

# 2020 Annual Landfill Inspection Report

**Amos FGD Landfill**

**John E. Amos Plant  
Appalachian Power Company  
Putnam County, West Virginia**

**December 16, 2020**

**Document ID: GERS-20-038**

Prepared for: Appalachian Power Co.

Prepared by: American Electric Power Service Corporation  
1 Riverside Plaza  
Columbus, OH 43215



**2020 Annual Landfill Inspection Report**  
**John E. Amos Plant: FGD Landfill**

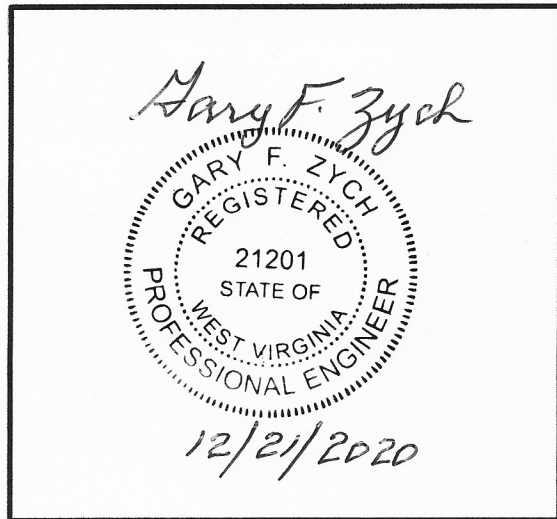
**Inspection Date: December 3, 2020**

**Document Number: GERS-20-038**

PREPARED BY *Dan Murphy* DATE 12/18/2020  
Dan Murphy, P.E.

REVIEWED BY *Brian Palmer* DATE 12/20/2020  
Brian Palmer, P.E.

APPROVED BY *Gary F. Zych* DATE 12/21/2020  
Gary F. Zych, P.E.  
Manager – AEP Geotechnical Engineering



I certify to the best of my knowledge, information and belief the information contained in this report meets the requirements of 40 CFR § 257.84(b).

## Table of Contents

1.0 INTRODUCTION .....	4
2.0 DESCRIPTION OF LANDFILL .....	4
3.0 REVIEW OF AVAILABLE INFORMATION (257.84(b)(1)(i)) .....	4
4.0 INSPECTION (257.84(b)(1)(ii)) .....	5
4.1 Changes In Geometry Since Last Inspection (257.84(b)(2)(i)) .....	5
4.2 Volume (257.84(b)(2)(ii)) .....	5
4.3 Definitions of Visual Observations and Deficiencies .....	5
4.4 Visual Inspection (257.84(b)(1)(ii)) .....	6
4.5 Changes That Effect Stability or Operation (257.84(b)(2)(iv)) .....	8
5.0 SUMMARY OF FINDINGS.....	8
5.1 General Observations .....	8
5.2 Maintenance Items .....	9
5.3 Items To Monitor .....	9
5.4 Deficiencies (257.84(b)(2)(iii)) .....	9

### List of Tables

Table 1- Leachate Holding Pond Water Levels and Drain Flows

Table 2- Table 2- Sediment Collection Pond Levels and Liner Undrain Inflows

### List of Attachments

Attachment A – Photos

Attachment B – Inspection Map

## **1.0 INTRODUCTION**

This report was prepared by AEPSC-Geotechnical Engineering Services (GES) section, in part, to fulfill requirements of 40 CFR 257.84 and to provide the John E. Amos Plant an evaluation of the facility.

Mr. Dan Murphy performed the 2020 inspection of the FGD Landfill at the John E. Amos Plant. This report is a summary of the inspection and an assessment of the general condition of the facility. Mr. Donald Duncan, Plant Environmental Coordinator Senior for the Plant, was the facility contact and Mr. Jack Smith also attended the inspection. The inspection was performed on December 3, 2020. Weather conditions were partly sunny and the temperature ranging from 40°F to 50°F. There was about 1 inch of recent precipitation (snow) over the seven days prior to the inspection.

## **2.0 DESCRIPTION OF LANDFILL**

The landfill was re-permitted on September 7, 2017 by the West Virginia Department of Environmental Protection (Permit No. WV0116254) that reduces the number of sequences and footprint. The landfill now consists of nine sequences that will encompass 191.9 acres for a permitted fill capacity of 36.8 million cubic yards.

