

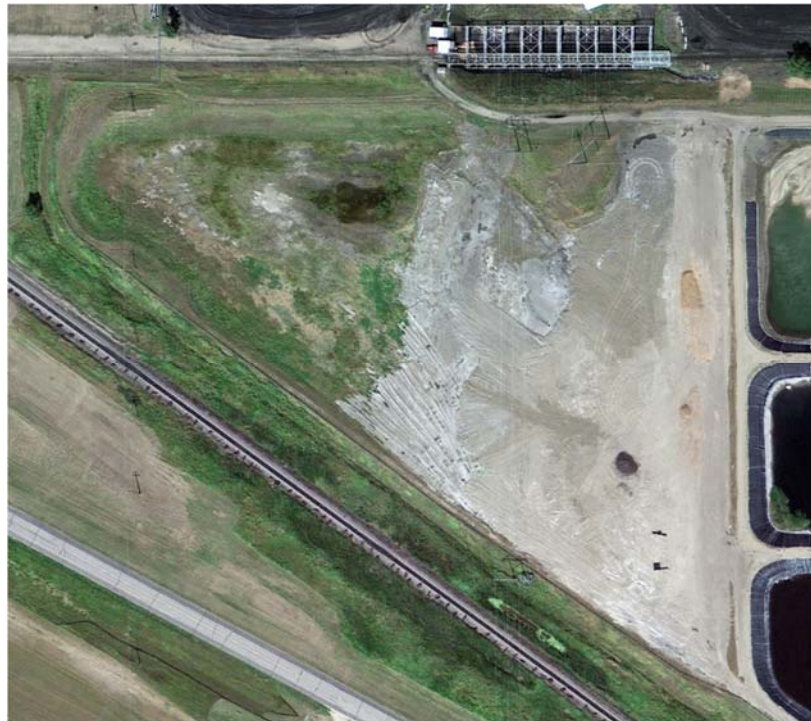


ANNUAL REPORT

ANNUAL INSPECTION REPORT

GREAT RIVER ENERGY – STANTON STATION

Bottom Ash Landfill



Submitted to: Great River Energy
Stanton Station
4001 Highway 200A
Stanton, North Dakota 58571

Submitted by: Golder Associates Inc.
44 Union Blvd.
Suite 300
Lakewood, Colorado 80228

January 2017

1649580



Table of Contents

1.0	INTRODUCTION.....	1
2.0	REVIEW OF EXISTING INFORMATION.....	2
2.1	Geological Conditions	2
2.2	Site History and Subgrade	2
2.3	Site Geometry	2
2.4	Changes in Geometry	3
2.5	Existing CCR Volume.....	3
2.6	Permits	3
2.7	Summary of 2016 Weekly Inspections.....	3
2.8	Summary of Previous Inspections.....	3
3.0	2016 ANNUAL INSPECTION.....	4
3.1	In-Place CCRs.....	4
3.2	Interior Slopes	4
3.3	Crest.....	4
3.4	Exterior Slopes	4
3.5	Toe	5
3.6	Signs of Structural Weakness or Other Observations that Could Affect Stability	5
4.0	SUMMARY AND CONCLUSIONS.....	6
5.0	REFERENCES.....	7

List of Figures

Figure 1	Stanton Station Site Overview
Figure 2	Bottom Ash Landfill Overview

List of Appendices

Appendix A	Selected Construction Drawings and Permit Drawings
Appendix B	Visual Observations Checklist
Appendix C	Photographs

1.0 INTRODUCTION

As part of 40 CFR Part 257 of the Subtitle D solid waste provisions under the Resource Conservation and Recovery Act (RCRA), utilities are required to complete annual inspections for surface impoundments and landfills containing Coal Combustion Residuals (CCR). This report has been prepared by Golder Associates Inc. (Golder) for Great River Energy (GRE) to satisfy the annual inspection requirements for CCR landfills under Part 257.84.

Stanton Station is located in Mercer County, approximately three miles south of Stanton, North Dakota (Figure 1). There are two facilities located at Stanton Station that fall under the CCR rule requirements. These facilities include the Bottom Ash CCR Landfill (Bottom Ash Landfill) and the Bottom Ash CCR Surface Impoundment (Bottom Ash Impoundment) which is currently used to dewater bottom ash. This report presents a review of available facility information and findings of the inspection of the Bottom Ash Landfill performed October 24, 2016.

2.0 REVIEW OF EXISTING INFORMATION

2.1 Geological Conditions

Stanton Station is located in the Missouri Slope district of the glaciated Missouri Plateau of the Great Plains physiographic province (NDDH 2005). The Bottom Ash Landfill is constructed in Missouri River alluvial deposits. The alluvial deposits have two distinct subunits: upper and lower. The upper subunit consists of a silty sand and clay and the lower subunit is an outwash sand and gravel (Barr 2010).

2.2 Site History and Subgrade

Stanton Station is located in Sections 16 and 21, Township 144N and Range 84W of Mercer County, three miles south of Stanton, North Dakota (see Figure 1). The Bottom Ash Landfill (see Figure 2) is located adjacent to the Bottom Ash Impoundment south of the plant. The north and south cells of the Bottom Ash Surface Impoundment are active cells used for dewatering bottom ash and the center cell functions as a retention cell. Bottom ash is placed into one of the active cells until the cell reaches capacity. Once capacity is reached in one of the active cells, bottom ash in the dewatered active cell is excavated and hauled to the Bottom Ash Landfill for containment. Bottom ash has historically been placed in the eastern half of the Bottom Ash Landfill (see Figure 2).

Stanton Station originally burned North Dakota lignite before being converted in November 2004 to use fuel from the Powder River Basin in Wyoming. All ash was originally wet sluiced into a series of ash ponds (Ponds A, B, and C) (Stone & Webster 1994b). In the mid-1990s, Stanton Station converted to a dry fly ash handling system, and the historic CCR management units were reconfigured.

CCRs from the 1970s ash disposal area and Pond A were excavated and hauled to Pond B and C for disposal. Ponds B and C were further consolidated and closed. Pond A was reconfigured to include a composite-lined surface impoundment with three cells on the east side and the Bottom Ash Landfill on the west side. Prior to the placement of bottom ash, the Bottom Ash Landfill was re-graded to promote drainage of contact water to the east side, and soil and/or ash fill was placed over the active placement area to bring the floor above groundwater. The historic Pond A perimeter soil berms were used as the perimeter berms for the Bottom Ash Landfill. Additional information regarding the design of the Bottom Ash Impoundment and Bottom Ash Landfill is included in the original design report (Stone & Webster 1994a). Selected construction and permit drawings are included in Appendix A.

