

2022 Annual Dam and Dike Inspection Report

Bottom Ash Pond Complex

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

December 2022

Prepared for: Appalachian Power Co.
1530 Winfield Rd
Winfield, West Virginia 25213

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



BOUNDLESS ENERGYSM

GERS-22-046

2022 Annual Dam and Dike Inspection Report

John E. Amos Plant

Bottom Ash Pond Complex

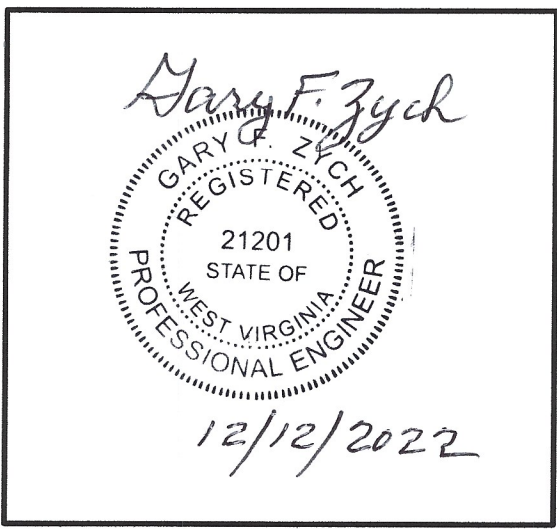
Document Number: GERS-22-046

Inspection Date: October 25, 2022

PREPARED BY *Brian G. Palmer* DATE 12/09/2022
Brian G. Palmer, P.E.(OH)
Principal Civil Engineer

REVIEWED BY *Dan Murphy* DATE 12/9/2022
Dan Murphy, P.E.(OH)
Principal Civil Engineer

APPROVED BY *Gary F. Zych* DATE 12/12/2022
Gary F. Zych, P.E.
Manager – Geotechnical Engineering Section



I certify to the best of my knowledge, information and belief the information contained in this report meets the requirements of 40 CFR § 257.83(b).

ENGINEER'S INSPECTION VERIFICATION STATEMENT

For Compliance with Dam Safety Rules §47-34-15.4.c

I hereby verify that I supervised the visual inspection of the Amos Bottom Ash Complex (ID# 07918) and its appurtenances on October 25, 2022. The attached signed and sealed inspection report documents:

- 1) the current conditions as observed;
- 2) any maintenance items necessary to prolong safe functioning of the dam;
- 3) any conditions observed during the inspection which indicate that the dam has a serious problem⁽¹⁾;
- 4) any conditions that will not allow proper functioning of the dam during normal or maximum reservoir water level conditions.

Gary F. Zych

Signature

Gary F. Zych, P.E.

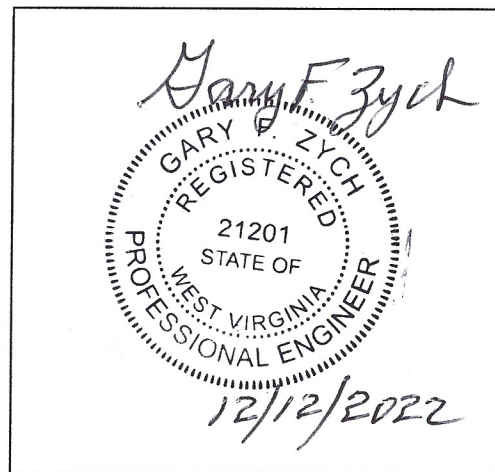
Manager

Geotechnical Engineering Services

American Electric Power Service Corporation

12/12/2022

Date



SEAL

(1) As defined in Section 2.47 of the Dam Safety Rules

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1.0 INTRODUCTION

This report was prepared by AEP- Geotechnical Engineering Services (GES) section, in part, to fulfill the US EPA requirements of 40 CFR 257.83 and the West Virginia Dept. of Environmental Protection, Division of Water Dam Inspection Section and to provide Appalachian Power Co. and John E. Amos (JEA) plant personnel with an evaluation of the facility.

The 2022 dam and dike inspection at the JEA bottom ash complex was conducted by Mr. Brian Palmer on October 25, 2022 with Mr. Derrick Brumfield who served as the facility contact. Weather conditions were sunny, with temperatures in the mid 70° F during the inspection. There was no precipitation during the seven day period prior to the inspection.

2.0 DESCRIPTIONS OF COAL COMBUSTION RESIDUALS (CCR) IMPOUNDMENTS

The bottom ash pond complex is located in Putnam County, West Virginia immediately northwest of the John E. Amos (JEA) Power Plant between State Route 817 and the Kanawha River (Figure 1). The JEA pond complex was used for sedimentation and storage of bottom ash produced as a waste product in burning pulverized coal at the JEA Power Plant. The bottom ash ponds are comprised of Ponds 1A and 1B within the pond complex (Figure 2).

