



REPORT

Closure and Post-Closure Plan, Revision 1

Bottom Ash Landfill - Stanton Station

Submitted to:

Great River Energy

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FIGURE

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1.0 INTRODUCTION

Great River Energy (GRE) owns and historically operated the Stanton Station site located near Stanton, North Dakota. GRE manages coal combustion residuals (CCR) in multiple facilities including the Bottom Ash CCR Landfill (Bottom Ash Landfill). The Bottom Ash Landfill is located adjacent to the Bottom Ash CCR Surface Impoundment (Bottom Ash Impoundment) south of the Missouri River and north of North Dakota Highway 200A (see Figure 1).

Golder Associates Inc. (Golder) has prepared this updated closure plan and post-closure plan for the Bottom Ash Landfill on behalf of GRE to serve as the written closure plan required under 40 CFR §257.102(b), and the written post-closure plan required under 40 CFR §257.104(d). This closure and post-closure plan supersedes the previous plan dated October 13, 2016. The facility will be closed with CCRs left in place in accordance with the requirements of 40 CFR §257.102(d). At the completion of closure activities in accordance with the closure plan, the post-closure care period will commence. Closure activities for CCR units at Stanton Station are planned to be completed in late 2019 or early 2020.

2.0 CLOSURE PLAN

2.1 Narrative Description of Facility Closure

The Bottom Ash Landfill primarily accepts de-watered bottom ash from the adjacent Bottom Ash Impoundment. Stanton Station ceased operation in early 2017 and subsequently ceased production of new bottom ash and economizer ash that were deposited in the Bottom Ash Impoundment and Bottom Ash Landfill. Between 2017 and 2019, remaining bottom ash and economizer ash from the plant and Bottom Ash Impoundment, as well as construction and demolition (C&D) material (non-hazardous and non-asbestos materials) resulting from the demolition of the plant facilities have been placed in the facility (as approved through the state permit program).

After receipt of any remaining permitted wastes, the Bottom Ash Landfill will undergo final closure. As necessary, the final grades for the Bottom Ash Landfill will be adjusted to accommodate the actual amount of permitted materials required to be contained as part of plant demolition activities. After regrading is completed, final cover will be constructed in accordance with the Closure Plan in effect at the time of closure, including installing required surface water controls and establishing vegetation.

2.1.1 Final Cover System Installation

The final cover system will be constructed using conventional soil placement techniques and common earthmoving equipment, such as bulldozers, haul trucks, scrapers, motor graders, and/or compactors. Soils that are suitable for use in the final cover system will be obtained from select on-site stockpiles and borrow sources. Disruption of the integrity of the final cover system will be inhibited by compacting the underlying CCRs to establish a firm and unyielding subgrade prior to installation of the final cover system and by establishing maximum slopes of 15% and minimum slopes of 3% to provide positive drainage off the facility, limit ponding, and mitigate the potential effects of settling and subsidence. Final cover soil placement, moisture conditioning, compaction, and testing will be in accordance with the site closure construction specifications. A North Dakota Registered Professional Engineer or a person working under their direct supervision will observe the placement of the final cover. A report indicating that closure was in compliance with the Closure Plan and signed by a North Dakota-registered Professional Engineer will be prepared after the closure of the facility. The closure report will be placed into the operating record of the facility.

2.1.2 Surface Water Controls

The Bottom Ash Landfill will be closed with maximum 15% and minimum 3% slopes. The slopes will promote surface water run-off, aid in preventing surface water from ponding on the final cover, and allow for maintenance of the final cover (erosion repairs, mowing, etc.). Surface water run-off from the Bottom Ash Landfill will sheet flow into perimeter ditches that carry the stormwater away from the facility.

The design slopes are shallow enough to minimize erosion of the final cover soils without construction of terrace channels or armored down-chute channels. The combination of soil types, grasses and surface water controls have been selected to control long-term soil loss.

2.1.3 Vegetation

Vegetation enhances evapotranspiration and reduces erosion, thus playing an important part in surface water control. Vegetation activities will include preparing the soil surface, applying fertilizer if necessary, seeding, and mulching.

