



Submitted to  
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Gas & Electric Company  
dba Vectren Power  
Supply, Inc. (SIGECO)  
One Vectren Square  
Evansville, IN 47708

Submitted by  
AECOM  
9400 Amberglen Boulevard  
Austin, Texas 78729

January 10, 2018

CCR Annual Inspection

§257.83 (b)

for the

Ash Pond

at the

A.B. Brown Generating Station

Revision 0

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## Executive Summary

This Coal Combustion Residuals (CCR) Annual Inspection for the Ash Pond at the Southern Indiana Gas & Electric Company dba Vectren Power Supply, Inc., A.B. Brown Generating Station has been prepared in accordance with the requirements specified in the USEPA CCR Rule under 40 Code of Federal Regulations §257.83 (b). These regulations require that the specified documentation and assessments for an existing CCR surface impoundment be prepared by January 13, 2018.

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

Table ES-1 –Summary				
Report Section	CCR Rule Reference	Requirement Summary	Requirement Met?	Comments
2.1	§257.83 (b)(1)	<i>Annual Inspection</i>	Yes	The CCR Unit has met the annual inspection requirements
2.2	§257.83 (b)(2)	<i>Inspection Report</i>	Yes	The CCR Unit has met the inspection report requirements
2.3	§257.83 (b)(4)	<i>Frequency of Inspections</i>	Yes	The CCR Unit has met the required frequency of inspections
2.4	§257.83 (b)(5)	<i>Deficiency Identified</i>	Yes	Remedial actions and measures have been identified for all noted deficiencies

The Brown Ash Pond is currently an active surface impoundment. All inspection requirements were evaluated and the surface impoundment was found to meet all requirements as required within each individual assessment in §257.83 (b).

# 1 Introduction

## 1.1 Purpose of this Report

The purpose of the Annual Inspection presented in this report is to document that the requirements specified in 40 Code of Federal Regulations (CFR) §257.83 (b) have been met to support the requirement 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 inspection for an existing CCR surface impoundment be prepared by January 13, 2018.

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.

**Table 1-1 – CCR Rule Cross Reference Table**

Report Section	Title	CCR Rule Reference
2.1	Annual Inspection	§257.83 (b)(1)
2.2	Inspection Report	§257.83 (b)(2)
2.3	Frequency of Inspections	§257.83 (b)(4)
2.4	Deficiency Identified	§257.83 (b)(5)

## 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, dba Vectren Power Supply, Inc. (SIGECO). 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-foot 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 159 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 feet<sup>1</sup> and has a

<sup>1</sup> Unless otherwise noted, all elevations in this report are in the NAVD88 datum.

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.

## 2 Annual Inspection Description

*Regulatory Citation: 40 CFR §257.83 Inspection requirements for CCR surface impoundments*

The Annual Inspection 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 Annual Inspection

*Regulatory Citation: 40 CFR §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 Ash Pond is subject to the periodic structural stability assessment requirements as mentioned. Thus, the following items were performed to comply with the CCR Rule.

#### 2.1.1 Review of Available Information

*Regulatory Citation: 40 CFR §257.83 (b)(1);*

- *(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).*

The available information was reviewed for the Ash Pond, including the weekly inspections by plant personnel and the previous CCR Rule annual inspection performed by AECOM on December 8, 2016.

#### 2.1.2 Visual Inspection

*Regulatory Citation: 40 CFR §257.83 (b)(1);*

- *(ii) A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit and appurtenant structures.*

The Ash Pond was visually inspected by AECOM on November 29, 2017. No major signs of distress or malfunction of the CCR unit and appurtenant structures were identified. A few minor maintenance issues are listed under section 2.4.2.

*Regulatory Citation: 40 CFR §257.83 (b)(1);*

- *(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.*

The exposed elements of the hydraulic structures underlying the base or passing through the dike of the CCR unit of the Ash Pond were visually inspected for structural integrity on November 29, 2017.

## 2.2 Content of the Inspection Report

*Regulatory Citation: 40 CFR §257.83 (b)(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.*

The geometry of the impounding structure has not changed 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.*

There is no automated instrumentation at this impoundment. Readings were observed via a staff gage located within the surface impoundment.

- *(iii) The approximate minimum, maximum, and present depth and elevation of the impounded water and CCR since the previous annual inspection.*

The required information is presented in Table 2.1 below. The minimum and maximum water depths were calculated based on the yearly minimum and maximum water elevation readings provided by Brown plant personnel. The depth was calculated by subtracting the elevation of the base of the impoundment (Elev. 406 obtained from the original bathymetric survey) from the water surface elevation.

