2018

J.M. Stuart Station
Ash Pond 5 Annual Inspection

ODNR File No.: 8535-003

Prepared by:
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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 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 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 five-foot diameter corrugated metal pipe to the waste water treatment building. In this building effluent is filtered in rapid sand filters with crushed 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.

J. M. Stuart Station stopped operating on May 24, 2018. This impoundment continued to receive sluiced CCR materials during the plant cleaning process for a period and is still receiving influent from plant sumps which may contain residual CCR materials.

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.

Previous Structural Assessments

Structural assessments were reviewed from previous years including Initial Periodic Structural Stability Assessment Pond 5 from Haley & Aldrich 2016, a 2010 inspection from BBC&M and the 2013 and 2018 ODNR 5-year inspection reports.

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 2017 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 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, piezometers installed in response to seepage areas and ground water monitoring wells. Piezometers show consistent readings. Monitoring wells are 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)]

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 31 and a five-foot diameter coated corrugated metal pipe which was added c1983. This pipe follows along the upstream slope of the dam and discharges into a concrete basin in the filter building, not penetrating the dam. Operation did not permit entrance into the pipe for inspection; however, inspection of the surface over the pipe and at the manholes showed 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	24	Feet
Min. depth of water	N/A	Feet
Max. depth of water	30	Feet
Elevation of water	519 (Max level)	Feet (review of weekly inspection reports show that the water level has been 8 to 10 below the crest for many weeks)
Storage Capacity	1,790,000	Cubic Yards, Crest Full Volume
Volume of water	590,000	Cubic Yards
Volume of CCR	1,072,000	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 inspection reports
  - CEC 2009
  - ODNR 2013, 2018
  - CHA 2010
  - BBCM 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
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 2018
Weather/Surface Conditions During Inspection: Overcast, ground was generally damp due to recent precipitation.
Freeboard: 9 to 10 ft'

	ACTION			
	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: Ground cover is in good condition and is well maintained.				
SLOPE PROTECTION	☒	☐	☐	☐
TYPE or NONE: Stone				
DESCRIPTION: Gabion stone generally ranging from 3 inches to 7 inches/No. 2 Stone/Bottom Ash				
CONDITION: Good condition. The water level is much lower than normally would have been observed during operation. Unprotected embankment below the stone protection was exposed in some areas.				
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: Stone				
CONDITION: Crest is in good condition a few small potholes have developed.				

	ACTION			
	NONE	MONITOR	MAINTENANCE	ENGINEER
EROSION	☒	☐	☐	☐
DESCRIPTION AND LOCATION:				
INSTABILITIES: (SLIDES, CRACKS, BULGES, etc.)				
CRACKS:	☒	☐	☐	☐
DESCRIPTION AND LOCATION:				
RUTS	☒	☐	☐	☐
DESCRIPTION AND LOCATION:				
POT HOLES:	☐	☒	☐	☐
DESCRIPTION AND LOCATION: A few small potholes were observed.				
OTHER	☒	☐	☐	☐
DESCRIPTION AND LOCATION:				
MONITORING INSTRUMENTATION:	☒	☐	☐	☐
DESCRIPTION: No settlement monuments. Piezometers in good condition. Water level is below the staff gauge				
CONDITION:				
ALIGNMENT:				
CONDITION: Alignment of dam indicates no deflection horizontally or vertically.	☒	☐	☐	☐
OTHER (rodent burrows, ruts, etc.)				
DESCRIPTION AND LOCATION:	☒	☐	☐	☐
DESCRIPTION AND LOCATION:	☐	☐	☐	☐
DESCRIPTION AND LOCATION:	☐	☐	☐	☐
DESCRIPTION AND LOCATION:	☐	☐	☐	☐
DOWNSTREAM SLOPE Gradient: Horizontal: 3 Vertical: 1 (est. meas.)				
VEGETATION				
Trees:	☒	☐	☐	☐
DESCRIPTION AND LOCATION:				
Brush:	☒	☐	☐	☐
DESCRIPTION AND LOCATION:				
Ground Cover:	☐	☒	☐	☐
DESCRIPTION: Grass				
CONDITION: Grass ground cover is in good condition with the exception of some small erosion rills noted below.				
EROSION	☐	☒	☐	☐
DESCRIPTION AND LOCATION: Some small erosion rills were noted near station 9. Rills appear to have formed at a recently seeded area where the river level was elevated for a long period of time earlier in the year.				
INSTABILITIES: (SLIDES, CRACKS, BULGES, etc.)				
SLIDES/SLOUGHS:	☒	☐	☐	☐
DESCRIPTION AND LOCATION:				
CRACKS:	☒	☐	☐	☐
DESCRIPTION AND LOCATION:				
BULGES	☒	☐	☐	☐
DESCRIPTION AND LOCATION:				
OTHER	☒	☐	☐	☐
DESCRIPTION AND LOCATION:				
SEEPAGE/WET AREA	☒	☐	☐	☐
DESCRIPTION AND LOCATION: No additional seeps have been located. Continue to monitor seep at xtation 31+15.				

	ACTION			
	NONE	MONITOR	MAINTENANCE	ENGINEER
EMBANKMENT DRAINS:	☒	☐	☐	☐
DESCRIPTION:				
CONDITION: Inverted filters are in good condition.				
MONITORING INSTRUMENTATION:	☒	☐	☐	☐
DESCRIPTION: This pond has piezometers installed to monitor seep areas. Readings are very consistent.				
CONDITION: Good condition.				
OTHER (rodent burrows, ruts, etc.)				
DESCRIPTION AND LOCATION:	☒	☐	☐	☐
DESCRIPTION AND LOCATION:	☐	☐	☐	☐
DESCRIPTION AND LOCATION:	☐	☐	☐	☐
DESCRIPTION AND LOCATION:	☐	☐	☐	☐

HYDRAULIC STRUCTURES

STRUCTURE: Principle/Emergency Spillway				
DESCRIPTION: Sheet pile inlet and corrugated metal piping discharge into a concrete basin providing pump suction inlet and emergency overflow through a reinforced concrete pipe to a back water of the Ohio River installed 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 the 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. No repairs noted.

Continued Monitoring

1. Continue to monitor seepage area at station 31+15 until addressed.
2. Monitor potholes in crest.
3. Monitor erosion at station 9