

Annual Groundwater Monitoring Report

Southwestern Electric Power Company
H. W. Pirkey Power Plant
West Bottom Ash Pond CCR Management Unit
Hallsville, Texas
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An **AEP** Company

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Abbreviations:

- ASD - Alternate Source Demonstration
- CCR – Coal Combustion Residual
- GWPS - Groundwater protection standards
- SSI - Statistically Significant Increase
- SSL - Statistically Significant Level

I. Overview

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

In general, the following activities were completed:

- At the start of the current annual reporting period, the 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 2021 and analyzed for Appendix III and Appendix IV constituents, as specified in 30 TAC §352.941 or §352.951 *et seq.* and AEP's *Groundwater Sampling and Analysis Plan (2021)*.
- Groundwater data underwent various validation tests, including tests for completeness, valid values, transcription errors, and consistent units.
- Data and statistical analysis not available for the previous reporting period indicates that during the 2nd semi-annual 2020 sampling event (November 2020):

The following Appendix IV parameters exceeded established groundwater protection standards:

- 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-30

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

The following Appendix IV parameters exceeded established groundwater protection standards:

- 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 concentrations at AD-30
- An ASD for 1st semi-annual 2021 potential SSL for cobalt was certified December 22, 2021 and submitted to TCEQ December 22, 2021 for approval.
 - The 2nd semi-annual event (November 2021) data are still undergoing statistical analysis.
 - Because an alternate source for the SSL(s) was identified, but no alternate source for the SSI(s) was identified, 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).

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;

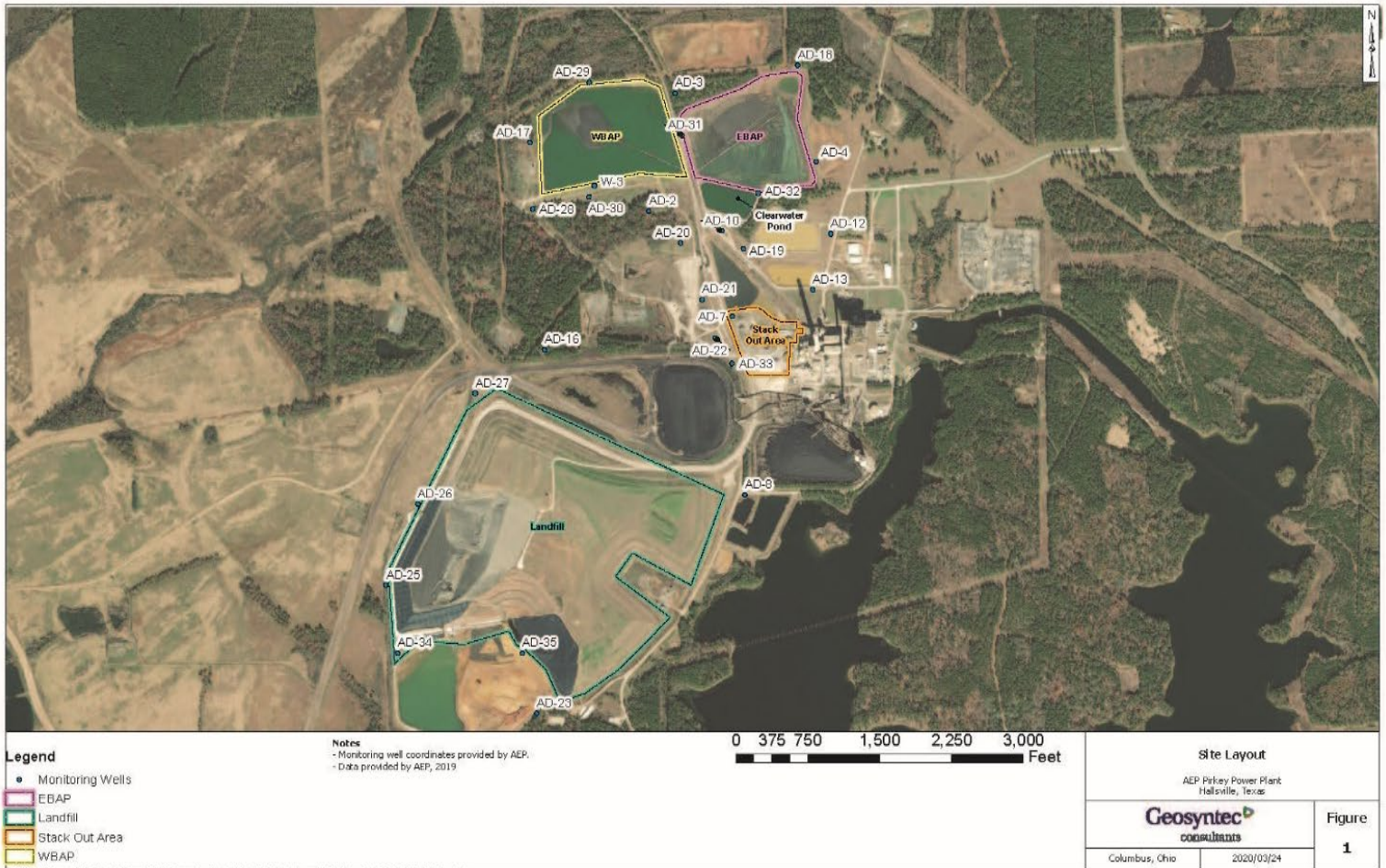
- Other information required to be included in the annual report such as field sheets, analytical reports, etc. (**Appendix 4 and 5**).

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 2021. The network design, as summarized in the *Groundwater Monitoring Network Design Report* (May 25, 2016) and as posted at the CCR website for Pirkey Power Plant’s 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 2021 satisfies the annual screening sampling requirements of 30 TAC §352.951.

V. Statistical Evaluation of 2021 Events

Appendix 2 contains the statistical analysis report(s).

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

The following Appendix IV parameters exceeded established groundwater protection standards:

- 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-30

During the 1st semi-annual sampling event held in May 2021:

The following Appendix IV parameters exceeded established groundwater protection standards:

- 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 concentrations at AD-30

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

VI. Alternate Source Demonstration

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

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

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

Because an alternate source for the SSL(s) was identified, but no alternate source for the SSI(s) was identified, 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 2021.

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

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

X. A Projection of Key Activities for the Upcoming Year

Key activities for next year will include:

- Assessment monitoring sampling will be conducted;
- Complete the statistical evaluation of the second semi-annual groundwater monitoring event that took place in November 2021;
- Conduct the annual groundwater sampling event for all constituents listed in appendix III and IV as required by 30 TAC 352.951;

- Perform statistical analysis on the sampling results for the Appendix III and Appendix IV parameters as required by 30 TAC 352.951;
- Determine applicable GWPSs for the Appendix IV parameters, and compare the results of Appendix IV concentrations in downgradient wells to the GWPSs;
- If no GWPSs are exceeded, the WBAP will remain in assessment monitoring;
- Responding to any new data received in light of CCR rule requirements;
- Preparation of the next annual groundwater report.

APPENDIX 1- Groundwater Data Tables and Figures

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

**Table 1 - Groundwater Data Summary: AD-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

Notes:

mg/L: milligrams per liter

SU: standard unit

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

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

--: Not analyzed

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

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

Table 1 - Groundwater Data Summary: AD-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	1.3	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

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

Notes:

mg/L: milligrams per liter

SU: standard unit

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

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

--: Not analyzed

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

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

Table 1 - Groundwater Data Summary: AD-12

Pirkey - 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	0.6	0.12	0.07 J1	0.00500	< 0.002 U1	< 0.1 U1	0.31 J1	< 0.04 U1
11/15/2021	Assessment	< 0.02 U1	0.05 J1	26.5	0.148	0.01 J1	0.30	1.38	1.76	0.07	0.07 J1	0.0110	< 0.002 U1	< 0.1 U1	0.10 J1	< 0.04 U1

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

Table 1 - Groundwater Data Summary: AD-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

Notes:

mg/L: milligrams per liter

SU: standard unit

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

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

--: Not analyzed

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

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

Table 1 - Groundwater Data Summary: AD-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	6.4	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

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

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.

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

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

Notes:

mg/L: milligrams per liter

SU: standard unit

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

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

--: Not analyzed

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

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

Table 1 - Groundwater Data Summary: AD-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

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

Notes:

mg/L: milligrams per liter

SU: standard unit

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

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

--: Not analyzed

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

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

Table 1 - Groundwater Data Summary: AD-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

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
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**Residence Time Calculation Summary Pirkey
West Bottom Ash Pond**

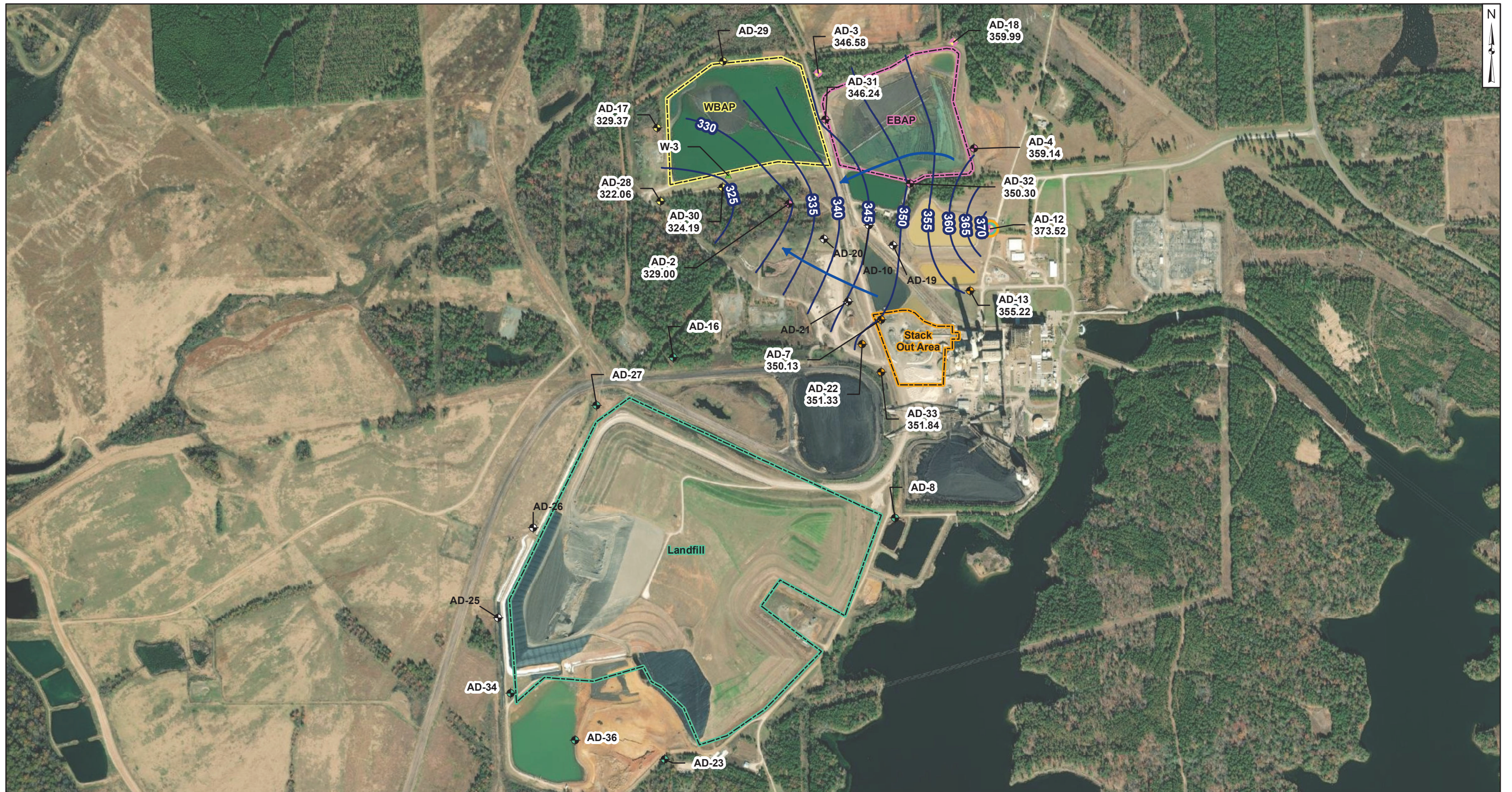
Geosyntec Consultants, Inc.

