

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: C150917.21

January 2020

Prepared for:
Allegheny Energy Supply Company, LLC
A FirstEnergy Company
800 Cabin Hill Drive
Greensburg, Pennsylvania 15601

Prepared by:
GAI Consultants, Inc.
Murrysville Office
4200 Triangle Lane
Export, Pennsylvania 15632-1358

Report Authors:

Arica L. DiTullio, P.E.
Engineering Manager

Charles F. Straley, P.E., P.S.
Senior Engineering Manager

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	5
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.....	6
6.0 References	7

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 Wednesday, September 4, 2019. 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.

Charles F. Straley, P.E., P.S.



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 2019 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:

- ▶ Previous CCR Annual Reports;
- ▶ 2016 Structural Stability Assessment Report;
- ▶ 2018 and 2019 7-day CCR Inspection Reports;
- ▶ 2017 and 2018 Annual Dam Safety Inspection;
- ▶ Piezometer data, 2016 – 2019;
- ▶ Survey performed March 2018 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 personnel 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 Wednesday, September 4, 2019 by Charles Straley, P.E., P.S., Jamie Joyce, P.E., and Arica L. DiTullio, P.E. of GAI. They were accompanied by FirstEnergy representatives Jeff Kapolka (Senior Environmental Specialist), Carol Hoffman (Environmental Field Operations) and Miciah Kennedy (Senior Scientist). The weather conditions were warm and partly cloudy, with temperatures ranging from 82 to 86 degrees Fahrenheit.

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. At the right (east) abutment upstream contact trees and vegetation were present to the edge of the embankment. Some minor erosion was present at the normal pool level of the upstream slope. There were some cattails and other aquatic vegetation located in the area of the entrance to the emergency spillway and near the right (east) abutment. A small animal burrow was observed on the downstream face. 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 May of 2019 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 through September of 2019. 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	889.3
CP-1	Piezometer	753.1
CP-1A	Piezometer	701.1
CP-2	Piezometer	761.0
CP-3	Piezometer	744.0
CP-4	Piezometer	702.5
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	842.7
P-1	Spillway Piezometer	859.8
P-2A	Spillway Piezometer	828.8
98.3	Spillway Piezometer	810.8
98.4	Spillway Piezometer	810.1
98.5A	Spillway Piezometer	806.9
98.6A	Spillway Piezometer	825.7
2001A	Spillway Piezometer	847.6
2002A	Spillway Piezometer	874.0
2005	Spillway Piezometer	850.3

Note:

¹ The maximum observed reading is based on measurements taken from December 3, 2015 through November 11, 2019.

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.

From survey completed in 2019, 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. 889.3 feet with a depth of water and CCR of 189.3 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 27,190,000 cubic yards (per the impoundment’s elevation vs. impoundment area and storage volume from Drawing 101-6514-114 Revision 5).

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 4, 2019 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 2019 inspection.

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

1. Animal burrow are maintenance issue that will be addressed by the Impoundment operator.
2. Vegetation within fifty feet of the upstream slope and right (east) abutment of dam is excessive. This area needs the vegetation removed.
3. Remove cattails and aquatic vegetation from the toe of the upstream slope.
4. Monitor the minor erosion area on the upstream slope for change in condition.
5. 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.

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.
- D'Appolonia Consulting Engineers, Inc., *Drawing 101-6514-114 Revision 5*, February 4, 1993.
- 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*, September 2017 through August 2018.
- FirstEnergy, *Preliminary Survey Data for Monuments*, May 2018.
- GAI Consultants, Inc., *2015 Annual Inspection Report, McElroy's Run Impoundment*, January 2016.
- GAI Consultants, Inc., *2016 Structural Stability Assessment Report, McElroy's Run Impoundment*, October 2016.
- GAI Consultants, Inc., *2017 Annual Inspection Report, McElroy's Run Impoundment*; December 2017.
- GAI Consultants, Inc., *2018 Annual Inspection Report, McElroy's Run Impoundment*; December 2018.
- GAI Consultants, *2016 Annual Embankment Inspection*, December 2016.
- GAI Consultants, *2017 Annual Embankment Inspection*, October 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. C150917.21
 Inspector Name Charles Straley, Arica DiTullio, Jamie Joyce
 Time 10:00 to 1:00 pm

Landfill No. McElroy's Run Impoundment
 Date 9/4/2019
 Weather Conditions Warm and Partly Cloudy
 Temperature 82 to 86 deg

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	Minor wave erosion in small area on upstream slope mid embankment
Approximate Depth and elevations of impounded water? and of CCR?	min	184.5 feet deep (El. 884.5 ft.)	max 189.3 feet deep (El. 889.3 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?	27,190,000 cu. yds.		
Location of instrumentation and max. reading?	Upstream slope of embankment slightly below the crest. Maximum readings are included in the report.		