

# **Annual Groundwater Monitoring Report**

Southwestern Electric Power Company  
H. W. Pirkey Power Plant  
East Bottom Ash Pond CCR Management Unit  
Hallsville, Texas  
January 31, 2022

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**Abbreviations:**

ASD - Alternate Source Demonstration

CCR – Coal Combustion Residual

GWPS - Groundwater protection standards

SSI - Statistically Significant Increase

SSL - Statistically Significant Level

## I. Overview

This *Annual Groundwater Monitoring Report* (Report) has been prepared to report the status of activities for the preceding year for the East Bottom Ash Pond (EBAP) CCR unit at Pirkey Power Plant. Southwestern Electric Power Company is wholly-owned subsidiary of American Electric Power Company (AEP). The Texas Commission on Environmental Quality's (TCEQ's) CCR rules require that the Annual Groundwater Monitoring Report be posted to the operating record for the preceding year no later than January 31, 2022.

In general, the following activities were completed:

- At the start of the current annual reporting period, the EBAP was operating under the Assessment monitoring program.
- At the end of the current annual reporting period, the EBAP was operating under the Assessment monitoring program.
- The EBAP initiated an assessment monitoring program on April 3, 2018.
- Groundwater samples were collected for AD-2, AD-4, AD-12, AD-18, AD-31, and AD-32 in March, May, and November 2021 and analyzed for Appendix III and Appendix IV constituents, as specified in 30 TAC §352.941 or §352.951 *et seq* and AEP's *Groundwater Sampling and Analysis Plan (2021)*.
- Groundwater data underwent various validation tests, including tests for completeness, valid values, transcription errors, and consistent units.
- Data and statistical analysis not available for the previous reporting period indicates that during the 2<sup>nd</sup> semi-annual 2020 sampling event (November 2020):

The following Appendix IV parameters exceeded established groundwater protection standards:

- Lithium at AD-31 and AD-32
- Cobalt at AD-2, AD-31 and AD-32

The following Appendix III parameters exceeded background:

- Boron at AD-2 and AD-32
- Calcium at AD-32
- Chloride at AD-2, AD-31 and AD-32
- Fluoride at AD-32
- Sulfate at AD-2, AD-31, and AD-32
- TDS concentrations at AD-2, AD-31, and AD-32

- An ASD for the 2<sup>nd</sup> semi-annual 2020 potential SSLs for cobalt and lithium was certified on May 28, 2021 and submitted to TCEQ June 1, 2021 for approval.
- During the 1<sup>st</sup> semi-annual sampling event held in May 2021:

The following Appendix IV parameters exceeded established groundwater protection standards:

- Lithium at AD-31 and AD-32
- Cobalt at AD-2, AD-31, and AD-32

The following Appendix III parameters exceeded background:

- Boron at AD-2 and AD-32
- Calcium at AD-31, and AD-32
- Chloride at AD-2, AD-31 and AD-32
- Fluoride at AD-32
- Sulfate at AD-2, AD-31, and AD-32
- TDS concentrations at AD-2, and AD-32

- An ASD for 1<sup>st</sup> semi-annual 2021 potential SSLs for cobalt and lithium was certified December 22, 2021 and submitted to TCEQ December 22, 2021 for approval.
- The 2<sup>nd</sup> semi-annual event (November 2021) data are still undergoing statistical analysis.
- Because an alternate source for the SSL(s) was identified, but no alternate source for the SSI(s) was identified, EBAP remained in Assessment Monitoring.
- A statistical process in accordance with 30 TAC §352.931 to evaluate groundwater data was updated, certified, and posted to AEP's CCR website in 2021 titled: AEP's *Statistical Analysis Plan* (Geosyntec 2021). The statistical process was guided by USEPA's *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* ("Unified Guidance," USEPA, 2009).

The major components of this annual report, to the extent applicable at this time, are presented in sections that follow:

- A map, aerial photograph or a drawing showing the CCR management unit(s), all groundwater monitoring wells and monitoring well identification numbers;
- All of the monitoring data collected, including the rate and direction of groundwater flow, plus a summary showing the number of samples collected per monitoring well, the dates the samples were collected and whether the sample was collected as part of detection monitoring or assessment monitoring programs (Attached as **Appendix 1**);

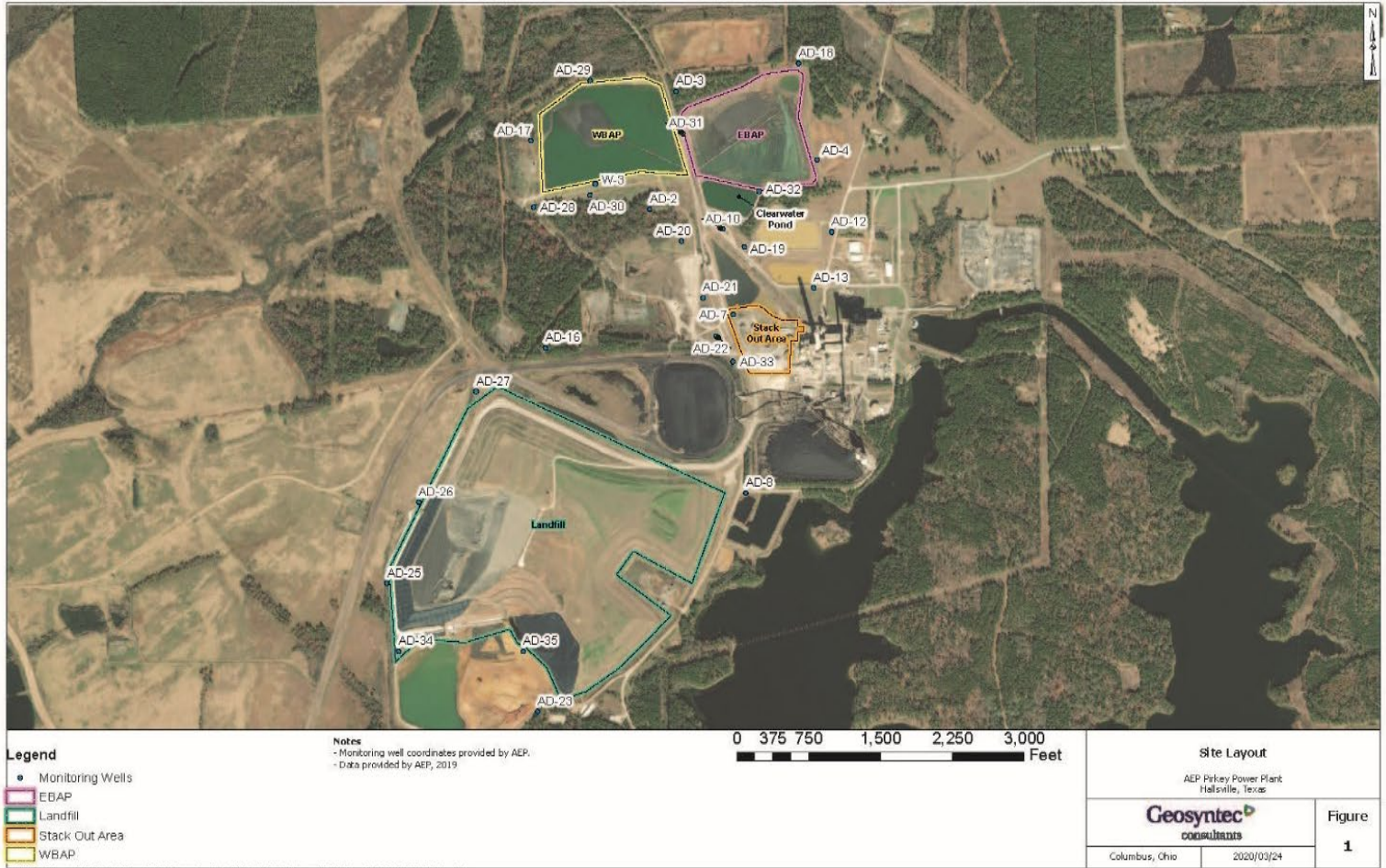
- Statistical comparison of monitoring data to determine if there have been SSI(s) or SSL(s) (Attached as **Appendix 2**);
- A discussion of whether any alternate source demonstrations were performed, and the conclusions (Attached as **Appendix 3**);
- A summary of any transition between monitoring programs, or an alternate monitoring frequency, for example the date and circumstances for transitioning from detection monitoring to assessment monitoring, in addition to identifying the constituents detected at a SSI over background concentrations (where applicable);
- Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a statement as to why that happened;
- Other information required to be included in the annual report such as field sheets, analytical reports, etc. (**Appendix 4 and 5**).

In addition, this report summarizes key actions completed, and where applicable, describes any problems encountered and actions taken to resolve those problems. The report includes a projection of key activities for the upcoming year.

## II. Groundwater Monitoring Well Locations and Identification Numbers

The figure that follows depicts the PE-certified groundwater monitoring network, the monitoring well locations and their corresponding identification numbers.

EBAP Monitoring Wells	
Up Gradient	Down Gradient
AD-4	AD-2
AD-12	AD-31
AD-18	AD-32



### **III. Monitoring Wells Installed or Decommissioned**

There were no new groundwater monitoring wells installed or decommissioned during 2021. The network design, as summarized in the *Groundwater Monitoring Network Design Report* (May 25, 2016) and as posted at the CCR website for Pirkey Power Plant's EBAP, did not change. That network design report, viewable on the AEP CCR web site, discusses the facility location, the hydrogeological setting, the hydrostratigraphic units, the uppermost aquifer, downgradient monitoring well locations and the upgradient monitoring well locations.

### **IV. Groundwater Quality Data and Static Water Elevation Data, With Flow Rate and Direction and Discussion**

**Appendix 1** contains tables showing the groundwater quality data collected during the establishment of background quality, and during detection and assessment monitoring. Static water elevation data from each monitoring event also are shown in **Appendix 1**, along with the groundwater velocity calculations, groundwater flow direction and potentiometric maps developed after each sampling event.

The sampling event conducted March 2021 satisfies the requirement of 257.95(b).

### **V. Statistical Evaluation of 2021 Events**

**Appendix 2** contains the statistical analysis report(s).

Data and statistical analysis not available for the previous reporting period indicates that during the 2<sup>nd</sup> semi-annual 2020 sampling event (November 2020):

The following Appendix IV parameters exceeded established groundwater protection standards:

- Lithium at AD-31 and AD-32
- Cobalt at AD-2, AD-31 and AD-32

The following Appendix III parameters exceeded background:

- Boron at AD-2 and AD-32
- Calcium at AD-32
- Chloride at AD-2, AD-31 and AD-32
- Fluoride at AD-32
- Sulfate at AD-2, AD-31, and AD-32
- TDS concentrations at AD-2, AD-31, and AD-32

During the 1<sup>st</sup> semi-annual sampling event held in May 2021:

The following Appendix IV parameters exceeded established groundwater protection standards:

- Lithium at AD-31 and AD-32
- Cobalt at AD-2, AD-31, and AD-32

The following Appendix III parameters exceeded background:

- Boron at AD-2 and AD-32
- Calcium at AD-31, and AD-32
- Chloride at AD-2, AD-31 and AD-32
- Fluoride at AD-32
- Sulfate at AD-2, AD-31, and AD-32
- TDS concentrations at AD-2, and AD-32

The 2<sup>nd</sup> semi-annual event (November 2021) data are still undergoing statistical analysis.

## **VI. Alternate Source Demonstration**

A successful ASDs for the Appendix IV parameters that exceeded the GWPS for the 2nd semi-annual 2020 was certified on May 28, 2021 and submitted to TCEQ June 1, 2021 for approval.

A successful ASD for the Appendix IV parameters that exceeded the GWPS 1st semi-annual 2021 was certified December 22, 2021 and submitted to TCEQ December 22, 2021 for approval.

The successful ASDs are found in **Appendix 3**.

Because an alternate source for the SSL(s) was identified, but no alternate source for the SSI(s) was identified, EBAP remained in Assessment Monitoring.

## **VII. Discussion About Transition Between Monitoring Requirements or Alternate Monitoring Frequency**

The EBAP will remain in assessment monitoring unless all Appendix III and IV parameters are below background values for two consecutive monitoring events (return to detection monitoring) as prescribed by 30 TAC §352.951(c). If an Appendix IV parameter exceeds its respective GWPS due to a release from the EBAP, an assessment of corrective measures will be undertaken as required by 30 TAC §352.961.

Regarding defining an alternate monitoring frequency, the groundwater velocity and monitoring well production are high enough at this facility that no modification to the semiannual assessment monitoring frequency is needed.



**VIII. Other Information Required**

As required by the CCR assessment monitoring rules in 30 TAC §352.951, sampling all CCR wells for the required Appendix III and IV parameters was completed in 2021.

**IX. Description of Any Problems Encountered in 2021 and Actions Taken**

No significant problems were encountered. The low flow sampling effort went smoothly and the schedule was met to support the annual groundwater report preparation covering the year 2021 groundwater monitoring activities.

**X. A Projection of Key Activities for the Upcoming Year**

Key activities for next year include:

- Assessment monitoring sampling will be conducted;
- Complete the statistical evaluation of the second semi-annual groundwater monitoring event that took place in November 2021;
- Conduct the annual groundwater sampling event for all constituents listed in appendix III and IV as required by 30 TAC 352.951;
- Perform statistical analysis on the sampling results for the Appendix III and Appendix IV parameters as required by 30 TAC 352.951;
- Determine applicable GWPSs for the Appendix IV parameters, and compare the results of Appendix IV concentrations in downgradient wells to the GWPSs;
- If no GWPSs are exceeded, the EBAP will remain in assessment monitoring;
- Responding to any new data received in light of CCR rule requirements;
- Preparation of the next annual groundwater report.

## **APPENDIX 1- Groundwater Data Tables and Figures**

Figures and Tables follow, showing the groundwater monitoring data collected, the rate and direction of groundwater flow, and a summary showing the number of samples collected per monitoring well. The dates that the samples were collected also is shown.

**Table 1 - Groundwater Data Summary: AD-2  
Pirkey - EBAP  
Appendix III Constituents**

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
5/11/2016	Background	1.27	1.43	28	< 0.083 U1	4.4	68	238
7/14/2016	Background	1.34	1.38	28	< 0.083 U1	4.2	71	216
9/7/2016	Background	1.3	2.65	20	< 0.083 U1	4.2	49	216
10/13/2016	Background	1.48	1.29	31	< 0.083 U1	3.6	67	230
11/14/2016	Background	1.36	1.44	28	< 0.083 U1	3.9	72	240
1/12/2017	Background	1.48	1.6	30	< 0.083 U1	3.9	94	244
3/1/2017	Background	1.62	1.28	28	< 0.083 U1	4.1	80	262
4/11/2017	Background	1.65	1.71	50	< 0.083 U1	4.0	88	254
8/24/2017	Detection	1.46	2.06	24	< 0.083 U1	4.3	64	200
12/21/2017	Detection	1.38	2.92	24	< 0.083 U1	--	64	206
3/22/2018	Assessment	1.99	1.97	30	< 0.083 U1	4.2	105	220
8/21/2018	Assessment	2.14	1.65	46	< 0.083 U1	4.7	130	312
2/28/2019	Assessment	2.25	1.96	31.8	0.1 J1	3.5	129	384
5/22/2019	Assessment	2.17	2.19	29.6	0.1 J1	4.0	137	316
8/12/2019	Assessment	2.16	3.30	28.4	0.1 J1	4.6	128	306
3/11/2020	Assessment	2.78	2.50	29.7	0.14	4.0	178	374
6/3/2020	Assessment	2.44	2.44	29.3	0.15	4.6	174	387
11/2/2020	Assessment	2.62	1.99	29.2	0.11	3.9	158	347
3/9/2021	Assessment	2.76	2.48	30.2	0.23	4.0	209	450
5/25/2021	Assessment	2.78	2.7	29.8	0.22	3.6	215	430
11/16/2021	Assessment	2.62	2.63	29.2	0.15	3.4	200	410

Notes:

mg/L: milligrams per liter

SU: standard unit

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.

In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

--: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.

In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

**Table 1 - Groundwater Data Summary: AD-2  
Pirkey - EBAP  
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
5/11/2016	Background	< 0.93 U1	< 1.05 U1	38	0.514594 J1	< 0.07 U1	< 0.23 U1	10	1.446	< 0.083 U1	< 0.68 U1	< 0.00013 U1	0.098	< 0.29 U1	2.08256 J1	< 0.86 U1
7/14/2016	Background	< 0.93 U1	< 1.05 U1	38	0.46511 J1	< 0.07 U1	0.401928 J1	11	0.723	< 0.083 U1	< 0.68 U1	0.051	0.068	0.862706 J1	< 0.99 U1	< 0.86 U1
9/7/2016	Background	< 0.93 U1	< 1.05 U1	39	0.439699 J1	< 0.07 U1	0.493592 J1	10	1.489	< 0.083 U1	< 0.68 U1	0.048	0.675	< 0.29 U1	< 0.99 U1	1.26444 J1
10/13/2016	Background	< 0.93 U1	< 1.05 U1	39	0.40165 J1	< 0.07 U1	0.885421 J1	11	2.65	< 0.083 U1	< 0.68 U1	0.052	0.048	< 0.29 U1	1.3807 J1	< 0.86 U1
11/14/2016	Background	< 0.93 U1	< 1.05 U1	34	0.367353 J1	< 0.07 U1	< 0.23 U1	10	2.121	< 0.083 U1	< 0.68 U1	0.048	0.154	< 0.29 U1	1.23147 J1	< 0.86 U1
1/12/2017	Background	< 0.93 U1	< 1.05 U1	37	0.376129 J1	< 0.07 U1	< 0.23 U1	10	1.656	< 0.083 U1	< 0.68 U1	0.052	0.093	< 0.29 U1	< 0.99 U1	< 0.86 U1
3/1/2017	Background	< 0.93 U1	< 1.05 U1	37	0.413652 J1	< 0.07 U1	< 0.23 U1	10	1.267	< 0.083 U1	< 0.68 U1	0.051	0.037	< 0.29 U1	< 0.99 U1	< 0.86 U1
4/11/2017	Background	< 0.93 U1	< 1.05 U1	37	0.435396 J1	< 0.07 U1	0.243798 J1	11	0.807	< 0.083 U1	< 0.68 U1	0.052	0.028	< 0.29 U1	< 0.99 U1	< 0.86 U1
3/22/2018	Assessment	< 0.93 U1	< 1.05 U1	33.28	0.45 J1	< 0.07 U1	< 0.23 U1	12.43	1.053	< 0.083 U1	< 0.68 U1	0.05379	0.042	< 0.29 U1	1.61 J1	< 0.86 U1
8/21/2018	Assessment	< 0.01 U1	0.52	29.0	0.428	0.06	0.406	13.6	1.059	< 0.083 U1	0.338	0.0479	0.02 J1	0.06 J1	1.1	0.096
2/28/2019	Assessment	0.02 J1	0.53	26.1	0.5 J1	0.06	0.1 J1	13.9	1.261	0.1 J1	0.355	0.0591	0.027	< 0.4 U1	1.5	< 0.1 U1
5/22/2019	Assessment	< 0.4 U1	< 0.6 U1	25.6	< 0.4 U1	< 0.2 U1	< 0.8 U1	15.5	0.832	0.1 J1	< 0.4 U1	0.0542	0.063	< 8 U1	0.9 J1	< 0.1 U1
8/12/2019	Assessment	< 0.02 U1	0.35	22.8	0.402	0.06	0.292	13.0	1.812	0.1 J1	0.288	0.0560	0.044	< 0.4 U1	0.8	0.1 J1
3/11/2020	Assessment	< 0.02 U1	0.52	21.9	0.499	0.08	0.247	17.7	0.1882	0.14	0.600	0.0476	0.056	4.37	1.5	0.1 J1
6/3/2020	Assessment	< 0.02 U1	0.45	19.7	0.474	0.07	0.243	16.5	1.412	0.15	0.389	0.0464	0.085	< 0.4 U1	1.5	0.1 J1
11/2/2020	Assessment	< 0.02 U1	0.41	21.5	0.463	0.07	0.254	16.9	0.961	0.11	0.435	0.0490	0.037	< 0.4 U1	1.3	0.1 J1
3/9/2021	Assessment	< 0.02 U1	0.68	19.6	0.564	0.09	0.280	20.2	0.681	0.23	0.517	0.0473	0.074	< 0.1 U1	2.3	0.1 J1
5/25/2021	Assessment	< 0.02 U1	0.55	18.9	0.541	0.094	0.38	21.7	1.16	0.22	0.46	0.0483	0.057	< 0.1 U1	1.68	0.09 J1
11/16/2021	Assessment	< 0.02 U1	0.62	19.2	0.575	0.078	0.37	21.2	1.69	0.15	0.51	0.0539	0.049	< 0.1 U1	1.75	0.11 J1

Notes:  
µg/L: micrograms per liter  
mg/L: milligrams per liter  
pCi/L: picocuries per liter  
<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.  
- -: Not analyzed  
J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

**Table 1 - Groundwater Data Summary: AD-4  
Pirkey - EBAP  
Appendix III Constituents**

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
5/11/2016	Background	0.02	1.63	4	< 0.083 U1	5.4	23	148
7/14/2016	Background	0.02	2.32	4	< 0.083 U1	4.9	20	157
9/8/2016	Background	0.02	2.37	5	< 0.083 U1	4.9	20	136
10/13/2016	Background	0.03	2.87	6	< 0.083 U1	4.1	19	164
11/15/2016	Background	0.04	2.71	5	< 0.083 U1	4.3	19	152
1/12/2017	Background	0.03	2.94	5	< 0.083 U1	4.8	18	148
3/1/2017	Background	0.03	2.86	4	< 0.083 U1	4.7	18	148
4/10/2017	Background	0.04	1.91	5	< 0.083 U1	4.4	21	140
8/24/2017	Detection	0.06229	2.04	5	< 0.083 U1	4.6	20	94
3/22/2018	Assessment	0.0331	1.41	3	< 0.083 U1	4.8	23	132
8/21/2018	Assessment	0.018	2.38	7	< 0.083 U1	4.8	21	158
2/28/2019	Assessment	0.021	1.57	3.56	0.11	4.9	22.9	192
5/23/2019	Assessment	0.021	1.71	3.31	0.15	5.0	24.6	150
8/14/2019	Assessment	< 0.02 U1	1.97	6.22	0.12	5.5	21.7	146
3/11/2020	Assessment	< 0.02 U1	1.46	3.42	0.13	5.4	24.2	166
6/3/2020	Assessment	0.02 J1	1.72	3.65	0.14	5.4	24.7	168
11/4/2020	Assessment	0.02 J1	2.33	3.66	0.05 J1	4.9	18.7	162
3/9/2021	Assessment	0.02 J1	1.72	3.63	0.12	5.2	21.5	146
5/25/2021	Assessment	0.032 J1	1.7	3.60	0.14	4.6	22.6	150
11/16/2021	Assessment	0.012 J1	2.13	3.94	< 0.02 U1	4.3	17.2	130

Notes:

mg/L: milligrams per liter

SU: standard unit

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.

In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

--: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.

In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

**Table 1 - Groundwater Data Summary: AD-4  
Pirkey - EBAP  
Appendix IV Constituents**

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
5/11/2016	Background	< 0.93 U1	3.95918 J1	75	1	0.133362 J1	0.396808 J1	8	0.729	< 0.083 U1	< 0.68 U1	0.013	0.00891 J1	< 0.29 U1	1.79183 J1	< 0.86 U1
7/14/2016	Background	< 0.93 U1	8	127	1	< 0.07 U1	3	9	4.271	< 0.083 U1	< 0.68 U1	0.041	0.037	< 0.29 U1	1.73546 J1	1.87362 J1
9/8/2016	Background	< 0.93 U1	5	123	1	0.111076 J1	2	8	0.193	< 0.083 U1	< 0.68 U1	0.04	0.01151 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
10/13/2016	Background	< 0.93 U1	11	183	0.830588 J1	< 0.07 U1	7	7	2.381	< 0.083 U1	< 0.68 U1	0.034	0.01005 J1	< 0.29 U1	1.60451 J1	0.868603 J1
11/15/2016	Background	< 0.93 U1	< 1.05 U1	114	0.53145 J1	< 0.07 U1	0.446412 J1	6	1.072	< 0.083 U1	< 0.68 U1	0.035	0.01268 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
1/12/2017	Background	< 0.93 U1	< 1.05 U1	149	0.406228 J1	< 0.07 U1	0.305795 J1	4.5062 J1	2.599	< 0.083 U1	< 0.68 U1	0.03	0.01146 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
3/1/2017	Background	< 0.93 U1	< 1.05 U1	131	0.354085 J1	< 0.07 U1	< 0.23 U1	4.45689 J1	1.089	< 0.083 U1	< 0.68 U1	0.033	0.01224 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
4/10/2017	Background	< 0.93 U1	< 1.05 U1	94	0.915299 J1	0.0796 J1	0.240917 J1	8	0.684	< 0.083 U1	< 0.68 U1	0.047	0.00554 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
3/22/2018	Assessment	< 0.93 U1	< 1.05 U1	66.74	1.15	0.26 J1	< 0.23 U1	9.39	1.283	< 0.083 U1	< 0.68 U1	0.05374	< 0.005 U1	< 0.29 U1	1.99 J1	< 0.86 U1
8/21/2018	Assessment	< 0.01 U1	1.30	121	0.400	0.02 J1	0.198	4.43	1.331	< 0.083 U1	0.098	0.0294	0.005 J1	< 0.02 U1	0.04 J1	0.096
2/28/2019	Assessment	< 0.02 U1	0.26	70.5	0.9 J1	0.01 J1	0.1 J1	6.92	0.818	0.11	0.106	0.0513	< 0.005 U1	< 0.4 U1	0.03 J1	< 0.1 U1
5/23/2019	Assessment	< 0.4 U1	< 0.6 U1	61.7	0.5 J1	< 0.2 U1	1 J1	7.86	0.5173	0.15	< 0.4 U1	0.0516	< 0.005 U1	< 8 U1	< 0.6 U1	< 0.1 U1
8/14/2019	Assessment	< 0.02 U1	0.17	73.5	1.04	< 0.01 U1	0.08 J1	6.52	0.833	0.12	0.06 J1	0.0484	< 0.005 U1	< 0.4 U1	0.04 J1	< 0.1 U1
3/11/2020	Assessment	< 0.02 U1	1.16	69.0	0.965	< 0.01 U1	0.1 J1	7.89	0.2327	0.13	0.06 J1	0.0415	< 0.002 U1	< 0.4 U1	< 0.03 U1	< 0.1 U1
6/3/2020	Assessment	< 0.02 U1	0.52	67.9	0.527	< 0.01 U1	0.2 J1	7.15	0.87	0.14	0.06 J1	0.0380	< 0.002 U1	< 0.4 U1	< 0.03 U1	< 0.1 U1
11/4/2020	Assessment	0.03 J1	5.30	124	0.922	0.03 J1	0.433	4.40	1.45	0.05 J1	0.402	0.0274	0.008	< 0.4 U1	0.1 J1	0.1 J1
3/9/2021	Assessment	< 0.02 U1	0.30	87.9	0.679	0.01 J1	0.2 J1	6.50	0.576	0.12	< 0.05 U1	0.0331	0.002 J1	< 0.1 U1	< 0.09 U1	0.06 J1
5/25/2021	Assessment	< 0.02 U1	0.13	80.7	0.489 M1	0.012 J1	0.24	6.86	0.83	0.14	< 0.05 U1	0.0335 M1	< 0.002 U1	< 0.1 U1	< 0.09 U1	0.06 J1
11/16/2021	Assessment	< 0.02 U1	0.25	122 M1, P3	0.280	0.022	0.28	3.08	1.6	< 0.02 U1	< 0.05 U1	0.0211	0.015	< 0.1 U1	< 0.09 U1	0.08 J1

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

- -: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

M1: The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.

P3: The precision on the matrix spike duplicate (MSD) was above acceptance limits.

**Table 1 - Groundwater Data Summary: AD-12  
Pirkey - EBAP  
Appendix III Constituents**

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
5/11/2016	Background	0.03	0.362	5	< 0.083 U1	4.4	4	94
7/13/2016	Background	0.03	0.26	6	< 0.083 U1	3.1	4	75
9/7/2016	Background	0.04	0.343	6	< 0.083 U1	3.9	7	63
10/12/2016	Background	0.03	0.271	7	1	3.4	8	92
11/14/2016	Background	0.04	0.331	8	< 0.083 U1	2.6	6	80
1/11/2017	Background	0.03	0.315	7	< 0.083 U1	4.8	6	76
2/28/2017	Background	0.04	0.434	5	< 0.083 U1	3.6	4	50
4/11/2017	Background	0.05	0.299	6	0.2565 J1	4.7	7	72
8/23/2017	Detection	0.0495	0.245	6	0.213 J1	4.8	6	52
3/21/2018	Assessment	0.01397	0.269	5	< 0.083 U1	4.2	3	< 2 U1
8/20/2018	Assessment	0.017	0.338	10	< 0.083 U1	4.4	4	94
2/27/2019	Assessment	0.03 J1	0.4 J1	6.08	0.09	5.2	3.6	36
5/21/2019	Assessment	0.020	0.3 J1	6.30	0.09	4.1	4.0	80
8/12/2019	Assessment	< 0.02 U1	0.278	7.24	0.06 J1	4.9	2.6	90
3/10/2020	Assessment	0.02 J1	0.3 J1	6.08	0.10	4.9	3.7	62
6/2/2020	Assessment	< 0.02 U1	0.2 J1	5.63	0.10	4.0	3.9	91
11/2/2020	Assessment	0.03 J1	0.3 J1	4.65	0.08	4.3	3.3	74
3/8/2021	Assessment	0.01 J1	0.2 J1	6.46	0.11	4.1	3.8	68
5/24/2021	Assessment	0.032 J1	0.2 J1	5.54	0.12	4.2	5.46	70
11/15/2021	Assessment	0.012 J1	0.28	8.03	0.07	3.5	2.90	90

Notes:

mg/L: milligrams per liter

SU: standard unit

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.

In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

--: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.

In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

Table 1 - Groundwater Data Summary: AD-12

Pirkey - EBAP

Appendix IV Constituents

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
5/11/2016	Background	< 0.93 U1	< 1.05 U1	26	0.219521 J1	< 0.07 U1	0.710981 J1	1.58207 J1	0.2073	< 0.083 U1	< 0.68 U1	< 0.00013 U1	< 0.005 U1	< 0.29 U1	1.73953 J1	< 0.86 U1
7/13/2016	Background	< 0.93 U1	< 1.05 U1	23	0.190337 J1	< 0.07 U1	0.68835 J1	1.29444 J1	2.909	< 0.083 U1	< 0.68 U1	0.008	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
9/7/2016	Background	< 0.93 U1	< 1.05 U1	30	0.232192 J1	< 0.07 U1	0.353544 J1	1.66591 J1	0.881	< 0.083 U1	< 0.68 U1	0.01	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
10/12/2016	Background	< 0.93 U1	< 1.05 U1	27	0.149553 J1	< 0.07 U1	0.529033 J1	1.56632 J1	0.257	1	< 0.68 U1	0.012	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
11/14/2016	Background	< 0.93 U1	< 1.05 U1	28	0.152375 J1	< 0.07 U1	0.32826 J1	1.47282 J1	0.767	< 0.083 U1	< 0.68 U1	0.013	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
1/11/2017	Background	< 0.93 U1	< 1.05 U1	23	0.126621 J1	< 0.07 U1	0.650158 J1	1.09495 J1	1.536	< 0.083 U1	< 0.68 U1	0.01	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
2/28/2017	Background	< 0.93 U1	< 1.05 U1	26	0.149219 J1	< 0.07 U1	0.325811 J1	1.29984 J1	0.416	< 0.083 U1	< 0.68 U1	0.009	< 0.005 U1	< 0.29 U1	< 0.99 U1	0.994913 J1
4/11/2017	Background	< 0.93 U1	< 1.05 U1	24	0.159412 J1	< 0.07 U1	0.416007 J1	1.33344 J1	0.3895	0.2565 J1	< 0.68 U1	0.008	0.01364 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
3/21/2018	Assessment	< 0.93 U1	< 1.05 U1	25.82	0.16 J1	< 0.07 U1	1.05	1.49 J1	0.784	< 0.083 U1	< 0.68 U1	0.00722	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
8/20/2018	Assessment	< 0.01 U1	0.11	27.8	0.159	0.01 J1	0.330	1.72	1.128	< 0.083 U1	0.089	0.0143	< 0.005 U1	0.04 J1	0.1	0.04 J1
2/27/2019	Assessment	< 0.4 U1	< 0.6 U1	22.5	< 0.4 U1	< 0.2 U1	< 0.8 U1	1.37	0.225	0.09	< 0.4 U1	0.00688	< 0.005 U1	< 8 U1	< 0.6 U1	< 2 U1
5/21/2019	Assessment	< 0.4 U1	< 0.6 U1	21.7	< 0.4 U1	< 0.2 U1	< 0.8 U1	1.15	0.201	0.09	< 0.4 U1	0.00576	< 0.005 U1	< 8 U1	< 0.6 U1	< 0.1 U1
8/12/2019	Assessment	< 0.02 U1	0.07 J1	23.8	0.154	< 0.01 U1	0.204	1.30	0.237	0.06 J1	0.08 J1	0.00829	< 0.005 U1	< 0.4 U1	0.2 J1	< 0.1 U1
3/10/2020	Assessment	< 0.02 U1	0.09 J1	21.7	0.139	0.01 J1	0.2 J1	1.21	3.0706	0.10	0.09 J1	0.00547	< 0.002 U1	< 0.4 U1	0.2	< 0.1 U1
6/2/2020	Assessment	< 0.02 U1	0.09 J1	19.0	0.132	< 0.01 U1	0.208	1.02	0.799	0.10	0.09 J1	0.00505	< 0.002 U1	< 0.4 U1	0.3	< 0.1 U1
11/2/2020	Assessment	0.05 J1	0.09 J1	18.9	0.122	< 0.01 U1	0.204	1.04	0.929	0.08	0.09 J1	0.00510	< 0.002 U1	< 0.4 U1	0.3	< 0.1 U1
3/8/2021	Assessment	< 0.02 U1	0.07 J1	22.9	0.150	0.007 J1	0.2 J1	1.19	0.214	0.11	0.07 J1	0.00570	< 0.002 U1	< 0.1 U1	0.2 J1	< 0.04 U1
5/24/2021	Assessment	< 0.02 U1	0.08 J1	23.1	0.136	0.005 J1	0.24	1.19	0.6	0.12	0.07 J1	0.00500	< 0.002 U1	< 0.1 U1	0.31 J1	< 0.04 U1
11/15/2021	Assessment	< 0.02 U1	0.05 J1	26.5	0.148	0.01 J1	0.30	1.38	1.76	0.07	0.07 J1	0.0110	< 0.002 U1	< 0.1 U1	0.10 J1	< 0.04 U1

Notes:  
 µg/L: micrograms per liter  
 mg/L: milligrams per liter  
 pCi/L: picocuries per liter  
 <: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.  
 -: Not analyzed  
 J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.



**Table 1 - Groundwater Data Summary: AD-18**

**Pirkey - EBAP**

**Appendix III Constituents**

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
5/10/2016	Background	0.01	0.548	8	< 0.083 U1	4.5	7	108
7/14/2016	Background	0.01	0.409	8	< 0.083 U1	4.7	7	116
9/8/2016	Background	0.01	0.343	8	< 0.083 U1	4.7	8	110
10/13/2016	Background	0.02	0.56	7	< 0.083 U1	4.1	10	124
11/15/2016	Background	0.02	0.59	7	< 0.083 U1	4.4	7	134
1/12/2017	Background	0.01	0.415	7	< 0.083 U1	4.7	10	128
3/1/2017	Background	0.01	0.224	6	< 0.083 U1	4.1	7	108
4/10/2017	Background	0.01	0.304	7	< 0.083 U1	4.1	8	102
8/24/2017	Detection	0.0278	0.435	8	< 0.083 U1	4.9	8	68
3/22/2018	Assessment	0.01642	0.292	6	< 0.083 U1	5.4	6	100
8/21/2018	Assessment	0.012	0.321	10	< 0.083 U1	5.1	8	118
2/28/2019	Assessment	< 0.02 U1	0.490	8.19	0.02 J1	5.0	6.1	84
5/23/2019	Assessment	0.013	0.684	8.82	0.02 J1	5.2	10.6	104
8/13/2019	Assessment	< 0.02 U1	0.647	8.49	0.01 J1	5.2	6.6	90
3/11/2020	Assessment	< 0.02 U1	0.3 J1	7.34	0.02 J1	4.4	6.1	90 J1
6/3/2020	Assessment	< 0.02 U1	0.2 J1	8.30	0.03 J1	4.5	6.3	119
11/3/2020	Assessment	--	--	--	--	4.4	--	--
11/4/2020	Assessment	< 0.02 U1	0.2 J1	6.30	0.02 J1	--	6.3	100
3/9/2021	Assessment	0.009 J1	0.2 J1	6.61	0.02 J1	4.5	6.6	113
5/25/2021	Assessment	0.021 J1	0.3	7.16	0.02 J1	4.4	7.46	100 P1
11/16/2021	Assessment	--	--	--	--	3.9	--	--
11/17/2021	Assessment	0.01 J1	0.20	5.99	< 0.02 U1	--	6.23	100

Notes:

mg/L: milligrams per liter

SU: standard unit

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.

In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

--: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.

In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

Due to limited groundwater volume, pH values for some sampling events were collected the day prior to collection of analytical samples.

Table 1 - Groundwater Data Summary: AD-18

Pirkey - EBAP

Appendix IV Constituents

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
5/10/2016	Background	< 0.93 U1	< 1.05 U1	157	0.262755 J1	0.109247 J1	1	1.82932 J1	0.847	< 0.083 U1	< 0.68 U1	0.004	0.01536 J1	< 0.29 U1	1.71074 J1	< 0.86 U1
7/14/2016	Background	< 0.93 U1	3.77261 J1	139	0.243326 J1	< 0.07 U1	3	2.16037 J1	3.264	< 0.083 U1	< 0.68 U1	0.02	0.064	0.41347 J1	2.45009 J1	< 0.86 U1
9/8/2016	Background	< 0.93 U1	< 1.05 U1	115	0.226343 J1	< 0.07 U1	0.779959 J1	1.09947 J1	1.105	< 0.083 U1	< 0.68 U1	0.019	0.03	< 0.29 U1	< 0.99 U1	< 0.86 U1
10/13/2016	Background	< 0.93 U1	< 1.05 U1	112	0.192611 J1	< 0.07 U1	0.631027 J1	2.24885 J1	1.161	< 0.083 U1	< 0.68 U1	0.026	0.01416 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
11/15/2016	Background	< 0.93 U1	< 1.05 U1	94	0.107171 J1	< 0.07 U1	0.724569 J1	1.66054 J1	1.486	< 0.083 U1	< 0.68 U1	0.017	0.029	< 0.29 U1	< 0.99 U1	< 0.86 U1
1/12/2017	Background	< 0.93 U1	< 1.05 U1	99	0.169196 J1	< 0.07 U1	0.411433 J1	1.62881 J1	0.976	< 0.083 U1	< 0.68 U1	0.026	0.01887 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
3/1/2017	Background	< 0.93 U1	< 1.05 U1	99	0.105337 J1	< 0.07 U1	0.572874 J1	0.976724 J1	0.468	< 0.083 U1	< 0.68 U1	0.017	0.01086 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
4/10/2017	Background	< 0.93 U1	< 1.05 U1	105	0.130316 J1	< 0.07 U1	0.967681 J1	0.98157 J1	0.648	< 0.083 U1	< 0.68 U1	0.019	0.0096 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
3/22/2018	Assessment	< 0.93 U1	< 1.05 U1	97.75	0.09 J1	< 0.07 U1	< 0.23 U1	0.97 J1	0.942	< 0.083 U1	< 0.68 U1	0.01647	0.006 J1	< 0.29 U1	1.53 J1	< 0.86 U1
8/21/2018	Assessment	0.02 J1	1.01	99.8	0.129	0.02 J1	0.809	1.18	1.108	< 0.083 U1	0.280	0.0175	0.014 J1	0.08 J1	0.2	0.060
2/28/2019	Assessment	< 0.4 U1	< 0.6 U1	106	< 0.4 U1	< 0.2 U1	< 0.8 U1	1.11	0.615	0.02 J1	0.7 J1	0.0177	0.009 J1	< 8 U1	< 0.6 U1	< 2 U1
5/23/2019	Assessment	< 0.4 U1	< 0.6 U1	131	< 0.4 U1	< 0.2 U1	< 0.8 U1	1.47	0.492	0.02 J1	< 0.4 U1	0.0209	0.009 J1	< 8 U1	< 0.6 U1	< 0.1 U1
8/13/2019	Assessment	< 0.02 U1	0.45	100	0.118	0.02 J1	0.212	1.25	0.473	0.01 J1	0.2 J1	0.0183	0.023 J1	< 0.4 U1	0.09 J1	< 0.1 U1
3/11/2020	Assessment	< 0.02 U1	0.09 J1	97.1	0.09 J1	0.01 J1	0.1 J1	0.948	4.813	0.02 J1	< 0.05 U1	0.0134	0.003 J1	< 0.4 U1	0.05 J1	< 0.1 U1
6/3/2020	Assessment	< 0.02 U1	0.22	100	0.1 J1	0.01 J1	0.2 J1	0.950	0.728	0.03 J1	0.06 J1	0.0132	0.007	< 0.4 U1	0.09 J1	< 0.1 U1
11/4/2020	Assessment	< 0.02 U1	0.29	89.3	0.08 J1	0.01 J1	0.1 J1	0.917	1.169	0.02 J1	0.06 J1	0.0128	0.028	< 0.4 U1	0.2 J1	< 0.1 U1
3/9/2021	Assessment	< 0.02 U1	0.28	88.7	0.09 J1	0.01 J1	0.271	0.827	0.331	0.02 J1	0.08 J1	0.0131	0.006	< 0.1 U1	0.1 J1	< 0.04 U1
5/25/2021	Assessment	< 0.02 U1	0.42	103	0.088	0.014 J1	0.55	0.964	0.77	0.02 J1	0.15 J1	0.0127	0.014	< 0.1 U1	0.13 J1	0.05 J1
11/17/2021	Assessment	< 0.02 U1	0.19	82.2	0.078	0.011 J1	0.31	0.801	1.91	< 0.02 U1	< 0.05 U1	0.0124	0.030	< 0.1 U1	0.11 J1	< 0.04 U1

Notes:  
 µg/L: micrograms per liter  
 mg/L: milligrams per liter  
 pCi/L: picocuries per liter  
 <: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.  
 -: Not analyzed  
 J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

**Table 1 - Groundwater Data Summary: AD-31**

**Pirkey - EBAP**

**Appendix III Constituents**

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
5/11/2016	Background	0.08	10.4	18	< 0.083 U1	4.5	63	286
7/13/2016	Background	0.03	4.27	18	< 0.083 U1	3.5	66	245
9/7/2016	Background	0.03	3.47	18	< 0.083 U1	3.7	60	260
10/12/2016	Background	0.04	4.41	18	< 0.083 U1	4.0	62	276
11/14/2016	Background	0.04	4.7	18	< 0.083 U1	3.2	66	266
1/11/2017	Background	0.03	4.43	19	< 0.083 U1	4.4	79	252
2/28/2017	Background	0.04	3.89	14	< 0.083 U1	3.6	68	212
4/11/2017	Background	0.04	3.64	16	< 0.083 U1	3.6	69	252
8/23/2017	Detection	0.01752	2.24	18	< 0.083 U1	4.5	52	228
12/21/2017	Detection	--	--	20	< 0.083 U1	--	58	224
3/22/2018	Assessment	0.04078	3.11	16	< 0.083 U1	4.5	76	260
8/21/2018	Assessment	0.022	2.86	25	< 0.083 U1	4.9	72	274
2/28/2019	Assessment	0.03 J1	2.77	18.8	0.1 J1	5.0	74.8	74
5/23/2019	Assessment	0.021	3.29	18.7	0.13	5.1	79.9	240
8/12/2019	Assessment	< 0.02 U1	2.86	21.6	0.16	4.1	70.0	250
3/10/2020	Assessment	0.03 J1	2.80	21.7	0.14	3.5	74.6	246
6/2/2020	Assessment	0.02 J1	2.92	22.1	0.16	4.2	81.4	288
11/2/2020	Assessment	0.03 J1	2.76	21.2	0.13	3.7	77.8	268
3/8/2021	Assessment	0.02 J1	2.69	18.5	0.17	3.8	81.1	279
5/24/2021	Assessment	0.026 J1	3.0	18.1	0.17	3.6	86.4	130
11/16/2021	Assessment	0.024 J1	2.68	20.1	0.13	2.8	76.6	250

Notes:

mg/L: milligrams per liter

SU: standard unit

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.

In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

--: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.

In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

Table 1 - Groundwater Data Summary: AD-31

Pirkey - EBAP

Appendix IV Constituents

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
5/11/2016	Background	< 0.93 U1	93	712	10	0.858875 J1	212	50	7.32	< 0.083 U1	57	0.077	1.797	0.893978 J1	1.84045 J1	< 0.86 U1
7/13/2016	Background	< 0.93 U1	3.41559 J1	69	1	< 0.07 U1	10	11	3.38	< 0.083 U1	< 0.68 U1	0.096	0.32	0.316083 J1	1.11301 J1	< 0.86 U1
9/7/2016	Background	< 0.93 U1	4.34007 J1	88	2	< 0.07 U1	15	11	2.345	< 0.083 U1	< 0.68 U1	0.094	0.284	< 0.29 U1	< 0.99 U1	< 0.86 U1
10/12/2016	Background	< 0.93 U1	6	76	1	< 0.07 U1	14	11	3.88	< 0.083 U1	1.54023 J1	0.097	0.347	< 0.29 U1	< 0.99 U1	< 0.86 U1
11/14/2016	Background	< 0.93 U1	11	125	2	0.174662 J1	30	14	3.202	< 0.083 U1	3.93298 J1	0.096	0.523	0.401556 J1	1.03392 J1	< 0.86 U1
1/11/2017	Background	< 0.93 U1	3.92088 J1	77	1	< 0.07 U1	12	10	2.725	< 0.083 U1	< 0.68 U1	0.093	0.384	< 0.29 U1	< 0.99 U1	1.01921 J1
2/28/2017	Background	< 0.93 U1	< 1.05 U1	44	0.998308 J1	< 0.07 U1	3	9	2.684	< 0.083 U1	< 0.68 U1	0.09	0.138	< 0.29 U1	< 0.99 U1	< 0.86 U1
4/11/2017	Background	< 0.93 U1	3.31744 J1	73	1	0.0944 J1	12	11	3.521	< 0.083 U1	< 0.68 U1	0.097	0.333	< 0.29 U1	< 0.99 U1	< 0.86 U1
3/22/2018	Assessment	< 0.93 U1	3.32 J1	70.83	1.24	0.12 J1	9.62	11.12	2.955	< 0.083 U1	< 0.68 U1	0.09732	1.389	< 0.29 U1	1.98 J1	< 0.86 U1
8/21/2018	Assessment	0.02 J1	1.92	57.7	0.729	0.06	2.39	9.29	4.13	< 0.083 U1	1.41	0.0556	1.112	0.24	2.5	0.113
2/28/2019	Assessment	< 0.4 U1	< 0.6 U1	33.1	1 J1	< 0.2 U1	< 0.8 U1	9.38	3.156	0.1 J1	< 0.4 U1	0.0864	0.01 J1	< 8 U1	< 0.6 U1	< 2 U1
5/23/2019	Assessment	< 0.4 U1	< 0.6 U1	37.9	0.9 J1	< 0.2 U1	< 0.8 U1	10.3	3.4	0.13	< 0.4 U1	0.0928	0.057	< 8 U1	< 0.6 U1	< 0.1 U1
8/12/2019	Assessment	< 0.02 U1	0.53	35.0	0.850	0.06	0.365	8.69	2.196	0.16	0.325	0.0875	1.027	< 0.4 U1	0.4	< 0.1 U1
3/10/2020	Assessment	< 0.02 U1	0.27	34.8	0.835	0.07	0.357	9.56	3.814	0.14	0.260	0.0669	0.183	< 0.4 U1	0.4	< 0.1 U1
6/2/2020	Assessment	< 0.02 U1	0.21	32.7	0.868	0.06	0.292	9.62	2.656	0.16	0.2 J1	0.0682	0.046	< 0.4 U1	0.4	< 0.1 U1
11/2/2020	Assessment	< 0.02 U1	0.26	34.0	1.10	0.07	0.2 J1	11.2	3.02	0.13	0.211	0.0895	0.144	< 0.4 U1	0.3	0.1 J1
3/8/2021	Assessment	< 0.02 U1	0.22	33.6	0.857	0.07	0.282	9.78	1.697	0.17	0.218	0.0664	0.095	< 0.1 U1	0.4	0.08 J1
5/24/2021	Assessment	< 0.02 U1	0.23	33.2	0.723	0.066	0.41	10.4	1.6	0.17	0.20	0.0638	0.059	0.1 J1	0.28 J1	0.09 J1
11/16/2021	Assessment	< 0.02 U1	0.26	32.1	0.801	0.063	0.39	9.18	3.39	0.13	0.34	0.0648	1.790	< 0.1 U1	0.33 J1	0.08 J1

Notes:  
 µg/L: micrograms per liter  
 mg/L: milligrams per liter  
 pCi/L: picocuries per liter  
 <: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.  
 -: Not analyzed  
 J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit. In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

**Table 1 - Groundwater Data Summary: AD-32**

**Pirkey - EBAP**

**Appendix III Constituents**

Collection Date	Monitoring Program	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	SU	mg/L	mg/L
5/11/2016	Background	0.708	7.41	12	< 0.083 U1	4.3	124	206
7/13/2016	Background	5.23	33.9	32	0.67 J1	3.3	461	835
9/7/2016	Background	5.78	37.4	35	< 0.083 U1	3.1	479	884
10/12/2016	Background	4.26	27.1	29	0.8585 J1	3.3	430	720
11/14/2016	Background	5.52	35.9	34	0.7468 J1	3.0	621	922
1/11/2017	Background	5.05	40	35	< 0.083 U1	3.9	683	894
2/28/2017	Background	2.73	18.4	19	< 0.083 U1	3.1	285	490
4/11/2017	Background	1.46	11	15	0.4468 J1	3.2	200	372
8/23/2017	Detection	0.716	7.15	14	1.962	4.3	115	288
12/21/2017	Detection	2.56	17.1	22	0.5932 J1	--	324	504
3/21/2018	Assessment	0.628	6.32	15	< 0.083 U1	4.1	113	288
8/21/2018	Assessment	2.45	17.8	28	< 0.083 U1	3.9	321	548
2/28/2019	Assessment	0.679	6.62	17.5	0.40	3.2	121	222
5/21/2019	Assessment	0.555	5.35	18.6	0.31	3.2	105	292
8/12/2019	Assessment	1.77	13.3	24.9	0.67	4.0	228	448
8/16/2019	Assessment	1.92	14.6	26.1	0.83	--	273	522
3/10/2020	Assessment	0.656	6.84	20.5	0.39	3.7	117	286
6/2/2020	Assessment	0.557	5.75	24.1	0.41	3.9	93.6	327
11/2/2020	Assessment	4.04	34.3	36.2	1.40	3.4	690	1,070
3/8/2021	Assessment	2.87	34.2	33.5	1.08	3.5	714	1,020
5/24/2021	Assessment	2.11	21.7	25.4	1.25	3.3	452	340
11/15/2021	Assessment	1.70	16.8	24.3	0.78	2.8	334	580

Notes:

mg/L: milligrams per liter

SU: standard unit

<: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag.

In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.

--: Not analyzed

J1: Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.

In analytical data prior to 5/18/2021, J1 flags were reported as J in the analytical report.

Table 1 - Groundwater Data Summary: AD-32

Pirkey - EBAP  
Appendix IV Constituents

Collection Date	Monitoring Program	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Combined Radium	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	pCi/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L
5/11/2016	Background	< 0.93 U1	3.77019 J1	35	3	0.293016 J1	5	27	2.501	< 0.083 U1	< 0.68 U1	0.016	0.925	< 0.29 U1	< 0.99 U1	< 0.86 U1
7/13/2016	Background	< 0.93 U1	13	58	8	0.729634 J1	18	74	6.41	0.67 J1	< 0.68 U1	0.119	13.916	0.76212 J1	3.88793 J1	< 0.86 U1
9/7/2016	Background	< 0.93 U1	3.25886 J1	35	8	0.601583 J1	6	70	4.846	< 0.083 U1	< 0.68 U1	0.111	1.68	< 0.29 U1	< 0.99 U1	1.09263 J1
10/12/2016	Background	< 0.93 U1	10	50	7	0.589066 J1	15	65	17.32	0.8585 J1	< 0.68 U1	0.972	7.285	< 0.29 U1	1.93488 J1	< 0.86 U1
11/14/2016	Background	< 0.93 U1	6	37	9	0.78793 J1	8	75	3.731	0.7468 J1	< 0.68 U1	0.114	3.624	< 0.29 U1	< 0.99 U1	1.078 J1
1/11/2017	Background	< 0.93 U1	6	37	7	0.602157 J1	9	69	4.342	< 0.083 U1	< 0.68 U1	0.115	7.202	< 0.29 U1	< 0.99 U1	0.991051 J1
2/28/2017	Background	< 0.93 U1	4.56273 J1	30	5	0.389491 J1	5	45	4.001	< 0.083 U1	< 0.68 U1	0.095	7.927	< 0.29 U1	2.53854 J1	< 0.86 U1
4/11/2017	Background	< 0.93 U1	< 1.05 U1	26	4	0.440252 J1	3	35	4.32	0.4468 J1	< 0.68 U1	0.095	2.755	< 0.29 U1	< 0.99 U1	< 0.86 U1
3/21/2018	Assessment	< 0.93 U1	3.05 J1	41.25	3.17	0.55 J1	5.38	25.8	4.922	< 0.083 U1	< 0.68 U1	0.103	6.4	< 0.29 U1	2.18 J1	< 0.86 U1
8/21/2018	Assessment	0.01 J1	4.81	17.2	3.70	0.47	0.646	43.5	6.01	< 0.083 U1	0.714	0.0689	2.649	0.04 J1	15.0	0.238
2/28/2019	Assessment	< 0.4 U1	2 J1	28.9	3.34	0.2 J1	2 J1	25.0	4.67	0.40	< 0.4 U1	0.0919	1.135	< 8 U1	3 J1	< 2 U1
5/21/2019	Assessment	< 0.4 U1	0.8 J1	35.6	2.77	0.3 J1	1 J1	23.5	5.37	0.31	0.4 J1	0.0897	1.371	< 8 U1	1 J1	0.2 J1
8/12/2019	Assessment	< 0.02 U1	3.43	38.5	3.65	0.40	1.70	33.7	5.7	0.67	0.996	0.0964	4.127	< 0.4 U1	7.3	0.2 J1
8/16/2019	Assessment	< 0.1 U1	2.77	27.9	4.88	0.46	0.5 J1	40.4	--	0.83	0.6 J1	0.103	--	< 2 U1	7.8	< 0.5 U1
3/10/2020	Assessment	< 0.02 U1	0.88	28.7	2.51	0.30	0.379	23.9	5.741	0.39	0.343	0.0711	1.70	< 0.4 U1	2.6	0.2 J1
6/2/2020	Assessment	< 0.02 U1	0.98	31.9	2.35	0.25	0.675	20.8	4.445	0.41	0.405	0.0696	3.97	< 0.4 U1	2.3	0.2 J1
11/2/2020	Assessment	0.02 J1	6.29	22.0	8.90	0.79	1.17	74.0	8.88	1.40	1.23	0.0987	1.40	< 0.4 U1	25.3	0.4 J1
3/8/2021	Assessment	< 0.02 U1	5.54	18.5	5.78	0.66	0.754	61.9	3.701	1.08	0.970	0.0618	1.07	< 0.1 U1	22.2	0.3 J1
5/24/2021	Assessment	< 0.02 U1	2.39	16.9	3.96 M1	0.529	0.71	50.5	5.38	1.25	0.52	0.0629 M1	0.800	< 0.1 U1	9.21	0.21
11/15/2021	Assessment	< 0.02 U1	2.39	22.5	3.90	0.452	0.75	39.9	4.6	0.78	0.52	0.0698	1.400	< 0.1 U1	7.70	0.25

Notes:  
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 mg/L: milligrams per liter  
 pCi/L: picocuries per liter  
 <: Non-detect value. Analytes which were not detected are shown as less than the method detection limit (MDL) followed by a 'U1' flag. In analytical data prior to 5/18/2021, U1 flags were reported as U in the analytical report.  
 --: Not analyzed  
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**Residence Time Calculation Summary Pirkey  
East Bottom Ash Pond**

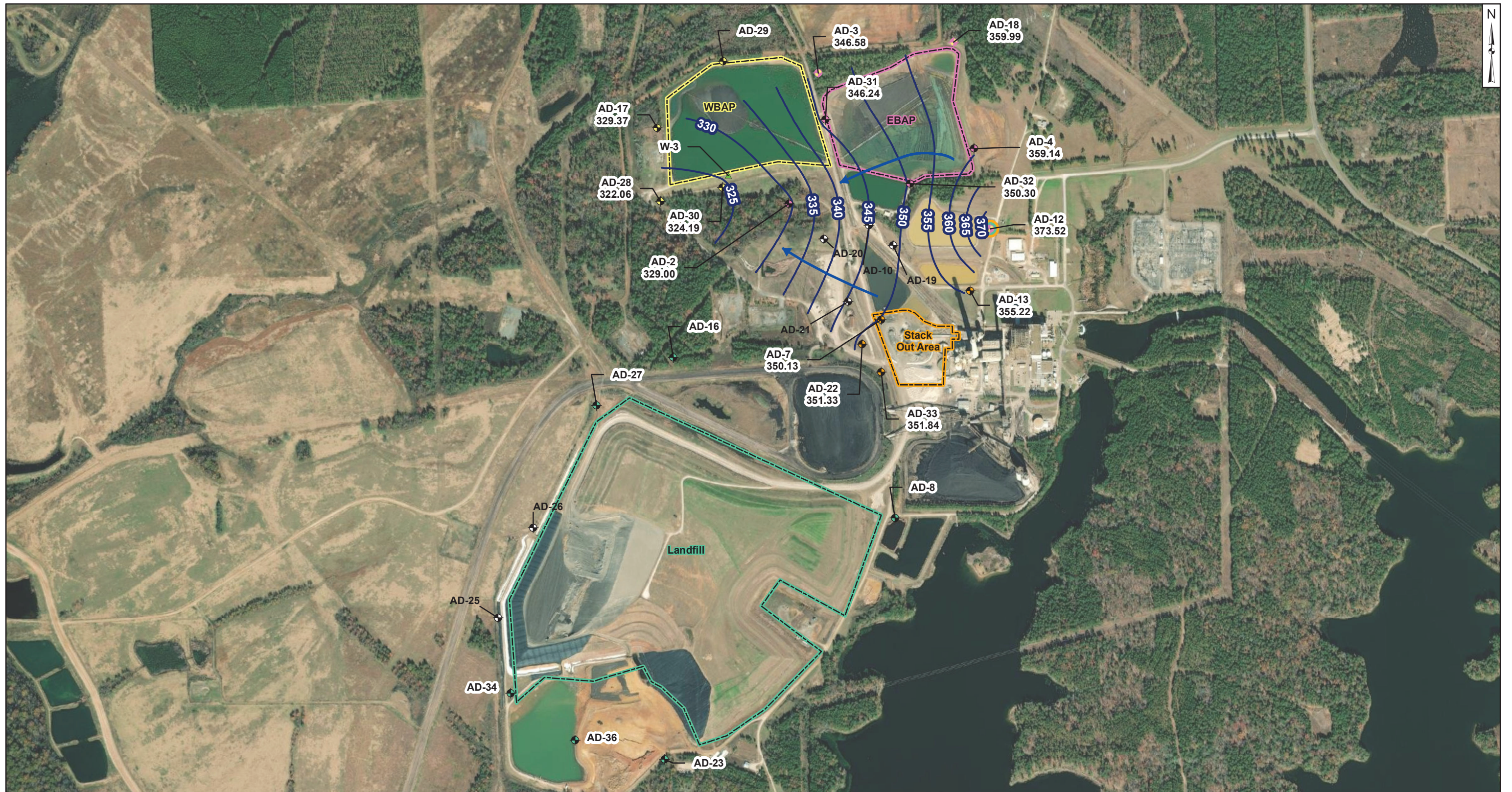
*Geosyntec Consultants, Inc.*

CCR Management Unit	Monitoring Well	Well Diameter (inches)	2021-03		2021-05		2021-11	
			Groundwater Velocity (ft/year)	Groundwater Residence Time (days)	Groundwater Velocity (ft/year)	Groundwater Residence Time (days)	Groundwater Velocity (ft/year)	Groundwater Residence Time (days)
East Bottom Ash Pond	AD-2 <sup>[2]</sup>	4.0	26.4	4.6	28.2	4.3	26.9	4.5
	AD-4 <sup>[1]</sup>	4.0	11.5	10.6	12.6	9.7	13.3	9.1
	AD-12 <sup>[1]</sup>	4.0	22.9	5.3	40.6	3.0	19.3	6.3
	AD-18 <sup>[1]</sup>	2.0	10.9	5.6	10.4	5.9	9.6	6.3
	AD-31 <sup>[2]</sup>	2.0	24.7	2.5	26.5	2.3	23.7	2.6
	AD-32 <sup>[2]</sup>	2.0	13.3	4.6	11.6	5.3	13.8	4.4

Notes:

[1] - Background Well

[2] - Downgradient Well



**Legend**

**Groundwater Monitoring Wells**

- Out of Network
- EBAP
- WBAP
- Landfill
- Stackout Area
- EBAP and WBAP
- All CCR Unit Networks
- Piezometer
- Approximate Groundwater Flow Direction
- Groundwater Elevation Contour

**Notes**

- Monitoring well coordinates and water level data (collected on March 9, 2021) provided by AEP.
- Site features based on information available in CCR Groundwater Monitoring Well Network Evaluations (Arcadis, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level.
- East and West Bottom Ash Ponds have compacted cohesive soil from elevation 344 to 347 ft. msl (Sargent and Lundy, 1984; AMEC, 2011).
- Clearwater pond base elevation is 344 ft. msl (Sargent and Lundy, 1983).
- AD-8, AD-10, AD-16, AD-19, AD-20, AD-21, AD-23, AD-25, AD-26, AD-27, AD-29, AD-34, AD-35, AD-36, and W-3 were not gauged during the March 2021 event.

1,000 500 0 1,000 Feet

*Beth Ann Gross*  
July 16, 2021

Geosyntec Consultants, Inc.  
Texas Firm Registration No. 1182

**Potentiometric Contours - Uppermost Aquifer  
March 2021**

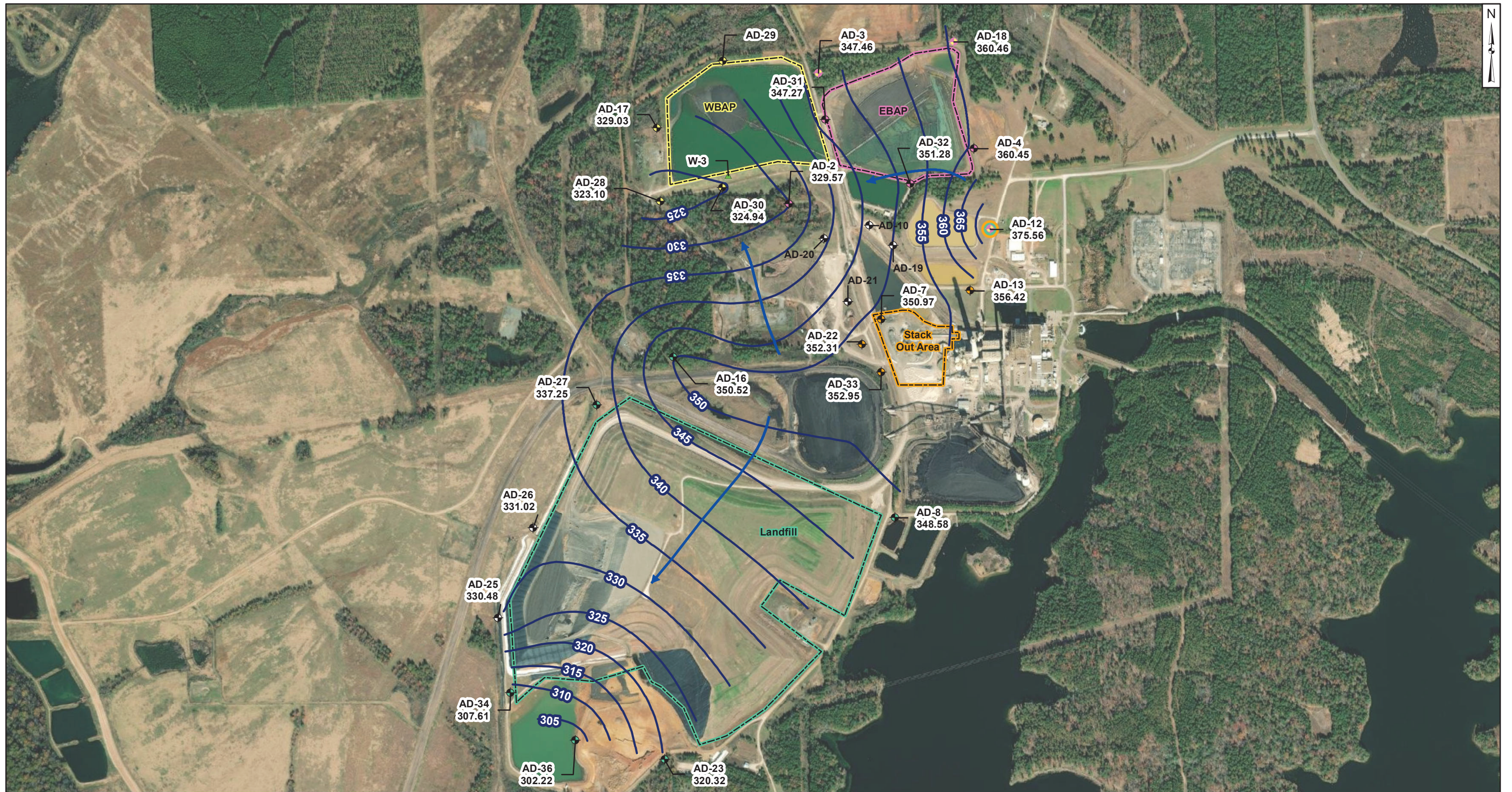
AEP Pirkey Power Plant  
Hallsville, Texas

**Geosyntec**  
consultants

Columbus, Ohio      2021/06/17

Figure  
1





**Legend**

- Groundwater Monitoring Wells**
- All CCR Unit Networks
  - Piezometer
  - Approximate Groundwater Flow Direction
  - Groundwater Elevation Contour
  - Out of Network
  - EBAP
  - WBAP
  - Landfill
  - Stackout Area
  - EBAP and WBAP

**Notes**

- Monitoring well coordinates and water level data (collected on May 24-26, 2021) provided by AEP.
- Site features based on information available in CCR Groundwater Monitoring Well Network Evaluations (Arcadis, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level.
- East and West Bottom Ash Ponds have compacted cohesive soil from elevation 344 to 347 ft. msl (Sargent and Lundy, 1984; AMEC, 2011).
- Clearwater pond base elevation is 344 ft. msl (Sargent and Lundy, 1983).
- AD-10, AD-19, AD-20, AD-21, AD-29, AD-35, and W-3 were not gauged during the May 2021 event.



Geosyntec Consultants, Inc.  
Texas Firm  
Registration No. 1182

**Potentiometric Contours - Uppermost Aquifer  
May 2021**

AEP Pirkey Power Plant  
Hallsville, Texas

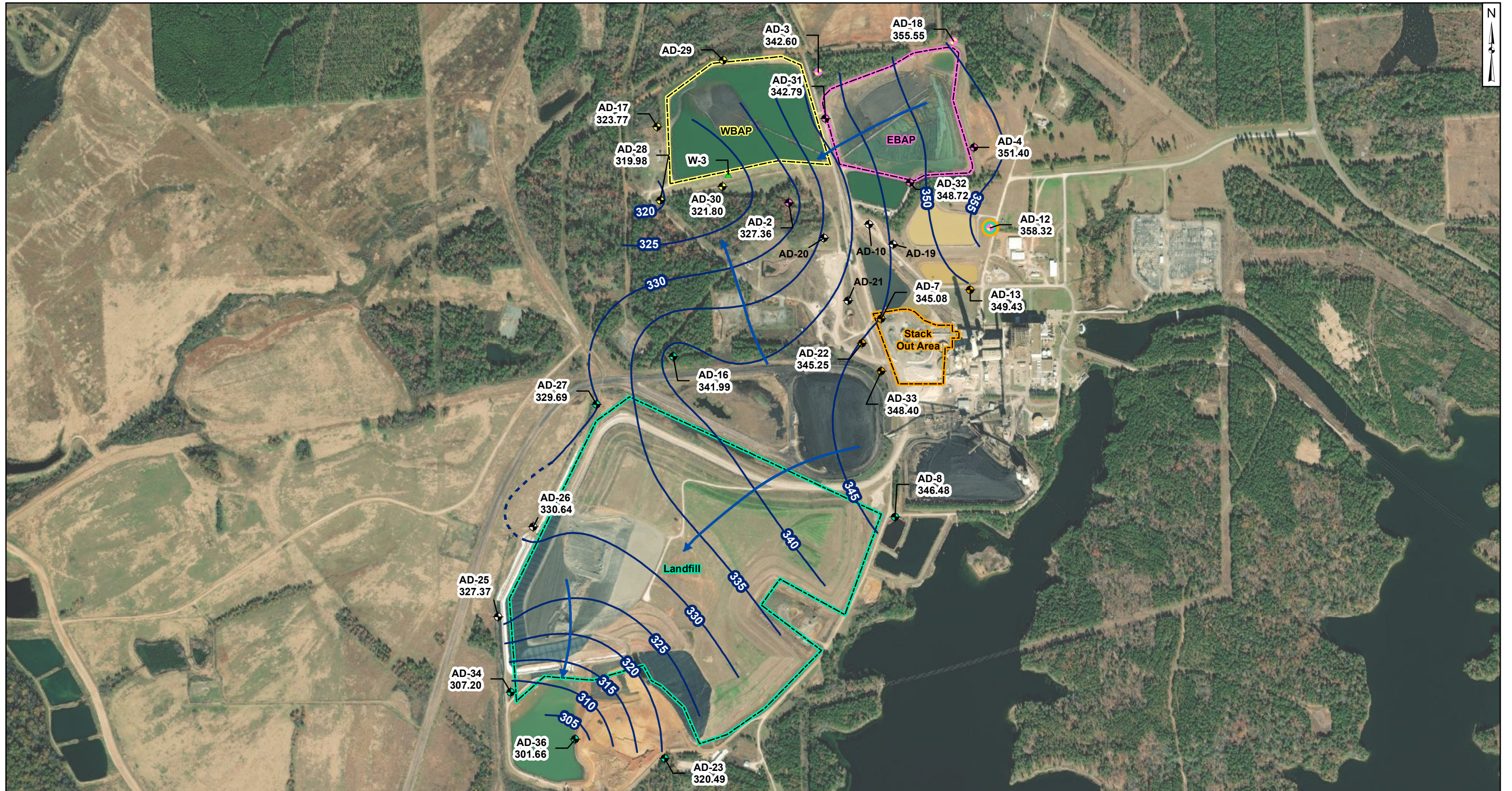


Columbus, Ohio

2021/08/18

Figure

**2**



**Legend**

- Groundwater Monitoring Wells**
- Out of Network
  - EBAP
  - WBAP
  - Landfill
  - Stackout Area
  - EBAP and WBAP
  - All CCR Unit Networks
  - Piezometer
  - Groundwater Elevation Contour
  - Groundwater Elevation Contours (Inferred)
  - Approximate Groundwater Flow Direction

**Notes**

- Monitoring well coordinates and water level data (collected on November 15 - 17, 2021) provided by AEP.
- Site features based on information available in CCR Groundwater Monitoring Well Network Evaluation (Arcadis, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level.
- East and West Bottom Ash Ponds have compacted cohesive soil from elevation 344 to 347 ft. msl (Sargent and Lundy, 1984; AMEC, 2011).
- Clearwater pond base elevation is 344 ft. msl (Sargent and Lundy, 1983).
- AD-10, AD-19, AD-20, AD-21, AD-29, AD-35, and W-3 were not gauged during the May 2021 event.

1,000 500 0 1,000 Feet

*Beth Ann Gross*  
Jan 14, 2022  
Geosyntec Consultants, Inc.  
Texas Firm  
Registration No. 1182

**Potentiometric Contours - Uppermost Aquifer  
November 2021**

AEP Pirkey Power Plant  
Hallsville, Texas

**Geosyntec**  
consultants

Columbus, Ohio      01/13/2022

**Figure 3**

## **APPENDIX 2- Statistical Analyses**

The reports summarizing the statistical evaluation follow.

**STATISTICAL ANALYSIS SUMMARY  
EAST BOTTOM ASH POND  
H.W. Pirkey Power Plant  
Hallsville, Texas**

*Submitted to*



1 Riverside Plaza  
Columbus, Ohio 43215-2372

*Submitted by*



engineers | scientists | innovators

941 Chatham Lane  
Suite 103  
Columbus, Ohio 43221

March 3, 2021  
CHA8500

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Table 3	Appendix III Data Summary

## LIST OF ATTACHMENTS

Attachment A	Certification by Qualified Professional Engineer
Attachment B	Statistical Analysis Output

## LIST OF ACRONYMS AND ABBREVIATIONS

AEP	American Electric Power
ASD	Alternative Source Demonstration
CCR	Coal Combustion Residuals
CCV	Continuing Calibration Verification
CFR	Code of Federal Regulations
EBAP	East Bottom Ash Pond
GWPS	Groundwater Protection Standard
LCL	Lower Confidence Limit
LFB	Laboratory Fortified Blanks
LRB	Laboratory Reagent Blanks
MCL	Maximum Contaminant Level
NELAP	National Environmental Laboratory Accreditation Program
QA	Quality Assurance
QC	Quality Control
RSL	Regional Screening Level
SSI	Statistically Significant Increase
SSL	Statistically Significant Level
TDS	Total Dissolved Solids
UPL	Upper Prediction Limit
USEPA	United States Environmental Protection Agency
UTL	Upper Tolerance Limit

## SECTION 1

### EXECUTIVE SUMMARY

In accordance with the United States Environmental Protection Agency's (USEPA's) regulations regarding the disposal of coal combustion residuals (CCR) in landfills and surface impoundments (40 CFR 257.90-257.98, "CCR rule"), groundwater monitoring has been conducted at the East Bottom Ash Pond (EBAP), an existing CCR unit at the Pirkey Power Plant located in Hallsville, Texas.

Based on detection monitoring conducted in 2017 and 2018, statistically significant increases (SSIs) over background were concluded for boron, calcium, chloride, total dissolved solids (TDS), and sulfate at the EBAP. An alternative source was not identified at the time, so the EBAP has been in assessment monitoring since. One event was conducted at the EBAP in November 2020 in accordance with 40 CFR 257.95. The results of the November 2020 assessment event are documented in this report.

Groundwater data underwent several validation tests, including those for completeness, sample tracking accuracy, transcription errors, and consistent use of measurement units. No data quality issues were identified which would impact data usability.

The monitoring data were submitted to Groundwater Stats Consulting, LLC for statistical analysis. Groundwater protection standards (GWPSs) were re-established for the Appendix IV parameters. Confidence intervals were calculated for Appendix IV parameters at the compliance wells to assess whether Appendix IV parameters were present at a statistically significant level (SSL) above the GWPS. SSLs were identified for cobalt, and lithium. Thus, either the unit will move to an assessment of corrective measures or an ASD will be conducted to evaluate if the unit can remain in assessment monitoring. Certification of the selected statistical methods by a qualified professional engineer is documented in Attachment A.

## SECTION 2

### EAST BOTTOM ASH POND EVALUATION

#### 2.1 Data Validation & QA/QC

During the assessment monitoring program, one set of samples was collected for analysis from each upgradient and downgradient well to meet the requirements of 40 CFR 257.95(d)(1) (November 2020). Samples from this event were analyzed for the Appendix III and Appendix IV parameters. A summary of the data collected during this assessment monitoring event is presented in Table 1.

Chemical analysis was completed by an analytical laboratory certified by the National Environmental Laboratory Accreditation Program (NELAP). Quality assurance and quality control (QA/QC) samples completed by the analytical laboratory included the use of laboratory reagent blanks (LRBs), continuing calibration verification (CCV) samples, and laboratory fortified blanks (LFBs).

The analytical data were imported into a Microsoft Access database, where checks were completed to assess the accuracy of sample location identification and analyte identification. Where necessary, unit conversions were applied to standardize reported units across all sampling events. Exported data files were created for use with the Sanitas™ v.9.6.27b statistics software. The export file was checked against the analytical data for transcription errors and completeness. No QA/QC issues were noted which would impact data usability.

#### 2.2 Statistical Analysis

Statistical analyses for the EBAP were conducted in accordance with the October 2020 *Statistical Analysis Plan* (Geosyntec, 2020), except where noted below. Time series plots and results for all completed statistical tests are provided in Attachment B.

The data obtained in November 2020 were screened for potential outliers. No outliers were identified for this event.

##### 2.2.1 Establishment of GWPSs

A GWPS was established for each Appendix IV parameter in accordance with 40 CFR 257.95(h) and the *Statistical Analysis Plan* (Geosyntec, 2020). The established GWPS was determined to be the greater value of the background concentration and the maximum contaminant level (MCL) or risk-based level specified in 40 CFR 257.95(h)(2) for each Appendix IV parameter. To determine background concentrations, an upper tolerance limit (UTL) was calculated using pooled data from the background wells collected during the background monitoring and assessment monitoring events. Tolerance limits were calculated parametrically with 95% coverage and 95% confidence for chromium, combined radium, and lithium. Non-parametric tolerance limits were calculated



for arsenic, barium, beryllium, cadmium, cobalt, fluoride, lead, mercury, and selenium due to apparent non-normal distributions and for antimony, molybdenum, and thallium due to a high non-detect frequency. Tolerance limits and the final GWPSs are summarized in Table 2.

### **2.2.2 Evaluation of Potential Appendix IV SSLs**

A confidence interval was constructed for each Appendix IV parameter at each compliance well. Confidence limits were generally calculated parametrically ( $\alpha = 0.01$ ); however, non-parametric confidence limits were calculated in some cases (e.g., when the data did not appear to be normally distributed or when the non-detect frequency was too high). An SSL was concluded if the lower confidence limit (LCL) exceeded the GWPS (i.e., if the entire confidence interval exceeded the GWPS). Calculated confidence limits are shown in Attachment B.

The following SSLs were identified at the Pirkey EBAP:

- The LCLs for cobalt exceeded the GWPS of 0.00940 mg/L at AD-2 (0.0100 mg/L), AD-31 (0.00953 mg/L), and AD-32 (0.0239 mg/L).
- The LCL for lithium exceeded the GWPS of 0.0590 mg/L at AD-31 (0.0835 mg/L) and AD-32 (0.0838 mg/L).

As a result, the Pirkey EBAP will either move to an assessment of corrective measures or an alternative source demonstration will be conducted to evaluate if the unit can remain in assessment monitoring.

### **2.2.3 Establishment of Appendix III Prediction Limits**

Upper prediction limits (UPL) for Appendix III parameters were previously updated after sufficient data was collected following the background monitoring period (Geosyntec, 2019). Intrawell tests were used to evaluate potential SSIs for pH, whereas interwell tests were used to evaluate potential SSIs for boron, calcium, chloride, fluoride, sulfate, and TDS. Prediction limits were updated using data through June 2020 for intrawell prediction limits and November 2020 for interwell prediction limits.

Mann-Whitney (Wilcoxon rank-sum) tests were performed to determine whether the newer data are affected by a release from the EBAP. Because the interwell Appendix III limits and the Appendix IV GWPSs are based on data from upgradient wells which we would not expect to have been impacted by a release, these tests were used for intrawell Appendix III tests only. Mann-Whitney tests were used to compare the medians of historical data (May 2016 – February 2019) to the new compliance samples (May 2019 – June 2020) for pH. Results were evaluated to determine if the medians of the two groups were similar at the 99% confidence level. Where no significant difference was found, the new compliance data were added to the background dataset. Where a statistically significant difference was found between the medians of the two groups, the data were reviewed to evaluate the cause of the difference and to determine if adding newer data to the background dataset, replacing the background dataset with the newer data, or continuing to

use the existing background dataset was most appropriate. If the differences appeared to have been caused by a release, then the previous background dataset continued to be used.

The complete Mann-Whitney test results and a summary of the significant findings can be found in Attachment B. A statistically significant difference was identified for pH in well AD-4. However, because this is an upgradient well and limited data are available, the background data were updated to include all data through June 2020.

After the revised background set was established, a parametric or non-parametric analysis was selected based on the distribution of the data and the frequency of non-detect data. Estimated results less than the practical quantitation limit (PQL) – i.e., “J-flagged” data – were considered detections and the estimated results were used in the statistical analyses. Non-parametric analyses were selected for datasets with at least 50% non-detect data or datasets that could not be normalized. Parametric analyses were selected for datasets (either transformed or untransformed) that passed the Shapiro-Wilk / Shapiro-Francia test for normality. The Kaplan-Meier non-detect adjustment was applied to datasets with between 15% and 50% non-detect data. For datasets with fewer than 15% non-detect data, non-detect data were replaced with one half of the PQL. The selected analysis (i.e., parametric or non-parametric) and transformation (where applicable) for each background dataset are shown in Attachment B.

Intrawell UPLs were updated using all historical data through June 2020 to represent background values. Interwell UPLs were updated using all historical data through November 2020 to represent background values. LPLs were also updated for pH. The updated prediction limits are summarized in Table 3. Intrawell tests continued to be used to evaluate potential SSIs for pH, whereas interwell tests continued to be used to evaluate potential SSIs for boron, calcium, chloride, fluoride, sulfate, and TDS. The prediction limits were calculated for a one-of-two retesting procedure; i.e., if at least one sample in a series of two does not exceed the UPL, then it can be concluded that an SSI has not occurred. The retesting procedures allow achieving an acceptably high statistical power to detect changes at downgradient wells for constituents evaluated using intrawell prediction limits.

#### **2.2.4 Evaluation of Potential Appendix III SSIs**

While SSLs were identified, a review of the Appendix III results were also completed to assess whether concentrations of Appendix III parameters at the compliance wells exceeded background concentrations.

Data collected during the November 2020 assessment monitoring event from each compliance well were compared to the prediction limits to evaluate results above background values. The results from this event and the prediction limits are summarized in Table 3. The following exceedances of the upper prediction limits (UPLs) were noted:

- Boron concentrations exceeded the interwell UPL of 0.0374 mg/L at AD-2 (2.62 mg/L) and AD-32 (4.04 mg/L).

- Calcium concentrations exceeded the interwell UPL of 2.94 mg/L at AD-32 (34.3 mg/L).
- Chloride concentrations exceeded the interwell UPL of 9.10 mg/L at AD-2 (29.2 mg/L), AD-31 (21.2 mg/L) and AD-32 (36.2 mg/L).
- Fluoride concentrations exceeded the interwell UPL of 1.00 mg/L at AD32 (1.40 mg/L).
- Sulfate concentrations exceeded the interwell UPL of 24.7 mg/L at AD-2 (158 mg/L), AD-31 (77.8 mg/L), and AD-32 (690 mg/L).
- TDS concentrations exceeded the interwell UPL of 174 mg/L at AD-2 (347 mg/L), AD-31 (268 mg/L), and AD-32 (1,070 mg/L).

While the prediction limits were calculated for a one-of-two retesting procedure, SSIs were conservatively assumed if the November 2020 sample was above the UPL or below the LPL. Based on these results, concentrations of Appendix III constituents appear to be above background concentrations.

### **2.3 Conclusions**

A semi-annual assessment monitoring event was conducted in accordance with the CCR Rule. The laboratory and field data were reviewed prior to statistical analysis, with no QA/QC issues identified that impacted data usability. A review of outliers identified no potential outliers in the November 2020 data. GWPSs were re-established for the Appendix IV parameters. A confidence interval was constructed at each compliance well for each Appendix IV parameter; SSLs were concluded if the entire confidence interval exceeded the GWPS. SSLs were identified for cobalt, and lithium. Appendix III parameters were compared to recalculated prediction limits, with exceedances identified for boron, calcium, chloride, fluoride, sulfate, and TDS.

Based on this evaluation, the Pirkey EBAP CCR unit will either move to an assessment of corrective measures or an ASD will be conducted to evaluate if the unit can remain in assessment monitoring.

### **SECTION 3**

#### **REFERENCES**

Geosyntec Consultants (Geosyntec). 2019. Statistical Analysis Summary – East Bottom Ash Pond, H.W. Pirkey Plant. December 26, 2019.

Geosyntec. 2020b. Statistical Analysis Plan. October 2020.

# TABLES

**Table 1 - Groundwater Data Summary  
Pirkey Plant - East Bottom Ash Pond**

Parameter	Unit	AD-2	AD-4	AD-12	AD-18	AD-31	AD-32
		11/2/2020	11/4/2020	11/2/2020	11/4/2020	11/2/2020	11/2/2020
Antimony	µg/L	0.1 U	0.03 J	0.05 J	0.1 U	0.1 U	0.02 J
Arsenic	µg/L	0.41	5.30	0.09 J	0.29	0.26	6.29
Barium	µg/L	21.5	124	18.9	89.3	34.0	22.0
Beryllium	µg/L	0.463	0.922	0.122	0.08 J	1.10	8.90
Boron	mg/L	2.62	0.02 J	0.03 J	0.05 U	0.03 J	4.04
Cadmium	µg/L	0.07	0.03 J	0.05 U	0.01 J	0.07	0.79
Calcium	mg/L	1.99	2.33	0.3 J	0.2 J	2.76	34.3
Chloride	mg/L	29.2	3.66	4.65	6.30	21.2	36.2
Chromium	µg/L	0.254	0.433	0.204	0.1 J	0.2 J	1.17
Cobalt	µg/L	16.9	4.40	1.04	0.917	11.2	74.0
Combined Radium	pCi/L	0.961	1.45	0.929	1.169	3.02	8.88
Fluoride	mg/L	0.11	0.05 J	0.08	0.02 J	0.13	1.40
Lead	µg/L	0.435	0.402	0.09 J	0.06 J	0.211	1.23
Lithium	mg/L	0.0490	0.0274	0.00510	0.0128	0.0895	0.0987
Mercury	µg/L	0.037	0.008	0.005 U	0.028	0.144	1.40
Molybdenum	µg/L	2 U	2 U	2 U	2 U	2 U	2 U
Selenium	µg/L	1.3	0.1 J	0.3	0.2 J	0.3	25.3
Sulfate	mg/L	158	18.7	3.3	6.3	77.8	690
Thallium	µg/L	0.1 J	0.1 J	0.5 U	0.5 U	0.1 J	0.4 J
Total Dissolved Solids	mg/L	347	162	74	100	268	1,070
pH	SU	3.9	4.9	4.3	4.4	3.7	3.4

Notes:

mg/L: milligrams per liter

µg/L: micrograms per liter

SU: standard unit

pCi/L: picocuries per liter

U: Parameter was not present in concentrations above method detection limit and is reported as the reporting limit

J: Estimated value. Parameter was detected in concentrations below the reporting limit

**Table 2 - Groundwater Protection Standards  
Pirkey Plant - East Bottom Ash Pond**

Constituent Name	MCL	CCR Rule-Specified	Calculated UTL	GWPS
Antimony, Total (mg/L)	0.006		0.005	0.006
Arsenic, Total (mg/L)	0.010		0.011	0.011
Barium, Total (mg/L)	2.00		0.180	2.00
Beryllium, Total (mg/L)	0.00400		0.00120	0.00400
Cadmium, Total (mg/L)	0.005		0.001	0.005
Chromium, Total (mg/L)	0.100		0.00400	0.100
Cobalt, Total (mg/L)	n/a	0.00600	0.00940	0.00940
Combined Radium, Total (pCi/L)	5.00		3.59	5.00
Fluoride, Total (mg/L)	4.0		1.0	4.0
Lead, Total (mg/L)	0.0150		0.00500	0.0150
Lithium, Total (mg/L)	n/a	0.0400	0.0590	0.0590
Mercury, Total (mg/L)	0.0020		0.000064	0.0020
Molybdenum, Total (mg/L)	n/a	0.1	0.04	0.1
Selenium, Total (mg/L)	0.05		0.005	0.05
Thallium, Total (mg/L)	0.002		0.002	0.002

Notes:

MCL = Maximum Contaminant Level

CCR = Coal Combustion Residual

GWPS = Groundwater Protection Standard

Calculated UTL (Upper Tolerance Limit) represents site-specific background values.

Grey cells indicate the GWPS is based on the calculated UTL, which is higher than the MCL or CCR Rule-specified value.

**Table 3 - Appendix III Data Summary  
Pirkey - East Bottom Ash Pond**

Analyte	Unit	Description	AD-2	AD-31	AD-32
			11/2/2020	11/2/2020	11/2/2020
Boron	mg/L	Interwell Background Value (UPL)	0.0374		
		Analytical Result	<b>2.62</b>	0.03	<b>4.04</b>
Calcium	mg/L	Interwell Background Value (UPL)	2.94		
		Analytical Result	1.99	2.76	<b>34.3</b>
Chloride	mg/L	Interwell Background Value (UPL)	9.10		
		Analytical Result	<b>29.2</b>	<b>21.2</b>	<b>36.2</b>
Fluoride	mg/L	Interwell Background Value (UPL)	1.00		
		Analytical Result	0.11	0.13	<b>1.40</b>
pH	SU	Intrawell Background Value (UPL)	4.8	5.3	4.5
		Intrawell Background Value (LPL)	3.5	3.0	2.7
		Analytical Result	3.9	3.7	3.4
Sulfate	mg/L	Interwell Background Value (UPL)	24.7		
		Analytical Result	<b>158</b>	<b>77.8</b>	<b>690</b>
Total Dissolved Solids	mg/L	Interwell Background Value (UPL)	174		
		Analytical Result	<b>347</b>	<b>268</b>	<b>1,070</b>

Notes:

UPL: Upper prediction limit

LPL: Lower prediction limit

**Bold values exceed the background value.**

Background values are shaded gray.



# ATTACHMENT A

Certification by Qualified Professional Engineer

**Certification by Qualified Professional Engineer**

I certify that the selected and above described statistical method is appropriate for evaluating the groundwater monitoring data for the Pirkey East Bottom Ash Pond CCR management area and that the requirements of 40 CFR 257.93(f) have been met.

DAVID ANTHONY MILLER

Printed Name of Licensed Professional Engineer

David Anthony Miller

Signature



112498

License Number

TEXAS

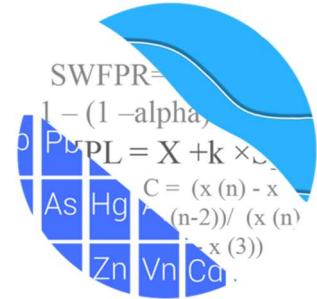
Licensing State

03.03.21

Date

**ATTACHMENT B**  
**Statistical Analysis Output**

## GROUNDWATER STATS CONSULTING



January 7, 2021

Geosyntec Consultants  
Attn: Ms. Allison Kreinberg  
941 Chatham Lane, #103  
Columbus, OH 43221

Re: Pirkey EBAP - Assessment Monitoring Event & Background Update 2020

Dear Ms. Kreinberg,

Groundwater Stats Consulting, formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the evaluation of groundwater data and the background update for American Electric Power Company's Pirkey EBAP. The analysis complies with the federal rule for the Disposal of Coal Combustion Residuals from Electric Utilities (CCR Rule, 2015) as well as with the USEPA Unified Guidance (2009).

Sampling at each of the wells below began at Pirkey EBAP for the CCR program in 2016. The monitoring well network, as provided by Geosyntec Consultants, consists of the following:

- **Upgradient wells:** AD-4, AD-12, and AD-18
- **Downgradient wells:** AD-2, AD-31, and AD-32

Data were sent electronically, and the statistical analysis was reviewed by Andrew Collins, Project Manager of Groundwater Stats Consulting. The analysis was conducted according to the Statistical Analysis Plan and initial screening evaluation prepared in November 2017 by GSC and approved by Dr. Kirk Cameron, PhD Statistician with MacStat Consulting, primary author of the USEPA Unified Guidance, and Senior Advisor to GSC.

The CCR program consists of the following constituents listed below. The terms “constituent” and “parameter” are interchangeable.

- **Appendix III** (Detection Monitoring) - boron, calcium, chloride, fluoride, pH, sulfate, and TDS
- **Appendix IV** (Assessment Monitoring) – antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, combined radium 226 + 228, fluoride, lead, lithium, mercury, molybdenum, selenium, and thallium

For all constituents, a substitution of the most recent reporting limit is used for nondetect data. In the time series plots, a single reporting limit substitution is used across all wells for a given parameter since the wells are plotted as a group. For calculating intrawell prediction limits, the substitution is performed for individual wells and may differ across wells. This generally gives the most conservative limit in each case.

Time series and box plots for Appendix III and IV parameters are provided for all wells and constituents, and are used to evaluate concentrations over the entire record (Figures A & B, respectively). A summary of the values identified as outliers in this report and through previous screenings follows this letter. These values are deselected prior to the statistical analysis. All flagged values may also be seen in a lighter font and disconnected symbol on the time series graphs (Figure C).

In earlier analyses, data at all wells were evaluated for the following: 1) outliers; 2) trends; 3) most appropriate statistical method for Appendix III parameters based on site characteristics of groundwater data upgradient of the facility; and 4) eligibility of downgradient wells when intrawell statistical methods are recommended. Power curves were provided during the initial background screening and demonstrated that the selected statistical methods for Appendix III parameters comply with the USEPA Unified Guidance recommendations as discussed below. During this analysis, data from all wells were screened for updating Appendix III background statistical limits, which was last performed in December 2019, as described below.

### **Summary of Statistical Methods:**

Based on the original background screening described in the 2017 screening report, the following statistical methods were selected for Appendix III parameters:

- 1) Intrawell prediction limits, combined with a 1-of-2 resample plan for pH
- 2) Interwell prediction limits, combined with a 1-of-2 resample plan for boron, calcium, chloride, fluoride, sulfate, and TDS

Parametric prediction limits are utilized when the screened historical data follow a normal or transformed-normal distribution. When data cannot be normalized or the majority of data are nondetects, a nonparametric test is utilized. While the false positive rate associated with the parametric limits is based on an annual 10% (5% per semi-annual event) as recommended by the EPA Unified Guidance (2009), the false positive rate associated with the nonparametric limits is dependent upon the available background sample size, number of future comparisons, and verification resample plan. The distribution of data is tested using the Shapiro-Wilk/Shapiro-Francia test for normality. After testing for normality and performing any adjustments as discussed below (US EPA, 2009), data are analyzed using either parametric or non-parametric prediction limits.

- No statistical analyses are required on wells and analytes containing 100% nondetects (USEPA Unified Guidance, 2009, Chapter 6).
- When data contain <15% nondetects in background, simple substitution of one-half the reporting limit may be utilized in the statistical analysis. The reporting limit utilized for nondetects is the practical quantification limit (PQL) as reported by the laboratory.
- When data contain between 15-50% nondetects, the Kaplan-Meier nondetect adjustment is applied to the background data. This technique adjusts the mean and standard deviation of the historical concentrations to account for concentrations below the reporting limit.
- Nonparametric prediction limits are used on data containing greater than 50% nondetects.

Note that values shown on data pages reflect raw data, and any non-detects that have been substituted with one-half of the reporting limit in the statistical analysis will be shown as "<" the original reporting limit on the data pages.

Natural systems continuously evolve due to physical changes made to the environment. Examples include capping a landfill, paving areas near a well, or lining a drainage channel to prevent erosion. Periodic updating of background statistical limits is necessary to accommodate these types of changes. In the intrawell case, data for all wells and constituents may be re-evaluated when a minimum of 4 new data points are available to determine whether earlier concentrations are representative of present-day groundwater quality. In the interwell case, prediction limits are updated with upgradient well data following each sampling event after careful screening for any new outliers. In some cases, deselecting the earlier portion of data may be necessary prior to construction of limits so that resulting statistical limits are conservative (lower) from a regulatory perspective and capable of rapidly detecting changes in groundwater quality. Even though the data are

excluded from the calculation, the values will continue to be reported and shown in tables and graphs.

### **Background Update Summary – Conducted in January 2020**

Proposed background data were last screened during December 2019. Prior to updating background data sets during this analysis, pH data (which is evaluated using intrawell methods) at all wells and boron, calcium, chloride, fluoride, sulfate, and TDS (which are evaluated using interwell methods) at upgradient wells were re-evaluated using Tukey's outlier test and visual screening (Figure C). Tukey's Outlier test did not identify any additional statistical outliers since the last background update.

As mentioned above, flagged data are displayed in a lighter font and as a disconnected symbol on the time series reports, as well as in a lighter font on the accompanying data pages. A summary of Tukey's test results was included with the December 2019 background update and a complete list of values flagged as outliers follows this letter.

The Mann-Whitney (Wilcoxon Rank Sum) test was used to compare the medians of historical data through February 2019 to the new compliance samples at each well through June 2020 to evaluate whether the groups are significantly different at the 99% confidence level. When no differences are noted, background data may be updated with more recent compliance data (Figure D). Typically, when the test concludes that the medians of the two groups are significantly different, particularly in the downgradient wells, the background are not updated to include the newer data but will be reconsidered in the future.

A statistically significant difference was identified for pH in upgradient well AD-4. However, because this is an upgradient well and limited data are available, the background data were updated to include all data through June 2020. These data will be re-evaluated during the next background update. If earlier measurements no longer represent present-day conditions, the earlier portion of the record will be deselected prior to construction of statistical limits. A summary of these results follows this letter and the test results are included with the Mann Whitney test section at the end of this report.

Intrawell prediction limits using all historical data through June 2020 combined with a 1-of-2 resample plan, were constructed for pH and a summary of the updated limits follows this letter (Figure E). Future compliance observations at each well will be compared to these background limits during each subsequent semi-annual sampling event.

The Sen's Slope/Mann Kendall trend test was used to evaluate data at upgradient wells for boron, calcium, chloride, fluoride, sulfate and TDS, which are tested using interwell prediction limits, to identify statistically significant increasing or decreasing trends. The results of the trend analyses showed all data are consistent over time. The statistically significant trends noted for boron at well AD-18 and fluoride and wells AD-4 and AD-12 were artificial trends that resulted from estimated values and nondetects, with no detections reported above the practical quantitation limit. No other statistically significant increasing or decreasing trends were noted (Figure F).

Interwell prediction limits, combined with a 1-of-2 resample plan, were updated using all available data through November 2020 from upgradient well for the constituents listed above (Figure G). Interwell prediction limits pool upgradient well data to establish a background limit for an individual constituent. A summary table of the updated limits may be found following this letter in the Prediction Limit Summary Tables.

### **Evaluation of Appendix IV Parameters – November 2020**

Prior to evaluating Appendix IV parameters, background data are screened through visual screening and Tukey's outlier test for potential outliers and extreme trending patterns that would lead to artificially elevated statistical limits. High outliers are also 'cautiously' flagged in the downgradient wells when they are clearly much different from the rest of the data. This is intended to be a regulatory conservative approach in that it will reduce the variance and thus reduce the width of parametric confidence intervals, although it will also reduce the mean and thus lower the entire interval. The intent is to better represent the actual downgradient mean. Flagging high outliers should have no effect on the lower limit of nonparametric confidence intervals.

Tukey's outlier test on pooled upgradient well data did not identify any additional outliers except for a value of 0.0007 mg/L in well AD-18. This was a reported trace value and, therefore, was not flagged as an outlier. For the individual downgradient wells, no additional outliers were identified except for 0.001 mg/L for beryllium at well AD-2. This value, however, was a reported nondetect value where the substitution of one-half of the reporting limit was applied due to the percentages of nondetects as described earlier. Therefore, this value was not flagged as an outlier. Flagged values may be seen on the Outlier Summary following this letter (Figure C).

Interwell upper tolerance limits were used to calculate background limits from all available pooled upgradient well data through November 2020 for Appendix IV parameters to determine the background limit for each constituent (Figure H).



Parametric limits use a target of 95% confidence and 95% coverage. The confidence and coverage levels for nonparametric tolerance limits are dependent upon the number of background samples. These limits were compared to the Maximum Contaminant Levels (MCLs) and CCR-Rule specified levels in the Groundwater Protection Standard (GWPS) table following this letter to determine the highest limit for use as the GWPS in the Confidence Interval comparisons (Figure I).

