

2022 Annual Landfill Inspection Report

Little Broad Run Landfill

**Mountaineer Plant
New Haven, West Virginia**

December, 2022

**Appalachian Power
Wheeling, WV**

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**2022 Annual Landfill Inspection Report
(CCR Landfill)**

Mountaineer Plant

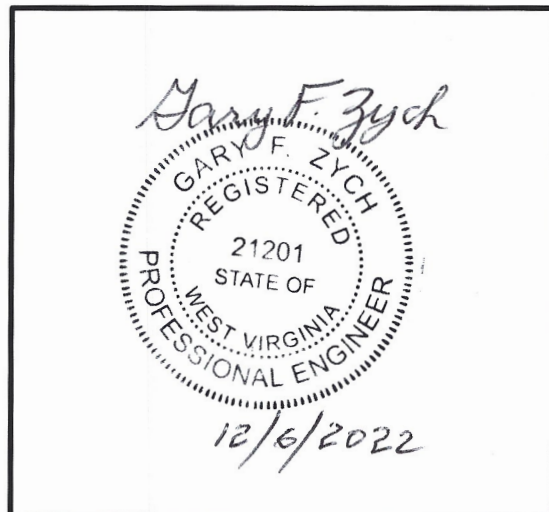
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Dan Murphy, P.E.

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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).

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Inspection Photos

1.0 INTRODUCTION

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

Mr. Dan Murphy, P.E. performed the 2022 inspection of the Landfill at the Mountaineer Plant. This report is a summary of the inspection and an assessment of the general condition of the facility. Mr. Chris Purdum, P.E. of the plant was the facility contact. The inspection was performed on November 15, 2022. Weather conditions were light rain and temperature was in the low to mid 40's (°F). There was 2.75 inches of rainfall recorded by the plant over the seven days prior to the inspection. All portions of the landfill had been recently mowed.

2.0 DESCRIPTION OF LANDFILL

The Landfill is permitted for nine disposal areas (Areas 1 through 9) and a vertical expansion that is designed over the existing landfill area of approximately 209 acres. Areas 1-7 of the landfill are filled to the permitted grades. Areas 8 and 9 are permitted but not constructed. The vertical expansion is currently divided into four development phases (Phase 1-4) and could be adjusted in acreages based on the operational needs. Figure 1 illustrates major components of the landfill facility that includes landfill, leachate collection ponds, bottom ash pond complex and gypsum stacker pad. Figure 2 provides general overview of the Landfill and breakdown of areas (1-9) and vertical expansion Phases 1-4.

The landfill inspection included all the fill areas (1-7) including vertical expansion, storm water management system, leachate collection management system, access roads and ditches, and conveyance channels.

At the time of the landfill inspection, operational activities were performed in the vertical expansion area. The landfill work was performed in accordance with the approved permit. Landfill areas outside of the current active fill area were generally covered with soil cover.

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 reports. Based on the review of the data there were no new signs of actual or potential structural weakness or adverse conditions. There is an open deficiency, and the evaluation of permanent remedial measures to address the open deficiency are ongoing.

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

4.1 CHANGES IN GEOMETRY SINCE LAST INSPECTION (257.84(b)(2)(i))

No modifications have been made to the geometry of the Landfill since the 2021 annual inspection. The geometry of the landfill has remained essentially unchanged, except for the change in topography of the active disposal area.

4.2 VOLUME (257.84(b)(2)(ii))

The total volume of CCR waste disposed at the landfill as of November 2022 was estimated by Chris Purdum with Mountaineer Plant as 25.46 million cubic yards.

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, open cells, and appurtenances such as chimney drains etc.

Overall, the facility is in satisfactory condition. 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 Appendix A. Additional pictures taken during the inspection can be made available upon request. A site map presenting locations of the inspection observations is included in Figure 3.

