: UNDERWOOD ND DATE: 9-20-93

I, the undersigned duly authorized representative of Gundle Lining Construction Corporation, certify that upon visual inspection the subgrade surface described below meets criteria for installation of a 40 mil flexible membrane liner. By signing below, however, Gundle acknowledges no responsibility for the subgrade design, degree of moisture or compaction, integrity, elevation, or maintenance thereof, in any way.

Approximate size of area: 3,100,520

Description of area: ASH POND 91 - All SLOPES SUMP, + ENTIRE FLOOR.

GUNDLE REPRESENTATIVE | OWNER/CONTRACTOR | INSPECTOR

Jim Martin

Cliff Beck / GCS, Inc

FORM NO. 05250 PROUDLY PRINTED IN TEXAS BY SOUTHWEST DATA CORP. 713-465-4900

APPENDIX F

ABBREVIATIONS

APPENDIX F
ABBREVIATIONS

P#	PANEL # or PATCH
P	PATCH
DS-	DESTRUCTIVE ON FUSION SEAM
DSE-	DESTRUCTIVE ON EXTRUSION SEAM
H	PIN HOLE
GW	GRIND AND WELD
C	CAP
BO	BURN OUT
PTF or PFS	PRESSURE TEST FAILURE
D	INSTALLATION DAMAGE
BS	BOOT/SKIRT FOR FML PIPE PENETRATION
WS	WELD RESTART
CR	CREASE
IO	INSUFFICIENT OVERLAP
VL	VACUUM LEAK
SI	SUBGRADE IRREGULARITY
WR	WRINKLE
FS	FAILED SEAM LENGTH
RS	RECONSTRUCTED SEAM
DTF	DESTRUCTIVE TEST FAILURE
FM	FISHMOUTH
CO	CHANGE OF OVERLAP
MD	MANUFACTURER'S/DELIVERY DAMAGE
OG	OVERGRIND
OCA	OUTSIDE CERTIFIED AREA
EE	EARTHWORK EQUIPMENT DAMAGE
FTS	FIELD TEST STRIP
HT	HEAT TACK BURN
C/FUS	CAP BY FUSION WELD
N	NORTH
S	SOUTH
E	EAST
W	WEST
NT	NORTH TOE
ST	SOUTH TOE
AT	ANCHOR TRENCH
NAT	NORTH ANCHOR TRENCH
SAT	SOUTH ANCHOR TRENCH
EAT	EAST ANCHOR TRENCH
WAT	WEST ANCHOR TRENCH
INT/T	INTERSECTION OF THREE OR MORE PANELS
ENT	ENTIRE SEAM
SNAT	SOUTH OF NORTH ANCHOR TRENCH
NSAT	NORTH OF SOUTH ANCHOR TRENCH

APPENDIX F
ABBREVIATIONS

EWAT	EAST OF WEST ANCHOR TRENCH
WEAT	WEST OF EAST ANCHOR TRENCH
STOE	SOUTH OF TOE
NTOE	NORTH OF TOE
ETOE	EAST OF TOE
WTOE	WEST OF TOE
EOS	END OF SEAM
SEOS	SOUTH END OF SEAM
NEOS	NORTH END OF SEAM
WEOS	WEST END OF SEAM
EEOS	EAST END OF SEAM
SNEOS	SOUTH OF NORTH END OF SEAM
NSEOS	NORTH OF SOUTH END OF SEAM
EWEOS	EAST OF WEST END OF SEAM
WEEOS	WEST OF EAST END OF SEAM
PT	PRESSURE TEST HOLE
#/#	SEAM OF TWO PANELS

APPENDIX G

GEOMEMBRANE DEPLOYMENT SUMMARIES

APPENDIX G-1

GEOMEMBRANE DEPLOYMENT SUMMARY - DRAINS POND

November 1993

937-4207

Golder Construction Services, Inc.

APPENDIX G-1
DRAINS POND
GEOMEMBRANE PANEL DEPLOYMENT SUMMARY

PANEL NO.	ROLL NUMBER	DATE	OVERLAP (INCHES)	APPROX. LENGTH (FT)	AVERAGE EDGE THICKNESS (mils)			QA MONITOR	VISUAL PANEL INSPECTION/REMARKS
					LEAD	SIDE	TRAIL		
1	0716	07/20/93	4	70	43.4	43.0	44.8	TD	OK
2	0716	07/20/93	4	70	48.4	52.0	43.4	TD	OK
3	0716	07/20/93	4	--	50.2	46.6	48.4	TD	CUT OFF PANEL 2
4	0716	07/20/93	4	70	47.6	47.8	47.6	TD	OK
5	0716	07/20/93	4	115	47.4	47.8	47.6	TD	OK
6	0716	07/20/93	4	113	46.4	48.2	47.4	TD	OK
7	0716	07/20/93	4	116	47.4	44.0	46.0	TD	OK
8	0716	07/20/93	4	104	45.6	44.4	47.4	TD	OK
9	0704	07/20/93	4	120	44.6	45.0	47.8	TD	OK
10	0704	07/20/93	4	114	49.6	48.2	44.6	TD	OK
11	0704	07/20/93	4	112	46.0	43.6	49.4	TD	OK
12	0704	07/20/93	4	114	49.8	48.4	46.0	TD	OK
13	0704	07/20/93	4	114	46.0	49.0	48.4	TD	OK
14	0706	07/20/93	4	111	48.6	43.6	46.0	TD	OK
15	0706	07/20/93	4	111	44.2	47.0	48.6	TD	OK
16	0706	07/20/93	4	115	44.2	47.8	44.2	TD	OK
17	0706	07/20/93	4	113	45.6	51.4	44.2	TD	OK
18	0706	07/20/93	4	93	45.0	47.2	45.6	TD	OK
19	0706	07/20/93	4	80	49.2	46.2	45.0	TD	OK
20	0706	07/20/93	4	--	46.2	47.2	47.4	TD	CUT OFF PANEL 19
21	0706	07/20/93	4	--	44.6	46.6	44.0	TD	CUT OFF PANEL 18
22	0715	08/04/93	4	495	45.8	46.8	47.8	TD	OK
23	6871	08/04/93	4	492	47.0	47.4	46.6	TD	OK
24	0704	08/04/93	4	16	44.4	47.2	46.0	TD	OK
25	0707	08/04/93	4	497	45.6	45.0	47.4	TD	OK
26	6867	08/04/93	4	496	48.4	43.8	47.4	TD	OK
27	0788	08/04/93	4	506	45.4	46.2	45.2	TD	OK

Golder Construction Services, Inc.

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APPENDIX G-1
DRAINS POND
GEOMEMBRANE PANEL DEPLOYMENT SUMMARY

PANEL NO.	ROLL NUMBER	DATE	OVERLAP (INCHES)	APPROX. LENGTH (FT)	AVERAGE EDGE THICKNESS (mils)			QA MONITOR	VISUAL PANEL INSPECTION/REMARKS
					LEAD	SIDE	TRAIL		
28	6929	08/04/93	4	501	44.0	46.8	45.2	TD	OK
29	6938	08/04/93	4	506	45.4	44.6	45.0	TD	OK
30	0664	08/05/93	4	502	44.8	44.2	44.6	TD	OK
31	0689	08/05/93	4	505	46.2	45.2	45.4	TD	OK
32	0789	08/05/93	4	505	44.6	46.2	45.4	TD	OK
33	0787	08/05/93	4	507	45.8	44.2	46.0	TD	OK
34	0787	08/05/93	4	92	43.4	43.6	45.0	TD	OK
35	0664	08/05/93	4	88	43.4	44.6	45.6	TD	OK
36	0664	08/05/93	4	60	43.6	44.2	45.2	TD	OK
37	0664	08/05/93	4	0	43.6	44.2	45.2	TD	CUT OFF PANEL 36
38	0664	08/05/93	4	0	43.6	46.2	45.2	TD	CUT OFF PANEL 36
39	0707	08/05/93	4	93	42.0	45.2	45.4	TD	OK
40	0707	08/05/93	4	92	45.4	46.0	45.0	TD	OK
41	6867	08/05/93	4	90	45.0	46.0	44.6	TD	OK
42	6867	08/05/93	4	77	44.0	43.6	45.8	TD	OK
43	0787	08/05/93	4	10	45.4	47.4	45.4	TD	OK
44	6829	08/05/93	4	91	45.4	44.4	45.4	TD	OK
45	6829	08/05/93	4	89	42.8	45.4	44.4	TD	OK
46	6829	08/05/93	4	90	42.6	45.0	45.2	TD	OK
47	6829	08/05/93	4	93	45.6	44.2	44.4	TD	OK
48	6829	08/06/93	4	93	46.2	45.6	45.8	TD	OK
49	6829	08/06/93	4	93	46.0	45.6	46.2	TD	OK
50	6829	08/06/93	4	94	46.8	45.6	46.0	TD	OK
51	0715	08/06/93	4	94	44.4	45.0	46.2	TD	OK
52	0715	08/06/93	4	89	44.8	44.2	45.2	TD	OK
53	0715	08/06/93	4	0	44.2	46.8	48.4	TD	CUT OFF PANEL 52
54	0788	08/06/93	4	130	46.8	44.6	44.4	TD	OK

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APPENDIX G-1
DRAINS POND
GEOMEMBRANE PANEL DEPLOYMENT SUMMARY

PANEL NO.	ROLL NUMBER	DATE	OVERLAP (INCHES)	APPROX. LENGTH (FT)	AVERAGE EDGE THICKNESS (mils)			QA MONITOR	VISUAL PANEL INSPECTION/REMARKS
					LEAD	SIDE	TRAIL		
55	0788	08/06/93	4	0	44.8	46.0	46.4	TD	CUT OFF PANEL 54
56	6871	08/06/93	4	117	45.8	46.2	44.8	TD	OK
57	6929	08/06/93	4	125	45.2	46.4	44.4	TD	OK
58	6938	08/06/93	4	121	45.6	45.8	45.4	TD	OK
59	0689	08/06/93	4	122	45.4	45.0	44.4	TD	OK
60	0789	08/06/93	4	118	46.0	44.8	45.6	TD	OK
61	0663	08/06/93	4	126	44.6	45.4	45.0	TD	OK
62	0663	08/06/93	4	121	45.0	45.2	45.8	TD	OK
63	0663	08/06/93	4	123	45.8	46.4	45.2	TD	OK
64	0663	08/06/93	4	124	45.2	45.0	44.0	TD	OK
65	0663	08/06/93	4	134	44.0	46.0	48.4	TD	OK
66	6826	08/06/93	4	125	44.6	45.8	46.0	TD	OK
67	6826	08/06/93	4	124	46.0	43.6	45.4	TD	OK
68	0789	08/06/93	4	50	45.0	43.0	45.4	TD	OK

Golder Construction Services, Inc.

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APPENDIX G-2

GEOMEMBRANE DEPLOYMENT SUMMARY - ASH POND 91

November 1993

937-4207

Golder Construction Services, Inc.

APPENDIX G-2
ASH POND 91
GEOMEMBRANE PANEL DEPLOYMENT SUMMARY

PANEL NO.	ROLL NUMBER	DATE	OVERLAP (INCHES)	APPROX. LENGTH (FT)	AVERAGE EDGE THICKNESS (mils)			QA MONITOR	VISUAL PANEL INSPECTION/REMARKS
					LEAD	SIDE	TRAIL		
1	07006826	08/09/93	4	56	44.6	45.0	45.2	TD	OK
2	07006826	08/09/93	4	56	45.6	45.8	44.6	TD	OK
3	07006826	08/09/93	4	58	44.8	45.2	45.6	TD	OK
4	07006826	08/09/93	4	56	43.8	45.6	44.8	TD	OK
5	07006826	08/09/93	4	55	45.6	45.0	45.0	TD	OK
6	07006826	08/09/93	4	55	44.2	43.6	45.6	TD	OK
7	07006826	08/09/93	4	67	45.0	43.0	44.2	TD	OK
8	06010689	08/09/93	4	50	45.6	46.0	47.2	TD	OK
9	07006929	08/09/93	4	52	45.8	45.4	44.6	TD	OK
10	06010663	08/09/93	4	49	45.6	44.2	46.8	TD	OK
11	07006938	08/09/93	4	51	45.8	45.8	44.6	TD	OK
12	07006822	08/09/93	4	660	44.6	45.2	48.4	TD	OK
13	06010669	08/09/93	4	665	45.6	45.4	45.0	TD	OK
14	07006839	08/09/93	4	650	44.8	44.0	45.6	TD	OK
15	07006834	08/09/93	4	650	46.0	45.4	45.2	TD	OK
16	06010659	08/09/93	4	595	45.0	45.4	43.8	TD	OK
17	06010667	08/09/93	4	650	45.0	45.4	46.0	TD	OK
18	06010674	08/09/93	4	535	44.8	45.4	44.6	TD	OK
19	07006928	08/10/93	4	530	46.2	44.8	45.4	TD	OK
20	06010671	08/10/93	4	520	45.2	45.2	45.6	TD	OK
21	06010704	08/10/93	4	63	46.2	46.8	46.2	TD	OK
22	06010671	08/10/93	4	63	46.4	45.0	44.4	TD	OK
23	06010671	08/10/93	4	65	43.8	43.8	45.2	TD	OK
24	06010674	08/10/93	4	65	46.0	46.0	45.6	TD	OK
25	07006926	08/10/93	4	420	43.4	45.4	45.2	TD	OK
26	07006926	08/10/93	4	0	43.4	45.4	43.8	TD	CUT OFF OF PANEL 25
27	06010677	08/10/93	4	380	44.2	45.0	45.2	TD	OK

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APPENDIX G-2
ASH POND 91
GEOMEMBRANE PANEL DEPLOYMENT SUMMARY

PANEL NO.	ROLL NUMBER	DATE	OVERLAP (INCHES)	APPROX. LENGTH (FT)	AVERAGE EDGE THICKNESS (mils)			QA MONITOR	VISUAL PANEL INSPECTION/REMARKS
					LEAD	SIDE	TRAIL		
28	06010677	08/10/93	4	62	46.8	45.0	45.0	TD	OK
29	06010677	08/10/93	4	62	45.0	44.6	44.8	TD	OK
30	06010677	08/10/93	4	57	43.2	45.0	45.0	TD	OK
31	06010677	08/10/93	4	60	43.4	45.2	43.2	TD	OK
32	06010677	08/10/93	4	30	45.6	44.4	43.4	TD	OK
33	07006926	08/10/93	4	75	44.4	44.2	45.0	TD	OK
34	07006926	08/10/93	4	85	43.6	45.0	44.4	TD	OK
35	07006926	08/10/93	4	30	42.6	44.6	43.6	TD	OK
36	07006928	08/10/93	4	95	44.4	44.8	46.4	TD	OK
37	06010660	08/10/93	4	102	45.4	42.8	44.4	TD	OK
38	06010660	08/10/93	4	108	44.2	45.4	45.4	TD	OK
39	06010660	08/10/93	4	115	43.8	44.4	44.2	TD	OK
40	06010660	08/10/93	4	118	44.6	45.4	43.8	TD	OK
41	06010660	08/10/93	4	190	47.4	43.4	45.4	TD	OK
42	06010671	08/10/93	4	35	45.0	44.6	45.6	TD	OK
43	06010674	08/10/93	4	45	46.0	45.4	46.4	TD	OK
44	06010659	08/10/93	4	35	43.2	43.0	44.0	CPB	OK
45	06010774	08/10/93	4	675	43.2	41.6	41.4	CPB	OK
46	06010662	08/10/93	4	670	43.0	41.0	42.4	CPB	OK
47	06010728	08/10/93	4	67	44.2	45.0	43.6	CPB	OK
48	06010728	08/10/93	4	75	44.8	45.4	44.2	TD	OK
49	06010728	08/12/93	4	527	41.2	40.4	43.2	TD	OK
50	06010775	08/12/93	4	670	42.2	42.0	41.0	TD	OK
51	06010718	08/12/93	4	670	41.8	41.8	43.2	TD	OK
52	06010766	08/12/93	4	676	44.4	44.0	44.2	TD	OK
53	06010714	08/12/93	4	675	44.2	44.2	44.0	TD	OK
54	06010722	08/12/93	4	670	44.8	43.6	44.8	TD	OK

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APPENDIX G-2
ASH POND 91
GEOMEMBRANE PANEL DEPLOYMENT SUMMARY

PANEL NO.	ROLL NUMBER	DATE	OVERLAP (INCHES)	APPROX. LENGTH (FT)	AVERAGE EDGE THICKNESS (mils)			QA MONITOR	VISUAL PANEL INSPECTION/REMARKS
					LEAD	SIDE	TRAIL		
55	07006927	08/12/93	4	664	44.4	46.0	43.6	TD	OK
56	06010721	08/12/93	4	676	44.6	43.0	43.6	TD	OK
57	06010729	08/12/93	4	136	45.0	44.8	44.0	TD	OK
58	06010729	08/13/93	4	0	44.0	45.4	44.0	TD	CUT FROM PANEL 57
59	06010729	08/13/93	4	465	42.4	41.0	42.0	TD	OK
60	06010719	08/13/93	4	213	44.2	44.4	43.8	TD	OK
61	06010829	08/13/93	4	663	44.8	42.8	44.6	TD	OK
62	06010830	08/13/93	4	674	43.6	45.4	44.8	TD	OK
63	06010832	08/16/93	4	675	44.8	45.2	44.0	TD	OK
64	06010828	08/16/93	4	673	44.4	44.6	43.8	TD	OK
65	06010814	08/16/93	4	677	42.0	44.6	43.0	TD	OK
66	06010827	08/16/93	4	675	43.8	44.2	45.0	TD	OK
67	06010817	08/17/93	4	675	42.4	42.8	43.8	TD	OK
68	06010808	08/17/93	4	677	44.0	44.8	42.8	TD	OK
69	07006961	08/17/93	4	665	44.0	44.4	44.4	TD	OK
70	06010812	08/17/93	4	675	42.2	43.8	43.6	TD	OK
71	07006958	08/17/93	4	663	44.4	43.8	42.6	TD	OK
72	06010820	08/18/93	4	81	44.0	44.0	44.4	TD	OK
73	06010820	08/18/93	4	77	44.2	44.4	44.0	TD	OK
74	06010820	08/18/93	4	75	44.0	44.6	43.0	TD	OK
75	06010820	08/18/93	4	75	43.6	44.2	44.0	TD	OK
76	06010820	08/18/93	4	83	42.8	43.2	43.6	TD	OK
77	06010820	08/18/93	4	82	43.6	44.0	41.8	TD	OK
78	06010820	08/18/93	4	83	43.8	43.6	44.4	TD	OK
79	06010820	08/18/93	4	50	44.2	44.8	44.0	TD	OK
80	06010858	08/18/93	4	580	43.6	43.8	41.4	TD	OK
81	06010858	08/18/93	4	90	44.6	42.8	43.6	TD	OK

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APPENDIX G-2
ASH POND 91
GEOMEMBRANE PANEL DEPLOYMENT SUMMARY

PANEL NO.	ROLL NUMBER	DATE	OVERLAP (INCHES)	APPROX. LENGTH (FT)	AVERAGE EDGE THICKNESS (mils)			QA MONITOR	VISUAL PANEL INSPECTION/REMARKS
					LEAD	SIDE	TRAIL		
82	07006963	08/18/93	4	465	44.0	44.0	44.2	TD	OK
83	07006963	08/18/93	4	77	42.2	43.4	44.0	TD	OK
84	07006963	08/18/93	4	75	42.2	44.4	44.4	TD	OK
85	07006959	08/18/93	4	89	43.0	44.2	43.8	TD	OK
86	07006959	08/18/93	4	90	44.6	43.6	43.0	TD	OK
87	07006959	08/18/93	4	95	44.6	42.4	44.6	TD	OK
88	07006959	08/18/93	4	96	44.8	41.4	44.6	TD	OK
89	06010853	08/18/93	4	524	42.6	43.0	42.6	TD	OK
90	06010853	08/19/93	4	149	42.8	43.0	42.6	MH	OK
91	07006959	08/19/93	4	195	42.0	43.4	42.6	MH	OK
92	06010896	08/19/93	4	5	43.4	45.4	43.4	MH	OK
93	06010896	08/19/93	4	448	42.8	43.6	42.4	MH	OK
94	06010820	08/19/93	4	50	42.8	42.6	42.2	MH	OK
95	06010820	08/19/93	4	29	42.4	43.0	44.8	MH	OK
96	06010896	08/19/93	4	211	42.4	43.0	42.0	MH	OK
97	06010818	08/19/93	4	183	44.0	43.8	42.8	MH	OK
98	06010818	08/19/93	4	379	42.0	44.2	44.0	MH	OK
99	06010818	08/20/93	4	79	43.2	46.0	45.0	MH	OK
100	07006938	08/20/93	4	84	43.2	43.8	43.6	MH	OK
101	07006938	08/20/93	4	85	42.8	43.2	42.2	MH	OK
102	07006938	08/20/93	4	91	44.6	46.6	44.0	MH	OK
103	07006938	08/20/93	4	87	44.6	43.4	45.0	MH	OK
104	07006938	08/20/93	4	87	45.4	42.8	44.2	MH	OK
105	07006938	08/20/93	4	93	47.6	45.8	45.4	MH	OK
106	07006938	08/20/93	4	89	42.6	43.8	45.8	MH	OK
107	06010791	08/20/93	4	89	47.6	46.4	46.8	MH	OK
108	06010791	08/20/93	4	91	43.6	44.4	44.2	MH	OK

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APPENDIX G-2
ASH POND 91
GEOMEMBRANE PANEL DEPLOYMENT SUMMARY

PANEL NO.	ROLL NUMBER	DATE	OVERLAP (INCHES)	APPROX. LENGTH (FT)	AVERAGE EDGE THICKNESS (mils)			QA MONITOR	VISUAL PANEL INSPECTION/REMARKS
					LEAD	SIDE	TRAIL		
109	06010791	08/20/93	4	89	41.8	42.2	42.0	MH	OK
110	06010791	08/20/93	4	89	43.0	42.2	43.8	MH	OK
111	06010791	08/20/93	4	89	43.8	44.4	42.6	MH	OK
112	06010791	08/20/93	4	89	42.4	43.2	43.8	MH	OK
113	06010791	08/20/93	4	94	44.4	43.4	42.2	MH	OK
114	06010843	08/20/93	4	92	42.4	42.8	42.8	MH	OK
115	06010843	08/20/93	4	94	43.8	42.8	45.6	MH	OK
116	06010843	08/20/93	4	92	43.4	43.2	44.0	MH	OK
117	06010843	08/20/93	4	94	45.8	44.2	43.2	MH	OK
118	07006940	08/20/93	4	674	44.6	43.6	44.0	MH	OK
119	06010717	08/20/93	4	675	43.8	45.4	43.8	MH	OK
120	06010825	08/20/93	4	670	42.8	45.0	41.6	MH	OK
121	06010843	08/21/93	4	91	42.2	43.0	42.8	MH	OK
122	06010843	08/21/93	4	93	42.8	43.8	42.8	MH	OK
123	06010843	08/21/93	4	48	42.6	42.8	43.0	MH	OK
124	06010844	08/21/93	4	668	42.4	42.0	44.2	MH	OK
125	06010848	08/21/93	4	671	42.8	42.6	42.2	MH	OK
126	06010846	08/21/93	4	668	42.2	42.8	42.4	MH	OK
127	06010845	08/24/93	4	128	42.4	42.2	42.6	MH	OK
128	06010845	08/24/93	4	128	42.0	42.0	42.0	MH	OK
129	06010845	08/24/93	4	126	42.0	42.0	43.0	MH	OK
130	06010845	08/24/93	4	124	43.2	42.8	42.8	MH	OK
131	06010845	08/24/93	4	122	42.0	43.6	43.2	MH	OK
132	06010840	08/24/93	4	121	42.0	42.6	42.4	MH	OK
133	06010840	08/24/93	4	59	42.2	43.2	42.8	MH	OK
134	06010840	08/24/93	4	105	42.2	43.2	43.8	MH	OK
134A	06010840	08/24/93	4	0	42.2	43.2	43.8	MH	CUT OFF PANEL 134

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ASH POND 91
GEOMEMBRANE PANEL DEPLOYMENT SUMMARY

PANEL NO.	ROLL NUMBER	DATE	OVERLAP (INCHES)	APPROX. LENGTH (FT)	AVERAGE EDGE THICKNESS (mils)			QA MONITOR	VISUAL PANEL INSPECTION/REMARKS
					LEAD	SIDE	TRAIL		
135	06010840	08/24/93	4	109	43.8	42.4	42.8	MH	OK
136	06010840	08/24/93	4	70	42.0	42.0	42.8	MH	OK
137	06010800	08/24/93	4	671	43.2	42.6	42.0	MH	OK
138	06010850	08/24/93	4	587	42.4	42.2	42.0	MH	OK
139	06010805	08/24/93	4	676	43.0	43.2	42.0	MH	OK
140	07006949	08/24/93	4	666	42.8	42.2	42.2	MH	OK
141	06010842	08/24/93	4	671	42.0	42.6	42.8	MH	OK
142	06010841	08/24/93	4	675	42.0	42.0	42.0	MH	OK
143	06010793	08/25/93	4	107	42.0	42.4	42.0	MH	OK
144	06010793	08/25/93	4	105	45.6	45.0	44.2	MH	OK
145	06010793	08/25/93	4	107	42.8	42.6	43.2	MH	OK
146	06010793	08/25/93	4	112	46.2	44.8	44.2	MH	OK
147	06010793	08/25/93	4	60	42.0	42.0	42.4	MH	OK
148	06010793	08/25/93	4	116	42.0	43.0	42.2	MH	OK
149	90907932	08/25/93	4	0	42.0	41.8	42.8	MH	CUT OFF PANEL 150
150	90907932	08/25/93	4	95	42.4	44.0	42.8	MH	OK
151	90907932	08/25/93	4	0	43.2	42.8	42.8	MH	CUT OFF PANEL 150
152	90907932	08/25/93	4	86	42.4	42.6	42.4	MH	OK
153	90907932	08/25/93	4	129	42.4	42.4	42.6	MH	OK
154	90907932	08/25/93	4	235	43.6	43.0	42.8	MH	OK
155	06010802	08/25/93	4	231	42.2	42.6	42.6	MH	OK
156	06010802	08/25/93	4	241	42.0	43.4	42.8	MH	OK
157	06010802	08/25/93	4	208	42.2	42.6	43.4	MH	OK
158	06010888	08/25/93	4	227	42.8	42.2	43.4	MH	OK
159	06010888	08/25/93	4	37	42.0	42.4	42.2	MH	OK
160	06010888	08/25/93	4	238	42.0	42.6	42.4	MH	OK
161	07006946	08/28/93	4	345	45.2	44.2	43.0	MH	OK

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APPENDIX G-2
ASH POND 91
GEOMEMBRANE PANEL DEPLOYMENT SUMMARY

PANEL NO.	ROLL NUMBER	DATE	OVERLAP (INCHES)	APPROX. LENGTH (FT)	AVERAGE EDGE THICKNESS (mils)			QA MONITOR	VISUAL PANEL INSPECTION/REMARKS
					LEAD	SIDE	TRAIL		
162	07006946	08/28/93	4	342	42.8	43.4	42.4	MH	OK
162A	07006946	08/28/93	4	0	42.8	42.2	42.4	MH	CUT OFF PANEL 162
163	06010840	08/28/93	4	208	42.6	43.0	42.2	MH	OK
164	06010888	08/28/93	4	38	42.4	42.4	42.4	MH	OK
165	06010850	08/28/93	4	91	42.2	42.4	43.0	MH	OK
166	06010889	08/28/93	4	335	42.6	42.8	42.4	MH	OK
167	06010889	08/28/93	4	345	42.4	42.2	42.0	MH	OK
168	06010877	08/28/93	4	336	42.2	42.4	42.6	MH	OK
169	06010877	08/28/93	4	342	42.6	42.2	42.0	MH	OK
170	06010795	08/28/93	4	342	42.4	42.2	42.8	MH	OK
171	06010795	08/28/93	4	338	42.4	42.2	42.8	MH	OK
172	07006948	08/28/93	4	335	42.4	42.6	42.8	MH	OK
173	07006948	08/28/93	4	342	42.6	42.4	42.6	MH	OK
174	07006950	08/31/93	4	662	43.8	44.6	43.4	SGH	OK
175	07006945	08/31/93	4	662	41.0	42.4	44.6	SGH	OK
176	06010796	08/31/93	4	676	40.6	43.0	42.4	SGH	OK
177	07006943	08/31/93	4	666	43.6	45.0	42.8	SGH	OK
178	06010878	08/31/93	4	673	44.0	41.0	44.0	SGH	OK
179	06010895	09/01/93	4	669	42.2	44.8	45.0	SGH	OK
180	07006944	09/01/93	4	663	40.8	44.0	44.6	SGH	OK
181	07006865	09/01/93	4	660	44.0	47.0	45.2	SGH	OK
182	06010826	09/01/93	4	675	41.6	42.8	44.6	SGH	OK
183	06010776	09/01/93	4	672	42.4	44.6	42.2	SGH	OK
184	06010816	09/01/93	4	676	43.2	44.6	41.2	SGH	OK
185	06010833	09/01/93	4	675	40.6	44.0	42.4	SGH	OK
186	06010823	09/01/93	4	663	44.8	42.4	40.6	SGH	OK
187	06010804	09/01/93	4	673	42.0	44.8	45.1	SGH	OK

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GEOMEMBRANE PANEL DEPLOYMENT SUMMARY

PANEL NO.	ROLL NUMBER	DATE	OVERLAP (INCHES)	APPROX. LENGTH (FT)	AVERAGE EDGE THICKNESS (mils)			QA MONITOR	VISUAL PANEL INSPECTION/REMARKS
					LEAD	SIDE	TRAIL		
188	07006952	09/01/93	4	666	43.8	46.0	41.2	SGH	OK
189	06010798	09/03/93	4	668	43.2	44.8	42.8	SGH	OK
190	06010879	09/03/93	4	669	43.6	45.2	41.0	SGH	OK
191	07006968	09/03/93	4	659	41.6	43.6	42.4	SGH	OK
192	07006969	09/03/93	4	665	45.2	44.2	41.2	SGH	OK
193	06010806	09/03/93	4	678	43.6	44.8	41.6	SGH	OK
194	06010811	09/03/93	4	657	42.1	43.1	42.8	SGH	OK
195	07006942	09/03/93	4	665	43.0	40.8	41.6	SGH	OK
196	06010822	09/03/93	4	676	42.4	45.0	41.2	SGH	OK
197	06010854	09/04/93	4	669	43.8	44.0	42.0	SGH	OK
198	07006960	09/04/93	4	659	42.6	42.8	40.4	SGH	OK
199	06010815	09/04/93	4	666	43.0	45.0	42.0	SGH	OK
200	06010790	09/04/93	4	670	42.8	44.2	41.0	SGH	OK
201	06010794	09/04/93	4	669	42.4	44.8	41.4	SGH	OK
202	06010899	09/04/93	4	655	43.8	45.0	41.2	SGH	OK
203	06010807	09/04/93	4	673	46.0	41.6	44.8	SGH	OK
204	06010868	09/06/93	4	358	42.4	42.2	41.4	JMI	OK
205	06010868	09/06/93	4	316	41.4	42.0	42.4	JMI	OK
206	07006963	09/06/93	4	37	41.6	42.0	41.4	JMI	OK
207	07006970	09/06/93	4	345	44.2	42.8	43.0	JMI	OK
208	07006970	09/06/93	4	320	43.0	42.2	43.0	JMI	OK
209	06010888	09/06/93	4	118	42.8	42.0	42.2	JMI	OK
210	07006967	09/06/93	4	434	43.0	42.6	43.2	JMI	OK
211	07006971	09/06/93	4	451	43.0	41.8	43.4	JMI	OK
212	07006965	09/06/93	4	467	42.0	42.0	41.6	JMI	OK
213	06010824	09/06/93	4	460	42.4	43.2	42.8	JMI	OK
214	06010824	09/07/93	4	213	42.0	42.6	42.4	JMI	OK

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GEOMEMBRANE PANEL DEPLOYMENT SUMMARY

PANEL NO.	ROLL NUMBER	DATE	OVERLAP (INCHES)	APPROX. LENGTH (FT)	AVERAGE EDGE THICKNESS (mils)			QA MONITOR	VISUAL PANEL INSPECTION/REMARKS
					LEAD	SIDE	TRAIL		
215	07006971	09/07/93	4	209	42.8	41.8	43.4	JMI	OK
216	07006965	09/07/93	4	200	42.0	41.2	43.2	JMI	OK
217	07006967	09/07/93	4	225	41.8	43.0	42.4	JMI	OK
218	06010890	09/07/93	4	236	43.6	41.8	43.4	JMI	OK
219	06010890	09/07/93	4	248	42.4	42.8	43.0	JMI	OK
220	06010890	09/07/93	4	195	43.2	41.4	43.2	JMI	OK
221	90907931	09/07/93	4	41	43.0	42.4	42.8	JMI	OK
222	06010819	09/07/93	4	215	42.4	41.4	42.8	JMI	OK
223	06010819	09/07/93	4	437	42.8	43.2	41.8	JMI	OK
224	06010819	09/07/93	4	7	42.8	41.4	42.4	JMI	OK
225	06010855	09/07/93	4	446	43.2	41.4	43.4	JMI	OK
226	06010863	09/07/93	4	449	41.4	41.4	42.8	JMI	OK
227	06010884	09/07/93	4	460	41.0	42.2	42.4	JMI	OK
228	06010884	09/08/93	4	225	42.2	42.0	42.4	JMI	OK
229	06010855	09/08/93	4	214	41.6	41.8	42.6	JMI	OK
230	90907931	09/08/93	4	17	42.0	41.8	42.0	JMI	OK
231	06010863	09/08/93	4	225	41.8	43.0	41.2	JMI	OK
232	90907932	09/08/93	4	116	42.4	42.0	42.8	JMI	OK
233	06010799	09/08/93	4	125	42.0	43.0	42.8	JMI	OK
234	06010799	09/08/93	4	453	42.6	41.6	43.4	JMI	OK
235	06010797	09/08/93	4	401	42.0	41.4	43.2	JMI	OK
236	06010799	09/08/93	4	36	42.0	40.8	42.6	JMI	OK
237	06010797	09/10/93	4	278	42.4	42.8	42.0	JMI	OK
238	06010849	09/10/93	4	175	42.8	42.0	42.6	JMI	OK
239	06010849	09/10/93	4	458	42.6	42.6	42.2	JMI	OK
240	06010838	09/10/93	4	434	42.0	42.0	42.0	JMI	OK
241	06010838	09/10/93	4	229	42.4	41.4	42.6	JMI	OK

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GEOMEMBRANE PANEL DEPLOYMENT SUMMARY

PANEL NO.	ROLL NUMBER	DATE	OVERLAP (INCHES)	APPROX. LENGTH (FT)	AVERAGE EDGE THICKNESS (mils)			QA MONITOR	VISUAL PANEL INSPECTION/REMARKS
					LEAD	SIDE	TRAIL		
242	06010885	09/10/93	4	215	42.0	42.0	41.8	JMI	OK
243	06010885	09/10/93	4	460	42.4	43.4	42.4	JMI	OK
244	06010870	09/10/93	4	440	42.2	42.2	42.4	MH	OK
245	06010870	09/10/93	4	223	42.0	42.6	42.8	MH	OK
246	07006964	09/10/93	4	220	42.0	42.2	42.2	MH	OK
247	07006964	09/10/93	4	438	42.6	41.8	42.6	JMI	OK
248	06010847	09/10/93	4	433	43.8	42.2	44.6	JMI	OK
249	06010847	09/10/93	4	4	42.2	43.2	42.4	JMI	OK
250	06010847	09/10/93	4	240	42.4	43.4	42.4	JMI	OK
251	07006955	09/10/93	4	198	43.0	42.0	41.4	JMI	OK
252	07006955	09/11/93	4	463	42.8	42.6	42.4	JMI	OK
253	90907931	09/11/93	4	461	42.4	41.6	42.4	JMI	OK
254	90907932	09/11/93	4	463	43.2	42.4	43.0	JMI	OK
255	06010810	09/11/93	4	465	42.6	42.6	42.8	JMI	OK
256	06010810	09/11/93	4	212	42.4	42.8	41.2	JMI	OK
257	90907931	09/11/93	4	210	42.2	42.8	42.6	JMI	OK
258	07006939	09/11/93	4	50	42.6	42.8	42.2	JMI	OK
259	07006941	09/14/93	4	660	42.6	43.6	43.2	TD	OK
260	90907931	09/14/93	4	100	42.8	45.6	42.2	TD	OK
261	07006973	09/14/93	4	645	43.4	42.0	45.0	TD	OK
262	06010857	09/14/93	4	110	41.6	43.0	44.0	TD	OK
263	06010857	09/14/93	4	560	44.0	44.4	44.2	TD	OK
264	06010861	09/14/93	4	330	43.2	44.8	43.4	TD	OK
265	06010861	09/14/93	4	245	43.2	43.4	42.2	TD	OK
266	06010861	09/14/93	4	101	44.2	44.0	44.8	TD	OK
267	06010860	09/14/93	4	195	43.2	44.0	43.4	TD	OK
268	06010860	09/14/93	4	470	43.8	43.4	42.8	TD	OK

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ASH POND 91
GEOMEMBRANE PANEL DEPLOYMENT SUMMARY

PANEL NO.	ROLL NUMBER	DATE	OVERLAP (INCHES)	APPROX. LENGTH (FT)	AVERAGE EDGE THICKNESS (mils)			QA MONITOR	VISUAL PANEL INSPECTION/REMARKS
					LEAD	SIDE	TRAIL		
269	06010894	09/14/93	4	362	44.4	41.4	44.2	TD	OK
270	06010894	09/14/93	4	128	45.0	43.0	44.0	TD	OK
271	06010894	09/15/93	4	105	43.8	43.8	43.4	TD	OK
272	07006954	09/15/93	4	655	44.0	44.4	44.6	TD	OK
273	06010856	09/15/93	4	117	44.8	42.8	44.4	TD	OK
274	06010856	09/15/93	4	100	42.2	43.8	43.4	TD	OK
275	06010856	09/15/93	4	103	44.4	44.2	44.4	TD	OK
276	06010856	09/15/93	4	145	44.2	43.4	45.2	TD	OK
277	06010856	09/17/93	4	193	42.0	43.0	41.8	TD	OK
278	06010894	09/17/93	4	28	43.4	42.2	44.2	TD	OK
278 ext	06010894	09/17/93	4	0	43.6	43.8	42.8	TD	CUT FROM PANEL 278
279	07006947	09/17/93	4	220	43.6	44.4	42.4	TD	OK
280	07006947	09/17/93	4	220	40.6	43.4	42.8	TD	OK
281	07006947	09/17/93	4	183	43.6	42.0	44.6	TD	OK
282	06010852	09/17/93	4	665	40.8	43.2	42.6	TD	OK
283	06010865	09/17/93	4	675	44.0	43.4	45.0	TD	OK
284	06010864	09/17/93	4	120	42.6	44.4	44.4	TD	OK
285	06010864	09/17/93	4	122	41.6	43.0	41.2	TD	OK
286	06010864	09/17/93	4	123	44.4	42.4	41.6	TD	OK
287	06010864	09/17/93	4	125	43.2	44.6	44.0	TD	OK
288	06010864	09/17/93	4	122	44.8	44.0	43.8	TD	OK
289	06010864	09/17/93	4	60	43.2	43.6	42.2	TD	OK
290	06010719	09/17/93	4	125	42.4	43.6	44.0	TD	OK
291	06010719	09/17/93	4	125	44.4	43.2	41.2	TD	OK
292	06010719	09/17/93	4	120	45.2	43.6	45.0	TD	OK
293	06010836	09/17/93	4	130	43.6	41.6	44.4	TD	OK
294	06010836	09/17/93	4	138	44.4	42.2	44.0	TD	OK

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APPENDIX G-2
ASH POND 91
GEOMEMBRANE PANEL DEPLOYMENT SUMMARY

PANEL NO.	ROLL NUMBER	DATE	OVERLAP (INCHES)	APPROX. LENGTH (FT)	AVERAGE EDGE THICKNESS (mils)			QA MONITOR	VISUAL PANEL INSPECTION/REMARKS
					LEAD	SIDE	TRAIL		
295	06010836	09/17/93	4	135	41.6	44.4	44.6	TD	OK
296	06010836	09/17/93	4	132	43.8	44.2	44.8	TD	OK
297	06010836	09/17/93	4	134	44.0	43.2	44.4	TD	OK
298	06010835	09/17/93	4	132	44.2	44.4	44.2	TD	OK
299	06010835	09/17/93	4	130	43.8	42.6	43.6	TD	OK
300	06010835	09/17/93	4	132	43.6	42.4	42.6	TD	OK
301	06010835	09/17/93	4	132	43.0	43.4	42.2	TD	OK
302	06010835	09/17/93	4	129	44.2	43.0	43.8	TD	OK
303	06010746	09/17/93	4	400	43.8	41.6	41.8	TD	OK
304	06010792	09/17/93	4	120	43.0	41.8	43.8	TD	OK
305	90907931	09/17/93	4	77	43.4	42.8	42.2	TD	OK
306	06010792	09/17/93	4	118	43.0	42.2	44.0	TD	OK
307	06010792	09/17/93	4	110	43.4	43.6	42.0	TD	OK
308	06010792	09/17/93	4	115	43.4	43.6	43.6	TD	OK
309	06010792	09/17/93	4	118	41.8	42.8	43.6	TD	OK
310	06010756	09/17/93	4	158	42.4	40.8	42.6	TD	OK
311	06010793	09/17/93	4	50	43.4	43.2	43.8	TD	OK

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APPENDIX H

TRIAL SEAM SUMMARIES

APPENDIX H-1

TRIAL SEAM SUMMARY - DRAINS POND

November 1993

937-4207

Golder Construction Services, Inc.

APPENDIX H-1
DRAINS POND
FUSION WELDING TRIAL SEAM SUMMARY

TRIAL SEAM NUMBER	DATE	TIME	WELD I.D.		TEMPERATURES			TEST RESULTS				QA MON.
			MACH.	TECH.	AMBIENT TEMP. (°F)	MACH. SETTING SPEED	MACH. SETTING TEMP.(C)	INSIDE PEEL	OUTSIDE PEEL	SHEAR	PASS/ FAIL	
TF-1	07/20/93	1020	1061	VN	70	10.0	405	P2/117 P2/101	P2/97 P2/98	P1/120	PASS	CPB
TF-2	07/20/93	1030	1175	BT	70	11.0	415	P2/93 P2/99	P2/103 P2/100	P1/122	PASS	CPB
TF-3	07/20/93	1035	1054	PP	70	9.0	410	P2/102 P2/100	P2/104 P2/98	P1/123	PASS	CPB
TF-4	07/20/93	1330	1175	BT	70	11.0	410	P2/84 P2/69	P2/125 P2/103	P1/122	PASS	TD
TF-5	07/20/93	1335	1061	VN	70	10.0	410	P2/95 P2/98	P2/100 P2/111	P1/123	PASS	TD
TF-1	08/04/93	1000	1061	VN	60	9.0	410	P2/105 P2/98	P2/102 P2/78	P1/124	PASS	CPB
TF-2	08/04/93	1010	1054	PP	60	8.0	415	P2/99 P2/88	P2/89 P2/105	P1/128	PASS	CPB
TF-3	08/04/93	1015	1175	BT	60	10.0	415	P2/109 P2/100	P2/104 P2/80	P1/116	PASS	CPB
TF-4	08/04/93	1400	1175	BT	70	10.0	415	P2/90 P2/90	P2/102 P2/90	P1/128	PASS	JMI
TF-1	08/05/93	0800	1061	VN	65	8.0	410	P2/117 P2/109	P2/116 P2/113	P1/143	PASS	JMI
TF-2	08/05/93	0810	1246	PP	65	7.5	450	P2/99 P2/112	P2/104 P2/105	P1/140	PASS	JMI
TF-3	08/05/93	0812	1175	BT	65	9.5	415	P2/109 P2/110	P2/121 P2/112	P1/134	PASS	JMI
TF-4	08/05/93	1310	1061	VN	65	8.0	410	P2/91 P2/92	P2/95 P2/87	P1/122	PASS	CPB
TF-5	08/05/93	1430	1246	PP	75	8.0	415	P2/111 P2/96	P2/113 P2/112	P1/126	PASS	JMI
TF-6	08/05/93	1520	1175	BT	75	10.0	415	P2/85 P2/84	P2/90 P2/94	P1/126	PASS	JMI
TF-1	08/06/93	0750	1061	VN	65	8.0	410	P2/96 P2/114	P2/110 P2/105	P1/149	PASS	JMI
TF-2	08/06/93	0755	1246	PP	65	7.5	415	P2/117 P2/106	P2/120 P2/117	P1/136	PASS	JMI
TF-3	08/06/93	0800	1175	BT	65	9.5	415	P2/93 P2/96	P2/114 P2/104	P1/145	PASS	JMI
TF-4	08/06/93	1255	1246	PP	70	8.0	415	P2/113 P2/114	P2/110 P2/110	P1/148	PASS	CPB
TF-5	08/06/93	1300	1175	BT	70	10.0	415	P2/108 P2/108	P2/103 P2/115	P1/132	PASS	CPB

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APPENDIX H-1
DRAINS POND
EXTRUSION WELDING TRIAL SEAM SUMMARY

TRIAL SEAM NUMBER	DATE	TIME	WELDER I.D.		TEMPERATURES			TEST RESULTS				QA MON.
			MACH.	TECH.	AMBIENT TEMP. (°F)	MACH. SETTING BARREL	MACH. SETTING NOZZLE	PEEL	PEEL	SHEAR	PASS/ FAIL	
TX-1	07/20/93	1040	10	CW	70	215	240	P2/72	P2/82	P1/119	PASS	CPB
TX-2	07/20/93	1045	10	SO	70	215	240	P2/82	P2/80	P1/105	PASS	CPB
TX-3	07/20/93	1330	10	CW	70	215	240	P2/87	P2/89	P1/128	PASS	TD
TX-4	07/20/93	1335	10	S0	70	215	240	P2/87	P2/90	P1/126	PASS	TD
TX-5	07/20/93	1730	52	BT	70	205	220	P2/56	P2/60	P1/113	PASS	TD
TX-1	08/04/93	1015	52	SO	60	225	240	P2/111	P2/98	P1/108	PASS	CPB
TX-2	08/04/93	1220	50	KK	70	225	240	P2/118	P2/113	P1/132	PASS	JMI
TX-3	08/04/93	1400	52	SO	70	225	240	P2/102	P2/90	P1/103	PASS	JMI
TX-4	08/04/93	1410	10	VN	70	225	240	P2/100	P2/98	P1/105	PASS	JMI
TX-5	08/04/93	1730	50	KK	70	225	240	P2/99	P2/98	P1/110	PASS	CPB
TX-6	08/04/93	1900	10	VN	70	225	240	P2/101	P2/100	P1/121	PASS	CPB
TX-1	08/05/93	0818	10	CW	65	225	240	P1/101	P1/99	P5/135	PASS	JMI
TX-2	08/05/93	1300	10	SO	75	225	240	P1/90	P1/88	P5/133	PASS	JMI
TX-3	08/05/93	1800	52	KK	65	225	240	P2/90	P2/77	P5/126	PASS	CPB
TX-4	08/05/93	1810	50	SO	65	225	240	P2/101	P2/85	P5/114	PASS	CPB
TX-1	08/06/93	1310	50	KK	70	225	240	P2/84	P2/91	P1/114	PASS	CPB
TX-2	08/06/93	1320	52	CW	70	225	240	P2/93	P2/111	P1/100	PASS	CPB
TX-3	08/06/93	1730	50	KK	70	225	240	P2/105	P2/105	P1/110	PASS	CPB
TX-4	08/06/93	1830	52	PP	70	225	240	P2/90	P2/106	P1/130	PASS	CPB
TX-1	08/07/93	0815	10	BT	65	220	235	P1/72	P1/84	P5/133	PASS	JMI
TX-2	08/07/93	0830	50	VN	65	220	250	P1/100	P1/114	P5/124	PASS	JMI
TX-3	08/07/93	1315	50	VN	70	225	250	P1/108	P1/100	P5/102	PASS	TD
TX-4	08/07/93	1335	10	BT	70	220	235	P1/90	P1/93	P5/121	PASS	TD

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APPENDIX H-2

TRIAL SEAM SUMMARY - ASH POND 91

November 1993

937-4207

Golder Construction Services, Inc.

APPENDIX H-2
ASH POND 91
FUSION WELDING TRIAL SEAM SUMMARY

TRIAL SEAM NUMBER	DATE	TIME	WELD I.D.		TEMPERATURES			TEST RESULTS				QA MON.
			MACH.	TECH.	AMBIENT TEMP. (°F)	MACH. SETTING SPEED	MACH. SETTING TEMP (C)	INSIDE PEEL	OUTSIDE PEEL	SHEAR	PASS/ FAIL	
TF-1	08/09/93	1040	1061	VN	75	9.0	410	P1/94 P1/100	P1/98 P1/102	P5/105	PASS	TD
TF-2	08/09/93	1100	1175	BT	75	9.5	415	P1/86 P1/100	P1/91 P1/95	P5/104	PASS	TD
TF-3	08/09/93	1115	1246	PP	75	8.0	415	P1/95 P1/114	P1/105 P1/113	P5/114	PASS	TD
TF-4	08/09/93	1250	1061	VN	75	10.0	410	P2/93 P2/96	P2/95 P2/96	P1/104	PASS	CPB
TF-5	08/09/93	1300	1175	BT	75	10.0	415	P2/89 P2/85	P2/89 P2/89	P1/96	PASS	CPB
TF-6	08/09/93	1310	1246	PP	75	8.5	415	P2/92 P2/93	P2/90 P2/91	P1/95	PASS	CPB
TF-1	08/10/93	0810	1246	PP	65	8.0	415	P2/115 P2/99	P2/112 P2/114	P1/123	PASS	CPB
TF-2	08/10/93	0810	1175	BT	65	10.0	415	P2/87 P2/94	P2/103 P2/111	P1/123	PASS	CPB
TF-3	08/10/93	1115	1061	VN	65	7.5	415	P2/85 P2/86	P2/96 P2/101	P1/118	PASS	CPB
TF-4	08/10/93	1250	1061	VN	70	7.5	415	P2/103 P2/108	P2/101 P2/102	P1/109	PASS	CPB
TF-5	08/10/93	1257	1246	PP	70	8.5	415	P2/97 P2/98	P2/112 P2/113	P1/117	PASS	CPB
TF-6	08/10/93	1235	1175	BT	70	10.0	415	P2/90 P2/89	P2/111 P2/112	P1/120	PASS	CPB
TF-1	08/12/93	0831	1175	BT	55	9.5	415	P2/101 P2/105	P2/101 P2/101	P1/156	PASS	JMI
TF-2	08/12/93	0833	1246	PP	55	8.0	415	P2/97 P2/96	P2/104 P2/120	P1/147	PASS	JMI
TF-3	08/12/93	0837	1061	VN	55	7.0	415	P2/106 P2/96	P2/109 P/118	P1/141	PASS	JMI
TF-4	08/12/93	1350	1061	VN	73	8.0	415	P2/105 P2/98	P2/95 P2/82	P1/133	PASS	SGH
TF-5	08/12/93	1353	1175	BT	73	8.5	400	P2/107 P2/110	P2/116 P2/99	P1/132	PASS	SGH
TF-6	08/12/93	1356	1246	PP	73	8.0	415	P2/117 P2/109	P2/107 P2/105	P1/133	PASS	SGH
TF-1	08/13/93	0815	1061	VN	59	6.5	415	P2/107 P2/110	P2/112 P2/109	P5/144	PASS	SGH
TF-2	08/13/93	0820	1246	PP	60	8.0	415	P2/94 P2/99	P2/94 P2/97	P5/135	PASS	SGH
TF-3	08/13/93	1054	1054	BT	65	9.0	415	P2/120 P2/110	P2/131 P2/115	P5/149	PASS	SGH
TF-1	08/16/93	0805	1054	BT	65	9.0	415	P2/96 P2/107	P2/120 P2/120	P1/129	PASS	SGH
TF-2	08/16/93	0810	1246	PP	65	8.0	415	P2/97 P2/97	P2/101 P2/102	P1/124	PASS	SGH
TF-1	08/17/93	0756	1054	BT	65	5.0	415	----	----	----	FAIL	MH

Golder Construction Services, Inc.

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APPENDIX H-2
ASH POND 91
FUSION WELDING TRIAL SEAM SUMMARY

TRIAL SEAM NUMBER	DATE	TIME	WELD I.D.		TEMPERATURES			TEST RESULTS				QA MON.
			MACH.	TECH.	AMBIENT TEMP. (°F)	MACH. SETTING SPEED	MACH. SETTING TEMP.(C)	INSIDE PEEL	OUTSIDE PEEL	SHEAR	PASS/ FAIL	
TF-2	08/17/93	0801	1066	VN	65	8.0	415	P1/92 P1/90	P1/102 P1/98	P5/106 P5/140	PASS	MH
TF-3	08/17/93	0807	1246	PP	65	8.0	415	P1/90 P1/98	P1/98 P1/99	P5/109 P5157	PASS	MH
TF-1R1	08/17/93	0820	1054	BT	65	9.0	415	----	----	----	FAIL	MH
TF-1R2	08/17/93	0846	1054	BT	65	9.0	415	P1/93 P1/98	P1/110 P1/91	P5130 P5/128	PASS	MH
TF-1	08/18/93	0740	1066	VN	52	8.0	415	P1/95 P1/102	P1/95 P1/111	P5/137	PASS	MH
TF-2	08/18/93	0745	1054	BT	52	9.5	415	P1/118 P1/104	P1/102 P1/104	P5/121	PASS	MH
TF-3	08/18/93	0800	1053	PP	52	8.0	415	P1/98 P1/101	P1/112 P1/118	P5/143	PASS	MH
TF-4	08/18/93	1330	1066	VN	75	9.0	415	P1/102 P1/102	P1/112 P1/106	P5/128	PASS	SGH
TF-5	08/18/93	1335	1053	PP	75	8.5	415	P1/102 P1/102	P1/91 P1/104	P5/102	PASS	SGH
TF-1	08/19/93	0730	1054	BT	60	8.5	420	P1/98 P1/101	P1/95 P1/102	P5/151	PASS	TD
TF-2	08/19/93	0735	1066	VN	60	8.0	415	P1/85 P1/91	P1/89 P1/93	P5/140	PASS	TD
TF-3	08/19/93	0735	1053	PP	60	8.0	415	P1/107 P1/102	P1/103 P1/109	P5/126	PASS	TD
TF-1	08/20/93	0730	1054	BT	70	9.0	415	P1/110 P1/109	P1/114 P1/118	P5/132	PASS	TD
TF-2	08/20/93	0745	1053	PP	70	8.0	415	P1/110 P1/93	P1/103 P1/117	P5/139	PASS	TD
TF-3	08/20/93	1310	1054	BT	75	9.0	415	P1/98 P1/101	P1/97 P1/99	P5/108	PASS	TD
TF-4	08/20/93	1310	1053	PP	75	8.0	415	P1/98 P1/101	P1/99 P1/98	P5/105	PASS	TD
TF-1	08/21/93	0735	1066	VN	70	7.5	415	P1/97 P1/93	P1/118 P1/110	P5/136	PASS	SGH
TF-2	08/21/93	0740	1054	BT	70	9.0	415	P1/95 P1/100	P1/107 P1/113	P5/122	PASS	SGH
TF-3	08/21/93	0800	1053	PP	70	8.0	415	P1/99 P1/103	P1/97 P1/95	P5/128	PASS	SGH
TF-1	08/24/93	0745	1066	VN	68	8.0	415	P1/104 P2/90	P1/114 P2/90	P5/133	PASS	MH
TF-2	08/24/93	0745	1053	PP	68	8.0	415	P2/109 P2/101	P1/102 P2/106	P5/135	PASS	MH
TF-3	08/24/93	0745	1054	BT	68	9.0	415	P1/118 P1/120	P1/106 P1/88	P5/128	PASS	SGH
TF-4	08/24/93	1314	1066	VN	80	8.0	415	P1/91 P1/97	P1/97 P2/89	P5/110	PASS	MH
TF-5	08/24/93	1317	1054	BT	80	9.5	415	P1/84 P1/82	P1/92 P1/95	P5/97	PASS	MH

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APPENDIX H-2
ASH POND 91
FUSION WELDING TRIAL SEAM SUMMARY

TRIAL SEAM NUMBER	DATE	TIME	WELD I.D.		TEMPERATURES			TEST RESULTS				QA MON.
			MACH.	TECH.	AMBIENT TEMP. (°F)	MACH. SETTING SPEED	MACH. SETTING TEMP (C)	INSIDE PEEL	OUTSIDE PEEL	SHEAR	PASS/ FAIL	
TF-6	08/24/93	1330	1053	PP	82	9.0	415	P1/103 P1/98	P1/013 P1/96	P5/100	PASS	MH
TF-1	08/25/93	0810	1066	VN	65	8.0	415	P1/93 P1/90	P1/111 P1/115	P5/120	PASS	TD
TF-2	08/25/93	0810	1054	BT	65	9.0	415	P1/100 P1/114	P1/98 P1/116	P5/126	PASS	TD
TF-3	08/25/93	0825	1053	PP	65	8.0	415	P1/95 P1/94	P1/94 P1/93	P5/116	PASS	TD
TF-4	08/25/93	1250	1054	BT	70	9.0	415	P1/95 P1/113	P1/96 P1/112	P5/118	PASS	TD
TF-5	08/25/93	1300	1053	PP	70	9.0	415	P1/96 P1/98	P1/95 P1/99	P5/109	PASS	TD
TF-6	08/25/93	1410	1066	PP	70	8.5	415	P1/96 P1/93	P1/96 P1/102	P5/110	PASS	MH
TF-1	08/28/93	0830	1066	VN	65	8.0	415	P1/95 P1/94	P1/94 P1/102	P5/136	PASS	TD
TF-2	08/28/93	0830	1053	PP	65	8.0	415	P1/100 P1/96	P1/101 P1/103	P5/143	PASS	TD
TF-3	08/28/93	1300	1053	PP	70	8.5	415	P1/96 P1/95	P1/98 P1/102	P5/110	PASS	TD
TF-4	08/28/93	1315	1066	VN	70	8.0	415	P1/96 P1/93	P1/99 P1/93	P5/105	PASS	TD
TF-1	08/31/93	1230	1054	BT	70	8.0	415	P2/89 P2/96	P2/91 P2/94	P1/122	PASS	JMI
TF-2	08/31/93	1306	1053	VN	70	8.0	415	P1/88 P1/96	P1/106 P1/106	P5/113	PASS	MH
TF-3	08/31/93	1310	1066	PP	70	8.0	415	P1/92 P1/94	P2/95 P1/91	P5/108	PASS	MH
TF-1	09/01/93	0800	1054	BT	65	7.5	415	P1/89 P1/98	P1/105 P1/105	P5/110	PASS	MH
TF-2	09/01/93	0803	1066	VN	65	8.0	415	P1/97 P1/93	P1/106 P1/105	P5/130	PASS	MH
TF-3	09/01/93	0805	1053	PP	65	7.5	415	P1/100 P1/90	P1/101 P1/97	P5/134	PASS	MH
TF-4	09/01/93	1255	1054	BT	70	7.5	415	P1/87 P1/85	P1/80 P1/108	P5/113	PASS	MH
TF-5	09/01/93	1300	1066	VN	70	8.0	415	P1/91 P1/90	P1/96 P1/95	P5/107	PASS	MH
TF-6	09/01/93	1305	1053	PP	70	8.0	415	P1/100 P1/87	P1/101 P1/93	P5/110	PASS	MH
TF-1	09/03/93	0730	1066	VN	55	8.0	415	P2/97 P2/105	P2/128 P2/115	P1/151	PASS	JMI
TF-2	09/03/93	0733	1054	BT	55	7.5	415	P2/111 P2/110	P2/105 P2/112	P1/141	PASS	JMI
TF-3	09/03/93	0740	1053	PP	55	7.5	415	P2/113 P2/112	P2/115 P2/107	P1/134	PASS	JMI
TF-4	09/03/93	1259	1066	VN	70	8.0	415	P2/91 P2/93	P2/95 P2/101	P1/105	PASS	JMI

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APPENDIX H-2
ASH POND 91
FUSION WELDING TRIAL SEAM SUMMARY

TRIAL SEAM NUMBER	DATE	TIME	WELD I.D.		TEMPERATURES			TEST RESULTS				QA MON.
			MACH.	TECH.	AMBIENT TEMP. (°F)	MACH. SETTING SPEED	MACH. SETTING TEMP (C)	INSIDE PEEL	OUTSIDE PEEL	SHEAR	PASS/ FAIL	
TF-5	09/03/93	1300	1054	BT	70	7.5	415	P2/81 P2/99	P2/82 P2/103	P1/110	PASS	JMI
TF-6	09/03/93	1310	1053	PP	70	8.0	415	P2/95 P2/103	P2/96 P2/96	P1/110	PASS	MH
TF-1	09/04/93	0807	1054	BT	50	7.5	415	P1/111 P1/103	P2/129 P2/106	P5/133	PASS	MH
TF-2	09/04/93	0810	1066	VN	50	7.5	415	P1/102 P1/105	P2/99 P2/96	P5/148	PASS	MH
TF-3	09/04/93	0830	1053	PP	50	7.5	415	P1/110 P1/113	P1/106 P1/93	P5/138	PASS	MH
TF-4	09/04/93	1312	1054	BT	60	7.5	415	P1/104 P1/123	P1/117 P1/109	P5/123	PASS	MH
TF-5	09/04/93	1317	1066	VN	60	8.0	415	P1/108 P1/92	P1/128 P1/122	P5/146	PASS	TD
TF-1	09/06/93	0830	1066	VN	60	7.5	415	P1/94 P1/102	P1/114 P1/90	P5/142	PASS	SGH
TF-2	09/06/93	0850	1053	PP	50	7.5	415	P1/93 P1/95	P1/85 P1/90	P5/145	PASS	SGH
TF-3	09/06/93	0900	1054	BT	50	7.5	415	P1/102 P1/108	P1/109 P1/115	P5/158	PASS	MH
TF-4	09/06/93	1320	1066	VN	55	8.0	415	P1/115 P1/116	P1/118 P1/120	P5/127	PASS	MH
TF-5	09/06/93	1325	1053	PP	55	8.0	415	P1/120 P1/119	P1/123 P1/120	P5/134	PASS	MH
TF-6	09/06/93	1330	1054	BT	55	7.5	415	P1/114 P1/97	P1/113 P1/108	P5/126	PASS	SGH
TF-1	09/07/93	0745	1054	BT	50	7.5	415	P1/114 P1/113	P1/116 P1/109	P5/171	PASS	SGH
TF-2	09/07/93	0750	1066	VN	50	8.0	415	P1/109 P1/121	P1/105 P1/110	P5/135	PASS	SGH
TF-3	09/07/93	0755	1053	PP	50	7.5	415	P1/122 P1/110	P1/105 P1/84	P5/150	PASS	SGH
TF-4	09/07/93	1305	1054	BT	60	7.5	415	P1/104 P1/98	P1/110 P1/111	P5/135	PASS	SGH
TF-5	09/07/93	1308	1053	PP	60	8.0	415	P1/111 P1/97	P1/102 P1/115	P5/127	PASS	SGH
TF-6	09/07/93	1310	1066	VN	60	8.0	415	P1/101 P1/101	P1/110 P1/112	P5/134	PASS	SGH
TF-1	09/08/93	0715	1066	VN	60	8.0	415	P1/120 P1/110	P1/111 P1/118	P5/138	PASS	TD
TF-2	09/08/93	0730	1054	BT	60	7.5	415	P1/103 P1/112	P1/113 P1/110	P5/150	PASS	TD
TF-3	09/08/93	0800	1053	PP	60	7.5	415	P1/118 P1/80	P1/75 P1/80	P5/143	PASS	TD
TF-1	09/10/93	0745	1054	BT	55	7.5	415	P1/104 P1/116	P1/120 P1/117	P5/156	PASS	MH
TF-2	09/10/93	0750	1066	VN	55	8.0	415	P1/129 P1/138	P1/118 P1/123	P5/156	PASS	MH

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APPENDIX H-2
ASH POND 91
FUSION WELDING TRIAL SEAM SUMMARY

TRIAL SEAM NUMBER	DATE	TIME	WELD I.D.		TEMPERATURES			TEST RESULTS				QA MON.
			MACH.	TECH.	AMBIENT TEMP. (°F)	MACH. SETTING SPEED	MACH. SETTING TEMP.(C)	INSIDE PEEL	OUTSIDE PEEL	SHEAR	PASS/ FAIL	
TF-3	09/10/93	0755	1053	PP	55	7.5	415	P1/120 P1/97	P1/112 P1/132	P5/160	PASS	MH
TF-4	09/10/93	1305	1066	VN	70	8.0	415	P1/103 P1/106	P1/125 P1/119	P5/132	PASS	MH
TF-5	09/10/93	1310	1054	BT	70	7.5	415	P1/105 P1/108	P1/124 P1/121	P5/141	PASS	MH
TF-6	09/10/93	1315	1053	PP	70	8.0	415	P1/108 P1/108	P1/105 P1/106	P5/130	PASS	MH
TF-1	09/11/93	0750	1054	BT	60	7.5	415	P1/117 P1/137	P1/123 P1/135	P5/152	PASS	TD
TF-2	09/11/93	0800	1053	PP	60	7.0	415	P1/115 P1/110	P1/128 P1/111	P5/140	PASS	TD
TF-3	09/11/93	0835	1066	VN	60	8.0	415	P1/110 P1/107	P1/111 P1/110	P5/139	PASS	TD
TF-4	09/11/93	1250	1054	BT	70	7.5	415	P1/118 P1/109	P1/117 P1/118	P5/126	PASS	TD
TF-5	09/11/93	1300	1066	VN	70	8.0	415	P1/110 P1/119	P1/113 P1/126	P5/123	PASS	TD
TF-1	09/14/93	0730	1066	VN	32	7.0	415	P2/98 P2/99	P2/104 P2/126	P1/150	PASS	JMI
TF-2	09/14/93	0735	1053	PP	32	7.0	415	P2/130 P2/128	P2/120 P2/123	P1/174	PASS	JMI
TF-3	09/14/93	0745	1054	BT	32	7.5	415	P2/118 P2/121	P2/116 P2/119	P1/172	PASS	JMI
TF-4	09/14/93	1300	1053	PP	45	7.5	415	P2/110 P2/109	P2/95 P2/95	P1/145	PASS	JMI
TF-5	09/14/93	1301	1054	BT	45	7.5	415	P2/114 P2/115	P2/108 P2/108	P1/157	PASS	JMI
TF-6	09/14/93	1310	1066	VN	45	7.0	415	P2/85 P2/96	P2/119 P2/109	P5/148	PASS	JMI
TF-1	09/15/93	0745	1054	BT	45	7.5	415	P2/115 P2/114	P2/120 P2/114	P1/130	PASS	JMI
TF-2	09/15/93	0750	1053	PP	45	7.0	415	P2/115 P2/120	P2/140 P2/136	P1/148	PASS	JMI
TF-3	09/15/93	0800	1066	VN	45	7.0	415	P2/106 P2/115	P2/126 P2/100	P1/174	PASS	JMI
TF-4	09/15/93	1310	1053	PP	55	7.5	425	P2/95 P1/109	P2/115 P1/115	P1/150	PASS	MH
TF-1	09/17/93	0740	1195	SK	30	10.0	415	P2/148 P2/113	P2/106 P2/111	P1/176	PASS	JMI
TF-2	09/17/93	0745	1054	BT	30	7.5	415	P2/111 P2/110	P2/111 P2/89	P1/165	PASS	JMI
TF-3	09/17/93	0800	1066	VN	30	6.0	415	P2/110 P2/109	P2/104 P2/117	P1/170	PASS	JMI
TF-4	09/17/93	0809	1053	PP	30	7.0	415	P2/133 P2/127	P2/118 P2/96	P1/192	PASS	JMI
TF-5	09/17/93	1309	1066	VN	50	6.5	415	P2/106 P2/112	P2/102 P2/111	P1/145	PASS	JMI

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APPENDIX H-2
ASH POND 91
FUSION WELDING TRIAL SEAM SUMMARY

TRIAL SEAM NUMBER	DATE	TIME	WELD I.D.		TEMPERATURES			TEST RESULTS				QA MON.
			MACH.	TECH.	AMBIENT TEMP. (°F)	MACH. SETTING SPEED	MACH. SETTING TEMP (C)	INSIDE PEEL	OUTSIDE PEEL	SHEAR	PASS/ FAIL	
TF-6	09/17/93	1310	1195	SK	50	9.0	415	P2/109 P2/108	P2/101 P2/135	P1/130	PASS	JMI
TF-7	09/17/93	1312	1054	BT	50	7.5	415	P2/113 P2/97	P2/105 P2/120	P1/145	PASS	JMI
TF-8	09/17/93	1320	1053	SK	50	7.5	415	P2/115 P2/119	P2/127 P2/121	P1/137	PASS	JMI

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APPENDIX H-2
ASH POND 91
EXTRUSION WELDING TRIAL SEAM SUMMARY

TRIAL SEAM NUMBER	DATE	TIME	WELDER I.D.		TEMPERATURES			TEST RESULTS				QA MON.
					AMBIENT TEMP.	MACH. SETTING						
			MACH.	TECH.	(°F)	BARREL	NOZZLE	PEEL	PEEL	SHEAR	PASS/ FAIL	
TX-1	08/09/93	1115	10	SO	75	225	240	P1/85	P1/106	P5/122	PASS	TD
TX-2	08/09/93	1750	10	SO	80	220	230	P2/96	P2/98	P5/120	PASS	CPB
TX-1	08/10/93	0730	10	SO	65	220	230	P2/96	P2/79	P5/127	PASS	CPB
TX-2	08/10/93	0745	50	VN	70	220	240	P2/101	P2/91	P5/120	PASS	CPB
TX-3	08/10/93	1300	10	SO	70	215	225	P2/105	P2/100	P5/111	PASS	CPB
TX-4	08/10/93	1720	50	BT	80	210	230	P2/90	P2/85	P5/126	PASS	CPB
TX-1	08/11/93	0800	10	VN	70	200	230	P1/76	P1/87	P5/135	PASS	TD
TX-2	08/11/93	0815	50	PP	70	220	235	P1/74	P1/79	P5/136	PASS	TD
TX-3	08/11/93	1300	10	VN	75	220	235	P1/86	P1/75	P5/121	PASS	JMI
TX-4	08/11/93	1303	50	PP	75	220	233	P1/86	P1/79	P5/96	PASS	JMI
TX-1	08/12/93	0830	10	SO	65	225	230	P2/72	P2/70	P5/144	PASS	TD
TX-2	08/12/93	1359	10	SO	73	220	240	P2/83	P2/68	P5/141	PASS	SGH
TX-3	08/12/93	1610	50	SK	80	220	235	P2/107	P2/113	P5/138	PASS	SGH
TX-1	08/13/93	0800	10	CW	60	220	240	P1/98	P1/93	P5/133	PASS	SGH
TX-2	08/13/93	1338	10	VN	70	230	240	P1/90	P1/104	P5/124	PASS	SGH
TX-3	08/13/93	1420	52	IOU	75	215	235	P1/99	P1/104	P5/115	PASS	SGH
TX-1	08/16/93	0750	10	SO	60	220	230	P2/91	P2/90	P5/126	PASS	SGH
TX-2	08/16/93	0755	10	VN	60	220	230	P2/80	P2/81	P5127	PASS	SGH
TX-3	08/16/93	1300	10	VN	80	220	230	P2/78	P2/70	P5/114	PASS	SGH
TX-4	08/16/93	1345	52	JS	80	210	235	P2/101	P2/92	P5/124	PASS	MH
TX-1	08/17/93	0802	10	SO	65	220	230	P1/90	P1/100	P5/131	PASS	MH
TX-2	08/17/93	1345	52	BN	75	225	235	P1/95	P1/100	P5/120	PASS	SGH
TX-3	08/17/93	1350	10	VN	75	220	230	P1/101	P1/99	P5/128	PASS	SGH

