

# Closure Completion Notification

for the

## Clinch River Ash Pond 1

In accordance with 40 CFR 257.102(h)

Prepared for:



An **AEP** Company

---

*BOUNDLESS ENERGY*<sup>SM</sup>

Clinch River Plant  
Cleveland, Virginia

Prepared by:

American Electric Power  
1 Riverside Plaza  
Columbus, OH 43215

**August 2, 2018**

July 26, 2018



American Electric Power  
Mr. Daniel W. Pizzino, P.E.  
1 Riverside Plaza  
Columbus, OH 43215  
Phone: (614) 716-1472  
Email: [DWPizzino@AEP.com](mailto:DWPizzino@AEP.com)

**Subject: Final Report of Construction Quality Assurance and Quality Control Services  
AEP Clinch River Plant – Ash Pond 1 Closure  
Russell County, Virginia  
Amec Foster Wheeler Project No. 3050-17-0343**

Dear Mr. Pizzino:

This report presents a summary of the construction quality assurance (CQA) and construction quality control (CQC) services for the American Electric Power – Clinch River Plant Ash Pond 1 (Pond 1) Closure as required by Permit #620 by the Virginia Department of Environmental Quality (VDEQ) and by the Virginia Department of Conservation and Recreation (VDCR) dam alteration permit. The report includes the Pond 1 Closure associated with the geomembrane cap system and diversion collection system. This report certifies that the closure of the Pond 1 facility was performed in compliance with the Federal Register 40 CFR Part 257.102, the Clinch River Plant Pond 1 Closure Plan, VDEQ Permit #620, and the VDCR Alteration Permit High Hazard Dam, Inventory Number 16703.

The Pond 1 Closure Report provides documentation of all work that was performed in accordance with the Federal Register 40 CFR Part 257.102, the Clinch River Pond 1 Closure Plan, VDEQ Permit #620, and VDCR alteration permit. Included with the report are the required observations, testing information, and summary of the construction and installation activities. The Appendices contain all applicable field test data, documentation of the geosynthetics installation, and the CQA record as-built drawings of the Pond 1 Closure.

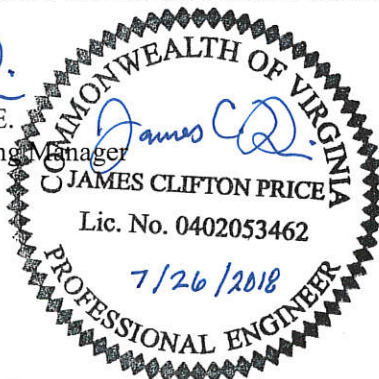
This report certifies that the approved CQA plan for the AEP Clinch River Pond 1 Closure, as outlined in the Federal Register 40 CFR Part 257.102, the Clinch River Pond 1 Closure Plan, VDEQ Permit #620, and the VDCR alteration permit, has been successfully carried out and the constructed unit meets all the requirements of the permitted CQA Plan.

Amec Foster Wheeler appreciates the opportunity to provide services to you and we look forward to serving as your consultant in the future. Please contact us with questions regarding the information presented.

Sincerely,  
Amec Foster Wheeler Environment & Infrastructure, Inc.

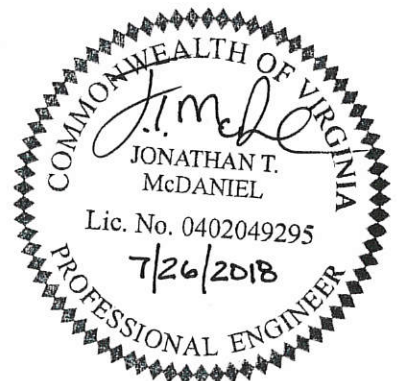
Handwritten signature of James Clifton Price in blue ink.

James Price, P.E.  
CQA Engineering Manager



Handwritten signature of Jonathan T. McDaniel in blue ink.

