

2023 Annual Dam and Dike Inspection Report

Primary Bottom Ash Dam

Flint Creek Plant

Southwestern Electric Power Company

Gentry, Arkansas

September 2023

Prepared by: American Electric Power Service Corporation

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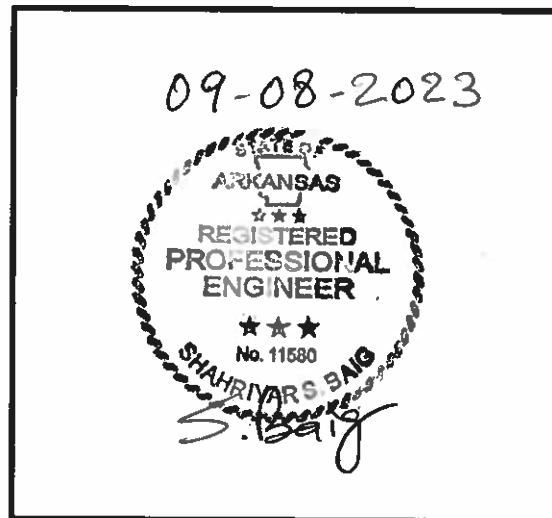
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I certify to the best of my knowledge, information, and belief that the information contained in this report meets the requirements of 40 CFR § 257.83(b).

Table of Contents	3
1.0 Introduction	4
2.0 Description of Impoundments	4
3.0 Review of Available Information	5
4.0 Inspection	5
4.1 Changes in Geometry Since Last Inspection	5
4.2 Instrumentation	6
4.3 Impoundment Characteristics	6
4.4 Definitions of Visual Observations and Deficiencies	8
4.5 Visual Inspection	9
4.6 Changes that Effect Stability or Operation	11
5.0 Summary of Findings	11
5.1 General Observations	11
5.2 Maintenance Items	11
5.3 Items to Monitor	11
5.4 Deficiencies	12

LIST OF TABLES

- Table 1 – Instrumentation Data
- Table 2 – Impoundment Characteristics

LIST OF FIGURES

- Figure 1 - Site Location Map
- Figure 2 – Piezometer Location Map
- Figure 3 – Historical Piezometer Data Plot
- Figure 4A – Photograph Location Map
- Figure 4B – Photograph Location Map

ATTACHMENT

- Inspection Photographs

1.0 INTRODUCTION

American Electric Power Service Corporation (AEPSC) Civil Engineering administers the Dam Inspection and Maintenance Program (DIMP) at AEP facilities. As part of the DIMP, staff from the geotechnical engineering section conducts dam and dike inspections on a periodic basis. This report was prepared by AEP- Geotechnical Engineering Services (GES) section, in part, to fulfill requirements of 40 CFR 257.83 and to provide the Flint Creek Plant an evaluation of the facility.

The primary bottom ash dam is located south of the Flint Creek Power Plant. Figure 1 (Site Location Map) illustrates the location of the primary bottom ash pond and dam facility. Shah Baig, P.E. of the AEP-Geotechnical Engineering performed the 2023 inspection of the dam. This report is a summary of the inspection and an assessment of the general condition of the facility. Greg Carter of the AEP-Plant Engineering coordinated the inspection activities and Scott Carney of the Flint Creek Plant facilitated the inspection of the facility. The inspection was performed on August 15, 2023. Weather conditions were sunny, clear skies, light breeze, visibility was good, and the temperature was 75 degrees Fahrenheit. In the last 7 days of the inspection 3.17 inches of rain was recorded. Inspection findings were briefly discussed with Scott Carney (Plant Environmental Coordinator).

