

2016

**J.M. Stuart Station
Ash Pond 5 Annual Inspection**

ODNR File No.: 8535-003

The Dayton Power & Light Company



**Prepared by:
John Hendrix, PE
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

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 41.1 acres at the crest, is 39.5 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 five-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.

In 2015 the northeastern most inverted filter was extended to encompass a seep area that had been monitored for several years at station 48.

Periodic Inspections

A thorough review of weekly facility inspections since the previous annual 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 5 Initial Periodic Structural Stability Assessment prepared by Haley & Aldrich, 2016.

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

The Pond 5 dam is in good structural condition based on the visual inspection. Maintenance items noted in the 2015 inspection had been addressed. Additional items were noted which require maintenance and can be found in Appendix D.

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 pond dam with the exception of an extension to an inverted filter. There were no 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, piezometers installed in response to seepage areas and ground water monitoring wells and groundwater monitoring wells. Piezometers show consistent readings. Monitoring wells are in good condition. Two piezometers were redeveloped in 2016 and extended to above the original flush design.

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 five-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	32.2	Feet
Min. depth of water	31.3	Feet
Max. depth of water	34.7	Feet
Elevation of water	524.2	Feet (review of weekly inspection reports show normal fluctuation of the depth/water level)
Storage Capacity	2,130,000	Cubic Yards, Crest Full Volume
Volume of water	930,000	Cubic Yards
Volume of CCR	1,140,000	Cubic Yards

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 5 Initial Periodic Structural Stability Assessment, Haley & Aldrich, 2016
- ❖ Previous inspections reports
 - CEC 2009
 - ODNR 2009, 2013
 - CHA 2010
 - H&A 2016
 - DP&L 2015
- ❖ 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): November 15, 2016

Weather/Surface Conditions During Inspection: Ambient temperature near 50 F, no recent precipitation, clear.

Freeboard: 6.6'

NONE
 MONITOR
 MAINTENANCE
 ENGINEER

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

VEGETATION

Trees:	<input checked="" type="checkbox"/>	<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:				
Ground Cover:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION: Grass from top of stone shoreline protection and crest.				
CONDITION: Ground cover is in good condition and is well maintained.				

SLOPE PROTECTION	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TYPE or NONE: Stone				
DESCRIPTION: Gabion stone generally ranging from 3 inches to 7 inches/No. 2 Stone/Bottom Ash				
CONDITION: Good condition				

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:				

OTHER (rodent burrows, ruts, etc.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION AND LOCATION:				
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: 4,764' Width: 12' (est. meas.)

GROUND COVER:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION: Grass cover between top of shore line protection and crest. Some areas have stone all the way to the crest.				
CONDITION: crest is in good condition and free of ruts and pot holes.				

EROSION	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
---------	-------------------------------------	--------------------------	--------------------------	--------------------------

	ACTION			
	NONE	MONITOR	MAINTENANCE	ENGINEER
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: Areas noted in 2015 had been repaired and are in good condition.				
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: Piezometers and staff gauge				
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: 3 Vertical: 1 (est. meas.)				
VEGETATION				
Trees:	<input checked="" type="checkbox"/>	<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:				
Ground Cover:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION: Grass				
CONDITION: Grass is in good condition. Several areas had been reseeded. New grass was well established. Continue monitoring to ensure that the growth continues.				
Additionally there appears to have been some over-spray from herbicided applicator that has caused bare areas along the inverted filters. Recommend winter overseeding for these areas.				
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 checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION AND LOCATION: An inverted filter had been installed in the location of the seep noted during the prior year near station 44.				
EMBANKMENT DRAINS:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	ACTION			
	NONE	MONITOR	MAINTENANCE	ENGINEER
DESCRIPTION: CONDITION: Inverted filters are in good condition.				
MONITORING INSTRUMENTATION:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION: This pond has piezometers installed to monitor seep areas. Readings are very consistent.				
CONDITION: Piezometers at stations 24+25 and 29+50 have been extended and have been redeveloped.				
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"/>
HYDRAULIC STRUCTURES				
STRUCTURE:				
DESCRIPTION: Principle/Emergency Spillway, added c1980				
INLET	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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: (<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: 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: (<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: Pipe discharges into Filter Building (water treatment facility) into a concrete tank.				
CONDITION: Good				
EROSION NOTED: (<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO) DESCRIBE IF YES:				
STRUCTURE: Original outlet structure - closed and abandoned.				
DESCRIPTION:				
INLET	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION: 60 inch RCP riser, top is below the minimum operating level and is not visible.				
CONDITION: not accessible				
OBSTRUCTION NOTED: (<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO) DESCRIBE IF YES: This outlet was grouted with cement-sand grout and abandoned after the new outlet was installed.				
CONDUIT	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DESCRIPTION: 36 inch RCP				
CONDITION: Grouted full and abandoned.				
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: Sheet pile headwall.				
CONDITION: Area is silted in from river deposits. No evidence of seepage or leaking.				
EROSION NOTED: (<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO) DESCRIBE IF YES:				

Appendix D

CCR Unit Maintenance Recommendations

1. Over seed area above the southern inverted filter where it would appear over spray of herbicide may have killed adjacent vegetation.

Continued Monitoring

1. Monitor areas seeded in 2016 on the south side and near inverted filters to ensure that a good stand of grass develops.