

Annual Groundwater Monitoring Report

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

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Table of Contents

I. Overview..... 1

II. Groundwater Monitoring Well Locations and Identification Numbers..... 4

III. Monitoring Wells Installed or Decommissioned 4

IV. Groundwater Quality Data and Static Water Elevation Data, With Flow Rate and Direction and Discussion..... 5

V. Groundwater Quality Data Statistical Analysis 5

VI. Alternate Source Demonstration..... 6

VII. Discussion About Transition Between Monitoring Requirements or Alternate Monitoring Frequency..... 6

VIII. Other Information Required..... 6

IX. Description of Any Problems Encountered in 2022 and Actions Taken 6

X. A Projection of Key Activities for the Upcoming Year..... 6

Appendix 1- Groundwater Data Tables and Figures

Appendix 2- Statistical Analysis

Appendix 3- Alternate Source Demonstrations

Appendix 4- Field Sheets

Appendix 5- Analytical Reports

Abbreviations:

- ASD - Alternate Source Demonstration
- CCR – Coal Combustion Residual
- GWPS - Groundwater protection standards
- SSI - Statistically Significant Increase
- SSL - Statistically Significant Level
- TDS – Total Dissolved Solids
- 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 West Bottom Ash Pond (WBAP) Coal Combustion Residual (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 rule requires 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 WBAP was operating under the Assessment monitoring program.
- At the end of the current annual reporting period, the WBAP was operating under the Assessment monitoring program.
- The WBAP initiated an assessment monitoring program on April 3, 2018.
- Groundwater samples were collected for AD-3, AD-12, AD-17, AD-18, AD-28, and AD-30 in March, May, and November 2022 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 2nd semi-annual 2021 sampling event (November 2021):

The following Appendix IV parameters exceeded established groundwater protection standards (GWPS):

- Cobalt at AD-28

The following Appendix III parameters exceeded background:

- Boron at AD-28 and AD-30
 - Chloride at AD-17 and AD-30
 - pH at AD-30
 - Sulfate at AD-30
 - TDS at AD-30
- A successful ASDs for the Appendix IV parameter 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.

- The 1st semi-annual sampling event held in June 2022:

The following Appendix IV parameters exceeded established GWPS:

- Cobalt at AD-28

The following Appendix III parameters exceeded background:

- Boron at AD-28 and AD-30
- Chloride at AD-17 and AD-30
- Sulfate at AD-28 and AD-30
- TDS at AD-30

- A successful ASD for the Appendix IV parameter that exceeded the GWPS 1st semi-annual 2022 was certified January 25, 2023 and submitted to TCEQ January 25, 2023 for approval.
- The 2nd semi-annual sampling event was held in November 2022 and 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, WBAP 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).
- On March 30, 2022, WBAP ceased receipt of CCR and non-CCR wastestreams and commenced closure by removal in accordance with the certified closure plan.
- The CCR material was removed from April to June of 2022 from the WBAP. An additional 12 inches of soil was then removed, finishing in July of 2022. The last inspection for the removal was completed on July 26, 2022.

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**);

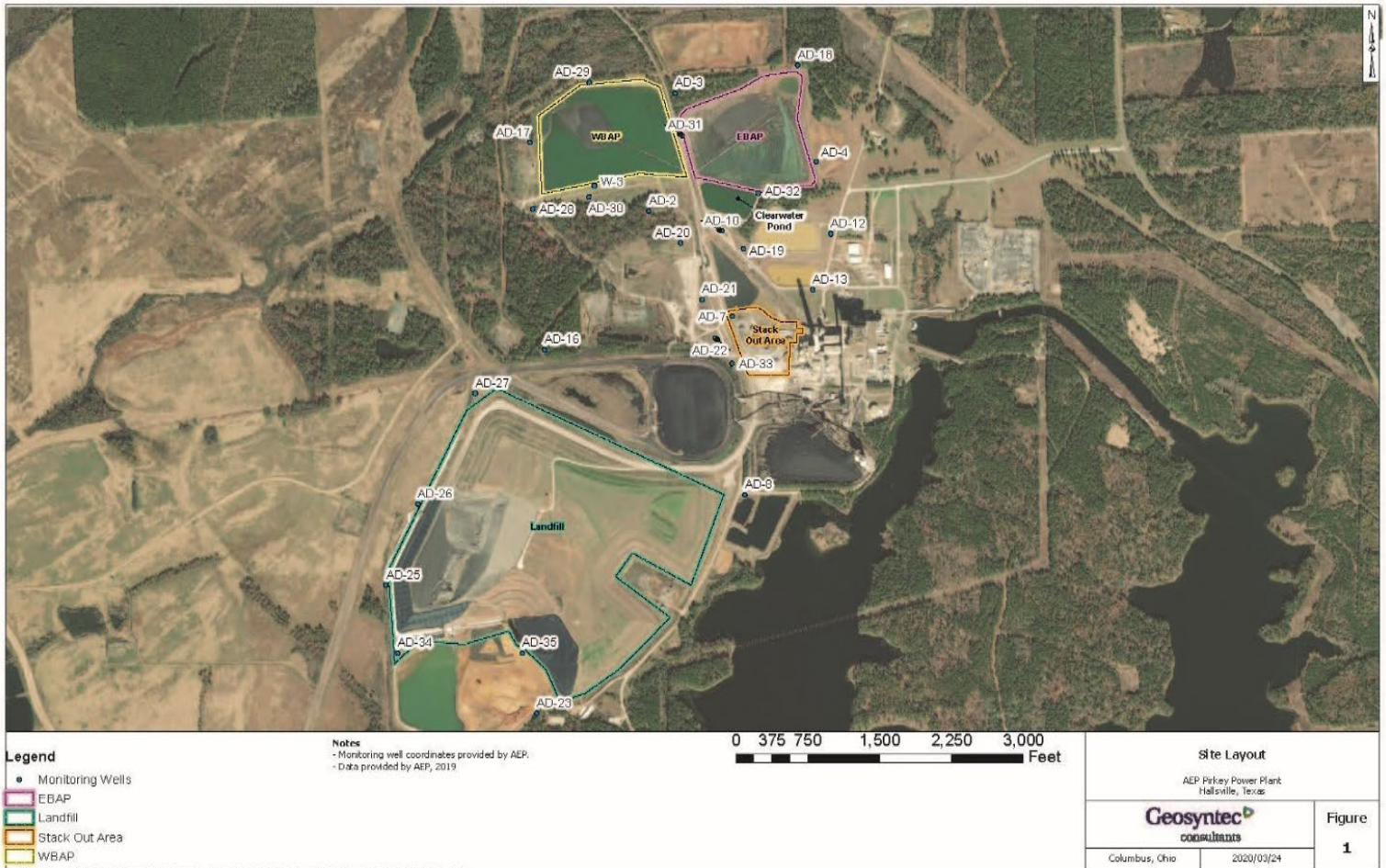
- Statistical comparison of monitoring data to determine if there have been SSI(s) or SSL(s) (Attached as **Appendix 2**);
- A discussion of whether any alternate source demonstrations were performed, and the conclusions (Attached as **Appendix 3**);
- A summary of any transition between monitoring programs, 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.

WBAP Monitoring Wells	
Upgradient	Downgradient
AD-3	AD-17
AD-12	AD-28
AD-18	AD-30



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 WBAP, 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 annual screening sampling requirements of 30 TAC §352.951.

V. Groundwater Quality Data Statistical Analysis

Appendix 2 contains the statistical analysis report(s).

Data and statistical analysis not available for the previous reporting period indicates that during the 2nd semi-annual 2021 sampling event (November 2021) the following Appendix IV parameters exceeded established GWPS:

- Cobalt at AD-28

The following Appendix III parameters exceeded background:

- Boron at AD-28 and AD-30
- Chloride at AD-17 and AD-30
- pH at AD-30
- Sulfate at AD-30
- TDS at AD-30

The 1st semi-annual sampling event held in June 2022:

The following Appendix IV parameters exceeded established GWPS:

- Cobalt at AD-28

The following Appendix III parameters exceeded background:

- Boron at AD-28 and AD-30
- Chloride at AD-17 and AD-30
- Sulfate at AD-28 and AD-30
- TDS at AD-30

The 2nd semi-annual sampling event was held in November 2022 and data are still undergoing statistical analysis.

VI. Alternate Source Demonstration

A successful ASD for the Appendix IV parameter 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 parameter that exceeded the GWPS 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, WBAP remained in Assessment Monitoring.

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

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

On March 30, 2022, WBAP ceased receipt of CCR and non-CCR wastestreams and commenced closure by removal for this CCR Unit in accordance with the certified closure plan.

The CCR material was removed from April to June of 2022 from the WBAP. An additional 12 inches of soil was then removed, finishing in July of 2022. The last inspection for the removal was completed on July 26, 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 will include:

- Complete the statistical evaluation of the second semi-annual groundwater monitoring event that took place in November 2022;
- If any SSL are identified, then an alternate source demonstration will be completed.
- If the alternate source demonstration is successful, then assessment monitoring will be discontinued since all conditions for closure completion in accordance with 30 TAC §352.1211 (40CFR257.102(c)) will have been met.
- Prepare a Closure Completion Notification that is certified by a Professional engineer and submit to TCEQ.
- 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-3
Pirkey - WBAP
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	0.04	2.9	6	< 0.083 U1	4.9	18	136
7/14/2016	Background	0.06	4.67	6	< 0.083 U1	4.7	30	161
9/8/2016	Background	0.06	4.28	7	< 0.083 U1	4.5	28	145
10/13/2016	Background	0.05	4.93	8	< 0.083 U1	5.5	31	168
11/14/2016	Background	0.07	4.61	7	< 0.083 U1	5.4	29	170
1/12/2017	Background	0.05	3.81	7	< 0.083 U1	5.3	27	152
3/1/2017	Background	0.05	2.55	5	< 0.083 U1	5.1	16	124
4/10/2017	Background	0.06	2.6	10	< 0.083 U1	4.9	19	140
8/24/2017	Detection	0.08625	2.37	6	< 0.083 U1	5.6	17	68
3/22/2018	Assessment	0.05508	3.41	5	< 0.083 U1	5.3	26	140
8/21/2018	Assessment	0.055	4.79	9	< 0.083 U1	5.6	34	166
2/27/2019	Assessment	0.034	3.46	6.16	0.04 J1	5.3	21.8	50
5/23/2019	Assessment	0.045	6.19	5.99	0.09	4.9	29.5	154
8/13/2019	Assessment	0.05 J1	5.08	6.83	0.19	5.1	32.5	168
3/11/2020	Assessment	0.04 J1	2.84	5.76	0.04 J1	4.8	19.5	124
6/3/2020	Assessment	0.04 J1	4.56	6.44	0.09	5.3	29.2	171
11/3/2020	Assessment	0.054	4.58	6.32	0.08	5.0	30.1	167
3/9/2021	Assessment	0.03 J1	4.22	5.98	0.06	5.0	27.1	158
5/25/2021	Assessment	0.051	4.7	6.06	0.08	4.6	28.8	150
11/16/2021	Assessment	0.054	4.92	6.42	0.12	5.3	31.3	150
3/29/2022	Assessment	0.059	6.09	6.84	0.21	4.8	34.0	170 L1
6/21/2022	Assessment	0.08 J1	3.1	5.65	0.04 J1	4.4	21.2	--
8/30/2022	Assessment	--	--	--	--	4.7	--	170
11/16/2022	Assessment	0.063	5.05	7.40	0.18	5.9	34.4	160

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-3
Pirkey - WBAP
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	59	0.412956 J1	0.0947139 J1	0.724945 J1	3.12937 J1	1.059	< 0.083 U1	< 0.68 U1	0.025	0.00992 J1	0.774997 J1	3.29747 J1	< 0.86 U1
7/14/2016	Background	< 0.93 U1	2.10876 J1	70	0.583927 J1	< 0.07 U1	1	7	1.69	< 0.083 U1	< 0.68 U1	0.095	0.025	1.16077 J1	2.50173 J1	< 0.86 U1
9/8/2016	Background	< 0.93 U1	< 1.05 U1	70	0.502486 J1	< 0.07 U1	0.974129 J1	7	1.491	< 0.083 U1	< 0.68 U1	0.087	0.00618 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
10/13/2016	Background	< 0.93 U1	4.22879 J1	82	0.591063 J1	0.159178 J1	2	9	3.42	< 0.083 U1	< 0.68 U1	0.991	0.0073 J1	< 0.29 U1	1.92667 J1	< 0.86 U1
11/14/2016	Background	< 0.93 U1	1.98138 J1	64	0.310985 J1	< 0.07 U1	0.42234 J1	8	1.532	< 0.083 U1	< 0.68 U1	0.092	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
1/12/2017	Background	< 0.93 U1	< 1.05 U1	62	0.281878 J1	< 0.07 U1	0.551806 J1	4.96138 J1	2.01	< 0.083 U1	< 0.68 U1	0.079	0.0057 J1	< 0.29 U1	< 0.99 U1	< 0.86 U1
3/1/2017	Background	< 0.93 U1	< 1.05 U1	62	0.279961 J1	< 0.07 U1	< 0.23 U1	2.54266 J1	0.862	< 0.083 U1	< 0.68 U1	0.046	< 0.005 U1	< 0.29 U1	1.78128 J1	1.13014 J1
4/10/2017	Background	< 0.93 U1	< 1.05 U1	61	0.284613 J1	< 0.07 U1	0.250858 J1	2.40319 J1	0.991	< 0.083 U1	< 0.68 U1	0.046	< 0.005 U1	< 0.29 U1	< 0.99 U1	< 0.86 U1
3/22/2018	Assessment	< 0.93 U1	< 1.05 U1	57.94	0.22 J1	< 0.07 U1	0.86 J1	3.74 J1	0.739	< 0.083 U1	< 0.68 U1	0.06189	< 0.005 U1	< 0.29 U1	1.13 J1	< 0.86 U1
8/21/2018	Assessment	< 0.01 U1	1.01	63.3	0.240	0.02 J1	0.496	7.18	1.837	< 0.083 U1	0.355	0.0876	< 0.005 U1	0.1 J1	0.1	0.057
2/27/2019	Assessment	0.04 J1	0.13	54.2	< 0.4 U1	0.03 J1	0.04 J1	2.31	0.3144	0.04 J1	0.05 J1	0.0525	< 0.005 U1	< 0.4 U1	0.05 J1	< 0.1 U1
5/23/2019	Assessment	< 0.4 U1	< 0.6 U1	61.8	< 0.4 U1	< 0.2 U1	< 0.8 U1	4.94	0.988	0.09	< 0.4 U1	0.0734	< 0.005 U1	< 8 U1	< 0.6 U1	< 0.1 U1
8/13/2019	Assessment	< 0.02 U1	2.41	58.3	0.196	0.02 J1	0.206	6.55	1.378	0.19	0.417	0.108	< 0.005 U1	< 0.4 U1	0.1 J1	< 0.1 U1
3/11/2020	Assessment	< 0.02 U1	0.81	62.4	0.312	0.02 J1	0.1 J1	2.62	1.504	0.04 J1	0.396	0.0353	0.003 J1	< 0.4 U1	0.09 J1	< 0.1 U1
6/3/2020	Assessment	< 0.02 U1	0.66	57.4	0.228	0.09	0.226	4.36	1.352	0.09	0.372	0.0561	0.003 J1	< 0.4 U1	0.06 J1	< 0.1 U1
11/3/2020	Assessment	< 0.02 U1	1.22	64.8	0.257	0.02 J1	0.220	5.27	1.594	0.08	0.364	0.0714	< 0.002 U1	< 0.4 U1	0.08 J1	< 0.1 U1
3/9/2021	Assessment	< 0.02 U1	0.53	60.7	0.185	0.02 J1	0.207	3.63	0.709	0.06	0.1 J1	0.0445	< 0.002 U1	< 0.1 U1	< 0.09 U1	< 0.04 U1
5/25/2021	Assessment	< 0.02 U1	0.49	66.4	0.169	0.097	0.32	3.98	1.30	0.08	0.20	0.0452	< 0.002 U1	< 0.1 U1	0.09 J1	0.05 J1
11/16/2021	Assessment	< 0.02 U1	1.90	64.1	0.200	0.016 J1	0.63	5.87	1.32	0.12	0.43	0.0722	0.006	< 0.1 U1	< 0.09 U1	< 0.04 U1
3/29/2022	Assessment	< 0.02 U1	1.51	68.3	0.163	0.012 J1	0.40	7.88	1.91	0.21	0.28	0.0934	< 0.002 U1	< 0.1 U1	< 0.09 U1	0.04 J1
6/21/2022	Assessment	< 0.1 U1	0.2 J1	55.6	0.22 J1	< 0.02 U1	0.3 J1	2.70	1.68	0.04 J1	< 0.3 U1	0.0457	0.004 J1	< 0.5 U1	< 0.5 U1	< 0.2 U1
11/16/2022	Assessment	< 0.02 U1	1.22	63.7	0.186	0.012 J1	0.63	7.40	1.51	0.18	0.31	0.0837	< 0.002 U1	< 0.1 U1	0.09 J1	0.05 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-12

Pirkey - WBAP

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 - WBAP
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-17

**Pirkey - WBAP
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	0.648	12	< 0.083 U1	4.3	4	68
7/14/2016	Background	0.03	1.28	34	< 0.083 U1	3.3	4	96
9/8/2016	Background	0.03	1.19	29	< 0.083 U1	3.9	6	88
10/13/2016	Background	0.03	1.34	32	0.393 J1	3.6	6	96
11/15/2016	Background	0.03	1.3	30	0.3446 J1	3.7	6	88
1/12/2017	Background	0.03	1.08	26	< 0.083 U1	4.4	6	90
3/1/2017	Background	0.04	0.57	19	< 0.083 U1	4.0	5	80
4/10/2017	Background	0.03	0.395	20	< 0.083 U1	4.2	9	88
8/24/2017	Detection	0.04495	1.06	25	0.245 J1	4.6	6	98
12/21/2017	Detection	--	--	26	< 0.083 U1	--	8	76
3/22/2018	Assessment	0.03113	0.0981	13	< 0.083 U1	4.4	5	44
8/21/2018	Assessment	0.044	0.997	35	< 0.083 U1	3.9	7	98
2/28/2019	Assessment	0.03 J1	0.2 J1	10.2	0.12	3.7	2.4	68
5/23/2019	Assessment	0.019	0.2 J1	10.3	0.13	4.0	2.4	58
8/13/2019	Assessment	0.03 J1	0.777	26.3	0.24	4.8	1.8	88
3/11/2020	Assessment	< 0.02 U1	0.1 J1	10.1	0.13	4.4	2.4	60 J1
6/3/2020	Assessment	0.02 J1	0.312	22.7	0.26	4.2	2.7	77
11/3/2020	Assessment	0.03 J1	1.06	32.4	0.24	3.7	1.8	86
3/9/2021	Assessment	0.02 J1	< 0.1 U1	10.2	0.17	4.3	2.3	83
5/25/2021	Assessment	0.031 J1	< 0.1 U1	9.30	0.17	3.9	2.66	60
11/16/2021	Assessment	0.022 J1	0.98	31.3	0.29	4.0	2.58	90
3/29/2022	Assessment	0.031 J1	0.24	16.2	0.26	4.1	6.77	60 L1
6/21/2022	Assessment	0.021 J1	1.10	30.2	0.30	3.3	5.78	90
11/16/2022	Assessment	0.026 J1	1.23	35.0	0.26	4.5	2.91	80

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-17

Pirkey - WBAP
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	1.21333 J1	143	0.507354 J1	0.0868344 J1	1	5	2.082	< 0.083 U1	< 0.68 U1	< 0.00013 U1	0.06	< 0.29 U1	2.55378 J1	< 0.86 U1
7/14/2016	Background	< 0.93 U1	1.3096 J1	334	0.85295 J1	0.0833036 J1	2	14	3.12	< 0.083 U1	< 0.68 U1	0.027	0.138	0.485824 J1	< 0.99 U1	< 0.86 U1
9/8/2016	Background	< 0.93 U1	1.76675 J1	327	0.948023 J1	< 0.07 U1	5	14	4.473	< 0.083 U1	< 0.68 U1	0.028	0.142	< 0.29 U1	< 0.99 U1	1.0754 J1
10/13/2016	Background	< 0.93 U1	< 1.05 U1	324	0.753919 J1	< 0.07 U1	0.542006 J1	14	6.64	0.393 J1	< 0.68 U1	0.026	0.05	< 0.29 U1	< 0.99 U1	< 0.86 U1
11/15/2016	Background	< 0.93 U1	< 1.05 U1	290	0.708598 J1	< 0.07 U1	0.448238 J1	13	7.94	0.3446 J1	< 0.68 U1	0.026	0.078	< 0.29 U1	< 0.99 U1	< 0.86 U1
1/12/2017	Background	< 0.93 U1	< 1.05 U1	234	0.541302 J1	< 0.07 U1	0.723126 J1	10	9.6	< 0.083 U1	< 0.68 U1	0.023	0.055	< 0.29 U1	< 0.99 U1	< 0.86 U1
3/1/2017	Background	< 0.93 U1	< 1.05 U1	176	0.499114 J1	< 0.07 U1	0.359001 J1	8	2.31	< 0.083 U1	< 0.68 U1	0.019	0.084	< 0.29 U1	< 0.99 U1	< 0.86 U1
4/10/2017	Background	< 0.93 U1	< 1.05 U1	140	0.511666 J1	< 0.07 U1	0.689417 J1	7	3.67	< 0.083 U1	< 0.68 U1	0.016	0.069	< 0.29 U1	< 0.99 U1	< 0.86 U1
3/22/2018	Assessment	< 0.93 U1	< 1.05 U1	94.77	0.38 J1	< 0.07 U1	1.21	4.57 J1	1.669	< 0.083 U1	< 0.68 U1	0.01186	0.125	< 0.29 U1	< 0.99 U1	< 0.86 U1
8/21/2018	Assessment	< 0.01 U1	0.41	223	0.588	0.04	0.367	10.9	2.505	< 0.083 U1	0.181	0.0234	0.216	< 0.02 U1	0.5	0.051
2/28/2019	Assessment	< 0.4 U1	< 0.6 U1	71.4	< 0.4 U1	< 0.2 U1	< 0.8 U1	2.93	0.772	0.12	< 0.4 U1	0.00912	0.107	< 8 U1	< 0.6 U1	< 2 U1
5/23/2019	Assessment	< 0.4 U1	< 0.6 U1	82.9	< 0.4 U1	< 0.2 U1	0.9 J1	3.15	1.62	0.13	< 0.4 U1	0.00911	0.103	< 8 U1	< 0.6 U1	< 0.1 U1
8/13/2019	Assessment	< 0.02 U1	0.40	216	0.554	0.04 J1	0.732	9.03	6.40	0.24	0.2 J1	0.0193	0.447	< 0.4 U1	0.3	< 0.1 U1
3/11/2020	Assessment	< 0.02 U1	0.46	73.5	0.285	0.02 J1	0.700	3.04	3.986	0.13	0.2 J1	0.00822	0.175	< 0.4 U1	0.2 J1	< 0.1 U1
6/3/2020	Assessment	< 0.02 U1	0.17	176	0.553	0.03 J1	0.208	7.02	2.44	0.26	0.09 J1	0.0147	0.346	< 0.4 U1	0.4	< 0.1 U1
11/3/2020	Assessment	< 0.02 U1	0.44	263	0.610	0.05	0.518	12.1	8.21	0.24	0.209	0.0237	0.476	< 0.4 U1	0.4	< 0.1 U1
3/9/2021	Assessment	< 0.02 U1	0.13	76.7	0.321	0.02 J1	0.222	3.05	0.816	0.17	0.06 J1	0.00924	0.123	< 0.1 U1	0.1 J1	< 0.04 U1
5/25/2021	Assessment	< 0.02 U1	0.14	74.5	0.262	0.012 J1	0.36	2.85	1.41	0.17	0.07 J1	0.00759	0.127	< 0.1 U1	0.12 J1	< 0.04 U1
11/16/2021	Assessment	< 0.02 U1	0.21	266	0.686	0.058	0.33	11.8	6.42	0.29	0.13 J1	0.0236	0.350	< 0.1 U1	0.35 J1	0.04 J1
3/29/2022	Assessment	< 0.02 U1	0.30	112	0.481	0.028	0.70	6.48	3.01	0.26	0.1 J1	0.0126	0.300 J1	< 0.1 U1	0.26 J1	< 0.04 U1
6/21/2022	Assessment	< 0.02 U1	0.39	250	0.650	0.063	0.51	12.2	11.96	0.30	0.13 J1	0.0206	0.200 J1	< 0.1 U1	0.44 J1	0.05 J1
11/16/2022	Assessment	< 0.02 U1	0.13	276	0.662	0.061	0.37	12.7	6.75	0.26	0.16 J1	0.0267	0.400 J1	< 0.1 U1	0.36 J1	0.07 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-18

Pirkey - WBAP

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 - WBAP

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-28

**Pirkey - WBAP
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	0.277	2.16	6	0.9005 J1	4.7	18	106
7/14/2016	Background	0.301	1.69	6	0.4478 J1	5.1	17	96
9/7/2016	Background	0.332	1.25	6	0.3966 J1	4.1	19	94
10/13/2016	Background	0.23	3.21	6	0.532 J1	5.3	19	124
11/15/2016	Background	0.32	1.64	8	0.9199 J1	4.2	16	112
1/12/2017	Background	0.285	1.22	7	0.7158 J1	4.1	17	84
3/1/2017	Background	0.293	1.25	5	< 0.083 U1	3.4	18	96
4/10/2017	Background	0.293	1.2	7	0.6732 J1	4.1	20	104
8/24/2017	Detection	0.281	1.22	6	0.557 J1	5.1	18	96
12/21/2017	Detection	0.277	1.14	--	--	--	--	--
3/22/2018	Assessment	0.254	1.4	5	0.6327 J1	5.2	23	100
8/21/2018	Assessment	0.330	1.39	9	0.4982 J1	5.0	22	96
2/27/2019	Assessment	0.458	1.65	6.29	0.81	5.0	19.6	32
5/22/2019	Assessment	0.313	1.24	4.48	0.69	4.6	20.1	100
8/12/2019	Assessment	0.366	1.72	6.04	0.65	4.7	22.5	128
3/11/2020	Assessment	0.370	1.14	5.48	1.04	4.2	29.1	112
6/2/2020	Assessment	0.351	1.18	5.33	0.87	4.5	26.2	125
11/2/2020	Assessment	0.395	1.38	5.51	0.55	4.4	21.9	104
3/9/2021	Assessment	0.358	1.26	5.16	1.03	4.2	28.3	117
5/25/2021	Assessment	0.391	1.3	4.92	1.0	3.9	27.6	110
11/16/2021	Assessment	0.363	1.22	4.79	0.58	4.3	24.2	100
3/29/2022	Assessment	0.356	1.31	5.07	0.68	3.7	28.9	100 L1
6/21/2022	Assessment	0.311	1.40	4.36	0.61	4.0	28.0	110
11/16/2022	Assessment	0.334	1.34	4.96	0.48	4.3	23.3	80

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-28

Pirkey - WBAP
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	1.58838 J1	2.49885 J1	223	0.968775 J1	< 0.07 U1	1	18	1.212	0.9005 J1	< 0.68 U1	0.004	0.146	< 0.29 U1	1.10335 J1	< 0.86 U1
7/14/2016	Background	< 0.93 U1	1.52986 J1	170	0.663081 J1	< 0.07 U1	0.982579 J1	15	2.29	0.4478 J1	< 0.68 U1	0.034	0.162	< 0.29 U1	< 0.99 U1	< 0.86 U1
9/7/2016	Background	< 0.93 U1	< 1.05 U1	168	0.728735 J1	< 0.07 U1	0.605543 J1	14	1.44	0.3966 J1	< 0.68 U1	0.03	0.069	< 0.29 U1	< 0.99 U1	1.24745 J1
10/13/2016	Background	< 0.93 U1	6	152	0.42032 J1	< 0.07 U1	6	18	2.547	0.532 J1	< 0.68 U1	0.066	0.085	< 0.29 U1	< 0.99 U1	< 0.86 U1
11/15/2016	Background	< 0.93 U1	1.40867 J1	148	0.520895 J1	< 0.07 U1	0.638766 J1	13	3.35	0.9199 J1	< 0.68 U1	0.032	0.029	0.294156 J1	< 0.99 U1	< 0.86 U1
1/12/2017	Background	< 0.93 U1	< 1.05 U1	154	0.475597 J1	< 0.07 U1	< 0.23 U1	12	2.67	0.7158 J1	< 0.68 U1	0.031	0.025	< 0.29 U1	< 0.99 U1	< 0.86 U1
3/1/2017	Background	< 0.93 U1	< 1.05 U1	163	0.576508 J1	< 0.07 U1	0.968975 J1	14	2.082	< 0.083 U1	< 0.68 U1	0.031	0.025	< 0.29 U1	< 0.99 U1	< 0.86 U1
4/10/2017	Background	< 0.93 U1	< 1.05 U1	162	0.654819 J1	< 0.07 U1	0.324151 J1	15	2.331	0.6732 J1	< 0.68 U1	0.03	0.026	< 0.29 U1	< 0.99 U1	< 0.86 U1
3/22/2018	Assessment	< 0.93 U1	< 1.05 U1	166	0.95 J1	< 0.07 U1	< 0.23 U1	14.36	1.288	0.6327 J1	< 0.68 U1	0.02561	0.046	< 0.29 U1	< 0.99 U1	< 0.86 U1
8/21/2018	Assessment	0.03 J1	0.64	143	0.598	0.05	0.688	14.4	2.028	0.4982 J1	0.266	0.0307	0.028	0.05 J1	0.3	0.03 J1
2/27/2019	Assessment	< 0.4 U1	< 0.6 U1	154	0.9 J1	< 0.2 U1	< 0.8 U1	14.3	2.318	0.81	< 0.4 U1	0.0266	0.061	< 8 U1	< 0.6 U1	< 2 U1
5/22/2019	Assessment	< 0.4 U1	< 0.6 U1	148	0.5 J1	< 0.2 U1	< 0.8 U1	13.8	1.948	0.69	< 0.4 U1	0.0227	0.028	< 8 U1	< 0.6 U1	< 0.1 U1
8/12/2019	Assessment	0.02 J1	0.64	113	0.473	0.04 J1	0.416	12.8	2.381	0.65	0.1 J1	0.0380	0.092	< 0.4 U1	0.2 J1	< 0.1 U1
3/11/2020	Assessment	< 0.02 U1	0.21	172	0.959	0.07	0.235	17.1	2.265	1.04	0.1 J1	0.0226	0.028	< 0.4 U1	0.4	< 0.1 U1
6/2/2020	Assessment	< 0.02 U1	0.16	146	0.801	0.05	0.230	13.6	1.667	0.87	0.06 J1	0.0223	0.026	< 0.4 U1	0.3	< 0.1 U1
11/2/2020	Assessment	< 0.02 U1	0.18	131	0.466	0.04 J1	0.2 J1	13.4	2.33	0.55	0.06 J1	0.0279	0.064	< 0.4 U1	0.2	< 0.1 U1
3/9/2021	Assessment	< 0.02 U1	0.16	153	0.958	0.07	0.292	15.3	1.214	1.03	0.08 J1	0.0223	0.019	< 0.1 U1	0.3	< 0.04 U1
5/25/2021	Assessment	0.02 J1	0.18	153	0.771	0.062	0.47	15.0	1.18	1.0	0.11 J1	0.0190	0.019	< 0.1 U1	0.21 J1	< 0.04 U1
11/16/2021	Assessment	< 0.02 U1	0.27	120	0.501	0.049	0.59	11.8	2.17	0.58	0.10 J1	0.0240	0.024	< 0.1 U1	0.17 J1	< 0.04 U1
3/29/2022	Assessment	< 0.02 U1	0.09 J1	120	0.605	0.057	0.35	12.5	2.98	0.68	0.05 J1	0.0242	0.012	< 0.1 U1	0.26 J1	< 0.04 U1
6/21/2022	Assessment	< 0.02 U1	0.14	130	0.463	0.047	0.40	13.3	5.96	0.61	0.08 J1	0.0213	0.007	< 0.1 U1	0.15 J1	< 0.04 U1
11/16/2022	Assessment	< 0.02 U1	0.10	125	0.459	0.046	0.54	11.8	5.15	0.48	0.15 J1	0.0270	0.008	< 0.1 U1	0.16 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-30
Pirkey - WBAP
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	0.258	0.591	18	< 0.083 U1	4.7	14	112
7/14/2016	Background	0.384	0.499	22	< 0.083 U1	4.8	14	118
9/7/2016	Background	0.515	0.27	24	< 0.083 U1	4.4	15	110
10/13/2016	Background	0.625	0.373	24	< 0.083 U1	4.2	18	140
11/15/2016	Background	0.701	0.326	25	< 0.083 U1	4.3	19	132
1/12/2017	Background	0.697	0.286	26	< 0.083 U1	5.2	22	136
3/1/2017	Background	0.824	0.273	22	< 0.083 U1	4.8	25	136
4/11/2017	Background	0.837	0.242	24	< 0.083 U1	4.2	27	124
8/24/2017	Detection	1.39	0.294	25	< 0.083 U1	5.2	46	176
12/21/2017	Detection	1.27	0.363	26	< 0.083 U1	--	48	152
3/22/2018	Assessment	0.937	0.345	17	< 0.083 U1	5.2	44	140
8/21/2018	Assessment	1.57	0.716	29	< 0.083 U1	4.8	66	188
2/28/2019	Assessment	0.491	0.3 J1	14.6	< 0.04 U1	4.2	31.5	--
4/3/2019	Assessment	--	--	--	--	--	--	135
5/23/2019	Assessment	0.520	1.74	18.8	0.04 J1	4.9	29.2	112
8/12/2019	Assessment	1.25	0.302	28.1	0.03 J1	4.9	39.8	160
3/11/2020	Assessment	1.63	0.351	22.8	0.05 J1	4.6	76.4	188
6/2/2020	Assessment	1.58	0.341	23.2	0.05 J1	4.9	77.2	219
11/2/2020	Assessment	2.55	0.523	30.6	0.05 J1	4.4	109	252
3/9/2021	Assessment	1.91	0.478	23.5	0.07	4.5	122	264
5/25/2021	Assessment	1.84	0.6	22.8	0.08	4.1	113	240
11/15/2021	Assessment	2.78	0.67	30.9	0.05 J1	3.7	149	330
3/28/2022	Assessment	2.45	0.66	29.5	0.07	4.0	170	330 L1
6/20/2022	Assessment	2.49	0.75	26.0	0.06	4.2	177	340
11/16/2022	Assessment	2.86	0.71	27.4	0.07	5.1	177	340

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-30

Pirkey - WBAP
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	1.71137 J1	1.92931 J1	54	0.155441 J1	< 0.07 U1	3	2.21375 J1	1.057	< 0.083 U1	< 0.68 U1	< 0.00013 U1	0.278	< 0.29 U1	< 0.99 U1	< 0.86 U1
7/14/2016	Background	< 0.93 U1	< 1.05 U1	54	0.126875 J1	< 0.07 U1	0.994219 J1	2.13856 J1	4.701	< 0.083 U1	< 0.68 U1	0.01	0.649	1.14165 J1	< 0.99 U1	< 0.86 U1
9/7/2016	Background	< 0.93 U1	< 1.05 U1	52	0.153878 J1	< 0.07 U1	0.769517 J1	1.83325 J1	0.312	< 0.083 U1	< 0.68 U1	0.009	0.214	< 0.29 U1	< 0.99 U1	1.34697 J1
10/13/2016	Background	< 0.93 U1	< 1.05 U1	56	0.0606961 J1	< 0.07 U1	0.543859 J1	2.26228 J1	2.27	< 0.083 U1	< 0.68 U1	0.01	0.709	< 0.29 U1	< 0.99 U1	< 0.86 U1
11/15/2016	Background	< 0.93 U1	< 1.05 U1	52	0.0603858 J1	< 0.07 U1	< 0.23 U1	1.91681 J1	4.07	< 0.083 U1	< 0.68 U1	0.009	0.584	< 0.29 U1	1.2068 J1	0.959001 J1
1/12/2017	Background	< 0.93 U1	< 1.05 U1	51	0.0580655 J1	< 0.07 U1	0.504125 J1	1.76108 J1	0.355	< 0.083 U1	< 0.68 U1	0.009	1.588	< 0.29 U1	< 0.99 U1	< 0.86 U1
3/1/2017	Background	0.997045 J1	< 1.05 U1	55	0.0632093 J1	< 0.07 U1	0.740184 J1	1.69598 J1	0.354	< 0.083 U1	< 0.68 U1	0.008	2.59	< 0.29 U1	< 0.99 U1	< 0.86 U1
4/11/2017	Background	< 0.93 U1	< 1.05 U1	55	0.0611 J1	< 0.07 U1	0.535696 J1	1.80383 J1	1.861	< 0.083 U1	< 0.68 U1	0.008	1.207	< 0.29 U1	< 0.99 U1	< 0.86 U1
3/22/2018	Assessment	< 0.93 U1	< 1.05 U1	56.42	0.09 J1	< 0.07 U1	1.47	2.6 J1	1.108	< 0.083 U1	< 0.68 U1	0.00837	0.104	< 0.29 U1	< 0.99 U1	< 0.86 U1
8/21/2018	Assessment	< 100 U1	0.77	62.9	0.07 J1	< 0.05 U1	1.22	2.93	0.987	< 0.083 U1	0.2 J1	0.0118	1.123	< 200 U1	0.4 J1	0.1 J1
2/28/2019	Assessment	< 0.4 U1	< 0.6 U1	43.3	< 0.4 U1	< 0.2 U1	4 J1	1.67	1.144	< 0.04 U1	< 0.4 U1	0.00707	0.461	< 8 U1	< 0.6 U1	< 2 U1
5/23/2019	Assessment	< 0.4 U1	0.6 J1	59.2	< 0.4 U1	< 0.2 U1	1 J1	3.26	1.089	0.04 J1	< 0.4 U1	0.00841	0.165	< 8 U1	< 0.6 U1	< 0.1 U1
8/12/2019	Assessment	< 0.02 U1	0.21	58.0	0.07 J1	< 0.01 U1	0.374	2.10	1.217	0.03 J1	0.06 J1	0.00804	0.345	< 0.4 U1	0.2 J1	< 0.1 U1
3/11/2020	Assessment	< 0.02 U1	0.23	82.6	0.08 J1	< 0.01 U1	0.300	2.82	3.41	0.05 J1	0.09 J1	0.00788	0.010	0.8 J1	0.2 J1	< 0.1 U1
6/2/2020	Assessment	< 0.02 U1	0.19	77.3	0.08 J1	< 0.01 U1	0.531	2.64	0.983	0.05 J1	0.09 J1	0.00779	0.021	< 0.4 U1	0.2	< 0.1 U1
11/2/2020	Assessment	< 0.02 U1	0.15	104	0.09 J1	0.01 J1	0.328	4.10	1.311	0.05 J1	< 0.05 U1	0.0104	0.085	< 0.4 U1	0.2 J1	< 0.1 U1
3/9/2021	Assessment	< 0.02 U1	0.15	115	0.107	0.01 J1	0.301	3.87	1.144	0.07	< 0.05 U1	0.00939	0.018	< 0.1 U1	0.3	< 0.04 U1
5/25/2021	Assessment	< 0.02 U1	0.17	104	0.158	0.019 J1	0.42	4.95	1.83	0.08	0.07 J1	0.00858	0.015	< 0.1 U1	0.30 J1	< 0.04 U1
11/15/2021	Assessment	< 0.02 U1	0.21	113	0.107	0.008 J1	0.51	4.55	1.48	0.05 J1	0.06 J1	0.0113	0.060	< 0.1 U1	0.33 J1	< 0.04 U1
3/28/2022	Assessment	< 0.02 U1	0.19	129	0.125	0.012 J1	0.45	4.76	2.30	0.07	< 0.05 U1	0.0101	0.035	< 0.1 U1	0.44 J1	0.04 J1
6/20/2022	Assessment	< 0.02 U1	0.23	106	0.089	0.014 J1	0.42	4.90	3.71	0.06	< 0.05 U1	0.0100	0.014	< 0.1 U1	0.34 J1	0.04 J1
11/16/2022	Assessment	< 0.02 U1	0.16	89.4	0.108	0.013 J1	0.55	4.86	1.52	0.07	< 0.05 U1	0.0119	0.017	< 0.1 U1	0.35 J1	0.05 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: Residence Time Calculation Summary
Pirkey West Bottom Ash Pond**

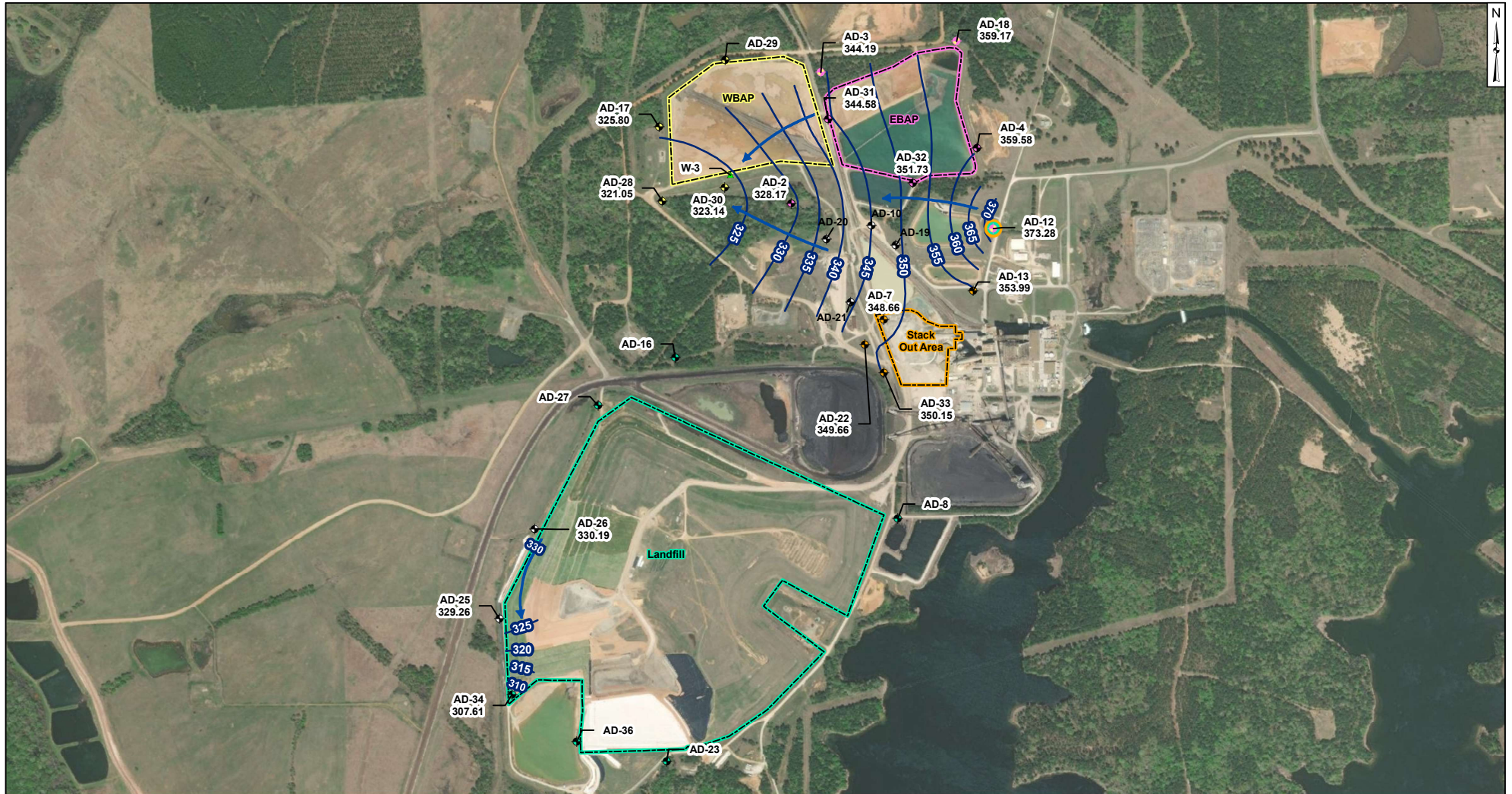
Geosyntec Consultants, Inc.

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)
West Bottom Ash Pond	AD-3 ^[1]	4.0	16.2	7.5	13.4	9.1	12.8	9.5
	AD-12 ^[1]	4.0	36.4	3.3	21.6	5.6	22.8	5.3
	AD-17 ^[2]	2.0	7.8	7.8	10.2	5.9	10.6	5.7
	AD-18 ^[1]	2.0	11.3	5.4	10.4	5.9	11.0	5.5
	AD-28 ^[2]	2.0	8.9	6.8	12.5	4.9	12.7	4.8
	AD-30 ^[2]	2.0	12.6	4.8	12.5	4.9	12.1	5.0

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

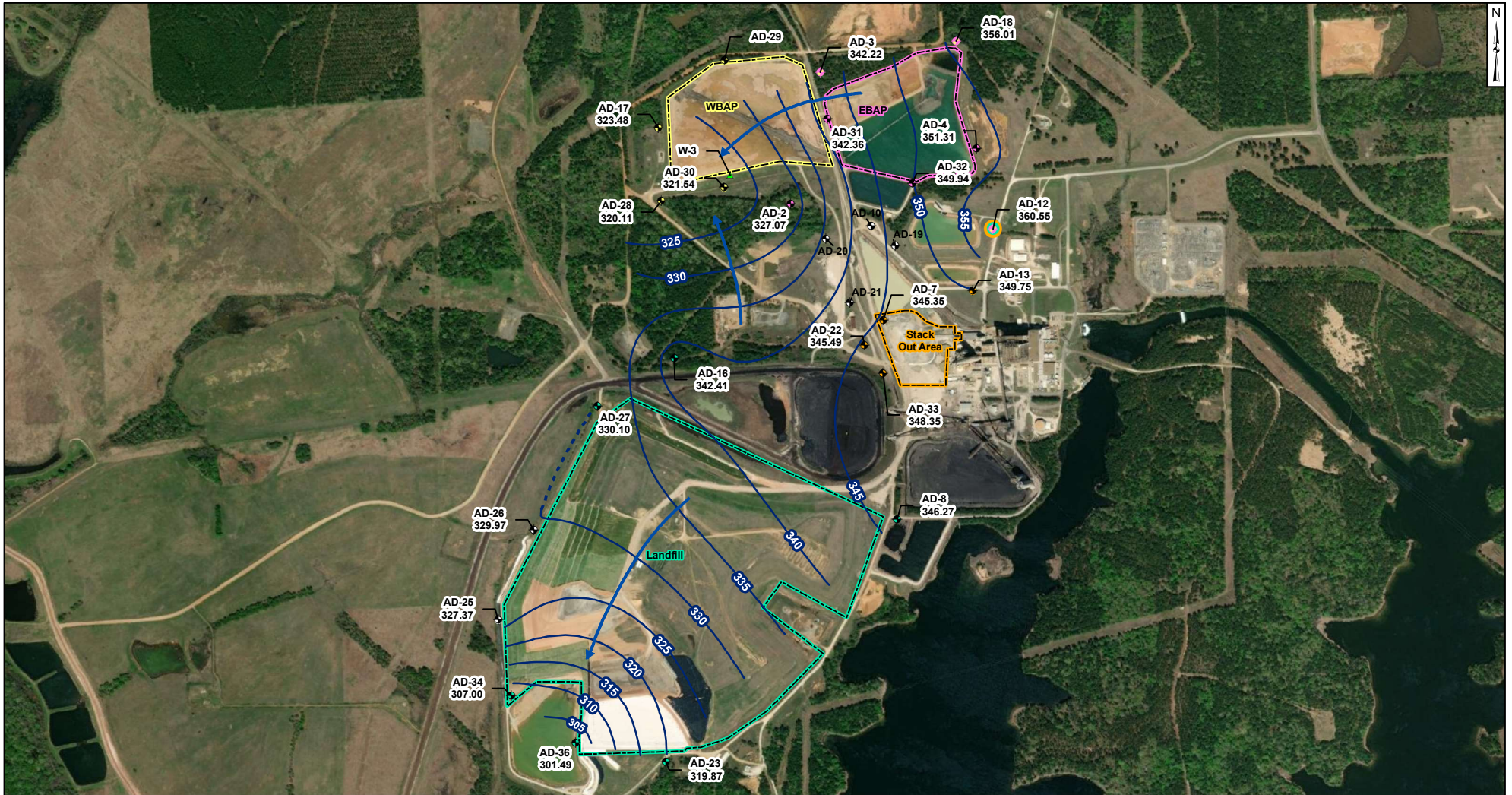
Geosyntec
consultants

Columbus, Ohio

2023/01/25

Figure

1

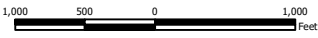


Legend

- 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.

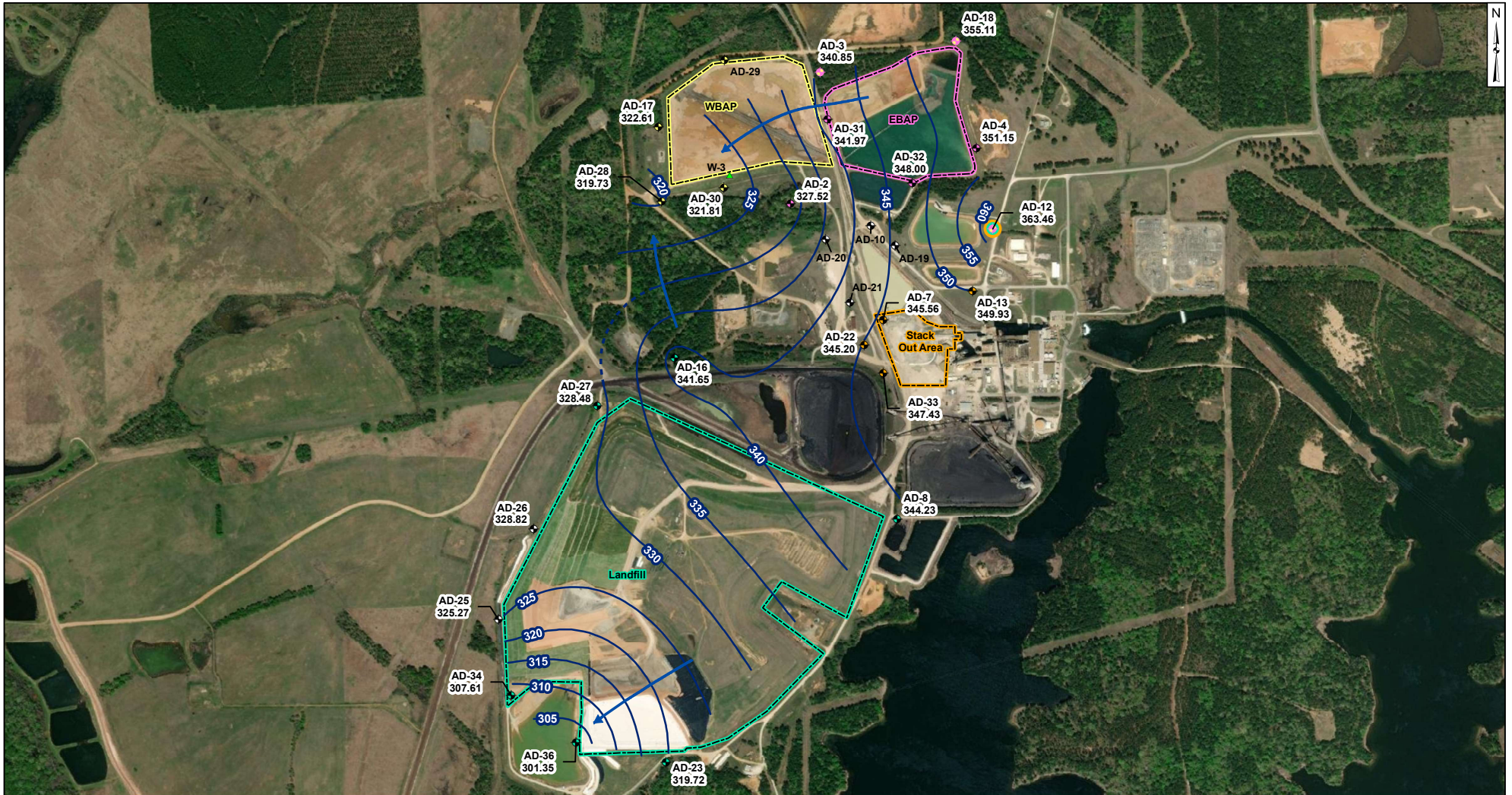


Beth Ann Gross
 12/29/2022
 Geosyntec Consultants, Inc.
 Texas Firm
 Registration No. 1182

Potentiometric Contours - Uppermost Aquifer June 2022	
AEP Pirkey Power Plant Hallsville, Texas	
Geosyntec consultants	
Columbus, Ohio	2022/12/21

Figure
2

W:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\HXD\Pirkey\2022\WEP-Pirkey_GW_2022-06\June.mxd, ASoltero, 12/21/2022, Project/Phase/Task.



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

Geosyntec
 consultants

Columbus, Ohio

2023/01/17

Figure

3

APPENDIX 2- Statistical Analyses

The reports summarizing the statistical evaluation follow.

**STATISTICAL ANALYSIS SUMMARY
WEST 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

TABLE OF CONTENTS

SECTION 1 Executive Summary	1
SECTION 2 West Bottom Ash Pond Evaluation	2-1
2.1 Data Validation & QA/QC	2-1
2.2 Statistical Analysis.....	2-1
2.2.1 Establishment of GWPSs.....	2-1
2.2.2 Evaluation of Potential Appendix IV SSLs.....	2-2
2.2.3 Establishment of Appendix III Prediction Limits.....	2-2
2.2.4 Evaluation of Potential Appendix III SSIs	2-3
2.3 Conclusions.....	2-4
SECTION 3 References	3-1

LIST OF TABLES

Table 1	Groundwater Data Summary
Table 2	Appendix IV Groundwater Protection Standards
Table 3	Appendix III Data Summary

LIST OF ATTACHMENTS

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

LIST OF ACRONYMS AND ABBREVIATIONS

AEP	American Electric Power
ASD	Alternative Source Demonstration
CCR	Coal Combustion Residuals
CCV	Continuing Calibration Verification
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 on Environmental Quality
TDS	Total Dissolved Solids
UPL	Upper Prediction Limit
UTL	Upper Tolerance Limit
WBAP	West Bottom Ash Pond

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 West Bottom Ash Pond (WBAP), 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 at the WBAP. An alternative source was not identified at the time, so the WBAP 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 (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 WBAP 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 GWPSs. An SSL was identified for cobalt. 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

WEST 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 WBAP 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, cadmium, cobalt, fluoride, lead, mercury, and selenium due to apparent non-normal distributions and for antimony,

molybdenum, and thallium due to a high non-detect frequency. Tolerance limits and the final GWPSs are summarized in Table 2.

2.2.2 Evaluation of Potential Appendix IV SSLs

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

The following SSLs were identified at the Pirkey WBAP:

- The LCL for cobalt exceeded the GWPS of 0.00900 mg/L at AD-28 (0.01345 mg/L).

As a result, the Pirkey WBAP 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 calcium, pH, sulfate, and total dissolved solids (TDS), whereas interwell tests were used to evaluate potential SSIs for boron, chloride, and fluoride. 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, thus 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 intrawell prediction limits were used to evaluate potential SSIs for calcium, pH, sulfate, and TDS.

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 limit was used to evaluate a potential SSI for boron, chloride, and fluoride.

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, chloride, and fluoride using historical data through November 2021. Intrawell UPLs were previously calculated for calcium, pH, sulfate, and TDS 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 0.100 mg/L at AD-28 (0.363 mg/L) and AD-30 (2.78 mg/L).
- Chloride concentrations exceeded the interwell UPL of 9.01 mg/L at AD-17 (31.3 mg/L) and AD-30 (30.9 mg/L).
- The pH value was below the intrawell LPL of 4.0 SU at AD-30 (3.7 SU).
- Sulfate concentrations exceeded the intrawell UPL of 31.6 mg/L at AD-30 (149 mg/L).
- TDS concentrations exceeded the intrawell UPL of 206 mg/L at AD-30 (330 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 WBAP 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. An SSL was identified for cobalt. Appendix III parameters were compared to established prediction limits, with exceedances identified for boron, chloride, pH, sulfate, and TDS.

Based on this evaluation, the Pirkey WBAP 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 – West Bottom Ash Pond, Pirkey, Hallsville, Texas. September.

Geosyntec. 2021b. Alternative Source Demonstration Report - Texas State CCR Rule. H.W. Pirkey Power Plant. December.

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

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

TABLES

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

Well ID		AD-3	AD-12	AD-17	AD-18		AD-28	AD-30
Well Classification		Background	Background	Compliance	Background		Compliance	Compliance
Parameter	Unit	11/16/2021	11/15/2021	11/16/2021	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	1.90	0.05 J	0.21	-	0.19	0.27	0.21
Barium	µg/L	64.1	26.5	266	-	82.2	120	113
Beryllium	µg/L	0.200	0.148	0.686	-	0.078	0.501	0.107
Boron	mg/L	0.054	0.012 J	0.022 J	-	0.01 J	0.363	2.78
Cadmium	µg/L	0.016 J	0.01 J	0.058	-	0.011 J	0.049	0.008 J
Calcium	mg/L	4.92	0.28	0.98	-	0.20	1.22	0.67
Chloride	mg/L	6.42	8.03	31.3	-	5.99	4.79	30.9
Chromium	µg/L	0.63	0.30	0.33	-	0.31	0.59	0.51
Cobalt	µg/L	5.87	1.38	11.8	-	0.801	11.8	4.55
Combined Radium	pCi/L	1.32	1.76	6.42	-	1.91	2.17	1.48
Fluoride	mg/L	0.12	0.07	0.29	-	0.06 U	0.58	0.05 J
Lead	µg/L	0.43	0.07 J	0.13 J	-	0.2 U	0.10 J	0.06 J
Lithium	mg/L	0.0722	0.0110	0.0236	-	0.0124	0.0240	0.0113
Mercury	µg/L	0.006	0.005 U	0.350	-	0.030	0.024	0.060
Molybdenum	µg/L	0.5 U	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U
Selenium	µg/L	0.5 U	0.10 J	0.35 J	-	0.11 J	0.17 J	0.33 J
Sulfate	mg/L	31.3	2.90	2.58	-	6.23	24.2	149
Thallium	µg/L	0.2 U	0.2 U	0.04 J	-	0.2 U	0.2 U	0.2 U
Total Dissolved Solids	mg/L	150	90	90	-	100	100	330
pH	SU	5.3	3.5	4.0	3.9	-	4.3	3.7

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 - West 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	0.00500	0.0100
Barium, Total (mg/L)	2.00	0.157	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	0.00386	0.100
Cobalt, Total (mg/L)	n/a	0.00900	0.00900
Combined Radium, Total (pCi/L)	5.00	3.15	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	0.143	0.143
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 because an MCL does not exist.

