2023 Dam and Dike Inspection Report

Bottom Ash Pond

Northeastern 3&4 Plant

Public Service Company of Oklahoma

Oologah, OK

December 2023

Prepared for: Public Service Company of Oklahoma – Northeastern Plant

Prepared by: American Electric Power Service Corporation

1 Riverside Plaza

Columbus, OH 43215

Document ID: GERS-23-049

2023 Dam and Dike Inspection Report

Northeastern Plant

Bottom Ash Pond

Document Number: GERS-23-049

Inspection Date: November 15, 2023

PREPARED BY: _____ DATE: 12-04-2023

Shah S. Baig, P.E.

REVIEWED BY: _____ DATE: 12/05/2023

W. Greg Carter

APPROVED BY: _____ DATE: 12/07/2023

Bryan W. Brunton, P.E.

Manager – AEP Geotechnical Engineering

12-07-2023

REGISTERED PROFESSIONAL ENGINEER
SHAHRIYAR S. BAIG
21255
OKLAHOMA

I certify to the best of my knowledge, information and belief the information contained in this report meets the requirements of OAC § 252:517-13-4.

Table of Contents 3

LIST OF TABLES

LIST OF FIGURES

ATTACHMENT

2023 Dam and Dike Inspection Report
Northeastern 3&4 Plant Bottom Ash Pond
Oologah, OK

1.0 INTRODUCTION

This report was prepared by AEP-Geotechnical Engineering Services (GES) section, in part, to fulfill requirements of OAC 252:517-13-4 and to provide the Northeastern Plant an evaluation of the facility.

Shah Baig, P.E. performed the 2023 inspection of the bottom ash pond facility at the Northeastern Plant. Greg Carter was also present during the inspection. Mike Berryhill was facility contact and was present during the inspection and provided access to the site. This report is a summary of the inspection and an assessment of the general condition of the facility. The inspection of the facility was performed on November 15, 2023. Weather conditions were favorable with clear skies, light breeze, and temperature was about 56 degrees Fahrenheit. There was no recorded rainfall over the 7-days prior to the inspection.

2.0 DESCRIPTION OF THE IMPOUNDMENT

The Public Service Company of Oklahoma (PSO), Northeastern Power Station is located at the junction of U.S. Highway 169 and Oklahoma highway 88, approximately 1 mile south of Oologah, Rogers County, Oklahoma. The bottom ash pond is located southwest side of the power plant, adjacent to the coalyard. Figure 1 (Site Location Map) illustrates the location of the bottom ash pond with respect to the power plant, landfill, and coalyard.

Figure 2 provides a plan view of the bottom ash pond, the embankment (dikes) structure of dam, pertinent dam features, and the dam's appurtenances. The dam is a 4,200-foot long cross-valley fill on an unnamed tributary to Fourmile Creek. The dam is roughly U-shaped and has been divided into north, west, and south embankments for reference in this inspection report.

There is no principal spillway at the bottom ash pond, water is typically recirculated back to the power plant for reuse. The auxiliary spillway at the bottom ash pond is a concrete overflow

structure with a design crest elevation of 625 feet. Overflow from the spillway discharges to a low area and them flows through culverts under a railroad and off site. Figure 2 shows the spillway and discharge culverts locations.

The dam was designed with a toe drain along the west and south embankments. This drainage system consists of a 1.5-feet 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 gravel and sand bedding layer, 9-inches in thickness, at the toe that runs 12-feet up the slope from the toe and is overlain by a foot 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. A railroad track used for coal deliveries to the power plant stretches through the crest of the west and south dikes.

3.0 REVIEW OF AVAILABLE INFORMATION (252:517-13-4(b)(1)(A))

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.

4.0 INSPECTION (252:517-13-4(b)(1)(B))

4.1 CHANGES IN GEOMETRY SINCE LAST INSPECTION (252:517-13-4(b)(2)(A))

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 (252:517-13-4(b)(2)(A))

There are two piezometers and a seepage collection pipe as part of the instrumentation for this facility. The locations of the instrumentations are shown on Figure 2. The maximum and minimum 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 safe operating ranges. MW-01 is located on the crest of the dam and MW-02 is located at the toe of the dam. The water level in the pond ranged from elevation 622.17-623.17 feet. Figure 3 illustrates the historical piezometer data.

Additionally, the seepage collected at the toe of the south embankment is measured at the culvert. 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**	**Date of readings**
MW-01	Piezometer	609.3/607.35	9-27-2023 /11-23-2022
MW-02	Piezometer	599.67/598.72	9-6-2023/9-21-2022

4.3 IMPOUNDMENT CHARACTERISTICS (252:517-13-4(b)(2)(C))

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 on-site landfill. Therefore, the depth range of ash does not vary.

