



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

January 13, 2017

CCR Annual Inspection

§257.83 (b)

for the

Ash Pond

at the

A.B. Brown Generating Station

Revision 0

January 13, 2017

Ms. Lisa Messinger
Vectren Corporation
One Vectren Square
Evansville, IN 47708**RE: CCR Annual Inspection Report for Vectren A.B. Brown Generating Station: Ash Pond CCR Unit**

Dear Ms. Lisa Messinger:

AECOM is pleased to provide this CCR Annual Inspection Report for the Ash Pond of the Vectren Coal Combustion Residuals (CCR) units at the A.B. Brown Generating Station located near Mount Vernon, Indiana.

The CCR Annual Inspection Report has been prepared in accordance with the requirements specified in the USEPA CCR Rule under 40 Code of Federal Regulations §257.83 (b) by a professional engineer licensed in the state of Indiana. These regulations require that the specified documentation and assessments for an existing CCR surface impoundment be prepared based on the timeframe of the initial annual inspection. The previous annual inspection was submitted on January 14, 2016, therefore, this annual inspection should be placed in the plant operating record within one year of that date.

AECOM looks forward to providing continued support to Vectren and working together on this important program. Please do not hesitate to call Terry Entwistle at 314-503-0128 (cell) or Jeremy Thomas at 920-236-6724 (work), if you have any questions or comments on this CCR Annual Inspection Report.

Sincerely,

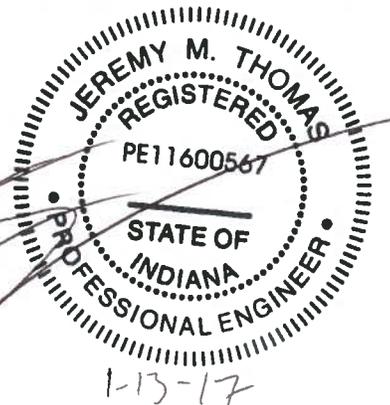
AECOMTeresa L. Entwistle, PE, CFM
Senior Project Manager
Terry.entwistle@aecom.comJeremy Thomas, PE
Project Manager
jeremy.thomas@aecom.comcc: Julie Harkin
Mark Rokoff

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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, 2017.

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, 2017.

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 feet¹ and has a

¹ 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 initial CCR Rule annual inspection performed by ATC Group Services LLC on October 7, 2015.

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 a registered professional engineer, registered in the State of Indiana on December 8, 2016. 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 December 8, 2016. A video inspection of the hydraulic structure was performed by others on December 7, 2016. No signs of structural deficiencies were identified.

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 changed since the previous annual inspection. 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. An earthen buttress was constructed against the outboard slope of the lower 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.

- *(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 2.2 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 elevation of the base of the impoundment (obtained from the original bathymetric survey) from the water surface elevation.

Table 2-1 – Depth and Elevation of Impounded Water

	Minimum		Maximum		Present	
	Depth (ft)	Elev (ft)	Depth (ft)	Elev (ft)	Depth (ft)	Elev (ft)
Impounded Water	33.5	439.5	37.7	443.7	36.9	442.9

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 441.0 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 was reduced due to the construction of the breach and is now 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 755,000 CY and 5,695,000 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 December 8, 2016 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 13, 2017.

- *(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

Four areas of concern were noted during the initial annual inspection performed on October 7, 2015. 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: October 7, 2015)

Deficiency/Observation	Corrective Measure Used
Lower Dam – Discharge of less than 1 gallon per minute (gpm) of clear water was noted at the principal spillway outlet. Since the reservoir level was below the invert of the principal spillway at the time of observation, the source of the water was unclear.	Outlet was monitored weekly and a camera inspection was completed on December 7, 2016.
Lower Dam – Phragmites were still present along the normal pool line.	Phragmites were sprayed twice per year.
Lower Dam – The drop inlets associated with the diversion berms on the intermediate berm were free of debris but continued monitoring is necessary to remove debris as needed.	The drop inlets were removed during the construction of the stabilizing berm.
Upper Dam – The area around the principal spillway outlet was clear and easily accessible but continued maintenance of the area is needed.	The Upper Dam was decommissioned in 2016.

2.4.2 Current Inspection

Seven minor areas of concern were noted during the annual inspection performed on December 8, 2016. 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: December 8, 2016)

Deficiency/Observation	Proposed Corrective Measure
Phragmites were present at the toe of the interior slope below the rip-rap cover.	Spray as necessary to eliminate phragmite growth.
Small potholes/ruts were present at the crest.	Fill and regrade potholes/ruts as necessary.
The swale between toe of embankment and coal pile has ponding water areas.	Regrade swale to create positive drainage towards outfall to eliminate ponding water.
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.	Flush silt from outlet pipe and monitor pipe for future silt deposits.
Sloughing was observed in two areas of the recently constructed buttress. See attached plan for locations.	Regrade and reseed areas this new construction area.
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.	Reseed areas these newly planted areas.
An abandoned section of pipe passes through the top of the embankment just under the access road.	Vectren has left this section of the pipe in place for future use. No action necessary as the pipe is above the peak water surface elevation of the inflow design storm. Monitor for potential erosion around pipe.

