

Coal Combustion Residuals Landfill Closure and Post-Closure Plans

GenOn Northeast Management Company
Conemaugh Station Ash/Refuse Disposal Site (#300876)
New Florence, Pennsylvania

GAI Project Number: C151611.00, Task 002
October 2016



Prepared by: GAI Consultants, Inc.
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Prepared for: GenOn Northeast Management Company
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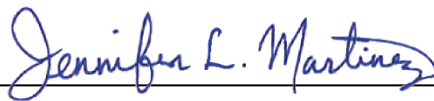
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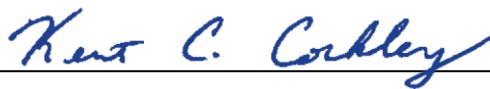
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Professional Engineer's Certification

The Closure and Post-Closure Plans for the Conemaugh Station Ash/Refuse Disposal Site were prepared by GAI Consultants, Inc. (GAI). The Plans were based on certain information that, other than for information GAI originally prepared, GAI has relied on but not independently verified. Therefore, this Professional Engineer's Certification is limited to the information available to GAI at the time the Plans were written. On the basis of and subject to the foregoing, it is my professional opinion as a Professional Engineer licensed in the Commonwealth of Pennsylvania, that the Plans have been prepared in accordance with good and accepted engineering practices as exercised by other engineers practicing in the same discipline(s), under similar circumstances and at the time and in the same locale. It is my professional opinion that the Plans were prepared consistent with the requirements of Sections 257.102 and 257.104 of the United States Environmental Protection Agency's "Disposal of Coal Combustion Residuals from Electric Utilities," published in the Federal Register on April 17, 2015 with an effective date of October 19, 2015.

The use of the words "certification" and/or "certify" in this document shall be interpreted and construed as a Statement of Professional Opinion and is not and shall not be interpreted or construed as a guarantee, warranty or legal opinion.


Kent C. Cockley, P.E.
Engineering Director / Senior Associate



1.0 Introduction

The Conemaugh Generating Station is a steam electric generating station located along the Conemaugh River in West Wheatfield Township, Indiana County, Pennsylvania (PA). The station is operated by GenOn Northeast Management Company, a subsidiary of NRG Energy, Inc. The station consists of two 850-megawatt coal-fired units. The station commenced operation in 1970.

The Conemaugh Station Ash/Refuse Disposal Site (disposal site) is permitted under PA Department of Environmental Protection (DEP) Solid Waste Permit No. 300876 and receives Coal Combustion Residuals (CCR) generated by the Conemaugh Generating Station. The disposal site is divided into three stages: Stages I (closed), II (currently active), and III (under construction and permitted to receive future CCR).

Stage I is approximately 160 acres and is located in the northern-most limits of the disposal site. Stage I started receiving CCR in 1970 and was closed in 1987. Stage II covers approximately 120 lined acres and is located directly south from Stage I, closer to the Conemaugh Generating Station. Stage III covers approximately 110 lined acres. When ultimate development is reached, the northern side of Stage III will abut a portion of Stage II. The CCR placed on the disposal site consists mostly of bottom ash, fly ash, pyrites, and Flue Gas Desulfurization by-product.

2.0 Closure Plan

This CCR Closure Plan (CP) [§257.102(b)] sets forth the techniques that will be utilized to complete closure activities of the disposal site by placement of a final cover system (FCS) in accordance with §257.102(b)(1)(iii) and §257.102(d). This CP will be placed in the facility's operating record in accordance with §257.102(b)(2)(iii) by October 17, 2016.

This document was prepared in accordance with the United States Environmental Protection Agency's "Disposal of Coal Combustion Residuals from Electric Utilities" (CCR Rule).

2.1 Closure Plan Overview

The CP includes the following information:

- Narrative describing how the CCR unit will be closed in accordance with §257.102;
- Description of the FCS including a general description of the methods and procedures to install the FCS, and a description stating how the FCS will achieve the performance standards set forth by §257.102(d);
- Estimate of the maximum inventory of CCR ever on-site over the active life of the disposal site;
- Estimate of the largest area of the CCR unit ever requiring final cover at any time over the disposal site's active life;
- Schedule for completing all activities necessary to satisfy the closure criteria, including an estimate of the year in which all closure activities for the disposal site will be completed; and
- Written certification from a qualified professional engineer that the written CP meets the requirements of §257.102.