The seedbed should be roughened to a depth of 4 to 6 inches by scarifying, disking, harrowing, or equivalent methods. Rows should be spaced a minimum of 12 inches apart. Immediately prior to seeding in areas that have been heavily compacted by trucks or equipment, the topsoil surface should be ripped and scarified. All areas to be seeded should be dozer-tracked prior to seeding. The seedbed should not be prepared prior to completion of earthwork activities and no more than 2 weeks prior to planting.

Seed rates should be applied by broadcast or drilled methods, or by the hydraulic seeding method and are to be applied as directed in the closure construction specifications. If broadcast or drilled, seed should be buried by harrowing, chain dragging, or other scarification measures. Equipment and procedures should be appropriate for the seed as recommended by the seed supplier.

The soil cover will be seeded using the seed mixture provided in Table 1 below or a suitable approved alternative native species seed mix. All seed mixtures will be commercial grade and conform to the requirements of the United States Department of Agriculture (USDA) rules and regulations set forth in the Federal Seed Act.

Table 1: Final Cover Seed Mixture.

Species (Variety)	Application Rate (pounds PLS per acre)
Western Wheatgrass (Rosana or Rodan)	1.85
Tall wheatgrass (Alkar)	2.0
Slender wheatgrass (Revenue)	1.0
Green Needlegrass (Lodorm)	1.2
Sideoats Grama (Killdeer or Pierre)	1.3
Little Bluestem (Northern Variety)	0.9
Canada wildrye (Mandan)	2.0
Buffalograss (Tatanka or Bowie)	3.9

Species (Variety)	Application Rate (pounds PLS per acre)
Switchgrass (Dacotah or Forestburg)	0.65
Triticale (QuickGuard), sterile seed	10.0
TOTAL	24.8

Straw mulch should be applied immediately after seeding at a rate of 2 tons per acre. To prevent dispersal or removal of straw by wind, mulch should be anchored using a crimper run perpendicular to the prevailing wind direction. A disc should not be used for crimping. The mulch should be applied over the seed in a separate application. At least 50% of individual straws should be 6 inches or greater in length.

2.2 Final Cover System

The federal CCR rule requires the final cover system to meet the requirements of §257.102(d)(3) with a minimum 18-inch infiltration layer and 6-inch erosion layer. The permeability of the final cover system must be less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 1×10^{-5} cm/sec, whichever is less.

The liner system for the Bottom Ash Landfill consists of regraded native soil material. This material is predominantly a silty sand (SM) and laboratory hydraulic conductivity testing conducted on samples collected between 2011 and 2019 indicate a geometric mean hydraulic conductivity of 2.0×10^{-4} cm/sec.

The final cover for the bottom ash liner will consist of two components:

- A minimum 18-inch infiltration layer with a hydraulic conductivity no greater than 1×10^{-5} cm/sec; and
- A minimum 6-inch erosion layer that is capable of sustaining native plant growth.

2.3 Closure Estimates

The current volume of bottom ash contained in the Bottom Ash Landfill as of 2019 is estimated to be 150,000 cubic yards. An additional 13,000 cubic yards of bottom ash and/or C&D material is expected to be placed in the Bottom Ash Landfill during plant demolition activities, meaning the maximum inventory of CCR in the Bottom Ash Landfill will be approximately 163,000 cubic yards at closure. The current maximum area anticipated to receive final cover is approximately 10 acres.

2.4 Closure Schedule

Within 30 days after the last receipt of waste (either CCR or any non-CCR waste stream) permitted for disposal, the closure plan will be implemented. Notification of intent to close the facility will be placed in the operating record prior to the commencement of closure activities. The North Dakota Department of Environmental Quality (NDDEQ) will also be notified in accordance with the engineering design and operations plan for the facility.

Closure activities will be completed in accordance with the closure plan within 6 months after commencing closure activities, or as allowed through a closure extension demonstration in accordance with §257.102(f)(2)(i). Closure activities to be completed during this time include regrading of CCR materials and permitted non-CCR materials to final grades and installation of the final cover system. Following closure, preparation and submittal of as-built documents and certifications as required under §257.102(f)(3) will be completed.