Confidence intervals were then constructed on downgradient wells with data through November 2020 for each of the Appendix IV parameters using the highest limit of either the MCL, CCR-Rule specified levels, or background as discussed above (Figure J). Only when the entire confidence interval is above a GWPS is the well/constituent pair considered to exceed its respective standard. The following confidence interval exceedances were noted: cobalt in wells AD-2, AD-31 and AD-32, and lithium in wells AD-31 and AD-32. A summary table of those results as well as the confidence interval results follows this letter.

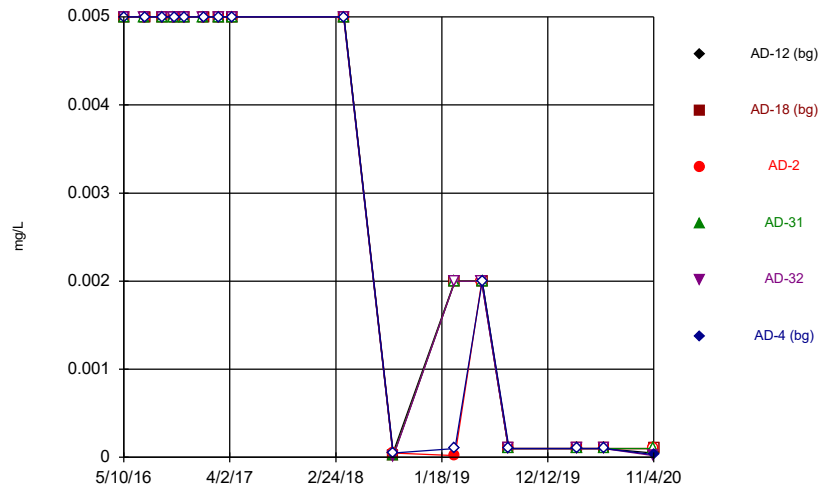
Thank you for the opportunity to assist you in the statistical analysis of groundwater quality for the Pirkey EBAP. If you have any questions or comments, please feel free to contact me.

For Groundwater Stats Consulting,

A handwritten signature in cursive script that reads "Kristina Rayner". The signature is written in black ink and is positioned below the typed name.

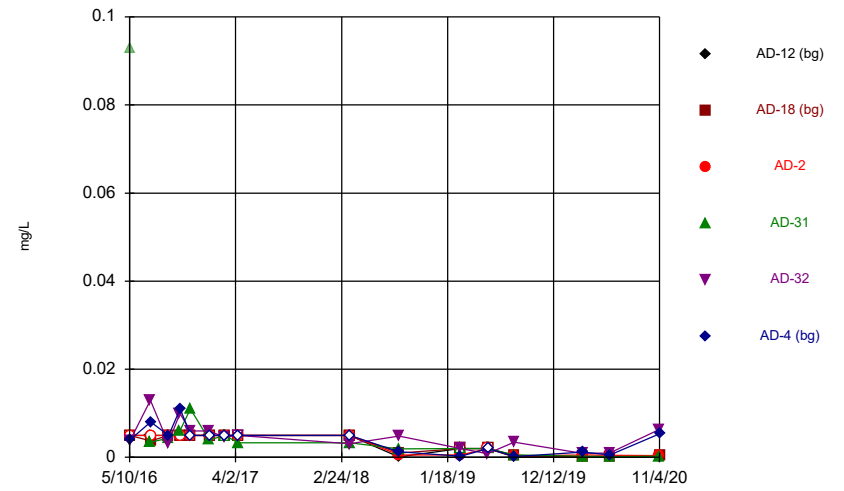
Kristina L. Rayner  
Groundwater Statistician

Time Series



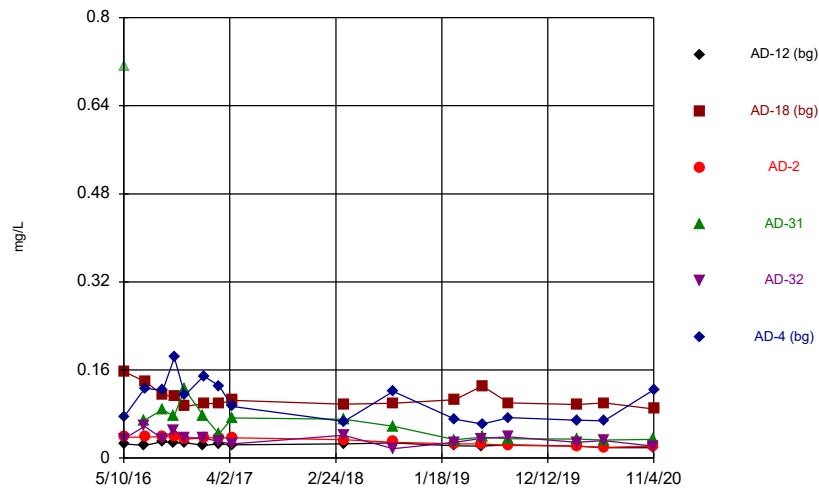
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Time Series



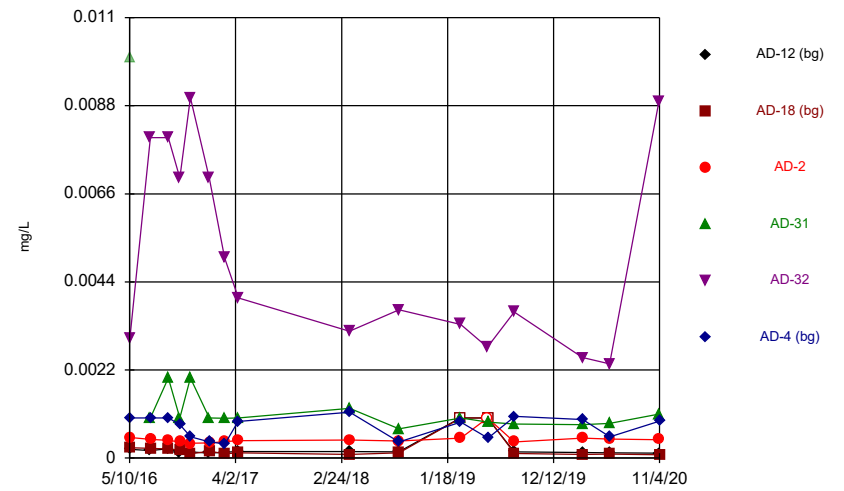
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Time Series



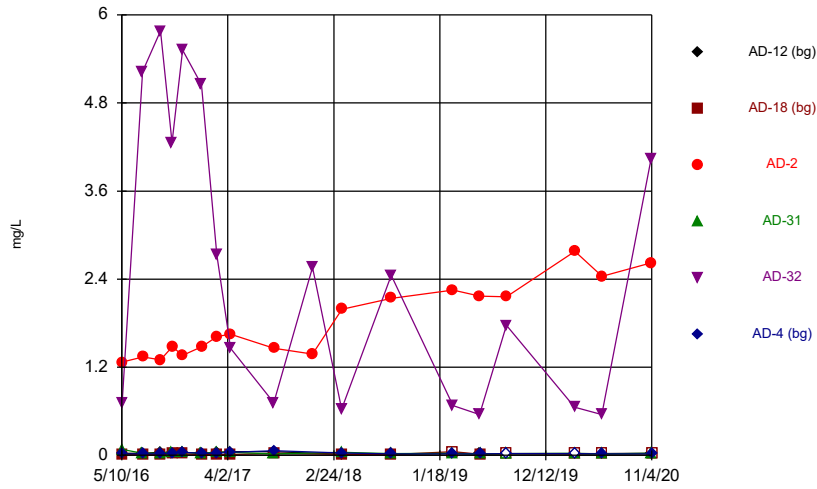
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Time Series



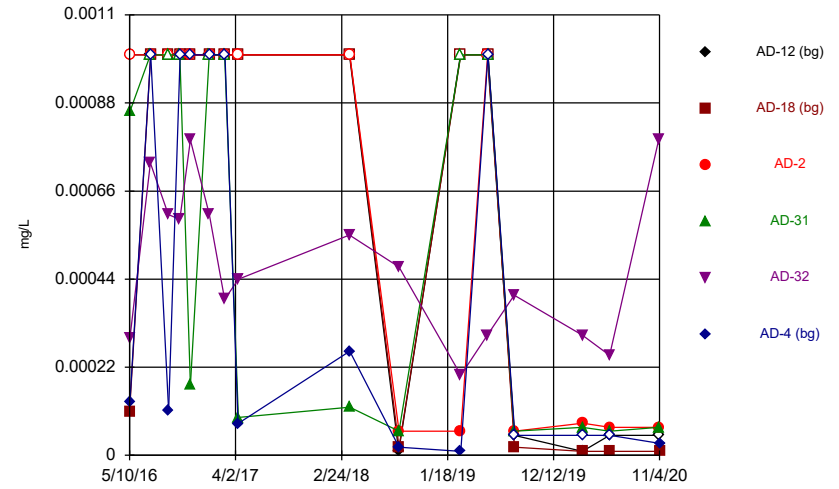
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Time Series



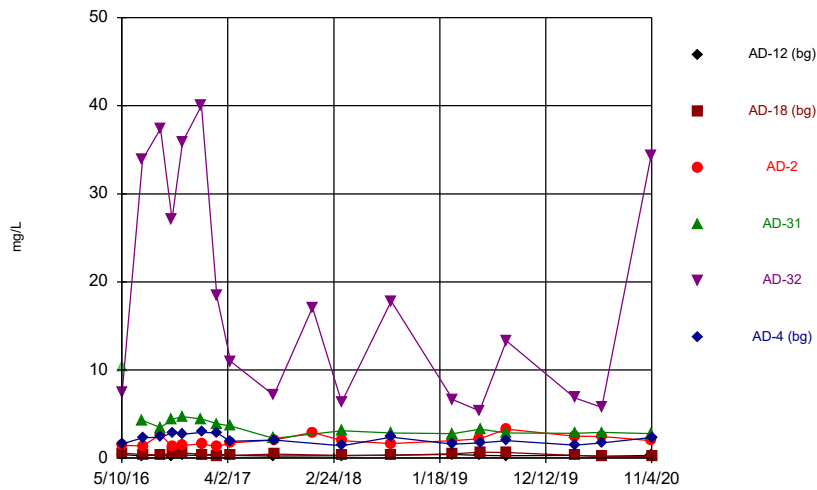
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Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Time Series



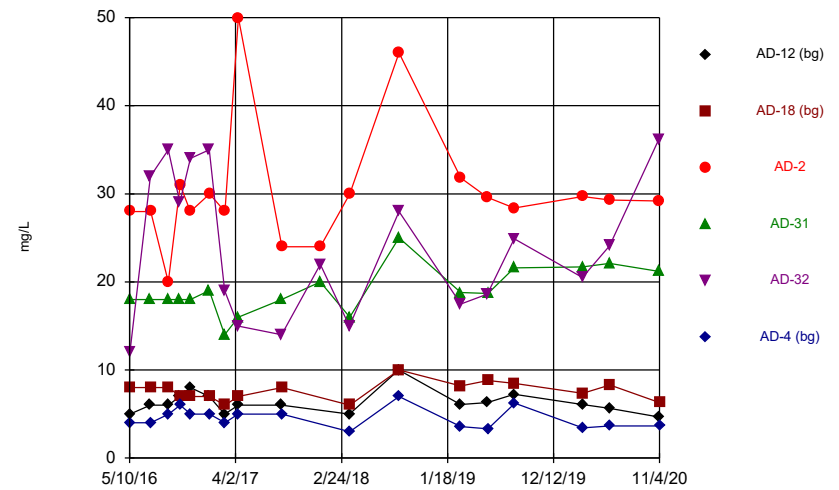
Constituent: Cadmium, total Analysis Run 1/6/2021 12:50 PM View: Descriptive  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Time Series



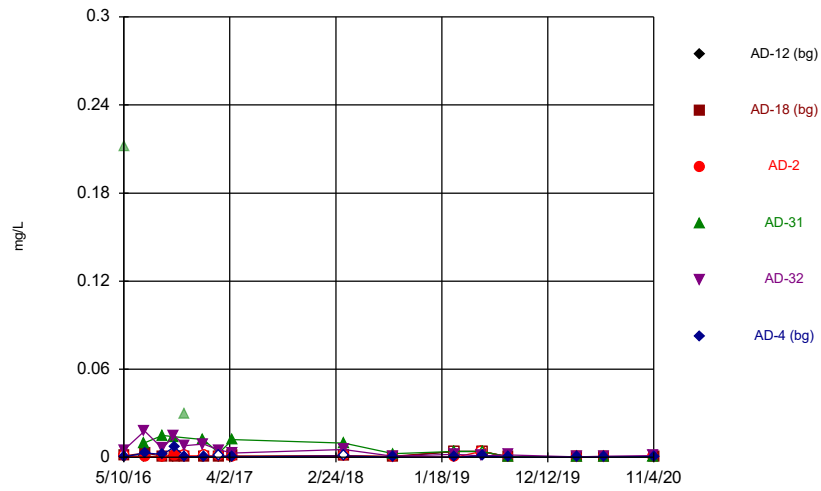
Constituent: Calcium, total Analysis Run 1/6/2021 12:50 PM View: Descriptive  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Time Series



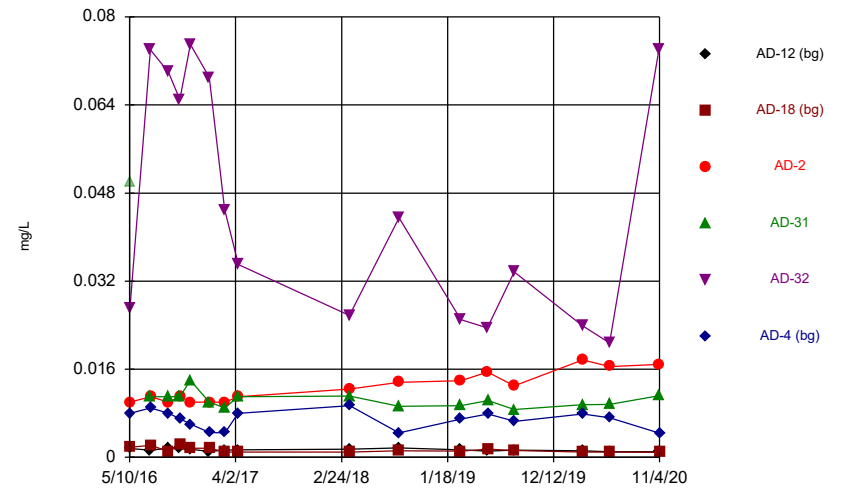
Constituent: Chloride, total Analysis Run 1/6/2021 12:50 PM View: Descriptive  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Time Series



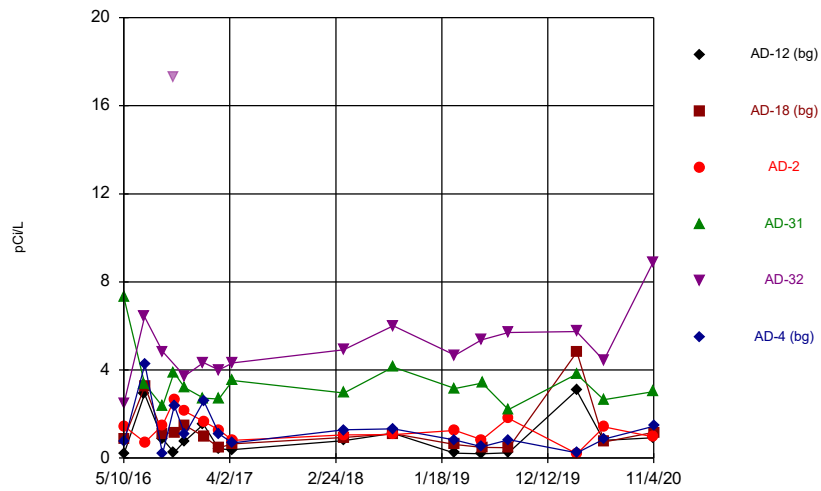
Constituent: Chromium, total Analysis Run 1/6/2021 12:50 PM View: Descriptive  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Time Series



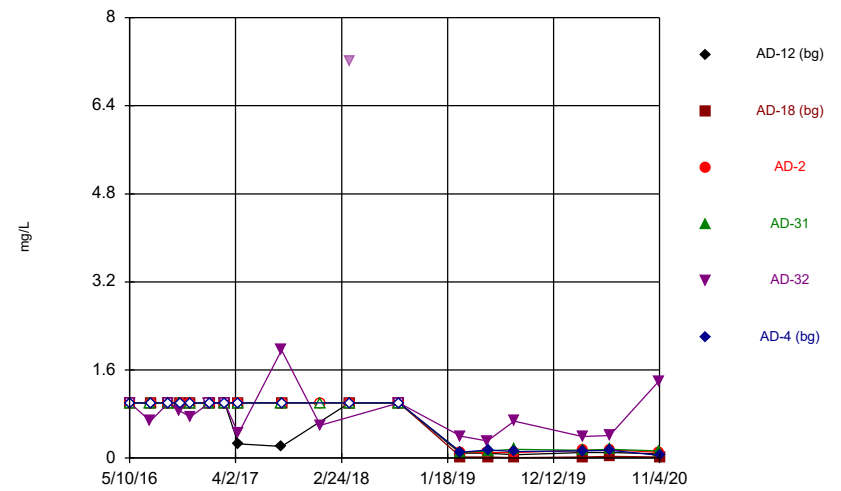
Constituent: Cobalt, total Analysis Run 1/6/2021 12:50 PM View: Descriptive  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Time Series



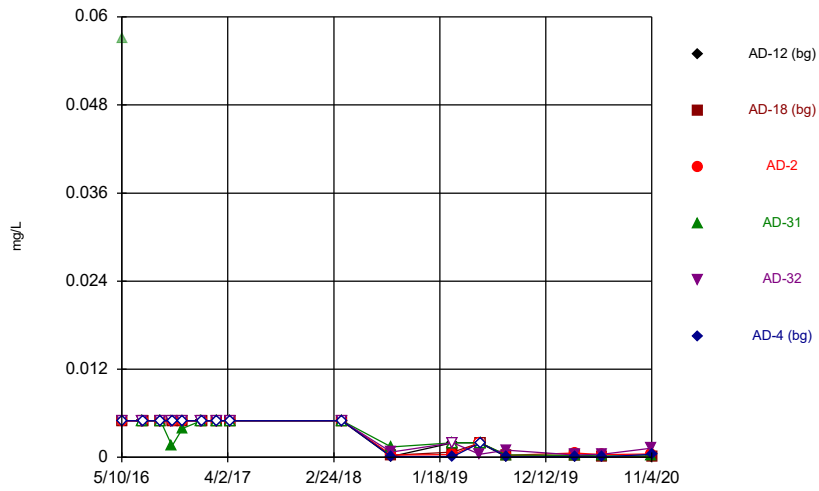
Constituent: Combined Radium 226 + 228 Analysis Run 1/6/2021 12:50 PM View: Descriptive  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Time Series



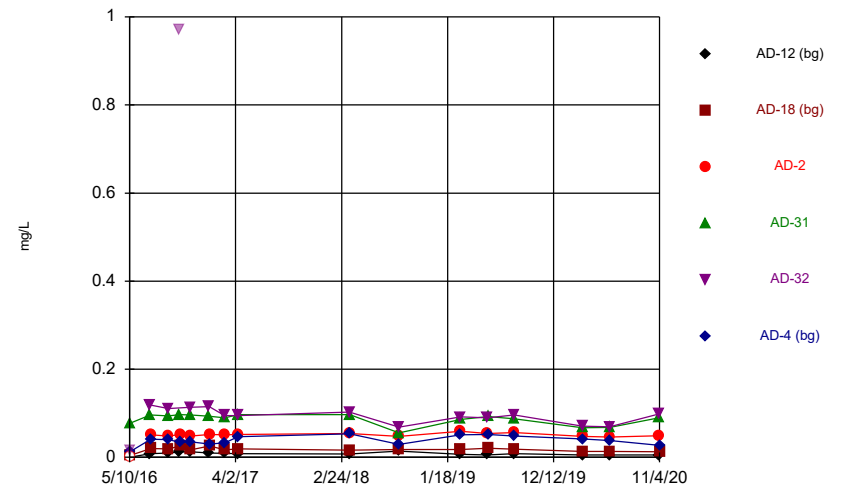
Constituent: Fluoride, total Analysis Run 1/6/2021 12:50 PM View: Descriptive  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Time Series



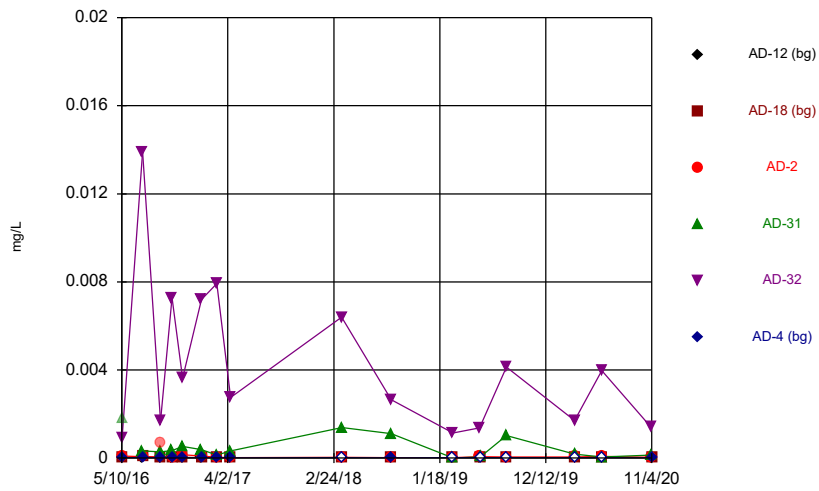
Constituent: Lead, total Analysis Run 1/6/2021 12:50 PM View: Descriptive  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Time Series



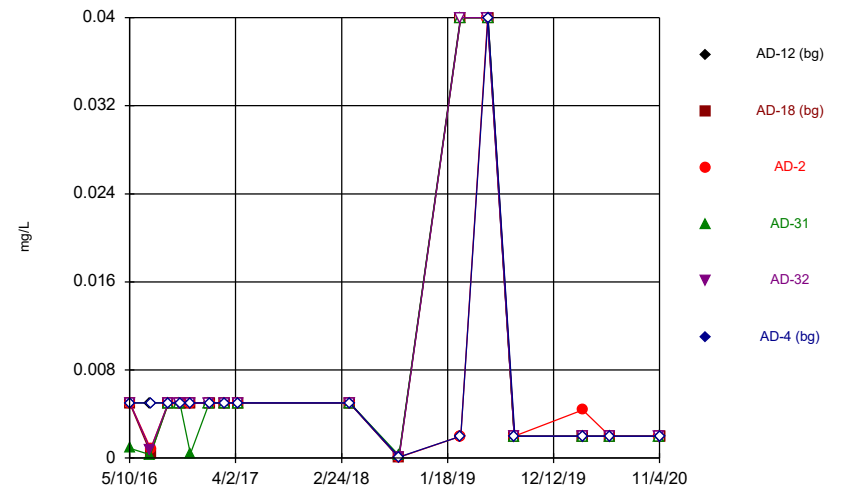
Constituent: Lithium, total Analysis Run 1/6/2021 12:50 PM View: Descriptive  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Time Series



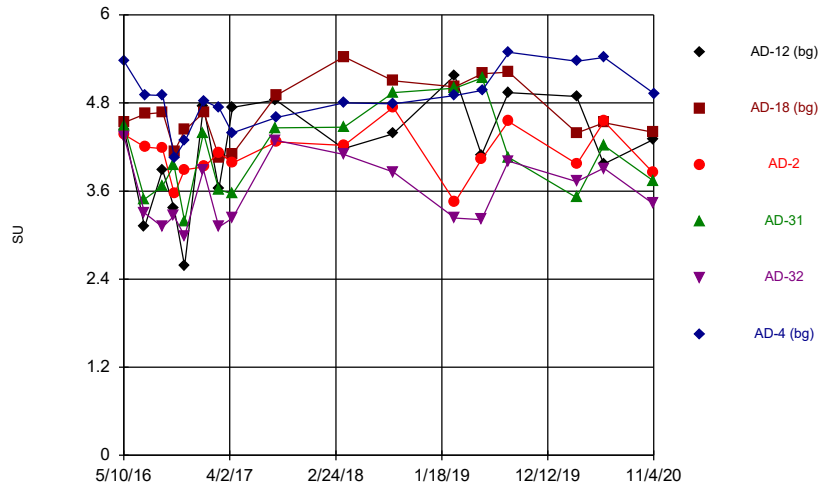
Constituent: Mercury, total Analysis Run 1/6/2021 12:50 PM View: Descriptive  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Time Series



Constituent: Molybdenum, total Analysis Run 1/6/2021 12:50 PM View: Descriptive  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

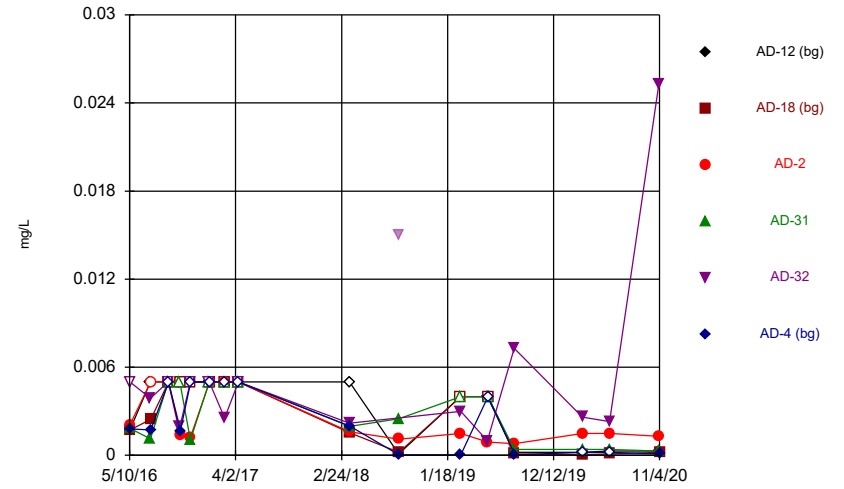
Time Series



Constituent: pH, field Analysis Run 1/6/2021 12:50 PM View: Descriptive  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

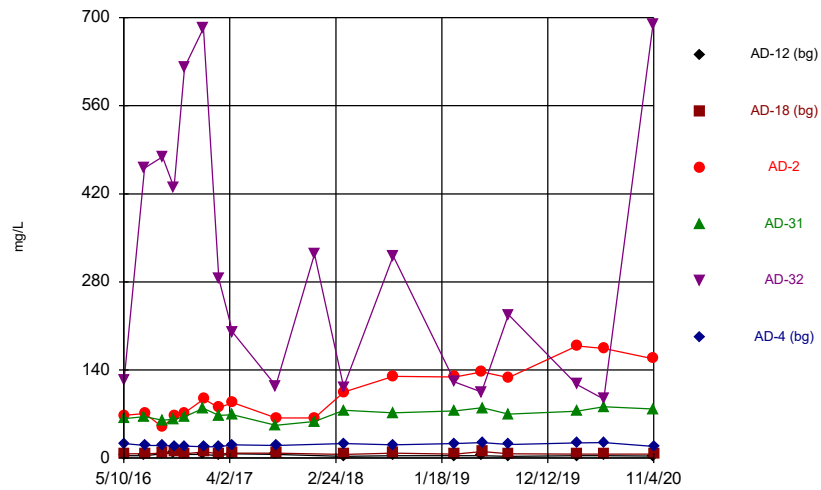
Hollow symbols indicate censored values.

Time Series



Constituent: Selenium, total Analysis Run 1/6/2021 12:50 PM View: Descriptive  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

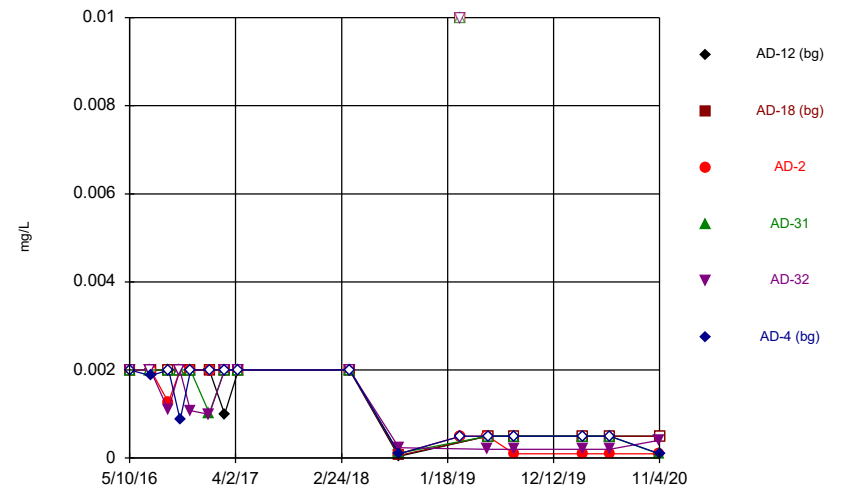
Time Series



Constituent: Sulfate, total Analysis Run 1/6/2021 12:50 PM View: Descriptive  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

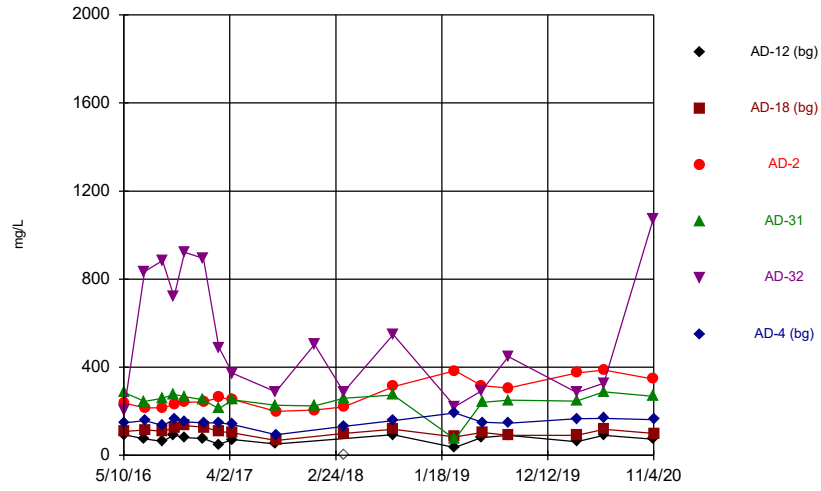
Hollow symbols indicate censored values.

Time Series



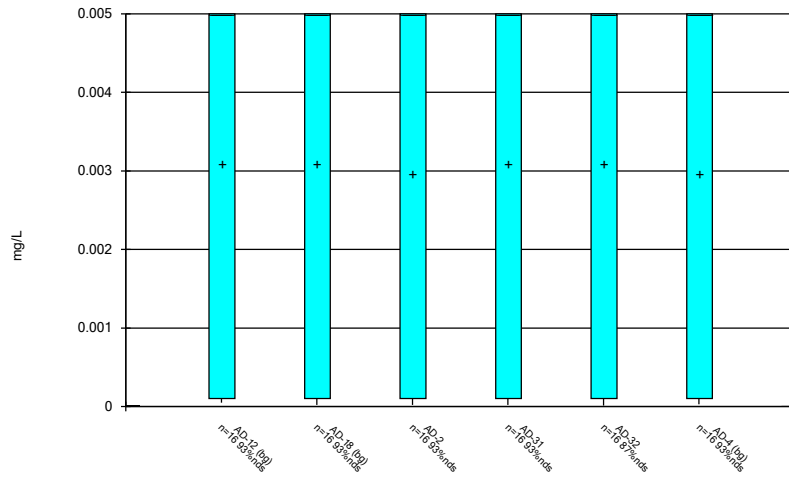
Constituent: Thallium, total Analysis Run 1/6/2021 12:50 PM View: Descriptive  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Time Series



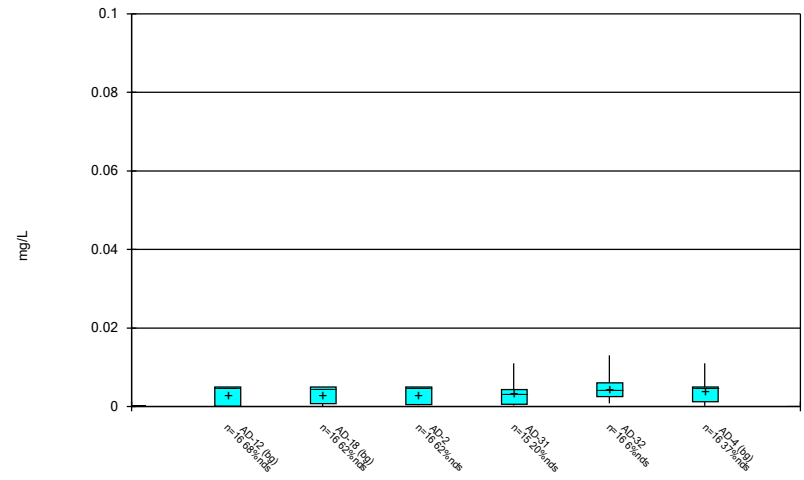
Constituent: Total Dissolved Solids Analysis Run 1/6/2021 12:50 PM View: Descriptive  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Box & Whiskers Plot



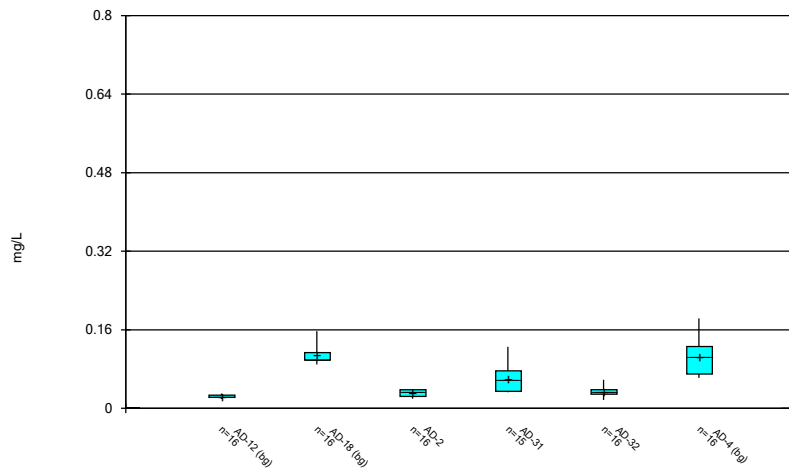
Constituent: Antimony, total Analysis Run 1/6/2021 12:52 PM View: Descriptive  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Box & Whiskers Plot



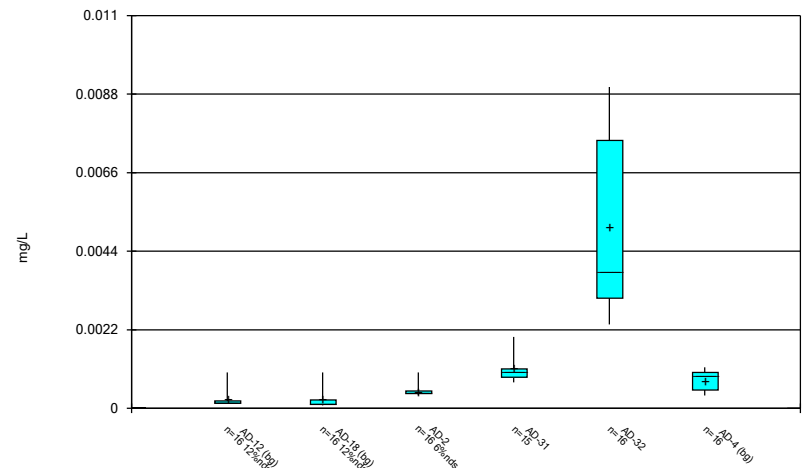
Constituent: Arsenic, total Analysis Run 1/6/2021 12:52 PM View: Descriptive  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Box & Whiskers Plot



Constituent: Barium, total Analysis Run 1/6/2021 12:52 PM View: Descriptive  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

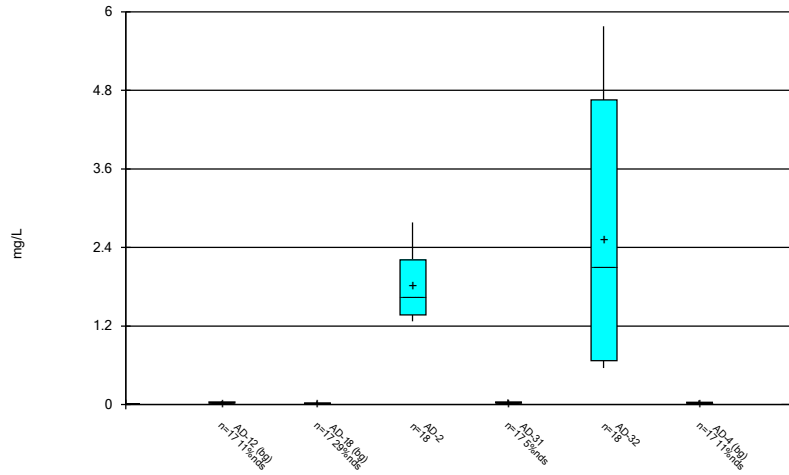
Box & Whiskers Plot



Constituent: Beryllium, total Analysis Run 1/6/2021 12:52 PM View: Descriptive  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

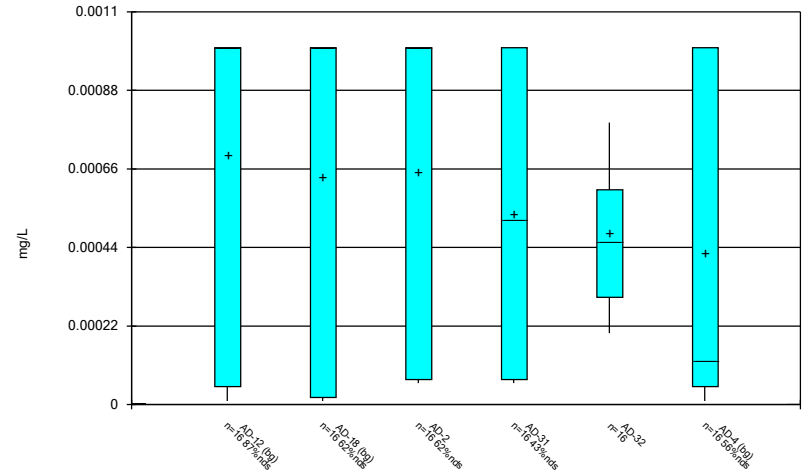


Box & Whiskers Plot



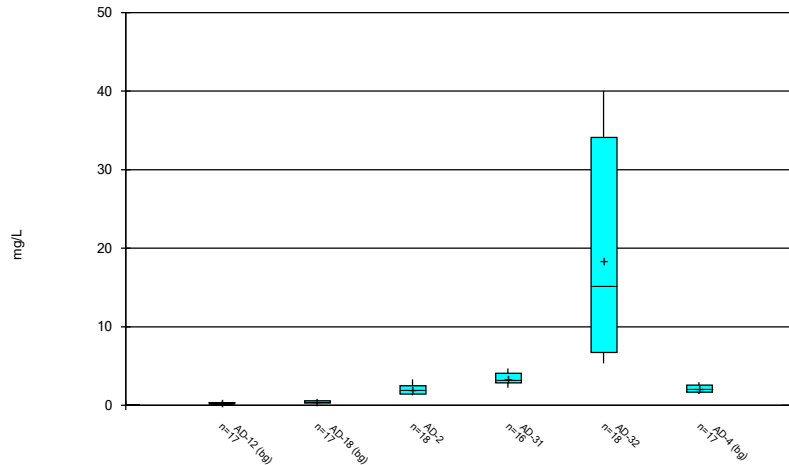
Constituent: Boron, total Analysis Run 1/6/2021 12:52 PM View: Descriptive  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Box & Whiskers Plot



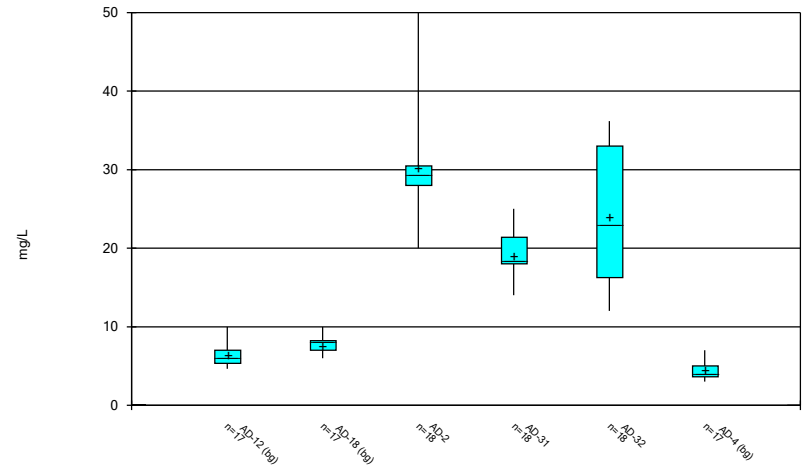
Constituent: Cadmium, total Analysis Run 1/6/2021 12:52 PM View: Descriptive  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Box & Whiskers Plot



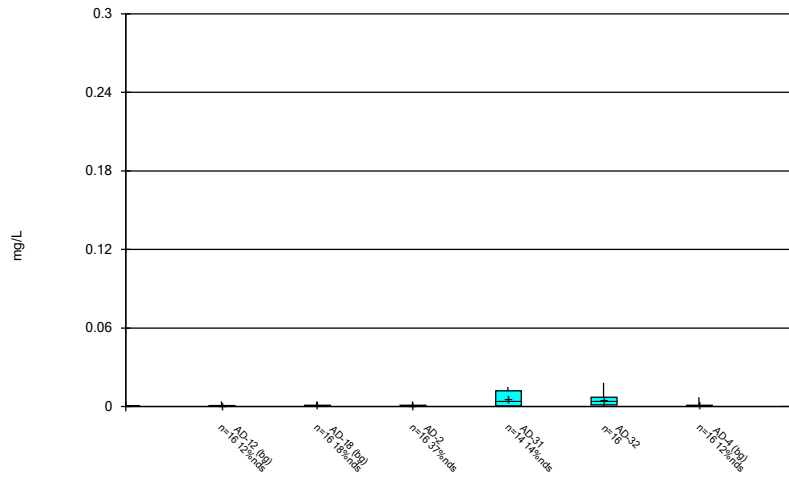
Constituent: Calcium, total Analysis Run 1/6/2021 12:52 PM View: Descriptive  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Box & Whiskers Plot



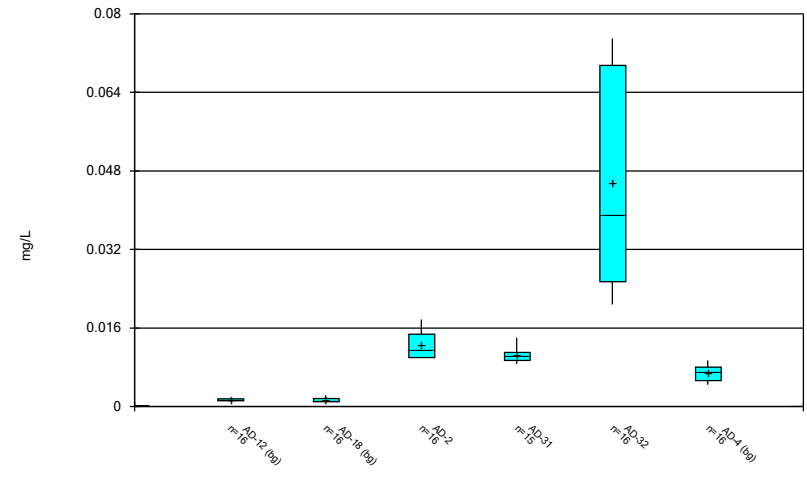
Constituent: Chloride, total Analysis Run 1/6/2021 12:53 PM View: Descriptive  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Box & Whiskers Plot



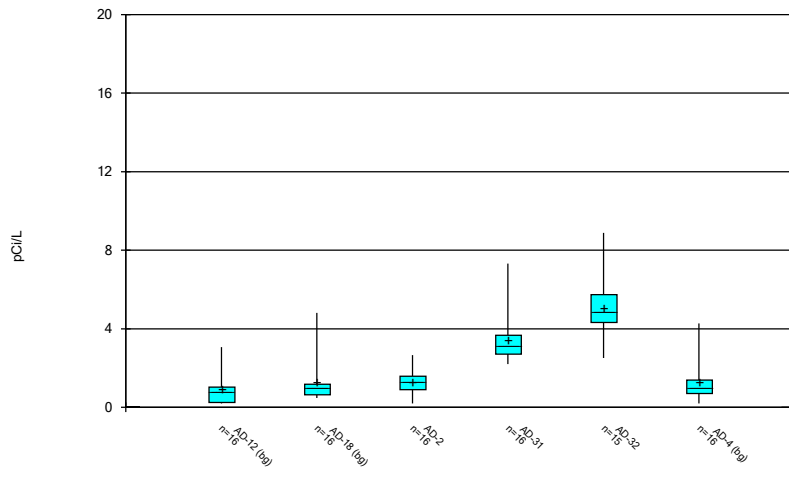
Constituent: Chromium, total Analysis Run 1/6/2021 12:53 PM View: Descriptive  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Box & Whiskers Plot



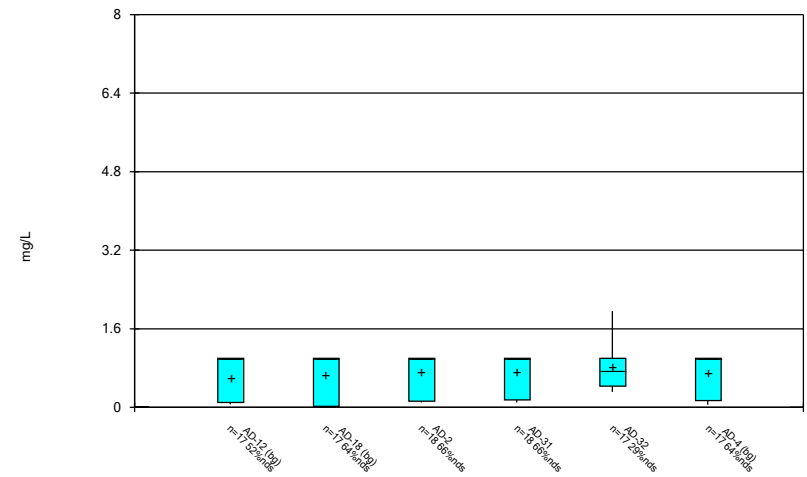
Constituent: Cobalt, total Analysis Run 1/6/2021 12:53 PM View: Descriptive  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Box & Whiskers Plot



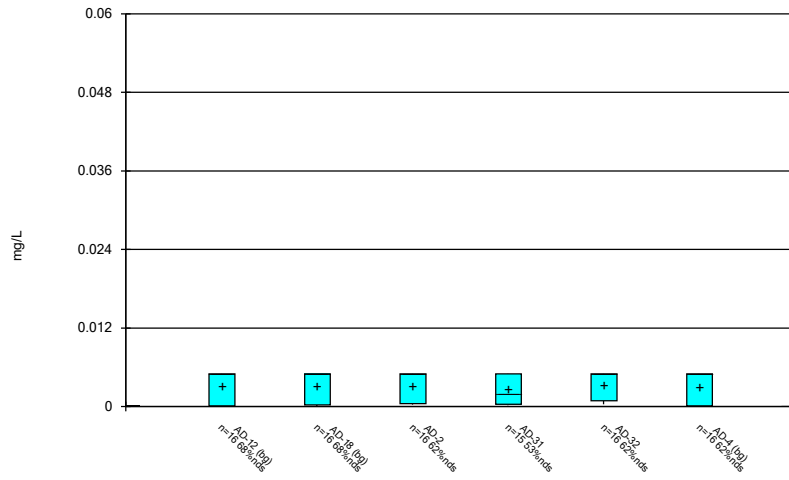
Constituent: Combined Radium 226 + 228 Analysis Run 1/6/2021 12:53 PM View: Descriptive  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Box & Whiskers Plot



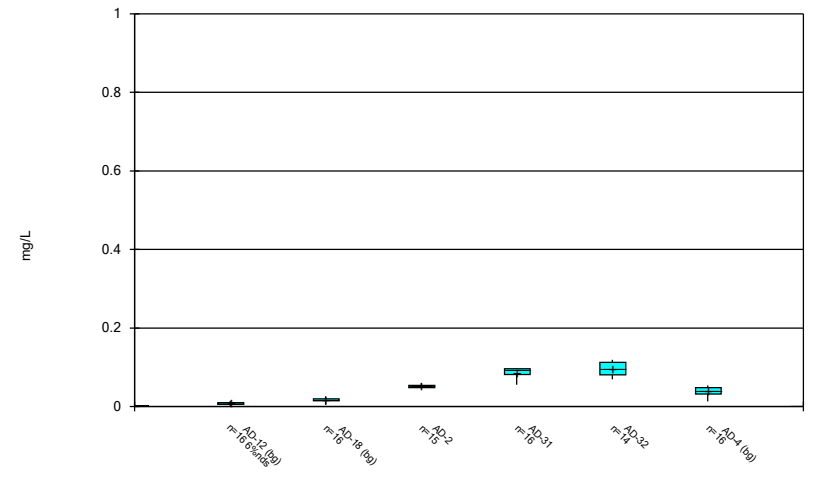
Constituent: Fluoride, total Analysis Run 1/6/2021 12:53 PM View: Descriptive  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Box & Whiskers Plot



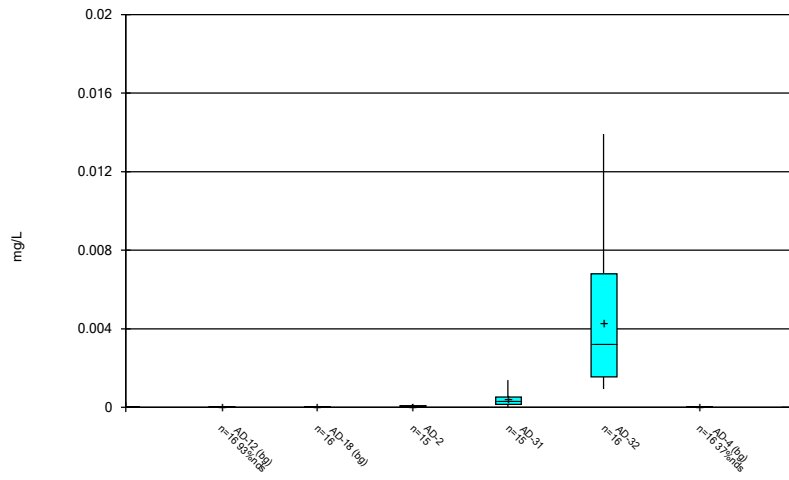
Constituent: Lead, total Analysis Run 1/6/2021 12:53 PM View: Descriptive  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Box & Whiskers Plot



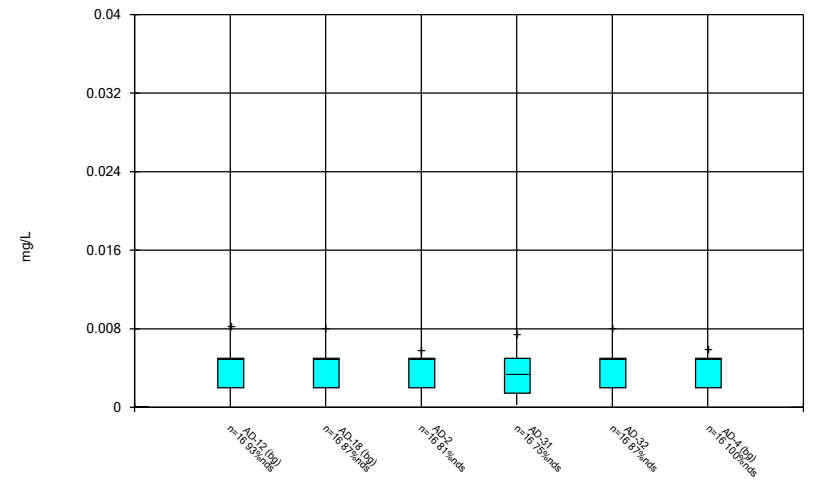
Constituent: Lithium, total Analysis Run 1/6/2021 12:53 PM View: Descriptive  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Box & Whiskers Plot



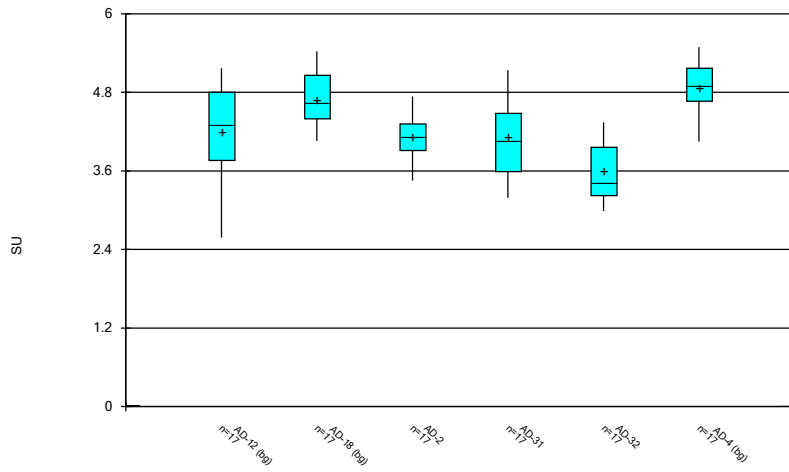
Constituent: Mercury, total Analysis Run 1/6/2021 12:53 PM View: Descriptive  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Box & Whiskers Plot



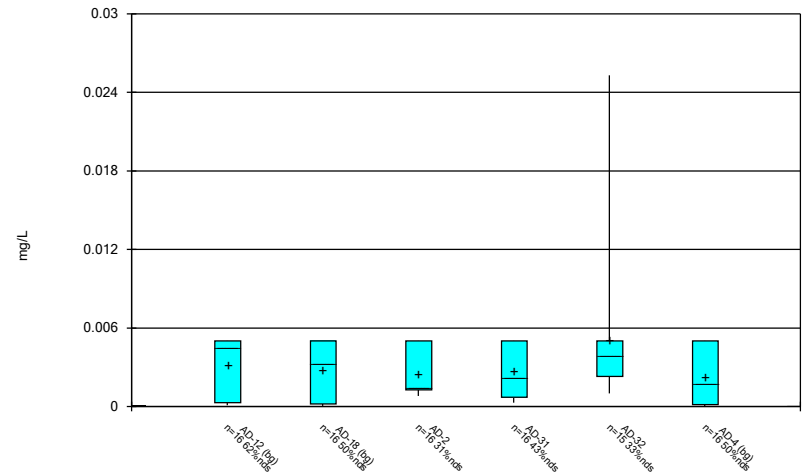
Constituent: Molybdenum, total Analysis Run 1/6/2021 12:53 PM View: Descriptive  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Box & Whiskers Plot



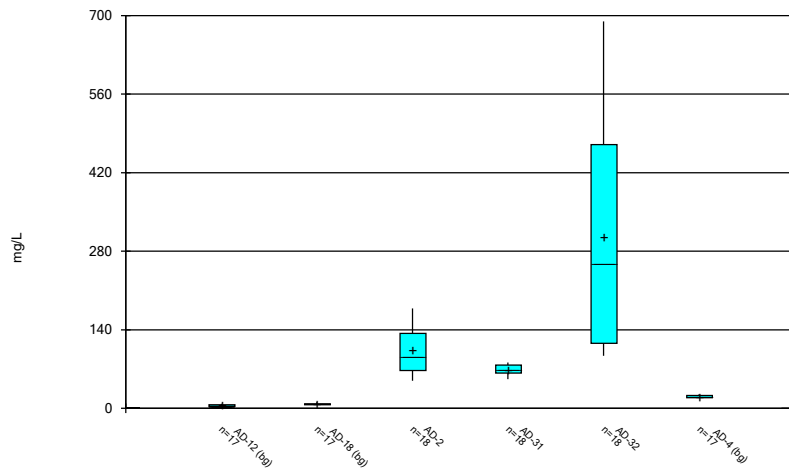
Constituent: pH, field Analysis Run 1/6/2021 12:53 PM View: Descriptive  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Box & Whiskers Plot



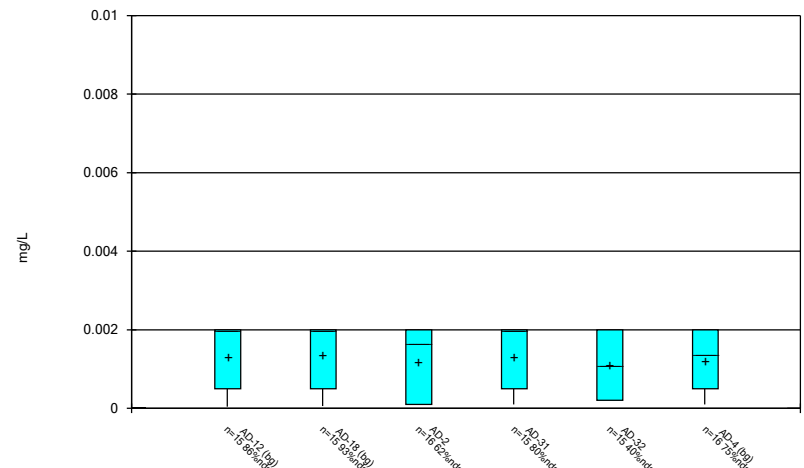
Constituent: Selenium, total Analysis Run 1/6/2021 12:53 PM View: Descriptive  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Box & Whiskers Plot



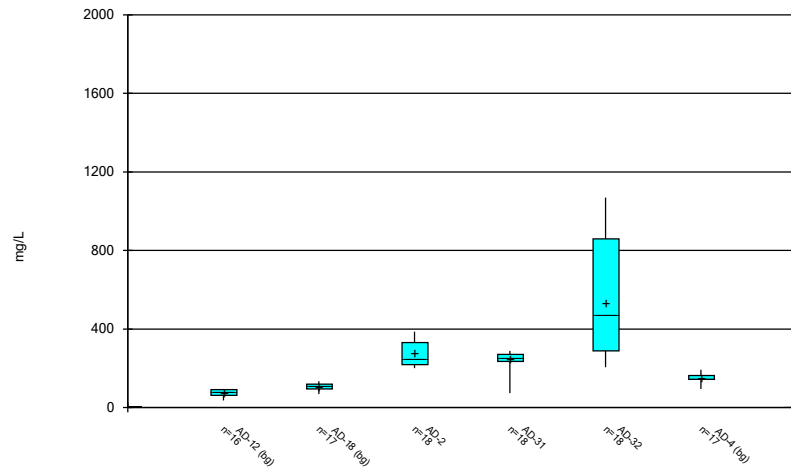
Constituent: Sulfate, total Analysis Run 1/6/2021 12:53 PM View: Descriptive  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Box & Whiskers Plot



Constituent: Thallium, total Analysis Run 1/6/2021 12:53 PM View: Descriptive  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Box & Whiskers Plot



Constituent: Total Dissolved Solids Analysis Run 1/6/2021 12:53 PM View: Descriptive  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

# Outlier Summary

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 1/6/2021, 12:48 PM

	AD-31 Arsenic, total (mg/L)	AD-31 Barium, total (mg/L)	AD-31 Beryllium, total (mg/L)	AD-31 Calcium, total (mg/L)	AD-2 Chloride, total (mg/L)	AD-31 Chromium, total (mg/L)	AD-31 Cobalt, total (mg/L)	AD-32 Combined Radium 226 + 228 (pCi/L)	AD-32 Fluoride, total (mg/L)	AD-31 Lead, total (mg/L)
5/11/2016	0.093 (o)	0.712 (o)	0.01 (o)	10.4 (o)		0.212 (o)	0.05 (o)			0.057 (o)
9/7/2016										
10/12/2016								17.32 (o)		
11/14/2016						0.03 (o)				
4/11/2017					50 (o)					
3/21/2018								7.2 (o)		
8/21/2018										
2/27/2019										
2/28/2019										

	AD-2 Lithium, total (mg/L)	AD-32 Lithium, total (mg/L)	AD-2 Mercury, total (mg/L)	AD-31 Mercury, total (mg/L)	AD-32 Selenium, total (mg/L)	AD-12 Thallium, total (mg/L)	AD-18 Thallium, total (mg/L)	AD-31 Thallium, total (mg/L)	AD-32 Thallium, total (mg/L)	AD-12 Total Dissolved Solids (mg/L)
5/11/2016	<0.001 (o)	0.016 (o)		0.001797 (o)						
9/7/2016			0.000675 (o)							
10/12/2016		0.972 (o)								
11/14/2016										
4/11/2017										
3/21/2018										<5 (o)
8/21/2018				0.015 (o)						
2/27/2019					<0.01 (o)					
2/28/2019						<0.01 (o)	<0.01 (o)	<0.01 (o)		

# Outlier Analysis (Intrawell Testing) - All Results (No Significant)

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 1/6/2021, 10:56 AM

<u>Constituent</u>	<u>Well</u>	<u>Outlier</u>	<u>Value(s)</u>	<u>Method</u>	<u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Distribution</u>	<u>Normality Test</u>
pH, field (SU)	AD-12 (bg)	No	n/a	NP	16	4.186	0.7328	x^3	ShapiroWilk
pH, field (SU)	AD-18 (bg)	No	n/a	NP	16	4.69	0.4218	sqrt(x)	ShapiroWilk
pH, field (SU)	AD-2	No	n/a	NP	16	4.126	0.3424	x^2	ShapiroWilk
pH, field (SU)	AD-31	No	n/a	NP	16	4.135	0.5986	ln(x)	ShapiroWilk
pH, field (SU)	AD-32	No	n/a	NP	16	3.598	0.4612	ln(x)	ShapiroWilk
pH, field (SU)	AD-4 (bg)	No	n/a	NP	16	4.863	0.4128	normal	ShapiroWilk

# Outlier Analysis (Interwell Testing) - All Results (No Significant)

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 1/6/2021, 11:06 AM

<u>Constituent</u>	<u>Well</u>	<u>Outlier</u>	<u>Value(s)</u>	<u>Method</u>	<u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Distribution</u>	<u>Normality Test</u>
Boron, total (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	51	0.02971	0.01467	x^(1/3)	ShapiroFrancia
Calcium, total (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	51	0.9492	0.8975	ln(x)	ShapiroFrancia
Chloride, total (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	51	6.142	1.718	sqrt(x)	ShapiroFrancia
Fluoride, total (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	51	0.6433	0.4504	ln(x)	ShapiroFrancia
Sulfate, total (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	51	11.12	7.444	ln(x)	ShapiroFrancia
Total Dissolved Solids (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	50	110.9	36.4	normal	ShapiroFrancia



# Outlier Analysis (Appendix IV) - Upgradient Significant Results

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 1/6/2021, 11:13 AM

<u>Constituent</u>	<u>Well</u>	<u>Outlier</u>	<u>Value(s)</u>	<u>Method</u>	<u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Distribution</u>	<u>Normality Test</u>
Lead, total (mg/L)	AD-12,AD-18,AD-4	Yes	0.0007	NP	48	0.0001859	0.00009978	In(x)	ShapiroWilk

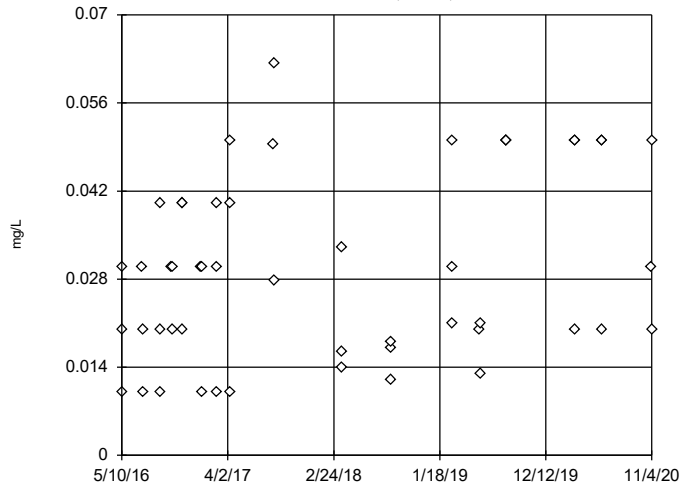
# Outlier Analysis (Appendix IV) - Significant Downgradient Results

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 1/6/2021, 1:16 PM

<u>Constituent</u>	<u>Well</u>	<u>Outlier</u>	<u>Value(s)</u>	<u>Method</u>	<u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Distribution</u>	<u>Normality Test</u>
Beryllium, total (mg/L)	AD-2	Yes	0.001	NP	16	0.0004768	0.0001461	In(x)	ShapiroWilk
Beryllium, total (mg/L)	AD-31	Yes	0.01	NP	16	0.001658	0.002255	In(x)	ShapiroWilk
Cobalt, total (mg/L)	AD-31	Yes	0.05	NP	16	0.01288	0.009979	In(x)	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	AD-32	Yes	17.32	NP	16	5.825	3.37	In(x)	ShapiroWilk
Lithium, total (mg/L)	AD-32	Yes	0.016,0.972	NP	16	0.1454	0.2219	In(x)	ShapiroWilk

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

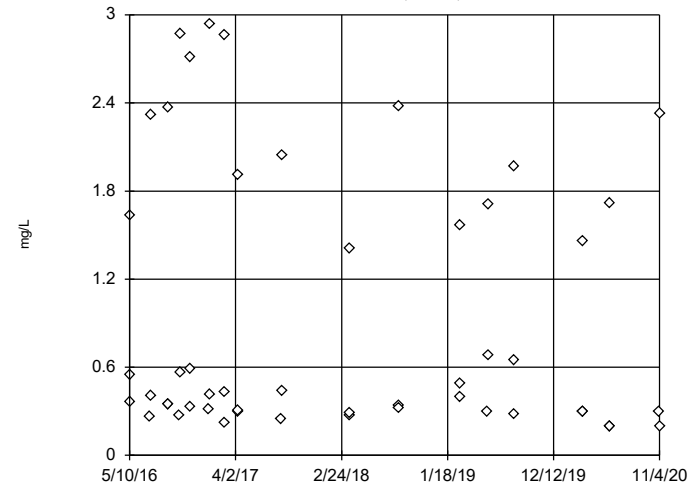


n = 51  
 No outliers found.  
 Tukey's method selected by user.  
 Data were cube root transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.1697, low cutoff = 0.0002136, based on IQR multiplier of 3.

Constituent: Boron, total Analysis Run 1/6/2021 11:02 AM View: PL's Interwell  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

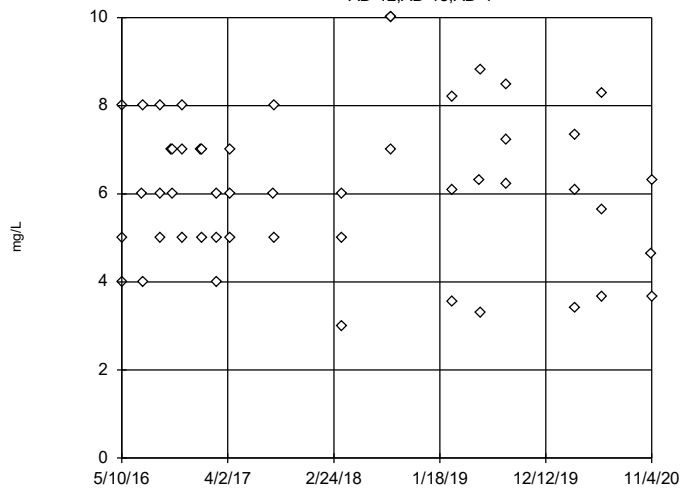


n = 51  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 316.7, low cutoff = 0.00162, based on IQR multiplier of 3.

Constituent: Calcium, total Analysis Run 1/6/2021 11:02 AM View: PL's Interwell  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

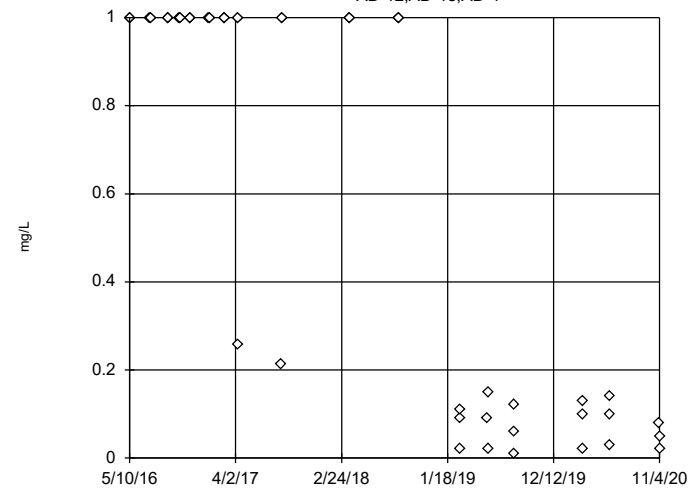


n = 51  
 No outliers found.  
 Tukey's method selected by user.  
 Data were square root transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 16.44, low cutoff = 0.7606, based on IQR multiplier of 3.

Constituent: Chloride, total Analysis Run 1/6/2021 11:02 AM View: PL's Interwell  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

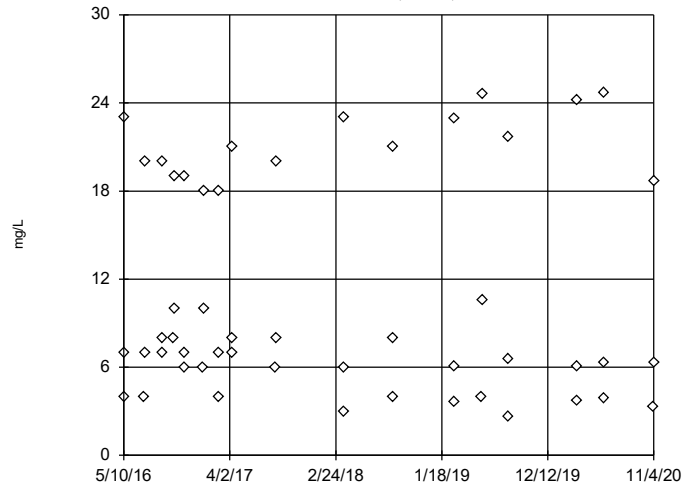


n = 51  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 1000, low cutoff = 0.0001, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 1/6/2021 11:02 AM View: PL's Interwell  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4



n = 51

No outliers found.  
Tukey's method selected by user.

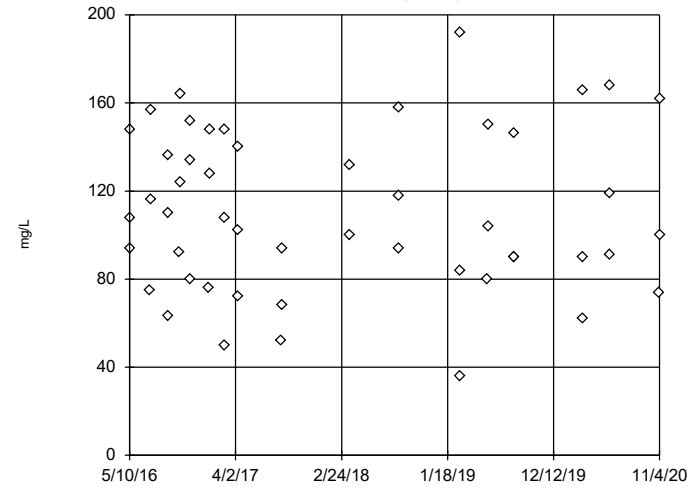
Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 603.3, low cutoff = 0.1889, based on IQR multiplier of 3.

Constituent: Sulfate, total Analysis Run 1/6/2021 11:02 AM View: PL's Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4



n = 50

No outliers found.  
Tukey's method selected by user.

Ladder of Powers transformations did not improve normality; analysis run on raw data.

High cutoff = 342, low cutoff = -113, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 1/6/2021 11:02 AM View: PL's Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

# Outlier Analysis (Appendix IV) - Upgradient Significant Results

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 1/6/2021, 11:13 AM

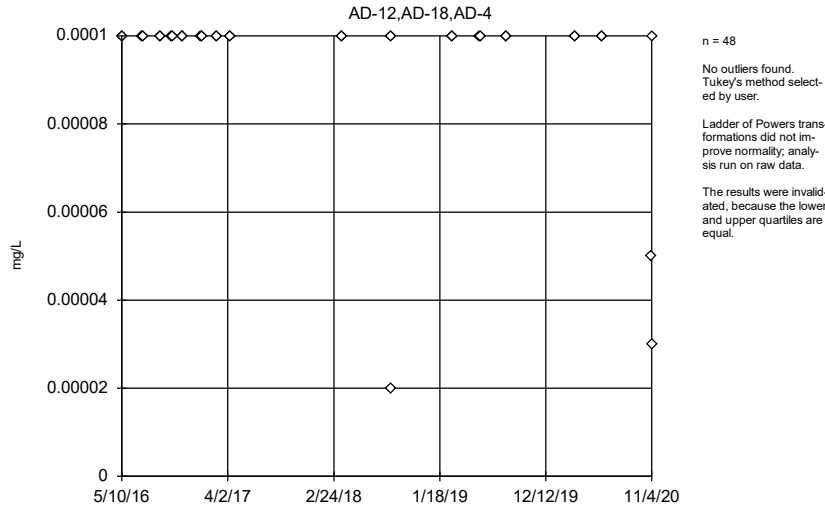
<u>Constituent</u>	<u>Well</u>	<u>Outlier</u>	<u>Value(s)</u>	<u>Method</u>	<u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Distribution</u>	<u>Normality Test</u>
Lead, total (mg/L)	AD-12,AD-18,AD-4	Yes	0.0007	NP	48	0.0001859	0.00009978	In(x)	ShapiroWilk

# Outlier Analysis (Appendix IV) - All Upgradient Results

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 1/6/2021, 11:13 AM

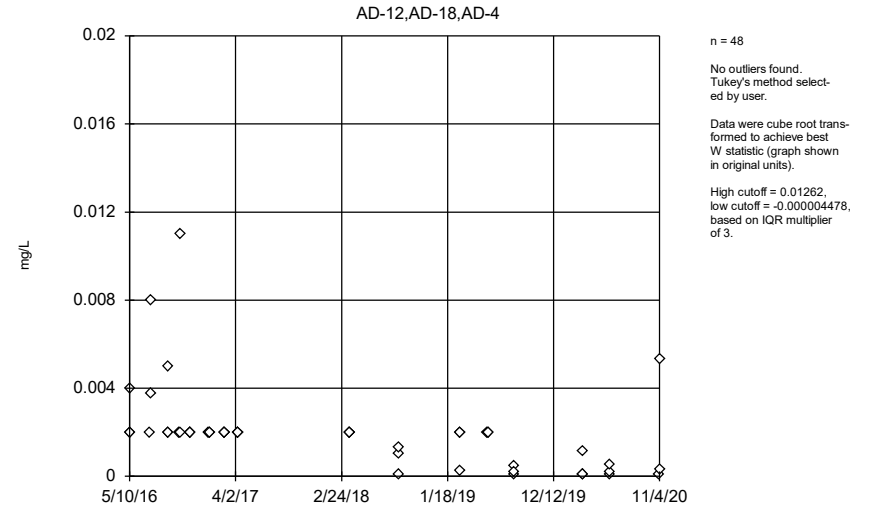
<u>Constituent</u>	<u>Well</u>	<u>Outlier</u>	<u>Value(s)</u>	<u>Method</u>	<u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Distribution</u>	<u>Normality Test</u>
Antimony, total (mg/L)	AD-12,AD-18,AD-4	n/a	n/a	NP	48	0.00009583	0.00001661	unknown	ShapiroWilk
Arsenic, total (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	48	0.00202	0.001984	x^(1/3)	ShapiroWilk
Barium, total (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	48	0.07874	0.04521	normal	ShapiroWilk
Beryllium, total (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	48	0.0004319	0.0003734	ln(x)	ShapiroWilk
Cadmium, total (mg/L)	AD-12,AD-18,AD-4	n/a	n/a	NP	48	0.00005194	0.00003905	unknown	ShapiroWilk
Chromium, total (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	48	0.0009418	0.00119	ln(x)	ShapiroWilk
Cobalt, total (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	48	0.003177	0.002797	ln(x)	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	AD-12,AD-18,AD-4	No	n/a	NP	48	1.154	1.026	ln(x)	ShapiroWilk
Fluoride, total (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	51	0.6433	0.4504	ln(x)	ShapiroFrancia
<b>Lead, total (mg/L)</b>	<b>AD-12,AD-18,AD-4</b>	<b>Yes</b>	<b>0.0007</b>	<b>NP</b>	<b>48</b>	<b>0.0001859</b>	<b>0.00009978</b>	<b>ln(x)</b>	<b>ShapiroWilk</b>
Lithium, total (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	48	0.02127	0.01463	x^(1/3)	ShapiroWilk
Mercury, total (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	48	0.00001108	0.00001098	ln(x)	ShapiroWilk
Molybdenum, total (mg/L)	AD-12,AD-18,AD-4	n/a	n/a	NP	48	0.001886	0.0004477	unknown	ShapiroWilk
Selenium, total (mg/L)	AD-12,AD-18,AD-4	n/a	n/a	NP	48	0.0004519	0.0006303	unknown	ShapiroWilk
Thallium, total (mg/L)	AD-12,AD-18,AD-4	n/a	n/a	NP	48	0.0005111	0.0002522	unknown	ShapiroWilk

Tukey's Outlier Screening, Pooled Background



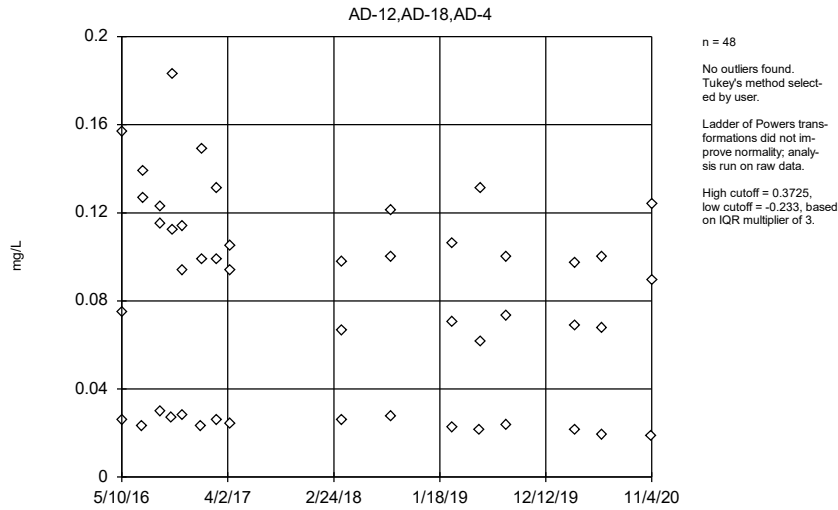
Constituent: Antimony, total Analysis Run 1/6/2021 11:11 AM View: UTL's  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Tukey's Outlier Screening, Pooled Background



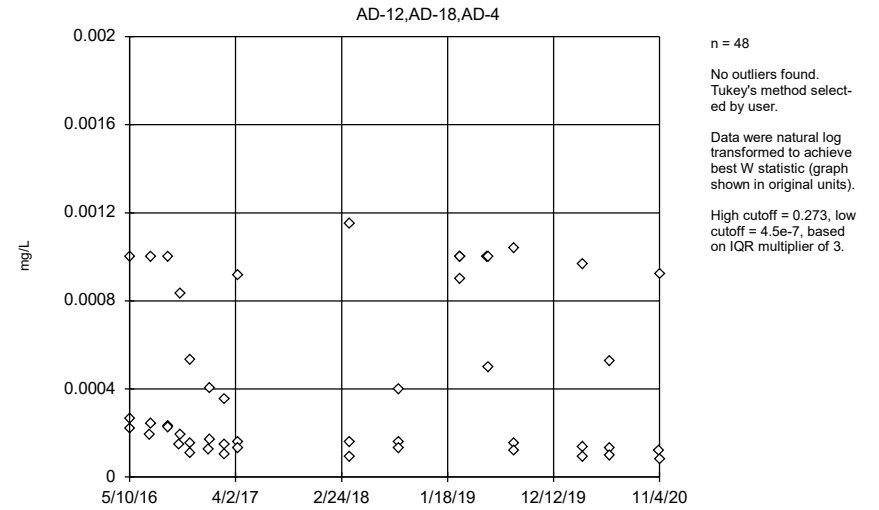
Constituent: Arsenic, total Analysis Run 1/6/2021 11:11 AM View: UTL's  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Tukey's Outlier Screening, Pooled Background



Constituent: Barium, total Analysis Run 1/6/2021 11:11 AM View: UTL's  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

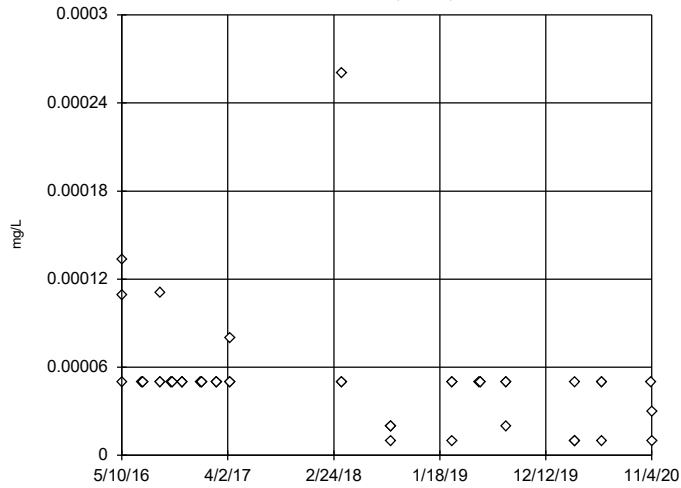
Tukey's Outlier Screening, Pooled Background



Constituent: Beryllium, total Analysis Run 1/6/2021 11:11 AM View: UTL's  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

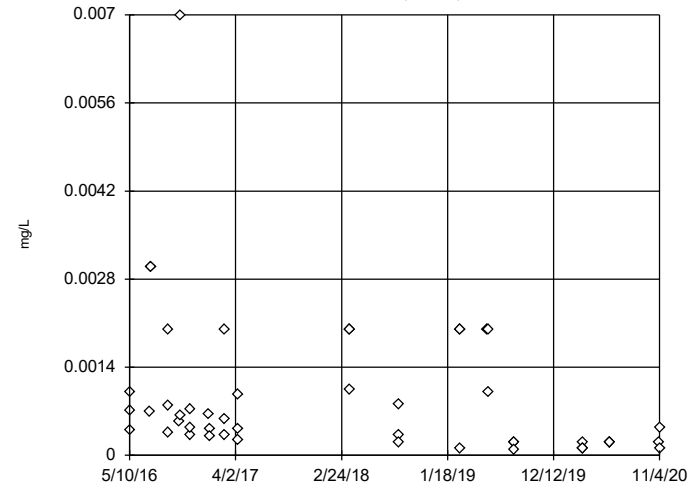


n = 48  
 No outliers found.  
 Tukey's method selected by user.  
 Data were cube root transformed to achieve best W statistic (graph shown in original units).  
 The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Cadmium, total Analysis Run 1/6/2021 11:11 AM View: UTL's  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

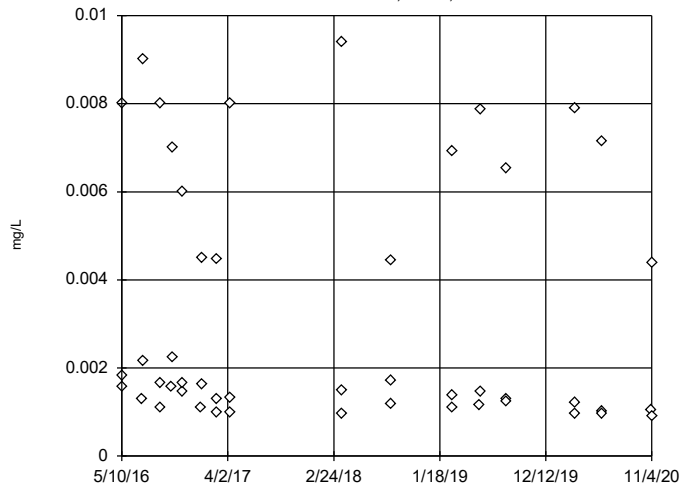


n = 48  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.1191, low cutoff = 0.000001807, based on IQR multiplier of 3.

Constituent: Chromium, total Analysis Run 1/6/2021 11:11 AM View: UTL's  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

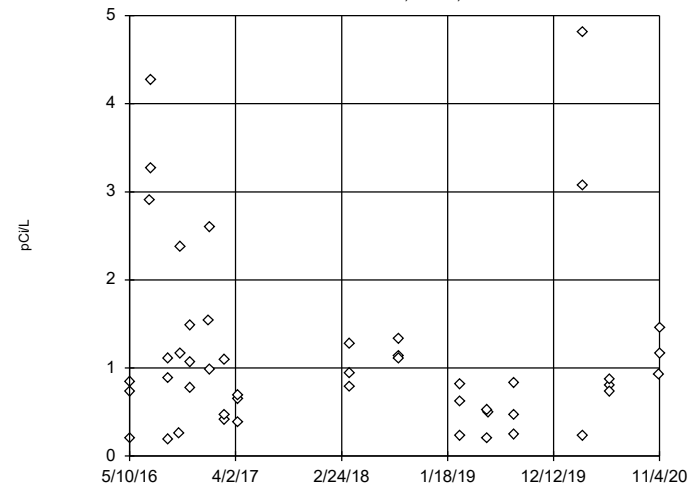


n = 48  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.4624, low cutoff = 0.0000131, based on IQR multiplier of 3.

Constituent: Cobalt, total Analysis Run 1/6/2021 11:11 AM View: UTL's  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

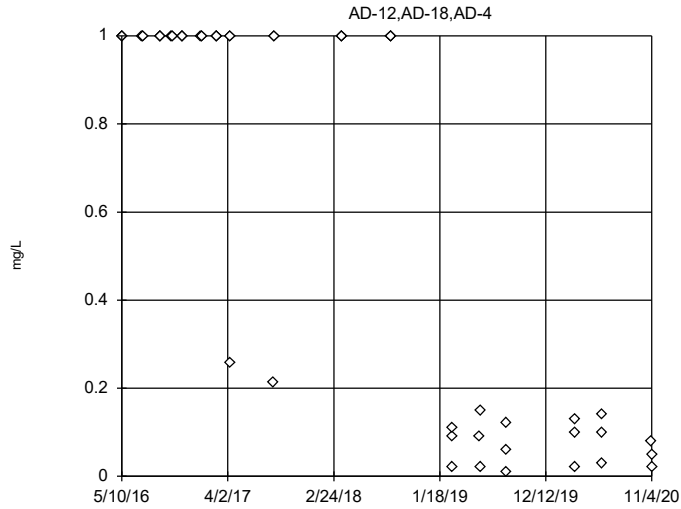


n = 48  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 17.44, low cutoff = 0.03539, based on IQR multiplier of 3.

Constituent: Combined Radium 226 + 228 Analysis Run 1/6/2021 11:11 AM View: UTL's  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP



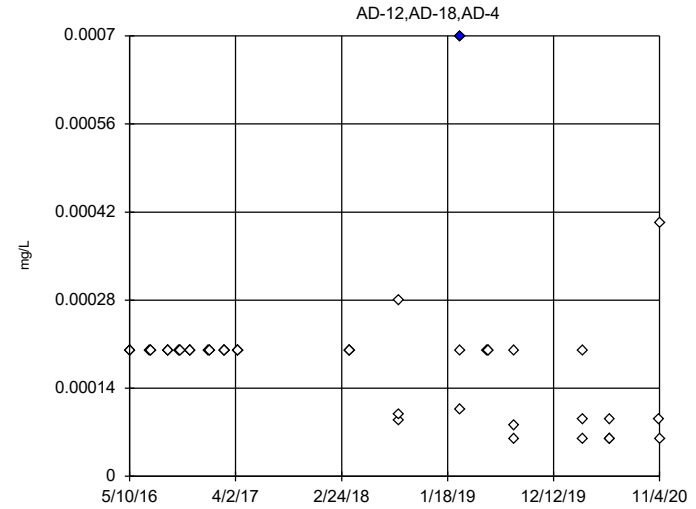
### Tukey's Outlier Screening, Pooled Background



n = 51  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 1000, low cutoff = 0.0001, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 1/6/2021 11:12 AM View: UTL's  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

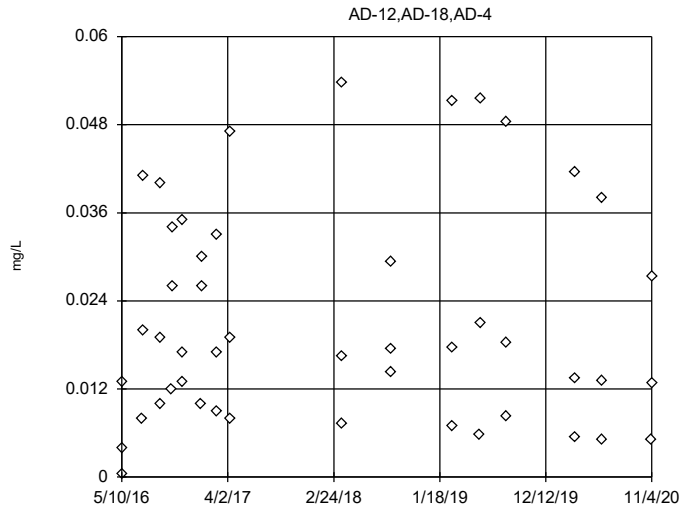
### Tukey's Outlier Screening, Pooled Background



n = 48  
 Outlier is drawn as solid.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.0005183, low cutoff = 0.00005618, based on IQR multiplier of 3.

Constituent: Lead, total Analysis Run 1/6/2021 11:12 AM View: UTL's  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

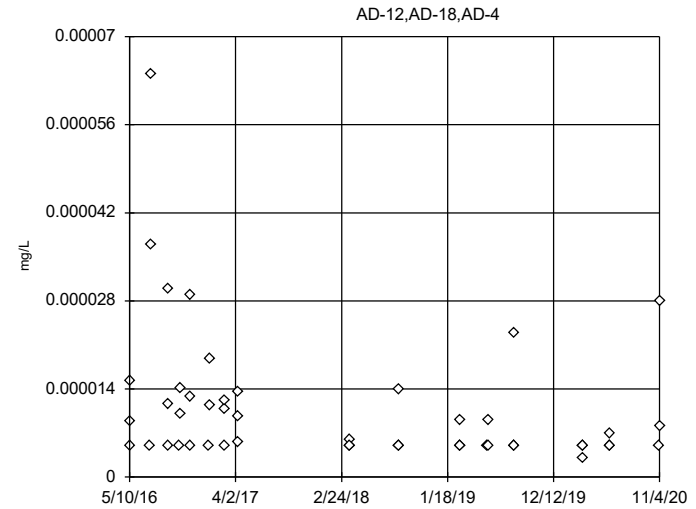
### Tukey's Outlier Screening, Pooled Background



n = 48  
 No outliers found.  
 Tukey's method selected by user.  
 Data were cube root transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.2474, low cutoff = -0.001009, based on IQR multiplier of 3.

Constituent: Lithium, total Analysis Run 1/6/2021 11:12 AM View: UTL's  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening, Pooled Background

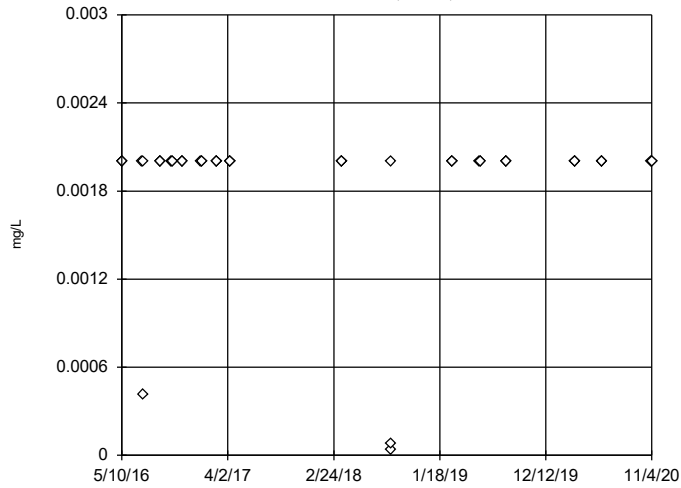


n = 48  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.0001927, low cutoff = 3.2e-7, based on IQR multiplier of 3.

Constituent: Mercury, total Analysis Run 1/6/2021 11:12 AM View: UTL's  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

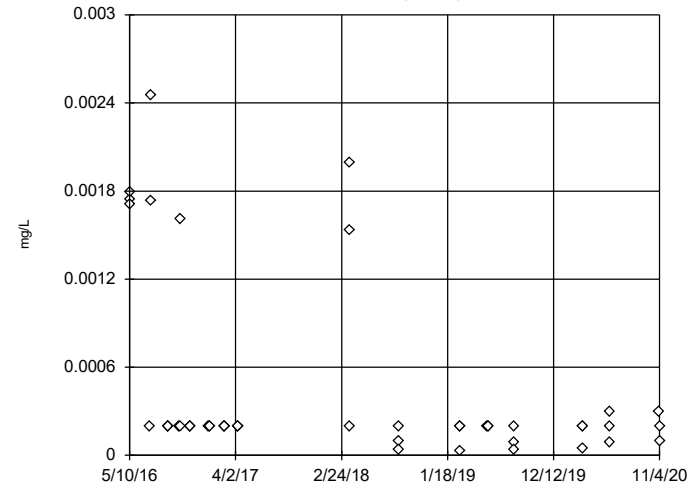


n = 48  
 No outliers found.  
 Tukey's method selected by user.  
 Data were square root transformed to achieve best W statistic (graph shown in original units).  
 The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Molybdenum, total Analysis Run 1/6/2021 11:12 AM View: UTL's  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

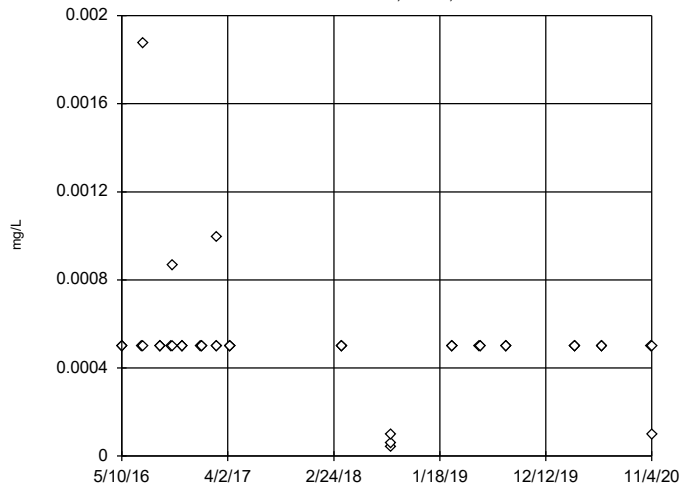


n = 48  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Constituent: Selenium, total Analysis Run 1/6/2021 11:12 AM View: UTL's  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4



n = 48  
 No outliers found.  
 Tukey's method selected by user.  
 Data were square root transformed to achieve best W statistic (graph shown in original units).  
 The results were invalidated, because the lower and upper quartiles are equal.

Constituent: Thallium, total Analysis Run 1/6/2021 11:12 AM View: UTL's  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

# Outlier Analysis (Appendix IV) - Significant Downgradient Results

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 1/6/2021, 1:16 PM

<u>Constituent</u>	<u>Well</u>	<u>Outlier</u>	<u>Value(s)</u>	<u>Method</u>	<u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Distribution</u>	<u>Normality Test</u>
Beryllium, total (mg/L)	AD-2	Yes	0.001	NP	16	0.0004768	0.0001461	In(x)	ShapiroWilk
Beryllium, total (mg/L)	AD-31	Yes	0.01	NP	16	0.001658	0.002255	In(x)	ShapiroWilk
Cobalt, total (mg/L)	AD-31	Yes	0.05	NP	16	0.01288	0.009979	In(x)	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	AD-32	Yes	17.32	NP	16	5.825	3.37	In(x)	ShapiroWilk
Lithium, total (mg/L)	AD-32	Yes	0.016,0.972	NP	16	0.1454	0.2219	In(x)	ShapiroWilk

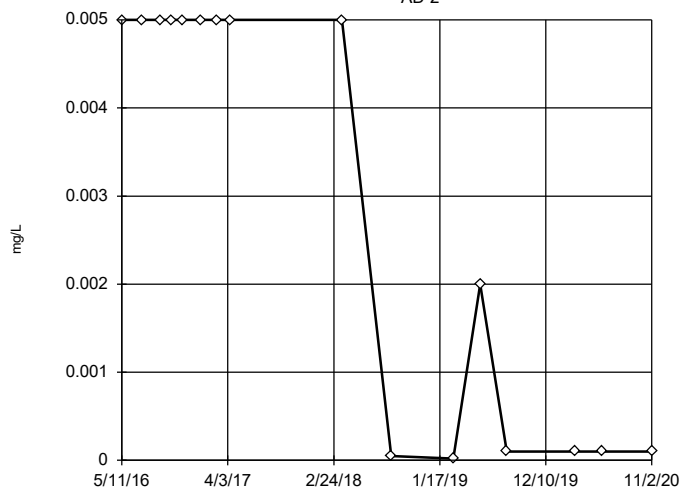
# Outlier Analysis (Appendix IV) - All Downgradient Results

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 1/6/2021, 1:16 PM

Constituent	Well	Outlier	Value(s)	Method	N	Mean	Std. Dev.	Distribution	Normality Test
Antimony, total (mg/L)	AD-2	n/a	n/a	NP	16	0.002967	0.002425	unknown	ShapiroWilk
Antimony, total (mg/L)	AD-31	n/a	n/a	NP	16	0.003089	0.002315	unknown	ShapiroWilk
Antimony, total (mg/L)	AD-32	n/a	n/a	NP	16	0.003083	0.002323	unknown	ShapiroWilk
Arsenic, total (mg/L)	AD-2	No	n/a	NP	16	0.003111	0.002243	ln(x)	ShapiroWilk
Arsenic, total (mg/L)	AD-31	No	n/a	NP	16	0.008781	0.02262	ln(x)	ShapiroWilk
Arsenic, total (mg/L)	AD-32	No	n/a	NP	16	0.004614	0.003277	x^(1/3)	ShapiroWilk
Barium, total (mg/L)	AD-2	No	n/a	NP	16	0.03118	0.007178	x^2	ShapiroWilk
Barium, total (mg/L)	AD-31	No	n/a	NP	16	0.1	0.1652	ln(x)	ShapiroWilk
Barium, total (mg/L)	AD-32	No	n/a	NP	16	0.03451	0.009962	x^(1/3)	ShapiroWilk
<b>Beryllium, total (mg/L)</b>	<b>AD-2</b>	<b>Yes</b>	<b>0.001</b>	<b>NP</b>	<b>16</b>	<b>0.0004768</b>	<b>0.0001461</b>	<b>ln(x)</b>	<b>ShapiroWilk</b>
<b>Beryllium, total (mg/L)</b>	<b>AD-31</b>	<b>Yes</b>	<b>0.01</b>	<b>NP</b>	<b>16</b>	<b>0.001658</b>	<b>0.002255</b>	<b>ln(x)</b>	<b>ShapiroWilk</b>
Beryllium, total (mg/L)	AD-32	No	n/a	NP	16	0.005087	0.002448	ln(x)	ShapiroWilk
Cadmium, total (mg/L)	AD-2	No	n/a	NP	16	0.00065	0.0004667	ln(x)	ShapiroWilk
Cadmium, total (mg/L)	AD-31	No	n/a	NP	16	0.0005355	0.0004636	ln(x)	ShapiroWilk
Cadmium, total (mg/L)	AD-32	No	n/a	NP	16	0.0004808	0.000191	x^(1/3)	ShapiroWilk
Chromium, total (mg/L)	AD-2	No	n/a	NP	16	0.0007854	0.0009246	ln(x)	ShapiroWilk
Chromium, total (mg/L)	AD-31	No	n/a	NP	16	0.02058	0.05165	ln(x)	ShapiroWilk
Chromium, total (mg/L)	AD-32	No	n/a	NP	16	0.005122	0.005218	ln(x)	ShapiroWilk
Cobalt, total (mg/L)	AD-2	No	n/a	NP	16	0.01266	0.002738	ln(x)	ShapiroWilk
<b>Cobalt, total (mg/L)</b>	<b>AD-31</b>	<b>Yes</b>	<b>0.05</b>	<b>NP</b>	<b>16</b>	<b>0.01288</b>	<b>0.009979</b>	<b>ln(x)</b>	<b>ShapiroWilk</b>
Cobalt, total (mg/L)	AD-32	No	n/a	NP	16	0.04564	0.02159	ln(x)	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	AD-2	No	n/a	NP	16	1.296	0.5901	normal	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	AD-31	No	n/a	NP	16	3.4	1.179	ln(x)	ShapiroWilk
<b>Combined Radium 226 + 228 (pCi/L)</b>	<b>AD-32</b>	<b>Yes</b>	<b>17.32</b>	<b>NP</b>	<b>16</b>	<b>5.825</b>	<b>3.37</b>	<b>ln(x)</b>	<b>ShapiroWilk</b>
Fluoride, total (mg/L)	AD-2	No	n/a	NP	18	0.7056	0.4287	ln(x)	ShapiroWilk
Fluoride, total (mg/L)	AD-31	No	n/a	NP	18	0.7122	0.419	ln(x)	ShapiroWilk
Fluoride, total (mg/L)	AD-32	No	n/a	NP	18	1.17	1.559	ln(x)	ShapiroWilk
Lead, total (mg/L)	AD-2	No	n/a	NP	16	0.003088	0.002273	ln(x)	ShapiroWilk
Lead, total (mg/L)	AD-31	No	n/a	NP	16	0.00618	0.0137	ln(x)	ShapiroWilk
Lead, total (mg/L)	AD-32	No	n/a	NP	16	0.003193	0.00215	ln(x)	ShapiroWilk
Lithium, total (mg/L)	AD-2	No	n/a	NP	16	0.04803	0.01313	x^5	ShapiroWilk
Lithium, total (mg/L)	AD-31	No	n/a	NP	16	0.08651	0.01276	x^6	ShapiroWilk
<b>Lithium, total (mg/L)</b>	<b>AD-32</b>	<b>Yes</b>	<b>0.016,0.972</b>	<b>NP</b>	<b>16</b>	<b>0.1454</b>	<b>0.2219</b>	<b>ln(x)</b>	<b>ShapiroWilk</b>
Mercury, total (mg/L)	AD-2	No	n/a	NP	16	0.00009844	0.0001575	ln(x)	ShapiroWilk
Mercury, total (mg/L)	AD-31	No	n/a	NP	16	0.0005058	0.0005335	x^(1/3)	ShapiroWilk
Mercury, total (mg/L)	AD-32	No	n/a	NP	16	0.004255	0.003512	ln(x)	ShapiroWilk
Molybdenum, total (mg/L)	AD-2	n/a	n/a	NP	16	0.005831	0.00928	unknown	ShapiroWilk
Molybdenum, total (mg/L)	AD-31	No	n/a	NP	16	0.007491	0.01283	ln(x)	ShapiroWilk
Molybdenum, total (mg/L)	AD-32	n/a	n/a	NP	16	0.00805	0.0126	unknown	ShapiroWilk
Selenium, total (mg/L)	AD-2	No	n/a	NP	16	0.002494	0.001769	ln(x)	ShapiroWilk
Selenium, total (mg/L)	AD-31	No	n/a	NP	16	0.002685	0.001967	x^(1/3)	ShapiroWilk
Selenium, total (mg/L)	AD-32	No	n/a	NP	16	0.005753	0.006143	ln(x)	ShapiroWilk
Thallium, total (mg/L)	AD-2	No	n/a	NP	16	0.001173	0.0009	sqrt(x)	ShapiroWilk
Thallium, total (mg/L)	AD-31	n/a	n/a	NP	16	0.001827	0.002319	unknown	ShapiroWilk
Thallium, total (mg/L)	AD-32	No	n/a	NP	16	0.001662	0.002359	ln(x)	ShapiroWilk

### Tukey's Outlier Screening

AD-2



n = 16

No outliers found. Tukey's method selected by user.

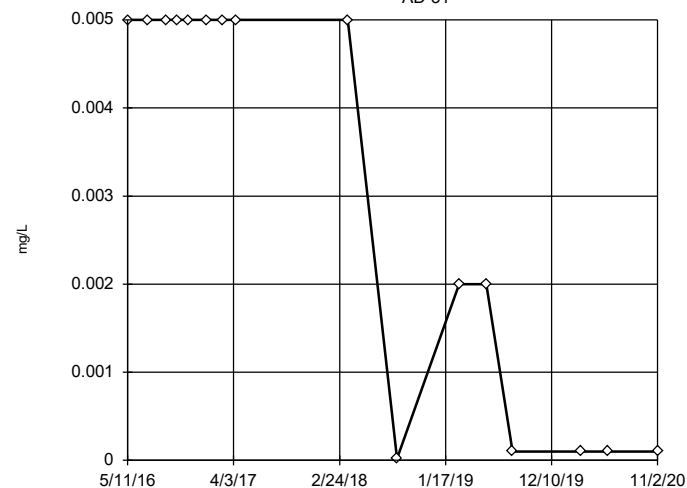
Data were natural log transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Constituent: Antimony, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-31



n = 16

No outliers found. Tukey's method selected by user.

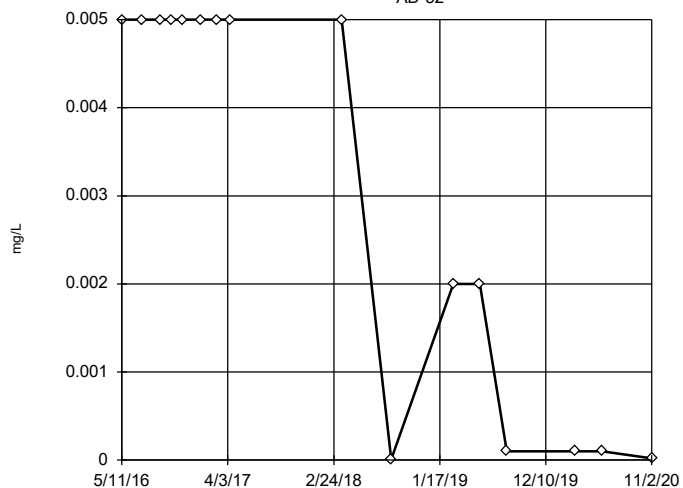
Data were cube root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Constituent: Antimony, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-32



n = 16

No outliers found. Tukey's method selected by user.

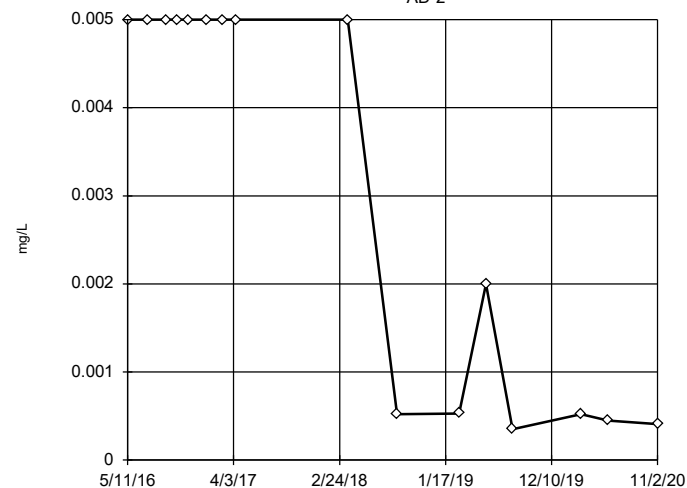
Data were cube root transformed to achieve best W statistic (graph shown in original units).

The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Constituent: Antimony, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-2



n = 16

No outliers found. Tukey's method selected by user.

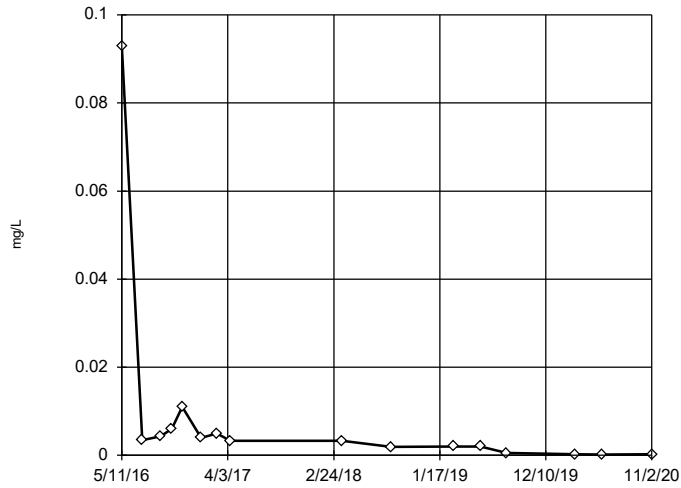
Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 4.445, low cutoff = 5.8e-7, based on IQR multiplier of 3.

Constituent: Arsenic, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-31

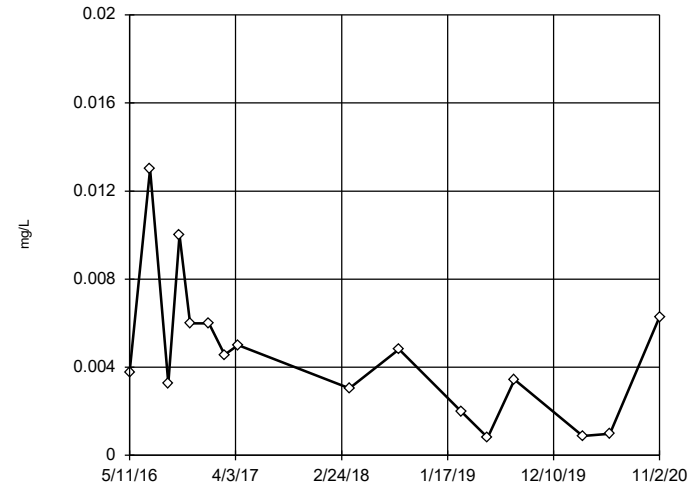


n = 16  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.4587,  
 low cutoff = 0.00001024,  
 based on IQR multiplier of 3.

Constituent: Arsenic, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-32

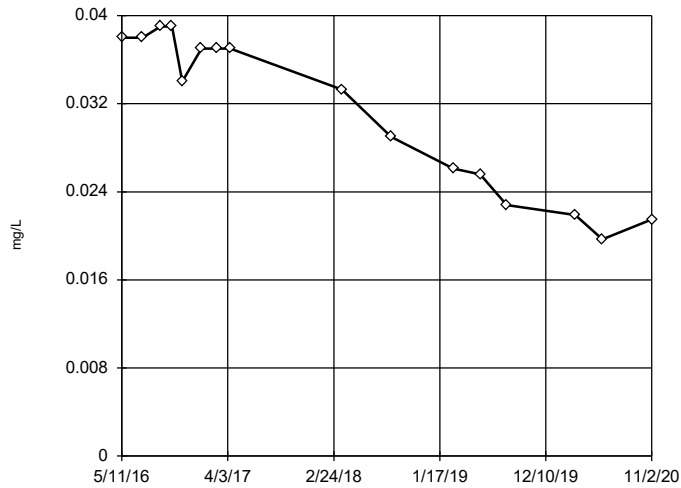


n = 16  
 No outliers found.  
 Tukey's method selected by user.  
 Data were cube root transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.03287,  
 low cutoff = -3.0e-8,  
 based on IQR multiplier of 3.

Constituent: Arsenic, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-2

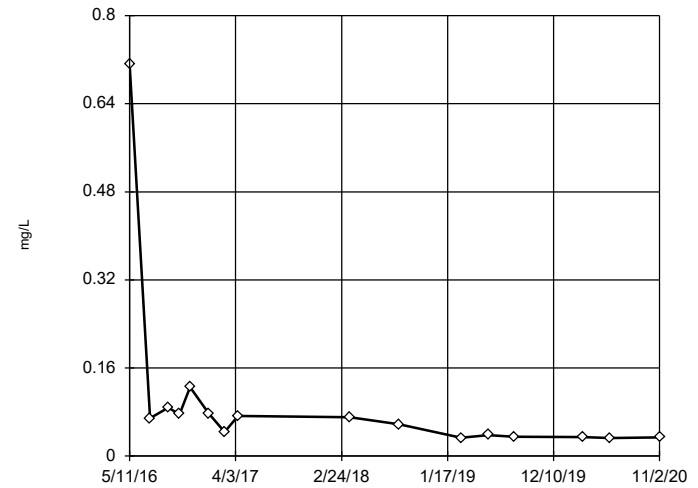


n = 16  
 No outliers found.  
 Tukey's method selected by user.  
 Data were square transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.06215,  
 low cutoff = -0.04323,  
 based on IQR multiplier of 3.

Constituent: Barium, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-31

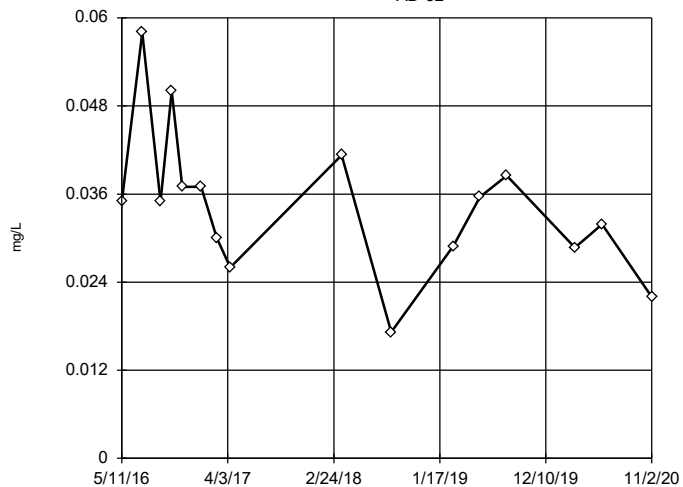


n = 16  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.8056,  
 low cutoff = 0.003314,  
 based on IQR multiplier of 3.

Constituent: Barium, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-32

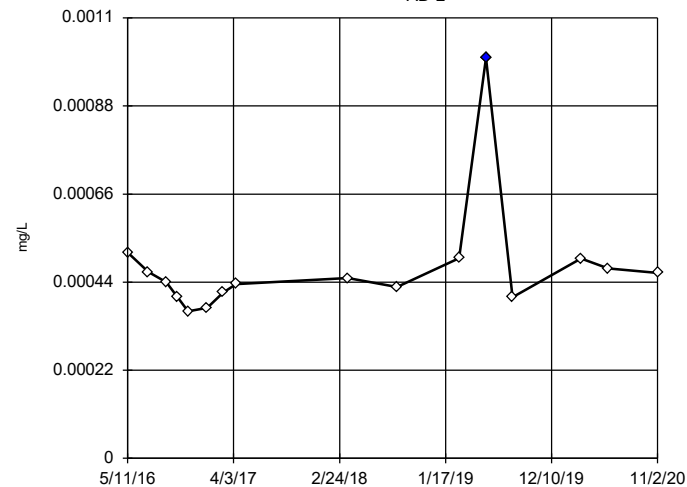


n = 16  
 No outliers found.  
 Tukey's method selected by user.  
 Data were cube root transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.07526,  
 low cutoff = 0.01061,  
 based on IQR multiplier of 3.

Constituent: Barium, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-2

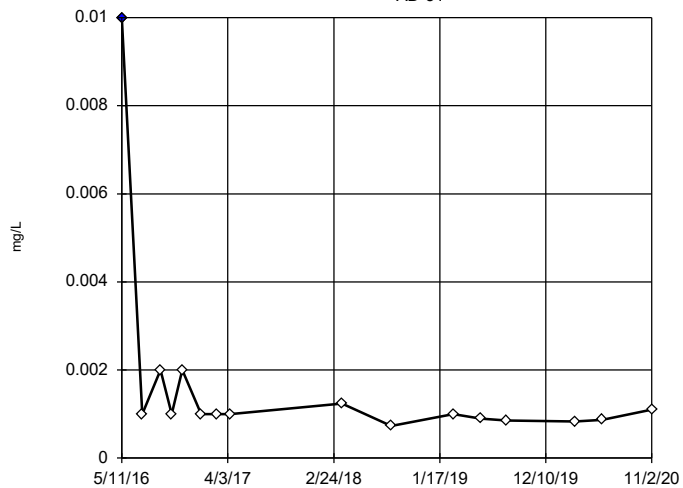


n = 16  
 Outlier is drawn as solid.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.000825,  
 low cutoff = 0.0002404,  
 based on IQR multiplier of 3.

Constituent: Beryllium, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-31

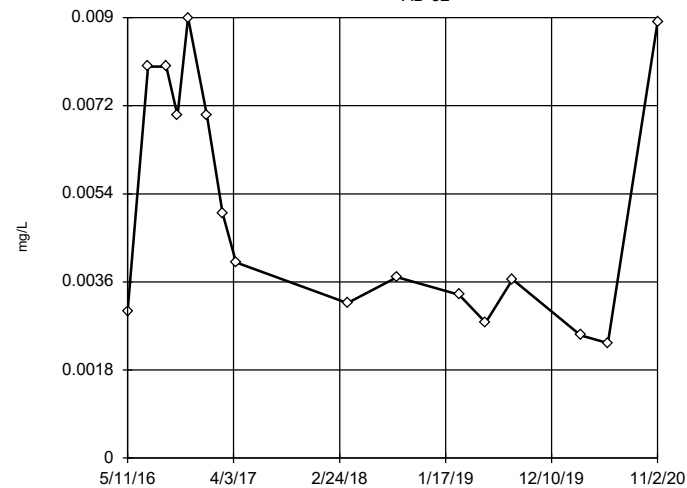


n = 16  
 Outlier is drawn as solid.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.002695,  
 low cutoff = 0.0003831,  
 based on IQR multiplier of 3.

Constituent: Beryllium, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-32



n = 16  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.1069,  
 low cutoff = 0.0002158,  
 based on IQR multiplier of 3.

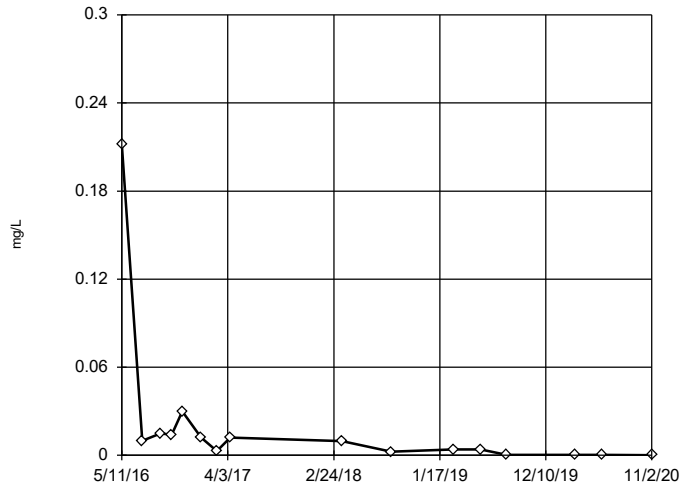
Constituent: Beryllium, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP





### Tukey's Outlier Screening

AD-31



n = 16

No outliers found. Tukey's method selected by user.

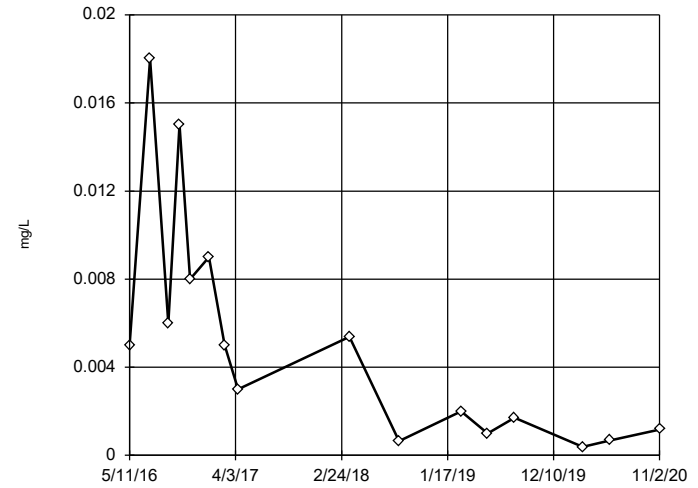
Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 34.64, low cutoff = 3.5e-7, based on IQR multiplier of 3.

Constituent: Chromium, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-32



n = 16

No outliers found. Tukey's method selected by user.

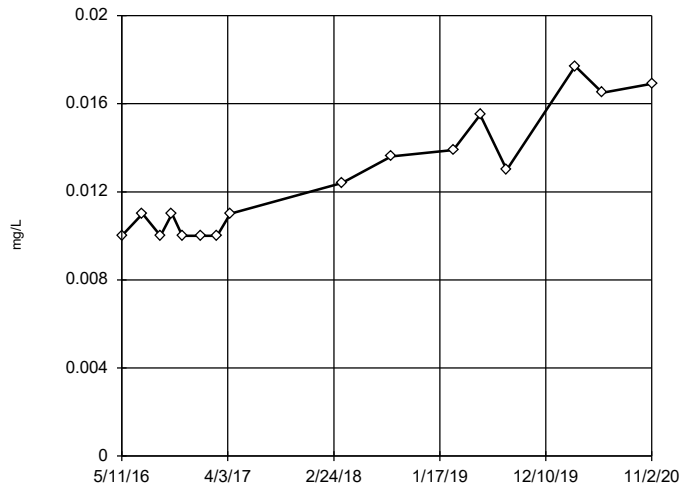
Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 1.821, low cutoff = 0.00004116, based on IQR multiplier of 3.

Constituent: Chromium, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-2



n = 16

No outliers found. Tukey's method selected by user.

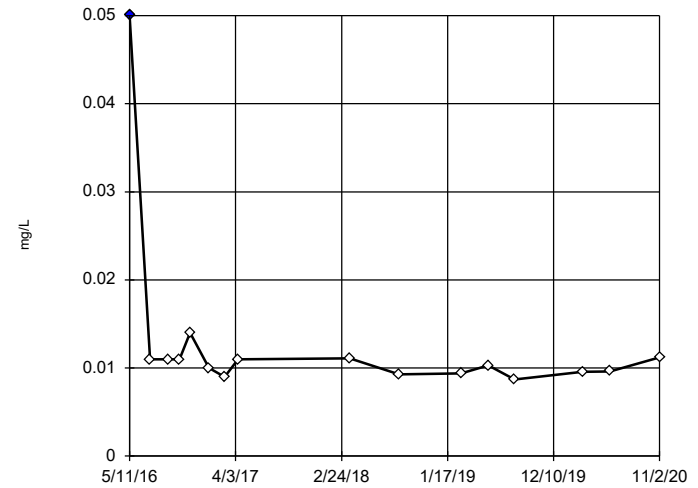
Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 0.04642, low cutoff = 0.003162, based on IQR multiplier of 3.

Constituent: Cobalt, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-31



n = 16

Outlier is drawn as solid. Tukey's method selected by user.

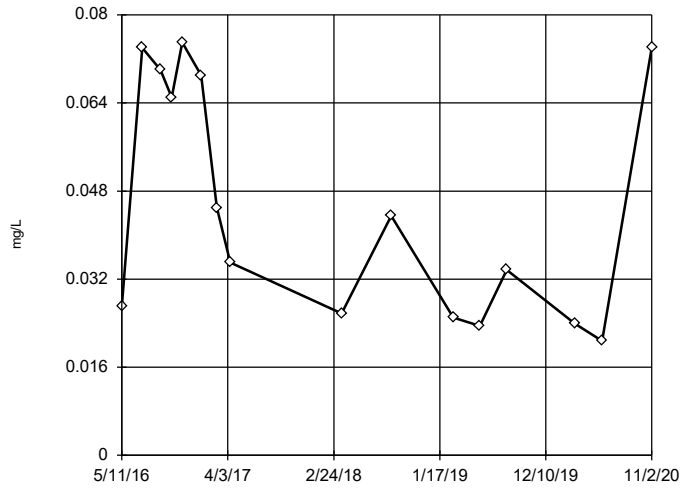
Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 0.01756, low cutoff = 0.00596, based on IQR multiplier of 3.

Constituent: Cobalt, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-32



n = 16

No outliers found. Tukey's method selected by user.

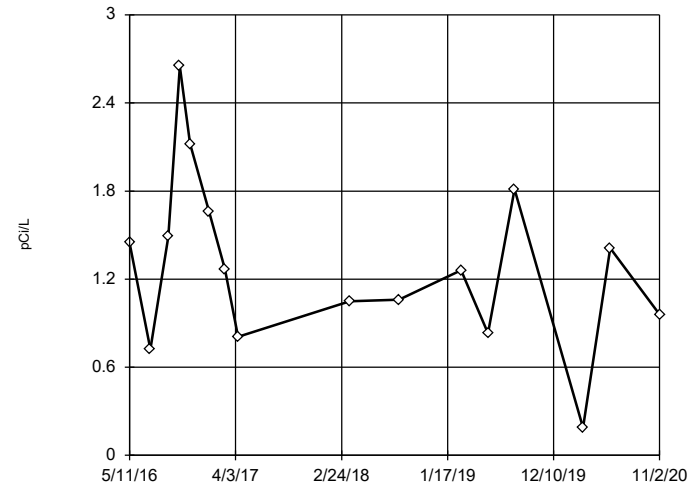
Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 1.424, low cutoff = 0.001239, based on IQR multiplier of 3.

Constituent: Cobalt, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-2



n = 16

No outliers found. Tukey's method selected by user.

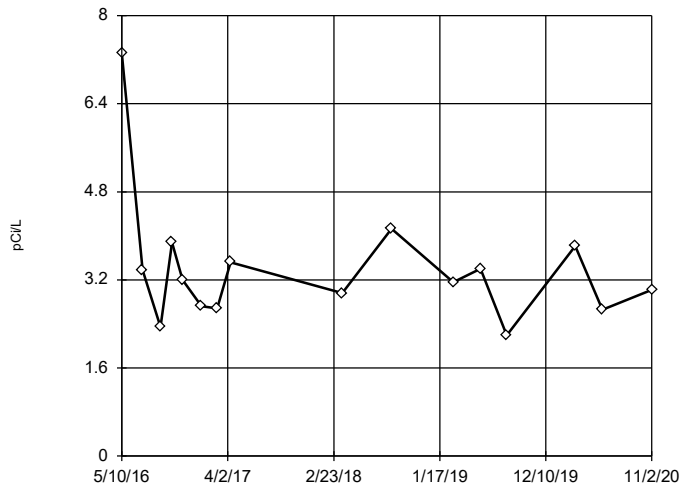
Ladder of Powers transformations did not improve normality; analysis run on raw data.

High cutoff = 3.601, low cutoff = -1.132, based on IQR multiplier of 3.

Constituent: Combined Radium 226 + 228 Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-31



n = 16

No outliers found. Tukey's method selected by user.

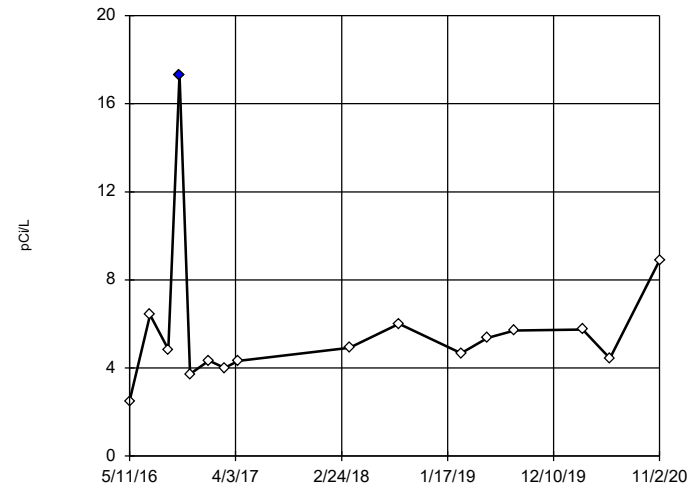
Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 9.117, low cutoff = 1.087, based on IQR multiplier of 3.

Constituent: Combined Radium 226 + 228 Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-32



n = 16

Outlier is drawn as solid. Tukey's method selected by user.

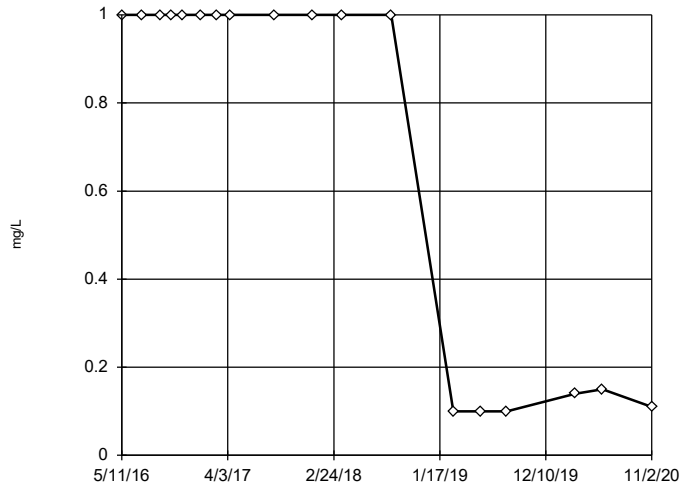
Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 14.65, low cutoff = 1.736, based on IQR multiplier of 3.

Constituent: Combined Radium 226 + 228 Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-2

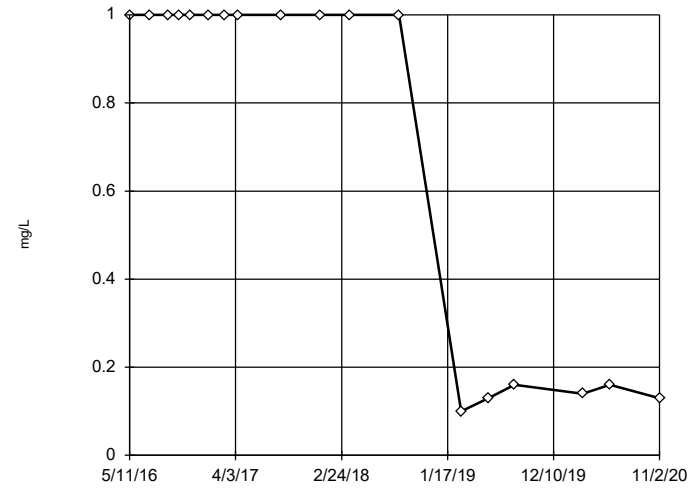


n = 18  
 No outliers found. Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 523.3, low cutoff = 0.0002372, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-31

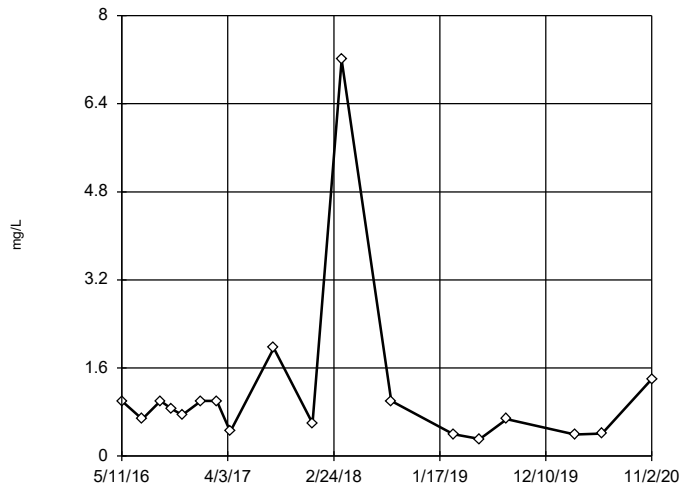


n = 18  
 No outliers found. Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 298.3, low cutoff = 0.0005018, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-32

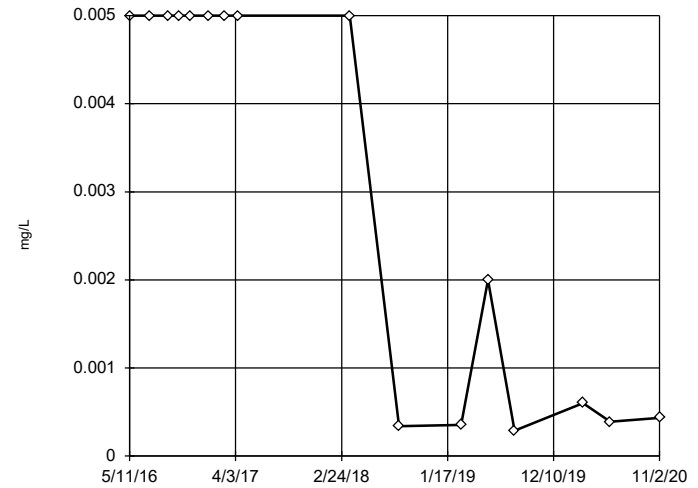


n = 18  
 No outliers found. Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 12.75, low cutoff = 0.03356, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-2

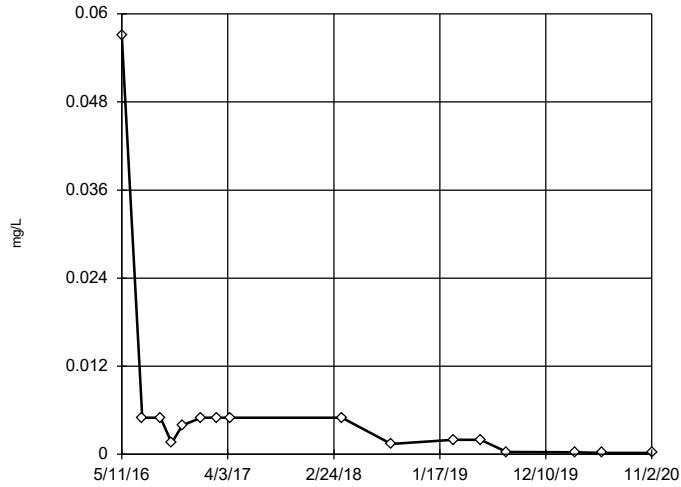


n = 16  
 No outliers found. Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 8.979, low cutoff = 2.3e-7, based on IQR multiplier of 3.

Constituent: Lead, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-31

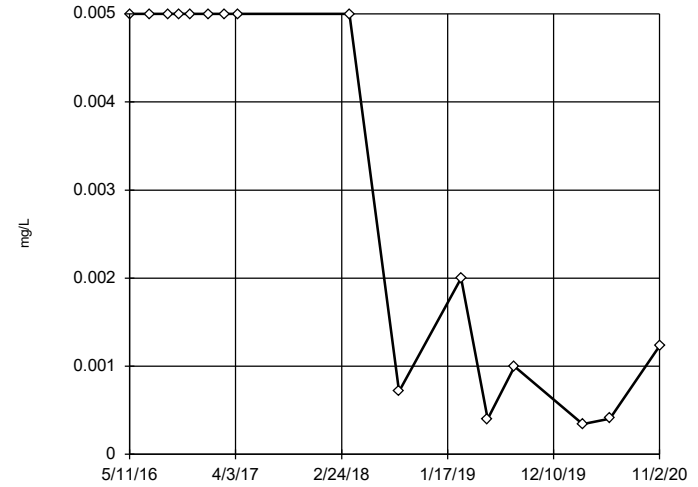


n = 16  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 2.015, low cutoff = 0.00000168, based on IQR multiplier of 3.

Constituent: Lead, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-32

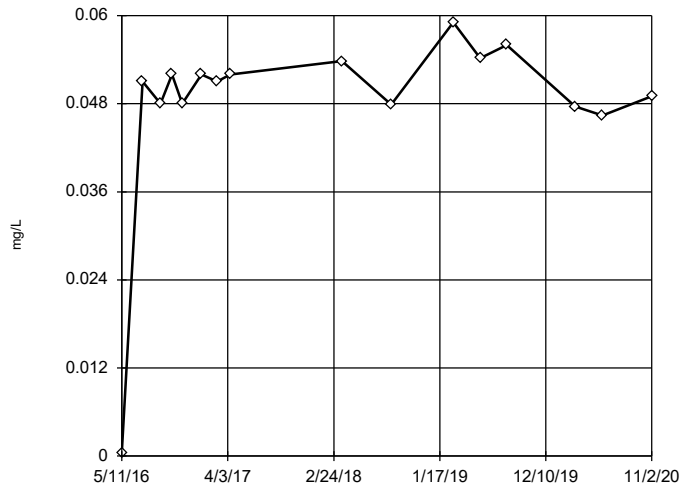


n = 16  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 1.042, low cutoff = 0.000004046, based on IQR multiplier of 3.

Constituent: Lead, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-2

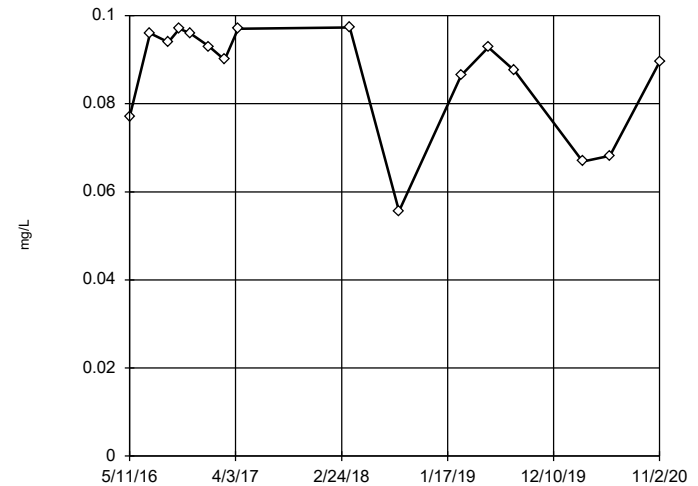


n = 16  
 No outliers found.  
 Tukey's method selected by user.  
 Data were x^5 transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.0618, low cutoff = -0.04713, based on IQR multiplier of 3.

Constituent: Lithium, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-31

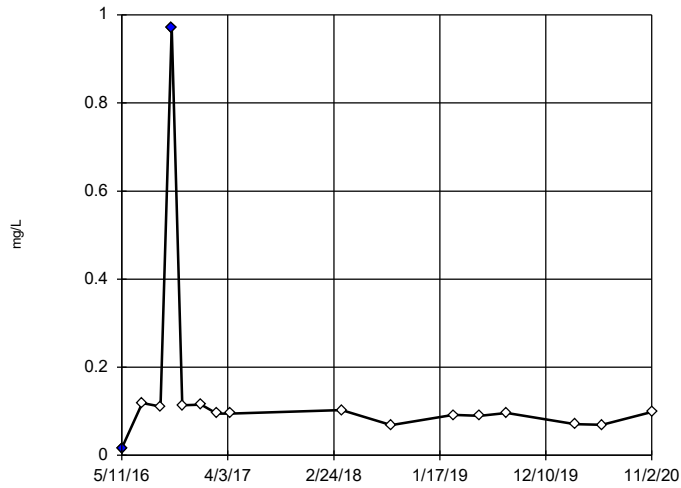


n = 16  
 No outliers found.  
 Tukey's method selected by user.  
 Data were x^6 transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.114, low cutoff = -0.1016, based on IQR multiplier of 3.

Constituent: Lithium, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-32

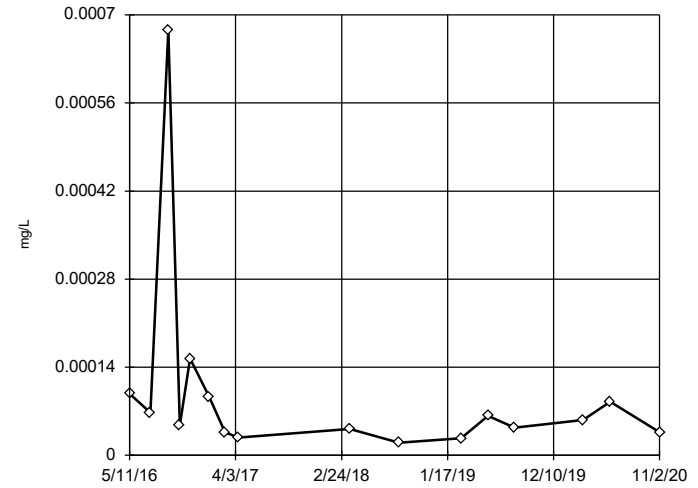


n = 16  
 Outliers are drawn as solid.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.3144, low cutoff = 0.02857, based on IQR multiplier of 3.

Constituent: Lithium, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-2

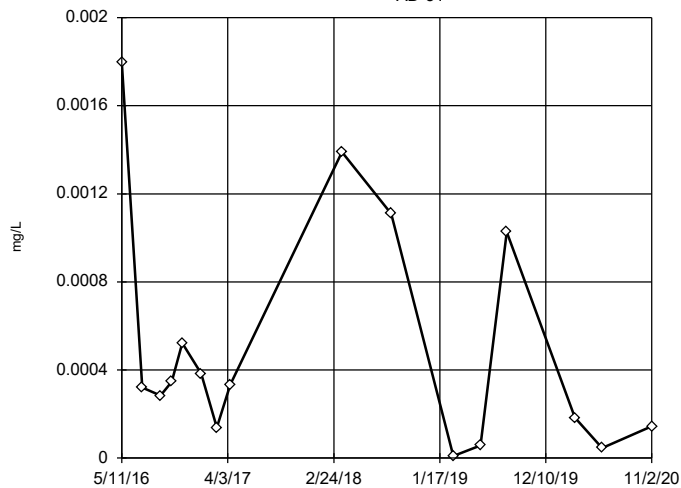


n = 16  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.001234, low cutoff = 0.00002667, based on IQR multiplier of 3.

Constituent: Mercury, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-31

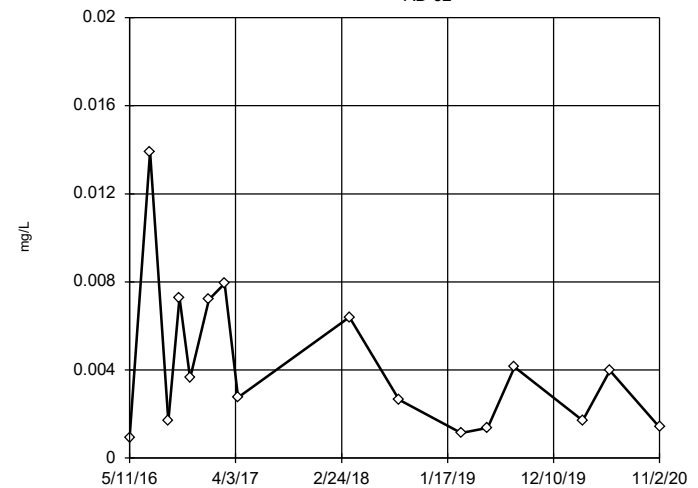


n = 16  
 No outliers found.  
 Tukey's method selected by user.  
 Data were cube root transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.008842, low cutoff = -0.0002623, based on IQR multiplier of 3.

Constituent: Mercury, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-32

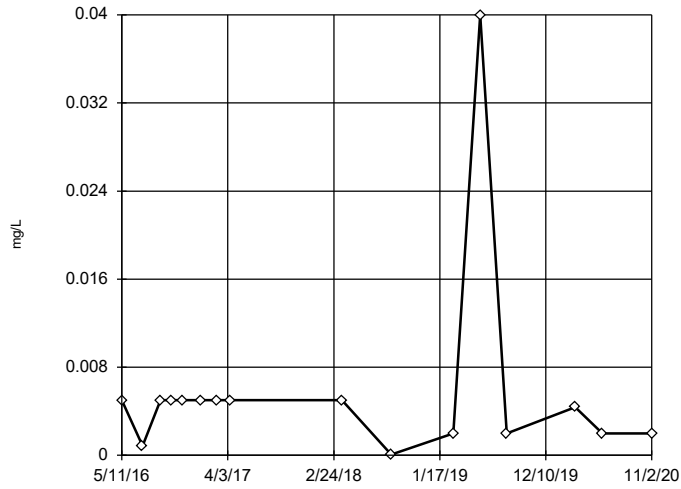


n = 16  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.589, low cutoff = 0.00001768, based on IQR multiplier of 3.

Constituent: Mercury, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-2

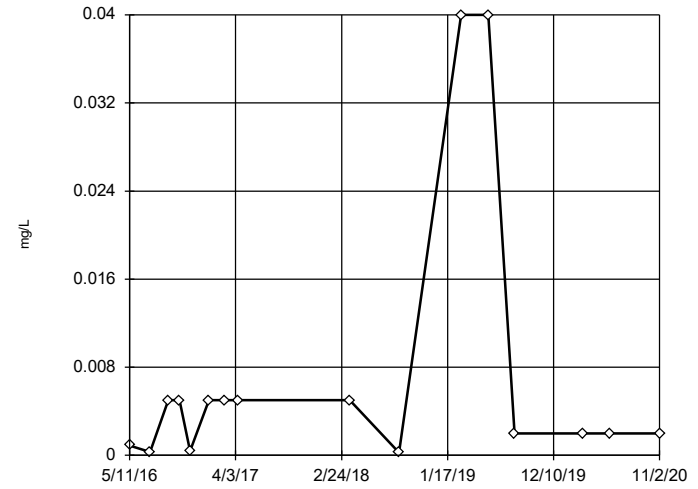


n = 16  
 No outliers found. Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Constituent: Molybdenum, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-31

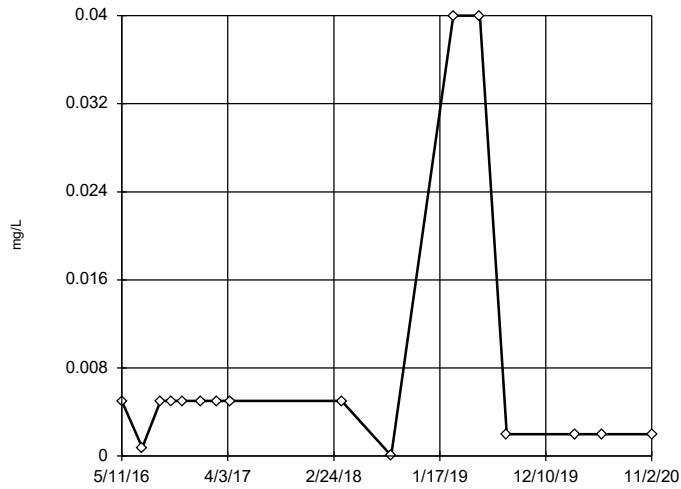


n = 16  
 No outliers found. Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.2614, low cutoff = 0.0002557, based on IQR multiplier of 3.

Constituent: Molybdenum, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-32

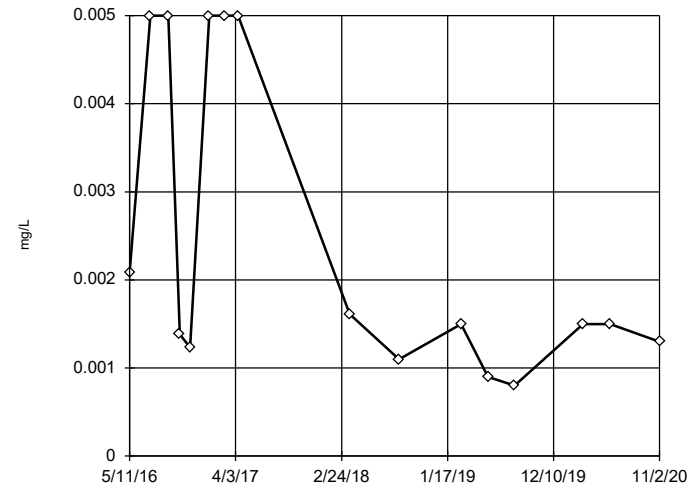


n = 16  
 No outliers found. Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Constituent: Molybdenum, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-2

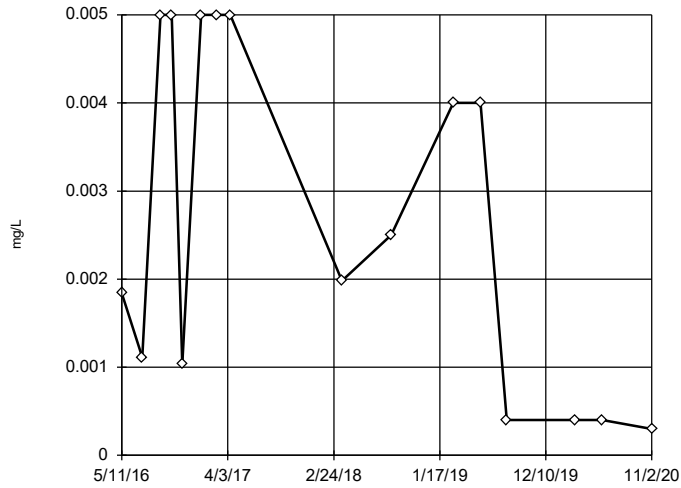


n = 16  
 No outliers found. Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.3086, low cutoff = 0.000205, based on IQR multiplier of 3.

Constituent: Selenium, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-31

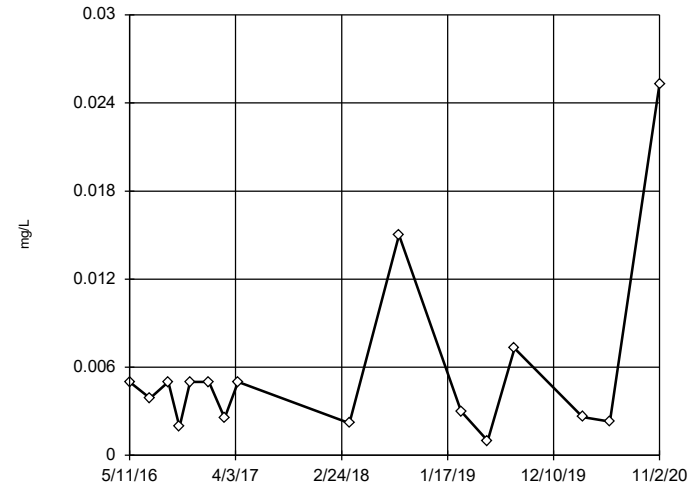


n = 16  
 No outliers found.  
 Tukey's method selected by user.  
 Data were cube root transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.07504,  
 low cutoff = -0.004362,  
 based on IQR multiplier of 3.

Constituent: Selenium, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-32

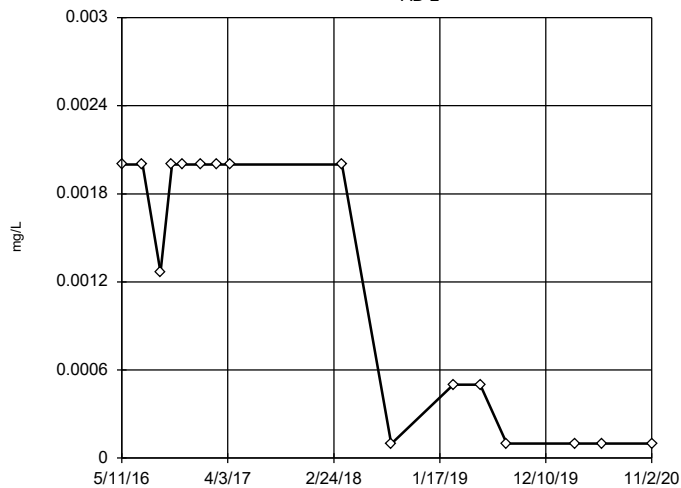


n = 16  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.0443,  
 low cutoff = 0.0002727,  
 based on IQR multiplier of 3.

Constituent: Selenium, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-2

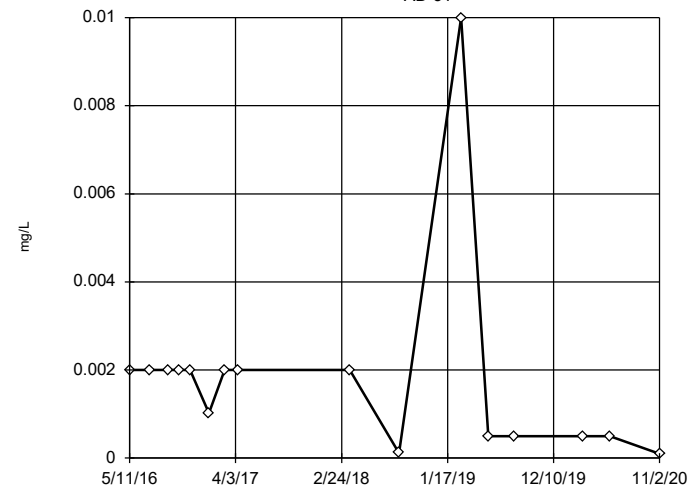


n = 16  
 No outliers found.  
 Tukey's method selected by user.  
 Data were square root transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.02217,  
 low cutoff = -0.008867,  
 based on IQR multiplier of 3.

Constituent: Thallium, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-31

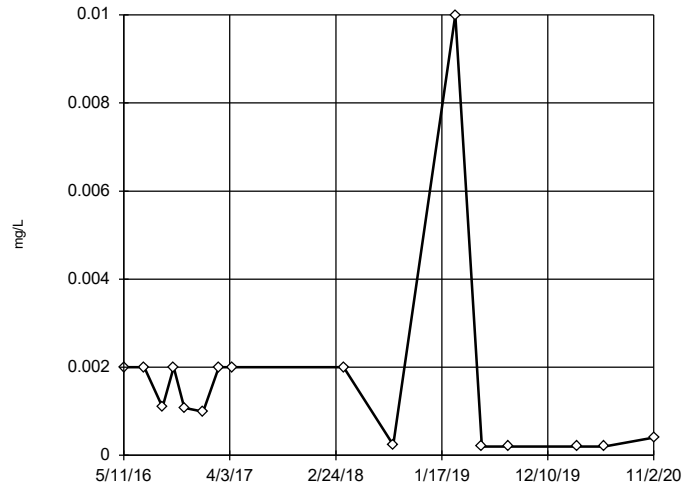


n = 16  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Constituent: Thallium, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening

AD-32



n = 16

No outliers found.  
Tukey's method selected by user.

Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 1.541, low cutoff = 2.8e-7, based on IQR multiplier of 3.

Constituent: Thallium, total Analysis Run 1/6/2021 1:13 PM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP



# Mann-Whitney Summary - Significant Results

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 1/6/2021, 1:00 PM

<u>Constituent</u>	<u>Well</u>	<u>Calc.</u>	<u>0.01</u>	<u>Sig.</u>	<u>Method</u>
<b>pH, field (SU)</b>	<b>AD-4 (bg)</b>	<b>2.672</b>	<b>Yes</b>	<b>Yes</b>	<b>Mann-W</b>

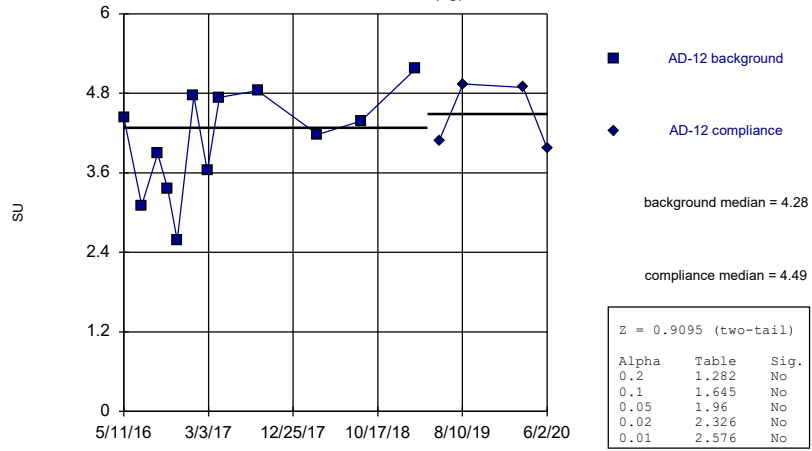
# Mann-Whitney Summary - All Results

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 1/6/2021, 1:00 PM

<u>Constituent</u>	<u>Well</u>	<u>Calc.</u>	<u>0.01</u>	<u>Sig.</u>	<u>Method</u>
pH, field (SU)	AD-12 (bg)	0.9095	No	No	Mann-W
pH, field (SU)	AD-18 (bg)	0.6072	No	No	Mann-W
pH, field (SU)	AD-2	0.7888	No	No	Mann-W
pH, field (SU)	AD-31	0.1819	No	No	Mann-W
pH, field (SU)	AD-32	0.4251	No	No	Mann-W
<b>pH, field (SU)</b>	<b>AD-4 (bg)</b>	<b>2.672</b>	<b>Yes</b>	<b>Yes</b>	<b>Mann-W</b>

Mann-Whitney (Wilcoxon Rank Sum)

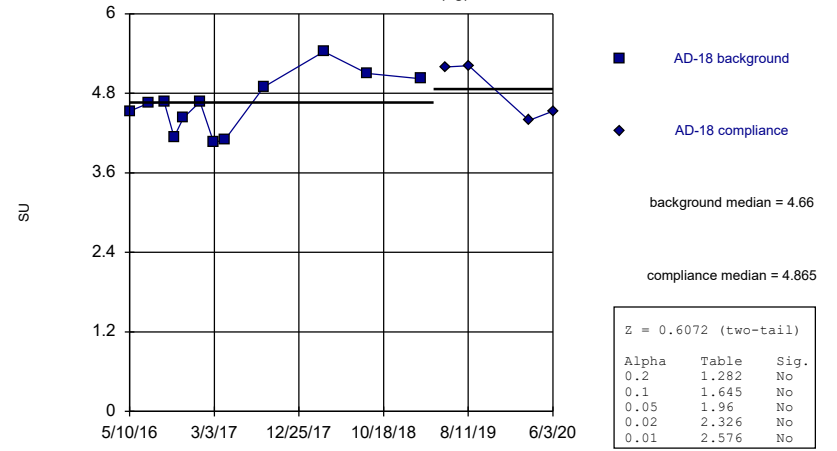
AD-12 (bg)



Constituent: pH, field Analysis Run 1/6/2021 12:57 PM View: Screening  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Mann-Whitney (Wilcoxon Rank Sum)

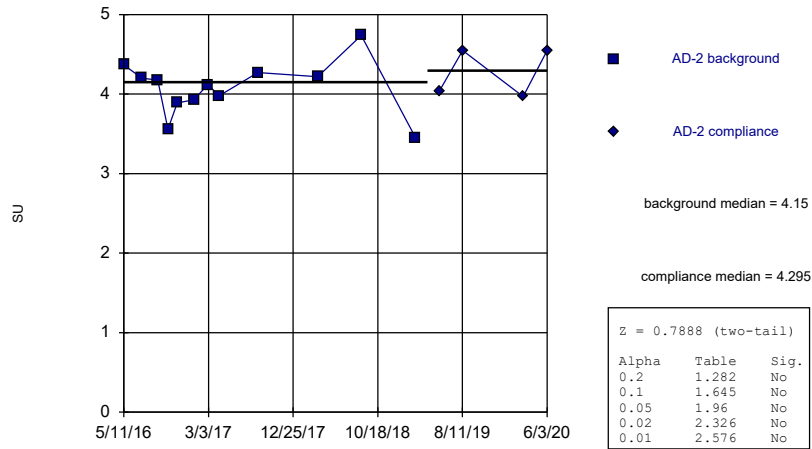
AD-18 (bg)



Constituent: pH, field Analysis Run 1/6/2021 12:57 PM View: Screening  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Mann-Whitney (Wilcoxon Rank Sum)

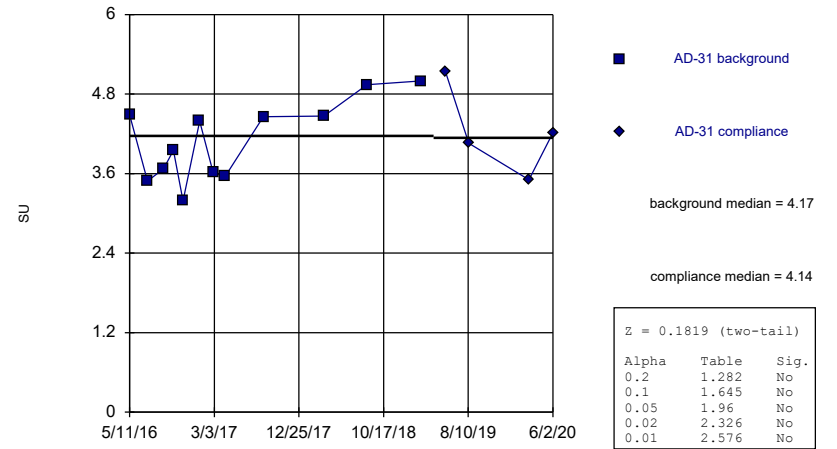
AD-2



Constituent: pH, field Analysis Run 1/6/2021 12:58 PM View: Screening  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Mann-Whitney (Wilcoxon Rank Sum)

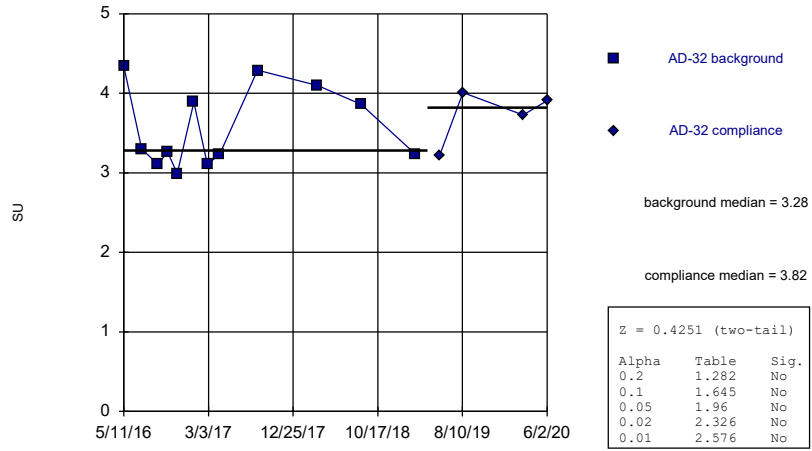
AD-31



Constituent: pH, field Analysis Run 1/6/2021 12:58 PM View: Screening  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Mann-Whitney (Wilcoxon Rank Sum)

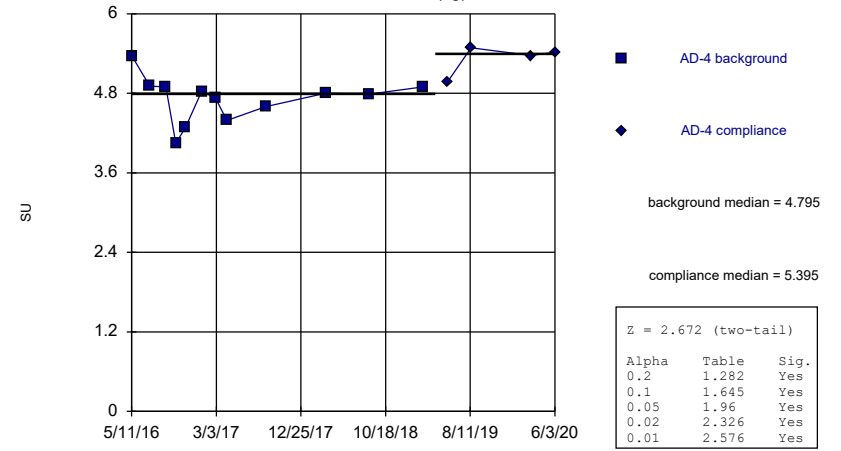
AD-32



Constituent: pH, field Analysis Run 1/6/2021 12:58 PM View: Screening  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Mann-Whitney (Wilcoxon Rank Sum)

AD-4 (bg)



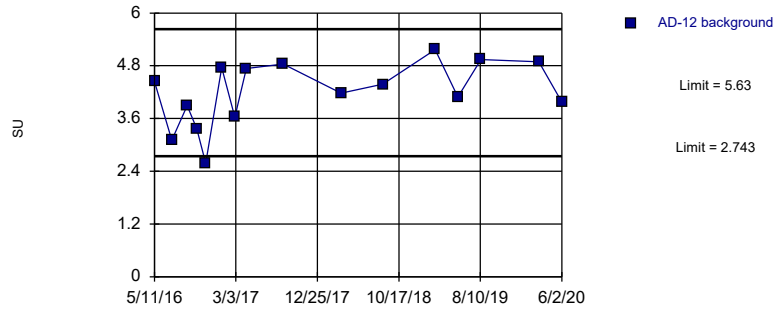
Constituent: pH, field Analysis Run 1/6/2021 12:58 PM View: Screening  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

# Intrawell Prediction Limits

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 1/6/2021, 10:59 AM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Bg N</u>	<u>Bg Mean</u>	<u>Std. Dev.</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
pH, field (SU)	AD-12	5.63	2.743	16	4.186	0.7328	0	None	No	0.001253	Param Intra 1 of 2
pH, field (SU)	AD-18	5.521	3.859	16	4.69	0.4218	0	None	No	0.001253	Param Intra 1 of 2
pH, field (SU)	AD-2	4.801	3.452	16	4.126	0.3424	0	None	No	0.001253	Param Intra 1 of 2
pH, field (SU)	AD-31	5.314	2.956	16	4.135	0.5986	0	None	No	0.001253	Param Intra 1 of 2
pH, field (SU)	AD-32	4.507	2.69	16	3.598	0.4612	0	None	No	0.001253	Param Intra 1 of 2
pH, field (SU)	AD-4	5.676	4.049	16	4.863	0.4128	0	None	No	0.001253	Param Intra 1 of 2

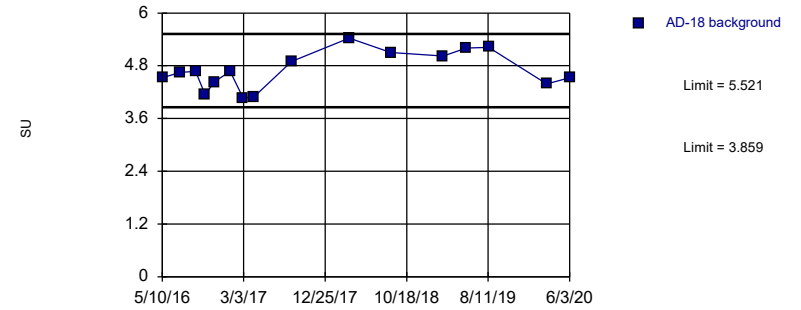
Prediction Limit  
Intrawell Parametric, AD-12 (bg)



Background Data Summary: Mean=4.186, Std. Dev.=0.7328, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.944, critical = 0.844. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: pH, field Analysis Run 1/6/2021 10:58 AM View: Screening  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

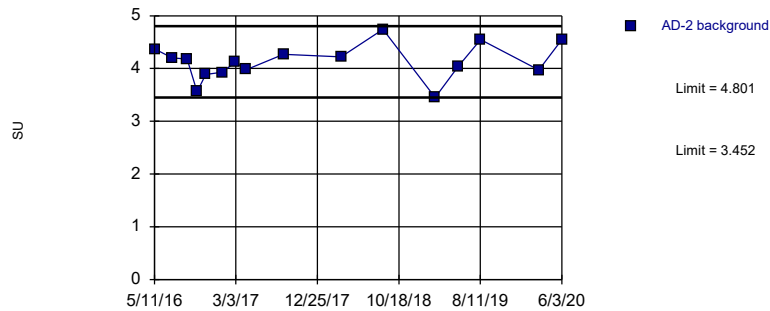
Prediction Limit  
Intrawell Parametric, AD-18 (bg)



Background Data Summary: Mean=4.69, Std. Dev.=0.4218, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9561, critical = 0.844. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: pH, field Analysis Run 1/6/2021 10:58 AM View: Screening  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

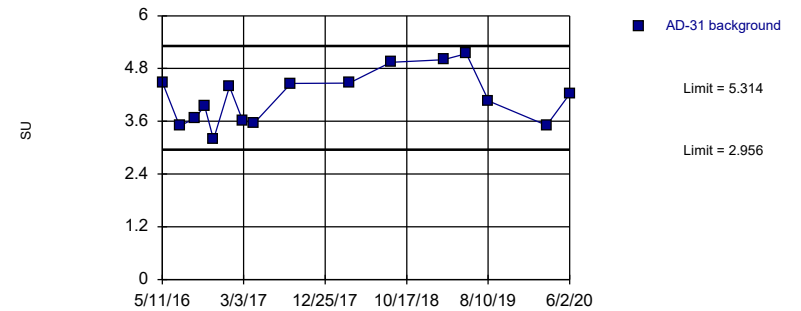
Prediction Limit  
Intrawell Parametric, AD-2



Background Data Summary: Mean=4.126, Std. Dev.=0.3424, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9726, critical = 0.844. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: pH, field Analysis Run 1/6/2021 10:58 AM View: Screening  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

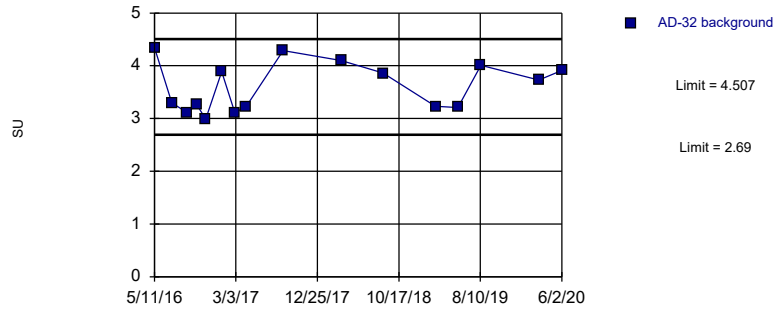
Prediction Limit  
Intrawell Parametric, AD-31



Background Data Summary: Mean=4.135, Std. Dev.=0.5986, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9464, critical = 0.844. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: pH, field Analysis Run 1/6/2021 10:58 AM View: Screening  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

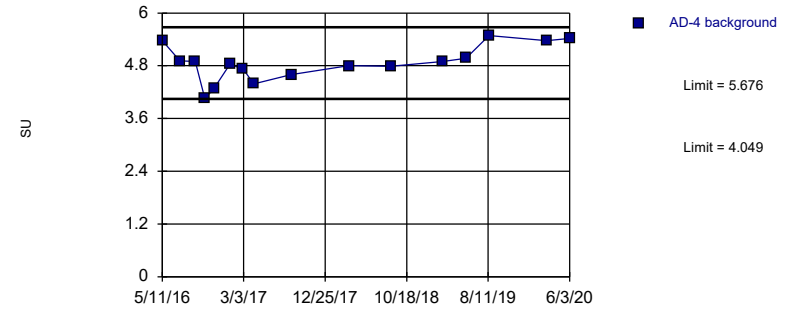
Prediction Limit  
Intrawell Parametric, AD-32



Background Data Summary: Mean=3.598, Std. Dev.=0.4612, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8891, critical = 0.844. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: pH, field Analysis Run 1/6/2021 10:58 AM View: Screening  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Prediction Limit  
Intrawell Parametric, AD-4 (bg)



Background Data Summary: Mean=4.863, Std. Dev.=0.4128, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9444, critical = 0.844. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: pH, field Analysis Run 1/6/2021 10:58 AM View: Screening  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

# Trend Test Summary - Significant Results

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 1/6/2021, 11:09 AM

<u>Constituent</u>	<u>Well</u>	<u>Slope</u>	<u>Calc.</u>	<u>Critical</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Normality</u>	<u>Xform</u>	<u>Alpha</u>	<u>Method</u>
Boron, total (mg/L)	AD-18 (bg)	0.008344	74	63	Yes	17	29.41	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	AD-12 (bg)	-0.1686	-76	-63	Yes	17	52.94	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	AD-4 (bg)	-0.1273	-67	-63	Yes	17	64.71	n/a	n/a	0.01	NP



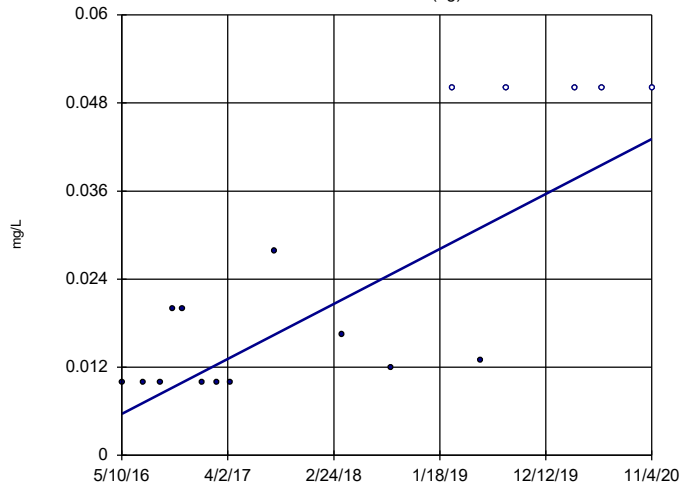
# Trend Test Summary - All Results

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 1/6/2021, 11:09 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Boron, total (mg/L)	AD-12 (bg)	0	4	63	No	17	11.76	n/a	n/a	0.01	NP
<b>Boron, total (mg/L)</b>	<b>AD-18 (bg)</b>	<b>0.008344</b>	<b>74</b>	<b>63</b>	<b>Yes</b>	<b>17</b>	<b>29.41</b>	<b>n/a</b>	<b>n/a</b>	<b>0.01</b>	<b>NP</b>
Boron, total (mg/L)	AD-4 (bg)	0	14	63	No	17	11.76	n/a	n/a	0.01	NP
Calcium, total (mg/L)	AD-12 (bg)	-0.0114	-23	-63	No	17	0	n/a	n/a	0.01	NP
Calcium, total (mg/L)	AD-18 (bg)	-0.03472	-29	-63	No	17	0	n/a	n/a	0.01	NP
Calcium, total (mg/L)	AD-4 (bg)	-0.149	-32	-63	No	17	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	AD-12 (bg)	0	-1	-63	No	17	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	AD-18 (bg)	0.03386	13	63	No	17	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	AD-4 (bg)	-0.09984	-23	-63	No	17	0	n/a	n/a	0.01	NP
<b>Fluoride, total (mg/L)</b>	<b>AD-12 (bg)</b>	<b>-0.1686</b>	<b>-76</b>	<b>-63</b>	<b>Yes</b>	<b>17</b>	<b>52.94</b>	<b>n/a</b>	<b>n/a</b>	<b>0.01</b>	<b>NP</b>
Fluoride, total (mg/L)	AD-18 (bg)	-0.02284	-63	-63	No	17	64.71	n/a	n/a	0.01	NP
<b>Fluoride, total (mg/L)</b>	<b>AD-4 (bg)</b>	<b>-0.1273</b>	<b>-67</b>	<b>-63</b>	<b>Yes</b>	<b>17</b>	<b>64.71</b>	<b>n/a</b>	<b>n/a</b>	<b>0.01</b>	<b>NP</b>
Sulfate, total (mg/L)	AD-12 (bg)	-0.5812	-62	-63	No	17	0	n/a	n/a	0.01	NP
Sulfate, total (mg/L)	AD-18 (bg)	-0.185	-33	-63	No	17	0	n/a	n/a	0.01	NP
Sulfate, total (mg/L)	AD-4 (bg)	0.995	41	63	No	17	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	AD-12 (bg)	-0.7222	-12	-58	No	16	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	AD-18 (bg)	-4.879	-41	-63	No	17	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	AD-4 (bg)	2.974	27	63	No	17	0	n/a	n/a	0.01	NP

### Sen's Slope Estimator

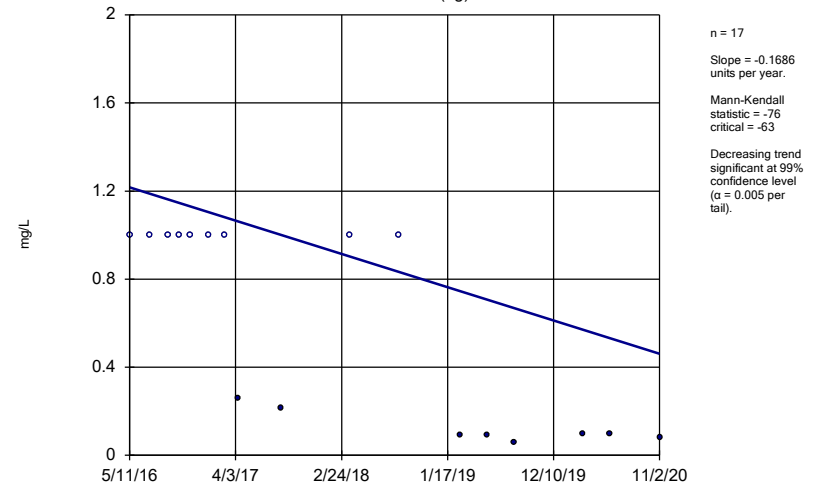
AD-18 (bg)



Constituent: Boron, total Analysis Run 1/6/2021 11:08 AM View: PL's Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Sen's Slope Estimator

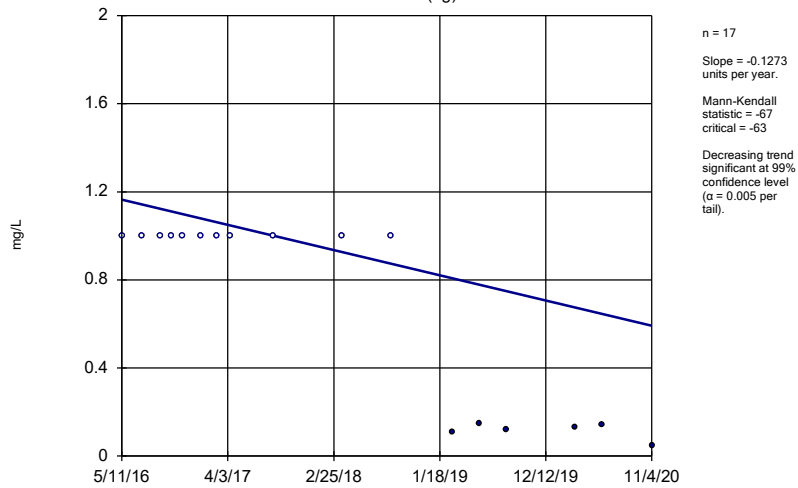
AD-12 (bg)



Constituent: Fluoride, total Analysis Run 1/6/2021 11:08 AM View: PL's Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Sen's Slope Estimator

AD-4 (bg)



Constituent: Fluoride, total Analysis Run 1/6/2021 11:08 AM View: PL's Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

# Interwell Prediction Limits

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 1/6/2021, 11:07 AM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Bg N</u>	<u>Bg Mean</u>	<u>Std. Dev.</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Boron, total (mg/L)	n/a	0.03744	n/a	51	0.1293	0.03724	17.65	Kaplan-Meier	sqrt(x)	0.002505	Param 1 of 2
Calcium, total (mg/L)	n/a	2.94	n/a	51	n/a	n/a	0	n/a	n/a	0.000725	NP (normality) 1 of 2
Chloride, total (mg/L)	n/a	9.104	n/a	51	6.142	1.718	0	None	No	0.002505	Param 1 of 2
Fluoride, total (mg/L)	n/a	1	n/a	51	n/a	n/a	60.78	n/a	n/a	0.000725	NP (NDs) 1 of 2
Sulfate, total (mg/L)	n/a	24.7	n/a	51	n/a	n/a	0	n/a	n/a	0.000725	NP (normality) 1 of 2
Total Dissolved Solids (mg/L)	n/a	173.7	n/a	50	110.9	36.4	0	None	No	0.002505	Param 1 of 2

# Tolerance Limit Summary Table

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 1/6/2021, 11:28 AM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Bg N</u>	<u>Bg Mean</u>	<u>Std. Dev.</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Antimony, total (mg/L)	n/a	0.005	48	n/a	n/a	93.75	n/a	n/a	0.08526	NP Inter(NDs)
Arsenic, total (mg/L)	n/a	0.011	48	n/a	n/a	56.25	n/a	n/a	0.08526	NP Inter(normality)
Barium, total (mg/L)	n/a	0.183	48	n/a	n/a	0	n/a	n/a	0.08526	NP Inter(normality)
Beryllium, total (mg/L)	n/a	0.00115	48	n/a	n/a	8.333	n/a	n/a	0.08526	NP Inter(normality)
Cadmium, total (mg/L)	n/a	0.001	48	n/a	n/a	68.75	n/a	n/a	0.08526	NP Inter(normality)
Chromium, total (mg/L)	n/a	0.003996	48	-7.613	1.007	14.58	None	ln(x)	0.05	Inter
Cobalt, total (mg/L)	n/a	0.00939	48	n/a	n/a	0	n/a	n/a	0.08526	NP Inter(normality)
Combined Radium 226 + 228 (pCi/L)	n/a	3.587	48	0.9785	0.2661	0	None	x^(1/3)	0.05	Inter
Fluoride, total (mg/L)	n/a	1	51	n/a	n/a	60.78	n/a	n/a	0.0731	NP Inter(normality)
Lead, total (mg/L)	n/a	0.005	48	n/a	n/a	66.67	n/a	n/a	0.08526	NP Inter(normality)
Lithium, total (mg/L)	n/a	0.05874	48	0.1369	0.0508	2.083	None	sqrt(x)	0.05	Inter
Mercury, total (mg/L)	n/a	0.000064	48	n/a	n/a	43.75	n/a	n/a	0.08526	NP Inter(normality)
Molybdenum, total (mg/L)	n/a	0.04	48	n/a	n/a	93.75	n/a	n/a	0.08526	NP Inter(NDs)
Selenium, total (mg/L)	n/a	0.005	48	n/a	n/a	54.17	n/a	n/a	0.08526	NP Inter(normality)
Thallium, total (mg/L)	n/a	0.002	46	n/a	n/a	84.78	n/a	n/a	0.09447	NP Inter(NDs)

<b>PIRKEY EBAP GWPS</b>				
<b>Constituent Name</b>	<b>MCL</b>	<b>CCR-Rule Specified</b>	<b>Background Limit</b>	<b>GWPS</b>
Antimony, Total (mg/L)	0.006		0.005	0.006
Arsenic, Total (mg/L)	0.01		0.011	0.011
Barium, Total (mg/L)	2		0.18	2
Beryllium, Total (mg/L)	0.004		0.0012	0.004
Cadmium, Total (mg/L)	0.005		0.001	0.005
Chromium, Total (mg/L)	0.1		0.004	0.1
Cobalt, Total (mg/L)	n/a	0.006	0.0094	0.0094
Combined Radium, Total (pCi/L)	5		3.59	5
Fluoride, Total (mg/L)	4		1	4
Lead, Total (mg/L)	0.015		0.005	0.015
Lithium, Total (mg/L)	n/a	0.04	0.059	0.059
Mercury, Total (mg/L)	0.002		0.000064	0.002
Molybdenum, Total (mg/L)	n/a	0.1	0.04	0.1
Selenium, Total (mg/L)	0.05		0.005	0.05
Thallium, Total (mg/L)	0.002		0.002	0.002

*\*Grey cell indicates Background Limit is higher than MCL.*

*\*MCL = Maximum Contaminant Level*

*\*CCR = Coal Combustion Residual*

*\*GWPS = Groundwater Protection Standard*

# Confidence Interval Summary Table - Significant Results

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 1/6/2021, 12:29 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig. N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Cobalt, total (mg/L)	AD-2	0.0165	0.01	0.0094	Yes 16	0.01266	0.002738	0	None	No	0.01	NP (normality)
Cobalt, total (mg/L)	AD-31	0.01125	0.009527	0.0094	Yes 15	0.01041	0.001314	0	None	sqrt(x)	0.01	Param.
Cobalt, total (mg/L)	AD-32	0.07	0.0239	0.0094	Yes 16	0.04564	0.02159	0	None	No	0.01	NP (normality)
Lithium, total (mg/L)	AD-31	0.09445	0.08352	0.059	Yes 16	0.08651	0.01276	0	None	x^6	0.01	Param.
Lithium, total (mg/L)	AD-32	0.1074	0.0838	0.059	Yes 14	0.09559	0.01665	0	None	No	0.01	Param.

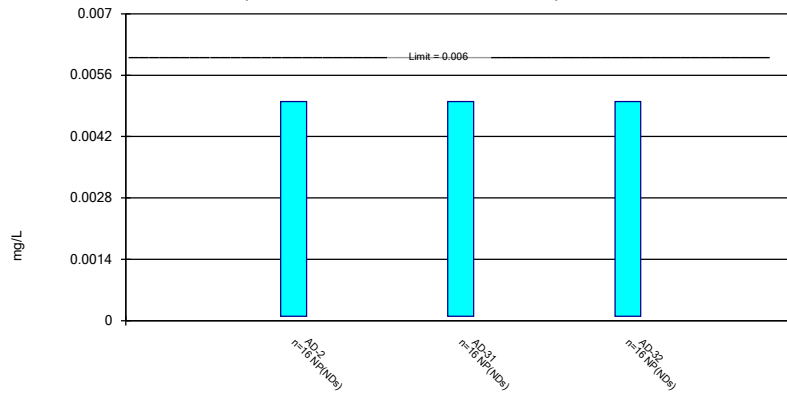
# Confidence Interval Summary Table - All Results

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 1/6/2021, 12:29 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig. N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony, total (mg/L)	AD-2	0.005	0.0001	0.006	No 16	0.002967	0.002425	93.75	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-31	0.005	0.0001	0.006	No 16	0.003089	0.002315	93.75	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-32	0.005	0.0001	0.006	No 16	0.003083	0.002323	87.5	None	No	0.01	NP (NDs)
Arsenic, total (mg/L)	AD-2	0.005	0.00045	0.011	No 16	0.003111	0.002243	62.5	None	No	0.01	NP (normality)
Arsenic, total (mg/L)	AD-31	0.004037	0.0007536	0.011	No 15	0.003167	0.002824	20	Kaplan-Meiersqrt(x)		0.01	Param.
Arsenic, total (mg/L)	AD-32	0.006747	0.002482	0.011	No 16	0.004614	0.003277	6.25	None	No	0.01	Param.
Barium, total (mg/L)	AD-2	0.038	0.0219	2	No 16	0.03118	0.007178	0	None	No	0.01	NP (normality)
Barium, total (mg/L)	AD-31	0.07497	0.04076	2	No 15	0.0592	0.02681	0	None	sqrt(x)	0.01	Param.
Barium, total (mg/L)	AD-32	0.04099	0.02802	2	No 16	0.03451	0.009962	0	None	No	0.01	Param.
Beryllium, total (mg/L)	AD-2	0.0005	0.0004017	0.004	No 16	0.0004768	0.0001461	6.25	None	No	0.01	NP (normality)
Beryllium, total (mg/L)	AD-31	0.00124	0.00085	0.004	No 15	0.001101	0.000384	0	None	No	0.01	NP (normality)
Beryllium, total (mg/L)	AD-32	0.00624	0.003335	0.004	No 16	0.005087	0.002448	0	None	ln(x)	0.01	Param.
Cadmium, total (mg/L)	AD-2	0.001	0.00007	0.005	No 16	0.00065	0.0004667	62.5	None	No	0.01	NP (normality)
Cadmium, total (mg/L)	AD-31	0.001	0.00007	0.005	No 16	0.0005355	0.0004636	43.75	None	No	0.01	NP (normality)
Cadmium, total (mg/L)	AD-32	0.0006051	0.0003566	0.005	No 16	0.0004808	0.000191	0	None	No	0.01	Param.
Chromium, total (mg/L)	AD-2	0.0004389	0.0002165	0.1	No 16	0.0007854	0.0009246	37.5	Kaplan-Meierln(x)		0.01	Param.
Chromium, total (mg/L)	AD-31	0.009479	0.001553	0.1	No 14	0.00623	0.005583	14.29	None	sqrt(x)	0.01	Param.
Chromium, total (mg/L)	AD-32	0.007357	0.001644	0.1	No 16	0.005122	0.005218	0	None	sqrt(x)	0.01	Param.
<b>Cobalt, total (mg/L)</b>	<b>AD-2</b>	<b>0.0165</b>	<b>0.01</b>	<b>0.0094</b>	<b>Yes 16</b>	<b>0.01266</b>	<b>0.002738</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.01</b>	<b>NP (normality)</b>
<b>Cobalt, total (mg/L)</b>	<b>AD-31</b>	<b>0.01125</b>	<b>0.009527</b>	<b>0.0094</b>	<b>Yes 15</b>	<b>0.01041</b>	<b>0.001314</b>	<b>0</b>	<b>None</b>	<b>sqrt(x)</b>	<b>0.01</b>	<b>Param.</b>
<b>Cobalt, total (mg/L)</b>	<b>AD-32</b>	<b>0.07</b>	<b>0.0239</b>	<b>0.0094</b>	<b>Yes 16</b>	<b>0.04564</b>	<b>0.02159</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.01</b>	<b>NP (normality)</b>
Combined Radium 226 + 228 (pCi/L)	AD-2	1.68	0.9119	5	No 16	1.296	0.5901	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-31	3.88	2.656	5	No 16	3.4	1.179	0	None	No	0.01	NP (normality)
Combined Radium 226 + 228 (pCi/L)	AD-32	6.041	4.077	5	No 15	5.059	1.449	0	None	No	0.01	Param.
Fluoride, total (mg/L)	AD-2	1	0.11	4	No 18	0.7056	0.4287	66.67	None	No	0.01	NP (normality)
Fluoride, total (mg/L)	AD-31	1	0.14	4	No 18	0.7122	0.419	66.67	None	No	0.01	NP (normality)
Fluoride, total (mg/L)	AD-32	0.8469	0.4168	4	No 17	0.8151	0.4209	29.41	Kaplan-Meiersqrt(x)		0.01	Param.
Lead, total (mg/L)	AD-2	0.005	0.000355	0.015	No 16	0.003088	0.002273	62.5	None	No	0.01	NP (normality)
Lead, total (mg/L)	AD-31	0.005	0.00026	0.015	No 15	0.002792	0.00209	53.33	None	No	0.01	NP (normality)
Lead, total (mg/L)	AD-32	0.005	0.000405	0.015	No 16	0.003193	0.00215	62.5	None	No	0.01	NP (normality)
Lithium, total (mg/L)	AD-2	0.0536	0.0488	0.059	No 15	0.0512	0.00354	0	None	No	0.01	Param.
<b>Lithium, total (mg/L)</b>	<b>AD-31</b>	<b>0.09445</b>	<b>0.08352</b>	<b>0.059</b>	<b>Yes 16</b>	<b>0.08651</b>	<b>0.01276</b>	<b>0</b>	<b>None</b>	<b>x^6</b>	<b>0.01</b>	<b>Param.</b>
<b>Lithium, total (mg/L)</b>	<b>AD-32</b>	<b>0.1074</b>	<b>0.0838</b>	<b>0.059</b>	<b>Yes 14</b>	<b>0.09559</b>	<b>0.01665</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.01</b>	<b>Param.</b>
Mercury, total (mg/L)	AD-2	0.00007942	0.00003627	0.002	No 15	0.00006	0.00003543	0	None	sqrt(x)	0.01	Param.
Mercury, total (mg/L)	AD-31	0.0006166	0.0001292	0.002	No 15	0.0004197	0.0004218	0	None	sqrt(x)	0.01	Param.
Mercury, total (mg/L)	AD-32	0.005901	0.001968	0.002	No 16	0.004255	0.003512	0	None	sqrt(x)	0.01	Param.
Molybdenum, total (mg/L)	AD-2	0.005	0.002	0.1	No 16	0.005831	0.00928	81.25	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-31	0.0005589	0.0002952	0.1	No 16	0.007491	0.01283	75	Kaplan-Meierln(x)		0.01	Param.
Molybdenum, total (mg/L)	AD-32	0.04	0.002	0.1	No 16	0.00805	0.0126	87.5	Kaplan-MeierNo		0.01	NP (NDs)
Selenium, total (mg/L)	AD-2	0.005	0.0011	0.05	No 16	0.002494	0.001769	31.25	None	No	0.01	NP (normality)
Selenium, total (mg/L)	AD-31	0.005	0.0004	0.05	No 16	0.002685	0.001967	43.75	None	No	0.01	NP (normality)
Selenium, total (mg/L)	AD-32	0.004766	0.001764	0.05	No 15	0.005136	0.005824	33.33	Kaplan-Meierln(x)		0.01	Param.
Thallium, total (mg/L)	AD-2	0.002	0.0001	0.002	No 16	0.001173	0.0009	62.5	None	No	0.01	NP (normality)
Thallium, total (mg/L)	AD-31	0.002	0.000113	0.002	No 15	0.001282	0.0008195	80	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-32	0.002	0.0002	0.002	No 15	0.001107	0.000817	40	None	No	0.01	NP (normality)

### Non-Parametric Confidence Interval

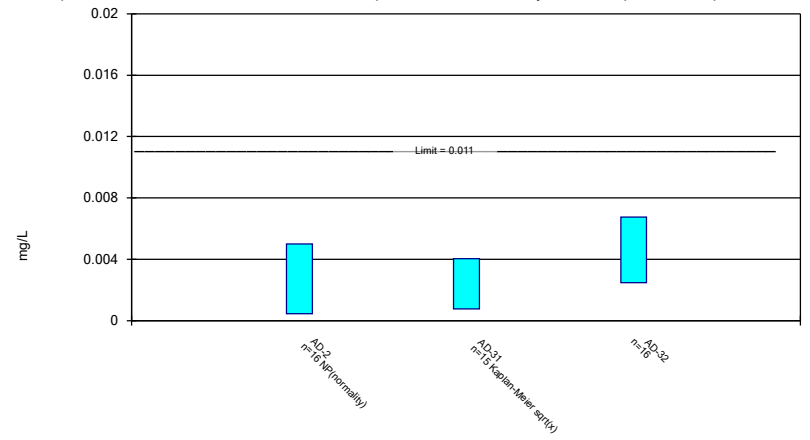
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Antimony, total Analysis Run 1/6/2021 11:31 AM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Parametric and Non-Parametric (NP) Confidence Interval

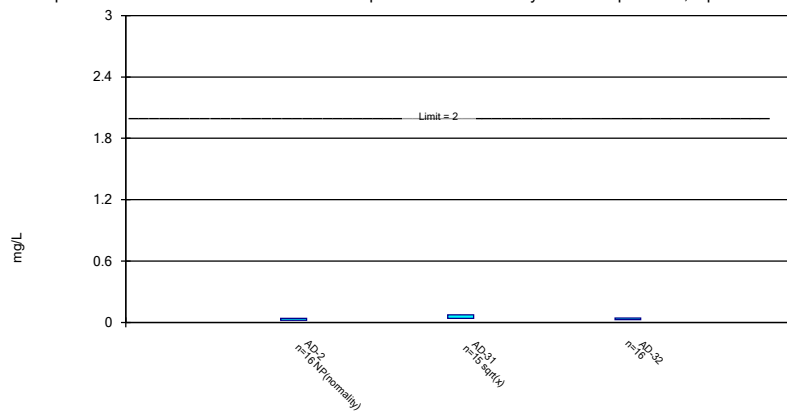
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Arsenic, total Analysis Run 1/6/2021 11:31 AM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Parametric and Non-Parametric (NP) Confidence Interval

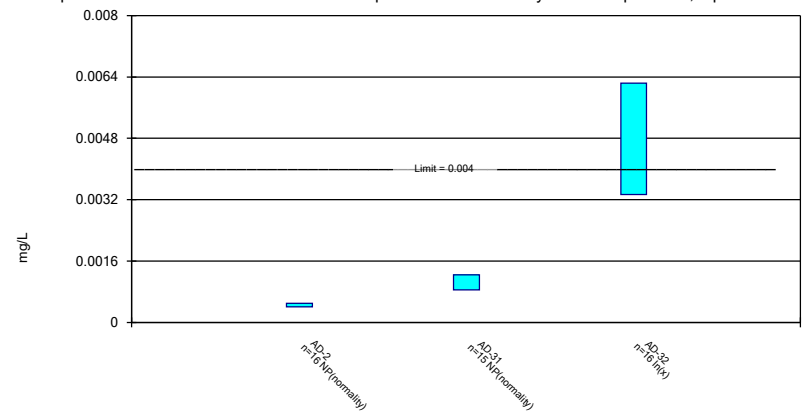
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Barium, total Analysis Run 1/6/2021 11:31 AM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.

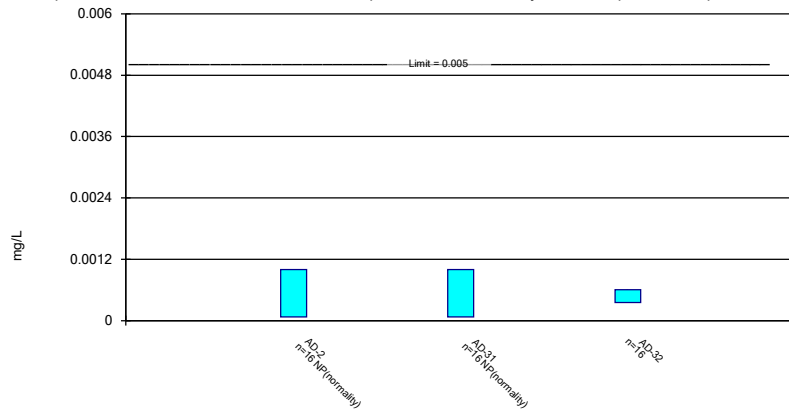


Constituent: Beryllium, total Analysis Run 1/6/2021 11:31 AM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP



### Parametric and Non-Parametric (NP) Confidence Interval

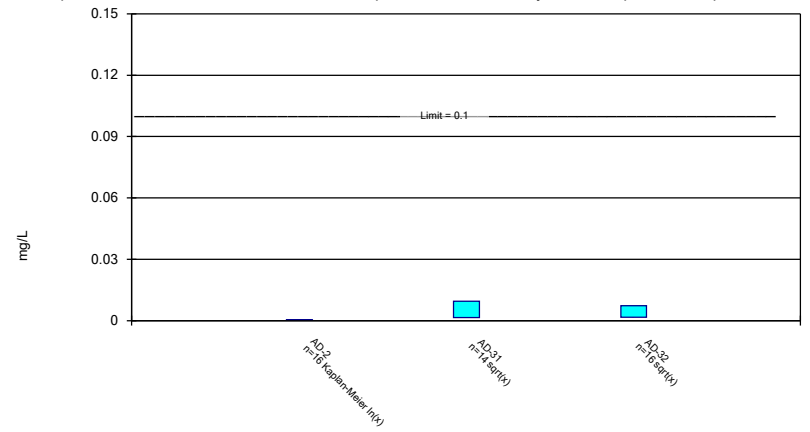
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cadmium, total Analysis Run 1/6/2021 11:31 AM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Parametric Confidence Interval

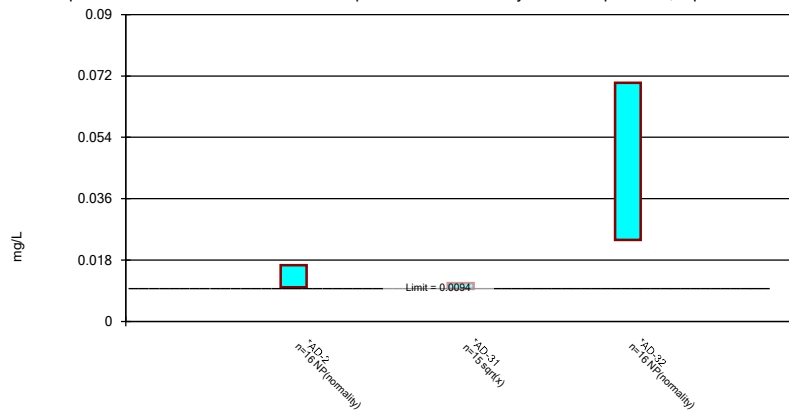
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Chromium, total Analysis Run 1/6/2021 11:31 AM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Parametric and Non-Parametric (NP) Confidence Interval

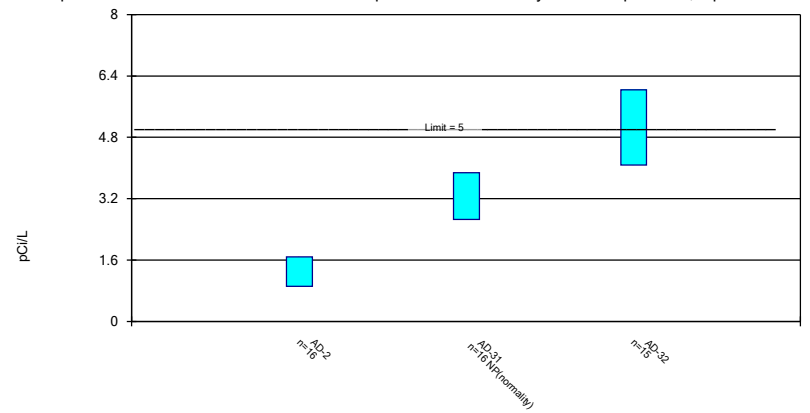
Compliance limit is exceeded.\* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt, total Analysis Run 1/6/2021 11:31 AM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Parametric and Non-Parametric (NP) Confidence Interval

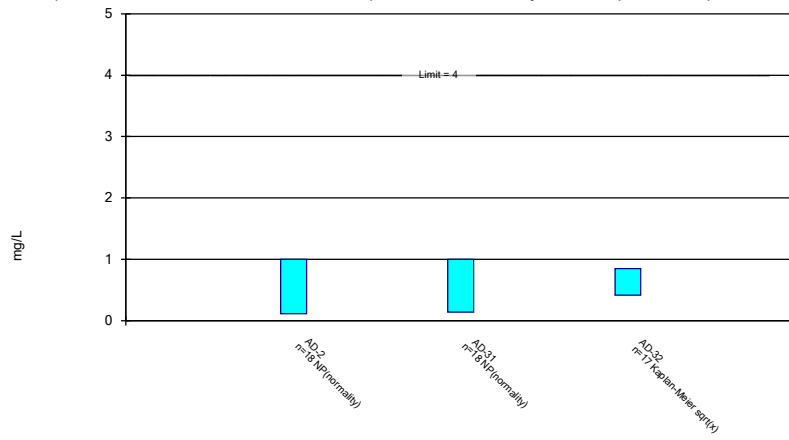
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Combined Radium 226 + 228 Analysis Run 1/6/2021 11:31 AM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Parametric and Non-Parametric (NP) Confidence Interval

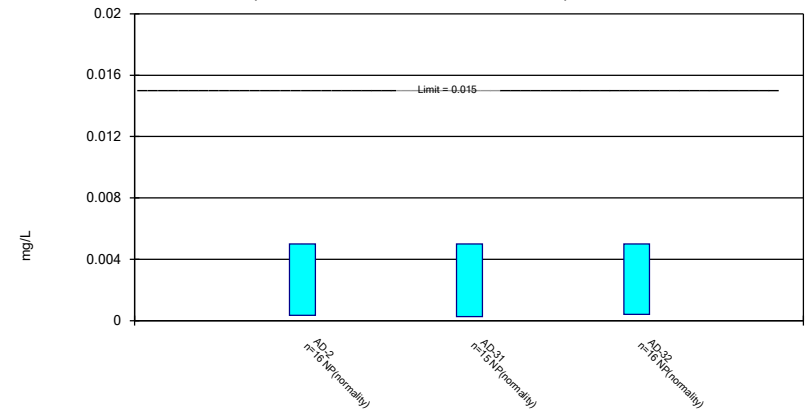
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Fluoride, total Analysis Run 1/6/2021 11:31 AM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Non-Parametric Confidence Interval

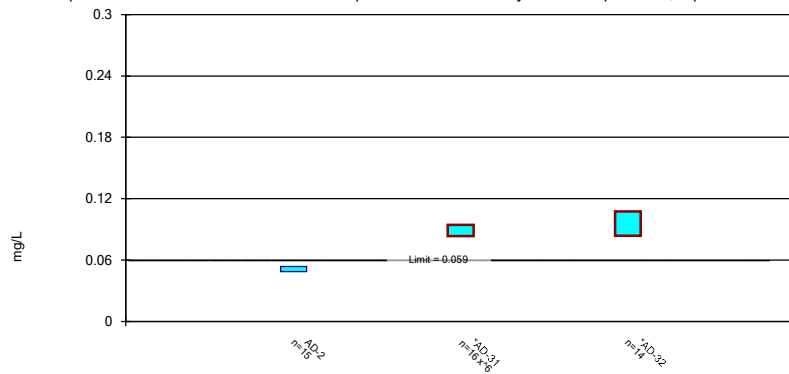
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Lead, total Analysis Run 1/6/2021 11:31 AM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Parametric Confidence Interval

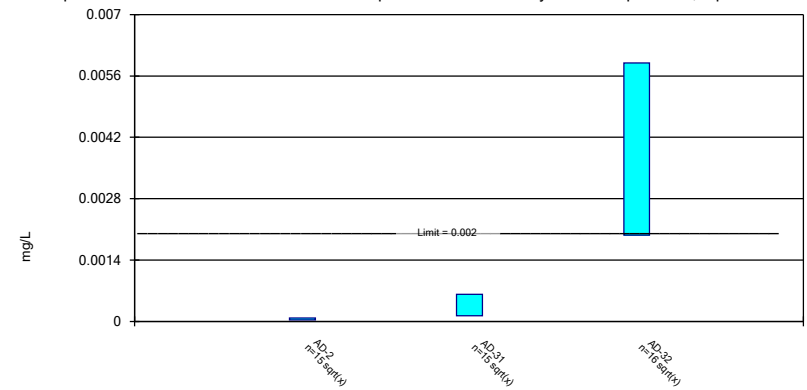
Compliance limit is exceeded.\* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lithium, total Analysis Run 1/6/2021 11:31 AM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Parametric Confidence Interval

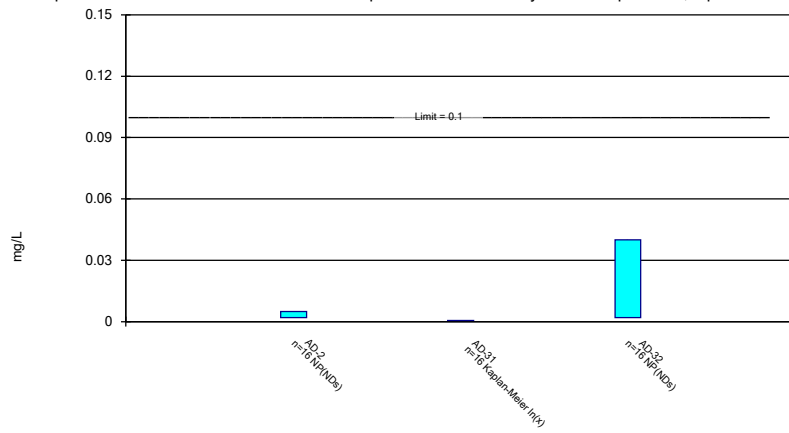
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Mercury, total Analysis Run 1/6/2021 11:31 AM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Parametric and Non-Parametric (NP) Confidence Interval

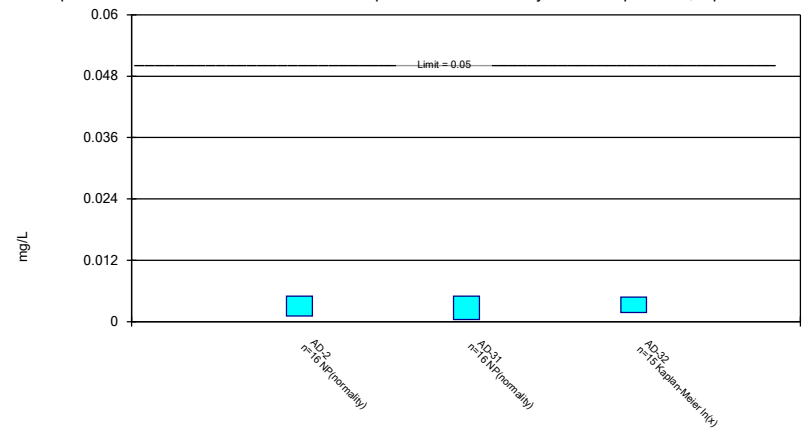
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Molybdenum, total Analysis Run 1/6/2021 11:31 AM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Parametric and Non-Parametric (NP) Confidence Interval

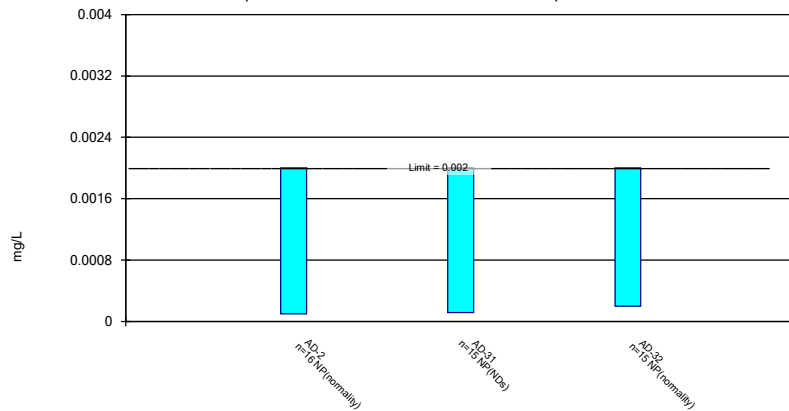
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Selenium, total Analysis Run 1/6/2021 11:31 AM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Thallium, total Analysis Run 1/6/2021 11:31 AM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

**STATISTICAL ANALYSIS SUMMARY  
EAST BOTTOM ASH POND  
H.W. Pirkey Power Plant  
Hallsville, Texas**

*Submitted to*



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Columbus, Ohio 43215-2372

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September 24, 2021

CHA8500

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Attachment A Certification by Qualified Professional Engineer  
Attachment B Statistical Analysis Output

## LIST OF ACRONYMS AND ABBREVIATIONS

AEP	American Electric Power
ASD	Alternative Source Demonstration
CCR	Coal Combustion Residuals
CCV	Continuing Calibration Verification
CFR	Code of Federal Regulations
EBAP	East Bottom Ash Pond
GWPS	Groundwater Protection Standard
LCL	Lower Confidence Limit
LFB	Laboratory Fortified Blanks
LRB	Laboratory Reagent Blanks
MCL	Maximum Contaminant Level
NELAP	National Environmental Laboratory Accreditation Program
QA	Quality Assurance
QC	Quality Control
SSI	Statistically Significant Increase
SSL	Statistically Significant Level
TCEQ	Texas Commission on Environmental Quality
TDS	Total Dissolved Solids
UPL	Upper Prediction Limit

## SECTION 1

### EXECUTIVE SUMMARY

In accordance with the Texas Commission on Environmental Quality's (TCEQ's) regulations regarding the disposal of coal combustion residuals (CCRs) in landfills and surface impoundments (Title 30 Chapter 352, "CCR rule"), groundwater monitoring has been conducted at the East Bottom Ash Pond (EBAP), an existing CCR unit at the Pirkey Power Plant located in Hallsville, Texas.

Based on detection monitoring conducted in 2017 and 2018, statistically significant increases (SSIs) over background were concluded for boron, calcium, chloride, total dissolved solids (TDS), and sulfate at the EBAP. An alternative source was not identified at the time, so the EBAP entered assessment monitoring. Groundwater protection standards (GWPS) were set in accordance with § 352.951(b) and a statistical evaluation of the assessment monitoring data was conducted. During the most recent assessment monitoring event, completed in November 2020, statistically significant levels (SSLs) were identified for cobalt and lithium (Geosyntec, 2021). An alternative source demonstration (ASD) was successfully completed in accordance with § 352.951(e); therefore, the EBAP remained in assessment monitoring. Two assessment monitoring events were conducted at the EBAP in March and May 2021 in accordance with § 352.951(a). The results of these assessment events are documented in this report.

Groundwater data underwent several validation tests, including those for completeness, sample tracking accuracy, transcription errors, and consistent use of measurement units. No data quality issues were identified which would impact data usability.

The monitoring data were submitted to Groundwater Stats Consulting, LLC for statistical analysis. Confidence intervals were calculated for Appendix IV parameters at the compliance wells to assess whether Appendix IV parameters were present at an SSL above previously established GWPS. SSLs were identified for cobalt and lithium. Thus, either the unit will move to an assessment of corrective measures or an ASD will be conducted to evaluate if the unit can remain in assessment monitoring. Certification of the selected statistical methods by a qualified professional engineer is documented in Attachment A.

## SECTION 2

### EAST BOTTOM ASH POND EVALUATION

#### 2.1 Data Validation & QA/QC

During the assessment monitoring program, two sets of samples (March 2021 and May 2021) were collected for analysis from each upgradient and downgradient well to meet the requirements of § 352.951(a). Samples from both sampling events were analyzed for the Appendix III and Appendix IV parameters. A summary of data collected during these assessment monitoring events are presented in Table 1.

Chemical analysis was completed by an analytical laboratory certified by the National Environmental Laboratory Accreditation Program (NELAP). Quality assurance and quality control (QA/QC) samples completed by the analytical laboratory included the use of laboratory reagent blanks (LRBs), continuing calibration verification (CCV) samples, and laboratory fortified blanks (LFBs).

The analytical data were imported into a Microsoft Access database, where checks were completed to assess the accuracy of sample location identification and analyte identification. Where necessary, unit conversions were applied to standardize reported units across all sampling events. Exported data files were created for use with the Sanitas™ v.9.6.30 statistics software. The export file was checked against the analytical data for transcription errors and completeness. No QA/QC issues were noted which would impact data usability.

#### 2.2 Statistical Analysis

Time series plots and results for all completed statistical tests are provided in Attachment B. The data obtained in March and May 2021 were screened for potential outliers. No outliers were identified for these events.

##### 2.2.1 Evaluation of Potential Appendix IV SSLs

A confidence interval was constructed for each Appendix IV parameter at each compliance well. Confidence limits were generally calculated parametrically ( $\alpha = 0.01$ ); however, non-parametric confidence limits were calculated in some cases (e.g., when the data did not appear to be normally distributed or when the non-detect frequency was too high). An SSL was concluded if the lower confidence limit (LCL) exceeded the GWPS (i.e., if the entire confidence interval exceeded the GWPS). Calculated confidence limits are shown in Attachment B. The calculated confidence limits were compared to the GWPSs provided in Table 2. The GWPSs were established as either the greater value of the background concentration calculated during a previous statistical analysis (Geosyntec, 2021) or the maximum contaminant level (MCL).

The following SSLs were identified at the Pirkey EBAP:



- The LCL for cobalt exceeded the GWPS of 0.00940 mg/L at AD-2 (0.0100 mg/L), AD-31 (0.00960 mg/L), and AD-32 (0.025 mg/L).
- The LCL for lithium exceeded the GWPS of 0.059 mg/L at AD-31 (0.0669 mg/L) and AD-32 (0.0789 mg/L).

As a result, the Pirkey EBAP will either move to an assessment of corrective measures or an alternative source demonstration will be conducted to evaluate if the unit can remain in assessment monitoring.

### **2.2.2 Evaluation of Potential Appendix III SSIs**

While SSLs were identified, a review of the Appendix III results were also completed to assess whether concentrations of Appendix III parameters at the compliance wells exceeded background concentrations.

Data collected during the May 2021 assessment monitoring event from each compliance well were compared to previously established prediction limits to evaluate results above background values. The results from this event and the prediction limits are summarized in Table 3. The following exceedances of the upper prediction limits (UPLs) were noted:

- Boron concentrations exceeded the interwell UPL of 0.0374 mg/L at AD-2 (2.78 mg/L) and AD-32 (2.11 mg/L).
- Calcium concentrations exceeded the interwell UPL of 2.94 mg/L at AD-31 (3.0 mg/L) and AD-32 (21.7 mg/L).
- Chloride concentrations exceeded the interwell UPL of 9.10 mg/L at AD-2 (29.8 mg/L), AD-31 (18.1 mg/L), and AD-32 (25.4 mg/L).
- Fluoride concentrations exceeded the interwell UPL of 1.00 mg/L at AD-32 (1.25 mg/L).
- Sulfate concentrations exceeded the interwell UPL of 24.7 mg/L at AD-2 (215 mg/L), AD-31 (86.4 mg/L), and AD-32 (452 mg/L).
- TDS concentrations exceeded the interwell UPL of 174 mg/L at AD-2 (430 mg/L) and AD-32 (340 mg/L).

While the prediction limits were calculated for a one-of-two retesting procedure, SSIs were conservatively assumed if the May 2021 sample was above the UPL or below the LPL. Based on these results, concentrations of Appendix III constituents appear to be above background concentrations.

### **2.3 Conclusions**

A semi-annual assessment monitoring event was conducted in accordance with the CCR Rule. The laboratory and field data were reviewed prior to statistical analysis, with no QA/QC issues identified that impacted data usability. A review of outliers identified no potential outliers in the March and May 2021 data. A confidence interval was constructed at each compliance well for each Appendix IV parameter; SSLs were concluded if the entire confidence interval exceeded the GWPS. SSLs were identified for cobalt, and lithium. Appendix III parameters were compared to calculated prediction limits, with exceedances identified for boron, calcium, chloride, fluoride, sulfate, and TDS.

Based on this evaluation, the Pirkey EBAP CCR unit will either move to an assessment of corrective measures or an ASD will be conducted to evaluate if the unit can remain in assessment monitoring.

### **SECTION 3**

#### **REFERENCES**

Geosyntec Consultants (Geosyntec). 2021. Statistical Analysis Summary – East Bottom Ash Pond, H.W. Pirkey Plant. March.

# TABLES

**Table 1 - Groundwater Data Summary  
Pirkey Plant - East Bottom Ash Pond**

*Geosyntec Consultants, Inc.*

Parameter	Unit	AD-12		AD-18		AD-2	
		3/8/2021	5/24/2021	3/9/2021	5/25/2021	3/9/2021	5/25/2021
Antimony	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Arsenic	µg/L	0.07 J	0.08 J	0.28	0.42	0.68	0.55
Barium	µg/L	22.9	23.1	88.7	103	19.6	18.9
Beryllium	µg/L	0.150	0.136	0.09 J	0.088	0.564	0.541
Boron	mg/L	0.01 J	0.032 J	0.009 J	0.021 J	2.76	2.78
Cadmium	µg/L	0.007 J	0.005 J	0.01 J	0.014 J	0.09	0.094
Calcium	mg/L	0.2 J	0.2 J	0.2 J	0.3	2.48	2.7
Chloride	mg/L	6.46	5.54	6.61	7.16	30.2	29.8
Chromium	µg/L	0.2 J	0.24	0.271	0.55	0.280	0.38
Cobalt	µg/L	1.19	1.19	0.827	0.964	20.2	21.7
Combined Radium	pCi/L	0.214	0.6	0.331	0.77	0.681	1.16
Fluoride	mg/L	0.11	0.12	0.02 J	0.02 J	0.23	0.22
Lead	µg/L	0.07 J	0.07 J	0.08 J	0.15 J	0.517	0.46
Lithium	mg/L	0.00570	0.00500	0.0131	0.0127	0.0473	0.0483
Mercury	µg/L	0.005 U	0.005 U	0.006	0.014	0.074	0.057
Molybdenum	µg/L	2 U	0.5 U	2 U	0.5 U	2 U	0.5 U
Selenium	µg/L	0.2 J	0.31 J	0.1 J	0.13 J	2.3	1.68
Sulfate	mg/L	3.8	5.46	6.6	7.46	209	215
Thallium	µg/L	0.5 U	0.2 U	0.5 U	0.05 J	0.1 J	0.09 J
Total Dissolved Solids	mg/L	68	70	113	100	450	430
pH	SU	4.1	4.2	4.5	4.4	4.0	3.6

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

SU: standard unit

U: Non-detect value. For statistical analysis, parameters which were not detected were replaced with the reporting limit.

J: Estimated value. Parameter was detected in concentrations below the reporting limit.

**Table 1 - Groundwater Data Summary  
Pirkey Plant - East Bottom Ash Pond**

*Geosyntec Consultants, Inc.*

Parameter	Unit	AD-31		AD-32		AD-4	
		3/8/2021	5/24/2021	3/8/2021	5/24/2021	3/9/2021	5/25/2021
Antimony	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Arsenic	µg/L	0.22	0.23	5.54	2.39	0.30	0.13
Barium	µg/L	33.6	33.2	18.5	16.9	87.9	80.7
Beryllium	µg/L	0.857	0.723	5.78	3.96	0.679	0.489
Boron	mg/L	0.02 J	0.026 J	2.87	2.11	0.02 J	0.032 J
Cadmium	µg/L	0.07	0.066	0.66	0.529	0.01 J	0.012 J
Calcium	mg/L	2.69	3.0	34.2	21.7	1.72	1.7
Chloride	mg/L	18.5	18.1	33.5	25.4	3.63	3.60
Chromium	µg/L	0.282	0.41	0.754	0.71	0.2 J	0.24
Cobalt	µg/L	9.78	10.4	61.9	50.5	6.50	6.86
Combined Radium	pCi/L	1.697	1.6	3.701	5.38	0.576	0.83
Fluoride	mg/L	0.17	0.17	1.08	1.25	0.12	0.14
Lead	µg/L	0.218	0.20	0.970	0.52	0.2 U	0.2 U
Lithium	mg/L	0.0664	0.0638	0.0618	0.0629	0.0331	0.0335
Mercury	µg/L	0.095	0.059	1.07	0.800	0.002 J	0.005 U
Molybdenum	µg/L	2 U	0.1 J	2 U	0.5 U	2 U	0.5 U
Selenium	µg/L	0.4	0.28 J	22.2	9.21	0.5 U	0.5 U
Sulfate	mg/L	81.1	86.4	714	452	21.5	22.6
Thallium	µg/L	0.08 J	0.09 J	0.3 J	0.21	0.06 J	0.06 J
Total Dissolved Solids	mg/L	279	130	1,020	340	146	150
pH	SU	3.8	3.6	3.5	3.3	5.2	4.6

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

SU: standard unit

U: Non-detect value. For statistical analysis, parameters which were not detected were replaced with the reporting limit.

J: Estimated value. Parameter was detected in concentrations below the reporting limit.

**Table 2: Appendix IV Groundwater Protection Standards  
Pirkey Plant - East Bottom Ash Pond**

*Geosyntec Consultants, Inc.*

Constituent Name	MCL	Calculated UTL	GWPS
Antimony, Total (mg/L)	0.006	0.005	0.006
Arsenic, Total (mg/L)	0.010	0.011	0.011
Barium, Total (mg/L)	2.00	0.180	2.00
Beryllium, Total (mg/L)	0.00400	0.00120	0.00400
Cadmium, Total (mg/L)	0.005	0.001	0.005
Chromium, Total (mg/L)	0.100	0.00400	0.100
Cobalt, Total (mg/L)	n/a	0.00940	0.00940
Combined Radium, Total (pCi/L)	5.00	3.59	5.00
Fluoride, Total (mg/L)	4.0	1.0	4.0
Lead, Total (mg/L)	n/a	0.00500	0.0050
Lithium, Total (mg/L)	n/a	0.0590	0.0590
Mercury, Total (mg/L)	0.0020	0.000064	0.0020
Molybdenum, Total (mg/L)	n/a	0.04	0.04
Selenium, Total (mg/L)	0.05	0.005	0.05
Thallium, Total (mg/L)	0.002	0.002	0.002

Notes:

MCL = Maximum Contaminant Level

GWPS = Groundwater Protection Standard

Calculated UTL (Upper Tolerance Limit) represents site-specific background values.

Grey cells indicate the GWPS is based on the calculated UTL, which is either higher than the MCL or an MCL does not exist.

**Table 3: Appendix III Data Evaluation  
Pirkey - East Bottom Ash Pond**

Analyte	Unit	Description	AD-2	AD-31	AD-32
			5/25/2021	5/24/2021	5/24/2021
Boron	mg/L	Interwell Background Value (UPL)	0.0374		
		Analytical Result	<b>2.78</b>	0.026	<b>2.11</b>
Calcium	mg/L	Interwell Background Value (UPL)	2.94		
		Analytical Result	2.7	<b>3.0</b>	<b>21.7</b>
Chloride	mg/L	Interwell Background Value (UPL)	9.10		
		Analytical Result	<b>29.8</b>	<b>18.1</b>	<b>25.4</b>
Fluoride	mg/L	Interwell Background Value (UPL)	1.00		
		Analytical Result	0.22	0.17	<b>1.25</b>
pH	SU	Intrawell Background Value (UPL)	4.8	5.3	4.5
		Intrawell Background Value (LPL)	3.5	3.0	2.7
		Analytical Result	3.6	3.6	3.3
Sulfate	mg/L	Interwell Background Value (UPL)	24.7		
		Analytical Result	<b>215</b>	<b>86.4</b>	<b>452</b>
Total Dissolved Solids	mg/L	Interwell Background Value (UPL)	174		
		Analytical Result	<b>430</b>	130	<b>340</b>

Notes:

UPL: Upper prediction limit

LPL: Lower prediction limit

**Bold values exceed the background value.**

Background values are shaded gray.



# ATTACHMENT A

Certification by Qualified Professional Engineer

**Certification by Qualified Professional Engineer**

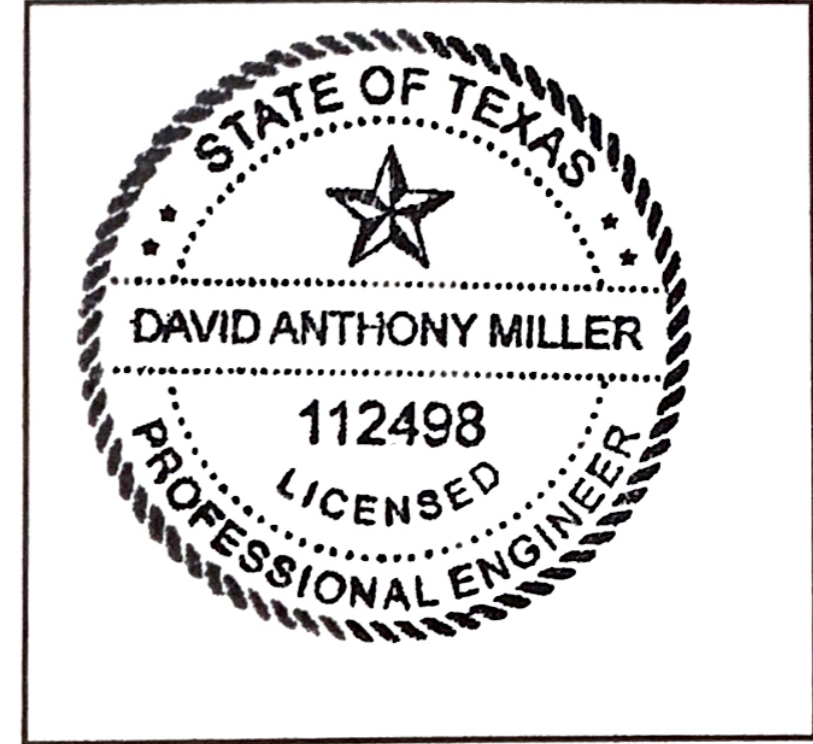
I certify that the selected and above described statistical method is appropriate for evaluating the groundwater monitoring data for the Pirkey East Bottom Ash Pond CCR management area and that the requirements of § 352.931(a) have been met.

DAVID ANTHONY MILLER

Printed Name of Licensed Professional Engineer

David Anthony Miller

Signature



112498

License Number

TEXAS

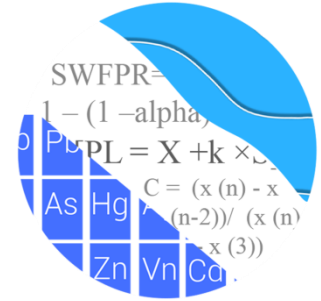
Licensing State

09.27.21

Date

**ATTACHMENT B**  
**Statistical Analysis Output**

## GROUNDWATER STATS CONSULTING



August 30, 2021

Geosyntec Consultants  
Attn: Ms. Allison Kreinberg  
941 Chatham Lane, #103  
Columbus, OH 43221

Re: Pirkey East Bottom Ash Pond  
Assessment Monitoring Event – May 2021

Dear Ms. Kreinberg,

Groundwater Stats Consulting (GSC), formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the evaluation of groundwater data from the May 2021 sample event for American Electric Power Company's Pirkey East Bottom Ash Pond (EBAP). The analysis complies with the Texas Commission of Environmental Quality rule 30 TAC 352 as well as with the United States Environmental Protection Agency (USEPA) Unified Guidance (2009).

Sampling at each of the wells below began at Pirkey EBAP for the Coal Combustion Residual (CCR) program in 2016. The monitoring well network, as provided by Geosyntec Consultants, consists of the following:

- **Upgradient wells:** AD-4, AD-12, and AD-18
- **Downgradient wells:** AD-2, AD-31, and AD-32

Data were sent electronically, and the statistical analysis was conducted according to the Statistical Analysis Plan and screening evaluation prepared by GSC and approved by Dr. Kirk Cameron, PhD Statistician with MacStat Consulting, primary author of the USEPA Unified Guidance, and Senior Advisor to GSC. The statistical analysis was reviewed by Andrew Collins, Project Manager of Groundwater Stats Consulting.

The CCR program consists of the following Assessment monitoring constituents:

- **Appendix IV** (Assessment Monitoring) – antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, combined radium 226 + 228, fluoride, lead, lithium, mercury, molybdenum, selenium, and thallium

Time series graphs for Appendix IV parameters are provided for all wells and are used to evaluate concentrations over the entire record (Figure A). Additionally, box plots are included for all constituents at upgradient and downgradient wells (Figure B). The time series plots are used to initially screen for suspected outliers and trends, while the box plots provide visual representation of variation within individual wells and between all wells. Values in background, which have previously been flagged as outliers, may be seen in a lighter font and disconnected symbol on the graphs. Additionally, a summary of flagged values follows this letter (Figure C).

### **Summary of Statistical Methods**

Assessment monitoring for Appendix IV parameters involves the comparison of a confidence interval for each parameter at downgradient wells against the corresponding Groundwater Protection Standard (GWPS). The GWPS is determined for each parameter as the highest limit of the Maximum Contaminant Levels (MCLs) or background limits determined from tolerance limits constructed from pooled upgradient well data.

Prior to computing tolerance limits on upgradient well data or confidence intervals on downgradient well data, the distribution of data is tested using the Shapiro-Wilk/Shapiro-Francia test for normality. After testing for normality and performing any adjustments as discussed below (US EPA, 2009), data are analyzed using either parametric or non-parametric tolerance limits and confidence intervals as appropriate, based on the following criteria.

- No statistical analyses are required on wells and analytes containing 100% non-detects (USEPA Unified Guidance, 2009, Chapter 6).
- When data contain <15% non-detects in background, the reporting limit utilized for non-detects is the practical quantification limit (PQL) as reported by the laboratory. For several constituents, the most recent reporting limits are significantly lower than those reported historically. This is a conservative approach for tolerance limits and confidence intervals at this site.
- When data contain between 15-50% non-detects, the Kaplan-Meier non-detect adjustment is applied to the background data. This technique adjusts the mean

and standard deviation of the historical concentrations to account for concentrations below the reporting limit.

- Nonparametric tolerance limits are used on data containing greater than 50% non-detects.

## **Background Update – Conducted in January 2021**

### Outlier Analysis

Prior to evaluating Appendix IV parameters, background data are screened through visual screening and Tukey's outlier test for potential outliers and extreme trending patterns that would lead to artificially elevated statistical limits. High outliers are also 'cautiously' flagged in the downgradient wells when they are clearly much different from the rest of the data. This is intended to be a regulatory conservative approach in that it will reduce the variance and thus reduce the width of parametric confidence intervals, although it will also reduce the mean and thus lower the entire interval. The intent is to better represent the actual downgradient mean. Flagging high outliers should have no effect on the lower limit of nonparametric confidence intervals.

Tukey's outlier test results for Appendix IV parameters and a description of outliers flagged during previous analyses were included and discussed with the background update conducted in January 2021. As mentioned above, a list of flagged values follows this report (Figure C).

### Tolerance Limits

Interwell upper tolerance limits were established in the Fall 2020 using all available pooled upgradient well data for each Appendix IV parameter through November 2020 (Figure D). GWPS will be updated during the Fall 2021. When data followed a normal or transformed-normal distribution, parametric tolerance limits were used to calculate background limits for Appendix IV parameters with a target of 95% confidence and 95% coverage. Nonparametric tolerance limits are constructed when data do not follow a normal or transformed-normal distribution or when there are greater than 50% non-detects. The confidence and coverage levels for nonparametric tolerance limits are dependent upon the number of background samples. These background limits were then compared to the Maximum Contaminant Levels (MCLs) to determine the highest limit for use as the GWPS in the confidence interval comparisons (Figure E).

## Evaluation of Appendix IV Parameters – May 2021

Confidence intervals were then constructed on downgradient wells with data through May 2021 for each of the Appendix IV parameters using either parametric or nonparametric intervals depending on the data distribution and percentage of non-detects, similar to the logic used to construct tolerance limits as discussed above (Figure F). Each confidence interval was compared with the corresponding GWPS from Figure E. Only when the entire confidence interval is above the GWPS is the well/constituent pair considered to exceed its respective standard. Both a tabular summary and graphical presentation of the confidence interval results follow this letter. Exceedances were noted for the following well/constituent pairs:

- Cobalt: AD-2, AD-31, and AD-32
- Lithium: AD-31 and AD-32

Thank you for the opportunity to assist you in the statistical analysis of groundwater quality for the Pirkey EBAP. If you have any questions or comments, please feel free to contact us.

For Groundwater Stats Consulting,

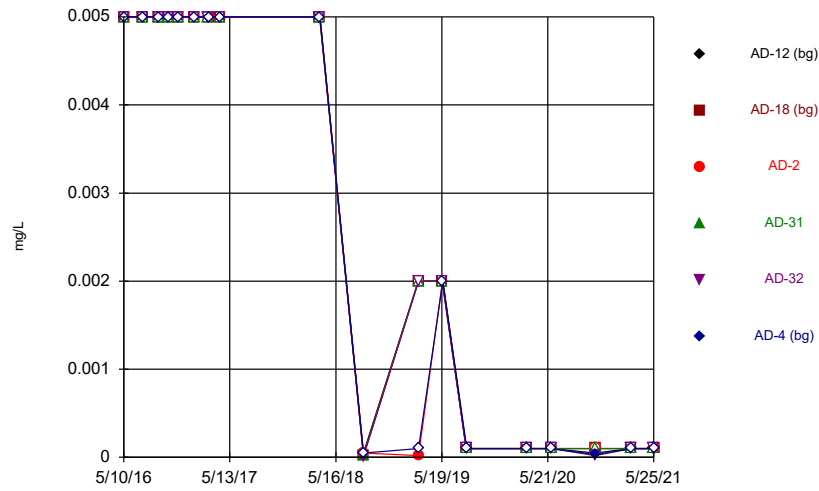


Easton Rayner  
Groundwater Analyst



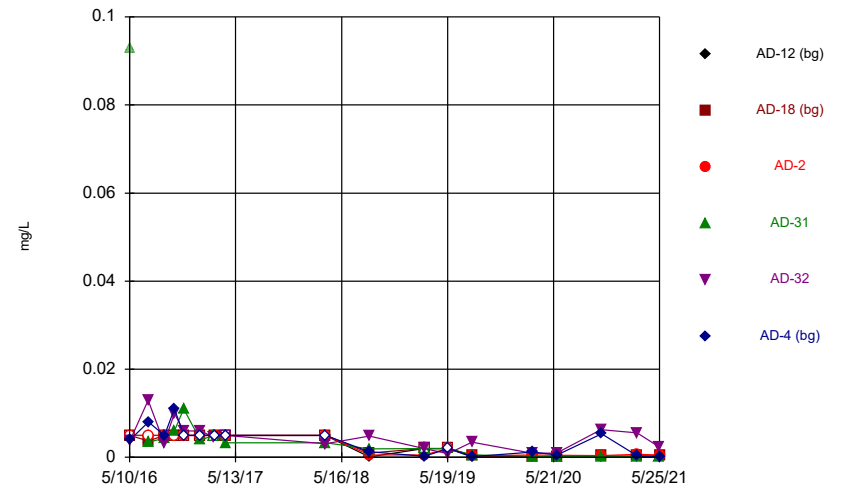
Andrew Collins  
Project Manager

Time Series



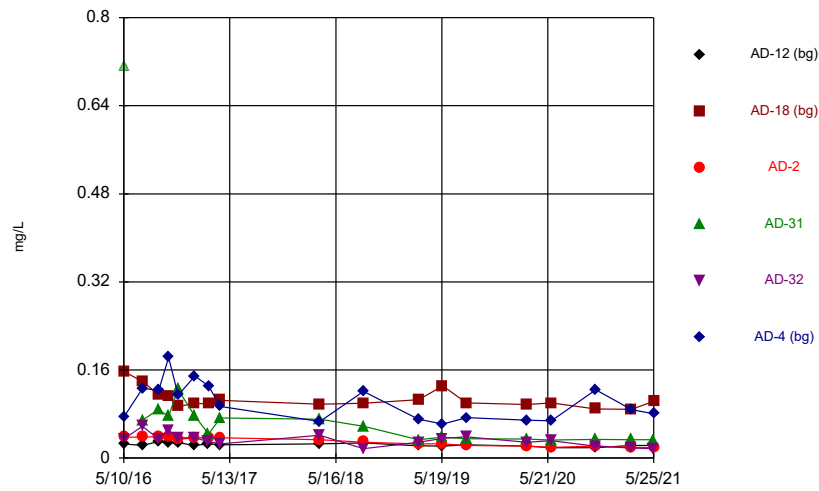
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Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Time Series



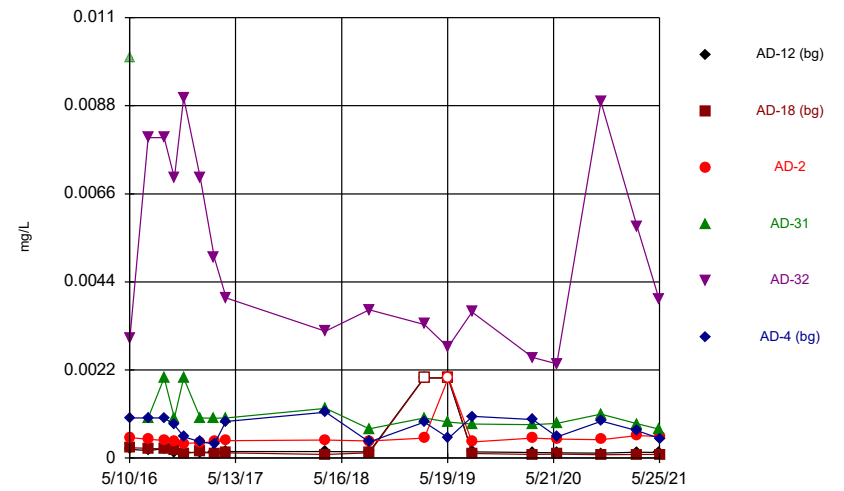
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Time Series



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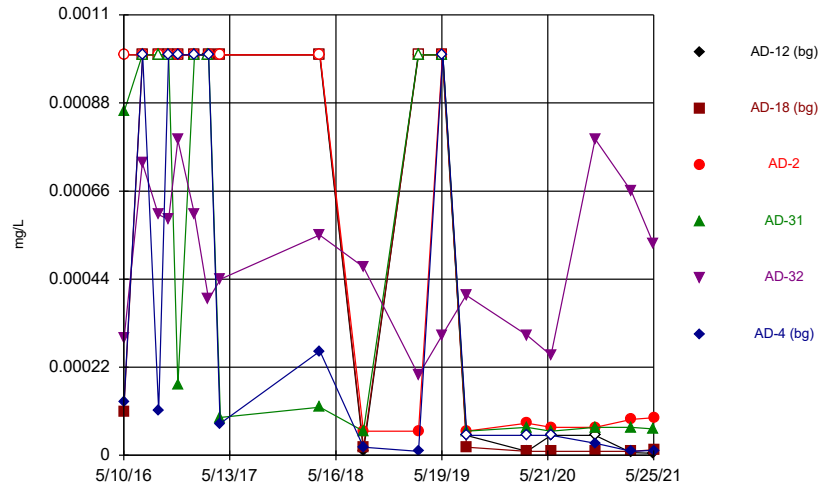
Time Series



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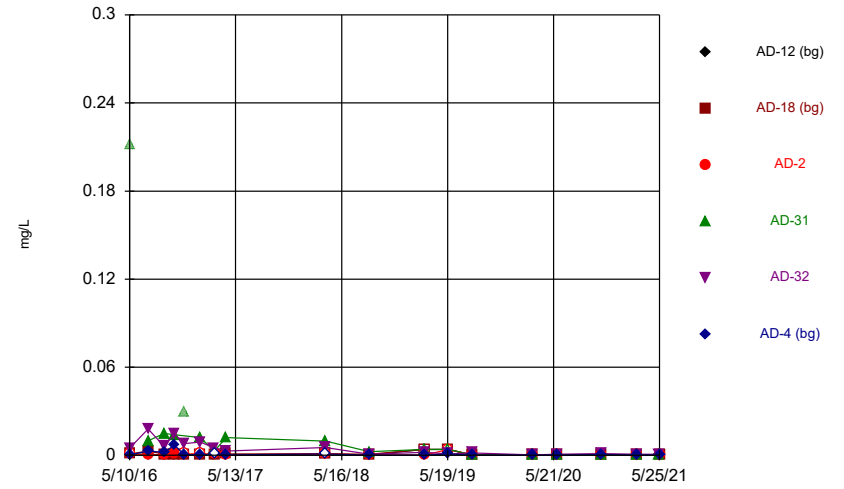


Time Series



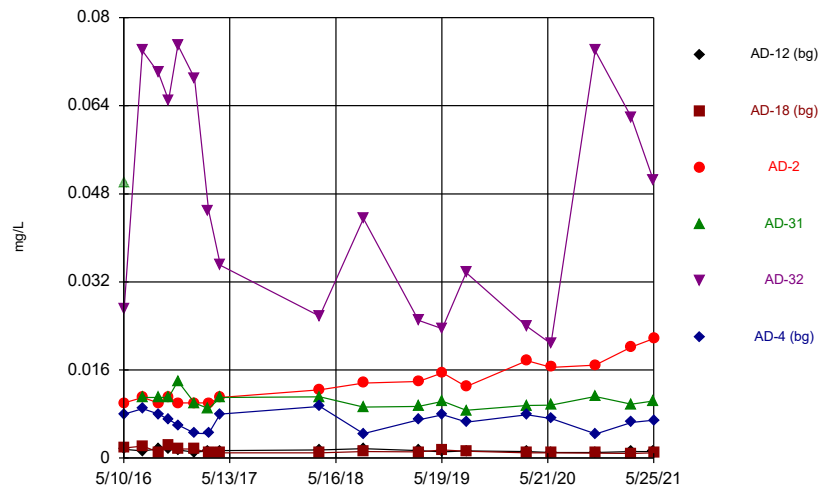
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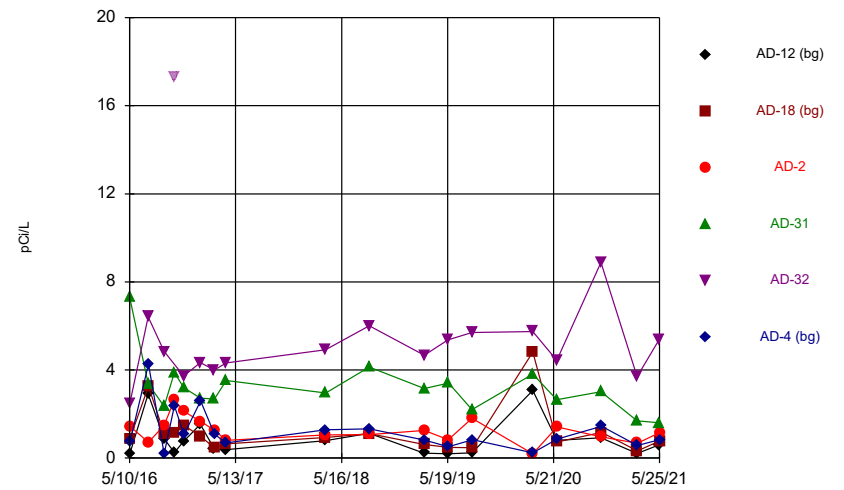
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Time Series



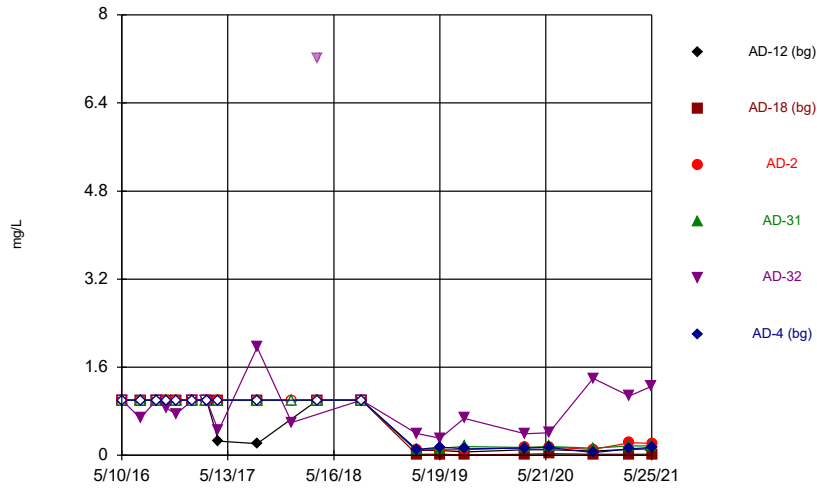
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Time Series



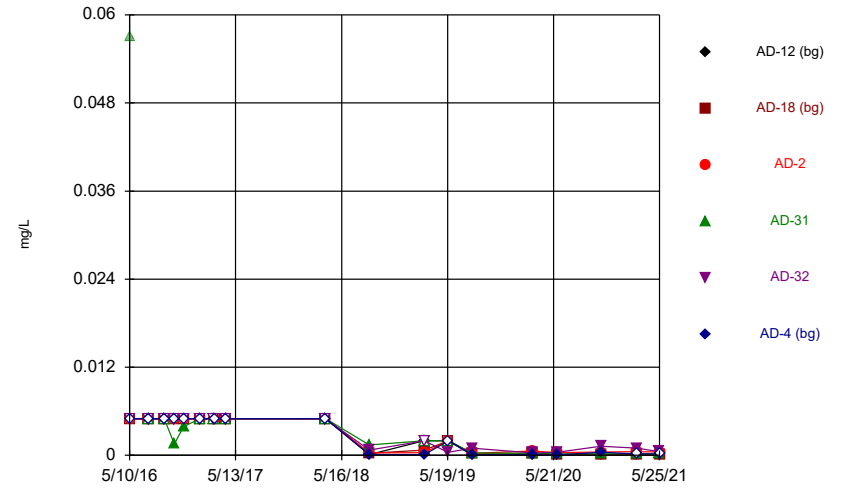
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### Time Series



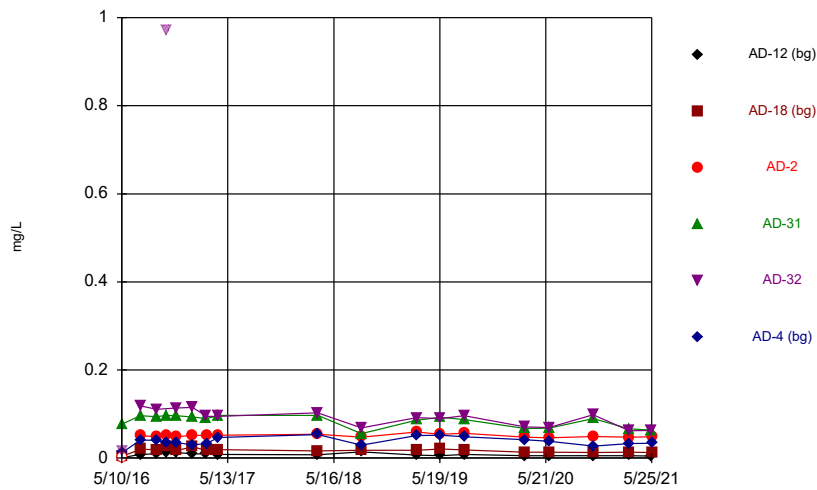
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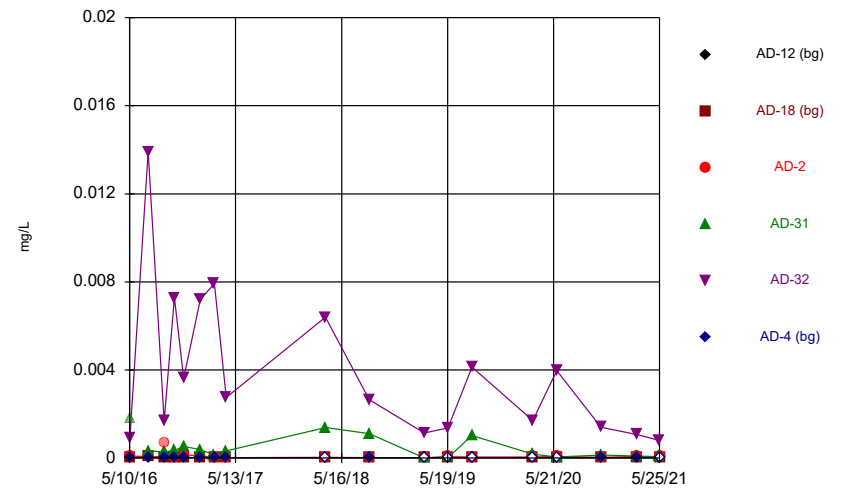
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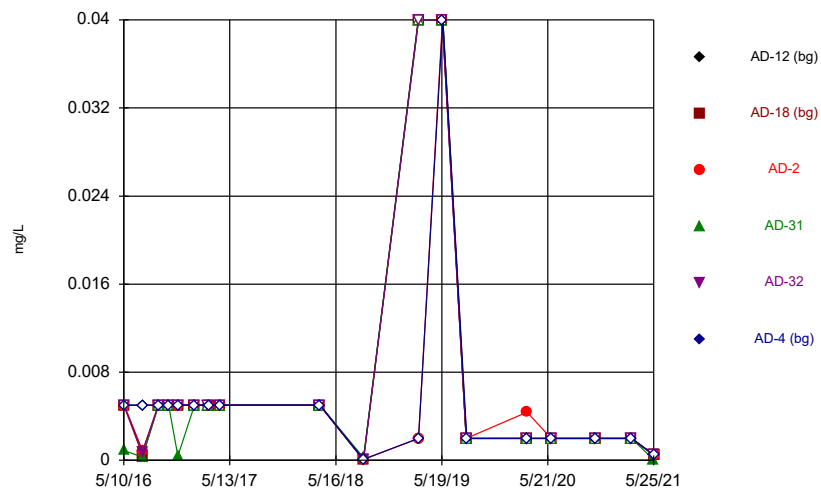
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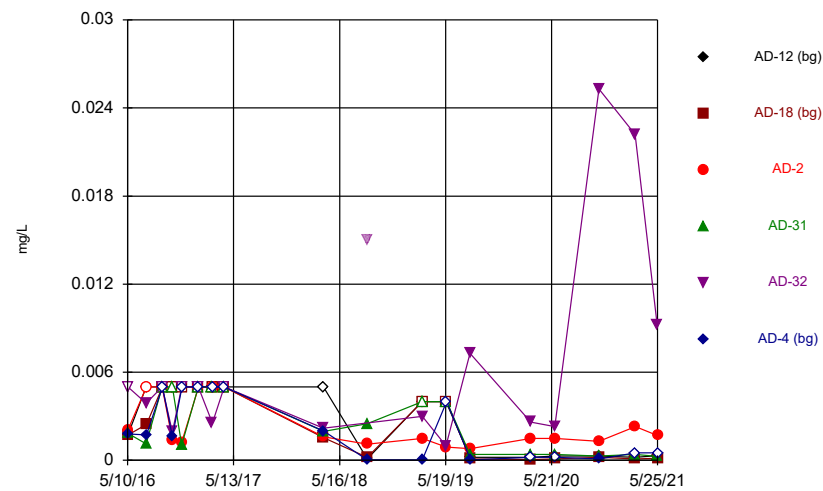
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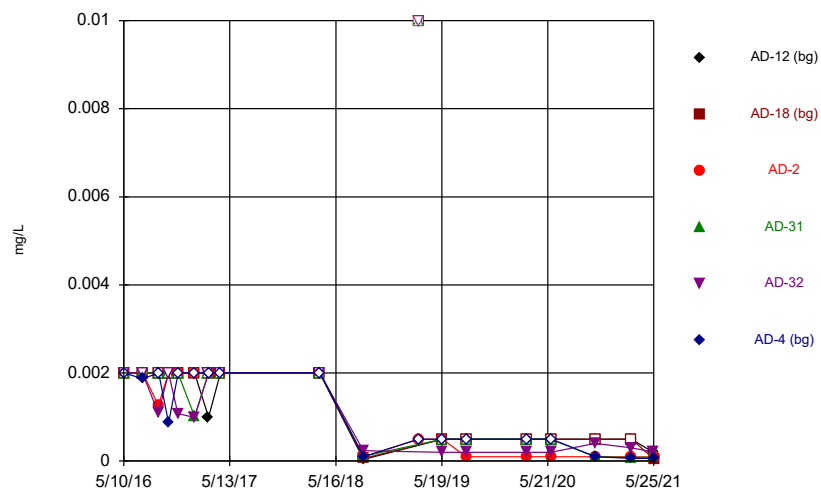
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### Time Series



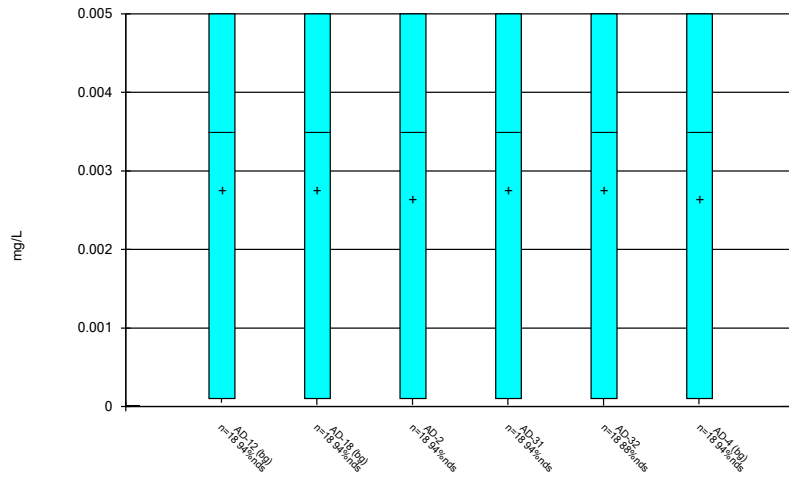
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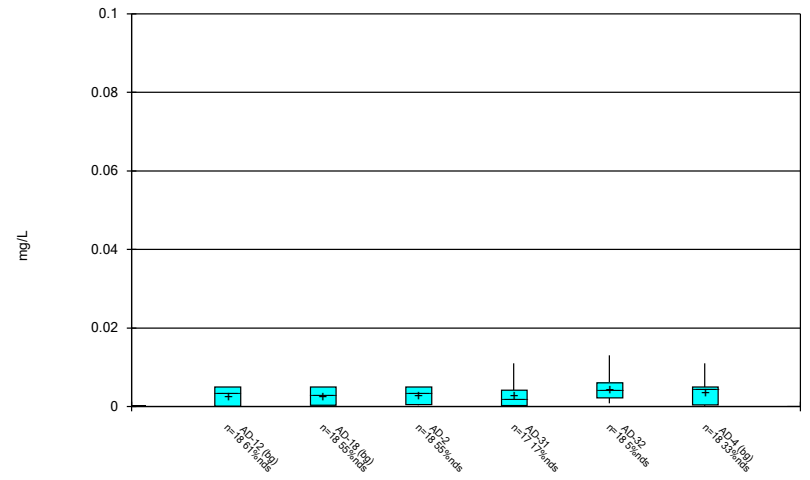
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Box & Whiskers Plot



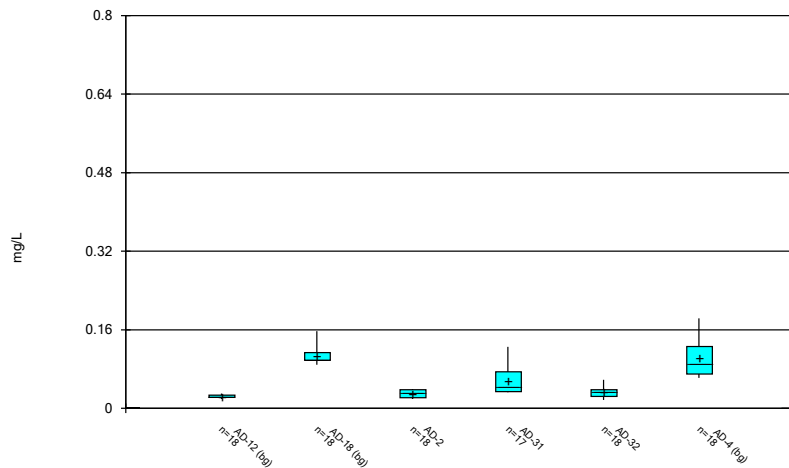
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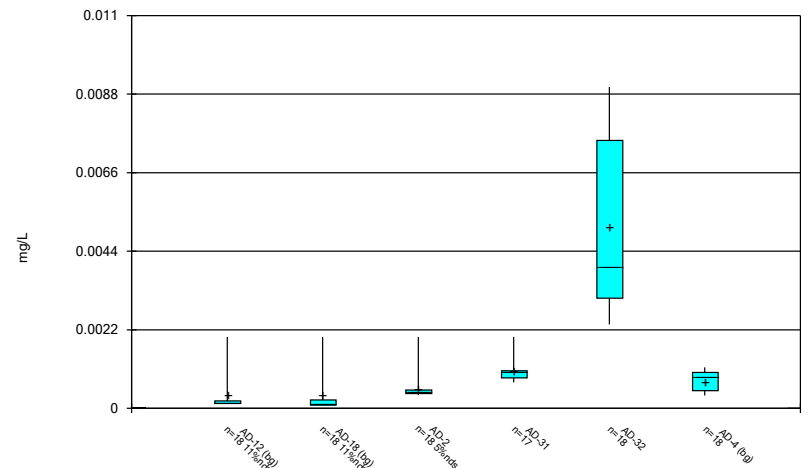
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Box & Whiskers Plot



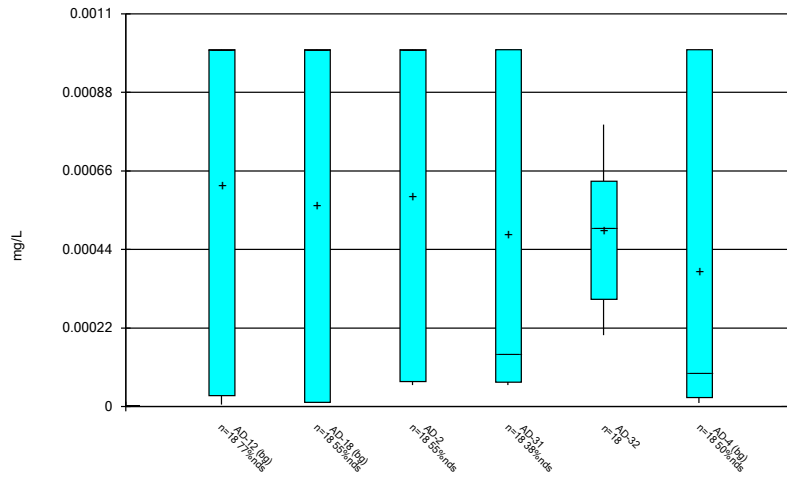
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Box & Whiskers Plot



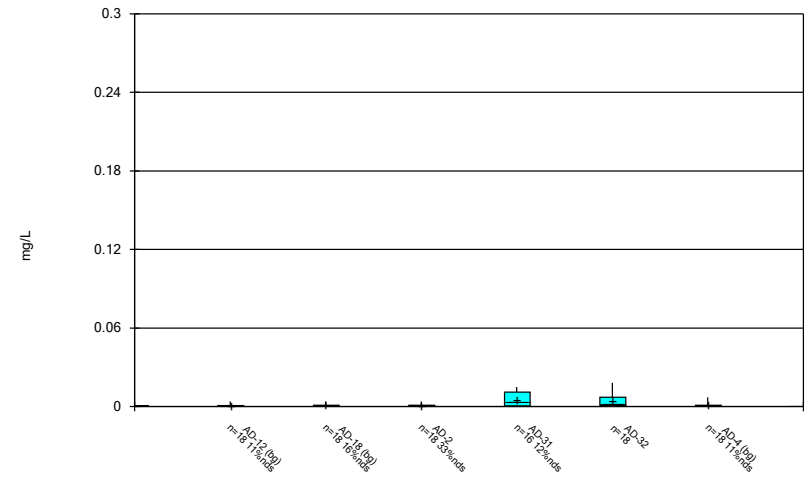
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Box & Whiskers Plot



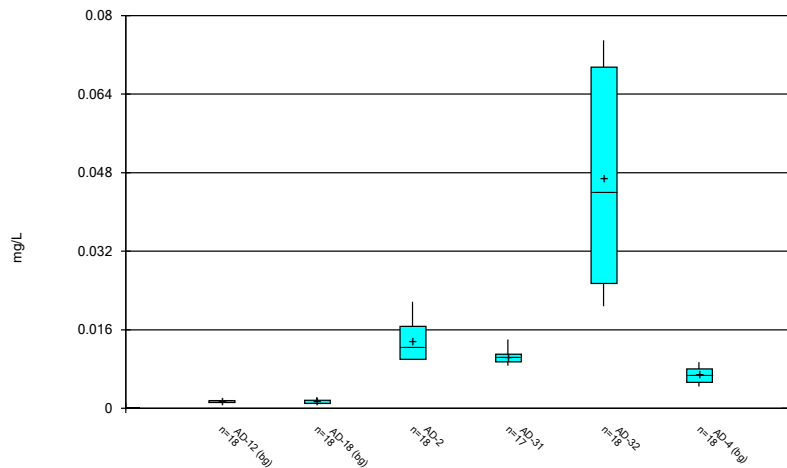
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Box & Whiskers Plot



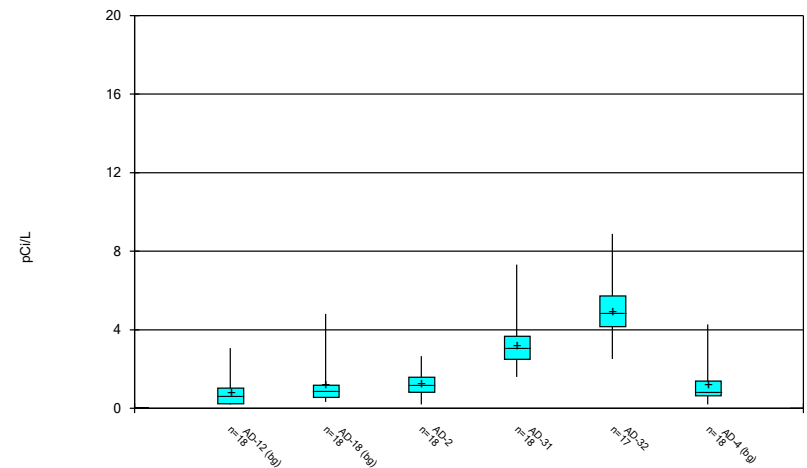
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Box & Whiskers Plot



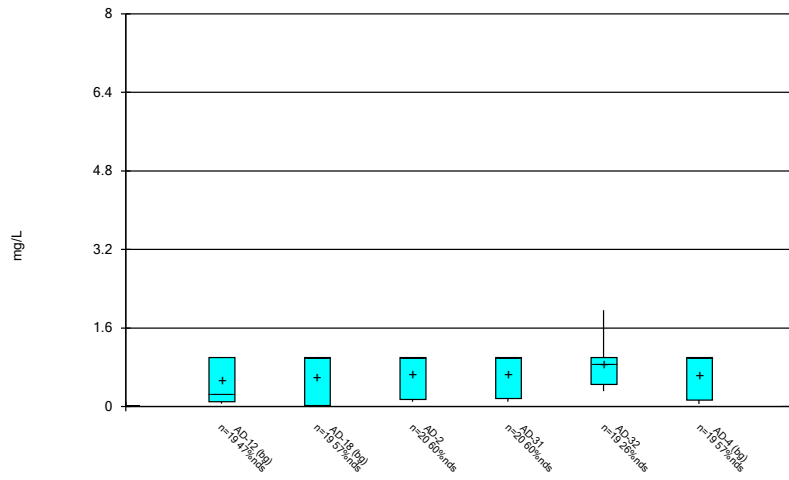
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Box & Whiskers Plot



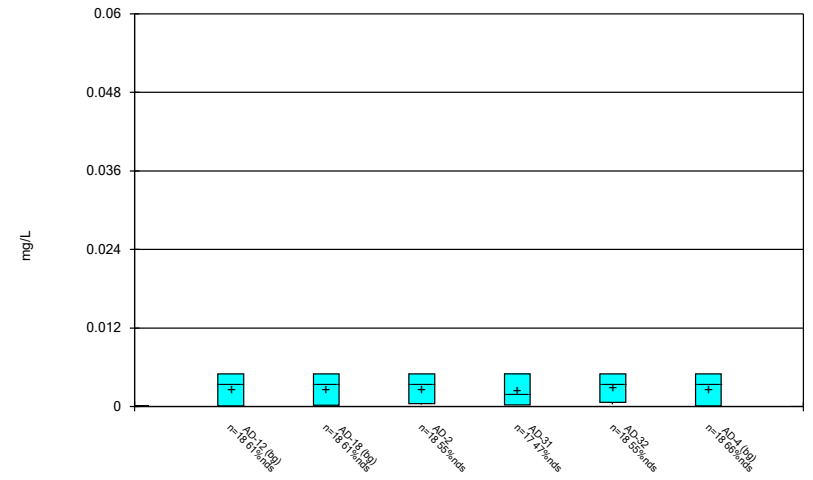
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Box & Whiskers Plot



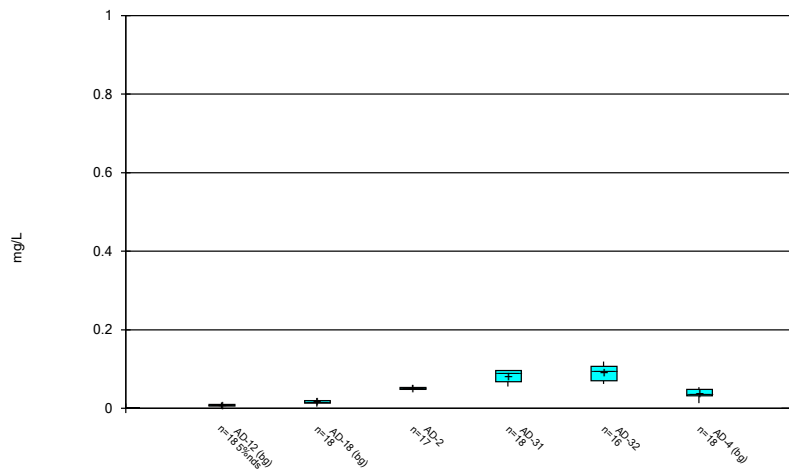
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Box & Whiskers Plot



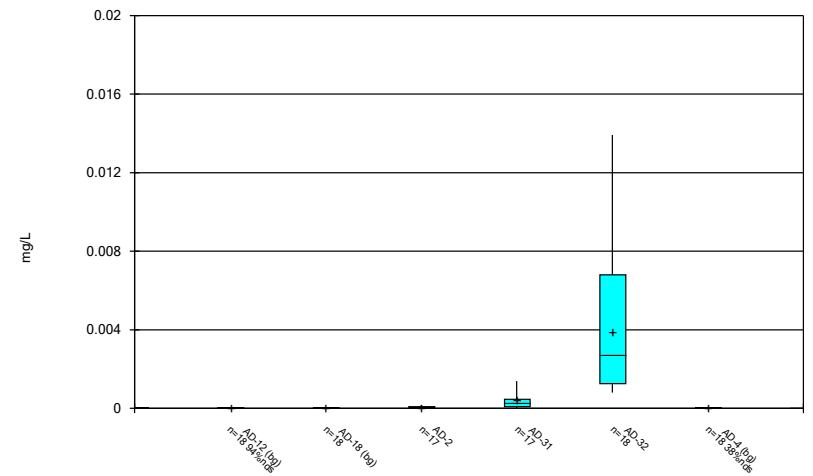
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Box & Whiskers Plot



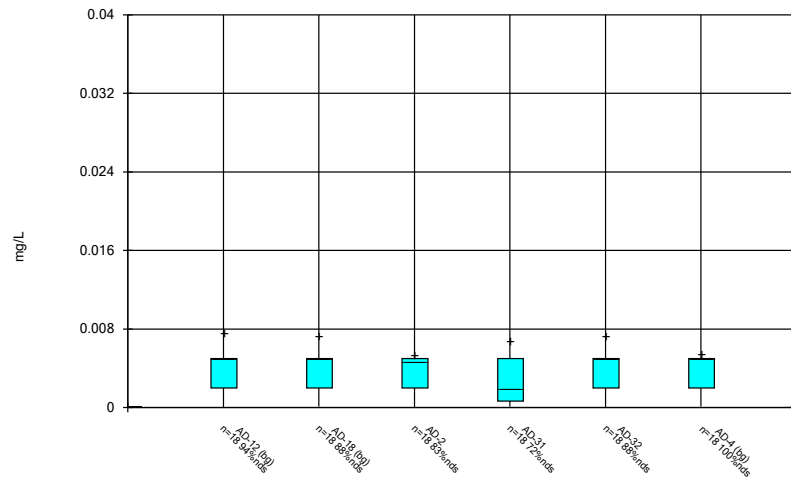
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Box & Whiskers Plot



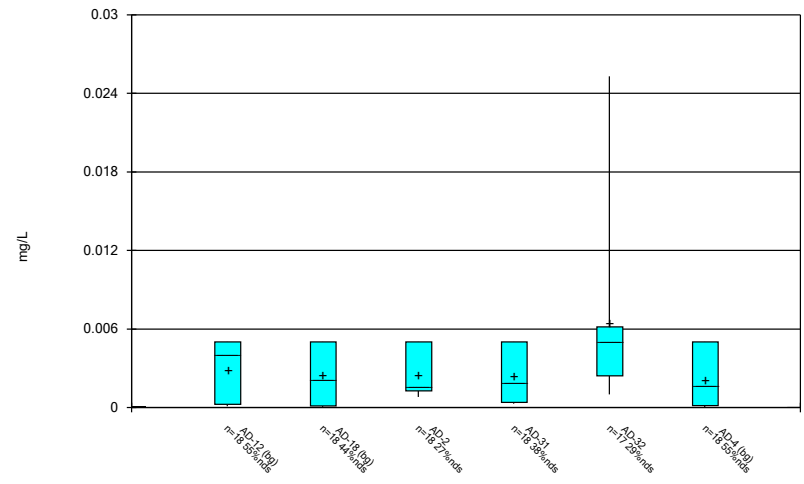
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Box & Whiskers Plot



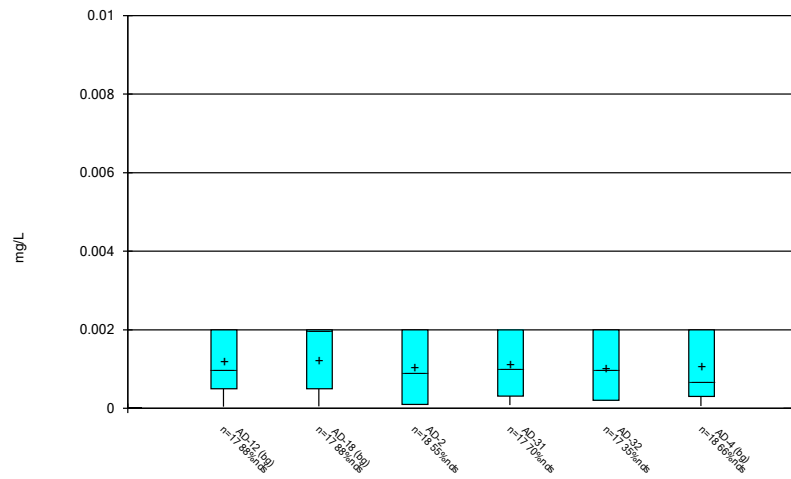
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Box & Whiskers Plot



Constituent: Selenium, total Analysis Run 8/30/2021 10:41 AM  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Box & Whiskers Plot



Constituent: Thallium, total Analysis Run 8/30/2021 10:42 AM  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

# Outlier Summary

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 8/30/2021, 10:43 AM

Date	AD-31 Arsenic, total (mg/L)	AD-31 Barium, total (mg/L)	AD-31 Beryllium, total (mg/L)	AD-31 Chromium, total (mg/L)	AD-31 Cobalt, total (mg/L)	AD-32 Combined Radium 226 + 228 (pCi/L)	AD-32 Fluoride, total (mg/L)	AD-31 Lead, total (mg/L)	AD-2 Lithium, total (mg/L)	AD-32 Lithium, total (mg/L)
5/11/2016	0.093 (o)	0.712 (o)	0.01 (o)	0.212 (o)	0.05 (o)			0.057 (o)	<0.001 (o)	0.016 (o)
9/7/2016										
10/12/2016						17.32 (o)				0.972 (o)
11/14/2016				0.03 (o)						
3/21/2018							7.2 (o)			
8/21/2018										
2/27/2019										
2/28/2019										

Date	AD-2 Mercury, total (mg/L)	AD-31 Mercury, total (mg/L)	AD-32 Selenium, total (mg/L)	AD-12 Thallium, total (mg/L)	AD-18 Thallium, total (mg/L)	AD-31 Thallium, total (mg/L)	AD-32 Thallium, total (mg/L)
5/11/2016		0.001797 (o)					
9/7/2016	0.000675 (o)						
10/12/2016							
11/14/2016							
3/21/2018							
8/21/2018			0.015 (o)				
2/27/2019				<0.01 (o)			
2/28/2019					<0.01 (o)	<0.01 (o)	<0.01 (o)



# Tolerance Limit Summary Table

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 1/6/2021, 11:28 AM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Bg N</u>	<u>Bg Mean</u>	<u>Std. Dev.</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Antimony, total (mg/L)	n/a	0.005	48	n/a	n/a	93.75	n/a	n/a	0.08526	NP Inter(NDs)
Arsenic, total (mg/L)	n/a	0.011	48	n/a	n/a	56.25	n/a	n/a	0.08526	NP Inter(normality)
Barium, total (mg/L)	n/a	0.183	48	n/a	n/a	0	n/a	n/a	0.08526	NP Inter(normality)
Beryllium, total (mg/L)	n/a	0.00115	48	n/a	n/a	8.333	n/a	n/a	0.08526	NP Inter(normality)
Cadmium, total (mg/L)	n/a	0.001	48	n/a	n/a	68.75	n/a	n/a	0.08526	NP Inter(normality)
Chromium, total (mg/L)	n/a	0.003996	48	-7.613	1.007	14.58	None	ln(x)	0.05	Inter
Cobalt, total (mg/L)	n/a	0.00939	48	n/a	n/a	0	n/a	n/a	0.08526	NP Inter(normality)
Combined Radium 226 + 228 (pCi/L)	n/a	3.587	48	0.9785	0.2661	0	None	x^(1/3)	0.05	Inter
Fluoride, total (mg/L)	n/a	1	51	n/a	n/a	60.78	n/a	n/a	0.0731	NP Inter(normality)
Lead, total (mg/L)	n/a	0.005	48	n/a	n/a	66.67	n/a	n/a	0.08526	NP Inter(normality)
Lithium, total (mg/L)	n/a	0.05874	48	0.1369	0.0508	2.083	None	sqrt(x)	0.05	Inter
Mercury, total (mg/L)	n/a	0.000064	48	n/a	n/a	43.75	n/a	n/a	0.08526	NP Inter(normality)
Molybdenum, total (mg/L)	n/a	0.04	48	n/a	n/a	93.75	n/a	n/a	0.08526	NP Inter(NDs)
Selenium, total (mg/L)	n/a	0.005	48	n/a	n/a	54.17	n/a	n/a	0.08526	NP Inter(normality)
Thallium, total (mg/L)	n/a	0.002	46	n/a	n/a	84.78	n/a	n/a	0.09447	NP Inter(NDs)

<b>PIRKEY EBAP GWPS</b>			
<b>Constituent Name</b>	<b>MCL</b>	<b>Background Limit</b>	<b>GWPS</b>
Antimony, Total (mg/L)	0.006	0.005	0.006
Arsenic, Total (mg/L)	0.01	0.011	0.011
Barium, Total (mg/L)	2	0.18	2
Beryllium, Total (mg/L)	0.004	0.0012	0.004
Cadmium, Total (mg/L)	0.005	0.001	0.005
Chromium, Total (mg/L)	0.1	0.004	0.1
Cobalt, Total (mg/L)	n/a	0.0094	0.0094
Combined Radium, Total (pCi/L)	5	3.59	5
Fluoride, Total (mg/L)	4	1	4
Lead, Total (mg/L)	n/a	0.005	0.005
Lithium, Total (mg/L)	n/a	0.059	0.059
Mercury, Total (mg/L)	0.002	0.000064	0.002
Molybdenum, Total (mg/L)	n/a	0.04	0.04
Selenium, Total (mg/L)	0.05	0.005	0.05
Thallium, Total (mg/L)	0.002	0.002	0.002

*\*Grey cell indicates Background Limit is higher than MCL*

*\*MCL = Maximum Contaminant Level*

*\*GWPS = Groundwater Protection Standard*

# Confidence Interval - Significant Results

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 8/30/2021, 10:50 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig. N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Cobalt, total (mg/L)	AD-2	0.0169	0.01	0.0094	Yes 18	0.01358	0.003725	0	None	No	0.01	NP (normality)
Cobalt, total (mg/L)	AD-31	0.01109	0.009602	0.0094	Yes 17	0.01037	0.001238	0	None	x^(1/3)	0.01	Param.
Cobalt, total (mg/L)	AD-32	0.07	0.025	0.0094	Yes 18	0.04681	0.02066	0	None	No	0.01	NP (normality)
Lithium, total (mg/L)	AD-31	0.096	0.0669	0.059	Yes 18	0.08413	0.01385	0	None	No	0.01	NP (normality)
Lithium, total (mg/L)	AD-32	0.1039	0.07894	0.059	Yes 16	0.09144	0.01921	0	None	No	0.01	Param.

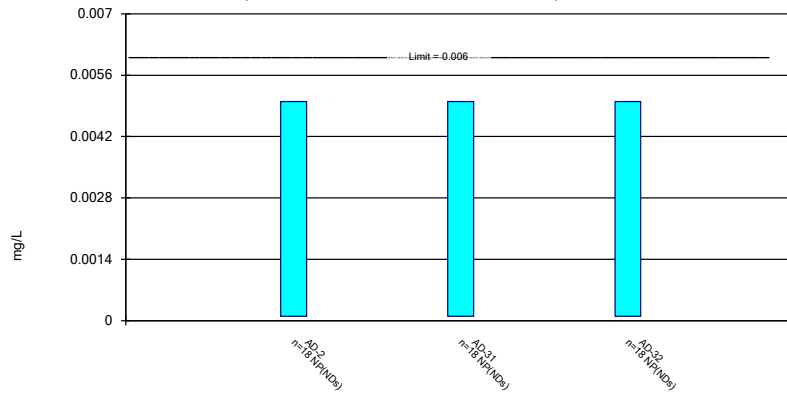
# Confidence Interval - All Results

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 8/30/2021, 10:50 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony, total (mg/L)	AD-2	0.005	0.0001	0.006	No	18	0.002648	0.002459	94.44	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-31	0.005	0.0001	0.006	No	18	0.002757	0.00238	94.44	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-32	0.005	0.0001	0.006	No	18	0.002752	0.002386	88.89	None	No	0.01	NP (NDs)
Arsenic, total (mg/L)	AD-2	0.005	0.00052	0.011	No	18	0.002834	0.002256	55.56	None	No	0.01	NP (NDs)
Arsenic, total (mg/L)	AD-31	0.00341	0.0005986	0.011	No	17	0.002821	0.002816	17.65	Kaplan-Meier	sqrt(x)	0.01	Param.
Arsenic, total (mg/L)	AD-32	0.006	0.002481	0.011	No	18	0.004542	0.003132	5.556	None	sqrt(x)	0.01	Param.
Barium, total (mg/L)	AD-2	0.038	0.0215	2	No	18	0.02986	0.00777	0	None	No	0.01	NP (normality)
Barium, total (mg/L)	AD-31	0.076	0.0336	2	No	17	0.05616	0.02651	0	None	No	0.01	NP (normality)
Barium, total (mg/L)	AD-32	0.03919	0.02609	2	No	18	0.03264	0.01083	0	None	No	0.01	Param.
Beryllium, total (mg/L)	AD-2	0.0005146	0.000402	0.004	No	18	0.0005408	0.0003682	5.556	None	No	0.01	NP (normality)
Beryllium, total (mg/L)	AD-31	0.0011	0.00085	0.004	No	17	0.001065	0.0003745	0	None	No	0.01	NP (normality)
Beryllium, total (mg/L)	AD-32	0.006261	0.003567	0.004	No	18	0.005063	0.002322	0	None	sqrt(x)	0.01	Param.
Cadmium, total (mg/L)	AD-2	0.001	0.00007	0.005	No	18	0.000588	0.0004741	55.56	None	No	0.01	NP (NDs)
Cadmium, total (mg/L)	AD-31	0.001	0.000066	0.005	No	18	0.0004836	0.000461	38.89	None	No	0.01	NP (normality)
Cadmium, total (mg/L)	AD-32	0.0006051	0.0003818	0.005	No	18	0.0004935	0.0001845	0	None	No	0.01	Param.
Chromium, total (mg/L)	AD-2	0.0004211	0.0002299	0.1	No	18	0.0007348	0.0008811	33.33	Kaplan-Meier	ln(x)	0.01	Param.
Chromium, total (mg/L)	AD-31	0.012	0.000292	0.1	No	16	0.005495	0.005573	12.5	None	No	0.01	NP (normality)
Chromium, total (mg/L)	AD-32	0.00642	0.001457	0.1	No	18	0.004634	0.005103	0	None	sqrt(x)	0.01	Param.
<b>Cobalt, total (mg/L)</b>	<b>AD-2</b>	<b>0.0169</b>	<b>0.01</b>	<b>0.0094</b>	<b>Yes</b>	<b>18</b>	<b>0.01358</b>	<b>0.003725</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.01</b>	<b>NP (normality)</b>
<b>Cobalt, total (mg/L)</b>	<b>AD-31</b>	<b>0.01109</b>	<b>0.009602</b>	<b>0.0094</b>	<b>Yes</b>	<b>17</b>	<b>0.01037</b>	<b>0.001238</b>	<b>0</b>	<b>None</b>	<b>x^(1/3)</b>	<b>0.01</b>	<b>Param.</b>
<b>Cobalt, total (mg/L)</b>	<b>AD-32</b>	<b>0.07</b>	<b>0.025</b>	<b>0.0094</b>	<b>Yes</b>	<b>18</b>	<b>0.04681</b>	<b>0.02066</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.01</b>	<b>NP (normality)</b>
Combined Radium 226 + 228 (pCi/L)	AD-2	1.601	0.9073	5	No	18	1.254	0.5734	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-31	3.785	2.469	5	No	18	3.205	1.244	0	None	x^(1/3)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-32	5.874	4.122	5	No	17	4.998	1.398	0	None	No	0.01	Param.
Fluoride, total (mg/L)	AD-2	1	0.14	4	No	20	0.6575	0.4316	60	None	No	0.01	NP (NDs)
Fluoride, total (mg/L)	AD-31	1	0.16	4	No	20	0.658	0.43	60	None	No	0.01	NP (NDs)
Fluoride, total (mg/L)	AD-32	0.9632	0.4649	4	No	19	0.852	0.4128	26.32	Kaplan-Meier	No	0.01	Param.
Lead, total (mg/L)	AD-2	0.005	0.000389	0.005	No	18	0.002799	0.002294	55.56	None	No	0.01	NP (NDs)
Lead, total (mg/L)	AD-31	0.005	0.000218	0.005	No	17	0.002488	0.002135	47.06	None	No	0.01	NP (normality)
Lead, total (mg/L)	AD-32	0.005	0.00052	0.005	No	18	0.002921	0.00217	55.56	None	No	0.01	NP (NDs)
Lithium, total (mg/L)	AD-2	0.05299	0.04861	0.059	No	17	0.0508	0.003503	0	None	No	0.01	Param.
<b>Lithium, total (mg/L)</b>	<b>AD-31</b>	<b>0.096</b>	<b>0.0669</b>	<b>0.059</b>	<b>Yes</b>	<b>18</b>	<b>0.08413</b>	<b>0.01385</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.01</b>	<b>NP (normality)</b>
<b>Lithium, total (mg/L)</b>	<b>AD-32</b>	<b>0.1039</b>	<b>0.07894</b>	<b>0.059</b>	<b>Yes</b>	<b>16</b>	<b>0.09144</b>	<b>0.01921</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.01</b>	<b>Param.</b>
Mercury, total (mg/L)	AD-2	0.00008153	0.00003976	0.002	No	17	0.00006065	0.00003333	0	None	No	0.01	Param.
Mercury, total (mg/L)	AD-31	0.0005355	0.0001177	0.002	No	17	0.0003794	0.0004107	0	None	sqrt(x)	0.01	Param.
Mercury, total (mg/L)	AD-32	0.005271	0.001755	0.002	No	18	0.003886	0.00347	0	None	sqrt(x)	0.01	Param.
Molybdenum, total (mg/L)	AD-2	0.005	0.0008627	0.04	No	18	0.005322	0.008846	83.33	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-31	0.005	0.0004016	0.04	No	18	0.006775	0.01224	72.22	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-32	0.005	0.0007621	0.04	No	18	0.007295	0.01204	88.89	None	No	0.01	NP (NDs)
Selenium, total (mg/L)	AD-2	0.005	0.001231	0.05	No	18	0.002438	0.001673	27.78	None	No	0.01	NP (normality)
Selenium, total (mg/L)	AD-31	0.005	0.0004	0.05	No	18	0.002425	0.001998	38.89	None	No	0.01	NP (normality)
Selenium, total (mg/L)	AD-32	0.006044	0.002025	0.05	No	17	0.006379	0.006875	29.41	Kaplan-Meier	ln(x)	0.01	Param.
Thallium, total (mg/L)	AD-2	0.002	0.0001	0.002	No	18	0.001053	0.0009144	55.56	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-31	0.002	0.000113	0.002	No	17	0.001141	0.0008636	70.59	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-32	0.002	0.0002	0.002	No	17	0.001006	0.000815	35.29	None	No	0.01	NP (normality)

### Non-Parametric Confidence Interval

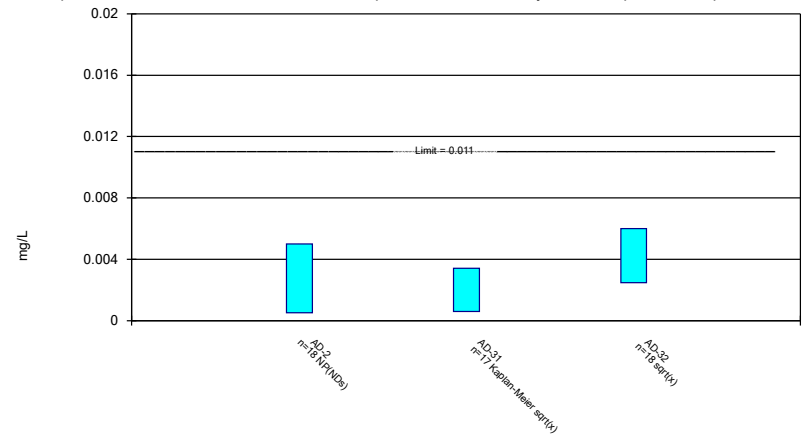
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Antimony, total Analysis Run 8/30/2021 10:48 AM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Parametric and Non-Parametric (NP) Confidence Interval

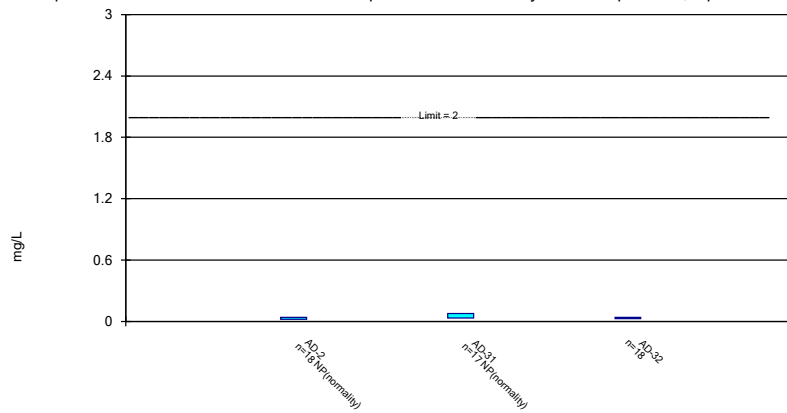
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Arsenic, total Analysis Run 8/30/2021 10:48 AM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Barium, total Analysis Run 8/30/2021 10:48 AM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Parametric and Non-Parametric (NP) Confidence Interval

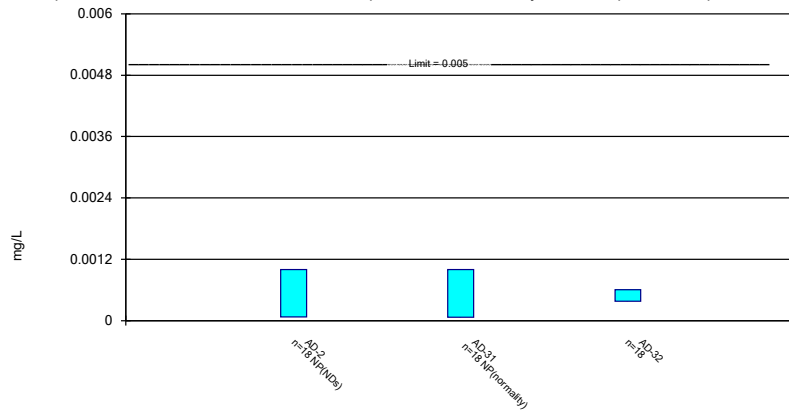
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Beryllium, total Analysis Run 8/30/2021 10:48 AM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Parametric and Non-Parametric (NP) Confidence Interval

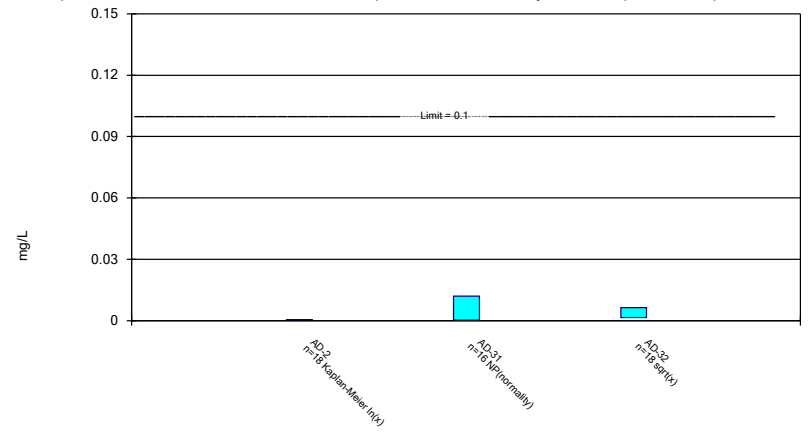
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cadmium, total Analysis Run 8/30/2021 10:48 AM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Parametric and Non-Parametric (NP) Confidence Interval

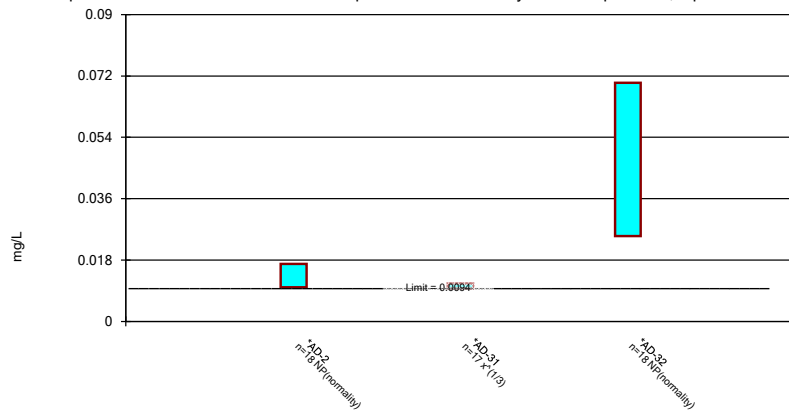
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Chromium, total Analysis Run 8/30/2021 10:48 AM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Parametric and Non-Parametric (NP) Confidence Interval

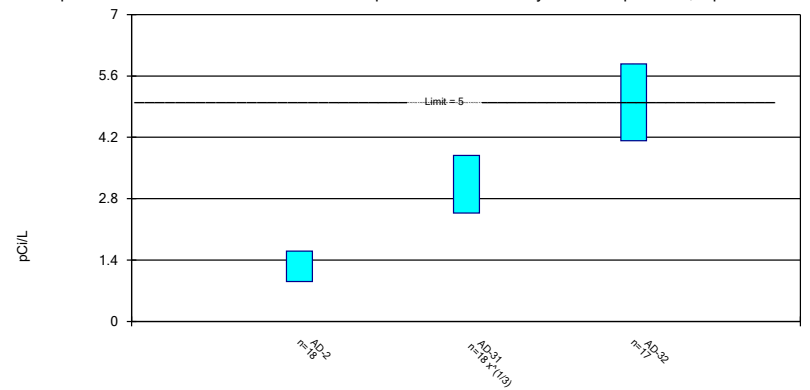
Compliance limit is exceeded.\* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt, total Analysis Run 8/30/2021 10:48 AM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Parametric Confidence Interval

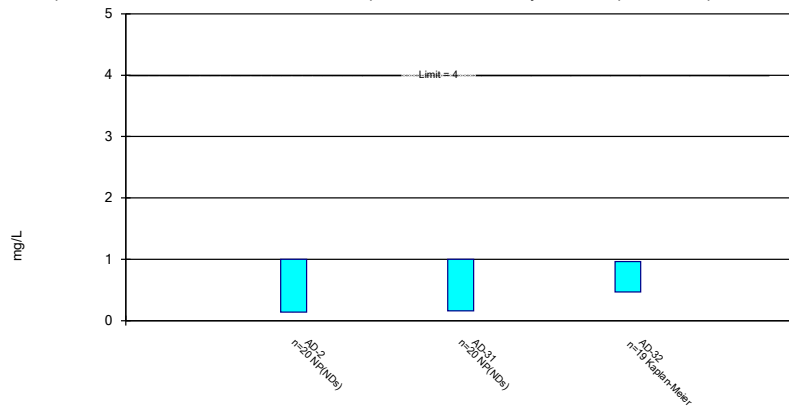
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Combined Radium 226 + 228 Analysis Run 8/30/2021 10:48 AM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Parametric and Non-Parametric (NP) Confidence Interval

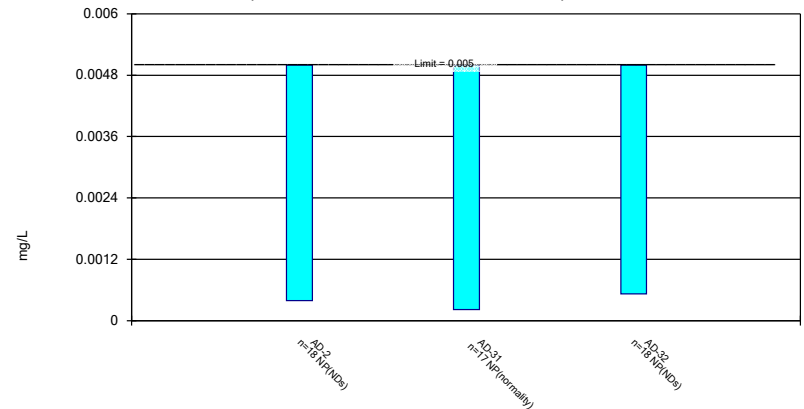
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Fluoride, total Analysis Run 8/30/2021 10:48 AM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Non-Parametric Confidence Interval

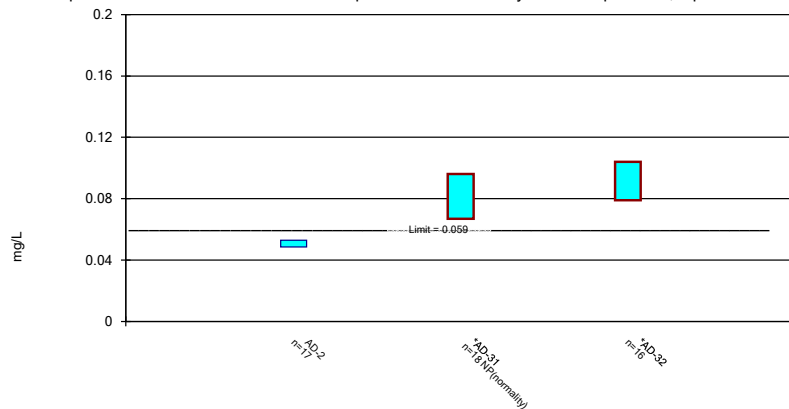
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Lead, total Analysis Run 8/30/2021 10:48 AM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Parametric and Non-Parametric (NP) Confidence Interval

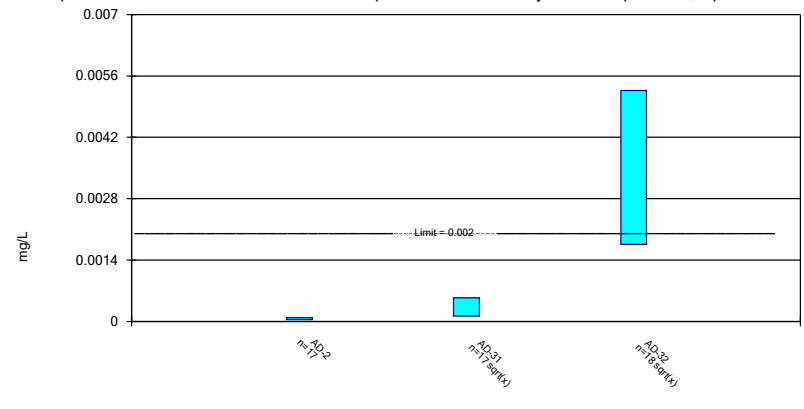
Compliance limit is exceeded.\* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lithium, total Analysis Run 8/30/2021 10:48 AM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Parametric Confidence Interval

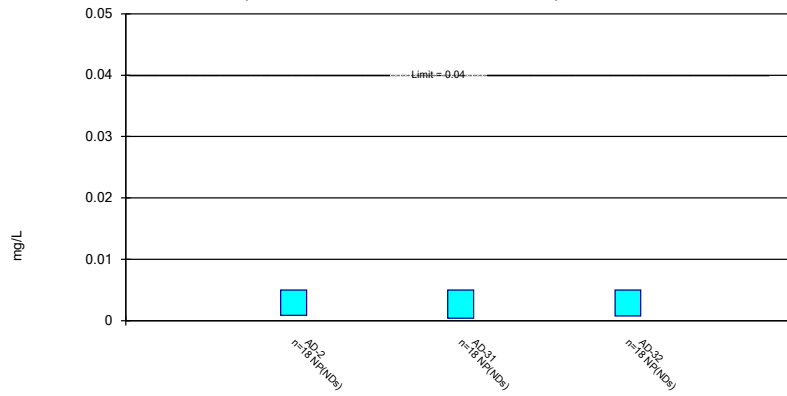
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Mercury, total Analysis Run 8/30/2021 10:48 AM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Non-Parametric Confidence Interval

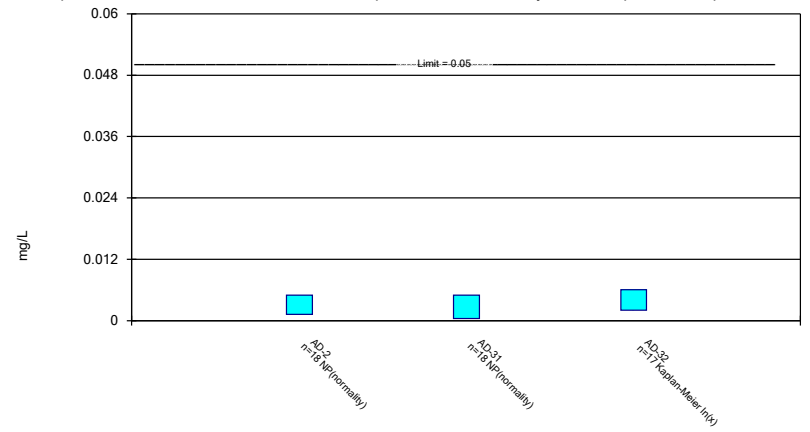
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Molybdenum, total Analysis Run 8/30/2021 10:48 AM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Parametric and Non-Parametric (NP) Confidence Interval

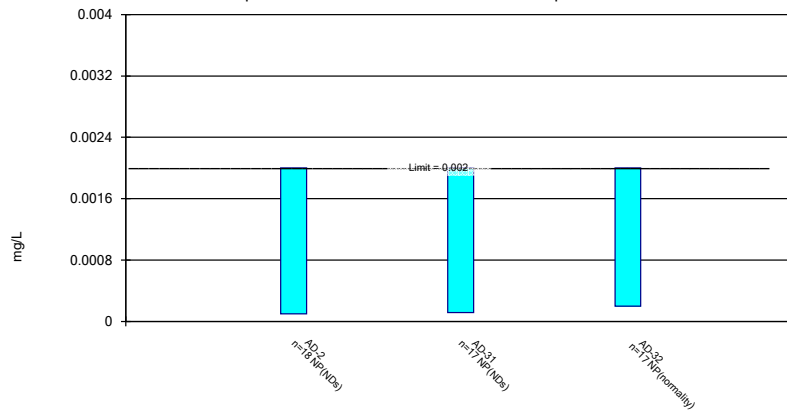
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Selenium, total Analysis Run 8/30/2021 10:48 AM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Non-Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Thallium, total Analysis Run 8/30/2021 10:48 AM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP



### **APPENDIX 3- Alternate Source Demonstrations**

Alternate source demonstrations are included in this appendix. Alternate sources are sources or reasons that explain that statistically significant increases over background or statistically significant levels above the groundwater protection standard are not attributable to the CCR unit.

**ALTERNATIVE SOURCE  
DEMONSTRATION REPORT  
FEDERAL CCR RULE**

**H.W. Pirkey Power Plant  
East Bottom Ash Pond  
Hallsville, Texas**

*Submitted to*



1 Riverside Plaza  
Columbus, Ohio 43215-2372

*Submitted by*

**Geosyntec**   
consultants

engineers | scientists | innovators

941 Chatham Lane  
Suite 103  
Columbus, OH 43221

May 2021

CHA8495

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## ATTACHMENTS

Attachment A	SB-2 Boring Log
Attachment B	SB-2 Boring Photographic Log
Attachment C	SEM/EDS Analysis
Attachment D	AD-32 Low-Flow Purge Logs
Attachment E	Certification by a Qualified Professional Engineer

## LIST OF ACRONYMS

AEP	American Electric Power
ASD	Alternative Source Demonstration
CCR	Coal Combustion Residuals
CFR	Code of Federal Regulations
EBAP	East Bottom Ash Pond
EDS	Energy Dispersive Spectroscopic Analyzer
EPRI	Electric Power Research Institute
GSC	Groundwater Stats Consulting, LLC
GWPS	Groundwater Protection Standard
LCL	Lower Confidence Limit
MCL	Maximum Contaminant Level
QA	Quality Assurance
QC	Quality Control
SEM	Scanning Electron Microscopy
SPLP	Synthetic Precipitation Leaching Profile
SSL	Statistically Significant Level
TCEQ	Texas Commission on Environmental Quality
UTL	Upper Tolerance Limit
USEPA	United States Environmental Protection Agency
VAP	Vertical Aquifer Profiling
WBAP	West Bottom Ash Pond
XRD	X-Ray Diffraction

## SECTION 1

### INTRODUCTION AND SUMMARY

This Alternative Source Demonstration (ASD) report has been prepared to address statistically significant levels (SSLs) for cobalt and lithium in the groundwater monitoring network at the H.W. Pirkey Plant East Bottom Ash Pond (EBAP), located in Hallsville, Texas, following the second semi-annual assessment monitoring event of 2020. The EBAP is registered as a surface impoundment under Texas Commission on Environmental Quality (TCEQ) Industrial and Hazardous Waste Solid Waste Registration No. 33240.

The H.W. Pirkey Plant has four regulated coal combustion residuals (CCR) storage units, including the EBAP (**Figure 1**). In November 2020, a semi-annual assessment monitoring event was conducted at the EBAP in accordance with 40 CFR 257.95(d)(1). The monitoring data were submitted to Groundwater Stats Consulting, LLC (GSC) for statistical analysis. Groundwater protection standards (GWPSs) were established for each Appendix IV parameter in accordance with the statistical analysis plan developed for the unit (Geosyntec, 2020a) and the United States Environmental Protection Agency's (USEPA's) *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance* (Unified Guidance; USEPA, 2009). The GWPS for each parameter was established as the greater of the background concentration and the maximum contaminant level (MCL) or, for parameters without an MCL, the risk-based level specified in 40 CFR 257.95(h)(2). To determine background concentrations, an upper tolerance limit (UTL) was calculated using pooled data from the background wells collected during the background monitoring and assessment monitoring events.

Confidence intervals were re-calculated for each Appendix IV parameter at the compliance wells to assess whether these parameters were present at a statistically significant level (SSL) above the GWPSs. An SSL was concluded if the lower confidence limit (LCL) of a parameter exceeded the GWPS (i.e., if the entire confidence interval exceeded the GWPS). The following SSLs were identified at the Pirkey EBAP (Geosyntec, 2021):

- The LCLs for cobalt exceeded the GWPS of 0.00940 mg/L at AD-2 (0.0100 mg/L), AD-31 (0.00953 mg/L), and AD-32 (0.0239 mg/L).
- The LCL for lithium exceeded the GWPS of 0.0590 mg/L at AD-31 (0.0835 mg/L) and AD-32 (0.0838 mg/L).

No other SSLs were identified.

## 1.1 CCR Rule Requirements

USEPA regulations regarding assessment monitoring programs for CCR landfills and surface impoundments provide owners and operators with the option to make an alternative source demonstration when an SSL is identified (40 CFR 257.95(g)(3)(ii)). An owner or operator may:

*Demonstrate that a source other than the CCR unit caused the contamination, or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Any such demonstration must be supported by a report that includes the factual or evidentiary basis for any conclusions and must be certified to be accurate by a qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority. If a successful demonstration is made, the owner or operator must continue monitoring in accordance with the assessment monitoring program pursuant to this section...*

Pursuant to 40 CFR 257.95(g)(3)(ii), Geosyntec Consultants, Inc. (Geosyntec) has prepared this ASD report to document that the SSLs identified for cobalt and lithium are from a source other than the EBAP.

## 1.2 Demonstration of Alternative Sources

An evaluation was completed to assess possible alternative sources to which the identified SSLs could be attributed. Alternative sources were identified amongst five types, based on methodology provided by EPRI (2017):

- ASD Type I: Sampling Causes;
- ASD Type II: Laboratory Causes;
- ASD Type III: Statistical Evaluation Causes;
- ASD Type IV: Natural Variation; and
- ASD Type V: Alternative Sources.

A demonstration was conducted to show that the SSLs identified for cobalt and lithium were based on a Type IV cause and not by a release from the Pirkey EBAP.

## SECTION 2

### ALTERNATIVE SOURCE DEMONSTRATION

The Federal CCR Rule allows the owner or operator 90 days from the determination of an SSL to demonstrate that a source other than the CCR unit caused the SSL. The methodology used to evaluate the SSLs identified for cobalt and lithium and the proposed alternative sources are described below.

#### 2.1 Proposed Alternative Source

An initial review of site geochemistry, site historical data, and laboratory quality assurance/quality control (QA/QC) data did not identify alternative sources for cobalt and lithium due to Type I (sampling), Type II (laboratory), or Type III (statistical evaluation) issues. Groundwater sampling, laboratory analysis, and statistical evaluations were generally completed in accordance with the Federal CCR Rule and draft TCEQ guidance for groundwater monitoring (TCEQ, 2020). As described below, the SSLs have been attributed to natural variation associated with the underlying geology, which is a Type IV (natural variation) issue.

##### 2.1.1 Cobalt

Previous ASDs for cobalt at the EBAP provided evidence that cobalt is present in the aquifer media at the site and that the observed cobalt concentrations were due to natural variation (Geosyntec, 2019a; Geosyntec, 2019b; Geosyntec, 2020b; Geosyntec, 2020c). The previous ASDs discussed how the EBAP did not appear to be a source for cobalt in downgradient groundwater, based on observed concentrations of cobalt both in the ash material and in leachate from Synthetic Precipitation Leaching Procedure (SPLP) analysis (SW-846 Test Method 1312, [USEPA, 1994]) of the ash material. Cobalt was not detected in the SPLP ash leachate above the reporting limit of 0.01 mg/L, which is lower than the average concentrations observed at the wells of interest (**Table 1**).

A surface water sample was collected directly from the WBAP on November 4, 2020 as a surrogate for an EBAP sample. A sample could not be collected from the EBAP, as all ponded water had been removed at the time of sampling. However, the EBAP and WBAP receive the same process water, with the use of each pond dependent on available freeboard and cleaning schedule; thus, there is a basis for the equivalency between these two surface water samples. Cobalt was detected at a concentration of 0.000501 mg/L in the WBAP sample (**Table 1**). Cobalt was detected in a surface water sample previously collected (December 15, 2018) from the EBAP at an estimated concentration of 0.0024 mg/L (**Table 1**). These concentrations are lower than all reported cobalt concentrations for in network wells from the most recent sampling event (excluding upgradient well AD-18), and over an order of magnitude lower than the average concentration in groundwater at the wells of interest (**Table 1; Figure 2**). Thus, the EBAP is not the likely source of cobalt at AD-2, AD-31, and AD-32.



As noted in the previous ASDs, soil samples collected across the site, including from locations near the EBAP, identified cobalt in the aquifer solids at varying concentrations. SB-2 was advanced in the vicinity of AD-2 in April 2020 to re-log the geology at AD-2 and collect samples for laboratory analysis of total metals and mineralogy. The SB-2 field boring log, which was generated by Auckland Consulting LLC, is provided as **Attachment A**. Cobalt was identified at SB-2 at concentrations of 9.45 milligrams per kilogram (mg/kg) at 25-27 feet below ground surface (bgs) and 19.2 mg/kg at 31-33 feet bgs (**Table 2**). These cobalt concentrations are greater than the concentration of cobalt present in the bottom ash (**Table 1**). Both samples correlate to the depth of the monitoring well screen of AD-2 (20-40 feet bgs), indicating that cobalt is present in aquifer solids within the AD-2 screened interval. Cobalt was also identified in the aquifer solids at varying concentrations at other locations throughout the site, with the highest value of 23.5 mg/kg reported at AD-41, which is upgradient of the EBAP (**Figure 3**).

In addition to total cobalt, soil samples were submitted for mineralogical analysis to evaluate the presence of cobalt-containing minerals. X-ray diffraction (XRD) analysis of soils from SB-2 identified pyrite (an iron sulfide) in samples collected at 25-27 feet bgs and 31-33 feet bgs at concentrations up to 7% by weight (**Figure 3**). Cobalt is known to undergo isomorphic substitution for iron in crystalline iron minerals such as pyrite due to their similar ionic radii of approximately 1.56 angstroms (Å) for iron vs. 1.52 Å for cobalt (Clementi and Raimondi, 1963; Krupka and Serne, 2002; Hitzman et al., 2017).

The aquifer solids at SB-2 are distinctly red in color at shallow depths, as illustrated in the photolog of soil cores provided in **Attachment B**. While shallow samples were not collected for mineralogical analysis, red color in soils is often associated with the presence of oxidized iron-bearing minerals such as hematite and goethite. The weathering of pyrite to goethite under oxidizing conditions is also a well-understood phenomenon, including in formations in east Texas (Senkayi et al., 1986; Dixon et al., 1982). It is likely that the pyrite weathering process is resulting in the release of isomorphically substituted cobalt from the pyrite crystal structure as it undergoes oxidative transformation to iron oxide minerals.

As described in the previous ASDs, vertical aquifer profiling (VAP) was used to collect groundwater samples from upgradient locations B-2 and B-3 during the soil boring and sample collection process (Geosyntec, 2019b). A groundwater sample was also collected from AD-32, an existing well within the EBAP groundwater monitoring network. Solid phases within these groundwater samples were separated and submitted for analysis of chemical composition. For the VAP samples, separation was completed using a centrifuge due to the high abundance of solids. For the groundwater sample at AD-32, the sample was filtered using a 1.5-micron filter. Based on total metals analysis, cobalt was identified both in the centrifuged solid material collected from upgradient VAP location B-3 [VAP-B3-(40-45)] and in the material retained on the filter after processing groundwater from permanent monitoring wells B-2 and B-3 (**Table 2**). The concentrations of cobalt in the solid material retained after filtration were comparable to the bulk soil samples collected from the same locations.

The solid sample [VAP-B3-(40-45)] was submitted for mineralogical analysis via XRD and scanning electron microscopy (SEM) using an energy dispersive spectroscopic analyzer (EDS). The XRD results identified pyrite as approximately 3% of the solid phase (**Table 3**). Pyrite was identified during SEM/EDS analysis of lignite which is mined immediately adjacent to the site. Logging completed while the VAP boring was advanced identified coal at several intervals, including 45 and 48 feet bgs (**Figure 4**). Furthermore, SEM/EDS of both centrifuged solid samples [VAP-B3-(40-45) and VAP-B3-(50-55)] identified pyrite in backscattered electron micrographs by the distinctive framboidal morphology (Harris et al., 1981; Sawlowicz, 2000). Major peaks involving iron and sulfur were identified in the EDS spectrum, which further support the identification of pyrite (**Attachment C**). While cobalt was not identified in the EDS spectrum, it is likely present at concentrations below the detection limit.

Naturally occurring cobalt is known to substitute for iron in pyrite, which is then known to weather to iron oxides. The presence of pyrite has been confirmed at AD-2 and across the Site. This suggests that pyrite may be providing a source for aqueous cobalt in groundwater. Additionally, the pond was not identified as the source of cobalt at wells in the EBAP network based on the low concentrations of cobalt in the pond itself.

### 2.1.2 Lithium

Previous ASDs for lithium at the EBAP attributed the observed lithium exceedances to variations in naturally suspended aquifer solids that likely originate from naturally occurring lignite and are ubiquitous in the aquifer based on the presence of lithium at upgradient locations and in the solid phase (Geosyntec, 2019b; Geosyntec, 2020b; Geosyntec, 2020c). Data gathered in support of the prior ASDs and recent results provide additional evidence that the observed lithium concentrations at AD-31 and AD-32 are due to natural variation in the aquifer.

As discussed in Section 2.1.1, a surface water sample was collected directly from the WBAP on November 4, 2020, as a surrogate for an EBAP sample. Lithium was detected in the WBAP sample at a concentration of 0.0274 mg/L, which is comparable to the estimated concentration of 0.023 mg/L reported for the EBAP water in 2018 (**Table 4**). The mobile fraction identified in the bottom ash by SPLP was even lower, with an estimated lithium concentration of 0.011 mg/L. These concentrations are lower than the average lithium concentrations at AD-31 and AD-32 (**Table 4**). Thus, the EBAP is not the likely source of lithium at AD-31 and AD-32.

Groundwater samples collected from upgradient wells B-2 and B-3 in March 2021 had total lithium concentrations of 0.0610 mg/L and 0.0686 mg/L, respectively, both of which were above the GWPS of 0.0590 mg/L (**Figure 5**). Because B-2 and B-3 were installed at locations upgradient to and unimpacted by site activities, their lithium concentrations suggest that lithium is naturally present at concentrations above the GWPS in the vicinity of the EBAP. It is noted that B-2 and B-3 are not part of the monitoring network for the EBAP, and as such the lithium concentrations in groundwater from these wells are not considered in calculating the GWPS for the CCR unit.

As described in Section 2.1.1, groundwater samples were collected from B-2, B-3, and AD-32 and filtered to separate solids. Groundwater was also collected from a VAP boring (VAP-B3-(40-45)) and centrifuged to separate solids. Lithium was detected in the solid material separated from these groundwater samples at concentrations comparable to bulk soil at all locations, providing evidence that the particulates captured during groundwater sampling contain lithium (**Table 5**).

### **2.1.2.1 Calculated Partition Coefficients**

A previous ASD for lithium at the EBAP developed a proposed lithium mobility in groundwater due to desorption from clay minerals associated with naturally occurring lignite material. This mechanism was posited as the source of lithium in both upgradient and downgradient wells at the EBAP (Geosyntec, 2019b). Previously completed XRD analysis of centrifuged solid material samples (VAP-B3-(40-45)) found that clay minerals, including kaolinite, smectite, and illite/mica, made up at least 60% of the aquifer solid (**Table 3**). These clay minerals, particularly smectite and illite, are known to retain positively charged ions such as lithium via cation exchange processes. SEM/EDS analysis identified the presence of silicon, aluminum and oxygen, all of which are indicative of clay minerals (**Attachment A**). The backscattered electron micrographs of these samples also identified clay particles by morphology. The largest clay particles (> 5  $\mu\text{m}$ ) are likely kaolinite, while smectite and illite dominate the smaller size fraction.

Total metal concentrations in the solid materials separated from the groundwater samples during filtration and the filtered groundwater concentrations were used to calculate partition coefficients values ( $K_d$ ) for lithium, potassium, and sodium. Details about the  $K_d$  calculation are provided in the previous ASD (Geosyntec, 2019b).  $K_d$  values for groundwater and particulates collected from wells B-2, B-3, and AD-32 were comparable to literature  $K_d$  values reported for organic-rich media such as bogs and peat beds (Sheppard et al., 2009; Sheppard et al., 2011), providing further evidence that lithium mobility in site groundwater is similar to other sites with organic-rich soils (**Table 6**). Additionally, the calculated  $K_d$  values for Pirkey soils were consistent with the literature, with potassium having the highest  $K_d$  (greatest affinity for sorption) and sodium the lowest  $K_d$  (least affinity for sorption). Furthermore, the values are similar for groundwater from all three wells, suggesting a universal mechanism controlling lithium, sodium, and potassium mobility in groundwater. Since the site-specific  $K_d$  values were calculated, lithium concentrations at the wells of interest have remained consistent, suggesting that this cation exchange mechanism is still controlling lithium groundwater concentrations (**Figure 6**).

These multiple lines of evidence show that elevated lithium concentrations at AD-31 and AD-32 are not due to a release from the EBAP, and instead can be attributed to natural variation. This variation appears related to the distribution of clay fractions associated with lignite materials in the soil aquifer material.

## **2.2 Sampling Requirements**

As the ASD presented above supports the position that the identified SSLs are not due to a release from the Pirkey EBAP, the unit will remain in the assessment monitoring program. Groundwater at the unit will continue to be sampled for Appendix IV parameters on a semiannual basis.

## SECTION 3

### CONCLUSIONS AND RECOMMENDATIONS

The preceding information serves as the ASD prepared in accordance with 40 CFR 257.95(g)(3)(ii) and supports the position that the SSLs for cobalt and lithium identified during assessment monitoring in November 2020 were not due to a release from the EBAP. The identified SSLs were instead attributed to natural variation in the underlying geology. Therefore, no further action is warranted, and the Pirkey EBAP will remain in the assessment monitoring program. Certification of this ASD by a qualified professional engineer is provided in **Attachment E**.

## SECTION 4

### REFERENCES

- Clementi, E., and Raimdoni, D. L. 1963. Atomic screening constants from SCF functions. *J. Chem. Phys.*, 38, 2686.
- Dixon, J.B., Hossner, L.R., Senkayi, A.L., and Egashira, K. 1982. Mineral properties of lignite overburden as they relate to mine spoil reclamation. In: J.A. Kittrick, D.S. Fanning, L. R. Hossner, editors, *Acid Sulfate Weathering, SSSA Spec. Publ. 10*. SSSA, Madison, WI. p. 169-191.
- EPRI, 2017. Guidelines for Development of Alternative Source Demonstrations at Coal Combustion Residual Sites. 3002010920. October.
- Geosyntec Consultants, 2019a. Alternative Source Demonstration – Federal CCR Rule. H.W. Pirkey Power Plant. East Bottom Ash Pond. Hallsville, Texas. April.
- Geosyntec Consultants, 2019b. Alternative Source Demonstration Report – Federal CCR Rule. H.W. Pirkey Plant, East Bottom Ash Pond. Hallsville, Texas. September.
- Geosyntec, 2020a. Statistical Analysis Plan – Revision 1. October.
- Geosyntec Consultants, 2020b. Alternative Source Demonstration Report – Federal CCR Rule. H. W. Pirkey Plant, East Bottom Ash Pond. Hallsville, Texas. April.
- Geosyntec Consultants, 2020c. Alternative Source Demonstration Report – Federal CCR Rule. H. W. Pirkey Plant, East Bottom Ash Pond. Hallsville, Texas. December.
- Geosyntec Consultants, 2021. Statistical Analysis Summary – East Bottom Ash Pond. H. W. Pirkey Plant. Hallsville, Texas. March
- Harris, L.A, Kenik, E.A., and Yust, C.S. 1981. Reactions in pyrite framboids induced by electron beam heating in a HVEM. *Scanning Electron Microscopy*, 1, web.
- Hitzman, M.W., Bookstrom, A.A., Slack, J.F., and Zientek, M.L., 2017. Cobalt – Styles of Deposits and the Search for Primary Deposits. USGS Open File Report 2017-1155.
- Krupka, K.M. and Serne, R.J., 2002. Geochemical Factors Affecting the Behavior of Antimony, Cobalt, Europium, Technetium, and Uranium in Vadose Sediments. Pacific Northwest National Lab, PNNL-14126. December.

- Manceau, A., Merkulova, M., Murdzek, M., Batanova, V., Baran, R., Glatzel, P., Saikia, B.K., Paktunc, D., Lefticariu, L. 2018. Chemical Forms of Mercury in Pyrite: Implications for Predicting Mercury Releases in Acid Mine Drainage Settings. *Env. Sci. Tech.*, 52 (18), 10286-10296.
- Sawlowicz, Z. 2000. *Framboids: From Their Origin to Application*. Pr. Mineral. (Mineralogical Transactions), 88, web.
- Senkayi, A.L., Dixon, J.B., and Hossner, L.R. 1986. Todorokite, goethite, and hematite: alteration products of siderite in East Texas lignite overburden. *Soil Science*, 142, 36-43.
- Sheppard, S., Long, J., Sanipelli, B., and Sohlenius, G. 2009. Solid/Liquid Partition Coefficients ( $K_d$ ) for Selected Soil and Sediments at Forsmark and Laxemar-Simpevarp. R-09-27. Swedish Nuclear Fuel and Waste Management Co. March.
- Sheppard, S., Sohlenius, G., Omberg, L.G., Borgiel, M., Grolander, S., and Nordén, S. 2011. Solid/Liquid Partition Coefficients ( $K_d$ ) and Plant/Soil Concentration Ratios (CR) for Selected Soil, Tills, and Sediments at Forsmark. R-11-24. Swedish Nuclear Fuel and Waste Management Co. R-11-24. November.
- TCEQ, 2020. Coal Combustion Residuals Groundwater Monitoring and Corrective Action Draft Technical Guideline No. 32. Topic: Coal Combustion Residuals (CCR) Groundwater Monitoring and Corrective Action. Waste Permits Division. May 2020.
- United States Environmental Protection Agency (USEPA), 1994. Method 1312 – Synthetic Precipitation Leaching Procedure, Revision 0, September 1994, Final Update to the Third Edition of the Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA publication SW-846.
- USEPA, 1996. Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures. EPA 540/S-95/504. April.
- USEPA, 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance. EPA 530/R-09/007. March.

# TABLES



**Table 1: Summary of Key Cobalt Analytical Data  
East Bottom Ash Pond - H.W. Pirkey Plant**

<b>Sample</b>	<b>Sample Date</b>	<b>Unit</b>	<b>Cobalt Concentration</b>
Bottom Ash (Solid Material)	2/11/2019	mg/kg	6.1
SPLP Leachate of Bottom Ash	2/11/2019	mg/L	<0.01
EBAP Pond Water	12/15/2018	mg/L	0.0024 J
WBAP Pond Water	11/4/2020	mg/L	0.000501
AD-2 - Average	May 2016 - November 2020	mg/L	0.0132
AD-31 - Average	May 2016 - November 2020	mg/L	0.0127
AD-32 - Average	May 2016 - November 2020	mg/L	0.0441

Notes:

mg/kg - milligram per kilogram

mg/L - milligram per liter

J - Estimated value. Result is less than the reporting limit but greater than or equal to the method detection limit.

A sample was collected from the WBAP on 11/4/2020 as a surrogate for the EBAP, as the EBAP did not contain free water. The same process water is stored in both the WBAP or EBAP.

Average values were calculated using all cobalt data collected under 40 CFR 257 Subpart D, excluding any identified outliers.

**Table 2: Soil Cobalt Data**  
**East Bottom Ash Pond - H.W. Pirkey Plant**

Location ID	Location	Sample Depth (ft bgs)	Cobalt (mg/kg)
<b>Bulk Soil Samples</b>			
AD-2	EBAP Network	25-27	9.45
		31-33	19.2
AD-18	EBAP Network	8	3.60
		22	2.90
AD-31	EBAP Network	12	1.90
		26	0.83
AD-32	EBAP Network	11	1.70
		20-25	9.10
AD-41	Upgradient	15	< 1.0
		35	23.5
		95	1.90
B-2	Upgradient	10	2.36
		16	3.62
		71	10.30
		82	7.21
		87	3.11
B-3	Upgradient	10	1.30
		20	0.59
		97	1.11
<b>Solid Material Retained After Filtration</b>			
AD-32	EBAP Network	13-33	5.4
B-2	Upgradient	38-48	4.3
B-3	Upgradient	29-34	12.0
		VAP 40-45	18.0

Notes:

mg/kg- milligram per kilogram

ft bgs - feet below ground surface

For AD-XX locations, samples were collected from additional boreholes advanced in the immediate area of the location identified by the well ID. Samples were not collected from the cuttings of the borings advanced for well installation. Samples for B-2 and B-3 locations were collected from cores removed from the borehole during well lithology logging.

Depths for samples collected after filtration represent the screened interval for the permanent well where the sample was collected.

**Table 3: X-Ray Diffraction Results  
East Bottom Ash Pond - H. W. Pirkey Plant**

*Geosyntec Consultants, Inc.*

<b>Constituent</b>	<b>VAP-B3-(40-45)</b>
Quartz	15
Plagioclase Feldspar	0.5
Orthoclase	ND
Calcite	ND
Dolomite	ND
Siderite	0.5
Goethite	ND
Hematite	2
Pyrite	3
Kaolinite	42
Chlorite	4
Illite/Mica	6
Smectite	12
Amorphous	15

Notes:

ND: Not detected

VAP-B3-(40-45) is the centrifuged solid material from the groundwater sample collected at that interval.

**Table 4: Summary of Key Lithium Analytical Data  
East Bottom Ash Pond - H.W. Pirkey Plant**

<b>Sample</b>	<b>Sample Date</b>	<b>Unit</b>	<b>Lithium Concentration</b>
Bottom Ash (Solid Material)	2/11/2019	mg/kg	0.82 J
SPLP Leachate of Bottom Ash	2/11/2019	mg/L	0.011 J
EBAP Pond Water	12/15/2018	mg/L	0.023 J
WBAP Pond Water	11/4/2020	mg/L	0.0274
AD-31 - Average	May 2016 - November 2020	mg/L	0.0855
AD-32 - Average	May 2016 - November 2020	mg/L	0.139

Notes:

mg/kg - milligram per kilogram

mg/L - milligram per liter

J - Estimated value. Result is less than the reporting limit but greater than or equal to the method detection limit.

A sample was collected from the WBAP on 11/4/2020 as a surrogate for the EBAP, as the EBAP did not contain free water. The same process water is stored in both the WBAP or EBAP.

Average values were calculated using all lithium data collected under 40 CFR 257 Subpart D, excluding any identified outliers.

**Table 5: Soil Lithium Data**  
**East Bottom Ash Pond - H.W. Pirkey Plant**

<b>Location ID</b>	<b>Sample Depth (ft bgs)</b>	<b>Lithium (mg/kg)</b>
<b>Bulk Soil Samples</b>		
AD-32	11	0.53
	20-25	1.60
B-2	10	5.30
	16	3.97
	71	7.42
	87	13.10
B-3	10	3.64
	20	2.59
	97	11.10
Lignite	N/A	2.9 J
<b>Solid Material Retained After Filtration</b>		
AD-32	13-33	9.8 J
B-2	38-48	6.5 J
B-3	29-34	7.8 J
	VAP 40-45	13.0

Notes:

J - estimated value

mg/kg- milligram per kilogram

ft bgs - feet below ground surface

For AD-32, samples were collected from additional boreholes advanced in the immediate area of the location identified by the well ID. Samples were not collected from the cuttings of the borings advanced for well installation. Samples for B-X locations were collected from cores removed from the borehole during well lithology logging.

Depths for samples collected after filtration represent the screened interval for the permanent well where the sample was collected.

VAP - vertical aquifer profiling

**Table 6: Calculated Site-Specific Partition Coefficients  
East Bottom Ash Pond - H. W. Pirkey Plant**

Source	B-2			Literature Value
Unit	mg/L	mg/kg	L/kg	L/kg
Element	Aqueous Phase	Adsorbed	Kd	Kd
Li	0.081	6.5	80	43-370
K	2.6	1100	423	42-1200
Na	14	130	9	5.2-82

Source	B-3			Literature Value
Unit	mg/L	mg/kg	L/kg	L/kg
Element	Aqueous Phase	Adsorbed	Kd	Kd
Li	0.097	7.8	80	43-370
K	2.9	1100	379	42-1200
Na	32	240	8	5.2-82

Source	AD-32			Literature Value
Unit	mg/L	mg/kg	L/kg	L/kg
Element	Aqueous Phase	Adsorbed	Kd	Kd
Li	0.11	9.8	89	43-370
K	3.9	1800	462	42-1200
Na	57	220	4	5.2-82

Notes:

mg/L: milligrams per liter

mg/kg: milligrams per kilogram

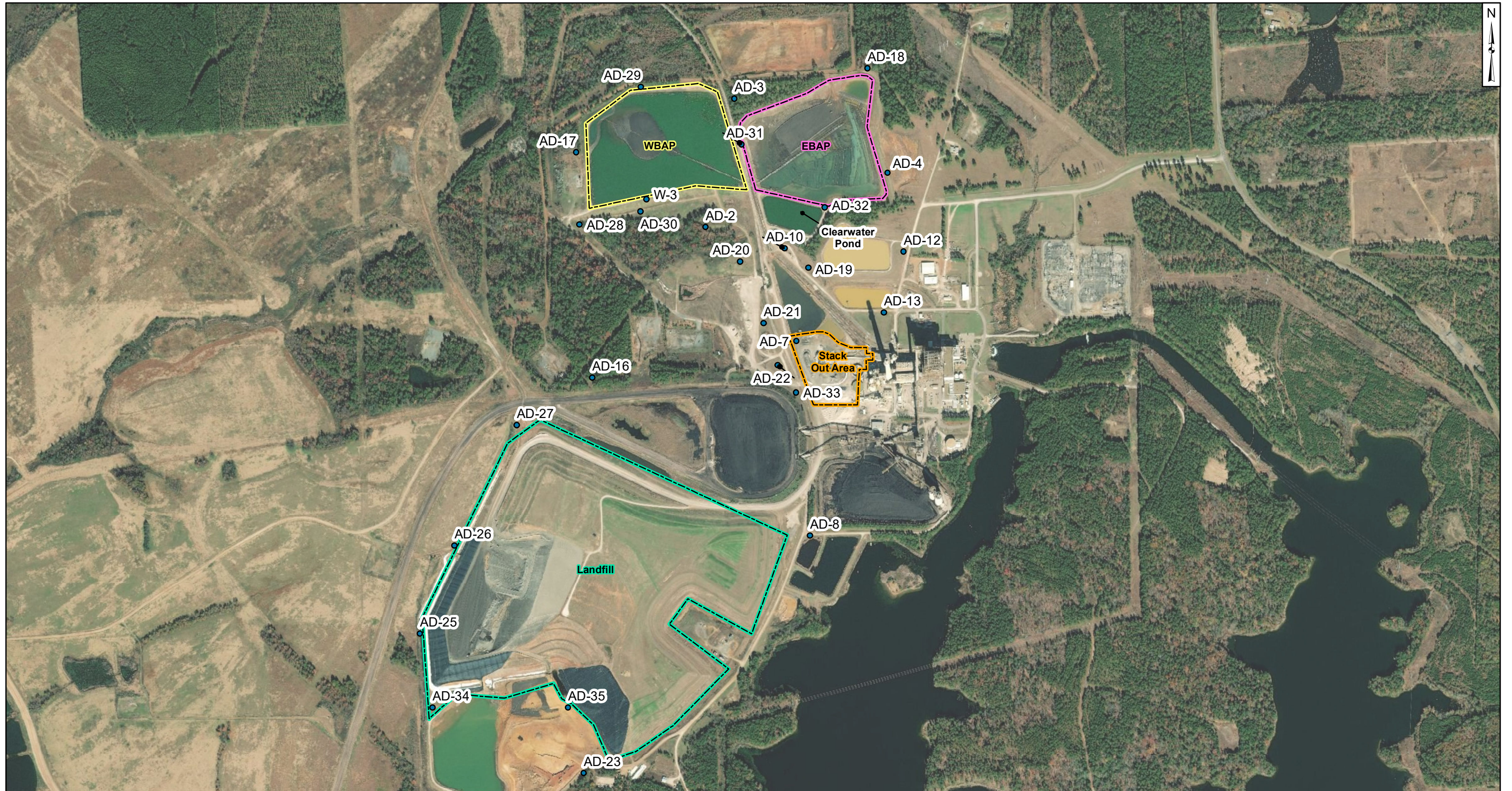
L/kg: liters per kilogram

Kd: partition coefficient

Adsorbed values are total metals concentrations reported by USEPA Method 6010B.

Literature values represent maximum and minimum values for the parameter as reported in Sheppard et al, 2009 (Table 4-1, all sites) and Sheppard et al, 2011 (Table 3-3 cultivated peat and wetland peat only).

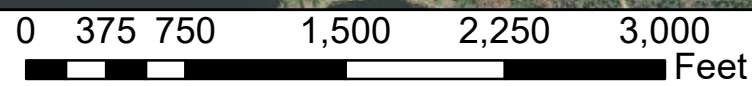
# FIGURES



**Legend**

- Monitoring Wells
- EBAP
- Landfill
- Stack Out Area
- WBAP

**Notes**  
 - Monitoring well coordinates provided by AEP.  
 - Data provided by AEP, 2019



**Site Layout**

AEP Pirkey Power Plant  
 Hallsville, Texas

**Geosyntec**  
 consultants

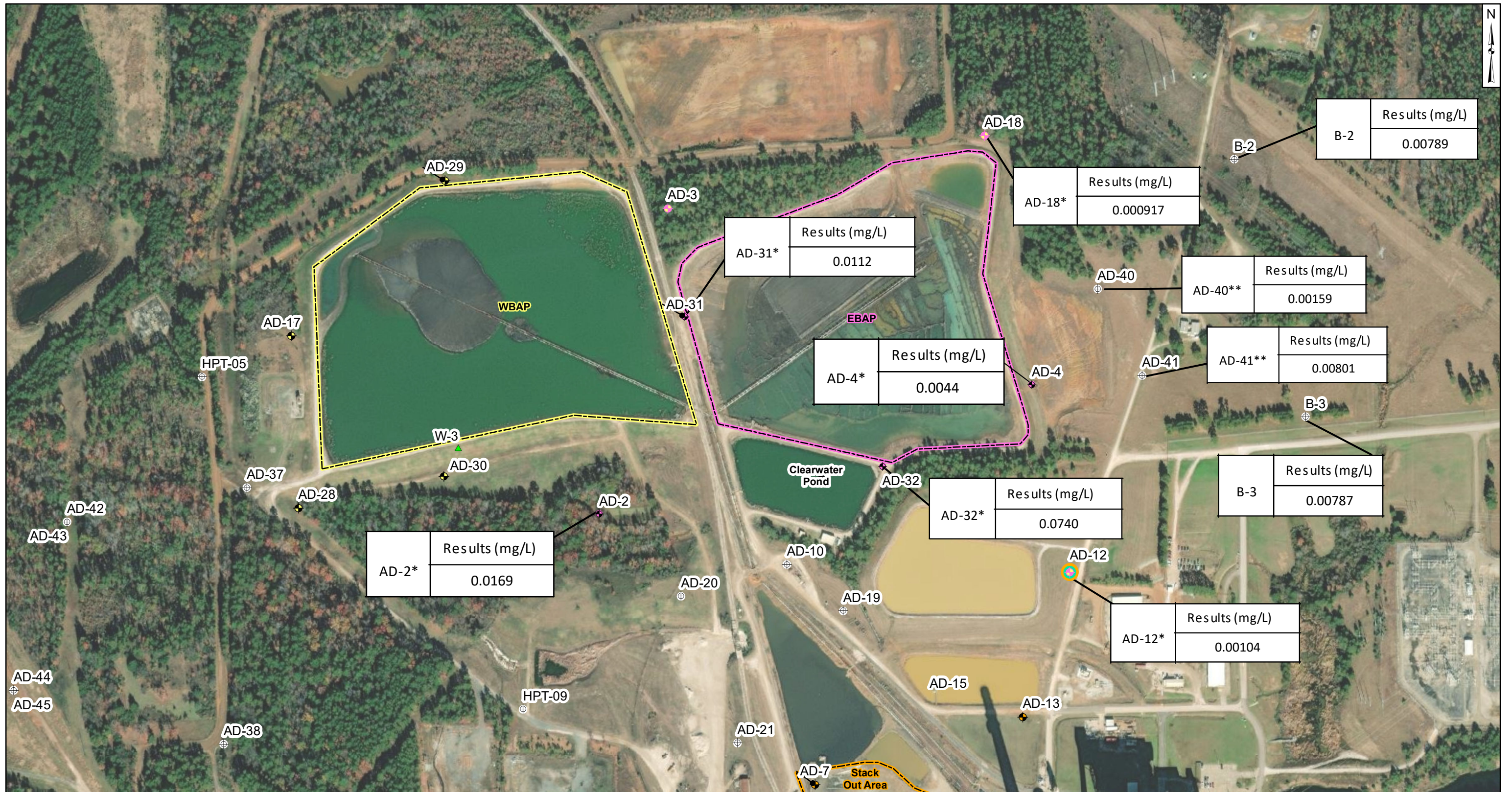
Columbus, Ohio

2020/03/24

Figure

**1**





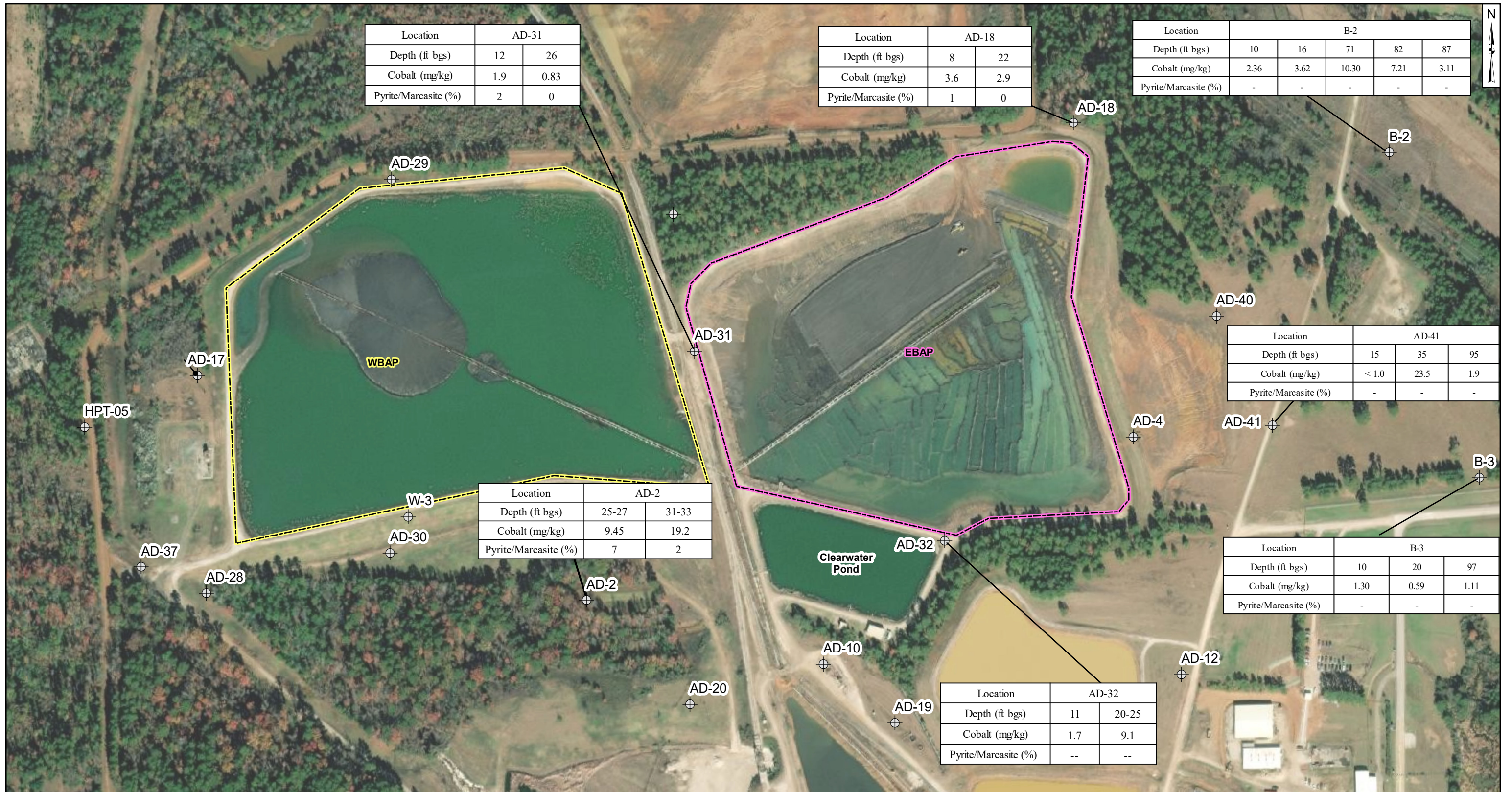
Legend			
⊕	Out of Network	◆	Stackout Area
◆	EBAP	◆	EBAP and WBAP
◼	WBAP	⊕	All CCR Unit Networks
⬮	Landfill	▲	Piezometer
		▭	EBAP
		▭	Stack Out Area
		▭	WBAP

**Notes**




- Monitoring well coordinates, site features, and data provided by AEP.
- AD-15 location is approximated
- B2 and B3 samples collected in March 2021
- \* - Well most recently sampled November 2020
- \*\* - Well most recently sampled August 2019



<b>Cobalt Distribution in Groundwater</b>	
AEP Pirkey Power Plant Hallsville, Texas	
<b>Geosyntec</b> consultants	
Columbus, Ohio	2021/04/29
<b>Figure 2</b>	



**Legend**

-  Monitoring Wells
-  EBAP
-  WBAP

**Notes**

- Monitoring well coordinates provided by AEP.
- AD-2 sample collected on April 20, 2020
- All other data provided by AEP, 2019.
- ft bgs: feet below ground surface.
- mg/kg: milligrams per kilogram.
- -- not analyzed.



**Cobalt Distribution in Soil**

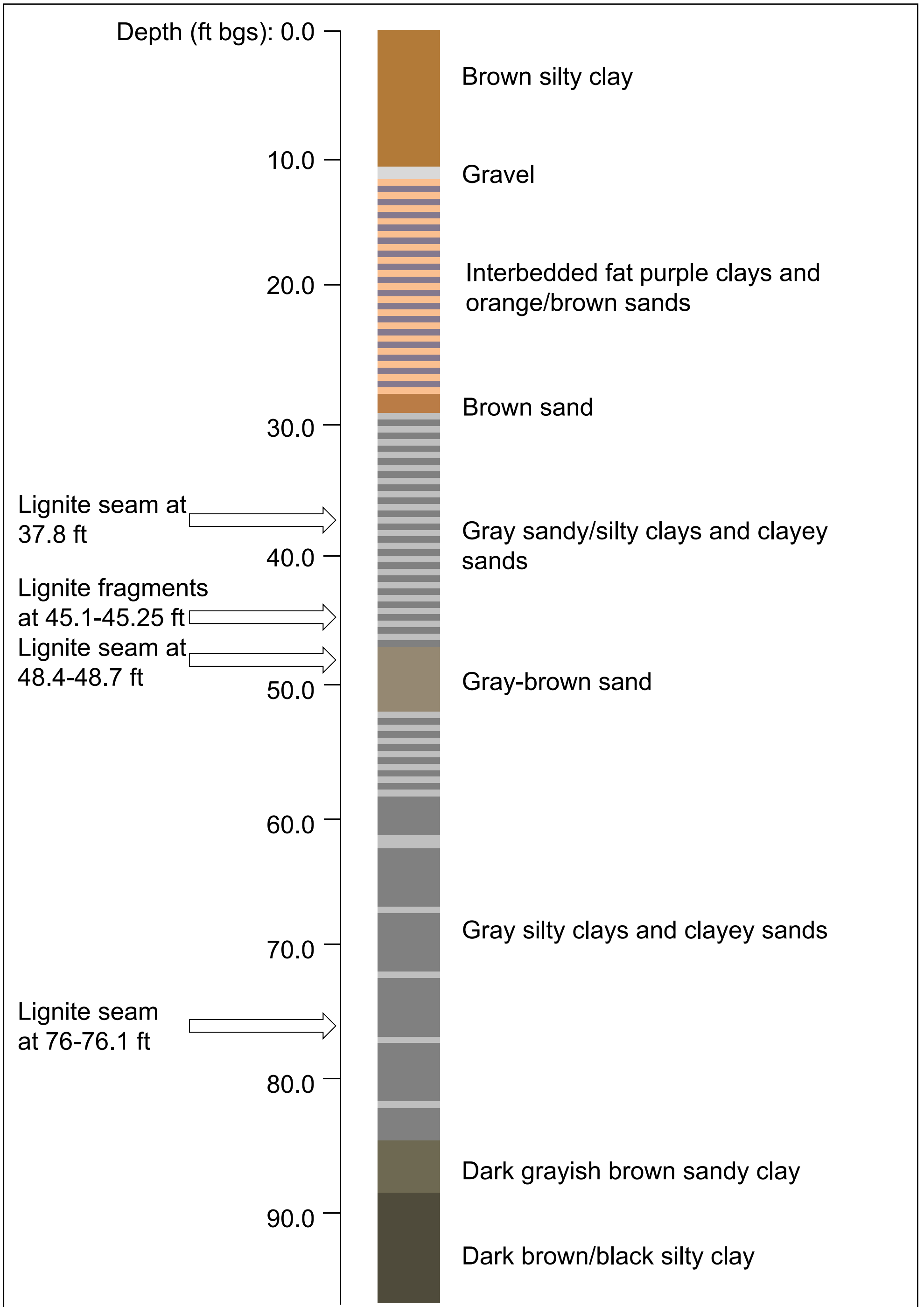
AEP Pirkey Power Plant  
Hallsville, Texas

**Geosyntec**  
consultants

Columbus, Ohio

2020/12/22

Figure  
**3**



Notes:

- Ft = feet
- Bgs = below ground surface
- Boring completed May 2019
- Total depth of 97.5 ft bgs
- Well installed in offset boring screened at 29-34 ft bgs

**B-3 Visual Boring Log**

AEP Pirkey Powerplant  
Hallsville, TX

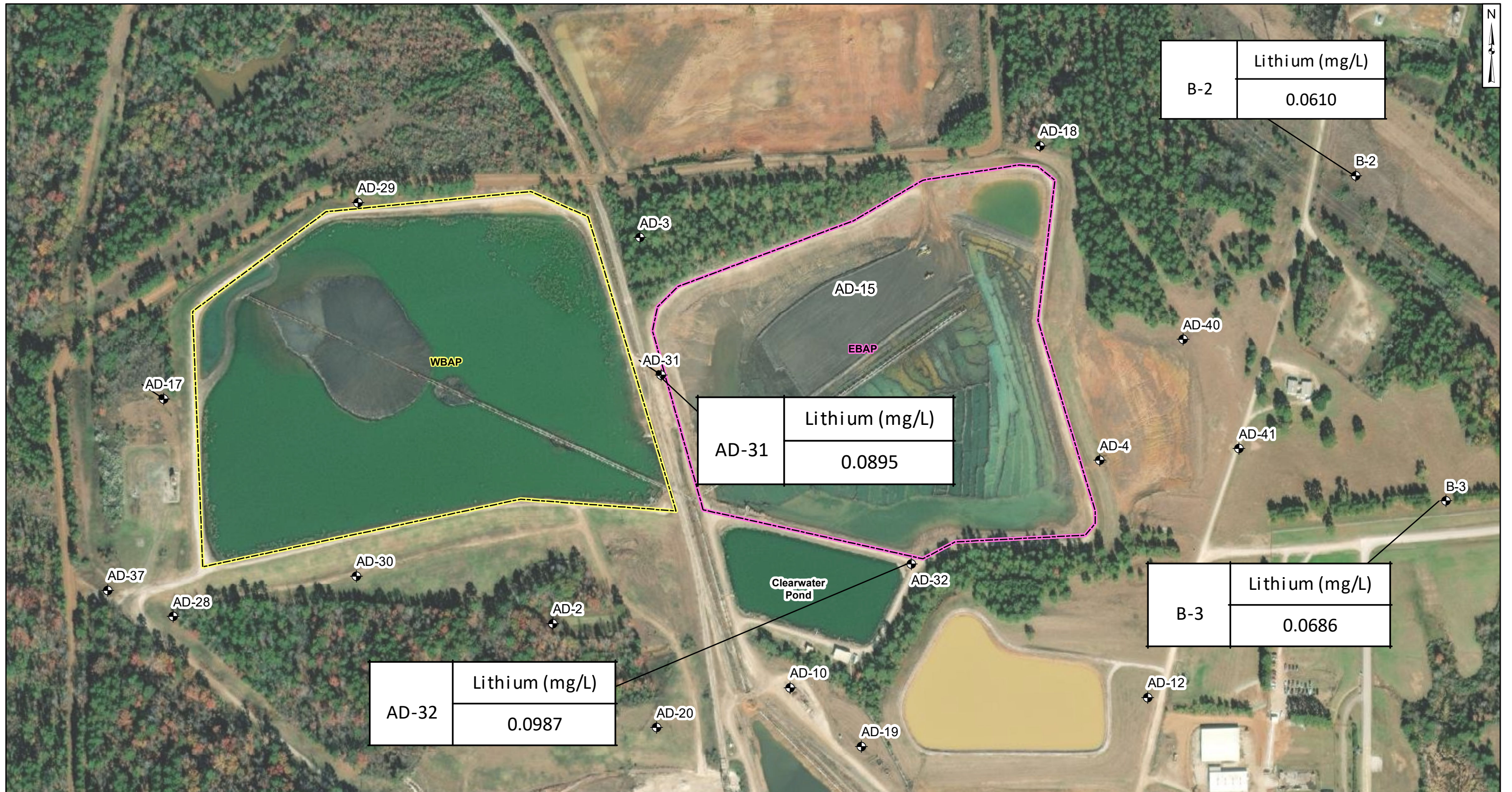
**Geosyntec**  
consultants

**Figure**

**4**

CHA8462

March 2020

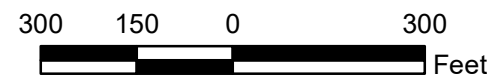


**Legend**

- ⊕ Monitoring Well
- EBAP
- Landfill
- Stack Out Area
- WBAP

**Notes**

- Lithium concentrations in micrograms per liter ug/L
- Monitoring well coordinates, site features, and data provided by AEP
- Groundwater samples were collected from B-2 and B-3 in March 2021
- Groundwater samples were collected from AD-31 and AD-32 in November 2020



**Lithium Distribution in Groundwater**

AEP Pirkey Power Plant  
Hallsville, Texas

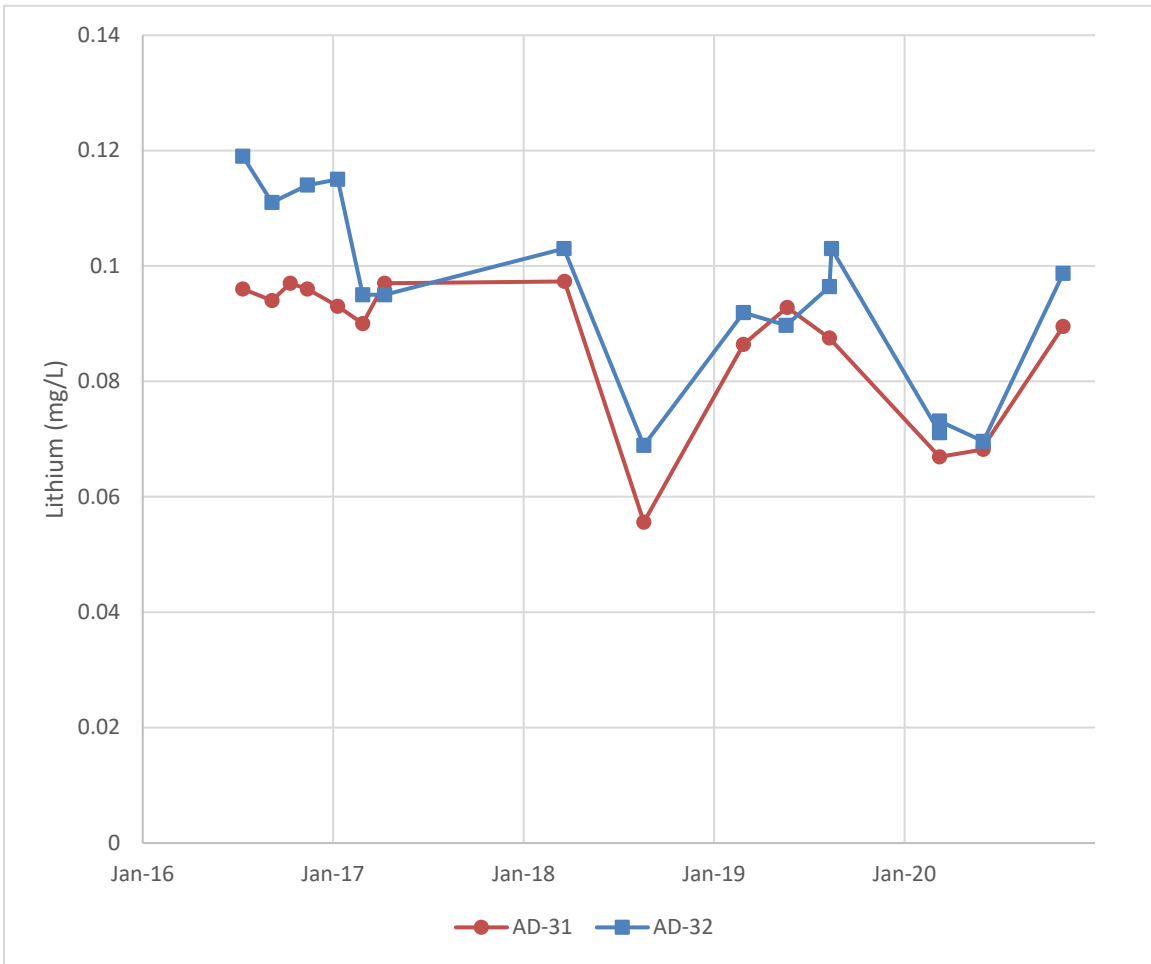
**Geosyntec**  
consultants

Columbus, Ohio

2021/04/29

Figure

**5**



Notes: Lithium concentrations are shown in milligrams per liter (mg/L). An outlier lithium value reported for AD-32 on 10/12/16 was excluded from the time series graph.

### Lithium Time Series Graph

Pirkey East Bottom Ash Pond

Geosyntec  
consultants



Figure

6

Columbus, Ohio

27-May-2021

ATTACHMENT A  
SB-2 Boring Log

PROJECT NO. \_\_\_\_\_ PROJ. \_\_\_\_\_ BOR. NO. SB-2  
 LOCATION AD-2/MW-2-Pitney Power Plant ELEV. \_\_\_\_\_ DATE 4/20/20

SILTS & SANDS		COHESIVE SOILS - CLAYS			COLORS		MATERIALS		SAND ADI.		CHARACTERISTICS		
CONDITION		CONSISTENCY		PENETROMETER	N - VALUE	Li ... Light ... Br ... Brown Dk ... Dark ... Bk ... Black G ... Grey ... Bl ... Blue T ... Tan ... Gr ... Green R ... Red ... Y ... Yellow Rdsh. Reddish. Wh ... White		Cl ... Clay, Clayey Si ... Silt, Silty Sa ... Sand, Sandy Ls ... Limestone Gr ... Gravel SiS ... Siltstone SS ... Sandstone Sh ... Shale, Shaley		F ... Fine M ... Medium Co ... Coarse Si ... Silty		Calc ... Calcareous Lig ... Lignite Org ... Organic Lam ... Laminate Sl ... Slickensided SL ... Slightly Sm(s) ... Seam(s) Nod ... Nodules	
VLo ... Very Loose	0-4	Vso ... Very Soft	0 - 0.25	0	< 2								
Lo ... Loose	4-10	So ... Soft	0.25 - 0.5		2 - 4								
MDe ... Med. Dense	10-30	Mst. ... Stiff	0.5 - 1.0		4 - 8								
De ... Dense	30-50	St ... Stiff	1.0 - 2.0		8 - 15								
VDe ... Very Dense	>50	VSt. ... Very Stiff	2.0 - 4.0		15 - 30								
		H ... Hard	> 4.0		>30								

Sample Interval FEET ASSIGNMENT	S-A-M-P-L-E-N-O. RECOVERY	DEPTH FT.	SAMPLES	STRATUM DESCRIPTION					STANDARD PENETROMETER			UNIFIED SOIL CLASSIFICATION	N - VALUE OR HAND PENETROMETER		
				CONDITION OR CONSISTENCY	COLOR	MINOR MATERIALS OR ADJECTIVES	PREDOMINATE MATERIAL	CHARACTERISTICS OR MODIFICATIONS	SEAT - 6"	1st - 6"	2nd - 6"				
SM 8'		0-5	2' Rec	0	0-8'	Br, Lt. Rd Br	Si	Sa	Silty Sand - trace clay, trace root hairs, moist.					moist (0-5)	
		5-10	2.5' Rec			Lt. Rd Br			- thin lenses (less than 1/4") at 7.5', trace iron staining					moist (5-10)	
CI 14.5'		10-15	4' Rec	8	8-14.5'	Lt. Rd Br, Br, Gray	Sa, Si, Cl	Cl	Clayey sand in interbeds to 14.5', trace iron ore gravel in sand seams @ 10.5', 12', 12.5'					moist (10-15)	
		15-20	2' Rec	14.5	14.5-39'	Rd Br, Ylw, Br, Gray	Si, Cl	Sa	silty sand - some sandvicks, iron cemented sand @ 16.5' and ironstone @ 17' (1.5")					v. moist to moist (15-20)	
		20-25	* No Rec.						- cemented sand seams in silty sand @ 20-25'					v. moist (20-25)	
SC		25-30	2.5' Rec			Gray - dk Gray dk. Br (25-39')			- gravel & cemented sand seam @ 25' (6") - cemented and part. clay cemented clayey silty sand @ 25.5' - dark gray silty sat sand seam (2") @ 27"					sat. @ 25'-25.5' moist 25.5-27 sati. @ 27' (2")	
		30-35	3' Rec						- sat. silty sand seam @ 30.5' (1") - sat. silty sand seam @ 32' (3")					sat. @ 30.5' (1") 32.0' (3")	
ML 39'		35-40	4' Rec	39	39-40	Lt. Gray, Gray Cl, Br (39-40)	Si	Clayey sandy silt, - interbedded silt & clay @ 39' to 40'						v. moist (to 39') moist (39-40')	
									S.O.T. @ 40'						
									* 25-27' collected @ 1015 * 31-33' collected @ 1035						

Type HSA Dry Auger  Rotary Wash   
 SEEPAGE @ 25 FT. WHILE DRILLING, W.L. @ \_\_\_\_\_ FT. ON COMPL.  
 (OR) BAILED TO \_\_\_\_\_ FT. UPON COMPLETION.  
 W.L. @ \_\_\_\_\_ FT AND CAVED TO \_\_\_\_\_ FT. ON \_\_\_\_\_

\* GPS: 32,46522, -94,49032 (12' E,  
3.5' N)  
of AD-2/MW-2

ATTACHMENT B  
SB-2 Boring Photographic Log



**GEOSYNTEC CONSULTANTS**  
**Photographic Record**



**Client: AEP**

**Project Number: CHA8495**

**Site Name: Pirkey East Bottom Ash Pond**

**Site Location: Hallsville, Texas**

**Photograph 1**

**Date: 4/21/2020**

**Direction: N/A**

**Comments:**  
0-5 foot interval of SB-2.

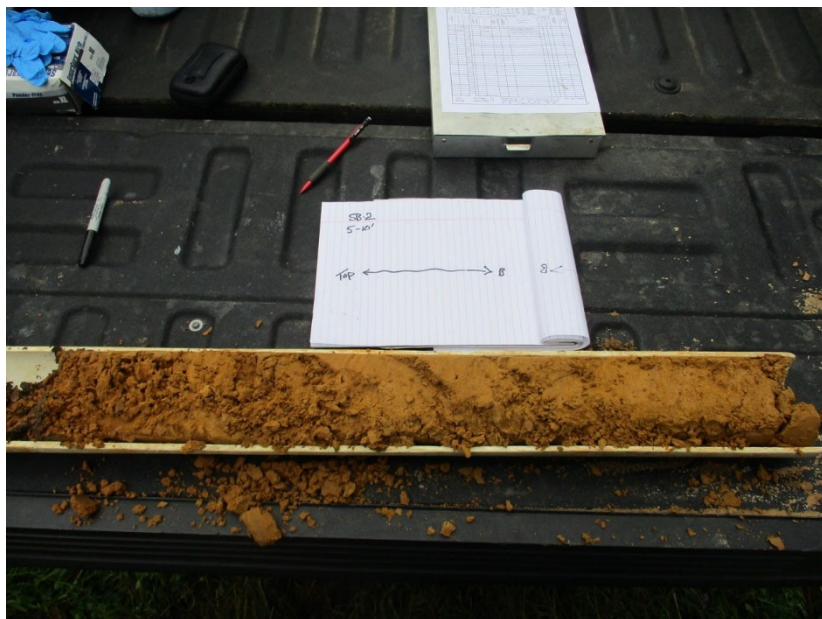


**Photograph 2**

**Date: 4/21/2020**

**Direction: N/A**

**Comments:**  
5-10 foot interval of SB-2.



**GEOSYNTEC CONSULTANTS**  
**Photographic Record**



**Client: AEP**

**Project Number: CHA8495**

**Site Name: Pirkey East Bottom Ash Pond**

**Site Location: Hallsville, Texas**

**Photograph 3**

**Date: 4/21/2020**

**Direction: N/A**

**Comments:**  
10-15 foot interval of SB-2.



**Photograph 4**

**Date: 4/21/2020**

**Direction: N/A**

**Comments:**  
15-20 foot interval of SB-2. Recovery of this interval was limited.



**GEOSYNTEC CONSULTANTS**  
**Photographic Record**



**Client: AEP**

**Project Number: CHA8495**

**Site Name: Pirkey East Bottom Ash Pond**

**Site Location: Hallsville, Texas**

**Photograph 5**

**Date: 4/21/2020**

**Direction: N/A**

**Comments:**  
20-25 foot interval of SB-2. Recovery of this interval was limited.

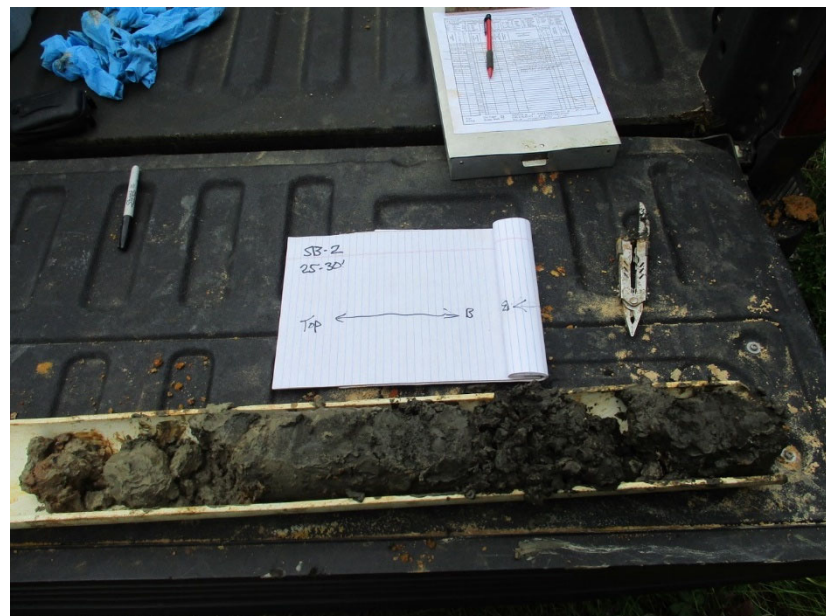


**Photograph 6**

**Date: 4/21/2020**

**Direction: N/A**

**Comments:**  
25-30 foot interval of SB-2. Very little of this interval was recovered. A color change was observed from red to dark brown/black. A sample was collected from this interval.



**GEOSYNTEC CONSULTANTS**  
**Photographic Record**



**Client: AEP**

**Project Number: CHA8495**

**Site Name: Pirkey East Bottom Ash Pond**

**Site Location: Hallsville, Texas**

**Photograph 9**

**Date: 4/21/2020**

**Direction: N/A**

**Comments:**  
30-35 foot interval of SB-2. Very little of this interval was recovered.. A sample was collected from this interval.



**Photograph 10**

**Date: 4/21/2020**

**Direction: N/A**

**Comments:**  
35-40 foot interval of SB-2

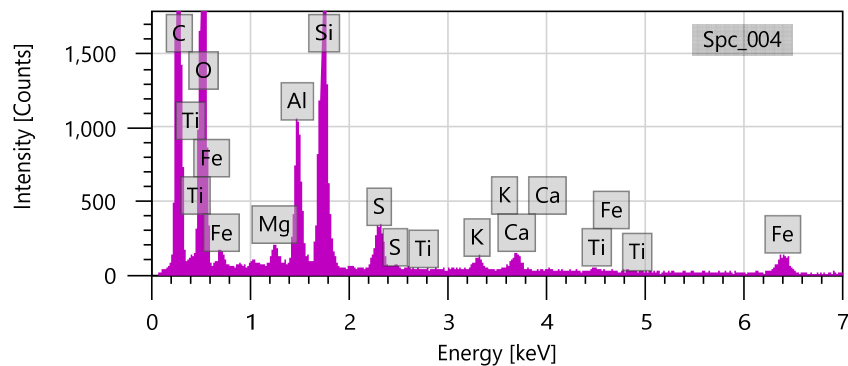
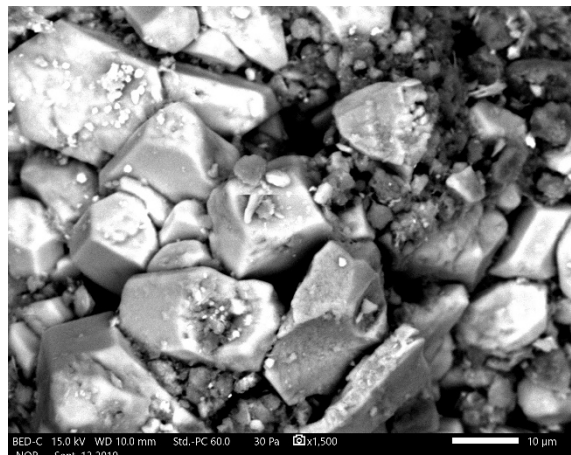
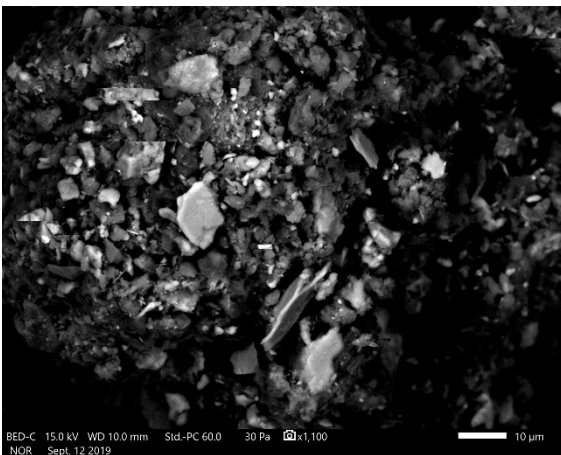
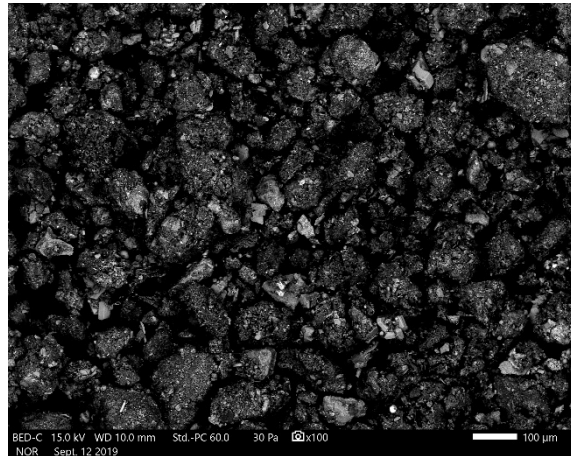
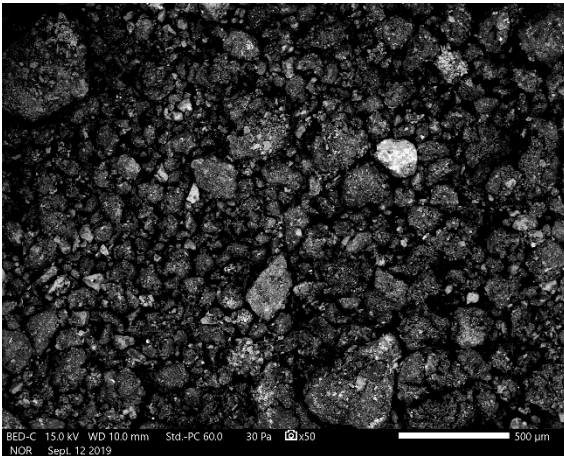


**ATTACHMENT C**  
**SEM/EDS Analysis**

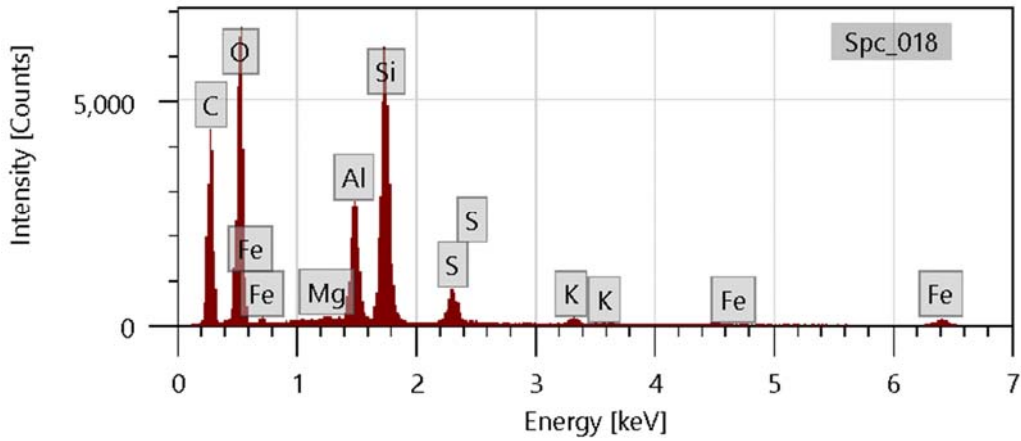
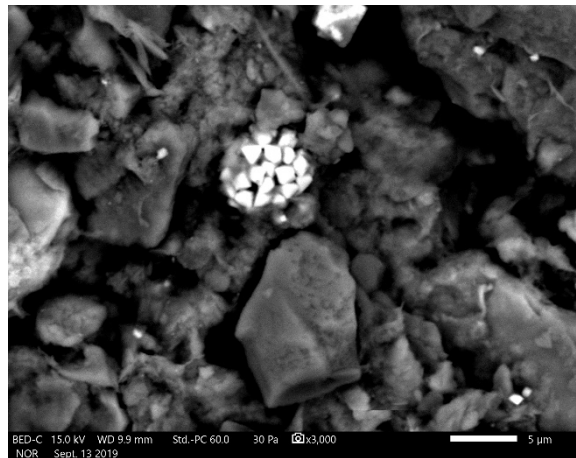
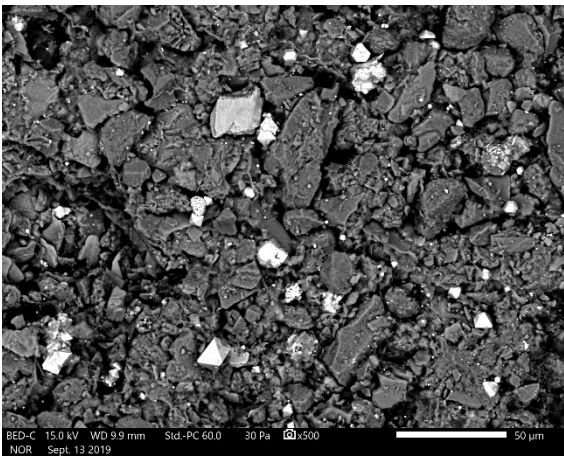
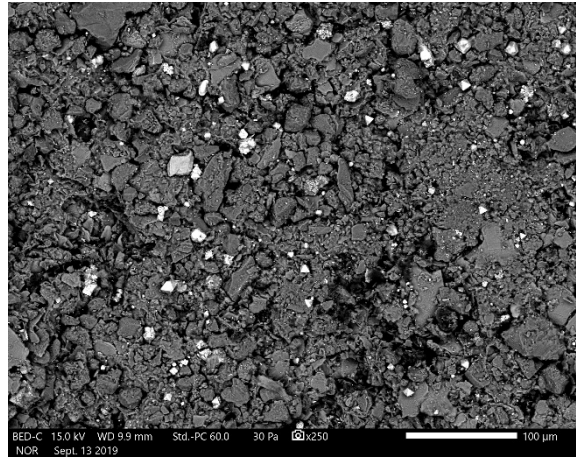
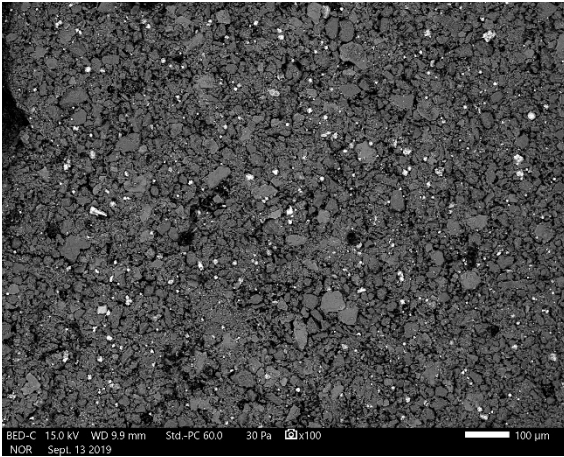
September 16, 2019

Dr. Bruce Sass  
941 Chatham Lane, Suite 103, Columbus, OH 43221

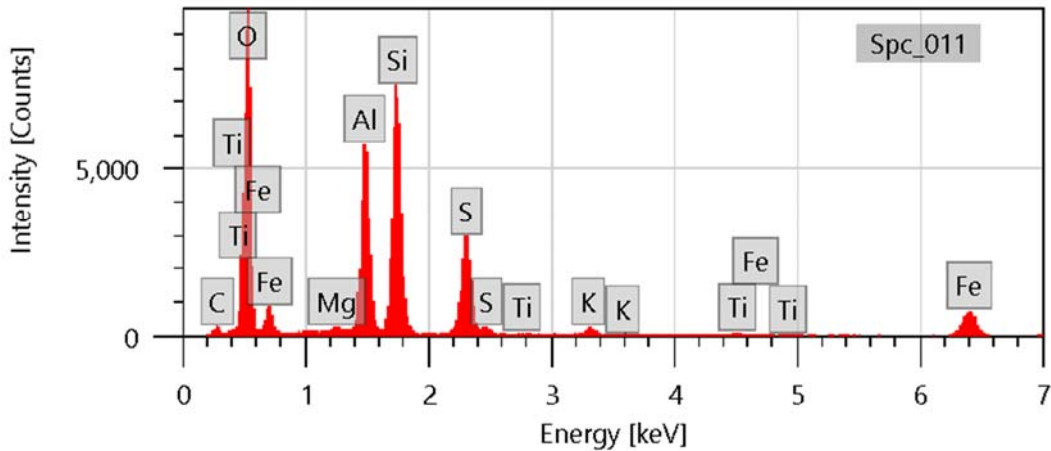
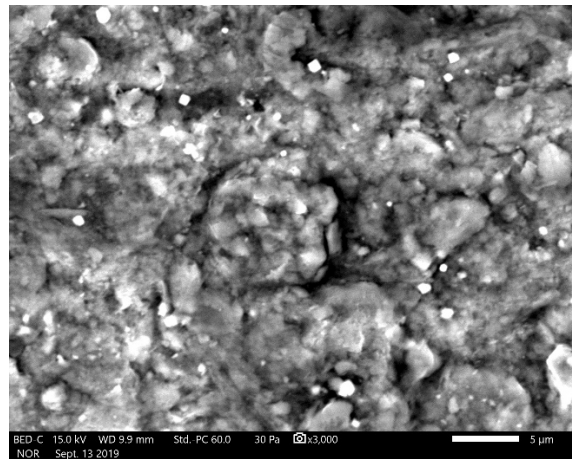
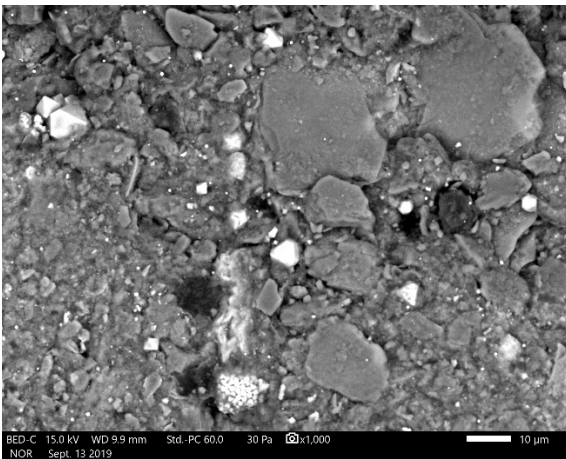
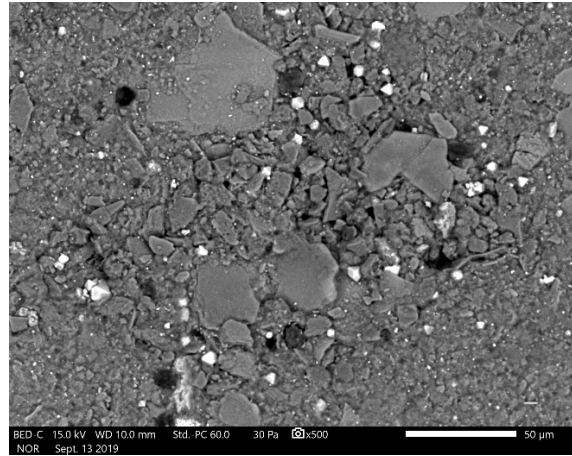
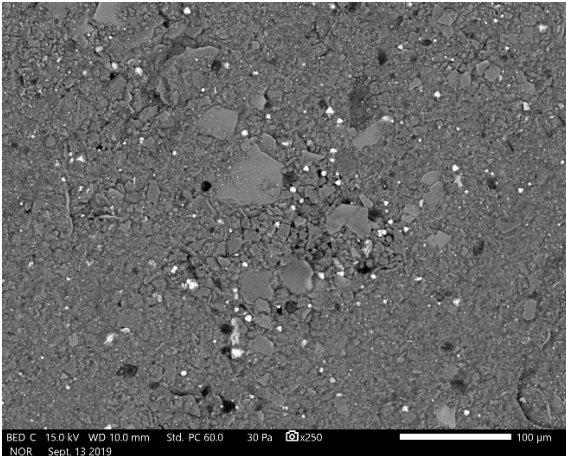
via Email: [BSass@geosyntec.com](mailto:BSass@geosyntec.com)



Lignite. Backscattered electron micrographs show the sample at 100X, 1,100X, and 1,500X. EDS spectrum at bottom is an area scan of the region shown in top right micrograph. Bright particles are mostly quartz and feldspar. Major peaks for carbon, oxygen, silicon, and aluminum suggest coal and clay.



Sample VAP B3 40-45. Backscattered electron micrographs show the sample at 100X, 250X, 500X, and 3000X. EDS spectrum at bottom is an area scan of the region shown at 500X. Bright particles are pyrite (framboid in bottom right micrograph). Major peaks for carbon, oxygen, silicon, and aluminum suggest coal and clay.



Sample VAP B3 50-55. Backscattered electron micrographs show the sample at 250X, 500X, 1000X, and 3000X. EDS spectrum at bottom is an area scan of the region shown at 3000X. Bright particles are mostly pyrite (framboid in bottom left micrograph); occasional particles of Fe-Ti oxide are detected. Major peaks for oxygen, silicon, and aluminum suggest clay. Large blocky particles are mostly quartz, feldspar, and clay.



## ATTACHMENT D

Certification by Qualified Professional Engineer

**CERTIFICATION BY A QUALIFIED PROFESSIONAL ENGINEER**

I certify that the selected and above described alternative source demonstration is appropriate for evaluating the groundwater monitoring data for the Pirkey East Bottom Ash Pond CCR management area and that the requirements of 40 CFR 257.95(g)(3)(ii) have been met.

Beth Ann Gross

Printed Name of Licensed Professional Engineer

Beth Ann Gross

Signature



Geosyntec Consultants  
2039 Centre Pointe Blvd, Suite 103  
Tallahassee, Florida 32308

Texas Registered Engineering Firm  
No. F-1182

79864  
License Number

Texas  
Licensing State

5/28/2021  
Date

**ALTERNATIVE SOURCE  
DEMONSTRATION REPORT  
TEXAS STATE CCR RULE**

**H.W. Pirkey Power Plant  
East Bottom Ash Pond  
Hallsville, Texas**

*Submitted to*



1 Riverside Plaza  
Columbus, Ohio 43215-2372

*Submitted by*

**Geosyntec**   
consultants

engineers | scientists | innovators

941 Chatham Lane, Suite 103  
Columbus, OH 43221

December 2021

CHA8495

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## ATTACHMENTS

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Attachment B	SB-2 Boring Photographic Log
Attachment C	SEM/EDS Analysis
Attachment D	Certification by a Qualified Professional Engineer

## LIST OF ACRONYMS

AEP	American Electric Power
ASD	Alternative Source Demonstration
CCR	Coal Combustion Residuals
EBAP	East Bottom Ash Pond
EDS	Energy Dispersive Spectroscopic Analyzer
EPRI	Electric Power Research Institute
GSC	Groundwater Stats Consulting, LLC
GWPS	Groundwater Protection Standard
LCL	Lower Confidence Limit
MCL	Maximum Contaminant Level
QA	Quality Assurance
QC	Quality Control
SEM	Scanning Electron Microscopy
SPLP	Synthetic Precipitation Leaching Profile
SSL	Statistically Significant Level
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
UTL	Upper Tolerance Limit
USEPA	United States Environmental Protection Agency
VAP	Vertical Aquifer Profiling
WBAP	West Bottom Ash Pond
XRD	X-Ray Diffraction

## SECTION 1

### INTRODUCTION AND SUMMARY

This Alternative Source Demonstration (ASD) report has been prepared to address statistically significant levels (SSLs) for cobalt and lithium in the groundwater monitoring network at the H.W. Pirkey Plant East Bottom Ash Pond (EBAP), located in Hallsville, Texas, following the first semi-annual assessment monitoring event of 2021. The EBAP is registered as a surface impoundment under Texas Commission on Environmental Quality (TCEQ) Industrial and Hazardous Waste Solid Waste Registration No. 33240.

The H.W. Pirkey Plant has four regulated coal combustion residuals (CCR) storage units, including the EBAP (**Figure 1**). In May 2021, a semi-annual assessment monitoring event was conducted at the EBAP in accordance with 30 TAC §352.951(a). The monitoring data were submitted to Groundwater Stats Consulting, LLC (GSC) for statistical analysis. Groundwater protection standards (GWPSs) were established for each Appendix IV parameter in accordance with the statistical analysis plan developed for the unit (Geosyntec, 2020a) and the United States Environmental Protection Agency's (USEPA's) *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance* (Unified Guidance; USEPA, 2009). The GWPS for each parameter was established as the greater of either the background concentration or, for constituents with a maximum contaminant level (MCL), the MCL. To determine background concentrations, an upper tolerance limit (UTL) was calculated using pooled data from the background wells collected during the background monitoring and assessment monitoring events.

Confidence intervals were re-calculated for the Appendix IV parameters at the compliance wells to assess whether these parameters were present at a statistically significant level (SSL) above the GWPSs. An SSL was concluded if the lower confidence limit (LCL) of a parameter exceeded the GWPS (i.e., if the entire confidence interval exceeded the GWPS). The following SSLs were identified at the Pirkey EBAP (Geosyntec, 2021a):

- The LCLs for cobalt exceeded the GWPS of 0.0094 mg/L at AD-2 (0.0100 mg/L), AD-31 (0.00960 mg/L), and AD-32 (0.025 mg/L).
- The LCL for lithium exceeded the GWPS of 0.0590 mg/L at AD-31 (0.0669 mg/L) and AD-32 (0.0789 mg/L).

No other SSLs were identified.

#### 1.1 CCR Rule Requirements

TCEQ regulations regarding assessment monitoring programs for CCR landfills and surface impoundments (TCEQ, 2020a) provide owners and operators with the option to make an ASD when an SSL is identified (30 TAC §352.951(e)):

*... In making a demonstration under this subsection, the owner or operator must, within 90 days of detecting a statistically significant level above the groundwater protection standard of any constituent listed in Appendix IV adopted by reference in §352.1431 of this title, submit a report prepared and certified in accordance with §352.4 of this title (relating to Engineering and Geoscientific Information) to the executive director, and any local pollution agency with jurisdiction that has requested to be notified, demonstrating that a source other than a CCR unit caused the exceedance or that the exceedance resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.*

Pursuant to 30 TAC §352.951(e), Geosyntec Consultants, Inc. (Geosyntec) has prepared this ASD report to document that the SSLs identified for cobalt and lithium are from a source other than the EBAP.

## **1.2 Demonstration of Alternative Sources**

An evaluation was completed to assess possible alternative sources to which the identified SSLs could be attributed. Alternative sources were identified amongst five types, based on methodology provided by EPRI (2017):

- ASD Type I: Sampling Causes;
- ASD Type II: Laboratory Causes;
- ASD Type III: Statistical Evaluation Causes;
- ASD Type IV: Natural Variation; and
- ASD Type V: Alternative Sources.

A demonstration was conducted to show that the SSLs identified for cobalt and lithium were based on a Type IV cause and not by a release from the Pirkey EBAP.



## SECTION 2

### ALTERNATIVE SOURCE DEMONSTRATION

The TCEQ CCR Rule allows the owner or operator 90 days from the determination of an SSL to demonstrate that a source other than the CCR unit caused the SSL. The methodology used to evaluate the SSLs identified for cobalt and lithium and the proposed alternative sources are described below.

#### 2.1 Proposed Alternative Source

An initial review of site geochemistry, site historical data, and laboratory quality assurance/quality control (QA/QC) data did not identify alternative sources for cobalt and lithium due to Type I (sampling), Type II (laboratory), or Type III (statistical evaluation) issues. Groundwater sampling, laboratory analysis, and statistical evaluations were generally completed in accordance with 30 TAC §352.931 and the draft TCEQ guidance for groundwater monitoring (TCEQ, 2020b). As described below, the SSLs have been attributed to natural variation associated with the underlying geology, which is a Type IV (natural variation) issue.

##### 2.1.1 Cobalt

Previous ASDs for cobalt at the EBAP provided evidence that cobalt is present in the aquifer media at the site and that the observed cobalt concentrations were due to natural variation (Geosyntec, 2019a; Geosyntec, 2019b; Geosyntec, 2020b; Geosyntec, 2020c; Geosyntec 2021b). The previous ASDs discussed how the EBAP did not appear to be a source for cobalt in downgradient groundwater, based on observed concentrations of cobalt both in the ash material and in leachate from Synthetic Precipitation Leaching Procedure (SPLP) analysis (SW-846 Test Method 1312, [USEPA, 1994]) of the ash material. Cobalt was not detected in the SPLP ash leachate above the reporting limit of 0.01 mg/L, which is lower than the average concentrations observed at the wells of interest (**Table 1**).

Surface water samples were previously collected from the EBAP and West Bottom Ash Pond (WBAP) to characterize the total cobalt concentrations. The EBAP and WBAP receive the same process water, with the use of each pond dependent on available freeboard and cleaning schedule; thus, there is a basis for the equivalency between these two surface water samples. Cobalt was detected in a sample collected on June 2, 2020 from the EBAP at an estimated concentration of 0.000080 mg/L (**Table 1**). Cobalt was detected at a concentration of 0.000501 mg/L in a sample collected from the WBAP on November 4, 2020 (**Table 1**). No changes to material handling or plant operations have occurred which would change the anticipated cobalt concentrations in the ponds since these samples were collected. These concentrations are lower than all reported cobalt concentrations for in network wells from the most recent sampling event and over an order of magnitude lower than the average concentration in groundwater at the wells of interest (**Table 1**; **Figure 2**). Thus, the EBAP is not the likely source of cobalt at AD-2, AD-31, and AD-32.

As noted in the previous ASDs, soil samples collected across the site, including from locations near the EBAP, identified cobalt in the aquifer solids at varying concentrations. SB-2 was advanced in the vicinity of AD-2 in April 2020 to re-log the geology at AD-2 and collect samples for laboratory analysis of total metals and mineralogy. The SB-2 field boring log, which was generated by Auckland Consulting LLC, is provided as **Attachment A**. Cobalt was detected at SB-2 at concentrations of 9.45 milligrams per kilogram (mg/kg) at 25-27 feet below ground surface (bgs) and 19.2 mg/kg at 31-33 feet bgs (**Table 2**). These cobalt concentrations are greater than the concentration of cobalt present in the bottom ash (**Table 1**). Both samples correlate to the depth of the monitoring well screen of AD-2 (20-40 feet bgs), indicating that cobalt is present in aquifer solids within the AD-2 screened interval. Cobalt was also identified in the aquifer solids at varying concentrations at other locations throughout the site, with the highest value of 23.5 mg/kg reported at AD-41, which is upgradient of the EBAP (**Figure 3**).

In addition to total cobalt, soil samples were submitted for mineralogical analysis to evaluate the presence of cobalt-containing minerals. X-ray diffraction (XRD) analysis of soils from SB-2 identified pyrite (an iron sulfide) in samples collected at 25-27 feet bgs and 31-33 feet bgs at concentrations up to 7% by weight (**Figure 3**). Cobalt is known to undergo isomorphic substitution for iron in crystalline iron minerals such as pyrite due to their similar ionic radii of approximately 1.56 angstroms (Å) for iron vs. 1.52 Å for cobalt (Clementi and Raimondi, 1963; Krupka and Serne, 2002; Hitzman et al., 2017).

The aquifer solids at SB-2 are distinctly red in color at shallow depths, as illustrated in the photolog of soil cores provided in **Attachment B**. While shallow samples were not collected for mineralogical analysis, red color in soils is often associated with the presence of oxidized iron-bearing minerals such as hematite and goethite. The weathering of pyrite to goethite under oxidizing conditions is also a well-understood phenomenon, including in formations in east Texas (Senkayi et al., 1986; Dixon et al., 1982). It is likely that the pyrite weathering process is resulting in the release of isomorphically substituted cobalt from the pyrite crystal structure as it undergoes oxidative transformation to iron oxide minerals.

As described in the previous ASDs, vertical aquifer profiling (VAP) was used to collect groundwater samples from upgradient locations B-2 and B-3 during the soil boring and sample collection process (Geosyntec, 2019b). A groundwater sample was also collected from AD-32, an existing well within the EBAP groundwater monitoring network. Solid phases within these groundwater samples were separated and submitted for analysis of chemical composition. For the VAP samples, separation was completed using a centrifuge due to the high abundance of solids. For the groundwater sample at AD-32, the sample was filtered using a 1.5-micron filter. Based on total metals analysis, cobalt was identified both in the centrifuged solid material collected from upgradient VAP location B-3 [VAP-B3-(40-45)] and in the material retained on the filter after processing groundwater from permanent monitoring wells B-2 and B-3 (**Table 2**). The concentrations of cobalt in the solid material retained after filtration were comparable to the bulk soil samples collected from the same locations.

The solid sample [VAP-B3-(40-45)] was submitted for mineralogical analysis via XRD and scanning electron microscopy (SEM) using an energy dispersive spectroscopic analyzer (EDS). The XRD results identified pyrite as approximately 3% of the solid phase (**Table 3**). Pyrite was identified during SEM/EDS analysis of lignite which is mined immediately adjacent to the site. Logging completed while the VAP boring was advanced identified coal at several intervals, including 45 and 48 feet bgs (**Figure 4**). Furthermore, SEM/EDS of both centrifuged solid samples [VAP-B3-(40-45) and VAP-B3-(50-55)] identified pyrite in backscattered electron micrographs by the distinctive framboidal morphology (Harris et al., 1981; Sawlowicz, 2000). Major peaks involving iron and sulfur were identified in the EDS spectrum, which further support the identification of pyrite (**Attachment C**). While cobalt was not identified in the EDS spectrum, it is likely present at concentrations below the detection limit.

Naturally occurring cobalt is known to substitute for iron in pyrite. The presence of pyrite has been confirmed at AD-2 and across the Site. This suggests that pyrite, and the weathering of pyritic minerals, may be providing a source for aqueous cobalt in groundwater. Additionally, the pond was not identified as the source of cobalt at wells in the EBAP network based on the low concentrations of cobalt in the pond itself.

### 2.1.2 Lithium

Previous ASDs for lithium at the EBAP attributed the observed lithium exceedances to variations in lithium associated with the suspended native aquifer solids that likely originate from naturally occurring lignite. These native lithium-containing aquifer solids are ubiquitous in the aquifer based on the presence of lithium at upgradient locations and in the solid phase (Geosyntec, 2019b; Geosyntec, 2020b; Geosyntec, 2020c; Geosyntec, 2021b). Data gathered in support of the prior ASDs and recent results provide additional evidence that the observed lithium concentrations at AD-31 and AD-32 are due to natural variation in the aquifer (Type IV ASD).

As discussed in Section 2.1.1, surface water samples were collected directly from the EBAP and WBAP. Lithium was detected in the June 2, 2020 EBAP sample at a concentration of 0.0295 mg/L, which is comparable to the concentration of 0.0274 mg/L reported for the WBAP water on November 4, 2020 (**Table 4**). The mobile fraction identified in the bottom ash by SPLP was even lower, with an estimated lithium concentration of 0.011 mg/L. These concentrations are lower than the average lithium concentrations at AD-31 (0.0841 mg/L) and AD-32 (0.1344 mg/L) (**Table 4**). Thus, the EBAP is not the source of lithium at AD-31 and AD-32.

Groundwater samples collected from upgradient wells B-2 and B-3 in May 2021 had total lithium concentrations of 0.0449 mg/L and 0.0627 mg/L, respectively; the reported concentration at B-3 is above the GWPS of 0.0590 mg/L (**Figure 5**). Because B-2 and B-3 were installed at locations upgradient to and unimpacted by site activities, their lithium concentrations suggest that lithium is naturally present at concentrations above the GWPS across the site at variable concentrations, and not limited to AD-31 and AD-32. It is noted that B-2 and B-3 are not part of the monitoring network

for the EBAP, and as such the lithium concentrations in groundwater from these wells are not considered in calculating the GWPS for the CCR unit.

As described in Section 2.1.1, groundwater samples were collected from B-2, B-3, and AD-32 and filtered to separate solids. Groundwater was also collected from a VAP boring (VAP-B3-(40-45)) and centrifuged to separate solids. Lithium was detected in the solid material separated from these groundwater samples at concentrations comparable to bulk soil at all locations, providing evidence that the particulates captured during groundwater sampling contain lithium (**Table 5**).

### **2.1.2.1 Calculated Partition Coefficients**

A previous ASD for lithium at the EBAP developed a proposed lithium mobility in groundwater due to desorption from clay minerals associated with naturally occurring lignite material. This mechanism was posited as the source of lithium in both upgradient and downgradient wells at the EBAP (Geosyntec, 2019b). Previously completed XRD analysis of centrifuged solid material samples (VAP-B3-(40-45)) found that clay minerals, including kaolinite, smectite, and illite/mica, made up at least 60% of the aquifer solid (**Table 3**). These clay minerals, particularly smectite and illite, are known to retain positively charged ions such as lithium via cation exchange processes. SEM/EDS analysis identified the presence of silicon, aluminum and oxygen, all of which are indicative of clay minerals (**Attachment A**). The backscattered electron micrographs of these samples also identified clay particles by morphology. The largest clay particles (> 5  $\mu\text{m}$ ) are likely kaolinite, while smectite and illite dominate the smaller size fraction.

Total metal concentrations in the solid materials separated from the groundwater samples during filtration and the filtered groundwater concentrations were used to calculate partition coefficients values ( $K_d$ ) for lithium, potassium, and sodium. Details about the  $K_d$  calculation are provided in the previous ASD (Geosyntec, 2019b).  $K_d$  values for groundwater and particulates collected from wells B-2, B-3, and AD-32 were comparable to literature  $K_d$  values reported for organic-rich media such as bogs and peat beds (Sheppard et al., 2009; Sheppard et al., 2011), providing further evidence that lithium mobility in site groundwater is similar to other sites with organic-rich soils (**Table 6**). Additionally, the calculated  $K_d$  values for Pirkey soils were consistent with the literature, with potassium having the highest  $K_d$  (greatest affinity for sorption) and sodium the lowest  $K_d$  (least affinity for sorption). Furthermore, the values are similar for groundwater from all three wells, suggesting a universal mechanism controlling lithium, sodium, and potassium mobility in groundwater. Since the site-specific  $K_d$  values were calculated, lithium concentrations at the wells of interest have remained consistent, suggesting that this cation exchange mechanism is still controlling lithium groundwater concentrations (**Figure 6**).

These multiple lines of evidence show that elevated lithium concentrations at AD-31 and AD-32 are not due to a release from the EBAP, and instead can be attributed to natural variation (Type IV ASD). This variation appears related to the distribution of clay fractions associated with lignite materials in the soil aquifer material.

## **2.2 Sampling Requirements**

As the ASD presented above supports the position that the identified SSLs are not due to a release from the Pirkey EBAP, the unit will remain in the assessment monitoring program. Groundwater at the unit will continue to be sampled for Appendix IV parameters on a semiannual basis.

## SECTION 3

### CONCLUSIONS AND RECOMMENDATIONS

The preceding information serves as the ASD prepared in accordance with 30 TAC §352.951(e) and supports the position that the SSLs for cobalt and lithium identified during assessment monitoring in May 2021 were not due to a release from the EBAP. The identified SSLs should instead be attributed to natural variation in the underlying geology. Therefore, no further action is warranted, and the Pirkey EBAP will remain in the assessment monitoring program. Certification of this ASD by a qualified professional engineer is provided in **Attachment D**.

## SECTION 4

### REFERENCES

- Clementi, E., and Raimdoni, D. L. 1963. Atomic screening constants from SCF functions. *J. Chem. Phys.*, 38, 2686.
- Dixon, J.B., Hossner, L.R., Senkayi, A.L., and Egashira, K. 1982. Mineral properties of lignite overburden as they relate to mine spoil reclamation. In: J.A. Kittrick, D.S. Fanning, L. R. Hossner, editors, *Acid Sulfate Weathering, SSSA Spec. Publ. 10*. SSSA, Madison, WI. p. 169-191.
- EPRI, 2017. Guidelines for Development of Alternative Source Demonstrations at Coal Combustion Residual Sites. 3002010920. October.
- Geosyntec Consultants, 2019a. Alternative Source Demonstration – Federal CCR Rule. H.W. Pirkey Power Plant. East Bottom Ash Pond. Hallsville, Texas. April.
- Geosyntec Consultants, 2019b. Alternative Source Demonstration Report – Federal CCR Rule. H.W. Pirkey Plant, East Bottom Ash Pond. Hallsville, Texas. September.
- Geosyntec, 2020a. Statistical Analysis Plan – Revision 1. October.
- Geosyntec Consultants, 2020b. Alternative Source Demonstration Report – Federal CCR Rule. H. W. Pirkey Plant, East Bottom Ash Pond. Hallsville, Texas. April.
- Geosyntec Consultants, 2020c. Alternative Source Demonstration Report – Federal CCR Rule. H. W. Pirkey Plant, East Bottom Ash Pond. Hallsville, Texas. December.
- Geosyntec Consultants, 2021a. Statistical Analysis Summary – East Bottom Ash Pond. H.W. Pirkey Plant. Hallsville, Texas. September.
- Geosyntec Consultants, 2021b. Alternative Source Demonstration Report – Federal CCR Rule. H.W. Pirkey Plant, East Bottom Ash Pond. Hallsville, Texas. May.
- Harris, L.A, Kenik, E.A., and Yust, C.S. 1981. Reactions in pyrite framboids induced by electron beam heating in a HVEM. *Scanning Electron Microscopy*, 1, web.
- Hitzman, M.W., Bookstrom, A.A., Slack, J.F., and Zientek, M.L., 2017. Cobalt – Styles of Deposits and the Search for Primary Deposits. USGS Open File Report 2017-1155.

