

# Annual Groundwater Monitoring Report

Southwestern Electric Power Company  
H. W. Pirkey Power Plant  
East Bottom Ash Pond CCR Management Unit  
CN600126767; RN100214287  
Registration No: CCR104  
Hallsville, Texas  
**January 31, 2023**

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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
- TCEQ – Texas Commission on Environmental Quality

## I. Overview

This *Annual Groundwater Monitoring Report* (Report) has been prepared to report the status of activities for the preceding year at 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, 2023.

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 2021 sampling event (November 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-32
- Chloride at AD-2, AD-31 and AD-32
- pH at AD-2 and AD-31
- Sulfate at AD-2, AD-31, and AD-32
- TDS concentrations at AD-2, AD-31, and AD-32

- A successful ASDs for the Appendix IV parameters that exceeded the GWPS for the 2nd semi-annual 2021 was certified on June 16, 2022 and submitted to TCEQ June 16, 2022 for approval.

- During the 1<sup>st</sup> semi-annual sampling event held in June 2022:

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

- A successful ASD for the Appendix IV parameters that exceeded the GWPS 1st semi-annual 2022 was certified January 25, 2023 and submitted to TCEQ January 25, 2023 for approval.
- The 2<sup>nd</sup> semi-annual event (November 2022) 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**);

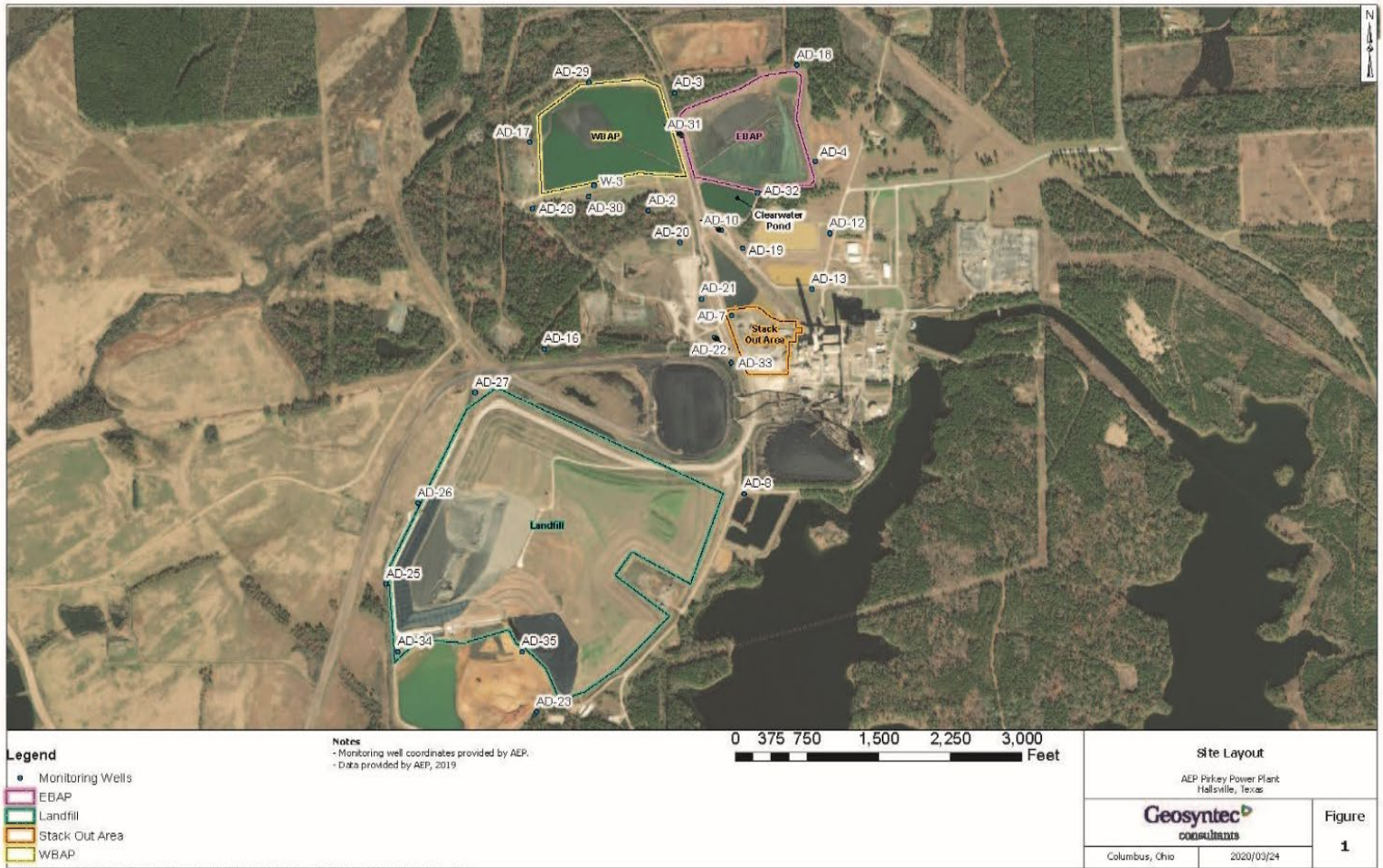
- Statistical comparison of monitoring data to determine if there have been SSI(s) or SSL(s) (Attached as **Appendix 2**);
- A discussion of whether any alternate source demonstrations were performed, and the conclusions (Attached as **Appendix 3**);
- A summary of any transition between monitoring programs, 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 2022. 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 2022 satisfies the requirement of 40 CFR 257.95(b)/30 TAC 352.951.

### **V. Statistical Evaluation of 2022 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 2021 sampling event (November 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-32
- Chloride at AD-2, AD-31 and AD-32
- pH at AD-2 and AD-31
- 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 June 2022:

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

The 2<sup>nd</sup> semi-annual event (November 2022) 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 2021 was certified on June 16, 2022 and submitted to TCEQ June 16, 2022 for approval.

A successful ASD for the Appendix IV parameters that exceeded the GWPS for the 1st semi-annual 2022 was certified January 25, 2023 and submitted to TCEQ January 25, 2023 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 and an ASD is determined not to be satisfactory to the executive director, 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 2022.



**IX. Description of Any Problems Encountered in 2022 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 2022 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 2022;
- 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;
- Conduct ASD(s) if GWPSs are exceeded;
- 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
3/29/2022	Assessment	3.02	3.13	31.4	0.20	3.9	241	460 L1
6/21/2022	Assessment	3.26	3.4	29.7	0.21	4.0	259	490
11/15/2022	Assessment	2.83	2.80	30.5	0.21	4.0	259	480

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.

L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.

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
3/29/2022	Assessment	< 0.04 U1	0.82	18.2	0.75	0.102	0.90	22.7	1.76	0.20	0.5	0.0653	0.092	< 0.2 U1	2.7	0.10 J1
6/21/2022	Assessment	< 0.1 U1	2.0	17.5	0.85	0.11	0.5 J1	25.7	1.87	0.21	0.6 J1	0.0688	0.244	< 0.5 U1	2.7	0.3 J1
11/15/2022	Assessment	< 0.02 U1	0.40	16.8	0.561	0.086	0.43	19.6	1.41	0.21	0.60	0.0556	0.058	< 0.1 U1	1.28	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
3/29/2022	Assessment	0.019 J1	1.84	3.80	0.08	4.9	22.2	140 L1
6/21/2022	Assessment	0.020 J1	2.51	3.92	0.05 J1	4.4	20.5	160
11/16/2022	Assessment	0.019 J1	2.25	4.14	< 0.02 U1	4.7	16.6	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.

L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.

**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	1.60	< 0.02 U1	< 0.05 U1	0.0211	0.015	< 0.1 U1	< 0.09 U1	0.08 J1
3/29/2022	Assessment	< 0.02 U1	1.10	93.2	0.641	0.010 J1	0.31	6.16	1.15	0.08	0.07 J1	0.0383	0.017	< 0.1 U1	< 0.09 U1	0.07 J1
6/21/2022	Assessment	< 0.02 U1	0.30	124	0.407	0.021	0.46	4.10	1.31	0.05 J1	< 0.05 U1	0.0220	0.004 J1	< 0.1 U1	< 0.09 U1	0.09 J1
11/16/2022	Assessment	< 0.02 U1	0.21	128	0.195	0.019 J1	0.44	3.00	0.40	< 0.02 U1	< 0.05 U1	0.0212	0.005	< 0.1 U1	< 0.09 U1	0.10 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
3/28/2022	Assessment	0.021 J1	0.20	6.10	0.07	3.9	3.80	60 L1
6/20/2022	Assessment	0.042 J1	0.32	7.59	0.09	4.3	4.81	80
11/15/2022	Assessment	0.013 J1	0.36	8.03	0.08	4.7	3.39	70

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.

L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.

**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	0.60	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
3/28/2022	Assessment	< 0.02 U1	0.09 J1	20.2	0.127	0.009 J1	0.35	1.01	0.76	0.07	0.09 J1	0.00604	< 0.002 U1	< 0.1 U1	0.33 J1	< 0.04 U1
6/20/2022	Assessment	< 0.02 U1	0.08 J1	24.2	0.135	0.008 J1	0.63	1.35	0.63	0.09	0.08 J1	0.00949	< 0.002 U1	< 0.1 U1	0.16 J1	< 0.04 U1
11/15/2022	Assessment	< 0.02 U1	0.06 J1	30.6	0.153	0.007 J1	0.45	1.59	1.46	0.08	0.08 J1	0.0119	< 0.002 U1	< 0.1 U1	0.23 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
3/29/2022	Assessment	0.009 J1	0.24	5.26	< 0.02 U1	4.4	7.31	140 L1
6/22/2022	Assessment	< 0.009 U1	1.49	5.20	< 0.02 U1	4.6	6.47	110
11/16/2022	Assessment	0.011 J1	0.19	4.94	< 0.02 U1	4.5	6.55	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.

L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.

P1: The precision between duplicate results was above acceptance limits.

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
3/29/2022	Assessment	0.02 J1	1.55	90.1	0.106	0.01 J1	1.40	0.842	2.01	< 0.02 U1	0.53	0.0137	0.021	< 0.1 U1	0.38 J1	0.05 J1
6/22/2022	Assessment	< 0.02 U1	0.30	79.3	0.073	0.012 J1	0.47	0.790	0.73	< 0.02 U1	0.11 J1	0.0108	< 0.007 U1	< 0.1 U1	0.14 J1	< 0.04 U1
11/16/2022	Assessment	< 0.02 U1	0.25	77.4	0.071	0.009 J1	0.54	0.723	1.61	< 0.02 U1	0.08 J1	0.0125	0.018	< 0.1 U1	0.12 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
3/28/2022	Assessment	0.026 J1	2.75	21.8	0.13	3.4	80.8	260 L1
6/20/2022	Assessment	0.028 J1	2.65	23.2	0.14 J1	3.5	89.0	270
11/15/2022	Assessment	0.035 J1	2.63	24.3	0.14	4.3	79.1	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.

L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.

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	3.40	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	1.60	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
3/28/2022	Assessment	< 0.02 U1	0.26	32.8	0.854	0.068	0.51	9.14	2.41	0.13	0.29	0.0687	0.103	< 0.1 U1	0.38 J1	0.09 J1
6/20/2022	Assessment	< 0.02 U1	0.42	34.1	1.03	0.071	0.59	9.61	4.60	0.14 J1	0.35	0.0844	0.089	< 0.1 U1	0.33 J1	0.08 J1
11/15/2022	Assessment	< 0.02 U1	0.30	35.8	0.863	0.066	0.74	9.41	3.81	0.14	0.34	0.0681	0.610	< 0.1 U1	0.38 J1	0.10 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
3/28/2022	Assessment	0.773	8.05	25.2	0.44	3.1	157	330 L1
6/20/2022	Assessment	0.909	7.25	30.6	0.42	3.0	147	320
11/15/2022	Assessment	1.26	12.0	22.7	0.49	4.0	244	450

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.

L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.

Table 1 - Groundwater Data Summary: AD-32

Pirkey - EBAP

## Appendix IV Constituents

Geosyntec Consultants, Inc.

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	5.70	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	4.60	0.78	0.52	0.0698	1.400	< 0.1 U1	7.70	0.25
3/28/2022	Assessment	< 0.02 U1	1.05	30.0	2.89	0.323	0.60	25.1	5.90	0.44	0.38	0.0731	1.900	< 0.1 U1	3.42	0.17 J1
6/20/2022	Assessment	< 0.02 U1	1.81	32.3	3.28	0.318	0.68	27.2	13.87	0.42	0.43	0.0923	2.700	< 0.1 U1	2.67	0.17 J1
11/15/2022	Assessment	< 0.02 U1	1.73	24.4	3.77	0.404	0.82	34.8	5.28	0.49	0.66	0.0812	1.500	< 0.1 U1	5.95	0.24

## Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

&lt;: 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.

**Table 1: Residence Time Calculation Summary  
Pirkey East Bottom Ash Pond**

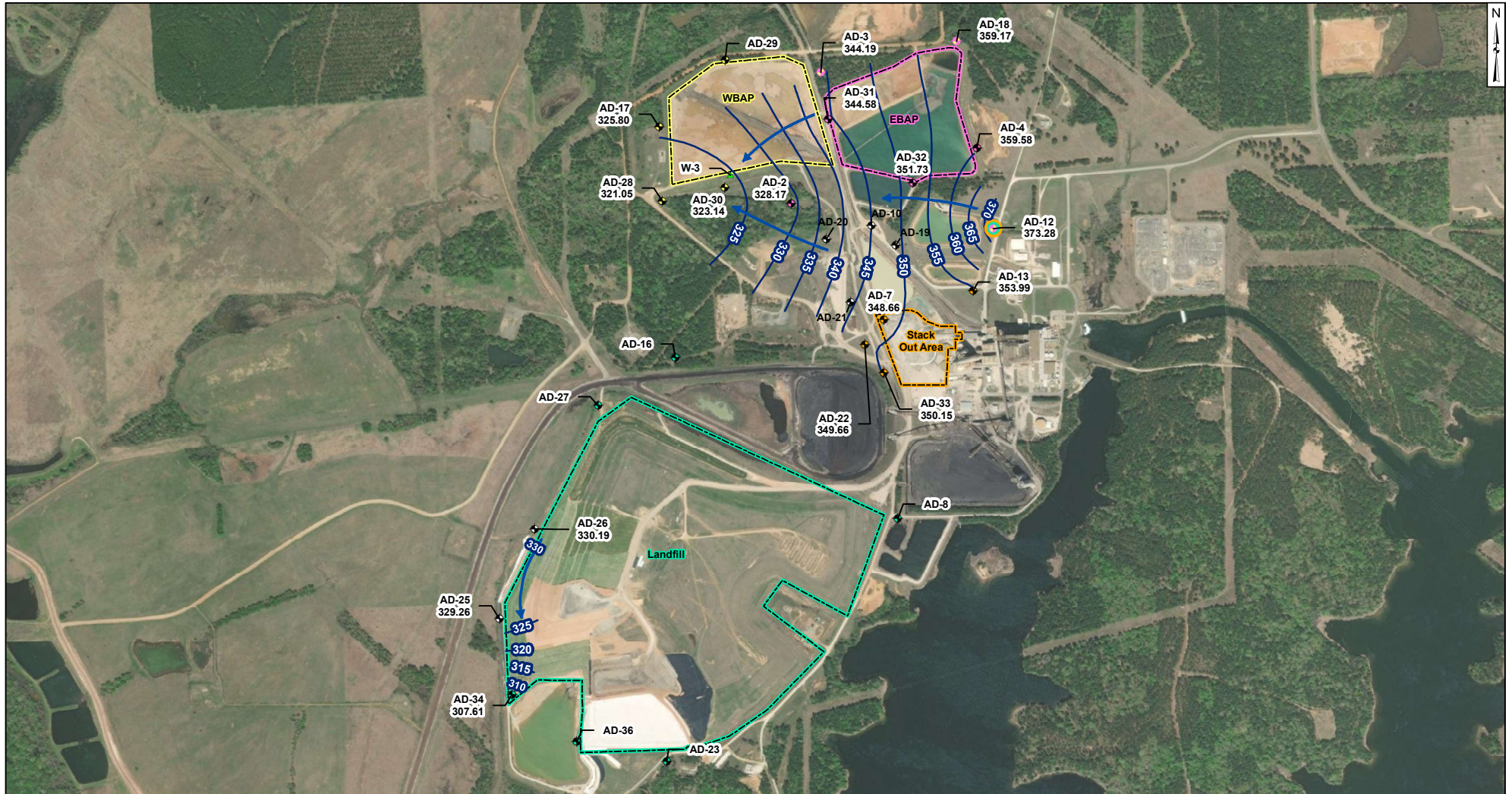
*Geosyntec Consultants, Inc.*

CCR Management Unit	Monitoring Well	Well Diameter (inches)	2022-03		2022-06		2022-11	
			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	27.4	4.4	26.0	4.7	23.9	5.1
	AD-4 <sup>[1]</sup>	4.0	11.1	10.9	16.3	7.5	9.3	13.0
	AD-12 <sup>[1]</sup>	4.0	36.4	3.3	21.6	5.6	22.8	5.3
	AD-18 <sup>[1]</sup>	2.0	11.3	5.4	10.4	5.9	11.0	5.5
	AD-31 <sup>[2]</sup>	2.0	24.9	2.4	23.7	2.6	23.6	2.6
	AD-32 <sup>[2]</sup>	2.0	16.5	3.7	15.8	3.9	12.9	4.7

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

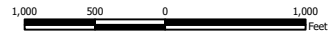
— Groundwater Elevation Contour

- - - Groundwater Elevation Contours (Inferred)

→ Approximate Groundwater Flow Direction

**Notes**

- Monitoring well coordinates and water level data (collected on March 28 - 29, 2022) 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.
- 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-27, AD-29, AD-35, AD-36, and W-3 were not gauged during the March 2022 event.
- AD-35 was abandoned on November 13, 2018.



*Beth Ann Gross*

January 25, 2023

TX Eng Firm  
Registration #1182

**Potentiometric Contours - Uppermost Aquifer  
March 2022**

AEP Pirkey Power Plant  
Hallsville, Texas

**Geosyntec**  
consultants

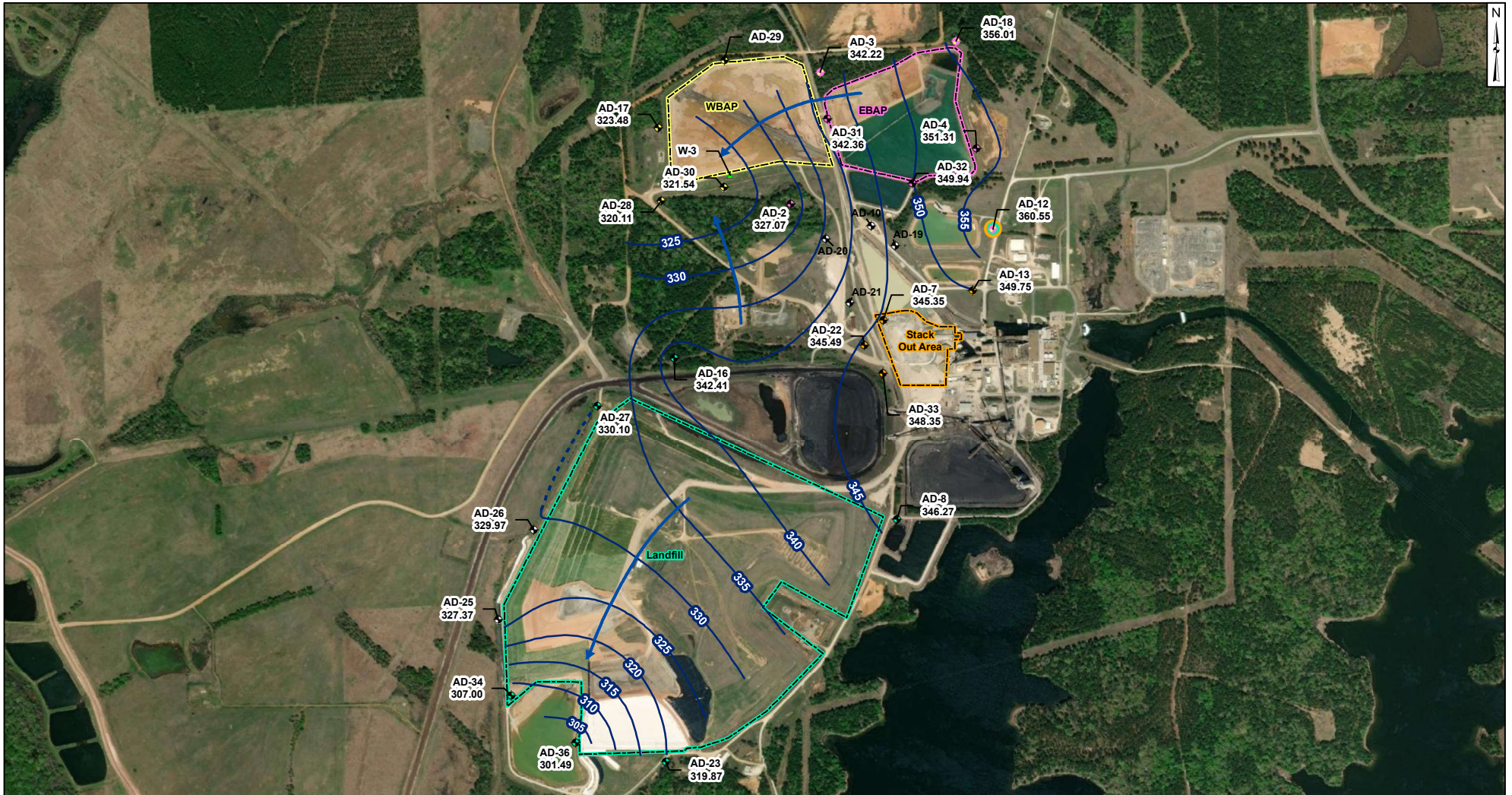
Columbus, Ohio

2023/01/25

Figure

1



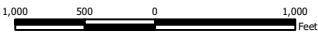


**Legend**

- 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 June 20-22, 2022) provided by AEP.
- Site features based on information available in CCR Groundwater Monitoring Well Network Evaluation Update (Arcadis, 2022) provided by AEP.
- Groundwater elevation units are feet above mean sea level.
- AD-10, AD-19, AD-20, AD-21, AD-24, AD-29, AD-35, and W-3 were not gauged during the June 2022 event.
- AD-35 was abandoned on November 13, 2018.



*Beth Ann Gross*  
 12/29/2022  
 Geosyntec Consultants, Inc.  
 Texas Firm  
 Registration No. 1182

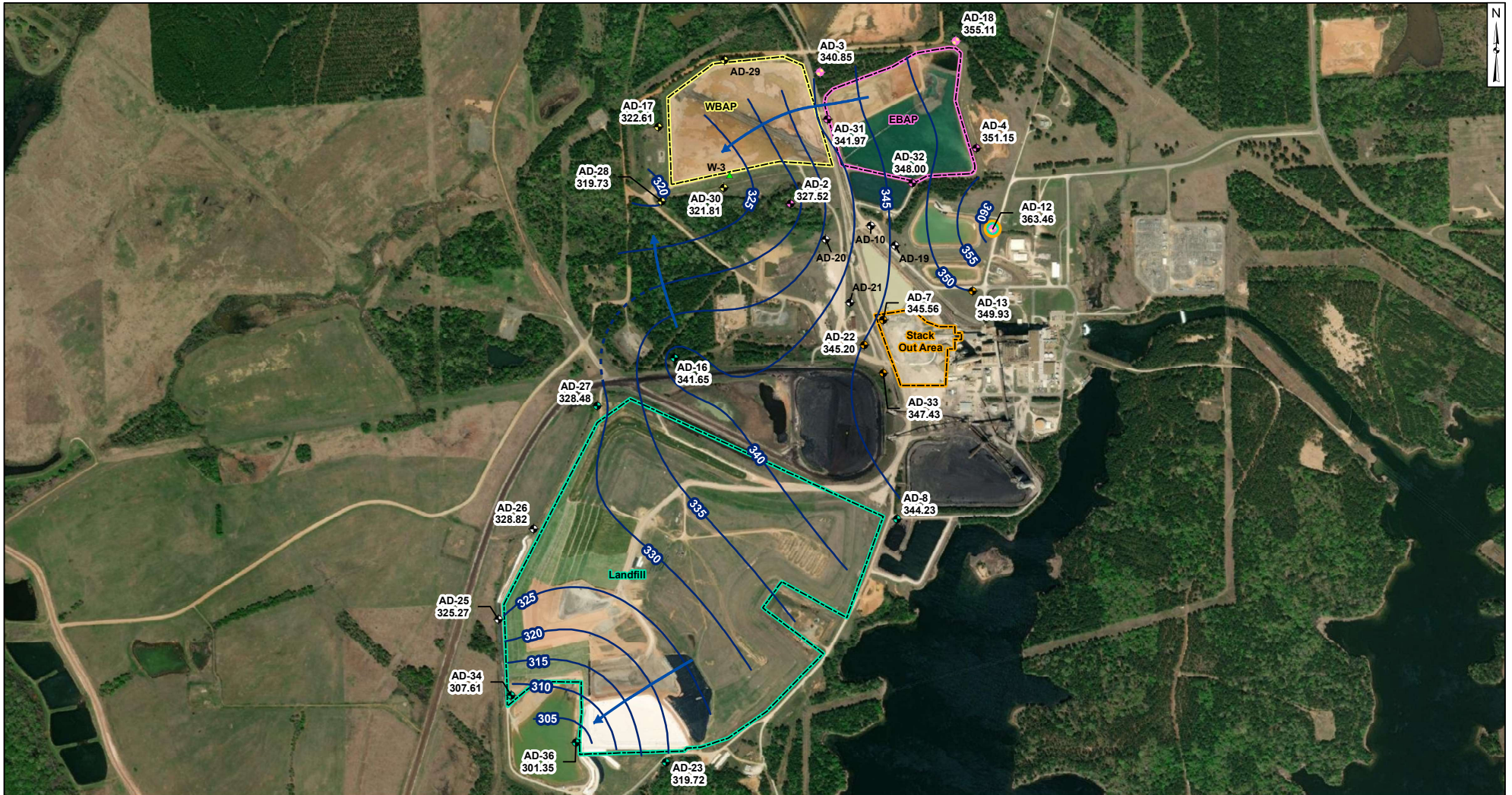
**Potentiometric Contours - Uppermost Aquifer  
 June 2022**

AEP Pirkey Power Plant  
 Hallsville, Texas

**Geosyntec**  
 consultants

Columbus, Ohio      2022/12/21

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, 2022) provided by AEP.
- Site features based on information available in CCR Groundwater Monitoring Well Network Evaluation Update (Arcadis, 2022) provided by AEP.
- Groundwater elevation units are feet above mean sea level.
- AD-10, AD-19, AD-20, AD-21, AD-29, and W-3 were not gauged during the November 2022 event.
- AD-35 was abandoned on November 13, 2018.



Digitally signed by Beth Gross,  
 Date: 2023.01.23 09:40:36 -05'00'  
 Texas Eng Firm  
 Registration No. 1182

**Potentiometric Contours - Uppermost Aquifer  
 November 2022**

AEP Pirkey Power Plant  
 Hallsville, Texas

<b>Geosyntec</b> consultants		Figure 3
Columbus, Ohio	2023/01/17	

## **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 18, 2022  
CHA8500

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## 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
EBAP	East Bottom Ash Pond
GWPS	Groundwater Protection Standard
LCL	Lower Confidence Limit
LFB	Laboratory Fortified Blanks
LPL	Lower Prediction Limit
LRB	Laboratory Reagent Blanks
MCL	Maximum Contaminant Level
NELAP	National Environmental Laboratory Accreditation Program
PQL	Practical Quantitation Limit
QA	Quality Assurance
QC	Quality Control
SSI	Statistically Significant Increase
SSL	Statistically Significant Level
SU	Standard Units
TCEQ	Texas Commission of Environmental Quality
TDS	Total Dissolved Solids
UPL	Upper Prediction Limit
UTL	Upper Tolerance 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 (CCR) 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 H.W. Pirkey Power Plant located in Hallsville, Texas. Recent groundwater monitoring results were compared to site-specific groundwater protection standards (GWPSs) to identify potential exceedances.

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 initiated assessment monitoring in 2018. GWPSs were set in accordance with § 352.951(b) and a statistical evaluation of the assessment monitoring data was conducted. During 2021, sampling events for both Appendix III parameters and Appendix IV parameters, as required by § 352.951(a), were completed in March and May. During the May 2021 assessment monitoring event, statistically significant levels (SSLs) were observed for cobalt and lithium (Geosyntec, 2021a). In accordance with § 352.951(e), an alternative source demonstration (ASD) was successfully completed (Geosyntec, 2021b); thus, the unit remained in assessment monitoring. One assessment monitoring event was conducted at the EBAP in November 2021 in accordance with § 352.951(a). The results of the November 2021 assessment event are documented in this report.

Prior to conducting the statistical analyses, the 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. GWPSs were re-established for the Appendix IV parameters. Confidence intervals were calculated for Appendix IV parameters at the compliance wells to assess whether SSLs of Appendix IV parameters were present 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 the background and compliance wells to meet the requirements of § 352.951(a) in November 2021. Samples from November 2021 were analyzed for all Appendix III and Appendix IV parameters. A summary of 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.9.6.32 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 November 2021 *Statistical Analysis Plan* (Geosyntec, 2021c). Time series plots and results for all completed statistical tests are provided in Attachment B.

The data obtained in November 2021 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 the *Statistical Analysis Plan* (Geosyntec, 2021c). The established GWPS was determined to be the greater value of the background concentration and the maximum contaminant level (MCL) 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, cobalt, and mercury due to apparent non-normal distributions and for antimony, cadmium, fluoride, lead, molybdenum,



selenium, 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 LCL for cobalt exceeded the GWPS of 0.00940 mg/L at AD-2 (0.0100 mg/L), AD-31 (0.00956 mg/L), and AD-32 (0.025 mg/L).
- The LCL for lithium exceeded the GWPS of 0.0550 mg/L at AD-31 (0.0664 mg/L) and AD-32 (0.0781 mg/L).

As a result, the Pirkey EBAP 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.

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

Upper prediction limits (UPLs) were previously established for all Appendix III parameters following the background monitoring period. 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. Interwell and intrawell prediction limits are updated periodically during the assessment monitoring period as sufficient data became available.

For the intrawell tests, insufficient data was available to compare against the existing background dataset, and so the prediction limits were not updated for the intrawell tests at this time. The intrawell prediction limits were previously calculated using historical data through June 2020 (Geosyntec, 2021d). The established intrawell prediction limits were used to evaluate potential SSIs for pH.

Prediction limits for the interwell tests were recalculated using data collected during the 2021 assessment monitoring events. New background well data were tested for outliers prior to being added to the background dataset. Background well data were also evaluated for statistically significant trends using the Sen's Slope/Mann-Kendall trend test, and the results are included in Attachment B. The revised interwell prediction limits were used to evaluate potential SSIs for boron, calcium, chloride, fluoride, sulfate, and TDS.

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.

Interwell UPLs were updated for boron, calcium, chloride, fluoride, sulfate, and TDS using historical data through November 2021. Intrawell UPLs and lower prediction limits (LPLs) were previously calculated for pH using historical data through June 2020 to represent background values. The updated prediction limits are summarized in Table 3. 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, or in the case of pH, is neither less than the LPL nor greater than the UPL, then it can be concluded that an SSI has not occurred. In practice, where the initial result does not exceed the UPL, or in the case of pH, is neither less than the LPL nor greater than the UPL, a second sample will not be collected. The retesting procedures allow achieving an acceptably high statistical power to detect changes at compliance wells for constituents evaluated using intrawell prediction limits.

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

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

Data collected during the November 2021 assessment monitoring event from each compliance well were compared to the re-calculated 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 UPLs were noted:

- Boron concentrations exceeded the interwell UPL of 0.0610 mg/L at AD-2 (2.62 mg/L) and AD-32 (1.70 mg/L).
- Calcium concentrations exceeded the interwell UPL of 2.94 mg/L at AD-32 (16.8 mg/L).
- Chloride concentrations exceeded the interwell UPL of 8.97 mg/L at AD-2 (29.2 mg/L), AD-31 (20.1 mg/L), and AD-32 (24.3 mg/L).

- pH values were below the intrawell LPL of 3.5 SU at AD-2 (3.4 SU) and the intrawell LPL of 3.0 SU at AD-31 (2.8 SU).
- Sulfate concentrations exceeded the interwell UPL of 24.7 mg/L at AD-2 (200 mg/L), AD-31 (76.6 mg/L), and AD-32 (334 mg/L).
- TDS concentrations exceeded the interwell UPL of 171 mg/L at AD-2 (410 mg/L), AD-31 (250 mg/L), and AD-32 (580 mg/L).

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

### **2.3 Conclusions**

A semi-annual assessment monitoring event was conducted at the EBAP 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 2021 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 established prediction limits, with exceedances identified for boron, calcium, chloride, pH, 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, Inc. (Geosyntec). 2021a. Statistical Analysis Summary – East Bottom Ash Pond, Pirkey, Hallsville, Texas. September.

Geosyntec. 2021b. Alternative Source Demonstration - Texas State CCR Rule. Pirkey East Bottom Ash Pond. December.

Geosyntec. 2021c. Statistical Analysis Plan – H.W. Pirkey Power Plant. November.

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

# TABLES

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

Well ID		AD-2	AD-4	AD-12	AD-18		AD-31	AD-32
Well Classification		Compliance	Background	Background	Background		Compliance	Compliance
Parameter	Unit	11/16/2021	11/16/2021	11/15/2021	11/16/2021	11/17/2021	11/16/2021	11/15/2021
Antimony	µg/L	0.1 U	0.1 U	0.1 U	-	0.1 U	0.1 U	0.1 U
Arsenic	µg/L	0.62	0.25	0.05 J	-	0.19	0.26	2.39
Barium	µg/L	19.2	122	26.5	-	82.2	32.1	22.5
Beryllium	µg/L	0.575	0.280	0.148	-	0.078	0.801	3.90
Boron	mg/L	2.62	0.012 J	0.012 J	-	0.01 J	0.024 J	1.70
Cadmium	µg/L	0.078	0.022	0.01 J	-	0.011 J	0.063	0.452
Calcium	mg/L	2.63	2.13	0.28	-	0.20	2.68	16.8
Chloride	mg/L	29.2	3.94	8.03	-	5.99	20.1	24.3
Chromium	µg/L	0.37	0.28	0.30	-	0.31	0.39	0.75
Cobalt	µg/L	21.2	3.08	1.38	-	0.801	9.18	39.9
Combined Radium	pCi/L	1.69	1.6	1.76	-	1.91	3.39	4.6
Fluoride	mg/L	0.15	0.06 U	0.07	-	0.06 U	0.13	0.78
Lead	µg/L	0.51	0.2 U	0.07 J	-	0.2 U	0.34	0.52
Lithium	mg/L	0.0539	0.0211	0.0110	-	0.0124	0.0648	0.0698
Mercury	µg/L	0.049	0.015	0.005 U	-	0.030	1.790	1.400
Molybdenum	µg/L	0.5 U	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U
Selenium	µg/L	1.75	0.5 U	0.10 J	-	0.11 J	0.33 J	7.70
Sulfate	mg/L	200	17.2	2.90	-	6.23	76.6	334
Thallium	µg/L	0.11 J	0.08 J	0.2 U	-	0.2 U	0.08 J	0.25
Total Dissolved Solids	mg/L	410	130	90	-	100	250	580
pH	SU	3.4	4.3	3.5	3.9	-	2.8	2.8

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

Due to limited groundwater volume, the pH value for AD-18 was collected the day prior to collection of analytical samples.

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

Constituent Name	MCL	Calculated UTL	GWPS
Antimony, Total (mg/L)	0.00600	0.00500	0.00600
Arsenic, Total (mg/L)	0.0100	0.0110	0.0110
Barium, Total (mg/L)	2.00	0.180	2.00
Beryllium, Total (mg/L)	0.00400	0.00200	0.00400
Cadmium, Total (mg/L)	0.00500	0.00100	0.00500
Chromium, Total (mg/L)	0.100	0.00420	0.100
Cobalt, Total (mg/L)	n/a	0.00940	0.00940
Combined Radium, Total (pCi/L)	5.00	3.36	5.00
Fluoride, Total (mg/L)	4.00	1.00	4.00
Lead, Total (mg/L)	n/a	0.00500	0.00500
Lithium, Total (mg/L)	n/a	0.0550	0.0550
Mercury, Total (mg/L)	0.00200	0.0000640	0.00200
Molybdenum, Total (mg/L)	n/a	0.00500	0.00500
Selenium, Total (mg/L)	0.0500	0.00500	0.0500
Thallium, Total (mg/L)	0.00200	0.00200	0.00200

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 Summary  
Pirkey Plant - East Bottom Ash Pond**

Analyte	Unit	Description	AD-2	AD-31	AD-32
			11/16/2021	11/16/2021	11/15/2021
Boron	mg/L	Interwell Background Value (UPL)	0.0610		
		Analytical Result	<b>2.62</b>	0.024	<b>1.70</b>
Calcium	mg/L	Interwell Background Value (UPL)	2.94		
		Analytical Result	2.63	2.68	<b>16.8</b>
Chloride	mg/L	Interwell Background Value (UPL)	8.97		
		Analytical Result	<b>29.2</b>	<b>20.1</b>	<b>24.3</b>
Fluoride	mg/L	Interwell Background Value (UPL)	1.00		
		Analytical Result	0.15	0.13	0.78
pH	SU	Intrawell Background Value (UPL)	4.8	5.3	4.5
		Intrawell Background Value (LPL)	3.5	3.0	2.7
		Analytical Result	<b>3.4</b>	<b>2.8</b>	2.8
Sulfate	mg/L	Interwell Background Value (UPL)	24.7		
		Analytical Result	<b>200</b>	<b>76.6</b>	<b>334</b>
Total Dissolved Solids	mg/L	Interwell Background Value (UPL)	171		
		Analytical Result	<b>410</b>	<b>250</b>	<b>580</b>

Notes:

UPL: Upper prediction limit

LPL: Lower prediction limit

**Background values are shaded gray.**

**Bold values exceed the background value.**



# 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.

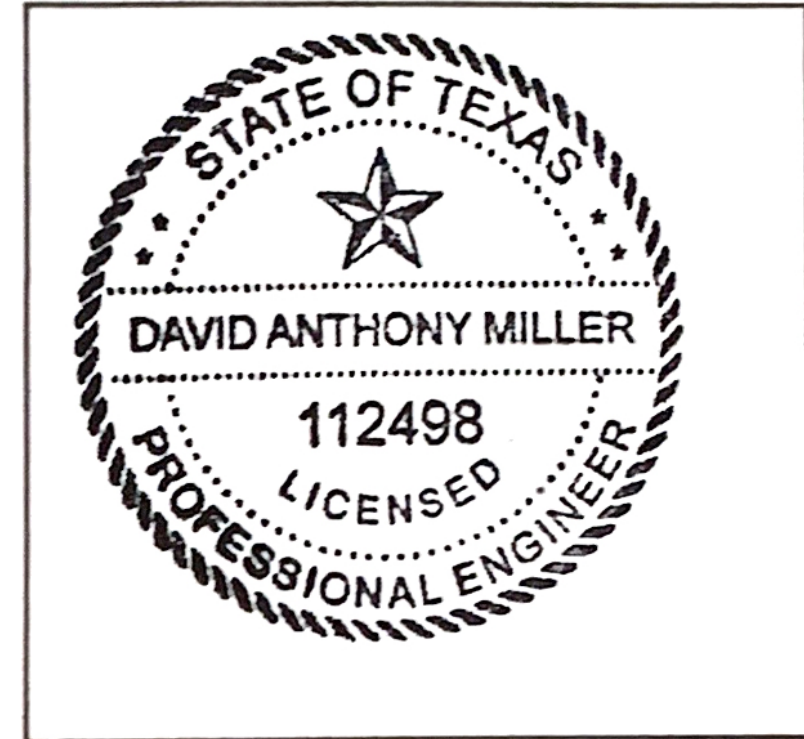
DAVID ANTHONY MILLER  
Printed Name of Licensed Professional Engineer

David Anthony Miller  
Signature

112498  
License Number

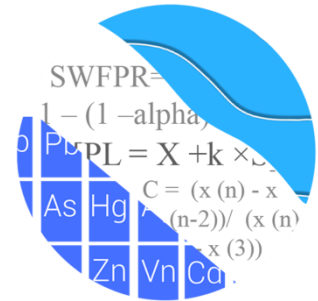
TEXAS  
Licensing State

03.19.22  
Date



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

## GROUNDWATER STATS CONSULTING



March 8, 2022

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

Re: Pirkey EBAP - Assessment Monitoring Event & Background Update 2021

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 through 2021 for American Electric Power Company's Pirkey 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 Residuals (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

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 January 2021, as described below.

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

Based on the original background screening described in the original 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 non-detects, 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% 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 prediction limits are used on data containing greater than 50% non-detects.

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.

## **Appendix III Background Update Summaries**

### **January 2021**

Proposed background data were originally screened during December 2019. Prior to updating background data sets during the January 2021 background update, pH (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. Tukey's Outlier test did not identify any additional statistical outliers.

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. 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.

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 non-detects, with no detections reported above the practical quantitation limit. No other statistically significant increasing or decreasing trends were noted. 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.

## **February 2022**

During this analysis, upgradient well data through November 2021 were re-screened for the purpose of updating the interwell prediction limits for boron, calcium, chloride, fluoride, sulfate and TDS. Intrawell prediction limits will be updated during the Fall 2022 when sufficient compliance samples are available.

### Outlier Analysis

Prior to updating background data, Tukey's outlier test and visual screening were used to evaluate data at all upgradient wells through November 2021, for boron, calcium, chloride, fluoride, sulfate, and TDS (Figure C). Tukey's outlier test on pooled upgradient well data for these constituents did not identify any additional statistical outliers since the last background update; therefore, no new outliers were flagged. Additionally, no changes to previously flagged outliers were made. 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 is included below.

For pH, which uses intrawell prediction limits, values were not re-evaluated for new outliers as these records had insufficient samples for updating background during this evaluation period.

#### Intrawell – Prediction Limits

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 limits follows this letter (Figure D). As discussed earlier, background data sets for all parameters utilizing intrawell prediction limits will be updated after the Fall 2022 sample event when a minimum of 4 compliance samples are available. A summary table of the limits follows this report.

#### Interwell – Trend Test Evaluation

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 (Figure E). The results of the trend analyses showed all data are consistent over time. The statistically significant trends noted for fluoride in wells AD-4, AD-12, and AD-18 were artificial trends that resulted from estimated values and non-detects, with no detections reported above the practical quantitation limit. No other statistically significant increasing or decreasing trends were noted.

#### Interwell – Prediction Limits

Interwell prediction limits, combined with a 1-of-2 resample plan, were updated using all available data through November 2021 from upgradient wells for the constituents listed above (Figure F). Time series plots were included with the interwell prediction limit graphs to display concentrations at upgradient wells that were used to construct the statistical limits. 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 Table.



## **Evaluation of Appendix IV Parameters – November 2021**

Prior to evaluating Appendix IV parameters, background data are screened through visual screening and Tukey's outlier test on pooled upgradient wells for potential outliers and extreme trending patterns that would lead to artificially elevated statistical limits.

For the current analysis, Tukey's outlier test on pooled upgradient well data did not identify any outliers through November 2021; however, high non-detect values of 0.04 mg/L for molybdenum in upgradient and downgradient wells were flagged in order to construct statistical limits that are conservative (i.e., lower) from a regulatory perspective and represent present-day groundwater quality at this facility.

Additionally, downgradient well data through November 2021 were screened through visual screening using time series graphs. Since the downgradient well data are used to construct confidence intervals, a regulatory conservative approach is taken in that values that are marginally high relative to the rest of the data are retained unless there is particular justification for excluding them. A previously flagged value for selenium in downgradient well AD-32 was unflagged as similar concentrations appeared among more recent observations, and all concentrations for selenium at this site are below the MCL. All flagged values may be seen on the Outlier Summary following this letter (Figure C).

### Interwell Upper Tolerance Limits

Interwell upper tolerance limits were used to calculate background limits from all available pooled upgradient well data through November 2021 for Appendix IV parameters to determine the background limit for each constituent (Figure H). For parametric limits a target of 95% confidence and 95% coverage is used. The confidence and coverage levels for nonparametric tolerance limits are dependent upon the number of background samples.

### Groundwater Protection Standards

These limits were compared to the Maximum Contaminant Levels (MCLs) 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

Confidence intervals were then constructed on downgradient wells with data through November 2021 for each of the Appendix IV parameters using the highest limit of either

the MCL 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. Complete results of the confidence interval results follow this letter. The following confidence interval exceedances were noted:

- 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 me.

For Groundwater Stats Consulting,

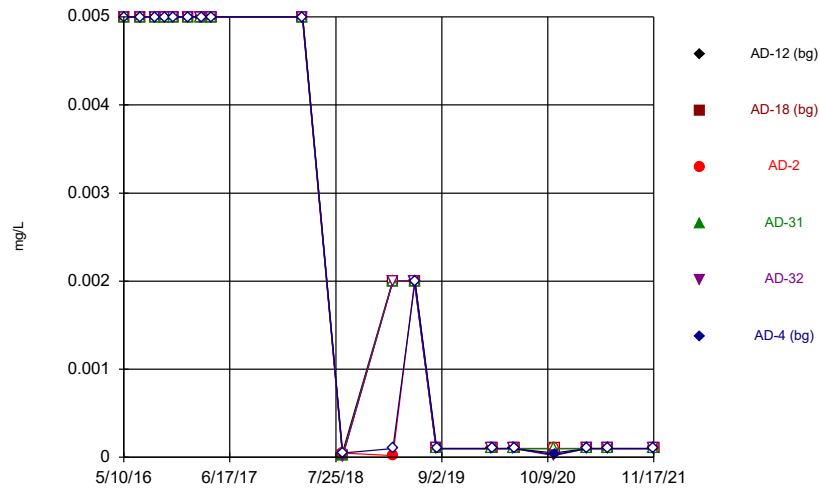


Easton Rayner  
Groundwater Analyst



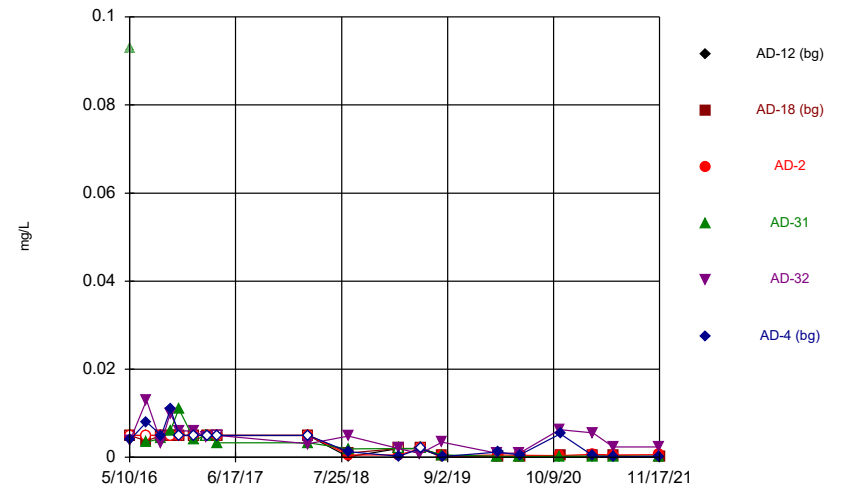
Andrew Collins  
Project Manager

### Time Series



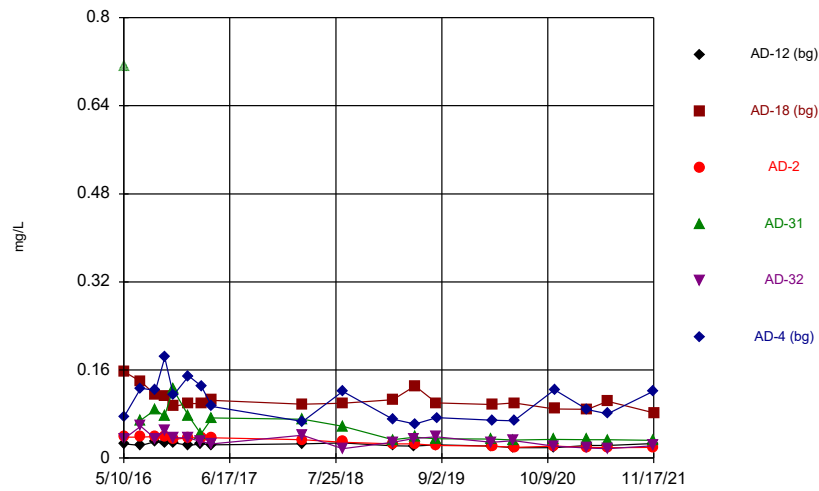
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### Time Series



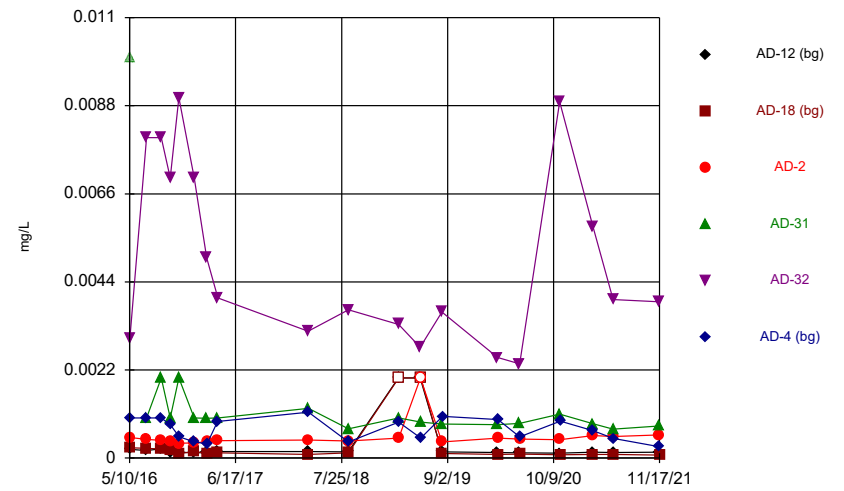
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### Time Series



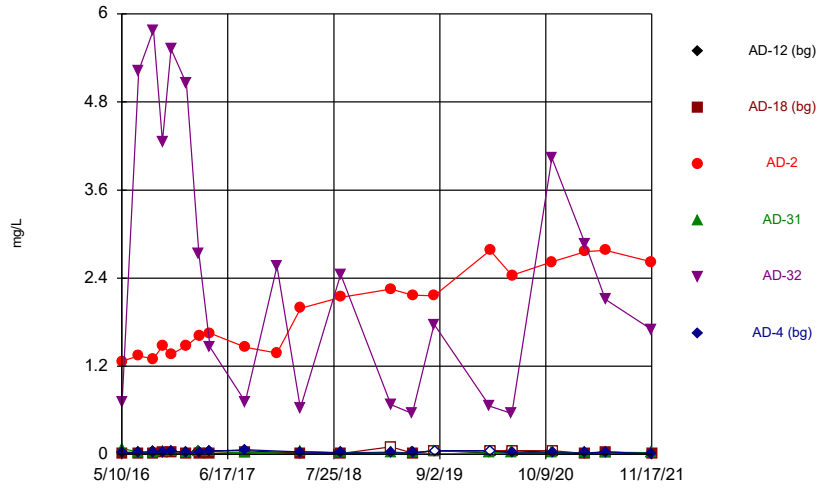
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### Time Series



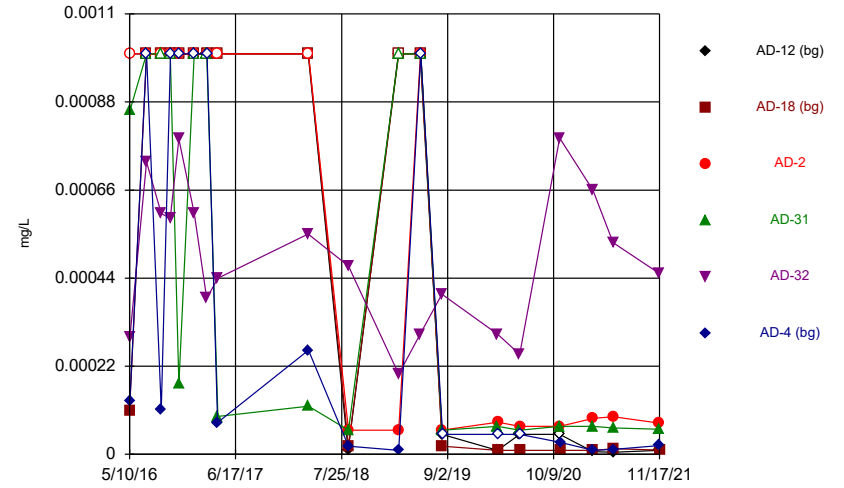
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### Time Series



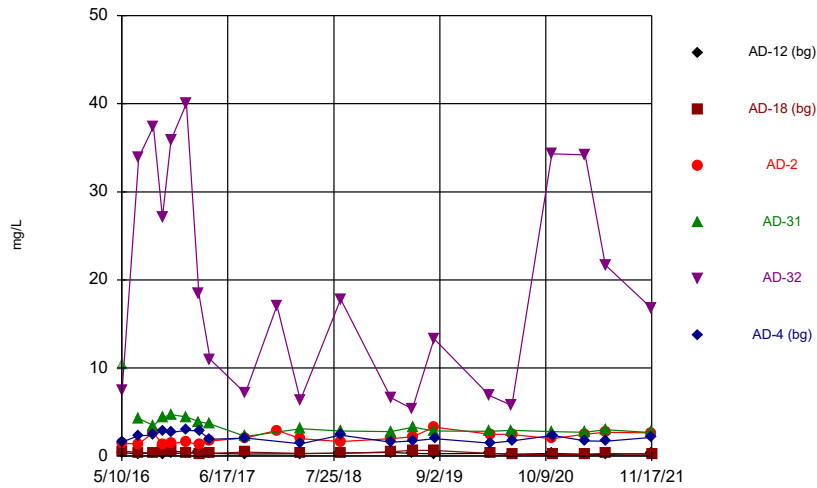
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### Time Series



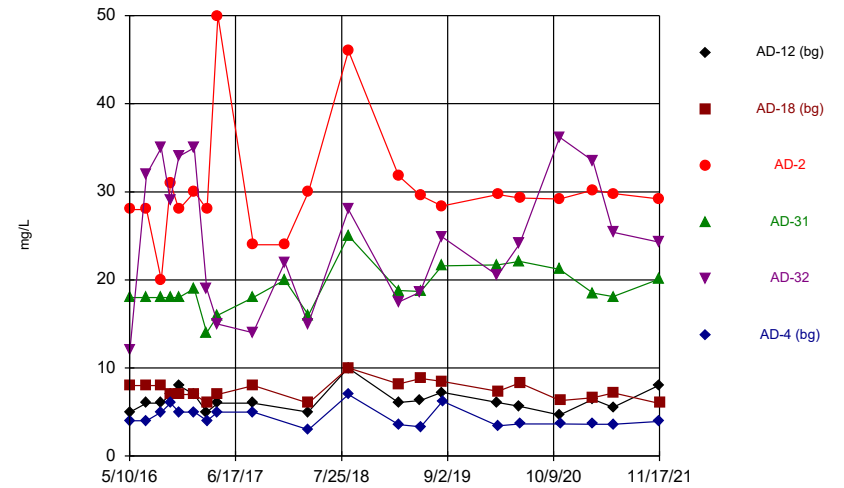
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### Time Series



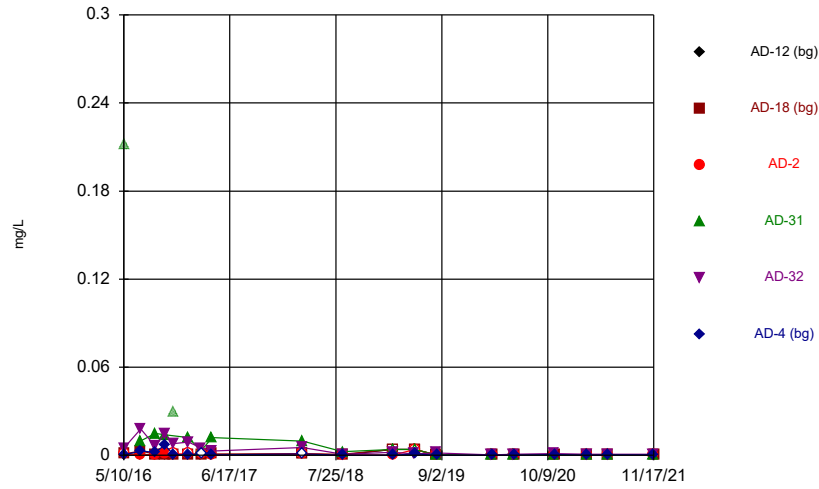
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### Time Series



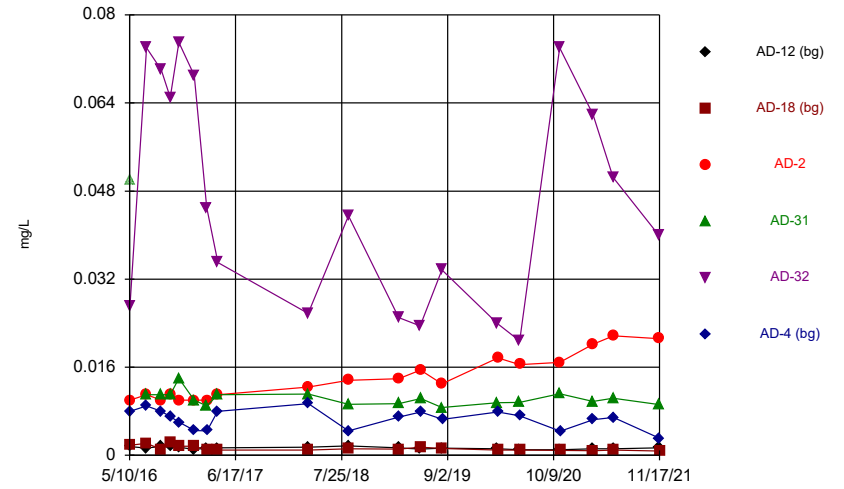
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### Time Series



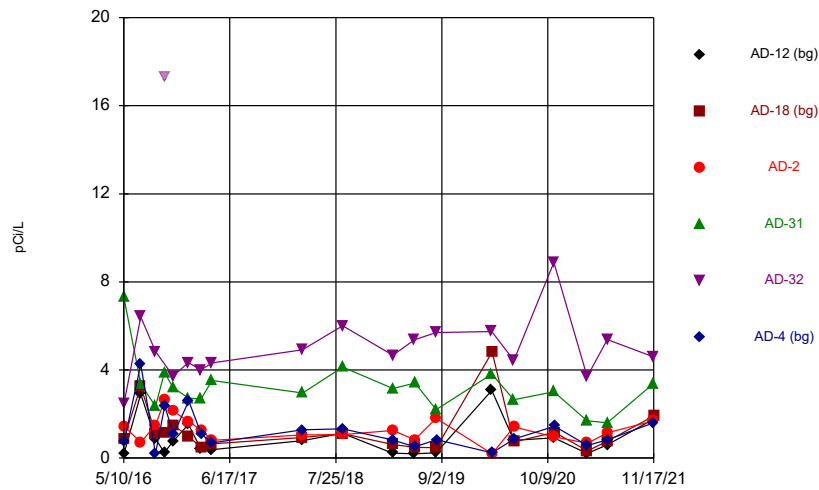
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### Time Series



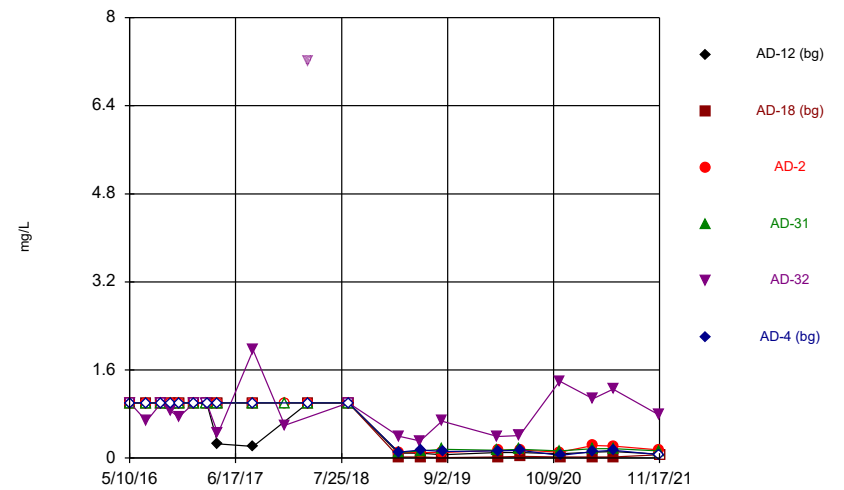
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### Time Series



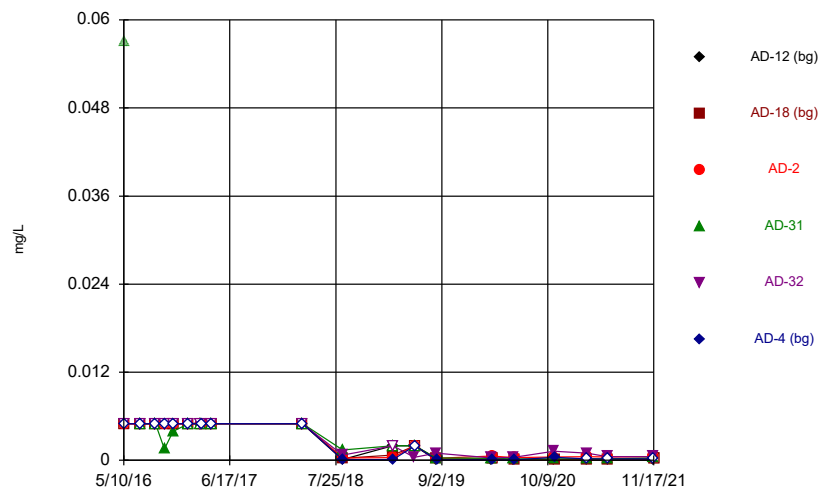
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### Time Series



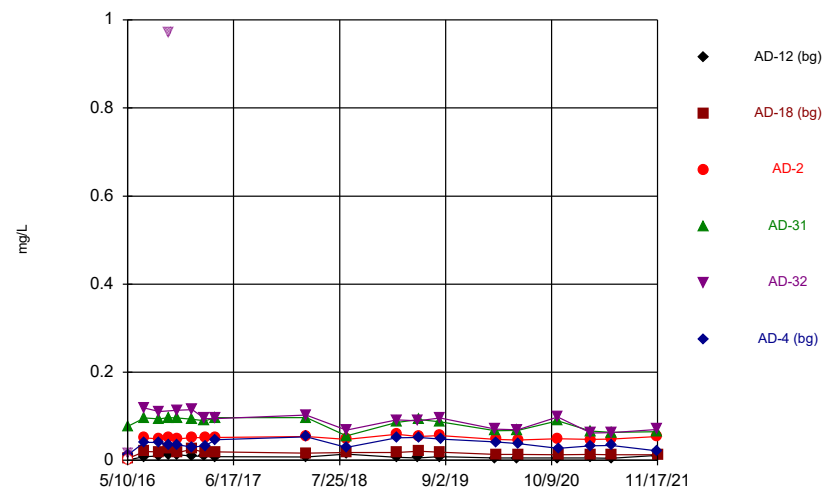
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Time Series



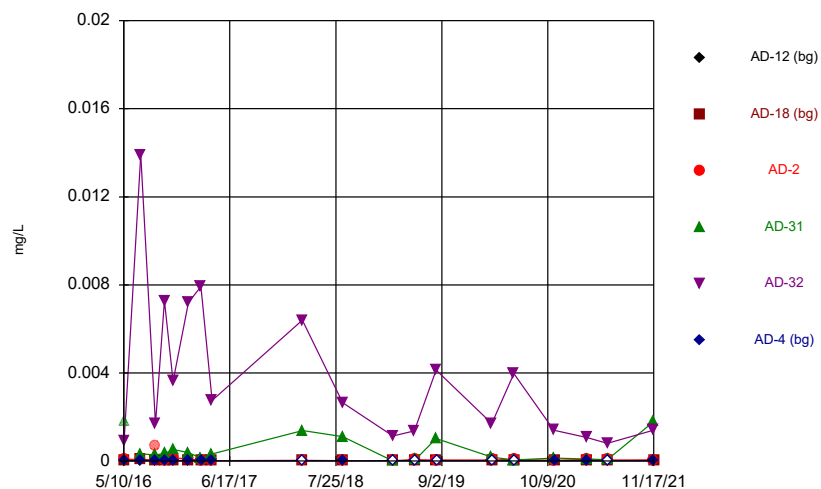
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Time Series



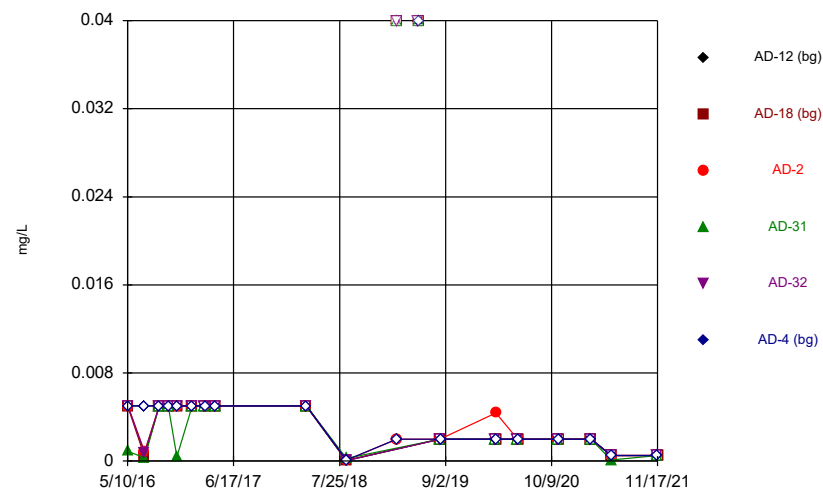
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Time Series



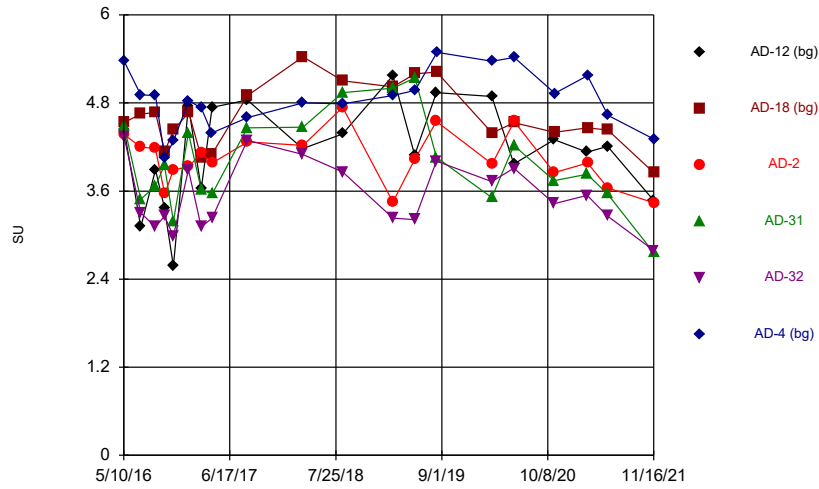
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Time Series



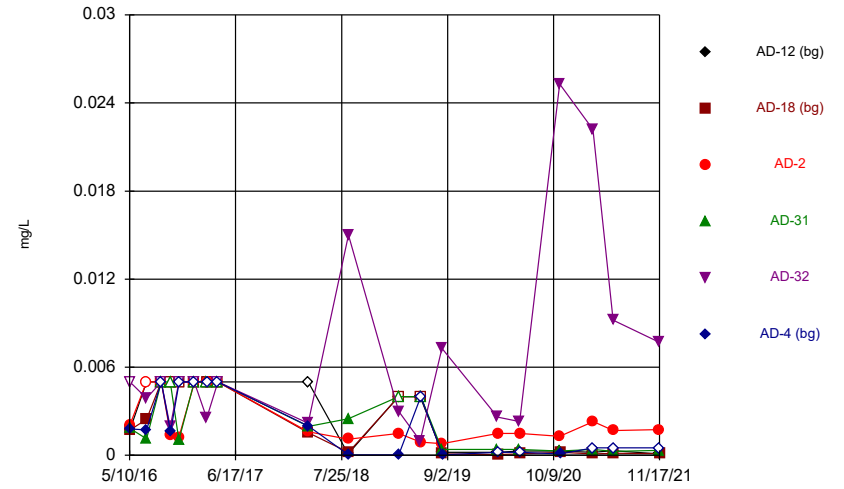
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### Time Series



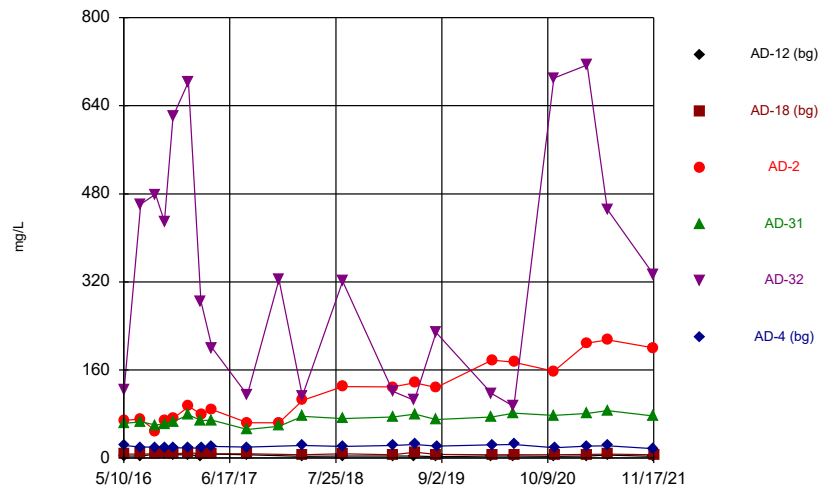
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### Time Series



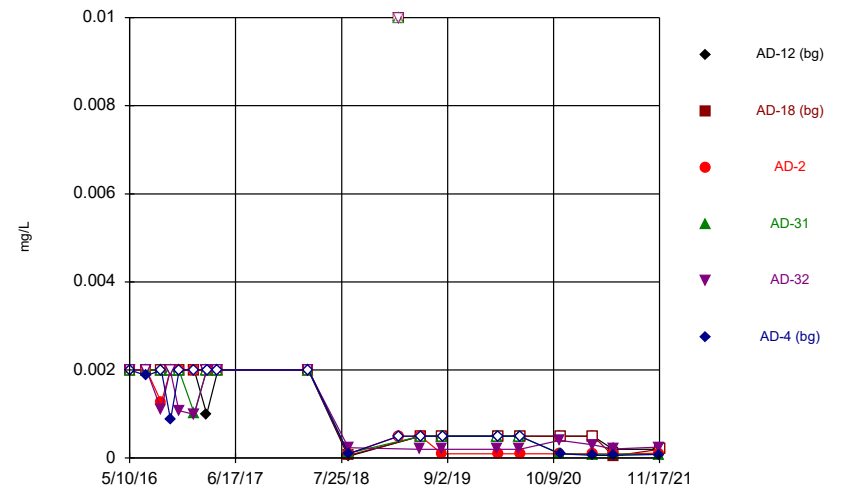
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### Time Series



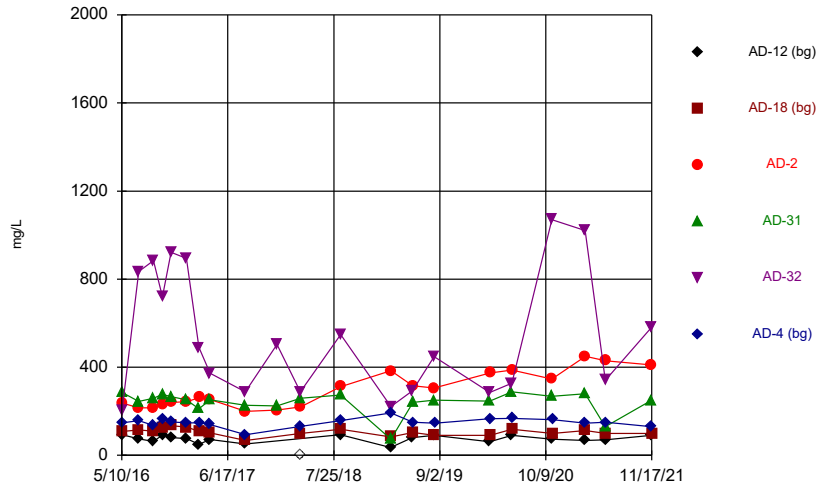
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Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Time Series



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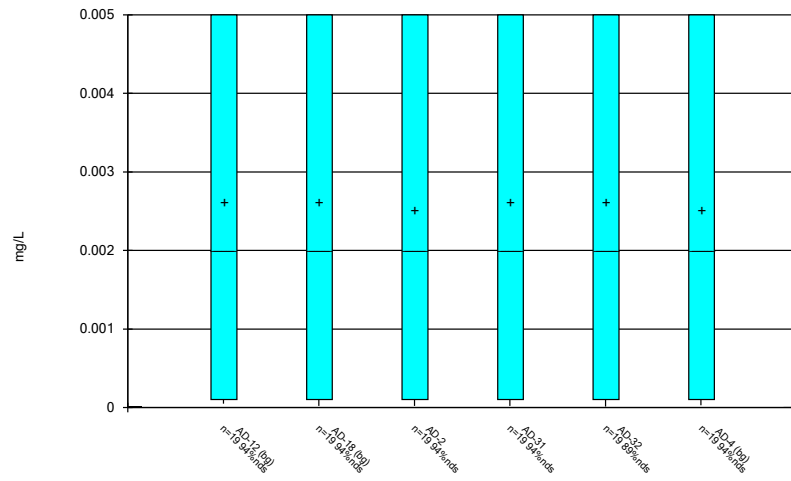
### Time Series



Constituent: Total Dissolved Solids Analysis Run 2/21/2022 10:17 AM  
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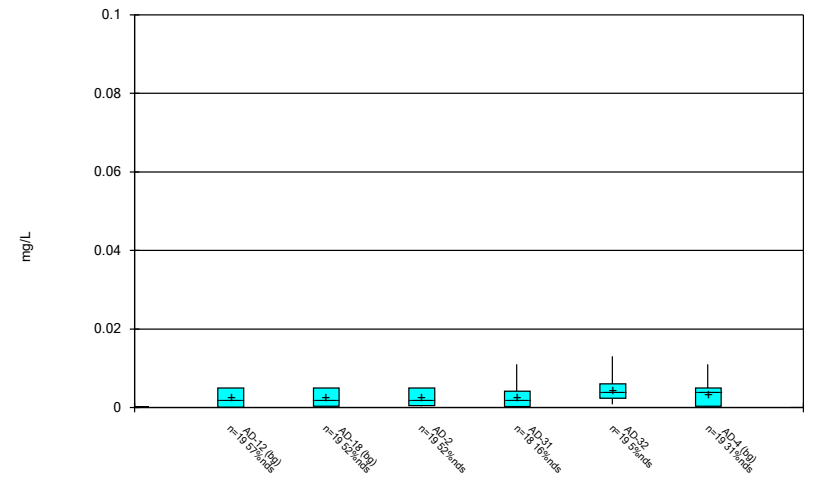


Box & Whiskers Plot



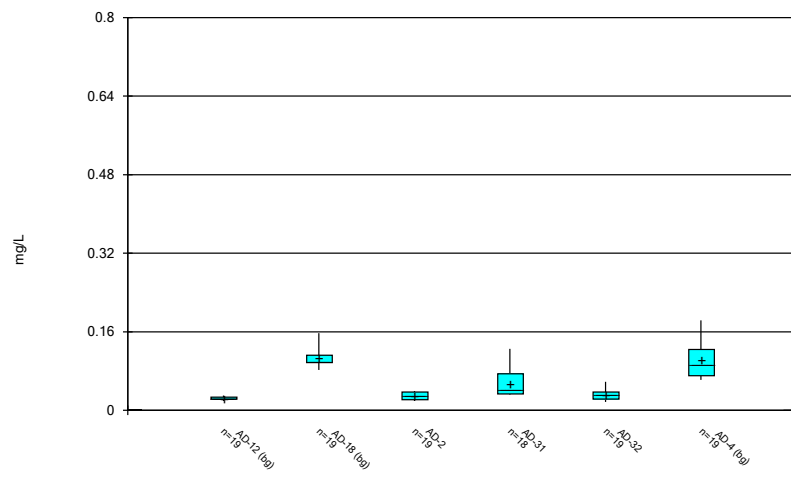
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Box & Whiskers Plot



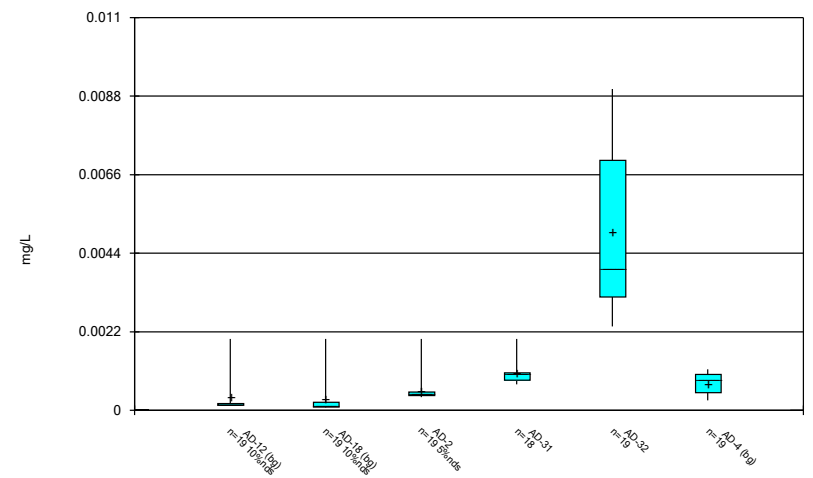
Constituent: Arsenic, total Analysis Run 2/21/2022 10:18 AM  
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Box & Whiskers Plot



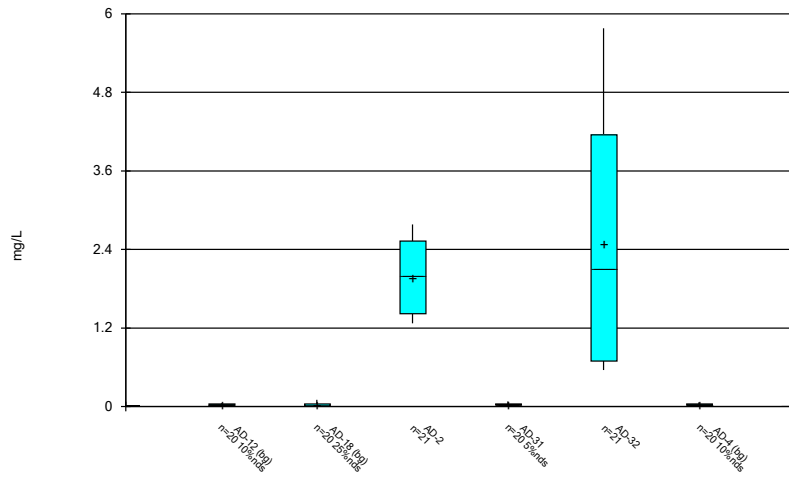
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Box & Whiskers Plot



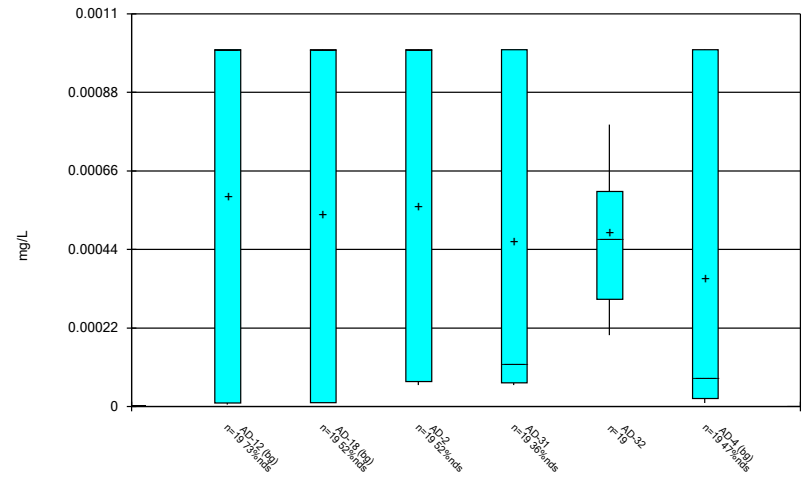
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Box & Whiskers Plot



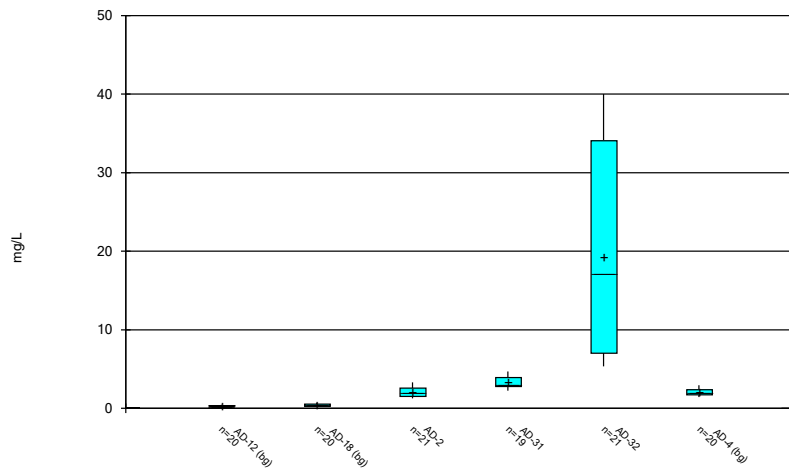
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Box & Whiskers Plot



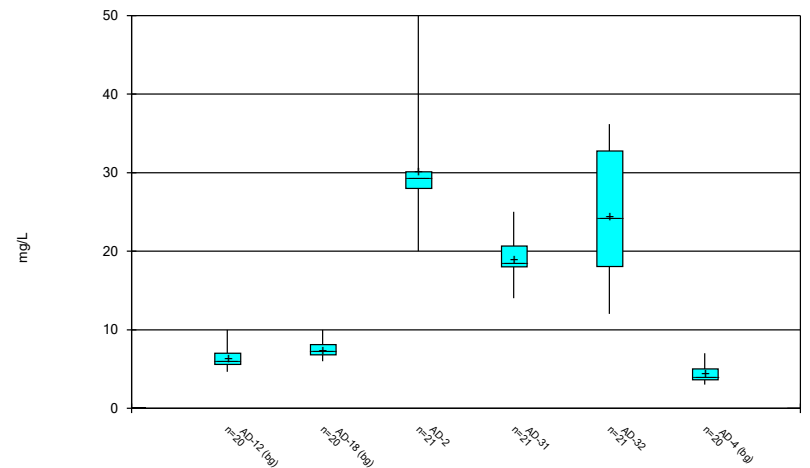
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Box & Whiskers Plot



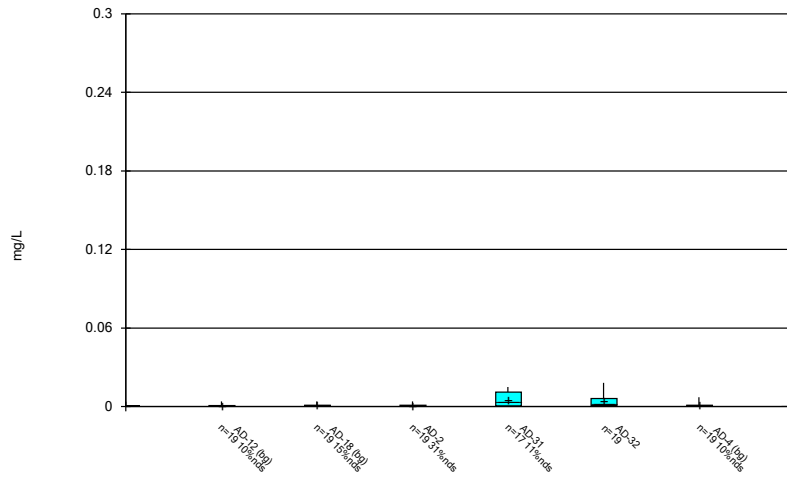
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Box & Whiskers Plot



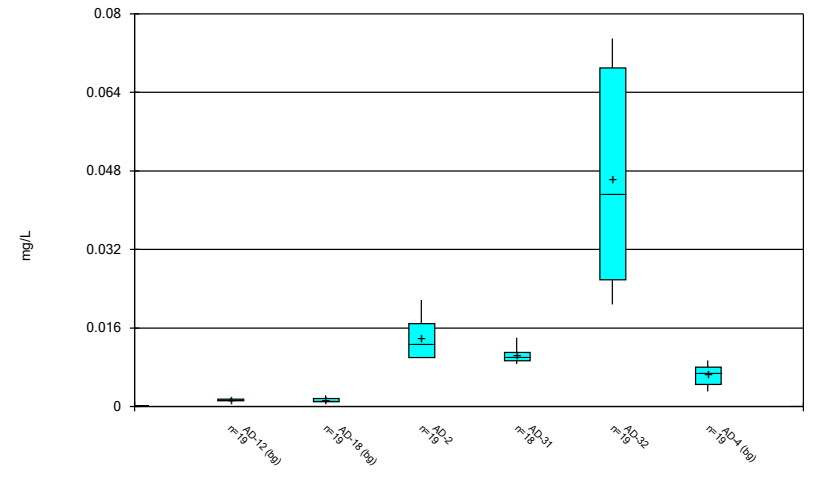
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### Box & Whiskers Plot



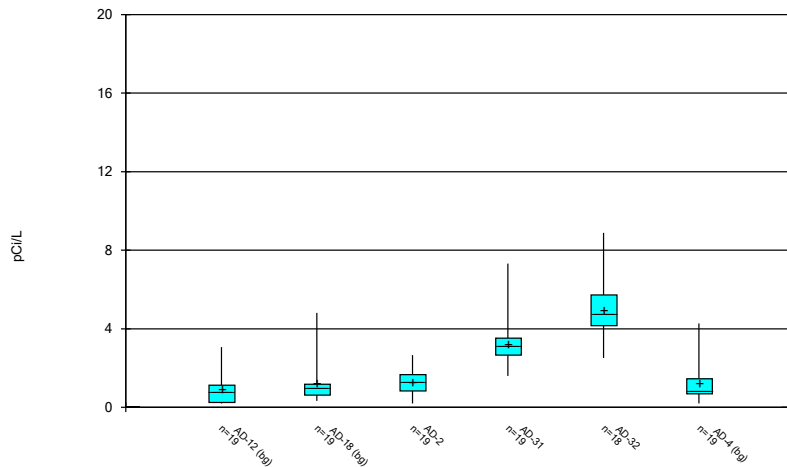
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### Box & Whiskers Plot



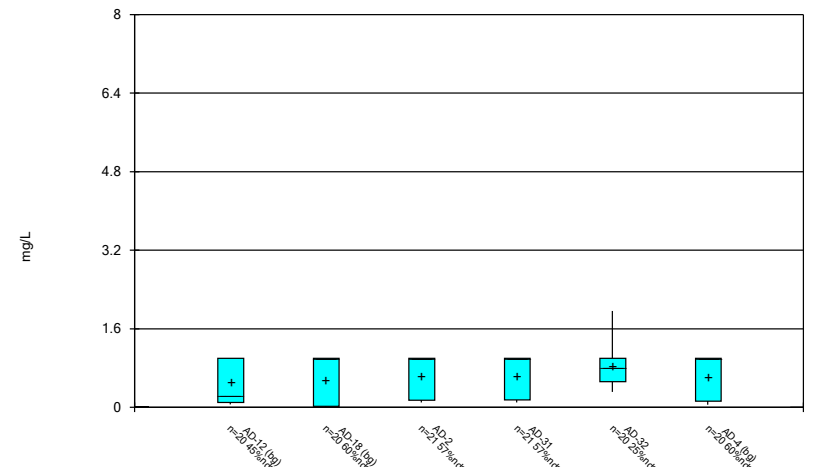
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### Box & Whiskers Plot



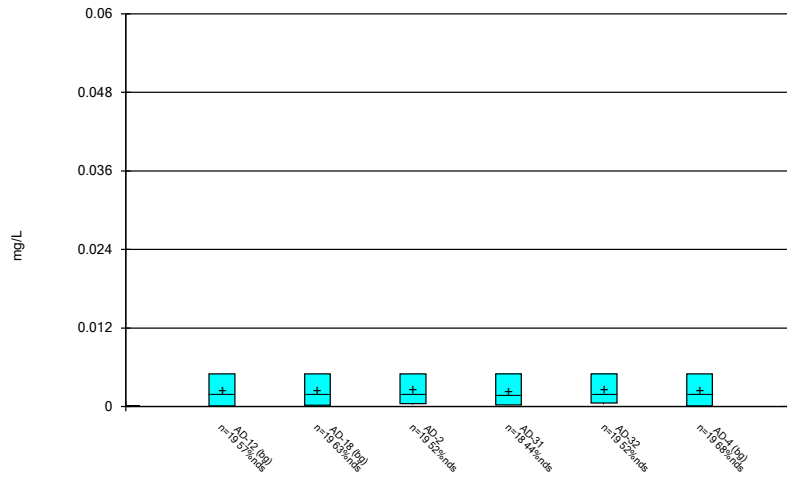
Constituent: Combined Radium 226 + 228 Analysis Run 2/21/2022 10:18 AM  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Box & Whiskers Plot



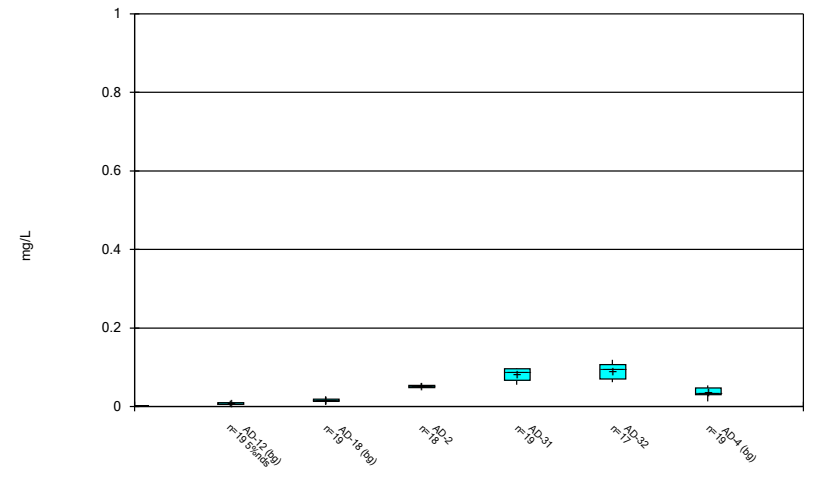
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Box & Whiskers Plot



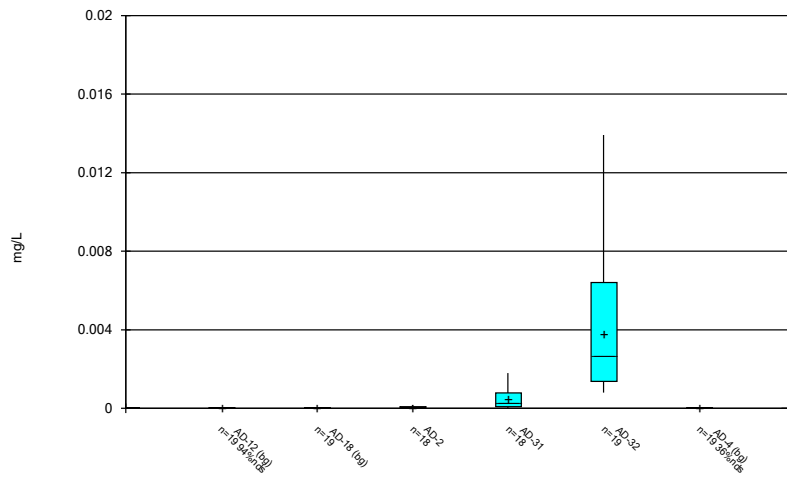
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Box & Whiskers Plot



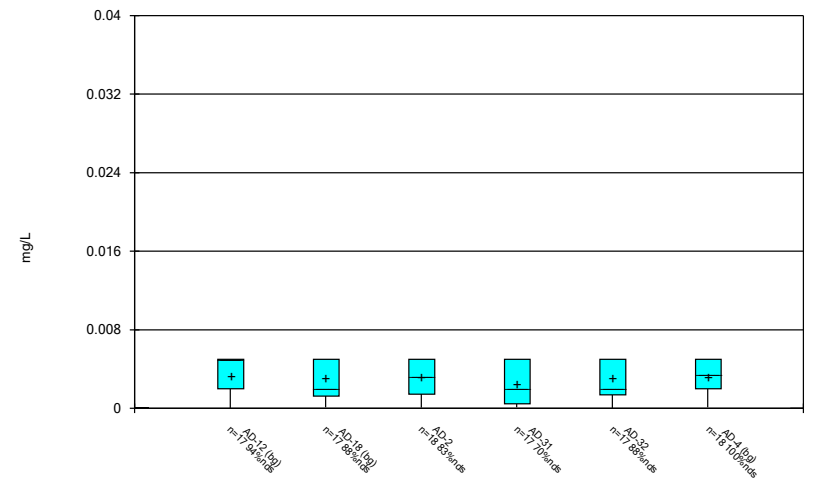
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Box & Whiskers Plot



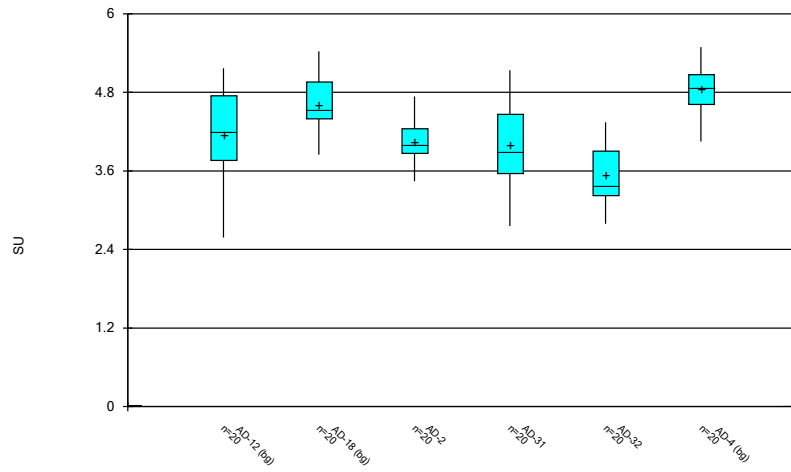
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Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Box & Whiskers Plot



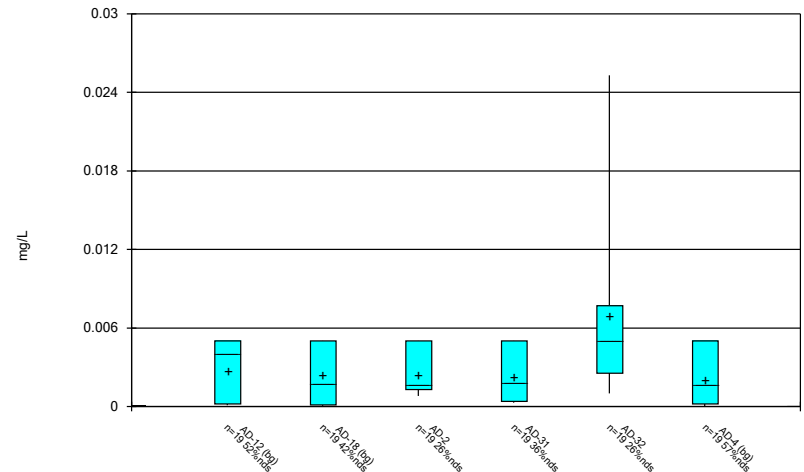
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Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Box & Whiskers Plot



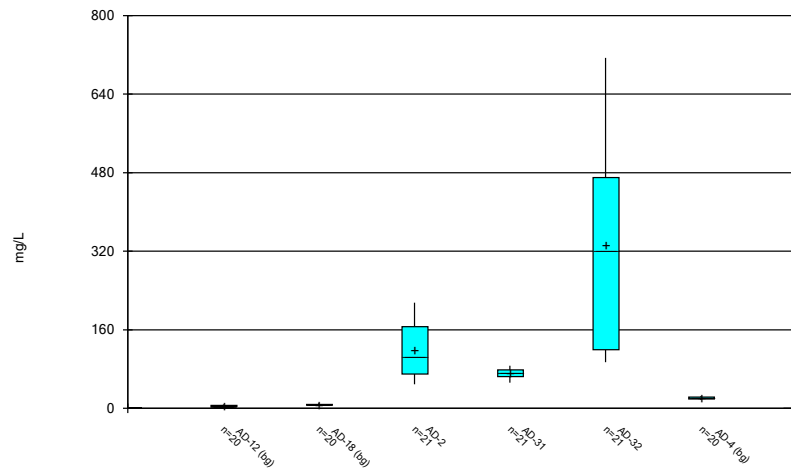
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Box & Whiskers Plot



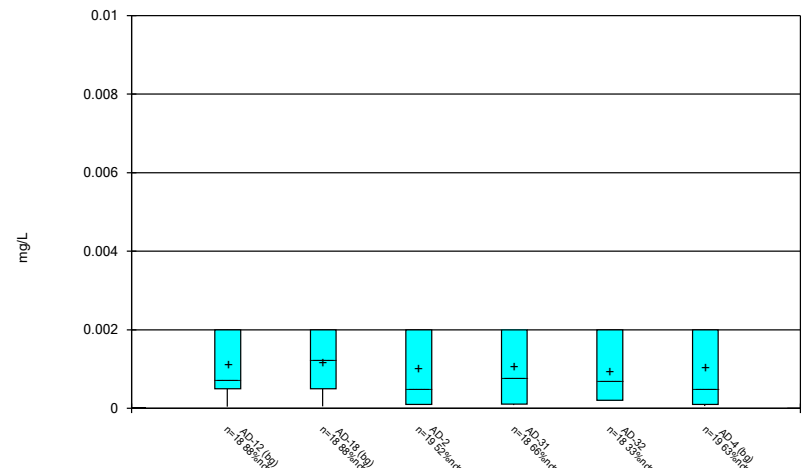
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Box & Whiskers Plot



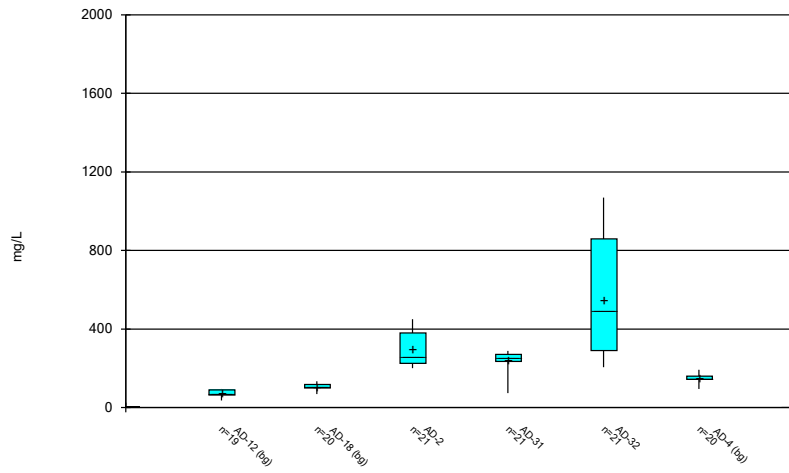
Constituent: Sulfate, total Analysis Run 2/21/2022 10:18 AM  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Box & Whiskers Plot



Constituent: Thallium, total Analysis Run 2/21/2022 10:18 AM  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Box & Whiskers Plot



Constituent: Total Dissolved Solids Analysis Run 2/21/2022 10:18 AM  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

# Outlier Summary

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 2/21/2022, 10:21 AM

Date	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-31 Chromium, total (mg/L)	AD-31 Cobalt, total (mg/L)	AD-32 Combined Radium 226 + 228 (pCi/L)	AD-31 Fluoride, total (mg/L)	AD-31 Lead, total (mg/L)	AD-2 Lithium, total (mg/L)	AD-32 Lithium, total (mg/L)	AD-2 Mercury, 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)	<0.001 (o)	0.016 (o)		
9/7/2016												0.000675 (o)
10/12/2016							17.32 (o)			0.972 (o)		
11/14/2016					0.03 (o)							
3/21/2018								7.2 (o)				
2/27/2019												
2/28/2019												
5/21/2019												
5/22/2019												
5/23/2019												

Date	AD-31 Mercury, total (mg/L)	AD-12 Molybdenum, total (mg/L)	AD-18 Molybdenum, total (mg/L)	AD-2 Molybdenum, total (mg/L)	AD-31 Molybdenum, total (mg/L)	AD-32 Molybdenum, total (mg/L)	AD-4 Molybdenum, 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	0.001797 (o)											
9/7/2016												
10/12/2016												
11/14/2016												
3/21/2018												<5 (o)
2/27/2019	<0.04 (o)							<0.01 (o)				
2/28/2019		<0.04 (o)		<0.04 (o)	<0.04 (o)			<0.01 (o)	<0.01 (o)	<0.01 (o)		
5/21/2019	<0.04 (o)				<0.04 (o)							
5/22/2019			<0.04 (o)									
5/23/2019		<0.04 (o)		<0.04 (o)		<0.04 (o)						

# Tukey's Outlier Test - Upgradient Wells - All Results (No Significant)

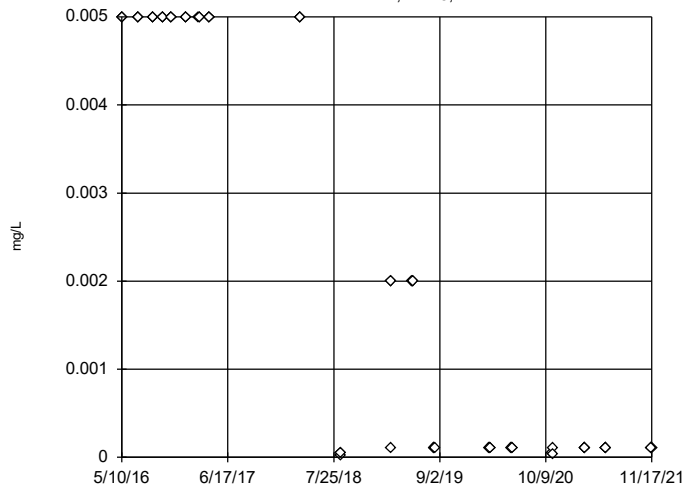
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 1/31/2022, 4:04 PM

Constituent	Well	Outlier	Value(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Antimony, total (mg/L)	AD-12,AD-18,AD-4	n/a	n/a	NP	NaN	57	0.002582	0.002372	unknown	ShapiroFrancia
Arsenic, total (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	NaN	57	0.00289	0.002561	x^(1/3)	ShapiroFrancia
Barium, total (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	NaN	57	0.07748	0.04383	normal	ShapiroFrancia
Beryllium, total (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	NaN	57	0.0004714	0.0005295	ln(x)	ShapiroFrancia
Boron, total (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	NaN	60	0.02872	0.0171	ln(x)	ShapiroFrancia
Cadmium, total (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	NaN	57	0.0004955	0.0004844	ln(x)	ShapiroFrancia
Calcium, total (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	NaN	60	0.9223	0.882	ln(x)	ShapiroFrancia
Chloride, total (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	NaN	60	6.07	1.698	normal	ShapiroFrancia
Chromium, total (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	NaN	57	0.0009263	0.001336	ln(x)	ShapiroFrancia
Cobalt, total (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	NaN	57	0.003076	0.002735	ln(x)	ShapiroFrancia
Combined Radium 226 + 228 (pCi/L)	AD-12,AD-18,AD-4	No	n/a	NP	NaN	57	1.122	0.9726	ln(x)	ShapiroFrancia
Fluoride, total (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	NaN	60	0.5588	0.4618	ln(x)	ShapiroFrancia
Lead, total (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	NaN	57	0.002578	0.002365	ln(x)	ShapiroFrancia
Lithium, total (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	NaN	57	0.02051	0.0141	x^(1/3)	ShapiroFrancia
Mercury, total (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	NaN	57	0.00001647	0.0000113	x^(1/3)	ShapiroFrancia
Molybdenum, total (mg/L)	AD-12,AD-18,AD-4	n/a	n/a	NP	NaN	57	0.006415	0.01067	unknown	ShapiroFrancia
Selenium, total (mg/L)	AD-12,AD-18,AD-4	n/a	n/a	NP	NaN	57	0.002357	0.002183	unknown	ShapiroFrancia
Sulfate, total (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	NaN	60	11.01	7.43	ln(x)	ShapiroFrancia
Thallium, total (mg/L)	AD-12,AD-18,AD-4	n/a	n/a	NP	NaN	57	0.001428	0.001839	unknown	ShapiroFrancia
Total Dissolved Solids (mg/L)	AD-12,AD-18,AD-4	No	n/a	NP	NaN	60	108.6	37.54	normal	ShapiroFrancia



### Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

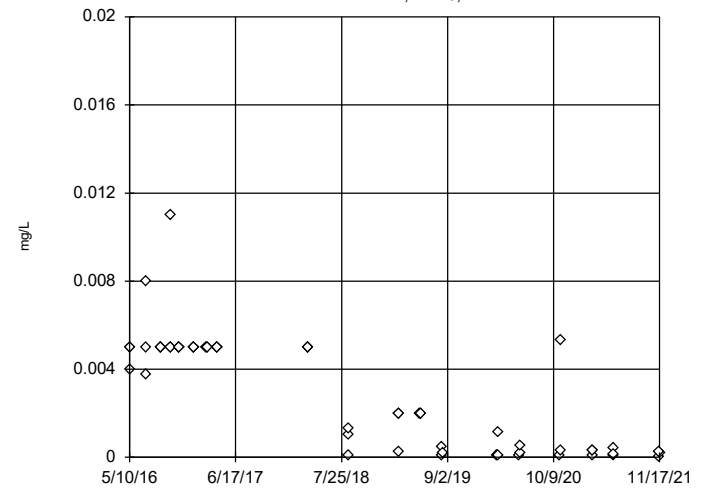


n = 57  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Constituent: Antimony, total Analysis Run 1/31/2022 4:02 PM View: AIII + AIV  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

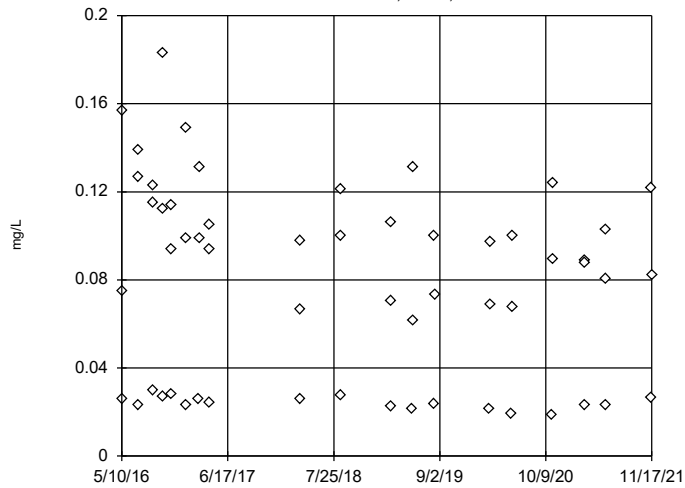


n = 57  
 No outliers found.  
 Tukey's method selected by user.  
 Data were cube root transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.1204, low cutoff = -0.01744, based on IQR multiplier of 3.

