

2015

J.M. Stuart Station Ash Pond 5 Annual Inspection

ODNR File No.: 8535-003



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

Pond 5 is an upland reservoir that was constructed in c1970. Inverted filters were added in 2010 at five seepage locations. This pond receives influent from plant processes including area drains, bottom ash sluicing, and flue gas desulfurization (FGD) blowdown. These influents are routed into settling bays in the eastern portion of the pond which discharge into the remaining portion of the pond. The western end of the pond provided secondary settling of any solids from primary settling forebays and settling of cooling tower blowdown water and other plant sumps.

The pond has an area of 39 acres at the crest, is 40-feet deep and has a volume of 1,110 acre-feet to the crest including the permanently filled portion of the pond. This pond is vital to the operation of the plant and cannot be drained without shutting the station down. The Maximum Operating Level of this pond is five feet below the crest. The outlet is constructed of driven sheet piling and is routed via a four-foot diameter corrugated metal pipe to the waste water treatment building. In this building effluent is filtered in rapid sand filters with a walnut shell filter media. There is also an emergency overflow weir (elevation 723.82 feet) in this building which will bypass the filters if the level is up to 5.5 feet below the crest.

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

Structural assessments were reviewed from previous years and well as the 2013 ODNR inspection and a 2010 inspection from BBC&M.

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

The Pond 5 dam is in good structural condition based on the visual inspection. Some items were noted which require maintenance and can be found in Appendix D. One seepage location was observed that has been monitored over the past five years. Maintenance is also needed along the crest adjacent to the FGD forebays.

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

There were no changes to the upstream face of the dam. Rock erosion protection is in place and in good condition. There were no changes to the geometry of the downstream face of the dam pond or other indications of structural weakness. Slopes have no indication of deformation or other indicators of instability.

Instrumentation [§ 257.83(b)(2)(ii)]

Pond 5 is equipped with a staff gauge near the filter building and piezometers installed in response to seepage areas. Piezometers show consistent readings.

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

No 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 consist of a sheet pile structure located at station and a four-foot diameter coated corrugated metal pipe which was added c1983. This pipe conveys the discharging water to the filter building. The structure and pipe are in good condition with no indication of deterioration or seepage.

This facility also contains the original outlet structure which consisted of a round concrete riser and reinforced concrete pipe located near the west end of the pond. According to records this outlet was closed and grouted. The discharge end of this outlet has been monitored weekly and has shown no indications of seepage.

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	27	Feet
Min. depth of water	20.5	Feet
Max. depth of water	528.3	Feet
Elevation of water	525.	Feet (review of weekly inspection reports show normal fluctuation of the depth/water level)
Storage Capacity	1,790,000	Cubic Yards ,Crest Full Volume
Volume of water	610,000	Cubic Yards
Volume of CCR	400,000	Cubic Yards

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
 - 300-12-1320
 - 300-12-1322
 - 300-12-1328 sh 1
 - 300-12-1328 sh 2
 - 300-12-1328 sh 3
 - 300-12-1329 sh 1
 - 300-12-1329 sh 2
 - 300-12-1365
 - 300-12-1373
 - 300-13-1143

Appendix C
Inspection Check List

Dam Field Inspection Report

DAM/IMPOUNDMENT ANNUAL FIELD INSPECTION FORM

Unit Name: Pond 5

Facility Name: J.M. Stuart Station

ODNR File No.: 8535-003

CCR Unit

ACTION

ODNR Hazard Classification: I II III IV N/A

Impoundment Type: Incised Upland Lake

Description: This pond was constructed for the collection and disposal for bottom ash and cooling tower blowdown and was modified c1983 to treat other plant wastewaters.

Inspection Date(s): December 2015

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

Freeboard: 6.5'

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: Grass from top of stone shoreline protection and crest.

CONDITION: good

SLOPE PROTECTION

TYPE or NONE: Stone

DESCRIPTION: Gabion stone generally ranging from 3 inches to 7 inches/No. 2 Stone/Bottom Ash

CONDITION: good, no indication of beaching. Stone is stable and not moving.

EROSION:

DESCRIPTION AND LOCATION:

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:

CREST Length: 4,764' Width: 12' (est. meas.)

GROUND COVER:

DESCRIPTION: Grass cover between top of shore line protection and crest. Some areas have stone all the way to the crest.