Jonathan T. McDaniel, P.E.  
CQA Certifying Engineer



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

**Clinch River Ash Pond 1A/1B**

**Clinch River  
Appalachian Power Company  
Carbo, Virginia**

**November 2021**

Prepared for: Appalachian Power Company – Clinch River Plant

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



Document ID: GERS-21-071

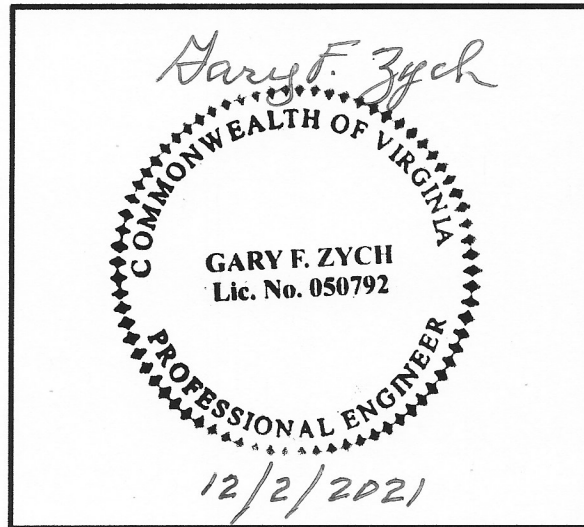
**Clinch River Plant**  
**Ash Pond 1A/1B Dam**  
**Annual Engineering Inspection Report**  
**Document Number: GERS-21-071**

**Inspection Date: October 27, 2021**

PREPARED BY *M.A.L.* DATE 11/19/2021  
Mohammad Ajlouni, P.E., Ph.D.

REVIEWED BY *Brett A. Dreger* DATE 11/22/2021  
Brett Dreger, P.E.

APPROVED BY *Gary F. Zych* DATE 12/2/2021  
Gary F. Zych, P.E.  
Manager – AEP Geotechnical Engineering



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).

FZ[e]efZWSe[f]` ebW[a]` dWaf dWg[dW]Tk fZW5D Dg^W



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## **1.0 INTRODUCTION**

This report was prepared by AEP- Geotechnical Engineering Services (GES) section, in part, to fulfill requirements of AEP's Dam and Dike Inspection and Maintenance Program, US EPA 40 CFR 257.83(b) for the CCR impoundments and to provide the Clinch River Plant an evaluation of the Ash Pond 1A/1B Dam. Additionally, a periodic inspection is required by the Virginia Department of Conservation and Resources (VDNR) Dam Safety Group.

The inspection was performed by Mr. Mohammad Ajlouni. Mr. Lyle Hartsock of the Clinch River Plant was the plant contact for the inspection. The inspection was performed on October 27<sup>th</sup>, 2021. Weather conditions were sunny and the temperature was in the upper 50's. There was 0.19 in of precipitation recorded for the 7 days prior to the inspection.

## **2.0 DESCRIPTION OF IMPOUNDMENT**

The following section provides background information for the Clinch River Plant Ash Pond 1A/1B Dam. Figure 1 is the current plan view with old features noted for reference.

### **Facility Location Description**

The Clinch River Plant is located in Russell County, Virginia approximately 2.5 miles southwest of Cleveland, Virginia and approximately 6.5 miles northeast of St. Paul, Virginia. The Ash Pond 1A/1B Dam is located about 0.25 miles north of the Clinch River Plant.

### **Description of Ash Pond 1A/1B**

Ash Pond 1A/1B has been closed in-place and capped. This construction work started in 2016 and the final work was completed in the 2<sup>nd</sup> quarter of 2018. The pond no longer has any capacity to receive and store CCR materials, sediments or surface water runoff. The dam is still a regulated structure by the Virginia Department of Conservation and Recreation- Dam Safety Program and is classified as High Hazard.

