

2016

J.M. Stuart Station Ash Pond 7 Annual Inspection

ODNR File No.: 8535-002

The Dayton Power & Light Company



Prepared by:
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The Dayton Power & Light Company

Date: December 21, 2016

Purpose

I have conducted the following annual inspection in compliance of the Federal CCR Rule, 40 CFR Part 257 and Ohio Department of Natural Resources OAC 1501-21.

Statement of Qualifications

I am a practicing Civil/Geotechnical Engineer registered with the State of Ohio employed by the Dayton Power & Light Company. I am experienced in the design, maintenance and operation of earthen dams and impoundments.

Review of Impoundment Documentation [§ 257.83(b)(1)(i)]

Design, History, and Operation of the Facility

Ash Pond 7 is an upland reservoir that was constructed in 1978. This pond is used for settling wet sluiced fly ash produced from the combustion of coal in the station generating units. This pond is rectangular and incised to the north and to the west. The dam to the south side of Pond 6 is the north side of Pond 7. It has an area of 38.4 acres at the crest, is 39.5-feet deep and has a volume of 2,010,000 cubic yards to the crest. In c1983, after initial filling, a portion of Pond 7 was excavated and lined to form Pond 7A. Another portion of the original pond 7 was excavated and the remaining area (approximately 29%) capped leaving the remainder of the pond for ash sluicing. This portion of Pond 7 is periodically drained and the settled fly ash excavated which is then sent to a dry ash landfill. As originally constructed the normal operating level of this pond was two feet below the crest. In 2013 the outlet of this pond was replaced to provide a Maximum Operating Level of three feet. This new outlet is composed to two, 36-inch high density polyethylene (HDPE) pipes incased in concrete with a concrete flume structure at the inlet and concrete headwall at the outlet.

Pond 7A, located in the northeast corner of the original Pond 7, was excavated to elevation 515.0 feet. The area is approximately three acres at the crest and is 16.5-feet deep from the crest. Pond 7A overflow is a concrete weir with a skimmer. The weir discharges to the Ohio River through a 36-inch HDPE pipe that replaced the previous corrugated metal pipe in 2015.

Periodic Inspections

A thorough review of weekly facility inspections since the previous report was conducted. These periodic inspections do not indicate any structural weakness or concerns.

Previous Structural Assessments

Structural assessments from previous years reviewed were Ponds 3A, 5, 6 & 7 Slope Stability Investigation, BBC&M, 2010, and Pond 7 Initial Periodic Structural Stability Assessment prepared by Haley & Aldrich, 2016.

Visual Inspection of Impoundment [§ 257.83(b)(1)(ii)]

The Pond 7 dam is in good structural condition with the exception erosion along the shore of the Ohio River. Action items were noted and are shown in Appendix C.

Changes in Geometry [§ 257.83(b)(2)(i)]

Erosion of the east end of the south dam has not increased significantly since the 2015 inspection yet remains a concern. No changes were noted in other portions of the dam. No sloughs, slides or budes were observed.

DP&L is attempting to obtain a nationwide permit that would allow them to place rock channel protection along the Ohio River shoreline to eliminate the erosion.

Instrumentation [§ 257.83(b)(2)(ii)]

Pond 7 is equipped with a staff gauge located at the Pond 7 outlet. A gauge is also located adjacent to the Pond 7A weir. These gauges are in good condition. Groundwater monitoring wells are located along the south and north sides of the pond.

Structural Weakness [§ 257.83(b)(2)(vi)]

DP&L has retained an engineering firm to further investigate the impacts of the erosion noted above. No other indication was found of an actual or potential structural weakness of the CCR unit or any existing condition that was disrupting or had the potential to disrupt the operation and safety of the CCR unit and appurtenant structures.

Other Changes [§ 257.83(b)(2)(vii)]

No changes were found to the CCR unit which could affect the stability or operation of the impounding structure since the previous annual inspection.

Visual Inspection of Hydraulic Structures [§ 257.83(b)(1)(iii)]

The hydraulic structures for this pond are twofold. Pond 7 outlets to Pond 6 through two 30-inch HDPE pipes encased in concrete with concrete inlet and outlet structures. This structure replaced the former structure in 2014. Pond 7A has a 40-foot wide concrete weir to maintain the pond level. This weir outlets to the Ohio River through a new 36-inch HDPE pipe. Pond 7 also has a grass-lined channel emergency spillway that would convey water directly to Pond 7A to by-pass Pond 6.

