

McElroy's Run Impoundment Coal Combustion Residual Annual Report

Allegheny Energy Supply Company, LLC
A FirstEnergy Company
Pleasants Power Station
Pleasants County, West Virginia

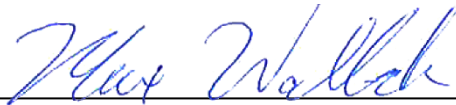
GAI Project Number: C150917.15

October 2017

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Table of Contents

Certification/Statement of Professional Opinion	ii
1.0 Purpose	1
2.0 Introduction	1
3.0 Information Review	2
4.0 Visual Inspection	3
4.1 General Information	3
4.2 Inspection Strategy and Route	3
4.3 Facility Conditions	3
4.4 Geometry	3
4.5 Instrumentation	3
4.6 Depth and Elevation of Impounded Water and CCR	4
4.7 Storage Capacity	5
4.8 Volume of Impounded Water and CCR	5
4.9 Structural Appearance	5
4.10 Unit Performance	5
5.0 Conclusions and Recommendations	5
6.0 References	6
Appendix A Annual Inspection Checklist	

Certification/Statement of Professional Opinion

The Annual Inspection of McElroy's Run Impoundment was performed by GAI Consultants, Inc. (GAI) on Tuesday, September 5, 2017. The Inspection was based on certain information identified in Section 3.0 that GAI has relied on but not independently verified and the visual observations made by GAI personnel at the Site during specific site visits. Therefore this Certification/Statement of Professional Opinion is limited to the information available to GAI at the time the Inspection was performed. On the basis of and subject to the foregoing it is my professional opinion as a Professional Engineer licensed in the State of West Virginia that the Inspection has been performed in accordance with good and accepted engineering practices as exercised by other engineers practicing in the same discipline(s), under similar circumstances and at the time and in the same locale. It is my professional opinion that the Annual Inspection Report was prepared consistent with the requirements of the United States Environmental Protection Agency's "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments," published in the Federal Register on April 17, 2015 with an effective date of October 19, 2015.

The use of the words "certification" and/or "certify" in this document shall be interpreted and construed as a Statement of Professional Opinion and is not and shall not to be interpreted or construed as a guarantee, warranty or legal opinion.



1.0 Purpose

Pursuant to the Federal Coal Combustion Residuals (CCR) Rule 40 CFR 257.83, each CCR unit is to have an annual inspection and report prepared by a qualified professional engineer. The inspection is to include:

- ▶ A review of available information regarding the status and condition of the CCR unit, including, but not limited to, files in the operating record;
- ▶ A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit; and
- ▶ A visual inspection of any hydraulic structures underlying the base of the CCR unit or passing through the dike of the CCR unit for structural integrity and continued safe and reliable operation.

The Inspection Report is to include:

- ▶ Any changes in geometry of the impounding structure since the previous annual inspection;
- ▶ The location and type of existing instrumentation and the maximum recorded readings of each instrument since the previous annual inspection;
- ▶ The approximate 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;
- ▶ The approximate volume of the impounded water and CCR at the time of the inspection;
- ▶ Any appearances of an actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit and appurtenant structures; and
- ▶ Any other change(s) which may have affected the stability or operation of the impounding structure since the previous annual inspection.

This report fulfills the requirements for the 2017 annual inspection.

2.0 Introduction

The Pleasants Power Station is a coal-fired electric generating station located near the community of Willow Island in Pleasants County, West Virginia (WV). The station consists of two generating units, which are capable of producing 1,300 megawatts of electricity. Coal Combustion Residuals generated at the station (as well as CCRs from the deactivated Willow Island Power Station) are placed in the McElroy's Run CCR Surface Impoundment, which is located approximately one-half mile east-southeast of the station.

According to the West Virginia Title 47 Legislative Rule, Series 34 Dam Safety Rule, the Impoundment has a Hazard Classification of Class I, meaning the failure of the Impoundment may cause loss of human life or major damage to dwellings, buildings, railroads, or important utilities.

A National Pollutant Discharge Elimination System (NPDES) Water Pollution Control Permit (WV 0079171) has been issued to Allegheny Energy Supply, LLC to maintain a solid waste facility in the form of a surface impoundment/dam. The embankment of the Impoundment is constructed of compacted ash and onsite clay soil and has been permitted separately under the West Virginia Dam Safety Regulations by the Office of Water Resources, Certificate of Approval No. 07302, dated February 7, 1978.

