

2022 Annual Landfill Inspection Report

Amos FGD Landfill

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

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John E. Amos Plant: FGD Landfill

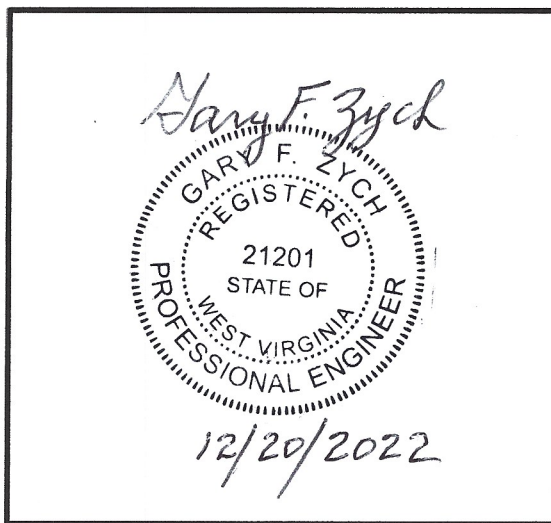
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I certify to the best of my knowledge, information and belief the information contained in this report meets the requirements of 40 CFR § 257.84(b).

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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. Gary Zych performed the 2022 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. Derrick Brumfield and Jack Smith, both from the Amos landfill staff, were present during the inspection. The inspection was performed on December 16, 2022. Weather conditions were mostly sunny and the temperature ranging from the mid 40°F during the inspection. There was 0.11 of precipitation on the day prior to the inspection and a total of 0.41 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. An additional 9 acres of the South Valley slopes had final cover installed in 2022.

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 change to the geometry of the landfill since the last 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 2022 to be approximately 10,025,000 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 (photos 1 & 2). Waste was being compacted as it was placed.
2. The eastern bowl of Sequence 4 (photo 3), where the noted deficiency is located, 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. The repair work is expected to be completed in 2023.
3. There are some areas within the constructed landfill that have interim/ temporary cover. That cover is good condition and no erosion.

Final Cover Area (Sequence 3)

4. The final cover on the southwest slope of the South Valley is in good condition, and dense grass cover vegetation is established (photos 4-6). There were no signs of erosion or instabilities observed.

5. The final cover soil drain pipe outlets at the fabric-formed concrete ditch were in good condition with no signs of obstructions or problems. The fabric-formed ditches along both abutments were in good condition (photos 7-10).
6. The recently completed cover along the referenced 950 bench has been seeded and mulched (photos 11-12).

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	687.8	Leachate Detection Pipe	Zero
		Groundwater Underdrain	Not estimated.
South Valley Leachate Pond	721.9	Leachate Detection Pipe	Zero
		Groundwater Underdrain	Not estimated.

7. The leachate holding ponds are generally in good condition. The landfill staff did not indicate that there have been any issues with the exposed geomembrane. The observation from outside of the security fence did not reveal any apparent issues.
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 Underdrain Inflows		
Pond Complex	Approximate Pond Water Surface Elevation (ft-msl)	Approximate Landfill Liner Underdrain Inflow (gallons per minute)
North Valley Sediment Pond	692.1	10 (as per staff)
South Valley Sediment Pond	717.6	10 (as per staff)
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. Photos 13-14 show the pipe outlet and discharge channel from the North Valley Sediment Pond.
10. The Plateau Sediment Collection Pond was in good condition appeared to be functioning as designed.

North Valley Soil Nail Walls

11. The soil nail walls in the North Valley appeared to be in good condition with no visible displacement, spalling or damage based on a view from the toe of the walls. Photos 15-16 show the north valley sediment pond and soil nail wall.

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 convey 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) Continue to monitor the flowrate and appearance of flow from the leachate collection pipes and underdrain pipes entering the respective ponds for any unusual changes.

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 was not determined and the repairs had not resolved the issue.

An investigation was undertaken in 2021/2022 and a repair plan has been developed. That work will be conducted in 2023.

ATTACHMENT A

Photos



Photo #1 – chimney drain in active area



Photo #2 – chimney drain and active area



Photo #3 –Bowl of Seq 4 to be repaired in 2023



Photo #4 – closed slope of South Valley and ponds



Photo #5 –covered South slope-looking north



Photo #6 – covered South slope-looking south



Photo #7 – South valley perimeter ditch-right abutment



Photo #8 – South valley perimeter ditch- right abutment



Photo #9 – South valley perimeter ditch-right abutment



Photo #10 – South valley perimeter ditch-left abutment



Photo #11 – New cap/cover along 950 bench



Photo #12 – New cap/cover along 950 bench



Photo #13 –Outlet pipe from North Sediment pond



Photo #14 – Outlet channel from North Valley



Photo #15 – Soil nail wall and sediment pond –North Valley



Photo #16 – Soil nail wall and sediment pond-North Valley

ATTACHMENT B

Site Map

