

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

by  
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for  
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Evansville, Indiana

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# 1. Annual Groundwater Monitoring Report Summary

## 1.1 CODE OF FEDERAL REGULATIONS TITLE 40 (40 CFR) § 257.90(e)(6) SUMMARY

*A section at the beginning of the annual report that provides an overview of the current status of groundwater monitoring and corrective action programs for the CCR unit. At a minimum, the summary must specify all of the following:*

### 1.1.1 40 CFR § 257.90(e)(6)(i) – Status of Monitoring Program at start of reporting period

*At the start of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in § 257.94 or the assessment monitoring program in §257.95;*

At the start of the current annual reporting period (1 January 2021), the Ash Pond at A.B. Brown Generating Station (ABB) was operating under an assessment monitoring program in compliance with 40 CFR § 257.95.

### 1.1.2 40 CFR § 257.90(e)(6)(ii) – Status of Monitoring Program at End of Reporting Period

*At the end of the current annual reporting period, whether the CCR unit was operating under the detection monitoring program in §257.94 or the assessment monitoring program in §257.95;*

At the end of the current annual reporting period (31 December 2021), The Ash Pond continued operating under an assessment monitoring program in compliance with 40 CFR § 257.95.

### 1.1.3 40 CFR § 257.90(e)(6)(iii) – Statistically Significant Increases

*If it was determined that there was a statistically significant increase over background for one or more constituents listed in appendix III to this part pursuant to §257.94(e):*

#### 1.1.3.1 40 CFR § 257.90(e)(6)(iii)( A)

*Identify those constituents listed in appendix III to this part and the names of the monitoring wells associated with such an increase; and*

The Ash Pond is operating under an assessment monitoring program; therefore, no statistical evaluations were conducted on Appendix III constituents in 2021.

1.1.3.2 40 CFR § 257.90(e)(6)(iii)( B)

**Provide the date when the assessment monitoring program was initiated for the CCR unit.**

An assessment monitoring program was established on 15 August 2018 for the Ash Pond to meet the requirements of 40 CFR § 257.95. The Ash Pond has remained in assessment monitoring since that time.

1.1.4 40 CFR § 257.90(e)(6)(iv) – Statistically Significant Levels

**If it was determined that there was a statistically significant level above the groundwater protection standard for one or more constituents listed in appendix IV to this part pursuant to §257.95(g) include all of the following:**

1.1.4.1 40 CFR § 257.90(e)(6)(iv)(A) – Statistically Significant Level Constituents

**Identify those constituents listed in appendix IV to this part and the names of the monitoring wells associated with such an increase;**

Statistical analyses of appendix IV constituents were completed following the November 2020 and May 2021 semiannual sampling events as described in § 257.93(h)(2) and statistically significant levels (SSL) of lithium (CCR-AP-3R) and molybdenum (CCR-AP-2R and CCR-AP-3R) were identified downgradient of the Ash Pond.

1.1.4.2 40 CFR § 257.90(e)(6)(iv)(B) – Initiation of the Assessment of Corrective Measures

**Provide the date when the assessment of corrective measures was initiated for the CCR unit;**

Assessment of corrective measures was initiated on 15 May 2019.

1.1.4.3 40 CFR § 257.90(e)(6)(iv)(C) – Assessment of Corrective Measures Public Meeting

**Provide the date when the public meeting was held for the assessment of corrective measures for the CCR unit; and**

The public was given the opportunity to comment on the assessment of corrective measures prepared for the Ash Pond during a public meeting held on 18 October 2021.

1.1.4.4 40 CFR § 257.90(e)(6)(iv)( D) – Completion of the Assessment of Corrective Measures

**Provide the date when the assessment of corrective measures was completed for the CCR unit.**

The assessment of corrective measures was completed on 13 September 2019 and placed into the facility's operating record, followed by being posted to the facility's publicly available website, and the notification sent to the state agency.

### 1.1.5 40 CFR § 257.90(e)(6)(v) – Selection of Remedy

***Whether a remedy was selected pursuant to §257.97 during the current annual reporting period, and if so, the date of remedy selection; and***

The selection of remedy required under § 257.97 was ongoing in 2021 for molybdenum and lithium at the Ash Pond. A summary of actions completed associated with selection of remedy are provided in the March 2021 and September 2021 Semi-Annual Remedy Selection Progress Reports.

### 1.1.6 40 CFR § 257.90(e)(6)(vi) – Remedial Activities

***Whether remedial activities were initiated or are ongoing pursuant to §257.98 during the current annual reporting period.***

Remedial activities were not initiated in 2021; therefore, no demonstration or certification is applicable for this unit.

### 1.2 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 ABB is subject to the groundwater monitoring and corrective action requirements described under 40 CFR § 257.90 through § 257.98 (Rule). The remainder of this document addresses the requirement for the Owner/Operator to prepare an Annual Groundwater Monitoring and Corrective Action Report per § 257.90(e).

### 1.3 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 2021 for the Ash Pond as required by the Rule. Semi-annual 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.

### 1.3.1 Status of the Groundwater Monitoring Program

In 2021 Southern Indiana Gas and Electric Company (SIGECO) conducted an evaluation of an existing French drain located downgradient of the Ash Pond to determine its effect on the groundwater flow and constituent migration. It was determined that the French drain is a relevant site feature that may affect the selection of remedy. Work completed in 2021, including drilling, sampling, and groundwater monitoring, is provided in Appendix A.

Annual and semi-annual groundwater sampling continued in 2021 as outlined in § 257.95(b) and 257.95(d)(1). Statistical analyses of Appendix IV constituents were conducted within 90-days following completion of the sampling and analysis events as described in § 257.93(h)(2) and SSLs of lithium and molybdenum continue to be observed downgradient of the Ash Pond consistent with previous events. In addition, the selection of remedy required under § 257.97 was ongoing in 2021.

### 1.3.2 Key Actions Completed

The following key actions were completed in 2021:

- Per the requirements of 257.93(c) of the Rule, static water level measurements were collected during each sampling event to evaluate groundwater flow direction and rate.
- Completed statistical analyses of assessment monitoring results to evaluate potential SSLs;
- Prepared the 2020 Annual Report including:
  - Pursuant to § 257.105(h)(1), the Annual Report was placed in the facility's operating record;
  - 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)];
- Collected and analyzed two rounds of groundwater samples in accordance with § 257.95.
- Prepared semiannual selection of remedy progress reports in March 2021 and September 2021 in accordance with § 257.97(a) to document progress. These semiannual progress reports were placed in the operating record as required by § 257.105(h)(12) , followed by being posted on the facility's publicly available website as required by § 257.107(h)(9) and notification being sent to the state agency.
- Completed the French drain nature and extent evaluation and refined the sites hydrogeologic framework to be considered in the selection of remedy.
- Held a public meeting on 18 October 2021 for interested and affected parties in accordance with § 257.96(e) to discuss the results of the corrective measures assessment, along with the characterization of nature and extent and site-specific characteristics.

### 1.3.3 Problems Encountered

As reported in the 2020 annual report, MW CCR-AP-5 was damaged by heavy equipment during infrastructure construction along the Ash Pond in November 2020. In accordance with the plan for repair stated in that same annual report, CenterPoint repaired<sup>1</sup> and sampled CCR-AP-5 in March and sampled the well again in June of 2021 in support of the ongoing CCR groundwater monitoring program and the French drain evaluation (i.e., in support of the 2021 nature and extent evaluations). However, due to miscommunications with the field sampling crew regarding the well repair status, CCR-AP-5 was not sampled during the regularly scheduled semiannual sampling events but as previously stated it was sampled for the minimum required two events for 2021, and the results were consistent with previous findings. Please also refer to “Actions to Resolve Problems” (below).

### 1.3.4 Actions to Resolve Problems

Because of the off-cycle sampling of AP-5 due to the previous well repair this well will be sampled again the first week of February 2022. Semiannual sampling of well CCR-AP-5 will resume on the regular May and November sampling schedule in 2022.

### 1.3.5 Project Key Activities for Upcoming Year

Key activities to be completed in 2022 include the following:

- Evaluate if further characterization of the hydrogeologic conditions downgradient of the Ash Pond is warranted to support remedy selection.
- 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).
- As soon as feasible 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).
- Following remedy selection initiate remedial activities and implement the corrective action groundwater monitoring program as outlined in § 257.98.

## 1.4 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:***

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<sup>1</sup> After further inspection of the well, it was determined that only the stick-up for the well was damaged and that with proper repair, the well could continue to function properly.



#### 1.4.1 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.

#### 1.4.2 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 further characterize the influence of the French drain and relevant site features, additional piezometers and monitoring wells (FD-PD-3S, FD-PZ-3D, FD-PZ-4 and CCR-AP-21R) were installed. Location and construction details are provided in Appendix A and in Table I.

#### 1.4.3 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. Analytical data generated during the Nature & Extent French drain evaluation is also provided in Table II.