CCR Management Unit	Monitoring Well	Well Diameter (inches)	2021-03		2021-05		2021-11	
			Groundwater Velocity (ft/year)	Groundwater Residence Time (days)	Groundwater Velocity (ft/year)	Groundwater Residence Time (days)	Groundwater Velocity (ft/year)	Groundwater Residence Time (days)
West Bottom Ash Pond	AD-3 ^[1]	4.0	14.0	8.7	17.7	6.9	15.7	7.7
	AD-12 ^[1]	4.0	22.9	5.3	40.6	3.0	19.3	6.3
	AD-17 ^[2]	2.0	12.0	5.1	10.2	6.0	10.1	6.0
	AD-18 ^[1]	2.0	10.9	5.6	10.4	5.9	9.6	6.3
	AD-28 ^[2]	2.0	9.6	6.3	11.8	5.1	12.5	4.9
	AD-30 ^[2]	2.0	14.7	4.1	13.2	4.6	12.6	4.8

Notes:

[1] - Background Well

[2] - Downgradient Well



- Legend**
- Groundwater Monitoring Wells**
- Out of Network
 - EBAP
 - WBAP
 - Landfill
 - Stackout Area
 - EBAP and WBAP
 - All CCR Unit Networks
 - Piezometer

- Approximate Groundwater Flow Direction
- Groundwater Elevation Contour

Notes

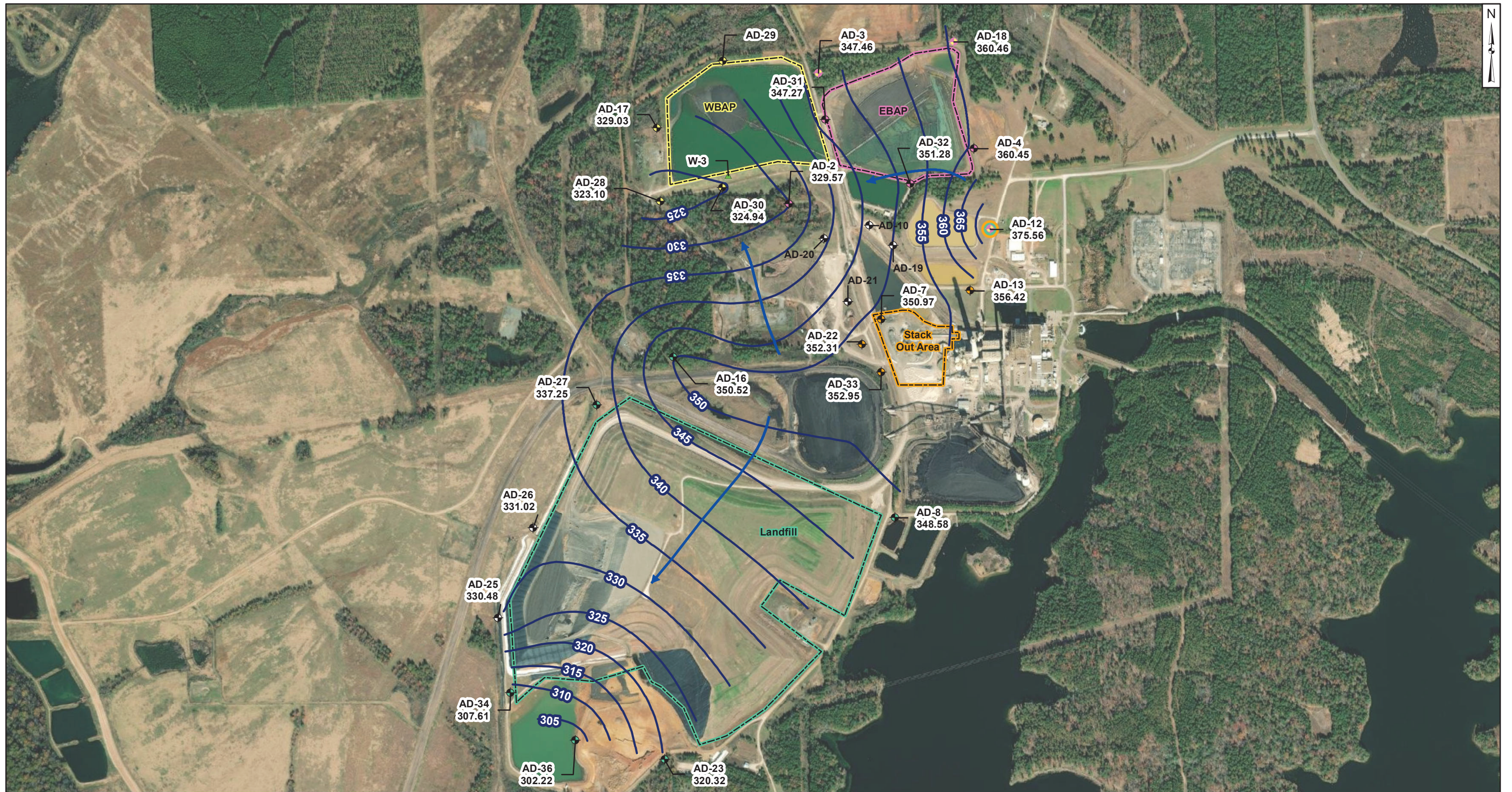
- Monitoring well coordinates and water level data (collected on March 9, 2021) provided by AEP.
- Site features based on information available in CCR Groundwater Monitoring Well Network Evaluations (Arcadis, 2016) provided by AEP.
- Groundwater elevation units are feet above mean sea level.
- East and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

1,000 500 0 1,000 Feet

Beth Ann Gross
July 16, 2021

Geosyntec Consultants, Inc.
Texas Firm Registration No. 1182

Potentiometric Contours - Uppermost Aquifer March 2021	
AEP Pirkey Power Plant Hallsville, Texas	
Columbus, Ohio	2021/06/17
Figure 1	



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

Notes

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

1,000 500 0 1,000 Feet

Beth Ann Gross
Oct 24, 2021

Geosyntec Consultants, Inc.
Texas Firm
Registration No. 1182

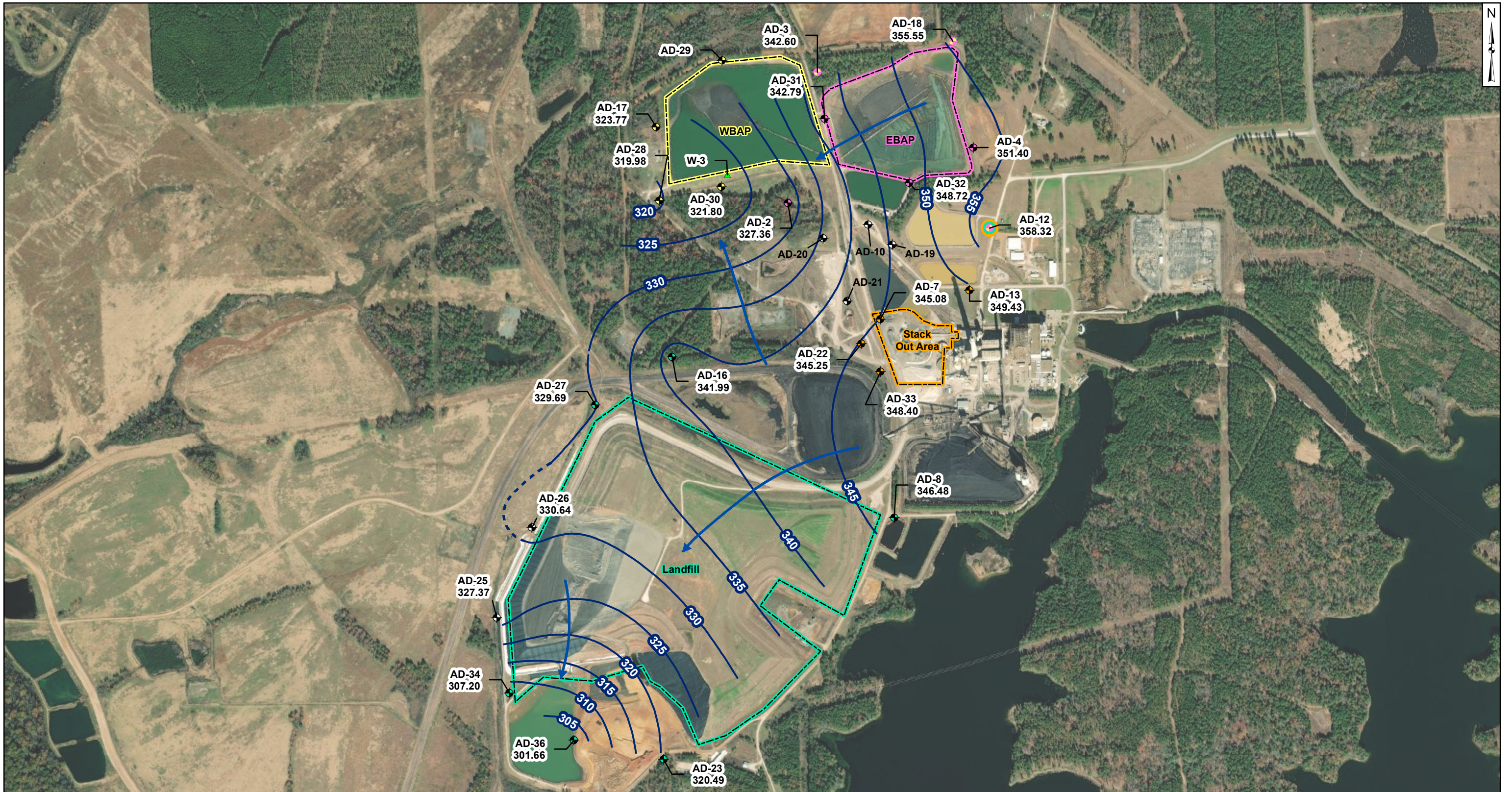
**Potentiometric Contours - Uppermost Aquifer
May 2021**

AEP Pirkey Power Plant
Hallsville, Texas

Geosyntec
consultants

Columbus, Ohio 2021/08/18

Figure 2



Legend

Groundwater Monitoring Wells

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

Notes

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

1,000 500 0 1,000 Feet

Beth Ann Gross
Jan 14, 2022

Geosyntec Consultants, Inc.
Texas Firm
Registration No. 1182

**Potentiometric Contours - Uppermost Aquifer
November 2021**

AEP Pirkey Power Plant
Hallsville, Texas

Figure 3

Columbus, Ohio 01/13/2022

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
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Columbus, Ohio 43221

March 3, 2021
CHA8500

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Table 2	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
CFR	Code of Federal Regulations
GWPS	Groundwater Protection Standard
LCL	Lower Confidence Limit
LFB	Laboratory Fortified Blanks
LRB	Laboratory Reagent Blanks
MCL	Maximum Contaminant Level
NELAP	National Environmental Laboratory Accreditation Program
QA	Quality Assurance
QC	Quality Control
SSI	Statistically Significant Increase
SSL	Statistically Significant Level
TDS	Total Dissolved Solids
UPL	Upper Prediction Limit
USEPA	United States Environmental Protection Agency
UTL	Upper Tolerance Limit
WBAP	West Bottom Ash Pond

SECTION 1

EXECUTIVE SUMMARY

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

Based on detection monitoring conducted in 2017 and 2018, statistically significant increases (SSIs) over background were concluded for boron at the WBAP. An alternative source was not identified at the time, so the WBAP has been in assessment monitoring since. Groundwater protection standards (GWPS) were set in accordance with 40 CFR 257.95(d)(2) and a statistical evaluation of the assessment monitoring data was conducted. One assessment monitoring event was conducted at the WBAP in November 2020 in accordance with 40 CFR 257.95. The results of the November 2020 assessment event are documented in this report.

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

The monitoring data were submitted to Groundwater Stats Consulting, LLC for statistical analysis. Groundwater protection standards (GWPSs) were re-established for the Appendix IV parameters. Confidence intervals were calculated for Appendix IV parameters at the compliance wells to assess whether Appendix IV parameters were present at a statistically significant level (SSL) above the GWPS. 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 each upgradient and downgradient well to meet the requirements of 40 CFR 257.95(d)(1) (November 2020). Samples from this sampling event were analyzed for all Appendix III and Appendix IV parameters. A summary of data collected during this assessment monitoring event are presented in Table 1.

