

# **2021 Annual Dam and Dike Inspection Report**

**Primary Bottom Ash Dam**

**Flint Creek Plant**

**Southwestern Electric Power Company**

**Gentry, Arkansas**

**August 2021**

Prepared by: American Electric Power Service Corporation

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Columbus, OH 43215




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# 2021 Annual Dam and Dike Inspection Report

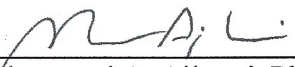
**Flint Creek Plant**

**Primary Bottom Ash Dam**

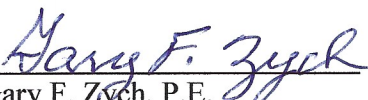
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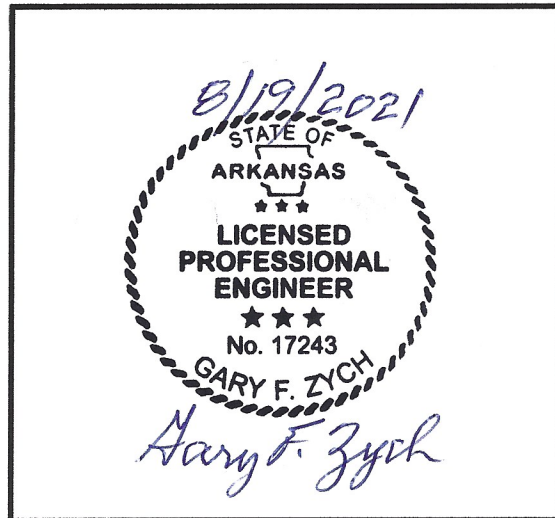
DATE 08-18-2021

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Manager – AEP Geotechnical Engineering

DATE 8/19/2021



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

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## **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. Shah Baig, P.E. performed the inspection of the primary ash pond dam at the Flint Creek Power Plant. 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.

Mr. Scott Carney was the plant contact for the inspection. The inspection was performed on August 5, 2021. Weather conditions were sunny skies, light breeze, and temperatures were in the range of mid 80°F.

## **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. The bottom ash is periodically excavated/dredged for beneficial use. Flow from the reservoir discharges into the Clearwater pond.

### GENERAL INFORMATION

Dam or Reservoir:	Primary Bottom ash Pond
Owner:	Southwestern Electric Power Co.
Type of Dam:	Earth-Fill Structure
Date of Construction:	1978
D/S 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 1,144.9 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 in the range of an elevation 1,144.9 feet. In the past, the normal pond level was at an elevation 1,145 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 (2017-2021) 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 bottom ash pond. The trend in the historical data between the piezometers reading, lake level, and pond levels are consistent.

Table 1 lists the maximum piezometer reading since the last annual inspection.

Figure 3 is a historical plot of the piezometer readings over the past several years.

<b>TABLE 1 - INSTRUMENTATION DATA</b>			
<b>Primary Bottom ash Dam</b>			
<b>Instrument</b>	<b>Type</b>	<b>Maximum Reading (Elevation) Since Last Annual Inspection</b>	<b>Date of Reading</b>
A1	Piezometer	1133.22	6/24/2021
A2	Piezometer	1134.24	1/7/2021
A3	Piezometer	1136.35	6/24/2021
A4	Piezometer	1141.06	7/22/2021

**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. (The data below is based on the original topography and 2004 hydrographic survey. The lowest elevation of CCR/sediment is 1130 ft msl; original was 1120; ash pipe discharge 1150.) 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.

<b><u>Table 2 - IMPOUNDMENT CHARACTERISTICS</u></b>	
	<b>Primary Bottom ash Dam</b>
Approximate <b>Minimum</b> depth (elevation) of impounded water since last annual inspection	13.7 ft (1143.70 ft msl)
Approximate <b>Maximum</b> depth (elevation) of impounded water since last annual inspection	16.05 ft. (1146.25 ft msl)
Approximate <b>Present</b> depth of impounded water at the time of the inspection	14.9 ft. (1144.9 ft msl)
Approximate <b>Minimum</b> depth (elevation) of CCR since last annual inspection	30 ft. (1150 ft msl)
Approximate <b>Maximum</b> depth (elevation) of CCR since last annual inspection	30 ft.(1150 ft msl)
Approximate <b>Present</b> depth (elevation) of CCR at the time of the inspection	30 ft. (1150ft msl)
Approximate Storage Capacity of impounding structure at the time of the inspection	771 ac-ft (at crest elevation)
Approximate volume of impounded water at the time of the inspection	135 ac-ft.
Approximate volume of CCR at the time of the inspection	347 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 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 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. Inspection photos are included in Attachment A.

