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**REPORT ON
2019 ANNUAL GROUNDWATER MONITORING AND
CORRECTIVE ACTION REPORT
F.B. CULLEY GENERATING STATION
WEST ASH POND
WARRICK COUNTY, INDIANA**

by Haley & Aldrich, Inc.
Greenville, South Carolina

for Southern Indiana Gas and Electric Company (SIGECO)
Evansville, Indiana

File No. 129420-013
August 2019

Annual Groundwater Monitoring Report Summary

Haley & Aldrich, Inc. (Haley & Aldrich) has prepared this 2019 Annual Groundwater Monitoring Corrective Action Report for the F.B. Culley Generating Station (FBC). This 2019 Annual Report was developed to comply with the United States Environmental Protection Agency (USEPA) Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals (CCR) from Electric Utilities, 40 CFR Part 257, Subpart D dated 17 April 2015 (Rule), specifically subsection §257.90(e)(1) through (5). Southern Indiana Gas and Electric Company (SIGECO) operates the existing coal combustion residuals (CCR) management unit referred to as the West Ash Pond (WAP) at FBC located in Warrick County, Indiana.

The West Ash Pond was previously classified as an inactive surface impoundment as defined by 40 CFR §257.53. SIGECO filed a Notice of Intent (NOI) to initiate closure of the West Ash Pond and placed the NOI in the facility's operating record on December 17, 2015. The WAP is currently in the closure process. However, on 5 August 2016, the EPA issued a "Direct Final Rule" effective on 4 October 2016, constituting a vacatur of 40 CFR §257.100. The Direct Final Rule applies the requirements of existing surface impoundments that had been previously declared inactive. As a result, owners and operators of inactive CCR surface impoundments must comply with the groundwater monitoring requirements for existing CCR surface impoundments. The CCR Rule changes extended the deadlines to comply with the groundwater monitoring requirements with the initial eight-rounds of groundwater sampling to be completed by 17 April 2019. In addition, this annual report must be completed by 1 August 2019 and annually thereafter.

This annual report addresses the WAP at FBC, as described in the Groundwater Monitoring Program report, which was submitted to the Indiana Department of Environmental Management (IDEM) in April 2018 as part of the Closure Plan application. The submittal of the Closure Plan application and the corresponding IDEM Virtual File Cabinet document number was posted to the facility's website. The Groundwater Monitoring Program was updated in April 2019 as part of the modified Closure Plan application that was submitted to IDEM as part of the company's response to IDEM's Request for Additional Information. The Groundwater Monitoring System Certification page was placed in the facility's operating record on 19 April 2019 as required by the Direct Final Rule and §257.105(h)(3) and posted on the facility's website on 17 May 2019 as required by §257.107(h)(2).

To report on the activities conducted at the WAP and document compliance with the Rule, the specific requirements listed in §257.90(e)(1) through (5) are provided below in bold/italic type followed by a short narrative addressing how that specific requirement was met.

§257.90 APPLICABILITY

§257.100(e)(5)(ii) No later than August 1, 2019, prepare the initial groundwater monitoring and corrective action report as set forth in §257.90(e).

§257.90(e) 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).

As outlined in the Groundwater Monitoring Program Plan and required by §257.100(e)(5)(ii), this Annual Report is to be completed to later than 1 August 2019 due to the partial vacatur ordered by the DC Circuit Court on 14 June 2016 and the subsequent Direct Final Rule effective 4 October 2016. As required, this annual report documents the status of the groundwater monitoring program for the WAP at FBC and summarizes key actions completed through 15 July 2019.

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

§257.90(e)(1) AERIAL IMAGE OF GROUNDWATER MONITORING PROGRAM

§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 location of the WAP and associated upgradient and downgradient monitoring wells is included in this report as Figure 1. In addition, this information is presented in the Groundwater Monitoring Program Plan prepared for the WAP at FBC, which was placed in the facility's operating record as required by §257.105(h)(2) and included in the Closure Plan application submitted to IDEM and identified on the facility's website.

§257.90(e)(2) ADJUSTMENTS TO GROUNDWATER MONITORING PROGRAM

§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 comply with the requirements of §257.91, a groundwater monitoring network comprised of six (6) monitoring wells was installed for the WAP at FBC. As described in the Groundwater Monitoring Program Plan, CCR-AP-7 which was originally installed as part of the East Ash Pond groundwater monitoring network was added to the groundwater monitoring network at the WAP. CCR-AP-7 was added to the monitoring well network to provide an additional dataset of background concentrations that are not affected by the CCR unit. Details of the design, and construction of the monitoring wells are summarized in Table 1. Updating the site conceptual model to reflect current conditions revealed that lowering the water level in the WAP in preparation for closure reduced the water level in monitoring well WAP-2 to less than two feet from the bottom of the well. This water level was not sufficient to provide reliable groundwater

samples. As such, Haley & Aldrich replaced this well with a new well screened 15-feet below the original WAP-2 well screen. The new well, WAP-2R, was installed at the same location as the original WAP-2. Additional description of the monitoring network is presented in the Groundwater Monitoring Program Plan, which was placed in the facility's operating record, as required by §257.105(h)(2).

Monitoring wells WAP-4I, WAP-4D, WAP-5I and WAP-5D were originally installed along the southern berm of the West Ash Pond as requested by Indiana Department of Environmental Management (IDEM) to comply with the Solid Waste Land Disposal Facility rules under 329 IAC 10. They are not part of the CCR groundwater monitoring network, as the current groundwater monitoring program satisfies the requirements of §257.91(a). However, if the WAP enters an Assessment Monitoring Program and requires a determination of the Nature and Extent of potential releases, these monitoring wells may be used for data collection. The monitoring wells are currently being used to monitor groundwater elevations and hydraulic gradients of the intermediate and deep aquifers beneath the WAP.