Notification that closure of the Bottom Ash Landfill has been completed will be placed in the operating record within 30 days of the completion of closure activities. This notification will include certification by a qualified professional engineer that closure has been completed in accordance with the closure plan. Following closure of the Bottom Ash Landfill, GRE will record a notation on the deed to the property (or another instrument that is normally examined during title search) that will notify potential purchasers of the land that the land has been used as a CCR landfill and its use is restricted under post-closure care requirements. Within 30 days of recording the notation, notification will be placed in the operating record.

3.0 POST-CLOSURE PLAN

During the post-closure care period for the Bottom Ash Landfill, GRE will implement inspection, maintenance, and monitoring programs to maintain the integrity of the final cover system, maintain the groundwater monitoring system, and monitor groundwater in accordance with the requirements of §257.90 through §257.98. The post-closure care period will be 30 years in duration. If GRE is operating under assessment monitoring in accordance with §257.95 at the conclusion of the post-closure care period, GRE will continue to conduct post-closure care until it can return to detection monitoring in accordance with §257.95. Within 60 days following the completion of the post-closure care period, GRE will prepare a notification certified by a qualified professional engineer that post-closure care has been completed in accordance with the post-closure plan and will place the notification in the operating record.

3.1 Inspection

Regular inspections will be conducted during the post-closure care period to help ensure that the integrity of the Bottom Ash Landfill is maintained. The final cover system will be inspected for signs of settlement, subsidence, erosion, and other damage or deficiency. Surface components of groundwater monitoring wells will be inspected for damage.

During the first five years of the post-closure period as vegetation is becoming established, semi-annual inspections of the facility will be made, typically in the spring and fall. Once healthy vegetation is established (the remaining 25 years), inspections of the facility will be made annually, typically in the spring or fall, to facilitate inspection of the final cover vegetation. To maintain consistency in the inspection process, trained GRE employees or contract employees will conduct the inspections. Issues identified during the inspections will be reported to the person responsible for compliance with this post-closure plan as soon as practical.

3.2 Maintenance

GRE will oversee post-closure maintenance of the Bottom Ash Landfill, using appropriate internal resources and/or third-party personnel and equipment. Post-closure maintenance of the Bottom Ash Landfill will include making necessary repairs to the final cover system to maintain its integrity and effectiveness. Earthen fill will be placed as needed to correct the effects of settlement, subsidence, and erosion and to prevent run-on and run-off from eroding or otherwise damaging the final cover system. The final cover system will be reseeded in areas that have been repaired and where additional vegetation is needed to effectively limit erosion and promote transpiration of soil moisture. GRE will control noxious weeds and unwanted trees and shrubs from becoming established on the Bottom Ash Landfill.

3.3 Monitoring

During post-closure, groundwater monitoring will be conducted in accordance with the requirements of §257.90 through §257.98. Groundwater samples will be collected and analyzed in accordance with the sampling and analysis program for the Bottom Ash Landfill. Results of the analyses will be placed in the operating record.

3.4 Contact Information

The post-closure contact for the Bottom Ash Landfill will be:

Great River Energy
Coal Creek Station
2875 Third Street SW
Underwood, North Dakota 58576
(701) 442-3211

Great River Energy
12300 Elm Creek Boulevard
Maple Grove, Minnesota 55369
(763) 445-5000

3.5 Planned Property Usage

The closed Bottom Ash Landfill will be designated as open space during the post-closure period and will be controlled via earthworks grading features, fences/gates, and/or signage. No agricultural, recreational, public, or otherwise active uses are planned for the facility during the post-closure care period. There will be no grazing or feeding of farm or domestic animals at the Bottom Ash Landfill during the post-closure care period.

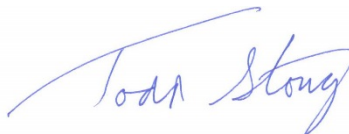
4.0 CERTIFICATION

The undersigned attest to the completeness and accuracy of this closure and post-closure plan, and certify that the plan meets the requirements of 40 CFR §257.102(b) and 40 CFR §257.104(d).

Golder Associates Inc.



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FIGURE





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