The Bottom Ash Pond, Reclaim Water Pond and Treatment Pond were generally formed by the construction of a dike at the confluence of Bill's Creek with the Kanawha River. The primary dike is on the north side of the Reclaim Water pond and the Treatment Pond. Additional dikes were constructed at the northwest corner of Bottom Ash Pond 1B to redirect Bills's Creek.

The north dike of the Reclaim Water Pond and Treatment (Clearwater) Pond is approximately 800 feet long. The height of the dam is about 29 feet and the design crest width is 10 feet using concrete block face filled with compacted cohesive soil. The top of the dike is at elevation 588.0 feet with the natural ground surface beneath the dikes is at about elevation 559 feet. Field measurements indicate that dam side slopes are 2.5:H to 1:V (Figure 3).

Both the bottom ash ponds discharge sluice water through 36 inch diameter pipes to the Reclaim Water Pond. A portion of the flow into the Reclaim Water Pond is pumped backed to the JEA Power Plant for reuse. The remaining portion flows through a 36 inch diameter pipe to the Treatment (Clearwater) Pond. From the Treatment(Clearwater) Pond the water flows through a 24 in x 38 inch elliptical reinforced concrete pipe that transitions to a 36 inch diameter steel pipe. There is a flange connection from the steel pipe to the 36 inch diameter HDPE pipe that conveys the effluent to six diffuser ports submerged along the bottom of the Kanawha River.

Overflow spillway pipes, 36 inch diameter, are located along the Reclaim Pond and Pond 1B that discharge to Bill's Creek.

During 2022 the CCR material in BAP 1B was removed and the pond repurposed to a wastewater pond. In October 2022 all sluicing of CCR material to the pond complex had stopped. CCR removal and pond repurposing to continue until 2024.

3.0 REVIEW OF AVAILABLE INFORMATION (257.83(b)(1)(i))

A review has been conducted of available information regarding the status and condition of the JEA Bottom Ash Pond Complex that includes files available in the operating record such as previous 7-day inspection reports, piezometric measurements and previous annual inspections.

4.0 INSPECTION (257.83(b)(1)(ii))

4.1 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 or | A condition or activity that generally meets what is minimally Satisfactory: 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 previously 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 §257.83(b)(5) Inspection Requirements for CCR Surface Impoundments. 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 dam has developed a problem that could impact the structural integrity of the dam. There are four general categories of deficiencies. These four categories are described below:

1. Uncontrolled Seepage
 - a. Uncontrolled seepage is seepage that is not behaving as the design engineer has intended. An example of uncontrolled seepage is seepage that comes through or around the embankment and is not picked up and safely carried off by a drain. Seepage that is collected by a drain can still be uncontrolled if it is not safely collected and transported, such as seepage that is not clear. Seepage that is unable to be measured and/or observe it is considered uncontrolled seepage. [Wet or soft areas are not considered as uncontrolled seepage, but can lead to this type of deficiency. These areas should monitored my frequently.]
2. Displacement of the Embankment
 - a. Displacement of the embankment is large scale movement of part of the dam. Common signs of displacement are cracks, scraps, bulges, depressions, sinkholes and slides.
3. Blockage of Control Features
 - a. Blockage of Control Features is the restriction of flow at spillways, decant or pipe spillways, or drains.
4. Erosion
 - a. 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.

4.2 Changes in Geometry Since Last Inspection (257.83(b)(2)(i))

Since the 2021 inspection changes have occurred to geometry of the pond complex in BAP 1B. As part of the closure and repurposing, BAP 1B has had all CCR material removed, the northwest dike that was constructed of bottom ash was removed and reconstructed with soils, a new south dike was constructed along the east side of BAP 1B next to the internal splitter dike that separates BAP 1A and 1B, and the new wastewater pond has been lined with a dual liner system. The geometry of the remaining areas of the pond complex are generally unchanged.

4.3 Instrumentation (257.83(b)(2)(ii))

The location and type of instrumentation is shown on Figure 2 and select piezometers are depicted in cross section along the perimeter dike embankment in Figure 3. The maximum recorded readings of each instrument since the previous annual inspection is shown in the table below.

Table 1 INSTRUMENTATION DATA Bottom Ash Pond Complex			
Instrument	Type	Maximum Reading since last annual inspection	Date of reading
PZ-1	Piezometer	573.21	November 9, 2021
PZ-3	Piezometer	566.99	February 15, 2022
PZ-6	Piezometer	566.55	February 15, 2022
PZ-7	Piezometer	568.22	February 15, 2022

4.4 Impoundment Characteristics (257.83(b)(2)(iii, iv, v))

Below is a summary of the minimum, maximum, and present depth and elevation of the impounded water & CCR since the previous annual inspection; the storage capacity of the impounding structure at the time of the inspection; and the approximate volume of the impounded water and CCR at the time of the inspection.