The landfill permit revision also allows a design change from a 2 ft thick soil cover cap to a Coal Combustion Residuals (CCR) compliant cap. This permit revision also allows a change for the basal liner design from an 18 inch thick recompacted clay liner (overlain by a geomembrane and leachate collection system) to a 24 inch thick recompacted clay liner (overlain by a geomembrane and a leachate collection system) that is compliant with the Coal Combustion Residuals regulations.

Currently only Sequences 1 through 4, consisting of approximately 100 acres have been developed and contain CCR material. Sequences 1 through 3 drain to the South Valley leachate /sedimentation basin complex.

Sequence 4 completed construction in 2019 and was placed into service. Sequence 4 along with future sequences (5-9) will drain to the North Valley leachate/sedimentation basin complex.

Approximately 16.3 acres within the South Valley had final cover cap installed in 2018 to 2019. The remaining portions of Sequences 1 and 2 are active and are receiving CCR material.

The landfill utilizes sediment collection ponds and two leachate holding basins at the mouth of each drainage area (North and South Areas). The sediment collection ponds are used to collect watershed runoff that is not leachate or CCR contact water. The leachate holding basins collect and contain leachate and contact water generated from the landfill.

## **3.0 REVIEW OF AVAILABLE INFORMATION (257.84(b)(1)(i))**

A review of available information regarding the status and condition of the Landfill which include files available in the operating record, such as design and construction information, previous 7 day inspection reports, and previous annual inspections has been conducted.

Based on the review of the data, it is understood that geomembrane liner underdrain system in an area of Sequence 4 is not functioning as intended, and is being handled as a deficiency. Plans to relieve this water pressure under the geomembrane liner are being developed at the time this report was written.

## **4.0 INSPECTION (257.84(b)(1)(ii))**

### ***4.1 Changes In Geometry Since Last Inspection (257.84(b)(2)(i))***

Construction of Sequence 4 (28.7 acres) was completed. The final cover was completed on the west slope area of the South Valley (16.3 acres). In 2020, the Plateau Sediment Collection Pond was lined with a geomembrane liner.

### ***4.2 Volume (257.84(b)(2)(ii))***

It is estimated that the approximate volume of CCR contained in the Landfill as of early November 2020 to be approximately 8,467,537 CY.

The volume of CCR contained in the Landfill at the end of 2019 is approximately 7,850,610 CY based on aerial survey by AEP. The CCR Tracking Spreadsheet provided by Landfill staff indicates that 616,927 cubic yards of CCR was placed in the Landfill from February to November 2020.

### ***4.3 Definitions of Visual Observations and Deficiencies***

This summary of the visual observations uses terms to describe the general appearance or condition of an observed item, activity or structure. The meaning of these terms is as follows:

- |                    |  |
|--------------------|--|
| Good:              | A condition or activity that is generally better or slightly better than what is minimally expected or anticipated from a design or maintenance point of view.   |
| Fair/Satisfactory: | A condition or activity that generally meets what is minimally expected or anticipated from a design or maintenance point of view.   |
| Poor:              | A condition or activity that is generally below what is minimally expected or anticipated from a design or maintenance point of view.  |
| Minor:             | A reference to an observed item (e.g., erosion, seepage, vegetation, etc.) where the current maintenance condition is below what is normal or desired, but which is not currently causing concern from a structure safety or stability point of view.          |
| Significant:       | A reference to an observed item (e.g. erosion, seepage, vegetation, etc.) where the current maintenance program has neglected to improve the condition. Usually conditions that have been identified in the previous inspections, but have not been corrected. |

Excessive: A reference to an observed item (e.g., erosion, seepage, vegetation, etc.) where the current maintenance condition is above or worse than what is normal or desired, and which may have affected the ability of the observer to properly evaluate the structure or particular area being observed or which may be a concern from a structure safety or stability point of view.

This document also uses the definition of a “deficiency” as referenced in the CCR rule section §257.84(b)(5) Inspection Requirements for CCR Landfills. This definition has been assembled using the CCR rule preamble as well as guidance from MSHA, “Qualifications for Impoundment Inspection” CI-31, 2004. These guidance documents further elaborate on the definition of deficiency. Items not defined by deficiency are considered maintenance or items to be monitored.

