

2017 Annual Dam and Dike Inspection Report

Bottom Ash Pond Complex

**Rockport Plant
Indiana Michigan Power Company
Rockport, Indiana**

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Prepared for: Indiana Michigan Power Company – Rockport Plant

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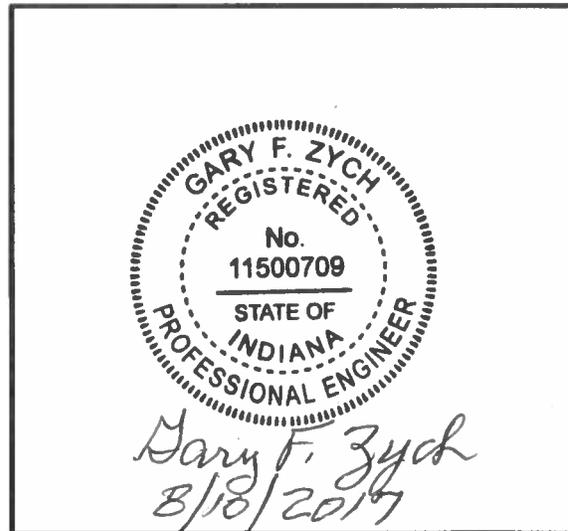


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1.0 INTRODUCTION

This report was prepared by AEP- Geotechnical Engineering Services (GES) section, in part, to fulfill requirements of 40 CFR 257.83 for the CCR impoundments and to provide the Rockport Plant an evaluation of the entire Bottom Ash Pond Complex.

Mr. Daniel W. Pizzino, P.E. performed the 2017 inspection of the Bottom Ash Pond Complex at the Rockport Plant. This report is a summary of the inspection and an assessment of the general condition of the facility. Mr. Mitch Montgomery, landfill supervisor for the Plant, was the facility contact during the inspection. The inspection was performed on July 24, 2017. Weather conditions were sunny and the temperature was in the mid 80's(°F). There was 1.3-inches of rainfall over the seven days prior to the inspection. The embankments were recently mowed.

2.0 DESCRIPTION OF IMPOUNDMENTS

The Bottom Ash Pond Complex consists of the East Bottom Ash Pond (EBAP) and the West Bottom Ash Ponds (WBAP), the East Waste Water Pond (EWWP), and the West Waste Water Pond (WWWP), the Reclaim Pond, and the Clear Water Pond. See Figure 1 of Attachment B. The Bottom Ash Complex is generally a below ground facility with only the west dike of the WBAP extending above grade such that the normal pool elevation is maintained above ground level. The exterior slopes are 2.5 Horizontal to 1 Vertical (2.5H:1V) with interior slopes of 2 H:1V. The East and West Bottom Ash Ponds are considered a CCR impoundment per 40 CFR 257 and items have been included in this report to fulfill these requirements. The EWWP, WWWP, Reclaim Pond, & Clear Water Pond are not CCR Impoundments but are included as part of this overall inspection report.

The WBAP dike is approximately 2000 feet long and is 13 feet high with a design crest width of 30 feet. The dike is a compacted soil earthen embankment. The top of the dike is at elevation 399.0 feet with the natural ground surface beneath the dikes at about elevation 390 feet. The exterior side slope of the embankment fill is designed to be 2.5:H to 1:V that transitions to 3:H to 1:V. The interior design side slopes are 2:H to 1:V. The bottom elevation of the WBAP is at elevation 386 ft msl with a minimum operating pool elevation of 394 ft msl providing a CCR storage capacity of 211 ac-ft.

The EBAP is an incised pond with the surrounding ground at elevations above 399 ft msl. The EBAP also has interior design slopes of 2:H to 1:V. The bottom elevation of the EBAP is at elevation 377 ft msl with a minimum operating pool elevation of 391 ft msl providing a CCR storage capacity of 337 ac-ft.

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

A review of available information regarding the status and condition of the EBAP and WBAP which include files available in the operating record, such as design and construction information, previous periodic structural stability assessments, previous 7 day inspection reports, and previous annual inspections has been conducted. Based on the review of the data there were no signs of actual or potential structural weakness or adverse conditions noted.