1. The leachate ponds discharge into the leachate surge pond located at the power plant. The two discharge HDPE pipes (8" and 16" in diameter) are located on the west dike of the pond appeared in good functional condition. The exposed geomembrane liner of the leachate surge pond appeared in good condition, with no signs of tears, punctures or other damage.
2. There are numerous cleanouts for the discharge pipes between the leachate surge pond and leachate pond. All the cleanouts were accessible inside the manhole and appeared in satisfactory condition. There were no signs of leakage noted.
3. Overall, landfill Areas 6 and 7 appeared in satisfactory and stable condition with adequate vegetative cover. The centerline drainage ditch through Areas 6 and 7 is in satisfactory condition. The perimeter ditches were observed to be in satisfactory and functional condition. No standing water was observed in the perimeter ditches.
4. Landfill Area 1 appeared in satisfactory and stable condition. A minor slip located on the outside earthen berm of Area 1 that was repaired in years past is showing signs of minor movement. There were no signs of seepage observed along the toe in this area. Erosion gullies on the southern slope of the earthen perimeter berm were estimated to be about 3 feet deep and did not appear to be newly formed.
5. The perimeter ditch around Area 1 is in satisfactory and stable condition. The gabion check dams along the groin ditch showed minor damage to the wire mesh, but there were no signs of active erosion.

6. Overall, Area 2 slopes appeared in satisfactory and stable condition. There were signs of an erosion rill, about 12 inches deep, along the groin contact, a few feet into the tree line. The soil cover and vegetation on top of Area 2 are in satisfactory and stable condition.
7. Overall, Area 3 appeared in satisfactory and stable condition with good vegetative cover and the perimeter ditches around Area 3 were in satisfactory and functioning condition with no standing water. There was an isolated area of bare soils noted upslope from sump #2.
8. Toe drains and sump collection pits were installed along the bottom of Area 3 slopes to address the ongoing deficiency pertaining to leachate buildup. These elements appeared to be in satisfactory and functional condition. There were no signs of seepage or wetness along the outside slope areas.
9. 10 dewatering wells have been installed in Area 3 in 2022 to address the ongoing deficiency pertaining to leachate buildup. The dewatering wells discharge to a frac-tank with secondary containment. A few of the dewatering wells need to have seals replaced.
10. Overall Area 4 appeared in satisfactory and stable condition. The soil cover, vegetation and rip rap drainage channel appeared to be in satisfactory condition.
11. Landfill Area 5 and the perimeter access road were in satisfactory and stable condition with controlled vegetation.
12. The northwest sediment pond appeared to be functioning as designed and the dikes were in satisfactory and stable condition. Cattail growth was observed throughout the pond area and needs to be cleared from the interior slopes of the dikes. The spillways appeared functional and not obstructed.
13. The upper area of Phase 1A was active. The surface was shaped to drain toward the two chimney drains in this area. Minor ponding was observed around the chimney drains due to the weather.
14. The outside side slope areas of vertical expansion Phase 1A were observed to be in good condition with dense grass cover, with some areas having been recently covered with soil. Recently placed cover soil near the top of the slope of Phase 1A was observed to have been recently seeded and mulched. The perimeter ditches and access road were in satisfactory and stable condition with controlled vegetation.
15. The outside side slope areas of vertical expansion Phase 1B was observed to be in good condition. Recently placed cover soil on the outside slope was seeded and mulched. The slope area and perimeter access road were in satisfactory and stable condition.
16. Parts of Phase 1B were active. The surface was shaped to drain towards the chimney drains. This area appeared satisfactory and in compliance with the permit requirements.
17. The gypsum stackout pad was inspected during this inspection. The radial stacker was not in operation at the time of inspection. The stacker pad has some accumulation of gypsum in and around the sump structure which will need continuous maintenance.
18. The Area 7 fabri-form letdown channel appeared to be functioning as intended.