2.0 DESCRIPTION OF IMPOUNDMENTS

Figure 1 provides a general plan view of the facility including the Primary Bottom Ash and Clearwater dams. The Flint Creek power plant is located to the north of the Primary Bottom Ash Pond (PBAP) and the Clearwater Pond (CWP). The coalyard is located east of the power plant and the Flint Creek lake is located west of both dams. The primary bottom ash pond dam is an 820-foot long cross-valley dam on an unnamed tributary to Little Flint Creek. The Primary Bottom Ash Pond is used primarily for the settling and storage of bottom ash, and is considered a coal combustion residuals (CCR) surface impoundment. It also receives runoff from the coalyard, surrounding watershed area consisting of agricultural land, plant site, and residential areas of the City of Gentry, and plant other waste streams. Flow from the reservoir discharges into the Clearwater pond.

The Primary Bottom Ash Pond is in final stage of closure by removal of all the CCR materials and is substantially complete. All the CCR and other materials from the pond removed by dredging and excavation was disposed of at the onsite CCR landfill.

GENERAL INFORMATION

Dam or Reservoir:	Primary Bottom Ash Pond
Owner:	Southwestern Electric Power Company (SWEPCO)
Type of Dam:	Earth-Fill Structure
Date of Construction:	1978
Downstream Hazard:	Low

LOCATION

County:	Benton County
General Location:	Approximately 4.5 miles north of Siloam Springs, AR
Stream and Basin:	Unnamed tributary to Little Flint Creek; Flint Creek Basin

SIZE – PRIMARY DAM

Dam Crest Elevation:	1,155 feet
Dam Height:	45 feet
Water Surface Area:	24 acres (current elevation 1,143.9 feet)
Reservoir Volume:	485 acre-feet (elevation 1,145 feet)

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

A review of available information regarding the status and condition of the primary bottom ash dam has been conducted. This 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 inspections has been conducted. Based on the review of the data, no signs of actual or potential structural weakness or adverse conditions were 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 primary bottom ash dam since the last annual inspection.

The plant has made minor changes to the operations of the pond and the water level has been steady. The normal pond level is currently at an elevation 1,143.3 feet.

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

There are four piezometers located along the crest of the dam as shown on Figure 2. These are the only instrumentation related to this facility. A review of readings since the last inspection and historical readings (2017-2023) indicate the levels are consistent and respond to the fluctuation of the cooling lake level. The piezometers are more influenced by the level of the cooling lake than the elevation of the Primary Bottom Ash Pond. A spike was noticed in Piezometers A1-A3 in April 2023 and A4 in August 2023. Piezometers A1-A3 were damaged by construction equipment and were replaced in June 2023. Typically, the trend in the historical data between the piezometers reading, lake level, and pond levels are consistent. Once the pond resume to its normal operating condition, the piezometer reading shall be checked and compared to its historical readings. Table 1 lists the maximum piezometer reading since the last annual inspection. Figure 3 provides historical data plot of the piezometer readings over the past several years.

TABLE 1 - INSTRUMENTATION DATA (primary bottom ash dam)			
Instrument	Type	Maximum Reading (Elevation) Since Last Annual Inspection	Date of Reading
A1	Piezometer	1152.04	4/27/2023
A2	Piezometer	1144.14	4/27/2023
A3	Piezometer	1143.29	4/1/2023
A4	Piezometer	1141.46	8/18/2023

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 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. The data below is based on the original topography and 2004 hydrographic survey. The water level in the Primary Bottom Ash Pond does not vary much during normal operations. Based on the normal operations,

the volume of ash and water remain fairly constant, as material is annually removed or temporarily stockpiled within the footprint of the pond and currently more material has been removed for the pond closure.

<u>Table 2 - IMPOUNDMENT CHARACTERISTICS</u>	
	Primary Bottom Ash Dam
Approximate Minimum depth (elevation) of impounded water since last annual inspection	10.80 ft. (1,144.20 feet msl)
Approximate Maximum depth (elevation) of impounded water since last annual inspection	42 ft. (1,113.00 feet msl)
Approximate Present depth of impounded water at the time of the inspection	11.7 ft. (1,143.3 feet msl)
Approximate Minimum depth (elevation) of CCR since last annual inspection	0 ft.
Approximate Maximum depth (elevation) of CCR since last annual inspection	0 ft.
Approximate Present depth (elevation) of CCR at the time of the inspection	0 ft.
Approximate Storage Capacity of impounding structure at the time of the inspection	771 ac-feet (at crest elevation)
Approximate volume of impounded water at the time of the inspection	123.8 ac-ft.
Approximate volume of CCR at the time of the inspection	0.05 ac-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 are 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 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 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, scraps, bulges, depressions, sinkholes and slides.

