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ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
ASH POND
A.B. BROWN GENERATING STATION
POSEY COUNTY, INDIANA

by
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Greenville, South Carolina

for
Southern Indiana Gas and Electric Company
Evansville, Indiana

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1. 40 CFR § 257.90 Applicability

1.1 40 CFR § 257.90(a)

Except as provided for in § 257.100 for inactive CCR surface impoundments, all CCR landfills, CCR surface impoundments, and lateral expansions of CCR units are subject to the groundwater monitoring and corrective action requirements under § 257.90 through § 257.98.

The Ash Pond at A.B. Brown Generating Station (ABB) is subject to the groundwater monitoring and corrective action requirements described under Code of Federal Regulations Title 40 (40 CFR) § 257.90 through § 257.98 (Rule). This document addresses the requirement for the Owner/Operator to prepare an Annual Groundwater Monitoring and Corrective Action Report per § 257.90(e).

1.2 40 CFR § 257.90(e) - SUMMARY

Annual groundwater monitoring and corrective action report. For existing CCR landfills and existing CCR surface impoundments, no later than January 31, 2018, and annually thereafter, the owner or operator must prepare an annual groundwater monitoring and corrective action report. For new CCR landfills, new CCR surface impoundments, and all lateral expansions of CCR units, the owner or operator must prepare the initial annual groundwater monitoring and corrective action report no later than January 31 of the year following the calendar year a groundwater monitoring system has been established for such CCR unit as required by this subpart, and annually thereafter. For the preceding calendar year, the annual report must document the status of the groundwater monitoring and corrective action program for the CCR unit, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year. For purposes of this section, the owner or operator has prepared the annual report when the report is placed in the facility's operating record as required by § 257.105(h)(1).

This Annual Groundwater Monitoring and Corrective Action Report documents the activities completed in 2019 for the Ash Pond as required by the Rule. Groundwater sampling and analysis was conducted per the requirements described in § 257.93, and the status of the groundwater monitoring program described in § 257.95 is provided in this report.

1.2.1 Status of the Groundwater Monitoring Program

As provided in the notification on 15 January 2018 statistically significant increases (SSI) of Appendix III constituents were identified downgradient of the Ash Pond. An evaluation of alternate sources was conducted; however, a successful alternate source demonstration (ASD) was not achieved at that time. As a result, an Assessment Monitoring program was initiated as required by § 257.94(e)(2). The notification was placed in the facility's operating record as required by 257.105(h)(5). Annual and semi-annual groundwater samples were collected as outlined in § 257.95(b) and 257.95(d)(1) and groundwater protection standards were established as required by § 257.95(d)(2). Statistical analysis was completed in January 2019 as described in § 257.93(h)(2) and statistically significant levels (SSL) of Appendix IV constituents (lithium and molybdenum) were identified downgradient of the Ash Pond. An alternate source evaluation was conducted and was not successful in identifying a source other than the CCR unit. As a result, nature and extent and assessment of corrective measures was initiated as defined in § 257.96. A 60-day extension to complete the assessment of corrective measures (Appendix A) was

required and certified by a professional engineer as required by 257.96(a) resulting in completion of the Assessment of Corrective Measures in September 2019.

1.2.2 Key Actions Completed

The following key actions were completed in 2019:

- Completed a statistical analysis of assessment monitoring results to evaluate potential SSLs;
- Prepared 2018 Annual Report including:
  - The Annual Report was placed in the facility's operating record pursuant to § 257.105(h)(1);
  - Pursuant to § 257.106(h)(1), the notification was sent to the relevant State Director and/or Tribal authority within 30 days of the Annual Report being placed in the facility's operating record [§ 257.106(d)];
  - Pursuant to § 257.107(h)(1), the Annual Report was posted to the CCR Website within 30 days of the Annual Report being placed in the facility's operating record [§ 257.107(d) and 257.107(h)(1)];
- Evaluated the nature and extent of Appendix IV SSLs as required by § 257.95(g)(1);
- Collected and analyzed two rounds of groundwater samples in accordance with § 257.95
- Initiated and completed an assessment of corrective measures in accordance with § 257.96;
  - The 90-day deadline to complete the assessment of corrective measures was extended an additional 60-days in accordance with § 257.96(a). (Appendix A)
  - The assessment of corrective measures was placed in the facility's operating record in accordance with § 257.96(d).

1.2.3 Problems Encountered

No problems such as damaged wells, issues with sample collection or lack of sampling, and problems with analytical analysis were encountered at the ABB Ash Pond in 2019.

1.2.4 Actions to Resolve Problems

Actions to resolve problems were not required.

1.2.5 Project Key Activities for Upcoming Year

Key activities to be completed in 2020 include the following:

- Further refine the characterization of the nature and extent of lithium and molybdenum in groundwater downgradient of the Ash Pond.
- Continue semiannual groundwater monitoring in accordance with § 257.95.
- Complete statistical analysis of the semiannual groundwater sampling results as required by § 257.93(h)(2).
- Hold a public meeting with interested and affected parties in accordance with § 257.96(e) to discuss the results of the corrective measures assessment at least 30 days prior to the selection of remedy.
- As soon as feasible following the public meeting select a remedy that, meets the standards outlined in § 257.97(b).

  - As part of the selected remedy SIGECO will develop a schedule for implementing and completing remedial activities as defined in § 257.97(d).
- Prepare semiannual and annual progress reports, , describing the progress in selecting and designing the remedy as outlined in § 257.97(a).

