

2015

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, 2015

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 42,400,000 cubic feet 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 25%) 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 monthly and weekly facility inspections was conducted. Monthly inspections were conducted through September 2015. Weekly inspections were conducted from October 2015 through the present. These periodic inspections do not indicate any structural weakness or concerns.

Previous Structural Assessments

Annual inspections from previous years were reviewed as well as a 2009 inspection by Civil Environmental Consultants, the 2013 inspection by Ohio Department of Natural Resources and a 2010 structural assessment by BBC&M.

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

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

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

An area at the east end of the south dam has eroded at the toe from wave erosion from the Ohio River. The river shoreline has encroached northward over time and has eroded material from the toe area of the dam. Additionally, numerous small erosion rills have developed on the upstream slope of the north and south dams. 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.

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	34	Feet
Maximum Depth of Water	36.5	Feet
Minimum Depth of water	0	Feet (by pumping only)
Elevation of water	527.50	Feet (review of weekly inspection reports show normal fluctuation of the depth/water level)
Storage Capacity	2,240,000	Cubic Yards, Crest Full Volume
	1910,000	Cubic Yards ,(to three foot freeboard)
Volume of water	410,000	Cubic Yards
Volume of CCR	400,000	Cubic Yards (sluiced ash)
	560,000	Cubic Yards (permanent fill)

Appendix A

CCR Rule Requirements for Impoundment Annual Inspections

257.83 (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.

Appendix B

Reference Documents Reviewed

- ❖ Operation Maintenance and Inspection Manual
- ❖ Emergency Action Plan
- ❖ Structural Analysis
- ❖ 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): December 2015

Weather/Surface Conditions During Inspection: mostly cool and dry.

Freeboard: 4.5'

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 is sparse and in poor condition. 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.

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.)

DESCRIPTION AND LOCATION:

DESCRIPTION AND LOCATION:

DESCRIPTION AND LOCATION:

DESCRIPTION AND LOCATION:	ACTION			
	NONE	MONITOR	MAINTENANCE	ENGINEER
CREST Length: 3,819 Width: 16' design, 26 ft effective (est. meas.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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:				
<input type="checkbox"/> 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 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: varries Vertical: 1 (est. meas.)				
VEGETATION				
Trees:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION AND LOCATION: Some trees (<3" in diameter) on the lower slope on the east end of the south dam.				
Brush:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION AND LOCATION: Some 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.				
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				

	ACTION			
	NONE	MONITOR	MAINTENANCE	ENGINEER
the shoreline of the Ohio River adjacent to the south dam. The river shoreline has and continues to encroach on the dam and could compromise the integrity of the dam if not addressed. Erosion is most significant on the east end of the dam				
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: Two vibrating wire piezometers were installed for the 2010 investigation and are no longer active.				
CONDITION: not active				
OTHER (rodent burrows, ruts, etc.)				
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"/>
DESCRIPTION AND LOCATION:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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 and gates are in good (new) 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 (new) 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"/>
DESCRIPTION: Concrete headwall.				
CONDITION: Good (new) condition.				
EROSION NOTED: (<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO) DESCRIBE IF YES:				

ACTION

NONE
MONITOR
MAINTENANCE
ENGINEER

STRUCTURE:

DESCRIPTION: Pond 7A Principle Spillway

INLET

DESCRIPTION: 40' side, 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 (new) condition. Pipe was slip-lined in 2015 into corrugated metal line which had deflectin of approximately 20% in some locations with some deterioration. The annular space was grouted with cement-sand grout.

SEEPAGE NOTED: (YES NO) DESCRIBE IF YES:

OUTLET

DESCRIPTION: Concrete headwall.

CONDITION: Good

EROSION NOTED: (YES NO) DESCRIBE IF YES: Erosion 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. At next cleaning cycle repair erosion rills on the upstream slopes of the north and south dams. Investigate options for control of wave erosion.
2. Clear trees and brush on east end of south dam.
3. Continue pursuit of permit from the US Army Corp of Engineers and install shoreline erosion protection along the Ohio River as needed.

Continued Monitoring

1. Monitor erosion along the Ohio River.