2019 Annual Dam and Dike Inspection Report

Primary Bottom Ash Dam

Flint Creek Plant

Southwestern Electric Power Company

Gentry, Arkansas

December 2019

Prepared by: American Electric Power Service Corporation

1 Riverside Plaza

Columbus, OH 43215

Document ID: GERS-19-044

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STATE OF ARKANSAS
LICENSED PROFESSIONAL ENGINEER
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GARY F. ZYCH
12/17/2019

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. Gary Zych, 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 November 13, 2019. Weather conditions were sunny and temperatures were in the range of 30°F. Rainfall for the 7 days preceding the inspection was 3.4 inches – about 3 inches was recorded from November 6 -7.

2.0 DESCRIPTION OF IMPOUNDMENTS

Figure 1 provides a plan view of the Primary Bottom Ash and Clearwater 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 for the settling and storage of bottom ash, and is considered a CCR surface impoundment. 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
Dam Height:	45 feet
Water Surface Area:	24 acres (current at el. 1145)
Reservoir Volume:	485 ac-ft (el. 1145)

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 changes to the operations of the pond and the water level has been lowered to improve the settling efficiency of the pond during stormwater runoff events. The normal pond level is currently in the range of elevation 1143.5-1144.0. In the past, the normal pond level was elevation 1145 feet.

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

There are four piezometers located along the crest of the dam as shown on Figure 1. These are the only instrumentation related to this facility. A review of readings since the last inspection and historical readings 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. Table 1 lists the maximum piezometer reading since the last annual inspection.

Figure 2 is a plot of the piezometer readings over the past several years.

TABLE 1: INSTRUMENTATION DATA
Primary Bottom ash Dam

Instrument	Type	Maximum Reading since last annual inspection	Date of reading
A1	Piezometer	1138.1	10/28/2019
A2	Piezometer	1138.5	10/28/2019
A3	Piezometer	1139.50	7/8/2019
A4	Piezometer	1142.5	7/8/2019

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.

Table 2

IMPOUNDMENT CHARACTERISTICS	
	Primary Bottom ash Dam
Approximate **Minimum** depth (elevation) of impounded water since last annual inspection	13.3 ft (1143.30 ft msl)
Approximate **Maximum** depth (elevation) of impounded water since last annual inspection	16.05 ft. (1146.05 ft msl)
Approximate **Present** depth of impounded water at the time of the inspection	13.67 ft. (1143.6 ft msl)
Approximate **Minimum** depth (elevation) of CCR since last annual inspection	30 ft. (1150 ft msl)
Approximate **Maximum** depth (elevation) of CCR since last annual inspection	30 ft.(1150 ft msl)
Approximate **Present** 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	138 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.

Spillway Structures

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. As noted earlier, the plant has lowered the operating level of the pond by removing several stoplogs.

The emergency spillway 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 (photo 1-2). The spillway appeared to be generally stable.

Vegetation control in this natural ground area is good.

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 over the upstream slope. The operations of ash removal has removed a significant portion of the ash delta and the natural vegetation that established on the ash. The interface of the upstream slope and ash limits was visible and stable. The inspector was able to walk along the interface. (photos 3-5)

There were no signs of sloughing or movement of the upstream slope. No rodent holes or erosion were observed during the inspection. The condition of the riprap was good.

The upper 12-15 feet of the slope length above the riprap is grass. However, the grass had not been mowed recently and is higher than desired for an adequate visual inspection.

Crest

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 satisfactory condition with no evidence of misalignment, settlement, or cracking.

Some rutting along the crest was noted due to the vehicle traffic (photo 6).

Downstream Slope

The downstream slope of the primary dam was in satisfactory condition (photo 7). Most of the slope is covered with riprap except for the upper 12-15 feet of the slope length is grass. Woody vegetation within the riprap is being controlled. There was no observed displacement or movement of the riprap. There was no seepage observed along the face of the slope.

About half of the downstream slope is inundated by the normal pool of the Little Flint Creek dam cooling lake.

There were no rodent holes observed in the upper slope that is grassed. However, the grass had not been mowed recently and is higher than desired for an adequate visual inspection.

No erosion was observed in either of the groin ditches (photo 8).

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.

There is adequate vegetation on the slopes but 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.

