

Harrison Landfill Closure and Post-Closure Plans

Monongahela Power Company
A FirstEnergy Company
Harrison Power Station
Shinnston, Harrison County, West Virginia

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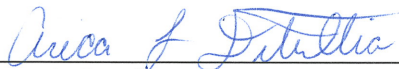
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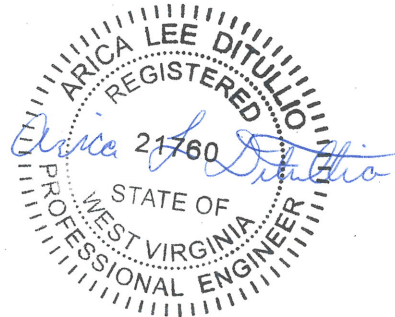
Certification/Statement of Professional Opinion

The Closure and Post-Closure Plan (Plan) for the Harrison Landfill was prepared by GAI Consultants, Inc. (GAI). The Plan was based on certain information that, other than for information GAI originally prepared, GAI has relied on but not independently verified. Therefore, this Certification/Statement of Professional Opinion is limited to the information available to GAI at the time the Plan was written. On the basis of and subject to the foregoing, it is my professional opinion as a Professional Engineer licensed in the State of West Virginia that the Plan has 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 same time and in the same locale. It is my professional opinion that the Plan was prepared consistent with the requirements of the United States Environmental Protection Agency's "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments," 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.



Arica L. DiTullio, P.E.
Engineering Manager



This closure plan is intended to meet the requirements of 40 CFR § 257 but can be amended at any time [pursuant to § 257.102(b)(3)] due to a number of factors, including but not limited to: specified provisions in 40 CFR § 257, federal or state regulatory changes, and facility operational changes.

1.0 Introduction

The Harrison Landfill (Landfill) is a captive coal combustion residuals (CCR) facility located approximately one mile north-northeast of the Harrison Power Station (Station) in Shinnston, West Virginia (WV).

The Landfill is composed of three areas, referred to as the Lower Area, Main Area, and Upper Area. The Landfill is currently permitted for operations under WV Department of Environmental Protection (WVDEP) Permit No. WV0075795.

2.0 Closure Plan

This Plan was prepared in accordance with the applicable requirements of the United States Environmental Protection Agency 40 CFR Part 257, Criteria for Classification of Solid Waste Disposal Facilities and Practices (CCR Rule). This Plan sets forth the materials and techniques that will be used to complete closure activities of the Landfill by placement of a final cover system pursuant to the requirements in §257.102(d).

2.1 Harrison Landfill Closure Plan Overview

The Closure Plan includes the following:

- Closure Plan narrative;
- Final Cover System description including methods and procedures to install the system, and a description stating how the system 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 CCR unit;
- Estimate of the largest area of the CCR unit ever requiring final cover at any time over the CCR unit's active life; and
- Closure Plan schedule for completing all activities necessary to satisfy the closure criteria, including an estimate of the year in which all closure activities for the CCR unit will be completed.

2.2 Closure Plan Narrative

The Harrison Landfill is to be closed by leaving the CCR in place and installing a final cover system and stormwater collection features. This will be accomplished by meeting the requirements of §257.102 and any additional requirements imposed by the WVDEP.

During the active life of the Landfill, intermediate soil cover consisting of a minimum of one foot of cover soil will be used to cover the finished slopes and benches. The soil cover will be seeded, fertilized, and mulched.

At final closure, a final cover system and drainage channels, if needed, will be installed. Prior to the installation of the final cover system, any temporary vegetation present will be stripped, underlying soils removed, and CCR regraded, if necessary, to promote positive drainage in accordance with the CCR Rule. The final cover system will be graded to prevent ponding of stormwater and vegetated.

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

- Temporary cover soil will be removed and CCR material will be graded as necessary to promote positive drainage. The final cover system will be placed over the graded surface to minimize infiltration of water into the CCR and releases of CCR, leachate, or impacted run-off to the ground or surface waters, as required by §257.102(d)(1)(i);
- The final cover system soil layers will be graded in order to preclude the probability of future impoundment of water and sediment, as required by §257.102(d)(1)(ii);
- Stability of the final cover system will be provided by properly compacting the CCR and the cover soil layers during placement operations and cap construction, respectively. Movement and sloughing of the final cover system will be minimized during the closure and post-closure periods by installation of a textured geomembrane, as required by §257.102(d)(1)(iii); and
- This design reduces the need for further maintenance through grades that minimize or prevent erosion, and with a vegetation mix that, once well established, forms a thick, self-sustaining layer that minimizes woody plant growth in accordance with the requirements of §257.102(d)(1)(iv).