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APPENDIX H-2
ASH POND 91
EXTRUSION WELDING TRIAL SEAM SUMMARY

TRIAL SEAM NUMBER	DATE	TIME	WELDER I.D.		TEMPERATURES			TEST RESULTS				QA MON.
			MACH.	TECH.	AMBIENT TEMP. (°F)	MACH. SETTING BARREL	MACH. SETTING NOZZLE	PEEL	PEEL	SHEAR	PASS/ FAIL	
TX-1	08/18/93	0806	10	SO	52	220	230	P1/78	P1/89	P5/127	PASS	MH
TX-2	08/18/93	1340	10	SO	75	220	230	P1/85	P1/85	P5/122	PASS	SGH
TX-3	08/18/93	1450	52	JS	75	220	230	P1/91	P1/82	P1/110	PASS	JMI
TX-1	08/19/93	0815	52	SO	60	220	230	P1/85	P1/70	P5/123	PASS	TD
TX-2	08/19/93	1100	50	PP	63	235	240	P1/83	P1/75	P5/130	PASS	MH
TX-3	08/19/93	1330	52	VN	70	220	230	P1/58	P1/50	P5/132	PASS	SGH
TX-4	08/19/93	1420	50	KK	70	222	245	P1/98	P1/107	P5/123	PASS	SGH
TX-1	08/20/93	0735	50	VN	70	220	230	P1/82	P1/89	P5/124	PASS	TD
TX-2	08/20/93	0800	52	SK	70	220	230	P1/74	P1/84	P5/146	PASS	JMI
TX-3	08/20/93	1100	52	SK	75	220	230	P1/84	P1/100	P5/117	PASS	SGH
TX-4	08/20/93	1300	52	SK	75	220	230	P1/76	P1/104	P5/126	PASS	TD
TX-5	08/20/93	1530	50	KK	75	210	220	P1/80	P1/73	P5/127	PASS	JMI
TX-1	08/21/93	0800	50	SO	65	220	230	P1/72	P1/74	P5/136	PASS	TD
TX-1	08/23/93	0745	50	PP	55	210	220	P1/93	P1/90	P5/123	PASS	JMI
TX-2	08/23/93	0746	50	VN	55	210	220	P1/96	P1/82	P5/129	PASS	JMI
TX-3	08/23/93	0750	52	KK	55	224	230	P1/85	P1/90	P5/140	PASS	JMI
TX-1	08/24/93	0750	52	SO	68	220	230	P1/73	P1/77	P5/147	PASS	SGH
TX-2	08/24/93	1320	52	SO	82	210	220	P1/70	P1/64	P5/90	PASS	MH
TX-3	08/24/93	1630	50	BT	90	210	220	P1/95	P1/96	P5/104	PASS	MH
TX-1	08/25/93	0810	52	SO	65	220	230	P1/70	P1/77	P5/90	PASS	TD
TX-2	08/25/93	1240	52	VN	70	220	230	P1/77	P1/65	P5/113	PASS	TD
TX-3	08/25/93	1600	50	BT	70	205	215	P1/75	P1/78	P5/115	PASS	MH
TX-1	08/27/93	0745	52	VN	55	220	230	P1/65	P1/70	P5/143	PASS	SGH

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APPENDIX H-2
ASH POND 91
EXTRUSION WELDING TRIAL SEAM SUMMARY

TRIAL SEAM NUMBER	DATE	TIME	WELDER I.D.		TEMPERATURES			TEST RESULTS				QA MON
			MACH.	TECH.	AMBIENT TEMP. (°F)	MACH. SETTING BARREL	MACH. SETTING NOZZLE	PEEL	PEEL	SHEAR	PASS/ FAIL	
TX-2	08/27/93	0750	50	BN	55	220	230	P1/77	P1/78	P5/142	PASS	SGH
TX-1	08/28/93	0845	52	SO	65	220	220	P1/75	P1/80	P5/125	PASS	TD
TX-2	08/28/93	1330	52	SO	75	220	230	P1/82	P1/79	P5/111	PASS	TD
TX-3	08/28/93	1345	10	SK	75	215	240	P1/107	P1/110	P5/116	PASS	TD
TX-4	08/28/93	1800	50	VN	70	220	230	P1/60	P1/90	P5/120	PASS	SGH
TX-5	08/28/93	1800	50	VN	70	220	230	P1/83	P1/93	P5/129	PASS	SGH
TX-1	08/31/93	0750	50	VN	45	220	230	P1/102	P1/90	P5/162	PASS	MH
TX-2	08/31/93	0800	52	SO	45	220	230	P1/91	P1/88	P5/141	PASS	MH
TX-3	08/31/93	0843	10	KK	50	225	245	P1/100	P1/101	P5/121	PASS	MH
TX-4	08/31/93	1320	52	SO	70	225	230	P1/70	P1/102	P5/102	PASS	MH
TX-5	08/31/93	1700	52	VN	72	225	230	P1/87	P1/94	P5/107	PASS	MH
TX-6	08/31/93	1725	50	BT	70	215	225	P1/108	P1/107	P5/124	PASS	MH
TX-1	09/01/93	0800	52	SO	65	215	230	P1/71	P1/80	P5/141	PASS	MH
TX-2	09/01/93	0900	10	SK	65	220	240	P1/70	P1/86	P5/133	PASS	MH
TX-3	09/01/93	1255	10	SK	70	225	215	P1/96	P1/87	P5/117	PASS	MH
TX-4	09/01/93	1300	52	SO	70	220	230	P1/89	P1/90	P5/111	PASS	MH
TX-5	09/01/93	1520	50	JS	70	220	230	P1/82	P1/83	P5/116	PASS	MH
TX-1	09/03/93	0745	52	SK	55	215	225	P1/83	P1/86	P5/112	PASS	JMI
TX-2	09/03/93	0746	50	JS	55	220	230	P1/86	P1/82	P5/130	PASS	JMI
TX-3	09/03/93	1309	52	SK	70	215	225	P1/94	P1/92	P5/90	PASS	JMI
TX-4	09/03/93	1315	50	JS	70	220	230	P1/97	P1/92	P5/104	PASS	JMI
TX-5	09/03/93	1600	10	BT	70	215	235	P1/82	P1/72	P5/104	PASS	JMI
TX-1	09/04/93	0815	52	SO	50	235	235	P1/90	P1/92	P5/151	PASS	MH

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APPENDIX H-2
ASH POND 91
EXTRUSION WELDING TRIAL SEAM SUMMARY

TRIAL SEAM NUMBER	DATE	TIME	WELDER I.D.		TEMPERATURES			TEST RESULTS				QA MON.
			MACH.	TECH.	AMBIENT TEMP. (°F)	MACH. SETTING BARREL	MACH. SETTING NOZZLE	PEEL	PEEL	SHEAR	PASS/ FAIL	
TX-2	09/04/93	0915	50	CW	50	215	235	P1/84	P1/81	P5/133	PASS	MH
TX-3	09/04/93	1030	52	SA	54	220	230	P1/103	P1/63	P5/133	PASS	MH
TX-4	09/04/93	1320	52	SA	60	220	235	P1/59	P1/71	P5/135	PASS	MH
TX-5	09/04/93	1335	10	PP	60	225	235	P1/95	P1/94	P5/134	PASS	MH
TX-1	09/06/93	0850	52	SO	50	220	230	P1/78	P1/90	P5/125	PASS	SGH
TX-2	09/06/93	0920	52	SK	50	220	230	P1/80	P1/94	P5/129	PASS	SGH
TX-3	09/06/93	1340	52	SK	55	220	230	P1/95	P1/93	P5/118	PASS	MH
TX-4	09/06/93	1510	50	JS	55	220	230	P1/112	P1/113	P5/116	PASS	MH
TX-5	09/06/93	1615	10	BT	55	225	235	P1/76	P1/70	P5/147	PASS	MH
TX-1	09/07/93	0745	52	SK	50	220	235	P1/96	P1/100	P5/104	PASS	SGH
TX-2	09/07/93	1300	52	SK	60	220	235	P1/109	P1/107	P5/136	PASS	SGH
TX-3	09/07/93	1435	50	JS	65	220	230	P1/109	P1/112	P5/144	PASS	SGH
TX-4	09/07/93	1510	10	BT	70	225	235	P1/82	P1/78	P5/109	PASS	SGH
TX-1	09/08/93	0730	52	SA	60	220	235	P1/118	P1/112	P5/145	PASS	TD
TX-2	09/08/93	0735	50	JS	60	220	230	P1/120	P1/140	P5/143	PASS	TD
TX-3	09/08/93	1130	10	VN	65	220	230	P1/72	P1/70	P5/134	PASS	MH
TX-4	09/08/93	1330	52	SK	75	220	230	P1/95	P1/115	P1/125	PASS	MH
TX-5	09/08/93	1335	10	BT	75	225	235	P1/102	P1/111	P5/119	PASS	MH
TX-6	09/08/93	1430	50	VN	75	220	230	P1/101	P1/98	P5/123	PASS	MH
TX-1	09/10/93	0800	52	SK	50	230	245	P2/107	P2/98	P5/154	PASS	MH
TX-2	09/10/93	0810	50	JS	50	220	230	P2/154	P2/138	P5/114	PASS	MH
TX-3	09/10/93	1300	50	JS	70	220	230	P2/109	P2/123	P5/100	PASS	MH
TX-4	09/10/93	1325	52	SK	70	220	235	P2/130	P2/119	P5/106	PASS	MH

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APPENDIX H-2
ASH POND 91
EXTRUSION WELDING TRIAL SEAM SUMMARY

TRIAL SEAM NUMBER	DATE	TIME	WELDER I.D.		TEMPERATURES			TEST RESULTS				QA MON.
					AMBIENT TEMP.	MACH. SETTING						
			MACH.	TECH.	(°F)	BARREL	NOZZLE	PEEL	PEEL	SHEAR	PASS/ FAIL	
TX-5	09/10/93	1504	10	BT	75	225	235	P2/94	P2/110	P5/121	PASS	MH
TX-1	09/11/93	0815	52	SA	60	220	235	P1/124	P1/118	P5/138	PASS	TD
TX-2	09/11/93	0830	50	JS	60	220	230	P1/132	P1/82	P5/146	PASS	TD
TX-3	09/11/93	1000	10	JS	60	220	230	P1/90	P1/98	P5/141	PASS	TD
TX-4	09/11/93	1300	52	BN	70	220	235	P1/78	P1/78	P5/112	PASS	TD
TX-5	09/11/93	1300	10	JS	70	220	230	P1/89	P1/118	P5/118	PASS	TD
TX-6	09/11/93	1400	50	VN	70	220	230	P1/90	P1/93	P5/120	PASS	TD
TX-1	09/14/93	1030	10	CW	40	220	230	P2/96	P2/105	P5/161	PASS	JMI
TX-2	09/14/93	1305	10	CW	45	220	235	P2/95	P2/128	P5/137	PASS	JMI
TX-3	09/14/93	1340	50	SO	45	220	235	P2/135	P2/102	P5/140	PASS	JMI
TX-4	09/14/93	1500	52	VN	45	223	230	P2/110	P2/113	P5/147	PASS	JMI
TX-5	09/14/93	1600	50	JS	45	220	230	P2/80	P2/75	P5/130	PASS	JMI
TX-1	09/15/93	0805	50	SO	45	220	230	P1/82	P1/114	P5/120	PASS	JMI
TX-2	09/15/93	1030	52	VN	50	220	230	P1/89	P1/101	P5/150	PASS	TD
TX-3	09/15/93	1330	52	VN	55	220	230	P1/82	P1/86	P5/139	PASS	MH
TX-4	09/15/93	1335	50	SO	55	220	230	P1/104	P1/85	P5/140	PASS	MH
TX-5	09/15/93	1340	50	SK	55	220	230	P1/138	P1/110	P5/141	PASS	MH
TX-1	09/17/93	0805	50	SO	30	220	230	P2/77	P2/89	P5/161	PASS	JMI
TX-2	09/17/93	1300	50	SO	50	220	235	P2/100	P2/125	P5/140	PASS	JMI
TX-1	09/18/93	0820	52	VN	55	220	230	P1/112	P1/116	P5/153	PASS	TD
TX-2	09/18/93	0830	10	BT	55	220	230	P1/108	P1/100	P5/152	PASS	TD
TX-3	09/18/93	1230	10	BT	60	225	235	P1/112	P1/98	P5/134	PASS	TD
TX-4	09/18/93	1245	52	VN	60	220	230	P1/98	P1/96	P5/119	PASS	TD

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APPENDIX I

FUSION WELDING SUMMARIES

APPENDIX I-1

FUSION WELDING SUMMARY - DRAINS POND

November 1993

937-4207

Golder Construction Services, Inc.

APPENDIX I-1
DRAINS POND
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET.	ACT.						
1	1 / 2	7-20-93	1045	70	PP	1054	410	410	70	--	CPB	SEOS TO NEOS	07/20/93	CPB
2	1 / 5	7-20-93	1130	70	PP	1054	410	409	34	--	CPB	EEOS TO WEOS	07/20/93	CPB
3	2 / 3	7-20-93	1100	70	VN	1061	405	405	25	--	CPB	NEOS TO SEOS	07/20/93	CPB
4	3 / 4	7-20-93	1115	70	VN	1061	405	405	25	--	CPB	EEOS TO WEOS	07/20/93	CPB
5	2 / 4	7-20-93	1120	70	VN	1061	405	404	50	--	CPB	SEOS TO NEOS	07/20/93	CPB
6	5 / 6	7-20-93	1142	70	VN	1061	405	405	60	--	CPB	EEOS TO 1E	07/20/93	CPB
7	5 / 6	7-20-93	1155	75	VN	1061	405	405	50	--	CPB	WEOS TO 1E	07/20/93	CPB
8	7 / 8	7-20-93	1345	75	VN	1061	410	409	100	DS-1	CPB	WEOS TO EEOS	07/20/93	CPB
9	9 / 10	7-20-93	1400	75	VN	1061	410	403	112	--	CPB	WEOS TO EEOS	07/20/93	CPB
10	11 / 12	7-20-93	1425	75	VN	1061	410	405	110	--	CPB	WEOS TO EEOS	07/20/93	CPB
11	13 / 14	7-20-93	1455	75	VN	1061	410	408	112	--	CPB	WEOS TO EEOS	07/20/93	CPB
12	15 / 16	7-20-93	1520	70	VN	1061	410	409	113	DS-3	CPB	WEOS TO EEOS	07/20/93	CPB
13	17 / 18	7-20-93	1600	70	VN	1061	410	407	93	--	CPB	WEOS TO EEOS	07/20/93	CPB
14	18 / 19	7-20-93	1620	70	VN	1061	410	410	50	--	CPB	EEOS TO WEOS	07/20/93	CPB
15	19 / 21	7-20-93	1645	70	VN	1061	410	408	30	--	CPB	SEOS TO NEOS	07/20/93	CPB
16	4 / 5	7-20-93	1130	70	BT	1175	410	410	74	--	CPB	EEOS TO WEOS	07/20/93	CPB
17	6 / 7	7-20-93	1145	75	BT	1175	410	409	112	--	CPB	EEOS TO WEOS	07/20/93	CPB
18	8 / 9	7-20-93	1345	75	BT	1175	410	410	100	--	CPB	WEOS TO EEOS	07/20/93	CPB
19	10 / 11	7-20-93	1420	75	BT	1175	410	410	110	DS-2	CPB	WEOS TO EEOS	07/20/93	CPB
20	12 / 13	7-20-93	1435	75	BT	1175	410	408	110	--	CPB	WEOS TO EEOS	07/20/93	CPB
21	14 / 15	7-20-93	1510	70	BT	1175	410	408	110	--	CPB	WEOS TO EEOS	07/20/93	CPB
22	16 / 17	7-20-93	1530	70	BT	1175	410	410	112	--	CPB	WEOS TO EEOS	07/20/93	CPB
23	20 / 21	7-20-93	1645	70	BT	1175	410	410	30	--	CPB	EEOS TO WEOS	07/20/93	CPB
24	18 / 20	7-20-93	1650	70	BT	1175	410	410	30	--	CPB	WEOS TO EEOS	07/20/93	CPB
25	9 / 22	8-04-93	1015	65	VN	1061	410	410	10	--	CPB	SEOS TO 10' N	08/04/93	TD

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APPENDIX I-1
DRAINS POND
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET.	ACT.						
26	9 / 22	8-04-93	----	65	VN	1061	410	---	--	--	CPB	10'N TO NEOS	08/04/93	TD
27	10 / 22	8-04-93	1030	65	VN	1061	410	410	34	--	CPB	SEOS TO NEOS	08/04/93	TD
28	11 / 22	8-04-93	1042	65	VN	1061	410	402	34	--	CPB	SEOS TO NEOS	08/04/93	TD
29	12 / 22	8-04-93	1050	65	VN	1061	410	408	34	--	CPB	SEOS TO NEOS	08/04/93	TD
30	22 / 23	8-04-93	1100	65	VN	1061	410	405	225	--	CPB	SEOS TO 225'N	08/04/93	JMI
31	25 / 26	8-04-93	1450	70	VN	1061	410	410	210	DS-6	CPB	NEOS TO 275'N	08/04/93	JMI
32	26 / 27	8-04-93	1610	70	VN	1061	410	410	63	--	CPB	260'N TO 197'N	08/04/93	JMI
33	27 / 28	8-04-93	1650	70	VN	1061	410	410	260	DS-9	CPB	260'N TO SEOS	08/04/93	JMI
34	13 / 22	8-04-93	1030	65	BT	1175	415	412	34	--	CPB	SEOS TO NEOS	08/07/93	TD
35	14 / 22	8-04-93	1040	65	BT	1175	415	415	34	--	CPB	SEOS TO NEOS	08/07/93	TD
36	15 / 22	8-04-93	1050	65	BT	1175	415	415	34	--	CPB	SEOS TO NEOS	08/07/93	TD
37	16 / 22	8-04-93	1105	65	BT	1175	415	415	34	--	CPB	SEOS TO NEOS	08/07/93	TD
38	22 / 23	8-04-93	1120	65	BT	1175	415	412	260	DS-4	CPB	225'N TO NEOS	08/04/93	JMI
39	23 / 25	8-04-93	1405	70	BT	1175	415	415	485	DS-5	CPB	SEOS TO NEOS	08/04/93	JMI
40	26 / 27	8-04-93	1600	70	BT	1175	415	415	230	DS-7	CPB	NEOS TO 260'N	08/04/93	JMI
41	27 / 28	8-04-93	1645	70	BT	1175	415	415	235	--	CPB	NEOS TO 260'N	08/04/93	JMI
42	28 / 29	8-04-93	1740	70	BT	1175	415	415	250	DS-10	CPB	NEOS TO 240'N	08/04/93	JMI
43	1 / 22	8-04-93	1030	65	PP	1054	415	415	68	--	CPB	SEOS TO NEOS	08/07/93	TD
44	5 / 22	8-04-93	1115	65	PP	1054	415	414	34	--	CPB	SEOS TO NEOS	08/07/93	TD
45	6 / 22	8-04-93	1130	65	PP	1054	415	415	34	--	CPB	SEOS TO NEOS	08/07/93	TD
46	7 / 22	8-04-93	1138	65	PP	1054	415	415	34	--	CPB	SEOS TO NEOS	08/07/93	TD
47	22 / 24	8-04-93	1200	65	PP	1054	415	412	34	--	CPB	SEOS TO NEOS	08/04/93	JMI
48	7 / 24	8-04-93	1210	65	PP	1054	415	415	15	--	CPB	EEOS TO WEOS	08/07/93	TD
49	8 / 24	8-04-93	1220	65	PP	1054	415	414	34	--	CPB	SEOS TO NEOS	08/07/93	TD
50	9 / 24	8-04-93	1230	65	PP	1054	415	415	15	--	CPB	WEOS TO EEOS	08/07/93	TD

Golder Construction Services, Inc.

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APPENDIX I-1
DRAINS POND
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET.	ACT.						
51	25 / 26	8-04-93	1500	70	PP	1054	415	415	275	--	CPB	275'N TO SEOS	08/04/93	JMI
52	26 / 27	8-04-93	1640	70	PP	1054	415	415	72	DS-8	CPB	197'N TO 125'N	08/04/93	JMI
53	26 / 27	8-04-93	1650	70	PP	1054	415	415	125	--	CPB	SEOS TO 125'N	08/04/93	JMI
54	28 / 29	8-04-93	1740	70	PP	1054	415	415	240	--	CPB	240'N TO SEOS	08/07/93	TD
55	29 / 30	8-05-93	0855	60	VN	1061	410	410	275	--	CPB	SEOS TO 275'N	08/05/93	JMI
56	30 / 31	8-05-93	1000	60	VN	1061	410	410	270	DS-11	CPB	SEOS TO 270'N	08/05/93	JMI
57	32 / 33	8-05-93	1125	60	VN	1061	410	410	250	--	CPB	SEOS TO 250'N	08/05/93	JMI
58	33 / 34	8-05-93	1320	60	VN	1061	410	410	90	--	CPB	NEOS TO SEOS	08/05/93	JMI
59	34 / 35	8-05-93	1350	60	VN	1061	410	410	20	--	CPB	EEOS TO WEOS	08/05/93	JMI
60	34 / 37	8-05-93	1438	65	VN	1061	410	409	20	--	CPB	SEOS TO NEOS	08/05/93	JMI
61	36 / 37	8-05-93	1442	65	VN	1061	410	410	20	--	CPB	EEOS TO WEOS	08/05/93	JMI
62	34 / 36	8-05-93	1445	65	VN	1061	410	410	50	--	CPB	SEOS TO NEOS	08/05/93	JMI
63	35 / 36	8-05-93	1455	65	VN	1061	410	408	13	--	CPB	20'E TO WEOS	08/05/93	JMI
64	39 / 40	8-05-93	1525	65	VN	1061	410	410	85	DS-14	CPB	EEOS TO WEOS	08/05/93	JMI
65	30 / 31	8-05-93	0950	65	BT	1175	415	415	220	--	CPB	270'N TO NEOS	08/05/93	JMI
66	31 / 32	8-05-93	1040	60	BT	1175	415	415	220	DS-13	CPB	270'N TO NEOS	08/05/93	JMI
67	32 / 33	8-05-93	1120	60	BT	1175	415	415	240	--	CPB	250'N TO NEOS	08/05/93	JMI
68	33 / 35	8-05-93	1540	60	BT	1175	415	413	20	--	CPB	SEOS TO NEOS	08/05/93	JMI
69	33 / 39	8-05-93	1545	65	BT	1175	415	415	34	--	CPB	SEOS TO NEOS	08/05/93	JMI
70	33 / 40	8-05-93	1555	65	BT	1175	415	412	34	--	CPB	SEOS TO NEOS	08/05/93	JMI
71	33 / 41	8-05-93	1610	65	BT	1175	415	415	34	--	CPB	SEOS TO NEOS	08/05/93	JMI
72	42 / 43	8-05-93	1620	65	BT	1175	415	413	34	--	CPB	SEOS TO NEOS	08/05/93	JMI
73	33 / 43	8-05-93	1645	65	BT	1175	415	412	34	--	CPB	SEOS TO NEOS	08/05/93	JMI
74	33 / 44	8-05-93	1655	65	BT	1175	415	415	34	--	CPB	SEOS TO NEOS	08/05/93	JMI
75	33 / 45	8-05-93	1705	65	BT	1175	415	415	34	DS-16	CPB	SEOS TO NEOS	08/05/93	JMI

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APPENDIX I-1
DRAINS POND
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET.	ACT.						
76	33 / 46	8-05-93	1720	65	BT	1175	415	415	34	--	CPB	SEOS TO NEOS	08/05/93	JMI
77	29 / 30	8-05-93	0900	60	PP	1246	450	450	215	--	CPB	275'N TO NEOS	08/05/93	JMI
78	31 / 32	8-05-93	1040	60	PP	1246	450	450	270	DS-12	CPB	SEOS TO 270'N	08/05/93	JMI
79	35 / 36	8-05-93	1445	65	PP	1246	415	408	40	--	CPB	EEOS TO 20'W	08/05/93	JMI
80	36 / 38	8-05-93	1458	65	PP	1246	415	407	12	--	CPB	EEOS TO WEOS	08/05/93	JMI
81	35 / 38	8-05-93	1504	65	PP	1246	415	400	12	--	CPB	EEOS TO WEOS	08/05/93	JMI
82	35 / 39	8-05-93	1516	65	PP	1246	415	412	85	--	CPB	EEOS TO WEOS	08/05/93	JMI
83	40 / 41	8-05-93	1558	65	PP	1246	415	415	85	--	CPB	EEOS TO WEOS	08/05/93	JMI
84	41 / 42	8-05-93	1620	65	PP	1246	415	415	80	DS-15	CPB	EEOS TO WEOS	08/05/93	JMI
85	41 / 43	8-05-93	1638	65	PP	1246	415	413	5	--	CPB	EEOS TO WEOS	08/05/93	JMI
86	42 / 44	8-05-93	1642	65	PP	1246	415	415	80	--	CPB	EEOS TO WEOS	08/05/93	JMI
87	43 / 44	8-05-93	1655	65	PP	1246	415	415	5	--	CPB	EEOS TO WEOS	08/05/93	JMI
88	44 / 45	8-05-93	1700	65	PP	1246	415	412	85	--	CPB	EEOS TO WEOS	08/05/93	JMI
89	45 / 46	8-05-93	1720	65	PP	1246	415	415	85	--	CPB	EEOS TO WEOS	08/05/93	JMI
90	46 / 47	8-05-93	1740	65	PP	1246	415	415	85	--	CPB	EEOS TO WEOS	08/05/93	JMI
91	33 / 47	8-05-93	1755	65	PP	1246	415	415	34	--	CPB	SEOS TO NEOS	08/05/93	JMI
92	48 / 49	8-06-93	0834	65	PP	1246	415	415	86	DS-17	JMI	EAT TO WEOS	08/06/93	JMI
93	52 / 53	8-06-93	0937	65	PP	1246	415	415	34	--	JMI	EAT TO WEOS	08/06/93	JMI
94	53 / 54	8-06-93	0945	65	PP	1246	415	415	34	--	JMI	EAT TO WEOS	08/06/93	JMI
95	52 / 54	8-06-93	0957	65	PP	1246	415	415	50	--	JMI	EEOS TO WEOS	08/06/93	JMI
96	58 / 59	8-06-93	1140	65	PP	1246	415	412	105	--	JMI	NAT TO SEOS	08/06/93	JMI
97	30 / 59	8-06-93	1150	65	PP	1246	415	413	34	--	JMI	EEOS TO WEOS	08/06/93	JMI
98	59 / 60	8-06-93	1300	70	PP	1246	415	415	111	DS-22	JMI	NAT TO SEOS	08/06/93	JMI
99	47 / 48	8-06-93	0805	65	BT	1175	415	415	86	--	JMI	EAT TO WEOS	08/07/93	JMI
100	49 / 50	8-06-93	0845	65	BT	1175	415	415	86	--	JMI	EAT TO WEOS	08/06/93	JMI

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APPENDIX I-1
DRAINS POND
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST	
					TECH.	MACH.	SET.	ACT.					DATE	MON.
101	33 / 50	8-06-93	0920	65	BT	1175	415	415	34	--	JMI	SEOS TO NEOS	08/06/93	JMI
102	33 / 51	8-06-93	0930	65	BT	1175	415	415	34	--	JMI	SEOS TO NEOS	08/06/93	JMI
103	33 / 56	8-06-93	0940	65	BT	1175	415	412	30	--	JMI	EEOS TO WEOS	08/06/93	JMI
104	56 / 57	8-06-93	1012	65	BT	1175	415	415	105	DS-18	JMI	NAT TO SEOS	08/06/93	JMI
105	32 / 57	8-06-93	1147	65	BT	1175	415	414	31	DS-19	JMI	EEOS TO WEOS	08/06/93	JMI
106	31 / 58	8-06-93	1155	65	BT	1175	415	415	32	--	JMI	EEOS TO WEOS	08/06/93	JMI
107	29 / 60	8-06-93	1307	70	BT	1175	415	415	32	--	JMI	EEOS TO WEOS	08/06/93	JMI
108	60 / 61	8-06-93	1359	70	BT	1175	415	412	110	--	JMI	SEOS TO NAT	08/06/93	JMI
109	61 / 62	8-06-93	1442	70	BT	1175	415	410	107	--	JMI	SEOS TO NAT	08/06/93	JMI
110	62 / 63	8-06-93	1500	70	BT	1175	415	411	110	--	JMI	NAT TO SEOS	08/06/93	JMI
111	63 / 64	8-06-93	1515	70	BT	1175	415	415	110	DS-20	JMI	SEOS TO NAT	08/06/93	JMI
112	64 / 65	8-06-93	1530	70	BT	1175	415	415	110	--	JMI	SEOS TO NAT	08/06/93	JMI
113	28 / 61	8-06-93	1600	70	BT	1175	415	414	33	--	JMI	EEOS TO WEOS	08/06/93	JMI
114	27 / 62	8-06-93	1605	70	BT	1175	415	415	28	--	JMI	EEOS TO WEOS	08/06/93	JMI
115	27 / 63	8-06-93	1610	75	BT	1175	415	415	6	--	JMI	EEOS TO WEOS	08/06/93	TD
116	26 / 63	8-06-93	1611	75	BT	1175	415	415	22	--	JMI	EEOS TO WEOS	08/06/93	TD
117	26 / 64	8-06-93	1615	75	BT	1175	415	412	6	--	JMI	EEOS TO WEOS	08/06/93	TD
118	25 / 64	8-06-93	1617	75	BT	1175	415	413	21	--	JMI	EEOS TO WEOS	08/06/93	TD
119	25 / 65	8-06-93	1622	75	BT	1175	415	412	6	--	JMI	EEOS TO WEOS	08/06/93	TD
120	23 / 65	8-06-93	1623	75	BT	1175	415	415	19	--	JMI	EEOS TO WEOS	08/06/93	TD
121	65 / 66	8-06-93	1638	75	BT	1175	415	415	111	--	JMI	SEOS TO NAT	08/06/93	TD
122	23 / 66	8-06-93	1648	75	BT	1175	415	410	8	--	JMI	EEOS TO WEOS	08/06/93	TD
123	22 / 66	8-06-93	1657	75	BT	1175	415	415	22	DS-21	JMI	EEOS TO WEOS	08/06/93	TD
124	66 / 67	8-06-93	1705	75	BT	1175	415	415	112	--	JMI	SEOS TO NAT	08/06/93	TD
125	17 / 67	8-06-93	1800	70	BT	1175	415	415	41	--	CPB	EEOS TO WEOS	08/06/93	TD

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DRAINS POND
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET.	ACT.						
126	19 / 67	8-06-93	1830	70	BT	1175	415	412	20	--	CPB	SEOS TO NEOS	08/06/93	TD
127	67 / 68	8-06-93	1840	70	BT	1175	415	415	50	--	CPB	SEOS TO NEOS	08/06/93	TD
128	19 / 68	8-06-93	1900	70	BT	1175	415	415	50	--	CPB	NEOS TO SEOS	08/06/93	TD
129	33 / 48	8-06-93	0815	65	VN	1061	410	410	34	--	JMI	SEOS TO NEOS	08/06/93	JMI
130	33 / 49	8-06-93	0848	65	VN	1061	410	411	34	--	JMI	SEOS TO NEOS	08/06/93	JMI
131	50 / 51	8-06-93	0855	65	VN	1061	410	410	86	--	JMI	EAT TO WEOS	08/06/93	JMI
132	51 / 52	8-06-93	0920	65	VN	1061	410	410	82	--	JMI	EAT TO WEOS	08/06/93	JMI
133	54 / 55	8-06-93	0940	65	VN	1061	410	411	79	--	JMI	NAT TO SEOS	08/06/93	JMI
134	55 / 56	8-06-93	1000	65	VN	1061	410	412	81	--	JMI	NAT TO SEOS	08/06/93	JMI
135	54 / 56	8-06-93	1011	65	VN	1061	410	409	14	--	JMI	NEOS TO SEOS	08/06/93	JMI
136	57 / 58	8-06-93	1127	65	VN	1061	410	407	105	--	JMI	NAT TO SEOS	08/06/93	JMI

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APPENDIX I-2

FUSION WELDING SUMMARY - ASH POND 91

November 1993

937-4207

Golder Construction Services, Inc.

APPENDIX I-2
ASH POND 91 - PRIMARY
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET.	ACT.						
1	1 / 2	08-09-93	1115	70	BT	1175	415	410	45	--	JMI	NEOS TO SAT	08/09/93	TD
2	3 / 4	08-09-93	1130	70	BT	1175	415	412	50	--	JMI	NEOS TO SAT	08/09/93	TD
3	8 / 9	08-09-93	1305	80	BT	1175	415	415	45	--	JMI	NEOS TO SAT	08/09/93	TD
4	9 / 10	08-09-93	1310	80	BT	1175	415	415	45	--	JMI	NEOS TO SAT	08/09/93	TD
5	12 / 13	08-09-93	1420	80	BT	1175	415	412	310	DS-1	JMI	355'N OF SEOS TO SEOS	08/09/93	TD
6	1 / 12	08-09-93	1506	80	BT	1175	415	415	32	--	JMI	EEOS TO WEOS	08/09/93	TD
7	2 / 13	08-09-93	1515	80	BT	1175	415	412	34	--	JMI	EEOS TO WEOS	08/09/93	TD
8	3 / 14	08-09-93	1530	80	BT	1175	415	409	27	--	JMI	EEOS TO WEOS	08/09/93	TD
9	14 / 15	08-09-93	1615	80	BT	1175	415	413	300	--	JMI	350'N OF SEOS TO SEOS	08/10/93	TD
10	4 / 15	08-09-93	1635	80	BT	1175	415	415	19	--	JMI	EEOS TO WEOS	08/09/93	TD
11	5 / 15	08-09-93	1645	80	BT	1175	415	414	10	DS-5	JMI	EEOS TO WEOS	08/09/93	TD
12	5 / 16	08-09-93	1655	80	BT	1175	415	415	17	--	JMI	EEOS TO WEOS	08/11/93	TD
13	6 / 16	08-09-93	1710	80	BT	1175	415	412	16	--	JMI	EEOS TO WEOS	08/11/93	TD
14	16 / 17	08-09-93	1739	80	BT	1175	415	415	306	--	JMI	356'N OF SEOS TO SEOS	08/10/93	CPB
15	6 / 17	08-09-93	1820	80	BT	1175	415	413	14	--	JMI	EEOS TO WEOS	08/09/93	TD
16	7 / 17	08-09-93	1825	80	BT	1175	415	415	20	--	JMI	EEOS TO WEOS	08/09/93	TD
17	7 / 18	08-09-93	1840	80	BT	1175	415	414	9	--	JMI	EEOS TO WEOS	08/11/93	TD
18	8 / 18	08-09-93	1843	80	BT	1175	415	415	19	--	JMI	EEOS TO WEOS	08/10/93	CPB
19	9 / 18	08-09-93	1849	80	BT	1175	415	415	13	--	JMI	EEOS TO WEOS	08/10/93	CPB
20	17 / 18	08-09-93	1855	80	BT	1175	415	412	214	DS-9	JMI	254'N OF SEOS TO SEOS	08/09/93	TD
21	2 / 3	08-09-93	1120	70	VN	1061	410	410	50	--	JMI	NEOS TO SAT	08/09/93	TD
22	5 / 6	08-09-93	1140	70	VN	1061	410	410	49	--	JMI	NEOS TO SAT	08/09/93	TD
23	10 / 11	08-09-93	1255	80	VN	1061	410	409	45	--	JMI	NEOS TO SAT	08/09/93	TD
24	12 / 13	08-09-93	1440	80	VN	1061	410	410	350	DS-2	JMI	NEOS TO 355'N OF SEOS	08/09/93	TD
25	13 / 14	08-09-93	1545	80	VN	1061	410	409	350	DS-3	JMI	NEOS TO 362'N OF SEOS	08/10/93	TD

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APPENDIX I-2
ASH POND 91 - PRIMARY
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET.	ACT.						
26	14 / 15	08-09-93	1610	80	VN	1061	410	410	350	--	JMI	NEOS TO 350'N OF SEOS	08/10/93	TD
27	15 / 16	08-09-93	1730	80	VN	1061	410	410	300	DS-6	JMI	NEOS TO 370'N OF SEOS	08/10/93	CPB
28	16 / 17	08-09-93	1825	80	VN	1061	410	408	289	DS-7	JMI	NEOS TO 356'N OF SEOS	08/10/93	CPB
29	4 / 5	08-09-93	1130	70	PP	1246	415	415	50	--	JMI	NEOS TO SAT	08/09/93	TD
30	6 / 7	08-09-93	1140	70	PP	1246	415	415	49	--	JMI	NEOS TO SAT	08/09/93	TD
31	7 / 8	08-09-93	1202	70	PP	1246	415	412	49	--	JMI	SAT TO NEOS	08/09/93	TD
32	13 / 14	08-09-93	1515	80	PP	1246	415	413	312	DS-4	JMI	362'N OF SEOS TO SEOS	08/10/93	TD
33	15 / 16	08-09-93	1700	80	PP	1246	415	415	320	--	JMI	370'N OF SEOS TO SEOS	08/10/93	CPB
34	17 / 18	08-09-93	1825	80	PP	1246	415	411	356	DS-8	JMI	NEOS TO 254'N OF SEOS	08/10/93	MH
35	18 / 19	08-10-93	0815	75	BT	1175	415	415	238	--	JMI	288'N OF SEOS TO SEOS	08/10/93	MH
36	19 / 20	08-10-93	0840	75	BT	1175	415	408	255	DS-10	JMI	300'N OF SEOS TO SEOS	08/10/93	MH
37	11 / 21	08-10-93	0910	75	BT	1175	415	415	50	--	JMI	NEOS TO SAT	08/10/93	MH
38	21 / 22	08-10-93	0915	75	BT	1175	415	415	55	--	JMI	NEOS TO SAT	08/10/93	MH
39	22 / 23	08-10-93	0920	75	BT	1175	415	401	51	--	JMI	NEOS TO SAT	08/10/93	MH
40	23 / 24	08-10-93	0930	75	BT	1175	415	415	51	--	JMI	NEOS TO SAT	08/10/93	MH
41	20 / 25	08-10-93	1000	75	BT	1175	415	409	245	DS-12	JMI	300'N OF SEOS TO SEOS	08/10/93	MH
42	25 / 27	08-10-93	1030	75	BT	1175	415	415	170	--	JMI	200'N OF SEOS TO SEOS	08/10/93	MH
43	25 / 26	08-10-93	1047	75	BT	1175	415	415	30	--	JMI	30'N OF SEOS TO SEOS	08/10/93	MH
44	24 / 28	08-10-93	1057	75	BT	1175	415	410	45	DS-14	JMI	NEOS TO SAT	08/10/93	MH
45	28 / 29	08-10-93	1105	75	BT	1175	415	415	55	--	JMI	SAT TO NEOS	08/10/93	MH
46	27 / 32	08-10-93	1110	75	BT	1175	415	415	30	--	JMI	NEOS TO SEOS	08/10/93	MH
47	27 / 28	08-10-93	1115	75	BT	1175	415	411	32	--	JMI	SEOS TO NEOS	08/10/93	MH
48	29 / 32	08-10-93	1130	75	BT	1175	415	415	32	--	JMI	SEOS TO NEOS	08/10/93	MH
49	29 / 30	08-10-93	1140	75	BT	1175	415	415	52	--	JMI	EOS TO WAT	08/10/93	MH
50	30 / 31	08-10-93	1150	75	BT	1175	415	415	52	--	JMI	EOS TO WAT	08/10/93	MH

Golder Construction Services, Inc.

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APPENDIX I-2
ASH POND 91 - PRIMARY
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET.	ACT.						
51	31 / 33	08-10-93	1240	85	BT	1175	415	415	50	--	JMI	WAT TO EEOS	08/10/93	MH
52	33 / 34	08-10-93	1255	85	BT	1175	415	415	79	--	JMI	EEOS TO WAT	08/10/93	MH
53	34 / 36	08-10-93	1320	85	BT	1175	415	410	88	DS-15	JMI	WAT TO EEOS	08/10/93	MH
54	36 / 37	08-10-93	1400	85	BT	1175	415	415	95	--	JMI	EEOS TO WAT	08/10/93	MH
55	37 / 38	08-10-93	1410	85	BT	1175	415	412	100	--	JMI	WAT TO EEOS	08/10/93	MH
56	38 / 39	08-10-93	1415	85	BT	1175	415	415	105	--	JMI	EEOS TO WAT	08/10/93	MH
57	39 / 40	08-10-93	1430	85	BT	1175	415	409	108	--	JMI	WAT TO EEOS	08/10/93	MH
58	12 / 45	08-10-93	1530	85	BT	1175	415	415	178	DS-18	JMI	SEOS TO 178'N OF SEOS	08/10/93	MH
59	12 / 45	08-10-93	1540	85	BT	1175	415	413	483	DS-19	JMI	NEOS TO 178'N OF SEOS	08/10/93	MH
60	9 / 19	08-10-93	1130	75	VN	1061	415	413	18	--	JMI	EEOS TO SEOS	08/10/93	MH
61	10 / 19	08-10-93	1135	75	VN	1061	415	415	19	--	JMI	EEOS TO SEOS	08/10/93	MH
62	10 / 20	08-10-93	1140	75	VN	1061	415	414	10	--	JMI	EEOS TO SEOS	08/10/93	MH
63	11 / 20	08-10-93	1142	75	VN	1061	415	415	31	--	JMI	EEOS TO SEOS	08/10/93	MH
64	20 / 21	08-10-93	1145	75	VN	1061	415	415	20	--	JMI	SEOS TO NEOS	08/10/93	MH
65	21 / 25	08-10-93	1150	75	VN	1061	415	412	13	--	JMI	SEOS TO WEOS	08/10/93	MH
66	22 / 25	08-10-93	1155	75	VN	1061	415	415	31	--	JMI	EEOS TO WEOS	08/10/93	MH
67	32 / 41	08-10-93	1420	75	VN	1061	415	412	19	--	JMI	EEOS TO WEOS	08/10/93	MH
68	30 / 41	08-10-93	1425	75	VN	1061	415	411	23	--	JMI	SEOS TO NEOS	08/10/93	MH
69	35 / 41	08-10-93	1440	85	VN	1061	415	407	28	--	JMI	SEOS TO NEOS	08/10/93	MH
70	31 / 35	08-10-93	1445	85	VN	1061	415	412	26	--	JMI	SEOS TO NEOS	08/10/93	MH
71	33 / 35	08-10-93	1450	85	VN	1061	415	415	10	--	JMI	WEOS TO EEOS	08/10/93	MH
72	33 / 41	08-10-93	1500	85	VN	1061	415	415	31	--	JMI	SEOS TO NEOS	08/10/93	MH
73	34 / 41	08-10-93	1505	85	VN	1061	415	412	32	DS-17	JMI	SEOS TO NEOS	08/10/93	MH
74	36 / 41	08-10-93	1515	85	VN	1061	415	415	37	--	JMI	SEOS TO NEOS	08/11/93	MH
75	37 / 41	08-10-93	1520	85	VN	1061	415	415	28	--	JMI	SEOS TO NEOS	08/11/93	MH

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APPENDIX I-2
ASH POND 91 - PRIMARY
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET.	ACT.						
76	38 / 42	08-10-93	1530	85	VN	1061	415	412	26	--	JMI	SEOS TO NEOS	08/11/93	MH
77	39 / 43	08-10-93	1540	85	VN	1061	415	415	29	--	JMI	SEOS TO NEOS	08/11/93	MH
78	45 / 46	08-10-93	1600	85	VN	1061	415	412	305	--	JMI	NEOS TO 362'N OF SEOS	08/11/93	MH
79	47 / 48	08-10-93	1630	85	VN	1061	415	415	60	DS-21	JMI	SAT TO NEOS	08/12/93	MH
80	1 / 47	08-10-93	1730	85	VN	1061	415	412	50	--	JMI	SAT TO NEOS	08/12/93	MH
81	45 / 47	08-10-93	1740	85	VN	1061	415	411	33	--	JMI	WEOS TO EEOS	08/10/93	MH
82	46 / 48	08-10-93	1745	85	VN	1061	415	412	32	--	JMI	WEOS TO EEOS	08/10/93	MH
83	18 / 19	08-10-93	0820	75	PP	1246	415	410	295	DS-11	JMI	NEOS TO 288'N OF SEOS	08/10/93	MH
84	19 / 20	08-10-93	0855	75	PP	1246	415	413	260	--	JMI	NEOS TO 300'N OF SEOS	08/10/93	MH
85	20 / 25	08-10-93	1000	75	PP	1246	415	410	234	DS-13	JMI	NEOS TO 300'N OF SEOS	08/10/93	MH
86	25 / 27	08-10-93	1030	75	PP	1246	415	415	212	--	JMI	NEOS TO 200'N OF SEOS	08/10/93	MH
87	23 / 26	08-10-93	1130	75	PP	1246	415	408	12	--	JMI	EEOS TO WEOS	08/10/93	MH
88	24 / 26	08-10-93	1145	75	PP	1246	415	411	21	--	JMI	EEOS TO WEOS	08/10/93	MH
89	26 / 27	08-10-93	1155	75	PP	1246	415	415	22	--	JMI	EEOS TO WEOS	08/10/93	MH
90	24 / 27	08-10-93	1200	75	PP	1246	415	409	10	--	JMI	EEOS TO WEOS	08/10/93	MH
91	27 / 41	08-10-93	1430	85	PP	1246	415	407	208	DS-16	JMI	NEOS TO SEOS	08/10/93	MH
92	27 / 44	08-10-93	1450	85	PP	1246	415	415	24	--	JMI	NEOS TO SEOS	08/11/93	MH
93	27 / 43	08-10-93	1457	85	PP	1246	415	409	34	--	JMI	NEOS TO SEOS	08/11/93	MH
94	27 / 42	08-10-93	1517	85	PP	1246	415	415	30	--	JMI	NEOS TO SEOS	08/11/93	MH
95	41 / 42	08-10-93	1525	85	PP	1246	415	415	34	--	JMI	EEOS TO WEOS	08/11/93	MH
96	42 / 43	08-10-93	1530	85	PP	1246	415	415	34	--	JMI	WEOS TO EEOS	08/11/93	MH
97	43 / 44	08-10-93	1540	85	PP	1246	415	415	34	--	JMI	WEOS TO EEOS	08/11/93	MH
98	40 / 44	08-10-93	1545	85	PP	1246	415	406	25	--	JMI	SEOS TO NEOS	08/18/93	TD
99	45 / 46	08-10-93	1600	85	PP	1246	415	415	362	DS-20	JMI	362'N OF SEOS TO SEOS	08/11/93	MH
100	46 / 49	08-12-93	0850	55	BT	1175	415	415	209	--	JMI	NEOS TO 308'N OF SEOS	08/12/93	MH

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APPENDIX I-2
ASH POND 91 – PRIMARY
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET.	ACT.						
101	50 / 51	08-12-93	0930	55	BT	1175	415	397	310	DS-24	JMI	NEOS TO 350'N OF SAT	08/12/93	MH
102	51 / 52	08-12-93	1030	55	BT	1175	415	391	341	DS-26	JMI	NEOS TO 319'N OF SAT	08/12/93	MH
103	53 / 54	08-12-93	1135	55	BT	1175	415	400	383	DS-29	JMI	NEOS TO 277'N OF SAT	08/12/93	MH
104	55 / 56	08-12-93	1500	75	BT	1175	400	390	300	--	JMI	NEOS TO 350'N OF SAT	08/12/93	MH
105	46 / 49	08-12-93	0850	55	PP	1246	415	411	246	DS-22	JMI	308'N OF SEOS TO SEOS	08/12/93	MH
106	50 / 51	08-12-93	0950	55	PP	1246	415	407	350	--	JMI	350'N OF SAT TO SAT	08/12/93	MH
107	52 / 53	08-12-93	1100	55	PP	1246	415	407	357	DS-27	JMI	357'N OF SAT TO SAT	08/12/93	MH
108	53 / 54	08-12-93	1147	55	PP	1246	415	410	277	DS-28	JMI	277'N OF SAT TO SAT	08/12/93	MH
109	54 / 53	08-12-93	1359	75	PP	1246	415	411	350	DS-31	JMI	350'N OF SAT TO SAT	08/12/93	MH
110	55 / 56	08-12-93	1500	75	PP	1246	415	409	350	--	JMI	350'N OF SAT TO SAT	08/12/93	MH
111	49 / 58	08-12-93	1600	75	PP	1246	415	410	62	DS-33	TD	SEOS TO NEOS	08/13/93	MH
112	48 / 58	08-12-93	1630	75	PP	1246	415	410	65	--	TD	NEOS TO SEOS	08/13/93	MH
113	49 / 50	08-12-93	0900	55	VN	1061	415	413	530	DS-23	JMI	NEOS TO SAT	08/12/93	MH
114	51 / 52	08-12-93	1020	55	VN	1061	415	402	318	DS-25	JMI	319'N OF SAT TO SAT	08/12/93	MH
115	52 / 53	08-12-93	1145	55	VN	1061	415	408	255	--	JMI	NEOS TO 357'N OF SAT	08/12/93	MH
116	54 / 55	08-12-93	1355	75	VN	1061	415	413	305	DS-30	JMI	NEOS TO 350'N OF SAT	08/12/93	MH
117	46 / 57	08-12-93	1515	75	VN	1061	415	412	135	--	JMI	NEOS TO SEOS	08/12/93	MH
118	49 / 57	08-12-93	1534	75	VN	1061	415	411	34	DS-32	TD	WEOS TO EEOS	08/12/93	MH
119	50 / 57	08-12-93	1555	75	VN	1061	415	413	136	--	JMI	NEOS TO SEOS	08/12/93	MH
120	56 / 59	08-13-93	0819	50	VN	1061	415	413	227	--	JMI	223'N OF SAT TO NEOS	08/19/93	MH
121	56 / 60	08-13-93	0950	50	VN	1061	415	410	220	DS-34	JMI	SEOS TO NEOS	08/13/93	MH
122	59 / 60	08-13-93	1025	50	VN	1061	415	414	34	--	JMI	EEOS TO WEOS	08/13/93	MH
123	60 / 61	08-13-93	1037	50	VN	1061	415	413	210	--	JMI	SEOS TO NEOS	08/13/93	MH
124	56 / 59	08-13-93	0830	50	PP	1246	415	410	223	--	JMI	SAT TO 223'N OF SAT	08/13/93	MH
125	59 / 61	08-13-93	0930	50	PP	1246	415	411	312	DS-36	JMI	312'N OF SAT TO SAT	08/13/93	MH

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APPENDIX I-2
ASH POND 91 – PRIMARY
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET.	ACT.						
126	61 / 62	08-13-93	1010	50	PP	1246	415	396	311	DS-37	JMI	SAT TO 311'N OF SAT	08/13/93	MH
127	59 / 61	08-13-93	0945	50	BT	1054	415	411	138	DS-35	JMI	312'N OF SAT TO NEOS	08/13/93	MH
128	61 / 62	08-13-93	1020	50	BT	1054	415	415	351	--	JMI	311'N OF SAT TO NEOS	08/13/93	MH
129	62 / 63	08-16-93	0845	65	BT	1054	415	407	356	DS-38	JMI	317'N OF SAT TO NEOS	08/16/93	MH
130	63 / 64	08-16-93	0930	65	BT	1054	415	411	364	DS-40	JMI	300'N OF SAT TO NEOS	08/16/93	MH
131	64 / 65	08-16-93	1030	65	BT	1054	415	409	353	DS-42	JMI	300'N OF SAT TO NEOS	08/16/93	MH
132	65 / 66	08-16-93	1115	65	BT	1054	415	415	330	DS-43	JMI	300'N OF SAT TO NEOS	08/16/93	MH
133	62 / 63	08-16-93	0845	65	PP	1246	415	412	317	--	JMI	SAT TO 317'N OF SAT	08/16/93	MH
134	63 / 64	08-16-93	0940	65	PP	1246	415	411	300	DS-39	JMI	SAT TO 300'N OF SAT	08/16/93	MH
135	64 / 65	08-16-93	1033	65	PP	1246	415	410	300	DS-41	JMI	SAT TO 300'N OF SAT	08/16/93	MH
136	65 / 66	08-16-93	1110	65	PP	1246	415	411	300	--	JMI	SAT TO 300'N OF SAT	08/16/93	MH
137	66 / 67	08-17-93	0820	65	PP	1246	415	411	320	DS-44	JMI	320'N OF SAT TO SAT	08/17/93	MH
138	67 / 68	08-17-93	0943	70	PP	1246	415	411	310	DS-46	JMI	310'N OF SAT TO SAT	08/17/93	MH
139	70 / 71	08-17-93	1215	75	PP	1246	415	412	154	--	JMI	310'N TO 156'N OF SAT	08/17/93	MH
140	66 / 67	08-17-93	0840	65	VN	1066	415	409	265	DS-45	JMI	320'N TO 585'N OF SAT	08/17/93	MH
141	66 / 67	08-17-93	0910	65	VN	1066	415	412	81	--	JMI	NEOS TO 585'N OF SAT	08/17/93	MH
142	68 / 69	08-17-93	1010	65	VN	1066	415	410	390	DS-48	JMI	390'N OF SAT TO SAT	08/17/93	MH
143	69 / 70	08-17-93	1120	75	VN	1066	415	411	285	DS-50	JMI	285'N OF SAT TO SAT	08/17/93	MH
144	70 / 71	08-17-93	1210	75	VN	1066	415	411	156	--	JMI	156'N OF SAT TO SAT	08/17/93	MH
145	67 / 68	08-17-93	0935	65	BT	1054	415	413	356	--	JMI	NEOS TO 310'N OF SAT	08/17/93	MH
146	68 / 69	08-17-93	1015	65	BT	1054	415	405	264	DS-47	JMI	NEOS TO 390'N OF SAT	08/17/93	MH
147	69 / 70	08-17-93	1050	65	BT	1054	415	408	365	DS-49	JMI	NEOS TO 285'N OF SAT	08/17/93	MH
148	70 / 71	08-17-93	1215	65	BT	1054	415	409	345	--	JMI	NEOS TO 310'N OF SAT	08/17/93	MH
149	72 / 73	08-18-93	0752	50	VN	1066	415	411	68	--	SGH	NEOS TO SAT	08/18/93	MH
150	74 / 75	08-18-93	0830	50	VN	1066	415	412	68	DS-53	SGH	NEOS TO SAT	08/18/93	MH

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APPENDIX I-2
ASH POND 91 - PRIMARY
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET	ACT.						
151	76 / 77	08-18-93	0851	50	VN	1066	415	407	68	--	SGH	NEOS TO SAT	08/18/93	MH
152	71 / 79	08-18-93	0915	55	VN	1066	415	406	55	--	SGH	NEOS TO SAT	08/18/93	MH
153	72 / 79	08-18-93	0927	55	VN	1066	415	410	55	--	SGH	NEOS TO SAT	08/18/93	MH
154	71 / 72	08-18-93	0945	55	VN	1066	415	411	25	--	SGH	50'N OF SAT TO NEOS	08/18/93	MH
155	72 / 80	08-18-93	1004	55	VN	1066	415	411	17	--	SGH	EEOS TO WEOS	08/18/93	MH
156	73 / 80	08-18-93	1007	55	VN	1066	415	411	17	--	SGH	EEOS TO WEOS	08/18/93	MH
157	80 / 81	08-18-93	1015	60	VN	1066	415	412	90	--	SGH	NEOS TO SEOS	08/18/93	MH
158	75 / 81	08-18-93	1030	60	VN	1066	415	408	5	--	SGH	EEOS TO WEOS	08/23/93	SGH
159	74 / 81	08-18-93	1031	60	VN	1066	415	408	29	--	SGH	EEOS TO WEOS	08/18/93	MH
160	73 / 81	08-18-93	1034	60	VN	1066	415	408	12	--	SGH	EEOS TO WEOS	08/18/93	MH
161	78 / 83	08-18-93	1100	65	VN	1066	415	411	68	DS-55	SGH	NEOS TO SAT	08/18/93	MH
162	83 / 84	08-18-93	1110	65	VN	1066	415	410	68	--	SGH	NEOS TO SAT	08/18/93	MH
163	84 / 85	08-18-93	1135	70	VN	1066	415	408	68	--	SGH	NEOS TO SAT	08/18/93	MH
164	86 / 87	08-18-93	1200	70	VN	1066	415	411	70	--	SGH	NEOS TO SAT	08/18/93	MH
165	81 / 89	08-18-93	1355	75	VN	1066	415	412	59	--	SGH	NEOS TO SEOS	08/18/93	MH
166	76 / 89	08-18-93	1413	75	VN	1066	415	409	29	--	SGH	EEOS TO WEOS	08/18/93	MH
167	75 / 89	08-18-93	1419	75	VN	1066	415	409	5	--	SGH	EEOS TO WEOS	08/18/93	MH
168	73 / 74	08-18-93	0802	50	BT	1054	415	403	68	DS-51	SGH	NEOS TO SAT	08/18/93	MH
169	75 / 76	08-18-93	0845	50	BT	1054	415	398	68	--	SGH	NEOS TO SAT	08/18/93	MH
170	77 / 78	08-18-93	0901	50	BT	1054	415	392	68	--	SGH	NEOS TO SAT	08/18/93	MH
171	71 / 80	08-18-93	0952	55	BT	1054	415	403	405	DS-52	SGH	NEOS TO 175'N OF SEOS	08/18/93	MH
172	80 / 82	08-18-93	1058	65	BT	1054	415	405	262	--	SGH	NEOS TO 203'N OF SEOS	08/18/93	MH
173	71 / 80	08-18-93	0948	55	PP	1053	415	407	175	DS-54	SGH	175'N OF SEOS TO SEOS	08/18/93	MH
174	80 / 82	08-18-93	1051	65	PP	1053	415	410	203	--	SGH	203'N OF SEOS TO SEOS	08/18/93	MH
175	81 / 82	08-18-93	1115	65	PP	1053	415	410	34	--	SGH	EEOS TO WEOS	08/18/93	MH

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APPENDIX I-2
ASH POND 91 - PRIMARY
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET.	ACT.						
176	85 / 86	08-18-93	1150	70	PP	1053	415	411	68	DS-56	SGH	NEOS TO SAT	08/18/93	MH
177	87 / 88	08-18-93	1210	70	PP	1053	415	412	78	--	SGH	NEOS TO SAT	08/18/93	MH
178	82 / 89	08-18-93	1300	75	PP	1053	415	410	466	DS-57	SGH	NEOS TO SEOS	08/18/93	MH
179	89 / 90	08-19-93	0740	60	VN	1066	415	410	149	DS-58	SGH	SEOS TO NEOS	08/19/93	MH
180	91 / 92	08-19-93	0815	60	VN	1066	415	411	34	--	SGH	EEOS TO WEOS	08/19/93	TD
181	90 / 92	08-19-93	0825	60	VN	1066	415	410	34	--	SGH	EEOS TO WEOS	08/19/93	TD
182	90 / 93	08-19-93	0840	60	VN	1066	415	408	105	--	SGH	NEOS TO SEOS	08/19/93	TD
183	95 / 96	08-19-93	0900	65	VN	1066	415	405	20	--	SGH	EEOS TO WEOS	08/19/93	TD
184	85 / 96	08-19-93	0930	65	VN	1066	415	410	20	--	SGH	EEOS TO WEOS	08/19/93	TD
185	84 / 95	08-19-93	0935	65	VN	1066	415	409	34	--	SGH	EEOS TO WEOS	08/19/93	TD
186	83 / 93	08-19-93	0950	65	VN	1066	415	405	25	--	SGH	5'E OF 83/93/95 WEOS	08/19/93	MH
187	78 / 93	08-19-93	0955	65	VN	1066	415	405	14	--	SGH	EEOS TO WEOS	08/19/93	MH
188	78 / 90	08-19-93	1005	65	VN	1066	415	411	13	--	SGH	EEOS TO WEOS	08/19/93	MH
189	77 / 90	08-19-93	1010	65	VN	1066	415	408	33	--	SGH	EEOS TO WEOS	08/19/93	MH
190	93 / 95	08-19-93	1030	65	VN	1066	415	411	30	--	SGH	NEOS TO SEOS	08/19/93	MH
191	91 / 93	08-19-93	0830	60	BT	1054	420	409	400	DS-59	SGH	NEOS TO SEOS	08/19/93	MH
192	93 / 96	08-19-93	0900	65	BT	1054	420	410	208	DS-61	SGH	NEOS TO SEOS	08/19/93	TD
193	96 / 98	08-19-93	0950	65	BT	1054	420	397	193	--	SGH	NEOS TO SEOS	08/19/93	TD
194	86 / 98	08-19-93	1020	65	BT	1054	420	400	34	--	SGH	EEOS TO WEOS	08/19/93	MH
195	85 / 98	08-19-93	1023	65	BT	1054	420	402	18	--	SGH	EEOS TO WEOS	08/19/93	MH
196	96 / 97	08-19-93	1040	65	BT	1054	420	404	34	--	SGH	EEOS TO WEOS	08/19/93	MH
197	89 / 91	08-19-93	0815	60	PP	1053	415	410	295	--	SGH	SEOS TO NEOS	08/19/93	MH
198	89 / 94	08-19-93	0850	60	PP	1053	415	411	50	DS-60	SGH	SEOS TO NEOS	08/19/93	MH
199	93 / 94	08-19-93	0900	65	PP	1053	415	412	50	--	SGH	SEOS TO NEOS	08/19/93	TD
200	97 / 98	08-19-93	1000	65	PP	1053	415	409	181	--	SGH	NEOS TO SEOS	08/19/93	TD

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APPENDIX I-2
ASH POND 91 - PRIMARY
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET.	ACT.						
201	91 / 94	08-19-93	1030	65	PP	1053	415	410	34	--	SGH	EEOS TO WEOS	08/19/93	TD
202	93 / 97	08-19-93	1100	65	PP	1053	415	410	183	--	SGH	NEOS TO SEOS	08/19/93	MH
203	99 / 100	08-20-93	0820	70	PP	1053	415	405	84	--	SGH	EEOS TO WAT	08/21/93	CPB
204	100 / 101	08-20-93	0835	70	PP	1053	415	406	85	--	SGH	EEOS TO WAT	08/21/93	CPB
205	103 / 104	08-20-93	0845	70	PP	1053	415	405	82	DS-62	SGH	EEOS TO WAT	08/23/93	TD
206	104 / 105	08-20-93	0900	70	PP	1053	415	408	83	--	SGH	EEOS TO WAT	08/21/93	JMI
207	107 / 108	08-20-93	0915	70	PP	1053	415	410	85	--	SGH	EEOS TO WAT	08/20/93	MH
208	108 / 109	08-20-93	0925	70	PP	1053	415	410	84	--	SGH	WAT TO EEOS	08/20/93	MH
209	111 / 112	08-20-93	1000	70	PP	1053	415	407	84	--	SGH	WAT TO EEOS	08/20/93	MH
210	112 / 113	08-20-93	1015	70	PP	1053	415	409	89	DS-65	SGH	WAT TO EEOS	08/20/93	MH
211	116 / 117	08-20-93	1030	70	PP	1053	415	410	89	--	SGH	EEOS TO WAT	08/20/93	MH
212	109 / 118	08-20-93	1120	75	PP	1053	415	411	34	--	SGH	SEOS TO NEOS	08/20/93	MH
213	110 / 118	08-20-93	1125	75	PP	1053	415	411	34	--	SGH	SEOS TO NEOS	08/20/93	MH
214	111 / 118	08-20-93	1130	75	PP	1053	415	405	34	--	SGH	SEOS TO NEOS	08/23/93	TD
215	112 / 118	08-20-93	1135	75	PP	1053	415	410	34	DS-67	SGH	SEOS TO NEOS	08/20/93	MH
216	113 / 118	08-20-93	1140	75	PP	1053	415	407	34	--	SGH	SEOS TO NEOS	08/20/93	MH
217	114 / 118	08-20-93	1145	75	PP	1053	415	407	34	--	SGH	SEOS TO NEOS	08/20/93	MH
218	115 / 118	08-20-93	1150	75	PP	1053	415	410	34	--	SGH	SEOS TO NEOS	08/20/93	MH
219	116 / 118	08-20-93	1158	75	PP	1053	415	410	34	--	TD	SEOS TO NEOS	08/20/93	MH
220	117 / 118	08-20-93	1205	75	PP	1053	415	410	34	--	TD	SEOS TO NEOS	08/20/93	JMI
221	118 / 119	08-20-93	1325	75	PP	1053	415	407	265	--	TD	361'N OF SEOS TO NEOS	08/20/93	MH
222	119 / 120	08-20-93	1410	75	PP	1053	415	410	270	DS-68	TD	350'N OF SEOS TO NEOS	08/20/93	MH
223	27 / 120	08-20-93	1450	75	PP	1053	415	410	32	--	JMI	EEOS TO WEOS	08/23/93	TD
224	44 / 119	08-20-93	1520	75	PP	1053	415	412	33	--	JMI	EEOS TO WEOS	08/21/93	CPB
225	40 / 118	08-20-93	1550	75	PP	1053	415	411	29	--	JMI	EEOS TO WEOS	08/23/93	TD

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APPENDIX I-2
ASH POND 91 - PRIMARY
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET.	ACT.						
226	40 / 99	08-20-93	0830	70	BT	1054	415	413	90	--	TD	WAT TO EEOS	08/20/93	MH
227	101 / 102	08-20-93	0840	70	BT	1054	415	410	90	--	TD	EEOS TO WAT	08/23/93	TD
228	102 / 103	08-20-93	0850	70	BT	1054	415	407	82	DS-63	TD	EEOS TO WAT	08/21/93	JMI
229	105 / 106	08-20-93	0905	70	BT	1054	415	410	84	--	TD	EEOS TO WAT	08/21/93	JMI
230	106 / 107	08-20-93	0915	70	BT	1054	415	409	84	--	TD	EEOS TO WAT	08/21/93	JMI
231	109 / 110	08-20-93	0930	70	BT	1054	415	411	85	--	TD	WAT TO EEOS	08/23/93	TD
232	110 / 111	08-20-93	0940	70	BT	1054	415	411	84	--	TD	WAT TO EEOS	08/20/93	MH
233	113 / 114	08-20-93	1005	70	BT	1054	415	410	87	DS-64	TD	WAT TO EEOS	08/20/93	MH
234	114 / 115	08-20-93	1015	70	BT	1054	415	410	89	--	TD	WAT TO EEOS	08/20/93	MH
235	115 / 116	08-20-93	1030	70	BT	1054	415	410	87	--	TD	WAT TO EEOS	08/20/93	MH
236	99 / 118	08-20-93	1120	75	BT	1054	415	410	18	--	TD	SEOS TO NEOS	08/23/93	SGH
237	100 / 118	08-20-93	1123	75	BT	1054	415	410	34	--	TD	SEOS TO NEOS	08/21/93	CPB
238	101 / 118	08-20-93	1125	75	BT	1054	415	411	34	--	TD	SEOS TO NEOS	08/21/93	JMI
239	102 / 118	08-20-93	1135	75	BT	1054	415	409	34	--	TD	SEOS TO NEOS	08/21/93	JMI
240	103 / 118	08-20-93	1140	75	BT	1054	415	410	34	--	TD	SEOS TO NEOS	08/23/93	TD
241	104 / 118	08-20-93	1145	75	BT	1054	415	411	34	--	TD	SEOS TO NEOS	08/21/93	JMI
242	105 / 118	08-20-93	1150	75	BT	1054	415	410	34	--	TD	SEOS TO NEOS	08/21/93	JMI
243	106 / 118	08-20-93	1147	75	BT	1054	415	415	34	DS-66	JMI	SEOS TO NEOS	08/23/93	TD
244	107 / 118	08-20-93	1155	75	BT	1054	415	412	34	--	JMI	SEOS TO NEOS	08/20/93	MH
245	108 / 118	08-20-93	1200	75	BT	1054	415	407	34	--	JMI	SEOS TO NEOS	08/23/93	TD
246	118 / 119	08-20-93	1320	75	BT	1054	415	411	361	--	JMI	SEOS TO 361'N OF SEOS	08/20/93	MH
247	119 / 120	08-20-93	1406	75	BT	1054	415	406	350	DS-69	JMI	SEOS TO 350'N OF SEOS	08/20/93	MH
248	117 / 121	08-21-93	0805	70	VN	1066	415	410	90	DS-70	SGH	WAT TO EEOS	08/23/93	TD
249	121 / 122	08-21-93	0813	70	VN	1066	415	411	88	--	SGH	EEOS TO WAT	08/23/93	TD
250	118 / 123	08-21-93	0835	70	VN	1066	415	409	34	--	SGH	EEOS TO WEOS	08/23/93	TD

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APPENDIX I-2
ASH POND 91 - PRIMARY
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET.	ACT.						
251	118 / 121	08-21-93	0846	70	VN	1066	415	409	20	--	SGH	SEOS TO NEOS	08/23/93	TD
252	121 / 123	08-21-93	0848	70	VN	1066	415	409	14	--	SGH	SEOS TO NEOS	08/23/93	TD
253	122 / 123	08-21-93	0850	70	VN	1066	415	409	34	--	SGH	SEOS TO NEOS	08/23/93	TD
254	118 / 119	08-21-93	0905	70	VN	1066	415	409	30	--	SGH	626'N OF SEOS TO NEOS	08/23/93	TD
255	119 / 123	08-21-93	0907	70	VN	1066	415	409	19	--	SGH	SEOS TO NEOS	08/27/93	MH
256	119 / 120	08-21-93	0920	70	VN	1066	415	410	42	--	SGH	628'N OF SEOS TO NEOS	08/23/93	TD
257	124 / 125	08-21-93	0950	70	VN	1066	415	411	34	--	SGH	EEOS TO WEOS	08/23/93	TD
258	20 / 125	08-21-93	1010	70	VN	1066	415	413	34	--	SGH	EEOS TO WEOS	08/23/93	TD
259	19 / 126	08-21-93	1030	70	VN	1066	415	412	34	--	SGH	EEOS TO WEOS	08/23/93	TD
260	120 / 124	08-21-93	0818	70	BT	1054	415	400	350	DS-71	SGH	SEOS TO 350'N OF SEOS	08/23/93	TD
261	124 / 125	08-21-93	0910	70	BT	1054	415	403	360	DS-73	SGH	SEOS TO 360'N OF SEOS	08/23/93	TD
262	125 / 126	08-21-93	1000	70	BT	1054	415	410	365	DS-75	SGH	SEOS TO 365'N OF SEOS	08/23/93	TD
263	120 / 124	08-21-93	0820	70	PP	1053	415	412	318	DS-72	SGH	350'N OF SEOS TO NEOS	08/23/93	TD
264	124 / 125	08-21-93	0926	70	PP	1053	415	411	311	DS-74	SGH	360'N OF SEOS TO NEOS	08/23/93	TD
265	125 / 126	08-21-93	1020	70	PP	1053	415	413	303	--	SGH	365'N OF SEOS TO NEOS	08/23/93	TD
266	128 / 129	08-24-93	0800	65	VN	1066	415	409	121	DS-76	SGH	EEOS TO WAT	08/27/93	TD
267	129 / 130	08-24-93	0825	65	VN	1066	415	410	119	--	SGH	EEOS TO WAT	08/27/93	TD
268	131 / 132	08-24-93	0855	70	VN	1066	415	409	116	--	SGH	WAT TO EEOS	08/27/93	TD
269	134 / 136	08-24-93	0953	75	VN	1066	415	411	52	--	SGH	SE OF EOS TO 10'N OF SWAT	08/27/93	TD
270	135 / 136	08-24-93	0957	75	VN	1066	415	412	62	--	SGH	NAT TO SE OF EOS	08/27/93	TD
271	134 / 135	08-24-93	1016	75	VN	1066	415	411	16	--	SGH	NEOS TO SEOS	08/27/93	TD
272	132 / 135	08-24-93	1018	75	VN	1066	415	412	32	DS-78	SGH	WEOS TO EEOS	08/27/93	TD
273	137 / 138	08-24-93	1334	85	VN	1066	415	412	245	--	SGH	245'N OF SEOS TO SEOS	08/27/93	TD
274	139 / 140	08-24-93	1437	85	VN	1066	415	409	415	DS-83	SGH	SEOS TO 415'N OF SEOS	08/27/93	TD
275	140 / 141	08-24-93	1700	85	VN	1066	415	411	295	--	SGH	SEOS TO 295'N OF SEOS	08/27/93	TD