2.3 Site Geometry

The perimeter berms surrounding the Bottom Ash Landfill on the north, west, and south sides consist of the historic Pond A soil embankments and have top elevations of approximately 1708 feet. The east berm is a shared berm with the Bottom Ash Impoundment and was constructed out of embankment fill in 1994 and 1995 to a top elevation of approximately 1720 feet. The crest of the east berm is a gravel surfaced roadway that supports both light passenger vehicles and some heavy construction equipment. The

original bottom elevation of the Bottom Ash Landfill varies between approximately 1698 and 1701 feet based on as-built survey (see Appendix A). The interior and exterior slopes of perimeter berms are 3:1. Current top of waste elevations range between approximately 1700 and 1715 feet based on survey performed in 2014. Contact water generally flows west to a low area on the west side of the Bottom Ash Landfill.

2.4 Changes in Geometry

No significant recent changes to geometry were noted other than the periodic placement of bottom ash to the design grades.

2.5 Existing CCR Volume

Stanton Station produces approximately 10,600 cubic yards (CY) of bottom ash and economizer ash (herein referred to as bottom ash) per year that is sluiced to the Bottom Ash Impoundment. This bottom ash is periodically excavated and hauled to the Bottom Ash Landfill. Bottom ash was last placed in the Bottom Ash Landfill in 2014 prior to a survey. Using the 2014 survey information and the original design grades (Stone & Webster 1994b), the current volume of bottom ash contained in the Bottom Ash Landfill at the time of the inspection was approximately 150,000 CY.

2.6 Permits

The Bottom Ash Landfill is currently permitted with the North Dakota Department of Health (NDDH) under Permit Number 0043. The most recent permit renewal was submitted in February 2015 (GRE 2015).

2.7 Summary of 2016 Weekly Inspections

GRE performed weekly inspections of the Bottom Ash Landfill throughout 2016. Based on a review of the available inspection forms, the following items were noted:

- Generally good site maintenance.
- No signs of significant seepage, settlement, or cracking of the exterior slopes.
- Minor animal burrows were noted on exterior embankments.

2.8 Summary of Previous Inspections

A previous inspection of the Bottom Ash Landfill was performed by Golder in April of 2015 (Golder 2016) and a summary of the observations of that inspection are as follows:

- Generally good vegetation and site maintenance.
- Animal burrows were noted on exterior embankments.
- Stormwater and/or contact water control features to control run-on and runoff were not well-established.
- Isolated and minor woody vegetation was growing on downstream slopes and near the toe of slopes.

3.0 2016 ANNUAL INSPECTION

On October 24, 2016, Ryan Shedivy of Golder performed an inspection of the Bottom Ash Landfill per United States Environmental Protection Agency (USEPA) Regulation 40 CFR Part 257.84(b) requirements. The inspection consisted of visual observations while walking around the crest of the facility combined with traversing up and down exterior and interior slopes. An annual inspection checklist used during the inspection is presented in Appendix B. Photographs were taken and are presented in Appendix C. The following presents a summary of the observations made during the 2016 annual inspection.

3.1 In-Place CCRs

The Operations Plan and design documentation call for bottom ash to be placed at 15% final slopes directing contact water to the edge of active placement. Collected contact water is to be evaporated, used for dust suppression, or pumped to the Bottom Ash Impoundment as required. The observed CCR placement slopes appeared to be within the design CCR grades, and contact water was generally directed to the low area on the west end of the landfill. The contact water control berm/channel along the south side of the facility where active placement is occurring was not well-defined during the inspection. A perimeter berm/channel should be built to direct contact water to the west side of the facility and clean stormwater off of the facility footprint and into perimeter stormwater drainage ditches. The majority of in-place CCRs within the landfill appear to be in fair condition except near the southeast corner of the facility where there are several erosion rills.

3.2 Interior Slopes

The interior slopes appeared to match the design slopes of 3:1 with no observed section of significant slope movement. The west interior of the facility is vegetated with grass where bottom ash has not recently been placed. Contact water is directed toward the west side of the facility. The interior slopes of the landfill appear to be in good condition.

3.3 Crest

The east berm crest and part of the north berm crest of the Bottom Ash Landfill are surfaced with gravel at elevations between approximately 1715 feet and 1720 feet. These roads are primarily used for light vehicle traffic, but are exposed to heavy construction equipment when the Bottom Ash Impoundment is cleaned out. The west and south perimeter berm crests are vegetated with grass and are not surfaced for vehicle travel. Bottom Ash Landfill berm crests appeared to be in good condition.

3.4 Exterior Slopes

The exterior slopes on the north, west, and south sides are between approximately 5 feet and 10 feet high and have slopes of approximately 3:1. Slopes are well vegetated with grass, but do contain numerous, but mostly small, animal burrows. A larger (10-inch diameter) animal burrow was found on the southern

exterior slope. This burrow should be excavated and backfilled with compacted soil. A small tree was also observed on the exterior slope on the south side of the facility. This small tree along with any other woody vegetation should be removed from the landfill. The exterior slopes of the Bottom Ash Landfill appear to be in fair condition.

3.5 Toe

The toe of the west and south perimeter berms is in a surface water drainage ditch that has some marshy vegetation and minor amounts of standing water. Some small animal burrows were noted near the toe of the slope, but there were no observed indications of seepage, settlement, or excessive vegetation at the toe of these slopes.

3.6 Signs of Structural Weakness or Other Observations that Could Affect Stability

No signs of structural weakness or other observations that could affect the stability of the Bottom Ash Landfill were observed during the site inspection in October, 2016.

4.0 SUMMARY AND CONCLUSIONS

An annual inspection was performed for the Bottom Ash Landfill at Stanton Station on October 24, 2016. The inspection met the requirements for CCR landfills under 40 CFR Part 257.84. Golder observed good vegetation and site maintenance and did not identify significant deficiencies such as seepage, excessive erosion or settlement, or cracking during visual observations.

In addition to annual inspections by the Professional Engineer, trained and qualified site personnel are performing the required weekly facility inspections to look for signs of potential structural weaknesses.