Table 2 – Impoundment Data

IMPOUNDMENT CHARACTERISTICS **Bottom Ash Pond (crest elevation: 630.0 ft; lowest 604.0 ft)**	
Approximate **Minimum** depth of impounded water since last annual inspection	18.17 ft (622.17 ft)
Approximate **Maximum** depth of impounded water since last annual inspection	19.17 ft (623.17 ft)
Approximate **Present** depth of impounded water at the time of the inspection	18.17 ft (622.17 ft)
Approximate **Minimum** depth of CCR since last annual inspection	5 ft.
Approximate **Maximum** depth of CCR since last annual inspection	5 ft.
Approximate **Present** depth of CCR at the time of the inspection	5 ft.
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, etc.) where the current 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 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 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 problem has developed that could impact the structural integrity of the structure. 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, scarps, 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 (252:517-13-4(b)(1)(B))

A visual inspection of the Bottom Ash Pond 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. Figure 4 illustrate the visual inspection photograph location.

1. Photograph No. 1 illustrates the auxiliary spillway located at the northwest corner of the pond. Overall, the spillway appeared to be in good and functional condition as designed without any obstruction to flow. There were no signs of movement, settlement, or misalignment of the spillway. There were no signs of seepage along the contacts between the concrete training walls and downstream slope or at the end of the concrete chute.
2. The energy dissipater baffles (Photograph No. 2) at the toe of the spillway were clear of sediment and were in good condition. The drainage pipe culverts downstream of the spillway appeared clear of obstruction, dry, and in good functional condition.

3. The pipe culverts located downstream of the spillway (Photograph No. 3) appeared in good condition and clear from any obstruction.

4. Typical condition of the crest and downstream slope of the northwest dike section was well vegetated. The grass along the exterior slope was recently mowed. There were no signs of sloughing or other slope movement observed at this dike section (Photographs No. 4 and 5).

5. The downstream slope (Photographs No. 6-9) was well vegetated and maintained in a controlled manner. There was no observed seepage, wet, or damp areas along the slope. The area about 30-feet beyond the toe of the dike is well maintained and free from overgrown trees. There were no signs of sloughing, settlement, animal holes, or other deficiencies. The toe drainage blanket appeared in good and intact condition. No seepage was observed at the time of inspection.

6. The upstream slope and crest with railroad track are illustrated in Photographs No. 10 and 11. The crest appeared in good and stable condition with no sign of any settlement, misalignment, or noticeable sign of distress. The interior slopes show no signs of sloughing or bulges. The riprap protection along the slope was in good condition and no significant grassy vegetation was noticed within the riprap. An erosion gully was noticed along the upstream slope in the southeast corner (Photograph No. 12).

7. The upstream slope of the southeast corner of the south dike is illustrated in Photograph No. 13. A runoff ditch is located at the toe of the upstream slope. The upstream slope with the riprap appeared in good condition. Standing water and excessive vegetation was present in the ditch, but appears to be functioning. The access road between the coalyard and the pond is illustrated in Photograph No. 14. The unpaved road appeared in good functioning condition.

8. Ash and waste water sluice pipes are illustrated in Photograph Nos. 15 and 16. The sluice pipes are located in the mid-section of the north dike. Overall, the sluice pipes are functioning as intended. The outlet end support of the pipe may need additional support to the existing arrangement. All the pipe support should be inspected for undermining of pipe support footings.

9. Photographs No. 17 and 18 illustrate the crest and upstream of the northeast section of the dike. The crest appeared in good and stable condition with no significant settlement, misalignment, or noticeable sign of distress. The interior slopes show no signs of significant sloughing or bulges. The riprap protection section along the slope was in good condition and no significant grassy vegetation was noticed within the riprap.

4.6 CHANGES THAT EFFECT STABILITY OR OPERATION (252:517-13-4(b)(2)(G))

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.

5.0 SUMMARY OF FINDINGS

5.1 GENERAL OBSERVATIONS

The following general observations were identified during the visual inspection:

1. 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.
2. The outboard slopes, crest and inboard slopes of the embankment were generally in good condition. The embankments did not exhibit any signs of structural weakness or

instability.

3. The seepage collection blanket located at the downstream slope of the south and west sections of the dike appeared in good functional condition. No active seepage was noticed during the inspection.

5.2 MAINTENANCE ITEMS

The following maintenance items were identified during the visual inspection, see inspection map for locations:

1. Maintain the vegetation in the ditch to the southeast corner to a minimum possible in order to use it effectively. Repair erosion gully noted in the southeast corner.
2. In general, clear any overgrown vegetation during mowing activities.