The surface Impoundment receives flue gas desulfurization (FGD) scrubber by-product generated at the Power Station, effluent from the recirculation system from Sedimentation Ponds Nos. 1 and 2 of

the adjacent landfill and their underdrains, and waste materials collected primarily as a result of general house-cleaning maintenance and/or repair at the Pleasants and Willow Island Power Station. The NPDES permit authorizes discharge to the Ohio River in accordance with effluent limitations, monitoring requirements, and other conditions set forth in the permit.

FGD scrubber by-product is pumped to the Impoundment through two eight-inch diameter slurry lines to a valve station near the west end of the Impoundment dam. The slurry can be discharged into the Impoundment from the valve station or directed into a mobile pipeline boom for discharge at various locations in the Impoundment.

The crest of the dam is at elevation (El.) 900 feet, with El. 887 feet as the permitted final level of CCR. The Impoundment area is approximately 253 acres. Two perforated cross-valley foundation underdrain pipes were installed in a trench below the drainage blanket of the downstream slope of the water-impounding embankment as a part of construction. The drains were installed across the flat bottom of the valley about 100 feet upstream of the toe of the Impoundment embankment. The two pipes meet near the center of the valley where they turn and extend to the current toe of the ash disposal embankment. The pipes collect any seepage that enters the drainage blanket, either through the embankment or from the subgrade below the Impoundment embankment. This water is transmitted to Sedimentation Pond No. 1.

The dam was constructed with a concrete discharge tower, which is outfitted with an operational sluice gate at El. 885 feet and a 24-inch square (former sluice gate) opening at El. 890 feet. Discharge from this structure is directed under the dam via a 3,600-foot long 36-inch concrete pipe. Flow from the concrete pipe is conveyed to the principal spillway, which discharges to a channel that leads to McElroy's Run Creek. Currently, the primary discharge from the Impoundment is via a 12-inch siphon with an operating discharge rate of 3,000 gallon per minute. The siphon flow can either be diverted to the plant for makeup water or discharged to an NPDES Outfall through a 14-inch line. The siphon line is the primary operating mechanism for withdrawing water from the Impoundment to maintain a safe water elevation behind the dam. A concrete emergency spillway is located near the west abutment.

3.0 Information Review

CCR Rule §257.83(b)(1)(i) states that an inspection includes "a review of available information regarding the status and condition of the CCR unit, including, but not limited to, files available in the operating record (e.g., CCR unit design and construction information required by §257.73(c)(1) and §257.74(c)(1), previous periodic structural stability assessments required under §257.73(d) and §257.74(d), the results of inspections by a qualified person, and results of previous annual inspections)."

GAI reviewed the following available information prior to performing the inspection:

- ▶ 2015, 2016 and 2017 7-day CCR Inspection Reports;
- ▶ 2016 and 2017 Annual Dam Safety Inspection;
- ▶ Piezometer data, 2015 – 2017;
- ▶ Survey performed March 6, 2017 by FirstEnergy;
- ▶ Site record drawings;
- ▶ WVDEP Permit documents; and
- ▶ Results from Structural Condition Assessment of Primary Spillway Pipe and Decant Tower dated February 12, 2015 (Appurtenances Structural Assessment Report).

The reports are listed under the References section. Conversations were held with the Impoundment operators before the inspection to obtain additional information such as operation and maintenance procedures, current state of the Impoundment, and the typical process for the operators' weekly reports.

4.0 Visual Inspection

4.1 General Information

The inspection was performed on Tuesday September 5, 2017. The weather conditions were mostly cloudy and overcast with temperatures ranging from 69 to 71 degrees Fahrenheit. Ms. Heather Lane and Mr. English Webb of FirstEnergy and Messrs. James Joyce, P.E., Terry Queen, and Charles Straley, P.E., P.S., of GAI performed the inspection.

4.2 Inspection Strategy and Route

The GAI team inspected the Impoundment and its facilities by making visual observations, recording site conditions, and talking to plant personnel.

The inspection started at the crest of the embankment along the east abutment. We then proceeded across the crest and the exposed portion of the upstream slope from the right abutment (east) to left abutment (west) and then down the West Collection channel of the adjacent landfill. We then crossed the downstream face of the embankment working our way progressively down the slope toward the toe. We observed the slopes, the piezometers, and the access road across the face of the embankment, the discharge ends of the cross-valley drain pipes, and the principal spillway pipe near the toe.

