

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

by
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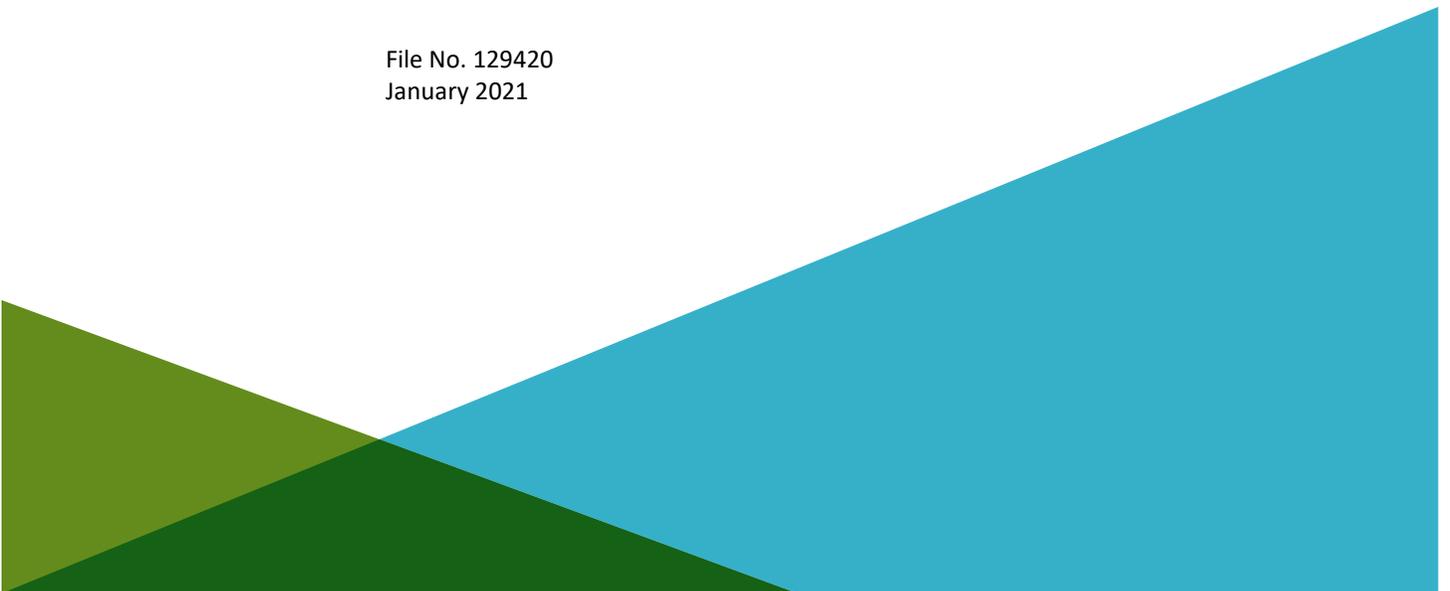


Table of Contents

	Page
List of Tables	ii
List of Figures	ii
1. Annual Groundwater Monitoring Report Summary	1
1.1 40 CFR § 257.90(e)(6) SUMMARY	1
1.1.1 40 CFR § 257.90(e)(6)(i) – Status of Monitoring Program at Start of Reporting Period	1
1.1.2 40 CFR § 257.90(e)(6)(ii) – Status of Monitoring Program at End of Reporting Period	1
1.1.3 40 CFR § 257.90(e)(6)(iii) – Statistically Significant Increases	1
1.1.4 40 CFR § 257.90(e)(6)(iv) – Statistically Significant Levels	2
1.1.5 40 CFR § 257.90(e)(6)(v) – Selection of Remedy	3
1.1.6 40 CFR § 257.90(e)(6)(vi) – Remedial Activities	3
1.2 40 CFR § 257.90(a)	3
1.3 40 CFR § 257.90(e) – SUMMARY	3
1.3.1 Status of the Groundwater Monitoring Program	4
1.3.2 Key Actions Completed	4
1.3.3 Problems Encountered	4
1.3.4 Actions to Resolve Problems	5
1.3.5 Project Key Activities for Upcoming Year	5
1.4 40 CFR § 257.90(e) – INFORMATION	5
1.4.1 40 CFR § 257.90(e)(1)	5
1.4.2 40 CFR § 257.90(e)(2)	5
1.4.3 40 CFR § 257.90(e)(3)	6
1.4.4 40 CFR § 257.90(e)(4)	6
1.4.5 40 CFR § 257.90(e)(5)	7

Tables
Figures

List of Tables

Table No.	Title
I	Groundwater Monitoring Well Location and Construction Details
II	Summary of Groundwater Quality Data

List of Figures

Figure No.	Title
1	Groundwater Monitoring Well Locations

1. Annual Groundwater Monitoring Report Summary

1.1 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 2020), the Ash Pond 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 2020), 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 2020.