#### 1.4.4 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***

Statistical analysis was completed within 90-days following completion of the semi-annual sampling events as described in § 257.93(h)(2) and the SSLs of lithium and molybdenum continue to be observed downgradient of the Ash Pond consistent with previous results. As a result, the monitoring program did not change and the EAP remained in assessment monitoring throughout 2022.

**1.4.5 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 previous reports.

## 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	Active
CCR-AP-2IR	Ash Pond	March 2021	2771920	969076.29	465.80	465.79	0.0 - 41.0	42.0 - 49.70	49.70 - 51.70	51.70 - 61.70	10	2	Active
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	Active
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-5R	Ash Pond	March 2016	2771019.65	968165.74	453.20	453.14	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	Active
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	Active
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	Active
CCR-AP-11	Ash Pond	May 2020	2768459.21	967930.60	373.64	376.72	0.0 - 12.0	12.0 - 14.0	14.0 - 26.0	16.00 - 26.00	10	2	Active
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	Destroyed
APPW-1D	Ash Pond	November 2018	-	-	-	-	+	24.0 - 28.0	28.0 - 29.0	29.00 - 34.00	5	2	Destroyed
APPW-2S	Ash Pond	November 2018	-	-	-	-	+	10.0 - 12.0	13.0 - 19.0	14.00 - 19.00	5	2	Destroyed
APPW-2I	Ash Pond	November 2018	-	-	-	-	+	26.0 - 28.0	28.0 - 34.0	29.00 - 34.00	5	2	Destroyed
APPW-2D	Ash Pond	November 2018	-	-	-	-	+	34.0 - 38.0	38.0 - 44.0	39.00 - 44.00	5	2	Destroyed
APPW-3	Ash Pond	November 2018	-	-	-	-	+	16.0 - 18.0	18.0 - 29.0	19.00 - 29.00	10	2	Destroyed
APPW-4S	Ash Pond	November 2018	-	-	-	-	+	12.0 - 14.0	14.0 - 20.0	15.00 - 20.00	5	2	Destroyed
APPW-4I	Ash Pond	November 2018	-	-	-	-	+	34.0 - 36.0	36.0 - 42.0	37.00 - 42.00	5	2	Destroyed
APPW-4D	Ash Pond	November 2018	-	-	-	-	+	42.0 - 47.0	47.0 - 54.0	49.00 - 54.00	5	2	Destroyed
APPW-5I	Ash Pond	November 2018	-	-	-	-	+	10.0 - 12.0	12.0 - 18.0	13.00 - 18.00	5	2	Destroyed
APPW-5D	Ash Pond	November 2018	-	-	-	-	+	17.0 - 23.0	23.0 - 29.0	24.00 - 29.00	5	2	Destroyed
HA-PP-1*	Ash Pond	May 2020	2769934.70	967323.16	381.12	381.82	+	+	+	2.50 - 3.50	1	1	Active
HA-PP-2*	Ash Pond	May 2020	2769922.20	967290.63	380.87	381.51	+	+	+	2.50 - 3.50	1	1	Active
FD-PZ-1	Ash Pond	May 2020	2771101.58	968746.38	418.94	418.94	0.0 - 9.5	9.5 - 11.5	11.5 - 13.5	13.50 - 18.50	5	1	Active
FD-PZ-2	Ash Pond	May 2020	2771272.40	969128.98	423.37	423.34	0.0 - 20.0	20.0 - 22.0	22.0 - 34.0	24.00 - 34.00	10	1	Active
FD-PZ-3S	Ash Pond	March 2021	2771178.58	968663.70	420.45	420.09	0.0 - 6.0	6.0 - 7.6	7.6 - 19.6	9.60 - 19.60	10	2	Active
FD-PZ-3D	Ash Pond	March 2021	2771181.92	968659.62	420.67	420.30	0.0 - 20.0	20.0 - 22.0	22.0 - 34.0	24.00 - 34.00	10	2	Active
FD-PZ-4	Ash Pond	March 2021	2771055.46	968516.03	419.74	419.19	0.0 - 8.0	8.0 - 11.0	11.0 - 23.0	13.00 - 23.00	10	2	Active

**Notes:**

bgs = below ground surface

- = not been surveyed

+ = Natural collapse

ft = feet

in = inches

msl = mean sea level

Datum of Elevations in NAVD 88

\*Water levels only

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

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JANUARY 2022

**TABLE II**  
**SUMMARY OF GROUNDWATER QUALITY DATA**  
 A.B. BROWN GENERATING STATION  
 MOUNT VERNON, INDIANA

Location Group Location Name Sample Name Sample Date Lab Sample ID	Action Level Maximum Contaminant Level/ Regional Screening Levels	Background			
		CCR-BK-1R CCR-BK-1R-20210519 05/19/2021 180-122065-13	CCR-BK-1R CCR-BK-1R-20211118 11/18/2021 180-130315-12	CCR-BK-2 CCR-BK-2-20210519 05/19/2021 180-122065-14	CCR-BK-2 CCR-BK-2-20211118 11/18/2021 180-130315-11
<b>Detection Monitoring - EPA Appendix III Constituents (mg/L)</b>					
Boron, Total	NA	0.054 J	0.08 UJ	0.056 J	0.08 UJ
Calcium, Total	NA	53	47 J+	58	34 J+
Chloride	NA	6.6	7.2	12	18
Fluoride	4	0.33 J+	0.36	0.16 J+	0.19 J+
pH (lab) (pH units)	NA	6.5 J	7.5 J	6.8 J	7.3 J
Sulfate	NA	30	35	41	22
Total Dissolved Solids (TDS)	NA	320	300	330	250
<b>Assessment Monitoring - EPA Appendix IV Constituents (mg/L)</b>					
Antimony, Total	0.006	0.002 U	0.002 U	0.002 U	0.002 U
Arsenic, Total	0.01	0.001 U	0.001 U	0.001 U	0.0027
Barium, Total	2	0.035	0.038	0.04	0.049
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	0.0015 J	0.002 U	0.0047
Cobalt, Total	0.006	0.0005 U	0.00022 J	0.0005 U	0.0015
Fluoride	4	0.33 J+	0.36	0.16 J+	0.19 J+
Lead, Total	0.015	0.001 U	0.00026 J	0.001 U	0.0024
Lithium, Total	0.04	0.005 U	0.005 U	0.005 U	0.0043 J
Mercury, Total	0.002	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Molybdenum, Total	0.1	0.00084 J	0.00098 J	0.00092 J	0.00077 J
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	0.00019 J
<b>Radiological (pCi/L)</b>					
Radium-226	NA	0.252 ± 0.108	0.410 ± 0.202	0.0449 ± 0.0731	0.359 ± 0.293
Radium-228	NA	0.388 ± 0.296	2.05 ± 0.517	0.268 ± 0.287	2.39 ± 0.889
Radium-226 & 228	5	0.640 ± 0.315	2.46 ± 0.555	0.313 ± 0.296	2.74 ± 0.936
<b>Field Parameters</b>					
Temperature (Deg C)	NA	16.16	13.12	14.63	14.33
Dissolved Oxygen, Field (mg/L)	NA	6.65	6.33	0.37	0.81
Conductivity, Field (mS/cm)	NA	0.50816	0.51769	0.51031	0.63651
ORP, Field (mv)	NA	42.6	61.9	27.6	53.2
Turbidity, Field (NTU)	NA	0.19	2.07	1.77	7.23
pH, Field (pH units)	NA	7.04	6.94	6.98	6.78

**ABBREVIATIONS AND NOTES:**

CCR: Coal Combustion Residuals.  
 mg/L: milligram per liter.  
 pCi/L: picoCurie per liter.  
 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**  
 A.B. BROWN GENERATING STATION  
 MOUNT VERNON, INDIANA

