POST CLOSURE PLAN

CFR 257.104(d)

CCR Landfill

Northeastern 3&4 Power Station
Oologah, Oklahoma

October, 2016

Prepared for: Public Service Company of Oklahoma

Prepared by: American Electric Power Service Corporation

1 Riverside Plaza

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GERS-16-044

POST CLOSURE PLAN
CFR 257.104(d)
NORTHEASTERN 3&4 POWER STATION
CCR LANDFILL

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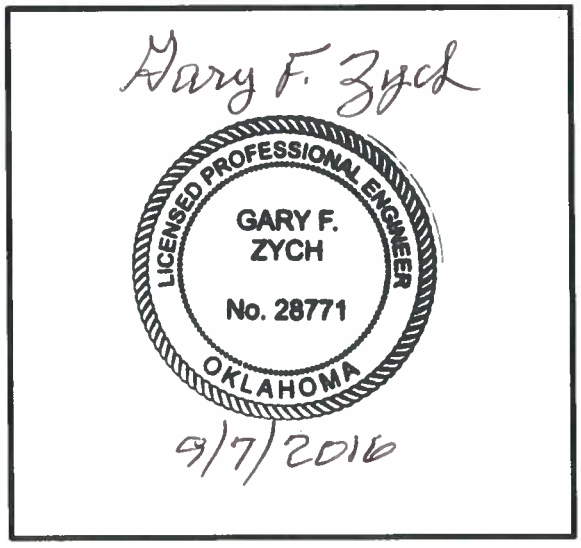

I certify to the best of my knowledge, information, and belief that the information contained in this post closure plan meets the requirements of 40 CFR § 257.104

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1.0 OBJECTIVE

This report was prepared by AEP- Geotechnical Engineering Services (GES) section to fulfill requirements of CFR 257.104(d) for Post Closure Plans of CCR units.

2.0 DESCRIPTION OF THE CCR UNIT

The Northeastern 3&4 Power Station is located near the City of Oologah, Rogers County, Oklahoma. It is owned and operated by Public Service Company of Oklahoma (PSO). The facility operates one landfill for disposal CCR called the Northeastern Landfill

The landfill is permitted by the Oklahoma Department of Environmental Quality, OSHD Permit No. FA3566010.

3.0 DESCRIPTION OF POST CLOSURE PLAN 257.104(d)(1)(i)

[A description of the monitoring and maintenance activities required in paragraph (b) of this section for the CCR unit, and the frequency at which these activities will be performed.]

The Northeastern Landfill will be closed at either the end life of the plant or the end of capacity of the facility, once closure activities are completed. The post closure care plan is further discussed in the ODEQ approved Plan in Attachment A, with the exception that the post closure care period will be 30 years.

3.1 SECTION 257.104(b)(1)

[Maintaining the integrity and effectiveness of the final cover system including making repairs to the final cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, and preventing run-on and run-off from eroding or otherwise damaging the final cover.]

Inspections are performed as described in ODEQ approved Closure/Post Closure Plan included in Attachment A. The inspection frequency will be quarterly to detect any issues so that repairs can be performed before significant harm occurs.

- Embankment: The entire waste embankment, including top surface and side-slopes, will be inspected for slides, settlement, subsidence, displacement, and cover condition (see below).
- Soil Dike: The soil dike will be inspected for slides, displacement, and erosion.
- Cover: The final cover will be inspected for erosion and for the condition of the vegetated cover, i.e., gaps in vegetation or presence of undesirable trees or brush. The integrity of the cover drainage system will also be inspected.
- Final Cover Surface: The Final Cover surface will be inspected for any ponding of water or flat areas.
- Surface Drainage System: The surface drainage system, including channels, culverts, slope drains, etc., will be inspected for erosion, integrity of channel lining, ponding, and accumulated sediment.
- Leachate Collection Piping: The discharge pipes of the Leachate Collection System at the Leachate Pond will be inspected for clogging or damage. Other exposed portions of the Leachate Collection System including cleanouts will be inspected for damage. Similarly, the Leachate

Collection Pond will be inspected for general damage to the pond and perimeter berms, and for accumulation of sediment in the pond.

Maintenance during the post-closure care period will be performed as discussed below, based upon the facility inspections described above.