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 remained in assessment monitoring in 2020.

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 analysis was completed in January 2020 (October 2019 event) and September 2020 (May 2020 event) as described in § 257.93(h)(2) and statistically significant levels (SSL) of lithium (CCR-AP-3) and molybdenum (CCR-AP-2 and CCR-AP-3) 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 meeting has not been held for the assessment of corrective measures for the Ash Pond. Determination of nature and extent, and corresponding site-specific characteristics, are progressing and necessary in order to prepare for the public meeting and to inform the selection of remedy. The public meeting is anticipated to be completed in 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, 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 2020 for molybdenum and lithium at the Ash Pond. A summary of actions completed associated with selection of remedy are provided in the March 2020 and September 2020 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.

No remedial activities have been initiated in 2020; 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 A.B. Brown Generating Station 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).

1.3 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 2020 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.

1.3.1 Status of the Groundwater Monitoring Program

Currently, Southern Indiana Gas and Electric Company (SIGECO) is evaluating an existing French drain located downgradient of the Ash Pond and its effect on the groundwater flow and constituent migration. This French drain is a relevant site feature that may affect the selection of remedy. Work that is being completed includes evaluating the control the French drain exerts on groundwater flow and the transport of molybdenum and lithium downgradient of the Ash Pond.

Annual and semi-annual groundwater sampling continued in May 2020 and November 2020 as outlined in § 257.95(b) and 257.95(d)(1). Statistical analysis was completed in January 2020 (October 2019 event) and September 2020 (May 2020 event) as described in § 257.93(h)(2) and SSLs of Appendix IV constituents (lithium and molybdenum) were identified downgradient of the Ash Pond. The results were consistent with previous events.

1.3.2 Key Actions Completed

The following key actions were completed in 2020:

- Completed a statistical analyses of assessment monitoring results to evaluate potential SSLs;
- Prepared the 2019 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.
- Prepared semiannual selection of remedy progress reports in March 2020 and September 2020 in accordance with § 257.97(a).
- Initiated an evaluation of the French drain as a potential control on groundwater flow and solute transport.

1.3.3 Problems Encountered

CCR-AP-5 was damaged by heavy equipment during infrastructure construction along the Ash Pond in November 2020. As a result, CCR-AP-5 was not able to be sampled during the November 2020 semiannual event. The monitoring well will be replaced and sampled in the first quarter of 2021.

1.3.4 Actions to Resolve Problems

Planning and coordination occurred in December 2020 to replace CCR-AP-5 in 2021.

1.3.5 Project Key Activities for Upcoming Year

Key activities to be completed in 2021 include the following:

- Further refine the characterization of the nature and extent of lithium and molybdenum in groundwater downgradient of the Ash Pond.
- Refine the characterization of the nature and extent of the French drain and its influence on groundwater flow and its effect on the potential selected remedy.
- 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, along with the characterization of nature and extent and site-specific characteristics 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).

1.4 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:

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;

Previously, a French drain was constructed to capture shallow groundwater flowing west beneath the generating station. The captured groundwater was routed through a hard pipe to the south side runoff pond. Piezometer FD-PZ-1 and FD-PZ-2 were installed in 2020 to evaluate the influence of the French drain on groundwater flow. Two push point piezometers (HA-PP-1 and HA-PP-2) were installed in 2020 adjacent to the creek below the Ash Pond in the vicinity of the previously installed staff gauge to evaluate groundwater/surface water interactions. Lastly, an additional well (CCR-AP-11) was installed in 2020 at the downgradient property line per 257.95(g)(1)(iii). Location and construction details are provided in Table I.