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

Analyte	Unit	Description	AD-17	AD-28	AD-30
			11/16/2021	11/16/2021	11/15/2021
Boron	mg/L	Interwell Background Value (UPL)	0.100		
		Analytical Result	0.022	0.363	2.78
Calcium	mg/L	Intrawell Background Value (UPL)	1.63	3.21	1.74
		Analytical Result	0.98	1.22	0.67
Chloride	mg/L	Interwell Background Value (UPL)	9.01		
		Analytical Result	31.3	4.79	30.9
Fluoride	mg/L	Interwell Background Value (UPL)	1.00		
		Analytical Result	0.29	0.58	0.05
pH	SU	Intrawell Background Value (UPL)	4.8	5.6	5.4
		Intrawell Background Value (LPL)	3.3	3.5	4.0
		Analytical Result	4.0	4.3	3.7
Sulfate	mg/L	Intrawell Background Value (UPL)	9.05	27.2	31.6
		Analytical Result	2.58	24.2	149
Total Dissolved Solids	mg/L	Intrawell Background Value (UPL)	111	133	206
		Analytical Result	90	100	330

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

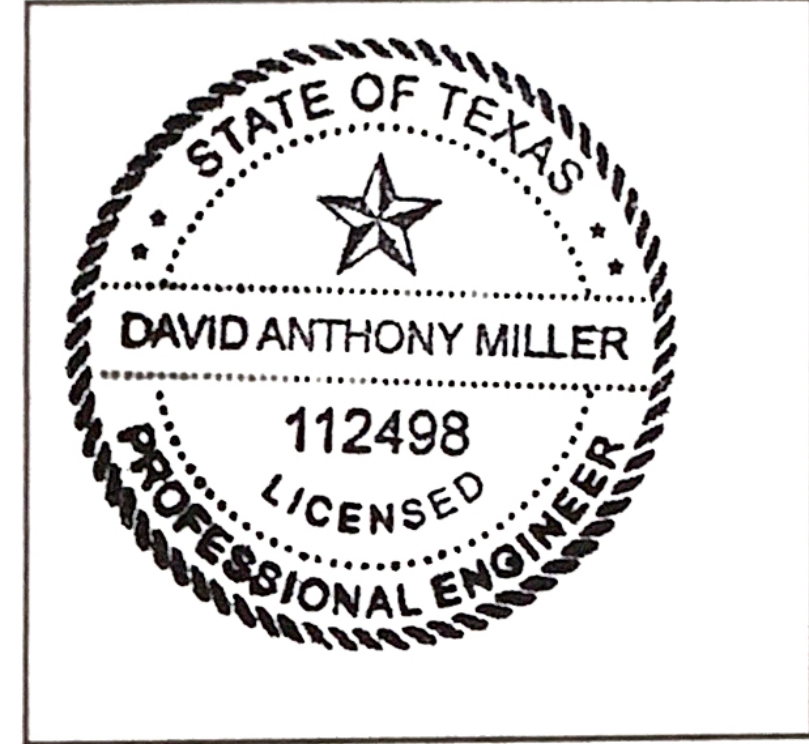
I certify that the selected and above described statistical method is appropriate for evaluating the groundwater monitoring data for the Pirkey West Bottom Ash Pond CCR management area and that the requirements of § 352.931(a) have been met.

DAVID ANTHONY MILLER

Printed Name of Licensed Professional Engineer

David Anthony Miller

Signature



112498

License Number

TEXAS

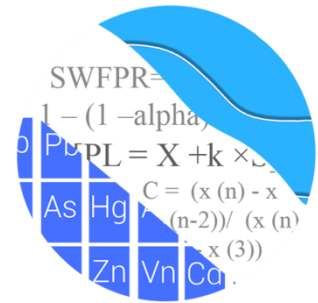
Licensing State

03.19.22

Date

ATTACHMENT B
Statistical Analysis Output

GROUNDWATER STATS CONSULTING



February 25, 2022

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

Re: Pirkey WBAP - 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 background update and assessment of 2021 groundwater data for American Electric Power Inc.'s Pirkey West Bottom Ash Pond. 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 began at the site 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-3, AD-12, and AD-18
- **Downgradient wells:** AD-17, AD-28, and AD-30

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 – Appendix III Parameters

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

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

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 annual false positive rate associated with parametric limits is fixed at 10% as recommended by the EPA Unified

Guidance (2009), the false positive rate associated with nonparametric limits is not fixed and depends 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 as appropriate. Non-detects are handled as follows:

- 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 and there is no replacement of historical reporting limits with the most recent reporting limit. It was noted that the more recent reporting limits are significantly lower than those reported historically.
- 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

November 2019

Samples from all wells for intrawell parameters and from all upgradient wells for interwell parameters were evaluated using Tukey's outlier test and visual screening. Samples during August and December 2017 that were previously absent were also incorporated into this analysis. No values were noted or flagged as outliers for Appendix III parameters. A summary of Tukey's test results and flagged outliers followed the November 2019 background update.

For constituents requiring intrawell prediction limits, the Mann-Whitney (Wilcoxon Rank Sum) test was used to compare the medians of historical data through April 2017 to the new compliance samples at each well through February 2019 to evaluate whether the groups are statistically different at the 99% confidence level. Statistically significant differences were found between the two groups for pH in upgradient well AD-18, and sulfate in downgradient well AD-30. This resulted in truncating earlier portions of background data for pH in upgradient well AD-18 to use the 8 most recent values and using trend tests in lieu of prediction limits for sulfate in downgradient well AD-30. The full results of the Mann-Whitney test were included with the November 2019 background update.

January 2021

Prior to updating background data for the 2020 analysis, Tukey's outlier test and visual screening were used to evaluate data for outliers at all wells for calcium, pH, sulfate, and TDS, which utilize intrawell prediction limits, and at all upgradient wells for boron, chloride, and fluoride, which utilize interwell prediction limits. No values were noted or flagged as outliers for Appendix III parameters.

No seasonal adjustments were made. However, calcium at well AD-17 showed a possible seasonal pattern, which if it persists, could suggest the need for a seasonal adjustment in the future.

For constituents requiring intrawell prediction limits, 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 statistically different at the 99% confidence level. A statistically significant difference was found between the two groups for sulfate in well AD-17 and the record for

sulfate at well AD-17 was updated because the recent data were lower than the older data, and the update resulted in the same or a lower prediction limit.

Since the December 2019 background update, concentrations for sulfate in well AD-30 briefly returned (decreased) to near the older historic concentrations, but recently have substantially increased. Although the Mann-Whitney test did not identify a statistically significant difference in medians, a trend test was recommended in lieu of a prediction limit for this well/constituent pair until concentrations stabilize. Additionally, because pH concentrations in upgradient well AD-18 have returned to historical levels, all historical data were used instead of using a truncated portion of background data as was recommended during the 2019 background update. Intrawell prediction limits using all historical data through June 2020, combined with a 1-of-2 resample plan, were constructed and a trend test was used to evaluate sulfate in well AD-30 which resulted in an increasing trend during the 2020 background update.

For parameters tested using interwell analyses, the Sen's Slope/Mann-Kendall trend test was used to evaluate data in upgradient wells and determine whether concentrations are statistically increasing, decreasing or stable. A statistically significant increasing trend was identified for boron in upgradient well AD-18, and statistically significant decreasing trends were noted for fluoride in upgradient wells AD-3 and AD-12. Since all three of these trends were strongly influenced by substantial numbers of non-detects near one end of the record, no adjustments were made at this time. All well/constituent pairs for parameters using interwell prediction limits were updated to use all historical data through November 2020.

February 2022

Interwell and intrawell prediction limits were last updated during Fall 2020, and the results of those findings were submitted with the January 5, 2021 report. During this analysis, upgradient well data through November 2021 were re-screened for the purpose of updating the interwell prediction limits for boron, chloride, and fluoride. Intrawell prediction limits will be updated during the Fall 2022 when sufficient compliance samples are available.

Outlier Analysis

Prior to updating background data during this analysis, Tukey's outlier test and visual screening were used to re-evaluate data through November 2021 at all upgradient wells for parameters utilizing interwell prediction limits (boron, chloride, and fluoride). Tukey's outlier test identified several values as potential outliers; though, no new values were

flagged as outliers and no changes were made to previously flagged outliers for these constituents due to the potential outliers either being consistent with previous data, or below the Maximum Containment Level (MCL). Tukey's outlier test results for all Appendix III parameters are shown in Figure C.

For parameters which use intrawell prediction limits (calcium, pH, sulfate, and TDS), 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, combined with a 1-of-2 resample plan, were constructed using historical data through June 2020 for calcium, pH, sulfate, and TDS (Figure D). 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.

Due to significant differences identified between background and compliance medians using the Mann-Whitney test as discussed above, trend tests were initially recommended in lieu of prediction limits for sulfate in downgradient well AD-30. However, during this analysis, a prediction limit was constructed using the earlier and stable portion of the record through April 2017 for the purpose of comparing future compliance samples. A list of any well/constituent pairs using a truncated portion of their record 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, chloride, and fluoride to identify statistically significant increasing or decreasing trends (Figure E). The results of the trend analyses showed decreasing trends for fluoride in upgradient wells AD-3, AD-12, and AD-18. However, the magnitudes of the trends were low relative to the average concentrations in these wells; therefore, no adjustments were required at this time.

Interwell – Prediction Limits

Interwell prediction limits, combined with a 1-of-2 resample plan, were constructed using all available data from upgradient wells through November 2021 for boron, chloride, and fluoride (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, upgradient well data are screened through both visual screening and Tukey's outlier test 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 through November 2021 identified outliers for beryllium, chromium, combined radium 226 + 228, and lithium. Among these identified values, no new values were flagged as outliers as they were similar to concentrations upgradient of the facility or below the MCL.

During previous screenings, the highest value for lithium at upgradient well AD-3 was flagged to construct statistical limits that are conservative (i.e., lower) from a regulatory perspective. The reporting limit for thallium for the February 2019 event was 0.01 mg/L, which is higher than the historical reporting limit of 0.002 mg/L. Therefore, this value was flagged as an outlier at wells with reported non-detects for the February 2019 event. Similarly, the high non-detects for molybdenum of 0.04 mg/L for February and May of 2019 are flagged since they are censored at a much higher level than the other non-detects.

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. No new outliers were flagged and no changes to previously flagged outliers were made during this analysis. All flagged values may be seen on the Outlier Summary following this letter (Figure C).

Interwell Upper Tolerance Limits

Upper tolerance limits were used to calculate background limits from pooled upgradient well data through November 2021 for Appendix IV parameters (Figure G). 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 background limits were compared to the Maximum Contaminant Levels (MCLs) as shown 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 H).

Confidence Intervals

Confidence intervals were then constructed on downgradient wells using all data through November 2021 for each of the Appendix IV parameters and then compared to the GWPS, i.e., the highest limit of the MCL or background limit as discussed above (Figure I). Only when the entire confidence interval is above a GWPS is the well/constituent pair considered to exceed its respective standard. An exceedance was found for cobalt in downgradient well AD-28. A summary of the confidence interval results follows this letter.

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

For Groundwater Stats Consulting,

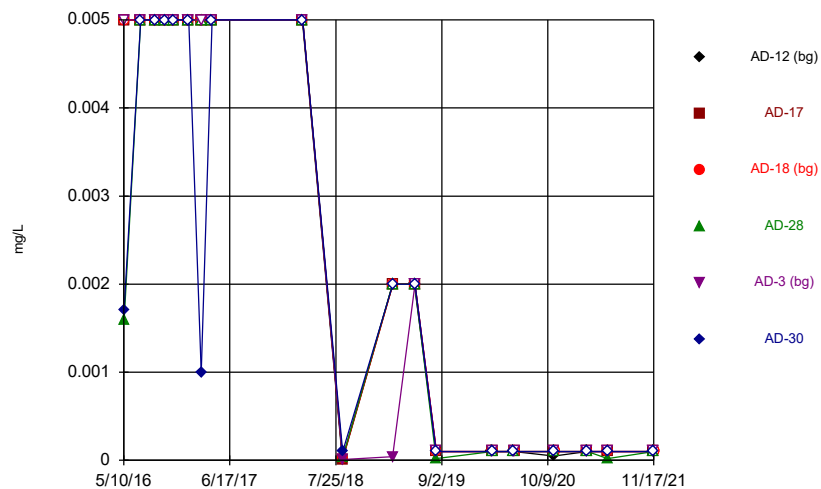


Easton Rayner
Groundwater Analyst



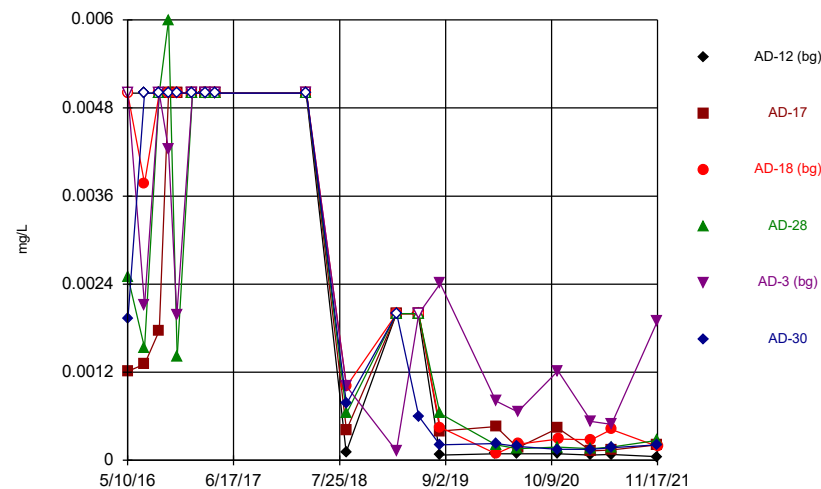
Andrew T. Collins
Project Manager

Time Series



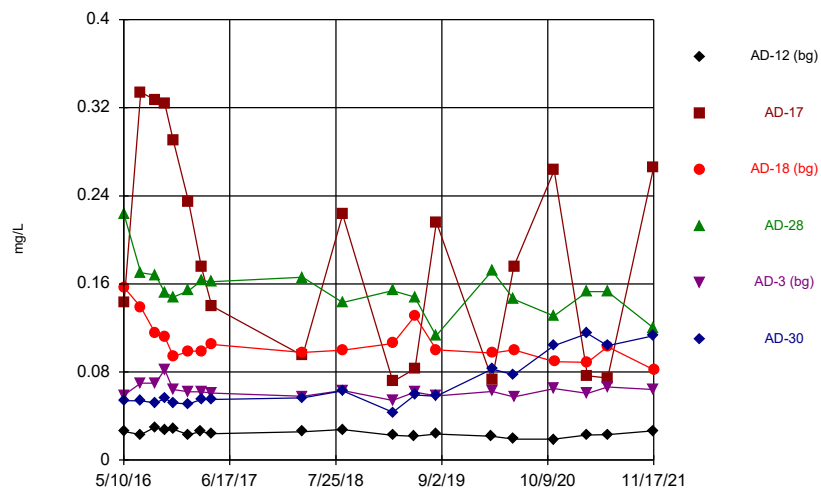
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Time Series



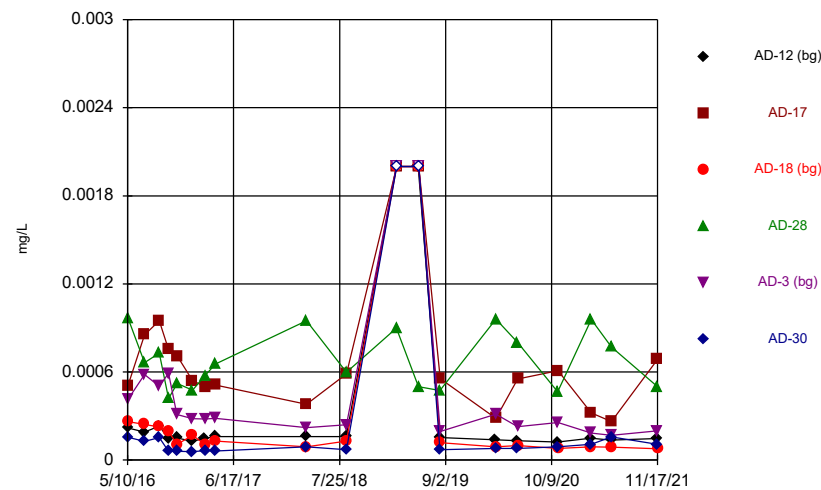
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Time Series



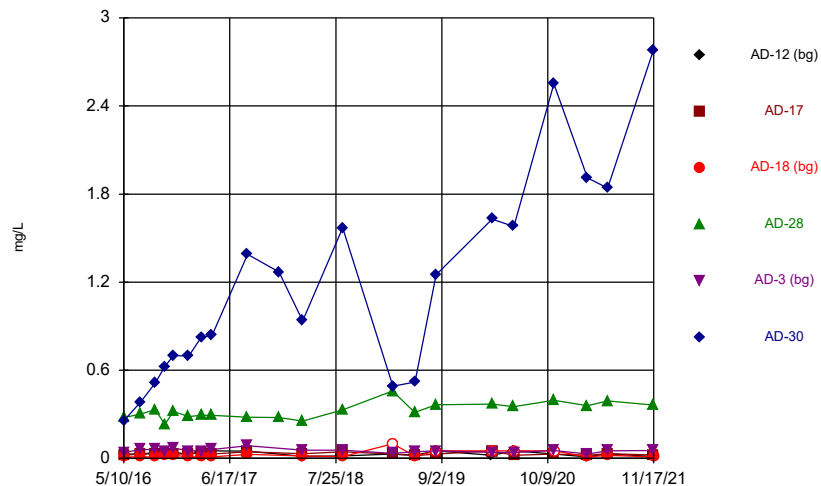
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Time Series



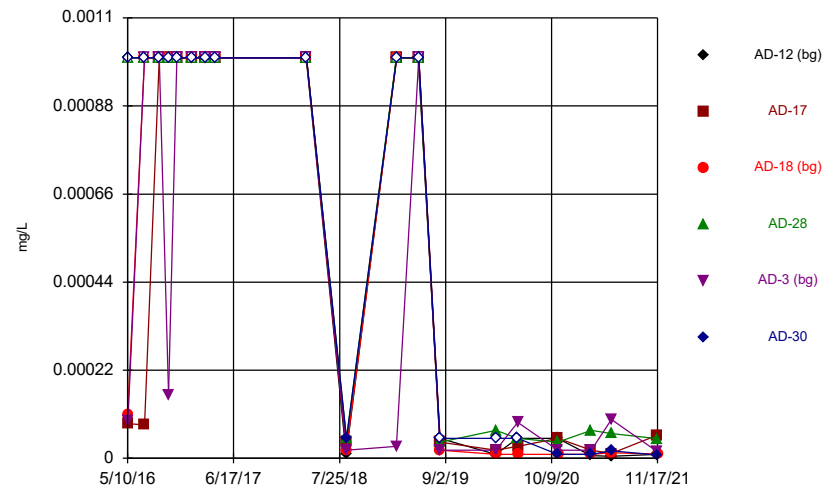
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Time Series



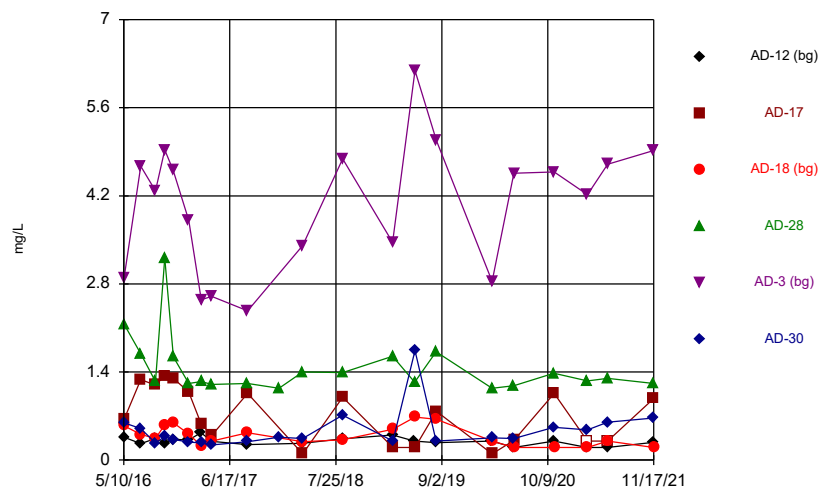
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Time Series



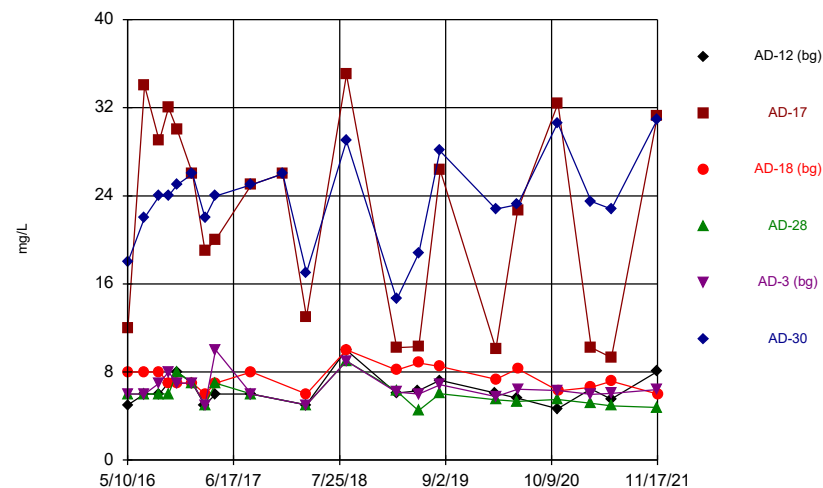
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Time Series



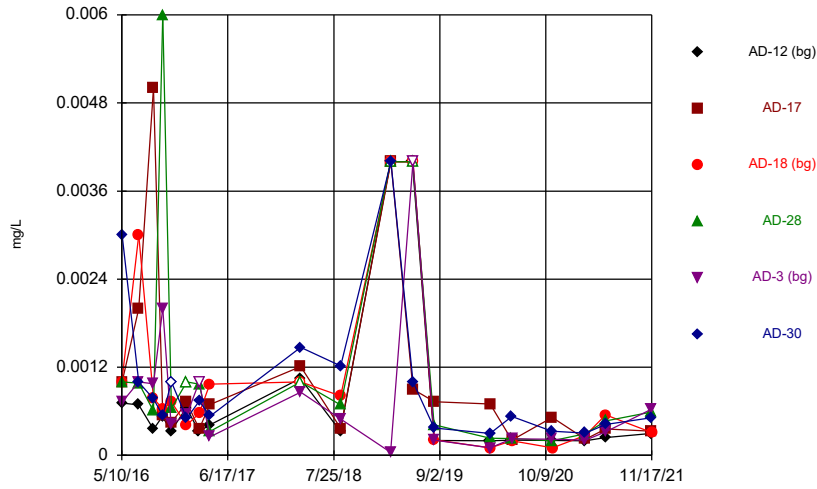
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Time Series



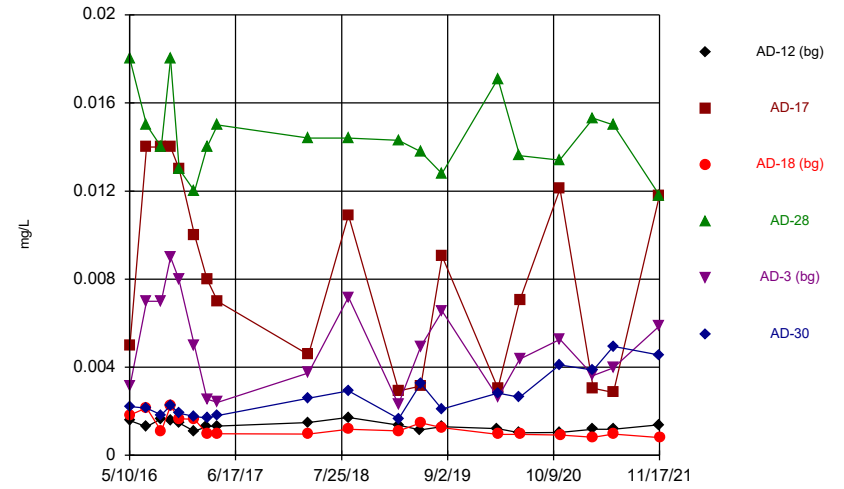
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Time Series



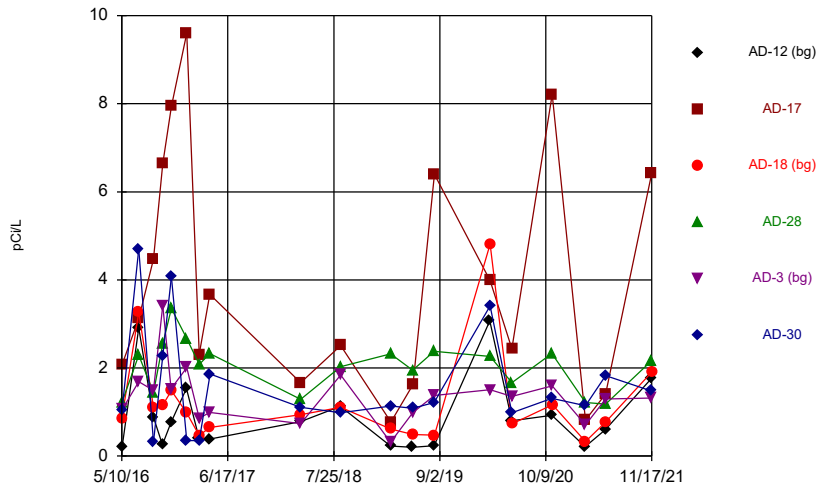
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Time Series



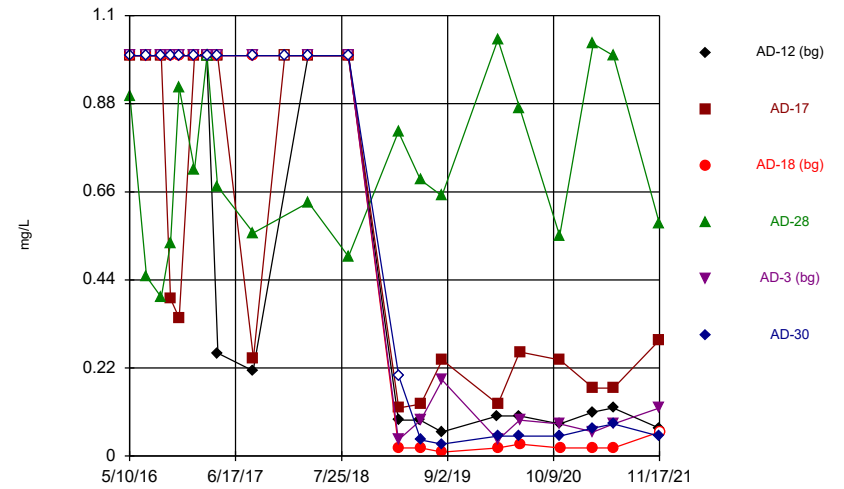
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Time Series



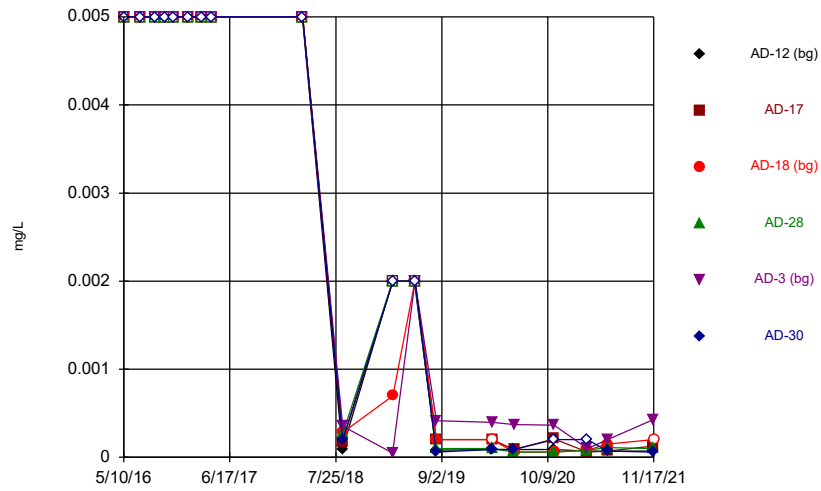
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Time Series



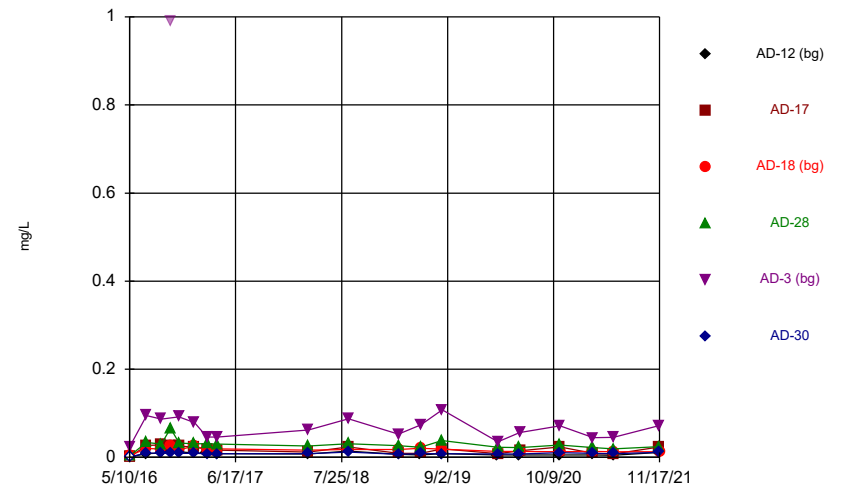
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Time Series



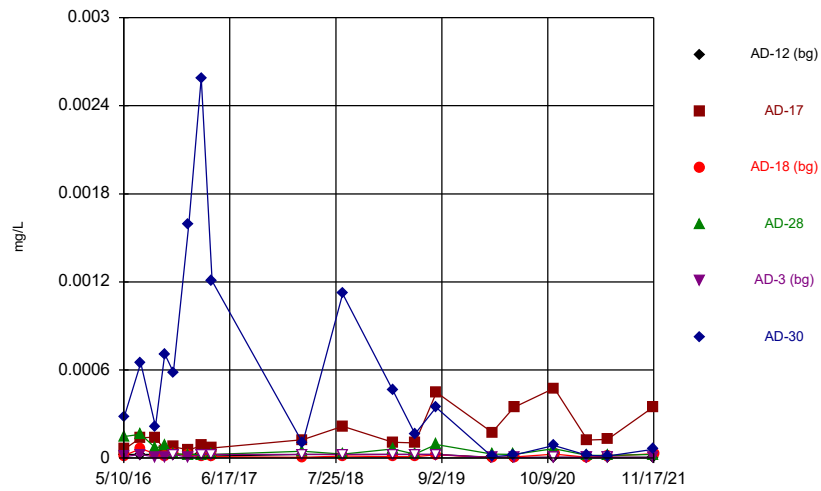
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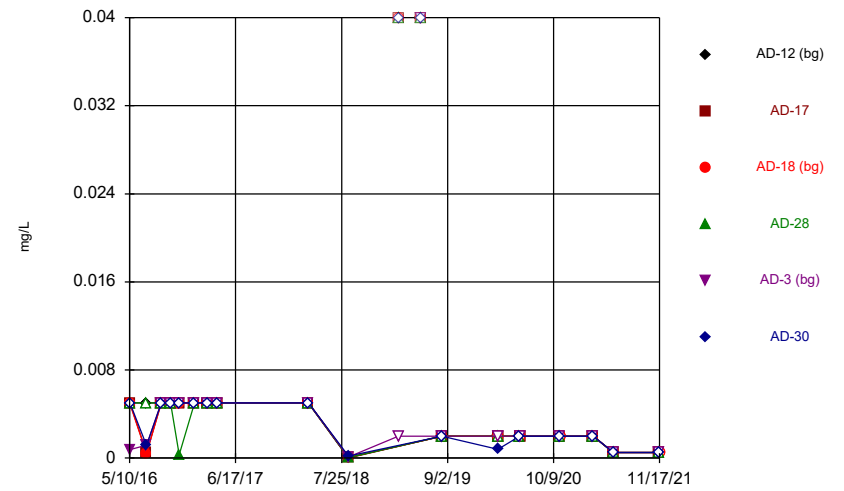
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Time Series



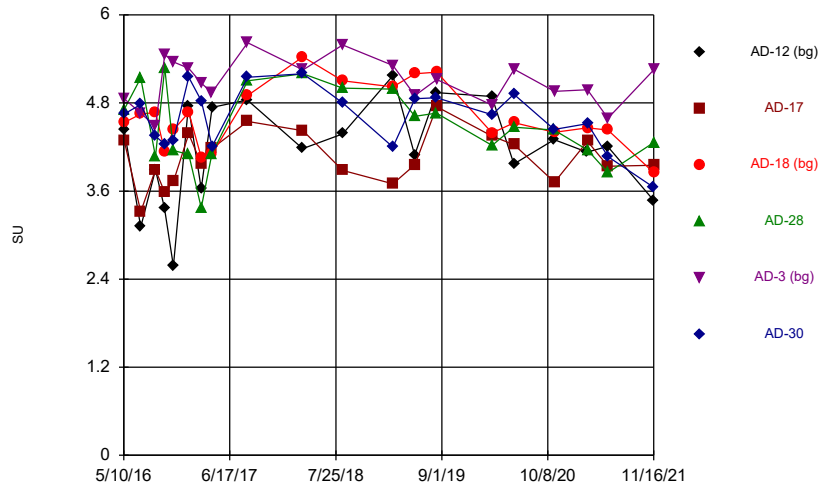
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Time Series



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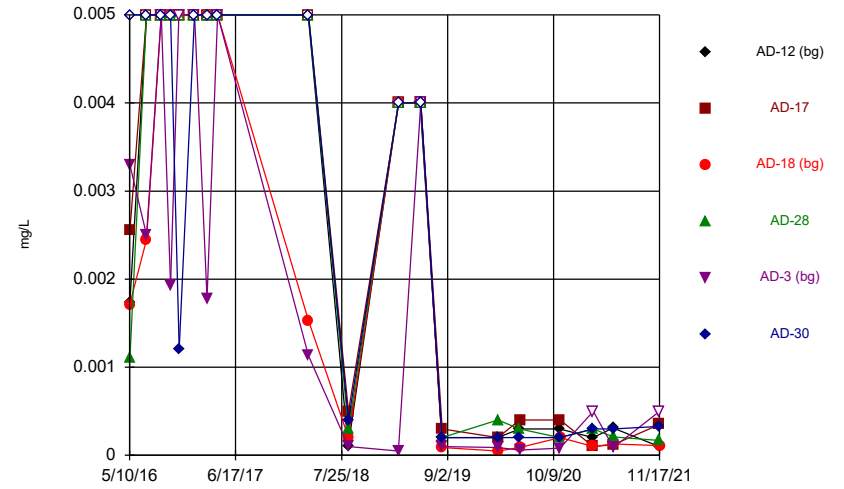
Time Series



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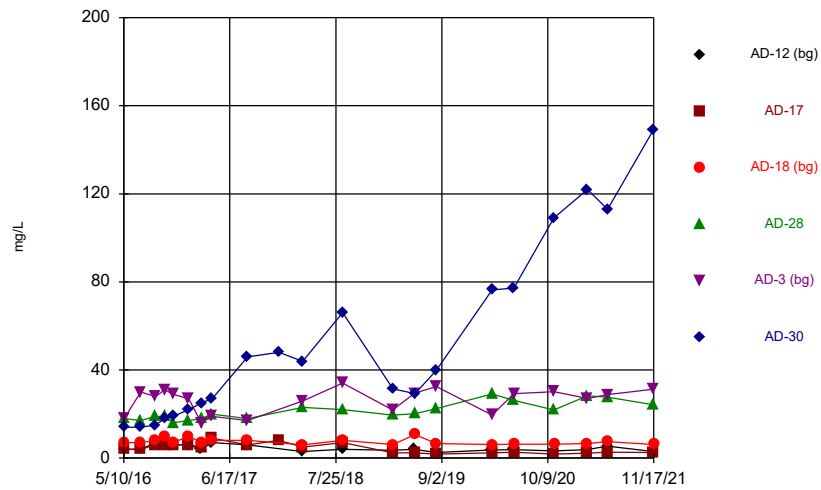
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Time Series



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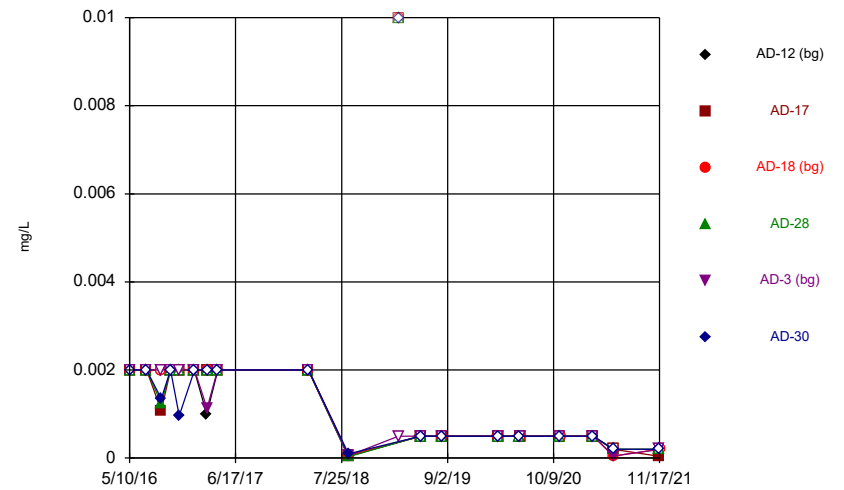
Time Series



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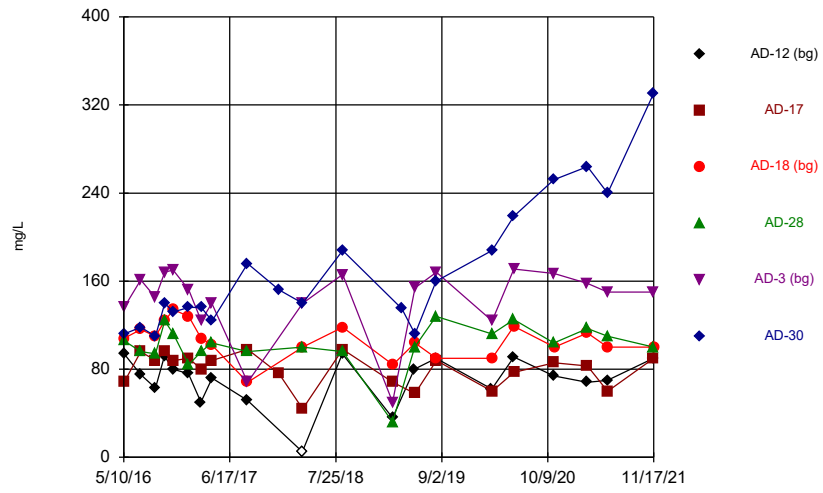
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Time Series



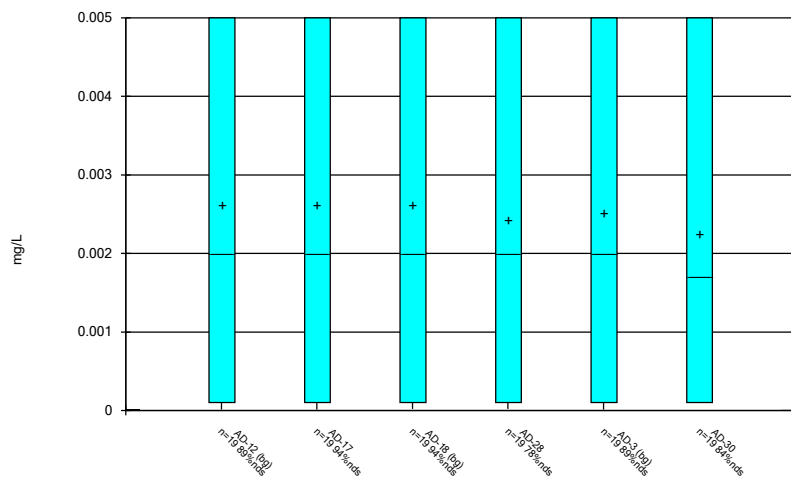
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Time Series



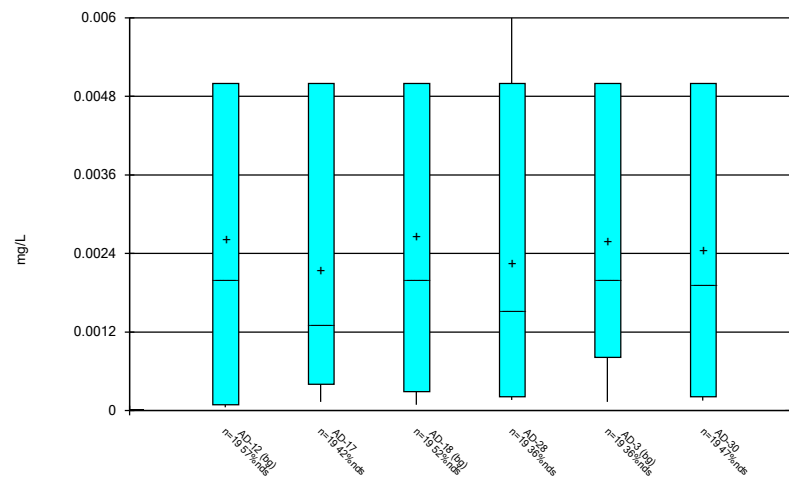
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Box & Whiskers Plot



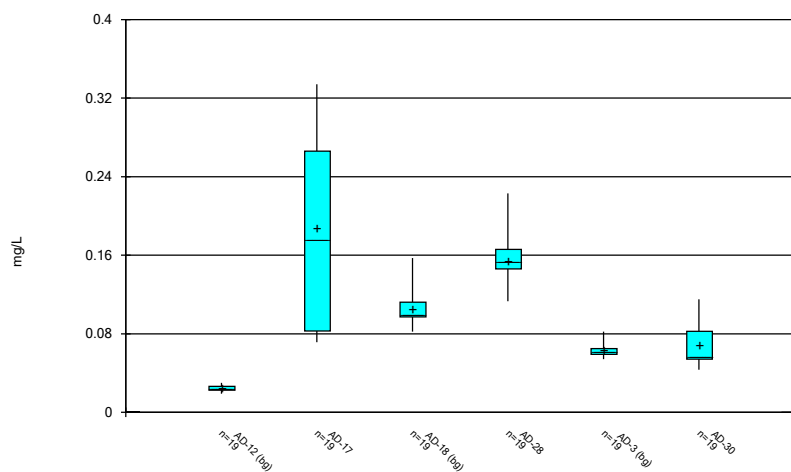
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Box & Whiskers Plot



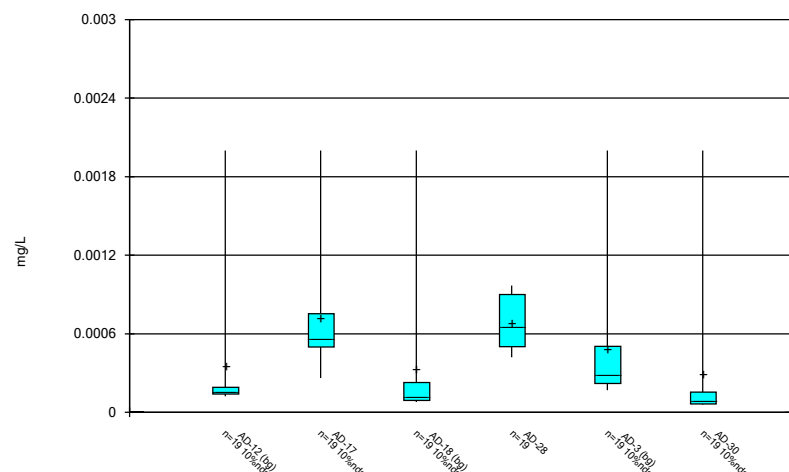
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Box & Whiskers Plot



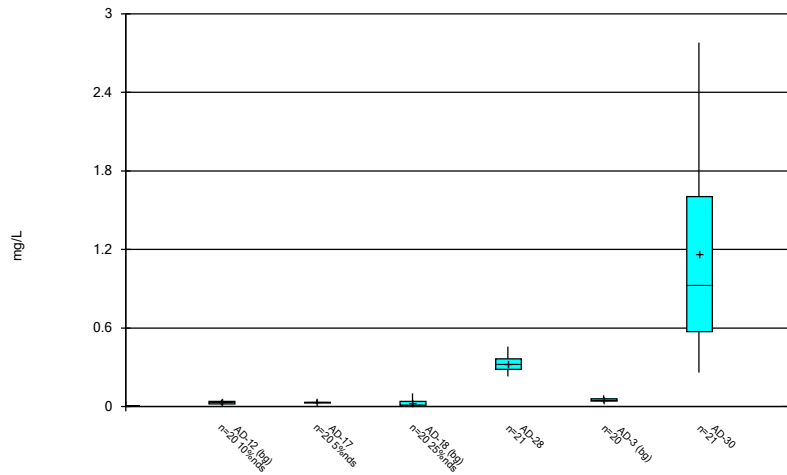
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Box & Whiskers Plot



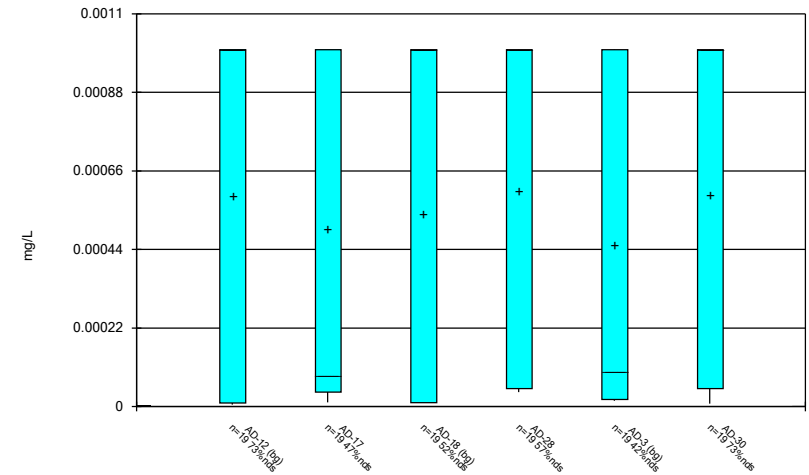
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Box & Whiskers Plot



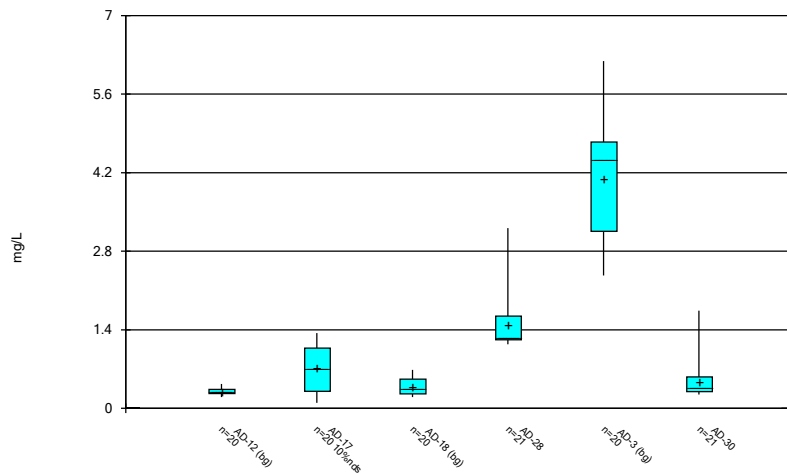
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Box & Whiskers Plot



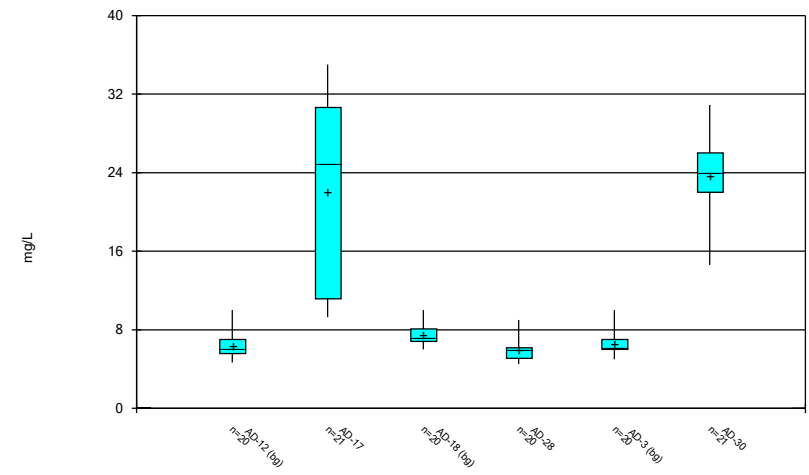
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Box & Whiskers Plot



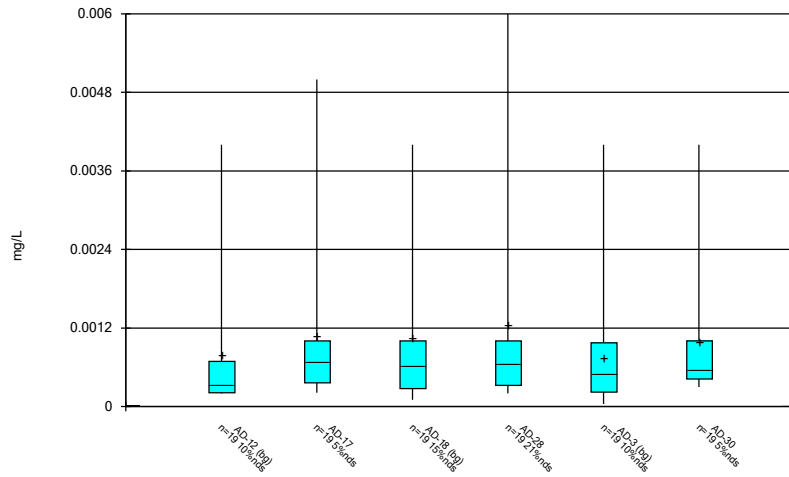
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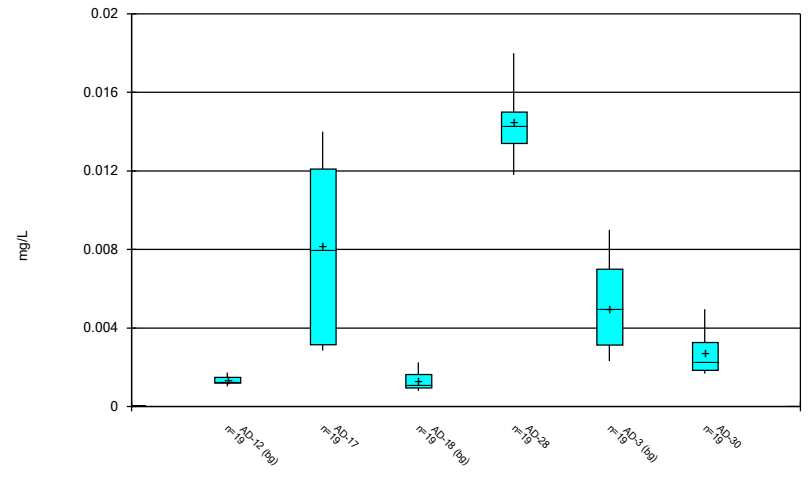
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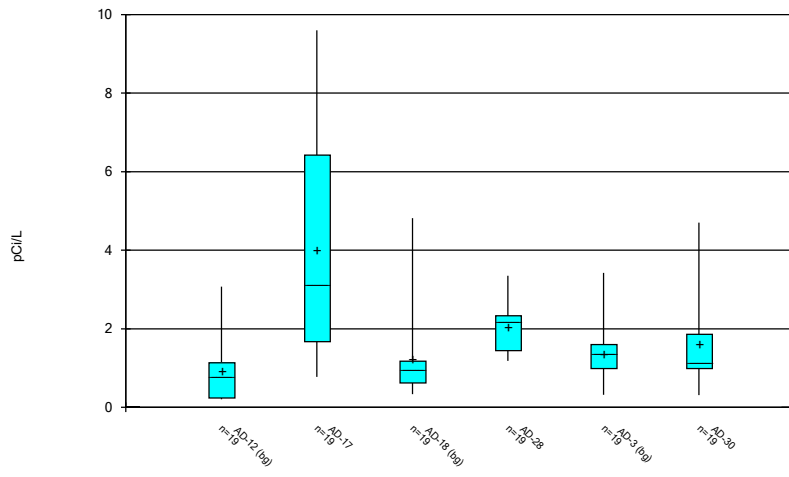
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Box & Whiskers Plot



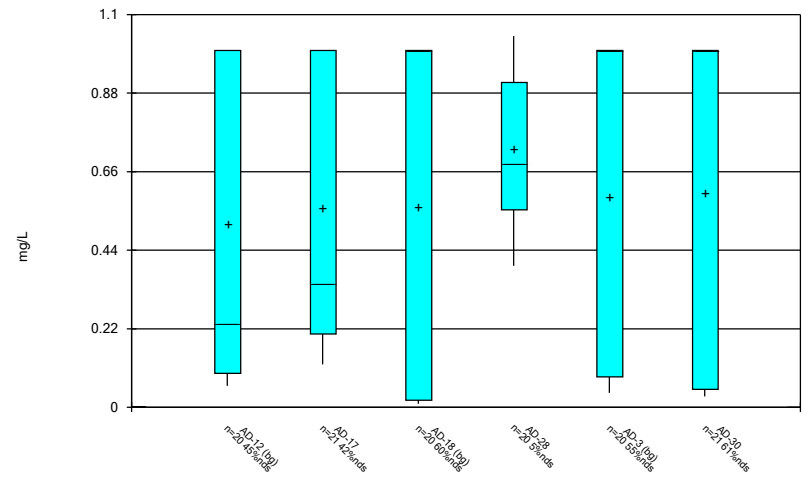
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Box & Whiskers Plot



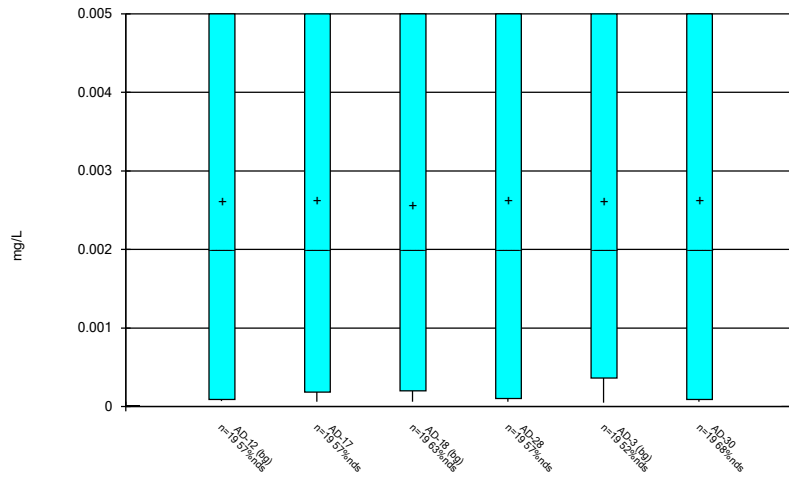
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Box & Whiskers Plot



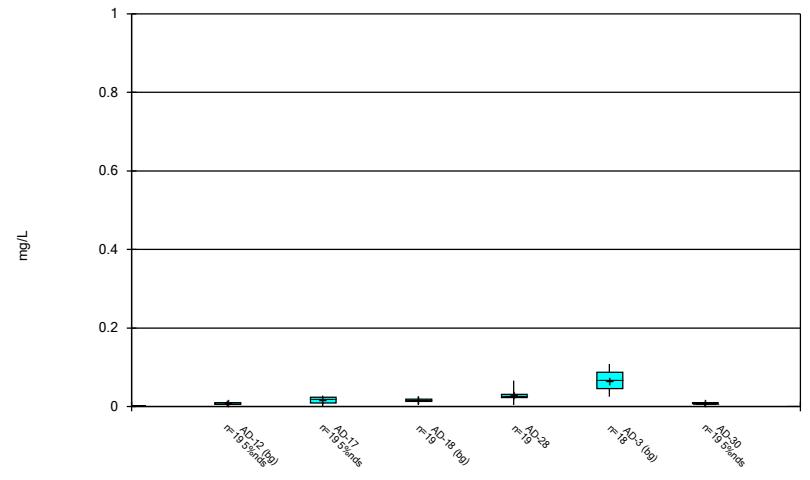
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Box & Whiskers Plot