- Security Control Devices: Any portions of the roadway barricades which might be damaged will be repaired or replaced as necessary.
- Erosion Damage Repair: Any areas exhibiting erosion will be repaired by replacing and compacting the material in-kind to design grade/specifications, and reseeding the area to the specifications. Applications of additional fertilizer, selective herbicides, rodent control measures, etc. will be implemented as necessary. In the selection of fertilizers and herbicides, ensure their use will not impact the groundwater negatively. Follow-up monitoring of the repaired area will be conducted to ascertain the integrity of the repair.
- Settlement, Subsidence, Displacement: Any areas at the closed site exhibiting evidence of settlement, subsidence, or displacement will be examined to determine the cause of the movement. If backfilling or placing additional fill material is needed to maintain the integrity of the closed structure, it will be performed in accordance with the site/closure specifications, including seeding. If the condition reoccurs or persists, or if the severity of the condition initially is judged to warrant it, a detailed investigation of the cause will be performed and remedial action will be performed. Similarly, any areas of the soil dike exhibiting sliding, displacement, or seepage will be investigated. Repairs will be made as necessary. Follow-up monitoring of the area will be performed to ascertain that the problem has been corrected.
- Closure Cap Surface: Any areas that show signs of ponding water or flat contours will be examined and rectified.
- Surface Water Drainage System: The channel linings are designed to withstand the design velocities. Maintenance of the surface water drainage system will consist of removing sediment and/or undesirable vegetation from the surface water runoff control system (channels and culverts) as required. Eroded areas will be repaired by back-filling and reseeding according to the specifications. Damage to culverts will be repaired; structure replacement will be performed if needed.
- Leachate Collection System: Maintenance of the leachate collection system, collection sump, and leachate pumps will consist of repairing and/or replacing in-kind any damaged or eroded portions of the system and pond, cleaning pipes, and removing leachate and sediment from the collection sump and the Leachate Collection Pond, as needed.

3.2 SECTION 257.104(b)(3)

[Maintaining the groundwater monitoring system and monitoring the groundwater in accordance with the requirements of §§257.90 through 257.98.]

The groundwater monitoring system will be inspected for the general integrity of the wells, well casings and well protective casings. Any damaged portions of the monitoring wells and/or their protective casings will be replaced in-kind.

Monitoring the groundwater will be in accordance with the groundwater monitoring plan for this facility and in accordance with the requirements of §§257.90 through 257.98.

4.0 POST-CLOSURE CONTACT 257.104 (d)(1)(ii)

[The name, address, telephone number and email address of the person or office to contact about the facility during the post-closure care period.]

The name, address, and telephone number of the person to contact about the Facility during the post-closure period shall be provided upon notice of closure.

5.0 POST-CLOSURE PLANNED USE 257.104 (d)(1)(iii)

[A description of the planned uses of the property during the post-closure period. Post-closure use of the property shall not disturb the integrity of the final cover, liner(s), or any other component of the containment system, or the function of the monitoring systems unless necessary to comply with the requirements in this subpart…]

The post-closure use of the property will be undisturbed vacant land space. The only activities occurring on the closed CCR unit will be related to the Post-Closure care activities.

ATTACHMENT A

Post Closure Care Plan from approved landfill permit

Closure/Post-Closure Care Plan

Public Service Company of Oklahoma
OSHD Permit No. FA3566010
Project No. 35107130
November 2011

PUBLIC SERVICE COMPANY OF OKLAHOMA

A unit of American Electric Power

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1.0 INTRODUCTION

The following document constitutes a *Closure/Post-Closure Care Plan* for the existing Public Service Company of Oklahoma Northeastern Power Station Ash Landfill, a non-hazardous industrial waste (NHIW) Landfill, and is intended to comply with the requirements of *OAC 252:515-25*. The Closure/Post-Closure Care Plan has been prepared to provide a reference and directive for landfill personnel and regulatory officials while establishing technical requirements and standards to close, stabilize, inspect, maintain, and monitor the NHIW Landfill once waste disposal operations cease in a given area and during the post-closure care period.

The design of the final cover system is presented along with plans for total, phased (sequential) and unexpected closure of waste disposal areas. In addition, provisions for erosion control, seeding, and stabilization of associated areas are addressed.