19. Landfill Area 7 sediment pond appeared to be functioning as designed and in satisfactory condition. Spillways were observed to be unobstructed and in satisfactory condition. Turbidity curtains appeared to be functioning as intended.
20. The leachate collection system of the landfill is collected in a manhole at the east side of the landfill. The leachate pipes were observed to be flowing and free of any obstructions. Some minor iron-stained sediments were accumulating at the outlet in the manhole, but this did not appear to restrict the flows.
21. The ground water interceptor drain outlets were observed to be flowing free and clear of any obstructions.
22. The leachate collection ponds were observed to be in overall good condition. There were some accumulated sediments observed near the gravity feed leachate influent line into Leachate Pond #2.

4.5 CHANGES THAT AFFECT STABILITY OR OPERATION (257.84(b)(2)(iv))

Based on interviews with plant personnel and field observations there were no changes to the landfill since the last annual inspection that would affect the stability 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 and the active cell, inactive cells, closed areas, and storm water ditches are in satisfactory condition. The Plant is performing regular maintenance and inspections as required. Several maintenance items have been noted and are described in Section 5.2.

5.2 MAINTENANCE ITEMS

The following maintenance items were identified during the visual inspection, see site map for locations. Contact GES for specific recommendations regarding repairs:

1. Remove the accumulated sediments by the leachate influent pipe in Leachate Pond #2.
2. Clean out the excessive cattail growth on the interior slopes of the dikes of the northwest sediment pond.
3. Install new seals at the dewatering wells in Area 3 and replace as needed.
4. Seed and mulch the bare soils on the exterior slope of Area 3.
5. Perform maintenance on the Area 1 outside slope berm slip area. Regrade and seed as necessary to establish good vegetation.

6. Repair the erosion gullies on the exterior slope of Area 1. Consider constructing a riprap let down channel.
7. Repair the erosion rill along the groin of Area 2.

5.3 ITEMS TO MONITOR

The following items were identified during the visual inspection as items to be monitored:

1. Continue to perform weekly readings of the piezometers, flow meters and dewatering wells in Area 3 to measure the effectiveness of the permanent remedial measure.
2. Monitor the scarp area on the Area 1 outside slope berm until it has been completely stabilized.
3. Monitor the gypsum stackout pad sump for sediment accumulation and remove as needed.

5.4 DEFICIENCIES (257.84(b)(2)(iii))

There were no new signs of structural weakness or disruptive conditions that were observed at the time of the inspection that would require additional investigation or remedial action.

There is, however, a noted deficiency pertaining to leachate seepage and buildup in Area 3 of the existing landfill. The deficiency related to seepage from the cover soils of Area 3 was identified as part of regular monitoring and inspections on July 9, 2020.

An interim seepage control plan for Area 3 was developed that consisted of installing several shallow toe drains and sump structures to intercept the seepage before it could daylight through the toe areas of the cover soils. The sump structures pump the collected seepage to a storage tank that is then emptied back into the landfill leachate collection system. A study into the thickness and permeability of the final soil cap in Area 3 was completed in March, 2022.

