HALEY ALDRICH

www.haleyaldrich.com

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

by
Haley & Aldrich, Inc.
Greenville, South Carolina

for
Southern Indiana Gas and Electric Company
Evansville, Indiana

File No. 129420
July 2020

Table of Contents

List of Tables

List of Figures

1. 40 CFR § 257.90 Applicability

1.1 40 CFR § 257.90(a)

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

The West Ash Pond (WAP) at the F.B. Culley Generating Station (FBC) 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). The WAP located at FBC was previously classified as an inactive surface impoundment as defined by 40 CFR §257.53. The Southern Indiana Gas and Electric Company (SIGECO) filed a Notice of Intent (NOI) to initiate closure of the WAP and placed the NOI in the facility's operating record on 17 December 2015. The WAP is currently in the closure process. However, on 5 August 2016, the United States Environmental Protection Agency (USEPA) 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 coal combustion residuals (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 and corrective action requirements with the initial annual groundwater monitoring and corrective action report being placed in the facilities operating record by 1 August 2019 and annually thereafter.

This document addresses the requirement for the Owner/Operator to prepare an Annual Groundwater Monitoring and Corrective Action Report (Annual Report) per § 257.90(e).

1.2 40 CFR § 257.90(e) - SUMMARY

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

As required by §257.100(e)(5)(ii), this Annual Report is to be completed no later than 1 August 2020 due to the partial vacatur ordered by the District of Columbia Circuit Court on 14 June 2016 and the subsequent Direct Final Rule effective 4 October 2016, and within one year of the previous annual report being placed into the facility's operating record. As required, this Annual Report documents the status of the groundwater monitoring and corrective action program for the WAP at FBC and summarizes key actions completed through 15 July 2020.

1.2.1 Status of the Groundwater Monitoring Program

As provided in the notification on 12 July 2019, statistically significant increases (SSI) of Appendix III constituents were identified downgradient of the WAP. An evaluation of alternate sources was conducted; however, a successful alternate source demonstration (ASD) was not achieved at that time. As a result, an Assessment Monitoring program was initiated as required by § 257.94(e)(2). Annual and semi-annual groundwater samples were collected as outlined in § 257.95(b) and § 257.95(d)(1) and groundwater protection standards (GWPS) were established as required by § 257.95(d)(2). Statistical analysis was completed on 2 July 2020 as described in § 257.93(h)(2) and statistically significant levels (SSL) of Appendix IV constituents above GWPS (lithium and molybdenum) were identified downgradient of the WAP.

1.2.2 Key Actions Completed

The following key actions were completed in 2019/2020:

- Statistical analysis of assessment monitoring results on 2 July 2020 to evaluate potential for SSLs of Appendix IV constituents present downgradient of the WAP.
- Preparation of the 2018/2019 Annual Report which included the following activities:
  - The 2018/2019 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 2018/2019 Annual Report being placed in the facility's operating record [§ 257.106(d)].
  - Pursuant to § 257.107(h)(1), the 2018/2019 Annual Report was posted to the CCR Website within 30 days of the 2018/2019 Annual Report being placed in the facility's operating record [§ 257.107(d)] and 257.107(h)(1)].
- Assessment monitoring groundwater samples were collected and analyzed in accordance with § 257.95(b) and § 257.95(d)(1). In addition to the two rounds of assessment monitoring required by § 257.95(b) and § 257.95(d)(1), an additional confirmation sampling round was conducted in March 2020 to validate the results obtained during the February 2020 sampling round.

1.2.3 Problems Encountered

No problems, such as damaged wells, issues with sample collection, or lack of sampling, or problems with laboratory analysis were encountered at the WAP in 2019/2020.

1.2.4 Actions to Resolve Problems

Actions to resolve problems were not required.

1.2.5 Project Key Activities for Upcoming Year

Key activities to be completed in 2020 include the following:

- 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).
- Characterize the nature and extent of the release and any relevant site conditions that may affect the remedy ultimately selected.
- Initiate an assessment of corrective measures as required by § 257.96.

1.3 40 CFR § 257.90(e) - INFORMATION

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

1.3.1 40 CFR § 257.90(e)(1) Aerial Image

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 presented as Figure 1.

1.3.2 40 CFR § 257.90(e)(2) Adjustments to Groundwater Monitoring

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.

No additional monitoring wells were installed or decommissioned during 2020. However, the location and construction details of the existing monitoring well network for the WAP are provided for reference as Table I.

1.3.3 40 CFR § 257.90(e)(3) Summary of Groundwater Analysis

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. In addition, a confirmation sampling round was conducted in March 2020 to validate the February sampling results. As required by § 257.95(d)(3), this Annual Report includes the assessment sampling results required by § 257.95(d)(1), the background concentrations established under § 257.94(b), and the GWPS established under § 257.95(d)(2). This information is provided in Table II.

1.3.4 40 CFR § 257.90(e)(4) Current Groundwater Monitoring Program

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 § 257.93(h) a statistical analysis of the Appendix III constituents was completed by 12 July 2019. This statistical analysis determined that SSIs of boron, calcium, chloride, fluoride, sulfate, and

total dissolved solids were present downgradient of the WAP. An evaluation of alternate sources was initiated as allowed by § 257.94(e)(2). A source causing the SSI over background levels other than the CCR unit was not identified at that time and an Assessment Monitoring Program was initiated. The Assessment Monitoring Program has been established to meet the requirements of 40 CFR § 257.95.

As required by § 257.95, a statistical analysis of the Appendix IV constituents was completed. This statistical analysis determined that SSLs for lithium and molybdenum were present downgradient of the WAP.

1.3.5 40 CFR § 257.90(e)(5) Other Required information

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

Other information including development of GWPS, 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
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 GROUNDWATER QUALITY DATA
WEST ASH POND - OCTOBER 2019 THROUGH MARCH 2020
F.B. CULLEY GENERATING STATION
NEWBURGH, INDIANA
FILE NO. 129420

Location Group	Action Level	Upgradient					
Location Name	Maximum Contaminant Level	WAP-1	WAP-1	WAP-1	CCR-AP-7	CCR-AP-7	CCR-AP-7
Sample Name		WAP-1-20191028	WAP-1-20200219	WAP-1-20200331	CCR-AP-7/WAP-7-20191023	CCR-AP-7-20200219	WAP-7-20200330
Sample Date		10/28/2019	02/19/2020	03/31/2020	10/23/2019	02/19/2020	03/30/2020
Lab Sample ID		180-97909-1	180-102603-1	180-104189-1	180-97809-16	180-102603-6	180-104189-6
Detection Monitoring - EPA Appendix III Constituents (mg/L)							
Boron, Total	NA	0.08 U	0.08 U	0.08 U	0.08 U	0.082 U	0.047 J
Calcium, Total	NA	-	180	180	110	110	110
Chloride	NA	-	25 J+	260	27	16 J+	27
Fluoride	4	0.19 J+	0.17	2	0.14 J+	0.22	0.3
pH (lab) (su)	NA	7.4 J	7.4 J	7.3 J	7.4 J	7.4 J	7.3 J
Sulfate	NA	-	340 J+	340	65	45 J+	76
Total Dissolved Solids (TDS)	NA	-	930	910	530	570	560
Other							
Antimony, Total	0.006	0.00059 J	0.00045 J	0.00073 J	0.002 U	0.002 U	0.002 U
Arsenic, Total	0.015	0.0066	0.0073	0.004	0.0075	0.004	0.0018
Barium, Total	2	0.54	0.56	0.45	0.15	0.12	0.11
Beryllium, Total	0.004	0.00027 J	0.00023 J	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium, Total	0.005	0.00022 J	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Chromium, Total	0.1	0.011	0.012	0.005	0.0018 J	0.0018 J	0.002 U
Cobalt, Total	0.019	0.0047	0.0058	0.0033	0.001	0.0011	0.00029 J
Fluoride	4	0.19 J+	0.17	2	0.14 J+	0.22	0.3
Lead, Total	0.032	0.0072	0.0094	0.0041	0.0014 J+	0.0015	0.001 U
Lithium, Total	0.04	0.015	0.011	0.0096	0.02 J+	0.011	0.01
Mercury, Total	0.002	0.0002 U	-	-	0.0002 U	-	-
Molybdenum, Total	0.1	0.0012 J	0.001 J	0.00068 J	0.0017 J	0.0015 J	0.0014 J
Selenium, Total	0.05	0.005 U	-	-	0.005 U	-	-
Thallium, Total	0.002	0.00025 J	0.001 U	0.00021 J	0.001 U	0.001 U	0.001 U
Radiological (pCi/L)							
Radium-226	NA	0.737 ± 0.329	0.549 J- ± 0.241	0.569 ± 0.238	0.194 J ± 0.097	0.309 J- ± 0.125	0.243 ± 0.117
Radium-228	NA	0.715 U ± 1.18	0.962 ± 0.489	0.792 U ± 0.561	1.02 ± 0.324	0.111 U ± 0.217	0.197 U ± 0.268
Radium-226 & 228	5	1.45 UJ ± 1.23	1.51 J- ± 0.545	1.36 J ± 0.609	1.21 ± 0.338	0.419 J- ± 0.25	0.441 UJ ± 0.292
Field Parameters							
Temperature (Deg C)	NA	14.67	13.4	11.86	18.44	15.51	16.79
Dissolved Oxygen, Field (mg/L)	NA	4.01	8.41	5.86	0.18	1.61	0.13
Conductivity, Field (mS/cm)	NA	1.3105	1.4677	1.0865	0.97501	0.95642	0.96873
ORP, Field (mv)	NA	-70.5	-79.4	-86.6	-111.5	-75.1	-44.2
Turbidity, Field (NTU)	NA	647.78	1845.9	658.83	21.59	200.93	21.58
pH, Field (su)	NA	7.22	7.34	6.91	7.01	7.13	7.12

ABBREVIATIONS AND NOTES:

CCR: Coal Combustion Residuals.
mg/L: milligram per liter.
pCi/L: picoCurie per liter.
su: standard units.
USEPA: United States Environmenta.l Protection Agency
J: Value is estimated
J-: Value is estimated, biased low
J+: Value is estimated, biased high
R: Rejected during validation
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

TABLE II
SUMMARY OF GROUNDWATER QUALITY DATA
WEST ASH POND - OCTOBER 2019 THROUGH MARCH 2020
F.B. CULLEY GENERATING STATION
NEWBURGH, INDIANA
FILE NO. 129420

Location Group	Action Level	Downgradient								
Location Name	Maximum Contaminant Level	WAP-2R	WAP-2R	WAP-2R	WAP-3I	WAP-3I	WAP-3I	WAP-4S	WAP-4S	WAP-4S
Sample Name		WAP-2R-20191028	WAP-2R-20200218	WAP-2R-20200331	WAP-3-20191028	WAP-3I-20200219	WAP-3-20200330	WAP-4S-20191025	WAP-4S-20200219	WAP-4-20200330
Sample Date		10/28/2019	02/18/2020	03/31/2020	10/28/2019	02/19/2020	03/30/2020	10/25/2019	02/19/2020	03/30/2020
Lab Sample ID		180-97909-2	180-102603-2	180-104189-2	180-97909-3	180-102603-3	180-104189-3	180-97909-4	180-102603-4	180-104189-4
Detection Monitoring - EPA Appendix III Constituents (mg/L)										
Boron, Total	NA	6.1	6.3	6.7	14	9.9	13	12	10	12
Calcium, Total	NA	-	140	140	-	200	280	-	290	320
Chloride	NA	-	47 J+	42	-	89 J+	130	-	150 J+	180
Fluoride	4	0.25 J+	0.2	0.23	0.39 J+	0.24	0.48	0.17 J+	0.16	0.17
pH (lab) (su)	NA	7.1 J	7.2 J	7 J	7 J	7 J	6.9 J	7.3 J	7.4 J	7.2 J
Sulfate	NA	-	180 J+	160	-	230 J+	550	-	530 J+	530
Total Dissolved Solids (TDS)	NA	-	630	650	-	920	1200	-	1200	1200
Other										
Antimony, Total	0.006	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Arsenic, Total	0.015	0.001	0.00054 J	0.00056 J	0.002	0.0014	0.0064	0.0054	0.0032	0.0061
Barium, Total	2	0.031	0.023	0.025	0.25	0.39	0.33	0.049	0.056	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
Cadmium, Total	0.005	0.00027 J	0.001 U	0.001 U	0.0002 J	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	0.0024	0.002 U	0.003	0.002 U	0.002 U	0.002 U
Cobalt, Total	0.019	0.0015 J	0.00052	0.00083	0.00094	0.00043 J	0.0016	0.0023	0.0022	0.0019
Fluoride	4	0.25 J+	0.2	0.23	0.39 J+	0.24	0.48	0.17 J+	0.16	0.17
Lead, Total	0.032	0.00029 J	0.001 U	0.00019 J	0.00094 J	0.00071 J	0.0027	0.001 U	0.001 U	0.001 U
Lithium, Total	0.04	0.016	0.012	0.014	0.079	0.033	0.1	0.0036 J	0.005 U	0.0049 J
Mercury, Total	0.002	0.0002 U	-	-	0.0002 U	-	-	0.0002 U	-	0.0002 U
Molybdenum, Total	0.1	0.16	0.05	0.07	0.92	0.26	0.7	0.5	0.33	0.47
Selenium, Total	0.05	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
Radiological (pCi/L)										
Radium-226	NA	0.0181 U ± 0.0789	0.0350 R ± 0.0713	0.112 U ± 0.105	0.308 ± 0.119	0.462 J- ± 0.147	0.500 ± 0.174	0.131 U ± 0.102	0.136 J- ± 0.0915	0.128 U ± 0.122
Radium-228	NA	0.0701 U ± 0.341	0.204 U ± 0.218	-0.0721 U ± 0.334	0.243 U ± 0.34	0.629 ± 0.261	0.650 ± 0.391	-0.0635 U ± 0.322	0.154 U ± 0.227	0.774 U ± 0.589
Radium-226 & 228	5	0.0883 U ± 0.35	0.239 UJ ± 0.229	0.112 U ± 0.35	0.551 UJ ± 0.36	1.09 J- ± 0.3	1.15 ± 0.428	0.131 U ± 0.338	0.289 UJ ± 0.245	0.901 U ± 0.602
Field Parameters										
Temperature (Deg C)	NA	16.35	15.24	15.13	17.34	16.28	17.23	16.02	17.45	17.99
Dissolved Oxygen, Field (mg/L)	NA	0.36	0.37	0.24	0.17	0.13	0.04	0.57	0.31	0.12
Conductivity, Field (mS/cm)	NA	1.0587	1.0161	0.97302	1.2504	1.4541	1.3957	1.7667	1.709	1.7973
ORP, Field (mv)	NA	61.4	112.2	36.2	-103.1	-122.7	-114.6	-14.7	-19.4	-10.6
Turbidity, Field (NTU)	NA	11.61	8.73	0	18.24	5.81	135.89	4.65	2.5	4.55
pH, Field (su)	NA	6.86	6.68	6.56	7.04	6.93	6.79	7.11	7.09	6.99

ABBREVIATIONS AND NOTES:

CCR: Coal Combustion Residuals.
mg/L: milligram per liter.
pCi/L: picoCurie per liter.
su: standard units.
USEPA: United States Environmenta.l Protection Agency
J: Value is estimated
J-: Value is estimated, biased low
J+: Value is estimated, biased high
R: Rejected during validation
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

TABLE II
SUMMARY OF GROUNDWATER QUALITY DATA
WEST ASH POND - OCTOBER 2019 THROUGH MARCH 2020
F.B. CULLEY GENERATING STATION
NEWBURGH, INDIANA
FILE NO. 129420