A “deficiency” is some evidence that a landfill has developed a problem that could impact the structural integrity of the landfill. There are four general categories of deficiencies. These four categories are described below:

1. Uncontrolled Seepage (Leachate Outbreak)  
Leachate outbreak is the uncontrolled release of leachate from the landfill.
2. Displacement of the Embankment  
Displacement of the embankment is large scale movement of part of the landfill. Common signs of displacement are cracks, scraps, bulges, depressions, sinkholes and slides.
3. Blockage of Control Features  
Blockage of Control Features is the restriction of flow at spillways, decant or pipe spillways, or drains.
4. Erosion  
Erosion is the gradual movement of surface material by water, wind or ice. Erosion is considered a deficiency when it is more than a minor routine maintenance item.

#### **4.4 Visual Inspection (257.84(b)(1)(ii))**

A visual inspection of the Landfill was conducted to identify any signs of distress or malfunction of the landfill and appurtenant structures. Specific items inspected included all structural elements of the landfill perimeter berms, temporary and final covers, drainage features, leachate ponds, open cells, and appurtenances such as chimney drains.

Overall, the facility is in good condition. With the exception of the trapped water under the geomembrane liner in Sequence 4, the landfill is functioning as intended with no signs of potential structural weakness or conditions which are disrupting to the safe operation of the landfill. Inspection photos are included in Attachment A. Additional pictures taken during the inspection can be made available upon request. A map presenting the site is included in Attachment B.

#### **Active Landfill Disposal Areas (Sequences 1, 2, and 4)**

1. During the inspection, the active disposal area was being used for waste placement. The chimney drains were functioning as designed and there was no pooling of contact water around the drains. Waste was being compacted as it was placed.

2. In the eastern bowl of Sequence 4, trapped groundwater has resulted in bubbles underneath the liner. The bubbles were noted in areas where the bottom ash cover soils have eroded away. There were also several areas where the liner had been cut to relieve the trapped groundwater and then the cut liner was repaired.
3. There were erosion rills noted through the protective cover layer/leachate collection system (bottom ash) overlying the geomembrane liner. These erosion rills were limited to the eastern bowl of Sequence 4 near the bubbles under the geomembrane liner noted in Observation 2. These erosion rills are not a concern, as future repair work in this area will result in the replacement of this material.

**Interim Cover Area (Northern Portion of Sequences 1 & 2)**

4. The northern portion of Sequences 1 & 2 has interim cover installed. Generally, the interim cover was in good condition with vegetation and no erosion. The most recent areas of interim cover appeared to have been recently hydro seeded and the vegetation has not become established yet.

**Final Cover Area (Sequence 3)**

5. The final cover construction on the southwest slope of the South Valley is complete and dense grass cover vegetation is established. There were no signs of erosion or instabilities observed.
6. The final cover soil drain pipe outlets exposed in the fabric-formed concrete ditch were in good condition with no signs of obstructions or problems.

**Leachate Holding Ponds**

Table 1- Leachate Holding Pond Water Levels and Drain Flows			
Pond Complex	Approximate Pond Water Surface Elevation (ft-msl)	Drain Pipe	Approximate Flow (gallons per minute)
North Valley Leachate Pond	690.7	Leachate Detection Pipe	Zero
		Liner Underdrain	1 gpm
South Valley Leachate Pond	721.0	Leachate Detection Pipe	Zero
		Liner Underdrain	2 gpm

7. The leachate holding ponds are generally in good condition. There were no holes or problems observed with on the visible sections of the geomembrane liner.
8. The emergency spillways for both leachate ponds were observed to be unobstructed and in good condition for both of the leachate holding ponds.

**Sediment Collection Ponds**

Table 2- Sediment Collection Pond Levels and Liner Undrain Inflows		
Pond Complex	Approximate Pond Water Surface Elevation (ft-msl)	Approximate Landfill Liner Underdrain Inflow (gallons per minute)
North Valley Sediment Pond	691.3	60
South Valley Sediment Pond	717.5	20
Plateau Sediment Pond	916.5	NA

9. The sediment collection ponds were in good condition with no signs of erosion or blockage and appeared to be functioning as designed. Discharge from the sediment collection ponds was unobstructed and appeared to be visually clear (total suspended sediments).
10. The forebay of both North and South Sedimentation Ponds had been dredged since the last inspection. Sediments from the dredging operation were still contained in the dewatering bags.
11. There was a small erosion rill noted upstream of the emergency overflow at the South Valley Sediment pond. Otherwise, the emergency spillway channels from the sediment collection ponds were in good condition with no observable signs of erosion.
12. A section of the floating platform to access the principal spillway for the South Valley Sediment Pond has a damaged handrail.
13. The Plateau Sediment Collection Pond was lined with a geomembrane, which was then covered with aggregates in 2020.