- (i) Photograph Nos. 1-3 illustrates the downstream slope of the primary 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. There was no observed displacement or movement of the riprap. There was no seepage observed along the face of the slope. Slightly overgrown vegetation was observed at the upper section of the slope and vegetation was seen protruding between the riprap.
- (ii) Photograph Nos. 4-6 illustrates the condition of the upstream slope. A dredge cell is located adjacent to the north section of the upstream slope. The upstream slope of the primary dam was observed to be in satisfactory condition from the visible riprap up to the crest. Since the pond is used for settling of solids, there is an accumulation of bottom ash stockpile in the north section of the upstream slope at the dredge cell. The north area of the pond is used for operational activities by maintaining and

removal of bottom ash for the beneficial use. The interface of the upstream slope and ash limits was visible and stable. Excessive and overgrown trees were noticed at the south end of the upstream slope.

- (iii) Photograph No. 7 illustrates the principal spillway (overflow discharge structure). The principal spillway for the pond is a concrete drop-inlet structure with stop logs used to control the pool elevation. The spillway was in generally fair condition. Flow through the principal spillway was unobstructed (Photograph No. 8).

The emergency spillway (Photograph No. 9) 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.

- (iv) Photograph Nos. 10 and 11 illustrates upstream slope of the north dike. North dike crest also support the railroad loop of the coal-yard. The west section of the dike is covered with the dredge cell and most of the slope is covered with the bottom ash. The exposed upper section of the slope is covered with excessive vegetation, but the slope is in stable condition.

- (v) Photograph Nos. 12 and 13 illustrates crest of the dam. The crest surface of the dam is composed of hard-packed earth topped with bottom ash. Vehicular traffic is maintained across the crest to access the monitoring instrumentation. The crest is in generally good condition with no evidence of misalignment, settlement, or cracking. Some rutting along the crest was noted due to the vehicle traffic (Photograph No. 13).

- (vi) Partial view of the dredge cell illustrated in Photograph No. 14. The dredge cell is limited to the northwest corner of the pond and properly maintained for the management and transportation of the bottom ash for beneficial use.

#### **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.

### **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.

In general, there is excessive vegetation on the slopes and mowing should be performed more frequently.

#### **5.2 MAINTENANCE ITEMS**

The following maintenance items were identified during the visual inspection.

- Continue the vegetation control plan of mowing and spraying.
- Continue maintaining the temporary stockpile and dredge cell so that it is contained within the limited area.
- Avoid any encroachment and overtopping of the dam with bottom ash stockpile.

#### **5.3 ITEMS TO MONITOR**

None.