Location Group Location Name Sample Name Sample Date Lab Sample ID	Action Level Maximum Contaminant Level/ Regional Screening Levels	Downgradient									
		CCR-AP-1R CCR-AP-1R-20210518 05/18/2021 180-122065-1	CCR-AP-1R CCR-AP-1R-20211117 11/17/2021 180-130315-1	CCR-AP-2I CCR-AP-2I-20210518 05/18/2021 180-122065-3	CCR-AP-2I CCR-AP-2I-20211117 11/17/2021 180-130263-2	CCR-AP-2R CCR-AP-2R-20210518 05/18/2021 180-122065-2	CCR-AP-2R CCR-AP-2R-20211117 11/17/2021 180-130263-3	CCR-AP-3I CCR-AP-3I-20210518 05/18/2021 180-122065-5	CCR-AP-3I CCR-AP-3I-20211117 11/17/2021 180-130263-4	CCR-AP-3I DUP-1-20211117 11/17/2021 180-130263-6	CCR-AP-3R CCR-AP-3R-20210518 05/18/2021 180-122065-4
<b>Detection Monitoring - EPA Appendix III Constituents (mg/L)</b>											
Boron, Total	NA	2.6	2.4	2	2 J-	12	11 J-	2	1.8 J-	1.9 J-	11
Calcium, Total	NA	33	46 J+	11	10 J+	340	330 J+	19	19 J+	21 J+	200
Chloride	NA	20	97	46	98	510	500	140	150	140	530
Fluoride	4	0.61	0.61 J+	1	1.1 J+	0.51 J+	0.5 U	1.3	1.6	1.4 J+	1.6
pH (lab) (pH units)	NA	7.5 J	7.3 J	6.9 J	7.8 J	7.2 J	7 J	7 J	8 J	7.9 J	7.3 J
Sulfate	NA	190	310	0.86 J	1 U	2800	2800	17	18	16	2700
Total Dissolved Solids (TDS)	NA	930	1100	720 J	700	4700	4500	750 J	730	710	5000 J
<b>Assessment Monitoring - EPA Appendix IV Constituents (mg/L)</b>											
Antimony, Total	0.006	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Arsenic, Total	0.01	0.001 U	0.001 U	0.001	0.0015 J	0.00096 J	0.00088 J	0.001	0.00049 J	0.00055 J	0.00047 J
Barium, Total	2	0.032	0.044	0.092	0.09	0.024	0.04	0.15	0.13	0.14	0.012
Beryllium, Total	0.004	0.001 U	0.001 U	0.00021 J	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	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Chromium, Total	0.1	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Cobalt, Total	0.006	0.0005 U	0.0002 J	0.00015 J	0.0005 U	0.0032	0.0027	0.0005 U	0.0002 J	0.0002 J	0.00063
Fluoride	4	0.61	0.61 J+	1	1.1 J+	0.51 J+	0.5 U	1.3	1.6	1.4 J+	1.6
Lead, Total	0.015	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00061 J	0.00013 J	0.00032 J	0.00053 J	0.001 U
Lithium, Total	0.04	0.005 U	0.005 U	0.02	0.02	0.032	0.03	0.021	0.02	0.02	0.062
Mercury, Total	0.002	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Molybdenum, Total	0.1	0.0047 J	0.005	0.00087 J	0.005 U	2	1.6	0.0041 J	0.0037 J	0.0036 J	0.96
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	0.005 U	0.019
Thallium, Total	0.002	0.001 U	0.001 U	0.00038 J	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00016 J
<b>Radiological (pCi/L)</b>											
Radium-226	NA	0.192 ± 0.11	0.542 ± 0.202	0.367 ± 0.18	0.337 ± 0.148	0.106 ± 0.0824	0.161 ± 0.147	0.394 ± 0.172	0.309 ± 0.168	0.356 ± 0.167	0.0427 ± 0.114
Radium-228	NA	0.744 ± 0.305	0.786 ± 0.366	0.182 ± 0.208	0.956 ± 0.323	0.857 ± 0.383	1.38 ± 0.455	0.356 ± 0.247	1.51 ± 0.457	1.44 ± 0.447	0.388 ± 0.229
Radium-226 & 228	5	0.936 ± 0.324	1.33 ± 0.418	0.550 ± 0.275	1.29 ± 0.355	0.964 ± 0.392	1.55 ± 0.478	0.750 ± 0.301	1.82 ± 0.487	1.80 ± 0.477	0.430 ± 0.256
<b>Field Parameters</b>											
Temperature (Deg C)	NA	14.95	15.35	17.43	19.53	18.11	18.09	17.3	17.62	17.62	18.17
Dissolved Oxygen, Field (mg/L)	NA	0.07	0.41	0.24	1.76	0.25	0.45	0.12	0.22	0.22	0.21
Conductivity, Field (mS/cm)	NA	1.3223	1.5437	1.1934	1.179	6.662	5.9575	1.2747	1.1928	1.1928	7.0453
ORP, Field (mv)	NA	11.7	252.6	-128.8	-76.8	59.3	15.7	-266.2	-171.5	-171.5	33.3
Turbidity, Field (NTU)	NA	0	0	0.66	0	0.7	26.64	0.67	26.4	26.4	0.14
pH, Field (pH units)	NA	7.2	7.15	7.63	7.48	6.98	6.71	7.83	7.61	7.61	7.42

**ABBREVIATIONS AND NOTES:**

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

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

**TABLE II**  
**SUMMARY OF GROUNDWATER QUALITY DATA**  
 A.B. BROWN GENERATING STATION  
 MOUNT VERNON, INDIANA

Location Group Location Name Sample Name Sample Date Lab Sample ID	Action Level Maximum Contaminant Level/ Regional Screening Levels	Downgradient								
		CCR-AP-3R CCR-AP-3R-20211117 11/17/2021 180-130263-5	CCR-AP-4R CCR-AP-4R-20210518 05/18/2021 180-122065-6	CCR-AP-4R CCR-AP-4R-20211117 11/17/2021 180-130315-2	CCR-AP-5 CCR-AP-5-20210324 03/24/2021 180-118982-1	CCR-AP-5R CCR-AP-5R-20210609 06/09/2021 240-151149-2	CCR-AP-6 CCR-AP-6-20210519 05/19/2021 180-122065-7	CCR-AP-6 BLIND DUPLICATE 1-20210519 05/19/2021 180-122065-15	CCR-AP-6 CCR-AP-6-20211118 11/18/2021 180-130263-10	CCR-AP-7R CCR-AP-7R-20210519 05/19/2021 180-122065-8
<b>Detection Monitoring - EPA Appendix III Constituents (mg/L)</b>										
Boron, Total	NA	12 J-	0.076 J	0.08 UJ	13	11	6.4	6.3	5.2 J-	7.2
Calcium, Total	NA	250 J+	180	150 J+	550	480	270	270	240 J+	390
Chloride	NA	570	24	22	490	500	270	260	230	580
Fluoride	4	1.6	0.36 J+	0.58 J+	0.38 J	0.31	0.17 J+	0.17 J+	0.31 J+	0.17 J+
pH (lab) (pH units)	NA	7.4 J	7 J	7.3 J	7.2 J	7.5 J	6.9 J	6.2 J	7.1 J	6.7 J
Sulfate	NA	2900	99	96	3500	3400	1400	1300	1300	2700
Total Dissolved Solids (TDS)	NA	5400	990 J	870	5500	5100	2500	2400	2400	4600
<b>Assessment Monitoring - EPA Appendix IV Constituents (mg/L)</b>										
Antimony, Total	0.006	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Arsenic, Total	0.01	0.001 U	0.001 U	0.001 U	0.001 U	0.00073 J	0.00073 J	0.00073 J	0.00085 J	0.00046 J
Barium, Total	2	0.013	0.095	0.083	0.025	0.011	0.024	0.011	0.011	0.024
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
Cadmium, Total	0.005	0.001 U	0.001 U	0.001 U	0.001	0.00051 J	0.001 U	0.001 U	0.001 U	0.001 U
Chromium, Total	0.1	0.002 U	0.0025 U	0.0028	0.0017 J	0.005 U	0.002 U	0.002 U	0.002 U	0.002 U
Cobalt, Total	0.006	0.00061	0.0005 U	0.0005 U	0.00044 J	0.00088 J	0.00048 J	0.00047 J	0.00063	0.00022 J
Fluoride	4	1.6	0.36 J+	0.58 J+	0.38 J	0.31	0.17 J+	0.17 J+	0.31 J+	0.17 J+
Lead, Total	0.015	0.001 U	0.001 U	0.001 U	0.00083 J	0.00071 J	0.001 U	0.001 U	0.001 U	0.001 U
Lithium, Total	0.04	0.063	0.005 U	0.005 U	0.015	0.014	0.025	0.025	0.024	0.024
Mercury, Total	0.002	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Molybdenum, Total	0.1	0.74	0.0012 J	0.0012 J	0.068	0.085	0.0043 J	0.0043 J	0.0039 J	0.005 U
Selenium, Total	0.05	0.016	0.005 U	0.005 U	0.005 U	0.005 U	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	0.001 U	0.001 U	0.001 U	0.0002 J	0.001 U
<b>Radiological (pCi/L)</b>										
Radium-226	NA	0.129 ± 0.109	0.283 ± 0.166	0.295 ± 0.155	0.117 ± 0.0901	0.0627 ± 0.093	0.115 ± 0.0875	-0.0645 ± 0.142	0.119 ± 0.0994	0.163 ± 0.085
Radium-228	NA	0.896 ± 0.278	0.281 ± 0.267	0.458 ± 0.349	0.682 ± 0.395	0.580 ± 0.382	0.284 ± 0.315	0.151 ± 0.266	0.412 ± 0.313	0.690 ± 0.426
Radium-226 & 228	5	1.03 ± 0.299	0.564 ± 0.314	0.754 ± 0.382	0.799 ± 0.405	0.642 ± 0.393	0.399 ± 0.327	0.151 ± 0.302	0.531 ± 0.328	0.853 ± 0.434
<b>Field Parameters</b>										
Temperature (Deg C)	NA	17.54	14.72	14.41	17.09	15.78	14.73	14.73	13.29	14.95
Dissolved Oxygen, Field (mg/L)	NA	0.16	6.32	4.88	0.00	0	2.48	2.48	1.19	8.15
Conductivity, Field (mS/cm)	NA	7.4835	1.5153	1.4976	7.10	7.04	3.5254	3.5254	3.081	6.1554
ORP, Field (mv)	NA	-74.3	8.7	236.9	138.00	54	-3.4	-3.4	-2.2	98.2
Turbidity, Field (NTU)	NA	0	2.22	0	18.50	3.2	3.4	3.4	14.37	8.87
pH, Field (pH units)	NA	7.12	6.96	7.09	6.77	7.3	7.08	7.08	6.71	6.47