Constituent: Arsenic, total Analysis Run 1/31/2022 4:02 PM View: AIII + AIV  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

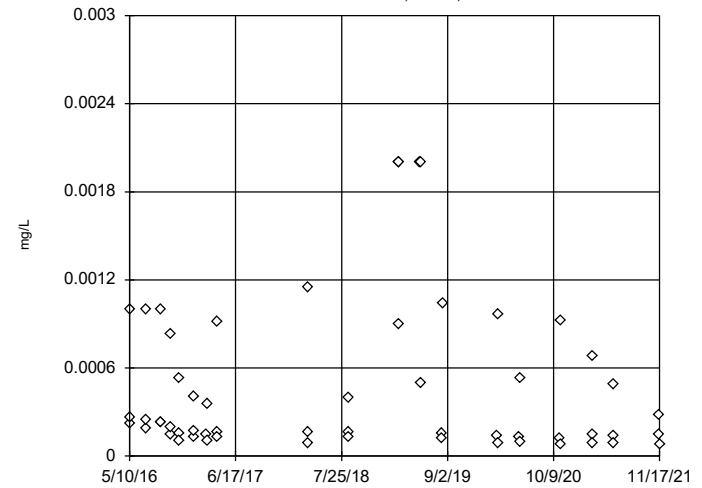


n = 57  
 No outliers found.  
 Tukey's method selected by user.  
 Ladder of Powers transformations did not improve normality, analysis run on raw data.  
 High cutoff = 0.3573, low cutoff = -0.222, based on IQR multiplier of 3.

Constituent: Barium, total Analysis Run 1/31/2022 4:02 PM View: AIII + AIV  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

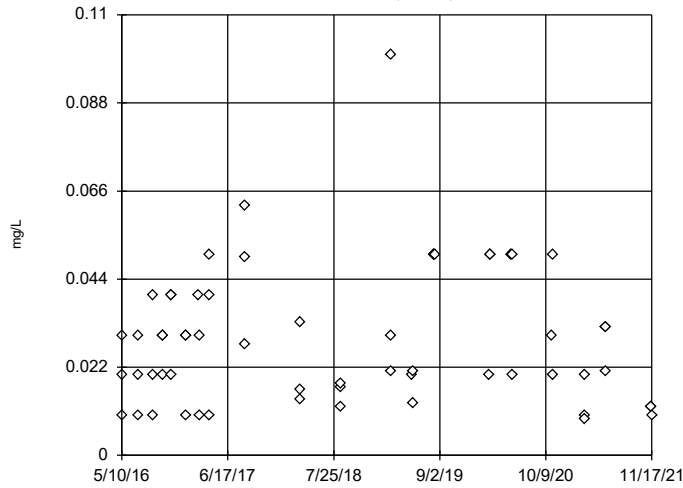


n = 57  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.141, low cutoff = 7.0e-7, based on IQR multiplier of 3.

Constituent: Beryllium, total Analysis Run 1/31/2022 4:02 PM View: AIII + AIV  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

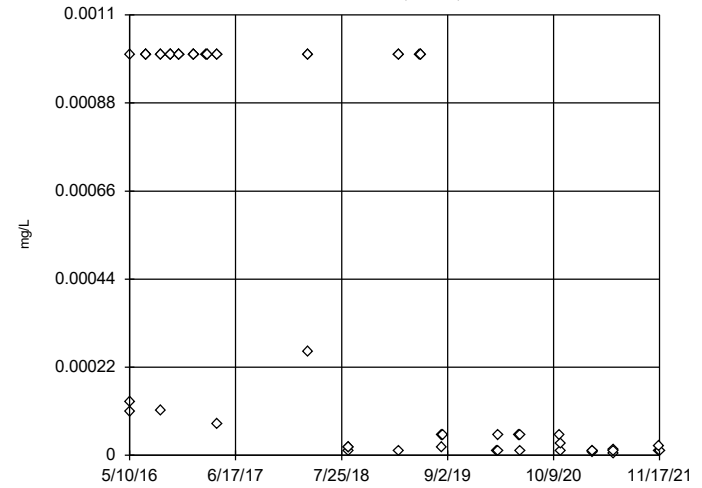


n = 60  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.5499, low cutoff = 0.001215, based on IQR multiplier of 3.

Constituent: Boron, total Analysis Run 1/31/2022 4:02 PM View: All + AIV  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

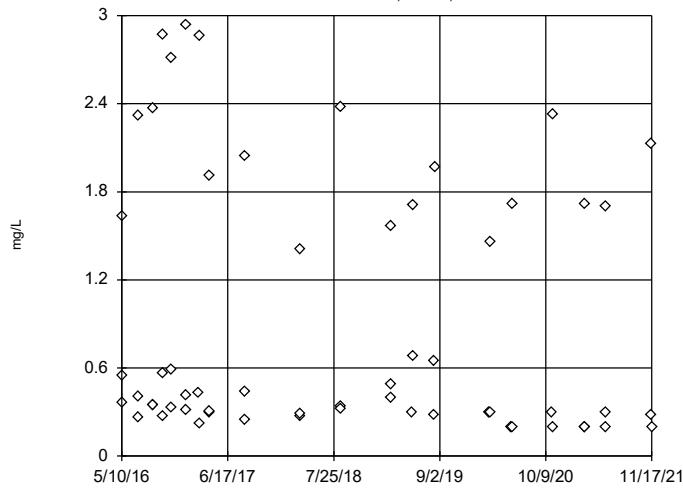


n = 57  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 213.4, low cutoff = 7.8e-11, based on IQR multiplier of 3.

Constituent: Cadmium, total Analysis Run 1/31/2022 4:02 PM View: All + AIV  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

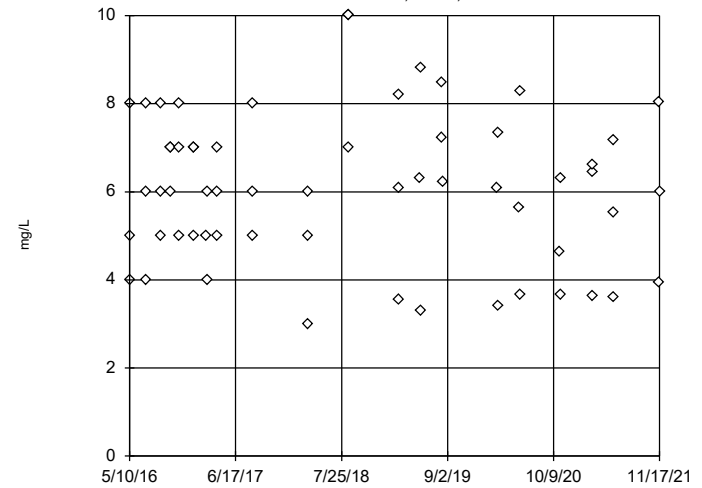


n = 60  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 327.6, low cutoff = 0.001538, based on IQR multiplier of 3.

Constituent: Calcium, total Analysis Run 1/31/2022 4:02 PM View: All + AIV  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

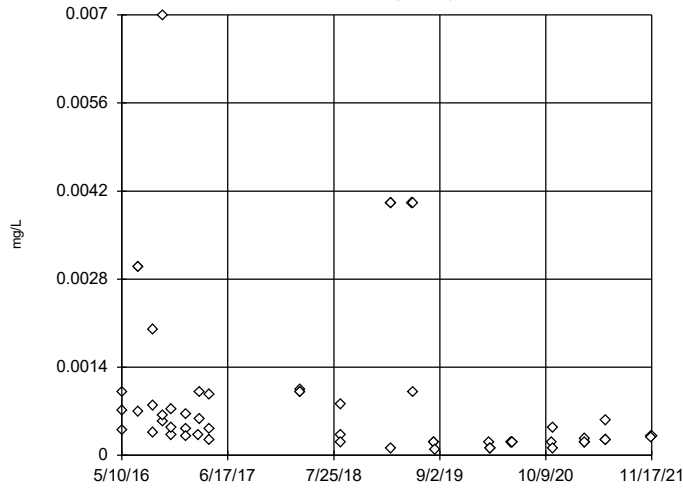


n = 60  
 No outliers found.  
 Tukey's method selected by user.  
 Ladder of Powers transformations did not improve normality; analysis run on raw data.  
 High cutoff = 13.32, low cutoff = -1.24, based on IQR multiplier of 3.

Constituent: Chloride, total Analysis Run 1/31/2022 4:02 PM View: All + AIV  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

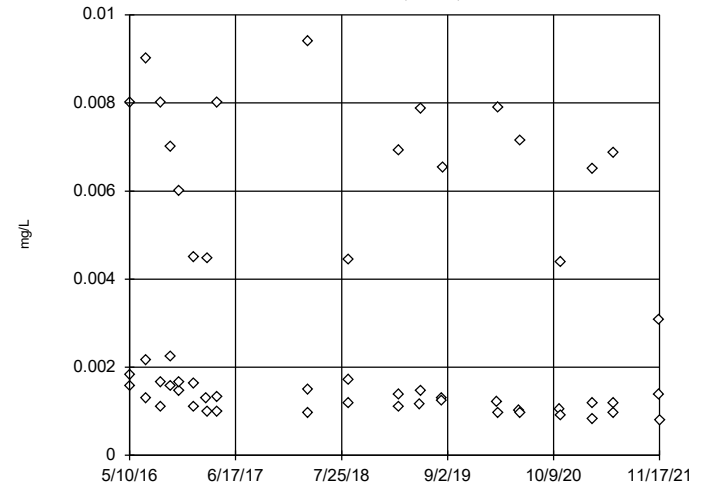


n = 57  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.1011, low cutoff = 0.00002043, based on IQR multiplier of 3.

Constituent: Chromium, total Analysis Run 1/31/2022 4:02 PM View: All + AIV  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

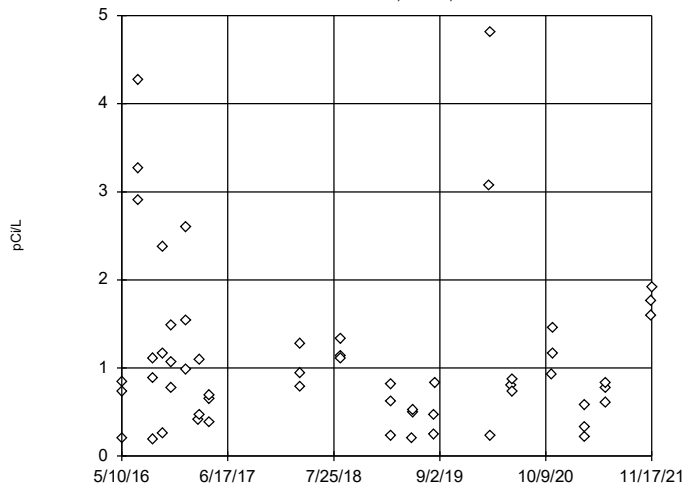


n = 57  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.5069, low cutoff = 0.00001159, based on IQR multiplier of 3.

Constituent: Cobalt, total Analysis Run 1/31/2022 4:02 PM View: All + AIV  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

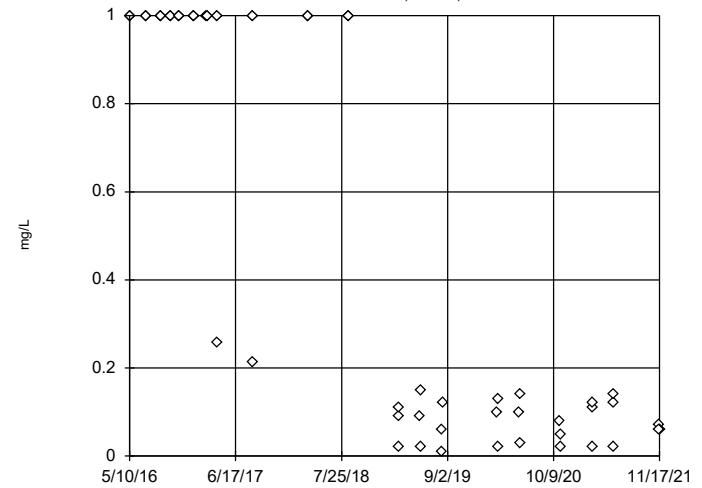


n = 57  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 22.57, low cutoff = 0.02916, based on IQR multiplier of 3.

Constituent: Combined Radium 226 + 228 Analysis Run 1/31/2022 4:02 PM View: All + AIV  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

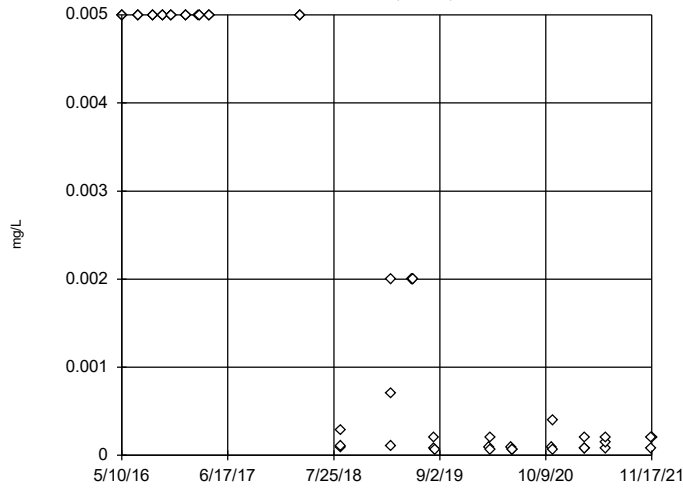


n = 60  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 1372, low cutoff = 0.00006561, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 1/31/2022 4:02 PM View: All + AIV  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

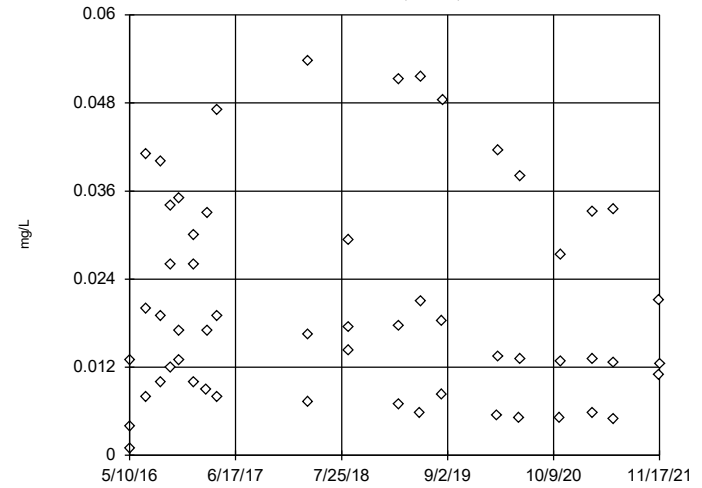


n = 57  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 754.5, low cutoff = 6.2e-10, based on IQR multiplier of 3.

Constituent: Lead, total Analysis Run 1/31/2022 4:02 PM View: AllI + AIV  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

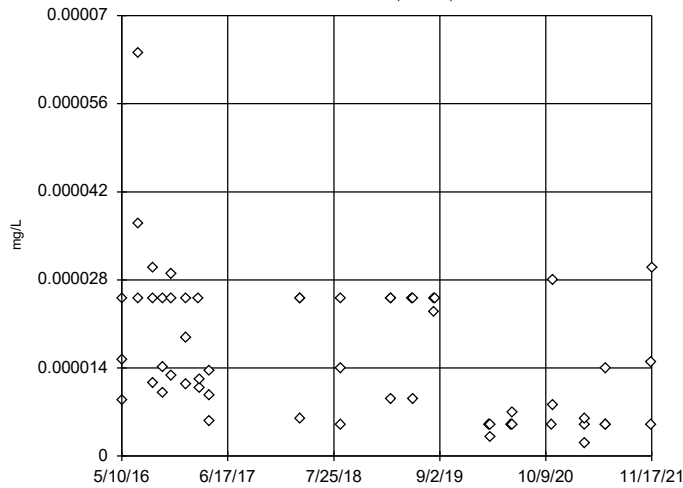


n = 57  
 No outliers found.  
 Tukey's method selected by user.  
 Data were cube root transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.2474, low cutoff = -0.001009, based on IQR multiplier of 3.

Constituent: Lithium, total Analysis Run 1/31/2022 4:02 PM View: AllI + AIV  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

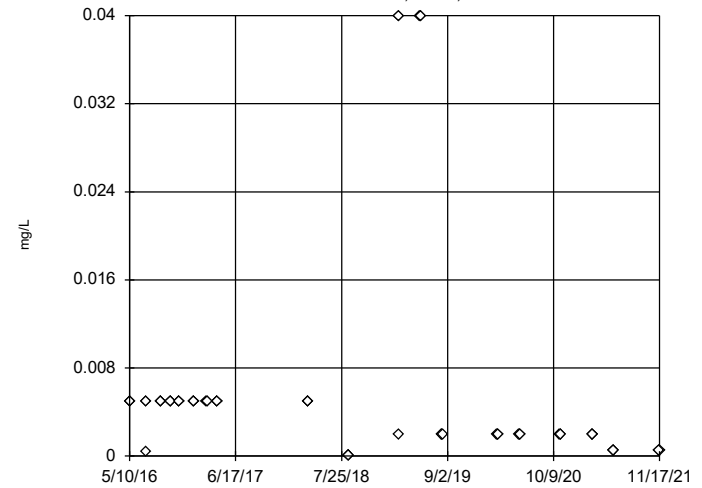


n = 57  
 No outliers found.  
 Tukey's method selected by user.  
 Data were cube root transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 0.0002435, low cutoff = -0.000003399, based on IQR multiplier of 3.

Constituent: Mercury, total Analysis Run 1/31/2022 4:02 PM View: AllI + AIV  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

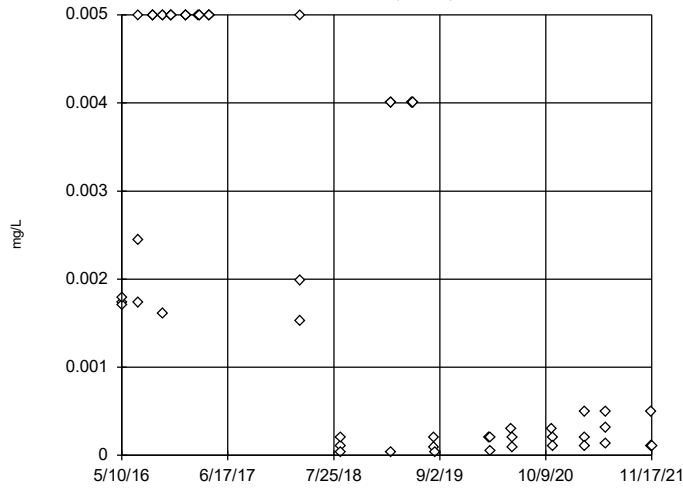


n = 57  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Constituent: Molybdenum, total Analysis Run 1/31/2022 4:02 PM View: AllI + AIV  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

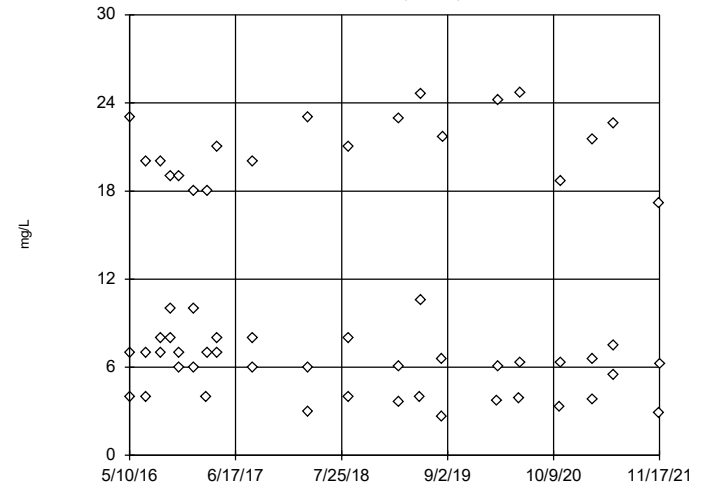


n = 57  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Constituent: Selenium, total Analysis Run 1/31/2022 4:02 PM View: All + AIV  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

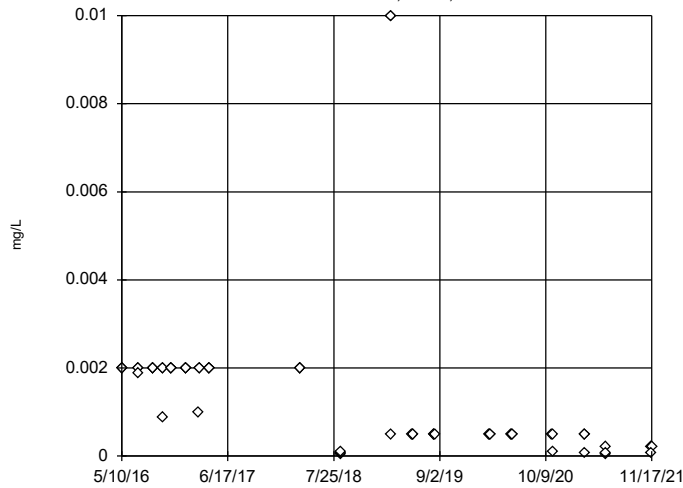


n = 60  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 High cutoff = 603.3, low cutoff = 0.1889, based on IQR multiplier of 3.

Constituent: Sulfate, total Analysis Run 1/31/2022 4:03 PM View: All + AIV  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4

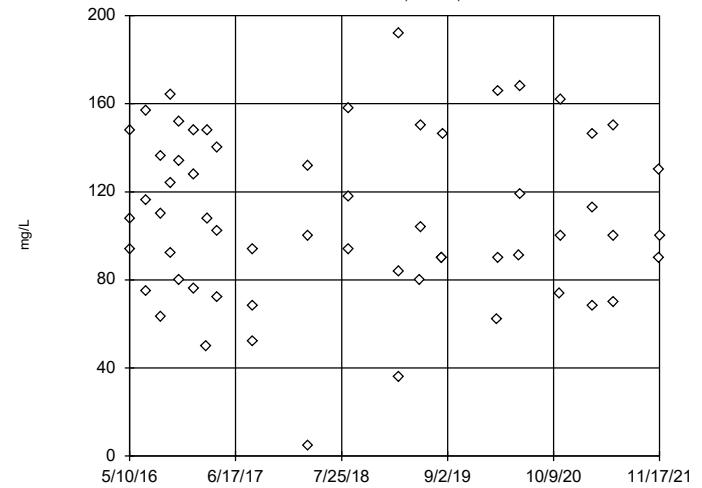


n = 57  
 No outliers found.  
 Tukey's method selected by user.  
 Data were natural log transformed to achieve best W statistic (graph shown in original units).  
 The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Constituent: Thallium, total Analysis Run 1/31/2022 4:03 PM View: All + AIV  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-4



n = 60  
 No outliers found.  
 Tukey's method selected by user.  
 Ladder of Powers transformations did not improve normality; analysis run on raw data.  
 High cutoff = 326, low cutoff = -101, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids Analysis Run 1/31/2022 4:03 PM View: All + AIV  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

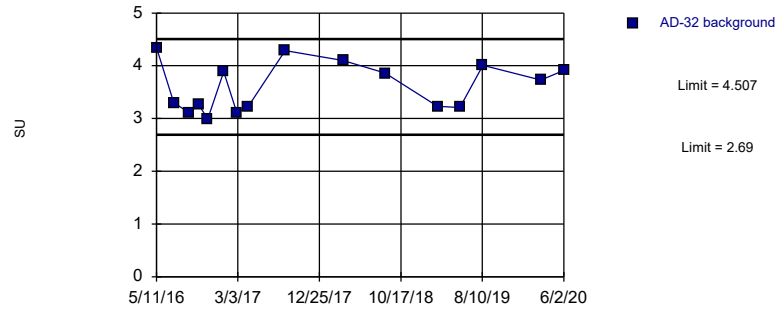
# Intrawell Prediction Limits

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 1/31/2022, 4:06 PM

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



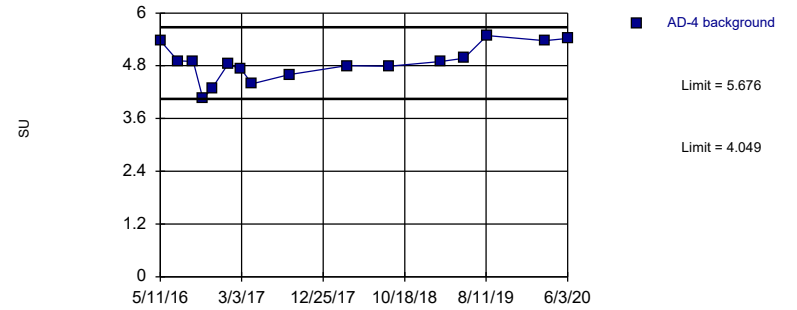
Prediction Limit  
Intrawell Parametric, AD-32



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 1/31/2022 4:05 PM View: All Intrawell  
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 1/31/2022 4:05 PM View: All Intrawell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP



# Trend Test - Significant Results

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 1/20/2022, 10:04 AM

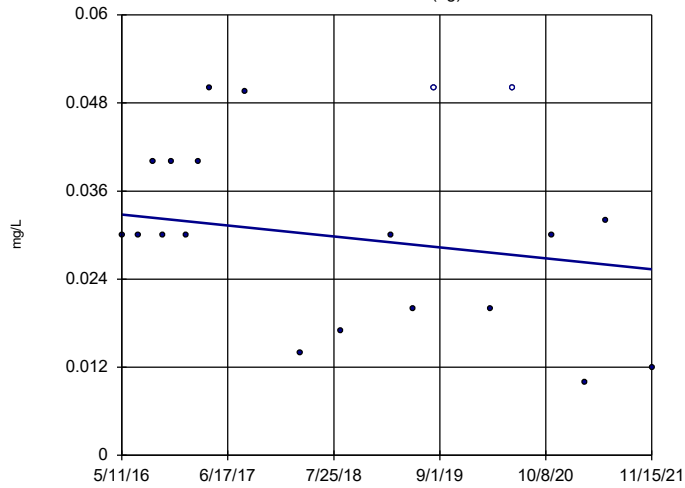
<u>Constituent</u>	<u>Well</u>	<u>Slope</u>	<u>Calc.</u>	<u>Critical</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Normality</u>	<u>Xform</u>	<u>Alpha</u>	<u>Method</u>
Fluoride, total (mg/L)	AD-12 (bg)	-0.1502	-102	-81	Yes	20	45	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	AD-18 (bg)	-0.186	-88	-81	Yes	20	60	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	AD-4 (bg)	-0.1816	-103	-81	Yes	20	60	n/a	n/a	0.01	NP

# Trend Test - All Results

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 1/20/2022, 10:04 AM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Boron, total (mg/L)	AD-12 (bg)	-0.001355	-26	-81	No	20	10	n/a	n/a	0.01	NP
Boron, total (mg/L)	AD-18 (bg)	0.0013	48	81	No	20	25	n/a	n/a	0.01	NP
Boron, total (mg/L)	AD-4 (bg)	0	-9	-81	No	20	10	n/a	n/a	0.01	NP
Calcium, total (mg/L)	AD-12 (bg)	-0.01512	-58	-81	No	20	0	n/a	n/a	0.01	NP
Calcium, total (mg/L)	AD-18 (bg)	-0.03684	-67	-81	No	20	0	n/a	n/a	0.01	NP
Calcium, total (mg/L)	AD-4 (bg)	-0.1155	-45	-81	No	20	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	AD-12 (bg)	0.01392	13	81	No	20	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	AD-18 (bg)	-0.08945	-19	-81	No	20	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	AD-4 (bg)	-0.09339	-45	-81	No	20	0	n/a	n/a	0.01	NP
<b>Fluoride, total (mg/L)</b>	<b>AD-12 (bg)</b>	<b>-0.1502</b>	<b>-102</b>	<b>-81</b>	<b>Yes</b>	<b>20</b>	<b>45</b>	<b>n/a</b>	<b>n/a</b>	<b>0.01</b>	<b>NP</b>
<b>Fluoride, total (mg/L)</b>	<b>AD-18 (bg)</b>	<b>-0.186</b>	<b>-88</b>	<b>-81</b>	<b>Yes</b>	<b>20</b>	<b>60</b>	<b>n/a</b>	<b>n/a</b>	<b>0.01</b>	<b>NP</b>
<b>Fluoride, total (mg/L)</b>	<b>AD-4 (bg)</b>	<b>-0.1816</b>	<b>-103</b>	<b>-81</b>	<b>Yes</b>	<b>20</b>	<b>60</b>	<b>n/a</b>	<b>n/a</b>	<b>0.01</b>	<b>NP</b>
Sulfate, total (mg/L)	AD-12 (bg)	-0.3331	-80	-81	No	20	0	n/a	n/a	0.01	NP
Sulfate, total (mg/L)	AD-18 (bg)	-0.1591	-48	-81	No	20	0	n/a	n/a	0.01	NP
Sulfate, total (mg/L)	AD-4 (bg)	0.4493	31	81	No	20	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	AD-12 (bg)	-0.5248	-14	-74	No	19	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	AD-18 (bg)	-2.575	-52	-81	No	20	0	n/a	n/a	0.01	NP
Total Dissolved Solids (mg/L)	AD-4 (bg)	0	3	81	No	20	0	n/a	n/a	0.01	NP

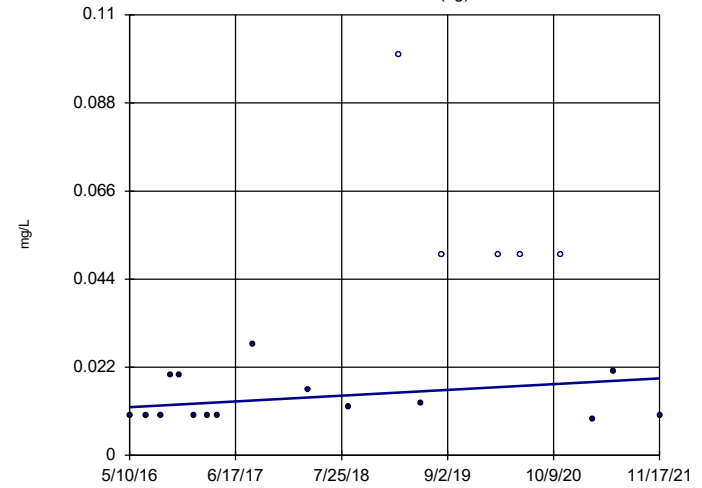
Sen's Slope Estimator  
AD-12 (bg)



n = 20  
Slope = -0.001355  
units per year.  
Mann-Kendall  
statistic = -26  
critical = -81  
Trend not sig-  
nificant at 99%  
confidence level  
( $\alpha = 0.005$  per  
tail).

Constituent: Boron, total Analysis Run 1/20/2022 10:02 AM View: All Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

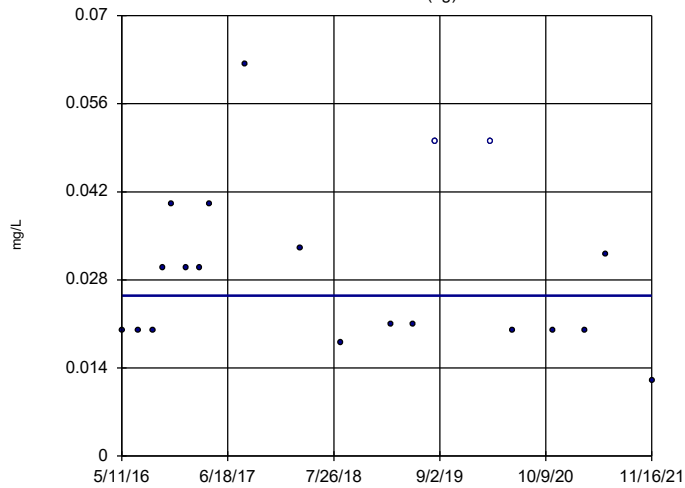
Sen's Slope Estimator  
AD-18 (bg)



n = 20  
Slope = 0.0013  
units per year.  
Mann-Kendall  
statistic = 48  
critical = 81  
Trend not sig-  
nificant at 99%  
confidence level  
( $\alpha = 0.005$  per  
tail).

Constituent: Boron, total Analysis Run 1/20/2022 10:02 AM View: All Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

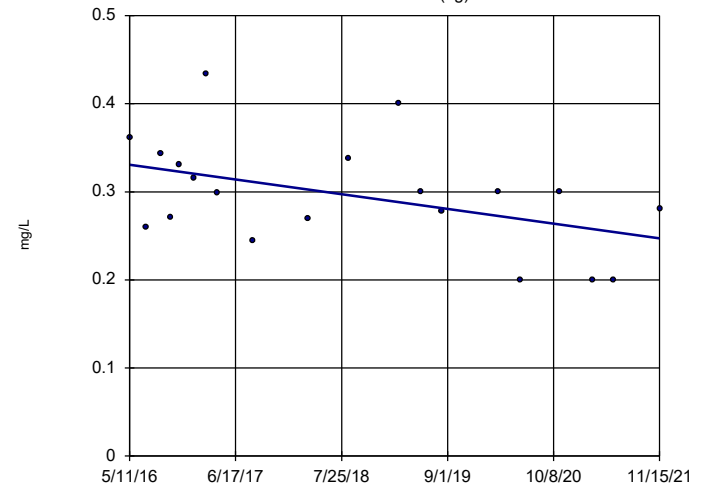
Sen's Slope Estimator  
AD-4 (bg)



n = 20  
Slope = 0  
units per year.  
Mann-Kendall  
statistic = -9  
critical = -81  
Trend not sig-  
nificant at 99%  
confidence level  
( $\alpha = 0.005$  per  
tail).

Constituent: Boron, total Analysis Run 1/20/2022 10:02 AM View: All Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

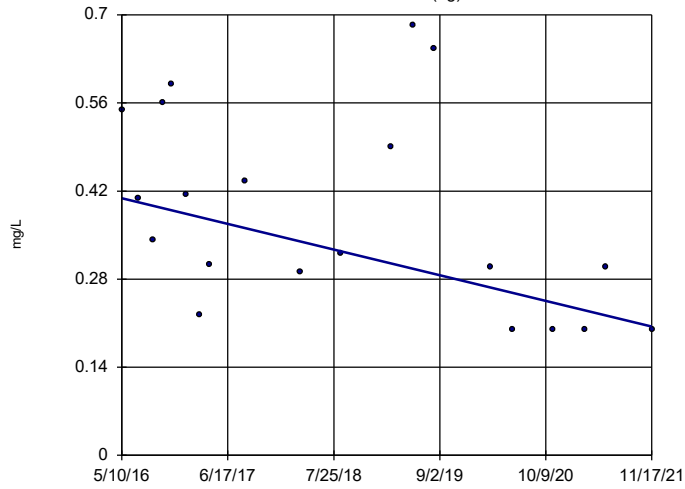
Sen's Slope Estimator  
AD-12 (bg)



n = 20  
Slope = -0.01512  
units per year.  
Mann-Kendall  
statistic = -58  
critical = -81  
Trend not sig-  
nificant at 99%  
confidence level  
( $\alpha = 0.005$  per  
tail).

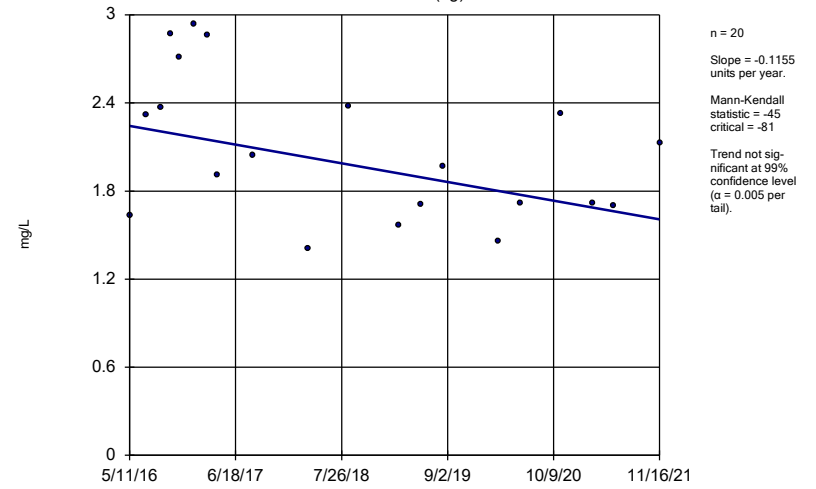
Constituent: Calcium, total Analysis Run 1/20/2022 10:02 AM View: All Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Sen's Slope Estimator  
AD-18 (bg)



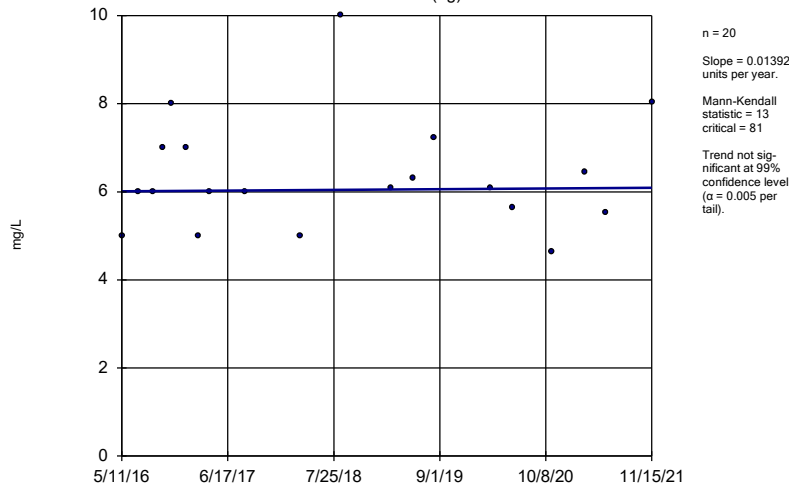
Constituent: Calcium, total Analysis Run 1/20/2022 10:02 AM View: All Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Sen's Slope Estimator  
AD-4 (bg)



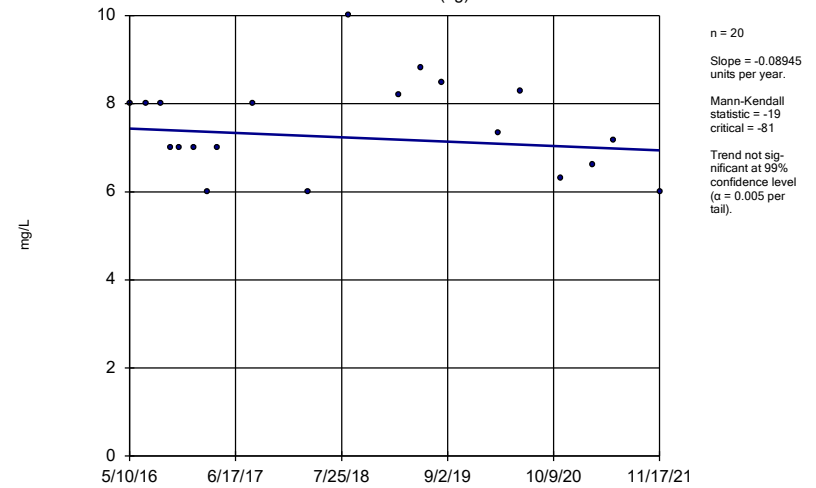
Constituent: Calcium, total Analysis Run 1/20/2022 10:02 AM View: All Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Sen's Slope Estimator  
AD-12 (bg)



Constituent: Chloride, total Analysis Run 1/20/2022 10:03 AM View: All Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

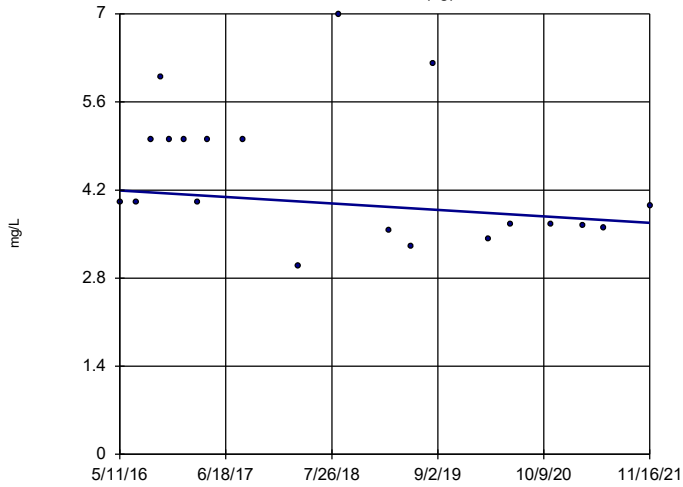
Sen's Slope Estimator  
AD-18 (bg)



Constituent: Chloride, total Analysis Run 1/20/2022 10:03 AM View: All Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Sen's Slope Estimator

AD-4 (bg)

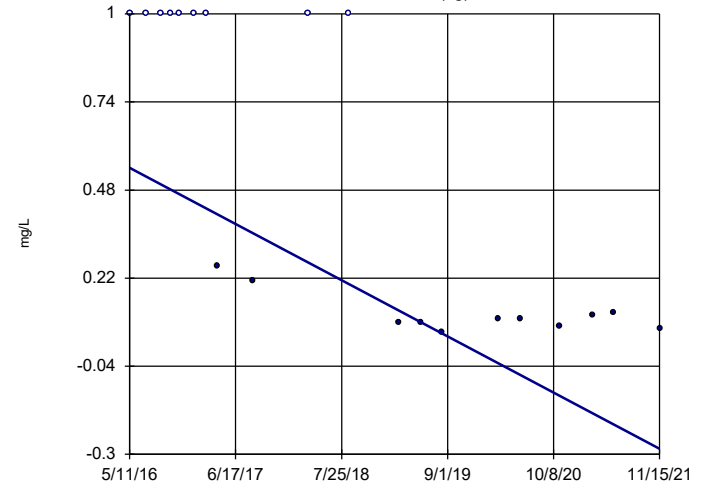


Constituent: Chloride, total Analysis Run 1/20/2022 10:03 AM View: All Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Hollow symbols indicate censored values.

### Sen's Slope Estimator

AD-12 (bg)

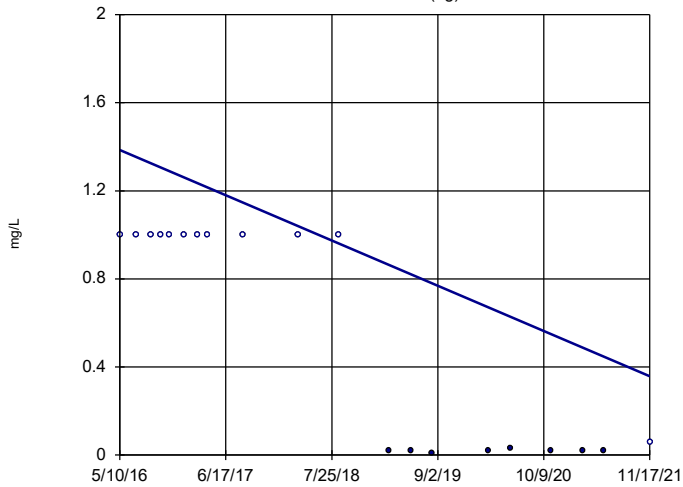


Constituent: Fluoride, total Analysis Run 1/20/2022 10:03 AM View: All Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Hollow symbols indicate censored values.

### Sen's Slope Estimator

AD-18 (bg)

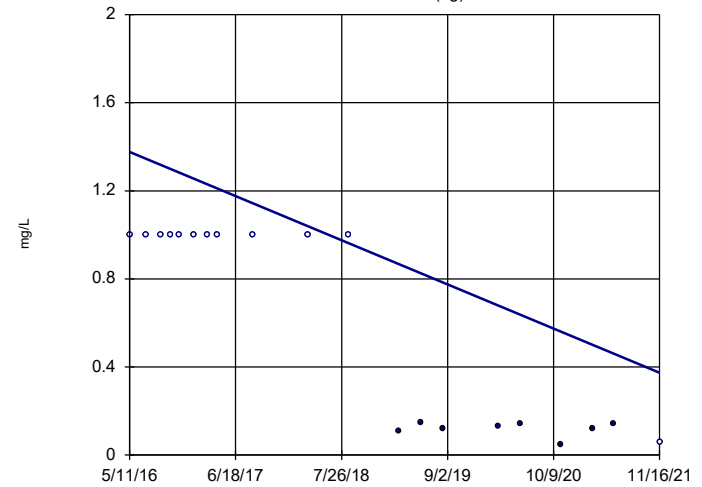


Constituent: Fluoride, total Analysis Run 1/20/2022 10:03 AM View: All Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Hollow symbols indicate censored values.

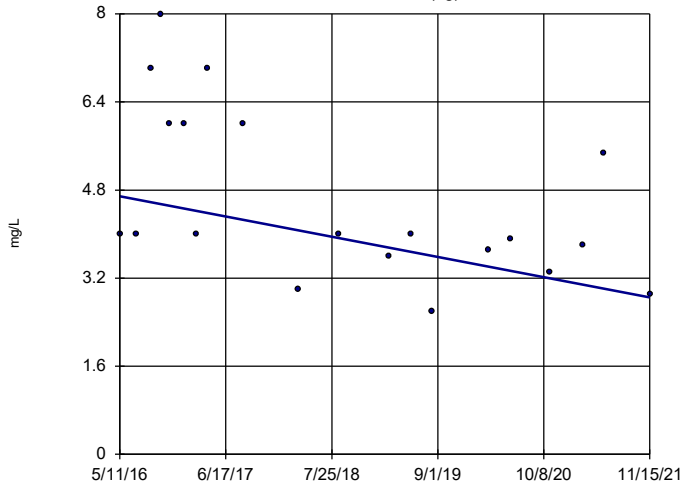
### Sen's Slope Estimator

AD-4 (bg)



Constituent: Fluoride, total Analysis Run 1/20/2022 10:03 AM View: All Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

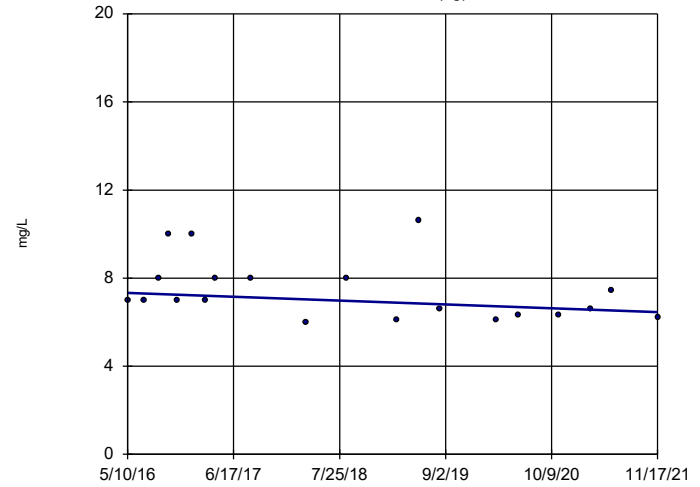
### Sen's Slope Estimator AD-12 (bg)



n = 20  
 Slope = -0.3331  
 units per year.  
 Mann-Kendall  
 statistic = -80  
 critical = -81  
 Trend not sig-  
 nificant at 99%  
 confidence level  
 (α = 0.005 per  
 tail).

Constituent: Sulfate, total Analysis Run 1/20/2022 10:03 AM View: All Interwell  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

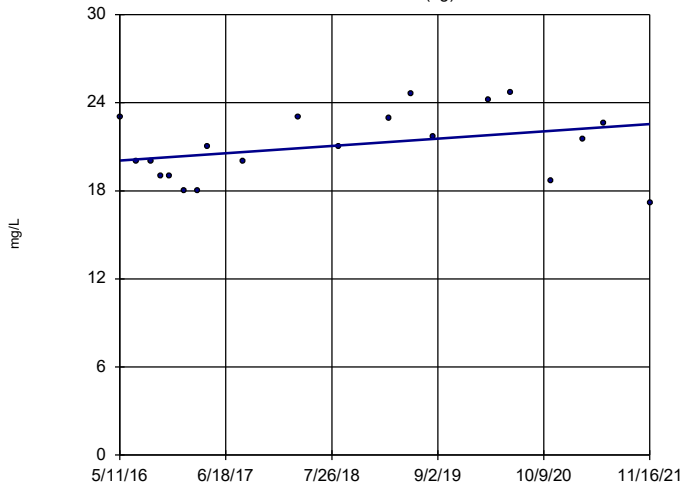
### Sen's Slope Estimator AD-18 (bg)



n = 20  
 Slope = -0.1591  
 units per year.  
 Mann-Kendall  
 statistic = -48  
 critical = -81  
 Trend not sig-  
 nificant at 99%  
 confidence level  
 (α = 0.005 per  
 tail).

Constituent: Sulfate, total Analysis Run 1/20/2022 10:03 AM View: All Interwell  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

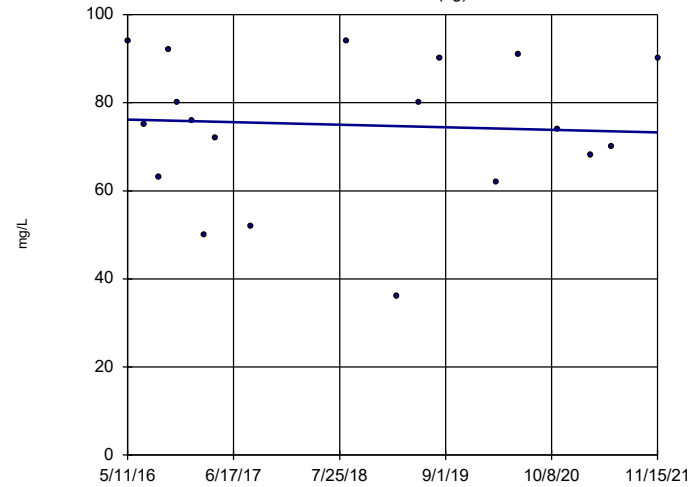
### Sen's Slope Estimator AD-4 (bg)



n = 20  
 Slope = 0.4493  
 units per year.  
 Mann-Kendall  
 statistic = 31  
 critical = 81  
 Trend not sig-  
 nificant at 99%  
 confidence level  
 (α = 0.005 per  
 tail).

Constituent: Sulfate, total Analysis Run 1/20/2022 10:03 AM View: All Interwell  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

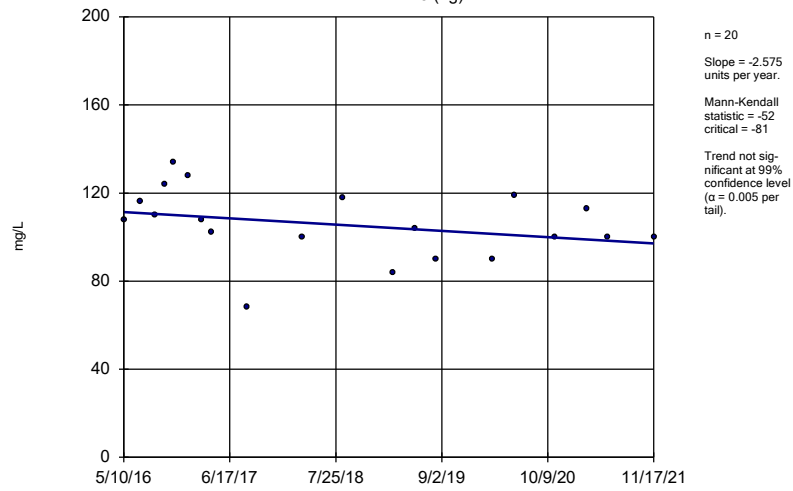
### Sen's Slope Estimator AD-12 (bg)



n = 19  
 Slope = -0.5248  
 units per year.  
 Mann-Kendall  
 statistic = -14  
 critical = -74  
 Trend not sig-  
 nificant at 99%  
 confidence level  
 (α = 0.005 per  
 tail).

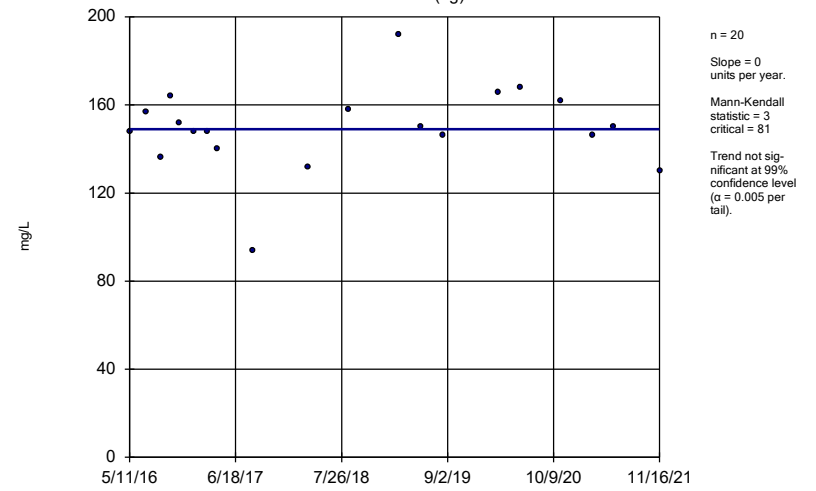
Constituent: Total Dissolved Solids Analysis Run 1/20/2022 10:03 AM View: All Interwell  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Sen's Slope Estimator AD-18 (bg)



Constituent: Total Dissolved Solids Analysis Run 1/20/2022 10:03 AM View: All Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Sen's Slope Estimator AD-4 (bg)



Constituent: Total Dissolved Solids Analysis Run 1/20/2022 10:03 AM View: All Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

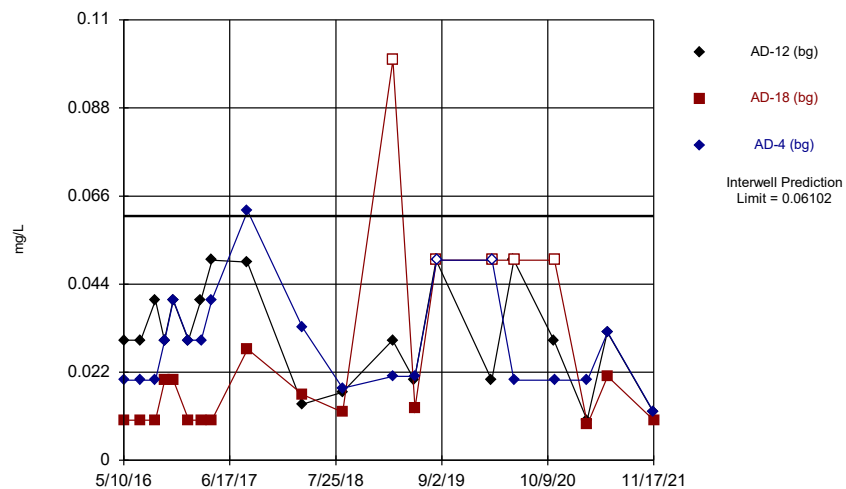
# Intrrwell Prediction Limits

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 1/20/2022, 10:07 AM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Date</u>	<u>Observ.</u>	<u>Sig.</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	0.06102	n/a	3 future	n/a	60	0.2953	0.05767	15	None	x^(1/3)	0.002505	Param Inter 1 of 2
Calcium, total (mg/L)	n/a	2.94	n/a	3 future	n/a	60	n/a	n/a	0	n/a	n/a	0.0005253	NP Inter (normality) 1 of 2
Chloride, total (mg/L)	n/a	8.968	n/a	3 future	n/a	60	6.07	1.698	0	None	No	0.002505	Param Inter 1 of 2
Fluoride, total (mg/L)	n/a	1	n/a	3 future	n/a	60	n/a	n/a	55	n/a	n/a	0.0005253	NP Inter (NDs) 1 of 2
Sulfate, total (mg/L)	n/a	24.7	n/a	3 future	n/a	60	n/a	n/a	0	n/a	n/a	0.0005253	NP Inter (normality) 1 of 2
Total Dissolved Solids (mg/L)	n/a	170.6	n/a	3 future	n/a	59	110.4	35.29	0	None	No	0.002505	Param Inter 1 of 2

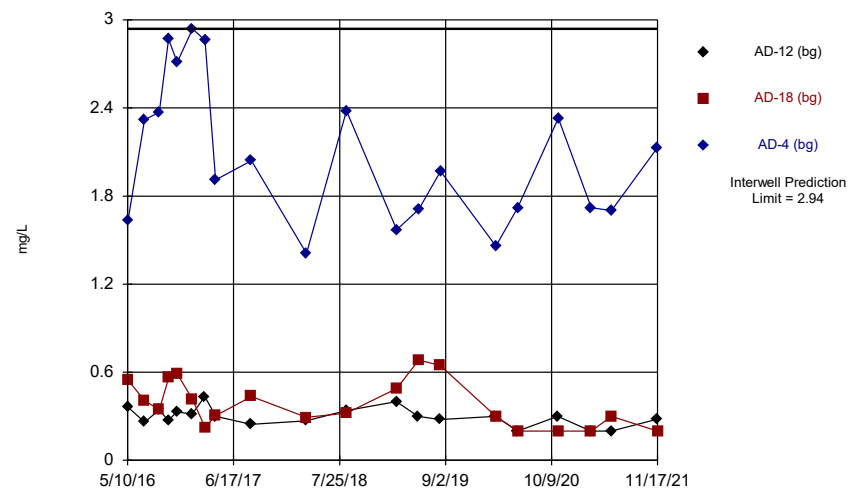


Time Series



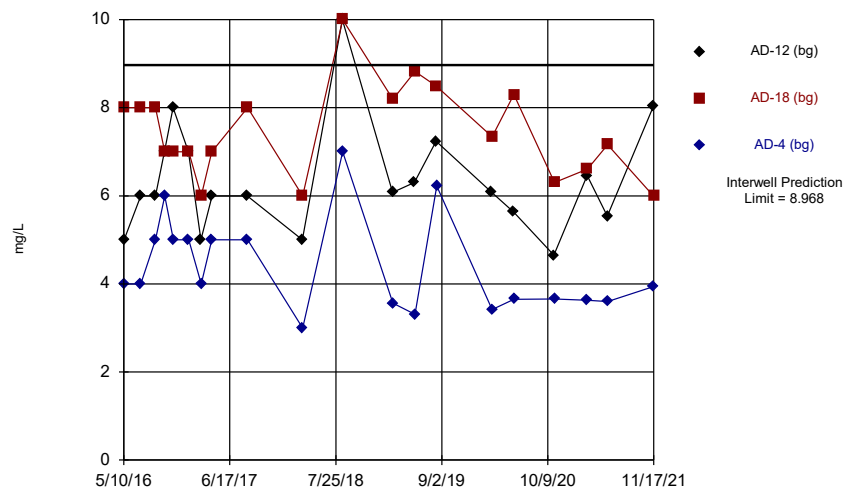
Constituent: Boron, total Analysis Run 2/3/2022 12:28 PM View: Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Time Series



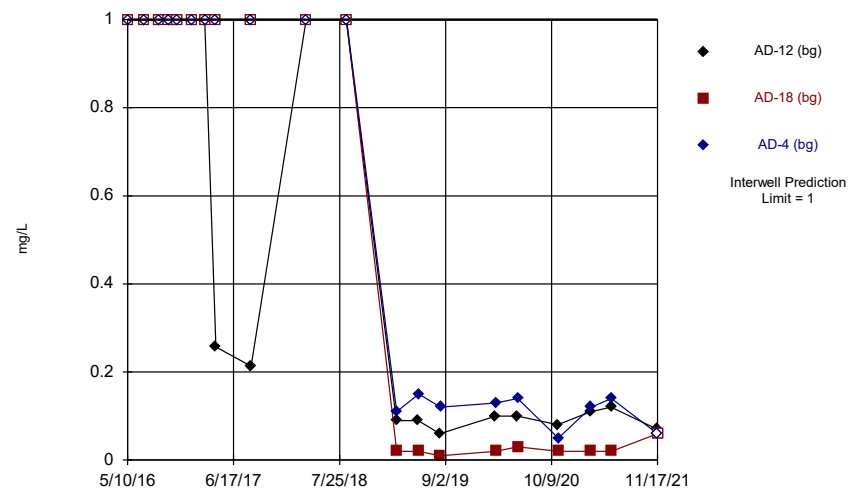
Constituent: Calcium, total Analysis Run 2/3/2022 12:28 PM View: Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Time Series



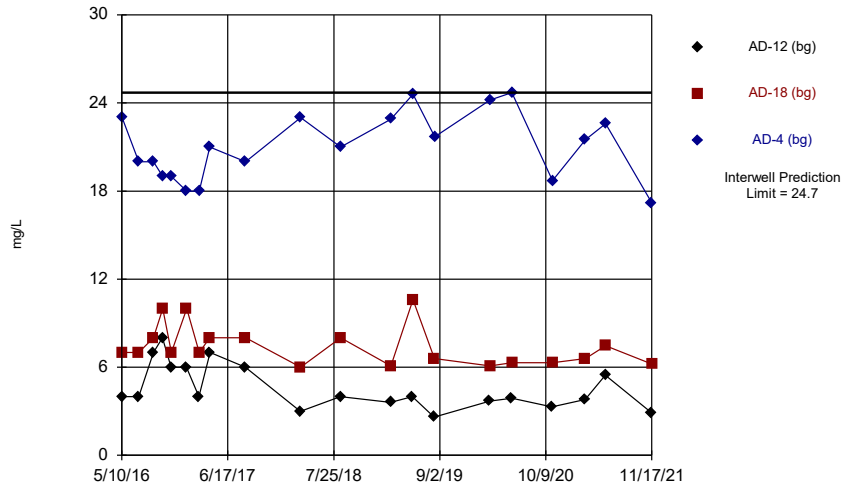
Constituent: Chloride, total Analysis Run 2/3/2022 12:28 PM View: Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Time Series



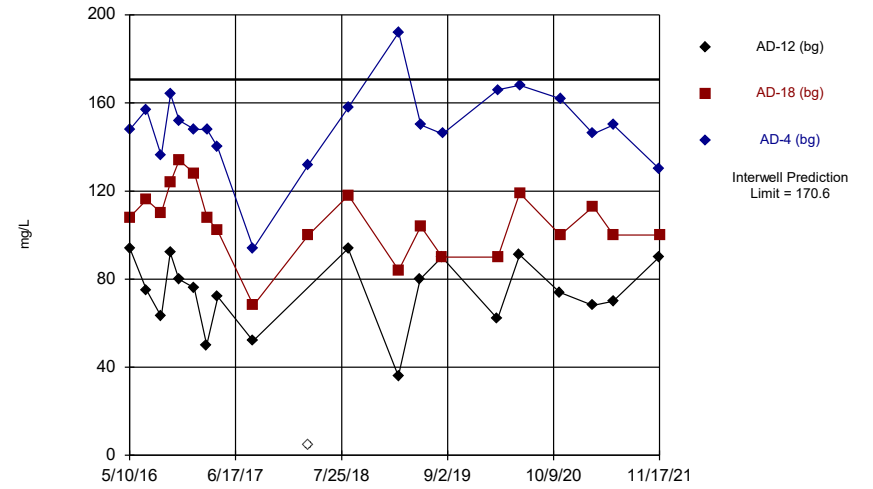
Constituent: Fluoride, total Analysis Run 2/3/2022 12:28 PM View: Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Time Series



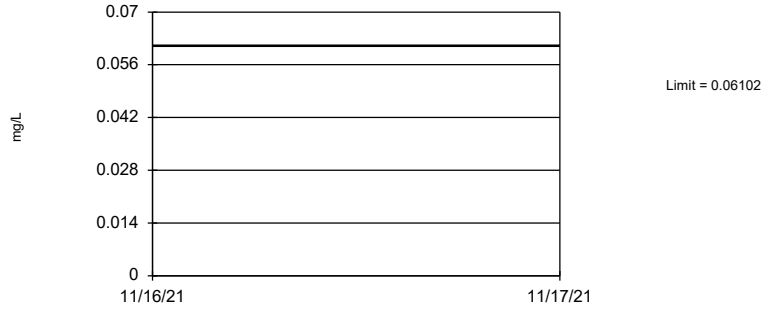
Constituent: Sulfate, total Analysis Run 2/3/2022 12:28 PM View: Interwell  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Time Series



Constituent: Total Dissolved Solids Analysis Run 2/3/2022 12:28 PM View: Interwell  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

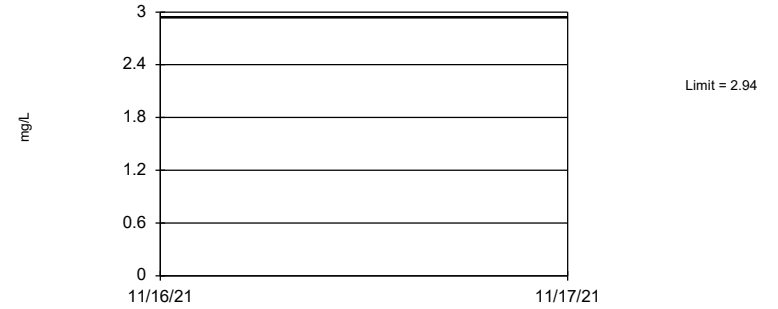
Prediction Limit  
Interwell Parametric



Background Data Summary (based on cube root transformation): Mean=0.2953, Std. Dev.=0.05767, n=60, 15% NDs. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9465, critical = 0.945. Kappa = 1.706 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.002505. Assumes 3 future values.

Constituent: Boron, total Analysis Run 1/20/2022 10:06 AM View: All Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Prediction Limit  
Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 60 background values. Annual per-constituent alpha = 0.003148. Individual comparison alpha = 0.0005253 (1 of 2). Assumes 3 future values.

Constituent: Calcium, total Analysis Run 1/20/2022 10:06 AM View: All Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

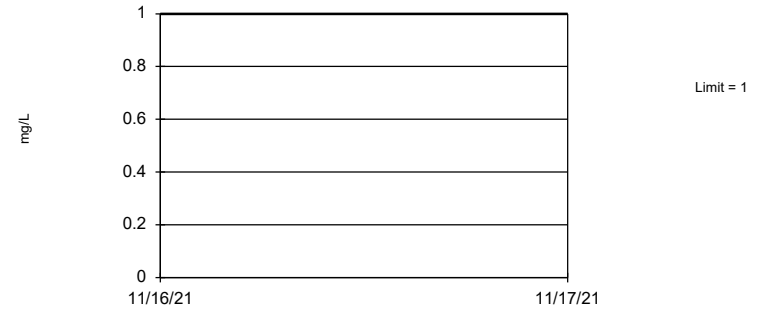
Prediction Limit  
Interwell Parametric



Background Data Summary: Mean=6.07, Std. Dev.=1.698, n=60. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9764, critical = 0.945. Kappa = 1.706 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.002505. Assumes 3 future values.

Constituent: Chloride, total Analysis Run 1/20/2022 10:06 AM View: All Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

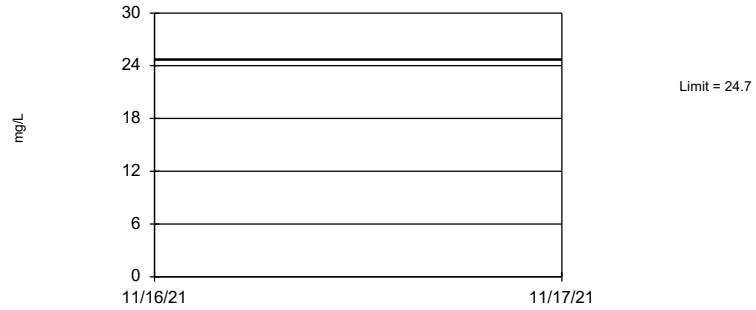
Prediction Limit  
Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because censored data exceeded 50%. Limit is highest of 60 background values. 55% NDs. Annual per-constituent alpha = 0.003148. Individual comparison alpha = 0.0005253 (1 of 2). Assumes 3 future values.

Constituent: Fluoride, total Analysis Run 1/20/2022 10:06 AM View: All Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

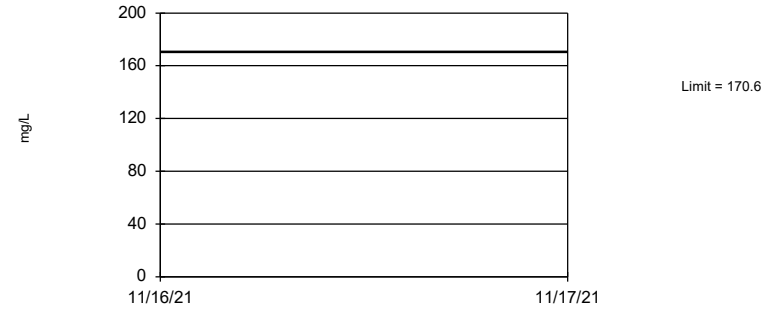
### Prediction Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 60 background values. Annual per-constituent alpha = 0.003148. Individual comparison alpha = 0.0005253 (1 of 2). Assumes 3 future values.

Constituent: Sulfate, total Analysis Run 1/20/2022 10:06 AM View: All Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Prediction Limit Interwell Parametric



Background Data Summary: Mean=110.4, Std. Dev.=35.29, n=59. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9826, critical = 0.945. Kappa = 1.708 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.002505. Assumes 3 future values.

Constituent: Total Dissolved Solids Analysis Run 1/20/2022 10:06 AM View: All Interwell  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

# Upper Tolerance Limits

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 2/21/2022, 10:26 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony, total (mg/L)	n/a	0.005	n/a	n/a	n/a	n/a	57	n/a	n/a	94.74	n/a	n/a	0.05373	NP Inter(NDs)
Arsenic, total (mg/L)	n/a	0.011	n/a	n/a	n/a	n/a	57	n/a	n/a	47.37	n/a	n/a	0.05373	NP Inter(normality)
Barium, total (mg/L)	n/a	0.183	n/a	n/a	n/a	n/a	57	n/a	n/a	0	n/a	n/a	0.05373	NP Inter(normality)
Beryllium, total (mg/L)	n/a	0.002	n/a	n/a	n/a	n/a	57	n/a	n/a	7.018	n/a	n/a	0.05373	NP Inter(normality)
Cadmium, total (mg/L)	n/a	0.001	n/a	n/a	n/a	n/a	57	n/a	n/a	57.89	n/a	n/a	0.05373	NP Inter(NDs)
Chromium, total (mg/L)	n/a	0.004192	n/a	n/a	n/a	n/a	57	-7.62	1.058	12.28	None	ln(x)	0.05	Inter
Cobalt, total (mg/L)	n/a	0.00939	n/a	n/a	n/a	n/a	57	n/a	n/a	0	n/a	n/a	0.05373	NP Inter(normality)
Combined Radium 226 + 228 (pCi/L)	n/a	3.357	n/a	n/a	n/a	n/a	57	0.9721	0.2589	0	None	x^(1/3)	0.05	Inter
Fluoride, total (mg/L)	n/a	1	n/a	n/a	n/a	n/a	60	n/a	n/a	55	n/a	n/a	0.04607	NP Inter(NDs)
Lead, total (mg/L)	n/a	0.005	n/a	n/a	n/a	n/a	57	n/a	n/a	63.16	n/a	n/a	0.05373	NP Inter(NDs)
Lithium, total (mg/L)	n/a	0.05477	n/a	n/a	n/a	n/a	57	0.1348	0.04894	1.754	None	sqrt(x)	0.05	Inter
Mercury, total (mg/L)	n/a	0.000064	n/a	n/a	n/a	n/a	57	n/a	n/a	43.86	n/a	n/a	0.05373	NP Inter(normality)
Molybdenum, total (mg/L)	n/a	0.005	n/a	n/a	n/a	n/a	52	n/a	n/a	94.23	n/a	n/a	0.06944	NP Inter(NDs)
Selenium, total (mg/L)	n/a	0.005	n/a	n/a	n/a	n/a	57	n/a	n/a	50.88	n/a	n/a	0.05373	NP Inter(NDs)
Thallium, total (mg/L)	n/a	0.002	n/a	n/a	n/a	n/a	55	n/a	n/a	80	n/a	n/a	0.05954	NP Inter(NDs)

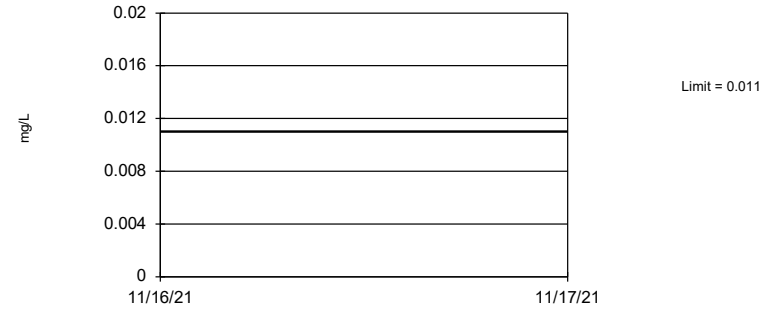
Tolerance Limit  
Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 57 background values. 94.74% NDs. 92.38% coverage at alpha=0.01; 94.73% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.05373.

Constituent: Antimony, total Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limits  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

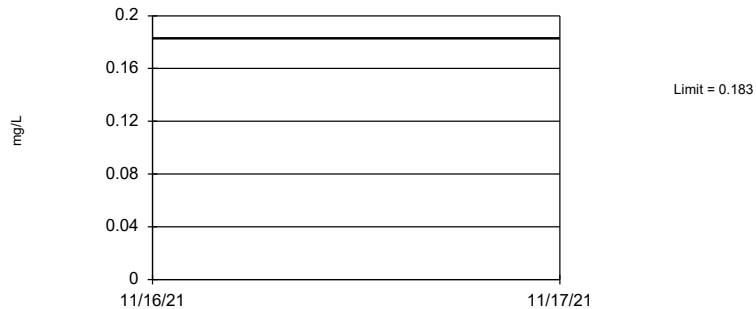
Tolerance Limit  
Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 57 background values. 47.37% NDs. 92.38% coverage at alpha=0.01; 94.73% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.05373.

Constituent: Arsenic, total Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limits  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

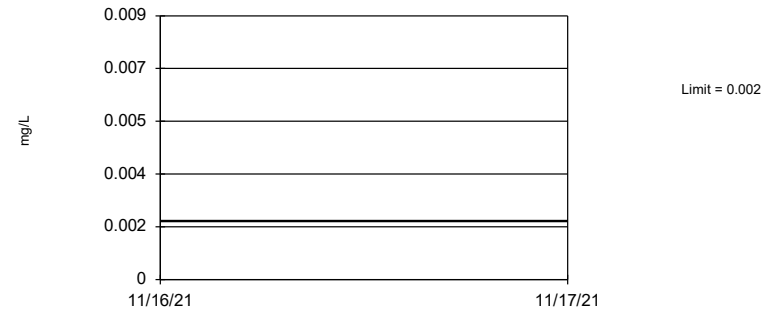
Tolerance Limit  
Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 57 background values. 92.38% coverage at alpha=0.01; 94.73% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.05373.

Constituent: Barium, total Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limits  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

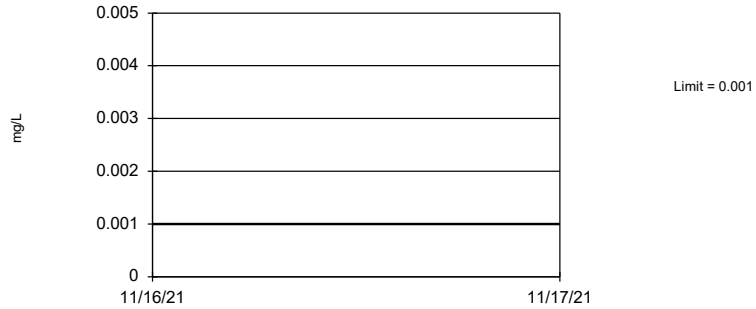
Tolerance Limit  
Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 57 background values. 7.018% NDs. 92.38% coverage at alpha=0.01; 94.73% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.05373.

Constituent: Beryllium, total Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limits  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

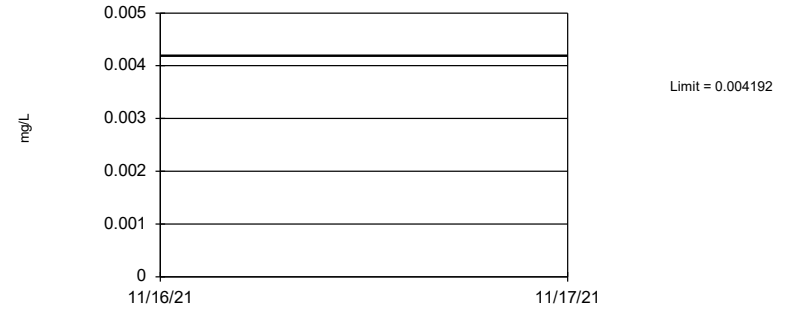
Tolerance Limit  
Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 57 background values. 57.89% NDs. 92.38% coverage at alpha=0.01; 94.73% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.05373.

Constituent: Cadmium, total Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limits  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

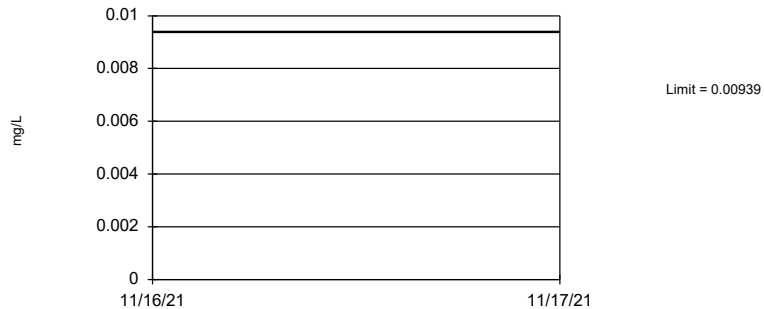
Tolerance Limit  
Interwell Parametric



95% coverage. Background Data Summary (based on natural log transformation): Mean=-7.62, Std. Dev.=1.058, n=57, 12.28% NDs. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9462, critical = 0.944. Report alpha = 0.05.

Constituent: Chromium, total Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limits  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

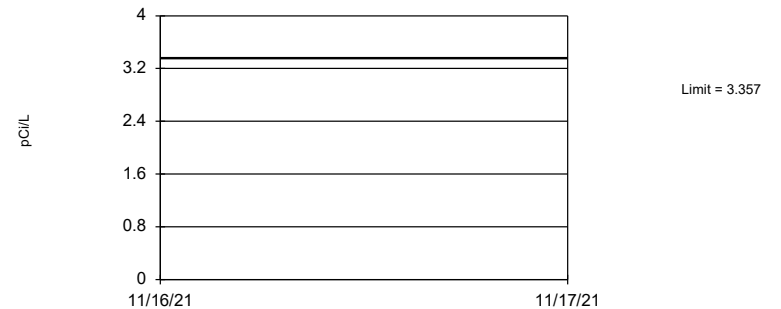
Tolerance Limit  
Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 57 background values. 92.38% coverage at alpha=0.01; 94.73% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.05373.

Constituent: Cobalt, total Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limits  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Tolerance Limit  
Interwell Parametric



95% coverage. Background Data Summary (based on cube root transformation): Mean=0.9721, Std. Dev.=0.2589, n=57. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9514, critical = 0.944. Report alpha = 0.05.

Constituent: Combined Radium 226 + 228 Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limit  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Tolerance Limit  
Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 60 background values. 55% NDs. 92.77% coverage at alpha=0.01; 95.12% coverage at alpha=0.05; 99.02% coverage at alpha=0.5. Report alpha = 0.04607.

Constituent: Fluoride, total Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limits  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Tolerance Limit  
Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 57 background values. 63.16% NDs. 92.38% coverage at alpha=0.01; 94.73% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.05373.

Constituent: Lead, total Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limits  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

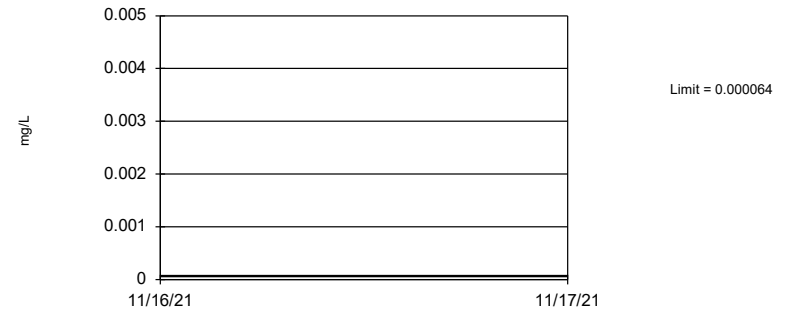
Tolerance Limit  
Interwell Parametric



95% coverage. Background Data Summary (based on square root transformation): Mean=0.1348, Std. Dev.=0.04894, n=57, 1.754% NDs. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9741, critical = 0.944. Report alpha = 0.05.

Constituent: Lithium, total Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limits  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Tolerance Limit  
Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 57 background values. 43.86% NDs. 92.38% coverage at alpha=0.01; 94.73% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.05373.

Constituent: Mercury, total Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limits  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP



### Tolerance Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 52 background values. 94.23% NDs. 91.6% coverage at alpha=0.01; 94.34% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.06944.

Constituent: Molybdenum, total Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limits  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

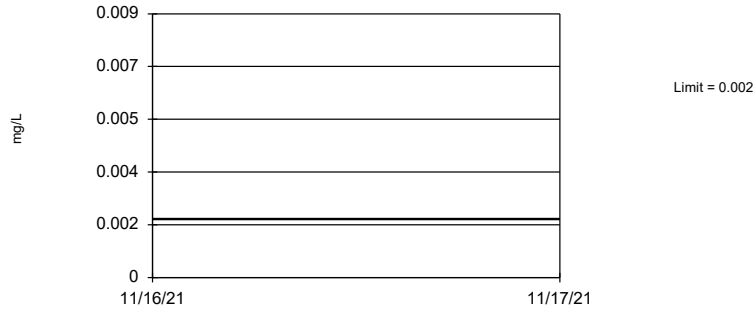
### Tolerance Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 57 background values. 50.88% NDs. 92.38% coverage at alpha=0.01; 94.73% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.05373.

Constituent: Selenium, total Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limits  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tolerance Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 55 background values. 80% NDs. 91.99% coverage at alpha=0.01; 94.73% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.05954.

Constituent: Thallium, total Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limits  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

<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	0.002	0.004
Cadmium, Total (mg/L)	0.005	0.001	0.005
Chromium, Total (mg/L)	0.1	0.0042	0.1
Cobalt, Total (mg/L)	n/a	0.0094	0.0094
Combined Radium, Total (pCi/L)	5	3.36	5
Fluoride, Total (mg/L)	4	1	4
Lead, Total (mg/L)	n/a	0.005	0.005
Lithium, Total (mg/L)	n/a	0.055	0.055
Mercury, Total (mg/L)	0.002	0.000064	0.002
Molybdenum, Total (mg/L)	n/a	0.005	0.005
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 Intervals - Significant Results

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 3/8/2022, 2:45 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	0.0177	0.01	0.0094	Yes	19	0.01398	0.00402	0	None	No	0.01	NP (normality)
Cobalt, total (mg/L)	AD-31	0.01097	0.009564	0.0094	Yes	18	0.01031	0.001234	0	None	In(x)	0.01	Param.
Cobalt, total (mg/L)	AD-32	0.07	0.025	0.0094	Yes	19	0.04645	0.02014	0	None	No	0.01	NP (normality)
Lithium, total (mg/L)	AD-31	0.096	0.0664	0.055	Yes	19	0.08312	0.01417	0	None	No	0.01	NP (normality)
Lithium, total (mg/L)	AD-32	0.1023	0.07805	0.055	Yes	17	0.09016	0.01933	0	None	No	0.01	Param.