IMPOUNDMENT CHARACTERISTICS		
Bottom Ash Pond Complex		
	Bottom Ash Pond 1A	Bottom Ash Pond 1B
Water Surface Elevation at time of the inspection	~581 ft.	NA.
Approximate Minimum, Maximum, and Present depth/elevation of impounded water since last annual inspection	1 ft./579.1 ft. elev. 22 ft./581-ft. elev. 15 ft./581.2-ft. elev.	NA NA NA
Approximate Minimum Maximum and Present depth/elevation of CCR since last annual inspection	<2 ft./561 ft. elev. 21 ft./580 ft. elev. <2 ft.)/561 ft. elev.	<1 ft./560 ft. elev. ~5 ft./564 ft. elev. None
Storage Capacity of impounding structure at the time of the inspection	~195 AC-Ft	~157 AC-Ft
Approximate volume of impounded water at the time of the inspection	~168 AC-Ft.	None
Approximate volume of CCR at the time of the inspection	~40 AC-Ft	None

Notes:

1. Assumes base of impoundment to be at an elevation of 559 ft. based on design drawings.
2. All CCR material have been removed from 1B and the area repurposed as a wastewater pond and was not yet operational at the time of inspection. The storage capacity of the wastewater pond located within the footprint of BAP 1B is 157 ac-ft.

4.5 Visual Inspection (257.83(b)(2)(i))

A visual inspection of the Bottom Ash Pond Complex was conducted to identify any signs of distress or malfunction of the impoundment and appurtenant structures. The inspection also included hydraulic structures underlying the base of the dike. Specific items inspected included all structural elements of the dam such as inboard and outboard slopes, crest, and toe; as well as appurtenances such as the outlet structure at the Bottom Ash Pond 1B, Reclaim Pond and the primary decant structure located within the Treatment (Clearwater) Pond. Photographs of the inspection are in Attachment A with photograph locations shown in Figure 4.

The following summarizes the visual inspection of each element:

- The Stone wall along the East side of the Clearwater pond appeared in good condition with no observed signs of settlement or movement.

- The stone wall along the crest of the Main Dam along the Clearwater and Reclaim Ponds appeared in good condition with no signs of settlement or movement noted.
- The interior splitter dike between the Reclaim and Clearwater pond appeared in good condition.
- The downstream slope of the Main Dam was observed to be in good condition. No significant settlement, misalignment, erosion, or seepage were observed. An animal burrow was found .
- An animal burrow was found just above the riprap revetment on the downstream toe of the Main Dam. Otherwise, the riprap revetment appeared in good condition. Woody vegetation continues to exist along the toe area and Bills Creek but is being maintained as possible.
- No erosion or seepage was noted along the pipe that extends out from downstream slope of the Main Dam at the Reclaim pond. This pipe was permanently abandoned by welding a steel plate at the discharge end of the pipe.
- As noted above the Northwest dike has been reconstructed with soil and a geosynthetic liner installed on the interior slope. The exterior slope was constructed steep as the area to the northwest was used as a temporary pond during construction. The exterior slope has been reconstructed since the inspection.
- The reclaim pond's 36 inch diameter HDPE emergency overflow pipe was observed to be in good condition from the block wall and no erosion was noted along the pipe. The outlet to the 36 inch diameter overflow pipe was free of vegetation and could flow unobstructed to Bills Creek.
- The 36 inch diameter HDPE overflow pipe at the Wastewater Pond (formally BAP 1B) was observed to be in good condition The inlet and outlet to the overflow pipe were observed to be in satisfactory condition.
- The primary decant structure in the Clearwater Pond (outfall 003) was observed to be in excellent condition and no debris is entrained on trash rack that would impede discharge from the pond. No concrete spalling or other defects were observed at the upstream decant structure
- The splitter dikes between BAP 1A/1B and BAP 1A/Reclaim appear to be in satisfactory condition with no signs of settlement or movement.
- A new Southeast Dike has been built along the south end of the east side of the Wastewater pond to separate the work area for the BAP 1A/1B splitter constructed of CCR material. The contractor working in Wastewater Pond continues to work to manage the seepage from BAP 1A and maintain the splitter dike integrity.
- Bottom Ash Pond 1A is in operation. Receiving plant operation water until the Wastewater Pond can be placed in service
- The primary outfall (003) downstream headwall where the effluent discharges into the Kanawha River appeared to be in good condition. Flow from the pond is discharged through submerged diffuser ports.

4.6 Evaluation of Instrumentation Data

The instrumentation for the pond complex consists of staff gauges used to measure the pond water levels and four piezometers installed along the perimeter dike.

The elevations of pond water levels and respective piezometer water levels have remained fairly constant with no adverse trends observed that would impair the structural stability of the perimeter dike. Piezometer hydrographs shown in Figure 5.

4.7 Changes That Effect Stability or Operation (257.83(b)(2)(vii))

Based on interviews with plant personnel and field observations the only changes that effect stability and operations was the CCR Removal and repurposing of BAP 1B into a new Wastewater Pond. The new dikes appear stable and ready for operation.