2.2 Closure Plan Narrative

During the active life of Stage II and the permitted Stage III area under construction, cover soil will be placed on an intermittent schedule. As each bench within a stage is completed, it will be covered with soil, seeded, fertilized, and mulched. Where the benches and slopes become part of the final disposal landfill configuration, they will be covered with two-feet of cover soil. Where the benches and slopes will be buried by the succeeding stage development, these areas will be covered with one-foot of cover soil. The one-foot of cover soil will be removed and reused prior to burial by the succeeding stage. Cover soil removed will be used later for final cover, and the underlying CCR regraded, if necessary, to promote positive drainage.

At final closure, all disposal site surfaces will have received two feet of soil cover and will be vegetated in accordance with the approved permit. Existing stormwater controls will be utilized to manage stormwater and for erosion and sediment control. Once the Stage III disposal site is soil covered and seeded, stormwater from the revegetated Stages II and III disposal areas will be diverted around the Ash Disposal Leachate Surge Pond (Surge Pond).

At closure, the Surge Pond will remain only for leachate storage of the CCR units. If the station is still operational, the treated discharge water will continue to be recycled, used at the station as makeup water, or discharged to a National Pollutant Discharge Elimination System (NPDES) outfall. If the station is closed, the treated discharge water will be conveyed to an NPDES outfall.

The closure performance standards stated in §257.102(d) will be achieved in the following manner:

1. CCR material at the disposal site will be graded to promote positive drainage.
2. Closure will be accomplished by placing the FCS, consisting of erosion and soil layers and geomembrane over the CCR surface to meet §257.102(d)(1)(i). The geomembrane will meet the infiltration layer requirement of the CCR Rule.
3. The soil layer will be graded to promote positive drainage and to preclude the probability of future impoundment of water, sediment, or slurry as required by §257.102(d)(1)(ii).
4. Stability of the FCS will be promoted by the proposed textured 40-mil geomembrane [High-Density Polyethylene (HDPE) or Linear Low-Density Polyethylene (LLDPE)] on the final slope configuration for the landfill. The use and stability of the proposed geosynthetic products is approved as part of the PA solid waste permit as it will prevent sloughing or movement of the FCS during closure and post-closure care periods as required by §257.102(d)(1)(iii).
5. To the extent practical for a FCS, the proposed design of the FCS will minimize the need for further maintenance of the CCR unit as required by §257.102(d)(1)(iv).
6. Periodic inspection and maintenance of the FCS and stormwater management system will occur through the closure and post-closure care periods.

2.3 Final Cover System

This section provides a description of the FCS components, site preparation, and installation.

2.3.1 Cover Components

The proposed FCS consists of the following for the flatter top area (from bottom to top):

- ▶ Textured HDPE or LLDPE Geomembrane (40-mil) (infiltration layer);
- ▶ Single-sided (non-woven geotextile thermally bonded to the upper surface) Geocomposite Drainage Net (GDN) (250-mil) and periodic perforated drainage pipes in aggregate envelopes;

- ▶ Two feet of cover soil (which includes 18 inches of soil and a six-inch erosion layer as stated in CCR Rule and defined later in this Plan); and
- ▶ Vegetation (mulch, fertilizer, and seed).

For side slopes and benches, the proposed FCS will consist of (from bottom to top):

- ▶ Textured HDPE or LLDPE Geomembrane (40-mil) (infiltration layer);
- ▶ Double-sided (non-woven geotextile thermally bonded to the upper and lower surfaces) GDN (200-mil or 220-mil) and periodic perforated drainage pipes in aggregate envelopes;
- ▶ Two feet of cover soil (which includes 18 inches of soil and a six-inch erosion layer as stated in CCR Rule and defined later in this Plan); and
- ▶ Vegetation (mulch, fertilizer, and seed).

