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Bottom Ash Pond 2024 Annual Dam and Dike Inspection Report

Northeastern Plant, Oologah, Oklahoma

Submitted to:

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

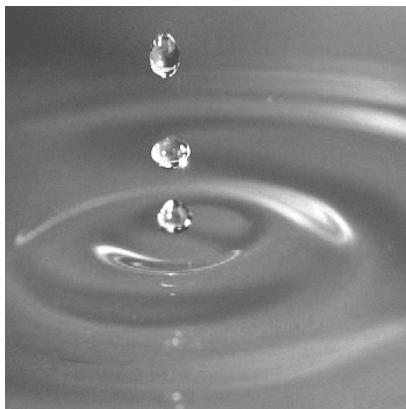
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December 2, 2024

Project 2305686

AEP Document ID: GEVR-24-036



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Vice President

2024 Annual Inspection Report



Bottom Ash Pond
Northeastern Power Station
AEP Document ID: GEVR-24-036

A handwritten signature in black ink, appearing to read "John M. Trast", written over a horizontal line.

Signature

John M. Trast, PE, D.GE
Vice President
GEI Consultants, Inc.

December 2, 2024

Date



I certify, to the best of my knowledge, that the information provided in this report satisfies the requirements of 40 CFR 257.83(b).

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1. Introduction

GEI Consultants, Inc. was retained by AEP to implement the 2024 Annual Inspection and Maintenance Program at AEP facilities. As part of the program, GEI's Pedro Amaya, P.E. performed the 2024 inspection of the Bottom Ash Pond at the Northeastern Power Station in general accordance with the requirements of 40 CFR 257.83. Mr. Greg Carter and Mr. Bryan White were the AEP facility contacts. This report was prepared by Pedro Amaya, PE and John Trast, PE of GEI and serves as a summary of the inspection and an assessment of the general conditions of the Bottom Ash Pond at the Northeastern Power Station.

The inspection was performed on November 6, 2024 with clear skies and temperatures that ranged between 45 and 70 degrees Fahrenheit. Approximately 7-inches of precipitation was recorded at the regional airport in Oklahoma City, Oklahoma in the 7 days prior to the inspection.

The Northeastern Power Station is located near Oogolah, Oklahoma as shown on Figure 1 – Site Location Map. The facility arrangement is provided on Figure 2 – Facility Plan. The Bottom Ash Pond and its appurtenances are shown on Figure 3 – Site Plan. The locations of items that should be addressed are provided on Figure 4 – Items to be Addressed.

2. Description of Impoundments

The Bottom Ash Pond dam is a 4,200-foot-long cross-valley fill on an unnamed tributary to Fourmile Creek and has no principal spillway. The auxiliary spillway consists of a concrete overflow structure with a design crest elevation of 625 feet. During and overflow event, the auxiliary spillway discharges to a low area and then flows through culverts under a railroad and offsite. Bottom Ash Pond water is typically recirculated back to the power plant for reuse.

The Bottom Ash Pond dam was designed with a toe drain along the west and south embankments. This drainage system consists of a 1.5-foot-thick sand and gravel drainage blanket layer that extends along the subgrade from the downstream toe toward the centerline of the embankment. The drainage blanket is connected to a 9-inch-thick gravel and sand bedding layer at the toe that runs 12-feet up the slope from the toe and is overlain by 12-inch-thick layer of riprap. The toe drain was designed to drain seepage from the dam at any point along its length and there are no seepage collection pipes to discharge seepage at specific locations. Therefore, seepage will tend to collect and discharge at the lowest elevation along the toe. This area is near the western end of the south embankment at the location of the pre-existing natural streambed, where a pipe was installed under the access road.

3. Review of Available Information (257.83(b)(1)(i))

A review of available information regarding the status and condition of the Bottom Ash Pond has been conducted. This information includes files available in the operating record, such as design and construction information, previous periodic structural stability assessments, previous 7-day inspection reports, 30-day data collection reports, and previous annual inspection. Based on the review of the data there were no signs of actual or potential structural weakness or adverse conditions.

4. 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 Bottom Ash Pond since the last annual inspection. The geometry of the impoundment has essentially remained unchanged.