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APPENDIX I-2
ASH POND 91 - PRIMARY
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON
					TECH.	MACH.	SET.	ACT.						
276	141 / 142	08-24-93	1735	85	VN	1066	415	410	305	DS-85	SGH	305'N OF SEOS TO SEOS	08/27/93	TD
277	13 / 142	08-24-93	1840	85	VN	1066	415	409	34	--	SGH	EEOS TO WEOS	08/27/93	TD
278	14 / 141	08-24-93	1842	85	VN	1066	415	409	34	--	SGH	EEOS TO WEOS	08/27/93	TD
279	127 / 128	08-24-93	0803	65	PP	1053	415	408	121	DS-77	SGH	EEOS TO WAT	08/27/93	TD
280	130 / 131	08-24-93	0827	65	PP	1053	415	402	117	--	SGH	EEOS TO WAT	08/27/93	TD
281	132 / 133	08-24-93	1005	75	PP	1053	415	406	54	--	SGH	WAT TO EEOS	08/27/93	TD
282	133 / 134	08-24-93	1013	75	PP	1053	415	409	54	--	SGH	EEOS TO SWAT	08/27/93	TD
283	132 / 134	08-24-93	1017	75	PP	1053	415	410	15	--	SGH	WEOS TO EEOS	08/27/93	TD
284	126 / 137	08-24-93	1117	75	PP	1053	415	413	267	DS-80	SGH	NEOS TO 405'N OF SEOS	08/27/93	TD
285	137 / 138	08-24-93	1345	85	PP	1053	415	412	342	--	SGH	245'N OF SEOS TO NEOS	08/27/93	TD
286	138 / 139	08-24-93	1430	85	PP	1053	415	409	271	DS-82	SGH	320'N OF SEOS TO NEOS	08/27/93	TD
287	139 / 140	08-24-93	1509	85	PP	1053	415	411	240	--	SGH	415'N OF SEOS TO NEOS	08/27/93	TD
288	140 / 141	08-24-93	1705	85	PP	1053	415	409	357	DS-84	SGH	295'N OF SEOS TO NEOS	08/27/93	TD
289	141 / 142	08-24-93	1740	85	PP	1053	415	409	360	DS-86	SGH	NEOS TO 305'N OF SEOS	08/27/93	TD
290	123 / 127	08-24-93	0815	65	BT	1054	415	409	34	--	SGH	EEOS TO WEOS	08/27/93	TD
291	122 / 127	08-24-93	0817	65	BT	1054	415	409	87	--	SGH	EEOS TO WAT	08/27/93	TD
292	126 / 137	08-24-93	1108	65	BT	1054	415	408	405	DS-79	SGH	SEOS TO 405'N OF SEOS	08/27/93	TD
293	17 / 137	08-24-93	1338	85	BT	1054	415	410	91	--	SGH	SEOS TO NEOS	08/27/93	TD
294	17 / 138	08-24-93	1351	85	BT	1054	415	409	34	--	SGH	EEOS TO WEOS	08/27/93	TD
295	17 / 139	08-24-93	1401	85	BT	1054	415	411	91	--	SGH	SEOS TO NEOS	08/27/93	TD
296	138 / 139	08-24-93	1405	85	BT	1054	415	409	320	DS-81	SGH	SEOS TO 320'N OF SEOS	08/27/93	TD
297	15 / 140	08-24-93	1510	85	BT	1054	415	406	34	--	SGH	EEOS TO WEOS	08/27/93	TD
298	15 / 139	08-24-93	1515	85	BT	1054	415	408	15	--	SGH	SEOS TO NEOS	08/27/93	MH
299	144 / 145	08-24-93	0852	65	BT	1054	415	412	100	--	SGH	SEOS TO NAT	08/25/93	TD
300	145 / 146	08-25-93	0913	65	BT	1054	415	411	104	DS-87	SGH	SEOS TO NAT	08/25/93	TD

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APPENDIX I-2
ASH POND 91 - PRIMARY
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET.	ACT.						
301	146 / 148	08-25-93	0945	65	BT	1054	415	399	80	--	SGH	SW OF EOS TO NE OF EOS	08/25/93	TD
302	146 / 147	08-25-93	1004	65	BT	1054	415	403	45	--	SGH	SW OF EOS TO NAT	08/25/93	TD
303	147 / 148	08-25-93	1009	65	BT	1054	415	404	45	--	SGH	NE OF EOS TO SW OF EOS	08/25/93	TD
304	148 / 150	08-25-93	1100	65	BT	1054	415	411	80	--	SGH	SW OF EOS TO EAT	08/25/93	TD
305	149 / 150	08-25-93	1105	65	BT	1054	415	409	35	--	SGH	SWEOS TO EAT	08/25/93	TD
306	150 / 152	08-25-93	1130	65	BT	1054	415	409	140	--	SGH	EAT TO WEOS	08/25/93	TD
307	144 / 153	08-25-93	1145	65	BT	1054	415	415	8	--	SGH	8'W OF EEOS TO EEOS	08/25/93	TD
308	145 / 153	08-25-93	1147	65	BT	1054	415	415	34	--	SGH	WEOS TO EEOS	08/25/93	TD
309	146 / 153	08-25-93	1149	65	BT	1054	415	415	10	--	SGH	WEOS TO EEOS	08/25/93	TD
310	152 / 153	08-25-93	1152	65	BT	1054	415	413	34	DS-88	SGH	SEOS TO NEOS	08/25/93	TD
311	143 / 153	08-25-93	1155	65	BT	1054	415	414	34	--	SGH	WEOS TO EEOS	08/25/93	TD
312	144 / 153	08-25-93	1200	65	BT	1054	415	412	19	--	SGH	WEOS TO 26'E OF WEOS	08/25/93	TD
313	152 / 154	08-25-93	1305	70	BT	1054	415	415	100	--	SGH	EAT OF WEOS	08/25/93	TD
314	153 / 154	08-25-93	1311	70	BT	1054	415	413	129	--	SGH	EEOS TO WEOS	08/25/93	TD
315	154 / 155	08-25-93	1337	70	BT	1054	415	410	227	DS-89	SGH	WEOS TO EAT	08/25/93	TD
316	155 / 156	08-25-93	1408	70	BT	1054	415	411	226	--	SGH	EAT TO WEOS	08/25/93	TD
317	143 / 144	08-25-93	0825	65	VN	1066	415	411	98	--	SGH	SEOS TO NAT	08/25/93	TD
318	156 / 157	08-25-93	1420	70	PP	1066	415	408	200	DS-90	SGH	EAT TO WEOS	08/25/93	SGH
319	156 / 159	08-25-93	1505	70	PP	1066	415	413	32	--	SGH	EEOS TO WEOS	08/25/93	SGH
320	157 / 159	08-25-93	1520	70	PP	1066	415	409	34	--	SGH	NEOS TO SEOS	08/25/93	SGH
321	157 / 158	08-25-93	1530	70	PP	1066	415	411	93	--	SGH	135'E OF WEOS TO WEOS	08/25/93	SGH
322	158 / 160	08-25-93	1600	70	PP	1066	415	410	230	DS-91	SGH	EAT TO WEOS	08/25/93	SGH
323	158 / 159	08-25-93	1630	70	PP	1066	415	411	32	--	SGH	EEOS TO WEOS	08/25/93	SGH
324	161 / 162	08-28-93	0908	60	VN	1066	415	414	232	--	SGH	SEOS TO NAT	08/31/93	TD
325	162 / 163	08-28-93	1000	65	VN	1066	415	412	200	DS-93	SGH	NAT TO SEOS	08/31/93	TD

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APPENDIX I-2
ASH POND 91 - PRIMARY
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET.	ACT.						
326	163 / 164	08-28-93	1025	65	VN	1066	415	411	34	--	SGH	WEOS TO EEOS	08/31/93	TD
327	164 / 165	08-28-93	1035	65	VN	1066	415	410	34	--	SGH	EEOS TO WEOS	08/31/93	TD
328	162 / 165	08-28-93	1055	65	VN	1066	415	410	85	--	SGH	NEOS TO SEOS	08/31/93	TD
329	166 / 167	08-28-93	1110	65	VN	1066	415	411	336	DS-94	SGH	NAT TO SEOS	08/31/93	TD
330	126 / 167	08-28-93	1200	65	VN	1066	415	410	30	--	SGH	EEOS TO WEOS	08/31/93	TD
331	168 / 169	08-28-93	1330	70	VN	1066	415	409	330	DS-96	SGH	SEOS TO NEOS	08/31/93	TD
332	170 / 171	08-28-93	1440	70	VN	1066	415	411	322	DS-98	SGH	NAT TO SEOS	08/31/93	TD
333	172 / 173	08-28-93	1545	70	VN	1066	415	412	322	--	SGH	NAT TO SEOS	08/31/93	TD
334	140 / 171	08-28-93	1700	70	VN	1066	415	411	30	--	SGH	EEOS TO WEOS	08/31/93	TD
335	123 / 161	08-28-93	0915	60	PP	1053	415	411	21	--	SGH	21'S OF NEOS TO NEOS	08/31/93	TD
336	127 / 161	08-28-93	0920	60	PP	1053	415	411	34	--	SGH	SEOS TO NEOS	08/31/93	TD
337	128 / 161	08-28-93	0925	60	PP	1053	415	411	34	--	SGH	SEOS TO NEOS	08/31/93	TD
338	129 / 161	08-28-93	0930	65	PP	1053	415	411	34	--	SGH	SEOS TO NEOS	08/31/93	TD
339	130 / 161	08-28-93	0935	65	PP	1053	415	411	34	--	SGH	SEOS TO NEOS	08/31/93	TD
340	131 / 161	08-28-93	0945	65	PP	1053	415	409	34	--	SGH	SEOS TO NEOS	08/31/93	TD
341	132 / 161	08-28-93	0955	65	PP	1053	415	409	34	DS-92	SGH	SEOS TO NEOS	08/31/93	TD
342	135 / 161	08-28-93	1000	65	PP	1053	415	409	78	--	SGH	SEOS TO NAT	08/31/93	TD
343	163 / 166	08-28-93	1040	65	PP	1053	415	410	196	--	SGH	NAT TO SEOS	08/31/93	TD
344	164 / 166	08-28-93	1100	65	PP	1053	415	412	38	--	SGH	NEOS TO SEOS	08/31/93	TD
345	165 / 166	08-28-93	1110	65	PP	1053	415	412	85	--	SGH	NEOS TO SEOS	08/31/93	TD
346	119 / 161	08-28-93	1130	65	PP	1053	415	411	34	--	SGH	EEOS TO WEOS	08/31/93	TD
347	162 / 162A	08-28-93	1145	65	PP	1053	415	410	34	--	SGH	WEOS TO EEOS	08/31/93	TD
348	120 / 162A	08-28-93	1150	65	PP	1053	415	409	30	--	SGH	EEOS TO 3'E OF WEOS	08/31/93	TD
349	124 / 165	08-28-93	1200	65	PP	1053	415	410	30	--	SGH	EEOS TO WEOS	08/31/93	TD
350	125 / 166	08-28-93	1210	65	PP	1053	415	411	30	DS-95	SGH	EEOS TO WEOS	08/31/93	TD

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APPENDIX I-2
ASH POND 91 - PRIMARY
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET	ACT.						
351	167 / 168	08-28-93	1330	70	PP	1053	415	412	330	--	SGH	WAT TO SEOS	08/31/93	TD
352	169 / 170	08-28-93	1430	70	PP	1053	415	410	322	DS-97	SGH	NAT TO SEOS	08/31/93	TD
353	171 / 172	08-28-93	1525	70	PP	1053	415	411	322	DS-99	SGH	NAT TO SEOS	08/31/93	TD
354	138 / 169	08-28-93	1640	70	PP	1053	415	411	30	--	SGH	EEOS TO WEOS	08/31/93	TD
355	137 / 168	08-28-93	1700	70	PP	1053	415	412	30	--	SGH	EEOS TO WEOS	08/31/93	TD
356	141 / 172	08-28-93	1730	70	PP	1053	415	410	30	--	SGH	EEOS TO WEOS	08/31/93	TD
357	162 / 164	08-28-93	1740	70	PP	1053	415	410	38	--	SGH	NEOS TO SEOS	08/31/93	TD
358	139 / 170	08-28-93	1750	70	PP	1053	415	411	30	--	SGH	EEOS TO WEOS	08/31/93	TD
359	142 / 174	08-31-93	1247	70	BT	1054	415	410	305	DS-101	JMI	SEOS TO 305'N OF SEOS	09/01/93	TD
360	174 / 175	08-31-93	1340	70	BT	1054	415	410	305	--	JMI	305'N OF SEOS TO SEOS	08/31/93	TD
361	12 / 174	08-31-93	1445	70	BT	1054	415	412	32	--	JMI	EEOS TO WEOS	08/31/93	TD
362	45 / 175	08-31-93	1500	70	BT	1054	415	415	27	--	JMI	EEOS TO 27'W OF EEOS	08/31/93	TD
363	46 / 176	08-31-93	1515	70	BT	1054	415	411	25	--	JMI	EEOS TO 25'W OF EEOS	09/08/93	TD
364	46 / 177	08-31-93	1540	70	BT	1054	415	415	84	--	JMI	NEOS TO SEOS	08/31/93	TD
365	57 / 177	08-31-93	1600	70	BT	1054	415	414	34	DS-107	JMI	WEOS TO EEOS	08/31/93	TD
366	50 / 178	08-31-93	1615	70	BT	1054	415	409	34	--	JMI	EEOS TO WEOS	08/31/93	TD
367	142 / 174	08-31-93	1315	70	VN	1066	415	412	357	DS-100	JMI	305'N OF SEOS TO NEOS	08/31/93	TD
368	175 / 176	08-31-93	1430	70	VN	1066	415	411	313	DS-103	JMI	313'N OF SEOS TO SEOS	08/31/93	TD
369	176 / 177	08-31-93	1530	70	VN	1066	415	412	268	--	JMI	268'N OF SEOS TO SEOS	08/31/93	TD
370	177 / 178	08-31-93	1600	70	VN	1066	415	415	290	DS-106	JMI	290'N OF SEOS TO SEOS	08/31/93	TD
371	174 / 175	08-31-93	1350	70	PP	1053	415	409	358	DS-102	JMI	NEOS TO 305'N OF SEOS	08/31/93	TD
372	175 / 176	08-31-93	1430	70	PP	1053	415	412	347	DS-104	JMI	NEOS TO 313'N OF SEOS	08/31/93	TD
373	176 / 177	08-31-93	1530	70	PP	1053	415	411	314	--	JMI	NEOS TO 268'N OF SEOS	08/31/93	TD
374	177 / 178	08-31-93	1610	70	PP	1053	415	414	375	DS-105	JMI	NEOS TO 290'N OF SEOS	08/31/93	TD
375	178 / 179	09-01-93	0840	65	BT	1054	415	400	340	--	JMI	SEOS TO 340' OF SEOS	09/01/93	TD

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APPENDIX I-2
ASH POND 91 - PRIMARY
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET.	ACT.						
376	51 / 179	09-01-93	0935	65	BT	1054	415	415	34	--	JMI	EEOS TO WEOS	09/01/93	TD
377	180 / 181	09-01-93	0940	65	BT	1054	415	395	350	DS-111	JMI	SEOS TO 350'N OF SEOS	09/01/93	TD
378	182 / 183	09-01-93	1045	65	BT	1054	415	395	350	DS-113	JMI	350'N OF SEOS TO SEOS	09/01/93	TD
379	183 / 184	09-01-93	1305	70	BT	1054	415	398	342	DS-115	JMI	SEOS TO 342'N OF SEOS	09/01/93	TD
380	185 / 186	09-01-93	1340	70	BT	1054	415	412	345	--	JMI	SEOS TO 345'N OF SEOS	09/01/93	TD
381	186 / 187	09-01-93	1450	70	BT	1054	415	415	353	DS-119	JMI	353'N OF SEOS TO SEOS	09/01/93	TD
382	178 / 179	09-01-93	0852	65	PP	1053	415	411	329	DS-108	JMI	340'N OF SEOS TO NEOS	09/01/93	TD
383	179 / 180	09-01-93	0920	65	PP	1053	415	411	310	DS-110	JMI	NEOS TO 353'N OF SEOS	09/01/93	TD
384	180 / 181	09-01-93	1010	65	PP	1053	415	411	310	--	JMI	NEOS TO 350'N OF SEOS	09/01/93	TD
385	182 / 183	09-01-93	1050	65	PP	1053	415	410	311	DS-114	JMI	NEOS TO 350'N OF SEOS	09/01/93	TD
386	183 / 184	09-01-93	1310	70	PP	1053	415	411	308	DS-117	JMI	NEOS TO 342'N OF SEOS	09/01/93	TD
387	185 / 186	09-01-93	1350	70	PP	1053	415	415	318	--	JMI	NEOS TO 345'N OF SEOS	09/01/93	TD
388	186 / 187	09-01-93	1510	70	PP	1053	415	412	320	DS-120	JMI	NEOS TO 353'N OF SEOS	09/01/93	TD
389	179 / 180	09-01-93	0905	65	VN	1066	415	411	353	DS-109	JMI	SEOS TO 353'N OF SEOS	09/01/93	TD
390	181 / 182	09-01-93	1010	65	VN	1066	415	411	660	DS-112	JMI	NEOS TO SEOS	09/01/93	TD
391	184 / 185	09-01-93	1320	70	VN	1066	415	408	675	DS-116/11	JMI	SEOS TO NEOS	09/01/93	TD
392	187 / 188	09-01-93	1600	70	VN	1066	415	410	666	DS-121	JMI	NEOS TO SEOS	09/03/93	MH
393	188 / 189	09-03-93	0820	60	PP	1053	415	411	355	DS-122	TD	300'N OF SEOS TO NEOS	09/03/93	MH
394	190 / 191	09-03-93	0930	65	PP	1053	415	406	360	DS-125	TD	NEOS TO 300'N OF SEOS	09/03/93	MH
395	192 / 193	09-03-93	1120	65	PP	1053	415	410	360	--	TD	NEOS TO 300'N OF SEOS	09/03/93	MH
396	193 / 194	09-03-93	1340	70	PP	1053	415	408	355	DS-130	TD	NEOS TO 300'N OF SEOS	09/03/93	MH
397	195 / 196	09-03-93	1510	70	PP	1053	415	407	345	DS-132	TD	NEOS TO 320'N OF SOES	09/03/93	MH
398	188 / 189	09-03-93	0840	60	BT	1054	415	411	300	DS-123	TD	SEOS TO 300'N OF SEOS	09/03/93	MH
399	190 / 191	09-03-93	0945	60	BT	1054	415	409	300	--	TD	300'N OF SEOS TO SEOS	09/03/93	MH
400	192 / 193	09-03-93	1120	65	BT	1054	415	405	300	DS-127	TD	300'N OF SEOS TO SEOS	09/03/93	MH

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APPENDIX I-2
ASH POND 91 - PRIMARY
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET	ACT.						
401	193 / 194	09-03-93	1325	70	BT	1054	415	400	300	DS-129	TD	300'N OF SEOS TO SEOS	09/03/93	MH
402	195 / 196	09-03-93	1450	70	BT	1054	415	405	320	--	TD	320'N OF SEOS TO SEOS	09/03/93	MH
403	189 / 190	09-03-93	0900	60	VN	1066	415	405	670	DS-124	TD	SEOS TO NEOS	09/03/93	MH
404	191 / 192	09-03-93	1040	65	VN	1066	415	408	665	DS-126/12	TD	NEOS TO SEOS	09/03/93	MH
405	194 / 195	09-03-93	1410	70	VN	1066	415	405	660	DS-131	TD	NEOS TO SEOS	09/03/93	MH
406	196 / 197	09-04-93	0845	60	PP	1053	415	405	370	DS-134	TD	300'N TO 670'N OF SEOS	09/04/93	MH
407	197 / 198	09-04-93	1000	60	PP	1053	415	408	310	--	TD	NEOS TO 350'S OF NEOS	09/04/93	MH
408	199 / 200	09-04-93	1100	60	PP	1053	415	407	310	DS-138	TD	NEOS TO 350'S OF NEOS	09/04/93	MH
409	196 / 197	09-04-93	0900	60	VN	1066	415	408	300	DS-133	TD	SEOS TO 300'N OF SEOS	09/06/93	MH
410	198 / 199	09-04-93	1010	60	VN	1066	415	408	360	DS-137	TD	300'N OF SEOS TO NEOS	09/04/93	MH
411	200 / 201	09-04-93	1115	60	VN	1066	415	416	390	DS-139	TD	275'N OF SEOS TO NEOS	09/04/93	MH
412	202 / 203	09-04-93	1400	60	VN	1066	415	409	665	DS-143	TD	NEOS TO SEOS	09/06/93	MH
413	197 / 198	09-04-93	0910	60	BT	1054	415	410	350	DS-135	TD	350'N OF SEOS TO SEOS	09/04/93	MH
414	198 / 199	09-04-93	1008	60	BT	1054	415	410	300	DS-136	TD	SEOS TO 300'N OF SEOS	09/04/93	MH
415	199 / 200	09-04-93	1100	60	BT	1054	415	410	350	DS-140	TD	350'N OF SEOS TO SEOS	09/04/93	MH
416	200 / 201	09-04-93	1145	60	BT	1054	415	410	275	--	TD	SEOS TO 275'N OF SEOS	09/04/93	MH
417	201 / 202	09-04-93	1330	60	BT	1054	415	415	665	DS-141/14	TD	SEOS TO NEOS	09/06/93	SGH
418	173 / 204	09-06-93	0915	60	VN	1066	415	408	341	DS-144	TD	SEOS TO NEOS	09/06/93	SGH
419	205 / 207	09-06-93	1035	65	VN	1066	415	405	307	DS-146	TD	NEOS TO SEOS	09/06/93	SGH
420	206 / 207	09-06-93	1115	65	VN	1066	415	410	25	--	TD	NEOS TO SEOS	09/06/93	SGH
421	208 / 210	09-06-93	1135	65	VN	1066	415	410	318	DS-148	TD	NEOS TO SEOS	09/06/93	SGH
422	210 / 211	09-06-93	1340	70	VN	1066	415	403	428	DS-150	TD	NEOS TO SEOS	09/06/93	SGH
423	212 / 213	09-06-93	1440	70	VN	1066	415	410	450	DS-152	TD	NEOS TO SEOS	09/06/93	SGH
424	204 / 205	09-06-93	0930	60	PP	1053	415	405	310	DS-145	TD	NEOS TO SEOS	09/06/93	SGH
425	204 / 206	09-06-93	1020	60	PP	1053	415	407	37	--	TD	NEOS TO SEOS	09/06/93	SGH

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APPENDIX I-2
ASH POND 91 - PRIMARY
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET.	ACT.						
426	207 / 208	09-06-93	1045	65	PP	1053	415	405	313	DS-147	TD	NEOS TO SEOS	09/06/93	SGH
427	207 / 209	09-06-93	1130	65	PP	1053	415	409	22	--	TD	NEOS TO SEOS	09/06/93	SGH
428	208 / 209	09-06-93	1143	65	PP	1053	415	406	34	--	TD	WEOS TO EEOS	09/06/93	SGH
429	209 / 210	09-06-93	1150	65	PP	1053	415	409	117	--	TD	NEOS TO SEOS	09/06/93	SGH
430	211 / 212	09-06-93	1405	70	PP	1053	415	410	437	DS-151	TD	NEOS TO SEOS	09/06/93	SGH
431	174 / 204	09-06-93	0935	60	BT	1054	415	410	34	--	TD	EEOS TO WEOS	09/06/93	SGH
432	205 / 206	09-06-93	0950	60	BT	1054	415	408	34	--	TD	WEOS TO EEOS	09/08/93	TD
433	175 / 206	09-06-93	1020	60	BT	1054	415	402	34	--	TD	EEOS TO WEOS	09/08/93	TD
434	176 / 207	09-06-93	1050	65	BT	1054	415	408	34	--	TD	EEOS TO WEOS	09/06/93	SGH
435	176 / 209	09-06-93	1105	65	BT	1054	415	405	96	--	TD	SEOS TO NEOS	09/08/93	TD
436	177 / 209	09-06-93	1155	65	BT	1054	415	405	34	--	TD	EEOS TO WEOS	09/06/93	SGH
437	178 / 210	09-06-93	1205	65	BT	1054	415	410	39	--	TD	EEOS TO WEOS	09/06/93	SGH
438	179 / 211	09-06-93	1354	70	BT	1054	415	404	34	DS-149	TD	WEOS TO EEOS	09/06/93	SGH
439	180 / 212	09-06-93	1425	70	BT	1054	415	410	34	--	TD	EEOS TO WEOS	09/06/93	SGH
440	182 / 213	09-06-93	1505	70	BT	1054	415	408	15	--	TD	NEOS TO SEOS	09/06/93	SGH
441	181 / 213	09-06-93	1515	70	BT	1054	415	408	34	--	TD	EEOS TO WEOS	09/06/93	SGH
442	182 / 214	09-07-93	0810	60	BT	1054	415	410	34	--	TD	EEOS TO WEOS	09/07/93	SGH
443	183 / 215	09-07-93	0845	60	BT	1054	415	411	34	--	TD	EEOS TO WEOS	09/07/93	SGH
444	184 / 215	09-07-93	0900	60	BT	1054	415	405	25	--	TD	NEOS TO SEOS	09/07/93	SGH
445	184 / 216	09-07-93	0920	60	BT	1054	415	410	34	--	TD	EEOS TO WEOS	09/07/93	SGH
446	185 / 217	09-07-93	0935	60	BT	1054	415	408	34	--	TD	EEOS TO WEOS	09/07/93	SGH
447	215 / 219	09-07-93	1015	60	BT	1054	415	410	34	--	TD	EEOS TO WEOS	09/08/93	TD
448	214 / 218	09-07-93	1030	60	BT	1054	415	409	34	--	TD	EEOS TO WEOS	09/07/93	SGH
449	216 / 221	09-07-93	1040	60	BT	1054	415	412	34	--	TD	EEOS TO WEOS	09/07/93	SGH
450	217 / 222	09-07-93	1055	60	BT	1054	415	410	34	--	TD	EEOS TO WEOS	09/07/93	SGH

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APPENDIX I-2
ASH POND 91 - PRIMARY
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET.	ACT.						
451	186 / 224	09-07-93	1125	60	BT	1054	415	410	34	--	TD	WEOS TO EEOS	09/07/93	SGH
452	223 / 224	09-07-93	1137	60	BT	1054	415	408	34	DS-157	TD	WEOS TO EEOS	09/07/93	SGH
453	187 / 225	09-07-93	1145	60	BT	1054	415	410	34	--	TD	WEOS TO EEOS	09/07/93	SGH
454	188 / 226	09-07-93	1410	65	BT	1054	415	411	34	--	TD	EEOS TO WEOS	09/07/93	SGH
455	189 / 227	09-07-93	1450	65	BT	1054	415	409	34	--	TD	EEOS TO WEOS	09/07/93	SGH
456	214 / 215	09-07-93	0812	60	VN	1066	415	406	196	--	TD	NEOS TO SEOS	09/07/93	SGH
457	215 / 216	09-07-93	0850	60	VN	1066	415	407	200	--	TD	SEOS TO NEOS	09/07/93	SGH
458	218 / 219	09-07-93	0955	60	VN	1066	415	410	230	DS-154	TD	SEOS TO NEOS	09/07/93	SGH
459	220 / 222	09-07-93	1050	60	VN	1066	415	411	188	--	TD	NEOS TO SEOS	09/07/93	SGH
460	221 / 222	09-07-93	1115	60	VN	1066	415	411	21	--	TD	NEOS TO SEOS	09/07/93	SGH
461	217 / 221	09-07-93	1120	60	VN	1066	415	409	21	--	TD	NEOS TO SEOS	09/07/93	SGH
462	217 / 223	09-07-93	1130	60	VN	1066	415	410	225	DS-156	TD	NEOS TO SEOS	09/07/93	SGH
463	225 / 226	09-07-93	1400	65	VN	1066	415	411	440	DS-159	TD	NEOS TO SEOS	09/08/93	SGH
464	213 / 214	09-07-93	0815	60	PP	1053	415	408	213	--	TD	SEOS TO NEOS	09/07/93	SGH
465	216 / 217	09-07-93	0900	60	PP	1053	415	410	203	DS-153	TD	NEOS TO SEOS	09/08/93	SGH
466	213 / 218	09-07-93	0940	60	PP	1053	415	409	221	--	TD	SEOS TO NEOS	09/07/93	SGH
467	219 / 220	09-07-93	1015	60	PP	1053	415	410	186	DS-155	TD	NEOS TO SEOS	09/07/93	SGH
468	219 / 221	09-07-93	1040	60	PP	1053	415	408	41	--	TD	NEOS TO SEOS	09/07/93	SGH
469	216 / 219	09-07-93	1050	60	PP	1053	415	415	11	--	TD	NEOS TO SEOS	09/08/93	SGH
470	220 / 221	09-07-93	1105	60	PP	1053	415	410	34	--	TD	WEOS TO EEOS	09/07/93	SGH
471	222 / 223	09-07-93	1120	60	PP	1053	415	408	210	--	TD	SEOS TO NEOS	09/08/93	SGH
472	223 / 225	09-07-93	1130	65	PP	1053	415	410	435	DS-158	TD	NEOS TO SEOS	09/08/93	SGH
473	226 / 227	09-07-93	1445	65	PP	1053	415	412	430	DS-160	TD	SEOS TO NEOS	09/08/93	SGH
474	227 / 228	09-08-93	0800	60	VN	1066	415	410	214	--	TD	NEOS TO SEOS	09/08/93	SGH
475	228 / 230	09-08-93	0840	60	VN	1066	415	409	34	--	TD	EEOS TO WEOS	09/08/93	SGH

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APPENDIX I-2
ASH POND 91 – PRIMARY
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET.	ACT.						
476	229 / 230	09-08-93	0900	60	VN	1066	415	410	34	DS-162	TD	WEOS TO EEOS	09/08/93	SGH
477	228 / 232	09-08-93	0915	60	VN	1066	415	407	105	--	TD	NEOS TO SEOS	09/08/93	SGH
478	230 / 232	09-08-93	0930	60	VN	1066	415	407	10	--	TD	NEOS TO SEOS	09/08/93	SGH
479	232 / 233	09-08-93	0937	60	VN	1066	415	410	34	--	TD	WEOS TO EEOS	09/08/93	SGH
480	233 / 234	09-08-93	0943	60	VN	1066	415	407	115	--	TD	NEOS TO SEOS	09/08/93	SGH
481	234 / 235	09-08-93	1015	60	VN	1066	415	409	394	DS-165	TD	NEOS TO SEOS	09/08/93	SGH
482	190 / 228	09-08-93	0805	60	BT	1054	415	410	34	--	TD	EEOS TO WEOS	09/08/93	SGH
483	228 / 233	09-08-93	0910	60	BT	1054	415	412	112	--	TD	NEOS TO SEOS	09/08/93	SGH
484	191 / 233	09-08-93	0930	60	BT	1054	415	408	34	--	TD	EEOS TO WEOS	09/08/93	SGH
485	192 / 234	09-08-93	1000	60	BT	1054	415	410	34	--	TD	EEOS TO WEOS	09/08/93	SGH
486	193 / 234	09-08-93	1015	60	BT	1054	415	409	22	--	TD	NEOS TO SEOS	09/08/93	SGH
487	234 / 236	09-08-93	1040	60	BT	1054	415	410	36	--	TD	NEOS TO SEOS	09/08/93	SGH
488	193 / 236	09-08-93	1050	60	BT	1054	415	410	34	--	TD	EEOS TO WEOS	09/08/93	SGH
489	235 / 236	09-08-93	1100	60	BT	1054	415	413	34	DS-164	TD	WEOS TO EEOS	09/08/93	SGH
490	227 / 229	09-08-93	0815	60	PP	1053	415	408	215	DS-161	TD	NEOS TO SEOS	09/08/93	SGH
491	227 / 230	09-08-93	0850	60	PP	1053	415	410	15	--	TD	SEOS TO NEOS	09/08/93	SGH
492	229 / 231	09-08-93	0900	60	PP	1053	415	405	214	--	TD	NEOS TO SEOS	09/08/93	SGH
493	231 / 234	09-08-93	0930	60	PP	1053	415	407	220	DS-163	TD	NEOS TO SEOS	09/08/93	SGH
494	232 / 234	09-08-93	1020	60	PP	1053	415	410	112	--	TD	WEOS TO SEOS	09/08/93	SGH
495	231 / 232	09-08-93	1045	60	PP	1053	415	410	34	--	TD	WEOS TO EEOS	09/08/93	SGH
496	235 / 237	09-10-93	0805	60	PP	1053	415	408	210	--	TD	SEOS TO NEOS	09/10/93	MH
497	237 / 239	09-10-93	0855	60	PP	1053	415	405	269	DS-167	TD	NEOS TO SEOS	09/10/93	MH
498	238 / 239	09-10-93	940	60	PP	1053	415	411	168	--	TD	NEOS TO SEOS	09/11/93	MH
499	240 / 241	09-10-93	1020	60	PP	1053	415	410	219	DS-169	TD	SEOS TO NEOS	09/10/93	MH
500	243 / 244	09-10-93	1110	60	PP	1053	415	408	435	DS-171	TD	NEOS TO SEOS	09/10/93	MH

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ASH POND 91 - PRIMARY
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET.	ACT.						
501	246 / 247	09-10-93	1315	70	PP	1053	415	410	217	--	TD	NEOS TO SEOS	09/11/93	MH
502	248 / 250	09-10-93	1335	70	PP	1053	415	405	234	DS-174	TD	NEOS TO SEOS	09/11/93	MH
503	248 / 251	09-10-93	1350	70	PP	1053	415	411	189	--	TD	NEOS TO SEOS	09/11/93	MH
504	236 / 238	09-10-93	0810	60	VN	1066	415	410	36	--	TD	SEOS TO NEOS	09/11/93	MH
505	235 / 238	09-10-93	0820	60	VN	1066	415	409	124	--	TD	SEOS TO NEOS	09/10/93	MH
506	237 / 238	09-10-93	0830	60	VN	1066	415	407	34	--	TD	EEOS TO WEOS	09/10/93	MH
507	239 / 240	09-10-93	9000	60	VN	1066	415	410	429	DS-166	TD	NEOS TO SEOS	09/10/93	MH
508	241 / 243	09-10-93	1020	60	VN	1066	415	408	221	DS-170	TD	NEOS TO SEOS	09/10/93	MH
509	242 / 243	09-10-93	1050	60	VN	1066	415	410	213	--	TD	NEOS TO SEOS	09/10/93	MH
510	244 / 245	09-10-93	1125	60	VN	1066	415	405	213	DS-172	TD	SEOS TO NEOS	09/10/93	MH
511	245 / 247	09-10-93	1305	70	VN	1066	415	410	211	--	TD	NEOS TO SEOS	09/10/93	MH
512	247 / 248	09-10-93	1330	70	VN	1066	415	405	429	DS-173	TD	NEOS TO SEOS	09/10/93	MH
513	250 / 251	09-10-93	1400	70	VN	1066	415	410	34	--	TD	SEOS TO WEOS	09/15/93	JMI
514	194 / 238	09-10-93	0815	60	BT	1054	415	412	34	--	TD	WEOS TO EEOS	09/10/93	MH
515	195 / 239	09-10-93	0830	60	BT	1054	415	410	34	--	TD	EEOS TO WEOS	09/10/93	MH
516	196 / 240	09-10-93	0900	60	BT	1054	415	409	34	--	TD	EEOS TO WEOS	09/10/93	MH
517	240 / 242	09-10-93	0925	60	BT	1054	415	408	206	--	TD	SEOS TO NEOS	09/10/93	MH
518	241 / 242	09-10-93	1010	60	BT	1054	415	410	34	--	TD	EEOS TO WEOS	09/10/93	MH
519	197 / 242	09-10-93	1030	60	BT	1054	415	412	34	--	TD	WEOS TO EEOS	09/10/93	MH
520	198 / 243	09-10-93	1045	60	BT	1054	415	408	34	--	TD	EEOS TO WEOS	09/10/93	MH
521	199 / 244	09-10-93	1100	60	BT	1054	415	410	34	DS-168	TD	EEOS TO WEOS	09/10/93	MH
522	244 / 246	09-10-93	1120	60	BT	1054	415	408	220	--	TD	SEOS TO NEOS	09/10/93	MH
523	245 / 246	09-10-93	1155	60	BT	1054	415	410	34	--	TD	WEOS TO EEOS	09/10/93	MH
524	200 / 246	09-10-93	1310	70	BT	1054	415	409	34	--	TD	EEOS TO WEOS	09/10/93	MH
525	201 / 247	09-10-93	1320	70	BT	1054	415	406	34	--	TD	EEOS TO WEOS	09/10/93	MH

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APPENDIX I-2
ASH POND 91 - PRIMARY
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET.	ACT.						
526	248 / 249	09-10-93	1330	70	BT	1054	415	410	34	--	TD	EEOS TO WEOS	09/10/93	MH
527	202 / 249	09-10-93	1335	70	BT	1054	415	408	34	--	TD	EEOS TO WEOS	09/10/93	MH
528	203 / 251	09-10-93	1345	70	BT	1054	415	412	34	--	TD	EEOS TO WEOS	09/10/93	MH
529	252 / 253	09-11-93	0830	60	BT	1054	415	410	450	DS-175	TD	SEOS TO NEOS	09/11/93	MH
530	255 / 256	09-11-93	1100	65	BT	1054	415	409	200	DS-179	TD	NEOS TO SEOS	09/11/93	MH
531	256 / 257	09-11-93	1130	65	BT	1054	415	407	34	--	TD	WEOS TO EEOS	09/11/93	MH
532	255 / 257	09-11-93	1140	65	BT	1054	415	410	210	--	TD	NEOS TO SEOS	09/11/93	MH
533	257 / 258	09-11-93	1310	70	BT	1054	415	410	34	DS-180	TD	WEOS TO EEOS	09/11/93	MH
534	255 / 258	09-11-93	1320	70	BT	1054	415	407	45	--	TD	NEOS TO SEOS	09/11/93	MH
535	156 / 257	09-11-93	1330	70	BT	1054	415	410	30	--	TD	NEOS TO SEOS	09/11/93	MH
536	159 / 257	09-11-93	1335	70	BT	1054	415	412	34	--	TD	NEOS TO SEOS	09/11/93	MH
537	158 / 257	09-11-93	1341	70	BT	1054	415	408	34	--	TD	NEOS TO SEOS	09/11/93	MH
538	160 / 257	09-11-93	1345	70	BT	1054	415	412	34	--	TD	NEOS TO SEOS	09/11/93	MH
539	253 / 254	09-11-93	0850	60	PP	1053	415	411	450	DS-176	TD	SEOS TO NEOS	09/14/93	JMI
540	254 / 255	09-11-93	0925	60	VN	1066	415	408	460	DS-177	TD	NEOS TO SEOS	09/14/93	JMI
541	251 / 252	09-11-93	1050	60	VN	1066	415	410	190	DS-178	TD	SEOS TO NEOS	09/15/93	TD
542	250 / 252	09-11-93	1130	65	VN	1066	415	407	230	--	TD	SEOS TO NEOS	09/11/93	MH
543	143 / 256	09-11-93	1330	65	VN	1066	415	412	100	--	TD	NEOS TO SEOS	09/11/93	MH
544	153 / 256	09-11-93	1347	70	VN	1066	415	410	34	--	TD	NEOS TO SEOS	09/11/93	MH
545	154 / 256	09-11-93	1351	70	VN	1066	415	409	34	DS-181	TD	NEOS TO SEOS	09/11/93	MH
546	155 / 256	09-11-93	1357	70	VN	1066	415	405	34	--	TD	NEOS TO SEOS	09/11/93	MH
547	98 / 259	09-14-93	0850	40	VN	1066	415	413	332	--	MH	SEOS TO 332' N	09/15/93	JMI
548	203 / 259	09-14-93	1030	50	VN	1066	415	412	330	DS-182	MH	SEOS TO NEOS	09/15/93	JMI
549	203 / 264	09-14-93	1140	50	VN	1066	415	412	320	DS-186	MH	SEOS TO NEOS	09/15/93	JMI
550	265 / 266	09-14-93	1340	55	VN	1066	415	413	46	--	MH	NEOS TO SEOS	09/15/93	JMI

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APPENDIX I-2
ASH POND 91 - PRIMARY
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET.	ACT.						
551	261 / 266	09-14-93	1415	55	VN	1066	415	415	55	--	MH	NEOS TO SEOS	09/15/93	JMI
552	266 / 267	09-14-93	1430	55	VN	1066	415	415	34	--	MH	WEOS TO EEOS	09/15/93	JMI
553	265 / 267	09-14-93	1445	55	VN	1066	415	413	195	DS-189	MH	WEOS TO SEOS	09/15/93	JMI
554	88 / 260	09-14-93	0900	40	BT	1054	415	412	83	--	MH	EAT TO WEOS	09/15/93	JMI
555	260 / 261	09-14-93	0915	40	BT	1054	415	413	37	--	MH	EEOS TO WEOS	09/15/93	JMI
556	259 / 260	09-14-93	0938	40	BT	1054	415	412	40	--	MH	NEOS TO SEOS	09/15/93	JMI
557	259 / 261	09-14-93	0945	40	BT	1054	415	413	565	DS-183/18	MH	SEOS TO NEOS	09/15/93	JMI
558	259 / 264	09-14-93	1100	50	BT	1054	415	413	34	--	MH	WEOS TO EEOS	09/15/93	JMI
559	252 / 264	09-14-93	1208	50	BT	1054	415	413	34	--	MH	WEOS TO EEOS	09/15/93	JMI
560	261 / 264	09-14-93	1145	50	BT	1054	415	412	80	--	MH	NEOS TO SEOS	09/15/93	JMI
561	261 / 265	09-14-93	1330	55	BT	1054	415	414	34	--	MH	WEOS TO EEOS	09/15/93	JMI
562	264 / 265	09-14-93	1400	55	BT	1054	415	413	245	--	MH	SEOS TO NEOS	09/15/93	JMI
563	253 / 265	09-14-93	1430	55	BT	1054	415	412	34	DS-188	MH	WEOS TO EEOS	09/15/93	JMI
564	254 / 267	09-14-93	1445	55	BT	1054	415	414	34	--	MH	WEOS TO EEOS	09/15/93	JMI
565	267 / 268	09-14-93	1505	55	BT	1054	415	412	195	--	MH	NEOS TO SEOS	09/15/93	JMI
566	266 / 268	09-14-93	1520	55	BT	1054	415	413	100	--	MH	NEOS TO SEOS	09/15/93	JMI
567	255 / 268	09-14-93	1540	55	BT	1054	415	413	34	--	MH	WEOS TO EEOS	09/15/93	JMI
568	260 / 262	09-14-93	1005	40	PP	1053	415	413	75	--	MH	EAT TO WEOS	09/15/93	JMI
569	261 / 263	09-14-93	1030	45	PP	1053	415	412	560	DS-184/18	MH	NEOS TO SEOS	09/15/93	JMI
570	261 / 262	09-14-93	1230	50	PP	1053	415	412	34	--	MH	NEOS TO SEOS	09/15/93	JMI
571	263 / 266	09-14-93	1400	55	PP	1053	415	413	34	--	MH	WEOS TO EEOS	09/15/93	JMI
572	263 / 268	09-14-93	1442	55	PP	1053	415	412	175	--	MH	NEOS TO SEOS	09/15/93	JMI
573	263 / 269	09-14-93	1525	55	PP	1053	415	412	362	DS-190	MH	NEOS TO EEOS	09/15/93	JMI
574	268 / 269	09-14-93	1600	55	PP	1053	415	413	34	--	MH	WEOS TO EEOS	09/15/93	JMI
575	88 / 259	09-14-93	1700	55	PP	1053	415	412	34	--	MH	EEOS TO WEOS	09/15/93	JMI

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APPENDIX I-2
ASH POND 91 - PRIMARY
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET.	ACT.						
576	87 / 259	09-14-93	1715	55	PP	1053	415	412	34	--	MH	EEOS TO WEOS	09/15/93	JMI
577	262 / 270	09-14-93	1742	55	PP	1053	415	413	108	--	MH	WEOS TO EEOS	09/15/93	JMI
578	270 / 271	09-15-93	0830	45	PP	1053	415	412	95	DS-191	MH	WEOS TO EEOS	09/15/93	JMI
579	269 / 271	09-15-93	0910	45	PP	1053	415	412	34	--	MH	WEOS TO EEOS	09/15/93	JMI
580	271 / 273	09-15-93	1100	45	PP	1053	415	413	80	--	MH	WEOS TO EEOS	09/15/93	JMI
581	273 / 274	09-15-93	1116	45	PP	1053	415	415	93	--	MH	WEOS TO EEOS	09/15/93	JMI
582	274 / 275	09-15-93	1140	45	PP	1053	415	412	95	--	MH	WEOS TO EEOS	09/15/93	JMI
583	269 / 276	09-15-93	1155	45	PP	1053	415	412	145	DS-193	MH	SEOS TO NEOS	09/15/93	JMI
584	275 / 276	09-15-93	1343	55	PP	1053	415	413	34	--	MH	SEOS TO NEOS	09/15/93	JMI
585	274 / 276	09-15-93	1350	55	PP	1053	415	412	34	--	MH	EEOS TO WEOS	09/15/93	JMI
586	272 / 276	09-15-93	1400	55	PP	1053	415	413	34	--	MH	WEOS TO EEOS	09/15/93	JMI
587	263 / 270	09-15-93	1410	55	PP	1053	415	412	34	--	MH	WEOS TO EEOS	09/15/93	JMI
588	273 / 276	09-15-93	1420	55	PP	1053	415	413	34	--	MH	WEOS TO EEOS	09/15/93	JMI
589	269 / 272	09-15-93	0830	45	VN	1066	415	412	185	--	MH	SEOS TO NEOS	09/15/93	JMI
590	268 / 272	09-15-93	0835	45	BT	1054	415	412	470	DS-192	MH	SEOS TO NEOS	09/15/93	JMI
591	258 / 272	09-15-93	0930	45	BT	1054	415	412	34	--	MH	WEOS TO EEOS	09/15/93	JMI
592	278 / 279	09-17-93	0815	30	SK	1195	425	410	28	--	MH	WEOS TO EEOS	09/17/93	JMI
593	277 / 279	09-17-93	0820	30	SK	1195	425	420	188	DS-194	MH	WEOS TO EEOS	09/17/93	JMI
594	282 / 283	09-17-93	0830	30	SK	1195	425	422	610	DS-198	MH	NEOS TO 610'S OF NEOS	09/18/93	JMI
595	285 / 286	09-17-93	1100	40	SK	1195	425	423	115	--	MH	WEOS TO EEOS	09/18/93	JMI
596	287 / 288	09-17-93	1120	40	SK	1195	425	422	115	--	MH	WEOS TO EEOS	09/18/93	JMI
597	283 / 292	09-17-93	1200	40	SK	1195	425	420	120	DS-202	MH	SEOS TO NEOS	09/18/93	JMI
598	289 / 292	09-17-93	1210	40	SK	1195	425	425	34	--	MH	WEOS TO EEOS	09/18/93	JMI
599	293 / 294	09-17-93	1345	50	SK	1195	415	415	85	--	MH	EEOS TO 35'W OF EEOS	09/18/93	JMI
600	293 / 294	09-17-93	1420	50	SK	1195	415	410	35	--	MH	35'W OF EEOS TO WEOS	09/18/93	JMI

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APPENDIX I-2
ASH POND 91 – PRIMARY
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET.	ACT.						
601	279 / 280	09-17-93	0815	30	BT	1054	415	412	212	DS-195	MH	WEOS TO EEOS	09/18/93	JMI
602	272 / 282	09-17-93	0930	30	BT	1054	415	410	565	DS-196	MH	SEOS TO NEOS	09/18/93	JMI
603	286 / 287	09-17-93	1100	40	BT	1054	415	410	115	--	MH	WEOS TO EEOS	09/18/93	JMI
604	288 / 290	09-17-93	1130	40	BT	1054	415	413	115	DS-200	MH	WEOS TO EEOS	09/18/93	JMI
605	285 / 292	09-17-93	1150	40	BT	1054	415	412	10	--	MH	SEOS TO NEOS	09/18/93	JMI
606	286 / 292	09-17-93	1200	40	BT	1054	415	413	34	--	MH	NEOS TO SEOS	09/18/93	JMI
607	287 / 292	09-17-93	1205	40	BT	1054	415	410	34	--	MH	NEOS TO SEOS	09/18/93	JMI
608	288 / 292	09-17-93	1210	40	BT	1054	415	412	34	--	MH	NEOS TO SEOS	09/18/93	JMI
609	290 / 292	09-17-93	1215	40	BT	1054	415	414	6	--	MH	NEOS TO SEOS	09/18/93	JMI
610	294 / 295	09-17-93	1400	50	BT	1054	415	410	120	--	MH	WEOS TO EEOS	09/18/93	JMI
611	296 / 297	09-17-93	1425	50	BT	1054	415	410	120	--	MH	WEOS TO EEOS	09/18/93	JMI
612	299 / 300	09-17-93	1510	50	BT	1054	415	412	120	DS-203	MH	WEOS TO EEOS	09/18/93	JMI
613	283 / 303	09-17-93	1620	50	BT	1054	415	410	400	DS-206	MH	NEOS TO SEOS	09/18/93	JMI
614	276 / 305	09-17-93	1715	50	BT	1054	415	410	65	--	MH	SEOS TO NEOS	09/18/93	JMI
615	272 / 305	09-17-93	1735	50	BT	1054	415	412	17	--	MH	EEOS TO NEOS	09/18/93	JMI
616	282 / 305	09-17-93	1745	50	BT	1054	415	410	34	--	MH	WEOS TO EEOS	09/18/93	JMI
617	282 / 283	09-17-93	1810	50	BT	1054	415	414	30	--	MH	610'S OF NEOS TO SEOS	09/18/93	JMI
618	283 / 305	09-17-93	1815	50	BT	1054	415	410	35	--	MH	NEOS TO SEOS	09/18/93	JMI
619	283 / 306	09-17-93	1825	50	BT	1054	415	412	34	--	MH	EEOS TO WEOS	09/18/93	JMI
620	305 / 306	09-17-93	1835	50	BT	1054	415	410	25	--	MH	SEOS TO NEOS	09/18/93	JMI
621	304 / 305	09-17-93	1850	50	BT	1054	415	414	34	--	MH	EEOS TO WEOS	09/18/93	JMI
622	302 / 310	09-17-93	1920	50	BT	1054	415	412	120	--	MH	WEOS TO EEOS	09/18/93	JMI
623	310 / 311	09-17-93	1940	50	BT	1054	415	410	50	--	MH	EEOS TO WEOS	09/18/93	JMI
624	280 / 281	09-17-93	0845	30	VN	1066	415	412	183	--	MH	WEOS TO EEOS	09/17/93	JMI
625	280 / 282	09-17-93	0930	30	VN	1066	415	412	34	--	MH	WEOS TO EEOS	09/17/93	JMI

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APPENDIX I-2
ASH POND 91 - PRIMARY
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET.	ACT.						
626	281 / 282	09-17-93	0940	30	VN	1066	415	410	34	DS-197	MH	NEOS TO SEOS	09/17/93	JMI
627	281 / 283	09-17-93	0955	30	VN	1066	415	410	34	--	MH	EEOS TO WEOS	09/17/93	JMI
628	281 / 284	09-17-93	1015	35	VN	1066	415	412	115	--	MH	EEOS TO WEOS	09/17/93	JMI
629	284 / 285	09-17-93	1040	35	VN	1066	415	412	115	--	MH	WEOS TO EEOS	09/17/93	JMI
630	283 / 289	09-17-93	1100	35	VN	1066	415	410	60	--	MH	SEOS TO WEOS	09/18/93	JMI
631	281 / 289	09-17-93	1110	40	VN	1066	415	414	34	--	MH	WEOS TO EEOS	09/17/93	JMI
632	284 / 289	09-17-93	1120	40	VN	1066	415	412	34	--	MH	NEOS TO SEOS	09/17/93	JMI
633	285 / 289	09-17-93	1130	40	VN	1066	415	410	24	--	MH	NEOS TO SEOS	09/18/93	JMI
634	290 / 291	09-17-93	1140	40	VN	1066	415	412	115	DS-201	MH	WEOS TO EEOS	09/18/93	JMI
635	291 / 293	09-17-93	1330	50	VN	1066	415	412	120	--	MH	EEOS TO WE OF EOS	09/18/93	JMI
636	295 / 296	09-17-93	1410	50	VN	1066	415	410	120	--	MH	WEOS TO EEOS	09/18/93	JMI
637	298 / 299	09-17-93	1455	50	VN	1066	415	413	120	--	MH	WEOS TO EEOS	09/18/93	JMI
638	301 / 302	09-17-93	1546	50	VN	1066	415	412	120	DS-204	MH	WEOS TO EEOS	09/18/93	JMI
639	275 / 304	09-17-93	1730	50	VN	1066	415	410	120	--	MH	WEOS TO EEOS	09/18/93	JMI
640	306 / 307	09-17-93	1815	50	VN	1066	415	410	100	--	MH	WEOS TO EEOS	09/18/93	JMI
641	308 / 309	09-17-93	1840	50	VN	1066	415	412	110	--	MH	WEOS TO EEOS	09/18/93	JMI
642	303 / 310	09-17-93	1930	50	VN	1066	415	410	34	--	MH	WEOS TO EEOS	09/18/93	JMI
643	283 / 310	09-17-93	1945	50	VN	1066	415	413	10	--	MH	NEOS TO SEOS	09/18/93	JMI
644	308 / 310	09-17-93	1955	50	VN	1066	415	413	15	--	MH	NEOS TO SEOS	09/18/93	JMI
645	258 / 280	09-17-93	0905	30	PP	1053	415	412	15	--	MH	NEOS TO SEOS	09/17/93	JMI
646	257 / 280	09-17-93	0915	30	PP	1053	415	410	15	--	MH	SEOS TO NEOS	09/17/93	JMI
647	257 / 279	09-17-93	0925	30	PP	1053	415	410	34	--	MH	SEOS TO NEOS	09/17/93	JMI
648	278 / 278e	09-17-93	0935	30	PP	1053	415	410	34	--	MH	SEOS TO NEOS	09/17/93	JMI
649	257 / 278e	09-17-93	0940	30	PP	1053	415	412	34	--	MH	SEOS TO NEOS	09/17/93	JMI
650	277 / 278	09-17-93	0955	30	PP	1053	415	412	34	--	MH	NEOS TO SEOS	09/17/93	JMI

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APPENDIX I-2
ASH POND 91 - PRIMARY
FUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDING APPARATUS				LENGTH (FT)	DEST. NUMBER	QA MONITOR	SEAM SECTION	PRESSURE TEST	
					WELDER I.D.		MACH. TEMP (°F)						TEST DATE	MON.
					TECH.	MACH.	SET.	ACT.						
651	160 / 278	09-17-93	1010	35	PP	1053	415	410	15	--	MH	WEOS TO EEOS	09/17/93	JMI
652	160 / 277	09-17-93	1020	35	PP	1053	415	413	188	DS-199	MH	WEOS TO EEOS	09/18/93	JMI
653	297 / 298	09-17-93	1450	50	SK	1053	415	410	120	--	MH	WEOS TO EEOS	09/18/93	JMI
654	300 / 301	09-17-93	1525	50	SK	1053	415	412	120	--	MH	WEOS TO EEOS	09/18/93	JMI
655	292 / 303	09-17-93	1630	50	SK	1053	415	412	34	--	MH	WEOS TO EEOS	09/18/93	JMI
656	290 / 303	09-17-93	1635	50	SK	1053	415	410	34	--	MH	NEOS TO SEOS	09/18/93	JMI
657	291 / 303	09-17-93	1640	50	SK	1053	415	410	34	DS-205	MH	NEOS TO SEOS	09/18/93	JMI
658	293 / 303	09-17-93	1645	50	SK	1053	415	412	34	--	MH	NEOS TO SEOS	09/18/93	JMI
659	294 / 303	09-17-93	1650	50	SK	1053	415	410	34	--	MH	NEOS TO SEOS	09/18/93	JMI
660	295 / 303	09-17-93	1655	50	SK	1053	415	410	34	--	MH	NEOS TO SEOS	09/18/93	JMI
661	296 / 303	09-17-93	1700	50	SK	1053	415	412	34	--	MH	NEOS TO SEOS	09/18/93	JMI
662	297 / 303	09-17-93	1645	50	SK	1053	415	412	34	--	MH	NEOS TO SEOS	09/18/93	JMI
663	298 / 303	09-17-93	1647	50	SK	1053	415	412	34	--	MH	NEOS TO SEOS	09/18/93	JMI
664	299 / 303	09-17-93	1650	50	SK	1053	415	410	34	--	MH	NEOS TO SEOS	09/18/93	JMI
665	300 / 303	09-17-93	1653	50	SK	1053	415	412	34	--	MH	NEOS TO SEOS	09/18/93	JMI
666	301 / 303	09-17-93	1655	50	SK	1053	415	413	34	--	MH	NEOS TO SEOS	09/18/93	JMI
667	302 / 303	09-17-93	1700	50	SK	1053	415	410	20	--	MH	NEOS TO SEOS	09/18/93	JMI
668	304 / 306	09-17-93	1744	50	SK	1053	415	412	108	--	MH	NEOS TO SEOS	09/18/93	JMI
669	307 / 308	09-17-93	1815	50	SK	1053	415	413	115	DS-207	MH	WEOS TO EEOS	09/18/93	JMI
670	283 / 308	09-17-93	1900	50	SK	1053	415	410	43	--	MH	NEOS TO SEOS	09/18/93	JMI
671	283 / 307	09-17-93	1910	50	SK	1053	415	410	34	--	MH	NEOS TO SEOS	09/18/93	JMI
672	283 / 310	09-17-93	1930	50	SK	1053	415	410	31	--	MH	NEOS TO SEOS	09/18/93	JMI
673	309 / 310	09-17-93	1940	50	SK	1053	415	410	50	--	MH	EEOS TO WEOS	09/18/93	JMI
674	309 / 311	09-17-93	1955	50	SK	1053	415	410	50	--	MH	EEOS TO WEOS	09/18/93	JMI

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APPENDIX J

EXTRUSION WELDING SUMMARIES

APPENDIX J-1

EXTRUSION WELDING SUMMARY - DRAINS POND

November 1993

937-4207

Golder Construction Services, Inc.

There is no extrusion welding summary for the Drains Pond
because all extrusion welded seams were associated with repairs (Appendix K-1).

APPENDIX J-2

EXTRUSION WELDING SUMMARY - ASH POND 91

November 1993

937-4207

Golder Construction Services, Inc.

APPENDIX J-2
ASH POND 91
EXTRUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDER I.D.		MACHINE TEMPERATURES				LENGTH (FT)	QA MONITOR	NON -DEST.	
							DIGITAL SET		INDICATOR				TEST	
					TECH.	MACH.	BARREL	NOZZLE	BARREL	NOZZLE			DATE	MON.
1	18 / 137	08-24-93	1700	85	BT	50	210	220	210	220	32	JMI	08/27/93	MH
2	149 / 151	08-25-93	1200	65	SO	52	220	230	220	230	20	TD	OCA	--
3	150 / 151	08-25-93	1315	70	VN	52	220	230	220	230	20	TD	OCA	--
4	134 /134A	08-24-93	1430	85	SO	52	220	230	220	230	11	TD	08/31/93	SGH
5	134A / 136	08-24-93	1435	85	SO	52	220	230	220	230	11	TD	08/31/93	SGH
6	52 / 180	09-01-93	1045	65	SO	52	220	230	220	230	34	MH	09/08/93	TD
7	53 / 181	09-01-93	1125	65	SO	52	220	230	220	230	34	MH	09/08/93	TD
8	54 / 182	09-01-93	1340	70	SO	52	220	230	220	230	34	MH	09/08/93	TD
9	55 / 183	09-01-93	1400	70	SO	52	220	230	220	230	34	MH	09/08/93	TD
10	56 / 183	09-01-93	1415	70	SO	52	220	230	220	230	16	MH	09/08/93	TD
11	56 / 184	09-01-93	1430	70	SO	52	220	230	220	230	34	MH	09/08/93	TD
12	60 / 185	09-01-93	1530	70	SO	52	220	230	220	230	34	MH	09/08/93	TD
13	61 / 186	09-01-93	1715	65	JS	52	220	230	220	230	34	MH	09/08/93	TD
14	62 / 187	09-01-93	1730	65	SO	52	220	230	220	230	34	MH	09/08/93	TD
15	63 / 188	09-03-93	1745	65	JS	52	220	230	220	230	34	MH	09/08/93	TD
16	64 / 189	09-03-93	1345	70	KS	52	215	225	215	225	34	JMI	09/09/93	TD
17	65 / 190	09-03-93	1420	70	KS	52	215	225	215	225	34	JMI	09/09/93	TD
18	66 / 191	09-03-93	1450	70	KS	52	215	225	215	225	34	JMI	09/09/93	TD
19	67 / 192	09-03-93	1510	70	KS	52	215	225	215	225	34	JMI	09/09/93	TD
20	68 / 192	09-03-93	1530	70	KS	52	215	225	215	225	8	JMI	09/09/93	TD
21	68 / 193	09-03-93	1600	70	KS	52	215	225	215	225	34	JMI	09/09/93	TD
22	70 / 195	09-03-93	1700	70	KS	52	215	225	215	225	34	JMI	09/09/93	TD
23	71 / 196	09-03-93	1710	70	KS	52	215	225	215	225	16	JMI	09/09/93	TD
24	69 / 194	09-03-93	1630	70	BT	10	215	235	215	235	34	JMI	09/09/93	TD
25	70 / 194	09-03-93	1700	70	BT	10	215	235	215	235	16	JMI	09/09/93	TD

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APPENDIX J-2
ASH POND 91
EXTRUSION WELDING SUMMARY

RECORD NUMBER	SEAM NUMBER	DATE	START TIME	AMB. TEMP. (°F)	WELDER I.D.		MACHINE TEMPERATURES				LENGTH (FT)	QA MONITOR	NON-DEST.	
							DIGITAL SET		INDICATOR				TEST	
					TECH.	MACH.	BARREL	NOZZLE	BARREL	NOZZLE			DATE	MON.
26	71 / 196	09-03-93	1709	70	JS	50	215	225	215	225	16	JMI	09/09/93	TD
27	80 / 197	09-04-93	1040	50	SO	52	235	235	235	235	34	JMI	09/09/93	TD
28	82 / 198	09-04-93	1110	50	SO	52	235	235	235	235	34	JMI	09/09/93	TD
29	89 / 199	09-04-93	1130	50	SO	52	235	235	235	235	34	JMI	09/09/93	TD
30	94 / 200	09-04-93	1200	50	SO	52	235	235	235	235	34	JMI	09/09/93	TD
31	93 / 200	09-04-93	1330	50	SK	52	220	235	220	235	5	JMI	09/09/93	TD
32	93 / 201	09-04-93	1340	50	SK	52	220	235	220	235	34	JMI	09/09/93	TD
33	97 / 202	09-04-93	1400	50	SK	52	220	235	220	235	34	JMI	09/09/93	TD
34	98 / 203	09-04-93	1420	50	SK	52	220	235	220	235	34	JMI	09/09/93	TD
35	176 / 206	09-06-93	1630	55	JS	50	220	230	220	230	15	MH	09/08/93	TD
36	178 / 211	09-06-93	1640	55	JS	50	220	230	220	230	15	MH	09/08/93	TD
37	224 / 225	09-07-93	1525	60	JS	50	220	230	220	230	5	MH	09/08/93	TD
38	189 / 226	09-07-93	1535	60	JS	50	220	230	220	230	15	MH	09/09/93	TD
39	193 / 238	09-10-93	0845	50	SK	50	220	230	220	230	15	MH	09/09/93	TD

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APPENDIX K

GEOMEMBRANE REPAIR SUMMARIES

APPENDIX K-1

GEOMEMBRANE REPAIR SUMMARY - DRAINS POND

November 1993

937-4207

Golder Construction Services, Inc.