3. Blockage of Water Control Appurtenances

Blockage of Water Control Appurtenances is the restriction of the flow section 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 primary bottom ash dam 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 that are disrupting the safe operation of the impoundment. Currently, the bottom ash from the impoundment has been removed as part of the pond closure work. Inspection photograph location map (Figures 4A and 4B) and inspection photos are included.

- (i) Overall view of the primary bottom ash pond is illustrated in Photograph No. 1. Most of the CCR materials had been removed from the pond and placed in the onsite landfill. A very small quantity of CCR material remains in the pond at this time which will be removed shortly.
- (ii) Photograph Nos. 2-4 illustrates the condition of the upstream slope. At present, the plant wastewater is conveyed via temporary channel (Photograph No. 4) to the south side of the pond. The riprap on the upstream slope was removed to facilitate CCR

- removal activities. The upstream slope of the primary dam was observed to be in satisfactory condition. Minor erosion was observed on the south slope of the dam.
- (iii) Photograph Nos. 5 and 6 illustrate crest of the dam. The crest surface of the dam is composed of hard-packed earth topped with bottom ash. Crest is also used by vehicular traffic to access the monitoring instrumentation and at present for the pond closure work activities. The crest is in generally good condition with no evidence of misalignment, settlement, or cracking. Some minor rutting along the crest was noted due to the vehicle traffic.
 - (iv) Photograph Nos. 7 and 8 illustrates the downstream slope of the dam. The downstream slope of the primary dam appeared in satisfactory condition. Most of the slope was protected with riprap cover except for the upper 12-15 feet of the slope is covered with vegetation. Slightly excessive vegetation was observed in the upper section of the slope. There was no observed displacement or movement of the riprap. There was no seepage observed along the face of the slope.
 - (v) Typical condition of the north dike is illustrated in Photograph No. 9. North dike crest also supports the railroad loop of the coal-yard. The north dike slope was regraded and vegetation was cleared due to the pond closure activities.
 - (vi) The principal spillway for the pond is a concrete drop-inlet structure with stop logs used to control the pool elevation. The overflow discharge structure was in generally fair condition. The access platform and flow through the principal spillway was unobstructed (Photograph No. 10).
 - (vii) The emergency spillway (Photograph No. 11) is an incised channel in natural ground with a concrete weir control section, 1 ft. in height, across the channel width. The spillway was in generally good condition at the time of inspection. The spillway appeared to be generally stable. Vegetation control in this natural ground area is good. Hairline cracks were noticed along the concrete spillway and at the buttress to the north of the spillway (Photograph No. 12).

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 primary bottom ash dam since the last annual inspection that would affect the stability of the impounding structure.

The riprap cover of the upstream slope of the dam was removed for the pond closure work, but will be replaced once the pond closure work is complete.

5.0 SUMMARY OF FINDINGS

5.1 GENERAL OBSERVATIONS

Based on the visual inspection and review of the instrumentation information available, it is concluded that the primary bottom ash pond dam is generally in good condition at the time of inspection.

There were no signs of distress that would indicate possible instability, excessive settlement, misalignment, sloughing, or cracking of the dam.

At the time of inspection, the bottom ash removal activities were in progress and reportedly to be completed in few weeks. After the closure by removal project is complete, no CCR materials will be sluiced into the pond. These activities are mainly conducted within the pond limits and has not impacted the dam structure or its appurtenances.

In general, there was minor erosion, cleanup work, and replacement of riprap on the upstream slope. Few hairline cracks were noticed at the concrete spillway.