1.3 40 CFR § 257.90(e) - INFORMATION

At a minimum, the annual groundwater monitoring and corrective action report must contain the following information, to the extent available:

1.3.1 40 CFR § 257.90(e)(1)

A map, aerial image, or diagram showing the CCR unit and all background (or upgradient) and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit;

As required by § 257.90(e)(1), a map showing the locations of the Ash Pond and associated upgradient, nature and extent and downgradient wells is presented as Figure 1.

1.3.2 40 CFR § 257.90(e)(2)

Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken;

To characterize the horizontal and vertical nature and extent of SSLs at the Ash Pond, five new monitoring wells were installed in the uppermost aquifer downgradient of the Ash Pond. The new monitoring wells, identified as CCR-AP-2I, CCR-AP-3I, CCR-AP-8, CCR-AP-9 and CCR-AP-10 as shown on Figure 1, were completed in the intermediate zone within the uppermost aquifer. Location and construction details are provided in Table I.

1.3.3 40 CFR § 257.90(e)(3)

In addition to all the monitoring data obtained under § 257.90 through § 257.98, a summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs;

In accordance with § 257.95(b) and § 257.95(d)(1), two independent samples from each background and downgradient monitoring well were collected and analyzed. A summary table including the sample names, dates of sample collection, reason for sample collection (detection or assessment), and monitoring data obtained for the groundwater monitoring program for the Ash Pond is presented in Table II of this report.

1.3.4 40 CFR § 257.90(e)(4)

A narrative discussion of any transition between monitoring programs (e.g., the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels); and

As required by § 257.95(d) through § 257.95(g) a statistical analysis of the Appendix IV constituents was completed by 15 January 2019. This statistical analysis determined that statistically significant levels of lithium and molybdenum were present downgradient of the Ash Pond. An evaluation of alternate

sources was initiated as required by § 257.94(e)(2). The Assessment Monitoring program was established to meet the requirements of 40 CFR § 257.95. Nature and extent and assessment of corrective measures was initiated as required by § 257.95 and § 257.96. Semiannual sampling will continue in 2020.

1.3.5 40 CFR § 257.90(e)(5)

Other information required to be included in the annual report as specified in § 257.90 through § 257.98.

Other information including development of groundwater protection standards, recording groundwater monitoring results in the operating record, and an evaluation of alternate sources is discussed in preceding sections.

TABLES

TABLE I

GROUNDWATER MONITORING WELL LOCATION AND CONSTRUCTION DETAILS

A.B. BROWN GENERATING STATION - ASH POND

MOUNT VERNON, INDIANA

Well	CCR Unit	Date Installed	Easting	Northing	Top of Pad Elevation (ft msl)	Top of Riser Elevation (ft msl)	Surface Grout (ft bgs)	Bentonite (ft bgs)	Sand Pack (ft bgs)	Screen Zone (ft bgs)	Screen Length (ft)	Well Radius (in)	Status
CCR-AP-1R	Ash Pond	July 2016	2773560.71	968260.82	464.70	467.57	0.0 - 23.0	23.0 - 25.0	25.0 - 37.0	27.00 - 37.00	10	2	Active
CCR-AP-2R	Ash Pond	July 2016	2771922.52	969079.16	465.40	468.13	0.0 - 39.0	39.0 - 41.0	41.0 - 53.3	43.30 - 53.30	10	2	Active
CCR-AP-2I	Ash Pond	January 2019	**319167.75	**148852.17	465.82	468.88	0.0 - 77.0	77.0 - 79.0	79.0 - 93.3	83.00 - 93.00	10	2	Available
CCR-AP-3R	Ash Pond	July 2016	2771404.27	966865.12	450.10	449.13	0.0 - 33.0	33.0 - 35.0	35.0 - 47.0	37.00 - 47.00	10	2	Active
CCR-AP-3I	Ash Pond	January 2019	**318653.79	**146643.51	450.35	450.35	0.0 - 63.5	63.5 - 67.5	67.5 - 77.8	67.50 - 77.50	10	2	Available
CCR-AP-4R	Ash Pond	July 2016	2772827.01	966741.47	472.80	475.38	0.0 - 34.0	34.0 - 36.0	36.0 - 48.0	38.00 - 48.00	10	2	Active
CCR-AP-5	Ash Pond	March 2016	2771019.70	968166.03	451.00	453.77	0.0 - 31.0	31.0 - 33.0	33.0 - 45.0	35.00 - 45.00	10	2	Active
CCR-AP-6	Ash Pond	March 2016	2771626.75	969932.76	458.90	461.57	0.0 - 25.0	25.0 - 27.0	27.0 - 39.0	29.00 - 39.00	10	2	Active
CCR-AP-7R	Ash Pond	July 2016	2773501.63	970758.70	486.00	488.57	0.0 - 39.5	39.5 - 41.5	41.5 - 53.5	43.50 - 53.50	10	2	Active
CCR-AP-8	Ash Pond	January 2019	**317746.04	**149793.38	413.97	417.17	0.0 - 2.0	2.0 - 4.2	4.2 - 16.5	6.20 - 16.20	10	2	Available
CCR-AP-9	Ash Pond	January 2019	**316940.58	**147282.61	392.51	392.51	0.0 - 19.5	19.5 - 22.5	22.5 - 35.5	25.20 - 35.20	10	2	Available
CCR-AP-10	Ash Pond	January 2019	**319549.96	**146467.58	471.46	474.34	0.0 - 29.2	29.2 - 31.2	31.2 - 43.5	33.20 - 43.20	10	2	Available
CCR-BK-1R	Background	March 2016	2770919.08	974083.40	480.10	483.39	0.0 - 50.0	50.0 - 52.0	52.0 - 64.0	54.00 - 64.00	10	2	Active
CCR-BK-2	Background	March 2016	2769728.14	972854.33	427.50	430.60	0.0 - 11.5	11.5 - 13.5	13.5 - 25.5	15.50 - 25.50	10	2	Active
APPW-1I	Ash Pond	November 2018	-	-	-	-	+	12.0 - 14.0	14.0 - 20.0	15.00 - 20.00	5	2	Available
APPW-1D	Ash Pond	November 2018	-	-	-	-	+	24.0 - 28.0	28.0 - 29.0	29.00 - 34.00	5	2	Available
APPW-2S	Ash Pond	November 2018	-	-	-	-	+	10.0 - 12.0	13.0 - 19.0	14.00 - 19.00	5	2	Available
APPW-2I	Ash Pond	November 2018	-	-	-	-	+	26.0 - 28.0	28.0 - 34.0	29.00 - 34.00	5	2	Available
APPW-2D	Ash Pond	November 2018	-	-	-	-	+	34.0 - 38.0	38.0 - 44.0	39.00 - 44.00	5	2	Available
APPW-3	Ash Pond	November 2018	-	-	-	-	+	16.0 - 18.0	18.0 - 29.0	19.00 - 29.00	10	2	Available
APPW-4S	Ash Pond	November 2018	-	-	-	-	+	12.0 - 14.0	14.0 - 20.0	15.00 - 20.00	5	2	Available
APPW-4I	Ash Pond	November 2018	-	-	-	-	+	34.0 - 36.0	36.0 - 42.0	37.00 - 42.00	5	2	Available
APPW-4D	Ash Pond	November 2018	-	-	-	-	+	42.0 - 47.0	47.0 - 54.0	49.00 - 54.00	5	2	Available
APPW-5I	Ash Pond	November 2018	-	-	-	-	+	10.0 - 12.0	12.0 - 18.0	13.00 - 18.00	5	2	Available
APPW-5D	Ash Pond	November 2018	-	-	-	-	+	17.0 - 23.0	23.0 - 29.0	24.00 - 29.00	5	2	Available