3 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 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
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AECOM PROJECT NO:	60442676
DRAWN BY:	MJC
DESIGNED BY:	MJC
CHECKED BY:	TLE
DATE CREATED:	01/10/2017
PLOT DATE:	1/12/2017
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 ANNUAL
 INSPECTION
 ASH POND**

**PRELIMINARY
 NOT FOR
 CONSTRUCTION**

ISSUED FOR BIDDING _____ DATE BY _____

ISSUED FOR CONSTRUCTION _____ DATE BY _____

REVISIONS

NO.	DESCRIPTION	DATE
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AECOM PROJECT NO: 60442676

DRAWN BY: MJC

DESIGNED BY: MJC

CHECKED BY: TLE

DATE CREATED: 01/10/2017

PLOT DATE: 1/12/2017

SCALE: 1" = 300'

ACAD VER: 2014

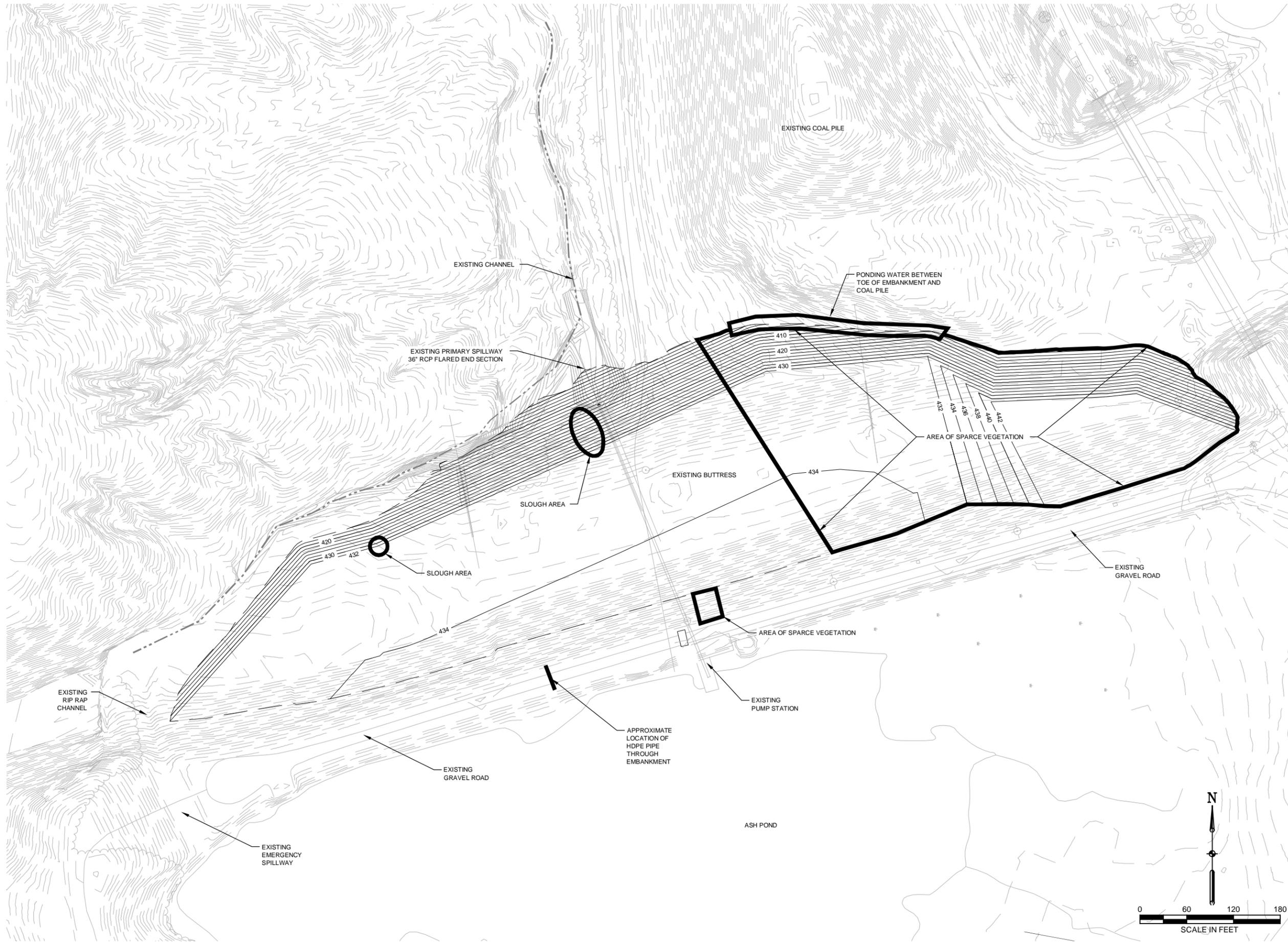
SHEET TITLE

SITE MAP

FIGURE 2

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AECOM DRAWING PATH: P:\Projects\Environmental\60442676_VectrenCCRY.0_CAD_GIS\7.04_Plan_Sheets\BROWN-ANNUAL INSPECTION PLAN.dwg



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**

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REVISIONS		
NO.	DESCRIPTION	DATE
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AECOM PROJECT NO:	60442676
DRAWN BY:	MJC
DESIGNED BY:	MJC
CHECKED BY:	TLE
DATE CREATED:	01/05/2017
PLOT DATE:	1/12/2017
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.