

# Fort Martin Landfills Closure and Post-Closure Plans

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Fort Martin Power Station  
Maidsville, Monongalia County, West Virginia

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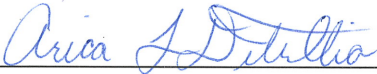
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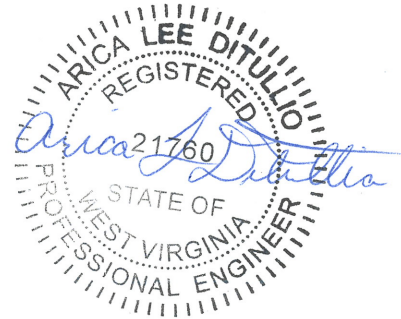
## Certification/Statement of Professional Opinion

The Closure and Post-Closure Plan (Plan) for the Fort Martin Landfill Facility 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 Fort Martin Landfill Facility, consisting of two captive coal combustion residuals (CCR) landfills, is located approximately one-half mile northwest of the Fort Martin Power Station (Station) in Madsville, West Virginia (WV).

The facility consists of two separate landfills. The original landfill, the Fort Martin Landfill (Original Landfill), lies south of the haul road. The Original Landfill contains fly ash and bottom ash, and is unlined. The second landfill, the Fort Martin Expansion Area (Expansion Area) (collectively, the "Landfills"), lies north of the haul road. The Expansion Area contains flue gas desulfurization (FGD) material and/or synthetic gypsum, and is lined. Both landfills are permitted for operations under WV Department of Environmental Protection (WVDEP) Permit No. WV0075752.

## 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 Landfills by placement of a final cover system on each pursuant to the requirements in §257.102(d).

### 2.1 Fort Martin Landfills 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 Fort Martin Original Landfill and Expansion Area are to be closed by leaving the CCR in place and installing a final cover system with 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 Landfills, 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, as needed, will be installed at each landfill. Prior to the installation of the final cover system, any temporary vegetation present will be

stripped and the underlying soils 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 will be vegetated.

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

- Temporary cover soil and/or CCR material will be graded to promote positive drainage and 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 grading that minimizes or prevents 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 for the Original Landfill consists of the following (from the bottom layer to the top layer):

- ▶ An infiltration layer composed of 18 inches of soil;
- ▶ An erosion layer composed of 6 inches of soil; and
- ▶ Vegetation (mulch, fertilizer, and seed).

The proposed final cover system for the Original Landfill meets the design requirements set forth in §257.102(d)(3)(i).

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

- ▶ An infiltration layer composed of a geomembrane and a 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 for the Expansion Area 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 final cover systems 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 landfills will be regraded, if necessary, to

provide positive drainage toward the drainage facilities. For the Expansion Area, a geomembrane will be placed, followed by a geocomposite drainage layer. An erosion layer of soil will be placed, then seeded, fertilized, and mulched.

### **2.3.3 Infiltration Layer Installation**

An infiltration layer consisting of 18 inches of soil will be placed on the Original Landfill. In steep slope areas, the soil will be placed from the bottom of the slope upward.

An infiltration layer consisting of geosynthetic material will be placed on the Expansion Area. The specific geosynthetic layers to be used on the Expansion Area 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 6 inches of earthen material on the Original Landfill and 12 inches of earthen material on the Expansion Area, will be placed as part of the final cover system on top of the infiltration layer for each landfill. In steep slope areas, the erosion layer soil will be placed from the bottom of the slope upward. The erosion layer will support vegetation to stabilize the soil to 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**

Stormwater run-on and run-off controls will be incorporated into the construction of each stage of the work and will continue through closure on each landfill. Surface water management and erosion controls will be provided by sloping the benches toward slope drains that flow into channels. Run-off will be directed to permitted Sedimentation Ponds. Run-on water will be diverted, via channels, around the Landfills.

## **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 each landfill closure and an estimate of the largest area ever requiring a final cover system.

### **2.4.1 Maximum CCR Inventory Estimate**

The Original Landfill is expected to contain 4,390,000 cubic yards of CCRs at full capacity. The Expansion Area is expected to contain 8,770,000 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 of each landfill. The maximum area of the Original Landfill will be approximately 53 acres. The maximum area of the Expansion Area will be approximately 76 acres.

## **2.5 Closure Schedule**

Closure activities will commence within 30 days after each 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 each landfill is nearing full capacity, as FirstEnergy expects the landfills' lives may be extended due to actual disposal rates or beneficial use.

### **2.5.1 Original Landfill**

The estimated annual fly ash and bottom ash disposal rate per WVDEP Permit No. 0075752 is up to 320,000 cubic yards. At this disposal rate, the Original Landfill is expected to have capacity until 2021. Based on actual CCR material placement rates and beneficial use opportunities, the Original Landfill may operate well beyond this date.

#### **2.5.1.1 Original Landfill Closure Extension**

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

- ▶ Secure state closure permits;
- ▶ Order and secure final closure system components (liner, piping, etc.);
- ▶ Strip vegetation for approximately 53 acres;
- ▶ Grade the site where necessary for final cover system installation;
- ▶ Install the final cover system including liner, soil, and vegetation, placed over approximately 53 acres; and
- ▶ Construction seasons limited to approximately eight months also contribute to the extended closure timeframe.

Assuming the Original Landfill reaches near full capacity in 2021, closure activities will be projected to be completed in 2023.

### **2.5.2 Expansion Area**

The estimated annual gypsum disposal rate per WVDEP Permit No. 0075752 is up to 870,000 cubic yards. At this disposal rate, the Expansion Area is expected to have capacity until 2026. Based on actual CCR material placement rates and beneficial use opportunities, the Expansion Area may operate well beyond this date.

#### **2.5.2.1 Expansion Area Closure Extension**

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

- ▶ Secure state closure permits;
- ▶ Order and secure final closure system components (liner, piping, etc.);
- ▶ Strip vegetation for approximately 76 acres;
- ▶ Grade the site where necessary for final cover system installation;
- ▶ Install the final cover system including liner, soil, and vegetation, placed over approximately 76 acres; and
- ▶ Construction seasons limited to approximately eight months also contribute to the extended closure timeframe.

Assuming the Expansion Area reaches near full capacity in 2026, closure activities will be projected to be completed in 2028.

As described above, the Landfills may operate well beyond the projected closing dates, in which case the closure dates will be updated.

Once each 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 each 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 each 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 area surrounding the Original Landfill contains four sedimentation ponds (Nos. 3, 4, 5, and 6) and various stormwater controls. A series of collection channels installed around the Fort Martin Landfill perimeters guide run-off to the sedimentation ponds. The area surrounding the Expansion Area contains a gypsum loading area, Sedimentation Pond No. 2, and various stormwater controls. Force mains from each sedimentation pond connect to a main pipe southeast of the Original Landfill area and drain to the Station, where it is eventually discharged via an National Pollutant Discharge Elimination System (NPDES) permit.

## 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 system 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 Landfills 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 ponds will be inspected for siltation which may cause operational and capacity issues. The drainage features will be cleaned and repaired, as 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.

The Original Landfill sedimentation ponds are enclosed by chain link fences. The fences are constructed of steel posts, frames, and braces. All posts are anchored in concrete.

The Expansion Area sedimentation pond is enclosed by an eight-foot high chain link fence. The fence is constructed with a 45-degree barbed wire area on top of the fence. Corner posts are anchored at least three feet into concrete. A 20-foot wide double swing chain link gate allows access to the pond.

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 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 Monongalia 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

- United States Environmental Protection Agency. 2015.  
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