Water and Material Depths and Volumes

[§ 257.83(b)(2)(iii), § 257.83(b)(2)(iv), § 257.83(b)(2)(v)]

Physical Parameters of Impoundment		
Depth of water	33.6	Feet
Maximum Depth of Water	36.5	Feet
Minimum Depth of water	33.0	Feet (by pumping only)
Elevation of water	525.6	Feet (review of weekly inspection reports show normal fluctuation of the depth/water level)
Storage Capacity	2,010,000	Cubic Yards, Crest Full Volume
	1,380,000	Cubic Yards (to current 5.9 ft freeboard)
Volume of water	680,000	Cubic Yards
Volume of CCR	700,000	Cubic Yards (sluiced ash)
	560,000	Cubic Yards (permanent fill)

Appendix A

CCR Rule Requirements for Impoundment Annual Inspections

§257.83 Inspection requirements for CCR surface impoundments.

- (a) *Inspections by a qualified person.*
- (1) All CCR surface impoundments and any lateral expansion of a CCR surface impoundment must be examined by a qualified person as follows:
 - (i) At intervals not exceeding seven days, inspect for any appearances of actual or potential structural weakness and other conditions which are disrupting or have the potential to disrupt the operation or safety of the CCR unit;
 - (ii) At intervals not exceeding seven days, inspect the discharge of all outlets of hydraulic structures which pass underneath the base of the surface impoundment or through the dike of the CCR unit for abnormal discoloration, flow or discharge of debris or sediment; and
 - (iii) At intervals not exceeding 30 days, monitor all CCR unit instrumentation.
 - (2) The results of the inspection by a qualified person must be recorded in the facility's operating record as required by §257.105(g)(5).
 - (i) (2) *Timeframes for inspections by a qualified person—(i) Existing CCR surface impoundments.* The owner or operator of the CCR unit must initiate the inspections required under paragraph (a) of this section no later than October 19, 2015.
 - (ii) *New CCR surface impoundments and any lateral expansion of a CCR surface impoundment.* The owner or operator of the CCR unit must initiate the inspections required under paragraph (a) of this section upon initial receipt of CCR by the CCR unit.
- (b) *Annual inspections by a qualified professional engineer.*
- (1) If the existing or new CCR surface impoundment or any lateral expansion of the CCR surface impoundment is subject to the periodic structural stability assessment requirements under §257.73(d) or §257.74(d), the CCR unit must additionally be inspected on a periodic basis by a qualified professional engineer to ensure that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering standards. The inspection must, at a minimum, include:
 - (i) 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);
 - (ii) A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit and appurtenant structures; and
 - (iii) 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.
 - (2) *Inspection report.* The qualified professional engineer must prepare a report following each inspection that addresses the following:
 - (i) Any changes in geometry of the impounding structure since the previous annual inspection;
 - (ii) The location and type of existing instrumentation and the maximum recorded readings of each instrument since the previous annual inspection;
 - (iii) The approximate minimum, maximum, and present depth and elevation of the impounded water and CCR since the previous annual inspection;
 - (iv) The storage capacity of the impounding structure at the time of the inspection;
 - (v) The approximate volume of the impounded water and CCR at the time of the inspection;
 - (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; and
 - (vii) Any other change(s) which may have affected the stability or operation of the impounding structure since the previous annual inspection.
 - (3) *Timeframes for conducting the initial inspection—*

- (i) *Existing CCR surface impoundments.* The owner or operator of the CCR unit must complete the initial inspection required by paragraphs (b)(1) and (2) of this section no later than January 19, 2016.
 - (ii) *New CCR surface impoundments and any lateral expansion of a CCR surface impoundment.* The owner or operator of the CCR unit must complete the initial annual inspection required by paragraphs (b)(1) and (2) of this section is completed no later than 14 months following the date of initial receipt of CCR in the CCR unit.
- (4) *Frequency of inspections.*
- (i) Except as provided for in paragraph (b)(4)(ii) of this section, the owner or operator of the CCR unit must conduct the inspection required by paragraphs (b)(1) and (2) of this section on an annual basis. The date of completing the initial inspection report is the basis for establishing the deadline to complete the first subsequent inspection. Any required inspection may be conducted prior to the required deadline provided the owner or operator places the completed inspection report into the facility's operating record within a reasonable amount of time. In all cases, the deadline for completing subsequent inspection reports is based on the date of completing the previous inspection report. For purposes of this section, the owner or operator has completed an inspection when the inspection report has been placed in the facility's operating record as required by §257.105(g)(6).
 - (ii) (ii) In any calendar year in which both the periodic inspection by a qualified professional engineer and the quinquennial (occurring every five years) structural stability assessment by a qualified professional engineer required by §§257.73(d) and 257.74(d) are required to be completed, the annual inspection is not required, provided the structural stability assessment is completed during the calendar year. If the annual inspection is not conducted in a year as provided by this paragraph (b)(4)(ii), the deadline for completing the next annual inspection is one year from the date of completing the quinquennial structural stability assessment.
- (5) If a deficiency or release is identified during an inspection, the owner or operator must remedy the deficiency or release as soon as feasible and prepare documentation detailing the corrective measures taken.
- (c) The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in §257.105(g), the notification requirements specified in §257.106(g), and the internet requirements specified in §257.107(g).