Notes:

bgs = below ground surface

- = not been surveyed

+ = Natural collaspe

ft = feet

in = inches

msl = mean sea level

Datum of Elevations in NAVD 88

**Elevation of wells is based on IN State Plane (US Foot) West NAD27

TABLE II
SUMMARY OF GROUNDWATER QUALITY DATA
ASH POND - MAY THROUGH OCTOBER 2019
A.B. BROWN GENERATION STATION
MOUNT VERNON, INDIANA

Location Group	Action Level	Background			
Location Name	Maximum	CCR-BK-1R	CCR-BK-1R	CCR-BK-2	CCR-BK-2
Sample Name	Contaminant	CCR-BK-1R-20190521	CCR-BK-1R-20191014	CCR-BK-2-20190521	CCR-BK-2-20191014
Sample Date	Level/ Regional Screening	05/21/2019	10/14/2019	05/21/2019	10/14/2019
Lab Sample ID	Levels	180-90467-7	180-97392-1	180-90467-8	180-97392-2
Detection Monitoring - EPA Appendix III Constituents (mg/L)					
Boron, Total	NA	0.08 U	**0.056 J**	**0.58**	**0.051 J**
Calcium, Total	NA	**37**	**34**	**71**	**35**
Chloride	NA	**2.3**	**2.4**	**4.6**	**17**
Fluoride	4	0.23 U	**0.2**	0.12 U	**0.07 J**
Sulfate	NA	**23**	**22**	**60**	**20**
Total Dissolved Solids (TDS)	NA	**230**	**210**	**440**	**230**
pH (lab) (SU)	NA	**7.4 J**	**7.2 HF**	**7.5 J**	**7 HF**
Assessment Monitoring - EPA Appendix IV Constituents (mg/L)					
Antimony, Total	0.006	0.002 U	0.002 U	0.002 U	0.002 U
Arsenic, Total	0.01	**0.00034 J**	**0.00036 J**	**0.00041 J**	0.001 U
Barium, Total	2	**0.027 J**	**0.036**	**0.045 J-**	**0.032**
Beryllium, Total	0.004	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium, Total	0.005	0.001 U	0.001 U	0.001 U	0.001 U
Chromium, Total	0.1	0.002 U	0.002 U	**0.0087**	0.002 U
Cobalt, Total	0.006	**0.00012 J**	**0.00017 J**	**0.0005**	**0.00011 J**
Fluoride	4	0.23 U	**0.2**	0.12 U	**0.07 J**
Lead, Total	0.015	**0.00016 J**	**0.00023 J**	0.001 U	0.001 U
Lithium, Total	0.04	0.0065 U	0.005 U	0.0095 U	0.005 U
Mercury, Total	0.002	0.0002 U	-	0.0002 U	-
Molybdenum, Total	0.1	**0.00063 J**	**0.00075 J**	**0.0025 J**	0.005 U
Selenium, Total	0.05	0.005 U	0.005 U	0.005 U	0.005 U
Thallium, Total	0.002	0.001 U	0.001 U	0.001 U	0.001 U
Radiological (pCi/L)					
Radium-226	NA	**0.336 J ± 0.108**	0.0729 U ± 0.182	-0.0109 U ± 0.184	-0.0644 U ± 0.0992
Radium-228	NA	-0.0733 UJ ± 0.235	0.147 U ± 0.233	0.0733 U ± 0.246	0.323 U ± 0.292
Radium-226 & 228	5	0.336 UJ ± 0.259	0.220 U ± 0.296	0.0733 U ± 0.307	0.259 U ± 0.308
Field Parameters					
Temperature (Deg C)	NA	**15.78**	**15.72**	**14.47**	**16.04**
Dissolved Oxygen, Field (mg/L)	NA	**5.82**	**5.98**	**0.48**	**0.51**
Conductivity, Field (mS/cm)	NA	**0.34186**	**0.3542**	**0.72035**	**0.38427**
ORP, Field (mv)	NA	**43.3**	**104.9**	**47.9**	**72.1**
Turbidity, Field (NTU)	NA	**0.97**	**9.8**	**12.88**	**11.89**
pH, Field (SU)	NA	**7**	**6.34**	**7.2**	**6.54**

ABBREVIATIONS AND NOTES:

CCR: Coal Combustion Residuals.
mg/L: milligram per liter.
pCi/L: picoCurie per liter.
SU: standard units.
USEPA: United States Environmental Protection Agency.
Results in **bold** are detected.

