



Submitted to
Southern Indiana
Gas & Electric Company
(SIGECO)
dba CenterPoint Energy
Indiana South
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Drive, Evansville, IN 47708

Submitted by
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October 13, 2021

CCR Certification:
Structural Stability Assessment
§257.73 (d)
for the
Ash Pond
at the
A.B. Brown Generating Station
Revision 0

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Executive Summary

The purpose of the Structural Stability Assessment presented in this report is to document that the requirements specified in 40 Code of Federal Regulations (CFR) §257.73 (d) have been met to support the certification required under each of the applicable regulatory provisions for the A.B. Brown Generating Station (Brown) Ash Pond. The Ash Pond is an existing coal combustion residual (CCR) surface impoundment as defined by 40 CFR §257.53. The CCR Rule requires that the specified documentation and assessments for an existing CCR surface impoundment be prepared within five years of the placement of the previous assessment in the facility's operating record. Since the Initial Structural Stability Assessment was placed in the facility's operating record on October 13, 2016, the deadline for completing this 5-year update is October 13, 2021.

This Structural Stability Assessment for the Ash Pond meets the regulatory requirements as summarized in **Table ES-1**.

Table ES-1 – Certification Summary				
Report Section	CCR Rule Reference	Requirement Summary	Requirement Met?	Comments
2.1	§257.73 (d)(1)(i)	<i>Foundations and Abutments</i>	Yes	The CCR Unit has stable foundations
2.2	§257.73 (d)(1)(ii)	<i>Slope Protections</i>	Yes	The CCR Unit has sufficient slope protection
2.3	§257.73 (d)(1)(iii)	<i>Dike Compaction</i>	Yes	The CCR Unit has appropriate dike Compaction
2.4	§257.73 (d)(1)(iv)	<i>Vegetated Slopes</i>	Yes	The CCR Unit has vegetated slopes or other forms of protection
2.5	§257.73 (d)(1)(v)	<i>Spillways</i>	Yes	The CCR Unit spillways are sufficient for the 1000 year event
2.6	§257.73 (d)(1)(vi)	<i>Stability and Structural Integrity of Hydraulic Structures</i>	Yes	Hydraulic structures passing through the base of the unit are free from noticeable defects which may negatively affect the operation of the unit
2.7	§257.73 (d)(1)(vii)	<i>Downstream Slope Inundation / Stability</i>	Yes	The CCR Unit maintains structural stability during low pool or sudden drawdown of adjacent water body

The Brown Ash Pond is currently an active surface impoundment. All structural stability assessment requirements were evaluated, and the surface impoundment was found to meet all requirements as required within each individual structural stability assessment in §257.73 (d)(1).

1 Introduction

1.1 Purpose of this Report

The purpose of the Structural Stability Assessment Structural Stability Assessment presented in this report is to document that the requirements specified in 40 Code of Federal Regulations (CFR) §257.73 (d) have been met to support the certification required under each of the applicable regulatory provisions for the A.B. Brown Generating Station (Brown) Ash Pond. The Brown Ash Pond is an existing coal combustion residual (CCR) surface impoundment as defined by 40 CFR §257.53. The CCR Rule requires that the structural stability assessment for an existing CCR surface impoundment be prepared by October 17, 2016. These regulations also require that the specified documentation and assessments for an existing CCR surface impoundment be prepared within five years of the placement of the previous assessment in the facility's operating record. Since the Structural Stability Assessment was placed in the facility's operating record on October 13, 2016, the deadline for completing this 5-year update is October 13, 2021.

The Brown station has an interconnected existing CCR surface impoundment, the Ash Pond, which consists of a lower pool and an upper pool. The following table summarizes the documentation required within the CCR Rule and the sections that specifically respond to those requirements of this assessment.