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

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

2.2 Statistical Analysis

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

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

2.2.1 Establishment of GWPSs

A GWPS was established for each Appendix IV parameter in accordance with 40 CFR 257.95(h) and the *Statistical Analysis Plan* (AEP, 2017). The established GWPS was determined to be the greater value of the background concentration and the maximum contaminant level (MCL) or risk-based level specified in 40 CFR 257.95(h)(2) for each Appendix IV parameter. To determine background concentrations, an upper tolerance limit (UTL) was calculated using pooled data from the background wells collected during the background monitoring and assessment monitoring events. Tolerance limits were calculated parametrically with 95% coverage and 95% confidence for chromium, combined radium, and lithium. Non-parametric tolerance limits were calculated

for barium, beryllium, cobalt, mercury, and selenium due to apparent non-normal distributions and for antimony, arsenic, cadmium, fluoride, lead, 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 SSL was identified at the Pirkey WBAP:

- The LCL for cobalt exceeded the GWPS of 0.0090 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 alternative source demonstration will be conducted to evaluate if the unit can remain in assessment monitoring.

2.2.3 Establishment of Appendix III Prediction Limits

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

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

The complete Mann-Whitney test results and a summary of the significant findings can be found in Attachment B. A significant difference was found between the two groups for sulfate in downgradient well AD-17. Typically, when the test concludes that the medians of the two groups are significantly different, particularly in the downgradient wells, the background are not updated to include the newer data but will be reconsidered in the future. In the case of sulfate at AD-17, the recent data were lower than the older data; therefore, including the new data produces a lower, more conservative UPL. As such, the background dataset was updated for sulfate at well AD-17.

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

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

2.2.4 Evaluation of Potential Appendix III SSIs

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

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

- Boron concentrations exceeded the interwell UPL of 0.0742 mg/L at AD-28 (0.395 mg/L) and AD-30 (2.55 mg/L).

- Chloride concentrations exceeded the interwell UPL of 9.22 mg/L at AD-17 (32.4 mg/L) and AD-30 (30.6 mg/L).
- Sulfate concentrations exceeded the intrawell UPL of 31.6 mg/L at AD-30 (109 mg/L).
- Total dissolved solids (TDS) concentrations exceeded the intrawell UPL of 206 mg/L at AD-30 (252 mg/L).

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

2.3 Conclusions

A semi-annual assessment monitoring event was conducted in accordance with the CCR Rule. The laboratory and field data were reviewed prior to statistical analysis, with no QA/QC issues identified that impacted data usability. A review of outliers identified one potential outlier for lithium in well AD-3 in the November 2020 data. GWPSs were re-established for the Appendix IV parameters. A confidence interval was constructed at each compliance well for each Appendix IV parameter; SSLs were concluded if the entire confidence interval exceeded the GWPS. An SSL was identified for cobalt. Appendix III parameters were compared to recalculated 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). 2019. Statistical Analysis Summary – West Bottom Ash Pond, H.W. Pirkey Plant. December 26, 2019.

Geosyntec Consultants (Geosyntec). 2020a. Statistical Analysis Summary – West Bottom Ash Pond, H.W. Pirkey Plant. October 2, 2020.

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

TABLES

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

Parameter	Unit	AD-3	AD-12	AD-17	AD-18	AD-28	AD-30
		11/3/2020	11/2/2020	11/3/2020	11/4/2020	11/2/2020	11/2/2020
Antimony	µg/L	0.1 U	0.05 J	0.1 U	0.1 U	0.1 U	0.1 U
Arsenic	µg/L	1.22	0.09 J	0.44	0.29	0.18	0.15
Barium	µg/L	64.8	18.9	263	89.3	131	104
Beryllium	µg/L	0.257	0.122	0.610	0.08 J	0.466	0.09 J
Boron	mg/L	0.054	0.03 J	0.03 J	0.05 U	0.395	2.55
Cadmium	µg/L	0.02 J	0.05 U	0.05	0.01 J	0.04 J	0.01 J
Calcium	mg/L	4.58	0.3 J	1.06	0.2 J	1.38	0.523
Chloride	mg/L	6.32	4.65	32.4	6.30	5.51	30.6
Chromium	µg/L	0.220	0.204	0.518	0.1 J	0.2 J	0.328
Cobalt	µg/L	5.27	1.04	12.1	0.917	13.4	4.10
Combined Radium	pCi/L	1.594	0.929	8.21	1.169	2.33	1.311
Fluoride	mg/L	0.08	0.08	0.24	0.02 J	0.55	0.05 J
Lead	µg/L	0.364	0.09 J	0.209	0.06 J	0.06 J	0.2 U
Lithium	mg/L	0.0714	0.00510	0.0237	0.0128	0.0279	0.0104
Mercury	µg/L	0.005 U	0.005 U	0.476	0.028	0.064	0.085
Molybdenum	µg/L	2 U	2 U	2 U	2 U	2 U	2 U
Selenium	µg/L	0.08 J	0.3	0.4	0.2 J	0.2	0.2 J
Sulfate	mg/L	30.1	3.3	1.8	6.3	21.9	109
Thallium	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Total Dissolved Solids	mg/L	167	74	86	100	104	252
pH	SU	5.0	4.3	3.7	4.4	4.4	4.4

Notes:

mg/L: milligrams per liter

µg/L: micrograms per liter

SU: standard unit

pCi/L: picocuries per liter

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

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

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

Geosyntec Consultants, Inc.

Constituent Name	MCL	CCR Rule-Specified	Calculated UTL	GWPS
Antimony, Total (mg/L)	0.006		0.005	0.006
Arsenic, Total (mg/L)	0.01		0.0050	0.01
Barium, Total (mg/L)	2		0.16	2
Beryllium, Total (mg/L)	0.004		0.0020	0.004
Cadmium, Total (mg/L)	0.005		0.001	0.005
Chromium, Total (mg/L)	0.1		0.0063	0.1
Cobalt, Total (mg/L)	n/a	0.006	0.009	0.009
Combined Radium, Total (pCi/L)	5		3.66	5
Fluoride, Total (mg/L)	4		1	4
Lead, Total (mg/L)	n/a	0.015	0.005	0.015
Lithium, Total (mg/L)	n/a	0.04	0.13	0.13
Mercury, Total (mg/L)	0.002		0.000064	0.002
Molybdenum, Total (mg/L)	n/a	0.1	0.01	0.1
Selenium, Total (mg/L)	0.05		0.005	0.05
Thallium, Total (mg/L)	0.002		0.002	0.002

Notes:

MCL = Maximum Contaminant Level

CCR = Coal Combustion Residual

GWPS = Groundwater Protection Standard

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

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

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

Analyte	Unit	Description	AD-17	AD-28	AD-30
			11/3/2020	11/2/2020	11/2/2020
Boron	mg/L	Interwell Background Value (UPL)	0.0742		
		Analytical Result	0.03	0.395	2.55
Calcium	mg/L	Intrawell Background Value (UPL)	1.63	3.21	1.74
		Analytical Result	1.06	1.38	0.523
Chloride	mg/L	Interwell Background Value (UPL)	9.22		
		Analytical Result	32.4	5.51	30.6
Fluoride	mg/L	Interwell Background Value (UPL)	1.00		
		Analytical Result	0.24	0.55	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	3.7	4.4	4.4
Sulfate	mg/L	Intrawell Background Value (UPL)	9.05	27.2	31.6
		Analytical Result	1.8	21.9	109
Total Dissolved Solids	mg/L	Intrawell Background Value (UPL)	111	133	206
		Analytical Result	86	104	252

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 40 CFR 257.93(f) have been met.

DAVID ANTHONY MILLER

Printed Name of Licensed Professional Engineer

David Anthony Miller

Signature



112498

License Number

TEXAS

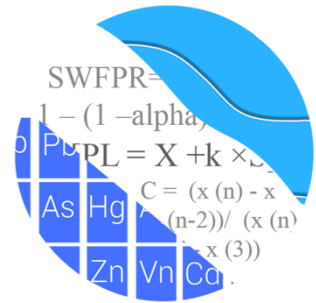
Licensing State

03.03.21

Date

ATTACHMENT B
Statistical Analysis Output

GROUNDWATER STATS CONSULTING



January 5, 2021

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

Re: Pirkey WBAP
Background Update & Assessment Monitoring Statistics – November 2020

Dear Ms. Kreinberg,

Groundwater Stats Consulting, formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the background update of groundwater data for American Electric Power Inc.'s Pirkey West Bottom Ash Pond. The analysis complies with the federal rule for the Disposal of Coal Combustion Residuals from Electric Utilities (CCR Rule, 2015) as well as with the United States Environmental Protection Agency (USEPA) Unified Guidance (2009).

Sampling began at the site for the 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 Groundwater Stats Consulting, 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 Groundwater Stats Consulting. The analysis was reviewed by Jim Loftis, emeritus professor of Civil and Environmental Engineering at Colorado State University and senior adviser for Groundwater Stats Consulting.

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

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

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

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

For regulatory comparison of current observations against statistical limits for Appendix III constituents, the annual site-wide false positive rate is based on the USEPA Unified Guidance (2009) recommendation of 10% (5% for each semi-annual sample event). Power curves are included with this report to demonstrate that the selected statistical method provides sufficient power to detect a change at any of the downgradient wells which complies with the USEPA Unified Guidance recommendation. The EPA suggests the selected statistical method should provide at least 55% power at 3 standard deviations or at least 80% power at 4 standard deviations. Power curves were based on the following:

Semi-Annual Sampling

1-of-2 resample plan

Constituents: $c=7$

Downgradient wells: $w=3$

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 and 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 nondetects, 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. Nondetects are handled as follows:

- No statistical analyses are required on wells and analytes containing 100% nondetects (USEPA Unified Guidance, 2009, Chapter 6).
- When data contain <15% nondetects in background, the reporting limit utilized for nondetects 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% nondetects, the Kaplan-Meier nondetect adjustment is applied to the background data. This technique adjusts the mean and standard deviation of the historical concentrations to account for concentrations below the reporting limit.
- Nonparametric prediction limits are used on data containing greater than 50% nondetects.

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

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

Appendix III Background Update – 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. When the test finds no statistically significant difference between the medians of the two groups, background data may be updated with compliance data. 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.

Appendix III Background Update – Conducted in December 2020

Prior to updating background data, 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 (Figure C). Time series plots were used to identify suspected outliers, or extreme values that would result in limits that are not conservative from a regulatory perspective, in proposed background data. Suspected outliers at all wells for Appendix III parameters were formally tested using Tukey's box plot method and, when identified, flagged in the computer database with "o" and deselected prior to construction of statistical limits. No values were noted or flagged as outliers for Appendix III parameters.

As mentioned above, any flagged data are displayed in a lighter font and as a disconnected symbol on the time series reports, as well as in a lighter font on the accompanying data pages. Tukey's test results follow this letter as Figure C. There were no significant results for Appendix III constituents. The outlier summary following this report includes Appendix IV constituents only since no Appendix III observations were flagged.

No seasonal adjustments were made. However, calcium at well AD-17 shows 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. (Figure D). If no statistically significant differences are noted, background data may be updated to include more recent data. A statistically significant difference was found between the two groups for sulfate in well AD-17.

Typically, when the test concludes that the medians of the two groups are significantly different, particularly in the downgradient wells, the background data are not updated to include the newer data unless it can be reasonably justified that the change in concentrations reflects a naturally occurring shift unrelated to practices at the site. In studies such as the current one, in which one or both of the segments being compared are short, the comparison is complicated by the fact that normal short-term variation may be mistaken for long-term change in medians. However, in this analysis the record for sulfate at well AD-17 was updated because the recent data were lower than the older data, and the update will result in the same or a lower prediction limit. The Mann-Whitney results are included in Figure D of this report.

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 is recommended (and provided in this report) 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 results of the updated limits follow this letter (Figure E). As discussed above, a trend test was used to evaluate sulfate in well AD-30 which resulted in an increasing trend. Those results follow this letter (Figure F).

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 (Figure G). 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 nondetects near one end of the record, no adjustments were made at this time.

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

Evaluation of Appendix IV Parameters – November 2020

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

Due to no variation in the data, Tukey's outlier test could not effectively test for the following: antimony in wells AD-17, AD-28, and AD-30; cadmium and lead in well AD-30; molybdenum in wells AD-17, AD-28, and AD-30; and thallium in wells AD-17, AD-28, and AD-30.