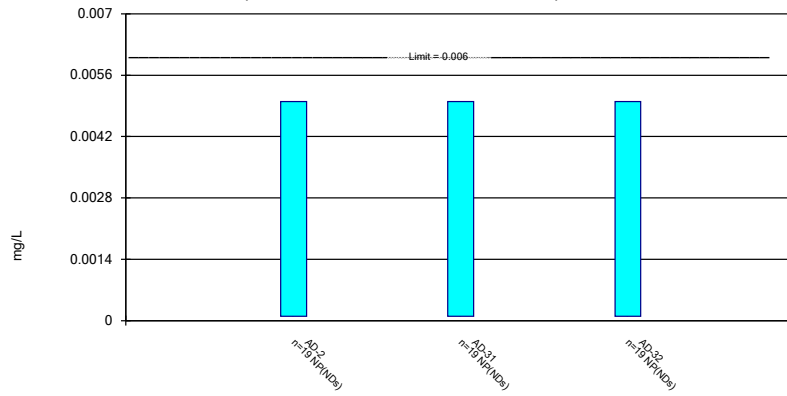
# Confidence Intervals - All Results

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 3/8/2022, 2:45 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	19	0.002514	0.00246	94.74	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-31	0.005	0.0001	0.006	No	19	0.002617	0.002392	94.74	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-32	0.005	0.0001	0.006	No	19	0.002612	0.002397	89.47	None	No	0.01	NP (NDs)
Arsenic, total (mg/L)	AD-2	0.005	0.00052	0.011	No	19	0.002717	0.002251	52.63	None	No	0.01	NP (NDs)
Arsenic, total (mg/L)	AD-31	0.00434	0.00026	0.011	No	18	0.002679	0.002798	16.67	None	No	0.01	NP (normality)
Arsenic, total (mg/L)	AD-32	0.005777	0.002471	0.011	No	19	0.004429	0.003084	5.263	None	sqrt(x)	0.01	Param.
Barium, total (mg/L)	AD-2	0.038	0.0197	2	No	19	0.02929	0.007937	0	None	No	0.01	NP (normality)
Barium, total (mg/L)	AD-31	0.076	0.0332	2	No	18	0.05483	0.02633	0	None	No	0.01	NP (normality)
Barium, total (mg/L)	AD-32	0.03841	0.0258	2	No	19	0.03211	0.01077	0	None	No	0.01	Param.
Beryllium, total (mg/L)	AD-2	0.000541	0.000402	0.004	No	19	0.0005426	0.0003579	5.263	None	No	0.01	NP (normality)
Beryllium, total (mg/L)	AD-31	0.0011	0.000835	0.004	No	18	0.00105	0.0003686	0	None	No	0.01	NP (normality)
Beryllium, total (mg/L)	AD-32	0.006048	0.003558	0.004	No	19	0.005002	0.002272	0	None	x^(1/3)	0.01	Param.
Cadmium, total (mg/L)	AD-2	0.001	0.00007	0.005	No	19	0.0005612	0.0004753	52.63	None	No	0.01	NP (NDs)
Cadmium, total (mg/L)	AD-31	0.001	0.000063	0.005	No	19	0.0004614	0.0004583	36.84	None	No	0.01	NP (normality)
Cadmium, total (mg/L)	AD-32	0.0005964	0.0003861	0.005	No	19	0.0004913	0.0001795	0	None	No	0.01	Param.
Chromium, total (mg/L)	AD-2	0.0004183	0.0002377	0.1	No	19	0.0007156	0.0008603	31.58	Kaplan-Meier	ln(x)	0.01	Param.
Chromium, total (mg/L)	AD-31	0.012	0.000357	0.1	No	17	0.005194	0.005536	11.76	None	No	0.01	NP (normality)
Chromium, total (mg/L)	AD-32	0.005587	0.001321	0.1	No	19	0.00443	0.005039	0	None	x^(1/3)	0.01	Param.
<b>Cobalt, total (mg/L)</b>	<b>AD-2</b>	<b>0.0177</b>	<b>0.01</b>	<b>0.0094</b>	<b>Yes</b>	<b>19</b>	<b>0.01398</b>	<b>0.00402</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>0.01097</b>	<b>0.009564</b>	<b>0.0094</b>	<b>Yes</b>	<b>18</b>	<b>0.01031</b>	<b>0.001234</b>	<b>0</b>	<b>None</b>	<b>ln(x)</b>	<b>0.01</b>	<b>Param.</b>
<b>Cobalt, total (mg/L)</b>	<b>AD-32</b>	<b>0.07</b>	<b>0.025</b>	<b>0.0094</b>	<b>Yes</b>	<b>19</b>	<b>0.04645</b>	<b>0.02014</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	1.609	0.9456	5	No	19	1.277	0.5661	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-31	3.76	2.515	5	No	19	3.215	1.209	0	None	x^(1/3)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-32	5.798	4.154	5	No	18	4.976	1.359	0	None	No	0.01	Param.
Fluoride, total (mg/L)	AD-2	1	0.14	4	No	21	0.6333	0.435	57.14	None	No	0.01	NP (NDs)
Fluoride, total (mg/L)	AD-31	1	0.14	4	No	21	0.6329	0.4347	57.14	None	No	0.01	NP (NDs)
Fluoride, total (mg/L)	AD-32	0.9578	0.4886	4	No	20	0.8484	0.4021	25	Kaplan-Meier	No	0.01	Param.
Lead, total (mg/L)	AD-2	0.005	0.000389	0.005	No	19	0.002679	0.002291	52.63	None	No	0.01	NP (NDs)
Lead, total (mg/L)	AD-31	0.005	0.000218	0.005	No	18	0.002369	0.002132	44.44	None	No	0.01	NP (normality)
Lead, total (mg/L)	AD-32	0.005	0.00052	0.005	No	19	0.002795	0.00218	52.63	None	No	0.01	NP (NDs)
Lithium, total (mg/L)	AD-2	0.05308	0.04887	0.055	No	18	0.05097	0.003476	0	None	No	0.01	Param.
<b>Lithium, total (mg/L)</b>	<b>AD-31</b>	<b>0.096</b>	<b>0.0664</b>	<b>0.055</b>	<b>Yes</b>	<b>19</b>	<b>0.08312</b>	<b>0.01417</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>0.1023</b>	<b>0.07805</b>	<b>0.055</b>	<b>Yes</b>	<b>17</b>	<b>0.09016</b>	<b>0.01933</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.01</b>	<b>Param.</b>
Mercury, total (mg/L)	AD-2	0.00007557	0.00004	0.002	No	18	0.00006	0.00003245	0	None	sqrt(x)	0.01	Param.
Mercury, total (mg/L)	AD-31	0.0006349	0.0001347	0.002	No	18	0.0004578	0.0005189	0	None	sqrt(x)	0.01	Param.
Mercury, total (mg/L)	AD-32	0.004793	0.001691	0.002	No	19	0.003755	0.00342	0	None	x^(1/3)	0.01	Param.
Molybdenum, total (mg/L)	AD-2	0.005	0.0008627	0.005	No	18	0.003127	0.001945	83.33	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-31	0.005	0.0004016	0.005	No	17	0.002497	0.002021	70.59	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-32	0.005	0.0007621	0.005	No	17	0.003047	0.001988	88.24	None	No	0.01	NP (NDs)
Selenium, total (mg/L)	AD-2	0.005	0.001231	0.05	No	19	0.002402	0.001633	26.32	None	No	0.01	NP (normality)
Selenium, total (mg/L)	AD-31	0.005	0.0004	0.05	No	19	0.002315	0.002	36.84	None	No	0.01	NP (normality)
Selenium, total (mg/L)	AD-32	0.007738	0.002381	0.05	No	19	0.006903	0.006779	26.32	Kaplan-Meier	x^(1/3)	0.01	Param.
Thallium, total (mg/L)	AD-2	0.002	0.0001	0.002	No	19	0.001003	0.0009146	52.63	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-31	0.002	0.0001	0.002	No	18	0.001082	0.0008743	66.67	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-32	0.002	0.00021	0.002	No	18	0.0009644	0.0008106	33.33	None	No	0.01	NP (normality)

### Non-Parametric Confidence Interval

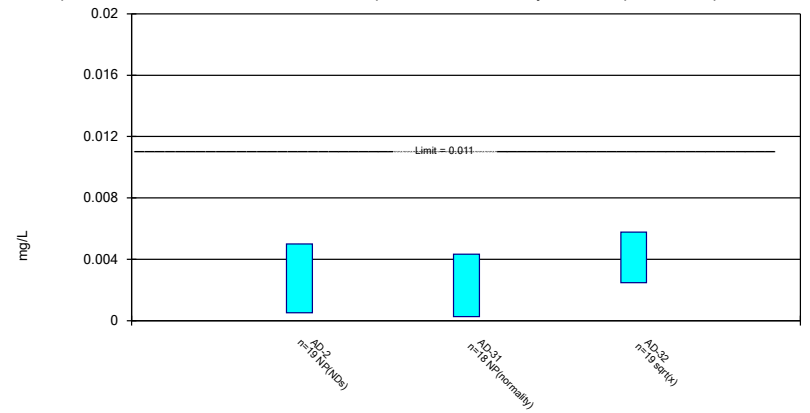
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Antimony, total Analysis Run 3/8/2022 2:43 PM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

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

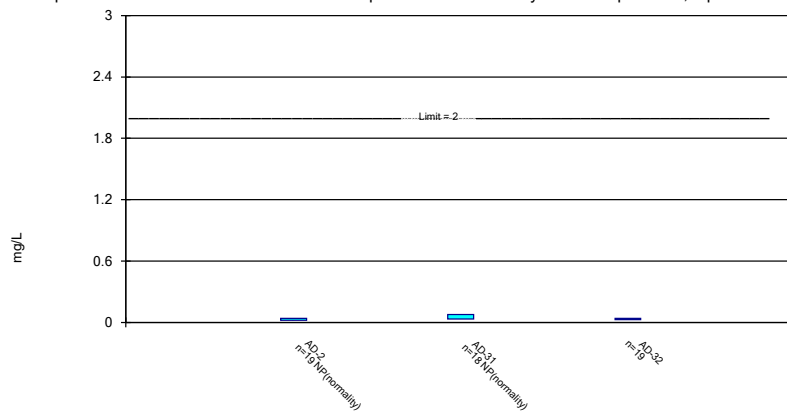
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Arsenic, total Analysis Run 3/8/2022 2:43 PM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

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

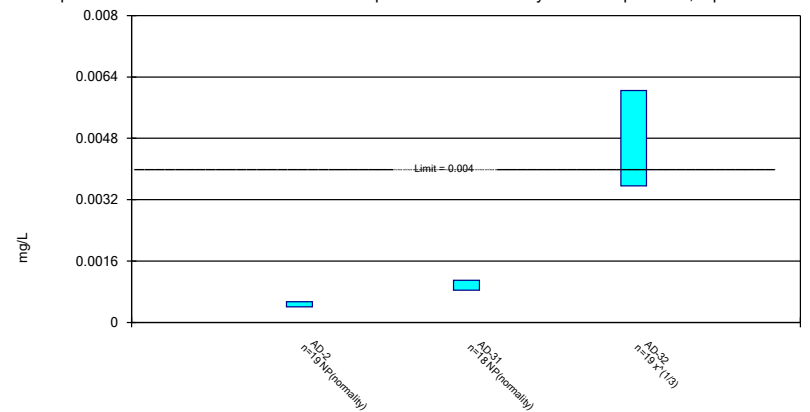
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Barium, total Analysis Run 3/8/2022 2:43 PM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

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

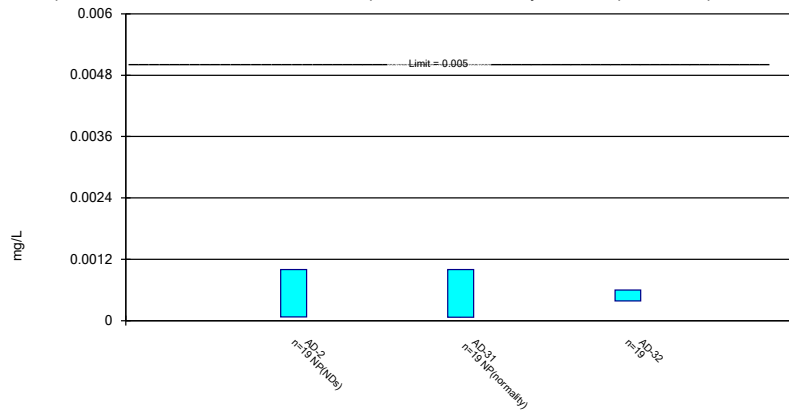
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Beryllium, total Analysis Run 3/8/2022 2:43 PM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Parametric and Non-Parametric (NP) Confidence Interval

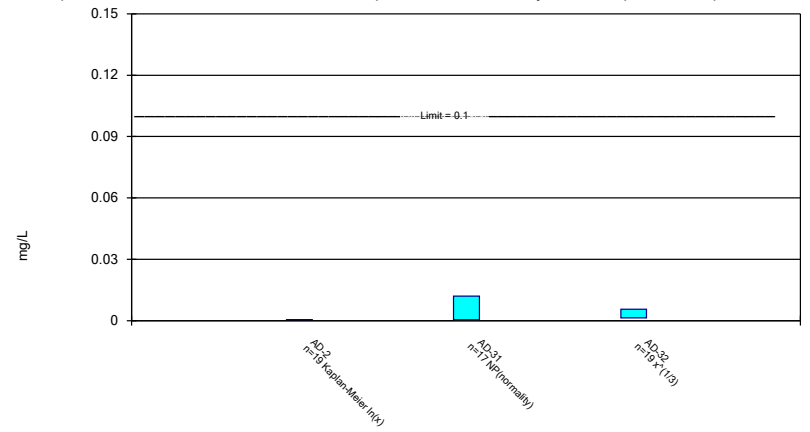
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cadmium, total Analysis Run 3/8/2022 2:43 PM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Parametric and Non-Parametric (NP) Confidence Interval

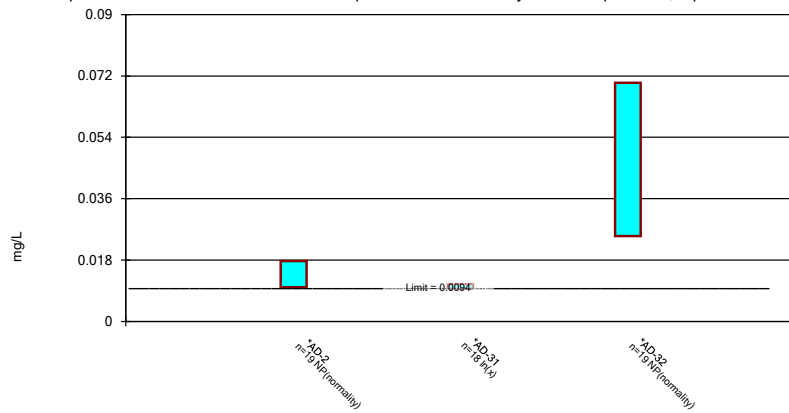
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Chromium, total Analysis Run 3/8/2022 2:43 PM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Parametric and Non-Parametric (NP) Confidence Interval

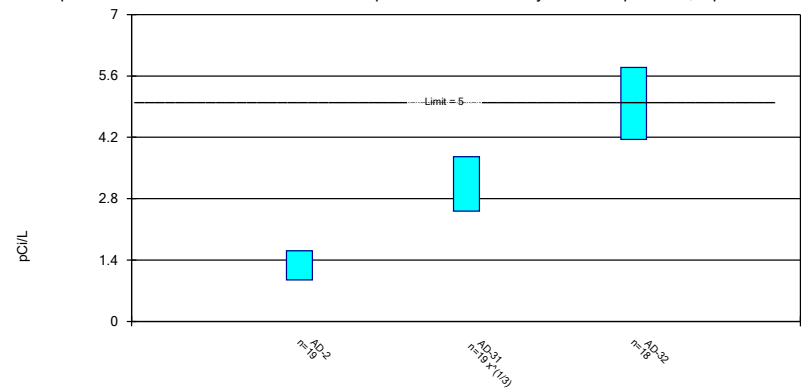
Compliance limit is exceeded.\* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt, total Analysis Run 3/8/2022 2:43 PM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Parametric Confidence Interval

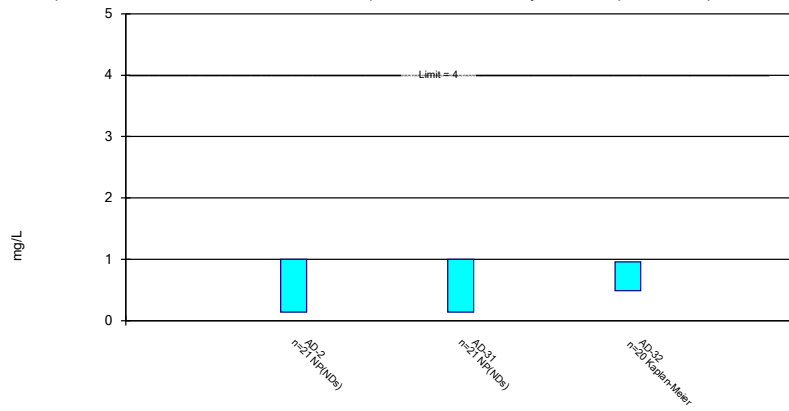
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Combined Radium 226 + 228 Analysis Run 3/8/2022 2:43 PM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

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

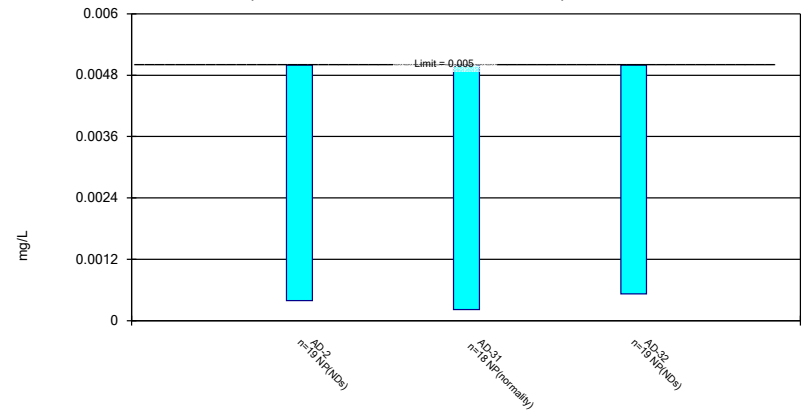
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Fluoride, total Analysis Run 3/8/2022 2:43 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Non-Parametric Confidence Interval

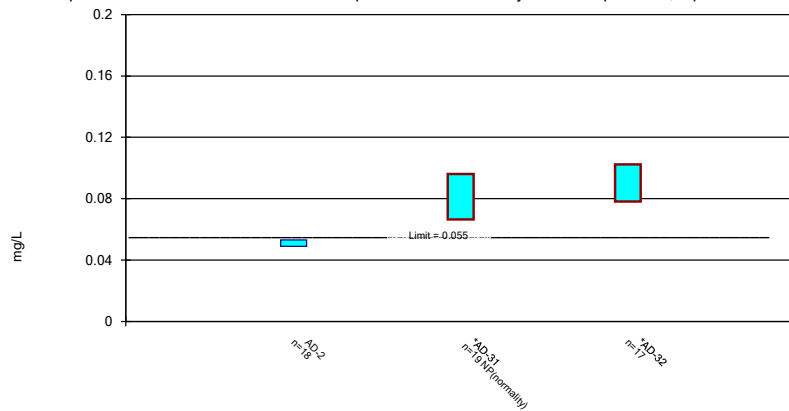
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Lead, total Analysis Run 3/8/2022 2:43 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

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

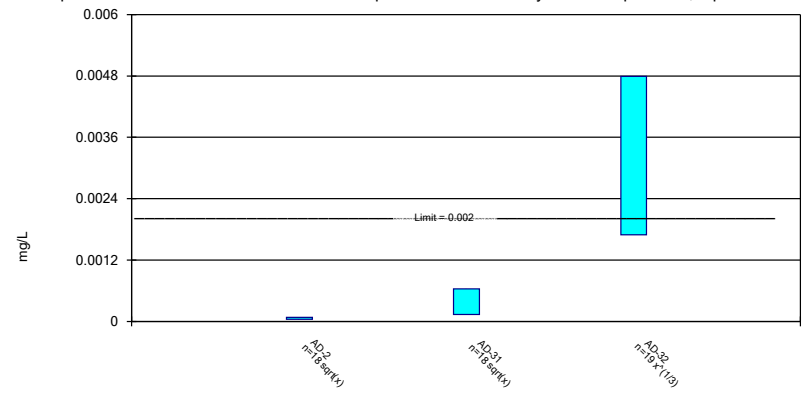
Compliance limit is exceeded.\* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



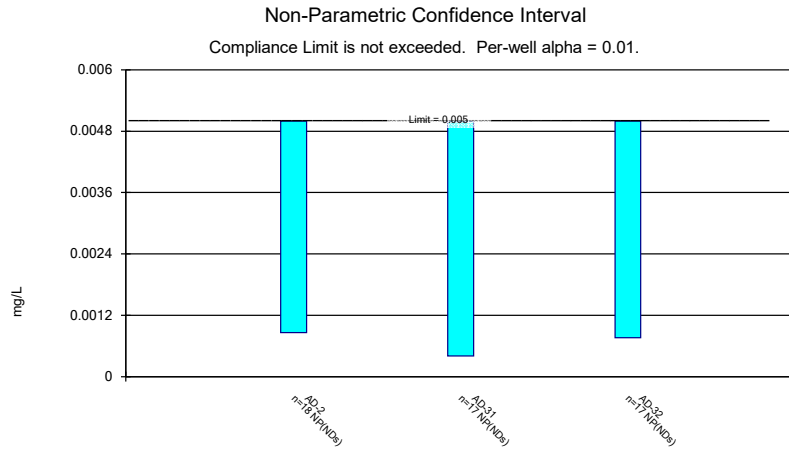
Constituent: Lithium, total Analysis Run 3/8/2022 2:43 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Parametric Confidence Interval

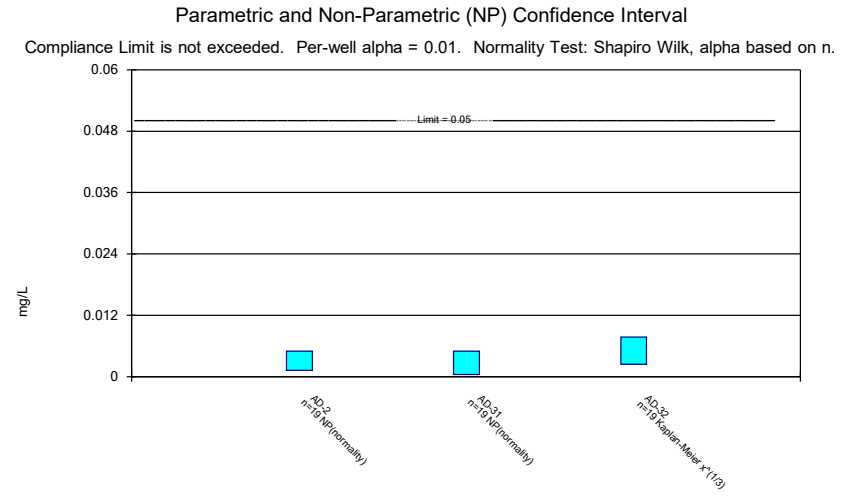
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



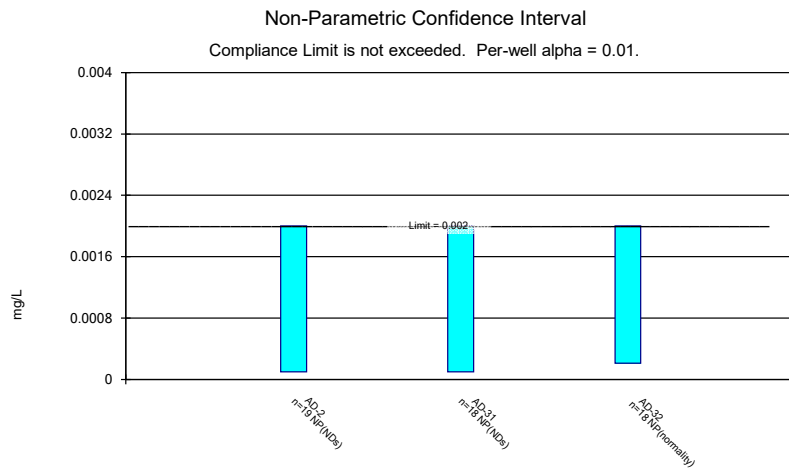
Constituent: Mercury, total Analysis Run 3/8/2022 2:43 PM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP



Constituent: Molybdenum, total Analysis Run 3/8/2022 2:43 PM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP



Constituent: Selenium, total Analysis Run 3/8/2022 2:43 PM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP



Constituent: Thallium, total Analysis Run 3/8/2022 2:43 PM View: Confidence Intervals  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP



January 11, 2023

David Miller  
American Electric Power  
1 Riverside Plaza  
Columbus, Ohio 43215

**Subject: October 2022 Assessment Monitoring Report Revisions  
Pirkey East Bottom Ash Pond (EBAP)**

Dear Mr. Miller:

Geosyntec Consultants, Inc. (Geosyntec) has revised the attached Statistical Analysis Summary report for the H.W. Pirkey Power Plant's East Bottom Ash Pond (EBAP), which summarizes the statistical analysis of the March and June 2022 groundwater sampling results collected 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").

The Statistical Analysis Summary report was previously certified on October 27, 2022, which was within 90 days of issuance of the analytical laboratory reports for the June 2022 groundwater sampling event. Following certification, the analytical laboratory reports were reissued with amended matrix spike precision calculations. The data quality review memorandum, which was provided as Attachment B of the certified Statistical Analysis Summary report, has been updated to reflect the reissued analytical laboratory reports. A record of revisions is provided with the updated data quality review memorandum as Attachment B of the compiled Statistical Analysis Summary report attached to this cover letter. There are no other changes to the previously certified report, as the conclusions of the data quality review memorandum were unaffected and no changes to the statistical analysis were required.

Sincerely,



Allison Kreinberg, Project Manager

Attachment A: Statistical Analysis Summary, East Bottom Ash Pond (EBAP). H.W. Pirkey Power Plant, Hallsville, Texas. October 2022.

**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

500 W. Wilson Bridge Road  
Suite 250  
Worthington, Ohio 43085

October 27, 2022  
CHA8500B

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## LIST OF ATTACHMENTS

Attachment A	Certification by Qualified Professional Engineer
Attachment B	Data Quality Review Memorandum
Attachment C	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
LPL	Lower Prediction Limit
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
SU	Standard Units
TCEQ	Texas Commission on Environmental Quality
TDS	Total Dissolved Solids
UPL	Upper Prediction Limit
UTL	Upper Tolerance 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. Recent groundwater monitoring results were compared to site-specific groundwater protection standards (GWPSs) to identify potential exceedances.

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 assessment monitoring was initiated and GWPSs were set in accordance with § 352.951(b). Two assessment monitoring events were conducted at the EBAP in March and June 2022 in accordance with § 352.951(a). The results of these assessment events are documented in this report.

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 2022 and June 2022) were collected for analysis from each background and compliance well to meet the requirements of § 352.951(a). Samples from both sampling events were analyzed for all 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).

A data quality review was completed to assess if the data met the objectives outlined in TCEQ Draft Technical Guidance No. 32 related to groundwater sampling and analysis (TCEQ, 2020). The data were determined usable for supporting project objectives, as documented in the review memorandum provided in Attachment B. 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.9.6.32 statistics software. The export file was checked against the analytical data for transcription errors and completeness.

#### 2.2 Statistical Analysis

Statistical analyses for the EBAP were conducted in accordance with the November 2021 *Statistical Analysis Plan* (Geosyntec, 2021). Time series plots and results for all completed statistical tests are provided in Attachment C. The data obtained in March and June 2022 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 C. 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, 2022) or the maximum contaminant level (MCL).

The following SSLs were identified at the Pirkey EBAP:

- The LCL for cobalt exceeded the GWPS of 0.00939 mg/L at AD-2 (0.0122 mg/L), AD-31 (0.00953 mg/L), and AD-32 (0.0323 mg/L).
- The LCL for lithium exceeded the GWPS of 0.0548 mg/L at AD-31 (0.0771 mg/L) and AD-32 (0.0785 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 June 2022 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 0.0610 mg/L at AD-2 (3.26 mg/L) and AD-32 (0.909 mg/L).
- Calcium concentrations exceeded the interwell UPL of 2.94 mg/L at AD-2 (3.4 mg/L) and AD-32 (7.25 mg/L).
- Chloride concentrations exceeded the interwell UPL of 8.97 mg/L at AD-2 (29.7 mg/L), AD-31 (23.2 mg/L), and AD-32 (30.6 mg/L).
- Sulfate concentrations exceeded the interwell UPL of 24.7 mg/L at AD-2 (259 mg/L), AD-31 (89.0 mg/L), and AD-32 (147 mg/L).
- TDS concentrations exceeded the interwell UPL of 171 mg/L at AD-2 (490 mg/L), AD-31 (270 mg/L), and AD-32 (320 mg/L).

While the prediction limits were calculated for a one-of-two retesting procedure, SSIs were conservatively assumed if the June 2022 sample was above the UPL or below the lower prediction limit (LPL). Based on these results, concentrations of Appendix III constituents appear to be above background concentrations.

### **2.3 Conclusions**

An annual and semi-annual assessment monitoring event were 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 prevented data usage. A review of outliers identified no potential outliers in the March and June 2022 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, 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 Plan – H.W. Pirkey Plant. November.

Geosyntec. 2022. Statistical Analysis Summary – East Bottom Ash Pond, H.W. Pirkey Plant. March.

Texas Commission on Environmental Quality (TCEQ). 2020. Draft Technical Guidance No. 32. Coal Combustion Residuals Groundwater Monitoring and Corrective Action. May.

# TABLES

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

Well ID		AD-2		AD-4		AD-12		AD-18		AD-31		AD-32	
Classification		Compliance		Background		Background		Background		Compliance		Compliance	
Parameter	Unit	3/29/2022	6/21/2022	3/29/2022	6/21/2022	3/28/2022	6/20/2022	3/29/2022	6/21/2022	3/28/2022	6/20/2022	3/28/2022	6/20/2022
Antimony	µg/L	0.2 U1	0.5 U1	0.1 U1	0.1 U1	0.1 U1	0.1 U1	0.02 J1	0.1 U1	0.1 U1	0.1 U1	0.1 U1	0.1 U1
Arsenic	µg/L	0.82	2.0	1.10	0.30	0.09 J1	0.08 J1	1.55	0.30	0.26	0.42	1.05	1.81
Barium	µg/L	18.2	17.5	93.2	124	20.2	24.2	90.1	79.3	32.8	34.1	30.0	32.3
Beryllium	µg/L	0.75	0.85	0.641	0.407	0.127	0.135	0.106	0.073	0.854	1.03	2.89	3.28
Boron	mg/L	3.02	3.26	0.019 J1	0.020 J1	0.021 J1	0.042 J1	0.009 J1	0.05 U1	0.026 J1	0.028 J1	0.773	0.909
Cadmium	µg/L	0.102	0.11	0.010 J1	0.021	0.009 J1	0.008 J1	0.01 J1	0.012 J1	0.068	0.071	0.323	0.318
Calcium	mg/L	3.13	3.4	1.84	2.51	0.20	0.32	0.24	1.49	2.75	2.65	8.05	7.25
Chloride	mg/L	31.4	29.7	3.80	3.92	6.10	7.59	5.26	5.20	21.8	23.2	25.2	30.6
Chromium	µg/L	0.90	0.5 J1	0.31	0.46	0.35	0.63	1.40	0.47	0.51	0.59	0.60	0.68
Cobalt	µg/L	22.7	25.7	6.16	4.10	1.01	1.35	0.842	0.790	9.14	9.61	25.1	27.2
Combined Radium	pCi/L	1.76	1.87	1.15	1.31	0.76	0.63	2.01	0.73	2.41	4.6	5.9	13.87
Fluoride	mg/L	0.20	0.21	0.08	0.05 J1	0.07	0.09	0.06 U1	0.06 U1	0.13	0.14 J1	0.44	0.42
Lead	µg/L	0.5	0.6 J1	0.07 J1	0.2 U1	0.09 J1	0.08 J1	0.53	0.11 J1	0.29	0.35	0.38	0.43
Lithium	mg/L	0.0653	0.0688	0.0383	0.0220	0.00604	0.00949	0.0137	0.0108	0.0687	0.0844	0.0731	0.0923
Mercury	µg/L	0.092	0.244	0.017	0.004 J1	0.005 U1	0.005 U1	0.021	0.02 U1	0.103	0.089	1.900	2.700
Molybdenum	µg/L	1 U1	2.5 U1	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.5 U1	0.5 U1
Selenium	µg/L	2.7	2.7	0.5 U1	0.5 U1	0.33 J1	0.16 J1	0.38 J1	0.14 J1	0.38 J1	0.33 J1	3.42	2.67
Sulfate	mg/L	241	259	22.2	20.5	3.80	4.81	7.31	6.47	80.8	89.0	157	147
Thallium	µg/L	0.10 J1	0.3 J1	0.07 J1	0.09 J1	0.2 U1	0.2 U1	0.05 J1	0.2 U1	0.09 J1	0.08 J1	0.17 J1	0.17 J1
Total Dissolved Solids	mg/L	460 L1	490	140 L1	160	60 L1	80	140 L1	110	260 L1	270	330 L1	320
pH	SU	3.91	3.96	4.94	4.4	3.85	4.25	4.4	4.61	3.41	3.45	3.12	3.03

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

SU: standard unit

U1: Non-detect value. For statistical analysis, parameters which were not detected were replaced with the reporting limit.

J1: Estimated value. Parameter was detected in concentrations below the reporting limit.

L1: The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.

**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)	0.00600	0.00500	0.00600
Arsenic, Total (mg/L)	0.0100	0.0110	0.0110
Barium, Total (mg/L)	2.00	0.183	2.00
Beryllium, Total (mg/L)	0.00400	0.00200	0.00400
Cadmium, Total (mg/L)	0.00500	0.00100	0.00500
Chromium, Total (mg/L)	0.100	0.00419	0.100
Cobalt, Total (mg/L)	n/a	0.00939	0.00939
Combined Radium, Total (pCi/L)	5.00	3.36	5.00
Fluoride, Total (mg/L)	4.00	1.00	4.00
Lead, Total (mg/L)	n/a	0.00500	0.00500
Lithium, Total (mg/L)	n/a	0.0548	0.0548
Mercury, Total (mg/L)	0.00200	0.0000640	0.00200
Molybdenum, Total (mg/L)	n/a	0.00500	0.00500
Selenium, Total (mg/L)	0.0500	0.00500	0.0500
Thallium, Total (mg/L)	0.00200	0.00200	0.00200

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 Summary  
Pirkey - East Bottom Ash Pond**

Analyte	Unit	Description	AD-2	AD-31	AD-32
			6/21/2022	6/20/2022	6/20/2022
Boron	mg/L	Interwell Background Value (UPL)	0.0610		
		Analytical Result	<b>3.26</b>	0.028	<b>0.909</b>
Calcium	mg/L	Interwell Background Value (UPL)	2.94		
		Analytical Result	<b>3.4</b>	2.65	<b>7.25</b>
Chloride	mg/L	Interwell Background Value (UPL)	8.97		
		Analytical Result	<b>29.7</b>	<b>23.2</b>	<b>30.6</b>
Fluoride	mg/L	Interwell Background Value (UPL)	1.00		
		Analytical Result	0.21	0.14	0.42
pH	SU	Intrawell Background Value (UPL)	4.8	5.3	4.5
		Intrawell Background Value (LPL)	3.5	3.0	2.7
		Analytical Result	4.0	3.5	3.0
Sulfate	mg/L	Interwell Background Value (UPL)	24.7		
		Analytical Result	<b>259</b>	<b>89.0</b>	<b>147</b>
Total Dissolved Solids	mg/L	Interwell Background Value (UPL)	171		
		Analytical Result	<b>490</b>	<b>270</b>	<b>320</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

10.27.22

Date



ATTACHMENT B  
Data Quality Review Memorandum  
Revision 1 - January 2023



**ATTACHMENT B**  
**DATA QUALITY REVIEW – H.W. PIRKEY POWER PLANT**  
**JUNE 2022 SAMPLING EVENT MEMORANDUM**  
**RECORD OF REVISIONS**

**Revision 1 (January 2023)**

- The introductory text was updated to note that the laboratory reports for the sample data groups (SDGs) discussed in this memorandum were reissued in December 2022 with amended matrix spike (MS) precision calculations.
- For the second bullet point, regarding equipment blank detections, the text was amended to note that a high bias for groundwater chromium results may occur in multiple, not all, samples.
- The low matrix spike duplicate (MSD) recovery for beryllium in the sample “Duplicate 1” was added to the discussion of MS and MSD issues associated with SDG 222015.
- The relative percent difference (RPD) for sodium between the MS and MSD associated with sample ‘AD-2’ on SDG 222015 is no longer outside the acceptable range. This text was removed.
- The RPDs for calcium, lithium, magnesium, and sodium between the MS and MSD associated with sample ‘Duplicate-1’ on SDG 222015 are no longer outside the acceptable range. This text was removed.
- The RPD for calcium and sodium associated with the sample ‘AD-8’ on SDG 222016 are no longer outside the acceptable range. This text was removed.

## Memorandum

Date: January 11, 2023  
To: David Miller (AEP)  
Copies to: Leslie Fuerschbach (AEP)  
From: Allison Kreinberg (Geosyntec)  
Subject: Data Quality Review – H.W. Pirkey Power Plant  
June 2022 Sampling Event – Revision 1

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This memorandum summarizes the findings of a data quality review for groundwater samples collected at the H.W. Pirkey Power Plant, located in Pittsburg, Texas in June 2022. The groundwater samples were collected to comply 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"). The groundwater samples were analyzed for 40 CFR 257 Appendix III and IV constituents, plus additional constituents collected to support site evaluation efforts.

The following sample data groups (SDGs) were associated with the June 2022 sampling event and are reviewed in this memorandum:

- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 221988
- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 221989
- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 221990
- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 221991
- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 222015
- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 222016

The laboratory reports for these SDGs were reissued in December 2022 with amended matrix spike precision calculations. The data included in the revised laboratory reports associated with these

SDGs were reviewed to assess if they met the objectives outlined in TCEQ Draft Technical Guideline No. 32<sup>1</sup> prior to submittal of this data to TCEQ.

The following data quality issues were identified:

- As reported in SDG 221989, the sample “AD-3” submitted for total dissolved solids (TDS) analysis via method SM2540C was analyzed out of hold time. The “AD-3” TDS results should be considered estimated.
- As reported in SDG 222015, chromium and cobalt were detected in the equipment blank sample “Equipment Blank” collected on 6/20/2022. The detected chromium concentration in the equipment blank (0.41 µg/L) was higher than the detected values for chromium in multiple groundwater samples, which could result in high bias for all groundwater chromium results. The cobalt equipment blank detection was less than 10% of the detected values in the groundwater samples and would not result in a high bias.
- As reported in SDG 221988 and SDG 221989, the relative percent difference (RPD) for fluoride concentrations from parent sample “AD-13” and duplicate sample “Duplicate-1” was 24%. The “AD-13” fluoride results should be considered estimated.
- As reported in SDG 2221989, the RPD for TDS (11.5%) in the laboratory duplicate was above the acceptable limit of 10%. The associated sample (“AD-3”) was flagged P1: the precision between duplicate results was above acceptance limits. The “AD-3” TDS results should be considered estimated.
- As reported in SDG 222015, the following matrix spike (MS) or matrix spike duplicate (MSD) recovery issues were observed:
  - The MSD recovery for sodium (-30.9%) associated with sample “AD-2” was below the acceptable range of 75-125%. The associated sample (AD-2) was flagged M1: the associated MS or MSD recovery was outside acceptance limits. The “AD-2” sodium results should be considered estimated. Sodium is not a regulated Appendix III or IV constituent.
  - The MS recovery for cobalt (69.7%) and lithium (54%) associated with sample “AD13” were below the acceptable range of 75-125%. The associated sample (AD-13) was flagged M1: the associated MS or MSD recovery was outside

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<sup>1</sup> TCEQ. 2020. Topic: Coal Combustion Residuals (CCR) Groundwater Monitoring and Corrective Action Draft Technical Guidance No. 32. May.

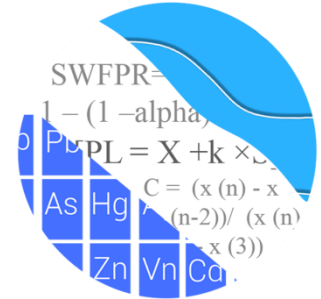
acceptance limits. The “AD-13” cobalt and lithium results should be considered estimated.

- The MSD recovery (72%) for beryllium associated with sample “Duplicate-1”, which was collected from well AD-13, was below the acceptable range of 75-125%. The MS recovery (62.6%) for calcium was below the acceptable range of 75-125%. The MS recovery (5.81%) and MSD recovery (53.9%) for cobalt were below the acceptable range of 75-125%. The MS recovery (-3.26%) and MSD recovery (-49.7%) for lithium were below the acceptable range of 75-125%. The MS recovery (32.4%) and MSD recovery (52.1%) for magnesium were below the acceptable range of 75-125%. The MS recovery (71.5%) and MSD recovery (54.3%) for sodium were below the acceptable range of 75-125%. The ‘Duplicate-1’ beryllium, calcium, cobalt, lithium, magnesium, and sodium results should be considered estimated. Magnesium and sodium are not regulated Appendix III or IV constituents.
- As reported in SDG 222015, the RPD for radium-226 (25.5%) in the laboratory duplicate was above the acceptable limit of 25%. The “AD-13” radium-226 results should be considered estimated.
- As reported in SDG 222016, the MS recovery (49.2%) and MSD recovery (63.5%) for calcium associated with sample “AD-8” were below the acceptable range of 75-125%. The MS recovery for sodium (70.1%) was below the acceptable range of 75-125%. The MS recovery (62.6%) and MSD recovery (72.2%) were below the acceptable range of 75-125%. The associated sample (AD-8) was flagged M1: the associated MS or MSD recovery was outside acceptance limits. The “AD-8” calcium, sodium, and strontium results should be considered estimated. Sodium and strontium are not regulated Appendix III or Appendix IV constituents.

Based on these findings, the majority of the data reported in these SDGs are considered accurate and complete. Although the QC failures mentioned above will result in some limitations of data use since the affected results are considered estimated or have elevated reporting limits, the data are considered usable for supporting project objectives.

**ATTACHMENT C**  
**Statistical Analysis Output**

## GROUNDWATER STATS CONSULTING



August 25, 2022

Geosyntec Consultants  
Attn: Ms. Allison Kreinberg  
500 W. Wilson Bridge Road, Ste. #250  
Worthington, OH 43085

Re: Pirkey East Bottom Ash Pond  
Assessment Monitoring Event – March & June 2022

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 March and June 2022 sample events 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 Kristina Rayner, Senior Statistician and Founder 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 March 2022**

### 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 on pooled upgradient well data did not identify any outliers through November 2021; however, high non-detect values of 0.04 mg/L for molybdenum in upgradient and downgradient wells were flagged in order to construct statistical limits that are conservative (i.e., lower) from a regulatory perspective and represent present-day groundwater quality at this facility.

Additionally, downgradient well data through November 2021 were screened through visual screening using time series graphs. Since the downgradient well data are used to construct confidence intervals, a regulatory conservative approach is taken in that values that are marginally high relative to the rest of the data are retained unless there is particular justification for excluding them. A previously flagged value for selenium in downgradient well AD-32 was unflagged as similar concentrations appeared among more recent observations, and all concentrations for selenium at this site are below the MCL. All flagged values may be seen on the Outlier Summary following this letter (Figure C).

### Interwell Upper Tolerance Limits

Interwell upper tolerance limits were established in Fall 2021 using all available pooled upgradient well data for each Appendix IV parameter through November 2021 (Figure D). GWPS will be updated during the Fall 2022. 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.

### Groundwater Protection Standards

Background limits were compared to the Maximum Contaminant Levels (MCLs) 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 E).

### **Evaluation of Appendix IV Parameters – March and June 2022**

Confidence intervals were then constructed on downgradient wells with data through June 2022 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,

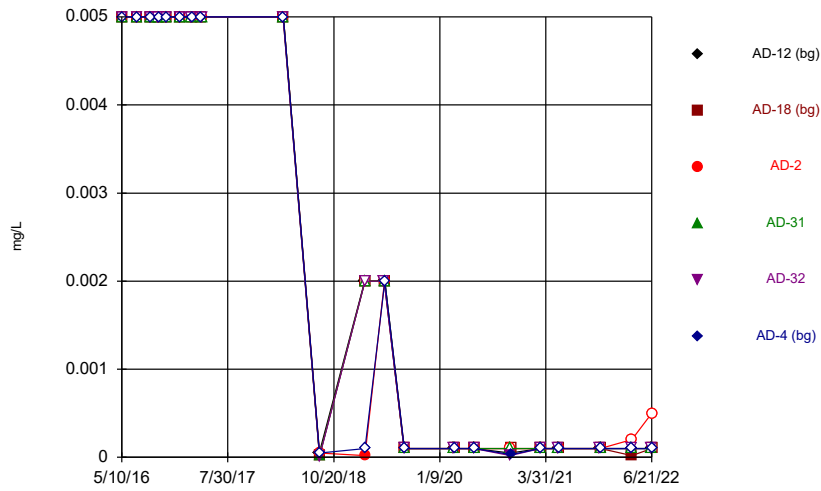


Andrew T. Collins  
Project Manager



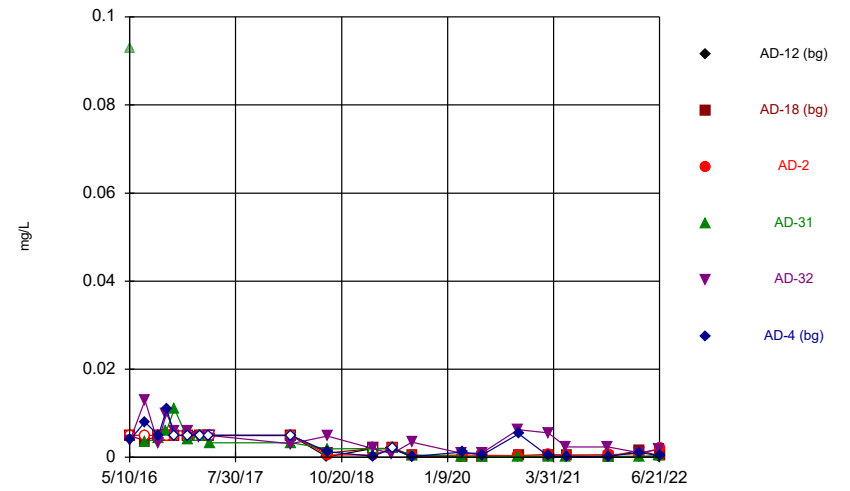
Kristina L. Rayner  
Senior Statistician

### Time Series



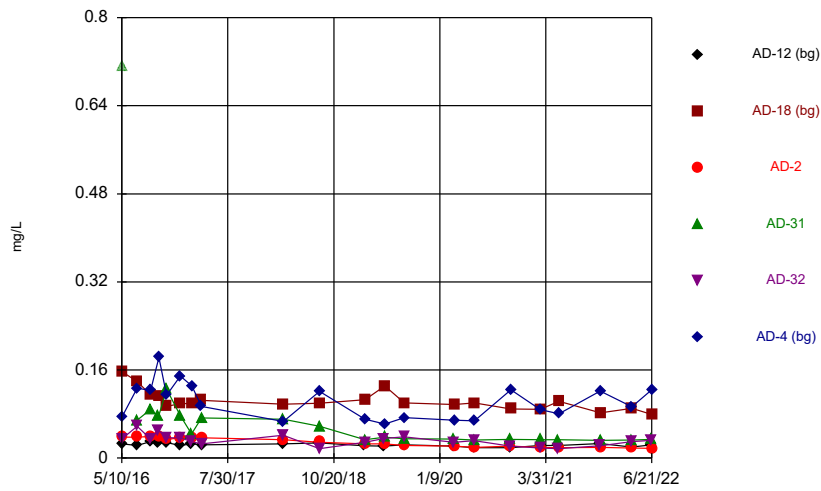
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Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Time Series



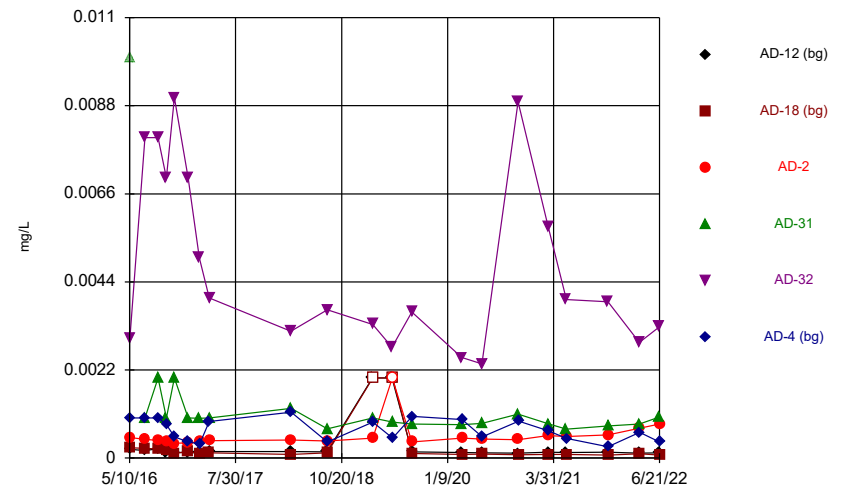
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### Time Series



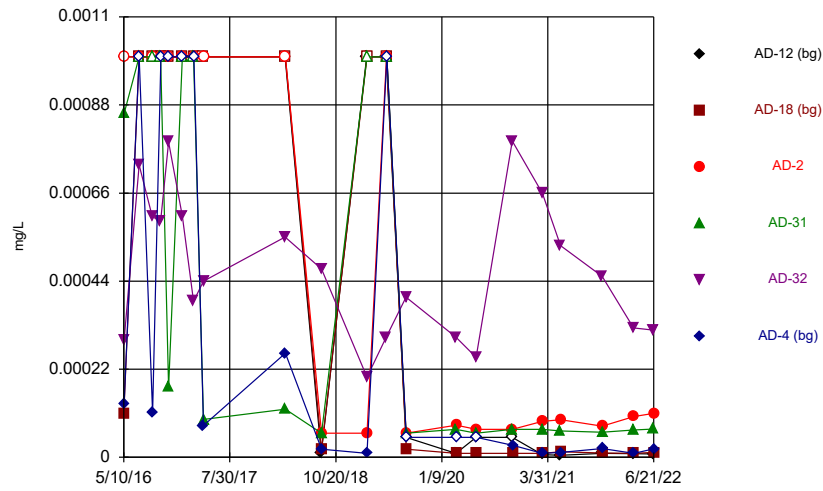
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### Time Series



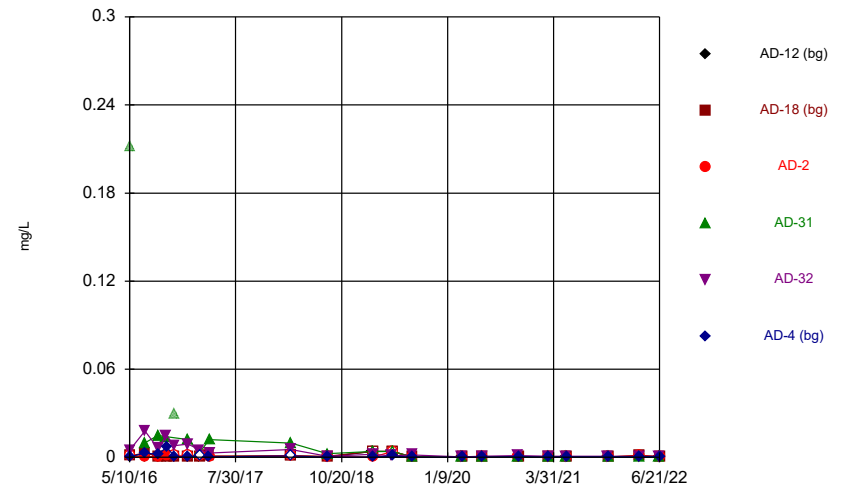
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### Time Series



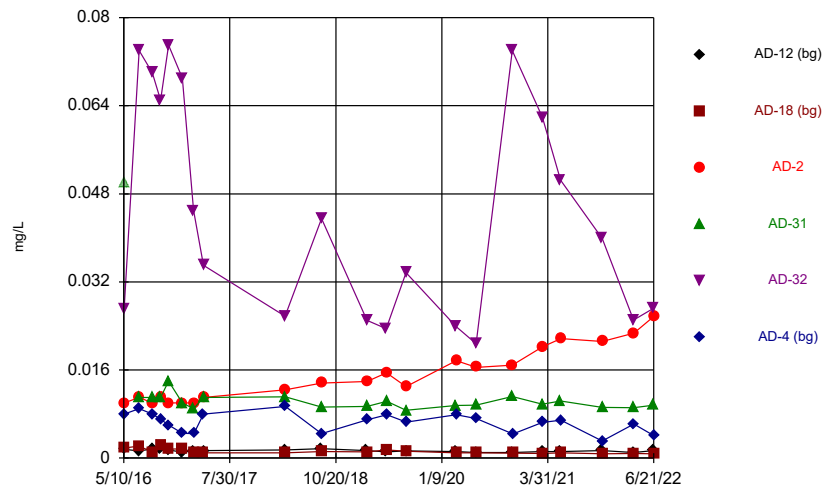
Constituent: Cadmium, total Analysis Run 8/25/2022 7:11 AM  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Time Series



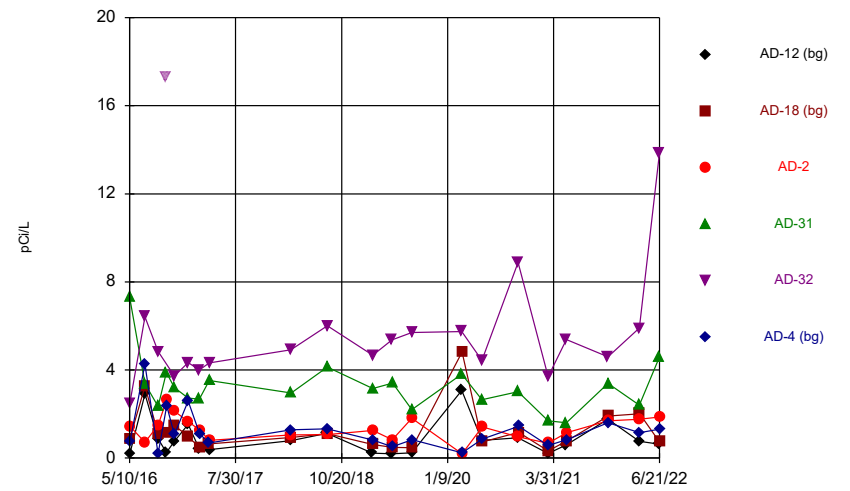
Constituent: Chromium, total Analysis Run 8/25/2022 7:11 AM  
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### Time Series



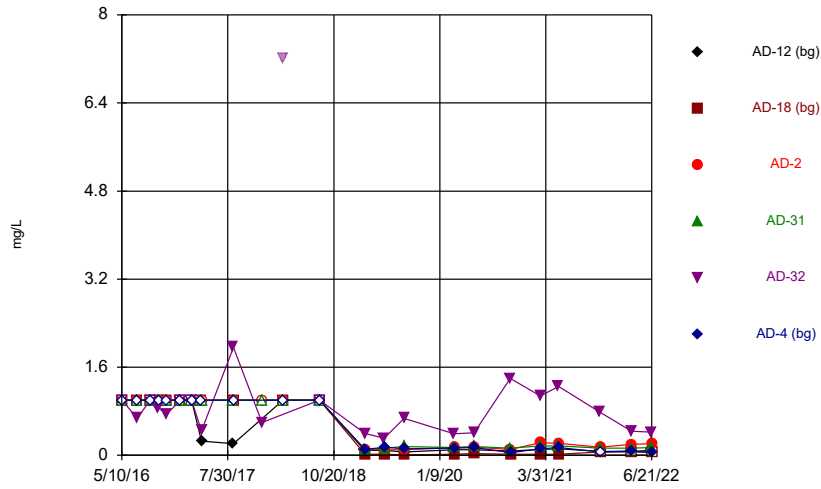
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### Time Series



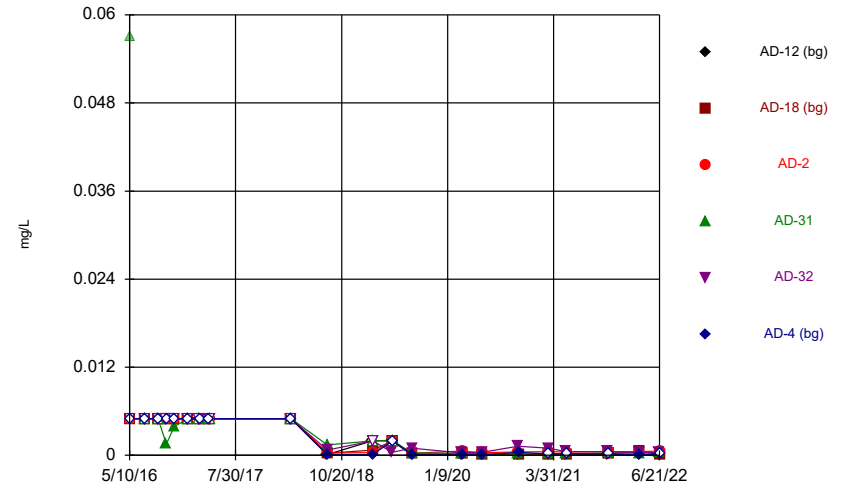
Constituent: Combined Radium 226 + 228 Analysis Run 8/25/2022 7:11 AM  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Time Series



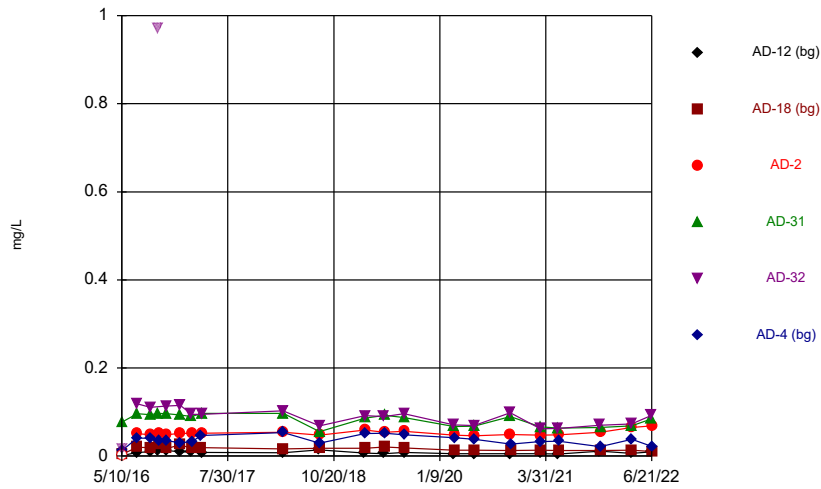
Constituent: Fluoride, total Analysis Run 8/25/2022 7:11 AM  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Time Series



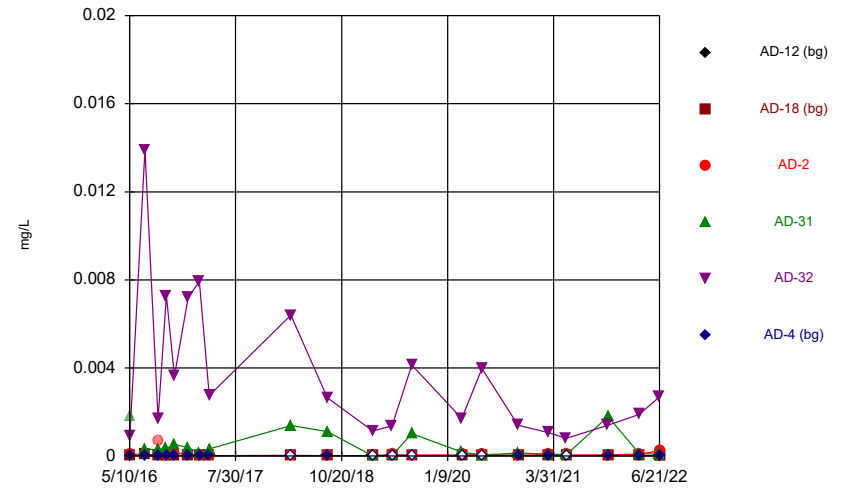
Constituent: Lead, total Analysis Run 8/25/2022 7:11 AM  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Time Series



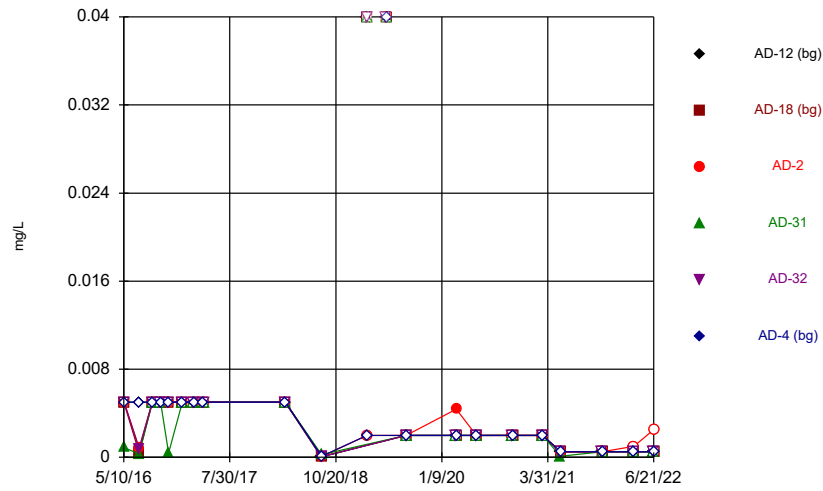
Constituent: Lithium, total Analysis Run 8/25/2022 7:11 AM  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Time Series



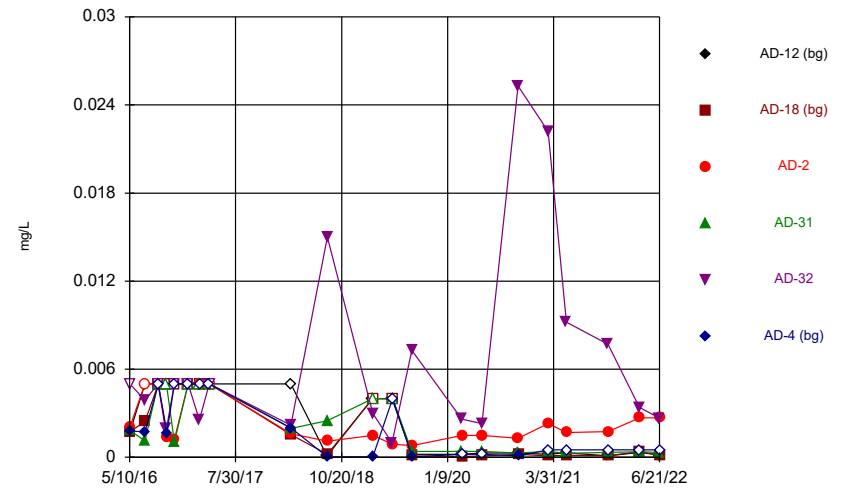
Constituent: Mercury, total Analysis Run 8/25/2022 7:11 AM  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Time Series



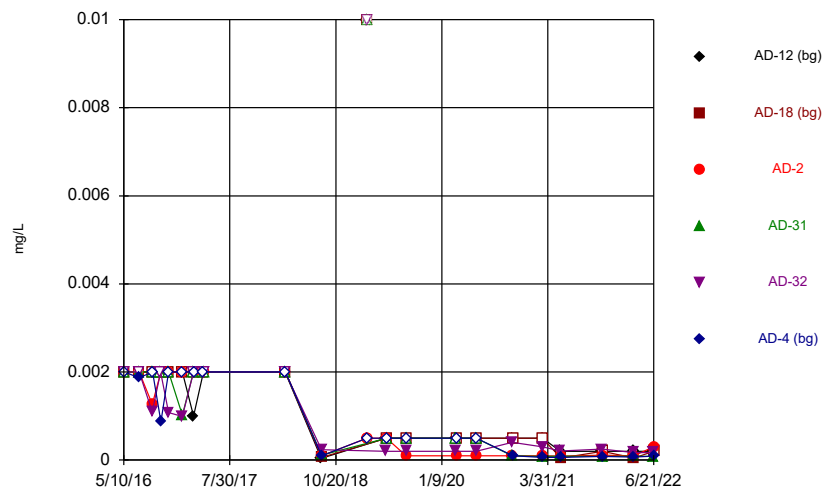
Constituent: Molybdenum, total Analysis Run 8/25/2022 7:11 AM  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Time Series



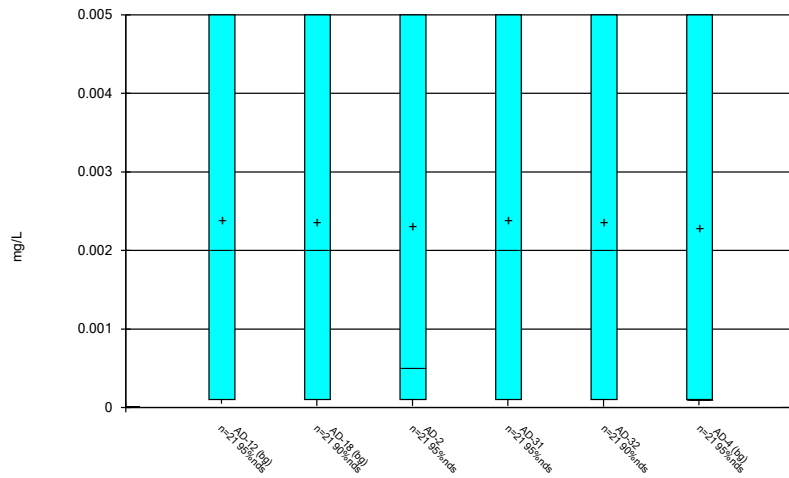
Constituent: Selenium, total Analysis Run 8/25/2022 7:11 AM  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Time Series



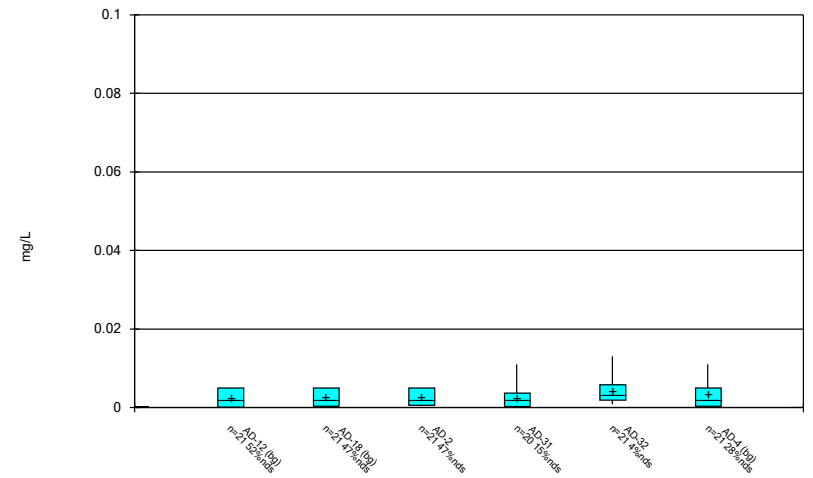
Constituent: Thallium, total Analysis Run 8/25/2022 7:11 AM  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Box & Whiskers Plot



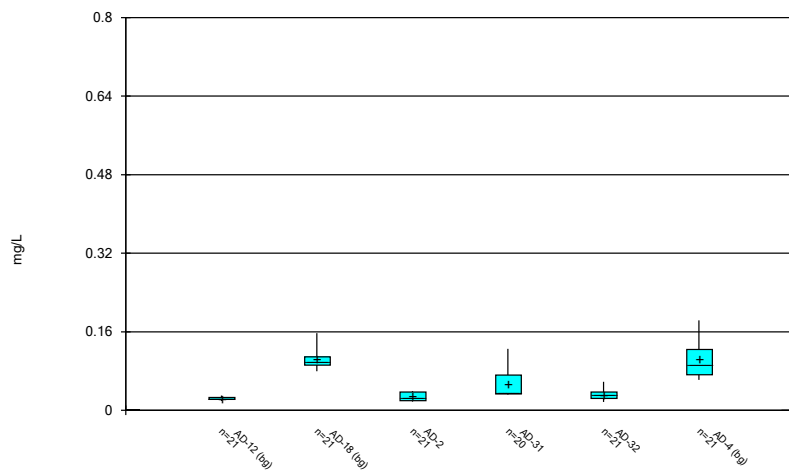
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Box & Whiskers Plot



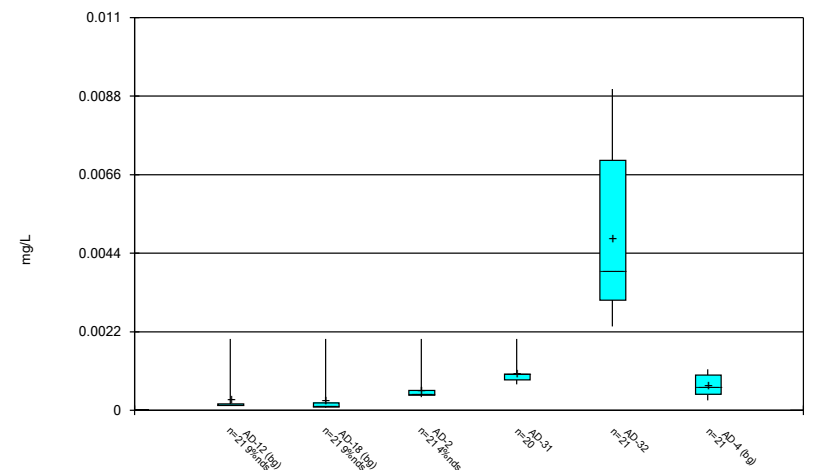
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Box & Whiskers Plot



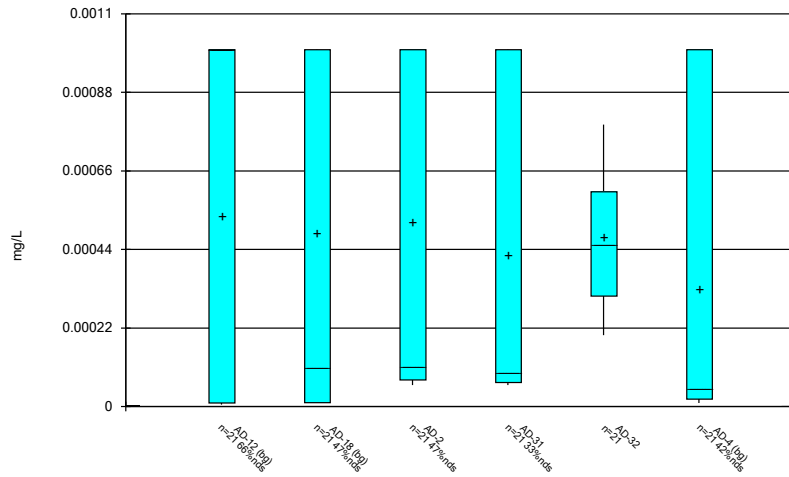
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Box & Whiskers Plot



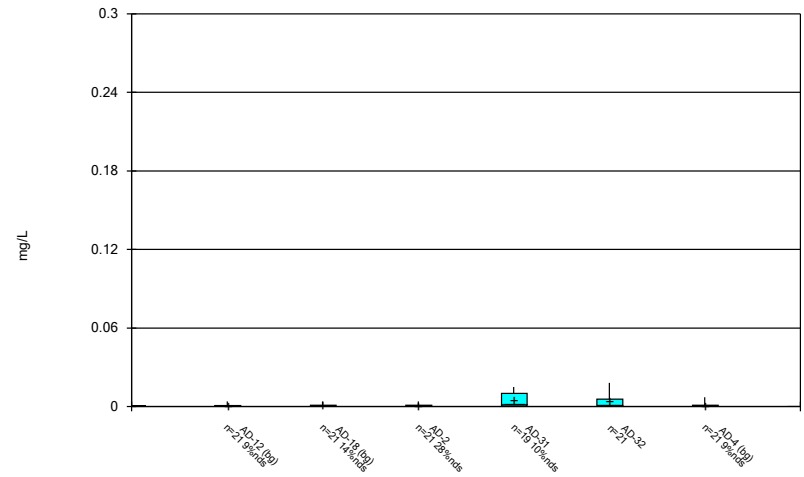
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Box & Whiskers Plot



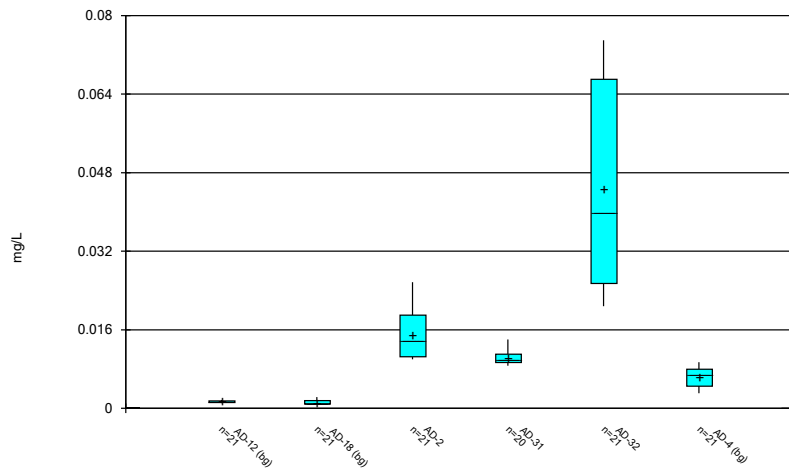
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Box & Whiskers Plot



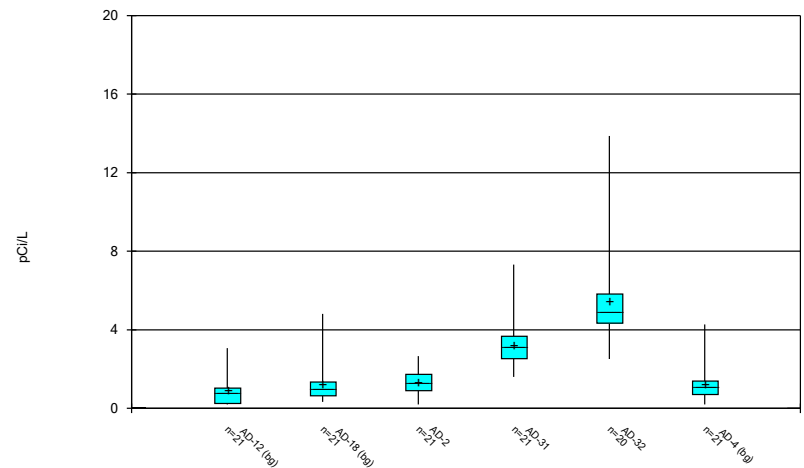
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Box & Whiskers Plot



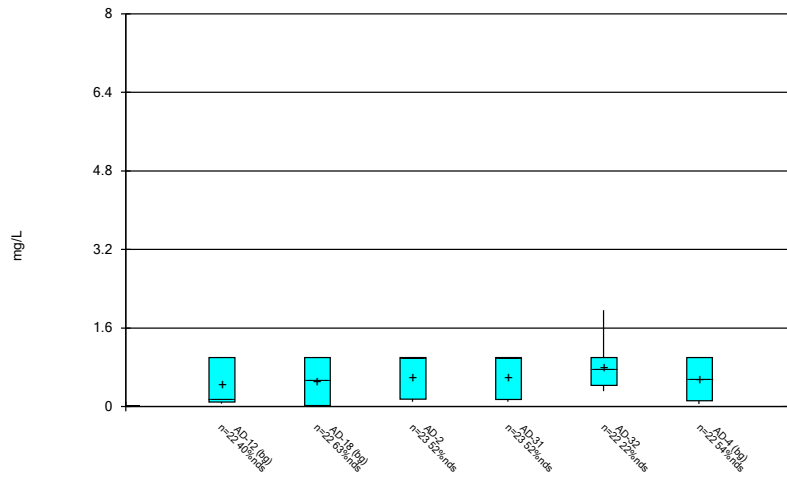
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 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Box & Whiskers Plot



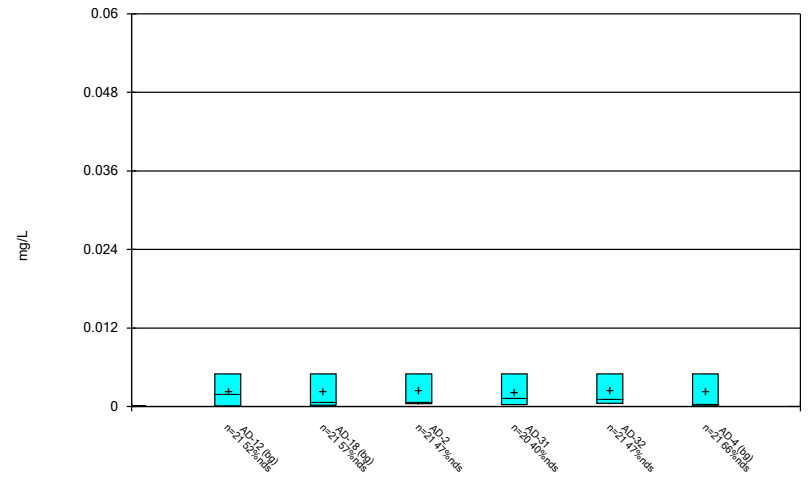
Constituent: Combined Radium 226 + 228 Analysis Run 8/25/2022 7:13 AM  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Box & Whiskers Plot



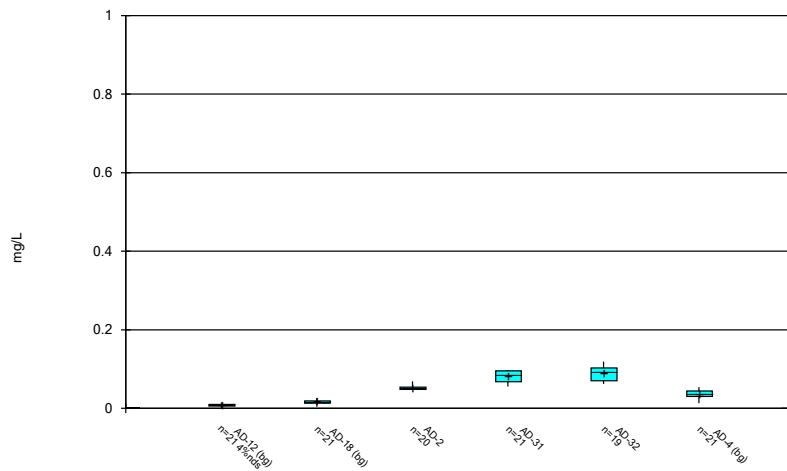
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Box & Whiskers Plot



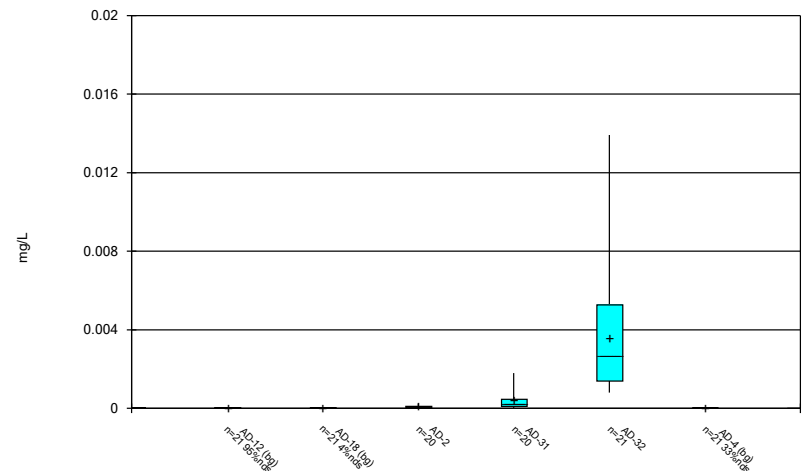
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 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Box & Whiskers Plot



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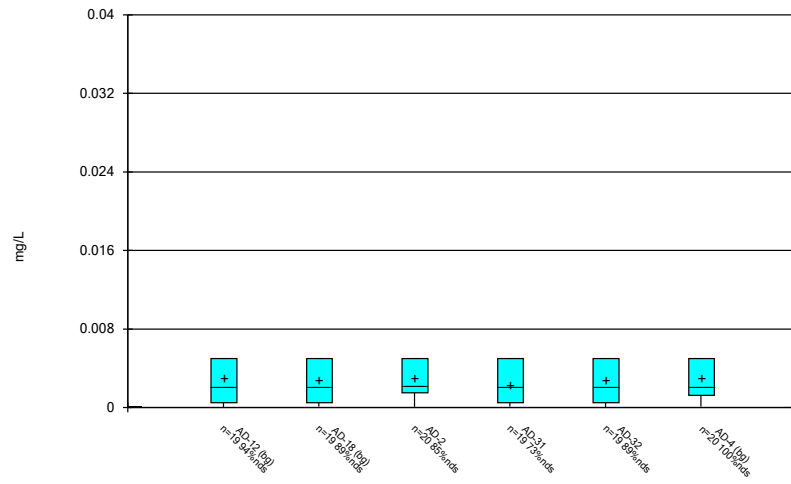
Box & Whiskers Plot



Constituent: Mercury, total Analysis Run 8/25/2022 7:14 AM  
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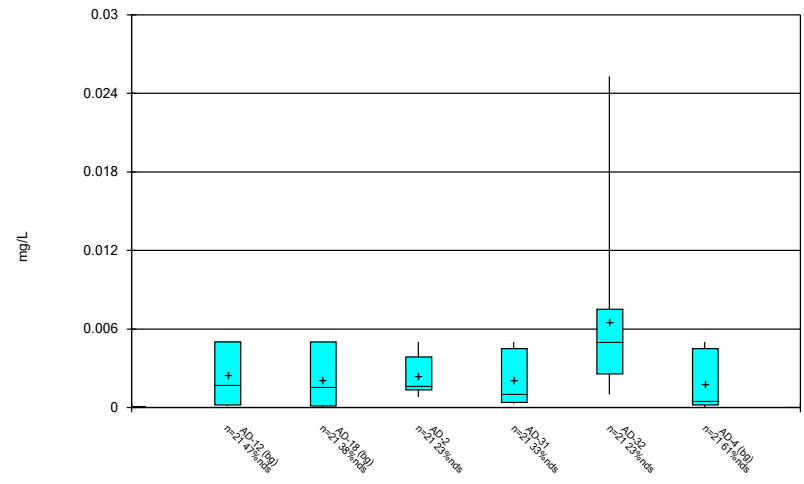


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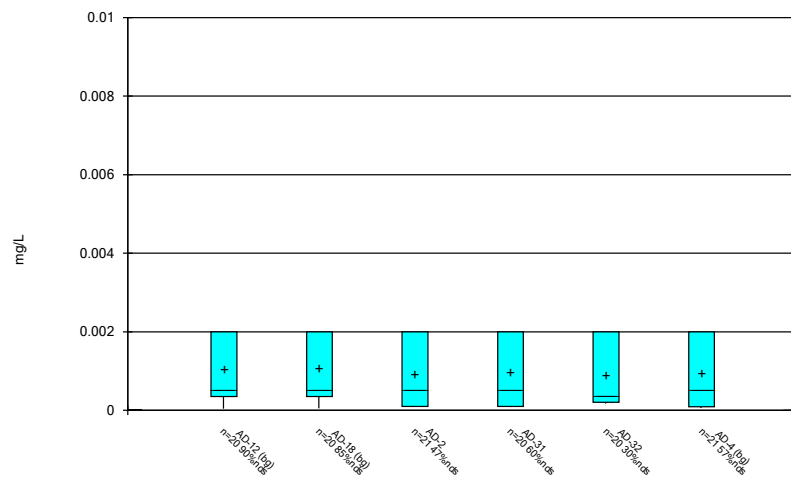
Constituent: Molybdenum, total Analysis Run 8/25/2022 7:14 AM  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Box & Whiskers Plot



Constituent: Selenium, total Analysis Run 8/25/2022 7:14 AM  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Box & Whiskers Plot



Constituent: Thallium, total Analysis Run 8/25/2022 7:14 AM  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

# Outlier Summary

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 8/25/2022, 7:27 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)			
2/27/2019										
2/28/2019										
5/21/2019										
5/22/2019										
5/23/2019										

Date	AD-2 Mercury, total (mg/L)	AD-31 Mercury, total (mg/L)	AD-12 Molybdenum, total (mg/L)	AD-18 Molybdenum, total (mg/L)	AD-2 Molybdenum, total (mg/L)	AD-31 Molybdenum, total (mg/L)	AD-32 Molybdenum, total (mg/L)	AD-4 Molybdenum, total (mg/L)	AD-12 Thallium, total (mg/L)	AD-18 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										
2/27/2019			<0.04 (o)						<0.01 (o)	
2/28/2019			<0.04 (o)	<0.04 (o)	<0.04 (o)	<0.04 (o)	<0.04 (o)		<0.01 (o)	
5/21/2019			<0.04 (o)				<0.04 (o)			
5/22/2019				<0.04 (o)						
5/23/2019			<0.04 (o)		<0.04 (o)		<0.04 (o)			

Date	AD-31 Thallium, total (mg/L)	AD-32 Thallium, total (mg/L)
5/11/2016		
9/7/2016		
10/12/2016		
11/14/2016		
3/21/2018		
2/27/2019		
2/28/2019	<0.01 (o)	<0.01 (o)
5/21/2019		
5/22/2019		
5/23/2019		

# Upper Tolerance Limits

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 2/21/2022, 10:26 AM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony, total (mg/L)	n/a	0.005	n/a	n/a	n/a	n/a	57	n/a	n/a	94.74	n/a	n/a	0.05373	NP Inter(NDs)
Arsenic, total (mg/L)	n/a	0.011	n/a	n/a	n/a	n/a	57	n/a	n/a	47.37	n/a	n/a	0.05373	NP Inter(normality)
Barium, total (mg/L)	n/a	0.183	n/a	n/a	n/a	n/a	57	n/a	n/a	0	n/a	n/a	0.05373	NP Inter(normality)
Beryllium, total (mg/L)	n/a	0.002	n/a	n/a	n/a	n/a	57	n/a	n/a	7.018	n/a	n/a	0.05373	NP Inter(normality)
Cadmium, total (mg/L)	n/a	0.001	n/a	n/a	n/a	n/a	57	n/a	n/a	57.89	n/a	n/a	0.05373	NP Inter(NDs)
Chromium, total (mg/L)	n/a	0.004192	n/a	n/a	n/a	n/a	57	-7.62	1.058	12.28	None	ln(x)	0.05	Inter
Cobalt, total (mg/L)	n/a	0.00939	n/a	n/a	n/a	n/a	57	n/a	n/a	0	n/a	n/a	0.05373	NP Inter(normality)
Combined Radium 226 + 228 (pCi/L)	n/a	3.357	n/a	n/a	n/a	n/a	57	0.9721	0.2589	0	None	x^(1/3)	0.05	Inter
Fluoride, total (mg/L)	n/a	1	n/a	n/a	n/a	n/a	60	n/a	n/a	55	n/a	n/a	0.04607	NP Inter(NDs)
Lead, total (mg/L)	n/a	0.005	n/a	n/a	n/a	n/a	57	n/a	n/a	63.16	n/a	n/a	0.05373	NP Inter(NDs)
Lithium, total (mg/L)	n/a	0.05477	n/a	n/a	n/a	n/a	57	0.1348	0.04894	1.754	None	sqrt(x)	0.05	Inter
Mercury, total (mg/L)	n/a	0.000064	n/a	n/a	n/a	n/a	57	n/a	n/a	43.86	n/a	n/a	0.05373	NP Inter(normality)
Molybdenum, total (mg/L)	n/a	0.005	n/a	n/a	n/a	n/a	52	n/a	n/a	94.23	n/a	n/a	0.06944	NP Inter(NDs)
Selenium, total (mg/L)	n/a	0.005	n/a	n/a	n/a	n/a	57	n/a	n/a	50.88	n/a	n/a	0.05373	NP Inter(NDs)
Thallium, total (mg/L)	n/a	0.002	n/a	n/a	n/a	n/a	55	n/a	n/a	80	n/a	n/a	0.05954	NP Inter(NDs)

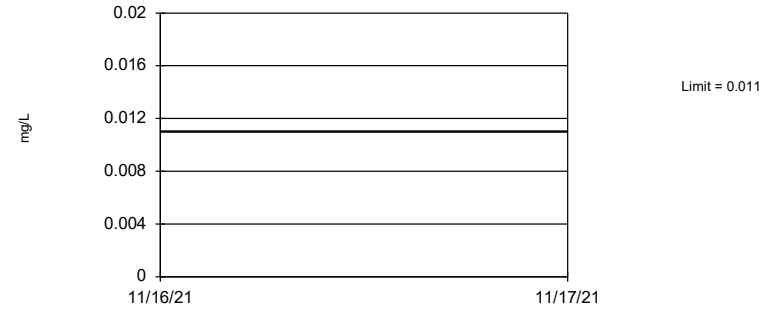
### Tolerance Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 57 background values. 94.74% NDs. 92.38% coverage at alpha=0.01; 94.73% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.05373.

Constituent: Antimony, total Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limits  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

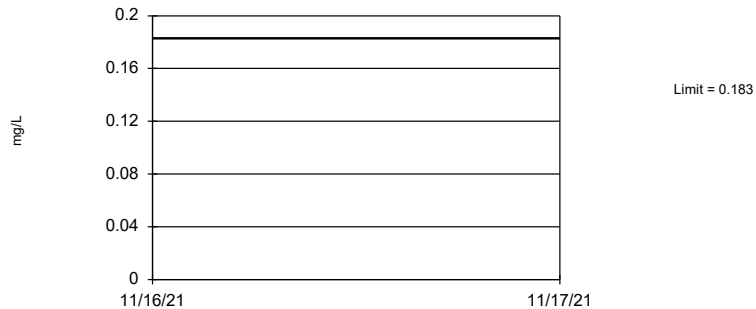
### Tolerance Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 57 background values. 47.37% NDs. 92.38% coverage at alpha=0.01; 94.73% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.05373.

Constituent: Arsenic, total Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limits  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

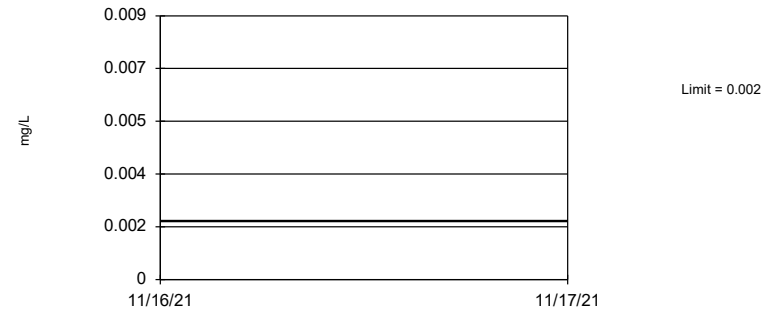
### Tolerance Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 57 background values. 92.38% coverage at alpha=0.01; 94.73% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.05373.

Constituent: Barium, total Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limits  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tolerance Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 57 background values. 7.018% NDs. 92.38% coverage at alpha=0.01; 94.73% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.05373.

Constituent: Beryllium, total Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limits  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

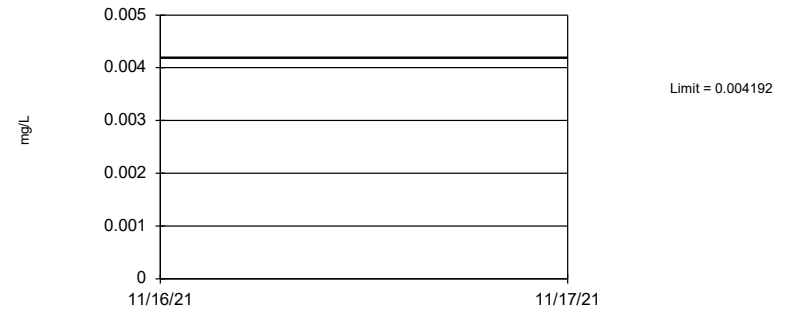
Tolerance Limit  
Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 57 background values. 57.89% NDs. 92.38% coverage at alpha=0.01; 94.73% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.05373.

Constituent: Cadmium, total Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limits  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

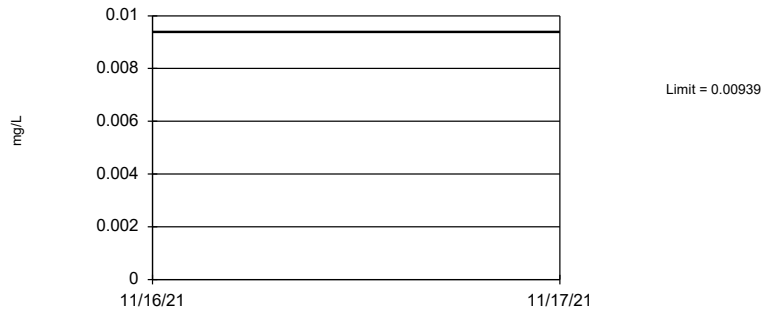
Tolerance Limit  
Interwell Parametric



95% coverage. Background Data Summary (based on natural log transformation): Mean=-7.62, Std. Dev.=1.058, n=57, 12.28% NDs. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9462, critical = 0.944. Report alpha = 0.05.

Constituent: Chromium, total Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limits  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

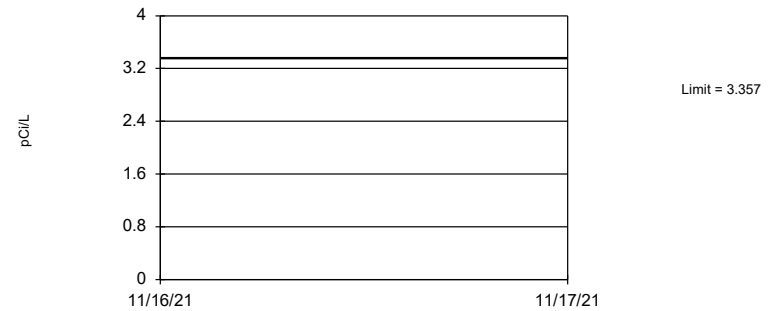
Tolerance Limit  
Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 57 background values. 92.38% coverage at alpha=0.01; 94.73% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.05373.

Constituent: Cobalt, total Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limits  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Tolerance Limit  
Interwell Parametric



95% coverage. Background Data Summary (based on cube root transformation): Mean=0.9721, Std. Dev.=0.2589, n=57. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9514, critical = 0.944. Report alpha = 0.05.

Constituent: Combined Radium 226 + 228 Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limit  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Tolerance Limit  
Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 60 background values. 55% NDs. 92.77% coverage at alpha=0.01; 95.12% coverage at alpha=0.05; 99.02% coverage at alpha=0.5. Report alpha = 0.04607.

Constituent: Fluoride, total Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limits  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

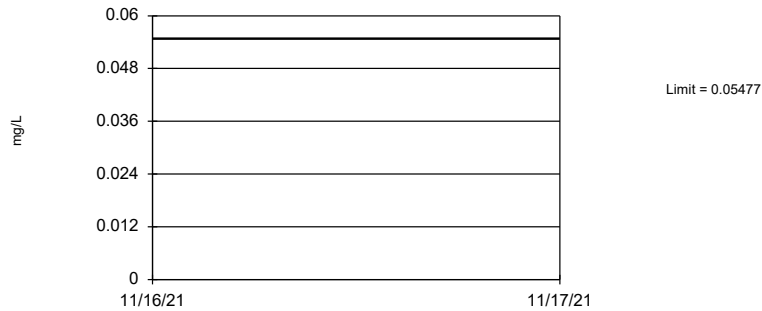
Tolerance Limit  
Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 57 background values. 63.16% NDs. 92.38% coverage at alpha=0.01; 94.73% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.05373.

Constituent: Lead, total Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limits  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

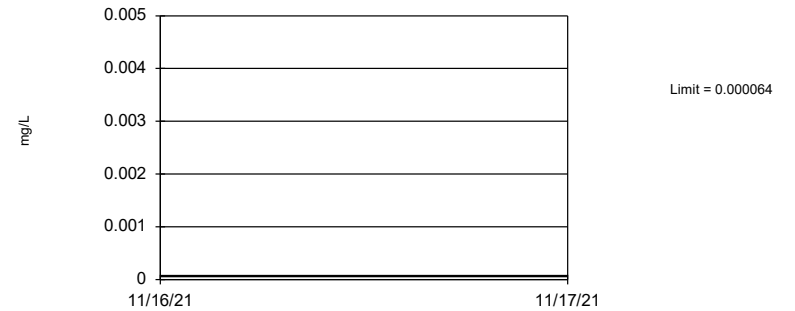
Tolerance Limit  
Interwell Parametric



95% coverage. Background Data Summary (based on square root transformation): Mean=0.1348, Std. Dev.=0.04894, n=57, 1.754% NDs. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9741, critical = 0.944. Report alpha = 0.05.

Constituent: Lithium, total Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limits  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Tolerance Limit  
Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because the Shapiro Francia normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 57 background values. 43.86% NDs. 92.38% coverage at alpha=0.01; 94.73% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.05373.

Constituent: Mercury, total Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limits  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tolerance Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 52 background values. 94.23% NDs. 91.6% coverage at alpha=0.01; 94.34% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.06944.

Constituent: Molybdenum, total Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limits  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

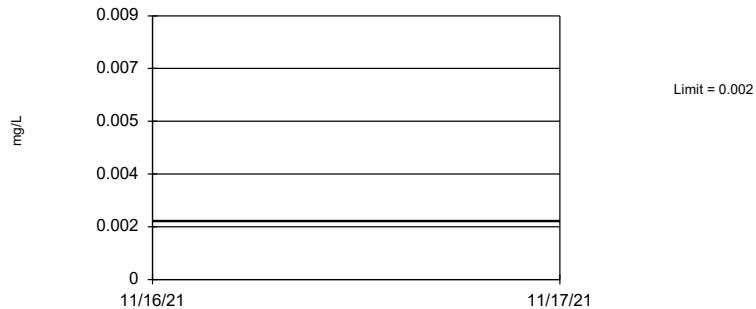
### Tolerance Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 57 background values. 50.88% NDs. 92.38% coverage at alpha=0.01; 94.73% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.05373.

Constituent: Selenium, total Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limits  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

### Tolerance Limit Interwell Non-parametric



Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Limit is highest of 55 background values. 80% NDs. 91.99% coverage at alpha=0.01; 94.73% coverage at alpha=0.05; 98.63% coverage at alpha=0.5. Report alpha = 0.05954.

Constituent: Thallium, total Analysis Run 2/21/2022 10:25 AM View: Upper Tolerance Limits  
Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

<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	0.002	0.004
Cadmium, Total (mg/L)	0.005	0.001	0.005
Chromium, Total (mg/L)	0.1	0.0042	0.1
Cobalt, Total (mg/L)	n/a	0.0094	0.0094
Combined Radium, Total (pCi/L)	5	3.36	5
Fluoride, Total (mg/L)	4	1	4
Lead, Total (mg/L)	n/a	0.005	0.005
Lithium, Total (mg/L)	n/a	0.055	0.055
Mercury, Total (mg/L)	0.002	0.000064	0.002
Molybdenum, Total (mg/L)	n/a	0.005	0.005
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 Intervals - Significant Results

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 8/25/2022, 7:29 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	0.01767	0.01224	0.0094	Yes	21	0.01495	0.004922	0	None	No	0.01	Param.
Cobalt, total (mg/L)	AD-31	0.01085	0.009532	0.0094	Yes	20	0.01021	0.001204	0	None	sqrt(x)	0.01	Param.
Cobalt, total (mg/L)	AD-32	0.05381	0.03232	0.0094	Yes	21	0.04451	0.02006	0	None	sqrt(x)	0.01	Param.
Lithium, total (mg/L)	AD-31	0.0909	0.07714	0.055	Yes	21	0.08249	0.01381	0	None	x^3	0.01	Param.
Lithium, total (mg/L)	AD-32	0.1003	0.07846	0.055	Yes	19	0.08938	0.01865	0	None	No	0.01	Param.