	Minimum		Maximum		Present	
	Depth (ft)	Elev (ft)	Depth (ft)	Elev (ft)	Depth (ft)	Elev (ft)
Impounded Water	35.41	441.41	37.94	443.94	36.46	442.46

CCR depths range from 0 feet to approximately 62 feet. The minimum CCR depth occurs along the perimeter of the impoundment. The maximum CCR depth occurs at the center of the base of the impoundment embankment. The elevation at the top of CCR material at this location is approximately elevation 441.00 feet.

- *(iv) The storage capacity of the impounding structure at the time of the inspection.*

The storage capacity of the impounding structure is approximately 7,318,000 CY. The storage capacity of the lower pool is 2,640,000 CY. The storage capacity of the upper pool is 3,150,000 CY.

- *(v) The approximate volume of the impounded water and CCR at the time of the inspection.*

The approximate volume of impounded water and CCR material for the Ash Pond are 720,000 CY and 5,715,850 CY respectively.

- *(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.*

The visual inspection performed on November 29, 2017 did not reveal any actual or potential structural weaknesses. However, a few minor maintenance issues are listed under section 2.4.2.

- *(vii) Any other change(s) which may have affected the stability or operation of the impounding structure since the previous annual inspection.*

There were no other changes which might have affected the stability or operation of the impounding structure since the previous annual inspection.

### 2.3 Frequency of Inspections

*Regulatory Citation: 40 CFR §257.83 (b)(4);*

- *(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).*

The annual inspection report was submitted to SIGECO on January 11, 2018.

- *(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.*

The quinquennial structural stability assessment is not required for this year as it was completed October 2016. Thus, an annual inspection report was submitted to SIGECO as stipulated in §257.83 (b)(4)(i).

### 2.4 Deficiency Identified

*Regulatory Citation: 40 CFR §257.83 (b)(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.*

Areas of concern from previous inspections were reviewed and described below in section 2.4.1. Areas of concern from this year's inspection are described in section 2.4.2.

### 2.4.1 Previous Inspection

Seven areas of minor concern were noted during the previous annual inspection performed on December 8, 2016. Corrective measures were completed to meet the requirements of §257.83 (b)(5) for each deficiency or observation identified as shown in the table below.

Table 2-2 – Areas of Concern (Inspected: December 8, 2016)	
Deficiency/Observation	Corrective Measure Used
Phragmites were present at the toe of the interior slope below the rip-rap cover.	Phragmite growth have been eliminated by spraying.
Small potholes/ruts were present at the crest.	The crest has been filled and regraded to eliminate any potholes/ruts.
The swale between toe of embankment and coal pile has ponding water areas.	Swale has been regraded to create positive drainage towards outfall and eliminate ponding water. See Section 2.4.2 for current inspection concerns regarding the coal pile.
Silt was observed in the primary spillway's concrete flared end section at the toe of the embankment. This may have been residual silt from the recent buttress construction.	Although the primary spillway undergoes periodic CCTV monitoring, some silt is present. The vegetation at the adjacent stream relocation/mitigation is not yet fully established which results in periodic silting at the end of the spillway.
Sloughing was observed in two areas of the recently constructed buttress. See attached plan for locations.	Areas along the buttress that had sloughing were regraded and reseeded.
Sparse vegetation was observed in areas of the recently constructed buttress. See attached plan for locations. Vegetation is required to prevent erosion of soil material.	Reseeding has been done and ample vegetation is present in the areas of the constructed buttress.
An abandoned section of pipe passes through the top of the embankment just under the access road.	Vectren had left this section of the pipe in place for future use. As detailed in the previous annual inspection, no action necessary as the pipe is above the peak water surface elevation of the inflow design storm. There is no erosion around the pipe.

### 2.4.2 Current Inspection

Five minor areas of concern were noted during the annual inspection performed on November 29, 2017. Corrective measures have been proposed to meet the requirements of §257.83 (b)(5) for each deficiency or observation identified as shown in the table below.