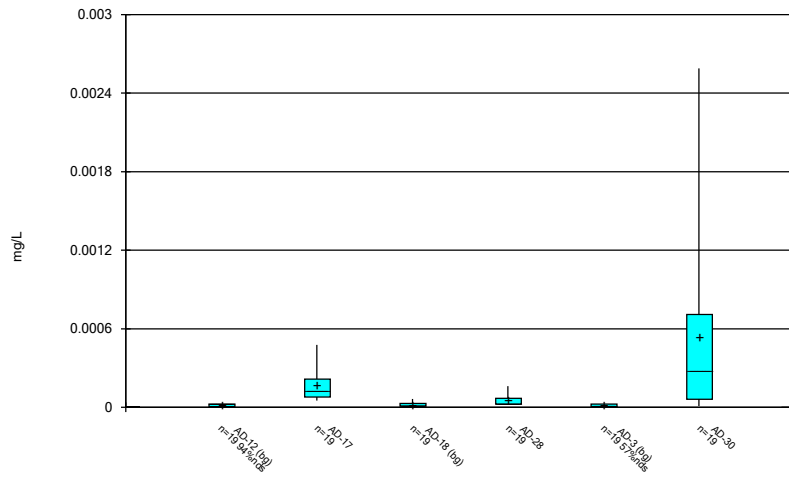
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Box & Whiskers Plot



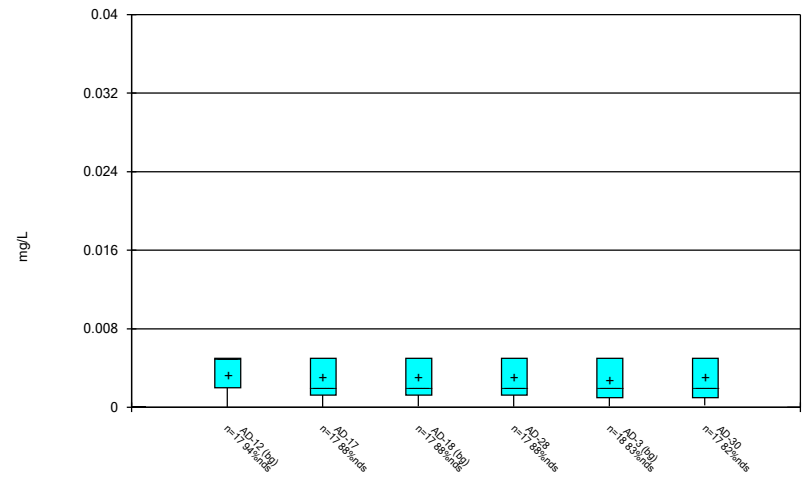
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Box & Whiskers Plot



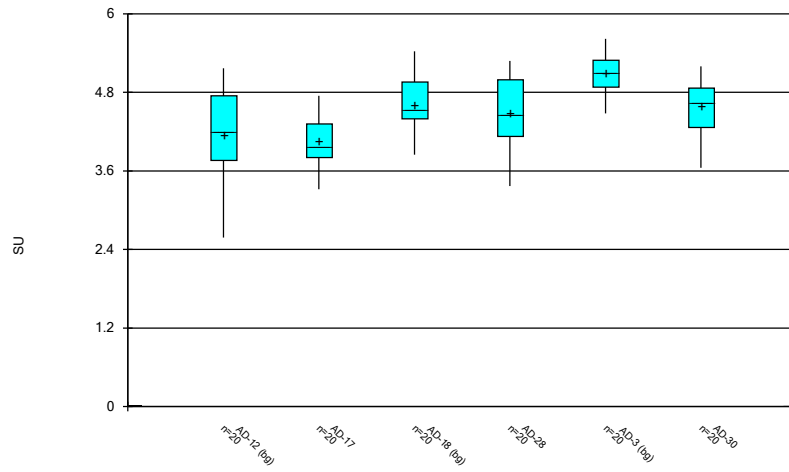
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Box & Whiskers Plot



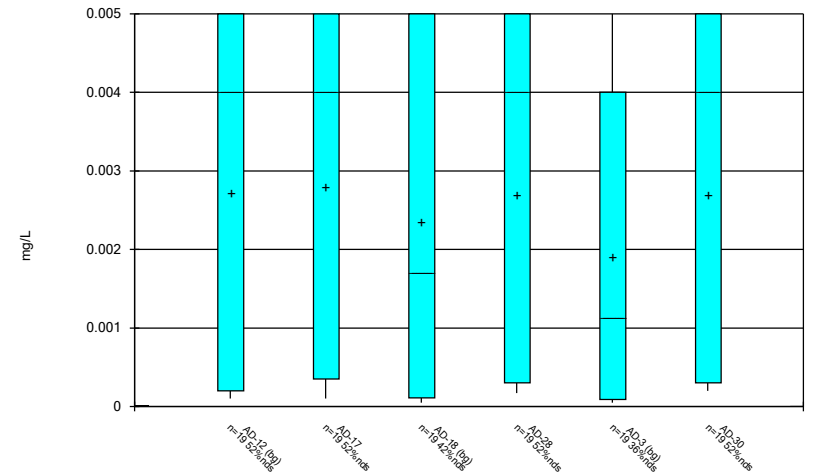
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Box & Whiskers Plot



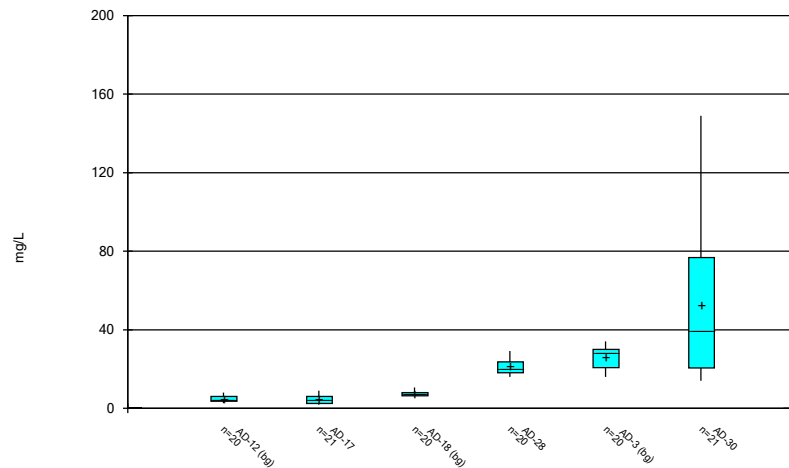
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Box & Whiskers Plot



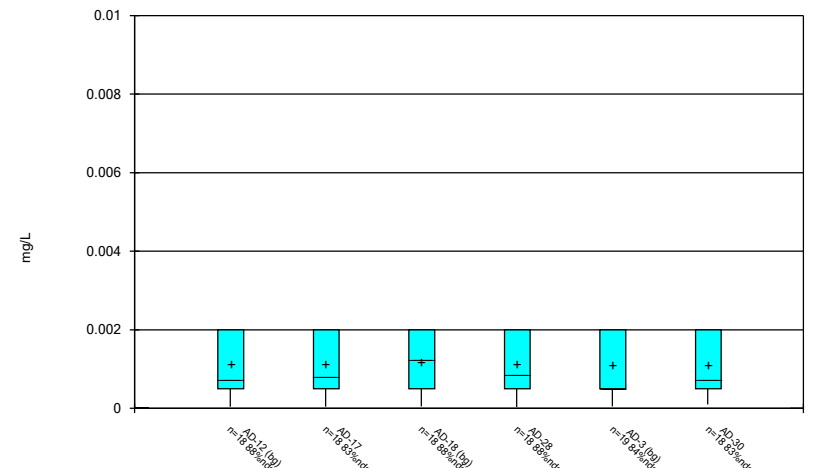
Constituent: Selenium, total Analysis Run 1/24/2022 2:17 PM View: Descriptive
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



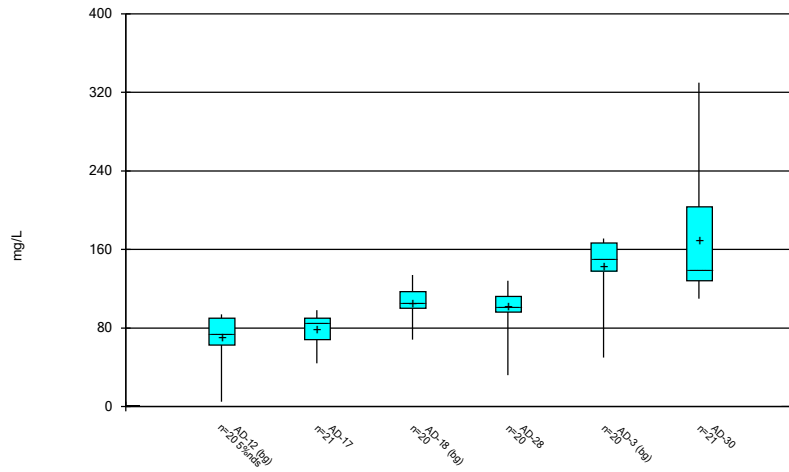
Constituent: Sulfate, total Analysis Run 1/24/2022 2:17 PM View: Descriptive
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



Constituent: Thallium, total Analysis Run 1/24/2022 2:17 PM View: Descriptive
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



Constituent: Total Dissolved Solids [TDS] Analysis Run 1/24/2022 2:17 PM View: Descriptive
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Outlier Summary

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 1/24/2022, 2:19 PM

AD-3 Lithium, total (mg/L)
 AD-12 Molybdenum, total (mg/L)
 AD-17 Molybdenum, total (mg/L)
 AD-18 Molybdenum, total (mg/L)
 AD-28 Molybdenum, total (mg/L)
 AD-3 Molybdenum, total (mg/L)
 AD-30 Molybdenum, total (mg/L)
 AD-12 Thallium, total (mg/L)
 AD-17 Thallium, total (mg/L)
 AD-18 Thallium, total (mg/L)

Date	AD-3 Lithium, total (mg/L)	AD-12 Molybdenum, total (mg/L)	AD-17 Molybdenum, total (mg/L)	AD-18 Molybdenum, total (mg/L)	AD-28 Molybdenum, total (mg/L)	AD-3 Molybdenum, total (mg/L)	AD-30 Molybdenum, total (mg/L)	AD-12 Thallium, total (mg/L)	AD-17 Thallium, total (mg/L)	AD-18 Thallium, total (mg/L)
10/13/2016	0.991 (o)									
2/27/2019		<0.04 (o)			<0.04 (o)			<0.01 (o)		
2/28/2019			<0.04 (o)	<0.04 (o)			<0.04 (o)		<0.01 (o)	<0.01 (o)
5/21/2019		<0.04 (o)								
5/22/2019					<0.04 (o)					
5/23/2019			<0.04 (o)	<0.04 (o)		<0.04 (o)	<0.04 (o)			

AD-28 Thallium, total (mg/L)
 AD-30 Thallium, total (mg/L)

Date	AD-28 Thallium, total (mg/L)	AD-30 Thallium, total (mg/L)
10/13/2016		
2/27/2019	<0.01 (o)	
2/28/2019		<0.01 (o)
5/21/2019		
5/22/2019		
5/23/2019		

Tukey's Outlier Test - Upgradient Wells - Significant Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 1/31/2022, 3:50 PM

Constituent	Well	Outlier	Value(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Beryllium, total (mg/L)	AD-12,AD-18,AD-3	Yes	0.002,0.002,0.002,0.002	NP	NaN	57	0.0003901	0.0005677	normal	ShapiroWilk
Chromium, total (mg/L)	AD-12,AD-18,AD-3	Yes	0.004,0.004,0.004,0.004,0.003	NP	NaN	57	0.0008563	0.001093	normal	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	AD-12,AD-18,AD-3	Yes	4.813	NP	NaN	57	1.17	0.8925	normal	ShapiroWilk
Lithium, total (mg/L)	AD-12,AD-18,AD-3	Yes	0.991	NP	NaN	57	0.04625	0.1305	normal	ShapiroWilk

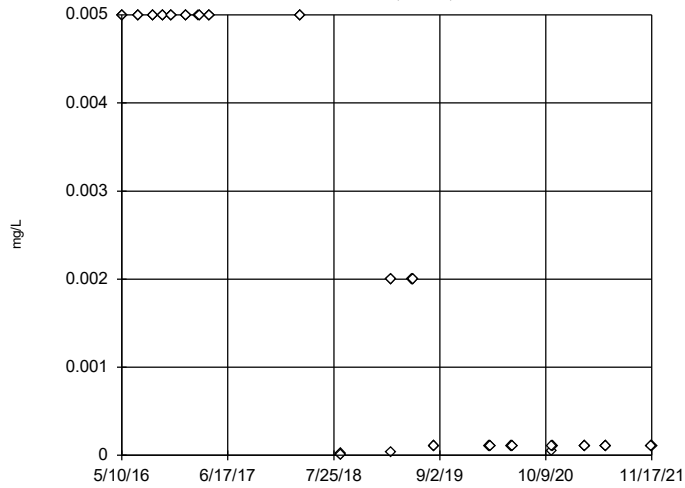
Tukey's Outlier Test - Upgradient Wells - All Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 1/31/2022, 3:50 PM

Constituent	Well	Outlier	Value(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Antimony, total (mg/L)	AD-12,AD-18,AD-3	n/a	n/a	NP	NaN	57	0.002581	0.002373	unknown	ShapiroWilk
Arsenic, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	NP	NaN	57	0.002629	0.002141	normal	ShapiroWilk
Barium, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	NP	NaN	57	0.06451	0.03549	normal	ShapiroWilk
Beryllium, total (mg/L)	AD-12,AD-18,AD-3	Yes	0.002,0.002,0.002,0.002	NP	NaN	57	0.0003901	0.0005677	normal	ShapiroWilk
Boron, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	NP	NaN	60	0.03613	0.02027	normal	ShapiroWilk
Cadmium, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	NP	NaN	57	0.0005262	0.0004872	normal	ShapiroWilk
Chloride, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	NP	NaN	60	6.803	1.259	normal	ShapiroWilk
Chromium, total (mg/L)	AD-12,AD-18,AD-3	Yes	0.004,0.004,0.004,0.004,0.003	NP	NaN	57	0.0008563	0.001093	normal	ShapiroWilk
Cobalt, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	NP	NaN	57	0.002523	0.002115	normal	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	AD-12,AD-18,AD-3	Yes	4.813	NP	NaN	57	1.17	0.8925	normal	ShapiroWilk
Fluoride, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	NP	NaN	60	0.555	0.4658	normal	ShapiroWilk
Lead, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	NP	NaN	57	0.002601	0.002342	normal	ShapiroWilk
Lithium, total (mg/L)	AD-12,AD-18,AD-3	Yes	0.991	NP	NaN	57	0.04625	0.1305	normal	ShapiroWilk
Mercury, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	NP	NaN	57	0.00001694	0.00001133	normal	ShapiroWilk
Molybdenum, total (mg/L)	AD-12,AD-18,AD-3	n/a	n/a	NP	NaN	57	0.006273	0.01071	unknown	ShapiroWilk
Selenium, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	NP	NaN	57	0.002321	0.002169	normal	ShapiroWilk
Thallium, total (mg/L)	AD-12,AD-18,AD-3	n/a	n/a	NP	NaN	57	0.001451	0.001829	unknown	ShapiroWilk

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-3



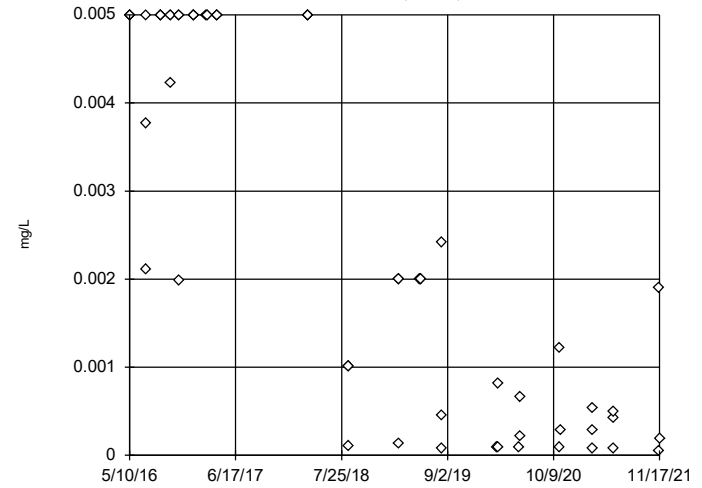
n = 57

No outliers found.
 Tukey's method selected by user.
 The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Constituent: Antimony, total Analysis Run 1/31/2022 3:47 PM View: All + AIV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-3



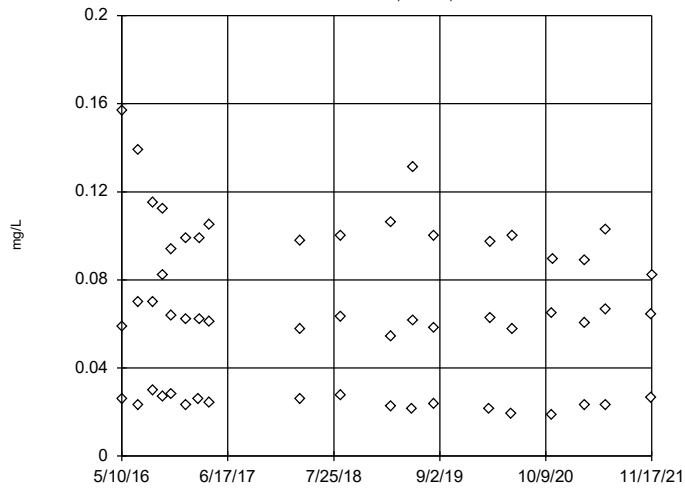
n = 57

No outliers found.
 Tukey's method selected by user.
 High cutoff = 0.01893,
 low cutoff = -0.01358,
 based on IQR multiplier of 3.

Constituent: Arsenic, total Analysis Run 1/31/2022 3:47 PM View: All + AIV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-3



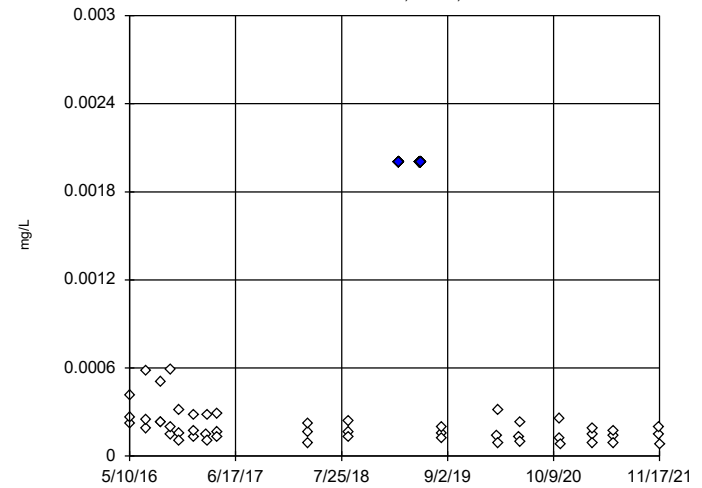
n = 57

No outliers found.
 Tukey's method selected by user.
 High cutoff = 0.3111,
 low cutoff = -0.1874,
 based on IQR multiplier of 3.

Constituent: Barium, total Analysis Run 1/31/2022 3:47 PM View: All + AIV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-3



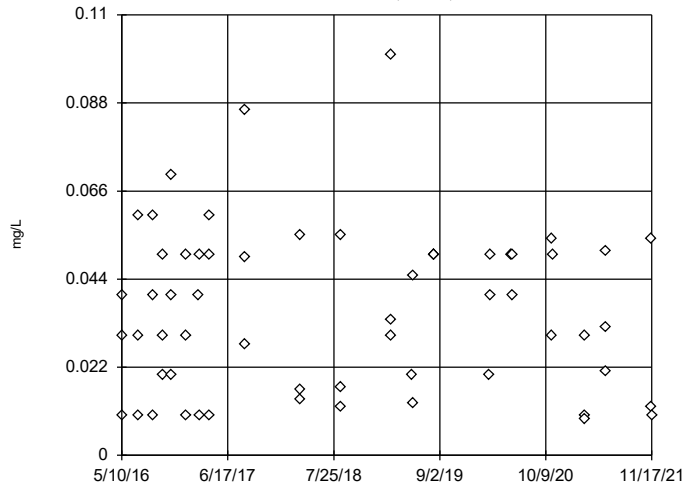
n = 57

Outliers are drawn as solid.
 Tukey's method selected by user.
 High cutoff = 0.0007302,
 low cutoff = -0.0003181,
 based on IQR multiplier of 3.

Constituent: Beryllium, total Analysis Run 1/31/2022 3:47 PM View: All + AIV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-3

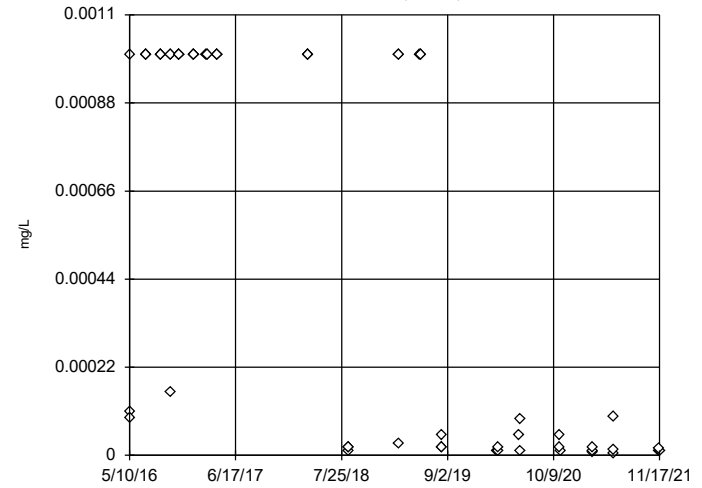


n = 60
 No outliers found.
 Tukey's method selected by user.
 High cutoff = 0.1445,
 low cutoff = -0.076, based
 on IQR multiplier of 3.

Constituent: Boron, total Analysis Run 1/31/2022 3:47 PM View: All + AIV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-3

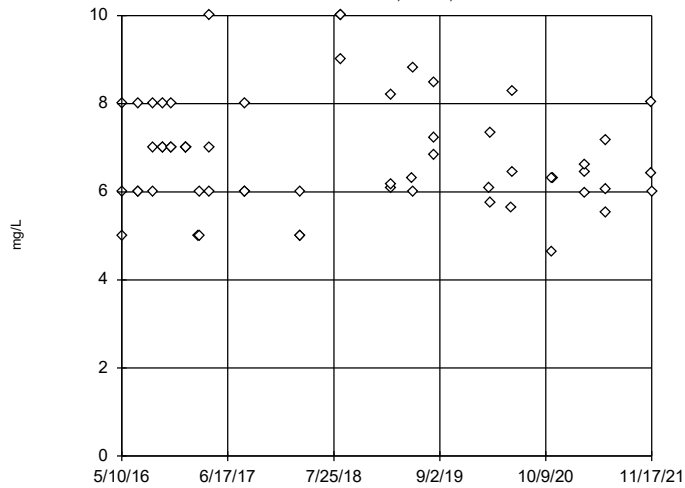


n = 57
 No outliers found.
 Tukey's method selected by user.
 High cutoff = 0.00394,
 low cutoff = -0.00292,
 based on IQR multiplier
 of 3.

Constituent: Cadmium, total Analysis Run 1/31/2022 3:47 PM View: All + AIV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-3

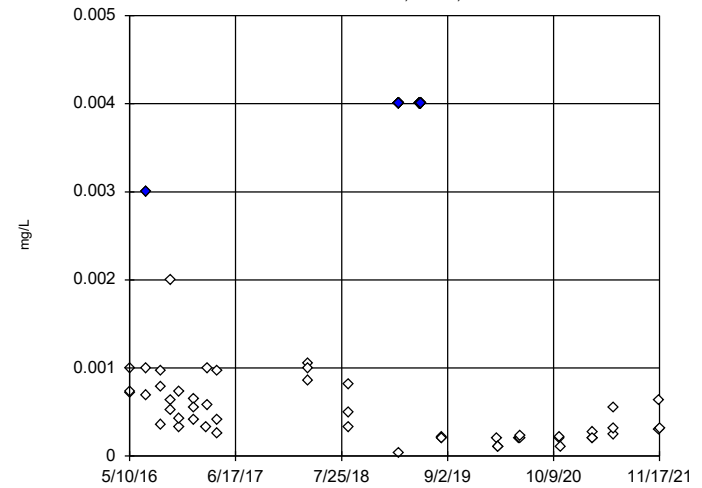


n = 60
 No outliers found.
 Tukey's method selected by user.
 High cutoff = 12.68,
 low cutoff = 0.99, based on
 IQR multiplier of 3.

Constituent: Chloride, total Analysis Run 1/31/2022 3:47 PM View: All + AIV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-3

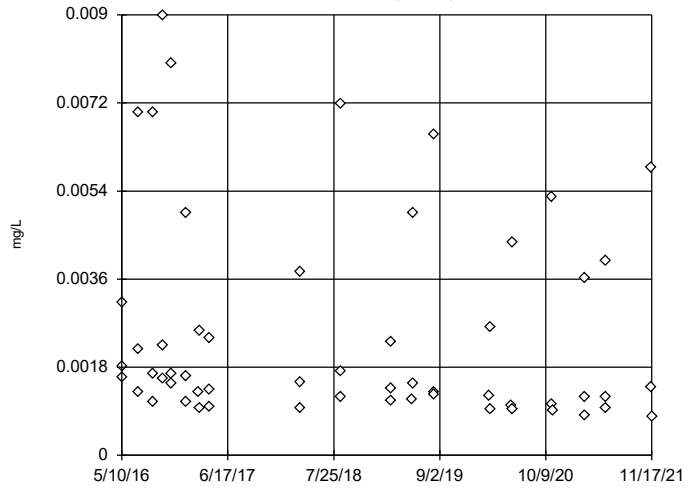


n = 57
 Outliers are drawn as
 solid.
 Tukey's method selected
 by user.
 High cutoff = 0.002986,
 low cutoff = -0.00185,
 based on IQR multiplier
 of 3.

Constituent: Chromium, total Analysis Run 1/31/2022 3:47 PM View: All + AIV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-3

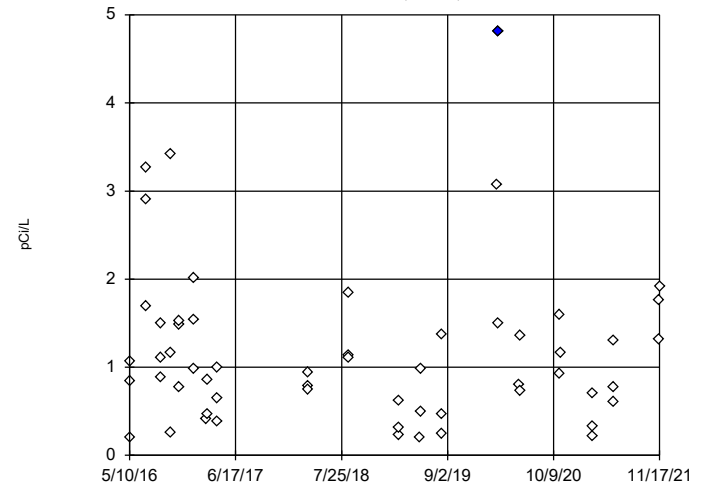


n = 57
 No outliers found.
 Tukey's method selected by user.
 High cutoff = 0.01013,
 low cutoff = -0.005619,
 based on IQR multiplier of 3.

Constituent: Cobalt, total Analysis Run 1/31/2022 3:47 PM View: AIII + AIV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-3

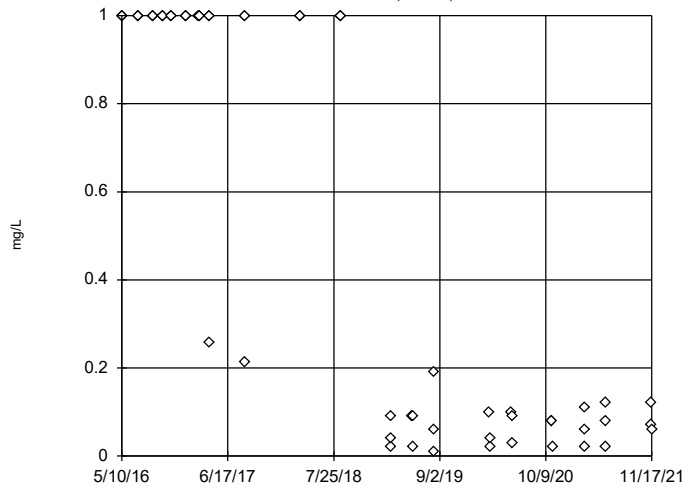


n = 57
 Outlier is drawn as solid.
 Tukey's method selected by user.
 High cutoff = 4.168, low cutoff = -2.063,
 based on IQR multiplier of 3.

Constituent: Combined Radium 226 + 228 Analysis Run 1/31/2022 3:47 PM View: AIII + AIV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-3

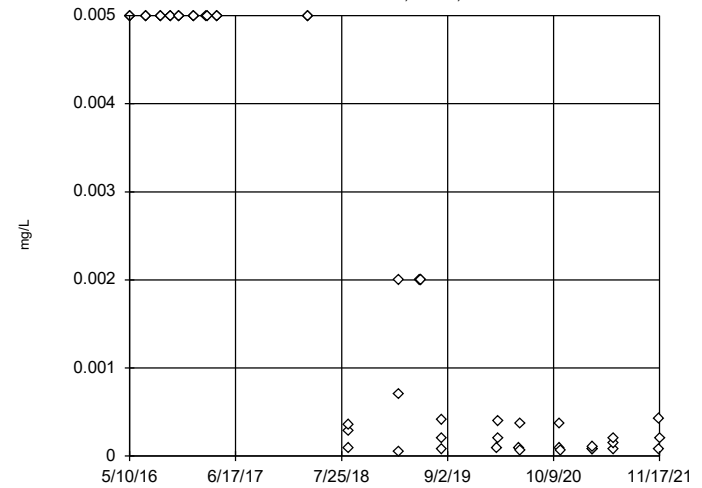


n = 60
 No outliers found.
 Tukey's method selected by user.
 High cutoff = 3.76, low cutoff = -2.68,
 based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 1/31/2022 3:47 PM View: AIII + AIV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-3

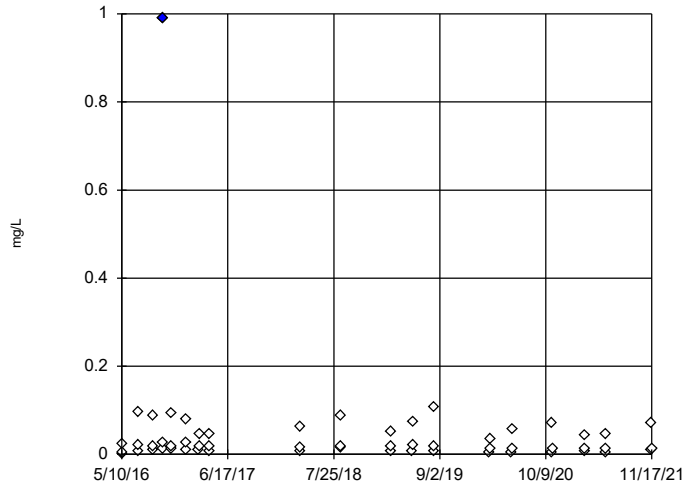


n = 57
 No outliers found.
 Tukey's method selected by user.
 High cutoff = 0.01947,
 low cutoff = -0.0143,
 based on IQR multiplier of 3.

Constituent: Lead, total Analysis Run 1/31/2022 3:47 PM View: AIII + AIV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-3

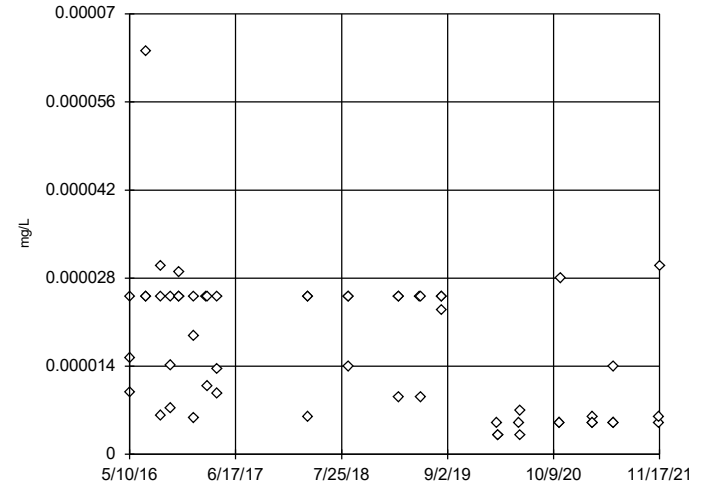


n = 57
 Outlier is drawn as solid.
 Tukey's method selected by user.
 High cutoff = 0.1555,
 low cutoff = -0.1, based
 on IQR multiplier of 3.

Constituent: Lithium, total Analysis Run 1/31/2022 3:47 PM View: All + AIV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-3

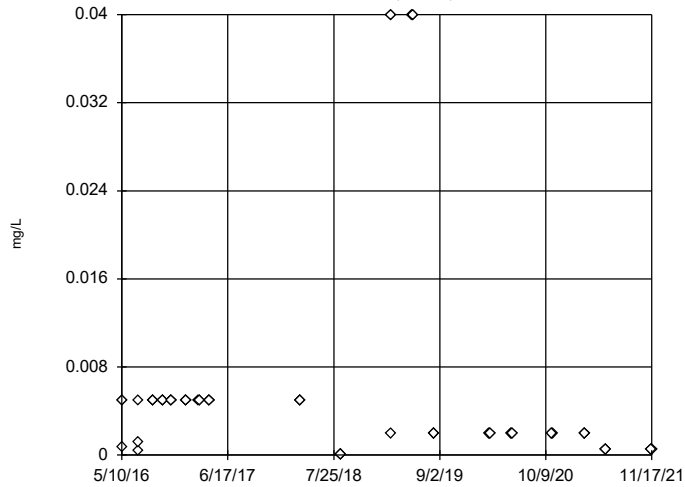


n = 57
 No outliers found.
 Tukey's method selected by user.
 High cutoff = 0.000082,
 low cutoff = -0.000051,
 based on IQR multiplier of 3.

Constituent: Mercury, total Analysis Run 1/31/2022 3:47 PM View: All + AIV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-3

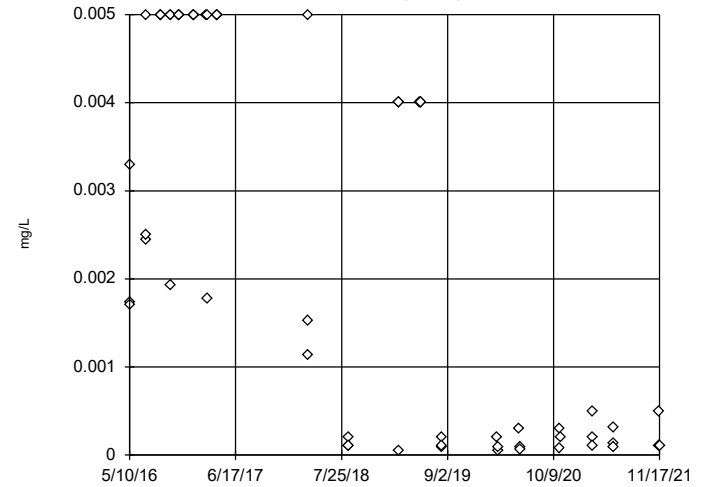


n = 57
 No outliers found.
 Tukey's method selected by user.
 The results were invalidated,
 because both the lower and upper
 quartiles represent reporting limits.

Constituent: Molybdenum, total Analysis Run 1/31/2022 3:47 PM View: All + AIV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

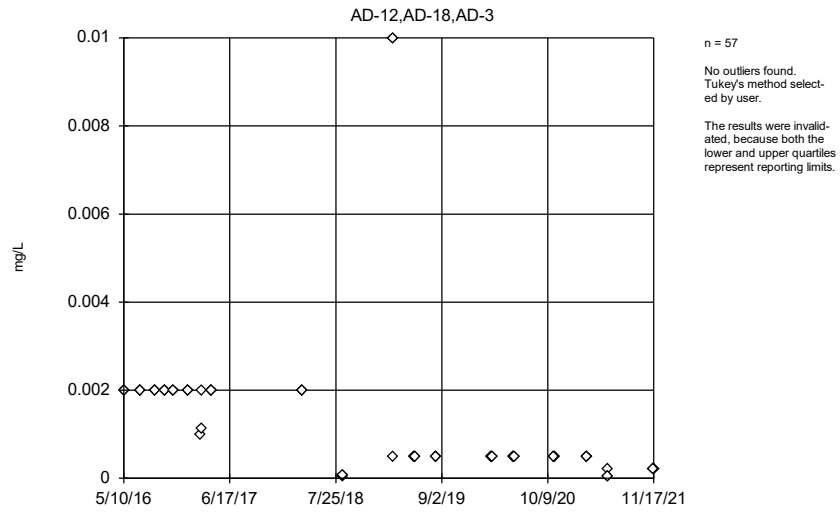
AD-12,AD-18,AD-3



n = 57
 No outliers found.
 Tukey's method selected by user.
 High cutoff = 0.01964,
 low cutoff = -0.01452,
 based on IQR multiplier of 3.

Constituent: Selenium, total Analysis Run 1/31/2022 3:47 PM View: All + AIV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background



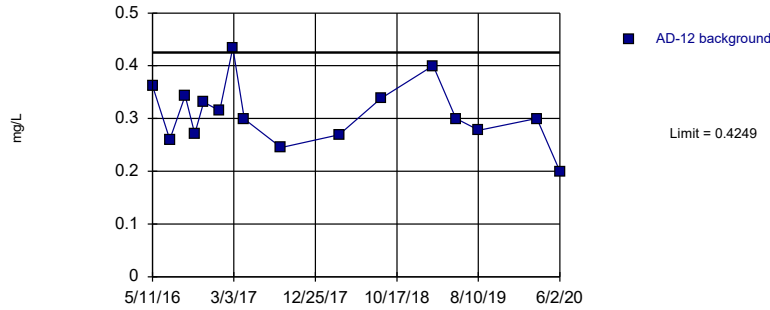
Constituent: Thallium, total Analysis Run 1/31/2022 3:47 PM View: All + AIV
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Intrawell Prediction Limits - All Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 2/24/2022, 3:51 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg	N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Calcium, total (mg/L)	AD-12	0.4249	n/a	n/a	1 future	n/a	16	0.3091	0.05881	0	None	No	No	0.002505	Param Intra 1 of 2
Calcium, total (mg/L)	AD-17	1.63	n/a	n/a	1 future	n/a	16	0.7217	0.4613	0	None	No	No	0.002505	Param Intra 1 of 2
Calcium, total (mg/L)	AD-18	0.7184	n/a	n/a	1 future	n/a	16	0.4226	0.1501	0	None	No	No	0.002505	Param Intra 1 of 2
Calcium, total (mg/L)	AD-28	3.21	n/a	n/a	1 future	n/a	17	n/a	n/a	0	n/a	n/a	n/a	0.005914	NP Intra (normality) 1 of 2
Calcium, total (mg/L)	AD-3	6.132	n/a	n/a	1 future	n/a	16	3.941	1.112	0	None	No	No	0.002505	Param Intra 1 of 2
Calcium, total (mg/L)	AD-30	1.74	n/a	n/a	1 future	n/a	17	n/a	n/a	0	n/a	n/a	n/a	0.005914	NP Intra (normality) 1 of 2
pH, field (SU)	AD-12	5.63	2.743	n/a	1 future	n/a	16	4.186	0.7328	0	None	No	No	0.001253	Param Intra 1 of 2
pH, field (SU)	AD-17	4.831	3.318	n/a	1 future	n/a	16	4.074	0.384	0	None	No	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	No	0.001253	Param Intra 1 of 2
pH, field (SU)	AD-28	5.633	3.514	n/a	1 future	n/a	16	4.574	0.5378	0	None	No	No	0.001253	Param Intra 1 of 2
pH, field (SU)	AD-3	5.77	4.47	n/a	1 future	n/a	16	5.12	0.33	0	None	No	No	0.001253	Param Intra 1 of 2
pH, field (SU)	AD-30	5.377	4.016	n/a	1 future	n/a	16	4.696	0.3454	0	None	No	No	0.001253	Param Intra 1 of 2
Sulfate, total (mg/L)	AD-12	7.976	n/a	n/a	1 future	n/a	16	4.8	1.612	0	None	No	No	0.002505	Param Intra 1 of 2
Sulfate, total (mg/L)	AD-17	9.053	n/a	n/a	1 future	n/a	17	4.924	2.117	0	None	No	No	0.002505	Param Intra 1 of 2
Sulfate, total (mg/L)	AD-18	10.5	n/a	n/a	1 future	n/a	16	7.606	1.469	0	None	No	No	0.002505	Param Intra 1 of 2
Sulfate, total (mg/L)	AD-28	27.24	n/a	n/a	1 future	n/a	16	20.28	3.535	0	None	No	No	0.002505	Param Intra 1 of 2
Sulfate, total (mg/L)	AD-3	37.21	n/a	n/a	1 future	n/a	16	25.47	5.962	0	None	No	No	0.002505	Param Intra 1 of 2
Sulfate, total (mg/L)	AD-30	31.56	n/a	n/a	1 future	n/a	8	19.25	5.007	0	None	No	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids [TDS] (mg/L)	AD-12	117.6	n/a	n/a	1 future	n/a	16	69.5	24.43	6.25	None	No	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids [TDS] (mg/L)	AD-17	110.9	n/a	n/a	1 future	n/a	17	80.06	15.83	0	None	No	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids [TDS] (mg/L)	AD-18	140.6	n/a	n/a	1 future	n/a	16	106.4	17.36	0	None	No	No	0.002505	Param Intra 1 of 2
Total Dissolved Solids [TDS] (mg/L)	AD-28	133.4	n/a	n/a	1 future	n/a	16	10519	3698	0	None	x^2	0.002505	Param Intra 1 of 2	
Total Dissolved Solids [TDS] (mg/L)	AD-3	191.8	n/a	n/a	1 future	n/a	16	20718	8150	0	None	x^2	0.002505	Param Intra 1 of 2	
Total Dissolved Solids [TDS] (mg/L)	AD-30	206.4	n/a	n/a	1 future	n/a	17	145.8	31.08	0	None	No	No	0.002505	Param Intra 1 of 2

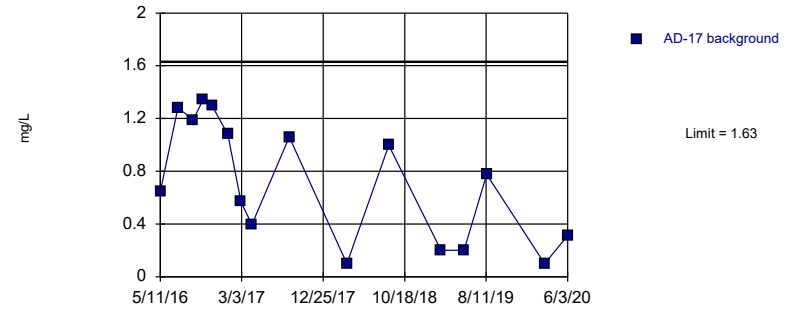
Prediction Limit
Intrawell Parametric, AD-12 (bg)



Background Data Summary: Mean=0.3091, Std. Dev.=0.05881, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9788, 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: Calcium, total Analysis Run 2/24/2022 3:36 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

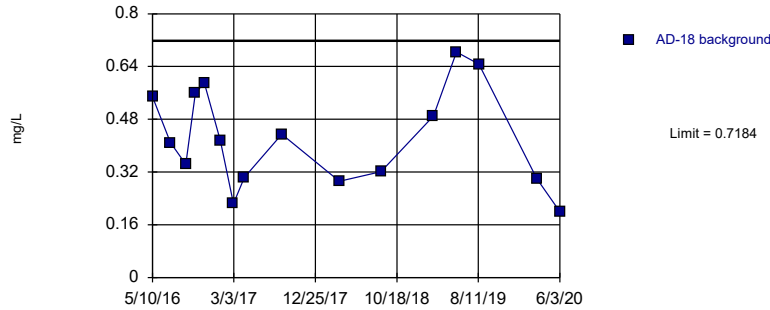
Prediction Limit
Intrawell Parametric, AD-17



Background Data Summary: Mean=0.7217, Std. Dev.=0.4613, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8976, 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: Calcium, total Analysis Run 2/24/2022 3:36 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

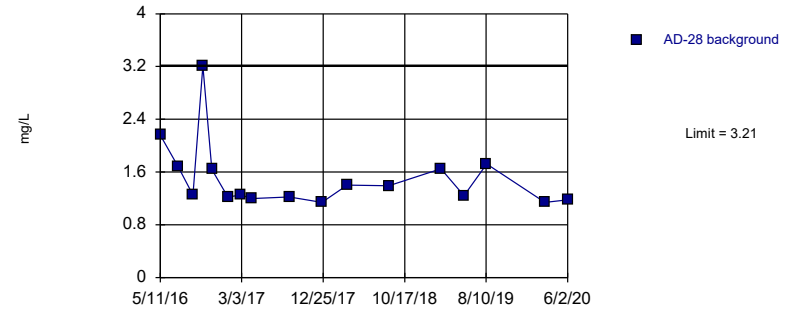
Prediction Limit
Intrawell Parametric, AD-18 (bg)



Background Data Summary: Mean=0.4226, Std. Dev.=0.1501, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9519, 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: Calcium, total Analysis Run 2/24/2022 3:36 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

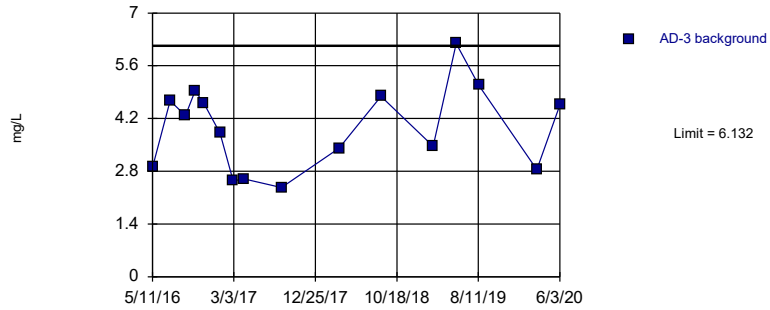
Prediction Limit
Intrawell Non-parametric, AD-28



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 17 background values. Well-constituent pair annual alpha = 0.01179. Individual comparison alpha = 0.005914 (1 of 2). Assumes 1 future value.

Constituent: Calcium, total Analysis Run 2/24/2022 3:36 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

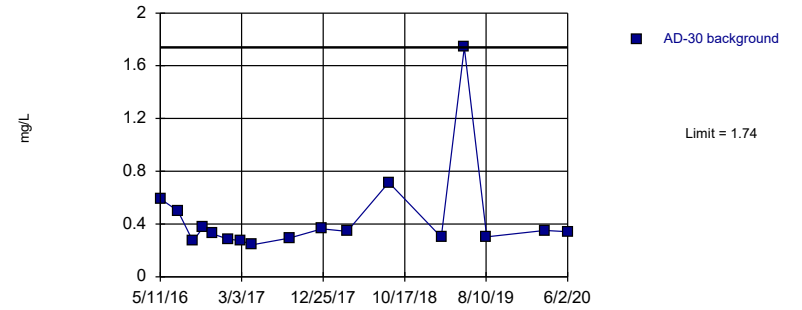
Prediction Limit
Intrawell Parametric, AD-3 (bg)



Background Data Summary: Mean=3.941, Std. Dev.=1.112, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9416, 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: Calcium, total Analysis Run 2/24/2022 3:36 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

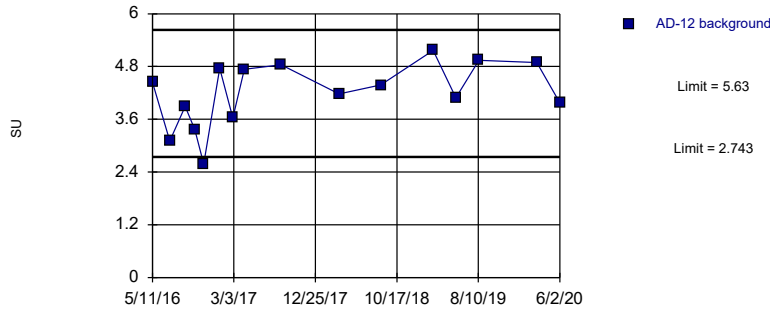
Prediction Limit
Intrawell Non-parametric, AD-30



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 17 background values. Well-constituent pair annual alpha = 0.01179. Individual comparison alpha = 0.005914 (1 of 2). Assumes 1 future value.

Constituent: Calcium, total Analysis Run 2/24/2022 3:36 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

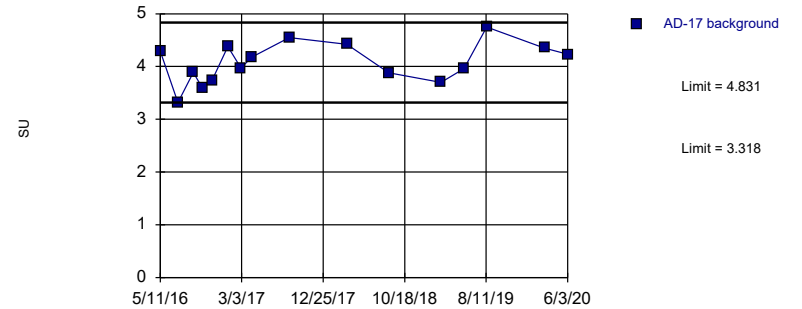
Prediction Limit
Intrawell Parametric, AD-12 (bg)



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

Constituent: pH, field Analysis Run 2/24/2022 3:36 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

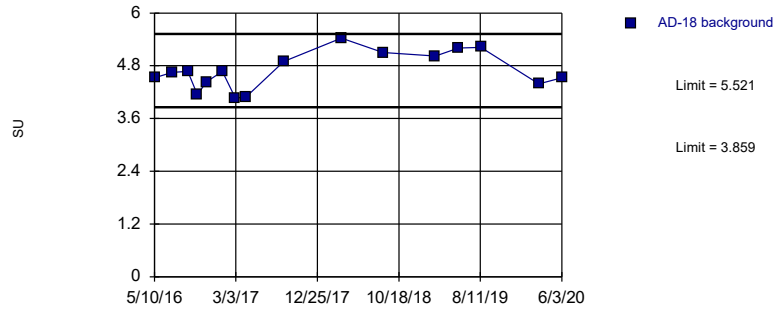
Prediction Limit
Intrawell Parametric, AD-17



Background Data Summary: Mean=4.074, Std. Dev.=0.384, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9834, 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 2/24/2022 3:36 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

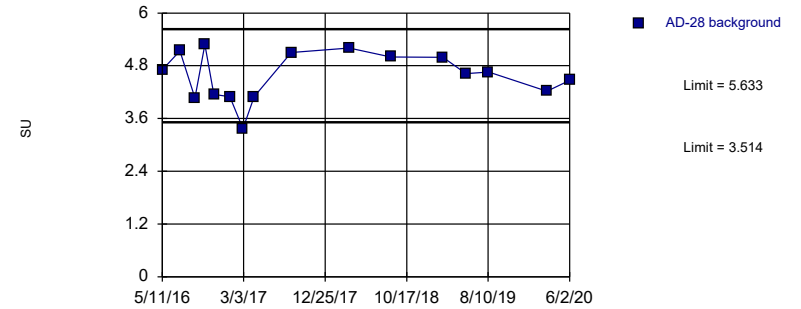
Prediction Limit
Intrawell Parametric, AD-18 (bg)



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

Constituent: pH, field Analysis Run 2/24/2022 3:36 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

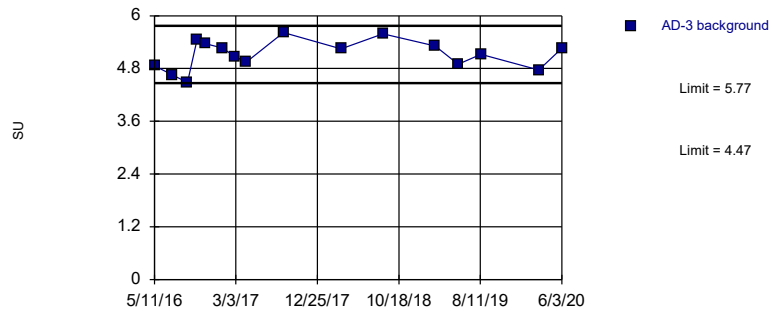
Prediction Limit
Intrawell Parametric, AD-28



Background Data Summary: Mean=4.574, Std. Dev.=0.5378, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9302, 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 2/24/2022 3:36 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

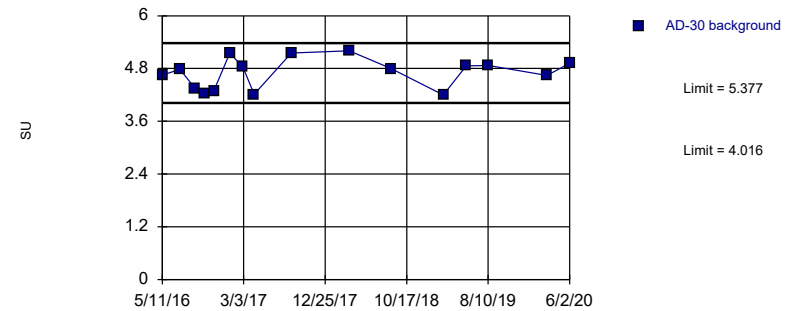
Prediction Limit
Intrawell Parametric, AD-3 (bg)



Background Data Summary: Mean=5.12, Std. Dev.=0.33, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.971, 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 2/24/2022 3:36 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

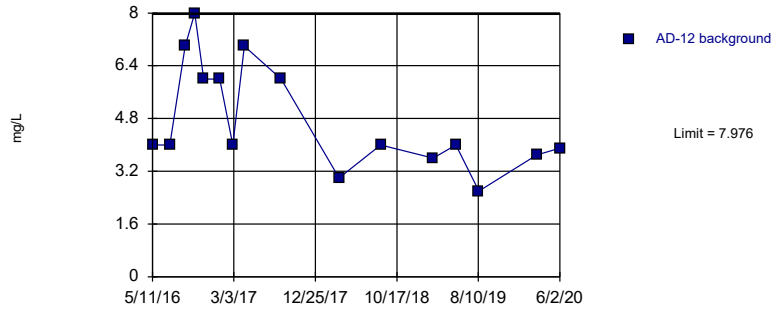
Prediction Limit
Intrawell Parametric, AD-30



Background Data Summary: Mean=4.696, Std. Dev.=0.3454, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9083, 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 2/24/2022 3:36 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

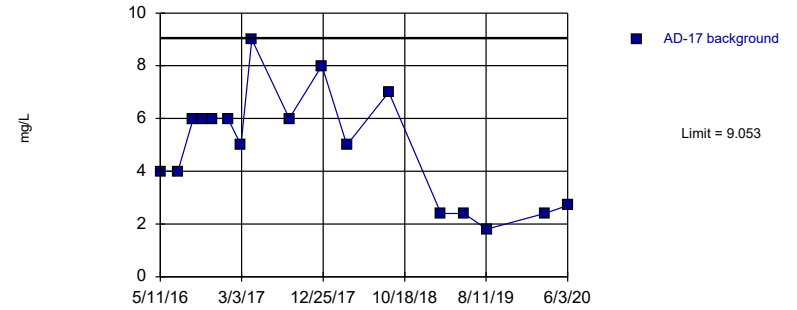
Prediction Limit
Intrawell Parametric, AD-12 (bg)



Background Data Summary: Mean=4.8, Std. Dev.=1.612, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8792, 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: Sulfate, total Analysis Run 2/24/2022 3:36 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

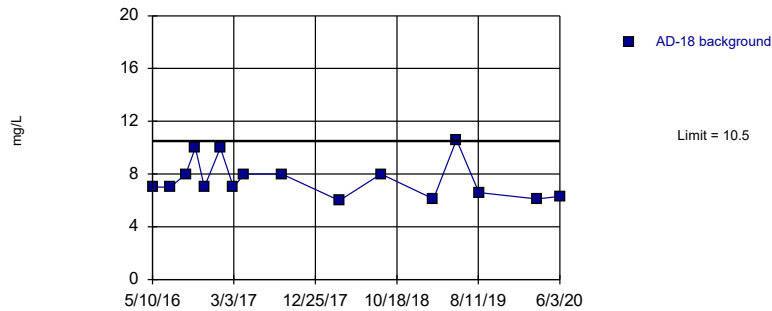
Prediction Limit
Intrawell Parametric, AD-17



Background Data Summary: Mean=4.924, Std. Dev.=2.117, n=17. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9376, critical = 0.851. Kappa = 1.951 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 2/24/2022 3:36 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

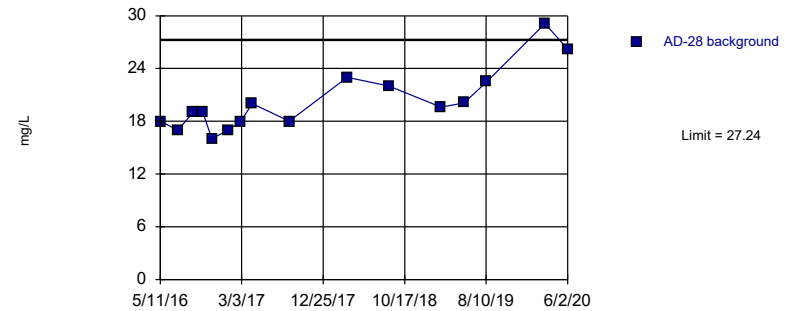
Prediction Limit
Intrawell Parametric, AD-18 (bg)



Background Data Summary: Mean=7.606, Std. Dev.=1.469, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8631, 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: Sulfate, total Analysis Run 2/24/2022 3:36 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