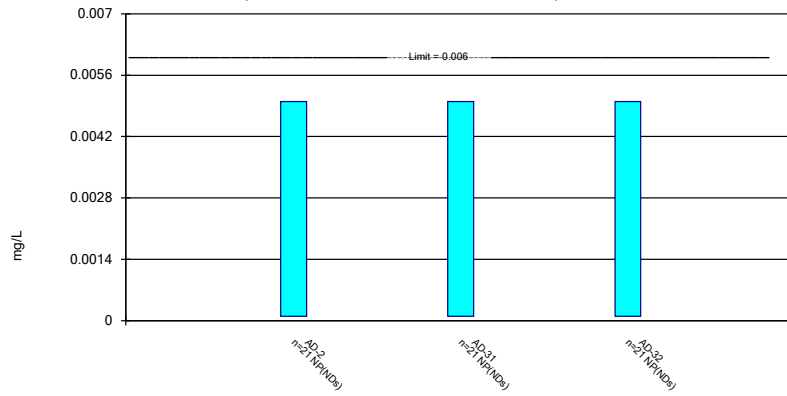
# Confidence Intervals - All Results

Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP Printed 8/25/2022, 7:29 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	21	0.002308	0.002424	95.24	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-31	0.005	0.0001	0.006	No	21	0.002377	0.002392	95.24	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-32	0.005	0.0001	0.006	No	21	0.002373	0.002396	90.48	None	No	0.01	NP (NDs)
Arsenic, total (mg/L)	AD-2	0.005	0.00052	0.011	No	21	0.002593	0.002179	47.62	None	No	0.01	NP (normality)
Arsenic, total (mg/L)	AD-31	0.003272	0.0007249	0.011	No	20	0.002445	0.002743	15	None	sqrt(x)	0.01	Param.
Arsenic, total (mg/L)	AD-32	0.005323	0.002297	0.011	No	21	0.004143	0.003064	4.762	None	sqrt(x)	0.01	Param.
Barium, total (mg/L)	AD-2	0.037	0.0196	2	No	21	0.0282	0.00828	0	None	No	0.01	NP (normality)
Barium, total (mg/L)	AD-31	0.073	0.0332	2	No	20	0.05269	0.02576	0	None	No	0.01	NP (normality)
Barium, total (mg/L)	AD-32	0.03766	0.02637	2	No	21	0.03201	0.01023	0	None	No	0.01	Param.
Beryllium, total (mg/L)	AD-2	0.000564	0.0004137	0.004	No	21	0.0005671	0.0003486	4.762	None	No	0.01	NP (normality)
Beryllium, total (mg/L)	AD-31	0.00103	0.00085	0.004	No	20	0.001039	0.0003514	0	None	No	0.01	NP (normality)
Beryllium, total (mg/L)	AD-32	0.005818	0.003512	0.004	No	21	0.004819	0.002232	0	None	sqrt(x)	0.01	Param.
Cadmium, total (mg/L)	AD-2	0.001	0.00007	0.005	No	21	0.0005178	0.0004713	47.62	None	No	0.01	NP (normality)
Cadmium, total (mg/L)	AD-31	0.001	0.000066	0.005	No	21	0.0004241	0.0004504	33.33	None	No	0.01	NP (normality)
Cadmium, total (mg/L)	AD-32	0.0005731	0.0003769	0.005	No	21	0.000475	0.0001779	0	None	No	0.01	Param.
Chromium, total (mg/L)	AD-2	0.0004668	0.0002605	0.1	No	21	0.0007141	0.0008186	28.57	Kaplan-Meier	ln(x)	0.01	Param.
Chromium, total (mg/L)	AD-31	0.01	0.000357	0.1	No	19	0.004706	0.005421	10.53	None	No	0.01	NP (normality)
Chromium, total (mg/L)	AD-32	0.004899	0.001204	0.1	No	21	0.004069	0.004914	0	None	x^(1/3)	0.01	Param.
<b>Cobalt, total (mg/L)</b>	<b>AD-2</b>	<b>0.01767</b>	<b>0.01224</b>	<b>0.0094</b>	<b>Yes</b>	<b>21</b>	<b>0.01495</b>	<b>0.004922</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.01</b>	<b>Param.</b>
<b>Cobalt, total (mg/L)</b>	<b>AD-31</b>	<b>0.01085</b>	<b>0.009532</b>	<b>0.0094</b>	<b>Yes</b>	<b>20</b>	<b>0.01021</b>	<b>0.001204</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>0.05381</b>	<b>0.03232</b>	<b>0.0094</b>	<b>Yes</b>	<b>21</b>	<b>0.04451</b>	<b>0.02006</b>	<b>0</b>	<b>None</b>	<b>sqrt(x)</b>	<b>0.01</b>	<b>Param.</b>
Combined Radium 226 + 228 (pCi/L)	AD-2	1.638	1.019	5	No	21	1.328	0.5612	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-31	3.785	2.577	5	No	21	3.242	1.202	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-32	6.245	4.206	5	No	20	5.467	2.368	0	None	ln(x)	0.01	Param.
Fluoride, total (mg/L)	AD-2	1	0.15	4	No	23	0.5961	0.4327	52.17	None	No	0.01	NP (NDs)
Fluoride, total (mg/L)	AD-31	1	0.14	4	No	23	0.5896	0.4386	52.17	None	No	0.01	NP (NDs)
Fluoride, total (mg/L)	AD-32	0.909	0.476	4	No	22	0.8103	0.4018	22.73	Kaplan-Meier	No	0.01	Param.
Lead, total (mg/L)	AD-2	0.005	0.000435	0.005	No	21	0.002476	0.002266	47.62	None	No	0.01	NP (normality)
Lead, total (mg/L)	AD-31	0.005	0.00026	0.005	No	20	0.002164	0.002113	40	None	No	0.01	NP (normality)
Lead, total (mg/L)	AD-32	0.005	0.00043	0.005	No	21	0.002567	0.00219	47.62	None	No	0.01	NP (normality)
Lithium, total (mg/L)	AD-2	0.0542	0.048	0.055	No	20	0.05258	0.005968	0	None	No	0.01	NP (normality)
<b>Lithium, total (mg/L)</b>	<b>AD-31</b>	<b>0.0909</b>	<b>0.07714</b>	<b>0.055</b>	<b>Yes</b>	<b>21</b>	<b>0.08249</b>	<b>0.01381</b>	<b>0</b>	<b>None</b>	<b>x^3</b>	<b>0.01</b>	<b>Param.</b>
<b>Lithium, total (mg/L)</b>	<b>AD-32</b>	<b>0.1003</b>	<b>0.07846</b>	<b>0.055</b>	<b>Yes</b>	<b>19</b>	<b>0.08938</b>	<b>0.01865</b>	<b>0</b>	<b>None</b>	<b>No</b>	<b>0.01</b>	<b>Param.</b>
Mercury, total (mg/L)	AD-2	0.00009033	0.00004268	0.002	No	20	0.0000708	0.00005153	0	None	sqrt(x)	0.01	Param.
Mercury, total (mg/L)	AD-31	0.0005645	0.0001282	0.002	No	20	0.0004216	0.0005033	0	None	sqrt(x)	0.01	Param.
Mercury, total (mg/L)	AD-32	0.004709	0.001779	0.002	No	21	0.003616	0.003276	0	None	sqrt(x)	0.01	Param.
Molybdenum, total (mg/L)	AD-2	0.005	0.001	0.005	No	20	0.00299	0.001903	85	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-31	0.005	0.0004016	0.005	No	19	0.002287	0.002007	73.68	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-32	0.005	0.0005	0.005	No	19	0.002779	0.002039	89.47	None	No	0.01	NP (NDs)
Selenium, total (mg/L)	AD-2	0.001706	0.001176	0.05	No	21	0.00243	0.001552	23.81	Kaplan-Meier	ln(x)	0.01	Param.
Selenium, total (mg/L)	AD-31	0.004	0.00038	0.05	No	21	0.002128	0.001987	33.33	None	No	0.01	NP (normality)
Selenium, total (mg/L)	AD-32	0.007193	0.002484	0.05	No	21	0.006535	0.006536	23.81	Kaplan-Meier	x^(1/3)	0.01	Param.
Thallium, total (mg/L)	AD-2	0.002	0.0001	0.002	No	21	0.0009267	0.0009012	47.62	None	No	0.01	NP (normality)
Thallium, total (mg/L)	AD-31	0.002	0.00009	0.002	No	20	0.0009826	0.0008822	60	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-32	0.002	0.0002	0.002	No	20	0.000885	0.0008048	30	None	No	0.01	NP (normality)

### Non-Parametric Confidence Interval

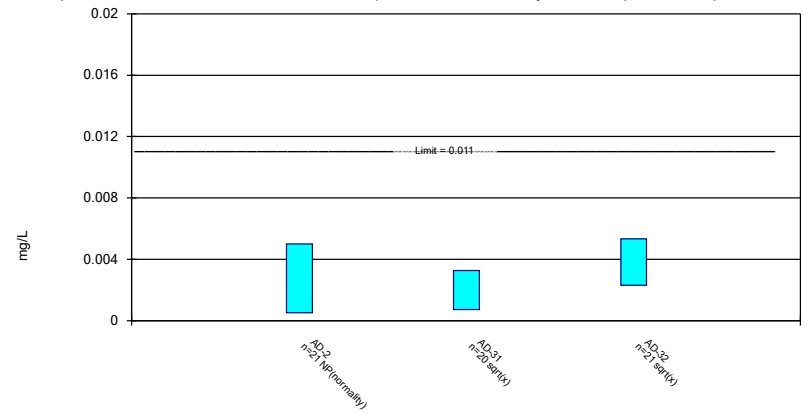
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Antimony, total Analysis Run 8/25/2022 7:27 AM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

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

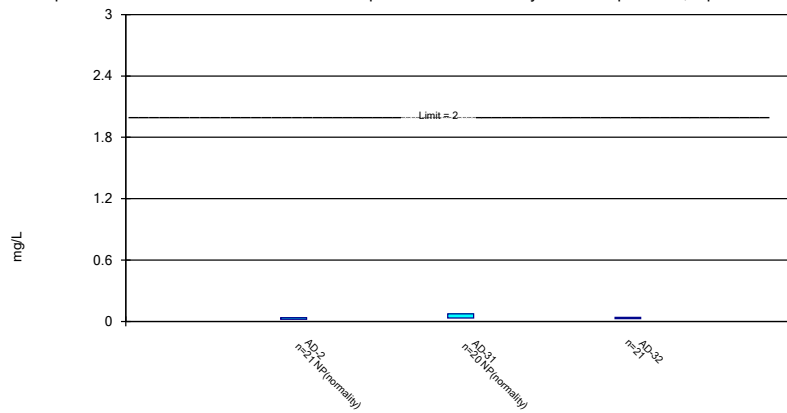
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Arsenic, total Analysis Run 8/25/2022 7:27 AM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

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

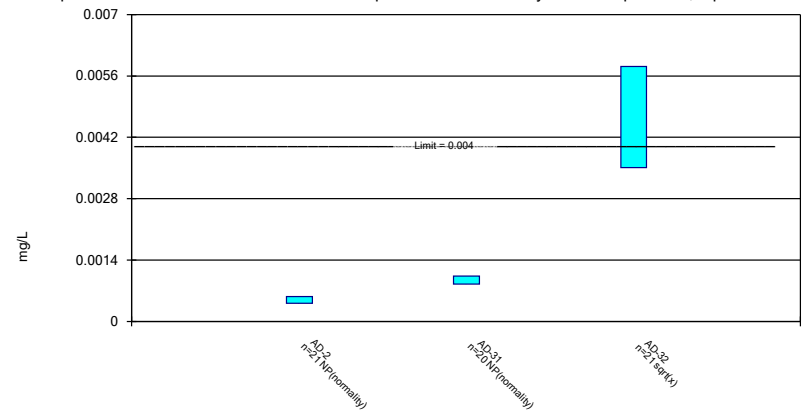
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Barium, total Analysis Run 8/25/2022 7:27 AM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

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

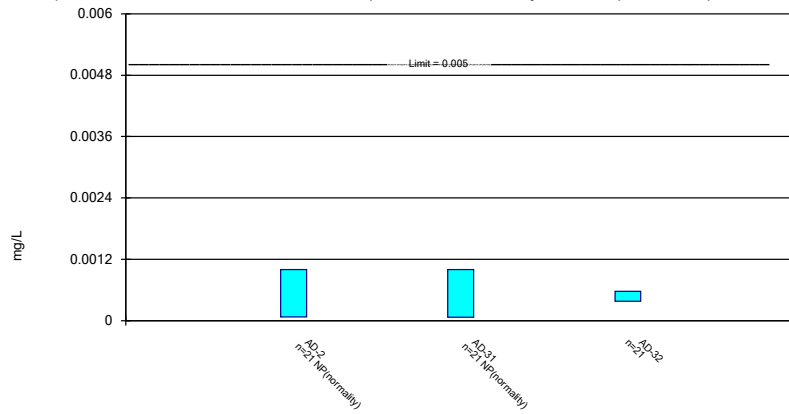
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Beryllium, total Analysis Run 8/25/2022 7:27 AM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Parametric and Non-Parametric (NP) Confidence Interval

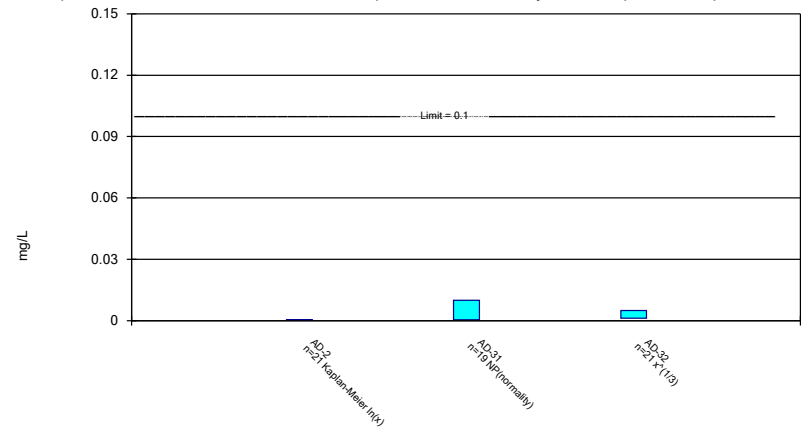
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cadmium, total Analysis Run 8/25/2022 7:27 AM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Parametric and Non-Parametric (NP) Confidence Interval

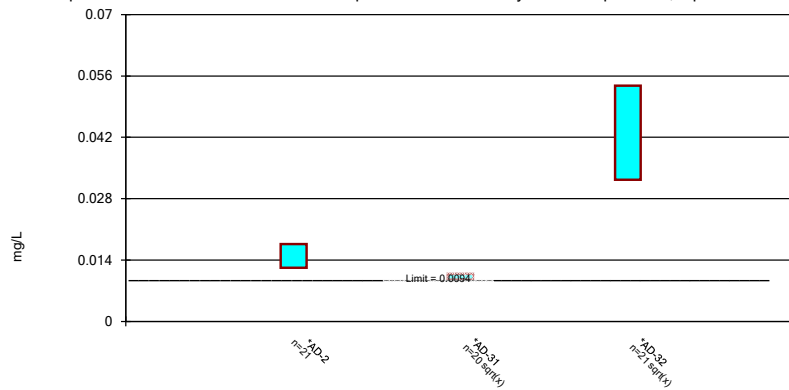
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Chromium, total Analysis Run 8/25/2022 7:27 AM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Parametric Confidence Interval

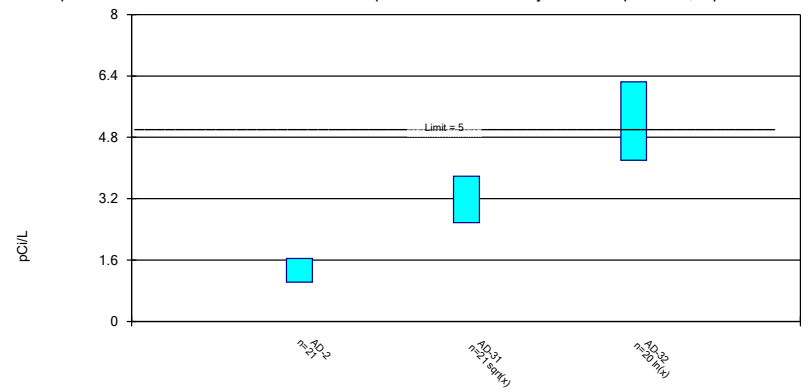
Compliance limit is exceeded.\* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt, total Analysis Run 8/25/2022 7:27 AM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Parametric Confidence Interval

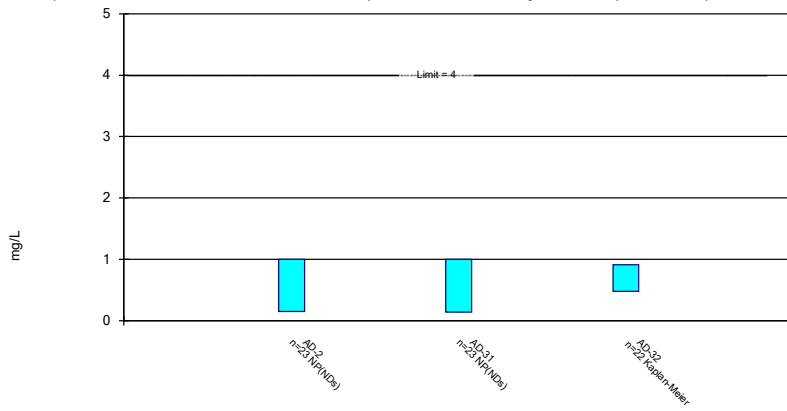
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Combined Radium 226 + 228 Analysis Run 8/25/2022 7:27 AM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Parametric and Non-Parametric (NP) Confidence Interval

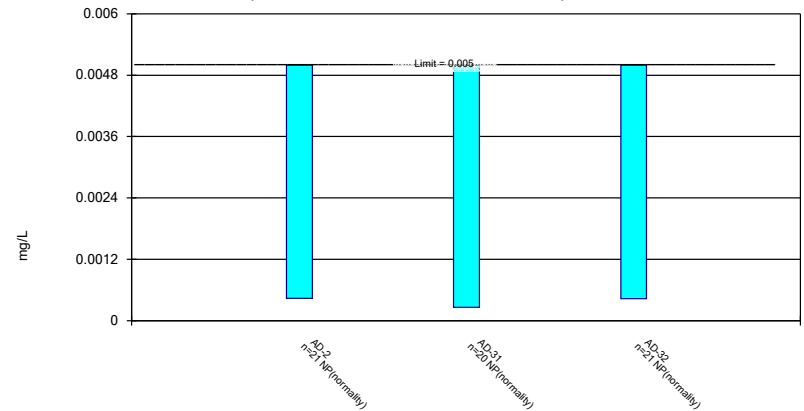
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Fluoride, total Analysis Run 8/25/2022 7:28 AM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Non-Parametric Confidence Interval

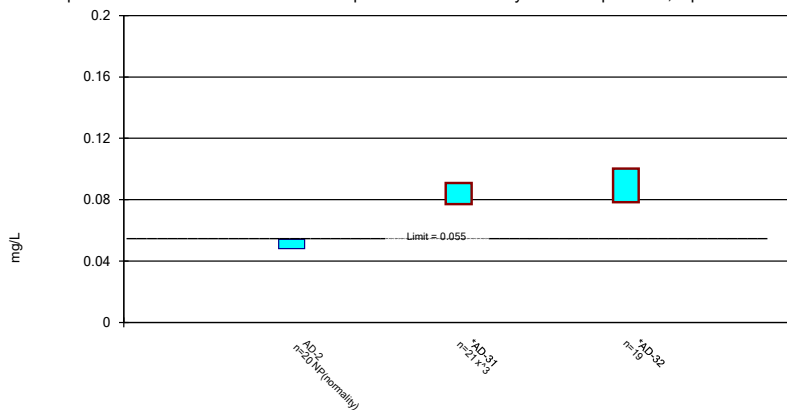
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Lead, total Analysis Run 8/25/2022 7:28 AM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Parametric and Non-Parametric (NP) Confidence Interval

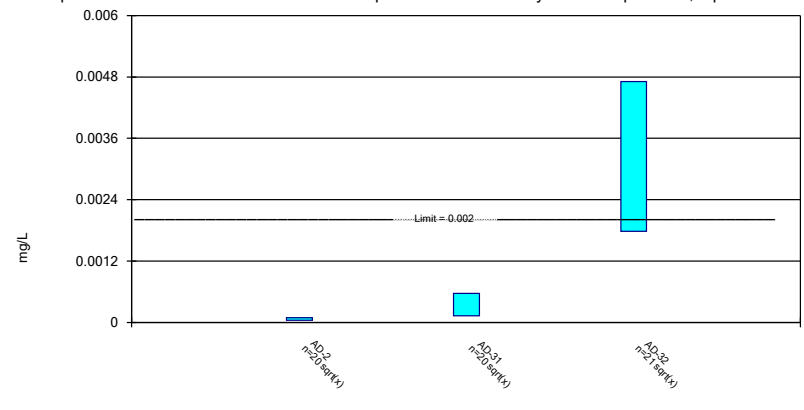
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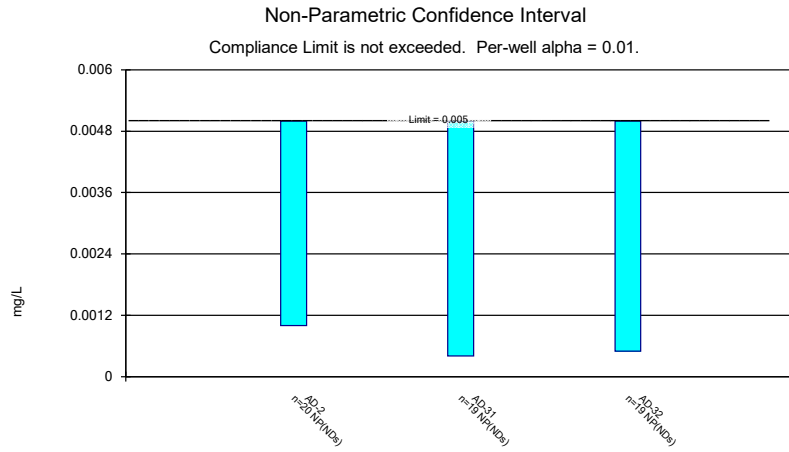
Constituent: Lithium, total Analysis Run 8/25/2022 7:28 AM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

Parametric Confidence Interval

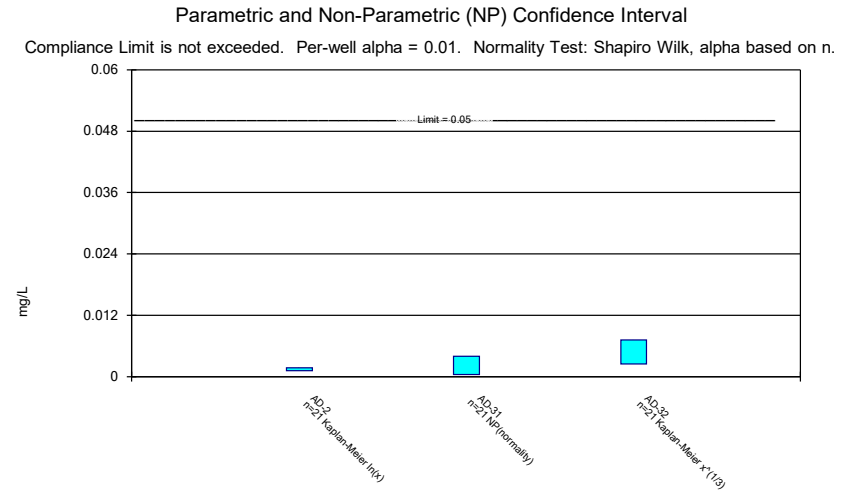
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



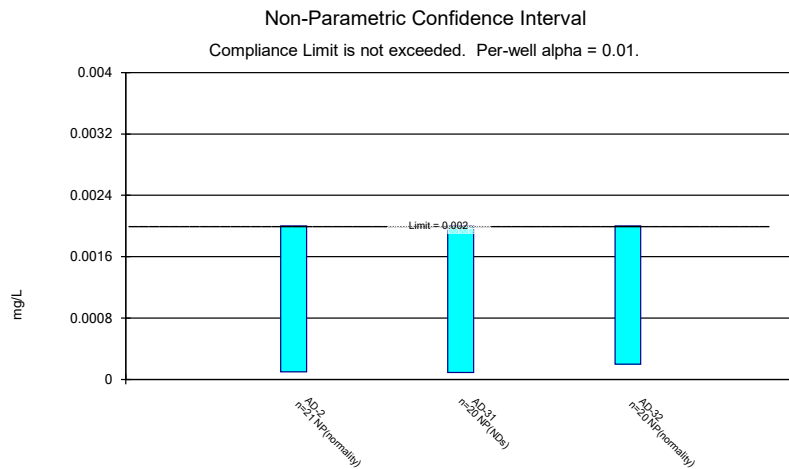
Constituent: Mercury, total Analysis Run 8/25/2022 7:28 AM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP



Constituent: Molybdenum, total Analysis Run 8/25/2022 7:28 AM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP



Constituent: Selenium, total Analysis Run 8/25/2022 7:28 AM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP



Constituent: Thallium, total Analysis Run 8/25/2022 7:28 AM View: Confidence Intervals  
 Pirkey EBAP Client: Geosyntec Data: Pirkey EBAP

## Memorandum

Date: January 20, 2023  
To: David Miller (AEP)  
Copies to: Leslie Fuerschbach (AEP)  
From: Allison Kreinberg (Geosyntec)  
Subject: Data Quality Review – H.W. Pirkey Power Plant  
November 2022 Sampling Event

---

This memorandum summarizes the findings of a data quality review for groundwater samples collected at the H.W. Pirkey Power Plant, located in Pittsburg, Texas in November 2022. The groundwater samples were collected to comply 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"). The groundwater samples were analyzed for 40 CFR 257 Appendix III and IV constituents, plus additional constituents collected to support site evaluation efforts.

The following sample data groups (SDGs) were associated with the November 2022 sampling event and are reviewed in this memorandum:

- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 223647
- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 223649
- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 223664
- Dolan Chemical Laboratory (Groveport, Ohio) Job ID # 223668

The laboratory reports for SDGs 223647 and 223649 were reissued in December 2022 with amended matrix spike precision calculations. The data included in the revised laboratory reports associated with these SDGs were reviewed to assess if they met the objectives outlined in TCEQ Draft Technical Guideline No. 32<sup>1</sup> prior to submittal of this data to TCEQ.

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<sup>1</sup> TCEQ. 2020. Topic: Coal Combustion Residuals (CCR) Groundwater Monitoring and Corrective Action Draft Technical Guidance No. 32. May.

The following data quality issues were identified:

- As reported in SDG 223664, chromium, cobalt, and molybdenum were detected in the equipment blank sample “Equipment Blank” collected on 11/16/2022. The detected chromium concentration in the equipment blank (0.47 µg/L) was more than 10% of the detected values in the groundwater samples, which could result in high bias for all groundwater chromium results. The detected cobalt concentration in the equipment blank (0.143 µg/L) was more than 10% of the detected value in sample “AD-18” (0.723 µg/L), which could result in high bias in the “AD-18” cobalt results. The estimated molybdenum concentration in the equipment blank (0.2 µg/L) was more than 10% of the detected value in sample “Duplicate-2” (0.2 µg/L), which could result in high bias in the “Duplicate-2” molybdenum results. Molybdenum was not detected in the other groundwater samples.
- As reported in SDG 223649, the relative percent difference (RPD) for sulfate concentrations from parent sample “AD-36” and duplicate sample “Landfill Duplicate” was 86%. The “AD-36” sulfate results should be considered estimated.
- As reported in SDG 223664, the following matrix spike (MS) and matrix spike duplicate (MSD) recovery for sodium (160% and 223%, respectively) associated with sample “AD-2” was above the acceptable range of 75-125%. The MS recovery for sodium (50.4%) associated with sample “AD-30” was below the acceptable range of 75-125%. The associated samples (“AD-2” and “AD-30”) were flagged M1: the associated MS or MSD recovery was outside acceptance limits. The “AD-2” and “AD-30” sodium results should be considered estimated. Sodium is not a regulated Appendix III or IV constituent.
- As reported in SDG 223664, the RPD for radium-226 (52.5%) in the laboratory duplicate was above the acceptable limit of 25%. The “AD-12” radium-226 result was flagged P1: the precision between duplicate results was above acceptance limits. The “AD-12” radium-226 results should be considered estimated.

Based on these findings, the majority of the data reported in these SDGs are considered accurate and complete. Although the QC failures mentioned above will result in some limitations of data use since the affected results are considered estimated or have elevated reporting limits, the data are considered usable for supporting project objectives.



### **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  
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

June 2022

CHA8495

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Attachment C	SB-2 Boring Photographic Log
Attachment D	SEM/EDS Analysis
Attachment E	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 second semi-annual assessment monitoring event of 2021.

The H.W. Pirkey Plant has four coal combustion residuals (CCR) storage units regulated by the Texas Commission on Environmental Quality (TCEQ) under Registration No. CCR104, including the EBAP (**Figure 1**). The EBAP is also registered as a surface impoundment under TCEQ Industrial and Hazardous Waste Solid Waste Registration No. 33240. In November 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, 2022):

- The LCLs for cobalt exceeded the GWPS of 0.0094 mg/L at AD-2 (0.0100 mg/L), AD-31 (0.00956 mg/L), and AD-32 (0.0250 mg/L).
- The LCL for lithium exceeded the GWPS of 0.0550 mg/L at AD-31 (0.0664 mg/L) and AD-32 (0.0781 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. Descriptions of the regional geology and site hydrogeology and the methodology used to evaluate the SSLs and the proposed alternative source are described below.

#### 2.1 Regional Geology/Site Hydrogeology

The EBAP is positioned on an outcrop of the Eocene-age Recklaw Formation, which consists predominantly of clay and fine-grained sand (Arcadis, 2016). The Recklaw Formation is underlain by the Carrizo Sand, which crops out in the topographically lower southern portion of the plant. The Carrizo Sand consists of fine to medium grained sand interbedded with silt and clay.

The EBAP monitoring well network monitors groundwater within the Uppermost Aquifer, which was defined by Arcadis (2016) as very fine to fine grained clayey and silty sand with an average thickness of approximately 15 feet. Geologic cross-section A-A' from the EBAP Groundwater Monitoring Well Network Report (Arcadis, 2016) shows the subsurface geometry of the Uppermost Aquifer (indicated on the figure as clayey silty sand, tan to gray) underlying the EBAP and the West Bottom Ash Pond (WBAP). This figure is provided as **Attachment A. Attachment A** demonstrates lateral continuity of the Uppermost Aquifer spanning the entire length of the EBAP.

Groundwater flow direction in the area of the EBAP is west-southwesterly (**Figure 1**). Seasonal variability in groundwater flow has not been observed since the monitoring well network was installed. Groundwater flow through the Uppermost Aquifer contains a hydraulic gradient of approximately 0.01 feet per foot. The EBAP monitoring well network consists of upgradient monitoring wells AD-4, AD-12, and AD-18, and compliance wells AD-2, AD-3, AD-31, and AD-32, all of which are screened within the Uppermost Aquifer.

#### 2.2 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), Type III (statistical evaluation), or Type V (anthropologic) 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.



### 2.2.1 Cobalt

Previous ASDs for cobalt at the EBAP provided evidence that cobalt is present in the aquifer geologic media at the site and that the observed cobalt concentrations were due to natural variation (Geosyntec, 2019a; Geosyntec, 2019b; Geosyntec, 2020b; Geosyntec, 2020c; Geosyntec, 2021a; Geosyntec, 2021b) of native geogenic sources. The previous ASDs demonstrated how the EBAP was not 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 collected from the EBAP and West Bottom Ash Pond (WBAP) to characterize the total cobalt concentrations. 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**). Sampling of the EBAP was attempted again in November 2020 but was unsuccessful as the EBAP did not contain free water at the time of the sampling event. A sample was collected from the WBAP as a surrogate for the EBAP sample. Cobalt was detected at a concentration of 0.000501 mg/L in this WBAP surrogate sample (**Table 1**). 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 of these two surface water samples. 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 B**. 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 naturally occurring 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 the analysis of total cobalt, soil samples were submitted for mineralogical analysis to determine the mineral composition of soils near the EBAP. 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 presence of iron-bearing minerals in soil near the EBAP constitutes a potential source of naturally occurring cobalt.

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 C**. 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 red color of the soil suggests the presence of iron oxide and hydroxide minerals within the shallow depth interval. The alteration of pyrite to these iron oxide and hydroxide minerals 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 alteration process is resulting in the release of isomorphically substituted cobalt from the pyrite crystal structure as it undergoes oxidative transformation to iron oxide/hydroxide 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 suspended 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 representing iron and sulfur were identified in the EDS spectrum, which further support the identification of pyrite (**Attachment D**). While cobalt was not identified in the EDS spectrum, it is likely present at concentrations below the detection limit.

The EBAP 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. Cobalt in the EBAP network groundwater is believed to be a result of natural variability within the aquifer. Naturally occurring cobalt is known

to substitute for iron in iron-bearing minerals. The presence of iron sulfide pyrite and iron oxides/hydroxides hematite and goethite have been confirmed at AD-2 and across the Site. The weathering of pyritic minerals to iron oxide/hydroxide minerals may be resulting in the release of cobalt into groundwater from the crystal structure of these aquifer minerals.

## 2.2.2 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 present in these soils. 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, 2021a; 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 naturally occurring and 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 (**Figure 5, 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 (0.0824 mg/L) and AD-32 (0.0863 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 November 2021 had total lithium concentrations of 0.0554 mg/L and 0.0871 mg/L, respectively; the reported concentration at B-3 is greater than both the GWPS of 0.0590 mg/L and the concentrations of lithium observed at AD-31 and AD-32 (**Figure 5**). Because B-2 and B-3 were installed at locations upgradient to and unimpacted by site activities, these lithium concentrations suggest that dissolved 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**).

### 2.2.2.1 Calculated Partition Coefficients

A previous ASD for lithium at the EBAP discussed 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**). SEM/EDS analysis also identified the presence of silicon, aluminum, and oxygen, all of which are components of clay minerals (**Attachment D**). 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. These clay minerals, particularly smectite and illite, are known to retain cations such as lithium via incorporation into the octahedral layer of the mineral structure and through cation exchange processes.

Mass measurements and 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 the clay mineralogy 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.

### **2.3 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 November 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 E**.

## SECTION 4

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# TABLES



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

*Geosyntec Consultants, Inc.*

<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 - November 2021	mg/L	0.0149
AD-31 - Average	May 2016 - November 2021	mg/L	0.0121
AD-32 - Average	May 2016 - November 2021	mg/L	0.0450

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 and 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**

*Geosyntec Consultants, Inc.*

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:

Results given in units of relative % abundance

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 - November 2021	mg/L	0.0817
AD-32 - Average	May 2016 - November 2021	mg/L	0.1231

Notes:

mg/kg - milligram per kilogram

mg/L - milligram per liter

Average lithium values for monitoring wells AD-31 and AD-32 were calculated using all lithium data collected under 40 CFR 257 Subpart D, excluding statistically identified outliers.

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 and EBAP.

**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 Sample</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

\* - AD-32 samples were collected from a separate borehole advanced near monitoring well AD-32

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  
Pirkey Plant - East Bottom Ash Pond**

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

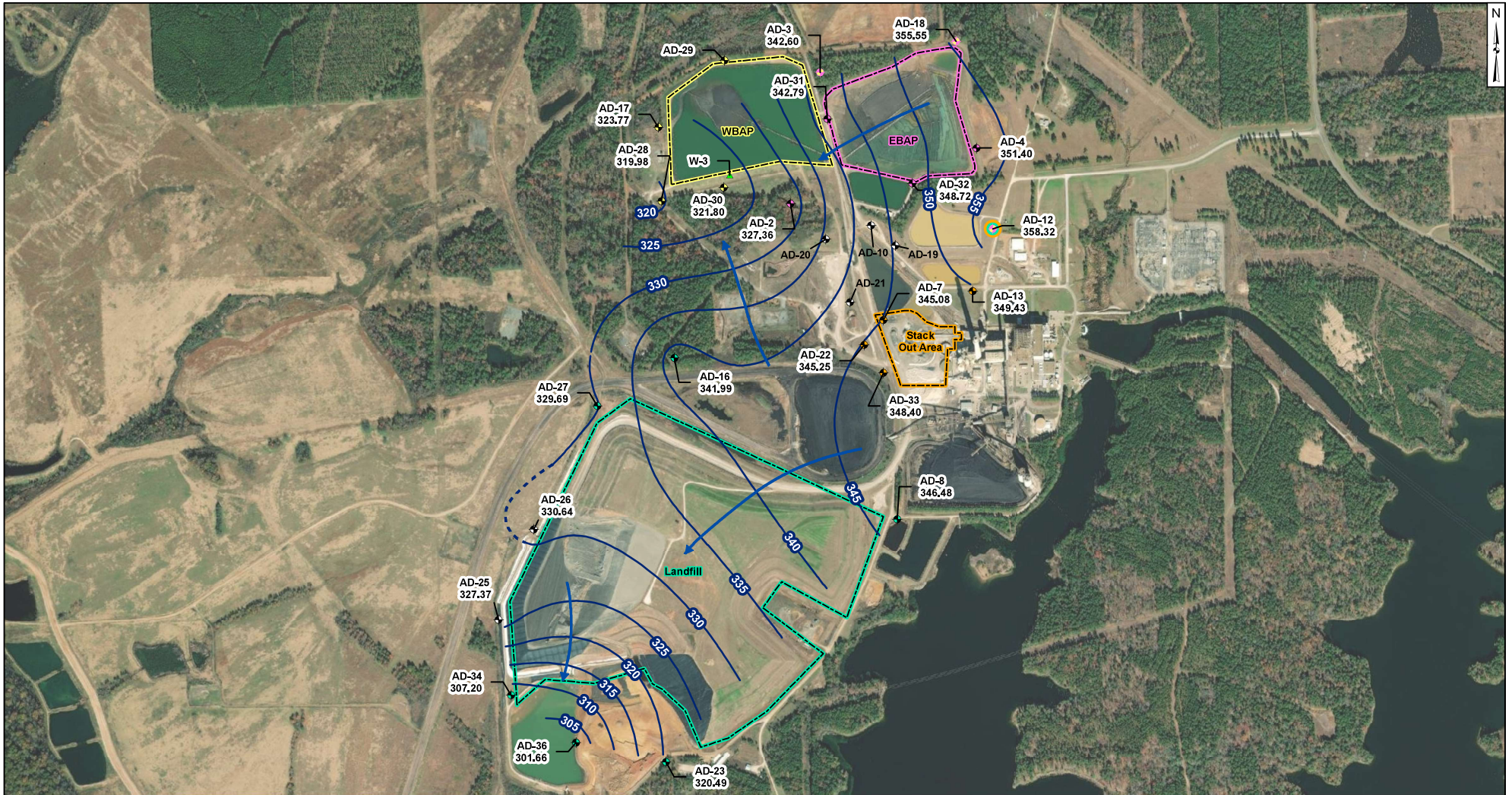
Kd: partition coefficient

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).

\* - AD-32 samples were collected from a separate borehole advanced near monitoring well AD-32

# FIGURES

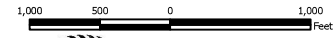


**Legend**

- 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.



*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

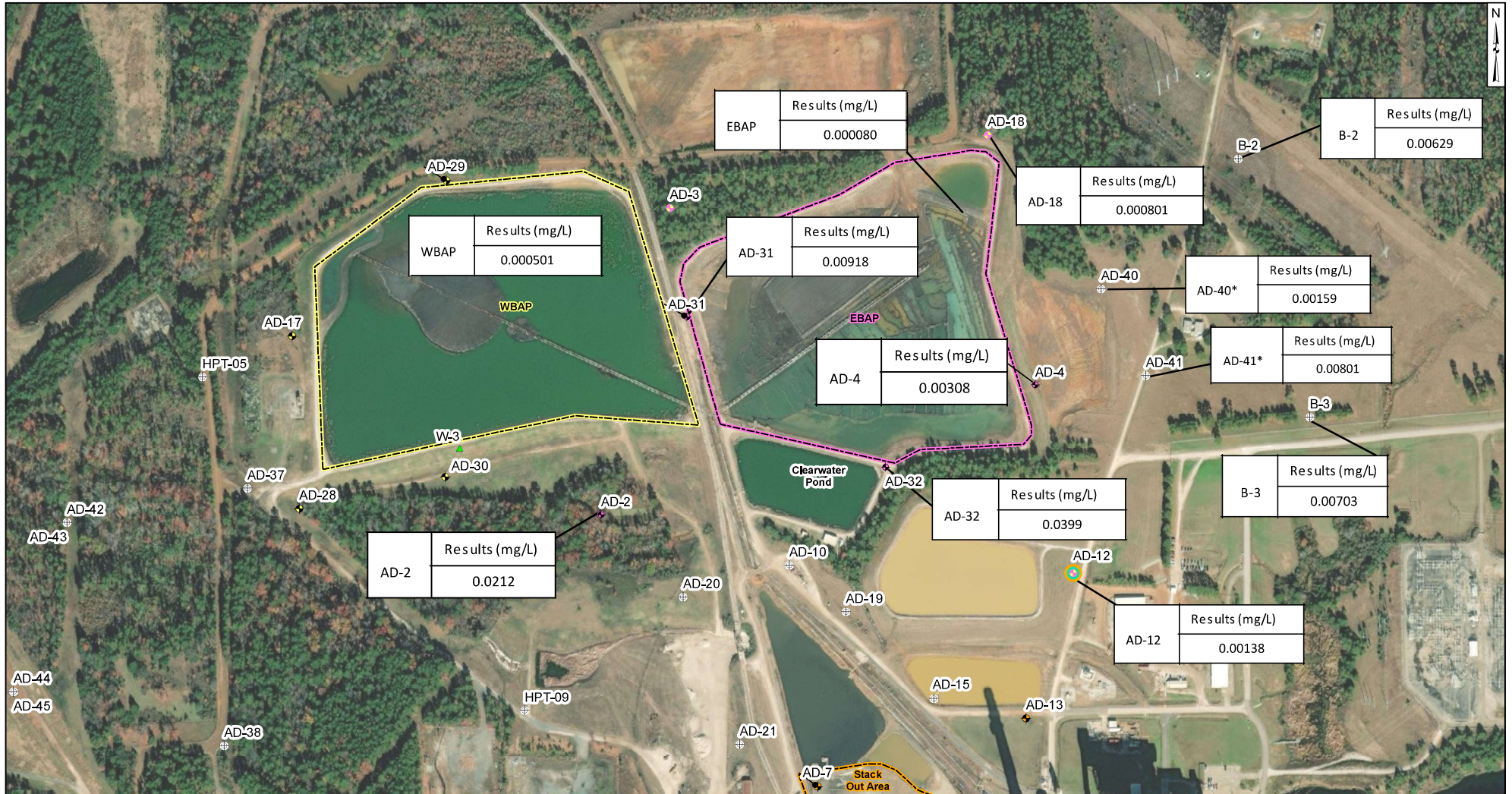
Columbus, Ohio

01/13/2022

Figure

**1**



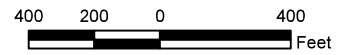


**Legend**

- ⊕ 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
- Samples collected in November 2021
- \* - Well most recently sampled August 2019
- EBAP surface water sample was collected in June 2020
- WBAP surface water sample was collected in November 2020



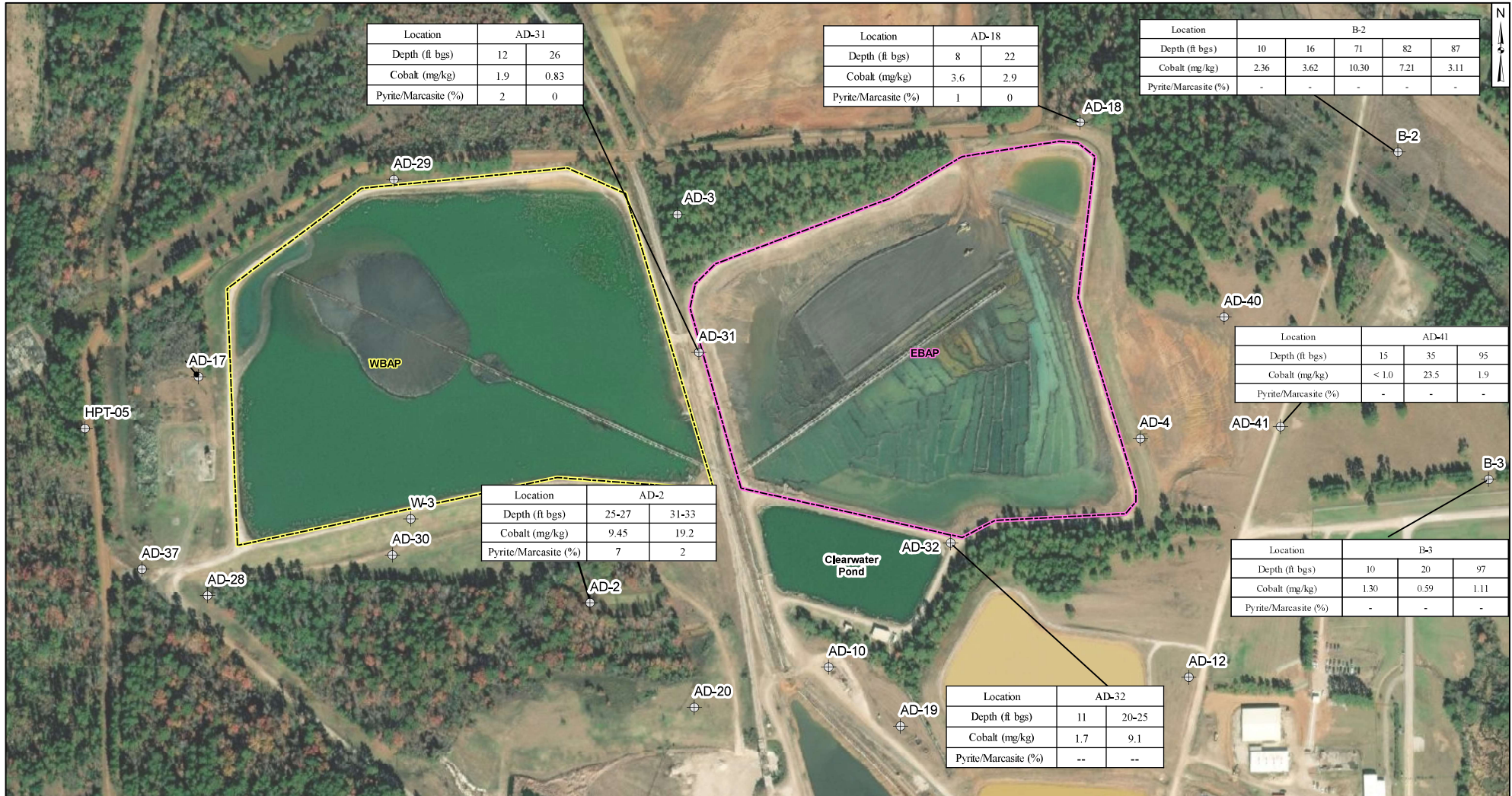
**Aqueous Cobalt Distribution**

AEP Pirkey Power Plant  
Hallsville, Texas






Columbus, Ohio      2022/05/02

Figure  
**2**

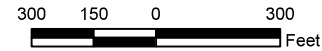


**Legend**

-  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.



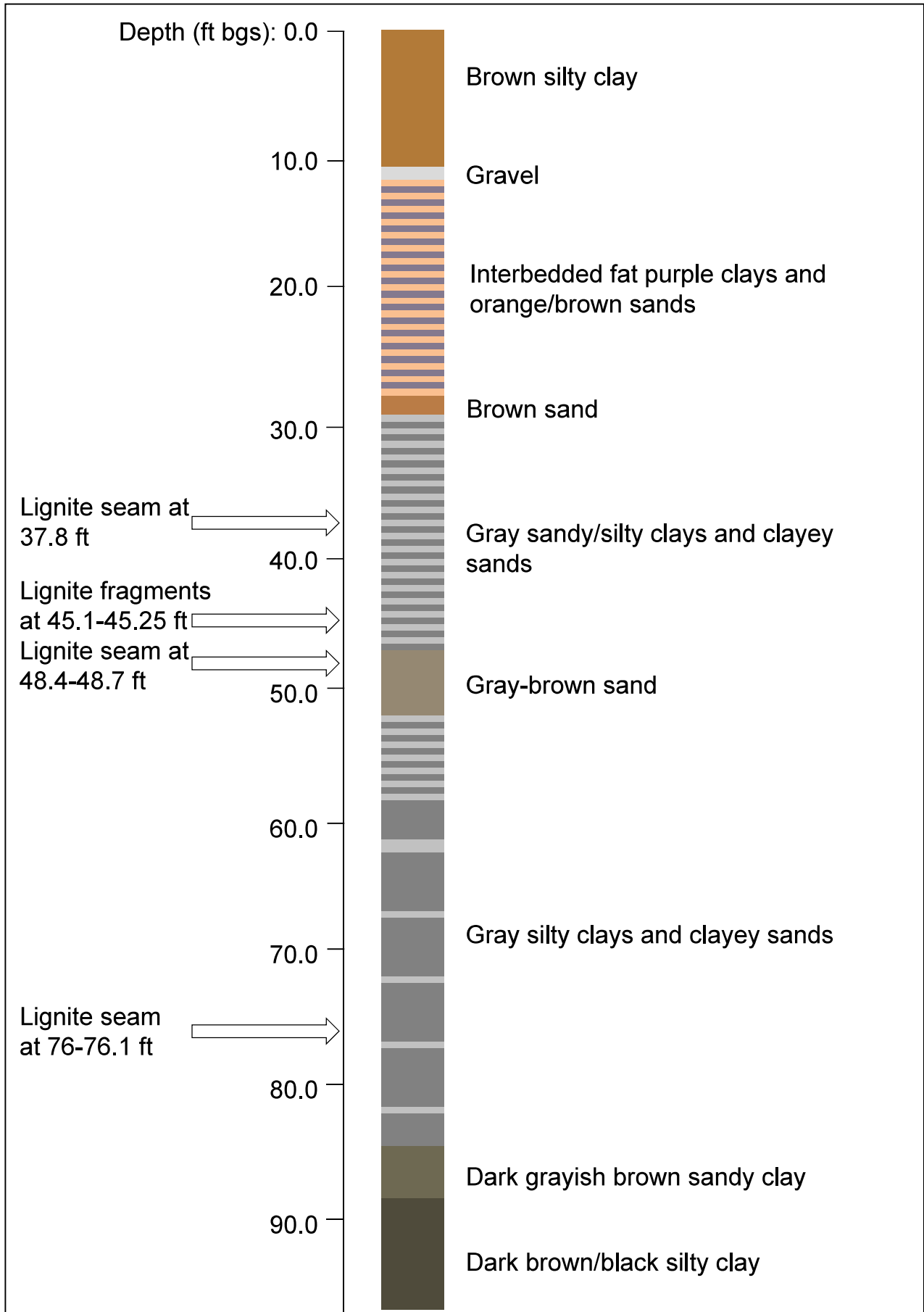
**Cobalt Distribution in Soil**

AEP Pirkey Power Plant  
Hallsville, Texas

**Geosyntec**  
consultants

Columbus, Ohio      2022/05/14

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

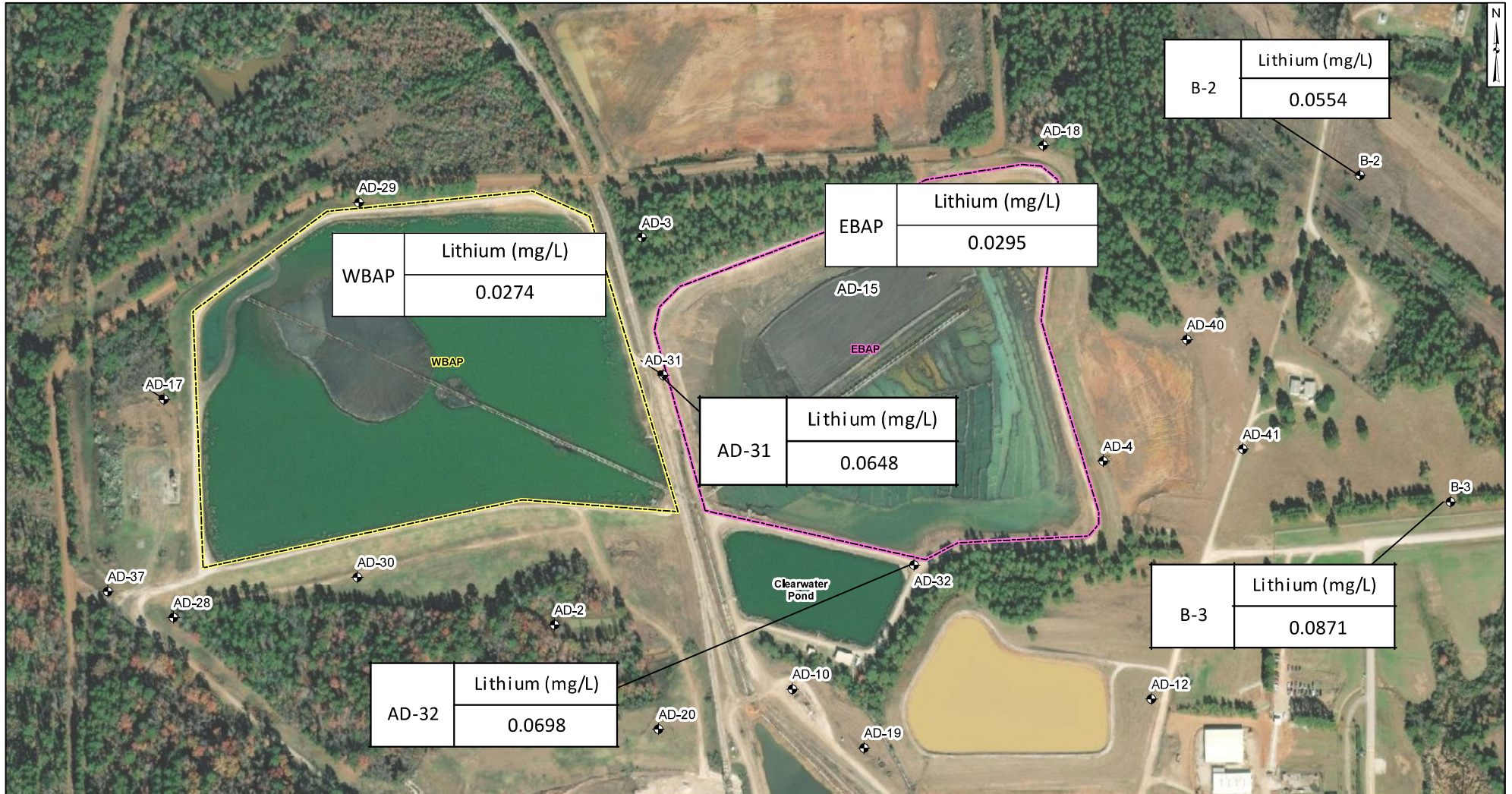
**Geosyntec**  
consultants

**Figure**

**4**

CHA8462

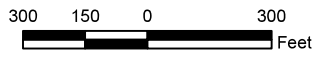
March 2020



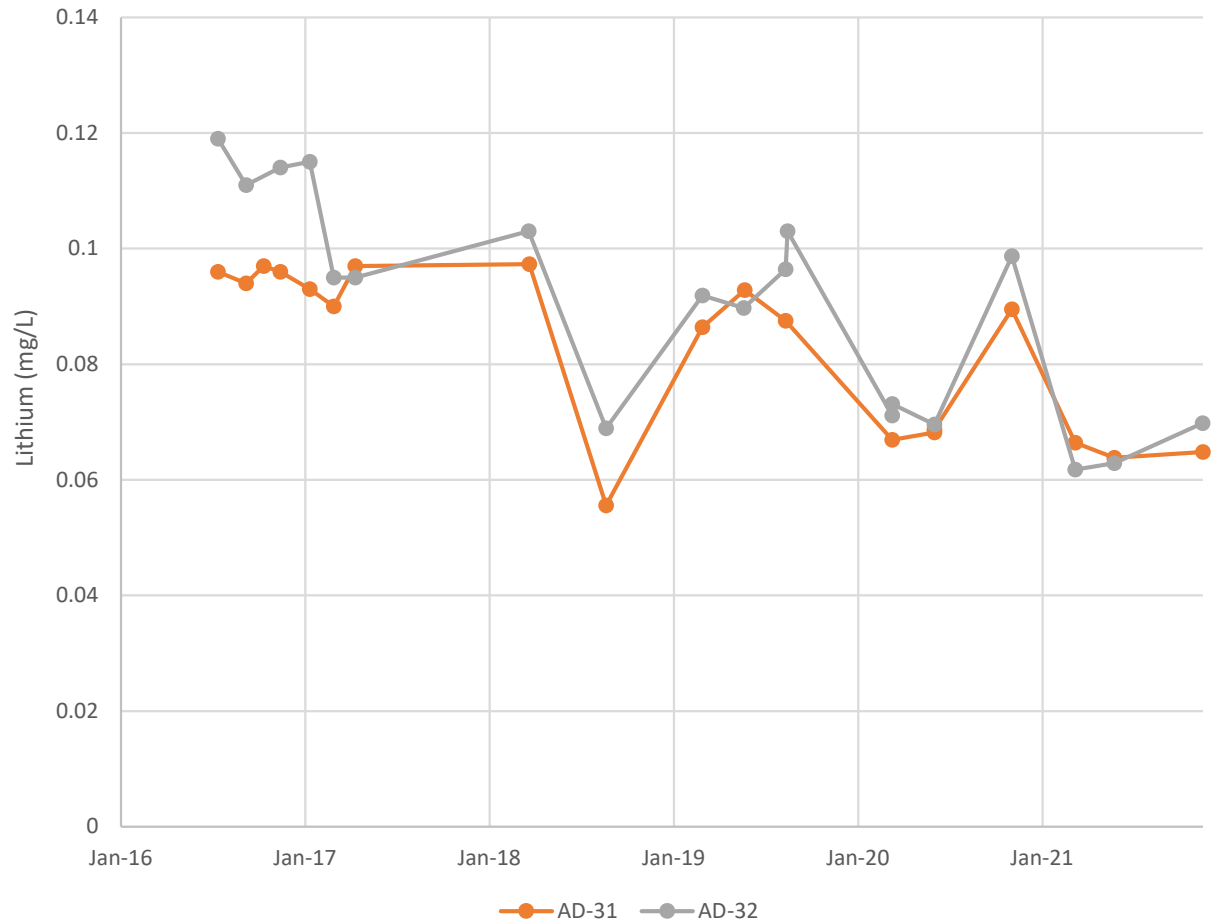
- Legend**
- ◆ Monitoring Well
  - ▭ EBAP
  - ▭ Landfill
  - ▭ Stack Out Area
  - ▭ WBAP

**Notes**

- Lithium concentrations in milligrams per liter mg/L.
- Monitoring well coordinates, site features, and data provided by AEP.
- Groundwater samples were collected in November 2021.
- Porewater samples from ash ponds were collected in 2020.



<b>Aqueous Lithium Distribution</b>	
AEP Pirkey Power Plant Hallsville, Texas	
<b>Geosyntec</b> consultants	
Columbus, Ohio	2022/06/01
<b>Figure 5</b>	



Notes: Lithium time series diagram for compliance wells AD-31 and AD-32. Data collected as part of state groundwater monitoring program requirements.

**Lithium Time Series Graph**  
Pirkey EBAP

**Geosyntec**  
consultants

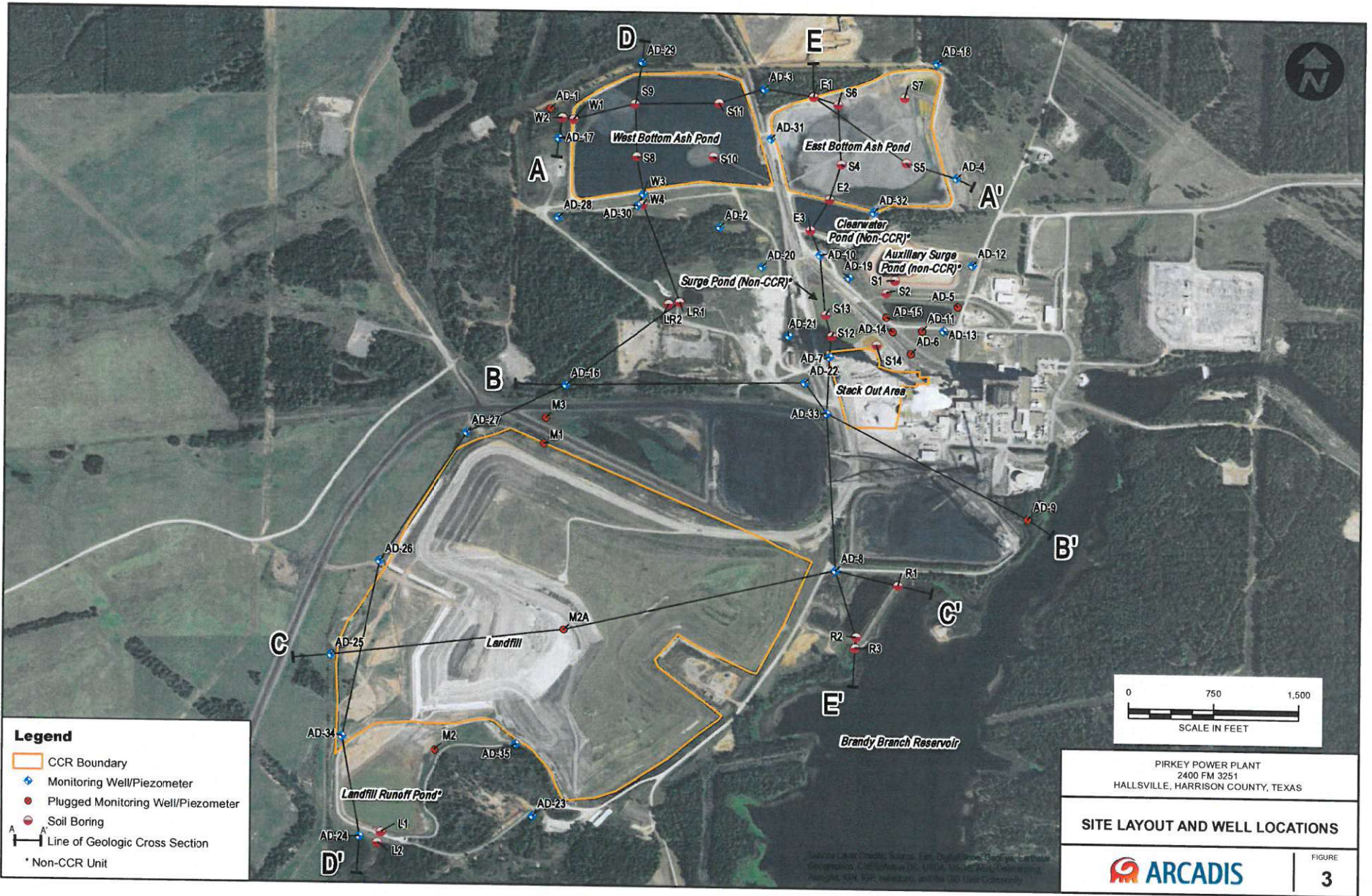


Figure  
6

Columbus, Ohio

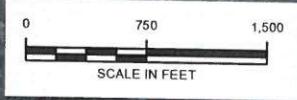
June 2022

ATTACHMENT A  
Geologic Cross-Section A-A'



**Legend**

- CCR Boundary
- ◆ Monitoring Well/Piezometer
- Plugged Monitoring Well/Piezometer
- Soil Boring
- Line of Geologic Cross Section
- \* Non-CCR Unit



PIRKEY POWER PLANT  
 2400 FM 3251  
 HALLSVILLE, HARRISON COUNTY, TEXAS

**SITE LAYOUT AND WELL LOCATIONS**

**ARCADIS**





ATTACHMENT B  
SB-2 Boring Log

PROJECT NO. \_\_\_\_\_ PROJ. \_\_\_\_\_ BOR. NO. SB-2  
 LOCATION AD-2/MW-2-Pitby Payer 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	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	4 - 8	T ... Tan ... Gr ... Green	Ls ... Limestone	M ... Medium				Lam ... Laminate	
De ... Dense	30-50	St ... Stiff	1.0 - 2.0	8 - 15	8 - 15	R ... Red ... Y ... Yellow	Gr ... Gravel	M ... Medium				Sl ... Slickensided	
VDe ... Very Dense	>50	VSt. Very Stiff	2.0 - 4.0	15 - 30	15 - 30	Rdsh. Reddish. Wh ... White	SiS ... Siltstone	M ... Medium				SL ... Slightly	
		H ... Hard	> 4.0	> 30	> 30		SS ... Sandstone	M ... Medium				Sm(s) ... Seam(s)	
							Sh ... Shale, Shaley	M ... Medium				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"		
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	Clayey sand - some silt 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	11.5	14.5-39'	Rd Br, Ylw, Br, Gray	Si, Cl	Sa	silty sand - some sand iron cemented sand @ 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			- gravel cemented sand seam @ 25' (6") - cemented and partially cemented clayey silty sand @ 25.5'						sat. @ 25'-25.5'	
				(25-39')			- dark gray silty sat sand seam (2") @ 27"						moist 25.5-27	
30-35	3' Rec						- sat. silty sand seam @ 30.5' (1") - sat. silty sand seam @ 32' (3")						sat @ 30.5' (1") 32.0' (3")	
							* some u.f. gypsum crystals in clayey sand between sat. sand seams (25-40')						v. moist @ 39'	
35-40	4' Rec	39	39-40'	Lt. Gray, Gray Cl, Br	Si		clayey sandy silt, - interbedded silt & clay @ 39' to 40'						moist (39-40')	
							B.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 C  
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.

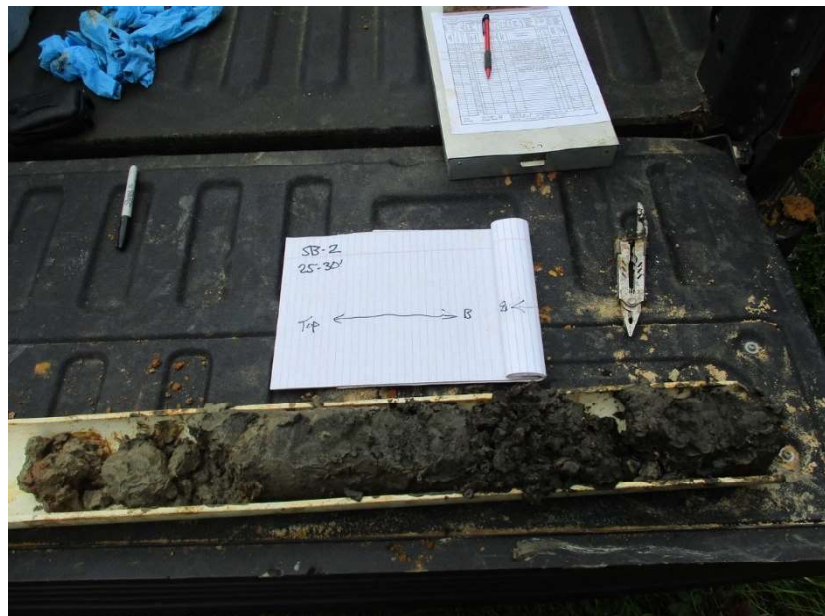


**Photograph 6**

**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



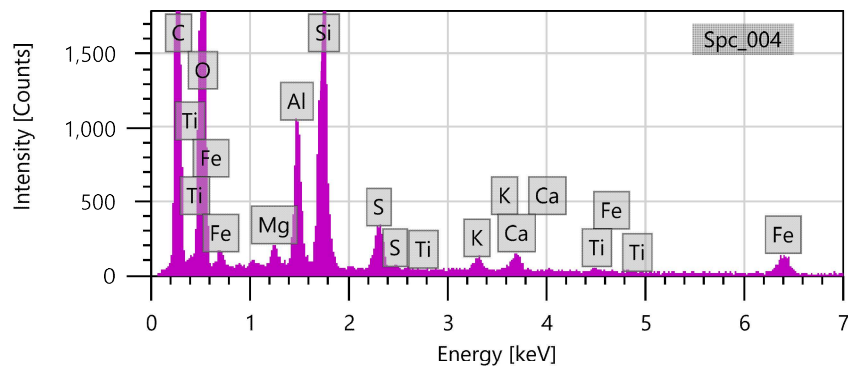
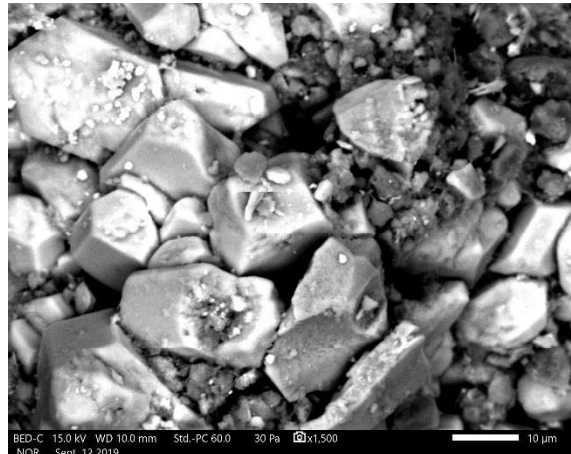
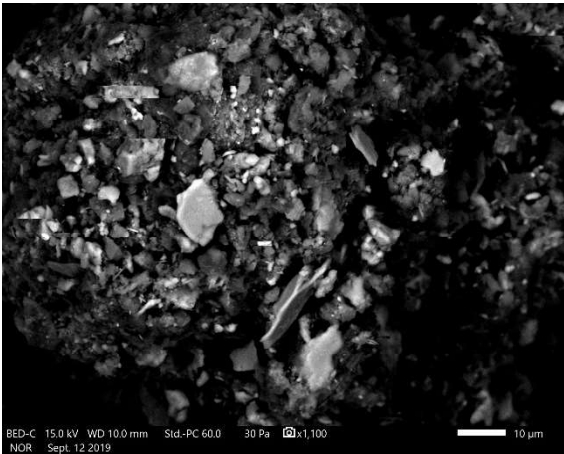
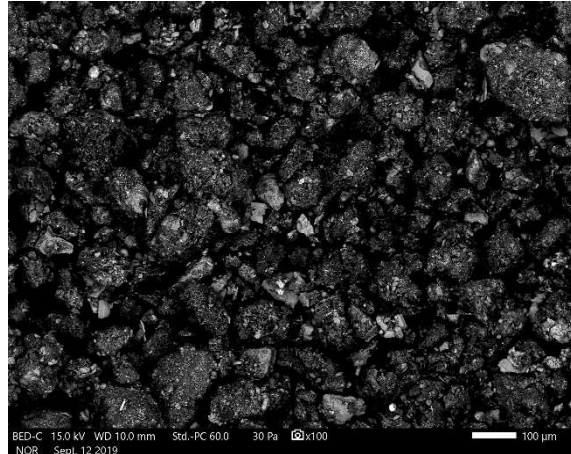
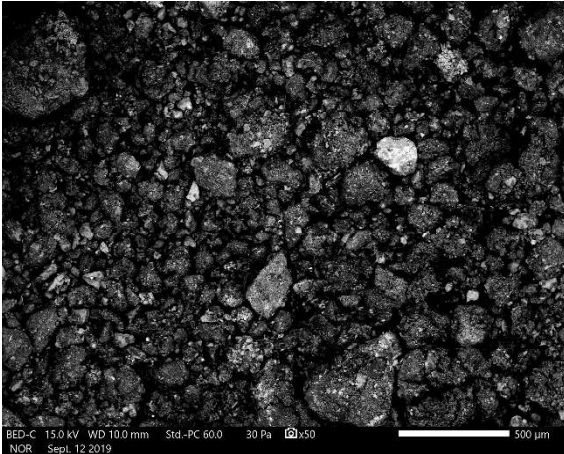
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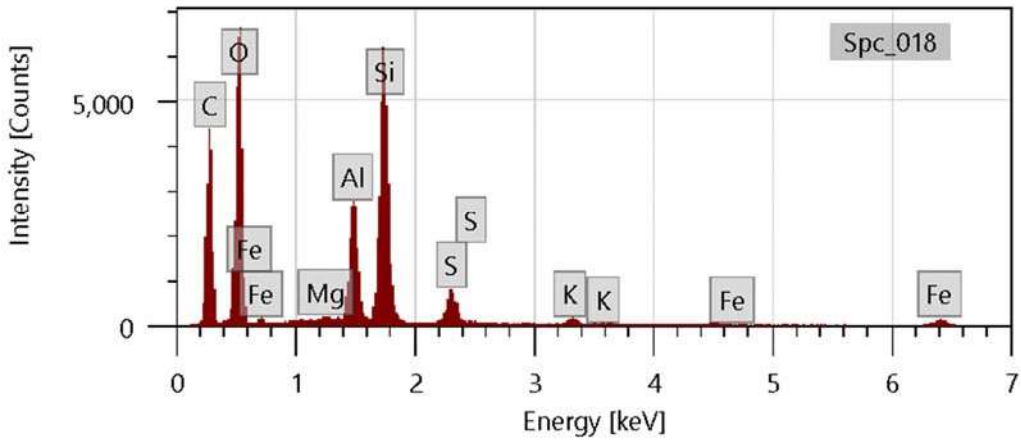
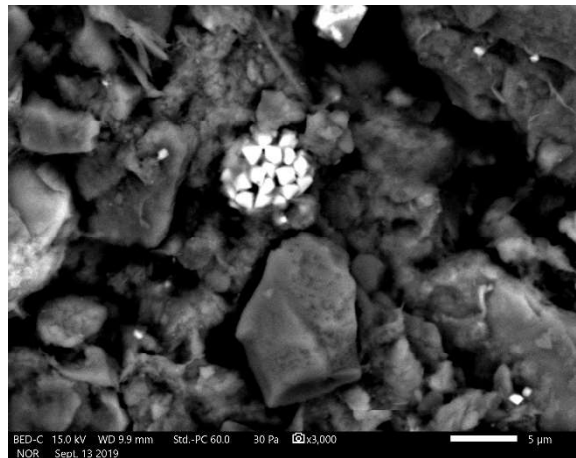
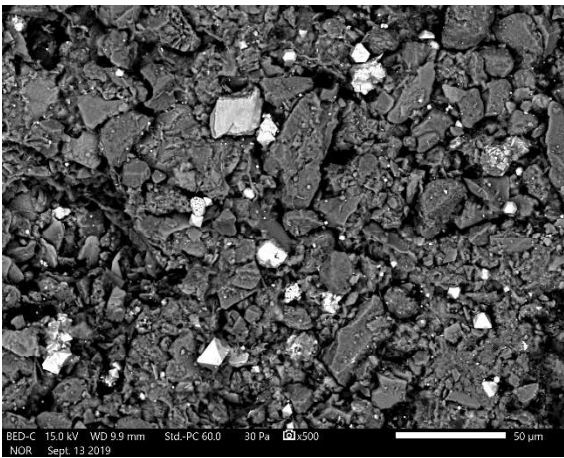
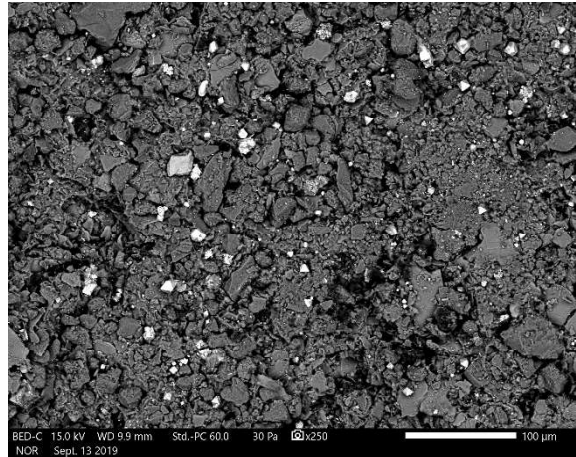
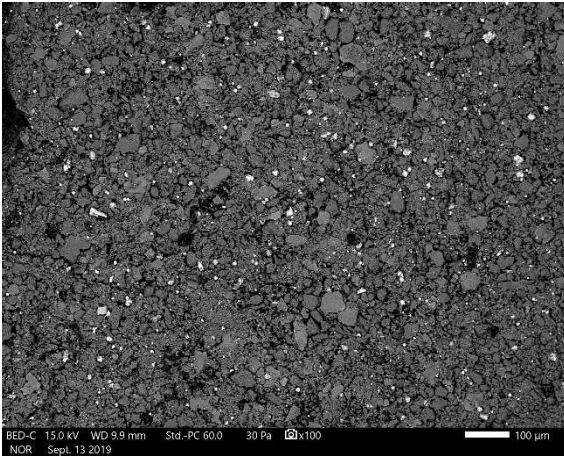
September 16, 2019

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

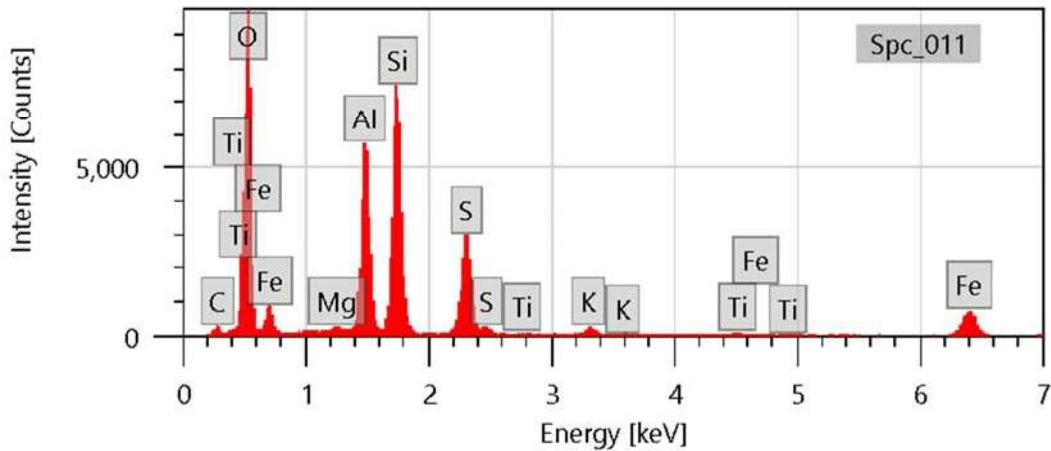
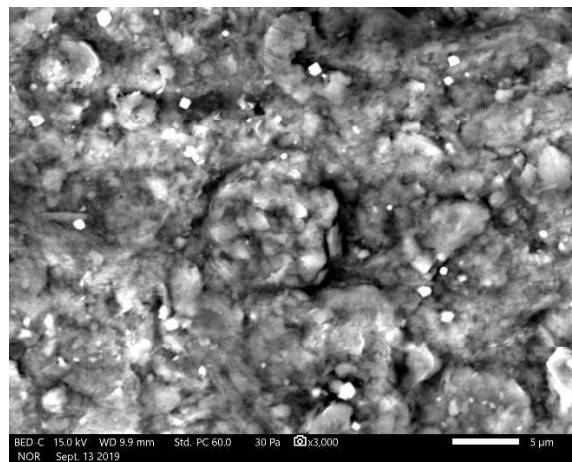
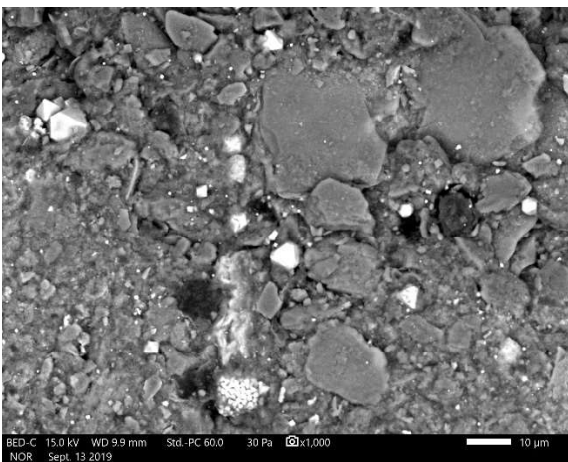
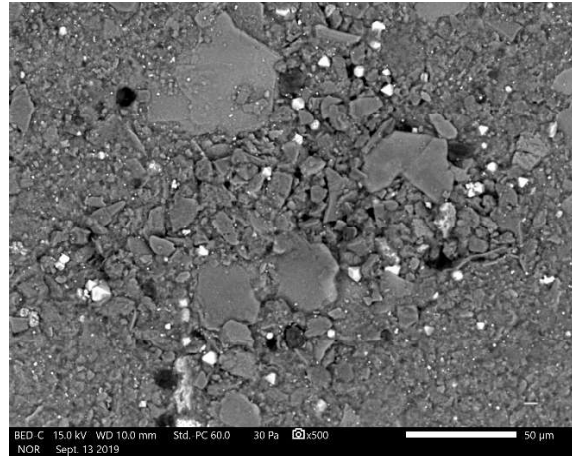
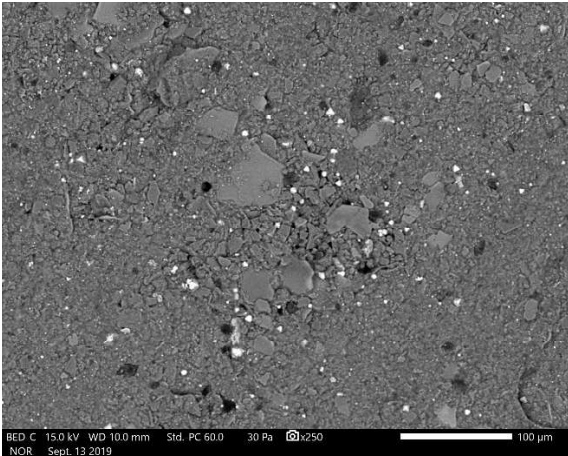
via Email: [BSass@geosyntec.com](mailto:BSass@geosyntec.com)



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 E  
Certification by a 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  
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Texas Registered Engineering Firm  
No. F-1182

79864  
License Number

Texas  
Licensing State

June 16, 2022  
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*



engineers | scientists | innovators

500 West Wilson Bridge Road, Suite 250  
Worthington, OH 43085

January 2023

CHA8495

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## LIST OF ACRONYMS

ASD	Alternative Source Demonstration
BGS	Below Ground Surface
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 semiannual assessment monitoring event of 2022. The H.W. Pirkey Plant has four coal combustion residuals (CCR) storage units regulated by the Texas Commission on Environmental Quality (TCEQ) under Registration No. CCR104, including the EBAP (**Figure 1**).

In June 2022, a semiannual 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 an 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, 2022a):

- The LCLs for cobalt exceeded the GWPS of 0.00939 mg/L at AD-2 (0.0122 mg/L), AD-31 (0.00953 mg/L), and AD-32 (0.0323 mg/L).
- The LCL for lithium exceeded the GWPS of 0.0548 mg/L at AD-31 (0.0771 mg/L) and AD-32 (0.0785 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 in the groundwater monitoring network for the EBAP 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 rules allow 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. Descriptions of the EBAP design and construction, regional geology and site hydrogeology, methodology used to evaluate the SSLs, and proposed alternative source are described below.

#### **2.1 EBAP Design and Construction**

The EBAP is a 31.5-acre CCR surface impoundment located at the north end of the Pirkey Plant, immediately east of the West Bottom Ash Pond (WBAP) (**Figure 1**). It was constructed while the Pirkey Plant was being developed in 1983 and 1984 and placed into operation in 1985 to receive bottom ash and economizer ash sluiced from the Plant boiler. Bottom ash and economizer ash are periodically excavated from the EBAP and removed via truck to either the on-site landfill or sold for offsite beneficial re-use.

The EBAP was developed by excavating part of its' perimeter into native soils to create an embankment height of approximately 4 feet, constructing compacted clay perimeter embankments, and constructing a compacted clay liner over the base of the pond (Arcadis, 2016). Multiple lithological borings advanced following installation of the clay liner confirm that at least 6 feet of clay is present below the base of the EBAP (Arcadis, 2016). The bottom elevation of the EBAP is approximately 347 feet above mean sea level, and the elevation of the top of the pond embankment is approximately 357 feet above mean sea level. The unit was designed to have a maximum storage capacity of 188 acre-feet.

#### **2.2 Regional Geology/Site Hydrogeology**

The EBAP is positioned on an outcrop of the Eocene-age Recklaw Formation, which consists predominantly of clay and fine-grained sand (Arcadis, 2016). The Recklaw Formation is underlain by the Carrizo Sand, which crops out in the topographically lower southern portion of the plant. The Carrizo Sand consists of fine to medium grained sand interbedded with silt and clay.

The EBAP monitoring well network monitors groundwater within the Uppermost Aquifer, which was defined by Arcadis (2016) as very fine to fine grained clayey and silty sand with an average thickness of approximately 15 feet. Geologic cross-section A-A' from the EBAP Groundwater Monitoring Well Network Report (Arcadis, 2016) shows the subsurface geometry of the Uppermost Aquifer (indicated on the figure as clayey silty sand, tan to gray) underlying the EBAP and the WBAP. This figure is provided as **Attachment A**. **Attachment A** demonstrates lateral continuity of the Uppermost Aquifer spanning the entire length of the EBAP.

Groundwater flow direction in the area of the EBAP is west-southwesterly (**Figure 1**). Seasonal variability in groundwater flow has not been observed since the monitoring well network was

installed. Groundwater flow through the Uppermost Aquifer occurs at a hydraulic gradient of approximately 0.01 feet per foot. The EBAP monitoring well network consists of upgradient monitoring wells AD-4, AD-12, and AD-18, and compliance wells AD-2, AD-3, AD-31, and AD-32, all of which are screened within the Uppermost Aquifer.

### **2.3 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), Type III (statistical evaluation), or Type V (anthropologic) 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.

#### **2.3.1 Cobalt**

Previous ASDs for cobalt at the EBAP provided evidence that cobalt is present in the aquifer geologic media at the site and that the observed cobalt concentrations in groundwater were due to natural variation of native geogenic sources (Geosyntec, 2019a; Geosyntec, 2019b; Geosyntec, 2020b; Geosyntec, 2020c; Geosyntec, 2021a; Geosyntec, 2021b; Geosyntec, 2022b). The previous ASDs demonstrated how the EBAP was not 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 most recent SPLP ash leachate sample, collected in 2019, above the reporting limit of 0.01 mg/L, which is lower than the average concentrations observed at the wells of interest (**Table 1**). No changes to material handling or plant operations have occurred which would change the anticipated cobalt concentrations in the pond since this sample was collected.

Cobalt was detected at a concentration of 0.00128 mg/L in a June 2022 surface water sample collected from the EBAP to characterize the total cobalt concentrations (**Table 1**). This concentration is lower than the reported cobalt concentrations for multiple in network wells from the June 2022 sampling event, including the upgradient monitoring wells AD-4 (0.0041 mg/L; **Figure 2**) and AD-12 (0.00135 mg/L; **Figure 2**). The EBAP sample was also found to be approximately an order of magnitude lower than the average concentration in groundwater at the wells of interest (**Table 1**). 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 concentrations ranging from 0.59 – 23.5 milligrams per kilogram (mg/kg) with the highest value reported at AD-41, which is upgradient of the EBAP (**Figure 3**). 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 B**. Cobalt was detected at SB-2 at concentrations of 9.45 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 (6.1 mg/kg; **Table 1**). Both samples correlate to the depth of the monitoring well screen of AD-2 (20-40 feet bgs), indicating that naturally occurring cobalt is present in aquifer solids within the AD-2 screened interval.

In addition to the analysis of total cobalt, soil samples were submitted for mineralogical analysis to determine the mineral composition of soils near the EBAP. 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 presence of iron-bearing minerals in soil near the EBAP constitutes a potential source of naturally occurring cobalt.

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 C**. 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 red color of the soil suggests the presence of iron oxide and hydroxide minerals within the shallow depth interval. The alteration of pyrite to these iron oxide and hydroxide minerals 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/hydroxide 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, one of the existing compliance-wells within the EBAP groundwater monitoring network where a cobalt SSL was identified. Solid phase materials 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 suspended 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 representing iron and sulfur were identified in the EDS spectrum, which further support the identification of pyrite (**Attachment D**). While cobalt was not identified in the EDS spectrum, it is likely present at concentrations below the detection limit.

The EBAP 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 and the ubiquity of naturally occurring cobalt, especially in soil and groundwater samples upgradient from the EBAP. Cobalt in the EBAP network groundwater is believed to be a result of natural variability within the aquifer. Naturally occurring cobalt is known to substitute for iron in iron-bearing minerals. The presence of iron sulfide (as pyrite) and iron oxides/hydroxides hematite and goethite have been confirmed at AD-2 and across the Site. The weathering of pyritic minerals to iron oxide/hydroxide minerals may be resulting in the release of cobalt into groundwater from the crystal structure of these aquifer minerals.

### 2.3.2 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 present in these soils. These native lithium-containing aquifer solids are ubiquitous in the aquifer based on the presence of both solid-phase and dissolved lithium at upgradient locations (Geosyntec, 2019b; Geosyntec, 2020b; Geosyntec, 2020c; Geosyntec, 2021a; Geosyntec, 2021b; Geosyntec, 2022b). Data gathered in support of the prior ASDs and recent results provide additional evidence that the observed lithium groundwater concentrations at AD-31 and AD-32 are naturally occurring and are due to natural variation in the aquifer (Type IV ASD).

As discussed in Section 2.3.1, a surface water sample was collected directly from the EBAP in June 2022. Lithium was detected in the June 2022 EBAP sample at a concentration of 0.0463 mg/L (**Figure 5, Table 4**). The labile fraction identified in the bottom ash by SPLP from a February 2019 sample was even lower, with an estimated (J-flagged) lithium concentration of 0.011 mg/L. These concentrations are below the average lithium concentrations at AD-31 (0.0819 mg/L) and AD-32 (0.0859 mg/L) (**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 2022 had total lithium concentrations of 0.0574 mg/L and 0.0734 mg/L, respectively. The reported concentration at B-3 is greater than the GWPS of 0.0590 mg/L and only slightly lower than the concentrations

of lithium observed at AD-31 and AD-32 (**Figure 5**). Because B-2 and B-3 were installed at locations upgradient to and unimpacted by site activities, these lithium concentrations suggest that dissolved 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 2.3.1, 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**).

### ***2.3.2.1 Calculated Partition Coefficients***

A previous ASD for lithium at the EBAP discussed lithium mobility in groundwater due to desorption from cation exchange complexes associated with clay minerals within 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**). SEM/EDS analysis also identified the presence of silicon, aluminum, and oxygen, all of which are components of clay minerals (**Attachment D**). The backscattered electron micrographs of these samples also identified clay particles by morphology. The largest clay particles (> 5 µm) are likely kaolinite, while smectite and illite dominate the smaller size fraction. These clay minerals, particularly smectite and illite, are known to retain cations such as lithium via incorporation into the octahedral layer of the mineral structure and through cation exchange processes.

Mass measurements and 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.

These multiple lines of evidence show that elevated lithium concentrations at AD-31 and AD-32 are likely 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.

## **2.4 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 June 2022 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 E**.

## SECTION 4

### REFERENCES

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# TABLES

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

*Geosyntec Consultants, Inc.*

<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	6/24/2022	mg/L	0.00128
AD-2 - Average	May 2016 - June 2022	mg/L	0.0140
AD-31 - Average	May 2016 - June 2022	mg/L	0.0123
AD-32 - Average	May 2016 - June 2022	mg/L	0.0431

Notes:

mg/kg - milligram per kilogram

mg/L - milligram per liter

SPLP - Synthetic Precipitation Leaching Procedure

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:

Results given in units of relative % abundance

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**

*Geosyntec Consultants, Inc.*

<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	6/24/2022	mg/L	0.0463
AD-31 - Average	May 2016 - June 2022	mg/L	0.0819
AD-32 - Average	May 2016 - June 2022	mg/L	0.0859

Notes:

mg/kg - milligram per kilogram

mg/L - milligram per liter

Average lithium values for monitoring wells AD-31 and AD-32 were calculated using all lithium data collected under 40 CFR 257 Subpart D, excluding statistically identified outliers.

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

**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 Sample</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

\* - AD-32 samples were collected from a separate borehole advanced near monitoring well AD-32

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  
Pirkey Plant - East Bottom Ash Pond**

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

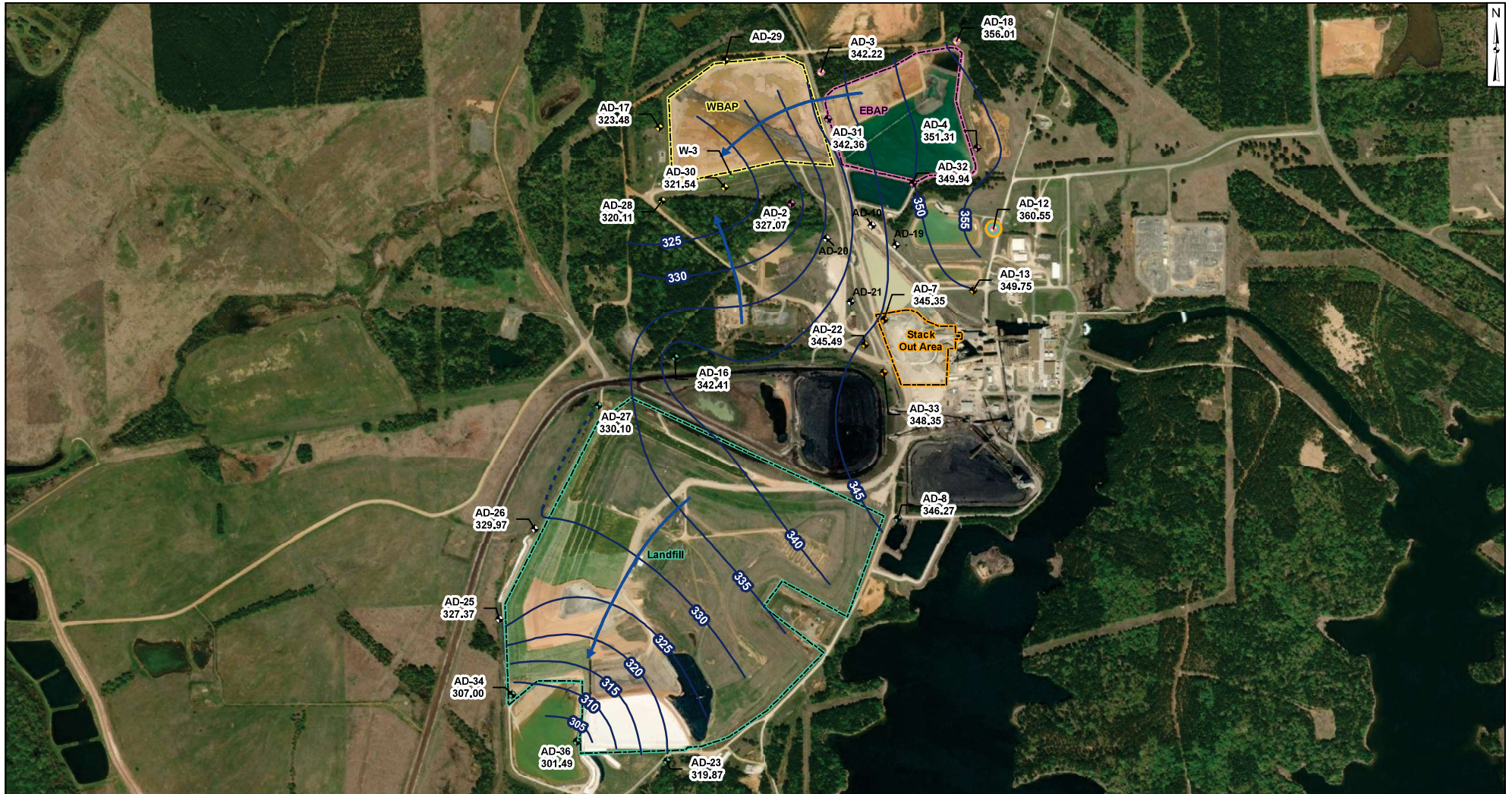
Kd: partition coefficient

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).

\* - AD-32 samples were collected from a separate borehole advanced near monitoring well AD-32

# FIGURES

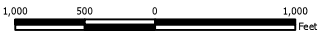


**Legend**

- 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 June 20-22, 2022) provided by AEP.
- Site features based on information available in CCR Groundwater Monitoring Well Network Evaluation Update (Arcadis, 2022) provided by AEP.
- Groundwater elevation units are feet above mean sea level.
- AD-10, AD-19, AD-20, AD-21, AD-24, AD-29, AD-35, and W-3 were not gauged during the June 2022 event.
- AD-35 was abandoned on November 13, 2018.