- USEPA. 2016. Final Rule: Disposal of Coal Combustion Residuals from Electric Utilities. July 26. 40 CFR Part 257. https://www.epa.gov/coalash/coal-ash-rule

TABLE II
SUMMARY OF GROUNDWATER QUALITY DATA
ASH POND - MAY THROUGH OCTOBER 2019
A.B. BROWN GENERATION STATION
MOUNT VERNON, INDIANA

Location Group	Action Level	Downgradient									
Location Name	Maximum	CCR-AP-1R	CCR-AP-1R	CCR-AP-2I	CCR-AP-2I	CCR-AP-2R	CCR-AP-2R	CCR-AP-3I	CCR-AP-3I	CCR-AP-3R	CCR-AP-3R
Sample Name	Contaminant	CCR-AP-1R-20190524	CCR-AP-1R-20191016	CCR-AP-2I-20190614	CCR-AP-2I-20191021	CCR-AP-2R-20190524	CCR-AP-2R-20191017	CCR-AP-3I-20190614	CCR-AP-3I-20191018	CCR-AP-3R-20190522	CCR-AP-3R-20191017
Sample Date	Level/ Regional Screening	05/24/2019	10/16/2019	06/14/2019 180-91430-1	10/21/2019	05/24/2019	10/17/2019	06/14/2019 180-91430-2	10/18/2019	05/22/2019	10/17/2019
Lab Sample ID	Levels	180-90606-4	180-97535-1	1906640-1	180-97725-1	180-90606-5	180-97535-2	1906640-3	180-97535-4	180-90467-9	180-97535-3
Detection Monitoring - EPA Appendix III Constituents (mg/L)											
Boron, Total	NA	**4.5**	**4.6**	**2.1**	**2.2**	**11**	**11**	**2.2**	**2.3**	**11**	**14**
Calcium, Total	NA	**68**	**61**	**19**	**13 F1**	**300**	**280**	**16**	**18**	**260**	**280**
Chloride	NA	**69**	**55**	**110**	**97**	**530**	**440**	**150**	**140**	**620**	**670**
Fluoride	4	**0.57 J+**	**0.37**	**0.83**	**1.1**	**0.47 J+**	**0.3 J**	**1.1**	**1.2**	**1.3 J+**	**0.79**
Sulfate	NA	**530**	**410**	**23**	**7.6**	**2600**	**2500**	**16**	**14**	**3100**	**3700**
Total Dissolved Solids (TDS)	NA	**1500**	**1300**	**710**	**710**	**4100**	**4400**	**700**	**720**	**5800**	**5100**
pH (lab) (SU)	NA	**7.5 J**	**7.3 HF**	**7.6 J**	**8 HF**	**7.3 J**	**7.2 HF**	**8.1 J**	**8.1 HF**	**7.5 J**	**7.5 HF**
Assessment Monitoring - EPA Appendix IV Constituents (mg/L)											
Antimony, Total	0.006	0.002 U	0.002 U	**0.00053 J**	**0.00052 J**	0.002 U	0.002 U	**0.00045 J**	0.002 U	0.02 U	0.002 U
Arsenic, Total	0.01	**0.00047 J**	**0.00038 J**	**0.0022**	**0.0019**	**0.00053 J**	**0.00058 J**	**0.0018**	**0.0016**	0.01 U	**0.00035 J**
Barium, Total	2	**0.025 J+**	**0.027 B**	**0.11**	**0.1**	**0.042 J+**	**0.023 B**	**0.17**	**0.17 B**	**0.16 J-**	**0.016 B**
Beryllium, Total	0.004	0.001 U	0.001 U	0.001 U	**0.00027 J^**	0.001 U	0.001 U	**0.00026 J**	0.001 U	0.001 U	0.001 U
Cadmium, Total	0.005	0.001 U	0.001 U	0.001 U	**0.00023 J**	**0.00059 J**	**0.00039 J**	0.001 U	0.001 U	0.01 U	**0.00025 J**