Report Section	Title	CCR Rule Reference
2.1	Foundations and Abutments	§257.73 (d)(1)(i)
2.2	Slope Protection	§257.73 (d)(1)(ii)
2.3	Dike Compaction	§257.73 (d)(1)(iii)
2.4	Vegetated Slopes	§257.73 (d)(1)(iv)
2.5	Spillways	§257.73 (d)(1)(v)
2.6	Stability and Structural Integrity of Hydraulic Structures	§257.73 (d)(1)(vi)
2.7	Downstream Slope Inundation / Stability	§257.73 (d)(1)(vii)

1.2 Brief Description of Impoundment

The Brown station is a coal-fired power plant located approximately 10 miles east of Mount Vernon in Posey County, Indiana and is owned and operated by Southern Indiana Gas & Electric Company (SIGECO), dba CenterPoint Energy Indiana South. The Brown station is situated just west of the Vanderburgh-Posey County line and north of the Ohio River with the Ash Pond positioned on the east side of the generating station.

The Ash Pond was commissioned in 1978. An earthen dam was constructed across an existing valley to create the impoundment. In 2003, a second dam was constructed east of the original dam and further up the valley to increase the storage capacity. This temporarily created an upper pond and a lower pond. The upper and lower ponds were operated separately until 2016 when the upper dam was decommissioned. A 10' wide breach was installed in the upper embankment and the normal pool elevation was lowered. Currently, the upper pool and the lower pool act as one CCR unit referred to as the Ash Pond, which has a surface area of approximately 164 acres.

The lower pool dam embankment is approximately 1,540 feet long, 30 feet high, and has 3 to 1 (horizontal to vertical) side slopes covered with grassy vegetation. The embankment crest elevation is 450.9 feet¹ and has a crest width of 20 feet. An earthen buttress was constructed against the outboard slope of the dam. The buttress crest extends the length of the dam, is up to 200 feet wide and varies in elevation from 442 feet to 432 feet. A site Location Map showing the area surrounding the station is included as **Figure 1** of **Appendix A**. **Figure 2** in **Appendix A** presents the Brown Site Map.

¹ Unless otherwise noted, all elevations in this report are in the NAVD88 datum.

2 Structural Stability Assessment Description

Regulatory Citation: 40 CFR §257.73 (d)(1);

- *The owner or operator of the CCR unit must conduct initial and periodic structural stability assessments and document whether the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering practices for the maximum volume of CCR and CCR wastewater which can be impounded therein. The assessment must, at a minimum, document whether the CCR unit has been designed, constructed, operated, and maintained with [the standards in (d)(1)(i)-(vii)]:*

The Structural Stability Analysis for the Ash Pond is described in this section. Information about operational and maintenance procedures was provided by Brown plant personnel. The Brown station follows an established maintenance program that quickly identifies and resolves issues of concern.

2.1 Foundations and Abutments

Regulatory Citation: 40 CFR §257.73 (d)(1);

- *(i) Stable foundations and abutments;*

Background and Assessment

The stability of the foundations was evaluated using soil data from field investigations and reviewing design drawings, operational and maintenance procedures, and conditions observed in the field by AECOM. Additionally, slope stability analyses were performed to evaluate slip surfaces passing through the foundations.

The foundation soils consist of interbedded stiff to very stiff clay and loose to medium dense silt soils. While the silts are susceptible to liquefaction as a result of strong earthquake shaking, the slope stability analyses exceed the criteria listed in §257.73(e)(1) for slip surfaces passing through the foundation (including the post-liquefaction loading condition). Therefore, the foundation soils are considered to be stable under all loading conditions. The slope stability analyses are discussed in the *CCR Certification Report: Initial Safety Factor Assessment for the Ash Pond at the A.B. Brown Generating Station* (October 2016). A review of operational and maintenance procedures as well as current and past performance of the dikes has determined appropriate processes are in place for continued operational performance.

Conclusion and Recommendation

Based on the conditions observed by AECOM, the Ash Pond was designed and constructed with stable foundations. Operational and maintenance procedures are in place to address any issues related to the stability of foundations.

Therefore, the Ash Pond meets the requirements in §257.73 (d)(1)(i).

2.2 Slope Protection

Regulatory Citation: 40 CFR §257.73 (d)(1);

- *(ii) Adequate slope protection to protect against surface erosion, wave action and adverse effects of sudden drawdown;*

Background and Assessment

The adequacy of slope protection was evaluated by reviewing design drawings, operational and maintenance procedures, and conditions observed in the field by AECOM.