In addition, the APPW piezometers, originally installed in the Ash Pond to support an ASD, have been destroyed or could not be located due to construction activities at the Ash Pond. The ASD was unsuccessful therefore these piezometers are no longer needed and will not be replaced.

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.

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

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. The assessment of corrective measures was completed in September 2019. Two semiannual progress Selection of Remedy Progress Reports (March 2020 and September 2020) were completed in and placed in the operating record. A remedy will be selected once the feasibility of potential corrective measures identified by the CMA and the on-going evaluation of nature and extent is completed. Semiannual sampling will continue in 2021.

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 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	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-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	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

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

TABLE II
 SUMMARY OF GROUNDWATER QUALITY DATA
 ASH POND
 A.B. BROWN GENERATION STATION
 MOUNT VERNON, INDIANA

Location Group Location Name Sample Name Sample Date Lab Sample ID	Action Level Maximum Contaminant Leve	Background			
		CCR-BK-1R CCR-BK-1R-20200526 05/26/2020 180-106382-8	CCR-BK-1R CCR-BK-1R-20201103 11/03/2020 180-113224-1	CCR-BK-2 CCR-BK-2-20200526 05/26/2020 180-106382-9	CCR-BK-2 CCR-BK-2-20201103 11/03/2020 180-113224-2
		Detection Monitoring - EPA Appendix III Constituents (mg/L)			
Boron, Total	NA	0.11 U	0.08 U	0.091 U	0.08 U
Calcium, Total	NA	41	59	56	42
Chloride	NA	3.7	6.2	10	19
Fluoride	4	0.37 J+	0.36	0.21 J+	0.15
Sulfate	NA	24	30	42	23
Total Dissolved Solids (TDS)	NA	220	310	450	240
pH (lab) (SU)	NA	7 J	7.4 J	7.1 J	7.2 J
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	0.001 U	0.001 U	0.001 U	0.001 U
Barium, Total	2	0.031	0.037 J-	0.038	0.033 J-
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	0.0019 J	0.002 U	0.002 U
Cobalt, Total	0.006	0.00015 J	0.00013 J	0.0005 U	0.0005 U
Fluoride	4	0.37 J+	0.36	0.21 J+	0.15
Lead, Total	0.015	0.00023 J	0.0002 J	0.001 U	0.00017 J
Lithium, Total	0.04	0.005 U	0.005 U	0.0036 J	0.005 U
Mercury, Total	0.002	0.0002 U	0.0002 U	0.0002	0.0002 U
Molybdenum, Total	0.1	0.00079 J	0.00096 J	0.0015 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	0.00027 J	0.001 U	0.00018 J
Radiological (pCi/L)					
Radium-226	NA	0.0680 U ± 0.124	0.0680 U ± 0.156	-0.0171 U ± 0.066	-0.125 U ± 0.19
Radium-228	NA	0.141 U ± 0.307	0.287 U ± 0.211	-0.0790 U ± 0.213	0.185 U ± 0.217
Radium-226 & 228	5	0.209 U ± 0.331	0.355 ± 0.262	-0.0961 U ± 0.223	0.185 U ± 0.288
Field Parameters					
Temperature (Deg C)	NA	16.25	16.69	15	15.74
Dissolved Oxygen, Field (mg/L)	NA	5.6	7.17	0.34	0.25
Conductivity, Field (mS/cm)	NA	0.37785	0.26939	0.60272	0.19472
ORP, Field (mv)	NA	5.4	157.4	-17	177.6
Turbidity, Field (NTU)	NA	4.49	0.5	0.36	12.93
pH, Field (SU)	NA	6.86	6.66	6.82	6.68