Minor maintenance items that may need to be continually addressed include repairing large animal burrows as they appear, repairing stormwater and/or contact water control features to control run-on and runoff, monitoring vegetative success of exterior slopes, and removal of any woody vegetation growing on the exterior slopes.

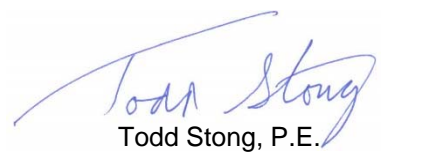
GOLDER ASSOCIATES INC.



Ryan Shedivy, P.E.
Project Engineer



Craig Schuettpelz, P.E.
Senior Project Engineer

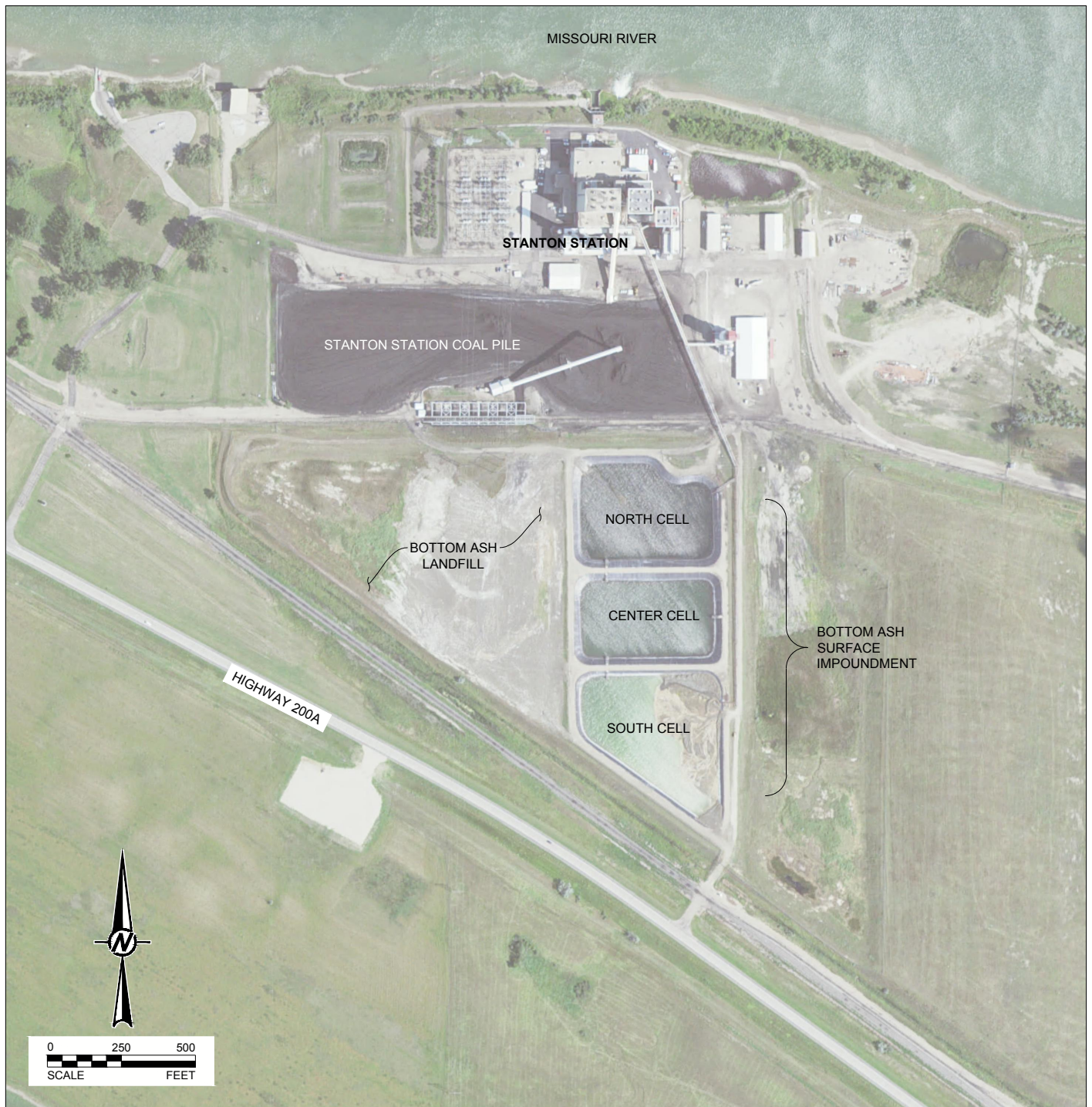


Todd Stong, P.E.
Associate/Senior Engineer

5.0 REFERENCES

- Barr, 2010. 2010 Annual Groundwater Monitoring Report, Stanton Station Ash Disposal Facility, NDDH Solid Waste Permit # SP043. Prepared for Great River Energy, February 2011.
- Golder Associates Inc. Golder 2016. Annual Inspection Report – Great River Energy – Stanton Station – Bottom Ash Surface Impoundment. January 2016.
- Great River Energy – Coal Creek Station. GRE 2015. Permit Renewal Document, Permit No. SP-043. Original Permit Renewal dated February 2, 2015.
- North Dakota Department of Health, 2005. Permit for a Solid Waste Management Facility, North Dakota Department of Health – Division of Waste Management Permit No. SP-043. March 17, 2005.
- Stone & Webster, 1994a. *Design Report Stanton Station Ash Pond Modifications*. Prepared for United Power Association, Project No. 4177. April 25, 1994.
- Stone & Webster, 1994b. *Stanton Station Ash Pond Modifications, Project No. 4177 Design Drawings Rev. 2*. Prepared for United Power Association, June 1994.

FIGURES



REFERENCES

1. AERIAL IMAGE FROM UNITED STATES DEPARTMENT OF AGRICULTURE NATIONAL AERIAL IMAGERY PROGRAM, PUBLISHED SEPTEMBER 9, 2016.