The exterior slopes of the lower pool dike are covered with grass vegetation. The interior slopes of the lower pool and upper pool dikes are covered with riprap which has an approximate median diameter of 15-inches. No evidence of significant areas of erosion or wave action was observed during AECOM's site visit on October 08, 2021. See **Appendix B** for further details from AECOM's site visit.

Conclusion and Recommendation

Based on this evaluation, adequate slope protection was designed and constructed at the Ash Pond. Areas of the interior and exterior slopes of the upper and lower pool dams and buttress show no evidence of significant areas of erosion or wave action. Operational and maintenance procedures to repair the vegetation (exterior slopes) and riprap (interior slopes), if required, are appropriate to protect against future surface erosion or wave action. Sudden drawdown of the pool in the Ash Pond is not expected to occur. See Section 2.7 of this report for further information on sudden drawdown.

Therefore, the Ash Pond meets the requirements in §257.73 (d)(1)(ii).

2.3 Dike Compaction

Regulatory Citation: 40 CFR §257.73 (d)(1)

- *(iii) Dikes mechanically compacted to a density sufficient to withstand the range of loading conditions in the CCR unit;*

Background and Assessment

The density of the dike materials was evaluated using soil data from field investigations and reviewing design drawings, operational and maintenance procedures, and conditions observed in the field by AECOM. Additionally, slope stability analyses were performed to evaluate slip surfaces passing through the dike over the range of expected loading conditions as defined within §257.73 (e)(1).

Historical construction drawings for the dam required that the embankment be compacted to 95% of the Standard Proctor maximum dry density (ASTM D 698). Based on the geotechnical field evaluations, the dam embankment consists of stiff to very stiff clayey soils that have consistency and strength indicative of well-compacted materials. The soil buttress that exists against the downstream slope of the dam was constructed in 8-inch loose lifts and was mechanically compacted to at least 95% of the Standard Proctor maximum dry density. Soil densities for the buttress were verified using nuclear methods. Slope stability analyses exceed the criteria listed in §257.73 (e)(1) for slip surfaces passing through the dike. The slope stability analyses and results are discussed in the *CCR Rule Report: Initial Safety Factor Assessment for the Ash Pond at the A.B. Brown Generating Station* (October 2016).

Conclusion and Recommendation

Based on the conditions observed by AECOM, the Ash Pond was designed and constructed with sufficient dike compaction.

Therefore, the Ash Pond meets the requirements in §257.73 (d)(1)(iii).

2.4 Vegetated Slopes

Regulatory Citation: 40 CFR §257.73 (d)(1)

- *(iv) Vegetated slopes of dikes and surrounding areas, except for slopes which have an alternate form or forms of slope protection;²*

Background and Assessment

The adequacy of slope vegetation was evaluated by reviewing design drawings, operational and maintenance procedures, and conditions observed in the field by AECOM.

The exterior slopes of the lower pool dike are covered with grass vegetation. No evidence of significant areas of erosion was observed during AECOM's site visit on October 08, 2021. See **Appendix B** for further details from AECOM's site visit.

Conclusion and Recommendation

Based on this evaluation, the vegetation on the exterior slopes of the lower pool dike and buttress is adequate as no substantial bare or overgrown areas were observed. Therefore, the original design and construction of the Ash Pond and subsequent design and construction of the buttress included adequate vegetation of the dikes and surrounding areas. Adequate operational and maintenance procedures are in place to regularly manage vegetation growth, including mowing and seeding any bare areas, and to address erosional issues as they occur, as evidenced by the conditions observed by AECOM.

Therefore, the Ash Pond meets the requirements in §257.73 (d)(1)(iv).

2.5 Spillways

Regulatory Citation: 40 CFR §257.73 (d)(1)

- *(v) single spillway or a combination of spillways configured as specified in [paragraph (A) and (B)]:*
 - *(A) All spillways must be either:*
 - *(1) of non-erodible construction and designed to carry sustained flows; or*
 - *(2) earth- or grass-lined and designed to carry short-term, infrequent flows at non-erosive velocities where sustained flows are not expected.*

² As modified by court order issued June 14, 2016, Utility Solid Waste Activities Group v. EPA, D.C. Cir. No. 15-1219 (order granting remand and vacatur of specific regulatory provisions).