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
 A.B. BROWN GENERATION STATION
 MOUNT VERNON, INDIANA

Location Group Location Name Sample Name Sample Date Lab Sample ID	Action Level Maximum Contaminant Leve	Downgradient						
		CCR-AP-1R	CCR-AP-1R	CCR-AP-2I	CCR-AP-2I	CCR-AP-2R	CCR-AP-2R	CCR-AP-3I
		CCR-AP-1R-20200526 05/26/2020 180-106382-1	CCR-AP-1R-20201105 11/05/2020 180-113376-1	CCR-AP-2I-20200526 05/26/2020 180-106382-3	CCR-AP-2I-20201105 11/05/2020 180-113376-2	CCR-AP-2R-20200526 05/26/2020 180-106382-2	CCR-AP-2R-20201105 11/05/2020 180-113376-3	CCR-AP-3I-20200526 05/26/2020 180-106382-5
Detection Monitoring - EPA Appendix III Constituents (mg/L)								
Boron, Total	NA	3.5	2.7	1.9	1.7	13	11	2.2
Calcium, Total	NA	47	40	14	12	340	350	19
Chloride	NA	39	29	97	99	580	1300	150
Fluoride	4	0.62	0.65	1.1	1.1	0.76	1.1	1.4
Sulfate	NA	7.2 J	7.4 J	1.9 U	0.57 J-	2800	6700 J-	12
Total Dissolved Solids (TDS)	NA	280	240 J-	740	690	5600	3600	740
pH (lab) (SU)	NA	1100	850	7.5 J	7.8 J	7.1 J	7.4 J	8 J
Assessment Monitoring - EPA Appendix IV Constituents (mg/L)								
Antimony, Total	0.006	0.002 U	0.002 U	0.002 U	0.002 U	0.02 U	0.002 U	0.002 U
Arsenic, Total	0.01	0.00031 J	0.0005 J	0.0013	0.001	0.01 U	0.00055 J	0.0021
Barium, Total	2	0.026	0.031	0.096	0.12	0.021 J	0.022 J+	0.16
Beryllium, Total	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.001 U	0.001 U
Cadmium, Total	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.001 U	0.001 U
Chromium, Total	0.1	0.002 U	0.02	0.002 U	0.002 U	0.02 U	0.002 U	0.002 U
Cobalt, Total	0.006	0.0005 U	0.00044 J	0.00019 J	0.00017 J	0.0027 J	0.0028	0.00014 J
Fluoride	4	0.62	0.65	1.1	1.1	0.76	1.1	1.4
Lead, Total	0.015	0.001 U	0.00016 J	0.001 U	0.001 U	0.01 U	0.001 U	0.00021 J
Lithium, Total	0.04	0.005 U	0.005 U	0.022	0.022	0.035 J	0.033	0.023
Mercury, Total	0.002	0.0002 U						
Molybdenum, Total	0.1	0.0042 J	0.0049 J	0.0014 J	0.0009 J	2	1.9	0.0023 J
Selenium, Total	0.05	0.005 U	0.005 U	0.005 U	0.005 U	0.05 U	0.005 U	0.005 U
Thallium, Total	0.002	0.001 U	0.001 U	0.001 U	0.001 U	0.01 U	0.001 U	0.00023 J
Radiological (pCi/L)								
Radium-226	NA	0.0878 U ± 0.123	0.152 U ± 0.226	0.329 ± 0.196	0.279 U ± 0.277	0.213 ± 0.148	0.115 U ± 0.178	0.385 ± 0.17
Radium-228	NA	0.113 U ± 0.259	0.500 ± 0.332	0.362 U ± 0.226	-0.00932 U ± 0.347	0.339 U ± 0.224	0.224 U ± 0.3	0.391 U ± 0.228
Radium-226 & 228	5	0.200 U ± 0.287	0.652 J ± 0.402	0.690 J+ ± 0.299	0.279 U ± 0.444	0.552 J+ ± 0.268	0.339 U ± 0.349	0.776 J+ ± 0.284
Field Parameters								
Temperature (Deg C)	NA	15.71	16.09	18.11	17.29	18.2	17.49	18.77
Dissolved Oxygen, Field (mg/L)	NA	0.04	0.54	0.33	0.48	0.16	0.21	0.15
Conductivity, Field (mS/cm)	NA	1.6621	1.6158	0.95706	1.3378	6.9759	7.7844	1.2904
ORP, Field (mv)	NA	-45.2	127.3	-83.5	-140.9	53.1	52.5	-236
Turbidity, Field (NTU)	NA	0.48	11.05	1.83	18.71	7.54	150.79	7.5
pH, Field (SU)	NA	7.1	6.98	7.34	7.47	7.11	6.9	8.04