4.3 Facility Conditions

The crest of the embankment and the upstream slope were examined and no cracking or slumping, were observed. No visual signs of slope instability were observed. The crest alignment was straight with no visual indication of lateral or vertical movement. A couple of small animal burrows were observed on the downstream face. A small amount of erosion was noticed near the left (west) side of the dam flowing into the groin channel. No cracking or slumping of the downstream slope was observed.

4.4 Geometry

Pursuant to §257.83(b)(2)(i), "any changes in the geometry of the impounding structure since the previous annual inspection" are reported.

Based on visual inspection and a review of the design drawings, no changes to the geometry of the Impoundment were observed.

4.5 Instrumentation

Pursuant to CFR §257.83(b)(2)(ii), "the location and type of existing instrumentation and the maximum recorded readings of each instrument since the previous annual inspection" are reported.

Five survey monitoring points were installed in 1997 in the upstream slope of the embankment slightly below the crest near El. 900 feet. These monitoring points serve to monitor both horizontal and vertical movement of the embankment. The monitoring points consist of small diameter aluminum pipes driven into the ground reportedly to a depth of about 30 inches. The most recent readings obtained in March of 2017 indicate the approximate same elevation as historically reported. Horizontal movement of the monuments were also reviewed. The readings do not indicate any significant movement compared to historical data.

The data for the piezometers for the downstream embankment was reviewed in August of 2017. GAI received and reviewed data from that date until the date of the inspection. Water levels measured in the piezometers are well below water levels that would affect the stability of the embankment.

Table 1
Maximum Instrumentation Readings

Instrumentation	Type	Maximum Recorded Readings (ft., NGVD) ¹
Pool Level	Staff gage	888.1
CP-1	Piezometer	753.1
CP-1A	Piezometer	701.1
CP-2	Piezometer	759.0
CP-3	Piezometer	743.4
CP-4	Piezometer	700.0
CP-5	Piezometer	716.7
CP-6	Piezometer	744.0
CP-8	Piezometer	691.4
CP-9	Piezometer	700.4
CP-10	Piezometer	710.1
CP-11	Piezometer	708.5
CP-12	Piezometer	690.1
CP-13	Piezometer	674.4
CP-14	Piezometer	684.0
GAI-23	Spillway Piezometer	841.7
P-1	Spillway Piezometer	858.9
P-2A	Spillway Piezometer	828.1
98.3	Spillway Piezometer	810.7
98.4	Spillway Piezometer	810.1
98.5A	Spillway Piezometer	806.2
98.6A	Spillway Piezometer	821.4
2001A	Spillway Piezometer	847.6
2002A	Spillway Piezometer	873.5
2005	Spillway Piezometer	849.7

Note:

¹ The maximum observed reading is based on measurements taken from December 3, 2015 through September 6, 2017.

4.6 Depth and Elevation of Impounded Water and CCR

Pursuant to CFR §257.83(b)(2)(iii), "the approximate minimum, maximum, and present depth and elevation of the impounded water and CCR since the previous annual inspection" are reported.

The approximate minimum elevation of the impounded water and CCR was El. 884.5 feet with a depth of water and CCR of 184.5 feet (based on an elevation of approximately 700.0 feet at the upstream toe

of the embankment). The approximate maximum elevation of the impounded water and CCR was El. 888.1 feet with a depth of water and CCR of 188.1 feet. The approximate elevation of the impounded water and CCR the day of the inspection was 886.9 feet with a depth of water and CCR of 186.9 feet.

4.7 Storage Capacity

Pursuant to CFR §257.83(b)(2)(iv), "the storage capacity of the impounding structure at the time of the inspection" is reported.

The approximate storage capacity of the Impoundment at the permitted level of El. 887 feet is approximately 28,000,000 cubic yards (5,800 acre-feet).

4.8 Volume of Impounded Water and CCR

Pursuant to CFR §257.83(b)(2)(v), "the approximate volume of the impounded water and CCR at the time of the inspection" is reported.

The approximate volume of the impounded CCR and water in the Impoundment at the time of the inspection was 26,489,632 cubic yards (GAI Consultants, Hydrographic Survey, June 2017).

4.9 Structural Appearance

Pursuant to CFR §257.83(b)(2)(vi), "any appearances of an actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit and appurtenant structures" are reported.