- (B) *The combined capacity of all spillways must adequately manage flow during and following the peak discharge from a:*
 - (1) *Probable maximum flood (PMF) for a high hazard potential CCR surface impoundment; or*
 - (2) *1000-year flood for a significant hazard potential CCR surface impoundment; or*
 - (3) *100-year flood for a low hazard potential CCR surface impoundment.*

Background and Assessment

The plant operates as a zero-discharge facility during normal operating conditions.

There are four piped outlets and one spillway available to discharge runoff from the lower pool. These outlets and spillway were evaluated using design drawings, operational and maintenance procedures, and conditions observed in the field by AECOM. The conditions of each structure were observed in the field by AECOM October 08, 2021. See Site Visit Report in **Appendix B** for additional details.

The first outlet is a 12-inch HDPE Ash Pond Discharge Line that goes to a chemical precipitation treatment system prior to mixing with other plant water and going to an NPDES permitted outfall. The HDPE pipe is a non-erodible material.

The second outlet is a Low Pressure Recirculation System. This system is comprised of three pumps that are rated for 2,750 gpm each. All three pumps discharge into individual 8-inch diameter carbon steel pipes before combining into a common header and proceeding as a 20-inch diameter carbon steel pipeline to the plant. The carbon steel pipe is a non-erodible material.

The third and fourth outlets are associated with a High Pressure Recirculation System. This system is comprised of two high pressure pumps that are rated for 2,100 gpm each. Both pumps discharge into individual 8-inch diameter carbon steel pipes before combining into a common header and proceeding as a 10-inch diameter carbon steel pipeline to the plant. The carbon steel pipes are a non-erodible material.

The spillway is a combined Principal Spillway and Emergency Spillway. The outlet from the Ash Pond is a grass-lined, trapezoidal channel spillway with Class II rip-rap having a median diameter of approximately 15-inches lining the discharge channel to prevent erosion. The grass-lined spillway and the rip-rap lined discharge channel were designed to prevent erosion. The velocities through the spillways during peak discharge were analyzed to determine if erosion would occur within preparation of the *CCR Certification: Inflow Design Flood Control System Plan for the Ash Pond at the A.B. Brown Generating Station* (October 2021).

The former Principal Spillway which consisted of a metal gooseneck inlet structure connected to a 36-inch RCP drop inlet was grouted in place and abandoned in 2020.

Additionally, hydrologic and hydraulic analyses were completed to evaluate the capacity of the spillway relative to inflow estimated for the 1,000-year flood event for the significant hazard potential for the Ash Pond. The ability of the spillway design to carry sustained flows, as well as the capacity of the spillway, was evaluated using hydrologic and hydraulic analysis performed per §257.82(a). The hydrologic and hydraulic analyses are discussed in the *CCR Certification: Inflow Design Flood Control System Plan for the Ash Pond at the A.B. Brown Generating Station* (October 2021).

Conclusion and Recommendation

All outlet devices and the Principal/Emergency Spillway were designed to prevent erosion. The HDPE, steel and RCP pipes of the outlets are non-erodible material, while the channel of the Principal/Emergency Spillway is lined with rip-rap.

The analysis found that the spillways can adequately manage flow during peak discharge resulting from the 1,000-year storm event without overtopping of the embankments. The peak water surcharge elevation is 447.31 feet during the IDF, and the minimum crest elevation of the Ash Pond dike is 450.9 feet, resulting in 3.59 feet of freeboard. This also indicates that the design of the spillway is adequate to carry sustained flows. Operational and maintenance procedures are in place to remove debris or other obstructions from the spillway, if observed after normal inspections. As a result, these procedures are appropriate for maintaining the spillway.

Therefore, the Ash Pond meets the requirements in §257.73 (d)(1)(v).