CLIENT
GREAT RIVER ENERGY
STANTON STATION
STANTON, NORTH DAKOTA

CONSULTANT



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PREPARED RFS

REVIEWED CCS

APPROVED TJS

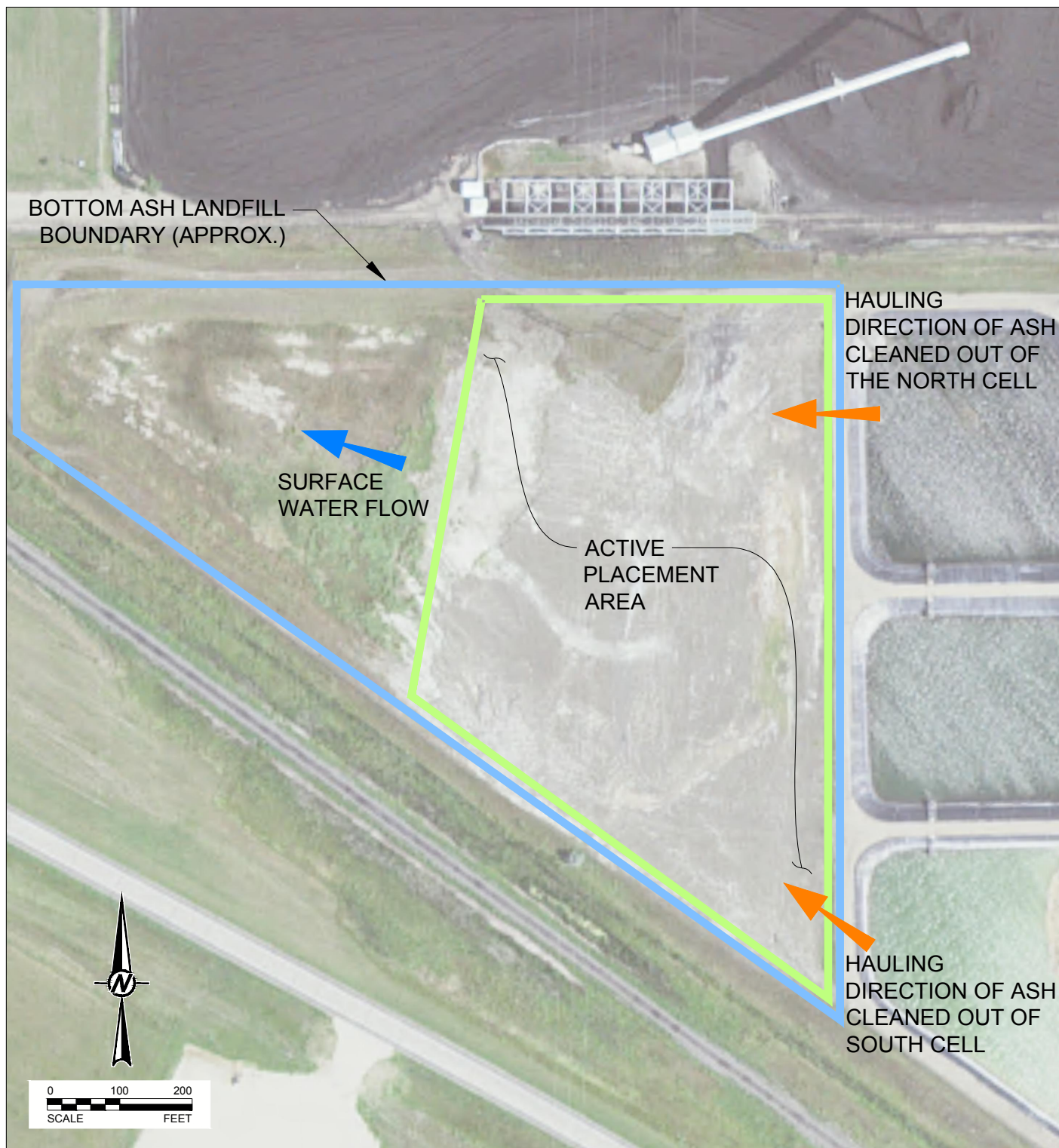
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2016 ANNUAL INSPECTION REPORT

TITLE
STANTON STATION SITE OVERVIEW

PROJECT NO.
1649580

REV.
B

FIGURE
1



REFERENCES

1. AERIAL IMAGE FROM UNITED STATES DEPARTMENT OF AGRICULTURE NATIONAL AERIAL IMAGERY PROGRAM, PUBLISHED SEPTEMBER 9, 2016.