4.2 Instrumentation (257.83(b)(2)(ii))

The instrumentation for the Bottom Ash Pond consists of two piezometers which are shown on Figure 3 – Site Plan. The minimum maximum recorded readings of each piezometer since the previous annual inspection is shown in Table 1 below. The readings collected since the last inspection were all within their normal operating ranges as shown on the graph provided in Appendix A – Instrumentation Data.

Bottom Ash Pond Seepage was historically measured at a culvert at the toe of the south embankment. Since the installation of the new culvert in 2016, there has been no measurable flow from the culvert.

Table 1 - Piezometer Water Elevation Data

Instrumentation Data Bottom Ash Pond		
Instrument	Type	Max/Min Reading since last annual inspection
MW-01	Piezometer	608.8 - 609.9
MW-02	Piezometer	599.0 – 599.7

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 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. Most of the bottom ash settles out is a very small area that is periodically excavated and either beneficially used or placed in the Northeastern Landfill.

Table 2 Summary of Relevant Storage Information

IMPOUNDMENT CHARACTERISTICS	
Bottom Ash Pond (Crest Elevation: 630.0 ft; lowest 604.0 ft)	
	Bottom Ash Pond
Approximate Minimum depth (elevation) of impounded water since last annual inspection	18.5 ft (622.5 ft)
Approximate Maximum depth (elevation) of impounded water since last annual inspection	20.0 ft (624.0 ft)
Approximate Present depth of impounded water at the time of the inspection	20.0 ft (624.0 ft)
Approximate Minimum depth (elevation) of CCR since last annual inspection	5 ft
Approximate Maximum depth (elevation) of CCR since last annual inspection	5 ft
Approximate Present depth (elevation) of CCR at the time of the inspection	5 ft
Approximate Storage Capacity of impounding structure at the time of the inspection	183 ac-ft
Approximate volume of impounded water at the time of the inspection	183 ac-ft
Approximate volume of CCR at the time of the inspection	145 ac-ft (Elev. 625 – 630 ft)

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, cracks, concrete surface 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 have affected the ability of the observer to properly evaluate the structure or 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 the CCR Unit has developed a problem that could impact its structural integrity. There are four general categories of deficiencies. These four categories are described below:

- Uncontrolled Seepage

Uncontrolled seepage is an uncontrolled release from the unit.

- Displacement of the Embankment

Displacement of the embankment is large scale movement of part of the pond embankment. Common signs of displacement are cracks, scarps, bulges, depressions, sinkholes, and slides.

- Blockage of Control Features

Blockage of Control Features is the restriction of flow at spillways, decant or pipe spillways, or drains.

- 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 (257.84(b)(1)(ii))

A visual inspection of the Bottom Ash Pond was conducted to identify signs of distress or malfunction of the Bottom Ash Pond and appurtenant structures. Specific items inspected included structural elements of the Bottom Ash Pond upstream slope, downstream slope, crest, and drainage features.

Overall, the facility is in good condition. The Bottom Ash Pond is functioning as intended with no signs of structural weakness or conditions which are disrupting to its safe operation. Inspection photos are included in Attachment B - Photolog.

The Bottom Ash Pond Crest is in good condition. No cracks, ruts, potholes, or evidence of subsidence were observed on the areas paved with gravel or areas supporting the train tracks as shown on Photograph No. 1 and No. 10.

The Bottom Ash Pond Discharge Structure is in satisfactory condition. Vegetation and debris that could restrict flow was observed and should be addressed as shown in Photograph No. 2 and No. 3. Some concrete deterioration was also observed but does not need to be addressed as its understood that the unit is scheduled to be closed.

The Bottom Ash Pond Emergency Spillway culvert wingwall / apron is deteriorated as shown in Photograph No. 17 and should be addressed.

The Bottom Ash Pond Inlet Structure, Spillway, and Stilling Basin are in good condition with no erosion observed or debris that could restrict flow as shown in Photographs No. 4 through No. 7.

The Bottom Ash Pond Upstream Slope is in satisfactory condition. Generally, the upstream slope vegetation is healthy and maintained to 12-inches or less as shown in Photograph No. 8, No. 9, and No. 11. Vegetation along the southern upstream slope shown in Photograph No. 10 should be maintained to 12-inches or less. The riprap that exists along the upstream slope shoreline is compact and in good condition with no signs of erosion.

The Bottom Ash Pond Downstream Slope is in good condition. The vegetation is healthy and maintained to 12-inches or less as shown in Photograph No. 12, Photograph No. 13, and Photograph No. 14.

