

2021 Annual Landfill Inspection Report

Amos FGD Landfill

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

December 2021

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John E. Amos Plant: FGD Landfill

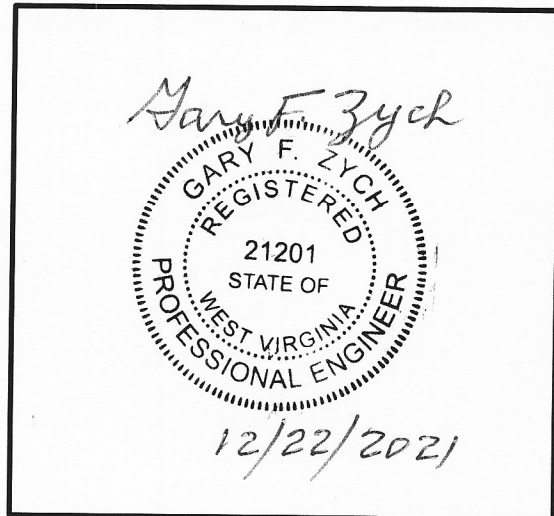
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I certify to the best of my knowledge, information and belief the information contained in this report meets the requirements of 40 CFR § 257.84(b).

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	8
5.3 Items To Monitor	8
5.4 Deficiencies (257.84(b)(2)(iii))	8

List of Tables

Table 1- Leachate Holding Pond Water Levels and Drain Flows

Table 2- Sediment Collection Pond Levels and Liner Underdrain 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. Brian Palmer performed the 2021 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. Doug Berryhill provided safety escort during the inspection. The inspection was performed on November 17, 2021. Weather conditions were mostly sunny and the temperature ranging from the mid to upper 60°F during the inspection. There was no of precipitation on the day of the inspection and 0.74 inches of rainfall within the preceding seven days.

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.

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

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

There has been no changes to the geometry of the landfill since the 2020 inspection other than the placement of additional waste.

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

It is estimated that the approximate volume of CCR contained in the Landfill at the end of November 2021 to be approximately 9,384,019 CY.

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 the east lob of 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. The eastern bowl of Sequence 4, where the deficiency for water under the liner is under investigation, has erosion rills in the protective cover layer above the leachate collection geocomposite. This area of Sequence 4 has been isolated from the operating portion of Sequence 4. 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)

3. Interim cover on northern slope has been mostly removed with placement of waste in Sequence 4. The remaining interim cover is in satisfactory condition.

Temporary Cover Area (Western and Southern Portion of Sequences 1 & 2)

4. The western and southern portion of Sequences 1 & 2 has temporary cover installed. Generally, the temporary cover was in good condition with vegetation and no erosion. The

most recent areas of temporary 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.
7. An active animal borrow was noted in the final cover along the south west side. The animal borrow was filled the day of the inspection.

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	688.9	Leachate Detection Pipe	Zero
		Groundwater Underdrain	1 gpm
South Valley Leachate Pond	720.0	Leachate Detection Pipe	Zero
		Groundwater Underdrain	2 gpm

8. 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.
9. 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 Underdrain Inflows		
Pond Complex	Approximate Pond Water Surface Elevation (ft-msl)	Approximate Landfill Liner Underdrain Inflow (gallons per minute)
North Valley Sediment Pond	690.7	10
South Valley Sediment Pond	717.4	10
Plateau Sediment Pond	916.5	NA

10. 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).

11. The small erosion rill noted upstream of the emergency overflow at the South Valley Sediment pond in the 2020 inspection has been repaired with the placement of riprap.
12. The 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 in good condition appeared to be functioning as designed.

North Valley Soil Nail Walls

14. Based on ground review of the both soil nail walls in the North Valley both appeared to be in good condition with no visible displacement, spalling or damage observed.

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

Based on interviews with plant personnel and field observations there are no changes that 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.

5.2 Maintenance Items

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

- 3) Continue routine mowing of final and temporary covers to ensure proper vegetative growth.
- 4) Address issues like animal burrows and erosion rills as they are found.

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 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 and had not resolved the issue.

An investigation was undertaken in 2021 that included a review of construction and engineering documents, video inspection of the underdrain pipe, and a hydrogeologic investigation to identify a root cause of the trapped water and develop corrective measures. Several conceptual correction measures have been developed and are being evaluated for implementation.

ATTACHMENT A

Photos

AEP GES Dam Inspection

Plant Name: Amos

Inspector: B. Palmer

Unit: FGD Landfill

Date: November 17, 2021

Photo #: 1

Notes: General condition of south valley sediment pond looking northeast



N38 28.722 W81 51.500

Photo #: 2

Notes: General condition of south valley sediment pond discharge structure looking northeast.