- Krupka, K.M. and Serne, R.J., 2002. Geochemical Factors Affecting the Behavior of Antimony, Cobalt, Europium, Technetium, and Uranium in Vadose Sediments. Pacific Northwest National Lab, PNNL-14126. December.
- Sawlowicz, Z. 2000. *Framboids: From Their Origin to Application*. Pr. Mineral. (Mineralogical Transactions), 88, web.
- Senkayi, A.L., Dixon, J.B., and Hossner, L.R. 1986. Todorokite, goethite, and hematite: alteration products of siderite in East Texas lignite overburden. *Soil Science*, 142, 36-43.
- Sheppard, S., Long, J., Sanipelli, B., and Sohlenius, G. 2009. Solid/Liquid Partition Coefficients ( $K_d$ ) for Selected Soil and Sediments at Forsmark and Laxemar-Simpevarp. R-09-27. Swedish Nuclear Fuel and Waste Management Co. March.
- Sheppard, S., Sohlenius, G., Omberg, L.G., Borgiel, M., Grolander, S., and Nordén, S. 2011. Solid/Liquid Partition Coefficients ( $K_d$ ) and Plant/Soil Concentration Ratios (CR) for Selected Soil, Tills, and Sediments at Forsmark. R-11-24. Swedish Nuclear Fuel and Waste Management Co. R-11-24. November.
- TCEQ, 2020a. Title 30, Part 1, Chapter 352: Coal Combustion Residuals Waste Management, May 22.
- TCEQ, 2020b. Coal Combustion Residuals Groundwater Monitoring and Corrective Action Draft Technical Guideline No. 32. Topic: Coal Combustion Residuals (CCR) Groundwater Monitoring and Corrective Action. Waste Permits Division. May.
- United States Environmental Protection Agency (USEPA), 1994. Method 1312 – Synthetic Precipitation Leaching Procedure, Revision 0, September 1994, Final Update to the Third Edition of the Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA publication SW-846.
- USEPA, 1996. Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures. EPA 540/S-95/504. April.
- USEPA, 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance. EPA 530/R-09/007. March.



# TABLES

**Table 1: Summary of Key Cobalt Analytical Data  
East Bottom Ash Pond - H.W. Pirkey Plant**

<b>Sample</b>	<b>Sample Date</b>	<b>Unit</b>	<b>Cobalt Concentration</b>
Bottom Ash (Solid Material)	2/11/2019	mg/kg	6.1
SPLP Leachate of Bottom Ash	2/11/2019	mg/L	<0.01
EBAP Pond Water	6/2/2020	mg/L	0.000080
WBAP Pond Water	11/4/2020	mg/L	0.000501
AD-2 - Average	May 2016 - May 2021	mg/L	0.0136
AD-31 - Average	May 2016 - May 2021	mg/L	0.0126
AD-32 - Average	May 2016 - May 2021	mg/L	0.0465

Notes:

mg/kg - milligram per kilogram

mg/L - milligram per liter

J - Estimated value. Result is less than the reporting limit but greater than or equal to the method detection limit.

A sample was collected from the WBAP on 11/4/2020 as a surrogate for the EBAP, as the EBAP did not contain free water. The same process water is stored in both the WBAP or EBAP.

Average values were calculated using all cobalt data collected under 40 CFR 257 Subpart D, excluding any identified outliers.

**Table 2: Soil Cobalt Data**  
**East Bottom Ash Pond - H.W. Pirkey Plant**

Location ID	Location	Sample Depth (ft bgs)	Cobalt (mg/kg)
<b>Bulk Soil Samples</b>			
AD-2	EBAP Network	25-27	9.45
		31-33	19.2
AD-18	EBAP Network	8	3.60
		22	2.90
AD-31	EBAP Network	12	1.90
		26	0.83
AD-32	EBAP Network	11	1.70
		20-25	9.10
AD-41	Upgradient	15	< 1.0
		35	23.5
		95	1.90
B-2	Upgradient	10	2.36
		16	3.62
		71	10.30
		82	7.21
		87	3.11
B-3	Upgradient	10	1.30
		20	0.59
		97	1.11
<b>Solid Material Retained After Filtration</b>			
AD-32	EBAP Network	13-33	5.4
B-2	Upgradient	38-48	4.3
B-3	Upgradient	29-34	12.0
		VAP 40-45	18.0

Notes:

mg/kg- milligram per kilogram

ft bgs - feet below ground surface

For AD-XX locations, samples were collected from additional boreholes advanced in the immediate area of the location identified by the well ID. Samples were not collected from the cuttings of the borings advanced for well installation. Samples for B-2 and B-3 locations were collected from cores removed from the borehole during well lithology logging.

Depths for samples collected after filtration represent the screened interval for the permanent well where the sample was collected.

**Table 3: X-Ray Diffraction Results  
East Bottom Ash Pond - H. W. Pirkey Plant**

*Geosyntec Consultants, Inc.*

<b>Constituent</b>	<b>VAP-B3-(40-45)</b>
Quartz	15
Plagioclase Feldspar	0.5
Orthoclase	ND
Calcite	ND
Dolomite	ND
Siderite	0.5
Goethite	ND
Hematite	2
Pyrite	3
Kaolinite	42
Chlorite	4
Illite/Mica	6
Smectite	12
Amorphous	15

Notes:

ND: Not detected

VAP-B3-(40-45) is the centrifuged solid material from the groundwater sample collected at that interval.

**Table 4: Summary of Key Lithium Analytical Data  
East Bottom Ash Pond - H.W. Pirkey Plant**

<b>Sample</b>	<b>Sample Date</b>	<b>Unit</b>	<b>Lithium Concentration</b>
Bottom Ash (Solid Material)	2/11/2019	mg/kg	0.82 J
SPLP Leachate of Bottom Ash	2/11/2019	mg/L	0.011 J
EBAP Pond Water	6/2/2020	mg/L	0.0295
WBAP Pond Water	11/4/2020	mg/L	0.0274
AD-31 - Average	May 2016 - May 2021	mg/L	0.0841
AD-32 - Average	May 2016 - May 2021	mg/L	0.1344

Notes:

mg/kg - milligram per kilogram

mg/L - milligram per liter

J - Estimated value. Result is less than the reporting limit but greater than or equal to the method detection limit.

A sample was collected from the WBAP on 11/4/2020 as a surrogate for the EBAP, as the EBAP did not contain free water. The same process water is stored in both the WBAP or EBAP.

Average values were calculated using all lithium data collected under 40 CFR 257 Subpart D, excluding any identified outliers.

**Table 5: Soil Lithium Data**  
**East Bottom Ash Pond - H.W. Pirkey Plant**

<b>Location ID</b>	<b>Sample Depth (ft bgs)</b>	<b>Lithium (mg/kg)</b>
<b>Bulk Soil Samples</b>		
AD-32	11	0.53
	20-25	1.60
B-2	10	5.30
	16	3.97
	71	7.42
	87	13.10
B-3	10	3.64
	20	2.59
	97	11.10
Lignite	N/A	2.9 J
<b>Solid Material Retained After Filtration</b>		
AD-32	13-33	9.8 J
B-2	38-48	6.5 J
B-3	29-34	7.8 J
	VAP 40-45	13.0

Notes:

J - estimated value

mg/kg- milligram per kilogram

ft bgs - feet below ground surface

For AD-32, samples were collected from additional boreholes advanced in the immediate area of the location identified by the well ID. Samples were not collected from the cuttings of the borings advanced for well installation. Samples for B-X locations were collected from cores removed from the borehole during well lithology logging.

Depths for samples collected after filtration represent the screened interval for the permanent well where the sample was collected.

VAP - vertical aquifer profiling

**Table 6: Calculated Site-Specific Partition Coefficients  
East Bottom Ash Pond - H. W. Pirkey Plant**

Source	B-2			Literature Value
Unit	mg/L	mg/kg	L/kg	L/kg
Element	Aqueous Phase	Adsorbed	Kd	Kd
Li	0.081	6.5	80	43-370
K	2.6	1100	423	42-1200
Na	14	130	9	5.2-82

Source	B-3			Literature Value
Unit	mg/L	mg/kg	L/kg	L/kg
Element	Aqueous Phase	Adsorbed	Kd	Kd
Li	0.097	7.8	80	43-370
K	2.9	1100	379	42-1200
Na	32	240	8	5.2-82

Source	AD-32			Literature Value
Unit	mg/L	mg/kg	L/kg	L/kg
Element	Aqueous Phase	Adsorbed	Kd	Kd
Li	0.11	9.8	89	43-370
K	3.9	1800	462	42-1200
Na	57	220	4	5.2-82

Notes:

mg/L: milligrams per liter

mg/kg: milligrams per kilogram

L/kg: liters per kilogram

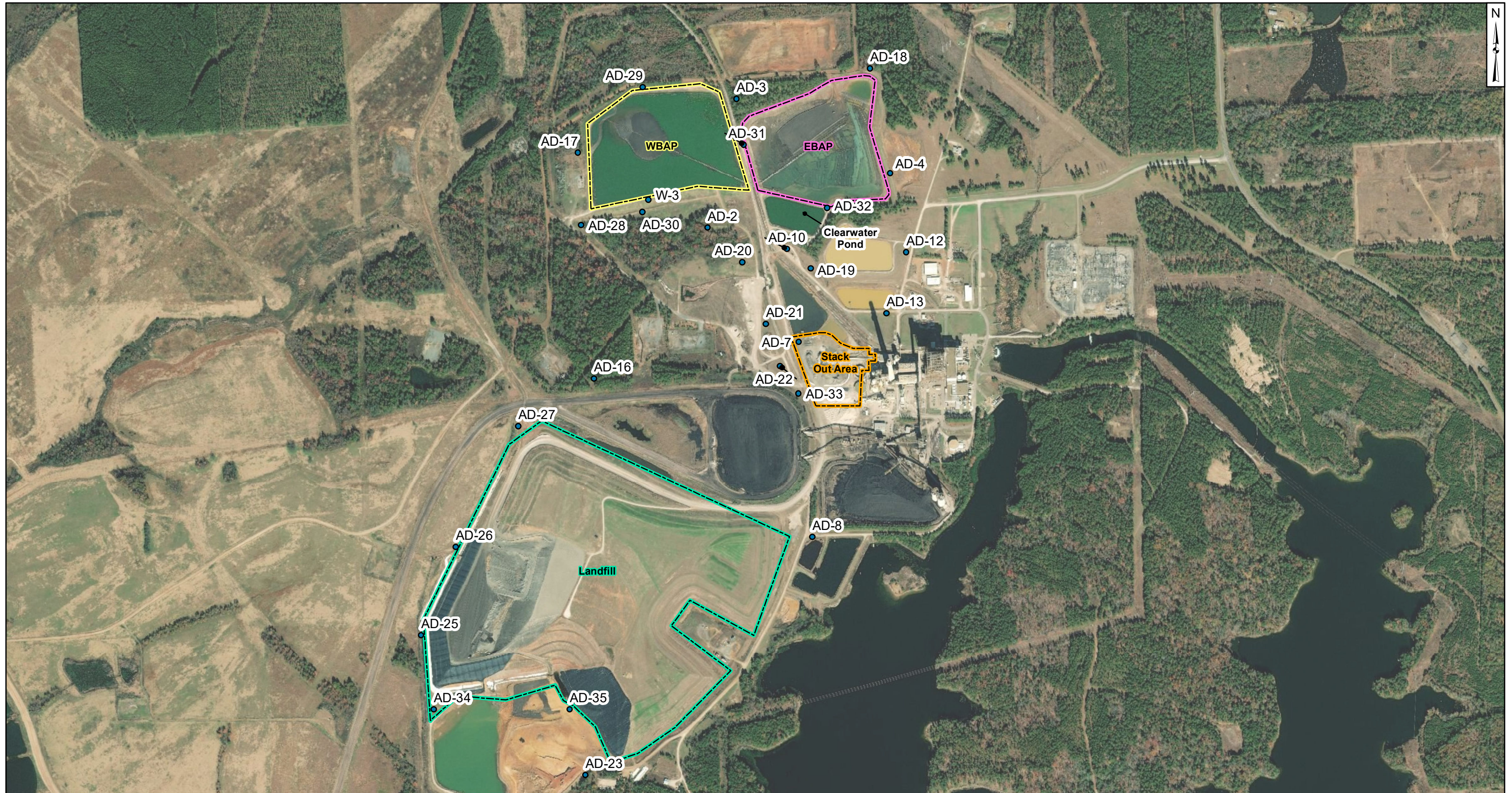
Kd: partition coefficient

Adsorbed values are total metals concentrations reported by USEPA Method 6010B.

Literature values represent maximum and minimum values for the parameter as reported in Sheppard et al, 2009 (Table 4-1, all sites) and Sheppard et al, 2011 (Table 3-3 cultivated peat and wetland peat only).

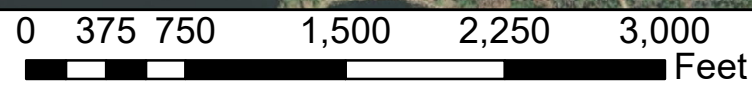
# FIGURES



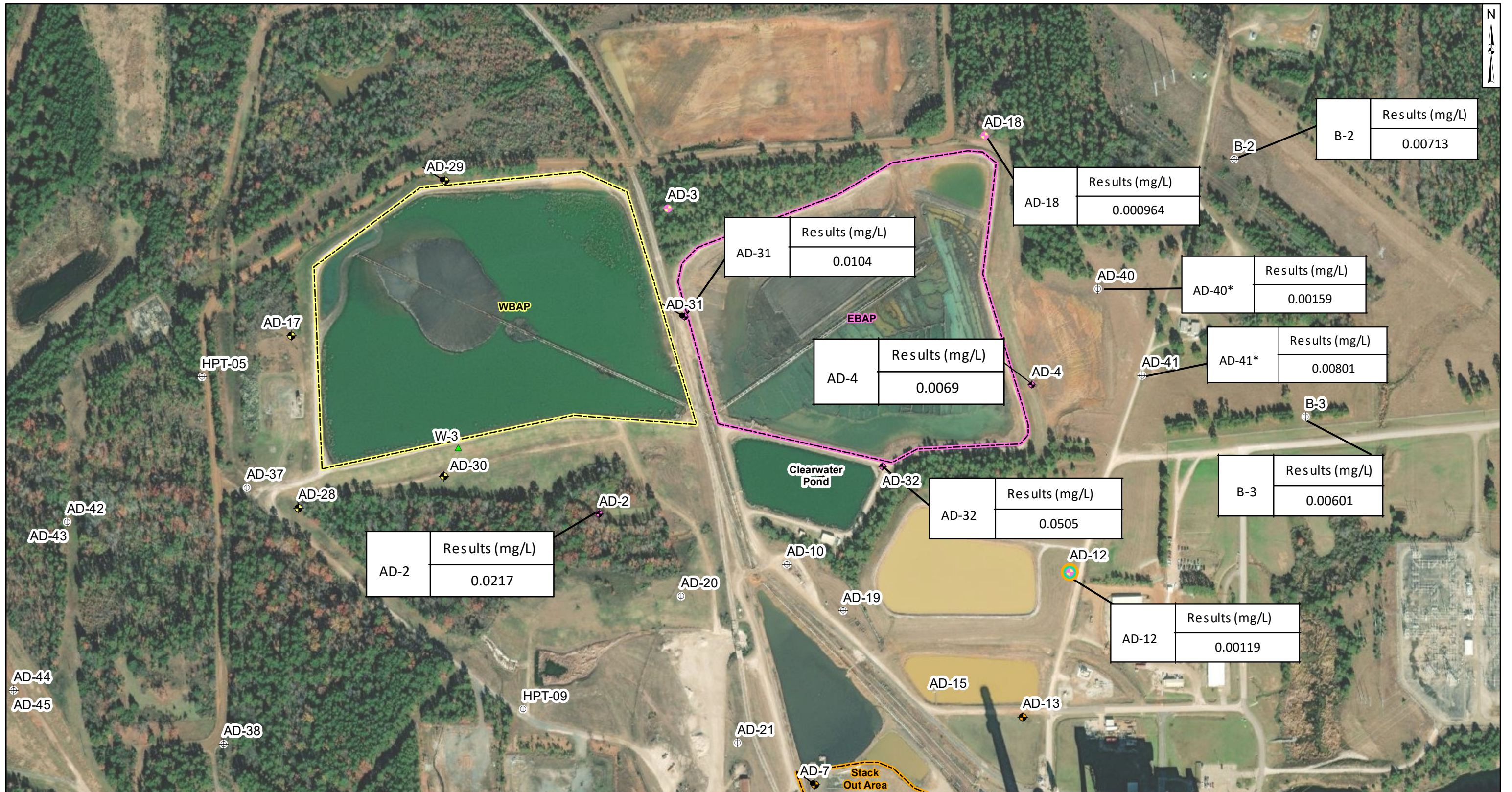


- Legend**
- Monitoring Wells
  - EBAP
  - Landfill
  - Stack Out Area
  - WBAP

**Notes**  
 - Monitoring well coordinates provided by AEP.  
 - Data provided by AEP, 2019



<b>Site Layout</b>	
AEP Pirkey Power Plant Hallsville, Texas	
<b>Geosyntec</b> consultants	
Columbus, Ohio	2020/03/24
<b>Figure 1</b>	



**Legend**

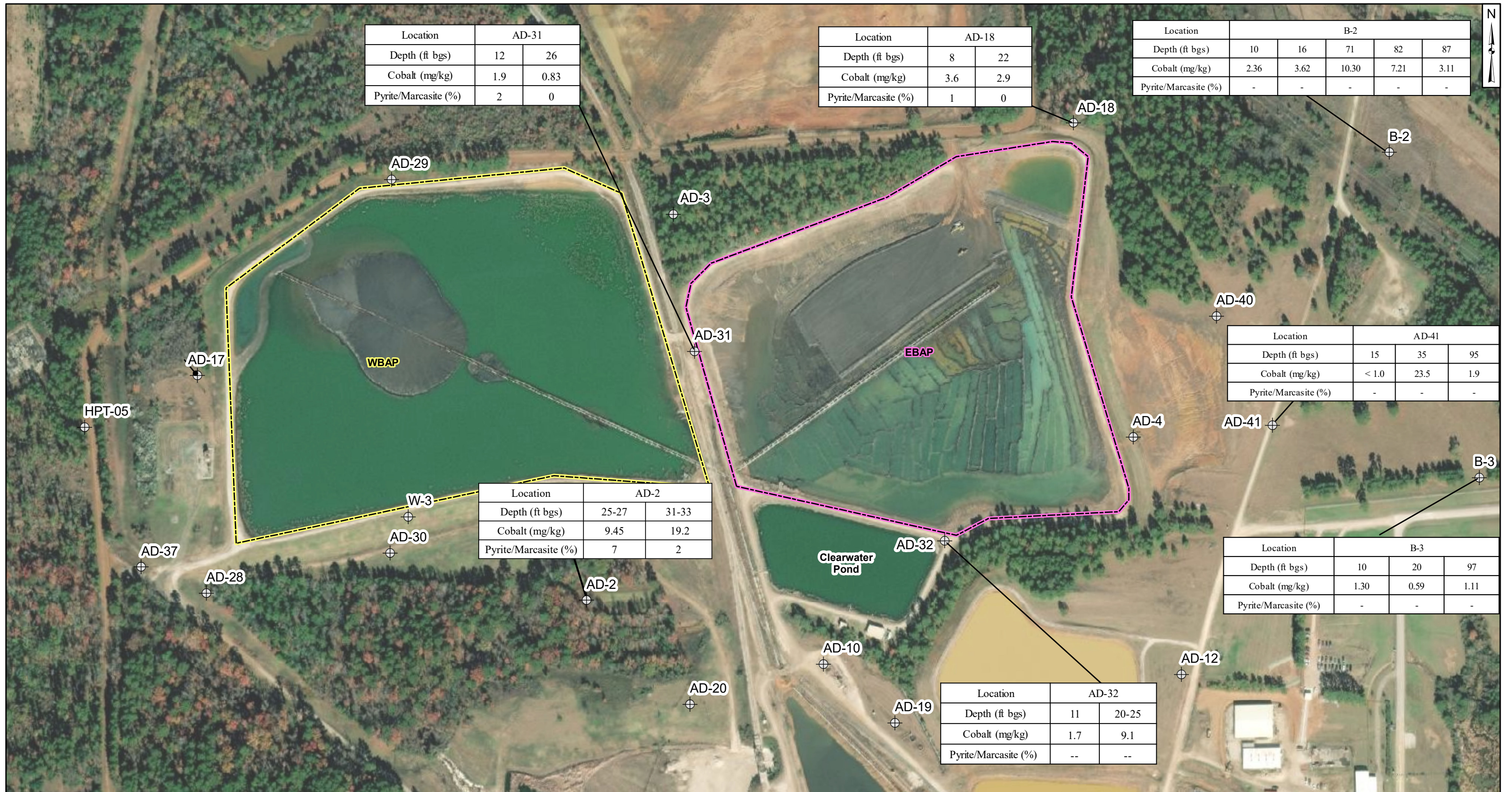
⊕ Out of Network	◆ Stackout Area	▭ EBAP
◆ EBAP	◆ EBAP and WBAP	▭ Stack Out Area
◆ WBAP	⊕ All CCR Unit Networks	▭ WBAP
◆ Landfill	▲ Piezometer	

**Notes**

- Monitoring well coordinates, site features, and data provided by AEP.
- AD-15 location is approximated
- Samples collected in May 2021
- \* - Well most recently sampled August 2019



<b>Cobalt Distribution in Groundwater</b>	
AEP Pirkey Power Plant Hallsville, Texas	
<b>Geosyntec</b> consultants	
Columbus, Ohio	2021/10/27
<b>Figure 2</b>	



Location	AD-31	
Depth (ft bgs)	12	26
Cobalt (mg/kg)	1.9	0.83
Pyrite/Marcasite (%)	2	0

Location	AD-18	
Depth (ft bgs)	8	22
Cobalt (mg/kg)	3.6	2.9
Pyrite/Marcasite (%)	1	0

Location	B-2				
Depth (ft bgs)	10	16	71	82	87
Cobalt (mg/kg)	2.36	3.62	10.30	7.21	3.11
Pyrite/Marcasite (%)	-	-	-	-	-

Location	AD-2	
Depth (ft bgs)	25-27	31-33
Cobalt (mg/kg)	9.45	19.2
Pyrite/Marcasite (%)	7	2

Location	AD-41		
Depth (ft bgs)	15	35	95
Cobalt (mg/kg)	< 1.0	23.5	1.9
Pyrite/Marcasite (%)	-	-	-

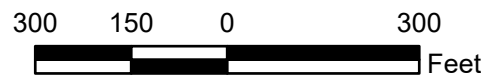
Location	B-3		
Depth (ft bgs)	10	20	97
Cobalt (mg/kg)	1.30	0.59	1.11
Pyrite/Marcasite (%)	-	-	-

Location	AD-32	
Depth (ft bgs)	11	20-25
Cobalt (mg/kg)	1.7	9.1
Pyrite/Marcasite (%)	--	--

- Legend**
- Monitoring Wells
  - EBAP
  - WBAP

**Notes**

- Monitoring well coordinates provided by AEP.
- AD-2 sample collected on April 20, 2020
- All other data provided by AEP, 2019.
- ft bgs: feet below ground surface.
- mg/kg: milligrams per kilogram.
- -- not analyzed.



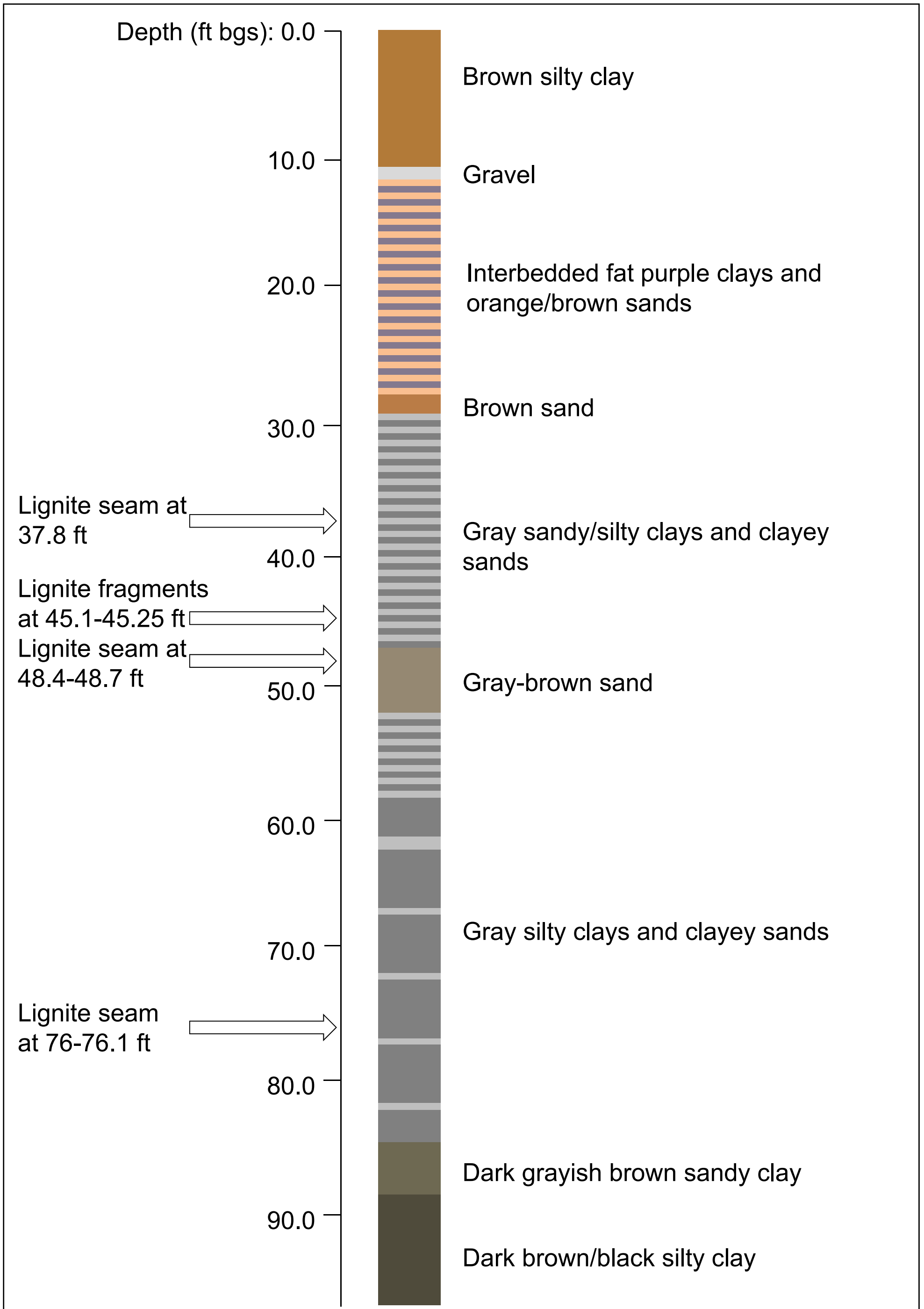
**Cobalt Distribution in Soil**

AEP Pirkey Power Plant  
Hallsville, Texas

**Geosyntec**  
consultants

Columbus, Ohio      2020/12/22

**Figure 3**



Notes:

- Ft = feet
- Bgs = below ground surface
- Boring completed May 2019
- Total depth of 97.5 ft bgs
- Well installed in offset boring screened at 29-34 ft bgs

**B-3 Visual Boring Log**

AEP Pirkey Powerplant  
Hallsville, TX

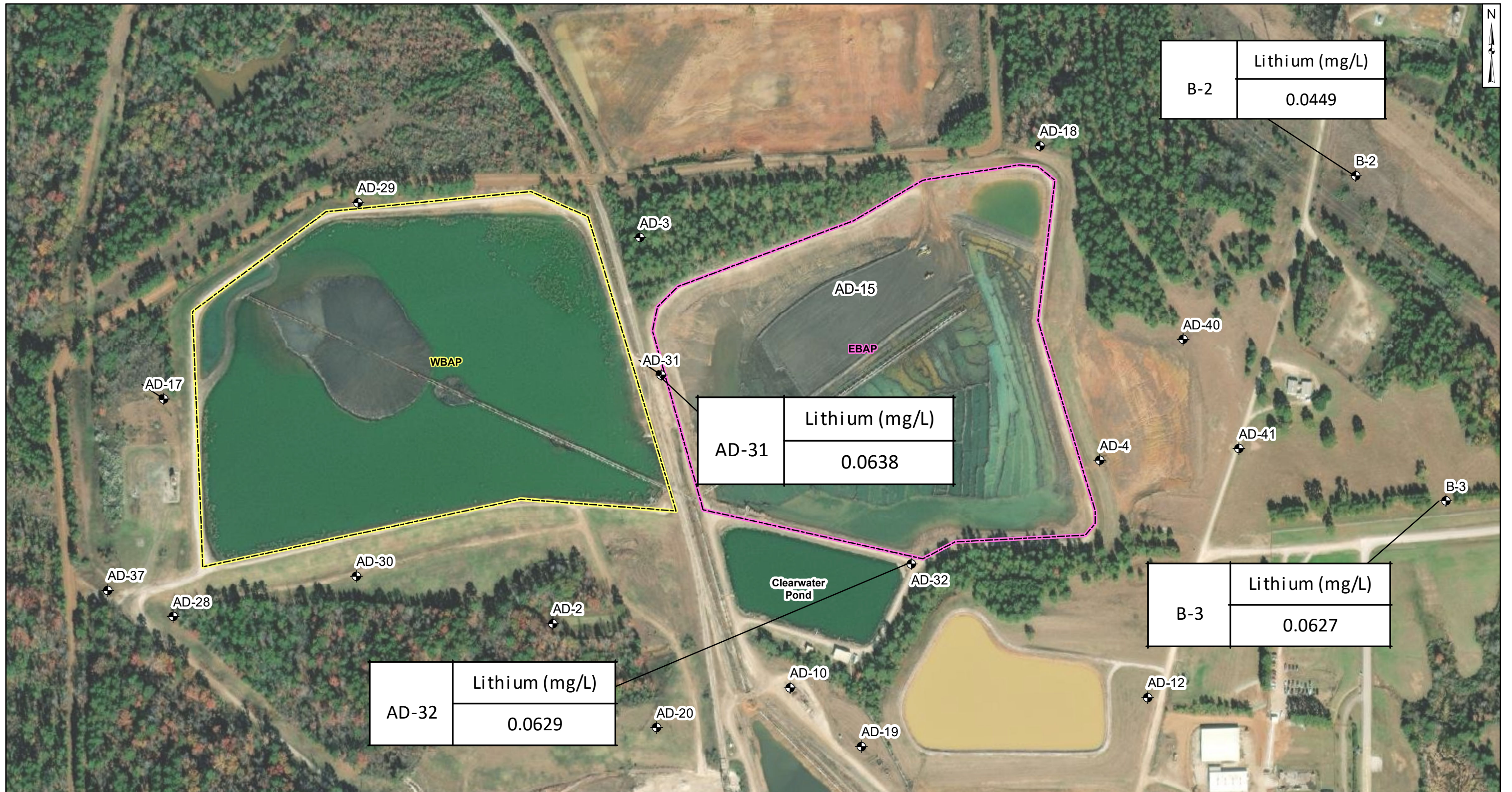
**Geosyntec**  
consultants

**Figure**

**4**

CHA8462

March 2020

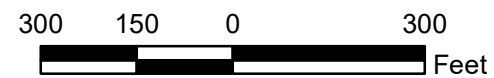


**Legend**

- ⊕ Monitoring Well
- EBAP
- Landfill
- Stack Out Area
- WBAP

**Notes**

- Lithium concentrations in micrograms per liter ug/L.
- Monitoring well coordinates, site features, and data provided by AEP.
- Groundwater samples were collected in May 2021.



**Lithium Distribution in Groundwater**

AEP Pirkey Power Plant  
Hallsville, Texas

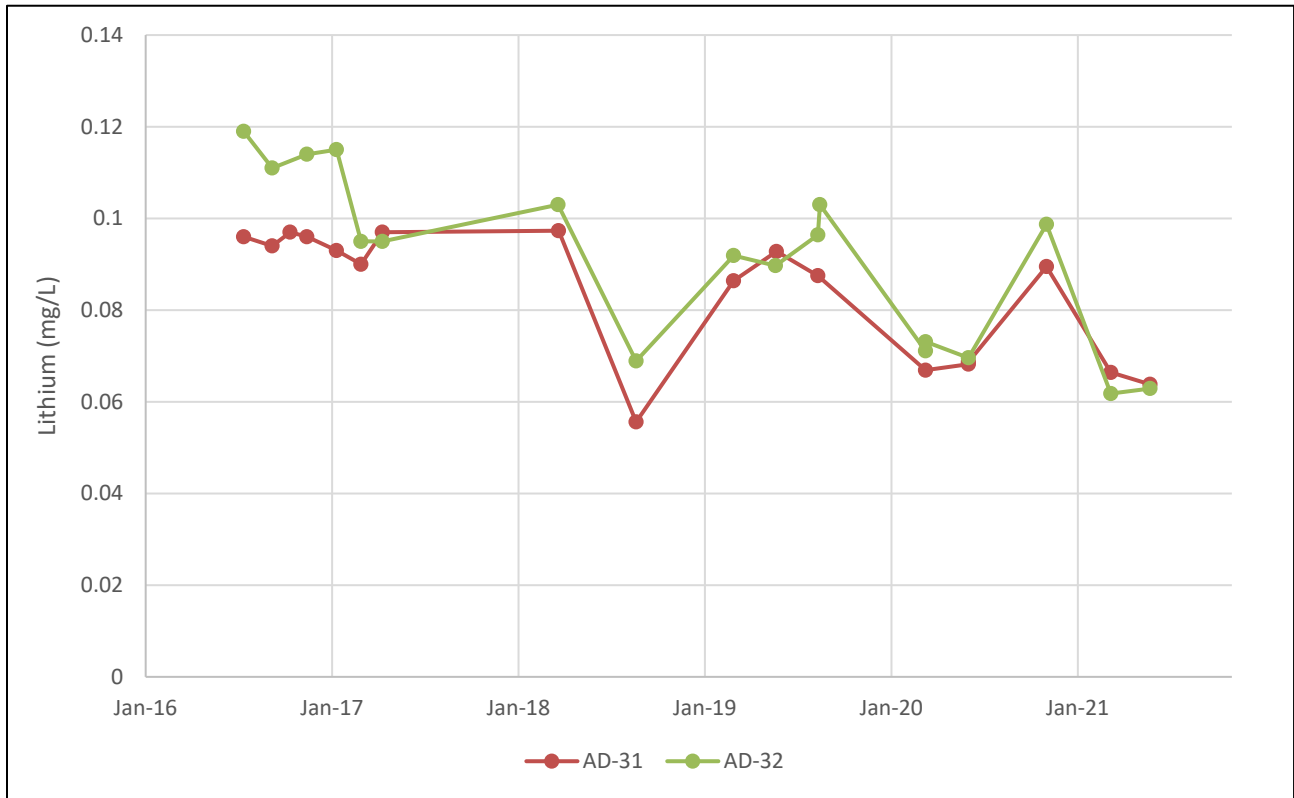
**Geosyntec**  
consultants

Columbus, Ohio

2021/12/15

Figure

**5**



Notes: Lithium concentrations are shown in milligrams per liter (mg/L). An outlier lithium value reported for AD-32 on 10/12/16 was excluded from the time series graph.

### Lithium Time Series Graph

Pirkey East Bottom Ash Pond



Figure

6

Columbus, Ohio

27-October-2021

ATTACHMENT A  
SB-2 Boring Log

PROJECT NO. \_\_\_\_\_ PROJ. \_\_\_\_\_ BOR. NO. SB-2  
 LOCATION AD-2/MW-2-Pitney Power Plant ELEV. \_\_\_\_\_ DATE 4/20/20

SILTS & SANDS		COHESIVE SOILS - CLAYS			COLORS		MATERIALS		SAND ADI.		CHARACTERISTICS		
CONDITION		CONSISTENCY		PENETROMETER	N - VALUE	Li ... Light ... Br ... Brown		Cl ... Clay, Clayey		F ... Fine		Calc ... Calcareous	
VLo ... Very Loose	0-4	Vso... Very Soft	0 - 0.25	0	<2	Dk ... Dark ... Bk ... Black	Si ... Silt, Silty	M ... Medium		Co ... Coarse		Lig ... Lignite	
Lo ... Loose	4-10	So ... Soft	0.25 - 0.5	2 - 4		G ... Grey ... Bl ... Blue	Sa ... Sand, Sandy	Co ... Coarse		Si ... Silty		Org ... Organic	
MDe ... Med. Dense	10-30	Mst. Stiff	0.5 - 1.0	4 - 8		T ... Tan ... Gr ... Green	Ls ... Limestone					Lam ... Laminate	
De ... Dense	30-50	St ... Stiff	1.0 - 2.0	8 - 15		R ... Red ... Y ... Yellow	Gr ... Gravel					Sl ... Slickensided	
VDe ... Very Dense	>50	VSt. Very Stiff	2.0 - 4.0	15 - 30		Rdsh. Reddish. Wh ... White	SiS ... Siltstone					SL ... Slightly	
		H ... Hard	> 4.0	>30			SS ... Sandstone					Sm(s) ... Seam(s)	
							Sh ... Shale, Shaley					Nod ... Nodules	

Sample Interval FEET ASSIGNMENT	S-A-M-P-L-E-N-O. RECOVERY	DEPTH FT.	SAMPLES	STRATUM DESCRIPTION					STANDARD PENETROMETER			UNIFIED SOIL CLASSIFICATION	N - VALUE OR HAND PENETROMETER		
				CONDITION OR CONSISTENCY	COLOR	MINOR MATERIALS OR ADJECTIVES	PREDOMINATE MATERIAL	CHARACTERISTICS OR MODIFICATIONS	SEAT - 6"	1st - 6"	2nd - 6"				
SM 8' CI 14.5'		0-5	2' Rec	0	0-8'	Br, Lt. Rd Br	Si	Sa	Silty Sand - trace clay, trace root hairs, moist.					moist (0-5)	
		5-10	2.5' Rec			Lt. Rd Br			- thin lenses (less than 1/4") at 7.5', trace iron staining					moist (5-10)	
		10-15	4' Rec	8	8-14.5'	Lt. Rd Br, Br, Gray	Sa, Si, Cl	Cl	Clayey sand in interbeds to 14.5', trace iron ore gravel in sand seams @ 10.5', 12', 12.5'					moist (10-15)	
		15-20	2' Rec	14.5	14.5-39'	Rd Br, Ylw, Br, Gray	Si, Cl	Sa	silty sand - some sand/silt iron cemented bands @ 16.5' and ironstone @ 1.5"					v. moist to moist (15-20)	
		20-25	* No Rec.						- cemented sand seams in silty sand @ 20-25'					v. moist (20-25)	
		25-30	2.5' Rec			Gray - dk Gray dk. Br (25-39')			- gravel & cemented sand seam @ 25' (6") - cemented and part. clay cemented clayey silty sand @ 25.5' - dark gray silty sat sand seam (2") @ 27"					sat. @ 25'-25.5' moist 25.5-27 sati. @ 27' (2")	
		30-35	3' Rec						- sat. silty sand seam @ 30.5' (1") - sat. silty sand seam @ 32' (3") * some u.f. gypsum crystals in clayey sand between sat. sand seams (25-40')					sat. @ 30.5' (1") 32.0' (3") v. moist (to 39')	
ML 39'		35-40	4' Rec	39	39-40	Lt. Gray, Gray Cl, Br (39-40)	Si	Si	Clayey sandy silt - interbedded silt & clay @ 39' to 40'					moist (39-40)	
									S.O.T. @ 40'						
									* 25-27' collected @ 1015 * 31-33' collected @ 1035						

Type HSA Dry Auger  Rotary Wash   
 SEEPAGE @ 25 FT. WHILE DRILLING, W.L. @      FT. ON COMPL.  
 (OR) BAILED TO      FT. UPON COMPLETION.  
 W.L. @      FT AND CAVED TO      FT. ON     

\* GPS: 32,46522, -94,49032 (12' E,  
3.5' N)  
of AD-2/MW-2



ATTACHMENT B  
SB-2 Boring Photographic Log

**GEOSYNTEC CONSULTANTS**  
**Photographic Record**



**Client: AEP**

**Project Number: CHA8495**

**Site Name: Pirkey East Bottom Ash Pond**

**Site Location: Hallsville, Texas**

**Photograph 1**

**Date: 4/21/2020**

**Direction: N/A**

**Comments:**  
0-5 foot interval of SB-2.

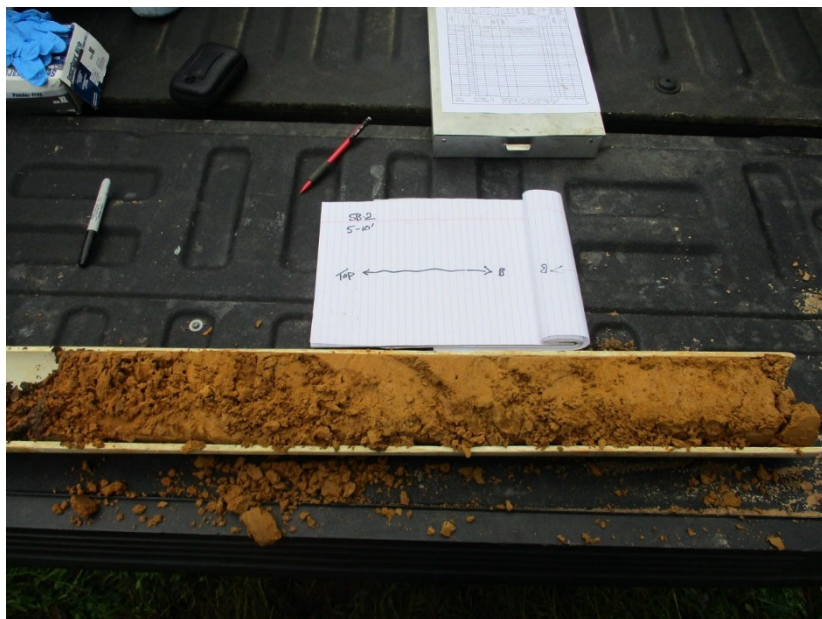


**Photograph 2**

**Date: 4/21/2020**

**Direction: N/A**

**Comments:**  
5-10 foot interval of SB-2.



**GEOSYNTEC CONSULTANTS**  
**Photographic Record**



**Client: AEP**

**Project Number: CHA8495**

**Site Name: Pirkey East Bottom Ash Pond**

**Site Location: Hallsville, Texas**

**Photograph 3**

**Date: 4/21/2020**

**Direction: N/A**

**Comments:**  
10-15 foot interval of SB-2.



**Photograph 4**

**Date: 4/21/2020**

**Direction: N/A**

**Comments:**  
15-20 foot interval of SB-2. Recovery of this interval was limited.



**GEOSYNTEC CONSULTANTS**  
**Photographic Record**



**Client: AEP**

**Project Number: CHA8495**

**Site Name: Pirkey East Bottom Ash Pond**

**Site Location: Hallsville, Texas**

**Photograph 5**

**Date: 4/21/2020**

**Direction: N/A**

**Comments:**  
20-25 foot interval of SB-2. Recovery of this interval was limited.

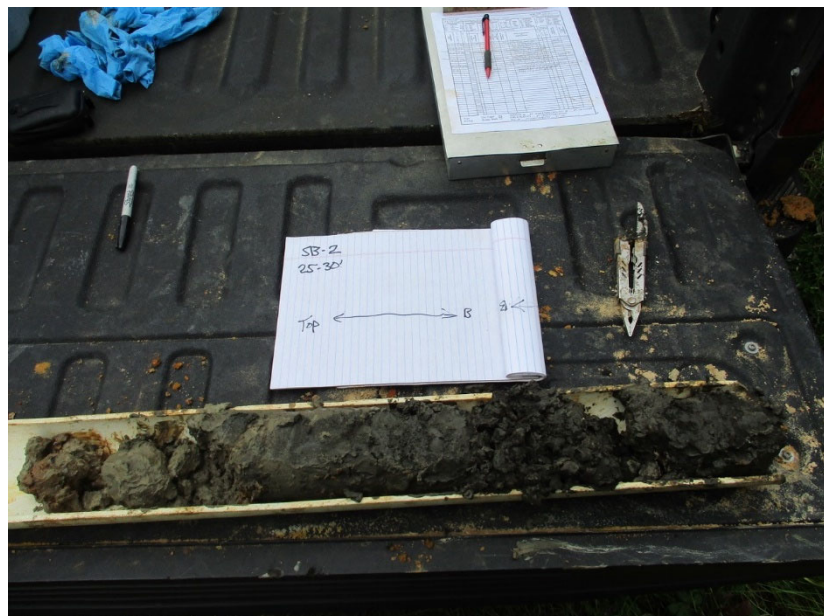


**Photograph 6**

**Date: 4/21/2020**

**Direction: N/A**

**Comments:**  
25-30 foot interval of SB-2. Very little of this interval was recovered. A color change was observed from red to dark brown/black. A sample was collected from this interval.



**GEOSYNTEC CONSULTANTS**  
**Photographic Record**



**Client: AEP**

**Project Number: CHA8495**

**Site Name: Pirkey East Bottom Ash Pond**

**Site Location: Hallsville, Texas**

**Photograph 9**

**Date: 4/21/2020**

**Direction: N/A**

**Comments:**  
30-35 foot interval of SB-2. Very little of this interval was recovered.. A sample was collected from this interval.



**Photograph 10**

**Date: 4/21/2020**

**Direction: N/A**

**Comments:**  
35-40 foot interval of SB-2

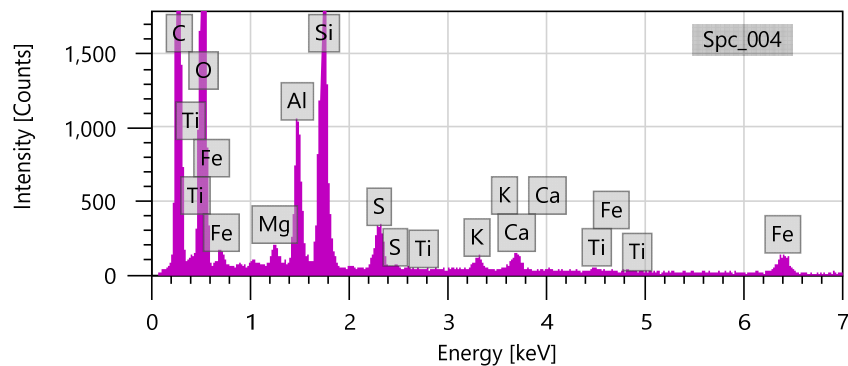
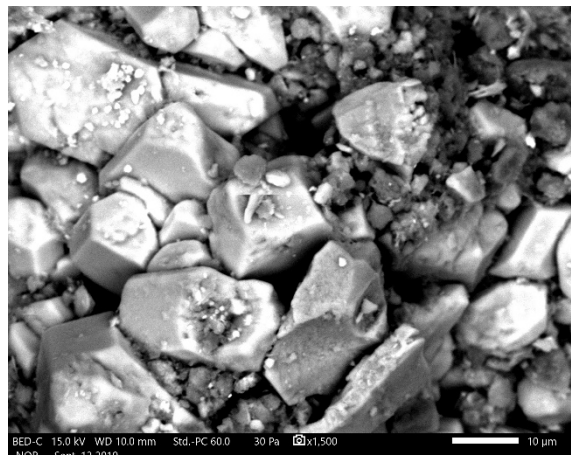
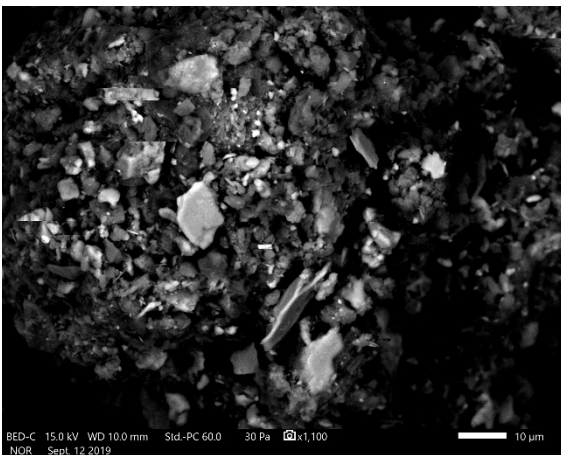
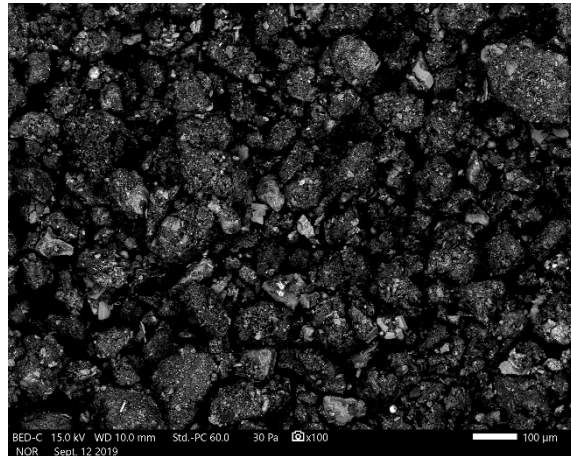
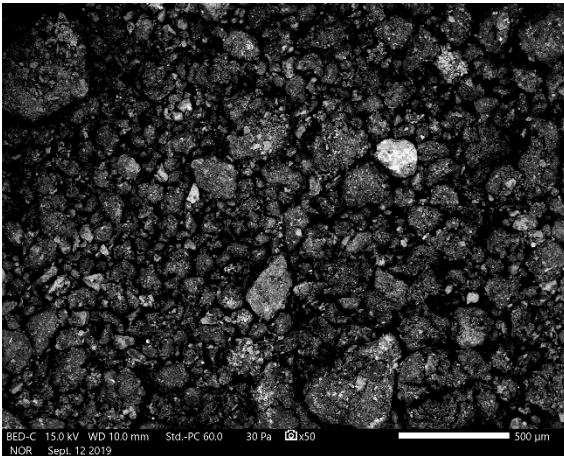


ATTACHMENT C  
SEM/EDS Analysis

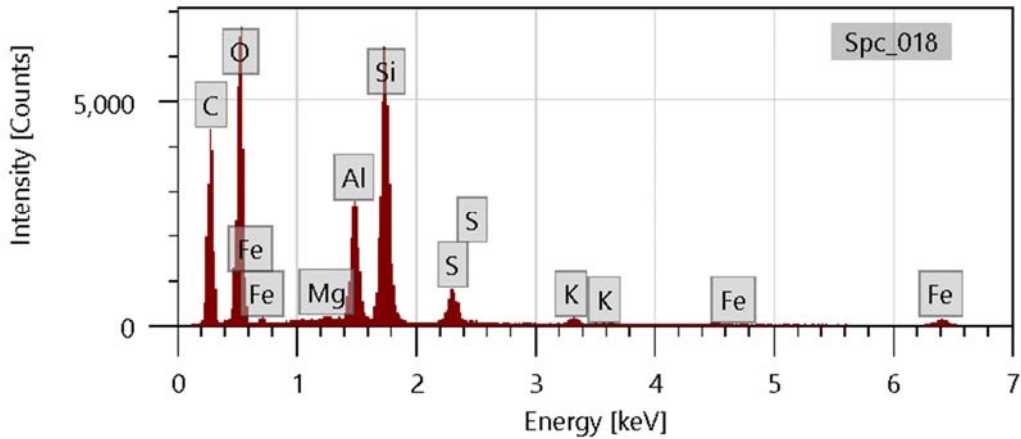
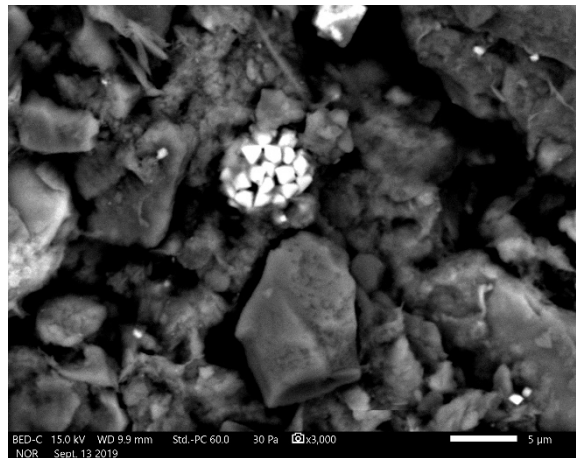
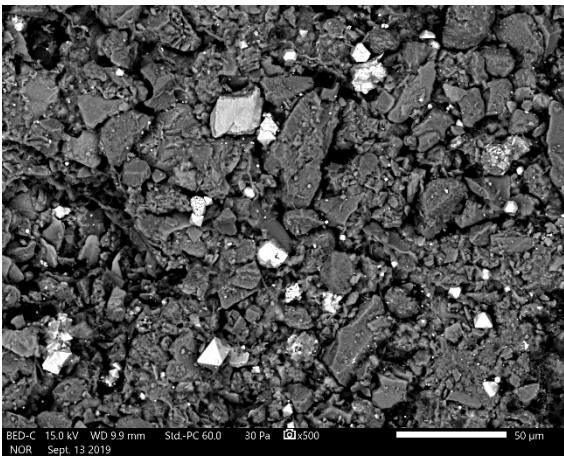
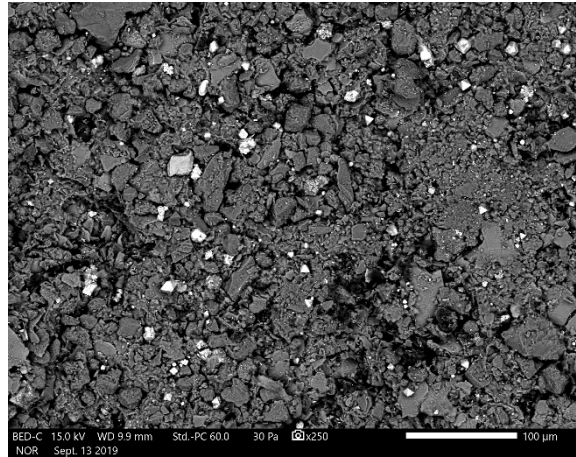
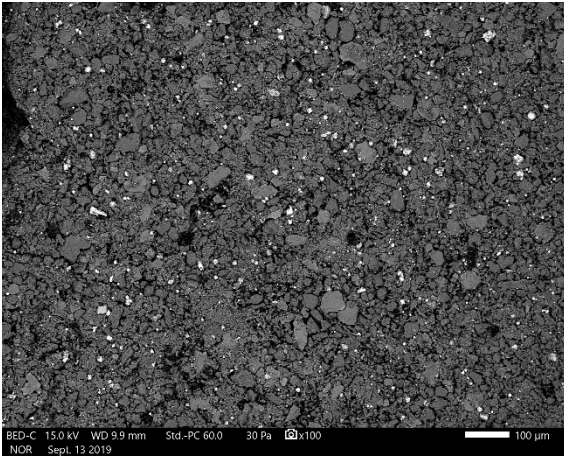
September 16, 2019

Dr. Bruce Sass  
941 Chatham Lane, Suite 103, Columbus, OH 43221

via Email: [BSass@geosyntec.com](mailto:BSass@geosyntec.com)

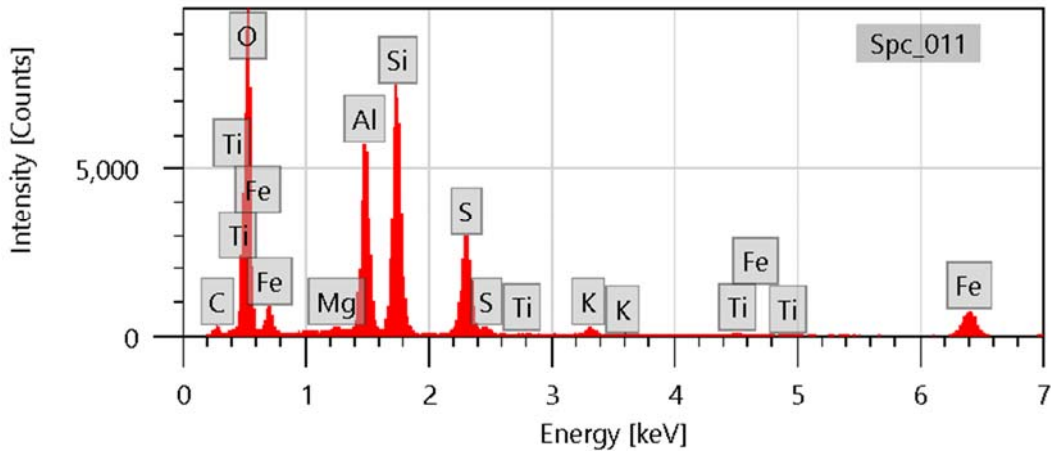
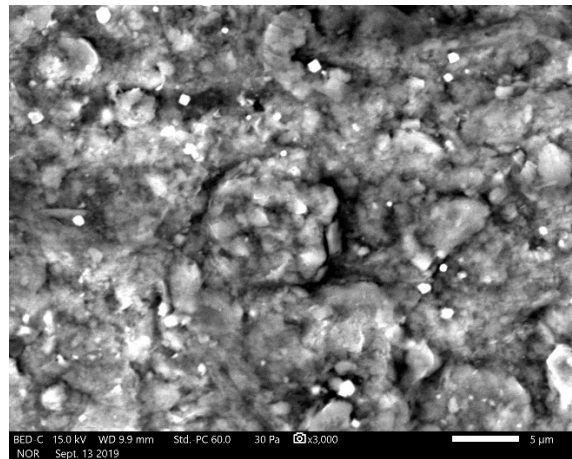
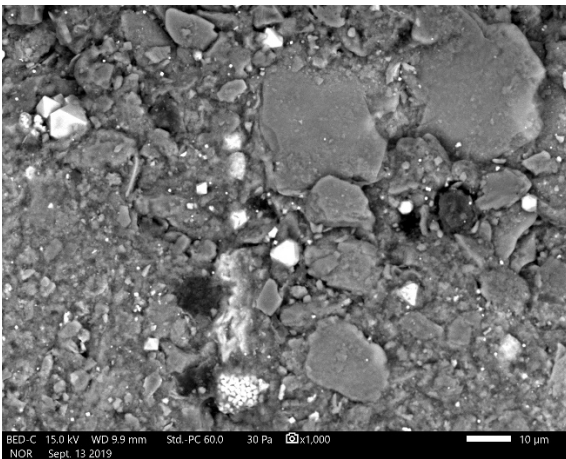
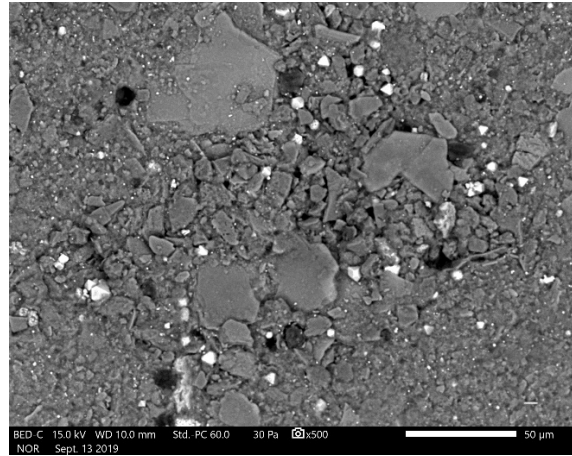
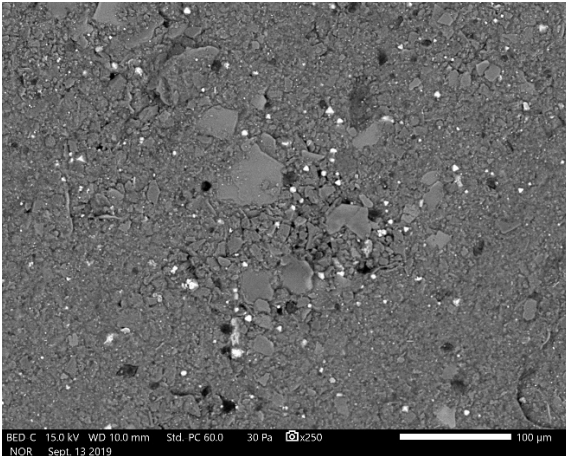


Lignite. Backscattered electron micrographs show the sample at 100X, 1,100X, and 1,500X. EDS spectrum at bottom is an area scan of the region shown in top right micrograph. Bright particles are mostly quartz and feldspar. Major peaks for carbon, oxygen, silicon, and aluminum suggest coal and clay.



Sample VAP B3 40-45. Backscattered electron micrographs show the sample at 100X, 250X, 500X, and 3000X. EDS spectrum at bottom is an area scan of the region shown at 500X. Bright particles are pyrite (framboid in bottom right micrograph). Major peaks for carbon, oxygen, silicon, and aluminum suggest coal and clay.





Sample VAP B3 50-55. Backscattered electron micrographs show the sample at 250X, 500X, 1000X, and 3000X. EDS spectrum at bottom is an area scan of the region shown at 3000X. Bright particles are mostly pyrite (framboid in bottom left micrograph); occasional particles of Fe-Ti oxide are detected. Major peaks for oxygen, silicon, and aluminum suggest clay. Large blocky particles are mostly quartz, feldspar, and clay.

## ATTACHMENT D

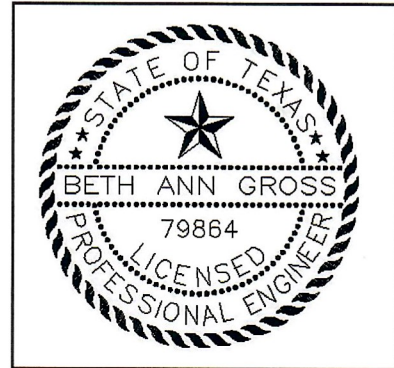
Certification by Qualified Professional Engineer

**CERTIFICATION BY A QUALIFIED PROFESSIONAL ENGINEER**

I certify that the selected and above described alternative source demonstration is appropriate for evaluating the groundwater monitoring data for the Pirkey East Bottom Ash Pond CCR management area and that the requirements of 30 TAC § 352.951(e) have been met.

Beth Ann Gross  
Printed Name of Licensed Professional Engineer

Beth Ann Gross  
Signature



Geosyntec Consultants  
2039 Centre Pointe Blvd, Suite 103  
Tallahassee, Florida 32308

Texas Registered Engineering Firm  
No. F-1182

79864  
License Number

Texas  
Licensing State

12/22/2021  
Date

**APPENDIX 4- Field Sheets**

Facility Name  
Sample by

APP PIPK07 PP  
KERRY McDermid

Depth to water, feet (TOC)  
Measured Total Depth, feet (TOC)

15.04  
46.36

Sample Location ID

A0-02

Depth to water date

03/09/21

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)
1020	15.51	180	3.97	582	8.8	4.13	371	19.21
1025	15.60	180	3.97	583	4.8	2.16	368	19.07
1030	15.64	180	3.99	583	3.4	2.05	365	18.92
1035	15.71	180	3.98	584	3.6	2.00	361	18.84

Total volume purged  
Sample appearance  
Sample time  
Sample date

0 L  
Clear  
1037  
03/09/21

Duplicate - 2

Facility Name: AFL Panga PP  
 Sample by: Kenny McDonald

Sample Location ID: A0-07

Depth to water, feet (TOC): 7.65  
 Measured Total Depth, feet (TOC): 47.29

Depth to water date: 03/09/21

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond ( $\mu\text{S/cm}$ )	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ( $^{\circ}\text{C}$ )
1146	8.02	260	5.06	106	190	4.80	307	18.72
1151	8.09	196	5.13	94	164	2.61	311	18.84
1156	8.00	196	5.15	94	131	2.58	317	18.87
1201	8.08	196	5.17	92	128	2.55	314	19.00

Total volume purged:  
 Sample appearance: Slight yellow  
 Sample time: 1203  
 Sample date: 03/09/21

Facility Name: Pirkey  
 Sample by: Matt Hamilton

Depth to water, feet (TOC): 8.47  
 Measured Total Depth, feet (TOC): 52.00

Sample Location ID: AD-12

Depth to water date: 3-8-21

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond ( $\mu$ S/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ( $^{\circ}$ C)
1015	8.84	300	4.30	44	0	3.61	251	15.65
1020	9.14	300	4.15	46	0	3.30	242	14.72
1025	9.27	300	4.13	47	0	3.35	242	14.76

Total volume purged:                     

Sample appearance: clear

Sample time: 1027

Sample date: 3-8-21

Facility Name: **APP PLANT PH**  
 Sample by: **KIMM MCDONALD**

Depth to water, feet (TOC): **3.43**  
 Measured Total Depth, feet (TOC): **28.42**

Sample Location ID: **AD-18**

Depth to water date: **03/09/21**

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond ( $\mu$ S/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ( $^{\circ}$ C)
756	4.63	110	4.38	72	10.5	4.39	339	19.37
755	5.57	110	4.46	61	12.8	2.87	321	19.42

Total volume purged: \_\_\_\_\_  
 Sample appearance: **CLEAR**  
 Sample time: **1315**  
 Sample date: **03/09/21**



Facility Name  
Sample by

Pilled  
M.H. Hamilton

Sample Location ID

AD-31

Depth to water, feet (TOC)  
Measured Total Depth, feet (TOC)

14.51

37.32

Depth to water date

3-8-21

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)
1211	14.75	220	3.78	325	0.0	1.20	331	24.15
1216	14.82	220	3.81	311	0	1.05	321	24.05
1221	14.85	220	3.83	304	0	0.99	313	23.98

Total volume purged  
Sample appearance  
Sample time  
Sample date

0

clear

1223

3-8-21

Facility Name	Pineley
Sample by	Mutt / Hamilton
Depth to water, feet (TOC)	8.88
Measured Total Depth, feet (TOC)	34.67

Sample Location ID: AD-32

Depth to water date: 3-8-21

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond ( $\mu$ S/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ( $^{\circ}$ C)
1104	9.30	220	3.56	1370	43.4	4.81	333	22.35
1109	9.36	220	3.55	1350	13.6	2.26	300	21.81
1114	9.38	220	3.55	1340	4.9	2.01	287	21.88
1119	9.35	220	3.54	1300	4.8	1.94	278	21.90

Total volume purged	
Sample appearance	Clear
Sample time	1121
Sample date	3.8.21

Duplicate - 1 /ms/msd

Facility Name	Apo Petrochemical
Sample by	Kenny McDonald

Sample Location ID	AP-2
--------------------	------

Depth to water, feet (TOC)	14.47
Measured Total Depth, feet (TOC)	40.36

Depth to water date	05/25/21
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Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)
0912	14.52	180	3.56	595	6.8	6.97	346	21.24
0917	14.55	180	3.67	604	0.0	3.87	345	21.27
0922	14.60	180	3.61	607	0.0	3.59	344	21.32
0927	14.62	180	3.64	610	0.0	3.52	341	21.36

Total volume purged	
Sample appearance	CLAM
Sample time	0929
Sample date	05/25/21

Facility Name	AEP PARKY PP
Sample by	Kenny McDonald

Sample Location ID	AD-4
--------------------	------

Depth to water, feet (TOC)	6.34
Measured Total Depth, feet (TOC)	47.29

Depth to water date	05/25/21
---------------------	----------

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond ( $\mu$ S/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ( $^{\circ}$ C)
1007	6.39	120	4.37	104	29.0	3.20	312	24.21
1012	6.40	120	4.62	97	20.3	2.81	317	24.09
1017	6.42	120	4.63	95	18.7	2.77	322	24.17
1022	6.43	120	4.63	95	17.6	2.74	328	24.23

Total volume purged	
Sample appearance	CLAR
Sample time	1024
Sample date	05/25/21

Facility Name	Pirley
Sample by	M. Hall Hamilton

Depth to water, feet (TOC)	6.43
Measured Total Depth, feet (TOC)	52.00

Sample Location ID	AD-12
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Depth to water date	5-24-21
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Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond ( $\mu$ S/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)
1035	6.42	300	4.07	53	0	3.73	137	23.81
1046	7.04	"	<del>4.15</del> 4.15	51	0	2.94	168	23.22
1048	7.13	"	4.21	50	0	2.53	174	23.02

Total volume purged	
Sample appearance	clear
Sample time	1047
Sample date	5-24-21

Facility Name	AGG P.I.A.M. PP
Sample by	Kieran McDonald

Sample Location ID	1A0-18
--------------------	--------

Depth to water, feet (TOC)	2.96
Measured Total Depth, feet (TOC)	28.42

Depth to water date	05/25/21
---------------------	----------

Purge Stabilization Data										
Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)		
1115	4.03	100	4.38	57	0.0	5.71	366	22.47		
1120	5.17	100	4.93	56	0.0	3.10	358	22.61		

Total volume purged	
Sample appearance	CLEAR
Sample time	1145
Sample date	05/25/21

Facility Name  
 Sample by

Pirkey  
 Matt Hamilton

Depth to water, feet (TOC)  
 Measured Total Depth, feet (TOC)

13.48  
 37.32

Sample Location ID

AD-31

Depth to water date

5-24-21

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)
1213	13.68	220	3.63	323	1.8	2.23	361	27.72
1218	13.86	220	3.51	316	10.3	0.91	357	25.60
1223	13.87	220	3.54	312	5.4	0.82	344	25.03
1228	13.88	220	3.56	320	5.8	0.75	356	24.92

Total volume purged

Sample appearance

Sample time

Sample date

0.6m  
 1230  
 5-24-21

Facility Name: Pikeay  
 Sample by: Mott Hamilton

Depth to water, feet (TOC): 7.90  
 Measured Total Depth, feet (TOC): 34.69

Sample Location ID: AD-32

Depth to water date: 5-24-21

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)
1116	8.46	220	3.40	983	50.5	2.05	362	24.45
1121	8.51	220	3.34	1030	30.9	0.53	337	23.02
1126	8.54	220	3.33	1030	23.4	0.46	324	22.55
1131	8.56	220	3.28	1030	8.2	0.54	311	22.55
1136	8.57	220	3.26	1030	8.3	0.77	303	22.45

Total volume purged: Clew  
 Sample appearance: 1138  
 Sample time: 5:24:21  
 Sample date:

MS/MSD



Facility Name	AFP Primary
Sample by	Kenny n. Downard

Sample Location ID	AD-2
--------------------	------

Depth to water, feet (TOC)	16.68
Measured Total Depth, feet (TOC)	40.36

Depth to water date	11/16/21
---------------------	----------

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond ( $\mu\text{S}/\text{cm}$ )	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ( $^{\circ}\text{C}$ )
0953	16.71	200	3.43	582	0.7	7.84	423	22.28
0958	16.71	200	3.43	599	0.0	4.31	420	22.26
1003	16.72	200	3.43	600	0.0	4.28	420	22.25
1008	16.71	200	3.44	601	0.0	4.23	419	22.24

Total volume purged	
Sample appearance	Clear
Sample time	10:0
Sample date	11/16/21

Facility Name	APP PARKING PP
Sample by	Kimmy McDonald

Sample Location ID AD-4

Depth to water, feet (TOC)	<u>15.39</u>
Measured Total Depth, feet (TOC)	<u>47.29</u>

Depth to water date 11/16/21

Purge Stabilization Data									
Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond ( $\mu\text{S/cm}$ )	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ( $^{\circ}\text{C}$ )	
1051	<u>15.62</u>	<u>180</u>	<u>4.14</u>	<u>93</u>	<u>0.3</u>	<u>8.49</u>	<u>390</u>	<u>22.95</u>	
1056	<u>15.70</u>	<u>180</u>	<u>4.28</u>	<u>86</u>	<u>0.0</u>	<u>2.73</u>	<u>374</u>	<u>22.88</u>	
1101	<u>15.72</u>	<u>180</u>	<u>4.31</u>	<u>85</u>	<u>0.0</u>	<u>2.69</u>	<u>368</u>	<u>22.84</u>	
1106	<u>15.75</u>	<u>180</u>	<u>4.31</u>	<u>82</u>	<u>6.0</u>	<u>2.67</u>	<u>363</u>	<u>22.81</u>	
<u>STOP</u>									

Total volume purged	
Sample appearance	<u>Clear</u>
Sample time	<u>1108</u>
Sample date	<u>11/16/21</u>

Facility Name	Pilkey
Sample by	Matt Hum. Hum
Depth to water, feet (TOC)	23.67
Measured Total Depth, feet (TOC)	52.00

Sample Location ID	AD-12
Depth to water date	11-15-21

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)
1012	24.12	300	3.68	67	10.3	2.55	234	21.74
1017	24.47	300	3.61	65	18.7	1.57	256	22.18
1022	24.44	300	3.50	65	7.5	1.87	251	22.31
1027	24.53	300	3.47	65	7.4	1.85	248	22.39

Total volume purged	
Sample appearance	clear
Sample time	1029
Sample date	11-15-21

Facility Name	App Pinnoy
Sample by	Kenny McDona

Sample Location ID	AD-18
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Depth to water, feet (TOC)	7.87
Measured Total Depth, feet (TOC)	28.42

Depth to water date	11/16/21
---------------------	----------

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)
1153	8.71	100	4.08	57	0.0	7.76	412	24.14
1158	9.53	100	3.85	54	0.0	5.85	420	23.49
				won't hold water level				

Total volume purged	
Sample appearance	Clear
Sample time	0825
Sample date	11/17/21

Facility Name	Pirkley
Sample by	Mont Hamilton
Depth to water, feet (TOC)	17.56
Measured Total Depth, feet (TOC)	37.32

Sample Location ID	AD-31
Depth to water date	11-16-21

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)
826	18.25	220	3.03	315	160	1.66	376	21.85
831	18.25	220	2.45	314	152	0.57	370	21.77
836	18.32	220	2.50	314	90.8	0.85	368	21.74
841	18.32	220	2.83	313	55.8	0.45	365	21.71
846	18.32	220	2.75	312	48.8	1.04	368	21.77
851	18.32	220	2.77	313	50.2	0.91	368	21.85
856	18.32	220	2.76	313	51.4	0.80	368	21.85

Total volume purged	
Sample appearance	clear
Sample time	858
Sample date	11-16-21

Facility Name P. 1124  
Sample by 1124 Teri J. N.  
Depth to water, feet (TOC) 10.46  
Measured Total Depth, feet (TOC) 39.69

Sample Location ID AD-32  
Depth to water date 11-15-21

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond ( $\mu\text{S/cm}$ )	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ( $^{\circ}\text{C}$ )
1057	10.84	220	2.51	642	105	2.15	344	24.03
1102	10.94	220	2.57	748	72.8	0.85	323	24.07
1107	10.96	220	2.54	517	46.0	0.80	314	24.05
1112	10.97	220	2.52	815	23.0	0.76	311	24.26
1117	10.99	220	2.50	514	6.2	0.75	305	24.31
1122	11.00	220	2.79	814	6.3	0.74	305	24.34

Total volume purged  
Sample appearance clear  
Sample time 1124  
Sample date 11-15-21

**APPENDIX 5- Analytical Laboratory Reports**



Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
T: 614-836-4221, Audinet 210-4221  
F: 614-836-4168, Audinet 210-4168  
<http://aepenv/labs>

### Water Analysis

**Location: Pirkey PS**

**Report Date: 3/26/2021**

**AD-2**  
**Sample Number: 210572-001**                      **Date Collected: 03/09/2021 10:37**                      **Date Received: 3/11/2021**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.283	mg/L		0.2	0.04	CRJ	03/18/2021 18:59	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	30.2	mg/L		0.04	0.01	CRJ	03/18/2021 18:59	EPA 300.1-1997, Rev. 1.0
Fluoride, F	0.23	mg/L		0.06	0.01	CRJ	03/18/2021 18:59	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	450	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	209	mg/L		2	0.3	CRJ	03/18/2021 18:33	EPA 300.1-1997, Rev. 1.0

**AD-3**  
**Sample Number: 210572-002**                      **Date Collected: 03/09/2021 11:56**                      **Date Received: 3/11/2021**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.06	mg/L	J	0.2	0.04	CRJ	03/18/2021 17:17	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	5.98	mg/L		0.04	0.01	CRJ	03/18/2021 17:17	EPA 300.1-1997, Rev. 1.0
Fluoride, F	0.06	mg/L		0.06	0.01	CRJ	03/18/2021 17:17	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	158	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	27.1	mg/L		0.4	0.06	CRJ	03/18/2021 17:17	EPA 300.1-1997, Rev. 1.0

**AD-4**  
**Sample Number: 210572-003**                      **Date Collected: 03/09/2021 12:03**                      **Date Received: 3/11/2021**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.2	mg/L	J	0.2	0.04	CRJ	03/18/2021 18:08	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	3.63	mg/L		0.04	0.01	CRJ	03/18/2021 18:08	EPA 300.1-1997, Rev. 1.0
Fluoride, F	0.12	mg/L		0.06	0.01	CRJ	03/18/2021 18:08	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	146	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	21.5	mg/L		0.4	0.06	CRJ	03/18/2021 18:08	EPA 300.1-1997, Rev. 1.0



## AD-7

Sample Number: 210572-004

Date Collected: 03/09/2021 09:43

Date Received: 3/11/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	2.74	mg/L		0.2	0.04	CRJ	03/18/2021 19:50	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	29.3	mg/L		0.04	0.01	CRJ	03/18/2021 19:50	EPA 300.1-1997, Rev. 1.0
Fluoride, F	0.55	mg/L		0.06	0.01	CRJ	03/18/2021 19:50	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	283	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	71.5	mg/L		0.4	0.06	CRJ	03/18/2021 19:50	EPA 300.1-1997, Rev. 1.0

## AD-12

Sample Number: 210572-005

Date Collected: 03/08/2021 10:27

Date Received: 3/11/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.05	mg/L	J	0.2	0.04	CRJ	03/18/2021 20:15	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	6.46	mg/L		0.04	0.01	CRJ	03/18/2021 20:15	EPA 300.1-1997, Rev. 1.0
Fluoride, F	0.11	mg/L		0.06	0.01	CRJ	03/18/2021 20:15	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	68	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	3.8	mg/L		0.4	0.06	CRJ	03/18/2021 20:15	EPA 300.1-1997, Rev. 1.0

## AD-13

Sample Number: 210572-006

Date Collected: 03/08/2021 09:47

Date Received: 3/11/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.267	mg/L		0.2	0.04	CRJ	03/18/2021 23:38	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	41.2	mg/L		0.2	0.06	CRJ	03/18/2021 23:13	EPA 300.1-1997, Rev. 1.0
Fluoride, F	0.36	mg/L		0.06	0.01	CRJ	03/18/2021 23:38	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	229	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	74.6	mg/L		0.4	0.06	CRJ	03/18/2021 23:38	EPA 300.1-1997, Rev. 1.0

## AD-17

Sample Number: 210572-007

Date Collected: 03/09/2021 11:06

Date Received: 3/11/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.1	mg/L	J	0.2	0.04	CRJ	03/18/2021 22:48	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	10.2	mg/L		0.04	0.01	CRJ	03/18/2021 22:48	EPA 300.1-1997, Rev. 1.0
Fluoride, F	0.17	mg/L		0.06	0.01	CRJ	03/18/2021 22:48	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	83	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	2.3	mg/L		0.4	0.06	CRJ	03/18/2021 22:48	EPA 300.1-1997, Rev. 1.0

## AD-18

Sample Number: 210572-008

Date Collected: 03/09/2021 13:15

Date Received: 3/11/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.04	mg/L	J	0.2	0.04	CRJ	03/19/2021 00:29	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	6.61	mg/L		0.04	0.01	CRJ	03/19/2021 00:29	EPA 300.1-1997, Rev. 1.0
Fluoride, F	0.02	mg/L	J	0.06	0.01	CRJ	03/19/2021 00:29	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	113	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	6.6	mg/L		0.4	0.06	CRJ	03/19/2021 00:29	EPA 300.1-1997, Rev. 1.0

## AD-22

Sample Number: 210572-009

Date Collected: 03/08/2021 10:56

Date Received: 3/11/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.376	mg/L		0.2	0.04	CRJ	03/19/2021 01:20	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	71.1	mg/L		0.2	0.06	CRJ	03/19/2021 00:55	EPA 300.1-1997, Rev. 1.0
Fluoride, F	1.03	mg/L		0.06	0.01	CRJ	03/19/2021 01:20	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	692	mg/L		100	40	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	337	mg/L		2	0.3	CRJ	03/19/2021 00:55	EPA 300.1-1997, Rev. 1.0

## AD-28

Sample Number: 210572-010

Date Collected: 03/09/2021 10:18

Date Received: 3/11/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.07	mg/L	J	0.2	0.04	CRJ	03/19/2021 02:11	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	5.16	mg/L		0.04	0.01	CRJ	03/19/2021 02:11	EPA 300.1-1997, Rev. 1.0
Fluoride, F	1.03	mg/L		0.06	0.01	CRJ	03/19/2021 02:11	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	117	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	28.3	mg/L		0.4	0.06	CRJ	03/19/2021 02:11	EPA 300.1-1997, Rev. 1.0

## AD-30

Sample Number: 210572-011

Date Collected: 03/09/2021 09:35

Date Received: 3/11/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.286	mg/L		0.2	0.04	CRJ	03/19/2021 03:02	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	23.5	mg/L		0.04	0.01	CRJ	03/19/2021 03:02	EPA 300.1-1997, Rev. 1.0
Fluoride, F	0.07	mg/L		0.06	0.01	CRJ	03/19/2021 03:02	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	264	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	122	mg/L		2	0.3	CRJ	03/19/2021 02:36	EPA 300.1-1997, Rev. 1.0

## AD-31

Sample Number: 210572-012

Date Collected: 03/08/2021 12:23

Date Received: 3/11/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.291	mg/L		0.2	0.04	CRJ	03/19/2021 03:53	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	18.5	mg/L		0.04	0.01	CRJ	03/19/2021 03:53	EPA 300.1-1997, Rev. 1.0
Fluoride, F	0.17	mg/L		0.06	0.01	CRJ	03/19/2021 03:53	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	279	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	81.1	mg/L		0.4	0.06	CRJ	03/19/2021 03:53	EPA 300.1-1997, Rev. 1.0

## AD-32

Sample Number: 210572-013

Date Collected: 03/08/2021 11:21

Date Received: 3/11/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.604	mg/L		0.2	0.04	CRJ	03/19/2021 07:16	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	33.5	mg/L		0.04	0.01	CRJ	03/19/2021 07:16	EPA 300.1-1997, Rev. 1.0
Fluoride, F	1.08	mg/L		0.06	0.01	CRJ	03/19/2021 07:16	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	1020	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
The %RPD between sample and duplicate exceeds 5%. Sdw031721								
Sulfate, SO4	714	mg/L		5	0.8	CRJ	03/19/2021 13:40	EPA 300.1-1997, Rev. 1.0

## AD-33

Sample Number: 210572-014

Date Collected: 03/08/2021 11:59

Date Received: 3/11/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.260	mg/L		0.2	0.04	CRJ	03/19/2021 06:25	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	8.65	mg/L		0.04	0.01	CRJ	03/19/2021 06:25	EPA 300.1-1997, Rev. 1.0
Fluoride, F	0.42	mg/L		0.06	0.01	CRJ	03/19/2021 06:25	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	213	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	70.1	mg/L		0.4	0.06	CRJ	03/19/2021 06:25	EPA 300.1-1997, Rev. 1.0

## Duplicate 1

Sample Number: 210572-015

Date Collected: 03/08/2021 11:21

Date Received: 3/11/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.610	mg/L		0.2	0.04	CRJ	03/19/2021 10:16	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	33.4	mg/L		0.04	0.01	CRJ	03/19/2021 10:16	EPA 300.1-1997, Rev. 1.0
Fluoride, F	1.07	mg/L		0.06	0.01	CRJ	03/19/2021 10:16	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	1020	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	727	mg/L		5	0.8	CRJ	03/19/2021 14:05	EPA 300.1-1997, Rev. 1.0

Duplicate 2

Sample Number: 210572-016

Date Collected: 03/09/2021 10:37

Date Received: 3/11/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.279	mg/L		0.2	0.04	CRJ	03/19/2021 10:42	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	30.1	mg/L		0.04	0.01	CRJ	03/19/2021 10:42	EPA 300.1-1997, Rev. 1.0
Fluoride, F	0.22	mg/L		0.06	0.01	CRJ	03/19/2021 10:42	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	431	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	210	mg/L		2	0.3	CRJ	03/19/2021 08:35	EPA 300.1-1997, Rev. 1.0

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Michael Ohlinger, Chemist

Email msohlinger@aep.com Tel.

Fax 614-836-4168 Audinet 8-210-

**THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED AND SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY. ALL TEST RESULTS MEET ALL OF THE REQUIREMENTS OF THE ACCREDITING AUTHORITY, UNLESS OTHERWISE NOTED.**

# Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Site Contact:

Date:

For Lab Use Only:

COC/Order #:

Project Name: Pirkey

Contact Name: Leslie Fuerschbach

Contact Phone: 318-423-3805

Sampler(s): Matt Hamilton Kenny McDonald

Analysis Turnaround Time (in Calendar Days)

250 mL bottle, pH<2, HNO<sub>3</sub>

Field-filter 250 mL bottle, then pH<2, HNO<sub>3</sub>

1 L bottle, Cool, 0-5°C

Three (six every 10th) L bottles, pH<2, HNO<sub>3</sub>

40 mL Glass vial or 250 mL PTFE lined bottle, HCL, pH<2

40 mL Glass vial or 250 mL PTFE lined bottle, HCL, pH<2

Sample Specific Notes:

Sample Identification

Sample Date

Sample Time

Sample Type (C=Comp, G=Grab)

Matrix

# of Cont.

Sampler(s) Initials

B, Ca, Li, Sb, As, Ba, Mo, Se, TL and Na, K, Mg, Sr

B, Ca, Li, Sb, As, Ba, Cd, Cr, Co, Fe, Mn, Mo, Pb, Se, Tl and Na, K, Mg, Sr

TDS, F, Cl, SO<sub>4</sub> and Br, Alkalinity

Hg

Hg

1

3/9/2021

1037

G

GW

1

Dolan Chemical Laboratory (DCL)  
4001 Bixby Road  
Groveport, Ohio 43125  
Jonathan Barnhill (318-673-3803)  
Contacts: Michael Ohlinger (614-836-4184)

Project Name: Pirkey  
Contact Name: Leslie Fuerschbach  
Contact Phone: 318-423-3805

Sampler(s): Matt Hamilton Kenny McDonald

Analysis Turnaround Time (in Calendar Days)

250 mL bottle, pH<2, HNO<sub>3</sub>

Field-filter 250 mL bottle, then pH<2, HNO<sub>3</sub>

1 L bottle, Cool, 0-5°C

Three (six every 10th) L bottles, pH<2, HNO<sub>3</sub>

40 mL Glass vial or 250 mL PTFE lined bottle, HCL, pH<2

40 mL Glass vial or 250 mL PTFE lined bottle, HCL, pH<2

Sample Specific Notes:

Sample Identification

Sample Date

Sample Time

Sample Type (C=Comp, G=Grab)

Matrix

# of Cont.

Sampler(s) Initials

B, Ca, Li, Sb, As, Ba, Mo, Se, TL and Na, K, Mg, Sr

B, Ca, Li, Sb, As, Ba, Cd, Cr, Co, Fe, Mn, Mo, Pb, Se, Tl and Na, K, Mg, Sr

TDS, F, Cl, SO<sub>4</sub> and Br, Alkalinity

Hg

Hg

1

3/9/2021

1037

G

GW

1

Preservation Used: 1= Ice, 2= HCl; 3= H<sub>2</sub>SO<sub>4</sub>; 4=HNO<sub>3</sub>; 5=NaOH; 6= Other

F= filter in field

\* Six 1L Bottles must be collected for Radium for every 10th sample.

Special Instructions/QC Requirements & Comments:

Relinquished by: [Signature]

Relinquished by: [Signature]

Relinquished by: [Signature]

Company: [Signature]

Company: [Signature]

Company: [Signature]

Received by: [Signature]

Received by: [Signature]

Received in Laboratory by: [Signature]

Date/Time: 3/10/21 14:30

Date/Time: 3/10/21

Date/Time: 3/11/21 11:30

Date/Time: 3/11/21 11:30

Form COC-04, AEP Chain of Custody (COC) Record for Coal Combustion Residual (CCR) Sampling - Shreveport, Rev. 1, 1/10/17

# Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

**Dolan Chemical Laboratory (DCL)**  
 4001 Bixby Road  
 Groveport, Ohio 43125  
 Jonathan Barnhill (318-673-3803)  
 Contacts: Michael Ohlinger (614-838-4184)

Project Name: Pirkey  
 Contact Name: Leslie Fuerschbach  
 Contact Phone: 318-423-3805  
 Sample(s): Matt Hamilton Kenny McDonald

Sample Identification	Analysis Turnaround Time (in Calendar Days)		Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Site Contact:						COC/Order #:	For Lab Use Only:
	260 mL bottle, pH<2, HNO <sub>3</sub>	Field-filter 250 mL bottle, then pH<2, HNO <sub>3</sub>						1 L bottle, Cool, 0-5°C	Three (six every 10hr) L bottles, pH<2, HNO <sub>3</sub>	40 mL Glass vial or 250 mL PTFE lined bottle, HCL <sup>+</sup> , pH<2	40 mL Glass vial or 250 mL PTFE lined bottle, HCL <sup>+</sup> , pH<2				
AD-31	Mo, Se, TL and Na, K, Mg, Sr	B, Ca, Li, Sb, As, Ba, Cd, Cr, Co, Pb, Mn, Mo, Pb, Se, Tl and Na, K, Mg, Sr	3/8/2021	1223	G	GW	1	X	TDS, F, Cl, SO <sub>4</sub> and Br, Alkalinity	Ra-226, Ra-228	Hg	Hg			
AD-32			3/8/2021	1121	G	GW	1	X							
AD-33			3/8/2021	1159	G	GW	1	X							
DUPLICATE 1			3/8/2021	1121	G	GW	1	X							
DUPLICATE 2			3/8/2021	1037	G	GW	1	X							
								1							

Preservation Used: 1= Ice, 2= HCl; 3= H<sub>2</sub>SO<sub>4</sub>; 4=HNO<sub>3</sub>; 5=NaOH; 6= Other \_\_\_\_\_; F= filter in field

\* Six 1L Bottles must be collected for Radium for every 10th sample.

Special Instructions/QC Requirements & Comments:

Relinquished by: 	Company: <i>Esse</i>	Date/Time: 3/10/21 1430	Received by:
Relinquished by:	Company:	Date/Time:	Received by:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: <i>S. Reile</i>

Date/Time: 5-11-21 11:30



# WATER & WASTE SAMPLE RECEIPT FORM

<u>Package Type</u>				<u>Delivery Type</u>			
Cooler	Box	Bag	Envelope	PONY	UPS	FedEX	USPS
				Other _____			
Plant/Customer <u>Portkey</u>				Number of Plastic Containers: <u>16</u>			
Opened By <u>SM, MGK</u>				Number of Glass Containers: _____			
Date/Time <u>3-11-21 11:30</u>				Number of Mercury Containers: _____			
Were all temperatures within 0-6°C? <input checked="" type="radio"/> Y <input type="radio"/> N or N/A Initial: <u>MGK</u> <input checked="" type="radio"/> on ice <input type="radio"/> no ice							
1(IR Gun Ser# <u>200700311</u> , Expir. <u>11/06/22</u> ) - If No, specify each deviation: _____							
Was container in good condition? <input checked="" type="radio"/> Y <input type="radio"/> N Comments _____							
Was Chain of Custody received? <input checked="" type="radio"/> Y <input type="radio"/> N Comments _____							
Requested turnaround: <u>Route</u> If RUSH, who was notified? _____							
pH (15 min)	Cr <sup>6</sup> (pres) (24 hr)	NO <sub>2</sub> or NO <sub>3</sub> (48 hr)	ortho-PO <sub>4</sub> (48 hr)	Hg-diss (pres) (48 hr)			

Was COC filled out properly?  Y  N Comments \_\_\_\_\_

Were samples labeled properly?  Y  N Comments \_\_\_\_\_

Were correct containers used?  Y  N Comments \_\_\_\_\_

Was pH checked & Color Coding done?  Y  N or N/A Initial & Date: MGK 3-11-21

pH paper (circle one): MQuant,PN1.09535.0001,LOT# HC904495 [OR] Lab Rat,PN4801,LOT# X000RWDG21

- Was Add'l Preservative needed?  Y  N If Yes: By whom & when: \_\_\_\_\_ (See Prep Book)

Is sample filtration requested?  Y  N Comments \_\_\_\_\_ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: \_\_\_\_\_

Lab ID# 210577 Initial & Date & Time: \_\_\_\_\_

Comments: \_\_\_\_\_

Logged by MSO

Reviewed by MGK

**REMINDER:** Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.



Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
T: 614-836-4221, Audinet 210-4221  
F: 614-836-4168, Audinet 210-4168  
<http://aepenv/labs>

**Water Analysis**

**Location: Pirkey PS**

**Report Date: 4/12/2021**

**AD-2**

**Sample Number: 210586-001**

**Date Collected: 03/09/2021 10:37**

**Date Received: 3/15/2021**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 12:58	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.68	ug/L		0.1	0.03	GES	03/17/2021 12:58	EPA 200.8-1994, Rev. 5.4
Barium, Ba	19.6	ug/L		0.2	0.05	GES	03/17/2021 12:58	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.564	ug/L		0.1	0.007	GES	03/17/2021 12:58	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.09	ug/L		0.05	0.004	GES	03/17/2021 12:58	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.280	ug/L		0.2	0.04	GES	03/17/2021 12:58	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	20.2	ug/L		0.05	0.003	GES	03/17/2021 12:58	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.517	ug/L		0.2	0.05	GES	03/17/2021 12:58	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.074	ug/L		0.01	0.004	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 12:58	EPA 200.8-1994, Rev. 5.4
Selenium, Se	2.3	ug/L		0.5	0.09	GES	03/17/2021 12:58	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.1	ug/L	J	0.5	0.04	GES	03/17/2021 12:58	EPA 200.8-1994, Rev. 5.4
Boron, B	2.76	mg/L		0.05	0.009	GES	03/17/2021 12:58	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	2.48	mg/L		0.3	0.1	SH	03/17/2021 14:58	EPA 200.7-1994, Rev. 4.4

dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Lithium, Li	0.0473	mg/L		0.0002	0.00005	GES	03/17/2021 12:58	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	5.54	mg/L		0.1	0.02	SH	03/17/2021 14:58	EPA 200.7-1994, Rev. 4.4

dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Potassium, K	1.22	mg/L		1	0.2	SH	03/17/2021 14:58	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Sodium, Na	94.2	mg/L		0.5	0.2	SH	03/17/2021 14:58	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Strontium, Sr	0.0395	mg/L		0.01	0.002	SH	03/17/2021 14:58	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	0.357	pCi/L	0.15	0.50	ttp	3/26/2021	SW-846 9320-2014, Rev. 1.0
The LFBF is outside of the acceptable limit of 75-125%.							
Radium-226	0.324	pCi/L	0.082	0.12		3/29/2021	SW-846 9315-1986, Rev. 0

The RPD between the sample and duplicate result exceeds 25%.