2.3 Final Cover System

This section provides a description of final cover system components, site preparation, and installation.

2.3.1 Cover Components

The proposed final cover system consists of the following (from the bottom layer to the top layer):

- ▶ An infiltration layer composed of a geomembrane and double-sided geocomposite drainage net;
- ▶ An erosion layer composed of 12 inches of soil; and
- ▶ Vegetation (mulch, fertilizer, and seed).

The proposed final cover system meets the alternate design requirements set forth in §257.102(d)(3)(ii).

2.3.2 Site Preparation and Final Cover System Installation

Site preparation for the Landfill final cover system will comply with applicable regulations. The CCR will be properly compacted during placement operations to minimize the possibility of subsidence or settling. The topmost portion of the Landfill will be regraded, if necessary, to provide positive drainage toward the drainage facilities. A geomembrane will be placed, followed by a geocomposite drainage layer sandwiched between two geotextiles above. One foot of cover soil will be placed, then seeded, fertilized, and mulched.

2.3.3 Infiltration Layer Installation

An infiltration layer consisting of geosynthetic material will be placed on the Landfill. The specific geosynthetic layers to be used are identified in sub-section 2.3.1. They will be placed according to the manufacturer specifications. Prior to geomembrane placement, the CCR or temporary soil cover shall be fine graded and compacted as necessary.

2.3.4 Erosion Layer Installation

An erosion layer, consisting of 12 inches of earthen material, will be placed as part of the final cover system on top of the infiltration layer. In steep slope areas, the cover soil will be placed

from the bottom of the slope upward. The erosion layer will support vegetation to stabilize the soil and reduce erosion of the infiltration layer during the post-closure period.

2.3.5 Vegetation

The erosion layer will be seeded with a grass mix native to northern WV.

2.3.6 Stormwater Run-on/Run-off Controls Installation

Erosion and sedimentation control will be incorporated into the construction of each stage of the work and will continue through the closure and post-closure periods. Surface water management and erosion controls will be provided by sloping the benches toward slope drains that flow into ditches, and ultimately into a three-cell Sedimentation Pond (Pond).

2.4 Estimates for Final CCR Volume and Closure Area

This section provides an estimate of the maximum quantity of CCR material expected to be contained during landfill closure and an estimate of the largest area ever requiring a final cover system.

2.4.1 Maximum CCR Inventory Estimate

The Landfill is expected to contain 122,200,000 cubic yards of CCRs at full capacity.

2.4.2 Largest Area Requiring Final Cover System

The maximum area to be capped and covered will include the flat areas, outside slopes, and benches. The maximum area will be approximately 344 acres.

2.5 Closure Schedule

The permitted estimated annual CCR disposal rate is 2,200,000 tons. At this disposal rate, the Landfill is expected to have capacity until 2045. Based on actual CCR material placement rates and beneficial use opportunities, the landfill may operate well beyond 2045.

Closure activities will commence within 30 days after the landfill receives the final known volume of CCR [§257.102(e)(1)(i)], by providing the WVDEP a notice of intent to close along with a certification of assurance by a qualified professional engineer that the design of the final cover system meets the requirements of §257.102(d)(3).

The final cover system will be installed only when the landfill is nearing full capacity, as FirstEnergy expects the Landfill life may be extended due to actual disposal rates or beneficial use.

2.5.1 Closure Extension

FirstEnergy anticipates applying for both extensions of the closure timeframe allowed under §257.102(f)(2)(i). It is anticipated that it will take approximately two and a half years to close the Landfill, due to the time required to:

- ▶ Order and secure final closure system components (liner, piping, etc.);
- ▶ Strip vegetation for approximately 344 acres;
- ▶ Grade the site where necessary for final cover system installation;
- ▶ Install the final cover system including liner, soil, and vegetation, placed over approximately 344 acres; and
- ▶ Construction seasons limited to approximately eight months also contribute to the extended closure timeframe.

Assuming the Landfill reaches near full capacity in 2045, closure activities would be projected to be completed in 2048. As described above, the landfill may operate well beyond 2045, in which case the closure dates will be updated.

Once the Landfill closure is complete, a professional engineer will verify and certify that closure has been completed in accordance with the Closure Plan [§257.102(f)(3)]. Within 30 days of completing the Landfill closure, a notification of closure will be prepared and include the professional engineer's certification of completion [§257.102(h)].