Based on visual inspection, the Impoundment appeared to have no structural weaknesses, no existing conditions that are disrupting or that have the potential to disrupt the operation and safety of the CCR unit at the time of inspection.

The Appurtenances Structural Assessment Report was reviewed and based on the observations from the inspections, the professional opinion was that the observed portion of the Spillway Pipe is structurally sound and in good condition.

4.10 Unit Performance

Pursuant to CFR §257.83(b)(2)(vii), "any other change(s) which may have affected the stability or operation of the impounding structure since the previous annual inspection" are reported.

Based on a visual inspection, there did not appear to be any other changes that would affect the stability or operation of the Impoundment.

5.0 Conclusions and Recommendations

During the September 5, 2017 visual inspection of the Impoundment, GAI did not identify any signs of distress or malfunction that would affect the structural condition of the Impoundment. No releases of CCR were observed during the 2017 inspection.

The following are GAI's recommendations to be completed when weather permits or during normal maintenance activities:

1. Animal burrows are maintenance issues that will be addressed by the Impoundment operator.
2. FirstEnergy has indicated a plan to continue to monitor the Primary Spillway Pipe and Decant Tower for those items referenced in the Appurtenances Structural Assessment Report.
3. Small erosion of left (west) side of dam discharging into groin channel is a maintenance issue that will be addressed by the Impoundment operator.

6.0 References

- CHA, *Assessment of Dam Safety: Coal Combustion Surface Impoundments, Pleasants Power Station McElroy's Run Dam*, April 2010.
- Civil & Environmental Consultants, Inc., *Application for Renewal, Solid Waste Permit No. WV0079171, McElroy's Run Disposal Facility*, February 2007.
- Environmental Protection Agency, *40 CFR Parts 257 and 261, Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities*, April 17, 2015.
- FirstEnergy, *Federal CCR 7-Day Inspection Form*, December 2015.
- FirstEnergy, *Federal CCR 7-Day Inspection Form*, January 2016 through December 2016.
- FirstEnergy, *Federal CCR 7-Day Inspection Form*, January 2017 through August 2017.
- FirstEnergy, *Preliminary Survey Data for Monuments*, March 6, 2017.
- GAI Consultants, *2016 Annual Embankment Inspection*, December 2016.
- GAI Consultants, *2017 Annual Embankment Inspection*, Draft September 2017.
- GAI Consultants, *Results from Structural Condition Assessment of Principal Spillway Pipe and Decant Tower*, February 2015.
- GAI Consultants, *Hydrographic Survey, McElroy's Run Impoundment, Drawing C79508574, Rev. 3*, June 2017.

APPENDIX A

Annual Inspection Checklist

**CCR Surface Impoundment
Annual Inspection Checklist**

Project Name McElroy's Run Impoundment
 Project No. C170917.15
 Inspector Name Charles Straley, Terry W. Queen, Jamie Joyce
 Time 10:00 to 13:30

Landfill No. McElroy's Run Impoundment
 Date 9/5/2017
 Weather Conditions Mostly Cloudy
 Temperature 69° to 71°

Review of Available Information (Preamble and 257.83(b)(i))

	Reviewed
Files in operating record	yes reviewed prior to inspection
Design and construction drawings	yes reviewed prior to inspection
Previous inspection forms	yes reviewed prior to inspection
Previous structural assessments	yes reviewed prior to inspection
Signage	yes reviewed prior to inspection
Status and condition of impoundment	yes reviewed prior to inspection

Comments:

Visual Inspections (Preamble and 257.83)

Comments

Weakness or malfunction of CCR or appurtenant structure?	yes	no	
Hydraulic structures under base or dike of CCR unit safe and reliable?	yes	no	
Any changes in geometry?	yes	no	
Any surface erosion detected? (257.73)	yes	no	Small erosion on left side of dam discharging into ditch.
Approximate Depth and elevations of impounded water? and of CCR?	min	184.5 feet deep (El. 884.5 ft.)	max 188.1 feet deep (El. 888.1 ft.) present 186.9 feet deep (El. 886.9 ft.)
	min	see above	max see above present see above
Impoundment storage capacity (current)?	28,000,000 cu. yds		
Approximate Volume of impounded water and CCR?	26,489,632 cu. yds		
Location of instrumentation and max. reading?	Upstream slope of embankment slightly below the crest. Most recent readings indicate an approximate same elevation as 2015. Maximum readings are included in the report.		