The proposed FCS is an alternate FCS as set forth in §257.102(d)(3)(ii).

2.3.2 Site Preparation

Site preparation will comply with applicable regulations. The cover soil and temporary vegetation covering Stage II and Stage III will be stripped. The topmost portion of the final landfill configuration will be regraded, if necessary, to provide positive drainage toward the drainage facilities. An infiltration layer composed of geosynthetic materials will be placed on top of the regraded surface. A geomembrane will first be placed as the low permeability layer. Next, a geocomposite drainage layer will be placed above the geomembrane. Finally, two feet of cover soil (i.e. 18 inches of soil and a six-inch erosion layer) will be placed, then seeded, fertilized, and mulched.

2.3.3 Infiltration Layer Installation

The specific geosynthetic layers to be used as the infiltration layer of the FCS were discussed in Section 2.3.1. They will be placed according to the manufacturer specifications. Prior to geomembrane placement, the CCR will be fine-graded and compacted.

2.3.4 Stormwater Run-on/Run-off Controls Installation

Erosion and Sedimentation Controls will be incorporated into the construction of the closure facilities. Once the disposal area has been revegetated, stormwater will be diverted as clean water to the existing diversion channels where it will be conveyed to the unnamed tributaries of the Conemaugh River. The channels and erosion and sedimentation control facilities will be maintained and inspected on an annual basis and, if needed, repaired through the closure and post-closure periods.

2.3.5 Erosion Layer Installation

The erosion layer will be six inches of earthen material placed above 18 inches of soil. In steep slope areas, the erosion layer soil will be placed from the bottom of the slope and pushed upward. The erosion layer will support vegetation to stabilize the soil to reduce erosion during the post-closure period.

2.3.6 Final Seeding

A grass mix, suited for the PA climate, will be seeded onto the erosion layer.

2.4 Information Elements

This section provides a description of the maximum quantity of CCR material expected to be contained during landfill closure, an estimate of the largest area ever requiring a FCS, and a description of the drainage facilities.

2.4.1 CCR Material Estimates

The largest final cover area will occur when Stage III reaches full capacity. At that time, the amount of cover material, drainage net, and geomembrane required for closure will be at a maximum.

The maximum area to be capped and covered will include the flat areas, outside slopes, and benches for the unburied portions of Stage II and all of Stage III. The total Stage II area to be capped will be approximately 111 acres. The total Stage III area to be capped will be approximately 171 acres. The total area to be capped and covered will be 282 acres.

The total permitted capacity for the disposal site is 90,430,343 tons. The remaining waste capacity is composed of the remaining Stage II disposal area and the proposed Stage III disposal area and is approximately 25,346,222 tons, as per the 2015 Residual Waste Landfill Annual Operation Report.

2.4.2 Drainage Description

The landfill embankment consists of benches constructed every 15 vertical feet with 2H:1V side slopes. The limit of the 15-foot high face slopes between benches will constrain the drainage path lengths, thus minimizing erosion gulley development. The 20-foot wide benches are designed to contain and control stormwater from the slope above. The benches are sloped back into the landfill and are sloped longitudinally to drain towards slope drains and channels. The proposed GDN in the FCS will prevent saturation of the overlying vegetated cover soil.

The topmost portion of the landfill will be fine-graded to provide positive drainage towards drainage facilities. The overall top grade will be no less than three percent. The current and future run-on, run-off controls for the disposal site are detailed in a separate report, the CCR Run-on and Run-off Control System Plan.

2.5 Closure Schedule

The total area to be capped and covered will be 282 acres. According to the 2014 Major Permit Modification Application to Residual Waste Permit No. 300876 for the Conemaugh Generating Station, final waste placement should occur at the end of 2041. The actual year of final waste placement in the landfill is dependent on the amount of power production and beneficial use of CCRs and may extend beyond 2041.