CLIENT
**GREAT RIVER ENERGY
 STANTON STATION
 STANTON, NORTH DAKOTA**

CONSULTANT



YYYY-MM-DD 2017-01-13

DESIGNED RFS

PREPARED RFS

REVIEWED CCS

APPROVED TJS

PROJECT
2016 ANNUAL INSPECTION REPORT

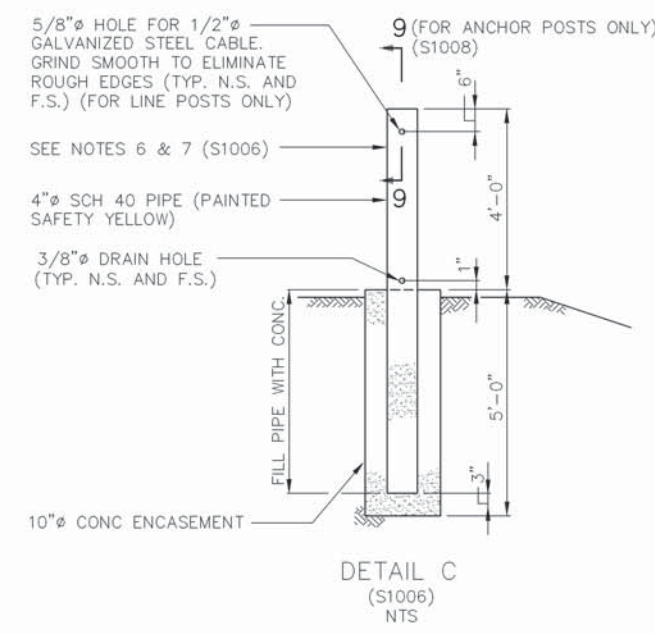
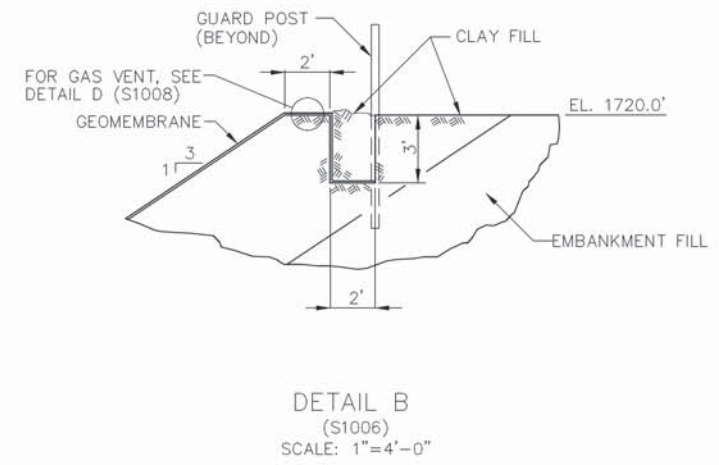
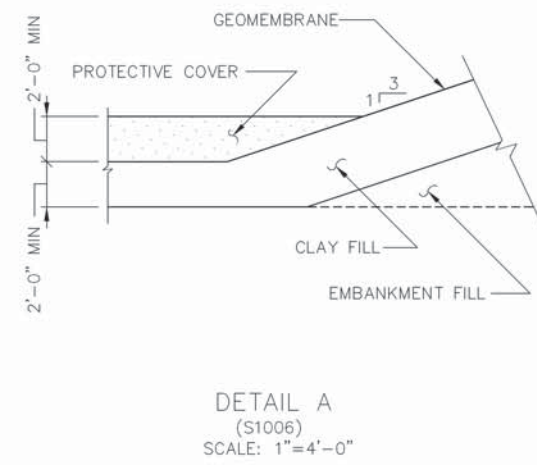
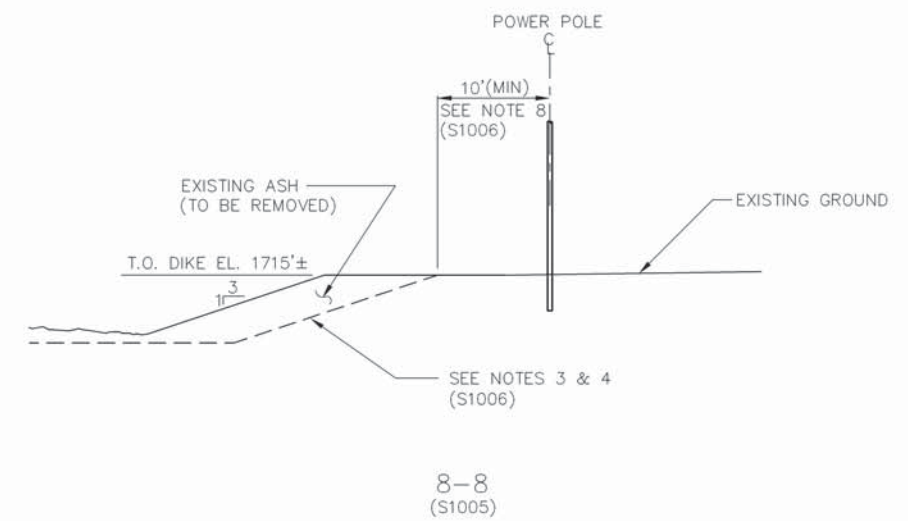
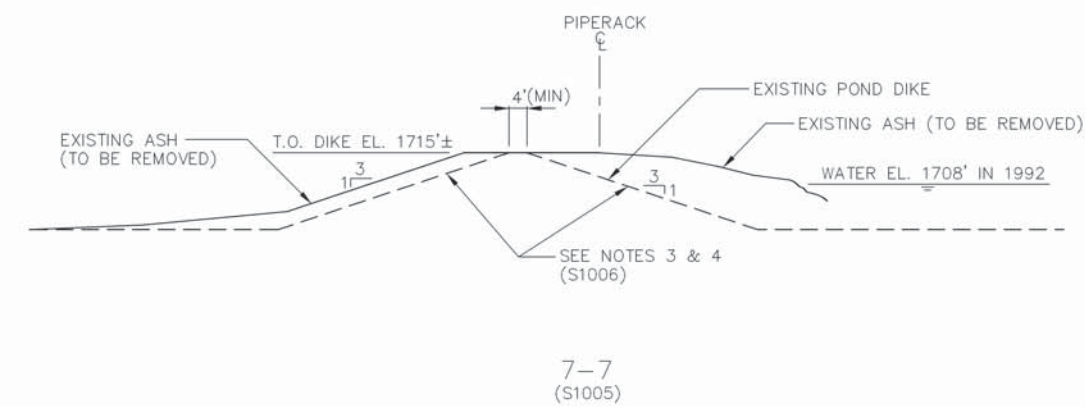
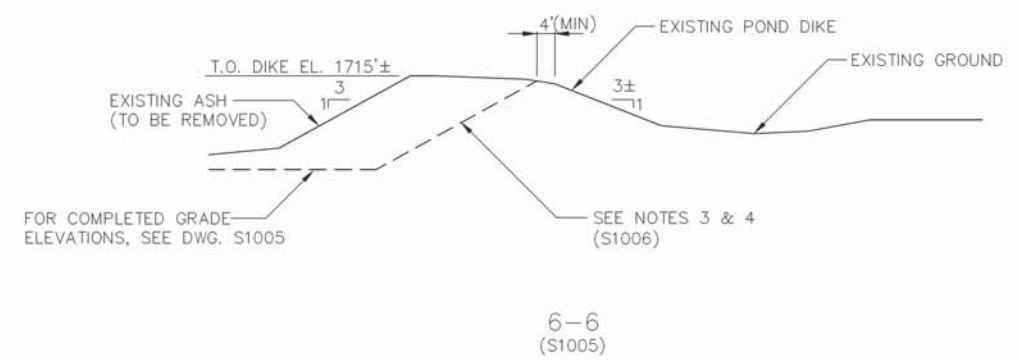
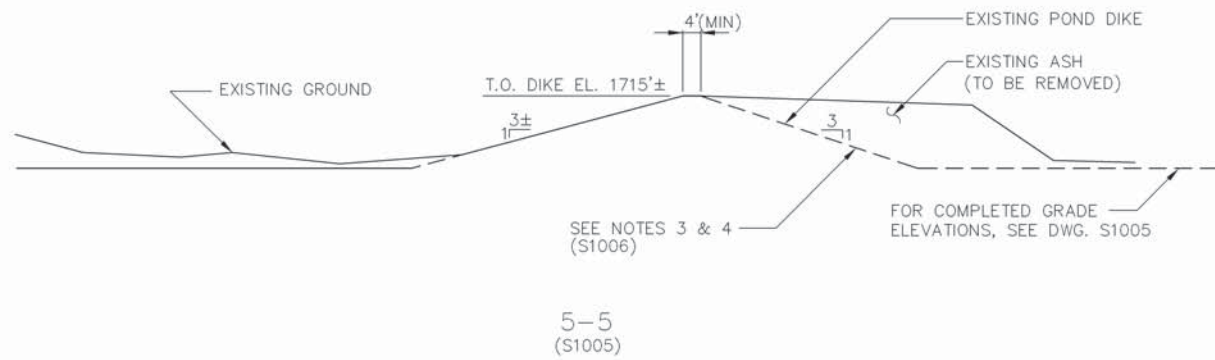
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BOTTOM ASH LANDFILL OVERVIEW