5.3 ITEMS TO MONITOR

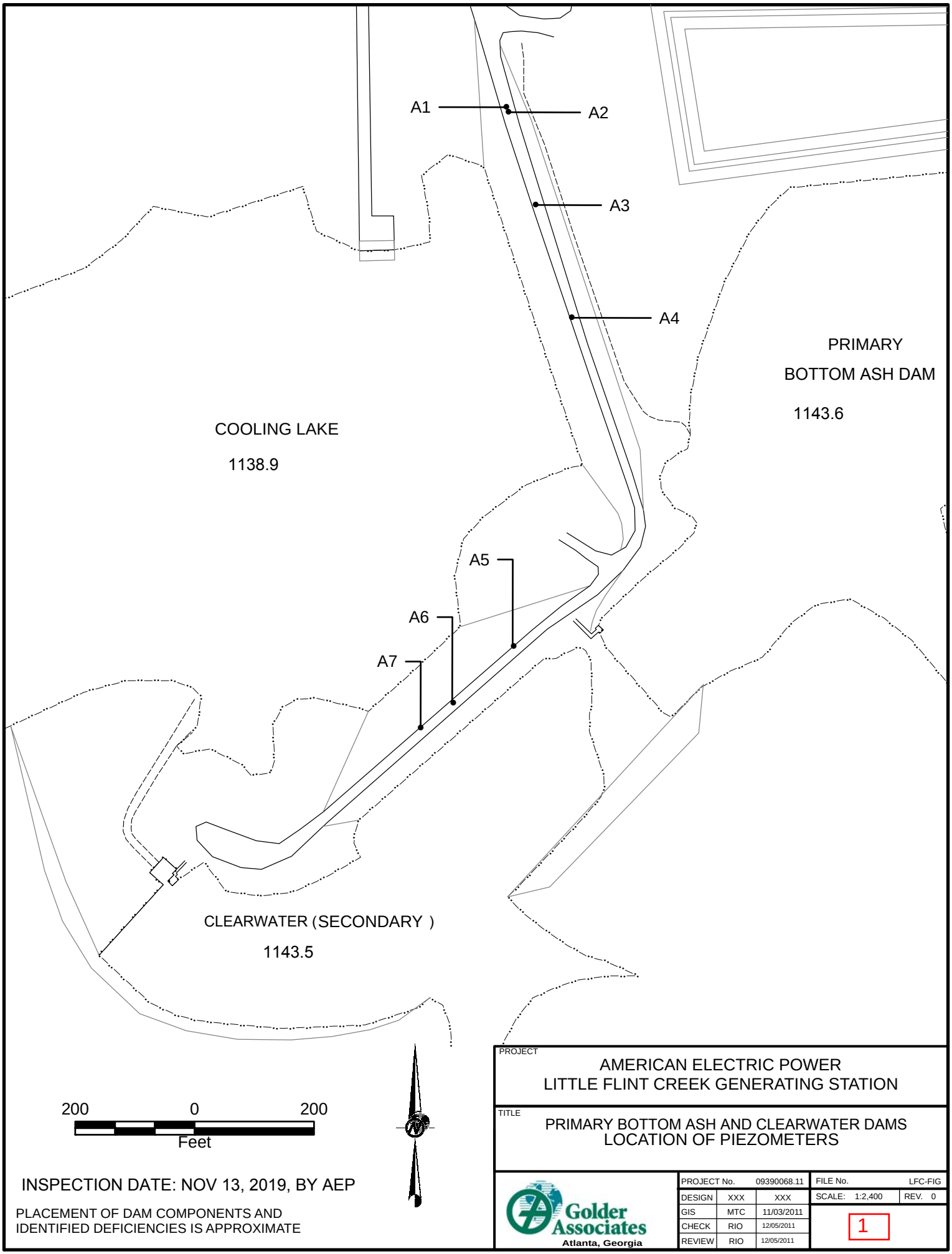
None

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 Gary Zych at 614-716-2917 (Audinet: 200-2917