Tukey's outlier test for Appendix IV parameters in downgradient wells identified high values for barium in well AD-30, beryllium in well AD-30, and both high and low values for lithium in well AD-28. None of those values were flagged, consistent with caution in flagging downgradient data for Appendix IV constituents. Also, when the most recent value is suspected to be an outlier, it is typically not flagged until it can be determined whether or not the suspected outlier represents the beginning of a trend.

Tukey's outlier test on pooled upgradient well data did not identify any outliers; however, a high value was identified visually and flagged for lithium in well AD-3 because the stability of background samples indicates that this value does not accurately represent the population of its respective well.

Note that the reporting limit for thallium for the February 2019 event was <0.01 mg/L, which is higher than both the historical reporting limit of <0.002 mg/L and the MCL of 0.002 mg/L. Since the <0.01 mg/L values provide no information regarding whether or not those individual observations or the mean/median of their group exceed the GWPS, they are flagged as outliers. Similarly, censored observations for molybdenum with high reporting limits of <0.04 mg/L were also flagged as outliers because they are much higher than the rest of the observations, even though they are lower than the CCR rule-specified level. Flagged values may be seen on the Outlier Summary following this letter (Figure C).

Parametric upper tolerance limits were used to calculate background limits from pooled upgradient well data through October 2020 for Appendix IV parameters with a target of 95% confidence and 95% coverage to determine background limits (Figure I). The confidence and coverage levels for nonparametric tolerance limits are dependent upon the number of background samples. For lithium, a nonparametric upper tolerance limit was constructed instead of a parametric upper tolerance limit in order to provide a statistical limit that is more conservative (lower) from a regulatory perspective. These limits were compared to the Maximum Contaminant Levels (MCLs), CCR Rule-Specified levels, and background limits 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 J).

Confidence intervals were then constructed on downgradient wells using all data through October 2020 for each of the Appendix IV parameters and then compared to the GWPS, i.e. the highest limit of the MCL, CCR Rule-Specified level, or background limit as discussed above (Figure K). Only when the entire confidence interval is above a GWPS is the well/constituent pair considered to exceed its respective standard. A summary of the confidence interval results follows this letter. An exceedance was found for cobalt in downgradient well AD-28.

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,

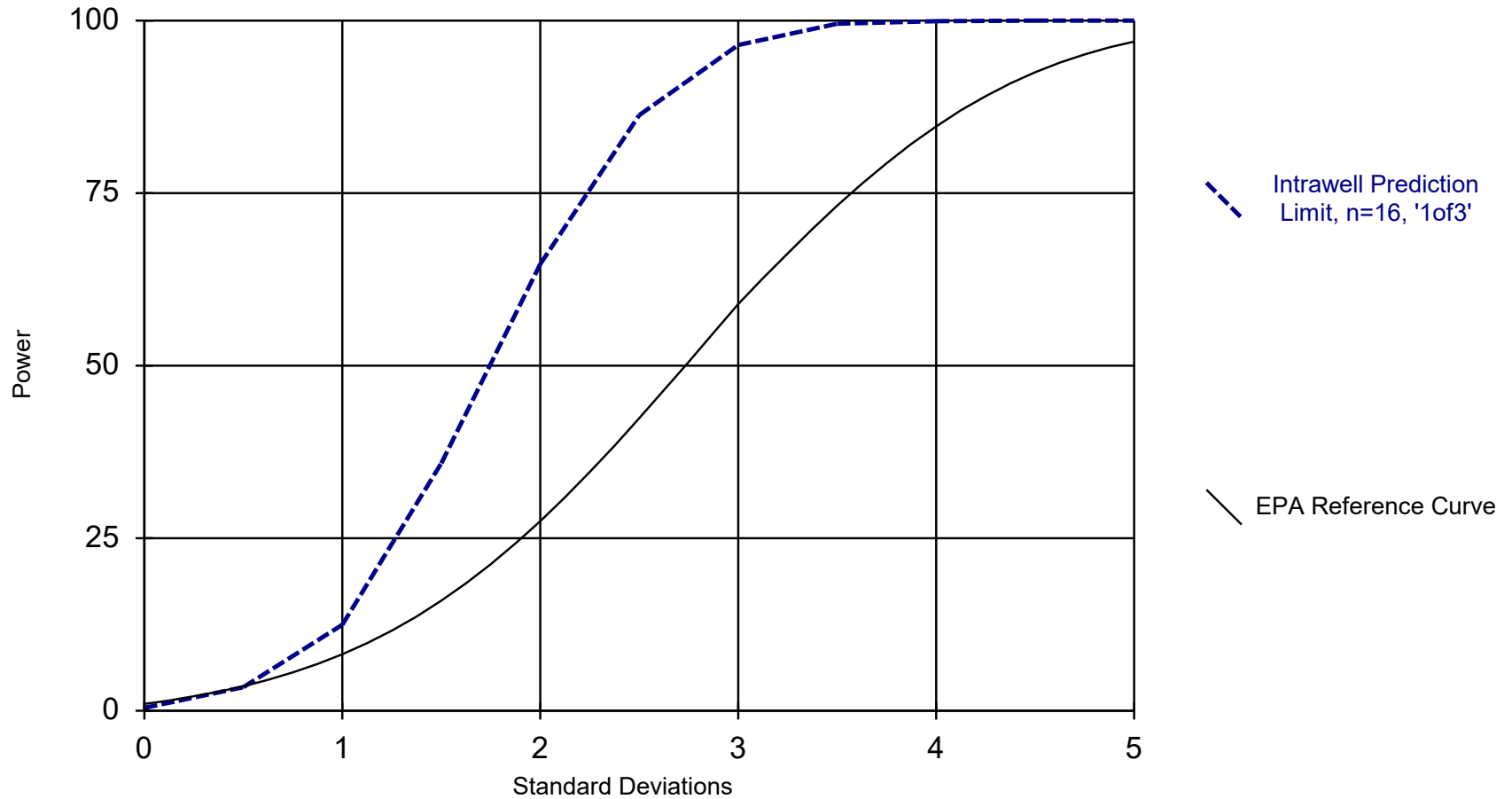


Andrew T. Collins
Project Manager



Kristina L. Rayner
Groundwater Statistician

Intrawell Power Curve

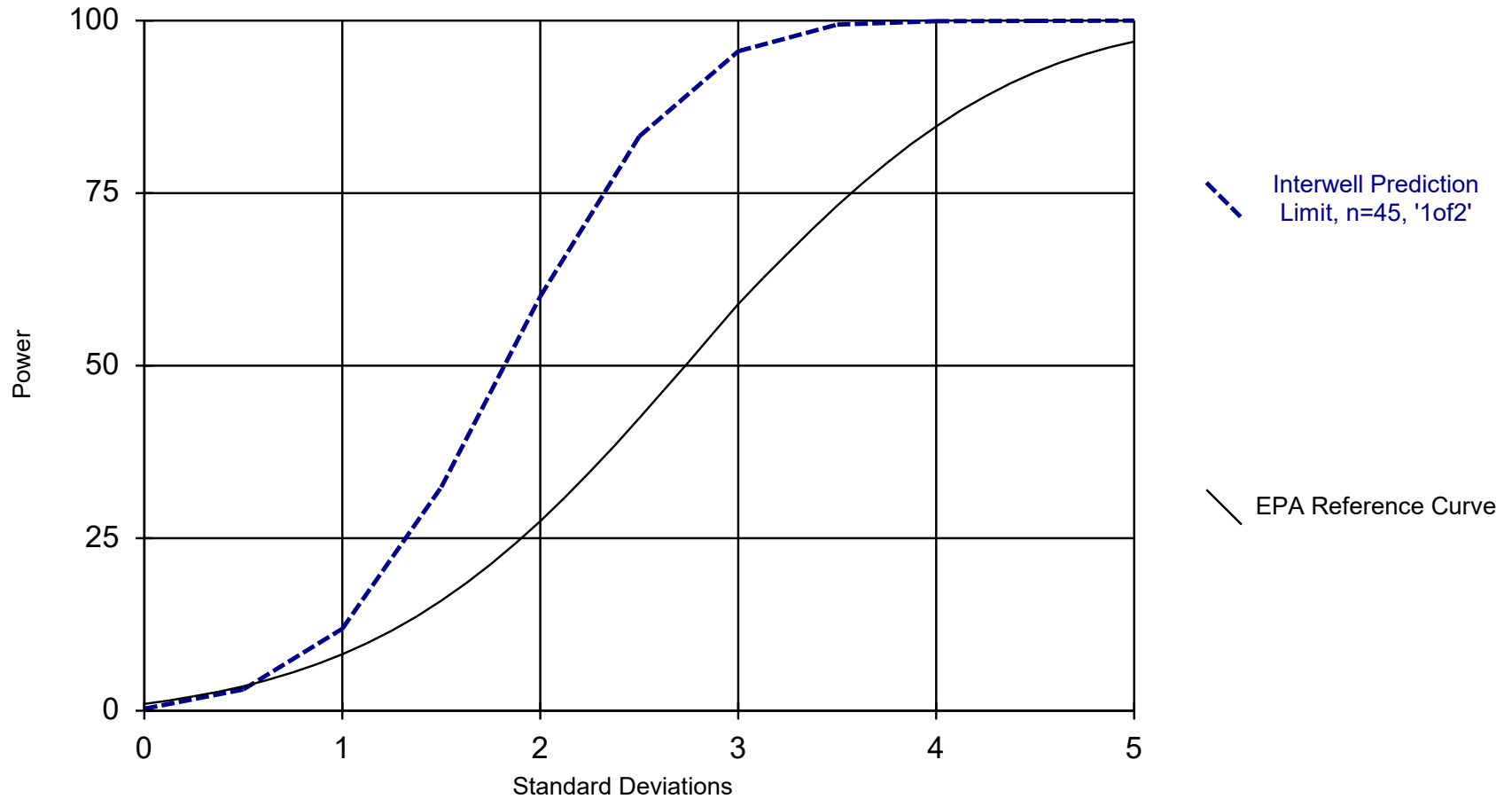


Kappa = 1.346, based on 3 compliance wells and 7 constituents, evaluated semi-annually (this report reflects annual total).

Analysis Run 1/5/2021 11:46 AM

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Interwell Power Curve



Kappa = 1.736, based on 3 compliance wells and 7 constituents, evaluated semi-annually (this report reflects annual total).

Analysis Run 12/29/2020 4:52 PM

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Analysis - Downgradient Wells - Significant Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 12/29/2020, 2:11 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Barium, total (mg/L)	AD-30	Yes	0.104	11/2/2020	NP	NaN	16	0.06079	0.01503	In(x)	ShapiroWilk
Beryllium, total (mg/L)	AD-30	Yes	0.002,0.002	2/28/2019,5/23/2019	NP	NaN	16	0.0003262	0.0006541	In(x)	ShapiroWilk
Lithium, total (mg/L)	AD-28	Yes	0.004,0.066	5/11/2016,10/13/2016	NP	NaN	16	0.02965	0.01227	sqrt(x)	ShapiroWilk