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

4.1 CHANGES IN GEOMETRY SINCE LAST INSPECTION (257.83(b)(2)(i))

No modifications have been made to the geometry of the EBAP and WBAP since the 2016 annual inspection. The geometry of the impoundments has remained essential unchanged.

4.2 INSTRUMENTATION (257.83(b)(2)(ii))

There is no instrumentation located at the EBAP and WBAP.

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 & 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.

Table 1

IMPOUNDMENT CHARACTERISTICS		
Bottom Ash Ponds		
	West Bottom Ash Pond	East Bottom Ash Pond
Approximate Minimum depth (elevation) of impounded water since last annual inspection	0 ft (NA)**	0 ft.(N/A)**
Approximate Maximum depth (elevation) of impounded water since last annual inspection	9.5 ft. (395.5 ft msl)	14 ft. (391 ft msl)
Approximate Present depth of impounded water at the time of the inspection	9.5 ft. (395.5 ft msl)	2 ft. (377 ft msl)
Approximate Minimum depth (elevation) of CCR since last annual inspection	1.0 ft. (387.0 ft msl)	1 ft. (378 ft msl)
Approximate Maximum depth (elevation) of CCR since last annual inspection	13 ft.(399 ft msl)	22 ft.(399 ft msl)
Approximate Present depth (elevation) of CCR at the time of the inspection	13 ft. (399 ft msl)	22 (399 ft. msl)
Storage Capacity of impounding structure at the time of the inspection	352 ac-ft.	557 ac-ft.
Approximate volume of impounded water at the time of the inspection	250 ac-ft.	15 ac-ft.**
Approximate volume of CCR at the time of the inspection	25 ac-ft.	197 ac-ft.

** The West Pond and East Pond were taken out of service and were drained for a portion of the time since the previous annual inspection.

4.4 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 §257.83(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

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. Seepage that is not clear and is turbid would also be considered as uncontrolled. Seepage that is unable to be measured and/or observe it 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 more frequently.

2. Displacement of the Embankment

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

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.

4.5 VISUAL INSPECTION (257.83(b)(2)(i))

A visual inspection of the Bottom Ash Pond Complex including the EBAP and WBAP was conducted to identify any signs of distress or malfunction of the impoundment and appurtenant structures. Specific items inspected included all structural elements of the dam such as inboard and outboard slopes, crest, and toe; as well as appurtenances.

Overall the facility is in good condition. The impoundment is functioning as intended with no signs of potential structural weakness or conditions which are disrupting to the safe operation of the impoundment. Inspection photos are included in Attachment A. Additional pictures taken during the inspection can be made available upon request. A map presenting locations of the inspection observations is included in Attachment B.

East Bottom Ash Pond

1. The EBAP was out of service at the time of the inspection. Almost all flow has been removed from the impoundment as part of routine operations of the pond for cleaning out of bottom ash.
2. The interior slopes showed no signs of distress such as sloughing, bulges or erosion. The rip rap protection along the slope was visible to the toe and appeared in good condition and has not deteriorated. The area above the typical normal pool appears clean and free of vegetation. There was minor grass and weed vegetation growing within the riprap which is typically located below the normal pool. (Observation 1)
3. There was minor erosion observed in the bottom of the pond within the remaining bottom ash material. This erosion was attributed to the pond being drained and rainfall runoff flowing across the pond bottom. This erosion was visible at several of the storm water entry points. (Observation 2)
4. The portion of diked embankment adjacent to the metal cleaning tank containment area was in good condition and showed no signs of distress. There are two pipes that are used to pump storm water from the containment area into the EBAP and they appeared to be functioning properly.
5. Plant personnel noted that the low level drainage structure used to drain pond during cleaning operations was not operational. During the recent draining the stop logs were pulled but flow did not exit through the structure. A pumping system was instead used to drain the pond. It was unknown from visual inspection if the pipe was clogged with material or has failed for other reasons. (Observation 3)
6. The principal spillway structure was not being utilized because the pond was drained. It appeared in good condition. The concrete structure and skimmer boards showed minor signs of wear but were in fair condition.
7. The access road located at the crest of the pond appeared in good and stable condition with no signs of distress such as settlement, cracking or ruts.