*Beth Ann Gross*  
 12/29/2022  
 Geosyntec Consultants, Inc.  
 Texas Firm  
 Registration No. 1182

**Potentiometric Contours - Uppermost Aquifer  
 June 2022**

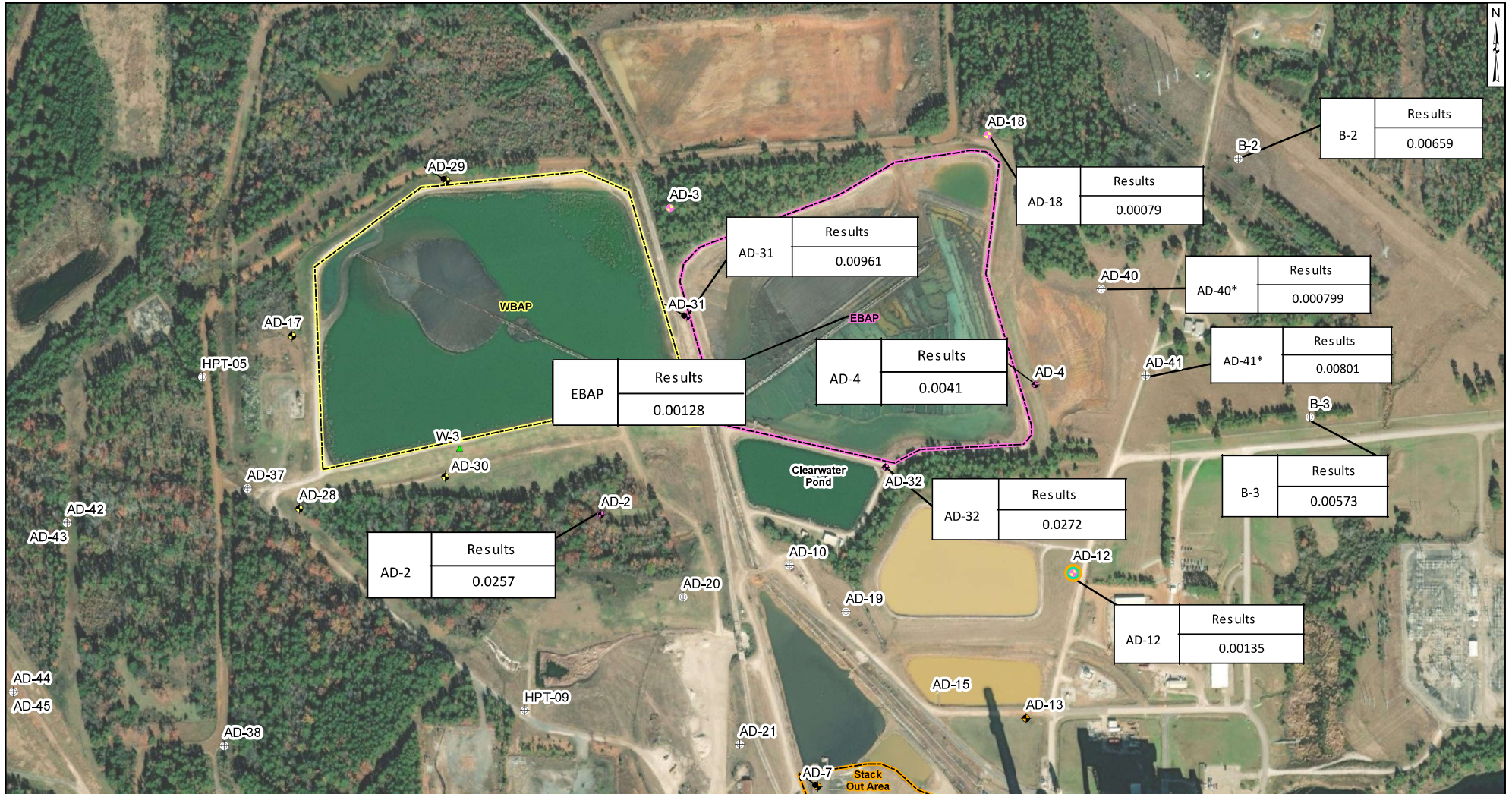
AEP Pirkey Power Plant  
 Hallsville, Texas

**Geosyntec**  
 consultants

Columbus, Ohio      2022/12/21

Figure  
 1

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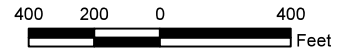


**Legend**

- ⊕ 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.
- Samples collected in June 2022.
- \* - Well most recently sampled August 2019.
- Samples show in milligrams per liter



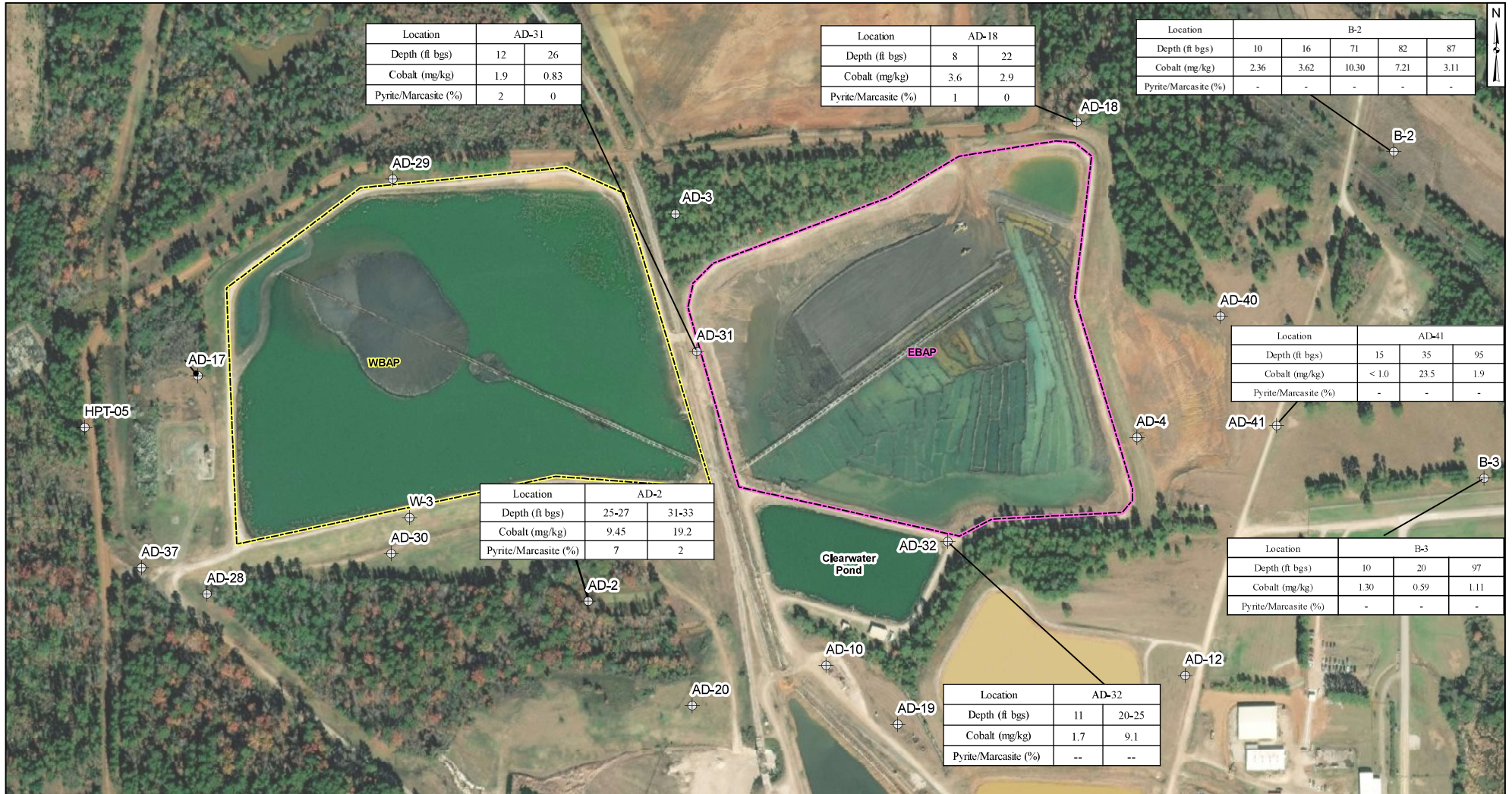
**Aqueous Cobalt Distribution**

AEP Pirkey Power Plant  
Hallsville, Texas






Columbus, Ohio      2022/12/19

Figure  
**2**



**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.



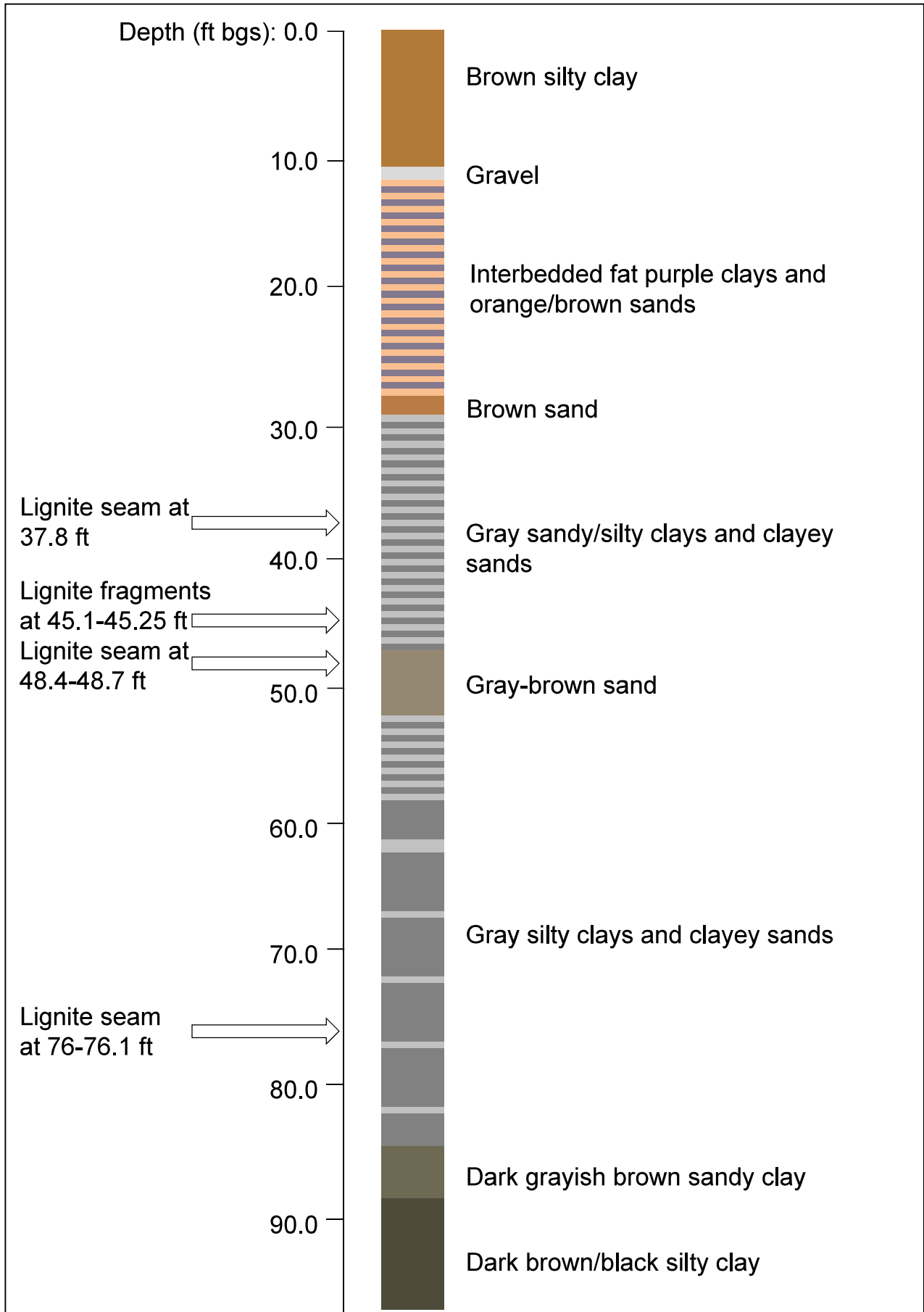
**Cobalt Distribution in Soil**

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

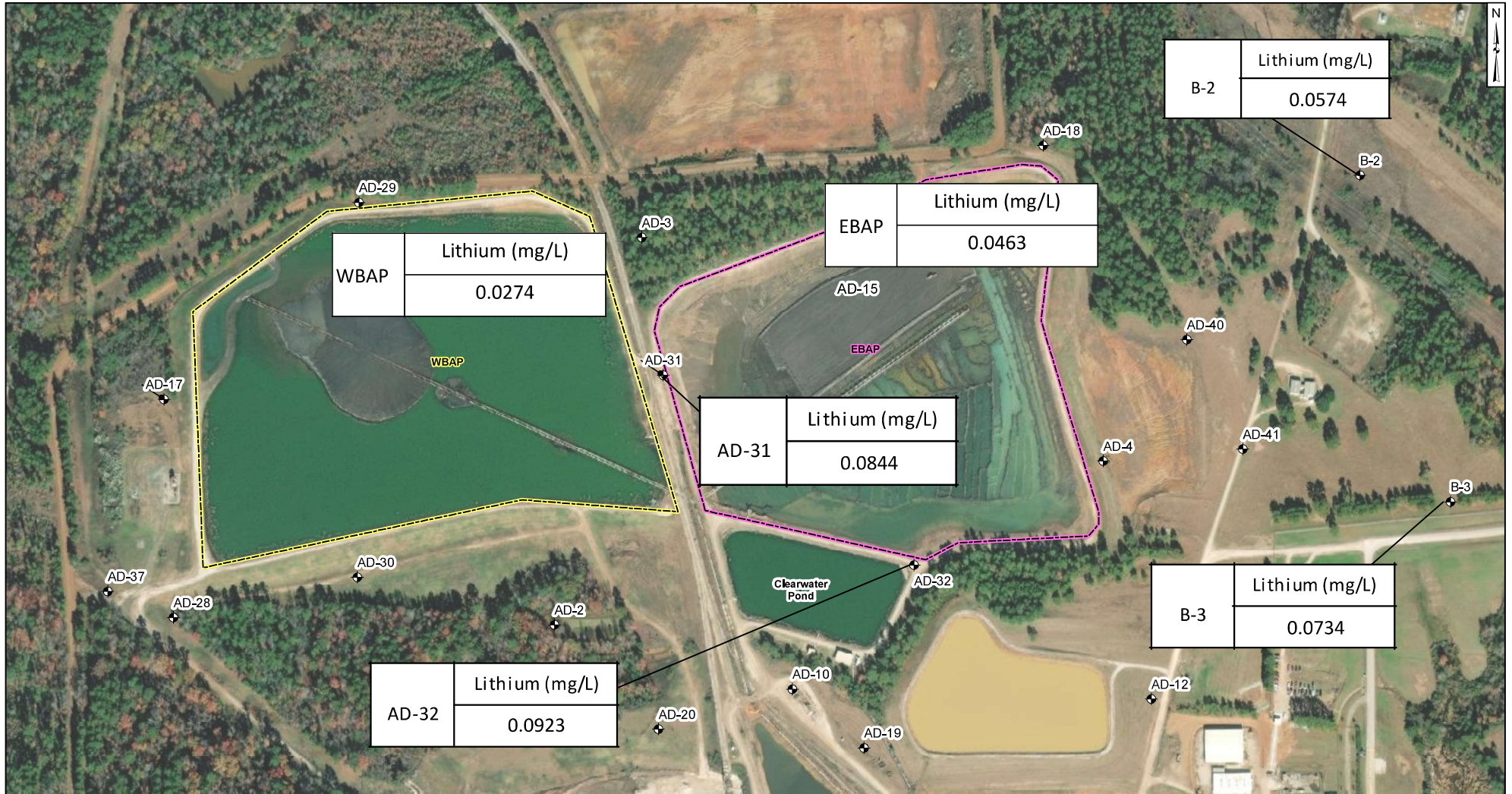
**Figure**

**4**

CHA8462

March 2020





**Legend**

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

**Notes**

- Lithium concentrations in milligrams per liter mg/L.
- Monitoring well coordinates, site features, and data provided by AEP.
- Groundwater samples were collected in June 2022.
- Porewater sample from East Bottom Ash Pond (EBAP) was collected in 2022.



**Aqueous Lithium Distribution**

AEP Pirkey Power Plant  
Hallsville, Texas

**Geosyntec**  
consultants

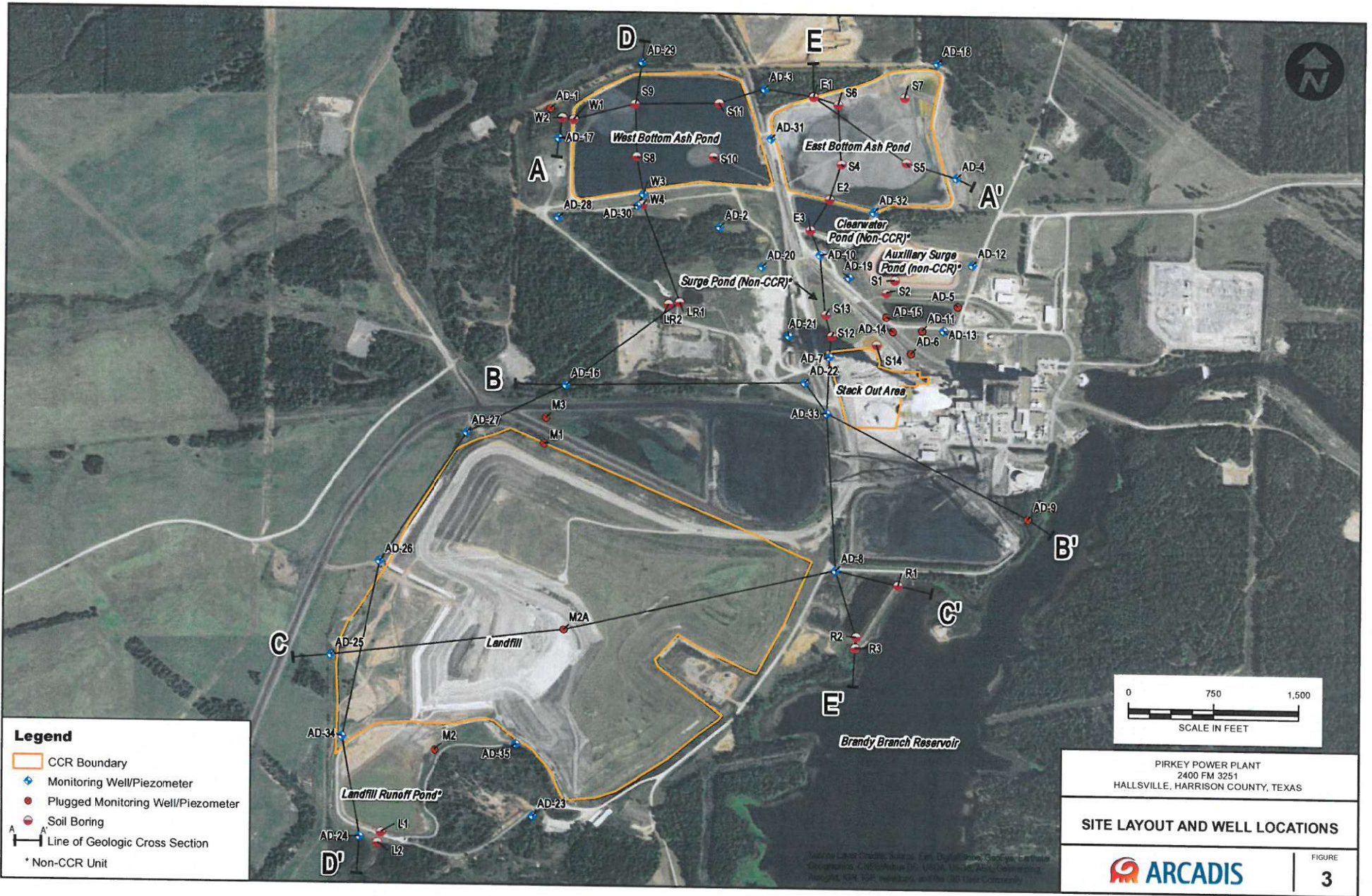
Columbus, Ohio

2022/12/19

Figure

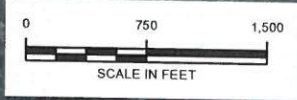
**5**

ATTACHMENT A  
Geologic Cross-Section A-A'



**Legend**

- CCR Boundary
- ◆ Monitoring Well/Piezometer
- Plugged Monitoring Well/Piezometer
- Soil Boring
- Line of Geologic Cross Section
- \* Non-CCR Unit



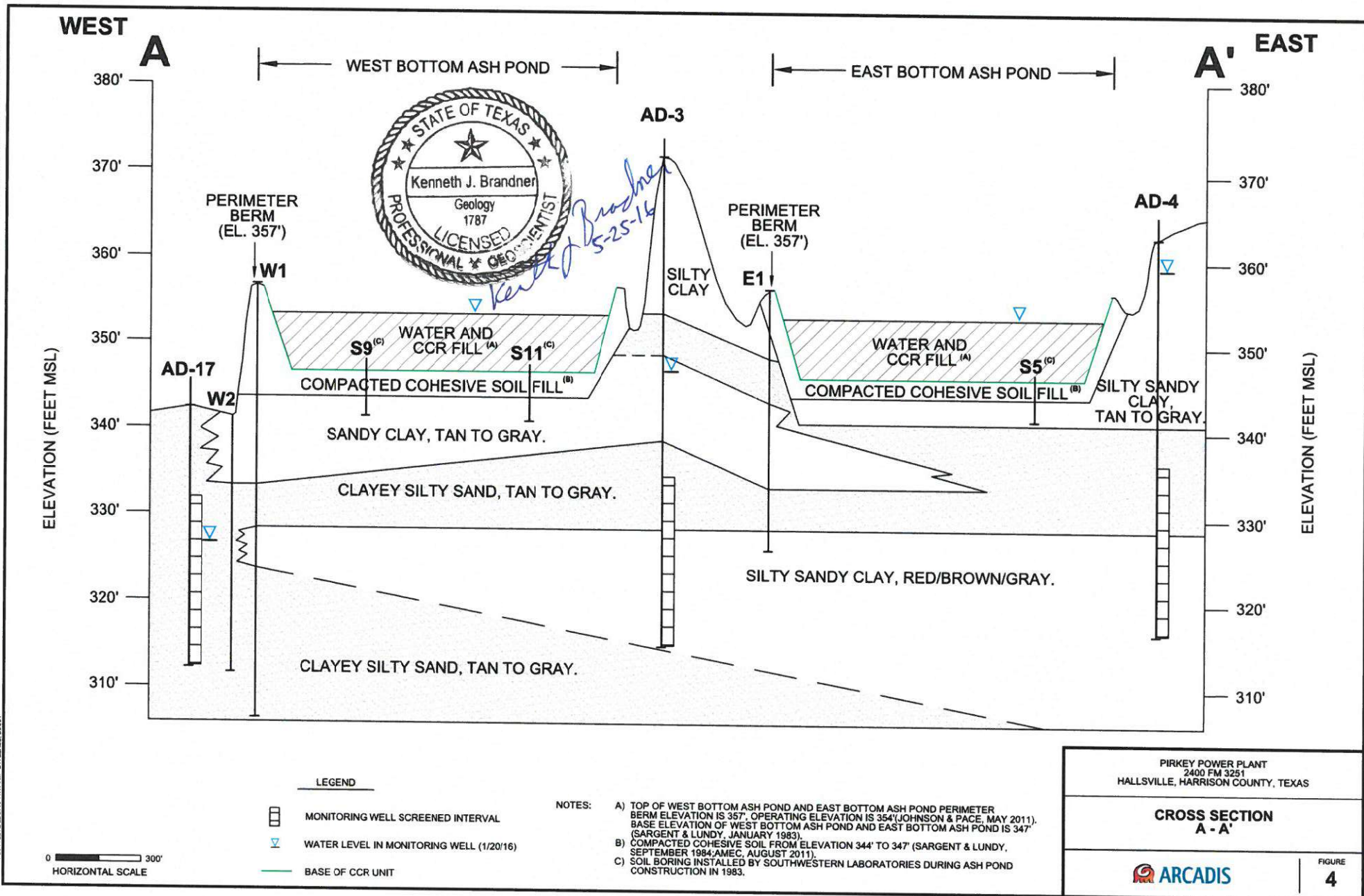
PIRKEY POWER PLANT  
 2400 FM 3251  
 HALLSVILLE, HARRISON COUNTY, TEXAS

**SITE LAYOUT AND WELL LOCATIONS**

**ARCADIS**

FIGURE  
**3**

CITY: DFW/GROUP: DR: LD: AM: PD: TM: TR: LYNCH-ORF-REF-  
 COUNTY: TARRANT: PROJECT: PIRKEY POWER PLANT/ASH POND/ASBESTOS  
 DRAWING: WEST BOTTOM ASH POND AND EAST BOTTOM ASH POND/ASBESTOS  
 DATE: 11/17/16 BY: LEASE/DAVA  
 PLOTTED: 2/22/2018 11:17 AM  
 LAYOUT: MODEL: SAVED: 2/19/2018 2:18 PM ACADVER: 18.15 (LMS TECH) PAGESETUP: - PLOTSTYLETABLE: PAGERSETUP: - PLOTSTYLETABLE:



ATTACHMENT B  
SB-2 Boring Log

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

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

Sample Interval FEET ASSIGNMENT	SAMPLING RECOVERY	DEPTH FT.	SAMPLES	STRATUM DESCRIPTION					STANDARD PENETROMETER			UNIFIED SOIL CLASSIFICATION	N - VALUE OR HAND PENETROMETER
				CONDITION OR CONSISTENCY	COLOR	MINOR MATERIALS OR ADJECTIVES	PREDOMINANT MATERIAL	CHARACTERISTICS OR MODIFICATIONS	SEAT - 6"	1st - 6"	2nd - 6"		
SM 0-5'	2' Rec	0		0-8' Br, Lt. Rd Br Si	Sa	Silty Sand - trace clay, trace root hairs, moist.					moist (0-5)		
8'	2.5' Rec			11. Rd Br		- thin lenses (less than 1/4") at 7.5' trace iron staining					moist (5-10)		
CI 10-15'	4' Rec	8		8-14.5 Lt. Rd Br, Br, Gray	Sa, Si, Cl	Clay - some silty clayey sand in interbeds to 14.5', trace iron ore gravel in sand seams @ 10.5', 12', 12.5'					moist (10-15')		
14.5'	2' Rec	11.5		14.5-39' Lt. Br, Yllw. Si, Cl Br, Gray	Sa, Cl	silty sand - some sand iron cemented sand @ 16.5' and ironstone @ (1.5")					v. moist to moist (15-20)		
SC 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 partially cemented clayey silty sand @ 25.5'					sat. @ 25'-25.5'		
						- dark gray silty sat sand seam (2") e 27"					moist 25.5-27' sati. @ 27' (2")		
	3' Rec					- sat. silty sand seam @ 30.5' (1") - sat. silty sand seam @ 32' (3")					sat @ 30.5' (1") 32.0' (3")		
39'						* some u.f. gypsum crystals in clayey sand between sat. sand seams (25-40')					v. moist (to 39')		
ML 35-40'	4' Rec	39		39-40 Lt. Gray, Gray Cl, Si (39-40)	Si	clayey sandy silt, - interbedded silt & clay @ 39' to 40'					moist (39-40')		
						B.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 C  
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.

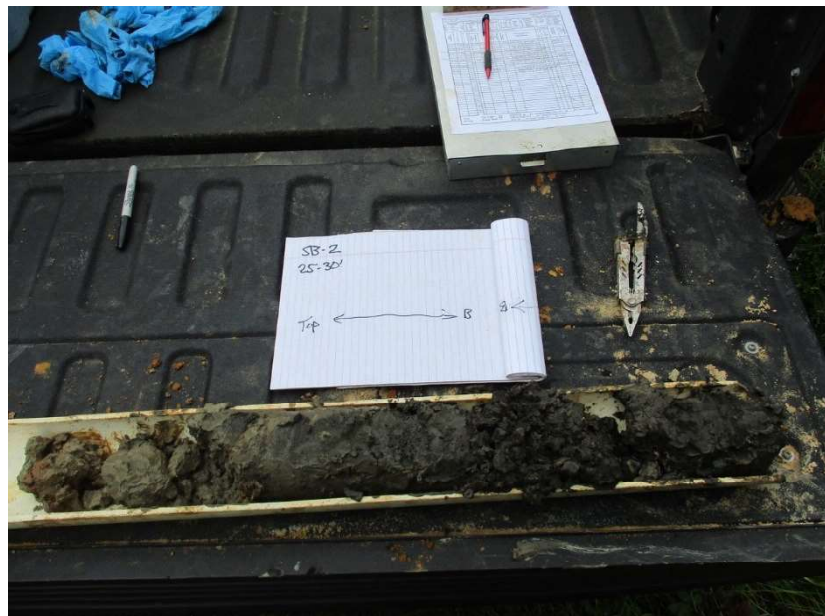


**Photograph 6**

**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

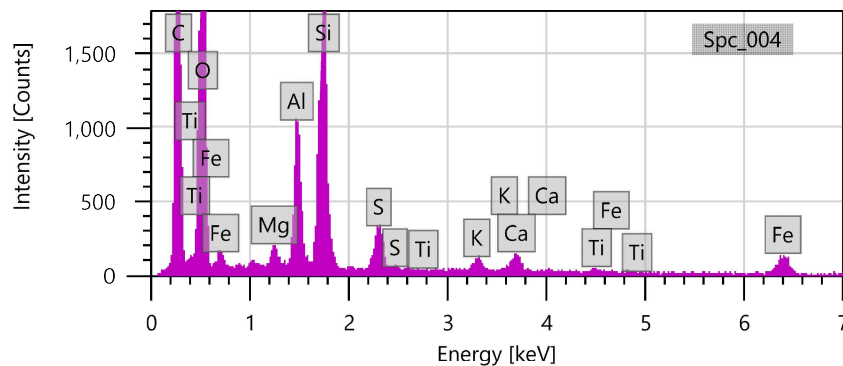
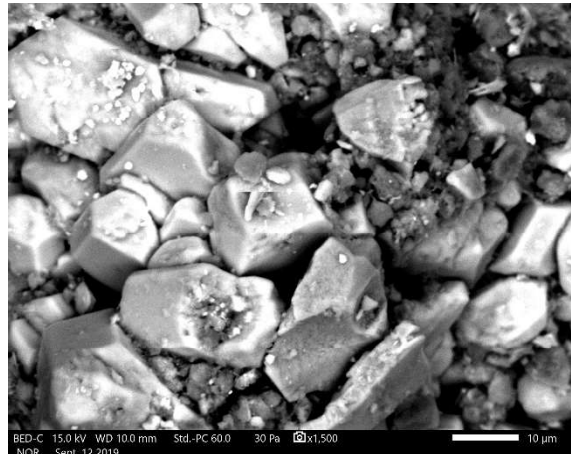
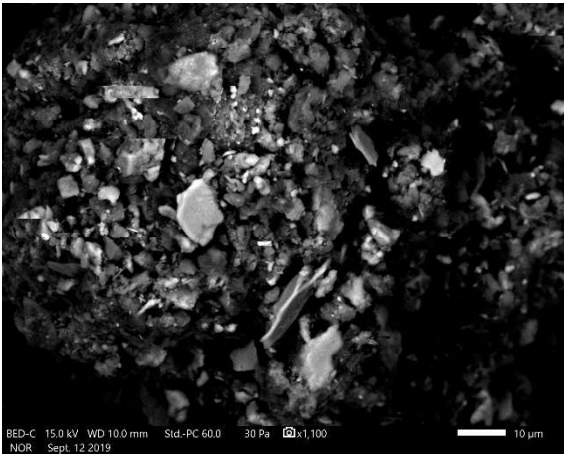
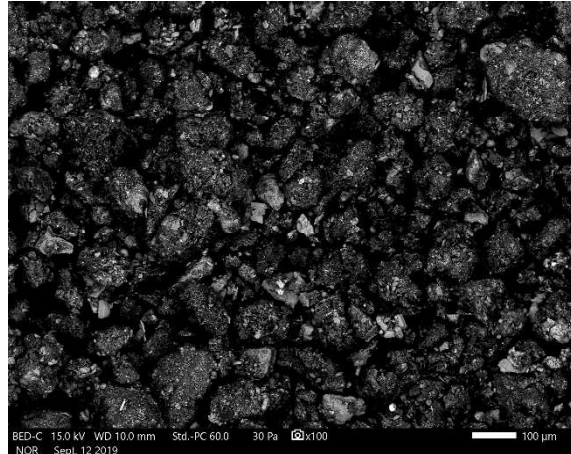
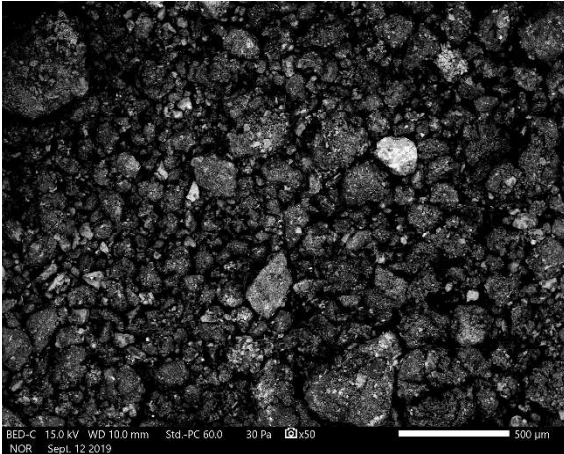


ATTACHMENT D  
SEM/EDS Analysis

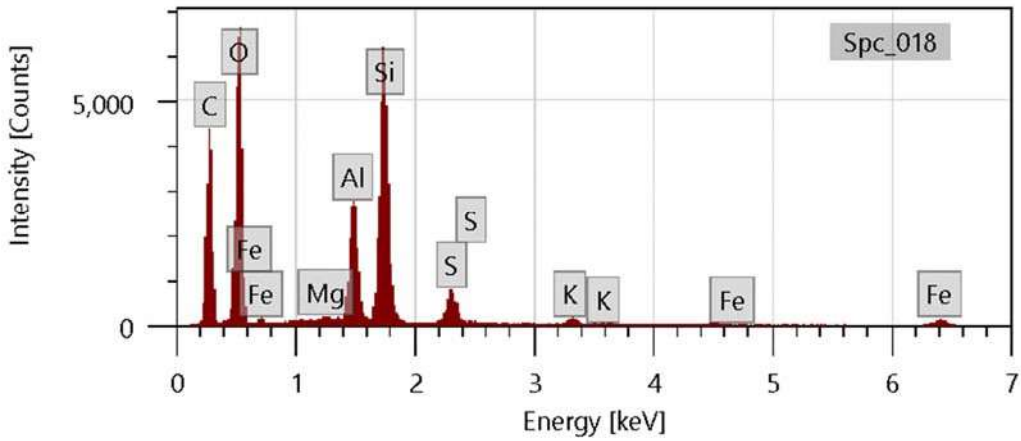
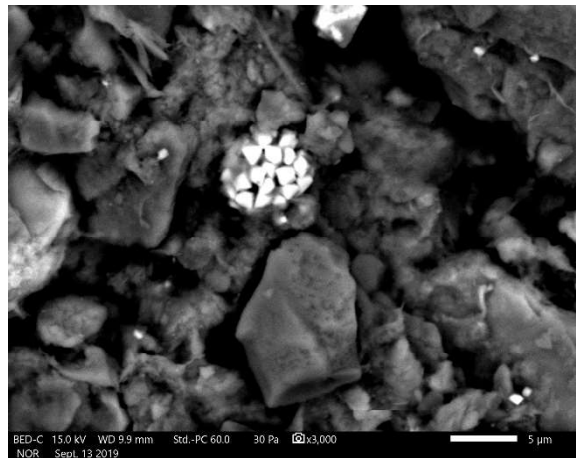
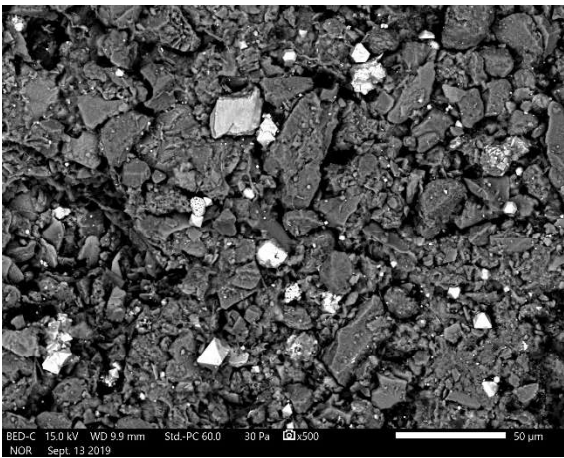
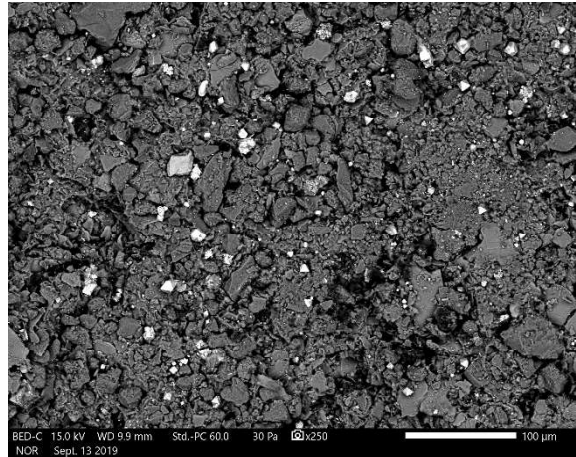
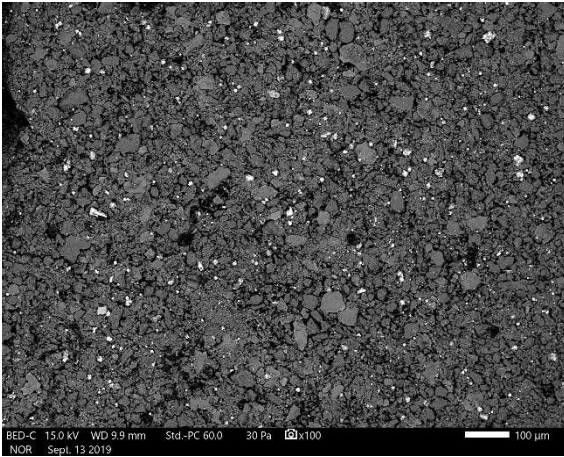
September 16, 2019

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

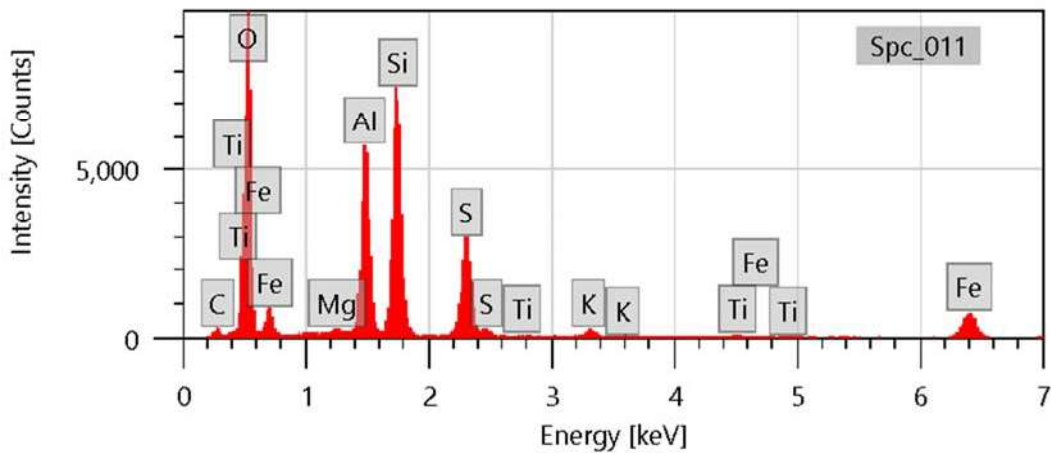
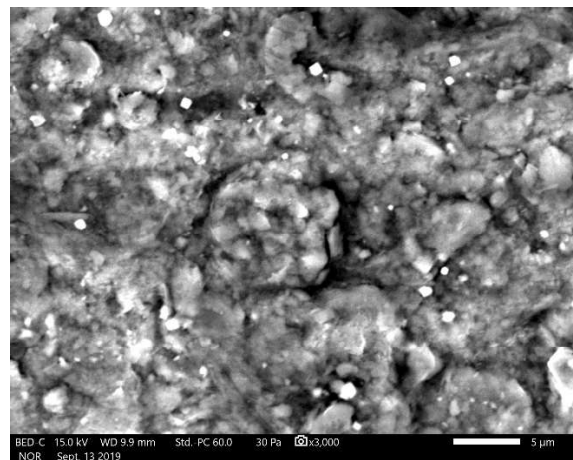
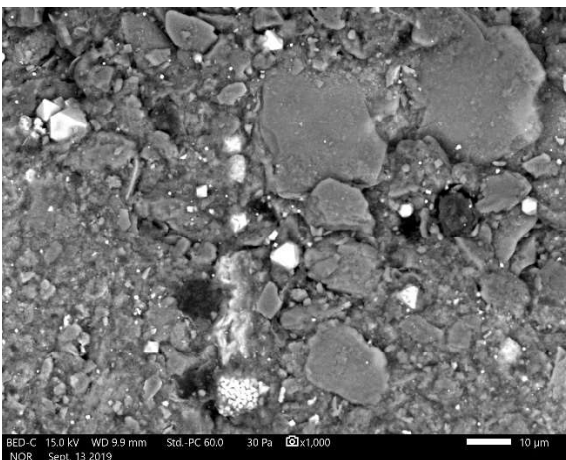
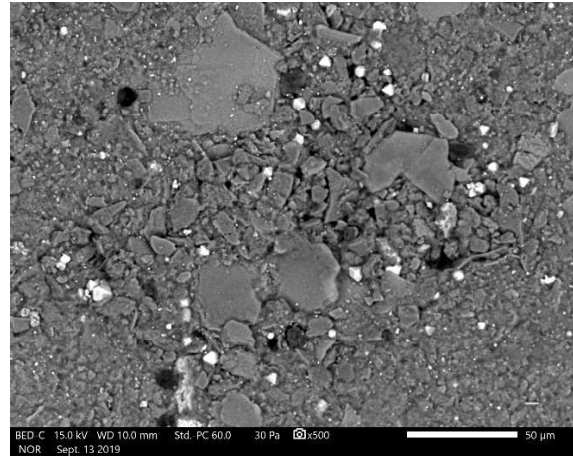
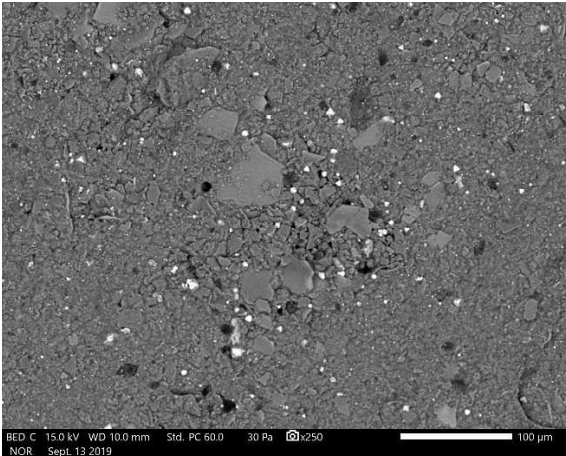
via Email: [BSass@geosyntec.com](mailto:BSass@geosyntec.com)



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 E  
Certification by a Qualified  
Professional Engineer



**CERTIFICATION BY A QUALIFIED PROFESSIONAL ENGINEER**

I certify that the 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*  
Digitally signed by Beth Gross,  
Date: 2023.01.25 16:50:32 -05'00'

\_\_\_\_\_  
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

January 25, 2023  
Date

**APPENDIX 4- Field Reports**

## CCR Groundwater Monitoring Well Inspection Form

Facility: Pinnacle PP  
 Sampling Contractor: EAGLE ENVIRONMENTAL

Sampling Period: MARCH 2022  
 Signature: [Signature]

Well No.	Well Locked	Lock Functioning	Well Locked After Sampling	Access to Well Maintained	Well Casing, Housing, and Pad in Good Shape	Well Properly Labeled	Well cap present	Comments
AD-13	✓	✓	✓	✓	✓	✓	✓	
AD-22	✓	✓	✓	✓	✓	✓	✓	
AD-33	✓	✓	✓	✓	✓	✓	✓	
AD-7	✓	✓	✓	✓		✓	✓	CORROSION, CASING HARD TO OPEN
B-3				✓	✓		✓	NO LOCK NO LABEL
AD-18	✓	✓	✓	✓		✓	✓	
AD-34	✓	✓	✓	✓		✓	✓	HINGE BROKEN
AD-17	✓	✓	✓	✓	✓	✓	✓	
AD-2	✓	✓	✓	✓	✓	✓	✓	
AD-4					✓	✓	✓	NO LOCK LIMITED ACCESS

ESPECIALLY  
WHEN WET

**Instructions:** Complete form and submit to AEP Environmental Services with Field Data. Place check mark for items that are satisfactory. Unsatisfactory items should be left blank with a note in the comments section on what needs to be remedied.

# CCR Groundwater Monitoring Well Inspection Form

Facility: Pittcoy

Sampling Period: March 2022

Sampling Contractor: Eagle Env

Signature: [Signature]

Well No.	Well Locked	Lock Functioning	Well Locked After Sampling	Access to Well Maintained	Well Casing, Housing, and Pad in Good Shape	Well Properly Labeled	Well cap present	Comments
B-2					✓		✓	Model covered won't close -no lock -no label
AD-12	✓	✓	✓	✓	✓	labeled as <del>AD</del> MW-12	✓	
AD-32	✓	✓	✓	✓	✓	✓	✓	
AD-31	✓	✓	✓	✓	✓	✓	✓	
AD-30	✓	✓	✓	✓	✓	✓	✓	
AD-26	✓	✓	✓	✓	✓	✓	✓	
AD-25	✓	✓	✓	✓	✓	✓	✓	overgrown
AD-28	✓	✓	✓	✓	✓	✓	✓	
AD-3	✓	✓	✓	✗	✓	labeled as MW-3	✓	access not maintained overgrown

**Instructions:** Complete form and submit to AEP Environmental Services with Field Data. Place check mark for items that are satisfactory. Unsatisfactory items should be left blank with a note in the comments section on what needs to be remedied.

Facility Name	Pinkney Pond
Sample by	Kenny McDonald

Depth to water, feet (TOC)	15.87
Measured Total Depth, feet (TOC)	40.36

Sample Location ID	AD-2
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Depth to water date	03/29/22
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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 ( $^{\circ}$ C)
1108	16.24	220	3.97	658	0.0	6.21	445	21.17
1113	16.30	220	3.95	666	0.0	4.29	449	21.20
1118	16.32	220	3.90	675	0.0	4.34	454	21.29
1123	16.34	220	3.91	675	0.0	4.31	456	21.31

Total volume purged	
Sample appearance	Clear
Sample time	1125
Sample date	03/29/22

Facility Name	
Sample by	P. Keen Matt Hamilton

Depth to water, feet (TOC)	31.11
Measured Total Depth, feet (TOC)	57.45

Sample Location ID	AD-03
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Depth to water date	3-25-22
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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)		
1121	31.55	300	4.42	131	57.5	4.76	272	21.83		
1126	31.69	300	4.58	130	28.7	0.49	225	21.30		
1131	31.78	300	4.66	137	24.6	0.40	202	21.25		
1136	31.89	300	4.71	145	25.4	0.34	175	21.21		
1141	31.97	300	4.76	155	25.6	0.32	166	21.17		
1146	32.07	300	4.78	161	25.7	0.31	162	21.16		

Total volume purged	
Sample appearance	clear
Sample time	1148
Sample date	3-26-22

Facility Name	Pinkos PP
Sample by	Kerry McDevitt

Sample Location ID	AP-4
--------------------	------

Depth to water, feet (TOC)	7.21
Measured Total Depth, feet (TOC)	47.29

Depth to water date	03/29/22
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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 ( $^{\circ}$ C)		
1154	7.30	178	4.84	148	52.1	7.59	402	23.74		
1159	7.44	178	4.90	98	42.6	3.72	400	22.86		
1204	7.61	178	4.92	95	41.7	3.67	399	22.83		
1209	7.68	178	4.93	94	41.2	3.65	396	22.82		
1214	7.74	178	4.94	94	40.6	3.63	395	22.79		

Total volume purged	
Sample appearance	SLIGHTLY TURBID
Sample time	1216
Sample date	03/29/22

Facility Name  
 Sample by *Ryan M. Dewar*

Depth to water, feet (TOC)  
 Measured Total Depth, feet (TOC) *14.13*  
*41.48*

Sample Location ID *A0-7*

Depth to water date *03/28/22*

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)
<i>1133</i>	<i>14.31</i>	<i>152</i>	<i>3.67</i>	<i>327</i>	<i>3.6</i>	<i>6.31</i>	<i>451</i>	<i>23.64</i>
<i>1138</i>	<i>14.50</i>	<i>152</i>	<i>3.64</i>	<i>330</i>	<i>5.5</i>	<i>3.02</i>	<i>496</i>	<i>23.59</i>
<i>1143</i>	<i>14.76</i>	<i>152</i>	<i>3.61</i>	<i>334</i>	<i>3.2</i>	<i>2.91</i>	<i>440</i>	<i>23.52</i>
<i>1148</i>	<i>14.91</i>	<i>152</i>	<i>3.60</i>	<i>336</i>	<i>0.0</i>	<i>2.87</i>	<i>437</i>	<i>23.50</i>

Total volume purged  
 Sample appearance *CLEAR*  
 Sample time *1150*  
 Sample date *03/28/22*



Facility Name	
Sample by	P. Riley M. Hamilton

Depth to water, feet (TOC)	8.71
Measured Total Depth, feet (TOC)	52.00

Sample Location ID	AD-12
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Depth to water date	3-28-22
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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)		
950	9.02	300	4.20	47	2.1	3.48	214	21.15		
955	9.24	300	3.92	46	1.2	3.07	245	21.11		
1000	9.45	300	3.85	45	1.3	3.10	259	21.14		

Total volume purged	
Sample appearance	clear
Sample time	1002
Sample date	3-28-22

Facility Name	Pinkum PP
Sample by	Kempy McDonald
Depth to water, feet (TOC)	10.77
Measured Total Depth, feet (TOC)	40.70

Sample Location ID	AD-13
Depth to water date	03/28/22

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 ( $^{\circ}\text{C}$ )
0816	10.95	180	5.24	399	261	6.41	294	20.35
0821	11.06	180	5.25	393	255	2.83	290	20.37
0826	11.14	180	5.25	384	217	1.57	236	20.43
0831	11.20	180	5.25	379	206	1.56	232	20.37
0836	11.26	180	5.25	377	208	1.52	229	20.39

Total volume purged	
Sample appearance	Brown
Sample time	0838
Sample date	03/28/22

Facility Name	Plumby PP
Sample by	Kenny McDonald
Depth to water, feet (TOC)	20.29
Measured Total Depth, feet (TOC)	33.05

Sample Location ID	AD-17
Depth to water date	03/29/22

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 ( $^{\circ}\text{C}$ )		
1008	20.37	216	4.16	98	19.9	8.24	429	21.63		
1013	20.40	216	4.16	98	12.1	2.69	429	21.54		
1018	20.40	216	4.15	98	11.6	2.66	434	21.68		
1023	20.41	216	4.13	98	11.2	2.64	440	21.70		

Total volume purged	
Sample appearance	Clean
Sample time	1025
Sample date	03/29/22

Facility Name	Pi-AVOT PP
Sample by	Kenny McDonald
Depth to water, feet (TOC)	4.25
Measured Total Depth, feet (TOC)	28.42

Sample Location ID	RD-18
Depth to water date	03/28/22

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 ( $^{\circ}\text{C}$ )		
1257	5.69	100	4.25	153	60.3	9.70	341	20.98		
1302	6.54	100	4.40	64	0.0	3.75	382	20.86		

WON 14 HOLD WATER LEVEL

Total volume purged	
Sample appearance	Brown tint
Sample time	0936
Sample date	03/29/22

Facility Name	PIRAM PP
Sample by	Kenny McDonald

Depth to water, feet (TOC)	8.85
Measured Total Depth, feet (TOC)	32.70

Sample Location ID	AD-22
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Depth to water date	03/28/22
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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 ( $^{\circ}\text{C}$ )
0918	9.95	200	4.25	957	1.1	6.49	342	20.82
0923	9.96	200	4.27	966	0.0	1.97	311	20.96
0928	10.01	200	4.26	968	0.0	2.01	307	21.05
0933	10.06	200	4.25	971	0.0	1.92	301	21.09

Total volume purged	
Sample appearance	Clear
Sample time	0935
Sample date	03/28/22

DUPLICATE - 1  
1200

Facility Name	P. Irkey
Sample by	Matt Harriett

Depth to water, feet (TOC)	7.83
Measured Total Depth, feet (TOC)	27.38

Sample Location ID	AD-25
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Depth to water date	3-29-22
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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 ( $^{\circ}$ C)		
941	8.15	120	3.22	920	19.9	1.67	245	21.77		
946	8.43	120	3.22	870	23.5	0.56	212	21.65		
951	8.56	120	3.22	873	7.2	0.35	260	21.84		
956	8.65	120	3.24	504	8.5	0.25	287	21.85		
1001	8.72	120	3.25	911	8.4	0.34	286	21.87		

Total volume purged	
Sample appearance	clear
Sample time	1003
Sample date	3-29-22

Facility Name	
Sample by	P. Kelly Mett Hamilton

Sample Location ID	AD-28
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Depth to water, feet (TOC)	15.06
Measured Total Depth, feet (TOC)	42.75

Depth to water date	3-29-22
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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)		
855	15.48	300	3.30	2100						
900	15.76	300	3.18	2100	21.7	1.28	308	22.33		
905	15.66	300	3.14	2100	48.9	0.65	290	21.98		
910	16.15	300	3.01	2100	44.5	0.60	291	21.88		
915	16.24	300	3.04	2120	36.7	0.58	294	21.82		
920	16.33	300	3.03	2140	17.2	0.55	300	21.80		
					9.6	0.52	306	21.95		

Total volume purged	
Sample appearance	clear
Sample time	922
Sample date	3-29-22

Landfill  
Deep  
930

Facility Name: \_\_\_\_\_  
 Sample by: *Pirley*  
*Nat/ Hqm/hq*

Depth to water, feet (TOC): *18.35*  
 Measured Total Depth, feet (TOC): *38.51*

Sample Location ID: *AD 28*

Depth to water date: *3-29-22*

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)
<i>1022</i>	<i>18.51</i>	<i>220</i>	<i>3.66</i>	<i>133</i>	<i>3.3</i>	<i>2.52</i>	<i>273</i>	<i>22.05</i>
<i>1027</i>	<i>18.51</i>	<i>220</i>	<i>3.68</i>	<i>120</i>	<i>2.1</i>	<i>1.67</i>	<i>278</i>	<i>21.18</i>
<i>1032</i>	<i>18.81</i>	<i>220</i>	<i>3.66</i>	<i>118</i>	<i>2.0</i>	<i>1.59</i>	<i>289</i>	<i>21.04</i>

Total volume purged: \_\_\_\_\_  
 Sample appearance: *clear*  
 Sample time: *1034*  
 Sample date: *3-29-22*

*Dup-2*  
*1055*



Facility Name	P. Pricey
Sample by	Matt Hamilton

Sample Location ID	AD-30
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Depth to water, feet (TOC)	8.55
Measured Total Depth, feet (TOC)	27.15

Depth to water date	3-28-22
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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)		
1234	19.00	220	3.99	530	61	2.11	275	25.90		
1239	19.01	220	4.00	533	13.1	1.78	270	23.91		
1244	19.01	220	3.97	530	8.2	1.76	272	23.95		
1249	19.01	220	3.96	529	8.4	1.74	271	23.37		

Total volume purged	
Sample appearance	clear
Sample time	1251
Sample date	3-28-22

Facility Name	
Sample by	Pirizov Mott Hamilton
Depth to water, feet (TOC)	16.17
Measured Total Depth, feet (TOC)	37.32

Sample Location ID	AD-31
Depth to water date	3-28-22

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)
1127	16.47	220	3.40	298	51.4	1.31	310	22.98
1142	16.45	220	3.42	297	50.4	0.88	306	23.39
1147	16.51	220	3.42	299	31.9	0.83	303	23.72
1153	16.51	220	3.41	300	16.7	0.64	302	23.65
1157	16.51	220	3.41	300	7.6	0.78	302	23.62
1202	16.51	220	3.41	300	7.5	0.75	302	23.99

Total volume purged	
Sample appearance	clear
Sample time	1204
Sample date	3-28-22

Facility Name	P. Hiley
Sample by	M. H. Hamilton
Depth to water, feet (TOC)	7.45
Measured Total Depth, feet (TOC)	34.69

Sample Location ID	AD-32
Depth to water date	3-28-22

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 ( $^{\circ}\text{C}$ )
1035	7.98	220	3.27	435	181	1.23	307	22.11
1040	8.03	220	3.21	445	67.1	0.53	307	21.51
1045	8.07	220	3.17	450	41.5	0.51	312	21.47
1050	8.07	220	3.15	446	25.3	0.51	315	21.34
1055	8.07	220	3.13	446	12.7	0.42	317	21.32
1100	8.08	220	3.12	448	8.2	0.39	316	21.30
1105	8.08	220	3.12	445	8.2	0.38	317	21.31

Total volume purged	
Sample appearance	Clear
Sample time	11-7
Sample date	3-28-22

Facility Name	PIRAN7 PP
Sample by	K. FRAY Mc DONALD

Sample Location ID	A0-33
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Depth to water, feet (TOC)	12.22
Measured Total Depth, feet (TOC)	32.50

Depth to water date	03/28/22
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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 ( $^{\circ}\text{C}$ )		
1037	12.29	180	3.98	269	6.4	12.45	375	22.68		
1042	12.29	180	3.98	230	6.3	2.29	375	22.61		
1047	12.30	180	3.98	227	3.5	2.26	370	22.57		
1052	12.30	180	3.97	222	0.3	2.19	367	22.51		

Total volume purged	
Sample appearance	CLEAR
Sample time	1054
Sample date	03/28/22

Facility Name:   
 Sample by: *P. AMM PP*  
*Kenny McDonald*

Depth to water, feet (TOC): *SURFACE*  
 Measured Total Depth, feet (TOC): *26.05*

Sample Location ID: *AD-34*

Depth to water date: *03/29/22*

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)
<i>0815</i>	<i>0.62</i>	<i>160</i>	<i>3.61</i>	<i>1800</i>	<i>3.7</i>	<i>12.61</i>	<i>406</i>	<i>20.66</i>
<i>0820</i>	<i>0.84</i>	<i>160</i>	<i>3.57</i>	<i>1840</i>	<i>0.0</i>	<i>6.27</i>	<i>353</i>	<i>20.57</i>
<i>0825</i>	<i>0.92</i>	<i>160</i>	<i>3.56</i>	<i>1870</i>	<i>0.0</i>	<i>1.31</i>	<i>350</i>	<i>20.57</i>
<i>0830</i>	<i>1.09</i>	<i>160</i>	<i>3.55</i>	<i>1800</i>	<i>0.0</i>	<i>1.28</i>	<i>344</i>	<i>20.59</i>
<i>0835</i>	<i>1.13</i>	<i>160</i>	<i>3.55</i>	<i>1800</i>	<i>0.0</i>	<i>1.24</i>	<i>347</i>	<i>20.62</i>

Total volume purged:   
 Sample appearance: *CLEAR*  
 Sample time: *0837*  
 Sample date: *03/29/22*

*AD-34 DUP*  
*0837*

Facility Name	
Sample by	P. Kelly M-H Hamilton

Depth to water, feet (TOC)	15.77
Measured Total Depth, feet (TOC)	57.44

Sample Location ID	B-2
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Depth to water date	3-28-22
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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)		
847	16.05	3cc	4.73	161						
852	16.14	3cc	4.55	139	18.2	3.03	211	20.62		
857	16.18	3cc	4.55	136	8.4	1.43	128	20.19		
902	16.19	3cc	4.54	136	5.4	1.20	120	20.17		
					5.3	1.14	115	20.14		

Total volume purged	
Sample appearance	clear
Sample time	904
Sample date	3-28-22

Dup-1  
1-55

Facility Name	P. M. M. P.
Sample by	K. M. M. M. P.

Depth to water, feet (TOC)	10.99
Measured Total Depth, feet (TOC)	37.49

Sample Location ID	B-3
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Depth to water date	03/28/22
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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 ( $^{\circ}$ C)
1236	12.21	100	5.26	314	32.3	7.58	343	24.28
1241	13.07	100	5.21	307	20.6	5.17	352	24.39

Total volume purged	
Sample appearance	SLIGHTLY TURBID
Sample time	0903
Sample date	03/29/22

# CCR Groundwater Monitoring Well Inspection Form

Facility: Pirkey

Sampling Period: June 2022

Sampling Contractor: Eagle

Signature: [Signature]

Well No.	Well Locked	Fastener and Lock Functioning	Well Locked After Sampling	Access to Well Maintained	Well Casing, Protective Cover, Barriers and Pad in Good Shape	Well Properly Labeled	Well Cap Present and Vented*	Comments
								<u>All wells</u> <u>no fill</u> <u>no weep hole</u> <u>no inside label</u>
AD-12	S	S	S	S	S	U	S	labeled as MW-12
AD-32	S	S	S	S	S	S	S	
AD-37	S	S	S	S	S	S	S	
AD-30	S	S	S	S	S	S	S	
B-2	U	U	U	U	S	U	S	- no lock - access not maintained - no label
AD-28	S	S	S	S	S	S	S	
AD-17	S	S	S	S	S	S	S	- needs needletting to see pad
AD-3	S	S	S	S	S	S	S	
AD-26	S	S	S	S	S	S	S	- needs new lock
AD-25	S	S	S	S	S	S	S	
AD-23	S	S	S	S	S	S	S	
AD-27	S	S	S	S	S	S	S	

\*Not all wells will be vented, especially flush mounted wells. If that is the case, please note "flush mount well" in the comments.



## CCR Groundwater Monitoring Well Inspection Form

Facility: APP PIANM PP

Sampling Period: JUNE 2022

Sampling Contractor: EAGLE ENVIRONMENTAL

Signature: [Signature]

Well No.	Well Locked	Fastener and Lock Functioning	Well Locked After Sampling	Access to Well Maintained	Well Casing, Protective Cover, Barriers and Pad in Good Shape	Well Properly Labeled	Well Cap Present and Vented*	Comments
AD-13	S	S	S	S	U	U	U	NO WEEP HOLE, NO GRANULAR FILL, WELL LABELED MW-13, CAP NOT VENTED
AD-22	S	S	S	S	U	U	U	NO WEEP HOLE, NO GRANULAR FILL, CAP NOT VENTED, NOT LABELED INSIDE
AD-33	S	S	S	U	U	U	U	NOT WEEP PATTED, NO WEEP HOLE, NO GRANULAR FILL, CAP NOT VENTED, NOT LABELED INSIDE
AD-7R	S	S	S	S	U	U	U	NOT LABELED INSIDE OR OUTSIDE, NO WEEP HOLE, CAP NOT VENTED, NO GRANULAR FILL
AD-2	S	S	S	S	U	U	U	NO WEEP HOLE, NO GRANULAR FILL, CAP NOT VENTED, LABELED AS MW-2, NOT LABELED INSIDE
AD-7	S	S	S	S	U	U	U	
AD-4	U	U	U	U	U	U	U	NO LOCK, NOT WEEP PATTED, NO GOOD WAY TO GET TO WELL
AD-18	S	S	S	U	U	U	U	OVERGROWN DOWN TREE IN WAY, NOT LABELED INSIDE, NO WEEP HOLE, CAP NOT VENTED, NO FILL
B-3	U	U	U	U	U	U	U	NO LOCK NO LABEL INSIDE OR OUTSIDE, NO WEEP HOLE, NO VENT, NO GRANULAR FILL
AD-16	S	S	S	U	U	U	U	OVERGROWN TRAIL, WELL OVERGROWN, NO WEEP HOLE, NO INTERNAL LABEL, CAP NOT VENTED
AD-34	S	S	S	S	U	U	U	HINGE BROKEN WHEN NOT SECURED, NOT LABELED INSIDE, NO GRANULAR FILL, NO WEEP
AD-36	S	S	S	S	U	U	U	NOT LABELED INSIDE, NO GRANULAR FILL, CAP NOT VENTED, NO WEEP
AD-8	S	S	S	S	U	U	U	LABELED AS MW-8, NO WEEP, CAP NOT VENTED

\*Not all wells will be vented, especially flush mounted wells. If that is the case, please note "flush mount well" in the comments.

Facility Name	Asp PIANO PP
Sample by	Kenny McDevitt

Sample Location ID	A0-02
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Depth to water, feet (TOC)	16.97
Measured Total Depth, feet (TOC)	40.36

Depth to water date	06/21/22
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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)		
0832	17.01	200	7.02	668	16.5	8.31	475	23.82		
0837	17.13	200	4.00	674	1.8	5.00	475	23.16		
0842	17.21	200	3.96	675	0.0	4.47	475	23.04		
0847	17.28	200	3.96	677	0.0	4.42	476	22.92		

Total volume purged	
Sample appearance	Clean
Sample time	0849
Sample date	06/21/22

Facility Name	Pirkey
Sample by	Matt Hamill

Sample Location ID	AD-3
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Depth to water, feet (TOC)	33.08
Measured Total Depth, feet (TOC)	57.41

Depth to water date	6-21-22
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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)		
1106	33.51	220	4.38	92	41.3	1.88	274	31.70		
1111	33.68	220	4.40	90	10.8	1.04	275	25.50		
1116	33.77	220	4.34	90	9.2	1.02	275	24.62		
1121	33.85	220	4.38	90	9.2	1.00	276	24.51		

Total volume purged	
Sample appearance	clear
Sample time	1123
Sample date	6-21-22

Facility Name	ASP Pinnon PP
Sample by	Kerry McDonald

Sample Location ID	A0-4
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Depth to water, feet (TOC)	15.48
Measured Total Depth, feet (TOC)	47.29

Depth to water date	06/21/22
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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)		
1017	15.81	160	4.27	127	228	8.21	329	24.82		
1022	15.86	160	4.36	113	216	3.17	341	24.63		
1027	15.93	160	4.39	110	201	3.06	355	24.57		
1032	15.99	160	4.40	108	204	3.02	357	24.51		
Ⓚ										

Total volume purged	
Sample appearance	Clear
Sample time	10:34
Sample date	06/21/22

Facility Name	NEP PINTON PD
Sample by	KIMMY McDEWITT

Sample Location ID	AD-7
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Depth to water, feet (TOC)	17.44
Measured Total Depth, feet (TOC)	41.98

Depth to water date	06/21/22
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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)		
0930	18.02	150	3.55	410	20.6	9.79	472	26.83		
0935	18.11	150	3.54	406	5.9	2.80	472	26.42		
0940	18.19	150	3.54	397	2.6	2.71	472	26.11		
0945	18.25	150	3.52	399	0.0	2.63	467	25.99		

Total volume purged	
Sample appearance	CLM
Sample time	0947
Sample date	06/21/22

Facility Name	ACP PinnacPP
Sample by	Kerry McDonald

Sample Location ID	AD-7R
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Depth to water, feet (TOC)	10.95
Measured Total Depth, feet (TOC)	33.03

Depth to water date	06/20/22
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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 ( $^{\circ}$ C)		
1107	11.01	120	4.56	210	4.1	10.21	383	28.27		
1109	11.02	120	4.59	211	0.0	3.21	360	26.97		
1114	11.05	120	4.58	212	0.0	3.19	351	26.52		
1119	11.10	120	4.57	213	0.0	3.12	346	26.25		

Total volume purged	
Sample appearance	Clear
Sample time	1121
Sample date	06/20/22

Facility Name	AEP PILOT PP
Sample by	KERRY McDONALD

Sample Location ID	A-D-8
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Depth to water, feet (TOC)	13.57
Measured Total Depth, feet (TOC)	31.33

Depth to water date	06/22/22
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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)		
1154	13.82	160	5.25	334	26.0	9.45	350	27.41		
1159	13.87	160	5.16	335	13.1	2.47	346	26.46		
1204	13.88	160	5.03	337	6.8	2.22	350	26.28		
1209	13.89	160	5.00	337	4.8	2.19	352	26.19		
1214	13.88	160	5.01	337	5.2	2.17	354	26.13		

Total volume purged	
Sample appearance	Clear
Sample time	1216
Sample date	06/22/22

Facility Name	Piskey
Sample by	Matt Hamilton
Depth to water, feet (TOC)	21.44
Measured Total Depth, feet (TOC)	52.00

Sample Location ID	AD-12
Depth to water date	6-20-22

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)		
840	21.67	300	4.61	123	0	3.71	254	27.28		
845	21.78	300	4.30	57	0	1.63	242	24.73		
850	21.90	300	4.25	56	0	1.48	300	24.58		

Total volume purged	
Sample appearance	clear
Sample time	852
Sample date	6-20-22



Facility Name	ALP PIRANON PD
Sample by	KERRY McDONALD

Sample Location ID	AD-13
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Depth to water, feet (TOC)	15.01
Measured Total Depth, feet (TOC)	40.70

Depth to water date	06/20/22
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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)		
0821	15.22	170	5.79	539	556	12.75	-33	24.29		
0826	15.28	170	5.71	537	321	6.37	-22	24.31		
0831	15.37	170	5.68	536	337	6.30	-8	24.02		
0836	15.48	170	5.68	535	306	5.97	-10	24.07		
0841	15.55	170	5.68	533	298	5.91	-18	24.08		

Total volume purged	
Sample appearance	BROWN
Sample time	0843
Sample date	06/20/22

COMPLETE DUPLICATE-1400

Facility Name	APP VIMAWY PP
Sample by	Kenny A. DeAcid

Sample Location ID	AD-16
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Depth to water, feet (TOC)	17.64
Measured Total Depth, feet (TOC)	38.24

Depth to water date	06/22/22
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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)		
0948	18.01	210	4.57	131	35.5	3.87	421	23.87		
0953	18.09	210	4.54	136	28.6	1.97	419	23.91		
0958	18.13	210	4.51	136	27.1	2.03	419	23.94		
1002	18.17	210	4.51	136	26.9	2.11	414	23.97		

Total volume purged	
Sample appearance	CLEAR
Sample time	1005
Sample date	06/22/22

Facility Name	Pillay
Sample by	19-07 Hamilton

Sample Location ID	AD-17
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Depth to water, feet (TOC)	22.61
Measured Total Depth, feet (TOC)	23.05

Depth to water date	6-21-22
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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 ( $^{\circ}$ C)		
1023	22.76	200	3.75	146	6.7	3.24	360	26.48		
1028	22.76	200	3.35	147	7.8	1.07	328	23.42		
1033	22.76	200	3.32	145	4.8	0.95	321	23.22		
1038	22.76	200	3.20	145	2.2	0.85	316	23.01		

Total volume purged	
Sample appearance	clear
Sample time	1040
Sample date	6-21-22

Facility Name	REP PIRMM PP
Sample by	Kenny McDermid

Sample Location ID	AJ-18
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Depth to water, feet (TOC)	7.91
Measured Total Depth, feet (TOC)	28.42

Depth to water date	06/21/22
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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)		
1108	8.37	102	4.83	58	56.4	5.28	365	25.12		
1113	9.41	102	4.61	51	18.2	3.79	374	24.68		

WON'T HOLD WATER LEVEL

Total volume purged	
Sample appearance	CLEAR
Sample time	0817
Sample date	06/22/22

Facility Name	APP PIAHOM PP
Sample by	Kerry McDermid

Sample Location ID	AD-22
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Depth to water, feet (TOC)	13.02
Measured Total Depth, feet (TOC)	32.70

Depth to water date	06/20/22
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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 ( $^{\circ}$ C)	
0936	13.22	164	4.80	766	13.0	8.21	274	27.21	
0941	13.29	164	4.57	778	5.5	3.63	290	26.69	
0946	13.31	164	4.54	787	5.1	3.59	277	26.75	
0951	13.36	164	4.51	791	4.6	3.52	274	26.71	

Total volume purged	
Sample appearance	CLMAM
Sample time	0953
Sample date	06/20/22

Facility Name	
Sample by	Pirkov Matt Hamilton
Depth to water, feet (TOC)	30.23
Measured Total Depth, feet (TOC)	38.20

Sample Location ID	AD-23
Depth to water date	6-22-22

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)		
1050	30.45	220	3.56	237	46.2	2.33	260	31.16		
1055	30.50	220	3.58	44	85.7	1.93	269	26.41		
1100	30.52	220	3.59	87	55.7	1.78	280	26.04		
1105	30.53	220	3.51	79	36.8	1.66	284	25.94		
1110	30.53	220	3.62	77	32.2	1.61	287	25.89		
1115	30.53	220	3.62	76	32.6	1.57	288	25.85		

Total volume purged	
Sample appearance	white/cloudy
Sample time	1117
Sample date	6-22-22

Facility Name  
 Sample by *Pirkey Mitt Hamilton*

Sample Location ID *AD-25*

Depth to water, feet (TOC) *9.72*  
 Measured Total Depth, feet (TOC) *27.38*

Depth to water date *6-22-23*

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)
955	9.91	120	3.81	867	54.0	1.45	218	29.00
1000	9.95	120	3.83	834	32.3	0.38	208	28.12
1005	10.06	120	3.77	849	10.1	0.29	209	28.15
1010	10.14	120	3.75	856	9.9	0.22	210	28.17

Total volume purged  
 Sample appearance *Clear*  
 Sample time *1012*  
 Sample date *6-22-23*

Facility Name	Pirkey
Sample by	Matt Hamilton

Depth to water, feet (TOC)	15.28
Measured Total Depth, feet (TOC)	42.75

Sample Location ID	AD-26
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Depth to water date	6-22-22
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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 ( $^{\circ}$ C)		
902	15.61	300	3.41	2,050	51.40	1.61	261	27.41		
907	15.76	300	3.34	2,110	59.30	2.41	248	25.10		
912	15.85	300	3.23	2,110	50.0	3.27	249	24.91		
917	15.99	300	3.24	2,110	28.20	4.01	245	24.82		
922	16.07	300	3.24	2,120	17.5	4.42	244	24.75		
	16.15	300	3.25	2,120	17.8	4.53	243	24.70		

Total volume purged	
Sample appearance	clear
Sample time	924
Sample date	6-22-21



Facility Name	Piskey
Sample by	Matt Hamilton

Sample Location ID	AD-27
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Depth to water, feet (TOC)	22.52
Measured Total Depth, feet (TOC)	40.07

Depth to water date	6-22-22
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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 ( $^{\circ}\text{C}$ )		
1140	22.67	300	3.37	221	8.7	2.01	312	31.84		
1145	22.81	300	3.33	224	17.6	0.60	324	28.55		
1150	22.90	300	3.30	230	5.9	0.43	332	27.17		
1155	22.97	300	3.30	232	5.8	0.39	335	27.02		

Total volume purged	
Sample appearance	clear
Sample time	1157
Sample date	6-22-22

Facility Name	Pirlov
Sample by	Matt Hamilton

Sample Location ID	AD-28
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Depth to water, feet (TOC)	19.25
Measured Total Depth, feet (TOC)	38.59

Depth to water date	6-21-27
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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 ( $^{\circ}$ C)		
944	19.68	220	4.22	103	1	4.60	208	26.52		
949	19.68	22-	4.06	107	2.1	1.76	237	24.30		
954	19.74	220	4.00	108	1.3	1.63	245	24.01		

Total volume purged	
Sample appearance	Clear
Sample time	956
Sample date	6-21-27

Facility Name	P. McCoy
Sample by	Matt Hamilton

Sample Location ID	AD-3
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Depth to water date	6-2-22
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Depth to water, feet (TOC)	20.48
Measured Total Depth, feet (TOC)	27.15

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 ( $^{\circ}\text{C}$ )		
11-7	20.46	220	4.15	495	48.8	1.69	296	22.09		
1112	20.91	220	4.23	518	57.1	0.97	294	27.38		
1117	21.00	220	4.20	520	13.1	0.97	297	26.28		
1122	21.00	220	4.17	521	3.2	0.85	300	26.00		
1129	21.01	220	4.15	522	3.1	0.81	301	25.99		

Total volume purged	
Sample appearance	clear
Sample time	1129
Sample date	6-2-22

Facility Name	P.10104
Sample by	Matt Hamilton

Sample Location ID	A11-31
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Depth to water, feet (TOC)	18.35
Measured Total Depth, feet (TOC)	37.32

Depth to water date	6-20-22
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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 ( $^{\circ}$ C)
1021	18.71	220	3.51	308	79.4	1.96	311	25.33
1026	18.77	220	3.48	295	24.6	0.43	336	25.81
1031	18.75	220	3.47	296	14.3	0.34	256	25.57
1036	18.50	220	3.46	252	7.6	0.25	253	25.55
1041	18.51	220	3.45	240	7.5	0.28	317	25.51

Total volume purged	
Sample appearance	clear
Sample time	1043
Sample date	6-20-22

Facility Name	Pinkney
Sample by	Matt Hamilton

Sample Location ID	AD-32
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Depth to water, feet (TOC)	9.74
Measured Total Depth, feet (TOC)	34.69

Depth to water date	6-20-22
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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 ( $^{\circ}\text{C}$ )		
925	11.71	220	3.31	415	82.6	1.14	351	26.89		
934	11.75	220	3.15	421	51.4	0.48	355	24.93		
936	11.85	220	3.06	410	31.3	0.38	383	24.59		
944	11.87	220	3.05	412	9.9	0.31	386	24.48		
949	11.88	220	3.09	413	9.8	0.30	387	24.45		

Total volume purged	
Sample appearance	clear
Sample time	9:51
Sample date	6-20-22

Facility Name	APD PINKY PP
Sample by	KERRY MCDONALD

Sample Location ID	AD-33
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Depth to water, feet (TOC)	14.02
Measured Total Depth, feet (TOC)	32.50

Depth to water date	06/20/22
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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 ( $^{\circ}\text{C}$ )		
1020	14.09	200	4.60	180	9.5	<del>6.9</del>	323	26.47		
1025	14.10	200	4.44	163	9.3	3.45	297	26.33		
1030	14.11	200	4.39	161	9.3	3.37	294	25.91		
1035	14.13	200	4.37	158	8.9	3.31	296	25.87		

Total volume purged	
Sample appearance	CLGAN
Sample time	1037
Sample date	06/20/22

Facility Name	APP PIANO
Sample by	KIMM MCDONALD

Sample Location ID	AQ-34
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Depth to water, feet (TOC)	0.61
Measured Total Depth, feet (TOC)	26.05

Depth to water date	06/22/22
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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 ( $^{\circ}$ C)		
1031	1.01	120	3.76	1610	10.4	6.84	452	28.41		
1036	1.10	120	3.70	1650	0.0	2.99	434	27.72		
1041	1.14	120	3.66	1670	3.3	2.87	428	27.49		
1046	1.20	120	3.66	1670	5.6	2.79	423	27.48		

Total volume purged	
Sample appearance	Clear
Sample time	1048
Sample date	06/22/22

Duplicate - 3  
1400

Facility Name	ABP Pinnac AP
Sample by	Kenny McDonald

Sample Location ID	A0-36
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Depth to water, feet (TOC)	7.71
Measured Total Depth, feet (TOC)	17.10

Depth to water date	06/22/22
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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)		
1113	7.83	146	4.03	63	62.7	2.87	354	29.71		
1118	7.85	146	4.53	64	29.1	1.87	353	29.64		
1123	7.89	146	4.55	64	11.4	1.42	350	29.63		
1128	7.89	146	4.58	64	10.9	1.37	349	29.72		
1133	7.92	146	4.58	63	11.2	1.32	347	29.78		

Total volume purged	
Sample appearance	clear
Sample time	1135
Sample date	06/22/22



Facility Name	Pirkey
Sample by	14-11 Hamilton

Sample Location ID	B-2
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Depth to water, feet (TOC)	24.40
Measured Total Depth, feet (TOC)	51.44

Depth to water date	6-21-22
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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 ( $^{\circ}\text{C}$ )		
823	24.71	300	4.94	106	7.9	5.89	275	25.44		
828	24.78	300	4.92	103	0	4.51	251	22.51		
833	24.85	300	4.66	121	0	1.13	161	22.27		
838	24.90	300	4.68	125	0	1.07	158	22.19		

Total volume purged	
Sample appearance	clear
Sample time	54c
Sample date	6-21-22

Duplicate  
1000

Facility Name	APP P. M. M. 9 PP
Sample by	KERRY McNEACD

Sample Location ID	B-3
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Depth to water, feet (TOC)	16.24
Measured Total Depth, feet (TOC)	37.49

Depth to water date	06/21/22
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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)		
1142	17.13	106	4.84	246	35.2	8.31	414	23.34		
1147	18.27	106	4.88	248	7.8	2.75	407	23.73		

Total volume purged	
Sample appearance	CLEAR
Sample time	0951
Sample date	06/22/22

WON'T HOLD WATER FULL

Facility Name  
 Sample by *P. Kelly  
 Matt Hamilla*

Sample Location ID *EBAD*

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

Depth to water date *6-22-22*

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)		
<i>12:10</i>			<i>5.02</i>	<i>4,460</i>	<i>246</i>	<i>7.87</i>	<i>176</i>	<i>27.31</i>		

Total volume purged  
 Sample appearance *cloudy*  
 Sample time *12:10*  
 Sample date *6-22-22*

## CCR Groundwater Monitoring Well Inspection Form

Facility: Pittcoy

Sampling Period: Nov 2022

Sampling Contractor: Engle

Signature: [Signature]

Well No.	Well Locked	Lock Functioning	Well Locked After Sampling	Access to Well Maintained	Well Casing, Housing, and Pad in Good Shape	Well Properly Labeled	Well cap present	Comments
AD-26	S	S	S	S	S	S	S	
AD-25	S	S	S	S	S	S	S	
AD-23	S	S	S	S	S	S	S	
AD-27	S	S	S	S	S	S	S	
AD-32	S	S	S	S	S	S	S	
AD-31	S	S	S	S	S	S	S	
AD-12	S	S	S	S	S	S	S	
B-2	U	U	U	S	S	U	S	-No label -No lock
AD-28	S	S	S	S	S	S	S	
AD-30	S	S	S	S	S	S	S	
AD-17	S	S	S	S	S	S	S	
AD-3	S	S	S	S	S	S	S	

**Instructions:** Complete form and submit to AEP Environmental Services with Field Data. Place check mark for items that are satisfactory. Unsatisfactory items should be left blank with a note in the comments section on what needs to be remedied.

## CCR Groundwater Monitoring Well Inspection Form

Facility: PIRNEY PP

Sampling Period: NOVEMBER 2022

Sampling Contractor: EAGLE

Signature: [Signature]

Well No.	Well Locked	Lock Functioning	Well Locked After Sampling	Access to Well Maintained	Well Casing, Housing, and Pad in Good Shape	Well Properly Labeled	Well cap present	Comments
AD-34	✓	✓	✓	✓		✓	✓	Hinge broken
AD-36	✓	✓	✓	✓	✓	✓	✓	
AD-8	✓	✓	✓	✓	✓	✓	✓	
AD-16	✓		✓	✓	✓	✓	✓	NFDS NEW LOCK
AD-22	✓	✓	✓	✓	✓	✓	✓	
AD-13	✓	✓	✓	✓	✓	✓	✓	
AD-7R	✓	✓	✓	✓	✓		✓	NO LABEL
AD-2	✓	✓	✓	✓	✓	✓	✓	
AD-33	✓	✓	✓	✓	✓	✓	✓	
B-3				✓	✓		✓	NO LOCK NOT LABELED
AD-18	✓	✓	✓		✓	✓	✓	NFDS MOWING + BRUSH CLEARING
AD-7	✓	✓	✓	✓	✓	✓	✓	

**Instructions:** Complete form and submit to AEP Environmental Services with Field Data. Place check mark for items that are satisfactory. Unsatisfactory items should be left blank with a note in the comments section on what needs to be remedied.

# CCR Groundwater Monitoring Well Inspection Form

Facility: PIANUM

Sampling Period: NOVEMBER 2022

Sampling Contractor: EAGLE

Signature: [Handwritten Signature]

Well No.	Well Locked	Lock Functioning	Well Locked After Sampling	Access to Well Maintained	Well Casing, Housing, and Pad in Good Shape	Well Properly Labeled	Well cap present	Comments
AD-4					✓	✓	✓	NEEDS WELL CAP

**Instructions:** Complete form and submit to AEP Environmental Services with Field Data. Place check mark for items that are satisfactory. Unsatisfactory items should be left blank with a note in the comments section on what needs to be remedied.

Facility Name	APP PIRAMON PP
Sample by	KERRY MCPONNELL

Sample Location ID	AD-2
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Depth to water, feet (TOC)	16.52
Measured Total Depth, feet (TOC)	40.36

Depth to water date	11/15/22
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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 ( $^{\circ}$ C)		
0948	16.71	210	3.97	581	2.4	3.97	280	15.52		
0953	16.76	210	3.96	592	1.8	2.54	276	16.28		
0958	16.83	210	3.96	594	1.7	2.46	276	16.39		
1003	16.87	210	3.96	595	1.3	2.49	275	16.47		

Total volume purged	
Sample appearance	clear
Sample time	1005
Sample date	11/15/22

Facility Name	
Sample by	P. Riley M. Hill H. Smith

Depth to water, feet (TOC)	34.45
Measured Total Depth, feet (TOC)	57.41

Sample Location ID	A1-3
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Depth to water date	11-16-20
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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 ( $^{\circ}\text{C}$ )		
1128	34.86	220	5.70	132	25.4	1.27	243	17.54		
1133	34.79	270	5.84	144	7.6	0.71	212	18.33		
1138	35.07	220	5.91	148	6.5	0.26	154	18.68		
1143	35.18	220	5.94	149	6.4	0.28	186	18.79		

Total volume purged	
Sample appearance	clear
Sample time	1145
Sample date	11-16-20



Facility Name	Air Pinhook PP
Sample by	Kenny McDonald

Sample Location ID	AD-4
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Depth to water, feet (TOC)	15.64
Measured Total Depth, feet (TOC)	47.29

Depth to water date	11/16/22
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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)		
1116	15.69	170	4.59	77	13.2	4.82	339	19.86		
1121	15.73	170	4.63	77	14.3	3.31	330	20.65		
1126	15.99	170	4.65	77	15.9	3.27	330	20.71		
1131	16.03	170	4.68	76	16.2	3.22	329	20.74		

Total volume purged	
Sample appearance	clear
Sample time	1133
Sample date	11/16/22

Facility Name	AEP Piramy PP
Sample by	Kenny McDonald

Sample Location ID	A0-7
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Depth to water, feet (TOC)	17.23
Measured Total Depth, feet (TOC)	41.98

Depth to water date	11/16/22
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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 ( $^{\circ}$ C)		
0853	17.82	160	3.66	424	4.2	3.62	367	16.82		
0858	17.91	160	3.67	424	2.7	2.09	372	17.46		
0903	17.98	160	3.64	427	3.2	2.03	369	17.51		
0908	18.03	160	3.62	429	5.6	1.97	366	17.57		

Total volume purged	
Sample appearance	Clear
Sample time	0910
Sample date	11/16/22

RA MS/MSO

Facility Name	AEP Pinnac AP
Sample by	Kenny McDuffie

Sample Location ID	AD-7R
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Depth to water, feet (TOC)	10.75
Measured Total Depth, feet (TOC)	33.03

Depth to water date	11/15/22
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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)		
0859	10.90	126	4.92	209	12.9	6.21	142	15.62		
0904	10.81	126	4.89	208	2.4	2.48	151	16.13		
0909	10.82	126	4.90	208	2.8	2.46	156	16.18		
0914	10.85	126	4.90	208	3.1	2.45	161	16.27		

Total volume purged	
Sample appearance	CLM
Sample time	0916
Sample date	11/15/22

Facility Name	AEP Pinnock PP
Sample by	Kenny McDermott

Sample Location ID	AD-8
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Depth to water, feet (TOC)	15.61
Measured Total Depth, feet (TOC)	31.33

Depth to water date	11/14/22
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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 ( $^{\circ}\text{C}$ )		
0956	15.63	168	4.43	310	8.2	3.84	322	19.07		
0955	15.64	168	4.44	312	7.6	2.13	331	19.19		
1000	15.64	168	4.43	314	7.4	2.09	333	19.22		
1005	15.66	168	4.46	323	6.9	2.14	333	19.26		

Total volume purged	
Sample appearance	clear
Sample time	100.7
Sample date	11/14/22

Facility Name	
Sample by	P. Hwang Mett Hamilton
Depth to water, feet (TOC)	18.53
Measured Total Depth, feet (TOC)	52.0

Sample Location ID	AD-12
Depth to water date	11-15-22

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)		
1036	18.98	300	4.38	72		2.46	72	17.14		
1041	19.57	300	4.56	67	12	1.88	328	19.00		
1046	20.21	300	4.66	67	33.8	1.83	223	19.17		
1051	20.52	300	4.71	67	2.2	1.82	318	19.25		
1056	20.93	300	4.73	66	30.0	1.80	320	19.28		

Total volume purged	
Sample appearance	clear
Sample time	1058
Sample date	11-15-22

MS/ASD

Facility Name	APP PIRACY PP
Sample by	KERRY McDONALD

Sample Location ID	AD-13
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Depth to water, feet (TOC)	14.83
Measured Total Depth, feet (TOC)	40.70

Depth to water date	11/15/22
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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 ( $^{\circ}$ C)		
0804	15.01	180	5.65	400	126	8.21	224	17.21		
0809	15.10	180	5.83	400	88.2	4.63	140	18.06		
0814	15.21	180	5.81	399	86.4	4.59	131	18.32		
0819	15.33	180	5.81	398	85.1	4.54	124	18.51		

Total volume purged	
Sample appearance	SLIGHTLY TURBID
Sample time	0821
Sample date	11/15/22

DUPLICATE-2  
 WG + METALS ONLY  
 1400

Facility Name	Pinkney PP
Sample by	Kenny McQuinn

Sample Location ID	AD-16
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Depth to water, feet (TOC)	18.40
Measured Total Depth, feet (TOC)	38.24

Depth to water date	11/14/22
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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 ( $^{\circ}$ C)		
1038	18.62	200	4.26	132	21.7	2.87	313	18.14		
1043	18.68	200	4.31	132	19.9	1.94	321	18.71		
1048	18.71	200	4.33	132	19.7	1.94	324	19.02		
1053	18.73	200	4.33	134	18.8	1.90	331	19.13		

Total volume purged	
Sample appearance	Clear
Sample time	1055
Sample date	11/14/22

Facility Name	
Sample by	Pillcoy Matt Hamilton
Depth to water, feet (TOC)	23.48
Measured Total Depth, feet (TOC)	33.05

Sample Location ID	AD-17
Depth to water date	11-16-22

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)		
1026	23.59	200	4.87	154	42.7	1.60	286	17.43		
1031	23.60	200	4.76	153	55.2	0.77	283	16.87		
1036	23.61	200	4.66	156	43.1	0.45	285	16.33		
1041	23.61	200	4.66	160	32.2	1.07	284	16.54		
1046	23.62	200	4.56	163	21.8	1.13	283	16.72		
1051	23.62	200	4.85	165	9.6	1.09	286	16.75		
1056	23.62	200	4.51	166	4.6	1.07	285	16.71		

Total volume purged	
Sample appearance	Clear
Sample time	1058
Sample date	11-16-22



Facility Name	AEP PIRAM3 PP
Sample by	Kenny McDonald

Sample Location ID	AD-18
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Depth to water, feet (TOC)	8.31
Measured Total Depth, feet (TOC)	28.42

Depth to water date	11/15/22
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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 ( $^{\circ}$ C)		
1201	9.27	110	4.37	55	16.5	3.87	332	15.50		
1206	10.42	110	4.46	52	8.2	2.19	331	16.97		

won't hold water level

Total volume purged	
Sample appearance	clear
Sample time	1013
Sample date	11/16/22

Facility Name	APPRIKOT PP
Sample by	Kenny McDermid

Sample Location ID	A0-22
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Depth to water, feet (TOC)	13.31
Measured Total Depth, feet (TOC)	32.70

Depth to water date	11/14/22
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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)		
1114	13.46	160	4.64	769	10.7	4.21	311	17.45		
1119	13.48	160	4.76	767	5.2	2.87	300	17.50		
1124	13.49	160	4.77	768	4.8	2.83	295	17.56		
1129	13.51	160	4.77	770	5.5	2.80	292	17.61		

Total volume purged	
Sample appearance	Clear
Sample time	113
Sample date	11/14/22

Facility Name		
Sample by	P. J. [unclear] Ment Hamilton	
Depth to water, feet (TOC)	3-38	
Measured Total Depth, feet (TOC)	38.20	

Sample Location ID	AD-23
Depth to water date	11-14-22

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)		
1034	30.61	220	4.77	500	28.8	7.15	160	10.06		
1039	30.63	220	4.32	151	376	6.30	218	13.75		
1044	30.64	220	4.38	104	212	5.17	224	14.62		
1049	30.65	220	4.43	87	204	4.58	228	14.80		
1054	30.65	220	4.46	79	201	3.92	231	14.94		
1059	30.65	220	4.40	71	204	3.81	233	15.07		

Total volume purged	
Sample appearance	turbid
Sample time	11:02
Sample date	11-14-22

Facility Name	
Sample by	P. Riley 19 Oct Hamilton
Depth to water, feet (TOC)	11.82
Measured Total Depth, feet (TOC)	27.38

Sample Location ID	AD-25
Depth to water date	11-14-27

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)
944	12.00	120	4.88	11040	12.6	7.04	172	11.41
949	12.08	120	5.01	11200	21.5	0.85	155	13.67
954	12.14	120	4.89	986	38.6	0.93	153	14.43
959	12.19	120	4.90	975	37.1	0.95	151	14.78
1004	12.23	120	4.91	971	37.8	0.97	150	14.87

Total volume purged	
Sample appearance	clear
Sample time	1006
Sample date	11-14-27

Facility Name \_\_\_\_\_  
 Sample by P. Key  
Michelle Hamilton

Depth to water, feet (TOC) \_\_\_\_\_  
 Measured Total Depth, feet (TOC) 16.43 42.76

Sample Location ID AD-26  
 Depth to water date 11-14-22

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)		
841	16.87	300	3.57	2,230	56.1	17.06	340	13.06		
852	17.02	300	3.78	2,230	31.8	1.83	274	14.78		
857	17.14	300	3.97	2,220	31.1	0.86	251	15.23		
902	17.22	300	3.98	2,220	31.2	0.70	243	15.06		
907	17.27	300	3.11	2,220	31.1	0.65	238	15.04		

Total volume purged \_\_\_\_\_  
 Sample appearance clear  
 Sample time 9:09  
 Sample date 11-14-22

Facility Name	
Sample by	P. Llew Matt Hemmley
Depth to water, feet (TOC)	24.14
Measured Total Depth, feet (TOC)	40.07

Sample Location ID	AD-27
Depth to water date	11-14-22

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)		
1122	24.34	300	3.71	159	52.1	7.57	165	11.03		
1127	24.44	300	3.66	214	47.8	3.43	310	13.26		
1132	24.48	300	3.81	215	29.2	2.26	303	<del>14.21</del> 14.21		
1137	24.51	300	4.02	225	9.8	1.05	211	14.40		
1142	24.56	300	4.04	226	9.9	0.87	287	14.48		
1147	24.60	300				0.82	285	14.55		

Total volume purged	
Sample appearance	clear
Sample time	1149
Sample date	11-14-22

Facility Name	Pirkey
Sample by	M.H. Hamlin

Depth to water, feet (TOC)	19.67
Measured Total Depth, feet (TOC)	38.55

Sample Location ID	AD-28
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Depth to water date	11-16-22
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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 ( $^{\circ}$ C)
826	20.02	220	4.54	95				
831	20.13	220	4.46	96	10.4	2.39	302	16.53
836	20.24	220	4.43	97	23.0	2.26	307	17.63
841	20.31	220	4.32	97	12.7	2.81	308	17.82
846	20.36	220	4.29	100	4.8	1.58	301	18.11
					4.9	1.52	310	18.16

Total volume purged	
Sample appearance	clear
Sample time	848
Sample date	11-16-22

Facility Name  
Sample by *Pirkey*  
*Matt Hamilton*

Depth to water, feet (TOC) *20.21*

Measured Total Depth, feet (TOC) *27.15*

Sample Location ID *AD-3a*

Depth to water date *11-16-22*

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)
<i>915</i>	<i>20.52</i>	<i>220</i>	<i>4.89</i>	<i>447</i>	<i>24.7</i>	<i>2.54</i>	<i>296</i>	<i>14.08</i>
<i>924</i>	<i>20.60</i>	<i>220</i>	<i>4.94</i>	<i>516</i>	<i>23.1</i>	<i>1.36</i>	<i>284</i>	<i>18.22</i>
<i>929</i>	<i>20.63</i>	<i>220</i>	<i>4.98</i>	<i>523</i>	<i>22.5</i>	<i>1.29</i>	<i>276</i>	<i>19.69</i>
<i>934</i>	<i>20.65</i>	<i>220</i>	<i>5.03</i>	<i>526</i>	<i>22.7</i>	<i>1.22</i>	<i>269</i>	<i>19.65</i>
<i>935</i>	<i>20.65</i>	<i>220</i>	<i>5.05</i>	<i>527</i>	<i>11.8</i>	<i>1.19</i>	<i>265</i>	<i>19.72</i>
<i>944</i>	<i>20.65</i>	<i>220</i>	<i>5.05</i>	<i>528</i>	<i>10.7</i>	<i>1.17</i>	<i>264</i>	<i>19.75</i>

Total volume purged

Sample appearance *clear*

Sample time *946*

Sample date *11-16-22*



Facility Name	
Sample by	Pillay Murt Hemidy

Depth to water, feet (TOC)	18.78
Measured Total Depth, feet (TOC)	37.32

Sample Location ID	AD-31
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Depth to water date	11-15-22
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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)		
930	19.03	220	3.95	407	12.7	3.51	361	12.13		
935	19.10	220	4.15	313	11.1	0.66	348	16.71		
940	19.12	220	4.24	307	65.9	0.46	338	17.67		
945	19.17	220	4.26	302	57.2	0.46	335	17.84		
950	19.13	220	4.27	307	40.6	0.46	333	17.67		
955	19.13	220	4.27	301	12.5	0.45	332	18.06		
1000	19.13	220	4.28	302	13.3	0.45	331	18.10		

Total volume purged	
Sample appearance	clear
Sample time	1002
Sample date	11-15-22

Facility Name	APP Pinnon PP
Sample by	R. L. M. Pinnon

Sample Location ID	AD-33
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Depth to water, feet (TOC)	14.94
Measured Total Depth, feet (TOC)	32.50

Depth to water date	11/15/22
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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)		
1049	15.00	192	3.97	171	5.6	5.12	312	18.95		
1054	15.01	192	3.97	166	4.8	3.27	306	18.97		
1059	15.01	192	3.98	164	4.3	3.24	302	18.96		
1104	15.02	192	3.96	163	4.5	3.20	297	18.95		

Total volume purged	
Sample appearance	CLM
Sample time	1106
Sample date	11/15/22

Facility Name	
Sample by	Pitney Nash Hamilton
Depth to water, feet (TOC)	11.18
Measured Total Depth, feet (TOC)	34.65

Sample Location ID	AD-32
Depth to water date	11-15-22

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 ( $^{\circ}\text{C}$ )
831	11.62	220	3.76	610	77.3	5.81	401	15.65
836	11.71	220	3.75	618	66.4	0.71	341	17.01
841	11.77	220	3.82	606	46.5	0.57	375	15.16
846	11.83	220	3.91	598	34.8	0.58	378	15.15
851	11.84	220	3.66	597	15.5	0.62	363	17.74
856	11.85	220	3.98	596	4.2	0.64	359	17.85
901	11.85	220	3.99	596	208	0.65	357	17.92

Total volume purged	
Sample appearance	clear
Sample time	903
Sample date	11-15-22

Facility Name	AEP PRIORITY PP
Sample by	Kenny McDonald

Sample Location ID	AD-34
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Depth to water, feet (TOC)	TOP OF CASING
Measured Total Depth, feet (TOC)	26.05

Depth to water date	11/14/22
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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)		
0802	0.61	124	3.63	1750	3.8	3.62	78	14.94		
0807	0.73	124	3.61	1730	6.1	2.55	98	15.37		
0812	0.88	124	3.59	1720	4.2	2.54	104	15.40		
0817	0.97	124	3.54	1690	4.5	2.51	106	15.44		

Total volume purged	
Sample appearance	CLEAR
Sample time	0819
Sample date	11/14/22

Facility Name	ATE PIER 17 PP
Sample by	KELLY McDONALD

Sample Location ID	AD-36
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Depth to water, feet (TOC)	7.85
Measured Total Depth, feet (TOC)	17.10

Depth to water date	11/14/22
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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 ( $^{\circ}$ C)		
0901	7.92	150	4.18	125	41.2	13.21	184	15.39		
0906	7.93	150	4.39	90	16.8	7.48	177	16.54		
0911	7.93	150	4.41	83	10.1	6.13	169	17.61		
0916	7.95	150	4.45	75	7.6	5.52	170	18.20		
0921	7.95	150	4.45	74	7.8	5.52	168	18.24		
0926	7.95	150	4.46	72	7.4	5.50	168	18.26		

Total volume purged	
Sample appearance	Clear
Sample time	0928
Sample date	11/14/22

LAND FILL DUPLICATE 11/05

Facility Name	
Sample by	P. Kelly N.H. Hamilton

Sample Location ID	B-2
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Depth to water, feet (TOC)	27.15
Measured Total Depth, feet (TOC)	51.44

Depth to water date	11-15-22
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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 ( $^{\circ}\text{C}$ )		
1141	27.58	300	5.68	113	41.9	2.11	266	17.77		
1146	27.66	300	5.87	125	42.0	0.83	197	18.54		
1151	27.61	300	5.89	124	42.2	0.56	155	18.45		

Total volume purged	
Sample appearance	clear
Sample time	1153
Sample date	11-15-22

Dap-1

1023

Facility Name	AEP PIRACY PP
Sample by	Kenny McDonald

Sample Location ID	B-3
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Depth to water, feet (TOC)	15.83
Measured Total Depth, feet (TOC)	37.49

Depth to water date	11/15/22
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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 ( $^{\circ}$ C)		
1216	16.71	108	4.99	227	11.4	4.11	335	15.82		
1221	17.93	108	5.03	216	6.1	2.97	314	16.04		

WOR T HOLD WATER UNTIL

Total volume purged	
Sample appearance	clear
Sample time	0803
Sample date	11/16/22

**APPENDIX 5- Analytical Laboratory Reports**





# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

**Job ID: 221004**

**Customer: Pirkey Power Station**

**Date Reported: 12/27/2022**

Customer Sample ID: AD-2

Customer Description:

Lab Number: 221004-001

Preparation:

Date Collected: 03/29/2022 12:25 EDT

Date Received: 03/31/2022 10:30 EDT

## 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	04/05/2022 15:40	EPA 300.1 -1997, Rev. 1.0
Chloride	31.4	mg/L	2	0.04	0.02		CRJ	04/05/2022 15:40	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.20	mg/L	2	0.06	0.02		CRJ	04/05/2022 15:40	EPA 300.1 -1997, Rev. 1.0
Sulfate	241	mg/L	10	2.0	0.3		CRJ	04/05/2022 15:14	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	03/31/2022 13:59	SM 2320B-2011
TDS, Filterable Residue	460	mg/L	1	50	20	L1	SDW	04/01/2022 15:09	SM 2540C-2011

Customer Sample ID: AD-3

Customer Description:

Lab Number: 221004-002

Preparation:

Date Collected: 03/29/2022 12:48 EDT

Date Received: 03/31/2022 10:30 EDT

## 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	04/05/2022 14:47	EPA 300.1 -1997, Rev. 1.0
Chloride	6.84	mg/L	2	0.04	0.02		CRJ	04/05/2022 14:47	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.21	mg/L	2	0.06	0.02		CRJ	04/05/2022 14:47	EPA 300.1 -1997, Rev. 1.0
Sulfate	34.0	mg/L	2	0.40	0.06		CRJ	04/05/2022 14:47	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	35	mg/L	1	20	5		MGK	03/31/2022 13:59	SM 2320B-2011
TDS, Filterable Residue	170	mg/L	1	50	20	L1	SDW	04/01/2022 15:15	SM 2540C-2011



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 221004

Customer: Pirkey Power Station

Date Reported: 12/27/2022

Customer Sample ID: AD-4	Customer Description:
Lab Number: 221004-003	Preparation:
Date Collected: 03/29/2022 13:16 EDT	Date Received: 03/31/2022 10:30 EDT

### 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	04/05/2022 16:33	EPA 300.1 -1997, Rev. 1.0
Chloride	3.80	mg/L	2	0.04	0.02		CRJ	04/05/2022 16:33	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.08	mg/L	2	0.06	0.02		CRJ	04/05/2022 16:33	EPA 300.1 -1997, Rev. 1.0
Sulfate	22.2	mg/L	2	0.40	0.06		CRJ	04/05/2022 16:33	EPA 300.1 -1997, Rev. 1.0

### Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	03/31/2022 13:59	SM 2320B-2011
TDS, Filterable Residue	140	mg/L	1	50	20	L1	SDW	04/01/2022 15:15	SM 2540C-2011

Customer Sample ID: AD-7	Customer Description:
Lab Number: 221004-004	Preparation:
Date Collected: 03/28/2022 12:50 EDT	Date Received: 03/31/2022 10:30 EDT

### Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	2.86	mg/L	2	0.10	0.02		CRJ	04/05/2022 18:19	EPA 300.1 -1997, Rev. 1.0
Chloride	40.8	mg/L	2	0.04	0.02		CRJ	04/05/2022 18:19	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.36	mg/L	2	0.06	0.02		CRJ	04/05/2022 18:19	EPA 300.1 -1997, Rev. 1.0
Sulfate	49.9	mg/L	2	0.40	0.06		CRJ	04/05/2022 18:19	EPA 300.1 -1997, Rev. 1.0

### Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	03/31/2022 13:59	SM 2320B-2011
TDS, Filterable Residue	230	mg/L	1	50	20	L1	SDW	04/01/2022 15:20	SM 2540C-2011



## Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 221004

Customer: Pirkey Power Station

Date Reported: 12/27/2022

Customer Sample ID: AD-12

Customer Description:

Lab Number: 221004-005

Preparation:

Date Collected: 03/28/2022 11:02 EDT

Date Received: 03/31/2022 10:30 EDT

### Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.05	mg/L	2	0.10	0.02	J1	CRJ	04/05/2022 18:45	EPA 300.1 -1997, Rev. 1.0
Chloride	6.10	mg/L	2	0.04	0.02		CRJ	04/05/2022 18:45	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.07	mg/L	2	0.06	0.02		CRJ	04/05/2022 18:45	EPA 300.1 -1997, Rev. 1.0
Sulfate	3.80	mg/L	2	0.40	0.06		CRJ	04/05/2022 18:45	EPA 300.1 -1997, Rev. 1.0

### Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	03/31/2022 13:59	SM 2320B-2011
TDS, Filterable Residue	60	mg/L	1	50	20	L1	SDW	04/01/2022 15:20	SM 2540C-2011

Customer Sample ID: AD-13

Customer Description:

Lab Number: 221004-006

Preparation:

Date Collected: 03/28/2022 09:38 EDT

Date Received: 03/31/2022 10:30 EDT

### 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	04/05/2022 17:26	EPA 300.1 -1997, Rev. 1.0
Chloride	46.5	mg/L	10	0.2	0.1		CRJ	04/05/2022 17:00	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.34	mg/L	2	0.06	0.02		CRJ	04/05/2022 17:26	EPA 300.1 -1997, Rev. 1.0
Sulfate	79.2	mg/L	2	0.40	0.06		CRJ	04/05/2022 17:26	EPA 300.1 -1997, Rev. 1.0

### Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	03/31/2022 13:59	SM 2320B-2011
TDS, Filterable Residue	230	mg/L	1	50	20	L1	SDW	04/01/2022 15:21	SM 2540C-2011



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 221004

Customer: Pirkey Power Station

Date Reported: 12/27/2022

Customer Sample ID: AD-17

Customer Description:

Lab Number: 221004-007

Preparation:

Date Collected: 03/29/2022 11:25 EDT

Date Received: 03/31/2022 10:30 EDT

## 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	04/05/2022 21:24	EPA 300.1 -1997, Rev. 1.0
Chloride	16.2	mg/L	2	0.04	0.02		CRJ	04/05/2022 21:24	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.26	mg/L	2	0.06	0.02		CRJ	04/05/2022 21:24	EPA 300.1 -1997, Rev. 1.0
Sulfate	6.77	mg/L	2	0.40	0.06		CRJ	04/05/2022 21:24	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	03/31/2022 13:59	SM 2320B-2011
TDS, Filterable Residue	60	mg/L	1	50	20	L1	SDW	04/01/2022 15:21	SM 2540C-2011

Customer Sample ID: AD-18

Customer Description:

Lab Number: 221004-008

Preparation:

Date Collected: 03/29/2022 10:36 EDT

Date Received: 03/31/2022 10:30 EDT

## 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	04/05/2022 23:10	EPA 300.1 -1997, Rev. 1.0
Chloride	5.26	mg/L	2	0.04	0.02		CRJ	04/05/2022 23:10	EPA 300.1 -1997, Rev. 1.0
Fluoride	<0.02	mg/L	2	0.06	0.02	U1	CRJ	04/05/2022 23:10	EPA 300.1 -1997, Rev. 1.0
Sulfate	7.31	mg/L	2	0.40	0.06		CRJ	04/05/2022 23:10	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	03/31/2022 13:59	SM 2320B-2011
TDS, Filterable Residue	140	mg/L	1	50	20	L1	SDW	04/01/2022 15:26	SM 2540C-2011



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 221004

Customer: Pirkey Power Station

Date Reported: 12/27/2022

Customer Sample ID: AD-22

Customer Description:

Lab Number: 221004-009

Preparation:

Date Collected: 03/28/2022 10:35 EDT

Date Received: 03/31/2022 10:30 EDT

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.42	mg/L	2	0.10	0.02		CRJ	04/05/2022 22:17	EPA 300.1 -1997, Rev. 1.0
Chloride	88.8	mg/L	10	0.2	0.1		CRJ	04/05/2022 21:50	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.96	mg/L	2	0.06	0.02		CRJ	04/05/2022 22:17	EPA 300.1 -1997, Rev. 1.0
Sulfate	385	mg/L	10	2.0	0.3		CRJ	04/05/2022 21:50	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	03/31/2022 13:59	SM 2320B-2011
TDS, Filterable Residue	720	mg/L	2	100	40	L1	SDW	04/01/2022 15:26	SM 2540C-2011

Customer Sample ID: AD-28

Customer Description:

Lab Number: 221004-010

Preparation:

Date Collected: 03/29/2022 11:34 EDT

Date Received: 03/31/2022 10:30 EDT

## 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	04/06/2022 00:55	EPA 300.1 -1997, Rev. 1.0
Chloride	5.07	mg/L	2	0.04	0.02		CRJ	04/06/2022 00:55	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.68	mg/L	2	0.06	0.02		CRJ	04/06/2022 00:55	EPA 300.1 -1997, Rev. 1.0
Sulfate	28.9	mg/L	2	0.40	0.06		CRJ	04/06/2022 00:55	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	03/31/2022 13:59	SM 2320B-2011
TDS, Filterable Residue	100	mg/L	1	50	20	L1	SDW	04/01/2022 15:38	SM 2540C-2011



## Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 221004

Customer: Pirkey Power Station

Date Reported: 12/27/2022

Customer Sample ID: AD-30

Customer Description:

Lab Number: 221004-011

Preparation:

Date Collected: 03/28/2022 13:51 EDT

Date Received: 03/31/2022 10:30 EDT

### 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	04/06/2022 00:03	EPA 300.1 -1997, Rev. 1.0
Chloride	29.5	mg/L	2	0.04	0.02		CRJ	04/06/2022 00:03	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.07	mg/L	2	0.06	0.02		CRJ	04/06/2022 00:03	EPA 300.1 -1997, Rev. 1.0
Sulfate	170	mg/L	10	2.0	0.3		CRJ	04/05/2022 23:36	EPA 300.1 -1997, Rev. 1.0

### Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	P1, U1	MGK	03/31/2022 13:59	SM 2320B-2011
TDS, Filterable Residue	330	mg/L	1	50	20	L1	SDW	04/01/2022 15:38	SM 2540C-2011

Customer Sample ID: AD-31

Customer Description:

Lab Number: 221004-012

Preparation:

Date Collected: 03/28/2022 13:04 EDT

Date Received: 03/31/2022 10:30 EDT

### Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.29	mg/L	2	0.10	0.02		CRJ	04/06/2022 01:22	EPA 300.1 -1997, Rev. 1.0
Chloride	21.8	mg/L	2	0.04	0.02		CRJ	04/06/2022 01:22	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.13	mg/L	2	0.06	0.02		CRJ	04/06/2022 01:22	EPA 300.1 -1997, Rev. 1.0
Sulfate	80.8	mg/L	2	0.40	0.06		CRJ	04/06/2022 01:22	EPA 300.1 -1997, Rev. 1.0

### Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	03/31/2022 13:59	SM 2320B-2011
TDS, Filterable Residue	260	mg/L	1	50	20	L1	SDW	04/01/2022 15:45	SM 2540C-2011



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 221004

Customer: Pirkey Power Station

Date Reported: 12/27/2022

Customer Sample ID: AD-32

Customer Description:

Lab Number: 221004-013

Preparation:

Date Collected: 03/28/2022 12:07 EDT

Date Received: 03/31/2022 10:30 EDT

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	3.87	mg/L	2	0.10	0.02		CRJ	04/06/2022 04:53	EPA 300.1 -1997, Rev. 1.0
Chloride	25.2	mg/L	2	0.04	0.02		CRJ	04/06/2022 04:53	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.44	mg/L	2	0.06	0.02		CRJ	04/06/2022 04:53	EPA 300.1 -1997, Rev. 1.0
Sulfate	157	mg/L	25	5.0	0.8		CRJ	04/06/2022 04:27	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	03/31/2022 13:59	SM 2320B-2011
TDS, Filterable Residue	330	mg/L	1	50	20	L1	SDW	04/01/2022 15:45	SM 2540C-2011

Customer Sample ID: AD-33

Customer Description:

Lab Number: 221004-014

Preparation:

Date Collected: 03/28/2022 11:54 EDT

Date Received: 03/31/2022 10:30 EDT

## 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	04/06/2022 05:46	EPA 300.1 -1997, Rev. 1.0
Chloride	8.88	mg/L	2	0.04	0.02		CRJ	04/06/2022 05:46	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.30	mg/L	2	0.06	0.02		CRJ	04/06/2022 05:46	EPA 300.1 -1997, Rev. 1.0
Sulfate	67.0	mg/L	2	0.40	0.06		CRJ	04/06/2022 05:46	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	03/31/2022 13:59	SM 2320B-2011
TDS, Filterable Residue	190	mg/L	1	50	20	L1	SDW	04/01/2022 15:50	SM 2540C-2011



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

**Job ID: 221004**

**Customer: Pirkey Power Station**

**Date Reported: 12/27/2022**

Customer Sample ID: Duplicate 1

Customer Description:

Lab Number: 221004-015

Preparation:

Date Collected: 03/28/2022 13:00 EDT

Date Received: 03/31/2022 10:30 EDT

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.42	mg/L	2	0.10	0.02		CRJ	04/05/2022 13:55	EPA 300.1 -1997, Rev. 1.0
Chloride	88.0	mg/L	10	0.2	0.1		CRJ	04/06/2022 04:00	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.94	mg/L	2	0.06	0.02		CRJ	04/05/2022 13:55	EPA 300.1 -1997, Rev. 1.0
Sulfate	381	mg/L	10	2.0	0.3		CRJ	04/06/2022 04:00	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	03/31/2022 13:59	SM 2320B-2011
TDS, Filterable Residue	720	mg/L	1	50	20	L1	SDW	04/01/2022 15:50	SM 2540C-2011

Customer Sample ID: Duplicate 2

Customer Description:

Lab Number: 221004-016

Preparation:

Date Collected: 03/29/2022 11:55 EDT

Date Received: 03/31/2022 10:30 EDT

## 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	04/05/2022 13:28	EPA 300.1 -1997, Rev. 1.0
Chloride	5.02	mg/L	2	0.04	0.02		CRJ	04/05/2022 13:28	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.64	mg/L	2	0.06	0.02		CRJ	04/05/2022 13:28	EPA 300.1 -1997, Rev. 1.0
Sulfate	29.1	mg/L	2	0.40	0.06		CRJ	04/05/2022 13:28	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	03/31/2022 13:59	SM 2320B-2011
TDS, Filterable Residue	110	mg/L	1	50	20	L1	SDW	04/01/2022 16:23	SM 2540C-2011

**221004**

Job Comments:

Original report issued 5/11/2022. Report reissued with amended Matrix Spike precision calculations.





## Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 221004

Customer: Pirkey Power Station

Date Reported: 12/27/2022

### 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. ALL TIMES LISTED ARE IN THE EASTERN TIME ZONE.**

### Data Qualifier Legend

**U1** - Not detected at or above method detection limit (MDL).

**L1** - The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.

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

**P1** - The precision between duplicate results was above acceptance limits.

**Dolan Chemical Laboratory (DCL)**  
 4001 Bizby Road  
 Groveport, Ohio 43125  
 Jonathan Barmhill (318-673-3803)  
 Contacts: Michael Ohlinger (614-838-4184)

Project Name: Pirkey - CCR  
 Contact Name: Leslie Fuerschbach  
 Contact Phone: 318-423-3805

Sampler(s): Matt Hamilton Kenny McDonald

## Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Site Contact:

Date:

For Lab Use Only:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	# of Cont.	Analysis Turnaround Time (in Calendar Days)				Sample Specific Notes									
					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 10hr) 1 L bottles, pH<2, HNO <sub>3</sub>		Hg	Hg							
AD-2	3/29/2022	1125	G	1	B, Ca, Li, Sb, As, Ba, Mo, Se, Ti, Sr	B, Ca, Li, Sb, As, Ba, Mo, Se, Ti, Sr	B, Cd, Cr, Co, Fe, Mn, Mo, Pb, Se, Ti, Sr	and Na, K, Mg, Sr										
AD-3	3/29/2022	1148	G	1														
AD-4	3/29/2022	1216	G	1														
AD-7	3/28/2022	1150	G	1														
AD-12	3/28/2022	1002	G	1														
AD-13	3/28/2022	838	G	1														
AD-17	3/29/2022	1025	G	1														
AD-18	3/29/2022	936	G	1														
AD-22	3/28/2022	935	G	1														
AD-28	3/29/2022	1034	G	1														
AD-30	3/28/2022	1251	G	1														

221004

COC/Order #:

Preservation Used: 1= Ice, 2= HCl; 3= H<sub>2</sub>SO<sub>4</sub>; 4=HNO<sub>3</sub>; 5=NaOH; 6= Other  
 \* Six 1L Bottles must be collected for Radium for every 10th sample.

Special Instructions/QC Requirements & Comments:

TG-32

Relinquished by: <i>[Signature]</i>	Company: <i>Engle</i>	Date/Time: 1300	Received by:
Relinquished by:	Company:	Date/Time: 3-30-22	Received by:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: <i>[Signature]</i>
		Date/Time:	Date/Time: 3/31/22
		Date/Time:	Date/Time: 10:15AM

# Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Dolan Chemical Laboratory (DCL)  
 4001 Bixby Road  
 Groveport, Ohio 43125  
 Contacts: Michael Ohlinger (614-836-4184)

Project Name: Pirkey - CCR  
 Contact Name: Leslie Fuerschbach  
 Contact Phone: 318-423-3805

Sampler(s): Matt Hamilton Kenny McDonald

Analysis Turnaround Time (in Calendar Days)

Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.
3/28/2022	1204	G	GW	1
3/28/2022	1107	G	GW	1
3/28/2022	1054	G	GW	1
3/28/2022	1200	G	GW	1
3/29/2022	1055	G	GW	1

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>	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	COC/Order #	For Lab Use Only:
AD-31	3/28/2022	1204	G	GW	1		Ba, Cd, Cr, Co, Pb, Mn, Mo, Ni, Sb, As, Ba, and Na, K, Mg, Sr	Ba, Cd, Cr, Co, Fe, Mn, Mo, Ni, Sb, As, Ba, and Na, K, Mg, Sr	TDS, F, Cl, SO <sub>4</sub> , Br, and Alkalinity	Ra-226, Ra-228	Hg	Hg		
AD-32	3/28/2022	1107	G	GW	1									
AD-33	3/28/2022	1054	G	GW	1									
DUPLICATE 1	3/28/2022	1200	G	GW	1									
DUPLICATE 2	3/29/2022	1055	G	GW	1									

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:

TG-32

Relinquished by: <i>[Signature]</i>	Company: <i>Feste</i>	Date/Time: 3-30-22 1300	Received by: <i>[Signature]</i>	Date/Time: 3/31/22 10:15 AM
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: <i>[Signature]</i>	Date/Time: 3/31/22 10:15 AM



# WATER & WASTE SAMPLE RECEIPT FORM (IR#1)

Package Type				Delivery Type			
<input checked="" type="radio"/> Cooler	<input type="radio"/> Box	<input type="radio"/> Bag	<input type="radio"/> Envelope	<input type="radio"/> PONY	<input checked="" type="radio"/> UPS	<input type="radio"/> FedEx	<input type="radio"/> USPS
				Other _____			
Plant/Customer <u>Piney</u>				Number of Plastic Containers: <u>16</u>			
Opened By <u>MGK</u>				Number of Glass Containers: <u>—</u>			
Date/Time <u>3/31/22 10:15 AM</u>				Number of Mercury Containers: <u>—</u>			
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 (IR Gun Ser# 210441568, Expir. 5/27/2023) - 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>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 CDC 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

pH paper (circle one): MQuant pH Cat 1.09535.0001 lot HC904495 IQR: Lab rat pH Cat # LRS -4801 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# 221004 Initial & Date & Time: \_\_\_\_\_

Logged by MSB Comments: waiting JAS 3/31/22 Emerson

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.

# Alkalinity Laboratory Review Checklist

## Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

**Release Statement:** I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

**Check, if applicable:**  This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Michael Ohlinger      Michael Ohlinger      Chemist      4/11/22  
Name (printed)      Signature      Official Title      Date

## Alkalinity Laboratory Review Checklist

**Table 1. Reportable Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey - CCR  
**Reviewer Name:** Michael Ohlinger  
**LRC Date:** 4/11/22  
**Laboratory Job Number:** 221004  
**Prep Batch Number(s):** QC2204008

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
R1	O, I	<b>Chain-of-custody (COC)</b>		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	<b>Sample and quality control (QC) identification</b>		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	<b>Test reports</b>		
	I	Were all samples prepared and analyzed within holding times?		
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	<b>Surrogate recovery data</b>		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	<b>Test reports/summary forms for blank samples</b>		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

## Alkalinity Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?		
R6	O, I	<b>Laboratory control samples (LCS):</b>		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?		
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?		
R7	O, I	<b>Matrix spike (MS) and matrix spike duplicate (MSD) data</b>		
	I	Were the project/method specified analytes included in the MS and MSD?	NA	
	I	Were MS/MSD analyzed at the appropriate frequency?	NA	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NA	
	I	Were MS/MSD RPDs within laboratory QC limits?	NA	
R8	O, I	<b>Analytical duplicate data</b>		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	No	ER2
R9	O, I	<b>Method quantitation limits (MQLs):</b>		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	<b>Other problems/anomalies</b>		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

## Alkalinity Laboratory Review Checklist

**Table 2. Supporting Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey - CCR  
**Reviewer Name:** Michael Ohlinger  
**LRC Date:** 4/11/22  
**Laboratory Job Number:** 221004  
**Prep Batch Number(s):** QC2204008

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S1	O, I	<b>Initial calibration (ICAL)</b>		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	NA	
	I	Was the number of standards recommended in the method used for all analytes?	NA	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?		
	I	Are ICAL data available for all instruments used?	NA	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	NA	
S2	O, I	<b>Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):</b>		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER1
S3	O	<b>Mass spectral tuning:</b>		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	<b>Internal standards (IS):</b>		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	<b>Raw data (NELAC section 1 appendix A glossary, and section 5.)</b>		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	



## Alkalinity Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	O	<b>Dual column confirmation</b>		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	<b>Tentatively identified compounds (TICs):</b>		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	<b>Interference Check Sample (ICS) results:</b>		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	<b>Serial dilutions, post digestion spikes, and method of standard additions</b>		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	<b>Method detection limit (MDL) studies</b>		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	<b>Proficiency test reports:</b>		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	<b>Standards documentation</b>		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	<b>Compound/analyte identification procedures</b>		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	<b>Demonstration of analyst competency (DOC)</b>		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	<b>Verification/validation documentation for methods (NELAC Chap 5n 5)</b>		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	<b>Laboratory standard operating procedures (SOPs):</b>		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

## Alkalinity Laboratory Review Checklist

**Table 3. Exception Reports.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey - CCR  
**Reviewer Name:** Michael Ohlinger  
**LRC Date:** 4/11/22  
**Laboratory Job Number:** 221004  
**Prep Batch Number(s):** QC2204008

<b>Exception Report No.</b>	<b>Description</b>
ER1	CCB acceptance criteria is CCB<0.5*ML.
ER2	The duplicate result is above the acceptance criteria.

---

<sup>1</sup> Items identified by the letter “R” must be available as a hard copy or as a .pdf file. Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period.  
<sup>2</sup> O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).  
<sup>3</sup> NA - Not applicable; NR - Not reviewed.  
<sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is “No” or “NR.”

# Ion Chromatography Laboratory Review Checklist

## Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

**Release Statement:** I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

**Check, if applicable:**  This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Tim E. Arnold  
Name (printed)

  
Signature

Principal Chemist  
Official Title

4/11/22  
Date

## Ion Chromatography Laboratory Review Checklist

**Table 1. Reportable Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey - CCR  
**Reviewer Name:** Tim Arnold  
**LRC Date:** 4/11/2022  
**Laboratory Job Number:** 221004  
**Prep Batch Number(s):** QC2204049

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
R1	O, I	<b>Chain-of-custody (COC)</b>		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	<b>Sample and quality control (QC) identification</b>		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	<b>Test reports</b>		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	Yes	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	<b>Surrogate recovery data</b>		
	I	Were surrogates added prior to extraction?	Yes	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	Yes	
R5	O, I	<b>Test reports/summary forms for blank samples</b>		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

## Ion Chromatography Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	<b>Laboratory control samples (LCS):</b>		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	<b>Matrix spike (MS) and matrix spike duplicate (MSD) data</b>		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	<b>Analytical duplicate data</b>		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	<b>Method quantitation limits (MQLs):</b>		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	<b>Other problems/anomalies</b>		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

## Ion Chromatography Laboratory Review Checklist

**Table 2. Supporting Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey - CCR  
**Reviewer Name:** Tim Arnold  
**LRC Date:** 4/11/2022  
**Laboratory Job Number:** 221004  
**Prep Batch Number(s):** QC2204049

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S1	O, I	<b>Initial calibration (ICAL)</b>		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	Yes	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	<b>Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):</b>		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER1
S3	O	<b>Mass spectral tuning:</b>		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	<b>Internal standards (IS):</b>		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	<b>Raw data (NELAC section 1 appendix A glossary, and section 5.)</b>		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

## Ion Chromatography Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	O	<b>Dual column confirmation</b>		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	<b>Tentatively identified compounds (TICs):</b>		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	<b>Interference Check Sample (ICS) results:</b>		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	<b>Serial dilutions, post digestion spikes, and method of standard additions</b>		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	<b>Method detection limit (MDL) studies</b>		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	<b>Proficiency test reports:</b>		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	<b>Standards documentation</b>		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	<b>Compound/analyte identification procedures</b>		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	<b>Demonstration of analyst competency (DOC)</b>		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	<b>Verification/validation documentation for methods (NELAC Chap 5n 5)</b>		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	<b>Laboratory standard operating procedures (SOPs):</b>		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

## Ion Chromatography Laboratory Review Checklist

### Table 3. Exception Reports.

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory

**Project Name:** Pirkey - CCR

**Reviewer Name:** Tim Arnold

**LRC Date:** 4/11/2022

**Laboratory Job Number:** 221004

**Prep Batch Number(s):** QC2204049

<b>Exception Report No.</b>	<b>Description</b>
ER1	CCB acceptance criteria is CCB<MQL.

<sup>1</sup> Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.

<sup>2</sup> O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

<sup>3</sup> NA - Not applicable; NR - Not reviewed.

<sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."





# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-2

Customer Description:

Lab Number: 221028-001

Preparation:

Date Collected: 03/29/2022 12:25 EDT

Date Received: 04/01/2022 12:20 EDT

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.04	µg/L	2	0.20	0.04	U1	GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Arsenic	0.82	µg/L	2	0.20	0.06		GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Barium	18.2	µg/L	2	0.4	0.1		GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Beryllium	0.75	µg/L	2	0.10	0.01		GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Boron	3.02	mg/L	2	0.10	0.02		GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Cadmium	0.102	µg/L	2	0.040	0.008		GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Calcium	3.13	mg/L	2	0.10	0.04		GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Chromium	0.90	µg/L	2	0.40	0.08		GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Cobalt	22.7	µg/L	2	0.040	0.006		GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Lead	0.5	µg/L	2	0.4	0.1		GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Lithium	0.0653	mg/L	2	0.0004	0.0001		GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Magnesium	6.51	mg/L	2	0.20	0.04		GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Mercury	92	ng/L	2	10	4		JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.2	µg/L	2	1.0	0.2	U1	GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Potassium	1.36	mg/L	2	0.20	0.04		GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Selenium	2.7	µg/L	2	1.0	0.2		GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Sodium	103	mg/L	2	0.4	0.1	M1	GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Strontium	0.0455	mg/L	2	0.0040	0.0008		GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4
Thallium	0.10	µg/L	2	0.40	0.08	J1	GES	04/14/2022 19:02	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.57	pCi/L	0.12	0.15		ST	04/12/2022 10:28	SW-846 9315-1986, Rev. 0
Carrier Recovery	92.3	%						
Radium-228	1.19	pCi/L	0.18	0.54		TTP	04/08/2022 13:57	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	88.3	%						

\* 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

**Reissued**

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-2

Customer Description:

Lab Number: 221028-001-01

Preparation: Dissolved

Date Collected: 03/29/2022 12:25 EDT

Date Received: 04/01/2022 12:20 EDT

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.04	µg/L	2	0.20	0.04	U1	GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Arsenic	0.81	µg/L	2	0.20	0.06		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Barium	18.4	µg/L	2	0.4	0.1		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Beryllium	0.73	µg/L	2	0.10	0.01		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Boron	3.09	mg/L	2	0.10	0.02		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Cadmium	0.097	µg/L	2	0.040	0.008		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Calcium	3.13	mg/L	2	0.10	0.04		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Chromium	1.30	µg/L	2	0.40	0.08		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Cobalt	22.7	µg/L	2	0.040	0.006		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Iron	0.07	mg/L	2	0.04	0.01		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Lead	0.5	µg/L	2	0.4	0.1		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Lithium	0.0649	mg/L	2	0.0004	0.0001		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Magnesium	6.46	mg/L	2	0.20	0.04		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Manganese	0.0859	mg/L	2	0.0020	0.0004		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.2	µg/L	2	1.0	0.2	U1	GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Potassium	1.35	mg/L	2	0.20	0.04		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Selenium	2.6	µg/L	2	1.0	0.2		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Sodium	103	mg/L	2	0.4	0.1		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Strontium	0.0455	mg/L	2	0.0040	0.0008		GES	04/14/2022 19:18	EPA 200.8-1994, Rev. 5.4
Thallium	0.13	µg/L	2	0.40	0.08	J1	GES	04/14/2022 19:18	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

**Reissued**

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-3

Customer Description:

Lab Number: 221028-002

Preparation:

Date Collected: 03/29/2022 12:48 EDT

Date Received: 04/01/2022 12:20 EDT

## 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	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Arsenic	1.51	µg/L	1	0.10	0.03		GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Barium	68.3	µg/L	1	0.20	0.05		GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Beryllium	0.163	µg/L	1	0.050	0.007		GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Boron	0.059	mg/L	1	0.050	0.009		GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Cadmium	0.012	µg/L	1	0.020	0.004	J1	GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Calcium	6.09	mg/L	1	0.05	0.02		GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Chromium	0.40	µg/L	1	0.20	0.04		GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Cobalt	7.88	µg/L	1	0.020	0.003		GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Lead	0.28	µg/L	1	0.20	0.05		GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Lithium	0.0934	mg/L	1	0.00020	0.00005		GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Magnesium	4.69	mg/L	1	0.10	0.02		GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Potassium	3.60	mg/L	1	0.10	0.02		GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Sodium	13.2	mg/L	1	0.20	0.05		GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Strontium	0.0434	mg/L	1	0.0020	0.0004		GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4
Thallium	0.04	µg/L	1	0.20	0.04	J1	GES	04/14/2022 18:21	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.59	pCi/L	0.12	0.14		ST	04/12/2022 10:28	SW-846 9315-1986, Rev. 0
Carrier Recovery	95.2	%						
Radium-228	1.32	pCi/L	0.18	0.54		TTP	04/08/2022 13:57	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	76.9	%						

\* 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

**Reissued**

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-3

Customer Description:

Lab Number: 221028-002-01

Preparation: Dissolved

Date Collected: 03/29/2022 12:48 EDT

Date Received: 04/01/2022 12:20 EDT

## 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	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Arsenic	0.98	µg/L	1	0.10	0.03		GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Barium	65.0	µg/L	1	0.20	0.05		GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Beryllium	0.124	µg/L	1	0.050	0.007		GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Boron	0.053	mg/L	1	0.050	0.009		GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Cadmium	0.014	µg/L	1	0.020	0.004	J1	GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Calcium	6.04	mg/L	1	0.05	0.02		GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Chromium	0.39	µg/L	1	0.20	0.04		GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Cobalt	7.81	µg/L	1	0.020	0.003		GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Iron	10.1	mg/L	1	0.020	0.006		GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Lithium	0.0934	mg/L	1	0.00020	0.00005		GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Magnesium	4.67	mg/L	1	0.10	0.02		GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Manganese	0.119	mg/L	1	0.0010	0.0002		GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Potassium	3.61	mg/L	1	0.10	0.02		GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Sodium	13.1	mg/L	1	0.20	0.05		GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Strontium	0.0420	mg/L	1	0.0020	0.0004		GES	04/14/2022 18:26	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	04/14/2022 18:26	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

**Reissued**

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-4

Customer Description:

Lab Number: 221028-003

Preparation:

Date Collected: 03/29/2022 13:16 EDT

Date Received: 04/01/2022 12:20 EDT

## 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	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Arsenic	1.10	µg/L	1	0.10	0.03		GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Barium	93.2	µg/L	1	0.20	0.05		GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Beryllium	0.641	µg/L	1	0.050	0.007		GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Boron	0.019	mg/L	1	0.050	0.009	J1	GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Cadmium	0.010	µg/L	1	0.020	0.004	J1	GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Calcium	1.84	mg/L	1	0.05	0.02		GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Chromium	0.31	µg/L	1	0.20	0.04		GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Cobalt	6.16	µg/L	1	0.020	0.003		GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Lead	0.07	µg/L	1	0.20	0.05	J1	GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Lithium	0.0383	mg/L	1	0.00020	0.00005		GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Magnesium	1.24	mg/L	1	0.10	0.02		GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Mercury	17	ng/L	1	5	2		JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Potassium	2.51	mg/L	1	0.10	0.02		GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Sodium	9.25	mg/L	1	0.20	0.05		GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Strontium	0.0160	mg/L	1	0.0020	0.0004		GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4
Thallium	0.07	µg/L	1	0.20	0.04	J1	GES	04/14/2022 18:31	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.54	pCi/L	0.12	0.17		ST	04/12/2022 10:28	SW-846 9315-1986, Rev. 0
Carrier Recovery	89.7	%						
Radium-228	0.61	pCi/L	0.18	0.60		TTP	04/08/2022 13:57	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	90.9	%						

\* 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

**Reissued**

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-4

Customer Description:

Lab Number: 221028-003-01

Preparation: Dissolved

Date Collected: 03/29/2022 13:16 EDT

Date Received: 04/01/2022 12:20 EDT

## 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	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Barium	94.9	µg/L	1	0.20	0.05		GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Beryllium	0.629	µg/L	1	0.050	0.007		GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Boron	0.019	mg/L	1	0.050	0.009	J1	GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Cadmium	0.011	µg/L	1	0.020	0.004	J1	GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Calcium	1.88	mg/L	1	0.05	0.02		GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Chromium	0.27	µg/L	1	0.20	0.04		GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Cobalt	6.29	µg/L	1	0.020	0.003		GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Iron	0.148	mg/L	1	0.020	0.006		GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Lithium	0.0391	mg/L	1	0.00020	0.00005		GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Magnesium	1.29	mg/L	1	0.10	0.02		GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Manganese	0.0570	mg/L	1	0.0010	0.0002		GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Potassium	2.52	mg/L	1	0.10	0.02		GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Sodium	9.36	mg/L	1	0.20	0.05		GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Strontium	0.0162	mg/L	1	0.0020	0.0004		GES	04/14/2022 18:37	EPA 200.8-1994, Rev. 5.4
Thallium	0.07	µg/L	1	0.20	0.04	J1	GES	04/14/2022 18:37	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

**Reissued**

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-7

Customer Description:

Lab Number: 221028-004

Preparation:

Date Collected: 03/28/2022 12:50 EDT

Date Received: 04/01/2022 12:20 EDT

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.04	µg/L	2	0.20	0.04	U1	GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Arsenic	1.08	µg/L	2	0.20	0.06		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Barium	58.8	µg/L	2	0.4	0.1		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Beryllium	5.59	µg/L	2	0.10	0.01		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Boron	3.78	mg/L	2	0.10	0.02		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Cadmium	0.998	µg/L	2	0.040	0.008		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Calcium	4.33	mg/L	2	0.10	0.04		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Chromium	4.78	µg/L	2	0.40	0.08		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Cobalt	33.6	µg/L	2	0.040	0.006		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Lead	0.8	µg/L	2	0.4	0.1		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Lithium	0.0967	mg/L	2	0.0004	0.0001		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Magnesium	7.54	mg/L	2	0.20	0.04		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Mercury	400	ng/L	100	500	200	J1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.2	µg/L	2	1.0	0.2	U1	GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Potassium	2.80	mg/L	2	0.20	0.04		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Selenium	3.5	µg/L	2	1.0	0.2		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Sodium	18.3	mg/L	2	0.4	0.1		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Strontium	0.0561	mg/L	2	0.0040	0.0008		GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4
Thallium	0.20	µg/L	2	0.40	0.08	J1	GES	04/14/2022 19:23	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.15	pCi/L	0.19	0.18		ST	04/12/2022 10:28	SW-846 9315-1986, Rev. 0
Carrier Recovery	80.7	%						
Radium-228	3.44	pCi/L	0.24	0.70		TTP	04/08/2022 13:57	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

**Reissued**

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-7

Customer Description:

Lab Number: 221028-004-01

Preparation: Dissolved

Date Collected: 03/28/2022 12:50 EDT

Date Received: 04/01/2022 12:20 EDT

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.04	µg/L	2	0.20	0.04	U1	GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Arsenic	1.05	µg/L	2	0.20	0.06		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Barium	59.2	µg/L	2	0.4	0.1		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Beryllium	5.56	µg/L	2	0.10	0.01		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Boron	3.76	mg/L	2	0.10	0.02		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Cadmium	0.994	µg/L	2	0.040	0.008		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Calcium	4.38	mg/L	2	0.10	0.04		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Chromium	2.35	µg/L	2	0.40	0.08		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Cobalt	33.7	µg/L	2	0.040	0.006		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Iron	0.09	mg/L	2	0.04	0.01		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Lead	0.8	µg/L	2	0.4	0.1		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Lithium	0.0956	mg/L	2	0.0004	0.0001		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Magnesium	7.62	mg/L	2	0.20	0.04		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Manganese	0.0952	mg/L	2	0.0020	0.0004		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Mercury	30	ng/L	10	50	20	J1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.2	µg/L	2	1.0	0.2	U1	GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Potassium	2.79	mg/L	2	0.20	0.04		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Selenium	3.6	µg/L	2	1.0	0.2		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Sodium	18.2	mg/L	2	0.4	0.1		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Strontium	0.0565	mg/L	2	0.0040	0.0008		GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4
Thallium	0.17	µg/L	2	0.40	0.08	J1	GES	04/14/2022 19:28	EPA 200.8-1994, Rev. 5.4





# Water Analysis Report

Reissued

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-12

Customer Description:

Lab Number: 221028-005

Preparation:

Date Collected: 03/28/2022 11:02 EDT

Date Received: 04/01/2022 12:20 EDT

## 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	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Arsenic	0.09	µg/L	1	0.10	0.03	J1	GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Barium	20.2	µg/L	1	0.20	0.05		GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Beryllium	0.127	µg/L	1	0.050	0.007		GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Boron	0.021	mg/L	1	0.050	0.009	J1	GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Cadmium	0.009	µg/L	1	0.020	0.004	J1	GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Calcium	0.20	mg/L	1	0.05	0.02		GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Chromium	0.35	µg/L	1	0.20	0.04		GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Cobalt	1.01	µg/L	1	0.020	0.003		GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Lead	0.09	µg/L	1	0.20	0.05	J1	GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Lithium	0.00604	mg/L	1	0.00020	0.00005		GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Magnesium	0.35	mg/L	1	0.10	0.02		GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Potassium	0.33	mg/L	1	0.10	0.02		GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Selenium	0.33	µg/L	1	0.50	0.09	J1	GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Sodium	4.07	mg/L	1	0.20	0.05		GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Strontium	0.0021	mg/L	1	0.0020	0.0004		GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	04/14/2022 18:52	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.21	pCi/L	0.09	0.21		ST	04/14/2022 09:42	SW-846 9315-1986, Rev. 0
Carrier Recovery	101	%						
Radium-228	0.55	pCi/L	0.18	0.57		TTP	04/08/2022 13:57	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

**Reissued**

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-12

Customer Description:

Lab Number: 221028-005-01

Preparation: Dissolved

Date Collected: 03/28/2022 11:02 EDT

Date Received: 04/01/2022 12:20 EDT

## 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	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Arsenic	0.06	µg/L	1	0.10	0.03	J1	GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Barium	19.4	µg/L	1	0.20	0.05		GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Beryllium	0.123	µg/L	1	0.050	0.007		GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Boron	0.016	mg/L	1	0.050	0.009	J1	GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Cadmium	0.006	µg/L	1	0.020	0.004	J1	GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Calcium	0.24	mg/L	1	0.05	0.02		GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Chromium	0.29	µg/L	1	0.20	0.04		GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Cobalt	1.01	µg/L	1	0.020	0.003		GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Iron	0.015	mg/L	1	0.020	0.006	J1	GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Lead	0.12	µg/L	1	0.20	0.05	J1	GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Lithium	0.00591	mg/L	1	0.00020	0.00005		GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Magnesium	0.34	mg/L	1	0.10	0.02		GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Manganese	0.0037	mg/L	1	0.0010	0.0002		GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Potassium	0.34	mg/L	1	0.10	0.02		GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Selenium	0.28	µg/L	1	0.50	0.09	J1	GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Sodium	4.15	mg/L	1	0.20	0.05		GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Strontium	0.0021	mg/L	1	0.0020	0.0004		GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	04/14/2022 18:57	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audin: 210-4221

**Reissued**

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-13

Customer Description:

Lab Number: 221028-006

Preparation:

Date Collected: 03/28/2022 09:38 EDT

Date Received: 04/01/2022 12:20 EDT

## 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	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Arsenic	2.18	µg/L	1	0.10	0.03		GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Barium	52.1	µg/L	1	0.20	0.05		GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Beryllium	0.579	µg/L	1	0.050	0.007		GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Boron	0.065	mg/L	1	0.050	0.009		GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Calcium	13.3	mg/L	1	0.05	0.02		GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Chromium	0.52	µg/L	1	0.20	0.04		GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Cobalt	46.9	µg/L	1	0.020	0.003		GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Lithium	0.138	mg/L	1	0.00020	0.00005		GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Magnesium	13.8	mg/L	1	0.10	0.02		GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Potassium	5.16	mg/L	1	0.10	0.02		GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Sodium	19.6	mg/L	1	0.20	0.05		GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Strontium	0.117	mg/L	1	0.0020	0.0004		GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	04/14/2022 20:35	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.10	pCi/L	0.24	0.29		ST	04/14/2022 09:42	SW-846 9315-1986, Rev. 0
Carrier Recovery	77.6	%						
Radium-228	1.85	pCi/L	0.20	0.57		TTP	04/08/2022 13:57	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	76.6	%						

\* 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

Reissued

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-13

Customer Description:

Lab Number: 221028-006-01

Preparation: Dissolved

Date Collected: 03/28/2022 09:38 EDT

Date Received: 04/01/2022 12:20 EDT

### 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	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Arsenic	0.25	µg/L	1	0.10	0.03		GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Barium	50.1	µg/L	1	0.20	0.05		GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Beryllium	0.471	µg/L	1	0.050	0.007		GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Boron	0.067	mg/L	1	0.050	0.009		GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Cadmium	0.009	µg/L	1	0.020	0.004	J1	GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Calcium	12.8	mg/L	1	0.05	0.02		GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Chromium	0.28	µg/L	1	0.20	0.04		GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Cobalt	45.7	µg/L	1	0.020	0.003		GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Iron	12.8	mg/L	1	0.020	0.006		GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Lithium	0.142	mg/L	1	0.00020	0.00005		GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Magnesium	13.5	mg/L	1	0.10	0.02		GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Manganese	0.466	mg/L	1	0.0010	0.0002		GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Potassium	5.03	mg/L	1	0.10	0.02		GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Sodium	19.6	mg/L	1	0.20	0.05		GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Strontium	0.112	mg/L	1	0.0020	0.0004		GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	04/14/2022 20:40	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Reissued

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-17

Customer Description:

Lab Number: 221028-007

Preparation:

Date Collected: 03/29/2022 11:25 EDT

Date Received: 04/01/2022 12:20 EDT

### 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	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Arsenic	0.30	µg/L	1	0.10	0.03		GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Barium	112	µg/L	1	0.20	0.05		GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Beryllium	0.481	µg/L	1	0.050	0.007		GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Boron	0.031	mg/L	1	0.050	0.009	J1	GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Cadmium	0.028	µg/L	1	0.020	0.004		GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Calcium	0.24	mg/L	1	0.05	0.02		GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Chromium	0.70	µg/L	1	0.20	0.04		GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Cobalt	6.48	µg/L	1	0.020	0.003		GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Lead	0.1	µg/L	1	0.20	0.05	J1	GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Lithium	0.0126	mg/L	1	0.00020	0.00005		GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Magnesium	2.05	mg/L	1	0.10	0.02		GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Mercury	300	ng/L	100	500	200	J1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Potassium	0.42	mg/L	1	0.10	0.02		GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Selenium	0.26	µg/L	1	0.50	0.09	J1	GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Sodium	6.73	mg/L	1	0.20	0.05		GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Strontium	0.0099	mg/L	1	0.0020	0.0004		GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	04/14/2022 20:45	EPA 200.8-1994, Rev. 5.4

### Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.48	pCi/L	0.24	0.24		ST	04/14/2022 09:42	SW-846 9315-1986, Rev. 0
Carrier Recovery	95.0	%						
Radium-228	1.53	pCi/L	0.16	0.47		TTP	04/08/2022 13:57	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	84.5	%						

\* 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

**Reissued**

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-17

Customer Description:

Lab Number: 221028-007-01

Preparation: Dissolved

Date Collected: 03/29/2022 11:25 EDT

Date Received: 04/01/2022 12:20 EDT

## 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	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Arsenic	0.09	µg/L	1	0.10	0.03	J1	GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Barium	111	µg/L	1	0.20	0.05		GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Beryllium	0.469	µg/L	1	0.050	0.007		GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Boron	0.031	mg/L	1	0.050	0.009	J1	GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Cadmium	0.027	µg/L	1	0.020	0.004		GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Calcium	0.24	mg/L	1	0.05	0.02		GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Chromium	1.28	µg/L	1	0.20	0.04		GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Cobalt	6.40	µg/L	1	0.020	0.003		GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Iron	0.013	mg/L	1	0.020	0.006	J1	GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Lead	0.08	µg/L	1	0.20	0.05	J1	GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Lithium	0.0126	mg/L	1	0.00020	0.00005		GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Magnesium	2.01	mg/L	1	0.10	0.02		GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Manganese	0.0052	mg/L	1	0.0010	0.0002		GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Mercury	<200	ng/L	100	500	200	U1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Potassium	0.40	mg/L	1	0.10	0.02		GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Selenium	0.21	µg/L	1	0.50	0.09	J1	GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Sodium	6.63	mg/L	1	0.20	0.05		GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Strontium	0.0096	mg/L	1	0.0020	0.0004		GES	04/14/2022 20:50	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	04/14/2022 20:50	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

**Reissued**

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-18

Customer Description:

Lab Number: 221028-008

Preparation:

Date Collected: 03/29/2022 10:36 EDT

Date Received: 04/01/2022 12:20 EDT

## 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	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Arsenic	1.55	µg/L	1	0.10	0.03		GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Barium	90.1	µg/L	1	0.20	0.05		GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Beryllium	0.106	µg/L	1	0.050	0.007		GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Boron	0.009	mg/L	1	0.050	0.009	J1	GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Cadmium	0.01	µg/L	1	0.020	0.004	J1	GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Calcium	0.24	mg/L	1	0.05	0.02		GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Chromium	1.40	µg/L	1	0.20	0.04		GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Cobalt	0.842	µg/L	1	0.020	0.003		GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Lead	0.53	µg/L	1	0.20	0.05		GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Lithium	0.0137	mg/L	1	0.00020	0.00005		GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Magnesium	0.34	mg/L	1	0.10	0.02		GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Mercury	21	ng/L	1	5	2		JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Potassium	0.77	mg/L	1	0.10	0.02		GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Selenium	0.38	µg/L	1	0.50	0.09	J1	GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Sodium	5.33	mg/L	1	0.20	0.05		GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Strontium	0.0050	mg/L	1	0.0020	0.0004		GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	04/14/2022 20:55	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.60	pCi/L	0.13	0.18		ST	04/14/2022 09:42	SW-846 9315-1986, Rev. 0
Carrier Recovery	140	%						
Radium-228	1.41	pCi/L	0.20	0.60		TTP	04/08/2022 13:57	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

**Reissued**

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-18

Customer Description:

Lab Number: 221028-008-01

Preparation: Dissolved

Date Collected: 03/29/2022 10:36 EDT

Date Received: 04/01/2022 12:20 EDT

## 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	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Arsenic	0.03	µg/L	1	0.10	0.03	J1	GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Barium	82.7	µg/L	1	0.20	0.05		GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Beryllium	0.084	µg/L	1	0.050	0.007		GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Boron	0.009	mg/L	1	0.050	0.009	J1	GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Cadmium	0.012	µg/L	1	0.020	0.004	J1	GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Calcium	0.27	mg/L	1	0.05	0.02		GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Chromium	2.02	µg/L	1	0.20	0.04		GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Cobalt	0.743	µg/L	1	0.020	0.003		GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Iron	0.039	mg/L	1	0.020	0.006		GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Lithium	0.0140	mg/L	1	0.00020	0.00005		GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Magnesium	0.30	mg/L	1	0.10	0.02		GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Manganese	0.0035	mg/L	1	0.0010	0.0002		GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Potassium	0.73	mg/L	1	0.10	0.02		GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Sodium	5.21	mg/L	1	0.20	0.05		GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Strontium	0.0041	mg/L	1	0.0020	0.0004		GES	04/14/2022 21:00	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	04/14/2022 21:00	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

**Reissued**

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-22

Customer Description:

Lab Number: 221028-009

Preparation:

Date Collected: 03/28/2022 10:35 EDT

Date Received: 04/01/2022 12:20 EDT

## 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	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Arsenic	3.21	µg/L	1	0.10	0.03		GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Barium	19.3	µg/L	1	0.20	0.05		GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Beryllium	8.78	µg/L	1	0.050	0.007		GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Boron	0.068	mg/L	1	0.050	0.009		GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Cadmium	1.27	µg/L	1	0.020	0.004		GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Calcium	16.4	mg/L	1	0.05	0.02		GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Chromium	0.43	µg/L	1	0.20	0.04		GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Cobalt	109	µg/L	1	0.020	0.003		GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Lead	0.15	µg/L	1	0.20	0.05	J1	GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Lithium	0.170	mg/L	1	0.00020	0.00005		GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Magnesium	22.7	mg/L	1	0.10	0.02		GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Mercury	<4	ng/L	2	10	4	U1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Potassium	4.73	mg/L	1	0.10	0.02		GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Selenium	9.20	µg/L	1	0.50	0.09		GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Sodium	96.7	mg/L	1	0.20	0.05		GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Strontium	0.140	mg/L	1	0.0020	0.0004		GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4
Thallium	0.19	µg/L	1	0.20	0.04	J1	GES	04/14/2022 21:05	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.48	pCi/L	0.26	0.26		ST	04/14/2022 09:42	SW-846 9315-1986, Rev. 0
Carrier Recovery	80.4	%						
Radium-228	2.76	pCi/L	0.21	0.55		TTP	04/08/2022 13:57	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	74.9	%						

\* 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

Reissued

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-22

Customer Description:

Lab Number: 221028-009-01

Preparation: Dissolved

Date Collected: 03/28/2022 10:35 EDT

Date Received: 04/01/2022 12:20 EDT

## 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	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Arsenic	3.30	µg/L	1	0.10	0.03		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Barium	19.3	µg/L	1	0.20	0.05		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Beryllium	8.78	µg/L	1	0.050	0.007		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Boron	0.069	mg/L	1	0.050	0.009		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Cadmium	1.28	µg/L	1	0.020	0.004		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Calcium	16.5	mg/L	1	0.05	0.02		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Chromium	0.53	µg/L	1	0.20	0.04		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Cobalt	111	µg/L	1	0.020	0.003		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Iron	31.8	mg/L	1	0.020	0.006		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Lead	0.17	µg/L	1	0.20	0.05	J1	GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Lithium	0.171	mg/L	1	0.00020	0.00005		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Magnesium	23.1	mg/L	1	0.10	0.02		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Manganese	0.407	mg/L	1	0.0010	0.0002		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Mercury	12	ng/L	1	5	2		JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Potassium	4.80	mg/L	1	0.10	0.02		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Selenium	9.49	µg/L	1	0.50	0.09		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Sodium	97.9	mg/L	1	0.20	0.05		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Strontium	0.142	mg/L	1	0.0020	0.0004		GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4
Thallium	0.19	µg/L	1	0.20	0.04	J1	GES	04/14/2022 21:11	EPA 200.8-1994, Rev. 5.4



## Water Analysis Report

Reissued

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-28

Customer Description:

Lab Number: 221028-010

Preparation:

Date Collected: 03/29/2022 11:34 EDT

Date Received: 04/01/2022 12:20 EDT

### 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	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Arsenic	0.09	µg/L	1	0.10	0.03	J1	GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Barium	120	µg/L	1	0.20	0.05		GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Beryllium	0.605	µg/L	1	0.050	0.007		GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Boron	0.356	mg/L	1	0.050	0.009		GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Cadmium	0.057	µg/L	1	0.020	0.004		GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Calcium	1.31	mg/L	1	0.05	0.02		GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Chromium	0.35	µg/L	1	0.20	0.04		GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Cobalt	12.5	µg/L	1	0.020	0.003		GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Lead	0.05	µg/L	1	0.20	0.05	J1	GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Lithium	0.0242	mg/L	1	0.00020	0.00005		GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Magnesium	2.94	mg/L	1	0.10	0.02		GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Mercury	12	ng/L	1	5	2		JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Potassium	0.73	mg/L	1	0.10	0.02		GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Selenium	0.26	µg/L	1	0.50	0.09	J1	GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Sodium	7.52	mg/L	1	0.20	0.05		GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Strontium	0.0197	mg/L	1	0.0020	0.0004		GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	04/14/2022 21:16	EPA 200.8-1994, Rev. 5.4

### Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.61	pCi/L	0.26	0.26		ST	04/14/2022 09:42	SW-846 9315-1986, Rev. 0
Carrier Recovery	83.5	%						
Radium-228	1.37	pCi/L	0.16	0.47		TTP	04/08/2022 13:57	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

**Reissued**

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-28

Customer Description:

Lab Number: 221028-010-01

Preparation: Dissolved

Date Collected: 03/29/2022 11:34 EDT

Date Received: 04/01/2022 12:20 EDT

## 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	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Arsenic	0.08	µg/L	1	0.10	0.03	J1	GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Barium	125	µg/L	1	0.20	0.05		GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Beryllium	0.576	µg/L	1	0.050	0.007		GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Boron	0.359	mg/L	1	0.050	0.009		GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Cadmium	0.052	µg/L	1	0.020	0.004		GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Calcium	1.29	mg/L	1	0.05	0.02		GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Chromium	0.36	µg/L	1	0.20	0.04		GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Cobalt	12.4	µg/L	1	0.020	0.003		GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Iron	0.013	mg/L	1	0.020	0.006	J1	GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Lead	0.06	µg/L	1	0.20	0.05	J1	GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Lithium	0.0245	mg/L	1	0.00020	0.00005		GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Magnesium	2.92	mg/L	1	0.10	0.02		GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Manganese	0.0497	mg/L	1	0.0010	0.0002		GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Mercury	3	ng/L	1	5	2	J1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Potassium	0.76	mg/L	1	0.10	0.02		GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Selenium	0.25	µg/L	1	0.50	0.09	J1	GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Sodium	7.49	mg/L	1	0.20	0.05		GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Strontium	0.0198	mg/L	1	0.0020	0.0004		GES	04/14/2022 21:31	EPA 200.8-1994, Rev. 5.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	04/14/2022 21:31	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

Reissued

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-30

Customer Description:

Lab Number: 221028-011

Preparation:

Date Collected: 03/28/2022 13:51 EDT

Date Received: 04/01/2022 12:20 EDT

## 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	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Arsenic	0.19	µg/L	1	0.10	0.03		GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Barium	129	µg/L	1	0.20	0.05		GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Beryllium	0.125	µg/L	1	0.050	0.007		GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Boron	2.45	mg/L	1	0.050	0.009		GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Cadmium	0.012	µg/L	1	0.020	0.004	J1	GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Calcium	0.66	mg/L	1	0.05	0.02		GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Chromium	0.45	µg/L	1	0.20	0.04		GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Cobalt	4.76	µg/L	1	0.020	0.003		GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Lithium	0.0101	mg/L	1	0.00020	0.00005		GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Magnesium	2.73	mg/L	1	0.10	0.02		GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Mercury	35	ng/L	2	10	4		JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/18/2022 19:09	EPA 200.8-1994, Rev. 5.4
Potassium	0.92	mg/L	1	0.10	0.02		GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Selenium	0.44	µg/L	1	0.50	0.09	J1	GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Sodium	90.3	mg/L	1	0.20	0.05	M1	GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Strontium	0.0116	mg/L	1	0.0020	0.0004		GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4
Thallium	0.04	µg/L	1	0.20	0.04	J1	GES	04/14/2022 23:09	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.85	pCi/L	0.19	0.25		ST	04/14/2022 09:42	SW-846 9315-1986, Rev. 0
Carrier Recovery	83.7	%						
Radium-228	1.45	pCi/L	0.26	0.81		TTP	04/13/2022 13:52	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	57.2	%						

\* 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

**Reissued**

**Job ID: 221028**

**Customer: Pirkey Power Station**

**Date Reported: 12/22/2022**

Customer Sample ID: AD-30

Customer Description:

Lab Number: 221028-011-01

Preparation: Dissolved

Date Collected: 03/28/2022 13:51 EDT

Date Received: 04/01/2022 12:20 EDT

## 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	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Arsenic	0.09	µg/L	1	0.10	0.03	J1	GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Barium	114	µg/L	1	0.20	0.05		GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Beryllium	0.130	µg/L	1	0.050	0.007		GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Boron	2.50	mg/L	1	0.050	0.009		GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Cadmium	0.012	µg/L	1	0.020	0.004	J1	GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Calcium	0.66	mg/L	1	0.05	0.02		GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Chromium	0.31	µg/L	1	0.20	0.04		GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Cobalt	4.73	µg/L	1	0.020	0.003		GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Iron	0.009	mg/L	1	0.020	0.006	J1	GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Lead	0.06	µg/L	1	0.20	0.05	J1	GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Lithium	0.0103	mg/L	1	0.00020	0.00005		GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Magnesium	2.70	mg/L	1	0.10	0.02		GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Manganese	0.0166	mg/L	1	0.0010	0.0002		GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Mercury	11	ng/L	2	10	4		JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	0.1	µg/L	1	0.5	0.1	J1	GES	04/18/2022 19:24	EPA 200.8-1994, Rev. 5.4
Potassium	0.93	mg/L	1	0.10	0.02		GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Selenium	0.20	µg/L	1	0.50	0.09	J1	GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Sodium	91.4	mg/L	1	0.20	0.05		GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Strontium	0.0116	mg/L	1	0.0020	0.0004		GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4
Thallium	0.07	µg/L	1	0.20	0.04	J1	GES	04/14/2022 23:24	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

**Reissued**

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-31

Customer Description:

Lab Number: 221028-012

Preparation:

Date Collected: 03/28/2022 13:04 EDT

Date Received: 04/01/2022 12:20 EDT

## 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	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Arsenic	0.26	µg/L	1	0.10	0.03		GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Barium	32.8	µg/L	1	0.20	0.05		GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Beryllium	0.854	µg/L	1	0.050	0.007		GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Boron	0.026	mg/L	1	0.050	0.009	J1	GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Cadmium	0.068	µg/L	1	0.020	0.004		GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Calcium	2.75	mg/L	1	0.05	0.02		GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Chromium	0.51	µg/L	1	0.20	0.04		GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Cobalt	9.14	µg/L	1	0.020	0.003		GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Lead	0.29	µg/L	1	0.20	0.05		GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Lithium	0.0687	mg/L	1	0.00020	0.00005		GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Magnesium	4.03	mg/L	1	0.10	0.02		GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Mercury	103	ng/L	1	5	2		JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/18/2022 19:29	EPA 200.8-1994, Rev. 5.4
Potassium	1.65	mg/L	1	0.10	0.02		GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Selenium	0.38	µg/L	1	0.50	0.09	J1	GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Sodium	32.4	mg/L	1	0.20	0.05		GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Strontium	0.0392	mg/L	1	0.0020	0.0004		GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4
Thallium	0.09	µg/L	1	0.20	0.04	J1	GES	04/14/2022 23:29	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.95	pCi/L	0.19	0.22		ST	04/14/2022 09:42	SW-846 9315-1986, Rev. 0
Carrier Recovery	90.5	%						
Radium-228	1.46	pCi/L	0.16	0.46		TTP	04/13/2022 13:52	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	91.7	%						

\* 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

**Reissued**

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-31

Customer Description:

Lab Number: 221028-012-01

Preparation: Dissolved

Date Collected: 03/28/2022 13:04 EDT

Date Received: 04/01/2022 12:20 EDT

## 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	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Arsenic	0.14	µg/L	1	0.10	0.03		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Barium	31.8	µg/L	1	0.20	0.05		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Beryllium	0.765	µg/L	1	0.050	0.007		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Boron	0.021	mg/L	1	0.050	0.009	J1	GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Cadmium	0.063	µg/L	1	0.020	0.004		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Calcium	2.78	mg/L	1	0.05	0.02		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Chromium	0.34	µg/L	1	0.20	0.04		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Cobalt	8.83	µg/L	1	0.020	0.003		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Iron	0.109	mg/L	1	0.020	0.006		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Lead	0.39	µg/L	1	0.20	0.05		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Lithium	0.0679	mg/L	1	0.00020	0.00005		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Magnesium	3.84	mg/L	1	0.10	0.02		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Manganese	0.0252	mg/L	1	0.0010	0.0002		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/18/2022 19:34	EPA 200.8-1994, Rev. 5.4
Potassium	1.63	mg/L	1	0.10	0.02		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Selenium	0.14	µg/L	1	0.50	0.09	J1	GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Sodium	32.6	mg/L	1	0.20	0.05		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Strontium	0.0386	mg/L	1	0.0020	0.0004		GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4
Thallium	0.09	µg/L	1	0.20	0.04	J1	GES	04/14/2022 23:34	EPA 200.8-1994, Rev. 5.4





# Water Analysis Report

Reissued

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-32

Customer Description:

Lab Number: 221028-013

Preparation:

Date Collected: 03/28/2022 12:07 EDT

Date Received: 04/01/2022 12:20 EDT

## 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	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Arsenic	1.05	µg/L	1	0.10	0.03		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Barium	30.0	µg/L	1	0.20	0.05		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Beryllium	2.89	µg/L	1	0.050	0.007		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Boron	0.773	mg/L	1	0.050	0.009		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Cadmium	0.323	µg/L	1	0.020	0.004		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Calcium	8.05	mg/L	1	0.05	0.02		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Chromium	0.60	µg/L	1	0.20	0.04		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Cobalt	25.1	µg/L	1	0.020	0.003		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Lead	0.38	µg/L	1	0.20	0.05		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Lithium	0.0731	mg/L	1	0.00020	0.00005		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Magnesium	9.45	mg/L	1	0.10	0.02		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Mercury	1900	ng/L	100	500	200		JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/18/2022 19:39	EPA 200.8-1994, Rev. 5.4
Potassium	2.99	mg/L	1	0.10	0.02		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Selenium	3.42	µg/L	1	0.50	0.09		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Sodium	33.6	mg/L	1	0.20	0.05		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Strontium	0.150	mg/L	1	0.0020	0.0004		GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4
Thallium	0.17	µg/L	1	0.20	0.04	J1	GES	04/14/2022 23:39	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.34	pCi/L	0.24	0.27		ST	04/14/2022 09:42	SW-846 9315-1986, Rev. 0
Carrier Recovery	83.3	%						
Radium-228	4.56	pCi/L	0.21	0.52		TTP	04/13/2022 13:52	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	80.4	%						

\* 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

**Reissued**

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-32

Customer Description:

Lab Number: 221028-013-01

Preparation: Dissolved

Date Collected: 03/28/2022 12:07 EDT

Date Received: 04/01/2022 12:20 EDT

## 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	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Arsenic	0.92	µg/L	1	0.10	0.03		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Barium	28.9	µg/L	1	0.20	0.05		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Beryllium	2.86	µg/L	1	0.050	0.007		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Boron	0.747	mg/L	1	0.050	0.009		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Cadmium	0.317	µg/L	1	0.020	0.004		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Calcium	7.84	mg/L	1	0.05	0.02		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Chromium	0.56	µg/L	1	0.20	0.04		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Cobalt	24.1	µg/L	1	0.020	0.003		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Iron	0.719	mg/L	1	0.020	0.006		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Lead	0.34	µg/L	1	0.20	0.05		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Lithium	0.0719	mg/L	1	0.00020	0.00005		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Magnesium	8.96	mg/L	1	0.10	0.02		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Manganese	0.0455	mg/L	1	0.0010	0.0002		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Mercury	<20	ng/L	10	50	20	U1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/18/2022 19:45	EPA 200.8-1994, Rev. 5.4
Potassium	2.87	mg/L	1	0.10	0.02		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Selenium	3.30	µg/L	1	0.50	0.09		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Sodium	32.5	mg/L	1	0.20	0.05		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Strontium	0.145	mg/L	1	0.0020	0.0004		GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4
Thallium	0.12	µg/L	1	0.20	0.04	J1	GES	04/14/2022 23:45	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

**Reissued**

Dolan Chemical Laboratory  
 4001 Bixby Road  
 Groveport, OH 43125  
 Phone: 614-836-4221  
 Audinet: 210-4221

**Job ID: 221028**

**Customer: Pirkey Power Station**

**Date Reported: 12/22/2022**

Customer Sample ID: AD-33

Customer Description:

Lab Number: 221028-014

Preparation:

Date Collected: 03/28/2022 11:54 EDT

Date Received: 04/01/2022 12:20 EDT

## 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	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Arsenic	0.87	µg/L	1	0.10	0.03		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Barium	45.0	µg/L	1	0.20	0.05		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Beryllium	1.35	µg/L	1	0.050	0.007		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Boron	0.146	mg/L	1	0.050	0.009		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Cadmium	0.057	µg/L	1	0.020	0.004		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Calcium	2.28	mg/L	1	0.05	0.02		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Chromium	0.47	µg/L	1	0.20	0.04		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Cobalt	9.82	µg/L	1	0.020	0.003		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Lead	0.32	µg/L	1	0.20	0.05		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Lithium	0.0219	mg/L	1	0.00020	0.00005		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Magnesium	4.10	mg/L	1	0.10	0.02		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Mercury	4600	ng/L	100	500	200		JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/18/2022 19:50	EPA 200.8-1994, Rev. 5.4
Potassium	0.30	mg/L	1	0.10	0.02		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Selenium	2.68	µg/L	1	0.50	0.09		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Sodium	18.7	mg/L	1	0.20	0.05		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Strontium	0.0345	mg/L	1	0.0020	0.0004		GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	04/14/2022 23:50	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.27	pCi/L	0.23	0.24		ST	04/14/2022 09:42	SW-846 9315-1986, Rev. 0
Carrier Recovery	87.2	%						
Radium-228	1.01	pCi/L	0.23	0.72		TTP	04/13/2022 13:52	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	53.6	%						

\* 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

**Reissued**

**Job ID: 221028**

**Customer: Pirkey Power Station**

**Date Reported: 12/22/2022**

Customer Sample ID: AD-33

Customer Description:

Lab Number: 221028-014-01

Preparation: Dissolved

Date Collected: 03/28/2022 11:54 EDT

Date Received: 04/01/2022 12:20 EDT

## 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	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Arsenic	0.82	µg/L	1	0.10	0.03		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Barium	45.7	µg/L	1	0.20	0.05		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Beryllium	1.35	µg/L	1	0.050	0.007		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Boron	0.143	mg/L	1	0.050	0.009		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Cadmium	0.058	µg/L	1	0.020	0.004		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Calcium	2.29	mg/L	1	0.05	0.02		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Chromium	0.39	µg/L	1	0.20	0.04		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Cobalt	9.88	µg/L	1	0.020	0.003		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Iron	0.030	mg/L	1	0.020	0.006		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Lead	0.29	µg/L	1	0.20	0.05		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Lithium	0.0220	mg/L	1	0.00020	0.00005		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Magnesium	4.21	mg/L	1	0.10	0.02		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Manganese	0.0090	mg/L	1	0.0010	0.0002		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Mercury	34	ng/L	1	5	2		JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/18/2022 19:55	EPA 200.8-1994, Rev. 5.4
Potassium	0.30	mg/L	1	0.10	0.02		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Selenium	2.70	µg/L	1	0.50	0.09		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Sodium	18.6	mg/L	1	0.20	0.05		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Strontium	0.0353	mg/L	1	0.0020	0.0004		GES	04/14/2022 23:55	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	04/14/2022 23:55	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

**Reissued**

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: Duplicate 1

Customer Description:

Lab Number: 221028-015

Preparation:

Date Collected: 03/28/2022 13:00 EDT

Date Received: 04/01/2022 12:20 EDT

## 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	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Arsenic	3.19	µg/L	1	0.10	0.03		GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Barium	19.2	µg/L	1	0.20	0.05		GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Beryllium	9.06	µg/L	1	0.050	0.007		GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Boron	0.068	mg/L	1	0.050	0.009		GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Cadmium	1.23	µg/L	1	0.020	0.004		GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Calcium	16.4	mg/L	1	0.05	0.02		GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Chromium	0.47	µg/L	1	0.20	0.04		GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Cobalt	109	µg/L	1	0.020	0.003		GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Lead	0.15	µg/L	1	0.20	0.05	J1	GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Lithium	0.176	mg/L	1	0.00020	0.00005		GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Magnesium	22.7	mg/L	1	0.10	0.02		GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Mercury	14	ng/L	1	5	2		JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/18/2022 20:00	EPA 200.8-1994, Rev. 5.4
Potassium	4.79	mg/L	1	0.10	0.02		GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Selenium	8.93	µg/L	1	0.50	0.09		GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Sodium	96.9	mg/L	1	0.20	0.05		GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Strontium	0.141	mg/L	1	0.0020	0.0004		GES	04/15/2022 00:00	EPA 200.8-1994, Rev. 5.4
Thallium	0.19	µg/L	1	0.20	0.04	J1	GES	04/15/2022 00:00	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

**Reissued**

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: Duplicate 1

Customer Description:

Lab Number: 221028-015-01

Preparation: Dissolved

Date Collected: 03/28/2022 13:00 EDT

Date Received: 04/01/2022 12:20 EDT

## 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	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Arsenic	3.18	µg/L	1	0.10	0.03		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Barium	19.4	µg/L	1	0.20	0.05		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Beryllium	8.88	µg/L	1	0.050	0.007		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Boron	0.069	mg/L	1	0.050	0.009		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Cadmium	1.26	µg/L	1	0.020	0.004		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Calcium	16.5	mg/L	1	0.05	0.02		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Chromium	1.10	µg/L	1	0.20	0.04		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Cobalt	109	µg/L	1	0.020	0.003		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Iron	31.7	mg/L	1	0.020	0.006		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Lead	0.17	µg/L	1	0.20	0.05	J1	GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Lithium	0.174	mg/L	1	0.00020	0.00005		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Magnesium	23.0	mg/L	1	0.10	0.02		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Manganese	0.408	mg/L	1	0.0010	0.0002		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Mercury	3	ng/L	1	5	2	J1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/18/2022 20:05	EPA 200.8-1994, Rev. 5.4
Potassium	4.85	mg/L	1	0.10	0.02		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Selenium	8.99	µg/L	1	0.50	0.09		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Sodium	98.3	mg/L	1	0.20	0.05		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Strontium	0.141	mg/L	1	0.0020	0.0004		GES	04/15/2022 00:05	EPA 200.8-1994, Rev. 5.4
Thallium	0.19	µg/L	1	0.20	0.04	J1	GES	04/15/2022 00:05	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

**Reissued**

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: Duplicate 2

Customer Description:

Lab Number: 221028-016

Preparation:

Date Collected: 03/29/2022 11:55 EDT

Date Received: 04/01/2022 12:20 EDT

## 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	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Arsenic	0.09	µg/L	1	0.10	0.03	J1	GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Barium	125	µg/L	1	0.20	0.05		GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Beryllium	0.633	µg/L	1	0.050	0.007		GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Boron	0.355	mg/L	1	0.050	0.009		GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Cadmium	0.059	µg/L	1	0.020	0.004		GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Calcium	1.31	mg/L	1	0.05	0.02		GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Chromium	0.75	µg/L	1	0.20	0.04		GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Cobalt	12.5	µg/L	1	0.020	0.003		GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Lead	0.05	µg/L	1	0.20	0.05	J1	GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Lithium	0.0253	mg/L	1	0.00020	0.00005		GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Magnesium	2.98	mg/L	1	0.10	0.02		GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Mercury	13	ng/L	2	10	4		JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/18/2022 21:12	EPA 200.8-1994, Rev. 5.4
Potassium	0.77	mg/L	1	0.10	0.02		GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Selenium	0.22	µg/L	1	0.50	0.09	J1	GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Sodium	7.52	mg/L	1	0.20	0.05		GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Strontium	0.0205	mg/L	1	0.0020	0.0004		GES	04/15/2022 01:12	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	04/15/2022 01:12	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

**Reissued**

**Job ID: 221028**

**Customer: Pirkey Power Station**

**Date Reported: 12/22/2022**

Customer Sample ID: Duplicate 2

Customer Description:

Lab Number: 221028-016-01

Preparation: Dissolved

Date Collected: 03/29/2022 11:55 EDT

Date Received: 04/01/2022 12:20 EDT

## 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	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Arsenic	0.07	µg/L	1	0.10	0.03	J1	GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Barium	127	µg/L	1	0.20	0.05		GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Beryllium	0.595	µg/L	1	0.050	0.007		GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Boron	0.346	mg/L	1	0.050	0.009		GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Cadmium	0.050	µg/L	1	0.020	0.004		GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Calcium	1.34	mg/L	1	0.05	0.02		GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Chromium	0.34	µg/L	1	0.20	0.04		GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Cobalt	12.0	µg/L	1	0.020	0.003		GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Iron	0.012	mg/L	1	0.020	0.006	J1	GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Lead	0.07	µg/L	1	0.20	0.05	J1	GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Lithium	0.0252	mg/L	1	0.00020	0.00005		GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Magnesium	2.87	mg/L	1	0.10	0.02		GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Manganese	0.0493	mg/L	1	0.0010	0.0002		GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Mercury	5	ng/L	1	5	2		JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/18/2022 21:17	EPA 200.8-1994, Rev. 5.4
Potassium	0.75	mg/L	1	0.10	0.02		GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Selenium	0.21	µg/L	1	0.50	0.09	J1	GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Sodium	7.20	mg/L	1	0.20	0.05		GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Strontium	0.0199	mg/L	1	0.0020	0.0004		GES	04/15/2022 01:17	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	04/15/2022 01:17	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

**Reissued**

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: Equipment Blank

Customer Description:

Lab Number: 221028-017

Preparation:

Date Collected: 03/28/2022 11:30 EDT

Date Received: 04/01/2022 12:20 EDT

## 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	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Barium	0.05	µg/L	1	0.20	0.05	J1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Beryllium	<0.007	µg/L	1	0.050	0.007	U1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Boron	<0.009	mg/L	1	0.050	0.009	U1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Calcium	<0.02	mg/L	1	0.05	0.02	U1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Chromium	0.25	µg/L	1	0.20	0.04		GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Cobalt	0.009	µg/L	1	0.020	0.003	J1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Lithium	<0.00005	mg/L	1	0.00020	0.00005	U1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Magnesium	<0.02	mg/L	1	0.10	0.02	U1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	04/25/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	04/18/2022 21:22	EPA 200.8-1994, Rev. 5.4
Potassium	<0.02	mg/L	1	0.10	0.02	U1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Sodium	<0.05	mg/L	1	0.20	0.05	U1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Strontium	<0.0004	mg/L	1	0.0020	0.0004	U1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	04/15/2022 01:22	EPA 200.8-1994, Rev. 5.4

221028

Job Comments:

Original report issued 5/11/2022. Report reissued with amended Matrix Spike precision calculations.



## Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 221028

Customer: Pirkey Power Station

Date Reported: 12/22/2022

### 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. ALL TIMES LISTED ARE IN THE EASTERN TIME ZONE.**

### Data Qualifier Legend

**U1** - Not detected at or above method detection limit (MDL).

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

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

# 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 (614-836-4184)

Project Name: Pikey - CCR

Contact Name: Leslie Fuerschbach

Contact Phone: 318-423-3805

Sampler(s): Matt Hamilton Kenny McDonald

Site Contact:

Date:

For Lab Use Only:

COC/Order #: 221028

Analysis Turnaround Time (in Calendar Days)

Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.
3/28/2022	1125	G	GW	7
3/28/2022	1148	G	GW	7
3/28/2022	1216	G	GW	7
3/28/2022	1150	G	GW	7
3/28/2022	1002	G	GW	7
3/28/2022	838	G	GW	7
3/28/2022	1025	G	GW	7
3/28/2022	936	G	GW	7
3/28/2022	935	G	GW	10
3/28/2022	1034	G	GW	10
3/28/2022	1251	G	GW	7

Field-filter 250 mL bottle, then pH<2, HNO<sub>3</sub>

250 mL bottle, 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

Sample Specific Notes

250 mL PTFE lined bottle, HCL, pH<2

40 mL Glass vial or 250 mL PTFE lined bottle, HCL, pH<2

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Field-filter 250 mL bottle, then pH<2, HNO <sub>3</sub>	250 mL bottle, 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
AD-2	3/28/2022	1125	G	GW	7	X	X	X	X	X	X	
AD-3	3/28/2022	1148	G	GW	7	X	X	X	X	X	X	
AD-4	3/28/2022	1216	G	GW	7	X	X	X	X	X	X	
AD-7	3/28/2022	1150	G	GW	7	X	X	X	X	X	X	
AD-12	3/28/2022	1002	G	GW	7	X	X	X	X	X	X	
AD-13	3/28/2022	838	G	GW	7	X	X	X	X	X	X	
AD-17	3/28/2022	1025	G	GW	7	X	X	X	X	X	X	
AD-18	3/28/2022	936	G	GW	7	X	X	X	X	X	X	
AD-22	3/28/2022	935	G	GW	10	X	X	X	X	X	X	
AD-28	3/28/2022	1034	G	GW	10	X	X	X	X	X	X	
AD-30	3/28/2022	1251	G	GW	7	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:

TG-32

Relinquished by:	Company: <u>Fask</u>	Date/Time: <u>3-30-22 1300</u>	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: <u>J. Beach</u>	Date/Time: <u>4/1/22 1230PM</u>

Form COC-04, AEP Chain of Custody (COC) Record for Coal Combustion Residual (CCR) Sampling - Shreveport, Rev. 1, 1/10/17





# WATER & WASTE SAMPLE RECEIPT FORM (IR#1)

<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>Piney</u>			Number of Plastic Containers: <u>81</u>			
Opened By <u>MGK</u>			Number of Glass Containers: _____			
Date/Time <u>4/1/22 1230</u>			Number of Mercury Containers: <u>33</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						
(IR Gun Ser# 210441568, Expir. 5/27/2023) - 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>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: \_\_\_\_\_

pH paper (circle one): MQuant pH Cat 1.09535.0001 \_\_\_\_\_ [OR] Lab rat pH Cat # LRS -4801  
lot HC904495 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# 221028 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.

# Mercury Laboratory Review Checklist


## Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

**Release Statement:** I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

**Check, if applicable:**  This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Susann Henschen		Chemist	5-11-2022
Name (printed)	Signature	Official Title	Date

## Mercury Laboratory Review Checklist

**Table 1. Reportable Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey Power  
**Reviewer Name:** Susann Henschen  
**LRC Date:** 5-6-2022  
**Laboratory Job Number:** 221028  
**Prep Batch Number(s):** PB22041805, PB22041806, PB22042503

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
R1	O, I	<b>Chain-of-custody (COC)</b>		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	<b>Sample and quality control (QC) identification</b>		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	<b>Test reports</b>		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	No	ER 2
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	<b>Surrogate recovery data</b>		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	<b>Test reports/summary forms for blank samples</b>		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

## Mercury Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	<b>Laboratory control samples (LCS):</b>		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?		
R7	O, I	<b>Matrix spike (MS) and matrix spike duplicate (MSD) data</b>		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	<b>Analytical duplicate data</b>		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	<b>Method quantitation limits (MQLs):</b>		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	<b>Other problems/anomalies</b>		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	



## Mercury Laboratory Review Checklist

**Table 2. Supporting Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory

**Project Name:** Pirkey Power

**Reviewer Name:** Susann Henschen

**LRC Date:** 5-6-2022

**Laboratory Job Number:** 221028

**Prep Batch Number(s):** PB22041805, PB22041806, PB22042503

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S1	O, I	<b>Initial calibration (ICAL)</b>		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?		
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	<b>Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):</b>		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER1
S3	O	<b>Mass spectral tuning:</b>		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	<b>Internal standards (IS):</b>		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	<b>Raw data (NELAC section 1 appendix A glossary, and section 5.)</b>		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

## Mercury Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	O	<b>Dual column confirmation</b>		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	<b>Tentatively identified compounds (TICs):</b>		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	<b>Interference Check Sample (ICS) results:</b>		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	<b>Serial dilutions, post digestion spikes, and method of standard additions</b>		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	<b>Method detection limit (MDL) studies</b>		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	<b>Proficiency test reports:</b>		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	<b>Standards documentation</b>		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	<b>Compound/analyte identification procedures</b>		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	<b>Demonstration of analyst competency (DOC)</b>		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	<b>Verification/validation documentation for methods (NELAC Chap 5n 5)</b>		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	<b>Laboratory standard operating procedures (SOPs):</b>		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

## Mercury Laboratory Review Checklist

**Table 3. Exception Reports.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey Power  
**Reviewer Name:** Susann Henschen  
**LRC Date:** 5-6-2022  
**Laboratory Job Number:** 221028  
**Prep Batch Number(s):** PB22041805, PB22041806, PB22042503

Exception Report No.	Description
ER1	CCB acceptance criteria is CCB<MQL.
ER 2	Sample result was less than 10% above the Curve and less than the LDR.

<sup>1</sup> Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.

<sup>2</sup> O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

<sup>3</sup> NA - Not applicable; NR - Not reviewed.

<sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

# Radium Laboratory Review Checklist

## Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

**Release Statement:** I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

**Check, if applicable:**  This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Tamisha Palmer  Chemical Tech Princ. 04/20/2022  
Name (printed) Signature Official Title Date

## Radium Laboratory Review Checklist

**Table 1. Reportable Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey Power  
**Reviewer Name:** Tamisha Palmer  
**LRC Date:** 04/20/2022  
**Laboratory Job Number:** 221028  
**Prep Batch Number(s):** PB22040403, PB22040405

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
R1	O, I	<b>Chain-of-custody (COC)</b>		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	<b>Sample and quality control (QC) identification</b>		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	<b>Test reports</b>		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	<b>Surrogate recovery data</b>		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	<b>Test reports/summary forms for blank samples</b>		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

## Radium Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	<b>Laboratory control samples (LCS):</b>		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	<b>Matrix spike (MS) and matrix spike duplicate (MSD) data</b>		
	I	Were the project/method specified analytes included in the MS and MSD?	NA	
	I	Were MS/MSD analyzed at the appropriate frequency?	NA	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NA	
	I	Were MS/MSD RPDs within laboratory QC limits?	NA	
R8	O, I	<b>Analytical duplicate data</b>		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	ER1
R9	O, I	<b>Method quantitation limits (MQLs):</b>		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	<b>Other problems/anomalies</b>		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

## Radium Laboratory Review Checklist

**Table 2. Supporting Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey Power  
**Reviewer Name:** Tamisha Palmer  
**LRC Date:** 04/20/2022  
**Laboratory Job Number:** 221028  
**Prep Batch Number(s):** PB22040403, PB22040405

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S1	O, I	<b>Initial calibration (ICAL)</b>		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	NA	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	<b>Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):</b>		
	I	Was the CCV analyzed at the method-required frequency?	NA	
	I	Were percent differences for each analyte within the method-required QC limits?	NA	
	I	Was the ICAL curve verified for each analyte?	NA	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	NA	
S3	O	<b>Mass spectral tuning:</b>		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	<b>Internal standards (IS):</b>		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	<b>Raw data (NELAC section 1 appendix A glossary, and section 5.)</b>		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

## Radium Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	O	<b>Dual column confirmation</b>		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	<b>Tentatively identified compounds (TICs):</b>		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	<b>Interference Check Sample (ICS) results:</b>		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	<b>Serial dilutions, post digestion spikes, and method of standard additions</b>		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	<b>Method detection limit (MDL) studies</b>		
	I	Was a MDL study performed for each reported analyte?	NA	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	NA	
S11	O, I	<b>Proficiency test reports:</b>		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	<b>Standards documentation</b>		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	<b>Compound/analyte identification procedures</b>		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	<b>Demonstration of analyst competency (DOC)</b>		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	<b>Verification/validation documentation for methods (NELAC Chap 5n 5)</b>		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	<b>Laboratory standard operating procedures (SOPs):</b>		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	



## Radium Laboratory Review Checklist

### Table 3. Exception Reports.

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory

**Project Name:** Pirkey Power

**Reviewer Name:** Tamisha Palmer

**LRC Date:** 04/20/2022

**Laboratory Job Number:** 221028

**Prep Batch Number(s):** PB22040403, PB22040405

Exception Report No.	Description
ER1	PB22040405 RPD exceeded 25%; results less than critical value/MDA 0.95

<sup>1</sup> Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.

<sup>2</sup> O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

<sup>3</sup> NA - Not applicable; NR - Not reviewed.

<sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

# Radium Laboratory Review Checklist

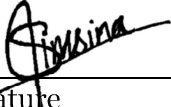
## Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

**Release Statement:** I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

**Check, if applicable:**  This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Sunita Timsina		Chemist Associate	04/13/2022
Name (printed)	Signature	Official Title	Date

## Radium Laboratory Review Checklist

**Table 1. Reportable Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey Power Station  
**Reviewer Name:** Sunita Timsina  
**LRC Date:** 04/13/2022  
**Laboratory Job Number:** 221028  
**Prep Batch Number(s):** PB22040402

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
R1	O, I	<b>Chain-of-custody (COC)</b>		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	<b>Sample and quality control (QC) identification</b>		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	<b>Test reports</b>		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	<b>Surrogate recovery data</b>		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	<b>Test reports/summary forms for blank samples</b>		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

## Radium Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	<b>Laboratory control samples (LCS):</b>		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	<b>Matrix spike (MS) and matrix spike duplicate (MSD) data</b>		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	<b>Analytical duplicate data</b>		
	I	Were appropriate analytical duplicates analyzed for each matrix?	NA	
	I	Were analytical duplicates analyzed at the appropriate frequency?	NA	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	NA	
R9	O, I	<b>Method quantitation limits (MQLs):</b>		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	<b>Other problems/anomalies</b>		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

## Radium Laboratory Review Checklist

**Table 2. Supporting Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey Power Station  
**Reviewer Name:** Sunita Timsina  
**LRC Date:** 04/13/2022  
**Laboratory Job Number:** 221028  
**Prep Batch Number(s):** PB22040402

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S1	O, I	<b>Initial calibration (ICAL)</b>		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	NA	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	<b>Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):</b>		
	I	Was the CCV analyzed at the method-required frequency?	NA	
	I	Were percent differences for each analyte within the method-required QC limits?	NA	
	I	Was the ICAL curve verified for each analyte?	NA	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	NA	
S3	O	<b>Mass spectral tuning:</b>		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	<b>Internal standards (IS):</b>		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	<b>Raw data (NELAC section 1 appendix A glossary, and section 5.)</b>		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

## Radium Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	O	<b>Dual column confirmation</b>		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	<b>Tentatively identified compounds (TICs):</b>		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	<b>Interference Check Sample (ICS) results:</b>		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	<b>Serial dilutions, post digestion spikes, and method of standard additions</b>		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	<b>Method detection limit (MDL) studies</b>		
	I	Was a MDL study performed for each reported analyte?	NA	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	NA	
S11	O, I	<b>Proficiency test reports:</b>		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	<b>Standards documentation</b>		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	<b>Compound/analyte identification procedures</b>		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	<b>Demonstration of analyst competency (DOC)</b>		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	<b>Verification/validation documentation for methods (NELAC Chap 5n 5)</b>		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	<b>Laboratory standard operating procedures (SOPs):</b>		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

## Radium Laboratory Review Checklist

**Table 3. Exception Reports.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey Power Station  
**Reviewer Name:** Sunita Timsina  
**LRC Date:** 04/13/2022  
**Laboratory Job Number:** 221028  
**Prep Batch Number(s):** PB22040402

Exception Report No.	Description

<sup>1</sup> Items identified by the letter “R” must be available as a hard copy or as a .pdf file. Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period.  
<sup>2</sup> O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).  
<sup>3</sup> NA - Not applicable; NR - Not reviewed.  
<sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is “No” or “NR.”

# Radium Laboratory Review Checklist

## Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

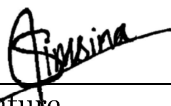
- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

**Release Statement:** I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

**Check, if applicable:**  This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Sunita Timsina

Name (printed)

  
Signature

Chemist Associate

Official Title

04/22/2022

Date



## Radium Laboratory Review Checklist

**Table 1. Reportable Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey Power Station  
**Reviewer Name:** Sunita Timsina  
**LRC Date:** 04/22/2022  
**Laboratory Job Number:** 221028  
**Prep Batch Number(s):** PB22040708

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
R1	O, I	<b>Chain-of-custody (COC)</b>		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	<b>Sample and quality control (QC) identification</b>		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	<b>Test reports</b>		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	<b>Surrogate recovery data</b>		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	<b>Test reports/summary forms for blank samples</b>		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

## Radium Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	<b>Laboratory control samples (LCS):</b>		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	<b>Matrix spike (MS) and matrix spike duplicate (MSD) data</b>		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	<b>Analytical duplicate data</b>		
	I	Were appropriate analytical duplicates analyzed for each matrix?	NA	
	I	Were analytical duplicates analyzed at the appropriate frequency?	NA	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	NA	
R9	O, I	<b>Method quantitation limits (MQLs):</b>		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	<b>Other problems/anomalies</b>		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

## Radium Laboratory Review Checklist

**Table 2. Supporting Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey Power Station  
**Reviewer Name:** Sunita Timsina  
**LRC Date:** 04/22/2022  
**Laboratory Job Number:** 221028  
**Prep Batch Number(s):** PB22040708

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S1	O, I	<b>Initial calibration (ICAL)</b>		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	NA	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	<b>Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):</b>		
	I	Was the CCV analyzed at the method-required frequency?	NA	
	I	Were percent differences for each analyte within the method-required QC limits?	NA	
	I	Was the ICAL curve verified for each analyte?	NA	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	NA	
S3	O	<b>Mass spectral tuning:</b>		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	<b>Internal standards (IS):</b>		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	<b>Raw data (NELAC section 1 appendix A glossary, and section 5.)</b>		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

## Radium Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	O	<b>Dual column confirmation</b>		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	<b>Tentatively identified compounds (TICs):</b>		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	<b>Interference Check Sample (ICS) results:</b>		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	<b>Serial dilutions, post digestion spikes, and method of standard additions</b>		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	<b>Method detection limit (MDL) studies</b>		
	I	Was a MDL study performed for each reported analyte?	NA	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	NA	
S11	O, I	<b>Proficiency test reports:</b>		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	<b>Standards documentation</b>		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	<b>Compound/analyte identification procedures</b>		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	<b>Demonstration of analyst competency (DOC)</b>		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	<b>Verification/validation documentation for methods (NELAC Chap 5n 5)</b>		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	<b>Laboratory standard operating procedures (SOPs):</b>		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

# Radium Laboratory Review Checklist

**Table 3. Exception Reports.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey Power Station  
**Reviewer Name:** Sunita Timsina  
**LRC Date:** 04/22/2022  
**Laboratory Job Number:** 221028  
**Prep Batch Number(s):** PB22040708

Exception Report No.	Description

<sup>1</sup> Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.  
<sup>2</sup> O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).  
<sup>3</sup> NA - Not applicable; NR - Not reviewed.  
<sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

# ICP-MS Laboratory Review Checklist

## Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

**Release Statement:** I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

**Check, if applicable:**  This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Jonathan Barnhill		Supervisor	12/5/2022
Name (printed)	Signature	Official Title	Date

# ICP-MS Laboratory Review Checklist

**Table 1. Reportable Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey CCR  
**Reviewer Name:** Jonathan Barnhill  
**LRC Date:** 12/5/2022  
**Laboratory Job Number:** 221028  
**Prep Batch Number(s):** PB22040605 PB22040606 QC2204153 QC2204159

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
R1	O, I	<b>Chain-of-custody (COC)</b>		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	<b>Sample and quality control (QC) identification</b>		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	<b>Test reports</b>		
	I	Were all samples prepared and analyzed within holding times?		
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	No	ER1
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	<b>Surrogate recovery data</b>		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	<b>Test reports/summary forms for blank samples</b>		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

## ICP-MS Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	<b>Laboratory control samples (LCS):</b>		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	<b>Matrix spike (MS) and matrix spike duplicate (MSD) data</b>		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	No	ER3
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	<b>Analytical duplicate data</b>		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	<b>Method quantitation limits (MQLs):</b>		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	<b>Other problems/anomalies</b>		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	



## ICP-MS Laboratory Review Checklist

**Table 2. Supporting Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory

**Project Name:** Pirkey CCR

**Reviewer Name:** Jonathan Barnhill

**LRC Date:** 12/5/2022

**Laboratory Job Number:** 221028

**Prep Batch Number(s):** PB22040605 PB22040606 QC2204153 QC2204159

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S1	O, I	<b>Initial calibration (ICAL)</b>		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	Yes	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	<b>Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):</b>		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER2
S3	O	<b>Mass spectral tuning:</b>		
	I	Was the appropriate compound for the method used for tuning?	Yes	
	I	Were ion abundance data within the method-required QC limits?	Yes	
S4	O	<b>Internal standards (IS):</b>		
	I	Were IS area counts and retention times within the method-required QC limits?	Yes	
S5	O, I	<b>Raw data (NELAC section 1 appendix A glossary, and section 5.)</b>		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

## ICP-MS Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	O	<b>Dual column confirmation</b>		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	<b>Tentatively identified compounds (TICs):</b>		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	<b>Interference Check Sample (ICS) results:</b>		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	<b>Serial dilutions, post digestion spikes, and method of standard additions</b>		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	<b>Method detection limit (MDL) studies</b>		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	<b>Proficiency test reports:</b>		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	<b>Standards documentation</b>		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	<b>Compound/analyte identification procedures</b>		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	<b>Demonstration of analyst competency (DOC)</b>		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	<b>Verification/validation documentation for methods (NELAC Chap 5n 5)</b>		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	<b>Laboratory standard operating procedures (SOPs):</b>		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

## ICP-MS Laboratory Review Checklist

**Table 3. Exception Reports.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey CCR  
**Reviewer Name:** Jonathan Barnhill  
**LRC Date:** 12/5/2022  
**Laboratory Job Number:** 221028  
**Prep Batch Number(s):** PB22040605 PB22040606 QC2204153 QC2204159

Exception Report No.	Description
ER1	Linear Dynamic Range (LDR) study used to determine upper limit of analyte calibration.
ER2	CCB acceptance criteria is $CCB < 2.2 * MDL$ .
ER3	MS/MSD failure on sample 221028-001 for Na.
	MS/MSD failure on sample 221028-011 for Na.

<sup>1</sup> Items identified by the letter “R” must be available as a hard copy or as a .pdf file. Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period.  
<sup>2</sup> O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).  
<sup>3</sup> NA - Not applicable; NR - Not reviewed.  
<sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is “No” or “NR.”



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 221988

Customer: Pirkey Power Station

Date Reported: 12/27/2022

Customer Sample ID: AD-32

Customer Description:

Lab Number: 221988-001

Preparation:

Date Collected: 06/20/2022 10:51 EDT

Date Received: 06/24/2022 11:48 EDT

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	6.70	mg/L	2	0.10	0.02		CRJ	07/08/2022 00:31	EPA 300.1 -1997, Rev. 1.0
Chloride	30.6	mg/L	2	0.04	0.02		CRJ	07/08/2022 00:31	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.42	mg/L	2	0.06	0.02		CRJ	07/08/2022 00:31	EPA 300.1 -1997, Rev. 1.0
Sulfate	147	mg/L	25	5.0	0.8		CRJ	07/07/2022 22:22	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	320	mg/L	1	50	20		SDW	06/27/2022 08:39	SM 2540C-2015

Customer Sample ID: AD-33

Customer Description:

Lab Number: 221988-002

Preparation:

Date Collected: 06/20/2022 11:37 EDT

Date Received: 06/24/2022 11:48 EDT

## 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	07/08/2022 01:23	EPA 300.1 -1997, Rev. 1.0
Chloride	8.49	mg/L	2	0.04	0.02		CRJ	07/08/2022 01:23	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.19	mg/L	2	0.06	0.02		CRJ	07/08/2022 01:23	EPA 300.1 -1997, Rev. 1.0
Sulfate	57.7	mg/L	10	2.0	0.3		CRJ	07/07/2022 22:47	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	150	mg/L	1	50	20		SDW	06/27/2022 08:39	SM 2540C-2015



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 221988

Customer: Pirkey Power Station

Date Reported: 12/27/2022

Customer Sample ID: Duplicate-1

Customer Description:

Lab Number: 221988-003

Preparation:

Date Collected: 06/20/2022 15:00 EDT

Date Received: 06/24/2022 11:48 EDT

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.26	mg/L	5	0.25	0.05		CRJ	07/08/2022 01:48	EPA 300.1 -1997, Rev. 1.0
Chloride	55.1	mg/L	5	0.10	0.05		CRJ	07/08/2022 01:48	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.33	mg/L	5	0.15	0.05		CRJ	07/08/2022 01:48	EPA 300.1 -1997, Rev. 1.0
Sulfate	165	mg/L	50	10	2		CRJ	07/07/2022 23:13	EPA 300.1 -1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	260	mg/L	1	50	20		SDW	06/27/2022 08:48	SM 2540C-2015

221988

Job Comments:

Original report issued 7/28/2022. Report reissued with amended Matrix Spike precision calculations.

## 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. ALL TIMES LISTED ARE IN THE EASTERN TIME ZONE.**



## Water Analysis Report

**Reissued**

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Job ID: 221988**

**Customer: Pirkey Power Station**

**Date Reported: 12/27/2022**

### Data Qualifier Legend

U1 - Not detected at or above method detection limit (MDL).

# Chain of Custody Record

**Program: Coal Combustion Residuals (CCR)**

**Dolan Chemical Laboratory (DCL)**  
 4001 Bixby Road  
 Groveport, Ohio 43125  
**Contacts: 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

**For Lab Use Only:**

**COC/Order #:** 221988

**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.	Field Analysis				Sample Specific Notes
						250 mL bottle, pH<2, HNO3	Field-filter 250 mL bottle, then pH<2, HNO3	1 L bottle, Cool, 0-5C, 10th	Three (six every 10th) 1 L bottles, pH<2, HNO3	
AD-32	6/20/2022	951	G	GW	1	Mercury	Dissolved Mercury	F, Cl, SO4, Br, TDS, Alkalinity	Ra-226, Ra-228	
AD-33	6/20/2022	1037	G	GW	1					
Duplicate - 1	6/20/2022	1400	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:	Company:	Date/Time:	Received by:	Date/Time:
<i>[Signature]</i>	Esge	6/23/22 160	<i>[Signature]</i>	6/24/22 10:30 AM
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Date/Time:



# WATER & WASTE SAMPLE RECEIPT FORM (IR#1)

<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>Pukey</u>			Number of Plastic Containers: <u>3</u>		
Opened By <u>MGK</u>			Number of Glass Containers: _____		
Date/Time <u>6/24/22 10:30 AM</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 (IR Gun Ser# 210441568, Expir. 5/27/2023) - 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>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: MGK 6/24/22

pH paper (circle one): MQuant pH Cat 1.09535.0001 lot HC904495 [OR] Lab rat pH Cat # LRS -4801 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# 221988 Initial & Date & Time : \_\_\_\_\_

Logged by JAB Comments: \_\_\_\_\_

Reviewed by [Signature] \_\_\_\_\_

**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.



# Alkalinity Laboratory Review Checklist

## Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

**Release Statement:** I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

**Check, if applicable:**  This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Michael Ohlinger  
Name (printed)

 Chemist  
Signature Official Title

7/28/22  
Date

## Alkalinity Laboratory Review Checklist

**Table 1. Reportable Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey PP CCR  
**Reviewer Name:** Michael Ohlinger  
**LRC Date:** 7/28/22  
**Laboratory Job Number:** 221988  
**Prep Batch Number(s):** QC2206187

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
R1	O, I	<b>Chain-of-custody (COC)</b>		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	<b>Sample and quality control (QC) identification</b>		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	<b>Test reports</b>		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	<b>Surrogate recovery data</b>		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	<b>Test reports/summary forms for blank samples</b>		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

## Alkalinity Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	<b>Laboratory control samples (LCS):</b>		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	<b>Matrix spike (MS) and matrix spike duplicate (MSD) data</b>		
	I	Were the project/method specified analytes included in the MS and MSD?	NA	
	I	Were MS/MSD analyzed at the appropriate frequency?	NA	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NA	
	I	Were MS/MSD RPDs within laboratory QC limits?	NA	
R8	O, I	<b>Analytical duplicate data</b>		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	<b>Method quantitation limits (MQLs):</b>		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	<b>Other problems/anomalies</b>		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

## Alkalinity Laboratory Review Checklist

**Table 2. Supporting Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey PP CCR  
**Reviewer Name:** Michael Ohlinger  
**LRC Date:** 7/28/22  
**Laboratory Job Number:** 221988  
**Prep Batch Number(s):** QC2206187

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S1	O, I	<b>Initial calibration (ICAL)</b>		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	NA	
	I	Was the number of standards recommended in the method used for all analytes?	NA	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	Yes	
	I	Are ICAL data available for all instruments used?	NA	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	NA	
S2	O, I	<b>Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):</b>		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER1
S3	O	<b>Mass spectral tuning:</b>		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	<b>Internal standards (IS):</b>		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	<b>Raw data (NELAC section 1 appendix A glossary, and section 5.)</b>		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

## Alkalinity Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	O	<b>Dual column confirmation</b>		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	<b>Tentatively identified compounds (TICs):</b>		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	<b>Interference Check Sample (ICS) results:</b>		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	<b>Serial dilutions, post digestion spikes, and method of standard additions</b>		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	<b>Method detection limit (MDL) studies</b>		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	<b>Proficiency test reports:</b>		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	<b>Standards documentation</b>		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	<b>Compound/analyte identification procedures</b>		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	<b>Demonstration of analyst competency (DOC)</b>		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	<b>Verification/validation documentation for methods (NELAC Chap 5n 5)</b>		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	<b>Laboratory standard operating procedures (SOPs):</b>		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

# Alkalinity Laboratory Review Checklist

**Table 3. Exception Reports.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey PP CCR  
**Reviewer Name:** Michael Ohlinger  
**LRC Date:** 7/28/22  
**Laboratory Job Number:** 221988  
**Prep Batch Number(s):** QC2206187

Exception Report No.	Description
ER1	CCB acceptance criteria is CCB<0.5*MQL.