Under the CCR Rule, closure of the disposal site must be initiated within 30 days after the disposal site receives the final known volume of CCR [§257.102(e)(1)(i)]. The closure process is initiated by the state closure permit process and posting of a notification of intent to close the CCR facility. The notification must include a certification by a qualified professional engineer that the design of the FCS meets the requirements of §257.102(d) [§257.102(g)]. Closure is to be completed within six months [§257.102(f)(1)(i)].

The CCR Rule also allows owners of CCR units to request time extensions beyond the time specified in the CP. CCR landfills may extend the timeframe to complete closure of the CCR unit two times in one-year increments [§257.102(f)(2)(i) and §257.102(f)(2)(ii)(C)].

Assuming that the disposal site reaches near full capacity in December 2041 and it will take approximately nine years to place synthetic cap on 282 acres of Stage II and III areas, below is a suggested closure timeline to place the synthetic cap on 282 acres of Stage II and Stage III:

- December 2031 – Submit a major permit modification to the PADEP for the CP. This application must be submitted a minimum of 180 days prior to initiating closure activities.
- June 2032 – Begin placing FCS on Stage II and Stage III areas that have reached final configuration.
- December 2041 – Final waste to be placed on Stage III disposal area. Commence final closure [§257.102(e)(1)] no later than 30 days after final placement of either CCR or any non-CCR waste stream.
- June 2042 – Finalize closure of disposal site. Closure should be finished within 6 months of initiating final closure. Modify CP if closure extensions are needed.

Once closure is complete, a professional engineer will verify and certify that closure has been completed in accordance with the CP [§257.102(f)(3)]. Within 30 days of completing closure, a notification of closure will be prepared including the professional engineer's certification of completion [§257.102(h)]. A notation must also be recorded on the deed to the property, or some other instrument that is normally examined during title search [§257.102(i)], to notify potential buyers that the land has been used as a CCR unit and its use is restricted under the post-closure care requirements as provided by §257.104(d)(1)(iii).

3.0 Post-Closure Plan

This CCR Post-Closure Plan (PCP) [§257.104(b) and (d)] sets forth the techniques that will be utilized to perform post-closure care activities at the Conemaugh Station Ash/Refuse Disposal Site. The purpose of this PCP document is to detail the post-closure care maintenance activities, which will be performed for a period of 30 years. This PCP will be placed in the facility's operating record by October 17, 2016.

3.1 Post-Closure Plan Overview

The PCP includes the following information according to §257.104(d)(1)(i through iii):

- Narrative describing how the CCR unit will be maintained after closure;
- Description of the monitoring and maintenance activities, including the frequency that activities will be performed;
- Name, address, and telephone number of the office to contact about the facility during the post-closure care period; and
- Description of the planned use of the property during the post-closure care period.

3.2 Post-Closure Plan Narrative

The proposed maintenance and monitoring activities associated with post-closure include the following:

- Groundwater quality monitoring;
- Maintenance of the leachate collection system;
- Maintenance of FCS and vegetation;
- Maintenance of clean water diversion channels and culverts;
- Maintenance of access controls (fencing, gates, etc.); and
- Leachate treatment.

These activities are discussed in the next section.

Repairs to the FCS will be made, as necessary, to mitigate erosion or settlement of the erosion and infiltration soil layers. The FCS will be inspected at least annually for the 30-year post-closure period. Stormwater drainage features will be cleared of debris to maintain capacity, as needed. The groundwater monitoring system will be monitored for the full 30 years of post-closure.

3.3 Monitoring and Maintenance Activities

Following closure of the CCR unit, the owner or operator will conduct post-closure care, which consists of the following:

- Maintaining the integrity and effectiveness of the FCS, including making repairs to the final cover as necessary to correct the effects of settlement, erosion, or other events, and preventing stormwater from eroding or otherwise damaging the final cover;
- Maintaining the integrity, effectiveness, and operation of the leachate collection and removal system; and
- Maintaining the groundwater monitoring system and monitoring the groundwater in accordance with the requirements of §257.90 through §257.98.

The owner or operator of the CCR unit must conduct post-closure care for 30 years.

