



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

Submitted by
AECOM
9400 Amberglen Boulevard
Austin, Texas 78729

October 13, 2016

CCR Certification:
Initial Written Closure Plan
§257.102 (b) & (d)

for the

Ash Pond

at the

A.B. Brown Generating Station

Revision 0

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Executive Summary

This Coal Combustion Residuals (CCR) Initial Written Closure Plan (Closure Plan) 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 §257.102. These regulations require that the specified documentation, assessments and plans for an existing CCR surface impoundment be prepared by October 17, 2016.

This Closure Plan 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
Closure Plan				
2.1	§257.102 (b)	<i>A written closure plan must be prepared that describes the steps necessary to close the unit</i>	Yes	This Closure Plan has been prepared based on a preliminary closure design. All steps necessary to close the unit and information as required concerning the unit are included in the Closure Plan.
2.2	§257.102 (d)	<i>Closure performance standards</i>	Yes	The Closure Plan has been prepared in accordance with the required performance standards

The Brown Ash Pond is currently an active surface impoundment. Upon decision to close this surface impoundment, a Notification of Intent to Initiate Closure will be placed in the Operating Record, closure operations will commence and the surface impoundment will be closed within the time frame as allowed in the CCR Rule.

1 Introduction

1.1 Purpose of this Report

The purpose of the Initial Written Closure Plan (Closure Plan) is to document that the requirements specified in 40 Code of Federal Regulations (CFR) §257.102 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 residuals (CCR) surface impoundment as defined by 40 CFR §257.53. The CCR Rule requires that the closure plan for an existing CCR surface impoundment be prepared by October 17, 2016.

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 plan.

Table 1-1 – CCR Rule Cross Reference Table		
Report Section	Title	CCR Rule Reference
2.1	Content of the Plan	§257.102 (b)(1)
2.2	Achievement of Performance Standards	§257.102 (d)(1)
2.3	Stabilization of Waste	§257.102 (d)(2)
2.4	Final Cover System	§257.102 (d)(3)

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' 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 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 Initial Written Closure Plan

Regulatory Citation: 40 CFR §257.102 (b); Written closure plan—

- *(1) Content of the plan. The owner or operator of a CCR unit must prepare a written closure plan that describes the steps necessary to close the CCR unit at any point during the active life of the CCR unit consistent with recognized and generally accepted good engineering practices. The written closure plan must include, at a minimum, the information specified in paragraphs (b)(1)(i) through (vi) of this section.*

The Initial Written Closure Plan 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 Content of the Plan

2.1.1 Closure Plan Description

Regulatory Citation: 40 CFR §257.102 (b)(1);

- *(i) Narrative description of how the CCR unit will be closed in accordance with this section.*

The Ash Pond will be dewatered to facilitate closure by leaving CCR in place. The final cover will be sloped to promote drainage towards conveyance channels, which will direct stormwater runoff to a drainage point at the southwest corner of the impoundment and through the existing NPDES permitted outfall. Closure operations will involve:

- 1) Dewatering the impoundment;
- 2) Removal of upper dam embankment fill for use as cover fill;
- 3) Regrading and placement of fill to create acceptable grades for closure; and
- 4) Installation of the final cover system.

In accordance with §257.102(b)(3), this Closure Plan will be amended as needed to provide additional details after the final engineering design is completed. This Closure Plan reflects the information available to date.

Regulatory Citation: 40 CFR §257.102 (b)(1);

- *(ii) If closure of the CCR unit will be accomplished through removal of CCR from the CCR unit, a description of the procedures to remove the CCR and decontaminate the CCR unit in accordance with paragraph (c) of this section.*

Not applicable, CCR material will be left in place.

Regulatory Citation: 40 CFR §257.102 (b)(1);

- *(iii) If closure of the CCR Unit will be accomplished by leaving CCR in place, a description of the final cover system and methods and procedures used to install the final cover.*

The final cover system will be installed in direct contact with graded CCR material to achieve final subgrade elevations and will include (from bottom to top):

- 1) 18-inches of compacted earthen material with a permeability of less than or equal to the permeability of the natural subsoils present at the site or no greater than 1×10^{-5} cm/sec, whichever is less;
- 2) 6-inches of soil capable of sustaining native plant growth (erosion layer); and
- 3) Planted with native grasses.

CCR material will be placed and regraded as fill to bring the grades to the design slopes. Earthen material will be placed, graded, and compacted to meet the thickness as discussed above for the cover system. Earthen material will then be placed on top to create a 6-inch soil layer that will sustain native plant growth. The final cover surface will be seeded and vegetated. The final cover slope will have a minimum slope of 2% and will be graded to convey stormwater runoff to drainage channels to discharge through an NPDES permitted outfall.