5.3 ITEMS TO MONITOR

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

1) Continue to monitor sluice pipe support footing and subgrade for any undermining or potential unstable condition.

5.4 DEFICIENCIES (252:517-13-4(b)(5))

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 or 30-day data collection since the last annual inspection. 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 regarding this report, please contact Shah Baig at 614-716-2241 (email: sbaig@aep.com) or Bryan Brunton at 614-716-3090 (email: bwbrunton@aep.com).

LIST OF FIGURES

Figure 1 – Site Location Map

Bottom Ash Pond
Northeastern Plant, Oologah, OK

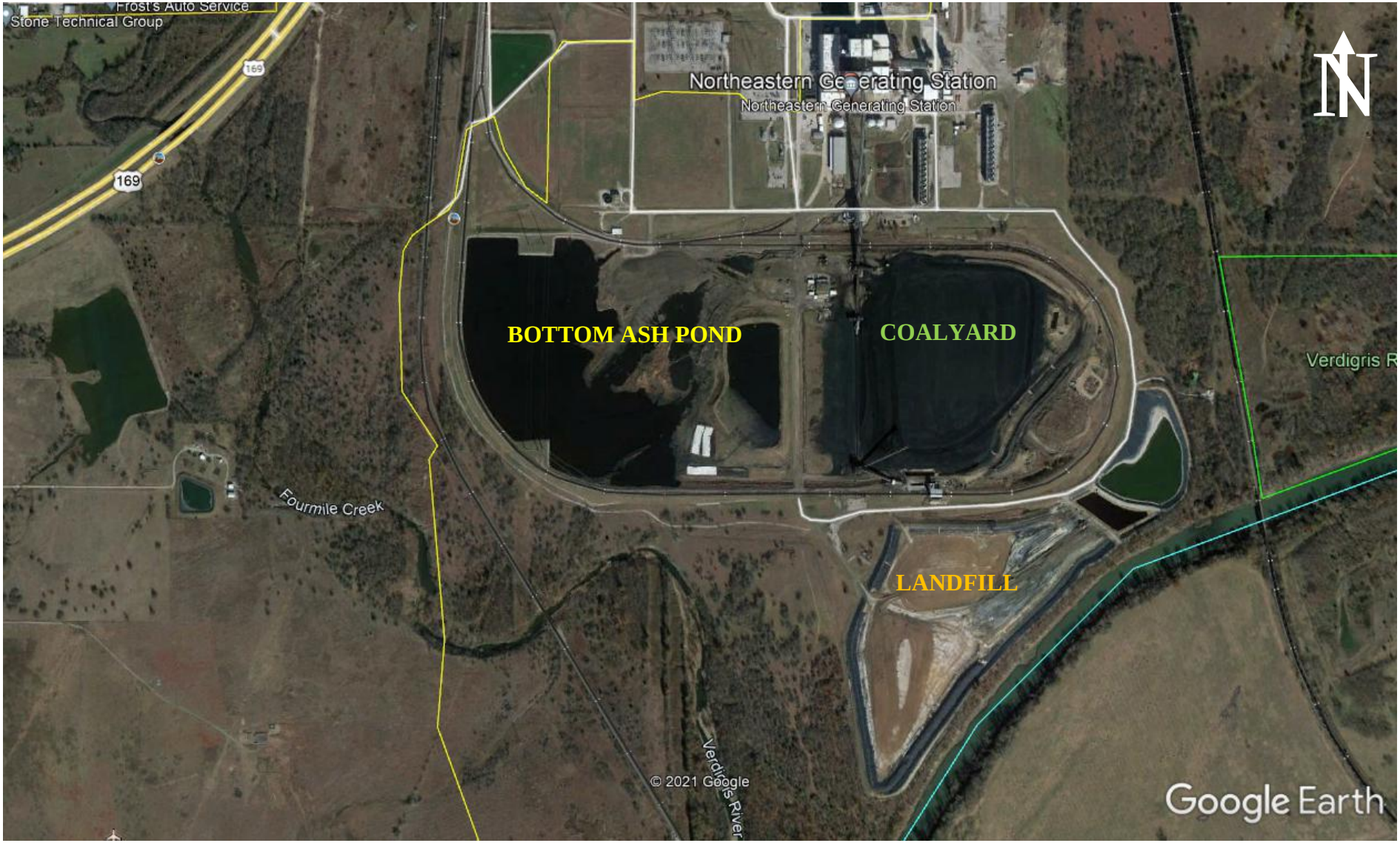