5.2 MAINTENANCE ITEMS

The following maintenance items were identified during the visual inspection.

- Continue the vegetation control plan of mowing and spraying.
- Make sure the piezometers are in functional condition after they were replaced following the completion of construction activities.

5.3 ITEMS TO MONITOR

None.

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

The primary bottom ash dam exhibited no signs of structural weakness or disruptive conditions during 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 1) uncontrolled seepage, 2) displacement of the embankment, 3) blockage of control features, or 4) erosion, more than minor maintenance. If any of these conditions occur before the next annual inspection contact AEP Geotechnical Engineering immediately.

If you have any questions with regard to this report, please contact Shah Baig (Phone: 614-716-2241, email: sbaig@aep.com) or Bryan Brunton (Phone: 614-716-3090, email: bwbrunton@aep.com)

LIST OF FIGURES

- Figure 1 - Site Location Map
- Figure 2 – Piezometer Location Map
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- Figure 4A – Photograph Location Map
- Figure 4B – Photograph Location Map

Figure 1 – Site Location Map
Primary Bottom Ash Pond
Flint Creek Plant, Gentry, AR

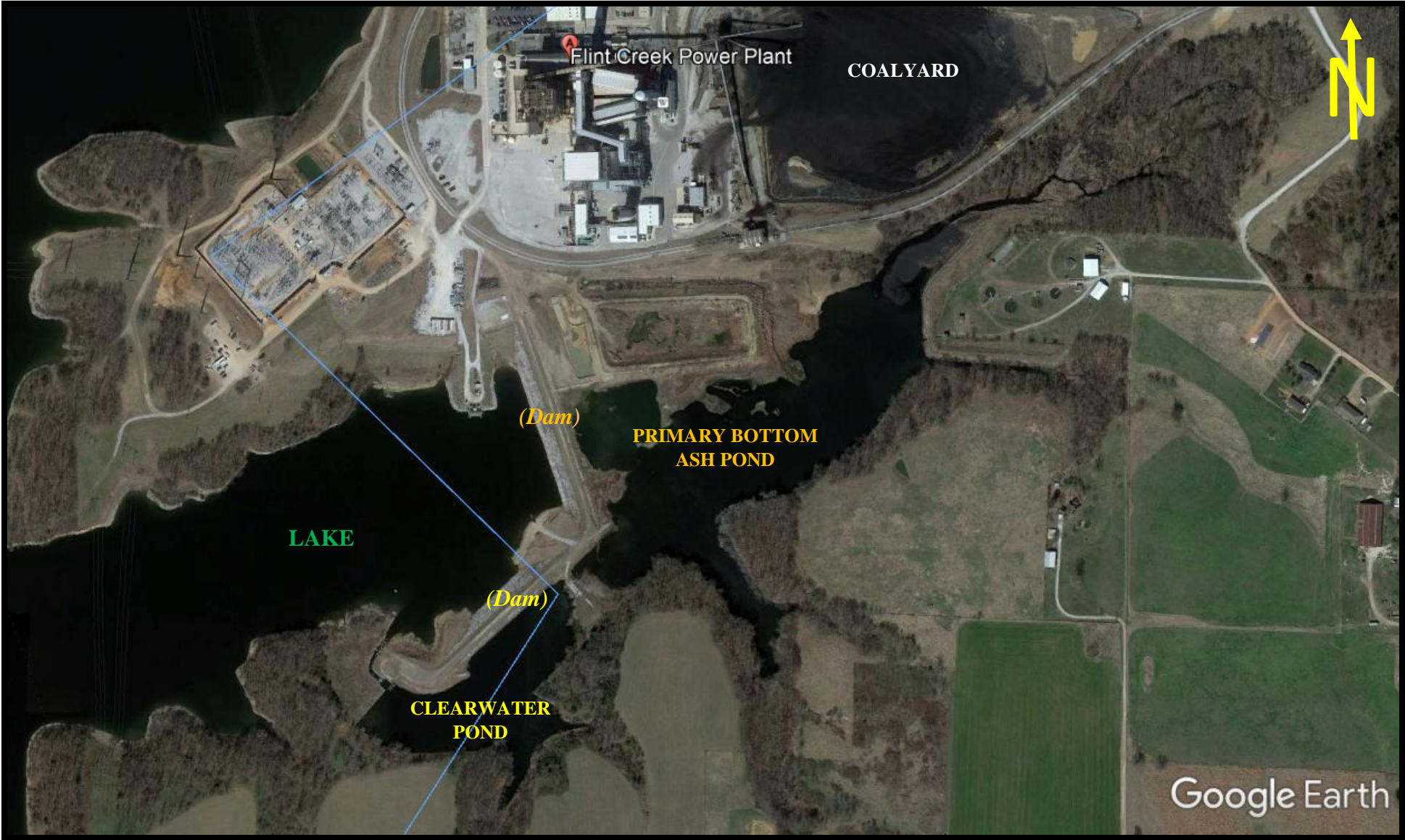
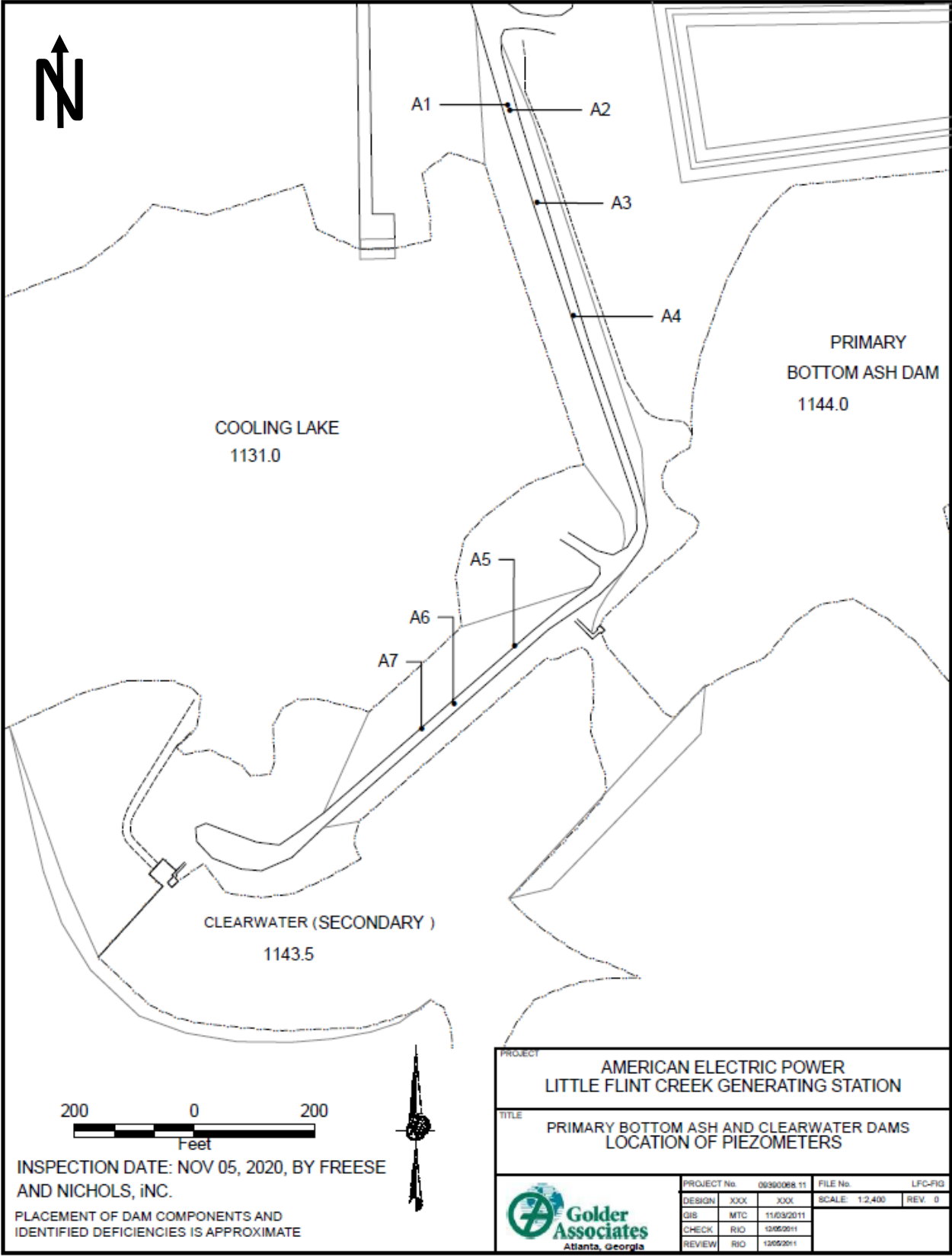