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

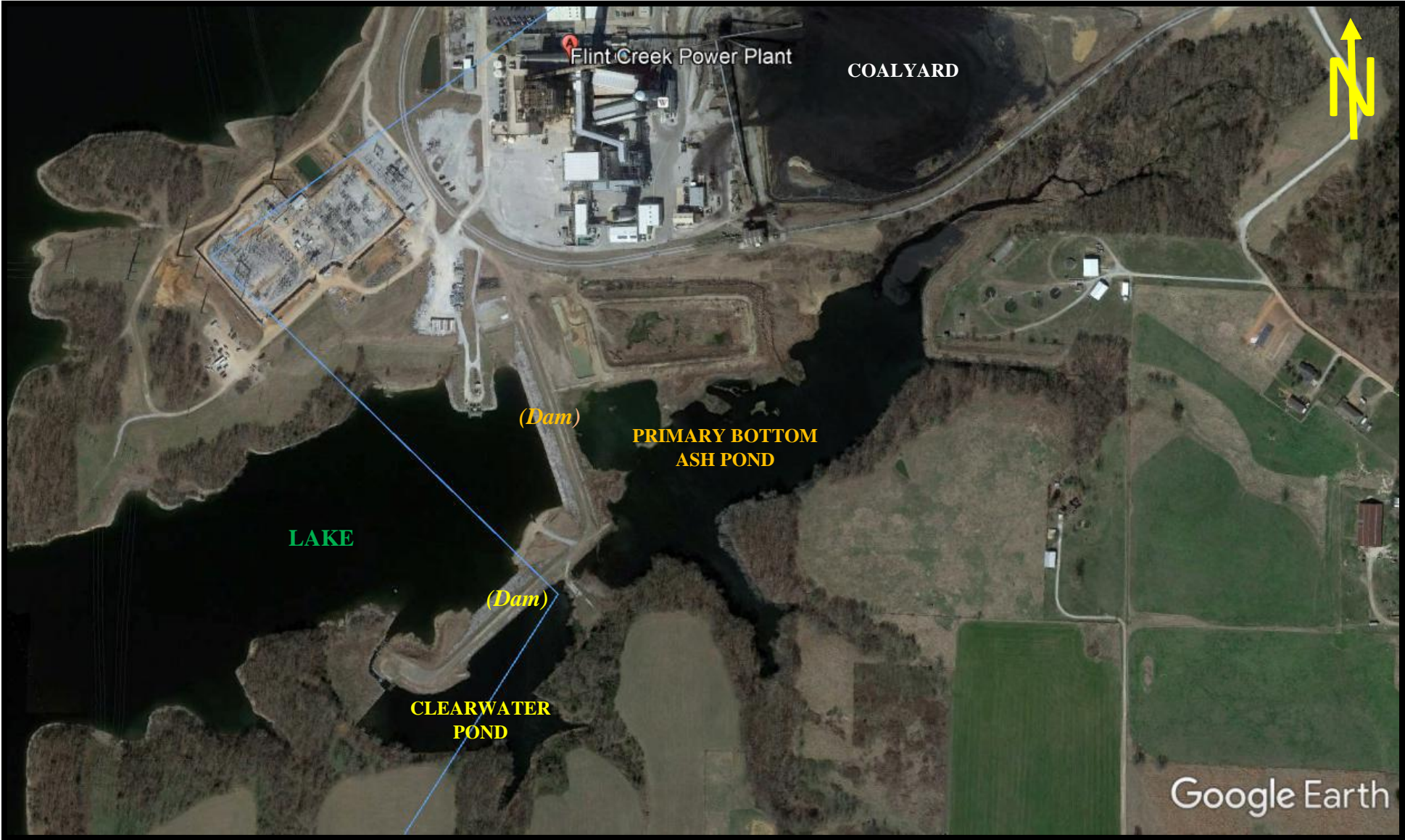
The Primary Bottom ash Dam exhibited no signs of structural weakness or disruptive conditions during the inspection that would require additional investigation or remedial action. There were no deficiencies noted during this inspection or during any of the periodic 7-day inspections. A deficiency is 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](mailto:sbaig@aep.com)) or Gary Zych (Phone: 614-716-2917, email: [gfzych@aep.com](mailto:gfzych@aep.com))