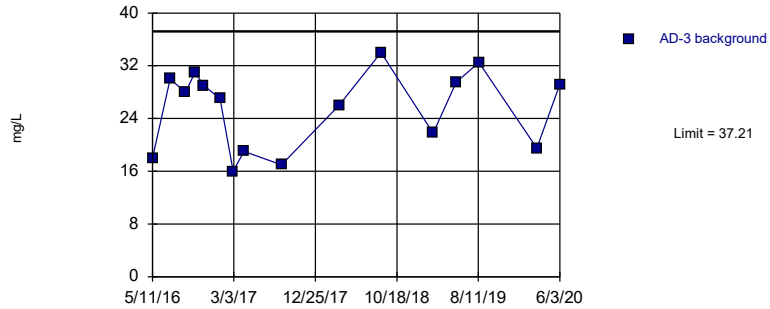
Prediction Limit
Intrawell Parametric, AD-28



Background Data Summary: Mean=20.28, Std. Dev.=3.535, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8875, 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: Sulfate, total Analysis Run 2/24/2022 3:36 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

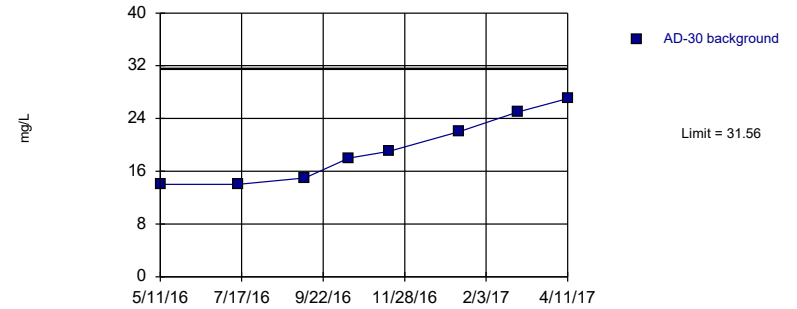
Prediction Limit
Intrawell Parametric, AD-3 (bg)



Background Data Summary: Mean=25.47, Std. Dev.=5.962, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9078, 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: Sulfate, total Analysis Run 2/24/2022 3:36 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

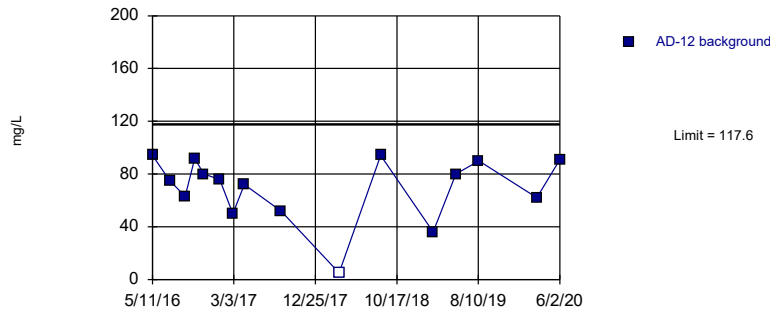
Prediction Limit
Intrawell Parametric, AD-30



Background Data Summary: Mean=19.25, Std. Dev.=5.007, n=8. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9081, critical = 0.749. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Sulfate, total Analysis Run 2/24/2022 3:36 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

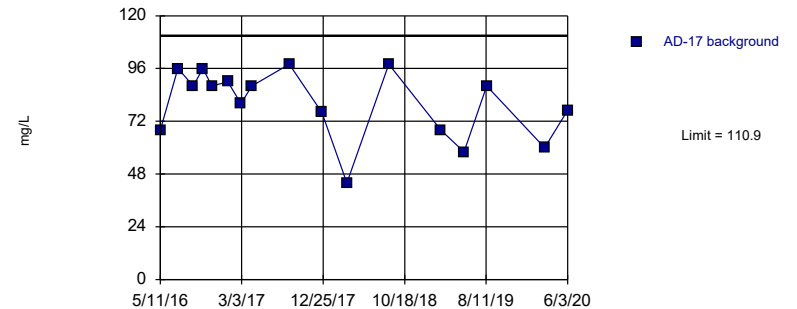
Prediction Limit
Intrawell Parametric, AD-12 (bg)



Background Data Summary: Mean=69.5, Std. Dev.=24.43, n=16, 6.25% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8742, 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: Total Dissolved Solids [TDS] Analysis Run 2/24/2022 3:36 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

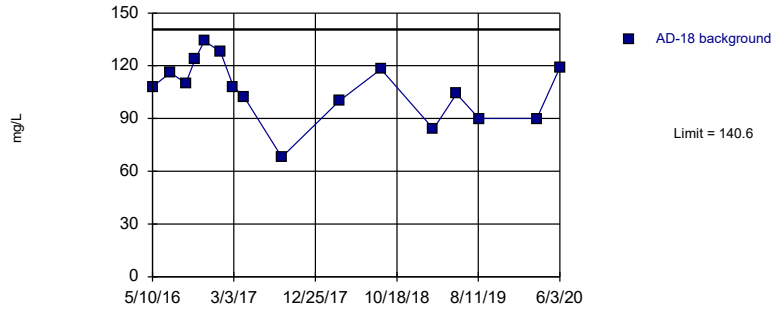
Prediction Limit
Intrawell Parametric, AD-17



Background Data Summary: Mean=80.06, Std. Dev.=15.83, n=17. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9099, critical = 0.851. Kappa = 1.951 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Total Dissolved Solids [TDS] Analysis Run 2/24/2022 3:36 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

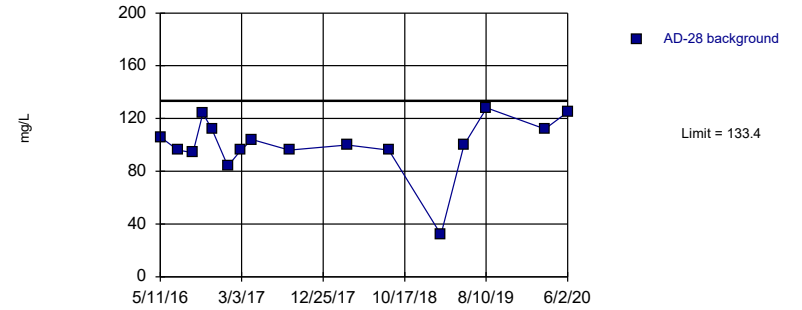
Prediction Limit
Intrawell Parametric, AD-18 (bg)



Background Data Summary: Mean=106.4, Std. Dev.=17.36, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9752, 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: Total Dissolved Solids [TDS] Analysis Run 2/24/2022 3:36 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

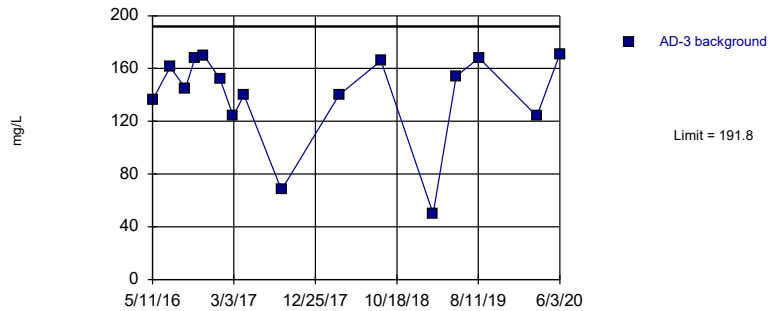
Prediction Limit
Intrawell Parametric, AD-28



Background Data Summary (based on square transformation): Mean=10519, Std. Dev.=3698, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9093, 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: Total Dissolved Solids [TDS] Analysis Run 2/24/2022 3:36 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

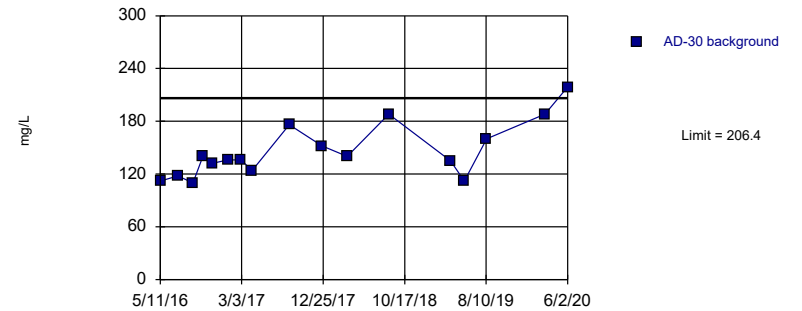
Prediction Limit
Intrawell Parametric, AD-3 (bg)



Background Data Summary (based on square transformation): Mean=20718, Std. Dev.=8150, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8716, 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: Total Dissolved Solids [TDS] Analysis Run 2/24/2022 3:36 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Prediction Limit
Intrawell Parametric, AD-30



Background Data Summary: Mean=145.8, Std. Dev.=31.08, n=17. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9021, critical = 0.851. Kappa = 1.951 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: Total Dissolved Solids [TDS] Analysis Run 2/24/2022 3:36 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Upgradient Trend Test - Significant Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 1/24/2022, 2:41 PM

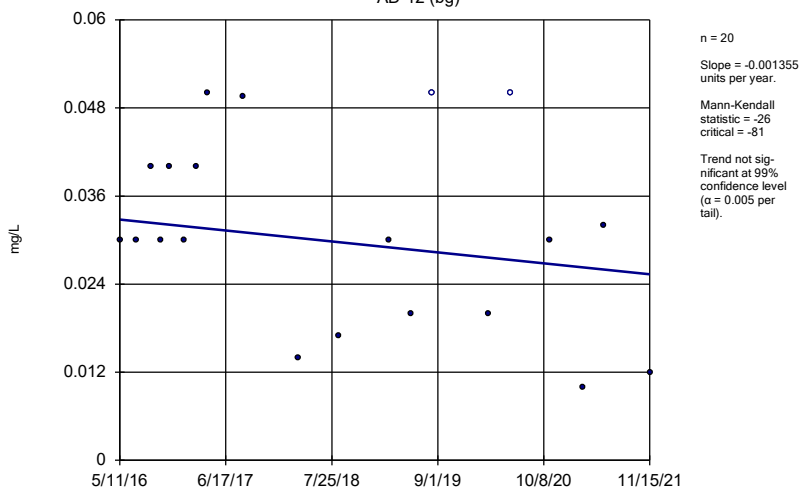
<u>Constituent</u>	<u>Well</u>	<u>Slope</u>	<u>Calc.</u>	<u>Critical</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Normality</u>	<u>Xform</u>	<u>Alpha</u>	<u>Method</u>
Fluoride, total (mg/L)	AD-12 (bg)	-0.1502	-102	-81	Yes	20	45	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	AD-18 (bg)	-0.186	-88	-81	Yes	20	60	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	AD-3 (bg)	-0.1786	-94	-81	Yes	20	55	n/a	n/a	0.01	NP

Upgradient Trend Test - All Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 1/24/2022, 2:41 PM

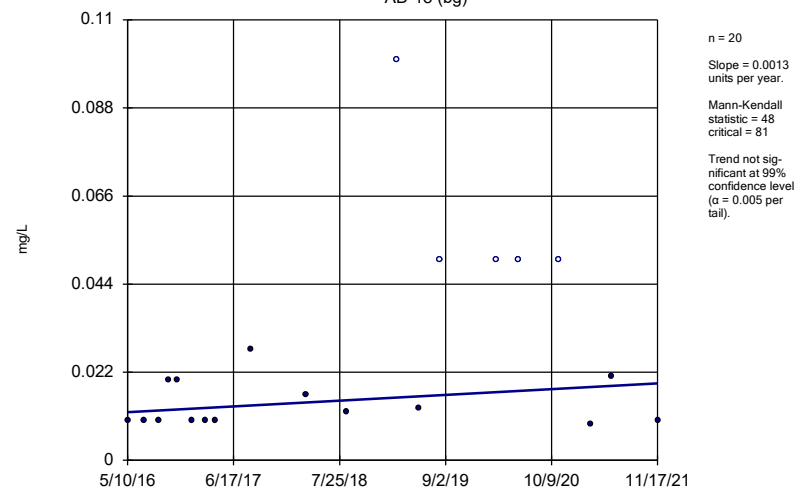
<u>Constituent</u>	<u>Well</u>	<u>Slope</u>	<u>Calc.</u>	<u>Critical</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Normality</u>	<u>Xform</u>	<u>Alpha</u>	<u>Method</u>
Boron, total (mg/L)	AD-12 (bg)	-0.001355	-26	-81	No	20	10	n/a	n/a	0.01	NP
Boron, total (mg/L)	AD-18 (bg)	0.0013	48	81	No	20	25	n/a	n/a	0.01	NP
Boron, total (mg/L)	AD-3 (bg)	-0.001944	-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-3 (bg)	-0.02918	-23	-81	No	20	0	n/a	n/a	0.01	NP
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-3 (bg)	-0.1786	-94	-81	Yes	20	55	n/a	n/a	0.01	NP

Sen's Slope Estimator
AD-12 (bg)



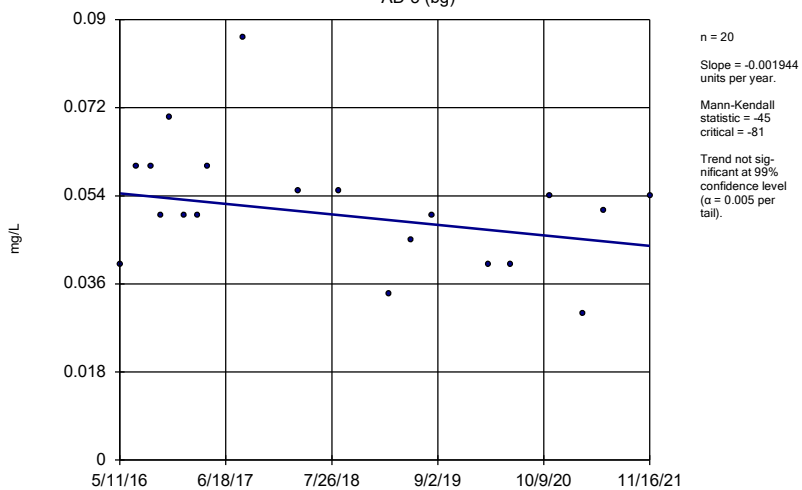
Constituent: Boron, total Analysis Run 1/24/2022 2:39 PM View: All Interwell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Sen's Slope Estimator
AD-18 (bg)



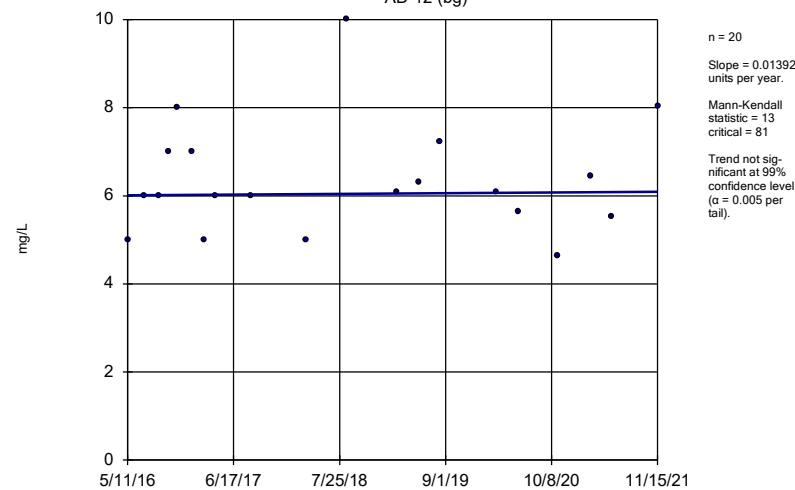
Constituent: Boron, total Analysis Run 1/24/2022 2:39 PM View: All Interwell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Sen's Slope Estimator
AD-3 (bg)



Constituent: Boron, total Analysis Run 1/24/2022 2:39 PM View: All Interwell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

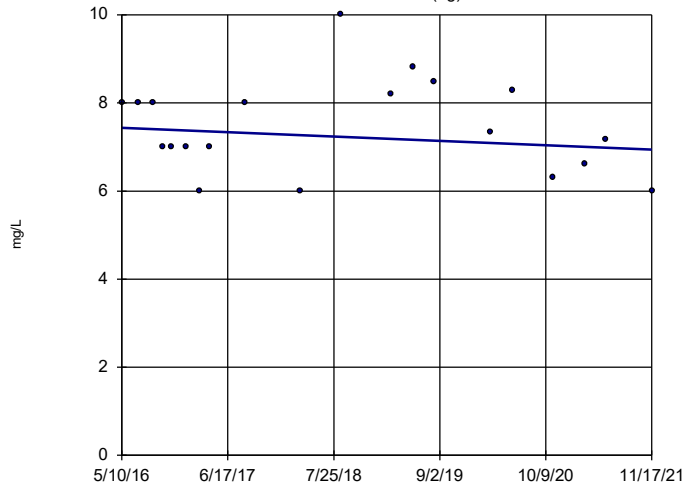
Sen's Slope Estimator
AD-12 (bg)



Constituent: Chloride, total Analysis Run 1/24/2022 2:39 PM View: All Interwell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Sen's Slope Estimator

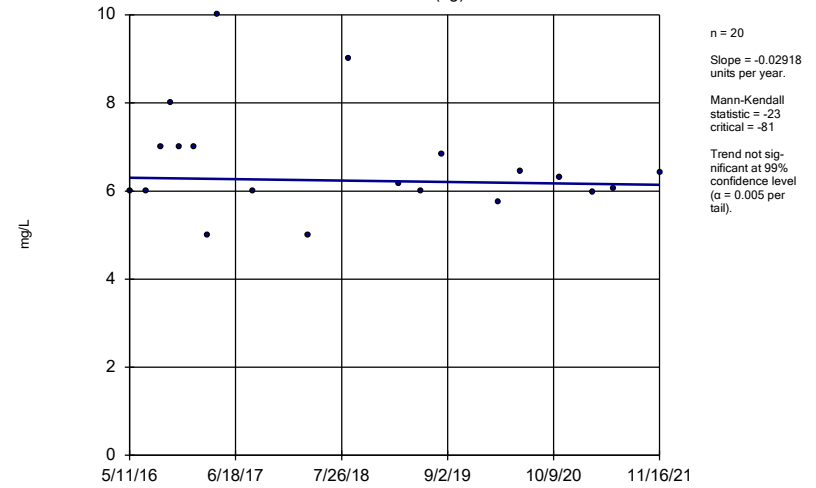
AD-18 (bg)



Constituent: Chloride, total Analysis Run 1/24/2022 2:39 PM View: All Interwell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Sen's Slope Estimator

AD-3 (bg)

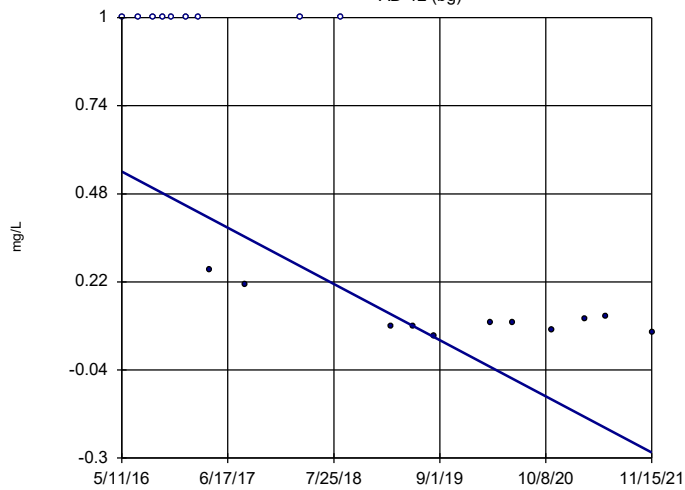


Constituent: Chloride, total Analysis Run 1/24/2022 2:39 PM View: All Interwell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Hollow symbols indicate censored values.

Sen's Slope Estimator

AD-12 (bg)

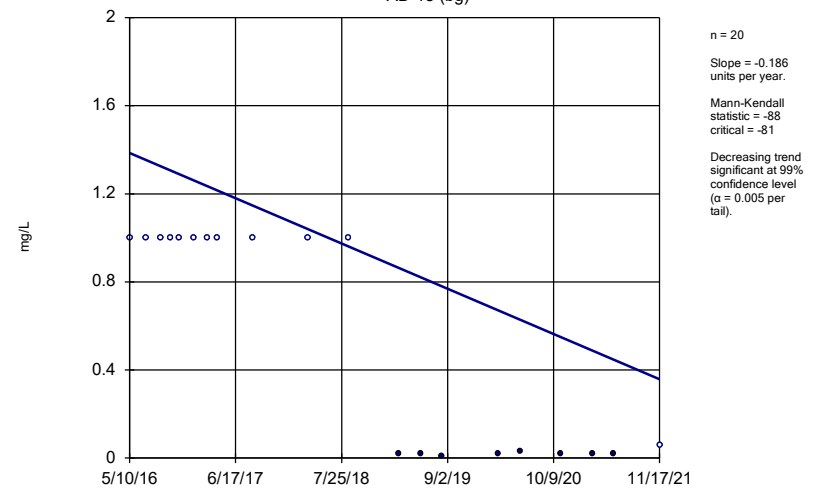


Constituent: Fluoride, total Analysis Run 1/24/2022 2:39 PM View: All Interwell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Hollow symbols indicate censored values.

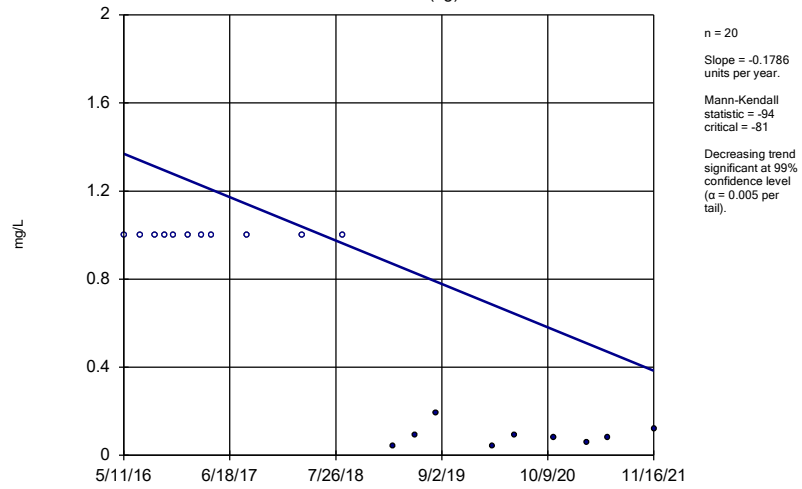
Sen's Slope Estimator

AD-18 (bg)



Constituent: Fluoride, total Analysis Run 1/24/2022 2:39 PM View: All Interwell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Sen's Slope Estimator
AD-3 (bg)



n = 20
Slope = -0.1786
units per year.
Mann-Kendall
statistic = -94
critical = -81
Decreasing trend
significant at 99%
confidence level
($\alpha = 0.005$ per
tail).

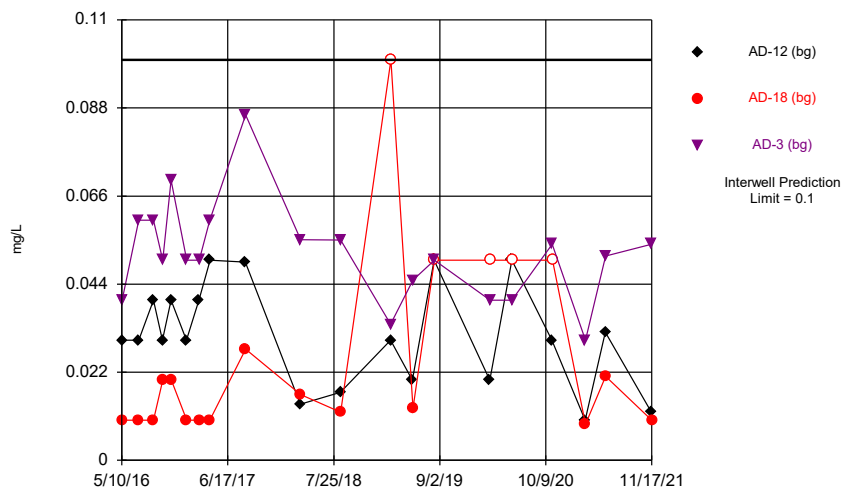
Constituent: Fluoride, total Analysis Run 1/24/2022 2:39 PM View: All Interwell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Interwell Prediction Limits - All Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 2/3/2022, 2:15 PM

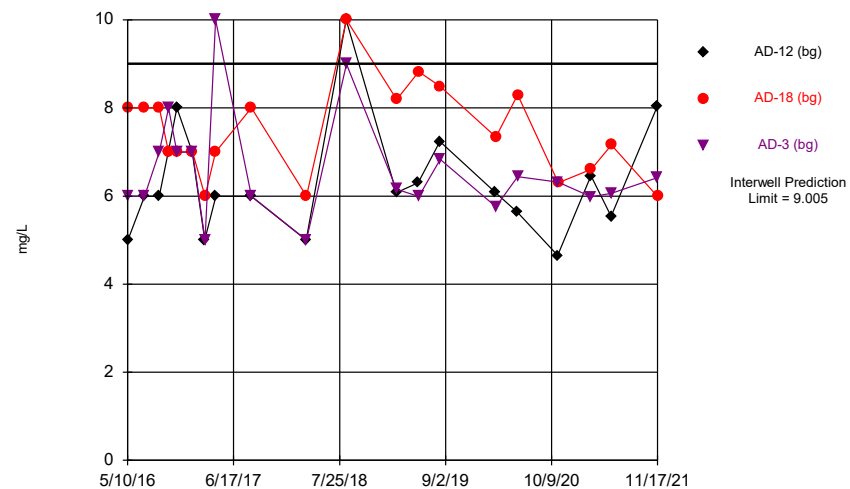
Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bg	N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron, total (mg/L)	n/a	0.1	n/a	n/a	3 future	n/a	60	n/a	n/a	11.67	n/a	n/a	n/a	0.0005253	NP Inter (normality) 1 of 2
Chloride, total (mg/L)	n/a	9.005	n/a	n/a	3 future	n/a	60	2.598	0.2363	0	None	sqrt(x)	0.002505	Param Inter 1 of 2	
Fluoride, total (mg/L)	n/a	1	n/a	n/a	3 future	n/a	60	n/a	n/a	53.33	n/a	n/a	n/a	0.0005253	NP Inter (NDs) 1 of 2

Time Series



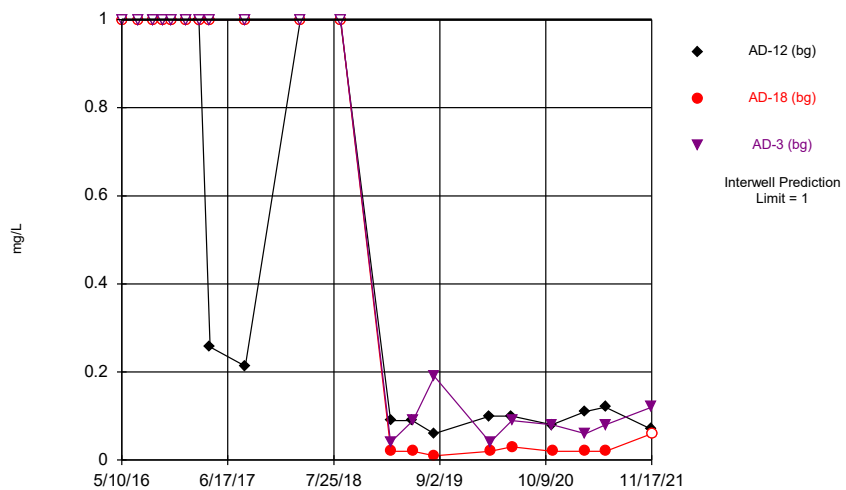
Constituent: Boron, total Analysis Run 2/3/2022 2:17 PM View: Interwell
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



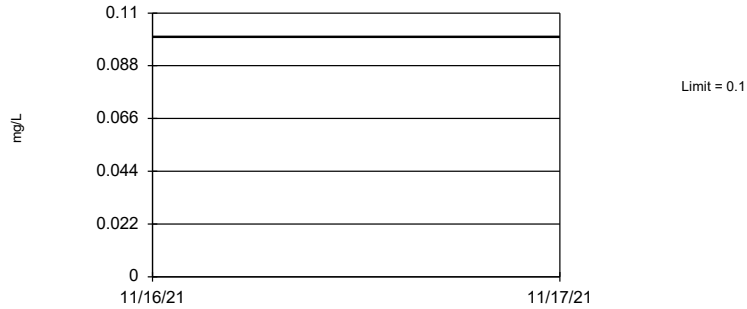
Constituent: Chloride, total Analysis Run 2/3/2022 2:17 PM View: Interwell
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



Constituent: Fluoride, total Analysis Run 2/3/2022 2:17 PM View: Interwell
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

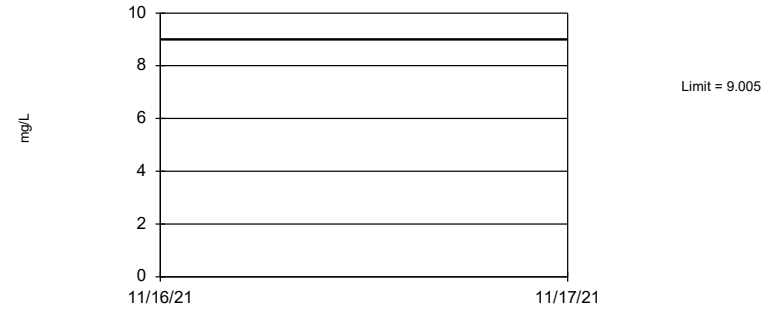
Prediction Limit
Interwell Non-parametric



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. 11.67% NDs. Annual per-constituent alpha = 0.003148. Individual comparison alpha = 0.0005253 (1 of 2). Assumes 3 future values.

Constituent: Boron, total Analysis Run 2/3/2022 2:14 PM View: Interwell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Prediction Limit
Interwell Parametric



Background Data Summary (based on square root transformation): Mean=2.598, Std. Dev.=0.2363, n=60. Normality test: Shapiro Francia @alpha = 0.01, calculated = 0.9521, 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 2/3/2022 2:14 PM View: Interwell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

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. 53.33% NDs. Annual per-constituent alpha = 0.003148. Individual comparison alpha = 0.0005253 (1 of 2). Assumes 3 future values.

Constituent: Fluoride, total Analysis Run 2/3/2022 2:14 PM View: Interwell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Upper Tolerance Limits

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 1/20/2022, 8:56 AM

Constituent	Well	Upper Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Antimony, total (mg/L)	n/a	0.005	n/a	n/a	n/a	57	91.23	n/a	0.05373	NP Inter(NDs)
Arsenic, total (mg/L)	n/a	0.005	n/a	n/a	n/a	57	49.12	n/a	0.05373	NP Inter(normality)
Barium, total (mg/L)	n/a	0.157	n/a	n/a	n/a	57	0	n/a	0.05373	NP Inter(normality)
Beryllium, total (mg/L)	n/a	0.002	n/a	n/a	n/a	57	10.53	n/a	0.05373	NP Inter(normality)
Cadmium, total (mg/L)	n/a	0.001	n/a	n/a	n/a	57	56.14	n/a	0.05373	NP Inter(normality)
Chromium, total (mg/L)	n/a	0.003856	n/a	n/a	n/a	57	12.28	ln(x)	0.05	Inter
Cobalt, total (mg/L)	n/a	0.009	n/a	n/a	n/a	57	0	n/a	0.05373	NP Inter(normality)
Combined Radium 226 + 228 (pCi/L)	n/a	3.148	n/a	n/a	n/a	57	0	sqrt(x)	0.05	Inter
Fluoride, total (mg/L)	n/a	1	n/a	n/a	n/a	60	53.33	n/a	0.04607	NP Inter(normality)
Lead, total (mg/L)	n/a	0.005	n/a	n/a	n/a	57	57.89	n/a	0.05373	NP Inter(normality)
Lithium, total (mg/L)	n/a	0.1426	n/a	n/a	n/a	56	1.786	ln(x)	0.05	Inter
Mercury, total (mg/L)	n/a	0.000064	n/a	n/a	n/a	57	50.88	n/a	0.05373	NP Inter(normality)
Molybdenum, total (mg/L)	n/a	0.005	n/a	n/a	n/a	52	88.46	n/a	0.06944	NP Inter(NDs)
Selenium, total (mg/L)	n/a	0.005	n/a	n/a	n/a	57	43.86	n/a	0.05373	NP Inter(normality)
Thallium, total (mg/L)	n/a	0.002	n/a	n/a	n/a	55	87.27	n/a	0.05954	NP Inter(NDs)

Confidence Intervals - Significant Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 2/24/2022, 3:25 PM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Compliance</u>	<u>Sig.</u>	<u>N</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Cobalt, total (mg/L)	AD-28	0.01549	0.01345	0.009	Yes	19	0.01447	0.001738	0	None	No	0.01	Param.

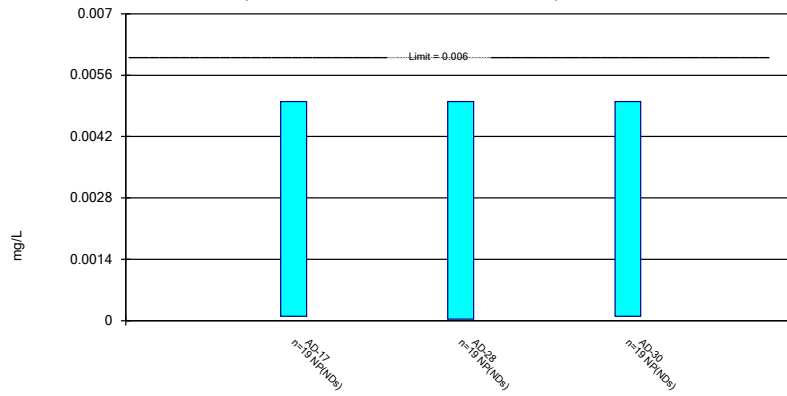
Confidence Intervals - All Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 2/24/2022, 3:25 PM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony, total (mg/L)	AD-17	0.005	0.0001	0.006	No	19	0.002616	0.002392	94.74	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-28	0.005	0.00003	0.006	No	19	0.002429	0.002339	78.95	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-30	0.005	0.0001	0.006	No	19	0.002237	0.00226	84.21	None	No	0.01	NP (NDs)
Arsenic, total (mg/L)	AD-17	0.005	0.00021	0.01	No	19	0.002139	0.002084	42.11	None	No	0.01	NP (normality)
Arsenic, total (mg/L)	AD-28	0.005	0.00021	0.01	No	19	0.002257	0.002158	36.84	None	No	0.01	NP (normality)
Arsenic, total (mg/L)	AD-30	0.005	0.00019	0.01	No	19	0.002453	0.002292	47.37	None	No	0.01	NP (normality)
Barium, total (mg/L)	AD-17	0.2442	0.1332	2	No	19	0.1887	0.09478	0	None	No	0.01	Param.
Barium, total (mg/L)	AD-28	0.1673	0.1411	2	No	19	0.1547	0.02291	0	None	sqrt(x)	0.01	Param.
Barium, total (mg/L)	AD-30	0.0826	0.052	2	No	19	0.06867	0.02326	0	None	No	0.01	NP (normality)
Beryllium, total (mg/L)	AD-17	0.0008375	0.0004442	0.004	No	19	0.0007138	0.0004874	10.53	None	ln(x)	0.01	Param.
Beryllium, total (mg/L)	AD-28	0.0007792	0.0005547	0.004	No	19	0.0006782	0.0001959	0	None	x^(1/3)	0.01	Param.
Beryllium, total (mg/L)	AD-30	0.0001554	0.0000611	0.004	No	19	0.0002943	0.000602	10.53	None	No	0.01	NP (normality)
Cadmium, total (mg/L)	AD-17	0.001	0.00003	0.005	No	19	0.0004968	0.0004908	47.37	None	No	0.01	NP (normality)
Cadmium, total (mg/L)	AD-28	0.001	0.00005	0.005	No	19	0.0006016	0.00048	57.89	None	No	0.01	NP (NDs)
Cadmium, total (mg/L)	AD-30	0.001	0.000019	0.005	No	19	0.0005919	0.0004918	73.68	None	No	0.01	NP (NDs)
Chromium, total (mg/L)	AD-17	0.001155	0.0004188	0.1	No	19	0.001069	0.00129	5.263	None	ln(x)	0.01	Param.
Chromium, total (mg/L)	AD-28	0.0008538	0.0003453	0.1	No	19	0.001244	0.001595	21.05	Kaplan-Meier	ln(x)	0.01	Param.
Chromium, total (mg/L)	AD-30	0.001109	0.0004746	0.1	No	19	0.0009759	0.0009623	5.263	None	ln(x)	0.01	Param.
Cobalt, total (mg/L)	AD-17	0.013	0.00305	0.009	No	19	0.008181	0.004247	0	None	No	0.01	NP (normality)
Cobalt, total (mg/L)	AD-28	0.01549	0.01345	0.009	Yes	19	0.01447	0.001738	0	None	No	0.01	Param.
Cobalt, total (mg/L)	AD-30	0.003162	0.00208	0.009	No	19	0.00269	0.001012	0	None	x^(1/3)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-17	5.601	2.408	5	No	19	4.005	2.727	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-28	2.377	1.698	5	No	19	2.038	0.5794	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-30	2.116	0.8775	5	No	19	1.615	1.214	0	None	sqrt(x)	0.01	Param.
Fluoride, total (mg/L)	AD-17	1	0.17	4	No	21	0.5587	0.3969	42.86	None	No	0.01	NP (normality)
Fluoride, total (mg/L)	AD-28	0.8421	0.6073	4	No	20	0.7247	0.2067	5	None	No	0.01	Param.
Fluoride, total (mg/L)	AD-30	1	0.05	4	No	21	0.601	0.4733	61.9	None	No	0.01	NP (NDs)
Lead, total (mg/L)	AD-17	0.005	0.00013	0.005	No	19	0.002639	0.002367	57.89	None	No	0.01	NP (NDs)
Lead, total (mg/L)	AD-28	0.005	0.0001	0.005	No	19	0.002625	0.002383	57.89	None	No	0.01	NP (NDs)
Lead, total (mg/L)	AD-30	0.005	0.00009	0.005	No	19	0.00263	0.002377	68.42	None	No	0.01	NP (NDs)
Lithium, total (mg/L)	AD-17	0.02192	0.01238	0.14	No	19	0.01715	0.008151	5.263	None	No	0.01	Param.
Lithium, total (mg/L)	AD-28	0.032	0.0226	0.14	No	19	0.02841	0.01162	0	None	No	0.01	NP (normality)
Lithium, total (mg/L)	AD-30	0.009789	0.007791	0.14	No	19	0.008581	0.002213	5.263	None	x^2	0.01	Param.
Mercury, total (mg/L)	AD-17	0.000203	0.00009001	0.002	No	19	0.0001722	0.0001329	0	None	ln(x)	0.01	Param.
Mercury, total (mg/L)	AD-28	0.000085	0.000025	0.002	No	19	0.00005274	0.00004229	0	None	No	0.01	NP (normality)
Mercury, total (mg/L)	AD-30	0.0007298	0.000124	0.002	No	19	0.0005381	0.0006754	0	None	sqrt(x)	0.01	Param.
Molybdenum, total (mg/L)	AD-17	0.005	0.0005	0.005	No	17	0.00303	0.002011	88.24	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-28	0.005	0.0005	0.005	No	17	0.00302	0.002024	88.24	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-30	0.005	0.0008	0.005	No	17	0.003008	0.00201	82.35	None	No	0.01	NP (NDs)
Selenium, total (mg/L)	AD-17	0.005	0.0003	0.05	No	19	0.002785	0.00226	52.63	None	No	0.01	NP (NDs)
Selenium, total (mg/L)	AD-28	0.005	0.00021	0.05	No	19	0.002694	0.002308	52.63	None	No	0.01	NP (NDs)
Selenium, total (mg/L)	AD-30	0.005	0.0003	0.05	No	19	0.002702	0.002302	52.63	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-17	0.002	0.0002	0.002	No	18	0.001131	0.0008281	83.33	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-28	0.002	0.0002	0.002	No	18	0.001149	0.0008183	88.89	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-30	0.002	0.0002	0.002	No	18	0.0011	0.0007871	83.33	None	No	0.01	NP (NDs)

Non-Parametric Confidence Interval

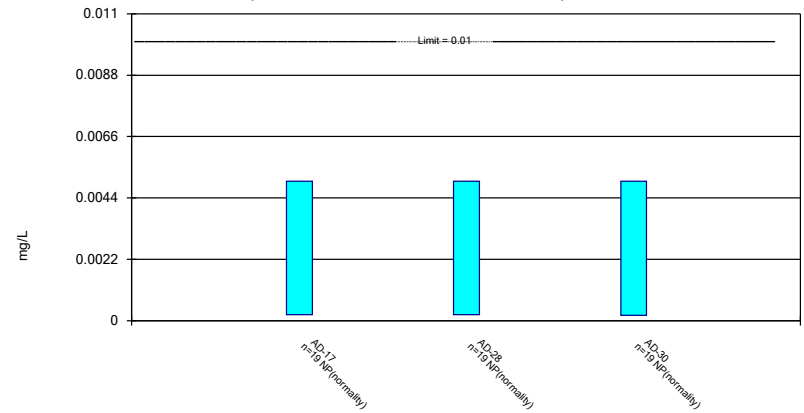
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Antimony, total Analysis Run 2/24/2022 3:24 PM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Non-Parametric Confidence Interval

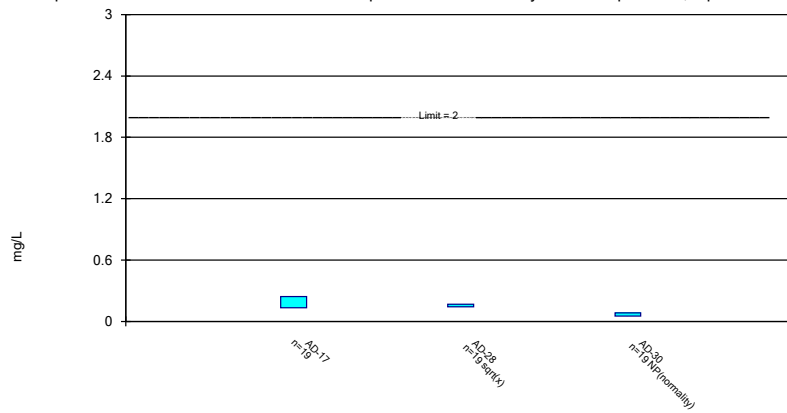
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Arsenic, total Analysis Run 2/24/2022 3:24 PM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric and Non-Parametric (NP) Confidence Interval

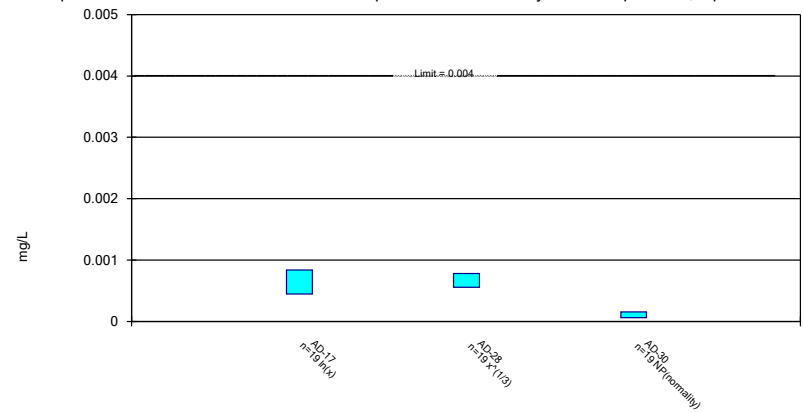
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Barium, total Analysis Run 2/24/2022 3:24 PM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric and Non-Parametric (NP) Confidence Interval

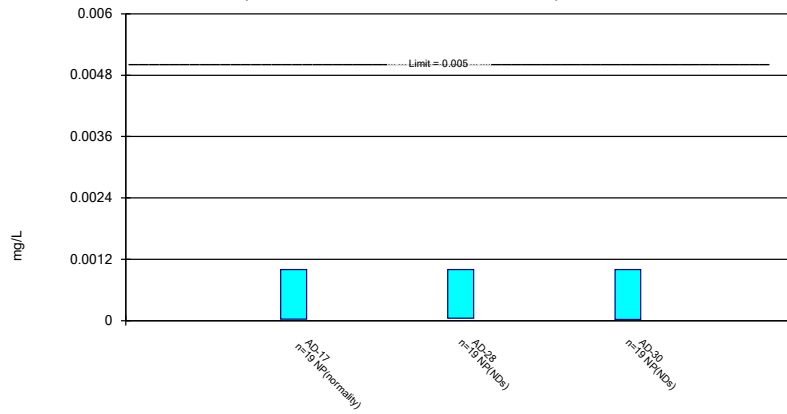
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Beryllium, total Analysis Run 2/24/2022 3:24 PM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Non-Parametric Confidence Interval

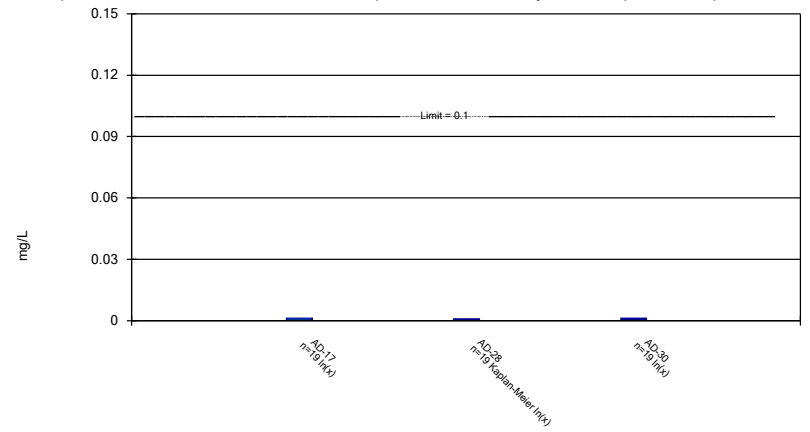
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Cadmium, total Analysis Run 2/24/2022 3:24 PM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric Confidence Interval

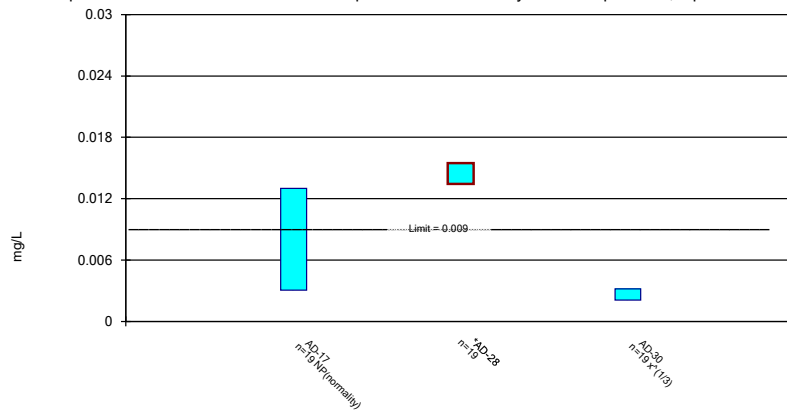
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Chromium, total Analysis Run 2/24/2022 3:24 PM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric and Non-Parametric (NP) Confidence Interval

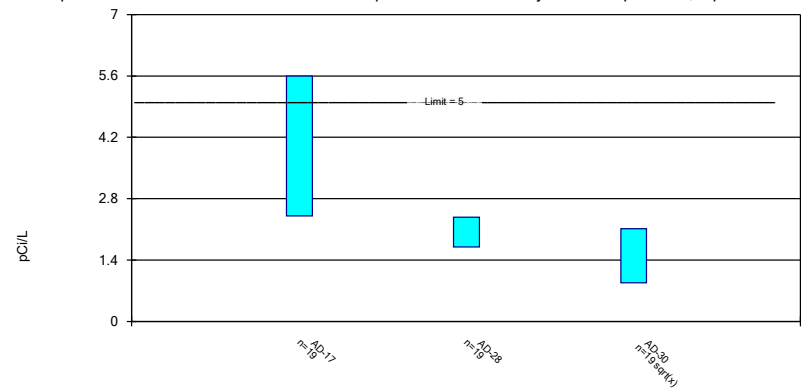
Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt, total Analysis Run 2/24/2022 3:24 PM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric Confidence Interval

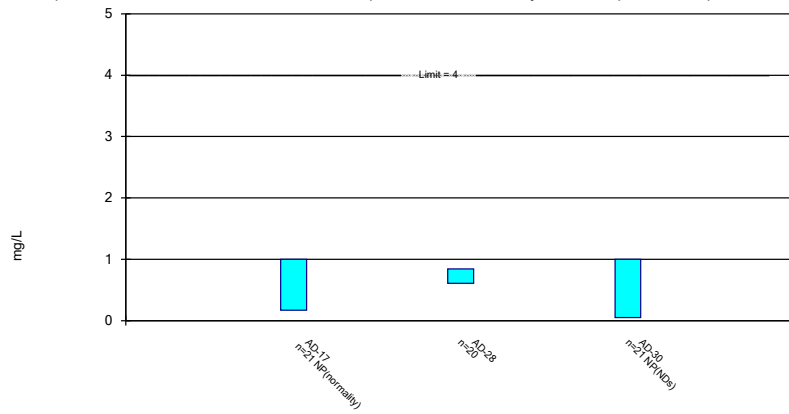
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Combined Radium 226 + 228 Analysis Run 2/24/2022 3:24 PM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric and Non-Parametric (NP) Confidence Interval

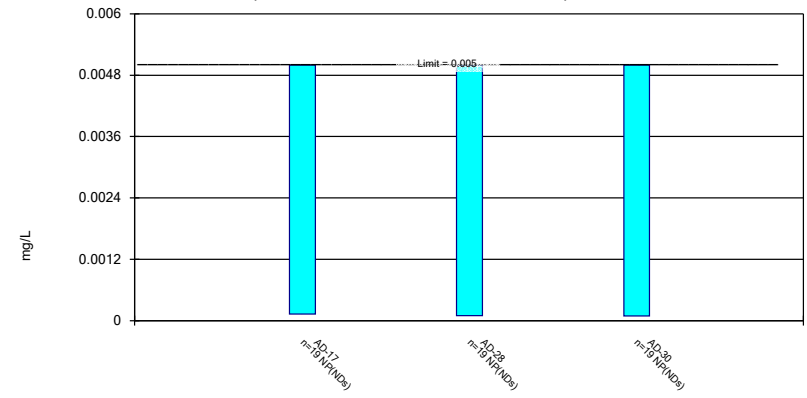
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Fluoride, total Analysis Run 2/24/2022 3:24 PM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Non-Parametric Confidence Interval

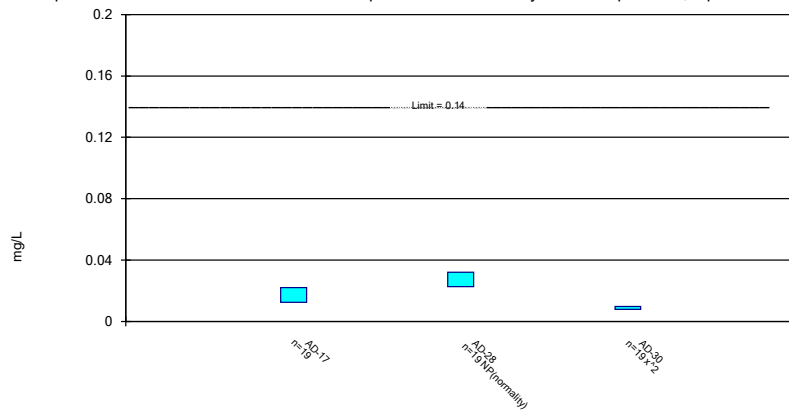
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Lead, total Analysis Run 2/24/2022 3:24 PM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric and Non-Parametric (NP) Confidence Interval

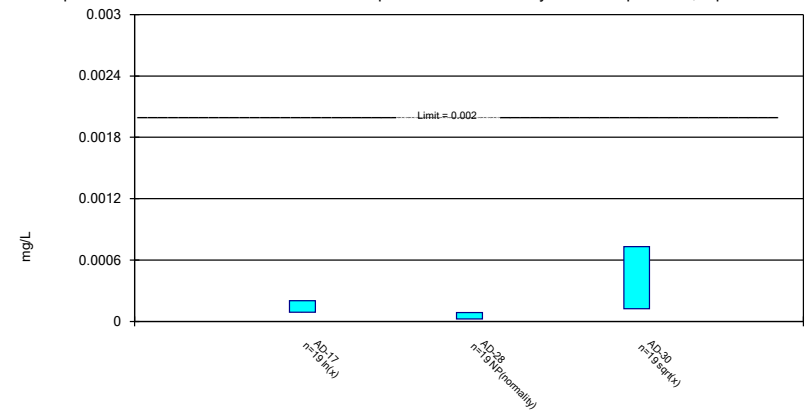
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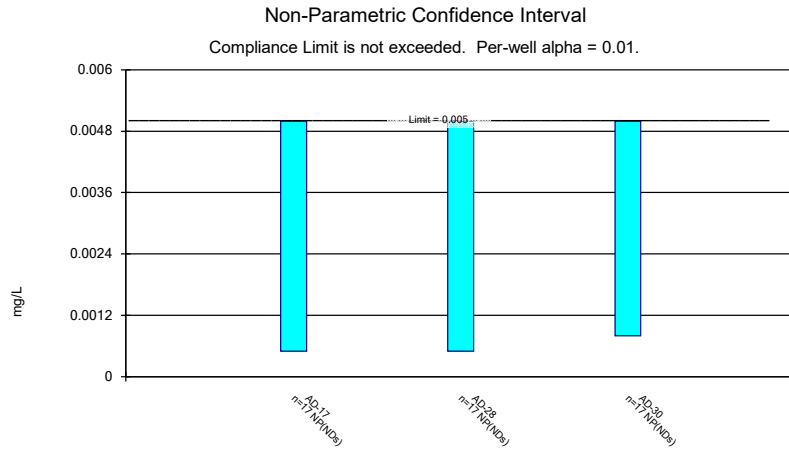
Constituent: Lithium, total Analysis Run 2/24/2022 3:24 PM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric and Non-Parametric (NP) Confidence Interval

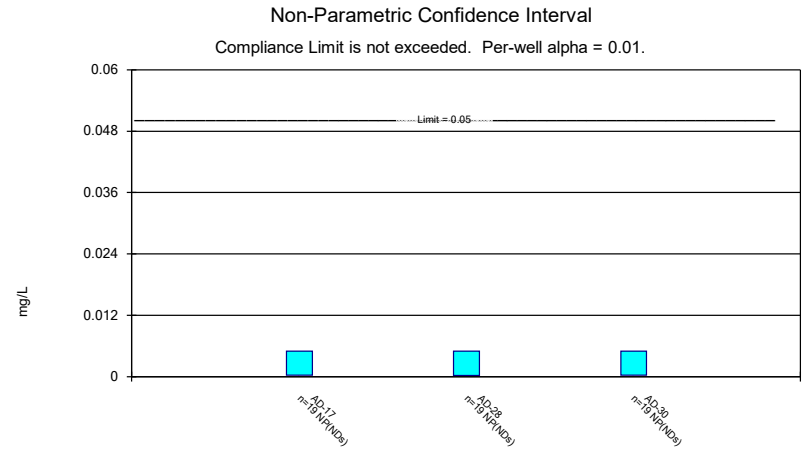
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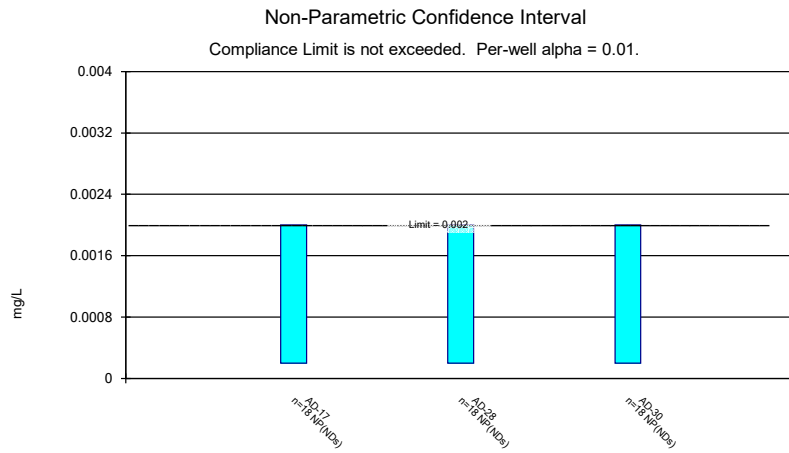
Constituent: Mercury, total Analysis Run 2/24/2022 3:24 PM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP



Constituent: Molybdenum, total Analysis Run 2/24/2022 3:24 PM View: Appendix IV
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP



Constituent: Selenium, total Analysis Run 2/24/2022 3:24 PM View: Appendix IV
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP



Constituent: Thallium, total Analysis Run 2/24/2022 3:25 PM View: Appendix IV
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

PIRKEY WBAP GWPS			
Constituent Name	MCL	Background Limit	GWPS
Antimony, Total (mg/L)	0.006	0.005	0.006
Arsenic, Total (mg/L)	0.01	0.005	0.01
Barium, Total (mg/L)	2	0.16	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	0.0039	0.1
Cobalt, Total (mg/L)	n/a	0.009	0.009
Combined Radium, Total (pCi/L)	5	3.15	5
Fluoride, Total (mg/L)	4	1	4
Lead, Total (mg/L)	n/a	0.005	0.005
Lithium, Total (mg/L)	n/a	0.14	0.14
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*

January 11, 2023

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

**Subject: October 2022 Assessment Monitoring Report Revisions
Pirkey West Bottom Ash Pond (WBAP)**

Dear Mr. Miller:

Geosyntec Consultants, Inc. (Geosyntec) has revised the attached Statistical Analysis Summary report for the H.W. Pirkey Power Plant's West Bottom Ash Pond (WBAP), 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, West Bottom Ash Pond (WBAP). H.W. Pirkey Power Plant, Hallsville, Texas. October 2022.

**STATISTICAL ANALYSIS SUMMARY
WEST 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 West Wilson Bridge Road
Suite 250
Worthington, Ohio 43085

October 27, 2022
CHA8500B

TABLE OF CONTENTS

SECTION 1 Executive Summary	1
SECTION 2 West Bottom Ash Pond Evaluation	2-1
2.1 Data Validation & QA/QC	2-1
2.2 Statistical Analysis.....	2-1
2.2.1 Evaluation of Potential Appendix IV SSLs.....	2-1
2.2.2 Evaluation of Potential Appendix III SSIs	2-2
2.3 Conclusions.....	2-2
SECTION 3 References	3-1

LIST OF TABLES

Table 1	Groundwater Data Summary
Table 2	Appendix IV Groundwater Protection Standards
Table 3	Appendix III Data Summary

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
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
WBAP	West Bottom Ash Pond

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 West Bottom Ash Pond (WBAP), an existing CCR unit at the Pirkey Power Plant located in Hallsville, Texas. Recent groundwater monitoring results were compared to the site-specific groundwater protection standards (GWPS) to identify potential exceedances.

Based on detection monitoring conducted in 2017 and 2018, statistically significant increases (SSIs) over background were concluded for boron at the WBAP. An alternative source was not identified at the time, so assessment monitoring was initiated and GWPS were set in accordance with § 352.951(b). Two assessment monitoring events were conducted at the WBAP 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. An SSL was identified for cobalt. 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

WEST BOTTOM ASH POND EVALUATION

2.1 Data Validation & QA/QC

During the assessment monitoring program in 2022, two sets of samples (March 2022 and June 2022) were collected for analysis from each upgradient and downgradient well to meet the requirements of § 352.951(a). Samples from both sampling events were analyzed for 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 total dissolved solids (TDS) sample collected at AD-3 in June 2022 was analyzed out of hold time. Thus, the June 2022 TDS results from AD-3 will not be used for data analysis purposes. An additional TDS sample was collected from AD-3 in August 2022 and these results will be used for statistical analysis. 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.9.6.35 statistics software. The export file was checked against the analytical data for transcription errors and completeness.

2.2 Statistical Analysis

Statistical analyses for the WBAP 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 GWPS provided in Table 2. The GWPS 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 SSL was identified at the Pirkey WBAP:

- The LCL for cobalt exceeded the GWPS of 0.00900 mg/L at AD-28 (0.0134 mg/L).

As a result, the Pirkey WBAP 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.

2.2.2 Evaluation of Potential Appendix III SSIs

While SSLs were identified, 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 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 0.100 mg/L at AD-28 (0.311 mg/L) and AD-30 (2.49 mg/L).
- Chloride concentrations exceeded the interwell UPL of 9.01 mg/L at AD-17 (30.2 mg/L) and AD-30 (26.0 mg/L).
- Sulfate concentrations exceeded the intrawell UPL of 27.2 mg/L at AD-28 (28.0 mg/L) and the intrawell UPL of 31.6 mg/L at AD-30 (177 mg/L).
- TDS concentrations exceeded the intrawell UPL of 206 mg/L at AD-30 (340 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 a 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. An SSL was identified for cobalt. Appendix III parameters were compared to previously calculated prediction limits, with exceedances identified for boron, chloride, sulfate, and TDS.

Based on this evaluation, the Pirkey WBAP 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 – West Bottom Ash Pond, H.W. Pirkey Plant. March 18, 2022.

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 - West Bottom Ash Pond**

Well ID		AD-3			AD-12		AD-17		AD-18		AD-28		AD-30	
Classification		Background			Background		Compliance		Background		Compliance		Compliance	
Parameter	Unit	3/29/2022	6/21/2022	8/30/2022	3/28/2022	6/20/2022	3/29/2022	6/21/2022	3/29/2022	6/21/2022	3/29/2022	6/21/2022	3/28/2022	6/20/2022
Antimony	µg/L	0.1 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	1.51	0.2 J1	--	0.09 J1	0.08 J1	0.30	0.39	1.55	0.30	0.09 J1	0.14	0.19	0.23
Barium	µg/L	68.3	55.6	--	20.2	24.2	112	250	90.1	79.3	120	130	129	106
Beryllium	µg/L	0.163	0.22 J1	--	0.127	0.135	0.481	0.650	0.106	0.073	0.605	0.463	0.125	0.089
Boron	mg/L	0.059	0.08 J1	--	0.021 J1	0.042 J1	0.031 J1	0.021 J1	0.009 J1	0.05 U1	0.356	0.311	2.45	2.49
Cadmium	µg/L	0.012 J1	0.1 U1	--	0.009 J1	0.008 J1	0.028	0.063	0.01 J1	0.012 J1	0.057	0.047	0.012 J1	0.014 J1
Calcium	mg/L	6.09	3.1	--	0.20	0.32	0.24	1.10	0.24	1.49	1.31	1.40	0.66	0.75
Chloride	mg/L	6.84	5.65	--	6.10	7.59	16.2	30.2	5.26	5.20	5.07	4.36	29.5	26.0
Chromium	µg/L	0.40	0.3 J1	--	0.35	0.63	0.70	0.51	1.40	0.47	0.35	0.40	0.45	0.42
Cobalt	µg/L	7.88	2.70	--	1.01	1.35	6.48	12.2	0.842	0.790	12.5	13.3	4.76	4.90
Combined Radium	pCi/L	1.91	1.68	--	0.76	0.63	3.01	11.96	2.01	0.73	2.98	5.96	2.3	3.71
Fluoride	mg/L	0.21	0.04 J1	--	0.07	0.09	0.26	0.30	0.06 U1	0.06 U1	0.68	0.61	0.07	0.06
Lead	µg/L	0.28	1 U1	--	0.09 J1	0.08 J1	0.1 J1	0.13 J1	0.53	0.11 J1	0.05 J1	0.08 J1	0.2 U1	0.2 U1
Lithium	mg/L	0.0934	0.0457	--	0.00604	0.00949	0.0126	0.0206	0.0137	0.0108	0.0242	0.0213	0.0101	0.0100
Mercury	µg/L	0.005 U1	0.004 J1	--	0.005 U1	0.005 U1	0.300 J1	0.200 J1	0.021	0.02 U1	0.012	0.007	0.035	0.014
Molybdenum	µg/L	0.5 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	0.5 U1	2.5 U1	--	0.33 J1	0.16 J1	0.26 J1	0.44 J1	0.38 J1	0.14 J1	0.26 J1	0.15 J1	0.44 J1	0.34 J1
Sulfate	mg/L	34.0	21.2	--	3.80	4.81	6.77	5.78	7.31	6.47	28.9	28.0	170	177
Thallium	µg/L	0.04 J1	1 U1	--	0.2 U1	0.2 U1	0.2 U1	0.05 J1	0.05 J1	0.2 U1	0.2 U1	0.2 U1	0.04 J1	0.04 J1
Total Dissolved Solids	mg/L	170 L1	150 P1, H2	170	60 L1	80	60 L1	90	140 L1	110	100 L1	110	330 L1	340
pH	SU	4.78	4.38	--	3.85	4.25	4.13	3.3	4.4	4.61	3.66	4	3.96	4.15

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

SU: standard unit

--: Not analyzed

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.

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

H2: Sample analysis performed past holding time.

**Table 2: Appendix IV Groundwater Protection Standards
Pirkey Plant - West 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	0.00500	0.0100
Barium, Total (mg/L)	2.00	0.157	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	0.00386	0.100
Cobalt, Total (mg/L)	n/a	0.00900	0.00900
Combined Radium, Total (pCi/L)	5.00	3.15	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	0.143	0.143
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 because an MCL does not exist.

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

Analyte	Unit	Description	AD-17	AD-28	AD-30
			6/21/2022	6/21/2022	6/20/2022
Boron	mg/L	Interwell Background Value (UPL)	0.100		
		Analytical Result	0.021	0.311	2.49
Calcium	mg/L	Intrawell Background Value (UPL)	1.63	3.21	1.74
		Analytical Result	1.10	1.40	0.75
Chloride	mg/L	Interwell Background Value (UPL)	9.01		
		Analytical Result	30.2	4.36	26.0
Fluoride	mg/L	Interwell Background Value (UPL)	1.00		
		Analytical Result	0.30	0.61	0.06
pH	SU	Intrawell Background Value (UPL)	4.8	5.6	5.4
		Intrawell Background Value (LPL)	3.3	3.5	4.0
		Analytical Result	3.3	4.0	4.2
Sulfate	mg/L	Intrawell Background Value (UPL)	9.05	27.2	31.6
		Analytical Result	5.78	28.0	177
Total Dissolved Solids	mg/L	Intrawell Background Value (UPL)	111	133	206
		Analytical Result	90	110	340

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 West 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

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. 32¹ 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

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

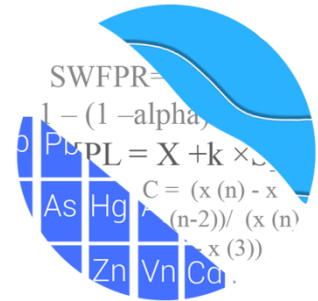
acceptance limits. The “AD-13” cobalt and lithium results should be considered estimated.

- 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 West 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 Assessment Monitoring Event statistical analysis of groundwater data through June 2022 for American Electric Power Inc.'s Pirkey West Bottom Ash Pond (WBAP). 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 began at the site 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-3, AD-12, and AD-18
- **Downgradient wells:** AD-17, AD-28, and AD-30

Data were sent electronically to GSC, and the statistical analysis report was prepared according to the background screening conducted in December 2017 that was 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 Assessment Monitoring program consists of the following 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 and box plots for Appendix IV parameters are provided for all wells and constituents; and are used to evaluate concentrations over the entire record (Figures A and B, respectively). The time series plots are used to evaluate concentrations over time and between wells, and to initially screen for suspected outliers and trends while the box plots provide visual representation of variation within individual wells and between 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 each downgradient well 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 constructed from tolerance limits using all 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 (USEPA, 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 Screening – Conducted in March 2022

Outlier Analysis

Prior to evaluating Appendix IV parameters, background data were 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 through November 2021 identified outliers for beryllium, chromium, combined radium 226 + 228, and lithium. Among these identified values, no new values were flagged as outliers as they were similar to concentrations upgradient of the facility or below the MCL.

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. No new outliers were flagged and no changes to previously flagged outliers were made during the March 2022 screening.

During previous screenings, the reporting limit for thallium for the February 2019 event was 0.01 mg/L, which is higher than both the historical reporting limit and the GWPS of 0.002 mg/L. Therefore, this value was flagged as an outlier at wells with reported non-detects for the February 2019 event. Similarly, the reporting limit for molybdenum of 0.04 mg/L during the February and May 2019 sample events, while lower than the GWPS of 0.1 mg/L, are flagged since they are censored at a much higher level than remaining reporting limits for this constituent.

Tukey's outlier test results for Appendix IV parameters were included with the background update conducted in February 2022. As mentioned above, a list of flagged values follows this report (Figure C).

Interwell Upper Tolerance Limits

Interwell upper tolerance limits were established in the Fall 2021 using all available pooled upgradient well data for each Appendix IV parameter through November 2021 (Figure D). GWPS will be updated during 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 & 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. An exceedance was noted for the following well/constituent pair:

- Cobalt: AD-28

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

For Groundwater Stats Consulting,

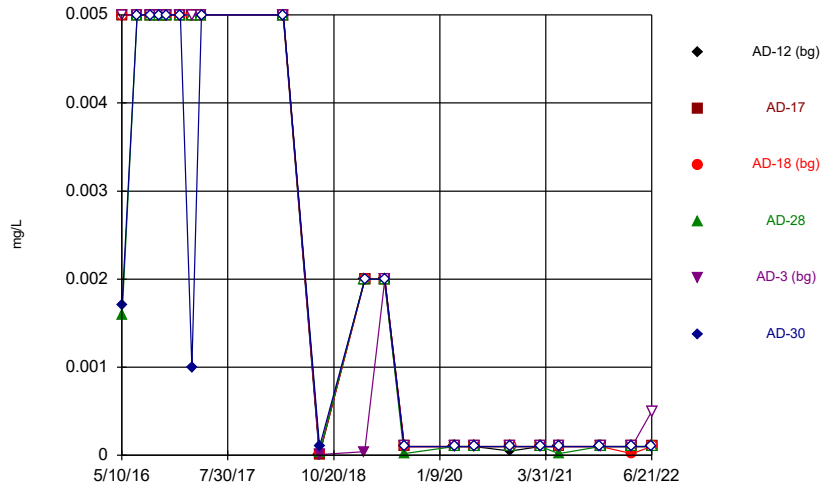


Andrew T. Collins
Project Manager



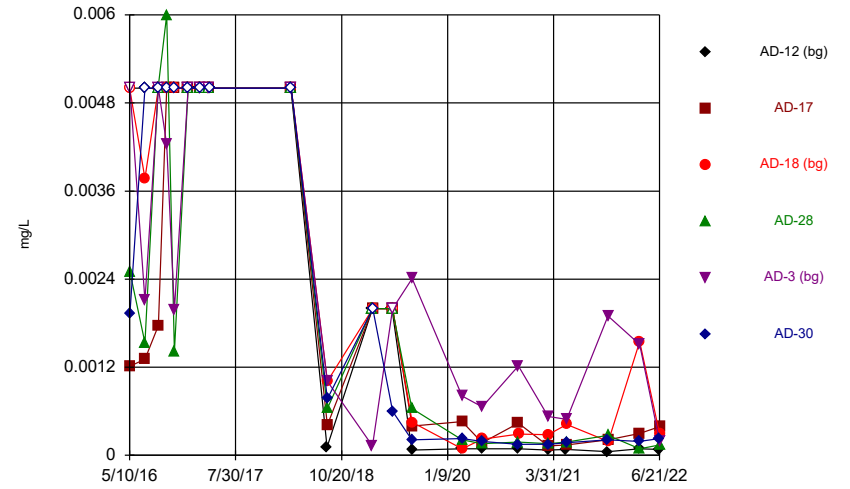
Kristina L. Rayner
Senior Statistician

Time Series



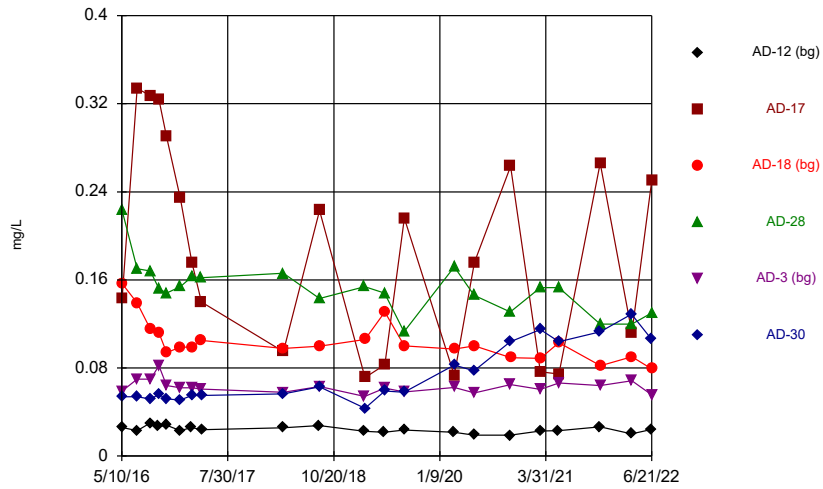
Constituent: Antimony, total Analysis Run 8/25/2022 8:10 AM
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



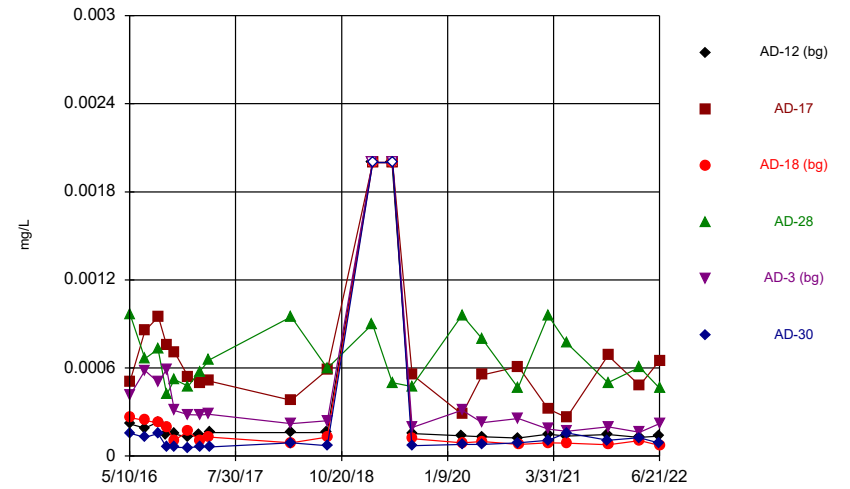
Constituent: Arsenic, total Analysis Run 8/25/2022 8:10 AM
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Time Series



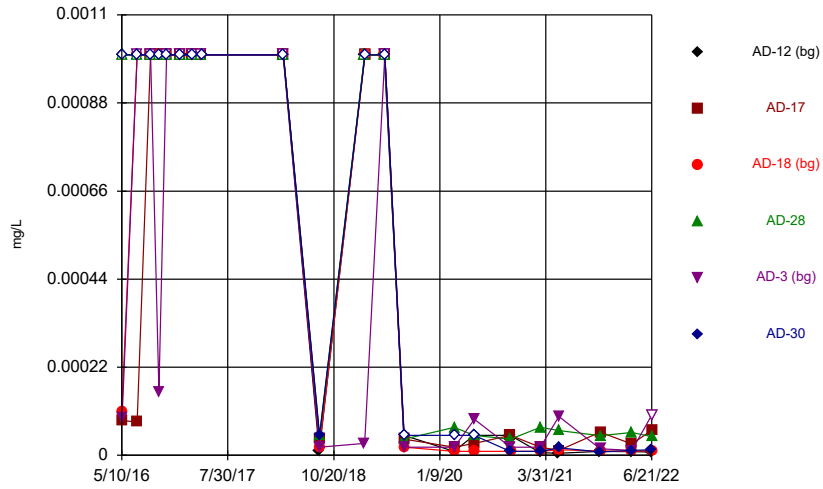
Constituent: Barium, total Analysis Run 8/25/2022 8:10 AM
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Time Series



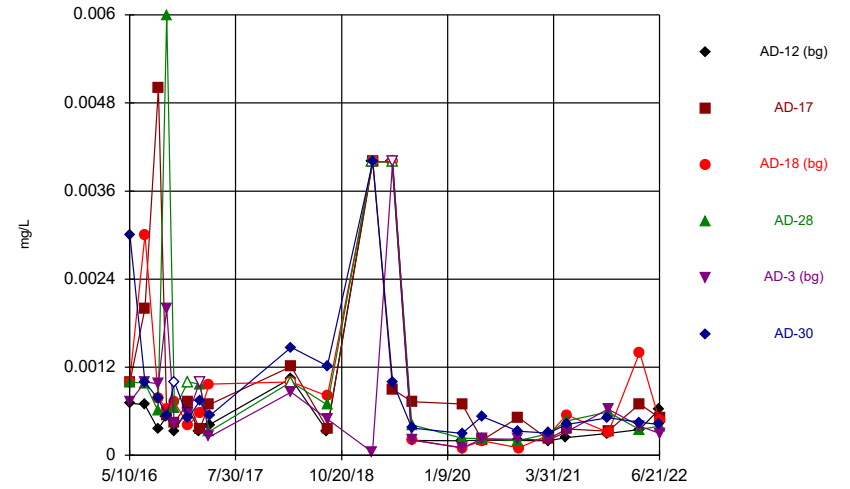
Constituent: Beryllium, total Analysis Run 8/25/2022 8:10 AM
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Time Series



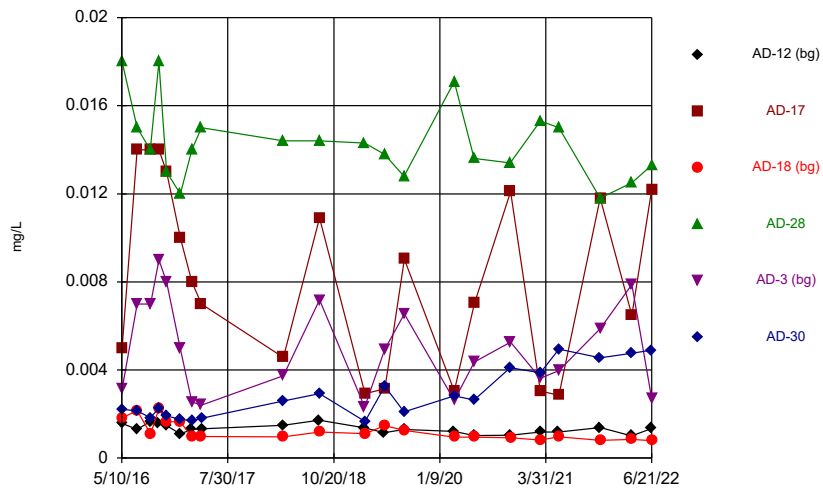
Constituent: Cadmium, total Analysis Run 8/25/2022 8:10 AM
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



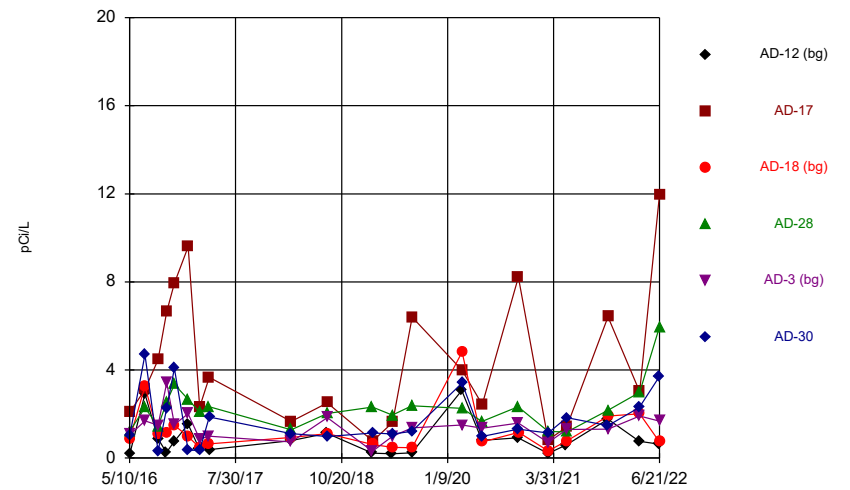
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Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



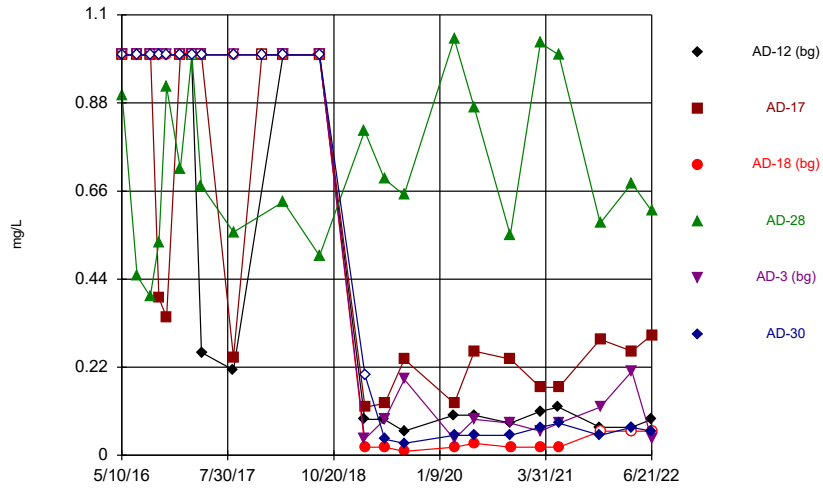
Constituent: Cobalt, total Analysis Run 8/25/2022 8:10 AM
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



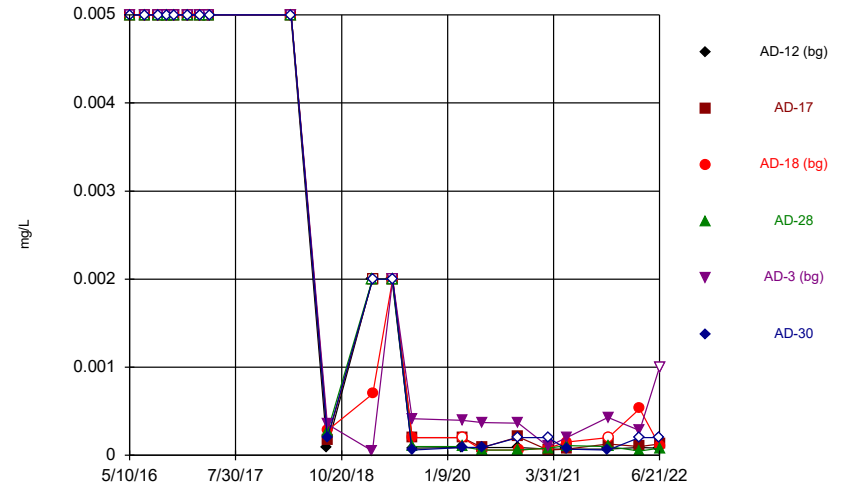
Constituent: Combined Radium 226 + 228 Analysis Run 8/25/2022 8:10 AM
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



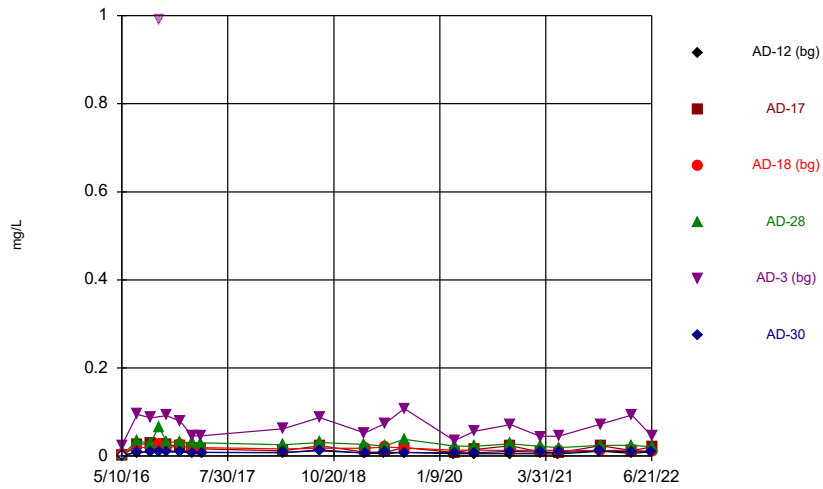
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Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



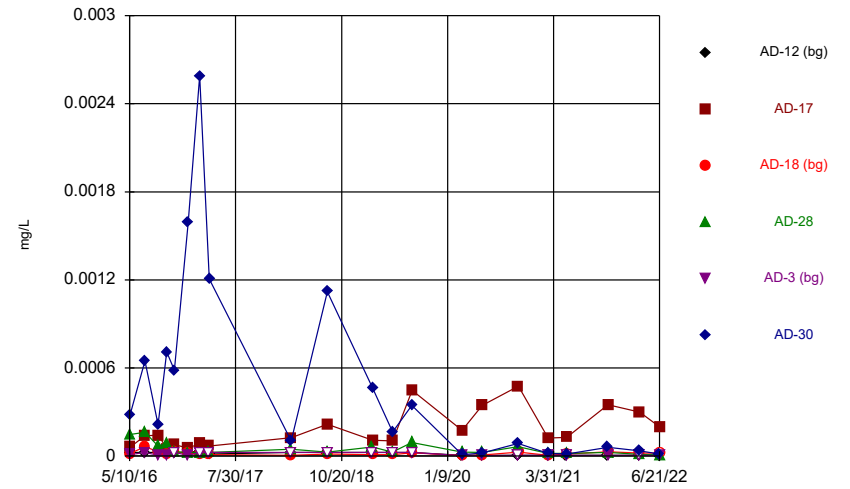
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Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



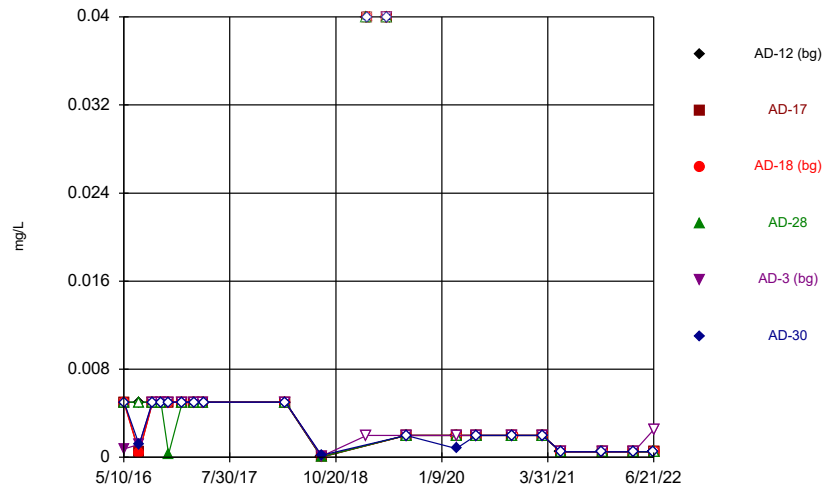
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Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



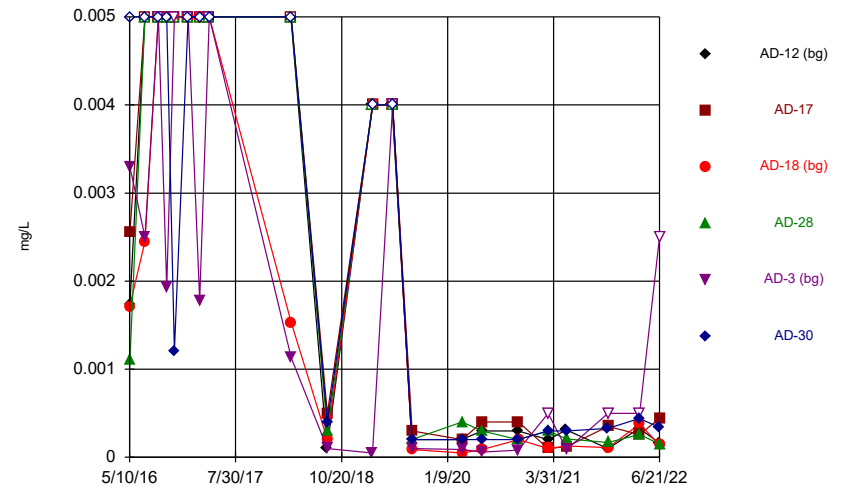
Constituent: Mercury, total Analysis Run 8/25/2022 8:10 AM
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



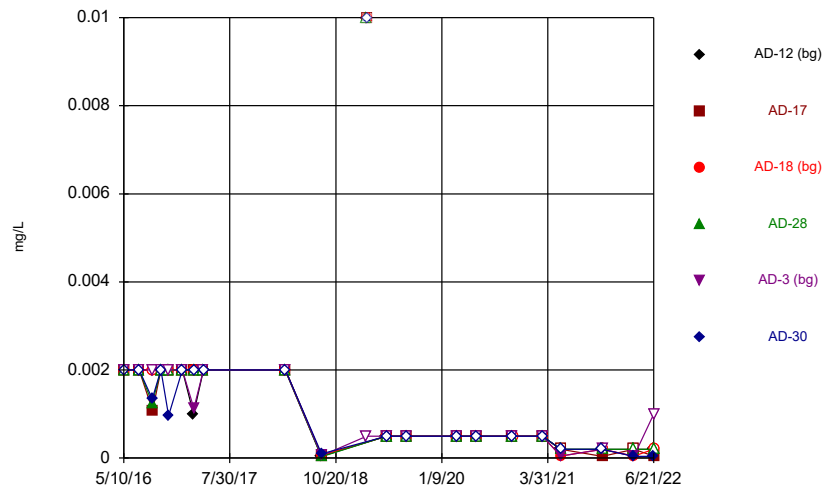
Constituent: Molybdenum, total Analysis Run 8/25/2022 8:10 AM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



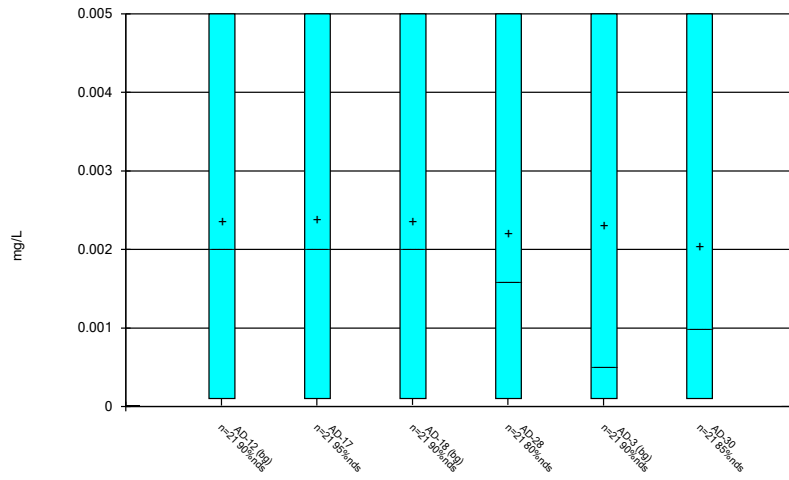
Constituent: Selenium, total Analysis Run 8/25/2022 8:10 AM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



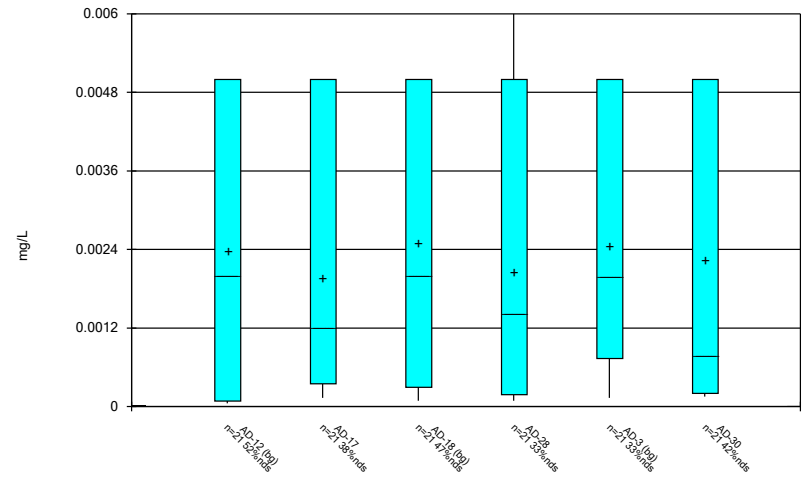
Constituent: Thallium, total Analysis Run 8/25/2022 8:10 AM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



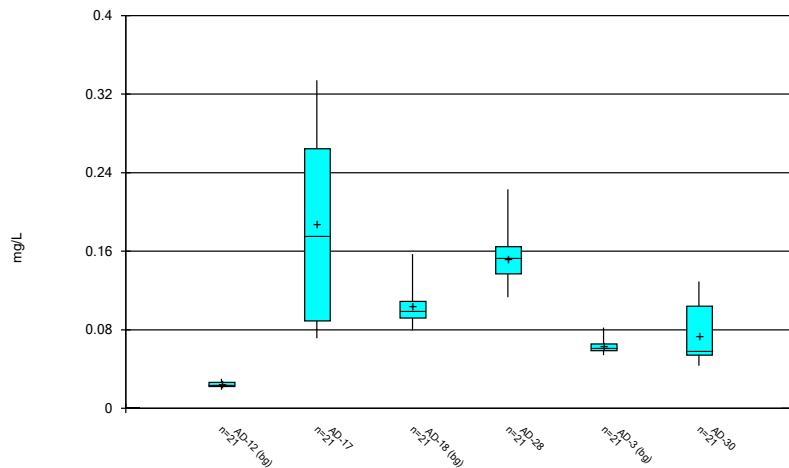
Constituent: Antimony, total Analysis Run 8/25/2022 8:13 AM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



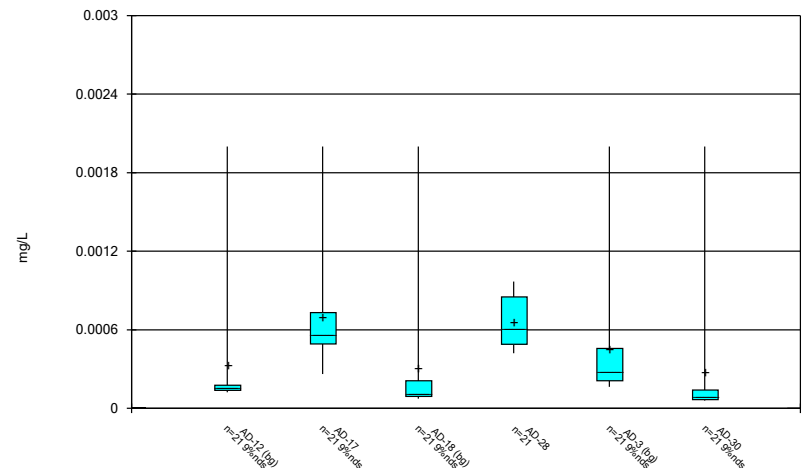
Constituent: Arsenic, total Analysis Run 8/25/2022 8:13 AM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



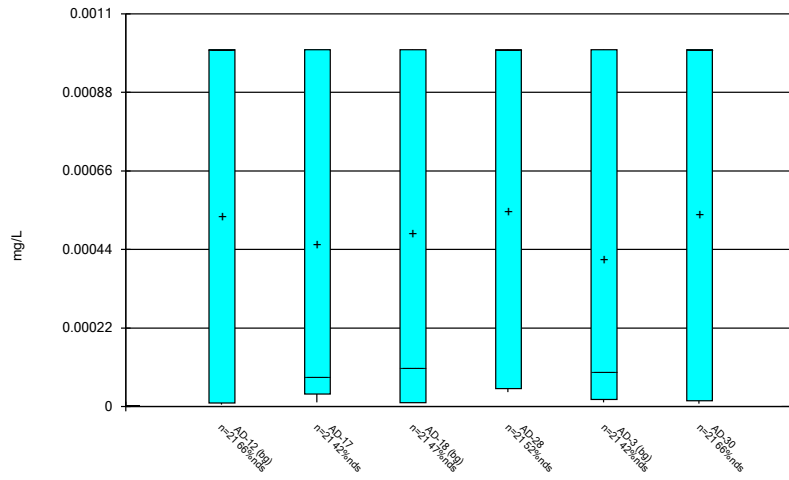
Constituent: Barium, total Analysis Run 8/25/2022 8:13 AM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



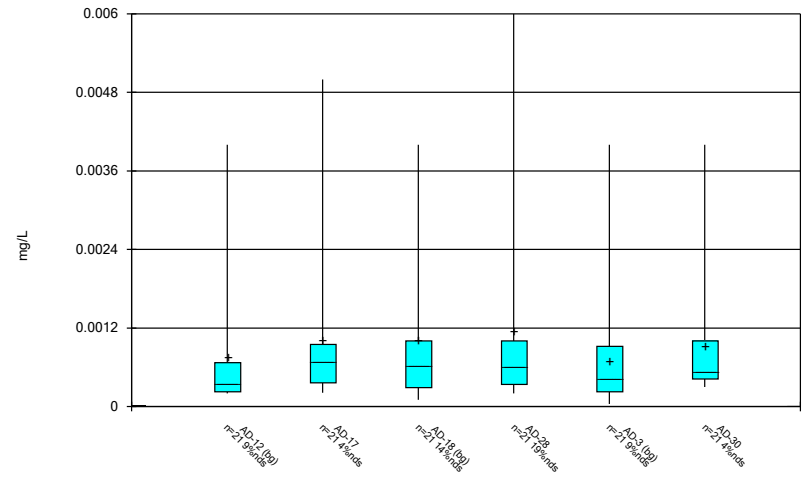
Constituent: Beryllium, total Analysis Run 8/25/2022 8:13 AM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



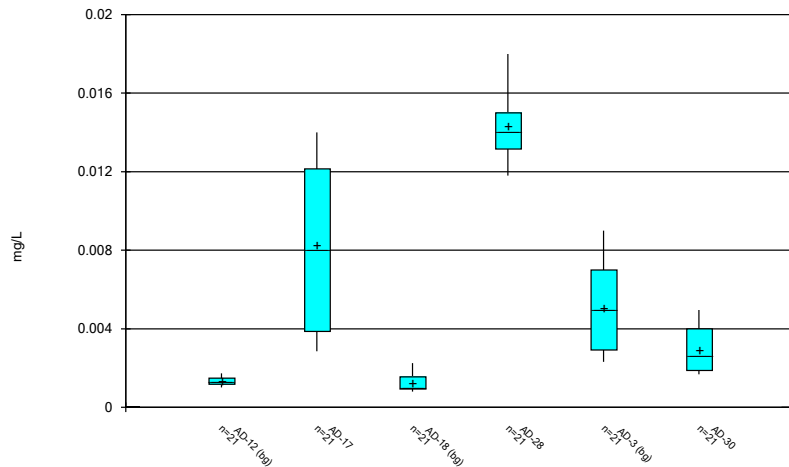
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Box & Whiskers Plot



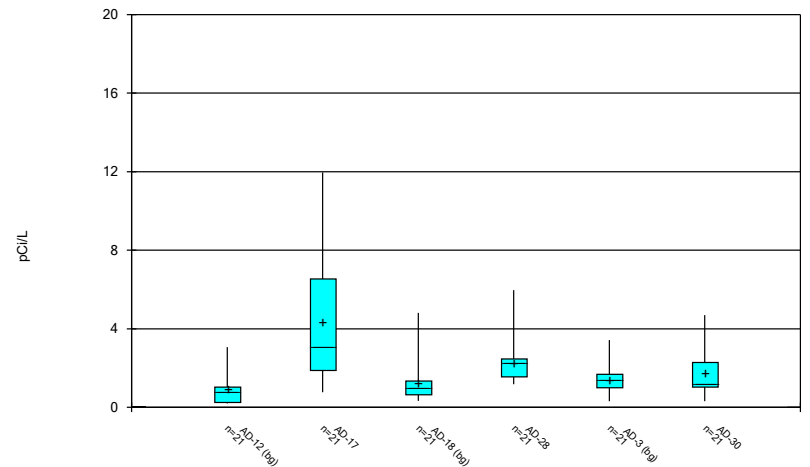
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Box & Whiskers Plot



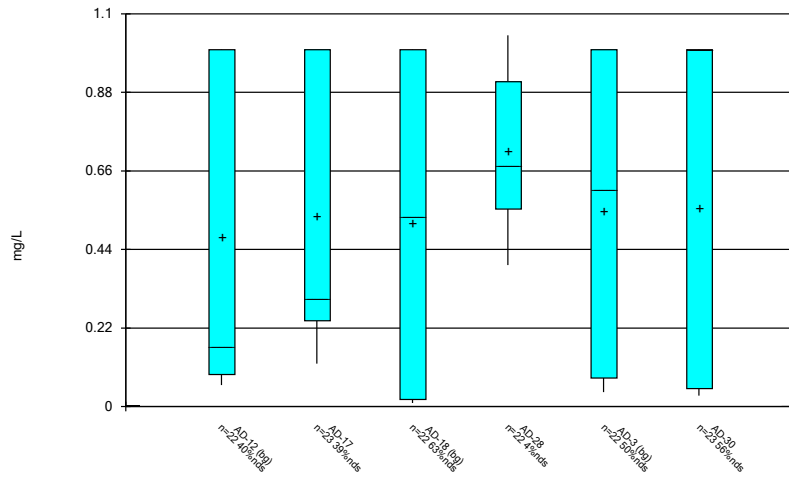
Constituent: Cobalt, total Analysis Run 8/25/2022 8:13 AM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



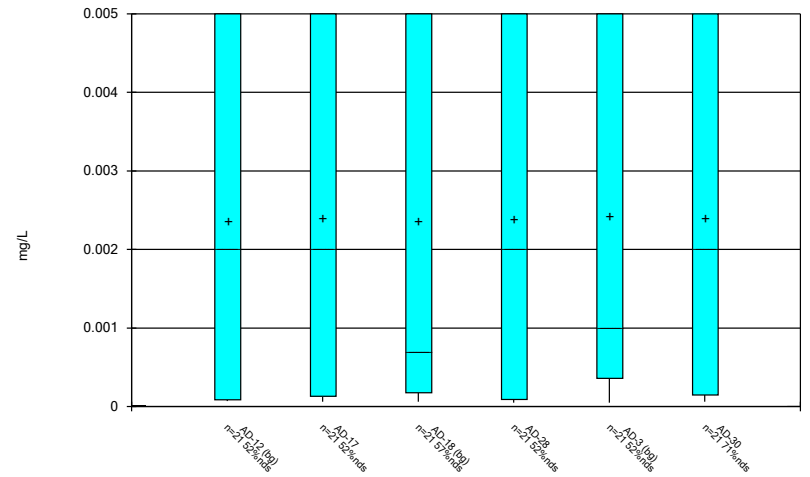
Constituent: Combined Radium 226 + 228 Analysis Run 8/25/2022 8:13 AM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



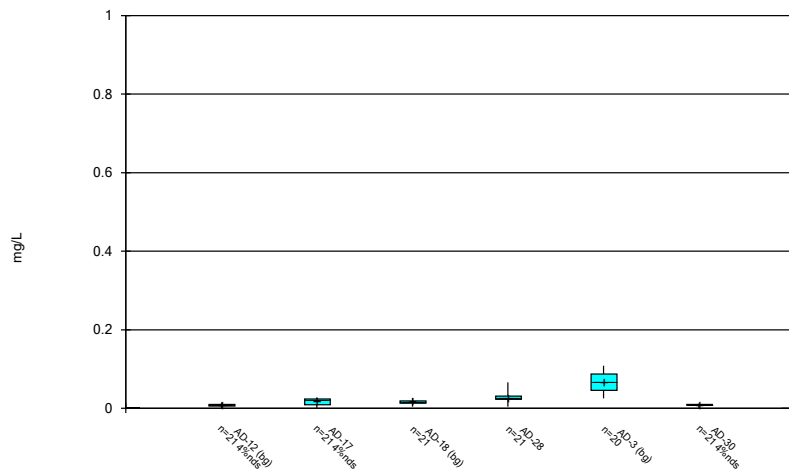
Constituent: Fluoride, total Analysis Run 8/25/2022 8:13 AM
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Box & Whiskers Plot



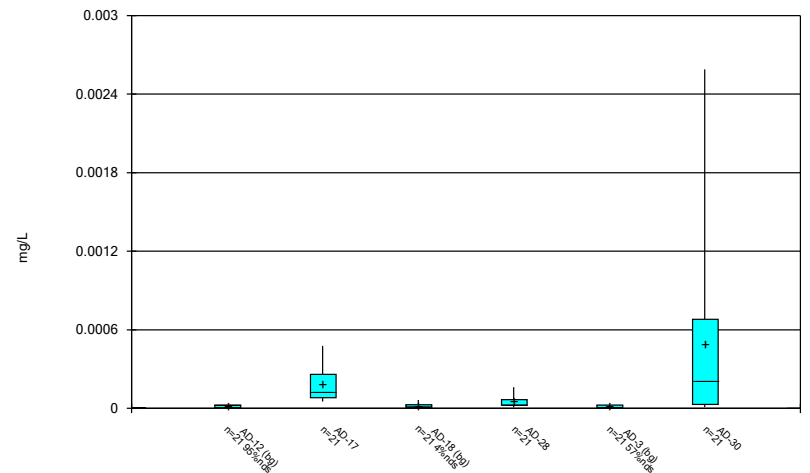
Constituent: Lead, total Analysis Run 8/25/2022 8:13 AM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



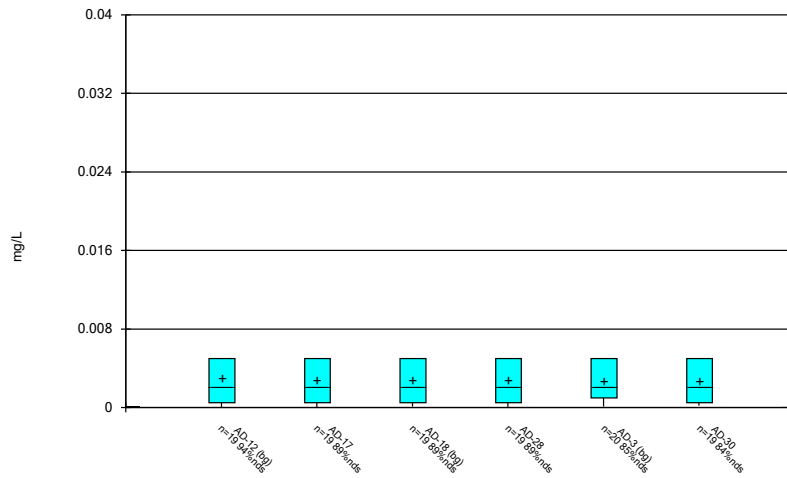
Constituent: Lithium, total Analysis Run 8/25/2022 8:13 AM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



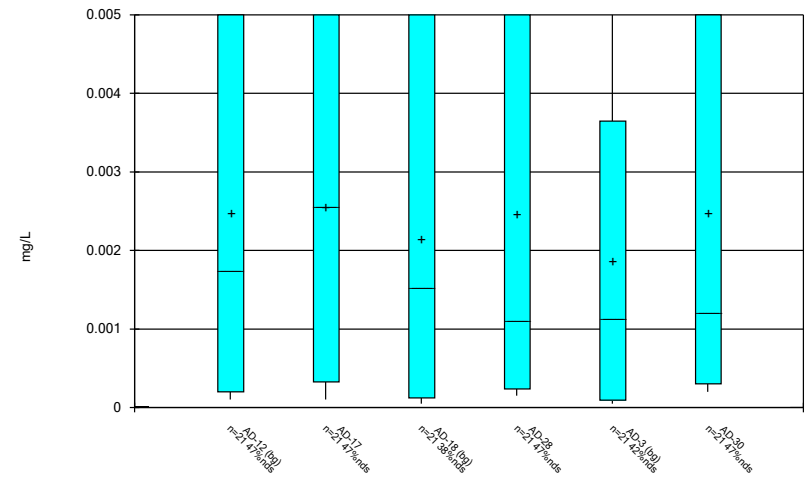
Constituent: Mercury, total Analysis Run 8/25/2022 8:13 AM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



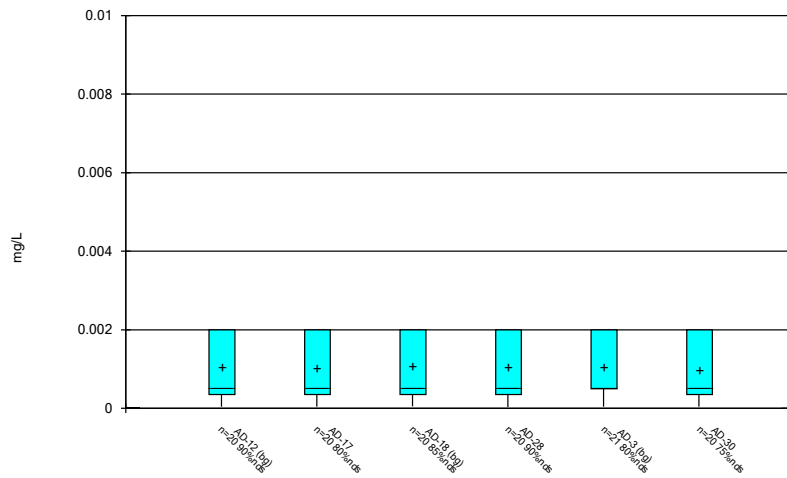
Constituent: Molybdenum, total Analysis Run 8/25/2022 8:13 AM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



Constituent: Selenium, total Analysis Run 8/25/2022 8:13 AM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



Constituent: Thallium, total Analysis Run 8/25/2022 8:13 AM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Outlier Summary

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 8/25/2022, 8:25 AM

	AD-3 Lithium, total (mg/L)	AD-12 Molybdenum, total (mg/L)	AD-17 Molybdenum, total (mg/L)	AD-18 Molybdenum, total (mg/L)	AD-28 Molybdenum, total (mg/L)	AD-3 Molybdenum, total (mg/L)	AD-30 Molybdenum, total (mg/L)	AD-12 Thallium, total (mg/L)	AD-17 Thallium, total (mg/L)	AD-18 Thallium, total (mg/L)
10/13/2016	0.991 (o)									
2/27/2019		<0.04 (o)			<0.04 (o)			<0.01 (o)		
2/28/2019			<0.04 (o)	<0.04 (o)			<0.04 (o)		<0.01 (o)	<0.01 (o)
5/21/2019		<0.04 (o)								
5/22/2019					<0.04 (o)					
5/23/2019			<0.04 (o)	<0.04 (o)		<0.04 (o)	<0.04 (o)			

	AD-28 Thallium, total (mg/L)	AD-30 Thallium, total (mg/L)
10/13/2016		
2/27/2019	<0.01 (o)	
2/28/2019		<0.01 (o)
5/21/2019		
5/22/2019		
5/23/2019		

Upper Tolerance Limits

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 1/20/2022, 8:56 AM

Constituent	Well	Upper Lim.	Date	Observ.	Sig.	Bg N	%NDs	Transform	Alpha	Method
Antimony, total (mg/L)	n/a	0.005	n/a	n/a	n/a	57	91.23	n/a	0.05373	NP Inter(NDs)
Arsenic, total (mg/L)	n/a	0.005	n/a	n/a	n/a	57	49.12	n/a	0.05373	NP Inter(normality)
Barium, total (mg/L)	n/a	0.157	n/a	n/a	n/a	57	0	n/a	0.05373	NP Inter(normality)
Beryllium, total (mg/L)	n/a	0.002	n/a	n/a	n/a	57	10.53	n/a	0.05373	NP Inter(normality)
Cadmium, total (mg/L)	n/a	0.001	n/a	n/a	n/a	57	56.14	n/a	0.05373	NP Inter(normality)
Chromium, total (mg/L)	n/a	0.003856	n/a	n/a	n/a	57	12.28	ln(x)	0.05	Inter
Cobalt, total (mg/L)	n/a	0.009	n/a	n/a	n/a	57	0	n/a	0.05373	NP Inter(normality)
Combined Radium 226 + 228 (pCi/L)	n/a	3.148	n/a	n/a	n/a	57	0	sqrt(x)	0.05	Inter
Fluoride, total (mg/L)	n/a	1	n/a	n/a	n/a	60	53.33	n/a	0.04607	NP Inter(normality)
Lead, total (mg/L)	n/a	0.005	n/a	n/a	n/a	57	57.89	n/a	0.05373	NP Inter(normality)
Lithium, total (mg/L)	n/a	0.1426	n/a	n/a	n/a	56	1.786	ln(x)	0.05	Inter
Mercury, total (mg/L)	n/a	0.000064	n/a	n/a	n/a	57	50.88	n/a	0.05373	NP Inter(normality)
Molybdenum, total (mg/L)	n/a	0.005	n/a	n/a	n/a	52	88.46	n/a	0.06944	NP Inter(NDs)
Selenium, total (mg/L)	n/a	0.005	n/a	n/a	n/a	57	43.86	n/a	0.05373	NP Inter(normality)
Thallium, total (mg/L)	n/a	0.002	n/a	n/a	n/a	55	87.27	n/a	0.05954	NP Inter(NDs)

PIRKEY WBAP GWPS			
Constituent Name	MCL	Background Limit	GWPS
Antimony, Total (mg/L)	0.006	0.005	0.006
Arsenic, Total (mg/L)	0.01	0.005	0.01
Barium, Total (mg/L)	2	0.16	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	0.0039	0.1
Cobalt, Total (mg/L)	n/a	0.009	0.009
Combined Radium, Total (pCi/L)	5	3.15	5
Fluoride, Total (mg/L)	4	1	4
Lead, Total (mg/L)	n/a	0.005	0.005
Lithium, Total (mg/L)	n/a	0.14	0.14
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 WBAP Client: Geosyntec Data: Pirkey WBAP Printed 8/25/2022, 8:27 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Cobalt, total (mg/L)	AD-28	0.01527	0.01337	0.009	Yes	21	0.01432	0.00172	0	None	No	0.01	Param.

