



CLOSURE AND POST-CLOSURE PLAN

CLOSURE AND POST-CLOSURE PLAN FOR GERALD GENTLEMAN STATION

Submitted To: Nebraska Public Power District
Gerald Gentleman Station
6089 South Highway 25
Sutherland, Nebraska 69165

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

Distribution: Electronic

September 22, 2016
Rev. 1 - November 3, 2016

Project No. 153662516





Table of Contents

1.0	CLOSURE PLAN	1
1.1	Closure Description	1
1.2	Final Cover System	1
1.2.1	Design	1
1.2.2	Methods and Procedures	1
1.3	Closure Estimates	2
1.3.1	Active Life Maximum CCR Inventory Estimates	2
1.3.2	CCR Area for Final Cover Estimates	2
1.4	Closure Schedule	2
2.0	POST-CLOSURE PLAN	4
2.1	Post-Closure Monitoring and Maintenance Activities	4
2.2	Contact Information	5
2.3	Planned Property Usage	5
3.0	CERTIFICATION.....	6
4.0	REFERENCES.....	7



1.0 CLOSURE PLAN

1.1 Closure Description

The ash landfill at Nebraska Public Power District's (NPPD's) Gerald Gentleman Station (GGS) will be closed in phases as ash placement progresses, through construction of both temporary and final cover. The phased design minimizes the active ash depositional footprint, provides surface water controls to manage ash contact water within composite-lined areas, and prevents surface water run-on into the deposition area. The current operational plan includes eight phases. New final cover placement is unlikely to occur before 2021. Future final cover will be installed in accordance with the Closure Plan in effect at the time of closure, conforming to the Environmental Protection Agency's (EPA's) Coal Combustion Residual (CCR) Rule, 40 Code of Federal Regulations (CFR) Part 257, promulgated April 17, 2015 and effective October 19, 2015. The following sections describe the closure design and procedures as required by CFR Part §257.102

1.2 Final Cover System

The ash landfill at GGS will be closed by leaving the CCR in place and will therefore be designed to meet the requirements of §257.102. A description of the final cover system, methods and procedures for final cover installation, and cover performance design is presented in the following sections.

1.2.1 Design

The CCR rule states that the final cover system must be designed and constructed such that the permeability of the final cover system is less than or equal to the permeability of the bottom liner system or no greater than 1×10^{-5} cm/sec, whichever is less. Historic liner design varies across the landfill, and future final cover will be placed in areas with bottom liners consisting of a geomembrane installed on a prepared subgrade or a geomembrane placed on a two-foot thick low permeability soil liner. In either case, final cover will be constructed according to the regulatory requirements present at the time of closure.

1.2.2 Methods and Procedures

Methods and procedures will be developed to ensure that the closure of the ash landfill meets the cover performance standards specified in the CCR rules. The following minimum requirements will be met to maintain in-place closure of CCR:

- Control, minimization, or elimination, to the maximum possible extent, post-closure infiltration of liquids into the waste and releases of CCR, leachate, or contaminated run-off to the ground, surface waters, or the atmosphere;
- Preclusion of the probability of future impoundment of water, sediment, or slurry;
- Inclusion of measures providing for major slope stability that prevents the sloughing or movement of the final cover system during the closure and post-closure care period;
- Minimization of the need for further maintenance of the unit;



- And completion in the shortest amount of time consistent with recognized and generally accepted good engineering practices.

The final cover system design, including cover grades and profile, will be re-evaluated prior to construction of final cover. The cover system will be engineered to meet the regulatory requirements effective at the time of placement. Final cover will be installed in accordance with a construction quality assurance (CQA) plan, which will be developed and submitted to the appropriate regulatory agencies for approval prior to commencing the work. The CQA plan will require monitoring of final cover construction to help ensure that the final cover system will meet the design intent and conforms to the performance standards of the CCR rules.

1.3 Closure Estimates

1.3.1 Active Life Maximum CCR Inventory Estimates

Based on topographical survey collected in 2009 and 2014, approximately 85,600 cy of fly ash are placed in the ash landfill annually. Comparison between the 2014 survey and the design ash depositional plan indicates that the approximate remaining capacity of the ash landfill is 6.2 million cubic yards. NPPD estimates that the ash landfill at GGS (Ash Landfill Nos. 1, 2, 3, and 4, and the bottom ash storage and handling area) has a remaining lifespan of 72 years (as of January 2014). Therefore, closure will occur in approximately 2086. At that time, NPPD estimates that a maximum inventory of about 10.1 million cubic yards will exist on site.

1.3.2 CCR Area for Final Cover Estimates

Based on the phased deposition and closure plan, the estimated maximum area requiring final cover at any time during the active life of the ash landfill is approximately 33 acres. The maximum open area is anticipated to occur at the beginning of Phase 6, when deposition is taking place in Ash Landfill No. 2 and the bottom ash storage and handling area. Note that the maximum area requiring final cover includes area that has temporary cover, so there may not necessarily be 33 acres of active ash deposition area at any given time.

1.4 Closure Schedule

NPPD will provide the appropriate regulatory agencies with written notice 30 days prior to the closure of any phase. The phased closure will be constructed according to the regulation in place at the time of final cover construction. NPPD will provide the regulatory agencies with construction quality assurance (CQA) documentation and as-built drawings certified by an independent professional engineer registered in Nebraska for each phase of closure.



NPPD will provide written notification to the appropriate regulatory agencies at least 180 days prior to the date that closure of the final phase is expected to begin at the ash landfill. This notice will also be placed in the site's Operating Record.