5.0 CORRECTIVE MEASURES TAKEN TO REMEDY DEFICIENCY OR RELEASE SINCE LAST INSPECTION

Based on the 7-day inspections, the 30-day instrumentation readings and interviews with plant personnel there have been no deficiencies or releases observed during any inspection since the last annual inspection.

6.0 SUMMARY OF FINDINGS

6.1 General Observations

Overall the facility is in good condition. The Main Dam appears to be is functioning as intended with no signs of potential structural weakness. The newly constructed Northwest and Southeast Dikes appear in good condition with final construction stabilization (final grading and seeding) needed as the construction project continues. The outfall structures appear to be functioning as intended.

6.2 Items to Monitor

Bottom Ash Pond Complex

1. Static water levels should continue to be measured on its current frequency for piezometers PZ-1, PZ-3, PZ-6 and PZ-7.
2. Monitor the Dam and dikes as during construction activities for movement or changes in conditions.
3. The pond pool stages should continue to be recorded on a periodic basis.
4. Monitor and remove animal burrows as they appear

6.3 Maintenance Items

The following maintenance items were identified during the visual inspection:

Bottom Ash Pond Complex

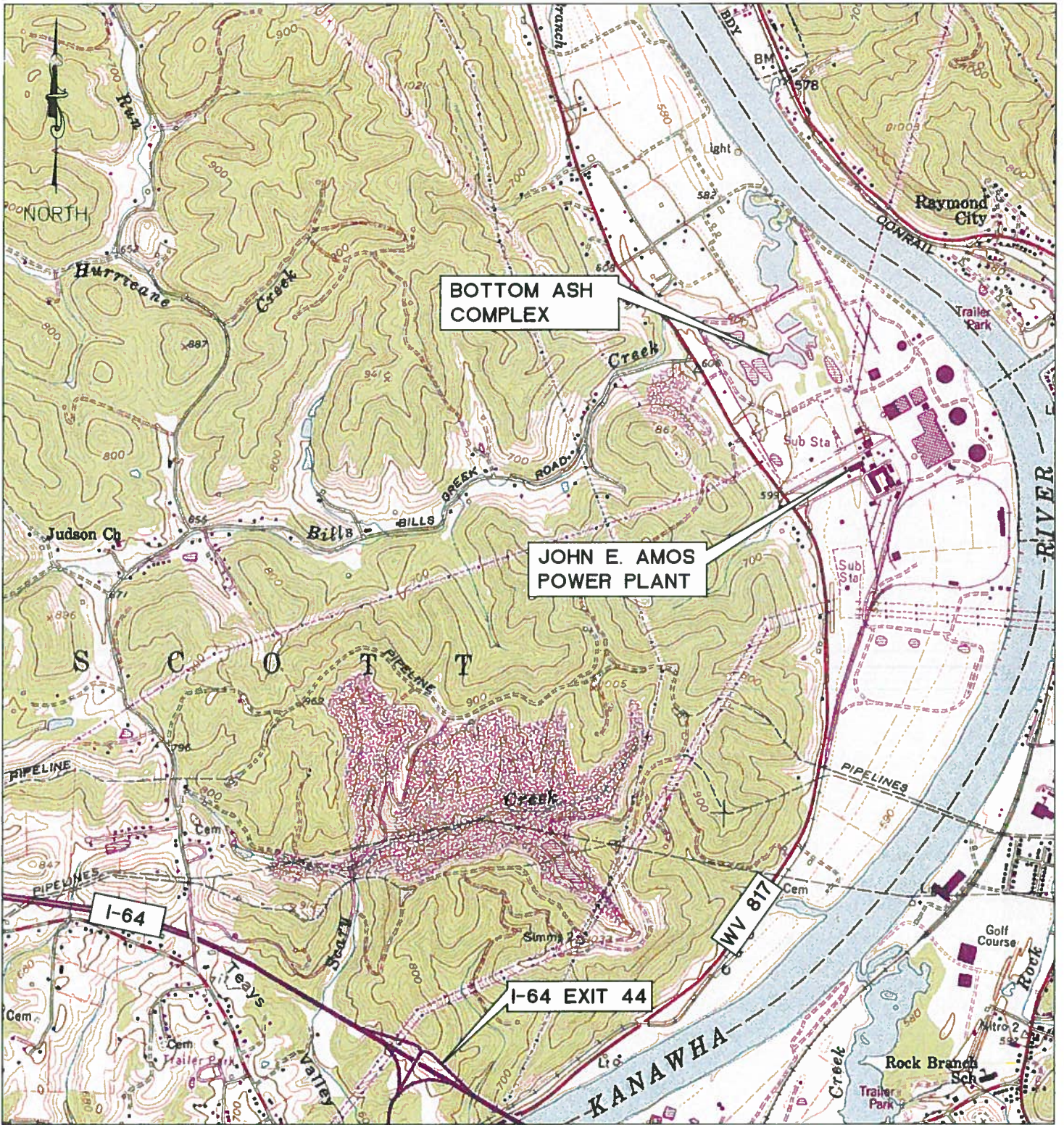
1. Control of the vegetation cover (i.e. mowing) should be continued on its current regularly scheduled basis.
2. Safely remove the woody vegetation that is growing in the riprap at the toe of the Main Dam and along Bills Creek.