**\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.**



AD-2 Dissolved

Sample Number: 210586-001A

Date Collected: 03/09/2021 10:37

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	0.03	ug/L	J	0.1	0.02	GES	03/17/2021 13:03	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.68	ug/L		0.1	0.03	GES	03/17/2021 13:03	EPA 200.8-1994, Rev. 5.4
Barium, Ba	19.9	ug/L		0.2	0.05	GES	03/17/2021 13:03	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.559	ug/L		0.1	0.007	GES	03/17/2021 13:03	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.09	ug/L		0.05	0.004	GES	03/17/2021 13:03	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.728	ug/L		0.2	0.04	GES	03/17/2021 13:03	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	20.6	ug/L		0.05	0.003	GES	03/17/2021 13:03	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.516	ug/L		0.2	0.05	GES	03/17/2021 13:03	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 13:03	EPA 200.8-1994, Rev. 5.4
Selenium, Se	2.2	ug/L		0.5	0.09	GES	03/17/2021 13:03	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.1	ug/L	J	0.5	0.04	GES	03/17/2021 13:03	EPA 200.8-1994, Rev. 5.4
Boron, B	2.80	mg/L		0.05	0.009	GES	03/17/2021 13:03	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	2.59	mg/L		0.3	0.1	SH	03/17/2021 15:06	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Iron, Fe	0.144	mg/L		0.1	0.02	SH	03/17/2021 15:06	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0469	mg/L		0.0002	0.00005	GES	03/17/2021 13:03	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	5.59	mg/L		0.1	0.02	SH	03/17/2021 15:06	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Manganese, Mn	0.0772	mg/L		0.002	0.0005	SH	03/17/2021 15:06	EPA 200.7-1994, Rev. 4.4
Potassium, K	1.25	mg/L		1	0.2	SH	03/17/2021 15:06	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Sodium, Na	94.9	mg/L		0.5	0.2	SH	03/17/2021 15:06	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Strontium, Sr	0.0400	mg/L		0.01	0.002	SH	03/17/2021 15:06	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-3

Sample Number: 210586-002

Date Collected: 03/09/2021 11:56

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 11:36	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.53	ug/L		0.1	0.03	GES	03/17/2021 11:36	EPA 200.8-1994, Rev. 5.4
Barium, Ba	60.7	ug/L		0.2	0.05	GES	03/17/2021 11:36	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.185	ug/L		0.1	0.007	GES	03/17/2021 11:36	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.02	ug/L	J	0.05	0.004	GES	03/17/2021 11:36	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.207	ug/L		0.2	0.04	GES	03/17/2021 11:36	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	3.63	ug/L		0.05	0.003	GES	03/17/2021 11:36	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.1	ug/L	J	0.2	0.05	GES	03/17/2021 11:36	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 11:36	EPA 200.8-1994, Rev. 5.4
Selenium, Se	< 0.09	ug/L	U	0.5	0.09	GES	03/17/2021 11:36	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 11:36	EPA 200.8-1994, Rev. 5.4
Boron, B	0.03	mg/L	J	0.05	0.009	GES	03/17/2021 11:36	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	4.22	mg/L		0.3	0.1	SH	03/17/2021 15:44	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0445	mg/L		0.0002	0.00005	GES	03/17/2021 11:36	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	1.92	mg/L		0.1	0.02	SH	03/17/2021 15:44	EPA 200.7-1994, Rev. 4.4
Potassium, K	2.38	mg/L		1	0.2	SH	03/17/2021 15:44	EPA 200.7-1994, Rev. 4.4
Sodium, Na	9.34	mg/L		0.5	0.2	SH	03/17/2021 15:44	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.0307	mg/L		0.01	0.002	SH	03/17/2021 15:44	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	0.455	pCi/L	0.11	0.34	ttp	3/26/2021	SW-846 9320-2014, Rev. 1.0
The LFBD is outside of the acceptable limit of 75-125%.							
Radium-226	0.254	pCi/L	0.077	0.14		3/29/2021	SW-846 9315-1986, Rev. 0

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

## AD-3 Dissolved

Sample Number: 210586-002A

Date Collected: 03/09/2021 11:56

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 11:41	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.32	ug/L		0.1	0.03	GES	03/17/2021 11:41	EPA 200.8-1994, Rev. 5.4
Barium, Ba	59.0	ug/L		0.2	0.05	GES	03/17/2021 11:41	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.172	ug/L		0.1	0.007	GES	03/17/2021 11:41	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.02	ug/L	J	0.05	0.004	GES	03/17/2021 11:41	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.203	ug/L		0.2	0.04	GES	03/17/2021 11:41	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	3.59	ug/L		0.05	0.003	GES	03/17/2021 11:41	EPA 200.8-1994, Rev. 5.4
Lead, Pb	< 0.05	ug/L	U	0.2	0.05	GES	03/17/2021 11:41	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 11:41	EPA 200.8-1994, Rev. 5.4
Selenium, Se	< 0.09	ug/L	U	0.5	0.09	GES	03/17/2021 11:41	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 11:41	EPA 200.8-1994, Rev. 5.4
Boron, B	0.03	mg/L	J	0.05	0.009	GES	03/17/2021 11:41	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	4.18	mg/L		0.3	0.1	SH	03/17/2021 15:48	EPA 200.7-1994, Rev. 4.4
Iron, Fe	1.60	mg/L		0.1	0.02	SH	03/17/2021 15:48	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0445	mg/L		0.0002	0.00005	GES	03/17/2021 11:41	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	1.89	mg/L		0.1	0.02	SH	03/17/2021 15:48	EPA 200.7-1994, Rev. 4.4
Manganese, Mn	0.0433	mg/L		0.002	0.0005	SH	03/17/2021 15:48	EPA 200.7-1994, Rev. 4.4
Potassium, K	2.29	mg/L		1	0.2	SH	03/17/2021 15:48	EPA 200.7-1994, Rev. 4.4
Sodium, Na	9.15	mg/L		0.5	0.2	SH	03/17/2021 15:48	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.0303	mg/L		0.01	0.002	SH	03/17/2021 15:48	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-4

Sample Number: 210586-003

Date Collected: 03/09/2021 12:03

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 13:08	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.30	ug/L		0.1	0.03	GES	03/17/2021 13:08	EPA 200.8-1994, Rev. 5.4
Barium, Ba	87.9	ug/L		0.2	0.05	GES	03/17/2021 13:08	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.679	ug/L		0.1	0.007	GES	03/17/2021 13:08	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.01	ug/L	J	0.05	0.004	GES	03/17/2021 13:08	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.2	ug/L	J	0.2	0.04	GES	03/17/2021 13:08	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	6.50	ug/L		0.05	0.003	GES	03/17/2021 13:08	EPA 200.8-1994, Rev. 5.4
Lead, Pb	< 0.05	ug/L	U	0.2	0.05	GES	03/17/2021 13:08	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.002	ug/L	J	0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 13:08	EPA 200.8-1994, Rev. 5.4
Selenium, Se	< 0.09	ug/L	U	0.5	0.09	GES	03/17/2021 13:08	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.06	ug/L	J	0.5	0.04	GES	03/17/2021 13:08	EPA 200.8-1994, Rev. 5.4
Boron, B	0.02	mg/L	J	0.05	0.009	GES	03/17/2021 13:08	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	1.72	mg/L		0.3	0.1	SH	03/17/2021 15:52	EPA 200.7-1994, Rev. 4.4

dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Lithium, Li	0.0331	mg/L		0.0002	0.00005	GES	03/17/2021 13:08	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	1.32	mg/L		0.1	0.02	SH	03/17/2021 15:52	EPA 200.7-1994, Rev. 4.4

dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Potassium, K	2.44	mg/L		1	0.2	SH	03/17/2021 15:52	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Sodium, Na	9.42	mg/L		0.5	0.2	SH	03/17/2021 15:52	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Strontium, Sr	0.0162	mg/L		0.01	0.002	SH	03/17/2021 15:52	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	0.222	pCi/L	0.12	0.39	ttp	3/26/2021	SW-846 9320-2014, Rev. 1.0
The LFBD is outside of the acceptable limit of 75-125%.							
Radium-226	0.354	pCi/L	0.084	0.099		3/29/2021	SW-846 9315-1986, Rev. 0

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-4 Dissolved

Sample Number: 210586-003A

Date Collected: 03/09/2021 12:03

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 13:13	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.07	ug/L	J	0.1	0.03	GES	03/17/2021 13:13	EPA 200.8-1994, Rev. 5.4
Barium, Ba	90.6	ug/L		0.2	0.05	GES	03/17/2021 13:13	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.675	ug/L		0.1	0.007	GES	03/17/2021 13:13	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.01	ug/L	J	0.05	0.004	GES	03/17/2021 13:13	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.1	ug/L	J	0.2	0.04	GES	03/17/2021 13:13	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	6.74	ug/L		0.05	0.003	GES	03/17/2021 13:13	EPA 200.8-1994, Rev. 5.4
Lead, Pb	< 0.05	ug/L	U	0.2	0.05	GES	03/17/2021 13:13	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 13:13	EPA 200.8-1994, Rev. 5.4
Selenium, Se	< 0.09	ug/L	U	0.5	0.09	GES	03/17/2021 13:13	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.07	ug/L	J	0.5	0.04	GES	03/17/2021 13:13	EPA 200.8-1994, Rev. 5.4
Boron, B	0.02	mg/L	J	0.05	0.009	GES	03/17/2021 13:13	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	1.83	mg/L		0.3	0.1	SH	03/17/2021 15:56	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Iron, Fe	0.257	mg/L		0.1	0.02	SH	03/17/2021 15:56	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0333	mg/L		0.0002	0.00005	GES	03/17/2021 13:13	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	1.34	mg/L		0.1	0.02	SH	03/17/2021 15:56	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Manganese, Mn	0.0601	mg/L		0.002	0.0005	SH	03/17/2021 15:56	EPA 200.7-1994, Rev. 4.4
Potassium, K	2.49	mg/L		1	0.2	SH	03/17/2021 15:56	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Sodium, Na	9.56	mg/L		0.5	0.2	SH	03/17/2021 15:56	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Strontium, Sr	0.0165	mg/L		0.01	0.002	SH	03/17/2021 15:56	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-7

Sample Number: 210586-004

Date Collected: 03/09/2021 09:43

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 13:19	EPA 200.8-1994, Rev. 5.4
Arsenic, As	1.32	ug/L		0.1	0.03	GES	03/17/2021 13:19	EPA 200.8-1994, Rev. 5.4
Barium, Ba	44.1	ug/L		0.2	0.05	GES	03/17/2021 13:19	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	4.80	ug/L		0.1	0.007	GES	03/17/2021 13:19	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.65	ug/L		0.05	0.004	GES	03/17/2021 13:19	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.402	ug/L		0.2	0.04	GES	03/17/2021 13:19	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	37.5	ug/L		0.05	0.003	GES	03/17/2021 13:19	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.997	ug/L		0.2	0.05	GES	03/17/2021 13:19	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.341	ug/L		0.02	0.007	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 13:19	EPA 200.8-1994, Rev. 5.4
Selenium, Se	4.9	ug/L		0.5	0.09	GES	03/17/2021 13:19	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.2	ug/L	J	0.5	0.04	GES	03/17/2021 13:19	EPA 200.8-1994, Rev. 5.4
Boron, B	2.12	mg/L		0.05	0.009	GES	03/17/2021 13:19	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	4.54	mg/L		0.3	0.1	SH	03/17/2021 16:00	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0684	mg/L		0.0002	0.00005	GES	03/17/2021 13:19	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	8.88	mg/L		0.1	0.02	SH	03/17/2021 16:00	EPA 200.7-1994, Rev. 4.4
Potassium, K	2.16	mg/L		1	0.2	SH	03/17/2021 16:00	EPA 200.7-1994, Rev. 4.4
Sodium, Na	18.5	mg/L		0.5	0.2	SH	03/17/2021 16:00	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.0660	mg/L		0.01	0.002	SH	03/17/2021 16:00	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	2.16	pCi/L	0.19	0.56	ttp	3/26/2021	SW-846 9320-2014, Rev. 1.0
The LFBD is outside of the acceptable limit of 75-125%.							
Radium-226	0.939	pCi/L	0.14	0.11		3/29/2021	SW-846 9315-1986, Rev. 0

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-7 Dissolved

Sample Number: 210586-004A

Date Collected: 03/09/2021 09:43

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 13:24	EPA 200.8-1994, Rev. 5.4
Arsenic, As	1.32	ug/L		0.1	0.03	GES	03/17/2021 13:24	EPA 200.8-1994, Rev. 5.4
Barium, Ba	43.9	ug/L		0.2	0.05	GES	03/17/2021 13:24	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	4.78	ug/L		0.1	0.007	GES	03/17/2021 13:24	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.65	ug/L		0.05	0.004	GES	03/17/2021 13:24	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.360	ug/L		0.2	0.04	GES	03/17/2021 13:24	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	37.0	ug/L		0.05	0.003	GES	03/17/2021 13:24	EPA 200.8-1994, Rev. 5.4
Lead, Pb	1.00	ug/L		0.2	0.05	GES	03/17/2021 13:24	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.056	ug/L		0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 13:24	EPA 200.8-1994, Rev. 5.4
Selenium, Se	4.8	ug/L		0.5	0.09	GES	03/17/2021 13:24	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.2	ug/L	J	0.5	0.04	GES	03/17/2021 13:24	EPA 200.8-1994, Rev. 5.4
Boron, B	2.10	mg/L		0.05	0.009	GES	03/17/2021 13:24	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	4.53	mg/L		0.3	0.1	SH	03/17/2021 16:04	EPA 200.7-1994, Rev. 4.4
Iron, Fe	0.121	mg/L		0.1	0.02	SH	03/17/2021 16:04	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0684	mg/L		0.0002	0.00005	GES	03/17/2021 13:24	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	8.80	mg/L		0.1	0.02	SH	03/17/2021 16:04	EPA 200.7-1994, Rev. 4.4
Manganese, Mn	0.0785	mg/L		0.002	0.0005	SH	03/17/2021 16:04	EPA 200.7-1994, Rev. 4.4
Potassium, K	2.17	mg/L		1	0.2	SH	03/17/2021 16:04	EPA 200.7-1994, Rev. 4.4
Sodium, Na	18.4	mg/L		0.5	0.2	SH	03/17/2021 16:04	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.0657	mg/L		0.01	0.002	SH	03/17/2021 16:04	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-12

Sample Number: 210586-005

Date Collected: 03/08/2021 10:27

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 13:29	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.07	ug/L	J	0.1	0.03	GES	03/17/2021 13:29	EPA 200.8-1994, Rev. 5.4
Barium, Ba	22.9	ug/L		0.2	0.05	GES	03/17/2021 13:29	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.150	ug/L		0.1	0.007	GES	03/17/2021 13:29	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.007	ug/L	J	0.05	0.004	GES	03/17/2021 13:29	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.2	ug/L	J	0.2	0.04	GES	03/17/2021 13:29	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	1.19	ug/L		0.05	0.003	GES	03/17/2021 13:29	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.07	ug/L	J	0.2	0.05	GES	03/17/2021 13:29	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 13:29	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.2	ug/L	J	0.5	0.09	GES	03/17/2021 13:29	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 13:29	EPA 200.8-1994, Rev. 5.4
Boron, B	0.01	mg/L	J	0.05	0.009	GES	03/17/2021 13:29	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	0.2	mg/L	J	0.3	0.1	SH	03/17/2021 16:08	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.00570	mg/L		0.0002	0.00005	GES	03/17/2021 13:29	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	0.395	mg/L		0.1	0.02	SH	03/17/2021 16:08	EPA 200.7-1994, Rev. 4.4
Potassium, K	0.2	mg/L	J	1	0.2	SH	03/17/2021 16:08	EPA 200.7-1994, Rev. 4.4
Sodium, Na	4.79	mg/L		0.5	0.2	SH	03/17/2021 16:08	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	< 0.002	mg/L	U	0.01	0.002	SH	03/17/2021 16:08	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	-0.0409	pCi/L	0.16	0.55	ttp	3/26/2021	SW-846 9320-2014,Rev. 1.0
The LFBD is outside of the acceptable limit of 75-125%.							
Radium-226	0.214	pCi/L	0.064	0.10		3/29/2021	SW-846 9315-1986,Rev. 0

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*



## AD-12 Dissolved

Sample Number: 210586-005A

Date Collected: 03/08/2021 10:27

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 13:34	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.06	ug/L	J	0.1	0.03	GES	03/17/2021 13:34	EPA 200.8-1994, Rev. 5.4
Barium, Ba	21.7	ug/L		0.2	0.05	GES	03/17/2021 13:34	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.141	ug/L		0.1	0.007	GES	03/17/2021 13:34	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.008	ug/L	J	0.05	0.004	GES	03/17/2021 13:34	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.251	ug/L		0.2	0.04	GES	03/17/2021 13:34	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	1.14	ug/L		0.05	0.003	GES	03/17/2021 13:34	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.09	ug/L	J	0.2	0.05	GES	03/17/2021 13:34	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 13:34	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.1	ug/L	J	0.5	0.09	GES	03/17/2021 13:34	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 13:34	EPA 200.8-1994, Rev. 5.4
Boron, B	0.01	mg/L	J	0.05	0.009	GES	03/17/2021 13:34	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	0.3	mg/L	J	0.3	0.1	SH	03/17/2021 16:12	EPA 200.7-1994, Rev. 4.4
Iron, Fe	< 0.02	mg/L	U	0.1	0.02	SH	03/17/2021 16:12	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.00557	mg/L		0.0002	0.00005	GES	03/17/2021 13:34	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	0.393	mg/L		0.1	0.02	SH	03/17/2021 16:12	EPA 200.7-1994, Rev. 4.4
Manganese, Mn	0.0036	mg/L		0.002	0.0005	SH	03/17/2021 16:12	EPA 200.7-1994, Rev. 4.4
Potassium, K	0.2	mg/L	J	1	0.2	SH	03/17/2021 16:12	EPA 200.7-1994, Rev. 4.4
Sodium, Na	4.77	mg/L		0.5	0.2	SH	03/17/2021 16:12	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.003	mg/L	J	0.01	0.002	SH	03/17/2021 16:12	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-13

Sample Number: 210586-006

Date Collected: 03/08/2021 09:47

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 13:39	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.44	ug/L		0.1	0.03	GES	03/17/2021 13:39	EPA 200.8-1994, Rev. 5.4
Barium, Ba	56.7	ug/L		0.2	0.05	GES	03/17/2021 13:39	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	1.20	ug/L		0.1	0.007	GES	03/17/2021 13:39	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	< 0.004	ug/L	U	0.05	0.004	GES	03/17/2021 13:39	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.2	ug/L	J	0.2	0.04	GES	03/17/2021 13:39	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	46.3	ug/L		0.05	0.003	GES	03/17/2021 13:39	EPA 200.8-1994, Rev. 5.4
Lead, Pb	< 0.05	ug/L	U	0.2	0.05	GES	03/17/2021 13:39	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 13:39	EPA 200.8-1994, Rev. 5.4
Selenium, Se	< 0.09	ug/L	U	0.5	0.09	GES	03/17/2021 13:39	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 13:39	EPA 200.8-1994, Rev. 5.4
Boron, B	0.067	mg/L		0.05	0.009	GES	03/17/2021 13:39	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	13.2	mg/L		0.3	0.1	SH	03/17/2021 16:16	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Lithium, Li	0.132	mg/L		0.0002	0.00005	GES	03/17/2021 13:39	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	13.2	mg/L		0.1	0.02	SH	03/17/2021 16:16	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Potassium, K	4.93	mg/L		1	0.2	SH	03/17/2021 16:16	EPA 200.7-1994, Rev. 4.4
Sodium, Na	18.9	mg/L		0.5	0.2	SH	03/17/2021 16:16	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Strontium, Sr	0.165	mg/L		0.01	0.002	SH	03/17/2021 16:16	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit  
 J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	0.537	pCi/L	0.16	0.53	ttp	3/26/2021	SW-846 9320-2014, Rev. 1.0
The LFBD is outside of the acceptable limit of 75-125%.							
Radium-226	0.817	pCi/L	0.13	0.12		3/29/2021	SW-846 9315-1986, Rev. 0

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-13 Dissolved

Sample Number: 210586-006A

Date Collected: 03/08/2021 09:47

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 13:44	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.17	ug/L		0.1	0.03	GES	03/17/2021 13:44	EPA 200.8-1994, Rev. 5.4
Barium, Ba	57.4	ug/L		0.2	0.05	GES	03/17/2021 13:44	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	1.28	ug/L		0.1	0.007	GES	03/17/2021 13:44	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	< 0.004	ug/L	U	0.05	0.004	GES	03/17/2021 13:44	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.1	ug/L	J	0.2	0.04	GES	03/17/2021 13:44	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	47.2	ug/L		0.05	0.003	GES	03/17/2021 13:44	EPA 200.8-1994, Rev. 5.4
Lead, Pb	< 0.05	ug/L	U	0.2	0.05	GES	03/17/2021 13:44	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 13:44	EPA 200.8-1994, Rev. 5.4
Selenium, Se	< 0.09	ug/L	U	0.5	0.09	GES	03/17/2021 13:44	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 13:44	EPA 200.8-1994, Rev. 5.4
Boron, B	0.068	mg/L		0.05	0.009	GES	03/17/2021 13:44	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	13.3	mg/L		0.3	0.1	SH	03/17/2021 16:20	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Iron, Fe	3.27	mg/L		0.1	0.02	SH	03/17/2021 16:20	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.141	mg/L		0.0002	0.00005	GES	03/17/2021 13:44	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	13.2	mg/L		0.1	0.02	SH	03/17/2021 16:20	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Manganese, Mn	0.476	mg/L		0.002	0.0005	SH	03/17/2021 16:20	EPA 200.7-1994, Rev. 4.4
Potassium, K	4.92	mg/L		1	0.2	SH	03/17/2021 16:20	EPA 200.7-1994, Rev. 4.4
Sodium, Na	18.9	mg/L		0.5	0.2	SH	03/17/2021 16:20	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Strontium, Sr	0.166	mg/L		0.01	0.002	SH	03/17/2021 16:20	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-17

Sample Number: 210586-007

Date Collected: 03/09/2021 11:06

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 15:37	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.13	ug/L		0.1	0.03	GES	03/17/2021 15:37	EPA 200.8-1994, Rev. 5.4
Barium, Ba	76.7	ug/L		0.2	0.05	GES	03/17/2021 15:37	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.321	ug/L		0.1	0.007	GES	03/17/2021 15:37	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.02	ug/L	J	0.05	0.004	GES	03/17/2021 15:37	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.222	ug/L		0.2	0.04	GES	03/17/2021 15:37	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	3.05	ug/L		0.05	0.003	GES	03/17/2021 15:37	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.06	ug/L	J	0.2	0.05	GES	03/17/2021 15:37	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.123	ug/L		0.05	0.02	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 15:37	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.1	ug/L	J	0.5	0.09	GES	03/17/2021 15:37	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 15:37	EPA 200.8-1994, Rev. 5.4
Boron, B	0.02	mg/L	J	0.05	0.009	GES	03/17/2021 15:37	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	< 0.1	mg/L	U	0.3	0.1	SH	03/17/2021 17:04	EPA 200.7-1994, Rev. 4.4

dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Lithium, Li	0.00924	mg/L		0.0002	0.00005	GES	03/17/2021 15:37	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	1.39	mg/L		0.1	0.02	SH	03/17/2021 17:04	EPA 200.7-1994, Rev. 4.4
Potassium, K	< 0.2	mg/L	U	1	0.2	SH	03/17/2021 17:04	EPA 200.7-1994, Rev. 4.4

dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Sodium, Na	5.14	mg/L		0.5	0.2	SH	03/17/2021 17:04	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Strontium, Sr	0.003	mg/L	J	0.01	0.002	SH	03/17/2021 17:04	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit  
 J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	0.359	pCi/L	0.13	0.44	ttp	3/26/2021	SW-846 9320-2014, Rev. 1.0
The LFBD is outside of the acceptable limit of 75-125%.							
Radium-226	0.457	pCi/L	0.095	0.15		3/29/2021	SW-846 9315-1986, Rev. 0

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-17 Dissolved

Sample Number: 210586-007A

Date Collected: 03/09/2021 11:06

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 15:42	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.07	ug/L	J	0.1	0.03	GES	03/17/2021 15:42	EPA 200.8-1994, Rev. 5.4
Barium, Ba	74.0	ug/L		0.2	0.05	GES	03/17/2021 15:42	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.310	ug/L		0.1	0.007	GES	03/17/2021 15:42	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.01	ug/L	J	0.05	0.004	GES	03/17/2021 15:42	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.396	ug/L		0.2	0.04	GES	03/17/2021 15:42	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	2.97	ug/L		0.05	0.003	GES	03/17/2021 15:42	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.06	ug/L	J	0.2	0.05	GES	03/17/2021 15:42	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.101	ug/L		0.05	0.02	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 15:42	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.09	ug/L	J	0.5	0.09	GES	03/17/2021 15:42	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 15:42	EPA 200.8-1994, Rev. 5.4
Boron, B	0.02	mg/L	J	0.05	0.009	GES	03/17/2021 15:42	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	0.2	mg/L	J	0.3	0.1	SH	03/17/2021 17:24	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Iron, Fe	< 0.02	mg/L	U	0.1	0.02	SH	03/17/2021 17:24	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.00927	mg/L		0.0002	0.00005	GES	03/17/2021 15:42	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	1.37	mg/L		0.1	0.02	SH	03/17/2021 17:24	EPA 200.7-1994, Rev. 4.4
Manganese, Mn	0.0029	mg/L		0.002	0.0005	SH	03/17/2021 17:24	EPA 200.7-1994, Rev. 4.4
Potassium, K	0.3	mg/L	J	1	0.2	SH	03/17/2021 17:24	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Sodium, Na	5.16	mg/L		0.5	0.2	SH	03/17/2021 17:24	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Strontium, Sr	0.004	mg/L	J	0.01	0.002	SH	03/17/2021 17:24	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-18

Sample Number: 210586-008

Date Collected: 03/09/2021 13:15

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 15:47	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.28	ug/L		0.1	0.03	GES	03/17/2021 15:47	EPA 200.8-1994, Rev. 5.4
Barium, Ba	88.7	ug/L		0.2	0.05	GES	03/17/2021 15:47	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.09	ug/L	J	0.1	0.007	GES	03/17/2021 15:47	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.01	ug/L	J	0.05	0.004	GES	03/17/2021 15:47	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.271	ug/L		0.2	0.04	GES	03/17/2021 15:47	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.827	ug/L		0.05	0.003	GES	03/17/2021 15:47	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.08	ug/L	J	0.2	0.05	GES	03/17/2021 15:47	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.006	ug/L		0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 15:47	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.1	ug/L	J	0.5	0.09	GES	03/17/2021 15:47	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 15:47	EPA 200.8-1994, Rev. 5.4
Boron, B	0.009	mg/L	J	0.05	0.009	GES	03/17/2021 15:47	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	0.2	mg/L	J	0.3	0.1	SH	03/17/2021 17:28	EPA 200.7-1994, Rev. 4.4

dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Lithium, Li	0.0131	mg/L		0.0002	0.00005	GES	03/17/2021 15:47	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	0.341	mg/L		0.1	0.02	SH	03/17/2021 17:28	EPA 200.7-1994, Rev. 4.4

dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Potassium, K	0.8	mg/L	J	1	0.2	SH	03/17/2021 17:28	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Sodium, Na	6.12	mg/L		0.5	0.2	SH	03/17/2021 17:28	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Strontium, Sr	0.005	mg/L	J	0.01	0.002	SH	03/17/2021 17:28	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	0.088	pCi/L	0.12	0.42	ttp	3/26/2021	SW-846 9320-2014, Rev. 1.0
The LFBD is outside of the acceptable limit of 75-125%.							
Radium-226	0.243	pCi/L	0.067	0.10		3/29/2021	SW-846 9315-1986, Rev. 0

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-18 Dissolved

Sample Number: 210586-008A

Date Collected: 03/09/2021 13:15

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 15:53	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.07	ug/L	J	0.1	0.03	GES	03/17/2021 15:53	EPA 200.8-1994, Rev. 5.4
Barium, Ba	97.4	ug/L		0.2	0.05	GES	03/17/2021 15:53	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.1	ug/L	J	0.1	0.007	GES	03/17/2021 15:53	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.01	ug/L	J	0.05	0.004	GES	03/17/2021 15:53	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.220	ug/L		0.2	0.04	GES	03/17/2021 15:53	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.947	ug/L		0.05	0.003	GES	03/17/2021 15:53	EPA 200.8-1994, Rev. 5.4
Lead, Pb	< 0.05	ug/L	U	0.2	0.05	GES	03/17/2021 15:53	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 15:53	EPA 200.8-1994, Rev. 5.4
Selenium, Se	< 0.09	ug/L	U	0.5	0.09	GES	03/17/2021 15:53	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 15:53	EPA 200.8-1994, Rev. 5.4
Boron, B	0.009	mg/L	J	0.05	0.009	GES	03/17/2021 15:53	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	0.2	mg/L	J	0.3	0.1	SH	03/17/2021 17:32	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Iron, Fe	0.06	mg/L	J	0.1	0.02	SH	03/17/2021 17:32	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0150	mg/L		0.0002	0.00005	GES	03/17/2021 15:53	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	0.358	mg/L		0.1	0.02	SH	03/17/2021 17:32	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Manganese, Mn	0.0044	mg/L		0.002	0.0005	SH	03/17/2021 17:32	EPA 200.7-1994, Rev. 4.4
Potassium, K	0.8	mg/L	J	1	0.2	SH	03/17/2021 17:32	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Sodium, Na	6.33	mg/L		0.5	0.2	SH	03/17/2021 17:32	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Strontium, Sr	0.005	mg/L	J	0.01	0.002	SH	03/17/2021 17:32	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-22

Sample Number: 210586-009

Date Collected: 03/08/2021 10:56

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 15:58	EPA 200.8-1994, Rev. 5.4
Arsenic, As	3.05	ug/L		0.1	0.03	GES	03/17/2021 15:58	EPA 200.8-1994, Rev. 5.4
Barium, Ba	19.2	ug/L		0.2	0.05	GES	03/17/2021 15:58	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	8.52	ug/L		0.1	0.007	GES	03/17/2021 15:58	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	1.42	ug/L		0.05	0.004	GES	03/17/2021 15:58	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.395	ug/L		0.2	0.04	GES	03/17/2021 15:58	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	107	ug/L		0.05	0.003	GES	03/17/2021 15:58	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.277	ug/L		0.2	0.05	GES	03/17/2021 15:58	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.045	ug/L		0.02	0.007	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 15:58	EPA 200.8-1994, Rev. 5.4
Selenium, Se	11.7	ug/L		0.5	0.09	GES	03/17/2021 15:58	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.2	ug/L	J	0.5	0.04	GES	03/17/2021 15:58	EPA 200.8-1994, Rev. 5.4
Boron, B	0.069	mg/L		0.05	0.009	GES	03/17/2021 15:58	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	12.5	mg/L		0.3	0.1	SH	03/17/2021 17:36	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.164	mg/L		0.0002	0.00005	GES	03/17/2021 15:58	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	19.4	mg/L		0.1	0.02	SH	03/17/2021 17:36	EPA 200.7-1994, Rev. 4.4
Potassium, K	4.00	mg/L		1	0.2	SH	03/17/2021 17:36	EPA 200.7-1994, Rev. 4.4
Sodium, Na	81.9	mg/L		0.5	0.2	SH	03/17/2021 17:36	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.127	mg/L		0.01	0.002	SH	03/17/2021 17:36	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	5.05	pCi/L	0.19	0.42	ttp	3/26/2021	SW-846 9320-2014, Rev. 1.0
The LFBD is outside of the acceptable limit of 75-125%.							
Radium-226	0.957	pCi/L	0.14	0.096		4/5/2021	SW-846 9315-1986, Rev. 0

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*



## AD-22 Dissolved

Sample Number: 210586-009A

Date Collected: 03/08/2021 10:56

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 16:03	EPA 200.8-1994, Rev. 5.4
Arsenic, As	2.99	ug/L		0.1	0.03	GES	03/17/2021 16:03	EPA 200.8-1994, Rev. 5.4
Barium, Ba	18.7	ug/L		0.2	0.05	GES	03/17/2021 16:03	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	8.33	ug/L		0.1	0.007	GES	03/17/2021 16:03	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	1.36	ug/L		0.05	0.004	GES	03/17/2021 16:03	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.387	ug/L		0.2	0.04	GES	03/17/2021 16:03	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	105	ug/L		0.05	0.003	GES	03/17/2021 16:03	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.266	ug/L		0.2	0.05	GES	03/17/2021 16:03	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.010	ug/L		0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 16:03	EPA 200.8-1994, Rev. 5.4
Selenium, Se	11.2	ug/L		0.5	0.09	GES	03/17/2021 16:03	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.2	ug/L	J	0.5	0.04	GES	03/17/2021 16:03	EPA 200.8-1994, Rev. 5.4
Boron, B	0.067	mg/L		0.05	0.009	GES	03/17/2021 16:03	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	12.5	mg/L		0.3	0.1	SH	03/17/2021 17:40	EPA 200.7-1994, Rev. 4.4
Iron, Fe	9.53	mg/L		0.1	0.02	SH	03/17/2021 17:40	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.162	mg/L		0.0002	0.00005	GES	03/17/2021 16:03	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	19.4	mg/L		0.1	0.02	SH	03/17/2021 17:40	EPA 200.7-1994, Rev. 4.4
Manganese, Mn	0.327	mg/L		0.002	0.0005	SH	03/17/2021 17:40	EPA 200.7-1994, Rev. 4.4
Potassium, K	3.95	mg/L		1	0.2	SH	03/17/2021 17:40	EPA 200.7-1994, Rev. 4.4
Sodium, Na	81.7	mg/L		0.5	0.2	SH	03/17/2021 17:40	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.127	mg/L		0.01	0.002	SH	03/17/2021 17:40	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-28

Sample Number: 210586-010

Date Collected: 03/09/2021 10:18

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 16:08	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.16	ug/L		0.1	0.03	GES	03/17/2021 16:08	EPA 200.8-1994, Rev. 5.4
Barium, Ba	153	ug/L		0.2	0.05	GES	03/17/2021 16:08	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.958	ug/L		0.1	0.007	GES	03/17/2021 16:08	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.07	ug/L		0.05	0.004	GES	03/17/2021 16:08	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.292	ug/L		0.2	0.04	GES	03/17/2021 16:08	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	15.3	ug/L		0.05	0.003	GES	03/17/2021 16:08	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.08	ug/L	J	0.2	0.05	GES	03/17/2021 16:08	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.019	ug/L		0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 16:08	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.3	ug/L		0.5	0.09	GES	03/17/2021 16:08	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 16:08	EPA 200.8-1994, Rev. 5.4
Boron, B	0.358	mg/L		0.05	0.009	GES	03/17/2021 16:08	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	1.26	mg/L		0.3	0.1	SH	03/17/2021 17:44	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0223	mg/L		0.0002	0.00005	GES	03/17/2021 16:08	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	3.57	mg/L		0.1	0.02	SH	03/17/2021 17:44	EPA 200.7-1994, Rev. 4.4
Potassium, K	0.7	mg/L	J	1	0.2	SH	03/17/2021 17:44	EPA 200.7-1994, Rev. 4.4
Sodium, Na	8.20	mg/L		0.5	0.2	SH	03/17/2021 17:44	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.0264	mg/L		0.01	0.002	SH	03/17/2021 17:44	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	0.617	pCi/L	0.14	0.45	ttp	3/22/2021	SW-846 9320-2014, Rev. 1.0
Radium-226	0.597	pCi/L	0.11	0.12		4/5/2021	SW-846 9315-1986, Rev. 0

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

## AD-28 Dissolved

Sample Number: 210586-010A

Date Collected: 03/09/2021 10:18

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 16:13	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.11	ug/L		0.1	0.03	GES	03/17/2021 16:13	EPA 200.8-1994, Rev. 5.4
Barium, Ba	152	ug/L		0.2	0.05	GES	03/17/2021 16:13	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.904	ug/L		0.1	0.007	GES	03/17/2021 16:13	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.07	ug/L		0.05	0.004	GES	03/17/2021 16:13	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.405	ug/L		0.2	0.04	GES	03/17/2021 16:13	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	15.3	ug/L		0.05	0.003	GES	03/17/2021 16:13	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.1	ug/L	J	0.2	0.05	GES	03/17/2021 16:13	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.014	ug/L		0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 16:13	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.4	ug/L		0.5	0.09	GES	03/17/2021 16:13	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 16:13	EPA 200.8-1994, Rev. 5.4
Boron, B	0.362	mg/L		0.05	0.009	GES	03/17/2021 16:13	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	1.28	mg/L		0.3	0.1	SH	03/17/2021 17:48	EPA 200.7-1994, Rev. 4.4
Iron, Fe	0.03	mg/L	J	0.1	0.02	SH	03/17/2021 17:48	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0222	mg/L		0.0002	0.00005	GES	03/17/2021 16:13	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	3.45	mg/L		0.1	0.02	SH	03/17/2021 17:48	EPA 200.7-1994, Rev. 4.4
Manganese, Mn	0.0432	mg/L		0.002	0.0005	SH	03/17/2021 17:48	EPA 200.7-1994, Rev. 4.4
Potassium, K	0.7	mg/L	J	1	0.2	SH	03/17/2021 17:48	EPA 200.7-1994, Rev. 4.4
Sodium, Na	7.97	mg/L		0.5	0.2	SH	03/17/2021 17:48	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.0256	mg/L		0.01	0.002	SH	03/17/2021 17:48	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-30

Sample Number: 210586-011

Date Collected: 03/09/2021 09:35

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 17:30	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.15	ug/L		0.1	0.03	GES	03/17/2021 17:30	EPA 200.8-1994, Rev. 5.4
Barium, Ba	115	ug/L		0.2	0.05	GES	03/17/2021 17:30	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.107	ug/L		0.1	0.007	GES	03/17/2021 17:30	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.01	ug/L	J	0.05	0.004	GES	03/17/2021 17:30	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.301	ug/L		0.2	0.04	GES	03/17/2021 17:30	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	3.87	ug/L		0.05	0.003	GES	03/17/2021 17:30	EPA 200.8-1994, Rev. 5.4
Lead, Pb	< 0.05	ug/L	U	0.2	0.05	GES	03/17/2021 17:30	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.018	ug/L		0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 17:30	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.3	ug/L		0.5	0.09	GES	03/17/2021 17:30	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 17:30	EPA 200.8-1994, Rev. 5.4
Boron, B	1.91	mg/L		0.05	0.009	GES	03/17/2021 17:30	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	0.478	mg/L		0.3	0.1	SH	03/17/2021 17:52	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.00939	mg/L		0.0002	0.00005	GES	03/17/2021 17:30	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	2.11	mg/L		0.1	0.02	SH	03/17/2021 17:52	EPA 200.7-1994, Rev. 4.4
Potassium, K	0.8	mg/L	J	1	0.2	SH	03/17/2021 17:52	EPA 200.7-1994, Rev. 4.4
Sodium, Na	71.7	mg/L		0.5	0.2	SH	03/17/2021 17:52	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.009	mg/L	J	0.01	0.002	SH	03/17/2021 17:52	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	0.593	pCi/L	0.16	0.51	ttp	3/22/2021	SW-846 9320-2014, Rev. 1.0
Radium-226	0.551	pCi/L	0.10	0.12		4/5/2021	SW-846 9315-1986, Rev. 0

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-30 Dissolved

Sample Number: 210586-011A

Date Collected: 03/09/2021 09:35

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 17:35	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.13	ug/L		0.1	0.03	GES	03/17/2021 17:35	EPA 200.8-1994, Rev. 5.4
Barium, Ba	112	ug/L		0.2	0.05	GES	03/17/2021 17:35	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.104	ug/L		0.1	0.007	GES	03/17/2021 17:35	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.01	ug/L	J	0.05	0.004	GES	03/17/2021 17:35	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.320	ug/L		0.2	0.04	GES	03/17/2021 17:35	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	3.81	ug/L		0.05	0.003	GES	03/17/2021 17:35	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.05	ug/L	J	0.2	0.05	GES	03/17/2021 17:35	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.015	ug/L		0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 17:35	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.3	ug/L		0.5	0.09	GES	03/17/2021 17:35	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 17:35	EPA 200.8-1994, Rev. 5.4
Boron, B	1.91	mg/L		0.05	0.009	GES	03/17/2021 17:35	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	0.536	mg/L		0.3	0.1	SH	03/17/2021 18:00	EPA 200.7-1994, Rev. 4.4
Iron, Fe	< 0.02	mg/L	U	0.1	0.02	SH	03/17/2021 18:00	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.00939	mg/L		0.0002	0.00005	GES	03/17/2021 17:35	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	2.09	mg/L		0.1	0.02	SH	03/17/2021 18:00	EPA 200.7-1994, Rev. 4.4
Manganese, Mn	0.0133	mg/L		0.002	0.0005	SH	03/17/2021 18:00	EPA 200.7-1994, Rev. 4.4
Potassium, K	0.8	mg/L	J	1	0.2	SH	03/17/2021 18:00	EPA 200.7-1994, Rev. 4.4
Sodium, Na	71.3	mg/L		0.5	0.2	SH	03/17/2021 18:00	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.009	mg/L	J	0.01	0.002	SH	03/17/2021 18:00	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit  
 J: Analyte was positively identified, though the quantitation was below Reporting Limit.

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-31

Sample Number: 210586-012

Date Collected: 03/08/2021 12:23

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 16:18	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.22	ug/L		0.1	0.03	GES	03/17/2021 16:18	EPA 200.8-1994, Rev. 5.4
Barium, Ba	33.6	ug/L		0.2	0.05	GES	03/17/2021 16:18	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.857	ug/L		0.1	0.007	GES	03/17/2021 16:18	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.07	ug/L		0.05	0.004	GES	03/17/2021 16:18	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.282	ug/L		0.2	0.04	GES	03/17/2021 16:18	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	9.78	ug/L		0.05	0.003	GES	03/17/2021 16:18	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.218	ug/L		0.2	0.05	GES	03/17/2021 16:18	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.095	ug/L		0.01	0.004	JAB	03/26/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 16:18	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.4	ug/L		0.5	0.09	GES	03/17/2021 16:18	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.08	ug/L	J	0.5	0.04	GES	03/17/2021 16:18	EPA 200.8-1994, Rev. 5.4
Boron, B	0.02	mg/L	J	0.05	0.009	GES	03/17/2021 16:18	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	2.69	mg/L		0.3	0.1	SH	03/17/2021 18:36	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0664	mg/L		0.0002	0.00005	GES	03/17/2021 16:18	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	4.10	mg/L		0.1	0.02	SH	03/17/2021 18:36	EPA 200.7-1994, Rev. 4.4
Potassium, K	1.59	mg/L		1	0.2	SH	03/17/2021 18:36	EPA 200.7-1994, Rev. 4.4
Sodium, Na	33.3	mg/L		0.5	0.2	SH	03/17/2021 18:36	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.0412	mg/L		0.01	0.002	SH	03/17/2021 18:36	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	1.16	pCi/L	0.14	0.41	ttp	3/22/2021	SW-846 9320-2014,Rev. 1.0
Radium-226	0.537	pCi/L	0.10	0.12		4/5/2021	SW-846 9315-1986,Rev. 0

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-31 Dissolved

Sample Number: 210586-012A

Date Collected: 03/08/2021 12:23

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 16:23	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.21	ug/L		0.1	0.03	GES	03/17/2021 16:23	EPA 200.8-1994, Rev. 5.4
Barium, Ba	33.0	ug/L		0.2	0.05	GES	03/17/2021 16:23	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.873	ug/L		0.1	0.007	GES	03/17/2021 16:23	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.07	ug/L		0.05	0.004	GES	03/17/2021 16:23	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.364	ug/L		0.2	0.04	GES	03/17/2021 16:23	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	9.94	ug/L		0.05	0.003	GES	03/17/2021 16:23	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.240	ug/L		0.2	0.05	GES	03/17/2021 16:23	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 16:23	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.4	ug/L		0.5	0.09	GES	03/17/2021 16:23	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.08	ug/L	J	0.5	0.04	GES	03/17/2021 16:23	EPA 200.8-1994, Rev. 5.4
Boron, B	0.02	mg/L	J	0.05	0.009	GES	03/17/2021 16:23	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	2.78	mg/L		0.3	0.1	SH	03/17/2021 18:40	EPA 200.7-1994, Rev. 4.4
Iron, Fe	0.132	mg/L		0.1	0.02	SH	03/17/2021 18:40	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0677	mg/L		0.0002	0.00005	GES	03/17/2021 16:23	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	4.11	mg/L		0.1	0.02	SH	03/17/2021 18:40	EPA 200.7-1994, Rev. 4.4
Manganese, Mn	0.0282	mg/L		0.002	0.0005	SH	03/17/2021 18:40	EPA 200.7-1994, Rev. 4.4
Potassium, K	1.57	mg/L		1	0.2	SH	03/17/2021 18:40	EPA 200.7-1994, Rev. 4.4
Sodium, Na	33.4	mg/L		0.5	0.2	SH	03/17/2021 18:40	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.0419	mg/L		0.01	0.002	SH	03/17/2021 18:40	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-32

Sample Number: 210586-013

Date Collected: 03/08/2021 11:21

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 17:40	EPA 200.8-1994, Rev. 5.4
Arsenic, As	5.54	ug/L		0.1	0.03	GES	03/17/2021 17:40	EPA 200.8-1994, Rev. 5.4
Barium, Ba	18.5	ug/L		0.2	0.05	GES	03/17/2021 17:40	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	5.78	ug/L		0.1	0.007	GES	03/17/2021 17:40	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.66	ug/L		0.05	0.004	GES	03/17/2021 17:40	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.754	ug/L		0.2	0.04	GES	03/17/2021 17:40	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	61.9	ug/L		0.05	0.003	GES	03/17/2021 17:40	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.970	ug/L		0.2	0.05	GES	03/17/2021 17:40	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	1.07	ug/L		0.5	0.2	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 17:40	EPA 200.8-1994, Rev. 5.4
Selenium, Se	22.2	ug/L		0.5	0.09	GES	03/17/2021 17:40	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.3	ug/L	J	0.5	0.04	GES	03/17/2021 17:40	EPA 200.8-1994, Rev. 5.4
Boron, B	2.87	mg/L		0.05	0.009	GES	03/17/2021 17:40	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	34.2	mg/L		0.3	0.1	SH	03/17/2021 18:44	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0618	mg/L		0.0002	0.00005	GES	03/17/2021 17:40	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	23.0	mg/L		0.1	0.02	SH	03/17/2021 18:44	EPA 200.7-1994, Rev. 4.4
Potassium, K	4.74	mg/L		1	0.2	SH	03/17/2021 18:44	EPA 200.7-1994, Rev. 4.4
Sodium, Na	127	mg/L		0.5	0.2	SH	03/17/2021 18:44	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.706	mg/L		0.01	0.002	SH	03/17/2021 18:44	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	2.91	pCi/L	0.19	0.52	ttp	3/22/2021	SW-846 9320-2014, Rev. 1.0
The RPD between the MS/MSD exceeds 25%.							
Radium-226	0.791	pCi/L	0.12	0.096		4/5/2021	SW-846 9315-1986, Rev. 0

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*



## AD-32 Dissolved

Sample Number: 210586-013A

Date Collected: 03/08/2021 11:21

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 17:45	EPA 200.8-1994, Rev. 5.4
Arsenic, As	5.40	ug/L		0.1	0.03	GES	03/17/2021 17:45	EPA 200.8-1994, Rev. 5.4
Barium, Ba	18.3	ug/L		0.2	0.05	GES	03/17/2021 17:45	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	5.67	ug/L		0.1	0.007	GES	03/17/2021 17:45	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.66	ug/L		0.05	0.004	GES	03/17/2021 17:45	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.751	ug/L		0.2	0.04	GES	03/17/2021 17:45	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	61.6	ug/L		0.05	0.003	GES	03/17/2021 17:45	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.950	ug/L		0.2	0.05	GES	03/17/2021 17:45	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.712	ug/L		0.05	0.02	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 17:45	EPA 200.8-1994, Rev. 5.4
Selenium, Se	22.2	ug/L		0.5	0.09	GES	03/17/2021 17:45	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.3	ug/L	J	0.5	0.04	GES	03/17/2021 17:45	EPA 200.8-1994, Rev. 5.4
Boron, B	2.84	mg/L		0.05	0.009	GES	03/17/2021 17:45	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	33.5	mg/L		0.3	0.1	SH	03/17/2021 18:48	EPA 200.7-1994, Rev. 4.4
Iron, Fe	1.02	mg/L		0.1	0.02	SH	03/17/2021 18:48	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0615	mg/L		0.0002	0.00005	GES	03/17/2021 17:45	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	22.7	mg/L		0.1	0.02	SH	03/17/2021 18:48	EPA 200.7-1994, Rev. 4.4
Manganese, Mn	0.123	mg/L		0.002	0.0005	SH	03/17/2021 18:48	EPA 200.7-1994, Rev. 4.4
Potassium, K	4.65	mg/L		1	0.2	SH	03/17/2021 18:48	EPA 200.7-1994, Rev. 4.4
Sodium, Na	125	mg/L		0.5	0.2	SH	03/17/2021 18:48	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.693	mg/L		0.01	0.002	SH	03/17/2021 18:48	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-33

Sample Number: 210586-014

Date Collected: 03/08/2021 11:59

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 17:50	EPA 200.8-1994, Rev. 5.4
Arsenic, As	1.01	ug/L		0.1	0.03	GES	03/17/2021 17:50	EPA 200.8-1994, Rev. 5.4
Barium, Ba	47.5	ug/L		0.2	0.05	GES	03/17/2021 17:50	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	1.51	ug/L		0.1	0.007	GES	03/17/2021 17:50	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.06	ug/L		0.05	0.004	GES	03/17/2021 17:50	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.373	ug/L		0.2	0.04	GES	03/17/2021 17:50	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	12.4	ug/L		0.05	0.003	GES	03/17/2021 17:50	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.286	ug/L		0.2	0.05	GES	03/17/2021 17:50	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	3.13	ug/L		1	0.4	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 17:50	EPA 200.8-1994, Rev. 5.4
Selenium, Se	3.4	ug/L		0.5	0.09	GES	03/17/2021 17:50	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 17:50	EPA 200.8-1994, Rev. 5.4
Boron, B	0.159	mg/L		0.05	0.009	GES	03/17/2021 17:50	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	1.96	mg/L		0.3	0.1	SH	03/17/2021 18:52	EPA 200.7-1994, Rev. 4.4

dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Lithium, Li	0.0232	mg/L		0.0002	0.00005	GES	03/17/2021 17:50	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	4.97	mg/L		0.1	0.02	SH	03/17/2021 18:52	EPA 200.7-1994, Rev. 4.4

dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Potassium, K	0.3	mg/L	J	1	0.2	SH	03/17/2021 18:52	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Sodium, Na	20.5	mg/L		0.5	0.2	SH	03/17/2021 18:52	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Strontium, Sr	0.0383	mg/L		0.01	0.002	SH	03/17/2021 18:52	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	0.984	pCi/L	0.15	0.45	ttp	3/26/2021	SW-846 9320-2014, Rev. 1.0
The LFBD is outside of the acceptable limit of 75-125%.							
Radium-226	0.328	pCi/L	0.081	0.11		4/5/2021	SW-846 9315-1986, Rev. 0

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-33 Dissolved

Sample Number: 210586-014A

Date Collected: 03/08/2021 11:59

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 17:56	EPA 200.8-1994, Rev. 5.4
Arsenic, As	1.01	ug/L		0.1	0.03	GES	03/17/2021 17:56	EPA 200.8-1994, Rev. 5.4
Barium, Ba	47.8	ug/L		0.2	0.05	GES	03/17/2021 17:56	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	1.55	ug/L		0.1	0.007	GES	03/17/2021 17:56	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.07	ug/L		0.05	0.004	GES	03/17/2021 17:56	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.242	ug/L		0.2	0.04	GES	03/17/2021 17:56	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	12.7	ug/L		0.05	0.003	GES	03/17/2021 17:56	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.297	ug/L		0.2	0.05	GES	03/17/2021 17:56	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.064	ug/L		0.05	0.02	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 17:56	EPA 200.8-1994, Rev. 5.4
Selenium, Se	3.4	ug/L		0.5	0.09	GES	03/17/2021 17:56	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 17:56	EPA 200.8-1994, Rev. 5.4
Boron, B	0.160	mg/L		0.05	0.009	GES	03/17/2021 17:56	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	2.04	mg/L		0.3	0.1	SH	03/17/2021 18:56	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Iron, Fe	0.03	mg/L	J	0.1	0.02	SH	03/17/2021 18:56	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0240	mg/L		0.0002	0.00005	GES	03/17/2021 17:56	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	5.13	mg/L		0.1	0.02	SH	03/17/2021 18:56	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Manganese, Mn	0.0090	mg/L		0.002	0.0005	SH	03/17/2021 18:56	EPA 200.7-1994, Rev. 4.4
Potassium, K	0.3	mg/L	J	1	0.2	SH	03/17/2021 18:56	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Sodium, Na	20.9	mg/L		0.5	0.2	SH	03/17/2021 18:56	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Strontium, Sr	0.0393	mg/L		0.01	0.002	SH	03/17/2021 18:56	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

## Duplicate 1

Sample Number: 210586-015

Date Collected: 03/08/2021 11:21

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 18:01	EPA 200.8-1994, Rev. 5.4
Arsenic, As	5.66	ug/L		0.1	0.03	GES	03/17/2021 18:01	EPA 200.8-1994, Rev. 5.4
Barium, Ba	19.0	ug/L		0.2	0.05	GES	03/17/2021 18:01	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	5.75	ug/L		0.1	0.007	GES	03/17/2021 18:01	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.69	ug/L		0.05	0.004	GES	03/17/2021 18:01	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.785	ug/L		0.2	0.04	GES	03/17/2021 18:01	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	64.2	ug/L		0.05	0.003	GES	03/17/2021 18:01	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.991	ug/L		0.2	0.05	GES	03/17/2021 18:01	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	1.09	ug/L		0.05	0.02	JAB	03/26/2021	EPA 245.7-2005, Rev. 2.0
Sample was slightly over the curve but within the Linear Dynamic Range. Sample was diluted at 10x after original run at 1x was above curve and LDR.								
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 18:01	EPA 200.8-1994, Rev. 5.4
Selenium, Se	22.7	ug/L		0.5	0.09	GES	03/17/2021 18:01	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.3	ug/L	J	0.5	0.04	GES	03/17/2021 18:01	EPA 200.8-1994, Rev. 5.4
Boron, B	2.93	mg/L		0.05	0.009	GES	03/17/2021 18:01	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	34.2	mg/L		0.3	0.1	SH	03/17/2021 19:00	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0616	mg/L		0.0002	0.00005	GES	03/17/2021 18:01	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	23.3	mg/L		0.1	0.02	SH	03/17/2021 19:00	EPA 200.7-1994, Rev. 4.4
Potassium, K	4.70	mg/L		1	0.2	SH	03/17/2021 19:00	EPA 200.7-1994, Rev. 4.4
Sodium, Na	128	mg/L		0.5	0.2	SH	03/17/2021 19:00	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.708	mg/L		0.01	0.002	SH	03/17/2021 19:00	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

Duplicate 1 Dissolved

Sample Number: 210586-015A

Date Collected: 03/08/2021 11:21

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 18:06	EPA 200.8-1994, Rev. 5.4
Arsenic, As	5.25	ug/L		0.1	0.03	GES	03/17/2021 18:06	EPA 200.8-1994, Rev. 5.4
Barium, Ba	18.2	ug/L		0.2	0.05	GES	03/17/2021 18:06	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	5.69	ug/L		0.1	0.007	GES	03/17/2021 18:06	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.65	ug/L		0.05	0.004	GES	03/17/2021 18:06	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.748	ug/L		0.2	0.04	GES	03/17/2021 18:06	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	60.6	ug/L		0.05	0.003	GES	03/17/2021 18:06	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.953	ug/L		0.2	0.05	GES	03/17/2021 18:06	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.746	ug/L		0.05	0.02	JAB	03/26/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 18:06	EPA 200.8-1994, Rev. 5.4
Selenium, Se	21.5	ug/L		0.5	0.09	GES	03/17/2021 18:06	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.3	ug/L	J	0.5	0.04	GES	03/17/2021 18:06	EPA 200.8-1994, Rev. 5.4
Boron, B	2.79	mg/L		0.05	0.009	GES	03/17/2021 18:06	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	33.6	mg/L		0.3	0.1	SH	03/17/2021 19:03	EPA 200.7-1994, Rev. 4.4
Iron, Fe	1.00	mg/L		0.1	0.02	SH	03/17/2021 19:03	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0618	mg/L		0.0002	0.00005	GES	03/17/2021 18:06	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	22.7	mg/L		0.1	0.02	SH	03/17/2021 19:03	EPA 200.7-1994, Rev. 4.4
Manganese, Mn	0.121	mg/L		0.002	0.0005	SH	03/17/2021 19:03	EPA 200.7-1994, Rev. 4.4
Potassium, K	4.65	mg/L		1	0.2	SH	03/17/2021 19:03	EPA 200.7-1994, Rev. 4.4
Sodium, Na	125	mg/L		0.5	0.2	SH	03/17/2021 19:03	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.694	mg/L		0.01	0.002	SH	03/17/2021 19:03	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

Duplicate 2

Sample Number: 210586-016

Date Collected: 03/09/2021 10:37

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 18:11	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.70	ug/L		0.1	0.03	GES	03/17/2021 18:11	EPA 200.8-1994, Rev. 5.4
Barium, Ba	20.2	ug/L		0.2	0.05	GES	03/17/2021 18:11	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.592	ug/L		0.1	0.007	GES	03/17/2021 18:11	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.08	ug/L		0.05	0.004	GES	03/17/2021 18:11	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.312	ug/L		0.2	0.04	GES	03/17/2021 18:11	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	20.6	ug/L		0.05	0.003	GES	03/17/2021 18:11	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.517	ug/L		0.2	0.05	GES	03/17/2021 18:11	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.059	ug/L		0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 18:11	EPA 200.8-1994, Rev. 5.4
Selenium, Se	2.3	ug/L		0.5	0.09	GES	03/17/2021 18:11	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.1	ug/L	J	0.5	0.04	GES	03/17/2021 18:11	EPA 200.8-1994, Rev. 5.4
Boron, B	2.87	mg/L		0.05	0.009	GES	03/17/2021 18:11	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	2.50	mg/L		0.3	0.1	SH	03/17/2021 19:07	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0506	mg/L		0.0002	0.00005	GES	03/17/2021 18:11	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	5.59	mg/L		0.1	0.02	SH	03/17/2021 19:07	EPA 200.7-1994, Rev. 4.4
Potassium, K	1.27	mg/L		1	0.2	SH	03/17/2021 19:07	EPA 200.7-1994, Rev. 4.4
Sodium, Na	95.6	mg/L		0.5	0.2	SH	03/17/2021 19:07	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.0403	mg/L		0.01	0.002	SH	03/17/2021 19:07	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

Duplicate 2 Dissolved

Sample Number: 210586-016A

Date Collected: 03/09/2021 10:37

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 18:16	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.63	ug/L		0.1	0.03	GES	03/17/2021 18:16	EPA 200.8-1994, Rev. 5.4
Barium, Ba	19.5	ug/L		0.2	0.05	GES	03/17/2021 18:16	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.577	ug/L		0.1	0.007	GES	03/17/2021 18:16	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.09	ug/L		0.05	0.004	GES	03/17/2021 18:16	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.399	ug/L		0.2	0.04	GES	03/17/2021 18:16	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	19.7	ug/L		0.05	0.003	GES	03/17/2021 18:16	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.481	ug/L		0.2	0.05	GES	03/17/2021 18:16	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 18:16	EPA 200.8-1994, Rev. 5.4
Selenium, Se	2.1	ug/L		0.5	0.09	GES	03/17/2021 18:16	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.09	ug/L	J	0.5	0.04	GES	03/17/2021 18:16	EPA 200.8-1994, Rev. 5.4
Boron, B	2.74	mg/L		0.05	0.009	GES	03/17/2021 18:16	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	2.48	mg/L		0.3	0.1	SH	03/17/2021 19:11	EPA 200.7-1994, Rev. 4.4
Iron, Fe	0.136	mg/L		0.1	0.02	SH	03/17/2021 19:11	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0494	mg/L		0.0002	0.00005	GES	03/17/2021 18:16	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	5.57	mg/L		0.1	0.02	SH	03/17/2021 19:11	EPA 200.7-1994, Rev. 4.4
Manganese, Mn	0.0772	mg/L		0.002	0.0005	SH	03/17/2021 19:11	EPA 200.7-1994, Rev. 4.4
Potassium, K	1.23	mg/L		1	0.2	SH	03/17/2021 19:11	EPA 200.7-1994, Rev. 4.4
Sodium, Na	95.2	mg/L		0.5	0.2	SH	03/17/2021 19:11	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.0400	mg/L		0.01	0.002	SH	03/17/2021 19:11	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

Equipment Blank

Sample Number: 210586-017

Date Collected: 03/09/2021 11:42

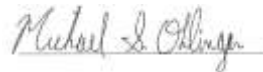
Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 20:04	EPA 200.8-1994, Rev. 5.4
Arsenic, As	< 0.03	ug/L	U	0.1	0.03	GES	03/17/2021 20:04	EPA 200.8-1994, Rev. 5.4
Barium, Ba	< 0.05	ug/L	U	0.2	0.05	GES	03/17/2021 20:04	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	< 0.007	ug/L	U	0.1	0.007	GES	03/17/2021 20:04	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	< 0.004	ug/L	U	0.05	0.004	GES	03/17/2021 20:04	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.1	ug/L	J	0.2	0.04	GES	03/17/2021 20:04	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.006	ug/L	J	0.05	0.003	GES	03/17/2021 20:04	EPA 200.8-1994, Rev. 5.4
Lead, Pb	< 0.05	ug/L	U	0.2	0.05	GES	03/17/2021 20:04	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 20:04	EPA 200.8-1994, Rev. 5.4
Selenium, Se	< 0.09	ug/L	U	0.5	0.09	GES	03/17/2021 20:04	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 20:04	EPA 200.8-1994, Rev. 5.4
Boron, B	< 0.009	mg/L	U	0.05	0.009	GES	03/17/2021 20:04	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	< 0.1	mg/L	U	0.3	0.1	SH	03/17/2021 19:54	EPA 200.7-1994, Rev. 4.4
Lithium, Li	< 0.00005	mg/L	U	0.0002	0.00005	GES	03/18/2021 12:39	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	< 0.02	mg/L	U	0.1	0.02	SH	03/17/2021 19:54	EPA 200.7-1994, Rev. 4.4
Potassium, K	< 0.2	mg/L	U	1	0.2	SH	03/17/2021 19:54	EPA 200.7-1994, Rev. 4.4
Sodium, Na	< 0.2	mg/L	U	0.5	0.2	SH	03/17/2021 19:54	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	< 0.002	mg/L	U	0.01	0.002	SH	03/17/2021 19:54	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

*\*The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*



**Michael Ohlinger, Chemist**

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**THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED AND SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY. ALL TEST RESULTS MEET ALL OF THE REQUIREMENTS OF THE ACCREDITING AUTHORITY, UNLESS OTHERWISE NOTED.**



**Dolan Chemical Laboratory (DCL)**  
 4001 Bixby Road  
 Groveport, Ohio 43125  
 Jonathan Barnhill (318-873-3803)  
 Contacts: Michael Ohlinger (614-836-4184)

Project Name: Pirkey  
 Contact Name: Leslie Fuerschbach  
 Contact Phone: 318-423-3805  
 Sampler(s): Matt Hamilton Kenny McDonald

# Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	# of Cont.	Analysis Turnaround Time (in Calendar Days)						Date	COC/Order #	For Lab Use Only:
				250 mL bottle, pH<2, HNO <sub>3</sub>	Field-filter 250 mL bottle, then pH<2, HNO <sub>3</sub>	1 L bottle, Cool, 0-5°C	Three (six every 1000 <sup>1</sup> ) L bottles, pH<2, HNO <sub>3</sub>	40 mL Glass Vial or 250 mL PTFE lined bottle, HCL <sup>2</sup> , pH<2	40 mL Glass Vial or 250 mL PTFE lined bottle, HCL <sup>2</sup> , pH<2			
3/9/2021	1037	G	10	B, Ca, Li, Sb, As, Ba, Bi, Cd, Cr, Co, Pb, Mn, Mo, P, Se, Tl, and Na, K, Mg, Sr	X	X	X	X	X	X	210586	
3/9/2021	1156	G	7	B, Ca, Li, Sb, As, Ba, Bi, Cd, Cr, Co, Pb, Mn, Mo, P, Se, Tl, and Na, K, Mg, Sr	X	X	X	X	X	X		
3/9/2021	1203	G	7	B, Ca, Li, Sb, As, Ba, Bi, Cd, Cr, Co, Pb, Mn, Mo, P, Se, Tl, and Na, K, Mg, Sr	X	X	X	X	X	X		
3/9/2021	943	G	7	B, Ca, Li, Sb, As, Ba, Bi, Cd, Cr, Co, Pb, Mn, Mo, P, Se, Tl, and Na, K, Mg, Sr	X	X	X	X	X	X		
3/9/2021	1027	G	7	B, Ca, Li, Sb, As, Ba, Bi, Cd, Cr, Co, Pb, Mn, Mo, P, Se, Tl, and Na, K, Mg, Sr	X	X	X	X	X	X		
3/9/2021	947	G	7	B, Ca, Li, Sb, As, Ba, Bi, Cd, Cr, Co, Pb, Mn, Mo, P, Se, Tl, and Na, K, Mg, Sr	X	X	X	X	X	X		
3/9/2021	1106	G	7	B, Ca, Li, Sb, As, Ba, Bi, Cd, Cr, Co, Pb, Mn, Mo, P, Se, Tl, and Na, K, Mg, Sr	X	X	X	X	X	X		
3/9/2021	1315	G	7	B, Ca, Li, Sb, As, Ba, Bi, Cd, Cr, Co, Pb, Mn, Mo, P, Se, Tl, and Na, K, Mg, Sr	X	X	X	X	X	X		
3/9/2021	1056	G	7	B, Ca, Li, Sb, As, Ba, Bi, Cd, Cr, Co, Pb, Mn, Mo, P, Se, Tl, and Na, K, Mg, Sr	X	X	X	X	X	X		
3/9/2021	1018	G	7	B, Ca, Li, Sb, As, Ba, Bi, Cd, Cr, Co, Pb, Mn, Mo, P, Se, Tl, and Na, K, Mg, Sr	X	X	X	X	X	X		
3/9/2021	935	G	7	B, Ca, Li, Sb, As, Ba, Bi, Cd, Cr, Co, Pb, Mn, Mo, P, Se, Tl, and Na, K, Mg, Sr	X	X	X	X	X	X		
Preservation Used: 1= Ice, 2= HCl; 3= H <sub>2</sub> SO <sub>4</sub> ; 4=HNO <sub>3</sub> ; 5=NaOH; 6= Other				F4	1	4	2	2	2			

\* Six 1L Bottles must be collected for Radium for every 10th sample.

**Special Instructions/QC Requirements & Comments:**

Relinquished by: <i>[Signature]</i>	Company: <i>[Signature]</i>	Date/Time: 3/10/21	Received by: <i>[Signature]</i>	Date/Time: 3/15/21
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time: 12:40 PM
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: <i>[Signature]</i>	Date/Time: 3/15/21 12:40 PM

# Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Dolan Chemical Laboratory (DCL)  
 4001 Bibby Road  
 Groveport, Ohio 43125  
 Jonathan Barnhill (318-673-3803)  
 Contacts: Michael Ohlinger (614-836-4184)

Project Name: Pirkey  
 Contact Name: Leslie Fuerschbach  
 Contact Phone: 318-423-3805  
 Sampler(s): Matt Hamilton Kenny McDonald

Site Contact: \_\_\_\_\_ Date: \_\_\_\_\_  
 For Lab Use Only:  
 COC/Order #: \_\_\_\_\_

Analysis Turnaround Time (in Calendar Days)

Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Samplers Initials	250 mL bottle, pH<2, HNO <sub>3</sub>	Field-filter 250 mL bottle, then pH<2, HNO <sub>3</sub>	1 L bottle, Cool, 0-5°C	Three (six every 10th) L bottles, pH<2, HNO <sub>3</sub>	40 mL Glass vial or 250 mL PTFE lined bottle, HCL, pH<2	40 mL Glass vial or 250 mL PTFE lined bottle, HCL, pH<2	Sample Specific Notes
3/8/2021	1223	G	GW	7		B, Ca, Li, Sb, As, Ba, Mo, Se, TL	B, Ca, Li, Sb, As, Ba, Mn, Mo, Pb, Se, Tl	TDS, F, Cl, SO <sub>4</sub> and Br, Alkalinity	Ra-226, Ra-228	Hg	Hg	
3/8/2021	1121	G	GW	10								
3/8/2021	1159	G	GW	7								
3/8/2021	1121	G	GW	4								
3/8/2021	1037	G	GW	4								
3/8/2021	1142	G	GW	2								
					F= filter in field							

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other \_\_\_\_\_; F= filter in field

\* Six 1L Bottles must be collected for Radium for every 10th sample.

Special Instructions/QC Requirements & Comments:

Relinquished by: <i>[Signature]</i>	Company: Eagle	Date/Time: 3/16/21 143	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: <i>[Signature]</i>	Date/Time: 3/15/21 12:40 pm



# WATER & WASTE SAMPLE RECEIPT FORM

Package Type		Delivery Type	
Cooler	Box Bag Envelope	PONY	UPS FedEX USPS
Other _____		Other _____	
Plant/Customer	<u>Parkey</u>	Number of Plastic Containers:	<u>81</u>
Opened By	<u>MSO</u>	Number of Glass Containers:	_____
Date/Time	<u>3-15-21 12:40</u>	Number of Mercury Containers:	<u>23</u>
Were all temperatures within 0-6°C? Y / N or <u>N/A</u> Initial: <u>SM</u> on ice / no ice			
1(IR Gun Ser# <u>200700311</u> , Expir. <u>11/06/22</u> ) - If No, specify each deviation: _____			
Was container in good condition? <u>Y</u> / N Comments _____			
Was Chain of Custody received? <u>Y</u> / N Comments _____			
Requested turnaround: <u>Roller</u> If RUSH, who was notified? _____			
pH (15 min)	Cr <sup>+6</sup> (pres) (24 hr)	NO <sub>2</sub> or NO <sub>3</sub> (48 hr)	ortho-PO <sub>4</sub> (48 hr) Hg-diss (pres) (48 hr)

Was COC filled out properly? Y / N Comments \_\_\_\_\_

Were samples labeled properly? Y / N Comments \_\_\_\_\_

Were correct containers used? Y / N Comments \_\_\_\_\_

Was pH checked & Color Coding done? Y / N or N/A Initial & Date: JAB, SM MSO 3-15-21

pH paper (circle one): MQuant, PN1.09535.0001, LOT# HC904495 [OR] Lab Rat, PN4801, LOT# X000RWDG21

- Was Add'l Preservative needed? Y / N If Yes: By whom & when: Hg Lab (See Prep Book)

Is sample filtration requested? Y / N Comments \_\_\_\_\_ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: \_\_\_\_\_

Lab ID# 210586 Initial & Date & Time : \_\_\_\_\_

Logged by MSO Comments: \_\_\_\_\_

Reviewed by JAB \_\_\_\_\_

**REMINDER:** Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-001

Sampling Point: AD-2

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation:

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.55	µg/L	1	0.10	0.03		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Barium	18.9	µg/L	1	0.20	0.05		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.541	µg/L	1	0.050	0.007		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Boron	2.78	mg/L	1	0.050	0.009		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.094	µg/L	1	0.020	0.004		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Calcium	2.7	mg/L	1	0.3	0.1		DAM	06/08/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.38	µg/L	1	0.20	0.04		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	21.7	µg/L	1	0.020	0.003		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.08	mg/L	1	0.10	0.02	J1	DAM	06/08/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.46	µg/L	1	0.20	0.05		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0483	mg/L	1	0.00020	0.00005		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	5.83	mg/L	1	0.10	0.02		DAM	06/08/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0820	mg/L	1	0.0020	0.0005		DAM	06/08/2021	EPA 200.7-1994, Rev. 4.4
Mercury	57	ng/L	1	5	2		JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Potassium	1.4	mg/L	1	1.0	0.2		DAM	06/08/2021	EPA 200.7-1994, Rev. 4.4
Selenium	1.68	µg/L	1	0.50	0.09		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Sodium	95.3	mg/L	1	0.5	0.2		DAM	06/08/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.046	mg/L	1	0.010	0.003		DAM	06/08/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.09	µg/L	1	0.20	0.04	J1	GES	06/03/2021	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.43	pCi/L	0.09	0.11		TTP	06/22/2021	SW-846 9315-1986, Rev. 0
Carrier Recovery	91.7	%						
Radium-228	0.73	pCi/L	0.17	0.54		TTP	06/11/2021	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	74.4	%						

\* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-001-01

Sampling Point: AD-2

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation: Dissolved

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.53	µg/L	1	0.10	0.03		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Barium	19.0	µg/L	1	0.20	0.05		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.532	µg/L	1	0.050	0.007		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Boron	2.85	mg/L	1	0.050	0.009		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.091	µg/L	1	0.020	0.004		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Calcium	2.6	mg/L	1	0.3	0.1		DAM	06/08/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.63	µg/L	1	0.20	0.04		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	22.2	µg/L	1	0.020	0.003		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.08	mg/L	1	0.10	0.02	J1	DAM	06/08/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.48	µg/L	1	0.20	0.05		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0472	mg/L	1	0.00020	0.00005		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	5.27	mg/L	1	0.10	0.02		DAM	06/08/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0840	mg/L	1	0.0020	0.0005		DAM	06/08/2021	EPA 200.7-1994, Rev. 4.4
Mercury	8	ng/L	1	5	2		JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Potassium	1.3	mg/L	1	1.0	0.2		DAM	06/08/2021	EPA 200.7-1994, Rev. 4.4
Selenium	1.73	µg/L	1	0.50	0.09		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Sodium	86.5	mg/L	1	0.5	0.2		DAM	06/08/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.042	mg/L	1	0.010	0.003		DAM	06/08/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.1	µg/L	1	0.20	0.04	J1	GES	06/03/2021	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
 4001 Bixby Road  
 Groveport, OH 43125  
 Phone: 614-836-4221  
 Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-002

Sampling Point: AD-3

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation:

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.49	µg/L	1	0.10	0.03		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	66.4	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.169	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.051	mg/L	1	0.050	0.009		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.097	µg/L	1	0.020	0.004		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	4.7	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.32	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	3.98	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	1.80	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.20	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0452	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	2.03	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0468	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	2.5	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	0.09	µg/L	1	0.50	0.09	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	9.4	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.033	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.62	pCi/L	0.11	0.16		TTP	06/22/2021	SW-846 9315-1986, Rev. 0
Carrier Recovery	93.5	%						
Radium-228	0.68	pCi/L	0.13	0.43		TTP	06/11/2021	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	96.3	%						

\* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-002-01

Sampling Point: AD-3

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation: Dissolved

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.15	µg/L	1	0.10	0.03		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	64.6	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.161	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.052	mg/L	1	0.050	0.009		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.083	µg/L	1	0.020	0.004		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	4.8	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.29	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	4.08	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.55	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0463	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	2.10	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0503	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	2.6	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	9.6	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.034	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-003

Sampling Point: AD-4

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation:

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.13	µg/L	1	0.10	0.03		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	80.7	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.489	µg/L	1	0.050	0.007	M1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.032	mg/L	1	0.050	0.009	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.012	µg/L	1	0.020	0.004	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	1.7	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.24	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	6.86	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	2.98	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0335	mg/L	1	0.00020	0.00005	M1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	1.35	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0654	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	2.6	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	9.7	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.016	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.06	µg/L	1	0.20	0.04	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.47	pCi/L	0.09	0.11		TTP	06/22/2021	SW-846 9315-1986, Rev. 0
Carrier Recovery	95.1	%						
Radium-228	0.36	pCi/L	0.16	0.53		TTP	06/11/2021	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	72.4	%						

\* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.





# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-003-01

Sampling Point: AD-4

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation: Dissolved

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.17	µg/L	1	0.10	0.03		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	79.8	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.442	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.032	mg/L	1	0.050	0.009	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.008	µg/L	1	0.020	0.004	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	1.6	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.24	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	7.07	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	4.29	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0335	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	1.37	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0617	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	2.6	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	9.8	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.015	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-004

Sampling Point: AD-7

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation:

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.82	µg/L	1	0.10	0.03		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	36.1	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	4.11	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	1.84	mg/L	1	0.050	0.009		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.642	µg/L	1	0.020	0.004		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	4.4	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.40	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	36.1	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.12	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.92	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0634	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	8.27	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0764	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	300	ng/L	100	500	200	J1	JAB	06/18/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	0.1	µg/L	1	0.5	0.1	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	2.2	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	2.91	µg/L	1	0.50	0.09		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	15.5	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.064	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.23	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.94	pCi/L	0.14	0.10		TTP	06/28/2021	SW-846 9315-1986, Rev. 0
Carrier Recovery	77.8	%						
Radium-228	2.36	pCi/L	0.14	0.38		TTP	06/11/2021	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	95.8	%						

\* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-004-01

Sampling Point: AD-7

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation: Dissolved

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.81	µg/L	1	0.10	0.03		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	36.5	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	4.00	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	1.91	mg/L	1	0.050	0.009		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.656	µg/L	1	0.020	0.004		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	4.5	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.90	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	37.1	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.11	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.89	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0628	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	8.33	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0762	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	120	ng/L	10	50	20		JAB	06/18/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	2.3	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	3.05	µg/L	1	0.50	0.09		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	15.6	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.065	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.21	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-005

Sampling Point: AD-12

Date Collected: 05/24/2021

Date Received: 06/03/2021

Preparation:

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.08	µg/L	1	0.10	0.03	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	23.1	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.136	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.032	mg/L	1	0.050	0.009	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.005	µg/L	1	0.020	0.004	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	0.2	mg/L	1	0.3	0.1	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.24	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	1.19	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.03	mg/L	1	0.10	0.02	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.07	µg/L	1	0.20	0.05	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.00500	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	0.39	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0037	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	0.3	mg/L	1	1.0	0.2	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	0.31	µg/L	1	0.50	0.09	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	4.7	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	<0.003	mg/L	1	0.010	0.003	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.51	pCi/L	0.10	0.11		TTP	06/28/2021	SW-846 9315-1986, Rev. 0
Carrier Recovery	99.5	%						
Radium-228	0.09	pCi/L	0.13	0.45		TTP	06/11/2021	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	97.7	%						

\* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-005-01

Sampling Point: AD-12

Date Collected: 05/24/2021

Date Received: 06/03/2021

Preparation: Dissolved

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.06	µg/L	1	0.10	0.03	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	23.0	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.127	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.030	mg/L	1	0.050	0.009	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.009	µg/L	1	0.020	0.004	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	0.3	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.31	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	1.14	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	<0.02	mg/L	1	0.10	0.02	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.08	µg/L	1	0.20	0.05	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.00498	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	0.38	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0036	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	0.3	mg/L	1	1.0	0.2	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	0.26	µg/L	1	0.50	0.09	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	4.7	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	<0.003	mg/L	1	0.010	0.003	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
 4001 Bixby Road  
 Groveport, OH 43125  
 Phone: 614-836-4221  
 Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:	Customer Description:
Lab Number: 215084-006	Sampling Point: AD-13
Date Collected: 05/24/2021	Date Received: 06/03/2021
Preparation:	

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.89	µg/L	1	0.10	0.03		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	36.6	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.119	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.078	mg/L	1	0.050	0.009		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	13.6	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.24	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	43.9	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	38.6	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.134	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	13.1	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.468	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	4.9	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	19.2	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.154	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.50	pCi/L	0.10	0.12		TTP	06/28/2021	SW-846 9315-1986, Rev. 0
Carrier Recovery	92.4	%						
Radium-228	0.94	pCi/L	0.18	0.58		TTP	06/11/2021	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	64.7	%						

\* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-006-01

Sampling Point: AD-13

Date Collected: 05/24/2021

Date Received: 06/03/2021

Preparation: Dissolved

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.20	µg/L	1	0.10	0.03		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	36.3	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.084	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.077	mg/L	1	0.050	0.009		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	13.5	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.32	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	44.4	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	28.6	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.137	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	13.2	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.464	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	5.2	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	19.7	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.161	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-007

Sampling Point: AD-17

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation:

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.14	µg/L	1	0.10	0.03		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Barium	74.5	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.262	µg/L	1	0.050	0.007		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.031	mg/L	1	0.050	0.009	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.012	µg/L	1	0.020	0.004	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Calcium	<0.1	mg/L	1	0.3	0.1	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.36	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	2.85	µg/L	1	0.020	0.003		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.12	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.07	µg/L	1	0.20	0.05	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.00759	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	1.29	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0026	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	127	ng/L	4	20	7		JAB	06/18/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Potassium	<0.2	mg/L	1	1.0	0.2	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	0.12	µg/L	1	0.50	0.09	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Sodium	4.9	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	<0.003	mg/L	1	0.010	0.003	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.61	pCi/L	0.10	0.11		TTP	06/28/2021	SW-846 9315-1986, Rev. 0
Carrier Recovery	98.2	%						
Radium-228	0.80	pCi/L	0.20	0.66		TTP	06/11/2021	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	80.7	%						

\* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.





# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-007-01

Sampling Point: AD-17

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation: Dissolved

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.07	µg/L	1	0.10	0.03	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	75.5	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.255	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.027	mg/L	1	0.050	0.009	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.013	µg/L	1	0.020	0.004	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	0.2	mg/L	1	0.3	0.1	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.35	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	2.87	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	<0.02	mg/L	1	0.10	0.02	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.06	µg/L	1	0.20	0.05	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.00840	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	1.27	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0028	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	0.2	mg/L	1	1.0	0.2	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	4.7	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.003	mg/L	1	0.010	0.003	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-008

Sampling Point: AD-18

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation:

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.42	µg/L	1	0.10	0.03		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	103	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.088	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.021	mg/L	1	0.050	0.009	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.014	µg/L	1	0.020	0.004	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	0.3	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.55	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	0.964	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.96	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.15	µg/L	1	0.20	0.05	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0127	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	0.38	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0044	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	14	ng/L	1	5	2		JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	0.9	mg/L	1	1.0	0.2	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	0.13	µg/L	1	0.50	0.09	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	6.6	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.005	mg/L	1	0.010	0.003	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.40	pCi/L	0.08	0.08		TTP	06/28/2021	SW-846 9315-1986, Rev. 0
Carrier Recovery	108	%						
Radium-228	0.37	pCi/L	0.17	0.56		TTP	06/11/2021	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	96.5	%						

\* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-008-01

Sampling Point: AD-18

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation: Dissolved

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.04	µg/L	1	0.10	0.03	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	103	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.080	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.022	mg/L	1	0.050	0.009	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.013	µg/L	1	0.020	0.004	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	0.3	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.26	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	0.958	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.05	mg/L	1	0.10	0.02	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0130	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	0.37	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0043	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	3	ng/L	1	5	2	J1	JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	0.9	mg/L	1	1.0	0.2	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	6.7	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.005	mg/L	1	0.010	0.003	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
 4001 Bixby Road  
 Groveport, OH 43125  
 Phone: 614-836-4221  
 Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:	Customer Description:
Lab Number: 215084-009	Sampling Point: AD-22
Date Collected: 05/24/2021	Date Received: 06/03/2021
Preparation:	

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	2.05	µg/L	1	0.10	0.03		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	16.0	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	6.83	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.076	mg/L	1	0.050	0.009		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	1.25	µg/L	1	0.020	0.004		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	12.7	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.56	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	99.1	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	8.74	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.24	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.166	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	18.1	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.329	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	84	ng/L	1	5	2		JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	4.1	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	7.43	µg/L	1	0.50	0.09		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	74.9	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.114	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.21	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.97	pCi/L	0.14	0.12		TTP	06/28/2021	SW-846 9315-1986, Rev. 0
Carrier Recovery	79.0	%						
Radium-228	4.30	pCi/L	0.22	0.59		TTP	06/11/2021	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	79.2	%						

\* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-009-01

Sampling Point: AD-22

Date Collected: 05/24/2021

Date Received: 06/03/2021

Preparation: Dissolved

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	2.22	µg/L	1	0.10	0.03		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	16.1	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	6.92	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.078	mg/L	1	0.050	0.009		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	1.26	µg/L	1	0.020	0.004		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	13.0	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.54	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	103	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	8.58	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.24	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.169	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	18.5	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.338	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	31	ng/L	1	5	2		JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	4.3	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	7.55	µg/L	1	0.50	0.09		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	75.6	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.116	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.21	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
 4001 Bixby Road  
 Groveport, OH 43125  
 Phone: 614-836-4221  
 Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-010

Sampling Point: AD-28

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation:

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.02	µg/L	1	0.10	0.02	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.18	µg/L	1	0.10	0.03		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Barium	153	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.771	µg/L	1	0.050	0.007		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.391	mg/L	1	0.050	0.009		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.062	µg/L	1	0.020	0.004		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Calcium	1.3	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.47	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	15.0	µg/L	1	0.020	0.003		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.26	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.11	µg/L	1	0.20	0.05	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0190	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	3.32	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0414	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	19	ng/L	1	5	2		JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Potassium	0.7	mg/L	1	1.0	0.2	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	0.21	µg/L	1	0.50	0.09	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Sodium	7.8	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.024	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.56	pCi/L	0.10	0.11		TTP	06/28/2021	SW-846 9315-1986, Rev. 0
Carrier Recovery	87.5	%						
Radium-228	0.62	pCi/L	0.15	0.48		TTP	06/11/2021	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	87.8	%						

\* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-010-01

Sampling Point: AD-28

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation: Dissolved

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.07	µg/L	1	0.10	0.03	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Barium	148	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.751	µg/L	1	0.050	0.007		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.377	mg/L	1	0.050	0.009		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.062	µg/L	1	0.020	0.004		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Calcium	1.3	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.84	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	14.5	µg/L	1	0.020	0.003		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Iron	<0.02	mg/L	1	0.10	0.02	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.12	µg/L	1	0.20	0.05	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0191	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	3.32	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0412	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	6	ng/L	1	5	2		JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Potassium	0.7	mg/L	1	1.0	0.2	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	0.27	µg/L	1	0.50	0.09	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Sodium	7.9	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.024	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
 4001 Bixby Road  
 Groveport, OH 43125  
 Phone: 614-836-4221  
 Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:	Customer Description:
Lab Number: 215084-011	Sampling Point: AD-30
Date Collected: 05/25/2021	Date Received: 06/03/2021
Preparation:	

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.17	µg/L	1	0.10	0.03		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Barium	104	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.158	µg/L	1	0.050	0.007		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Boron	1.84	mg/L	1	0.050	0.009		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.019	µg/L	1	0.020	0.004	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Calcium	0.6	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.42	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	4.95	µg/L	1	0.020	0.003		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.06	mg/L	1	0.10	0.02	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.07	µg/L	1	0.20	0.05	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.00858	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	2.48	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0265	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	15	ng/L	1	5	2		JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Potassium	0.9	mg/L	1	1.0	0.2	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	0.30	µg/L	1	0.50	0.09	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Sodium	67.3	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.009	mg/L	1	0.010	0.003	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.86	pCi/L	0.13	0.11		TTP	06/28/2021	SW-846 9315-1986, Rev. 0
Carrier Recovery	87.9	%						
Radium-228	0.97	pCi/L	0.14	0.44		TTP	06/11/2021	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	84.2	%						

\* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.





# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-011-01

Sampling Point: AD-30

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation: Dissolved

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.14	µg/L	1	0.10	0.03		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	104	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.151	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	1.87	mg/L	1	0.050	0.009		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.021	µg/L	1	0.020	0.004		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	0.6	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.49	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	4.85	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	<0.02	mg/L	1	0.10	0.02	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.08	µg/L	1	0.20	0.05	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.00739	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	2.40	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0257	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	0.1	µg/L	1	0.5	0.1	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	0.9	mg/L	1	1.0	0.2	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	0.31	µg/L	1	0.50	0.09	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	66.2	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.009	mg/L	1	0.010	0.003	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.07	µg/L	1	0.20	0.04	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-012

Sampling Point: AD-31

Date Collected: 05/24/2021

Date Received: 06/03/2021

Preparation:

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.23	µg/L	1	0.10	0.03		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Barium	33.2	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.723	µg/L	1	0.050	0.007		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.026	mg/L	1	0.050	0.009	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.066	µg/L	1	0.020	0.004		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Calcium	3.0	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.41	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	10.4	µg/L	1	0.020	0.003		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.17	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.20	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0638	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	4.35	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0288	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	59	ng/L	1	5	2		JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	0.1	µg/L	1	0.5	0.1	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Potassium	1.7	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	0.28	µg/L	1	0.50	0.09	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Sodium	35.7	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.042	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.09	µg/L	1	0.20	0.04	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.39	pCi/L	0.10	0.20		TTP	06/28/2021	SW-846 9315-1986, Rev. 0
Carrier Recovery	72.7	%						
Radium-228	1.21	pCi/L	0.17	0.55		TTP	06/11/2021	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	88.5	%						

\* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-012-01

Sampling Point: AD-31

Date Collected: 05/24/2021

Date Received: 06/03/2021

Preparation: Dissolved

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.17	µg/L	1	0.10	0.03		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Barium	31.3	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.731	µg/L	1	0.050	0.007		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.026	mg/L	1	0.050	0.009	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.066	µg/L	1	0.020	0.004		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Calcium	2.9	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.65	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	9.85	µg/L	1	0.020	0.003		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.14	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.19	µg/L	1	0.20	0.05	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0642	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	4.20	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0287	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Potassium	1.7	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	0.34	µg/L	1	0.50	0.09	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Sodium	34.9	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.041	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.09	µg/L	1	0.20	0.04	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
 4001 Bixby Road  
 Groveport, OH 43125  
 Phone: 614-836-4221  
 Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:	Customer Description:
Lab Number: 215084-013	Sampling Point: AD-32
Date Collected: 05/24/2021	Date Received: 06/03/2021
Preparation:	

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	2.39	µg/L	1	0.10	0.03		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Barium	16.9	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	3.96	µg/L	1	0.050	0.007	M1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Boron	2.11	mg/L	1	0.050	0.009		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.529	µg/L	1	0.020	0.004		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Calcium	21.7	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.71	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	50.5	µg/L	1	0.020	0.003		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Iron	2.42	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.52	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0629	mg/L	1	0.00020	0.00005	M1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	17.7	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0924	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	800	ng/L	100	500	200		JAB	06/18/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Potassium	4.2	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	9.21	µg/L	1	0.50	0.09		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Sodium	87.0	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.406	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.21	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.98	pCi/L	0.12	0.11	P1	TTP	06/28/2021	SW-846 9315-1986, Rev. 0
Carrier Recovery	83.0	%						
Radium-228	4.40	pCi/L	0.24	0.62		TTP	06/11/2021	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	72.8	%						

\* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-013-01

Sampling Point: AD-32

Date Collected: 05/24/2021

Date Received: 06/03/2021

Preparation: Dissolved

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	2.32	µg/L	1	0.10	0.03		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Barium	17.6	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	3.95	µg/L	1	0.050	0.007		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Boron	2.11	mg/L	1	0.050	0.009		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.552	µg/L	1	0.020	0.004		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Calcium	21.8	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	1.30	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	51.0	µg/L	1	0.020	0.003		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Iron	1.72	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.56	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0634	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	17.7	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0930	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	37	ng/L	1	5	2		JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	0.1	µg/L	1	0.5	0.1	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Potassium	4.2	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	9.20	µg/L	1	0.50	0.09		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Sodium	87.1	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.408	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.21	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-014

Sampling Point: AD-33

Date Collected: 05/24/2021

Date Received: 06/03/2021

Preparation:

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.43	µg/L	1	0.10	0.03		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Barium	43.8	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	1.04	µg/L	1	0.050	0.007		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.121	mg/L	1	0.050	0.009		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.048	µg/L	1	0.020	0.004		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Calcium	1.5	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.28	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	9.85	µg/L	1	0.020	0.003		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.05	mg/L	1	0.10	0.02	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.22	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0188	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	3.96	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0066	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	2000	ng/L	200	1000	400		JAB	06/18/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Potassium	0.3	mg/L	1	1.0	0.2	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	1.39	µg/L	1	0.50	0.09		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Sodium	20.2	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.029	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.68	pCi/L	0.11	0.09		TTP	06/28/2021	SW-846 9315-1986, Rev. 0
Carrier Recovery	92.4	%						
Radium-228	0.72	pCi/L	0.19	0.62		TTP	06/24/2021	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	75.6	%						

\* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-014-01

Sampling Point: AD-33

Date Collected: 05/24/2021

Date Received: 06/03/2021

Preparation: Dissolved

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.42	µg/L	1	0.10	0.03		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Barium	44.5	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	1.06	µg/L	1	0.050	0.007		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.118	mg/L	1	0.050	0.009		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.057	µg/L	1	0.020	0.004		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Calcium	1.5	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.34	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	9.97	µg/L	1	0.020	0.003		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.02	mg/L	1	0.10	0.02	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.27	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0186	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	3.94	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0068	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	310	ng/L	20	100	40		JAB	06/18/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Potassium	0.3	mg/L	1	1.0	0.2	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	1.51	µg/L	1	0.50	0.09		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Sodium	20.3	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.029	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.04	µg/L	1	0.20	0.04	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID: Duplicate-1

Customer Description:

Lab Number: 215084-015

Sampling Point:

Date Collected: 05/24/2021

Date Received: 06/03/2021

Preparation:

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	2.03	µg/L	1	0.10	0.03		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Barium	15.3	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	6.91	µg/L	1	0.050	0.007		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.076	mg/L	1	0.050	0.009		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	1.18	µg/L	1	0.020	0.004		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Calcium	12.5	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.50	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	99.0	µg/L	1	0.020	0.003		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Iron	8.86	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.23	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.170	mg/L	1	0.00020	0.00005		GES	06/09/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	17.9	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.326	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	79	ng/L	1	5	2		JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Potassium	4.2	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	7.44	µg/L	1	0.50	0.09		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Sodium	75.7	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.113	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.21	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4





# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID: Duplicate-1

Customer Description:

Lab Number: 215084-015-01

Sampling Point:

Date Collected: 05/24/2021

Date Received: 06/03/2021

Preparation: Dissolved

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	2.13	µg/L	1	0.10	0.03		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Barium	16.0	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	6.96	µg/L	1	0.050	0.007		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.080	mg/L	1	0.050	0.009		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	1.24	µg/L	1	0.020	0.004		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Calcium	12.6	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.64	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	102	µg/L	1	0.020	0.003		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Iron	8.51	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.26	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.171	mg/L	1	0.00020	0.00005		GES	06/09/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	18.0	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.328	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	35	ng/L	1	5	2		JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Potassium	4.2	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	7.43	µg/L	1	0.50	0.09		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Sodium	75.9	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.114	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.21	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
 4001 Bixby Road  
 Groveport, OH 43125  
 Phone: 614-836-4221  
 Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID: Equipment Blank	Customer Description:
Lab Number: 215084-016	Sampling Point:
Date Collected: 05/24/2021	Date Received: 06/03/2021
Preparation:	

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Barium	0.09	µg/L	1	0.20	0.05	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	<0.007	µg/L	1	0.050	0.007	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.011	mg/L	1	0.050	0.009	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Calcium	<0.1	mg/L	1	0.3	0.1	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.25	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	0.039	µg/L	1	0.020	0.003		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Iron	<0.02	mg/L	1	0.10	0.02	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.00024	mg/L	1	0.00020	0.00005		GES	06/09/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	<0.02	mg/L	1	0.10	0.02	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	<0.0005	mg/L	1	0.0020	0.0005	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Potassium	<0.2	mg/L	1	1.0	0.2	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Sodium	<0.2	mg/L	1	0.5	0.2	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	<0.003	mg/L	1	0.010	0.003	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4

Customer Sample ID:	Customer Description:
Lab Number: 215084-016-01	Sampling Point:
Date Collected: 05/24/2021	Date Received: 06/03/2021
Preparation: Dissolved	

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
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## Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

### Report Verification

This report and the above data have been confirmed by the following analyst.

A handwritten signature in black ink that reads "Michael S. Ohlinger". The signature is written in a cursive style and is positioned above a horizontal line.

Michael Ohlinger, Chemist

Email: [msohlinger@aep.com](mailto:msohlinger@aep.com)

Phone: 614-836-4184

Audinet: 8-210-4184

**THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED AND SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY. ALL TEST RESULTS MEET ALL OF THE REQUIREMENTS OF THE ACCREDITING AUTHORITY, UNLESS OTHERWISE NOTED.**



## Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

### Data Qualifier Legend

- B1 Analyte detected in method blank (MB) at or above the method criteria.
- B2 Analyte detected in initial calibration blank (ICB) at or above the method criteria.
- B3 Analyte detected in continuing calibration blank (CCB) at or above the method criteria.
- B4 The interference check standard (ICS) exceeded the method criteria on this parameter.
- H1 Sample was received past holding time.
- H2 Sample analysis performed past holding time.
- J1 Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.
- J2 Concentration estimated. Analyte exceeded calibration range.
- L1 The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.
- M1 The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
- M2 Analyzed by method of standard additions (MSA).
- O1 The reporting limit for oil and grease is directly affected by the collected sample volume.
- O2 Client did not provide additional bottles; therefore, the MS and duplicate are missing in this batch.
- O3 Client did not provide additional bottles; therefore, the duplicate is missing in this batch.
- O4 Sample was transferred to a different bottle due to excess fine particulate. The particulate was rinsed with hexane, and the hexane layer was transferred to the corresponding bottle. The hexane rinse was completed three times.
- P1 The precision between duplicate results was above acceptance limits.
- P2 The precision on the laboratory control sample duplicate (LCSD) was above acceptance limits.
- P3 The precision on the matrix spike duplicate (MSD) was above acceptance limits.
- P4 The field duplicate was used as a sample duplicate.
- P5 The precision on the inorganic efficiency check (IEC) exceeded the method criteria.
- Q1 Sample received in inappropriate sample container.
- Q2 Sample was received damaged. The sample was recoverable.
- Q3 Sample container was received damaged. Unable to recover the sample.
- Q4 Sample was received outside of thermal preservation range.
- Q5 Sample was received with improper chemical preservation.
- Q6 Insufficient sample was received by the laboratory to perform the requested analysis.
- Q7 Insufficient sample was received to meet method QC requirements.
- Q8 Sample was received with head space.
- Q9 Due to instrument malfunction, sample was invalidated.
- Q10 Analysis was performed by a contracted laboratory. See attached report.
- Q11 Sample contains free liquid.
- Q12 Sample does not contain free liquid.
- Q13 Sample did not ignite.
- Q14 This analyte and method are not included on the primary Laboratory Scope of TNI Accreditation.
- R1 Surrogate recovery was outside acceptance limits.
- R2 Carrier recovery was outside acceptance limits.
- R3 Internal standard recovery was outside acceptance limits.
- R4 The recovery of the reduction efficiency checks (REC) for nitrate or nitrite exceeded the method criteria.
- R5 The back calculation recovery of one or more calibration points exceeded the method criteria.
- S1 Residue weight is above or below the method criteria and needs to be re-analyzed at a different dilution.



## Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Job ID: 215084**

**Customer: Pirkey Power Station**

**Date Reported: 06/29/2021**

- S2 Residue weight is above the method criteria but was already analyzed with the highest dilution factor.
- S3 Residue weight is below the method criteria but was already analyzed with 1000mL.
- S4 Sample and duplicate results vary due to large amounts of solids present.
- S5 Filtration time exceeds ten minutes.
- S6 Insufficient sample was received to meet the minimum volume of the method. Residue weight is below the method criteria and was analyzed with less than 1000mL.
- S7 Sample did not achieve constant weight.
- S8 Sample with low residue was selected for duplicate analysis.
- S9 Based on history, the sample residue was only measured twice and did not achieve constant weight.
- U1 Not detected at or above method detection limit (MDL).
- V1 The associated initial calibration verification (ICV) recovery was outside acceptance limits.
- V2 The associated continuing calibration verification (CCV) recovery was outside acceptance limits.

# Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

**Dolan Chemical Laboratory (DCL)**  
 4001 Bixby Road  
 Groveport, Ohio 43125  
 Michael Ohlinger (614-836-4184)  
 Contacts: Dave Conover (614-836-4219)

For Lab Use Only:  
 COC/Order #: **215084**

Date: \_\_\_\_\_  
 Site Contact: \_\_\_\_\_

Analysis Turnaround Time (in Calendar Days)  
 ☉ Routine (28 days for Monitoring Wells)

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials				Field-filter 250 mL bottle, then pH<2, HNO <sub>3</sub>	Three (six every 10th) 1 L bottles, pH<2, HNO <sub>3</sub>	125 mL PTFE lined bottle, HCL <sup>+</sup> , pH<2	Field Filtered 125 mL PTFE lined bottle, HCL <sup>+</sup> , pH<2	Sample Specific Notes:
						B, Ca, Li, Sb, As, Ba, Mn, Mo, Pb, Se, TL	Disolved B, Ca, Li, and Na, K, Mg, Sr	Cr, Co, Fe, Mn, Mo, Pb, Se, TL	and Na, K, Mg, Sr					
AD-2	5/25/2021	929	G	GW	7				X	X	X	X	X	
AD-3	5/25/2021	1159	G	GW	7				X	X	X	X	X	
AD-4	5/25/2021	1024	G	GW	7				X	X	X	X	X	
AD-7	5/25/2021	828	G	GW	7				X	X	X	X	X	
AD-12	5/24/2021	1047	G	GW	7				X	X	X	X	X	
AD-13	5/24/2021	954	G	GW	7				X	X	X	X	X	
AD-17	5/25/2021	1115	G	GW	7				X	X	X	X	X	
AD-18	5/25/2021	1145	G	GW	7				X	X	X	X	X	
AD-22	5/24/2021	1046	G	GW	7				X	X	X	X	X	
AD-28	5/25/2021	1022	G	GW	7				X	X	X	X	X	
AD-30	5/25/2021	946	G	GW	7				X	X	X	X	X	
AD-31	5/24/2021	1230	G	GW	7				X	X	X	X	X	
Preservation Used: 1= Ice, 2= HCl; 3= H <sub>2</sub> SO <sub>4</sub> ; 4=HNO <sub>3</sub> ; 5=NaOH; 6= Other ; F= filter in field														
* Six 1L Bottles must be collected for Radium for every 10th sample.														

**Special Instructions/QC Requirements & Comments:**

Relinquished by: <b>RJ MW</b>	Company: <b>FAULK</b>	Date/Time: <b>05/27/21 1400</b>	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: <i>[Signature]</i>	Date/Time: <b>6/1/21 2:00 PM</b>

# Chain of Custody Record

**Program: Coal Combustion Residuals (CCR)**

Site Contact: \_\_\_\_\_ Date: \_\_\_\_\_

For Lab Use Only:  
COC/Order #: \_\_\_\_\_

**Dolan Chemical Laboratory (DCL)**  
4001 Bixby Road  
Groveport, Ohio 43125  
Michael Ohlinger (614-836-4184)  
Dave Conover (614-836-4219)

Project Name: Pirkey PP CCR  
Contact Name: Leslie Fuerschbach  
Contact Phone: 318-673-2744

Sampler(s): Matt Hamilton Kenny McDonald

Analysis Turnaround Time (in Calendar Days)  
(c) Routine (28 days for Monitoring Wells)

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials				Field-filter 250 mL bottle, then pH<2, HNO <sub>3</sub>	250 mL bottle, pH<2, HNO <sub>3</sub>	Three (six every 10th) 1 L bottles, pH<2, HNO <sub>3</sub>	125 mL PTFE lined bottle, HCL <sup>++</sup> , pH<2	Field Filtered 125 mL PTFE lined bottle, HCL <sup>++</sup> , pH<2	Sample Specific Notes:
						B, Ca, Li, Sb, As, Ba, Be, Cd, Cr, Co, Fe, Mn, Mo, Pb, Se, TL, Dissolved B, Ca, Li, and Na, K, Mg, Sr	Cr, Co, Fe, Mn, Mo, Pb, Se, TL	Cr, Co, Fe, Mn, Mo, Pb, Se, TL	Cr, Co, Fe, Mn, Mo, Pb, Se, TL						
AD-32	5/24/2021	1138	G	GW	10				X	X	X	X	X		
AD-33	5/24/2021	1233	G	GW	7				X	X	X	X	X		
Duplicate - 1	5/24/2021	1200	G	GW	4				X	X	X	X	X		
Equipment Blank	5/24/2021	1026	G	GW	2				X	X	X	X	X		

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other \_\_\_\_\_; F= filter in field \_\_\_\_\_

\* Six 1L Bottles must be collected for Radium for every 10th sample.