APPENDIX K-1
DRAINS POND
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	APPROX. SIZE	WELDER I.D. TECH.	WELDER I.D. MACH.	QA MON.	DATE	QA MON.
1 A	3 / 4	@ AT	D	07/20/93	P	1X1	CW	10	CPB	OCA	--
1 B	2 / 3	INT W/4	T	07/20/93	P	2X4	BT	10	TD	08/07/93	TD
1 C	2	4'S OF 5,2'W	D	07/20/93	P	1X1	CW	10	TD	08/07/93	TD
1 D	1 / 2	INT W/5	T	07/20/93	P	2X2	CW	10	TD	08/07/93	TD
1 E	5 / 6	45'E OF WAT	BO	07/20/93	P	2X2	BT	10	TD	08/07/93	TD
1 F	7 / 8	15'E OF TOE	DS-1	07/20/93	P	1X1	CW	10	TD	08/07/93	TD
1 G	10 / 11	27'E OF TOE	DS-2	08/04/93	P	2X5	SO	52	CPB	08/07/93	TD
1 H	7	68'E OF AT,20'S	D	08/04/93	B	6"	SO	52	CPB	08/07/93	TD
1 I	14 / 15	18'E OF AT	FM	07/20/93	RS	25'	CW	10	TD	08/07/93	TD
1 J	15 / 16	52'E OF AT	BO	07/20/93	P	2X2	BT	10	TD	08/07/93	TD
1 K	15 / 16	30'E OF TOE	DS-3	08/04/93	P	3X6	SO	52	JMI	08/07/93	TD
1 M	17 / 18	38'E OF AT	BO	07/20/93	P	1X1	BT	10	TD	08/07/93	TD
1 N	17 / 18	60'E OF AT	BO	07/20/93	P	2X2	CW	10	TD	08/07/93	TD
1 P	19	10'N OF 18,12'W	D	08/07/93	GW	7"	BT	10	JMI	08/07/93	TD
1 Q	18 / 19	INT W/20/21	INT	07/20/93	P	3X5	CW	10	TD	08/07/93	TD
1 R	20 / 21	5'W OF 18/19	D	07/20/93	P	1X1	CW	10	TD	08/07/93	TD
1 S	20 / 21	@ AT	WS	07/20/93	P	2X2	CW	10	TD	OCA	--
1 T	18 / 20	@ AT	WS	07/20/93	P	2X2	CW	10	TD	OCA	--
1 W	22 / 23	225'N OF SAT	WS	08/04/93	P	2X4	SO	52	TD	08/07/93	TD
1 X	22 / 23	240'N OF SAT	DS-4	08/04/93	P	2X4	KK	50	CPB	08/07/93	TD
2 A	5 / 6	2'E OF WAT TO AT	WS	07/20/93	P	1X1	CW	10	TD	OCA	--
2 B	1 / 5	95'E OF WAT	PT	08/04/93	P	2X5	KK	50	JMI	08/07/93	TD
2 C	16 / 17	@ WAT	PT	07/20/93	P	2X2	CW	10	TD	OCA	--
2 D	17 / 18	@ WAT	PT	07/20/93	P	2X2	CW	10	TD	OCA	--
2 E	23	20'N OF SAT,15'E	D	08/07/93	P	1X1	VN	50	CPB	08/07/93	TD

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APPENDIX K-1
DRAINS POND
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	APPROX. SIZE	WELDER I.D. TECH.	WELDER I.D. MACH.	QA MON.	DATE	QA MON.
2 F	23	25'N OF SAT,15'E	D	08/07/93	GW	12"	VN	50	CPB	08/07/93	TD
2 G	23 / 25	155'N OF SAT	BO	08/04/93	P	2X5	SO	52	JMI	08/07/93	TD
2 H	26	55'N OF SAT,20'E	D	08/05/93	P	1X1	CW	10	JMI	08/07/93	TD
2 I	28	10'N OF SAT,20'E	D	08/04/93	P	1X1	KK	50	JMI	08/07/93	TD
2 J	28	2'N OF SAT,20'E	D	08/04/93	P	2X2	KK	50	CPB	OCA	--
2 K	28 / 29	240'N OF SAT	PT	08/04/93	P	3X3	SO	52	JMI	08/07/93	TD
2 M	31	20'N OF SAT,10'E	D	08/07/93	P	1X1	VN	50	CPB	08/07/93	TD
2 N	31 / 32	60'N OF SAT	PT	08/05/93	2-P	1X1/4X4	SO	50	CPB	08/07/93	TD
2 P	32 / 33	20'N OF SAT	PT	08/05/93	P	1X1	SO	50	CPB	08/07/93	TD
2 Q	32 / 33	60'N OF SAT	PT	08/05/93	2-P	1X2/1X1	SO	50	CPB	08/07/93	TD
2 R	--	<<< VOID >>>	--	--	--	--	--	--	--	--	--
2 S	42 / 44	10'W OF EAT	BO	08/07/93	GW	6"	VN	50	CPB	OCA	--
2 T	--	<<< VOID >>>	--	--	--	--	--	--	--	--	--
2 W	33 / 40	10'S OF 33/40/41	BO	08/05/93	GW	12"	KK	52	CPB	08/07/93	TD
3 A	14 / 22	12'N OF 13/14	BO	08/04/93	P	2X3	SO	52	JMI	08/07/93	TD
3 B	14 / 22	FROM 13/14 TO 12'N	FS	08/04/93	RS	12'	SO	52	JMI	08/07/93	TD
3 C	13 / 14	INT W/22	T	08/04/93	P	2X2	SO	52	JMI	08/07/93	TD
3 D	12 / 14	INT W/22	T	08/04/93	P	1X2	SO	52	JMI	08/07/93	TD
3 E	12 / 22	FROM 12/13 TO 10'S	FS	08/04/93	RS	10'	SO	52	JMI	08/07/93	TD
3 F	12 / 22	10'S OF 12/13	BO	08/04/93	P	1X1	SO	52	JMI	08/07/93	TD
3 G	1 / 22	FROM SAT TO 5'N	WS	08/04/93	P	2X4	KK	50	JMI	OCA	--
3 H	14 / 15	INT W/22	T	08/04/93	P	2X4	SO	52	JMI	08/07/93	TD
3 I	15 / 16	INT W/22	T	08/04/93	P	2X3	SO	52	JMI	08/07/93	TD
3 J	11 / 12	INT W/22	T	08/04/93	P	2X2	SO	52	JMI	08/07/93	TD
3 K	10 / 11	INT W/22	T	08/04/93	P	2X2	SO	52	JMI	08/07/93	TD

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REPAIR SUMMARY

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				DATE	TYPE	APPROX. SIZE	WELDER I.D. TECH.	WELDER I.D. MACH.	QA MON.	DATE	QA MON.
3 M	9 / 10	INT W/22	T	08/04/93	P	3X4	SO	52	JMI	08/07/93	TD
3 N	25 / 26	FROM 55' TO 64'N OF SAT	FS	08/04/93	RS	9'	KK	50	JMI	08/07/93	TD
3 P	6 / 7	INT W/22	T	08/04/93	P	2X2	SO	52	JMI	08/07/93	TD
3 Q	5 / 6	INT W/22	T	08/04/93	P	2X2	SO	52	JMI	08/07/93	TD
3 R	28 / 29	FROM 175' TO 195' N OF SAT	FS	08/05/93	RS	18'	CW	10	JMI	08/07/93	TD
3 S	26 / 27	120'N OF SAT	P	08/04/93	P	3X3	SO	52	JMI	08/07/93	TD
3 T	28 / 29	65'N OF SAT	P	08/04/93	P	2X3	KK	50	JMI	08/07/93	TD
3 W	28 / 29	114'N OF SAT	P	08/04/93	P	1X1	KK	50	JMI	08/07/93	TD
3 X	16 / 22	ENTIRE SEAM	FS	08/04/93	RS	34'	VN	10	CPB	08/07/93	TD
4 A	1 / 22	52'N OF SAT	D	08/04/93	P	2X3	KK	50	JMI	08/07/93	TD
4 B	7 / 22	INT W/24	T	08/04/93	P	2X3	SO	52	JMI	08/07/93	TD
4 C	7 / 8	INT W/24	T	08/04/93	P	2X2	SO	52	JMI	08/07/93	TD
4 D	8 / 9	INT W/24	T	08/04/93	P	2X2	SO	52	JMI	08/07/93	TD
4 E	9 / 22	INT W/24	T	08/04/93	P	2X3	SO	52	JMI	08/07/93	TD
4 F	23 / 25	@ SAT	FTS	08/04/93	P	2X5	KK	50	JMI	08/07/93	TD
4 G	23 / 25	205'N OF SAT	DS-5	08/05/93	P	3X5	CW	10	JMI	08/07/93	TD
4 H	25 / 26	50'S OF NEOS	DS-6	08/05/93	P	3X5	CW	10	JMI	08/07/93	TD
4 I	25 / 26	275'N OF SAT	WS	08/04/93	P	2X6	SO	52	TD	08/07/93	TD
4 J	26 / 27	425'N OF SAT	BO	08/05/93	P	2X3	CW	10	JMI	08/07/93	TD
4 K	26 / 27	310'N OF SAT	DS-7	08/04/93	P	3X7	SO	52	TD	08/07/93	TD
4 M	26 / 27	197'N OF SAT	BO	08/04/93	P	2X3	SO	52	JMI	08/07/93	TD
4 N	26 / 27	156'N OF SAT	BO	08/04/93	P	2X2	SO	52	JMI	08/07/93	TD
4 P	26 / 27	260'N OF SAT	BO	08/04/93	P	2X2	SO	52	TD	08/07/93	CPB
4 Q	26 / 27	125'N OF SAT	DS-8	08/05/93	P	3X5	CW	10	JMI	08/07/93	TD
4 R	26 / 27	110'N OF SAT	IO	08/05/93	P	2X5	SO	50	CPB	08/07/93	TD

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				DATE	TYPE	APPROX. SIZE	WELDER I.D. TECH.	WELDER I.D. MACH.	QA MON.	DATE	QA MON.
4 S	27 / 28	130'N OF SAT	BO	08/04/93	P	1X1	SO	52	JMI	08/07/93	TD
4 T	27 / 28	260'N OF SAT	WS	08/04/93	P	2X2	SO	52	CPB	08/07/93	CPB
4 W	27 / 28	3'N OF SAT	DS-9	08/05/93	P	3X5	CW	10	JMI	OCA	--
4 X	28 / 29	290'N OF SAT	DS-10	08/05/93	P	3X5	CW	10	JMI	08/07/93	TD
5 A	15 / 22	ENTIRE SEAM	FS	08/04/93	RS	34'	VN	10	CPB	08/07/93	TD
5 B	14 / 22	ENTIRE SEAM	FS	08/04/93	RS	34'	VN	10	CPB	08/07/93	TD
5 C	6 / 22	ENTIRE SEAM	FS	08/04/93	RS	34'	KK	50	CPB	08/07/93	TD
5 D	5 / 22	ENTIRE SEAM	FS	08/04/93	RS	34'	KK	50	CPB	08/07/93	TD
5 E	28 / 29	170'N OF SAT	BO	08/04/93	P	3X4	SO	52	CPB	08/07/93	TD
5 F	28 / 29	194'N OF SAT	BO	08/04/93	P	1X1	SO	52	CPB	08/07/93	TD
5 G	13 / 22	ENTIRE SEAM	FS	08/04/93	RS	34'	VN	10	CPB	08/07/93	TD
5 H	12 / 22	FROM SEOS TO 25'N	FS	08/04/93	RS	34'	VN	10	CPB	08/07/93	TD
5 I	11 / 22	ENTIRE SEAM	FS	08/04/93	RS	34'	VN	10	CPB	08/07/93	TD
5 J	10 / 22	ENTIRE SEAM	FS	08/04/93	RS	34'	VN	10	CPB	08/07/93	TD
5 K	9 / 22	ENTIRE SEAM	FS	08/04/93	RS	34'	VN	10	CPB	08/07/93	TD
5 M	--	<<< VOID >>>	--	--	--	--	--	--	--	--	--
5 N	7 / 22	ENTIRE SEAM	FS	08/04/93	RS	34'	KK	50	CPB	08/07/93	TD
5 P	1 / 22	ENTIRE SEAM	FS	08/04/93	RS	60'	KK	50	CPB	08/07/93	TD
5 Q	9 / 24	FROM WEOS TO 10'E	FS	08/04/93	RS	10'	KK	50	CPB	08/07/93	TD
5 R	8 / 24	ENTIRE SEAM	FS	08/04/93	RS	34'	KK	50	CPB	08/07/93	TD
5 S	7 / 24	ENTIRE SEAM	FS	08/04/93	RS	15'	KK	50	CPB	08/07/93	TD
5 T	29 / 30	275'N OF SAT	WS	08/05/93	P	1X2	SO	50	CPB	08/07/93	TD
5 W	30 / 31	270'N OF SAT	WS	08/05/93	P	2X2	SO	50	CPB	08/07/93	TD
5 X	31 / 32	270'N OF SAT	WS	08/05/93	P	3X4	SO	50	CPB	08/07/93	TD
6 A	26 / 27	@ CREST OF S SLOPE	DS-8A	08/05/93	P	2X10	SO	50	CPB	08/07/93	TD

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REPAIR SUMMARY

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				DATE	TYPE	APPROX. SIZE	WELDER I.D. TECH.	WELDER I.D. MACH.	QA MON.	DATE	QA MON.
6 B	32 / 35	250'N OF SAT	WS	08/05/93	P	2X3	KK	52	CPB	08/07/93	TD
6 C	30 / 31	200'N OF SAT	DS-11	08/05/93	P	2X5	SO	50	CPB	08/07/93	TD
6 D	31 / 32	100'N OF SAT	DS-12	08/06/93	P	2X4	KK	50	CPB	08/07/93	TD
6 E	31 / 32	10'S OF NEOS	DS-13	08/06/93	P	2X5	KK	50	CPB	08/06/93	CPB
6 F	35 / 36	INT W/38	T	08/05/93	P	2X2	KK	52	CPB	08/07/93	TD
6 G	33 / 34	52'N OF SAT	FM	08/05/93	P	3X4	SO	50	CPB	08/07/93	TD
6 H	39 / 40	5'W OF EAT	DS-14	08/07/93	P	2X5	VN	50	CPB	OCA	--
6 I	39 / 40	45'W OF EAT	BO	08/05/93	P	2X2	SO	50	CPB	08/07/93	TD
6 J	33 / 35	INT W/39	T	08/05/93	P	2X2	KK	52	CPB	08/07/93	TD
6 K	33 / 39	INT W/40	T	08/05/93	P	2X2	SO	50	CPB	08/07/93	TD
6 M	33 / 40	INT W/41	T	08/05/93	P	3X5	KK	52	CPB	08/07/93	TD
6 N	40 / 41	@ TOE	FM	08/07/93	P	2X2	VN	50	CPB	08/07/93	TD
6 P	33 / 41	INT W/43	T	08/05/93	P	2X4	KK	52	CPB	08/07/93	TD
6 Q	41 / 42	INT W/43	T	08/05/93	P	2X3	KK	52	CPB	08/07/93	TD
6 R	41 / 42	30'W OF EAT	DS-15	08/07/93	P	2X4	VN	50	CPB	08/07/93	TD
6 S	42 / 43	INT W/44	T	08/05/93	P	3X4	KK	52	CPB	08/07/93	TD
6 T	33 / 43	INT W/44	T	08/05/93	P	3X5	KK	52	CPB	08/07/93	TD
6 W	33 / 45	10'S OF 46	DS-16	08/07/93	P	2X4	VN	50	CPB	08/07/93	TD
6 X	33 / 44	INT W/45	T	08/05/93	P	2X3	KK	52	CPB	08/07/93	TD
7 A	33 / 45	INT W/46	T	08/05/93	P	2X2	KK	52	CPB	08/07/93	TD
7 B	45 / 46	15'E OF 33	FM	08/05/93	P	2X3	KK	52	CPB	08/07/93	TD
7 C	33 / 46	INT W/47	T	08/06/93	P	2X3	KK	50	CPB	08/07/93	TD
7 D	40	12'N OF 39,1'E	EE	08/07/93	P	2X4	VN	50	CPB	08/07/93	TD
7 E	39	3'S OF 40,2'E	EE	08/07/93	P	2X2	VN	50	CPB	08/07/93	TD
7 F	33	295'N OF SAT,10'E	EE	08/05/93	P	1X2	KK	52	CPB	08/07/93	TD

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DRAINS POND
REPAIR SUMMARY

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				DATE	TYPE	APPROX. SIZE	WELDER I.D. TECH.	WELDER I.D. MACH.	QA MON.	DATE	QA MON.
7 G	47 / 48	FROM EAT TO TOE	FS	08/07/93	RS	50'	VN	50	CPB	08/07/93	TD
7 H	26 / 27	FROM 197' TO 145'N OF SAT	FS	08/07/93	RS	52'	VN	50	CPB	08/07/93	TD
7 I	26 / 27	FROM 125' TO 145'N OF SAT	FS	08/06/93	RS	20'	PP	52	CPB	08/07/93	TD
7 J	24 / 25	INT W/65	T	08/06/93	P	1X1	PP	52	TD	08/07/93	TD
7 K	64 / 65	INT W/25	T	08/06/93	P	3X3	PP	52	TD	08/07/93	TD
7 M	63 / 64	INT W/26	T	08/06/93	P	3X3	PP	52	TD	08/07/93	TD
7 N	66 / 67	@ CERST OF SLOPE	BO	08/07/93	RS/P	1X2/5'	BT	10	JMI	OCA	--
7 P	19 / 67	6'N OF 17	BO	08/06/93	P	1X1	PP	52	CPB	08/07/93	TD
7 Q	22 / 67	ENT.SEAM,INT W/17/18	T/SEAM	08/06/93	P/RS	2X3/6'	PP	52	CPB	08/07/93	TD
7 R	59 / 60	85'S OF NAT	DS-22	08/07/93	P	2X7	BT	10	TD	08/07/93	TD
7 S	19 / 68	@ NAT	PT	08/07/93	P	2X2	BT	10	TD	OCA	--
7 T	26 / 27	194'N OF SAT	DS-8B2	08/07/93	P	2X5	VN	50	CPB	08/07/93	TD
8 A	25 / 26	@ SAT	WS	08/05/93	P	1X1	CW	10	JMI	OCA	--
8 B	28 / 29	FROM SAT TO 170'N	FS	08/05/93	RS/P	150'/2X5	CW	10	JMI	08/07/93	TD
8 C	30 / 31	58'N OF SAT	WR	08/05/93	P	3X3	SO	10	JMI	08/07/93	TD
8 D	30 / 31	160'N OF SAT	BO	08/05/93	P	1X1	SO	50	CPB	08/07/93	TD
8 E	31 / 32	30'N OF SAT	BOOT	08/07/93	BOOT	6X10	VN	50	CPB	08/07/93	TD
8 F	30 / 31	243'N OF SAT	IO	08/05/93	P	1X2	SO	50	CPB	08/07/93	TD
8 G	30 / 31	410'N OF SAT	BO	08/05/93	GW	6"	SO	50	CPB	08/07/93	TD
8 H	31 / 32	385'N OF SAT	BO	08/05/93	P	2X3	SO	50	CPB	08/07/93	TD
8 I	31 / 32	135'N OF SAT	BO	08/05/93	P	1X1	SO	50	CPB	08/07/93	TD
8 J	34 / 36	INT W/37	T	08/05/93	P	1X2	KK	52	CPB	08/07/93	TD
8 K	34 / 35	INT W/36	T	08/05/93	P	5X5	SO	50	CPB	08/07/93	TD
8 M	35 / 36	46'NW OF SEAT	WS	08/05/93	P	2X2	SO	50	CPB	08/07/93	TD
8 N	33 / 34	INT W/35	T	08/05/93	P	3X5	KK	52	CPB	08/07/93	TD

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				DATE	TYPE	APPROX. SIZE	WELDER I.D. TECH	WELDER I.D. MACH.	QA MON.	DATE	QA MON.
8 P	44	7'S OF 44/45,1'E OF 33/44	D	08/05/93	P	2X3	KK	52	CPB	08/07/93	TD
8 Q	33 / 44	FROM 44/45 TO 8'S	IO	08/05/93	RS	6'	KK	52	CPB	08/07/93	TD
8 R	33 / 47	FROM 30' TO 34'N OF 46/47	IO	08/06/93	2-P	1X3/1X2	KK	50	CPB	08/06/93	CPB
8 S	47 / 48	68'W OF EAT	BO	08/06/93	P	1X1	KK	50	CPB	08/06/93	CPB
8 T	--	<<< VOID >>>	--	--	--	--	--	--	--	--	--
8 W	48 / 49	INT W/33	T	08/06/93	P	2X2	KK	50	CPB	08/06/93	CPB
8 X	49 / 50	FROM 16'W TO EAT	IO	08/07/93	P/RS	2X2/16'	VN	50	CPB	08/07/93	TD
9 A	33 / 49	INT W/50	T	08/06/93	P	2X3	KK	50	CPB	08/06/93	CPB
9 B	33 / 50	8'S OF 50/51	BO	08/06/93	P	1X2	KK	50	CPB	08/06/93	CPB
9 C	33 / 50	INT W/51	T	08/06/93	P	2X5	KK	50	CPB	08/06/93	CPB
9 D	48 / 49	4'W OF EAT	DS-17	08/07/93	P	2X4	VN	50	CPB	08/07/93	CPB
9 E	52 / 53	INT W/54	T	08/07/93	P	3X3	VN	50	CPB	08/07/93	TD
9 F	54 / 55	INT W/56	T	08/06/93	P	2X4	KK	50	CPB	08/06/93	CPB
9 G	51 / 52	INT W/54/56	T	08/06/93	2P/GW	1X4/2X4/4"	KK	50	CPB	08/06/93	CPB
9 H	56 / 57	4'S OF NAT	DS-18	08/07/93	P	2X4	BT	10	TD	OCA	--
9 I	33 / 56	INT W/57	T	08/06/93	P	2X7	KK	50	CPB	08/06/93	CPB
9 J	32 / 57	INT W/58	T	08/06/93	P	3X4	KK	50	CPB	08/06/93	CPB
9 K	31 / 58	7'E OF 58/59	BO	08/06/93	P	1X1	KK	50	CPB	08/06/93	CPB
9 M	31 / 58	INT W/59	T	08/06/93	P	3X5	KK	50	CPB	08/06/93	CPB
9 N	32 / 57	12'W OF 56/57	DS-19	08/06/93	P	3X5	KK	50	CPB	08/06/93	CPB
9 P	60 / 61	FROM 65' TO 70' S OF NAT	IO	08/07/93	P	2X6	BT	10	TD	08/07/93	TD
9 Q	61	5'N OF 28/61,9'W OF 60/61	D	08/06/93	P	1X1	KK	50	CPB	08/07/93	TD
9 R	29 / 60	INT W/61	T	08/06/93	P	2X3	KK	50	CPB	08/06/93	CPB
9 S	48	4'S OF 48/49,1'E OF 33/48	D	08/06/93	P	1X1	KK	50	CPB	08/06/93	CPB
9 T	56 / 57	88'S OF NAT	BO	08/06/93	GW	6"	KK	50	CPB	08/07/93	TD

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REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	APPROX. SIZE	WELDER I.D. TECH.	WELDER I.D. MACH.	QA MON.	DATE	QA MON.
9 W	63 / 64	50'S OF NAT	DS-20	08/07/93	P	2X6	BT	10	TD	08/07/93	TD
9 X	23 / 65	INT W/66	T	08/06/93	2-P	3X3/1X1	PP	52	TD	08/07/93	TD
10 A	51	55'W OF EAT,15'N OF 50/51	D	08/07/93	P	1X1	VN	50	CPB	08/07/93	TD
10 B	29 / 60	10'W OF 29/30/60	BO	08/06/93	P	2X2	KK	50	CPB	08/06/93	CPB
10 C	30 / 60	INT W/29/30/60	PT	08/06/93	P	3X4	KK	50	CPB	08/06/93	CPB
10 D	22 / 66	11'W OF INT 22/23/66	DS-21	08/07/93	P	4X6	BT	10	TD	08/07/93	TD
10 E	22 / 66	11'W OF INT 22/23/66&4'N	D	08/06/93	P	1X1	PP	52	CPB	08/07/93	TD
10 F	22 / 23	INT W/66	PT	08/06/93	P	2X2	PP	52	CPB	08/07/93	TD
10 G	66 / 67	INT W/22	T	08/06/93	P	3X5	PP	52	CPB	08/07/93	TD
10 H	19 / 67	INT W/17	T	08/06/93	P	4X4	PP	52	CPB	08/07/93	TD
10 I	67	50'S OF NAT,15'W OF 66/67	BS	08/07/93	P	15X15	BT	10	TD	08/07/93	TD
10 J	62 / 63	INT W/27	T	08/06/93	P	4X6	PP	52	TD	08/07/93	TD
10 K	61 / 62	INT W/28	T	08/06/93	P	3X4	KK	50	CPB	08/07/93	TD
10 M	19 / 67	50'S OF NAT	T	08/07/93	P	4X13	BT	10	JMI	08/07/93	TD
10 N	26 / 27	145'N OF SAT	DS-8B	08/05/93	P	2X5	SO	50	CPB	08/07/93	TD

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APPENDIX K-2

GEOMEMBRANE REPAIR SUMMARY - ASH POND 91

November 1993

937-4207

Golder Construction Services, Inc.

APPENDIX K-2
ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MON.	DATE	QA MON.
1 A	12 / 13	355'N OF SAT	WS	08/10/93	P	2X3	VN	50	JMI	08/11/93	TD
1 B	12 / 13	100'N OF SAT	DS-1	08/10/93	P	2X5	SO	10	JMI	08/11/93	TD
1 C	12	5'E OF 12/13,8'N OF 1/12	D	08/09/93	P	1X1	SO	10	JMI	08/11/93	TD
1 D	1 / 2	INT W/12/13	T	08/09/93	P	2X3	SO	10	JMI	08/11/93	TD
1 E	12	20'E OF 12/13,4'N OF 1/12	D	08/09/93	P	1X1	SO	10	JMI	08/11/93	TD
1 F	12 / 13	513'N OF SAT	D	08/10/93	P	1X1	VN	50	JMI	08/11/93	TD
1 G	12 / 13	500'N OF SAT	DS-2	08/10/93	P	3X5	VN	50	JMI	08/11/93	TD
1 H	13 / 14	362'N OF SAT	WS	08/10/93	P	2X2	SO	10	JMI	08/11/93	TD
1 I	12 / 13	425'N OF SAT	PT	08/10/93	P	1X1	VN	50	JMI	08/11/93	TD
1 J	12 / 13	396'N OF SAT	PT	08/10/93	P	2X2	VN	50	JMI	08/11/93	TD
1 K	12 / 13	355'N TO 500'N OF SAT	FS	08/10/93	RS	145'	VN	50	JMI	08/11/93	TD
1 M	2 / 3	INT W/13/14	T	08/09/93	2-P/RS	2X3/1X2/3'	SO	10	CPB	08/11/93	TD
1 N	12 / 13	450'N OF SAT	PT	08/10/93	P	1X1	VN	50	CPB	08/11/93	TD
1 P	13 / 14	407'N OF SAT	BO	08/10/93	P	1X2	VN	50	JMI	08/11/93	TD
1 Q	13 / 14	462'N OF SAT	DS-3	08/10/93	P	2X5	VN	50	JMI	08/11/93	TD
1 R	3 / 4	INT W/14	T	08/09/93	P	2X3	SO	10	JMI	08/11/93	TD
1 S	13 / 14	60'N OF SAT	DS-4	08/11/93	P	2X6	PP	50	CPB	08/11/93	TD
1 T	14 / 15	350'N OF SAT	WS	08/10/93	P	2X3	VN	50	CPB	08/11/93	TD
1 W	14 / 15	535'N OF SAT	D	08/10/93	P	1X1	SO	10	CPB	08/11/93	TD
1 X	5 / 15	1'W OF 4/5	DS-5	08/10/93	P	2X5	SO	10	CPB	08/11/93	TD
2 A	12 / 13	195'N OF SAT	PT	08/10/93	P	2X3	SO	10	CPB	08/11/93	TD
2 B	6 / 16	ENTIRE SEAM	FS	08/10/93	RS	17'	SO	10	CPB	08/11/93	TD
2 C	5 / 16	ENTIRE SEAM	FS	08/10/93	RS	34'	VN	50	CPB	08/11/93	TD
2 D	7 / 17	INT W/18	T	08/09/93	P	2X3	SO	10	CPB	08/11/93	TD
2 E	12 / 13	50'N TO 100'N OF SAT	FS	08/10/93	RS	25'	SO	10	CPB	08/11/93	TD

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APPENDIX K-2
ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MON.	DATE	QA MON.
2 F	11 / 20	15'E OF 11/20/21	D	08/10/93	GW	4"	SO	10	CPB	08/11/93	TD
2 G	10 / 11	INT W/20	T	08/10/93	P	1X1	SO	10	CPB	08/11/93	TD
2 H	22 / 23	INT W/25	T	08/11/93	P	1X1	VN	10	CPB	08/11/93	TD
2 I	25 / 26	INT W/27	T	08/11/93	P	2X4	VN	10	CPB	08/11/93	TD
2 J	26	15'W OF 25/26/27,5'S	D	08/11/93	P	1X1	VN	10	CPB	08/11/93	TD
2 K	23 / 24	INT W/26	T	08/11/93	P	1X1	VN	10	JMI	08/11/93	TD
2 M	23 / 25	INT W/26	T	08/11/93	P	1X2	VN	10	JMI	08/11/93	TD
2 N	36	25'E OF AT,20'N OF 34/36	D	08/11/93	P	1X1	IOU	10	JMI	08/11/93	TD
2 P	47	35'N OF SAT,20'W OF 47/48	D	08/11/93	P	1X1	PP	50	JMI	08/11/93	TD
2 Q	48	40'N OF SAT,20'E OF 47/48	D	08/11/93	P	2X2	PP	50	JMI	08/11/93	TD
2 R	16 / 17	450' N OF SAT	DS-7A	08/11/93	P	3X7	PP	50	JMI	08/11/93	TD
2 S	54	2'N OF SAT,20'E OF 53/54	D	08/12/93	P	3X3	SO	10	JMI	08/18/93	TD
2 T	50 / 57	90'N OF SEOS	DS-32	08/13/93	P	3X5	CW	10	JMI	08/18/93	TD
2 W	49 / 58	30'N OF SAT	BO	08/12/93	P	4X4	SO	10	CPB	08/18/93	TD
2 X	49 / 58	40'N OF SAT	DS-33	08/13/93	P	2X6	CW	10	CPB	08/11/93	TD
3 A	14 / 15	INT W/4	T	08/09/93	P	1X1	SO	10	CPB	08/11/93	TD
3 B	4 / 14	ENTIRE SEAM	RS	08/09/93	RS	3'	SO	10	CPB	08/11/93	TD
3 C	4 / 5	INT W/15	T	08/09/93	GW	7"	SO	10	CPB	08/11/93	TD
3 D	15 / 16	INT W/5	T	08/09/93	P	3X3	SO	10	CPB	08/11/93	TD
3 E	16 / 17	INT W/6	T	08/09/93	P	3X3	SO	10	CPB	08/11/93	TD
3 F	14 / 15	FROM SEOS TO 12'N	FS	08/10/93	RS	12'	SO	10	CPB	08/11/93	TD
3 G	12 / 45	164'N OF SEOS	IO	08/10/93	P	1X2	BT	50	CPB	08/11/93	TD
3 H	12 / 45	178'N OF SEOS	WS	08/10/93	P	2X2	BT	50	CPB	08/11/93	TD
3 I	12 / 45	606'N OF SEOS	BO	08/11/93	P	4X6	IOU	10	CPB	08/11/93	TD
3 J	12 / 45	635'N OF SEOS	FM	08/11/93	P	3X6	IOU	10	SGH	08/11/93	TD

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ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM	WELDER I.D. OPER	WELDER I.D. MACH.	QA MON.	DATE	QA MON.
3 K	12 / 45	580'N OF SEOS	FM	08/11/93	P	4X6	IOU	10	SGH	08/11/93	TD
3 M	16 / 17	475'N OF SAT	DS-7B	08/11/93	2-P/RS	3X5/1X1/3'	PP	50	SGH	08/11/93	TD
3 N	16 / 17	459'N TO 475'N OF SAT	FS	08/11/93	RS	10'	PP	50	SGH	08/11/93	TD
3 P	16 / 17	442'N TO 455'N OF SAT	FS	08/11/93	RS	10'	PP	50	SGH	08/11/93	TD
3 Q	34 / 36	INT W/41	T	08/11/93	P	1X1	VN	10	SGH	08/11/93	TD
3 R	36 / 37	INT W/41	T	08/11/93	P	2X2	VN	10	SGH	08/18/93	TD
3 S	46 / 49	308'N OF SAT	WS	08/12/93	P	2X3	SO	10	SGH	08/18/93	TD
3 T	46 / 49	506'N OF SAT	BO	08/12/93	P	1X2	SK	50	SGH	08/18/93	TD
3 W	46 / 49	407'N OF SAT	BO	08/12/93	P	1X1	SK	50	SGH	08/18/93	TD
3 X	46 / 49	400'N OF SAT	BO	08/12/93	P	3X5	SK	50	SGH	08/18/93	TD
4 A	16 / 17	356'N OF SAT	WS	08/10/93	P	2X2	VN	50	SGH	08/11/93	TD
4 B	15 / 16	650'N OF SAT	DS-6	08/11/93	P	2X4	PP	50	SGH	08/11/93	TD
4 C	15 / 16	370'N OF SAT	WS	08/10/93	P	2X3	VN	50	SGH	08/11/93	TD
4 D	17	1'W OF 16/17,5'N OF 6/17	D	08/09/93	2-P	1X1/1X1	SO	10	SGH	08/11/93	TD
4 E	16 / 17	503'N OF SAT	IO	08/10/93	GW	3"	VN	50	SGH	08/11/93	TD
4 F	17 / 18	463'N OF SAT	BO	08/11/93	P	2X2	PP	50	SGH	08/11/93	TD
4 G	17 / 18	254'N OF SAT	WS	08/11/93	P	2X2	PP	50	SGH	08/11/93	TD
4 H	16 / 17	456'N OF SAT	DS-7	08/11/93	P	3X5	PP	50	SGH	08/11/93	TD
4 I	17 / 18	262'N OF SAT	BO	08/11/93	P	2X2	VN	10	SGH	08/11/93	TD
4 J	17 / 18	490'N OF SAT	DS-8	08/11/93	P	3X5	PP	50	SGH	08/11/93	TD
4 K	17 / 18	217'N OF SAT	DS-9	08/11/93	P	3X5	PP	50	TD	08/11/93	TD
4 M	7 / 8	INT W/18	T	08/09/93	P	2X2	SO	10	TD	08/11/93	TD
4 N	18 / 19	288'N OF SAT	WS	08/11/93	P	2X3	PP	50	TD	08/11/93	TD
4 P	19 / 20	275'N OF SAT	DS-10	08/11/93	P	3X5	PP	50	TD	08/11/93	TD
4 Q	19 / 20	300'N OF SAT	WS	08/11/93	P	2X3	PP	50	TD	08/11/93	TD

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ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
							WELDER I.D.		QA		QA
				DATE	TYPE	DIM.	OPER.	MACH.	MON.	DATE	MON.
4 R	18 / 19	369'N OF SAT	DS-11	08/11/93	P	3X5	PP	50	TD	08/11/93	TD
4 S	11 / 20	INT W/21	T	08/10/93	P	3X5	SO	10	TD	08/11/93	TD
4 T	11 / 21	40'N OF SAT	BO	08/11/93	P	2X4	PP	50	TD	08/11/93	TD
4 W	23 / 24	20'N OF SAT	IO	08/11/93	RS	1'	VN	10	TD	08/11/93	TD
4 X	20 / 25	300'N OF SAT	WS	08/11/93	P	3X4	VN	10	TD	08/11/93	TD
5 A	20 / 25	237'N OF SAT	BO	08/11/93	P	2X3	VN	10	TD	08/11/93	TD
5 B	20 / 25	283'N OF SAT	DS-12	08/11/93	P	2X3	IOU	10	TD	08/11/93	TD
5 C	20 / 25	517'N OF SAT	BO	08/11/93	P	2X5	VN	10	TD	08/11/93	TD
5 D	20 / 25	400'N OF SAT	DS-13	08/11/93	P	2X6	VN	10	TD	08/11/93	TD
5 E	20 / 25	160'N OF SAT	BO	08/11/93	P	3X3	VN	10	MH	08/11/93	TD
5 F	20 / 21	INT W/25	T	08/11/93	P	2X4	VN	10	MH	08/11/93	TD
5 G	25 / 27	200'N OF SEOS	WS	08/11/93	P	2X5	VN	10	MH	08/18/93	TD
5 H	24 / 28	27'N OF SAT	DS-14	08/11/93	P	2X5	VN	10	JMI	08/11/93	TD
5 I	9 / 18	INT W/19	T	08/10/93	2-P	3X4/1X1	SO	10	JMI	08/11/93	TD
5 J	9 / 10	INT W/19	T	08/10/93	P	2X2	SO	10	JMI	08/11/93	TD
5 K	10 / 19	9'W OF 9/10	D	08/10/93	P	1X1	SO	10	JMI	08/11/93	TD
5 M	10 / 19	INT W/20	T	08/10/93	2-P/RS	3X4/1X3/6'	SO	10	JMI	08/11/93	TD
5 N	34 / 36	80'E OF WAT	DS-15	08/11/93	P	2X5	VN	10	JMI	08/11/93	TD
5 P	38 / 39	38'E OF WAT	BO	08/11/93	P	2X3	VN	10	JMI	08/11/93	TD
5 Q	27 / 41	197'N OF SEOS	DS-16	08/11/93	P	3X6	VN	10	JMI	08/11/93	TD
5 R	34 / 41	18'N OF SEOS	DS-17	08/11/93	P	3X5	VN	10	TD	08/11/93	TD
5 S	37 / 41	5'N OF SEOS	BO	08/11/93	P	1X1	VN	10	JMI	08/11/93	TD
5 T	38 / 39	INT W/42/43	T	08/11/93	2-P/RS	2X2/2X2/3'	CW	10	JMI	08/11/93	TD
5 W	43 / 44	9'W OF EEOS	BO	08/11/93	P	2X2	VN	10	JMI	08/11/93	TD
5 X	27 / 43	INT W/44	T	08/11/93	P	3X3	VN	10	JMI	08/11/93	TD

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APPENDIX K-2
ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MON.	DATE	QA MON.
6 A	17 / 18	415'N OF SEOS	PT	08/11/93	P	2X4	PP	50	JMI	08/11/93	TD
6 B	19 / 20	80'N OF SEOS	PT	08/10/93	P	1X2	SO	10	JMI	08/11/93	TD
6 C	11 / 20	7'W OF EEOS	D	08/10/93	GW	4"	SO	10	JMI	08/11/93	TD
6 D	21 / 22	INT W/25	PT	08/11/93	P	1X1	VN	10	JMI	08/11/93	TD
6 E	26 / 27	INT W/24	PT	08/11/93	P	3X4	VN	10	JMI	08/11/93	TD
6 F	24 / 28	INT W/27	PT	08/11/93	P	2X2	VN	10	JMI	08/11/93	TD
6 G	27 / 28	INT W/29/32	PT	08/11/93	P	2X2	VN	10	JMI	08/11/93	TD
6 H	32 / 41	INT W/27	PT	08/11/93	P	2X3	VN	10	JMI	08/11/93	TD
6 I	29 / 30	INT W/41/32	PT	08/11/93	P	3X5	VN	10	JMI	08/11/93	TD
6 J	30 / 31	INT W/35/41	PT	08/11/93	P	4X7	VN	10	JMI	08/11/93	TD
6 M	12	420'N OF SEOS,3'W OF 45	SI	08/11/93	P	2X2	PP	50	JMI	08/11/93	TD
6 N	46 / 49	235'N OF SEOS	BO	08/12/93	P	2X2	SO	10	JMI	08/18/93	TD
6 P	46 / 49	270'N OF SEOS	BO	08/12/93	P	3X3	SO	10	JMI	08/18/93	TD
6 Q	51	5'N OF AT,15'E OF 50	D	08/12/93	P	1X1	SO	10	JMI	08/23/93	SGH
6 R	51	2'N OF AT,15'E OF 50	D	08/12/93	P	1X1	SO	10	JMI	OCA	--
6 S	51	15'N OF AT,15'E OF 50	D	08/12/93	P	1X1	SO	10	JMI	08/19/93	TD
6 T	51	20'N OF AT,15'E OF 50	D	08/12/93	P	1X1	SO	10	JMI	08/19/93	TD
6 W	51	25'N OF AT,15'E OF 50	D	08/12/93	P	1X1	SO	10	JMI	08/19/93	TD
6 X	46 / 49	120'N OF SEOS	B	08/12/93	P	1X1	SO	10	JMI	08/18/93	TD
7 A	43 / 44	6'E OF WEOS	BO	08/11/93	P	1X1	VN	10	JMI	08/11/93	TD
7 B	39 / 40	INT W/43/44	T	08/11/93	P	3X5	VN	10	JMI	08/11/93	TD
7 C	37 / 38	INT W/41/42	T	08/11/93	P	3X6	VN	10	JMI	08/11/93	TD
7 D	12 / 45	10'N OF SEOS	BO	08/11/93	P	2X3	PP	50	JMI	08/11/93	TD
7 E	12 / 45	34'N OF SEOS	DS-18	08/11/93	P	3X5	PP	50	SGH	08/11/93	TD
7 F	12 / 45	443'N OF SEOS	BO	08/10/93	P	1X2	BT	50	SGH	08/11/93	TD

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ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MON.	DATE	QA MON.
7 G	12 / 45	541'N OF SEOS	BO	08/10/93	P	1X2	BT	50	SGH	08/11/93	TD
7 H	12 / 45	610'N OF SEOS	BO	08/11/93	P	1X1	IOU	10	SGH	08/11/93	TD
7 I	12 / 45	307'N OF SEOS	BO	08/10/93	P	1X2	BT	50	SGH	08/11/93	TD
7 J	12 / 45	355'N OF SEOS	DS-19	08/11/93	P	3X5	PP	50	SGH	08/11/93	TD
7 K	45 / 46	362'N OF SEOS	WS	08/11/93	P	1X1	PP	50	SGH	08/11/93	TD
7 M	45 / 46	262'N OF SEOS	DS-20	08/11/93	P	3X5	PP	50	TD	08/11/93	TD
7 N	47 / 48	11'N OF SAT	DS-21	08/11/93	P	3X5	PP	50	TD	08/11/93	TD
7 P	1 / 12	INT W/45/47	T	08/11/93	2-P	3X5/1X1	PP	50	TD	08/11/93	TD
7 Q	45 / 46	INT W/47/48	T	08/11/93	P	2X6	PP	50	TD	08/11/93	TD
7 R	31 / 32	INT W/35	T	08/11/93	P	2X3	VN	10	TD	08/11/93	TD
7 S	33 / 35	INT W/41	T	08/11/93	P	2X3	VN	10	TD	08/11/93	TD
7 T	27 / 41	INT W/42	T	08/11/93	P	3X4	VN	10	SGH	08/11/93	TD
7 W	27 / 42	INT W/43	T	08/11/93	P	3X4	VN	10	SGH	08/11/93	TD
7 X	33 / 34	INT W/41	T	08/11/93	P	1X1	VN	10	SGH	08/11/93	TD
8 A	52 / 53	315'N OF SAT	DS-27	08/13/93	P	2X6	CW	10	SGH	08/18/93	TD
8 B	53 / 54	277'N OF SAT	WS	08/12/93	P	2X5	SO	10	SGH	08/19/93	TD
8 C	53 / 54	142'N OF SAT	DS-28	08/13/93	P	2X6	CW	10	SGH	08/19/93	TD
8 D	53 / 54	341'N OF SAT	DS-29	08/17/93	P	3X6	VN	10	SGH	08/18/93	TD
8 E	12 / 47	ENTIRE SEAM	DSE-02	08/13/93	P	2X6	CW	10	SGH	08/23/93	SGH
8 F	54 / 55	350'N OF SAT	WS	08/12/93	P	2X4	SO	10	SGH	08/18/93	TD
8 G	54 / 55	582'N OF SAT	DS-30	08/13/93	P	3X5	CW	10	SGH	08/18/93	TD
8 H	54 / 55	50'N OF SAT	DS-31	08/12/93	P	2X6	SO	10	SGH	08/23/93	SGH
8 I	55 / 56	350'N OF SAT	WS	08/12/93	P	2X4	SO	10	SGH	08/18/93	TD
8 J	55 / 56	630'N OF SAT	BO	08/13/93	P	1X1	CW	10	SGH	08/18/93	TD
8 M	56 / 59	333'N OF SAT	BO	08/13/93	P	2X3	IOU	52	SGH	08/19/93	TD

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APPENDIX K-2
ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MON.	DATE	QA MON.
8 N	56 / 59	342'N OF SAT	BO	08/13/93	P	2X3	IOU	52	SGH	08/19/93	TD
8 P	56 / 59	405'N OF SAT	BO	08/13/93	P	2X2	IOU	52	SGH	08/19/93	TD
8 Q	56 / 59	230'N OF SAT	WS	08/13/93	P	3X3	VN	10	SGH	08/19/93	TD
8 R	59 / 61	312'N OF SAT	WS	08/13/93	P	3X4	VN	10	SGH	08/19/93	TD
8 S	59 / 61	395'N OF SAT	DS-35	08/13/93	P	2X6	VN	10	SGH	08/19/93	TD
8 T	56 / 60	145'N OF SEOS	DS-34	08/13/93	P	2X5	IOU	52	SGH	08/23/93	SGH
8 W	59 / 60	9'W OF 59/60/61	D	08/13/93	P	1X1	IOU	52	SGH	08/19/93	TD
8 X	59 / 61	197'N OF SAT	DS-36	08/13/93	P	2X6	VN	10	SGH	08/19/93	TD
9 A	46 / 49	414'N OF SAT	BO	08/12/93	P	1X1	SK	50	SGH	08/18/93	TD
9 B	46 / 49	418'N OF SAT	BO	08/12/93	P	1X1	SK	50	SGH	08/18/93	TD
9 C	46 / 49	400'N TO 418'N OF SAT	BO	08/12/93	RS	6'	SK	50	SGH	08/23/93	SGH
9 D	46 / 49	282'N OF SAT	BO	08/12/93	P	2X3	SO	10	SGH	08/18/93	TD
9 E	46 / 49	168'N OF SAT	BO	08/12/93	P	2X6	SO	10	SGH	08/18/93	TD
9 F	46 / 49	161'N OF SAT	BO	08/12/93	P	2X3	SO	10	SGH	08/18/93	TD
9 G	46 / 49	120'N OF SAT	DS-22	08/12/93	P	2X5	SO	10	SGH	08/18/93	TD
9 H	49 / 50	254'N OF SAT	DS-23	08/13/93	P	2X6	CW	10	SGH	08/18/93	TD
9 I	50 / 51	350'N OF SAT	WS	08/12/93	P	3X4	SO	10	SGH	08/18/93	TD
9 J	50 / 51	622'N OF SAT	BO	08/12/93	P	1X1	SK	50	SGH	08/18/93	TD
9 K	50 / 51	615'N OF SAT	BO	08/12/93	P	1X1	SK	50	SGH	08/18/93	TD
9 M	50 / 51	556'N OF SAT	BO	08/12/93	P	1X1	SK	50	SGH	08/18/93	TD
9 N	50 / 51	547'N OF SAT	BO	08/12/93	P	2X4	SK	50	SGH	08/18/93	TD
9 P	50 / 51	590'N OF SAT	DS-24	08/13/93	P	2X5	CW	10	SGH	08/18/93	TD
9 Q	51 / 52	659'N OF SAT	BO	09/06/93	GW	4"	SO	52	MH	09/08/93	TD
9 R	51 / 52	652'N OF SAT	BO	09/06/93	GW	6"	SO	52	MH	09/08/93	TD
9 S	51 / 52	319'N OF SAT	WS	08/12/93	P	3X3	SO	10	MH	08/18/93	TD

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APPENDIX K-2
ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MON.	DATE	QA MON.
9 T	51 / 52	155'N OF SAT	DS-25	08/13/93	P	2X5	CW	10	MH	08/19/93	TD
9 W	51 / 52	450'N OF SAT	DS-26	08/13/93	P	3X5	CW	10	MH	08/19/93	TD
9 X	51 / 52	357'N OF SAT	WS	08/12/93	P	1X5	SO	10	MH	08/18/93	TD
10 A	46 / 49	315'N OF SAT	D	08/12/93	P	3X3	SO	10	MH	08/18/93	TD
10 B	49 / 50	3'N OF SAT	FTS	08/12/93	P	2X3	SO	10	MH	OCA	--
10 C	50 / 51	3'N OF SAT	FTS	08/12/93	P	2X3	SO	10	MH	OCA	--
10 D	50 / 51	@ AT	D	08/12/93	P	3X3	SO	10	SGH	OCA	--
10 E	46 / 57	2'N OF SEOS	D	08/12/93	P	1X1	SK	50	SGH	08/18/93	TD
10 F	49 / 50	INT W/57	T	08/12/93	P	3X5	SK	50	SGH	08/18/93	TD
10 G	48 / 58	40'N OF SAT	D	08/12/93	P	4X6	SO	10	SGH	08/18/93	TD
10 H	56	5'N OF SAT,5'E	D	08/13/93	P	1X1	VN	10	SGH	OCA	--
10 I	59	3'N OF SAT,10'E	D	08/13/93	P	1X1	VN	10	SGH	OCA	--
10 J	59	10'N OF SAT,10'E	D	08/13/93	P	1X1	VN	10	SGH	OCA	--
10 K	59	16'N OF SAT,10'E	D	08/13/93	P	1X1	VN	10	SGH	08/23/93	SGH
10 M	48 / 58	2'N OF SAT	D	08/13/93	P	3X3	CW	10	SGH	08/23/93	SGH
10 N	59 / 61	5'N OF SAT	FTS	08/13/93	P	2X2	VN	10	SGH	08/23/93	SGH
10 P	56 / 59	85'N OF SAT	PT	08/13/93	P	1X1	VN	10	SGH	08/23/93	SGH
10 Q	56 / 59	INT W/60	T	08/13/93	P	3X5	IOU	52	SGH	08/19/93	TD
10 R	62 / 63	45'N OF SAT	D	08/16/93	P	2X3	SO	10	SGH	08/19/93	TD
10 S	65	350'N OF SAT	EE	08/19/93	P	2X10	VN	52	SGH	08/23/93	SGH
10 T	65	660'N OF SAT,3'W	D	08/16/93	P	3X8	JS	52	SGH	08/23/93	SGH
10 W	63 / 64	300'N OF SAT	PT	08/16/93	P	3X3	VN	10	SGH	08/19/93	TD
10 X	64 / 65	5'N OF SAT	PT	08/16/93	P	1X1	VN	10	SGH	OCA	--
11 A	49 / 50	50'N TO 80'N OF SAT	PT	08/12/93	RS	30'	SO	10	SGH	08/18/93	TD
11 B	50 / 57	20'N OF SAT	PT	08/12/93	P	2X2	SK	50	MH	08/18/93	TD

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APPENDIX K-2
ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM	WELDER I.D. OPER	WELDER I.D. MACH.	QA MON.	DATE	QA MON.
11 C	46 / 57	132'N OF SEOS	PT	08/31/93	P	1X1	BT	50	MH	09/08/93	TD
11 D	49 / 57	25'E OF WEOS	D	08/12/93	RS	11'	SO	10	MH	08/23/93	SGH
11 E	59 / 60	INT W/61	T	08/13/93	P	3X5	IOU	52	MH	08/19/93	TD
11 F	60 / 61	210'N OF SEOS	PT	09/01/93	P	1X1	JS	52	MH	09/08/93	TD
11 G	56 / 60	230'N OF SEOS	PT	09/01/93	P	1X1	JS	52	MH	09/08/93	TD
11 H	61 / 62	311'N OF SAT	PT	08/13/93	P	2X4	VN	10	MH	08/19/93	TD
11 I	56 / 59	310'N OF SAT	PT	08/13/93	P	2X2	IOU	52	MH	08/19/93	TD
11 J	56 / 59	265'N OF SAT	PT	08/13/93	P	2X2	IOU	52	MH	08/19/93	TD
11 K	56 / 59	265'N TO 225'N OF SAT	FS	08/13/93	RS	40'	IOU	52	MH	08/19/93	TD
11 M	56 / 59	80'N OF SAT	PT	08/13/93	P	1X2	IOU	52	MH	08/23/93	SGH
11 N	64 / 65	650'N OF SEOS	PT	08/16/93	P	3X3	JS	52	MH	08/19/93	TD
11 P	64 / 65	300'N OF SAT	PT	08/16/93	P	2X4	JS	52	MH	08/23/93	SGH
11 Q	53	115'N OF SAT,5'E OF 52	SI	08/20/93	P	1X1	SK	50	MH	08/23/93	SGH
11 R	68 / 69	400'N OF SAT	PT	08/17/93	P	1X2	VN	10	MH	08/19/93	TD
11 S	74 / 75	@ SEOS	FS	08/18/93	P	4X6	SO	10	MH	OCA	--
11 T	71 / 80	175'N OF SAT	WS	08/18/93	P	2X3	JS	52	MH	08/23/93	SGH
11 W	71 / 80	35'N OF SAT	WS	08/18/93	P	3X3	JS	52	MH	08/19/93	TD
11 X	72 / 79	3'N OF SAT	PT	08/18/93	P	1X1	JS	52	MH	OCA	--
12 A	46 / 49	125'N OF SAT	DSE-1	08/12/93	P	3X5	SO	10	MH	08/18/93	TD
12 B	49 / 58	62'N OF SAT	PT	08/12/93	P	5X6	SO	10	MH	08/18/93	TD
12 E	12 / 13	505'N TO 518'N OF SAT	FS	08/17/93	RS	13'	VN	10	MH	08/23/93	SGH
12 F	12 / 13	518'N OF SAT	D	08/13/93	P	2X5	IOU	52	MH	08/18/93	TD
12 G	12 / 13	518'N TO 530'N OF SAT	FS	08/13/93	RS	12'	IOU	52	SGH	08/23/93	SGH
12 H	12 / 13	525'N OF SAT	BO	08/13/93	P	1X2	IOU	52	SGH	08/18/93	TD
12 I	12 / 13	530'N OF SAT	BO	08/13/93	P	2X9	IOU	52	SGH	08/18/93	TD

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REPAIR SUMMARY

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				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MON.	DATE	QA MON.
12 J	12 / 13	350'N OF SAT	DS-2B	08/13/93	P	2X7	IOU	52	SGH	08/18/93	TD
12 K	64	5'N OF SAT,15'W OF 64/65	D	08/16/93	P	1X1	VN	10	SGH	OCA	--
12 M	65 / 66	340'N OF SAT	BO	08/16/93	P	3X7	JS	52	SGH	08/23/93	SGH
12 N	71 / 80	330'N OF SEOS	DS-52	08/19/93	P	2X5	SO	52	MH	08/23/93	SGH
12 P	71 / 80	482'N OF SEOS	BO	08/18/93	P	2X3	JS	52	TD	08/23/93	SGH
12 Q	71 / 80	412'N OF SEOS	BO	08/18/93	P	2X2	JS	52	TD	08/23/93	SGH
12 R	71 / 80	395'N OF SEOS	BO	08/18/93	P	2X3	JS	52	TD	08/23/93	SGH
12 S	71 / 80	245'N OF SEOS	BO	08/18/93	P	1X2	JS	52	TD	08/23/93	SGH
12 T	71 / 80	236'N OF SEOS	BO	08/18/93	P	1X2	JS	52	TD	08/23/93	SGH
12 W	71 / 80	175'N OF SEOS	DS-54	08/19/93	P	2X5	SO	52	TD	08/23/93	SGH
12 X	78 / 83	38'N OF SAT	DS-55	08/19/93	P	2X6	KK	50	TD	08/23/93	SGH
13 A	61 / 62	253'N OF SAT	DS-37	08/13/93	P	2X5	VN	10	TD	08/19/93	TD
13 B	13 / 14	16'S OF NEOS	DS-2A	NO REPAIR MADE SINCE 20' OF THE NORTH ENDS OF PANELS 13 AND 14 WERE CUT OFF.							
13 D	62 / 63	100'N OF SAT	BO	08/16/93	P	2X4	VN	10	TD	08/19/93	TD
13 E	62 / 63	291'N OF SAT	BO	08/16/93	P	2X3	VN	10	TD	08/19/93	TD
13 F	62 / 63	590'N OF SAT	BO	08/16/93	P	2X2	VN	10	TD	08/19/93	TD
13 G	63 / 64	75'N OF SAT	DS-39	08/16/93	P	2X7	VN	10	TD	08/19/93	TD
13 H	63 / 64	434'N OF SAT	DS-40	08/16/93	P	2X6	JS	52	TD	08/19/93	TD
13 I	64 / 65	225'N OF SAT	DS-41	08/16/93	P	3X6	JS	52	TD	08/23/93	SGH
13 J	64 / 65	520'N OF SAT	DS-42	08/16/93	P	2X5	JS	52	TD	08/23/93	SGH
13 K	65 / 66	300'N OF SAT	WS	08/16/93	P	2X3	JS	52	TD	08/19/93	TD
13 M	65 / 66	50'N OF SAT	BO	08/16/93	P	3X4	VN	10	TD	08/23/93	SGH
13 N	65 / 66	25'N OF SAT	BO	08/16/93	P	1X1	VN	10	TD	08/23/93	SGH
13 P	65 / 66	647'N OF SAT	DS-43	08/16/93	P	2X5	JS	52	TD	08/19/93	TD
13 Q	66 / 67	367'N OF SAT	IO	08/17/93	P	2X6	VN	10	MH	08/19/93	TD

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APPENDIX K-2
ASH POND 91
REPAIR SUMMARY

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				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MON.	DATE	QA MON.
13 R	66 / 67	400'N OF SAT	DS-45	08/17/93	P	3X6	VN	10	MH	08/19/93	TD
13 S	66 / 67	607'N OF SAT	BO	08/17/93	P	2X5	VN	10	MH	08/19/93	TD
13 T	67 / 68	540'N OF SAT	BO	08/17/93	P	2X4	VN	10	MH	08/19/93	TD
13 W	67 / 68	565'N OF SAT	BO	08/17/93	P	2X2	VN	10	MH	08/19/93	TD
13 X	67 / 68	585'N OF SAT	BO	08/17/93	P	2X2	VN	10	MH	08/19/93	TD
14 A	62 / 63	317'N OF SAT	WS	08/16/93	P	3X3	VN	10	MH	08/19/93	TD
14 B	62 / 63	357'N OF SAT	DS-38	08/16/93	P	2X6	JS	52	MH	08/19/93	TD
14 C	68 / 69	573'N OF SAT	DS-47	08/17/93	P	2X6	VN	10	MH	08/19/93	TD
14 D	68 / 69	135'N OF SAT	IO	08/17/93	P	2X6	BN	52	SGH	08/19/93	TD
14 E	68 / 69	206'N OF SAT	DS-48	08/17/93	P	2X5	BN	52	SGH	08/19/93	TD
14 F	69 / 70	383'N OF SAT	DS-49	08/17/93	P	2X7	VN	10	SGH	08/19/93	TD
14 G	70 / 71	530'N OF SAT	FS	08/17/93	2P/RS	2X2/2X2/5'	BN	52	SGH	08/19/93	TD
14 H	53	135'N OF SAT,7'E OF 52/53	D	08/20/93	P	1X1	SK	50	SGH	08/23/93	SGH
14 I	46 / 49	125'N OF SAT	CAP	08/20/93	2-P	2X2/5X5	SK	50	SGH	08/23/93	SGH
14 J	46 / 49	162'N OF SAT	CAP	08/20/93	P	4X12	SK	50	SGH	08/23/93	SGH
14 K	46 / 49	166'N OF SAT	DSE-1B	08/20/93	P	4X12	SK	50	SGH	08/23/93	SGH
14 M	51	15'N OF AT,15'E OF 50/51	CAP	08/20/93	P	2X3	SK	50	SGH	08/23/93	SGH
14 N	51	20'N OF AT,15'E OF 50/51	CAP	08/20/93	P	1X1	SK	50	SGH	08/23/93	SGH
14 P	51	25'N OF AT,15'E OF 50/51	CAP	08/20/93	P	1X1	SK	50	SGH	08/23/93	SGH
14 Q	54 / 55	50'N OF SAT	DSE-1A	08/20/93	P	3X6	SK	50	SGH	08/23/93	SGH
14 R	56 / 60	145'N OF SEOS	DSE-3	08/20/93	P	3X5	SK	52	SGH	08/23/93	SGH
14 S	80	10'W OF 80/81,25'N OF 73/80	SI	08/19/93	P	2X20	VN	52	SGH	08/19/93	TD
14 T	81 / 82	10'W OF EEOS	D	08/18/93	P	2X3	SO	10	MH	08/19/93	TD
14 W	89	10'N OF SEOS,10'W OF EEOS	SI	08/18/93	P	2X2	SO	10	MH	08/23/93	SGH
14 X	82	15'N OF SEOS,12'W OF EEOS	SI	08/19/93	3-P	1X7/1X7/1X25	KK	50	SGH	08/23/93	SGH

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				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MON.	DATE	QA MON.
15 A	63 / 64	5'N OF SAT	PT	08/16/93	P	2X2	VN	10	SGH	08/23/93	SGH
15 B	66 / 67	298'N OF SAT	BO	08/17/93	P	2X3	VN	10	SGH	08/19/93	TD
15 C	66 / 67	320'N OF SAT	WS	08/17/93	P	2X3	VN	10	SGH	08/19/93	TD
15 D	66 / 67	250'N OF SAT	BO	08/17/93	P	1X1	VN	10	SGH	08/19/93	TD
15 E	66 / 67	206'N OF SAT	IO	08/17/93	P	1X1	VN	10	SGH	08/19/93	TD
15 F	66 / 67	245'N OF SAT	DS-44	08/17/93	P	2X6	VN	10	SGH	08/19/93	TD
15 G	66 / 67	138'N OF SAT	BO	08/17/93	P	2X3	VN	10	SGH	08/19/93	TD
15 H	66 / 67	85'N OF SAT	BO	08/17/93	P	3X5	VN	10	SGH	08/19/93	TD
15 I	66 / 67	40'N OF SAT	BO	08/17/93	P	2X3	VN	10	SGH	08/19/93	TD
15 J	66 / 67	35'N OF SAT	BO	08/17/93	P	1X1	VN	10	SGH	08/19/93	TD
15 K	66 / 67	20'N OF SAT	BO	08/17/93	P	1X1	BN	52	SGH	08/19/93	TD
15 M	67 / 68	310'N OF SAT	WS	08/17/93	P	2X3	VN	10	SGH	08/19/93	TD
15 P	67 / 68	100'N OF SAT	BO	08/17/93	P	3X7	VN	10	SGH	08/19/93	TD
15 Q	67 / 68	45'N OF SAT	IO	08/20/93	P	1X1	SK	50	SGH	08/23/93	SGH
15 R	67 / 68	38'N OF SAT	IO	08/20/93	P	1X1	SK	50	SGH	08/23/93	SGH
15 S	67 / 68	10'N OF SAT	FTS	08/17/93	P	2X7	BN	52	SGH	08/23/93	SGH
15 T	67 / 68	105'N OF SAT	DS-46	08/17/93	P	3X7	VN	10	SGH	08/19/93	TD
15 W	69 / 70	285'N OF SAT	WS	08/17/93	P	3X3	BN	52	SGH	08/19/93	TD
15 X	69 / 70	51'N OF SAT	DS-50	08/17/93	P	2X5	BN	52	SGH	08/19/93	TD
16 A	70 / 71	156'N OF SAT	WS	08/17/93	P	3X3	BN	52	SGH	08/19/93	TD
16 B	70 / 71	310'N OF SAT	WS	08/17/93	P	2X3	BN	52	SGH	08/19/93	TD
16 C	70 / 71	20'N OF SAT	BO	08/17/93	P	2X2	BN	52	SGH	08/19/93	TD
16 D	70 / 71	35'N OF SAT	IO	08/17/93	P	2X4	BN	52	SGH	08/19/93	TD
16 E	70 / 71	5'N OF SAT	D	08/17/93	P	2X2	BN	52	SGH	OCA	--
16 F	66 / 67	5'N OF SAT	WS	08/17/93	P	2X4	BN	52	SGH	OCA	--

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				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MON.	DATE	QA MON.
16 G	67 / 68	8'N OF SAT	PT	08/17/93	P	2X2	BN	52	SGH	OCA	--
16 H	75 / 76	60'N OF SAT	BO	08/18/93	P	3X3	JS	52	SGH	08/23/93	SGH
16 I	73 / 74	61'N OF SAT	DS-51	08/18/93	P	2X5	JS	52	SGH	08/23/93	SGH
16 J	74 / 75	61'N OF SAT	DS-53	08/18/93	P	2X5	JS	52	SGH	08/23/93	SGH
16 K	71 / 72	INT W/79	T	08/18/93	P	2X3	SO	10	SGH	08/19/93	TD
16 M	80	1'W OF 71/80,6'N OF SEOS	D	08/18/93	P	1X1	JS	52	JMI	08/19/93	TD
16 N	71 / 72	INT W/80	T	08/18/93	P	2X5	JS	52	JMI	08/19/93	TD
16 P	73 / 80	INT W/81	T	08/18/93	P	2X3	JS	52	JMI	08/24/93	CPB
16 Q	71 / 80	142'N OF SEOS	BO	08/18/93	P	1X2	JS	52	JMI	08/19/93	TD
16 R	71 / 80	125'N OF SEOS	BO	08/18/93	P	1X1	JS	52	JMI	08/19/93	TD
16 S	71 / 80	110'N OF SSEOS	BO	08/18/93	P	2X3	JS	52	JMI	08/19/93	TD
16 T	71 / 80	92'N OF SEOS	BO	08/18/93	P	2X2	JS	52	JMI	08/19/93	TD
16 W	71 / 80	80'N OF SEOS	BO	08/18/93	P	2X3	JS	52	JMI	08/19/93	TD
16 X	80 / 81	INT W/82	T	08/18/93	P	3X3	JS	52	JMI	08/19/93	TD
17 A	82 / 89	90' TO 250'N OF SEOS	FS	08/19/93	RS	160'	SO	52	JMI	08/23/93	SGH
17 B	96 / 97	INT W/98	T	08/19/93	P	4X5	VN	52	JMI	08/23/93	SGH
17 C	96 / 98	5'N OF SEOS	D	08/19/93	P	4X5	KK	50	JMI	08/23/93	SGH
17 D	76 / 89	5'W OF EEOS	FTS	08/19/93	P	2X3	KK	50	JMI	08/23/93	SGH
17 E	117 / 118	INT W/121	T	08/21/93	P	2X2	SO	52	JMI	08/23/93	SGH
17 F	117 / 121	72'E OF EAT	DS-70	08/23/93	P	2X5	KK	52	JMI	08/23/93	SGH
17 G	120 / 124	120'N OF SEOS	DS-71	08/23/93	P	2X5	KK	52	JMI	08/23/93	SGH
17 H	118 / 121	INT W/123	T	08/21/93	P	1X1	SO	52	JMI	08/23/93	SGH
17 I	119 / 120	628'N OF SEOS	PT	08/21/93	P	1X1	SO	52	JMI	08/23/93	SGH
17 J	120 / 124	350'N OF SEOS	WS	08/21/93	P	2X2	SO	52	JMI	08/23/93	SGH
17 K	120 / 124	454'N OF SEOS	DS-72	08/23/93	P	2X5	VN	50	JMI	08/23/93	SGH

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APPENDIX K-2
ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MON.	DATE	QA MON.
17 M	124 / 125	5'N OF SEOS	WS	08/21/93	P	4X4	SO	52	MH	08/23/93	SGH
17 N	124	3'N OF SEOS,10'W OF 124/125	D	08/21/93	P	1X1	SO	52	MH	08/23/93	SGH
17 P	120 / 124	309'N OF SEOS	BO	08/21/93	P	2X2	SO	52	MH	08/23/93	SGH
17 Q	118 / 119	626'N OF SEOS	WS	08/23/93	P	2X2	VN	50	JMI	08/23/93	SGH
17 R	124 / 125	35'N OF SEOS	BO	08/21/93	P	1X1	SO	52	MH	08/23/93	SGH
17 S	124 / 125	220'N OF SEOS	DS-73	08/23/93	P	2X5	KK	52	JMI	08/23/93	SGH
17 T	25 / 124	INT W/120	T	08/21/93	P	2X2	SO	52	MH	08/23/93	SGH
17 W	124 / 125	591'N OF SEOS	DS-74	08/23/93	P	2X5	VN	50	JMI	08/23/93	SGH
17 X	19 / 20	INT W/125/126	T	08/21/93	P	2X2	SO	52	MH	08/23/93	SGH
18 B	83 / 93	INT W/95	T	08/19/93	P	3X8	KK	50	MH	08/23/93	SGH
18 C	78 / 83	INT W/93	T	08/19/93	P	2X2	KK	50	MH	08/23/93	SGH
18 D	78 / 90	INT W/93	T	08/19/93	P	3X6	KK	50	MH	08/23/93	SGH
18 E	90 / 92	INT W/93	T	08/19/93	P	2X6	PP	50	MH	08/23/93	SGH
18 F	91 / 93	12'N OF SEOS	BO	08/19/93	P	2X2	PP	50	MH	08/23/93	SGH
18 G	40 / 99	40'E OF WAT	BO	08/23/93	P	1X1	VN	50	JMI	08/23/93	SGH
18 H	103 / 104	55'E OF WAT	DS-62	08/23/93	P	2X5	KK	52	JMI	08/23/93	SGH
18 I	101 / 102	40'E OF WAT	BO	08/20/93	P	2X3	SK	52	MH	08/23/93	SGH
18 J	102 / 103	59'E OF WAT	DS-63	08/23/93	P	2X2	KK	52	JMI	08/23/93	SGH
18 K	106 / 107	45'E OF WAT	BO	08/20/93	P	2X3	SK	52	SGH	08/23/93	SGH
18 M	108 / 109	45'E OF WAT	BO	08/20/93	P	4X4	SK	52	SGH	08/23/93	SGH
18 N	109 / 110	80'E OF WAT	BO	08/20/93	P	1X1	SK	52	SGH	08/23/93	SGH
18 P	113 / 114	38'E OF WAT	BO	08/20/93	P	1X1	KK	50	SGH	08/23/93	SGH
18 Q	113 / 114	33'E OF WAT	DS-64	08/23/93	P	2X5	VN	50	JMI	08/23/93	SGH
18 R	112 / 113	59'E OF WAT	DS-65	08/23/93	P	2X5	VN	50	JMI	08/23/93	SGH
18 S	109 / 110	INT W/118	T	08/20/93	P	1X1	SK	52	SGH	08/23/93	SGH

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APPENDIX K-2
ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MON.	DATE	QA MON.
18 T	110 / 111	INT W/118	T	08/20/93	RS	2'	KK	50	SGH	08/23/93	SGH
18 W	111 / 112	INT W/118	T	08/20/93	RS	2'	KK	50	SGH	08/23/93	SGH
18 X	112 / 118	22'N OF SEOS	DS-67	08/23/93	P	2X5	VN	50	JMI	08/23/93	SGH
19 A	80 / 82	388'N OF SEOS	BO	08/18/93	P	1X3	JS	52	SGH	08/23/93	SGH
19 B	80 / 82	203'N OF SEOS	WS	08/18/93	P	2X5	JS	52	SGH	08/23/93	SGH
19 C	85 / 86	24'N OF SAT	DS-56	08/19/93	P	2X6	KK	50	SGH	08/23/93	SGH
19 D	81 / 82	INT W/89	T	08/18/93	P	3X4	JS	52	SGH	08/19/93	TD
19 E	81 / 89	INT W/75	T	08/18/93	P	3X4	JS	52	SGH	08/19/93	TD
19 G	82 / 89	394'N OF SEOS	BO	08/18/93	P	2X3	JS	52	SGH	08/23/93	SGH
19 H	82 / 89	118'N OF SEOS	D	08/19/93	P	1X1	SO	52	SGH	08/23/93	SGH
19 I	80 / 82	5'N OF SEOS	D	08/18/93	P	2X2	JS	52	SGH	08/19/93	TD
19 J	82 / 89	270' TO 286'N OF SEOS	FS	08/18/93	2P/RS	1X1/2X3/10'	JS	52	SGH	08/23/93	SGH
19 K	81 / 82	3'N OF SEOS	D	08/18/93	P	1X1	JS	52	SGH	08/19/93	TD
19 M	75 / 81	2'W OF INT 75/81/89	D	08/18/93	P	1X1	JS	52	SGH	08/19/93	TD
19 N	93	148'N OF SEOS,10'W	SI	08/19/93	3-P	2X6/1X6/1X12	KK	50	SGH	08/23/93	SGH
19 Q	124 / 125	358' TO 360'N OF SEOS	FS	08/21/93	RS	2'	SO	52	SGH	08/23/93	SGH
19 R	125 / 126	310'N OF SEOS	DS-75	08/23/93	P	2X5	KK	52	JMI	08/23/93	SGH
19 S	122 / 123	INT W/127	T	08/27/93	P	1X1	BN	50	JMI	08/27/93	MH
19 X	132 / 133	INT W/134	T	08/24/93	P	2X2	SO	52	TD	08/31/93	SGH
20 A	76 / 77	INT W/90	T	08/19/93	P	3X3	KK	50	SGH	08/23/93	SGH
20 B	89 / 90	113'N OF SEOS	DS-58	08/19/93	P	2X5	VN	52	SGH	08/23/93	SGH
20 C	89 / 91	INT W/92	T	08/19/93	P	2X5	PP	50	SGH	08/23/93	SGH
20 D	91 / 93	240'N OF SEOS	DS-59	08/19/93	P	2X5	SO	52	SGH	08/23/93	SGH
20 E	89 / 90	INT W/92	T	08/19/93	P	1X1	PP	50	SGH	08/23/93	SGH
20 F	89 / 91	INT W/94	T	08/19/93	P	3X5	VN	52	SGH	08/23/93	SGH

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APPENDIX K-2
ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER	WELDER I.D. MACH.	QA MON.	DATE	QA MON.
20 G	91 / 93	344'N OF SEOS	BO	08/19/93	P	2X3	VN	52	SGH	08/23/93	SGH
20 H	91 / 93	296'N OF SEOS	BO	08/19/93	P	2X2	VN	52	SGH	08/23/93	SGH
20 I	89 / 94	37'N OF SEOS	DS-60	08/19/93	P	2X5	VN	52	SGH	08/23/93	SGH
20 J	82 / 89	175'N OF SEOS	FTS	08/19/93	P	1X1	SO	52	SGH	08/23/93	SGH
20 K	82 / 89	90'N OF SEOS	FTS	08/19/93	P	1X1	SO	52	SGH	08/23/93	SGH
20 M	91 / 93	INT W/94	T	08/19/93	P	3X5	VN	52	SGH	08/23/93	SGH
20 N	82 / 89	118'N OF SEOS	DS-57	08/19/93	P	2X5	VN	52	SGH	08/23/93	SGH
20 P	82 / 89	203'N OF SEOS	FTS	08/19/93	P	1X1	SO	52	SGH	08/23/93	SGH
20 Q	82 / 89	235'N OF SEOS	FTS	08/19/93	P	1X1	SO	52	SGH	08/23/93	SGH
20 R	82 / 89	270'N OF SEOS	FTS	08/19/93	P	1X1	SO	52	SGH	08/23/93	SGH
20 S	93 / 95	INT W/96	T	08/19/93	P	3X4	KK	50	SGH	08/23/93	SGH
20 T	93 / 96	39'N OF SEOS	BO	08/19/93	P	2X2	PP	50	SGH	08/23/93	SGH
20 W	93 / 96	136'N OF SEOS	BO	08/19/93	P	2X3	VN	52	SGH	08/23/93	SGH
20 X	93 / 96	86'N OF SEOS	DS-61	08/19/93	P	2X5	VN	52	SGH	08/23/93	SGH
21 A	56 / 60	123'N OF SEOS	DS-34B	08/20/93	P	2X5	SK	52	SGH	08/23/93	SGH
21 B	56 / 60	187'N OF SEOS	DS-34A	08/20/93	P	3X6	SK	52	JMI	08/23/93	SGH
21 C	56 / 60	123' TO 187'N OF SEOS	FS	08/20/93	RS	64'	SK	52	JMI	08/23/93	SGH
21 D	56 / 60	167'N OF SEOS	FTS	08/20/93	P	2X6	SK	52	JMI	08/23/93	SGH
21 E	119 / 120	350'N OF SEOS	D	08/20/93	P	2X4	SK	52	TD	08/23/93	SGH
21 F	108 / 109	INT W/118	T	08/23/93	P	2X3	KK	52	SGH	08/23/93	SGH
21 G	134 / 135	INT W/136	T	08/24/93	P	2X2	SO	52	TD	08/31/93	SGH
21 H	132 / 134	INT W/135	T	08/24/93	C	5X20	SO	52	TD	08/31/93	SGH
21 I	132 / 135	10'E OF WEOS	DS-78	08/27/93	P	3X6	BN	50	TD	08/31/93	SGH
21 J	128 / 129	49'W OF EEOS	DS-76	08/27/93	P	3X6	BN	50	TD	08/31/93	SGH
21 K	127 / 128	44'E OF WAT	DS-77	08/27/93	P	3X6	BN	50	TD	08/31/93	SGH

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ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MON.	DATE	QA MON.
21 M	126 / 137	648'N OF SEOS	D	08/27/93	P	1X1	BN	50	SGH	08/31/93	SGH
21 N	126 / 137	405'N OF SEOS	WS	08/24/93	P	2X2	SO	52	TD	08/27/93	MH
21 P	126 / 137	140'N OF SEOS	D	08/24/93	P	1X1	SO	52	TD	08/27/93	MH
21 Q	19 / 126	INT W/137	T	08/24/93	P	3X3	BT	50	JMI	08/27/93	MH
21 R	126 / 137	286'N OF SEOS	DS-79	08/27/93	P	2X6	BN	50	SGH	08/31/93	SGH
21 S	126 / 137	407'N OF SEOS	DS-80	08/27/93	P	2X6	BN	50	SGH	08/31/93	SGH
21 T	17 / 137	60'N OF SEOS	WS	08/24/93	2-P	1X1/2X2	BT	50	JMI	08/27/93	MH
21 W	137 / 138	245'N OF SEOS	WS	08/24/93	P	1X1	SO	52	TD	08/27/93	MH
21 X	17 / 137	INT W/138	T	08/24/93	P	2X4	SO	52	MH	08/27/93	MH
22 A	138 / 139	427'N OF SEOS	DS-82	08/27/93	P	2X7	BN	50	SGH	08/31/93	SGH
22 B	139 / 140	183'N OF SEOS	DS-83	08/27/93	P	2X6	VN	52	SGH	08/27/93	MH
22 C	16 / 139	INT W/15	T	08/24/93	P	3X3	SO	52	MH	08/27/93	MH
22 D	139 / 140	380'N OF SEOS	BO	08/27/93	P	1X1	BN	50	JMI	08/31/93	SGH
22 E	139 / 140	415'N OF SEOS	WS	08/24/93	P	1X1	SO	52	TD	08/27/93	MH
22 F	140 / 141	340'N OF SEOS	DS-84	08/27/93	P	2X5	BN	50	JMI	08/31/93	SGH
22 G	141 / 142	305'N OF SEOS	WS	08/24/93	P	2X2	BT	50	JMI	08/27/93	MH
22 H	140 / 141	295'N OF SEOS	WS	08/24/93	P	2X2	BT	50	JMI	08/27/93	MH
22 I	141 / 142	183'N OF SEOS	DS-85	08/27/93	P	2X6	VN	52	SGH	08/27/93	MH
22 J	141 / 142	445'N OF SEOS	DS-86	08/27/93	P	2X5	BN	50	JMI	08/31/93	SGH
22 K	141 / 142	432'N OF SEOS	BO	08/24/93	P	2X2	BT	50	JMI	08/27/93	MH
22 M	15 / 140	INT W/141	T	08/24/93	2-P	1X3/2X3	BT	50	JMI	08/27/93	MH
22 N	15 / 14	INT W/141	T	08/24/93	C	18X18	SO	52	MH	08/27/93	MH
22 P	145 / 146	10'S OF NAT	DS-87	08/25/93	P	2X5	VN	52	JMI	OCA	--
22 Q	145 / 146	75'S OF NAT	PT	08/25/93	P	1X1	BT	50	JMI	08/25/93	MH
22 R	146 / 147	INT W/148	T	08/25/93	RS	3'	SO	52	TD	08/25/93	MH

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APPENDIX K-2
ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MON.	DATE	QA MON.
22 S	148 / 149	INT W/150	T	08/25/93	RS	3'	SO	52	TD	08/25/93	MH
22 W	148 / 150	INT W/153	T	08/25/93	P	2X3	VN	52	JMI	08/25/93	MH
22 X	144 / 145	INT W/153	PT	08/25/93	P	2X2	BT	50	JMI	08/25/93	MH
23 A	96 / 97	5'W OF EEOS	PT	08/19/93	P	2X2	VN	52	TD	08/23/93	SGH
23 B	96 / 97	INT W/93	T	08/19/93	2-P	2X2/2X2	VN	52	TD	08/24/93	CPB
23 C	95 / 96	INT W/84	T	08/19/93	P	2X2	KK	50	TD	08/23/93	SGH
23 D	85 / 98	ENTIRE SEAM	PT	08/19/93	RS	18'	KK	50	TD	08/23/93	SGH
23 E	86 / 87	INT W/98	T	09/14/93	P	2X6	VN	52	JMI	09/15/93	TD
23 F	77 / 78	INT W/90	T	08/19/93	P	2X2	KK	50	TD	08/23/93	SGH
23 G	76 / 89	INT W/90	T	08/19/93	P	1X2	KK	50	TD	08/23/93	SGH
23 H	90	10'N OF SEOS,5'W	D	08/19/93	3-P	1X6/1X6/1X18	KK	50	TD	08/23/93	SGH
23 I	141	160'N OF SEOS,10'E OF 140	SI	08/27/93	P	3X6	VN	52	SGH	08/27/93	MH
23 J	137	15'E OD WEOS,1'N	D	08/24/93	P	1X1	BT	50	JMI	08/27/93	MH
23 K	137	15'E OF WEOS,4'N	D	08/24/93	P	1X1	BT	50	JMI	08/27/93	MH
23 M	152 / 153	INT W/154	T	08/25/93	P	3X5	VN	52	JMI	08/25/93	MH
23 P	154 / 155	89'E OF WAT	DS-89	08/25/93	P	2X5	VN	52	JMI	08/25/93	MH
23 Q	154 / 154	60'W OF EAT	BO	08/25/93	P	2X5	BT	50	SGH	08/25/93	MH
23 R	145 / 146	INT W/153	PT	08/25/93	P	1X1	VN	52	JMI	08/25/93	MH
23 S	156 / 157	12'W OF EAT	FM	08/25/93	P	1X1	VN	52	SGH	08/25/93	MH
23 T	156 / 157	112'W OF EAT	DS-90	08/25/93	P	2X6	SO	50	SGH	08/25/93	MH
23 W	156 / 157	INT W/159	T	08/25/93	P	3X3	BT	50	JMI	08/25/93	MH
23 X	157 / 158	INT W/159	T	08/25/93	P	3X3	BT	50	SGH	08/25/93	MH
24 A	152 154	80'W OF EAT	WR	08/25/93	P	2X4	VN	52	JMI	08/25/93	MH
24 B	137 / 138	210'N OF SEOS	BO	08/27/93	P	1X1	BN	50	SGH	08/27/93	MH
24 C	155	3'W OF EAT,10'N OF 155/156	D	08/25/93	P	1X1	VN	52	JMI	OCA	--