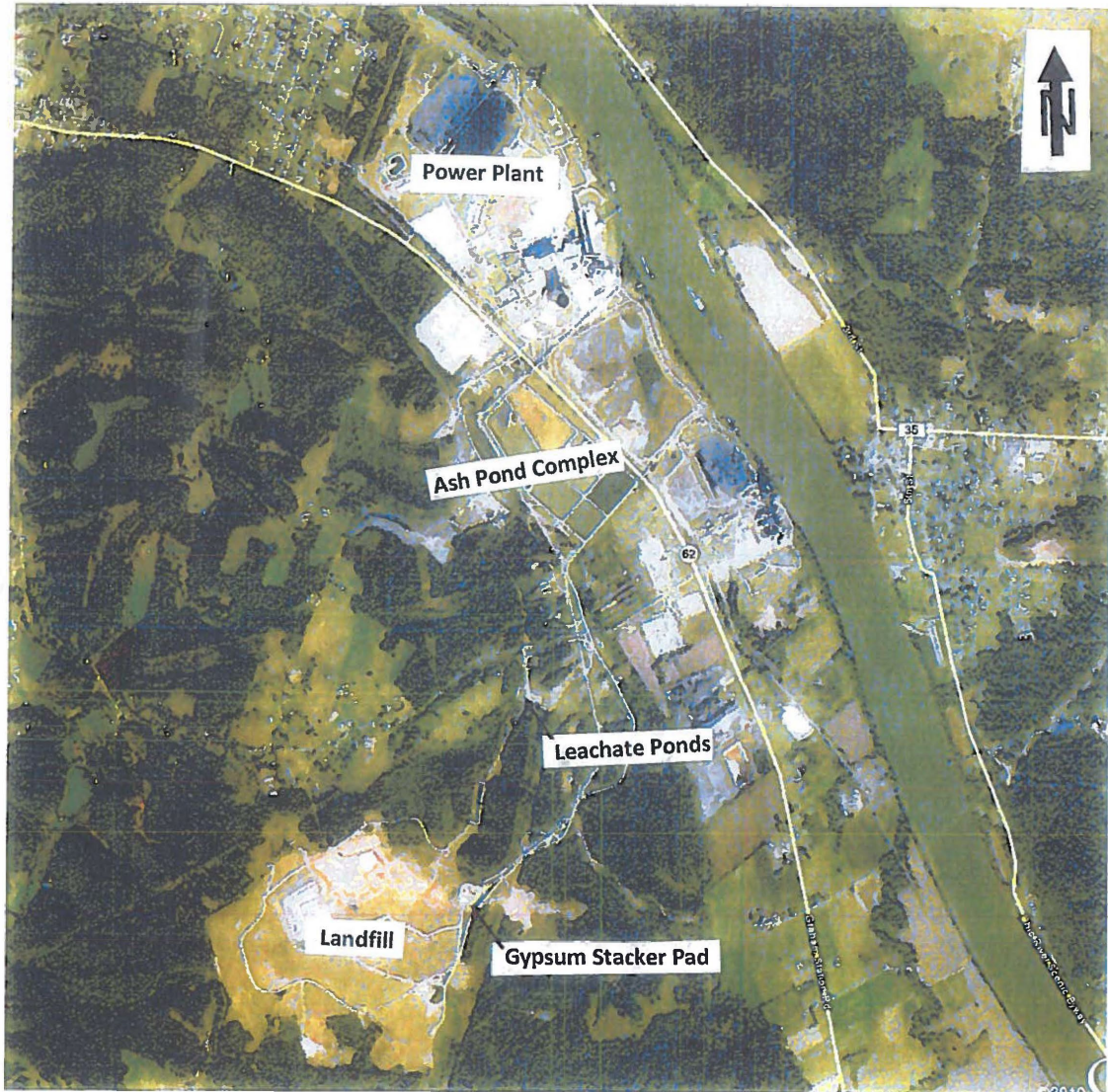
A permanent remediation plan for the seepage build up in Area 3 has been developed and consists of 10 dewatering wells that discharge into a storage tank. The system was installed from June to July 2022 and began dewatering on August 4, 2022. Weekly piezometer readings are being collected to determine the effectiveness of the system.