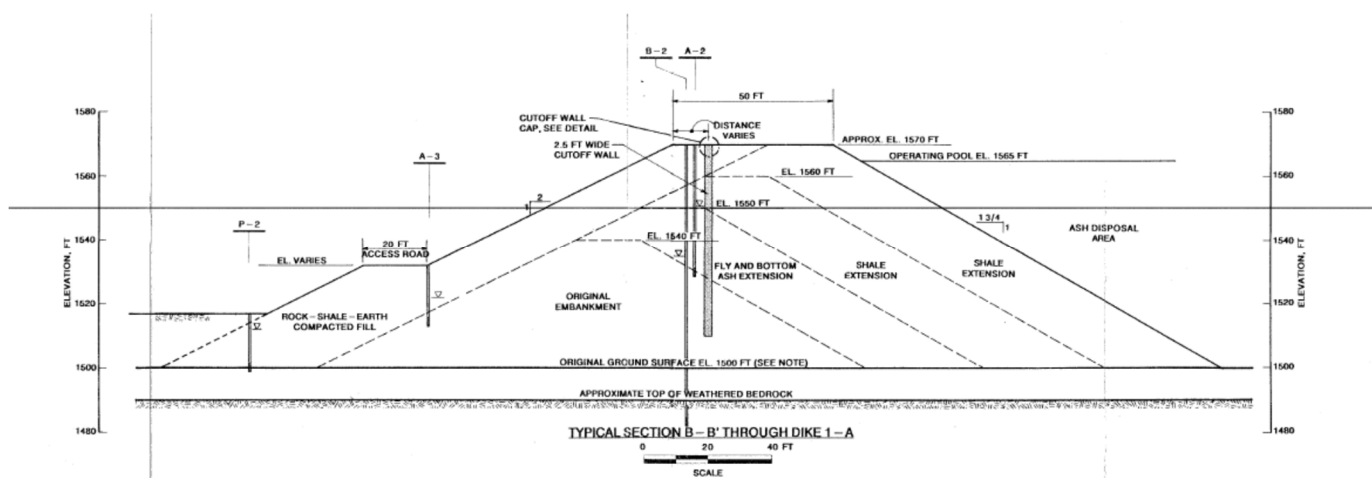
The following section discusses the embankment configuration, construction and operational history, and surface water control associated with the Ash Pond 1A/1B Dam.

### **Embankment Configuration**

The Ash Pond 1A/1B embankment has a maximum height of approximately 70 feet with a length of roughly 3,150 feet. The embankment is constructed of soil (silty clay with shale/sandstone fragments); fly ash, bottom ash, and shale/rock fill on with a downstream slope of 2.0 H: 1 V (2.0 feet horizontal, 1 foot vertical) and an upstream slope of 1.75 H: 1V. The final configuration of the dam was the result of 3 upstream raisings. The width of the crest is roughly 35 feet wide, and portions of the embankment have a 20-foot wide bench on the downstream slope which carries an access road leading up to the crest. There is a splitter dike separating Pond 1A and 1B. A 2.5-foot wide, 65-foot deep, 2,150-foot long cement-

bentonite-fly ash slurry wall was designed and constructed in 1990. The slurry wall penetrated the various materials used for the upstream raising and was keyed into the original embankment, except at the ends of the dam where it was keyed 1 to 2 feet into the shallow, fractured, bedrock. A 1,500 foot long section of Dump’s Creek was re-routed during the original construction of the Ash Pond 1A/1B Dam.

The majority of the downstream slope has an inverted filter that was constructed in 2006-2009. A toe drain system with a single stage drainage media runs along the downstream toe. The toe drain system was retrofitted to drain into a seepage pump station near the center of the dam. The seepage is pumped and drains by gravity into the reclaim pond, near the southern end of the Ash Pond 1A/1B Dam.



Typical cross section taken from AEP Drawing SK-CL-62290A.

### **Construction and Operational History**

An abbreviated bullet point list of the construction and operational history of Ash Pond 1A/1B is included below:

- Original embankment construction completed in 1964. Designed by Casagrande Consultants.
- A splitter dike creating Ash Pond 1A and Ash Pond 1B built – Unknown year
- Upstream raising number 1 – Crest Elevation 1550 – Unknown year
- Upstream raising number 2 – Crest Elevation 1560 – Unknown year
- Upstream raising number 3- Crest Elevation 1570 – 1971
- Upstream raising number 4 – Crest Elevation 1580 – 1976 (planned but never constructed)
- First application of an inverted filter blanket-1984
- Toe drain construction-1988
- Slurry trench construction completed-1990
- Northern end of the toe drain system repaired-1991
- Inverted filter blanket installed on the downstream – 2006 through 2009.
- Diversion channel constructed -2015

- Principal spillway abandoned and fully grouted due to increased infiltration/seepage at joints 2016
- Temporary emergency spillway constructed at the very left end of the dam.

### **Surface Water Control**

The water surface level was previously controlled by a principal spillway riser/discharge pipe structure near the northern end of Ash Pond 1B. As part of the closure project, the riser structure was demolished and removed, and the 36-inch-diameter concrete discharge pipe was abandoned in place and fully grouted.

Currently, storm water runoff is diverted around the Ash Pond 1A/1B area by means of two diversion channels. The Pond 1A diversion channel consists of grouted riprap channel and a concrete chute/ stilling basin.

The Pond 1B Upper and Lower diversion channels are lined with riprap for erosion protection and sections also have gabion mattresses lining system.

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

A review of available information regarding the status and condition of the Ash Pond 1A/1B Dam was conducted. This included files available, such as design and construction information, 7-day inspection reports, 30-day data collection reports, previous dam safety inspection reports and pond closure plans. Based on the review of the data there were no signs of actual or potential structural weakness or adverse conditions.

### **4.0 INSPECTION**

#### **4.1 CHANGES IN GEOMETRY OF IMPOUNDING STRUCTURE (257.83(b)(2)(i))**

The pond closure project has been completed as per the approved drawings by Virginia DCR Dam Safety and Virginia DEQ. The pond area has been regraded and capped with a 30-mil PVC liner and 24-inches soil cover. The facility is no longer active and has no storage capacity to impound surface water runoff.

#### **4.2 ASSESSMENT OF RECENT INSTRUMENTATION DATA (257.83(b)(2)(ii))**

Instrumentation at the dam consists of seepage collection system and piezometers. The locations of each instrument are shown on the Instrumentation Location Plan in Appendix B.

In general, the pond closure project appears to have the reduced seepage quantities as measured by the V-notch weirs and the seepage collection system. The maximum value record by each V-notch weir since the last inspection is listed in the table below. The weirs can be impacted by surface water runoff and the maximum flows listed below are not representative of normal seepage during dry weather. (Note that Weir 6 has been dry for several years).



Table 1 Maximum recorded V-Notch Weir reading since the previous annual inspection

V-Notch Weir Id	Maximum Reading (Seepage in Gallons per Minute)	Date of Reading
3	4.16	8/31/2020
4	2.42	2/11/2021
5	6.5	12/17/2020
5A	2.42	10/8/2021
6	0	N/A

A review of the seepage sump data indicates a drastic reduction in overall toe seepage since the closure project starting the capping. The seepage sump values are averaging less than 60 gpm. The seepage rate during this inspection was calculated to be 12 gpm.

In general, the piezometer data indicates no significant changes in the phreatic surface in the embankments. As a result of the pond closure project, several of the piezometers have been abandoned. The table below identifies the piezometers that remain and includes the maximum value/date recorded since the last inspection. Piezometers which are representative of specific cross sections through the dam have been plotted and shown in Appendix B. Piezometers that are shaded in the table below are located along the toe of the dike.

Table 2 Maximum recorded Piezometer reading since the previous annual inspection

<b>INSTRUMENTATION DATA</b>			
<b>Bottom Ash Pond 1</b>			
<b>Instrument</b>	<b>Top of Riser Elev. (ft)</b>	<b>Date of reading</b>	<b>Maximum Reading since last annual inspection (ft)</b>
PZ-A-2R	1569.54	4/8/2021	1540
PZ-A-3	1535.04	4/8/2021	1518.71
MW-0913S	1520.87	4/8/2021	1507.14
MW-0914	1571.94	4/8/2021	1527.3
PZ-P-0901S	1573.29	7/1/2021	1539.89
PZ-P-0902	1517.86	12/17/2020	1510.65
PZ-P-0904	1572.98	4/8/2021	1487.26
PZ-P-0906	1521.99	4/8/2021	1504.27
PZ-P-0908S	1571.37	4/8/2021	1488.15
PZ-P-0909	1522.94	5/6/2021	1508.41
PZ-P-5R	1519.66	4/8/2021	1508.45
PZ-P-6R	1517.53	4/8/2021	1509.12

**4.3 CHARACTERISTICS OF IMPOUNDED MATERIAL (257.83(b)(2)(iii, iv,v))**

As part of the Ash Pond 1 Closure Project, all free water within the pond area has been removed. Ash Pond 1A/1B is no longer receiving CCR materials.

<b>IMPOUNDMENT CHARACTERISTICS</b>	
<b>Pond 1A/1B</b>	
Approximate <b>Minimum</b> depth of impounded water since last annual inspection	0 feet
Approximate <b>Maximum</b> depth of impounded water since last annual inspection	0 feet
Approximate <b>Present</b> depth of impounded water at the time of the inspection	0 feet
Approximate <b>Minimum</b> depth of CCR since last annual inspection	40 ft. (El. 1540)
Approximate <b>Maximum</b> depth of CCR since last annual inspection	70 ft. (El. 1570)
Approximate <b>Present</b> depth of CCR at the time of the inspection	Varies between 40 & 70 feet. <sup>1</sup>
Storage Capacity of impounding structure at the time of the inspection	500 ac-ft. at Top of Dam El. 1540 (notch at North End) <sup>2</sup>
Approximate volume of impounded water at the time of the inspection	0 ac-ft.
Approximate volume of CCR at the time of the inspection	500 ac-ft.

1. The depth of CCR material in the impoundment varies as a result of intentional contouring of the ash surface to promote surface runoff as part of the pond closure project.
2. The values in the table above assume that the 1570 contour encompasses a plan view area of 22.5 acres and the interior surfaces of the pond slope at a uniform rate of 2H: 1V.

#### 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 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 SUMMARY OF VISUAL OBSERVATIONS

Results of the visual inspection are summarized below. References to left and right are made as if one is standing on the crest of the dam and facing downstream.

1. In general, there were no signs of slope instabilities, uncontrolled seepage, or erosion of the downstream slopes of the dam. The slopes are covered with a combination of riprap and vegetation. Vegetation is adequate and was recently mowed before the inspection. The condition of the riprap appeared sound and there was no displacement of the riprap. [photos 1-4]
2. The slope of the most southern dike is all grassed and in good condition. There were no observed signs of instabilities, erosion or seepage [photo 5].
3. The Pond 1A diversion ditch along the right abutment was in good condition. The riprap lining was observed to be in good condition. The concrete downchute for the diversion ditch was also in good condition. [photos 6-7].
4. The seepage weirs at the reclaim pond were all discharging to some extent. All of the flow was clear. Weir 5 appeared to have the largest flowrate based on the field measurements [photo 8].
5. The right abutment area is cleared of brush within 25 feet of the dam embankment, except for a short section near the toe. [photo 9]
6. The seepage collection sump was operational at the time of the inspection. The majority of the seepage was flowing in from the left segment of the system. All of the flow appeared clear.
7. The surface area of the impoundment has been capped and covered. The vegetative growth is good over the entire surface. [photos 10-13]
8. Surface drainage appears adequate and there is no evidence of poor drainage at the inlet of the south swale into the east diversion ditch [photo 14]
9. No erosion along any of the surface water drainage swales and ditches was observed.
10. Pond 1B diversion ditch system and collection basin appeared to be in good condition. No debris was observed in the collection basin [photos 15-16].
11. The interior slopes of the reclaim pond appeared stable and there was no displacement of the riprap cover or erosion of the grassed slopes [photo 17].
12. Mineralization on some of the seepage collection sump pipes were removed per last inspection report recommendation.