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Location Group Location Name Sample Name Sample Date Lab Sample ID	Action Level Maximum Contaminant Leve	Downgradient						
		CCR-AP-3I CCR-AP-3I-20201104 11/04/2020 180-113224-11	CCR-AP-3I BLIND DUPLICATE 1-20201104 11/04/2020 180-113224-17	CCR-AP-3R CCR-AP-3R-20200526 05/26/2020 180-106382-4	CCR-AP-3R CCR-AP-3R-20201104 11/04/2020 180-113224-12	CCR-AP-4R CCR-AP-4R-20200521 05/21/2020 180-106195-1	CCR-AP-4R CCR-AP-4R-20201105 11/05/2020 180-113376-4	CCR-AP-5 CCR-AP-5-20200526 05/26/2020 180-106382-6
		Detection Monitoring - EPA Appendix III Constituents (mg/L)						
Boron, Total	NA	2.3 J+	1.8 J+	13	12 J+	0.041 U	0.12	12
Calcium, Total	NA	21	21	300	210	180	140	430
Chloride	NA	160	150	730	540	28	19	420
Fluoride	4	1.4	1.4	1.7	1.3	0.26 J+	0.48	0.56
Sulfate	NA	11	11	4200	2800	99	86 J-	2900
Total Dissolved Solids (TDS)	NA	770	760	6600	5300	920	720	4900
pH (lab) (SU)	NA	8.1 J	8 J	7.4 J	7.5 J	7.2 J	7.4 J	7.1 J
Assessment Monitoring - EPA Appendix IV Constituents (mg/L)								
Antimony, Total	0.006	0.002 U	0.002 U	0.02 U	0.002 U	0.002 U	0.002 U	0.02 U
Arsenic, Total	0.01	0.0018	0.002	0.01 U	0.001 U	0.001 U	0.001 U	0.01 U
Barium, Total	2	0.17 J-	0.17 J-	0.019 J	0.014 J-	0.091	0.08	0.02 J
Beryllium, Total	0.004	0.001 U	0.001 U	0.01 U	0.001 U	0.001 U	0.001 U	0.01 U
Cadmium, Total	0.005	0.001 U	0.001 U	0.01 U	0.001 U	0.001 U	0.001 U	0.01 U
Chromium, Total	0.1	0.002 U	0.002 U	0.02 U	0.002 U	0.0027	0.0023	0.02 U
Cobalt, Total	0.006	0.00014 J	0.0005 U	0.005 U	0.00088	0.0005 U	0.0005 U	0.005 U
Fluoride	4	1.4	1.4	1.7	1.3	0.26 J+	0.48	0.56
Lead, Total	0.015	0.001 U	0.001 U	0.01 U	0.001 U	0.001 U	0.001 U	0.01 U
Lithium, Total	0.04	0.026	0.025	0.074	0.063	0.005 U	0.005 U	0.05 U
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
Molybdenum, Total	0.1	0.0025 J	0.0023 J	0.86	0.89	0.0012 J	0.0012 J	0.071
Selenium, Total	0.05	0.005 U	0.005 U	0.05 U	0.04	0.005 U	0.005 U	0.05 U
Thallium, Total	0.002	0.001 U	0.001 U	0.01 U	0.001 U	0.001 U	0.001 U	0.01 U
Radiological (pCi/L)								
Radium-226	NA	0.349 ± 0.224	-0.00679 U ± 0.171	-0.0218 U ± 0.0691	0.0380 U ± 0.139	0.114 ± 0.0759	0.0118 U ± 0.291	0.0594 U ± 0.0909
Radium-228	NA	0.518 ± 0.23	0.0532 U ± 0.156	0.636 U ± 0.247	0.252 U ± 0.203	0.319 U ± 0.335	-0.0270 U ± 0.306	0.492 U ± 0.235
Radium-226 & 228	5	0.867 J ± 0.321	0.0532 UJ ± 0.231	0.615 J+ ± 0.256	0.290 U ± 0.246	0.433 UJ ± 0.343	0.0118 U ± 0.422	0.552 J+ ± 0.252
Field Parameters								
Temperature (Deg C)	NA	18.22	18.22	18.46	19.54	15.27	13.89	17.22
Dissolved Oxygen, Field (mg/L)	NA	0.47	0.47	0.14	0.44	6.33	7.09	0.13
Conductivity, Field (mS/cm)	NA	1.3955	1.3955	7.5986	7.5839	1.4968	1.2279	6.2241
ORP, Field (mv)	NA	-109.1	-109.1	-8.1	20.2	-19.6	121.8	15
Turbidity, Field (NTU)	NA	2.79	2.79	0.49	0.32	3.09	0	0.41
pH, Field (SU)	NA	7.79	7.79	7.41	7.19	7.16	6.98	7.11