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<b>Detection Monitoring - EPA Appendix III Constituents (mg/L)</b>										
Boron, Total	NA	4.9 J-	0.75	0.64 J-	7.7 J-	8 J-	8.1	6.9 J-	0.81 J-	0.58 J
Calcium, Total	NA	360 J+	280	260 J+	420	420 J+	210	180 J+	120	110 J+
Chloride	NA	460	100	440	440	130	110	48	44	
Fluoride	4	0.3 J+	0.28 J+	0.37 J+	0.22 J+	0.54 J+	0.5 J+	0.5 J+	0.15 J+	0.21 J+
pH (lab) (pH units)	NA	6.8 J	7.2 J	6.8 J	7.9 J	6.9 J	7.8 J	7.5 J	7.5 J	7.4 J
Sulfate	NA	3000	940	2300	4300	1700	1800	200	170	
Total Dissolved Solids (TDS)	NA	4700	1800	1800	8800	6800	3400 J	2900	860	730
<b>Assessment Monitoring - EPA Appendix IV Constituents (mg/L)</b>										
Antimony, Total	0.006	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.00096 J	0.002 U	0.002 U
Arsenic, Total	0.01	0.00058 J	0.00066 J	0.001	0.016	0.02	0.0013	0.0047	0.00075 J	0.0024
Barium, Total	2	0.022	0.048	0.052	0.067	0.093	0.017	0.035	0.043	0.068
Beryllium, Total	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00076 J	0.001 U	0.001 U
Cadmium, Total	0.005	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
Chromium, Total	0.1	0.002 U	0.002 U	0.002 U	0.002 U	0.0015 J	0.0023	0.007	0.002 U	0.0029
Cobalt, Total	0.006	0.0003 J	0.0028	0.0041	0.00031 J	0.00063	0.0015	0.005	0.00036 J	0.0019
Fluoride	4	0.3 J+	0.28 J+	0.37 J+	0.22 J+	0.54 J+	0.5 J+	0.5 J+	0.15 J+	0.21 J+
Lead, Total	0.015	0.00027 J	0.00018 J	0.001 U	0.00035 J	0.00086 J	0.0013	0.0051	0.00025 J	0.0023
Lithium, Total	0.04	0.021	0.014	0.013	0.029	0.032	0.005 U	0.0051	0.011	0.011
Mercury, Total	0.002	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Molybdenum, Total	0.1	0.005 U	0.00081 J	0.005 U	0.0092	0.0091	0.0024 J	0.0028 J	0.00077 J	0.001 J
Selenium, Total	0.05	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.04	0.0097	0.0027 J
Thallium, Total	0.002	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00015 J	0.001 U	0.001 U
<b>Radiological (pCi/L)</b>										
Radium-226	NA	0.337 ± 0.179	0.0687 ± 0.0747	0.342 ± 0.21	0.369 ± 0.254	0.485 ± 0.184	-0.253 ± 0.429	0.735 ± 0.381	0.250 ± 0.198	0.484 ± 0.33
Radium-228	NA	0.509 ± 0.437	0.155 ± 0.277	1.99 ± 0.607	0.945 ± 0.394	1.12 ± 0.405	0.533 ± 0.632	3.33 ± 1.14	0.555 ± 0.319	0.973 ± 1.02
Radium-226 & 228	5	0.846 ± 0.472	0.224 ± 0.287	2.33 ± 0.642	1.31 ± 0.469	1.61 ± 0.445	0.533 ± 0.764	4.06 ± 1.2	0.805 ± 0.375	1.46 ± 1.07
<b>Field Parameters</b>										
Temperature (Deg C)	NA	14.63	15.34	17.92	17.73	18.56	14.1	15.26	13.93	14.24
Dissolved Oxygen, Field (mg/L)	NA	7.56	0.18	1.24	0.08	0.09	0.53	1.52	0.26	0.36
Conductivity, Field (mS/cm)	NA	0.06501	2.319	2.3308	10.018	9.7521	3.9488	2.6132	1.2019	1.1761
ORP, Field (mv)	NA	263.2	-131.7	-107.1	-127	-133.5	32.4	255.6	105.1	-4.6
Turbidity, Field (NTU)	NA	0.69	5.12	0	62.25	44.89	144.02	3357	23.61	110.04
pH, Field (pH units)	NA	6.48	6.91	6.56	7.11	7.01	7.27	7.3	6.8	6.93

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 A.B. BROWN GENERATING STATION  
 MOUNT VERNON, INDIANA

Location Group Location Name Sample Name Sample Date Lab Sample ID	Action Level Maximum Contaminant Level/ Regional Screening Levels	Nature & Extent - French Drain											
		CCR-AP-2I CCR-AP-2I-20210415 04/15/2021 180-120172-5	CCR-AP-2IR CCR-AP-2IR-20210415 04/15/2021 180-120172-6	CCR-AP-2IR CCR-AP-2IR-20210609 06/09/2021 240-151149-1	CCR-AP-2R CCR-AP-2R-20210415 04/15/2021 180-120172-4	CCR-AP-5 CCR-AP-5-20210324 03/24/2021 180-118982-1	FD-PZ-1 FD-PZ-1-20210415 04/15/2021 180-120172-3	FD-PZ-1 FD-PZ-1-20210521 05/21/2021 180-122147-9	FD-PZ-1 FD-PZ-1-20211118 11/18/2021 180-130315-9	FD-PZ-2 FD-PZ-2-20210415 04/15/2021 180-120172-10	FD-PZ-2 FD-PZ-2-20210521 05/21/2021 180-122147-10	FD-PZ-2 FD-PZ-2-20211118 11/18/2021 180-130315-10	MH-1 MH-1-20210414 04/14/2021 180-120172-1
<b>Detection Monitoring - EPA Appendix III Constituents (mg/L)</b>													
Boron, Total	NA	1.8	13	13	13	13	13	0.79 J-	14 J-	0.14	14 J-	0.095 UJ	14
Calcium, Total	NA	11	350	330	340	550	390	120	350 J+	110	350	100 J+	360
Chloride	NA	99	570	590	550	490	550	8.1	620	7.1	610	5.6	580
Fluoride	4	1.2	0.57	0.58	0.55	0.38 J	0.43 J	0.21 J+	0.73	0.14	0.5 J+	0.17 J+	0.53
pH (lab) (pH units)	NA	8 J	7.2 J	7.5 J	6.7 J	7.2 J	7.3 J	7.4 J	7.7 J	7.4 J	6.8 J	7.6 J	7.2 J
Sulfate	NA	1 U	3300	3500	3200	3500	3300	25	3700	36	3600	11	3400
Total Dissolved Solids (TDS)	NA	720	5300	4800	5200	5500	5700	510 J	5300	520	5600 J	480	6200
<b>Assessment Monitoring - EPA Appendix IV Constituents (mg/L)</b>													
Antimony, Total	0.006	0.002 U	0.01 U	0.002 U	0.01 U	0.002 U	0.01 U	0.002 U	0.00087 J	0.0016 J	0.00066 J	0.002 U	0.01 U
Arsenic, Total	0.01	0.00092 J	0.005 U	0.00096 J	0.005 U	0.0011	0.027	0.00058 J	0.0084	0.00058 J	0.0041	0.00063 J	0.005 U
Barium, Total	2	0.09	0.021 J	0.021	0.021 J	0.025	0.16	0.12	0.092	0.16	0.041	0.17	0.023 J
Beryllium, Total	0.004	0.001 U	0.005 U	0.001 U	0.005 U	0.001 U	0.0016 J	0.001 U	0.00059 J	0.001 U	0.00018 J	0.001 U	0.005 U
Cadmium, Total	0.005	0.001 U	0.005 U	0.00075 J	0.005 U	0.001	0.0017 J	0.001 U	0.00079 J	0.001 U	0.00051 J	0.001 U	0.005 U
Chromium, Total	0.1	0.002 U	0.01 U	0.005 U	0.01 U	0.0017 J	0.033	0.0099	0.004	0.0043	0.0015 J	0.01 U	0.01 U
Cobalt, Total	0.006	0.00019 J	0.0024 J	0.0027	0.0029	0.00044 J	0.029	0.00093	0.0083	0.0007	0.0024	0.0019	0.0018 J
Fluoride	4	1.2	0.57	0.58	0.55	0.38 J	0.43 J	0.21 J+	0.73	0.14	0.5 J+	0.17 J+	0.53
Lead, Total	0.015	0.00021 J	0.005 U	0.00059 J	0.005 U	0.00083 J	0.025	0.00034 J	0.0076	0.0015	0.0025	0.00076 J	0.005 U
Lithium, Total	0.04	0.02	0.029	0.028	0.03	0.015	0.07	0.0078	0.046	0.0049 J	0.04	0.004 J	0.037
Mercury, Total	0.002	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Molybdenum, Total	0.1	0.005 U	2.1	2.3	1.9	0.068	0.71	0.062	0.94	0.002 J	0.74	0.0016 J	1.5
Selenium, Total	0.05	0.005 U	0.025 U	0.005 U	0.025 U	0.005 U	0.025 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.025 U
Thallium, Total	0.002	0.001 U	0.005 U	0.001 U	0.005 U	0.001 U	0.005 U	0.001 U	0.00015 J	0.001 U	0.001 U	0.00038 J	0.005 U
<b>Radiological (pCi/L)</b>													
Radium-226	NA	0.318 ± 0.139	0.0627 ± 0.0835	0.180 ± 0.103	0.120 ± 0.0981	0.117 ± 0.0901	0.548 ± 0.218	0.136 ± 0.128	1.14 ± 0.429	0.146 ± 0.116	2.29 ± 0.639	0.102 ± 0.19	0.0796 ± 0.0875
Radium-228	NA	0.924 ± 0.386	0.496 ± 0.352	1.08 ± 0.402	0.513 ± 0.322	0.682 ± 0.395	0.538 ± 0.496	0.582 ± 0.303	2.54 ± 0.98	0.290 ± 0.311	1.43 ± 0.882	3.46 ± 0.78	0.0652 ± 0.248
Radium-226 & 228	5	1.24 ± 0.41	0.558 ± 0.362	1.26 ± 0.415	0.633 ± 0.337	0.799 ± 0.405	1.09 ± 0.542	0.718 ± 0.329	3.68 ± 1.07	0.436 ± 0.332	3.71 ± 1.09	3.56 ± 0.803	0.145 ± 0.263
<b>Field Parameters</b>													
Temperature (Deg C)	NA	15.82	17.01	15.51	13.48	17.09	12.36	16.42	16.05	11.12	27.23	15.02	-
Dissolved Oxygen, Field (mg/L)	NA	0.27	0	0	0.81	0	2.85	0.41	3.28	4.81	2.52	0.27	-
Conductivity, Field (mS/cm)	NA	1.19	7.16	7.38	7.32	7.1	7.79	0.82068	4.2897	0.742	7.8195	0.8787	-
ORP, Field (mv)	NA	-60	15	22	133	138	175	-1	47.6	202.00	5.9	41.2	-
Turbidity, Field (NTU)	NA	5	0.1	0	9.3	18.5	269	8.48	598.01	14.30	61.78	88.61	-
pH, Field (pH units)	NA	7.78	7.24	7.39	6.54	6.77	7.53	7.04	7.36	6.64	7.33	7.27	-