Location Group	Action Level	Downgradient					
Location Name	Maximum Contaminant Level	WAP-4S	WAP-5S	WAP-5S	WAP-5S	WAP-5S	WAP-5S
Sample Name		BLIND DUP-20200330	WAP-5S-20191025	BLIND DUPLICATE-20191025	WAP-5S-20200218	BLIND DUPLICATE-20200218	WAP-5-20200330
Sample Date		03/30/2020	10/25/2019	10/25/2019	02/18/2020	02/18/2020	03/30/2020
Lab Sample ID		180-104189-7	180-97909-5	180-97909-6	180-102603-5	180-102603-7	180-104189-5
Detection Monitoring - EPA Appendix III Constituents (mg/L)							
Boron, Total	NA	13	4.2	4.5	3.9	3.6	4.5
Calcium, Total	NA	320	-	-	210	200	250
Chloride	NA	190	-	-	100 J+	120 J+	130
Fluoride	4	0.2	0.1 U	0.11 U	0.099 J	0.11	0.064 J
pH (lab) (su)	NA	7.3 J	6.8 J	6.8 J	6.9 J	6.9 J	6.7 J
Sulfate	NA	530	-	-	320 J+	340 J+	390
Total Dissolved Solids (TDS)	NA	1300	-	-	940	930	1100
Other							
Antimony, Total	0.006	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Arsenic, Total	0.015	0.0068	0.0013	0.0013	0.00058 J	0.00054 J	0.001 U
Barium, Total	2	0.057	0.061	0.059	0.047	0.045	0.046
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	0.00015 J	0.001 U	0.001 U	0.001 U	0.001 U
Chromium, Total	0.1	0.002 U	0.002 U	0.0016 J	0.002 U	0.002 U	0.002 U
Cobalt, Total	0.019	0.002	0.0094	0.0097	0.0063	0.0062	0.0062
Fluoride	4	0.2	0.1 U	0.11 U	0.099 J	0.11	0.064 J
Lead, Total	0.032	0.00014 J	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Lithium, Total	0.04	0.0056	0.0047 J	0.0041 J	0.005 U	0.005 U	0.005 U
Mercury, Total	0.002	-	0.0002 U	0.0002 U	-	-	-
Molybdenum, Total	0.1	0.48	0.00097 J	0.00086 J	0.00097 J	0.00091 J	0.00086 J
Selenium, Total	0.05	-	0.005 U	0.005 U	-	-	-
Thallium, Total	0.002	0.00025 J	0.00022 J	0.001 U	0.001 U	0.001 U	0.001 U
Radiological (pCi/L)							
Radium-226	NA	0.0740 U ± 0.097	0.0779 U ± 0.0866	0.00333 U ± 0.0873	0.0104 R ± 0.0669	0.0796 R ± 0.0617	0.000 U ± 0.0649
Radium-228	NA	0.540 U ± 0.484	0.276 U ± 0.271	0.130 U ± 0.26	0.249 U ± 0.224	0.0650 U ± 0.21	0.648 ± 0.364
Radium-226 & 228	5	0.614 U ± 0.494	0.354 U ± 0.285	0.133 U ± 0.274	0.259 UJ ± 0.234	0.145 UJ ± 0.219	0.648 J ± 0.37
Field Parameters							
Temperature (Deg C)	NA	17.99	16.9	16.9	16.82	16.82	19.17
Dissolved Oxygen, Field (mg/L)	NA	0.12	0.51	0.51	0.25	0.25	0.14
Conductivity, Field (mS/cm)	NA	1.7973	1.6219	1.6219	1.4869	1.4869	1.6252
ORP, Field (mv)	NA	-10.6	21.6	21.6	97.3	97.3	-14.2
Turbidity, Field (NTU)	NA	4.55	0.84	0.84	0	0	1.06
pH, Field (su)	NA	6.99	6.55	6.55	6.41	6.41	6.64

ABBREVIATIONS AND NOTES:

CCR: Coal Combustion Residuals.
mg/L: milligram per liter.
pCi/L: picoCurie per liter.
su: standard units.
USEPA: United States Environmenta.l Protection Agency
J: Value is estimated
J-: Value is estimated, biased low
J+: Value is estimated, biased high
R: Rejected during validation
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

FIGURES

DRAFT

LEGEND

- CCR COMPLIANCE MONITORING WELL
- MONITORING WELL
- APPROXIMATE LOCATION OF CLOSED WEST ASH POND
- APPROXIMATE CCR BOUNDARY
- APPROXIMATE F.B. CULLEY PROJECT BOUNDARY

NOTES

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

N

0 200 400
APPROXIMATE SCALE IN FEET

HALEY ALDRICH

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

GROUNDWATER MONITORING WELL NETWORK

MAY 2020

FIGURE 1

GIS FILE PATH: \\haleyaldrich.com\shares\bos_common\Projects\Vectren_Corporation\142796_Evansville_CCR_GWMP_Development\Global\GIS\Maps\2020_05\129420_001_0001_GROUNDWATER_MONITORING_WELL_NETWORK.mxd — USER: hwaldholz — LAST SAVED: 5/28/2020 4:18:19 PM