6.4 Deficiencies (257.83(b)(2)(vi))

There were no 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 were no deficiencies noted during this inspection or during any of the periodic inspections. A deficiency is defined as either 1) uncontrolled seepage, 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

If you have any questions with regard to this report, please contact Brian Palmer at 614-716-3382 (Audinet: 200-3382) or Gary Zych at 614-716-2917 (Audinet: 200-2917).

Figures



SAINT ALBANS, WV
7.5 MINUTE SERIES
UPDATED 1976

**JOHN E. AMOS PLANT
BOTTOM ASH COMPLEX**

LOCATION MAP

PUTNAM COUNTY

REV NO.

DATE

DESC.



gai consultants

CHARLESTON OFFICE
300 SUMMERS STREET,
SUITE 1100
CHARLESTON, WV 25301
304-926-8100

DATE

7/8/13

SCALE

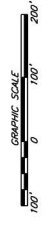
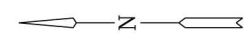
1"=2000'

FIGURE NUMBER

1

SCALE 1" = 2000'





NOTES

1. BASE MAP PROVIDED BY AEP SERVICE CORPORATION. AERIAL PHOTOGRAPHY DATED APRIL 15, 2007.
2. SEE DRAWING SHEET 2 FOR SECTIONS, SPILLWAY PIPE PROFILES, AND DETAILS.
3. PREVIOUSLY PLACED TELL AND CONCRETE LINING SHALL BE REMOVED FROM THE OPEN CHANNEL SPILLWAY AND REPLACED WITH ENGINEERED FILL AS DESCRIBED IN THE ACCOMPANYING REPORT.