**ABBREVIATIONS AND NOTES:**

CCR: Coal Combustion Residuals.  
 mg/L: milligram per liter.  
 pCi/L: picoCurie per liter.  
 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**  
 A.B. BROWN GENERATING STATION  
 MOUNT VERNON, INDIANA

Location Group Location Name Sample Name Sample Date Lab Sample ID	Action Level Maximum Contaminant Level/ Regional Screening Levels	Nature & Extent - French Drain										
		MH-1 MH-1-20210521 05/21/2021 180-122147-11	MH-1 MH-1-20211118 11/18/2021 180-130315-8	MH-2 MH-2-20210414 04/14/2021 180-120172-2	MH-2 MH-2-20210521 05/21/2021 180-122147-12	MH-2 MH-2-20211118 11/18/2021 180-130315-7	FD-PZ-3D FD-PZ-3D-20210415 04/15/2021 180-120172-9	FD-PZ-3D FD-PZ-3D-20210609 06/09/2021 240-151149-4	FD-PZ-3S FD-PZ-3S-20210415 04/15/2021 180-120172-8	FD-PZ-3S FD-PZ-3S-20210609 06/09/2021 240-151149-3	FD-PZ-4 FD-PZ-4-20210415 04/15/2021 180-120172-7	FD-PZ-4 FD-PZ-4-20210609 06/09/2021 240-151149-5
<b>Detection Monitoring - EPA Appendix III Constituents (mg/L)</b>												
Boron, Total	NA	13 J-	3.3 J-	12	13 J-	2.5 J-	1.8	5.1	13	13	8.3	9.8
Calcium, Total	NA	340	360 J+	370	350	200 J+	110	230	380	350	370	380
Chloride	NA	540	130	520	550	100	100	290	510	560	550	600
Fluoride	4	0.5 J+	1.1	0.53	0.48 J+	0.59	0.48	0.44	0.43 J	0.49	0.47 J	0.5
pH (lab) (pH units)	NA	6.3 J	7.7 J	7.3 J	6.3 J	8.2 J	7.7 J	7.8 J	7.3 J	7.6 J	7.5 J	7.7 J
Sulfate	NA	3300	1700	3300	3300	1100	420	1500	3400	3100	3700	3600
Total Dissolved Solids (TDS)	NA	5300 J	2400	5400	5500 J	1800	1100	2700	5600	6300	5900	6400
<b>Assessment Monitoring - EPA Appendix IV Constituents (mg/L)</b>												
Antimony, Total	0.006	0.002 U	0.0004 J	0.01 U	0.002 U	0.00081 J	0.00049 J	0.002 U	0.01 U	0.002 U	0.01 U	0.0011 J
Arsenic, Total	0.01	0.00039 J	0.0012	0.005 U	0.001 U	0.0036	0.0011	0.0039 J	0.005 U	0.0014 J	0.034	0.023
Barium, Total	2	0.015	0.023	0.016 J	0.014	0.083	0.086	0.11	0.024 J	0.027	0.13	0.093
Beryllium, Total	0.004	0.001 U	0.001 U	0.005 U	0.001 U	0.001 U	0.001 U	0.001 U	0.005 U	0.001 U	0.0021 J	0.0016
Cadmium, Total	0.005	0.00084 J	0.001 U	0.005 U	0.00075 J	0.001 U	0.00036 J	0.00028 J	0.005 U	0.00076 J	0.0015 J	0.0013
Chromium, Total	0.1	0.002 U	0.0023	0.01 U	0.002 U	0.0032	0.0019 J	0.0077	0.01 U	0.005 U	0.028	0.025
Cobalt, Total	0.006	0.0022	0.00068	0.0012 J	0.002	0.00027 J	0.00092	0.0036	0.0015 J	0.0022	0.012	0.0086
Fluoride	4	0.5 J+	1.1	0.53	0.48 J+	0.59	0.48	0.44	0.43 J	0.49	0.47 J	0.5
Lead, Total	0.015	0.001 U	0.0005 J	0.005 U	0.001 U	0.0006 J	0.0017	0.0041	0.005 U	0.00091 J	0.018	0.012
Lithium, Total	0.04	0.029	0.013	0.03	0.029	0.016	0.023	0.032	0.034	0.035	0.035	0.039
Mercury, Total	0.002	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.002 U	0.0002 U
Molybdenum, Total	0.1	1.2	0.25	1.1	1.2	0.08	0.06	0.083	1.1	1.3	0.23	0.28
Selenium, Total	0.05	0.005 U	0.016	0.025 U	0.005 U	0.0053	0.005 U	0.005 U	0.025 U	0.005 U	0.025 U	0.005 U
Thallium, Total	0.002	0.001 U	0.001 U	0.005 U	0.001 U	0.001 U	0.001 U	0.001 U	0.005 U	0.001 U	0.005 U	0.0003 J
<b>Radiological (pCi/L)</b>												
Radium-226	NA	0.0756 ± 0.0932	0.416 ± 0.21	0.0333 ± 0.0866	0.0686 ± 0.0946	0.391 ± 0.209	0.825 ± 0.304	1.11 ± 0.536	0.298 ± 0.133	0.481 ± 0.182	2.54 ± 0.502	1.32 ± 0.421
Radium-228	NA	0.164 ± 0.261	0.843 ± 0.492	0.216 ± 0.277	0.0162 ± 0.244	0.734 ± 0.509	0.252 ± 0.638	2.50 ± 1.32	0.0439 ± 0.263	0.555 ± 0.359	1.24 ± 0.619	2.28 ± 0.958
Radium-226 & 228	5	0.240 ± 0.277	1.26 ± 0.535	0.249 ± 0.29	0.0847 ± 0.262	1.12 ± 0.55	1.08 ± 0.707	3.62 ± 1.42	0.342 ± 0.295	1.04 ± 0.402	3.78 ± 0.797	3.61 ± 1.05
<b>Field Parameters</b>												
Temperature (Deg C)	NA	24.62	14.67	-	17.63	20.15	16.61	17.23	15.15	16.07	15.59	16.43
Dissolved Oxygen, Field (mg/L)	NA	3.17	8.32	-	3.37	8.43	0.4	0	0.05	0	1.3	0
Conductivity, Field (mS/cm)	NA	7.3366	3.0618	-	7.2535	2.2135	1.79	5.34	7.02	7.22	7.76	7.96
ORP, Field (mv)	NA	7.2	0.1	-	13.9	-84.9	119	10	126	117	129	106
Turbidity, Field (NTU)	NA	116.79	83.14	-	0.76	325.33	467	446	8.2	110	228	506
pH, Field (pH units)	NA	7.18	8	-	7.18	9.43	7.82	7.84	7.37	7.58	7.52	7.87

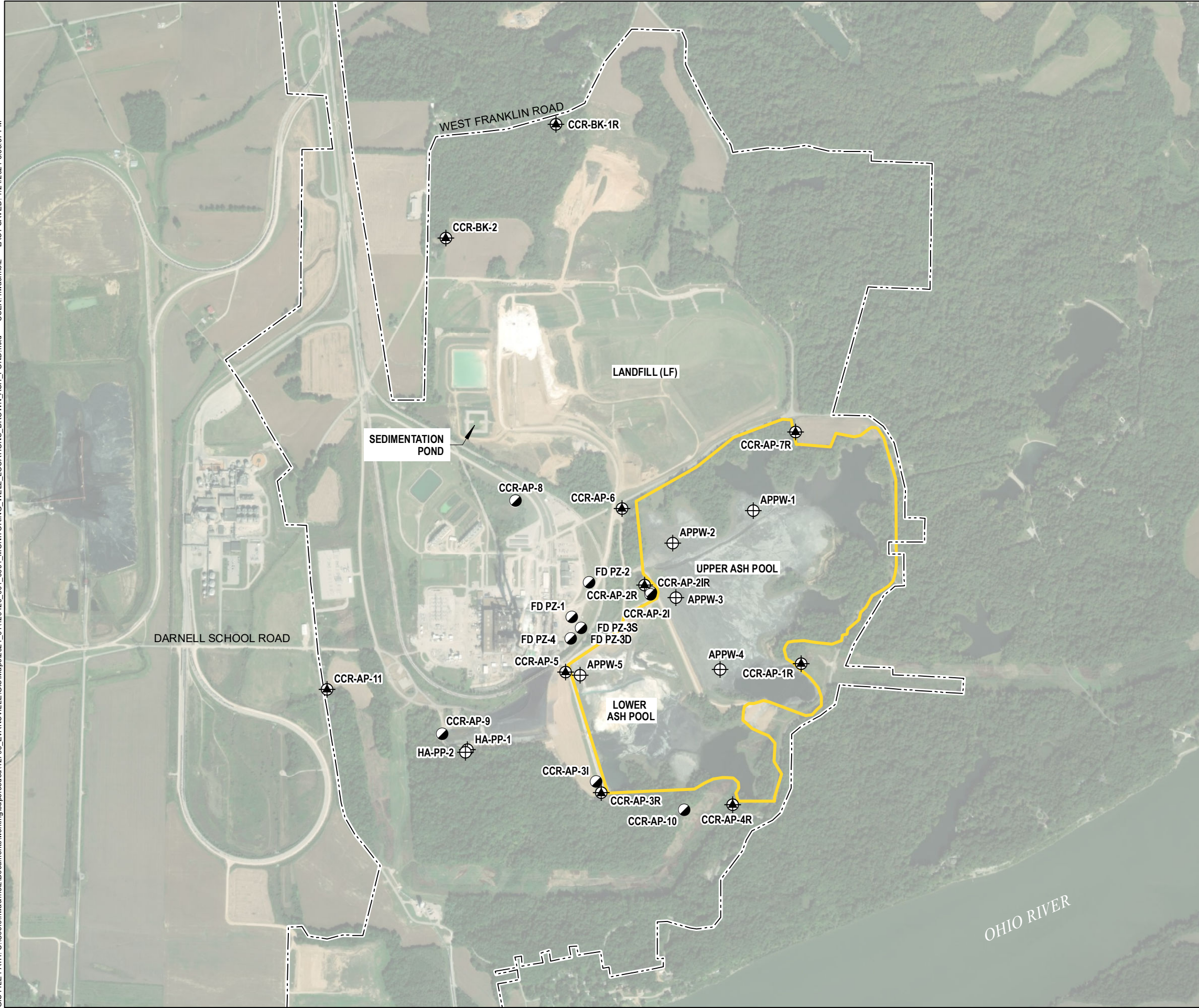
**ABBREVIATIONS AND NOTES:**

CCR: Coal Combustion Residuals.  
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- 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>

## FIGURES

GIS FILE PATH: C:\Users\hwachholz\Documents\working\superseded\42796\_EVANSVILLE\GIS\Maps\2021\_011129420\_001\_MONITORING\_WELL\_LOCATIONS\_BROWN\_ASH\_POND.mxd — USER: hwachholz — LAST SAVED: 1/21/2021 3:58:37 PM

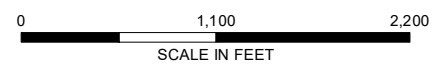


**LEGEND**

-  CCR MONITORING WELL
-  NATURE AND EXTENT MONITORING WELL
-  CCR PIEZOMETER WELL
-  APPROXIMATE UNIT BOUNDARY

**NOTES**

1. ALL LOCATIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: ESRI



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

**GROUNDWATER MONITORING  
WELL LOCATIONS - ASH POND**

JANUARY 2022

**FIGURE 1**

## **Appendix A**

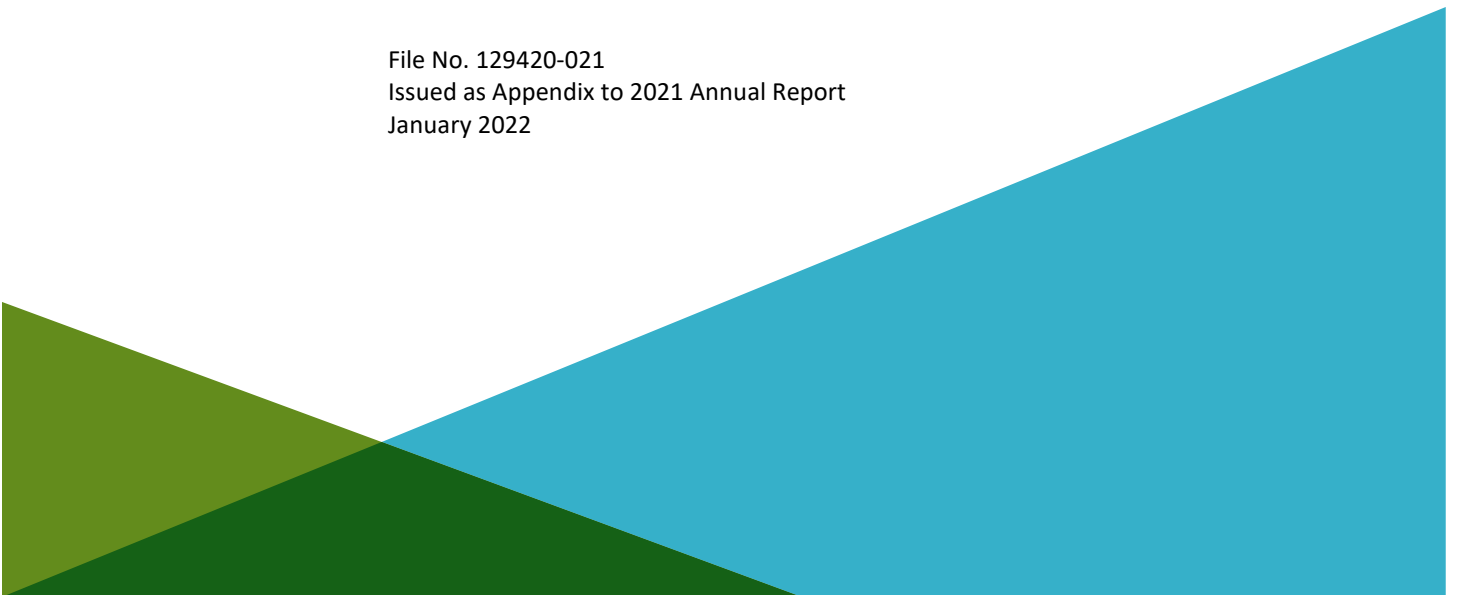
Updated Groundwater Conceptual Site Model

REPORT ON  
UPDATED GROUNDWATER CONCEPTUAL SITE MODEL  
A.B. BROWN GENERATING STATION  
ASH POND  
MOUNT VERNON, INDIANA

by  
Haley & Aldrich, Inc.  
Cleveland, Ohio

for  
Southern Indiana Gas and Electric Company  
Evansville, Indiana

File No. 129420-021  
Issued as Appendix to 2021 Annual Report  
January 2022



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1	Water Table Configuration Map - 13 May 2021
2	Molybdenum Isoconcentration Map



## 1. Introduction

The Southern Indiana Gas and Electric Company (SIGECO) initiated an evaluation of the nature and extent of impacted groundwater and an assessment of corrective measures for the Ash Pond at the A.B. Brown Generating Station (Site) in response to a statistically significant level (SSL) of an Appendix IV constituent exceeding Groundwater Protection Standards (GWPS). The completed Corrective Measures Assessment (CMA) Report was placed in the facility's operating record on 13 September 2019.

Discussions between Haley & Aldrich, Inc. (Haley & Aldrich) and SIGECO representatives pertaining to the construction details and impact of various closure by removal alternatives outlined in the CMA has been completed. Following completion of the CMA and in the process of evaluating the nature and extent of contamination, Haley & Aldrich identified a relevant site feature (French drain) that appeared to control groundwater flow and contaminant transport downgradient of the Ash Pond. Consistent with §257.95(g)(1), additional investigations were conducted to update the Conceptual Site Model (CSM). This updated CSM incorporates the findings of the French drain evaluation and will be considered in the selection of remedy and its effect on post-closure groundwater flow and groundwater quality over time.

## 2. Groundwater Conceptual Site Model

The Site geology and hydrogeology was initially described in the *Groundwater Monitoring Plan* prepared by Haley & Aldrich in October 2017. Additional soil borings, monitoring wells and piezometers were installed to evaluate a relevant site feature as outlined in §257.95(g)(1). The findings of those investigations have refined the CSM and is presented below.

### 2.1 SITE SETTING

The Site is located in Posey County near the community of West Franklin, Indiana. The Site is located approximately 0.5 miles north of the Ohio River. The Site varies in elevation with natural ground surface, with elevations varying from 380 to 520-feet above mean sea level. The higher elevations are generally to the north of the Site with surface topography dominated by a series of ridges separated by ravines. In general, surface topography across the Site generally slopes to the west towards the western property boundary then to the south toward the Ohio River. Surface water runoff occurs via sheet flow to low lying areas or ravines which eventually lead to the Ohio River.

### 2.2 RELEVANT SITE FEATURE “FRENCH DRAIN”

During the nature and extent evaluation to delineate molybdenum and lithium above GWPS for the Ash Pond, a French drain was identified as a relevant site feature that required additional investigation. During conversations with SIGECO personnel it was determined that the French drain was installed to intercept groundwater that began seeping into the administration building when the Ash Pond was charged with water and put into operation. The location of the French drain and the construction details were not documented at the time the drain was constructed.

Prior to mobilization, the location of the French drain was identified via a series of backhoe trenches. At that time, two manholes (MH-1 and MH-2) were installed to provide access for water level gauging and flow evaluations. The construction details of the French drain were determined using a downhole camera that was inserted into MH-1 and routed to the north and to the south of that location. This investigation revealed that the French drain extended across the unconsolidated overburden and into the upper portion of the shale bedrock unit. Groundwater entering the French drain flows through two, 4-inch perforated pipes placed in a bed of gravel. The French drain extends north to the haul road from the plant site to the flue gas desulfurization Landfill and south to the railroad trestle east of the coal pile where manhole MH-2 was installed. From MH-2 the groundwater captured by the French drain is hard-piped to the Southside runoff pond, which discharges back into the Ash Pond. Groundwater flow through the French drain was measured at MH-2 at approximately 150 gallons per minute. The location of the French drain and the new manholes is shown on **Figure 1**.

The French drain investigation was conducted in a stepwise manner to first identify the extent to which the French drain captures shallow groundwater downgradient of the Ash Pond. The second phase of work was conducted to evaluate the geometry of the lithium and molybdenum plumes so that it could be incorporated into the groundwater flow and solute transport model. The first field event was completed in May 2020 which included the installation of two piezometers (FD-PZ-1 and FD-PZ-2) and one monitoring well at the downgradient property line (CCR-AP-11).

During this first phase of investigation, a high conductivity flow zone was identified in the upper portion of the shale bedrock near the French drain. This feature was also identified at the boundary of the waste on the west side of the Ash Pond at approximately the same elevation as CCR-AP-2R. A review of the historical geotechnical borings suggests that this high conductivity flow zone pinches out to the north of CCR-AP-2R but extends to the west of the Administration building, indicating that the high conductivity flow zone may have been the source of the groundwater seeping into the administration building prior to constructing the French drain. Water levels measured in MH-1, MH-2, FD-PZ-1 and FD-PZ-2 confirmed an inward hydraulic gradient demonstrating that the French drain was capturing shallow groundwater downgradient of the Ash Pond where SSLs were identified above GWPS.

A second field event was completed in March 2021 to evaluate groundwater quality within the high conductivity flow zone and to further define the effectiveness of the French drain in controlling groundwater flow and contaminant transport. During the second phase of investigation, three additional piezometers were installed in the vicinity of the French drain (FD-PZ-3A, FD-PZ-3B, FD-PZ-4) and one new monitoring well (CCR-AP-2IR) was constructed in the flow zone encountered at the boundary of the Ash Pond at CCR-AP-2R. The findings from the second phase of investigation confirmed that the molybdenum and lithium detected in shallow groundwater and within the high conductivity flow zone above GWPS was being captured by the French drain and did not extend further west. The water table configuration is also provided on **Figure 1** while the extent of molybdenum is depicted on **Figure 2**. Lithium is not depicted on Figure 2 because the lithium plume is smaller than the molybdenum plume.

### 2.3 GEOLOGY AND HYDROGEOLOGY

The Ohio River valley contains fill and loess (windblown) deposits derived indirectly from continental ice sheets. These were deposited from meltwater heavily loaded with entrained sediments accumulated in the area on the Pennsylvanian age shale, limestone and sandstone bedrock. Westerly winds simultaneously deposited silty sediments that cap the upland areas north of the river.

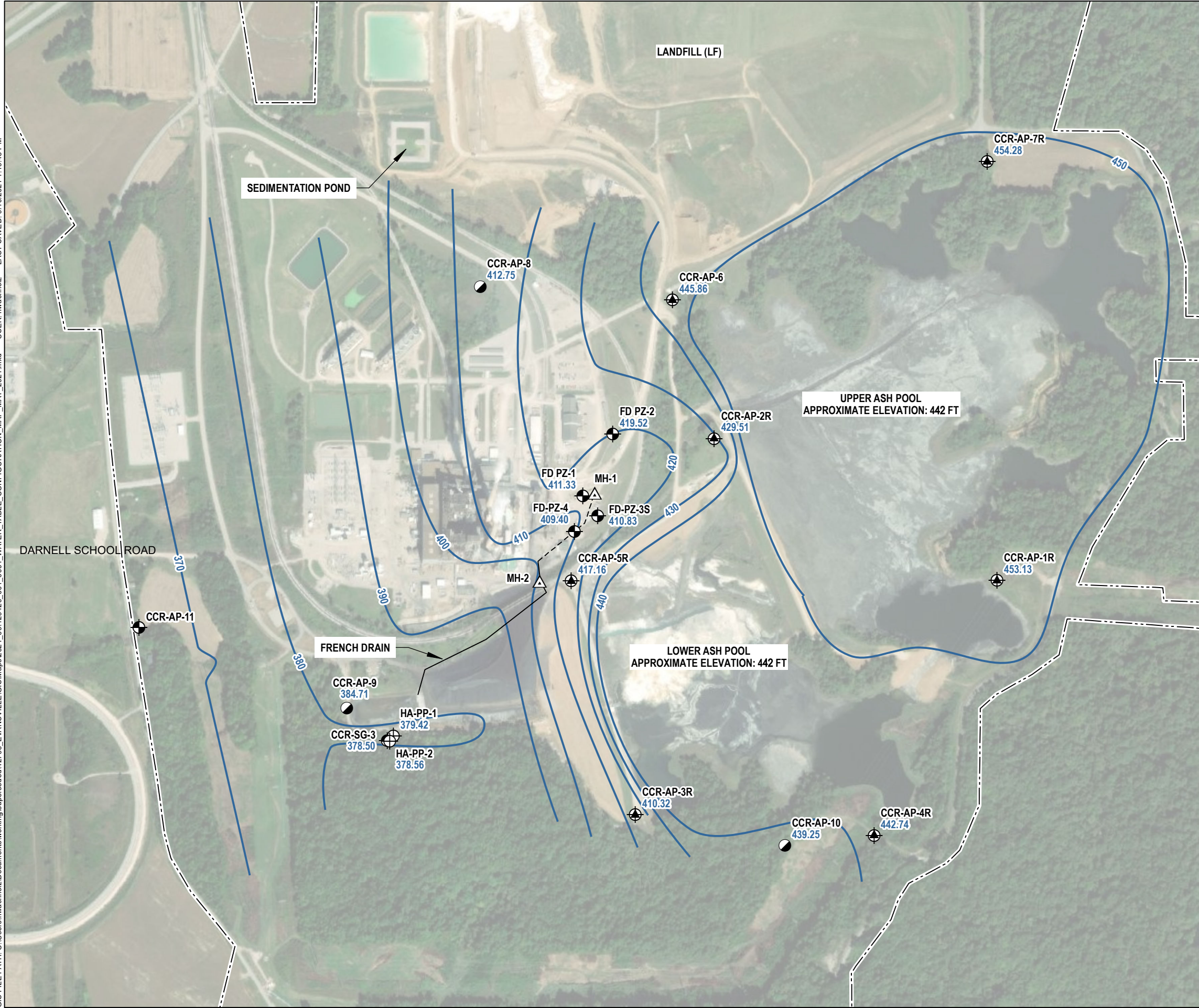
Logs from soil borings drilled at the Site indicate that the uppermost geologic unit is comprised of unconsolidated deposits consisting of primarily silt and clay with discontinuous layers of sand. This unconsolidated soil overlies Pennsylvanian age sandstone which is commonly identified as the Inglefield Sandstone. Underlying the Inglefield Sandstone is low permeability weathered shale and siltstone with intermittent discontinuous limestone deposits. The French drain evaluation identified a high conductivity zone within the uppermost portion of the weathered shale and siltstone. While limestone was not encountered within this flow zone, the high conductivity flow zone is interpreted to be the result of differential weathering of limestone. The available drilling records indicate that this flow zone pinches out to the north and extends from the Ash Pond to the west of the administration building. This flow zone is partially filled with saturated, very soft red silt/clay.