2.1.2 Inventory and Area Estimates

Regulatory Citation: 40 CFR §257.102 (b);

- *(iv) An estimate of the maximum inventory of CCR ever on-site over the active life of the CCR unit.*

An estimate of the maximum inventory of CCR ever on-site over the active life is 5,930,000 cubic yards.

Regulatory Citation: 40 CFR §257.102 (b);

- *(v) An estimate of the largest area of the CCR unit ever requiring a final cover as required by paragraph (d) of this section at any time during the CCR unit's active life.*

An estimate of the largest area of the CCR unit ever requiring a final cover is 159 acres.

2.1.3 Closure Schedule

Regulatory Citation: 40 CFR §257.102 (b)(1);

- *(vi) Schedule for completing all activities necessary to satisfy the closure criteria in this section, including an estimate of the year in which all closure activities for the CCR unit will be completed.*

The milestones and the associated timeframes are initial estimates. Some of the activities associated with the milestones will overlap. Amendments to the milestones and timeframes will be made as more information becomes available.

Table 2-1 – Closure Schedule	
Milestone	Schedule
Initial Written Closure Plan	October 17, 2016
Notification of Intent to Close Placed in Operating Record	No later than the date closure of the CCR unit is initiated. Closure to commence in accordance with the applicable timeframes in 40 CFR 257.102(e).

Table 2-1 – Closure Schedule

Milestone	Schedule
Agency coordination and permit acquisition <ul style="list-style-type: none"> – Coordinating with state agencies for compliance. – Acquiring state permits. 	Years 1 – 5 (estimated) Year 1 (estimated)
Mobilization	Year 1 (estimated)
Closure Construction Activities CCR <ul style="list-style-type: none"> – Complete dewatering, as necessary – Complete Stabilization of CCR – Grade CCR material in pond – Installation of Final Cover 	Year 2 (estimated) Year 2 (estimated) Years 2 - 5 (estimated) Years 2 - 5 (estimated)
Estimate of Year in which all closure activities will be completed.	Year 5

2.2 Achievement of Performance Standards

Regulatory Citation: 40 CFR §257.102 (d); Closure performance standard when leaving CCR in place.

- (1) *The owner or operator of a CCR unit must ensure that, at a minimum, the CCR unit is closed in a manner that will*
 - (i) *Control, minimize or eliminate, to the maximum extent feasible, post-closure infiltration of liquids into the waste and releases of CCR, leachate, or combined run-off to the ground or surface waters or to the atmosphere*

The final cover will include a minimum of 18-inches of compacted earthen material with a permeability equal to or less than the permeability of the natural subsoils or no greater than 1×10^{-5} cm/sec, whichever is less. The final cover system will be graded with a minimum 2% slope.

Regulatory Citation: 40 CFR §257.102 (d)(1);

- (ii) *Preclude the probability of future impoundment of water, sediment or slurry.*

The final cover will be installed with a minimum 2% slope. Drainage channels will be installed with a minimum 0.5% slope. Due to the size of this impoundment, it is anticipated benching will be required and described in an amended closure plan after final engineering is completed.

Regulatory Citation: 40 CFR §257.102 (d)(1);

- *(iii) Include measures that provide for major slope stability to prevent the sloughing or movement of the final cover system during the closure and post-closure care period.*

The final cover will have a minimum 2% slope and drainage channels will have minimum 0.5% slope. Drainage channels will be lined with turf reinforced mats, where required, to reduce the potential for erosion. Preliminary geotechnical analysis determined the final slope of the berms and cover will meet the stability requirements to prevent sloughing or movement of the final cover system.

Regulatory Citation: 40 CFR §257.102 (d)(1);

- *(iv) Minimize the need for further maintenance of the CCR Unit.*

The final cover will be seeded and vegetated to minimize erosion and maintenance.

Regulatory Citation: 40 CFR §257.102 (d)(1);

- *(v) Be completed in the shortest amount of time consistent with recognized and generally accepted good engineering practices.*

Closure is estimated to be completed no later than five years after commencing closure activities.

2.3 Stabilization of Waste

Regulatory Citation: 40 CFR §257.102 (d);

- *(2) Drainage and stabilization of CCR surface impoundments.*
 - *(i) Free liquids must be eliminated by removing liquid wastes or solidifying the remaining wastes and waste residue.*

The unit will be dewatered sufficiently, as necessary, to remove the free liquids in order to provide a stable base for the construction of the final cover system.

Regulatory Citation: 40 CFR §257.102 (d)(2);

- *(ii) Remaining wastes must be stabilized sufficiently to support the final cover system.*

Dewatering, as necessary, and regrading of existing in-place CCR will sufficiently stabilize the waste such that the final cover will be supported.