Chromium, Total	0.1	0.002 U	0.002 U	0.004 U	**0.0027**	0.002 U	0.002 U	0.0046 U	0.002 U	0.02 U	0.002 U
Cobalt, Total	0.006	**0.00021 J**	**0.0002 J**	0.0005 U	**0.0004 J**	**0.0026**	**0.0026**	**0.0013**	**0.00059**	**0.0017 J**	**0.0019**
Fluoride	4	**0.57 J+**	**0.37**	**0.83**	**1.1**	**0.47 J+**	**0.3 J**	**1.1**	**1.2**	**1.3 J+**	**0.79**
Lead, Total	0.015	0.001 U	0.001 U	0.001 U	**0.00047 J**	**0.00016 J**	**0.00015 J**	0.0011 U	**0.00072 J**	0.01 U	**0.00013 J**
Lithium, Total	0.04	**0.0036 J**	0.025 U	**0.024**	**0.023**	**0.033**	**0.05**	**0.025**	**0.026**	**0.062**	**0.1**
Mercury, Total	0.002	0.0002 U	-	0.0002 U	-	0.0002 U	-	0.0002 U	-	0.0002 U	-
Molybdenum, Total	0.1	**0.0042 J**	**0.0047 J**	**0.0092**	**0.0038 J**	**1.9**	**1.7**	**0.0061**	**0.0043 J**	**0.89**	**0.9**
Selenium, Total	0.05	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.05 U	**0.0074**
Thallium, Total	0.002	0.001 U	0.001 U	0.001 U	**0.00048 J**	0.001 U	0.001 U	**0.00013 J**	0.001 U	0.01 U	0.001 U
Radiological (pCi/L)											
Radium-226	NA	0.0879 U ± 0.0697	0.0796 U ± 0.0757	0.07 U ± 0.11	**0.349 ± 0.12**	**0.264 ± 0.102**	-0.0236 U ± 0.0528	**0.43 ± 0.25**	**0.397 ± 0.135**	**0.283 J ± 0.0999**	-0.0190 U ± 0.0631
Radium-228	NA	-0.0354 U ± 0.241	0.0814 U ± 0.239	0.53 U ± 0.37	0.237 U ± 0.249	**0.448 ± 0.291**	**0.518 ± 0.269**	0.56 U ± 0.39	0.357 U ± 0.251	0.163 UJ ± 0.283	**0.437 ± 0.253**
Radium-226 & 228	5	0.0879 U ± 0.251	0.161 U ± 0.251	0.60 U ± 0.386	**0.587 ± 0.276**	**0.713 ± 0.308**	**0.494 ± 0.274**	**0.99 J ± 0.463**	**0.753 ± 0.285**	0.447 UJ ± 0.3	**0.418 ± 0.261**
Field Parameters											
Temperature (Deg C)	NA	**16.16**	**15.44**	**19.55**	**17.3**	**18.73**	**16.89**	**18.31**	**18.55**	**18.78**	**18.29**
Dissolved Oxygen, Field (mg/L)	NA	**0.03**	**0.13**	**1.62**	**2.77**	**0.66**	**0.28**	**0.09**	**0.46**	**0.08**	**0.21**
Conductivity, Field (mS/cm)	NA	**2.0135**	**1.9694**	**1.264**	**1.2276**	**5.577**	**5.6187**	**1.2331**	**1.2989**	**7.4198**	**8.2589**
ORP, Field (mv)	NA	**-8.6**	**32.2**	**-16.2**	**99.2**	**90.9**	**111.1**	**-114.6**	**89**	**85.5**	**113.4**
Turbidity, Field (NTU)	NA	**0**	**3.77**	**17.09**	**14.99**	**2.19**	**1.83**	**141.52**	**49.94**	**0**	**0.49**
pH, Field (SU)	NA	**7.21**	**6.94**	**7.71**	**7.71**	**7.05**	**6.83**	**8.23**	**7.82**	**7.26**	**7.23**