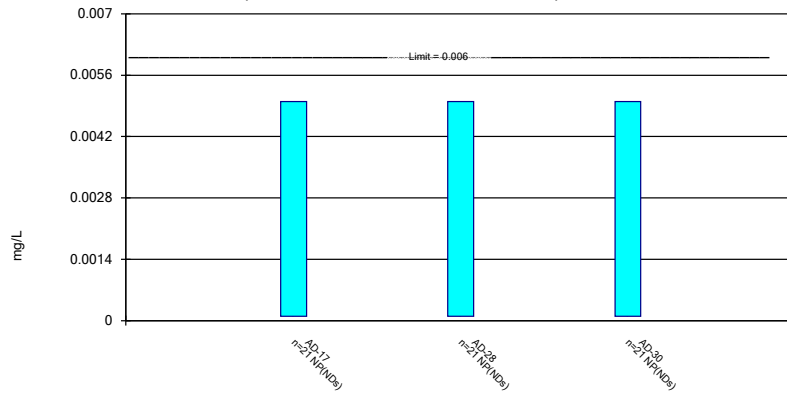
Confidence Intervals - All Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 8/25/2022, 8:27 AM

Constituent	Well	Upper Lim.	Lower Lim.	Compliance	Sig.	N	Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony, total (mg/L)	AD-17	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-28	0.005	0.0001	0.006	No	21	0.002208	0.002327	80.95	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-30	0.005	0.0001	0.006	No	21	0.002034	0.002238	85.71	None	No	0.01	NP (NDs)
Arsenic, total (mg/L)	AD-17	0.000627	0.0002573	0.01	No	21	0.001969	0.00205	38.1	Kaplan-Meier	ln(x)	0.01	Param.
Arsenic, total (mg/L)	AD-28	0.0006625	0.0001709	0.01	No	21	0.002053	0.002147	33.33	Kaplan-Meier	ln(x)	0.01	Param.
Arsenic, total (mg/L)	AD-30	0.005	0.00019	0.01	No	21	0.002239	0.002277	42.86	None	No	0.01	NP (normality)
Barium, total (mg/L)	AD-17	0.239	0.1369	2	No	21	0.188	0.09255	0	None	No	0.01	Param.
Barium, total (mg/L)	AD-28	0.1648	0.1389	2	No	21	0.1519	0.02355	0	None	No	0.01	Param.
Barium, total (mg/L)	AD-30	0.104	0.054	2	No	21	0.07332	0.02676	0	None	No	0.01	NP (normality)
Beryllium, total (mg/L)	AD-17	0.0008043	0.0004549	0.004	No	21	0.0006997	0.0004653	9.524	None	ln(x)	0.01	Param.
Beryllium, total (mg/L)	AD-28	0.0007705	0.0005584	0.004	No	21	0.0006645	0.0001922	0	None	No	0.01	Param.
Beryllium, total (mg/L)	AD-30	0.0001539	0.0000632	0.004	No	21	0.0002765	0.0005739	9.524	None	No	0.01	NP (normality)
Cadmium, total (mg/L)	AD-17	0.001	0.00003	0.005	No	21	0.0004539	0.000485	42.86	None	No	0.01	NP (normality)
Cadmium, total (mg/L)	AD-28	0.001	0.00005	0.005	No	21	0.0005493	0.0004844	52.38	None	No	0.01	NP (NDs)
Cadmium, total (mg/L)	AD-30	0.001	0.000014	0.005	No	21	0.0005368	0.000498	66.67	None	No	0.01	NP (NDs)
Chromium, total (mg/L)	AD-17	0.001081	0.000435	0.1	No	21	0.001025	0.001232	4.762	None	ln(x)	0.01	Param.
Chromium, total (mg/L)	AD-28	0.0007841	0.0003463	0.1	No	21	0.001161	0.001536	19.05	Kaplan-Meier	ln(x)	0.01	Param.
Chromium, total (mg/L)	AD-30	0.001019	0.0004684	0.1	No	21	0.0009244	0.0009273	4.762	None	ln(x)	0.01	Param.
Cobalt, total (mg/L)	AD-17	0.01058	0.006005	0.009	No	21	0.008291	0.004144	0	None	No	0.01	Param.
Cobalt, total (mg/L)	AD-28	0.01527	0.01337	0.009	Yes	21	0.01432	0.00172	0	None	No	0.01	Param.
Cobalt, total (mg/L)	AD-30	0.003429	0.002219	0.009	No	21	0.002894	0.001156	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-17	6.062	2.61	5	No	21	4.336	3.129	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-28	2.667	1.713	5	No	21	2.269	1.029	0	None	x^(1/3)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-30	2.237	0.9917	5	No	21	1.747	1.246	0	None	sqrt(x)	0.01	Param.
Fluoride, total (mg/L)	AD-17	1	0.24	4	No	23	0.5345	0.3869	39.13	None	No	0.01	NP (normality)
Fluoride, total (mg/L)	AD-28	0.8239	0.611	4	No	22	0.7174	0.1983	4.545	None	No	0.01	Param.
Fluoride, total (mg/L)	AD-30	1	0.06	4	No	23	0.5543	0.4769	56.52	None	No	0.01	NP (NDs)
Lead, total (mg/L)	AD-17	0.005	0.00013	0.005	No	21	0.002399	0.002371	52.38	None	No	0.01	NP (NDs)
Lead, total (mg/L)	AD-28	0.005	0.00008	0.005	No	21	0.002381	0.002388	52.38	None	No	0.01	NP (NDs)
Lead, total (mg/L)	AD-30	0.005	0.00009	0.005	No	21	0.002399	0.002371	71.43	None	No	0.01	NP (NDs)
Lithium, total (mg/L)	AD-17	0.02142	0.01278	0.14	No	21	0.0171	0.007837	4.762	None	No	0.01	Param.
Lithium, total (mg/L)	AD-28	0.031	0.0223	0.14	No	21	0.02787	0.01116	0	None	No	0.01	NP (normality)
Lithium, total (mg/L)	AD-30	0.009828	0.008018	0.14	No	21	0.00872	0.002146	4.762	None	x^2	0.01	Param.
Mercury, total (mg/L)	AD-17	0.0002293	0.0001036	0.002	No	21	0.0001796	0.0001292	0	None	sqrt(x)	0.01	Param.
Mercury, total (mg/L)	AD-28	0.00006309	0.00002482	0.002	No	21	0.00004862	0.00004218	0	None	sqrt(x)	0.01	Param.
Mercury, total (mg/L)	AD-30	0.0006351	0.0001048	0.002	No	21	0.0004891	0.0006591	0	None	sqrt(x)	0.01	Param.
Molybdenum, total (mg/L)	AD-17	0.005	0.0005	0.005	No	19	0.002763	0.002057	89.47	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-28	0.005	0.0005	0.005	No	19	0.002755	0.002067	89.47	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-30	0.005	0.0005	0.005	No	19	0.002744	0.002053	84.21	None	No	0.01	NP (NDs)
Selenium, total (mg/L)	AD-17	0.005	0.0003	0.05	No	21	0.002554	0.002266	47.62	None	No	0.01	NP (normality)
Selenium, total (mg/L)	AD-28	0.005	0.00021	0.05	No	21	0.002457	0.002314	47.62	None	No	0.01	NP (normality)
Selenium, total (mg/L)	AD-30	0.005	0.0003	0.05	No	21	0.002482	0.002292	47.62	None	No	0.01	NP (normality)
Thallium, total (mg/L)	AD-17	0.002	0.0002	0.002	No	20	0.001031	0.0008427	80	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-28	0.002	0.0002	0.002	No	20	0.001054	0.0008273	90	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-30	0.002	0.0002	0.002	No	20	0.0009943	0.0008129	75	None	No	0.01	NP (NDs)

Non-Parametric Confidence Interval

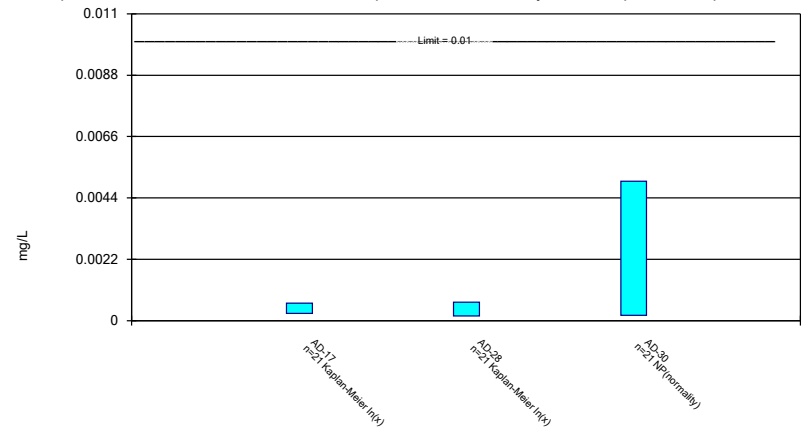
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Antimony, total Analysis Run 8/25/2022 8:26 AM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric and Non-Parametric (NP) Confidence Interval

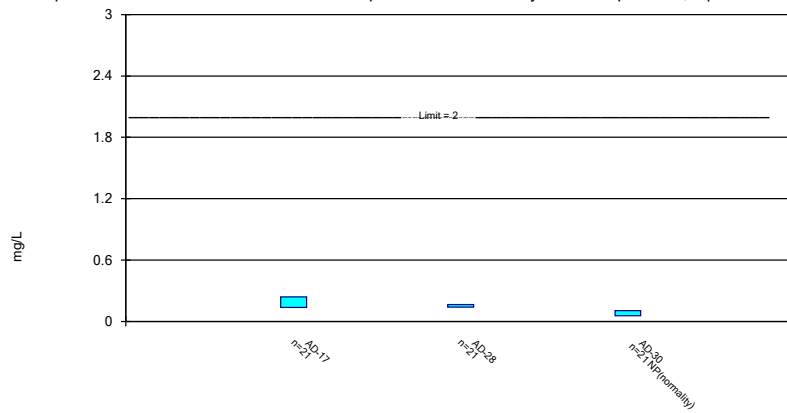
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Arsenic, total Analysis Run 8/25/2022 8:26 AM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric and Non-Parametric (NP) Confidence Interval

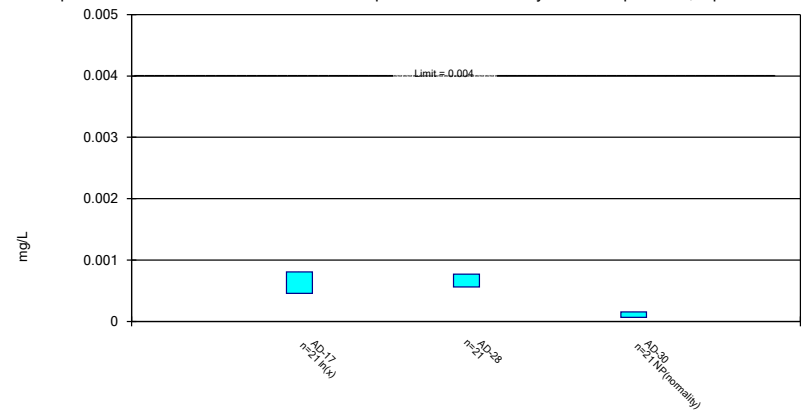
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Barium, total Analysis Run 8/25/2022 8:26 AM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric and Non-Parametric (NP) Confidence Interval

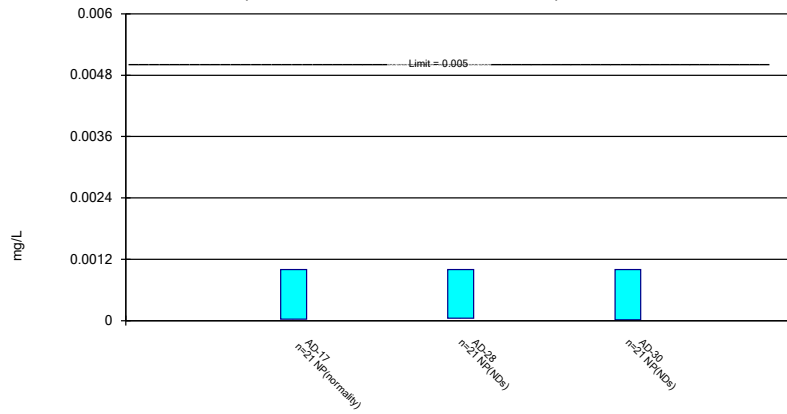
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Beryllium, total Analysis Run 8/25/2022 8:26 AM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Non-Parametric Confidence Interval

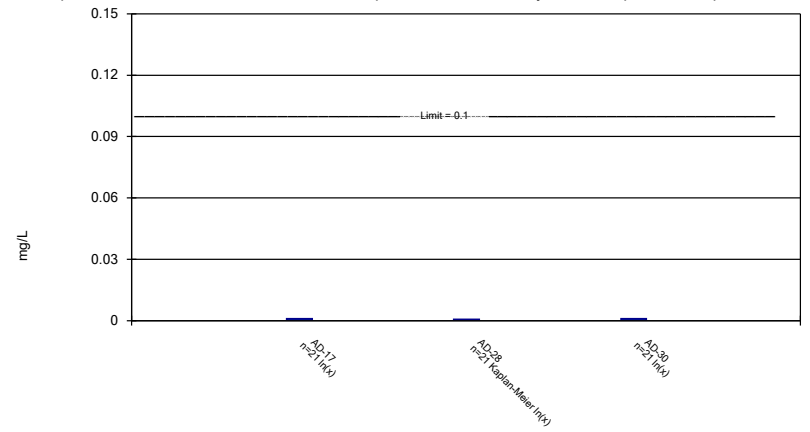
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Cadmium, total Analysis Run 8/25/2022 8:26 AM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric Confidence Interval

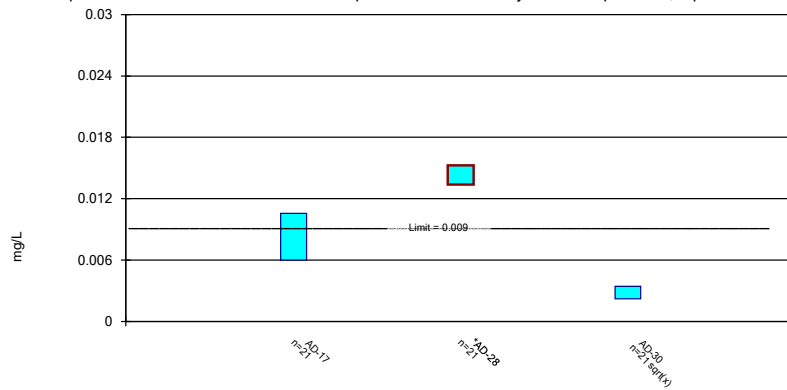
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Chromium, total Analysis Run 8/25/2022 8:26 AM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric Confidence Interval

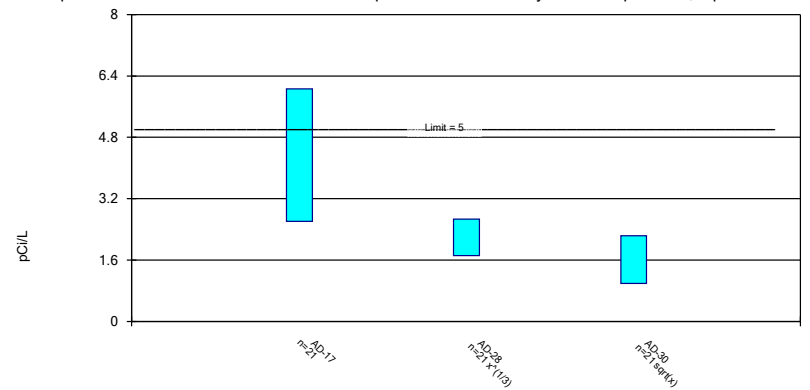
Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt, total Analysis Run 8/25/2022 8:26 AM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric Confidence Interval

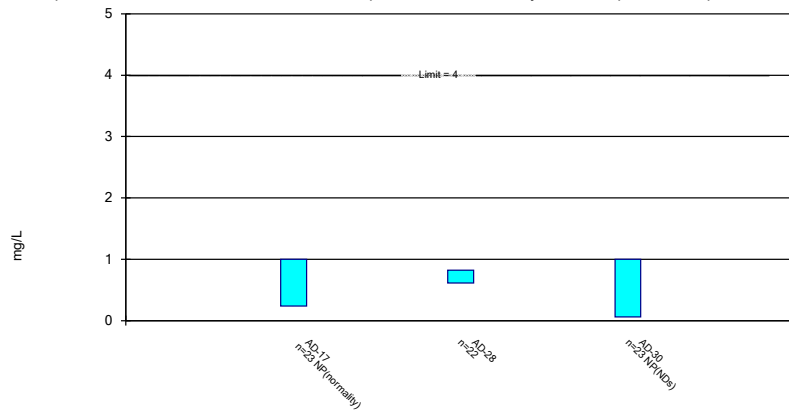
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Combined Radium 226 + 228 Analysis Run 8/25/2022 8:26 AM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric and Non-Parametric (NP) Confidence Interval

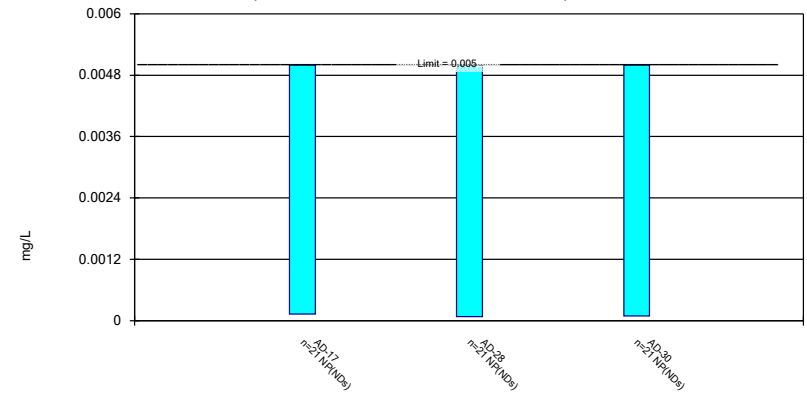
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Fluoride, total Analysis Run 8/25/2022 8:26 AM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Non-Parametric Confidence Interval

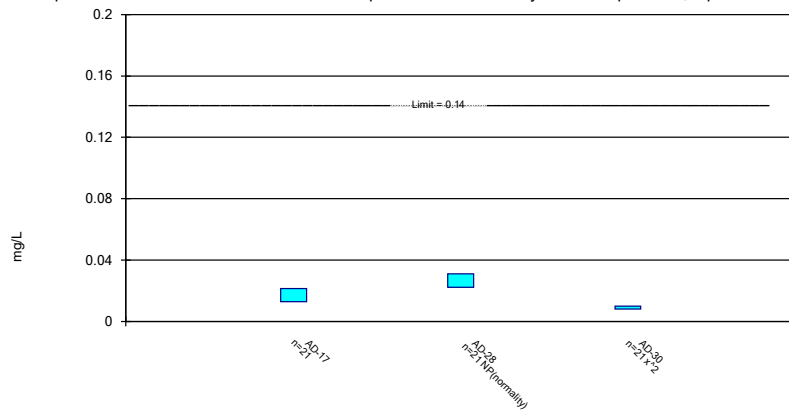
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Lead, total Analysis Run 8/25/2022 8:26 AM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric and Non-Parametric (NP) Confidence Interval

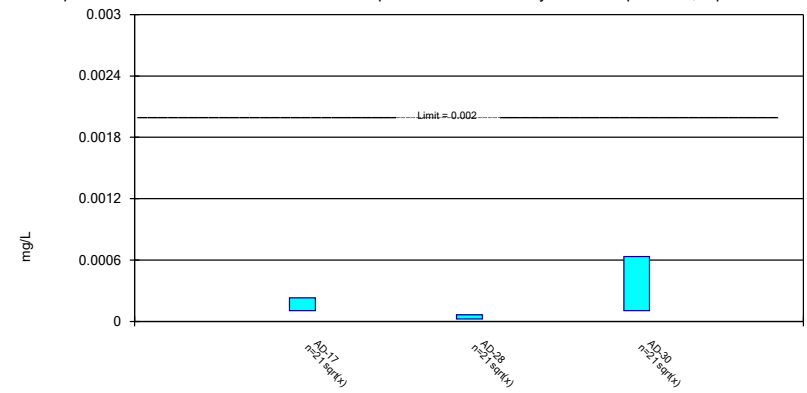
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



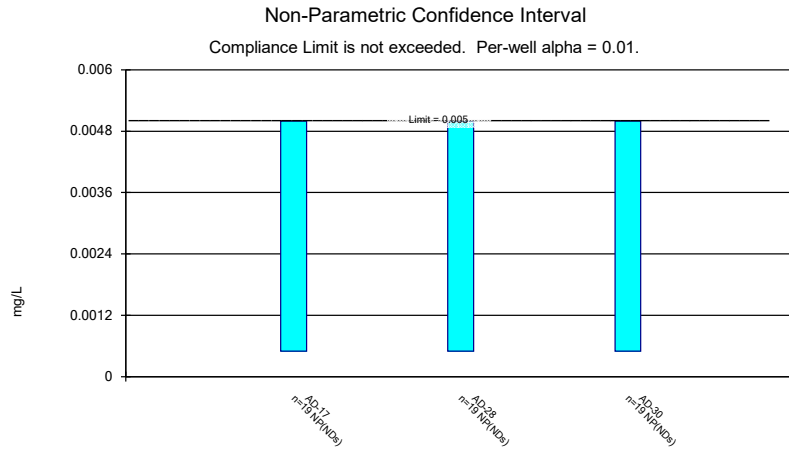
Constituent: Lithium, total Analysis Run 8/25/2022 8:26 AM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric Confidence Interval

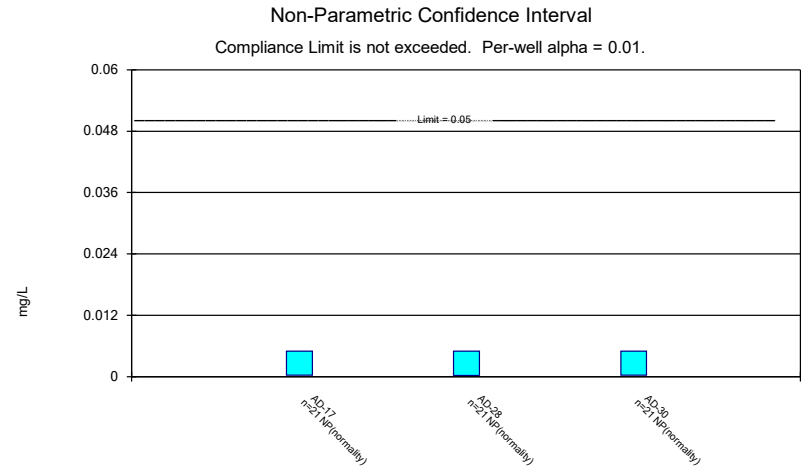
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



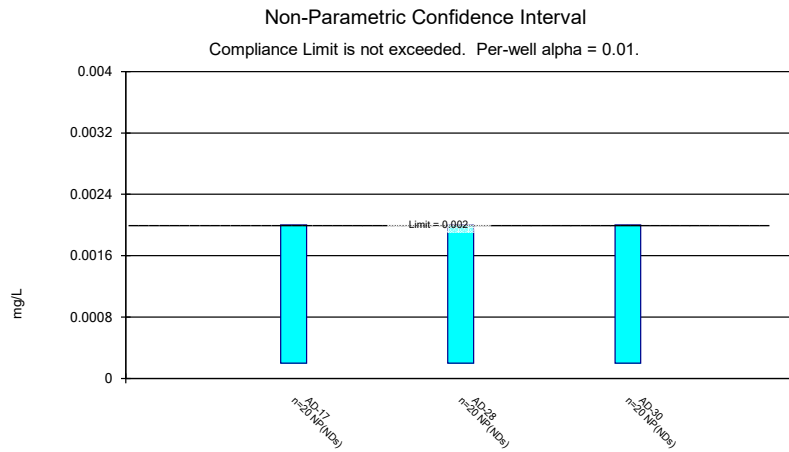
Constituent: Mercury, total Analysis Run 8/25/2022 8:26 AM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP



Constituent: Molybdenum, total Analysis Run 8/25/2022 8:26 AM View: Appendix IV
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP



Constituent: Selenium, total Analysis Run 8/25/2022 8:26 AM View: Appendix IV
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP



Constituent: Thallium, total Analysis Run 8/25/2022 8:26 AM View: Appendix IV
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

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. 32¹ prior to submittal of this data to TCEQ.

¹ 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
West 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
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June 2022

CHA8495

TABLE OF CONTENTS

SECTION 1 Introduction and Summary.....	1-1
1.1 CCR Rule Requirements.....	1-1
1.2 Demonstration of Alternative Sources.....	1-2
SECTION 2 Alternative Source Demonstration.....	2-1
2.1 Regional Geology/Site Hydrogeology.....	2-1
2.2 Proposed Alternative Source	2-1
2.3 Sampling Requirements.....	2-4
SECTION 3 Conclusions and Recommendations	3-1
SECTION 4 References.....	4-1

TABLES

Table 1	Summary of Key Analytical Data
Table 2	Soil Cobalt Data
Table 3	AD-28 Mineralogy Results
Table 4	B-3 X-Ray Diffraction Results

FIGURES

Figure 1	Potentiometric Contours – Uppermost Aquifer November 2021
Figure 2	Aqueous Cobalt Distribution
Figure 3	Cobalt Distribution in Soil
Figure 4	B-3 Visual Boring Log

ATTACHMENTS

Attachment A	Geologic Cross-Section A-A'
Attachment B	SB-28 Boring Log
Attachment C	SB-28 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 Spectroscopy
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 Procedure
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 a statistically significant level (SSL) for cobalt in the groundwater monitoring network at the H.W. Pirkey Plant Western Bottom Ash Pond (WBAP), 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 WBAP (**Figure 1**). The WBAP 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 WBAP 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 facility (Geosyntec, 2020a) and United States Environmental Protection Agency's (USEPA) *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 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). An SSL was identified for cobalt at AD-28 at the WBAP, where the LCL of 0.0135 milligrams per liter (mg/L) exceeded the calculated GWPS of 0.0090 mg/L (Geosyntec, 2021a). No other SSLs were identified.

1.1 CCR Rule Requirements

TCEQ regulations (TCEQ, 2020a) regarding assessment monitoring programs for CCR landfills and surface impoundments 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 section, 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 SSL identified for cobalt at AD-28 is from a source other than the WBAP.

1.2 Demonstration of Alternative Sources

An evaluation was completed to assess possible alternative sources to which the identified SSL 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 SSL identified for cobalt at AD-28 was based on a Type IV cause and not by a release from the Pirkey WBAP.

SECTION 2

ALTERNATIVE SOURCE DEMONSTRATION

The TCEQ CCR rules 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 SSL identified for cobalt and the proposed alternative source are described below.

2.1 Regional Geology/Site Hydrogeology

The WBAP 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 WBAP 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 located about 7 feet below the WBAP with an average thickness of approximately 15 feet. Geologic cross-section A-A' from the Arcadis (2016) shows the subsurface structure of the uppermost aquifer (indicated on the figure as clayey silty sand, tan to gray) underlying the WBAP and the East Bottom Ash Pond (EBAP). This figure as well as a cross-section location map is provided as **Attachment A**. Geologic cross-section A-A' demonstrates lateral continuity of the uppermost aquifer spanning the entire length of the WBAP.

Groundwater flow direction in the area of the WBAP is west-southwesterly (**Figure 1**). Seasonal variability in groundwater flow has not been observed since the monitoring well network was installed. Groundwater flow velocities in the Uppermost Aquifer in the area of the WBAP have been reported as approximately 5 to 40 feet/year. The WBAP monitoring well network consists of upgradient monitoring wells AD-3 and AD-17, and compliance wells AD-12, AD-18, AD-28, AD-29, and AD-30, 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 due to Type I (sampling), Type II (laboratory), Type III (statistical evaluation), or Type V (alternative: anthropologic) issues. Groundwater sampling, laboratory analysis, and statistical evaluations were generally completed in accordance with the 30 TAC §352.931 and draft TCEQ guidance for groundwater monitoring (TCEQ, 2020b). As described below, the SSL has been attributed to natural variation associated with the underlying geology, which is a Type IV (natural variation) issue.

Monitoring well AD-28 is located near the southwest corner of the WBAP, as shown in **Figure 1**. Previous ASDs for cobalt at the WBAP provided evidence that cobalt is present in the aquifer

media at the site and that the observed cobalt concentrations were due to natural variation of native geogenic sources (Geosyntec, 2019a; Geosyntec, 2019b; Geosyntec, 2020b; Geosyntec, 2020c; Geosyntec, 2021a; Geosyntec, 2021b). The previous ASDs discussed how the WBAP 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-864 Test Method 1312 [USEPA, 1994]) of the ash material. Cobalt was not detected in the SPLP leachate above the reporting limit of 0.01 mg/L, which is lower than the average concentration at AD-28 (**Table 1**).

A surface water sample was collected from the WBAP in November 2020 to characterize the total cobalt concentrations. Cobalt was detected at a concentration of 0.000501 mg/L in this sample. No changes to material handling or plant operations have occurred which would change the anticipated cobalt concentrations in the WBAP since this sample was collected. The WBAP ceased receipt of CCR and non-CCR waste streams in March 2022 and commenced closure by removal activities (AEP, 2022). The cobalt concentration from the November 2020 surface water sample is lower than all reported cobalt concentrations for in-network wells from the most recent WBAP sampling event, and over an order of magnitude lower than the average concentration observed at AD-28 (**Figure 2; Table 1**). Thus, the WBAP is not the likely source of cobalt at AD-28.

As noted in the previous ASDs, soil samples collected across the site, including from locations near the WBAP, identified cobalt in the aquifer solids at varying concentrations. SB-28 was advanced in the vicinity of AD-28 in April 2020 to re-log the geology at AD-28 and collect samples for laboratory analysis of total metals and mineralogy. The SB-28 field boring log, which was generated by Auckland Consulting LLC, is provided as **Attachment B**. Cobalt was identified at SB-28 at concentrations of 4.53 milligrams per kilogram (mg/kg) at 15.5-16 feet below ground surface (bgs) and 8.70 mg/kg at 40-41 feet bgs (**Table 2**). The 15.5-16 feet bgs interval at SB-28 correlates to the depth of the monitoring well screen of AD-28 (15-35 feet bgs), indicating that naturally occurring cobalt is present in aquifer solids within the AD-28 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 WBAP (**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 WBAP. X-ray diffraction (XRD) analysis of soils from SB-28 identified pyrite (an iron sulfide mineral) in samples collected at 25-30 feet bgs and 40-41 feet bgs at concentrations up to 3% by weight (**Table 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 angstrom (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 WBAP constitutes a potential source of naturally occurring cobalt.

The aquifer solids at SB-28 are distinctly red in color at shallow depths, as illustrated in the photolog of soil cores provided in **Attachment C**. Red color in soils is often associated with the presence of oxidized iron-bearing minerals such as hematite and goethite. Goethite, an iron

hydroxide mineral (FeOOH), was present at depths up to 16 ft bgs at SB-28 at up to 37% of the total aquifer solids (**Table 3**). The alteration of pyrite to goethite under oxidizing conditions is 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 weathering to iron oxide/hydroxide minerals.

As described in an ASD previously generated for the Pirkey Plant's EBAP, 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-30, an existing well within the WBAP groundwater monitoring network. Solid phases within these groundwater samples were separated and submitted for analysis of chemical composition and mineralogy. For the VAP samples, separation was completed using a centrifuge due to the high abundance of suspended solids. For the groundwater sample at AD-30, 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 AD-30, 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 4**). 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 ft 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 WBAP was not identified as the source of cobalt at AD-28 based on the low concentrations of cobalt in the pond itself. Cobalt concentrations at AD-28 are believed to be a result of natural variability within the aquifer. The presence of pyrite and iron oxides has been confirmed at AD-28 and across the Site. Naturally occurring cobalt is known to substitute for iron in pyrite, which is then known to weather to iron oxides/hydroxides. 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 Sampling Requirements

As the ASD presented above supports the position that the identified SSL is not due to a release from the Pirkey WBAP, the unit will remain in the assessment monitoring program. Groundwater at the unit will continue to be sampled for Appendix IV parameters on a semi-annual 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 SSL for cobalt identified at AD-28 during assessment monitoring in November 2021 was not due to a release from the WBAP. The identified SSL was instead attributed to natural variation in the underlying geology. Therefore, no further action is warranted, and the Pirkey WBAP 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 Analytical Data
West Bottom Ash Pond - H.W. Pirkey Plant**

Geosyntec Consultants, Inc.

Sample	Sample Date	Unit	Cobalt Concentration
Bottom Ash (Solid Material)	2/11/2019	mg/kg	5.8
SPLP Leachate of Bottom Ash	2/11/2019	mg/L	<0.01
WBAP Pond Water	11/4/2020	mg/L	0.000501
AD-28 - Average	May 2016 - November 2021	mg/L	0.0143

Notes:

mg/kg - milligram per kilogram

mg/L - milligram per liter

An average value was calculated for AD-28 using all cobalt data collected under 40 CFR 257 Subpart D

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

Location ID	Location	Sample Depth (ft bgs)	Cobalt (mg/kg)
Bulk Soil Samples			
AD-28	WBAP Network	6-6.5	< 2.38
		15.5-16	4.53
		25-30	< 2.50
		40-41	8.70
AD-30	WBAP Network	7	1.00
		23	15.0
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
AD-41	Upgradient	15	<1.0
		35	23.5
		95	1.90
Solid Material Retained After Filtration			
AD-30	WBAP Network	15-25	9.3 J
B-2	Upgradient	38-48	4.3 J
B-3	Upgradient	29-34	12.0
		VAP 40-45	18.0

Notes:

mg/kg- milligram per kilogram
ft bgs - feet below ground surface
J = estimated value

For AD-28 and AD-30, 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 at B-2, B-3, and AD-41 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 - AD-28 Mineralogy Results
West Bottom Ash Pond - H. W. Pirkey Plant**

Boring ID	SB-28 (AD-28)			
Sample Depth Interval	6-6.5	15.5-16	25-30	40-41
Sample Location	Above Screened Interval	Within Screened Interval		Below Screened Interval
Color	Red-brown to yellow-brown	Light gray, light red-brown	Brown, light red-brown	Gray to dark gray
Mineralogy				
Quartz	58%	46%	73%	34%
Pyrite	--	--	3%	3%
K-Feldspar	--	1%	1%	1%
Siderite	--	--	2%	52%
Goethite	37%	15%	--	--
Anhydrite	--	--	--	2%
Clay/Mica	5%	38%	21%	8%

Notes:

Sample depths are shown in feet below ground surface (bgs)

Well AD-28 is screened from 15-35 ft. below ground surface.

Mineralogical component results are given in relative % abundance.

Table 4: B-3 X-Ray Diffraction Results
West Bottom Ash Pond - H. W. Pirkey Plant

Geosyntec Consultants, Inc.

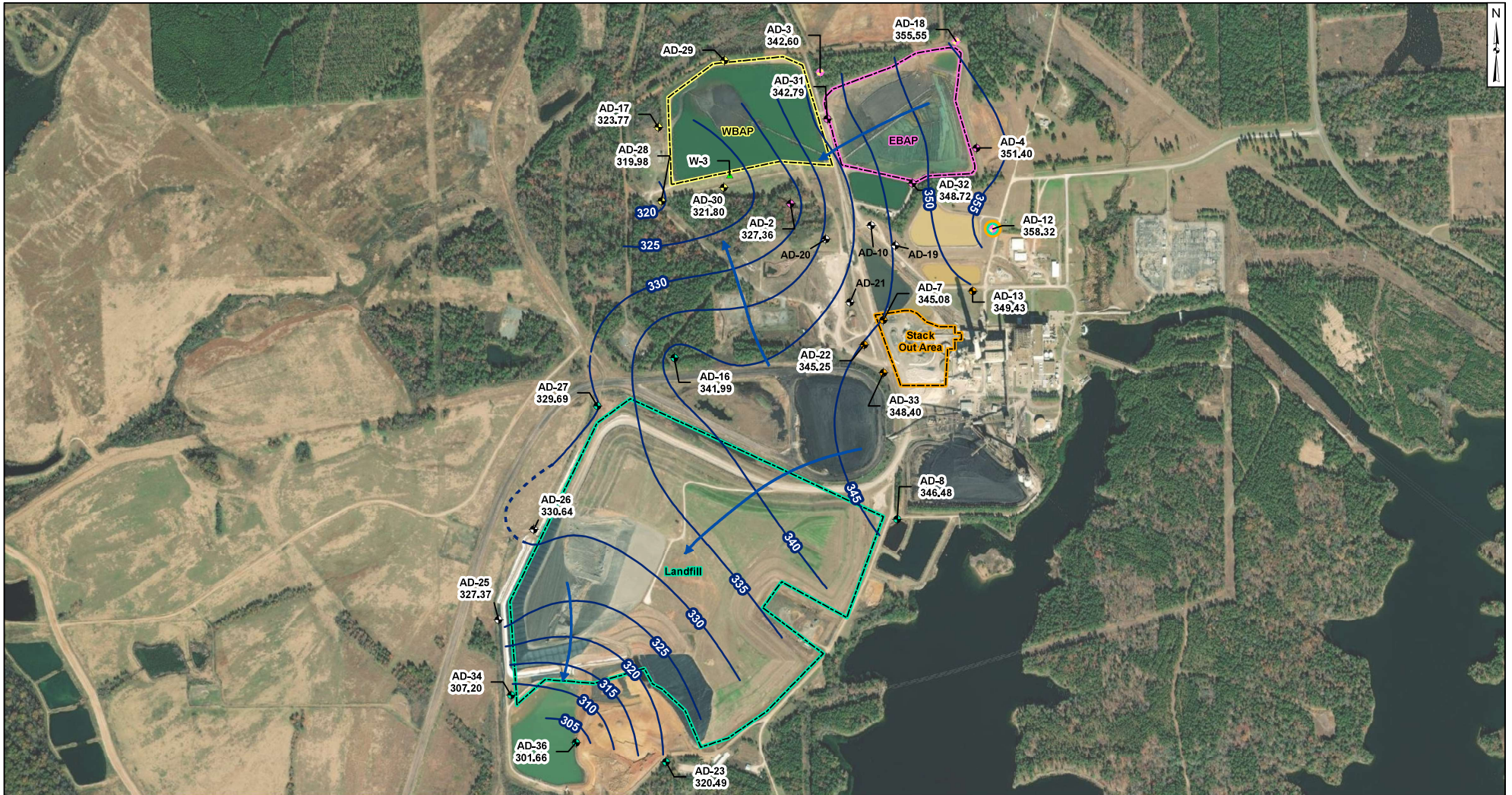
Constituent	VAP-B3-(40-45)
Quartz	15
Plagioclase Feldspar	0.5
Orthoclase	ND
Calcite	ND
Dolomite	ND
Siderite	0.5
Goethite	ND
Hematite	2
Pyrite	3
Kaolinite	42
Chlorite	4
Illite/Mica	6
Smectite	12
Amorphous	15

Notes:

ND: Not detected

Results given in units of relative % abundance
VAP-B3-(40-45) is the centrifuged solid
material from the groundwater sample collected
at that interval.

FIGURES

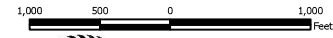


Legend

- 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

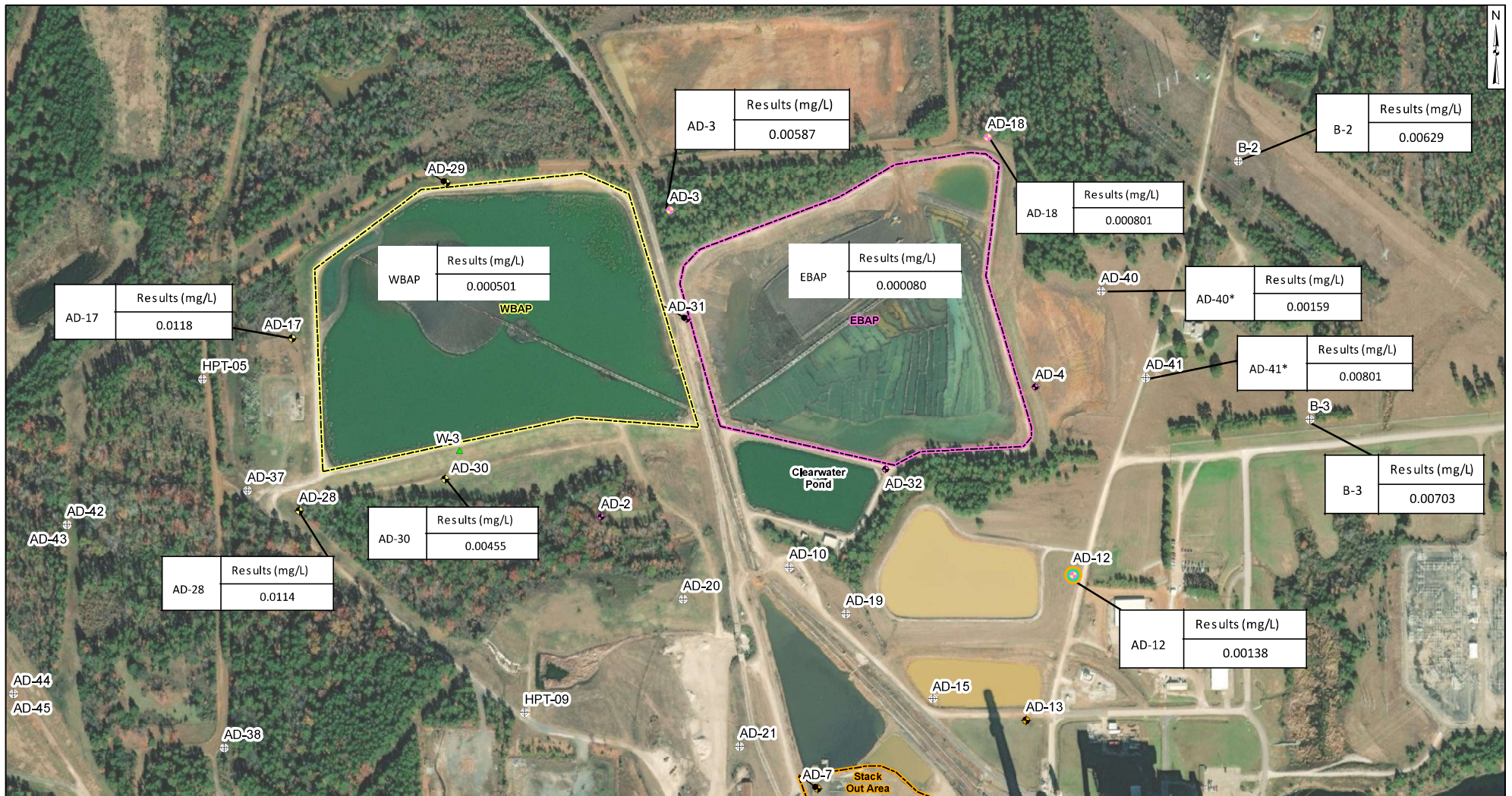
Notes

- 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	Figure 1
Columbus, Ohio	01/13/2022

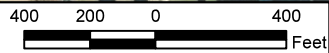


Legend

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

Notes

- Monitoring well coordinates, site features, and data provided by AEP.
- AD-15 location is approximated
- Samples collected in November 2021
- * - Well most recently sampled August 2019
- AD-29 included in the well network for water level measurements only
- EBAP surface water sample was collected in June 2020
- WBAP surface water sample was collected in November 2020



Aqueous Cobalt Distribution

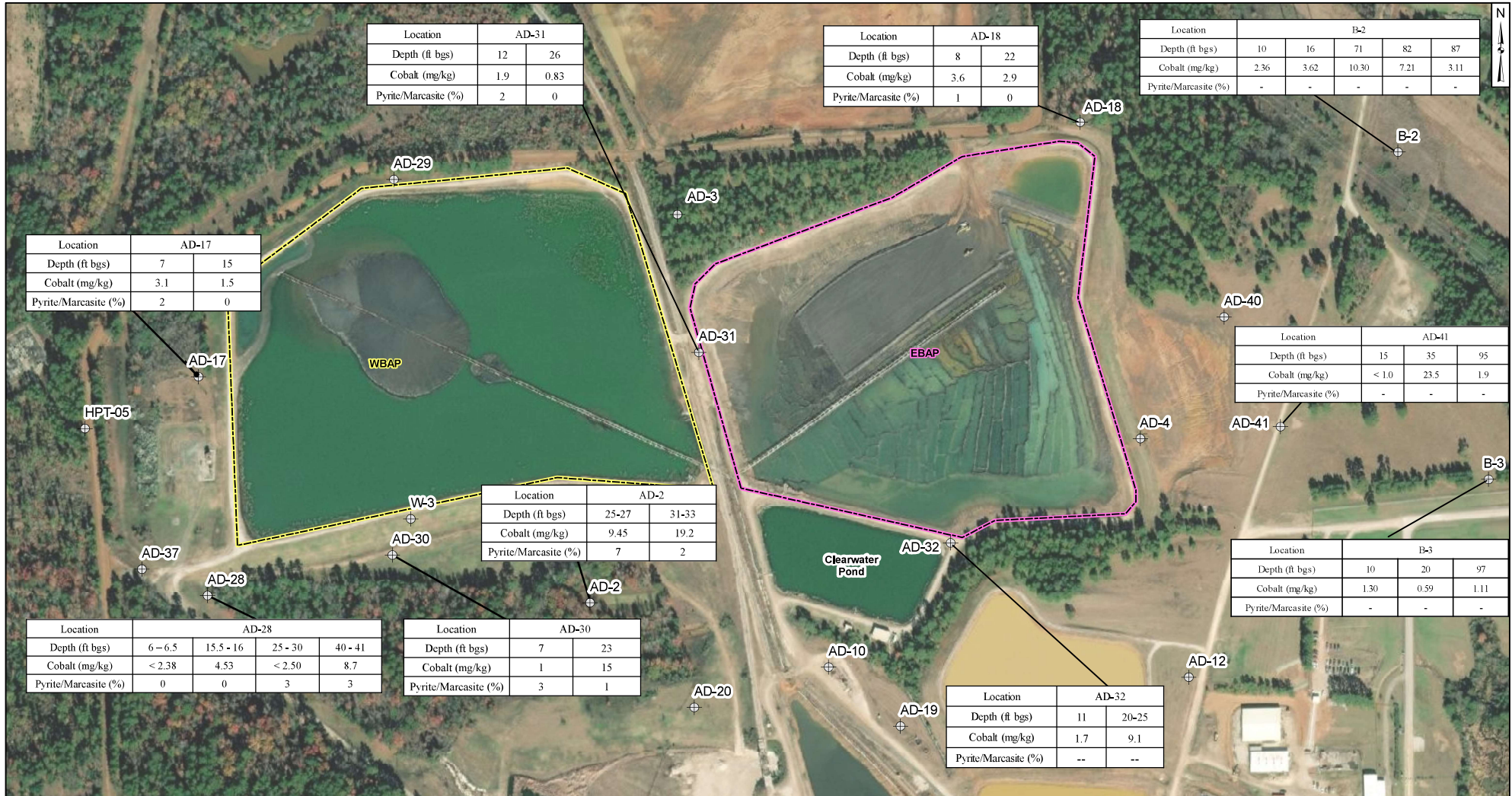
AEP Pirkey Power Plant
Hallsville, Texas

Geosyntec
consultants




Columbus, Ohio 2022/05/02

Figure

2

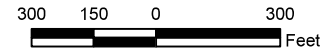


Legend

-  Monitoring Wells
-  EBAP
-  WBAP

Notes

- Monitoring well coordinates provided by AEP.
- AD-2 and AD-28 samples 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.



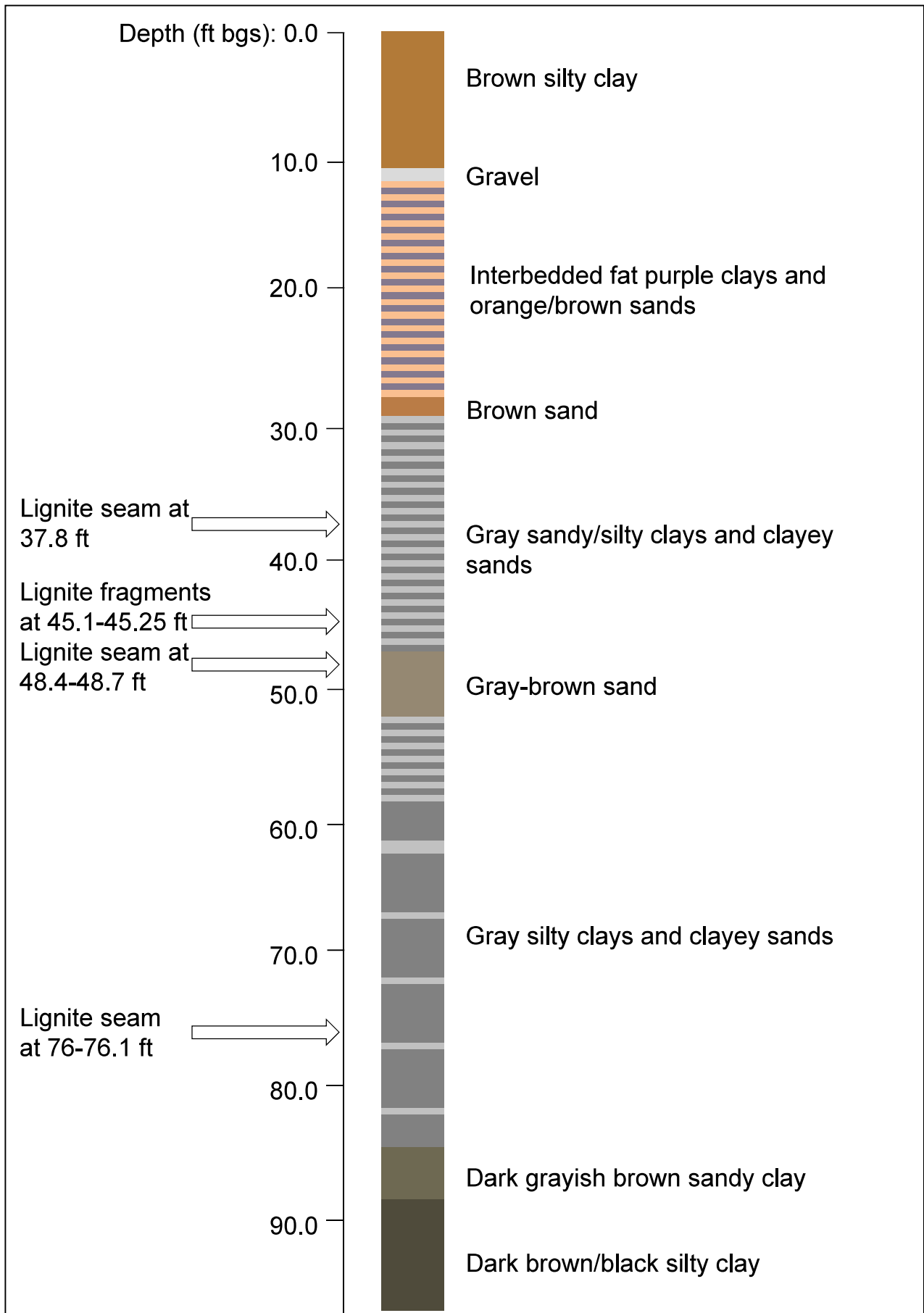
Cobalt Distribution in Soil

AEP Pirkey Power Plant
Hallsville, Texas

Geosyntec
consultants

Columbus, Ohio 2022/05/23

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

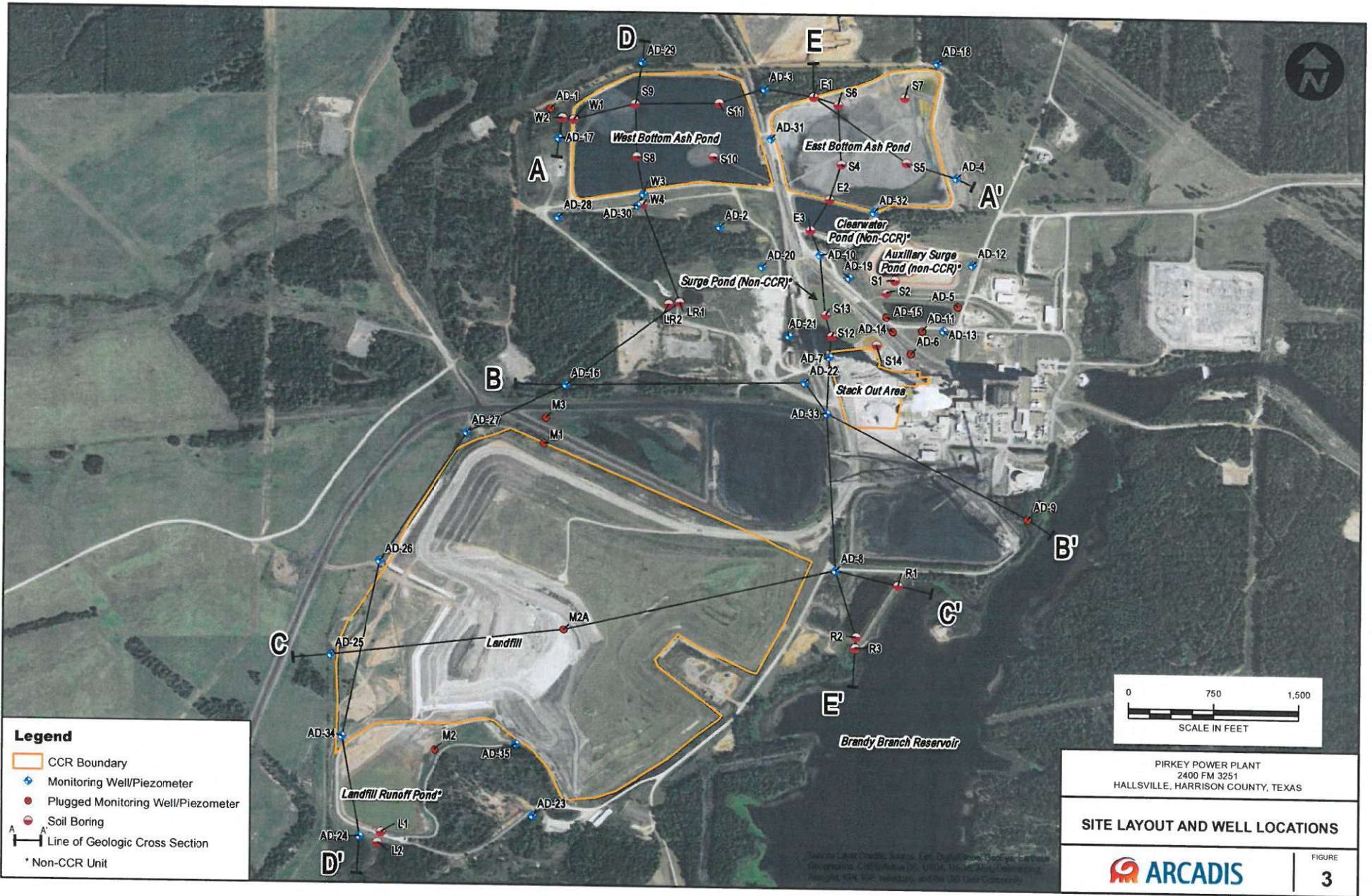
Figure

4

CHA8462

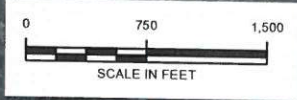
March 2020

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

ATTACHMENT B
SB-28 Boring Log

PROJECT NO. _____ PROJ. _____ BOR. NO. SB-28
 LOCATION AD-28/MW-28 - Pirkey Power Plant ELEV. _____ DATE 4/20/20

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

SAMPLE INTERVAL TEST ASSIGNMENT	SAMPLE NO. 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 SM	4'	0-2	0-2	Br Lt Br	Si	Sa	Silty sand, trace clay & roots, trace fine brook and gravel,				moist (0-2)		
2'		2-10'	2-10'	Rd Br, Yllw Br	Si, Gr	Cl	Clay - some silt, trace 1/2" sand, trace coarse iron ore concretions				moist (2-5)		
CL	1.5'	5-10	5-10				- some v.f. sand, ironstone layer @ 6-6.5'				moist (5-10)		
10'	1'	10-15'	10-15'	Rd Br, Lt Gr	Si Cl	Sa	clayey v.f. f				v. moist (10-15)		
SC SM	1.5'	15-20	15-20	Lt. br & Lt. Rd Br			thick lenses, trace cemented clayey sand				v. moist (15-16)		
16'	3"	20-25	20-25	Br, Lt. Rd Br	Si	Sa	- clay lenses @ 15' (6") - ironstone layer @ 15.5' & cemented sand to 16'				saturated @ 16' to 40'		
SM	3'	25-30	25-30	Gray			- gray @ 20'				some cemented clayey sand (only recovery @ 25-30')		
	NR	30-35	30-35										
	NR	35-40	35-40										
							R.T. @ 40'						
40'	1'	40-41	40-41	Gray, DK Gray	Cl	Sa	* Split Spoon Driven from 40-41'						
SC							clayey sand w/ lenses of cemented sand @ 41.5-41.75'				v. moist 40-41'		
							trace gypsum crystals @ 40-41'						
							* 6-6.5' collected @ 1140						
							* 15.5-16' collected @ 1215						
							* 25-36' collected @ 1230						
							* 40-41' collected @ 1300						

Type ASA Dry Auger Rotary Wash
 SEEPAGE @ 16 FT. WHILE DRILLING, W.L. @ _____ FT. ON COMPL. (OR) BAILED TO _____ FT. UPON COMPLETION.
 W.L. @ _____ FT AND CAVED TO _____ FT. ON _____.

* GPS: 32.46544°, -94.49432 (18' W-NW) of AD-28/MW-28

ATTACHMENT C
SB-28 Boring Photographic Log

GEOSYNTEC CONSULTANTS
Photographic Record



Client: American Electric Power

Project Number: CHA8495/12A/02

Site Name: H.W. Pirkey Plant WBAP

Site Location: Hallsville, Texas

Photograph 1

Date: 4/21/2020

Direction: N/A

Comments:
Multiple sections of core from soil boring SB-28 advanced near downgradient monitoring well AD-28 within the Western Bottom Ash Pond (WBAP) CCR unit. 5-foot pushes were used. Note the reddish color indicating the presence of oxidized iron-bearing minerals.



Photograph 2

Date: 4/21/2020

Direction: N/A

Comments:
0-5 foot interval of SB-28.



Photograph 3

Date: 4/21/2020

Direction: N/A

Comments:
5-10 foot interval of SB-28. Recovery of this interval was limited. A sample was collected from this interval from 6-6.5 ft. below ground surface (bgs).