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FIGURE
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APPENDIX A
SELECTED CONSTRUCTION DRAWINGS AND
PERMIT DRAWINGS

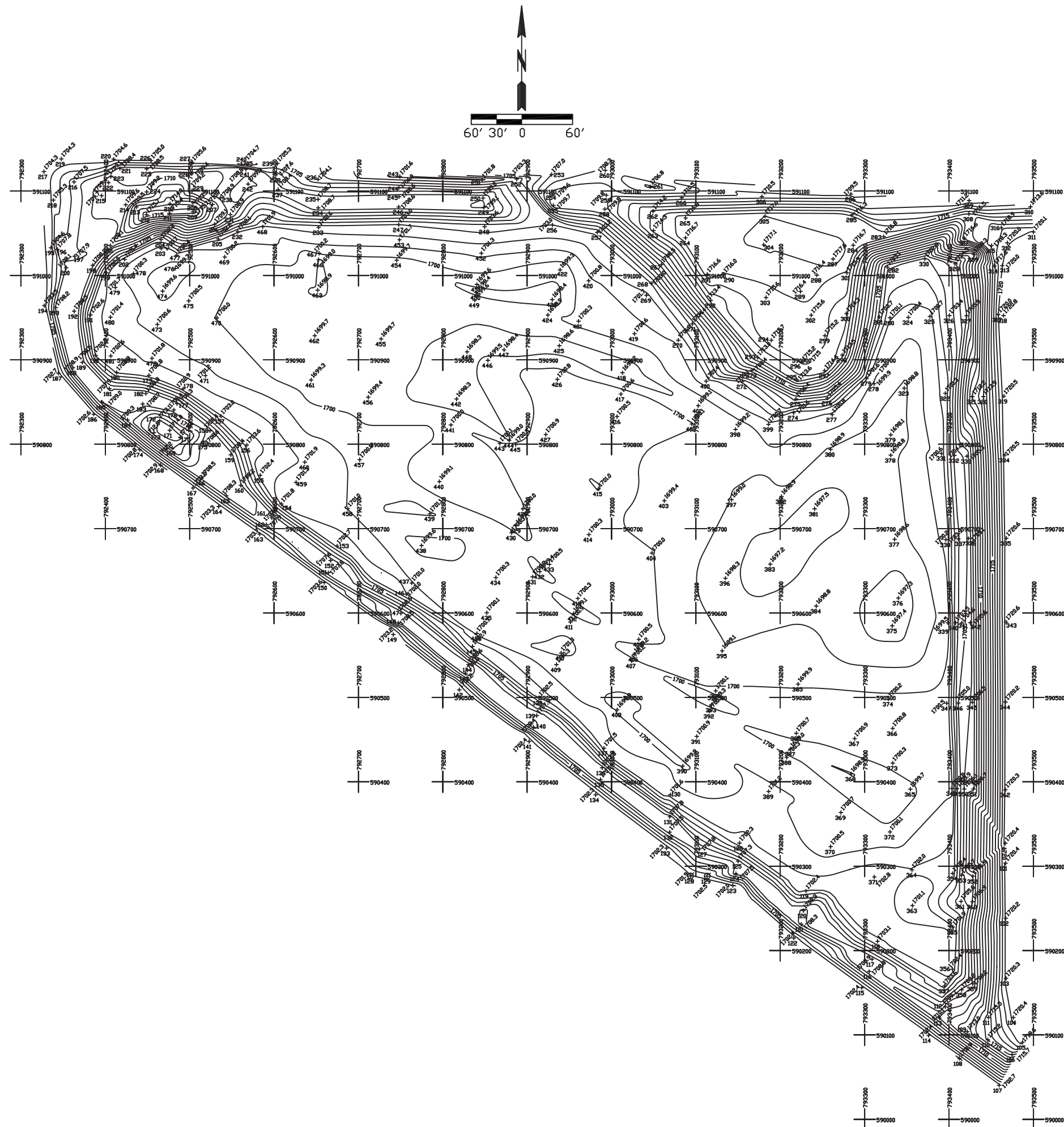


- NOTES:
- SCALE: 1" = 20' UNLESS NOTED.
 - SEE GENERAL NOTES, DRAWING S1002.
 - FOR ADDITIONAL NOTES, SEE DRAWING S1006.

- REFERENCE DRAWINGS:
- S1002 FACILITIES SITE PLAN
 - S1005 POND A CONVERSION PLAN
 - S1006 POND A SECTIONS & DETAILS - SH. 1
 - S1008 POND A SECTIONS & DETAILS - SH. 3