N38 28.731 W81 51.518

AEP GES Dam Inspection

Plant Name:

Inspector:

Unit:

Date:

Photo #:

Notes:



Photo #:

Notes:



AEP GES Dam Inspection

Plant Name:

Inspector:

Unit:

Date:

Photo #:

Notes:



Photo #:

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AEP GES Dam Inspection

Plant Name:

Inspector:

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Photo #:

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AEP GES Dam Inspection

Plant Name:

Inspector:

Unit:

Date:

Photo #:

Notes:



Photo #:

Notes:



AEP GES Dam Inspection

Plant Name: Amos

Inspector: B. Palmer

Unit: FGD Landfill

Date: November 17, 2021

Photo #: 11

Notes: General condition of bench drain to north perimeter channel on final cover.



N38 28.873 W81 51.480

Photo #: 12

Notes: General condition of 930 bench road looking northwest



N38 28.884 W81 51.352

AEP GES Dam Inspection

Plant Name:

Inspector:

Unit:

Date:

Photo #:

Notes:



Photo #:

Notes:



AEP GES Dam Inspection

Plant Name: Amos

Inspector: B. Palmer

Unit: FGD Landfill

Date: November 17, 2021

Photo #: 15

Notes: General condition from 950 bench looking south. Final cover and perimeter channel to the right, established temporary cover straight



N38 29.060 W81 51.477

Photo #: 16

Notes: General condition of waste placement in the west side of Sequence 4 looking northeast



N38 29.069 W81 51.452

AEP GES Dam Inspection

Plant Name:

Inspector:

Unit:

Date:

Photo #:

Notes:



Photo #:

Notes:



AEP GES Dam Inspection

Plant Name: Amos

Inspector: B. Palmer

Unit: FGD Landfill

Date: November 17, 2021

Photo #: 19

Notes: General condition of temporary cover along 950 bench



N38 28.850 W81 51.264

Photo #: 20

Notes: General condition of south perimeter channel looking west from below 930 bench road



N38 28.826 W81 51.232

AEP GES Dam Inspection

Plant Name: Amos

Inspector: B. Palmer

Unit: FGD Landfill

Date: November 17, 2021

Photo #: 21

Notes: General condition of final cover looking east



N38 28.822 W81 51.367

Photo #: 22

Notes: Active animal borrow in final cover above 4th bench near south perimeter.



N38 28.800 W81 51.373

AEP GES Dam Inspection

Plant Name:

Inspector:

Unit:

Date:

Photo #:

Notes:



Photo #:

Notes:



AEP GES Dam Inspection

Plant Name:

Inspector:

Unit:

Date:

Photo #:

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Photo #:

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AEP GES Dam Inspection

Plant Name:

Inspector:

Unit:

Date:

Photo #:

Notes:



Photo #:

Notes:



AEP GES Dam Inspection

Plant Name: Amos

Inspector: B. Palmer

Unit: FGD Landfill

Date: November 17, 2021

Photo #: 29

Notes: General condition of North Valley Sedimentation Pond looking east.



N38 29.235 W81 51.675

Photo #: 30

Notes: General condition of outlet structure and walkway for North Valley Sediment Pond.



N38 29.210 W81 51.647

AEP GES Dam Inspection

Plant Name:

Inspector:

Unit:

Date:

Photo #:

Notes:



Photo #:

Notes:



AEP GES Dam Inspection

Plant Name: Amos

Inspector: B. Palmer

Unit: FGD Landfill

Date: November 17, 2021

Photo #: 33

Notes: General condition of North Valley Sedimentation Pond discharge pipe.



N38 29.169 W81 51.732

Photo #: 34

Notes: General condition of North soil nail wall in North Valley.





N38 29.234 W81 51.692

ATTACHMENT B

Site Map



LEGEND

-  PHOTO LOCATION
-  PHOTO DIRECTION

DATE OF PHOTOGRAPHY: 10/23/2019 -GOOGLE EARTH

DRAWING NUMBER: **FIGURE 1**

APPALACHIAN POWER CO.

**AMOS FGD LANDFILL
PHOTOGRAPH MAP**

WINFIELD 2021 WEST VIRGINIA



AEP SERVICE CORP.
1 RIVERSIDE PLAZA
COLUMBUS, OH 43215

PLOT TIME: HOUR:MINUTE
BY: USER:PLOT
PLOT DATE: DD-MM-YYYY
CROSS REF: