

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

by
Haley & Aldrich, Inc.
Greenville, South Carolina

for
Southern Indiana Gas and Electric Company
Evansville, Indiana

File No. 129420
January 2021

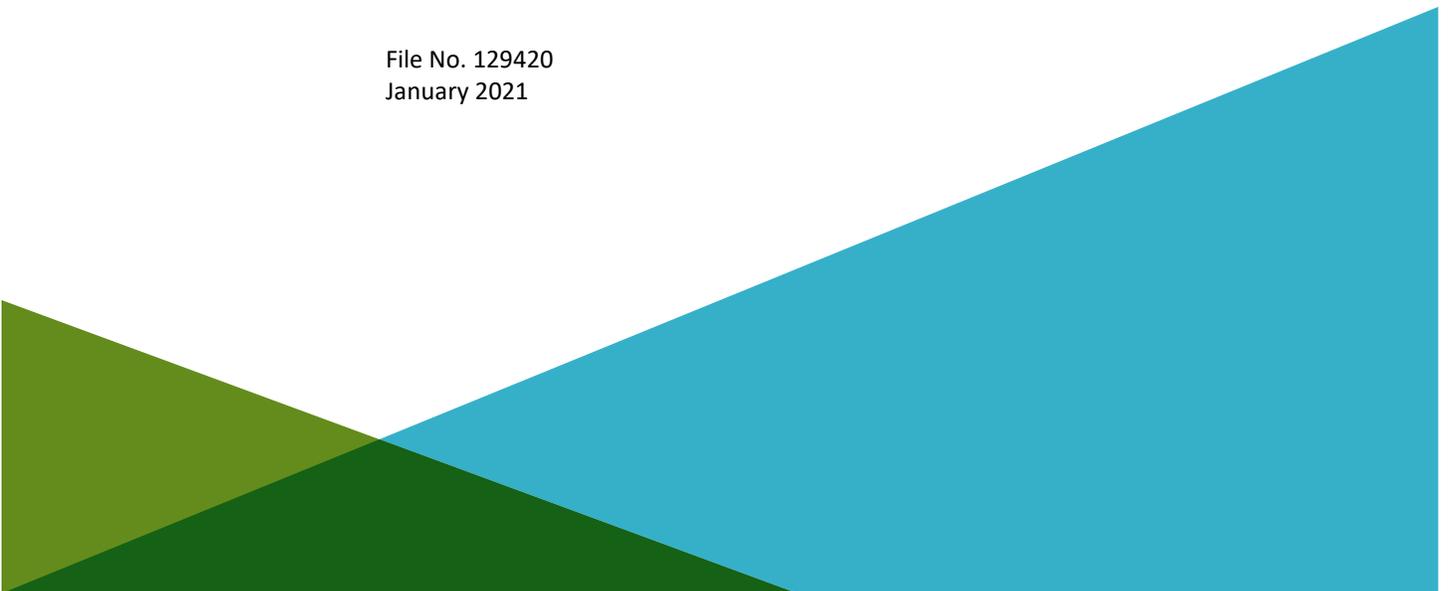


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1. Annual Groundwater Monitoring Report Summary

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 Sedimentation 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 Sedimentation Pond was 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 Sedimentation 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 Sedimentation Pond to meet the requirements of 40 CFR § 257.95.

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) were not identified at any of the monitoring wells in 2020.

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;

An assessment of corrective measures has not been initiated for this unit since no SSLs have been identified through year end 2020. The Sedimentation Pond remained in assessment monitoring during 2020.

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

An assessment of corrective measures is not required and therefore has not been initiated for the Sedimentation Pond through year end 2020; therefore, a public meeting was not held.

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.

An assessment of corrective measures has not been completed for this unit since no SSLs have been identified through year end 2020. The Sedimentation Pond remained in assessment monitoring during 2020.

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

Since an assessment of corrective measures has not been required, the selection of remedy under § 257.97 is not required. The Unit remained in Assessment Monitoring in 2020.

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 Sedimentation 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).

1.3 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 Sedimentation 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

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 for the November 2019 sampling event and again in September 2020 for the May 2020 sampling event as described in § 257.93(h)(2). The results of the statistical analysis continued to demonstrate that SSLs of Appendix IV constituents were not present in groundwater downgradient of the Sedimentation Pond. Although SSLs were not present, some concentrations are above background, therefore in accordance with 257.95(f), the Sedimentation Pond will continue with semiannual assessment monitoring. Key Actions Completed

The following key actions were completed in 2020:

- Completed statistical analyses of assessment monitoring results to evaluate potential SSLs;
- Prepared 2019 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 Coal Combustion Residuals (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(b) and § 257.95(d)(1).

1.3.2 Problems Encountered

In April 2020, the cover to monitoring well CCR-SP-1 was discovered missing. The integrity of the monitoring well and the annual seal was found to be in good condition.

1.3.3 Actions to Resolve Problems

As a precaution, and to ensure that groundwater samples collected from this location in the future were representative, CCR-SP-1 was redeveloped and the well cover was replaced.

1.3.4 Project Key Activities for Upcoming Year

Key activities to be completed in 2021 include the following:

- Continue semiannual Assessment Monitoring as required by § 257.95; and
- Complete statistical analyses of the semiannual groundwater sampling results as required by § 257.93(h)(2).

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 Sedimentation Pond and associated upgradient, 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;

Additional monitoring wells were not installed nor were any monitoring wells decommissioned during 2020. However, location and construction details of the existing monitoring well network for the Sedimentation Pond is provided for reference as 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 Sedimentation 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

The statistical analyses completed in 2020 determined that SSLs of Appendix IV constituents were not present downgradient of the Sedimentation Pond, though some concentrations are above background.

As a result, this CCR Unit remains in assessment monitoring and 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 - SEDIMENTATION 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-SP-1	Sediment Pond	March 2016	2770030.26	970981.89	403.90	403.51	0.0 - 6.0	6.0 - 8.0	8.0 - 20.0	10.00 - 20.00	10	2	Active
CCR-SP-2	Sediment Pond	March 2016	2769939.51	970887.25	403.60	403.23	0.0 - 6.0	6.0 - 8.0	8.0 - 20.0	10.00 - 20.00	10	2	Active
CCR-SP-3	Sediment Pond	March 2016	2770027.64	970735.02	403.90	403.57	0.0 - 6.0	6.0 - 8.0	8.0 - 20.0	10.00 - 20.00	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

Notes:
 bgs = below ground surface
 ft = feet
 in = inches
 msl = mean sea level
 Datum of Elevations in NAVD 88

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

Location Group Location Name Sample Name Sample Date Lab Sample ID	Action Level Maximum Contaminant Level	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
SEDIMENTATION POND
A.B. BROWN GENERATING STATION
MOUNT VERNON, INDIANA**

Location Group Location Name Sample Name Sample Date Lab Sample ID	Action Level Maximum Contaminant Level	Downgradient					
		CCR-SP-1 CCR-SP-1-20200527 05/27/2020 180-106384-1	CCR-SP-1 CCR-SP-1-20201105 11/05/2020 180-113377-1	CCR-SP-1 BLIND DUPLICATE 3-20201105 11/05/2020 180-113377-4	CCR-SP-2 CCR-SP-2-20200527 05/27/2020 180-106384-2	CCR-SP-2 BLIND DUPLICATE 3-20200527 05/27/2020 180-106384-4	CCR-SP-2 CCR-SP-2-20201105 11/05/2020 180-113377-2
Detection Monitoring - EPA Appendix III Constituents (mg/L)							
Boron, Total	NA	0.38 J+	0.48	0.44	0.14 U	0.17 J+	0.15
Calcium, Total	NA	210	210	210	160	160	170
Chloride	NA	87	92	91	61	62	70
Fluoride	4	0.15 U	0.25	0.24	0.23 J+	0.22 J+	0.33
Sulfate	NA	770	860	710	300	300	310
Total Dissolved Solids (TDS)	NA	1500	1600	1700	910	900	1000
pH (lab) (SU)	NA	7 J	6.9 J	7 J	7.1 J	7.2 J	7.1 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	0.002 U	0.002 U
Arsenic, Total	0.01	0.003	0.0039	0.0039	0.0028	0.0019	0.0034
Barium, Total	2	0.063 J+	0.075	0.076	0.1	0.1	0.1
Beryllium, Total	0.004	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
Chromium, Total	0.1	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Cobalt, Total	0.006	0.0064	0.0065	0.0066	0.0019 J	0.0012 J	0.0015
Fluoride	4	0.15 U	0.25	0.24	0.23 J+	0.22 J+	0.33
Lead, Total	0.015	0.001 U	0.001 U	0.001 U	0.00088 J	0.00038 J	0.00043 J
Lithium, Total	0.04	0.0066	0.0053	0.0053	0.0073	0.0062	0.0063
Mercury, Total	0.002	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Molybdenum, Total	0.1	0.0011 J	0.0011 J	0.0011 J	0.0014 J	0.0013 J	0.0013 J
Selenium, Total	0.05	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
Radiological (pCi/L)							
Radium-226	NA	0.163 U ± 0.141	0.310 U ± 0.302	-0.170 UJ ± 0.157	0.114 U ± 0.142	0.132 U ± 0.187	0.118 U ± 0.272
Radium-228	NA	0.364 U ± 0.24	0.164 U ± 0.426	0.149 U ± 0.334	0.408 U ± 0.324	0.135 U ± 0.253	0.123 U ± 0.356
Radium-226 & 228	5	0.527 J+ ± 0.278	0.474 U ± 0.522	0.149 U ± 0.369	0.522 ± 0.354	0.267 U ± 0.315	0.241 U ± 0.448
Field Parameters							
Temperature (Deg C)	NA	13.89	18.29	18.29	14.84	14.84	15.63
Dissolved Oxygen, Field (mg/L)	NA	0.03	0.06	0.06	0	0	0.06
Conductivity, Field (mS/cm)	NA	1.9757	2.3966	2.3966	1.2841	1.2841	1.5822
ORP, Field (mv)	NA	-19.2	-97.9	-97.9	-41.6	-41.6	-54
Turbidity, Field (NTU)	NA	1.08	44.5	44.5	2.7	2.7	1.97
pH, Field (SU)	NA	6.73	6.57	6.57	6.82	6.82	6.77

ABBREVIATIONS AND NOTES:

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

Location Group Location Name Sample Name Sample Date Lab Sample ID	Action Level Maximum Contaminant Level	Downgradient	
		CCR-SP-3 CCR-SP-3-20200527 05/27/2020 180-106384-3	CCR-SP-3 CCR-SP-3-20201105 11/05/2020 180-113377-3
Detection Monitoring - EPA Appendix III Constituents (mg/L)			
Boron, Total	NA	0.08 U	0.043 J
Calcium, Total	NA	87	88
Chloride	NA	5.6	6.9
Fluoride	4	0.27 J+	0.52
Sulfate	NA	3.2 J+	3.6
Total Dissolved Solids (TDS)	NA	500	390
pH (lab) (SU)	NA	7.1 J	7.4 J
Assessment Monitoring - EPA Appendix IV Constituents (mg/L)			
Antimony, Total	0.006	0.002 U	0.002 U
Arsenic, Total	0.01	0.0069	0.0085
Barium, Total	2	0.079	0.075
Beryllium, Total	0.004	0.001 U	0.001 U
Cadmium, Total	0.005	0.001 U	0.001 U
Chromium, Total	0.1	0.002 U	0.002 U
Cobalt, Total	0.006	0.00075	0.00063
Fluoride	4	0.27 J+	0.52
Lead, Total	0.015	0.00021 J	0.001 U
Lithium, Total	0.04	0.005 U	0.005 U
Mercury, Total	0.002	0.0002 U	0.0002 U
Molybdenum, Total	0.1	0.0041 J	0.0043 J
Selenium, Total	0.05	0.005 U	0.005 U
Thallium, Total	0.002	0.001 U	0.001 U
Radiological (pCi/L)			
Radium-226	NA	0.229 ± 0.146	0.228 U ± 0.28
Radium-228	NA	0.316 U ± 0.229	-0.0184 U ± 0.354
Radium-226 & 228	5	0.545 J ± 0.272	0.228 U ± 0.451
Field Parameters			
Temperature (Deg C)	NA	14.19	17.08
Dissolved Oxygen, Field (mg/L)	NA	0.41	0.13
Conductivity, Field (mS/cm)	NA	0.65459	0.74555
ORP, Field (mv)	NA	-43.5	-80.1
Turbidity, Field (NTU)	NA	5.33	2610
pH, Field (SU)	NA	6.99	7

ABBREVIATIONS AND NOTES:

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 Results in **bold** are detected.

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

FIGURES

GIS FILE PATH: C:\Users\hwachholz\Documents\working\42796_EVANSVILLE\GIS\Maps\2021_011129420_001_0001_MONITORING_WELL_LOCATIONS_BROWN_SED_POND.mxd — USER: hwachholz — LAST SAVED: 1/8/2021 2:54:03 PM



LEGEND

-  CCR MONITORING 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