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TABLE II
SUMMARY OF GROUNDWATER QUALITY DATA
ASH POND - MAY THROUGH OCTOBER 2019
A.B. BROWN GENERATION STATION
MOUNT VERNON, INDIANA

Location Group	Action Level	Downgradient									
Location Name	Maximum	CCR-AP-4R	CCR-AP-4R	CCR-AP-5	CCR-AP-5	CCR-AP-5	CCR-AP-6	CCR-AP-6	CCR-AP-6	CCR-AP-7R	CCR-AP-7R
Sample Name	Contaminant	CCR-AP-4R-20190522	CCR-AP-4R-20191017	CCR-AP-5-20190522	ND DUPLICATE 2-20190	CCR-AP-5-20191017	CCR-AP-6-20190521	CCR-AP-6-20191016	ND DUPLICATE 1-20191	CCR-AP-7R-20190521	CCR-AP-7R-20191016
Sample Date	Level/ Regional Screening	05/22/2019	10/17/2019	05/22/2019	05/22/2019	10/17/2019	05/21/2019	10/16/2019	10/16/2019	05/21/2019	10/16/2019
Lab Sample ID	Levels	180-90467-10	180-97535-5	180-90467-11	180-90467-17	180-97535-6	180-90467-12	180-97535-7	180-97535-10	180-90467-13	180-97535-8
Detection Monitoring - EPA Appendix III Constituents (mg/L)											
Boron, Total	NA	**0.045 J**	**0.14**	**11**	**11**	**12**	**2.9**	**3.2**	**3**	**5.6**	**3.6**
Calcium, Total	NA	**190**	**180**	**410**	**420**	**390**	**320**	**300**	**310**	**410**	**370**
Chloride	NA	**40**	**41**	**410**	**390**	**380**	**230**	**220**	**210**	**500**	**250**
Fluoride	4	**0.41 J+**	**0.1**	**0.31 J+**	**0.31 J+**	**0.23 J**	0.17 U	**0.14 J**	**0.14 J**	0.17 U	**0.16 J**
Sulfate	NA	**99**	**94**	**3100**	**2900**	**2900**	**1200**	**1200**	**1200**	**2600**	**3100**
Total Dissolved Solids (TDS)	NA	**950**	**940**	**5000**	**4900**	**4800**	**2400**	**2400**	**2300**	**4200**	**4500**
pH (lab) (SU)	NA	**7.4 J**	**7.3 HF**	**7.4 J**	**7.4 J**	**7.3 HF**	**7.5 J**	**7.3 HF**	**7.2 HF**	**6.8 J**	**6.7 HF**
Assessment Monitoring - EPA Appendix IV Constituents (mg/L)											
Antimony, Total	0.006	0.002 U	0.002 U	0.02 U	0.02 U	0.002 U	0.02 U	0.002 U	0.002 U	0.02 U	0.002 U
Arsenic, Total	0.01	**0.00038 J**	0.001 U	0.01 U	0.01 U	0.001 U	0.01 U	**0.00049 J**	**0.00043 J**	0.01 U	**0.00046 J**
Barium, Total	2	**0.094 J-**	**0.1 B**	**0.018 J**	**0.02 J**	**0.019 B**	0.1 UJ	**0.014 B**	**0.015 B**	**0.029 J**	**0.028 B**
Beryllium, Total	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium, Total	0.005	0.001 U	0.001 U	0.01 U	0.01 U	0.001 U	0.01 U	0.001 U	0.001 U	0.01 U	0.001 U
Chromium, Total	0.1	**0.0035**	**0.0025**	0.02 U	0.02 U	0.002 U	0.02 U	0.002 U	0.002 U	0.02 U	0.002 U
Cobalt, Total	0.006	**0.00017 J**	**0.00024 J**	0.005 U	0.005 U	**0.00034 J**	**0.0013 J**	**0.0011**	**0.001**	0.005 U	**0.00052**
Fluoride	4	**0.41 J+**	**0.1**	**0.31 J+**	**0.31 J+**	**0.23 J**	0.17 U	**0.14 J**	**0.14 J**	0.17 U	**0.16 J**
Lead, Total	0.015	0.001 U	**0.00013 J**	0.01 U	0.01 U	0.001 U	0.01 U	0.001 U	0.001 U	0.01 U	**0.00016 J**
Lithium, Total	0.04	0.0067 U	0.005 U	0.05 U	0.05 U	0.05 U	**0.034 J+**	**0.042**	**0.04**	0.05 U	**0.034 J**
Mercury, Total	0.002	0.0002 U	-	0.0002 U	0.0002 U	-	0.0002 U	-	-	0.0002 U	-
Molybdenum, Total	0.1	**0.0014 J**	**0.0013 J**	**0.059**	**0.053**	**0.058**	**0.0067 J**	**0.0064**	**0.0061**	0.05 U	0.005 U
Selenium, Total	0.05	0.005 U	0.005 U	0.05 U	0.05 U	0.005 U	0.05 U	0.005 U	0.005 U	0.05 U	0.005 U
Thallium, Total	0.002	0.001 U	0.001 U	0.01 U	0.01 U	0.001 U	0.01 U	0.001 U	0.001 U	0.01 U	0.001 U
Radiological (pCi/L)											
Radium-226	NA	0.0797 UJ ± 0.0791	0.132 U ± 0.0937	0.0606 UJ ± 0.0578	0.153 U ± 0.196	0.0430 U ± 0.0752	0.0195 UJ ± 0.0643	0.116 U ± 0.0914	**0.129 ± 0.0881**	-0.0773 U ± 0.198	0.104 U ± 0.0828
Radium-228	NA	0.412 UJ ± 0.361	0.251 U ± 0.244	-0.0634 UJ ± 0.257	0.254 U ± 0.27	**0.468 ± 0.264**	0.237 UJ ± 0.234	-0.0619 U ± 0.234	0.166 U ± 0.233	0.307 U ± 0.26	0.0730 U ± 0.233
Radium-226 & 228	5	0.492 UJ ± 0.37	0.382 U ± 0.261	0.0606 UJ ± 0.263	0.406 U ± 0.334	**0.511 ± 0.275**	0.257 UJ ± 0.243	0.0546 U ± 0.251	0.294 U ± 0.249	0.307 U ± 0.327	0.177 U ± 0.247
Field Parameters											
Temperature (Deg C)	NA	**15.77**	**14.22**	**16.6**	**16.6**	**16.67**	**15.42**	**14.33**	**14.33**	**15.25**	**13.9**
Dissolved Oxygen, Field (mg/L)	NA	**6.71**	**5.74**	**0.13**	**0.13**	**0.25**	**2.86**	**1.08**	**1.08**	**8.7**	**6.78**
Conductivity, Field (mS/cm)	NA	**1.4896**	**1.6039**	**5.9903**	**5.9903**	**6.2118**	**2.9476**	**3.154**	**3.154**	**5.2145**	**5.6246**
ORP, Field (mv)	NA	**25.7**	**55.9**	**73.3**	**73.3**	**87.8**	**-2.9**	**56.5**	**56.5**	**66.1**	**85.3**
Turbidity, Field (NTU)	NA	**1.67**	**8.3**	**0**	**0**	**0**	**4.05**	**1.52**	**1.52**	**6.41**	**25.87**
pH, Field (SU)	NA	**7.12**	**6.73**	**7.15**	**7.15**	**7**	**7.19**	**6.86**	**6.86**	**6.54**	**6.37**

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https://www.epa.gov/coalash/coal-ash-rule

TABLE II
SUMMARY OF GROUNDWATER QUALITY DATA
ASH POND - MAY THROUGH OCTOBER 2019
A.B. BROWN GENERATION STATION
MOUNT VERNON, INDIANA