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ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MON.	DATE	QA MON.
24 D	150 / 152	80'W OF EAT	BO	08/25/93	P	1X1	VN	52	JMI	08/25/93	MH
24 E	145 / 153	ENTIRE SEAM	FS	08/25/93	RS	34'	VN	52	JMI	08/25/93	MH
24 F	143 / 144	INT W/153	T	08/25/93	P	2X2	BT	50	JMI	08/25/93	MH
24 G	140 / 141	110'N OF SEOS	BO	08/27/93	P	1X1	BN	50	JMI	08/31/93	SGH
24 H	170 / 171	261'S OF NAT	DS-98	08/31/93	P	2X5	KK	10	MH	08/31/93	JMI
24 I	171 / 172	40'S OF NAT	BO	08/28/93	P	1X1	SK	10	SGH	08/31/93	JMI
24 J	171 / 172	60'S OF NAT	BO	08/31/93	P	3X5	KK	10	MH	08/31/93	SGH
24 K	172 / 173	35'S OF NAT	BO	08/28/93	P	1X1	VN	50	SGH	08/31/93	SGH
24 M	124	2'S OF 124/165	D	08/28/93	P	1X1	SO	52	JMI	08/31/93	SGH
24 N	171 / 172	275'S OF NAT	BO	08/28/93	P	2X2	SO	52	JMI	08/31/93	JMI
24 P	171 / 172	289'S OF NAT	DS-99	08/31/93	P	2X4	VN	50	MH	08/31/93	JMI
24 Q	172 / 173	180'S OF NAT	BO	08/28/93	P	1X1	VN	50	SGH	08/31/93	SGH
24 R	138 / 169	3'E OF WEOS	WS	08/28/93	P	1X1	SO	52	JMI	08/31/93	JMI
24 S	138 / 168	INT W/169	T	08/28/93	RS	5'	SO	52	JMI	08/31/93	JMI
24 T	126 / 137	2'S OF NEOS	PT	08/28/93	P	2X4	SO	52	JMI	08/31/93	JMI
24 W	167 / 168	INT W/137	T	08/28/93	P/RS	1X1/4'	SO	52	JMI	08/31/93	JMI
24 X	139 / 140	2'S OF NEOS	FTS	08/28/93	P	2X4	SO	52	JMI	08/31/93	JMI
25 A	107	2'E OF WAT,5'S OF 107/108	D	08/23/93	P	1X1	KK	52	SGH	OCA	--
25 B	115 / 116	21'E OF WAT	BO	08/20/93	2-P	1X1/1X1	KK	50	TD	08/23/93	SGH
25 C	115 / 116	40'E OF WAT	BO	08/20/93	P	1X1	KK	50	SGH	08/23/93	SGH
25 D	115 / 116	51'E OF WAT	BO	08/20/93	P	2X2	KK	50	SGH	08/23/93	SGH
25 E	106 / 118	8'N OF 105/118	DS-66	08/23/93	P	2X5	KK	52	JMI	08/23/93	SGH
25 F	119 / 120	20'N OF SEOS	DS-69	08/23/93	P	2X5	KK	52	JMI	08/23/93	SGH
25 G	119 / 120	610'N OF SEOS	BO	08/20/93	P	2X2	KK	50	SGH	08/23/93	SGH
25 H	27 / 44	INT W/119/120	T	08/20/93	P	4X7	KK	50	SGH	08/23/93	SGH

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DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MON.
25 I	40 / 44	INT W/118/119	T	08/20/93	P	3X5	KK	50	TD	08/23/93	SGH
25 J	40 / 99	INT W/118	T	08/20/93	P	4X5	KK	50	TD	08/23/93	SGH
25 K	99 / 100	INT W/118	T	08/20/93	P	2X2	KK	50	TD	08/23/93	SGH
25 M	99 / 118	ENTIRE SEAM	FS	08/23/93	RS	10'	KK	52	JMI	08/27/93	MH
25 N	110 / 111	INT W/118	T	08/23/93	P	1X1	VN	50	JMI	08/23/93	SGH
25 P	119 / 123	ENTIRE SEAM	FS	08/24/93	RS	34'	SO	52	MH	08/27/93	MH
25 Q	16 / 17	INT W/139	T	08/24/93	P	2X5	SO	52	MH	08/27/93	MH
25 R	17 / 139	35'N OF SEOS	BO	08/24/93	P	1X1	BT	50	JMI	08/27/93	MH
25 S	139	5'W OF 17/139,5'N	D	08/27/93	P	1X1	VN	52	JMI	08/27/93	MH
25 T	138 / 139	113'N OF SEOS	DS-81	08/27/93	P	2X6	VN	52	SGH	08/27/93	MH
25 W	15 / 139	INT W/140	T	08/24/93	P	3X5	SO	52	MH	08/27/93	MH
25 X	138 / 139	320'N OF SEOS	WS	08/24/93	P	1X1	SO	52	TD	08/27/93	MH
26 A	112 / 113	INT W/118	T	08/20/93	RS	2'	KK	50	TD	08/23/93	SGH
26 B	113 / 114	INT W/118	T	08/20/93	RS	2'	KK	50	TD	08/23/93	SGH
26 C	114 / 115	INT W/118	T	08/20/93	RS	2'	KK	50	TD	08/23/93	SGH
26 D	115 / 116	INT W/118	T	08/20/93	P	2X2	KK	50	JMI	08/23/93	SGH
26 E	118 / 119	361'N OF SEOS	PT	08/20/93	P	3X3	SK	52	SGH	08/23/93	SGH
26 F	118 / 119	590'N OF SEOS	PT	08/20/93	P	2X3	KK	50	TD	08/23/93	SGH
26 G	118 / 119	610'N OF SEOS	D	08/21/93	P	1X1	KK	50	TD	08/23/93	SGH
26 H	119 / 120	363'N OF SEOS	DS-68	08/20/93	P	2X6	SK	52	SGH	08/23/93	SGH
26 I	116 / 117	INT W/118	T	08/21/93	RS	2'	SO	52	TD	08/23/93	SGH
26 J	121 / 122	INT W/123	T	08/21/93	RS	2'	SO	52	TD	08/23/93	SGH
26 K	118 / 119	INT W/123	T	08/21/93	RS	2'	SO	52	TD	08/31/93	SGH
26 M	125 / 126	370'N OF SEOS	PT	08/21/93	P	2X2	SO	52	TD	08/23/93	SGH
26 N	111 / 112	INT W/118	PT	08/21/93	P	1X1	VN	50	JMI	08/23/93	SGH
26 P	134A	2'S OF NAT,5'N	D	08/24/93	P	1X1	SO	52	TD	OCA	--

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APPENDIX K-2
ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MON.
26 Q	17 / 138	INT W/139	T	08/24/93	RS	2'	SO	52	TD	08/27/93	MH
26 R	152 / 153	13'N OF SEOS	DS-88	08/25/93	P	2X5	VN	52	JMI	08/25/93	MH
26 T	147 / 152	INT W/153	T	08/25/93	P	2X6	VN	52	JMI	08/25/93	MH
26 X	144 / 153	16' TO 26'E OF WEOS	IO	08/25/93	C	2X15	BT	50	JMI	08/25/93	MH
27 A	158 / 160	27'E OF WEOS	DS-91	08/25/93	P	2X6	BT	50	SGH	08/25/93	MH
27 B	157 / 158	150'W OF EAT	D	08/25/93	3-P/RS	X3/1X1/1X1/5	BT	50	SGH	08/25/93	MH
27 C	157 / 159	30'S OF NEOS	PT	08/25/93	P	3X5	BT	50	SGH	08/25/93	MH
27 D	154 / 155	80'E OF EAT	D	08/25/93	P	1X1	VN	52	SGH	08/25/93	MH
27 E	158 / 160	4'W OF EAT	PT	08/25/93	P	1X1	VN	52	SGH	OCA	--
27 F	155 / 156	4'W OF EAT	PT	08/25/93	P	1X1	VN	52	SGH	OCA	--
27 G	155 / 156	75'W OF EAT	BO	08/25/93	P	2X6	BT	50	SGH	08/25/93	MH
27 H	157	110'W OF EAT,30'S	D	08/25/93	P	1X1	BT	50	SGH	08/25/93	MH
27 I	156	80'E OF WAT,5'N	D	08/25/93	P	1X1	BT	50	SGH	08/25/93	MH
27 J	157 / 158	3'W OF EAT	PT	08/25/93	P	1X1	VN	52	SGH	OCA	--
27 K	161 / 162	275'S OF NAT	BO	08/31/93	P	1X1	KK	10	MH	08/31/93	SGH
27 M	119 / 123	INT W/161	T	08/28/93	P	3X5	SO	52	JMI	08/31/93	SGH
27 N	129 / 130	INT W/161	T	08/28/93	P	3X3	SO	52	JMI	08/31/93	SGH
27 P	130 / 131	INT W/161	T	08/28/93	P	3X3	SO	52	JMI	08/31/93	SGH
27 Q	131 / 132	INT W/161	T	08/28/93	P	3X3	SO	52	JMI	08/31/93	SGH
27 R	132 / 161	8'N OF SEOS	DS-92	08/31/93	P	2X5	KK	10	MH	08/31/93	SGH
27 S	132 / 135	INT W/161	T	08/28/93	P	3X3	SO	52	JMI	08/31/93	SGH
27 T	162 / 163	60'S OF NAT	DS-93	08/31/93	P	3X5	KK	10	MH	08/31/93	SGH
27 W	162 / 163	INT W/164	T	08/28/93	P	1X1	SO	52	JMI	08/31/93	SGH
27 X	163 / 166	30'S OF NAT TQ NAT	IO	08/28/93	CAP	1X30	SO	52	JMI	08/31/93	SGH
28 A	17 / 138	ENTIRE SEAM	FS	08/27/93	RS	34'	VN	52	JMI	08/27/93	MH
28 B	17 / 137	ENTIRE SEAM	FS	08/27/93	RS	91'	VN	52	JMI	08/27/93	MH

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APPENDIX K-2
ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MON.
28 C	15 / 139	ENTIRE SEAM	FS	08/28/93	RS	13'	BN	50	JMI	08/27/93	MH
28 D	162 / 164	INT W/165	T	08/28/93	P	1X2	SO	52	JMI	08/31/93	SGH
28 E	166 / 167	48'S OF NAT	BO	08/28/93	P	1X1	SO	52	JMI	08/31/93	SGH
28 F	163 / 164	INT W/166	T	08/28/93	P	1X1	SO	52	JMI	08/31/93	SGH
28 G	119 / 161	INT W/162	T	08/28/93	P	3X4	SO	52	JMI	08/31/93	SGH
28 H	166 / 167	160'S OF NAT	DS-94	08/31/93	P	2X5	KK	10	MH	08/31/93	JMI
28 I	120 / 162A	15'W OF EEOS	BO	08/28/93	2-P	1X1/1X3	SO	52	JMI	08/31/93	SGH
28 K	120 / 162A	SWEOS TO NWEOS	IO	08/28/93	RS	5'	SO	52	JMI	08/31/93	SGH
28 M	162A / 165	ENTIRE SEAM	IO	08/28/93	2-P/RS	1X1/10'	SO	52	JMI	08/31/93	SGH
28 N	125 / 165	INT W/166	T	08/28/93	P	1X1	SO	52	JMI	08/31/93	SGH
28 P	124 / 125	5'N OF SEOS	FTS	08/28/93	P/RS	2X2/7'	SO	52	JMI	08/31/93	SGH
28 Q	125 / 126	INT W/166/167	T	08/28/93	P/RS	1X1/7'	SO	52	JMI	08/31/93	JMI
28 R	125 / 166	10'W OF EEOS	DS-95	08/31/93	P	2X5	KK	10	MH	08/31/93	SGH
28 S	168 / 169	189'S OF NAT	DS-96	08/31/93	P	2X5	KK	10	MH	08/31/93	JMI
28 T	169 / 170	150'S OF NAT	DS-97	08/31/93	P	2X5	VN	50	MH	08/31/93	JMI
28 W	170 / 171	29'S OF NAT	BO	08/28/93	P	1X1	SK	10	JMI	08/31/93	JMI
28 X	170 / 171	130'S OF NAT	BO	08/28/93	P	1X1	SO	52	JMI	08/31/93	JMI
29 A	171	30'S OF NAT	BS	08/28/93	CAP	8X12	SK	10	JMI	08/31/93	JMI
29 B	168 / 169	185'S OF NAT	BO	08/28/93	P	1X1	SO	52	JMI	08/31/93	JMI
29 C	139	2'N OF SEOS,15'W OF 139/140	D	08/28/93	P	1X1	SO	52	JMI	08/31/93	JMI
29 D	140 / 171	INT W/172	T	08/28/93	RS	20'	SO	52	JMI	08/31/93	JMI
29 E	140 / 170	INT W/171	T	08/28/93	P	1X1	SO	52	JMI	08/31/93	JMI
29 F	139 / 169	INT W/170	T	08/28/93	RS	5'	SO	52	JMI	08/31/93	JMI
29 G	171	5'N OF SEOS,5'W	D	08/28/93	2-P	2X2/2X2	SO	52	JMI	08/31/93	JMI
29 H	141 / 142	5'S OF NEOS	PT	08/28/93	P	1X1	VN	50	SGH	08/31/93	JMI
29 I	141 / 172	15'W OF EEOS	BO	08/28/93	P	1X1	VN	50	SGH	08/31/93	JMI

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APPENDIX K-2
ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MON
29 J	142 / 172	INT W/173	T	08/28/93	P	2X4	VN	50	SGH	08/31/93	JMI
29 K	142 / 173	ENTIRE SEAM	FS	08/28/93	RS	30'	VN	50	SGH	08/31/93	JMI
29 M	123 / 127	INT W/161	VL	09/04/93	GW	4"	SK	50	JMI	09/04/93	MH
29 N	124 / 162	INT W/165	VL	09/04/93	GW	4"	SK	50	JMI	09/04/93	MH
29 P	142 / 174	INT W/12/13	T	08/31/93	P	3X8	BT	50	MH	09/08/93	MH
29 Q	174 / 175	INT W/12/45	T	08/31/93	3-P/RS	X4/3X3/3X5/5	VN	52	MH	09/08/93	MH
29 R	126 / 137	7'N OF SEOS	FS	08/31/93	RS	7'	BT	50	MH	08/31/93	SGH
29 S	50 / 51	INT W/178/179	T	09/01/93	P	2X8	SO	52	MH	09/08/93	MH
29 T	71 / 80	3'S OF NEOS	PT	09/06/93	RS	1'	SO	52	MH	09/09/93	MH
29 W	200	3'N OF SEOS,3'E	D	09/04/93	P	1X1	SO	52	JMI	09/09/93	MH
29 X	168	320'S OF NAT,5'E	D	09/04/93	P	1X1	SK	52	JMI	09/04/93	MH
30 A	142 / 173	4'E OF WEOS	D	08/31/93	P	1X1	VN	50	MH	08/31/93	JMI
30 B	142 / 173	9'W OF EEOS	D	08/31/93	P	1X1	VN	50	MH	08/31/93	JMI
30 C	142 / 174	305'N OF SEOS	WS	08/31/93	P	2X2	SO	52	MH	09/08/93	MH
30 D	142 / 174	268'N OF SEOS	DS-101	08/31/93	P	2X6	SO	52	MH	09/08/93	MH
30 E	142 / 174	362'N OF SEOS	DS-100	08/31/93	P	2X5	SO	52	MH	09/08/93	MH
30 F	174 / 175	305'N OF SEOS	WS	08/31/93	P	1X1	SO	52	MH	09/08/93	MH
30 G	174 / 175	543'N OF SEOS	DS-102	08/31/93	P	2X5	VN	52	MH	09/09/93	TD
30 H	175 / 176	313'N OF SEOS	WS	08/31/93	P	3X3	SO	52	MH	09/09/93	TD
30 I	175 / 176	143'N OF SEOS	DS-103	08/31/93	P	2X5	VN	52	MH	09/08/93	MH
30 J	175 / 176	428'N OF SEOS	DS-104	08/31/93	P	2X5	SO	52	MH	09/09/93	TD
30 K	175 / 176	70'N OF SEOS	BO	08/31/93	P	1X1	VN	52	MH	09/08/93	MH
30 N	176 / 177	268'N OF SEOS	WS	08/31/93	P	3X3	VN	52	MH	09/08/93	MH
30 P	176 / 177	430'N OF SEOS	BO	08/31/93	P	2X3	VN	52	MH	09/09/93	TD
30 Q	46 / 177	65' TO 84'N OF SEOS	IO	08/31/93	2-P/RS	1X1/2X3/20'	BT	50	MH	09/08/93	MH
30 R	46 / 117	59'N OF SEOS	D	08/31/93	P	1X1	BT	50	MH	09/08/93	MH

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APPENDIX K-2
ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MON.
30 S	46 / 177	29' TO 43'N OF SEOS	IO	08/31/93	2-P/RS	2X2/3X4/8'	BT	50	MH	09/08/93	MH
30 T	46 / 177	43' TO 65'N OF SEOS	FS	08/31/93	RS	14'	BT	50	MH	09/08/93	MH
30 W	142 / 174	150' TO 190'N OF SEOS	FS	09/01/93	RS	40'	SO	52	MH	09/08/93	MH
30 X	51 / 179	WEOS TO 24'E	FS	09/01/93	RS	30'	SO	52	MH	09/08/93	MH
31 A	142 / 174	220' TO 225'N OF SEOS	FS	08/31/93	RS	10'	SO	52	MH	09/08/93	MH
31 B	46 / 176	ENTIRE SEAM	FS	08/31/93	3-P/RS	X2/2X2/1X1/4	VN	52	MH	09/08/93	MH
31 C	177 / 178	290'N OF SEOS	WS	08/31/93	P/RS	1X1/7'	VN	52	MH	09/08/93	MH
31 D	177 / 178	624'N OF SEOS	DS-105	09/03/93	P	2X5	KS	52	JMI	09/08/93	MH
31 E	177 / 178	231'N OF SEOS	DS-106	08/31/93	P	2X5	VN	52	MH	09/08/93	MH
31 F	57 / 177	2'E OF WEOS	DS-107	08/31/93	P	3X4	BT	50	MH	09/08/93	MH
31 G	175	4'N OF SEOS,15'E	D	08/31/93	P	2X2	VN	52	MH	09/08/93	MH
31 H	50 / 57	INT W/177/178	T	08/31/93	P	2X6	BT	50	MH	09/08/93	MH
31 I	178 / 179	340'N OF SEOS	WS	09/01/93	P	1X3	SK	10	MH	09/08/93	MH
31 J	178 / 179	476'N OF SEOS	DS-108	09/03/93	P	2X5	KS	52	JMI	09/08/93	MH
31 K	179 / 180	239'N OF SEOS	DS-109	09/03/93	P	2X5	KS	52	JMI	09/08/93	MH
31 M	180 / 181	30'N OF SEOS	DS-111	09/03/93	P	2X5	KS	52	JMI	09/09/93	TD
31 N	179 / 180	386'N OF SEOS	DS-110	09/01/93	P	2X5	SK	10	MH	09/08/93	MH
31 P	179 / 180	353'N OF SEOS	WS	09/01/93	P	2X2	SK	10	MH	09/08/93	MH
31 Q	180 / 181	350'N OF SEOS	WS	09/01/93	P	2X2	SK	10	MH	09/08/93	MH
31 R	182 / 183	350'N OF SEOS	WS	09/01/93	P	2X4	SK	10	MH	09/09/93	TD
31 S	181 / 182	304'N OF SEOS	DS-112	09/03/93	P	2X5	KS	52	JMI	09/09/93	TD
31 T	182 / 183	200'N OF SEOS	DS-113	09/03/93	P	2X5	KS	52	JMI	09/08/93	MH
31 W	182 / 183	534'N OF SEOS	DS-114	09/03/93	P	2X5	KS	52	JMI	09/09/93	TD
31 X	183 / 184	342'N OF SEOS	WS	09/01/93	P	2X2	SK	10	MH	09/09/93	TD
32 A	51 / 179	EEOS TO 10'W OF EEOS	CO	09/01/93	RS	10'	SO	52	MH	09/09/93	TD
32 B	51 / 52	INT W/179/180	T	09/01/93	P	2X2	SO	52	MH	09/08/93	MH

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APPENDIX K-2
ASH POND 91
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DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MON
32 C	52	NEOS TO 5'W OF EEOS	D	09/01/93	P	2X3	SO	52	MH	09/08/93	MH
32 D	53 / 54	2'S OF NEOS	D	09/01/93	P	1X1	SO	52	MH	09/08/93	TD
32 E	182 / 183	INT W/54/55	T	09/01/93	P	2X10	SO	52	MH	09/08/93	TD
32 F	56 / 183	INT W/55	T	09/01/93	P	2X4	SO	52	MH	09/08/93	TD
32 G	56	NEO P56 TO 15'W OF EEOS	D	09/01/93	P	1X1	JS	52	MH	09/08/93	TD
32 H	186 / 187	655'N OF SEOS TO NEOS	PT	09/08/93	RS	15'	SK	52	MH	09/09/93	TD
32 I	188 / 189	300'N OF SEOS	WS	09/03/93	2-P	1X1/1X2	JS	50	JMI	09/09/93	TD
32 J	189	300'N OF SEOS,4'E	D	09/03/93	P	2X2	JS	50	JMI	09/09/93	TD
32 K	195 / 196	2'N OF SEOS	PT	09/03/93	P	1X3	KS	52	JMI	09/09/93	MH
32 M	173	370'S OF NAT,10'E	SI	08/24/93	C	2X34	PP	50	MH	09/04/93	MH
32 N	173 / 142	INT W/172	SI	08/24/93	C	2X34	PP	50	MH	09/04/93	MH
32 P	176	NEOS TO 10'E OF WEOS	D	09/06/93	P	1X1	JS	50	MH	09/08/93	TD
32 Q	214	5'S OF NEOS	WR	09/07/93	P/RS	2X2/8'	SK	52	MH	09/08/93	TD
32 R	231 / 234	75'S OF NAT	BO	09/08/93	P	2X3	SK	52	MH	09/09/93	TD
32 S	197 / 196	SEOS TO 15'N	PT	09/08/93	RS	15'	SK	52	MH	09/09/93	MH
32 T	193 / 236	7'W OF EEOS	D	09/10/93	P	1X1	SK	52	MH	09/18/93	MH
32 W	204 / 173	250'S TO 240'S OF NAT	D	09/10/93	RS	10'	SK	52	MH	09/10/93	MH
32 X	204 / 173	200'S TO 210'S OF NAT	PT	09/10/93	RS	10'	SK	52	MH	09/10/93	MH
33 A	183 / 184	270'N OF SEOS	DS-115	09/03/93	P	2X5	KS	52	JMI	09/09/93	TD
33 B	184 / 185	166'N OF SEOS	DS-116	09/03/93	P	2X5	KS	52	JMI	09/08/93	MH
33 C	183 / 184	364'N OF SEOS	DS-117	09/01/93	P	3X5	SK	10	MH	09/09/93	TD
33 D	184 / 185	636'N OF SEOS	DS-118	09/03/93	P	2X5	JS	50	JMI	09/09/93	TD
33 E	185 / 186	445'N OF SEOS	WR	09/01/93	P	3X3	SK	10	MH	09/09/93	TD
33 F	185 / 186	345'N OF SEOS	WS	09/01/93	P	3X3	SK	10	MH	09/09/93	TD
33 G	186 / 187	353'N OF SEOS	WS	09/01/93	P	1X2	SK	10	MH	09/09/93	TD
33 H	186 / 187	300'N OF SEOS	DS-119	09/03/93	P	2X5	JS	50	JMI	09/09/93	TD

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				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH	QA MONITOR	DATE	QA MON.
33 I	186 / 187	660'N OF SEOS	BO	09/03/93	P	2X2	JS	50	JMI	09/09/93	TD
33 J	186 / 187	640'N OF SEOS	BO	09/03/93	P	2X2	JS	50	JMI	09/09/93	TD
33 K	186 / 187	543'N OF SEOS	DS-120	09/03/93	P	2X5	JS	50	JMI	09/09/93	TD
33 M	187 / 188	235'N OF SEOS	DS-121	09/03/93	P	2X5	KS	52	JMI	09/08/93	TD
33 N	68 / 193	10'W OF EEOS	D	09/03/93	P	2X6	KS	52	JMI	09/09/93	MH
33 P	68 / 194	ENTIRE SEAM	IO	09/03/93	C	3X15	BT	10	JMI	09/09/93	MH
33 Q	69 / 70	2'S OF NEOS	PT	09/03/93	P	1X1	BT	10	JMI	09/09/93	MH
33 R	70 / 71	INT W/195	T	09/03/93	P	2X3	KS	52	JMI	09/09/93	MH
33 S	142 / 204	ENTIRE SEAM	IO	09/06/93	P	3X7	SO	52	MH	09/08/93	TD
33 T	218	103'S OF NAT,9'E	D	09/07/93	P	1X1	SK	52	MH	09/08/93	TD
34 A	188 / 189	95'S OF NEOS	DS-122	09/03/93	P	2X5	JS	50	JMI	09/09/93	TD
34 B	186 / 187	SEOS TO 10'N OF SEOS	FS	09/01/93	P/RS	2X2/4'	SO	52	JMI	09/08/93	TD
34 C	188 / 189	150'N OF SEOS	DS-123	09/04/93	P	2X5	SO	52	JMI	09/09/93	TD
34 D	189 / 190	215'N OF SEOS	DS-124	09/04/93	P	2X5	SO	52	JMI	09/09/93	TD
34 E	190 / 191	20'S OF NEOS	BO	09/08/93	P	2X2	VN	50	MH	09/09/93	TD
34 F	188 / 189	50'N OF SEOS	BO	09/03/93	P	2X2	KS	52	JMI	09/09/93	MH
34 G	190 / 191	300'N OF SEOS	PT	09/03/93	P	2X2	JS	50	JMI	09/09/93	TD
34 H	190 / 191	355'S OF NEOS	DS-125	09/03/93	P	2X5	JS	50	JMI	09/09/93	TD
34 I	190 / 191	90'N OF SEOS	PT	09/03/93	P	2X7	JS	50	JMI	09/09/93	MH
34 J	191 / 192	15'S OF NEOS	DS-126	09/04/93	P	2X5	CW	50	MH	09/09/93	TD
34 K	192 / 193	280'N OF SEOS	DS-127	09/08/93	P	2X5	SK	52	MH	09/09/93	TD
34 M	191 / 192	220'N OF SEOS	DS-128	09/04/93	P	2X5	SO	52	JMI	09/09/93	TD
34 N	192 / 193	300'N OF SEOS	PT	09/03/93	P	2X3	JS	50	JMI	09/09/93	TD
34 P	188 / 189	190'N OF SEOS	BO	09/04/93	P	1X1	SO	52	JMI	09/09/93	TD
34 Q	188 / 189	165'N OF SEOS	BO	09/04/93	P	1X1	SO	52	JMI	09/09/93	TD
34 R	193 / 194	130'N OF SEOS	DS-129	09/04/93	P	2X5	SO	52	JMI	09/09/93	MH

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APPENDIX K-2
ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MON.
34 S	193 / 194	570'N OF SEOS	DS-130	09/04/93	P	2X5	CW	50	MH	09/09/93	TD
34 T	193 / 194	505'N OF SEOS	PT	09/03/93	P	2X3	JS	50	JMI	09/09/93	TD
34 W	193 / 194	300'N OF SEOS	PT	09/03/93	P	2X2	JS	50	JMI	09/09/93	TD
34 X	194 / 195	430'N OF SEOS	DS-131	09/04/93	P	2X5	CW	50	MH	09/09/93	TD
35 A	195 / 196	485'N OF SEOS	DS-132	09/04/93	P	2X5	CW	50	MH	09/09/93	TD
35 B	195 / 196	575'N OF SEOS	BO	09/03/93	P	2X2	JS	50	JMI	09/09/93	TD
35 C	195 / 196	130'N OF SEOS	BO	09/03/93	P	2X2	JS	50	JMI	09/09/93	MH
35 D	195 / 196	320'N OF SEOS	PT	09/03/93	P	2X2	JS	50	JMI	09/09/93	TD
35 E	196 / 197	20'N OF SEOS	DS-133	09/08/93	P	2X5	VN	50	MH	09/09/93	MH
35 F	196 / 197	300'N OF SEOS	PT	09/04/93	P	2X2	PP	50	MH	09/09/93	MH
35 G	196 / 197	85'S OF NEOS	DS-134	09/08/93	P	2X5	SK	52	MH	09/09/93	TD
35 H	197 / 198	330'N OF SEOS	DS-135	09/08/93	P	2X5	BT	10	MH	09/09/93	TD
35 I	197 / 198	350'N OF SEOS	PT	09/04/93	P	2X2	PP	50	MH	09/09/93	TD
35 J	198 / 199	300'N OF SEOS	PT	09/04/93	P	2X3	PP	50	MH	09/09/93	TD
35 K	198 / 199	120'N OF SEOS	DS-136	09/08/93	P	2X5	VN	50	MH	09/09/93	MH
35 M	198 / 199	470'N OF SEOS	DS-137	09/08/93	P	2X5	BT	10	MH	09/09/93	TD
35 N	200 / 201	275'N OF SEOS	PT	09/04/93	P	2X3	PP	50	MH	09/09/93	TD
35 P	199 / 200	350'N OF SEOS	PT	09/04/93	P	2X2	PP	50	MH	09/09/93	TD
35 Q	199 / 200	605'N OF SEOS	DS-138	09/08/93	P	2X5	SK	52	MH	09/09/93	TD
35 R	200 / 201	130'S OF NEOS	DS-139	09/08/93	P	2X5	BT	10	MH	09/09/93	TD
35 S	199 / 200	80'N OF SEOS	DS-140	09/08/93	P	2X5	VN	50	MH	09/09/93	MH
35 T	201 / 202	95'N OF SEOS	DS-141	09/08/93	P	2X5	VN	50	MH	09/09/93	MH
35 W	201 / 202	120'N OF SEOS	DS-142	09/08/93	P	2X5	BT	10	MH	09/09/93	TD
35 X	202 / 203	345'N OF SEOS	DS-143	09/08/93	P	2X5	BT	10	MH	09/09/93	TD
36 A	173 / 204	236'S OF NEOS	DS-144	09/06/93	P	2X5	SK	52	MH	09/08/93	TD
36 B	205 / 206	10'W OF EEOS	BO	09/06/93	P	2X3	JS	50	MH	09/08/93	TD

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ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER	WELDER I.D. MACH	QA MONITOR	DATE	QA MON.
36 C	204 / 205	115'N OF SEOS	DS-145	09/06/93	P	2X5	SK	52	MH	09/08/93	TD
36 D	204 / 205	INT W/206	T	09/06/93	RS	12"	SO	52	MH	09/08/93	TD
36 F	173 / 204	35'N OF SEOS	BO	09/06/93	P	2X3	SO	52	MH	09/08/93	TD
36 G	173 / 204	60'N OF SEOS	BO	09/06/93	P	2X3	SO	52	MH	09/08/93	TD
36 H	173 / 204	90'S OF NEOS	BO	09/06/93	P/RS	2X3/5'	SO	52	MH	09/08/93	TD
36 I	173 / 204	40'S OF NEOS	BO	09/06/93	P	2X3	SO	52	MH	09/08/93	TD
36 J	204 / 205	35'S OF NEOS	BO	09/06/93	P	2X4	SK	52	MH	09/08/93	TD
36 K	205 / 207	93'N OF SEOS	DS-146	09/06/93	P	2X5	SK	52	MH	09/08/93	TD
36 M	176 / 229	10'S OF NEOS	BO	09/06/93	P/RS	2X2/4'	SK	52	MH	09/08/93	TD
36 N	205 / 206	INT W/207	T	09/06/93	RS	3'	JS	50	MH	09/08/93	TD
36 P	176 / 206	INT W/207	T	09/06/93	GW	10"	JS	50	MH	09/08/93	TD
36 Q	207 / 208	15'N OF SEOS	DS-147	09/06/93	P	2X5	SK	52	MH	09/08/93	TD
36 R	207 / 208	INT W/209	T	09/06/93	P	2X2	SK	52	MH	09/08/93	TD
36 S	208 / 209	INT W/210	T	09/06/93	P	2X4	SK	52	MH	09/08/93	TD
36 T	176 / 207	INT W/209	T	09/06/93	RS	5'	JS	50	MH	09/08/93	TD
36 W	175 / 176	INT W/206	T	09/06/93	P/RS	1X1/8"	JS	50	MH	09/08/93	TD
36 X	175 / 204	INT W/206	T	09/06/93	RS	2'	JS	50	MH	09/08/93	TD
37 A	176 / 177	INT W/209	T	09/06/93	P	2X3	JS	50	MH	09/08/93	TD
37 B	178 / 209	ENTIRE SEAM	CAP	09/06/93	P	4X7	BT	10	MH	09/08/93	TD
37 D	205 / 206	ENTIRE SEAM	FS	09/06/93	RS	34'	JS	50	MH	09/08/93	TD
37 E	208 / 210	6'N OF SEOS	DS-148	09/06/93	P	2X5	SK	52	MH	09/08/93	TD
37 F	179 / 211	4'W OF EEOS	DS-149	09/06/93	P	3X5	BT	10	MH	09/08/93	TD
37 G	180 / 212	10'E OF WEOS	BO	09/06/93	P	1X1	BT	10	MH	09/08/93	TD
37 H	178 / 179	INT W/211	T	09/06/93	P	3X3	BT	10	MH	09/08/93	TD
37 I	178 / 210	INT W/211	T	09/06/93	P	2X2	BT	10	MH	09/08/93	TD
37 J	179 / 212	ENTIRE SEAM	CAP	09/06/93	P	2X7	BT	10	MH	09/08/93	TD

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ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
							WELDER I.D.		QA		QA
				DATE	TYPE	DIM.	OPER.	MACH.	MONITOR	DATE	MON.
37 M	210 / 211	4'N OF SEOS	DS-150	09/07/93	P	2X5	SK	52	MH	09/08/93	TD
37 N	181 / 182	INT W/213	T	09/06/93	GW	8"	BT	10	MH	09/08/93	TD
37 P	180 / 181	INT W/213	T	09/06/93	P/RS	1X1/20"	BT	10	MH	09/08/93	TD
37 Q	211 / 212	60'S OF NEOS	BO	09/06/93	P	2X2	SK	52	MH	09/08/93	TD
37 R	211 / 212	65'S OF NEOS	BO	09/06/93	P	2X2	SK	52	MH	09/08/93	TD
37 S	211 / 212	117'S OF NEOS	BO	09/06/93	P	2X2	SK	52	MH	09/08/93	TD
37 T	211 / 212	215'S OF NEOS	BO	09/06/93	P	2X2	SK	52	MH	09/08/93	TD
37 W	211 / 212	175'N OF SEOS	DS-151	09/06/93	P	2X5	BT	10	MH	09/08/93	TD
37 X	211 / 212	275'S OF NEOS	BO	09/06/93	P	2X2	BT	10	MH	09/08/93	TD
38 A	173 / 204	140'S TO 150'S OF NAT	FS	09/06/93	RS	10'	SK	52	MH	09/08/93	TD
38 B	173 / 204	165'S TO 170'S OF NAT	FS	09/06/93	RS	4'	SK	52	MH	09/08/93	TD
38 C	175 / 206	ENTIRE SEAM	FS	09/06/93	RS	34'	JS	50	MH	09/08/93	TD
38 D	207 / 209	28'N OF SEOS	BO	09/06/93	P	2X2	JS	50	MH	09/08/93	TD
38 E	213 / 214	NEOS TO 20'S OF NEOS	FS	09/07/93	RS	15	SK	52	MH	09/08/93	TD
38 F	220 / 221	EEOS TO 6'W OF EEOS	FS	09/07/93	RS	8'	SK	52	MH	09/08/93	TD
38 G	221	2'S OF 220/221,6'E	D	09/07/93	P	2X2	SK	52	MH	09/08/93	TD
38 H	193 / 194	INT W/238	T	09/10/93	RS	3'	SK	52	MH	09/15/93	TD
38 I	193 / 236	INT W/238	T	09/10/93	RS	3'	SK	52	MH	09/15/93	TD
38 J	235 / 236	INT W/238	T	09/10/93	P	2X2	SK	52	TD	09/15/93	TD
38 K	194 / 195	INT W/238	T	09/10/93	P/RS	1X1/5'	SK	52	MH	09/15/93	TD
38 M	195 / 238	INT W/239	T	09/10/93	P	2X3	SK	52	MH	09/15/93	TD
38 N	237 / 238	INT W/239	T	09/10/93	RS	3'	SK	52	MH	09/15/93	TD
38 P	236 / 237	INT W/238	T	09/10/93	P	3X3	SK	52	TD	09/15/93	TD
38 Q	195 / 196	INT W/239	T	09/10/93	P	2X2	SK	52	MH	09/15/93	TD
38 R	237 / 239	80'S OF NEOS	BO	09/10/93	P	2X5	JS	50	JMI	09/15/93	TD
38 S	196 / 240	INT W/242	T	09/10/93	P	1X1	SK	52	MH	09/15/93	TD

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ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MON.
38 T	173 / 204	200'S OF NEOS	DS-144A	09/10/93	P	2X5	SK	52	MH	09/10/93	MH
38 W	173 / 204	255'S OF NEOS	DS-144B	09/10/93	P	2X5	SK	52	MH	09/10/93	MH
38 X	196 / 240	@ WEOS	PT	09/10/93	RS	8'	SK	52	MH	09/15/93	TD
39 A	212 / 213	4'N OF SEOS	DS-152	09/07/93	P	2X5	SK	52	MH	09/08/93	TD
39 B	182 / 213	INT W/214	T	09/07/93	RS	3'	SK	52	MH	09/08/93	TD
39 C	182 / 215	ENTIRE SEAM	CAP	09/07/93	P	1X10	SK	52	MH	09/08/93	TD
39 D	183 / 184	INT W/215	T	09/07/93	P	1X2	SK	52	MH	09/08/93	TD
39 E	184 / 215	INT W/216	T	09/07/93	P/RS	1X1/3'	SK	52	MH	09/08/93	TD
39 F	216 / 217	141'N OF SEOS	DS-153	09/07/93	P	3X5	SK	52	MH	09/08/93	TD
39 G	184 / 216	INT W/217	T	09/07/93	P	3X4	SK	52	MH	09/08/93	TD
39 H	218 / 219	50'N OF SEOS	DS-154	09/07/93	P	2X5	SK	52	MH	09/08/93	TD
39 I	215 / 216	INT W/219	T	09/07/93	P	2X2	SK	52	MH	09/08/93	TD
39 J	214 / 215	INT W/219	T	09/07/93	P	2X2	SK	52	MH	09/08/93	TD
39 K	213 / 214	INT 218 TO 10'N	FS	09/07/93	RS	10'	SK	52	MH	09/08/93	TD
39 M	218 / 219	70'S OF NEOS	BO	09/07/93	P	1X1	SK	52	MH	09/08/93	TD
39 N	219 / 220	98'N OF SEOS	DS-155	09/07/93	P	2X5	SK	52	MH	09/08/93	TD
39 P	219 / 220	INT W/221	T	09/07/93	RS	5'	SK	52	MH	09/08/93	TD
39 Q	216 / 219	INT W/221	T	09/07/93	RS	3'	SK	52	MH	09/08/93	TD
39 R	216 / 217	INT W/221	T	09/07/93	P	2X2	SK	52	MH	09/08/93	TD
39 S	217 / 221	INT W/222	T	09/07/93	P	2X4	SK	52	MH	09/08/93	TD
39 T	220 / 221	INT W/222	T	09/07/93	RS	3'	SK	52	MH	09/08/93	TD
39 W	217 / 222	INT W/223	T	09/07/93	P	2X2	SK	52	MH	09/08/93	TD
39 X	217 / 223	40'S OF NEOS	DS-156	09/07/93	P	2X5	JS	50	MH	09/08/93	TD
40 A	228 / 230	INT W/232	T	09/08/93	P	1X2	SK	52	MH	09/09/93	TD
40 B	229 / 231	INT W/232	T	09/08/93	P	1X2	SK	52	MH	09/09/93	TD
40 C	227 / 229	124'N OF SEOS	DS-161	09/08/93	P	2X5	SK	52	MH	09/09/93	TD

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DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MON.
40 D	229 / 230	7'W OF EEOS	DS-162	09/08/93	P	3X5	SK	52	MH	09/09/93	TD
40 E	227 / 229	100'S OF NEOS	BO	09/08/93	P	3X3	SK	52	MH	09/09/93	TD
40 F	228 / 232	INT W/233	T	09/08/93	P	4X4	JS	50	MH	09/09/93	TD
40 G	232 / 233	10'E OF WEOS	D	09/08/93	P	1X1	JS	50	MH	09/09/93	TD
40 H	190 / 191	INT W/233	T	09/08/93	P	3X4	JS	50	MH	09/09/93	TD
40 I	190 / 191	3'S OF NEOS	PT	09/08/93	P	1X1	JS	50	MH	09/09/93	TD
40 J	192 / 233	INT W/234	T	09/08/93	RS	4'	JS	50	MH	09/09/93	TD
40 K	232 / 233	INT W/234	T	09/08/93	P	2X2	JS	50	MH	09/09/93	TD
40 M	231 / 234	23'N OF SEOS	DS-163	09/08/93	P	2X5	SK	52	MH	09/09/93	TD
40 N	192 / 193	INT W/234	T	09/08/93	RS	4'	JS	50	MH	09/09/93	TD
40 P	231 / 232	INT W/234	T	09/08/93	P	2X4	SK	52	MH	09/09/93	TD
40 Q	193 / 234	INT W/236	T	09/08/93	RS	5'	JS	50	MH	09/09/93	TD
40 R	234 / 235	INT W/236	T	09/08/93	RS	3'	JS	50	MH	09/09/93	TD
40 S	235 / 236	7'W OF EEOS	DS-164	09/08/93	P	2X5	VN	10	MH	09/09/93	TD
40 T	234 / 235	215'N OF SEOS	DS-165	09/08/93	P	2X5	JS	50	MH	09/09/93	TD
40 W	239 / 240	39'S OF NEOS	DS-166	09/11/93	P	2X5	SK	52	MH	09/15/93	TD
40 X	237 / 239	71'S OF NEOS	DS-167	09/11/93	P	2X5	SK	52	MH	09/15/93	TD
41 A	185 / 217	INT 223 TO 185/186/223	CAP	09/07/93	C	4X7	JS	50	MH	09/08/93	TD
41 B	223 / 224	2'W OF EEOS	DS-157	09/07/93	P	2X5	JS	50	MH	09/09/93	TD
41 C	217 / 223	120'S OF NEOS	BO	09/08/93	P	1X2	VN	50	MH	09/08/93	TD
41 D	186 / 187	INT W/224	T	09/07/93	P	2X2	JS	50	MH	09/09/93	TD
41 E	223 / 224	INT W/225	T	09/07/93	P	2X2	JS	50	MH	09/09/93	TD
41 F	187 / 225	10'W OF EEOS	D	09/07/93	P	2X3	BT	10	MH	09/09/93	TD
41 G	187 / 225	INT 226 TO 187/188/226	CAP	09/07/93	P	3X7	BT	10	MH	09/09/93	TD
41 H	188 / 189	INT W/226	T	09/07/93	P	2X4	BT	10	MH	09/09/93	TD
41 I	189 / 226	INT W/227	T	09/07/93	P	3X3	BT	10	MH	09/09/93	TD

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DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MON.
41 J	189 / 226	6'S OF NEOS	BO	09/07/93	P	1X1	BT	10	MH	09/09/93	TD
41 K	223 / 225	56'S OF NEOS	DS-158	09/07/93	P	2X5	SK	52	MH	09/09/93	TD
41 M	225 / 226	175'N OF SEOS	DS-159	09/07/93	P	2X5	JS	50	MH	09/09/93	TD
41 N	189 / 227	10'W OF EEOS	D	09/07/93	P	2X4	BT	10	MH	09/09/93	TD
41 P	226 / 227	359'S OF NEOS	DS-160	09/07/93	P	2X5	JS	50	MH	09/09/93	TD
41 Q	189 / 190	INT W/227	T	09/08/93	P	2X4	JS	50	MH	09/09/93	TD
41 R	190 / 228	10'E OF WEOS	D	09/08/93	P	1X1	JS	50	MH	09/09/93	TD
41 S	228 / 230	10'W OF EEOS,5'S	D	09/08/93	P	1X1	SK	52	MH	09/09/93	TD
41 T	227 / 229	INT W/230	T	09/08/93	P	2X2	SK	52	MH	09/09/93	TD
41 W	227 / 228	INT W/230	T	09/08/93	P	3X4	SK	52	MH	09/09/93	TD
41 X	229 / 230	INT W/231	T	09/08/93	P	1X2	SK	52	MH	09/09/93	TD
42 A	188 / 189	525'N OF SEOS	DS-122B	09/10/93	P	2X5	SK	52	MH	09/10/93	MH
42 B	188 / 189	570'N OF SEOS	DS-122A	09/10/93	P	2X5	SK	52	MH	09/10/93	MH
42 C	240 / 241	INT W/242	T	09/11/93	RS	3'	SK	52	MH	09/15/93	TD
42 D	237 / 239	125'S OF NEOS	BO	09/10/93	P	1X1	JS	50	JMI	09/15/93	TD
42 E	196 / 197	INT W/242	T	09/10/93	RS	10'	SK	52	MH	09/15/93	TD
42 F	241 / 242	INT W/243	T	09/11/93	RS	3'	SK	52	MH	09/15/93	TD
42 G	197 / 242	INT W/243	T	09/10/93	P	1X2	SK	52	MH	09/15/93	TD
42 H	199 / 244	1'E OF WEOS	DS-168	09/11/93	P	2X5	SK	52	MH	09/15/93	TD
42 I	188 / 189	525' TO 570'N OF SEOS	FS	09/10/93	RS	20'	SK	52	MH	09/10/93	MH
42 J	240 / 241	135'S OF NEOS	DS-169	09/11/93	P	2X5	SK	52	MH	09/15/93	TD
42 K	241 / 243	60'S OF NEOS	DS-170	09/11/93	P	2X5	SK	52	MH	09/15/93	TD
42 M	198 / 243	@ WEOS	PT	09/10/93	RS	10'	SK	52	MH	09/15/93	TD
42 N	198 / 199	INT W/243	T	09/10/93	RS	8'	SK	52	MH	09/15/93	TD
42 P	244 / 245	INT W/246	T	09/10/93	RS	4'	JS	50	JMI	09/15/93	TD
42 Q	244 / 246	INT W/199/200	C	09/10/93	P	3X8	SK	52	MH	09/15/93	TD

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REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MON.
42 R	243 / 244	120'N OF SEOS	DS-171	09/11/93	P	2X5	SK	52	MH	09/15/93	TD
42 S	244 / 245	137'S OF NEOS	DS-172	09/11/93	P	2X5	SK	52	MH	09/15/93	TD
42 T	244 / 245	50'S OF NEOS	BO	09/10/93	P	1X1	JS	50	JMI	09/15/93	TD
42 W	244 / 245	25'S OF NEOS	BO	09/10/93	P	1X1	JS	50	JMI	09/15/93	TD
42 X	245 / 246	INT W/247	T	09/10/93	RS	3'	BT	10	MH	09/15/93	TD
43 A	243	262'S OF NAT,14'W	D	09/10/93	P	1X1	SK	52	TD	09/15/93	TD
43 B	243 / 244	430'S OF NAT	HT	09/10/93	P	2X3	SK	52	MH	09/15/93	TD
43 C	247	80'S OF NAT,10'W	SI	09/10/93	P	1X1	JS	50	JMI	09/15/93	TD
43 D	248	350'S OF NAT,11'W	D	09/11/93	P	1X1	SK	52	MH	09/15/93	TD
43 E	251	3'N OF 203/251,7'E	D	09/10/93	P	1X1	BT	10	MH	09/15/93	TD
43 F	203 / 251	8'W OF EEOS	D	09/10/93	P	2X3	BT	10	MH	09/15/93	TD
43 G	251 / 252	170'S OF NEOS TO SEOS	FS	09/11/93	RS	20'	BN	52	JMI	09/15/93	TD
43 H	250 / 252	70'S OF NAT	WR	09/11/93	P	2X6	BN	52	JMI	09/15/93	TD
43 I	254 / 255	426' TO 430'S OF NEOS	FS	09/14/93	RS	4'	CW	10	JMI	09/15/93	TD
43 J	260 / 261	INT W/261	T	09/14/93	P	3X3	SO	50	JMI	09/18/93	MH
43 K	255 / 268	17'E OF WEOS	D	09/14/93	P	1X1	VN	52	JMI	09/18/93	MH
43 M	263 / 269	INT W/270/271	T	09/15/93	P/RS	1X1/6'	SO	50	JMI	09/18/93	MH
43 N	261 / 262	INT W/270	T	09/15/93	P	2X2	SO	50	JMI	09/18/93	MH
43 P	261 / 263	INT W/270	T	09/15/93	P	2X2	SO	50	JMI	09/18/93	MH
44 A	200 / 246	INT W/247	T	09/10/93	P	8'	SK	52	MH	09/15/93	TD
44 B	200 / 246	10'W OF EEOS	D	09/10/93	P	1X1	SK	52	MH	09/15/93	TD
44 C	200 / 246	14'W OF EEOS	BO	09/10/93	P	2X2	SK	52	MH	09/15/93	TD
44 D	201 / 247	10'W OF EEOS	BO	09/10/93	P	2X2	BT	10	MH	09/15/93	TD
44 E	247 / 248	102'S OF NEOS	DS-173	09/11/93	P	2X5	SK	52	MH	09/15/93	TD
44 F	248 / 250	INT W/251	T	09/10/93	RS	3'	BT	10	MH	09/15/93	TD
44 G	248 / 250	113'S OF NEOS	DS-174	09/11/93	P	2X5	SK	52	MH	09/15/93	TD

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APPENDIX K-2
ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MON.
44 H	245 / 247	40'S OF NEOS	BO	09/10/93	P	1X1	JS	50	JMI	09/15/93	TD
44 I	203 / 248	INT 251 TO 202/203/249	T	09/10/93	RS	11'	BT	10	MH	09/15/93	TD
44 J	201 / 247	INT 248 TO 201/202/249	T	09/10/93	RS	8'	BT	10	MH	09/15/93	TD
44 K	252 / 253	425'S OF NEOS	DS-175	09/11/93	P	2X5	JS	10	TD	09/15/93	TD
44 M	253 / 254	310'S OF NEOS	DS-176	09/11/93	P	2X6	BN	52	TD	09/15/93	TD
44 N	254 / 255	99'S OF NEOS	DS-177	09/11/93	P	2X7	BN	52	TD	09/15/93	TD
44 P	251 / 252	101'S OF NEOS	DS-178	09/11/93	P	2X5	BN	52	JMI	09/15/93	TD
44 Q	255 / 256	INT W/257	T	09/11/93	RS	20"	JS	10	TD	09/15/93	TD
44 R	255 / 256	25'S OF NEOS	DS-179	09/11/93	P	2X6	VN	50	TD	09/15/93	TD
44 S	257 / 258	3'W OF EEOS	DS-180	09/11/93	P	2X5	JS	10	TD	09/15/93	TD
44 T	255 / 257	INT W/258	T	09/11/93	RS	20"	JS	10	TD	09/15/93	TD
44 W	154 / 256	5'S OF NEOS	DS-181	09/11/93	P	2X5	VN	50	JMI	09/15/93	TD
44 X	143 / 144	INT W/256	T	09/11/93	P	1X1	JS	10	TD	09/15/93	TD
45 A	246	90'S OF NEOS,2'W	SI	09/10/93	P	1X1	BT	10	MH	09/15/93	TD
45 B	247	200'S OF NAT,3'W	SI	09/11/93	P	1X1	SK	52	MH	09/15/93	TD
45 C	352 / 353	340'S OF NAT	PT	09/11/93	P	2X3	BN	52	JMI	09/15/93	TD
45 D	255 / 256	80' TO 95'N OF SEOS	PT	09/11/93	RS	20'	BN	52	TD	09/15/93	TD
45 E	98 / 203	INT W/259	T	09/14/93	P	2X3	SO	50	JMI	09/15/93	TD
45 F	259 / 261	38'N OF SEOS	DS-183	09/15/93	P	2X5	SO	50	MH	09/18/93	MH
45 G	259 / 260	INT W/261	T	09/14/93	RS	2'	SO	50	JMI	09/18/93	MH
45 H	88 / 260	INT W/259	T	09/14/93	P	10X10	SO	50	JMI	09/18/93	MH
45 I	259 / 261	255'N OF SEOS	BO	09/14/93	2-P	2X3/1X1	SO	50	JMI	09/18/93	MH
45 J	259 / 261	375'N OF SEOS	BO	09/14/93	P	1X1	JS	50	JMI	09/18/93	MH
45 K	259 / 261	485'N OF SEOS	BO	09/14/93	P	2X2	JS	50	JMI	09/18/93	MH
45 M	203 / 259	145'N OF SEOS	BO	09/14/93	RS	6'	SO	50	JMI	09/18/93	MH
45 N	203 / 259	270'N OF SEOS	BO	09/14/93	2-P/RS	1X1/1X1/5'	JS	50	JMI	09/18/93	MH

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APPENDIX K-2
ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH	QA MONITOR	DATE	QA MON.
45 P	203 / 259	INT W/264	T	09/14/93	RS	6'	JS	50	JMI	09/18/93	MH
45 Q	261 / 263	495'N OF SEOS	DS-184	09/15/93	P	2X5	VN	52	MH	09/18/93	MH
45 R	261 / 263	45'N OF SEOS	DS-185	09/15/93	P	2X5	SO	50	MH	09/18/93	MH
45 S	203 / 259	40'N OF SEOS	DS-182	09/15/93	P	2X5	SK	50	MH	09/18/93	MH
45 T	203 / 264	175'N OF SEOS	DS-186	09/15/93	P	2X5	VN	52	MH	09/18/93	MH
45 W	203 / 264	INT W/252	T	09/14/93	RS	6'	VN	52	JMI	09/15/93	TD
45 X	259 / 261	488'N OF SEOS	DS-187	09/15/93	P	2X8	VN	52	MH	09/18/93	MH
46 A	255 / 256	165'S OF NEOS	BO	09/11/93	P	2X2	JS	10	TD	09/15/93	TD
46 B	255 / 256	75'S OF NEOS	BO	09/11/93	P	2X2	VN	50	TD	09/15/93	TD
46 C	255 / 256	53'S OF NEOS	BO	09/11/93	P	1X1	VN	50	TD	09/15/93	TD
46 D	254 / 255	45'S OF NEOS	BO	09/11/93	P	2X3	JS	10	JMI	09/15/93	TD
46 E	203 / 252	NEOS TO SEOS	C	09/11/93	C	2X30	BN	52	JMI	09/15/93	TD
46 F	251 / 252	170'S OF NEOS	BO	09/11/93	2-P	2X5/1X1	BN	52	JMI	09/15/93	TD
46 G	251 / 252	85'S OF NEOS	BO	09/11/93	P	2X3	BN	52	JMI	09/15/93	TD
46 H	251 / 252	40'S OF NEOS	BO	09/11/93	P	2X3	BN	52	JMI	09/15/93	TD
46 I	250 / 251	INT W/252	T	09/11/93	RS	2'	BN	52	JMI	09/15/93	TD
46 J	250 / 252	4'N OF SEOS	BO	09/11/93	P	2X3	BN	52	JMI	09/15/93	TD
46 K	250 / 252	80'S OF NEOS	BO	09/11/93	P	2X2	BN	52	JMI	09/15/93	TD
46 M	250 / 252	75'S OF NEOS	BO	09/11/93	P/RS	1X2/6'	BN	52	JMI	09/15/93	TD
46 N	153 / 154	INT W/256	T	09/11/93	P	2X2	VN	50	JMI	09/15/93	TD
46 P	154 / 155	INT W/256	T	09/11/93	RS	10"	JS	10	JMI	09/15/93	TD
46 Q	155 / 156	INT 256 TO 155/256/257	C	09/11/93	RS	30"	JS	10	TD	09/15/93	TD
46 R	156 / 157	13'S OF NEOS	BO	09/11/93	P	2X2	JS	10	TD	09/15/93	TD
46 S	156 / 159	INT W/257.	T	09/11/93	RS	10"	JS	10	JMI	09/15/93	TD
46 T	158 / 159	INT W/257	T	09/11/93	RS	10"	JS	10	JMI	09/15/93	TD
46 W	158 / 160	INT W/257	T	09/11/93	RS	10"	JS	10	JMI	09/15/93	TD

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APPENDIX K-2
ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MON
46 X	160 / 257	@ SEOS	PT	09/11/93	RS	8'	JS	10	TD	09/15/93	TD
47 A	261 / 264	INT W/265	T	09/14/93	RS	6'	VN	52	JMI	09/18/93	MH
47 B	261 / 266	INT W/265	T	09/14/93	P	2X4	VN	52	JMI	09/18/93	MH
47 C	261 / 263	INT W/266	T	09/14/93	P	2X3	VN	52	JMI	09/18/93	MH
47 D	253 / 265	18'E OF WEOS	DS-188	09/15/93	P	2X5	VN	52	MH	09/15/93	TD
47 E	264 / 265	INT W/252/253	T	09/15/93	RS	5'	VN	52	JMI	09/18/93	MH
47 F	256 / 257	INT W/253/254	T	09/14/93	RS	5'	VN	52	JMI	09/18/93	MH
47 G	265 / 267	25'N OF SEOS	DS-189	09/15/93	P	2X5	VN	52	MH	09/18/93	MH
47 H	265 / 266	INT W/267	T	09/14/93	RS	2'	VN	52	JMI	09/18/93	MH
47 I	263 / 268	INT W/266	T	09/14/93	RS	3'	VN	52	JMI	09/18/93	MH
47 J	266 / 268	INT W/267	T	09/14/93	RS	3'	VN	52	JMI	09/15/93	TD
47 K	267 / 268	INT W/254/255	T	09/14/93	RS	5'	VN	52	JMI	09/18/93	MH
47 M	263 / 269	INT W/268	T	09/14/93	P	2X3	JS	50	JMI	09/18/93	MH
47 N	263 / 269	200'N OF SEOS	DS-190	09/15/93	P	2X5	VN	52	MH	09/18/93	MH
47 P	87 / 88	INT W/259	T	09/15/93	RS	3'	SO	50	JMI	09/18/93	MH
47 R	270	50'W OF EAT,15'N	BS	09/14/93	BOOT	10X10	CW	10	JMI	09/18/93	MH
47 S	262 / 270	50'W OF EAT	BO	09/14/93	P	1X1	JS	50	JMI	09/18/93	MH
47 T	270 / 271	42'E OF WEOS	DS-191	09/15/93	P	2X5	SO	50	MH	09/18/93	MH
47 W	259 / 261	INT W/264	T	09/15/93	RS	3'	SO	50	JMI	09/18/93	MH
47 X	269 / 272	INT W/268	T	09/15/93	RS	3'	VN	52	MH	09/18/93	MH
48 A	268 / 272	425'N OF SEOS	BO	09/15/93	P	1X1	VN	52	MH	09/18/93	MH
48 B	268 / 272	69'N OF SEOS	DS-192	09/15/93	P	2X5	VN	52	MH	09/18/93	MH
48 C	271 / 273	INT W/269	T	09/15/93	P	3X3	SK	50	MH	09/18/93	MH
48 D	268 / 272	INT W/255/258	T	09/15/93	RS	5'	VN	52	MH	09/15/93	TD
48 E	269 / 276	93'N OF SEOS	DS-193	09/15/93	P	2X5	SK	50	MH	09/18/93	MH
48 F	274 / 275	INT W/276	T	09/15/93	RS	4'	SK	50	MH	09/18/93	MH

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APPENDIX K-2
ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MON.
48 G	273 / 274	INT W/276	T	09/15/93	P	3X4	SO	50	MH	09/18/93	MH
48 H	269 / 273	INT W/276	T	09/15/93	RS	8'	SO	50	MH	09/18/93	MH
48 I	88	70'N OF SAT,12'W	SI	09/15/93	P	1X1	SO	50	MH	09/18/93	MH
48 J	269 / 276	INT W/272	T	09/18/93	RS	5'	BT	10	TD	09/18/93	MH
48 K	276	75'N OF SEOS,28'E	D	09/15/93	P	1X1	SK	50	MH	09/18/93	MH
48 M	276	125'N OF SEOS,4'E	D	09/15/93	P	1X1	SK	50	MH	09/18/93	MH
48 N	160 / 277	155'W TO 151'W OF EEOS	FS	09/18/93	RS	36'	BT	10	TD	09/18/93	MH
48 P	297 / 303	15'S TO SEOS	FS	09/18/93	RS	15'	BT	10	TD	09/18/93	MH
48 Q	160 / 277	EEOS TO 30'WEST	FS	09/18/93	RS	30'	BT	10	TD	09/18/93	MH
49 A	277 / 279	172'W OF EEOS	DS-194	09/18/93	P	2X5	BT	10	TD	09/18/93	MH
49 B	277 / 278	INT W/279	T	09/18/93	RS	4'	BT	10	TD	09/18/93	MH
49 C	279 / 280	25'W OF EEOS	DS-195	09/18/93	P	2X5	BT	10	TD	09/18/93	MH
49 D	279 / 280	INT W/257	T	09/17/93	RS	4'	SO	50	JMI	09/18/93	MH
49 E	278 / 279	INT W/257	T	09/17/93	RS	4'	SO	50	JMI	09/18/93	MH
49 F	160 / 278	INT W/257	T	09/17/93	RS	15'	SO	50	JMI	09/18/93	MH
49 G	257 / 258	INT W/280	T	09/17/93	RS	4'	SO	50	JMI	09/18/93	MH
49 H	272 / 282	457'S OF NEOS	DS-196	09/18/93	P	3X5	BT	10	TD	09/18/93	MH
49 I	281 / 282	24'S OF NEOS	DS-197	09/18/93	P	2X5	BT	10	TD	09/18/93	MH
49 J	280 / 281	INT W/282	T	09/17/93	RS	4'	SO	50	JMI	09/18/93	MH
49 K	280 / 282	INT W/258	T	09/17/93	RS	20'	SO	50	JMI	09/18/93	MH
49 M	282 / 283	70'S OFNEOS	B	09/18/93	P	1X1	BT	10	TD	09/18/93	MH
49 N	282 / 283	444'S OF NEOS	DS-198	09/18/93	P	3X5	BT	10	TD	09/18/93	MH
49 P	282	490'S OF NEOS,5'W	SI	09/18/93	P	1X1	BT	10	TD	09/18/93	MH
49 Q	277 / 278	INT W/160.	T	09/17/93	P	2X2	SO	50	JMI	09/18/93	MH
49 R	160 / 277	168'W OF EEOS	BO	09/17/93	P	2X4	SO	50	JMI	09/18/93	MH
49 S	160 / 277	146'W OF EEOS	DS-199	09/18/93	P	2X5	BT	10	TD	09/18/93	MH

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ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MON.
49 T	281 / 283	INT W/289	T	09/18/93	RS	3'	BT	10	TD	09/18/93	MH
49 W	281 / 284	INT W/289	T	09/18/93	RS	3'	BT	10	TD	09/18/93	MH
49 X	284 / 285	INT W/289	T	09/17/93	RS	3'	SO	50	JMI	09/18/93	MH
50 A	286 / 287	15'W OF EAT	BO	09/17/93	P	2X2	SO	50	JMI	09/18/93	MH
50 B	288 / 290	107'W OF EEOS	DS-200	09/18/93	P	3X5	BT	10	TD	09/18/93	MH
50 C	290 / 291	101'W OF EEOS	DS-201	09/18/93	P	3X5	BT	10	TD	09/18/93	MH
50 D	287 / 288	60'W OF EEOS	BO	09/18/93	P	1X1	VN	52	TD	09/18/93	MH
50 E	283 / 289	INT W/292	T	09/18/93	RS	3'	BT	10	TD	09/18/93	MH
50 F	285 / 289	INT W/292	T	09/18/93	RS	6'	BT	10	TD	09/18/93	MH
50 G	285 / 286	INT W/292	T	09/18/93	RS	3'	BT	10	TD	09/18/93	MH
50 H	286 / 287	INT W/292	T	09/18/93	RS	3'	BT	10	TD	09/18/93	MH
50 I	287 / 288	INT W/292	T	09/18/93	RS	3'	BT	10	TD	09/18/93	MH
50 J	288 / 290	INT W/292	T	09/18/93	RS	5'	BT	10	TD	09/18/93	MH
50 K	283 / 292	100'S OF NEOS	DS-202	09/18/93	P	3X5	BT	10	TD	09/18/93	MH
50 M	290 / 291	50'W OF EAT	BO	09/18/93	P	1X1	BT	10	TD	09/18/93	MH
50 N	290 / 291	60'W OF EAT	BO	09/18/93	P	1X1	BT	10	TD	09/18/93	MH
50 P	291 / 293	35'W OF EAT	BO	09/18/93	P	1X1	BT	10	TD	09/18/93	MH
50 Q	293 / 294	38'W OF EAT	BO	09/18/93	P	1X1	BT	10	TD	09/18/93	MH
50 R	295 / 296	50'W OF EAT	BO	09/18/93	P	1X1	VN	52	TD	09/18/93	MH
50 S	299 / 300	100'W OF EAT	DS-203	09/18/93	P	3X5	BT	10	TD	09/18/93	MH
50 T	298 / 299	40'W OF EAT	BO	09/18/93	P	1X1	VN	52	TD	09/18/93	MH
50 W	299 / 300	60'W OF EAT	BO	09/18/93	P	1X1	VN	52	TD	09/18/93	MH
50 X	299 / 300	50'W OF EAT	BO	09/18/93	P	2X3	VN	52	TD	09/18/93	MH
51 A	281 / 282	INT W/283	T	09/17/93	RS	6'	SO	50	JMI	09/18/93	MH
51 B	284	7'W OF EAT,15'S	D	09/17/93	P	1X1	SO	50	JMI	09/18/93	MH
51 C	284	15'W OF EAT,15'S	D	09/17/93	P	1X1	SO	50	JMI	09/18/93	MH

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APPENDIX K-2
ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MON.
51 D	284	30'W OF EAT,15'S	D	09/17/93	P	1X1	SO	50	JMI	09/18/93	MH
51 E	160 / 277	80' TO 100'W OF EEOS	FS	09/18/93	RS	5'	BT	10	TD	09/18/93	MH
51 F	160 / 277	80' TO 100'W OF EEOS	BO	09/18/93	P	1X1	BT	10	TD	09/18/93	MH
51 G	160 / 277	60'W OF EEOS	BO	09/18/93	P	1X1	BT	10	TD	09/18/93	MH
51 H	284 / 285	60'W OF EEOS	BO	09/18/93	P	1X1	BT	10	TD	09/18/93	MH
51 I	282 / 283	600'S OF NEOS	WS	09/18/93	P	2X2	VN	52	TD	09/18/93	MH
51 J	275 / 304	INT W/305/276	T	09/18/93	RS	5'	BT	10	TD	09/18/93	MH
51 K	304 / 306	INT W/305	T	09/18/93	P	2X2	VN	52	TD	09/18/93	MH
51 M	272 / 282	INT W/305	T	09/18/93	RS	3'	VN	52	TD	09/18/93	MH
51 N	282 / 283	INT W/305	T	09/18/93	P	1X1	VN	52	TD	09/18/93	MH
51 P	304 / 306	INT W/285/305	T	09/18/93	P	1X1	VN	52	TD	09/18/93	MH
51 Q	307 / 308	92'W OF EEOS	DS-207	09/18/93	P	2X5	VN	52	TD	09/18/93	MH
51 R	306 / 307	INT W/283	T	09/18/93	P	1X1	VN	52	TD	09/18/93	MH
51 S	307 / 308	INT W/283	T	09/18/93	P	2X3	VN	52	TD	09/18/93	MH
51 T	308 / 309	50'W OF EAT	BO	09/18/93	P	1X1	VN	52	TD	09/18/93	MH
51 W	283 / 303	INT W/310	T	09/18/93	RS	3'	VN	52	TD	09/18/93	MH
51 X	308 / 310	INT W/283	T	09/18/93	P	1X3	BT	10	TD	09/18/93	MH
52 A	302 / 310	INT W/303	T	09/18/93	RS	6'	VN	52	TD	09/18/93	MH
52 B	309 / 311	INT W/310	T	09/18/93	RS	5'	VN	52	TD	09/18/93	MH
52 C	309 / 310	20'W OF EEOS	WS	09/18/93	P	2X2	VN	52	TD	09/18/93	MH
52 D	308 / 309	INT W/310	T	09/18/93	P	2X2	VN	52	TD	09/18/93	MH
52 E	272 / 276	INT W/305	T	09/18/93	P	1X1	VN	52	TD	09/18/93	MH
52 F	299 / 303	10'N OF SEOS	D	09/18/93	P	1X1	BT	10	TD	09/18/93	MH
53 A	301 / 302	100'W OF EAT	DS-204	09/18/93	P	3X5	BT	10	TD	09/18/93	MH
53 B	283 / 292	INT W/303	T	09/18/93	P	1X1	BT	10	TD	09/18/93	MH
53 C	290 / 292	INT W/303	T	09/18/93	RS	6'	BT	10	TD	09/18/93	MH

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APPENDIX K-2
ASH POND 91
REPAIR SUMMARY

DEFECT CODE	SEAM OR PANEL NUMBER	MAPPED LOCATION	DEFECT TYPE	REPAIR						VACUUM TEST	
				DATE	TYPE	DIM.	WELDER I.D. OPER.	WELDER I.D. MACH.	QA MONITOR	DATE	QA MON.
53 D	290 / 291	INT W/303	T	09/18/93	RS	3'	BT	10	TD	09/18/93	MH
53 E	291 / 293	INT W/303	T	09/18/93	RS	3'	BT	10	TD	09/18/93	MH
53 F	293 / 294	INT W/303	T	09/18/93	RS	2'	BT	10	TD	09/18/93	MH
53 G	294 / 295	INT W/303	T	09/18/93	RS	2'	BT	10	TD	09/18/93	MH
53 H	295 / 296	INT W/303	T	09/18/93	RS	2'	BT	10	TD	09/18/93	MH
53 I	296 / 297	INT W/303	T	09/18/93	RS	3'	BT	10	TD	09/18/93	MH
53 J	297 / 298	INT W/303	T	09/18/93	P	2X2	BT	10	TD	09/18/93	MH
53 K	298 / 299	INT W/303	T	09/18/93	RS	3'	BT	10	TD	09/18/93	MH
53 M	299 / 300	INT W/303	T	09/18/93	RS	3'	BT	10	TD	09/18/93	MH
53 N	300 / 301	INT W/303	T	09/18/93	RS	3'	BT	10	TD	09/18/93	MH
53 P	301 / 302	INT W/303	T	09/18/93	RS	3'	BT	10	TD	09/18/93	MH
53 Q	291 / 303	26'S OF NEOS	DS-205	09/18/93	P	2X6	BT	10	TD	09/18/93	MH
53 R	293 / 303	30'S OF NEOS	FS	09/18/93	P	2X2	BT	10	TD	09/18/93	MH
53 S	283 / 303	380'S OF NEOS	DS-206	09/18/93	P	3X6	VN	52	TD	09/18/93	MH
53 T	298 / 303	16'S OF NEOS	BO	09/18/93	P	1X1	BT	10	TD	09/18/93	MH
53 W	304	120'W OF EEOS,15'S	D	09/18/93	P	1X1	VN	52	TD	09/18/93	MH
53 X	304 / 306	20'W OF EAT	BO	09/18/93	P	1X2	BT	10	TD	09/18/93	MH

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APPENDIX L

DESTRUCTIVE TEST SUMMARIES

APPENDIX L-1

DESTRUCTIVE TEST SUMMARY - DRAINS POND

November 1993

937-4207

Golder Construction Services, Inc.

APPENDIX L-1
DRAINS POND
FUSION WELDING DESTRUCTIVE SAMPLE SUMMARY

SAMPLE NUMBER	SEAM NUMBER	MACH. NO.	DATE REMOVED	QA MONITOR	LAB RESULTS	REMARKS
DS-1	7 / 8	1061	08/04/93	CPB	PASS	--
DS-2	10 / 11	1175	08/04/93	CPB	PASS	--
DS-3	15 / 16	1061	08/04/93	CPB	PASS	--
DS-4	22 / 23	1175	08/05/93	CPB	PASS	--
DS-5	23 / 25	1175	08/05/93	CPB	PASS	--
DS-6	25 / 26	1061	08/05/93	CPB	PASS	--
DS-7	26 / 27	1175	08/05/93	CPB	PASS	--
DS-8	26 / 27	1054	08/05/93	CPB	--	FAILED FIELD TEST
DS-8A	26 / 27	1054	08/05/93	CPB	PASS	--
DS-8B	26 / 27	1054	08/05/93	CPB	FAIL	--
DS-8B2	26 / 27	1054	08/07/93	CPB	PASS	--
DS-9	27 / 28	1061	08/05/93	CPB	PASS	--
DS-10	28 / 29	1175	08/05/93	CPB	PASS	--
DS-11	30 / 31	1061	08/07/93	CPB	PASS	--
DS-12	31 / 32	1246	08/07/93	CPB	PASS	--
DS-13	31 / 32	1175	08/07/93	CPB	PASS	--
DS-14	39 / 40	1061	08/07/93	CPB	PASS	--
DS-15	41 / 42	1246	08/07/93	CPB	PASS	--
DS-16	33 / 45	1175	08/07/93	CPB	PASS	--
DS-17	48 / 49	1246	08/07/93	CPB	PASS	--
DS-18	56 / 57	1061	08/07/93	CPB	PASS	--
DS-19	32 / 57	1175	08/07/93	CPB	PASS	--
DS-20	63 / 64	1175	08/07/93	CPB	PASS	--
DS-21	22 / 66	1175	08/07/93	CPB	PASS	--
DS-22	59 / 60	1246	08/07/93	CPB	PASS	--

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APPENDIX L-2

DESTRUCTIVE TEST RESULTS - DRAINS POND

November 1993

937-4207

Golder Construction Services, Inc.