LEGEND

- BORING LOCATION
- PIEZOMETER LOCATION

DRN BY: Amanda Graphics

DATE: 07/12/2016

SCALE: N. T. S

APPALACHIAN POWER COMPANY

AMOS PLANT

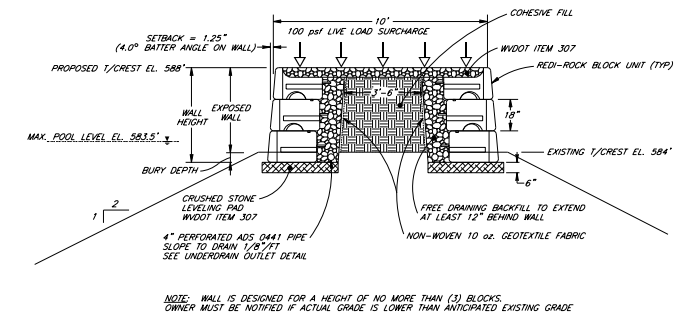
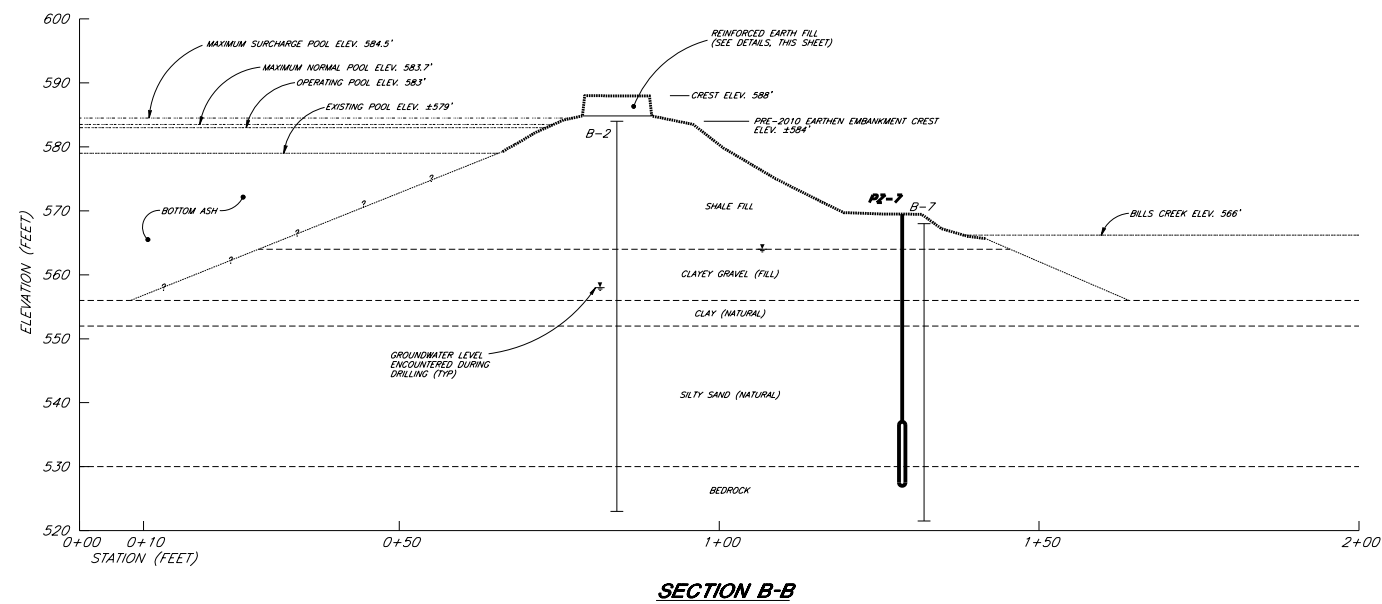
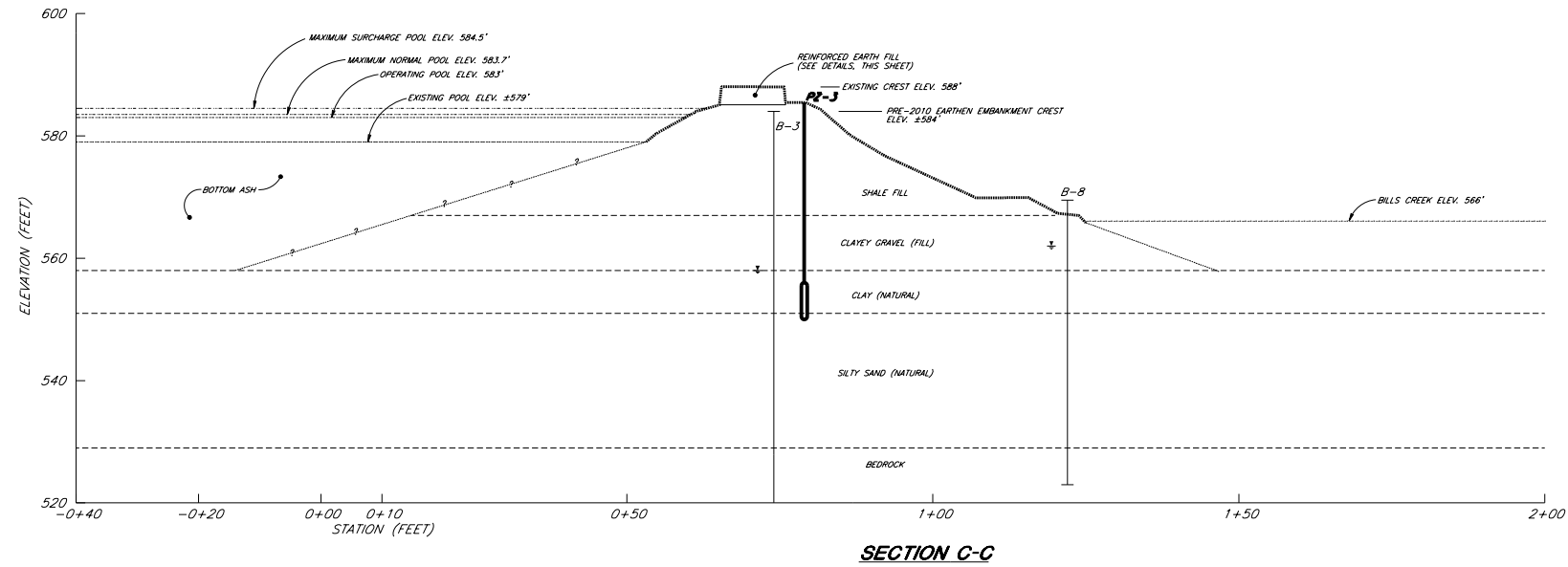
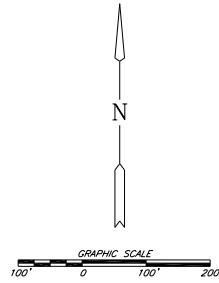
WEST VIRGINIA

BOTTOM ASH POND COMPLEX

AEP SERVICE CORP.
1 RIVERSIDE PLAZA
COLUMBUS, OH 43215



FIGURE 2



DETAIL - REINFORCED EARTH FILL TYPICAL SECTION
NOT TO SCALE

(EXCERPT FROM "BOTTOM ASH STORAGE AREA MODIFICATIONS 2010 DIKE RAISING, SECTIONS AND DETAILS"
PREPARED BY: AMERICAN ELECTRIC POWER, DATED 2/26/10 REV 6/16/11)

PIEZOMETER SCREEN

NOTES: 1. SEE SHEET 1 OF 2 FOR SECTION LOCATIONS.
2. EXISTING GROUND SURFACE FROM SURVEY DATA DATED 9/9/15 PROVIDED BY AEP.

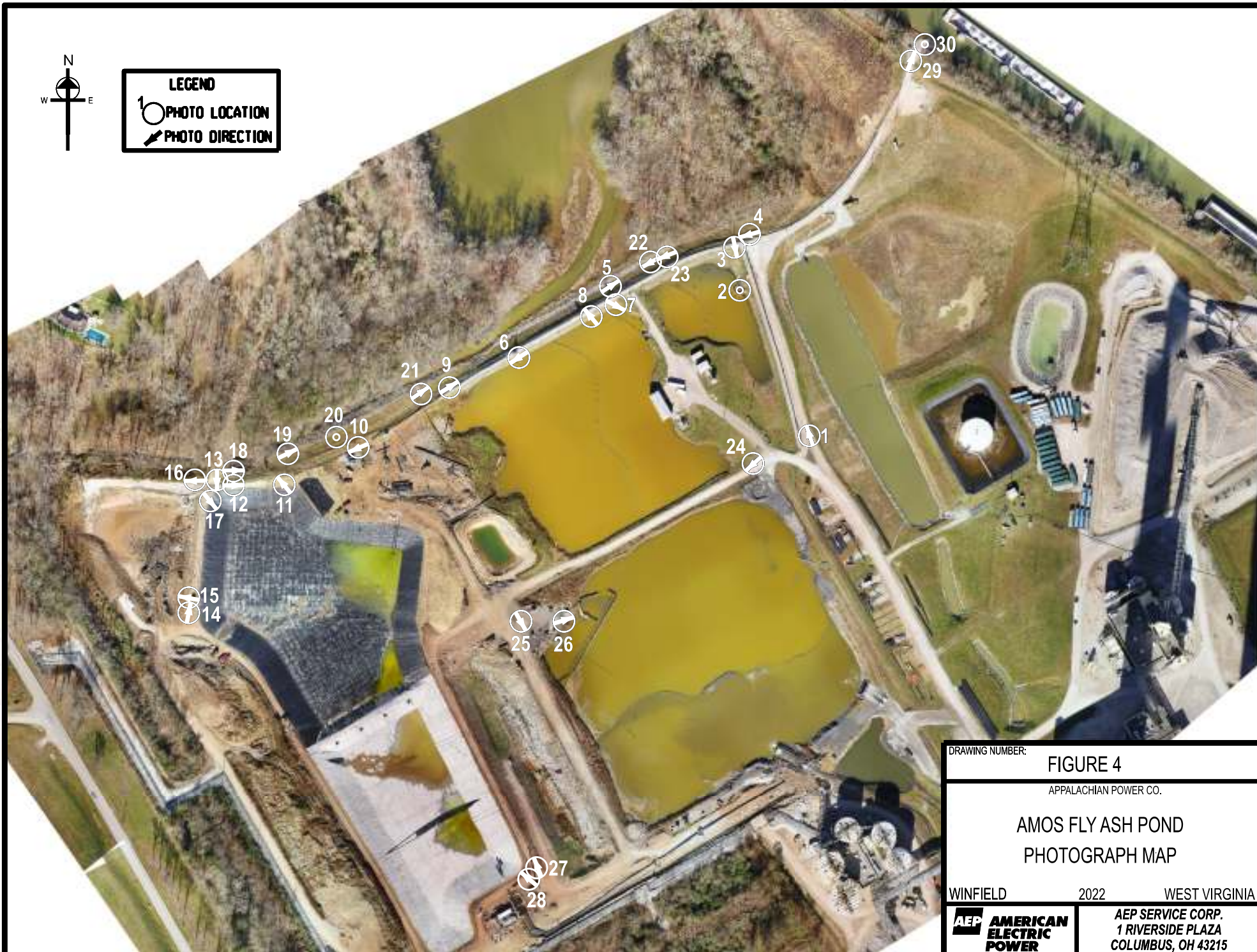
DRN BY: <i>Amanda Graphics</i>	APPALACHIAN POWER COMPANY			AEP SERVICE CORP. 1 RIVERSIDE PLAZA COLUMBUS, OH 43215
DATE: 07/12/2016	SCARY	AMOS PLANT WEST VIRGINIA		
SCALE: N. T. S	EMBANKMENT SECTIONS & DETAILS		FIGURE 3	