Tukey's Outlier Analysis - Downgradient Wells - All Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 12/29/2020, 2:11 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Antimony, total (mg/L)	AD-17	n/a	n/a	n/a	NP	NaN	16	0.003088	0.002316	unknown	ShapiroWilk
Antimony, total (mg/L)	AD-28	n/a	n/a	n/a	NP	NaN	16	0.002871	0.00229	unknown	ShapiroWilk
Antimony, total (mg/L)	AD-30	n/a	n/a	n/a	NP	NaN	16	0.002638	0.002245	unknown	ShapiroWilk
Arsenic, total (mg/L)	AD-17	No	n/a	n/a	NP	NaN	16	0.002511	0.002069	ln(x)	ShapiroWilk
Arsenic, total (mg/L)	AD-28	No	n/a	n/a	NP	NaN	16	0.002642	0.002142	x^(1/3)	ShapiroWilk
Arsenic, total (mg/L)	AD-30	No	n/a	n/a	NP	NaN	16	0.00288	0.002253	ln(x)	ShapiroWilk
Barium, total (mg/L)	AD-17	No	n/a	n/a	NP	NaN	16	0.198	0.09264	normal	ShapiroWilk
Barium, total (mg/L)	AD-28	No	n/a	n/a	NP	NaN	16	0.1571	0.02331	ln(x)	ShapiroWilk
Barium, total (mg/L)	AD-30	Yes	0.104	11/2/2020	NP	NaN	16	0.06079	0.01503	ln(x)	ShapiroWilk
Beryllium, total (mg/L)	AD-17	No	n/a	n/a	NP	NaN	16	0.0007683	0.0005079	ln(x)	ShapiroWilk
Beryllium, total (mg/L)	AD-28	No	n/a	n/a	NP	NaN	16	0.000666	0.000195	ln(x)	ShapiroWilk
Beryllium, total (mg/L)	AD-30	Yes	0.002,0.002	2/28/2019,5/23/2019	NP	NaN	16	0.0003262	0.0006541	ln(x)	ShapiroWilk
Cadmium, total (mg/L)	AD-17	No	n/a	n/a	NP	NaN	16	0.0005844	0.000487	ln(x)	ShapiroWilk
Cadmium, total (mg/L)	AD-28	No	n/a	n/a	NP	NaN	16	0.0007031	0.0004548	ln(x)	ShapiroWilk
Cadmium, total (mg/L)	AD-30	n/a	n/a	n/a	NP	NaN	16	0.0007006	0.0004587	unknown	ShapiroWilk
Calcium, total (mg/L)	AD-17	No	n/a	n/a	NP	NaN	17	0.7416	0.4541	normal	ShapiroWilk
Calcium, total (mg/L)	AD-28	No	n/a	n/a	NP	NaN	18	1.504	0.5043	ln(x)	ShapiroWilk
Calcium, total (mg/L)	AD-30	No	n/a	n/a	NP	NaN	18	0.4519	0.3453	ln(x)	ShapiroWilk
Chromium, total (mg/L)	AD-17	No	n/a	n/a	NP	NaN	16	0.001212	0.001363	ln(x)	ShapiroWilk
Chromium, total (mg/L)	AD-28	No	n/a	n/a	NP	NaN	16	0.001393	0.001703	ln(x)	ShapiroWilk
Chromium, total (mg/L)	AD-30	No	n/a	n/a	NP	NaN	16	0.001082	0.001017	ln(x)	ShapiroWilk
Cobalt, total (mg/L)	AD-17	No	n/a	n/a	NP	NaN	16	0.008609	0.004114	normal	ShapiroWilk
Cobalt, total (mg/L)	AD-28	No	n/a	n/a	NP	NaN	16	0.01455	0.001755	ln(x)	ShapiroWilk
Cobalt, total (mg/L)	AD-30	No	n/a	n/a	NP	NaN	16	0.002359	0.0006692	ln(x)	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	AD-17	No	n/a	n/a	NP	NaN	16	4.215	2.713	ln(x)	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	AD-28	No	n/a	n/a	NP	NaN	16	2.135	0.5454	normal	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	AD-30	No	n/a	n/a	NP	NaN	16	1.639	1.323	ln(x)	ShapiroWilk
Fluoride, total (mg/L)	AD-17	No	n/a	n/a	NP	NaN	18	0.6168	0.3997	ln(x)	ShapiroWilk
Fluoride, total (mg/L)	AD-28	No	n/a	n/a	NP	NaN	17	0.699	0.1954	ln(x)	ShapiroWilk
Fluoride, total (mg/L)	AD-30	No	n/a	n/a	NP	NaN	18	0.69	0.4525	ln(x)	ShapiroWilk
Lead, total (mg/L)	AD-17	No	n/a	n/a	NP	NaN	16	0.003117	0.002275	x^(1/3)	ShapiroWilk
Lead, total (mg/L)	AD-28	No	n/a	n/a	NP	NaN	16	0.003099	0.002301	sqrt(x)	ShapiroWilk
Lead, total (mg/L)	AD-30	n/a	n/a	n/a	NP	NaN	16	0.003102	0.002296	unknown	ShapiroWilk
Lithium, total (mg/L)	AD-17	No	n/a	n/a	NP	NaN	16	0.01784	0.008135	normal	ShapiroWilk
Lithium, total (mg/L)	AD-28	Yes	0.004,0.066	5/11/2016,10/13/2016	NP	NaN	16	0.02965	0.01227	sqrt(x)	ShapiroWilk
Lithium, total (mg/L)	AD-30	No	n/a	n/a	NP	NaN	16	0.00836	0.0023	x^2	ShapiroWilk
Mercury, total (mg/L)	AD-17	No	n/a	n/a	NP	NaN	16	0.0001669	0.000137	ln(x)	ShapiroWilk
Mercury, total (mg/L)	AD-28	No	n/a	n/a	NP	NaN	16	0.00005875	0.0000436	ln(x)	ShapiroWilk
Mercury, total (mg/L)	AD-30	No	n/a	n/a	NP	NaN	16	0.0006331	0.0006973	x^(1/3)	ShapiroWilk
Molybdenum, total (mg/L)	AD-17	n/a	n/a	n/a	NP	NaN	16	0.008032	0.01261	unknown	ShapiroWilk
Molybdenum, total (mg/L)	AD-28	n/a	n/a	n/a	NP	NaN	16	0.008022	0.01261	unknown	ShapiroWilk
Molybdenum, total (mg/L)	AD-30	n/a	n/a	n/a	NP	NaN	16	0.008009	0.01262	unknown	ShapiroWilk
pH, field (SU)	AD-17	No	n/a	n/a	NP	NaN	17	4.054	0.3816	normal	ShapiroWilk
pH, field (SU)	AD-28	No	n/a	n/a	NP	NaN	17	4.565	0.5219	x^3	ShapiroWilk
pH, field (SU)	AD-30	No	n/a	n/a	NP	NaN	17	4.681	0.3401	x^3	ShapiroWilk
Selenium, total (mg/L)	AD-17	No	n/a	n/a	NP	NaN	16	0.003272	0.002128	x^2	ShapiroWilk
Selenium, total (mg/L)	AD-28	No	n/a	n/a	NP	NaN	16	0.003156	0.002224	x^3	ShapiroWilk
Selenium, total (mg/L)	AD-30	No	n/a	n/a	NP	NaN	16	0.00315	0.002236	x^3	ShapiroWilk
Sulfate, total (mg/L)	AD-17	No	n/a	n/a	NP	NaN	18	4.75	2.182	normal	ShapiroWilk
Sulfate, total (mg/L)	AD-28	No	n/a	n/a	NP	NaN	17	20.38	3.445	ln(x)	ShapiroWilk
Sulfate, total (mg/L)	AD-30	No	n/a	n/a	NP	NaN	18	40.06	26.65	ln(x)	ShapiroWilk
Thallium, total (mg/L)	AD-17	n/a	n/a	n/a	NP	NaN	16	0.001852	0.002303	unknown	ShapiroWilk
Thallium, total (mg/L)	AD-28	n/a	n/a	n/a	NP	NaN	16	0.001861	0.002301	unknown	ShapiroWilk
Thallium, total (mg/L)	AD-30	n/a	n/a	n/a	NP	NaN	16	0.001807	0.002306	unknown	ShapiroWilk
Total Dissolved Solids [TDS] (mg/L)	AD-17	No	n/a	n/a	NP	NaN	18	80.39	15.42	x^3	ShapiroWilk
Total Dissolved Solids [TDS] (mg/L)	AD-28	No	n/a	n/a	NP	NaN	17	100.5	21.38	x^3	ShapiroWilk
Total Dissolved Solids [TDS] (mg/L)	AD-30	No	n/a	n/a	NP	NaN	18	151.7	39.19	ln(x)	ShapiroWilk

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

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 12/29/2020, 2:13 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Antimony, total (mg/L)	AD-12,AD-18,AD-3	n/a	n/a	n/a w/combined bg	NP	NaN	48	0.003046	0.002305	unknown	ShapiroWilk
Arsenic, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	n/a w/combined bg	NP	NaN	48	0.003038	0.002079	sqrt(x)	ShapiroWilk
Barium, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	n/a w/combined bg	NP	NaN	48	0.0654	0.03667	normal	ShapiroWilk
Beryllium, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	n/a w/combined bg	NP	NaN	48	0.0004373	0.0006076	ln(x)	ShapiroWilk
Boron, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	n/a w/combined bg	NP	NaN	51	0.03802	0.02028	sqrt(x)	ShapiroFrancia
Cadmium, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	n/a w/combined bg	NP	NaN	48	0.0006209	0.000474	ln(x)	ShapiroWilk
Chloride, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	n/a w/combined bg	NP	NaN	51	6.861	1.326	ln(x)	ShapiroFrancia
Chromium, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	n/a w/combined bg	NP	NaN	48	0.0009537	0.001165	ln(x)	ShapiroWilk
Cobalt, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	n/a w/combined bg	NP	NaN	48	0.002583	0.002176	ln(x)	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	AD-12,AD-18,AD-3	No	n/a	n/a w/combined bg	NP	NaN	48	1.204	0.9374	ln(x)	ShapiroWilk
Fluoride, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	n/a w/combined bg	NP	NaN	51	0.64	0.4546	ln(x)	ShapiroFrancia
Lead, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	n/a w/combined bg	NP	NaN	48	0.00306	0.002273	ln(x)	ShapiroWilk
Lithium, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	n/a w/combined bg	NP	NaN	48	0.0503	0.1417	ln(x)	ShapiroWilk
Mercury, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	n/a w/combined bg	NP	NaN	48	0.00001843	0.00001126	$x^{(1/3)}$	ShapiroWilk
Molybdenum, total (mg/L)	AD-12,AD-18,AD-3	n/a	n/a	n/a w/combined bg	NP	NaN	48	0.007262	0.01141	unknown	ShapiroWilk
Selenium, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	n/a w/combined bg	NP	NaN	48	0.002714	0.002146	sqrt(x)	ShapiroWilk
Thallium, total (mg/L)	AD-12,AD-18,AD-3	n/a	n/a	n/a w/combined bg	NP	NaN	48	0.001673	0.001913	unknown	ShapiroWilk

Welch's t-test/Mann-Whitney - Significant Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 1/4/2021, 11:32 AM

<u>Constituent</u>	<u>Well</u>	<u>Calc.</u>	<u>0.01</u>	<u>Method</u>
Sulfate, total (mg/L)	AD-17	-2.819	Yes	Mann-W

Welch's t-test/Mann-Whitney - All Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 1/4/2021, 11:32 AM

<u>Constituent</u>	<u>Well</u>	<u>Calc.</u>	<u>0.01</u>	<u>Method</u>
Calcium, total (mg/L)	AD-12 (bg)	-1.274	No	Mann-W
Calcium, total (mg/L)	AD-17	-1.82	No	Mann-W
Calcium, total (mg/L)	AD-18 (bg)	0.1819	No	Mann-W
Calcium, total (mg/L)	AD-28	-1.134	No	Mann-W
Calcium, total (mg/L)	AD-3 (bg)	1.273	No	Mann-W
Calcium, total (mg/L)	AD-30	0.8492	No	Mann-W
pH, field (SU)	AD-12 (bg)	0.9095	No	Mann-W
pH, field (SU)	AD-17	1.273	No	Mann-W
pH, field (SU)	AD-18 (bg)	0.6072	No	Mann-W
pH, field (SU)	AD-28	-0.5461	No	Mann-W
pH, field (SU)	AD-3 (bg)	-1.031	No	Mann-W
pH, field (SU)	AD-30	0.9102	No	Mann-W
Sulfate, total (mg/L)	AD-12 (bg)	-2.039	No	Mann-W
Sulfate, total (mg/L)	AD-17	-2.819	Yes	Mann-W
Sulfate, total (mg/L)	AD-18 (bg)	-0.8629	No	Mann-W
Sulfate, total (mg/L)	AD-28	2.497	No	Mann-W
Sulfate, total (mg/L)	AD-3 (bg)	1.031	No	Mann-W
Sulfate, total (mg/L)	AD-30	1.869	No	Mann-W
Total Dissolved Solids [TDS] (mg/L)	AD-12 (bg)	0.7287	No	Mann-W
Total Dissolved Solids [TDS] (mg/L)	AD-17	-1.598	No	Mann-W
Total Dissolved Solids [TDS] (mg/L)	AD-18 (bg)	-0.9108	No	Mann-W
Total Dissolved Solids [TDS] (mg/L)	AD-28	2.141	No	Mann-W
Total Dissolved Solids [TDS] (mg/L)	AD-3 (bg)	1.033	No	Mann-W
Total Dissolved Solids [TDS] (mg/L)	AD-30	1.004	No	Mann-W