§257.90(e)(3) SUMMARY OF GROUNDWATER ANALYSIS

§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 [upgradient] 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 §257.94(b), a minimum of eight independent samples from each upgradient and downgradient monitoring well were collected prior to 17 April 2019 deadline as ordered by the DC Circuit Court partial vacatur and subsequent Direct Final Rule described above. A summary of the groundwater monitoring program for the WAP, including the analytical results for the Appendix III and Appendix IV list of constituents, is presented in Table 2 of this report.

§257.90(e)(4) CURRENT GROUNDWATER MONITORING PROGRAM

§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);

As required by § 257.93(h) a statistical analysis of the Appendix III constituents was completed on 12 July 2019. The results of this statistical analysis showed that statistically significant increases (SSI) of boron, calcium, chloride, fluoride, sulfate, and total dissolved solids above background were present in one or more wells located downgradient of the WAP. Consistent with §257.94(e)(2), SIGECO is evaluating options to demonstrate that a source other than the CCR unit caused the SSI and will provide a narrative discussion of any transition between monitoring programs, as appropriate, in subsequent annual reports. The Assessment Monitoring program will be established to meet the requirements of 40 CFR § 257.95 if alternate sources have not been identified.

§257.90(e)(5) OTHER REQUIRED INFORMATION

§257.90(e)(5) Other information required to be included in the annual report as specified in §257.90 through §257.98.

This initial Annual Groundwater Monitoring and Corrective Action Report documents activities conducted to comply with Sections §257.90 through §257.94 of the Rule. There are no applicable requirements from Sections §257.95 through §257.98.

Attachments

Table I. Groundwater Monitoring Well Location and Construction Details

Table II. Summary of Analytical Results

Figure 1. Monitoring Well Network

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TABLE I

Page 1 of 1

GROUNDWATER MONITORING WELL LOCATION AND CONSTRUCTION DETAILS
 F.B. CULLEY GENERATING STATION - WEST ASH POND
 NEWBURGH, INDIANA

	Easting	Northing	Top of Pad Elevation (ft msl)	Top of Casing Elevation (ft msl)	Surface Grout (ft bgs)	Bentonite (ft bgs)	Sand Pack (ft bgs)	Screen Zone (ft bgs)	Screen Length (ft)	Well Radius (in)
Upgradient Wells										
WAP-1	2882824.18	971214.17	403.77	403.39	0 - 22	22 - 24	24 - 36	26 - 36	10	2
CCR-AP-7	2883090.34	970774.64	429.50	434.11	0 - 16	16 - 18	18 - 30	20 - 30	10	2
Downgradient Wells										
WAP-2R	2881511.71	971395.70	391.80	395.29	0 - 42	42 - 44	44 - 56	46 - 56	10	2
WAP-3	2881262.53	971000.02	393.59	393.10	0 - 59	59 - 61	61 - 73	63 - 73	10	2
WAP-4S	2881333.33	970405.14	395.32	397.08	0 - 41	41 - 43	43 - 55	45 - 55	10	2
WAP-5S	2881521.35	970235.87	394.40	396.41	0 - 36	36 - 38	38 - 50	40 - 50	10	2
Other Wells										
WAP-4I*	2881329.18	970408.95	395.26	397.23	0 - 71	71 - 73	73 - 85	75 - 85	10	2
WAP-4D*	2881325.08	970412.71	395.31	397.03	0 - 112	112 - 114	114 - 126	116 - 126	10	2
WAP-5I*	2881524.71	970232.61	394.43	396.35	0 - 71	71 - 73	73 - 85	75 - 85	10	2
WAP-5D*	2881528.71	970229.88	394.36	396.35	0 - 109	109 - 111	111 - 123	113 - 123	10	2

NOTES:

bgs = below ground surface

ft = feet

in = inches

msl = mean sea level

*Monitoring wells will only be used to measure groundwater elevations

TABLE II
SUMMARY OF ANALYTICAL RESULTS
F.B. CULLEY GENERATING STATION - WEST ASH POND
NEWBURGH, INDIANA

Location Group	Action Level	Upgradient									
		WAP-1 WAP-1-20180315	WAP-1 WAP-1-20180402	WAP-1 WAP-1-20180504	WAP-1 WAP-1-20180524	WAP-1 WAP-1-20180615	WAP-1 WAP-1-20180705	WAP-1 WAP-1-20180725	WAP-1 WAP-1-20180816	WAP-1 WAP-1-20180816	WAP-1 WAP-1-20181205
Location Name	MCL / RSL Criteria	Sample Name	Sample Date	Lab Sample ID							
Field Parameters											
Temperature (Deg C)	NA	17.27	13.91	20.41	29.81	31.48	29.69	29.52	23.78	8.71	
Dissolved Oxygen, Field (mg/L)	NA	4.04	7.03	2.41	3.79	0.28	0.91	1.65	1.03	3.12	
Conductivity, Field (mS/cm)	NA	0.66623	0.03373	0.71134	0.97468	1.28582	1.29027	0.16882	1.30809	879.84	
ORP, Field (mv)	NA	-24.13	128.13	-86.32	-47.75	-110.05	943.61	-133.38	-123.57	-80.44	
Turbidity, Field (NTU)	NA	527.85	1148	1051	417.43	1.03	766.16	472.62	858.99	1111	
Turbidity, Field (FNU)											
pH, Field (SU)	NA	7.39	5.62	7.34	7.15	7.16	6.99	7.09	6.66	7.21	
Detection Monitoring - EPA Appendix III Constituents (mg/L)											
Boron, Total	NA	0.005 U	0.08 U	0.08 U	0.08 U	0.005 U	0.005 U	0.03	0.005 U	0.005 U	
Calcium, Total	NA	150	160	160	160	160	160	160	150	150	
Chloride	NA	13	13	12	15	15	15	15	12	17	
Fluoride	4	0.31	0.23	0.21	0.28	0.24	0.28	0.28	0.27	0.29	
Sulfate	NA	280	340	270	330	330	240	300	290	320	
pH (lab) (SU)	NA	7.3 HF	7.5 HF	7.4 HF	7.5 HF	7.3 HF	7.3 HF	7.3 HF	7.3 HF	7.4 HF	
Total Dissolved Solids (TDS)	NA	850	870	900	880	870	890	860	900	890	
Assessment Monitoring - EPA Appendix IV Constituents (mg/L)											
Antimony, Total	0.006	0.002 U	0.0012 J	0.002 U	0.0012 JB	0.0014 J	0.0018 J	0.002 U	0.002 U	0.002 U	
Arsenic, Total	0.01	0.0033	0.0085	0.0038	0.0079	0.021	0.012	0.0049	0.0051	0.0032	
Barium, Total	2	0.37	0.46	0.37	0.51	0.88	0.67	0.39	0.4	0.38	
Beryllium, Total	0.004	0.001 U	0.00049 J	0.00072 J	0.00039 J	0.00089 J	0.0012	0.00042 J	0.0003 J	0.000089 J	
Cadmium, Total	0.005	0.001 U	0.00021 J	0.001 U	0.00018 J	0.00049 J	0.00044 J	0.00013 J	0.001 U	0.001 U	
Chromium, Total	0.1	0.0022	0.016	0.005 B	0.017 B	0.043 B	0.046 B	0.0088	0.014 B	0.0057	
Cobalt, Total	0.006	0.00044 J	0.0067	0.0013	0.0059	0.019	0.017	0.0047	0.0045	0.0019	
Lead, Total	0.015	0.00068 J	0.014	0.0024	0.012	0.035	0.034	0.0099	0.0089	0.0036	
Lithium, Total	0.04	0.0066	0.015 J	0.01	0.012 B	0.027	0.024	0.0095	0.01	0.01	
Molybdenum, Total	0.1	0.0009 J	0.0026 J	0.00086 J	0.0015 J	0.0028 J	0.0028 J	0.0019 J	0.0013 J	0.0011 J	
Selenium, Total	0.05	0.005 U	0.005 U	0.005 U	0.005 U	0.0018 J	0.0018 J	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	0.00047 J	0.00053 J	0.00019 J	0.00014 J	0.000083 J	
Mercury, Total	0.002	0.0002 U	0.000098 JB	0.0002 U	0.0002 U						
Fluoride	4	0.31	0.23	0.21	0.28	0.24	0.28	0.28	0.27	0.29	
Radium-226 & 228 (pCi/L)	5	1.48 ± 0.377	1.08 ± 0.306	0.807 ± 0.369	1.08 ± 0.353	1.56 ± 0.445	0.976 ± 0.375	0.480 U ± 0.301	1.76 ± 0.602	-	

ABBREVIATIONS AND NOTES:

CFR: Code of Federal Regulations

mg/L: milligram per liter

mS/cm: millisiemen per centimeter

mv: millivolt

NA: Not Applicable

NTU: Nephelometric Turbidity Units

pCi/L: picoCurie per liter

SU: standard units

USEPA: United States Environmental Protection Agency

QUALIFIERS:

*: LCS or LCSD is outside acceptance limits

^: QC is outside acceptance limits

F1: MS and/or MSD Recovery is outside acceptance limits

HF: field parameter with a holding time of 15 minutes

J: value is estimated

J+: value is estimated with a potentially high bias

U: Not detected value is the laboratory reporting limit

- 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>

CCR: Coal Combustion Residuals

TABLE II
SUMMARY OF ANALYTICAL RESULTS
F.B. CULLEY GENERATING STATION - WEST ASH POND
NEWBURGH, INDIANA

Location Group	Action Level	Upgradient									
		CCR-AP-7 CCR-AP-7-20160610	CCR-AP-7 CCR-AP-7-20160812	CCR-AP-7 CCR-AP-7-20161028	CCR-AP-7 CCR-AP-7-20161207	CCR-AP-7 CCR-AP-7-20170208	CCR-AP-7 CCR-AP-7-20170406	CCR-AP-7 CCR-AP-7-20170607	CCR-AP-7 CCR-AP-7-20170928	CCR-AP-7 CCR-AP-7-20171117	CCR-AP-7 CCR-AP-7-20171117
Location Name	MCL / RSL Criteria	Sample Name	Sample Date	Lab Sample ID							
Field Parameters											
Temperature (Deg C)	NA	20.27	19.2	22.01	15.31	13.89	16.15	16.62	17.93	14.47	
Dissolved Oxygen, Field (mg/L)	NA	0.21	0.15	0.69	0.23	-0.02	-0.02	0.09	0.13	0.21	
Conductivity, Field (mS/cm)	NA	0.96343	0.9769	0.90788	0.76817	1.00796	1.578	0.98246	0.97415	0.97231	
ORP, Field (mv)	NA	-105.35	-152.	-141.57	-146.4	-80.23	-115.03	-143.84	-153.3	-103.98	
Turbidity, Field (NTU)	NA	27	19	208	370	385	519	193	-	3	
Turbidity, Field (FNU)	NA	-	-	-	-	-	-	-	11	-	
pH, Field (SU)	NA	7.05	7.13	7.77	7.34	7.21	7.24	7.18	7.11	7.02	
Detection Monitoring - EPA Appendix III Constituents (mg/L)											
Boron, Total	NA	0.034 J+	0.034 U	0.02 J+	0.071 U	0.034 U	0.08 U	0.15 U	0.056 J	0.091 U	
Calcium, Total	NA	86	88	120 J-	99	150 J-	110 J+	100	94	96	
Chloride	NA	31	26	25 J+	26	25	27	28	29	31	
Fluoride	4	R	0.24	0.25	0.37 J+	0.28 J+	0.29	0.34	0.19	0.25	
Sulfate	NA	93 J-	73	66 J+	96	110	110	100	82	77 J-	
pH (lab) (SU)	NA	7.37 J	7.9 J	7.1 J	7.4 J	7.4 J	7.3 J	7.3 J	7.3 J	7.2 J	
Total Dissolved Solids (TDS)	NA	590	580	530	620	630	640	620	570	550	
Assessment Monitoring - EPA Appendix IV Constituents (mg/L)											
Antimony, Total	0.006	0.002 U	0.002 U	0.002 U	0.00016 J	0.00062 J	0.002 U	0.002 U	0.002 U	0.002 U	
Arsenic, Total	0.01	0.0025	0.0048	0.0084	0.0083	0.018	0.008	0.0075	0.0058	0.0034	
Barium, Total	2	0.1	0.12	0.16	0.14	0.19	0.15	0.15	0.12	0.11	
Beryllium, Total	0.004	0.001 U	0.001 U	0.00017 J	0.00012 J	0.00075 J	0.00022 J	0.00015 J	0.001 U	0.001 U	
Cadmium, Total	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.00032 J	0.00014 J	0.001 U	0.001 U	0.001 U	
Chromium, Total	0.1	0.00048 J	0.00047 J	0.0026	0.0039	0.019	0.0048	0.0039 J+	0.002 U	0.002 U	
Cobalt, Total	0.006	0.0012	0.0023	0.0053 J	0.0037	0.015	0.0054	0.0032	0.00054	0.0003 J	
Lead, Total	0.015	0.00062 J	0.00099 J	0.0082 J	0.0036	0.02	0.0087 J+	0.0041	0.001 U	0.001 U	
Lithium, Total	0.04	0.01 J	0.011 J	0.02 J	0.012 J	0.039 J	0.019 J	0.019 J	0.01 J	0.012 J	
Molybdenum, Total	0.1	0.0082	0.0054	0.0044 J	0.0088	0.013	0.0058	0.0069	0.0036 J	0.0028 J	
Selenium, Total	0.05	0.00035 J	0.005 U	0.00073 J	0.005 U	0.005 U	0.005 UJ	0.005 U	0.005 U	0.005 U	
Thallium, Total	0.002	0.001 U	0.001 U	0.00008 J	0.000066 J	0.00061 J	0.001 U	0.000088 J	0.001 U	0.001 U	
Mercury, Total	0.002	0.0002 U									
Fluoride	4	R	0.24	0.25	0.37 J+	0.28 J+	0.29	0.34	0.19	0.25	
Radium-226 & 228 (pCi/L)	5	0.496 ± 0.284	1.02 J ± 0.363	1.72 J ± 0.792	0.997 ± 0.602	1.11 J ± 0.335	1.55 ± 0.464	1.29 ± 0.433	R	R	

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*: LCS or LCSD is outside acceptance limits

^: QC is outside acceptance limits

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NEWBURGH, INDIANA

Location Group	Action Level	Downgradient									
		WAP-2R WAP-2R-20180315 03/15/2018 180-75879-1	WAP-2R WAP-2R-20180403 04/03/2018 180-76407-2	WAP-2R BLIND DUPLICATE-20180403 04/03/2018 180-76407-7	WAP-2R WAP-2R-20180504 05/04/2018 180-77434-2	WAP-2R WAP-2R-20180524 05/24/2018 180-78136-2	WAP-2R WAP-2R-20180615 06/15/2018 180-78840-2	WAP-2R WAP-2R-20180706 07/06/2018 180-79554-2	WAP-2R WAP-2R-20180726 07/26/2018 180-80247-2	WAP-2R WAP-2R-20180816 08/16/2018 180-81032-2	WAP-2R WAP-2R-20181205 12/05/2018 180-84710-2
Field Parameters											
Temperature (Deg C)	NA	17.04	17.32	17.32	18.49	18.42	19.88	18.83	18.63	19.23	15.65
Dissolved Oxygen, Field (mg/L)	NA	0.11	0.18	0.18	0.19	0.11	0.38	0.19	0.21	0.22	0.07
Conductivity, Field (mS/cm)	NA	2.01526	2.04425	2.04425	1.93498	2.05395	1.72707	1.89024	1.80727	1.76893	1009
ORP, Field (mv)	NA	377.23	311.59	311.59	-134.17	94.11	-22.63	537.1	390.57	94.21	99.91
Turbidity, Field (NTU)	NA	8.66	242.67	242.67	-0.1	2.87	3.88	-2.52	5.27	0.62	11.18
Turbidity, Field (FNU)											
pH, Field (SU)	NA	6.94	6.76	6.76	6.88	7.17	6.91	6.76	7.14	6.64	6.84
Detection Monitoring - EPA Appendix III Constituents (mg/L)											
Boron, Total	NA	19	12	12	22	17	17	16	12	12	10
Calcium, Total	NA	260	300	310	240	240	260	250	200	210	150
Chloride	NA	260	190	230	190	240	250	230	210	230	91
Fluoride	4	0.24	0.23	0.21	0.13 J	0.17	0.16	0.16	0.15	0.11	0.26
Sulfate	NA	570	680	730	460	600	620 F1	530	520	480	330
pH (lab) (SU)	NA	7.3 HF	7 HF	7 HF	7.2 HF	7.1 HF	7.3 HF	7.1 HF	7 HF	7.1 HF	7 HF
Total Dissolved Solids (TDS)	NA	1500	1600	1600	1500	1500	1500	1400	1200	1300	920
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	0.002 U	0.002 U	0.002 U	0.002 U
Arsenic, Total	0.01	0.00093 J	0.0059	0.0068	0.00095 J	0.00081 J	0.00092 J	0.00071 J	0.00047 J	0.00084 J	0.00064 J
Barium, Total	2	0.053	0.062	0.065	0.045	0.042	0.041	0.041	0.032	0.035	0.025
Beryllium, Total	0.004	0.001 U	0.00024 J	0.00031 J	0.001 U	0.001 U	0.001 UF1	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium, Total	0.005	0.00054 J	0.001	0.001	0.00044 J	0.0005 J	0.00043 J	0.00041 J	0.00032 J	0.00044 J	0.00032 J
Chromium, Total	0.1	0.0013 J	0.0041	0.0048	0.0015 JB	0.0014 JB	0.0018 JB	0.0009 JB	0.002 U	0.0015 JB	0.0015 J
Cobalt, Total	0.006	0.0023	0.0062	0.0068	0.002	0.0024	0.0019	0.0022	0.0017	0.0023	0.00096
Lead, Total	0.015	0.001 U	0.0064	0.0067	0.001 U	0.00016 J					
Lithium, Total	0.04	0.059	0.029 J	0.029 J	0.06	0.041 B	0.052	0.04	0.026	0.033	0.02
Molybdenum, Total	0.1	0.063	0.013	0.014	0.042	0.035	0.04	0.035	0.032	0.034	0.018
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	0.005 U
Thallium, Total	0.002	0.0003 J	0.00047 J	0.00052 J	0.00014 J	0.00011 J	0.000082 J	0.000084 J	0.001 U	0.000067 J	0.00014 J
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	0.000083 JB	0.0002 U	0.0002 U
Fluoride	4	0.24	0.23	0.21	0.13 J	0.17	0.16	0.16	0.15	0.11	0.26
Radium-226 & 228 (pCi/L)	5	0.131 U ± 0.191	0.878 ± 0.346	1.05 ± 0.354	0.382 ± 0.215	0.169 U ± 0.23	0.623 ± 0.29	0.579 ± 0.266	0.621 ± 0.312	0.495 ± 0.264	-

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CCR: Coal Combustion Residuals

TABLE II
SUMMARY OF ANALYTICAL RESULTS
F.B. CULLEY GENERATING STATION - WEST ASH POND
NEWBURGH, INDIANA

Location Group	Action Level	Downgradient									
		WAP-3 WAP-3-20180315	WAP-3 WAP-3-20180403	WAP-3 WAP-3-20180503	WAP-3 WAP-3-20180524	WAP-3 WAP-3-20180615	WAP-3 BLIND DUPLICATE-20180615	WAP-3 WAP-3-20180706	WAP-3 WAP-3-20180726	WAP-3 WAP-3-20180816	WAP-3 WAP-3-20181205
Location Name	MCL / RSL Criteria	Sample Name	Sample Date	Lab Sample ID							
Field Parameters											
Temperature (Deg C)	NA	18.6	17.04	16.81	18.21	18.48	18.48	20.1	20.14	18.83	16.78
Dissolved Oxygen, Field (mg/L)	NA	0.2	0.19	0.06	0.13	0.09	0.09	0.15	0.07	0.15	0.02
Conductivity, Field (mS/cm)	NA	1.35962	1.36286	0.99246	0.96549	1.06727	1.06727	1.13254	1.24046	1.2978	1223
ORP, Field (mv)	NA	-114.58	-126.8	-205.17	-115.95	-125.47	-125.47	1012	-100.24	-134.11	-135.29
Turbidity, Field (NTU)	NA	48.67	8.48	9.32	3.86	13.75	13.75	4.96	14.35	7.64	12.89
Turbidity, Field (FNU)											
pH, Field (SU)	NA	6.73	6.8	6.87	7.26	6.84	6.84	7.07	10.41	6.86	7.03
Detection Monitoring - EPA Appendix III Constituents (mg/L)											
Boron, Total	NA	7.8	7.3	7.7	6.9	5.6	5.6	5.5	5.2	7.6	13
Calcium, Total	NA	160	200	140	130	170	170	160	160	180	190
Chloride	NA	62	65	45	52	76	77	72	66	97	120
Fluoride	4	0.43	0.33	0.6	0.77	0.56	0.57	0.68	0.53	0.52	0.55
Sulfate	NA	150	130	110	190	250	240	280	180	290	450
pH (lab) (SU)	NA	7.1 HF	7.3 HF	7 HF	7.4 HF	7.2 HF	7.3 HF	7.3 HF	7 HF	7.3 HF	7.1 HF
Total Dissolved Solids (TDS)	NA	760	850	630	620	770	780	770	730	820	1100
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					
Arsenic, Total	0.01	0.0038	0.0031	0.003	0.0032	0.003	0.003	0.0022	0.0018	0.0023	0.0027
Barium, Total	2	0.35	0.32	0.23	0.1	0.2	0.19	0.12	0.22	0.17	0.16
Beryllium, Total	0.004	0.000068 J	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U				
Cadmium, Total	0.005	0.00024 J	0.001 U	0.00022 J	0.0003 J	0.00022 J	0.00022 J	0.00022 J	0.00017 J	0.00022 J	0.00016 J
Chromium, Total	0.1	0.0029	0.00099 J	0.0017 JB	0.0015 JB	0.0021 B	0.0018 JB	0.0012 JB	0.002 U	0.0017 JB	0.0015 J
Cobalt, Total	0.006	0.0015	0.0011	0.00053	0.00044 J	0.00071	0.00061	0.00034 J	0.00037 J	0.00048 J	0.00067
Lead, Total	0.015	0.0018	0.0011	0.001 U	0.0003 J	0.00038 J	0.00038 J	0.00023 J	0.00027 J	0.00037 J	0.00042 J
Lithium, Total	0.04	0.04	0.036 J	0.052	0.061 B	0.062	0.06	0.066	0.044	0.07	0.08
Molybdenum, Total	0.1	0.72	0.41	1.2	1.5	0.98	0.97	1.2	0.78	1	0.86
Selenium, Total	0.05	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					
Mercury, Total	0.002	0.0002 U	0.0002 U	0.0001 JB	0.0002 U	0.0002 U					
Fluoride	4	0.43	0.33	0.6	0.77	0.56	0.57	0.68	0.53	0.52	0.55
Radium-226 & 228 (pCi/L)	5	1.00 ± 0.299	1.07 ± 0.271	0.785 ± 0.287	0.199 U ± 0.29	1.08 ± 0.325	0.951 ± 0.308	0.928 ± 0.285	1.28 ± 0.416	0.943 ± 0.262	-

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CCR: Coal Combustion Residuals

TABLE II
SUMMARY OF ANALYTICAL RESULTS
F.B. CULLEY GENERATING STATION - WEST ASH POND
NEWBURGH, INDIANA

Location Group	Action Level	Downgradient												
		WAP-4S	WAP-4S	WAP-4S	WAP-4S	WAP-4S	WAP-4S	WAP-4S	WAP-4S	BLIND DUPLICATE-20180725	WAP-4S-20180816	WAP-4S-20180816	WAP-4S-20181204	
Location Name	MCL / RSL Criteria	WAP-4S-20180314	DUP-20180315	WAP-4S-20180402	WAP-4S-20180503	WAP-4S-20180524	WAP-4S-20180614	WAP-4S-20180705	WAP-4S-20180725	BLIND DUPLICATE-20180725	WAP-4S-20180816	WAP-4S-20180816	WAP-4S-20181204	
Sample Name		03/14/2018	03/15/2018	04/02/2018	05/03/2018	05/24/2018	06/14/2018	07/05/2018	07/25/2018	07/25/2018	08/16/2018	08/16/2018	12/04/2018	
Sample Date		180-75879-4	180-75879-12	180-76407-4	180-77434-4	180-78136-4	180-78840-4	180-79554-4	180-80247-4	180-80247-6	180-81032-4	180-81032-6	180-84710-4	
Lab Sample ID														
Field Parameters														
Temperature (Deg C)	NA	16.37	16.37	16.99	18.78	19.97	19.7	19.43	21.21	21.21	18.68	18.68	15.74	
Dissolved Oxygen, Field (mg/L)	NA	0.16	0.16	0.18	0.08	0.25	0.15	0.07	0.31	0.31	0.19	0.19	0.11	
Conductivity, Field (mS/cm)	NA	1.92924	1.92924	2.05243	1.91626	1.96336	1.72778	1.92887	1.94006	1.94006	1.91403	1.91403	1443	
ORP, Field (mv)	NA	-4.31	-4.31	-26.05	-201.81	-56.14	-76.19	937.4	-19.28	-19.28	-74.08	-74.08	-57.33	
Turbidity, Field (NTU)	NA	11.72	11.72	20.72	1.93	5.99	1.01	-0.31	0.14	0.14	0.23	0.23	3.72	
Turbidity, Field (FNU)														
pH, Field (SU)	NA	7.03	7.03	6.94	7.07	7.34	7.31	7.11	7.36	7.36	6.99	6.99	7.21	
Detection Monitoring - EPA Appendix III Constituents (mg/L)														
Boron, Total	NA	14	14	10	17	12	4.2	13	12	12	12	12	12	
Calcium, Total	NA	330	330	360	310	310	250	300	320	320	290	300	270	
Chloride	NA	230	220	240 F1	200	220	81	210	220	220	230	230	190	
Fluoride	4	0.24	0.23	0.19	0.14 J	0.24	0.11	0.23	0.25	0.25	0.18	0.18	0.24	
Sulfate	NA	600	610	650 F1	490	620	510	600	630	640	630	630	600 ^F1	
pH (lab) (SU)	NA	7.4 HF	7.4 HF	7.4 HF	7.4 HF	7.5 HF	6.9 HF	7.4 HF	7.3 HF	7.3 HF	7.3 HF	7.3 HF	7.3 HF	
Total Dissolved Solids (TDS)	NA	1500	1400	1600	1600	1300	1500	1400	1500	1500	1500	1500	1300	
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	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	
Arsenic, Total	0.01	0.0036	0.0035	0.0048	0.0042	0.0043	0.00073 J	0.0033	0.003	0.0026	0.0031	0.0032	0.0035	
Barium, Total	2	0.063	0.063	0.08	0.06	0.06	0.056	0.058	0.052	0.051	0.05	0.052	0.053	
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	0.000079 J	0.001 U	0.001 U	0.001 U	
Cadmium, Total	0.005	0.001 U	0.001 U	0.00025 J	0.001 U	0.000079 J	0.001 U	0.001 U	0.00018 J					
Chromium, Total	0.1	0.0015 J	0.0014 J	0.00088 J	0.0014 JB	0.0014 JB	0.0018 JB	0.0012 JB	0.002 U	0.002 U	0.0015 JB	0.0015 JB	0.0018 J	
Cobalt, Total	0.006	0.0019	0.0019	0.0026	0.0015	0.0014	0.0093	0.0013	0.0014	0.0016	0.0016	0.0018	0.0018	
Lead, Total	0.015	0.001 U	0.001 U	0.0007 J	0.001 U	0.001 U	0.001 U	0.00031 J						
Lithium, Total	0.04	0.014	0.014	0.014	0.011 J	0.017	0.016 B	0.0037 J	0.011	0.005 U	0.005 U	0.005 U	0.012	
Molybdenum, Total	0.1	0.39	0.39	0.33	0.43	0.42	0.00078 J	0.41	0.4	0.39	0.45	0.45	0.43	
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	0.005 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	0.001 U	0.001 U	0.001 U	0.001 U	0.001 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	0.0002 U	0.00011 JB	0.0002 U	0.0002 U	0.0002 U	
Fluoride	4	0.24	0.23	0.19	0.14 J	0.24	0.11	0.23	0.25	0.25	0.23	0.18	0.24	
Radium-226 & 228 (pCi/L)	5	0.227 U ± 0.212	0.600 ± 0.283	0.693 ± 0.232	0.191 U ± 0.221	0.185 U ± 0.253	0.476 ± 0.289	0.428 ± 0.243	0.726 ± 0.363	0.352 U ± 0.366	0.558 ± 0.232	0.517 ± 0.294	-	

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F.B. CULLEY GENERATING STATION - WEST ASH POND
NEWBURGH, INDIANA

Location Group	Action Level	Downgradient											
		WAP-5S WAP-5S-20180313 03/13/2018 180-75879-7	WAP-5S WAP-5S-20180402 04/02/2018 180-76407-5	WAP-5S WAP-5S-20180503 05/03/2018 180-77434-5	WAP-5S BLIND DUPLICATE-20180503 05/03/2018 180-77434-6	WAP-5S WAP-5S-20180523 05/23/2018 180-78136-5	WAP-5S BLIND DUPLICATE-20180523 05/23/2018 180-78136-6	WAP-5S WAP-5S-20180614 06/14/2018 180-78840-5	WAP-5S WAP-5S-20180705 07/05/2018 180-79554-5	WAP-5S BLIND DUPLICATE-20180705 07/05/2018 180-79554-6	WAP-5S WAP-5S-20180725 07/25/2018 180-80247-5	WAP-5S WAP-5S-20180816 08/16/2018 180-81032-5	
Field Parameters													
Temperature (Deg C)	NA	14.31	18.1	19.27	19.27	20.91	20.91	21.18	20.11	19.43	21.2	19.18	
Dissolved Oxygen, Field (mg/L)	NA	0.36	0.2	0.07	0.07	0.26	0.26	0.35	0.17	0.07	0.16	0.21	
Conductivity, Field (mS/cm)	NA	1.57901	1.60496	1.66252	1.66252	1.75073	1.75073	1.54601	1.69328	1.92887	1.70014	1.69636	
ORP, Field (mv)	NA	206.41	58.95	-8.74	-8.74	116.92	116.92	9.61	560.63	937.4	66.42	33.5	
Turbidity, Field (NTU)	NA	-1.45	-1.07	1.96	1.96	1.79	1.79	-0.37	-1.43	-0.31	0.14	0.23	
Turbidity, Field (FNU)													
pH, Field (SU)	NA	6.46	6.44	6.41	6.41	6.62	6.62	6.54	6.46	7.11	7.15	6.41	
Detection Monitoring - EPA Appendix III Constituents (mg/L)													
Boron, Total	NA	4.5	4.5	4.7	4.5	4.2	4.3	14	3.7	13	3.8	4.4	
Calcium, Total	NA	230	250	240	230	230	240	320	240	310	250	240	
Chloride	NA	79	71	83	83	84	85	220	81	220	81	70	
Fluoride	4	0.1	0.11	0.075 J	0.067 J	0.15	0.15	0.21	0.094 J	0.23	0.12	0.087 J	
Sulfate	NA	420	420	420	430	470	480	650	470 F1	610	470	420 F1	
pH (lab) (SU)	NA	7 HF	6.9 HF	6.8 HF	6.9 HF	6.8 HF	7.5 HF	6.8 HF	7.4 HF	6.7 HF	6.8 HF	6.8 HF	
Total Dissolved Solids (TDS)	NA	1200	1200	1300	1300	1300	1300	1500	1300	1500	1200	1300	
Assessment Monitoring - EPA Appendix IV Constituents (mg/L)													
Antimony, Total	0.006	0.002 U	0.0021	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	0.00075 J	0.00076 J	0.00089 J	0.00081 J	0.00065 J	0.00074 J	0.0042	0.00057 J	0.0034	0.00055 J	0.00086 J	
Barium, Total	2	0.058	0.053	0.061	0.058	0.053	0.055	0.063	0.055	0.059	0.049	0.056	
Beryllium, Total	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00084 J	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	0.001 U	
Chromium, Total	0.1	0.0013 J	0.002 U	0.0016 JB	0.0014 JB	0.0014 JB	0.0012 JB	0.0018 JB	0.00098 JB	0.00095 JB	0.002 U	0.0015 JB	
Cobalt, Total	0.006	0.0089	0.0085	0.0093	0.0087	0.008	0.0085	0.0016	0.0079	0.0015	0.0074	0.0086	
Lead, Total	0.015	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	0.001 U	
Lithium, Total	0.04	0.0037 J	0.05 U	0.0054	0.0049 J	0.0033 JB	0.0029 JB	0.016	0.005 U	0.011	0.005 U	0.005 U	
Molybdenum, Total	0.1	0.00064 J	0.0024 J	0.0007 J	0.00061 J	0.00067 J	0.00065 J	0.4	0.00065 J	0.41	0.0011 J	0.00068 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	0.005 U	0.005 U	0.005 U	0.005 U^	
Thallium, Total	0.002	0.001 U	0.00011 J	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	
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 UF1	0.0002 U	0.0002 U	0.0002 U	
Fluoride	4	0.1	0.11	0.075 J	0.067 J	0.15	0.15	0.21	0.094 J	0.23	0.12	0.087 J	
Radium-226 & 228 (pCi/L)	5	0.246 U ± 0.234	0.214 U ± 0.199	0.262 U ± 0.257	0.0987 U ± 0.227	0.409 ± 0.263	0.207 U ± 0.253	0.220 U ± 0.272	0.382 ± 0.244	0.597 ± 0.264	0.450 ± 0.279	0.442 ± 0.24	

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NEWBURGH, INDIANA

Location Group	Action Level	Downgradient	
		WAP-5S	WAP-5S
Location Name	MCL / RSL Criteria	WAP-5S-20181204	BLIND DUPLICATE-20181204
Sample Name		12/04/2018	12/04/2018
Sample Date		180-84710-5	180-84710-6
Lab Sample ID			
Field Parameters			
Temperature (Deg C)	NA	16.96	16.96
Dissolved Oxygen, Field (mg/L)	NA	0.11	0.11
Conductivity, Field (mS/cm)	NA	1400	1400
ORP, Field (mv)	NA	35.4	35.4
Turbidity, Field (NTU)	NA	0.36	0.36
Turbidity, Field (FNU)			
pH, Field (SU)	NA	6.54	6.54
Detection Monitoring - EPA Appendix III Constituents (mg/L)			
Boron, Total	NA	4.5	4.4
Calcium, Total	NA	220	220
Chloride	NA	100	100
Fluoride	4	0.11	0.12
Sulfate	NA	440	450
pH (lab) (SU)	NA	6.7 HF	6.7 HF
Total Dissolved Solids (TDS)	NA	1200	1200
Assessment Monitoring - EPA Appendix IV Constituents (mg/L)			
Antimony, Total	0.006	0.002 U	0.002 U
Arsenic, Total	0.01	0.00069 J	0.00072 J
Barium, Total	2	0.053	0.053
Beryllium, Total	0.004	0.001 U	0.001 U
Cadmium, Total	0.005	0.001 U	0.001 U
Chromium, Total	0.1	0.0015 J	0.0012 J
Cobalt, Total	0.006	0.0078	0.0077
Lead, Total	0.015	0.001 U	0.001 U
Lithium, Total	0.04	0.0044 J	0.0038 J
Molybdenum, Total	0.1	0.00077 J	0.00073 J
Selenium, Total	0.05	0.005 U	0.005 U
Thallium, Total	0.002	0.001 U	0.001 U
Mercury, Total	0.002	0.0002 U	0.0002 U
Fluoride	4	0.11	0.12
Radium-226 & 228 (pCi/L)	5	-	-

ABBREVIATIONS AND NOTES:

CFR: Code of Federal Regulations

mg/L: milligram per liter

mS/cm: millisiemen per centimeter

mv: millivolt

NA: Not Applicable

NTU: Nephelometric Turbidity Units

pCi/L: picoCurie per liter

SU: standard units

USEPA: United States Environmental Protection Agency

QUALIFIERS:

*: LCS or LCSD is outside acceptance limits

^: QC is outside acceptance limits

F1: MS and/or MSD Recovery is outside acceptance limits

HF: field parameter with a holding time of 15 minutes

J: value is estimated

J+: value is estimated with a potentially high bias

U: Not detected value is the laboratory reporting limit

- 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>

CCR: Coal Combustion Residuals



LEGEND

- CCR COMPLIANCE MONITORING WELL
- MONITORING WELL
- APPROXIMATE CCR BOUNDARY
- APPROXIMATE F.B. CULLEY PROJECT BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. AERIAL IMAGERY SOURCE: GOOGLE 2018



0 200 400
APPROXIMATE SCALE IN FEET

HALEY
ALDRICH

SIGECO
F.B. CULLEY GENERATING STATION
3711 DARLINGTON ROAD
NEWBURGH, IN 47630

MONITORING WELL NETWORK

AUGUST 2019

FIGURE 1