2.6 Stability and Structural Integrity of Hydraulic Structures

Regulatory Citation: 40 CFR §257.73 (d)(1)

- *(vi) Hydraulic structures underlying the base of the CCR unit or passing through the dike of the CCR unit that maintain structural integrity and are free of significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, and debris which may negatively affect the operation of the hydraulic structure.*

Background and Assessment

The stability and structural integrity of hydraulic structures penetrating the dike of the Ash Pond was evaluated using design drawings, operational and maintenance procedures, inspections, and conditions observed in the field by AECOM.

The former Principal Spillway consisting of a gooseneck inlet structure attached to a vertical 36-inch RCP drop inlet was the only hydraulic structure that penetrated the lower pool embankment. The gooseneck inlet structure was removed and both ends of the pipe as well as the RCP discharge outlet were grouted full and abandoned in 2020.

Conclusion and Recommendation

Since the former Principal Spillway is grouted in place and abandoned, there is no potential for failure or impact on the stability and structural integrity of the hydraulic structure.

Therefore, the Ash Pond meets the requirements in §257.73 (d)(1)(vi).

2.7 Downstream Slope Inundation / Stability

Regulatory Citation: 40 CFR §257.73 (d)(1)

- *(vii) For CCR units with downstream slopes which can be inundated by the pool of an adjacent water body, such as a river, stream or lake, downstream slopes that maintain structural stability during low pool of the adjacent water body or sudden drawdown of the adjacent water body.*

Background and Assessment

The structural stability of the downstream slopes of the Ash Pond was evaluated by comparing the location of the Ash Pond relative to adjacent water bodies using published United States Geological Survey (USGS) topographic maps, aerial imagery, and conditions observed in the field by AECOM.

Based on this evaluation, water bodies adjacent to the downstream slopes of the Ash Pond are not present. The nearest downstream water body is the Ohio River, which is approximately 2,500 lateral feet beyond the downstream slopes of the Ash Pond. The 100-year flood event (elevation 373 feet) from the Ohio River is 77 feet below the elevation of the toe of the lower pool dike. Therefore, there are no adjacent water bodies that can inundate the downstream slopes of the Ash Pond.

Conclusion and Recommendation

Based on this evaluation, the requirements in §257.73 (d)(1)(vii) are not applicable to the Ash Pond, as inundation of the downstream slopes is not expected to occur.

3 Certification

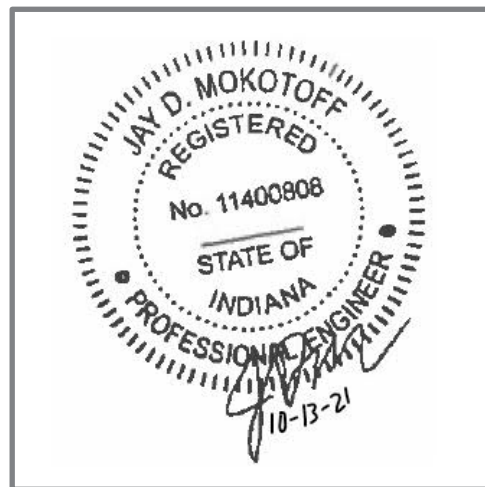
This Certification Statement documents that the Ash Pond at the A. B. Brown Generating Station meets the Structural Stability Assessment requirements specified in 40 CFR §257.73 (d). The Ash Pond is an existing CCR surface impoundment as defined by 40 CFR §257.53. The CCR Rule requires that the specified documentation and assessments for an existing CCR surface impoundment be prepared within five years of the placement of the previous assessment in the facility’s operating record. Since the Initial Structural Stability Assessment was placed in the facility’s operating record on October 13, 2016, the deadline for completing this 5-year update is October 13, 2021.

CCR Unit: Southern Indiana Gas & Electric Company; A. B. Brown Generating Station; Ash Pond

I, Jay Mokotoff, being a Registered Professional Engineer in good standing in the State of Indiana, do hereby certify, to the best of my knowledge, information, and belief that the information contained in this certification has been prepared in accordance with the accepted practice of engineering. I certify, for the above referenced CCR Unit, that the Structural Stability Assessment dated October 13, 2021 meets the requirements of 40 CFR § 257.73 (d).