**4.5 Changes That Effect Stability or Operation (257.84(b)(2)(iv))**

Based on interviews with plant personnel and field observations placing Sequence 4 into operation is the only change since the last annual inspection that would affect the stability and operation of the Landfill.

**5.0 SUMMARY OF FINDINGS**

**5.1 General Observations**

The following general observations were identified during the visual inspection:

- 1) In general, the landfill is functioning as intended with the active disposal area placing and compacting CCR material that is sloped to drain towards the bottom ash chimney drains that conveys the contact water to the leachate collection system.
- 2) The Plant is performing regular maintenance and inspections as required. Vegetation is well established for the embankments comprising the leachate holding basins, sediment collection



ponds and temporary soil cover slopes. Other erosion and sedimentation controls are in place and actively being maintained.

- 3) Trees were being cleared in Sequence 6/ Borrow Area A in advance of future work.

### **5.2 Maintenance Items**

The following maintenance items were identified during the visual inspection. Contact GES for specific recommendations regarding repairs:

- 4) Repair the small erosion rill located just upstream of the emergency spillway for the south valley sediment collection pond.

### **5.3 Items To Monitor**

The following items were identified during the visual inspection as items to be monitored, see inspection map for locations:

- 5) Monitor the floating platform for accessing the skimmers for the principal spillway for the south valley sediment collection pond for additional distress or unsafe conditions for people walking out to the principal spillway.

### **5.4 Deficiencies (257.84(b)(2)(iii))**

A deficiency is defined as either 1) uncontrolled seepage (leachate outbreak), 2) displacement of the embankment, 3) blockage of control features, or 4) erosion, more than minor maintenance.

- 6) There is trapped water underneath the liner in the eastern bowl of Sequence 4. The liner system has a network of underdrains designed to collect groundwater and safely convey the water to the sediment collection ponds. It appears that this underdrain system is not functioning as intended in this location and therefore meets the definition of uncontrolled seepage deficiency.

The deficiency was identified on January 15, 2020. Several interim repairs were completed during 2020 but the root cause has not been determined. Plans to remedy this issue are being developed at the time this report was written and these efforts should continue to address this issue before placing CCR in this area.

**ATTACHMENT A**

**Photos**



Photograph 1: View of the eastern bowl of Sequence 4. The location of the groundwater bubbles under the liner are noted by the red arrow.



Photograph 2: View of the bubble under the liner in Sequence 4 area.



Photograph 3: View of the Sequence 4 area.



Photograph 4: View of a chimney drain in the active CCR placement in Sequence 1.



Photograph 5: View of the final vegetated cap on the south face of Sequence 3.



Photograph 6: Typical view of the fabric-formed ditch along the groin of the south face of Sequence 3.



Photograph 7: View of the plateau sediment pond.



Photograph 8: View of the primary spillway at the north valley sediment pond.



Photograph 9: View of the north area leachate holding basin.



Photograph 10: View of the leachate detection outlet and underdrain outlet for the north area leachate holding basin.

The leachate detection pipe is circled in red.



Photograph 11: View of the primary spillway outlet for the south valley sediment collection pond and the leachate detection & underdrain for the south valley leachate holding pond.

The leachate detection pipe is noted by the red arrow and the liner underdrain is noted by the yellow arrow.



Photograph 12: View of the south valley leachate holding pond . The emergency spillway is noted by the red arrow.



Photograph 13: View of the primary spillway for the south valley sediment collection pond. The erosion rill found is noted by the red arrow.

The section of floating platform with a damaged handrail is noted by the yellow circle.



Photograph 14: View of the temporary soil cover on the north side of Sequence 1. This area had been recently hydro seeded.



Photograph 15: View of the liner and chimney drains at the north side of Sequence 4.

**ATTACHMENT B**

**Site Map**