2.4 Final Cover System

Regulatory Citation: 40 CFR §257.102 (d);

- (3) *Final cover system. A final cover system must be installed to minimize infiltration and erosion, and at a minimum, meets the requirements of (d)(3)(i)(A) through (D).*

The final cover will consist of a minimum of 18-inches earthen material layer with permeability equal to or less than the permeability of the natural subsoils or no greater than 1×10^{-5} cm/sec, whichever is less. Erosion will be minimized with a soil layer of no less than 6-inches of earthen material capable of sustaining native plant growth. The final cover surface will be seeded and vegetated.

Regulatory Citation: 40 CFR §257.102 (d)(3);

- (i) *The design of the final cover system must be included in the Initial Written Closure Plan.*

The design of the final cover system is included in Section 2.1.1. When the design of the final cover system is completed beyond the preliminary stage, the Closure Plan will be amended if the final design would substantially affect the Closure Plan. The current design of the final cover system meets the requirements of §257.73 (d)(3)(i)(A)–(D) as described below.

Regulatory Citation: 40 CFR §257.102 (d)(3)(i);

- (A) *The permeability of the final cover system must be less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 1×10^{-5} cm/sec, whichever is less.*
- (B) *The infiltration of liquids through the closed CCR unit must be minimized by the use of an infiltration layer that contains a minimum of 18 inches of earthen material.*

The final cover will include a minimum of 18-inches of compacted earthen material with a permeability equal to or less than the permeability of the natural subsoils or no greater than 1×10^{-5} cm/sec, whichever is less. This will be verified during construction per the construction quality assurance plan.

Regulatory Citation: 40 CFR §257.102 (d)(3)(i);

- (C) *The erosion of the final cover system must be minimized by the use of an erosion layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant growth.*

The final cover will include a minimum of 6-inches of an earthen erosion layer that is capable of sustaining native plant growth. The final cover will be seeded and vegetated.

Regulatory Citation: 40 CFR §257.102 (d)(3)(i);

- (D) *The disruption of the integrity of the final cover system must be minimized through a design that accommodates settling and subsidence.*

The final cover will be installed with a minimum 2% slope and will incorporate calculated settlement as well as differential settling and subsidence.

2.5 Amendment to Initial or any Subsequent Written Closure Plan

This initial written closure plan will be amended as required by §257.102 (b)(3).

3 Certification

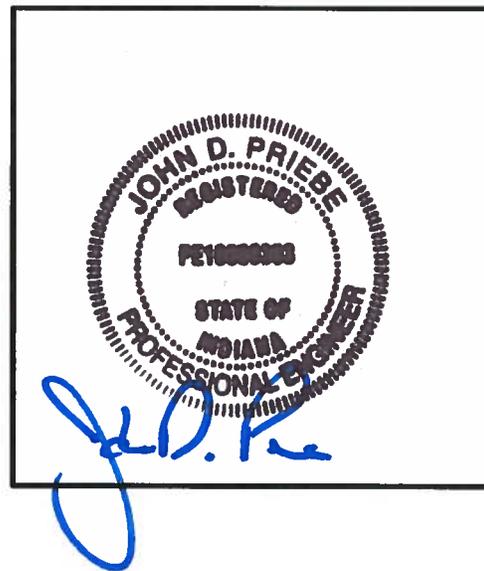
This Certification Statement documents that the Ash Pond at the A.B. Brown Generating Station meets the Initial Written Closure Plan requirements specified in 40 CFR §257.102 (b) and the closure performance standards in 40 CFR §257.102 (d). The Ash Pond is an existing CCR surface impoundment as defined by 40 CFR §257.53. The CCR Rule requires that the Initial Written Closure Plan for an existing CCR surface impoundment be prepared by October 17, 2016.

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

I, John Priebe, 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 Initial Written Closure Plan dated October 13, 2016 meets the requirements of 40 CFR § 257.102.

JOHN D. PRIEBE
Printed Name

10/13/16
Date



4 Limitations

Background information, design basis, and other data which AECOM has used in preparing 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 provisions and 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 Closure Plan 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



9400 Amberglenn 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 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:	MJC
DESIGNED BY:	MJC
CHECKED BY:	TLE
DATE CREATED:	
PLOT DATE:	4/22/2016
SCALE:	AS SHOWN
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 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: MJC

DESIGNED BY: MJC

CHECKED BY: TLE

DATE CREATED:

PLOT DATE: 4/22/2016

SCALE: AS SHOWN

ACAD VER: 2014

SHEET TITLE

SITE MAP

FIGURE 2

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 \$19 billion.

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 nearly 100,000 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 \$19 billion.

More information on AECOM and its services can be found at www.aecom.com.

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Austin, Texas 78729
1-512-454-4797