## APPENDICES

## APPENDIX A

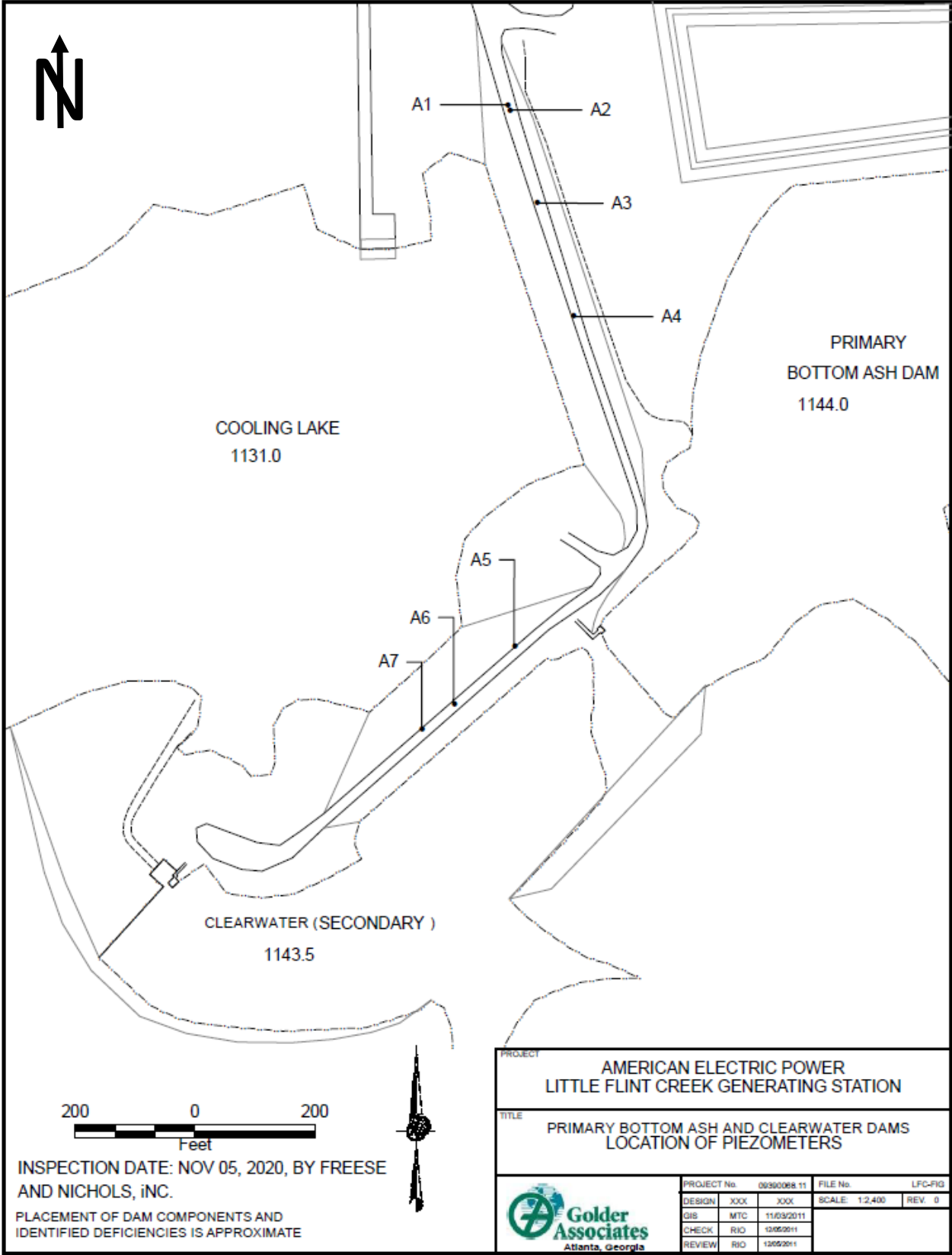
**Figure 1 – Site Location Map**  
**Primary Bottom Ash Pond**  
**Flint Creek Plant, Gentry, AR**