Appendix III - Intrawell Prediction Limits - All Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 1/4/2021, 1:05 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	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	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	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	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	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	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	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	0.001253	Param Intra 1 of 2
pH, field (SU)	AD-18	5.521	3.859	n/a	1 future	n/a	16	4.69	0.4218	0	None	No	0.001253	Param Intra 1 of 2
pH, field (SU)	AD-28	5.633	3.514	n/a	1 future	n/a	16	4.574	0.5378	0	None	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	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	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	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	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	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	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	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	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	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	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	0.002505	Param Intra 1 of 2

Appendix III Trend Tests - Sulfate AD-30

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 1/4/2021, 11:55 AM

<u>Constituent</u>	<u>Well</u>	<u>Slope</u>	<u>Calc.</u>	<u>Critical</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Normality</u>	<u>Xform</u>	<u>Alpha</u>	<u>Method</u>
Sulfate, total (mg/L)	AD-30	17.21	122	68	Yes	18	0	n/a	n/a	0.01	NP

Appendix III Trend Tests - Upgradient Wells - Significant Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 12/29/2020, 4:32 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-18 (bg)	0.008344	70	63	Yes	17	29.41	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	AD-12 (bg)	-0.1686	-76	-63	Yes	17	52.94	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	AD-3 (bg)	-0.1067	-65	-63	Yes	17	64.71	n/a	n/a	0.01	NP

Appendix III Trend Tests - Upgradient Wells - All Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 12/29/2020, 4:32 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Boron, total (mg/L)	AD-12 (bg)	0	4	63	No	17	11.76	n/a	n/a	0.01	NP
Boron, total (mg/L)	AD-18 (bg)	0.008344	70	63	Yes	17	29.41	n/a	n/a	0.01	NP
Boron, total (mg/L)	AD-3 (bg)	-0.00247	-34	-63	No	17	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	AD-12 (bg)	0	-1	-63	No	17	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	AD-18 (bg)	0.03386	13	63	No	17	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	AD-3 (bg)	-0.03189	-13	-63	No	17	0	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	AD-12 (bg)	-0.1686	-76	-63	Yes	17	52.94	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	AD-18 (bg)	-0.02284	-63	-63	No	17	64.71	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	AD-3 (bg)	-0.1067	-65	-63	Yes	17	64.71	n/a	n/a	0.01	NP

Appendix III - Interwell Prediction Limits - All Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 12/29/2020, 4:39 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	0.07422	n/a	n/a	3 future	n/a	45	0.03802	0.02085	11.11	None	No	0.002505	Param Inter 1 of 2
Chloride, total (mg/L)	n/a	9.22	n/a	n/a	3 future	n/a	45	2.597	0.2533	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	45	n/a	n/a	68.89	n/a	n/a	0.0009463	NP Inter (NDs) 1 of 2

Upper Tolerance Limit Summary Table

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 1/4/2021, 1:12 PM

Constituent	Upper Lim.	Lower Lim.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony, total (mg/L)	0.005	n/a	n/a	48	n/a	n/a	89.58	n/a	n/a	0.08526	NP Inter(NDs)
Arsenic, total (mg/L)	0.005	n/a	n/a	48	n/a	n/a	58.33	n/a	n/a	0.08526	NP Inter(NDs)
Barium, total (mg/L)	0.157	n/a	n/a	48	n/a	n/a	0	n/a	n/a	0.08526	NP Inter(normality)
Beryllium, total (mg/L)	0.002	n/a	n/a	48	n/a	n/a	12.5	n/a	n/a	0.08526	NP Inter(normality)
Cadmium, total (mg/L)	0.001	n/a	n/a	48	n/a	n/a	66.67	n/a	n/a	0.08526	NP Inter(NDs)
Chromium, total (mg/L)	0.00633	n/a	n/a	48	-7.517	1.066	14.58	None	ln(x)	0.01	Inter
Cobalt, total (mg/L)	0.009	n/a	n/a	48	n/a	n/a	0	n/a	n/a	0.08526	NP Inter(normality)
Combined Radium 226 + 228 (pCi/L)	3.663	n/a	n/a	48	1.029	0.3841	0	None	sqrt(x)	0.01	Inter
Fluoride, total (mg/L)	1	n/a	n/a	51	n/a	n/a	60.78	n/a	n/a	0.0731	NP Inter(NDs)
Lead, total (mg/L)	0.005	n/a	n/a	48	n/a	n/a	66.67	n/a	n/a	0.08526	NP Inter(NDs)
Lithium, total (mg/L)	0.108	n/a	n/a	47	n/a	n/a	2.128	n/a	n/a	0.08974	NP Inter
Mercury, total (mg/L)	0.000064	n/a	n/a	48	n/a	n/a	50	n/a	n/a	0.08526	NP Inter(normality)
Molybdenum, total (mg/L)	0.005	n/a	n/a	43	n/a	n/a	86.05	n/a	n/a	0.1102	NP Inter(NDs)
Selenium, total (mg/L)	0.005	n/a	n/a	48	n/a	n/a	47.92	n/a	n/a	0.08526	NP Inter(normality)
Thallium, total (mg/L)	0.002	n/a	n/a	46	n/a	n/a	89.13	n/a	n/a	0.09447	NP Inter(NDs)

Confidence Intervals - Significant Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 1/4/2021, 1:19 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	0.01564	0.01341	0.009	Yes	16	0.01455	0.001755	0	None	sqrt(x)	0.01	Param.

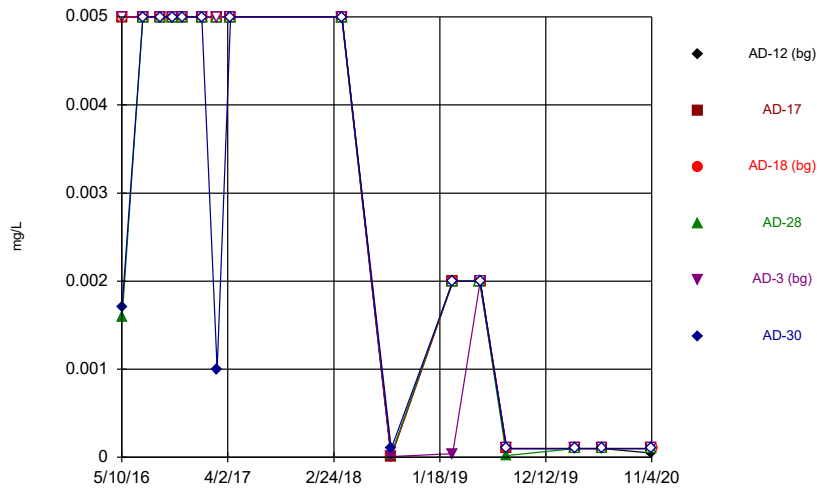
Confidence Intervals - All Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 1/4/2021, 1:19 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	16	0.003088	0.002316	93.75	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-28	0.005	0.0001	0.006	No	16	0.002871	0.00229	81.25	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-30	0.005	0.0001	0.006	No	16	0.002638	0.002245	81.25	None	No	0.01	NP (NDs)
Arsenic, total (mg/L)	AD-17	0.005	0.00041	0.01	No	16	0.002511	0.002069	50	None	No	0.01	NP (normality)
Arsenic, total (mg/L)	AD-28	0.005	0.00021	0.01	No	16	0.002642	0.002142	43.75	None	No	0.01	NP (normality)
Arsenic, total (mg/L)	AD-30	0.005	0.00021	0.01	No	16	0.00288	0.002253	56.25	None	No	0.01	NP (NDs)
Barium, total (mg/L)	AD-17	0.2583	0.1378	2	No	16	0.198	0.09264	0	None	No	0.01	Param.
Barium, total (mg/L)	AD-28	0.1714	0.1418	2	No	16	0.1571	0.02331	0	None	sqrt(x)	0.01	Param.
Barium, total (mg/L)	AD-30	0.0773	0.052	2	No	16	0.06079	0.01503	0	None	No	0.01	NP (normality)
Beryllium, total (mg/L)	AD-17	0.000948	0.0004991	0.004	No	16	0.0007683	0.0005079	12.5	None	No	0.01	NP (normality)
Beryllium, total (mg/L)	AD-28	0.0007928	0.0005391	0.004	No	16	0.000666	0.000195	0	None	No	0.01	Param.
Beryllium, total (mg/L)	AD-30	0.0001554	0.0000607	0.004	No	16	0.0003262	0.0006541	12.5	None	No	0.01	NP (normality)
Cadmium, total (mg/L)	AD-17	0.001	0.00004	0.005	No	16	0.0005844	0.000487	56.25	None	No	0.01	NP (NDs)
Cadmium, total (mg/L)	AD-28	0.001	0.00005	0.005	No	16	0.0007031	0.0004548	68.75	None	No	0.01	NP (NDs)
Cadmium, total (mg/L)	AD-30	0.001	0.00005	0.005	No	16	0.0007006	0.0004587	87.5	None	No	0.01	NP (NDs)
Chromium, total (mg/L)	AD-17	0.001417	0.0004694	0.1	No	16	0.001212	0.001363	6.25	None	ln(x)	0.01	Param.
Chromium, total (mg/L)	AD-28	0.0009802	0.0003318	0.1	No	16	0.001393	0.001703	25	Kaplan-Meier	ln(x)	0.01	Param.
Chromium, total (mg/L)	AD-30	0.001307	0.0005033	0.1	No	16	0.001082	0.001017	6.25	None	ln(x)	0.01	Param.
Cobalt, total (mg/L)	AD-17	0.01129	0.005932	0.009	No	16	0.008609	0.004114	0	None	No	0.01	Param.
Cobalt, total (mg/L)	AD-28	0.01564	0.01341	0.009	Yes	16	0.01455	0.001755	0	None	sqrt(x)	0.01	Param.
Cobalt, total (mg/L)	AD-30	0.002747	0.001927	0.009	No	16	0.002359	0.0006692	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-17	5.98	2.45	5	No	16	4.215	2.713	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-28	2.489	1.78	5	No	16	2.135	0.5454	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-30	2.267	0.7729	5	No	16	1.639	1.323	0	None	sqrt(x)	0.01	Param.
Fluoride, total (mg/L)	AD-17	1	0.24	4	No	18	0.6168	0.3997	50	None	No	0.01	NP (normality)
Fluoride, total (mg/L)	AD-28	0.8215	0.5766	4	No	17	0.699	0.1954	5.882	None	No	0.01	Param.
Fluoride, total (mg/L)	AD-30	1	0.05	4	No	18	0.69	0.4525	72.22	None	No	0.01	NP (NDs)
Lead, total (mg/L)	AD-17	0.005	0.0002	0.015	No	16	0.003117	0.002275	68.75	None	No	0.01	NP (NDs)
Lead, total (mg/L)	AD-28	0.005	0.0001	0.015	No	16	0.003099	0.002301	68.75	None	No	0.01	NP (NDs)
Lead, total (mg/L)	AD-30	0.005	0.0002	0.015	No	16	0.003102	0.002296	75	None	No	0.01	NP (NDs)
Lithium, total (mg/L)	AD-17	0.02313	0.01255	0.11	No	16	0.01784	0.008135	6.25	None	No	0.01	Param.
Lithium, total (mg/L)	AD-28	0.034	0.0226	0.11	No	16	0.02965	0.01227	0	None	No	0.01	NP (normality)
Lithium, total (mg/L)	AD-30	0.009712	0.007441	0.11	No	16	0.00836	0.0023	6.25	None	x^2	0.01	Param.
Mercury, total (mg/L)	AD-17	0.0002212	0.00008135	0.002	No	16	0.0001669	0.000137	0	None	x^(1/3)	0.01	Param.
Mercury, total (mg/L)	AD-28	0.000092	0.000026	0.002	No	16	0.00005875	0.0000436	0	None	No	0.01	NP (normality)
Mercury, total (mg/L)	AD-30	0.0009159	0.0001705	0.002	No	16	0.0006331	0.0006973	0	None	sqrt(x)	0.01	Param.
Molybdenum, total (mg/L)	AD-17	0.005	0.0004858	0.1	No	14	0.003465	0.001925	85.71	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-28	0.005	0.0002942	0.1	No	14	0.003453	0.001944	85.71	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-30	0.005	0.001142	0.1	No	14	0.003439	0.00193	78.57	None	No	0.01	NP (NDs)
Selenium, total (mg/L)	AD-17	0.005	0.0004	0.05	No	16	0.003272	0.002128	62.5	None	No	0.01	NP (NDs)
Selenium, total (mg/L)	AD-28	0.005	0.0003	0.05	No	16	0.003156	0.002224	62.5	None	No	0.01	NP (NDs)
Selenium, total (mg/L)	AD-30	0.005	0.0002	0.05	No	16	0.00315	0.002236	62.5	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-17	0.002	0.0005	0.002	No	15	0.001308	0.0007896	86.67	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-28	0.002	0.0005	0.002	No	15	0.001318	0.0007897	86.67	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-30	0.002	0.0005	0.002	No	15	0.00126	0.0007637	80	None	No	0.01	NP (NDs)

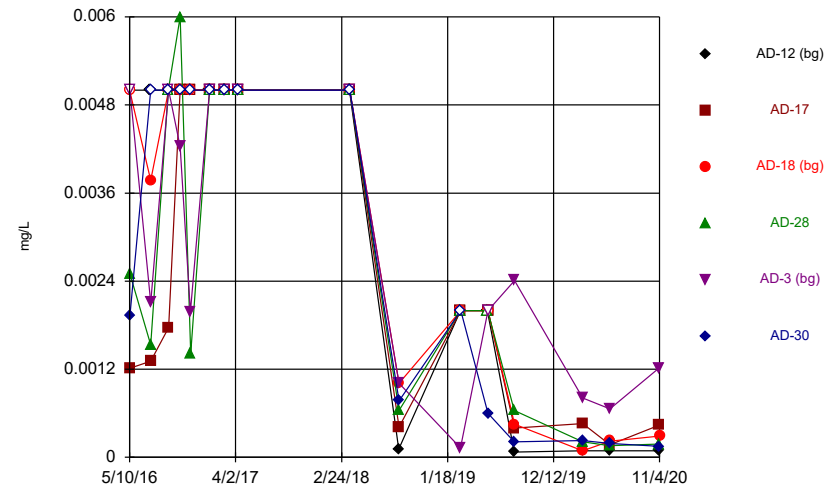
FIGURE A.

Time Series



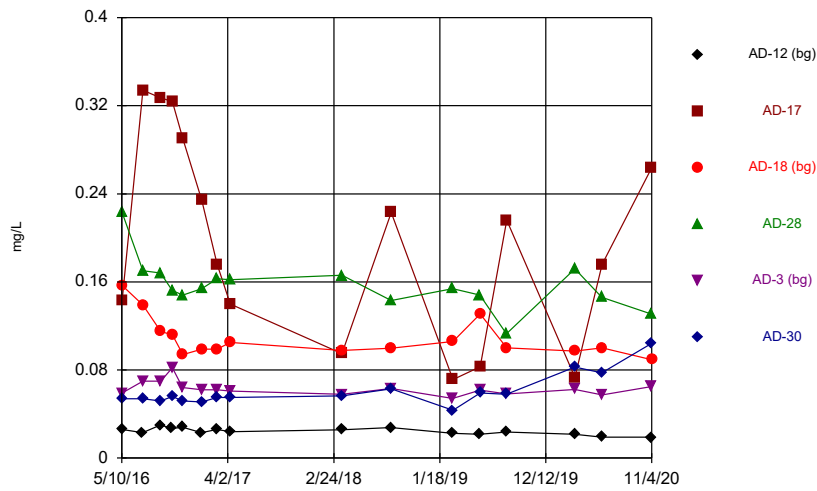
Constituent: Antimony, total Analysis Run 12/29/2020 2:06 PM
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



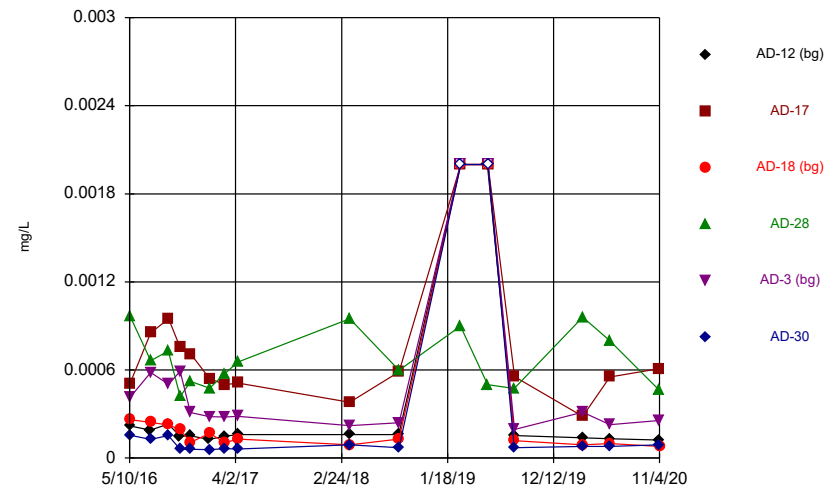
Constituent: Arsenic, total Analysis Run 12/29/2020 2:06 PM
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



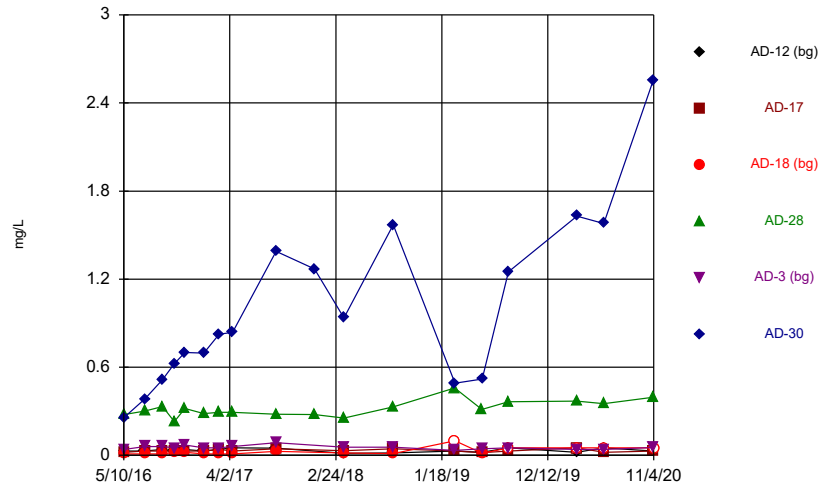
Constituent: Barium, total Analysis Run 12/29/2020 2:06 PM
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



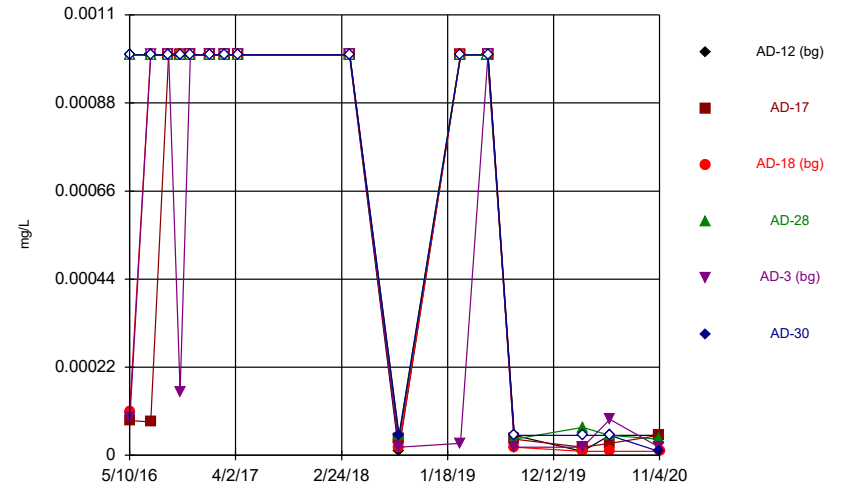
Constituent: Beryllium, total Analysis Run 12/29/2020 2:06 PM
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Time Series



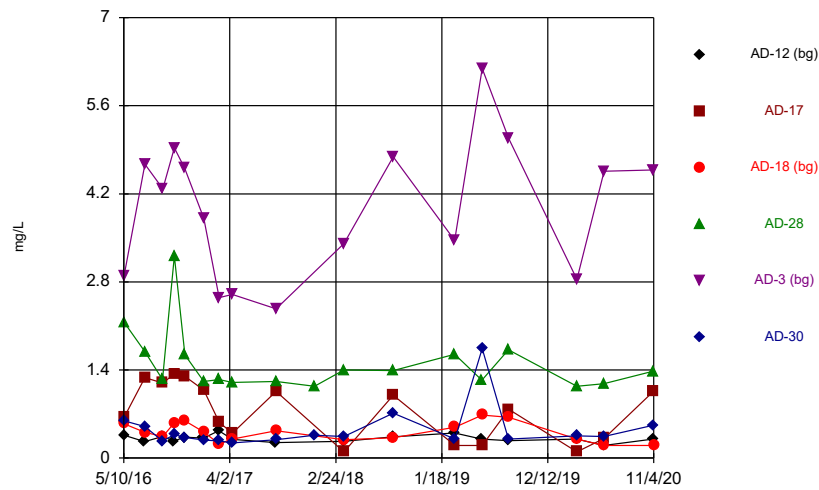
Constituent: Boron, total Analysis Run 12/29/2020 2:06 PM
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



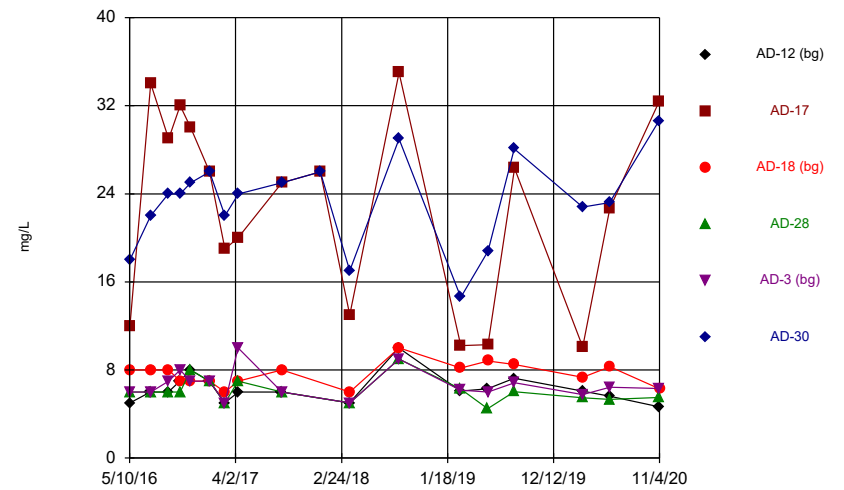
Constituent: Cadmium, total Analysis Run 12/29/2020 2:06 PM
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



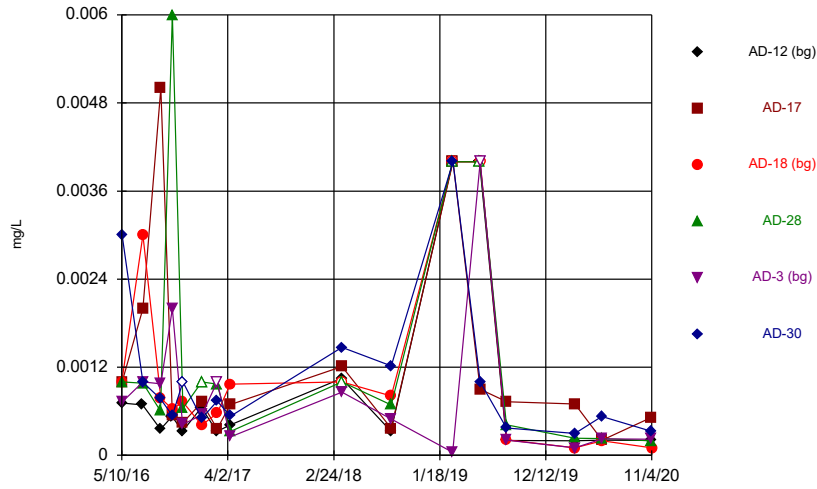
Constituent: Calcium, total Analysis Run 12/29/2020 2:06 PM
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