- <sup>1</sup> Items identified by the letter “R” must be available as a hard copy or as a .pdf file. Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period.
- <sup>2</sup> O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).
- <sup>3</sup> NA - Not applicable; NR - Not reviewed.
- <sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is “No” or “NR.”

# Ion Chromatography Laboratory Review Checklist

## Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

**Release Statement:** I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

**Check, if applicable:**  This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Timothy E. Arnold		Chemist Principle	7/11/2022
Name (printed)	Signature	Official Title	Date

## Ion Chromatography Laboratory Review Checklist

**Table 1. Reportable Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey PP CCR  
**Reviewer Name:** Timothy E. Arnold  
**LRC Date:** 7/11/2022  
**Laboratory Job Number:** 221988  
**Prep Batch Number(s):** QC2207069

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
R1	O, I	<b>Chain-of-custody (COC)</b>		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	<b>Sample and quality control (QC) identification</b>		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	<b>Test reports</b>		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	Yes	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	<b>Surrogate recovery data</b>		
	I	Were surrogates added prior to extraction?	Yes	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	Yes	
R5	O, I	<b>Test reports/summary forms for blank samples</b>		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	



## Ion Chromatography Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	<b>Laboratory control samples (LCS):</b>		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	<b>Matrix spike (MS) and matrix spike duplicate (MSD) data</b>		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	<b>Analytical duplicate data</b>		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	<b>Method quantitation limits (MQLs):</b>		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	<b>Other problems/anomalies</b>		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

## Ion Chromatography Laboratory Review Checklist

**Table 2. Supporting Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory

**Project Name:** Pirkey PP CCR

**Reviewer Name:** Timothy E. Arnold

**LRC Date:** 7/11/2022

**Laboratory Job Number:** 221988

**Prep Batch Number(s):** QC2207069

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S1	O, I	<b>Initial calibration (ICAL)</b>		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	Yes	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	<b>Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):</b>		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER1
S3	O	<b>Mass spectral tuning:</b>		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	<b>Internal standards (IS):</b>		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	<b>Raw data (NELAC section 1 appendix A glossary, and section 5.)</b>		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

## Ion Chromatography Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	O	<b>Dual column confirmation</b>		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	<b>Tentatively identified compounds (TICs):</b>		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	<b>Interference Check Sample (ICS) results:</b>		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	<b>Serial dilutions, post digestion spikes, and method of standard additions</b>		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	<b>Method detection limit (MDL) studies</b>		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	<b>Proficiency test reports:</b>		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	<b>Standards documentation</b>		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	<b>Compound/analyte identification procedures</b>		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	<b>Demonstration of analyst competency (DOC)</b>		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	<b>Verification/validation documentation for methods (NELAC Chap 5n 5)</b>		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	<b>Laboratory standard operating procedures (SOPs):</b>		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

## Ion Chromatography Laboratory Review Checklist

**Table 3. Exception Reports.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey PP CCR  
**Reviewer Name:** Timothy E. Arnold  
**LRC Date:** 7/11/2022  
**Laboratory Job Number:** 221988  
**Prep Batch Number(s):** QC2207069

Exception Report No.	Description
ER1	CCB acceptance criteria is CCB<MQL.

<sup>1</sup> Items identified by the letter “R” must be available as a hard copy or as a .pdf file. Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period.

<sup>2</sup> O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

<sup>3</sup> NA - Not applicable; NR - Not reviewed.

<sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is “No” or “NR.”

# TDS Laboratory Review Checklist

## Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

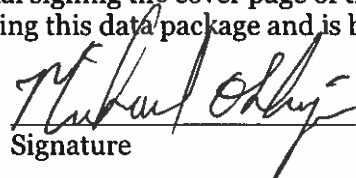
- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- NA R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

**Release Statement:** I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

**Check, if applicable:**  This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Michael Ohlinger

Name (printed)



Signature

Chemist

Official Title

7/28/22

Date

## TDS Laboratory Review Checklist

**Table 1. Reportable Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey PP CCR  
**Reviewer Name:** Michael Ohlinger  
**LRC Date:** 7/28/22  
**Laboratory Job Number:** 221988  
**Prep Batch Number(s):** QC2207061

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
R1	O, I	<b>Chain-of-custody (COC)</b>		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	NA	
R2	O, I	<b>Sample and quality control (QC) identification</b>		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	<b>Test reports</b>		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	<b>Surrogate recovery data</b>		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	<b>Test reports/summary forms for blank samples</b>		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

## TDS Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	<b>Laboratory control samples (LCS):</b>		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	<b>Matrix spike (MS) and matrix spike duplicate (MSD) data</b>		
	I	Were the project/method specified analytes included in the MS and MSD?	NA	
	I	Were MS/MSD analyzed at the appropriate frequency?	NA	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NA	
	I	Were MS/MSD RPDs within laboratory QC limits?	NA	
R8	O, I	<b>Analytical duplicate data</b>		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	<b>Method quantitation limits (MQLs):</b>		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	<b>Other problems/anomalies</b>		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

## TDS Laboratory Review Checklist

**Table 2. Supporting Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory

**Project Name:** Pirkey PP CCR

**Reviewer Name:** Michael Ohlinger

**LRC Date:** 4/5/22

**Laboratory Job Number:** 221988

**Prep Batch Number(s):** QC2207061

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S1	O, I	<b>Initial calibration (ICAL)</b>		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	NA	
	I	Was the number of standards recommended in the method used for all analytes?	NA	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	NA	
	I	Are ICAL data available for all instruments used?	NA	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	NA	
S2	O, I	<b>Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):</b>		
	I	Was the CCV analyzed at the method-required frequency?	NA	
	I	Were percent differences for each analyte within the method-required QC limits?	NA	
	I	Was the ICAL curve verified for each analyte?	NA	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	NA	
S3	O	<b>Mass spectral tuning:</b>		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	<b>Internal standards (IS):</b>		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	<b>Raw data (NELAC section 1 appendix A glossary, and section 5.)</b>		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	



## TDS Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	O	<b>Dual column confirmation</b>		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	<b>Tentatively identified compounds (TICs):</b>		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	<b>Interference Check Sample (ICS) results:</b>		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	<b>Serial dilutions, post digestion spikes, and method of standard additions</b>		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	<b>Method detection limit (MDL) studies</b>		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	<b>Proficiency test reports:</b>		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	<b>Standards documentation</b>		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	<b>Compound/analyte identification procedures</b>		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	<b>Demonstration of analyst competency (DOC)</b>		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	<b>Verification/validation documentation for methods (NELAC Chap 5n 5)</b>		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	<b>Laboratory standard operating procedures (SOPs):</b>		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	





# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 221989

Customer: Pirkey Power Station

Date Reported: 12/27/2022

Customer Sample ID: AD-2

Customer Description:

Lab Number: 221989-001

Preparation:

Date Collected: 06/21/2022 09:49 EDT

Date Received: 06/24/2022 11:56 EDT

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.32	mg/L	2	0.10	0.02		CRJ	07/06/2022 20:44	EPA 300.1-1997, Rev. 1.0
Chloride	29.7	mg/L	10	0.2	0.1		CRJ	07/06/2022 20:18	EPA 300.1-1997, Rev. 1.0
Fluoride	0.21	mg/L	2	0.06	0.02		CRJ	07/06/2022 20:44	EPA 300.1-1997, Rev. 1.0
Sulfate	259	mg/L	10	2.0	0.3		CRJ	07/06/2022 20:18	EPA 300.1-1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	490	mg/L	1	50	20		SDW	06/27/2022 13:08	SM 2540C-2015

Customer Sample ID: AD-3

Customer Description:

Lab Number: 221989-002

Preparation:

Date Collected: 06/21/2022 12:23 EDT

Date Received: 06/24/2022 11:56 EDT

## 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	07/06/2022 19:53	EPA 300.1-1997, Rev. 1.0
Chloride	5.65	mg/L	2	0.04	0.02		CRJ	07/06/2022 19:53	EPA 300.1-1997, Rev. 1.0
Fluoride	0.04	mg/L	2	0.06	0.02	J1	CRJ	07/06/2022 19:53	EPA 300.1-1997, Rev. 1.0
Sulfate	21.2	mg/L	2	0.40	0.06		CRJ	07/06/2022 19:53	EPA 300.1-1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	150	mg/L	1	50	20	P1, H2	SDW	06/29/2022 11:00	SM 2540C-2015



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 221989

Customer: Pirkey Power Station

Date Reported: 12/27/2022

Customer Sample ID: AD-4

Customer Description:

Lab Number: 221989-003

Preparation:

Date Collected: 06/21/2022 11:34 EDT

Date Received: 06/24/2022 11:56 EDT

## 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	07/06/2022 21:36	EPA 300.1-1997, Rev. 1.0
Chloride	3.92	mg/L	2	0.04	0.02		CRJ	07/06/2022 21:36	EPA 300.1-1997, Rev. 1.0
Fluoride	0.05	mg/L	2	0.06	0.02	J1	CRJ	07/06/2022 21:36	EPA 300.1-1997, Rev. 1.0
Sulfate	20.5	mg/L	2	0.40	0.06		CRJ	07/06/2022 21:36	EPA 300.1-1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	160	mg/L	1	50	20		SDW	06/27/2022 13:15	SM 2540C-2015

Customer Sample ID: AD-7

Customer Description:

Lab Number: 221989-004

Preparation:

Date Collected: 06/21/2022 10:47 EDT

Date Received: 06/24/2022 11:56 EDT

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	3.56	mg/L	2	0.10	0.02		CRJ	07/06/2022 22:28	EPA 300.1-1997, Rev. 1.0
Chloride	53.1	mg/L	10	0.2	0.1		CRJ	07/06/2022 22:02	EPA 300.1-1997, Rev. 1.0
Fluoride	0.30	mg/L	2	0.06	0.02		CRJ	07/06/2022 22:28	EPA 300.1-1997, Rev. 1.0
Sulfate	71.1	mg/L	10	2.0	0.3		CRJ	07/06/2022 22:02	EPA 300.1-1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	290	mg/L	1	50	20		SDW	06/27/2022 13:15	SM 2540C-2015



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 221989

Customer: Pirkey Power Station

Date Reported: 12/27/2022

Customer Sample ID: AD-12

Customer Description:

Lab Number: 221989-005

Preparation:

Date Collected: 06/20/2022 09:52 EDT

Date Received: 06/24/2022 11:56 EDT

## 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	07/06/2022 23:19	EPA 300.1-1997, Rev. 1.0
Chloride	7.59	mg/L	2	0.04	0.02		CRJ	07/06/2022 23:19	EPA 300.1-1997, Rev. 1.0
Fluoride	0.09	mg/L	2	0.06	0.02		CRJ	07/06/2022 23:19	EPA 300.1-1997, Rev. 1.0
Sulfate	4.81	mg/L	2	0.40	0.06		CRJ	07/06/2022 23:19	EPA 300.1-1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	80	mg/L	1	50	20		SDW	06/27/2022 08:30	SM 2540C-2015

Customer Sample ID: AD-13

Customer Description:

Lab Number: 221989-006

Preparation:

Date Collected: 06/20/2022 09:43 EDT

Date Received: 06/24/2022 11:56 EDT

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.30	mg/L	2	0.10	0.02		CRJ	07/07/2022 03:12	EPA 300.1-1997, Rev. 1.0
Chloride	54.5	mg/L	25	0.5	0.3		CRJ	07/07/2022 02:46	EPA 300.1-1997, Rev. 1.0
Fluoride	0.26	mg/L	2	0.06	0.02		CRJ	07/07/2022 03:12	EPA 300.1-1997, Rev. 1.0
Sulfate	138	mg/L	25	5.0	0.8		CRJ	07/07/2022 02:46	EPA 300.1-1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	270	mg/L	2	100	40		SDW	06/27/2022 08:30	SM 2540C-2015



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 221989

Customer: Pirkey Power Station

Date Reported: 12/27/2022

Customer Sample ID: AD-17

Customer Description:

Lab Number: 221989-007

Preparation:

Date Collected: 06/21/2022 11:40 EDT

Date Received: 06/24/2022 11:56 EDT

## 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	07/06/2022 23:45	EPA 300.1-1997, Rev. 1.0
Chloride	30.2	mg/L	2	0.04	0.02		CRJ	07/06/2022 23:45	EPA 300.1-1997, Rev. 1.0
Fluoride	0.30	mg/L	2	0.06	0.02		CRJ	07/06/2022 23:45	EPA 300.1-1997, Rev. 1.0
Sulfate	5.78	mg/L	2	0.40	0.06		CRJ	07/06/2022 23:45	EPA 300.1-1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	90	mg/L	1	50	20		SDW	06/27/2022 13:22	SM 2540C-2015

Customer Sample ID: AD-18

Customer Description:

Lab Number: 221989-008

Preparation:

Date Collected: 06/21/2022 09:17 EDT

Date Received: 06/24/2022 11:56 EDT

## 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	07/07/2022 02:20	EPA 300.1-1997, Rev. 1.0
Chloride	5.20	mg/L	2	0.04	0.02		CRJ	07/07/2022 02:20	EPA 300.1-1997, Rev. 1.0
Fluoride	<0.02	mg/L	2	0.06	0.02	U1	CRJ	07/07/2022 02:20	EPA 300.1-1997, Rev. 1.0
Sulfate	6.47	mg/L	2	0.40	0.06		CRJ	07/07/2022 02:20	EPA 300.1-1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	110	mg/L	1	50	20		SDW	06/27/2022 13:22	SM 2540C-2015



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 221989

Customer: Pirkey Power Station

Date Reported: 12/27/2022

Customer Sample ID: AD-22

Customer Description:

Lab Number: 221989-009

Preparation:

Date Collected: 06/20/2022 10:53 EDT

Date Received: 06/24/2022 11:56 EDT

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.79	mg/L	2	0.10	0.02		CRJ	07/07/2022 07:57	EPA 300.1-1997, Rev. 1.0
Chloride	107	mg/L	25	0.5	0.3		CRJ	07/07/2022 05:47	EPA 300.1-1997, Rev. 1.0
Fluoride	0.32	mg/L	2	0.06	0.02		CRJ	07/07/2022 07:57	EPA 300.1-1997, Rev. 1.0
Sulfate	293	mg/L	25	5.0	0.8		CRJ	07/07/2022 05:47	EPA 300.1-1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	580	mg/L	2	100	40		SDW	06/27/2022 08:48	SM 2540C-2015

Customer Sample ID: AD-28

Customer Description:

Lab Number: 221989-010

Preparation:

Date Collected: 06/21/2022 10:56 EDT

Date Received: 06/24/2022 11:56 EDT

## 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	07/07/2022 04:04	EPA 300.1-1997, Rev. 1.0
Chloride	4.36	mg/L	2	0.04	0.02		CRJ	07/07/2022 04:04	EPA 300.1-1997, Rev. 1.0
Fluoride	0.61	mg/L	2	0.06	0.02		CRJ	07/07/2022 04:04	EPA 300.1-1997, Rev. 1.0
Sulfate	28.0	mg/L	2	0.40	0.06		CRJ	07/07/2022 04:04	EPA 300.1-1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	110	mg/L	1	50	20		SDW	06/27/2022 13:29	SM 2540C-2015



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 221989

Customer: Pirkey Power Station

Date Reported: 12/27/2022

Customer Sample ID: AD-30

Customer Description:

Lab Number: 221989-011

Preparation:

Date Collected: 06/20/2022 12:29 EDT

Date Received: 06/24/2022 11:56 EDT

## 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	07/07/2022 04:56	EPA 300.1-1997, Rev. 1.0
Chloride	26.0	mg/L	2	0.04	0.02		CRJ	07/07/2022 04:56	EPA 300.1-1997, Rev. 1.0
Fluoride	0.06	mg/L	2	0.06	0.02		CRJ	07/07/2022 04:56	EPA 300.1-1997, Rev. 1.0
Sulfate	177	mg/L	10	2.0	0.3		CRJ	07/07/2022 04:30	EPA 300.1-1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	340	mg/L	1	50	20		SDW	06/27/2022 09:01	SM 2540C-2015

Customer Sample ID: AD-31

Customer Description:

Lab Number: 221989-012

Preparation:

Date Collected: 06/20/2022 11:43 EDT

Date Received: 06/24/2022 11:56 EDT

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.29	mg/L	5	0.25	0.05		CRJ	07/11/2022 15:51	EPA 300.1-1997, Rev. 1.0
Chloride	23.2	mg/L	5	0.10	0.05		CRJ	07/11/2022 15:51	EPA 300.1-1997, Rev. 1.0
Fluoride	0.14	mg/L	5	0.15	0.05	J1	CRJ	07/11/2022 15:51	EPA 300.1-1997, Rev. 1.0
Sulfate	89.0	mg/L	10	2.0	0.3		CRJ	07/07/2022 06:13	EPA 300.1-1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	06/28/2022 10:03	SM 2320B-2011
TDS, Filterable Residue	270	mg/L	1	50	20		SDW	06/27/2022 08:55	SM 2540C-2015

221989

Job Comments:

Original report issued 7/29/2022. Report reissued with amended Matrix Spike precision calculations.





## Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 221989

Customer: Pirkey Power Station

Date Reported: 12/27/2022

### 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. ALL TIMES LISTED ARE IN THE EASTERN TIME ZONE.**

### 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.

P1 - The precision between duplicate results was above acceptance limits.

H2 - Sample analysis performed past holding time.

# Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

**Dolan Chemical Laboratory (DCL)**  
 4001 Bixby Road  
 Groveport, Ohio 43125  
**Contacts:** Michael Ohlinger (614-836-4184)  
 Dave Conover (614-836-4219)

Project Name: Pirkey PP Semi-Annual CCR  
 Contact Name: Leslie Fuerschbach  
 Contact Phone: 319-673-2744

Sampler(s): Matt Hamilton, Kenny McDonald

For Lab Use Only:  
 COC/Order #: *22-1989*  
*22-1989*

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				Sample Specific Notes	
						250 mL bottle, pH<2, HNO3	Field-filter 250 mL bottle, then pH<2, HNO3	1 L bottle, Cool, 0-6C 10th*	Three (six every 10th*) L bottles, pH<2, HNO3		
AD-2	6/21/2022	849	G	GW	1						
AD-3	6/21/2022	1123	G	GW	1						
AD-4	6/21/2022	1034	G	GW	1						
AD-7	6/21/2022	947	G	GW	1						
AD-12	6/20/2022	852	G	GW	1						
AD-13	6/20/2022	843	G	GW	1						
AD-17	6/21/2022	1040	G	GW	1						
AD-18	6/21/2022	817	G	GW	1						
AD-22	6/20/2022	953	G	GW	1						
AD-28	6/21/2022	956	G	GW	1						
AD-30	6/20/2022	1129	G	GW	1						
AD-31	6/20/2022	1043	G	GW	1						
Preservation Used: 1= Ice, 2= HCl, 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other						F	F	F	F	F	F

\* Six 1L Bottles must be collected for Radium for every 10th sample.

Special Instructions/QC Requirements & Comments:

Relinquished by: <i>[Signature]</i>	Company: <i>Esck</i>	Date/Time: <i>6/23/22</i>	Received by: <i>[Signature]</i>	Date/Time: <i>6/24/22 10:30AM</i>
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: <i>[Signature]</i>	Date/Time:



# WATER & WASTE SAMPLE RECEIPT FORM (IR#1)

Package Type				Delivery Type			
<input checked="" type="radio"/> Cooler	<input type="radio"/> Box	<input type="radio"/> Bag	<input type="radio"/> Envelope	<input type="radio"/> PONY	<input checked="" type="radio"/> UPS	<input checked="" type="radio"/> FedEx	<input type="radio"/> USPS
				Other _____			

Plant/Customer Pukey Number of Plastic Containers: 12

Opened By MGK Number of Glass Containers: \_\_\_\_\_

Date/Time 6/24/22 10:30 AM Number of Mercury Containers: \_\_\_\_\_

Were all temperatures within 0-6°C?  Y /  N or N/A Initial: MGK  on ice /  no ice  
 (IR Gun Ser# 210441568, Expir. 5/27/2023) - If No, specify each deviation: \_\_\_\_\_

Was container in good condition?  Y /  N Comments \_\_\_\_\_

Was Chain of Custody received?  Y /  N Comments \_\_\_\_\_

Requested turnaround: Routine 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)
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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 6/24/22

pH paper (circle one): MQuant pH Cat 1.09535.0001 \_\_\_\_\_ (OR) Lab rat pH Cat # LRS -4801   
 lot HC904495 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# 221989 Initial & Date & Time : \_\_\_\_\_

Logged by JAB Comments: \_\_\_\_\_

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.

# Alkalinity Laboratory Review Checklist

## Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

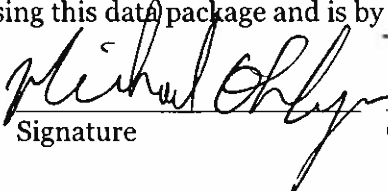
- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

**Release Statement:** I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

**Check, if applicable:**  This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Michael Ohlinger

Name (printed)



Signature

Chemist

Official Title

7/29/22

Date

## Alkalinity Laboratory Review Checklist

**Table 1. Reportable Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey PP Semi-Annual CCR  
**Reviewer Name:** Michael Ohlinger  
**LRC Date:** 7/29/22  
**Laboratory Job Number:** 221989  
**Prep Batch Number(s):** QC2206187

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
R1	O, I	<b>Chain-of-custody (COC)</b>		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	<b>Sample and quality control (QC) identification</b>		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	<b>Test reports</b>		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	<b>Surrogate recovery data</b>		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	<b>Test reports/summary forms for blank samples</b>		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

## Alkalinity Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	<b>Laboratory control samples (LCS):</b>		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	<b>Matrix spike (MS) and matrix spike duplicate (MSD) data</b>		
	I	Were the project/method specified analytes included in the MS and MSD?	NA	
	I	Were MS/MSD analyzed at the appropriate frequency?	NA	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NA	
	I	Were MS/MSD RPDs within laboratory QC limits?	NA	
R8	O, I	<b>Analytical duplicate data</b>		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	<b>Method quantitation limits (MQLs):</b>		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	<b>Other problems/anomalies</b>		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

## Alkalinity Laboratory Review Checklist

**Table 2. Supporting Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey PP Semi-Annual CCR  
**Reviewer Name:** Michael Ohlinger  
**LRC Date:** 7/29/22  
**Laboratory Job Number:** 221989  
**Prep Batch Number(s):** QC2206187

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S1	O, I	<b>Initial calibration (ICAL)</b>		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	NA	
	I	Was the number of standards recommended in the method used for all analytes?	NA	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	Yes	
	I	Are ICAL data available for all instruments used?	NA	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	NA	
S2	O, I	<b>Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):</b>		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER1
S3	O	<b>Mass spectral tuning:</b>		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	<b>Internal standards (IS):</b>		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	<b>Raw data (NELAC section 1 appendix A glossary, and section 5.)</b>		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

## Alkalinity Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	O	<b>Dual column confirmation</b>		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	<b>Tentatively identified compounds (TICs):</b>		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	<b>Interference Check Sample (ICS) results:</b>		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	<b>Serial dilutions, post digestion spikes, and method of standard additions</b>		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	<b>Method detection limit (MDL) studies</b>		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	<b>Proficiency test reports:</b>		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	<b>Standards documentation</b>		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	<b>Compound/analyte identification procedures</b>		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	<b>Demonstration of analyst competency (DOC)</b>		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	<b>Verification/validation documentation for methods (NELAC Chap 5n 5)</b>		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	<b>Laboratory standard operating procedures (SOPs):</b>		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	





# Ion Chromatography Laboratory Review Checklist

## Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
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  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

**Release Statement:** I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

**Check, if applicable:**  This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Timothy E. Arnold

Name (printed)

  
Signature

Chemist Principle

Official Title

7/13/2022

Date

## Ion Chromatography Laboratory Review Checklist

**Table 1. Reportable Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey PP Semi-Annual CCR  
**Reviewer Name:** Timothy E. Arnold  
**LRC Date:** 7/13/2022  
**Laboratory Job Number:** 221989  
**Prep Batch Number(s):** QC2207051

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
R1	O, I	<b>Chain-of-custody (COC)</b>		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	<b>Sample and quality control (QC) identification</b>		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	<b>Test reports</b>		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	Yes	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	<b>Surrogate recovery data</b>		
	I	Were surrogates added prior to extraction?	Yes	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	YES	
R5	O, I	<b>Test reports/summary forms for blank samples</b>		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

## Ion Chromatography Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	<b>Laboratory control samples (LCS):</b>		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	<b>Matrix spike (MS) and matrix spike duplicate (MSD) data</b>		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	<b>Analytical duplicate data</b>		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	<b>Method quantitation limits (MQLs):</b>		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	<b>Other problems/anomalies</b>		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

## Ion Chromatography Laboratory Review Checklist

**Table 2. Supporting Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey PP Semi-Annual CCR  
**Reviewer Name:** Timothy E. Arnold  
**LRC Date:** 7/13/2022  
**Laboratory Job Number:** 221989  
**Prep Batch Number(s):** QC2207051

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S1	O, I	<b>Initial calibration (ICAL)</b>		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	Yes	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	<b>Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):</b>		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER1
S3	O	<b>Mass spectral tuning:</b>		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	<b>Internal standards (IS):</b>		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	<b>Raw data (NELAC section 1 appendix A glossary, and section 5.)</b>		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

## Ion Chromatography Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	O	<b>Dual column confirmation</b>		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	<b>Tentatively identified compounds (TICs):</b>		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	<b>Interference Check Sample (ICS) results:</b>		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	<b>Serial dilutions, post digestion spikes, and method of standard additions</b>		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	<b>Method detection limit (MDL) studies</b>		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	<b>Proficiency test reports:</b>		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	<b>Standards documentation</b>		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	<b>Compound/analyte identification procedures</b>		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	<b>Demonstration of analyst competency (DOC)</b>		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	<b>Verification/validation documentation for methods (NELAC Chap 5n 5)</b>		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	<b>Laboratory standard operating procedures (SOPs):</b>		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

## Ion Chromatography Laboratory Review Checklist

**Table 3. Exception Reports.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey PP Semi-Annual CCR  
**Reviewer Name:** Timothy E. Arnold  
**LRC Date:** 7/13/2022  
**Laboratory Job Number:** 221989  
**Prep Batch Number(s):** QC2207051

<b>Exception Report No.</b>	<b>Description</b>
ER1	CCB acceptance criteria is CCB<MQL.

<sup>1</sup> Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.  
<sup>2</sup> O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).  
<sup>3</sup> NA - Not applicable; NR - Not reviewed.  
<sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

# TDS Laboratory Review Checklist

## Municipal Solid Waste Laboratory Review Checklist

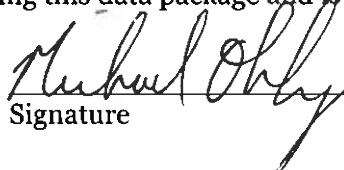
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  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
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- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
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- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

**Release Statement:** I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

**Check, if applicable:**  This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Michael Ohlinger  
Name (printed)

  
Signature

Chemist  
Official Title

7/29/22  
Date



## TDS Laboratory Review Checklist

**Table 1. Reportable Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey PP Semi-Annual CCR  
**Reviewer Name:** Michael Ohlinger  
**LRC Date:** 7/29/22  
**Laboratory Job Number:** 221989  
**Prep Batch Number(s):** QC2207061 & QC2207063

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
R1	O, I	<b>Chain-of-custody (COC)</b>		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	NA	
R2	O, I	<b>Sample and quality control (QC) identification</b>		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	<b>Test reports</b>		
	I	Were all samples prepared and analyzed within holding times?	No	ER1
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	<b>Surrogate recovery data</b>		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	<b>Test reports/summary forms for blank samples</b>		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

## TDS Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	<b>Laboratory control samples (LCS):</b>		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	<b>Matrix spike (MS) and matrix spike duplicate (MSD) data</b>		
	I	Were the project/method specified analytes included in the MS and MSD?	NA	
	I	Were MS/MSD analyzed at the appropriate frequency?	NA	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NA	
	I	Were MS/MSD RPDs within laboratory QC limits?	NA	
R8	O, I	<b>Analytical duplicate data</b>		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	No	ER2
R9	O, I	<b>Method quantitation limits (MQLs):</b>		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	<b>Other problems/anomalies</b>		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

## TDS Laboratory Review Checklist

**Table 2. Supporting Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey PP Semi-Annual CCR  
**Reviewer Name:** Michael Ohlinger  
**LRC Date:** 4/5/22  
**Laboratory Job Number:** 221989  
**Prep Batch Number(s):** QC2207061 & QC2207063

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S1	O, I	<b>Initial calibration (ICAL)</b>		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	NA	
	I	Was the number of standards recommended in the method used for all analytes?	NA	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	NA	
	I	Are ICAL data available for all instruments used?	NA	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	NA	
S2	O, I	<b>Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):</b>		
	I	Was the CCV analyzed at the method-required frequency?	NA	
	I	Were percent differences for each analyte within the method-required QC limits?	NA	
	I	Was the ICAL curve verified for each analyte?	NA	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	NA	
S3	O	<b>Mass spectral tuning:</b>		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	<b>Internal standards (IS):</b>		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	<b>Raw data (NELAC section 1 appendix A glossary, and section 5.)</b>		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

## TDS Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	O	<b>Dual column confirmation</b>		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	<b>Tentatively identified compounds (TICs):</b>		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	<b>Interference Check Sample (ICS) results:</b>		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	<b>Serial dilutions, post digestion spikes, and method of standard additions</b>		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	<b>Method detection limit (MDL) studies</b>		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	<b>Proficiency test reports:</b>		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	<b>Standards documentation</b>		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	<b>Compound/analyte identification procedures</b>		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	<b>Demonstration of analyst competency (DOC)</b>		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	<b>Verification/validation documentation for methods (NELAC Chap 5n 5)</b>		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	<b>Laboratory standard operating procedures (SOPs):</b>		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

## TDS Laboratory Review Checklist

**Table 3. Exception Reports.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey PP Semi-Annual CCR  
**Reviewer Name:** Michael Ohlinger  
**LRC Date:** 7/29/22  
**Laboratory Job Number:** 221989  
**Prep Batch Number(s):** QC2207061 & QC2207063

Exception Report No.	Description
ER1	Sample analysis performed past holding time for 221989-002.
ER2	The precision between duplicate results was above acceptance limits for the duplicate analyzed on 221989-002.

<sup>1</sup> Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.

<sup>2</sup> O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

<sup>3</sup> NA - Not applicable; NR - Not reviewed.

<sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

**Reissued**

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-2

Customer Description:

Lab Number: 222015-001

Preparation:

Date Collected: 06/21/2022 09:49 EDT

Date Received: 06/27/2022 14:08 EDT

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.1	µg/L	5	0.5	0.1	U1	GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Arsenic	2.0	µg/L	5	0.5	0.2		GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Barium	17.5	µg/L	5	1.0	0.3		GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Beryllium	0.85	µg/L	5	0.25	0.04		GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Boron	3.26	mg/L	5	0.25	0.05		GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Cadmium	0.11	µg/L	5	0.10	0.02		GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Calcium	3.4	mg/L	5	0.3	0.1		GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Chromium	0.5	µg/L	5	1.0	0.2	J1	GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Cobalt	25.7	µg/L	5	0.10	0.02		GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Lead	0.6	µg/L	5	1.0	0.3	J1	GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Lithium	0.0688	mg/L	5	0.0010	0.0003		GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Magnesium	7.1	mg/L	5	0.5	0.1		GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Mercury	244	ng/L	4	20	7		JAB	07/12/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.5	µg/L	5	2.5	0.5	U1	GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Potassium	1.4	mg/L	5	0.5	0.1		GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Selenium	2.7	µg/L	5	2.5	0.5		GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Sodium	111	mg/L	5	1.0	0.3	M1	GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Strontium	0.048	mg/L	5	0.010	0.002		GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4
Thallium	0.3	µg/L	5	1.0	0.2	J1	GES	07/12/2022 14:16	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.59	pCi/L	0.17	0.28		ST	06/30/2022 14:29	SW-846 9315-1986, Rev. 0
Carrier Recovery	95.1	%						
Radium-228	1.28	pCi/L	0.17	0.52		TTP	07/05/2022 17:32	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

**Reissued**

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-2

Customer Description:

Lab Number: 222015-001-01

Preparation: Dissolved

Date Collected: 06/21/2022 09:49 EDT

Date Received: 06/27/2022 14:08 EDT

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.1	µg/L	5	0.5	0.1	U1	GES	07/12/2022 15:18	EPA 200.8-1994, Rev. 5.4
Arsenic	1.6	µg/L	5	0.5	0.2		GES	07/12/2022 15:18	EPA 200.8-1994, Rev. 5.4
Barium	17.8	µg/L	5	1.0	0.3		GES	07/12/2022 15:18	EPA 200.8-1994, Rev. 5.4
Beryllium	0.80	µg/L	5	0.25	0.04		GES	07/12/2022 15:18	EPA 200.8-1994, Rev. 5.4
Cadmium	0.11	µg/L	5	0.10	0.02		GES	07/12/2022 15:18	EPA 200.8-1994, Rev. 5.4
Chromium	0.5	µg/L	5	1.0	0.2	J1	GES	07/12/2022 15:18	EPA 200.8-1994, Rev. 5.4
Cobalt	25.4	µg/L	5	0.10	0.02		GES	07/12/2022 15:18	EPA 200.8-1994, Rev. 5.4
Iron	0.13	mg/L	5	0.10	0.03		GES	07/12/2022 15:18	EPA 200.8-1994, Rev. 5.4
Lead	0.7	µg/L	5	1.0	0.3	J1	GES	07/12/2022 15:18	EPA 200.8-1994, Rev. 5.4
Lithium	0.0673	mg/L	5	0.0010	0.0003		GES	07/12/2022 15:18	EPA 200.8-1994, Rev. 5.4
Manganese	0.096	mg/L	5	0.005	0.001		GES	07/12/2022 15:18	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	07/08/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.5	µg/L	5	2.5	0.5	U1	GES	07/12/2022 15:18	EPA 200.8-1994, Rev. 5.4
Selenium	2.2	µg/L	5	2.5	0.5	J1	GES	07/12/2022 15:18	EPA 200.8-1994, Rev. 5.4
Thallium	<0.2	µg/L	5	1.0	0.2	U1	GES	07/12/2022 15:18	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

**Reissued**

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-3

Customer Description:

Lab Number: 222015-002

Preparation:

Date Collected: 06/21/2022 12:23 EDT

Date Received: 06/27/2022 14:08 EDT

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.1	µg/L	5	0.5	0.1	U1	GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Arsenic	0.2	µg/L	5	0.5	0.2	J1	GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Barium	55.6	µg/L	5	1.0	0.3		GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Beryllium	0.22	µg/L	5	0.25	0.04	J1	GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Boron	0.08	mg/L	5	0.25	0.05	J1	GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.02	µg/L	5	0.10	0.02	U1	GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Calcium	3.1	mg/L	5	0.3	0.1		GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Chromium	0.3	µg/L	5	1.0	0.2	J1	GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Cobalt	2.70	µg/L	5	0.10	0.02		GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Lead	<0.3	µg/L	5	1.0	0.3	U1	GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Lithium	0.0457	mg/L	5	0.0010	0.0003		GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Magnesium	1.4	mg/L	5	0.5	0.1		GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Mercury	4	ng/L	1	5	2	J1	JAB	07/08/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.5	µg/L	5	2.5	0.5	U1	GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Potassium	2.1	mg/L	5	0.5	0.1		GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Selenium	<0.5	µg/L	5	2.5	0.5	U1	GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Sodium	7.5	mg/L	5	1.0	0.3		GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Strontium	0.020	mg/L	5	0.010	0.002		GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4
Thallium	<0.2	µg/L	5	1.0	0.2	U1	GES	07/12/2022 15:23	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.04	pCi/L	0.23	0.29		ST	06/30/2022 14:29	SW-846 9315-1986, Rev. 0
Carrier Recovery	88.2	%						
Radium-228	0.64	pCi/L	0.14	0.45		TTP	07/05/2022 17:32	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	90.1	%						

\* 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

**Reissued**

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-3

Customer Description:

Lab Number: 222015-002-01

Preparation: Dissolved

Date Collected: 06/21/2022 12:23 EDT

Date Received: 06/27/2022 14:08 EDT

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.1	µg/L	5	0.5	0.1	U1	GES	07/12/2022 15:28	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.2	µg/L	5	0.5	0.2	U1	GES	07/12/2022 15:28	EPA 200.8-1994, Rev. 5.4
Barium	49.5	µg/L	5	1.0	0.3		GES	07/12/2022 15:28	EPA 200.8-1994, Rev. 5.4
Beryllium	0.14	µg/L	5	0.25	0.04	J1	GES	07/12/2022 15:28	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.02	µg/L	5	0.10	0.02	U1	GES	07/12/2022 15:28	EPA 200.8-1994, Rev. 5.4
Chromium	0.4	µg/L	5	1.0	0.2	J1	GES	07/12/2022 15:28	EPA 200.8-1994, Rev. 5.4
Cobalt	2.25	µg/L	5	0.10	0.02		GES	07/12/2022 15:28	EPA 200.8-1994, Rev. 5.4
Iron	<0.03	mg/L	5	0.10	0.03	U1	GES	07/12/2022 15:28	EPA 200.8-1994, Rev. 5.4
Lead	<0.3	µg/L	5	1.0	0.3	U1	GES	07/12/2022 15:28	EPA 200.8-1994, Rev. 5.4
Lithium	0.0459	mg/L	5	0.0010	0.0003		GES	07/12/2022 15:28	EPA 200.8-1994, Rev. 5.4
Manganese	0.025	mg/L	5	0.005	0.001		GES	07/12/2022 15:28	EPA 200.8-1994, Rev. 5.4
Mercury	3	ng/L	1	5	2	J1	JAB	07/08/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.5	µg/L	5	2.5	0.5	U1	GES	07/12/2022 15:28	EPA 200.8-1994, Rev. 5.4
Selenium	<0.5	µg/L	5	2.5	0.5	U1	GES	07/12/2022 15:28	EPA 200.8-1994, Rev. 5.4
Thallium	<0.2	µg/L	5	1.0	0.2	U1	GES	07/12/2022 15:28	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Reissued

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-4

Customer Description:

Lab Number: 222015-003

Preparation:

Date Collected: 06/21/2022 11:34 EDT

Date Received: 06/27/2022 14:08 EDT

## 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	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Arsenic	0.30	µg/L	1	0.10	0.03		GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Barium	124	µg/L	1	0.20	0.05		GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Beryllium	0.407	µg/L	1	0.050	0.007		GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Boron	0.020	mg/L	1	0.050	0.009	J1	GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Cadmium	0.021	µg/L	1	0.020	0.004		GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Calcium	2.51	mg/L	1	0.05	0.02		GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Chromium	0.46	µg/L	1	0.20	0.04		GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Cobalt	4.10	µg/L	1	0.020	0.003		GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Lithium	0.0220	mg/L	1	0.00020	0.00005		GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Magnesium	0.76	mg/L	1	0.10	0.02		GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Mercury	4	ng/L	1	5	2	J1	JAB	07/08/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Potassium	2.21	mg/L	1	0.10	0.02		GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Sodium	6.94	mg/L	1	0.20	0.05		GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Strontium	0.0184	mg/L	1	0.0020	0.0004		GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4
Thallium	0.09	µg/L	1	0.20	0.04	J1	GES	07/12/2022 14:47	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.66	pCi/L	0.18	0.26		ST	06/30/2022 14:29	SW-846 9315-1986, Rev. 0
Carrier Recovery	93.3	%						
Radium-228	0.65	pCi/L	0.14	0.47		TTP	07/05/2022 17:32	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	89.0	%						

\* 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.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

**Reissued**

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-4

Customer Description:

Lab Number: 222015-003-01

Preparation: Dissolved

Date Collected: 06/21/2022 11:34 EDT

Date Received: 06/27/2022 14:08 EDT

## 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	07/12/2022 14:52	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	07/12/2022 14:52	EPA 200.8-1994, Rev. 5.4
Barium	104	µg/L	1	0.20	0.05		GES	07/12/2022 14:52	EPA 200.8-1994, Rev. 5.4
Beryllium	0.226	µg/L	1	0.050	0.007		GES	07/12/2022 14:52	EPA 200.8-1994, Rev. 5.4
Cadmium	0.016	µg/L	1	0.020	0.004	J1	GES	07/12/2022 14:52	EPA 200.8-1994, Rev. 5.4
Chromium	0.27	µg/L	1	0.20	0.04		GES	07/12/2022 14:52	EPA 200.8-1994, Rev. 5.4
Cobalt	3.12	µg/L	1	0.020	0.003		GES	07/12/2022 14:52	EPA 200.8-1994, Rev. 5.4
Iron	0.019	mg/L	1	0.020	0.006	J1	GES	07/12/2022 14:52	EPA 200.8-1994, Rev. 5.4
Lead	0.14	µg/L	1	0.20	0.05	J1	GES	07/12/2022 14:52	EPA 200.8-1994, Rev. 5.4
Lithium	0.0233	mg/L	1	0.00020	0.00005		GES	07/12/2022 14:52	EPA 200.8-1994, Rev. 5.4
Manganese	0.0289	mg/L	1	0.0010	0.0002		GES	07/12/2022 14:52	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	07/08/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 14:52	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	07/12/2022 14:52	EPA 200.8-1994, Rev. 5.4
Thallium	0.09	µg/L	1	0.20	0.04	J1	GES	07/12/2022 14:52	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Reissued

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-7

Customer Description:

Lab Number: 222015-004

Preparation:

Date Collected: 06/21/2022 10:47 EDT

Date Received: 06/27/2022 14:08 EDT

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.1	µg/L	5	0.5	0.1	U1	GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Arsenic	1.3	µg/L	5	0.5	0.2		GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Barium	58.7	µg/L	5	1.0	0.3		GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Beryllium	4.66	µg/L	5	0.25	0.04		GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Boron	6.13	mg/L	5	0.25	0.05		GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Cadmium	0.95	µg/L	5	0.10	0.02		GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Calcium	5.4	mg/L	5	0.3	0.1		GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Chromium	0.4	µg/L	5	1.0	0.2	J1	GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Cobalt	36.4	µg/L	5	0.10	0.02		GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Lead	1.0	µg/L	5	1.0	0.3		GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Lithium	0.113	mg/L	5	0.0010	0.0003		GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Magnesium	8.9	mg/L	5	0.5	0.1		GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Mercury	<400	ng/L	200	1000	400	U1	JAB	07/12/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.5	µg/L	5	2.5	0.5	U1	GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Potassium	3.2	mg/L	5	0.5	0.1		GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Selenium	2.3	µg/L	5	2.5	0.5	J1	GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Sodium	22.6	mg/L	5	1.0	0.3		GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Strontium	0.058	mg/L	5	0.010	0.002		GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4
Thallium	0.2	µg/L	5	1.0	0.2	J1	GES	07/12/2022 15:33	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	2.59	pCi/L	0.38	0.35		ST	06/30/2022 14:29	SW-846 9315-1986, Rev. 0
Carrier Recovery	79.1	%						
Radium-228	2.23	pCi/L	0.16	0.46		TTP	07/05/2022 17:32	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	84.4	%						

\* 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

**Reissued**

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-7

Customer Description:

Lab Number: 222015-004-01

Preparation: Dissolved

Date Collected: 06/21/2022 10:47 EDT

Date Received: 06/27/2022 14:08 EDT

## 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	07/12/2022 15:02	EPA 200.8-1994, Rev. 5.4
Arsenic	1.38	µg/L	1	0.10	0.03		GES	07/12/2022 15:02	EPA 200.8-1994, Rev. 5.4
Barium	54.1	µg/L	1	0.20	0.05		GES	07/12/2022 15:02	EPA 200.8-1994, Rev. 5.4
Beryllium	3.55	µg/L	1	0.050	0.007		GES	07/12/2022 15:02	EPA 200.8-1994, Rev. 5.4
Cadmium	0.972	µg/L	1	0.020	0.004		GES	07/12/2022 15:02	EPA 200.8-1994, Rev. 5.4
Chromium	0.34	µg/L	1	0.20	0.04		GES	07/12/2022 15:02	EPA 200.8-1994, Rev. 5.4
Cobalt	35.4	µg/L	1	0.020	0.003		GES	07/12/2022 15:02	EPA 200.8-1994, Rev. 5.4
Iron	0.324	mg/L	1	0.020	0.006		GES	07/12/2022 15:02	EPA 200.8-1994, Rev. 5.4
Lead	1.06	µg/L	1	0.20	0.05		GES	07/12/2022 15:02	EPA 200.8-1994, Rev. 5.4
Lithium	0.0887	mg/L	1	0.00020	0.00005		GES	07/12/2022 15:02	EPA 200.8-1994, Rev. 5.4
Manganese	0.142	mg/L	1	0.0010	0.0002		GES	07/12/2022 15:02	EPA 200.8-1994, Rev. 5.4
Mercury	<20	ng/L	10	50	20	U1	JAB	07/08/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	0.2	µg/L	1	0.5	0.1	J1	GES	07/12/2022 15:02	EPA 200.8-1994, Rev. 5.4
Selenium	2.15	µg/L	1	0.50	0.09		GES	07/12/2022 15:02	EPA 200.8-1994, Rev. 5.4
Thallium	0.21	µg/L	1	0.20	0.04		GES	07/12/2022 15:02	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Reissued

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-12

Customer Description:

Lab Number: 222015-005

Preparation:

Date Collected: 06/20/2022 09:52 EDT

Date Received: 06/27/2022 14:08 EDT

## 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	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Arsenic	0.08	µg/L	1	0.10	0.03	J1	GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Barium	24.2	µg/L	1	0.20	0.05		GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Beryllium	0.135	µg/L	1	0.050	0.007		GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Boron	0.042	mg/L	1	0.050	0.009	J1	GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Cadmium	0.008	µg/L	1	0.020	0.004	J1	GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Calcium	0.32	mg/L	1	0.05	0.02		GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Chromium	0.63	µg/L	1	0.20	0.04		GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Cobalt	1.35	µg/L	1	0.020	0.003		GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Lead	0.08	µg/L	1	0.20	0.05	J1	GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Lithium	0.00949	mg/L	1	0.00020	0.00005		GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Magnesium	0.45	mg/L	1	0.10	0.02		GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	07/08/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Potassium	0.53	mg/L	1	0.10	0.02		GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Selenium	0.16	µg/L	1	0.50	0.09	J1	GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Sodium	5.28	mg/L	1	0.20	0.05		GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Strontium	0.0030	mg/L	1	0.0020	0.0004		GES	07/12/2022 15:07	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	07/12/2022 15:07	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	0.16	0.28		ST	06/30/2022 14:29	SW-846 9315-1986, Rev. 0
Carrier Recovery	93.1	%						
Radium-228	0.12	pCi/L	0.11	0.37		TTP	07/05/2022 17:32	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	96.0	%						

\* 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.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-12

Customer Description:

Lab Number: 222015-005-01

Preparation: Dissolved

Date Collected: 06/20/2022 09:52 EDT

Date Received: 06/27/2022 14:08 EDT

## 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	07/12/2022 15:13	EPA 200.8-1994, Rev. 5.4
Arsenic	0.06	µg/L	1	0.10	0.03	J1	GES	07/12/2022 15:13	EPA 200.8-1994, Rev. 5.4
Barium	24.4	µg/L	1	0.20	0.05		GES	07/12/2022 15:13	EPA 200.8-1994, Rev. 5.4
Beryllium	0.131	µg/L	1	0.050	0.007		GES	07/12/2022 15:13	EPA 200.8-1994, Rev. 5.4
Cadmium	0.009	µg/L	1	0.020	0.004	J1	GES	07/12/2022 15:13	EPA 200.8-1994, Rev. 5.4
Chromium	0.33	µg/L	1	0.20	0.04		GES	07/12/2022 15:13	EPA 200.8-1994, Rev. 5.4
Cobalt	1.30	µg/L	1	0.020	0.003		GES	07/12/2022 15:13	EPA 200.8-1994, Rev. 5.4
Iron	0.006	mg/L	1	0.020	0.006	J1	GES	07/12/2022 15:13	EPA 200.8-1994, Rev. 5.4
Lead	0.07	µg/L	1	0.20	0.05	J1	GES	07/12/2022 15:13	EPA 200.8-1994, Rev. 5.4
Lithium	0.00918	mg/L	1	0.00020	0.00005		GES	07/12/2022 15:13	EPA 200.8-1994, Rev. 5.4
Manganese	0.0052	mg/L	1	0.0010	0.0002		GES	07/12/2022 15:13	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	07/08/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 15:13	EPA 200.8-1994, Rev. 5.4
Selenium	0.12	µg/L	1	0.50	0.09	J1	GES	07/12/2022 15:13	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	07/12/2022 15:13	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Reissued

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-13

Customer Description:

Lab Number: 222015-006

Preparation:

Date Collected: 06/20/2022 09:43 EDT

Date Received: 06/27/2022 14:08 EDT

## 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	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Arsenic	4.30	µg/L	1	0.10	0.03		GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Barium	41.4	µg/L	1	0.20	0.05		GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Beryllium	0.409	µg/L	1	0.050	0.007		GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Boron	0.075	mg/L	1	0.050	0.009		GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Calcium	11.1	mg/L	1	0.05	0.02		GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Chromium	0.31	µg/L	1	0.20	0.04		GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Cobalt	56.2	µg/L	1	0.020	0.003	M1	GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Lithium	0.150	mg/L	1	0.00020	0.00005	M1	GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Magnesium	15.7	mg/L	1	0.10	0.02		GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	07/08/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	1.1	µg/L	1	0.5	0.1		GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Potassium	5.19	mg/L	1	0.10	0.02		GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Selenium	0.1	µg/L	1	0.50	0.09	J1	GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Sodium	21.4	mg/L	1	0.20	0.05		GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Strontium	0.0509	mg/L	1	0.0020	0.0004		GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	07/12/2022 16:40	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.15	pCi/L	0.24	0.29		ST	06/30/2022 11:09	SW-846 9315-1986, Rev. 0
Carrier Recovery	93.3	%						
Radium-228	1.07	pCi/L	0.14	0.45		TTP	07/05/2022 17:32	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	95.1	%						

\* 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

**Reissued**

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-13

Customer Description:

Lab Number: 222015-006-01

Preparation: Dissolved

Date Collected: 06/20/2022 09:43 EDT

Date Received: 06/27/2022 14:08 EDT

## 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	07/12/2022 17:11	EPA 200.8-1994, Rev. 5.4
Arsenic	0.80	µg/L	1	0.10	0.03		GES	07/12/2022 17:11	EPA 200.8-1994, Rev. 5.4
Barium	40.0	µg/L	1	0.20	0.05		GES	07/12/2022 17:11	EPA 200.8-1994, Rev. 5.4
Beryllium	0.203	µg/L	1	0.050	0.007		GES	07/12/2022 17:11	EPA 200.8-1994, Rev. 5.4
Cadmium	0.005	µg/L	1	0.020	0.004	J1	GES	07/12/2022 17:11	EPA 200.8-1994, Rev. 5.4
Chromium	0.27	µg/L	1	0.20	0.04		GES	07/12/2022 17:11	EPA 200.8-1994, Rev. 5.4
Cobalt	55.8	µg/L	1	0.020	0.003		GES	07/12/2022 17:11	EPA 200.8-1994, Rev. 5.4
Iron	47.8	mg/L	1	0.020	0.006		GES	07/12/2022 17:11	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	07/12/2022 17:11	EPA 200.8-1994, Rev. 5.4
Lithium	0.146	mg/L	1	0.00020	0.00005		GES	07/12/2022 17:11	EPA 200.8-1994, Rev. 5.4
Manganese	0.550	mg/L	1	0.0010	0.0002		GES	07/12/2022 17:11	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	07/08/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	0.8	µg/L	1	0.5	0.1		GES	07/12/2022 17:11	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	07/12/2022 17:11	EPA 200.8-1994, Rev. 5.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	07/12/2022 17:11	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Reissued

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-17

Customer Description:

Lab Number: 222015-007

Preparation:

Date Collected: 06/21/2022 11:40 EDT

Date Received: 06/27/2022 14:08 EDT

## 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	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Arsenic	0.39	µg/L	1	0.10	0.03		GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Barium	250	µg/L	1	0.20	0.05		GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Beryllium	0.650	µg/L	1	0.050	0.007		GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Boron	0.021	mg/L	1	0.050	0.009	J1	GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Cadmium	0.063	µg/L	1	0.020	0.004		GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Calcium	1.10	mg/L	1	0.05	0.02		GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Chromium	0.51	µg/L	1	0.20	0.04		GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Cobalt	12.2	µg/L	1	0.020	0.003		GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Lead	0.13	µg/L	1	0.20	0.05	J1	GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Lithium	0.0206	mg/L	1	0.00020	0.00005		GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Magnesium	4.35	mg/L	1	0.10	0.02		GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Mercury	200	ng/L	100	500	200	J1	JAB	07/08/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Potassium	1.11	mg/L	1	0.10	0.02		GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Selenium	0.44	µg/L	1	0.50	0.09	J1	GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Sodium	8.53	mg/L	1	0.20	0.05		GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Strontium	0.0206	mg/L	1	0.0020	0.0004		GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	07/12/2022 17:21	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	7.36	pCi/L	0.63	0.30		ST	06/30/2022 11:09	SW-846 9315-1986, Rev. 0
Carrier Recovery	94.4	%						
Radium-228	4.60	pCi/L	0.17	0.41		TTP	07/05/2022 17:32	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	94.6	%						

\* 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

**Reissued**

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-17

Customer Description:

Lab Number: 222015-007-01

Preparation: Dissolved

Date Collected: 06/21/2022 11:40 EDT

Date Received: 06/27/2022 14:08 EDT

## 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	07/12/2022 17:31	EPA 200.8-1994, Rev. 5.4
Arsenic	0.17	µg/L	1	0.10	0.03		GES	07/12/2022 17:31	EPA 200.8-1994, Rev. 5.4
Barium	245	µg/L	1	0.20	0.05		GES	07/12/2022 17:31	EPA 200.8-1994, Rev. 5.4
Beryllium	0.489	µg/L	1	0.050	0.007		GES	07/12/2022 17:31	EPA 200.8-1994, Rev. 5.4
Cadmium	0.061	µg/L	1	0.020	0.004		GES	07/12/2022 17:31	EPA 200.8-1994, Rev. 5.4
Chromium	0.47	µg/L	1	0.20	0.04		GES	07/12/2022 17:31	EPA 200.8-1994, Rev. 5.4
Cobalt	11.5	µg/L	1	0.020	0.003		GES	07/12/2022 17:31	EPA 200.8-1994, Rev. 5.4
Iron	0.021	mg/L	1	0.020	0.006		GES	07/12/2022 17:31	EPA 200.8-1994, Rev. 5.4
Lead	0.24	µg/L	1	0.20	0.05		GES	07/12/2022 17:31	EPA 200.8-1994, Rev. 5.4
Lithium	0.0198	mg/L	1	0.00020	0.00005		GES	07/12/2022 17:31	EPA 200.8-1994, Rev. 5.4
Manganese	0.0377	mg/L	1	0.0010	0.0002		GES	07/12/2022 17:31	EPA 200.8-1994, Rev. 5.4
Mercury	<200	ng/L	100	500	200	U1	JAB	07/08/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 17:31	EPA 200.8-1994, Rev. 5.4
Selenium	0.20	µg/L	1	0.50	0.09	J1	GES	07/12/2022 17:31	EPA 200.8-1994, Rev. 5.4
Thallium	0.04	µg/L	1	0.20	0.04	J1	GES	07/12/2022 17:31	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

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Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-18

Customer Description:

Lab Number: 222015-008

Preparation:

Date Collected: 06/21/2022 09:17 EDT

Date Received: 06/27/2022 14:08 EDT

## 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	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Arsenic	0.30	µg/L	1	0.10	0.03		GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Barium	79.3	µg/L	1	0.20	0.05		GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Beryllium	0.073	µg/L	1	0.050	0.007		GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Boron	<0.009	mg/L	1	0.050	0.009	U1	GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Cadmium	0.012	µg/L	1	0.020	0.004	J1	GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Calcium	1.49	mg/L	1	0.05	0.02		GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Chromium	0.47	µg/L	1	0.20	0.04		GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Cobalt	0.790	µg/L	1	0.020	0.003		GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Lead	0.11	µg/L	1	0.20	0.05	J1	GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Lithium	0.0108	mg/L	1	0.00020	0.00005		GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Magnesium	0.30	mg/L	1	0.10	0.02		GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Mercury	<7	ng/L	4	20	7	U1	JAB	07/12/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Potassium	0.70	mg/L	1	0.10	0.02		GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Selenium	0.14	µg/L	1	0.50	0.09	J1	GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Sodium	5.16	mg/L	1	0.20	0.05		GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Strontium	0.0069	mg/L	1	0.0020	0.0004		GES	07/12/2022 17:42	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	07/12/2022 17:42	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	0.17	0.30		ST	06/30/2022 11:09	SW-846 9315-1986, Rev. 0
Carrier Recovery	96.7	%						
Radium-228	0.18	pCi/L	0.17	0.58		TTP	07/05/2022 17:32	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	92.3	%						

\* 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

**Reissued**

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-18

Customer Description:

Lab Number: 222015-008-01

Preparation: Dissolved

Date Collected: 06/21/2022 09:17 EDT

Date Received: 06/27/2022 14:08 EDT

## 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	07/12/2022 17:52	EPA 200.8-1994, Rev. 5.4
Arsenic	0.05	µg/L	1	0.10	0.03	J1	GES	07/12/2022 17:52	EPA 200.8-1994, Rev. 5.4
Barium	31.8	µg/L	1	0.20	0.05		GES	07/12/2022 17:52	EPA 200.8-1994, Rev. 5.4
Beryllium	<0.007	µg/L	1	0.050	0.007	U1	GES	07/12/2022 17:52	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	07/12/2022 17:52	EPA 200.8-1994, Rev. 5.4
Chromium	0.29	µg/L	1	0.20	0.04		GES	07/12/2022 17:52	EPA 200.8-1994, Rev. 5.4
Cobalt	0.237	µg/L	1	0.020	0.003		GES	07/12/2022 17:52	EPA 200.8-1994, Rev. 5.4
Iron	0.024	mg/L	1	0.020	0.006		GES	07/12/2022 17:52	EPA 200.8-1994, Rev. 5.4
Lead	0.07	µg/L	1	0.20	0.05	J1	GES	07/12/2022 17:52	EPA 200.8-1994, Rev. 5.4
Lithium	0.0107	mg/L	1	0.00020	0.00005		GES	07/12/2022 17:52	EPA 200.8-1994, Rev. 5.4
Manganese	0.0008	mg/L	1	0.0010	0.0002	J1	GES	07/12/2022 17:52	EPA 200.8-1994, Rev. 5.4
Mercury	8	ng/L	4	20	7	J1	JAB	07/12/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 17:52	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	07/12/2022 17:52	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	07/12/2022 17:52	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Reissued

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-22

Customer Description:

Lab Number: 222015-009

Preparation:

Date Collected: 06/20/2022 10:53 EDT

Date Received: 06/27/2022 14:08 EDT

## 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	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Arsenic	3.02	µg/L	1	0.10	0.03		GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Barium	16.2	µg/L	1	0.20	0.05		GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Beryllium	2.11	µg/L	1	0.050	0.007		GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Boron	0.028	mg/L	1	0.050	0.009	J1	GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Cadmium	0.587	µg/L	1	0.020	0.004		GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Calcium	11.9	mg/L	1	0.05	0.02		GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Chromium	0.66	µg/L	1	0.20	0.04		GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Cobalt	69.6	µg/L	1	0.020	0.003		GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Lead	0.18	µg/L	1	0.20	0.05	J1	GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Lithium	0.110	mg/L	1	0.00020	0.00005		GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Magnesium	15.6	mg/L	1	0.10	0.02		GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Mercury	460	ng/L	10	50	20		JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	0.1	µg/L	1	0.5	0.1	J1	GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Potassium	3.63	mg/L	1	0.10	0.02		GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Selenium	2.01	µg/L	1	0.50	0.09		GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Sodium	90.5	mg/L	1	0.20	0.05		GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Strontium	0.0955	mg/L	1	0.0020	0.0004		GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4
Thallium	0.15	µg/L	1	0.20	0.04	J1	GES	07/12/2022 18:02	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.96	pCi/L	0.31	0.33		ST	06/30/2022 11:09	SW-846 9315-1986, Rev. 0
Carrier Recovery	96.0	%						
Radium-228	1.99	pCi/L	0.19	0.58		TTP	07/05/2022 17:32	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	92.5	%						

\* 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

**Reissued**

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-22

Customer Description:

Lab Number: 222015-009-01

Preparation: Dissolved

Date Collected: 06/20/2022 10:53 EDT

Date Received: 06/27/2022 14:08 EDT

## 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	07/12/2022 18:12	EPA 200.8-1994, Rev. 5.4
Arsenic	2.14	µg/L	1	0.10	0.03		GES	07/12/2022 18:12	EPA 200.8-1994, Rev. 5.4
Barium	16.3	µg/L	1	0.20	0.05		GES	07/12/2022 18:12	EPA 200.8-1994, Rev. 5.4
Beryllium	2.25	µg/L	1	0.050	0.007		GES	07/12/2022 18:12	EPA 200.8-1994, Rev. 5.4
Cadmium	0.564	µg/L	1	0.020	0.004		GES	07/12/2022 18:12	EPA 200.8-1994, Rev. 5.4
Chromium	0.41	µg/L	1	0.20	0.04		GES	07/12/2022 18:12	EPA 200.8-1994, Rev. 5.4
Cobalt	74.5	µg/L	1	0.020	0.003		GES	07/12/2022 18:12	EPA 200.8-1994, Rev. 5.4
Iron	38.1	mg/L	1	0.020	0.006		GES	07/12/2022 18:12	EPA 200.8-1994, Rev. 5.4
Lead	0.1	µg/L	1	0.20	0.05	J1	GES	07/12/2022 18:12	EPA 200.8-1994, Rev. 5.4
Lithium	0.125	mg/L	1	0.00020	0.00005		GES	07/12/2022 18:12	EPA 200.8-1994, Rev. 5.4
Manganese	0.351	mg/L	1	0.0010	0.0002		GES	07/12/2022 18:12	EPA 200.8-1994, Rev. 5.4
Mercury	4	ng/L	1	5	2	J1	JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 18:12	EPA 200.8-1994, Rev. 5.4
Selenium	2.13	µg/L	1	0.50	0.09		GES	07/12/2022 18:12	EPA 200.8-1994, Rev. 5.4
Thallium	0.15	µg/L	1	0.20	0.04	J1	GES	07/12/2022 18:12	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Reissued

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-28

Customer Description:

Lab Number: 222015-010

Preparation:

Date Collected: 06/21/2022 10:56 EDT

Date Received: 06/27/2022 14:08 EDT

## 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	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Arsenic	0.14	µg/L	1	0.10	0.03		GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Barium	130	µg/L	1	0.20	0.05		GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Beryllium	0.463	µg/L	1	0.050	0.007		GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Boron	0.311	mg/L	1	0.050	0.009		GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Cadmium	0.047	µg/L	1	0.020	0.004		GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Calcium	1.40	mg/L	1	0.05	0.02		GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Chromium	0.40	µg/L	1	0.20	0.04		GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Cobalt	13.3	µg/L	1	0.020	0.003		GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Lead	0.08	µg/L	1	0.20	0.05	J1	GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Lithium	0.0213	mg/L	1	0.00020	0.00005		GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Magnesium	2.95	mg/L	1	0.10	0.02		GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Mercury	7	ng/L	1	5	2		JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Potassium	0.78	mg/L	1	0.10	0.02		GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Selenium	0.15	µg/L	1	0.50	0.09	J1	GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Sodium	6.84	mg/L	1	0.20	0.05		GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Strontium	0.0192	mg/L	1	0.0020	0.0004		GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	07/12/2022 18:23	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	5.02	pCi/L	0.51	0.30		ST	06/30/2022 11:09	SW-846 9315-1986, Rev. 0
Carrier Recovery	85.4	%						
Radium-228	0.94	pCi/L	0.15	0.49		TTP	07/05/2022 17:32	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	93.6	%						

\* 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

**Reissued**

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-28

Customer Description:

Lab Number: 222015-010-01

Preparation: Dissolved

Date Collected: 06/21/2022 10:56 EDT

Date Received: 06/27/2022 14:08 EDT

## 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	07/12/2022 18:33	EPA 200.8-1994, Rev. 5.4
Arsenic	0.11	µg/L	1	0.10	0.03		GES	07/12/2022 18:33	EPA 200.8-1994, Rev. 5.4
Barium	131	µg/L	1	0.20	0.05		GES	07/12/2022 18:33	EPA 200.8-1994, Rev. 5.4
Beryllium	0.486	µg/L	1	0.050	0.007		GES	07/12/2022 18:33	EPA 200.8-1994, Rev. 5.4
Cadmium	0.054	µg/L	1	0.020	0.004		GES	07/12/2022 18:33	EPA 200.8-1994, Rev. 5.4
Chromium	0.38	µg/L	1	0.20	0.04		GES	07/12/2022 18:33	EPA 200.8-1994, Rev. 5.4
Cobalt	13.0	µg/L	1	0.020	0.003		GES	07/12/2022 18:33	EPA 200.8-1994, Rev. 5.4
Iron	0.070	mg/L	1	0.020	0.006		GES	07/12/2022 18:33	EPA 200.8-1994, Rev. 5.4
Lead	0.07	µg/L	1	0.20	0.05	J1	GES	07/12/2022 18:33	EPA 200.8-1994, Rev. 5.4
Lithium	0.0226	mg/L	1	0.00020	0.00005		GES	07/12/2022 18:33	EPA 200.8-1994, Rev. 5.4
Manganese	0.0530	mg/L	1	0.0010	0.0002		GES	07/12/2022 18:33	EPA 200.8-1994, Rev. 5.4
Mercury	4	ng/L	1	5	2	J1	JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 18:33	EPA 200.8-1994, Rev. 5.4
Selenium	0.21	µg/L	1	0.50	0.09	J1	GES	07/12/2022 18:33	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	07/12/2022 18:33	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Reissued

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-30

Customer Description:

Lab Number: 222015-011

Preparation:

Date Collected: 06/20/2022 12:29 EDT

Date Received: 06/27/2022 14:08 EDT

## 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	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Arsenic	0.23	µg/L	1	0.10	0.03		GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Barium	106	µg/L	1	0.20	0.05		GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Beryllium	0.089	µg/L	1	0.050	0.007		GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Boron	2.49	mg/L	1	0.050	0.009		GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Cadmium	0.014	µg/L	1	0.020	0.004	J1	GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Calcium	0.75	mg/L	1	0.05	0.02		GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Chromium	0.42	µg/L	1	0.20	0.04		GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Cobalt	4.90	µg/L	1	0.020	0.003		GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Lithium	0.0100	mg/L	1	0.00020	0.00005		GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Magnesium	2.48	mg/L	1	0.10	0.02		GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Mercury	14	ng/L	2	10	4		JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Potassium	0.89	mg/L	1	0.10	0.02		GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Selenium	0.34	µg/L	1	0.50	0.09	J1	GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Sodium	87.2	mg/L	1	0.20	0.05		GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Strontium	0.0114	mg/L	1	0.0020	0.0004		GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4
Thallium	0.04	µg/L	1	0.20	0.04	J1	GES	07/12/2022 19:55	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	2.72	pCi/L	0.35	0.28		ST	06/30/2022 11:09	SW-846 9315-1986, Rev. 0
Carrier Recovery	96.5	%						
Radium-228	0.99	pCi/L	0.15	0.47		TTP	07/05/2022 17:32	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	91.7	%						

\* 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

**Reissued**

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-30

Customer Description:

Lab Number: 222015-011-01

Preparation: Dissolved

Date Collected: 06/20/2022 12:29 EDT

Date Received: 06/27/2022 14:08 EDT

## 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	07/12/2022 20:00	EPA 200.8-1994, Rev. 5.4
Arsenic	0.10	µg/L	1	0.10	0.03		GES	07/12/2022 20:00	EPA 200.8-1994, Rev. 5.4
Barium	90.4	µg/L	1	0.20	0.05		GES	07/12/2022 20:00	EPA 200.8-1994, Rev. 5.4
Beryllium	0.092	µg/L	1	0.050	0.007		GES	07/12/2022 20:00	EPA 200.8-1994, Rev. 5.4
Cadmium	0.011	µg/L	1	0.020	0.004	J1	GES	07/12/2022 20:00	EPA 200.8-1994, Rev. 5.4
Chromium	0.36	µg/L	1	0.20	0.04		GES	07/12/2022 20:00	EPA 200.8-1994, Rev. 5.4
Cobalt	4.45	µg/L	1	0.020	0.003		GES	07/12/2022 20:00	EPA 200.8-1994, Rev. 5.4
Iron	0.014	mg/L	1	0.020	0.006	J1	GES	07/12/2022 20:00	EPA 200.8-1994, Rev. 5.4
Lead	0.05	µg/L	1	0.20	0.05	J1	GES	07/12/2022 20:00	EPA 200.8-1994, Rev. 5.4
Lithium	0.00993	mg/L	1	0.00020	0.00005		GES	07/12/2022 20:00	EPA 200.8-1994, Rev. 5.4
Manganese	0.0194	mg/L	1	0.0010	0.0002		GES	07/12/2022 20:00	EPA 200.8-1994, Rev. 5.4
Mercury	6	ng/L	2	10	4	J1	JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 20:00	EPA 200.8-1994, Rev. 5.4
Selenium	0.18	µg/L	1	0.50	0.09	J1	GES	07/12/2022 20:00	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	07/12/2022 20:00	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Reissued

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-31

Customer Description:

Lab Number: 222015-012

Preparation:

Date Collected: 06/20/2022 11:43 EDT

Date Received: 06/27/2022 14:08 EDT

## 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	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Arsenic	0.42	µg/L	1	0.10	0.03		GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Barium	34.1	µg/L	1	0.20	0.05		GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Beryllium	1.03	µg/L	5	0.25	0.04		GES	07/14/2022 13:04	EPA 200.8-1994, Rev. 5.4
Boron	0.028	mg/L	1	0.050	0.009	J1	GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Cadmium	0.071	µg/L	1	0.020	0.004		GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Calcium	2.65	mg/L	1	0.05	0.02		GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Chromium	0.59	µg/L	1	0.20	0.04		GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Cobalt	9.61	µg/L	1	0.020	0.003		GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Lead	0.35	µg/L	1	0.20	0.05		GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Lithium	0.0844	mg/L	5	0.0010	0.0003		GES	07/14/2022 13:04	EPA 200.8-1994, Rev. 5.4
Magnesium	3.85	mg/L	1	0.10	0.02		GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Mercury	89	ng/L	2	10	4		JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Potassium	1.50	mg/L	1	0.10	0.02		GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Selenium	0.33	µg/L	1	0.50	0.09	J1	GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Sodium	30.7	mg/L	1	0.20	0.05		GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Strontium	0.0376	mg/L	1	0.0020	0.0004		GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4
Thallium	0.08	µg/L	1	0.20	0.04	J1	GES	07/12/2022 20:05	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	2.51	pCi/L	0.34	0.27		ST	06/30/2022 11:09	SW-846 9315-1986, Rev. 0
Carrier Recovery	94.2	%						
Radium-228	2.09	pCi/L	0.15	0.42		TTP	07/05/2022 17:32	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	90.8	%						

\* 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

**Reissued**

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-31

Customer Description:

Lab Number: 222015-012-01

Preparation: Dissolved

Date Collected: 06/20/2022 11:43 EDT

Date Received: 06/27/2022 14:08 EDT

## 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	07/12/2022 20:11	EPA 200.8-1994, Rev. 5.4
Arsenic	0.23	µg/L	1	0.10	0.03		GES	07/12/2022 20:11	EPA 200.8-1994, Rev. 5.4
Barium	33.1	µg/L	1	0.20	0.05		GES	07/12/2022 20:11	EPA 200.8-1994, Rev. 5.4
Beryllium	0.96	µg/L	5	0.25	0.04		GES	07/14/2022 13:09	EPA 200.8-1994, Rev. 5.4
Cadmium	0.061	µg/L	1	0.020	0.004		GES	07/12/2022 20:11	EPA 200.8-1994, Rev. 5.4
Chromium	0.50	µg/L	1	0.20	0.04		GES	07/12/2022 20:11	EPA 200.8-1994, Rev. 5.4
Cobalt	9.49	µg/L	1	0.020	0.003		GES	07/12/2022 20:11	EPA 200.8-1994, Rev. 5.4
Iron	0.114	mg/L	1	0.020	0.006		GES	07/12/2022 20:11	EPA 200.8-1994, Rev. 5.4
Lead	0.31	µg/L	1	0.20	0.05		GES	07/12/2022 20:11	EPA 200.8-1994, Rev. 5.4
Lithium	0.0860	mg/L	5	0.0010	0.0003		GES	07/14/2022 13:09	EPA 200.8-1994, Rev. 5.4
Manganese	0.0253	mg/L	1	0.0010	0.0002		GES	07/12/2022 20:11	EPA 200.8-1994, Rev. 5.4
Mercury	9	ng/L	1	5	2		JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 20:11	EPA 200.8-1994, Rev. 5.4
Selenium	0.18	µg/L	1	0.50	0.09	J1	GES	07/12/2022 20:11	EPA 200.8-1994, Rev. 5.4
Thallium	0.08	µg/L	1	0.20	0.04	J1	GES	07/12/2022 20:11	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Reissued

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-32

Customer Description:

Lab Number: 222015-013

Preparation:

Date Collected: 06/20/2022 10:51 EDT

Date Received: 06/27/2022 14:08 EDT

## 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	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Arsenic	1.81	µg/L	1	0.10	0.03		GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Barium	32.3	µg/L	1	0.20	0.05		GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Beryllium	3.28	µg/L	5	0.25	0.04		GES	07/14/2022 13:14	EPA 200.8-1994, Rev. 5.4
Boron	0.909	mg/L	1	0.050	0.009		GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Cadmium	0.318	µg/L	1	0.020	0.004		GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Calcium	7.25	mg/L	1	0.05	0.02		GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Chromium	0.68	µg/L	1	0.20	0.04		GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Cobalt	27.2	µg/L	1	0.020	0.003		GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Lead	0.43	µg/L	1	0.20	0.05		GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Lithium	0.0923	mg/L	5	0.0010	0.0003		GES	07/14/2022 13:14	EPA 200.8-1994, Rev. 5.4
Magnesium	9.33	mg/L	1	0.10	0.02		GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Mercury	2700	ng/L	100	500	200		JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Potassium	3.05	mg/L	1	0.10	0.02		GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Selenium	2.67	µg/L	1	0.50	0.09		GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Sodium	33.8	mg/L	1	0.20	0.05		GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Strontium	0.128	mg/L	1	0.0020	0.0004		GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4
Thallium	0.17	µg/L	1	0.20	0.04	J1	GES	07/12/2022 20:16	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	6.24	pCi/L	0.56	0.29		ST	06/30/2022 11:09	SW-846 9315-1986, Rev. 0
Carrier Recovery	85.8	%						
Radium-228	7.63	pCi/L	0.23	0.55		TTP	07/05/2022 17:32	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	89.7	%						

\* 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

**Reissued**

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-32

Customer Description:

Lab Number: 222015-013-01

Preparation: Dissolved

Date Collected: 06/20/2022 10:51 EDT

Date Received: 06/27/2022 14:08 EDT

## 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	07/12/2022 20:21	EPA 200.8-1994, Rev. 5.4
Arsenic	1.69	µg/L	1	0.10	0.03		GES	07/12/2022 20:21	EPA 200.8-1994, Rev. 5.4
Barium	37.4	µg/L	1	0.20	0.05		GES	07/12/2022 20:21	EPA 200.8-1994, Rev. 5.4
Beryllium	3.48	µg/L	5	0.25	0.04		GES	07/14/2022 13:19	EPA 200.8-1994, Rev. 5.4
Cadmium	0.342	µg/L	1	0.020	0.004		GES	07/12/2022 20:21	EPA 200.8-1994, Rev. 5.4
Chromium	0.45	µg/L	1	0.20	0.04		GES	07/12/2022 20:21	EPA 200.8-1994, Rev. 5.4
Cobalt	26.6	µg/L	1	0.020	0.003		GES	07/12/2022 20:21	EPA 200.8-1994, Rev. 5.4
Iron	1.20	mg/L	1	0.020	0.006		GES	07/12/2022 20:21	EPA 200.8-1994, Rev. 5.4
Lead	0.38	µg/L	1	0.20	0.05		GES	07/12/2022 20:21	EPA 200.8-1994, Rev. 5.4
Lithium	0.0952	mg/L	5	0.0010	0.0003		GES	07/14/2022 13:19	EPA 200.8-1994, Rev. 5.4
Manganese	0.0517	mg/L	1	0.0010	0.0002		GES	07/12/2022 20:21	EPA 200.8-1994, Rev. 5.4
Mercury	80	ng/L	20	100	40	J1	JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 20:21	EPA 200.8-1994, Rev. 5.4
Selenium	2.57	µg/L	1	0.50	0.09		GES	07/12/2022 20:21	EPA 200.8-1994, Rev. 5.4
Thallium	0.18	µg/L	1	0.20	0.04	J1	GES	07/12/2022 20:21	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Reissued

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-33

Customer Description:

Lab Number: 222015-014

Preparation:

Date Collected: 06/20/2022 11:37 EDT

Date Received: 06/27/2022 14:08 EDT

## Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.04	µg/L	1	0.10	0.02	J1	GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Arsenic	1.19	µg/L	1	0.10	0.03		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Barium	42.0	µg/L	1	0.20	0.05		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Beryllium	0.939	µg/L	1	0.050	0.007		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Boron	0.093	mg/L	1	0.050	0.009		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Cadmium	0.039	µg/L	1	0.020	0.004		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Calcium	1.06	mg/L	1	0.05	0.02		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Chromium	0.64	µg/L	1	0.20	0.04		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Cobalt	7.81	µg/L	1	0.020	0.003		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Lead	0.27	µg/L	1	0.20	0.05		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Lithium	0.0166	mg/L	1	0.00020	0.00005		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Magnesium	3.11	mg/L	1	0.10	0.02		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Mercury	3000	ng/L	100	500	200		JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Potassium	0.27	mg/L	1	0.10	0.02		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Selenium	1.27	µg/L	1	0.50	0.09		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Sodium	16.7	mg/L	1	0.20	0.05		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Strontium	0.0218	mg/L	1	0.0020	0.0004		GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	07/12/2022 20:26	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	2.21	pCi/L	0.32	0.30		ST	06/30/2022 11:09	SW-846 9315-1986, Rev. 0
Carrier Recovery	93.6	%						
Radium-228	1.16	pCi/L	0.14	0.42		TTP	07/05/2022 17:32	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	90.0	%						

\* 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.





# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-33

Customer Description:

Lab Number: 222015-014-01

Preparation: Dissolved

Date Collected: 06/20/2022 11:37 EDT

Date Received: 06/27/2022 14:08 EDT

## 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	07/12/2022 20:31	EPA 200.8-1994, Rev. 5.4
Arsenic	0.72	µg/L	1	0.10	0.03		GES	07/12/2022 20:31	EPA 200.8-1994, Rev. 5.4
Barium	41.3	µg/L	1	0.20	0.05		GES	07/12/2022 20:31	EPA 200.8-1994, Rev. 5.4
Beryllium	0.863	µg/L	1	0.050	0.007		GES	07/12/2022 20:31	EPA 200.8-1994, Rev. 5.4
Cadmium	0.038	µg/L	1	0.020	0.004		GES	07/12/2022 20:31	EPA 200.8-1994, Rev. 5.4
Chromium	0.33	µg/L	1	0.20	0.04		GES	07/12/2022 20:31	EPA 200.8-1994, Rev. 5.4
Cobalt	7.29	µg/L	1	0.020	0.003		GES	07/12/2022 20:31	EPA 200.8-1994, Rev. 5.4
Iron	0.553	mg/L	1	0.020	0.006		GES	07/12/2022 20:31	EPA 200.8-1994, Rev. 5.4
Lead	0.22	µg/L	1	0.20	0.05		GES	07/12/2022 20:31	EPA 200.8-1994, Rev. 5.4
Lithium	0.0183	mg/L	1	0.00020	0.00005		GES	07/12/2022 20:31	EPA 200.8-1994, Rev. 5.4
Manganese	0.0059	mg/L	1	0.0010	0.0002		GES	07/12/2022 20:31	EPA 200.8-1994, Rev. 5.4
Mercury	410	ng/L	20	100	40		JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 20:31	EPA 200.8-1994, Rev. 5.4
Selenium	0.77	µg/L	1	0.50	0.09		GES	07/12/2022 20:31	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	07/12/2022 20:31	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

**Reissued**

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: Duplicate 1

Customer Description:

Lab Number: 222015-015

Preparation:

Date Collected: 06/20/2022 15:00 EDT

Date Received: 06/27/2022 14:08 EDT

## 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	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Arsenic	4.50	µg/L	1	0.10	0.03		GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Barium	41.7	µg/L	1	0.20	0.05		GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Beryllium	0.427	µg/L	1	0.050	0.007	M1	GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Boron	0.083	mg/L	1	0.050	0.009		GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Calcium	11.6	mg/L	1	0.05	0.02	M1	GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Chromium	0.33	µg/L	1	0.20	0.04		GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Cobalt	61.1	µg/L	1	0.020	0.003	M1	GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Lithium	0.163	mg/L	1	0.00020	0.00005	M1	GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Magnesium	16.9	mg/L	1	0.10	0.02	M1	GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	1.1	µg/L	1	0.5	0.1		GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Potassium	5.48	mg/L	1	0.10	0.02	M1	GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Selenium	0.09	µg/L	1	0.50	0.09	J1	GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Sodium	23.3	mg/L	1	0.20	0.05	M1	GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Strontium	0.0519	mg/L	1	0.0020	0.0004		GES	07/12/2022 20:36	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	07/12/2022 20:36	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

**Reissued**

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: Duplicate 1

Customer Description:

Lab Number: 222015-015-01

Preparation: Dissolved

Date Collected: 06/20/2022 15:00 EDT

Date Received: 06/27/2022 14:08 EDT

## 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	07/12/2022 20:52	EPA 200.8-1994, Rev. 5.4
Arsenic	0.84	µg/L	1	0.10	0.03		GES	07/12/2022 20:52	EPA 200.8-1994, Rev. 5.4
Barium	39.6	µg/L	1	0.20	0.05		GES	07/12/2022 20:52	EPA 200.8-1994, Rev. 5.4
Beryllium	0.203	µg/L	1	0.050	0.007		GES	07/12/2022 20:52	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	07/12/2022 20:52	EPA 200.8-1994, Rev. 5.4
Chromium	0.29	µg/L	1	0.20	0.04		GES	07/12/2022 20:52	EPA 200.8-1994, Rev. 5.4
Cobalt	57.9	µg/L	1	0.020	0.003		GES	07/12/2022 20:52	EPA 200.8-1994, Rev. 5.4
Iron	50.0	mg/L	1	0.020	0.006		GES	07/12/2022 20:52	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	07/12/2022 20:52	EPA 200.8-1994, Rev. 5.4
Lithium	0.147	mg/L	1	0.00020	0.00005		GES	07/12/2022 20:52	EPA 200.8-1994, Rev. 5.4
Manganese	0.561	mg/L	1	0.0010	0.0002		GES	07/12/2022 20:52	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	0.8	µg/L	1	0.5	0.1		GES	07/12/2022 20:52	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	07/12/2022 20:52	EPA 200.8-1994, Rev. 5.4
Thallium	0.08	µg/L	1	0.20	0.04	J1	GES	07/12/2022 20:52	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

**Reissued**

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: Equipment Blank

Customer Description:

Lab Number: 222015-016

Preparation:

Date Collected: 06/20/2022 11:13 EDT

Date Received: 06/27/2022 14:08 EDT

## 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	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Barium	<0.05	µg/L	1	0.20	0.05	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Beryllium	<0.007	µg/L	1	0.050	0.007	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Boron	<0.009	mg/L	1	0.050	0.009	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Calcium	<0.02	mg/L	1	0.05	0.02	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Chromium	0.41	µg/L	1	0.20	0.04		GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Cobalt	0.013	µg/L	1	0.020	0.003	J1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Lithium	<0.00005	mg/L	1	0.00020	0.00005	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Magnesium	<0.02	mg/L	1	0.10	0.02	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	07/18/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Potassium	<0.02	mg/L	1	0.10	0.02	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Sodium	<0.05	mg/L	1	0.20	0.05	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Strontium	<0.0004	mg/L	1	0.0020	0.0004	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	07/12/2022 21:43	EPA 200.8-1994, Rev. 5.4

222015

Job Comments:

Original report issued 8/9/2022. Report reissued with amended matrix spike precision calculations.



## Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 222015

Customer: Pirkey Power Station

Date Reported: 12/22/2022

### 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. ALL TIMES LISTED ARE IN THE EASTERN TIME ZONE.**

### 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.

**Dolan Chemical Laboratory (DCL)**  
 4001 Bixby Road  
 Groveport, Ohio 43125  
 Contacts: Michael Ohlinger (614-836-4184)  
 Dave Conover (614-836-4219)

Project Name: Pirkey PP CCR  
 Contact Name: Leslie Flierschbach  
 Contact Phone: 318-673-2744

Sampler(s): Matt Hamilton Kenny McDonald

# Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Site Contact:

Date:

For Lab Use Only:

COC/Order #:

222015

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						Sample Specific Notes:
						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>	250 mL Glass bottle, HCL**, pH<2	250 mL Glass bottle, HCL**, pH<2		
AD-2	6/21/2022	849	G	GW	7	Sb, As, B, Ba, Be, Ca, Cd, Cr, Co, K, Li, Mg, Mo, Na, Pb, Se, Sr, Ti	Disolved Sb, As, Ba, Be, Cd, Cr, Co, Fe, Li, Mn, Mo, Pb, Se, Ti	Ra-226, Ra-228	Mercury	Disolved Mercury		
AD-3	6/21/2022	1123	G	GW	7							
AD-4	6/21/2022	1034	G	GW	7							
AD-7	6/21/2022	947	G	GW	7							
AD-12	6/20/2022	852	G	GW	7							
AD-13	6/20/2022	843	G	GW	10							
AD-17	6/21/2022	1040	G	GW	7							
AD-18	6/21/2022	817	G	GW	7							
AD-22	6/20/2022	953	G	GW	7							
AD-28	6/21/2022	956	G	GW	7							
AD-30	6/20/2022	1129	G	GW	7							
AD-31	6/20/2022	1043	G	GW	7							

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>Egis</i>	Date/Time: 6/23/22 1600	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: 6/27/22 1:00PM





# WATER & WASTE SAMPLE RECEIPT FORM (IR#1)

45+31

<u>Package Type</u> <input checked="" type="radio"/> Cooler <input type="radio"/> Box <input type="radio"/> Bag <input type="radio"/> Envelope			<u>Delivery Type</u> PONY    UPS    FedEx    USPS Other _____			
Plant/Customer <u>Pukey</u>			Number of Plastic Containers: <u>76</u>			
Opened By <u>JAB/JDB/JWB</u>			Number of Glass Containers: _____			
Date/Time <u>6/27/22 1:00pm</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)						
(IR Gun Ser# 210441568, Expir. 5/27/2023) - 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>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: JWB 6/27/22

pH paper (circle one): MQuant pH Cat 1.09535.0001 \_\_\_\_\_ (OR) Lab rat pH Cat # LRS -4801 ✓  
lot HC904495 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# 222015 Initial & Date & Time : \_\_\_\_\_

Logged by JAB 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.



# ICP-MS Laboratory Review Checklist

## Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

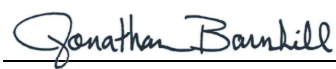
- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

**Release Statement:** I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

**Check, if applicable:**  This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Jonathan Barnhill

Name (printed)



Signature

Lab Supervisor

Official Title

12-12-2022

Date

# ICP-MS Laboratory Review Checklist

**Table 1. Reportable Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** \_\_\_\_\_  
**Reviewer Name:** Jonathan Barnhill  
**LRC Date:** 12-12-2022  
**Laboratory Job Number:** 222015  
**Prep Batch Number(s):** PB22070101 PB2207151 QC2207105 QC2207151

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
R1	O, I	<b>Chain-of-custody (COC)</b>		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	<b>Sample and quality control (QC) identification</b>		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	<b>Test reports</b>		
	I	Were all samples prepared and analyzed within holding times?		
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	No	ER1
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	<b>Surrogate recovery data</b>		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	<b>Test reports/summary forms for blank samples</b>		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

## ICP-MS Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	<b>Laboratory control samples (LCS):</b>		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	<b>Matrix spike (MS) and matrix spike duplicate (MSD) data</b>		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NO	ER3
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	<b>Analytical duplicate data</b>		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	<b>Method quantitation limits (MQLs):</b>		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	<b>Other problems/anomalies</b>		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

## ICP-MS Laboratory Review Checklist

**Table 2. Supporting Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory

**Project Name:** \_\_\_\_\_

**Reviewer Name:** Jonathan Barnhill

**LRC Date:** 12-12-2022

**Laboratory Job Number:** 222015

**Prep Batch Number(s):** PB22070101 PB2207151 QC2207105 QC2207151

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S1	O, I	<b>Initial calibration (ICAL)</b>		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	Yes	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	<b>Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):</b>		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER2
S3	O	<b>Mass spectral tuning:</b>		
	I	Was the appropriate compound for the method used for tuning?	Yes	
	I	Were ion abundance data within the method-required QC limits?	Yes	
S4	O	<b>Internal standards (IS):</b>		
	I	Were IS area counts and retention times within the method-required QC limits?	Yes	
S5	O, I	<b>Raw data (NELAC section 1 appendix A glossary, and section 5.)</b>		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

## ICP-MS Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	O	<b>Dual column confirmation</b>		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	<b>Tentatively identified compounds (TICs):</b>		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	<b>Interference Check Sample (ICS) results:</b>		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	<b>Serial dilutions, post digestion spikes, and method of standard additions</b>		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	<b>Method detection limit (MDL) studies</b>		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	<b>Proficiency test reports:</b>		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	<b>Standards documentation</b>		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	<b>Compound/analyte identification procedures</b>		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	<b>Demonstration of analyst competency (DOC)</b>		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	<b>Verification/validation documentation for methods (NELAC Chap 5n 5)</b>		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	<b>Laboratory standard operating procedures (SOPs):</b>		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

# ICP-MS Laboratory Review Checklist

**Table 3. Exception Reports.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** \_\_\_\_\_  
**Reviewer Name:** Jonathan Barnhill  
**LRC Date:** 12-12-2022  
**Laboratory Job Number:** 222015  
**Prep Batch Number(s):** PB22070101 PB2207151 QC2207105 QC2207151

Exception Report No.	Description
ER1	Linear Dynamic Range (LDR) study used to determine upper limit of analyte calibration.
ER2	CCB acceptance criteria is $CCB < 2.2 * MDL$ .
ER3	Matrix Spike failure for Na on sample 222015-001
	Matrix Spike failure for Co Li on sample 222015-006
	Matrix Spike failure for Ca Li Mg Na Co K on sample 222015-015

<sup>1</sup> Items identified by the letter “R” must be available as a hard copy or as a .pdf file. Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period.  
<sup>2</sup> O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).  
<sup>3</sup> NA - Not applicable; NR - Not reviewed.  
<sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is “No” or “NR.”