1.1 BACKGROUND

The Public Service Company of Oklahoma (PSO) Northeastern Power Station Ash Landfill (Northeastern Landfill or Site) is located at the junction of U.S. Highway 169 and Oklahoma Highway 88 approximately 1 mile south of Oologah, Rogers County, Oklahoma. More specifically, the site is located in the Southeast ¼ of the Northeast ¼ of Section 3, Township 22 North, Range 15 East I.M.

PSO operates two coal-fired power generating units on the property (identified as Units 3 and 4). The NHIW landfill is used for disposal of ash products generated by Units 3 and 4. The landfill permit (Permit No. FA3566010) was issued on July 20, 1978.

1.2 PURPOSE

PSO currently owns and operates the Northeastern Landfill for the disposal of coal combustion byproducts (CCB) that are generated by the Northeastern Power Station. A list of potential wastes that are intended to be placed in the lined landfill is presented in Application Volume 1, Section 12.0 WASTE STREAM INFORMATION.

The purpose of the Closure/Post-Closure Care Plan is to establish standards and requirements for closure, inspection, maintenance, monitoring, certification, and reporting associated with the NHIW Landfill. The Plan is intended to comply *with OAC 252:515-25-1 et. seq.*

1.3 CLOSURE PLAN OVERVIEW

Closure requirements specific to the PSO NHIW Landfill are presented in Section 2.0 of this Closure/Post-Closure Care Plan. More specifically, Section 2.0 addresses the design of the final cover system, grading plans for waste disposal areas, soil budget, survey requirements, phased closure requirements, and contingencies for unexpected closure. Section 2.0 also presents a general closure schedule associated with the planned sequential closure of the NHIW Landfill and estimated costs for closure. Section 3.0 presents the post-closure

sideslopes, and then will extend to an elevation of no more than about 667 feet. The top surface of the landfill will be graded to drain at a slope of approximately 4% and the final cover system will be applied.

The design of the final cover system includes provisions for mid-slope terraces (berms) and storm-water letdown structures. The mid-slope berms and letdown structures will assist in managing and controlling storm water run-off associated with the final cover system. while minimizing the potential for erosion. The final grading plan for the NHIW disposal area includes provisions for perimeter drainage and access as shown on the Permit Drawings.

2.1.2 Final Cover System Design

The final cover system for the Landfill will include a FML, a double sided geocomposite and a protective/vegetative cover. The FML will consist of textured LLDPE 40 mil liner. Permeability of fluids through the FML is assumed to be 2E-13 cm/sec (HELP model default). The geocomposite will be comprised of two 8 oz. geotextile layers covering each side of a geonet. The protective/vegetative cover layer will be materials that are capable of sustaining vegetation growth.

As discussed in Section 2.4, final cover will likely be placed over the whole landfill after completion. However, the final cover may optionally be placed in stages as the fill progresses and specific areas reach the design elevations. During the installation of the final cover system, the construction methods and material consistency will be monitored, tested, and documented in accordance with the facility Quality Assurance / Quality Control Plan (QAQC). The QAQC is included in the *Permit Application,* **Volume 3, Appendix B**.

2.2 SOIL BUDGET

As addressed in the *Permit Modification Application,* there exists a minimal quantity of material on site that is naturally suitable for use as a soil protective cover layer. As an alternative to on-site soils, soil materials may be imported from off-site for use in constructing the final cover soil protective cover layer. The final cover system will require roughly 124,407 cubic yards of protective cover material. Additional soil may be needed to cover and/or stabilize fill areas outside the lined landfill footprint to minimize erosion while establishing vegetative cover. All property owned by PSO is considered eligible as a borrow source for cover material.

2.3 SURVEY REQUIREMENTS

Upon completion of the final cover system installation associated with the NHIW landfill disposal areas, a topographic survey will be performed by an Oklahoma registered land surveyor (RLS). The topographic survey will be used to prepare a final as-built drawing that will document the final contours, the permit boundary, the disposal boundary, location(s) of drainage features, and access roads. All survey information and as-built drawings will be included as part of the Closure Certification Report and will be maintained as part of the facility permanent operating record during the life of the facility and post closure care period.