## **5.0 SUMMARY OF FINDINGS**

The dam forming the Pond 1A/1B is in satisfactory condition and there were no visual signs of weakness or instability observed during the inspection.

The following are general maintenance items and monitoring requirements that are recommended as a result of the inspection.

### **5.1 MAINTENANCE ITEMS**

Assistance or guidance with the implementation of these items can be provided by AEPSC Civil Engineering & Geotechnical Services:

1. Maintain the vegetation within the regulatory 25-foot zone beyond the toe and abutments as required by VDCR Dam Safety.

### **5.2 MONITORING ITEMS**

1. Continue to monitor the seepage weirs and sump as part of the normal periodic inspection.
2. Continue to monitor the piezometers in the dam and impoundment area.

### **5.3 DEFICINCIES (257.83(b)(2)(vi))**

There were no signs of structural weakness that was 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 plant 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.

## **6.0 CONCLUSIONS**

Based on the visual inspection, the overall condition of the Ash Pond 1A/1B is satisfactory and appears to be operating as designed. Inspection and monitoring activities being performed by the Plant and AEPSC Geotechnical Section should continue. There is no evidence of distress that would indicate the possibility of immediate sliding, slope instability, settlement, misalignment or cracking of the ash pond embankments.

If you have any questions with regard to this report, please do not hesitate to contact Mohammad Ajlouni at (614) 716-2939 (Audinet-200-2939).

