



# CLOSURE AND POST-CLOSURE PLAN

## CLOSURE AND POST-CLOSURE PLAN

Bottom Ash CCR Landfill  
Stanton Station  
Great River Energy

**Submitted To:** Great River Energy  
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Figure 1 Stanton Station CCR Facilities



## 1.0 INTRODUCTION

Great River Energy (GRE) owns and operates Stanton Station (SS) 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 south of the SS generating units (see Figure 1).

Golder Associates Inc. (Golder) has prepared this 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). The facility will be closed with CCRs left in place in accordance with the requirements of 40 CFR §257.102(d) (EPA 2015). At the completion of closure activities in accordance with the closure plan, the post-closure care period will commence.

## 2.0 CLOSURE PLAN

### 2.1 Narrative Description of Facility Closure

The Bottom Ash Landfill accepts de-watered bottom ash from the adjacent Bottom Ash CCR Surface Impoundment. The Bottom Ash Landfill has a re-compacted natural soil liner, with a footprint of approximately 10.5 acres. The Bottom Ash Landfill is contained by a perimeter embankment with 3H:1V exterior slopes. Final grades above the perimeter embankment will be constructed with maximum 15% slopes.

The Bottom Ash Landfill will be closed in phases as the facility is filled to final waste grades through construction of both temporary and final cover. The incremental closure allows placement of temporary and/or final cover on final outside slopes to aid in dust control, and to allow shedding of non-contact storm water from the facility. Installation of final cover will occur when a substantial portion of side-slope and/or cap area has reached final design grades. Future final cover will be installed in accordance with the Closure Plan in effect at the time of closure.

The primary closure activities include adjusting CCR grades if necessary, installing the final cover system with surface water controls, and establishing vegetation.

#### 2.1.1 Final Cover System Installation

The final cover system will be installed 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 a slope of approximately 15% across the top surface to provide positive drainage, 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 construction quality assurance plan. 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 15% 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 flat 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, 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 facility's Operations Plan (Stone & Webster 1994b). 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. A suitable native species seed mix and application rates shall be selected at the time of final cover placement.

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  $1 \times 10^{-5}$  cm/sec, whichever is less.

The bottom 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 a sample collected in 2011 had a hydraulic conductivity of  $3 \times 10^{-6}$  cm/sec (Golder 2011).

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  $3 \times 10^{-6}$  cm/sec; and
- A minimum 6-inch erosion layer that is capable of sustaining native plant growth.

## 2.3 Closure Estimates

### 2.3.1 Maximum Inventory of CCR

The maximum inventory of CCR in the Bottom Ash Landfill is approximately 427,000 cubic yards (Stone & Webster 1994b).

### 2.3.2 Largest Area Requiring Final Cover

Final cover may be placed in phases as necessary to aid in dust control, and to allow shedding of non-contact storm water from the facility when areas of the Bottom Ash Landfill reach final design grades. The current maximum area requiring final cover is approximately 10.5 acres (Stone & Webster 1994b).

## 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 Health (NDDH) will also be notified in accordance with the engineering design and operations plan for the facility.

Stanton Station is expected to cease generation in 2017. Once SS is no longer generating CCRs, the Bottom Ash Landfill will be filled with waste to reach design grades using CCRs or approved non-CCR materials, which is anticipated to occur in 2018. The duration of filling to reach final waste grades is subject to change depending upon plant operation and the use of the other CCR facilities at SS.

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, preparation of bid documents and solicitation of contractor's bids, installation of the final cover system, and preparation and submittal of as-built documents and certifications as required under §257.102(f)(3) and the engineering design and operations plan for the facility (Stone & Webster 1994a and Stone & Webster 1994b). An extension of the closure timeframe may be pursued in accordance with §257.102(f)(2)(i).

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.

Inspections will be conducted on an annual basis (typically between late spring and early fall) to facilitate inspection of the final cover vegetation. Inspection forms will be completed to document each inspection. Completed inspection forms will be maintained in the operating record. 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

Groundwater monitoring will be conducted during the post-closure care period 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:

Attention: Manager, Regulatory Services  
Great River Energy – Coal Creek Station  
2875 Third Street SW  
Underwood, North Dakota 58576  
Phone: (701) 442- 3211  
Email: Environmental@GREnergy.com

### 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 fence 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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TS/CS/rjg

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## 5.0 REFERENCES

EPA. 2015. Environmental Protection Agency, Code of Federal Regulations Title 40 Part 257: Hazardous and Solid Waste Management System; *Disposal of Coal Combustion Residuals from Electric Utilities*. April.

Golder. 2011. *Stability Evaluation of Bottom Ash Surface Impoundment Addendum*. December.

Stone & Webster. 1994a. Design Report – Stanton Station Ash Pond Modifications. Prepared by Stone & Webster Engineering Corporation. April.

Stone & Webster. 1994b. *Plan of Operations – Stanton Station – Bottom Ash Surface Impoundment and Bottom Ash Landfill*. June.

**FIGURE**





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