As provided by paragraph (c)(2) of §257.104, if at the end of the post-closure care period the owner or operator of the CCR unit is operating under assessment monitoring in accordance with §257.95, the owner or operator must continue to conduct post-closure care until the owner or operator returns to detection monitoring in accordance with §257.95.

3.3.1 Final Cover Surface

The FCS will be inspected annually by a qualified person during the 30-year post-closure period. The surface of the landfill will be inspected for stressed vegetation, animal burrows, woody vegetation, and cracking in the soil cover which could indicate surface movement. Woody vegetation will be removed. The FCS will be repaired if any of the aforementioned conditions are observed.

3.3.2 Stormwater Drainage Features

Stormwater drainage channels and basins will be inspected as part of the annual inspections. The channels will be inspected for signs of siltation and vegetative growth which are inhibiting the functionality of the channel. Basins will be inspected for signs of siltation, which may be causing operational issues. The drainage features will be cleaned and repaired, if necessary, if any of the aforementioned conditions are observed.

3.3.3 Fencing and Gates

Perimeter fencing and gates will be inspected at least annually for signs of unauthorized entry, damage caused by tree growth or falling limbs/trees, broken or bent posts, and to verify functionality of any gates. Gates will remain locked at all times when the site is unattended to prevent unauthorized access to the site. Any damage to the access control features observed will be repaired.

3.3.4 Groundwater Monitoring System

Groundwater monitoring will be performed in accordance with the requirements of §257.90 through §257.98 for the duration of the post-closure period.

3.3.5 Additional Site Specific Features

The disposal site treatment plant will be maintained for as long as the disposal site produces discharges that do not meet the NPDES discharge limits unless alternative treatment methods such as wetlands or other passive systems are approved and implemented.

Site roads will be inspected on an annual basis and, if needed, repaired to maintain access to site facilities.

3.4 Site Contact Information

The name, address, and telephone number at which the operator can be reached during the post-closure period is provided below:

Environmental Specialist
GenOn Northeast Management Company
1442 Power Plant Road
New Florence, Pennsylvania 15944-9154
724-235-4501

3.5 Proposed Post-Closure Property Use

The closed site will be revegetated and will have the character of open land suitable as habitat for resident wildlife species. No specific post-closure land use is planned other than grassed open land. No adjacent land uses will be impacted by the project. The deed notation required under §257.102(i) will protect future uses of the property.

3.6 Plan Amendment

The initial CP and PCP can be amended [§257.102(b)(3) and §257.104(d)(3), respectively] at any time, and must be amended whenever a change in operations substantially affects the written plan in effect. The CP must be amended at least 60 days prior to a planned change in operation, or no later than 60 days after an unanticipated event. In addition, if closure activities have commenced for the Conemaugh Station Ash/Refuse Disposal Site, then the initial written CP must be revised within 30 days of the event.

4.0 References

- April 2014 Major Permit Modification Application, Residual Waste Permit 300876, Stage III – Conemaugh Station Ash/Refuse Disposal Site. Revision 1: December 10, 2014, Revision 2: February 26, 2015, Revision 3: May 29, 2015, Revision 4: August 12, 2015.
- Form 1R Attachments 1R-1 and 1R-2, Facility Plan, Conemaugh Station Ash/Refuse Disposal Site; December 10, 2014.
- Form 12R Narrative, Operation Plan, Conemaugh Station Ash/Refuse Disposal Site; December 10, 2014.
- Form 16R Attachments 16R-11 and 16R-18, Liner System – Phase II, Conemaugh Station Ash/Refuse Disposal Site; August 12, 2015.
- Form 18R Narrative, Closure/Post-Closure Land Use Plan, Conemaugh Station Ash/Refuse Disposal Site; December 10, 2014.
- June 2016, 2015 Annual Operation Report, Conemaugh Generating Station.
- United States Environmental Protection Agency (USEPA) 40 CFR Parts 257 and 261 Hazardous and Solid Waste Management Disposal System; Disposal of Coal Combustion Residual from Electric Utilities, Final Rule April 2015.
- Worley Parson, November 2007. Residual Waste Permit Renewal, Conemaugh Disposal Site.