Location Group	Action Level	Downgradient						
Location Name	Maximum	CCR-AP-8	CCR-AP-8	CCR-AP-9	CCR-AP-9	CCR-AP-9	CCR-AP-10	CCR-AP-10
Sample Name	Contaminant	CCR-AP-8-20190617	CCR-AP-8-20191021	CCR-AP-9-20190617	ND DUPLICATE-20190	CCR-AP-9-20191021	CCR-AP-10-20190617	CCR-AP-10-20191018
Sample Date	Level/ Regional	06/17/2019	10/21/2019	06/17/2019	06/17/2019	10/21/2019	06/17/2019	10/18/2019
	Screening	180-91430-3		180-91430-4	180-91430-6		180-91430-5	
Lab Sample ID	Levels	1906640-4	180-97725-2	1906640-5	1906640-7	180-97725-3	1906640-6	180-97535-9
Detection Monitoring - EPA Appendix III Constituents (mg/L)								
Boron, Total	NA	0.12 U	**0.2**	**9.5**	**9**	**7.9**	**7.5**	**7.4**
Calcium, Total	NA	**140**	**190**	**470**	**490**	**440**	**230**	**220**
Chloride	NA	**41**	**52**	**870**	**820**	**720**	**250**	**220**
Fluoride	4	**0.29 J+**	**0.3**	**0.33 J+**	**0.33 J+**	**0.52 J**	**0.45 J+**	**0.24 J**
Sulfate	NA	**210**	**500**	**4400**	**4200**	**4800**	**2000**	**2000**
Total Dissolved Solids (TDS)	NA	**810**	**1200**	**6900**	**7300**	**6600**	**3400**	**3300**
pH (lab) (SU)	NA	**7.2 J**	**7.2 HF**	**6.8 J**	**6.8 J**	**6.8 HF**	**7.4 J**	**7.4 HF**
Assessment Monitoring - EPA Appendix IV Constituents (mg/L)								
Antimony, Total	0.006	0.002 U	0.002 U	0.02 U	0.02 U	0.002 U	0.002 U	0.002 U
Arsenic, Total	0.01	**0.0013**	**0.001**	**0.023**	**0.023**	**0.022**	**0.0011**	**0.00054 J**
Barium, Total	2	**0.066**	**0.1**	**0.086 J**	**0.074 J**	**0.088**	**0.019**	**0.016 B**
Beryllium, Total	0.004	0.001 U	**0.00024 J^**	0.01 U	0.01 U	0.001 U^	**0.00021 J**	0.001 U
Cadmium, Total	0.005	0.001 U	**0.00015 J**	0.01 U	0.01 U	0.001 U	0.001 U	0.001 U
Chromium, Total	0.1	0.0039 U	**0.0022**	0.02 U	0.02 U	**0.0027**	0.0038 U	0.002 U
Cobalt, Total	0.006	**0.0046**	**0.0018**	0.005 U	0.005 U	**0.00081**	**0.0016**	**0.0011**
Fluoride	4	**0.29 J+**	**0.3**	**0.33 J+**	**0.33 J+**	**0.52 J**	**0.45 J+**	**0.24 J**
Lead, Total	0.015	0.001 U	**0.00018 J**	0.01 U	0.01 U	**0.00065 J**	0.001 U	**0.00031 J**
Lithium, Total	0.04	**0.011**	**0.013**	0.05 U	0.05 U	**0.032**	**0.0059**	0.025 U
Mercury, Total	0.002	0.0002 U	-	0.0002 U	0.0002 U	-	0.0002 U	-
Molybdenum, Total	0.1	**0.001 J**	**0.001 J**	**0.021 J**	**0.021 J**	**0.014**	**0.0039 J**	**0.0028 J**
Selenium, Total	0.05	0.005 U	0.005 U	0.05 U	0.05 U	**0.0015 J**	**0.015**	**0.014**
Thallium, Total	0.002	0.001 U	**0.00029 J**	0.01 U	0.01 U	**0.00016 J**	**0.00013 J**	0.001 U
Radiological (pCi/L)								
Radium-226	NA	**0.35 ± 0.23**	0.104 U ± 0.0875	**0.58 ± 0.38**	**0.61 ± 0.38**	**0.260 ± 0.104**	0.32 U ± 0.27	0.0667 U ± 0.0737
Radium-228	NA	0.67 U ± 0.44	0.127 U ± 0.252	**0.76 ± 0.41**	0.63 U ± 0.38	**0.452 ± 0.294**	0.66 U ± 0.38	**0.490 ± 0.241**
Radium-226 & 228	5	**1.02 J ± 0.496**	0.231 U ± 0.267	**1.34 ± 0.559**	**1.24 J ± 0.537**	**0.713 ± 0.312**	**0.98 ± 0.466**	**0.556 ± 0.252**
Field Parameters								
Temperature (Deg C)	NA	**17.86**	**18.78**	**20.57**	**20.57**	**18.87**	**16.26**	**14.62**
Dissolved Oxygen, Field (mg/L)	NA	**0.35**	**0.76**	**0.01**	**0.01**	**0.15**	**0.43**	**1.79**
Conductivity, Field (mS/cm)	NA	**1.0861**	**1.5669**	**9.4045**	**9.4045**	**8.5938**	**4.6168**	**4.6003**
ORP, Field (mv)	NA	**12.4**	**-7.8**	**-165.1**	**-165.1**	**-82.2**	**11.5**	**120.8**
Turbidity, Field (NTU)	NA	**10.63**	**1.29**	**49.53**	**49.53**	**29.83**	**97.33**	**177.4**
pH, Field (SU)	NA	**7.38**	**6.85**	**7.66**	**7.66**	**7.03**	**7.85**	**7.09**