The Bottom Ash Pond Downstream Toe of Slope is satisfactory. The southwest and west downstream toe of slope areas were saturated given 6-8 inches of rain that the site received prior to the annual site inspection. Equipment should stay off these areas while ground conditions are soft. See Photograph No. 15 and No. 16.

4.6 Changes in Stability or Operation (257.83(b)(2)(iv))

Based on interviews with plant personnel and field observations there were no changes to the Bottom Ash Pond since the last annual inspection that would affect the stability or operation of the impounding structure.

5. Summary of Findings

5.1 General Observations

The following general observations were identified during the visual inspection:

1. In general, the Bottom Ash Pond is functioning as intended. The upstream slope, downstream slope, crest, and toe of slope are functioning as intended with no signs of structural weakness or conditions which are disrupting to its safe operation.
2. The Plant is performing regular maintenance as required. Vegetation is generally limited/maintained to 12-inches or less. The vegetation along the southern upstream slope should be maintained to 12-inches or less and the discharge structure should be cleaned of vegetation and debris that could restrict flow.
3. The emergency spillway galvanized wingwalls are deteriorated and should be repaired or replaced.

5.2 Maintenance Considerations

The maintenance items are provided for consideration:

- Continue to check site culverts, ditches, drainage structures for debris/blockages to allow the unit to function as it was designed.
- Maintain the vegetation to 12-inches or less within 25-feet of the upstream and downstream toe of slopes.

5.3 Items to be Monitored

The southern and western downstream toe of slope should be monitored for saturated conditions. No maintenance equipment should operate on the soft saturated subgrade.

5.4 Items to be Addressed

The following items should be addressed to allow the landfill to operate as its design intended.

- Item 2 – Address/remove the vegetation growing in the discharge structure.
- Item 3 – Address/remove the minor blockage/debris in the discharge structure.
- Item 10 – Address/maintain the vegetation to 12-inches or less along the southern upstream slope.

- Item 17 – Address/repair the deteriorated galvanized wingwalls on the emergency spillway.

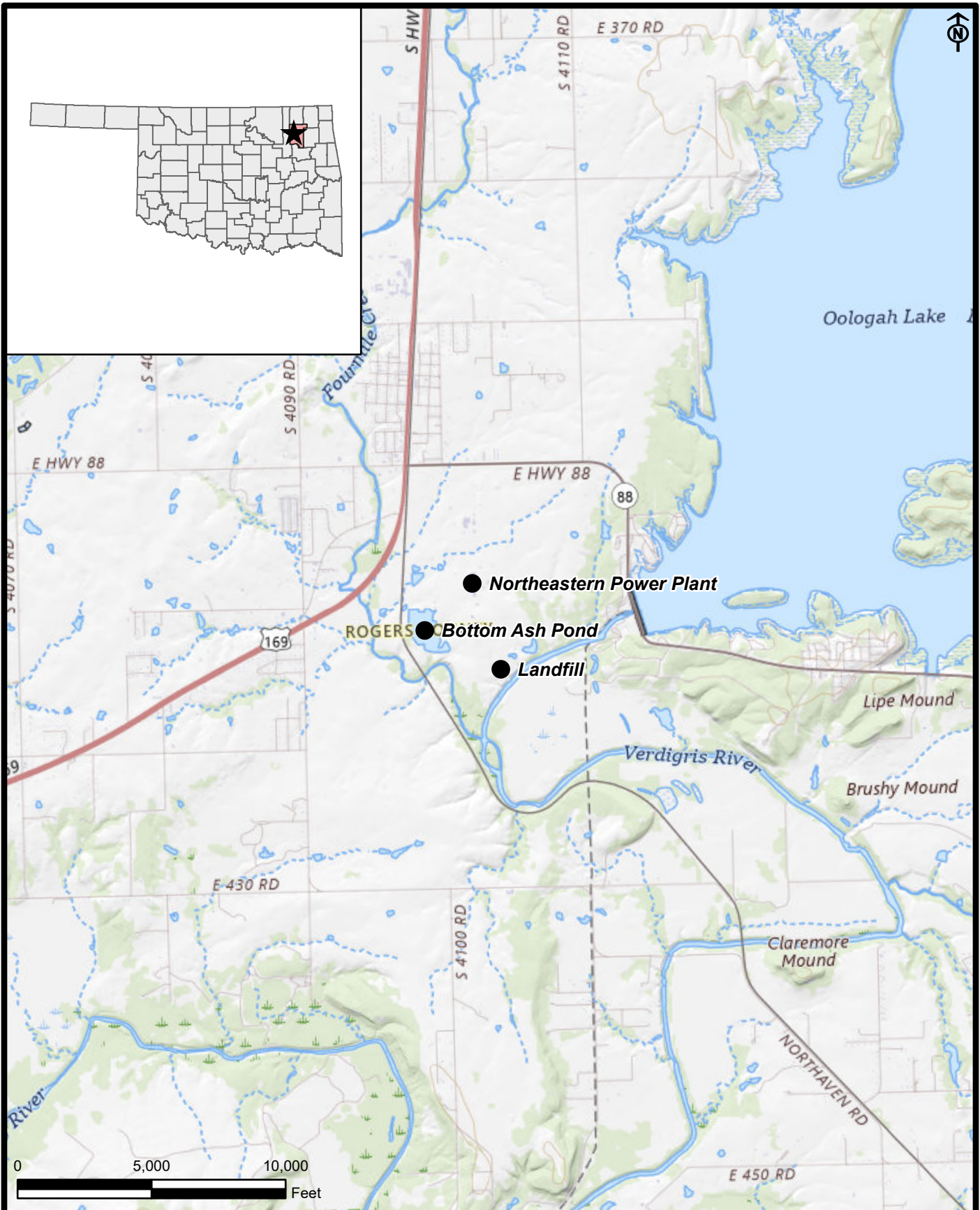
6. Deficiencies (257.83(b)(2)(iii))