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Engineers and Scientists Serving the Built and Natural Environments

H.D.P.E. Liner Reports

Project Number: BFDX-93-019C
Project Description: AEP #93 91 Coal Creek
Seam Number: P 7/8
Welder Number: 1061

Sample Number: DS-1
Date Sampled: 7/20/93
Date Tested: 8/4/93
Tested By: L. Larson

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	127	80	FT
3	132	80	FT
4	125	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	85	52	FT
2	85	52	FT
3	87	52	FT
4	89	52	FT
5	84	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0430	0.040	
2	.0420	0.040	
3	.0418	0.040	
4	.0416	0.040	
5	.0418	0.040	
Average	.0420		

REMARKS:

FT = Film Tear
BT = Bond Tear

Braun Intertec Corporation

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H.D.P.E. Liner Reports

Project Number: BFDX-93-019C
Project Description: AEP #93 Coal Creek
Seam Number: P 10/11 91
Welder Number: 1175

Sample Number: DS-2
Date Sampled: 7/20/93
Date Tested: 8/4/93
Tested By: L. Larson

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	130	80	FT
2	124	80	FT
3	125	80	FT
4	122	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	77	52	FT
2	75	52	FT
3	99	52	FT
4	102	52	FT
5	92	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.0411		

REMARKS:

FT = Film Tear
BT = Bond Tear

Braun Intertec Corporation

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H.D.P.E. Liner Reports

Project Number: BFDX-93-019C
Project Description: ~~AEP #93~~ Coal Creek
Seam Number: P 15/16 91
Welder Number: 1061

Sample Number: ~~DP~~ DS-3
Date Sampled: 7/20/93
Date Tested: 8/4/93
Tested By: L. Larson

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	118	80	FT
2	125	80	FT
3	125	80	FT
4	118	80	FT
5	122	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	82	52	FT
2	85	52	FT
3	81	52	FT
4	80	52	FT
5	82	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

Braun Intertec Corporation

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H.D.P.E. Liner Reports

Project Number: BFDX-93-019C
Project Description: AEP #93 91 Coal Creek
Seam Number: P 22/23
Welder Number: 1175

Sample Number: DS-4
Date Sampled: 8/4/93
Date Tested: 8/5/93
Tested By: J. Cadotte

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	119	80	FT
2	123	80	FT
3	124	80	FT
4	125	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	84	52	FT
2	94	52	FT
3	78	52	FT
4	87	52	FT
5	78	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0434	0.040	
2	.0435	0.040	
3	.0435	0.040	
4	.0435	0.040	
5	.0435	0.040	
Average	.0435		

REMARKS:

FT = Film Tear
BT = Bond Tear

Braun Intertec Corporation

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H.D.P.E. Liner Reports

Project Number: BFDX-93-019C
Project Description: AEP #93 Coal Creek
Seam Number: P 23/25 91
Welder Number: 1175

Sample Number: DS-5
Date Sampled: 8/4/93
Date Tested: 8/5/93
Tested By: L. Larson

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	117	80	FT
3	120	80	FT
4	119	80	FT
5	120	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	82	52	FT
2	82	52	FT
3	80	52	FT
4	79	52	FT
5	82	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0410	0.040	
2	.0410	0.040	
3	.0410	0.040	
4	.0410	0.040	
5	.0410	0.040	
Average	.0410		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-93-019C
Project Description: AEP #93 Coal Creek
Seam Number: P 25/26 '91
Welder Number: 1061

Sample Number: DS-6
Date Sampled: 8/4/93
Date Tested: 8/5/93
Tested By: L. Larson

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	120	80	FT
3	121	80	FT
4	123	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	82	52	FT
2	96	52	FT
3	88	52	FT
4	88	52	FT
5	93	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0428	0.040	
2	.0430	0.040	
3	.0426	0.040	
4	.0424	0.040	
5	.0427	0.040	
Average	.0427		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-93-019C
Project Description: AEP #93 Coal Creek
Seam Number: P 26/27 91
Welder Number: 1175

Sample Number: DS-7
Date Sampled: 8/4/93
Date Tested: 8/4/93
Tested By: L. Larson

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	120	80	FT
2	116	80	FT
3	118	80	FT
4	117	80	FT
5	117	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	96	52	FT
2	96	52	FT
3	96	52	FT
4	94	52	FT
5	96	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0416	0.040	
2	.0419	0.040	
3	.0417	0.040	
4	.0415	0.040	
5	.0419	0.040	
Average	.0417		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-93-019C
Project Description: ~~EP #93~~ Coal Creek
Seam Number: N/I AP#91
Welder Number: N/I (GCS)

Sample Number: DS-8A
Date Sampled: N/I
Date Tested: 8/5/93
Tested By: L. Larson

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	124	80	FT
3	124	80	FT
4	119	80	FT
5	120	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	77	52	FT
2	82	52	FT
3	82	52	FT
4	84	52	FT
5	84	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0414	0.040	
2	.0415	0.040	
3	.0414	0.040	
4	.0413	0.040	
5	.0411	0.040	
Average	.0413		

REMARKS:

FT = Film Tear
BT = Bond Tear

Braun Intertec Corporation

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H.D.P.E. Liner Reports

Project Number: BFDX-93-019C
Project Description: ~~EP #93~~ Coal Creek
Seam Number: N/I AP#91
Welder Number: N/I

Sample Number: DS-8B
Date Sampled: N/I
Date Tested: 8/5/93
Tested By: L. Larson

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	117	80	FT
3	113	80	FT
4	120	80	FT
5	120	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	87	52	FT
2	84	52	FT
3	78	52	FT
4	45	52	BF
5	65	52	BF
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0415	0.040	
2	.0417	0.040	
3	.0419	0.040	
4	.0417	0.040	
5	.0418	0.040	
Average	.0417		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-93-019C
Project Description: ~~EP~~ #93 Coal Creek
Seam Number: N/I AP#91
Welder Number: N/I

Sample Number: DS 8B [illegible] 2
Date Sampled: N/I
Date Tested: 8/7/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	125	80	FT
3	124	80	FT
4	126	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	90	52	FT
2	88	52	FT
3	79	52	FT
4	82	52	FT
5	82	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0415	0.040	
2	.0415	0.040	
3	.0415	0.040	
4	.0415	0.040	
5	.0415	0.040	
Average	.0415		

REMARKS:

FT = Film Tear
BT = Bond Tear

Braun Intertec Corporation

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H.D.P.E. Liner Reports

Project Number: BFDX-93-019C
Project Description: ~~EP #93~~ Coal Creek
Seam Number: P 27/28 AP 91
Welder Number: 1061

Sample Number: DS-9
Date Sampled: 8/4/93
Date Tested: 8/5/93
Tested By: L. Larson

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	126	80	FT
2	127	80	FT
3	126	80	FT
4	129	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	91	52	FT
2	98	52	FT
3	102	52	FT
4	93	52	FT
5	86	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0426	0.040	
2	.0428	0.040	
3	.0426	0.040	
4	.0426	0.040	
5	.0426	0.040	
Average	.0426		

REMARKS:

FT = Film Tear
BT = Bond Tear

Braun Intertec Corporation

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H.D.P.E. Liner Reports

Project Number: BFDX-93-019C
Project Description: AEP #93 Coal Creek
Seam Number: P 28/29 91
Welder Number: 1175

Sample Number: DS-10
Date Sampled: 8/4/93
Date Tested: 8/5/93
Tested By: L. Larson

PRELIMINARY DATA SHEET

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	122	80	FT
3	122	80	FT
4	125	80	FT
5	116	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	83	52	FT
2	76	52	FT
3	82	52	FT
4	87	52	FT
5	81	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0415	0.040	
2	.0417	0.040	
3	.0414	0.040	
4	.0415	0.040	
5	.0416	0.040	
Average	.0415		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-93-019C
Project Description: AEP #93 Coal Creek
Seam Number: P 30/31 91
Welder Number: 1061

Sample Number: DS-11
Date Sampled: 8/5/93
Date Tested: 8/8/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	128	80	FT
3	124	80	FT
4	126	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	88	52	FT
2	83	52	FT
3	90	52	FT
4	88	52	FT
5	85	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-93-019C
Project Description: AEP #93 Coal Creek
Seam Number: P 31/32 91
Welder Number: 1240

Sample Number: DS-12
Date Sampled: 8/5/93
Date Tested: 8/7/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	119	80	FT
3	127	80	FT
4	121	80	FT
5	122	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	91	52	FT
2	83	52	FT
3	82	52	FT
4	82	52	FT
5	91	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.0415	0.040	
3	.0415	0.040	
4	.042	0.040	
5	.042	0.040	
Average	.0416		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-93-019C
Project Description: AEP ~~#93~~ 91 Coal Creek
Seam Number: P 31/32
Welder Number: 1175

Sample Number: DS-13
Date Sampled: 8/5/93
Date Tested: 8/8/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	129	80	FT
3	129	80	FT
4	128	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	99	52	FT
2	100	52	FT
3	101	52	FT
4	100	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.042	0.040	
3	.042	0.040	
4	.042	0.040	
5	.042	0.040	
Average	.042		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-93-019C
Project Description: AEP ~~#93~~ 91 Coal Creek
Seam Number: P 39/40
Welder Number: 1061

Sample Number: DS-14
Date Sampled: 8/5/93
Date Tested: 8/8/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	123	80	FT
3	122	80	FT
4	124	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	81	52	FT
2	81	52	FT
3	87	52	FT
4	84	52	FT
5	87	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.040	0.040	
2	.040	0.040	
3	.040	0.040	
4	.040	0.040	
5	.040	0.040	
Average	.040		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-93-019C
Project Description: AEP #93 Coal Creek
Seam Number: P 41/42 91
Welder Number: 1246

Sample Number: DS-15
Date Sampled: 8/5/93
Date Tested: 8/8/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	133	80	FT
3	130	80	FT
4	129	80	FT
5	130	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	92	52	FT
2	91	52	FT
3	88	52	FT
4	86	52	FT
5	90	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.044	0.040	
2	.044	0.040	
3	.044	0.040	
4	.044	0.040	
5	.044	0.040	
Average	.044		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-93-019C
Project Description: AEP ~~#93~~ 91 Coal Creek
Seam Number: P 33/45
Welder Number: 1175

Sample Number: DS-16
Date Sampled: 8/5/93
Date Tested: 8/8/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	130	80	FT
3	131	80	FT
4	129	80	FT
5	129	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	83	52	FT
2	78	52	FT
3	76	52	FT
4	73	52	FT
5	79	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.0425	0.040	
3	.0425	0.040	
4	.0425	0.040	
5	.043	0.040	
Average	.0425		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-93-019C
Project Description: AEP #93 Coal Creek
Seam Number: P 48/49 91
Welder Number: 1246

Sample Number: DS-17
Date Sampled: 8/6/93
Date Tested: 8/8/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	128	80	FT
3	128	80	FT
4	128	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	79	52	FT
2	82	52	FT
3	85	52	FT
4	84	52	FT
5	84	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0425	0.040	
2	.0435	0.040	
3	.0435	0.040	
4	.0435	0.040	
5	.0435	0.040	
Average	.0433		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-93-019C
Project Description: ~~AEP #93~~ Coal Creek
Seam Number: P 56/57 91
Welder Number: 1061

Sample Number: DS-18
Date Sampled: 8/6/93
Date Tested: 8/8/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	131	80	FT
3	129	80	FT
4	129	80	FT
5	129	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	92	52	FT
2	93	52	FT
3	82	52	FT
4	103	52	FT
5	104	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0435	0.040	
2	.043	0.040	
3	.043	0.040	
4	.043	0.040	
5	.043	0.040	
Average	.0431		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-93-019C
Project Description: AEP ~~#93~~ 91 Coal Creek
Seam Number: P 32/57
Welder Number: 1175

Sample Number: DS-19
Date Sampled: 8/6/93
Date Tested: 8/8/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	111	80	FT
2	105	80	FT
3	109	80	FT
4	112	80	FT
5	112	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	83	52	FT
2	89	52	FT
3	90	52	FT
4	99	52	FT
5	91	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0415	0.040	
2	.040	0.040	
3	.040	0.040	
4	.0405	0.040	
5	.041	0.040	
Average	.0406		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-93-019C
Project Description: AEP #93 Coal Creek
Seam Number: P 63/64 91
Welder Number: 1175

Sample Number: DS-20
Date Sampled: 8/6/93
Date Tested: 8/8/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	123	80	FT
3	126	80	FT
4	121	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	77	52	FT
2	81	52	FT
3	78	52	FT
4	80	52	FT
5	78	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-93-019C
Project Description: AEP #93 Coal Creek
Seam Number: P 22/66 91
Welder Number: 1175

Sample Number: DS-21
Date Sampled: 8/6/93
Date Tested: 8/8/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	126	80	FT
3	126	80	FT
4	126	80	FT
5	133	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	101	52	FT
2	94	52	FT
3	98	52	FT
4	92	52	FT
5	94	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.042	0.040	
3	.0435	0.040	
4	.0425	0.040	
5	.0435	0.040	
Average	.0435		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-93-019C
Project Description: AEP #93 91 Coal Creek
Seam Number: 59/60
Welder Number: 1246

Sample Number: DS-22
Date Sampled: 8/6/93
Date Tested: 8/8/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	126	80	FT
2	127	80	FT
3	123	80	FT
4	125	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	94	52	FT
2	80	52	FT
3	79	52	FT
4	79	52	FT
5	80	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.042	0.040	
3	.042	0.040	
4	.042	0.040	
5	.042	0.040	
Average	.042		

REMARKS:

FT = Film Tear
BT = Bond Tear

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APPENDIX L-3

DESTRUCTIVE TEST SUMMARY - ASH POND 91

November 1993

937-4207

Golder Construction Services, Inc.

APPENDIX L-3
ASH POND 91
EXTRUSION WELDING DESTRUCTIVE SAMPLE SUMMARY

SAMPLE NUMBER	SEAM NUMBER	MACH. NO.	DATE REMOVED	QA MONITOR	LAB RESULTS	REMARKS
DSE-1	46 / 49	10	08/12/93	SGH	FAIL	PLACED ON PATCH 9G
DSE-1A	54 / 55	10	08/20/93	JMI	PASS	PLACED ON PATCH 8H
DSE-1B	46 / 49	10	08/20/93	JMI	PASS	PLACED ON PATCH 9E
DSE-2	12 / 47	50	08/13/93	SGH	PASS	ENTIRE SEAM/8E
DSE-3	56 / 60	52	08/20/93	JMI	PASS	PLACED ON PATCH 8T

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APPENDIX L-3
ASH POND 91
FUSION WELDING DESTRUCTIVE SAMPLE SUMMARY

SAMPLE NUMBER	SEAM NUMBER	MACH. NO.	DATE REMOVED	QA MONITOR	LAB RESULTS	REMARKS
DS-1	12 / 13	1175	08/11/93	JMI	PASS	--
DS-2	12 / 13	1061	08/11/93	JMI	FAIL	--
DS-2A	13 / 14	1061	08/28/93	JMI	PASS	--
DS-2B	12 / 13	1061	08/20/93	JMI	PASS	--
DS-3	13 / 14	1061	08/11/93	JMI	PASS	--
DS-4	13 / 14	1246	08/11/93	JMI	PASS	--
DS-5	5 / 15	1175	08/11/93	JMI	PASS	--
DS-6	15 / 16	1061	08/11/93	JMI	PASS	--
DS-7	16 / 17	1061	08/11/93	JMI	--	FAILED FIELD TEST
DS-7A	16 / 17	1061	08/11/93	JMI	PASS	--
DS-7B	16 / 17	1061	08/11/93	JMI	PASS	--
DS-8	17 / 18	1246	08/11/93	JMI	PASS	--
DS-9	17 / 18	1175	08/11/93	JMI	PASS	--
DS-10	19 / 20	1175	08/11/93	JMI	PASS	--
DS-11	18 / 19	1246	08/11/93	JMI	PASS	--
DS-12	20 / 25	1175	08/11/93	JMI	PASS	--
DS-13	20 / 25	1246	08/11/93	JMI	PASS	--
DS-14	24 / 28	1175	08/11/93	JMI	PASS	--
DS-15	34 / 36	1175	08/11/93	JMI	PASS	--
DS-16	27 / 41	1246	08/11/93	JMI	PASS	--
DS-17	34 / 41	1061	08/11/93	JMI	PASS	--
DS-18	12 / 45	1175	08/11/93	JMI	PASS	--
DS-19	12 / 45	1175	08/11/93	JMI	PASS	--
DS-20	45 / 46	1246	08/11/93	JMI	PASS	--
DS-21	47 / 48	1061	08/11/93	JMI	PASS	--
DS-22	46 / 49	1246	08/12/93	JMI	PASS	--
DS-23	49 / 50	1061	08/13/93	JMI	PASS	--
DS-24	50 / 51	1175	08/13/93	JMI	PASS	--
DS-25	51 / 52	1061	08/13/93	JMI	PASS	--
DS-26	51 / 52	1175	08/13/93	JMI	PASS	--
DS-27	52 / 53	1246	08/13/93	JMI	PASS	--
DS-28	53 / 54	1246	08/13/93	JMI	PASS	--
DS-29	53 / 54	1175	08/17/93	JMI	PASS	--
DS-30	54 / 55	1061	08/13/93	JMI	PASS	--
DS-31	54 / 55	1246	08/13/93	JMI	PASS	--
DS-32	50 / 57	1061	08/13/93	JMI	PASS	--
DS-33	49 / 58	1246	08/13/93	JMI	PASS	--
DS-34	56 / 60	1061	08/13/93	JMI	FAIL	--
DS-34A	56 / 60	1061	08/20/93	JMI	PASS	--
DS-34B	56 / 60	1061	08/20/93	JMI	PASS	--
DS-35	59 / 61	1054	08/13/93	JMI	PASS	--
DS-36	59 / 61	1246	08/13/93	JMI	PASS	--
DS-37	61 / 62	1246	08/13/93	JMI	PASS	--
DS-38	62 / 63	1054	08/16/93	JMI	PASS	--
DS-39	63 / 64	1246	08/18/93	JMI	PASS	--
DS-40	63 / 64	1054	08/16/93	JMI	PASS	--

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APPENDIX L-3
ASH POND 91
FUSION WELDING DESTRUCTIVE SAMPLE SUMMARY

SAMPLE NUMBER	SEAM NUMBER	MACH. NO.	DATE REMOVED	QA MONITOR	LAB RESULTS	REMARKS
DS-41	64 / 65	1246	08/16/93	JMI	PASS	--
DS-42	64 / 65	1054	08/16/93	JMI	PASS	--
DS-43	65 / 66	1054	08/16/93	JMI	PASS	--
DS-44	66 / 67	1246	08/17/93	JMI	PASS	--
DS-45	66 / 67	1066	08/17/93	JMI	PASS	--
DS-46	67 / 68	1246	08/17/93	JMI	PASS	--
DS-47	68 / 69	1054	08/17/93	JMI	PASS	--
DS-48	68 / 69	1066	08/18/93	JMI	PASS	--
DS-49	69 / 70	1054	08/17/93	JMI	PASS	--
DS-50	69 / 70	1066	08/18/93	JMI	PASS	--
DS-51	73 / 74	1054	08/20/93	JMI	PASS	--
DS-52	71 / 80	1054	08/20/93	JMI	PASS	--
DS-53	74 / 75	1066	08/20/93	JMI	PASS	--
DS-54	71 / 80	1053	08/20/93	JMI	PASS	--
DS-55	78 / 83	1066	08/20/93	JMI	PASS	--
DS-56	85 / 86	1053	08/20/93	JMI	PASS	--
DS-57	82 / 89	1053	08/20/93	JMI	PASS	--
DS-58	89 / 90	1066	08/20/93	JMI	PASS	--
DS-59	91 / 93	1054	08/20/93	JMI	PASS	--
DS-60	89 / 94	1053	08/20/93	JMI	PASS	--
DS-61	93 / 96	1054	08/20/93	JMI	PASS	--
DS-62	103 / 104	1053	08/28/93	JMI	PASS	--
DS-63	102 / 103	1054	08/28/93	JMI	PASS	--
DS-64	113 / 114	1054	08/28/93	JMI	PASS	--
DS-65	112 / 113	1053	08/28/93	JMI	PASS	--
DS-66	106 / 118	1054	08/28/93	JMI	PASS	--
DS-67	112 / 118	1053	08/28/93	JMI	PASS	--
DS-68	119 / 120	1053	08/28/93	JMI	PASS	--
DS-69	119 / 120	1054	08/28/93	JMI	PASS	--
DS-70	117 / 121	1066	08/28/93	JMI	PASS	--
DS-71	120 / 124	1054	08/28/93	JMI	PASS	--
DS-72	120 / 124	1053	08/28/93	JMI	PASS	--
DS-73	124 / 125	1054	08/28/93	JMI	PASS	--
DS-74	124 / 125	1053	08/28/93	JMI	PASS	--
DS-75	125 / 126	1054	08/28/93	JMI	PASS	--
DS-76	128 / 129	1066	08/28/93	JMI	PASS	--
DS-77	127 / 128	1053	08/28/93	JMI	PASS	--
DS-78	132 / 135	1066	08/28/93	JMI	PASS	--
DS-79	126 / 137	1054	08/28/93	JMI	PASS	--
DS-80	126 / 137	1053	08/28/93	JMI	PASS	--
DS-81	138 / 139	1054	08/28/93	JMI	PASS	--
DS-82	138 / 139	1053	08/28/93	JMI	PASS	--
DS-83	139 / 140	1066	08/28/93	JMI	PASS	--
DS-84	140 / 141	1053	08/28/93	JMI	PASS	--
DS-85	141 / 142	1066	08/28/93	JMI	PASS	--
DS-86	141 / 142	1053	08/28/93	JMI	PASS	--

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APPENDIX L-3
ASH POND 91
FUSION WELDING DESTRUCTIVE SAMPLE SUMMARY

SAMPLE NUMBER	SEAM NUMBER	MACH. NO.	DATE REMOVED	QA MONITOR	LAB RESULTS	REMARKS
DS-87	145 / 146	1054	08/25/93	JMI	PASS	--
DS-88	152 / 153	1054	08/25/93	JMI	PASS	--
DS-89	154 / 155	1054	08/25/93	JMI	PASS	--
DS-90	156 / 157	1066	08/25/93	JMI	PASS	--
DS-91	158 / 160	1066	08/25/93	JMI	PASS	--
DS-92	132 / 161	1053	09/01/93	JMI	PASS	--
DS-93	162 / 163	1066	09/01/93	JMI	PASS	--
DS-94	166 / 167	1066	09/01/93	JMI	PASS	--
DS-95	125 / 166	1053	09/01/93	JMI	PASS	--
DS-96	168 / 169	1066	09/01/93	JMI	PASS	--
DS-97	169 / 170	1053	09/01/93	JMI	PASS	--
DS-98	170 / 171	1066	09/01/93	JMI	PASS	--
DS-99	171 / 172	1053	09/01/93	JMI	PASS	--
DS-100	142 / 174	1066	09/01/93	JMI	PASS	--
DS-101	142 / 174	1054	09/01/93	JMI	PASS	--
DS-102	174 / 175	1053	09/01/93	JMI	PASS	--
DS-103	175 / 176	1066	09/01/93	JMI	PASS	--
DS-104	175 / 176	1053	09/01/93	JMI	PASS	--
DS-105	177 / 178	1053	09/07/93	JMI	PASS	--
DS-106	177 / 178	1066	09/01/93	JMI	PASS	--
DS-107	57 / 177	1054	09/01/93	JMI	PASS	--
DS-108	178 / 179	1053	09/07/93	JMI	PASS	--
DS-109	179 / 180	1066	09/07/93	JMI	PASS	--
DS-110	179 / 180	1053	09/07/93	JMI	PASS	--
DS-111	180 / 181	1054	09/07/93	JMI	PASS	--
DS-112	181 / 182	1066	09/07/93	JMI	PASS	--
DS-113	182 / 183	1054	09/07/93	JMI	PASS	--
DS-114	182 / 183	1053	09/07/93	JMI	PASS	--
DS-115	183 / 184	1054	09/07/93	JMI	PASS	--
DS-116	184 / 185	1066	09/07/93	JMI	PASS	--
DS-117	183 / 184	1053	09/07/93	JMI	PASS	--
DS-118	184 / 185	1066	09/07/93	JMI	PASS	--
DS-119	186 / 187	1054	09/07/93	JMI	PASS	--
DS-120	186 / 187	1053	09/07/93	JMI	PASS	--
DS-121	187 / 188	1066	09/07/93	JMI	PASS	--
DS-122	188 / 189	1053	09/07/93	JMI	FAIL	--
DS-122A	188 / 189	1053	09/10/93	JMI	PASS	--
DS-122B	188 / 189	1053	09/10/93	JMI	PASS	--
DS-123	188 / 189	1054	09/07/93	JMI	PASS	--
DS-124	189 / 190	1066	09/07/93	JMI	PASS	--
DS-125	190 / 191	1053	09/07/93	JMI	PASS	--
DS-126	191 / 192	1066	09/07/93	JMI	PASS	--
DS-127	192 / 193	1054	09/07/93	JMI	PASS	--
DS-128	191 / 192	1066	09/07/93	JMI	PASS	--
DS-129	193 / 194	1054	09/07/93	JMI	PASS	--
DS-130	193 / 194	1053	09/07/93	JMI	PASS	--

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APPENDIX L-3
ASH POND 91
FUSION WELDING DESTRUCTIVE SAMPLE SUMMARY

SAMPLE NUMBER	SEAM NUMBER	MACH. NO.	DATE REMOVED	QA MONITOR	LAB RESULTS	REMARKS
DS-131	194 / 195	1066	09/07/93	JMI	PASS	--
DS-132	195 / 196	1053	09/07/93	JMI	PASS	--
DS-133	196 / 197	1066	09/09/93	JMI	PASS	--
DS-134	196 / 197	1053	09/09/93	JMI	PASS	--
DS-135	197 / 198	1054	09/09/93	JMI	PASS	--
DS-136	198 / 199	1054	09/09/93	JMI	PASS	--
DS-137	198 / 199	1066	09/09/93	JMI	PASS	--
DS-138	199 / 200	1053	09/09/93	JMI	PASS	--
DS-139	200 / 201	1066	09/09/93	JMI	PASS	--
DS-140	199 / 200	1054	09/09/93	JMI	PASS	--
DS-141	201 / 202	1054	09/09/93	JMI	PASS	--
DS-142	201 / 202	1054	09/09/93	JMI	PASS	--
DS-143	202 / 203	1066	09/09/93	JMI	PASS	--
DS-144	173 / 204	1066	09/07/93	JMI	FAIL	--
DS-144A	173 / 204	1066	09/10/93	JMI	PASS	--
DS-144B	173 / 204	1066	09/10/93	JMI	PASS	--
DS-145	204 / 205	1053	09/07/93	JMI	PASS	--
DS-146	205 / 207	1066	09/07/93	JMI	PASS	--
DS-147	207 / 208	1053	09/07/93	JMI	PASS	--
DS-148	208 / 210	1066	09/07/93	JMI	PASS	--
DS-149	179 / 211	1054	09/07/93	JMI	PASS	--
DS-150	210 / 211	1066	09/07/93	JMI	PASS	--
DS-151	211 / 212	1053	09/07/93	JMI	PASS	--
DS-152	212 / 213	1066	09/07/93	JMI	PASS	--
DS-153	216 / 217	1053	09/07/93	JMI	PASS	--
DS-154	218 / 219	1066	09/09/93	JMI	PASS	--
DS-155	219 / 220	1053	09/09/93	JMI	PASS	--
DS-156	217 / 223	1066	09/09/93	JMI	PASS	--
DS-157	223 / 224	1054	09/09/93	JMI	PASS	--
DS-158	223 / 225	1053	09/09/93	JMI	PASS	--
DS-159	225 / 226	1066	09/09/93	JMI	PASS	--
DS-160	226 / 227	1053	09/09/93	JMI	PASS	--
DS-161	227 / 229	1053	09/09/93	JMI	PASS	--
DS-162	229 / 230	1066	09/09/93	JMI	PASS	--
DS-163	231 / 234	1053	09/09/93	JMI	PASS	--
DS-164	235 / 236	1054	09/09/93	JMI	PASS	--
DS-165	234 / 235	1066	09/09/93	JMI	PASS	--
DS-166	239 / 240	1066	09/16/93	JMI	PASS	--
DS-167	237 / 239	1053	09/16/93	JMI	PASS	--
DS-168	199 / 244	1054	09/16/93	JMI	PASS	--
DS-169	240 / 241	1053	09/16/93	JMI	PASS	--
DS-170	241 / 243	1066	09/16/93	JMI	PASS	--
DS-171	243 / 244	1053	09/16/93	JMI	PASS	--
DS-172	244 / 245	1066	09/16/93	JMI	PASS	--
DS-173	247 / 248	1066	09/16/93	JMI	PASS	--
DS-174	248 / 250	1053	09/16/93	JMI	PASS	--

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APPENDIX L-3
ASH POND 91
FUSION WELDING DESTRUCTIVE SAMPLE SUMMARY

SAMPLE NUMBER	SEAM NUMBER	MACH. NO.	DATE REMOVED	QA MONITOR	LAB RESULTS	REMARKS
DS-175	252 / 253	1054	09/16/93	JMI	PASS	--
DS-176	253 / 254	1053	09/16/93	JMI	PASS	--
DS-177	254 / 255	1066	09/16/93	JMI	PASS	--
DS-178	251 / 252	1066	09/16/93	JMI	PASS	--
DS-179	255 / 256	1054	09/16/93	JMI	PASS	--
DS-180	257 / 258	1054	09/16/93	JMI	PASS	--
DS-181	154 / 256	1066	09/16/93	JMI	PASS	--
DS-182	203 / 259	1066	09/16/93	JMI	PASS	--
DS-183	259 / 261	1054	09/16/93	JMI	PASS	--
DS-184	261 / 263	1053	09/16/93	JMI	PASS	--
DS-185	261 / 263	1053	09/16/93	JMI	PASS	--
DS-186	203 / 264	1066	09/18/93	JMI	PASS	--
DS-187	259 / 261	1054	09/16/93	JMI	PASS	--
DS-188	253 / 265	1054	09/16/93	JMI	PASS	--
DS-189	265 / 267	1066	09/16/93	JMI	PASS	--
DS-190	263 / 269	1053	09/18/93	JMI	PASS	--
DS-191	270 / 271	1053	09/18/93	JMI	PASS	--
DS-192	268 / 272	1054	09/18/93	JMI	PASS	--
DS-193	269 / 276	1053	09/18/93	JMI	PASS	--
DS-194	277 / 279	1195	09/18/93	JMI	PASS	--
DS-195	279 / 280	1054	09/18/93	JMI	PASS	--
DS-196	272 / 282	1054	09/18/93	JMI	PASS	--
DS-197	281 / 282	1066	09/18/93	JMI	PASS	--
DS-198	282 / 283	1195	09/18/93	JMI	PASS	--
DS-199	160 / 277	1053	09/18/93	JMI	PASS	--
DS-200	288 / 290	1054	09/18/93	JMI	PASS	--
DS-201	290 / 291	1066	09/18/93	JMI	PASS	--
DS-202	283 / 292	1195	09/18/93	JMI	PASS	--
DS-203	299 / 300	1053	09/18/93	JMI	PASS	--
DS-204	301 / 302	1066	09/18/93	JMI	PASS	--
DS-205	291 / 303	1053	09/18/93	JMI	PASS	--
DS-206	283 / 303	1054	09/18/93	JMI	PASS	--
DS-207	307 / 308	1053	09/18/93	JMI	PASS	--

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APPENDIX L-4

DESTRUCTIVE TEST RESULTS - ASH POND 91

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 46/49
Welder Number: 10

Sample Number: DSE-1
Date Sampled: N/I
Date Tested: 8/13/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	124	80	FT
3	130	80	FT
4	126	80	FT
5	131	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	65	52	FT
2	46	52	FT
3	61	52	FT
4	44	52	FT
5	59	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.042	0.040	
3	.042	0.040	
4	.042	0.040	
5	.042	0.040	
Average	.042		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Gerald L. Dauer, C.E.T.
Operations Manager

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Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: N/I
Welder Number: N/I

Sample Number: DSE-1A
Date Sampled: 8/18/93
Date Tested: 8/22/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	132	80	FT
3	128	80	FT
4	126	80	FT
5	132	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	93	52	FT
2	94	52	FT
3	94	52	FT
4	88	52	FT
5	86	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0425	0.040	
2	.0425	0.040	
3	.0425	0.040	
4	.0425	0.040	
5	.042	0.040	
Average	.0424		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 9E
Welder Number: N/I

Sample Number: DSE-1B
Date Sampled: 8/18/93
Date Tested: 8/22/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	117	80	FT
2	118	80	FT
3	124	80	FT
4	117	80	FT
5	118	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	94	52	FT
2	102	52	FT
3	96	52	FT
4	101	52	FT
5	103	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 12/47
Welder Number: 50

Sample Number: DSE-2
Date Sampled: N/I
Date Tested: 8/13/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	120	80	FT
2	122	80	FT
3	127	80	FT
4	126	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	89	52	FT
2	87	52	FT
3	93	52	FT
4	73	52	FT
5	66	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0431	0.040	
2	.0426	0.040	
3	.0427	0.040	
4	.0431	0.040	
5	.0429	0.040	
Average	.0429		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 87
Welder Number: N/I

Sample Number: DSE-3
Date Sampled: 8/18/93
Date Tested: 8/22/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	128	80	FT
3	125	80	FT
4	124	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	87	52	FT
2	85	52	FT
3	85	52	FT
4	82	52	FT
5	87	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0415	0.040	
2	.0415	0.040	
3	.0415	0.040	
4	.0415	0.040	
5	.0415	0.040	
Average	.0415		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: ~~EP~~ #93 Coal Creek
Seam Number: 12/13 AP91
Welder Number: 1175

Sample Number: DS-1
Date Sampled: 8/9/93
Date Tested: 8/12/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	127	80	FT
3	132	80	FT
4	129	80	FT
5	130	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	79	52	FT
2	85	52	FT
3	78	52	FT
4	74	52	FT
5	80	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0429	0.040	
2	.0437	0.040	
3	.0435	0.040	
4	.0438	0.040	
5	.0431	0.040	
Average	.0434		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: ~~EP #93~~ Coal Creek
Seam Number: 12/13 AP #91
Welder Number: 1061

Sample Number: DS-2
Date Sampled: 8/9/93
Date Tested: 8/12/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	130	80	FT
2	128	80	FT
3	132	80	FT
4	130	80	FT
5	131	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	66	52	BF
2	99	52	FT
3	91	52	FT
4	60	52	BF
5	103	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0442	0.040	
2	.0440	0.040	
3	.0441	0.040	
4	.0439	0.040	
5	.0438	0.040	
Average	.0440		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Jay Austs for
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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 14/13
Welder Number: 1061

Sample Number: DS-2A
Date Sampled: 8/13/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	135	80	FT
2	136	80	FT
3	139	80	FT
4	136	80	FT
5	135	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	99	52	FT
2	95	52	FT
3	94	52	FT
4	99	52	FT
5	88	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0435	0.040	
2	.0435	0.040	
3	.0435	0.040	
4	.0435	0.040	
5	.0435	0.040	
Average	.0435		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: P 11/13
Welder Number: 1061

Sample Number: DS-2B
Date Sampled: 8/18/93
Date Tested: 8/22/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	120	80	FT
3	124	80	FT
4	123	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	88	52	FT
2	89	52	FT
3	91	52	FT
4	85	52	FT
5	86	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.043	0.040	
2	.043	0.040	
3	.043	0.040	
4	.043	0.040	
5	.043	0.040	
Average	.043		

REMARKS:

FT = Film Tear
BT = Bond Tear

Braun Intertec Corporation

Gerald L. Dauer, C.E.T.
Operations Manager

cv2/154

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: ~~EP #93~~ Coal Creek
Seam Number: 13/14 AP#91
Welder Number: 1061

Sample Number: DS-3
Date Sampled: 8/9/93
Date Tested: 8/10/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	120	80	FT
2	121	80	FT
3	118	80	FT
4	119	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	80	52	FT
2	79	52	FT
3	88	52	FT
4	92	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0410	0.040	
2	.0410	0.040	
3	.0409	0.040	
4	.0408	0.040	
5	.0408	0.040	
Average	.0409		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Braun Intertec Corporation

For
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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: ~~EP #93~~ Coal Creek
Seam Number: 13/14 AP #91
Welder Number: 1246

Sample Number: ~~DS-4~~
Date Sampled: 8/9/93
Date Tested: 8/12/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	122	80	FT
3	122	80	FT
4	127	80	FT
5	125	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	90	52	FT
2	85	52	FT
3	81	52	FT
4	96	52	FT
5	78	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0413	0.040	
2	.0412	0.040	
3	.0416	0.040	
4	.0413	0.040	
5	.0412	0.040	
Average	.0413		

REMARKS:

FT = Film Tear
BT = Bond Tear

Braun Intertec Corporation

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cv2/93

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: ~~EP #93~~ Coal Creek AP #91
Seam Number: 5/15
Welder Number: 1175

Sample Number: DS-5
Date Sampled: 8/9/93
Date Tested: 8/12/93
Tested By: N/I

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	117	80	FT
2	119	80	FT
3	118	80	FT
4	118	80	FT
5	118	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	97	52	FT
2	96	52	FT
3	96	52	FT
4	97	52	FT
5	93	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0433	0.040	
2	.0434	0.040	
3	.0436	0.040	
4	.0434	0.040	
5	.0430	0.040	
Average	.0433		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: ~~EP #93~~ Coal Creek
Seam Number: 15/16 AP #91
Welder Number: 1061

Sample Number: DS-6
Date Sampled: 8/9/93
Date Tested: 8/12/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	115	80	FT
2	133	80	FT
3	132	80	FT
4	132	80	FT
5	134	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	98	52	FT
2	97	52	FT
3	88	52	FT
4	90	52	FT
5	98	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0431	0.040	
2	.0431	0.040	
3	.0431	0.040	
4	.0429	0.040	
5	.0429	0.040	
Average	.0430		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: ~~EP #93~~ Coal Creek
Seam Number: 17/16 AP #91
Welder Number: 1061

Sample Number: DS-7A
Date Sampled: 8/9/93
Date Tested: 8/12/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	124	80	FT
3	127	80	FT
4	126	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	73	52	FT
2	93	52	FT
3	92	52	FT
4	87	52	FT
5	99	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0408	0.040	
2	.0407	0.040	
3	.0405	0.040	
4	.0407	0.040	
5	.0408	0.040	
Average	.0407		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: ~~EP-#93~~ Coal Creek
Seam Number: 16/17 AP#91
Welder Number: 1061

Sample Number: DS-7B
Date Sampled: 8/9/93
Date Tested: 8/12/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	127	80	FT
3	127	80	FT
4	128	80	FT
5	125	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	98	52	FT
2	88	52	FT
3	99	52	FT
4	97	52	FT
5	102	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	0.040	
2	.0404	0.040	
3	.0405	0.040	
4	.0407	0.040	
5	.0405	0.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

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for
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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: ~~EP #93~~ Coal Creek AP#91
Seam Number: 17/18
Welder Number: 1246

Sample Number: DS-8
Date Sampled: 8/9/93
Date Tested: 8/12/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	127	80	FT
3	123	80	FT
4	122	80	FT
5	122	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	79	52	FT
2	88	52	FT
3	87	52	FT
4	66	52	FT
5	103	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0413	0.040	
2	.0416	0.040	
3	.0415	0.040	
4	.0411	0.040	
5	.0415	0.040	
Average	.0414		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: ~~EP #93~~ Coal Creek
Seam Number: 17/18 AP #91
Welder Number: 1175

Sample Number: DS-9
Date Sampled: 8/9/93
Date Tested: 8/12/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	124	80	FT
3	120	80	FT
4	121	80	FT
5	121	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	86	52	FT
2	90	52	FT
3	85	52	FT
4	96	52	FT
5	92	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0417	0.040	
2	.0417	0.040	
3	.0416	0.040	
4	.0415	0.040	
5	.0418	0.040	
Average	.0417		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: ~~EP #93~~ Coal Creek
Seam Number: 19/20 AP#91
Welder Number: 1175

Sample Number: DS-10
Date Sampled: 8/10/93
Date Tested: 8/12/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	129	80	FT
3	129	80	FT
4	127	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	88	52	FT
2	78	52	FT
3	86	52	FT
4	76	52	FT
5	84	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0420	0.040	
2	.0421	0.040	
3	.0421	0.040	
4	.0420	0.040	
5	.0423	0.040	
Average	.0421		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 18/19
Welder Number: 1246
REVISED

Sample Number: DS-11
Date Sampled: 8/10/93
Date Tested: 8/12/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	119	80	FT
2	117	80	FT
3	118	80	FT
4	123	80	FT
5	117	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	87	52	FT
2	75	52	FT
3	85	52	FT
4	80	52	FT
5	91	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.042	0.040	
3	.042	0.040	
4	.042	0.040	
5	.042	0.040	
Average	.042		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: ~~EP #93~~ Coal Creek
Seam Number: 20/25 AP #91
Welder Number: 1175

Sample Number: DS-12
Date Sampled: N/I
Date Tested: 8/12/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	119	80	FT
2	120	80	FT
3	114	80	FT
4	115	80	FT
5	120	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	83	52	FT
2	73	52	FT
3	85	52	FT
4	93	52	FT
5	87	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0410	0.040	
2	.0409	0.040	
3	.0408	0.040	
4	.0404	0.040	
5	.0403	0.040	
Average	.0407		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv2/102

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: ~~EP #93~~ Coal Creek
Seam Number: 20/25 AP#91
Welder Number: 1246

Sample Number: DS-13
Date Sampled: 8/10/93
Date Tested: 8/12/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	116	80	FT
2	123	80	FT
3	122	80	FT
4	121	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	78	52	FT
2	75	52	FT
3	73	52	FT
4	81	52	FT
5	84	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0419	0.040	
2	.0412	0.040	
3	.0413	0.040	
4	.0416	0.040	
5	.0412	0.040	
Average	.0414		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: ~~EP #93~~ Coal Creek AP #91
Seam Number: 24/28
Welder Number: 1175

Sample Number: DS-14
Date Sampled: 8/10/93
Date Tested: 8/11/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	119	80	FT
3	116	80	FT
4	122	80	FT
5	119	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	85	52	FT
2	85	52	FT
3	83	52	FT
4	81	52	FT
5	83	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0404	0.040	
2	.0402	0.040	
3	.0402	0.040	
4	.0400	0.040	
5	.0401	0.040	
Average	.0402		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: ~~EP #93~~ Coal Creek
Seam Number: 34/36 AP#1
Welder Number: 1175

Sample Number: DS-15
Date Sampled: 8/10/93
Date Tested: 8/11/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	132	80	FT
2	122	80	FT
3	126	80	FT
4	125	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	93	52	FT
2	92	52	FT
3	92	52	FT
4	87	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0418	0.040	
2	.0415	0.040	
3	.0418	0.040	
4	.0414	0.040	
5	.0415	0.040	
Average	.0416		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: ~~EP #93~~ Coal Creek
Seam Number: 27/41 AP #91
Welder Number: 1246

Sample Number: DS-16
Date Sampled: 8/10/93
Date Tested: 8/11/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	135	80	FT
3	134	80	FT
4	126	80	FT
5	132	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	92	52	FT
2	71	52	FT
3	80	52	FT
4	77	52	FT
5	76	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0431	0.040	
2	.0427	0.040	
3	.0430	0.040	
4	.0426	0.040	
5	.0431	0.040	
Average	.0429		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: ~~EP #93~~ Coal Creek
Seam Number: 34/41 AP#91
Welder Number: 1061

Sample Number: DS-17
Date Sampled: 8/10/93
Date Tested: 8/11/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	115	80	FT
2	116	80	FT
3	113	80	FT
4	109	80	FT
5	113	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	97	52	FT
2	93	52	FT
3	88	52	FT
4	93	52	FT
5	96	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0410	0.040	
2	.0409	0.040	
3	.0414	0.040	
4	.0405	0.040	
5	.0412	0.040	
Average			

REMARKS:

FT = Film Tear
BT = Bond Tear

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Gerald L. Dauer, C.E.T.
Operations Manager

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: ~~EP #93~~ Coal Creek AP #91
Seam Number: 12/45
Welder Number: 1175

Sample Number: DS-18
Date Sampled: 8/10/93
Date Tested: 8/12/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	124	80	FT
3	122	80	FT
4	121	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	71	52	FT
2	92	52	FT
3	79	52	FT
4	91	52	FT
5	72	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0422	0.040	
2	.0422	0.040	
3	.0426	0.040	
4	.0423	0.040	
5	.0419	0.040	
Average	.0422		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Operations Manager

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: ~~EP #93~~ Coal Creek
Seam Number: 12/45 AP #91
Welder Number: 1175

Sample Number: DS-19
Date Sampled: N/I
Date Tested: 8/12/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	140	80	FT
3	144	80	FT
4	136	80	FT
5	138	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	85	52	FT
2	87	52	FT
3	87	52	FT
4	90	52	FT
5	87	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0464	0.040	
2	.0469	0.040	
3	.0469	0.040	
4	.0468	0.040	
5	.0466	0.040	
Average	.0467		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Jon Quist FOR
Gerald L. Dauer, C.E.T.
Operations Manager

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: ~~EP #93~~ Coal Creek
Seam Number: 45/46 AP#91
Welder Number: 1246

Sample Number: DS-20
Date Sampled: 8/10/93
Date Tested: 8/12/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	123	80	FT
3	120	80	FT
4	123	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	77	52	FT
2	78	52	FT
3	77	52	FT
4	81	52	FT
5	74	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	0.040	
2	.0405	0.040	
3	.0404	0.040	
4	.0404	0.040	
5	.0406	0.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: ~~EP #93~~ Coal Creek
Seam Number: 47/48 AP#91
Welder Number: 1061

Sample Number: DS-21
Date Sampled: 8/10/93
Date Tested: 8/12/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	125	80	FT
2	128	80	FT
3	123	80	FT
4	126	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	66	52	FT
2	93	52	FT
3	89	52	FT
4	84	52	FT
5	83	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0412	0.040	
2	.0412	0.040	
3	.0413	0.040	
4	.0407	0.040	
5	.0414	0.040	
Average	.0412		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 46/49
Welder Number: 1246

Sample Number: DS-22
Date Sampled: 8/12/93
Date Tested: 8/18/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	129	80	FT
3	127	80	FT
4	125	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	87	52	FT
2	97	52	FT
3	91	52	FT
4	96	52	FT
5	76	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0400	0.040	
2	.0400	0.040	
3	.0400	0.040	
4	.0400	0.040	
5	.0400	0.040	
Average			

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 49/50
Welder Number: 1061

Sample Number: DS-23
Date Sampled: 8/12/93
Date Tested: 8/18/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	123	80	FT
3	122	80	FT
4	124	80	FT
5	121	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	86	52	FT
2	81	52	FT
3	81	52	FT
4	85	52	FT
5	82	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.040	0.040	
2	.040	0.040	
3	.040	0.040	
4	.040	0.040	
5	.040	0.040	
Average	.040		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 50/51
Welder Number: 1175

Sample Number: DS-24
Date Sampled: 8/12/93
Date Tested: 8/18/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	131	80	FT
2	127	80	FT
3	130	80	FT
4	127	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	81	52	FT
2	85	52	FT
3	85	52	FT
4	81	52	FT
5	83	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.040	0.040	
2	.040	0.040	
3	.040	0.040	
4	.040	0.040	
5	.040	0.040	
Average	.040		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 51-52
Welder Number: 1061

Sample Number: DS-25
Date Sampled: 8/12/93
Date Tested: 8/18/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	126	80	FT
2	124	80	FT
3	126	80	FT
4	127	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	82	52	FT
2	96	52	FT
3	92	52	FT
4	94	52	FT
5	90	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	0.040	
2	.0405	0.040	
3	.0405	0.040	
4	.0405	0.040	
5	.0405	0.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 51-52
Welder Number: 1175

Sample Number: DS-26
Date Sampled: 8/12/93
Date Tested: 8/18/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	126	80	FT
2	124	80	FT
3	127	80	FT
4	128	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	92	52	FT
2	85	52	FT
3	100	52	FT
4	88	52	FT
5	86	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0415	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 52/53
Welder Number: 1246

Sample Number: DS-27
Date Sampled: 8/12/93
Date Tested: 8/18/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	120	80	FT
3	128	80	FT
4	128	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	81	52	FT
2	83	52	FT
3	79	52	FT
4	84	52	FT
5	86	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	0.040	
2	.0405	0.040	
3	.0405	0.040	
4	.0405	0.040	
5	.0405	0.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 53/54
Welder Number: 1246

Sample Number: DS-28
Date Sampled: 8/12/93
Date Tested: 8/18/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	133	80	FT
2	133	80	FT
3	131	80	FT
4	130	80	FT
5	134	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	79	52	FT
2	79	52	FT
3	80	52	FT
4	77	52	FT
5	78	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0415	0.040	
2	.0415	0.040	
3	.0415	0.040	
4	.0415	0.040	
5	.0415	0.040	
Average	.0415		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 53/54
Welder Number: 1175

Sample Number: DS-29
Date Sampled: 8/12/93
Date Tested: 8/18/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	132	80	FT
2	129	80	FT
3	130	80	FT
4	132	80	FT
5	132	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	90	52	FT
2	85	52	FT
3	78	52	FT
4	79	52	FT
5	78	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 54/55
Welder Number: 1061

Sample Number: DS-30
Date Sampled: 8/12/93
Date Tested: 8/18/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	130	80	FT
2	132	80	FT
3	131	80	FT
4	132	80	FT
5	133	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	95	52	FT
2	78	52	FT
3	92	52	FT
4	94	52	FT
5	98	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0424	0.040	
2	.0423	0.040	
3	.0424	0.040	
4	.0424	0.040	
5	.0424	0.040	
Average	.0424		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 54/55
Welder Number: 1246

Sample Number: DS-31
Date Sampled: 8/12/93
Date Tested: 8/18/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	133	80	FT
2	134	80	FT
3	135	80	FT
4	133	80	FT
5	136	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	96	52	FT
2	98	52	FT
3	87	52	FT
4	91	52	FT
5	99	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0426	0.040	
2	.0425	0.040	
3	.0426	0.040	
4	.0425	0.040	
5	.0426	0.040	
Average	.0426		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 50/57 VN
Welder Number: 1061

Sample Number: DS-32
Date Sampled: 8/12/93
Date Tested: 8/18/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	131	80	FT
2	130	80	FT
3	132	80	FT
4	131	80	FT
5	130	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	82	52	FT
2	84	52	FT
3	79	52	FT
4	78	52	FT
5	85	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0410	0.040	
2	.0410	0.040	
3	.0409	0.040	
4	.0411	0.040	
5	.0410	0.040	
Average	.0410		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 49/58
Welder Number: 1246

Sample Number: DS-33
Date Sampled: 8/12/93
Date Tested: 8/19/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	127	80	FT
3	127	80	FT
4	127	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	81	52	FT
2	82	52	FT
3	81	52	FT
4	85	52	FT
5	82	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0410	0.040	
2	.0412	0.040	
3	.0409	0.040	
4	.0409	0.040	
5	.0408	0.040	
Average	.0410		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 56/60
Welder Number: 1061

Sample Number: DS-34
Date Sampled: 8/12/93
Date Tested: 8/19/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	123	80	FT
3	121	80	FT
4	121	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	54	52	BF
2	65	52	BF
3	75	52	BF
4	49	52	BF
5	83	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0403	0.040	
2	.0404	0.040	
3	.0405	0.040	
4	.0405	0.040	
5	.0406	0.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv2/126

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Gerald L. Dauer, C.E.T.
Operations Manager

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 56-60 91
Welder Number: 1061

Sample Number: DS-34A
Date Sampled: 8/20/93
Date Tested: 8/23/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	116	80	FT
2	113	80	FT
3	115	80	FT
4	121	80	FT
5	117	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	68	52	FT
2	72	52	FT
3	69	52	FT
4	76	52	FT
5	84	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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cv2/155

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 56-60
Welder Number: 1061

Sample Number: DS-34B
Date Sampled: 8/18/93
Date Tested: 8/22/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	112	80	FT
3	112	80	FT
4	120	80	FT
5	117	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	82	52	FT
2	79	52	FT
3	68	52	FT
4	75	52	FT
5	88	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	0.040	
2	.0405	0.040	
3	.0405	0.040	
4	.0405	0.040	
5	.0405	0.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv2/156

Braun Intertec Corporation

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 59/61
Welder Number: 1246

Sample Number: DS-35
Date Sampled: 8/12/93
Date Tested: 8/19/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	127	80	FT
3	128	80	FT
4	125	80	FT
5	130	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	81	52	FT
2	84	52	FT
3	82	52	FT
4	94	52	FT
5	78	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0409	0.040	
2	.0408	0.040	
3	.0410	0.040	
4	.0410	0.040	
5	.0408	0.040	
Average	.0409		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Gerald L. Dauer, C.E.T.
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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 59/61
Welder Number: 1246

Sample Number: DS-36
Date Sampled: 8/13/93
Date Tested: 8/19/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	120	80	FT
2	127	80	FT
3	127	80	FT
4	126	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	65	52	FT
2	71	52	FT
3	67	52	FT
4	70	52	FT
5	69	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	0.040	
2	.0405	0.040	
3	.0404	0.040	
4	.0405	0.040	
5	.0405	0.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv2/128

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 61/62
Welder Number: 1246

Sample Number: DS-37
Date Sampled: 8/13/93
Date Tested: 8/19/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	125	80	FT
3	127	80	FT
4	125	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	76	52	FT
2	80	52	FT
3	79	52	FT
4	84	52	FT
5	82	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.040	0.040	
2	.040	0.040	
3	.040	0.040	
4	.040	0.040	
5	.040	0.040	
Average	.040		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 62/63
Welder Number: 1054

Sample Number: DS-38
Date Sampled: 8/16/93
Date Tested: 8/19/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	124	80	FT
3	125	80	FT
4	125	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	77	52	FT
2	79	52	FT
3	83	52	FT
4	79	52	FT
5	81	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.040	0.040	
2	.040	0.040	
3	.040	0.040	
4	.040	0.040	
5	.040	0.040	
Average	.040		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 63/64
Welder Number: 1246

Sample Number: DS-39
Date Sampled: 8/16/93
Date Tested: 8/19/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	130	80	FT
3	127	80	FT
4	130	80	FT
5	129	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	90	52	FT
2	83	52	FT
3	88	52	FT
4	85	52	FT
5	84	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	0.040	
2	.0405	0.040	
3	.0405	0.040	
4	.0405	0.040	
5	.0405	0.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 63/64
Welder Number: 1054

Sample Number: DS-40
Date Sampled: 8/16/93
Date Tested: 8/19/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	125	80	FT
3	126	80	FT
4	124	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	84	52	FT
2	76	52	FT
3	85	52	FT
4	82	52	FT
5	80	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.040	0.040	
2	.040	0.040	
3	.0401	0.040	
4	.0401	0.040	
5	.0401	0.040	
Average	.0401		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 64/63
Welder Number: 1246

Sample Number: DS-41
Date Sampled: 8/16/93
Date Tested: 8/19/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	126	80	FT
2	126	80	FT
3	127	80	FT
4	128	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	87	52	FT
2	76	52	FT
3	72	52	FT
4	73	52	FT
5	70	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	0.040	
2	.0405	0.040	
3	.0405	0.040	
4	.0405	0.040	
5	.0405	0.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 64/65
Welder Number: 1054

Sample Number: DS-42
Date Sampled: 8/16/93
Date Tested: 8/19/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	125	80	FT
2	127	80	FT
3	126	80	FT
4	125	80	FT
5	125	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	83	52	FT
2	78	52	FT
3	80	52	FT
4	77	52	FT
5	80	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.040	0.040	
2	.040	0.040	
3	.040	0.040	
4	.040	0.040	
5	.040	0.040	
Average	.040		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 65/66
Welder Number: 1054

Sample Number: DS-43
Date Sampled: 8/16/93
Date Tested: 8/19/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	129	80	FT
3	130	80	FT
4	130	80	FT
5	130	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	85	52	FT
2	87	52	FT
3	91	52	FT
4	75	52	FT
5	78	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.040	0.040	
2	.040	0.040	
3	.040	0.040	
4	.040	0.040	
5	.040	0.040	
Average	.040		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 66/67
Welder Number: 1246

Sample Number: DS-44
Date Sampled: 8/17/93
Date Tested: 8/19/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	132	80	FT
2	134	80	FT
3	131	80	FT
4	134	80	FT
5	132	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	85	52	FT
2	86	52	FT
3	86	52	FT
4	84	52	FT
5	79	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv2/136

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 66/67
Welder Number: 1066

Sample Number: DS-45
Date Sampled: 8/17/93
Date Tested: 8/19/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	125	80	FT
2	124	80	FT
3	127	80	FT
4	129	80	FT
5	131	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	76	52	FT
2	79	52	FT
3	78	52	FT
4	80	52	FT
5	84	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.040	0.040	
2	.040	0.040	
3	.040	0.040	
4	.040	0.040	
5	.040	0.040	
Average	.040		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv2/137

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 67/68
Welder Number: 1246

Sample Number: DS-46
Date Sampled: 8/17/93
Date Tested: 8/19/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	124	80	FT
3	124	80	FT
4	122	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	90	52	FT
2	86	52	FT
3	85	52	FT
4	89	52	FT
5	88	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.040	0.040	
2	.040	0.040	
3	.040	0.040	
4	.040	0.040	
5	.040	0.040	
Average	.040		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 68/69
Welder Number: 1054

Sample Number: DS-47
Date Sampled: 8/17/93
Date Tested: 8/19/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	129	80	FT
3	130	80	FT
4	129	80	FT
5	129	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	82	52	FT
2	85	52	FT
3	84	52	FT
4	92	52	FT
5	88	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.040	0.040	
2	.040	0.040	
3	.040	0.040	
4	.040	0.040	
5	.040	0.040	
Average	.040		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 68/69
Welder Number: 1066

Sample Number: DS-48
Date Sampled: 8/17/93
Date Tested: 8/19/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	124	80	FT
3	124	80	FT
4	123	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	93	52	FT
2	65	52	FT
3	86	52	FT
4	88	52	FT
5	91	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0407	0.040	
2	.0408	0.040	
3	.0407	0.040	
4	.0407	0.040	
5	.0409	0.040	
Average	.0408		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 69/70
Welder Number: 1054

Sample Number: DS-49
Date Sampled: 8/17/93
Date Tested: 8/19/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	122	80	FT
3	128	80	FT
4	126	80	FT
5	125	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	77	52	FT
2	90	52	FT
3	97	52	FT
4	85	52	FT
5	88	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0410	0.040	
2	.0410	0.040	
3	.0408	0.040	
4	.0409	0.040	
5	.0412	0.040	
Average	.0410		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 70/69
Welder Number: 1066

Sample Number: DS-50
Date Sampled: 8/17/93
Date Tested: 8/19/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	123	80	FT
3	119	80	FT
4	128	80	FT
5	122	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	99	52	FT
2	96	52	FT
3	99	52	FT
4	98	52	FT
5	99	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0417	0.040	
2	.0415	0.040	
3	.0415	0.040	
4	.0416	0.040	
5	.0416	0.040	
Average	.0416		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 73/44
Welder Number: 1054

Sample Number: DS-51
Date Sampled: 8/18/93
Date Tested: 8/22/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	121	80	FT
3	120	80	FT
4	121	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	86	52	FT
2	68	52	FT
3	73	52	FT
4	85	52	FT
5	85	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0415	0.040	
2	.0415	0.040	
3	.0415	0.040	
4	.0415	0.040	
5	.0415	0.040	
Average	.0415		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 71/80
Welder Number: 1054

Sample Number: DS-52
Date Sampled: 8/18/93
Date Tested: 8/22/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	121	80	FT
3	122	80	FT
4	121	80	FT
5	120	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	90	52	FT
2	84	52	FT
3	80	52	FT
4	83	52	FT
5	90	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 74/75
Welder Number: 1066

Sample Number: DS-53
Date Sampled: 8/18/93
Date Tested: 8/22/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	126	80	FT
3	124	80	FT
4	122	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	78	52	FT
2	79	52	FT
3	79	52	FT
4	78	52	FT
5	80	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 71/80
Welder Number: 1053

Sample Number: DS-54
Date Sampled: 8/19/93
Date Tested: 8/22/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	120	80	FT
2	122	80	FT
3	123	80	FT
4	121	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	77	52	FT
2	83	52	FT
3	85	52	FT
4	87	52	FT
5	80	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.040	0.040	
2	.040	0.040	
3	.040	0.040	
4	.040	0.040	
5	.040	0.040	
Average	.040		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 78/83
Welder Number: 1066

Sample Number: DS-55
Date Sampled: 8/18/93
Date Tested: 8/22/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	125	80	FT
2	125	80	FT
3	125	80	FT
4	123	80	FT
5	117	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	90	52	FT
2	88	52	FT
3	87	52	FT
4	84	52	FT
5	87	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0425	0.040	
2	.0425	0.040	
3	.0425	0.040	
4	.0425	0.040	
5	.0425	0.040	
Average	.0425		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 85/86
Welder Number: 1053

Sample Number: DS-56
Date Sampled: 8/18/93
Date Tested: 8/22/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	123	80	FT
3	123	80	FT
4	125	80	FT
5	125	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	82	52	FT
2	81	52	FT
3	85	52	FT
4	89	52	FT
5	86	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	0.040	
2	.041	0.040	
3	.041	0.040	
4	.0405	0.040	
5	.0405	0.040	
Average	.0407		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 82/89
Welder Number: 1053

Sample Number: DS-57
Date Sampled: 8/19/93
Date Tested: 8/23/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	125	80	FT
2	127	80	FT
3	129	80	FT
4	127	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	92	52	FT
2	102	52	FT
3	95	52	FT
4	91	52	FT
5	98	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0445	0.040	
2	.0445	0.040	
3	.0445	0.040	
4	.0445	0.040	
5	.0445	0.040	
Average	.0445		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 90/89
Welder Number: 1066

Sample Number: DS-58
Date Sampled: 8/19/93
Date Tested: 8/22/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	118	80	FT
2	120	80	FT
3	118	80	FT
4	118	80	FT
5	119	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	78	52	FT
2	78	52	FT
3	82	52	FT
4	76	52	FT
5	76	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.040	0.040	
2	.040	0.040	
3	.040	0.040	
4	.040	0.040	
5	.040	0.040	
Average	.040		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 91/93
Welder Number: 1054

Sample Number: DS-59
Date Sampled: 8/19/93
Date Tested: 8/23/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	123	80	FT
3	123	80	FT
4	124	80	FT
5	122	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	92	52	FT
2	86	52	FT
3	86	52	FT
4	82	52	FT
5	87	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	0.040	
2	.0405	0.040	
3	.0405	0.040	
4	.0405	0.040	
5	.0405	0.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 89/94
Welder Number: 1053

Sample Number: DS-60
Date Sampled: 8/17/93
Date Tested: 8/23/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	120	80	FT
2	117	80	FT
3	117	80	FT
4	120	80	FT
5	120	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	88	52	FT
2	83	52	FT
3	82	52	FT
4	90	52	FT
5	77	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	0.040	
2	.0405	0.040	
3	.0405	0.040	
4	.0405	0.040	
5	.0405	0.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 93/96
Welder Number: 1054

Sample Number: DS-61
Date Sampled: 8/19/93
Date Tested: 8/23/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	116	80	FT
2	120	80	FT
3	116	80	FT
4	119	80	FT
5	117	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	81	52	FT
2	77	52	FT
3	78	52	FT
4	77	52	FT
5	81	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	0.040	
2	.0405	0.040	
3	.0405	0.040	
4	.0405	0.040	
5	.0405	0.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 103-104
Welder Number: 1053

Sample Number: DS-62
Date Sampled: 8/20/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	135	80	FT
2	137	80	FT
3	135	80	FT
4	134	80	FT
5	133	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	89	52	FT
2	89	52	FT
3	87	52	FT
4	88	52	FT
5	85	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.042	0.040	
3	.042	0.040	
4	.042	0.040	
5	.042	0.040	
Average	.042		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 102-103
Welder Number: 1054

Sample Number: DS-63
Date Sampled: 8/20/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	133	80	FT
2	132	80	FT
3	133	80	FT
4	133	80	FT
5	131	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	88	52	FT
2	93	52	FT
3	89	52	FT
4	93	52	FT
5	91	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0423	0.040	
2	.0423	0.040	
3	.0423	0.040	
4	.0423	0.040	
5	.0423	0.040	
Average			

REMARKS:

FT = Film Tear
BT = Bond Tear

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Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 114-113
Welder Number: 1054

Sample Number: DS-64
Date Sampled: 8/20/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	128	80	FT
3	128	80	FT
4	129	80	FT
5	129	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	83	52	FT
2	91	52	FT
3	91	52	FT
4	82	52	FT
5	83	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	0.040	
2	.0405	0.040	
3	.0405	0.040	
4	.0405	0.040	
5	.0405	0.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 112-113
Welder Number: 1053

Sample Number: DS-65
Date Sampled: 8/20/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	130	80	FT
2	132	80	FT
3	134	80	FT
4	135	80	FT
5	134	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	91	52	FT
2	101	52	FT
3	83	52	FT
4	82	52	FT
5	82	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0408	0.040	
2	.0408	0.040	
3	.0408	0.040	
4	.0408	0.040	
5	.0408	0.040	
Average	.0408		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 106-118
Welder Number: 1054

Sample Number: DS-66
Date Sampled: 8/20/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	130	80	FT
2	127	80	FT
3	127	80	FT
4	129	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	93	52	FT
2	92	52	FT
3	85	52	FT
4	85	52	FT
5	95	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0425	0.040	
2	.0425	0.040	
3	.0425	0.040	
4	.0425	0.040	
5	.0425	0.040	
Average	.0425		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 112-118
Welder Number: 1053

Sample Number: DS-67
Date Sampled: 8/20/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	123	80	FT
3	125	80	FT
4	126	80	FT
5	125	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	96	52	FT
2	89	52	FT
3	90	52	FT
4	82	52	FT
5	96	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0409	0.040	
2	.0411	0.040	
3	.0406	0.040	
4	.0410	0.040	
5	.0410	0.040	
Average	.0409		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 119-120
Welder Number: 1053

Sample Number: DS-68
Date Sampled: 8/20/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	131	80	FT
2	131	80	FT
3	130	80	FT
4	133	80	FT
5	132	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	88	52	FT
2	101	52	FT
3	93	52	FT
4	96	52	FT
5	98	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0408	0.040	
2	.0408	0.040	
3	.0406	0.040	
4	.0406	0.040	
5	.0407	0.040	
Average	.0407		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 120-119
Welder Number: 1054

Sample Number: DS-69
Date Sampled: 8/20/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	134	80	FT
2	132	80	FT
3	132	80	FT
4	132	80	FT
5	132	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	72	52	FT
2	74	52	FT
3	75	52	FT
4	72	52	FT
5	82	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 121-117
Welder Number: 1066

Sample Number: DS-70
Date Sampled: 8/21/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	132	80	FT
2	134	80	FT
3	132	80	FT
4	130	80	FT
5	133	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	89	52	FT
2	77	52	FT
3	83	52	FT
4	91	52	FT
5	81	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	0.040	
2	.0405	0.040	
3	.0405	0.040	
4	.0405	0.040	
5	.0405	0.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 120-124
Welder Number: 1054

Sample Number: DS-71
Date Sampled: 8/21/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	128	80	FT
3	128	80	FT
4	127	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	78	52	FT
2	76	52	FT
3	82	52	FT
4	76	52	FT
5	78	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.040	0.040	
2	.040	0.040	
3	.040	0.040	
4	.040	0.040	
5	.040	0.040	
Average	.040		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 120-124
Welder Number: 1053

Sample Number: DS-72
Date Sampled: 8/21/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	125	80	FT
2	127	80	FT
3	130	80	FT
4	131	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	87	52	FT
2	80	52	FT
3	89	52	FT
4	76	52	FT
5	96	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	0.040	
2	.0405	0.040	
3	.0405	0.040	
4	.0405	0.040	
5	.0405	0.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 124-125
Welder Number: 1054

Sample Number: DS-73
Date Sampled: 8/21/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	128	80	FT
3	130	80	FT
4	129	80	FT
5	129	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	83	52	FT
2	79	52	FT
3	81	52	FT
4	78	52	FT
5	60	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	0.040	
2	.0405	0.040	
3	.0405	0.040	
4	.0405	0.040	
5	.0405	0.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 124-125
Welder Number: 1053

Sample Number: DS-74
Date Sampled: 8/21/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	130	80	FT
2	131	80	FT
3	132	80	FT
4	132	80	FT
5	133	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	84	52	FT
2	85	52	FT
3	89	52	FT
4	88	52	FT
5	79	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	0.040	
2	.0405	0.040	
3	.0405	0.040	
4	.0405	0.040	
5	.0405	0.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 125-126
Welder Number: 1054

Sample Number: DS-75
Date Sampled: 8/21/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	128	80	FT
3	129	80	FT
4	130	80	FT
5	131	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	88	52	FT
2	78	52	FT
3	82	52	FT
4	76	52	FT
5	86	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 128-129
Welder Number: 1066

Sample Number: DS-76
Date Sampled: 8/24/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	134	80	FT
2	135	80	FT
3	135	80	FT
4	133	80	FT
5	133	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	82	52	FT
2	77	52	FT
3	77	52	FT
4	83	52	FT
5	78	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0412	0.040	
2	.0411	0.040	
3	.0410	0.040	
4	.0410	0.040	
5	.0411	0.040	
Average	.0411		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 128-127
Welder Number: 1053

Sample Number: DS-77
Date Sampled: 8/24/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	135	80	FT
2	135	80	FT
3	134	80	FT
4	134	80	FT
5	135	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	82	52	FT
2	90	52	FT
3	85	52	FT
4	96	52	FT
5	93	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.0405	0.040	
5	.041	0.040	
Average	.0409		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 138-132
Welder Number: 1066

Sample Number: DS-78
Date Sampled: 8/24/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	129	80	FT
3	130	80	FT
4	129	80	FT
5	131	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	92	52	FT
2	95	52	FT
3	79	52	FT
4	86	52	FT
5	86	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0403	0.040	
2	.0405	0.040	
3	.0405	0.040	
4	.0405	0.040	
5	.0405	0.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 126-137
Welder Number: 1054

Sample Number: DS-79
Date Sampled: 8/24/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	130	80	FT
2	128	80	FT
3	130	80	FT
4	126	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	91	52	FT
2	96	52	FT
3	89	52	FT
4	86	52	FT
5	88	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.0415	0.040	
5	.041	0.040	
Average	.0411		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 126-137
Welder Number: 1053

Sample Number: DS-80
Date Sampled: 8/24/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	130	80	FT
2	129	80	FT
3	129	80	FT
4	127	80	FT
5	130	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	92	52	FT
2	98	52	FT
3	96	52	FT
4	97	52	FT
5	97	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0408	0.040	
2	.0408	0.040	
3	.0408	0.040	
4	.0408	0.040	
5	.0408	0.040	
Average	.0408		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 139-138
Welder Number: 1054

Sample Number: DS-81
Date Sampled: 8/24/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	134	80	FT
2	134	80	FT
3	135	80	FT
4	134	80	FT
5	135	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	80	52	FT
2	90	52	FT
3	85	52	FT
4	96	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	0.040	
2	.0405	0.040	
3	.0405	0.040	
4	.0405	0.040	
5	.0405	0.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 138-139
Welder Number: 1053

Sample Number: DS-82
Date Sampled: 8/24/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	134	80	FT
2	133	80	FT
3	133	80	FT
4	134	80	FT
5	133	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	75	52	FT
2	84	52	FT
3	74	52	FT
4	78	52	FT
5	76	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	0.040	
2	.0405	0.040	
3	.0405	0.040	
4	.0405	0.040	
5	.0405	0.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 139-140
Welder Number: 1066

Sample Number: DS-83
Date Sampled: 8/24/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	125	80	FT
2	130	80	FT
3	131	80	FT
4	133	80	FT
5	132	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	74	52	FT
2	77	52	FT
3	79	52	FT
4	82	52	FT
5	76	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 104-141
Welder Number: 1053