INSPECTION DATE: NOV 13, 2019, BY AEP

PLACEMENT OF DAM COMPONENTS AND IDENTIFIED DEFICIENCIES IS APPROXIMATE

PROJECT

AMERICAN ELECTRIC POWER
LITTLE FLINT CREEK GENERATING STATION

TITLE

PRIMARY BOTTOM ASH AND CLEARWATER DAMS
LOCATION OF PIEZOMETERS

Golder Associates
Atlanta, Georgia

PROJECT No.		09390068.11
DESIGN	XXX	XXX
GIS	MTC	11/03/2011
CHECK	RIO	12/05/2011
REVIEW	RIO	12/05/2011

FILE No. LFC-FIG
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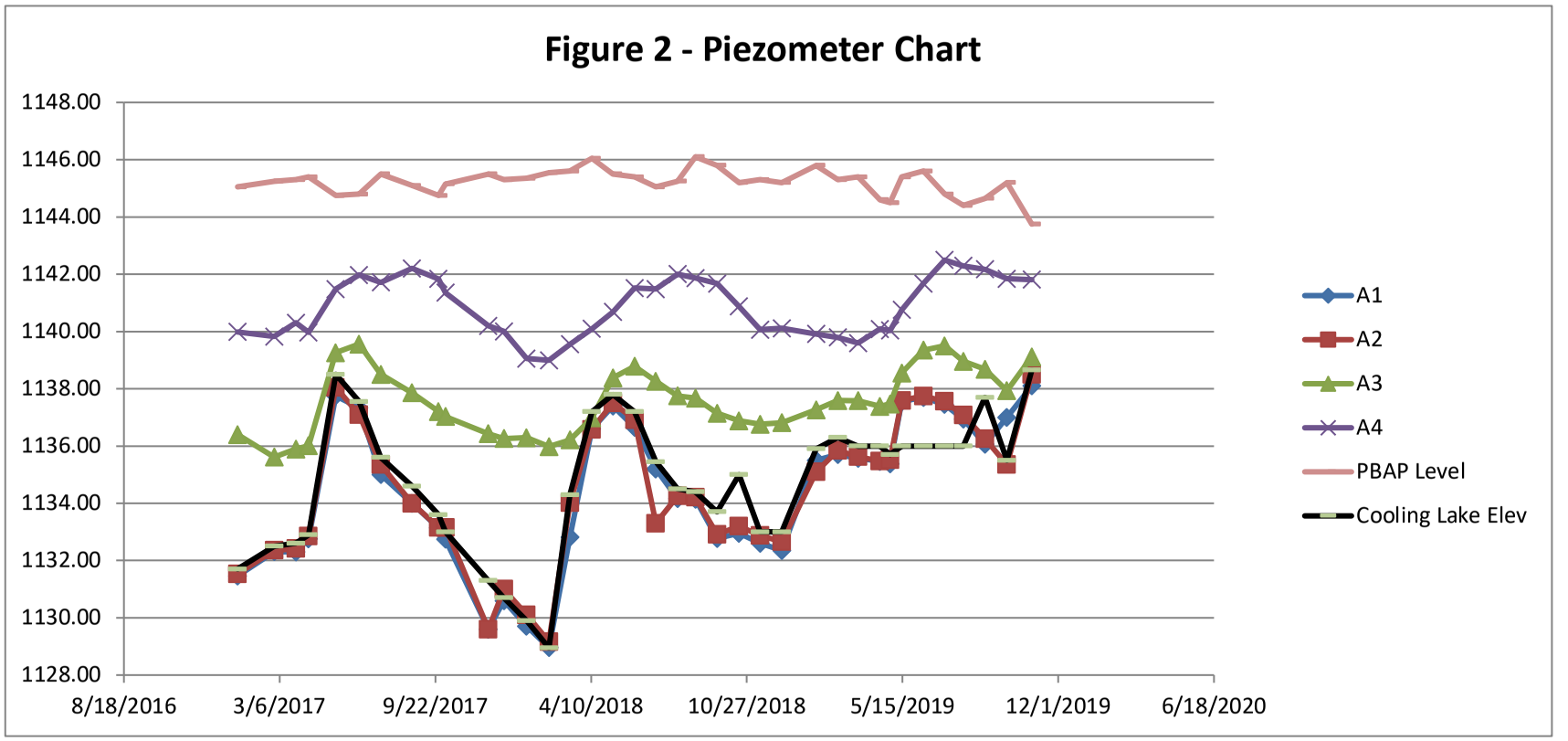
Figure 2 - Piezometer Chart
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1146.00
1144.00
1142.00
1140.00
1138.00
1136.00
1134.00
1132.00
1130.00
1128.00
8/18/2016
3/6/2017
9/22/2017
4/10/2018
10/27/2018
5/15/2019
12/1/2019
6/18/2020
A1
A2
A3
A4
PBAP Level
Cooling Lake Elev

ATTACHMENT A

Photographs

Photo #1 – emergency spillway concrete sill

Photo #2 – approach area to emergency spillway

Photo #3 –upstream slope looking towards right abutment

Photo #4 – upstream slope looking towards right abutment

Photo #5 – upstream slope with ash delta

Photo #6 – crest of dam

Photo #7 – downstream slope looking towards right abutment

Photo #8 – left groin