CONDITION: Good

EROSION

DESCRIPTION AND LOCATION:

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

CRACKS:

DESCRIPTION AND LOCATION:

		ACTION			
		NONE	MONITOR	MAINTENANCE	ENGINEER
RUTS		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	DESCRIPTION AND LOCATION: The section of dam from station 5 to 14 had significant rutting from forebay cleaning activities.				
POT HOLES:		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	DESCRIPTION AND LOCATION: Several potholes along the crest				
OTHER		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DESCRIPTION AND LOCATION:				
MONITORING INSTRUMENTATION:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DESCRIPTION: No settlement monuments				
	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: 3 Vertical: 1 (est. meas.)					
VEGETATION					
Trees:			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DESCRIPTION AND LOCATION:				
Brush:		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DESCRIPTION AND LOCATION: Some brush noted mid-way down the dam from station 8 to 16. the area is rough from previous construction activity or river flooding. This is preventing mowing in this area.				
Ground Cover:		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	DESCRIPTION: Grass				
	CONDITION: Grass cover was well maintained except as noted above and except for 2 small bare areas near the toe at stations 31 and 36				
EROSION		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DESCRIPTION AND LOCATION:				
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 type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DESCRIPTION AND LOCATION: One seep are noted at station 48 (past the north end of the dam). This seep has been monitored for several years and has not changed.				
EMBANKMENT DRAINS:		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	DESCRIPTION: Inverted filters were added post construction to this dam in 2010 to address several wet areas on the downstream slope				
	CONDITION: Inverted filters are in good condition.				
MONITORING INSTRUMENTATION:		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

ACTION

NONE
MONITOR
MAINTENANCE
ENGINEER

DESCRIPTION: This pond has piezometers installed to monitor seep areas. Readings are very consistent.

CONDITION: One piezometer at station 29+50 has broken at the ground level and should be repaired.

OTHER (rodent burrows, ruts, etc.)

DESCRIPTION AND LOCATION:

DESCRIPTION AND LOCATION:

DESCRIPTION AND LOCATION:

DESCRIPTION AND LOCATION:

HYDRAULIC STRUCTURES

STRUCTURE:

DESCRIPTION: Principle/Emergency Spillway, added c1980

INLET

DESCRIPTION: Sheet pile construction located at station 31+80. Structure includes a baffle to prevent floating debris from entering the structure.

CONDITION: structure is in good condition.

OBSTRUCTION NOTED: (YES NO) DESCRIBE IF YES:

CONDUIT

DESCRIPTION: 60 inch corrugated metal pipe.

CONDITION: Pipe has no visible defects but cannot be thoroughly inspected. Pipe does not penetrate the dam but discharges into a water treatment facility.

SEEPAGE NOTED: (YES NO) DESCRIBE IF YES:

OUTLET

DESCRIPTION: Pipe discharges into Filter Building (water treatment facility) into a concrete tank.

CONDITION: Good

EROSION NOTED: (YES NO) DESCRIBE IF YES:

STRUCTURE: Original outlet structure - closed and abandoned..

DESCRIPTION:

INLET

DESCRIPTION: 60 inch RCP riser, top is below the minimum operating level and is not visible.

CONDITION: not accessible

OBSTRUCTION NOTED: (YES NO) DESCRIBE IF YES: This outlet was grouted with cement-sand grout and abandoned after the new outlet was installed.

CONDUIT

DESCRIPTION: 36 inch RCP

CONDITION: Grouted full and abandoned.

SEEPAGE NOTED: (YES NO) DESCRIBE IF YES:

OUTLET

DESCRIPTION: Sheet pile headwall.

CONDITION: Area is silted in from river deposits. No evidence of seepage or leaking.

EROSION NOTED: (YES NO) DESCRIBE IF YES:

Appendix D

CCR Unit Maintenance Recommendations

1. Repair the road on crest which is rutted alongside the FGD effluent settling forebays and potholes along remaining length of the crest.
2. Reseed two small bare areas noted at station 31 and 36.
3. Repair piezometer at station 29+50 offset eight feet.
4. Clear trees around the outlet structure for the original pond discharge.

Continued Monitoring

1. Continue monitoring of the seep at mid-height of the dam at approximate station 48.