2.6 Stormwater and Leachate Controls

The final engineered benches for the Landfill will consist of state permit specified bench widths, bench heights, and side-slope grades as to minimize the possibility of erosion rills forming and minimize the possibility of stormwater flow overtopping the benches and eroding landfill slopes. The benches are constructed with a back slope so that water drains away from the front edge of the bench, minimizing the possibility of overtopping. The longitudinal slope of the benches toward slope drains and diversion channels is no greater than three percent, thus minimizing the possibility of erosion.

The topmost portion of the Landfill will be graded to provide positive drainage toward drainage facilities. The grade will be at least one percent to minimize the possibility of erosion.

The Landfill areas are contained within the same watershed. Surface run-off generally flows south/southeast through the Main Area. The lower portion of the site is occupied by the Pond, which is used as a settling pond for stormwater run-off and leachate flows. An 84-inch reinforced concrete pipe is used to convey run-on water around the Pond from undisturbed areas, then discharges through a National Pollutant Discharge Elimination System Outlet into Robinson Run via a grouted riprap channel.

An underdrain upgradient of the West side of the Main Area collects water from springs and seeps. The underdrain consists of perforated pipes in gravel trenches and conveys the water separately from the leachate detection/groundwater underdrain.

Water from the Pond underdrain and the underdrain system installed in the Lower Area is collected and pumped to the treatment wetlands. Leachate and groundwater that is collected in the leachate detection/groundwater underdrain and leachate collection systems drain to the Pond to undergo treatment.

3.0 Post-Closure Plan

This post-closure plan was prepared in accordance with the CCR Rule, and details the maintenance activities to be performed for a period of 30 years, as required by §257.104(d).

3.1 CCR Post-Closure Plan Overview

The post-closure plan, per §257.104(d)(1)(i through iii), must include the following information:

- Description of the monitoring and maintenance activities, including the frequency that activities will be performed;
- Name, address, and telephone number of the person 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 major items to be maintained and monitored during the post-closure care period are:

- The final cover surface (3.3.1);

- Stormwater drainage features (3.3.2);
- Fencing and gates (3.3.3);
- Groundwater monitoring system (3.3.4); and
- Leachate collection, treatment, and pumping system (3.3.5).

These activities are discussed in detail in the next section. Repairs to the final cover system will be made, as necessary, to mitigate erosion or settlement of the erosion and infiltration soil layers. The final cover system will be inspected at least annually for the 30-year post-closure period. Stormwater drainage features will be de-silted and 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 for 30 years, which consists of at least the following:

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

3.3.1 Final Cover Surface

The final cover surface will be inspected by a qualified person at least annually during the post-closure period. The site will also have a cursory inspection during groundwater sampling events. The surface of the Landfill will be inspected for erosion, thinning vegetation cover, animal burrows, woody vegetation, and cracking in the soil cover which could indicate surface movement. Any observed woody vegetation will be removed. The final cover system will be repaired if any of the aforementioned conditions are observed.

3.3.2 Stormwater Drainage Features

Stormwater drainage channels will be inspected for debris, siltation, and vegetative growth that are reducing channel capacity. Stormwater basins will be inspected for siltation which may cause operational and capacity 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

Site access will be controlled during closure and post-closure using the methods approved for use during site operation. Gates will remain locked at all times when the site is unattended to prevent unauthorized access to the site.

Fencing and gates will be inspected 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. 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 Leachate Collection, Treatment and Pumping

The leachate collection, treatment, and pumping system was described in Section 2.6. The system will be inspected as part of the periodic inspections previously described. Any damage or malfunction observed will be repaired.

3.4 Site Contact Information

The operator can be reached during the post-closure period at the following address and phone number:

FirstEnergy Environmental Department
800 Cabin Hill Drive
Greensburg, Pennsylvania 15601
(724) 837-3000

An e-mail address is not provided due to the potential employee turnover over the 30-year post-closure period.

3.5 Proposed Post-Closure Property Use

The proposed post-closure land use for this facility is anticipated to be for the permanent storage of CCRs and as open green space with controlled access. This is consistent with the surrounding existing and planned use by FirstEnergy. The site is located in rural Harrison County in an area that sees little foreseeable need for alternative land uses. There are no support activities needed to achieve the proposed land use. After closure, FirstEnergy expects the site to be utilized as an "unmanaged wildlife habitat."

4.0 References

GAI Consultants, Inc. 2016.

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