2.6 ANCILLARY FACILITIES AND MONITORING SYSTEMS

In conjunction with the final closure of the NHW Landfill, existing portable offices and associated sanitary facilities will be removed and/or relocated, if applicable. Access roads will be improved as necessary to provide all-weather access for maintenance of the landfill final cover system. Drainage improvements and erosion control mechanisms will be improved and/or installed to manage run-off from the final cover system. The drainage systems are to be constructed as shown on *the Permit Modification Drawings*. All storm water and groundwater monitoring systems are to be protected and maintained during closure and post-closure.

2.7 CLOSURE SCHEDULE

As designed, the Landfill should provide useful waste disposal capacity for the Northeastern Power Station for approximately 14.7 years from the April 2011 survey date (based on an annual utilization rate of 56,000 cy). Final cover installation activities will be applied to the entire landfill beginning within 90 days after final receipt of wastes at the facility. Should this activity happen to fall during the wet, winter months, PSO will petition that the schedule be extended until the next available dry weather construction season following the last receipt of waste. An estimated schedule, based on the largest area of the Facility requiring a final cover at any time during the active life, for completing all activities necessary for closure is presented in **TABLE 1**.

TABLE 1
ESTIMATED CLOSURE SCHEDULE

Closure Activity/Task	Number of days to complete
Notify the ODEQ of intent to perform closure for each cell (cells 1 through 4)	1
Phase 1 (upon initiation of placement of waste in the next cell)	1
Phase 2 (upon achieving final waste grades in each individual cell)	1
Begin closure activities	20
Perform grading of waste	10
Install final cover system	120
Installation of erosion and sediment control structures	10
Complete closure certification report	17
ESTIMATED TOTAL TIME TO COMPLETE CLOSURE	**180**

2.8 COST ESTIMATES FOR CLOSURE

As per *OAC 252:515-27 Part 3*, cost estimates for closure of the PSO Northeastern Landfill have been prepared and are included in the *Permit Modification Application (Volume 3.*

3.4 GROUND WATER MONITORING

During the designated post-closure care period, PSO will continue to sample ground water monitoring wells located around the perimeter of the site. Samples will be collected on a semi-annual basis and submitted to a qualified laboratory for analysis. Samples are to be collected and handled in accordance with the facility *Sampling and Analysis Plan*. Ground-water quality will be statistically evaluated in accordance with the groundwater monitoring plan presented in the *Permit Modification Application* ***Volume 2***.

3.5 LAND USE RESTRICTIONS

During the post-closure care period, no significant land use is planned associated with the site. PSO will notify the ODEQ in writing should a need arise in the future which would require use of the Northeastern Power Station landfill site for some purpose other than those described herein or in the *Permit Modification Application*.

3.6 SECURITY AND ACCESS CONTROL

During the post-closure care period, access to the site will be restricted and controlled. Only PSO personnel, regulatory officials, and/or authorized maintenance contractors will be allowed at the facility.

3.7 POST-CLOSURE SCHEDULE

The planned post-closure care period for the NHIW Landfill is eight (8) years from the date of final closure certification by the ODEQ. Because the projected life of the site as designed is approximately 14.7 years, post-closure activities are not planned or scheduled for several years.

3.8 POST-CLOSURE COST ESTIMATES

Cost estimates for closure and post-closure care have been prepared for the Landfill and are included in the *Permit Modification Application* ***(Volume 3, APPENDIX G)***. The cost estimates are intended to comply with *OAC 252:515-27* and will be reviewed and updated (if necessary) on an annual basis to consider changes in design, operations, and/or regulatory requirements.

4.0 NOTIFICATION AND CERTIFICATION REQUIREMENTS

PSO will notify the ODEQ in writing prior to beginning final closure of the site. As per *OAC 252:515-25-33(b)*, final closure shall begin within 90 days after the last receipt of waste. Should this activity happen to fall during the wet, winter months, PSO will petition that the schedule be extended until the next available dry weather construction season following the last receipt of waste. Additionally, if the ODEQ approves amendments in the closure plan, a later date may be acceptable. Closure will be accomplished within 180 days, in accordance with the regulation. Although final cover placement, quality control, and certification may occur in stages, final closure of the site will not occur until all phases have been filled to the design contours or if waste disposal operations cease at the site (whichever comes first).