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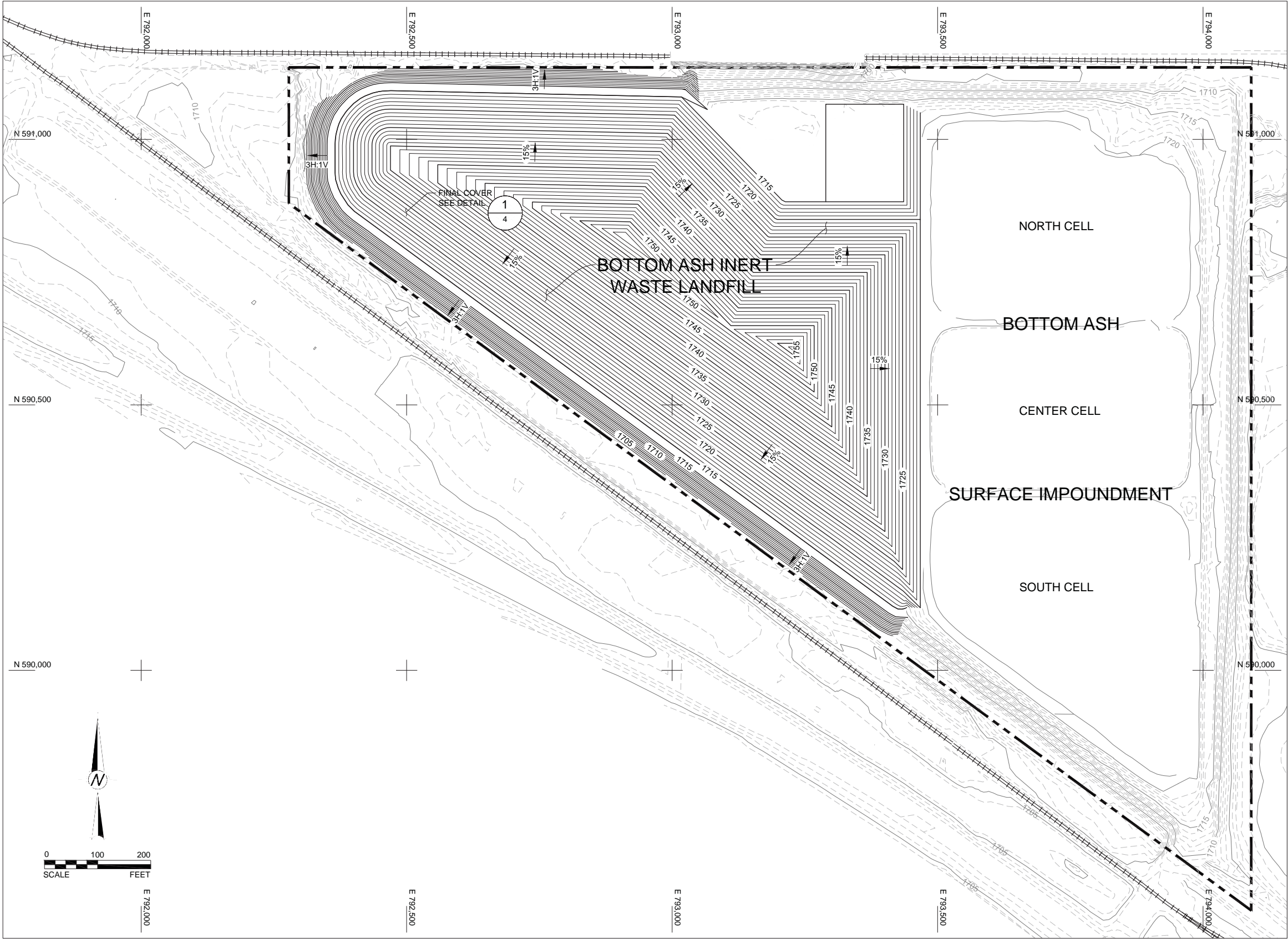
UPA PROJECT	UNITED POWER ASSOCIATION STANTON STATION ASH POND MODIFICATIONS	DRAWING NO.	REV
4177		S1007	1
POND A SECTIONS & DETAILS - SH. 2			
STONE & WEBSTER ENGINEERING CORPORATION DENVER, CO.			



AS CONSTRUCTED POND A

DATE: 1997.10.27			
REV. DATE DESCRIPTION BY			
UPA ASH POND MODIFICATIONS STANTON, NORTH DAKOTA			
AS BUILT TOPO OF POND A			
ULTEIG ENGINEERS, INC.		CONSULTING ENGINEERS FARGO • BISMARCK • MINNEAPOLIS	
DRAWN BY: A.W.E.		SCALE: AS SHOWN	
CHECKED BY:		DATE: 13 NOV. 1997	
APPROVED BY:		PROJECT NO. 97866	
		SHEET 1 of 1	

FIELD SURVEYED 27 OCT. 1997



LEGEND

- EXISTING GROUND TOPOGRAPHY (SEE REFERENCE 2)
- DESIGN TOP OF FINAL COVER GRADES
- EXISTING FACILITY BOUNDARY (SEE NOTE 1)
- RAIL LINES

NOTES

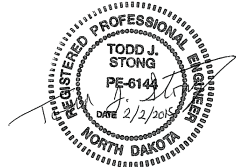
1. THE PROPOSED FACILITY BOUNDARY IS APPROXIMATE.
2. FINAL TOP OF COVER GRADES WILL NOT EXCEED 15 PERCENT PER NDAC RULES.

REFERENCES

1. SITE LOCATION: SECTIONS 16 AND 21, T144N, R84W, MERCER COUNTY, NORTH DAKOTA.
2. EXISTING GROUND TOPOGRAPHY IS A COMBINATION OF AN AERIAL SURVEY AND A GROUND SURVEY. THE GROUND SURVEY WAS PERFORMED BY INTERSTATE ENGINEERING ON OCTOBER 24 AND 27, 2014 BETWEEN THE RAIL LINES AND THE TOE OF THE EAST BERM OF THE BOTTOM ASH IMPOUNDMENTS. THE AERIAL SURVEY WAS FLOWN BY KBM, INC. ON APRIL 27, 2001 AND INCLUDES THE AREA OUTSIDE OF THE BOUNDARIES OF THE GROUND SURVEY.
3. COORDINATES ARE BASED ON THE PLANT GRID SYSTEM.
4. THE CONTOUR INTERVAL IS ONE FOOT.
5. THE BOTTOM ASH LANDFILL AND BOTTOM ASH SURFACE IMPOUNDMENT FACILITIES ARE CONTAINED WITHIN PROPERTY OWNED BY GREAT RIVER ENERGY.