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 MOUNT VERNON, INDIANA

Location Group Location Name Sample Name Sample Date Lab Sample ID	Action Level Maximum Contaminant Leve	Downgradient						
		CCR-AP-6 CCR-AP-6-20200522 05/22/2020 180-106195-5	CCR-AP-6 CCR-AP-6-20201104 11/04/2020 180-113224-13	CCR-AP-7R CCR-AP-7R-20200522 05/22/2020 180-106195-4	CCR-AP-7R BLIND DUPLICATE 1-20200522 05/22/2020 180-106195-6	CCR-AP-7R CCR-AP-7R-20201103 11/03/2020 180-113224-14	CCR-AP-8 CCR-AP-8-20200522 05/22/2020 180-106195-3	CCR-AP-8 CCR-AP-8-20201104 11/04/2020 180-113224-15
		Detection Monitoring - EPA Appendix III Constituents (mg/L)						
Boron, Total	NA	4.5	5.9 J+	5	5.2	3.8 J+	0.34 J+	0.69 J+
Calcium, Total	NA	310	270	420	400	410	240	310
Chloride	NA	260	280	2400 J	430 J	330	79	100
Fluoride	4	0.12 U	0.16 J	0.55	0.5 U	0.5 U	0.22 J+	0.25
Sulfate	NA	1500	1400	14000 J	3000 J	3100	700	1000
Total Dissolved Solids (TDS)	NA	2600	2700	4400	4700	4800	1500	2000
pH (lab) (SU)	NA	7.2 J	7.2 J	6.6 J	6.6 J	6.7 J	7.1 J	7 J
Assessment Monitoring - EPA Appendix IV Constituents (mg/L)								
Antimony, Total	0.006	0.002 U	0.002 U	0.0004 J	0.002 U	0.002 U	0.002 U	0.002 U
Arsenic, Total	0.01	0.0011	0.0011	0.00057 J	0.00043 J	0.00087 J	0.00036 J	0.0015
Barium, Total	2	0.013	0.011 J-	0.026	0.025	0.032 J-	0.089	0.065 J-
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
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
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
Cobalt, Total	0.006	0.00098	0.00044 J	0.00023 J	0.00021 J	0.00053	0.00054	0.00046 J
Fluoride	4	0.12 U	0.16 J	0.55	0.5 U	0.5 U	0.22 J+	0.25
Lead, Total	0.015	0.00019 J	0.001 U	0.00016 J	0.00034 J	0.0004 J	0.001 U	0.001 U
Lithium, Total	0.04	0.029	0.027	0.021	0.02	0.021	0.012	0.016
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
Molybdenum, Total	0.1	0.0057	0.0043 J	0.005 U	0.005 U	0.005 U	0.00082 J	0.00085 J
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
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
Radiological (pCi/L)								
Radium-226	NA	0.00136 U ± 0.0653	0.0144 U ± 0.142	0.0914 U ± 0.0671	0.227 ± 0.096	0.00614 U ± 0.121	0.208 ± 0.0939	0.0798 U ± 0.151
Radium-228	NA	0.300 U ± 0.211	0.0765 U ± 0.175	0.327 U ± 0.237	0.352 ± 0.221	0.389 ± 0.23	0.177 U ± 0.309	0.256 U ± 0.208
Radium-226 & 228	5	0.301 U ± 0.221	0.0909 U ± 0.225	0.418 ± 0.246	0.578 ± 0.241	0.395 J ± 0.26	0.385 UJ ± 0.323	0.336 ± 0.257
Field Parameters								
Temperature (Deg C)	NA	14.9	14.01	14.56	14.56	13.9	16.35	28.47
Dissolved Oxygen, Field (mg/L)	NA	1.22	0.85	7.98	7.98	6.59	0.7	4
Conductivity, Field (mS/cm)	NA	3.4481	3.6505	5.6531	5.6531	2.9795	1.7188	1.1164
ORP, Field (mv)	NA	-6.3	-82.4	47.3	47.3	201.3	7.3	131.9
Turbidity, Field (NTU)	NA	8.13	13.53	10.41	10.41	155.67	5.88	215.74
pH, Field (SU)	NA	7.13	6.88	6.66	6.66	6.4	6.97	6.84