West Bottom Ash Pond

8. The WBAP was in operation during the time of the inspection. The diverter discharge structure was configured to allow all flow to enter the WBAP. The concrete portion of the structure showed signs of wear but is in fair condition. The pool was at 395.5 which is its normal operating level.
9. The interior slopes showed no signs of distress such as sloughing, bulges or erosion. The rip rap protection along the slope was visible to the toe and appeared in good condition and has not deteriorated.
10. The splitter dike separating the WBAP and the EBAP was not accessible due to the barricades set up to protect Least Tern bird nests. The splitter dike appeared to be in good condition and showed no signs of distress. The splitter dike separating the WBAP from the WWWP was also in good condition and showed no signs of distress. There was one area of erosion at the south east corner of the impoundment which appears to be within the excess bottom ash and not within the soil of the splitter dike. (Observation 4)
11. The outboard slope of the WBAP was in good condition. The grass was recently mowed and there were no signs of movement or misalignment, sloughing or bulges. There was an area of bare ground from construction activities where the stormwater discharge pipe was trenched in the embankment. The area was flagged for repair (Observation 5).
12. There was an isolated area of erosion located along the outboard slope of the west embankment with erosion approximately 6" deep. This area has been flagged for repair (Observation 6).
13. There were no seepage or wet areas observed along the embankment.
14. The access road located at the crest of the pond appeared in good and stable condition with no signs of distress such as settlement or ruts
15. Flow was discharging into the low level drain structure. While this structure is typically used for draining the pond it appears to be functioning properly as part of the primary discharge for the pond. The structure appeared in good condition. (Observation 7)
16. The primary discharge structure was in good condition and functioning properly. Flow was entering from all 3 sides of the box weir structure. The skimmer structure was in good condition.

East and West Waste Water Ponds

17. Waste water flows were entering both the EWWP and WWWP at the northern end of each pond. The pool elevation of the EWWP was 386.3 and the pool elevation of the WWWP was 388.9.
18. The interior slopes of the EWWP and WWWP Ponds were in good condition. The rip rap was free of any vegetation and showed no signs of deterioration or weathering.
19. The spillway structures in the EWWP and the WWWP were in good condition. There were no obstructions at either structures and they appear to be functioning properly. Flow from both ponds is discharged into a distribution structure where flow is directed to the Reclaim Pond.
20. The EWWP and WWWP are incised impoundments. The crest of the ponds were well maintained with no signs of settlement or depressions. The area beyond the crest of the ponds were mowed and well maintained.

Reclaim Pond and Clear Water Pond

21. Flow was entering the Reclaim Pond from the EWWP and the WWWP. Flow within the Reclaim Pond was either pumped to back to the plant at the existing pump structure or discharged to the Clear Water Pond. Flows within the Clear Water Pond are discharged through the primary discharge structure and to Outfall 001. The pool elevation of the Reclaim pond was 386.3. The pool elevation of the Clear Water Pond was 381.5.

22. The Reclaim Pond and Clear Water Pond are incised impoundments. The interior slopes of the Reclaim Pond and Clear Water Ponds are in good condition. The rip rap was free of any vegetation and showed no signs of deterioration or weathering. The crest of the ponds were well maintained with no signs of settlement or depressions. The area beyond the crest of the ponds was mowed and well maintained.
23. The reclaim pump structure was in good condition and appeared to be pumping properly. The outlet structure between the Reclaim Pond and Clear Water Pond appeared in good condition with no obstruction. The outlet structure of the Clear Water Pond was in good condition with no obstructions. The skimmer board structure was in good condition.

4.6 CHANGES THAT EFFECT STABILITY OR OPERATION (257.83(b)(2)(vii))

Based on interviews with plant personnel and field observations there were no changes to the EBAP or WBAP, as well as the entire Bottom Ash Pond Complex since the last annual inspection that would affect the stability of the impounding structure. Sluiced inflow was switched from the EBAP to the WBAP since the last inspection.

5.0 SUMMARY OF FINDINGS

5.1 GENERAL OBSERVATIONS

The following general observations were identified during the visual inspection:

- 1) The outboard slopes, crest and inboard slopes and splitter dikes of the impoundments were generally in good condition. The embankment along the west side of the embankment did not show any signs of structural weakness or instability. The vegetation along the embankments was recently mowed in most locations. The crest did not contain any ruts, cracks, depressions or other signs of instability. Specific maintenance and items to monitor are described in the subsequent sections of this report.