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 inspections. A deficiency is defined as either:

- uncontrolled seepage
- displacement of the embankment
- blockage of control features
- erosion, more than minor maintenance

If any of these conditions occur or if you have any questions with regard to this report, please contact Greg Carter at (903) 927-5896 or wgcarter@aep.com or Bryan Brunton at 614-716-3090 bwbrunton@aep.com.

Figure 1 – Site Location Map



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 Northeastern Power Plant
 Oologah, Oklahoma

American Electric Power Service Corporation
 Columbus, OH 43215



SITE LOCATION MAP

Project 2305686

November 2024

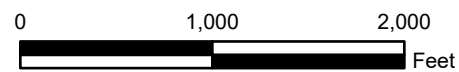
Fig. 1

Figure 2 – Facility Plan



NOTES:

- 1. Aerial image obtained from USDA NAIP. Image captured spring of 2021.
- 2. Site conditions may change over time, accuracy is not guaranteed.



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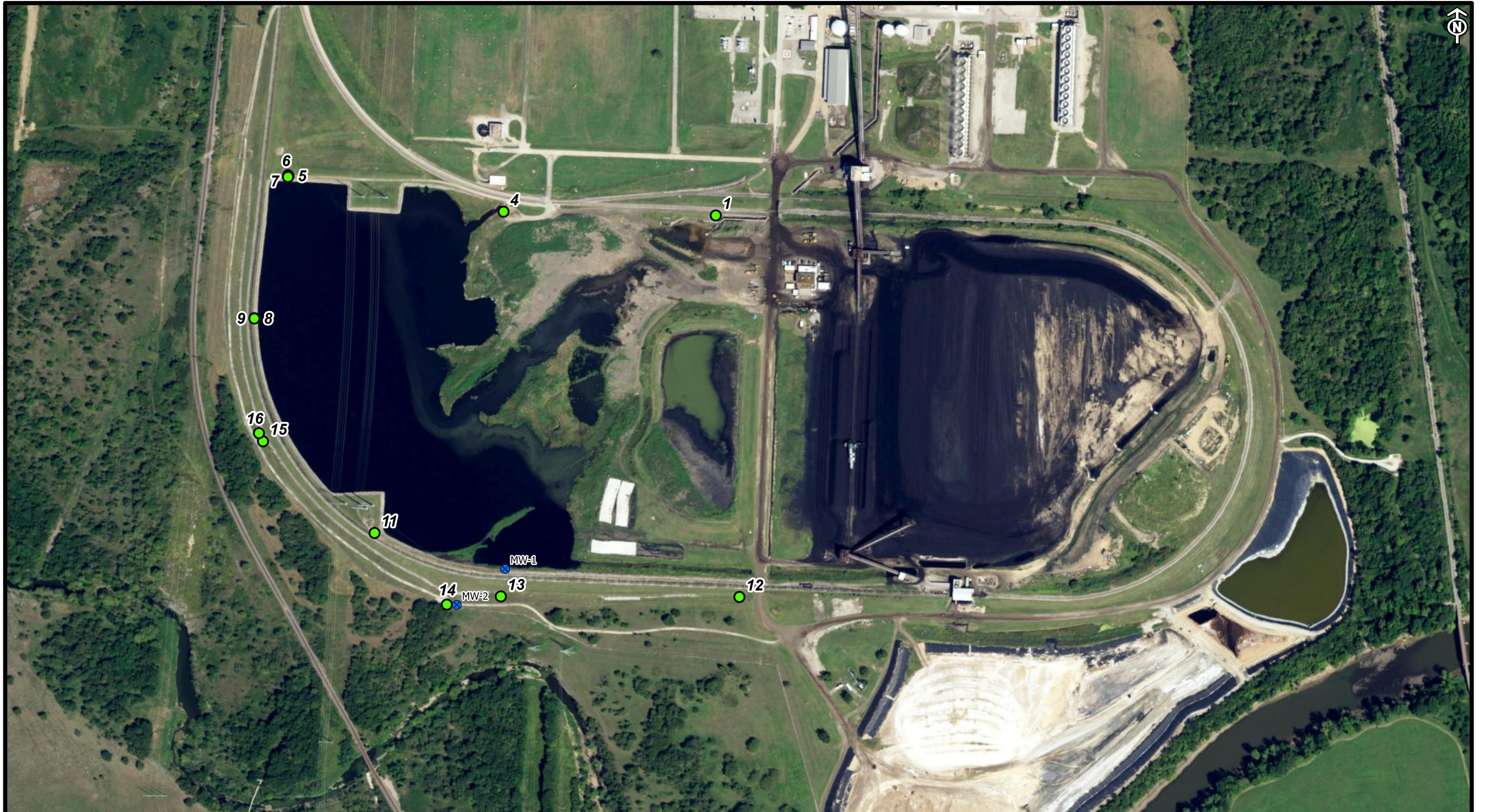
Project 2305686

FACILITY PLAN

November 2024

Fig. 2

Figure 3 – Site Plan

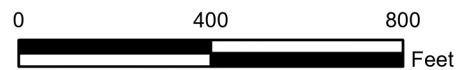


LEGEND:

- General Observation
- ⊗ Piezometers

NOTES:

1. Aerial image obtained from USDA NAIP. Image captured spring of 2021.
2. Points shown represent site conditions during time of inspection. Conditions may change overtime, accuracy is not guaranteed. Map should not be used for measurement.



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 Oologah, Oklahoma

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Project 2305686

SITE PLAN

November 2024

Fig. 3

Figure 4 – Items to be Addressed

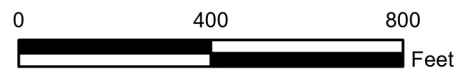


LEGEND:

● Repair

NOTES:

1. Aerial image obtained from USDA NAIP. Image captured spring of 2021.
2. Points shown represent site conditions during time of inspection. Conditions may change overtime, accuracy is not guaranteed. Map should not be used for measurement.