Sample Number: DS-84
Date Sampled: 8/24/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	131	80	FT
2	131	80	FT
3	133	80	FT
4	133	80	FT
5	133	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	93	52	FT
2	95	52	FT
3	90	52	FT
4	102	52	FT
5	96	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 141-142
Welder Number: 1066

Sample Number: DS-85
Date Sampled: 8/24/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	130	80	FT
2	132	80	FT
3	129	80	FT
4	130	80	FT
5	130	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	86	52	FT
2	87	52	FT
3	85	52	FT
4	84	52	FT
5	82	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.040	0.040	
2	.040	0.040	
3	.040	0.040	
4	.040	0.040	
5	.040	0.040	
Average	.040		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 141-142
Welder Number: 1053

Sample Number: DS-86
Date Sampled: 8/24/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	134	80	FT
3	132	80	FT
4	134	80	FT
5	131	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	97	52	FT
2	100	52	FT
3	98	52	FT
4	98	52	FT
5	101	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.040	0.040	
2	.040	0.040	
3	.040	0.040	
4	.040	0.040	
5	.040	0.040	
Average	.040		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 145-146
Welder Number: 1054

Sample Number: DS-87
Date Sampled: 8/24/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	128	80	FT
3	134	80	FT
4	131	80	FT
5	134	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	90	52	FT
2	84	52	FT
3	91	52	FT
4	82	52	FT
5	86	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.042	0.040	
3	.042	0.040	
4	.042	0.040	
5	.042	0.040	
Average	.042		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 152-153
Welder Number: 1054

Sample Number: DS-88
Date Sampled: 8/24/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	134	80	FT
2	138	80	FT
3	134	80	FT
4	135	80	FT
5	137	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	94	52	FT
2	92	52	FT
3	91	52	FT
4	88	52	FT
5	90	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0435	0.040	
2	.0433	0.040	
3	.044	0.040	
4	.044	0.040	
5	.044	0.040	
Average	.0438		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 154-155
Welder Number: 1054

Sample Number: DS-89
Date Sampled: 8/25/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	138	80	FT
2	141	80	FT
3	142	80	FT
4	141	80	FT
5	142	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	79	52	FT
2	84	52	FT
3	78	52	FT
4	80	52	FT
5	80	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0435	0.040	
2	.0435	0.040	
3	.0435	0.040	
4	.0435	0.040	
5	.0435	0.040	
Average	.0435		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 156-157
Welder Number: 1066

Sample Number: DS-90
Date Sampled: 8/25/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	138	80	FT
2	137	80	FT
3	137	80	FT
4	137	80	FT
5	137	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	92	52	FT
2	101	52	FT
3	107	52	FT
4	99	52	FT
5	98	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0425	0.040	
2	.0425	0.040	
3	.0425	0.040	
4	.0425	0.040	
5	.0425	0.040	
Average	.0425		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 158-160
Welder Number: 1066

Sample Number: DS-91
Date Sampled: 8/25/93
Date Tested: 8/30/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	121	80	FT
3	122	80	FT
4	126	80	FT
5	125	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	85	52	FT
2	83	52	FT
3	89	52	FT
4	79	52	FT
5	84	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.040	0.040	
2	.040	0.040	
3	.040	0.040	
4	.040	0.040	
5	.040	0.040	
Average	.040		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 132-161
Welder Number: 1054

Sample Number: DS-92
Date Sampled: 8/28/93
Date Tested: 9/1/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	125	80	FT
2	127	80	FT
3	130	80	FT
4	125	80	FT
5	129	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	92	52	FT
2	98	52	FT
3	87	52	FT
4	100	52	FT
5	99	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0415	0.040	
2	.0415	0.040	
3	.0415	0.040	
4	.0415	0.040	
5	.041	0.040	
Average	.0414		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 162-163
Welder Number: 1066

Sample Number: DS-93
Date Sampled: 8/28/93
Date Tested: 9/1/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	134	80	FT
2	135	80	FT
3	137	80	FT
4	135	80	FT
5	135	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	84	52	FT
2	76	52	FT
3	94	52	FT
4	98	52	FT
5	94	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0415	0.040	
2	.0415	0.040	
3	.0415	0.040	
4	.0414	0.040	
5	.0414	0.040	
Average	.0415		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 166-167
Welder Number: 1066

Sample Number: DS-94
Date Sampled: 8/28/93
Date Tested: 9/1/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	132	80	FT
2	133	80	FT
3	130	80	FT
4	130	80	FT
5	132	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	87	52	FT
2	86	52	FT
3	88	52	FT
4	83	52	FT
5	88	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	0.040	
2	.0405	0.040	
3	.0405	0.040	
4	.0405	0.040	
5	.0405	0.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 125-166
Welder Number: 1054

Sample Number: DS-95
Date Sampled: 8/28/93
Date Tested: 9/1/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	132	80	FT
3	132	80	FT
4	132	80	FT
5	136	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	105	52	FT
2	105	52	FT
3	96	52	FT
4	92	52	FT
5	94	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.045	0.040	
2	.0435	0.040	
3	.042	0.040	
4	.042	0.040	
5	.0425	0.040	
Average	.043		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 168-169
Welder Number: 1066

Sample Number: DS-96
Date Sampled: 8/28/93
Date Tested: 9/1/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	132	80	FT
2	126	80	FT
3	131	80	FT
4	130	80	FT
5	132	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	96	52	FT
2	90	52	FT
3	92	52	FT
4	97	52	FT
5	90	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0410	0.040	
2	.0411	0.040	
3	.0414	0.040	
4	.0410	0.040	
5	.0415	0.040	
Average	.0412		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 169-170
Welder Number: 1054

Sample Number: DS-97
Date Sampled: 8/28/93
Date Tested: 9/1/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	126	80	FT
2	126	80	FT
3	128	80	FT
4	129	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	94	52	FT
2	99	52	FT
3	91	52	FT
4	83	52	FT
5	97	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0403	0.040	
2	.0403	0.040	
3	.0403	0.040	
4	.0405	0.040	
5	.0407	0.040	
Average	.0404		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 170-171
Welder Number: 1066

Sample Number: DS-98
Date Sampled: 8/28/93
Date Tested: 9/1/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	130	80	FT
2	129	80	FT
3	130	80	FT
4	131	80	FT
5	131	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	74	52	FT
2	97	52	FT
3	83	52	FT
4	91	52	FT
5	87	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	0.040	
2	.0405	0.040	
3	.0405	0.040	
4	.0406	0.040	
5	.0406	0.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 171-172
Welder Number: 1054

Sample Number: DS-99
Date Sampled: 8/28/93
Date Tested: 9/1/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	127	80	FT
3	127	80	FT
4	128	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	82	52	FT
2	90	52	FT
3	85	52	FT
4	79	52	FT
5	91	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0402	0.040	
2	.0401	0.040	
3	.0402	0.040	
4	.0402	0.040	
5	.0402	0.040	
Average	.0402		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 142-174
Welder Number: 1066

Sample Number: DS-100
Date Sampled: 8/28/93
Date Tested: 9/1/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	132	80	FT
2	131	80	FT
3	135	80	FT
4	132	80	FT
5	132	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	86	52	FT
2	88	52	FT
3	89	52	FT
4	82	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0425	0.040	
2	.0425	0.040	
3	.0426	0.040	
4	.0424	0.040	
5	.0424	0.040	
Average	.0425		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 172/142
Welder Number: 1054

Sample Number: DS-101
Date Sampled: 8/31/93
Date Tested: 9/1/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	123	80	FT
3	126	80	FT
4	130	80	FT
5	130	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	79	52	FT
2	76	52	FT
3	78	52	FT
4	79	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0410	0.040	
2	.0411	0.040	
3	.0411	0.040	
4	.0406	0.040	
5	.0408	0.040	
Average	.0409		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 174-175
Welder Number: 1053

Sample Number: DS-102
Date Sampled: 8/31/93
Date Tested: 9/1/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	136	80	FT
2	135	80	FT
3	137	80	FT
4	136	80	FT
5	135	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	88	52	FT
2	88	52	FT
3	90	52	FT
4	89	52	FT
5	90	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0424	0.040	
2	.0423	0.040	
3	.0424	0.040	
4	.0425	0.040	
5	.0427	0.040	
Average	.0425		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 175-176
Welder Number: 1066

Sample Number: DS-103
Date Sampled: 8/31/93
Date Tested: 9/1/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	126	80	FT
3	128	80	FT
4	128	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	99	52	FT
2	77	52	FT
3	82	52	FT
4	77	52	FT
5	93	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	0.040	
2	.0405	0.040	
3	.0405	0.040	
4	.0405	0.040	
5	.0405	0.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 175-176
Welder Number: 1053

Sample Number: DS-104
Date Sampled: 8/31/93
Date Tested: 9/1/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	132	80	FT
2	133	80	FT
3	132	80	FT
4	130	80	FT
5	131	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	101	52	FT
2	101	52	FT
3	99	52	FT
4	100	52	FT
5	93	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0413	0.040	
2	.0412	0.040	
3	.0413	0.040	
4	.0413	0.040	
5	.0411	0.040	
Average	.0412		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 177-178
Welder Number: 1053

Sample Number: DS-105
Date Sampled: 8/31/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	124	80	FT
3	126	80	FT
4	124	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	88	52	FT
2	98	52	FT
3	89	52	FT
4	95	52	FT
5	91	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.043	0.040	
3	.040	0.040	
4	.040	0.040	
5	.042	0.040	
Average	.0414		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 177-178
Welder Number: 1066

Sample Number: DS-106
Date Sampled: 8/31/93
Date Tested: 9/1/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	134	80	FT
2	133	80	FT
3	135	80	FT
4	131	80	FT
5	133	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	105	52	FT
2	94	52	FT
3	97	52	FT
4	107	52	FT
5	93	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 57-177
Welder Number: 1054

Sample Number: DS-107
Date Sampled: 8/31/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	122	80	FT
3	121	80	FT
4	124	80	FT
5	122	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	98	52	FT
2	96	52	FT
3	94	52	FT
4	97	52	FT
5	96	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.044	0.040	
3	.043	0.040	
4	.042	0.040	
5	.0439	0.040	
Average	.043		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 178-179
Welder Number: 1053

Sample Number: DS-108
Date Sampled: 9/1/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	129	80	FT
3	123	80	FT
4	128	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	100	52	FT
2	94	52	FT
3	96	52	FT
4	90	52	FT
5	81	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.040	0.040	
2	.041	0.040	
3	.042	0.040	
4	.040	0.040	
5	.043	0.040	
Average	.0412		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 179-180
Welder Number: 1066

Sample Number: DS-109
Date Sampled: 9/1/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	133	80	FT
3	133	80	FT
4	136	80	FT
5	133	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	88	52	FT
2	89	52	FT
3	93	52	FT
4	94	52	FT
5	90	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.043	0.040	
2	.043	0.040	
3	.043	0.040	
4	.043	0.040	
5	.043	0.040	
Average	.043		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 179-180
Welder Number: 1053

Sample Number: DS-110
Date Sampled: 9/1/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	132	80	FT
2	132	80	FT
3	130	80	FT
4	133	80	FT
5	133	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	101	52	FT
2	93	52	FT
3	87	52	FT
4	92	52	FT
5	91	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.041	0.040	
3	.041	0.040	
4	.042	0.040	
5	.043	0.040	
Average	.0418		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 180-181
Welder Number: 1054

Sample Number: DS-111
Date Sampled: 9/1/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	132	80	FT
2	132	80	FT
3	133	80	FT
4	131	80	FT
5	132	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	95	52	FT
2	93	52	FT
3	96	52	FT
4	93	52	FT
5	91	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.044	0.040	
2	.043	0.040	
3	.044	0.040	
4	.044	0.040	
5	.044	0.040	
Average	.0438		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 181-182
Welder Number: 1066

Sample Number: DS-112
Date Sampled: 9/1/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	125	80	FT
3	124	80	FT
4	125	80	FT
5	125	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	97	52	FT
2	90	52	FT
3	84	52	FT
4	79	52	FT
5	81	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.040	0.040	
2	.040	0.040	
3	.040	0.040	
4	.040	0.040	
5	.040	0.040	
Average	.040		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 182-183
Welder Number: 1054

Sample Number: DS-113
Date Sampled: 9/1/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	126	80	FT
2	130	80	FT
3	127	80	FT
4	124	80	FT
5	125	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	106	52	FT
2	107	52	FT
3	79	52	FT
4	88	52	FT
5	81	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 182-183
Welder Number: 1053

Sample Number: DS-114
Date Sampled: 9/1/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	124	80	FT
3	124	80	FT
4	124	80	FT
5	121	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	91	52	FT
2	78	52	FT
3	84	52	FT
4	77	52	FT
5	68	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.040	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 183-184
Welder Number: 1054

Sample Number: DS-115
Date Sampled: 9/1/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	127	80	FT
3	130	80	FT
4	132	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	80	52	FT
2	81	52	FT
3	79	52	FT
4	83	52	FT
5	79	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.040	0.040	
3	.042	0.040	
4	.041	0.040	
5	.040	0.040	
Average	.0408		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Operations Manager

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 184-185
Welder Number: 1066

Sample Number: DS-116
Date Sampled: 9/1/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	131	80	FT
3	130	80	FT
4	126	80	FT
5	129	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	76	52	FT
2	72	52	FT
3	72	52	FT
4	75	52	FT
5	83	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.042	0.040	
5	.040	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 183-184
Welder Number: 1053

Sample Number: DS-117
Date Sampled: 9/1/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	126	80	FT
3	125	80	FT
4	124	80	FT
5	120	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	87	52	FT
2	93	52	FT
3	98	52	FT
4	92	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.042	0.040	
3	.042	0.040	
4	.042	0.040	
5	.042	0.040	
Average	.0418		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 184-185
Welder Number: 1066

Sample Number: DS-118
Date Sampled: 9/1/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	128	80	FT
3	128	80	FT
4	127	80	FT
5	130	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	87	52	FT
2	77	52	FT
3	76	52	FT
4	81	52	FT
5	83	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.042	0.040	
3	.042	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.0416		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 187-187
Welder Number: 1054

Sample Number: DS-119
Date Sampled: 9/1/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	120	80	FT
2	127	80	FT
3	126	80	FT
4	126	80	FT
5	125	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	73	52	FT
2	76	52	FT
3	73	52	FT
4	64	52	FT
5	71	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.042	0.040	
5	.042	0.040	
Average	.0414		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 186-187
Welder Number: 1053

Sample Number: DS-120
Date Sampled: 9/1/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	130	80	FT
2	129	80	FT
3	133	80	FT
4	132	80	FT
5	131	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	94	52	FT
2	89	52	FT
3	83	52	FT
4	87	52	FT
5	91	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 187-188
Welder Number: 1066

Sample Number: DS-121
Date Sampled: 9/1/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	125	80	FT
2	125	80	FT
3	126	80	FT
4	127	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	67	52	FT
2	73	52	FT
3	70	52	FT
4	70	52	FT
5	67	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.042	0.040	
3	.042	0.040	
4	.042	0.040	
5	.042	0.040	
Average	.0418		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 188-189
Welder Number: 1053

Sample Number: DS-122
Date Sampled: 9/3/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	129	80	FT
3	132	80	FT
4	129	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	96	52	FT
2	54	52	FT
3	95	52	FT
4	95	52	FT
5	81	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.040	0.040	
2	.042	0.040	
3	.042	0.040	
4	.042	0.040	
5	.042	0.040	
Average	.0416		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 188-189
Welder Number: N/I

Sample Number: DS-122A
Date Sampled: 9/10/93
Date Tested: 9/10/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	122	80	FT
2	130	80	FT
3	128	80	FT
4	127	80	FT
5	130	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	106	52	FT
2	98	52	FT
3	100	52	FT
4	98	52	FT
5	95	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 188-189
Welder Number: N/I

Sample Number: DS-122B
Date Sampled: 9/10/93
Date Tested: 9/10/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	131	80	FT
2	132	80	FT
3	130	80	FT
4	135	80	FT
5	131	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	106	52	FT
2	91	52	FT
3	84	52	FT
4	109	52	FT
5	82	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 188-189
Welder Number: 1054

Sample Number: DS-123
Date Sampled: 9/3/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	129	80	FT
3	132	80	FT
4	126	80	FT
5	129	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	72	52	FT
2	88	52	FT
3	89	52	FT
4	85	52	FT
5	69	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.043	0.040	
2	.042	0.040	
3	.043	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.042		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 189-190
Welder Number: 1066

Sample Number: DS-124
Date Sampled: 9/3/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	126	80	FT
3	130	80	FT
4	130	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	102	52	FT
2	92	52	FT
3	75	52	FT
4	76	52	FT
5	84	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.040	0.040	
3	.040	0.040	
4	.040	0.040	
5	.041	0.040	
Average	.0404		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 190-191
Welder Number: 1053

Sample Number: DS-125
Date Sampled: 9/3/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	118	80	FT
2	122	80	FT
3	125	80	FT
4	127	80	FT
5	118	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	91	52	FT
2	93	52	FT
3	91	52	FT
4	97	52	FT
5	93	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.041	0.040	
3	.040	0.040	
4	.041	0.040	
5	.040	0.040	
Average	.0408		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 191-192
Welder Number: 1053

Sample Number: DS-126
Date Sampled: 9/3/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	126	80	FT
3	123	80	FT
4	122	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	82	52	FT
2	83	52	FT
3	82	52	FT
4	84	52	FT
5	82	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.042	0.040	
3	.042	0.040	
4	.042	0.040	
5	.041	0.040	
Average	.0418		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: N/I
Welder Number: 1054

Sample Number: DS-127
Date Sampled: 9/3/93
Date Tested: 9/10/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	131	80	FT
2	130	80	FT
3	130	80	FT
4	129	80	FT
5	132	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	90	52	FT
2	87	52	FT
3	90	52	FT
4	91	52	FT
5	88	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.042	0.040	
3	.042	0.040	
4	.042	0.040	
5	.042	0.040	
Average			

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 191-192
Welder Number: 1066

Sample Number: DS-128
Date Sampled: 9/3/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	130	80	FT
3	130	80	FT
4	128	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	93	52	FT
2	95	52	FT
3	88	52	FT
4	90	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 193-194
Welder Number: 1054

Sample Number: DS-129
Date Sampled: 9/3/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	128	80	FT
3	126	80	FT
4	125	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	80	52	FT
2	90	52	FT
3	90	52	FT
4	72	52	FT
5	82	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.040	0.040	
2	.040	0.040	
3	.040	0.040	
4	.040	0.040	
5	.040	0.040	
Average	.040		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 193-194
Welder Number: 1053

Sample Number: DS-130
Date Sampled: 9/3/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	126	80	FT
2	127	80	FT
3	129	80	FT
4	130	80	FT
5	131	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	85	52	FT
2	76	52	FT
3	90	52	FT
4	75	52	FT
5	84	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.040	0.040	
3	.041	0.040	
4	.040	0.040	
5	.040	0.040	
Average	.0404		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 194-195
Welder Number: 1066

Sample Number: DS-131
Date Sampled: 9/3/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	130	80	FT
2	129	80	FT
3	130	80	FT
4	131	80	FT
5	129	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	86	52	FT
2	88	52	FT
3	91	52	FT
4	78	52	FT
5	82	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 195-196
Welder Number: 1053

Sample Number: DS-132
Date Sampled: 9/3/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	133	80	FT
2	131	80	FT
3	133	80	FT
4	132	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	76	52	FT
2	96	52	FT
3	79	52	FT
4	74	52	FT
5	79	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.0412		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 196/197
Welder Number: 1066

Sample Number: DS-133
Date Sampled: 9/4/93
Date Tested: 9/10/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	133	80	FT
2	132	80	FT
3	133	80	FT
4	134	80	FT
5	131	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	92	52	FT
2	84	52	FT
3	84	52	FT
4	81	52	FT
5	82	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 198/197
Welder Number: 1053

Sample Number: DS-134
Date Sampled: 9/4/93
Date Tested: 9/10/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	134	80	FT
2	134	80	FT
3	134	80	FT
4	133	80	FT
5	135	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	81	52	FT
2	83	52	FT
3	84	52	FT
4	82	52	FT
5	92	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.042	0.040	
3	.042	0.040	
4	.042	0.040	
5	.041	0.040	
Average	.042		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 198/197
Welder Number: 1054

Sample Number: DS-135
Date Sampled: 9/4/93
Date Tested: 9/10/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	131	80	FT
3	133	80	FT
4	135	80	FT
5	130	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	92	52	FT
2	85	52	FT
3	86	52	FT
4	79	52	FT
5	83	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.040	0.040	
2	.040	0.040	
3	.040	0.040	
4	.040	0.040	
5	.040	0.040	
Average	.040		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 198/199
Welder Number: 1054

Sample Number: DS-136
Date Sampled: 9/4/93
Date Tested: 9/10/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	134	80	FT
2	133	80	FT
3	135	80	FT
4	136	80	FT
5	136	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	99	52	FT
2	90	52	FT
3	81	52	FT
4	89	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.040	0.040	
3	.041	0.040	
4	.040	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 198/199
Welder Number: 1066

Sample Number: DS-137
Date Sampled: 9/4/93
Date Tested: 9/10/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	131	80	FT
2	131	80	FT
3	131	80	FT
4	130	80	FT
5	132	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	92	52	FT
2	102	52	FT
3	101	52	FT
4	95	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 199/200
Welder Number: 1053

Sample Number: DS-138
Date Sampled: 9/-/93
Date Tested: 9/10/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	127	80	FT
3	129	80	FT
4	130	80	FT
5	133	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	90	52	FT
2	88	52	FT
3	90	52	FT
4	86	52	FT
5	83	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.040	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 200/201
Welder Number: 1066

Sample Number: DS-139
Date Sampled: 9/4/93
Date Tested: 9/10/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	130	80	FT
2	129	80	FT
3	130	80	FT
4	130	80	FT
5	132	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	98	52	FT
2	85	52	FT
3	90	52	FT
4	80	52	FT
5	90	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 199/200
Welder Number: 1054

Sample Number: DS-140
Date Sampled: 9/4/93
Date Tested: 9/10/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	132	80	FT
3	132	80	FT
4	129	80	FT
5	130	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	79	52	FT
2	82	52	FT
3	88	52	FT
4	94	52	FT
5	92	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.040	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 201/202
Welder Number: 1054

Sample Number: DS-141
Date Sampled: 9/4/93
Date Tested: 9/10/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	132	80	FT
2	132	80	FT
3	133	80	FT
4	134	80	FT
5	135	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	99	52	FT
2	95	52	FT
3	91	52	FT
4	89	52	FT
5	91	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 201/202
Welder Number: 1054

Sample Number: DS-142
Date Sampled: 9/4/93
Date Tested: 9/10/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	135	80	FT
2	133	80	FT
3	133	80	FT
4	134	80	FT
5	132	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	81	52	FT
2	89	52	FT
3	81	52	FT
4	86	52	FT
5	82	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.040	0.040	
3	.040	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 202/203
Welder Number: 1066

Sample Number: DS-143
Date Sampled: 9/4/93
Date Tested: 9/10/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	133	80	FT
2	132	80	FT
3	131	80	FT
4	132	80	FT
5	134	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	89	52	FT
2	95	52	FT
3	85	52	FT
4	79	52	FT
5	80	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 173-204
Welder Number: 1066

Sample Number: DS-144
Date Sampled: 9/6/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	134	80	FT
2	130	80	FT
3	133	80	FT
4	129	80	FT
5	131	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	95	52	FT
2	99	52	FT
3	59	52	FT
4	92	52	FT
5	54	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.040	0.040	
2	.040	0.040	
3	.040	0.040	
4	.040	0.040	
5	.040	0.040	
Average	.040		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 173/204
Welder Number: N/I

Sample Number: DS-144A
Date Sampled: 9/10/93
Date Tested: 9/10/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	120	80	FT
2	119	80	FT
3	121	80	FT
4	118	80	FT
5	118	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	99	52	FT
2	102	52	FT
3	105	52	FT
4	103	52	FT
5	101	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.042	0.040	
3	.042	0.040	
4	.043	0.040	
5	.042	0.040	
Average	.042		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 173/204
Welder Number: N/I

Sample Number: DS-144B
Date Sampled: 9/10/93
Date Tested: 9/10/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	125	80	FT
2	130	80	FT
3	127	80	FT
4	126	80	FT
5	133	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	90	52	FT
2	90	52	FT
3	80	52	FT
4	77	52	FT
5	92	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.040	0.040	
2	.040	0.040	
3	.041	0.040	
4	.040	0.040	
5	.040	0.040	
Average	.040		

REMARKS:

FT = Film Tear
BT = Bond Tear

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I.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 205-204
Welder Number: 1053

Sample Number: DS-145
Date Sampled: 9/6/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	120	80	FT
2	123	80	FT
3	125	80	FT
4	126	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	88	52	FT
2	93	52	FT
3	76	52	FT
4	86	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.040	0.040	
2	.040	0.040	
3	.040	0.040	
4	.040	0.040	
5	.040	0.040	
Average	.040		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Gerald L. Dauer, C.E.T.
Operations Manager

cv3/58

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 205-207
Welder Number: 1066

Sample Number: DS-146
Date Sampled: 9/6/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	127	80	FT
3	125	80	FT
4	127	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	96	52	FT
2	100	52	FT
3	100	52	FT
4	105	52	FT
5	101	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.044	0.040	
2	.042	0.040	
3	.042	0.040	
4	.042	0.040	
5	.040	0.040	
Average	.042		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 208-207
Welder Number: 1053

Sample Number: DS-147
Date Sampled: 9/6/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	131	80	FT
2	132	80	FT
3	127	80	FT
4	127	80	FT
5	131	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	86	52	FT
2	87	52	FT
3	79	52	FT
4	85	52	FT
5	85	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.043	0.040	
2	.043	0.040	
3	.043	0.040	
4	.043	0.040	
5	.043	0.040	
Average	.043		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 210-208
Welder Number: 1066

Sample Number: DS-148
Date Sampled: 9/6/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	130	80	FT
3	132	80	FT
4	132	80	FT
5	131	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	99	52	FT
2	89	52	FT
3	94	52	FT
4	90	52	FT
5	92	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.044	0.040	
2	.042	0.040	
3	.042	0.040	
4	.042	0.040	
5	.042	0.040	
Average	.0424		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 179-211
Welder Number: 1054

Sample Number: DS-149
Date Sampled: 9/6/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	114	80	FT
2	118	80	FT
3	124	80	FT
4	121	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	90	52	FT
2	93	52	FT
3	93	52	FT
4	84	52	FT
5	91	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.044	0.040	
2	.042	0.040	
3	.042	0.040	
4	.043	0.040	
5	.042	0.040	
Average	.0426		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 210-211
Welder Number: 1066

Sample Number: DS-150
Date Sampled: 9/6/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	130	80	FT
3	131	80	FT
4	125	80	FT
5	127	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	96	52	FT
2	96	52	FT
3	93	52	FT
4	98	52	FT
5	95	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 212-211
Welder Number: 1053

Sample Number: DS-151
Date Sampled: 9/6/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	126	80	FT
2	129	80	FT
3	129	80	FT
4	127	80	FT
5	129	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	73	52	FT
2	83	52	FT
3	79	52	FT
4	81	52	FT
5	79	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.043	0.040	
2	.043	0.040	
3	.043	0.040	
4	.043	0.040	
5	.043	0.040	
Average	.043		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 213-212
Welder Number: 1066

Sample Number: DS-152
Date Sampled: 9/6/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	135	80	FT
3	127	80	FT
4	135	80	FT
5	135	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	85	52	FT
2	97	52	FT
3	89	52	FT
4	84	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.041	0.040	
3	.042	0.040	
4	.042	0.040	
5	.042	0.040	
Average	.0418		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 217-216
Welder Number: 1053

Sample Number: DS-153
Date Sampled: 9/7/93
Date Tested: 9/9/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	119	80	FT
2	120	80	FT
3	120	80	FT
4	124	80	FT
5	121	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	94	52	FT
2	88	52	FT
3	88	52	FT
4	103	52	FT
5	85	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.043	0.040	
2	.041	0.040	
3	.041	0.040	
4	.042	0.040	
5	.042	0.040	
Average	.0418		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 219/218
Welder Number: 1066

Sample Number: DS-154
Date Sampled: 9/7/93
Date Tested: 9/10/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	131	80	FT
2	130	80	FT
3	132	80	FT
4	131	80	FT
5	132	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	75	52	FT
2	85	52	FT
3	84	52	FT
4	78	52	FT
5	79	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.040	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 220/219
Welder Number: 1053

Sample Number: DS-155
Date Sampled: 9/7/93
Date Tested: 9/10/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	131	80	FT
3	131	80	FT
4	131	80	FT
5	131	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	83	52	FT
2	88	52	FT
3	90	52	FT
4	77	52	FT
5	86	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 223/117
Welder Number: 1066

Sample Number: DS-156
Date Sampled: 9/7/93
Date Tested: 9/10/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	132	80	FT
2	129	80	FT
3	132	80	FT
4	129	80	FT
5	133	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	92	52	FT
2	84	52	FT
3	80	52	FT
4	92	52	FT
5	82	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.040	0.040	
3	.040	0.040	
4	.040	0.040	
5	.040	0.040	
Average	.040		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 222/224
Welder Number: 1054

Sample Number: DS-157
Date Sampled: 9/7/93
Date Tested: 9/10/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	127	80	FT
3	124	80	FT
4	122	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	97	52	FT
2	94	52	FT
3	99	52	FT
4	90	52	FT
5	90	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.042	0.040	
3	.042	0.040	
4	.041	0.040	
5	.042	0.040	
Average	.042		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 223/225
Welder Number: 1053

Sample Number: DS-158
Date Sampled: 9/7/93
Date Tested: 9/10/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	126	80	FT
3	126	80	FT
4	128	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	86	52	FT
2	80	52	FT
3	69	52	FT
4	78	52	FT
5	82	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0401	0.040	
2	.0403	0.040	
3	.0402	0.040	
4	.0404	0.040	
5	.0401	0.040	
Average	.0402		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 226/225
Welder Number: 1066

Sample Number: DS-159
Date Sampled: 9/7/93
Date Tested: 9/10/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	130	80	FT
3	131	80	FT
4	132	80	FT
5	133	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	85	52	FT
2	79	52	FT
3	87	52	FT
4	80	52	FT
5	77	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0409	0.040	
2	.0409	0.040	
3	.0405	0.040	
4	.0405	0.040	
5	.0409	0.040	
Average	.0407		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: EP #93 Coal Creek
Seam Number: 226/227
Welder Number: 1053

Sample Number: DS-160
Date Sampled: 9/7/93
Date Tested: 9/10/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	129	80	FT
3	128	80	FT
4	126	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	72	52	FT
2	73	52	FT
3	76	52	FT
4	73	52	FT
5	72	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0404	0.040	
2	.0400	0.040	
3	.0401	0.040	
4	.0400	0.040	
5	.0402	0.040	
Average	.0401		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 227/229
Welder Number: 1053

Sample Number: DS-161
Date Sampled: 9/8/93
Date Tested: 9/10/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	129	80	FT
2	129	80	FT
3	132	80	FT
4	130	80	FT
5	130	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	75	52	FT
2	88	52	FT
3	79	52	FT
4	79	52	FT
5	81	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0406	0.040	
2	.0406	0.040	
3	.0406	0.040	
4	.0404	0.040	
5	.0405	0.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Gerald L. Dauer, C.E.T.
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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 230/229
Welder Number: 1066

Sample Number: DS-162
Date Sampled: 9/8/93
Date Tested: 9/10/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	140	80	FT
2	136	80	FT
3	140	80	FT
4	138	80	FT
5	137	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	102	52	FT
2	98	52	FT
3	99	52	FT
4	100	52	FT
5	96	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0450	0.040	
2	.0447	0.040	
3	.0449	0.040	
4	.0446	0.040	
5	.0446	0.040	
Average	.0448		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 231/234
Welder Number: 1053

Sample Number: DS-163
Date Sampled: 9/8/93
Date Tested: 9/10/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	130	80	FT
2	129	80	FT
3	133	80	FT
4	132	80	FT
5	132	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	100	52	FT
2	102	52	FT
3	79	52	FT
4	104	52	FT
5	104	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0416	0.040	
2	.0415	0.040	
3	.0417	0.040	
4	.0415	0.040	
5	.0416	0.040	
Average	.0416		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 236/235
Welder Number: 1054

Sample Number: DS-164
Date Sampled: 9/8/93
Date Tested: 9/10/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	135	80	FT
2	134	80	FT
3	130	80	FT
4	135	80	FT
5	132	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	111	52	FT
2	99	52	FT
3	104	52	FT
4	101	52	FT
5	100	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0440	0.040	
2	.0425	0.040	
3	.0434	0.040	
4	.0432	0.040	
5	.0430	0.040	
Average	.0432		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 234/235
Welder Number: 1066

Sample Number: DS-165
Date Sampled: 9/8/93
Date Tested: 9/10/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	137	80	FT
2	135	80	FT
3	135	80	FT
4	135	80	FT
5	136	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	84	52	FT
2	95	52	FT
3	106	52	FT
4	94	52	FT
5	84	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0407	0.040	
2	.0405	0.040	
3	.0406	0.040	
4	.0406	0.040	
5	.0406	0.040	
Average	.0406		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 240/239
Welder Number: 1066

Sample Number: DS-166
Date Sampled: 9/10/93
Date Tested: 9/18/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	123	80	FT
3	126	80	FT
4	125	80	FT
5	122	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	84	52	FT
2	73	52	FT
3	83	52	FT
4	78	52	FT
5	80	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 237/239
Welder Number: 1053

Sample Number: DS-167
Date Sampled: 9/10/93
Date Tested: 9/17/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	125	80	FT
2	128	80	FT
3	126	80	FT
4	125	80	FT
5	130	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	80	52	FT
2	79	52	FT
3	78	52	FT
4	77	52	FT
5	71	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 199/244
Welder Number: 1054

Sample Number: DS-168
Date Sampled: 9/10/93
Date Tested: 9/18/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	119	80	FT
2	121	80	FT
3	123	80	FT
4	121	80	FT
5	118	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	98	52	FT
2	102	52	FT
3	101	52	FT
4	98	52	FT
5	103	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.043	0.040	
3	.042	0.040	
4	.041	0.040	
5	.042	0.040	
Average	.042		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 241/240
Welder Number: 1053

Sample Number: DS-169
Date Sampled: 9/10/93
Date Tested: 9/18/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	128	80	FT
3	123	80	FT
4	129	80	FT
5	125	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	75	52	FT
2	83	52	FT
3	74	52	FT
4	87	52	FT
5	74	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.040	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 242/241
Welder Number: 1066

Sample Number: DS-170
Date Sampled: 9/10/93
Date Tested: 9/18/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	127	80	FT
3	126	80	FT
4	126	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	80	52	FT
2	81	52	FT
3	81	52	FT
4	93	52	FT
5	90	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.040	0.040	
2	.040	0.040	
3	.040	0.040	
4	.040	0.040	
5	.040	0.040	
Average	.040		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 243/244
Welder Number: 1053

Sample Number: DS-171
Date Sampled: 9/10/93
Date Tested: 9/18/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	125	80	FT
2	128	80	FT
3	128	80	FT
4	126	80	FT
5	122	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	78	52	FT
2	86	52	FT
3	77	52	FT
4	73	52	FT
5	79	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 244/245
Welder Number: 1066

Sample Number: DS-172
Date Sampled: 9/10/93
Date Tested: 9/18/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	128	80	FT
3	128	80	FT
4	124	80	FT
5	129	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	86	52	FT
2	86	52	FT
3	90	52	FT
4	83	52	FT
5	82	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average			

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 247/248
Welder Number: 1066

Sample Number: DS-173
Date Sampled: 9/10/93
Date Tested: 9/18/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	130	80	FT
2	133	80	FT
3	133	80	FT
4	132	80	FT
5	134	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	78	52	FT
2	82	52	FT
3	82	52	FT
4	84	52	FT
5	90	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.043	0.040	
2	.043	0.040	
3	.043	0.040	
4	.043	0.040	
5	.043	0.040	
Average	.043		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 248/250
Welder Number: 1053

Sample Number: DS-174
Date Sampled: 9/10/93
Date Tested: 9/18/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	139	80	FT
2	135	80	FT
3	130	80	FT
4	129	80	FT
5	128	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	78	52	FT
2	78	52	FT
3	95	52	FT
4	88	52	FT
5	99	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.042	0.040	
3	.042	0.040	
4	.042	0.040	
5	.042	0.040	
Average	.042		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 252/253
Welder Number: 1054

Sample Number: DS-175
Date Sampled: 9/11/93
Date Tested: 9/17/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	128	80	FT
2	129	80	FT
3	124	80	FT
4	124	80	FT
5	119	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	81	52	FT
2	79	52	FT
3	80	52	FT
4	80	52	FT
5	77	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.042	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 253/254
Welder Number: 1053

Sample Number: DS-176
Date Sampled: 9/11/93
Date Tested: 9/17/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	132	80	FT
2	132	80	FT
3	130	80	FT
4	134	80	FT
5	129	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	77	52	FT
2	76	52	FT
3	83	52	FT
4	80	52	FT
5	95	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.042	0.040	
3	.042	0.040	
4	.042	0.040	
5	.042	0.040	
Average	.042		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 254/255
Welder Number: 1066

Sample Number: DS-177
Date Sampled: 9/11/93
Date Tested: 9/17/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	133	80	FT
2	132	80	FT
3	132	80	FT
4	133	80	FT
5	130	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	86	52	FT
2	83	52	FT
3	80	52	FT
4	82	52	FT
5	80	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	0.040	
2	.0405	0.040	
3	.0405	0.040	
4	.0405	0.040	
5	.0405	0.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 251/252
Welder Number: 1066

Sample Number: DS-178
Date Sampled: 9/11/93
Date Tested: 9/17/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	126	80	FT
2	122	80	FT
3	122	80	FT
4	121	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	100	52	FT
2	83	52	FT
3	83	52	FT
4	86	52	FT
5	84	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

Braun Intertec Corporation

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 255/256
Welder Number: 1054

Sample Number: DS-179
Date Sampled: 9/11/93
Date Tested: 9/17/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	123	80	FT
3	122	80	FT
4	123	80	FT
5	122	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	89	52	FT
2	85	52	FT
3	82	52	FT
4	80	52	FT
5	92	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.040	0.040	
4	.041	0.040	
5	.041	0.040	
Average			

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 250/257
Welder Number: 1054

Sample Number: DS-180
Date Sampled: 9/11/93
Date Tested: 9/17/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	119	80	FT
2	117	80	FT
3	113	80	FT
4	124	80	FT
5	122	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	91	52	FT
2	79	52	FT
3	87	52	FT
4	87	52	FT
5	92	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.043	0.040	
2	.042	0.040	
3	.043	0.040	
4	.043	0.040	
5	.043	0.040	
Average	.043		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 257/154
Welder Number: 1066

Sample Number: DS-181
Date Sampled: 9/11/93
Date Tested: 9/17/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	132	80	FT
2	131	80	FT
3	132	80	FT
4	134	80	FT
5	136	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	93	52	FT
2	88	52	FT
3	96	52	FT
4	98	52	FT
5	90	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.042	0.040	
3	.042	0.040	
4	.042	0.040	
5	.042	0.040	
Average	.042		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 203/259
Welder Number: 1066

Sample Number: DS-182
Date Sampled: 9/14/93
Date Tested: 9/17/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	126	80	FT
2	131	80	FT
3	132	80	FT
4	131	80	FT
5	135	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	91	52	FT
2	87	52	FT
3	92	52	FT
4	89	52	FT
5	84	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.042	0.040	
4	.042	0.040	
5	.042	0.040	
Average	.042		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 259/261
Welder Number: 1054

Sample Number: DS-183
Date Sampled: 9/14/93
Date Tested: 9/17/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	132	80	FT
2	133	80	FT
3	132	80	FT
4	129	80	FT
5	132	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	88	52	FT
2	88	52	FT
3	85	52	FT
4	87	52	FT
5	85	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.043	0.040	
2	.044	0.040	
3	.044	0.040	
4	.044	0.040	
5	.044	0.040	
Average	.044		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 261/263
Welder Number: 1053

Sample Number: DS-184
Date Sampled: 9/14/93
Date Tested: 9/17/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	127	80	FT
3	124	80	FT
4	124	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	97	52	FT
2	81	52	FT
3	82	52	FT
4	77	52	FT
5	86	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 261/263
Welder Number: 1053

Sample Number: DS-185
Date Sampled: 9/14/93
Date Tested: 9/17/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	127	80	FT
2	122	80	FT
3	124	80	FT
4	119	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	98	52	FT
2	81	52	FT
3	82	52	FT
4	88	52	FT
5	85	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.042	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 263/264
Welder Number: 1066

Sample Number: DS-186
Date Sampled: 9/14/93
Date Tested: 9/18/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	116	80	FT
2	116	80	FT
3	106	80	FT
4	114	80	FT
5	115	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	86	52	FT
2	79	52	FT
3	101	52	FT
4	84	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0404	0.040	
2	.0405	0.040	
3	.0406	0.040	
4	.0406	0.040	
5	.0406	0.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 254/261
Welder Number: 1054

Sample Number: DS-187
Date Sampled: 9/14/93
Date Tested: 9/17/93
Tested By: L. Larson

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	126	80	FT
2	128	80	FT
3	124	80	FT
4	125	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	76	52	FT
2	78	52	FT
3	79	52	FT
4	80	52	FT
5	75	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.044	0.040	
2	.044	0.040	
3	.044	0.040	
4	.044	0.040	
5	.044	0.040	
Average	.044		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 253/265
Welder Number: 1053

Sample Number: DS-188
Date Sampled: 9/14/93
Date Tested: 9/17/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	120	80	FT
2	122	80	FT
3	119	80	FT
4	121	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	90	52	FT
2	87	52	FT
3	86	52	FT
4	87	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.040	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 265/267
Welder Number: 1066

Sample Number: DS-189
Date Sampled: 9/14/93
Date Tested: 9/17/93
Tested By: J. Cadotte

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	125	80	FT
3	129	80	FT
4	123	80	FT
5	126	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	84	52	FT
2	87	52	FT
3	71	52	FT
4	72	52	FT
5	81	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.040	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 263/269
Welder Number: 1053

Sample Number: DS-190
Date Sampled: 9/14/93
Date Tested: 9/18/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	123	80	FT
2	123	80	FT
3	123	80	FT
4	120	80	FT
5	117	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	81	52	FT
2	81	52	FT
3	81	52	FT
4	77	52	FT
5	70	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0405	0.040	
2	.0403	0.040	
3	.0405	0.040	
4	.0406	0.040	
5	.0406	0.040	
Average	.0405		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 270/271
Welder Number: 1053

Sample Number: DS-191
Date Sampled: 9/15/93
Date Tested: 9/18/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	115	80	FT
2	119	80	FT
3	117	80	FT
4	113	80	FT
5	120	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	72	52	FT
2	75	52	FT
3	80	52	FT
4	74	52	FT
5	78	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.0407	0.040	
4	.0405	0.040	
5	.041	0.040	
Average	.0408		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 268/272
Welder Number: 1054

Sample Number: DS-192
Date Sampled: 9/15/93
Date Tested: 9/18/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	116	80	FT
2	119	80	FT
3	123	80	FT
4	119	80	FT
5	125	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	67	52	FT
2	65	52	FT
3	72	52	FT
4	73	52	FT
5	76	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.0415	0.040	
3	.0415	0.040	
4	.041	0.040	
5	.0414	0.040	
Average	.0415		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 276/269
Welder Number: 1053

Sample Number: DS-193
Date Sampled: 9/15/93
Date Tested: 9/18/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	115	80	FT
2	110	80	FT
3	115	80	FT
4	108	80	FT
5	114	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	74	52	FT
2	79	52	FT
3	76	52	FT
4	78	52	FT
5	70	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.042	0.040	
3	.042	0.040	
4	.042	0.040	
5	.042	0.040	
Average	.042		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 277/279
Welder Number: 1095

Sample Number: DS-194
Date Sampled: 9/17/93
Date Tested: 9/18/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	117	80	FT
2	118	80	FT
3	117	80	FT
4	119	80	FT
5	116	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	85	52	FT
2	86	52	FT
3	90	52	FT
4	86	52	FT
5	92	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0408	0.040	
2	.0409	0.040	
3	.0406	0.040	
4	.0408	0.040	
5	.0409	0.040	
Average	.0408		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 279/280
Welder Number: 1054

Sample Number: DS-195
Date Sampled: 9/17/93
Date Tested: 9/18/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	115	80	FT
2	121	80	FT
3	117	80	FT
4	124	80	FT
5	116	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	82	52	FT
2	96	52	FT
3	94	52	FT
4	94	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.041	0.040	
3	.041	0.040	
4	.041	0.040	
5	.041	0.040	
Average	.041		

REMARKS:

FT = Film Tear
BT = Bond Tear

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cv3/120

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Engineers and Scientists Serving the Built and Natural Environments

H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 272/282
Welder Number: 1054

Sample Number: DS-196
Date Sampled: 9/17/93
Date Tested: 9/18/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	122	80	FT
3	116	80	FT
4	128	80	FT
5	121	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	74	52	FT
2	83	52	FT
3	83	52	FT
4	79	52	FT
5	89	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.041	0.040	
2	.0407	0.040	
3	.0405	0.040	
4	.0409	0.040	
5	.0403	0.040	
Average	.0407		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 281/282
Welder Number: 1066

Sample Number: DS-197
Date Sampled: 9/17/93
Date Tested: 9/18/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	111	80	FT
2	109	80	FT
3	112	80	FT
4	117	80	FT
5	115	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	69	52	FT
2	74	52	FT
3	69	52	FT
4	74	52	FT
5	77	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0402	0.040	
2	.040	0.040	
3	.0408	0.040	
4	.041	0.040	
5	.042	0.040	
Average	.0408		

REMARKS:

FT = Film Tear
BT = Bond Tear

Braun Intertec Corporation

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Engineers and Scientists Serving the Land and Natural Environments

H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 282/283
Welder Number: 1095

Sample Number: DS-198
Date Sampled: 9/17/93
Date Tested: 9/18/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	114	80	FT
2	116	80	FT
3	120	80	FT
4	121	80	FT
5	120	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	77	52	FT
2	77	52	FT
3	75	52	FT
4	74	52	FT
5	62	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.044	0.040	
2	.044	0.040	
3	.044	0.040	
4	.0436	0.040	
5	.044	0.040	
Average	.0439		

REMARKS:

FT = Film Tear
BT = Bond Tear

cv3/123

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 266/277
Welder Number: 1053

Sample Number: DS-199
Date Sampled: 9/17/93
Date Tested: 9/18/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	112	80	FT
2	115	80	FT
3	117	80	FT
4	112	80	FT
5	110	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	83	52	FT
2	76	52	FT
3	69	52	FT
4	75	52	FT
5	84	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0403	0.040	
2	.0401	0.040	
3	.0406	0.040	
4	.0401	0.040	
5	.0401	0.040	
Average	.0402		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 288/290
Welder Number: 1054

Sample Number: DS-200
Date Sampled: 9/17/93
Date Tested: 9/18/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	109	80	FT
2	117	80	FT
3	119	80	FT
4	118	80	FT
5	119	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	86	52	FT
2	90	52	FT
3	77	52	FT
4	76	52	FT
5	88	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0408	0.040	
2	.0404	0.040	
3	.0402	0.040	
4	.0404	0.040	
5	.0402	0.040	
Average	.0404		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 290/291
Welder Number: 1066

Sample Number: DS-201
Date Sampled: 9/17/93
Date Tested: 9/18/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	128	80	FT
3	124	80	FT
4	120	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	61	52	FT
2	67	52	FT
3	72	52	FT
4	62	52	FT
5	68	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0408	0.040	
2	.0404	0.040	
3	.0408	0.040	
4	.0408	0.040	
5	.0401	0.040	
Average	.0406		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 283/292
Welder Number: 1095

Sample Number: DS-202
Date Sampled: 9/17/93
Date Tested: 9/18/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	119	80	FT
2	123	80	FT
3	125	80	FT
4	124	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	91	52	FT
2	77	52	FT
3	85	52	FT
4	85	52	FT
5	82	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0408	0.040	
2	.0405	0.040	
3	.0406	0.040	
4	.0409	0.040	
5	.0406	0.040	
Average	.0407		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 299/300
Welder Number: 1054

Sample Number: DS-203
Date Sampled: 9/17/93
Date Tested: 9/18/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	126	80	FT
3	119	80	FT
4	123	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	77	52	FT
2	79	52	FT
3	76	52	FT
4	76	52	FT
5	73	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.0415	0.040	
2	.0416	0.040	
3	.0416	0.040	
4	.0416	0.040	
5	.0407	0.040	
Average	.0414		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 301/302
Welder Number: 106

Sample Number: DS-204
Date Sampled: 9/17/93
Date Tested: 9/18/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	125	80	FT
3	123	80	FT
4	122	80	FT
5	122	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	76	52	FT
2	79	52	FT
3	81	52	FT
4	76	52	FT
5	77	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.043	0.040	
2	.043	0.040	
3	.043	0.040	
4	.043	0.040	
5	.042	0.040	
Average	.0428		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 291/303
Welder Number: 1053

Sample Number: DS-205
Date Sampled: 9/17/93
Date Tested: 9/18/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	122	80	FT
3	119	80	FT
4	123	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	69	52	FT
2	79	52	FT
3	75	52	FT
4	70	52	FT
5	74	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.042	0.040	
3	.041	0.040	
4	.042	0.040	
5	.043	0.040	
Average	.042		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 283/303
Welder Number: 1054

Sample Number: DS-206
Date Sampled: 9/17/93
Date Tested: 9/18/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	121	80	FT
2	121	80	FT
3	123	80	FT
4	126	80	FT
5	124	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	82	52	FT
2	81	52	FT
3	74	52	FT
4	87	52	FT
5	81	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.042	0.040	
2	.043	0.040	
3	.042	0.040	
4	.042	0.040	
5	.042	0.040	
Average	.0422		

REMARKS:

FT = Film Tear
BT = Bond Tear

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H.D.P.E. Liner Reports

Project Number: BFDX-92-019C
Project Description: AP #91 Coal Creek
Seam Number: 307/308
Welder Number: 1053

Sample Number: DS-207
Date Sampled: 9/17/93
Date Tested: 9/18/93
Tested By: M. Colton

SEAM SHEAR TEST RESULTS:

Test Number	Shear Strength (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	124	80	FT
2	125	80	FT
3	125	80	FT
4	125	80	FT
5	123	80	FT
Average			

PEEL TEST RESULTS:

Test Number	Peel Strength at Failure (lbs./in.)	Specifications (lbs./in.)	Failure Type
1	78	52	FT
2	80	52	FT
3	84	52	FT
4	82	52	FT
5	75	52	FT
Average			

THICKNESS TEST RESULTS:

Test Number	Thickness (inches)	Specifications (inches)	
1	.043	0.040	
2	.043	0.040	
3	.043	0.040	
4	.043	0.040	
5	.0415	0.040	
Average	.0427		

REMARKS:

FT = Film Tear
BT = Bond Tear

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Operations Manager

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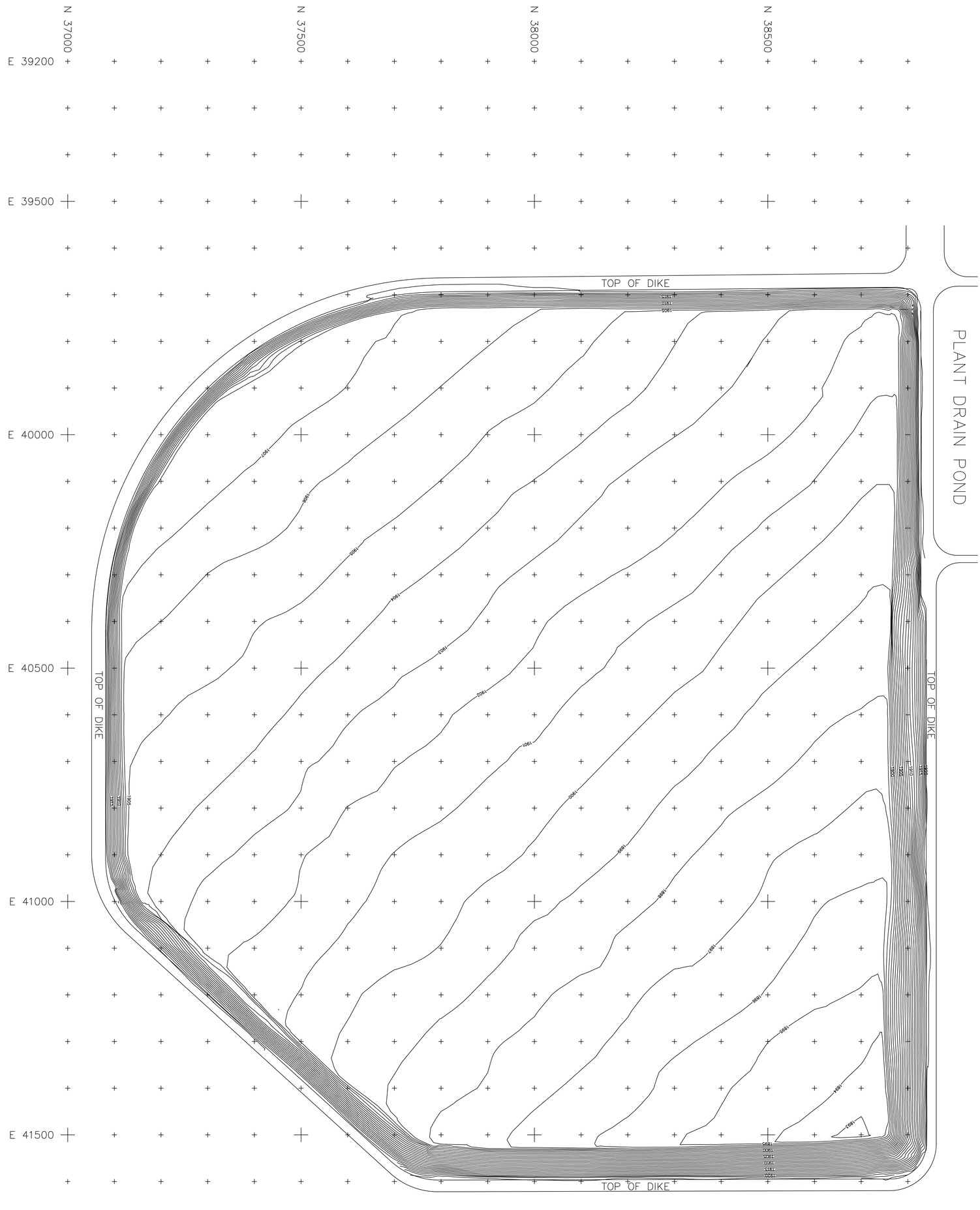
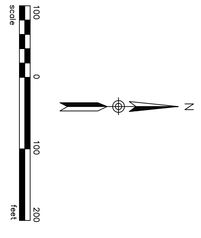
DRAWINGS

ASH POND 91 FINAL SUBGRADE CONTOURS





SHEET NO. 1

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COOPERATIVE POWER ASSOCIATION
UNDERWOOD, NORTH DAKOTA

ASH POND 91 FINAL SUBGRADE CONTOURS

Drawn By D.B.J. | Project No. B92-17-02
Checked By L.H.K | Date 1/25/94

Revision No.	Date	By	Description

ASH POND 91 FINAL BROWN CLAY CONTOURS

PLANT DRAIN POND

TOP OF DIKE

TOP OF DIKE

TOP OF DIKE

TOP OF DIKE

1920
1915
1910
1905
1900
1896
1897
1898
1899
1900
1901
1902
1903
1904
1905
1906
1907
1908
1909
1910
1905
1910
1915
1920

N 38500
N 38000
N 37500
N 37000

E 39200
E 39500
E 40000
E 40500
E 41000
E 41500

N

100 0 100 200
scale feet

Revision No.	Date	By	Description

COOPERATIVE POWER ASSOCIATION
UNDERWOOD, NORTH DAKOTA

ASH POND 91 FINAL BROWN CLAY CONTOURS

Drawn By D.B.J. | Project No. B92-17-02

Checked By L.H.K. | Date 1/25/94

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2

SHEET NO.

ASH POND 91 FINAL GRAY CLAY CONTOURS

PLANT DRAIN POND

TOP OF DIKE

TOP OF DIKE

TOP OF DIKE

TOP OF DIKE

N 38500

N 38000

N 37500

N 37000

E 39200

E 39500

E 40000

E 40500

E 41000

E 41500

N

100 0 100 200
scale feet

Revision No.	Date	By	Description

COOPERATIVE POWER ASSOCIATION
UNDERWOOD, NORTH DAKOTA

ASH POND 91 FINAL GRAY CLAY CONTOURS

Drawn By D.B.J. | Project No. B92-17-02

Checked By L.H.K. | Date 1/25/94

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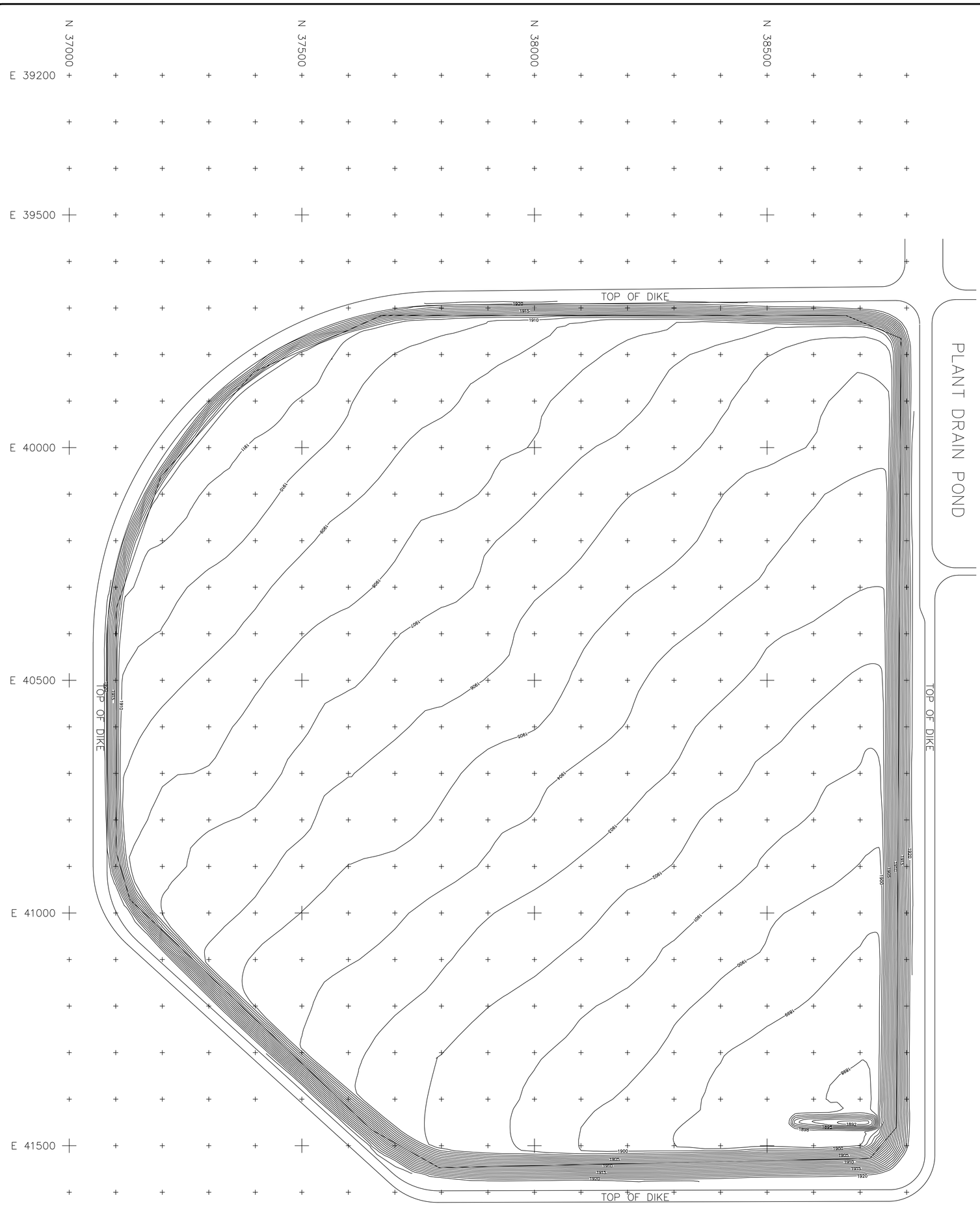
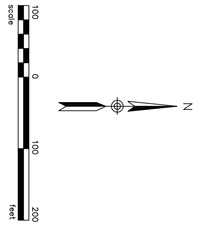


ASH POND 91 FINAL SAND CONTOURS



SHEET NO. 4

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UNDERWOOD, NORTH DAKOTA

ASH POND 91 FINAL SAND CONTOURS

Drawn By D.B.J. | Project No. B92-17-02

Checked By L.H.K | Date 1/25/94

Revision No.	Date	By	Description

ASH POND 91 FINAL FLY ASH CONTOURS

PLANT DRAIN POND

TOP OF DIKE

TOP OF DIKE

TOP OF DIKE

TOP OF DIKE

1920
1915
1910
1905

1900
1905
1910
1915
1920

1910
1915
1920

N 38500

N 38000

N 37500

N 37000

E 39200

E 39500

E 40000

E 40500

E 41000

E 41500

N

100 0 100 200
scale feet

Revision No.	Date	By	Description

COOPERATIVE POWER ASSOCIATION
UNDERWOOD, NORTH DAKOTA

ASH POND 91 FINAL FLY ASH CONTOURS

Project No. B92-17-02

Drawn By D.B.J.

Checked By L.H.K.

Date 1/25/94

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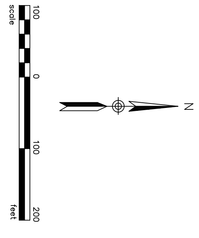
SHEET NO.

ASH POND 91 FINAL PIT RUN CONTOURS





SHEET NO. 6

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UNDERWOOD, NORTH DAKOTA

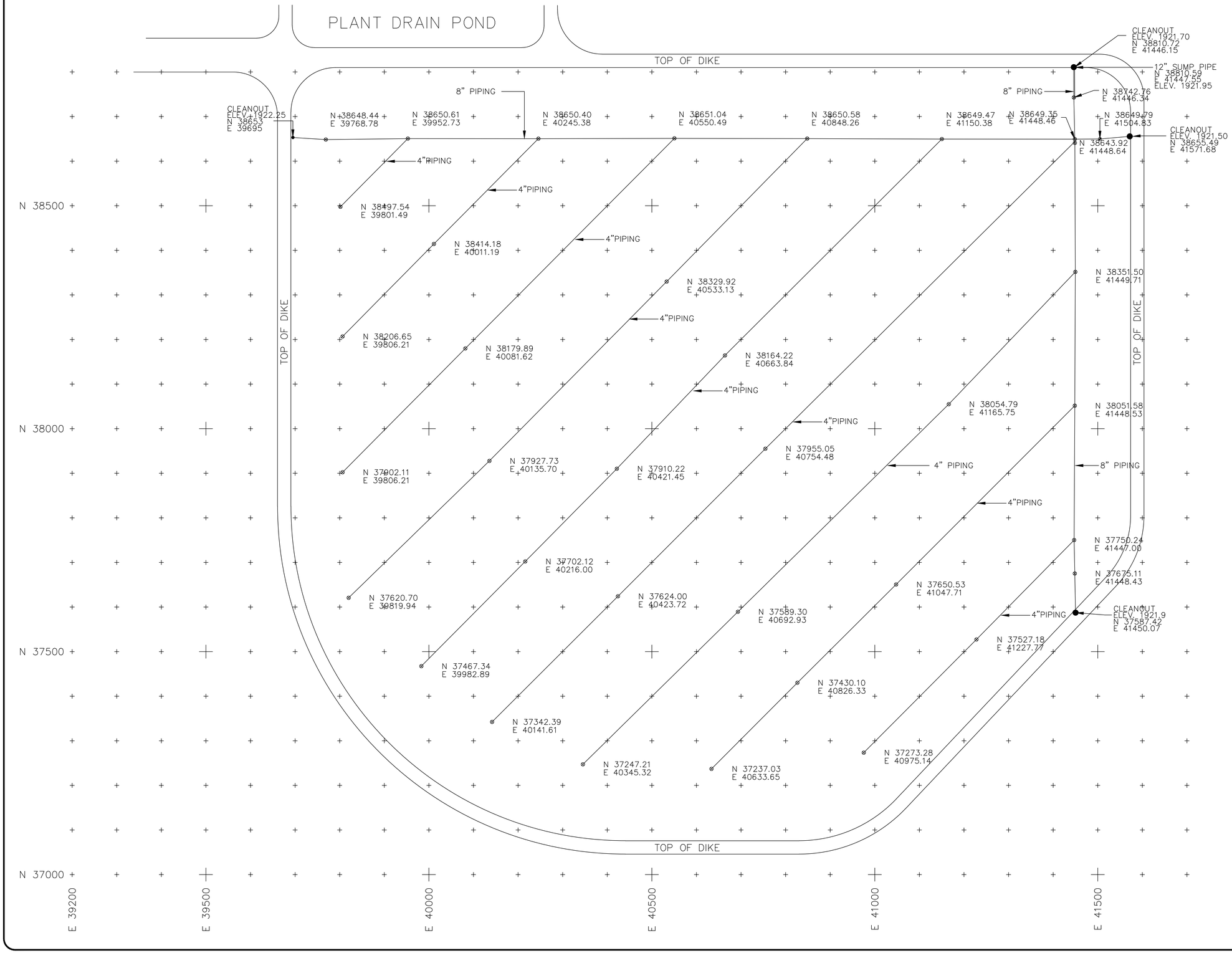
ASH POND 91 FINAL PIT RUN CONTOURS

Drawn By D.B.J. | Project No. B92-17-02

Checked By L.H.K | Date 1/25/94

Revision No.	Date	By	Description

ASH POND 91 FINAL DRAIN PIPE LAYOUT



Revision No.	Date	By	Description

COOPERATIVE POWER ASSOCIATION
UNDERWOOD, NORTH DAKOTA

ASH POND 91 FINAL DRAIN PIPE LAYOUT

Project No. B92-17-02

Drawn By D.B.J. Date 1/25/94

Checked By L.H.K.

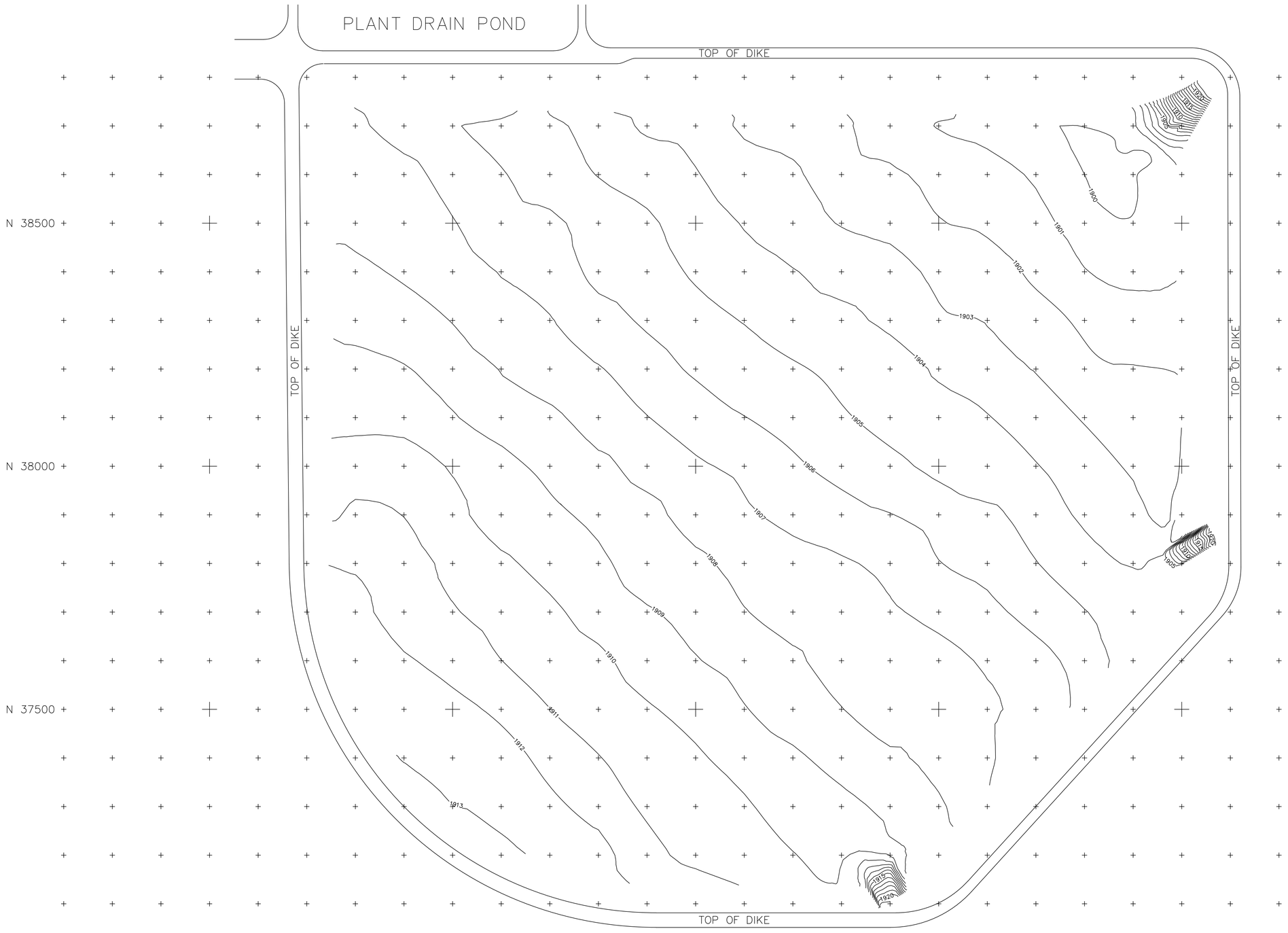
interstate engineering, inc.

Engineering - Surveying - Planning

7

SHEET NO.

ASH POND 91 FINAL BOTTOM ASH CONTOURS



Revision No.	Date	By	Description

COOPERATIVE POWER ASSOCIATION
UNDERWOOD, NORTH DAKOTA

ASH POND 91 FINAL BOTTOM ASH CONTOURS

Drawn By D.B.J. | Project No. B92-17-02

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interstate engineering, inc.
Engineering – Surveying – Planning

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SHEET NO.

ASH POND 91 FINAL CONTOURS

PLANT DRAIN POND

ELECTRIC MANHOLE-45
N 38954.63
E 40259.63
ELEV. 1920.39

ELECTRIC MANHOLE-46
N 38844.62
E 40661.62
ELEV. 1920.49

ELECTRIC MANHOLE-47
N 38844.62
E 41166.63
ELEV. 1920.48

4" VENT PIPE
N 38839.86
E 41400.96

N 38813.25
E 41381.06

N 38821.57
E 41421.24

CONTROL POINT
AP91-3 REBAR & CAP
N 38832.29
E 41568.72
ELEV. 1921.38

GATE VALVE
N 38846.8
E 40099.8

TOP OF DIKE ELEV. 1922.0

N 38723.82
E 39693.05

18" PIPE
N 38772.31
E 40096.77
ELEV. 1910.15

N 38682.91
E 39692.89

4" VENT PIPE
N 38702.95
E 39660.72

ELECTRIC MANHOLE-48
N 38788.00
E 41593.00
ELEV. 1922.34

ELECTRIC LINE

TOP OF DIKE ELEV. 1922.0

ELECTRIC MANHOLE-49
N 38244.00
E 41593.00
ELEV. 1922.54

POND 92

ELECTRIC MANHOLE-50
N 37898.00
E 41593.00
ELEV. 1922.49

30" R.C.P.
N 37499.79
E 41293.83
ELEV. 1907.34

N 37449.76
E 39782.19

N 37415.38
E 39802.41

4" VENT PIPE
N 37409.86
E 39754.54

CONTROL POINT
AP91-2 REBAR & CAP
N 37570.09
E 41485.77
ELEV. 1918.71

RIPRAP ROCK

CONTROL POINT
AP91-1 REBAR & CAP
N 37166.59
E 39839.74
ELEV. 1941.89

CONTROL POINT
SH87-2 REBAR & CAP
N 37047.16
E 41076.12
ELEV. 1920.06

N 37083.67
E 40890.58

N 37077.48
E 40850.84

4" VENT PIPE
N 37033.50
E 40855.76

TOP OF DIKE ELEV. 1922.0

N 38500
N 38000
N 37500
N 37000

E 39200
E 39500
E 40000
E 40500
E 41000
E 41500

AUTOCAD DWG: V:\PEC\SITE\P91SH9.DWG

N

100 0 100 200
scale feet

Revision No.	Date	By	Description

COOPERATIVE POWER ASSOCIATION
UNDERWOOD, NORTH DAKOTA

ASH POND 91 FINAL CONTOURS

Drawn By D.B.J. | Project No. B92-17-02
Checked By L.H.K. | Date 1/25/94

interstate engineering, inc.
Engineering - Surveying - Planning

9
SHEET NO.

PHOTOGRAPHS

GEOMEMBRANE
QUALITY ASSURANCE SERVICES
ASH POND 91 AND DRAINS POND
COAL CREEK STATION
UNDERWOOD, NORTH DAKOTA

Submitted To:

Cooperative Power Association
14615 Lone Oak Road
Eden Prairie, Minnesota 55344-2287

GOLDER CONSTRUCTION SERVICES, INC.