## FIGURES

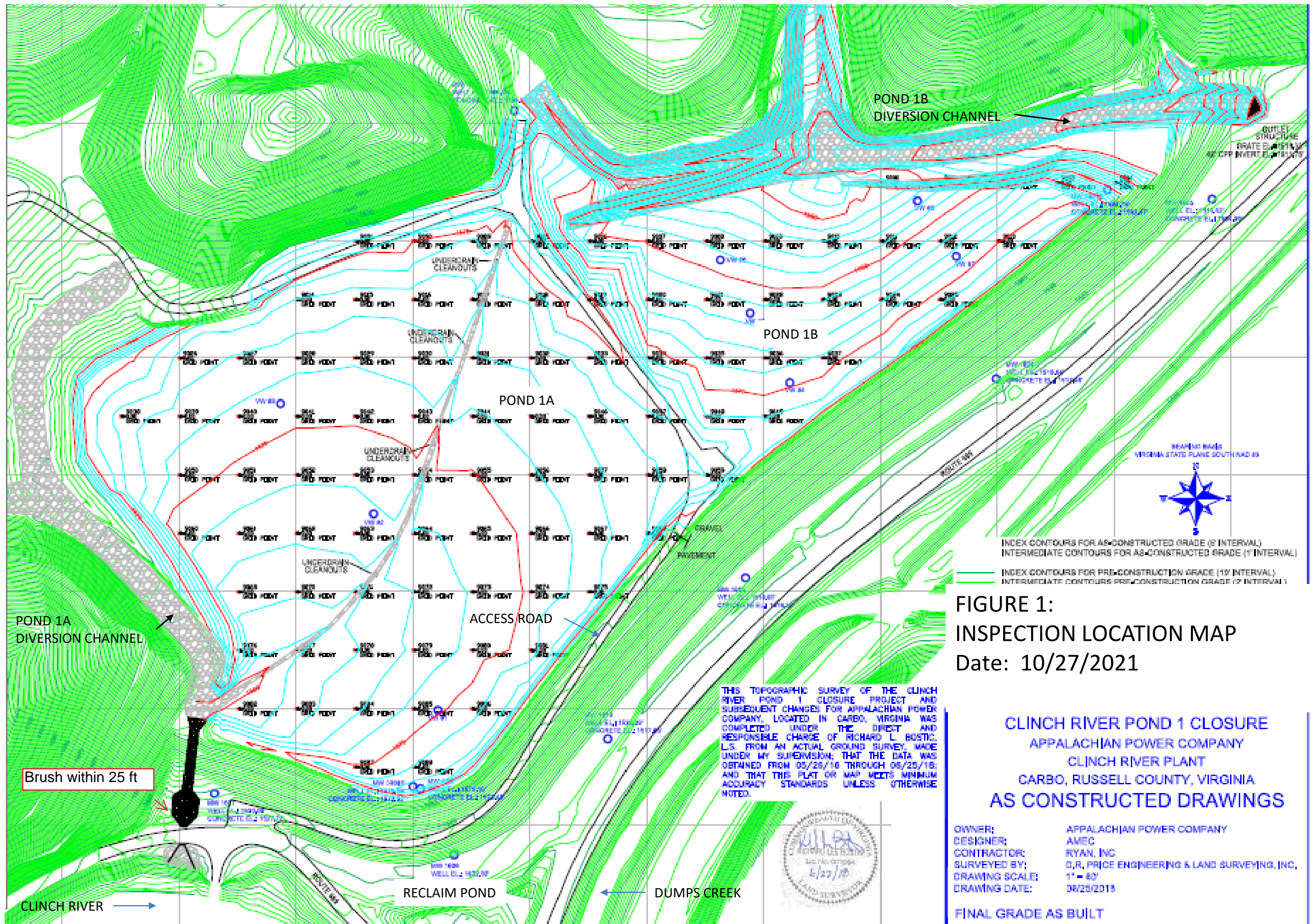


FIGURE 1:  
INSPECTION LOCATION MAP  
Date: 10/27/2021

THIS TOPOGRAPHIC SURVEY OF THE CLINCH RIVER POND 1 CLOSURE PROJECT AND SUBSEQUENT CHANGES FOR APPALACHIAN POWER COMPANY, LOCATED IN CARBO, VIRGINIA WAS COMPLETED UNDER THE DIRECT AND RESPONSIBLE CHARGE OF RICHARD L. BOSTIC, L.S. FROM AN ACTUAL GROUND SURVEY, MADE UNDER MY SUPERVISION; THAT THE DATA WAS OBTAINED FROM 05/28/16 THROUGH 06/25/18; AND THAT THIS PLAT OR MAP MEETS MINIMUM ACCURACY STANDARDS UNLESS OTHERWISE NOTED.



CLINCH RIVER POND 1 CLOSURE  
APPALACHIAN POWER COMPANY  
CLINCH RIVER PLANT  
CARBO, RUSSELL COUNTY, VIRGINIA  
AS CONSTRUCTED DRAWINGS

OWNER:	APPALACHIAN POWER COMPANY
DESIGNER:	AMEC
CONTRACTOR:	RYAN, INC
SURVEYED BY:	C.R. PRICE ENGINEERING & LAND SURVEYING, INC.
DRAWING SCALE:	1" = 60'
DRAWING DATE:	06/25/2018

FINAL GRADE AS BUILT





Clinch River Power Plant - Ash Pond 1A & 1B  
 Drawn By: Dan Murphy  
 Date: 7/26/2018

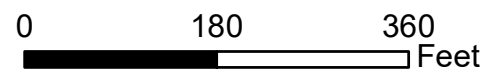


FIGURE 2: POND 1 INSTRUMENTATION LOCATION PLAN



Esri, HERE, Garmin, © OpenStreetMap contributors, Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community, Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