# Radium Laboratory Review Checklist

## Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

**Release Statement:** I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

**Check, if applicable:**  This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Tamisha T. Palmer		Chemical Technician, Principal	07/07/2022
Name (printed)	Signature	Official Title	Date

## Radium Laboratory Review Checklist

**Table 1. Reportable Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey Power  
**Reviewer Name:** Tamisha Palmer  
**LRC Date:** 07/07/2022  
**Laboratory Job Number:** 222015  
**Prep Batch Number(s):** PB22062803, PB22062804

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
R1	O, I	<b>Chain-of-custody (COC)</b>		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	<b>Sample and quality control (QC) identification</b>		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	<b>Test reports</b>		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	<b>Surrogate recovery data</b>		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	<b>Test reports/summary forms for blank samples</b>		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	



## Radium Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	<b>Laboratory control samples (LCS):</b>		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	<b>Matrix spike (MS) and matrix spike duplicate (MSD) data</b>		
	I	Were the project/method specified analytes included in the MS and MSD?	NA	
	I	Were MS/MSD analyzed at the appropriate frequency?	NA	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NA	
	I	Were MS/MSD RPDs within laboratory QC limits?	NA	
R8	O, I	<b>Analytical duplicate data</b>		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes, No	ER1
R9	O, I	<b>Method quantitation limits (MQLs):</b>		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	<b>Other problems/anomalies</b>		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

## Radium Laboratory Review Checklist

**Table 2. Supporting Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey Power  
**Reviewer Name:** Tamisha Palmer  
**LRC Date:** 07/07/2022  
**Laboratory Job Number:** 222015  
**Prep Batch Number(s):** PB22062803, PB22062804

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S1	O, I	<b>Initial calibration (ICAL)</b>		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	NA	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	<b>Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):</b>		
	I	Was the CCV analyzed at the method-required frequency?	NA	
	I	Were percent differences for each analyte within the method-required QC limits?	NA	
	I	Was the ICAL curve verified for each analyte?	NA	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	NA	
S3	O	<b>Mass spectral tuning:</b>		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	<b>Internal standards (IS):</b>		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	<b>Raw data (NELAC section 1 appendix A glossary, and section 5.)</b>		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

## Radium Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	O	<b>Dual column confirmation</b>		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	<b>Tentatively identified compounds (TICs):</b>		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	<b>Interference Check Sample (ICS) results:</b>		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	<b>Serial dilutions, post digestion spikes, and method of standard additions</b>		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	<b>Method detection limit (MDL) studies</b>		
	I	Was a MDL study performed for each reported analyte?	NA	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	NA	
S11	O, I	<b>Proficiency test reports:</b>		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	<b>Standards documentation</b>		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	<b>Compound/analyte identification procedures</b>		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	<b>Demonstration of analyst competency (DOC)</b>		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	<b>Verification/validation documentation for methods (NELAC Chap 5n 5)</b>		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	<b>Laboratory standard operating procedures (SOPs):</b>		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	



# Radium Laboratory Review Checklist

## Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

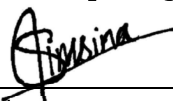
- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
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- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

**Release Statement:** I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

**Check, if applicable:**  This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Sunita Timsina

Name (printed)

  
Signature

Chemist Associate

Official Title

07/07/2022

Date

## Radium Laboratory Review Checklist

**Table 1. Reportable Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey Power Station  
**Reviewer Name:** Sunita Timsina  
**LRC Date:** 07/07/2022  
**Laboratory Job Number:** 222015  
**Prep Batch Number(s):** PB22062806

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
R1	O, I	<b>Chain-of-custody (COC)</b>		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	<b>Sample and quality control (QC) identification</b>		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	<b>Test reports</b>		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	<b>Surrogate recovery data</b>		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	<b>Test reports/summary forms for blank samples</b>		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

## Radium Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	<b>Laboratory control samples (LCS):</b>		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	<b>Matrix spike (MS) and matrix spike duplicate (MSD) data</b>		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	<b>Analytical duplicate data</b>		
	I	Were appropriate analytical duplicates analyzed for each matrix?	N/A	
	I	Were analytical duplicates analyzed at the appropriate frequency?	N/A	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	N/A	
R9	O, I	<b>Method quantitation limits (MQLs):</b>		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	<b>Other problems/anomalies</b>		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

## Radium Laboratory Review Checklist

**Table 2. Supporting Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey Power Station  
**Reviewer Name:** Sunita Timsina  
**LRC Date:** 07/07/2022  
**Laboratory Job Number:** 222015  
**Prep Batch Number(s):** PB22062806

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S1	O, I	<b>Initial calibration (ICAL)</b>		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	NA	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	<b>Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):</b>		
	I	Was the CCV analyzed at the method-required frequency?	NA	
	I	Were percent differences for each analyte within the method-required QC limits?	NA	
	I	Was the ICAL curve verified for each analyte?	NA	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	NA	
S3	O	<b>Mass spectral tuning:</b>		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	<b>Internal standards (IS):</b>		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	<b>Raw data (NELAC section 1 appendix A glossary, and section 5.)</b>		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	



## Radium Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	O	<b>Dual column confirmation</b>		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	<b>Tentatively identified compounds (TICs):</b>		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	<b>Interference Check Sample (ICS) results:</b>		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	<b>Serial dilutions, post digestion spikes, and method of standard additions</b>		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	<b>Method detection limit (MDL) studies</b>		
	I	Was a MDL study performed for each reported analyte?	NA	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	NA	
S11	O, I	<b>Proficiency test reports:</b>		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	<b>Standards documentation</b>		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	<b>Compound/analyte identification procedures</b>		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	<b>Demonstration of analyst competency (DOC)</b>		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	<b>Verification/validation documentation for methods (NELAC Chap 5n 5)</b>		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	<b>Laboratory standard operating procedures (SOPs):</b>		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	



# Mercury Laboratory Review Checklist

## Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

**Release Statement:** I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

**Check, if applicable:**  This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Susann Sulzmann	<i>Susann Sulzmann</i>	Senior Chemist	08-03-2022
Name (printed)	Signature	Official Title	Date

## Mercury Laboratory Review Checklist

**Table 1. Reportable Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey Power  
**Reviewer Name:** Susann Sulzmann  
**LRC Date:** 8-03-2022  
**Laboratory Job Number:** 222015  
**Prep Batch Number(s):** PB22070805, PB22070708, PB22071112

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
R1	O, I	<b>Chain-of-custody (COC)</b>		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	<b>Sample and quality control (QC) identification</b>		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	<b>Test reports</b>		
	I	Were all samples prepared and analyzed within holding times?	yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	yes	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	<b>Surrogate recovery data</b>		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	<b>Test reports/summary forms for blank samples</b>		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

## Mercury Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	yes	
R6	O, I	<b>Laboratory control samples (LCS):</b>		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?		
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	yes	
R7	O, I	<b>Matrix spike (MS) and matrix spike duplicate (MSD) data</b>		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	yes	
	I	Were MS/MSD RPDs within laboratory QC limits?		
R8	O, I	<b>Analytical duplicate data</b>		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	yes	
R9	O, I	<b>Method quantitation limits (MQLs):</b>		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	<b>Other problems/anomalies</b>		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

## Mercury Laboratory Review Checklist

**Table 2. Supporting Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory

**Project Name:** Pirkey Power

**Reviewer Name:** Susann Sulzmann

**LRC Date:** 8-03-2022

**Laboratory Job Number:** 222015

**Prep Batch Number(s):** PB22070805, PB22070708, PB22071112

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S1	O, I	<b>Initial calibration (ICAL)</b>		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	yes	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	<b>Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):</b>		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER1
S3	O	<b>Mass spectral tuning:</b>		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	<b>Internal standards (IS):</b>		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	<b>Raw data (NELAC section 1 appendix A glossary, and section 5.)</b>		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

## Mercury Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	O	<b>Dual column confirmation</b>		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	<b>Tentatively identified compounds (TICs):</b>		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	<b>Interference Check Sample (ICS) results:</b>		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	<b>Serial dilutions, post digestion spikes, and method of standard additions</b>		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	<b>Method detection limit (MDL) studies</b>		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	<b>Proficiency test reports:</b>		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	<b>Standards documentation</b>		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	<b>Compound/analyte identification procedures</b>		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	<b>Demonstration of analyst competency (DOC)</b>		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	<b>Verification/validation documentation for methods (NELAC Chap 5n 5)</b>		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	<b>Laboratory standard operating procedures (SOPs):</b>		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	







# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

**Reissued**

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: AD-2

Customer Description: TG-32

Lab Number: 223664-001

Preparation:

Date Collected: 11/15/2022 11:05 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Arsenic	0.40	µg/L	1	0.10	0.03		GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Barium	16.8	µg/L	1	0.20	0.05		GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Beryllium	0.561	µg/L	1	0.050	0.007		GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Boron	2.83	mg/L	1	0.050	0.009		GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Cadmium	0.086	µg/L	1	0.020	0.004		GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Calcium	2.80	mg/L	1	0.05	0.02		GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Chromium	0.43	µg/L	1	0.20	0.04		GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Cobalt	19.6	µg/L	1	0.020	0.003		GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Lead	0.60	µg/L	1	0.20	0.05		GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Lithium	0.0556	mg/L	1	0.00020	0.00005		GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Magnesium	5.23	mg/L	1	0.10	0.02		GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Mercury	58	ng/L	2	10	4		JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Potassium	1.43	mg/L	1	0.10	0.02		GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Selenium	1.28	µg/L	1	0.50	0.09		GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Sodium	90.6	mg/L	1	0.20	0.05	M1	GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Strontium	0.0408	mg/L	1	0.0020	0.0004		GES	11/30/2022 13:58	EPA 200.8-1994, Rev. 5.4
Thallium	0.11	µg/L	1	0.20	0.04	J1	GES	11/30/2022 13:58	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	0.12	0.23		ST	12/07/2022 10:18	SW-846 9315-1986, Rev. 0
Carrier Recovery	77.9	%						
Radium-228	1.01	pCi/L	0.13	0.39		TTP	11/29/2022 16:21	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	85.0	%						

\* 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.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: AD-2

Customer Description: TG-32

Lab Number: 223664-001-01

Preparation: Dissolved

Date Collected: 11/15/2022 11:05 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 14:13	EPA 200.8-1994, Rev. 5.4
Arsenic	0.41	µg/L	1	0.10	0.03		GES	11/30/2022 14:13	EPA 200.8-1994, Rev. 5.4
Barium	16.8	µg/L	1	0.20	0.05		GES	11/30/2022 14:13	EPA 200.8-1994, Rev. 5.4
Beryllium	0.559	µg/L	1	0.050	0.007		GES	11/30/2022 14:13	EPA 200.8-1994, Rev. 5.4
Cadmium	0.090	µg/L	1	0.020	0.004		GES	11/30/2022 14:13	EPA 200.8-1994, Rev. 5.4
Chromium	0.41	µg/L	1	0.20	0.04		GES	11/30/2022 14:13	EPA 200.8-1994, Rev. 5.4
Cobalt	19.9	µg/L	1	0.020	0.003		GES	11/30/2022 14:13	EPA 200.8-1994, Rev. 5.4
Iron	0.257	mg/L	1	0.020	0.006		GES	11/30/2022 14:13	EPA 200.8-1994, Rev. 5.4
Lead	0.60	µg/L	1	0.20	0.05		GES	11/30/2022 14:13	EPA 200.8-1994, Rev. 5.4
Lithium	0.0554	mg/L	1	0.00020	0.00005		GES	11/30/2022 14:13	EPA 200.8-1994, Rev. 5.4
Manganese	0.0853	mg/L	1	0.0010	0.0002		GES	11/30/2022 14:13	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 14:13	EPA 200.8-1994, Rev. 5.4
Selenium	1.30	µg/L	1	0.50	0.09		GES	11/30/2022 14:13	EPA 200.8-1994, Rev. 5.4
Thallium	0.13	µg/L	1	0.20	0.04	J1	GES	11/30/2022 14:13	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Reissued

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: AD-3

Customer Description: TG-32

Lab Number: 223664-002

Preparation:

Date Collected: 11/16/2022 12:45 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Arsenic	1.22	µg/L	1	0.10	0.03		GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Barium	63.7	µg/L	1	0.20	0.05		GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Beryllium	0.186	µg/L	1	0.050	0.007		GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Boron	0.063	mg/L	1	0.050	0.009		GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Cadmium	0.012	µg/L	1	0.020	0.004	J1	GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Calcium	5.05	mg/L	1	0.05	0.02		GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Chromium	0.63	µg/L	1	0.20	0.04		GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Cobalt	7.40	µg/L	1	0.020	0.003		GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Lead	0.31	µg/L	1	0.20	0.05		GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Lithium	0.0837	mg/L	1	0.00020	0.00005		GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Magnesium	4.15	mg/L	1	0.10	0.02		GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Potassium	3.44	mg/L	1	0.10	0.02		GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Selenium	0.09	µg/L	1	0.50	0.09	J1	GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Sodium	12.3	mg/L	1	0.20	0.05		GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Strontium	0.0380	mg/L	1	0.0020	0.0004		GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	11/30/2022 14:18	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.72	pCi/L	0.14	0.20		ST	12/07/2022 10:18	SW-846 9315-1986, Rev. 0
Carrier Recovery	89.9	%						
Radium-228	0.79	pCi/L	0.11	0.36		TTP	11/29/2022 16:21	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	99.5	%						

\* 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

**Reissued**

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: AD-3

Customer Description: TG-32

Lab Number: 223664-002-01

Preparation: Dissolved

Date Collected: 11/16/2022 00:45 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 14:23	EPA 200.8-1994, Rev. 5.4
Arsenic	0.91	µg/L	1	0.10	0.03		GES	11/30/2022 14:23	EPA 200.8-1994, Rev. 5.4
Barium	61.6	µg/L	1	0.20	0.05		GES	11/30/2022 14:23	EPA 200.8-1994, Rev. 5.4
Beryllium	0.139	µg/L	1	0.050	0.007		GES	11/30/2022 14:23	EPA 200.8-1994, Rev. 5.4
Cadmium	0.012	µg/L	1	0.020	0.004	J1	GES	11/30/2022 14:23	EPA 200.8-1994, Rev. 5.4
Chromium	0.29	µg/L	1	0.20	0.04		GES	11/30/2022 14:23	EPA 200.8-1994, Rev. 5.4
Cobalt	7.92	µg/L	1	0.020	0.003		GES	11/30/2022 14:23	EPA 200.8-1994, Rev. 5.4
Iron	9.45	mg/L	1	0.020	0.006		GES	11/30/2022 14:23	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2022 14:23	EPA 200.8-1994, Rev. 5.4
Lithium	0.0933	mg/L	1	0.00020	0.00005		GES	11/30/2022 14:23	EPA 200.8-1994, Rev. 5.4
Manganese	0.115	mg/L	1	0.0010	0.0002		GES	11/30/2022 14:23	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 14:23	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/30/2022 14:23	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2022 14:23	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

**Reissued**

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: AD-4

Customer Description: TG-32

Lab Number: 223664-003

Preparation:

Date Collected: 11/16/2022 12:32 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Arsenic	0.21	µg/L	1	0.10	0.03		GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Barium	128	µg/L	1	0.20	0.05		GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Beryllium	0.195	µg/L	1	0.050	0.007		GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Boron	0.019	mg/L	1	0.050	0.009	J1	GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Cadmium	0.019	µg/L	1	0.020	0.004	J1	GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Calcium	2.25	mg/L	1	0.05	0.02		GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Chromium	0.44	µg/L	1	0.20	0.04		GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Cobalt	3.00	µg/L	1	0.020	0.003		GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Lithium	0.0212	mg/L	1	0.00020	0.00005		GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Magnesium	0.55	mg/L	1	0.10	0.02		GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Mercury	5	ng/L	1	5	2		JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Potassium	2.15	mg/L	1	0.10	0.02		GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Sodium	6.41	mg/L	1	0.20	0.05		GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Strontium	0.0183	mg/L	1	0.0020	0.0004		GES	11/30/2022 14:29	EPA 200.8-1994, Rev. 5.4
Thallium	0.10	µg/L	1	0.20	0.04	J1	GES	11/30/2022 14:29	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	0.10	0.17		ST	12/07/2022 10:18	SW-846 9315-1986, Rev. 0
Carrier Recovery	96.5	%						
Radium-228	-0.01	pCi/L	0.13	0.46		TTP	11/29/2022 16:21	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	89.2	%						

\* 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

**Reissued**

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: AD-4

Customer Description: TG-32

Lab Number: 223664-003-01

Preparation: Dissolved

Date Collected: 11/16/2022 12:32 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 14:34	EPA 200.8-1994, Rev. 5.4
Arsenic	0.13	µg/L	1	0.10	0.03		GES	11/30/2022 14:34	EPA 200.8-1994, Rev. 5.4
Barium	128	µg/L	1	0.20	0.05		GES	11/30/2022 14:34	EPA 200.8-1994, Rev. 5.4
Beryllium	0.197	µg/L	1	0.050	0.007		GES	11/30/2022 14:34	EPA 200.8-1994, Rev. 5.4
Cadmium	0.021	µg/L	1	0.020	0.004		GES	11/30/2022 14:34	EPA 200.8-1994, Rev. 5.4
Chromium	0.40	µg/L	1	0.20	0.04		GES	11/30/2022 14:34	EPA 200.8-1994, Rev. 5.4
Cobalt	2.98	µg/L	1	0.020	0.003		GES	11/30/2022 14:34	EPA 200.8-1994, Rev. 5.4
Iron	2.40	mg/L	1	0.020	0.006		GES	11/30/2022 14:34	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2022 14:34	EPA 200.8-1994, Rev. 5.4
Lithium	0.0215	mg/L	1	0.00020	0.00005		GES	11/30/2022 14:34	EPA 200.8-1994, Rev. 5.4
Manganese	0.0291	mg/L	1	0.0010	0.0002		GES	11/30/2022 14:34	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 14:34	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/30/2022 14:34	EPA 200.8-1994, Rev. 5.4
Thallium	0.1	µg/L	1	0.20	0.04	J1	GES	11/30/2022 14:34	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Reissued

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: AD-7

Customer Description: TG-32

Lab Number: 223664-004

Preparation:

Date Collected: 11/16/2022 10:10 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Arsenic	0.43	µg/L	1	0.10	0.03		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Barium	55.2	µg/L	1	0.20	0.05		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Beryllium	2.49	µg/L	1	0.050	0.007		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Boron	9.38	mg/L	1	0.050	0.009		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Cadmium	0.880	µg/L	1	0.020	0.004		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Calcium	5.20	mg/L	1	0.05	0.02		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Chromium	0.35	µg/L	1	0.20	0.04		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Cobalt	31.8	µg/L	1	0.020	0.003		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Lead	0.27	µg/L	1	0.20	0.05		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Lithium	0.110	mg/L	1	0.00020	0.00005		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Magnesium	8.25	mg/L	1	0.10	0.02		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Mercury	37	ng/L	1	5	2		JAB	12/05/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Potassium	3.50	mg/L	1	0.10	0.02		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Selenium	1.49	µg/L	1	0.50	0.09		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Sodium	32.3	mg/L	1	0.20	0.05		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Strontium	0.0575	mg/L	1	0.0020	0.0004		GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4
Thallium	0.19	µg/L	1	0.20	0.04	J1	GES	11/30/2022 14:39	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.65	pCi/L	0.21	0.20		ST	12/07/2022 10:18	SW-846 9315-1986, Rev. 0
Carrier Recovery	93.9	%						
Radium-228	2.48	pCi/L	0.15	0.41		TTP	11/29/2022 16:21	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	98.0	%						

\* 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.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: AD-7

Customer Description: TG-32

Lab Number: 223664-004-01

Preparation: Dissolved

Date Collected: 11/16/2022 10:10 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 14:44	EPA 200.8-1994, Rev. 5.4
Arsenic	0.43	µg/L	1	0.10	0.03		GES	11/30/2022 14:44	EPA 200.8-1994, Rev. 5.4
Barium	54.5	µg/L	1	0.20	0.05		GES	11/30/2022 14:44	EPA 200.8-1994, Rev. 5.4
Beryllium	2.55	µg/L	1	0.050	0.007		GES	11/30/2022 14:44	EPA 200.8-1994, Rev. 5.4
Cadmium	0.879	µg/L	1	0.020	0.004		GES	11/30/2022 14:44	EPA 200.8-1994, Rev. 5.4
Chromium	0.35	µg/L	1	0.20	0.04		GES	11/30/2022 14:44	EPA 200.8-1994, Rev. 5.4
Cobalt	31.8	µg/L	1	0.020	0.003		GES	11/30/2022 14:44	EPA 200.8-1994, Rev. 5.4
Iron	10.8	mg/L	1	0.020	0.006		GES	11/30/2022 14:44	EPA 200.8-1994, Rev. 5.4
Lead	0.23	µg/L	1	0.20	0.05		GES	11/30/2022 14:44	EPA 200.8-1994, Rev. 5.4
Lithium	0.110	mg/L	1	0.00020	0.00005		GES	11/30/2022 14:44	EPA 200.8-1994, Rev. 5.4
Manganese	0.157	mg/L	1	0.0010	0.0002		GES	11/30/2022 14:44	EPA 200.8-1994, Rev. 5.4
Mercury	4	ng/L	1	5	2	J1	JAB	12/05/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 14:44	EPA 200.8-1994, Rev. 5.4
Selenium	1.53	µg/L	1	0.50	0.09		GES	11/30/2022 14:44	EPA 200.8-1994, Rev. 5.4
Thallium	0.17	µg/L	1	0.20	0.04	J1	GES	11/30/2022 14:44	EPA 200.8-1994, Rev. 5.4





# Water Analysis Report

Reissued

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: AD-12

Customer Description: TG-32

Lab Number: 223664-005

Preparation:

Date Collected: 11/15/2022 11:58 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Arsenic	0.06	µg/L	1	0.10	0.03	J1	GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Barium	30.6	µg/L	1	0.20	0.05		GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Beryllium	0.153	µg/L	1	0.050	0.007		GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Boron	0.013	mg/L	1	0.050	0.009	J1	GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Cadmium	0.007	µg/L	1	0.020	0.004	J1	GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Calcium	0.36	mg/L	1	0.05	0.02		GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Chromium	0.45	µg/L	1	0.20	0.04		GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Cobalt	1.59	µg/L	1	0.020	0.003		GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Lead	0.08	µg/L	1	0.20	0.05	J1	GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Lithium	0.0119	mg/L	1	0.00020	0.00005		GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Magnesium	0.54	mg/L	1	0.10	0.02		GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Potassium	0.81	mg/L	1	0.10	0.02		GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Selenium	0.23	µg/L	1	0.50	0.09	J1	GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Sodium	5.83	mg/L	1	0.20	0.05		GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Strontium	0.0035	mg/L	1	0.0020	0.0004		GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2022 17:44	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.72	pCi/L	0.15	0.19	P1	TTP	12/05/2022 11:11	SW-846 9315-1986, Rev. 0
Carrier Recovery	102	%						
Radium-228	0.74	pCi/L	0.14	0.44		TTP	11/29/2022 16:21	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	95.6	%						

\* 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

**Reissued**

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: AD-12

Customer Description: TG-32

Lab Number: 223664-005-01

Preparation: Dissolved

Date Collected: 11/15/2022 11:58 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 18:00	EPA 200.8-1994, Rev. 5.4
Arsenic	0.05	µg/L	1	0.10	0.03	J1	GES	11/30/2022 18:00	EPA 200.8-1994, Rev. 5.4
Barium	30.0	µg/L	1	0.20	0.05		GES	11/30/2022 18:00	EPA 200.8-1994, Rev. 5.4
Beryllium	0.149	µg/L	1	0.050	0.007		GES	11/30/2022 18:00	EPA 200.8-1994, Rev. 5.4
Cadmium	0.008	µg/L	1	0.020	0.004	J1	GES	11/30/2022 18:00	EPA 200.8-1994, Rev. 5.4
Chromium	0.35	µg/L	1	0.20	0.04		GES	11/30/2022 18:00	EPA 200.8-1994, Rev. 5.4
Cobalt	1.59	µg/L	1	0.020	0.003		GES	11/30/2022 18:00	EPA 200.8-1994, Rev. 5.4
Iron	<0.006	mg/L	1	0.020	0.006	U1	GES	11/30/2022 18:00	EPA 200.8-1994, Rev. 5.4
Lead	0.08	µg/L	1	0.20	0.05	J1	GES	11/30/2022 18:00	EPA 200.8-1994, Rev. 5.4
Lithium	0.0116	mg/L	1	0.00020	0.00005		GES	11/30/2022 18:00	EPA 200.8-1994, Rev. 5.4
Manganese	0.0061	mg/L	1	0.0010	0.0002		GES	11/30/2022 18:00	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 18:00	EPA 200.8-1994, Rev. 5.4
Selenium	0.28	µg/L	1	0.50	0.09	J1	GES	11/30/2022 18:00	EPA 200.8-1994, Rev. 5.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	11/30/2022 18:00	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Reissued

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: AD-13

Customer Description: TG-32

Lab Number: 223664-006

Preparation:

Date Collected: 11/15/2022 09:21 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Arsenic	1.62	µg/L	1	0.10	0.03		GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Barium	44.2	µg/L	1	0.20	0.05		GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Beryllium	0.131	µg/L	1	0.050	0.007		GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Boron	0.095	mg/L	1	0.050	0.009		GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Calcium	8.57	mg/L	1	0.05	0.02		GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Chromium	0.35	µg/L	1	0.20	0.04		GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Cobalt	45.9	µg/L	1	0.020	0.003		GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Lithium	0.141	mg/L	1	0.00020	0.00005		GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Magnesium	12.4	mg/L	1	0.10	0.02		GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Potassium	5.16	mg/L	1	0.10	0.02		GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Sodium	16.3	mg/L	1	0.20	0.05		GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Strontium	0.0402	mg/L	1	0.0020	0.0004		GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2022 14:49	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.55	pCi/L	0.26	0.35		TTP	12/05/2022 11:11	SW-846 9315-1986, Rev. 0
Carrier Recovery	84.9	%						
Radium-228	-0.86	pCi/L	0.14	0.50		TTP	11/29/2022 16:21	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	102	%						

\* 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

**Reissued**

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: AD-13

Customer Description: TG-32

Lab Number: 223664-006-01

Preparation: Dissolved

Date Collected: 11/15/2022 09:21 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 14:54	EPA 200.8-1994, Rev. 5.4
Arsenic	1.43	µg/L	1	0.10	0.03		GES	11/30/2022 14:54	EPA 200.8-1994, Rev. 5.4
Barium	44.7	µg/L	1	0.20	0.05		GES	11/30/2022 14:54	EPA 200.8-1994, Rev. 5.4
Beryllium	0.116	µg/L	1	0.050	0.007		GES	11/30/2022 14:54	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	11/30/2022 14:54	EPA 200.8-1994, Rev. 5.4
Chromium	0.31	µg/L	1	0.20	0.04		GES	11/30/2022 14:54	EPA 200.8-1994, Rev. 5.4
Cobalt	47.2	µg/L	1	0.020	0.003		GES	11/30/2022 14:54	EPA 200.8-1994, Rev. 5.4
Iron	39.9	mg/L	5	0.10	0.03		GES	12/05/2022 09:18	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2022 14:54	EPA 200.8-1994, Rev. 5.4
Lithium	0.140	mg/L	1	0.00020	0.00005		GES	11/30/2022 14:54	EPA 200.8-1994, Rev. 5.4
Manganese	0.428	mg/L	1	0.0010	0.0002		GES	11/30/2022 14:54	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 14:54	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/30/2022 14:54	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2022 14:54	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Reissued

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: AD-17

Customer Description: TG-32

Lab Number: 223664-007

Preparation:

Date Collected: 11/16/2022 11:58 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Arsenic	0.13	µg/L	1	0.10	0.03		GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Barium	276	µg/L	1	0.20	0.05		GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Beryllium	0.662	µg/L	1	0.050	0.007		GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Boron	0.026	mg/L	1	0.050	0.009	J1	GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Cadmium	0.061	µg/L	1	0.020	0.004		GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Calcium	1.23	mg/L	1	0.05	0.02		GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Chromium	0.37	µg/L	1	0.20	0.04		GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Cobalt	12.7	µg/L	1	0.020	0.003		GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Lead	0.16	µg/L	1	0.20	0.05	J1	GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Lithium	0.0267	mg/L	1	0.00020	0.00005		GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Magnesium	4.53	mg/L	1	0.10	0.02		GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Mercury	400	ng/L	100	500	200	J1	JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Potassium	1.40	mg/L	1	0.10	0.02		GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Selenium	0.36	µg/L	1	0.50	0.09	J1	GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Sodium	9.35	mg/L	1	0.20	0.05		GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Strontium	0.0231	mg/L	1	0.0020	0.0004		GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4
Thallium	0.07	µg/L	1	0.20	0.04	J1	GES	11/30/2022 18:05	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	3.34	pCi/L	0.33	0.23		TTP	12/05/2022 11:11	SW-846 9315-1986, Rev. 0
Carrier Recovery	101	%						
Radium-228	3.41	pCi/L	0.19	0.52		TTP	11/29/2022 16:21	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	95.3	%						

\* 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

**Reissued**

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: AD-17

Customer Description: TG-32

Lab Number: 223664-007-01

Preparation: Dissolved

Date Collected: 11/16/2022 11:58 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 18:10	EPA 200.8-1994, Rev. 5.4
Arsenic	0.12	µg/L	1	0.10	0.03		GES	11/30/2022 18:10	EPA 200.8-1994, Rev. 5.4
Barium	273	µg/L	1	0.20	0.05		GES	11/30/2022 18:10	EPA 200.8-1994, Rev. 5.4
Beryllium	0.648	µg/L	1	0.050	0.007		GES	11/30/2022 18:10	EPA 200.8-1994, Rev. 5.4
Cadmium	0.053	µg/L	1	0.020	0.004		GES	11/30/2022 18:10	EPA 200.8-1994, Rev. 5.4
Chromium	0.39	µg/L	1	0.20	0.04		GES	11/30/2022 18:10	EPA 200.8-1994, Rev. 5.4
Cobalt	12.3	µg/L	1	0.020	0.003		GES	11/30/2022 18:10	EPA 200.8-1994, Rev. 5.4
Iron	0.269	mg/L	1	0.020	0.006		GES	11/30/2022 18:10	EPA 200.8-1994, Rev. 5.4
Lead	0.16	µg/L	1	0.20	0.05	J1	GES	11/30/2022 18:10	EPA 200.8-1994, Rev. 5.4
Lithium	0.0262	mg/L	1	0.00020	0.00005		GES	11/30/2022 18:10	EPA 200.8-1994, Rev. 5.4
Manganese	0.0545	mg/L	1	0.0010	0.0002		GES	11/30/2022 18:10	EPA 200.8-1994, Rev. 5.4
Mercury	<200	ng/L	100	500	200	U1	JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 18:10	EPA 200.8-1994, Rev. 5.4
Selenium	0.30	µg/L	1	0.50	0.09	J1	GES	11/30/2022 18:10	EPA 200.8-1994, Rev. 5.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	11/30/2022 18:10	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Reissued

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: AD-18

Customer Description: TG-32

Lab Number: 223664-008

Preparation:

Date Collected: 11/16/2022 11:13 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Arsenic	0.25	µg/L	1	0.10	0.03		GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Barium	77.4	µg/L	1	0.20	0.05		GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Beryllium	0.071	µg/L	1	0.050	0.007		GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Boron	0.011	mg/L	1	0.050	0.009	J1	GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Cadmium	0.009	µg/L	1	0.020	0.004	J1	GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Calcium	0.19	mg/L	1	0.05	0.02		GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Chromium	0.54	µg/L	1	0.20	0.04		GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Cobalt	0.723	µg/L	1	0.020	0.003		GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Lead	0.08	µg/L	1	0.20	0.05	J1	GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Lithium	0.0125	mg/L	1	0.00020	0.00005		GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Magnesium	0.27	mg/L	1	0.10	0.02		GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Mercury	18	ng/L	1	5	2		JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Potassium	0.73	mg/L	1	0.10	0.02		GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Selenium	0.12	µg/L	1	0.50	0.09	J1	GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Sodium	5.46	mg/L	1	0.20	0.05		GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Strontium	0.0040	mg/L	1	0.0020	0.0004		GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2022 18:15	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1	pCi/L	0.18	0.21		TTP	12/05/2022 11:11	SW-846 9315-1986, Rev. 0
Carrier Recovery	103	%						
Radium-228	0.61	pCi/L	0.12	0.39		TTP	11/29/2022 16:21	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	92.6	%						

\* 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

**Reissued**

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: AD-18

Customer Description: TG-32

Lab Number: 223664-008-01

Preparation: Dissolved

Date Collected: 11/16/2022 11:13 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 18:20	EPA 200.8-1994, Rev. 5.4
Arsenic	0.06	µg/L	1	0.10	0.03	J1	GES	11/30/2022 18:20	EPA 200.8-1994, Rev. 5.4
Barium	77.2	µg/L	1	0.20	0.05		GES	11/30/2022 18:20	EPA 200.8-1994, Rev. 5.4
Beryllium	0.069	µg/L	1	0.050	0.007		GES	11/30/2022 18:20	EPA 200.8-1994, Rev. 5.4
Cadmium	0.012	µg/L	1	0.020	0.004	J1	GES	11/30/2022 18:20	EPA 200.8-1994, Rev. 5.4
Chromium	0.34	µg/L	1	0.20	0.04		GES	11/30/2022 18:20	EPA 200.8-1994, Rev. 5.4
Cobalt	0.719	µg/L	1	0.020	0.003		GES	11/30/2022 18:20	EPA 200.8-1994, Rev. 5.4
Iron	0.060	mg/L	1	0.020	0.006		GES	11/30/2022 18:20	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2022 18:20	EPA 200.8-1994, Rev. 5.4
Lithium	0.0127	mg/L	1	0.00020	0.00005		GES	11/30/2022 18:20	EPA 200.8-1994, Rev. 5.4
Manganese	0.0028	mg/L	1	0.0010	0.0002		GES	11/30/2022 18:20	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 18:20	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/30/2022 18:20	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2022 18:20	EPA 200.8-1994, Rev. 5.4





# Water Analysis Report

Reissued

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: AD-22

Customer Description: TG-32

Lab Number: 223664-009

Preparation:

Date Collected: 11/14/2022 12:31 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Arsenic	2.40	µg/L	1	0.10	0.03		GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Barium	20.8	µg/L	1	0.20	0.05		GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Beryllium	2.16	µg/L	1	0.050	0.007		GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Boron	0.021	mg/L	1	0.050	0.009	J1	GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Cadmium	0.494	µg/L	1	0.020	0.004		GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Calcium	10.5	mg/L	1	0.05	0.02		GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Chromium	0.47	µg/L	1	0.20	0.04		GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Cobalt	60.3	µg/L	1	0.020	0.003		GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Lead	0.22	µg/L	1	0.20	0.05		GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Lithium	0.0905	mg/L	1	0.00020	0.00005		GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Magnesium	15.1	mg/L	1	0.10	0.02		GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Mercury	410	ng/L	10	50	20		JAB	12/02/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Potassium	3.37	mg/L	1	0.10	0.02		GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Selenium	1.93	µg/L	1	0.50	0.09		GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Sodium	83.9	mg/L	1	0.20	0.05		GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Strontium	0.0898	mg/L	1	0.0020	0.0004		GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4
Thallium	0.14	µg/L	1	0.20	0.04	J1	GES	11/30/2022 18:25	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.96	pCi/L	0.21	0.31		TTP	12/05/2022 11:11	SW-846 9315-1986, Rev. 0
Carrier Recovery	76.7	%						
Radium-228	1.74	pCi/L	0.18	0.53		TTP	12/27/2022 14:41	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	88.6	%						

\* 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

**Reissued**

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: AD-22

Customer Description: TG-32

Lab Number: 223664-009-01

Preparation: Dissolved

Date Collected: 11/14/2022 12:31 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 18:30	EPA 200.8-1994, Rev. 5.4
Arsenic	1.28	µg/L	1	0.10	0.03		GES	11/30/2022 18:30	EPA 200.8-1994, Rev. 5.4
Barium	20.5	µg/L	1	0.20	0.05		GES	11/30/2022 18:30	EPA 200.8-1994, Rev. 5.4
Beryllium	2.04	µg/L	1	0.050	0.007		GES	11/30/2022 18:30	EPA 200.8-1994, Rev. 5.4
Cadmium	0.503	µg/L	1	0.020	0.004		GES	11/30/2022 18:30	EPA 200.8-1994, Rev. 5.4
Chromium	0.46	µg/L	1	0.20	0.04		GES	11/30/2022 18:30	EPA 200.8-1994, Rev. 5.4
Cobalt	60.0	µg/L	1	0.020	0.003		GES	11/30/2022 18:30	EPA 200.8-1994, Rev. 5.4
Iron	29.8	mg/L	1	0.020	0.006		GES	11/30/2022 18:30	EPA 200.8-1994, Rev. 5.4
Lead	0.12	µg/L	1	0.20	0.05	J1	GES	11/30/2022 18:30	EPA 200.8-1994, Rev. 5.4
Lithium	0.0883	mg/L	1	0.00020	0.00005		GES	11/30/2022 18:30	EPA 200.8-1994, Rev. 5.4
Manganese	0.295	mg/L	1	0.0010	0.0002		GES	11/30/2022 18:30	EPA 200.8-1994, Rev. 5.4
Mercury	51	ng/L	1	5	2		JAB	12/01/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 18:30	EPA 200.8-1994, Rev. 5.4
Selenium	2.06	µg/L	1	0.50	0.09		GES	11/30/2022 18:30	EPA 200.8-1994, Rev. 5.4
Thallium	0.13	µg/L	1	0.20	0.04	J1	GES	11/30/2022 18:30	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Reissued

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: AD-28

Customer Description: TG-32

Lab Number: 223664-010

Preparation:

Date Collected: 11/16/2022 09:48 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Arsenic	0.10	µg/L	1	0.10	0.03		GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Barium	125	µg/L	1	0.20	0.05		GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Beryllium	0.459	µg/L	1	0.050	0.007		GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Boron	0.334	mg/L	1	0.050	0.009		GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Cadmium	0.046	µg/L	1	0.020	0.004		GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Calcium	1.34	mg/L	1	0.05	0.02		GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Chromium	0.54	µg/L	1	0.20	0.04		GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Cobalt	11.8	µg/L	1	0.020	0.003		GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Lead	0.15	µg/L	1	0.20	0.05	J1	GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Lithium	0.0270	mg/L	1	0.00020	0.00005		GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Magnesium	2.76	mg/L	1	0.10	0.02		GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Mercury	8	ng/L	1	5	2		JAB	12/02/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Potassium	0.85	mg/L	1	0.10	0.02		GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Selenium	0.16	µg/L	1	0.50	0.09	J1	GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Sodium	6.45	mg/L	1	0.20	0.05		GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Strontium	0.0182	mg/L	1	0.0020	0.0004		GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2022 18:36	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	3.79	pCi/L	0.35	0.26		TTP	12/05/2022 11:11	SW-846 9315-1986, Rev. 0
Carrier Recovery	95.0	%						
Radium-228	1.36	pCi/L	0.13	0.39		TTP	12/27/2022 14:41	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	96.6	%						

\* 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

**Reissued**

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: AD-28

Customer Description: TG-32

Lab Number: 223664-010-01

Preparation: Dissolved

Date Collected: 11/16/2022 09:48 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 18:41	EPA 200.8-1994, Rev. 5.4
Arsenic	0.06	µg/L	1	0.10	0.03	J1	GES	11/30/2022 18:41	EPA 200.8-1994, Rev. 5.4
Barium	128	µg/L	1	0.20	0.05		GES	11/30/2022 18:41	EPA 200.8-1994, Rev. 5.4
Beryllium	0.447	µg/L	1	0.050	0.007		GES	11/30/2022 18:41	EPA 200.8-1994, Rev. 5.4
Cadmium	0.045	µg/L	1	0.020	0.004		GES	11/30/2022 18:41	EPA 200.8-1994, Rev. 5.4
Chromium	0.47	µg/L	1	0.20	0.04		GES	11/30/2022 18:41	EPA 200.8-1994, Rev. 5.4
Cobalt	11.8	µg/L	1	0.020	0.003		GES	11/30/2022 18:41	EPA 200.8-1994, Rev. 5.4
Iron	0.493	mg/L	1	0.020	0.006		GES	11/30/2022 18:41	EPA 200.8-1994, Rev. 5.4
Lead	0.08	µg/L	1	0.20	0.05	J1	GES	11/30/2022 18:41	EPA 200.8-1994, Rev. 5.4
Lithium	0.0267	mg/L	1	0.00020	0.00005		GES	11/30/2022 18:41	EPA 200.8-1994, Rev. 5.4
Manganese	0.0556	mg/L	1	0.0010	0.0002		GES	11/30/2022 18:41	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/02/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 18:41	EPA 200.8-1994, Rev. 5.4
Selenium	0.17	µg/L	1	0.50	0.09	J1	GES	11/30/2022 18:41	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2022 18:41	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Reissued

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: AD-30

Customer Description: TG-32

Lab Number: 223664-011

Preparation:

Date Collected: 11/16/2022 10:46 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Arsenic	0.16	µg/L	1	0.10	0.03		GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Barium	89.4	µg/L	1	0.20	0.05		GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Beryllium	0.108	µg/L	1	0.050	0.007		GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Boron	2.86	mg/L	1	0.050	0.009		GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Cadmium	0.013	µg/L	1	0.020	0.004	J1	GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Calcium	0.71	mg/L	1	0.05	0.02		GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Chromium	0.55	µg/L	1	0.20	0.04		GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Cobalt	4.86	µg/L	1	0.020	0.003		GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Lithium	0.0119	mg/L	1	0.00020	0.00005		GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Magnesium	2.58	mg/L	1	0.10	0.02		GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Mercury	17	ng/L	2	10	4		JAB	12/02/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Potassium	1.01	mg/L	1	0.10	0.02		GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Selenium	0.35	µg/L	1	0.50	0.09	J1	GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Sodium	94.0	mg/L	1	0.20	0.05	M1	GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Strontium	0.0113	mg/L	1	0.0020	0.0004		GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	11/30/2022 20:13	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.75	pCi/L	0.16	0.23		TTP	12/05/2022 11:11	SW-846 9315-1986, Rev. 0
Carrier Recovery	96.5	%						
Radium-228	0.77	pCi/L	0.14	0.46		TTP	12/27/2022 14:41	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	93.5	%						

\* 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

**Reissued**

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: AD-30

Customer Description: TG-32

Lab Number: 223664-011-01

Preparation: Dissolved

Date Collected: 11/16/2022 10:46 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 20:29	EPA 200.8-1994, Rev. 5.4
Arsenic	0.14	µg/L	1	0.10	0.03		GES	11/30/2022 20:29	EPA 200.8-1994, Rev. 5.4
Barium	79.7	µg/L	1	0.20	0.05		GES	11/30/2022 20:29	EPA 200.8-1994, Rev. 5.4
Beryllium	0.108	µg/L	1	0.050	0.007		GES	11/30/2022 20:29	EPA 200.8-1994, Rev. 5.4
Cadmium	0.012	µg/L	1	0.020	0.004	J1	GES	11/30/2022 20:29	EPA 200.8-1994, Rev. 5.4
Chromium	0.50	µg/L	1	0.20	0.04		GES	11/30/2022 20:29	EPA 200.8-1994, Rev. 5.4
Cobalt	4.76	µg/L	1	0.020	0.003		GES	11/30/2022 20:29	EPA 200.8-1994, Rev. 5.4
Iron	0.033	mg/L	1	0.020	0.006		GES	11/30/2022 20:29	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2022 20:29	EPA 200.8-1994, Rev. 5.4
Lithium	0.0119	mg/L	1	0.00020	0.00005		GES	11/30/2022 20:29	EPA 200.8-1994, Rev. 5.4
Manganese	0.0215	mg/L	1	0.0010	0.0002		GES	11/30/2022 20:29	EPA 200.8-1994, Rev. 5.4
Mercury	<4	ng/L	2	10	4	U1	JAB	12/02/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 20:29	EPA 200.8-1994, Rev. 5.4
Selenium	0.37	µg/L	1	0.50	0.09	J1	GES	11/30/2022 20:29	EPA 200.8-1994, Rev. 5.4
Thallium	0.07	µg/L	1	0.20	0.04	J1	GES	11/30/2022 20:29	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Reissued

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: AD-31

Customer Description: TG-32

Lab Number: 223664-012

Preparation:

Date Collected: 11/15/2022 11:02 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Arsenic	0.30	µg/L	1	0.10	0.03		GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Barium	35.8	µg/L	1	0.20	0.05		GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Beryllium	0.863	µg/L	1	0.050	0.007		GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Boron	0.035	mg/L	1	0.050	0.009	J1	GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Cadmium	0.066	µg/L	1	0.020	0.004		GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Calcium	2.63	mg/L	1	0.05	0.02		GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Chromium	0.74	µg/L	1	0.20	0.04		GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Cobalt	9.41	µg/L	1	0.020	0.003		GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Lead	0.34	µg/L	1	0.20	0.05		GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Lithium	0.0681	mg/L	1	0.00020	0.00005		GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Magnesium	3.94	mg/L	1	0.10	0.02		GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Mercury	610	ng/L	10	50	20		JAB	12/02/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Potassium	1.67	mg/L	1	0.10	0.02		GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Selenium	0.38	µg/L	1	0.50	0.09	J1	GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Sodium	30.6	mg/L	1	0.20	0.05		GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Strontium	0.0388	mg/L	1	0.0020	0.0004		GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4
Thallium	0.10	µg/L	1	0.20	0.04	J1	GES	11/30/2022 20:34	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.05	pCi/L	0.18	0.24		TTP	12/05/2022 11:11	SW-846 9315-1986, Rev. 0
Carrier Recovery	95.4	%						
Radium-228	2.76	pCi/L	0.18	0.50		TTP	12/27/2022 14:41	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	94.8	%						

\* 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

**Reissued**

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: AD-31

Customer Description: TG-32

Lab Number: 223664-012-01

Preparation: Dissolved

Date Collected: 11/15/2022 11:02 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 20:39	EPA 200.8-1994, Rev. 5.4
Arsenic	0.20	µg/L	1	0.10	0.03		GES	11/30/2022 20:39	EPA 200.8-1994, Rev. 5.4
Barium	35.7	µg/L	1	0.20	0.05		GES	11/30/2022 20:39	EPA 200.8-1994, Rev. 5.4
Beryllium	0.868	µg/L	1	0.050	0.007		GES	11/30/2022 20:39	EPA 200.8-1994, Rev. 5.4
Cadmium	0.065	µg/L	1	0.020	0.004		GES	11/30/2022 20:39	EPA 200.8-1994, Rev. 5.4
Chromium	0.44	µg/L	1	0.20	0.04		GES	11/30/2022 20:39	EPA 200.8-1994, Rev. 5.4
Cobalt	9.60	µg/L	1	0.020	0.003		GES	11/30/2022 20:39	EPA 200.8-1994, Rev. 5.4
Iron	0.113	mg/L	1	0.020	0.006		GES	11/30/2022 20:39	EPA 200.8-1994, Rev. 5.4
Lead	0.27	µg/L	1	0.20	0.05		GES	11/30/2022 20:39	EPA 200.8-1994, Rev. 5.4
Lithium	0.0694	mg/L	1	0.00020	0.00005		GES	11/30/2022 20:39	EPA 200.8-1994, Rev. 5.4
Manganese	0.0262	mg/L	1	0.0010	0.0002		GES	11/30/2022 20:39	EPA 200.8-1994, Rev. 5.4
Mercury	4	ng/L	1	5	2	J1	JAB	12/02/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 20:39	EPA 200.8-1994, Rev. 5.4
Selenium	0.35	µg/L	1	0.50	0.09	J1	GES	11/30/2022 20:39	EPA 200.8-1994, Rev. 5.4
Thallium	0.09	µg/L	1	0.20	0.04	J1	GES	11/30/2022 20:39	EPA 200.8-1994, Rev. 5.4





# Water Analysis Report

Reissued

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: AD-32

Customer Description: TG-32

Lab Number: 223664-013

Preparation:

Date Collected: 11/15/2022 10:03 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Arsenic	1.73	µg/L	1	0.10	0.03		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Barium	24.4	µg/L	1	0.20	0.05		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Beryllium	3.77	µg/L	1	0.050	0.007		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Boron	1.26	mg/L	1	0.050	0.009		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Cadmium	0.404	µg/L	1	0.020	0.004		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Calcium	12.0	mg/L	1	0.05	0.02		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Chromium	0.82	µg/L	1	0.20	0.04		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Cobalt	34.8	µg/L	1	0.020	0.003		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Lead	0.66	µg/L	1	0.20	0.05		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Lithium	0.0812	mg/L	1	0.00020	0.00005		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Magnesium	12.3	mg/L	1	0.10	0.02		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Mercury	1500	ng/L	100	500	200		JAB	12/02/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Potassium	3.76	mg/L	1	0.10	0.02		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Selenium	5.95	µg/L	1	0.50	0.09		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Sodium	48.7	mg/L	1	0.20	0.05		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Strontium	0.219	mg/L	1	0.0020	0.0004		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4
Thallium	0.24	µg/L	1	0.20	0.04		GES	11/30/2022 20:44	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.26	pCi/L	0.21	0.24		TTP	12/05/2022 11:11	SW-846 9315-1986, Rev. 0
Carrier Recovery	86.8	%						
Radium-228	4.02	pCi/L	0.19	0.46		TTP	12/27/2022 14:41	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	90.0	%						

\* 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.



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: AD-32

Customer Description: TG-32

Lab Number: 223664-013-01

Preparation: Dissolved

Date Collected: 11/15/2022 10:03 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 20:49	EPA 200.8-1994, Rev. 5.4
Arsenic	1.57	µg/L	1	0.10	0.03		GES	11/30/2022 20:49	EPA 200.8-1994, Rev. 5.4
Barium	23.9	µg/L	1	0.20	0.05		GES	11/30/2022 20:49	EPA 200.8-1994, Rev. 5.4
Beryllium	3.79	µg/L	1	0.050	0.007		GES	11/30/2022 20:49	EPA 200.8-1994, Rev. 5.4
Cadmium	0.409	µg/L	1	0.020	0.004		GES	11/30/2022 20:49	EPA 200.8-1994, Rev. 5.4
Chromium	0.67	µg/L	1	0.20	0.04		GES	11/30/2022 20:49	EPA 200.8-1994, Rev. 5.4
Cobalt	34.9	µg/L	1	0.020	0.003		GES	11/30/2022 20:49	EPA 200.8-1994, Rev. 5.4
Iron	2.03	mg/L	1	0.020	0.006		GES	11/30/2022 20:49	EPA 200.8-1994, Rev. 5.4
Lead	0.59	µg/L	1	0.20	0.05		GES	11/30/2022 20:49	EPA 200.8-1994, Rev. 5.4
Lithium	0.0809	mg/L	1	0.00020	0.00005		GES	11/30/2022 20:49	EPA 200.8-1994, Rev. 5.4
Manganese	0.0661	mg/L	1	0.0010	0.0002		GES	11/30/2022 20:49	EPA 200.8-1994, Rev. 5.4
Mercury	20	ng/L	2	10	4		JAB	12/02/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 20:49	EPA 200.8-1994, Rev. 5.4
Selenium	5.88	µg/L	1	0.50	0.09		GES	11/30/2022 20:49	EPA 200.8-1994, Rev. 5.4
Thallium	0.20	µg/L	1	0.20	0.04		GES	11/30/2022 20:49	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Reissued

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: AD-33

Customer Description: TG-32

Lab Number: 223664-014

Preparation:

Date Collected: 11/15/2022 12:06 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Arsenic	0.37	µg/L	1	0.10	0.03		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Barium	49.4	µg/L	1	0.20	0.05		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Beryllium	0.945	µg/L	1	0.050	0.007		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Boron	0.086	mg/L	1	0.050	0.009		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Cadmium	0.038	µg/L	1	0.020	0.004		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Calcium	0.90	mg/L	1	0.05	0.02		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Chromium	0.44	µg/L	1	0.20	0.04		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Cobalt	6.83	µg/L	1	0.020	0.003		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Lead	0.22	µg/L	1	0.20	0.05		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Lithium	0.0185	mg/L	1	0.00020	0.00005		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Magnesium	2.64	mg/L	1	0.10	0.02		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Mercury	5900	ng/L	100	500	200		JAB	12/02/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Potassium	0.28	mg/L	1	0.10	0.02		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Selenium	0.96	µg/L	1	0.50	0.09		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Sodium	14.9	mg/L	1	0.20	0.05		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Strontium	0.0201	mg/L	1	0.0020	0.0004		GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2022 20:54	EPA 200.8-1994, Rev. 5.4

## Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	2.68	pCi/L	0.30	0.24		TTP	12/05/2022 11:11	SW-846 9315-1986, Rev. 0
Carrier Recovery	93.9	%						
Radium-228	0.98	pCi/L	0.13	0.40		TTP	12/27/2022 14:41	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	99.2	%						

\* 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

**Reissued**

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: AD-33

Customer Description: TG-32

Lab Number: 223664-014-01

Preparation: Dissolved

Date Collected: 11/15/2022 12:06 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 20:59	EPA 200.8-1994, Rev. 5.4
Arsenic	0.29	µg/L	1	0.10	0.03		GES	11/30/2022 20:59	EPA 200.8-1994, Rev. 5.4
Barium	48.7	µg/L	1	0.20	0.05		GES	11/30/2022 20:59	EPA 200.8-1994, Rev. 5.4
Beryllium	0.936	µg/L	1	0.050	0.007		GES	11/30/2022 20:59	EPA 200.8-1994, Rev. 5.4
Cadmium	0.035	µg/L	1	0.020	0.004		GES	11/30/2022 20:59	EPA 200.8-1994, Rev. 5.4
Chromium	0.32	µg/L	1	0.20	0.04		GES	11/30/2022 20:59	EPA 200.8-1994, Rev. 5.4
Cobalt	6.65	µg/L	1	0.020	0.003		GES	11/30/2022 20:59	EPA 200.8-1994, Rev. 5.4
Iron	0.009	mg/L	1	0.020	0.006	J1	GES	11/30/2022 20:59	EPA 200.8-1994, Rev. 5.4
Lead	0.22	µg/L	1	0.20	0.05		GES	11/30/2022 20:59	EPA 200.8-1994, Rev. 5.4
Lithium	0.0182	mg/L	1	0.00020	0.00005		GES	11/30/2022 20:59	EPA 200.8-1994, Rev. 5.4
Manganese	0.0054	mg/L	1	0.0010	0.0002		GES	11/30/2022 20:59	EPA 200.8-1994, Rev. 5.4
Mercury	47	ng/L	1	5	2		JAB	12/02/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 20:59	EPA 200.8-1994, Rev. 5.4
Selenium	0.91	µg/L	1	0.50	0.09		GES	11/30/2022 20:59	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2022 20:59	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

**Reissued**

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: Duplicate - 2

Customer Description: TG-32

Lab Number: 223664-015

Preparation:

Date Collected: 11/15/2022 15:00 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Arsenic	1.69	µg/L	1	0.10	0.03		GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Barium	45.3	µg/L	1	0.20	0.05		GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Beryllium	0.129	µg/L	1	0.050	0.007		GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Boron	0.061	mg/L	1	0.050	0.009		GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Calcium	8.71	mg/L	1	0.05	0.02		GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Chromium	0.40	µg/L	1	0.20	0.04		GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Cobalt	46.5	µg/L	1	0.020	0.003		GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Lithium	0.139	mg/L	1	0.00020	0.00005		GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Magnesium	12.6	mg/L	1	0.10	0.02		GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/02/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	0.2	µg/L	1	0.5	0.1	J1	GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Potassium	5.32	mg/L	1	0.10	0.02		GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Sodium	16.4	mg/L	1	0.20	0.05		GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Strontium	0.0419	mg/L	1	0.0020	0.0004		GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2022 21:05	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

**Reissued**

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: Duplicate - 2

Customer Description: TG-32

Lab Number: 223664-015-01

Preparation: Dissolved

Date Collected: 11/15/2022 15:00 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 21:10	EPA 200.8-1994, Rev. 5.4
Arsenic	1.44	µg/L	1	0.10	0.03		GES	11/30/2022 21:10	EPA 200.8-1994, Rev. 5.4
Barium	45.2	µg/L	1	0.20	0.05		GES	11/30/2022 21:10	EPA 200.8-1994, Rev. 5.4
Beryllium	0.115	µg/L	1	0.050	0.007		GES	11/30/2022 21:10	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	11/30/2022 21:10	EPA 200.8-1994, Rev. 5.4
Chromium	0.42	µg/L	1	0.20	0.04		GES	11/30/2022 21:10	EPA 200.8-1994, Rev. 5.4
Cobalt	46.3	µg/L	1	0.020	0.003		GES	11/30/2022 21:10	EPA 200.8-1994, Rev. 5.4
Iron	39.7	mg/L	5	0.10	0.03		GES	12/05/2022 09:23	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2022 21:10	EPA 200.8-1994, Rev. 5.4
Lithium	0.140	mg/L	1	0.00020	0.00005		GES	11/30/2022 21:10	EPA 200.8-1994, Rev. 5.4
Manganese	0.420	mg/L	1	0.0010	0.0002		GES	11/30/2022 21:10	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/02/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2022 21:10	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/30/2022 21:10	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2022 21:10	EPA 200.8-1994, Rev. 5.4



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinnet: 210-4221

**Reissued**

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

Customer Sample ID: Equipment Blank

Customer Description: TG-32

Lab Number: 223664-016

Preparation:

Date Collected: 11/16/2022 11:22 EST

Date Received: 11/21/2022 12:30 EST

## 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	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Barium	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Beryllium	<0.007	µg/L	1	0.050	0.007	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Boron	<0.009	mg/L	1	0.050	0.009	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Calcium	<0.02	mg/L	1	0.05	0.02	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Chromium	0.47	µg/L	1	0.20	0.04		GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Cobalt	0.143	µg/L	1	0.020	0.003		GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Lithium	<0.00005	mg/L	1	0.00020	0.00005	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Magnesium	<0.02	mg/L	1	0.10	0.02	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/02/2022 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	0.2	µg/L	1	0.5	0.1	J1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Potassium	<0.02	mg/L	1	0.10	0.02	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Sodium	<0.05	mg/L	1	0.20	0.05	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Strontium	<0.0004	mg/L	1	0.0020	0.0004	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2022 22:06	EPA 200.8-1994, Rev. 5.4

223664

Job Comments:

Original report issued 12/29/22 . Report reissued with boron added to TM on 1/23/23.



## Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 223664

Customer: Pirkey Power Station

Date Reported: 01/23/2023

### 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. ALL TIMES LISTED ARE IN THE EASTERN TIME ZONE.**

### Data Qualifier Legend

**U1** - Not detected at or above method detection limit (MDL).

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

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

**P1** - The precision between duplicate results was above acceptance limits.



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

# Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

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, 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>	250 mL Glass bottle, HCL **, pH<2	250 mL Glass bottle, HCL **, pH<2	250 mL Glass bottle, HCL **, pH<2			
AD-2	11/15/2022	1005	G	GW	7	Sb, As, B, Ba, Be, Ca, Cd, Cr, Co, K, Li, Mg, Mo, Na, Pb, Se, Sr, Ti	Dissolved Sb, As, Ba, Be, Cd, Cr, Co, Fe, Li, Mn, Mo, Pb, Se, Ti	Ra-226, Ra-228	Mercury	Dissolved Mercury		223664		
AD-3	11/16/2022	1145	G	GW	7									
AD-4	11/16/2022	1132	G	GW	7									
AD-7	11/16/2022	910	G	GW	10									
AD-12	11/15/2022	1058	G	GW	10									
AD-13	11/15/2022	821	G	GW	7									
AD-17	11/16/2022	1058	G	GW	7									
AD-18	11/16/2022	1013	G	GW	7									
AD-22	11/14/2022	1131	G	GW	7									
AD-28	11/16/2022	848	G	GW	7									
AD-30	11/16/2022	946	G	GW	7									
AD-31	11/15/2022	1002	G	GW	7									

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:

TG-32 needed

Relinquished by: <i>[Signature]</i>	Company: <i>Eask</i>	Date/Time: 11-17-22	Received by: <i>[Signature]</i>	Date/Time: 11/21/22
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: <i>[Signature]</i>	Date/Time: 12:00PM
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: <i>[Signature]</i>	Date/Time: 12:00PM





# WATER & WASTE SAMPLE RECEIPT FORM (IR#1)

Package Type				Delivery Type			
<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>Pickney</u>				Number of Plastic Containers: <u>79</u>			
Opened By <u>MGK</u>				Number of Glass Containers: <u>31</u>			
Date/Time <u>11/21/22 12:00PM</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 (IR Gun Ser# 210441588, Expir. 5/27/2023) - 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>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: MGK 11/21/21

pH paper (circle one): MQuant pH Cat 1.09535.0001 lot HC904495  FORG Lab rat pH Cat # LRS-4801 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# 223664 Initial & Date & Time: \_\_\_\_\_

Comments: \_\_\_\_\_

Logged by MSD \_\_\_\_\_

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.

# ICP-MS Laboratory Review Checklist

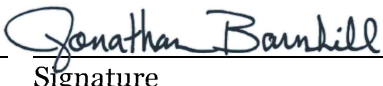
## Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- NA R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

**Release Statement:** I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

**Check, if applicable:**  This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Jonathan Barnhill		Lab Supervisor	12/14/2022
Name (printed)	Signature	Official Title	Date

# ICP-MS Laboratory Review Checklist

**Table 1. Reportable Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** \_\_\_\_\_  
**Reviewer Name:** Jonathan Barnhill  
**LRC Date:** 12/14/2022  
**Laboratory Job Number:** 223664  
**Prep Batch Number(s):** PB22112206 PB22112207 QC2212035 QC2212036

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
R1	O, I	<b>Chain-of-custody (COC)</b>		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	<b>Sample and quality control (QC) identification</b>		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	<b>Test reports</b>		
	I	Were all samples prepared and analyzed within holding times?		
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	No	ER1
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	<b>Surrogate recovery data</b>		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	<b>Test reports/summary forms for blank samples</b>		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

## ICP-MS Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	<b>Laboratory control samples (LCS):</b>		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	<b>Matrix spike (MS) and matrix spike duplicate (MSD) data</b>		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	No	ER3
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	<b>Analytical duplicate data</b>		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	<b>Method quantitation limits (MQLs):</b>		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	<b>Other problems/anomalies</b>		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

## ICP-MS Laboratory Review Checklist

**Table 2. Supporting Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory

**Project Name:** \_\_\_\_\_

**Reviewer Name:** Jonathan Barnhill

**LRC Date:** 12/14/2022

**Laboratory Job Number:** 223664

**Prep Batch Number(s):** PB22112206 PB22112207 QC2212035 QC2212036

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S1	O, I	<b>Initial calibration (ICAL)</b>		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	Yes	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	<b>Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):</b>		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER2
S3	O	<b>Mass spectral tuning:</b>		
	I	Was the appropriate compound for the method used for tuning?	Yes	
	I	Were ion abundance data within the method-required QC limits?	Yes	
S4	O	<b>Internal standards (IS):</b>		
	I	Were IS area counts and retention times within the method-required QC limits?	Yes	
S5	O, I	<b>Raw data (NELAC section 1 appendix A glossary, and section 5.)</b>		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

## ICP-MS Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	O	<b>Dual column confirmation</b>		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	<b>Tentatively identified compounds (TICs):</b>		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	<b>Interference Check Sample (ICS) results:</b>		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	<b>Serial dilutions, post digestion spikes, and method of standard additions</b>		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	<b>Method detection limit (MDL) studies</b>		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	<b>Proficiency test reports:</b>		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	<b>Standards documentation</b>		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	<b>Compound/analyte identification procedures</b>		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	<b>Demonstration of analyst competency (DOC)</b>		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	<b>Verification/validation documentation for methods (NELAC Chap 5n 5)</b>		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	<b>Laboratory standard operating procedures (SOPs):</b>		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	



# ICP-MS Laboratory Review Checklist

**Table 3. Exception Reports.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** \_\_\_\_\_  
**Reviewer Name:** Jonathan Barnhill  
**LRC Date:** 12/14/2022  
**Laboratory Job Number:** 223664  
**Prep Batch Number(s):** PB22112206 PB22112207 QC2212035 QC2212036

Exception Report No.	Description
ER1	Linear Dynamic Range (LDR) study used to determine upper limit of analyte calibration.
ER2	CCB acceptance criteria is $CCB < 2.2 * MDL$ .
ER3	Matrix Spike Failure for Na on sample 223664-001
	Matrix Spike Failure for Na on sample 223664-011

<sup>1</sup> Items identified by the letter “R” must be available as a hard copy or as a .pdf file. Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period.  
<sup>2</sup> O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).  
<sup>3</sup> NA - Not applicable; NR - Not reviewed.  
<sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is “No” or “NR.”

# Radium Laboratory Review Checklist

## Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

**Release Statement:** I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

**Check, if applicable:**  This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Tamisha Palmer

Name (printed)



Signature

Chemical Technician, Prin

Official Title

12/20/2022

Date

## Radium Laboratory Review Checklist

**Table 1. Reportable Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey Power  
**Reviewer Name:** Tamisha Palmer  
**LRC Date:** 12/20/2022  
**Laboratory Job Number:** PB22112803  
**Prep Batch Number(s):** 223664

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
R1	O, I	<b>Chain-of-custody (COC)</b>		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	<b>Sample and quality control (QC) identification</b>		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	<b>Test reports</b>		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	<b>Surrogate recovery data</b>		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	<b>Test reports/summary forms for blank samples</b>		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

## Radium Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	<b>Laboratory control samples (LCS):</b>		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?		
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	<b>Matrix spike (MS) and matrix spike duplicate (MSD) data</b>		
	I	Were the project/method specified analytes included in the MS and MSD?	NA	
	I	Were MS/MSD analyzed at the appropriate frequency?	NA	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NA	
	I	Were MS/MSD RPDs within laboratory QC limits?	NA	
R8	O, I	<b>Analytical duplicate data</b>		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	<b>Method quantitation limits (MQLs):</b>		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	<b>Other problems/anomalies</b>		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

## Radium Laboratory Review Checklist

**Table 2. Supporting Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey Power  
**Reviewer Name:** Tamisha Palmer  
**LRC Date:** 12/20/2022  
**Laboratory Job Number:** PB22112803  
**Prep Batch Number(s):** 223664

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S1	O, I	<b>Initial calibration (ICAL)</b>		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	NA	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	<b>Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):</b>		
	I	Was the CCV analyzed at the method-required frequency?	NA	
	I	Were percent differences for each analyte within the method-required QC limits?	NA	
	I	Was the ICAL curve verified for each analyte?	NA	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	NA	
S3	O	<b>Mass spectral tuning:</b>		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	<b>Internal standards (IS):</b>		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	<b>Raw data (NELAC section 1 appendix A glossary, and section 5.)</b>		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

## Radium Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	O	<b>Dual column confirmation</b>		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	<b>Tentatively identified compounds (TICs):</b>		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	<b>Interference Check Sample (ICS) results:</b>		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	<b>Serial dilutions, post digestion spikes, and method of standard additions</b>		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	<b>Method detection limit (MDL) studies</b>		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	<b>Proficiency test reports:</b>		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	<b>Standards documentation</b>		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	<b>Compound/analyte identification procedures</b>		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	<b>Demonstration of analyst competency (DOC)</b>		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	<b>Verification/validation documentation for methods (NELAC Chap 5n 5)</b>		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	<b>Laboratory standard operating procedures (SOPs):</b>		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	



# Radium Laboratory Review Checklist

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  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

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Sunita Timsina

Name (printed)

  
Signature

Chemist Associate

Official Title

12/20/2022

Date



## Radium Laboratory Review Checklist

**Table 1. Reportable Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey Power Station  
**Reviewer Name:** Sunita Timsina  
**LRC Date:** 12/20/2022  
**Laboratory Job Number:** 223664  
**Prep Batch Number(s):** PB22112804

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
R1	O, I	<b>Chain-of-custody (COC)</b>		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	<b>Sample and quality control (QC) identification</b>		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	<b>Test reports</b>		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	<b>Surrogate recovery data</b>		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	<b>Test reports/summary forms for blank samples</b>		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

## Radium Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	<b>Laboratory control samples (LCS):</b>		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	<b>Matrix spike (MS) and matrix spike duplicate (MSD) data</b>		
	I	Were the project/method specified analytes included in the MS and MSD?	NA	
	I	Were MS/MSD analyzed at the appropriate frequency?	NA	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NA	
	I	Were MS/MSD RPDs within laboratory QC limits?	NA	
R8	O, I	<b>Analytical duplicate data</b>		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	NO	ER1
R9	O, I	<b>Method quantitation limits (MQLs):</b>		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	<b>Other problems/anomalies</b>		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

## Radium Laboratory Review Checklist

**Table 2. Supporting Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey Power Station  
**Reviewer Name:** Sunita Timsina  
**LRC Date:** 12/20/2022  
**Laboratory Job Number:** 223664  
**Prep Batch Number(s):** PB22112804

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S1	O, I	<b>Initial calibration (ICAL)</b>		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	NA	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	<b>Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):</b>		
	I	Was the CCV analyzed at the method-required frequency?	NA	
	I	Were percent differences for each analyte within the method-required QC limits?	NA	
	I	Was the ICAL curve verified for each analyte?	NA	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	NA	
S3	O	<b>Mass spectral tuning:</b>		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	<b>Internal standards (IS):</b>		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	<b>Raw data (NELAC section 1 appendix A glossary, and section 5.)</b>		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

## Radium Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	O	<b>Dual column confirmation</b>		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	<b>Tentatively identified compounds (TICs):</b>		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	<b>Interference Check Sample (ICS) results:</b>		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	<b>Serial dilutions, post digestion spikes, and method of standard additions</b>		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	<b>Method detection limit (MDL) studies</b>		
	I	Was a MDL study performed for each reported analyte?	NA	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	NA	
S11	O, I	<b>Proficiency test reports:</b>		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	<b>Standards documentation</b>		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	<b>Compound/analyte identification procedures</b>		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	<b>Demonstration of analyst competency (DOC)</b>		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	<b>Verification/validation documentation for methods (NELAC Chap 5n 5)</b>		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	<b>Laboratory standard operating procedures (SOPs):</b>		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	



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  - (c) Preparation methods
  - (d) Cleanup methods
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  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
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  - (c) The laboratory's LCS QC limits
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  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
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  - (a) The amount of analyte measured in the duplicate
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Sunita Timsina

Name (printed)

  
Signature

Chemist Associate

Official Title

12/29/2022

Date

## Radium Laboratory Review Checklist

**Table 1. Reportable Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey Power Station  
**Reviewer Name:** Sunita Timsina  
**LRC Date:** 12/29/2022  
**Laboratory Job Number:** 223664  
**Prep Batch Number(s):** PB22112203, PB22112805

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
R1	O, I	<b>Chain-of-custody (COC)</b>		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	<b>Sample and quality control (QC) identification</b>		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	<b>Test reports</b>		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	<b>Surrogate recovery data</b>		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	<b>Test reports/summary forms for blank samples</b>		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

## Radium Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	<b>Laboratory control samples (LCS):</b>		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	<b>Matrix spike (MS) and matrix spike duplicate (MSD) data</b>		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	<b>Analytical duplicate data</b>		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	N/A	
R9	O, I	<b>Method quantitation limits (MQLs):</b>		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	<b>Other problems/anomalies</b>		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	



## Radium Laboratory Review Checklist

**Table 2. Supporting Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey Power Station  
**Reviewer Name:** Sunita Timsina  
**LRC Date:** 12/29/2022  
**Laboratory Job Number:** 223664  
**Prep Batch Number(s):** PB22112203, PB22112805

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S1	O, I	<b>Initial calibration (ICAL)</b>		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	NA	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	<b>Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):</b>		
	I	Was the CCV analyzed at the method-required frequency?	NA	
	I	Were percent differences for each analyte within the method-required QC limits?	NA	
	I	Was the ICAL curve verified for each analyte?	NA	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	NA	
S3	O	<b>Mass spectral tuning:</b>		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	<b>Internal standards (IS):</b>		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	<b>Raw data (NELAC section 1 appendix A glossary, and section 5.)</b>		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

## Radium Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	O	<b>Dual column confirmation</b>		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	<b>Tentatively identified compounds (TICs):</b>		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	<b>Interference Check Sample (ICS) results:</b>		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	<b>Serial dilutions, post digestion spikes, and method of standard additions</b>		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	<b>Method detection limit (MDL) studies</b>		
	I	Was a MDL study performed for each reported analyte?	NA	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	NA	
S11	O, I	<b>Proficiency test reports:</b>		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	<b>Standards documentation</b>		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	<b>Compound/analyte identification procedures</b>		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	<b>Demonstration of analyst competency (DOC)</b>		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	<b>Verification/validation documentation for methods (NELAC Chap 5n 5)</b>		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	<b>Laboratory standard operating procedures (SOPs):</b>		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	



## Mercury Laboratory Review Checklist

### Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

**Release Statement:** I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

**Check, if applicable:**  This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

<u>Susann Sulzmann</u>	<u>S. Sulzmann</u>	<u>Senior Chemist</u>	<u>12-20-2022</u>
Name (printed)	Signature	Official Title	Date

## Mercury Laboratory Review Checklist

**Table 1. Reportable Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey Power station  
**Reviewer Name:** Susann Sulzmann  
**LRC Date:** 12-20-2022  
**Laboratory Job Number:** 223664  
**Prep Batch Number(s):** PB22112503,-906,-907,-908

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
R1	O, I	<b>Chain-of-custody (COC)</b>		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	<b>Sample and quality control (QC) identification</b>		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	<b>Test reports</b>		
	I	Were all samples prepared and analyzed within holding times?	yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	yes	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	<b>Surrogate recovery data</b>		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	<b>Test reports/summary forms for blank samples</b>		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

## Mercury Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	yes	
R6	O, I	<b>Laboratory control samples (LCS):</b>		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	yes	
R7	O, I	<b>Matrix spike (MS) and matrix spike duplicate (MSD) data</b>		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	yes	
	I	Were MS/MSD RPDs within laboratory QC limits?	yes	
R8	O, I	<b>Analytical duplicate data</b>		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	yes	
R9	O, I	<b>Method quantitation limits (MQLs):</b>		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	<b>Other problems/anomalies</b>		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

## Mercury Laboratory Review Checklist

**Table 2. Supporting Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey Power station  
**Reviewer Name:** Susann Sulzmann  
**LRC Date:** 12-20-2022  
**Laboratory Job Number:** 223664  
**Prep Batch Number(s):** PB22112503,-906,-907,-908

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S1	O, I	<b>Initial calibration (ICAL)</b>		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	yes	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	<b>Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):</b>		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER1
S3	O	<b>Mass spectral tuning:</b>		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	<b>Internal standards (IS):</b>		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	<b>Raw data (NELAC section 1 appendix A glossary, and section 5.)</b>		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

## Mercury Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	O	<b>Dual column confirmation</b>		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	<b>Tentatively identified compounds (TICs):</b>		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	<b>Interference Check Sample (ICS) results:</b>		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	<b>Serial dilutions, post digestion spikes, and method of standard additions</b>		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	<b>Method detection limit (MDL) studies</b>		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	<b>Proficiency test reports:</b>		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	<b>Standards documentation</b>		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	<b>Compound/analyte identification procedures</b>		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	<b>Demonstration of analyst competency (DOC)</b>		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	<b>Verification/validation documentation for methods (NELAC Chap 5n 5)</b>		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	<b>Laboratory standard operating procedures (SOPs):</b>		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	







# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 223647

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-2

Customer Description: TG-32

Lab Number: 223647-001

Preparation:

Date Collected: 11/15/2022 11:05 EST

Date Received: 11/18/2022 10:20 EST

## 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	11/30/2022 14:27	EPA 300.1-1997, Rev. 1.0
Chloride	30.5	mg/L	2	0.04	0.02		CRJ	11/30/2022 14:27	EPA 300.1-1997, Rev. 1.0
Fluoride	0.21	mg/L	2	0.06	0.02		CRJ	11/30/2022 14:27	EPA 300.1-1997, Rev. 1.0
Sulfate	259	mg/L	10	2.0	0.3		CRJ	11/30/2022 13:54	EPA 300.1-1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	480	mg/L	1	50	20		SDW	11/20/2022 10:00	SM 2540C-2015

Customer Sample ID: AD-3

Customer Description: TG-32

Lab Number: 223647-002

Preparation:

Date Collected: 11/16/2022 12:45 EST

Date Received: 11/18/2022 10:20 EST

## 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	11/30/2022 13:21	EPA 300.1-1997, Rev. 1.0
Chloride	7.40	mg/L	2	0.04	0.02		CRJ	11/30/2022 13:21	EPA 300.1-1997, Rev. 1.0
Fluoride	0.18	mg/L	2	0.06	0.02		CRJ	11/30/2022 13:21	EPA 300.1-1997, Rev. 1.0
Sulfate	34.4	mg/L	2	0.40	0.06		CRJ	11/30/2022 13:21	EPA 300.1-1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	29	mg/L	1	20	5		MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	160	mg/L	1	50	20		SDW	11/20/2022 10:05	SM 2540C-2015



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 223647

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-4

Customer Description: TG-32

Lab Number: 223647-003

Preparation:

Date Collected: 11/16/2022 12:32 EST

Date Received: 11/18/2022 10:20 EST

## 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	11/30/2022 15:33	EPA 300.1-1997, Rev. 1.0
Chloride	4.14	mg/L	2	0.04	0.02		CRJ	11/30/2022 15:33	EPA 300.1-1997, Rev. 1.0
Fluoride	<0.02	mg/L	2	0.06	0.02	U1	CRJ	11/30/2022 15:33	EPA 300.1-1997, Rev. 1.0
Sulfate	16.6	mg/L	2	0.40	0.06		CRJ	11/30/2022 15:33	EPA 300.1-1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	130	mg/L	1	50	20		SDW	11/20/2022 10:10	SM 2540C-2015

Customer Sample ID: AD-7

Customer Description: TG-32

Lab Number: 223647-004

Preparation:

Date Collected: 11/16/2022 10:10 EST

Date Received: 11/18/2022 10:20 EST

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	4.29	mg/L	2	0.10	0.02		CRJ	11/30/2022 17:45	EPA 300.1-1997, Rev. 1.0
Chloride	69.7	mg/L	10	0.2	0.1		CRJ	12/01/2022 08:54	EPA 300.1-1997, Rev. 1.0
Fluoride	0.23	mg/L	2	0.06	0.02		CRJ	11/30/2022 17:45	EPA 300.1-1997, Rev. 1.0
Sulfate	60.5	mg/L	2	0.40	0.06		CRJ	11/30/2022 17:45	EPA 300.1-1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	300	mg/L	1	50	20		SDW	11/20/2022 10:10	SM 2540C-2015



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 223647

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-12

Customer Description: TG-32

Lab Number: 223647-005

Preparation:

Date Collected: 11/15/2022 11:58 EST

Date Received: 11/18/2022 10:20 EST

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.14	mg/L	2	0.10	0.02		CRJ	11/30/2022 18:17	EPA 300.1-1997, Rev. 1.0
Chloride	8.03	mg/L	2	0.04	0.02		CRJ	11/30/2022 18:17	EPA 300.1-1997, Rev. 1.0
Fluoride	0.08	mg/L	2	0.06	0.02		CRJ	11/30/2022 18:17	EPA 300.1-1997, Rev. 1.0
Sulfate	3.39	mg/L	2	0.40	0.06		CRJ	11/30/2022 18:17	EPA 300.1-1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	70	mg/L	1	50	20		SDW	11/20/2022 10:15	SM 2540C-2015

Customer Sample ID: AD-13

Customer Description: TG-32

Lab Number: 223647-006

Preparation:

Date Collected: 11/15/2022 09:21 EST

Date Received: 11/18/2022 10:20 EST

## 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	11/30/2022 16:39	EPA 300.1-1997, Rev. 1.0
Chloride	41.3	mg/L	2	0.04	0.02		CRJ	11/30/2022 16:39	EPA 300.1-1997, Rev. 1.0
Fluoride	0.36	mg/L	2	0.06	0.02		CRJ	11/30/2022 16:39	EPA 300.1-1997, Rev. 1.0
Sulfate	69.6	mg/L	2	0.40	0.06		CRJ	11/30/2022 16:39	EPA 300.1-1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	66	mg/L	1	20	5		MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	260	mg/L	1	50	20		SDW	11/20/2022 10:15	SM 2540C-2015



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 223647

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-17

Customer Description: TG-32

Lab Number: 223647-007

Preparation:

Date Collected: 11/16/2022 11:58 EST

Date Received: 11/18/2022 10:20 EST

## 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	11/30/2022 18:50	EPA 300.1-1997, Rev. 1.0
Chloride	35.0	mg/L	2	0.04	0.02		CRJ	11/30/2022 18:50	EPA 300.1-1997, Rev. 1.0
Fluoride	0.26	mg/L	2	0.06	0.02		CRJ	11/30/2022 18:50	EPA 300.1-1997, Rev. 1.0
Sulfate	2.91	mg/L	2	0.40	0.06		CRJ	11/30/2022 18:50	EPA 300.1-1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	80	mg/L	1	50	20		SDW	11/20/2022 10:23	SM 2540C-2015

Customer Sample ID: AD-18

Customer Description: TG-32

Lab Number: 223647-008

Preparation:

Date Collected: 11/16/2022 11:13 EST

Date Received: 11/18/2022 10:20 EST

## 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	11/30/2022 19:56	EPA 300.1-1997, Rev. 1.0
Chloride	4.94	mg/L	2	0.04	0.02		CRJ	11/30/2022 19:56	EPA 300.1-1997, Rev. 1.0
Fluoride	<0.02	mg/L	2	0.06	0.02	U1	CRJ	11/30/2022 19:56	EPA 300.1-1997, Rev. 1.0
Sulfate	6.55	mg/L	2	0.40	0.06		CRJ	11/30/2022 19:56	EPA 300.1-1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	90	mg/L	1	50	20		SDW	11/20/2022 10:23	SM 2540C-2015



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 223647

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-22

Customer Description: TG-32

Lab Number: 223647-009

Preparation:

Date Collected: 11/14/2022 12:31 EST

Date Received: 11/18/2022 10:20 EST

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.79	mg/L	2	0.10	0.02		CRJ	11/30/2022 23:47	EPA 300.1-1997, Rev. 1.0
Chloride	101	mg/L	25	0.5	0.3		CRJ	11/30/2022 23:14	EPA 300.1-1997, Rev. 1.0
Fluoride	0.28	mg/L	2	0.06	0.02		CRJ	11/30/2022 23:47	EPA 300.1-1997, Rev. 1.0
Sulfate	251	mg/L	25	5.0	0.8		CRJ	11/30/2022 23:14	EPA 300.1-1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	570	mg/L	1	50	20		SDW	11/20/2022 10:29	SM 2540C-2015

Customer Sample ID: AD-28

Customer Description: TG-32

Lab Number: 223647-010

Preparation:

Date Collected: 11/16/2022 09:48 EST

Date Received: 11/18/2022 10:20 EST

## 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	12/01/2022 00:53	EPA 300.1-1997, Rev. 1.0
Chloride	4.96	mg/L	2	0.04	0.02		CRJ	12/01/2022 00:53	EPA 300.1-1997, Rev. 1.0
Fluoride	0.48	mg/L	2	0.06	0.02		CRJ	12/01/2022 00:53	EPA 300.1-1997, Rev. 1.0
Sulfate	23.3	mg/L	2	0.40	0.06		CRJ	12/01/2022 00:53	EPA 300.1-1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	80	mg/L	1	50	20		SDW	11/20/2022 10:29	SM 2540C-2015



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 223647

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-30

Customer Description: TG-32

Lab Number: 223647-011

Preparation:

Date Collected: 11/16/2022 10:46 EST

Date Received: 11/18/2022 10:20 EST

## 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	12/01/2022 01:58	EPA 300.1-1997, Rev. 1.0
Chloride	27.4	mg/L	2	0.04	0.02		CRJ	12/01/2022 01:58	EPA 300.1-1997, Rev. 1.0
Fluoride	0.07	mg/L	2	0.06	0.02		CRJ	12/01/2022 01:58	EPA 300.1-1997, Rev. 1.0
Sulfate	177	mg/L	10	2.0	0.3		CRJ	12/01/2022 01:25	EPA 300.1-1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	340	mg/L	1	50	20		SDW	11/20/2022 10:35	SM 2540C-2015

Customer Sample ID: AD-31

Customer Description: TG-32

Lab Number: 223647-012

Preparation:

Date Collected: 11/15/2022 11:02 EST

Date Received: 11/18/2022 10:20 EST

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.35	mg/L	2	0.10	0.02		CRJ	12/01/2022 03:04	EPA 300.1-1997, Rev. 1.0
Chloride	24.3	mg/L	2	0.04	0.02		CRJ	12/01/2022 03:04	EPA 300.1-1997, Rev. 1.0
Fluoride	0.14	mg/L	2	0.06	0.02		CRJ	12/01/2022 03:04	EPA 300.1-1997, Rev. 1.0
Sulfate	79.1	mg/L	2	0.40	0.06		CRJ	12/01/2022 03:04	EPA 300.1-1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	250	mg/L	1	50	20		SDW	11/20/2022 10:35	SM 2540C-2015



# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 223647

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: AD-32

Customer Description: TG-32

Lab Number: 223647-013

Preparation:

Date Collected: 11/15/2022 10:03 EST

Date Received: 11/18/2022 10:20 EST

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	2.58	mg/L	2	0.10	0.02		CRJ	12/01/2022 05:49	EPA 300.1-1997, Rev. 1.0
Chloride	22.7	mg/L	2	0.04	0.02		CRJ	12/01/2022 05:49	EPA 300.1-1997, Rev. 1.0
Fluoride	0.49	mg/L	2	0.06	0.02		CRJ	12/01/2022 05:49	EPA 300.1-1997, Rev. 1.0
Sulfate	244	mg/L	25	5.0	0.8		CRJ	12/01/2022 05:16	EPA 300.1-1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	450	mg/L	1	50	20		SDW	11/20/2022 10:40	SM 2540C-2015

Customer Sample ID: AD-33

Customer Description: TG-32

Lab Number: 223647-014

Preparation:

Date Collected: 11/15/2022 12:06 EST

Date Received: 11/18/2022 10:20 EST

## Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.25	mg/L	2	0.10	0.02		CRJ	12/01/2022 06:55	EPA 300.1-1997, Rev. 1.0
Chloride	9.18	mg/L	2	0.04	0.02		CRJ	12/01/2022 06:55	EPA 300.1-1997, Rev. 1.0
Fluoride	0.16	mg/L	2	0.06	0.02		CRJ	12/01/2022 06:55	EPA 300.1-1997, Rev. 1.0
Sulfate	42.7	mg/L	2	0.40	0.06		CRJ	12/01/2022 06:55	EPA 300.1-1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	140	mg/L	1	50	20		SDW	11/20/2022 10:40	SM 2540C-2015





# Water Analysis Report

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Reissued**

Job ID: 223647

Customer: Pirkey Power Station

Date Reported: 12/22/2022

Customer Sample ID: Duplicate - 2

Customer Description: TG-32

Lab Number: 223647-015

Preparation:

Date Collected: 11/15/2022 15:00 EST

Date Received: 11/18/2022 10:20 EST

## 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	12/01/2022 04:10	EPA 300.1-1997, Rev. 1.0
Chloride	41.3	mg/L	2	0.04	0.02		CRJ	12/01/2022 04:10	EPA 300.1-1997, Rev. 1.0
Fluoride	0.36	mg/L	2	0.06	0.02		CRJ	12/01/2022 04:10	EPA 300.1-1997, Rev. 1.0
Sulfate	70.2	mg/L	2	0.40	0.06		CRJ	12/01/2022 04:10	EPA 300.1-1997, Rev. 1.0

## Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Alkalinity, as CaCO3	65	mg/L	1	20	5		MGK	11/21/2022 10:18	SM 2320B-2011
TDS, Filterable Residue	270	mg/L	1	50	20		SDW	11/20/2022 10:47	SM 2540C-2015

223647

Job Comments:

Original report issued 12/21/22. Report reissued without P1 flag for alkalinity as sample and duplicate results < RL.

## 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. ALL TIMES LISTED ARE IN THE EASTERN TIME ZONE.**



## Water Analysis Report

**Reissued**

Dolan Chemical Laboratory  
4001 Bixby Road  
Groveport, OH 43125  
Phone: 614-836-4221  
Audinet: 210-4221

**Job ID: 223647**

**Customer: Pirkey Power Station**

**Date Reported: 12/22/2022**

### 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.

# Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Site Contact:

For Lab Use Only:

**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 Semi-Annual CCR  
 Contact Name: Leslie Fuerschbach  
 Contact Phone: 318-673-2744

Sampler(s): Matt Hamilton, Kenny McDonald

Date: \_\_\_\_\_

COC/Order #: **223647**

Analysis Turnaround Time (in Calendar Days)  
 ☉ Routine (28 days for Monitoring Wells)

Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	# of Matrix Cont.	Sampler(s) Initials	Field/Filter				Sample Specific Notes:	
					250 mL bottle, pH<2, HNO3	Field-filter 250 mL bottle, then pH<2, HNO3	1 L bottle, Cool, 0-5C	Three (six every 10th) L bottles, pH<2, HNO3		
11/15/2022	1005	G	1		Mercury					
11/16/2022	1145	G	1							
11/16/2022	1132	G	1							
11/16/2022	910	G	1							
11/15/2022	1058	G	1							
11/15/2022	821	G	1							
11/16/2022	1058	G	1							
11/16/2022	1013	G	1							
11/14/2022	1131	G	1							
11/16/2022	848	G	1							
11/16/2022	946	G	1							
11/15/2022	1002	G	1							
				F= filter in field	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:**  
 TG-32 needed

Relinquished by: *[Signature]* Date/Time: 11-17-22 Received by: *[Signature]* Date/Time: 11/18/22

Relinquished by: *[Signature]* Date/Time: *[Blank]* Received by: *[Signature]* Date/Time: *[Blank]*

Relinquished by: *[Signature]* Date/Time: *[Blank]* Received by: *[Signature]* Date/Time: 10/20/22





**WATER & WASTE SAMPLE RECEIPT FORM (Temp Gun 1)**

<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	PONY <input type="radio"/> <b>UPS</b> <input type="radio"/> FedEX <input type="radio"/> USPS Other _____
Plant/Customer <u>Pinkey Church Power</u>		Number of Plastic Containers: <u>15</u>		
Opened By <u>MSO</u>		Number of Glass Containers: <u>—</u>		
Date/Time <u>11/18/22 10:20AM</u>		Number of Mercury Containers: <u>—</u>		
Were all temperatures within 0-6°C? <input checked="" type="radio"/> Y / <input type="radio"/> N or N/A Initial: <u>GAB</u> <input checked="" type="radio"/> on ice / <input type="radio"/> no ice (IR Gun Ser# 221368900, Expir. 3/22/2024) - 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>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: GAB 11/18/22

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# 223647 Initial & Date & Time : \_\_\_\_\_

Logged by MSO Comments: TG-32  
AD 4 Bottle saving Sups 11:33 C/C 1132

Reviewed by GAB

**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.

# Ion Chromatography Laboratory Review Checklist

## Municipal Solid Waste Laboratory Review Checklist


This data package consists of:

- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

**Release Statement:** I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

**Check, if applicable:**  This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Timothy E Arnold  
Name (printed)

  
Signature

Prin Chemist  
Official Title

12/21/2022  
Date

## Ion Chromatography Laboratory Review Checklist

**Table 1. Reportable Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey PP Semi-Annual CCR  
**Reviewer Name:** Timothy E Arnold  
**LRC Date:** 12/21/2022  
**Laboratory Job Number:** 223647  
**Prep Batch Number(s):** QC2212004

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
R1	O, I	<b>Chain-of-custody (COC)</b>		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	<b>Sample and quality control (QC) identification</b>		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	<b>Test reports</b>		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	Yes	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	<b>Surrogate recovery data</b>		
	I	Were surrogates added prior to extraction?	Yes	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	Yes	
R5	O, I	<b>Test reports/summary forms for blank samples</b>		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

## Ion Chromatography Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	<b>Laboratory control samples (LCS):</b>		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	<b>Matrix spike (MS) and matrix spike duplicate (MSD) data</b>		
	I	Were the project/method specified analytes included in the MS and MSD?	Yes	
	I	Were MS/MSD analyzed at the appropriate frequency?	Yes	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Were MS/MSD RPDs within laboratory QC limits?	Yes	
R8	O, I	<b>Analytical duplicate data</b>		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	<b>Method quantitation limits (MQLs):</b>		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	<b>Other problems/anomalies</b>		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	



## Ion Chromatography Laboratory Review Checklist

**Table 2. Supporting Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey PP Semi-Annual CCR  
**Reviewer Name:** Timothy E Arnold  
**LRC Date:** 12/21/2022  
**Laboratory Job Number:** 223647  
**Prep Batch Number(s):** QC2212004

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S1	O, I	<b>Initial calibration (ICAL)</b>		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	Yes	
	I	Was the number of standards recommended in the method used for all analytes?	Yes	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	Yes	
	I	Are ICAL data available for all instruments used?	Yes	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	Yes	
S2	O, I	<b>Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):</b>		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER1
S3	O	<b>Mass spectral tuning:</b>		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	<b>Internal standards (IS):</b>		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	<b>Raw data (NELAC section 1 appendix A glossary, and section 5.)</b>		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

## Ion Chromatography Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	O	<b>Dual column confirmation</b>		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	<b>Tentatively identified compounds (TICs):</b>		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	<b>Interference Check Sample (ICS) results:</b>		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	<b>Serial dilutions, post digestion spikes, and method of standard additions</b>		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	<b>Method detection limit (MDL) studies</b>		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	<b>Proficiency test reports:</b>		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	<b>Standards documentation</b>		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	<b>Compound/analyte identification procedures</b>		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	<b>Demonstration of analyst competency (DOC)</b>		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	<b>Verification/validation documentation for methods (NELAC Chap 5n 5)</b>		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	<b>Laboratory standard operating procedures (SOPs):</b>		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	



# TDS Laboratory Review Checklist

## Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

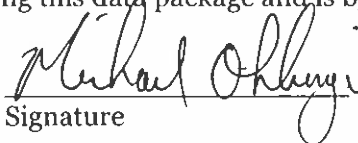
- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- NA R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

**Release Statement:** I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

**Check, if applicable:**  This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Michael Ohlinger

Name (printed)

 Michael Ohlinger

Signature

Chemist

Official Title

12/20/22

Date

## TDS Laboratory Review Checklist

**Table 1. Reportable Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey CCR  
**Reviewer Name:** Michael Ohlinger  
**LRC Date:** 12/20/2022  
**Laboratory Job Number:** 223647  
**Prep Batch Number(s):** QC2211231

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
R1	O, I	<b>Chain-of-custody (COC)</b>		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	NA	
R2	O, I	<b>Sample and quality control (QC) identification</b>		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	<b>Test reports</b>		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	<b>Surrogate recovery data</b>		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	<b>Test reports/summary forms for blank samples</b>		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

## TDS Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	<b>Laboratory control samples (LCS):</b>		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	<b>Matrix spike (MS) and matrix spike duplicate (MSD) data</b>		
	I	Were the project/method specified analytes included in the MS and MSD?	NA	
	I	Were MS/MSD analyzed at the appropriate frequency?	NA	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NA	
	I	Were MS/MSD RPDs within laboratory QC limits?	NA	
R8	O, I	<b>Analytical duplicate data</b>		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	Yes	
R9	O, I	<b>Method quantitation limits (MQLs):</b>		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	<b>Other problems/anomalies</b>		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

## TDS Laboratory Review Checklist

**Table 2. Supporting Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory

**Project Name:** Pirkey CCR

**Reviewer Name:** Michael Ohlinger

**LRC Date:** 4/5/22

**Laboratory Job Number:** 223647

**Prep Batch Number(s):** QC2211231

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S1	O, I	<b>Initial calibration (ICAL)</b>		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	NA	
	I	Was the number of standards recommended in the method used for all analytes?	NA	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	NA	
	I	Are ICAL data available for all instruments used?	NA	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	NA	
S2	O, I	<b>Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):</b>		
	I	Was the CCV analyzed at the method-required frequency?	NA	
	I	Were percent differences for each analyte within the method-required QC limits?	NA	
	I	Was the ICAL curve verified for each analyte?	NA	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	NA	
S3	O	<b>Mass spectral tuning:</b>		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	<b>Internal standards (IS):</b>		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	<b>Raw data (NELAC section 1 appendix A glossary, and section 5.)</b>		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

## TDS Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	O	<b>Dual column confirmation</b>		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	<b>Tentatively identified compounds (TICs):</b>		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	<b>Interference Check Sample (ICS) results:</b>		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	<b>Serial dilutions, post digestion spikes, and method of standard additions</b>		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	<b>Method detection limit (MDL) studies</b>		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	<b>Proficiency test reports:</b>		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	<b>Standards documentation</b>		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	<b>Compound/analyte identification procedures</b>		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	<b>Demonstration of analyst competency (DOC)</b>		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	<b>Verification/validation documentation for methods (NELAC Chap 5n 5)</b>		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	<b>Laboratory standard operating procedures (SOPs):</b>		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	





# Alkalinity Laboratory Review Checklist

## Municipal Solid Waste Laboratory Review Checklist

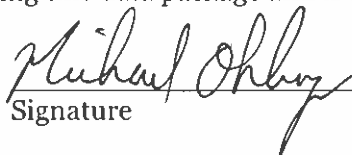
This data package consists of:

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- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- R5 Test reports/summary forms for blank samples
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- R10 Other problems or anomalies
- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

**Release Statement:** I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

**Check, if applicable:**  This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Michael Ohlinger  
Name (printed)

  
Signature

Chemist  
Official Title

12/22/2022  
Date

## Alkalinity Laboratory Review Checklist

**Table 1. Reportable Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey PP CCR  
**Reviewer Name:** Michael Ohlinger  
**LRC Date:** 12/22/2022  
**Laboratory Job Number:** 223647  
**Prep Batch Number(s):** QC2211194

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
R1	O, I	<b>Chain-of-custody (COC)</b>		
	I	Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	Yes	
	I	Were all departures from standard conditions described in an exception report?	Yes	
R2	O, I	<b>Sample and quality control (QC) identification</b>		
	I	Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	Yes	
	I	Are all laboratory ID numbers cross-referenced to the corresponding QC data?	Yes	
R3	O, I	<b>Test reports</b>		
	I	Were all samples prepared and analyzed within holding times?	Yes	
	I	Other than those results < MQL, were all other raw values bracketed by calibration standards?	NA	
	I	Were calculations checked by a peer or supervisor?	Yes	
	I	Were all analyte identifications checked by a peer or supervisor?	Yes	
	I	Were sample quantitation limits reported for all analytes not detected?	Yes	
	I	Were all results for soil and sediment samples reported on a dry weight basis?	NA	
	I	Was % moisture (or solids) reported for all soil and sediment samples?	NA	
	I	If required for the project, TICs reported?	NA	
R4	O	<b>Surrogate recovery data</b>		
	I	Were surrogates added prior to extraction?	NA	
	I	Were surrogate percent recoveries in all samples within the laboratory QC limits?	NA	
R5	O, I	<b>Test reports/summary forms for blank samples</b>		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

## Alkalinity Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
	I	Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	Yes	
	I	Were blank concentrations < MQL?	Yes	
R6	O, I	<b>Laboratory control samples (LCS):</b>		
	I	Were all COCs included in the LCS?	Yes	
	I	Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	Yes	
	I	Were LCSs analyzed at the required frequency?	Yes	
	I	Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	Yes	
	I	Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?	Yes	
	I	Was the LCSD RPD within QC limits?	Yes	
R7	O, I	<b>Matrix spike (MS) and matrix spike duplicate (MSD) data</b>		
	I	Were the project/method specified analytes included in the MS and MSD?	NA	
	I	Were MS/MSD analyzed at the appropriate frequency?	NA	
	I	Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	NA	
	I	Were MS/MSD RPDs within laboratory QC limits?	NA	
R8	O, I	<b>Analytical duplicate data</b>		
	I	Were appropriate analytical duplicates analyzed for each matrix?	Yes	
	I	Were analytical duplicates analyzed at the appropriate frequency?	Yes	
	I	Were RPDs or relative standard deviations within the laboratory QC limits?	No	ER1
R9	O, I	<b>Method quantitation limits (MQLs):</b>		
	I	Are the MQLs for each method analyte included in the laboratory data package?	Yes	
	I	Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	Yes	
	I	Are unadjusted MQLs included in the laboratory data package?	Yes	
R10	O, I	<b>Other problems/anomalies</b>		
	I	Are all known problems/anomalies/special conditions noted in this LRC and ER?	Yes	
	I	Were all necessary corrective actions performed for the reported data?	Yes	
	I	Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?	Yes	

## Alkalinity Laboratory Review Checklist

**Table 2. Supporting Data.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey PP CCR  
**Reviewer Name:** Michael Ohlinger  
**LRC Date:** 12/22/2022  
**Laboratory Job Number:** 223647  
**Prep Batch Number(s):** QC2211194

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S1	O, I	<b>Initial calibration (ICAL)</b>		
	I	Were response factors and/or relative response factors for each analyte within QC limits?	NA	
	I	Were percent RSDs or correlation coefficient criteria met?	NA	
	I	Was the number of standards recommended in the method used for all analytes?	NA	
	I	Were all points generated between the lowest and highest standard used to calculate the curve?	Yes	
	I	Are ICAL data available for all instruments used?	NA	
	I	Has the initial calibration curve been verified using an appropriate second source standard?	NA	
S2	O, I	<b>Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):</b>		
	I	Was the CCV analyzed at the method-required frequency?	Yes	
	I	Were percent differences for each analyte within the method-required QC limits?	Yes	
	I	Was the ICAL curve verified for each analyte?	Yes	
	I	Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	No	ER2
S3	O	<b>Mass spectral tuning:</b>		
	I	Was the appropriate compound for the method used for tuning?	NA	
	I	Were ion abundance data within the method-required QC limits?	NA	
S4	O	<b>Internal standards (IS):</b>		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	<b>Raw data (NELAC section 1 appendix A glossary, and section 5.)</b>		
	I	Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	Yes	
	I	Were data associated with manual integrations flagged on the raw data?	NA	

## Alkalinity Laboratory Review Checklist

Item <sup>1</sup>	Analytes <sup>2</sup>	Description	Result (Yes, No, NA, NR) <sup>3</sup>	Exception Report No. <sup>4</sup>
S6	O	<b>Dual column confirmation</b>		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	<b>Tentatively identified compounds (TICs):</b>		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	<b>Interference Check Sample (ICS) results:</b>		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	<b>Serial dilutions, post digestion spikes, and method of standard additions</b>		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	<b>Method detection limit (MDL) studies</b>		
	I	Was a MDL study performed for each reported analyte?	Yes	
	I	Is the MDL either adjusted or supported by the analysis of DCSs?	Yes	
S11	O, I	<b>Proficiency test reports:</b>		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	<b>Standards documentation</b>		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	<b>Compound/analyte identification procedures</b>		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	<b>Demonstration of analyst competency (DOC)</b>		
	I	Was DOC conducted consistent with NELAC Chapter 5C?	Yes	
	I	Is documentation of the analyst's competency up-to-date and on file?	Yes	
S15	O, I	<b>Verification/validation documentation for methods (NELAC Chap 5n 5)</b>		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	<b>Laboratory standard operating procedures (SOPs):</b>		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

## Alkalinity Laboratory Review Checklist

**Table 3. Exception Reports.**

**Laboratory Name:** American Electric Power Dolan Chemical Laboratory  
**Project Name:** Pirkey PP CCR  
**Reviewer Name:** Michael Ohlinger  
**LRC Date:** 12/22/2022  
**Laboratory Job Number:** 223647  
**Prep Batch Number(s):** QC2211194

Exception Report No.	Description
ER1	The RPD between duplicate results > acceptance limits, not flagged as results < MQL.
ER2	CCB acceptance criteria is $CCB < 0.5 * MQL$ .

<sup>1</sup> Items identified by the letter “R” must be available as a hard copy or as a .pdf file. Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period.  
<sup>2</sup> O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).  
<sup>3</sup> NA - Not applicable; NR - Not reviewed.  
<sup>4</sup> Exception Report identification number; an Exception Report should be completed for an item if the result is “No” or “NR.”