B						
A						
Rev.	YYYY-MM-DD	DESCRIPTION	PREPARED	DESIGN	REVIEW	APPROVED

SEAL



CLIENT
GREAT RIVER ENERGY
STANTON STATION
STANTON, NORTH DAKOTA
CONSULTANT



GOLDER ASSOCIATES INC.
44 UNION BLVD, SUITE 300
LAKEWOOD, COLORADO
USA
[+1] (303) 980-0540
www.golder.com

PROJECT
BOTTOM ASH FACILITIES
SP-043 PERMIT RENEWAL

TITLE
TOP OF COVER - BOTTOM ASH INERT WASTE LANDFILL

PROJECT No. 140-8252
Rev. B
3 of 4
DRAWING 3

Path: \\denver.golder.com\golder\141408252\PRODUCTION\A Bottom Ash Facility Permit Renewal File Name: 1408252A003.dwg

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI D 11in

APPENDIX B
VISUAL OBSERVATIONS CHECKLIST

LANDFILL INSPECTION CHECKLIST

Facility Name: Bottom Ash Landfill

Owner and Address: Great River Energy – Stanton Station

Purpose of Facility: CCR Storage and Disposal

Legal: Section: 21

Township: 144N

Range: 84W

County: Mercer

Inspected By: Ryan Shedivy

Inspection Date: October 24, 2016

Weather: Partly Cloudy, 45°F Wind: 8 mph


ITEM	Y	N	N/A	REMARKS
1. General Conditions				
a. Alterations		X		
b. Grass cover	X			Exterior berms have grass cover
c. Settlement/misalignment/cracks		X		
2. Contact Water Controls				
a. Water level in contact water control area	X			Depth: <1 foot
b. Sump & pump in good condition			X	
c. Containment controls working		X		Repair contact water control berm along south side to control potential contact water runoff
d. Ponding water outside of contact water control area		X		
e. Erosion protection in contact water control area			X	
3. CCR slopes				
a. Significant Erosion		X		
b. Cracks/settlement		X		
c. Seepage		X		
4. Upstream slope				
a. Erosion – liner exposed		X		
b. Rodent burrows		X		
c. Vegetation	X			Grassy vegetation on western slopes and marshy vegetation in low areas on west side
d. Cracks/settlement		X		
5. Crest				
a. Soil condition	X			Gravel on east and eastern half of north crest, grass on south and west crest
b. Comparable to design width	X			
c. Vegetation	X			Grass on south and west crest
d. Rodent burrows		X		
e. Exposed to heavy traffic	X			Only on east side
f. Damage from vehicles/machinery		X		
6. Downstream slope				
a. Erosion	X			< 6-inch deep erosion rills on north slope to coal pit unloading sump area
b. Vegetation	X			Grass – well vegetated; Occasional woody vegetation evident on south and north slopes
c. Rodent burrows	X			4-10" diameter burrows on NW and S slopes
d. Cracks/settlement/scarps		X		
e. Seepage		X		
7. Toe				
a. Vegetation	X			Grass – small tree on south side
b. Rodent burrows	X			South side
c. Settlement		X		
d. Drainage conditions	X			Drainage ditches on west and south sides – good condition
e. Seepage		X		

General Remarks: Landfill is in good condition with no signs of significant issues. Large animal burrows should be repaired, remove woody vegetation, and maintain contact water controls as required.

Name of Engineer: Craig Schuettpehlz

Date: 10/24/16

Engineering Firm: Golder Associates Inc.

Signature: 



PROFESSIONAL ENGINEER SEAL

APPENDIX C
PHOTOGRAPHS



LEGEND

1

PHOTOGRAPH LOCATION

REFERENCES

1. AERIAL IMAGE FROM UNITED STATES DEPARTMENT OF AGRICULTURE NATIONAL AERIAL IMAGERY PROGRAM, PUBLISHED SEPTEMBER 9, 2016.

CLIENT

GREAT RIVER ENERGY
STANTON STATION
STANTON, NORTH DAKOTA

CONSULTANT



YYYY-MM-DD 2017-01-13

DESIGNED RFS

PREPARED RFS

REVIEWED CCS

APPROVED TJS

PROJECT

2016 ANNUAL INSPECTION REPORT

TITLE

**BOTTOM ASH LANDFILL
PHOTOGRAPH LOCATIONS**

PROJECT NO.
1649580

REV.
B

FIGURE
1

Bottom Ash Landfill



Photograph 1
East interior berm and crest (looking north) (P1030333.JPG)



Photograph 2
Panoramic of interior from northeast corner (1 of 3) (P1030338.JPG)

Bottom Ash Landfill



Photograph 3
Panoramic of interior from northeast corner (2 of 3) (P1030339.JPG)



Photograph 4
Panoramic of interior from northeast corner (3 of 3) (P1030340.JPG)

Bottom Ash Landfill



Photograph 5
Grass vegetation on north exterior embankment berm (looking west from northeast corner of landfill)
(P1030341.JPG)



Photograph 6
Erosion rills and woody vegetation on north exterior embankment (P1030345.JPG)

Bottom Ash Landfill



Photograph 7
Erosion rills on north exterior embankment near coal unloading area (looking west) (P1030346.JPG)



Photograph 8
Grass vegetation on north exterior embankment (looking west) (P1030356.JPG)

Bottom Ash Landfill



Photograph 9
Animal burrow on north exterior embankment (P1030358.JPG)



Photograph 10
Panoramic of interior from northwest corner (1 of 3) (P1030359.JPG)

Bottom Ash Landfill



Photograph 11
Panoramic of interior from northwest corner (2 of 3) (P1030360.JPG)



Photograph 12
Panoramic of interior from northwest corner (3 of 3) (P1030361.JPG)

Bottom Ash Landfill



Photograph 13
Interior west side of landfill (looking north) (P1030364.JPG)



Photograph 14
Grass vegetation on south interior embankment (looking east) (P1030365.JPG)

Bottom Ash Landfill



Photograph 15

Erosion of placed bottom ash in the southeast corner and lack of well-defined contact water channel/berm (looking northwest) (P1030370.JPG)



Photograph 16

Erosion of placed bottom ash in the southeast corner (looking north) (P1030371.JPG)

Bottom Ash Landfill



Photograph 17
Bottom ash placement area (looking southwest) (P1030374.JPG)



Photograph 18
Grass vegetation of south exterior embankment (looking west) (P1030388.JPG)

Bottom Ash Landfill



Photograph 19
Small tree near the toe of the south exterior embankment (P1030389.JPG)



Photograph 20
Animal burrows on south exterior embankment (P1030391.JPG)

Bottom Ash Landfill



Photograph 21
Grass vegetation of south exterior embankment and marshy vegetation in the adjacent drainage ditch
(looking southeast) (P1030393.JPG)