Hydrogeologic units are defined based on their ability to transmit groundwater or serve as confining units between zones of groundwater saturation. The uppermost aquifer downgradient of the Ash Pond occurs within unconsolidated low permeability deposits which consist primarily of silty clay containing discontinuous layers of sand. Groundwater contained within these unconsolidated deposits recharge the underlying bedrock units. Downgradient of the Ash Pond the unconsolidated deposits overlie weathered, or partially decomposed shale bedrock. As previously indicated, a high conductivity flow zone was identified within the upper portion of the bedrock unit. Groundwater flow and groundwater

quality data obtained during the French drain evaluation indicate that this flow zone is connected to the Ash Pond. Recharge to the unconsolidated deposits occurs through direct surface infiltration. Piezometric data recorded from the monitoring wells installed on-Site show that the configuration of the uppermost aquifer mimics surface topography with groundwater flowing from the ridges into the ravines where groundwater discharges into small perennial streams. Groundwater flow in the vicinity of the Ash Pond is predominantly to the west with a component of flow to the northwest from the northern portion of the Ash Pond beneath the Landfill. The French drain evaluation and subsequent groundwater modeling confirm that groundwater flowing west of the Ash Pond is captured by the French drain. Groundwater elevations vary seasonally but the groundwater flow patterns remain consistent.

## FIGURES

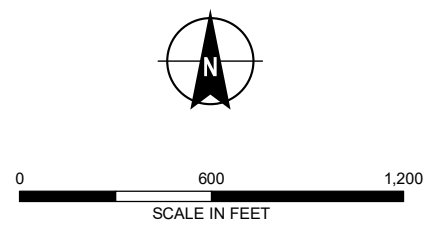
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**LEGEND**

- MANHOLE
- CCR MONITORING WELL
- NATURE AND EXTENT MONITORING WELL
- FRENCH DRAIN MONITORING WELL
- STAFF GAUGE
- CCR PIEZOMETER
- GROUNDWATER ELEVATION CONTOUR, 10-FT INTERVAL
- FRENCH DRAIN (OPEN PORTION)
- FRENCH DRAIN (CLOSED PORTION)

- NOTES**
1. ALL LOCATIONS ARE APPROXIMATE.
  2. AERIAL IMAGERY SOURCE: ESRI



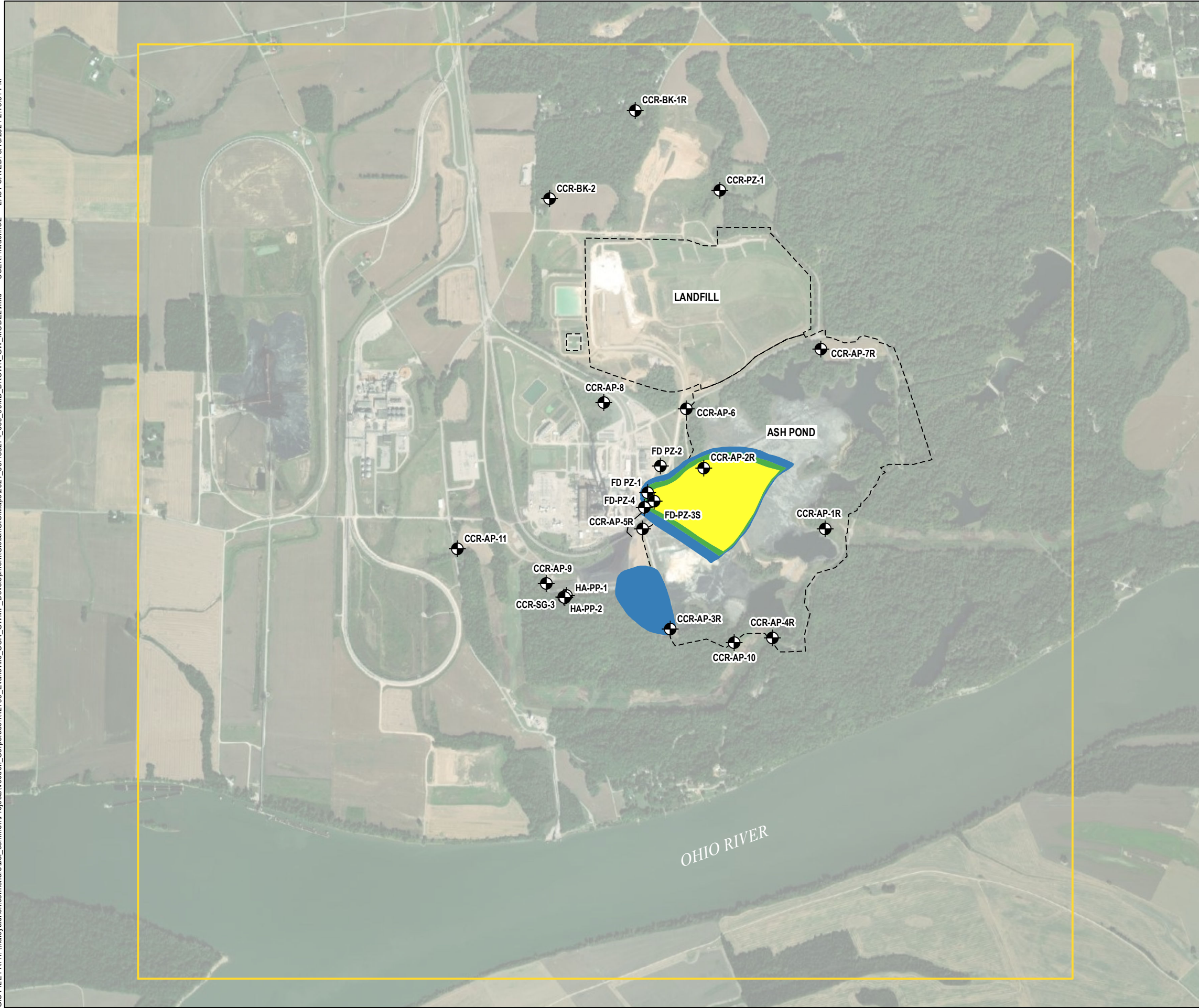
**HALEY ALDRICH** SOUTHERN INDIANA GAS AND ELECTRIC COMPANY  
A.B. BROWN GENERATING STATION  
MOUNT VERNON, INDIANA

**WATER TABLE CONFIGURATION MAP  
13 MAY 2021**

JANUARY 2022

**FIGURE 1**

GIS FILE PATH: \\haleyaldrich.com\share\boi\_common\Projects\Vegeten\_Corporation\42796\_Evansville\_CCR\_GWMP\_Development\Global\GIS\Maps\2021\_08\133274\_000\_00MB\_BROWN\_GW\_MODEL.mxd — USER: hwachholz — LAST SAVED: 8/19/2021 2:16:51 PM



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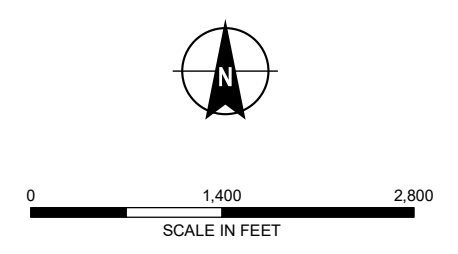
- MONITORING WELL LOCATION
- FRENCH DRAIN
- MODEL DOMAIN
- ASH POND

MOLYBDENUM CONCENTRATION (mg/L)

- 0.1 - 0.5
- 0.5 - 1.0
- 1.0 - 10.0

**NOTES**

- ALL LOCATIONS ARE APPROXIMATE.
- AERIAL IMAGERY SOURCE: ESRI



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

**MOLYBDENUM ISOCONCENTRATION MAP**

JANUARY 2022

FIGURE 2