Figure 2 – Facility Map

Bottom Ash Pond

Northeastern Plant, Oologah, OK

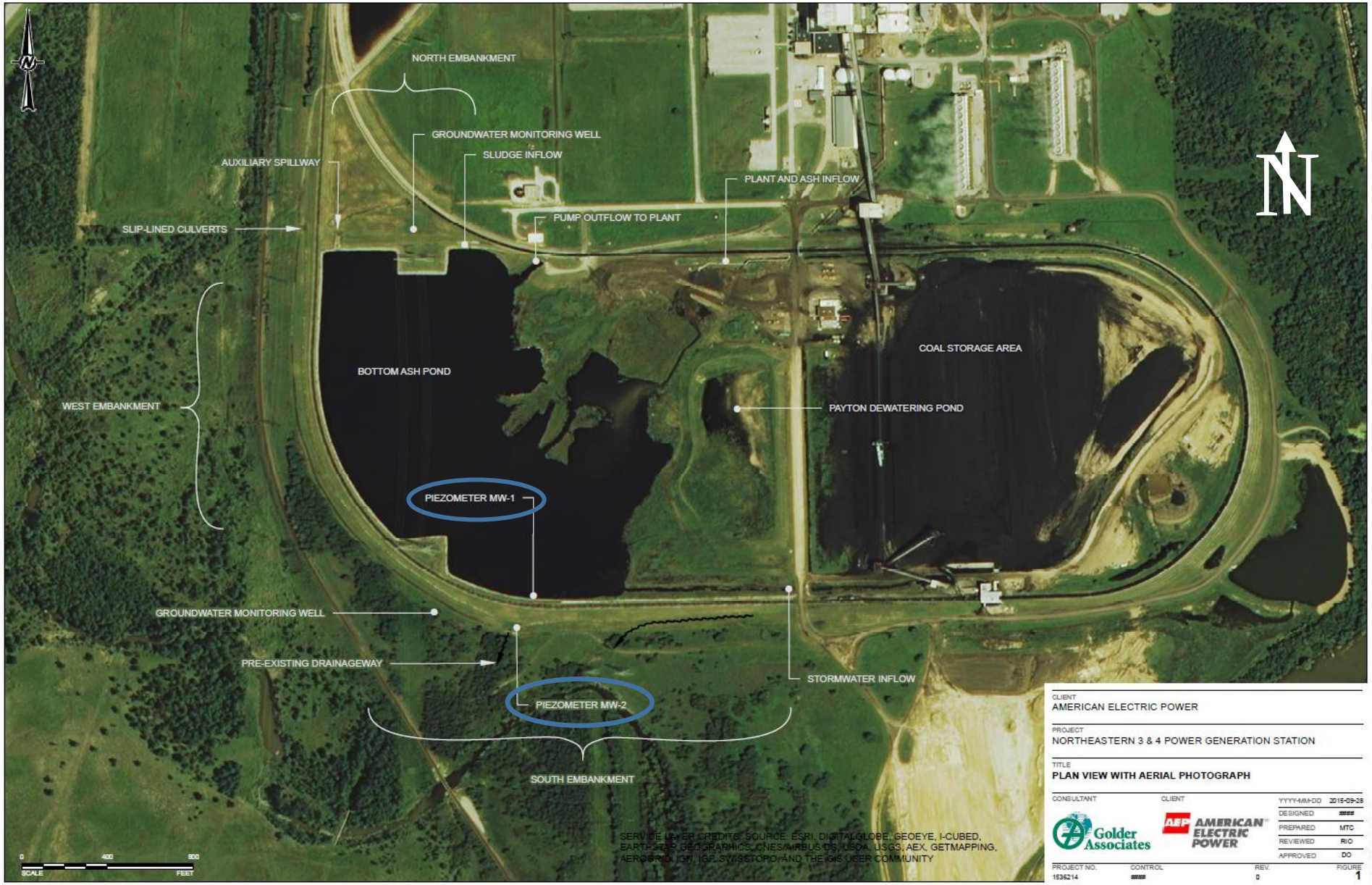

Figure 3 – Historical Piezometer Data

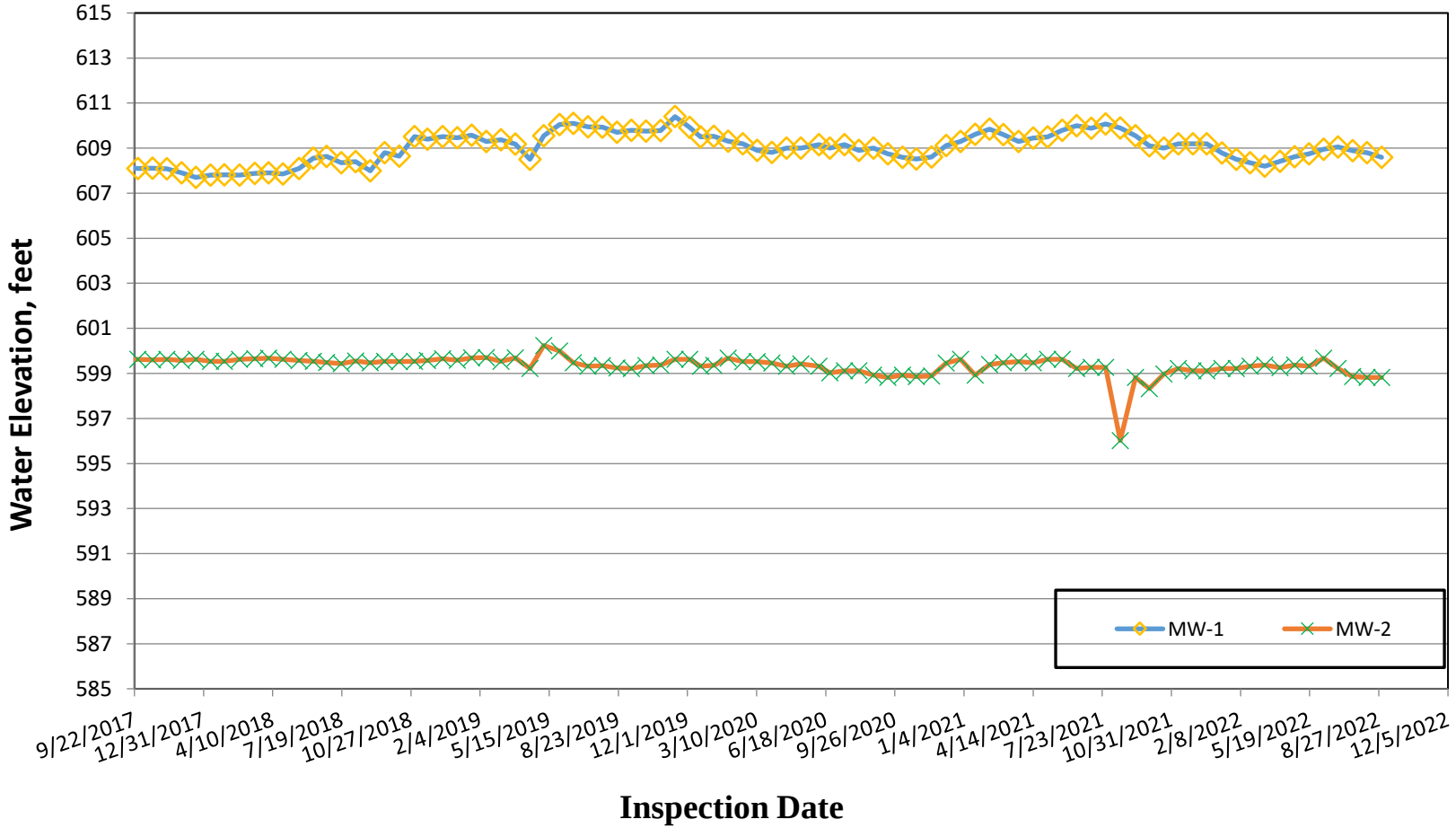

Figure 4 – Inspection Photograph Location Map

Bottom Ash Pond

Northeastern Plant, Oologah, OK

ATTACHMENT

- Inspection Photographs

Photograph No. 1 Upstream slope and auxiliary spillway (looking north).	
Photograph No. 2 Auxiliary spillway of the ash pond.	
Photograph No. 3 Culvert pipes.	

Photograph No. 4 Typical condition of the crest of the northwest dike section (looking east).	
Photograph No. 5 Downstream slope of the northwest dike section.	
Photograph No. 6 Downstream slope toe drain (looking north).	

Photograph No. 7 View of the downstream slope and toe drain (looking south).	
Photograph No. 8 Toe drain another section.	
Photograph No. 9 Downstream slope (south section).	

Photograph No. 10 Upstream slope and crest (looking south).	
Photograph No. 11 Upstream slope and crest (looking north).	
Photograph No. 12 Minor erosion gully.	

Photograph No. 13 Southeast ditch.	
Photograph No. 14 East dike (looking north).	
Photograph No. 15 Ash and wastewater sluice pipe.	

Photograph No. 16 Sluice pipes support.	
Photograph No. 17 North dike crest (looking west).	
Photograph No. 18 Upstream slope of the northeast dike section.