Figure 2 – Piezometer Location Map
Primary Bottom Ash Pond
Flint Creek Plant, Gentry, AR



INSPECTION DATE: NOV 05, 2020, BY FREESE AND NICHOLS, INC.
 PLACEMENT OF DAM COMPONENTS AND IDENTIFIED DEFICIENCIES IS APPROXIMATE



Figure 3 – Historical Piezometer Data Plot
Primary Bottom Ash Pond
Flint Creek Plant, Gentry, AR

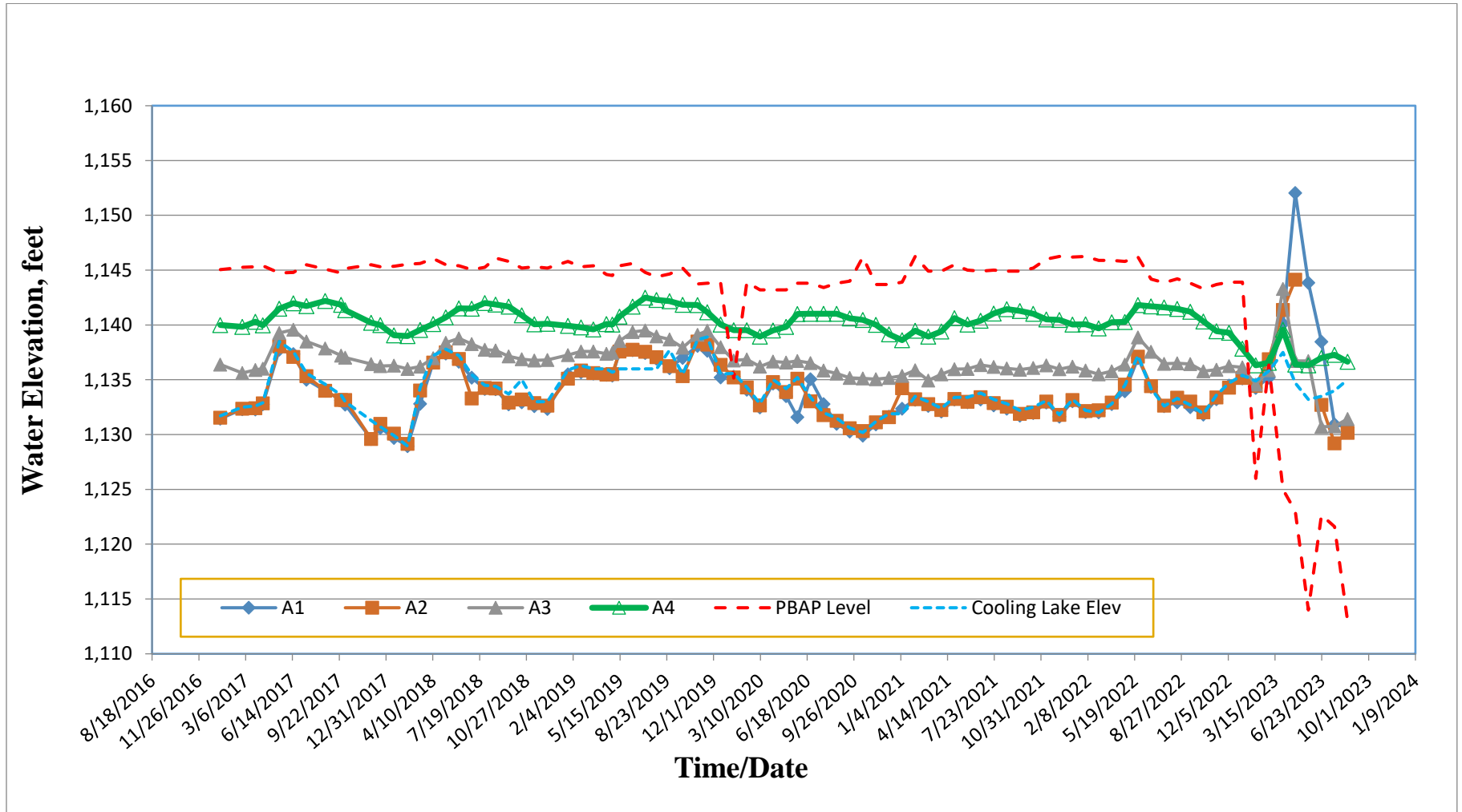


Figure 4A – Photograph Location Map
Primary Bottom Ash Pond
Flint Creek Plant, Gentry, AR



Figure 4B – Photograph Location Map
Primary Bottom Ash Pond
Flint Creek Plant, Gentry, AR



ATTACHMENT

- Inspection Photographs

<p>Photograph No. 1 Overall view of the pond interior.</p>	 A wide-angle photograph showing the interior of a large pond. The water is dark blue and occupies the middle ground. The surrounding land is mostly dry, brown earth with sparse green vegetation. In the background, there are some industrial buildings and a line of trees under a bright blue sky with scattered white clouds. In the foreground, there's a small stream of water flowing through a rocky, eroded area with some green plants.
<p>Photograph No. 2 Upstream slope (looking north).</p>	 A photograph showing an upstream slope of the pond. The slope is composed of reddish-brown soil and rocks, with patches of green grass. A small, shallow channel of water flows down the slope towards the pond. In the background, a large industrial facility with several tall chimneys and buildings is visible under a clear blue sky.