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ITEMS TO BE ADDRESSED

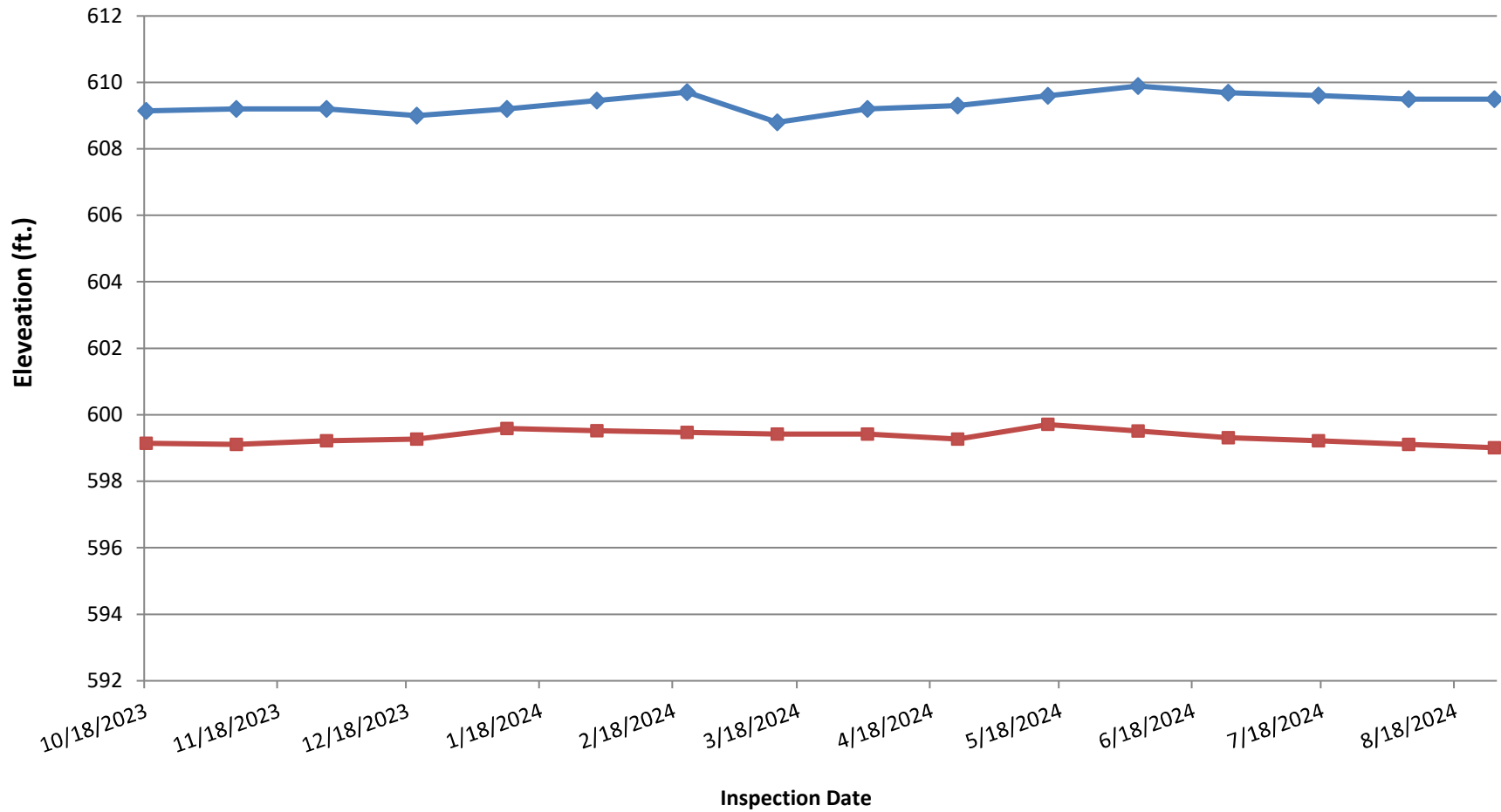
November 2024

Fig. 4

Appendix A – Instrumentation Data

Northeastern - 30 Day Piezometer Readings Bottom Ash Pond

MW-1 MW-2




Appendix B – Photolog

Photographic Log



Project: Northeastern Bottom Ash Pond Inspection
Client: American Electric Power

GEI Project: 2305686


PHOTOGRAPH NO: 1	DATE: November 6, 2024 1:14 PM	LATITUDE: 36.42290196	LONGITUDE: -95.70246456
DIRECTION: 158°		SITE LOCATION: OOLOGAH, OKLAHOMA	
DESCRIPTION: Bottom Ash Pond North Crest. General Photo, Typical Conditions.	 A photograph showing a wide, gravelly path or road leading through a field of tall, dry grass. In the background, there are utility poles and power lines under a clear blue sky. The terrain appears to be a flat, open area, likely a bottom ash pond or a similar industrial site.		
PHOTO BY: GEI CONSULTANTS, INC.			