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 ASH POND
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 MOUNT VERNON, INDIANA

Location Group Location Name Sample Name Sample Date Lab Sample ID	Action Level Maximum Contaminant Leve	Downgradient					
		CCR-AP-9 CCR-AP-9-20200526 05/26/2020 180-106382-7	CCR-AP-9 CCR-AP-9-20201104 11/04/2020 180-113224-16	CCR-AP-10 CCR-AP-10-20200521 05/21/2020 180-106195-2	CCR-AP-10 CCR-AP-10-20201105 11/05/2020 180-113376-5	CCR-AP-11 CCR-AP-11-20200529 05/29/2020 180-106529-1	CCR-AP-11 CCR-AP-11-20201105 11/05/2020 180-113376-6
		Detection Monitoring - EPA Appendix III Constituents (mg/L)					
Boron, Total	NA	7.5	5.5 J+	7.1	6.5	0.91	0.66
Calcium, Total	NA	490	480	220	210	120	120
Chloride	NA	630	670	210	180	54	70
Fluoride	4	0.56	1 U	0.34	0.4 J	0.19 J+	0.17
Sulfate	NA	3700	3800	2300	2000 J-	200	740 J-
Total Dissolved Solids (TDS)	NA	6000	6800	3100	3100	850	1000
pH (lab) (SU)	NA	6.7 J	6.7 J	7.4 J	7.5 J	7 J	7.2 J
Assessment Monitoring - EPA Appendix IV Constituents (mg/L)							
Antimony, Total	0.006	0.02 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Arsenic, Total	0.01	0.017	0.027	0.00045 J	0.0011	0.0011	0.0006 J
Barium, Total	2	0.083 J	0.09 J-	0.012	0.016 J+	0.06	0.058
Beryllium, Total	0.004	0.0022 J	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium, Total	0.005	0.01 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Chromium, Total	0.1	0.02 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Cobalt, Total	0.006	0.005 U	0.00022 J	0.00073	0.0012	0.00099	0.00062
Fluoride	4	0.56	1 U	0.34	0.4 J	0.19 J+	0.17
Lead, Total	0.015	0.0028 J	0.001 U	0.00016 J	0.00072 J	0.00091 J	0.00027 J
Lithium, Total	0.04	0.05 U	0.031	0.005 U	0.005 U	0.014	0.012
Mercury, Total	0.002	0.0002 U	0.0002 U	0.0002 U	0.0002 U	-	0.0002 U
Molybdenum, Total	0.1	0.0089 J	0.0078	0.0026 J	0.0026 J	0.00082 J	0.00087 J
Selenium, Total	0.05	0.05 U	0.005 U	0.018	0.036	0.0075	0.0033 J
Thallium, Total	0.002	0.01 U	0.001 U	0.001 U	0.00027 J	0.001 U	0.001 U
Radiological (pCi/L)							
Radium-226	NA	0.319 ± 0.185	0.444 ± 0.221	0.113 U ± 0.107	-0.0874 U ± 0.293	0.0569 U ± 0.0942	-0.0535 U ± 0.208
Radium-228	NA	0.807 U ± 0.381	0.245 U ± 0.171	0.294 U ± 0.295	0.445 U ± 0.36	0.440 ± 0.267	-0.317 U ± 0.336
Radium-226 & 228	5	1.13 J+ ± 0.424	0.689 J ± 0.279	0.408 U ± 0.314	0.445 U ± 0.464	0.497 J ± 0.283	0.00 U ± 0.395
Field Parameters							
Temperature (Deg C)	NA	17.51	19.42	14.75	14.55	14.78	17.58
Dissolved Oxygen, Field (mg/L)	NA	0.12	0.1	0.97	0.68	0.56	0.1
Conductivity, Field (mS/cm)	NA	8.1032	8.1425	4.4089	4.567	1.2574	1.2794
ORP, Field (mv)	NA	-115	-108.4	5.4	127.9	44.1	134.3
Turbidity, Field (NTU)	NA	7.35	4.03	21.02	5.21	27.13	12.86
pH, Field (SU)	NA	7.09	6.83	7.27	7.68	6.83	6.7