<p>Photograph No. 3 Minor erosion.</p>	 A close-up photograph of the upstream slope, focusing on an area of minor erosion. The ground is a mix of reddish-brown soil and grey rocks. A small stream of water is flowing through a narrow channel in the soil, creating a small pool of water. The surrounding area has some sparse green vegetation.

<p>Photograph No. 4 Upstream slope (looking south).</p>	
<p>Photograph No. 5 Crest of the dam (looking south).</p>	
<p>Photograph No. 6 Crest of the dam (looking north).</p>	

Photograph No. 7
Downstream slope
(looking north).






Photograph No. 8
Downstream slope
(looking south).



Photograph No. 9
The north embankment
(looking east).



<p>Photograph No. 10 Overflow discharge structure.</p>	 A photograph showing a concrete overflow discharge structure with metal railings. A blue barrel is on the structure. In the background, there is a large industrial facility with a tall chimney and a large earthen embankment under a blue sky with scattered clouds.
<p>Photograph No. 11 Emergency spillway concrete sill (looking south).</p>	 A photograph of a concrete spillway sill. The structure is partially covered with rocks and green vegetation. A river flows to the left, and a dense line of trees is in the background under a blue sky with white clouds.
<p>Photograph No. 12 Hairline crack at the spillway concrete buttress.</p>	 A close-up photograph of a concrete spillway buttress. A thin, vertical hairline crack is visible in the concrete surface. Some dry brush is in the foreground.