Photographic Log



Project: Northeastern Bottom Ash Pond Inspection
Client: American Electric Power


GEI Project: 2305686

PHOTOGRAPH NO: 2	DATE: November 6, 2024 1:17 PM	LATITUDE: 36.42277726	LONGITUDE: -95.70328869
DIRECTION: 85°		SITE LOCATION: OOLOGAH, OKLAHOMA	
DESCRIPTION: Bottom Ash Pond Discharge Structure. Address vegetation restricting flow.	 A photograph showing a concrete discharge structure for a bottom ash pond. The structure is a large, rectangular concrete basin with a sloped side. A metal railing with blue-painted posts and horizontal bars runs along the edge of the concrete. In the foreground, a dense patch of tall, green grasses is growing along the concrete edge, partially obscuring the structure. A circular pipe opening is visible on the concrete wall. The background shows a dirt embankment and some sparse vegetation under a clear sky.		
PHOTO BY: GEI CONSULTANTS, INC.			

Photographic Log



Project: Northeastern Bottom Ash Pond Inspection
Client: American Electric Power **GEI Project:** 2305686

PHOTOGRAPH NO: 3	DATE: November 6, 2024 1:20 PM	LATITUDE: 36.42278701	LONGITUDE: -95.70316706
DIRECTION: 37°	SITE LOCATION: OOLOGAH, OKLAHOMA		
DESCRIPTION: Bottom Ash Pond Discharge Structure. Address debris blockage.			
PHOTO BY: GEI CONSULTANTS, INC.			



PHOTOGRAPH NO: 4	DATE: November 6, 2024 1:24 PM	LATITUDE: 36.42285044	LONGITUDE: -95.70560042
DIRECTION: 263°	SITE LOCATION: OOLOGAH, OKLAHOMA		
DESCRIPTION: Bottom Ash Pond Inlet Works, Upstream Slope of Intake Structure. General Photo, Typical Conditions. Staff gauge at minus 12 inches. Approximate elevation 624.0 feet msl.			
PHOTO BY: GEI CONSULTANTS, INC.			

Photographic Log



Project: Northeastern Bottom Ash Pond Inspection
Client: American Electric Power



GEI Project: 2305686

PHOTOGRAPH NO: 5	DATE: November 6, 2024 1:28 PM	LATITUDE: 36.4231809	LONGITUDE: -95.7087995
DIRECTION: 269°		SITE LOCATION: OOLOGAH, OKLAHOMA	
DESCRIPTION: Bottom Ash Pond, Downstream Slope of Spillway and Stilling Basin. Concrete, Typical Conditions.			
PHOTO BY: GEI CONSULTANTS, INC.			
PHOTOGRAPH NO: 6	DATE: November 6, 2024 1:29 PM	LATITUDE: 36.42318644	LONGITUDE: -95.70880561
DIRECTION: 186°		SITE LOCATION: OOLOGAH, OKLAHOMA	
DESCRIPTION: Bottom Ash Pond Upstream Slope of Spillway. General Photo, Typical Conditions.			
PHOTO BY: GEI CONSULTANTS, INC.			

Photographic Log





Project: Northeastern Bottom Ash Pond Inspection
Client: American Electric Power **GEI Project:** 2305686

PHOTOGRAPH NO: 7	DATE: November 6, 2024 1:31 PM	LATITUDE: 36.42316916	LONGITUDE: -95.70880512
DIRECTION: 292°	SITE LOCATION: OOLOGAH, OKLAHOMA		
DESCRIPTION: Bottom Ash Pond Crest of Spillway. Concrete, Typical Conditions.			
PHOTO BY: GEI CONSULTANTS, INC.			
PHOTOGRAPH NO: 8	DATE: November 6, 2024 1:36 PM	LATITUDE: 36.4214664	LONGITUDE: -95.70922242
DIRECTION: 279°	SITE LOCATION: OOLOGAH, OKLAHOMA		
DESCRIPTION: Bottom Ash Pond Upstream West Slope of Dam. General Photo, Typical Conditions.			
PHOTO BY: GEI CONSULTANTS, INC.			

Photographic Log





Project: Northeastern Bottom Ash Pond Inspection
Client: American Electric Power **GEI Project:** 2305686

PHOTOGRAPH NO: 9	DATE: November 6, 2024 1:37 PM	LATITUDE: 36.42146564	LONGITUDE: -95.70922252
DIRECTION: 61°		SITE LOCATION: OOLOGAH, OKLAHOMA	
DESCRIPTION: Bottom Ash Pond Upstream Southwest Slope of Dam. General Photo, Typical Conditions.			
PHOTO BY: GEI CONSULTANTS, INC.			
PHOTOGRAPH NO: 10	DATE: November 6, 2024 1:38 PM	LATITUDE: 36.42143941	LONGITUDE: -95.70921718
DIRECTION: 5°		SITE LOCATION: OOLOGAH, OKLAHOMA	
DESCRIPTION: Bottom Ash Pond Upstream South Slope. Please address/maintain the vegetation to 12- inches or less along the shoreline.			
PHOTO BY: GEI CONSULTANTS, INC.			