**Table 3-3 – Areas of Concern (Inspected: November 29, 2017)**

Deficiency/Observation	Proposed Corrective Measure
Animal Burrows were present at the exterior edge of the buttress along the top of the outer slope. See attached plan for locations.	Fill with compacted soil and regrade as necessary. Regraded areas shall be seeded with vegetation.
Silt was observed in the primary spillway's concrete flared end section at the toe of the embankment.	Flush silt from outlet pipe and continue monitoring pipe with video inspections for deficiencies or future silt deposits.
Erosion was observed where the concrete mats tie into the embankment on the north end of the buttress. See attached plan for locations.	Regrade and reseed these areas.
Erosion was observed at the toe of the embankment adjacent to the coal pile area. The coal pile encroaches upon the swale causing erosion along the toe of the embankment. This erosion has also caused two non-operational drainage pipes to be exposed above ground surface in addition to minimal ponding water.	Move Coal Pile away from the toe of embankment, and regrade and reseed eroded areas. Positive drainage shall continue to be maintained along the swale towards the outfall.
Sparse vegetation and erosion rills were observed in areas of the buttress's exterior slope. See attached plan for locations.	Reseed these areas. Mulching can be done if necessary.

### 3 Certification

This Certification Statement documents that the annual inspection has been completed for the Ash Pond at the A.B. Brown Generating Station and this inspection report meets the requirements specified in 40 CFR §257.83 (b). The Ash Pond is an active CCR surface impoundment as defined by 40 CFR §257.53.

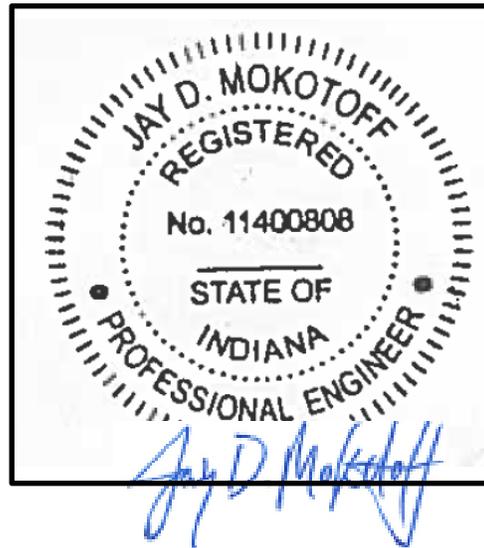
In accordance with the CCR rule, the deadline for completing the annual inspection for the active CCR surface impoundments and placing the report in the operating record is one year from the previous inspection report submittal date of January 13, 2017.

**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 annual inspection dated January 10, 2018 meets the requirements of 40 CFR §257.83 (b).

Jay D. Mokotoff  
*Printed Name*

1-10-18  
*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 Annual Inspection 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

Figure 3 – Inspection Site Plan



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

**SOUTHERN INDIANA  
 GAS AND ELECTRIC  
 COMPANY**  
 dba VECTREN POWER  
 SUPPLY, INC.

One Vectren Square  
 Evansville, IN 47708  
 1-800-227-1376 (phone)

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

**CCR LOCATION  
 RESTRICTIONS  
 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:	MJC
DATE CREATED:	12/07/2017
PLOT DATE:	12/08/2017
SCALE:	1" = 1000'
ACAD VER:	2014

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**  
 dba VECTREN POWER  
 SUPPLY, INC.

One Vectren Square  
 Evansville, IN 47708  
 1-800-227-1376 (phone)

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

**CCR LOCATION  
 RESTRICTIONS  
 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: MJC

DATE CREATED: 12/08/2017

PLOT DATE: 12/08/2017

SCALE: AS SHOWN

ACAD VER: 2014

SHEET TITLE

SITE MAP

**FIGURE 2**



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

**SOUTHERN INDIANA  
GAS AND ELECTRIC  
COMPANY**  
dba VECTREN POWER  
SUPPLY, INC.

One Vectren Square  
Evansville, IN 47708  
1-800-227-1376 (phone)

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

**CCR ANNUAL  
INSPECTION  
ASH POND**

**PRELIMINARY  
NOT FOR  
CONSTRUCTION**

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: MJC

DATE CREATED: 12/08/2017

PLOT DATE: 12/08/2017

SCALE: 1" = 60'

ACAD VER: 2014

SHEET TITLE

INSPECTION SITE PLAN

**FIGURE 3**

9400 Amberglen Boulevard  
Austin, Texas 78729  
1-512-454-4797

#### About AECOM

AECOM (NYSE: ACM) is a global provider of professional technical and management support services to a broad range of markets, including transportation, facilities, environmental, energy, water and government. With approximately 45,000 employees around the world, AECOM is a leader in all of the key markets that it serves. AECOM provides a blend of global reach, local knowledge, innovation, and collaborative technical excellence in delivering solutions that enhance and sustain the world's built, natural, and social environments. A Fortune 500 company, AECOM serves clients in more than 100 countries and has annual revenue in excess of \$6 billion.