NPPD will begin implementation of final closure within 30 days of receipt of the final volume of ash at the ash landfill. Written notification will be provided to the appropriate regulatory agencies, and copies placed in the site's Operating Record, for each of the following:

- Date of receipt of the final volume of ash placed in the ash landfill
- Date of the initiation of closure
- Date of the installation of the final cover system

Closure activities shall be completed within 180 days after the final volume of fly ash is placed in the ash landfill. The regulatory agencies will be provided a written notification, and a copy placed in the site's Operating Record, when the closure is completed. NPPD will have an independent professional engineer, registered in the State of Nebraska, submit CQA documentation and a topographical survey showing final cover grades, along with certification that closure has been completed in accordance with the approved CQA Plan and Closure Plan. This certification will be placed in the site's Operating Record.

Within 90 days following the installation of the final cover system (after final closure of the last phase following last receipt of waste at the facility), NPPD shall record a permanent notation on the deed at the county Register of Deeds, indicating (1) the existence of a closed fossil fuel combustion ash landfill on the property; (2) the type, depth, and location of the fossil fuel combustion ash on the property; (3) existence of components of the ash containment system; (4) existence of any monitoring systems at the site; and (5) any restrictions on the use of the property which may be provided to protect the integrity of the final cover, liner, monitoring systems, or any other components of the containment system. Documentation that such notation has been recorded in the permanent records of the county Register of Deeds will be submitted to the appropriate regulatory agencies, and a copy of this record will be placed in the site's Operating Record.



2.0 POST-CLOSURE PLAN

The Post-Closure Plan for the ash landfill shall apply to the thirty (30) year period immediately following closure of the ash landfill. Following the post-closure period, a certification signed by a professional engineer, registered in the State of Nebraska, shall be submitted to the appropriate regulatory agencies verifying post-closure care has been completed in accordance with the approved Post-Closure Plan. This certification will also be placed in the site's Operating Record.

As discussed in section §257.104 for CCR landfills and surface impoundments that are subject to the closure requirements of section §257.102, post-closure care must maintain the integrity and effectiveness of the final cover system, including repairs as needed to correct the effects of settlement, subsidence, erosion, or other events, and prevent run-on and run-off from eroding or otherwise damaging the final cover, as well as maintaining the groundwater monitoring system and groundwater monitoring activities specified by sections §257.90 through §257.98.

2.1 Post-Closure Monitoring and Maintenance Activities

Annual monitoring and maintenance of the cover and water control structures will be performed. If erosion, settling, subsidence, or other problems arise, the cover will be graded to match the design contours and re-seeded where necessary. Maintenance will be performed on the ash landfill cover and water control structures as needed to prevent run-on and runoff from eroding or otherwise damaging the final cover.

The annual site inspection will typically be performed between late spring and early fall to facilitate inspection of the final cover vegetation. Inspections may also be performed after significant storm events. Maintenance and repairs will be made as soon as practical after inspection. Cover and surface water controls repair work will be done in accordance with the CQA Plan. Cover repair will typically be completed in the spring or summer months, and any necessary re-seeding will take place in the spring or late fall. The annual site inspection report will be placed in the site's Operating Record.

To prevent unauthorized access, the gates, fences, and posted signs at GGS will be monitored annually and repaired as necessary during the post-closure period. Groundwater monitoring wells will be included with this monitoring and maintenance program, as needed.

Semi-annual groundwater quality sampling from the monitoring wells will be performed. The samples will be collected and analyzed in accordance with the most current Sampling and Analysis Plan (SAP). Results of the testing will be reported to the appropriate regulatory agencies and placed in the site's Operating Record.



2.2 Contact Information

Questions arising during the post-closure period should be directed to:

Nebraska Public Power District
Attn: Environmental Protection Supervisor
P.O. Box 499
Columbus, Nebraska 68602-0499
Telephone: (308) 386-2441
E-Mail: kmkruml@nppd.com

2.3 Planned Property Usage

During the post-closure period, this land will not be utilized by NPPD. The integrity of the final cover, liner, and other components of the containment system, and the function of the groundwater monitoring wells will not be disturbed during the post-closure period. There will be no grazing or feeding of farm or domestic animals upon the ash landfills. Unwanted vegetation such as trees and noxious weeds will be removed.



3.0 CERTIFICATION

The undersigned attest to the completeness and accuracy of the above written closure and post-closure plans, and certify that the plans meet the requirements detailed in §257.102 and §257.104. Notification of the completion of the plans will be provided to the State Director (NDEQ), as well as placed in the operating records and available on NPPD's publically accessible CCR website.

If further information is required, please contact the undersigned at (303) 980-0540.

GOLDER ASSOCIATES INC.

Jacob Sauer, P.E.
Senior Project Engineer

Ron Jorgenson
Principal and Senior Practice Leader

JJS/ds





4.0 REFERENCES

EPA 2015a. 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 17, 2015.

Established in 1960, Golder Associates is a global, employee-owned organization that helps clients find sustainable solutions to the challenges of finite resources, energy and water supply and management, waste management, urbanization, and climate change. We provide a wide range of independent consulting, design, and construction services in our specialist areas of earth, environment, and energy. By building strong relationships and meeting the needs of clients, our people have created one of the most trusted professional services organizations in the world.

Africa	+ 27 11 254 4800
Asia	+ 852 2562 3658
Australasia	+ 61 3 8862 3500
Europe	+ 356 21 42 30 20
North America	+ 1 800 275 3281
South America	+ 56 2 2616 2000

solutions@golder.com
www.golder.com

Golder Associates Inc.
44 Union Boulevard, Suite 300
Lakewood, CO 80228 USA
Tel: (303) 980-0540
Fax: (303) 985-2080



Engineering Earth's Development, Preserving Earth's Integrity

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation