

# 2023 Annual Dam and Dike Inspection Report

**Bottom Ash Pond Complex**

**Mountaineer Plant  
Appalachian Power Co.  
Mason County, West Virginia**

**November 2023**

Prepared for: Appalachian Power Co. – Mountaineer Plant  
1347 Graham Station Road  
Letart, West Virginia 25253

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



**Document ID: GERS-23-047**

# 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 Mountaineer Bottom Ash Complex (ID# 05307) and its appurtenances on October 30, 2023. The attached signed and sealed inspection report documents:

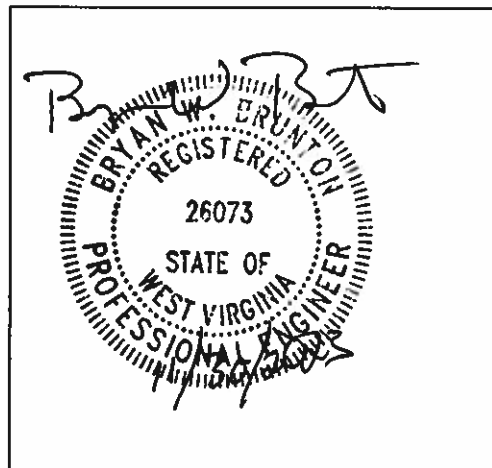
- 1) the current conditions as observed;
- 2) any maintenance items necessary to prolong safe functioning of the dam;
- 3) any conditions observed during the inspection which indicate that the dam has a serious problem<sup>(1)</sup>;
- 4) any conditions that will not allow proper functioning of the dam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



Signature  
Bryan W. Brunton, P.E.  
Manager  
Geotechnical Engineering Services  
American Electric Power Service Corporation

11/30/2023

Date



SEAL

<sup>(1)</sup> As defined in Section 2.47 of the Dam Safety Rules

**DAM & DIKE INSPECTION REPORT  
Mountaineer Bottom Ash Complex  
(Facility ID #05307)**

**GERS-23-047 – Revision 0**

MOUNTAINEER PLANT

NEW HAVEN, WV

**INSPECTION DATE: October 30, 2023**

**PREPARED BY** *Brian G Palmer* **DATE** 11/28/2023  
**Brian G Palmer, P.E.**

**REVIEWED BY** *Mazin Al-Zou'bi* **DATE** 11/28/2023  
**Mazin Al-zou'bi, Ph.d. , P.E.**

**APPROVED BY** *Bryan W. Brunton* **DATE** 11/30/2023  
**Bryan W. Brunton, P.E.**  
**Manager – Geotechnical Engineering Services**



**PROFESSIONAL ENGINEER  
SEAL AND SIGNATURE**

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

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## **1.0 INTRODUCTION:**

AEPSC Civil Engineering administers the company's Dam Inspection and Maintenance Program (DIMP). As part of DIMP, staff from the Geotechnical Engineering Section conducts dam and dike inspection annually. This report was prepared, in part, to fulfill the USEPA requirements of 40 CFR 257.83 and the West Virginia Department of Environmental Protection, Division of Water Dam Inspection Section and to provide Appalachian Power Company (APCO) and Mountaineer Plant with an evaluation of the facility. Mr. Brian Palmer, P.E. along with Mazin Al-zou'bi performed the 2023 inspection of the Mountaineer Bottom Ash Complex. This report has been reviewed by Mr. Mazin Al-zou'bi, Ph.D., P.E. and prepared under the direction of Bryan W. Brunton P.E. and is a summary of the inspection and assessment of the condition of the Bottom Ash Complex.

Mr. Chris Purdum and Mr. Randy Brown of the Mountaineer Plant was the facility contact for the inspection and assisted with the inspection. WV DEP Dam Safety Inspector Tracy Winders and Engineer David Dove also were on site and participated in the inspection. The inspection was performed on October 30, 2023. The weather condition was cloudy with light rain/drizzle with temperatures ranging from upper-40s° to the lower-50s° F. There was approx. 0.2-in of precipitation in the previous seven days with an additional 1.1-in the day of the inspection which primarily occurred in the in the morning prior to the inspection. Figure 1 illustrates the location of the Bottom Ash Pond Complex.

## **2.0 DESCRIPTION OF THE BOTTOM ASH COMPLEX (CCR UNIT):**

The Bottom Ash Complex (CCR unit) has been repurposed into a wastewater complex as CCR storage has ceased and been removed from the complex. The former East Bottom Ash Pond (EBAP) has been repurposed as a lined a Pyrite Pond (PyP) and East Settling Pond (ESP). The West Bottom Ash Pond (WBAP) has been repurposed to lined West Settling Pond (WSP). The remainder of the complex contains the East Wastewater Pond (EWP) and West Wastewater Pond (WWP), a Leachate Collection Surge Pond (LCP), a FGD Maintenance Pond, a Reclaim Water Pond (RWP), a

Clearwater Pond (CWP) and a small Metal Cleaning Waste Tank Secondary Containment Basin. The EBAP and WBAP are considered a CCR impoundment per 40 CFR 257 and items have been included in this report to fulfill these requirements. The EWP, WWP, RWP, CWP, LCP, FGD Maintenance Pond, and Metal Cleaning Waste Tank Secondary Containment Basin are not CCR impoundments but are included in this report as part of the overall inspection of the facility.

The pond embankments are generally small in height (< 50 ft.) and have design slopes of 3 Horizontal to 1 Vertical (3H to 1V) for both the interior and exterior slopes. The Bottom Ash Ponds and new Settling Ponds operate at normal pool elevation at 612 feet, the WasteWater Ponds normal pool elevations are at 609 feet, and the Reclaim and Clear Water Ponds normal pool elevations are at 603 feet. CCR sluicing to the Bottom Ash Complex has ceased as the Plant has converted to a dry handling system for bottom ash. Figure 2 included in illustrate various ponds arrangement at the Bottom Ash Complex.

### **3.0 REVIEW OF AVAILABLE INFORMATION**

In addition to the visual inspection, a review of available information regarding the status and condition of the Bottom Ash Pond Complex was completed. This review included files available in the operating record, such as design and construction information, previous periodic structural stability assessments, previous 7-day inspection reports, previous 30-day instrumentation data, and previous annual inspections reports. Based on the findings of the current inspection and review of the available data, it is concluded, there were no signs of actual or potential structural weakness or adverse conditions and that the facility is functioning as intended in the design.

### **4.0 INSPECTION [257.83(b)(1)(ii)]**

#### **4.1 CHANGES IN GEOMETRY SINCE LAST INSPECTION [257.83(b)(2)(i)]**

The repurposing of the East Bottom Ash Pond as the Pyrite Pond and East Settling Pond was completed and the West Bottom Ash Pond has been closed and repurposed as the West Settling Pond. While noting the work in the former Bottom Ash Ponds the general geometry of the impoundment has remained essentially unchanged.

**4.2 ASSESSMENT OF RECENT INSTRUMENTATION DATA [257.83(b)(2)(ii)]**

Three piezometers were installed in February 2009. PZ-09-03 was installed at the crest of the EBAP. PZ-09-04 was installed at the toe, directly down the slope from PZ-09-03. PZ-09-05 was installed at the crest of the CWP. The location of all three piezometer is illustrated in Figure 3 (Piezometer Location Map). The following Table 1a illustrates the maximum reading recorded of the piezometers since the last annual inspection (September 2022). A summary of the pond levels measured during the 2022 inspection and the pool level data from previous three years are summarized below in Table 1b. The historical static water level data (2021-2023) of the Bottom Ash Complex is compiled and presented in Figure 4.

**Table 1a – CCR Ponds Maximum Recorded Reading.**

<b>Piezometer</b>	<b>Maximum Reading Since Last Annual Inspection (Sept 2022)</b>	<b>Date of Reading</b>
PZ-09-03	602.2	10/5/2022
PZ-09-04	572.2	11/30/2022
PZ-09-05	561.8	All readings

**Table 1b – Static Water Levels of the Bottom Ash Pond Complex.**

<b>Pond Name</b>	<b>Normal Pool Elevation (feet)</b>	<b>Pond Elevation (feet)</b>			
		<b>10-13-2020</b>	<b>7-21-2021</b>	<b>9-13-2022</b>	<b>10/30/2023</b>
EBAP/ESP	612.0	602.6	603.0	Dry	612.9
WBAP/WSP	612.0	609.0	612.5	610.0	609.8
EWP	609.0	606.8	598.3	600.3	609.2
WWP	609.0	609.1	609.1	609.0	600.0
RWP	603.0	603.4	603.4	603.1	603.4
CWP	603.0	603.2	603.2	603.1	603.3

Piezometers PZ-09-04 and PZ-09-05 indicate minimal changes in the static water levels since installation in 2009 to present. This is due to the piezometers being installed at the toe of the embankment in the foundation material to evaluate stability. Based on well installation logs, piezometers PZ-09-04 and PZ-09-05 were installed, developed and remain dry. Piezometer PZ-09-03, which is located at the crest of EBAP has indicated fluctuations in the water level over the years. This fluctuation have historically been consistent with the water level changes in the EBAP and a reflection of the phreatic surface in the embankment materials. However, as the EBAP/ESP was essentially dry between April 2022 and December 2022 and PZ-09-03 levels generally

remained elevated and the source of the saturation is unknown and returned to “normal” lower levels for no apparent reason. There may be a correlation with the wetness in the toe area north of PZ-09-03 (and PZ-09-04) that appears to be related to inadequate drainage.

**4.3 IMPOUNDMENT CHARACTERISTICS (257.83(b)(2)(iii, iv, v))**

Table 2 is a summary of the minimum, maximum, and present depth and elevation of the impounded water and Coal Combustion Residuals (CCR) since the previous annual inspection; the approximate volume of the impounded water and CCR at the time of the inspection.

**Table 2 – Impoundment Data.**

Parameter	EBAP	WBAP
	Depth (Elevation)	
Approximate <b>Minimum</b> depth of impounded water since last annual inspection	NA	NA
Approximate <b>Maximum</b> depth of impounded water since last annual inspection	NA	NA
Approximate <b>Minimum</b> depth of CCR since last annual inspection	NA	NA
Approximate <b>Maximum</b> depth of CCR since last annual inspection	None	None
Approximate <b>Present</b> depth of CCR at the time of the inspection	NA	NA
Approximate <b>Present</b> depth of impounded water at the time of the inspection	NA	NA
Storage Capacity of impounding structure at the time of the inspection	NA	NA
Approximate volume of impounded water at the time of the inspection	NA	NA
Approximate volume of CCR at the time of the inspection	None	None

Note: All CCR material has been removed and ponds repurposed as Settling Ponds



#### **4.4 DEFINITIONS OF VISUAL OBSERVATIONS AND DEFICIENCIES:**

The 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 are described 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, cracks, concrete surface etc.) where the current maintenance program has neglected to improve the condition. Usually conditions that have been identified in previous inspections, but have not been corrected.
- Excessive:** A reference to an observed item (e.g., erosion, seepage, vegetation, cracks, concrete surface etc.) where the current maintenance condition is below or worse than what is normal or desired, and which may affect the ability of the observer to properly evaluate the structure or particular area, or which may be a concern from the structure safety or stability point of view.

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

##### **1. Uncontrolled Seepage**

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 (dike/dam) and is not collected and safely carried off by a drain. Seepage that is collected by a drain can still be uncontrolled if it is not safely transported, such as

seepage that is not clear. Seepage that is unable to be measured and/or observed is considered uncontrolled seepage.

[Note: Wet or soft areas are not considered as uncontrolled seepage, but can lead to this type of deficiency. These areas should be monitored frequently]

2. Displacement:

Displacement is a large-scale movement of the CCR unit, structural fill or other earthen material associated with the embankment (dike/dam). Common signs of displacement are cracks, scarps, bulges, depressions, sinkholes and slides.

3. Blockage of Water Control Appurtenances:

Blockage of Water Control Appurtenances is the restriction of water flow at spillways, storm water ditches/channels, leachate collection systems and ground water interceptor 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.

**4.5 BOTTOM ASH POND COMPLEX VISUAL INSPECTION [257.83(b)(i)]**

The Bottom Ash Pond Complex is comprised of diked embankments to the north, east, and west sides of the complex. The south side of the complex is primarily incised and also consists of a haul road providing access to this area. There are six main ponds (EBAP/ESP, WBAP/WSP, EWP, WWP, RWP, and CWP) within the complex. In addition, a metal cleaning tank pond, a FGD pond, and a leachate pond were previously added to the east of the EWWP. The Pyrite Pond has been added to the East Settling Pond as part of the pond closure and repurposing process. The Bottom Ash Ponds and Wastewater Ponds were designed in tandem and historically would operate exclusively with one side in service at a given time. The new Settling Ponds are likely to operate concurrently. Photograph Location Map and photographs are included in Appendix A. The Bottom Ash Pond Complex extends in a general northwest to southeasterly direction.

#### **4.5.1 Clearwater Pond (CWP) and Reclaim Water Pond (RWP):**

In general, the crest and exterior slope of the CWP (East Dike) and RWP (West Dike) were in satisfactory condition. The crest of the south dike is used as haul road. The gravel base on the crest and vegetation cover on the slope generally appeared satisfactory. There was an erosion rill in the off the haul road into the Clearwater pond that was noted. The access walkway to the overflow structures appeared safe and in fair condition. The inactive animal burrow on the exterior of the East Dike noted previously were not observed. Additionally, damage from mowing was noted in several areas of the East Dike.

The effluent structure was functioning as designed. The lower sections of the interior slope are protected by stone and the upper sections are covered by vegetation. Beaching or wave erosion was noted previously along the interior slope of the RWP at the SW corner at the stone vegetation interface and should continue to be monitored and repaired. Otherwise, the interior slopes appeared in satisfactory and stable conditions.

The stone material around the discharge culvert was in satisfactory condition. Overall, the interior dikes, crest and slopes of the CWP and RWP appeared to be in satisfactory condition with no signs of rutting, misalignment, or cracking.

#### **4.5.2 East Wastewater Pond (EWP) & West Wastewater Pond (WWP)**

The exterior slope and crest of the WWP (West dike) appeared to be in satisfactory condition. The interior slope, the effluent flume, and concrete weir appeared in satisfactory condition.

The EWP interior slope condition and effluent flume and concrete weir appeared to be in satisfactory and working condition.

In general, the main junction box was in satisfactory condition and appeared to be in functioning condition.

Overall, the exterior dike (west dike) and the interior dikes appeared in satisfactory and stable condition and the crest areas appeared in satisfactory and stable condition without any sign of settlement, misalignment, and significant rutting.

#### **4.5.3 East Bottom Ash Pond/Settling Pond (EBAP/ESP) & West Bottom Ash Pond/Settling Pond (WBAP/WSP)**

The overall condition of the exterior slope of the EBAP (East Dike) was fair. An extended area of excessive wetness approximately 500 feet long continues to be observed adjacent to the toe of the East Dike as noted in previous inspections. The wetness is not believed to be due to seepage as it was present in 2022 when the EBAP did not contain no water due active construction work in the interior and the in-service repurposed ESP has double geomembrane liner system limiting the possibility of seepage. The slope above the toe area appeared satisfactory. An inactive animal burrow was observed. Also mower damage due to the wetness in the toe area was also observed.

The crest area of the ESP appeared to be in satisfactory condition with no signs of rutting, cracks, or misalignment. There is minor erosion occurring under the pipe cribbing support on the eastern edge of the ESP crest area.

The ESP interior slopes are lined with a double geomembrane liner that appears in good condition. The interior slopes of the Pyrite Pond (PyP) were also observed to be in good condition as it has concrete revetment over the double geomembrane liner system. The overflow discharge structure, access platform, and side rail appeared to be in satisfactory working condition.

The north exterior slope of the ESP and WSP (North Dike) was in satisfactory and stable condition. Two wet/soft areas along the toe of the both the ESP and WSP northern downstream slope were observed. The areas extended from the toe of the slope to the existing chain-link fence. It appears that this condition is due to poor drainage on the other side of the fence. The area beyond the fence while severely

overgrown previously has been mowed but additional work on drainage in the area is recommended. One of the wet areas was below the stormwater discharge pipe from a catch basin on the crest of the north dike. WV Dam Safety recommended looking at piping this water down the slope and away from the toe to eliminate the wet area along the toe of the North Dike.

The interior slope and discharge structure for ESP and WSP on the interior of the North Dike appeared to be in satisfactory condition.

The WBAP western exterior slopes (West Dike) appeared to be in satisfactory condition. The lower portions are protected by riprap and the upper portions are properly vegetated. In general, the crest conditions are in satisfactory condition with no signs of rutting, cracks or misalignment.

The WBAP interior slopes are lined with a double geomembrane liner that appears in good condition. The general condition of the overflow discharge structure, access platform, and side rail appeared to be in satisfactory working condition.

#### **4.5.4 Metal Cleaning Tank, FGD Maintenance, and leachate collection Ponds**

The exterior of the East Dike along the FGD Maintenance Pond and the metal cleaning tank containment area generally appeared in satisfactory condition.

Overall, the FGD Maintenance Pond and leachate pond were in satisfactory condition. The overflow discharge structures appeared to be functioning as designed. The interior slope lined with a HDPE liner appeared in satisfactory and stable condition.

The metal cleaning tank containment dikes appeared in satisfactory and stable condition.

#### **4.5.5 Outfall Manhole**

The outfall 001 and the transfer basin connected to the outfall pipe at the riverbank. The transfer basin is located just before the outfall pipe to the river. The sinkhole noted

in 2022 at the transfer basin has been repaired and appears stable. The water flow appeared to be uninterrupted at the time of inspection.

#### **4.6 CHANGES THAT EFFECT STABILITY OR OPERATIONS [257.83(b)(2)(vii)]**

The repurposing of the EBAP to the ESP and PyP has been completed since the 2022 inspection. The reconstruction of the subgrade and interior slopes was completed and the double geomembrane liner system was install for the pond.

Since the 2022 inspection, the closure and repurposing of the WBAP has been completed. Water and CCR material were removed from the WBAP and the subgrade and interior slopes reconstructed as needed and a double liner system installed for the pond to be used as a settling pond (WSP) as part of the wastewater treatment system.

The exterior geometry of the impoundments did not change as a result of the closure and repurposing as non-CCR impoundments.

### **5.0 SUMMARY OF FINDINGS**

#### **5.1 GENERAL OBSERVATIONS**

Based on the visual inspection, the overall condition of the Bottom Ash Complex is satisfactory. Specific conclusions related to this inspection are as follows.

- (i) The Bottom Ash Complex appears to be operating as designed and shows no signs of distress, slope instability, dike misalignment or significant settlement.
- (ii) While the overall vegetation control and management for the facility is considered satisfactory, more frequent mowing to minimize the need to mowing when wet would be recommended.
- (iii) The animal activity appears to be the same as in previous years and it is manageable as routine maintenance items. Excessive animal activities were not noticed during this inspection. Few animal holes were observed as noted in this report.

- (iv) Some beaching (wave erosion) was noted at the vegetation-stone interface in the interior slope of the RWP.
- (v) Some minor erosion has occurred under the pipe cribbing on the EBAP/ESP crest area. There are some pipes that lie directly on the crest surface (next to the pipe cribbing) that may have caused concentrated water flow from rain events. The erosion does not appear to have any effect on the driving surface of the crest area, but should be repaired in a timely fashion.
- (vi) There were two areas at the toe of the downstream slopes of the EBAP/ESP and WBAP/WSP that exhibited wetness. One area is along the north dike that was wet and soft and appears to be related to potential drainage issue. Another area is along the east dike that has soft ground, ponding water, and exhibit significant rutting. These areas have been surveyed in the past and show that the areas are relatively flat and do not drain well. As the both ponds have recently been repurposed with double geomembrane liner systems likely that seepage is not the source of the various wet areas. Since seepage is not the source of these wet areas and the bottom ash pond modifications did not impact the exterior of the dikes a plan will need to be developed to address proper drainage on the exterior of the east and north dikes.

## **5.2 MAINTENANCE ITEMS**

Following are general maintenance items that are recommended as a result of the inspection. Assistance or guidance with the implementation of these items can be provided by AEPSC Civil Engineering & Geotechnical Services:

- (i) The animal holes encountered during the inspection shall be mitigated actively removal (trapping) of the animals and filling the holes in with compactible backfill and compact the final lift to finish at the existing grades.
- (ii) Water level measuring staff gauges should be installed at the overflow discharge structure or pipe locations. The staff gauges should have elevation marked and labelled in the mean sea level (msl). The length of the staff gauges shall be such that will provide full depth measurements in case of high pool level during significant flood events.
- (iii) .

### **5.3 ITEMS TO MONITOR/INVESTIGATE**

Following are items identified for monitoring or investigate that are recommended as a result of the inspection. Assistance or guidance with the implementation of these items can be provided by AEPSC Civil Engineering & Geotechnical Services:

- (i) Based on current site conditions it is apparent that the wet areas at the exterior toe of the East Dike are not from seepage but likely from poor drainage. The closure and repurposing of the EBAP to a settling pond did not impact the exterior of dikes, as such, AEP Geotechnical Engineering will work with the plant to develop a plan to address the wet areas.
- (ii) Similarly, wet areas along the north dike downstream slope of the EBAP and WBAP are most likely attributed to poor drainage to the north of the pond complex. The closure and repurposing of the EBAP and WBAP to settling ponds did not impact the exterior of dikes, as such, AEP Geotechnical Engineering will work with the plant to develop a plan to address the wet areas.
- (iii) Piezometer PZ-09-03 shall be flushed and continue to be used in monitoring and the data be reviewed for further corrective action.
- (iv) The beaching observed in the RWP should be monitored and repair as needed.

### **5.4 DEFICIENCIES (257.83(b)(2)(vi))**

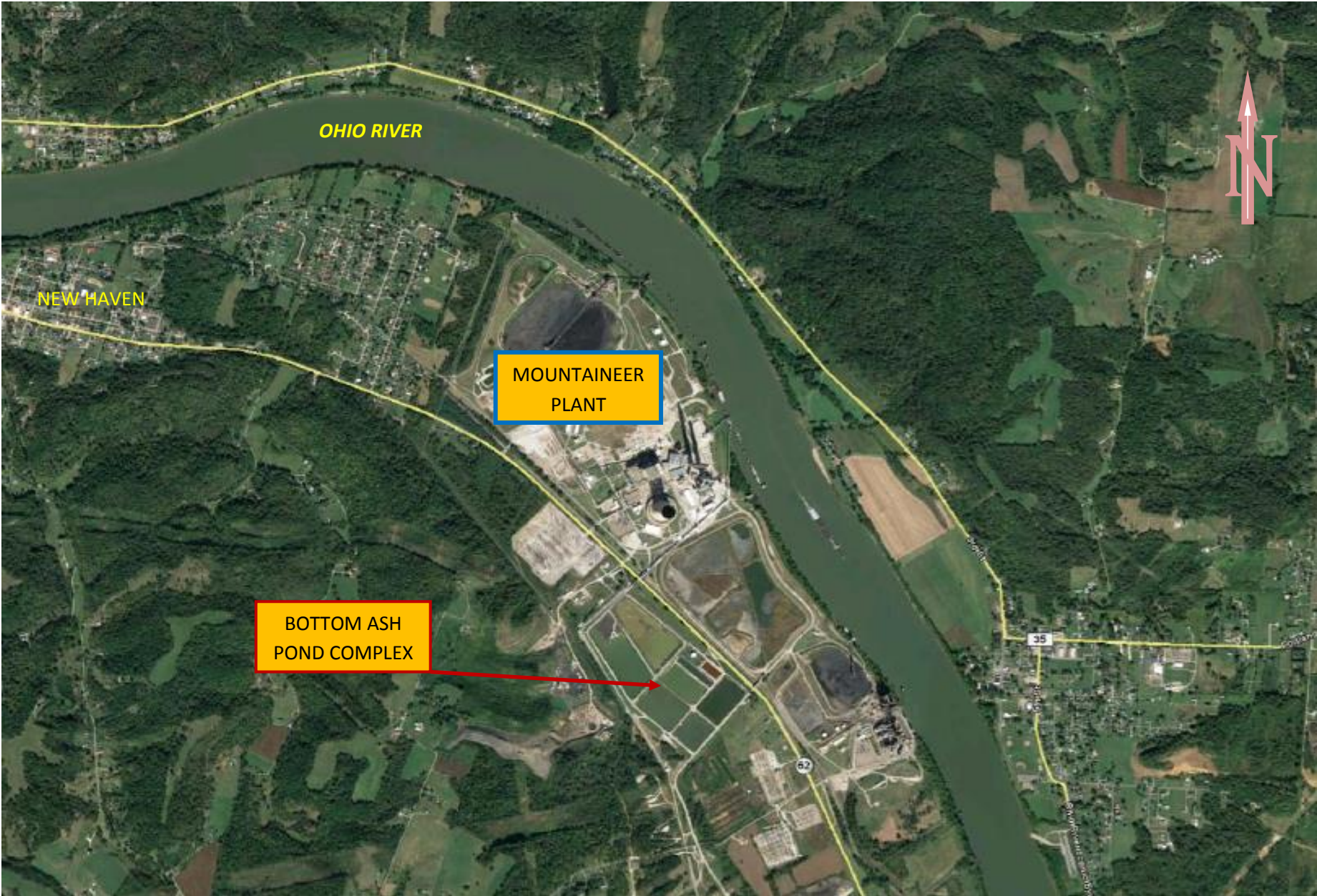
There were no deficiencies or signs of structural weakness or disruptive conditions. There were no deficiencies noted during any of the quarterly inspections. If any of these conditions occur before the next annual inspection contact AEP-Geotechnical Engineering immediately.

Based on the inspection and review of relevant documents, AEPSC – Civil Engineering believes that the Bottom Ash Complex has a generally satisfactory appearance and is in satisfactory functional condition. Inspections, monitoring and general maintenance by plant personnel should continue. If you have any questions with regard to this report, please do not hesitate to contact Brian Palmer at 614-716-3218 (Audinet 200-3218) or Bryan Brunton at 614-716-3090 (Audinet 200-3090).



**FIGURES:**

**FIGURE 1 – SITE LOCATION MAP**  
**MOUNTAINEER PLANT, NEW HAVEN, WV**

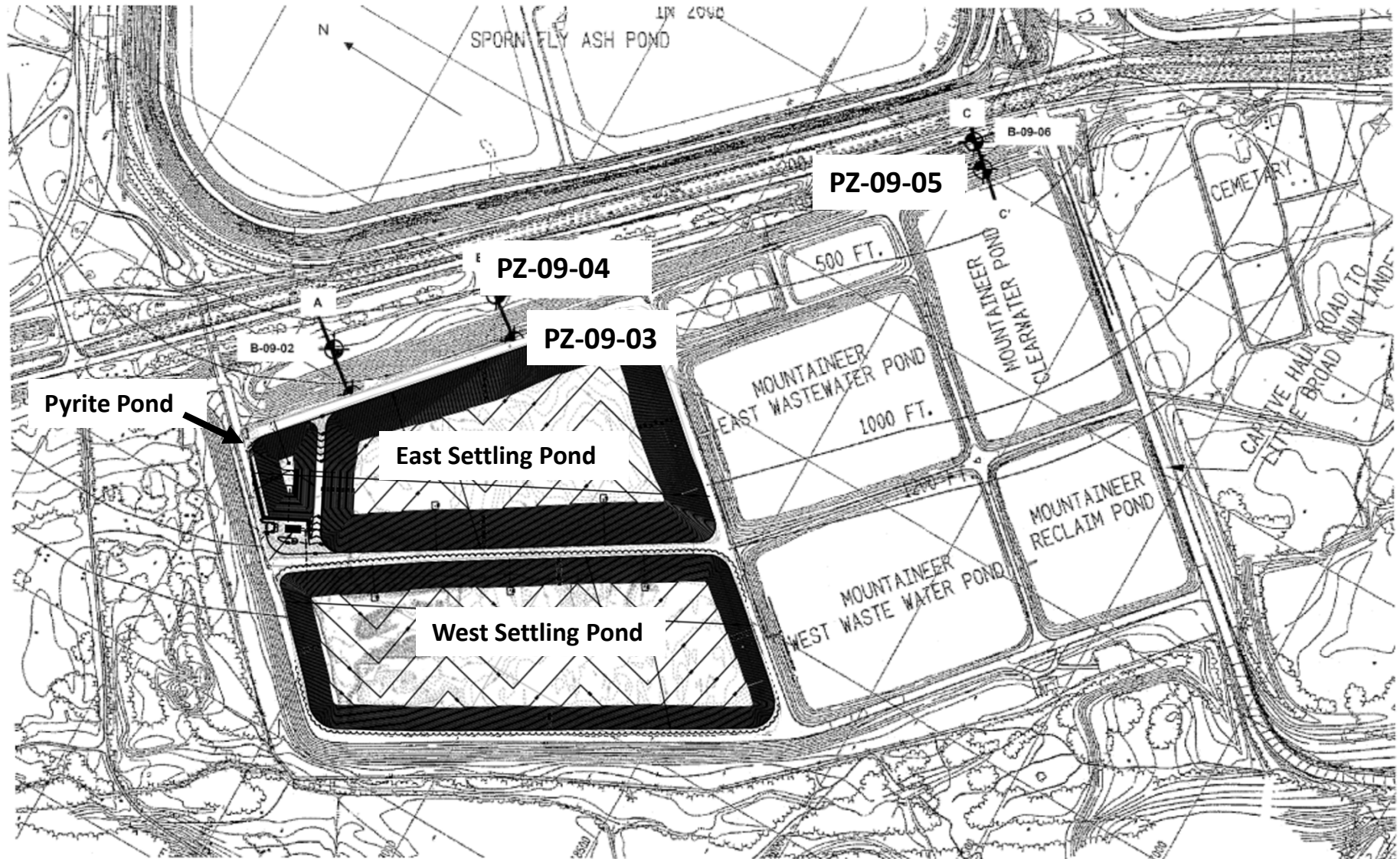


# FIGURE 2 – BOTTOM ASH POND COMPLEX

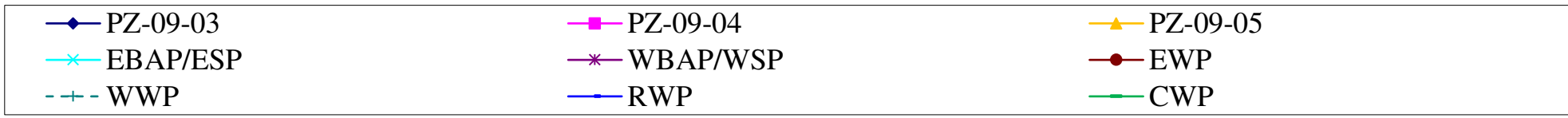
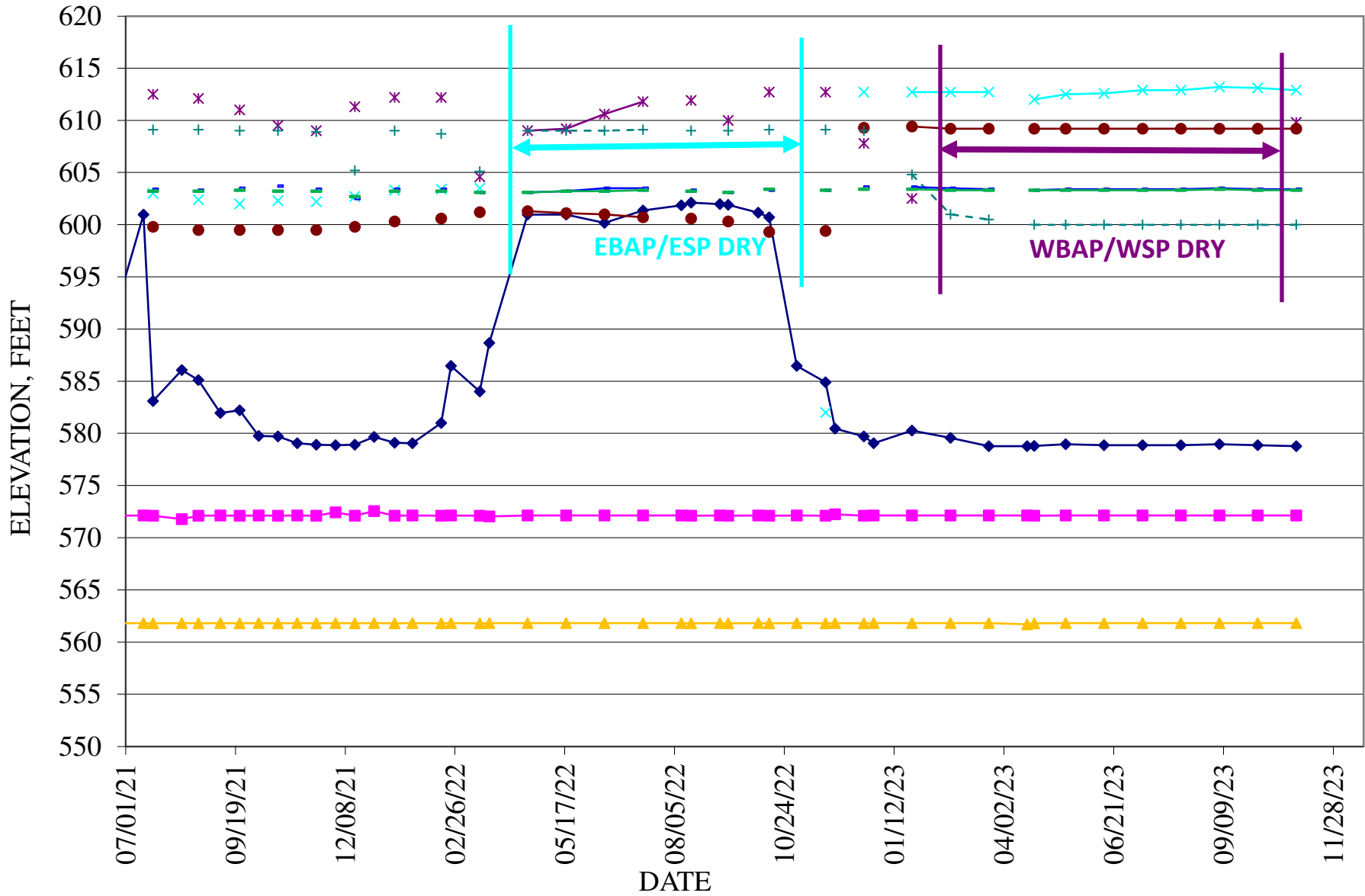
MOUNTAINEER PLANT, NEW HAVEN, WV



Figure 3  
Mountaineer Plant Bottom Ash Pond Complex



# FIGURE 4 - MOUNTAINEER BOTTOM ASH COMPLEX STATIC WATER LEVELS



**APPENDIX A:**

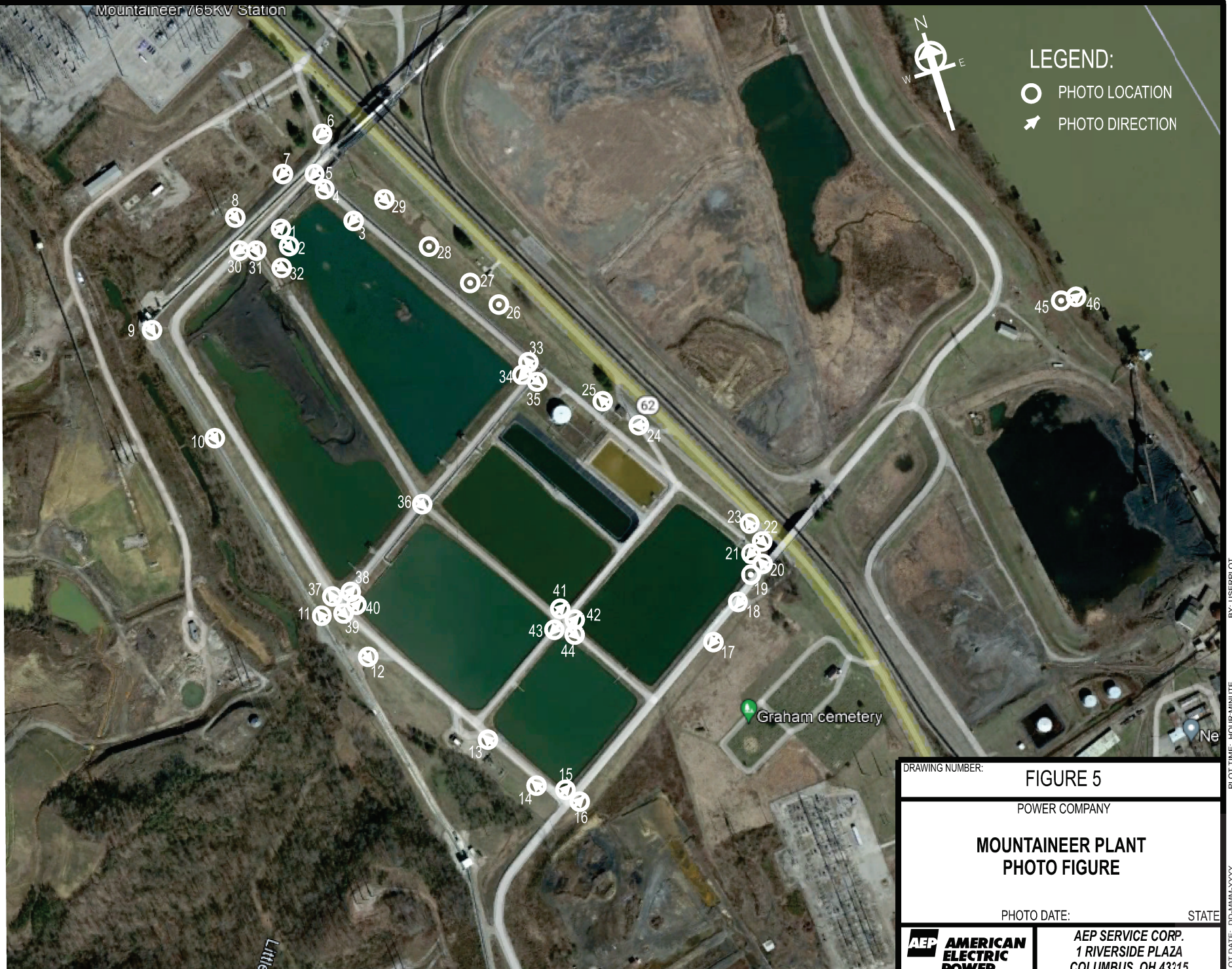
**Photograph Pages**

Mountaineer 765KV Station



LEGEND:

- PHOTO LOCATION
- ➔ PHOTO DIRECTION



DRAWING NUMBER: **FIGURE 5**

POWER COMPANY

**MOUNTAINEER PLANT  
PHOTO FIGURE**

PHOTO DATE: STATE



AEP SERVICE CORP.  
1 RIVERSIDE PLAZA  
COLUMBUS, OH 43215

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

# 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:

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Photo #:

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# AEP GES Dam Inspection

Plant Name:

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# AEP GES Dam Inspection

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# AEP GES Dam Inspection

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