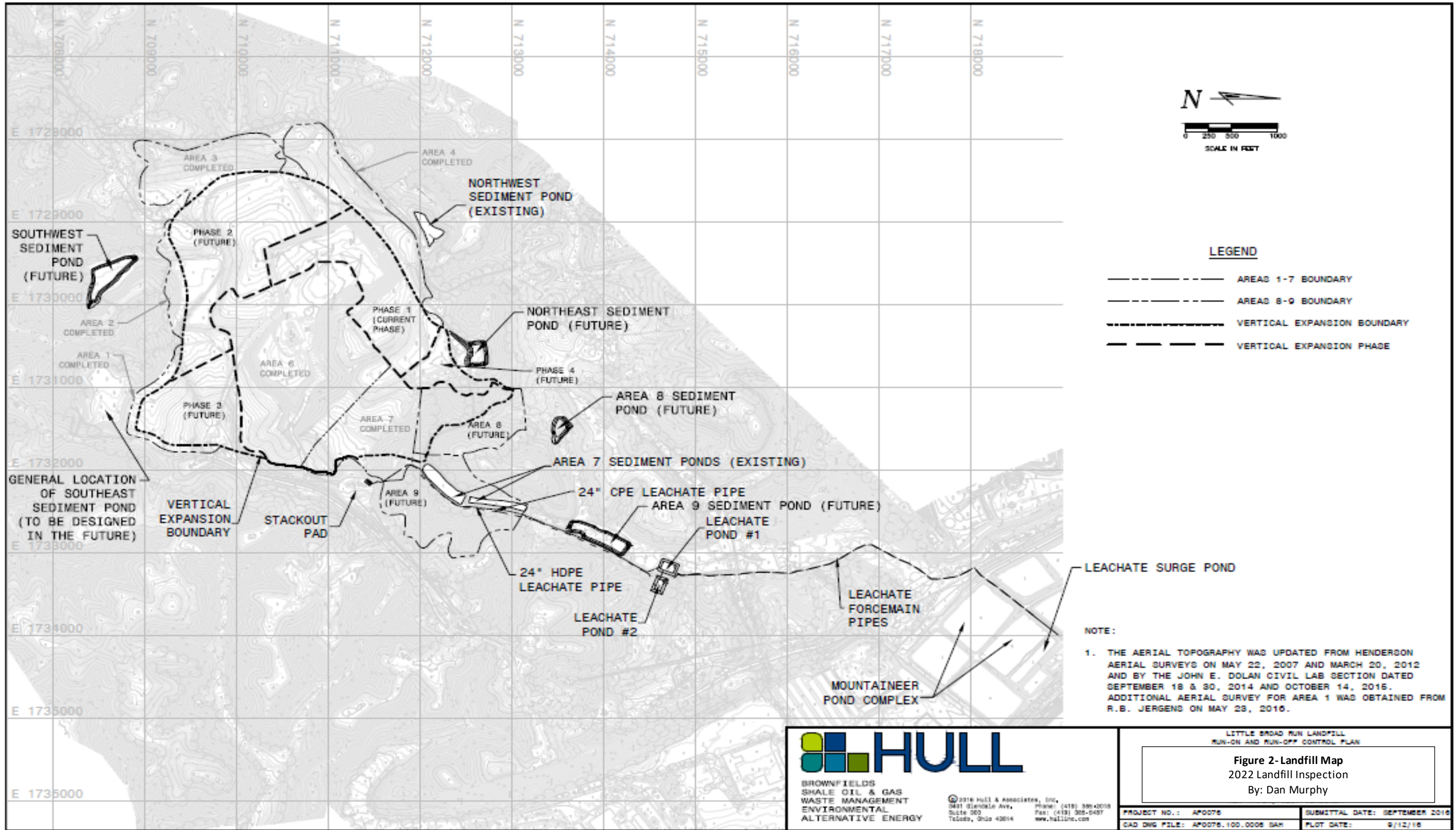
A deficiency is defined as either:

- 1) Uncontrolled seepage (leachate outbreak),
- 2) Displacement of the embankment,
- 3) Blockage of control features, or
- 4) Erosion, more than minor maintenance.

If any of these conditions occur before the next annual inspection contact AEP Geotechnical Engineering immediately.