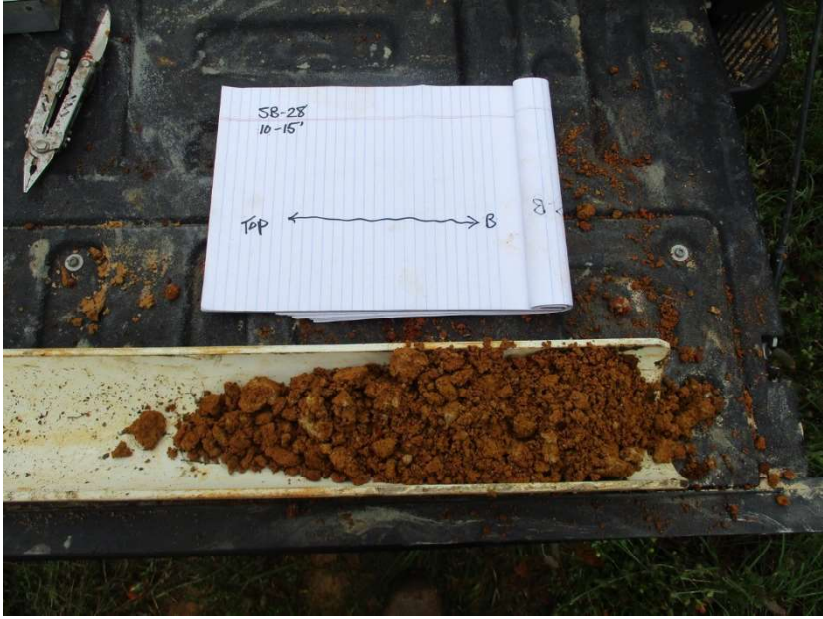



Photograph 4

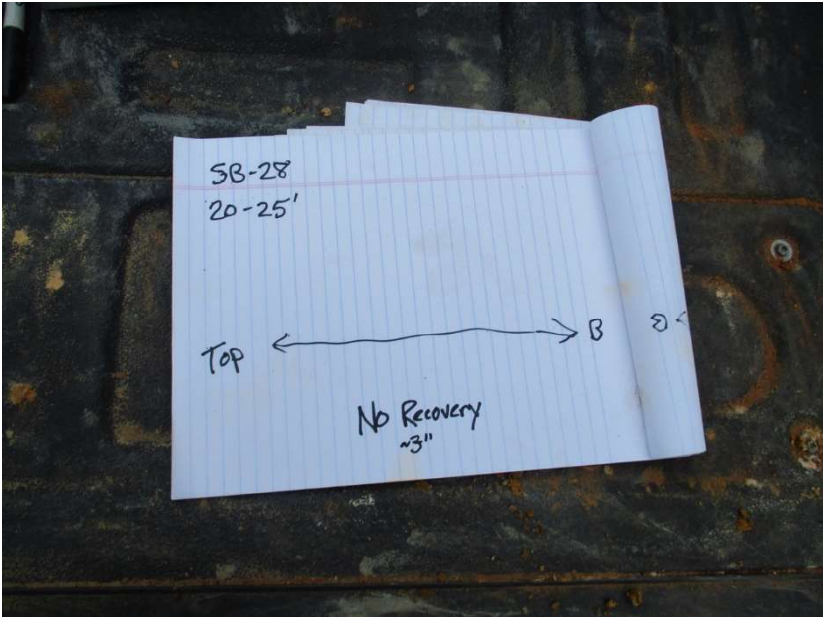
Date: 4/21/2020


Direction: N/A


Comments:
10-15 foot interval of SB-28. Recovery of this interval was limited.



Photograph 5	
Date: 4/21/2020	
Direction: N/A	
<p>Comments: 15-20 foot interval of SB-28. Recovery of this interval was limited. A sample was collected from this interval from 15.5-16 ft. bgs.</p>	

Photograph 6	
Date: 4/21/2020	
Direction: N/A	
<p>Comments: Field geologist's note indicating that very little of the 20-25 foot interval of SB-28 was recovered.</p>	

Photograph 7	
Date: 4/21/2020	
Direction: N/A	
Comments: 25-30 foot interval of SB-28. Very little of this interval was recovered. Note the color change of the soil from red to dark brown/black. A sample was collected from this interval.	

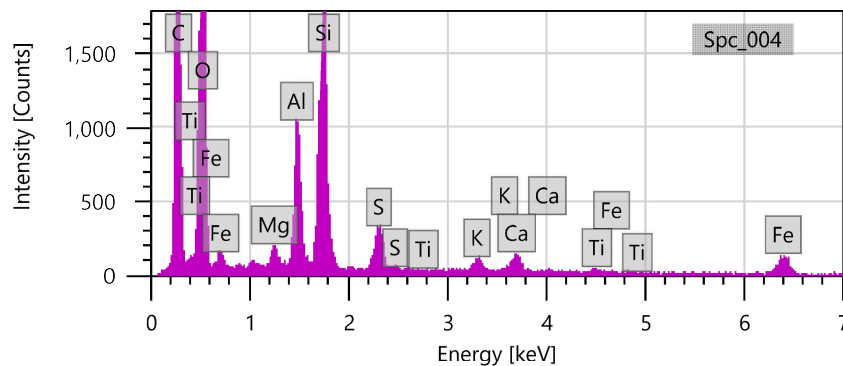
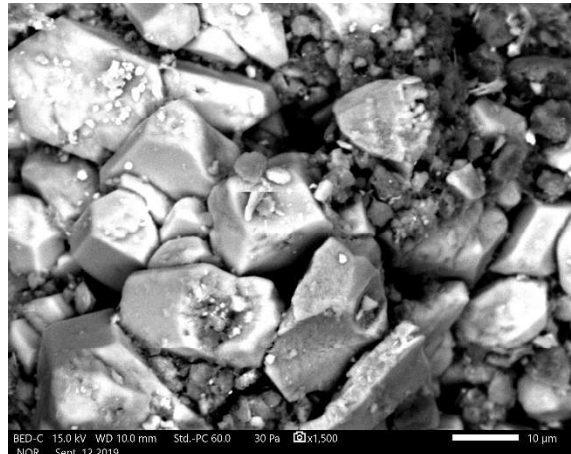
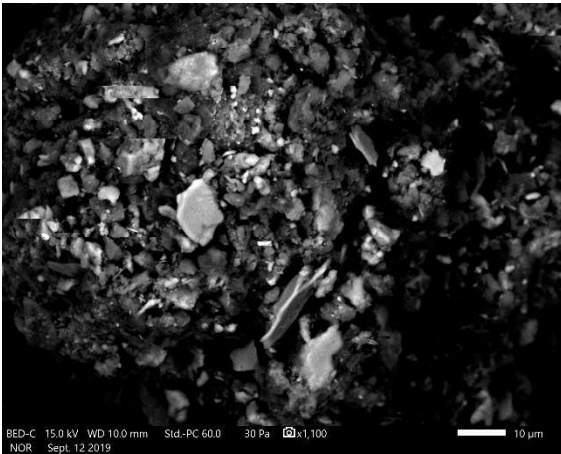
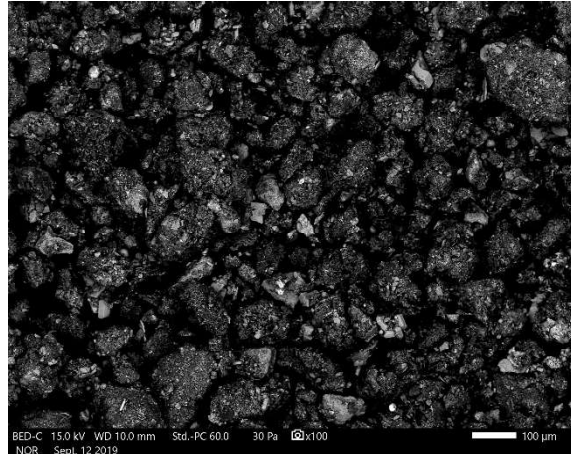
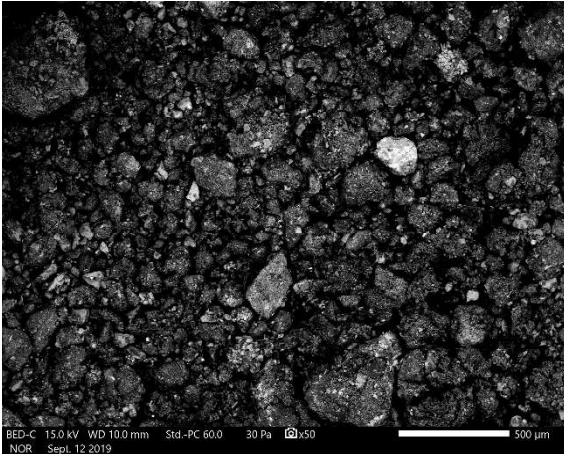
Photograph 8	
Date: 4/21/2020	
Direction: N/A	
Comments: Bottom of SB-28. The boring log indicates no recovery of soil from the 30-40 foot interval. A sample was collected from this interval.	

ATTACHMENT D
SEM/EDS Analysis

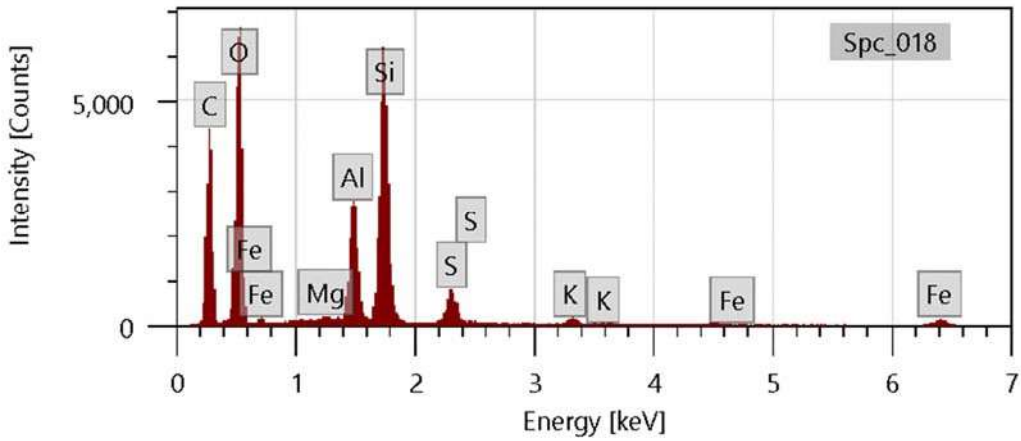
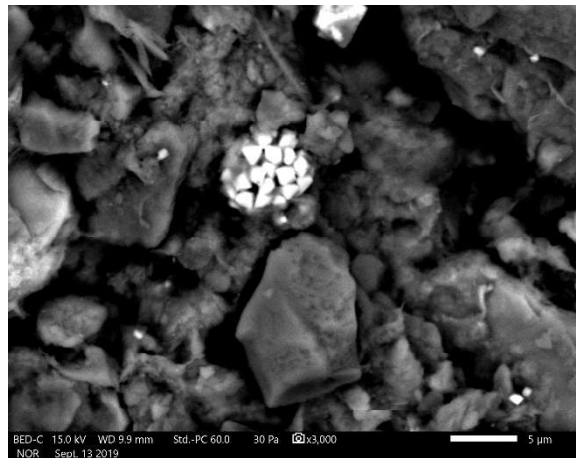
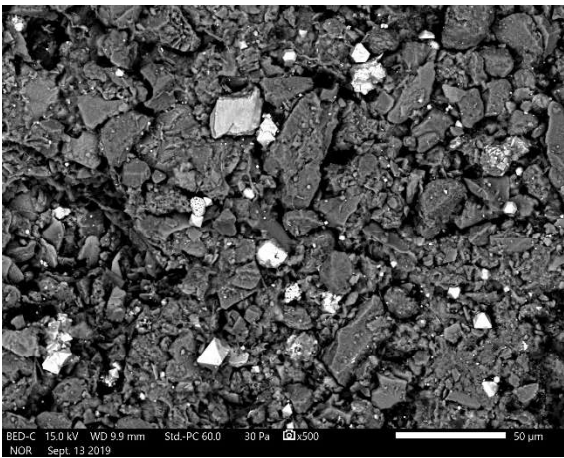
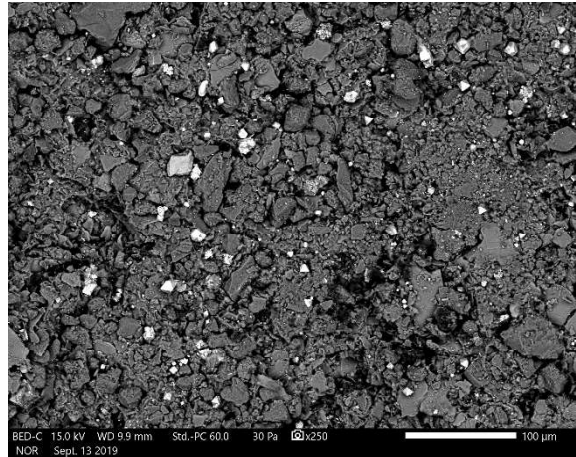
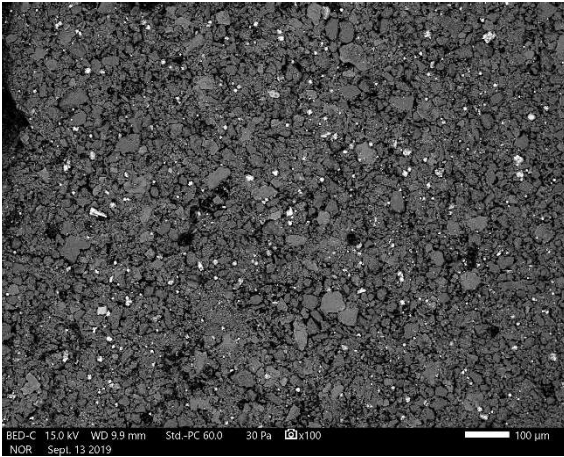
September 16, 2019

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

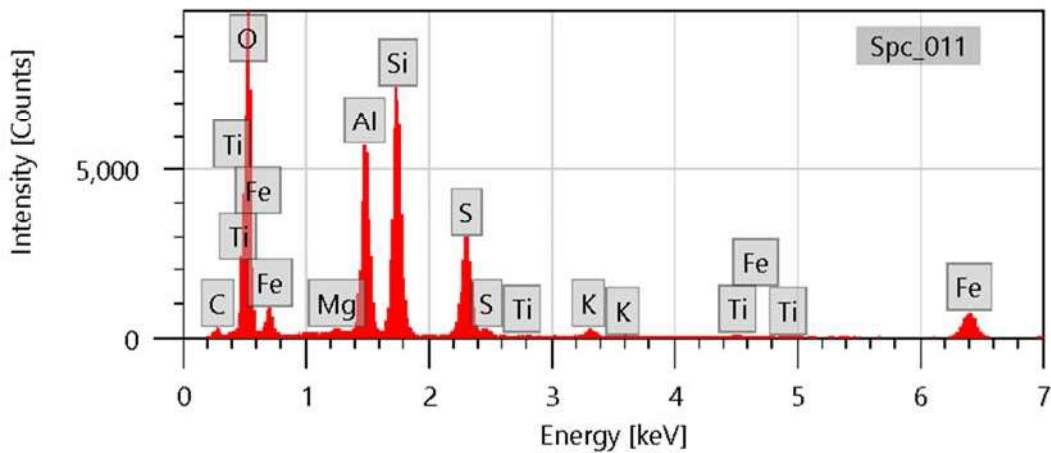
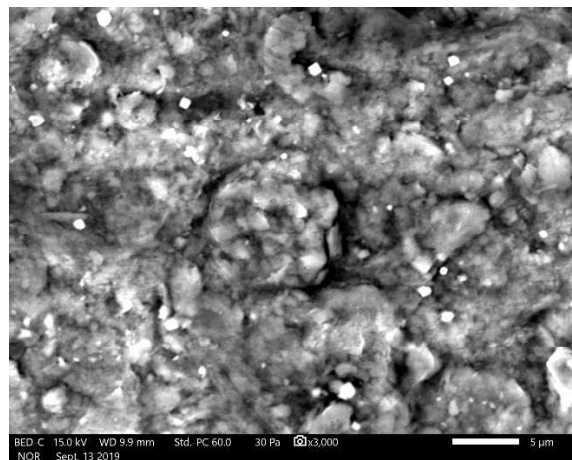
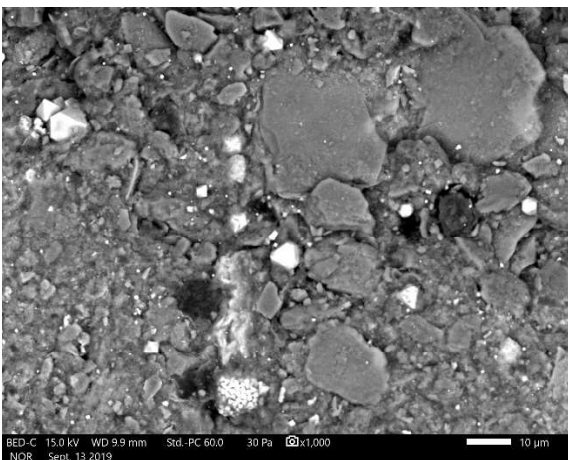
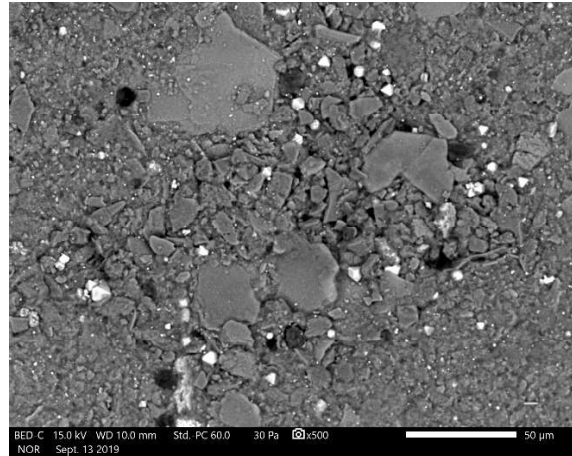
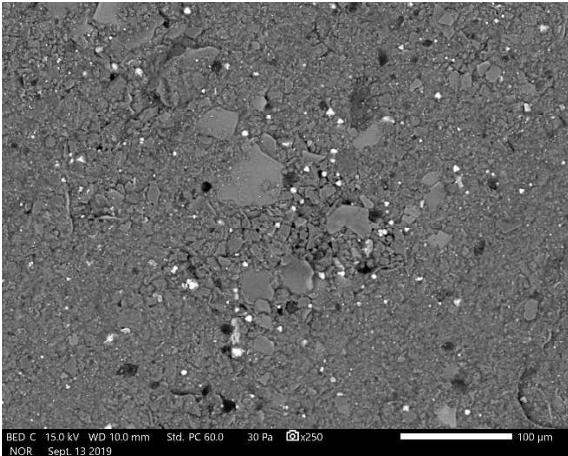
via Email: BSass@geosyntec.com



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 West Bottom Ash Pond CCR management area and that the requirements of 30 TAC § 352.951(e) have been met.

Beth Ann Gross
Printed Name of Licensed Professional Engineer

Beth Ann Gross
Signature



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

Texas Registered Engineering Firm
No. F-1182

79864
License Number

Texas
Licensing State

6/16/2022
Date

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

**H.W. Pirkey Power Plant
West 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

TABLE OF CONTENTS

SECTION 1 Introduction and Summary.....	1-1
1.1 CCR Rule Requirements.....	1-1
1.2 Demonstration of Alternative Sources.....	1-2
SECTION 2 Alternative Source Demonstration.....	2-1
2.1 WBAP Design and Construction	2-1
2.2 Regional Geology/Site Hydrogeology.....	2-1
2.3 Proposed Alternative Source	2-2
2.4 Sampling Requirements.....	2-4
SECTION 3 Conclusions and Recommendations	3-1
SECTION 4 References.....	4-1

TABLES

Table 1	Summary of Key Analytical Data
Table 2	Soil Cobalt and Mineralogy Data
Table 3	AD-28 Mineralogy Results
Table 4	B-3 X-Ray Diffraction Results

FIGURES

Figure 1	Potentiometric Contours – Uppermost Aquifer June 2022
Figure 2	Aqueous Cobalt Distribution
Figure 3	Cobalt Distribution in Soil
Figure 4	B-3 Visual Boring Log

ATTACHMENTS

Attachment A	SB-28 Boring Log
Attachment B	SB-28 Boring Photographic Log
Attachment C	SEM/EDS Analysis
Attachment D	Certification by a Qualified Professional Engineer

LIST OF ACRONYMS

ASD	Alternative Source Demonstration
BGS	Below Ground Surface
CCR	Coal Combustion Residuals
EBAP	East Bottom Ash Pond
EDS	Energy Dispersive Spectroscopy 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 Procedure
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 a statistically significant level (SSL) for cobalt in the groundwater monitoring network at the H.W. Pirkey Plant Western Bottom Ash Pond (WBAP), 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 WBAP (**Figure 1**).

In June 2022, a semiannual assessment monitoring event was conducted at the WBAP 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 facility (Geosyntec, 2020a) and United States Environmental Protection Agency's (USEPA) *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 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). An SSL was identified for cobalt at AD-28 at the WBAP, where the LCL of 0.0134 milligrams per liter (mg/L) exceeded the calculated GWPS of 0.0090 mg/L (Geosyntec, 2022a). 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 SSL identified for cobalt at AD-28 is from a source other than the WBAP.

1.2 Demonstration of Alternative Sources

An evaluation was completed to assess possible alternative sources to which the identified SSL 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 SSL identified for cobalt at AD-28 was based on a Type IV cause and not by a release from the Pirkey WBAP.

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 WBAP design and construction, regional geology and site hydrogeology, methodology used to evaluate the SSLs, and proposed alternative source are described below.

2.1 WBAP Design and Construction

The WBAP is a 30.9-acre CCR surface impoundment located at the north end of the Pirkey Plant, immediately west of the East Bottom Ash Pond (EBAP) (**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 (Arcadis, 2016). The WBAP ceased receipt of CCR and non-CCR waste streams on March 30, 2022 (AEP, 2022a). At this time, the WBAP commenced closure by removal in accordance with the certified closure plan, with CCR material removal occurring from April to June of 2022. The final inspection for CCR material removal was completed on July 26, 2022.

The WBAP was constructed with compacted clay embankments around the pond perimeter and a compacted clay liner over the pond base (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 WBAP 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 216.5 acre-feet (Arcadis, 2016).

2.2 Regional Geology/Site Hydrogeology

The WBAP 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 WBAP 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 Arcadis (2016) shows the subsurface structure of the uppermost aquifer (indicated on the figure as clayey silty sand, tan to gray) underlying the WBAP and the EBAP. This figure is provided as **Attachment A**. Geologic cross-section A-A' demonstrates lateral continuity of the uppermost aquifer spanning the entire length of the WBAP.

Groundwater flow direction in the area of the WBAP 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 WBAP monitoring well network consists of upgradient monitoring wells AD-3, AD-12, and AD-18, and compliance wells AD-17, AD-28, AD-29, and AD-30, 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 due to Type I (sampling), Type II (laboratory), or Type III (statistical evaluation) issues. Groundwater sampling, laboratory analysis, and statistical evaluations were generally completed in accordance with 30 TAC §352.931 and the draft TCEQ guidance for groundwater monitoring (TCEQ, 2020b). As described below, the SSL has been attributed to natural variation associated with the underlying geology, which is a Type IV (natural variation) issue.

Monitoring well AD-28 is located near the southwest corner of the WBAP, as shown in **Figure 1**. Previous ASDs for cobalt at the WBAP provided evidence that cobalt is present in the aquifer media at the site and that the observed cobalt concentrations in groundwater were due to natural variation (Geosyntec, 2019a; Geosyntec, 2019b; Geosyntec, 2020b; Geosyntec, 2020c; Geosyntec, 2021b; Geosyntec, 2022b). The previous ASDs discussed how the WBAP did not appear to be a source for cobalt in downgradient groundwater, based on observed concentrations of cobalt both in the ash material and in leachate from Synthetic Precipitation Leaching Procedure (SPLP) analysis (SW-864 Test Method 1312, [USEPA, 1994]) of the ash material. Cobalt was not detected in the SPLP leachate above the reporting limit of 0.01 mg/L, which is lower than the average concentration at AD-28 (**Table 1**).

Cobalt was detected at a concentration of 0.000501 mg/L in a surface water sample previously collected from the WBAP on November 4, 2020 to characterize total cobalt concentrations. The WBAP ceased receipt of waste on March 30, 2022 and initiated activities to close the pond via removal of CCR materials (AEP, 2022b). Cobalt was detected in a surface water sample collected on June 24, 2022 from the EBAP at a concentration of 0.00128 mg/L (**Table 1**). The EBAP and WBAP historically received the same process water, with the use of each pond dependent on available freeboard and cleaning schedule; thus, there is a basis for the equivalency between these two surface water samples. These concentrations are lower than the reported cobalt concentrations for in-network wells from the most recent sampling event, except for AD-18 (0.00079 mg/L) (**Figure 2**). However, both pond surface water samples were over an order of magnitude lower than the average concentration observed at AD-28 (**Table 1**). Thus, the WBAP is not the likely source of cobalt at AD-28.

As noted in the previous ASDs, soil samples collected across the site, including from locations near the WBAP, identified cobalt in the aquifer solids at concentrations ranging from non-detect

to 23.5 milligrams per kilogram (mg/kg) with the highest value reported at AD-41, which is upgradient of the WBAP and EBAP (**Figure 3**). SB-28 was advanced in the vicinity of AD-28 in April 2020 to re-log the geology at AD-28 and collect samples for laboratory analysis of total metals and mineralogy. The SB-28 field boring log, which was generated by Auckland Consulting LLC, is provided as **Attachment A**. Cobalt was identified at SB-28 at concentrations of 4.53 mg/kg at 15.5-16 feet below ground surface (bgs) and 8.70 mg/kg at 40-41 feet bgs (**Table 2**). The 15.5-16 feet bgs interval at SB-28 correlates to the depth of the monitoring well screen of AD-28 (15-35 feet bgs), indicating that cobalt is present in aquifer solids within the AD-28 screened interval.

In addition to total cobalt, soil samples were submitted for mineralogical analysis to evaluate the presence of cobalt-containing minerals. X-ray diffraction (XRD) analysis of soils from SB-28 identified pyrite (an iron sulfide mineral) in samples collected at 25-30 feet bgs and 40-41 feet bgs at concentrations up to 3% by weight (**Table 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 angstrom (Å) for iron vs. 1.52 Å for cobalt (Clementi and Raimondi, 1963; Krupka and Serne, 2002; Hitzman et al., 2017).

The aquifer solids at SB-28 are distinctly red in color at shallow depths, as illustrated in the photolog of soil cores provided in **Attachment B**. Red color in soils is often associated with the presence of oxidized iron-bearing minerals such as hematite and goethite. Goethite, an iron oxide mineral (FeOOH), was present at depths up to 16 ft bgs at SB-28 at up to 37% of the total aquifer solids (**Table 3**). The weathering of pyrite to goethite under oxidizing conditions is also a well-understood phenomenon, including in formations in east Texas (Senkayi et al., 1986; Dixon et al., 1982). It is likely that the pyrite weathering process is resulting in the release of isomorphically substituted cobalt from the pyrite crystal structure as it undergoes oxidative weathering to iron oxide minerals.

As described in an ASD previously generated for the EBAP, 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-30, one of the existing compliance wells within the WBAP groundwater monitoring network. Solid phase materials within these groundwater samples were separated and submitted for analysis of chemical composition and mineralogy. For the VAP samples, separation was completed using a centrifuge due to the high abundance of solids. For the groundwater sample at AD-30, 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 AD-30, 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 4**). 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 ft bgs (**Figure 4**). Furthermore, SEM/EDS of both centrifuged solid samples [VAP-B3-(40-45) and VAP-B3-(50-55)] identified pyrite in backscattered electron micrographs by the distinctive framboidal morphology (Harris et al., 1981; Sawlowicz, 2000). Major peaks involving iron and sulfur were identified in the EDS spectrum, which further support the identification of pyrite (**Attachment C**). While cobalt was not identified in the EDS spectrum, it is likely present at concentrations below the detection limit.

The WBAP was not identified as the source of cobalt at wells in the WBAP 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 WBAP. Cobalt in the WBAP network groundwater is believed to be a result of natural variability within the aquifer. Naturally occurring cobalt is known to substitute for iron in pyrite, which is then known to weather to iron oxides. The presence of pyrite and iron oxides has been confirmed at AD-28 and across the Site. The presence of these aquifer minerals suggests that weathering of pyritic minerals may be providing a source for aqueous cobalt in groundwater.

2.4 Sampling Requirements

As the ASD presented above supports the position that the identified SSL is not due to a release from the Pirkey WBAP, 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 SSL for cobalt identified at AD-28 during assessment monitoring in June 2022 was not due to a release from the WBAP. The identified SSL should instead be attributed to natural variation in the underlying geology, including the presence of pyrite and goethite in the solid aquifer material. Therefore, no further action is warranted, and the Pirkey WBAP will remain in the assessment monitoring program. Certification of this ASD by a qualified professional engineer is provided in **Attachment D**.

SECTION 4

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TABLES

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

Geosyntec Consultants, Inc.

Sample	Sample Date	Unit	Cobalt Concentration
Bottom Ash (Solid Material)	2/11/2019	mg/kg	5.8
SPLP Leachate of Bottom Ash	2/11/2019	mg/L	<0.01
WBAP Pond Water	11/4/2020	mg/L	0.000501
EBAP Pond Water	6/24/2022	mg/L	0.00128
AD-28 - Average	May 2016 - June 2022	mg/L	0.0143

Notes:

mg/kg - milligram per kilogram

mg/L - milligram per liter

AD-28 - Average value was calculated using all cobalt data collected under 40 CFR 257 Subpart D.

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

Geosyntec Consultants, Inc.

Location ID	Location	Sample Depth (ft bgs)	Cobalt (mg/kg)
Bulk Soil Samples			
AD-28	WBAP Network	6-6.5	< 2.38
		15.5-16	4.53
		25-30	< 2.50
		40-41	8.70
AD-30	WBAP Network	7	1.00
		23	15.0
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
AD-41	Upgradient	15	<1.0
		35	23.5
		95	1.90
Solid Material Retained After Filtration			
AD-30	WBAP Network	15-25	9.3 J
B-2	Upgradient	38-48	4.3 J
B-3	Upgradient	29-34	12.0
		VAP 40-45	18.0

Notes:

mg/kg- milligram per kilogram

ft bgs - feet below ground surface

J = estimated value

For AD-28 and AD-30, 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 at B-2, B-3, and AD-41 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 - AD-28 Mineralogy Results
West Bottom Ash Pond - H. W. Pirkey Plant**

Boring ID	SB-28 (AD-28)			
Sample Depth Interval	6-6.5	15.5-16	25-30	40-41
Sample Location	Above Screened Interval	Within Screened Interval		Below Screened Interval
Color	Red-brown to yellow-brown	Light gray, light red-brown	Brown, light red-brown	Gray to dark gray
Mineralogy				
Quartz	58%	46%	73%	34%
Pyrite	--	--	3%	3%
K-Feldspar	--	1%	1%	1%
Siderite	--	--	2%	52%
Goethite	37%	15%	--	--
Anhydrite	--	--	--	2%
Clay/Mica	5%	38%	21%	8%

Notes:

Sample depths are shown in feet below ground surface (bgs)

Well AD-28 is screened from 15-35 ft. below ground surface.

Mineralogical component results are shown in relative % abundance.

Table 4: B-3 X-Ray Diffraction Results
West Bottom Ash Pond - H. W. Pirkey Plant

Geosyntec Consultants, Inc.

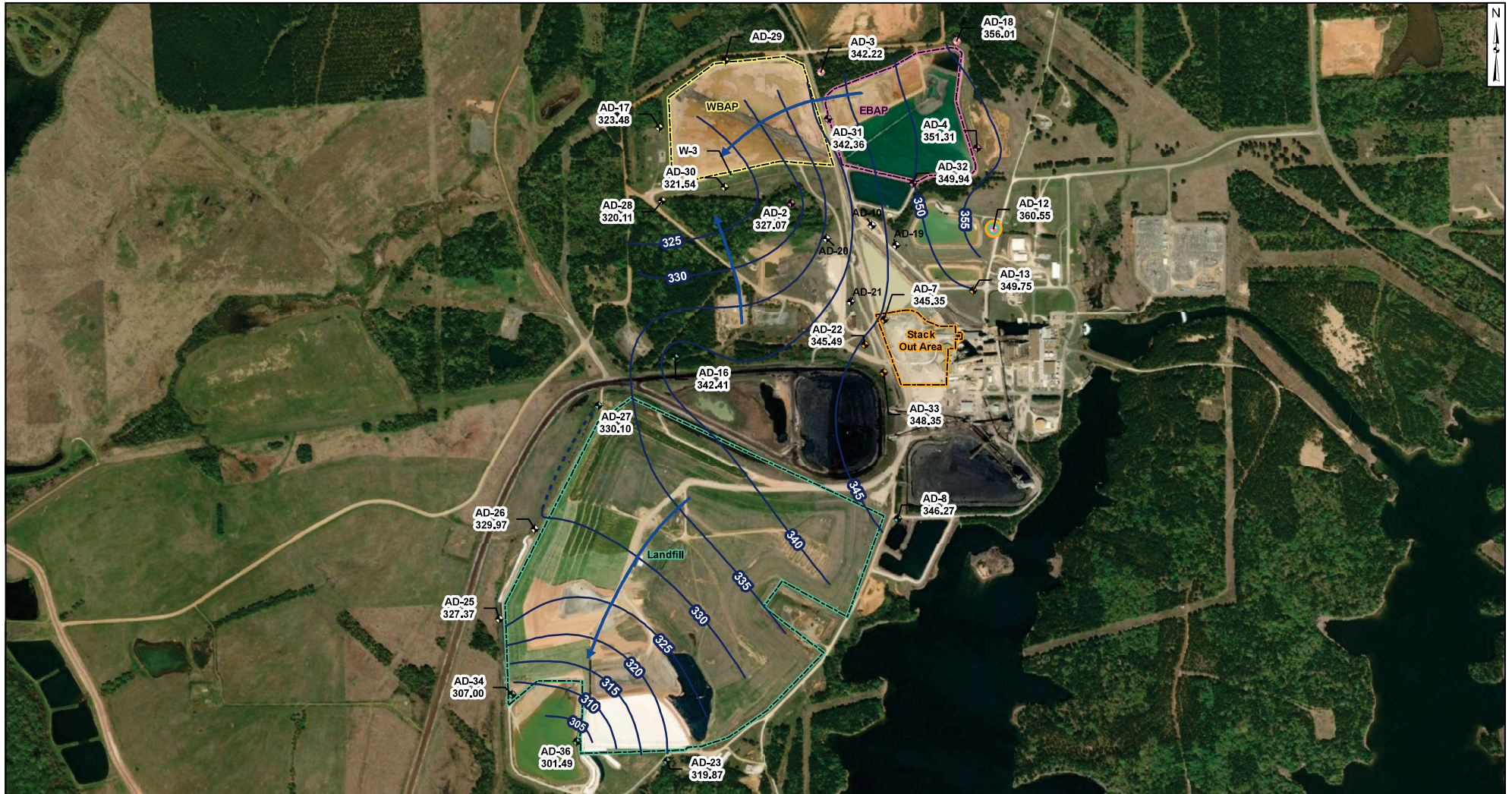
Constituent	VAP-B3-(40-45)
Quartz	15
Plagioclase Feldspar	0.5
Orthoclase	ND
Calcite	ND
Dolomite	ND
Siderite	0.5
Goethite	ND
Hematite	2
Pyrite	3
Kaolinite	42
Chlorite	4
Illite/Mica	6
Smectite	12
Amorphous	15

Notes:

ND: Not detected

Results given in units of relative % abundance
VAP-B3-(40-45) is the centrifuged solid
material from the groundwater sample collected
at that interval.

FIGURES

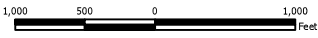


Legend

- 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**

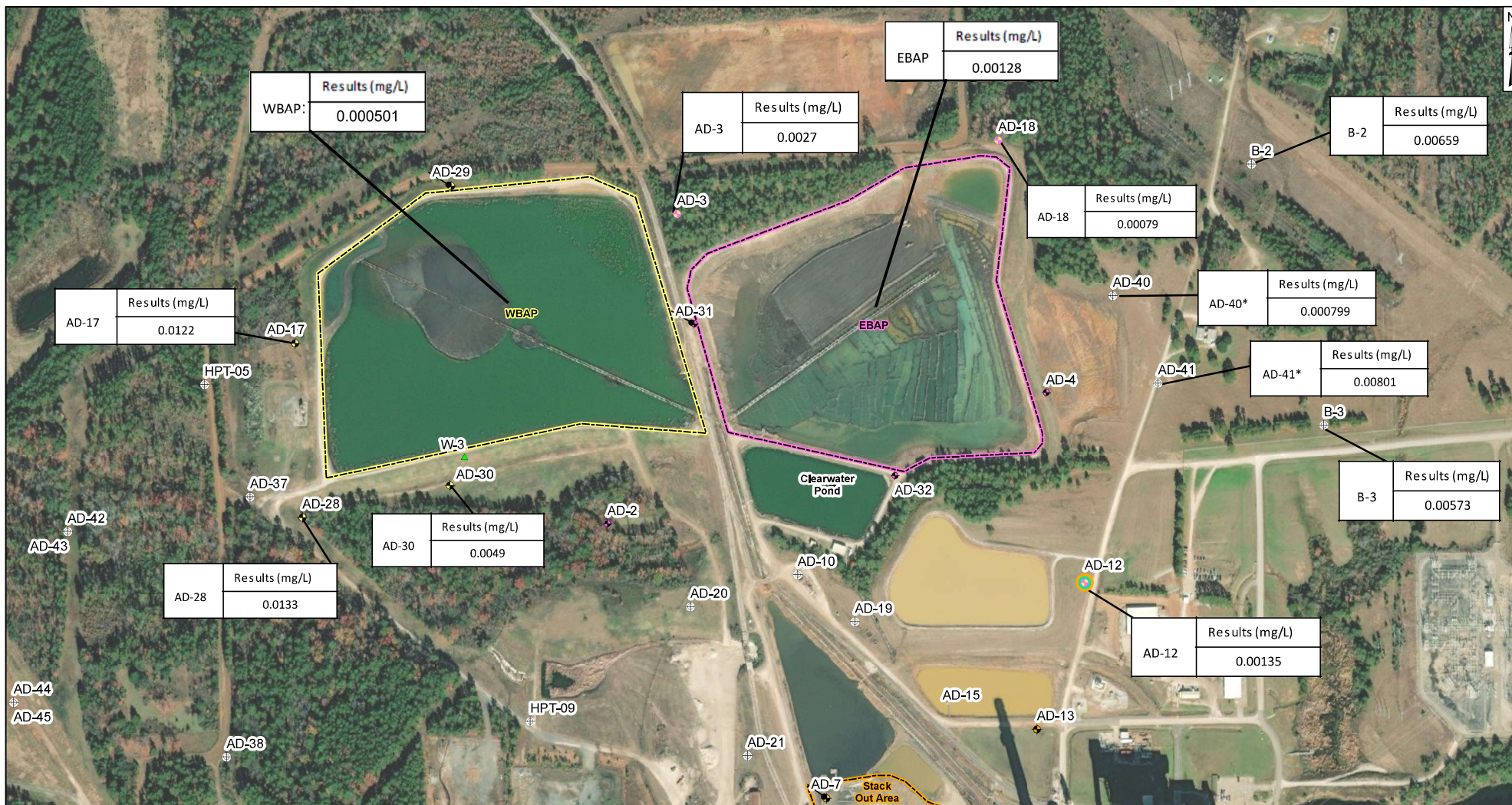
AEP Pirkey Power Plant
 Hallsville, Texas

Geosyntec
 consultants

Columbus, Ohio 2022/12/21

Figure
 1

W:\Projects\AEP\Groundwater Statistical Evaluation - CHA8423\Groundwater Mapping\GIS Files\MXD\Pirkey\2022\AEP-Pirkey_GW_2022-06\June.mxd, AS0\er0, 12/21/2022, Project/Phase/Task.

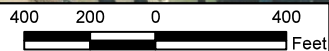


Legend

- ⊕ Out of Network
- ◆ Stackout Area
- ◆ EBAP
- ◆ WBAP
- ◆ Landfill
- ◆ EBAP and WBAP
- All CCR Unit Networks
- ▲ 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
- AD-29 included in the well network for water level measurements only
- : WBAP surface water results shown for November 2020 sample. EBAP surface water results shown for June 2022 sample.



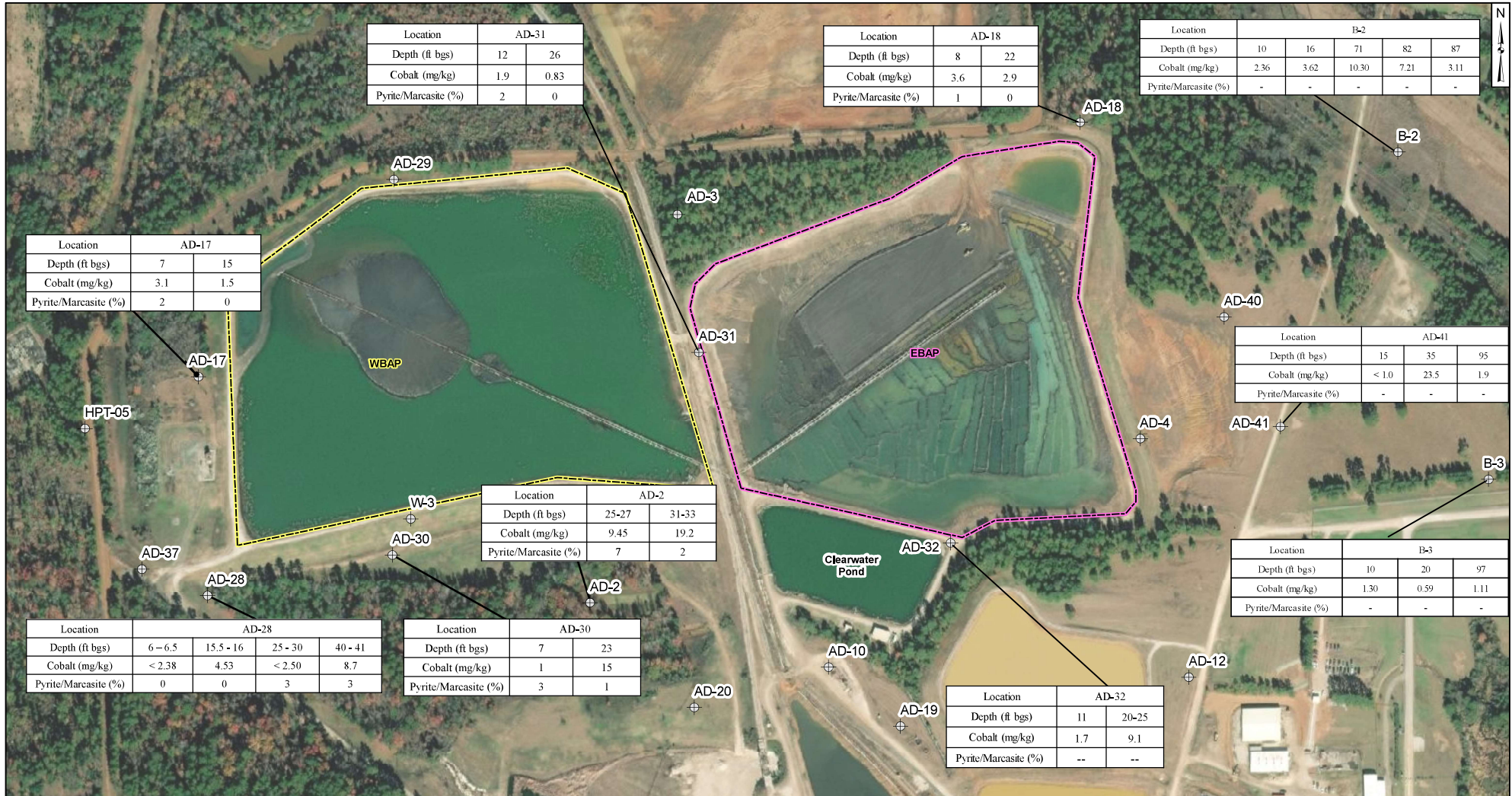
Aqueous Cobalt Distribution

AEP Pirkey Power Plant
Hallsville, Texas




Geosyntec
consultants

Columbus, Ohio 2022/12/21

Figure
2

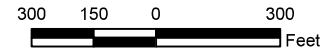


Legend

-  Monitoring Wells
-  EBAP
-  WBAP

Notes

- Monitoring well coordinates provided by AEP.
- AD-2 and AD-28 samples 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

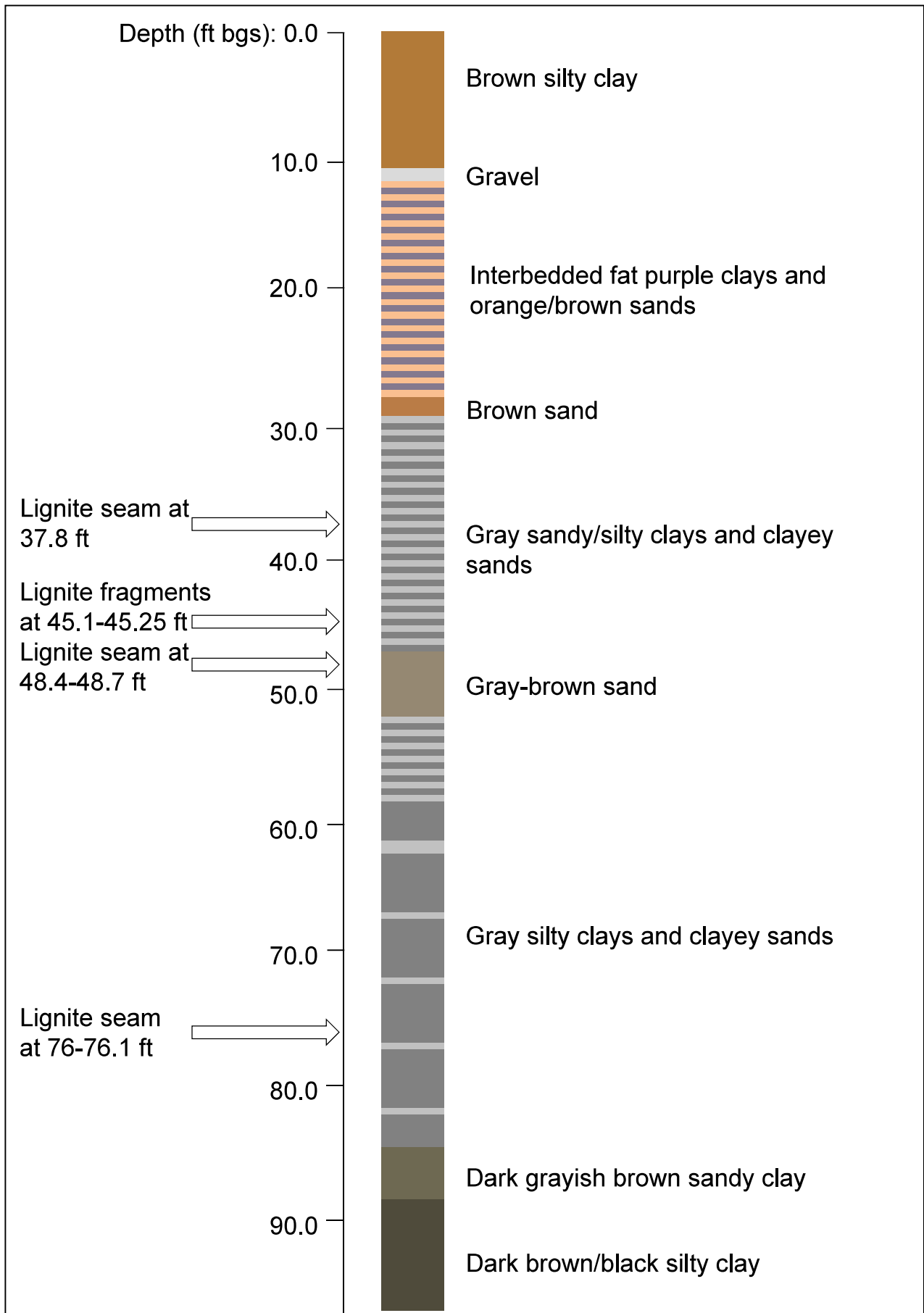
AEP Pirkey Power Plant
Hallsville, Texas

Geosyntec
consultants

Figure

3

Columbus, Ohio 2020/12/22



- 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



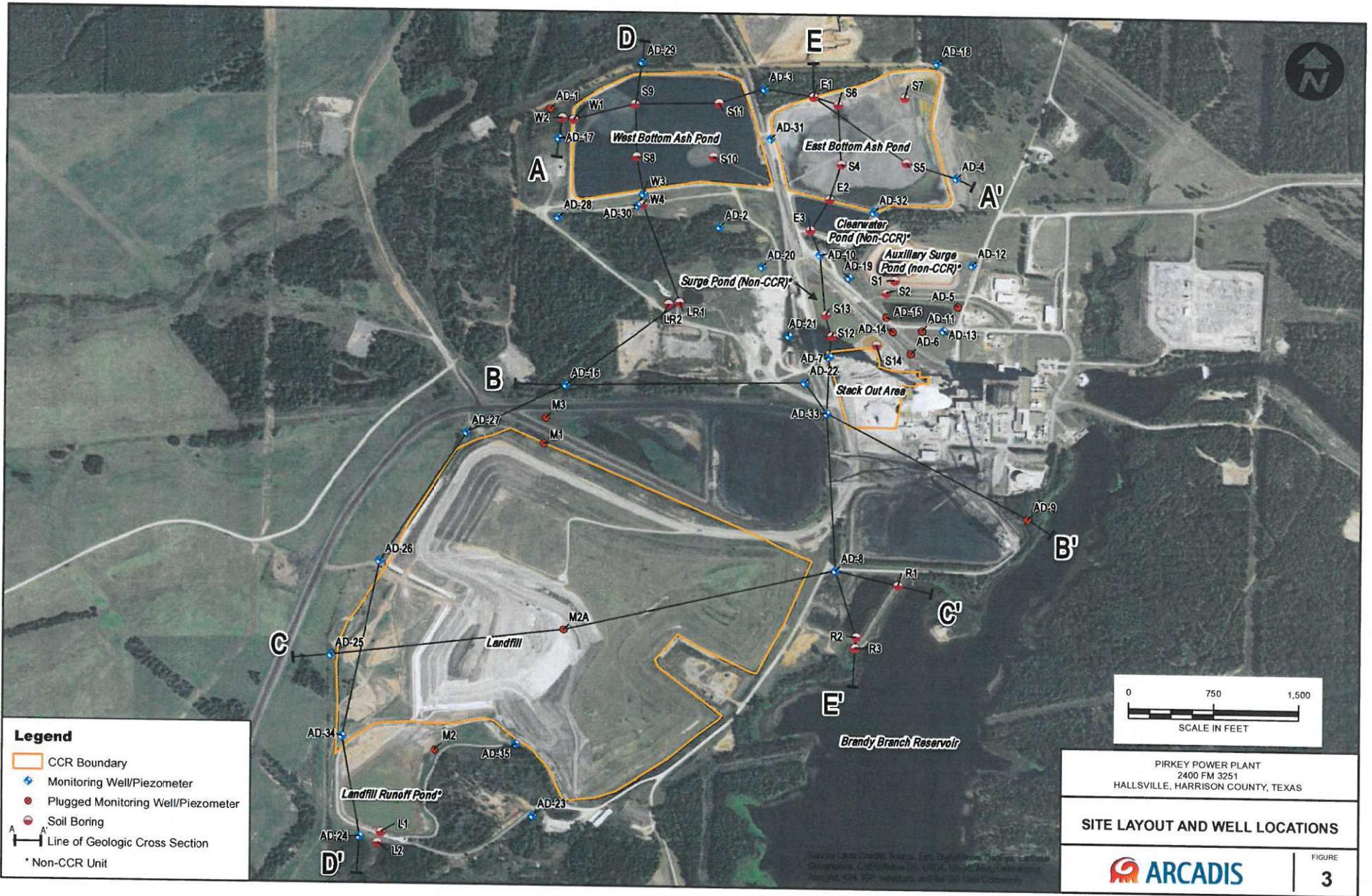
Figure

4

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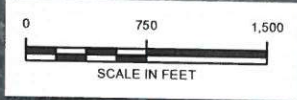
March 2020

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

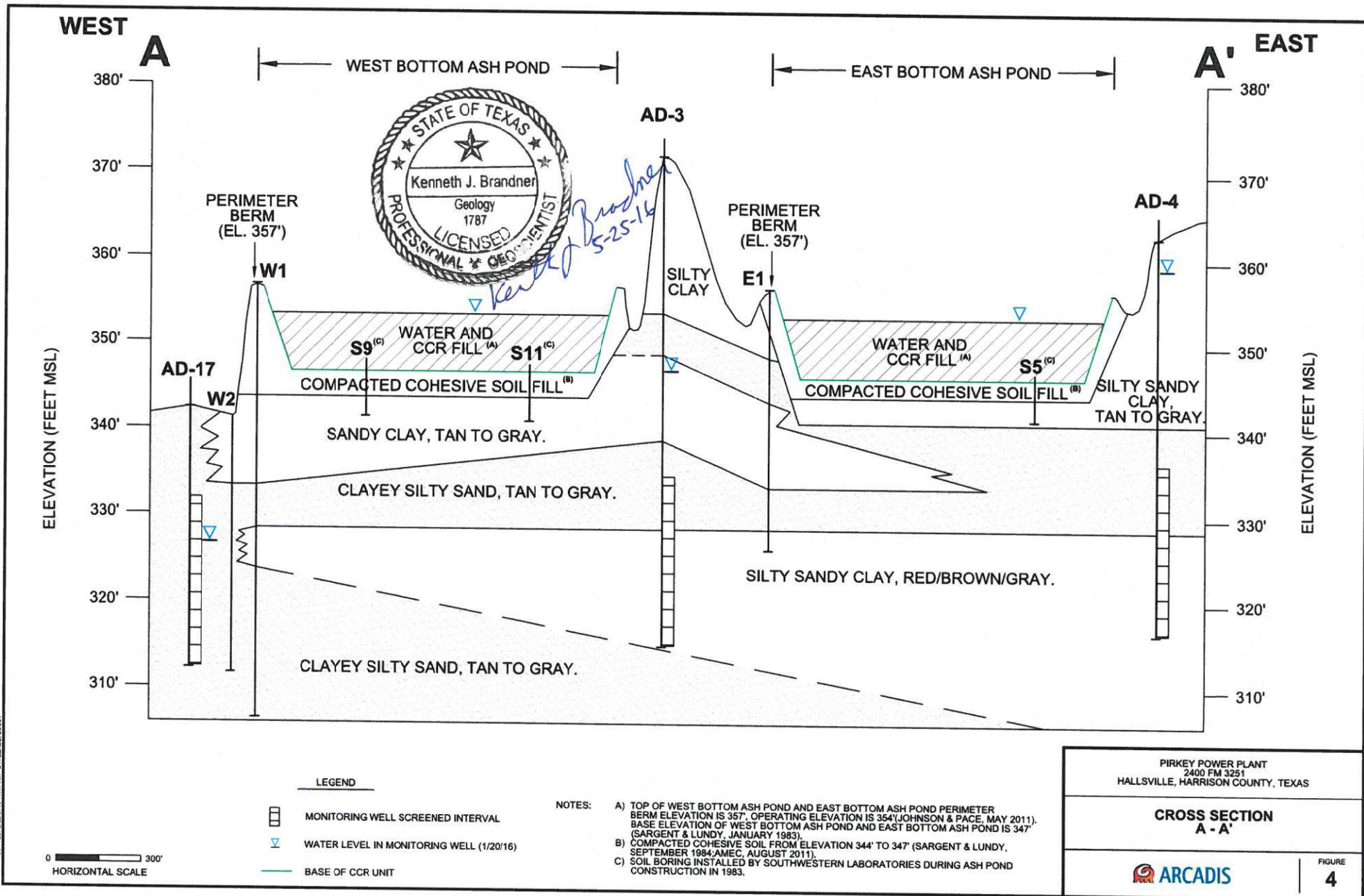


PIRKEY POWER PLANT
 2400 FM 3251
 HALLSVILLE, HARRISON COUNTY, TEXAS

SITE LAYOUT AND WELL LOCATIONS

ARCADIS

CITY: DFW GROUP; DR: LD; AM: PD; TM: TR; LYNCH™-OFFICE REF; PIRKEY Power Plant; 2400 FM 3251; HALLSVILLE, TEXAS; 75015; 11/17/16; BY: LEASE; DANA; PLOTTED: 2/22/2018 11:17 AM; LAYOUT: MODEL: 2/19/2018 2:18 PM; ACADVER: 19.15 (LMS TECH); PAGES: 1; PLOTSTYLE: PLT; PLOTSETUP: —



ATTACHMENT B
SB-28 Boring Log

PROJECT NO. _____ PROJ. _____ BOR. NO. SB-28
 LOCATION AD-28/MW-28 - Pirkey Power Plant ELEV. _____ DATE 4/20/20

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

SAMPLE INTERVAL TEST ASSIGNMENT	SAMPLE NO. 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 SM	4'	0-2	Br Lt Br	Si	Sa	Silty sand, trace clay & roots, trace fine brook and gravel,						moist (0-2)	
		2-10'	Lt. Rd Br	Si, Gr	Cl	Clay - some silt, trace 1/2" sand, trace coarse iron ore concretions						moist (2-5)	
CL	1.5'	5-10	Rd Br, Yll W Br	Si, Gr	Cl	Clay - some silt, trace 1/2" sand, trace coarse iron ore concretions						moist (5-10)	
10'	1'	10-15'	Rd Br, Lt Gr	Si Cl	Sa	Clayey silt & f silty sand with clay in thin lenses, trace cemented clayey sand						v. moist (10-15)	
50' SM	1.5'	15-20	Lt. Br & Lt. Rd Br			- clay lenses @ 15' (6") - ironstone layer @ 15.5' & cemented sand to 16'						v. moist (15-16)	
16'	3"	20-25	Br, Lt. Rd Br	Si	Sa	Silty sand - some ironstone						Saturated @ 16' to 40'	
SM	3'	25-30	Gray			- gray @ 20' = some cemented clayey sand (only recovery @ 25-30')							
	NR	30-35											
	NR	35-40											
						R.T. @ 40'							
40'	1'	40-41	Gray, DK Gray	Cl	Sa	* Split Spoon Driven from 40-41' Clayey sand w/ lenses of cemented sand @ 41.5-41.75' trace gypsum crystals @ 40-41'						v. moist 40-41'	
SC						* 6-6.5' collected @ 1140 * 15.5-16' collected @ 1215 * 25-36' collected @ 1230 * 40-41' collected @ 1300							

Type ASA Dry Auger Rotary Wash
 SEEPAGE @ 16 FT. WHILE DRILLING, W.L. @ _____ FT. ON COMPL. (OR) BAILED TO _____ FT. UPON COMPLETION.
 W.L. @ _____ FT AND CAVED TO _____ FT. ON _____.