## APPENDIX B

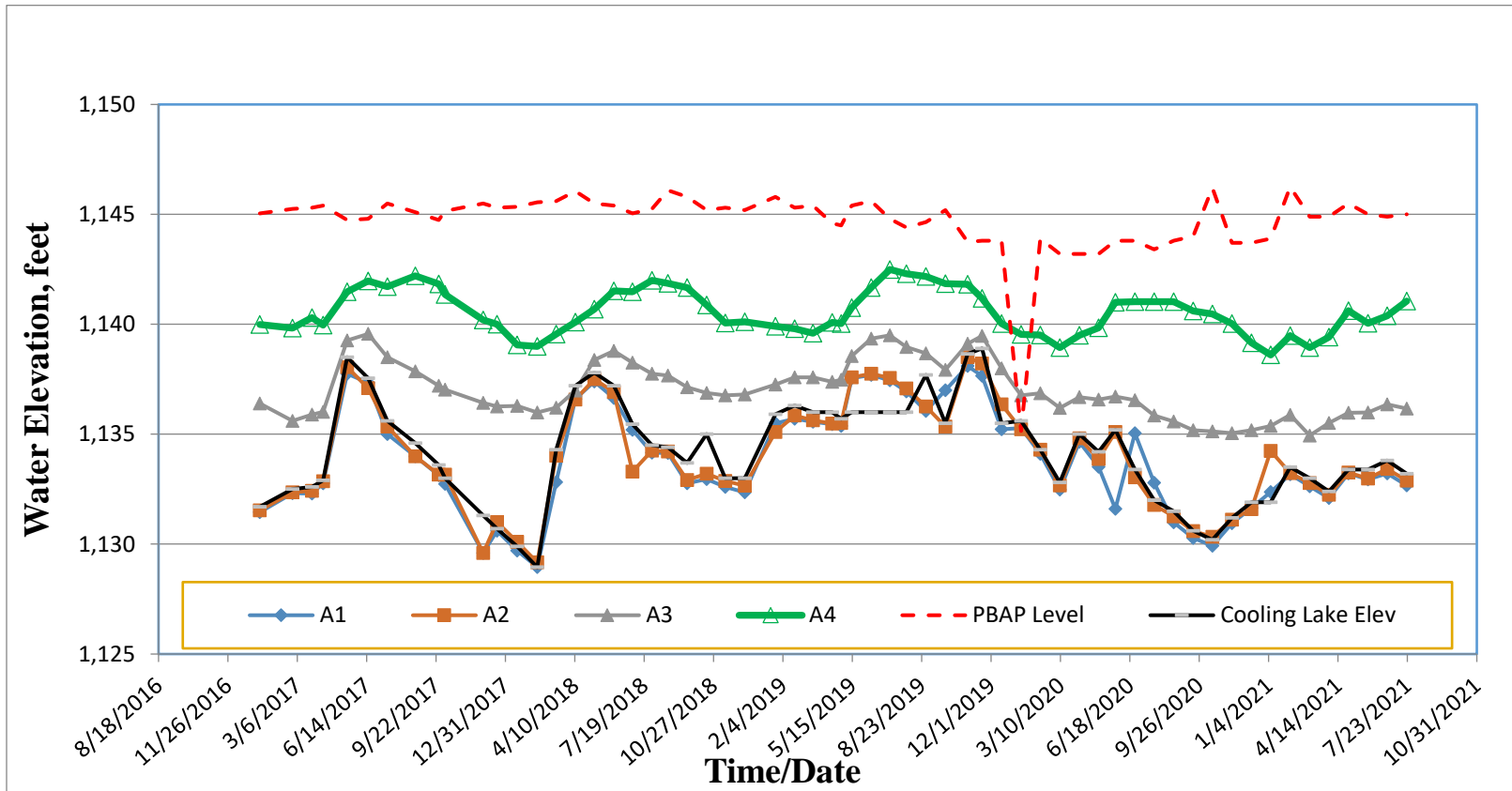


**Figure 2 – Piezometer Location Map**  
**Primary Bottom Ash Pond**  
**Flint Creek Plant, Gentry, AR**



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**



## APPENDIX C

**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**



PHOTO #1

Downstream slope and the groin (looking north).



PHOTO #2

Middle section of the downstream slope.



PHOTO #3

Downstream slope and the groin (looking south).