Jay Mokotoff
Printed Name

10-13-2021
Date



4 Limitations

Background information, design basis, and other data which AECOM has used in preparation of this report have been furnished to AECOM by SIGECO. AECOM has relied on this information as furnished, and is not responsible for the accuracy of this information. Our recommendations are based on available information from previous and current investigations. These recommendations may be updated as future investigations are performed.

The conclusions presented in this report are intended only for the purpose, site location, and project indicated. The recommendations presented in this report should not be used for other projects or purposes. Conclusions or recommendations made from these data by others are their responsibility. The conclusions and recommendations are based on AECOM's understanding of current plant operations, maintenance, stormwater handling, and ash handling procedures at the station, as provided by SIGECO. Changes in any of these operations or procedures may invalidate the findings in this report until AECOM has had the opportunity to review the findings, and revise the report if necessary.

This development of the Structural Stability Assessment was performed in accordance with the standard of care commonly used as state-of-practice in our profession. Specifically, our services have been performed in accordance with accepted principles and practices of the engineering profession. The conclusions presented in this report are professional opinions based on the indicated project criteria and data available at the time this report was prepared. Our services were provided in a manner consistent with the level of care and skill ordinarily exercised by other professional consultants under similar circumstances. No other representation is intended.

Appendix A Figures

Figure 1 – Location Map
Figure 2 – Site Map

ISSUED FOR BIDDING _____ DATE BY _____

ISSUED FOR CONSTRUCTION _____ DATE BY _____

REVISIONS

NO.	DESCRIPTION	DATE
△		
△		
△		
△		
△		

AECOM PROJECT NO:	60583533
DRAWN BY:	AG
DESIGNED BY:	AG
CHECKED BY:	JDM
DATE CREATED:	12/17/2020
PLOT DATE:	01/04/2021
SCALE:	1" = 1000'
ACAD VER:	2019

SHEET TITLE

LOCATION MAP

FIGURE 1





9400 Amberglen Boulevard
 Austin, TX 78729-1100
 512-454-4797 (phone)
 512-454-8807 (fax)

**SOUTHERN INDIANA
 GAS AND ELECTRIC
 COMPANY**

211 Northwest Riverside Drive
 Evansville, IN 47708
 1-800-227-1376 (phone)

**A.B. BROWN
 GENERATING STATION
 MT. VERNON, IN**

**CCR CERTIFICATION
 ASH POND**

**ISSUED FOR
 CERTIFICATION**

ISSUED FOR BIDDING _____ DATE BY _____

ISSUED FOR CONSTRUCTION _____ DATE BY _____

REVISIONS		
NO.	DESCRIPTION	DATE
△		
△		
△		
△		
△		

AECOM PROJECT NO:	60442676
DRAWN BY:	AG
DESIGNED BY:	AG
CHECKED BY:	JDM
DATE CREATED:	12/08/2020
PLOT DATE:	01/04/2021
SCALE:	AS SHOWN
ACAD VER:	2019

SHEET TITLE

SITE MAP

FIGURE 2

Appendix B
AECOM Site Visit Report

Station: A.B. Brown Generating Station
Station Location: Mt. Vernon, Indiana
Site Visit Date: 10/08/2021

Description of Impoundment Relevant to Site Inspection:

The surface impoundment was created in 1978 by the construction of an earthen dam across an existing valley. In 2003, a second dam was constructed east of the original dam and further up the valley to increase the storage capacity. In 2016, a 10-foot-wide breach was constructed in the upper dam and the normal pool elevation was lowered. Currently, the upper pool and lower pool act as one CCR unit referred to as the Ash Pond.

The lower pool (southern) dam embankment is approximately 1,540 feet long, 30 feet high, and has 3 to 1 (horizontal to vertical) side slopes covered with grassy vegetation. The embankment crest elevation is 450.9 feet and has a crest width of 20 feet. An earthen buttress was constructed against the outboard slope of the dam. The buttress crest extends the length of the dam, is up to 200 feet wide and varies in elevation from 442.0 feet to 432.0 feet. The operating elevation of the pool fluctuates from 439.0 feet to 444.0 feet.