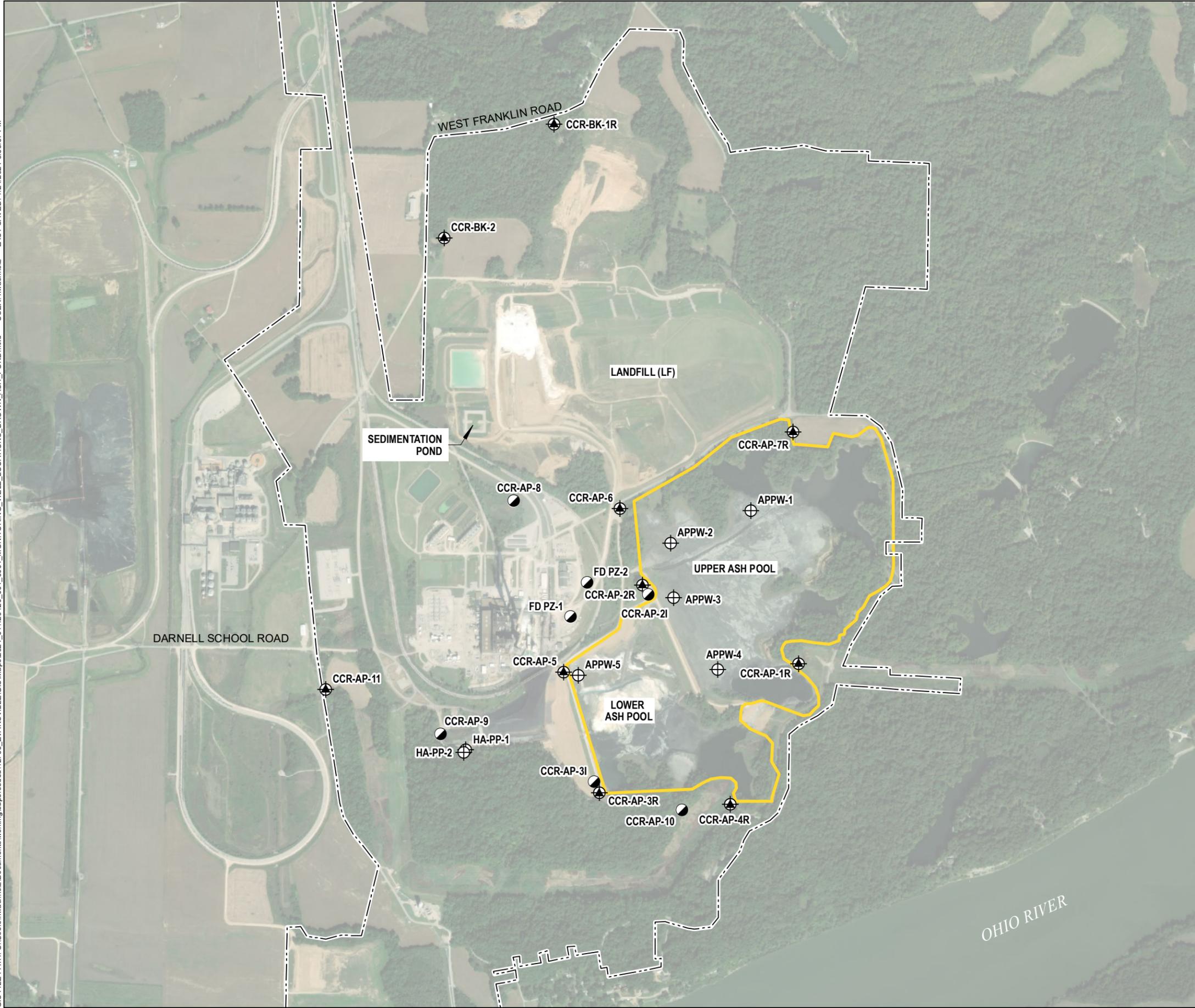
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FIGURES

GIS FILE PATH: C:\Users\hwachholz\Documents\working\superseded\42796_EVANSVILLE\GIS\Maps\2021_0112\9420_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
-  ASH POND 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

JANUARY 2021

FIGURE 1