Figure 1 – Site Location Map
Little Broad Run Landfill-Mountaineer Plant





NOTE:
 1. THE AERIAL TOPOGRAPHY WAS UPDATED FROM HENDERSON AERIAL SURVEYS ON MAY 22, 2007 AND MARCH 20, 2012 AND BY THE JOHN E. DOLAN CIVIL LAB SECTION DATED SEPTEMBER 18 & 30, 2014 AND OCTOBER 14, 2015. ADDITIONAL AERIAL SURVEY FOR AREA 1 WAS OBTAINED FROM R.B. JERGENS ON MAY 23, 2016.

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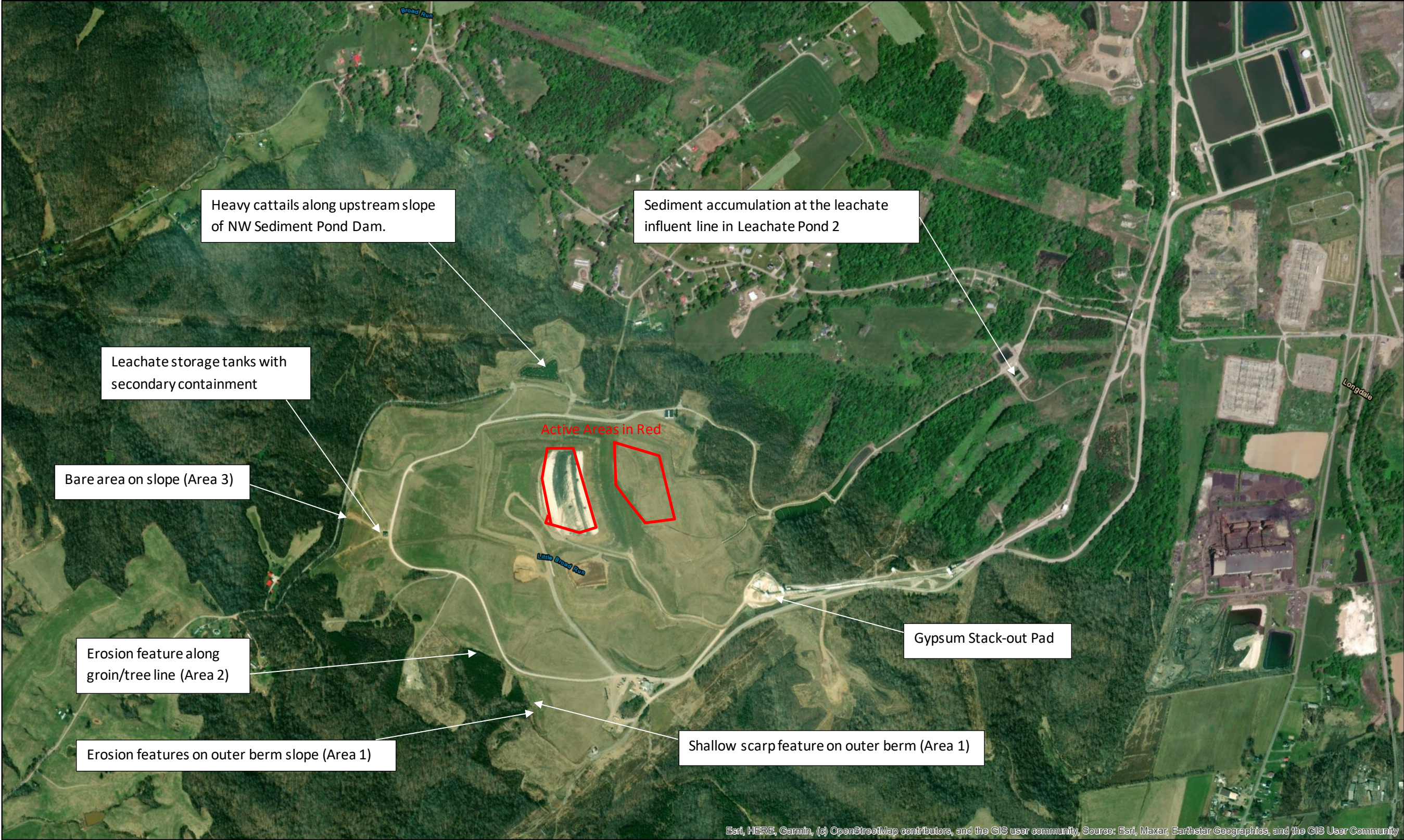
LITTLE BROAD RUN LANDFILL
 RUN-ON AND RUN-OFF CONTROL PLAN