Photographic Log



Project: Northeastern Bottom Ash Pond Inspection
Client: American Electric Power **GEI Project:** 2305686



PHOTOGRAPH NO: 11	DATE: November 6, 2024 1:47 PM	LATITUDE: 36.41895859	LONGITUDE: -95.70732981
DIRECTION: 186°	SITE LOCATION: OOLOGAH, OKLAHOMA		
DESCRIPTION: Bottom Ash Pond Upstream South Slope of Dam. Inlet from Coal Yard Drainage. General Photo, Typical Conditions.			
PHOTO BY: GEI CONSULTANTS, INC.			
PHOTOGRAPH NO: 12	DATE: November 6, 2024 1:58 PM	LATITUDE: 36.41835848	LONGITUDE: -95.70190474
DIRECTION: 189°	SITE LOCATION: OOLOGAH, OKLAHOMA		
DESCRIPTION: Bottom Ash Pond Downstream South Slope. General Photo, Typical Conditions.			
PHOTO BY: GEI CONSULTANTS, INC.			

Photographic Log



Project: Northeastern Bottom Ash Pond Inspection
Client: American Electric Power



GEI Project: 2305686

PHOTOGRAPH No: 13	DATE: November 6, 2024 2:03 PM	LATITUDE: 36.41825629	LONGITUDE: -95.70542427
DIRECTION: 353°		SITE LOCATION: OOLOGAH, OKLAHOMA	
DESCRIPTION: Bottom Ash Pond Downstream South Slope. This area was noted to be wet as a result of the 6-8 inches of precip that the site received in the week leading up to the inspection.			
PHOTO BY: GEI CONSULTANTS, INC.			
PHOTOGRAPH No: 14	DATE: November 6, 2024 2:05 PM	LATITUDE: 36.41813652	LONGITUDE: -95.70621592
DIRECTION: 316°		SITE LOCATION: OOLOGAH, OKLAHOMA	
DESCRIPTION: Bottom Ash Pond Downstream Southwest Slope at the highest cross-section. General Photo, Typical Conditions.			
PHOTO BY: GEI CONSULTANTS, INC.			

Photographic Log



Project: Northeastern Bottom Ash Pond Inspection
Client: American Electric Power **GEI Project:** 2305686

PHOTOGRAPH No: 15	DATE: November 6, 2024 2:11 PM	LATITUDE: 36.42000128	LONGITUDE: -95.70902604
DIRECTION: 33°	SITE LOCATION: OOLOGAH, OKLAHOMA		
<p>DESCRIPTION:</p> <p>Bottom Ash Pond Downstream Southwest Slope of Dam. General Photo, Typical Conditions.</p> <p>This area was noted to be wet as a result of the 6-8 inches of precip that the site received in the week leading up to the inspection.</p>			
<p>PHOTO BY:</p> <p>GEI CONSULTANTS, INC.</p>			
PHOTOGRAPH No: 16	DATE: November 6, 2024 2:12 PM	LATITUDE: 36.42009846	LONGITUDE: -95.70909419
DIRECTION: 254°	SITE LOCATION: OOLOGAH, OKLAHOMA		
<p>DESCRIPTION:</p> <p>Bottom Ash Pond Downstream West Slope of Dam. General Photo, Typical Conditions.</p> <p>This area was noted to be wet as a result of the 6-8 inches of precip that the site received in the week leading up to the inspection.</p>			
<p>PHOTO BY:</p> <p>GEI CONSULTANTS, INC.</p>			

Photographic Log



Project: Northeastern Bottom Ash Pond Inspection
Client: American Electric Power

GEI Project: 2305686

PHOTOGRAPH No: 17	DATE: November 6, 2024 2:20 PM	LATITUDE: 36.42348299	LONGITUDE: -95.70945093
DIRECTION: 355°		SITE LOCATION: OOLOGAH, OKLAHOMA	
DESCRIPTION: Bottom Ash Pond Emergency Spillway. Address deteriorated culvert wingwall.			
PHOTO BY: GEI CONSULTANTS, INC.			