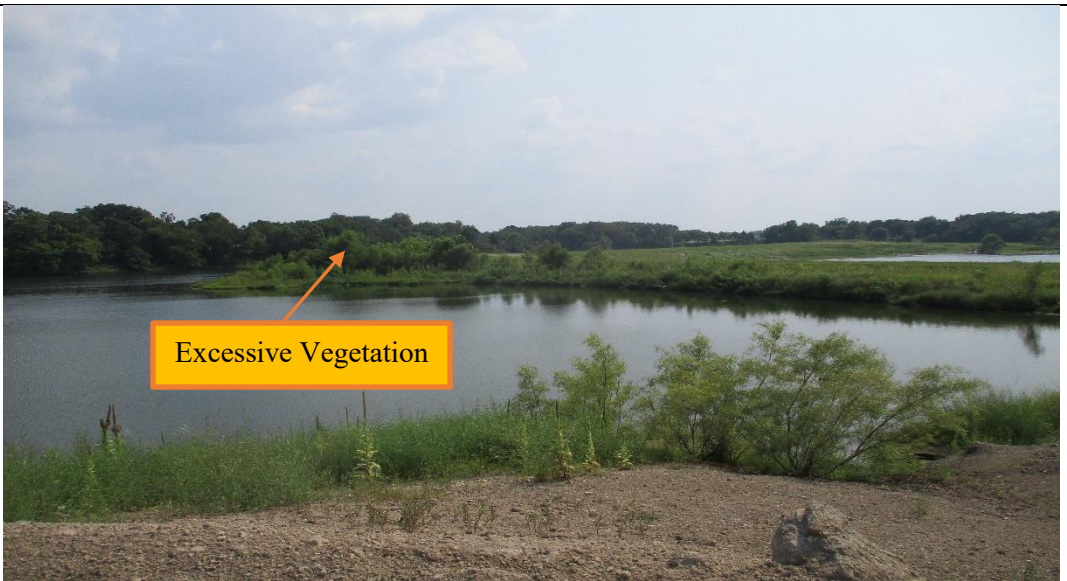


<p><u>PHOTO #4</u></p> <p>This photograph illustrating southeast area of the upstream slope, excessive vegetation.</p>	 <p>Excessive Vegetation</p> <p>This photograph shows a wide view of a pond or reservoir. The far bank is heavily overgrown with dense green trees and shrubs. An orange arrow points from a yellow box labeled 'Excessive Vegetation' to the dense foliage on the opposite shore. The foreground consists of a gravelly or sandy bank with some sparse vegetation.</p>
<p><u>PHOTO #5</u></p> <p>This photograph illustrates north section of the upstream slope.</p>	 <p>Excessive Vegetation</p> <p>This photograph shows a dirt road or path running alongside a body of water. The right side of the path is heavily overgrown with tall grasses and dense bushes. An orange arrow points from a yellow box labeled 'Excessive Vegetation' to the dense vegetation. In the background, industrial structures and a tall smokestack are visible under a blue sky with scattered clouds.</p>
<p><u>PHOTO #6</u></p> <p>Stockpile of bottom ash adjacent to the north section of the upstream slope.</p>	 <p>This photograph shows a large, light-colored stockpile of bottom ash. The ash is piled up in a long, low mound. In the foreground, there is a dirt road and some green grass. Several white PVC pipes are visible in the grass. The sky is blue with scattered white clouds.</p>

PHOTO #7  
Overflow discharge structure.



PHOTO #8  
Interior of the discharge structure.



PHOTO #9  
Emergency spillway concrete sill.





PHOTO #10  
Upstream north slope  
(looking east).



PHOTO #11  
Upstream north slope  
(looking west).



PHOTO #12  
Crest of the dam (looking south).



PHOTO #13

Crest of the dam (looking north).

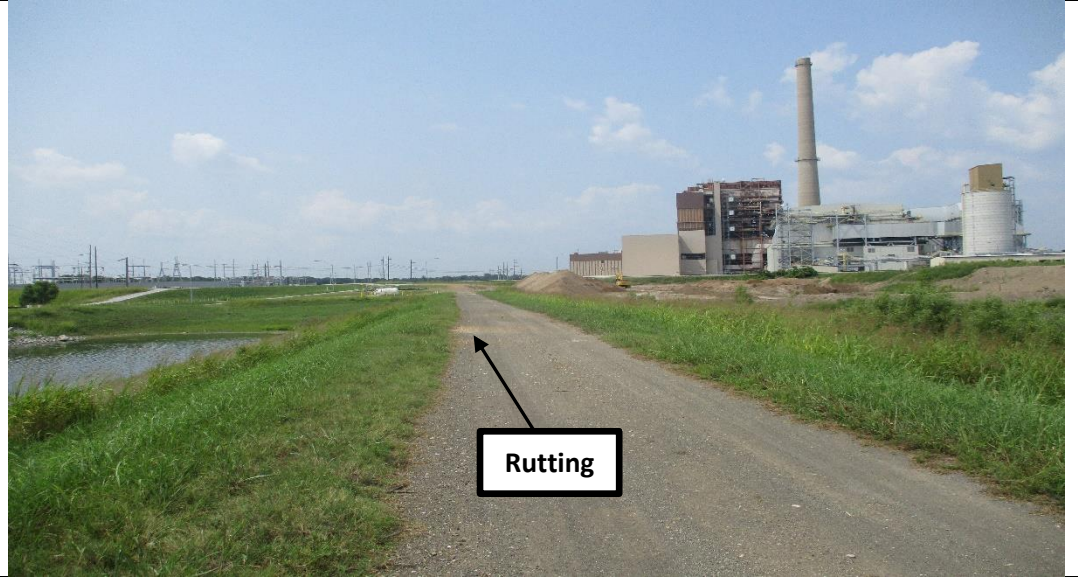


PHOTO #14

Dredge cell (looking northwest).