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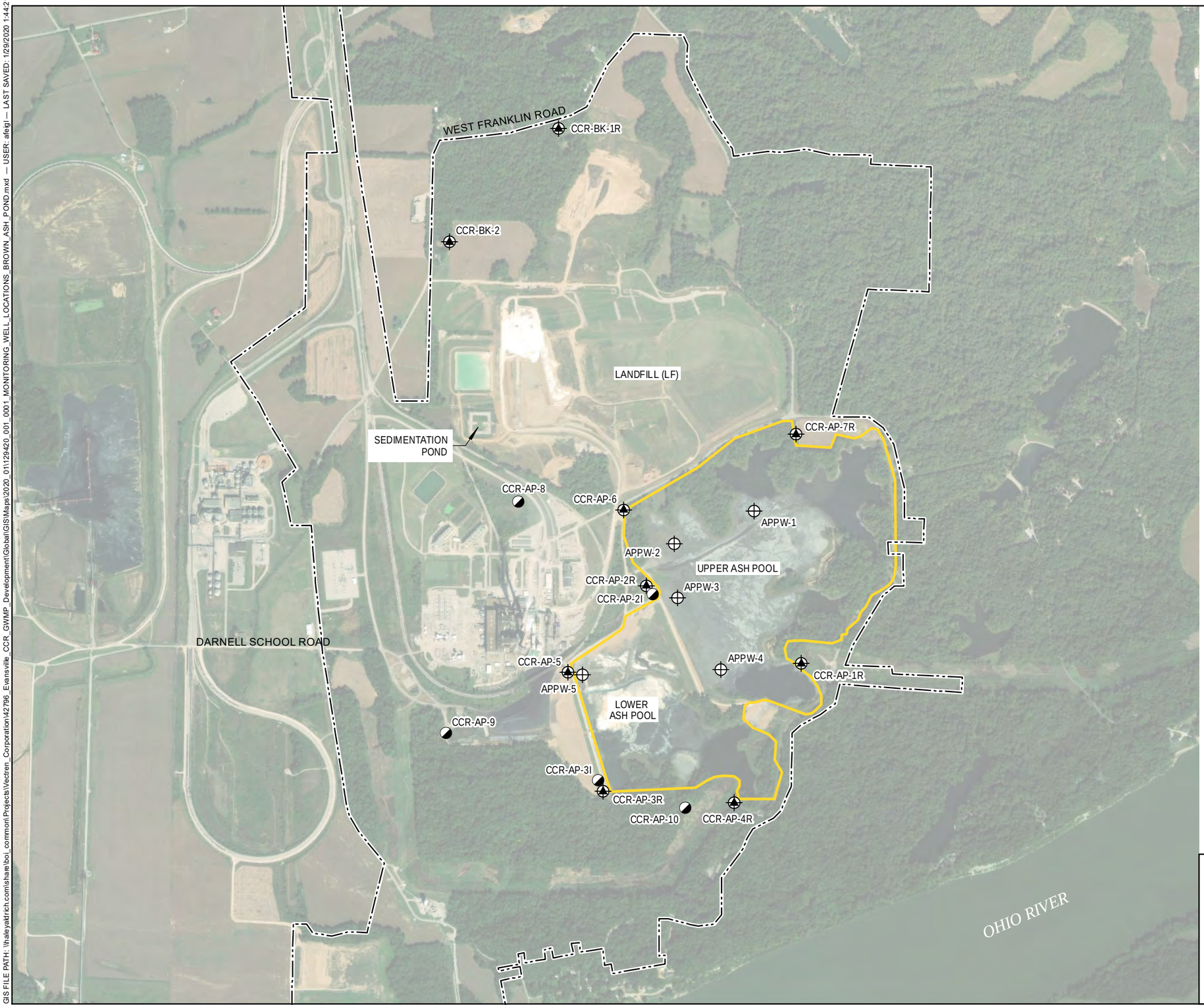
FIGURES



LEGEND

- CCR MONITORING WELL
- NATURE AND EXTENT MONITORING WELL
- CCR PIEZOMETER WELL
- ASH POND UNIT BOUNDARY

NOTES

1. AERIAL IMAGERY SOURCE: ESRI
2. LOCATIONS DERIVED FROM THREE I DESIGN DATA.

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0 1,100 2,200

SCALE IN FEET

HALEY ALDRICH

SOUTHERN INDIANA GAS AND ELECTRIC COMPANY
A.B. BROWN GENERATING STATION
MOUNT VERNON, INDIANA

GROUNDWATER MONITORING WELL LOCATIONS - ASH POND

JANAURY 2020

FIGURE 1

APPENDIX A

60 Day CMA Extension Demonstration

HALEY ALDRICH

HALEY & ALDRICH, INC.
6500 Rockside Road
Suite 200
Cleveland, OH 44131
216.739.0555

MEMORANDUM

July 2019
Project No. 129420-011

SUBJECT: **Demonstration for 60-Day Extension – Corrective Measures Assessment (CMA)**
Southern Indiana Gas and Electric Company (SIGECO)
Ash Pond
A. B. Brown Generating Station (ABB); Posey County, Indiana

Pursuant to 40 CFR §257.96(a) (CCR Rule Assessment of Corrective Measures), I certify that SIGECO has demonstrated the need for additional time beyond the period of 90 days to complete the assessment of corrective measures due to site-specific conditions and the evaluation of remedial treatment alternatives in support of an informed CMA process.

In the case of the assessment of corrective measures for the ABB Ash Pond, the site has complex hydrogeology. In addition, SIGECO is in the process of reviewing possible groundwater remedies and is having ongoing discussions with third-party experts regarding potential closure strategies, including beneficial reuse as well as implementation of critical steps in the groundwater treatment and remedy assessment process. Based on these site-specific conditions and related groundwater treatment alternatives evaluations in support of the CMA by SIGECO, the CCR Rule allows for a 60-day extension to complete the CMA process.

This certification as submitted, is to the best of my knowledge, accurate and complete.

Signed: _____

Certifying Engineer
Print Name: Steven F. Putrich, P.E.
Indiana License No.: PE11200566
Title: CCR Practice Lead, Senior Consulting Engineer
Company: Haley & Aldrich, Inc.

Professional Engineer's Seal