

2017

**J.M. Stuart Station
Ash Pond 6 Annual Inspection**
ODNR File No.: 8535-013



**Prepared by:
John Hendrix, PE**



Date: December 21, 2017

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 Professional Engineer registered in the State of Ohio, employed by AES Ohio Generation, LLC. 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 6 is a partially-incised, upland reservoir that was constructed in 1973 as an ash sluice pond. The pond was partially re-excavated in c1983 to elevation 523.0 (indicated on drawing 300-46-1101 as 6A) and now serves as a collection pond for ash sluicing water from Ponds 3A, 7 and 10, coal storage area drainage, and Landfill 11 storm water, contact water and leachate. The original pond has an area of 36.7 acres at the crest, is 31-feet deep (the re-excavated depth is 10.5 feet) and has a volume of 1,390 acre-feet to the crest. 18.6 acres of this pond are permanently filled leaving an operating area of 18.1 acres and volume of 308 acre-feet to the crest. The Maximum Operating Level of this pond is three feet below the crest.

The outlet is a concrete structure with adjustable weirs which discharges through the pH treatment building into the 7A portion of Pond 7. A standpipe with a sluice gate is located along the east dam which discharges to NPDES Outfall 013. The elevation of this standpipe is 530.32 feet per the 2013 survey. (Drawing 300-46-1315 sheet 1 indicates that the elevation of this standpipe is 530.50 feet.)

The east dam (the only exposed downstream slope) was rehabilitated and re-graded in 2010. A piezometer was also installed in this dam at that time, but is no longer active.

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 6 dam is in good structural condition based on the visual inspection. No maintenance items are noted for this impoundment.

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

There were no changes to the upstream face of the dam. Rock/concrete rubble erosion protection is in place and in good condition on the west interior slope and bottom ash fill on the south and west sides. The south dam of the pond is shared with Pond 7 which was full at the time of inspection preventing inspection of the majority of the slope. The top of the dam is showing some wave erosion which is discussed in the Pond 7 Report. The east dam is in very good condition and is very well maintained. 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 6 is equipped with a staff gauge near the pH building. This gauge is in good condition.

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)]

A damp area was noted just above the toe of the eastern dam. This potential seepage will not impact the stability nor were there any other changes found to the CCR unit which could affect the stability or operation of the impounding structure.

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

The hydraulic structures for this pond consist of a concrete flume with adjustable underflow/overflow gates to control exit flow. This flume directs water through the pH building and is then carried to Pond 7A through a four-foot diameter corrugated metal pipe. The concrete and gates are in good conditions showing no signs of deterioration. The corrugated metal pipe was inspected in 2015 year by Consulting Services Incorporated using a robotic video camera and was determined to be in good condition. Visual observations did not indicate any deterioration or other changes in the condition of this piping.

This pond also has an emergency overflow structure which discharges into the Pond 7A outlet structure. The outlet structure is a metal riser with an underflow baffle. The baffle is showing indications of corrosion but is still in serviceable condition.

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 ¹	6	Feet
Min. depth of water ¹	4.5	Feet
Max. depth of water ¹	7.5	Feet
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
Volume of water	395,000	Cubic Yards
Volume of CCR	1,765,000	Cubic Yards

¹to re-excavated bottom of pond

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
 - 300-12-1316 sh 1
 - 300-12-1315 sh 2
 - 300-12-1317
 - 300-12-1318 sh 1
 - 300-12-1318 sh 2
 - 300-12-1319
 - 300-12-7147 sh 1
 - 300-12-7147 sh 2
 - 300-12-7147 sh 3
 - 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 6

Facility Name: J.M. Stuart Station

ODNR File No.: 8535-013

CCR Unit

ACTION

ODNR Hazard Classification: I II III IV N/A

Impoundment Type: Incised Upland Lake

Description: Partially incised - upland impoundment constructed with an earthen dam. This pond was originally a fly ash sluice pond which was closed. A portion of the pond was re-excavated c1983 to be used as a secondary settling pond fly ash sluice water.

Inspection Date(s): December 2017

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

Freeboard: >5.5'

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: Concrete rubble/riprap/bottom ash
 CONDITION: good

SLOPE PROTECTION

TYPE or NONE: Concrete rubble/riprap/bottom ash
 DESCRIPTION: The east slope is protected with a combination of concrete rubble and riprap. The south slope is protected with bottom ash (approximately 40 ft. in width). West and north shores are incised.
 CONDITION: Good. On the east slope on the stone/concrete is stable and not beaching. Some beaching occurs on the south side in the bottom ash fill but is too far removed to affect the dam.

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: 3,250 Width: 16' design, 40 ft effective (est. meas.)

GROUND COVER:

DESCRIPTION: Dense graded stone (ODOT 304)
 CONDITION: Good

EROSION

DESCRIPTION AND LOCATION:

	ACTION			
	NONE	MONITOR	MAINTENANCE	ENGINEER
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 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: 2.75 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				
CONDITION: Grass cover is dense and well maintained on the east slope. The south dam is shared with Pond 7 and has sparse ground cover (will address in Pond 7 inspection).				
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: A damp area discovered near station 26 approximately 30 feet above the toe.				
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: One vibrating wire piezometer was installed for the 2010 investigation and is no				

ACTION

NONE
MONITOR
MAINTENANCE
ENGINEER

longer active.
CONDITION: not active

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

DESCRIPTION: Reinforced concrete channel with underflow/overflow gates.

CONDITION: Structure and gates are in good condition.

OBSTRUCTION NOTED: (YES NO) DESCRIBE IF YES:

CONDUIT

DESCRIPTION: 48 inch bituminous coated corrugated metal pipe.

CONDITION: Visual inspection does not indicate any deterioration.

SEEPAGE NOTED: (YES NO) DESCRIBE IF YES:

OUTLET

DESCRIPTION: Concrete headwall with sluice gate.

CONDITION: Headwall in good condition. Sluice gate permanently fixed in open position

EROSION NOTED: (YES NO) DESCRIBE IF YES:

STRUCTURE:

DESCRIPTION: Emergency Overflow - penetrates the dam between Ponds 6 and 7A and outlets into the pond 7A outlet, inlet structure.

INLET

DESCRIPTION: Metal riser with metal skimmer

CONDITION: Skimmer is showing some loose flaking rust scale. Pipe is in good condition.

OBSTRUCTION NOTED: (YES NO) DESCRIBE IF YES:

CONDUIT

DESCRIPTION: 48 inch bituminous coated corrugated metal pipe

CONDITION: Pipe could not be inspected internally but is not leaking.

SEEPAGE NOTED: (YES NO) DESCRIBE IF YES:

OUTLET

DESCRIPTION: Outlets into the reinforced concrete inlet structure of the Pond 7A outlet. A sluice gate is located at the end of the pipe which is locked open.

CONDITION: Good condition with no spalling or exposed reinforcing.

EROSION NOTED: (YES NO) DESCRIBE IF YES:

Appendix D

CCR Unit Maintenance Recommendations

1. No maintenance recommendations are noted for this impoundment.

Continued Monitoring

1. Monitor seepage noted on the eastern dam.