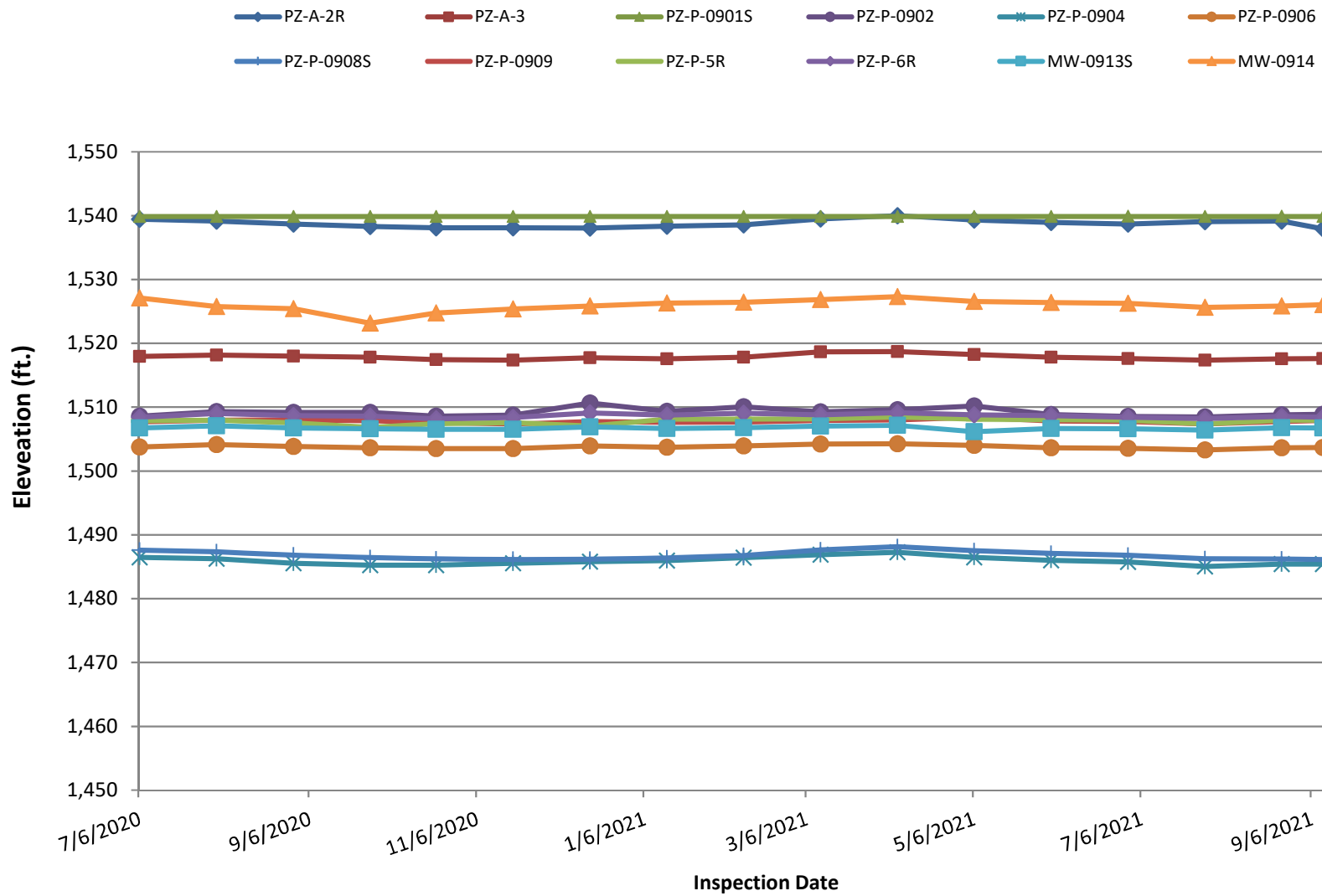


FIGURE 3: Pond 1 Piezometer Readings

**APPENDIX A: INSPECTION PHOTOGRAPHS**





Photo #1 – exterior slopes of Ponds 1A and 1B



Photo #2 – exterior slopes near transition of 1A and 1B



Photo #3 – exterior slope of Pond 1A



Photo #4 – grass cover on slopes of Pond 1B, above riprap





Photo #5 – exterior slope of south dike



Photo #6 – Pond 1A diversion ditch



Photo #7 – concrete chute for Pond 1A diversion ditch



Photo #8 – seepage leading towards weir #5





Photo #9 – right abutment, 25-ft clear zone



Photo #10 – cap surface of Pond 1A



Photo #11 – cap surface of Pond 1B



Photo #12 – cap surface of Pond 1A





Photo #13 – cap surface of Pond 1B



Photo #14 – drainage swale into Pond 1A diversion channel



Photo #15 – Pond 1B diversion ditch



Photo #16 – collection basin at toe of Pond 1B diversion ditch





Photo #17 – reclaim pond interior slopes