October 1993

937-4207

PHOTOGRAPHS

GEOMEMBRANE QUALITY ASSURANCE SERVICES
ASH POND 91 AND DRAINS POND
COAL CREEK STATION
UNDERWOOD, NORTH DAKOTA

PHOTOGRAPH NUMBER	DATE	LOCATION	COMMENT
1	7-8-93	POND 91	TOP OF 2-FOOT THICK CLAY LINER (LOOKING SOUTH)
2	7-8-93	POND 91	TOP OF 2-FOOT THICK CLAY LINER (LOOKING SOUTHWEST)
3	7-8-93	POND 91	TOP OF 2-FOOT THICK CLAY LINER (LOOKING WEST)
4	7-19-93	DRAINS POND	PROOFROLLING TOP OF CLAY LINER
5	7-19-93	DRAINS POND	GUNDLE EQUIPMENT
6	7-19-93	DRAINS POND	TOP OF 2-FOOT THICK CLAY LINER (LOOKING SOUTHEAST)
7	7-19-93	DRAINS POND	TOP OF 2-FOOT THICK CLAY LINER (LOOKING SOUTH)
8	7-20-93	DRAINS POND	DEPLOYING 40 MIL HDPE GEOMEMBRANE
9	7-20-93	DRAINS POND	PERIMETER ANCHORAGE OF GEOMEMBRANE
10	7-20-93	DRAINS POND	DEPLOYING 40 MIL HDPE GEOMEMBRANE (LOOKING NORTH)
11	8-3-93	DRAINS POND	DEPLOYING 40 MIL HDPE GEOMEMBRANE (LOOKING SOUTH)
12	8-4-93	DRAINS POND	GEOMEMBRANE INSTALLATION COMPLETED IN SOUTHWEST CORNER
13	8-4-93	DRAINS POND	DEPLOYING 40 MIL HDPE GEOMEMBRANE (LOOKING EAST)
14	8-4-93	DRAINS POND	DEPLOYING 40 MIL HDPE GEOMEMBRANE (LOOKING EAST)
15	8-5-93	DRAINS POND	DEPLOYING 40 MIL HDPE GEOMEMBRANE (LOOKING EAST)
16	8-5-93	DRAINS POND	FIELD TENSIOMETER
17	8-5-93	DRAINS POND	WELDING GEOMEMBRANE BY FUSION METHOD
18	8-5-93	DRAINS POND	PERIMETER ANCHOR TRENCH
19	8-6-93	DRAINS POND	40 MIL HDPE INSTALLATION (LOOKING EAST)
20	8-6-93	DRAINS POND	DEPLOYING 40 MIL HDPE GEOMEMBRANE
21	8-7-93	DRAINS POND	EXTRUSION WELDING A PIPE BOOT
22	8-7-93	DRAINS POND	WELDING BY EXTRUSION METHOD
23	8-7-93	DRAINS POND	NONDESTRUCTIVE VACUUM BOX TEST
24	8-9-93	POND 91	BEGIN DEPLOYING 40 MIL HDPE GEOMEMBRANE
25	8-9-93	POND 91	WELDING BY FUSION METHOD
26	8-9-93	POND 91	REPAIRING TOP OF CLAY LINER (LOOKING NORTH)
27	8-9-93	POND 91	DEPLOYING 40 MIL HDPE GEOMEMBRANE (LOOKING NORTH)
28	8-9-93	POND 91	DEPLOYING 40 MIL HDPE GEOMEMBRANE (LOOKING NORTHEAST)
29	8-9-93	POND 91	DEPLOYING 40 MIL HDPE GEOMEMBRANE (LOOKING EAST)
30	8-10-93	POND 91	DEPLOYING 40 MIL HDPE GEOMEMBRANE (LOOKING NORTH)
31	8-10-93	POND 91	PLACING SAND BALLAST ON GEOMEMBRANE (LOOKING NORTHEAST)
32	8-10-93	POND 91	PLACING SAND BALLAST ON GEOMEMBRANE (LOOKING EAST)
33	8-10-93	POND 91	GEOMEMBRANE INSTALLATION (LOOKING NORTHWEST)
34	8-16-93	DRAINS POND	PLACING 1-FOOT THICK SAND LAYER OVER GEOMEMBRANE
35	8-16-93	DRAINS POND	PLACING 1-FOOT THICK SAND LAYER OVER GEOMEMBRANE
36	8-17-93	POND 91	GEOMEMBRANE INSTALLATION (LOOKING NORTH)
37	8-17-93	POND 91	GEOMEMBRANE INSTALLATION (LOOKING NORTH)

PHOTOGRAPHS

GEOMEMBRANE QUALITY ASSURANCE SERVICES
ASH POND 91 AND DRAINS POND
COAL CREEK STATION
UNDERWOOD, NORTH DAKOTA

PHOTOGRAPH NUMBER	DATE	LOCATION	COMMENT
38	8-17-93	POND 91	GEOMEMBRANE INSTALLATION (LOOKING NORTHEAST)
39	8-17-93	POND 91	GEOMEMBRANE INSTALLATION (LOOKING EAST)
40	8-18-93	POND 91	GEOMEMBRANE INSTALLATION (LOOKING EAST)
41	8-18-93	DRAINS POND	PLACING 1-FOOT THICK SAND LAYER
42	8-18-93	DRAINS POND	PLACING 1-FOOT THICK SAND LAYER
43	8-18-93	POND 91	WELDING A PATCH BY EXTRUSION METHOD
44	8-18-93	POND 91	NONDESTRUCTIVE SEAM PRESSURE TEST
45	8-22-93	POND 91	GEOMEMBRANE INSTALLATION (LOOKING NORTH)
46	8-22-93	POND 91	GEOMEMBRANE INSTALLATION (LOOKING NORTHEAST)
47	8-22-93	POND 91	GEOMEMBRANE INSTALLATION (LOOKING EAST)
48	8-22-93	DRAINS POND	PLACING 1-FOOT THICK SAND LAYER
49	8-22-93	DRAINS POND	PLACING 1-FOOT THICK SAND LAYER
50	8-22-93	DRAINS POND	PLACING 1-FOOT THICK SAND LAYER
51	8-24-93	POND 91	PERIMETER ANCHOR TRENCH
52	8-24-93	POND 91	GEOMEMBRANE INSTALLATION (LOOKING EAST)
53	8-24-93	POND 91	DEPLOYING 40 MIL HDPE GEOMEMBRANE WEST OF SUMP
54	8-25-93	POND 91	DEPLOYING 40 MIL HDPE GEOMEMBRANE IN NORTHEAST CORNER
55	8-29-93	POND 91	GEOMEMBRANE INSTALLATION (LOOKING NORTH)
56	8-29-93	POND 91	GEOMEMBRANE INSTALLATION (LOOKING NORTHEAST)
57	8-29-93	POND 91	GEOMEMBRANE INSTALLATION (LOOKING EAST)
58	8-29-93	POND 91	GEOMEMBRANE INSTALLATION (LOOKING EAST)
59	8-31-93	POND 91	SAND PLACEMENT (LOOKING NORTH)
60	9-1-93	POND 91	SAND PLACEMENT (LOOKING NORTHWEST)
61	9-1-93	POND 91	SAND PLACEMENT (LOOKING NORTH)
62	9-1-93	POND 91	SAND PLACEMENT (LOOKING NORTH)
63	9-1-93	POND 91	SAND PLACEMENT (LOOKING NORTHWEST)
64	9-3-93	POND 91	COMPLETED SAND LAYER ALONG SOUTH POND EDGE (LOOKING NORTH)
65	9-5-93	POND 91	COMPLETED SAND LAYER ALONG SOUTH POND EDGE (LOOKING NORTH)
66	9-5-93	POND 91	COMPLETED SAND LAYER ALONG SOUTH POND EDGE (LOOKING NORTH)
67	9-11-93	POND 91	GEOMEMBRANE INSTALLATION (LOOKING NORTH)
68	9-11-93	POND 91	GEOMEMBRANE INSTALLATION (LOOKING WEST)
69	9-11-93	POND 91	GEOMEMBRANE INSTALLATION (LOOKING NORTH)
70	9-11-93	POND 91	TOP OF 2-FOOT THICK CLAY LINER (LOOKING SOUTH)
71	9-16-93	POND 91	REMOVING RAMP
72	9-16-93	POND 91	REMOVING RAMP
73	9-17-93	POND 91	TOP OF SAND (LOOKING NORTH)
74	9-17-93	POND 91	TOP OF SAND (LOOKING WEST)

PHOTOGRAPHS

GEOMEMBRANE QUALITY ASSURANCE SERVICES
ASH POND 91 AND DRAINS POND
COAL CREEK STATION
UNDERWOOD, NORTH DAKOTA

PHOTOGRAPH NUMBER	DATE	LOCATION	COMMENT
75	9-17-93	POND 91	TOP OF SAND (LOOKING NORTH)
76	9-17-93	POND 91	TOP OF SAND (LOOKING NORTHEAST)
77	9-17-93	POND 91	GEOMEMBRANE INSTALLATION COMPLETE
78	9-17-93	POND 91	GEOMEMBRANE INSTALLATION COMPLETE EXCEPT IN NORTHEAST CORNER
79	9-17-93	POND 91	FINAL GRADING OF SAND LAYER SURFACE
80	9-17-93	POND 91	GEOMEMBRANE INSTALLATION
81	9-17-93	POND 91	DEPLOYING 40 MIL HDPE GEOMEMBRANE
82	9-17-93	POND 91	DEPLOYING 40 MIL HDPE GEOMEMBRANE
83	9-17-93	POND 91	DEPLOYING 40 MIL HDPE GEOMEMBRANE
84	9-17-93	POND 91	DEPLOYING 40 MIL HDPE GEOMEMBRANE

AP91 9-3-93


83
9 17'93


84
9 17'93

81



82



79



80



77



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75



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37
8 17'93


38
8 17'93


39


40
8 18'93

33

Used For
Report Cover
(See drafting)

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APPENDIX D-2

Low Permeability Soil Layer Permeability Testing Results

Table 1: Upstream Raise 91 (Ash Pond 91) Low-Permeability Soil Layer Hydraulic Conductivty Test Results

Sample	Northing (ft)	Easting (ft)	Elevation (ft amsl)	Soil Classification	Hydraulic Conductivity (cm/sec)
CLB-CC-314	37258	40240	1908.1	CH	1.8E-08
CLB-CC-312	37392	40039	1908.4	CH	2.1E-08
CLB-CC-313	37551	39820	1908.7	CH	2.1E-08
CLB-CC-315	37462	40321	1906.4	CH	1.5E-08
CLB-CC-316	37615	40085	1907	CH	4.5E-08
CLB-CC-317	37769	39859	1907	CH	1.5E-08
CLB-CC-318	37610	40413	1905.3	CH	1.4E-08
CLB-CC-320	37734	40211	1905.7	CH	1.1E-08
CLB-CC-325	37315	39973	1909.7	CH	3.4E-08
CLB-CC-326	37180	40330	1908.7	CH	1.5E-08
CLB-CC-327	37335	40463	1907.3	CL	1.9E-08
CLB-CC-328	37387	40190	1908.4	CH	1.7E-08
CLB-CC-329	37422	39979	1909.3	CH	4.6E-08
CLB-CC-330	37622	39849	1908.9	CH	1.4E-08
CLB-CC-331	37573	40097	1908.2	CH	3.7E-08
CLB-CC-332	37526	40337	1907	CH	9.5E-08
CLB-CC-333	37483	40538	1906.4	CH	3.2E-08
CLB-CC-334	37801	39793	1908.4	CH	3.5E-08
CLB-CC-335	37748	40044	1907.5	CH	1.7E-08
CLB-CC-336	37694	40314	1906.4	CH	2.1E-08
CLB-CC-337	37627	40616	1905.1	CL	2.6E-08
CLS-CC-342	38765	40182	1901.3	CL	1.3E-08
CLS-CC-354	38768	40464	1900.9	CL	1.3E-08
CLS-CC-353	38700	41517	1897.5	CL	1.5E-08
CLS-CC-345	38506	41521	1896.8	CL	1.4E-08
CLS-CC-346	38753	41072	1898.5	CL	1.6E-08
CLS-CC-347	38760	40876	1899	CL	1.6E-08
CLS-CC-348	38107	41531	1899.7	CL	1.3E-08
CLS-CC-349	38737	39730	1906.4	CL	2.4E-08
CLS-CC-350	38203	41533	1900.9	CL	1.7E-08
CLS-CC-352	38782	39976	1904.9	CH	1.7E-08
CLS-CC-356	37364	41191	1905	CL	1.0E-08
CLS-CC-357	38768	41169	1900.2	CL	1.0E-08
CLS-CC-358	37595	41397	1904.8	CL	2.9E-08
CLS-CC-359	38587	39725	1910.1	CL	2.3E-08
CLS-CC-360	38781	40561	1906.2	CL	3.7E-08
CLS-CC-361	38783	40474	1908.1	CL	1.2E-08
CLS-CC-362	38784	41471	1905.2	CL	1.3E-08
CLS-CC-364	38676	39706	1914.2	CL	2.4E-08
CLS-CC-365	38598	41552	1909.3	CL	1.3E-08
CLS-CC-366	38400	41556	1909.8	CL	3.0E-08
CLS-CC-367	38777	41376	1906.5	CL	2.4E-08
CLS-CC-369	37726	41533	1911.9	CL	1.0E-08
CLS-CC-371	38001	41572	1916.2	CL	1.0E-08
CLB-CC-392	37258	40993	1904.2	CL	1.5E-08
CLB-CC-393	37412	41139	1902.7	CL	2.7E-08
CLB-CC-394	37364	40927	1904.2	CL	1.1E-08
CLB-CC-395	37493	41045	1902.9	CL	1.1E-08

Table 1: Upstream Raise 91 (Ash Pond 91) Low-Permeability Soil Layer Hydraulic Conductivty Test Results

Sample	Northing (ft)	Easting (ft)	Elevation (ft amsl)	Soil Classification	Hydraulic Conductivity (cm/sec)
CLB-CC-396	37972	40399	1903.3	CL	1.4E-08
CLB-CC-397	38025	40104	1904.6	CL	2.3E-08
CLB-CC-398	38061	39856	1905.9	CL	2.3E-08
CLB-CC-399	37209	40596	1907	CL	1.6E-08
CLB-CC-400	37375	40731	1905.4	CL	1.5E-08
CLB-CC-401	37556	40853	1903.9	CL	1.4E-08
CLB-CC-402	37830	40000	1906.4	CL	3.1E-08
CLB-CC-403	37950	39800	1906.6	CL	1.4E-08
CLB-CC-407	37432	41294	1913.9	CL	1.7E-08
CLB-CC-408	37200	41077	1915.5	CL	1.6E-08
CLB-CC-411	37160	40581	1907.7	CL	2.5E-08
CLB-CC-423	37325	40670	1906.4	SC	2.6E-08
CLB-CC-413	37516	40775	1904.9	CL	1.5E-08
CLB-CC-414	37144	40783	1906.8	CL	1.5E-08
CLB-CC-424	37299	40861	1905.9	CL	1.2E-08
CLB-CC-425	37438	40932	1904.5	CL	1.4E-08
CLB-CC-417	37600	41010	1903.4	CL	9.4E-09
CLB-CC-418	37190	40965	1905.8	CL	1.0E-08
CLB-CC-419	37337	41070	1904.5	CL	1.0E-08
CLB-CC-420	37484	41175	1903.3	CL	1.7E-08
CLB-CC-430	37995	40833	1901.1	CL	1.6E-08
CLB-CC-431	37963	41018	1900.7	CL	1.6E-08
CLB-CC-432	37910	41240	1899.5	CL	1.7E-08
CLB-CC-433	37865	41450	1898.8	CL	1.6E-08
CLB-CC-434	38115	40708	1901.3	CL	2.6E-08
CLB-CC-435	38157	40503	1902.4	CL	1.7E-08
CLB-CC-436	38192	40278	1903.5	CL	1.8E-08
CLB-CC-437	38227	40077	1903.9	CL	1.0E-08
CLB-CC-438	38264	39851	1904.9	CL	2.6E-08
CLB-CC-439	38260	40736	1900	CL	1.2E-08
CLB-CC-440	38288	40543	1901.3	CL	1.5E-08
CLB-CC-441	38322	40332	1902.3	CL	1.8E-08
CLB-CC-442	38353	40125	1903.2	CL	1.5E-08
CLB-CC-443	38391	39895	1904	CL	8.2E-09
CLB-CC-444	37664	41338	1900.3	CL	2.2E-08
CLB-CC-445	37700	41169	1901	CL	3.1E-08
CLB-CC-446	37746	40951	1901.7	CL	1.3E-08
CLB-CC-447	38550	39818	1903.7	CL	1.6E-08
CLB-CC-448	38518	40018	1903.1	CL	1.8E-08
CLB-CC-449	38479	40225	1902.2	CL	1.1E-08
CLB-CC-450	38431	40459	1901.3	CL	1.0E-08
CLB-CC-451	38381	40701	1900.2	CL	1.3E-08
CLB-CC-453	38192	39823	1906.6	CL	1.5E-08
CLB-CC-454	38157	40016	1905.8	CL	1.5E-08
CLB-CC-455	38118	40188	1905	CL	1.2E-08
CLB-CC-456	38079	40385	1904.4	CL	1.9E-08
CLB-CC-457	38040	40587	1904.4	CL	1.4E-08
CLB-CC-458	38136	40645	1902.7	CL	2.6E-08

Table 1: Upstream Raise 91 (Ash Pond 91) Low-Permeability Soil Layer Hydraulic Conductivty Test Results

Sample	Northing (ft)	Easting (ft)	Elevation (ft amsl)	Soil Classification	Hydraulic Conductivity (cm/sec)
CLB-CC-459	38184	40402	1903.6	CL	4.7E-08
CLB-CC-460	38220	40218	1904.4	CL	1.7E-08
CLB-CC-461	38258	40044	1905.2	CL	1.5E-08
CLB-CC-462	38295	39831	1905.9	CL	2.4E-08
CLB-CC-463	38411	39832	1905.2	CL	1.3E-08
CLB-CC-464	38369	40060	1904.4	CL	1.2E-08
CLB-CC-465	38332	40235	1903.7	CL	1.4E-08
CLB-CC-466	38293	40430	1902.8	CL	3.4E-08
CLB-CC-467	38242	40671	1901.9	CL	5.6E-08
CLB-CC-468	37582	41284	1902.3	CL	1.2E-08
CLB-CC-469	37626	41076	1903.1	CL	1.7E-08
CLB-CC-470	37651	40870	1904.1	CL	9.3E-09
CLB-CC-471	37676	40644	1904.9	CL	3.2E-08
CLB-CC-472	37888	40690	1903.7	CL	2.5E-08
CLB-CC-473	38761	40887	1903	CL	2.4E-08
CLB-CC-474	37831	41087	1902.1	CL	1.2E-08
CLB-CC-475	37792	41303	1901.2	CL	1.1E-08
CLB-CC-476	37760	41460	1900.6	CL	1.2E-08
CLB-CC-477	38020	40724	1902.9	CL	1.4E-08
CLB-CC-478	37993	40902	1902.3	CL	1.6E-08
CLB-CC-479	37960	41119	1901.4	CL	1.4E-08
CLB-CC-480	37922	41333	1900.3	CL	1.5E-08
CLB-CC-481	37896	41466	1899.9	CL	1.5E-08
CLB-CC-496	38707	39840	1903.1	CL	4.2E-08
CLB-CC-494	38692	40044	1902.3	CL	3.3E-08
CLB-CC-497	38692	40044	1902.3	CL	4.2E-08
CLB-CC-498	38671	40233	1901.1	CL	4.3E-08
CLB-CC-502	38177	40802	1900.4	CL	2.0E-08
CLB-CC-503	38140	41032	1899.6	CL	2.2E-08
CLB-CC-504	38106	41242	1898.5	SC	2.5E-08
CLB-CC-505	38088	41425	1897.8	CL	2.5E-08
CLB-CC-506	38470	40184	1903.2	CL	9.1E-09
CLB-CC-518	38504	40006	1903.8	CL	1.1E-08
CLB-CC-508	38543	39797	1904.8	CL	2.3E-08
CLB-CC-509	38647	39806	1904.3	CL	6.7E-08
CLB-CC-510	38613	39990	1903.4	SC	2.0E-08
CLB-CC-511	38584	40176	1902.7	CL	1.0E-07
CLB-CC-512	38567	40518	1900	CL	9.0E-09
CLB-CC-513	38542	40701	1899	CL	3.5E-08
CLB-CC-514	38334	40761	1900	CL	1.8E-08
CLB-CC-515	38309	40956	1898.9	CL	7.9E-09
CLB-CC-516	38283	41112	1898.4	CL	1.9E-08
CLB-CC-517	38253	41287	1897.6	CL	1.1E-08
CLB-CC-519	38450	41412	1896	CL	2.1E-08
CLB-CC-520	38477	41204	1897	CL	1.3E-08
CLB-CC-521	38496	41029	1897.7	CL	1.2E-08
CLB-CC-522	38520	40833	1898.5	CL	8.6E-09
CLB-CC-523	38681	40655	1898.7	SC	3.6E-08

Table 1: Upstream Raise 91 (Ash Pond 91) Low-Permeability Soil Layer Hydraulic Conductivty Test Results

Sample	Northing (ft)	Easting (ft)	Elevation (ft amsl)	Soil Classification	Hydraulic Conductivity (cm/sec)
CLB-CC-524	38670	40791	1898.1	CL	1.4E-08
CLB-CC-525	38652	40980	1897.1	CL	1.1E-08
CLB-CC-526	38653	41158	1896.4	CL	4.8E-09
CLB-CC-527	38619	41340	1895.4	CL	1.2E-08
CLB-CC-533	38509	40197	1903.4	CL	1.5E-08
CLB-CC-534	38474	40419	1902.3	CL	1.8E-08
CLB-CC-535	38431	40626	1901.5	CL	1.3E-08
CLB-CC-536	38391	40844	1900.6	CL	1.6E-08
CLB-CC-537	38356	41054	1899.7	CL	1.5E-08
CLB-CC-538	38322	41252	1898.9	CL	2.6E-08
CLB-CC-539	38294	41436	1898.3	CL	1.1E-08
CLB-CC-540	38177	40733	1902.1	CL	1.9E-08
CLB-CC-541	38144	40930	1901.3	CL	7.4E-09
CLB-CC-542	38114	41132	1900.5	CL	8.2E-09
CLB-CC-543	38082	41346	1899.6	CL	1.1E-08
CLB-CC-544	38492	41401	1896.4	CL	1.7E-08
CLB-CC-545	38512	41211	1898.1	CL	8.3E-09
CLB-CC-546	38548	41001	1898.9	CL	1.5E-08
CLB-CC-547	38577	40790	1900	CL	1.5E-08
CLB-CC-548	38609	40570	1900.7	CL	9.6E-09
CLB-CC-549	38636	40360	1901.7	CL	1.6E-08
CLB-CC-550	38659	40181	1902.3	CL	8.4E-09
CLB-CC-551	38699	41202	1897.2	CL	1.3E-08
CLB-CC-552	38708	40966	1898.4	CL	1.2E-08
CLB-CC-553	38726	40728	1899.4	CL	1.8E-08
CLB-CC-554	38736	40515	1900.5	CL	1.0E-08
				Geometric Mean	1.7E-08

Notes:

Permeability tests performed on undisturbed samples collected from the liner in Shelby tubes.

Permeability results from falling head tests performed by Braun Intertec.

Reference: Cooperative Power Association, 1993 "Final Construction Report, Evaporation Pond 93 and Ash Pond 91"

APPENDIX D-3

Geomembrane Liner QA/QC Testing Results

Table 1: Upstream Raise 91 (Ash Pond 91) HDPE Conformance Test Results

Roll ID	Thickness (mil)	Tensile Strength		Elongation	
		Test Method ASTM D638		Test Method ASTM D638	
		Break (lb/in)	Yield (lb/in)	Break (%)	Yield (%)
6846	45	209	106	797	20
6852	44	212	109	805	21
0697	44	224	121	827	19
0717	43	208	115	827	21
0721	43	213	115	825	20
0729	44	217	121	820	20
6693	43	206	107	830	19
6859	46	212	104	846	19
6862	44	208	110	808	20
6866	47	209	121	786	20
0661	47	227	119	830	20
0665	44	229	117	837	21
0670	46	231	107	852	20
0674	47	239	121	833	21
0683	46	243	117	834	19
0688	47	230	127	814	21
6829	46	203	107	789	21
6833	45	208	111	773	19
6838	47	225	119	823	20
6842	45	216	112	825	20
6871	45	208	111	799	20
6925	44	208	103	820	21
6907	46	219	100	878	20
6912	45	219	108	846	19
6916	46	207	104	831	20
6921	44	211	104	849	20
6939	48	226	116	840	20
6940	47	222	109	826	21
6947	47	224	118	822	20
6952	44	206	105	805	25
0722	43	216	114	833	20
0742	44	218	115	854	20
0747	44	227	116	841	20
0756	44	215	115	814	21
0761	44	225	112	833	20
0765	45	215	113	832	21
0771	43	218	114	825	21
0774	44	209	110	827	21
6821	46	195	114	765	21
6895	45	205	101	836	22
0783	43	209	113	819	19
0787	43	219	110	848	21
0790	44	218	104	823	23
0795	43	223	110	853	21
0800	43	218	104	845	24
6957	46	216	115	815	19
0802	44	207	111	801	20
0814	45	234	114	847	19

Table 1: Upstream Raise 91 (Ash Pond 91) HDPE Conformance Test Results

Roll ID	Thickness (mil)	Tensile Strength		Elongation	
		Test Method ASTM D638		Test Method ASTM D638	
		Break (lb/in)	Yield (lb/in)	Break (%)	Yield (%)
0816	43	215	112	804	23
0820	43	213	112	809	26
0824	44	228	118	817	25
0828	43	224	119	803	28
0833	43	210	116	791	27
0838	44	226	115	827	25
0840	43	216	115	824	23
0850	43	231	113	854	26
0860	43	211	111	826	28
0862	42	204	112	821	26
6960	45	215	114	802	26
6972	46	234	115	830	21
0874	42	209	109	824	26
0876	43	201	112	802	25
0883	43	216	111	874	20
0888	43	214	113	835	19
0893	44	224	118	828	20
0896	43	215	114	845	20
0899	44	222	115	840	20
0902	42	212	113	833	21
0903	43	213	114	840	20

Notes:

Reference: Cooperative Power Association, 1993 "Final Construction Report, Evaporation Pond 93 and Ash Pond 91"

The break strength, yield strength, break elongation, and yield elongation (ASTM D638) are each an average of one test in the machine direction and one test in the transverse direction.

Table 2: Upstream Raise 91 (Ash Pond 91) HDPE Quality Control Certification Test Results

Roll ID	Thickness (mil)	Tensile Strength		Elongation		Puncture Resistance	Tear Resistance
		Test Method ASTM D638		Test Method ASTM D638		Test Method ASTM D1004	Test Method FTMS 101C 2065
		Break (lb/in)	Yield (lb/in)	Break (%)	Yield (%)	(lbs)	(lbs)
6010659	44	203	142	750	14	89	42
6010662	44	192	141	714	14	90	41
6010663	43	244	120	880	17	89	38
6010667	44	240	130	835	16	84	39
6010669	44	272	152	903	14	83	40
6010671	43	247	139	890	16	89	41
6010674	45	235	127	838	16	88	38
6010677	46	259	132	889	17	83	36
6010689	45	239	129	861	19	89	37
6010704	43	247	136	835	15	81	35
6010706	43	240	134	847	15	84	36
6010714	45	240	138	835	15	89	39
6010716	44	217	134	790	15	90	39
6010718	43	233	126	864	15	89	39
6010721	43	228	120	855	15	88	34
6010722	43	222	114	856	17	85	36
6010728	44	257	134	919	16	89	37
6010729	43	244	129	888	16	86	38
6010746	43	239	133	851	14	78	38
6010756	43	236	144	830	15	86	39
6010766	43	226	130	831	17	83	38
6010774	43	220	130	785	16	85	36
6010776	43	222	120	828	16	83	37
6010787	42	222	119	833	17	84	39
6010789	43	226	130	791	16	67	38
6010791	43	215	115	817	15	82	39
6010793	42	214	127	770	15	81	37
6010795	42	221	125	807	15	84	37
6010797	43	228	134	800	15	83	37
6010799	41	199	113	775	15	86	37
6010800	43	216	117	819	17	88	35
6010802	43	206	117	786	16	82	40
6010804	42	215	123	784	16	92	36
6010806	43	220	133	761	16	88	37
6010808	43	233	132	829	15	87	38
6010810	44	239	132	811	15	85	38
6010812	43	208	127	762	17	94	34
6010814	44	218	127	766	17	83	33
6010816	43	213	129	784	17	86	35
6010818	44	222	138	753	16	91	36
6010820	43	186	133	726	15	89	36
6010822	43	208	133	716	15	92	36
6010824	45	201	124	740	17	78	34
6010826	43	192	122	725	16	80	34
6010828	44	253	128	878	15	74	39

Table 2: Upstream Raise 91 (Ash Pond 91) HDPE Quality Control Certification Test Results

Roll ID	Thickness (mil)	Tensile Strength		Elongation		Puncture Resistance	Tear Resistance
		Test Method ASTM D638		Test Method ASTM D638		Test Method ASTM D1004	Test Method FTMS 101C 2065
		Break (lb/in)	Yield (lb/in)	Break (%)	Yield (%)	(lbs)	(lbs)
6010830	42	216	130	792	15	88	38
6010832	43	228	136	812	15	75	39
6010835	43	242	133	855	15	76	39
6010836	43	228	115	889	15	85	39
6010838	43	187	122	764	16	100	37
6010840	42	211	117	833	16	84	38
6010842	45	263	144	861	15	90	40
6010844	45	230	127	900	15	91	39
6010846	44	238	133	893	16	86	39
6010848	44	243	124	894	17	88	37
6010850	43	235	124	887	17	74	33
6010852	43	226	119	880	16	76	37
6010854	44	240	134	905	17	83	37
6010856	44	245	135	919	15	87	39
6010858	44	230	124	896	16	88	40
6010860	42	203	119	792	16	85	35
6010863	44	229	114	858	17	89	35
6010864	43	234	120	895	16	85	36
6010868	43	212	120	860	16	83	38
6010870	41	228	119	915	16	88	39
6010877	43	209	124	774	18	91	47
6010878	43	209	125	770	16	86	37
6010884	42	215	127	806	16	97	37
6010885	43	223	122	825	15	87	34
6010888	43	186	121	710	16	83	32
6010889	43	183	124	702	16	83	32
6010894	43	203	126	760	16	87	36
6010895	43	198	124	740	16	90	36
6010899	43	227	122	846	16	88	36
7006822	45	222	152	772	14	93	44
7006826	45	239	121	868	16	78	39
7006829	46	237	118	859	17	89	37
7006834	44	210	142	764	15	86	40
7006839	44	216	111	847	17	72	41
7006865	44	242	118	894	16	87	37
7006867	45	229	128	804	16	88	37
7006871	45	231	118	846	17	87	37
7006926	43	225	129	810	16	89	37
7006928	43	211	118	798	17	86	38
7006938	45	229	124	798	15	91	40
7006940	45	202	130	716	15	90	40
7006942	44	231	131	792	15	90	37
7006944	45	228	134	767	14	89	38
7006946	45	227	131	789	15	93	38
7006948	45	211	114	802	15	91	38

Table 2: Upstream Raise 91 (Ash Pond 91) HDPE Quality Control Certification Test Results

Roll ID	Thickness (mil)	Tensile Strength		Elongation		Puncture Resistance	Tear Resistance
		Test Method ASTM D638		Test Method ASTM D638		Test Method ASTM D1004	Test Method FTMS 101C 2065
		Break (lb/in)	Yield (lb/in)	Break (%)	Yield (%)	(lbs)	(lbs)
7006950	44	216	113	826	17	88	37
7006952	43	221	127	790	15	90	38
7006954	44	236	127	811	14	85	37
7006958	44	241	133	809	15	90	37
7006959	43	192	115	740	16	82	35
7006961	43	202	120	718	15	74	35
7006963	44	207	130	701	14	89	38
7006965	44	204	130	709	14	89	38
7006967	43	209	130	723	14	88	38
7006969	44	189	118	718	16	92	39
7006971	44	200	122	746	15	86	34
7006973	44	251	128	862	16	85	40
907931	42	213	122	816	16	90	37
907932	40	201	122	801	16	80	35

Notes:
Reference: Cooperative Power Association, 1993 "Final Construction Report, Evaporation Pond 93 and Ash Pond 91"

Table 3: Upstream Raise 91 (Ash Pond 91) HDPE Field Seam Destructive Test Results

Sample ID	Shear Strength	Peel Strength
	Test Method ASTM D638	
	(lb/in)	(lb/in)
DSE-1A	128	91
DSE-1B	119	99
DSE-2	124	82
DSE-3	125	85
DS-1	129	79
DS-2A	136	95
DS-2B	122	88
DS-3	120	86
DS-4	124	86
DS-5	118	96
DS-6	129	94
DS-7A	126	89
DS-7B	127	97
DS-8	125	85
DS-9	122	90
DS-10	128	82
DS-11	119	84
DS-12	118	84
DS-13	121	78
DS-14	119	83
DS-15	126	91
DS-16	131	79
DS-17	113	93
DS-18	123	81
DS-19	136	87
DS-20	124	77
DS-21	126	83
DS-22	127	89
DS-23	122	83
DS-24	128	83
DS-25	126	91
DS-26	126	90
DS-27	126	83
DS-28	132	79
DS-29	131	82
DS-30	132	91
DS-31	134	94
DS-32	131	82
DS-33	127	82
DS-34A	116	74
DS-34B	117	78
DS-35	128	84
DS-36	125	68
DS-37	125	80
DS-38	125	80

Table 3: Upstream Raise 91 (Ash Pond 91) HDPE Field Seam Destructive Test Results

Sample ID	Shear Strength	Peel Strength
	Test Method ASTM D638	
	(lb/in)	(lb/in)
DS-39	129	86
DS-40	125	81
DS-41	127	76
DS-42	126	80
DS-43	130	83
DS-44	133	84
DS-45	127	79
DS-46	125	88
DS-47	129	86
DS-48	124	85
DS-49	126	87
DS-50	124	98
DS-51	121	79
DS-52	121	85
DS-53	124	79
DS-54	122	82
DS-55	123	87
DS-56	123	85
DS-57	126	96
DS-58	119	78
DS-59	123	87
DS-60	119	84
DS-61	118	79
DS-62	135	88
DS-63	132	91
DS-64	128	86
DS-65	133	88
DS-66	128	90
DS-67	124	91
DS-68	131	95
DS-69	132	75
DS-70	132	84
DS-71	127	78
DS-72	128	86
DS-73	129	76
DS-74	132	85
DS-75	129	82
DS-76	134	80
DS-77	135	89
DS-78	130	88
DS-79	128	90
DS-80	129	96
DS-81	134	88
DS-82	133	77
DS-83	130	78
DS-84	132	95
DS-85	130	85
DS-86	132	99
DS-87	131	87

Table 3: Upstream Raise 91 (Ash Pond 91) HDPE Field Seam Destructive Test Results

Sample ID	Shear Strength	Peel Strength
	Test Method ASTM D638	
	(lb/in)	(lb/in)
DS-88	136	91
DS-89	141	80
DS-90	137	99
DS-91	123	84
DS-92	127	95
DS-93	135	89
DS-94	131	86
DS-95	132	98
DS-96	130	93
DS-97	127	93
DS-98	130	86
DS-99	128	85
DS-100	132	87
DS-101	126	80
DS-102	136	89
DS-103	127	86
DS-104	132	99
DS-105	124	92
DS-106	133	99
DS-107	122	96
DS-108	127	92
DS-109	133	91
DS-110	132	93
DS-111	132	94
DS-112	125	86
DS-113	126	92
DS-114	123	80
DS-115	129	80
DS-116	129	76
DS-117	124	92
DS-118	128	81
DS-119	125	71
DS-120	131	89
DS-121	126	69
DS-122A	127	99
DS-122B	132	94
DS-123	128	81
DS-124	127	86
DS-125	122	93
DS-126	125	83
DS-127	130	89
DS-128	128	91
DS-129	126	83
DS-130	129	82
DS-131	130	85
DS-132	131	81
DS-133	133	85
DS-134	134	84
DS-135	131	85

Table 3: Upstream Raise 91 (Ash Pond 91) HDPE Field Seam Destructive Test Results

Sample ID	Shear Strength	Peel Strength
	Test Method ASTM D638	
	(lb/in)	(lb/in)
DS-136	135	90
DS-137	131	96
DS-138	129	87
DS-139	130	89
DS-140	130	87
DS-141	133	93
DS-142	133	84
DS-143	132	86
DS-144A	119	102
DS-144B	128	86
DS-145	124	86
DS-146	127	100
DS-147	130	84
DS-148	131	93
DS-149	120	90
DS-150	128	96
DS-151	128	79
DS-152	132	89
DS-153	121	92
DS-154	131	80
DS-155	130	85
DS-156	131	86
DS-157	125	94
DS-158	126	79
DS-159	131	82
DS-160	127	73
DS-161	130	80
DS-162	138	99
DS-163	131	98
DS-164	133	103
DS-165	136	93
DS-166	125	80
DS-167	127	77
DS-168	120	100
DS-169	127	79
DS-170	125	85
DS-171	126	79
DS-172	127	85
DS-173	132	83
DS-174	132	88
DS-175	125	79
DS-176	131	82
DS-177	132	82
DS-178	123	87
DS-179	122	86
DS-180	119	87
DS-181	133	93
DS-182	131	89
DS-183	132	87

Table 3: Upstream Raise 91 (Ash Pond 91) HDPE Field Seam Destructive Test Results

Sample ID	Shear Strength	Peel Strength
	Test Method ASTM D638	
	(lb/in)	(lb/in)
DS-184	124	85
DS-185	123	87
DS-186	113	88
DS-187	126	78
DS-188	121	88
DS-189	125	79
DS-190	121	78
DS-191	117	76
DS-192	120	71
DS-193	112	75
DS-194	117	88
DS-195	119	91
DS-196	122	82
DS-197	113	73
DS-198	118	73
DS-199	113	77
DS-200	116	83
DS-201	124	66
DS-202	123	84
DS-203	123	76
DS-204	123	78
DS-205	122	73
DS-206	123	81
DS-207	124	80

Notes:
Reference: Cooperative Power Association, 1993 "Final Construction Report, Evaporation Pond 93 and Ash Pond 91"

The shear and peel strengths shown are each an average of five tests (ASTM D638).

APPENDIX D-4

A Performance Evaluation Methodology for Composite and Alternative Surface Impoundment Liner Systems, Gradient 2018

A Performance Evaluation Methodology for Composite and Alternative Surface Impoundment Liner Systems

Prepared for
Utility Solid Waste Activities Group (USWAG)
701 Pennsylvania Ave., NW
Washington, DC 20004-2696

December 2018



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Table 3.2 Estimated Hydraulic Flux Through Composite Liner System – Poor Contact Quality (C_{qo} = 1.15)

Table 3.3 Estimated Hydraulic Flux Through Natural Clay-lined System

Table 3.4 Estimated Hydraulic Flux Through Two Composite Liner Systems

Abbreviations

CCR	Coal Combustion Residuals
CQA	Construction Quality Assurance
GM	Geomembrane
HDPE	High Density Polyethylene
QPE	Qualified Professional Engineer
SSI	Statistically Significant Increase
US EPA	United States Environmental Protection Agency

1 Introduction

In 2015, the United States Environmental Protection Agency (US EPA) published a final rule to regulate the disposal of coal combustion residuals (CCR) (US EPA, 2015). This rule (herein called the "CCR Rule") established criteria for liner systems to determine whether surface impoundments were lined or unlined. Impoundments classified as unlined were subject to closure requirements. Based on these criteria, a lined surface impoundment was required to have a liner system that met one of the following requirements.

- "A liner consisting of a minimum of two feet of compacted soil with a hydraulic conductivity of no more than 1×10^{-7} cm/sec" [40 CFR 257.71(a)(1)(i)];
- A composite liner system with "the upper component consisting of, at a minimum, a 30-mil geomembrane liner (GM), and the lower component consisting of at least a two-foot layer of compacted soil with a hydraulic conductivity of no more than 1×10^{-7} centimeters per second (cm/sec). GM components consisting of high density polyethylene (HDPE) must be at least 60-mil thick" [40 CFR 257.70(b)]; or
- An alternative composite liner system with "the upper component consisting of, at a minimum, a 30-mil GM, and a lower component, that is not a geomembrane, with a liquid flow rate no greater than the liquid flow rate of two feet of compacted soil with a hydraulic conductivity of no more than 1×10^{-7} cm/sec. GM components consisting of high density polyethylene (HDPE) must be at least 60-mil thick" [40 CFR 257.70(c)].

In August 2018, the United States Court of Appeals for the District of Columbia vacated portions of the CCR Rule related to the liner criteria. The Court decision was based on information contained in US EPA's 2014 Human and Ecological Risk Assessment of Coal Combustion Residuals (US EPA, 2014), which indicated that clay-lined impoundments were more likely to leak than composite-lined impoundments. As a result, the Court found that only composite-lined systems, as described in 40 CFR 257.70(b), meet minimum federal liner standards. Consequently, some impoundments that were formerly considered lined do not meet federal standards and are subject to closure requirements. This means that some impoundments that meet all CCR Rule requirements related to groundwater protections standards, location standards, and safety factor requirements may be required to close.

The objective of this report is to present an approach to evaluate the performance of liner systems and show that under certain conditions, alternative liners perform comparably to, if not better than, a composite liner. The CCR Rule specifies that flow through a clay or the compacted soil portion of a liner system is to be evaluated using Darcy's Law (Eqn. 1 and 3 in Section 2); this report details a methodology to evaluate flux and travel times through both the GM and clay layers in a liner system. Performance is assessed using two metrics: the hydraulic flux that is expected to migrate through a liner system and the travel time required for fluids to migrate through a liner system. Using the approach presented in this report, one can compare the performance of composite-lined systems with other liner systems that do not meet current liner criteria.

Section 2 of this report presents a general methodology for quantifying the rate of hydraulic flux and estimating travel times through various liner systems. Section 3 presents two examples of the methodology comparing the performance of a composite liner system to alternative liner systems.

Section 4 discusses the data that are necessary to credibly demonstrate that a natural clay liner is effective and performs comparably to a composite liner. Finally, Section 5 concludes by identifying the comparative methodology that a Qualified Professional Engineer (QPE) can employ, including hydraulic flux rate and travel time through the liner, to demonstrate that alternative liner systems can perform as well as, if not better than, composite liners as defined by 40 CFR 257.70(b).

2 Surface Impoundment Liner Performance Evaluation Methodology

This section presents an approach to evaluate and compare the performance of surface impoundment liner systems. Two metrics, hydraulic flux (*i.e.*, volume of fluid passing through the liner per unit area per unit time) and fluid travel time across the liner thickness, are used to define liner performance. Hydraulic flux governs how much mass ultimately gets into underlying groundwater, while travel time is a metric for immediacy of potential risks.

2.1 Hydraulic Flux

The flow of water through a liner system (*e.g.*, hydraulic flux) is one metric that can be used to evaluate performance. Hydraulic flux through a liner is a surrogate for constituent mass that may be escaping a disposal facility and impacting underlying groundwater. This section presents a methodology for estimating hydraulic flux through a clay liner system and a composite liner system. The methodology presented to calculate hydraulic flux through a clay lined system is appropriate both for engineered clay liners and natural clay liners.

2.1.1 Clay-Lined Systems

Darcy's Law describes the flow of a liquid moving through a layer of saturated soil (Freeze and Cherry, 1979, Eq. 2.5). This equation can also be used to describe flow through a clay liner system (Eqn. 1):

$$Q_c = k_s i_s A \qquad \text{Eqn. 1}$$

where:

Q_c = Flow rate in clay layer (L^3/T);
k_s = Saturated hydraulic conductivity (L/T);
i_s = Hydraulic gradient (unitless); and
A = Surface area (L^2).

In this scenario, the hydraulic conductivity, k_s, describes the ability of water to move through the liner matrix. Thus, it is a function of both liner (*e.g.*, soil) and fluid properties, including the size and shape of the liner soil particles, as well as fluid density and viscosity (Bear, 1979). Hydraulic gradient, i_s, is the change in hydraulic head over distance in the direction of flow. For vertical flow through a clay liner system, the hydraulic gradient is calculated as follows (Touze-Foltz *et al.*, 1999, Eq. 2):

$$i_s = \frac{h + t_s - h_a}{t_s} \qquad \text{Eqn. 2}$$

where:

h = Pressure head of the liquid on top of the liner (L);
h_a = Pressure head underlying the liner (L); and

t_s = Thickness of the liner (L).

Presence of a pressure head underlying a liner, h_a, creates resistance to downward seepage. In scenarios where soils underlying the liner are unsaturated (*i.e.*, zero hydraulic pressure at the base of the liner), h_a is set to 0. In these situations, the gravity-driven specific discharge in a saturated clay liner can be quantified by the following equation:

$$q = \frac{Q_c}{A} = k_s(\frac{h}{t_s} + 1) \quad \text{Eqn. 3}$$

where:

q = Specific discharge, which is the unit flow rate per area across the liner (L/T).

Specific discharge, q, divided by the effective porosity is seepage velocity, which describes the rate at which a fluid moves through a porous media.

It is important to note that the ability of a fluid to flow through an unsaturated or partially saturated environment is impeded relative to flow through saturated environments. This is because in a multi-fluid system, fluids (in this case, air and water) compete for pore space, resulting in reduced mobility for all fluids (Cohen and Mercer, 1993). Darcy's Law presented above is valid for fully saturated environments, which is likely appropriate for relatively thin, engineered clay liner systems during the period of the surface impoundment operation. However, for natural clay environments, clay layers are often much thicker than engineered clay liners. In these circumstances, it is inappropriate to assume that the entire natural clay liner is fully saturated and, thus, Darcy's equation must be adjusted to account for the lower water saturation level in the natural clay liner. The equivalent Darcy's equation for vertical unsaturated flow in porous media can be written as (Bear, 1979):

$$q = k_r \times k_s \times (\frac{\partial \psi}{\partial z} + 1) \quad \text{Eqn. 4}$$

where:

$\partial \psi / \partial z$ = Vertical pressure head gradient in the unsaturated seepage zone; and
k_r = Relative permeability of the clay liner.

Relative permeability varies from 0 to 1 depending on the level of saturation. Multiple models and approaches are available for estimating relative permeability as a function of moisture content or saturation (*e.g.*, Brooks and Corey, 1964; van Genuchten, 1980).

2.1.2 Composite-lined Systems

A composite liner, as defined in 40 CFR 257.70(b), consists of two components: an upper GM liner of at least 30 mil and the lower layer of compacted soil at least two feet deep with a hydraulic conductivity of no more than 1×10^{-7} cm/sec. GM components consisting of HDPE must be at least 60 mil thick. GM liners are effectively impermeable to flow; therefore, hydraulic flux through a composite liner occurs primarily *via* defects in the liner. GM defects, which may be a result of manufacturing, installation, or weathering, provide preferential pathways for water flow through the GM. There are two approaches, described below, that can be used to estimate hydraulic flux through defects in a composite liner. Both approaches assume that the hydraulic system is at steady state, the soil liner is saturated, and flow is vertical.

2.1.2.1 Giroud's (1997) Formula for Flux Through a Circular Defect

Giroud (1997, Eq. 20) presented a semi-empirical approach to calculate flow through a defect in a composite liner. Previous studies have evaluated flow through a wide range of GM defects, including circular defects, square and rectangular defects, infinitely long defects, and defects in GM wrinkles caused by thermal expansion (Giroud, 1997; Giroud *et al*., 1997; Touze-Foltz *et al*., 1999). This report presents only the approach to calculate flow through a circular GM defect (Eqn. 5).

$$Q_d = 0.976\, C_{qo}[1 + 0.1(h/t_s)^{0.95}](2r_d)^{0.2} h^{0.9} {k_s}^{0.74} \quad \text{Eqn. 5}$$

where:

Q_d = Flow rate through a single defect (L^3/T);
h = Pressure head of the liquid on top of the liner (L);
t_s = Thickness of the liner (L);
r_d = Radius of circular defect (L); and
k_s = Saturated hydraulic conductivity (L/T).

Here, C_{qo} is a unitless coefficient that varies in value depending on whether contact conditions are good (C_{qo} = 0.21) or poor (C_{qo} = 1.15). Good contact is when the GM has few wrinkles and the clay layer has a smooth surface. Poor contact is when the GM has many wrinkles and the clay layer has a rough surface. Importantly, the Giroud formula is semi-empirical and only valid when data are expressed in the following units: Q_d (m^3/s), i_s (unitless), r_d (m), h (m), k_s (m/s).

Giroud's (1997) formula is valid as long as three conditions are met. First, the defect diameter should fall between 0.5 mm and 25 mm. Second, h must be less than or equal to 3 meters. Third, k_s must not exceed k_G, which is defined as follows (Giroud, 1997, Eq. 25):

$$k_G = \left\{ \frac{0.3891(2r_d)^{1.8}}{C_{qo}[1+0.1(h/t_s)^{0.95}]h^{0.4}} \right\}^{1/0.74} \quad \text{Eqn. 6}$$

Eqn. 6 is an empirical relationship and, thus, the units for each parameter must match the units required in Eqn. 5.

2.1.2.2 Touze-Foltz *et al.*'s (1999) Formula for Flux Through a Circular Defect

Touze-Foltz *et al*. (1999, Eqn. 10-11, 15-17) presented an alternative solution to evaluate flow through a GM circular defect. The major difference between this approach and the Giroud (1997) approach is that Touze-Foltz *et al*. (1999) is an analytical solution to the differential equation describing the physics of fluid flow (Eqn. 7, 8, and 9); in contrast, the formula presented by Giroud (1997) was based on empirical observations.

$$Q_d = \pi {r_d}^2 k_s i_s - 2\pi r_d \theta \alpha C_Q [I_1(\alpha r_d) K_1(\alpha R) - I_1(\alpha R) K_1(\alpha r_d)] \quad \text{Eqn. 7}$$

$$C_Q = \frac{t_s + h - h_a}{K_1(\alpha R) I_0(\alpha r_d) + K_0(\alpha r_d) I_1(\alpha R)} \quad \text{Eqn. 8}$$

$$\alpha = \sqrt{\frac{k_s}{t_s \theta}}$$ Eqn. 9

where:

i_s = Hydraulic gradient (unitless);
R = Radius of the wetted area (L);
θ = Hydraulic transmissivity of the gap between the GM and the clay layer (L^2/T);
α = Analytical parameter defined above (unitless);
K_0 = Modified zero order Bessel function (unitless);
I_0 = Modified zero order Bessel function (unitless);
K_1 = Modified first order Bessel function (unitless);
I_1 = Modified first order Bessel function (unitless); and
C_{qo} = Dimensionless GM contact quality coefficient (0.21 for good and 1.15 for poor contact).

R is the radius of the wetted area and represents the validity limit of the solution; effectively, R is associated with the maximum distance between wrinkle defects and empirically ranges between 1.3 to 4.4 meters (Touze-Foltz *et al*., 1999). θ is the hydraulic transmissivity of the gap between the GM and the clay layer and can be determined experimentally. Alternatively, for a composite liner with a compacted clay layer, Rowe (2012) provides the following approaches to estimate θ where k_s is in m/s and θ is in m^2/s.

Good contact: $log_{10}\theta = 0.07 + 1.036(log_{10}k_s) + 0.0180(log_{10}k_s)^2$ Eqn. 10

Poor contact: $log_{10}\theta = 1.15 + 1.092(log_{10}k_s) + 0.0207(log_{10}k_s)^2$ Eqn. 11

2.1.2.3 Defect Density

The equations presented by Giroud (1997) and Touze-Foltz *et al*. (1999) define the total flow rate within a single defect. To determine the total flow rate across the entire GM, Q_{GM} (L^3/T), the flow rate though each defect must be multiplied by the defect density (D, in units of defects/L^2) and the liner area (A in units of L^2) as outlined below.

$$Q_{GM} = Q_d \times D \times A$$ Eqn. 12

Or, expressed in terms of the unit flow rate,

$$q = \frac{Q}{A} = Q_d \times D$$ Eqn. 13

Touze-Foltz *et al*. (1999) reported that GMs in composite liners typically have between 2 and 26 defects per hectare after installation.

2.2 Travel Time

The time required for leachate to flow through a liner system is an important additional metric to evaluate performance.[1] A liner performs better when time for fluids to migrate through the system is large. This concept is illustrated in US EPA's Criteria for Identifying Areas of Vulnerable Hydrogeology Under the Resource Conservation and Recovery Act (US EPA, 1986). In this document, US EPA defined a groundwater system as potentially vulnerable when the travel time for fluids to migrate 100 feet through the unsaturated and saturated environment is less than 100 years.

Under saturated conditions, a simple transit time equation can be used to estimate travel time across the liner depth, t_s, based on Darcy's Law (Eqn. 14):

$$T = \frac{\phi \cdot t_s}{q} \qquad \text{Eqn. 14}$$

where:

T = Travel time (T);
q = Specific discharge (L/T), calculated by Equation 3;
ϕ = Effective porosity of the liner material (unitless); and
t_s = Thickness of the liner (L).

In turn, Equations 3 and 14 can be rearranged to estimate the depth to which fluids penetrate into a liner, L_s, during the operational period of a surface impoundment:

$$L_s = 0.5\left\{\frac{k_s T}{\phi} + \left[\left(\frac{k_s T}{\phi}\right)^2 + \frac{4k_s Th}{\phi}\right]^{1/2}\right\} \qquad \text{Eqn. 15}$$

where:

L_s = Fluid penetration depth (L);
k_s = Saturated hydraulic conductivity (L/T);
T = Time of surface impoundment operation (T);
ϕ = Effective porosity of the liner material (unitless); and
h = Hydraulic head in overlying impoundment (L).

However, this simple transit time approach ignores the initial unsaturated nature of the liner and infiltration dynamics. Green and Ampt (1911, as cited in US EPA, 1988) described the process of fluid infiltration in unsaturated soils resulting from overlying impoundments. The approach assumes a sharp, saturated wetting front moving down the soil/liner column. Above the wetting front, the soil/liner is fully saturated, while below the wetting front, the moisture content is equal to its lower, initial moisture content. The required time for the wetting front to reach to a given depth, L_s, is given by (US EPA, 1988):

$$T = \frac{\Theta_s - \Theta_i}{k_s}\left[L_s - (h + \Psi_c)\ln\left(1 + \frac{L}{\mathrm{h} + \Psi_c}\right)\right] \qquad \text{Eqn. 16}$$

[1] For a composite liner, the travel time for fluids to flow through the liner is controlled by the depth and hydraulic conductivity of the compacted soil component of the liner.

where:

T = Time (T);
Θ_s = Saturated water content (unitless);
Θ_i = Initial water content (unitless);
k_s = Saturated hydraulic conductivity (L/T);
L_s = Penetration distance of wetting front (L);
h = Hydraulic head in overlying impoundment (L); and
Ψ_c = Capillary suction under the liner (L).

Equation 16 can be used to calculate the time required for the wetting front to penetrate the entire liner by setting k_s equal to the liner hydraulic conductivity and L equal to the liner thickness. If the time for the wetting front to penetrate the full liner thickness is less than the expected operational life of the surface impoundment, the use of the simplified transit time approach (Eqn. 14) may be reasonable for an operating surface impoundment. However, if the wetting front has not penetrated the entire liner thickness during the period of surface impoundment operation, which is likely for thick natural clay-lined scenarios, the travel time calculations must account for the transient hydraulic heads that occur during and after impoundment operation. Even after impoundment closure, the wetting front will continue to migrate vertically downward due to gravity; however, the rate of migration will slow without the overlying hydraulic head.

Additionally, as the wetting front migrates downward into previously unsaturated soils, a portion of the water is retained by capillary forces on the clay soil particles. Water is retained at its residual saturation value; water's residual saturation in clay soils typically ranges from 0.25 to 0.57% (Brooks and Corey, 1964). Furthermore, the volume of water migrating downward declines over time as it becomes trapped in the clay pore space. If the unsaturated portion of the clay liner is thick enough, and has sufficient pore space capacity, a wetting front may never migrate entirely through the liner. A fluid conservation model can be used to estimate the thickness of a clay liner, below the penetration depth calculated in Eqn. 15, that is required to entrap all fluids that have infiltrated into the liner from the overlying impoundment (Eqn. 17).

$$L_r = \frac{L_s \times \Theta_s}{\Theta_r - \Theta_i} \qquad \text{Eqn. 17}$$

where:

L_r = Clay thickness, below the penetration depth, required to entrap all fluids (L);
L_s = Penetration distance of wetting front (L);
Θ_s = Saturated water content (unitless);
Θ_i = Initial water content (unitless); and
Θ_r = Residual saturation of water in clay (unitless).

If the unsaturated clay liner thickness overlying groundwater is greater than the calculated value of L_r in Equation 17, all water that infiltrates into the liner from an overlying impoundment will be trapped by the capillary forces and, thus, no water from the overlying impoundment will penetrate the entire depth of the liner.

3 Liner Performance Evaluation Examples

The analytical equations described in Section 2 provide an approach by which the performance of various liners systems can be evaluated and compared. This section provides two examples of liner performance calculations for hypothetical surface impoundment liner systems. The first example compares the performance of a natural clay liner to a composite liner and the second example compares the performance of two composite liners, one that meets current federal design standards and one that does not. For both examples, liner performance is assessed using two criteria: hydraulic flux through the liner system, which is a surrogate for constituent mass that may be escaping the disposal facility, and travel time through the liner system, which is a metric that can be used to assess vulnerability of underlying groundwater resources.

3.1 Example 1: Performance Evaluation Comparison of Natural Clay Liner and Composite Liner

For the first example, liner performance was evaluated for both a natural clay liner and a composite liner. Details of the two liner systems are described below:

- An impoundment with a composite liner consisting of a 60 mil HDPE GM underlain by a 2-foot layer of compacted soil with a hydraulic conductivity of 1×10^{-7} cm/s. This liner meets the federal liner system design criteria contained in 40 CFR 257.70(b).
- An impoundment that has no engineered liner but does have a natural clay liner that is 50 feet thick, with an average hydraulic conductivity of 1×10^{-8} cm/s. This liner does not meet current federal liner system design criteria.

For both liner systems, a head on the liner system ranging from 0.5 to 3 meters was assumed. For the composite-lined system, circular GM defects occurring at frequency ranging from 2 to 26 defects per hectare (Touze-Foltz *et al*., 1999) with an average diameter of 5 mm were also assumed. Hydraulic flux was calculated for a range of values for contact quality factor (C_{qo}), which is an empirical parameter relating to the quality of the GM installation and the contact with the underlying compacted soil layer. Good contact (*i.e*., low C_{qo}) corresponds to GMs installed with few wrinkles and placed on a smooth compacted soil layer; poor contact (*i.e*., high C_{qo}) corresponds to GMs installed with wrinkles and placed on a compacted soil layer that has not been well compacted and/or is not smooth.

Flux was estimated using Equation 5 for the composite-lined system (Tables 3.1 and 3.2) and Equation 3 for the natural clay-lined system (Table 3.3) assuming fully saturated, steady-state conditions for each liner system. The calculated flux for a composite-lined system ranges from 1.6 liters/hectare-day (lphd) for systems installed with good contact and a low defect frequency to 747 lphd for systems installed with poor contact and a high defect frequency. The calculated flux for a natural clay-lined system ranges from 89 to 103 lphd. These results indicate that the hydraulic performance of the natural clay-lined system is comparable to the performance of the composite-lined system. As a comparison, the hydraulic flux through an engineered clay liner system (2 feet of clay with a hydraulic conductivity of 1×10^{-7} cm/s) with 0.5 to 3 meters of overlying hydraulic head, ranges from 1,572 to 5,115 lphd, one to two orders of magnitude higher than the calculated flux through both the composite-lined and natural clay-lined systems.

Table 3.1 Estimated Hydraulic Flux Through Composite Liner System – Good Contact Quality (C_{qo} = 0.21)

Surface Impoundment Head	Hydraulic Flux (liters/hectare-day)	
	2 Defects per Hectare	26 Defects per Hectare
h = 0.5 meters	1.6	20
h = 1.5 meters	4.8	62
h = 3 meters	10	136

Table 3.2 Estimated Hydraulic Flux Through Composite Liner System – Poor Contact Quality (C_{qo} = 1.15)

Surface Impoundment Head	Hydraulic Flux (liters/hectare-day)	
	2 Defects per Hectare	26 Defects per Hectare
h = 0.5 meters	8.5	111
h = 1.5 meters	26	340
h = 3 meters	57	747

Table 3.3 Estimated Hydraulic Flux Through Natural Clay-lined System

Surface Impoundment Head	Hydraulic Flux (liters/hectare-day)
h = 0.5 meters	89
h = 1.5 meters	95
h = 3 meters	103

The second metric we have used to evaluate liner system performance is travel time. The estimated time of travel for fluids to migrate through the composite and natural clay-lined systems was calculated using Darcy's Law (Eqn. 3) and the simplified transit equation presented in Equation 14. For these calculations, a unit hydraulic gradient (*i.e.*, no overlying impounded water, h = 0 in Eqn. 3) and a porosity of 40% were assumed. For the composite-lined system, the calculated seepage velocity of fluids migrating through the secondary 2-foot compacted soil liner (hydraulic conductivity of 1×10^{-7} cm/s) is 0.26 ft/year. For the natural clay-lined system, the calculated seepage velocity of fluids migrating through the 50-foot natural clay layer (hydraulic conductivity of 1×10^{-8} cm/s) is 0.03 ft/year. Thus, the total travel time for fluids to migrate through the composite liner is about 7.7 years and the total travel time for fluids to migrate through the natural clay liner is greater than 1,600 years.

The 1,600 year travel time through the natural clay liner is a conservative estimate based on full saturation of the entire 50-foot liner. If we assume a 3-meter head on top of the liner system and 30 years of surface impoundment operation, the penetration depth of the wetting front during impoundment operation given by Equation 15 is 3.2 feet. As discussed in Section 2.2, the rate and volume of fluid migration through the liner when the surface impoundment is inactive and dewatered depends on the initial and residual moisture contents and the capillary pressure in the clay formation (see Equations 16 and 17). In this example, reasonably assuming that the initial moisture content of the clay layer is 10% (*i.e.*, 10% of the volume of voids between clay grains are filled with water), the residual saturation of water in the clay is 20%, and the full saturation moisture content is 100%, the total penetration depth of water into the natural clay liner is 29 feet (Eqn. 17). Thus, assuming that no additional water enters the liner after surface impoundment closure (*e.g.*, precipitation), water from the overlying surface impoundment will not migrate completely through the natural clay liner.

Overall, based on an evaluation of hydraulic flux and travel time in this example, performance of the natural clay liner exceeded performance of the composite liner.

3.2 Example 2: Performance Evaluation Comparison of Two Different Composite Liners

For the second example, liner performance was evaluated for two different composite liners. Details of the two liner systems are described below:

- An impoundment with a composite liner consisting of a 60 mil HDPE GM underlain by a 2-foot layer of compacted soil with a hydraulic conductivity of 1×10^{-7} cm/s. This liner meets the federal liner system design criteria contained in 40 CFR 257.70(b).
- An impoundment with a composite liner consisting of a 30 mil HDPE GM underlain by a 2-foot layer of compacted soil with a hydraulic conductivity of 1×10^{-8} cm/s. This liner does not meet the federal liner system design criteria contained in 40 CFR 257.70(b) because the GM does meet the federal GM thickness standard. However, the secondary compacted soil layer exceeds federal standards.

For both composite liner systems, we assumed a head of 3 meters on the liner and assumed that both GMs were installed with a good contact quality (*e.g.*, $C_{qo} = 0.21$). For both liner systems, we also assumed circular GM defects with an average diameter of 5 mm. However, we assumed that the 30 mil HDPE GM is more prone to manufacturing and installation defects than the 60 mil GM because of the differences in thickness. For the 60 mil HDPE GM, we assumed 5 defects per hectare, and for the 30 mil HDPE GM, we assumed 15 defects per hectare. The defect density for both liners is within the range cited in Touze-Foltz *et al*. (1999).

Flux was estimated using Equation 5 for both composite-lined systems (Tables 3.4). The calculated flux for the composite-lined system with a 60 mil HDPE GM and a 1×10^{-7} cm/s hydraulic conductivity secondary soil layer, which meets the federal liner system design criteria, is 26 lphd. The calculated flux for the composite-lined system with a 30 mil HDPE GM and a 1×10^{-8} cm/s hydraulic conductivity secondary soil layer, which does not meet the federal liner system design criteria, is 14 lphd.

Table 3.4 Estimated Hydraulic Flux Through Two Composite Liner Systems

Composite Liner Description	Hydraulic Flux (liters/hectare-day)
60 mil HDPE GM with a 1×10^{-7} cm/s hydraulic conductivity secondary soil layer	26
30 mil HDPE GM with a 1×10^{-8} cm/s hydraulic conductivity secondary soil layer	14

The estimated time of travel for fluids to migrate through the two composite-lined systems was calculated using Darcy's Law (Eqn. 3) and the simplified transit equation presented in Equation 14. For these calculations, a porosity of 40% was assumed. For the composite-lined system with a 60 mil HDPE GM and 1×10^{-7} cm/s hydraulic conductivity secondary layer, the calculated seepage velocity of fluids migrating through the secondary 2-foot compacted soil liner is 1.5 ft/year. At this velocity, water would penetrate the secondary soil layer in 1.3 years. For the composite-lined system with a 30 mil HDPE GM and 1×10^{-8} cm/s hydraulic conductivity secondary layer, the calculated seepage velocity of fluids migrating through the secondary 2-foot compacted soil liner is 0.15 ft/year. At this velocity, water would penetrate the secondary soil layer in 13.3 years.

Overall, based on an evaluation of hydraulic flux and travel time in this example, performance of the alternate composite liner that does not meet current federal liner design criteria exceeded performance of the composite liner that does meet federal liner design criteria.

4 Data Requirements for Demonstrating Sustainability of Natural Clay Liners

In preceding sections, we demonstrated that an alternative liner system, including natural clay liners, can perform equivalently to, or better than, composite-lined systems. However, while a composite liner system can be installed with continuous oversight and a thorough construction quality assurance (CQA) program in order to reduce potential for defects, the only way to demonstrate that a natural clay liner will meet performance expectations is through a strong data collection and field investigation program. This section describes the types of data that may be used to demonstrate the suitability of a natural clay liner. Two types of data and analyses relating to the characterization of the clay geology and groundwater quality are presented in this section and can help inform evaluations of whether a natural clay liner system will meet performance expectations that are comparable to a composite liner.

4.1 Characterization of the Clay Geologic Environment

The effectiveness of a natural clay liner system depends on several factors, the most important of which are the permeability of the clay material and quality of the clay layer. Clay has unique chemical and electrostatic properties that influence its permeability and make it an effective liner material. However, natural clays are sometimes heterogeneous and may contain sand or gravel strata, organic matter, lenses of gypsum, limestone or other transmissive material, and cracks. Discontinuities such as these when present in a natural clay liner create preferential pathways for fluid migration and may lead to increased water fluxes or shorter travel time from the overlying disposal facility into the underlying groundwater. Thus, a thorough characterization of the clay geologic environment is necessary to ensure that a natural clay liner can reasonably meet or exceed the performance expectations that are comparable to a composite liner.

Soil borings should be drilled across the site to characterize the natural clay layer. Soil borings can be used to determine the specific thickness and variability of the natural clay layer across the site. The presence of lithologic materials such as sand or gravel strata, organic matter, lenses of gypsum, limestone, or other transmissive materials that may provide a preferential pathway between an impoundment and the underlying groundwater can also be determined with soil borings. In some cases, it may be appropriate to dig test pits and trenches to further identify and investigate the prevalence of features that may decrease the effectiveness of a natural clay liner. While the amount of data required varies depending on the size of the surface impoundment and how well characterized the regional environment is, sufficient borings and subsurface investigations should be performed based on site-specific conditions in order to make an informed decision regarding whether the natural clay liner can meet or exceed performance expectations that are comparable to a composite liner.

In-situ and/or laboratory tests should also be performed on clay samples from various depths to determine whether a natural clay liner will meet or exceed performance specifications that are comparable to a composite liner. Typically, this is performed by analyzing the permeability and hydraulic conductivity of the clay materials. Grain size analyses and Atterberg tests can also be useful in evaluating clay performance and locating potential heterogeneities. A significant change in Atterberg limits usually reflects a change in important engineering properties, such as the relationship among moisture content,

density, and permeability (US EPA, 1986), which can indicate a difference in lithological conditions and/or the presence of a preferential flow pathway in the natural clay.

4.2 Characterization of Groundwater Quality

In addition to characterizing the geologic environment of the natural clay liner, it is also important to characterize groundwater quality underlying the natural clay liner. Detection monitoring performed to determine indications of a release to groundwater is a long-term program that must be continued as long as a release is considered a potential risk. By monitoring groundwater, leaks through a natural clay liner may be identified, even if specific pathways for the leakage in the natural clay have not been determined. In order to evaluate groundwater quality beneath and downgradient of a disposal facility, a network of groundwater monitoring locations must be developed and installed. While the number and location of monitoring wells will vary depending on site-specific circumstances, including the size of the impoundment and hydrogeological conditions, the monitoring network should include multiple wells located upgradient and downgradient of the facility.

The CCR Rule (US EPA, 2015) presented monitoring program requirements that are designed to identify if releases from a disposal facility impact groundwater. This program requires installation of a groundwater monitoring system that consists of a sufficient number of wells installed at appropriate locations and depths to yield groundwater samples from the uppermost aquifer. The collected samples must accurately represent the quality of background water, as well as the quality of groundwater at the boundary of the CCR unit. The CCR Rule specifically requires the analysis of groundwater for typical coal ash constituents (*i.e.*, Appendix III constituents). For natural clay-lined sites, statistically significant increases (SSIs) of any constituent on the Appendix III list above the site-specific background concentration may be an indication that a release has penetrated the natural clay liner.

Other geochemical analyses, including but not limited to stable isotope analyses, tritium age dating, and trilinear piper diagrams, may also be useful by comparing the groundwater geochemistry downgradient and upgradient of a facility with the geochemistry of the impounded water. These analyses provide an indication of whether there may be mixing of different water types and sources – a sign that the natural clay liner may be leaking.

Overall, at sites where disposal facilities are lined by natural clays, the collection of site-specific data, including a characterization of both the natural clay geology and groundwater quality, is essential to determine whether a natural clay liner system can meet performance expectations that are comparable to a composite liner. These analyses that include field and laboratory methods are recognized and generally accepted good engineering practices consistent with CCR Rule requirements.

5 Conclusions

In August 2018, the United States Court of Appeals for the District of Columbia vacated portions of the CCR Rule related to the liner criteria. The Court decision was based on information contained in US EPA's 2014 Human and Ecological Risk Assessment of Coal Combustion Residuals (US EPA, 2014), which indicated that clay-lined impoundments were more likely to leak than composite-lined impoundments. As a result, only composite-lined systems, as described in 40 CFR 257.70(b), meet minimum federal liner standards. Consequently, some impoundments that were formerly considered lined do not meet federal standards and are subject to closure requirements.

This study presents a methodology demonstrating how liner performance can be evaluated based on both hydraulic flux through the liner and travel times. The method used for estimating leakage rate and time from clay liners is a widely accepted method that was referenced by US EPA in the CCR Rule, and the methods presented for estimating leakage through composite liners are widely known and used by practitioners. These methods are recognized and generally accepted good engineering practices consistent with requirements under the CCR Rule.

Additionally, in this report, we applied the methodology to compare the performance of a composite liner and several alternate liners that do not meet current federal liner design criteria. We used typical ranges of values for parameters that control leakage and evaluated performance through each liner system. Results of our analysis indicate that certain alternative liner systems, such as natural clay liners and alternate composite liners, perform comparable to, or better than, composite-lined systems that meet current federal liner design criteria.

With the comparative methodology presented in this report, a QPE would be able to certify a demonstration for an alternative liner system that:

- Defines the alternative liner system for which comparative performance requirements would be applied;
- Characterizes the alternative liner system by evaluating regional geology through available literature, site-specific characteristics, and subsurface investigations and field and laboratory testing;
- Calculates and compares the water flux between the defined alternative liner system and a composite liner system that meets current federal liner design criteria; and
- Calculates and compares the travel time between the defined alternative liner system and a composite liner system that meets current federal liner design criteria.

A QPE would be able to determine, on a site-specific basis, if the alternative liner system does not pose a reasonable probability of adverse effects to health or the environment if the comparative analysis demonstrates that the alternative liner system has comparable calculated water flux and travel times to a composite liner system that meets current federal liner design criteria.

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