* GPS: 32.46544°, -94.49432 (18' W-NW) of AD-28/MW-28

ATTACHMENT C
SB-28 Boring Photographic Log

GEOSYNTEC CONSULTANTS
Photographic Record



Client: American Electric Power

Project Number: CHA8495/12A/02

Site Name: H.W. Pirkey Plant WBAP

Site Location: Hallsville, Texas

Photograph 1

Date: 4/21/2020

Direction: N/A

Comments:
Multiple sections of core from soil boring SB-28 advanced near downgradient monitoring well AD-28 within the Western Bottom Ash Pond (WBAP) CCR unit. 5-foot pushes were used. Note the reddish color indicating the presence of oxidized iron-bearing minerals.



Photograph 2

Date: 4/21/2020

Direction: N/A

Comments:
0-5 foot interval of SB-28.



Photograph 3

Date: 4/21/2020

Direction: N/A

Comments:
5-10 foot interval of SB-28. Recovery of this interval was limited. A sample was collected from this interval from 6-6.5 ft. below ground surface (bgs).

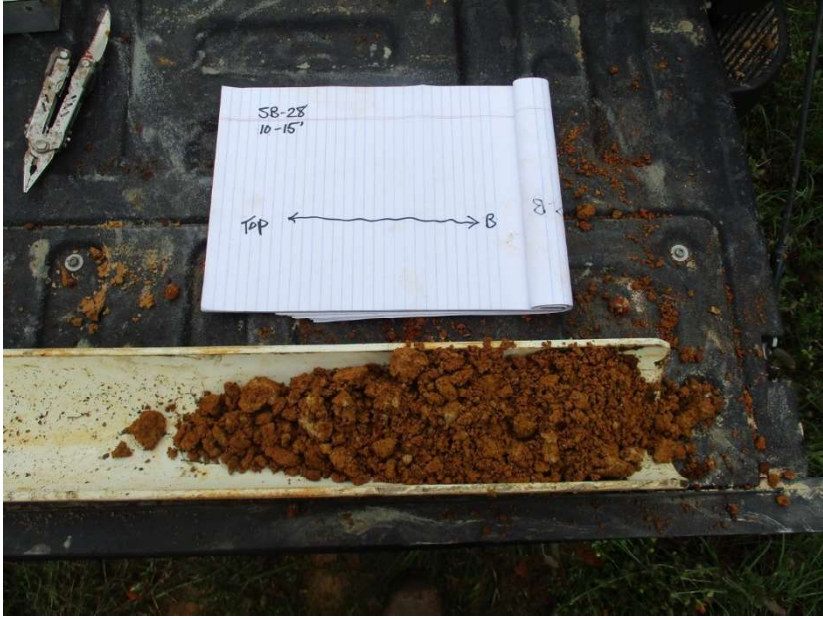



Photograph 4

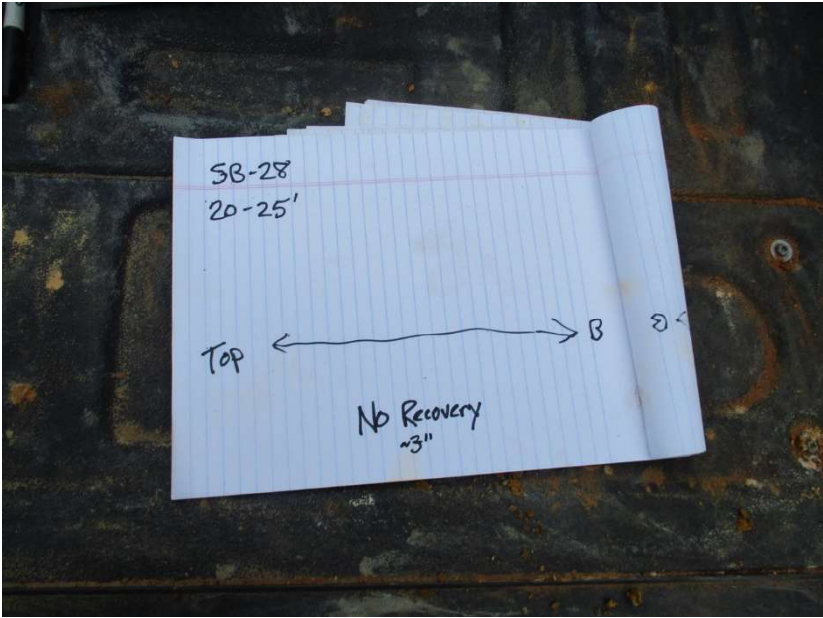
Date: 4/21/2020

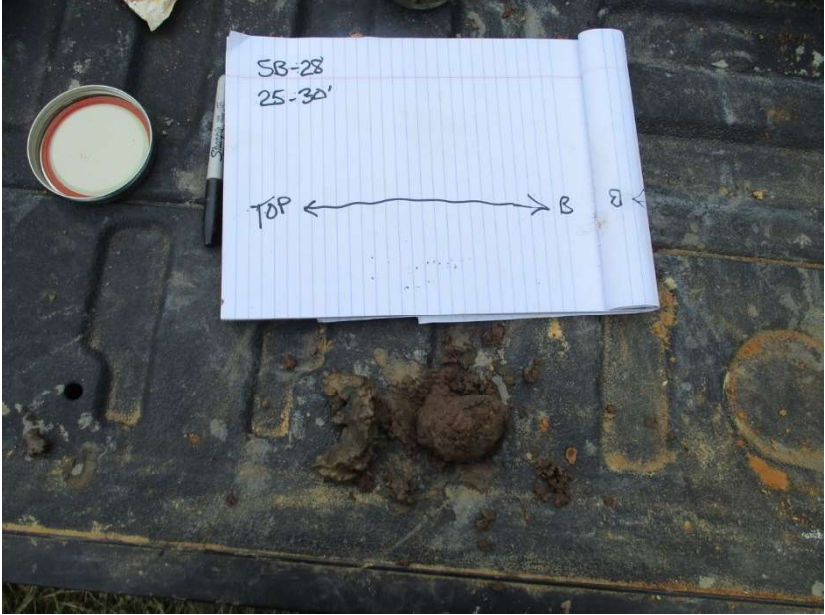
Direction: N/A


Comments:
10-15 foot interval of SB-28. Recovery of this interval was limited.



Photograph 5	
Date: 4/21/2020	
Direction: N/A	
<p>Comments: 15-20 foot interval of SB-28. Recovery of this interval was limited. A sample was collected from this interval from 15.5-16 ft. bgs.</p>	

Photograph 6	
Date: 4/21/2020	
Direction: N/A	
<p>Comments: Field geologist's note indicating that very little of the 20-25 foot interval of SB-28 was recovered.</p>	

<p>Photograph 7</p>	
<p>Date: 4/21/2020</p>	
<p>Direction: N/A</p>	
<p>Comments: 25-30 foot interval of SB-28. Very little of this interval was recovered. Note the color change of the soil from red to dark brown/black. A sample was collected from this interval.</p>	

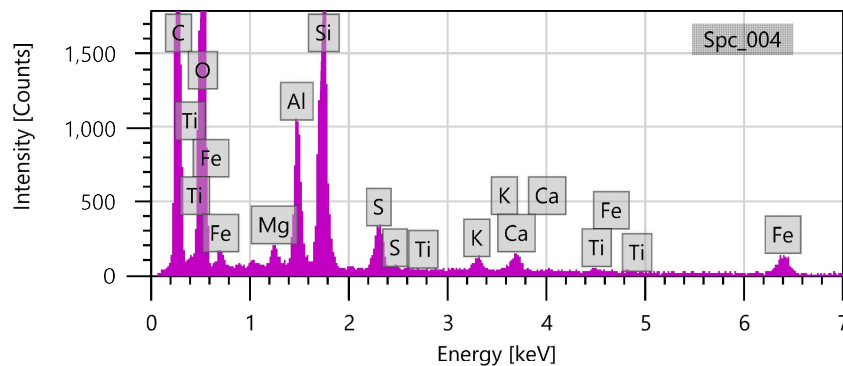
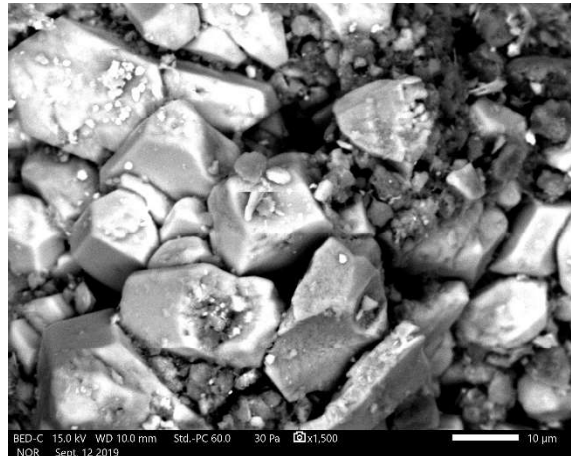
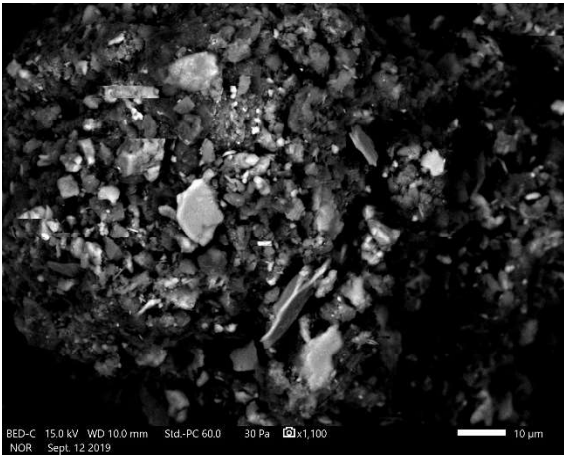
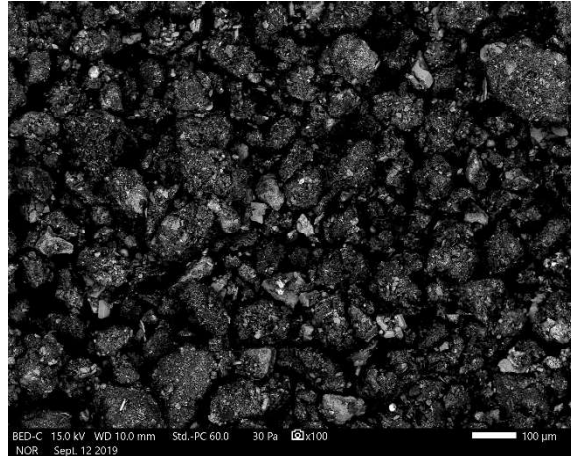
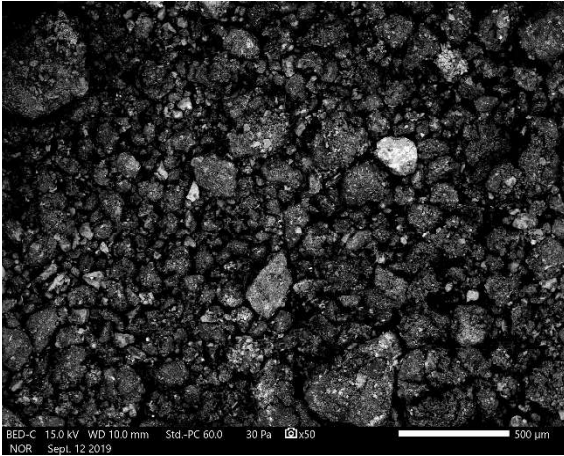
<p>Photograph 8</p>	
<p>Date: 4/21/2020</p>	
<p>Direction: N/A</p>	
<p>Comments: Bottom of SB-28. The boring log indicates no recovery of soil from the 30-40 foot interval. A sample was collected from this interval.</p>	

ATTACHMENT D
SEM/EDS Analysis

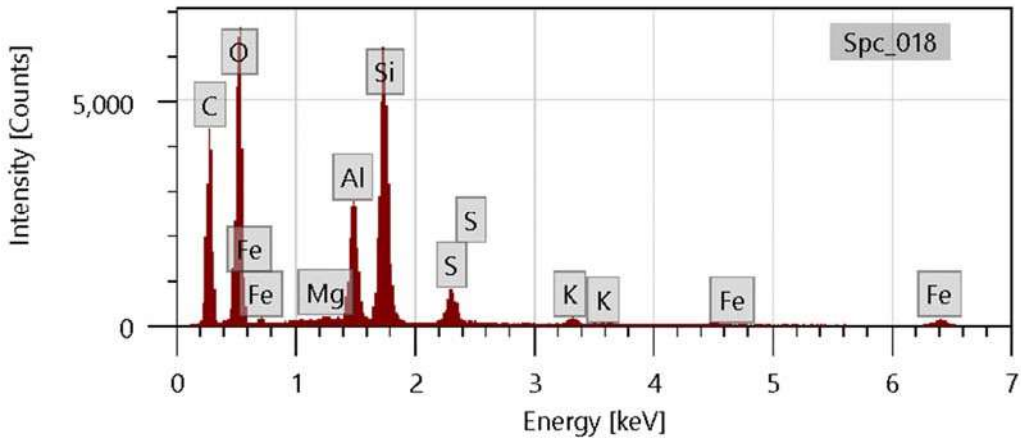
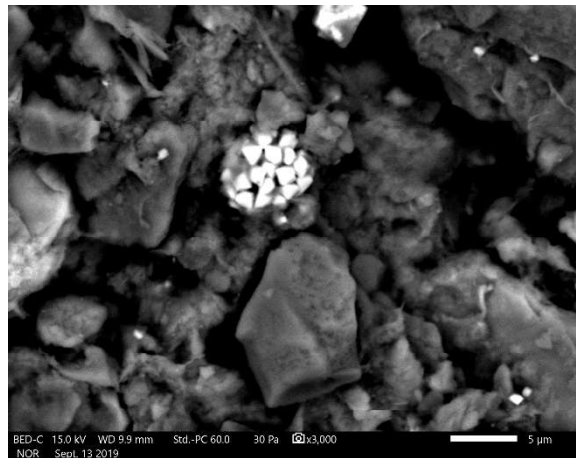
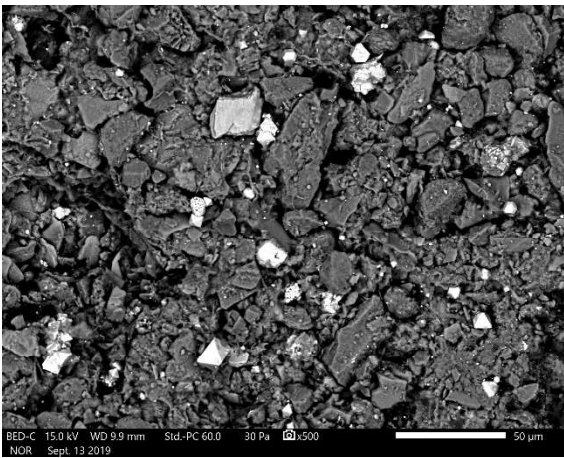
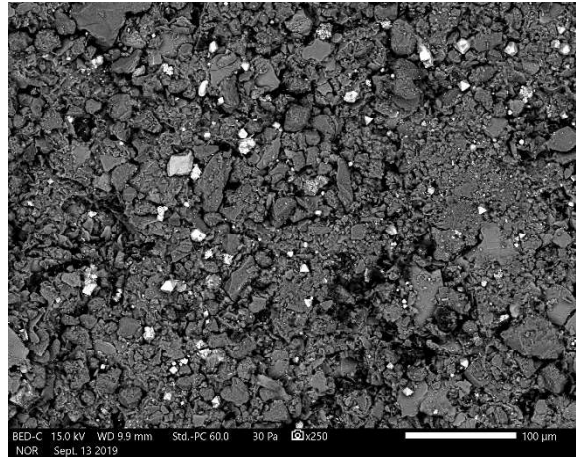
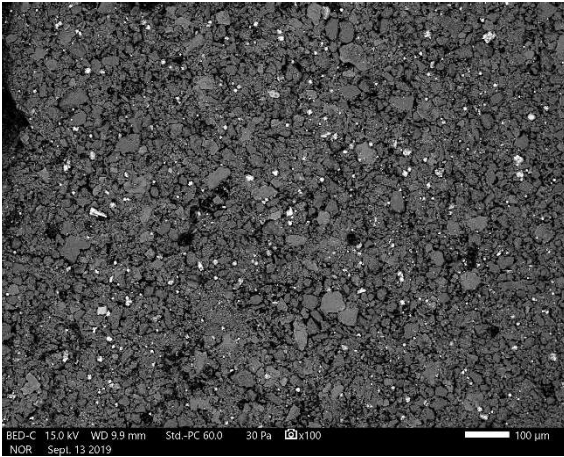
September 16, 2019

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

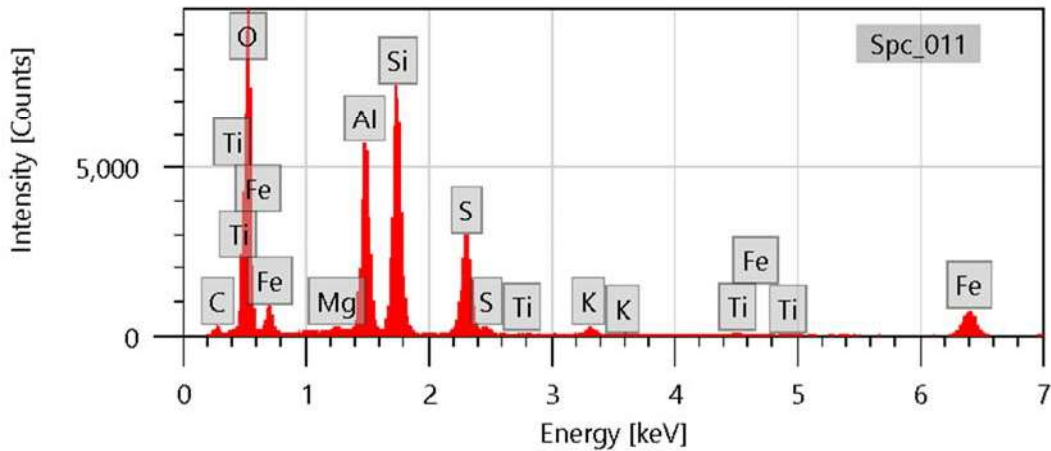
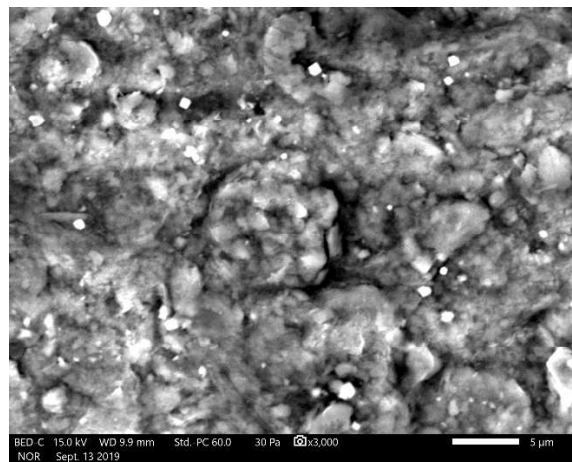
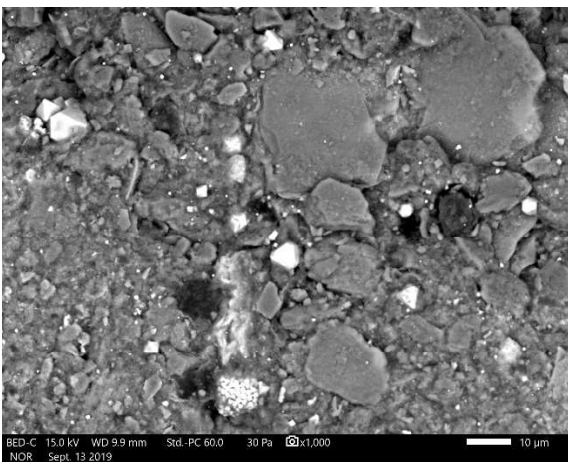
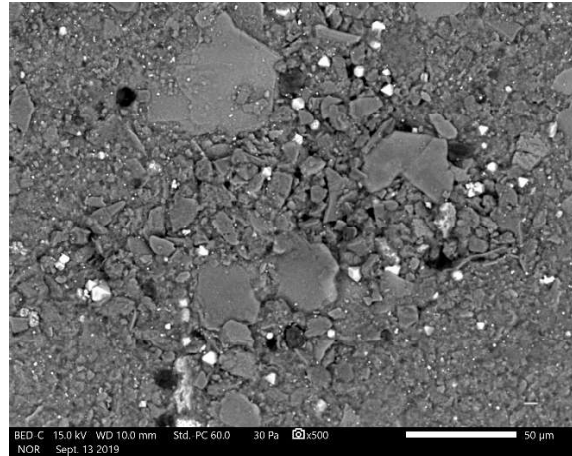
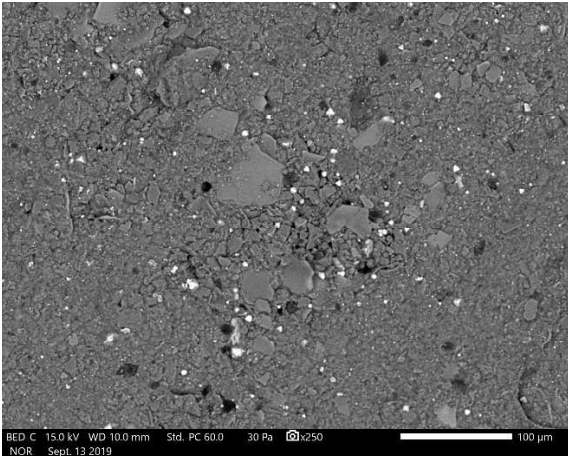
via Email: BSass@geosyntec.com



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 West 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 16:52:26 -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 AD 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
 Sample by

Pinkney
 Kenny McDonald

Sample Location ID

AD-2

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

15.87
 40.36

Depth to water date

03/29/22

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)		
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
 Sample time
 Sample date

CIFAN
 1125
 03/29/22

Facility Name	
Sample by	P. Kee Matt Hamilton

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

Sample Location ID	AD-03
--------------------	-------

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	4.78	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	PIANKOY PP
Sample by	KERRY Mc DONALD

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
---------------------	----------

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (μ S/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)
1154	7.30	178	4.84	148				
1159	7.44	178	4.90	98	52.1	7.59	402	23.74
1204	7.61	178	4.92	95	42.6	3.72	400	22.86
1209	7.68	178	4.93	94	41.7	3.67	399	22.83
1214	7.74	178	4.94	94	41.2	3.68	396	22.82
					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

Pikant PP
Kenny McDevitt

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 (μ S/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ($^{\circ}$ C)
1133	14.31	152	3.67	327	3.6	6.31	451	23.64
1138	14.50	152	3.64	330	5.5	3.02	446	23.59
1143	14.76	152	3.61	334	3.2	2.91	440	23.52
1148	14.91	152	3.60	336	0.0	2.87	437	23.50

Total volume purged
Sample appearance
Sample time
Sample date

CLEAR
1150
03/28/22

Facility Name	Pinkum PP
Sample by	Kim G McDonald

Depth to water, feet (TOC)	10.77
Measured Total Depth, feet (TOC)	40.70

Sample Location ID	AD-13
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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 ($^{\circ}\text{C}$)		
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	Pittman AP	
Sample by	Kevin 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 (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°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	Pinpoint
Sample by	Kenny McDonald

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

Sample Location ID	AD-22
--------------------	-------

Depth to water date	03/28/22
---------------------	----------

Purge Stabilization Data										
Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond ($\mu\text{S/cm}$)	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	
Sample by	P. Kelly Mutt Hamilton
Depth to water, feet (TOC)	15.06
Measured Total Depth, feet (TOC)	42.75

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 (μ S/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ($^{\circ}$ C)		
855	15.48	300	3.30	2,100						
900	15.76	300	3.18	2,150	21.7	1.28	308	22.33		
905	15.66	300	3.14	2,100	48.9	0.65	290	21.98		
910	16.15	300	3.05	2,100	44.5	0.60	291	21.88		
915	16.24	300	3.04	2,120	36.7	0.58	294	21.82		
920	16.33	300	3.03	2,140	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	Pirley
Sample by	N. Att / H. Hitt
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 (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°C)
1022	18.51	220	3.66	123	3.3	2.52	273	22.05
1027	18.51	220	3.68	120	2.1	1.67	278	21.18
1032	18.81	220	3.66	118	2.0	1.59	284	21.04

Total volume purged	
Sample appearance	Clear
Sample time	1034
Sample date	3-29-22

Dup-2
1055

Facility Name	
Sample by	Pirizov Matt 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 ($\mu\text{S/cm}$)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ($^{\circ}\text{C}$)		
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	23.77		
1152	16.51	220	3.41	300	16.7	0.64	302	23.68		
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	23.59		

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

Facility Name
Sample by

Piramy PP
K. Tracy McDonald

Sample Location ID

A0-33

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

12.22
32.50

Depth to water date

03/28/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (μ S/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ($^{\circ}$ 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
Sample time
Sample date

CLEAR
1054
03/28/22

Facility Name
 Sample by

PIRAM PP
 KERRY McDONALD

Sample Location ID

AD-34

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

SURFACE
 26.05

Depth to water date

03/29/22

Purge Stabilization Data

Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond ($\mu\text{S}/\text{cm}$)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ($^{\circ}\text{C}$)		
0815	0.62	160	3.61	1800	3.7	12.61	406	20.66		
0820	0.84	160	3.57	1840	0.0	6.27	353	20.57		
0825	0.92	160	3.56	1870	0.0	1.31	350	20.57		
0830	1.09	160	3.55	1800	0.0	1.28	344	20.59		
0835	1.13	160	3.55	1800	0.0	1.24	347	20.62		

Total volume purged
 Sample appearance
 Sample time
 Sample date

CLEAR
 0837
 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
Depth to water date	3-28-22

Purge Stabilization Data										
Time	Water Depth (from TOC)	Flow Rate (mL/min)	pH (S.U.)	Spec Cond (μ S/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ($^{\circ}$ C)		
847	16.05	300	4.73	161						
852	16.14	300	4.55	139	18.2	3.03	211	20.62		
857	16.18	300	4.55	136	8.4	1.43	128	20.19		
902	16.19	300	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

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 needling 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 PINKY 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 Plant PP
Sample by	K. Ann McDearid

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	Clear
Sample time	0849
Sample date	06/21/22

Facility Name	AEP Pinnacle 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 (μ S/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ($^{\circ}$ 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	KIMM McDONALD

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 (μ S/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ($^{\circ}$ 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	clear
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 (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°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 PIAHOT 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

Sample Location ID	AA-12
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Depth to water, feet (TOC)	21.44
Measured Total Depth, feet (TOC)	52.00

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 (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 (μ S/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ($^{\circ}$ 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 (μ S/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ($^{\circ}$ 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 (μ 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	21.48		
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	311	23.01		

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

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 ($\mu\text{S}/\text{cm}$)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ($^{\circ}\text{C}$)		
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	CLM
Sample time	0953
Sample date	06/20/22

Facility Name	Pirkey
Sample by	Matt Hamilton

Sample Location ID	AD-23
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Depth to water, feet (TOC)	30.23
Measured Total Depth, feet (TOC)	38.20

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 (μ S/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ($^{\circ}$ C)		
1050	30.45	220	3.56	237	46.2	2.33	260	31.16		
1055	30.50	220	3.58	14	85.7	1.93	264	26.41		
1100	30.52	220	2.59	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

Pirley
Matt Hamilton

Sample Location ID

AD-26

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

15.28
42.71

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)		
857	15.61	300	3.41	2,050	51.40	1.61	261	27.41		
902	15.76	300	3.34	2,110	59.30	2.41	248	25.10		
907	15.85	300	3.23	2,110	50.0	3.27	249	24.91		
912	15.99	300	3.24	2,110	28.20	4.01	245	24.82		
917	16.07	300	3.24	2,120	17.5	4.42	244	24.75		
922	16.15	300	3.25	2,120	17.8	4.53	243	24.70		

Total volume purged
Sample appearance
Sample time
Sample date

clear
924
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 (μ S/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ($^{\circ}$ 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	Pirtek
Sample by	Matt / Hamilton

Sample Location ID	AJ-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 (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°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, feet (TOC)	20.48
Measured Total Depth, feet (TOC)	27.15

Depth to water date	6-2-22
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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 ($^{\circ}\text{C}$)		
1107	20.46	220	4.15	495	48.8	1.69	296	22.09		
1112	20.99	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		
1127	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	APD Pinhook 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 (μ S/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ($^{\circ}$ C)		
1020	14.09	200	4.60	180	9.5	6.95	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	AD-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 (μ S/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ($^{\circ}$ C)		
1031	1.01	120	3.76	1610	10.4	10.84	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 Pinhook PP
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	24.1	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 (μ S/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ($^{\circ}$ C)		
823	24.71	300	4.54	106	7.4	5.85	275	25.44		
828	24.78	300	4.52	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	22.15		

Total volume purged	
Sample appearance	clear
Sample time	540
Sample date	6-21-22

Duplicate
1000

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 Contractor: EAGLE

Sampling Period: NOVEMBER 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-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: PIANON
 Sampling Contractor: EAGLE

Sampling Period: NOVEMBER 2022
 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	Air Pollution AP
Sample by	Kerry McDonald

Sample Location ID	A0-2
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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 (μ 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	Air Pollution 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	AO-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 (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°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	CLM
Sample time	0910
Sample date	11/16/22

RA MS/MSO

Facility Name	AKP Pinney AP
Sample by	Kenny McDonald

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 (μ S/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ($^{\circ}$ 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. Hwy Matt Hamill
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						
1041	19.57	300	4.56	67	12	2.46	72	17.14		
1046	20.21	300	4.66	67	33.8	1.88	325	19.00		
1051	20.52	300	4.71	67	30.2	1.83	323	19.17		
1056	20.93	300	4.73	66	30.1	1.82	318	19.25		
					30.0	1.80	320	19.29		

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 (μ 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	PIAKIY 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 (μ 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	Pillay 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 ($\mu\text{S/cm}$)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ($^{\circ}\text{C}$)		
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	18.87		
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	AFFAIRMENT PP
Sample by	Kenny M. Dinkard

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 (μ S/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ($^{\circ}$ 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. (com) M. H. Hamilton
Depth to water, feet (TOC)	3-38
Measured Total Depth, feet (TOC)	38.20

Sample Location ID	AD-23
Depth to water date	11-14-02

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		
1045	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		
1055	30.65	220	4.48	71	204	3.81	233	15.07		

Total volume purged	
Sample appearance	turbid
Sample time	1102
Sample date	11-14-02

Facility Name	
Sample by	Perley Mott Hamilton
Depth to water, feet (TOC)	16.43
Measured Total Depth, feet (TOC)	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 ($\mu\text{S}/\text{cm}$)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ($^{\circ}\text{C}$)		
841	16.89	300	3.57	2,230	56.1	17.06	340	13.06		
852	17.02	300	3.78	2,230	31.8	1.82	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	3.99	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. Kew Matt Hamill
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	7.67	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	14.21 14.21		
1137	24.51	300	3.97	223	23.5	1.05	211	14.40		
1142	24.56	300	4.02	225	9.8	0.87	287	14.48		
1147	24.60	300	4.04	226	9.9	0.82	285	14.55		

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

Facility Name
 Sample by *Pirley 11-14 Humley*

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

Sample Location ID *AD-28*

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>826</i>	<i>20.02</i>	<i>220</i>	<i>4.54</i>							
<i>831</i>	<i>20.13</i>	<i>220</i>	<i>4.46</i>	<i>95</i>	<i>10.4</i>	<i>2.35</i>	<i>302</i>	<i>16.53</i>		
<i>836</i>	<i>20.24</i>	<i>220</i>	<i>4.43</i>	<i>96</i>	<i>23.0</i>	<i>2.20</i>	<i>307</i>	<i>17.63</i>		
<i>841</i>	<i>20.31</i>	<i>220</i>	<i>4.32</i>	<i>97</i>	<i>12.7</i>	<i>2.81</i>	<i>308</i>	<i>17.82</i>		
<i>846</i>	<i>20.36</i>	<i>220</i>	<i>4.25</i>	<i>100</i>	<i>4.8</i>	<i>1.58</i>	<i>301</i>	<i>18.11</i>		
					<i>4.9</i>	<i>1.52</i>	<i>310</i>	<i>18.16</i>		

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

Facility Name	
Sample by	Pillee Mark Hamidi
Depth to water, feet (TOC)	15.78
Measured Total Depth, feet (TOC)	37.32

Sample Location ID	AD-31
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)		
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	65.6	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 PIAHON PP
Sample by	KLINAY m. Pinao

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 Natalie Hamill
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 (μ S/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ($^{\circ}$ 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	15.10		
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	3.95	596	208	0.65	357	17.92		

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

Facility Name	AEP PUMP 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 (μ S/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature ($^{\circ}$ C)		
0802	0.61	124	3.63	1750	3.8	3.02	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	ATO PIAH 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 (µS/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°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 11/14/22

Facility Name
 Sample by P. Key
 M.H. Hamilton

Sample Location ID B-2

Depth to water, feet (TOC) 27.15
 Measured Total Depth, feet (TOC) 51.44

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 ($^{\circ}\text{C}$)		
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

Dup-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 (μ S/cm)	Turbidity (N.T.U)	D.O. (mg/L)	ORP (mV)	Temperature (°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		

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 Barnhill (318-673-3803)
 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)	Matrix	# of Cont.	Analysis Turnaround Time (in Calendar Days)						Sample Specific Notes
						250 mL bottle, pH<2, HNO ₃	Field-filter 250 mL bottle, then pH<2, HNO ₃	1 L bottle, Cool, 0-5°C	Three (six every 10hr) 1 L bottles, pH<2, HNO ₃	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	
AD-2	3/29/2022	1125	G	GW	1	B, Ca, Li, Sb, As, Ba, Mo, Se, Tl, Cd, Cr, Co, Pb, and Na, K, Mg, Sr	B, Ca, Li, Sb, As, Ba, Mo, Se, Tl, Cd, Cr, Co, Pb, and Na, K, Mg, Sr	TDS, F, Cl, SO ₄ , Br, and Alkalinity	Ra-226, Ra-228	Hg	Hg	221004
AD-3	3/29/2022	1148	G	GW	1			X				
AD-4	3/29/2022	1216	G	GW	1			X				
AD-7	3/28/2022	1150	G	GW	1			X				
AD-12	3/28/2022	1002	G	GW	1			X				
AD-13	3/28/2022	838	G	GW	1			X				
AD-17	3/29/2022	1025	G	GW	1			X				
AD-18	3/29/2022	936	G	GW	1			X				
AD-22	3/28/2022	935	G	GW	1			X				
AD-28	3/29/2022	1034	G	GW	1			X				
AD-30	3/28/2022	1251	G	GW	1			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: <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



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>Pinkey</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 ⁶ (pres) (24 hr)	NO ₂ or NO ₃ (48 hr)	ortho-PO ₄ (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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	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	Sample and quality control (QC) identification		
	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	Test reports		
	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	Surrogate recovery data		
	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	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Alkalinity Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	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	Laboratory control samples (LCS):		
	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	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	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	Analytical duplicate data		
	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	Method quantitation limits (MQLs):		
	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	Other problems/anomalies		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	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	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	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	Mass spectral tuning:		
	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	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	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	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	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	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	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

Exception Report No.	Description
ER1	CCB acceptance criteria is $CCB < 0.5 * MQL$.
ER2	The duplicate result is above the acceptance criteria.

¹ 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.

² O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

³ NA - Not applicable; NR - Not reviewed.

⁴ 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)

Tim E. Arnold
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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	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	Sample and quality control (QC) identification		
	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	Test reports		
	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	Surrogate recovery data		
	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	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Ion Chromatography Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	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	Laboratory control samples (LCS):		
	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	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	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	Analytical duplicate data		
	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	Method quantitation limits (MQLs):		
	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	Other problems/anomalies		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	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	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	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	Mass spectral tuning:		
	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	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	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	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	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	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	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: 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
Audin: 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

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

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
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

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

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

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

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

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

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

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

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

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

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

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

250 mL bottle, pH<2, HNO₃

Field-filter 250 mL bottle, then pH<2, HNO₃

Three (six every 10th) L bottles, pH<2, HNO₃

250 mL PTFE lined bottle, HCL, pH<2

40 mL Glass vial or 250 mL PTFE lined bottle, HCL, pH<2

40 mL Glass vial or 250 mL PTFE lined bottle, HCL, pH<2

Sample Specific Notes

Sample Specific Notes

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Sample Specific Notes

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.

TG-32

Special Instructions/QC Requirements & Comments:

Relinquished by: [Signature] Date/Time: 3-30-22 1300

Relinquished by: [Signature] Date/Time: 4/1/22 1230PM

Relinquished by: [Signature] Date/Time: 4/1/22 1230PM

Form COC-04, AEP Chain of Custody (COC) Record for Coal Combustion Residual (CCR) Sampling - Shreveport, Rev. 1, 1/10/17

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

Project Name: Pirkey - CCR
 Contact Name: Leslie Fuerschbach
 Contact Phone: 318-423-3805
 Sample(s): Matt Hamilton Kenny McDonald

Program: Coal Combustion Residuals (CCR)
 Site Contact:
 Date:
 For Lab Use Only:
 COC/Order #:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Analysis Turnaround Time (in Calendar Days)						Sample Specific Notes
						260 mL bottle, pH<2, HNO ₃	Field-filter 250 mL bottle, then pH<2, HNO ₃	1 L bottle, Cool, 0-6°C	Three (six every 10th) L bottles, pH<2, HNO ₃	40 mL Glass vial or bottle, HCL, pH<2	250 mL PTFE lined or 40 mL Glass vial or bottle, HCL, pH<2	
AD-31	3/28/2022	1204	G	GW	7	B, Ca, Li, Sb, As, Ba, Mo, Se, TL and Na, K, Mg, Sr	B, Cd, Cr, Co, Tl, Mn, Mo, Pb, Se, TL and Na, K, Mg, Sr	TDS, F, Cl, SO ₄ and Br, Alkalinity	Ra-226, Ra-228	Hg	Hg	
AD-32	3/28/2022	1107	G	GW	7					X	X	
AD-33	3/28/2022	1054	G	GW	7					X	X	
DUPLICATE 1	3/28/2022	1200	G	GW	4					X	X	
DUPLICATE 2	3/28/2022	1055	G	GW	4					X	X	
EQUIPMENT BLANK	3/28/2022	1030	G	GW	2					X	X	
						4	F4	1	4	2	2	

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: *[Signature]* Date/Time: 3-30-22 Received by: *[Signature]* Date/Time: 130
 Relinquished by: *[Signature]* Date/Time: Received by: *[Signature]* Date/Time:
 Relinquished by: *[Signature]* Date/Time: Received by: *[Signature]* Date/Time: 4/1/22 12:30pm

Form COC-04, AEP Chain of Custody (COC) Record for Coal Combustion Residual (CCR) Sampling - Shreveport, Rev. 1, 11/10/17



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 ⁶⁺ (pres) (24 hr)	NO ₂ or NO ₃ (48 hr)	ortho-PO ₄ (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 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# 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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	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	Sample and quality control (QC) identification		
	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	Test reports		
	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	Surrogate recovery data		
	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	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Mercury Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	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	Laboratory control samples (LCS):		
	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	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	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	Analytical duplicate data		
	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	Method quantitation limits (MQLs):		
	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	Other problems/anomalies		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	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	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	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	Mass spectral tuning:		
	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	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	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	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	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	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	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.

¹ 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.

² O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

³ NA - Not applicable; NR - Not reviewed.

⁴ 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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	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	Sample and quality control (QC) identification		
	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	Test reports		
	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	Surrogate recovery data		
	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	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Radium Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	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	Laboratory control samples (LCS):		
	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	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	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	Analytical duplicate data		
	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	Method quantitation limits (MQLs):		
	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	Other problems/anomalies		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	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	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	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	Mass spectral tuning:		
	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	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	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	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	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	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	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

¹ 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.

² O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

³ NA - Not applicable; NR - Not reviewed.

⁴ Exception Report identification number; an Exception Report should be completed for an item if the result is “No” or “NR.”

Radium Laboratory Review Checklist

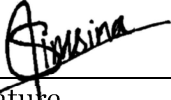
Municipal Solid Waste Laboratory Review Checklist

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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	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	Sample and quality control (QC) identification		
	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	Test reports		
	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	Surrogate recovery data		
	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	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Radium Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	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	Laboratory control samples (LCS):		
	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	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	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	Analytical duplicate data		
	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	Method quantitation limits (MQLs):		
	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	Other problems/anomalies		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	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	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	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	Mass spectral tuning:		
	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	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	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	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	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	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	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

¹ 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.

² O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

³ NA - Not applicable; NR - Not reviewed.

⁴ 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

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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
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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
- 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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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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	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	Sample and quality control (QC) identification		
	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	Test reports		
	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	Surrogate recovery data		
	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	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Radium Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	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	Laboratory control samples (LCS):		
	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	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	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	Analytical duplicate data		
	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	Method quantitation limits (MQLs):		
	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	Other problems/anomalies		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	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	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	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	Mass spectral tuning:		
	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	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	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	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	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	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

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		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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	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	Sample and quality control (QC) identification		
	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	Test reports		
	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	Surrogate recovery data		
	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	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

ICP-MS Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	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	Laboratory control samples (LCS):		
	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	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	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	Analytical duplicate data		
	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	Method quantitation limits (MQLs):		
	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	Other problems/anomalies		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	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	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	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	Mass spectral tuning:		
	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	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	Yes	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	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	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	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	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	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.

¹ 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.
² O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).
³ NA - Not applicable; NR - Not reviewed.
⁴ 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).



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 Pukey Number of Plastic Containers: 3

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 ⁶ (pres) (24 hr)	NO ₂ or NO ₃ (48 hr)	ortho-PO ₄ (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)


Signature

Chemist
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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	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	Sample and quality control (QC) identification		
	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	Test reports		
	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	Surrogate recovery data		
	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	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Alkalinity Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	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	Laboratory control samples (LCS):		
	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	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	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	Analytical duplicate data		
	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	Method quantitation limits (MQLs):		
	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	Other problems/anomalies		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	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	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	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	Mass spectral tuning:		
	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	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	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	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	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	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	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 $CCB < 0.5 * MQL$.

¹ 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.

² O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

³ NA - Not applicable; NR - Not reviewed.

⁴ 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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	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	Sample and quality control (QC) identification		
	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	Test reports		
	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	Surrogate recovery data		
	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	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Ion Chromatography Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	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	Laboratory control samples (LCS):		
	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	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	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	Analytical duplicate data		
	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	Method quantitation limits (MQLs):		
	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	Other problems/anomalies		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	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	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	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	Mass spectral tuning:		
	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	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	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	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	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	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	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.

¹ 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.

² O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).

³ NA - Not applicable; NR - Not reviewed.

⁴ 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:

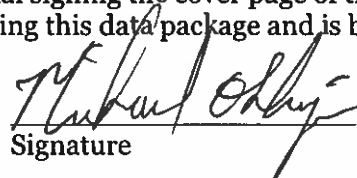
- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- 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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	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	Sample and quality control (QC) identification		
	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	Test reports		
	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	Surrogate recovery data		
	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	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

TDS Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	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	Laboratory control samples (LCS):		
	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	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	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	Analytical duplicate data		
	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	Method quantitation limits (MQLs):		
	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	Other problems/anomalies		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	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	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	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	Mass spectral tuning:		
	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	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	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	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	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	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	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 CCR
Reviewer Name: Michael Ohlinger
LRC Date: 7/28/22
Laboratory Job Number: 221988
Prep Batch Number(s): QC2207061

Exception Report No.	Description

¹ 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.
² O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).
³ NA - Not applicable; NR - Not reviewed.
⁴ 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: 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: _____
 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	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	Date	COC/Order #	Sample Specific Notes			
														Mercury	Dissolved Mercury	F, Cl, SO4, Br, TDS, Alkalinity
AD-2	6/21/2022	849	G	GW	1				X							
AD-3	6/21/2022	1123	G	GW	1				X							
AD-4	6/21/2022	1034	G	GW	1				X							
AD-7	6/21/2022	947	G	GW	1				X							
AD-12	6/20/2022	852	G	GW	1				X							
AD-13	6/20/2022	843	G	GW	1				X							
AD-17	6/21/2022	1040	G	GW	1				X							
AD-18	6/21/2022	817	G	GW	1				X							
AD-22	6/20/2022	953	G	GW	1				X							
AD-28	6/21/2022	956	G	GW	1				X							
AD-30	6/20/2022	1129	G	GW	1				X							
AD-31	6/20/2022	1043	G	GW	1				X							
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: <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)

<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 checked="" type="radio"/> UPS	<input checked="" type="radio"/> FedEx
				Other	USPS	

Plant/Customer Pukey Number of Plastic Containers: 12

Opened By MCK 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: MCK 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 ⁶ (pres) (24 hr)	NO ₂ or NO ₃ (48 hr)	ortho-PO ₄ (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: MCK 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 MCK _____

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:

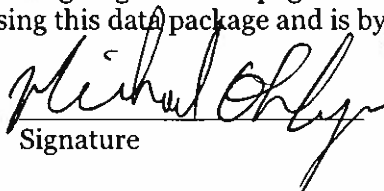
- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- 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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	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	Sample and quality control (QC) identification		
	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	Test reports		
	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	Surrogate recovery data		
	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	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Alkalinity Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	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	Laboratory control samples (LCS):		
	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	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	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	Analytical duplicate data		
	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	Method quantitation limits (MQLs):		
	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	Other problems/anomalies		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	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	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	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	Mass spectral tuning:		
	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	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	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	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	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	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	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.
- 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)

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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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	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	Sample and quality control (QC) identification		
	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	Test reports		
	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	Surrogate recovery data		
	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	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Ion Chromatography Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	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	Laboratory control samples (LCS):		
	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	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	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	Analytical duplicate data		
	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	Method quantitation limits (MQLs):		
	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	Other problems/anomalies		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	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	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	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	Mass spectral tuning:		
	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	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	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	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	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	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

TDS Laboratory Review Checklist

Municipal Solid Waste Laboratory Review Checklist

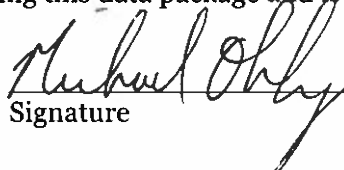
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 - (d) Cleanup methods
 - (e) If required for the project, tentatively identified compounds (TICs)
- R4 Surrogate recovery data including:
 - (a) Calculated recovery (%R)
 - (b) The laboratory's surrogate QC limits
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- 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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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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	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	Sample and quality control (QC) identification		
	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	Test reports		
	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	Surrogate recovery data		
	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	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

TDS Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	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	Laboratory control samples (LCS):		
	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	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	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	Analytical duplicate data		
	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	Method quantitation limits (MQLs):		
	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	Other problems/anomalies		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	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	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	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	Mass spectral tuning:		
	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	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	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	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	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	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	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
Audinert: 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

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-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

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

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
Audinnet: 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

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-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
Audinnet: 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 ₃	Field-filter 250 mL bottle, then pH<2, HNO ₃	Three (six every 10th) 1 L bottles, pH<2, HNO ₃	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, Tl	Disolved Sb, As, Ba, Be, Cd, Cr, Co, Fe, Li, Mn, Mo, Pb, Se, Tl	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 ⁶ (pres) (24 hr)	NO ₂ or NO ₃ (48 hr)	ortho-PO ₄ (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 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# 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.

<u>Jonathan Barnhill</u>	<u></u>	<u>Lab Supervisor</u>	<u>12-12-2022</u>
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: 12-12-2022
Laboratory Job Number: 222015
Prep Batch Number(s): PB22070101 PB2207151 QC2207105 QC2207151

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	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	Sample and quality control (QC) identification		
	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	Test reports		
	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	Surrogate recovery data		
	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	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

ICP-MS Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	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	Laboratory control samples (LCS):		
	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	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	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	Analytical duplicate data		
	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	Method quantitation limits (MQLs):		
	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	Other problems/anomalies		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	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	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	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	Mass spectral tuning:		
	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	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	Yes	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	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	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	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	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	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

¹ 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.
² O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).
³ NA - Not applicable; NR - Not reviewed.
⁴ 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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	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	Sample and quality control (QC) identification		
	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	Test reports		
	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	Surrogate recovery data		
	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	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Radium Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	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	Laboratory control samples (LCS):		
	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	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	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	Analytical duplicate data		
	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	Method quantitation limits (MQLs):		
	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	Other problems/anomalies		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	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	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	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	Mass spectral tuning:		
	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	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	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	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	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	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	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:

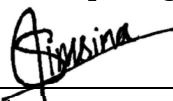
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- R4 Surrogate recovery data including:
 - (a) Calculated recovery (%R)
 - (b) The laboratory's surrogate QC limits
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 - (a) LCS spiking amounts
 - (b) Calculated %R for each analyte
 - (c) The laboratory's 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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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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	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	Sample and quality control (QC) identification		
	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	Test reports		
	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	Surrogate recovery data		
	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	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Radium Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	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	Laboratory control samples (LCS):		
	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	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	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	Analytical duplicate data		
	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	Method quantitation limits (MQLs):		
	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	Other problems/anomalies		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	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	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	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	Mass spectral tuning:		
	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	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	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	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	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	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	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.
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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)

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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	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	Sample and quality control (QC) identification		
	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	Test reports		
	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	Surrogate recovery data		
	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	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Mercury Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	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	Laboratory control samples (LCS):		
	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	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	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	Analytical duplicate data		
	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	Method quantitation limits (MQLs):		
	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	Other problems/anomalies		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	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	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	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	Mass spectral tuning:		
	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	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	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	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	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	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	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

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-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
Audin: 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

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-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)						Date:	COC/Order #:	For Lab Use Only:
						☑ Routine (28 days for Monitoring Wells)								
						250 mL bottle, pH<2, HNO ₃	Field-filter 250 mL bottle, then pH<2, HNO ₃	Three (six every 10th) 1 L bottles, pH<2, HNO ₃	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: *[Signature]* Date/Time: 11-17-22 Received by: *[Signature]* Date/Time: 11/21/22 12:00PM

Relinquished by: *[Signature]* Date/Time: *[Blank]* Received by: *[Signature]* Date/Time: *[Blank]*

Relinquished by: *[Signature]* Date/Time: *[Blank]* Received by: *[Signature]* Date/Time: *[Blank]*



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 ⁶ (pres) (24 hr)	NO ₂ or NO ₃ (48 hr)	ortho-PO ₄ (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

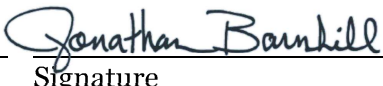
Municipal Solid Waste Laboratory Review Checklist

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)
- 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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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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	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	Sample and quality control (QC) identification		
	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	Test reports		
	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	Surrogate recovery data		
	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	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

ICP-MS Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	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	Laboratory control samples (LCS):		
	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	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	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	Analytical duplicate data		
	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	Method quantitation limits (MQLs):		
	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	Other problems/anomalies		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	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	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	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	Mass spectral tuning:		
	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	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	Yes	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	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	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	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	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	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

¹ 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.
² O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).
³ NA - Not applicable; NR - Not reviewed.
⁴ 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

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 - (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
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- The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

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<u>Tamisha Palmer</u>		<u>Chemical Technician, Prin</u>	<u>12/20/2022</u>
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: 12/20/2022
Laboratory Job Number: PB22112803
Prep Batch Number(s): 223664

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	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	Sample and quality control (QC) identification		
	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	Test reports		
	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	Surrogate recovery data		
	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	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Radium Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	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	Laboratory control samples (LCS):		
	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	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	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	Analytical duplicate data		
	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	Method quantitation limits (MQLs):		
	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	Other problems/anomalies		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	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	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	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	Mass spectral tuning:		
	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	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	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	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	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	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

Radium Laboratory Review Checklist

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 - (b) The laboratory's surrogate QC limits
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 - (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
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- 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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	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	Sample and quality control (QC) identification		
	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	Test reports		
	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	Surrogate recovery data		
	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	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Radium Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	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	Laboratory control samples (LCS):		
	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	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	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	Analytical duplicate data		
	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	Method quantitation limits (MQLs):		
	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	Other problems/anomalies		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	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	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	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	Mass spectral tuning:		
	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	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	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	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	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	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	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.
- 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

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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	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	Sample and quality control (QC) identification		
	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	Test reports		
	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	Surrogate recovery data		
	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	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Radium Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	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	Laboratory control samples (LCS):		
	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	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	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	Analytical duplicate data		
	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	Method quantitation limits (MQLs):		
	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	Other problems/anomalies		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	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	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	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	Mass spectral tuning:		
	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	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	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	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	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	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	I	Are laboratory SOPs current and on file for each method performed?	Yes	

Mercury 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)
 - (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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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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	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	Sample and quality control (QC) identification		
	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	Test reports		
	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	Surrogate recovery data		
	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	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Mercury Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	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	Laboratory control samples (LCS):		
	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	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	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	Analytical duplicate data		
	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	Method quantitation limits (MQLs):		
	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	Other problems/anomalies		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	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	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	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	Mass spectral tuning:		
	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	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	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	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	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	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	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

COC/Order #: 223647

Date:

Analysis Turnaround Time (in Calendar Days)
 ☉ Routine (28 days for Monitoring Wells)

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

Sampler(s) Initials

Sample Specific Notes:

Disolved Mercury

Mercury

F, Cl, SO4, Br, TDS, Alkalinity

Ra-226, Ra-228

Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials	Field-filter 250 mL bottle, then pH<2, HNO3	1 L bottle, Cool, 0-5C	Three (six every 10th) L bottles, pH<2, HNO3	Date:
11/15/2022	1005	G	GW	1					
11/16/2022	1145	G	GW	1					
11/16/2022	1132	G	GW	1					
11/16/2022	910	G	GW	1					
11/15/2022	1058	G	GW	1					
11/15/2022	821	G	GW	1					
11/16/2022	1058	G	GW	1					
11/16/2022	1013	G	GW	1					
11/14/2022	1131	G	GW	1					
11/16/2022	848	G	GW	1					
11/16/2022	946	G	GW	1					
11/15/2022	1002	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 needed

Relinquished by: *[Signature]* Date/Time: 11-17-22
 Company: *Euse*
 Received by: *[Signature]* Date/Time: 11/18/22
 Company: *[Signature]*
 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"/> UPS <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 ⁶ (pres) (24 hr)	NO ₂ or NO ₃ (48 hr)	ortho-PO ₄ (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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	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	Sample and quality control (QC) identification		
	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	Test reports		
	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	Surrogate recovery data		
	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	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Ion Chromatography Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	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	Laboratory control samples (LCS):		
	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	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	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	Analytical duplicate data		
	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	Method quantitation limits (MQLs):		
	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	Other problems/anomalies		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	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	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	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	Mass spectral tuning:		
	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	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	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	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	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	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	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:

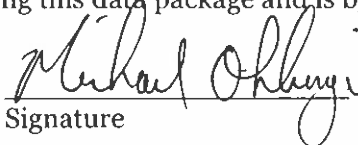
- This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- R1 Field chain-of-custody documentation
- R2 Sample identification cross-reference
- 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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	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	Sample and quality control (QC) identification		
	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	Test reports		
	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	Surrogate recovery data		
	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	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

TDS Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	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	Laboratory control samples (LCS):		
	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	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	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	Analytical duplicate data		
	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	Method quantitation limits (MQLs):		
	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	Other problems/anomalies		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	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	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	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	Mass spectral tuning:		
	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	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	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	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	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	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	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:

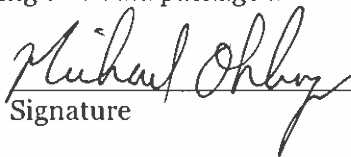
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- R2 Sample identification cross-reference
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
 - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
 - (b) Dilution 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.

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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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
R1	O, I	Chain-of-custody (COC)		
	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	Sample and quality control (QC) identification		
	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	Test reports		
	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	Surrogate recovery data		
	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	Test reports/summary forms for blank samples		
	I	Were appropriate type(s) of blanks analyzed?	Yes	
	I	Were blanks analyzed at the appropriate frequency?	Yes	

Alkalinity Laboratory Review Checklist

Item ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
	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	Laboratory control samples (LCS):		
	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	Matrix spike (MS) and matrix spike duplicate (MSD) data		
	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	Analytical duplicate data		
	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	Method quantitation limits (MQLs):		
	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	Other problems/anomalies		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S1	O, I	Initial calibration (ICAL)		
	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	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):		
	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	Mass spectral tuning:		
	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	Internal standards (IS):		
	I	Were IS area counts and retention times within the method-required QC limits?	NA	
S5	O, I	Raw data (NELAC section 1 appendix A glossary, and section 5.)		
	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 ¹	Analytes ²	Description	Result (Yes, No, NA, NR) ³	Exception Report No. ⁴
S6	O	Dual column confirmation		
	I	Did dual column confirmation results meet the method-required QC?	NA	
S7	O	Tentatively identified compounds (TICs):		
	I	If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?	NA	
S8	I	Interference Check Sample (ICS) results:		
	I	Were percent recoveries within method QC limits?	NA	
S9	I	Serial dilutions, post digestion spikes, and method of standard additions		
	I	Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	NA	
S10	O, I	Method detection limit (MDL) studies		
	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	Proficiency test reports:		
	I	Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	Yes	
S12	O, I	Standards documentation		
	I	Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	Yes	
S13	O, I	Compound/analyte identification procedures		
	I	Are the procedures for compound/analyte identification documented?	Yes	
S14	O, I	Demonstration of analyst competency (DOC)		
	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	Verification/validation documentation for methods (NELAC Chap 5n 5)		
	I	Are all the methods used to generate the data documented, verified, and validated, where applicable?	Yes	
S16	O, I	Laboratory standard operating procedures (SOPs):		
	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 $CCB < 0.5 * MQL$.

¹ 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.
² O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).
³ NA - Not applicable; NR - Not reviewed.
⁴ Exception Report identification number; an Exception Report should be completed for an item if the result is “No” or “NR.”