[80 FR 21468, Apr. 17, 2015, as amended at 80 FR 37992, July 2, 2015]

Appendix B

Reference Documents Reviewed

- ❖ Operation Maintenance and Inspection Manual
- ❖ Emergency Action Plan
- ❖ Ponds 3A, 5, 6 & 7 Slope Stability Investigation, BBC&M, 2010
- ❖ Pond 7 Initial Periodic Structural Stability Assessment, Haley & Aldrich, 2016
- ❖ Previous inspections reports
 - CEC 2009
 - ODNR 2009, 2013
 - CHA 2010
 - BBCM 2010
- ❖ Drawings
 - 300-12-1020B
 - 300-12-1020C
 - 300-12-1315 sh 1
 - 300-12-1315 sh 2
 - 300-46-1104
 - 300-46-1105
 - 300-46-1106

Appendix C
Inspection Check List

Dam Field Inspection Report

DAM/IMPOUNDMENT ANNUAL FIELD INSPECTION FORM

Unit Name: Pond 7

Facility Name: J.M. Stuart Station

ODNR File No.: 8535-002

CCR Unit

ACTION

ODNR Hazard Classification: I II III IV N/A

Impoundment Type: Incised Upland Lake

Description: Located south of Pond 6 and east of Pond 3A along the Ohio River.

Approximately one fourth of this pond is permanently closed, a portion of which was excavated and lined for use as a tertiary settling pond (Pond 7A) for ash sluice water.

Inspection Date(s): November 21, 2016

Weather/Surface Conditions During Inspection: Temperature in the upper 30's, scattered clouds, ground conditions mostly dry.

Freeboard: 4.9'

NONE
 MONITOR
 MAINTENANCE
 ENGINEER

UPSTREAM SLOPE

Gradient: Horizontal: 2.5 Vertical: 1 (est. meas.)

VEGETATION

Trees:

DESCRIPTION AND LOCATION:

Brush:

DESCRIPTION AND LOCATION:

Ground Cover:

DESCRIPTION: Pond 7 has grass cover on the upstream slope. Pond 7A is covered with No 2 stone

CONDITION: Pond 7 grass cover contains substantial broad leaf weeds but is mowed. Pond 7A is in good condition.

SLOPE PROTECTION

TYPE or NONE: Pond 7 - none, Pond 7A - stone

DESCRIPTION: Pond 7 - none, Pond 7A - No. 2 stone.

CONDITION: Good in 7A basin.

EROSION:

DESCRIPTION AND LOCATION: Pond 7 has numerous erosion rills on both the north and south dam. The east and west dams are in good condition. Pond 7A is in good condition.

Recommend improvements to Pond 7 prior to next filling cycle. Monitor until then.

INSTABILITIES: (SLIDES, CRACKS, BULGES, etc.)

SLIDES/SLOUGHS:

DESCRIPTION AND LOCATION:

CRACKS:

DESCRIPTION AND LOCATION:

BULGES

DESCRIPTION AND LOCATION:

OTHER

DESCRIPTION AND LOCATION:

OTHER (rodent burrows, ruts, etc.)

		ACTION			
		NONE	MONITOR	MAINTENANCE	ENGINEER
DESCRIPTION AND LOCATION:		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION AND LOCATION:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION AND LOCATION:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION AND LOCATION:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CREST Length: 3,819 Width: 16' design, 26 ft effective (est. meas.)					
GROUND COVER:		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION: Dense graded stone (ODOT 304)					
CONDITION: Good					
EROSION		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION AND LOCATION:					
INSTABILITIES: (SLIDES, CRACKS, BULGES, etc.)					
CRACKS:		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION AND LOCATION:					
RUTS		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION AND LOCATION:					
POT HOLES:		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION AND LOCATION:					
OTHER		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION AND LOCATION:					
MONITORING INSTRUMENTATION:		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION: Staff gauge at the outlet structure					
CONDITION: Good condition					
ALIGNMENT:					
CONDITION: Alignment of dam indicates no deflection horizontally or vertically.		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHER (rodent burrows, ruts, etc.)					
DESCRIPTION AND LOCATION:		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION AND LOCATION:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION AND LOCATION:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION AND LOCATION:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DOWNSTREAM SLOPE Gradient: Horizontal: varies Vertical: 1 (est. meas.)					
VEGETATION					
Trees:		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION AND LOCATION: Trees noted in previous inspection had been addressed.					
Brush:		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION AND LOCATION: Some scattered brush on the lower slope on the east end of the south dam.					
Ground Cover:		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION: Grass					
CONDITION: Grass cover is generally in good condition with the exception of the east end of the south dam.					