Drainage into the Ash Pond is from pumped process flows, rainfall falling directly onto the surface impoundment and from runoff from upstream areas. Discharge from the unit is via an active pumping station that recycles the water to the generating station for process use or bypasses the generating station and is treated in a water treatment system prior to its discharge through NPDES Outfall 001. The Ash Pond impoundment is operated as a zero-discharge facility during normal operating conditions. It receives and impounds sluiced ash from the plant and also recirculates water back to the plant for other necessary processes. Inflows including runoff from the coal pile, process flows from Bottom Ash and Fly Ash are received by the lower pool at a combined rate of 13.64 cubic feet per second (cfs). Water is recirculated back to the plant from the lower pool pump station at a variable rate of up to 14.0 cfs. The Ash Pond is operated such that the outflow to the plant is larger than the inflow from plant processes. Therefore, there is zero-discharge from the Ash Pond outlet devices during normal operating conditions.

Summary of Observation/Comments on Site Visit:



AECOM (Trinity Webb), a qualified professional, visited the A.B. Brown Generating Station (Brown) on October 8, 2021 to conduct a site inspection of the Ash Pond. She performed this work under the supervision of and in coordination with AECOM's qualified professional engineer (Jay Mokotoff, PE). AECOM inspected the site features of the Ash Pond to assess the unit with respect to the CCR Rule (40 CFR §257.83) and to better understand the operating methods of the surface impoundment in accordance with the Operating Criteria requirements of the CCR Rule.

AECOM's inspection included a visual inspection of the Ash Pond and the areas surrounding the Ash Pond. The inspection was conducted from the top of the southern dam, along an access road along the southern dam, from the west side of the Ash Pond via an access road between the Ash Pond and the generating station, and along the southern toe of the dam and earthen buttress.

A grass-lined trapezoidal spillway channel is present that serves as both the primary and emergency overflow structure from the lower pool. The outlet of this spillway channel is NPDES Outfall 004. The discharge from this spillway is via a grouted-riprap lined channel which flows through a grass-lined swale and ultimately discharges to an unnamed tributary of the Ohio River. The grass-lined spillway channel was found to be adequately stabilized and the discharge channel was observed to be in good condition.

Slope protection along the southern dike includes established grass cover along the external slopes and rip- rap along the interior slopes. No downstream structures were observed between the unit and the Ohio River (the former Principal Spillway located in the center of the southern dam embankment and the associated gooseneck inlet structure with a 36-inch RCP drop inlet has been grouted at both ends and abandoned in place).

No evidence of significant areas of erosion on the dam, earthen buttress or associated areas was observed during AECOM's site visit.

<p>Photo No. 1</p>	<p>Date: 10/08/2021</p>	
<p>Location: A.B. Brown Generating Station</p>		
<p>Description: Standing at east end of dike, looking west.</p> <p>Picture shows slope protection on downslope of dike.</p> <p>Photographer: Trinity Webb</p>		
<p>Photo No. 2</p>	<p>Date: 10/08/2021</p>	
<p>Location: A.B. Brown Generating Station</p>		
<p>Description: Standing at west end of dike, looking east.</p> <p>Picture shows slope protection on downslope of dike.</p> <p>Photographer: Trinity Webb</p>		



<p>Photo No. 3</p>	<p>Date: 10/08/2021</p>			
<p>Location: A.B. Brown Generating Station</p>				
<p>Description: Standing on western leg of dike, looking north. Picture shows slope protection on exterior face of dike. Photographer: Trinity Webb</p>				
<p>Photo No. 4</p>	<p>Date: 10/08/2021</p>			
<p>Location: A.B. Brown Generating Station</p>				
<p>Description: Standing midway along southern dike, looking back over surface impoundment. Picture shows stability of dike into surface impoundment. Photographer: Trinity Webb</p>				

Photo No. 5	Date: 10/08/2021	
Location: A.B. Brown Generating Station		
<p>Description: Standing at top of secondary emergency spillway, showing riprap lining of discharge channel</p> <p>Picture shows adequate erosion protection.</p> <p>Photographer: Trinity Webb</p>		

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