Special Instructions/QC Requirements & Comments:

Relinquished by: <i>[Signature]</i>	Company: <i>EAGLE</i>	Date/Time: 05/27/21 1400	Received by: <i>[Signature]</i>	Date/Time: 6/1/21 2:00PM
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: <i>[Signature]</i>	Date/Time: 6/1/21 2:00PM

# AEP WATER & WASTE SAMPLE RECEIPT FORM

<u>Package Type</u>			<u>Delivery Type</u>				
<input checked="" type="radio"/> Cooler	Box	Bag	Envelope	PONY	UPS	<input checked="" type="radio"/> FedEx	USPS
				Other _____			
Plant/Customer <u>Pirkay</u>			Number of Plastic Containers: <u>43</u>				
Opened By <u>M50</u>			Number of Glass Containers: <u>-</u>				
Date/Time <u>6/1/21 2:00PM</u>			Number of Mercury Containers: <u>-</u>				
Were all temperatures within 0-6°C? Y / N or <input checked="" type="radio"/> N/A Initial: _____ on ice / <input checked="" type="radio"/> no ice							
2(IR Gun Ser# <u>200700321</u> , Expir. <u>06-11-22</u> ) If No, specify each deviation: _____							
Was container in good condition? <input checked="" type="radio"/> Y / N Comments _____							
Was Chain of Custody received? <input checked="" type="radio"/> Y / N Comments _____							
Requested turnaround: <u>28 days</u> If RUSH, who was notified? _____							
pH (15 min)	Cr <sup>6</sup> (pres) (24 hr)	NO <sub>2</sub> or NO <sub>3</sub> (48 hr)	ortho-PO <sub>4</sub> (48 hr)	Hg-diss (pres) (48 hr)			

Was COC filled out properly?  Y / N Comments \_\_\_\_\_

Were samples labeled properly?  Y / N Comments \_\_\_\_\_

Were correct containers used?  Y / N Comments \_\_\_\_\_

Was pH checked & Color Coding done?  Y / N or N/A Initial & Date: M50 6/1/21

**pH paper (circle one):** MQuant,PN1.09535.0001,LOT# HC904495 [OR] Lab Rat,PN4801,LOT# X000RWDG21

- Was Add'l Preservative needed? Y /  N If Yes: By whom & when: \_\_\_\_\_ (See Prep Book)

Is sample filtration requested? Y /  N Comments \_\_\_\_\_ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: \_\_\_\_\_

Lab ID# 215084 Initial & Date & Time : \_\_\_\_\_

Logged by M50 Comments: Missing many bottles FedEx says they will arrive Thursday

Reviewed by SM

**REMINDER:** Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.



# AEP WATER & WASTE SAMPLE RECEIPT FORM

<b>Package Type</b>			<b>Delivery Type</b>				
<input checked="" type="radio"/> Cooler	<input type="radio"/> Box	<input type="radio"/> Bag	<input type="radio"/> Envelope	<input type="radio"/> PONY	<input type="radio"/> UPS	<input checked="" type="radio"/> FedEX	<input type="radio"/> USPS
				Other _____			
Plant/Customer <u>Pirkem</u>			Number of Plastic Containers: <u>33</u>				
Opened By <u>Mso</u>			Number of Glass Containers: <u>-</u>				
Date/Time <u>6/2/21</u>			Number of Mercury Containers: <u>31</u>				
Were all temperatures within 0-6°C? Y / N or <input checked="" type="radio"/> N/A Initial: _____ on ice <input checked="" type="radio"/> no ice							
1(IR Gun Ser# <u>200700311</u> , Expir. <u>06-11-22</u> ) - If No, specify each deviation: _____							
Was container in good condition? <input checked="" type="radio"/> Y / N Comments _____							
Was Chain of Custody received? <input checked="" type="radio"/> Y / N Comments _____							
Requested turnaround: <u>Routine</u> If RUSH, who was notified? _____							
pH (15 min)	Cr <sup>6</sup> (pres ) (24 hr)	NO <sub>2</sub> or NO <sub>3</sub> (48 hr)	ortho-PO <sub>4</sub> (48 hr)	Hg-diss (pres ) (48 hr)			

Was COC filled out properly?  Y / N Comments \_\_\_\_\_

Were samples labeled properly?  Y / N Comments \_\_\_\_\_

Were correct containers used?  Y / N Comments \_\_\_\_\_

Was pH checked & Color Coding done?  Y / N or  N/A Initial & Date: JLB 6/2/21

**pH paper (circle one):** MQuant,PN1.09535.0001,LOT# HC904495 [OR] Lab Rat,PN4801,LOT# X000RWDG21

- Was Add'l Preservative needed? Y /  N If Yes: By whom & when: \_\_\_\_\_ (See Prep Book)

Is sample filtration requested? Y /  N Comments \_\_\_\_\_ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: \_\_\_\_\_

Lab ID# 215084 Initial & Date & Time : \_\_\_\_\_

Logged by Mso Comments: \_\_\_\_\_

Reviewed by SH \_\_\_\_\_

**REMINDER:** Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-001

Sampling Point: AD-2

Date Collected: 05/25/2021

Date Received: 05/28/2021

Preparation:

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.33	mg/L	2	0.10	0.02		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	29.8	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.22	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	215	mg/L	10	2.0	0.3		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	30	mg/L	1	50	20	J1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	430	mg/L	1	50	20		SDW	05/29/2021	SM 2540C-2011
TSS, Non-Filterable Residue	<0.3	mg/L	0.13	1.3	0.3	U1	SDW	05/29/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-002

Sampling Point: AD-3

Date Collected: 05/25/2021

Date Received: 05/28/2021

Preparation:

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.07	mg/L	2	0.10	0.02	J1	CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	6.06	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.08	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	28.8	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	6	mg/L	1	20	5	J1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	150	mg/L	1	50	20		SDW	05/29/2021	SM 2540C-2011
TSS, Non-Filterable Residue	4.9	mg/L	0.22	2.2	0.4		SDW	05/29/2021	SM 2540D-2011



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-003

Sampling Point: AD-4

Date Collected: 05/25/2021

Date Received: 05/28/2021

Preparation:

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.23	mg/L	2	0.10	0.02		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	3.60	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.14	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	22.6	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	8	mg/L	1	20	5	J1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	150	mg/L	1	50	20		SDW	05/29/2021	SM 2540C-2011
TSS, Non-Filterable Residue	4.7	mg/L	0.22	2.2	0.4		SDW	05/29/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-004

Sampling Point: AD-7

Date Collected: 05/25/2021

Date Received: 05/28/2021

Preparation:

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	2.62	mg/L	2	0.10	0.02		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	28.4	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.54	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	64.6	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	50	mg/L	1	50	20		GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	250	mg/L	1	50	20		SDW	05/29/2021	SM 2540C-2011
TSS, Non-Filterable Residue	<0.3	mg/L	0.14	1.4	0.3	U1	SDW	05/29/2021	SM 2540D-2011



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-005

Sampling Point: AD-12

Date Collected: 05/24/2021

Date Received: 05/28/2021

Preparation:

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.04	mg/L	2	0.10	0.02	J1	CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	5.54	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.12	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	5.46	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	70	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	<0.3	mg/L	0.14	1.4	0.3	U1	HRF	05/28/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-006

Sampling Point: AD-13

Date Collected: 05/24/2021

Date Received: 05/28/2021

Preparation:

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.31	mg/L	2	0.10	0.02		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	41.6	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.48	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	78.6	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	30	mg/L	1	50	20	J1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	60	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	57.8	mg/L	0.20	2.0	0.4		HRF	05/28/2021	SM 2540D-2011



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-007

Sampling Point: AD-17

Date Collected: 05/25/2021

Date Received: 05/28/2021

Preparation:

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.11	mg/L	2	0.10	0.02		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	9.30	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.17	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	2.66	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	60	mg/L	1	50	20		SDW	05/29/2021	SM 2540C-2011
TSS, Non-Filterable Residue	<0.6	mg/L	0.29	2.9	0.6	U1	SDW	05/29/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-008

Sampling Point: AD-18

Date Collected: 05/25/2021

Date Received: 05/28/2021

Preparation:

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.06	mg/L	2	0.10	0.02	J1	CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	7.16	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.02	mg/L	2	0.06	0.01	J1	CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	7.46	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	100	mg/L	1	50	20	P1	SDW	05/29/2021	SM 2540C-2011
TSS, Non-Filterable Residue	3.2	mg/L	0.17	1.7	0.3		SDW	05/29/2021	SM 2540D-2011



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-009

Sampling Point: AD-22

Date Collected: 05/24/2021

Date Received: 05/28/2021

Preparation:

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.40	mg/L	2	0.10	0.02		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	60.6	mg/L	10	0.20	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	1.24	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	327	mg/L	10	2.0	0.3		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	120	mg/L	1	50	20		GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	290	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	4.7	mg/L	0.12	1.2	0.2		HRF	05/28/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-010

Sampling Point: AD-28

Date Collected: 05/25/2021

Date Received: 05/28/2021

Preparation:

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.09	mg/L	2	0.10	0.02	J1	CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	4.92	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	1.0	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	27.6	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	20	mg/L	1	50	20	J1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	110	mg/L	1	50	20		SDW	05/29/2021	SM 2540C-2011
TSS, Non-Filterable Residue	<0.3	mg/L	0.17	1.7	0.3	U1	SDW	05/29/2021	SM 2540D-2011



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-011

Sampling Point: AD-30

Date Collected: 05/25/2021

Date Received: 05/28/2021

Preparation:

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.37	mg/L	2	0.10	0.02		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	22.8	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.08	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	113	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	240	mg/L	1	50	20		SDW	05/29/2021	SM 2540C-2011
TSS, Non-Filterable Residue	<0.3	mg/L	0.17	1.7	0.3	U1	SDW	05/29/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-012

Sampling Point: AD-31

Date Collected: 05/24/2021

Date Received: 05/28/2021

Preparation:

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.34	mg/L	2	0.10	0.02		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	18.1	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.17	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	86.4	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	30	mg/L	1	50	20	J1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	130	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	1.4	mg/L	0.14	1.4	0.3		HRF	05/28/2021	SM 2540D-2011



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-013

Sampling Point: AD-32

Date Collected: 05/24/2021

Date Received: 05/28/2021

Preparation:

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.63	mg/L	2	0.10	0.02		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	25.4	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	1.25	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	452	mg/L	25	5.0	0.8		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	110	mg/L	1	50	20		GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	340	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	4.2	mg/L	0.14	1.4	0.3		HRF	05/28/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-014

Sampling Point: AD-33

Date Collected: 05/24/2021

Date Received: 05/28/2021

Preparation:

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.28	mg/L	2	0.10	0.02		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	8.56	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.29	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	60.4	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	30	mg/L	1	50	20	J1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	100	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	<0.2	mg/L	0.11	1.1	0.2	U1	HRF	05/28/2021	SM 2540D-2011





# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID: Duplicate-1

Customer Description:

Lab Number: 215073-015

Sampling Point:

Date Collected: 05/24/2021

Date Received: 05/28/2021

Preparation:

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.40	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	63.8	mg/L	25	0.5	0.2		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	1.27	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	355	mg/L	25	5.0	0.8		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	130	mg/L	1	50	20		GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	320	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	4.4	mg/L	0.13	1.3	0.3		HRF	05/28/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-016

Sampling Point: B-2

Date Collected: 05/24/2021

Date Received: 05/28/2021

Preparation:

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.06	mg/L	2	0.10	0.02	J1	CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	6.92	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.25	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	27.8	mg/L	2	0.40	0.06		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	160	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	20.6	mg/L	0.16	1.6	0.3		HRF	05/28/2021	SM 2540D-2011



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:	Customer Description:
Lab Number: 215073-017	Sampling Point: B-3
Date Collected: 05/26/2021	Date Received: 05/28/2021
Preparation:	

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.10	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	13.9	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.11	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	94.2	mg/L	2	0.40	0.06		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	13	mg/L	1	20	5	J1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	240	mg/L	1	50	20		SDW	06/01/2021	SM 2540C-2011
TSS, Non-Filterable Residue	1.3	mg/L	0.12	1.2	0.2	S6	SDW	06/01/2021	SM 2540D-2011

Customer Sample ID:	Customer Description:
Lab Number: 215073-018	Sampling Point: AD-7R
Date Collected: 05/24/2021	Date Received: 05/28/2021
Preparation:	

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.59	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	15.3	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.20	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	81.6	mg/L	2	0.40	0.06		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	30	mg/L	1	50	20	J1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	240	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	11.8	mg/L	0.12	1.2	0.2		HRF	05/28/2021	SM 2540D-2011



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-019

Sampling Point: AD-25

Date Collected: 05/26/2021

Date Received: 05/28/2021

Preparation:

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.08	mg/L	2	0.10	0.02	J1	CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	3.12	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	1.68	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	795	mg/L	25	5.0	0.8		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	400	mg/L	1	50	20		GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	1250	mg/L	1	50	20		SDW	06/01/2021	SM 2540C-2011
TSS, Non-Filterable Residue	1.6	mg/L	0.20	2.0	0.4	S6, J1	SDW	06/01/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-020

Sampling Point: AD-26

Date Collected: 05/26/2021

Date Received: 05/28/2021

Preparation:

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.46	mg/L	5	0.25	0.05		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	17.8	mg/L	5	0.10	0.03		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	4.01	mg/L	5	0.15	0.04		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	1460	mg/L	50	10	2		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	530	mg/L	1	50	20		GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	2100	mg/L	2	100	40		SDW	06/01/2021	SM 2540C-2011
TSS, Non-Filterable Residue	3.0	mg/L	0.20	2.0	0.4	S6	SDW	06/01/2021	SM 2540D-2011



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID: Duplicate-2

Customer Description:

Lab Number: 215073-021

Sampling Point:

Date Collected: 05/24/2021

Date Received: 05/28/2021

Preparation:

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.61	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	15.1	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.20	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	80.4	mg/L	2	0.40	0.06		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	230	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	10.6	mg/L	0.12	1.2	0.2		HRF	05/28/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-022

Sampling Point: AD-8

Date Collected: 05/26/2021

Date Received: 05/28/2021

Preparation:

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.11	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	3.28	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.35	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	168	mg/L	10	2.0	0.3		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	112	mg/L	1	20	5		GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	390	mg/L	1	50	20		SDW	06/01/2021	SM 2540C-2011
TSS, Non-Filterable Residue	8.8	mg/L	0.20	2.0	0.4		SDW	06/01/2021	SM 2540D-2011



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-023

Sampling Point: AD-16

Date Collected: 05/26/2021

Date Received: 05/28/2021

Preparation:

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.19	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	23.2	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.13	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	7.36	mg/L	2	0.40	0.06		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	120	mg/L	1	50	20		SDW	06/01/2021	SM 2540C-2011
TSS, Non-Filterable Residue	3.8	mg/L	0.20	2.0	0.4		SDW	06/01/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-024

Sampling Point: AD-23

Date Collected: 05/26/2021

Date Received: 05/28/2021

Preparation:

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.19	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	6.94	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.06	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	7.90	mg/L	2	0.40	0.06		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	70	mg/L	1	50	20		SDW	06/01/2021	SM 2540C-2011
TSS, Non-Filterable Residue	632	mg/L	1	10	2		SDW	06/01/2021	SM 2540D-2011



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-025

Sampling Point: AD-27

Date Collected: 05/26/2021

Date Received: 05/28/2021

Preparation:

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.31	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	13.5	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.25	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	50.8	mg/L	2	0.40	0.06		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	40	mg/L	1	50	20	J1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	230	mg/L	1	50	20		SDW	06/01/2021	SM 2540C-2011
TSS, Non-Filterable Residue	61.2	mg/L	0.20	2.0	0.4		SDW	06/01/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-026

Sampling Point: AD-34

Date Collected: 05/26/2021

Date Received: 05/28/2021

Preparation:

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.21	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	7.44	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	2.1	mg/L	25	0.8	0.2		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	1110	mg/L	25	5.0	0.8		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	840	mg/L	1	50	20		GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	1670	mg/L	1	50	20		SDW	06/01/2021	SM 2540C-2011
TSS, Non-Filterable Residue	0.3	mg/L	0.17	1.7	0.3	S6, J1	SDW	06/01/2021	SM 2540D-2011



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:	Customer Description:
Lab Number: 215073-027	Sampling Point: AD-36
Date Collected: 05/26/2021	Date Received: 05/28/2021
Preparation:	

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.59	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	10.6	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.10	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	4.08	mg/L	2	0.40	0.06		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	60	mg/L	1	50	20		SDW	06/01/2021	SM 2540C-2011
TSS, Non-Filterable Residue	<0.3	mg/L	0.17	1.7	0.3	S6, U1	SDW	06/01/2021	SM 2540D-2011

Customer Sample ID: Duplicate-3	Customer Description:
Lab Number: 215073-028	Sampling Point:
Date Collected: 05/26/2021	Date Received: 05/28/2021
Preparation:	

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.10	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	3.28	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.35	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	172	mg/L	25	5.0	0.8		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	109	mg/L	1	20	5		GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	380	mg/L	1	50	20		SDW	06/01/2021	SM 2540C-2011
TSS, Non-Filterable Residue	8.2	mg/L	0.18	1.8	0.4		SDW	06/01/2021	SM 2540D-2011



## Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

### Report Verification

This report and the above data have been confirmed by the following analyst.

A blue rectangular box containing a handwritten signature in black ink that reads "Jonathan Barnhill".

Jonathan Barnhill, Dolan Chemical Lab  
Supervisor

Email: [jdbarnhill@aep.com](mailto:jdbarnhill@aep.com)

Phone: 614-836-4256

Audinet: 8-210-4256

**THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED AND SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY. ALL TEST RESULTS MEET ALL OF THE REQUIREMENTS OF THE ACCREDITING AUTHORITY, UNLESS OTHERWISE NOTED.**





## Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

### Data Qualifier Legend

- B1 Analyte detected in method blank (MB) at or above the method criteria.
- B2 Analyte detected in initial calibration blank (ICB) at or above the method criteria.
- B3 Analyte detected in continuing calibration blank (CCB) at or above the method criteria.
- B4 The interference check standard (ICS) exceeded the method criteria on this parameter.
- H1 Sample was received past holding time.
- H2 Sample analysis performed past holding time.
- J1 Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.
- J2 Concentration estimated. Analyte exceeded calibration range.
- L1 The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.
- M1 The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
- M2 Analyzed by method of standard additions (MSA).
- O1 The reporting limit for oil and grease is directly affected by the collected sample volume.
- O2 Client did not provide additional bottles; therefore, the MS and duplicate are missing in this batch.
- O3 Client did not provide additional bottles; therefore, the duplicate is missing in this batch.
- O4 Sample was transferred to a different bottle due to excess fine particulate. The particulate was rinsed with hexane, and the hexane layer was transferred to the corresponding bottle. The hexane rinse was completed three times.
- P1 The precision between duplicate results was above acceptance limits.
- P2 The precision on the laboratory control sample duplicate (LCSD) was above acceptance limits.
- P3 The precision on the matrix spike duplicate (MSD) was above acceptance limits.
- P4 The precision on the inorganic efficiency check (IEC) exceeded the method criteria.
- Q1 Sample received in inappropriate sample container.
- Q2 Sample was received damaged. The sample was recoverable.
- Q3 Sample container was received damaged. Unable to recover the sample.
- Q4 Sample was received outside of thermal preservation range.
- Q5 Sample was received with improper chemical preservation.
- Q6 Insufficient sample was received by the laboratory to perform the requested analysis.
- Q7 Insufficient sample was received to meet method QC requirements.
- Q8 Sample was received with head space.
- Q9 Due to instrument malfunction, sample was invalidated.
- Q10 Analysis was performed by a contracted laboratory. See attached report.
- Q11 Sample contains free liquid.
- Q12 Sample does not contain free liquid.
- Q13 Sample did not ignite.
- Q14 This analyte and method are not included on the primary Laboratory Scope of TNI Accreditation.
- R1 Surrogate recovery was outside acceptance limits.
- R2 Carrier recovery was outside acceptance limits.
- R3 Internal standard recovery was outside acceptance limits.
- R4 The recovery of the reduction efficiency checks (REC) for nitrate or nitrite exceeded the method criteria.
- R5 The back calculation recovery of one or more calibration points exceeded the method criteria.
- S1 Residue weight is above or below the method criteria and needs to be re-analyzed at a different dilution.
- S2 Residue weight is above the method criteria but was already analyzed with the highest dilution factor.



## Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Job ID: 215073**

**Customer: Pirkey Power Station**

**Date Reported: 06/25/2021**

- S3 Residue weight is below the method criteria but was already analyzed with 1000mL.
- S4 Sample and duplicate results vary due to large amounts of solids present.
- S5 Filtration time exceeds ten minutes.
- S6 Insufficient sample was received to meet the minimum volume of the method. Residue weight is below the method criteria and was analyzed with less than 1000mL.
- S7 Sample did not achieve constant weight.
- S8 Sample with low residue was selected for duplicate analysis.
- S9 Based on history, the sample residue was only measured twice and did not achieve constant weight.
- U1 Not detected at or above method detection limit (MDL).
- V1 The associated initial calibration verification (ICV) recovery was outside acceptance limits.
- V2 The associated continuing calibration verification (CCV) recovery was outside acceptance limits.

# Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Site Contact:

Date:

COC/Order #:

2105073

**Dolan Chemical Laboratory (DCL)**  
 4001 Bixby Road  
 Groveport, Ohio 43125  
 Michael Ohlinger (614-836-4184)  
 Contacts: Dave Conover (614-836-4219)

Project Name: Pitkey PP CCR  
 Contact Name: Leslie Fuerschbach  
 Contact Phone: 318-673-2744

Sampler(s): Matt Hamilton Kenny McDonald

Analysis Turnaround Time (in Calendar Days)

☑ Routine (28 days for Monitoring Wells)

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials	Analysis				Sample Specific Notes:		
							250 mL bottle, pH<2, HNO3	Field-filter 250 mL bottle, then pH<2, HNO3	1 L bottle, Cool, 0-6C	Three (six every 10th*) 1 L bottles, pH<2, HNO3			
AD-2	5/25/2021	929	G	GW	1		Mercury						
AD-3	5/25/2021	1159	G	GW	1								
AD-4	5/25/2021	1024	G	GW	1								
AD-7	5/25/2021	828	G	GW	1								
AD-12	5/24/2021	1047	G	GW	1								
AD-13	5/24/2021	954	G	GW	1								
AD-17	5/25/2021	1115	G	GW	1								
AD-18	5/25/2021	1145	G	GW	1								
AD-22	5/24/2021	1046	G	GW	1								
AD-28	5/25/2021	1022	G	GW	1								
AD-30	5/25/2021	946	G	GW	1								
AD-31	5/24/2021	1230	G	GW	1								
							4	F4	1	4			

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other \_\_\_\_\_; F= filter in field

\* Six 1L Bottles must be collected for Radium for every 10th sample.

Special Instructions/QC Requirements & Comments:

Relinquished by: <i>Just Nodd</i>	Company: <i>EA&amp;F</i>	Date/Time: <i>05/27/21 1400</i>	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: <i>[Signature]</i>	Date/Time: <i>5/28/21 10:15</i>

# Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Dolan Chemical Laboratory (DCL)  
 4001 Bixby Road  
 Groveport, Ohio 43125  
 Michael Ohlinger (614-836-4184)  
 Contacts: Dave Conover (614-836-4219)

Project Name: Pirkey PP CCR  
 Contact Name: Leslie Fuerschbach  
 Contact Phone: 318-673-2744

Sampler(s): Matt Hamilton Kenny McDonald

Site Contact: \_\_\_\_\_ Date: \_\_\_\_\_  
 For Lab Use Only: \_\_\_\_\_  
 COC/Order #: \_\_\_\_\_

Analysis Turnaround Time (in Calendar Days)  
 ☉ Routine (28 days for Monitoring Wells)

Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials	Analysis				Sample Specific Notes
						250 mL bottle, pH<2, HNO3	Field-filter 250 mL bottle, then pH<2, HNO3	1 L bottle, Cool, 0-6C (six every 10th)* 1 L bottles, pH<2, HNO3	Date	
5/24/2021	1138	G	GW	1		Mercury		alkalinity, acidity		
5/24/2021	1233	G	GW	1						
5/24/2021	1200	G	GW	1						
Duplicate - 1										
Ra-226, Ra-228										
F, Cl, SO4, Br, TDS, TSS, alkalinity, acidity										
Dissolved Mercury										
F4										

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ; F= filter in field ; F4 = filter in field  
 \* Six 1L Bottles must be collected for Radium for every 10th sample.

Special Instructions/QC Requirements & Comments:

Relinquished by: <i>[Signature]</i>	Company: <i>EAGLE</i>	Date/Time: <i>05/27/21 1400</i>	Received by:
Relinquished by:	Company:	Date/Time:	Received by:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: <i>5-28-21 10:15</i>

# Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Site Contact:

Date:

COC/Order #:

Dolan Chemical Laboratory (DCL)  
4001 Bixby Road  
Groveport, Ohio 43125  
Michael Ohlinger (614-836-4184)  
Contacts: Dave Conover (614-836-4219)

Project Name: Pirkey PP CCR

Contact Name: Leslie Fuerschbach

Contact Phone: 318-673-2744

Sampler(s): Matt Hamilton Kenny McDonald

Analysis Turnaround Time (in Calendar Days)  
⊗ Routine (28 days for Monitoring Wells)

Sampler(s) Initials

Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.
5/24/2021	957	G	GW	1
5/26/2021	1113	G	GW	1
5/24/2021	1140	G	GW	1
5/26/2021	1021	G	GW	1
5/26/2021	937	G	GW	1
5/24/2021	1230	G	GW	1

Sample Identification

B-2

B-3

AD-7R

AD-25

AD-26

Duplicate - 2

250 mL bottle, pH<2, HNO3

Field-filter 250 mL bottle, then pH<2, HNO3

1 L bottle, Cool, 0-6C

Three (six every 10th\*) 1 L bottles, pH<2, HNO3

Disolved Mercury

F, Cl, SO4, Br, TDS, TSS, alkalinity, acidity

Ra-226, Ra-228

Mercury

Sample Specific Notes:

X

X

X

X

X

X

Preservation Used: 1= Ice, 2= HCl, 3= H2SO4, 4=HNO3; 5=NaOH; 6= Other

\* Six 1L Bottles must be collected for Radium for every 10th sample.

Special Instructions/QC Requirements & Comments:

Relinquished by:

*[Signature]*

Company:

EAGLE

Date/Time:

05/27/21 1400

Received by:

*[Signature]*

Date/Time:

Relinquished by:

Company:

Date/Time:

Received by:

*[Signature]*

Date/Time:

Relinquished by:

Company:

Date/Time:

Received in Laboratory by:

*[Signature]*

Date/Time:

5-28-21 10:15

# Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Dolan Chemical Laboratory (DCL)  
 4001 Bixby Road  
 Groveport, Ohio 43125  
 Michael Ohlinger (614-836-4184)  
 Contacts: Dave Conover (614-836-4219)

Project Name: Pitkey PP CCR  
 Contact Name: Leslie Fuerschbach  
 Contact Phone: 318-673-2744

Sampler(s): Matt Hamilton Kenny McDonald

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Analysis Turnaround Time (in Calendar Days) Ⓢ Routine (28 days for Monitoring Wells)				Date	COC/Order #:	For Lab Use Only:
						250 mL bottle, pH<2, HNO3	Field-filter 250 mL bottle, then pH<2, HNO3	1 L bottle, Cool, 0-6C	Three (six every 10th*) 1 L bottles, pH<2, HNO3			
AD-8	5/26/2021	912	G	GW	1	Mercury	Disolved Mercury	TDS, F, Cl, SO4, Br, Alkalinity	Ra-226, Ra-228			
AD-16	5/26/2021	1312	G	GW	1							
AD-23	5/26/2021	1137	G	GW	1							
AD-27	5/26/2021	1237	G	GW	1							
AD-34	5/26/2021	1043	G	GW	1							
AD-36	5/26/2021	959	G	GW	1							
Duplicate - 3	5/26/2021	1200	G	GW	1							
						4	F4	1	4			

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ; F= filter in field  
 \* Six 1L Bottles must be collected for Radium for every 10th sample.

Special Instructions/QC Requirements & Comments:

Relinquished by: <i>[Signature]</i>	Company: <i>EAGLE</i>	Date/Time: <i>05/27/21 1400</i>	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Date/Time: <i>5-28-21 10:15</i>

**AEP WATER & WASTE SAMPLE RECEIPT FORM**

Package Type				Delivery Type			
Cooler	Box	Bag	Envelope	PONY	UPS	FedEX	USPS
				Other _____			
Plant/Customer <u>Pitkey</u>				Number of Plastic Containers: <u>28</u>			
Opened By <u>SM, DGA</u>				Number of Glass Containers: _____			
Date/Time <u>5-27-21 10:15</u>				Number of Mercury Containers: _____			
Were all temperatures within 0-6°C? <input checked="" type="radio"/> Y / <input type="radio"/> N or N/A Initial: <u>SM</u> <input checked="" type="radio"/> on ice / <input type="radio"/> no ice							
2(IR Gun Ser# <u>200700321</u> , Expir. <u>06-11-22</u> ) - If No, specify each deviation: _____							
Was container in good condition? <input checked="" type="radio"/> Y / <input type="radio"/> N Comments _____							
Was Chain of Custody received? <input checked="" type="radio"/> Y / <input type="radio"/> N Comments _____							
Requested turnaround: <u>Rollie</u> If RUSH, who was notified? _____							
pH (15 min)	Cr <sup>+6</sup> (pres) (24 hr)	NO <sub>2</sub> or NO <sub>3</sub> (48 hr)	ortho-PO <sub>4</sub> (48 hr)	Hg-diss (pres) (48 hr)			

Was COC filled out properly?  Y /  N Comments \_\_\_\_\_

Were samples labeled properly?  Y /  N Comments \_\_\_\_\_

Were correct containers used?  Y /  N Comments \_\_\_\_\_

Was pH checked & Color Coding done?  Y /  N or N/A Initial & Date: JAB 5-28-21

**pH paper (circle one):** MQuant,PN1.09535.0001,LOT# HC904495 [OR] Lab Rat,PN4801,LOT# X000RWDG21

- Was Add'l Preservative needed? Y  N  If Yes: By whom & when: \_\_\_\_\_ (See Prep Book)

Is sample filtration requested? Y  N  Comments \_\_\_\_\_ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: \_\_\_\_\_

Lab ID# 215073 Initial & Date & Time : \_\_\_\_\_

Logged by SM Comments: \_\_\_\_\_

Reviewed by MSO \_\_\_\_\_

**REMINDER:** Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216283

Customer: Pirkey Power Station

Date Reported: 12/15/2021

Customer Sample ID: AD-2

Customer Description:

Lab Number: 216283-001

Preparation:

Date Collected: 11/16/2021 10:10

Date Received: 11/19/2021 12:00

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.24	mg/L	2	0.10	0.02		CRJ	12/02/2021 17:33	EPA 300.1 -1997, Rev. 1.0
Chloride	29.2	mg/L	2	0.04	0.02		CRJ	12/02/2021 17:33	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.15	mg/L	2	0.06	0.02		CRJ	12/02/2021 17:33	EPA 300.1 -1997, Rev. 1.0
Sulfate	200	mg/L	10	2.0	0.3		CRJ	12/02/2021 17:07	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO <sub>3</sub> to pH 8.3	40	mg/L	1	50	20	J1	GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO <sub>3</sub>	<5	mg/L	1	20	5	U1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	410	mg/L	1	50	20		SDW	11/20/2021 10:33	SM 2540C-2011
TSS, Non-Filterable Residue	<0.5	mg/L	0.25	2.5	0.5	S6, U1	SDW	11/20/2021 10:33	SM 2540D-2011

Customer Sample ID: AD-3

Customer Description:

Lab Number: 216283-002

Preparation:

Date Collected: 11/16/2021 11:39

Date Received: 11/19/2021 12:00

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.04	mg/L	2	0.10	0.02	J1	CRJ	12/02/2021 16:42	EPA 300.1 -1997, Rev. 1.0
Chloride	6.42	mg/L	2	0.04	0.02		CRJ	12/02/2021 16:42	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.12	mg/L	2	0.06	0.02		CRJ	12/02/2021 16:42	EPA 300.1 -1997, Rev. 1.0
Sulfate	31.3	mg/L	2	0.40	0.06		CRJ	12/02/2021 16:42	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO <sub>3</sub> to pH 8.3	<20	mg/L	1	50	20	U1	GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO <sub>3</sub>	10	mg/L	1	20	5	J1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	150	mg/L	1	50	20		SDW	11/20/2021 10:33	SM 2540C-2011
TSS, Non-Filterable Residue	23.6	mg/L	0.40	4.0	0.8		SDW	11/20/2021 10:33	SM 2540D-2011





# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216283

Customer: Pirkey Power Station

Date Reported: 12/15/2021

Customer Sample ID: AD-4

Customer Description:

Lab Number: 216283-003

Preparation:

Date Collected: 11/16/2021 11:08

Date Received: 11/19/2021 12:00

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.13	mg/L	2	0.10	0.02		CRJ	12/02/2021 18:23	EPA 300.1 -1997, Rev. 1.0
Chloride	3.94	mg/L	2	0.04	0.02		CRJ	12/02/2021 18:23	EPA 300.1 -1997, Rev. 1.0
Fluoride	<0.02	mg/L	2	0.06	0.02	U1	CRJ	12/02/2021 18:23	EPA 300.1 -1997, Rev. 1.0
Sulfate	17.2	mg/L	2	0.40	0.06		CRJ	12/02/2021 18:23	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	20	mg/L	1	50	20	J1	GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	130	mg/L	1	50	20		SDW	11/20/2021 10:43	SM 2540C-2011
TSS, Non-Filterable Residue	0.8	mg/L	0.25	2.5	0.5	S6, J1	SDW	11/20/2021 10:43	SM 2540D-2011

Customer Sample ID: AD-7

Customer Description:

Lab Number: 216283-004

Preparation:

Date Collected: 11/16/2021 08:37

Date Received: 11/19/2021 12:00

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	2.66	mg/L	2	0.10	0.02		CRJ	12/02/2021 21:47	EPA 300.1 -1997, Rev. 1.0
Chloride	33.6	mg/L	2	0.04	0.02		CRJ	12/02/2021 21:47	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.44	mg/L	2	0.06	0.02		CRJ	12/02/2021 21:47	EPA 300.1 -1997, Rev. 1.0
Sulfate	62.6	mg/L	2	0.40	0.06		CRJ	12/02/2021 21:47	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	60	mg/L	1	50	20		GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	260	mg/L	1	50	20		SDW	11/20/2021 10:43	SM 2540C-2011
TSS, Non-Filterable Residue	5.0	mg/L	0.25	2.5	0.5	S6	SDW	11/20/2021 10:43	SM 2540D-2011



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216283

Customer: Pirkey Power Station

Date Reported: 12/15/2021

Customer Sample ID: AD-12

Customer Description:

Lab Number: 216283-005

Preparation:

Date Collected: 11/15/2021 10:29

Date Received: 11/19/2021 12:00

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.08	mg/L	2	0.10	0.02	J1	CRJ	12/02/2021 20:56	EPA 300.1 -1997, Rev. 1.0
Chloride	8.03	mg/L	2	0.04	0.02		CRJ	12/02/2021 20:56	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.07	mg/L	2	0.06	0.02		CRJ	12/02/2021 20:56	EPA 300.1 -1997, Rev. 1.0
Sulfate	2.90	mg/L	2	0.40	0.06		CRJ	12/02/2021 20:56	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	90	mg/L	1	50	20		SDW	11/20/2021 10:53	SM 2540C-2011
TSS, Non-Filterable Residue	<0.5	mg/L	0.25	2.5	0.5	U1	SDW	11/20/2021 10:53	SM 2540D-2011

Customer Sample ID: AD-13

Customer Description:

Lab Number: 216283-006

Preparation:

Date Collected: 11/15/2021 09:38

Date Received: 11/19/2021 12:00

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.20	mg/L	2	0.10	0.02		CRJ	12/02/2021 23:28	EPA 300.1 -1997, Rev. 1.0
Chloride	42.3	mg/L	10	0.2	0.1		CRJ	12/02/2021 23:03	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.26	mg/L	2	0.06	0.02		CRJ	12/02/2021 23:28	EPA 300.1 -1997, Rev. 1.0
Sulfate	70.8	mg/L	2	0.40	0.06		CRJ	12/02/2021 23:28	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	20	mg/L	1	50	20	J1	GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	220	mg/L	1	50	20		SDW	11/20/2021 10:53	SM 2540C-2011
TSS, Non-Filterable Residue	62.4	mg/L	0.40	4.0	0.8	P1	SDW	11/20/2021 10:53	SM 2540D-2011



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216283

Customer: Pirkey Power Station

Date Reported: 12/15/2021

Customer Sample ID: AD-17

Customer Description:

Lab Number: 216283-007

Preparation:

Date Collected: 11/16/2021 10:52

Date Received: 11/19/2021 12:00

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.15	mg/L	2	0.10	0.02		CRJ	12/02/2021 22:38	EPA 300.1 -1997, Rev. 1.0
Chloride	31.3	mg/L	2	0.04	0.02		CRJ	12/02/2021 22:38	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.29	mg/L	2	0.06	0.02		CRJ	12/02/2021 22:38	EPA 300.1 -1997, Rev. 1.0
Sulfate	2.58	mg/L	2	0.40	0.06		CRJ	12/02/2021 22:38	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	20	mg/L	1	50	20	J1	GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	90	mg/L	1	50	20		SDW	11/20/2021 11:08	SM 2540C-2011
TSS, Non-Filterable Residue	1.5	mg/L	0.25	2.5	0.5	S6, J1	SDW	11/20/2021 11:08	SM 2540D-2011

Customer Sample ID: AD-18

Customer Description:

Lab Number: 216283-008

Preparation:

Date Collected: 11/17/2021 08:25

Date Received: 11/19/2021 12:00

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.02	mg/L	2	0.10	0.02	J1	CRJ	12/03/2021 00:19	EPA 300.1 -1997, Rev. 1.0
Chloride	5.99	mg/L	2	0.04	0.02		CRJ	12/03/2021 00:19	EPA 300.1 -1997, Rev. 1.0
Fluoride	<0.02	mg/L	2	0.06	0.02	U1	CRJ	12/03/2021 00:19	EPA 300.1 -1997, Rev. 1.0
Sulfate	6.23	mg/L	2	0.40	0.06		CRJ	12/03/2021 00:19	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	100	mg/L	1	50	20		SDW	11/20/2021 11:08	SM 2540C-2011
TSS, Non-Filterable Residue	2.8	mg/L	0.25	2.5	0.5	S6	SDW	11/20/2021 11:08	SM 2540D-2011



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216283

Customer: Pirkey Power Station

Date Reported: 12/15/2021

Customer Sample ID: AD-22

Customer Description:

Lab Number: 216283-009

Preparation:

Date Collected: 11/15/2021 11:21

Date Received: 11/19/2021 12:00

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.75	mg/L	2	0.10	0.02		CRJ	12/03/2021 01:10	EPA 300.1 -1997, Rev. 1.0
Chloride	108	mg/L	10	0.2	0.1		CRJ	12/03/2021 00:45	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.35	mg/L	2	0.06	0.02		CRJ	12/03/2021 01:10	EPA 300.1 -1997, Rev. 1.0
Sulfate	236	mg/L	10	2.0	0.3		CRJ	12/03/2021 00:45	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	100	mg/L	1	50	20		GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	570	mg/L	2	100	40		SDW	11/20/2021 11:18	SM 2540C-2011
TSS, Non-Filterable Residue	1.1	mg/L	0.22	2.2	0.4	S6, J1	SDW	11/20/2021 11:18	SM 2540D-2011

Customer Sample ID: AD-28

Customer Description:

Lab Number: 216283-010

Preparation:

Date Collected: 11/16/2021 09:53

Date Received: 11/19/2021 12:00

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.06	mg/L	2	0.10	0.02	J1	CRJ	12/03/2021 02:01	EPA 300.1 -1997, Rev. 1.0
Chloride	4.79	mg/L	2	0.04	0.02		CRJ	12/03/2021 02:01	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.58	mg/L	2	0.06	0.02		CRJ	12/03/2021 02:01	EPA 300.1 -1997, Rev. 1.0
Sulfate	24.2	mg/L	2	0.40	0.06		CRJ	12/03/2021 02:01	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	20	mg/L	1	50	20	J1	GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	100	mg/L	1	50	20		SDW	11/20/2021 11:18	SM 2540C-2011
TSS, Non-Filterable Residue	1.5	mg/L	0.25	2.5	0.5	S6, J1	SDW	11/20/2021 11:18	SM 2540D-2011



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216283

Customer: Pirkey Power Station

Date Reported: 12/15/2021

Customer Sample ID: AD-30

Customer Description:

Lab Number: 216283-011

Preparation:

Date Collected: 11/15/2021 12:12

Date Received: 11/19/2021 12:00

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.39	mg/L	2	0.10	0.02		CRJ	12/03/2021 04:59	EPA 300.1 -1997, Rev. 1.0
Chloride	30.9	mg/L	2	0.04	0.02		CRJ	12/03/2021 04:59	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.05	mg/L	2	0.06	0.02	J1	CRJ	12/03/2021 04:59	EPA 300.1 -1997, Rev. 1.0
Sulfate	149	mg/L	10	2.0	0.3		CRJ	12/03/2021 04:34	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	20	mg/L	1	50	20	J1	GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	330	mg/L	1	50	20		SDW	11/20/2021 11:28	SM 2540C-2011
TSS, Non-Filterable Residue	1.0	mg/L	0.25	2.5	0.5	S6, J1	SDW	11/20/2021 11:28	SM 2540D-2011

Customer Sample ID: AD-31

Customer Description:

Lab Number: 216283-012

Preparation:

Date Collected: 11/16/2021 08:58

Date Received: 11/19/2021 12:00

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.24	mg/L	2	0.10	0.02		CRJ	12/03/2021 05:24	EPA 300.1 -1997, Rev. 1.0
Chloride	20.1	mg/L	2	0.04	0.02		CRJ	12/03/2021 05:24	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.13	mg/L	2	0.06	0.02		CRJ	12/03/2021 05:24	EPA 300.1 -1997, Rev. 1.0
Sulfate	76.6	mg/L	2	0.40	0.06		CRJ	12/03/2021 05:24	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	30	mg/L	1	50	20	J1	GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	250	mg/L	1	50	20		SDW	11/20/2021 11:28	SM 2540C-2011
TSS, Non-Filterable Residue	23.2	mg/L	0.25	2.5	0.5	S6	SDW	11/20/2021 11:28	SM 2540D-2011



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216283

Customer: Pirkey Power Station

Date Reported: 12/15/2021

Customer Sample ID: AD-32

Customer Description:

Lab Number: 216283-013

Preparation:

Date Collected: 11/15/2021 11:24

Date Received: 11/19/2021 12:00

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	2.08	mg/L	2	0.10	0.02		CRJ	12/03/2021 08:22	EPA 300.1 -1997, Rev. 1.0
Chloride	24.3	mg/L	2	0.04	0.02		CRJ	12/03/2021 08:22	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.78	mg/L	2	0.06	0.02		CRJ	12/03/2021 08:22	EPA 300.1 -1997, Rev. 1.0
Sulfate	334	mg/L	25	5.0	0.8		CRJ	12/03/2021 07:57	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	110	mg/L	1	50	20		GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	580	mg/L	1	50	20		SDW	11/20/2021 11:38	SM 2540C-2011
TSS, Non-Filterable Residue	5.3	mg/L	0.25	2.5	0.5	S6	SDW	11/20/2021 11:38	SM 2540D-2011

Customer Sample ID: AD-33

Customer Description:

Lab Number: 216283-014

Preparation:

Date Collected: 11/15/2021 12:18

Date Received: 11/19/2021 12:00

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.16	mg/L	2	0.10	0.02		CRJ	12/03/2021 09:27	EPA 300.1 -1997, Rev. 1.0
Chloride	8.60	mg/L	2	0.04	0.02		CRJ	12/03/2021 09:27	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.17	mg/L	2	0.06	0.02		CRJ	12/03/2021 09:27	EPA 300.1 -1997, Rev. 1.0
Sulfate	41.9	mg/L	2	0.40	0.06		CRJ	12/03/2021 09:27	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	30	mg/L	1	50	20	J1	GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	150	mg/L	1	50	20		SDW	11/20/2021 11:38	SM 2540C-2011
TSS, Non-Filterable Residue	1.8	mg/L	0.25	2.5	0.5	S6, J1	SDW	11/20/2021 11:38	SM 2540D-2011



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216283

Customer: Pirkey Power Station

Date Reported: 12/15/2021

Customer Sample ID: Duplicate - 2	Customer Description:
Lab Number: 216283-015	Preparation:
Date Collected: 11/16/2021 12:00	Date Received: 11/19/2021 12:00

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	2.87	mg/L	2	0.10	0.02		CRJ	12/03/2021 07:06	EPA 300.1 -1997, Rev. 1.0
Chloride	38.3	mg/L	2	0.04	0.02		CRJ	12/03/2021 07:06	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.42	mg/L	2	0.06	0.02		CRJ	12/03/2021 07:06	EPA 300.1 -1997, Rev. 1.0
Sulfate	61.6	mg/L	2	0.40	0.06		CRJ	12/03/2021 07:06	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	60	mg/L	1	50	20		GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	270	mg/L	1	50	20		SDW	11/20/2021 11:48	SM 2540C-2011
TSS, Non-Filterable Residue	<0.5	mg/L	0.25	2.5	0.5	S6, U1	SDW	11/20/2021 11:48	SM 2540D-2011

## Report Verification

This report and the above data have been confirmed by the following analyst.

Michael Ohlinger, Chemist

Email: msohlinger@aep.com

Phone: 614-836-4184

Audinet: 8-210-4184

**THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED AND SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY. ALL TEST RESULTS MEET ALL OF THE REQUIREMENTS OF THE ACCREDITING AUTHORITY, UNLESS OTHERWISE NOTED.**



## Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Job ID: 216283**

**Customer: Pirkey Power Station**

**Date Reported: 12/15/2021**

### Data Qualifier Legend

**J1** - Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.

**U1** - Not detected at or above method detection limit (MDL).

**S6** - Insufficient sample was received to meet the minimum volume of the method. Residue weight is below the method criteria and was analyzed with less than 1000mL.

**P1** - The precision between duplicate results was above acceptance limits.



# Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

**Dolan Chemical Laboratory (DCL)**  
 4001 Bixby Road  
 Groveport, Ohio 43125  
 Michael Ohlinger (614-836-4184)  
 Contacts: Dave Conover (614-836-4219)

Project Name: Pikey PP CCR  
 Contact Name: Leslie Fuerschbach  
 Contact Phone: 318-673-2744

Sampler(s): Matt Hamilton Kenny McDonald

Site Contact:          Date:          For Lab Use Only:  
 COC/Order #: 216283 (251)

Analysis Turnaround Time (in Calendar Days)  
 ☞ Routine (28 days for Monitoring Wells)

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials				Field-filter 250 mL bottle, then pH<2, HNO3	250 mL bottle, pH<2, HNO3	1 L bottle, Cool, 0-4C	Three (six every 10hr) L bottles, pH<2, HNO3	Sample Specific Notes
AD-2	11/16/2021	1010	G	GW	1									
AD-3	11/16/2021	1139	G	GW	1									
AD-4	11/16/2021	1108	G	GW	1									
AD-7	11/16/2021	837	G	GW	1									
AD-12	11/15/2021	1029	G	GW	1									
AD-13	11/15/2021	938	G	GW	1									
AD-17	11/16/2021	1052	G	GW	1									
AD-18	11/17/2021	825	G	GW	1									
AD-22	11/15/2021	1121	G	GW	1									
AD-28	11/16/2021	953	G	GW	1									
AD-30	11/15/2021	1212	G	GW	1									
AD-31	11/16/2021	858	G	GW	1									

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ; F= filter in field 4 F4 1 4

\* Six 1L Bottles must be collected for Radium for every 10th sample.

Special Instructions/QC Requirements & Comments:

Relinquished by: <u>[Signature]</u>	Company: <u>Engk</u>	Date/Time: <u>11-18-21</u>	Received by: <u>[Signature]</u>	Date/Time: <u>12:30 PM</u>
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: <u>[Signature]</u>	Date/Time: <u>11/19/21 12:30 PM</u>



**AEP WATER & WASTE SAMPLE RECEIPT FORM**

<u>Package Type</u>				<u>Delivery Type</u>			
Cooler	Box	Bag	Envelope	PONY	UPS	FedEX	USPS
				Other _____			
Plant/Customer <u>Priley</u>				Number of Plastic Containers: <u>15</u>			
Opened By <u>SM, Mkw</u>				Number of Glass Containers: _____			
Date/Time <u>11-19-21 12:30</u>				Number of Mercury Containers: _____			
Were all temperatures within 0-6°C? <u>Y</u> / N or N/A Initial: <u>SM</u> on ice / no ice							
1(IR Gun Ser# <u>200700311</u> , Expir. <u>06-11-22</u> ) - If No, specify each deviation: _____							
Was container in good condition? <u>Y</u> / N Comments _____							
Was Chain of Custody received? <u>Y</u> / N Comments _____							
Requested turnaround: <u>2021</u> If RUSH, who was notified? _____							
pH (15 min)	Cr <sup>6</sup> (pres) (24 hr)	NO <sub>2</sub> or NO <sub>3</sub> (48 hr)	ortho-PO <sub>4</sub> (48 hr)	Hg-diss (pres) (48 hr)			

Was COC filled out properly? Y / N Comments \_\_\_\_\_

Were samples labeled properly? Y / N Comments \_\_\_\_\_

Were correct containers used? Y / N Comments \_\_\_\_\_

Was pH checked & Color Coding done? Y / N or N/A Initial & Date: SM 11-19-21

pH paper (circle one): MQuant,PN1.09535.0001,LOT# HC904495 [OR] Lab Rat,PN4801,LOT# X000RWDG21

- Was Add'l Preservative needed? Y / N If Yes: By whom & when: \_\_\_\_\_ (See Prep Book)

Is sample filtration requested? Y / N Comments \_\_\_\_\_ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: \_\_\_\_\_

Lab ID# 216283 Initial & Date & Time: \_\_\_\_\_

Logged by MSD Comments: Only 1 Liter bottles were sent for analysis. At least 2 bottles each would be needed.

Reviewed by M/M SM

**REMINDER:** Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-2

Customer Description:

Lab Number: 216298-001

Preparation:

Date Collected: 11/16/2021 10:10

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Arsenic	0.62	µg/L	1	0.10	0.03		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Barium	19.2	µg/L	1	0.20	0.05		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Beryllium	0.575	µg/L	1	0.050	0.007		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Boron	2.62	mg/L	1	0.050	0.009		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Cadmium	0.078	µg/L	1	0.020	0.004		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Calcium	2.63	mg/L	1	0.05	0.02		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Chromium	0.37	µg/L	1	0.20	0.04		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Cobalt	21.2	µg/L	1	0.020	0.003		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Iron	0.632	mg/L	1	0.020	0.006		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Lead	0.51	µg/L	1	0.20	0.05		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Lithium	0.0539	mg/L	1	0.00020	0.00005		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Magnesium	5.21	mg/L	1	0.10	0.02		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Manganese	0.0850	mg/L	1	0.0010	0.0002		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Mercury	49	ng/L	2	10	4		JAB	12/07/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Potassium	1.33	mg/L	1	0.10	0.02		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Selenium	1.75	µg/L	1	0.50	0.09		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Sodium	89.1	mg/L	1	0.20	0.05		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Strontium	0.0407	mg/L	1	0.0020	0.0004		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Thallium	0.11	µg/L	1	0.20	0.04	J1	GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.50	pCi/L	0.20	0.43		ST	12/15/2021 01:31	SW-846 9315-1986, Rev. 0
Carrier Recovery	89.3	%						
Radium-228	1.19	pCi/L	0.21	0.66		TTP	12/10/2021 12:44	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	83.1	%						

\* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-2

Customer Description:

Lab Number: 216298-001-01

Preparation: Dissolved

Date Collected: 11/16/2021 10:10

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Arsenic	0.58	µg/L	1	0.10	0.03		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Barium	18.9	µg/L	1	0.20	0.05		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Beryllium	0.573	µg/L	1	0.050	0.007		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Boron	2.51	mg/L	1	0.050	0.009		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Cadmium	0.083	µg/L	1	0.020	0.004		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Calcium	2.56	mg/L	1	0.05	0.02		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Chromium	0.41	µg/L	1	0.20	0.04		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Cobalt	20.5	µg/L	1	0.020	0.003		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Iron	0.629	mg/L	1	0.020	0.006		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Lead	0.50	µg/L	1	0.20	0.05		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Lithium	0.0531	mg/L	1	0.00020	0.00005		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Magnesium	4.97	mg/L	1	0.10	0.02		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Manganese	0.0833	mg/L	1	0.0010	0.0002		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Mercury	14	ng/L	1	5	2		JAB	12/07/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Potassium	1.30	mg/L	1	0.10	0.02		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Selenium	1.69	µg/L	1	0.50	0.09		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Sodium	85.3	mg/L	1	0.20	0.05		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Strontium	0.0395	mg/L	1	0.0020	0.0004		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Thallium	0.10	µg/L	1	0.20	0.04	J1	GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
 4001 Bixby Road  
 Groveport, OH 43125  
 Phone: 614-836-4221  
 Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-3

Customer Description:

Lab Number: 216298-002

Preparation:

Date Collected: 11/16/2021 11:39

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Arsenic	1.90	µg/L	1	0.10	0.03		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Barium	64.1	µg/L	1	0.20	0.05		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Beryllium	0.200	µg/L	1	0.050	0.007		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Boron	0.054	mg/L	1	0.050	0.009		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Cadmium	0.016	µg/L	1	0.020	0.004	J1	GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Calcium	4.92	mg/L	1	0.05	0.02		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Chromium	0.63	µg/L	1	0.20	0.04		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Cobalt	5.87	µg/L	1	0.020	0.003		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Iron	10.7	mg/L	1	0.020	0.006		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Lead	0.43	µg/L	1	0.20	0.05		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Lithium	0.0722	mg/L	1	0.00020	0.00005		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Magnesium	2.90	mg/L	1	0.10	0.02		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Manganese	0.0871	mg/L	1	0.0010	0.0002		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Mercury	6	ng/L	1	5	2		JAB	12/07/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Potassium	2.72	mg/L	1	0.10	0.02		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Sodium	9.49	mg/L	1	0.20	0.05		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Strontium	0.0359	mg/L	1	0.0020	0.0004		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.64	pCi/L	0.21	0.39		ST	12/15/2021 01:31	SW-846 9315-1986, Rev. 0
Carrier Recovery	93.9	%						
Radium-228	0.68	pCi/L	0.17	0.55		TTP	12/10/2021 12:44	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	84.6	%						

\* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-3

Customer Description:

Lab Number: 216298-002-01

Preparation: Dissolved

Date Collected: 11/16/2021 11:39

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Arsenic	0.44	µg/L	1	0.10	0.03		GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Barium	60.0	µg/L	1	0.20	0.05		GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Beryllium	0.133	µg/L	1	0.050	0.007		GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Boron	0.042	mg/L	1	0.050	0.009	J1	GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Cadmium	0.018	µg/L	1	0.020	0.004	J1	GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Calcium	5.06	mg/L	1	0.05	0.02		GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Chromium	0.28	µg/L	1	0.20	0.04		GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Cobalt	5.82	µg/L	1	0.020	0.003		GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Iron	5.96	mg/L	1	0.020	0.006		GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Lithium	0.0737	mg/L	1	0.00020	0.00005		GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Magnesium	3.15	mg/L	1	0.10	0.02		GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Manganese	0.0865	mg/L	1	0.0010	0.0002		GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Mercury	3	ng/L	1	5	2	J1	JAB	12/07/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Potassium	2.73	mg/L	1	0.10	0.02		GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Sodium	10.2	mg/L	1	0.20	0.05		GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Strontium	0.0351	mg/L	1	0.0020	0.0004		GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
 4001 Bixby Road  
 Groveport, OH 43125  
 Phone: 614-836-4221  
 Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-4

Customer Description:

Lab Number: 216298-003

Preparation:

Date Collected: 11/16/2021 11:08

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Arsenic	0.25	µg/L	1	0.10	0.03		GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Barium	122	µg/L	1	0.20	0.05	M1, P3	GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Beryllium	0.280	µg/L	1	0.050	0.007		GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Boron	0.012	mg/L	1	0.050	0.009	J1	GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Cadmium	0.022	µg/L	1	0.020	0.004		GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Calcium	2.13	mg/L	1	0.05	0.02		GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Chromium	0.28	µg/L	1	0.20	0.04		GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Cobalt	3.08	µg/L	1	0.020	0.003		GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Iron	2.73	mg/L	1	0.020	0.006	P3	GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Lithium	0.0211	mg/L	1	0.00020	0.00005		GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Magnesium	0.53	mg/L	1	0.10	0.02		GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Manganese	0.0307	mg/L	1	0.0010	0.0002		GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Mercury	15	ng/L	1	5	2		JAB	12/07/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Potassium	1.96	mg/L	1	0.10	0.02		GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Sodium	5.95	mg/L	1	0.20	0.05		GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Strontium	0.0173	mg/L	1	0.0020	0.0004		GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Thallium	0.08	µg/L	1	0.20	0.04	J1	GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.93	pCi/L	0.25	0.37		ST	12/15/2021 01:31	SW-846 9315-1986, Rev. 0
Carrier Recovery	95.9	%						
Radium-228	0.67	pCi/L	0.17	0.53		TTP	12/10/2021 12:44	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	83.3	%						

\* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.





# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-4

Customer Description:

Lab Number: 216298-003-01

Preparation: Dissolved

Date Collected: 11/16/2021 11:08

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Arsenic	0.20	µg/L	1	0.10	0.03		GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Barium	129	µg/L	1	0.20	0.05		GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Beryllium	0.264	µg/L	1	0.050	0.007		GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Boron	0.013	mg/L	1	0.050	0.009	J1	GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Cadmium	0.022	µg/L	1	0.020	0.004		GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Calcium	2.25	mg/L	1	0.05	0.02		GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Chromium	0.22	µg/L	1	0.20	0.04		GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Cobalt	3.20	µg/L	1	0.020	0.003		GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Iron	2.62	mg/L	1	0.020	0.006		GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Lithium	0.0207	mg/L	1	0.00020	0.00005		GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Magnesium	0.55	mg/L	1	0.10	0.02		GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Manganese	0.0316	mg/L	1	0.0010	0.0002		GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Mercury	4	ng/L	1	5	2	J1	JAB	12/07/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Potassium	2.01	mg/L	1	0.10	0.02		GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Sodium	6.01	mg/L	1	0.20	0.05		GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Strontium	0.0181	mg/L	1	0.0020	0.0004		GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Thallium	0.13	µg/L	1	0.20	0.04	J1	GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
 4001 Bixby Road  
 Groveport, OH 43125  
 Phone: 614-836-4221  
 Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-7

Customer Description:

Lab Number: 216298-004

Preparation:

Date Collected: 11/16/2021 08:37

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Arsenic	1.05	µg/L	1	0.10	0.03		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Barium	37.3	µg/L	1	0.20	0.05		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Beryllium	4.86	µg/L	1	0.050	0.007		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Boron	2.24	mg/L	1	0.050	0.009		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Cadmium	0.734	µg/L	1	0.020	0.004		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Calcium	4.56	mg/L	1	0.05	0.02		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Chromium	0.37	µg/L	1	0.20	0.04		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Cobalt	38.3	µg/L	1	0.020	0.003		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Iron	0.147	mg/L	1	0.020	0.006		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Lead	0.80	µg/L	1	0.20	0.05		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Lithium	0.0760	mg/L	1	0.00020	0.00005		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Magnesium	8.22	mg/L	1	0.10	0.02		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Manganese	0.0898	mg/L	1	0.0010	0.0002		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Mercury	480	ng/L	20	100	40		JAB	12/10/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Potassium	2.37	mg/L	1	0.10	0.02		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Selenium	3.47	µg/L	1	0.50	0.09		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Sodium	15.4	mg/L	1	0.20	0.05		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Strontium	0.0619	mg/L	1	0.0020	0.0004		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Thallium	0.26	µg/L	1	0.20	0.04		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.99	pCi/L	0.39	0.47		ST	12/15/2021 01:31	SW-846 9315-1986, Rev. 0
Carrier Recovery	84.0	%						
Radium-228	3.60	pCi/L	0.19	0.48		TTP	12/10/2021 12:44	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	84.8	%						

\* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-7

Customer Description:

Lab Number: 216298-004-01

Preparation: Dissolved

Date Collected: 11/16/2021 08:37

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Arsenic	1.02	µg/L	1	0.10	0.03		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Barium	37.2	µg/L	1	0.20	0.05		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Beryllium	4.80	µg/L	1	0.050	0.007		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Boron	2.31	mg/L	1	0.050	0.009		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Cadmium	0.737	µg/L	1	0.020	0.004		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Calcium	4.53	mg/L	1	0.05	0.02		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Chromium	0.30	µg/L	1	0.20	0.04		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Cobalt	37.5	µg/L	1	0.020	0.003		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Iron	0.488	mg/L	1	0.020	0.006		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Lead	0.76	µg/L	1	0.20	0.05		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Lithium	0.0776	mg/L	1	0.00020	0.00005		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Magnesium	7.99	mg/L	1	0.10	0.02		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Manganese	0.0903	mg/L	1	0.0010	0.0002		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Mercury	101	ng/L	2	10	4		JAB	12/10/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Potassium	2.35	mg/L	1	0.10	0.02		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Selenium	3.31	µg/L	1	0.50	0.09		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Sodium	15.4	mg/L	1	0.20	0.05		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Strontium	0.0599	mg/L	1	0.0020	0.0004		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Thallium	0.25	µg/L	1	0.20	0.04		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-12

Customer Description:

Lab Number: 216298-005

Preparation:

Date Collected: 11/15/2021 10:29

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Arsenic	0.05	µg/L	1	0.10	0.03	J1	GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Barium	26.5	µg/L	1	0.20	0.05		GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Beryllium	0.148	µg/L	1	0.050	0.007		GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Boron	0.012	mg/L	1	0.050	0.009	J1	GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Cadmium	0.01	µg/L	1	0.020	0.004	J1	GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Calcium	0.28	mg/L	1	0.05	0.02		GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Chromium	0.30	µg/L	1	0.20	0.04		GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Cobalt	1.38	µg/L	1	0.020	0.003		GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Iron	0.035	mg/L	1	0.020	0.006		GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Lead	0.07	µg/L	1	0.20	0.05	J1	GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Lithium	0.0110	mg/L	1	0.00020	0.00005		GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Magnesium	0.45	mg/L	1	0.10	0.02		GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Manganese	0.0052	mg/L	1	0.0010	0.0002		GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Potassium	0.55	mg/L	1	0.10	0.02		GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Selenium	0.10	µg/L	1	0.50	0.09	J1	GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Sodium	5.10	mg/L	1	0.20	0.05		GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Strontium	0.0027	mg/L	1	0.0020	0.0004		GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.44	pCi/L	0.18	0.38		ST	12/15/2021 01:31	SW-846 9315-1986, Rev. 0
Carrier Recovery	98.7	%						
Radium-228	1.32	pCi/L	0.19	0.57		TTP	12/10/2021 12:44	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	85.9	%						

\* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-12

Customer Description:

Lab Number: 216298-005-01

Preparation: Dissolved

Date Collected: 11/15/2021 10:29

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Arsenic	0.04	µg/L	1	0.10	0.03	J1	GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Barium	27.1	µg/L	1	0.20	0.05		GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Beryllium	0.146	µg/L	1	0.050	0.007		GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Boron	0.011	mg/L	1	0.050	0.009	J1	GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Cadmium	0.012	µg/L	1	0.020	0.004	J1	GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Calcium	0.32	mg/L	1	0.05	0.02		GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Chromium	0.45	µg/L	1	0.20	0.04		GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Cobalt	1.42	µg/L	1	0.020	0.003		GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Iron	0.019	mg/L	1	0.020	0.006	J1	GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Lead	0.07	µg/L	1	0.20	0.05	J1	GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Lithium	0.0112	mg/L	1	0.00020	0.00005		GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Magnesium	0.46	mg/L	1	0.10	0.02		GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Manganese	0.0054	mg/L	1	0.0010	0.0002		GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Potassium	0.58	mg/L	1	0.10	0.02		GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Selenium	0.11	µg/L	1	0.50	0.09	J1	GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Sodium	5.22	mg/L	1	0.20	0.05		GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Strontium	0.0029	mg/L	1	0.0020	0.0004		GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
 4001 Bixby Road  
 Groveport, OH 43125  
 Phone: 614-836-4221  
 Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-13

Customer Description:

Lab Number: 216298-006

Preparation:

Date Collected: 11/15/2021 09:38

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Arsenic	4.39	µg/L	1	0.10	0.03		GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Barium	41.7	µg/L	1	0.20	0.05		GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Beryllium	0.344	µg/L	1	0.050	0.007		GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Boron	0.063	mg/L	1	0.050	0.009		GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Calcium	8.61	mg/L	1	0.05	0.02		GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Chromium	0.34	µg/L	1	0.20	0.04		GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Cobalt	45.9	µg/L	1	0.020	0.003	M1	GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Iron	52.3	mg/L	2	0.04	0.01	M1, P3	GES	11/30/2021 09:21	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Lithium	0.135	mg/L	1	0.00020	0.00005	M1	GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Magnesium	12.6	mg/L	1	0.10	0.02	M1, P3	GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Manganese	0.436	mg/L	1	0.0010	0.0002	M1, P3	GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Potassium	4.97	mg/L	1	0.10	0.02		GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Sodium	16.8	mg/L	1	0.20	0.05	P3	GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Strontium	0.0392	mg/L	1	0.0020	0.0004		GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.55	pCi/L	0.11	0.13		ST	12/15/2021 08:15	SW-846 9315-1986, Rev. 0
Carrier Recovery	82.5	%						
Radium-228	1.01	pCi/L	0.18	0.58		TTP	12/14/2021 13:43	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	80.7	%						

\* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-13

Customer Description:

Lab Number: 216298-006-01

Preparation: Dissolved

Date Collected: 11/15/2021 09:38

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Arsenic	1.39	µg/L	1	0.10	0.03		GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Barium	40.6	µg/L	1	0.20	0.05		GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Beryllium	0.167	µg/L	1	0.050	0.007		GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Boron	0.066	mg/L	1	0.050	0.009		GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Calcium	8.71	mg/L	1	0.05	0.02		GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Chromium	0.23	µg/L	1	0.20	0.04		GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Cobalt	46.3	µg/L	1	0.020	0.003		GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Iron	42.9	mg/L	2	0.04	0.01		GES	11/30/2021 09:42	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Lithium	0.139	mg/L	1	0.00020	0.00005		GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Magnesium	12.8	mg/L	1	0.10	0.02		GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Manganese	0.446	mg/L	1	0.0010	0.0002		GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Potassium	5.01	mg/L	1	0.10	0.02		GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Sodium	17.4	mg/L	1	0.20	0.05		GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Strontium	0.0399	mg/L	1	0.0020	0.0004		GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
 4001 Bixby Road  
 Groveport, OH 43125  
 Phone: 614-836-4221  
 Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-17

Customer Description:

Lab Number: 216298-007

Preparation:

Date Collected: 11/16/2021 10:52

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Arsenic	0.21	µg/L	1	0.10	0.03		GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Barium	266	µg/L	1	0.20	0.05		GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Beryllium	0.686	µg/L	1	0.050	0.007		GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Boron	0.022	mg/L	1	0.050	0.009	J1	GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Cadmium	0.058	µg/L	1	0.020	0.004		GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Calcium	0.98	mg/L	1	0.05	0.02		GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Chromium	0.33	µg/L	1	0.20	0.04		GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Cobalt	11.8	µg/L	1	0.020	0.003		GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Iron	0.122	mg/L	1	0.020	0.006		GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Lead	0.13	µg/L	1	0.20	0.05	J1	GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Lithium	0.0236	mg/L	1	0.00020	0.00005		GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Magnesium	4.34	mg/L	1	0.10	0.02		GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Manganese	0.0409	mg/L	1	0.0010	0.0002		GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Mercury	350	ng/L	10	50	20		JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Potassium	1.14	mg/L	1	0.10	0.02		GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Selenium	0.35	µg/L	1	0.50	0.09	J1	GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Sodium	8.56	mg/L	1	0.20	0.05		GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Strontium	0.0204	mg/L	1	0.0020	0.0004		GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Thallium	0.04	µg/L	1	0.20	0.04	J1	GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	2.65	pCi/L	0.24	0.12		ST	12/15/2021 08:15	SW-846 9315-1986, Rev. 0
Carrier Recovery	97.1	%						
Radium-228	3.77	pCi/L	0.20	0.50		TTP	12/14/2021 13:43	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	85.6	%						

\* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.





# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-17

Customer Description:

Lab Number: 216298-007-01

Preparation: Dissolved

Date Collected: 11/16/2021 10:52

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Arsenic	0.15	µg/L	1	0.10	0.03		GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Barium	267	µg/L	1	0.20	0.05		GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Beryllium	0.690	µg/L	1	0.050	0.007		GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Boron	0.023	mg/L	1	0.050	0.009	J1	GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Cadmium	0.066	µg/L	1	0.020	0.004		GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Calcium	1.06	mg/L	1	0.05	0.02		GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Chromium	0.25	µg/L	1	0.20	0.04		GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Cobalt	11.7	µg/L	1	0.020	0.003		GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Iron	0.046	mg/L	1	0.020	0.006		GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Lead	0.15	µg/L	1	0.20	0.05	J1	GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Lithium	0.0241	mg/L	1	0.00020	0.00005		GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Magnesium	4.34	mg/L	1	0.10	0.02		GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Manganese	0.0411	mg/L	1	0.0010	0.0002		GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Mercury	270	ng/L	10	50	20		JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Potassium	1.15	mg/L	1	0.10	0.02		GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Selenium	0.33	µg/L	1	0.50	0.09	J1	GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Sodium	8.47	mg/L	1	0.20	0.05		GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Strontium	0.0207	mg/L	1	0.0020	0.0004		GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Thallium	0.04	µg/L	1	0.20	0.04	J1	GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-18

Customer Description:

Lab Number: 216298-008

Preparation:

Date Collected: 11/17/2021 08:25

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Arsenic	0.19	µg/L	1	0.10	0.03		GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Barium	82.2	µg/L	1	0.20	0.05		GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Beryllium	0.078	µg/L	1	0.050	0.007		GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Boron	0.01	mg/L	1	0.050	0.009	J1	GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Cadmium	0.011	µg/L	1	0.020	0.004	J1	GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Calcium	0.20	mg/L	1	0.05	0.02		GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Chromium	0.31	µg/L	1	0.20	0.04		GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Cobalt	0.801	µg/L	1	0.020	0.003		GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Iron	0.290	mg/L	1	0.020	0.006		GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Lithium	0.0124	mg/L	1	0.00020	0.00005		GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Magnesium	0.30	mg/L	1	0.10	0.02		GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Manganese	0.0033	mg/L	1	0.0010	0.0002		GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Mercury	30	ng/L	1	5	2		JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Potassium	0.72	mg/L	1	0.10	0.02		GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Selenium	0.11	µg/L	1	0.50	0.09	J1	GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Sodium	5.69	mg/L	1	0.20	0.05		GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Strontium	0.0041	mg/L	1	0.0020	0.0004		GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.70	pCi/L	0.12	0.13		ST	12/15/2021 08:15	SW-846 9315-1986, Rev. 0
Carrier Recovery	92.8	%						
Radium-228	1.21	pCi/L	0.17	0.52		TTP	12/14/2021 13:43	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	82.3	%						

\* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-18

Customer Description:

Lab Number: 216298-008-01

Preparation: Dissolved

Date Collected: 11/17/2021 08:25

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Arsenic	0.07	µg/L	1	0.10	0.03	J1	GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Barium	77.0	µg/L	1	0.20	0.05		GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Beryllium	0.073	µg/L	1	0.050	0.007		GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Boron	0.01	mg/L	1	0.050	0.009	J1	GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Cadmium	0.011	µg/L	1	0.020	0.004	J1	GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Calcium	0.20	mg/L	1	0.05	0.02		GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Chromium	0.19	µg/L	1	0.20	0.04	J1	GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Cobalt	0.749	µg/L	1	0.020	0.003		GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Iron	0.091	mg/L	1	0.020	0.006		GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Lithium	0.0122	mg/L	1	0.00020	0.00005		GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Magnesium	0.28	mg/L	1	0.10	0.02		GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Manganese	0.0031	mg/L	1	0.0010	0.0002		GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Mercury	13	ng/L	1	5	2		JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Potassium	0.69	mg/L	1	0.10	0.02		GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Sodium	5.32	mg/L	1	0.20	0.05		GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Strontium	0.0038	mg/L	1	0.0020	0.0004		GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
 4001 Bixby Road  
 Groveport, OH 43125  
 Phone: 614-836-4221  
 Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-22

Customer Description:

Lab Number: 216298-009

Preparation:

Date Collected: 11/15/2021 11:21

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Arsenic	1.85	µg/L	1	0.10	0.03		GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Barium	17.9	µg/L	1	0.20	0.05		GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Beryllium	2.50	µg/L	1	0.050	0.007		GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Boron	0.030	mg/L	1	0.050	0.009	J1	GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Cadmium	0.502	µg/L	1	0.020	0.004		GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Calcium	11.7	mg/L	1	0.05	0.02		GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Chromium	0.27	µg/L	1	0.20	0.04		GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Cobalt	69.9	µg/L	1	0.020	0.003		GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Iron	36.9	mg/L	2	0.04	0.01		GES	11/30/2021 10:20	EPA 200.8-1994, Rev. 5.4
Lead	0.09	µg/L	1	0.20	0.05	J1	GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Lithium	0.122	mg/L	1	0.00020	0.00005		GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Magnesium	16.1	mg/L	1	0.10	0.02		GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Manganese	0.339	mg/L	1	0.0010	0.0002		GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Mercury	56	ng/L	4	20	7		JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Potassium	3.69	mg/L	1	0.10	0.02		GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Selenium	1.92	µg/L	1	0.50	0.09		GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Sodium	92.3	mg/L	1	0.20	0.05		GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Strontium	0.0883	mg/L	1	0.0020	0.0004		GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Thallium	0.14	µg/L	1	0.20	0.04	J1	GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.84	pCi/L	0.14	0.15		ST	12/15/2021 08:15	SW-846 9315-1986, Rev. 0
Carrier Recovery	83.4	%						
Radium-228	2.04	pCi/L	0.20	0.57		TTP	12/14/2021 13:43	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	69.9	%						

\* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-22

Customer Description:

Lab Number: 216298-009-01

Preparation: Dissolved

Date Collected: 11/15/2021 11:21

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Arsenic	1.70	µg/L	1	0.10	0.03		GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Barium	18.2	µg/L	1	0.20	0.05		GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Beryllium	2.48	µg/L	1	0.050	0.007		GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Boron	0.029	mg/L	1	0.050	0.009	J1	GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Cadmium	0.508	µg/L	1	0.020	0.004		GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Calcium	11.8	mg/L	1	0.05	0.02		GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Chromium	0.30	µg/L	1	0.20	0.04		GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Cobalt	70.5	µg/L	1	0.020	0.003		GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Iron	38.4	mg/L	2	0.04	0.01		GES	11/30/2021 10:25	EPA 200.8-1994, Rev. 5.4
Lead	0.08	µg/L	1	0.20	0.05	J1	GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Lithium	0.121	mg/L	1	0.00020	0.00005		GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Magnesium	16.2	mg/L	1	0.10	0.02		GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Manganese	0.339	mg/L	1	0.0010	0.0002		GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Mercury	23	ng/L	1	5	2		JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Potassium	3.72	mg/L	1	0.10	0.02		GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Selenium	1.95	µg/L	1	0.50	0.09		GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Sodium	93.1	mg/L	1	0.20	0.05		GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Strontium	0.0902	mg/L	1	0.0020	0.0004		GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Thallium	0.14	µg/L	1	0.20	0.04	J1	GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-28

Customer Description:

Lab Number: 216298-010

Preparation:

Date Collected: 11/16/2021 09:53

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Arsenic	0.27	µg/L	1	0.10	0.03		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Barium	120	µg/L	1	0.20	0.05		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Beryllium	0.501	µg/L	1	0.050	0.007		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Boron	0.363	mg/L	1	0.050	0.009		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Cadmium	0.049	µg/L	1	0.020	0.004		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Calcium	1.22	mg/L	1	0.05	0.02		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Chromium	0.59	µg/L	1	0.20	0.04		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Cobalt	11.8	µg/L	1	0.020	0.003		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Iron	0.370	mg/L	1	0.020	0.006		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Lead	0.10	µg/L	1	0.20	0.05	J1	GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Lithium	0.0240	mg/L	1	0.00020	0.00005		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Magnesium	2.67	mg/L	1	0.10	0.02		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Manganese	0.0478	mg/L	1	0.0010	0.0002		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Mercury	24	ng/L	1	5	2		JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Potassium	0.79	mg/L	1	0.10	0.02		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Selenium	0.17	µg/L	1	0.50	0.09	J1	GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Sodium	6.74	mg/L	1	0.20	0.05		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Strontium	0.0180	mg/L	1	0.0020	0.0004		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.92	pCi/L	0.14	0.12		ST	12/15/2021 08:15	SW-846 9315-1986, Rev. 0
Carrier Recovery	87.3	%						
Radium-228	1.25	pCi/L	0.15	0.46		TTP	12/14/2021 13:43	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	81.6	%						

\* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-28

Customer Description:

Lab Number: 216298-010-01

Preparation: Dissolved

Date Collected: 11/16/2021 09:53

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Arsenic	0.06	µg/L	1	0.10	0.03	J1	GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Barium	116	µg/L	1	0.20	0.05		GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Beryllium	0.494	µg/L	1	0.050	0.007		GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Boron	0.362	mg/L	1	0.050	0.009		GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Cadmium	0.053	µg/L	1	0.020	0.004		GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Calcium	1.27	mg/L	1	0.05	0.02		GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Chromium	0.37	µg/L	1	0.20	0.04		GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Cobalt	11.4	µg/L	1	0.020	0.003		GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Iron	0.036	mg/L	1	0.020	0.006		GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Lead	0.07	µg/L	1	0.20	0.05	J1	GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Lithium	0.0243	mg/L	1	0.00020	0.00005		GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Magnesium	2.61	mg/L	1	0.10	0.02		GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Manganese	0.0464	mg/L	1	0.0010	0.0002		GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Mercury	11	ng/L	1	5	2		JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Potassium	0.77	mg/L	1	0.10	0.02		GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Selenium	0.14	µg/L	1	0.50	0.09	J1	GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Sodium	6.64	mg/L	1	0.20	0.05		GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Strontium	0.0178	mg/L	1	0.0020	0.0004		GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
 4001 Bixby Road  
 Groveport, OH 43125  
 Phone: 614-836-4221  
 Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-30

Customer Description:

Lab Number: 216298-011

Preparation:

Date Collected: 11/15/2021 12:12

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Arsenic	0.21	µg/L	1	0.10	0.03		GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Barium	113	µg/L	1	0.20	0.05		GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Beryllium	0.107	µg/L	1	0.050	0.007		GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Boron	2.78	mg/L	1	0.050	0.009		GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Cadmium	0.008	µg/L	1	0.020	0.004	J1	GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Calcium	0.67	mg/L	1	0.05	0.02		GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Chromium	0.51	µg/L	1	0.20	0.04		GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Cobalt	4.55	µg/L	1	0.020	0.003		GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Iron	0.243	mg/L	1	0.020	0.006		GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Lead	0.06	µg/L	1	0.20	0.05	J1	GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Lithium	0.0113	mg/L	1	0.00020	0.00005		GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Magnesium	2.37	mg/L	1	0.10	0.02		GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Manganese	0.0216	mg/L	1	0.0010	0.0002		GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Mercury	60	ng/L	1	5	2		JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Potassium	0.93	mg/L	1	0.10	0.02		GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Selenium	0.33	µg/L	1	0.50	0.09	J1	GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Sodium	85.2	mg/L	1	0.20	0.05		GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Strontium	0.0107	mg/L	1	0.0020	0.0004		GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.84	pCi/L	0.15	0.16		ST	12/15/2021 08:15	SW-846 9315-1986, Rev. 0
Carrier Recovery	68.9	%						
Radium-228	0.64	pCi/L	0.17	0.55		TTP	12/14/2021 13:43	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	81.7	%						

\* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.





# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-30

Customer Description:

Lab Number: 216298-011-01

Preparation: Dissolved

Date Collected: 11/15/2021 12:12

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Arsenic	0.15	µg/L	1	0.10	0.03		GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Barium	109	µg/L	1	0.20	0.05		GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Beryllium	0.104	µg/L	1	0.050	0.007		GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Boron	2.77	mg/L	1	0.050	0.009		GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Cadmium	0.011	µg/L	1	0.020	0.004	J1	GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Calcium	0.76	mg/L	1	0.05	0.02		GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Chromium	0.35	µg/L	1	0.20	0.04		GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Cobalt	4.48	µg/L	1	0.020	0.003		GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Iron	0.099	mg/L	1	0.020	0.006		GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Lead	0.05	µg/L	1	0.20	0.05	J1	GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Lithium	0.0114	mg/L	1	0.00020	0.00005		GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Magnesium	2.34	mg/L	1	0.10	0.02		GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Manganese	0.0215	mg/L	1	0.0010	0.0002		GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Mercury	34	ng/L	1	5	2		JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Potassium	0.94	mg/L	1	0.10	0.02		GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Selenium	0.31	µg/L	1	0.50	0.09	J1	GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Sodium	84.8	mg/L	1	0.20	0.05		GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Strontium	0.0107	mg/L	1	0.0020	0.0004		GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
 4001 Bixby Road  
 Groveport, OH 43125  
 Phone: 614-836-4221  
 Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-31

Customer Description:

Lab Number: 216298-012

Preparation:

Date Collected: 11/16/2021 08:58

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Arsenic	0.26	µg/L	1	0.10	0.03		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Barium	32.1	µg/L	1	0.20	0.05		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Beryllium	0.801	µg/L	1	0.050	0.007		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Boron	0.024	mg/L	1	0.050	0.009	J1	GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Cadmium	0.063	µg/L	1	0.020	0.004		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Calcium	2.68	mg/L	1	0.05	0.02		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Chromium	0.39	µg/L	1	0.20	0.04		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Cobalt	9.18	µg/L	1	0.020	0.003		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Iron	0.183	mg/L	1	0.020	0.006		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Lead	0.34	µg/L	1	0.20	0.05		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Lithium	0.0648	mg/L	1	0.00020	0.00005		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Magnesium	3.82	mg/L	1	0.10	0.02		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Manganese	0.0258	mg/L	1	0.0010	0.0002		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Mercury	1790	ng/L	50	250	90		JAB	12/10/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Potassium	1.60	mg/L	1	0.10	0.02		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Selenium	0.33	µg/L	1	0.50	0.09	J1	GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Sodium	31.0	mg/L	1	0.20	0.05		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Strontium	0.0379	mg/L	1	0.0020	0.0004		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Thallium	0.08	µg/L	1	0.20	0.04	J1	GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.87	pCi/L	0.13	0.12		ST	12/15/2021 08:15	SW-846 9315-1986, Rev. 0
Carrier Recovery	89.5	%						
Radium-228	2.52	pCi/L	0.18	0.49		TTP	12/14/2021 13:43	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	78.5	%						

\* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-31

Customer Description:

Lab Number: 216298-012-01

Preparation: Dissolved

Date Collected: 11/16/2021 08:58

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Arsenic	0.54	µg/L	1	0.10	0.03		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Barium	34.4	µg/L	1	0.20	0.05		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Beryllium	0.797	µg/L	1	0.050	0.007		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Boron	0.021	mg/L	1	0.050	0.009	J1	GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Cadmium	0.058	µg/L	1	0.020	0.004		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Calcium	2.53	mg/L	1	0.05	0.02		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Chromium	1.04	µg/L	1	0.20	0.04		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Cobalt	9.07	µg/L	1	0.020	0.003		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Iron	0.553	mg/L	1	0.020	0.006		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Lead	0.46	µg/L	1	0.20	0.05		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Lithium	0.0643	mg/L	1	0.00020	0.00005		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Magnesium	3.70	mg/L	1	0.10	0.02		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Manganese	0.0253	mg/L	1	0.0010	0.0002		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Mercury	239	ng/L	4	20	7		JAB	12/10/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Potassium	1.55	mg/L	1	0.10	0.02		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Selenium	0.37	µg/L	1	0.50	0.09	J1	GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Sodium	30.2	mg/L	1	0.20	0.05		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Strontium	0.0375	mg/L	1	0.0020	0.0004		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Thallium	0.08	µg/L	1	0.20	0.04	J1	GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
 4001 Bixby Road  
 Groveport, OH 43125  
 Phone: 614-836-4221  
 Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-32

Customer Description:

Lab Number: 216298-013

Preparation:

Date Collected: 11/15/2021 11:24

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Arsenic	2.39	µg/L	1	0.10	0.03		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Barium	22.5	µg/L	1	0.20	0.05		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Beryllium	3.90	µg/L	1	0.050	0.007		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Boron	1.70	mg/L	1	0.050	0.009		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Cadmium	0.452	µg/L	1	0.020	0.004		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Calcium	16.8	mg/L	1	0.05	0.02		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Chromium	0.75	µg/L	1	0.20	0.04		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Cobalt	39.9	µg/L	1	0.020	0.003		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Iron	3.51	mg/L	1	0.020	0.006		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Lead	0.52	µg/L	1	0.20	0.05		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Lithium	0.0698	mg/L	1	0.00020	0.00005		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Magnesium	14.4	mg/L	1	0.10	0.02		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Manganese	0.0827	mg/L	1	0.0010	0.0002		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Mercury	1400	ng/L	100	500	200		JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Potassium	3.95	mg/L	1	0.10	0.02		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Selenium	7.70	µg/L	1	0.50	0.09		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Sodium	68.3	mg/L	1	0.20	0.05		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Strontium	0.337	mg/L	1	0.0020	0.0004		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Thallium	0.25	µg/L	1	0.20	0.04		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.70	pCi/L	0.12	0.12		ST	12/15/2021 08:15	SW-846 9315-1986, Rev. 0
Carrier Recovery	82.0	%						
Radium-228	3.90	pCi/L	0.24	0.69		TTP	12/14/2021 13:43	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	81.5	%						

\* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-32

Customer Description:

Lab Number: 216298-013-01

Preparation: Dissolved

Date Collected: 11/15/2021 11:24

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Arsenic	2.25	µg/L	1	0.10	0.03		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Barium	21.8	µg/L	1	0.20	0.05		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Beryllium	3.85	µg/L	1	0.050	0.007		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Boron	1.68	mg/L	1	0.050	0.009		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Cadmium	0.455	µg/L	1	0.020	0.004		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Calcium	16.6	mg/L	1	0.05	0.02		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Chromium	0.52	µg/L	1	0.20	0.04		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Cobalt	39.3	µg/L	1	0.020	0.003		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Iron	2.42	mg/L	1	0.020	0.006		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Lead	0.50	µg/L	1	0.20	0.05		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Lithium	0.0694	mg/L	1	0.00020	0.00005		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Magnesium	14.1	mg/L	1	0.10	0.02		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Manganese	0.0818	mg/L	1	0.0010	0.0002		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Mercury	320	ng/L	10	50	20		JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Potassium	3.88	mg/L	1	0.10	0.02		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Selenium	7.45	µg/L	1	0.50	0.09		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Sodium	67.0	mg/L	1	0.20	0.05		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Strontium	0.335	mg/L	1	0.0020	0.0004		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Thallium	0.24	µg/L	1	0.20	0.04		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-33

Customer Description:

Lab Number: 216298-014

Preparation:

Date Collected: 11/15/2021 12:18

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Arsenic	0.40	µg/L	1	0.10	0.03		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Barium	45.1	µg/L	1	0.20	0.05		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Beryllium	0.916	µg/L	1	0.050	0.007		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Boron	0.093	mg/L	1	0.050	0.009		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Cadmium	0.043	µg/L	1	0.020	0.004		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Calcium	0.98	mg/L	1	0.05	0.02		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Chromium	0.28	µg/L	1	0.20	0.04		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Cobalt	6.75	µg/L	1	0.020	0.003		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Iron	0.152	mg/L	1	0.020	0.006		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Lead	0.23	µg/L	1	0.20	0.05		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Lithium	0.0177	mg/L	1	0.00020	0.00005		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Magnesium	2.68	mg/L	1	0.10	0.02		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Manganese	0.0054	mg/L	1	0.0010	0.0002		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Mercury	14600	ng/L	400	2000	700		JAB	12/10/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Potassium	0.26	mg/L	1	0.10	0.02		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Selenium	1.0	µg/L	1	0.50	0.09		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Sodium	15.1	mg/L	1	0.20	0.05		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Strontium	0.0213	mg/L	1	0.0020	0.0004		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.49	pCi/L		0.10	0.13	ST	12/15/2021 08:15	SW-846 9315-1986, Rev. 0
Carrier Recovery	87.8	%						
Radium-228	1.16	pCi/L		0.21	0.66	TTP	12/14/2021 13:43	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	82.8	%						

\* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-33

Customer Description:

Lab Number: 216298-014-01

Preparation: Dissolved

Date Collected: 11/15/2021 12:18

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Arsenic	0.30	µg/L	1	0.10	0.03		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Barium	43.4	µg/L	1	0.20	0.05		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Beryllium	0.892	µg/L	1	0.050	0.007		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Boron	0.089	mg/L	1	0.050	0.009		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Cadmium	0.042	µg/L	1	0.020	0.004		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Calcium	0.97	mg/L	1	0.05	0.02		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Chromium	0.20	µg/L	1	0.20	0.04		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Cobalt	6.53	µg/L	1	0.020	0.003		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Iron	0.033	mg/L	1	0.020	0.006		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Lead	0.19	µg/L	1	0.20	0.05	J1	GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Lithium	0.0173	mg/L	1	0.00020	0.00005		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Magnesium	2.57	mg/L	1	0.10	0.02		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Manganese	0.0052	mg/L	1	0.0010	0.0002		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Mercury	3300	ng/L	100	500	200		JAB	12/10/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Potassium	0.25	mg/L	1	0.10	0.02		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Selenium	0.90	µg/L	1	0.50	0.09		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Sodium	14.5	mg/L	1	0.20	0.05		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Strontium	0.0205	mg/L	1	0.0020	0.0004		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: Duplicate - 2

Customer Description:

Lab Number: 216298-015

Preparation:

Date Collected: 11/16/2021 12:00

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Arsenic	0.99	µg/L	1	0.10	0.03		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Barium	46.0	µg/L	1	0.20	0.05		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Beryllium	4.84	µg/L	1	0.050	0.007		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Boron	2.30	mg/L	1	0.050	0.009		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Cadmium	0.749	µg/L	1	0.020	0.004		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Calcium	4.67	mg/L	1	0.05	0.02		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Chromium	0.42	µg/L	1	0.20	0.04		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Cobalt	37.7	µg/L	1	0.020	0.003		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Iron	0.147	mg/L	1	0.020	0.006		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Lead	0.84	µg/L	1	0.20	0.05		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Lithium	0.0748	mg/L	1	0.00020	0.00005		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Magnesium	8.32	mg/L	1	0.10	0.02		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Manganese	0.0920	mg/L	1	0.0010	0.0002		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Mercury	510	ng/L	20	100	40		JAB	12/10/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Potassium	2.49	mg/L	1	0.10	0.02		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Selenium	3.20	µg/L	1	0.50	0.09		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Sodium	16.0	mg/L	1	0.20	0.05		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Strontium	0.0637	mg/L	1	0.0020	0.0004		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Thallium	0.25	µg/L	1	0.20	0.04		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4





# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: Duplicate - 2

Customer Description:

Lab Number: 216298-015-01

Preparation: Dissolved

Date Collected: 11/16/2021 12:00

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Arsenic	0.95	µg/L	1	0.10	0.03		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Barium	44.6	µg/L	1	0.20	0.05		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Beryllium	4.66	µg/L	1	0.050	0.007		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Boron	2.36	mg/L	1	0.050	0.009		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Cadmium	0.711	µg/L	1	0.020	0.004		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Calcium	4.64	mg/L	1	0.05	0.02		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Chromium	0.50	µg/L	1	0.20	0.04		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Cobalt	36.6	µg/L	1	0.020	0.003		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Iron	0.484	mg/L	1	0.020	0.006		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Lead	0.78	µg/L	1	0.20	0.05		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Lithium	0.0743	mg/L	1	0.00020	0.00005		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Magnesium	8.09	mg/L	1	0.10	0.02		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Manganese	0.0919	mg/L	1	0.0010	0.0002		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Mercury	113	ng/L	2	10	4		JAB	12/10/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Potassium	2.47	mg/L	1	0.10	0.02		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Selenium	3.26	µg/L	1	0.50	0.09		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Sodium	15.7	mg/L	1	0.20	0.05		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Strontium	0.0618	mg/L	1	0.0020	0.0004		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Thallium	0.27	µg/L	1	0.20	0.04		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: Equipment Blank

Customer Description:

Lab Number: 216298-016

Preparation:

Date Collected: 11/16/2021 10:46

Date Received: 11/22/2021 12:00

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Barium	0.08	µg/L	1	0.20	0.05	J1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Beryllium	<0.007	µg/L	1	0.050	0.007	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Boron	<0.009	mg/L	1	0.050	0.009	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Calcium	<0.02	mg/L	1	0.05	0.02	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Chromium	0.27	µg/L	1	0.20	0.04		GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Cobalt	0.012	µg/L	1	0.020	0.003	J1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Iron	<0.006	mg/L	1	0.020	0.006	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Lithium	<0.00005	mg/L	1	0.00020	0.00005	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Magnesium	<0.02	mg/L	1	0.10	0.02	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Manganese	<0.0002	mg/L	1	0.0010	0.0002	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/10/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Potassium	<0.02	mg/L	1	0.10	0.02	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Sodium	<0.05	mg/L	1	0.20	0.05	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Strontium	<0.0004	mg/L	1	0.0020	0.0004	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4



## Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

### Report Verification

This report and the above data have been confirmed by the following analyst.

Michael Ohlinger, Chemist

Email: msohlinger@aep.com

Phone: 614-836-4184

Audinet: 8-210-4184

**THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED AND SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY. ALL TEST RESULTS MEET ALL OF THE REQUIREMENTS OF THE ACCREDITING AUTHORITY, UNLESS OTHERWISE NOTED.**

### Data Qualifier Legend

U1 - Not detected at or above method detection limit (MDL).

J1 - Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.

M1 - The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.

P3 - The precision on the matrix spike duplicate (MSD) was above acceptance limits.

# Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

**Dolan Chemical Laboratory (DCL)**  
 4001 Bixby Road  
 Groveport, Ohio 43125  
 Michael Ohlinger (614-936-4184)  
 Contacts: Dave Conover (614-836-4219)

Project Name: Pitkey PP CCR  
 Contact Name: Leslie Fuerschbach  
 Contact Phone: 318-673-2744

Sampler(s): Matt Hamilton Kenny McDonald

Analysis Turnaround Time (in Calendar Days)  
 6 Routine (28 days for Monitoring Wells)

Site Contact:

Date:

COC/Order #:

For Lab Use Only:

216298  
 (ppg)

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials	250 mL bottle, pH<2, HNO <sub>3</sub>	Field-filter 250 mL bottle, then pH<2, HNO <sub>3</sub>	Three (six every 10th) 1 L bottles, pH<2, HNO <sub>3</sub>	125 mL PTFE lined bottle, HCL =, pH<2	Field Filtered 125 mL PTFE lined bottle, HCL =, pH<2	Sample Specific Notes
							B, Ca, Li, Sb, As, Ba, Be, Cd, Cr, Co, Fe, Mn, Mo, Pb, Se, TL and Na, K, Mg, Sr Dissolved B, Ca, Li, Sb, As, Ba, Be, Cd, Cr, Co, Fe, Mn, Mo, Pb, Se, TL and Na, K, Mn, Sr	Ra-226, Ra-228	Mercury	Dissolved Mercury		
AD-2	11/16/2021	1010	G	GW	7		X	X	X	X	X	
AD-3	11/16/2021	1139	G	GW	7		X	X	X	X	X	
AD-4	11/16/2021	1108	G	GW	7		X	X	X	X	X	
AD-7	11/16/2021	837	G	GW	10		X	X	X	X	X	
AD-12	11/16/2021	1029	G	GW	7		X	X	X	X	X	
AD-13	11/15/2021	938	G	GW	7		X	X	X	X	X	
AD-17	11/16/2021	1052	G	GW	7		X	X	X	X	X	
AD-18	11/17/2021	825	G	GW	7		X	X	X	X	X	
AD-22	11/15/2021	1121	G	GW	7		X	X	X	X	X	
AD-28	11/16/2021	953	G	GW	7		X	X	X	X	X	
AD-30	11/15/2021	1212	G	GW	7		X	X	X	X	X	
AD-31	11/16/2021	858	G	GW	7		X	X	X	X	X	

\* Six 1L Bottles must be collected for Radium for every 10th sample.

Special Instructions/QC Requirements & Comments:

Relinquished by: <i>[Signature]</i>	Company: <i>Envt</i>	Date/Time: <i>11-18-21 1200</i>	Received by: <i>[Signature]</i>	Date/Time: <i>11/22/21 12:30PM</i>
Relinquished by: <i>[Signature]</i>	Company: <i>Envt</i>	Date/Time: <i>11-18-21</i>	Received by: <i>[Signature]</i>	Date/Time: <i>11/22/21 12:30PM</i>
Relinquished by: <i>[Signature]</i>	Company: <i>Envt</i>	Date/Time: <i>11-18-21</i>	Received in Laboratory by: <i>[Signature]</i>	Date/Time: <i>11/22/21 12:30PM</i>

# Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

**Dolan Chemical Laboratory (DCL)**  
 4001 Bixby Road  
 Groveport, Ohio 43125  
 Michael Chlinger (614-836-4184)  
 Dave Conover (614-836-4219)

Project Name: Pitkey PP CCR  
 Contact Name: Leslie Fuerschbach  
 Contact Phone: 318-673-2744

Analysis Turnaround Time (in Calendar Days)  
 6 Routine (28 days for Monitoring Wells)

Sampler(s): Matt Hamilton Kenny McDonald

Site Contact:

Date:

COC/Order #:

For Lab Use Only:

216298 (pg 2)

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials	250 mL bottle, pH<2, HNO <sub>3</sub>	Field-filter 250 mL bottle, then pH<2, HNO <sub>3</sub>	Three (six every 100L) 1 L bottles, pH<2, HNO <sub>3</sub>	125 mL PTFE lined bottle, HCL, pH<2	Field Filtered 125 mL PTFE lined bottle, HCL, pH<2	Sample Specific Notes
							B, Ca, Li, Sb, As, Ba, Be, Cd, Cr, Co, Fe, Mn, Mo, Pb, Se, TL and Na, K, Mg, Sr	Unsoluble B, Ca, Li, Sb, As, Ba, Be, Cd, Cr, Co, Fe, Mn, Mo, Pb, Se, TL and Na, K, Mg, Sr	Ra-226, Ra-228	Mercury	Dissolved Mercury	
AD-32	11/15/2021	1124	G	GW	7		X	X	X	X	X	
AD-33	11/15/2021	1218	G	GW	7		X	X	X	X	X	
Duplicate - 2	11/16/2021	1200	G	GW	4		X	X	X	X	X	
Equipment Blank	11/16/2021	1046	G	GW	2		X					

Preservation Used: 1= Ice, 2= HCl, 3= H2SO4, 4=HNO3, 5=N-NaOH, 6= Other : F= filter in field

Six 1L Bottles must be collected for Radium for every 10th sample.

Special Instructions/QC Requirements & Comments:

Relinquished by: <i>Pat MC</i>	Company: <i>Eask</i>	Date/Time: 11-18-21 1200	Received by: <i>Pat MC</i>	Date/Time: 11-18-21 1200
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: <i>Pat MC</i>	Date/Time: 11/22/21 12:30 PM



# WATER & WASTE SAMPLE RECEIPT FORM

<u>Package Type</u>				<u>Delivery Type</u>			
<input checked="" type="radio"/> Cooler	<input type="radio"/> Box	<input type="radio"/> Bag	<input type="radio"/> Envelope	<input type="radio"/> PONY	<input type="radio"/> UPS	<input checked="" type="radio"/> FedEX	<input type="radio"/> USPS
				Other _____			
Plant/Customer <u>Pirkey</u>				Number of Plastic Containers: <u>76</u>			
Opened By <u>MSJ</u>				Number of Glass Containers: <u>-</u>			
Date/Time <u>11/22/21 12:30PM</u>				Number of Mercury Containers: <u>31</u>			
Were all temperatures within 0-6°C? Y / N or <input checked="" type="radio"/> N/A Initial: <u>MSJ</u> on ice / <input checked="" type="radio"/> no ice							
1(IR Gun Ser# <u>200700311</u> , Expir. <u>06-11-22</u> ) - If No, specify each deviation: _____							
Was container in good condition? <input checked="" type="radio"/> Y / <input type="radio"/> N Comments _____							
Was Chain of Custody received? <input checked="" type="radio"/> Y / <input type="radio"/> N Comments _____							
Requested turnaround: <u>Route</u> If RUSH, who was notified? _____							
pH (15 min)	Cr <sup>6+</sup> (pres) (24 hr)	NO <sub>2</sub> or NO <sub>3</sub> (48 hr)	ortho-PO <sub>4</sub> (48 hr)	Hg-diss (pres) (48 hr)			

Was COC filled out properly?  Y /  N Comments \_\_\_\_\_

Were samples labeled properly?  Y /  N Comments \_\_\_\_\_

Were correct containers used?  Y /  N Comments \_\_\_\_\_

Was pH checked & Color Coding done?  Y /  N or N/A Initial & Date: JAB/JWB/MBK 11/22/21

**pH paper (circle one):** MQuant,PN1.09535.0001,LOT# HC904495 [OR] Lab Rat,PN4801,LOT# X000RWDG21

- Was Add'l Preservative needed? Y /  N If Yes: By whom & when: \_\_\_\_\_ (See Prep Book)

Is sample filtration requested? Y /  N Comments \_\_\_\_\_ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: \_\_\_\_\_

Lab ID# 216298 Initial & Date & Time : \_\_\_\_\_

Logged by MSJ Comments: \_\_\_\_\_

Reviewed by SM \_\_\_\_\_

**REMINDER:** Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.