	ACTION			
	NONE	MONITOR	MAINTENANCE	ENGINEER
EROSION	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
DESCRIPTION AND LOCATION: Significant erosion has occurred from wave erosion along the shoreline of the Ohio River adjacent to the south dam near the east end of the pond. The river shoreline has and continues to encroach on the dam and could compromise the integrity of the dam if not addressed. Continue pursuit of permit from US Army Corps of Engineers to protect the shoreline from erosion.				
INSTABILITIES: (SLIDES, CRACKS, BULGES, etc.)				
SLIDES/SLOUGHS:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION AND LOCATION:				
CRACKS:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION AND LOCATION:				
BULGES	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION AND LOCATION:				
OTHER	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION AND LOCATION:				
SEEPAGE/WET AREA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION AND LOCATION:				
EMBANKMENT DRAINS:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION:				
CONDITION:				
MONITORING INSTRUMENTATION:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION: Groundwater monitoring wells were added in 2016.				
CONDITION:				
OTHER (rodent burrows, ruts, etc.)				
DESCRIPTION AND LOCATION:				
DESCRIPTION AND LOCATION:				
DESCRIPTION AND LOCATION:				
DESCRIPTION AND LOCATION:				
HYDRAULIC STRUCTURES				
STRUCTURE:				
DESCRIPTION: Pond 7 Principle Spillway, Rebuilt in 2013				
INLET	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION: Reinforced concrete channel, ungated				
CONDITION: Structure is in good condition.				
OBSTRUCTION NOTED: (<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO) DESCRIBE IF YES:				
CONDUIT	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION: Two 30 inch HDPE pipes encased in reinforced concrete.				
CONDITION: Good condition.				
SEEPAGE NOTED: (<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO) DESCRIBE IF YES:				
OUTLET	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

ACTION

NONE
MONITOR
MAINTENANCE
ENGINEER

DESCRIPTION: Concrete headwall.
CONDITION: Good condition.
EROSION NOTED: (YES NO) DESCRIBE IF YES:

STRUCTURE:

DESCRIPTION: Pond 7A Principle Spillway

INLET

DESCRIPTION: 40' long, reinforced concrete overflow weir
CONDITION: Structure is in good condition
OBSTRUCTION NOTED: (YES NO) DESCRIBE IF YES:

CONDUIT

DESCRIPTION: One 36" HDPE pipe on 6% slope
CONDITION: Good condition.
SEEPAGE NOTED: (YES NO) DESCRIBE IF YES:

OUTLET

DESCRIPTION: Concrete headwall.
CONDITION: Structure in good condition but significant erosion on upstream side.
EROSION NOTED: (YES NO) DESCRIBE IF YES: Erosion from Ohio River wave action has occurred on the up-river side of the headwall exposing most of that side of the structure.

STRUCTURE:

DESCRIPTION: Emergency Overflow from Pond 7 to Pond 7A

INLET

DESCRIPTION: Wide grass-vegetated, channel.
CONDITION: Good condition.
OBSTRUCTION NOTED: (YES NO) DESCRIBE IF YES:

CONDUIT

DESCRIPTION: Wide grass-vegetated, channel.
CONDITION: Good condition.
SEEPAGE NOTED: (YES NO) DESCRIBE IF YES:

OUTLET

DESCRIPTION: Wide grass-vegetated, channel.
CONDITION: Good condition.
EROSION NOTED: (YES NO) DESCRIBE IF YES:

Appendix D

CCR Unit Maintenance Recommendations

1. Over-seed north and south upstream slopes.
2. At next cleaning cycle repair erosion rills on the upstream slopes of the north and south dams. Investigate options for control of wave erosion.
3. Continue pursuit of permit from the US Army Corp of Engineers and install shoreline erosion protection along the Ohio River as needed. Implement installation as soon as possible.

Continued Monitoring

1. Monitor north and south upstream slopes for erosion.
2. Monitor erosion along the Ohio River.
3. Monitor erosion of upstream faces of north and south dams
4. Monitor vegetation on east end of south dam.