Figure 2- Landfill Map
 2022 Landfill Inspection
 By: Dan Murphy

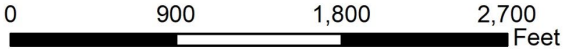
PROJECT NO.: APO076
 SUBMITTAL DATE: SEPTEMBER 2016

CAD DWG FILE: APO076.100.0006 SAH
 PLOT DATE: 9/12/16

Figure 3- Inspection Observations Map



Drawn By: Dan Murphy
Date: November 18, 2022



Appendix A

Inspection Photos



Photograph 1.

View of the leachate surge pond.



Photograph 2.

View of the HDPE influent lines into the leachate surge pond.



Photograph 3.

View of leachate collection pond #1



Photograph 4.

View of sediment accumulation in leachate collection pond #2. The influent line is noted by the red arrow.



Photograph 5.

View of the primary spillway for Area 7 Sediment Pond.



Photograph 6.

View of the outlet of the leachate collection pipes.



Photograph 7.

View of the groundwater interceptor pipes outlet into Area 7 sediment ponds.



Photograph 8.

View of the principal spillway for the northwest sediment pond. Notice the widespread cattail growth.



Photograph 9.

View of the inlet to the outfall underneath County Road 9.



Photograph 10.

View inside a sump #3 located along the toe of Area 3.



Photograph 11.

View of dewatering well #9, located in Area 3.



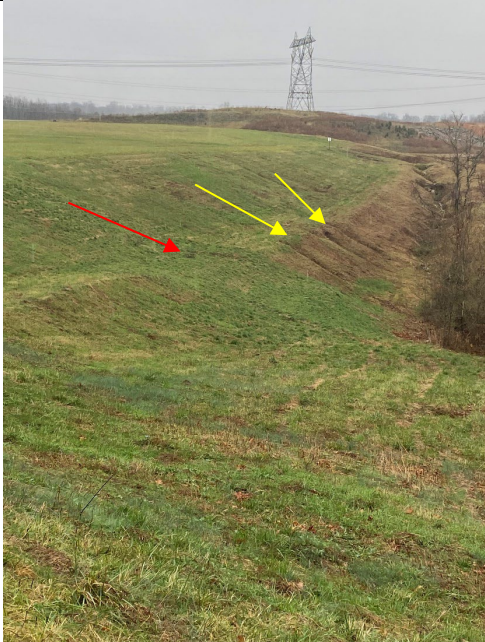
Photograph 12.

View of the leachate storage tank and secondary containment in Area 3.



Photograph 13.

View of some bare soils on the outside of Area 3, adjacent to sump #2.



Photograph 14.

View of the outside slope of Area 1. Erosion rills are noted in yellow (photograph 16) and a shallow slip (photograph 15) noted in red.



Photograph 15.

View of the shallow slip on the outside slope of Area 1.



Photograph 16.

View of erosion rills on the outside slope of Area 1.



Photograph 17.

View of a gabion check dam in the perimeter ditch along the groin of Area 1.



Photograph 18.

Overview of the active area in Phase 1B.



Photograph 19.

View of the active area in Phase 1A.



Photograph 20.

View of a chimney drain in Phase 1B.



Photograph 21.

Overview of the gypsum stackout pad.



Photograph 22.

View of the sediment accumulation in the gypsum stackout pad sump.



Photograph 23.

View of the letdown channel on Area 7.