LEGEND

1 PHOTO LOCATION

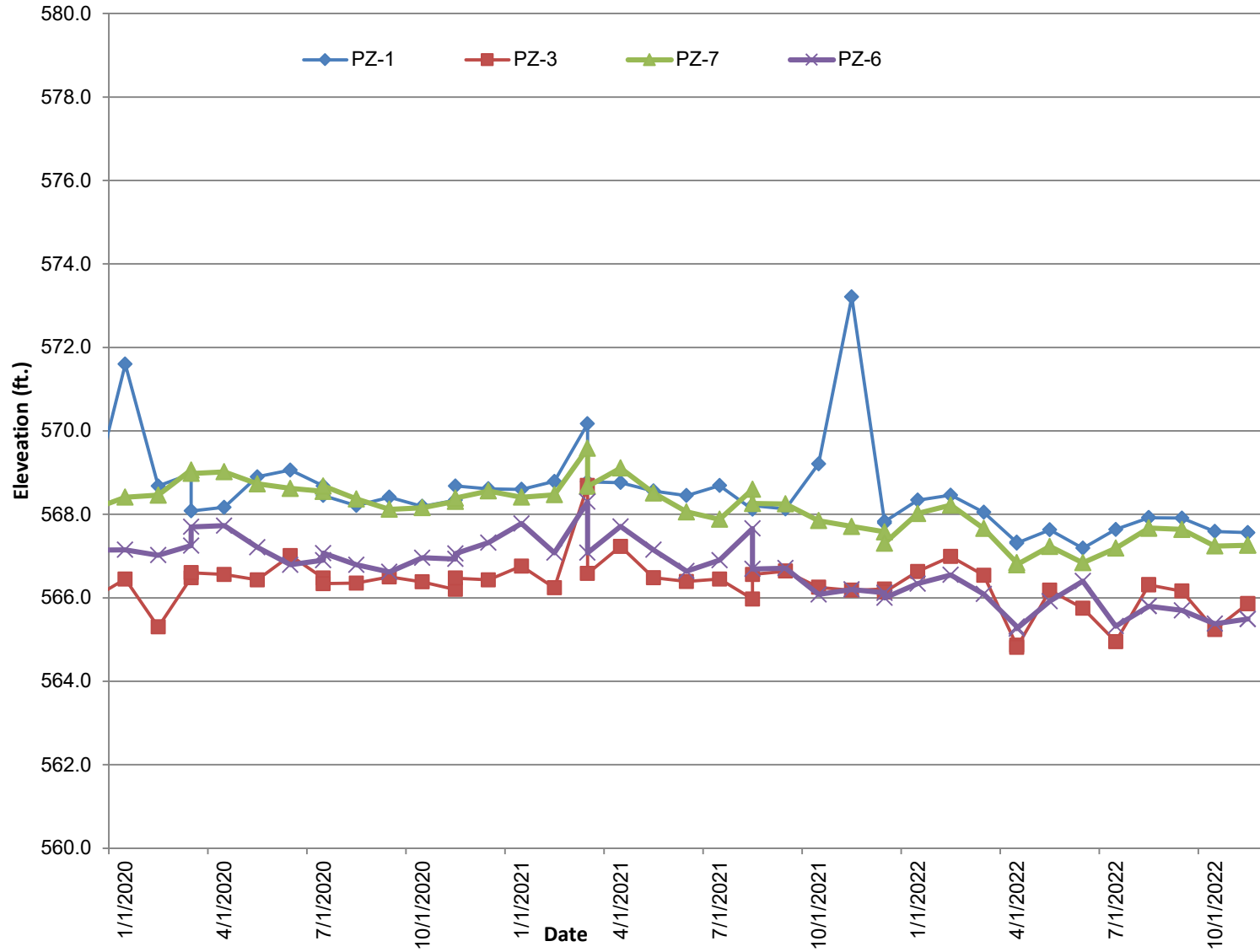
PHOTO DIRECTION



DRAWING NUMBER: FIGURE 4	
APPALACHIAN POWER CO.	
AMOS FLY ASH POND PHOTOGRAPH MAP	
WINFIELD	2022 WEST VIRGINIA
AMERICAN ELECTRIC POWER	AEP SERVICE CORP. 1 RIVERSIDE PLAZA COLUMBUS, OH 43215

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

FIGURE 5
John E Amos Plant
Bottom Ash Pond
Piezometer Readings



ATTACHMENT A

Photos

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 #:

Notes:



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 #:

Notes:



AEP GES Dam Inspection

Plant Name:

Inspector:

Unit:

Date:

Photo #:

Notes: General condition of the exterior and crest of the stone wall along Main Dam along Reclaim Pond



Photo #:

Notes: General condition of interior slope of Main Dam at Wastewater Pond (formally BAP 1B)



AEP GES Dam Inspection

Plant Name:

Inspector:

Unit:

Date:

Photo #:

Notes: General condition of emergency spillway inlet at top of Wastewater Pond (formally BAP1B)



Photo #:

Notes: General condition of interior slope of Wastewater Pond (formally BAP 1B) along main dike



AEP GES Dam Inspection

Plant Name:

Inspector:

Unit:

Date:

Photo #:

Notes:



Photo #:

Notes:



AEP GES Dam Inspection

Plant Name: Amos

Inspector: B. Palmer

Unit: Bottom Ash Pond

Date: October 25, 2022

Photo #: 15

Notes: General condition of of the temporary stormwater pond at northwest corner. CCRs removed from area and area to be backfilled when storm water can be routed to wastewater pond



N38 28.656 W81 50.023

Photo #: 16

Notes: Crest of the historical dike at the northwest corner.



N38 28.707 W81 50.015

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

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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: Bottom Ash Pond

Date: October 25, 2022

Photo #: 29

Notes: General condition of the approach to Outfall 003



N38 28.870 W81 49.652

Photo #: 30

Notes: General condition of of Outfall 003 diffuser into the river



N38 28.874 W81 49.642