5.2 MAINTENANCE ITEMS

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

- 2) Maintain vegetation growth within rip rap areas using herbicide. (Observation 1)
- 3) Repair minor erosion within the East Bottom Ash Pond prior to bringing the pond back in service. (Observation 2)
- 4) Investigate the cause of the malfunctioning low level drain in the East Bottom Ash Pond. Continue to use temporary pumps to drain the pond or repair the low level drain. (Observation 3)
- 5) Repair erosion within the excess bottom ash along the inboard slope located along the southeast corner of the WBAP or remove the access bottom ash material. (Observation 4)
- 6) Seed and mulch bare area of soil located on the outboard slope of the WBAP in the area of the buried stormwater pipe. (Observation 5)
- 7) Repair minor erosion area on outboard slope of the WBAP by placement of soil in the erosion rills. The area should be revegetated once the repair is made. (Observation 6)

5.3 ITEMS TO MONITOR

The following items were identified during the visual inspection as items to be monitored, see inspection map for locations:

- 8) No items were noted for monitoring.

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

At the Bottom Ash Pond Complex including the East & West Bottom Ash Ponds 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 7-day or 30-day 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.

ATTACHMENT A

Photos

AEP GES Dam Inspection

Plant Name:

Observation #:

Unit:

Date:

Observation:

Location:

Photo #1



Photo #2



Recommendations:

AEP GES Dam Inspection

Plant Name:

Observation #:

Unit:

Date:

Observation:

Location:

Photo #1



Photo #2



Recommendations:

AEP GES Dam Inspection

Plant Name:

Observation #:

Unit:

Date:

Observation:

Location:

Photo #1



Photo #2



Recommendations:

AEP GES Dam Inspection

Plant Name:

Observation #:

Unit:

Date:

Observation:

Location:

Photo #1

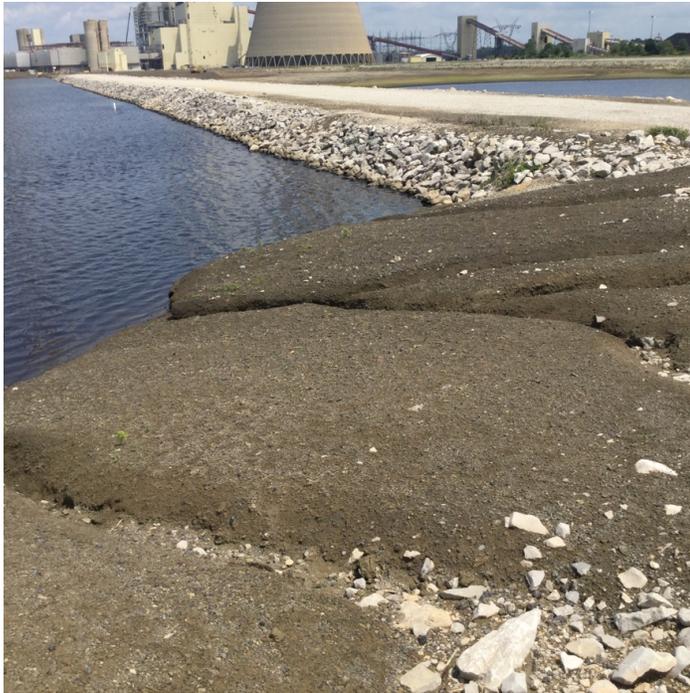


Photo #2

Recommendations:

AEP GES Dam Inspection

Plant Name:

Observation #:

Unit:

Date:

Observation:

Location:

Photo #1



Photo #2



Recommendations:

AEP GES Dam Inspection

Plant Name:

Observation #:

Unit:

Date:

Observation:

Location:

Photo #1



Photo #2



Recommendations:

AEP GES Dam Inspection

Plant Name:

Observation #:

Unit:

Date:

Observation:

Location:

Photo #1

Photo #2

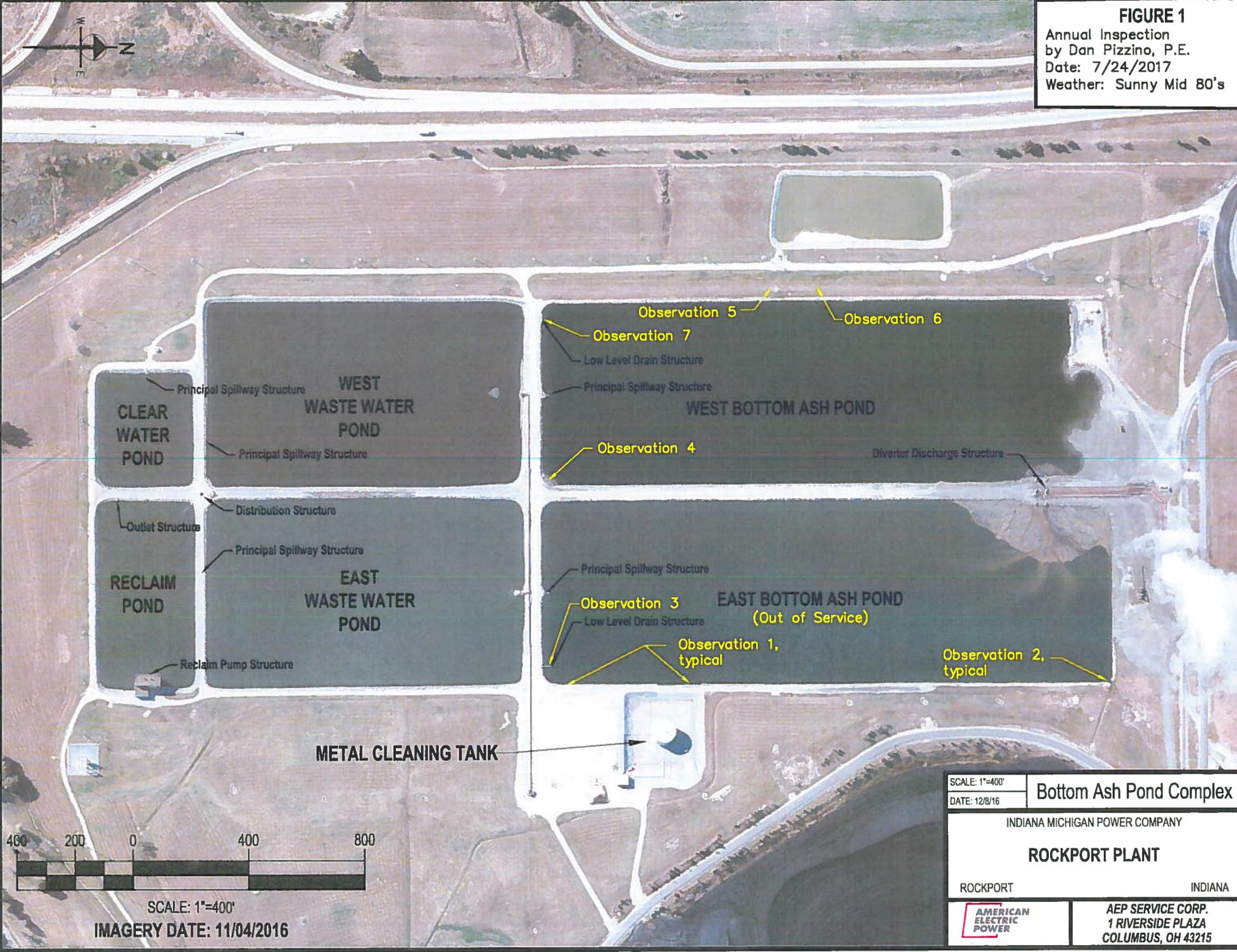


Recommendations:

ATTACHMENT B

Location Map

FIGURE 1
 Annual Inspection
 by Dan Pizzino, P.E.
 Date: 7/24/2017
 Weather: Sunny Mid 80's



SCALE: 1"=400'	Bottom Ash Pond Complex
DATE: 12/8/16	
INDIANA MICHIGAN POWER COMPANY	
ROCKPORT PLANT	
ROCKPORT	INDIANA
	AEP SERVICE CORP. 1 RIVERSIDE PLAZA COLUMBUS, OH 43215

SCALE: 1"=400'
 IMAGERY DATE: 11/04/2016