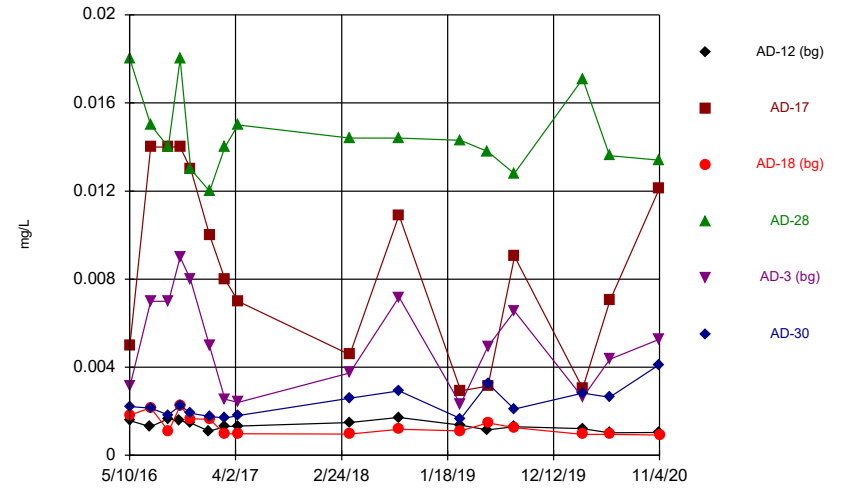
Constituent: Chloride, total Analysis Run 12/29/2020 2:07 PM
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



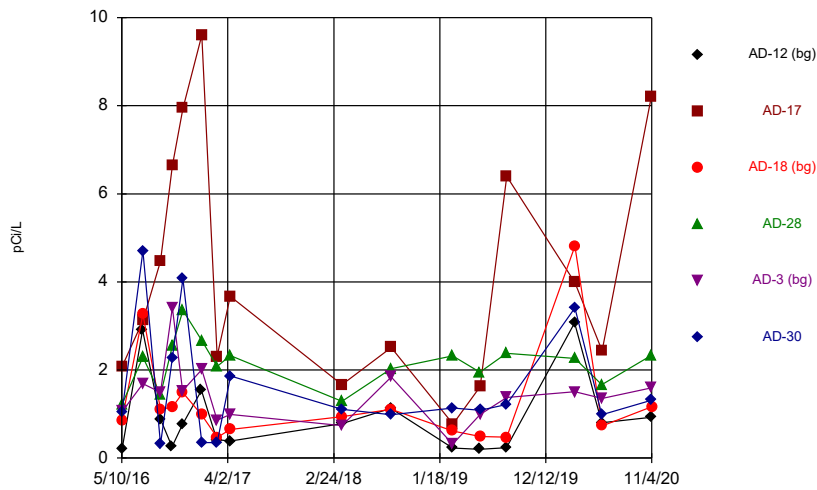
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Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



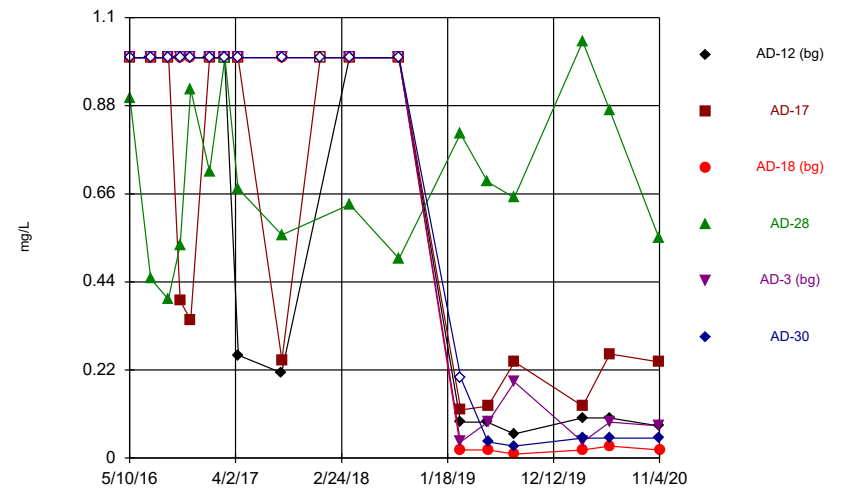
Constituent: Cobalt, total Analysis Run 12/29/2020 2:07 PM
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



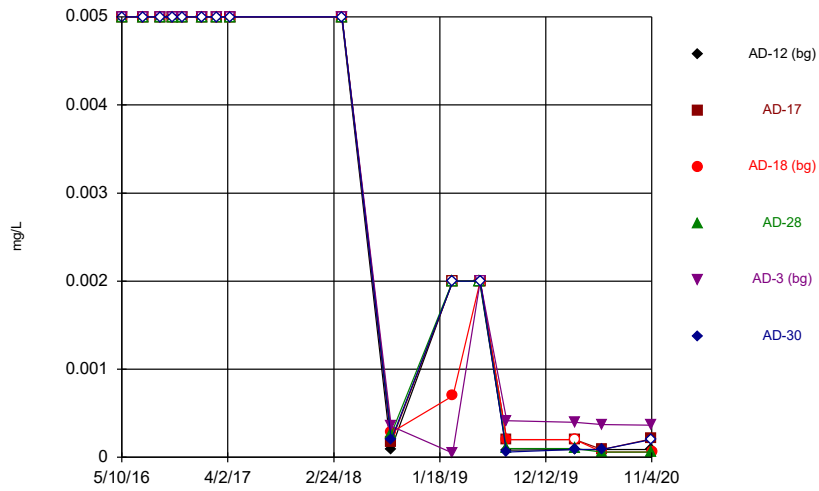
Constituent: Combined Radium 226 + 228 Analysis Run 12/29/2020 2:07 PM
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



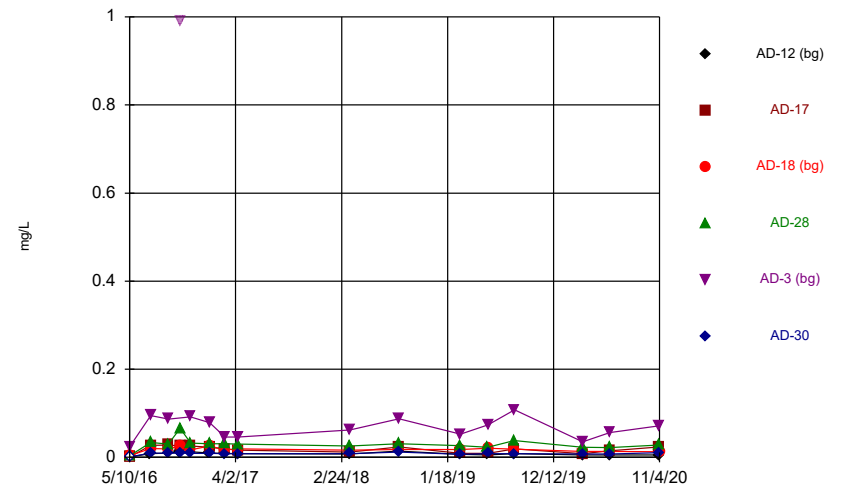
Constituent: Fluoride, total Analysis Run 12/29/2020 2:07 PM
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



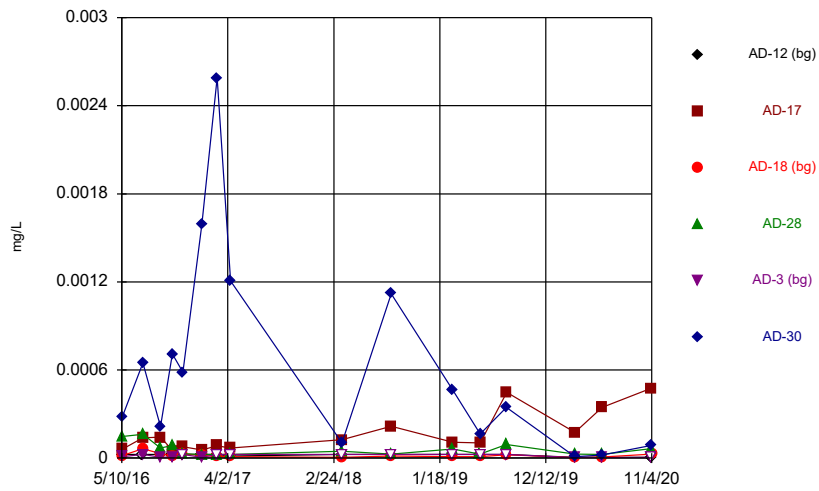
Constituent: Lead, total Analysis Run 12/29/2020 2:07 PM
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



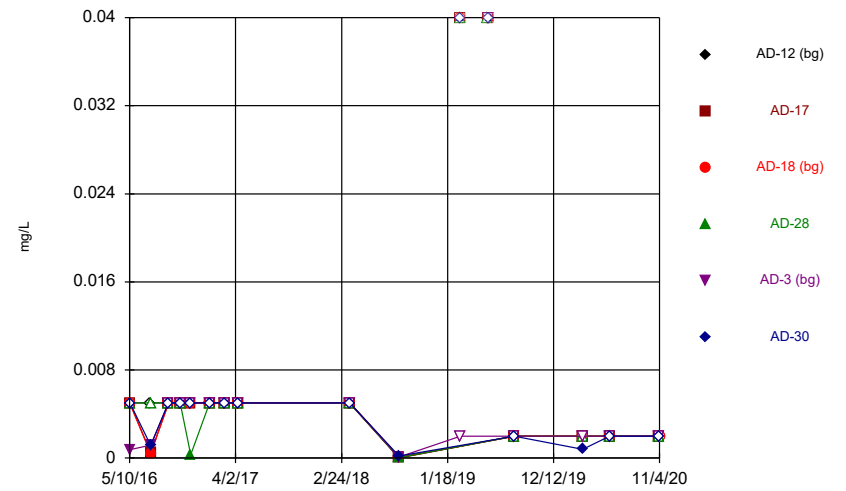
Constituent: Lithium, total Analysis Run 12/29/2020 2:07 PM
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



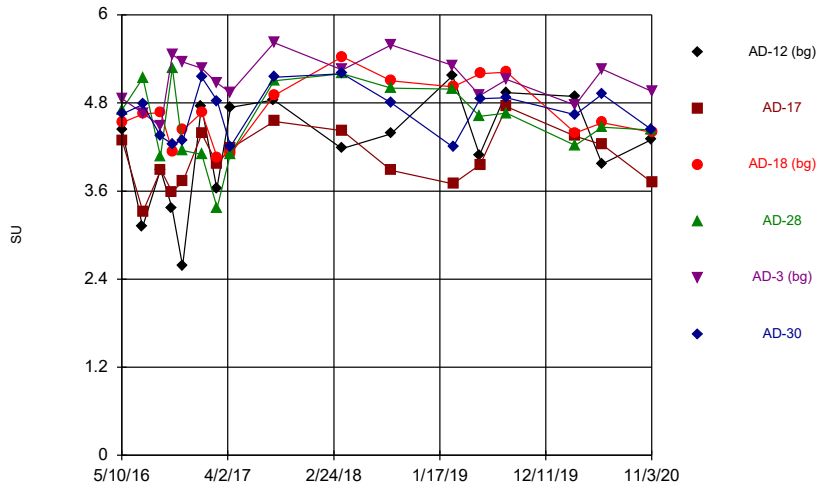
Constituent: Mercury, total Analysis Run 12/29/2020 2:07 PM
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



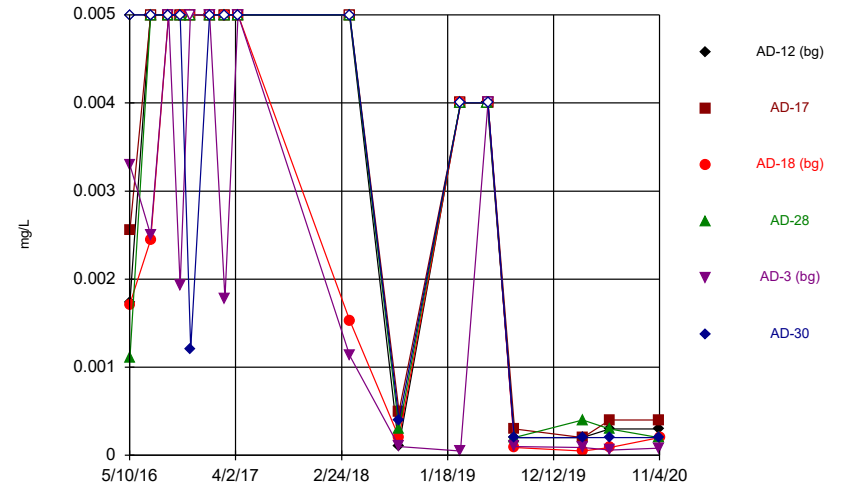
Constituent: Molybdenum, total Analysis Run 12/29/2020 2:07 PM
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



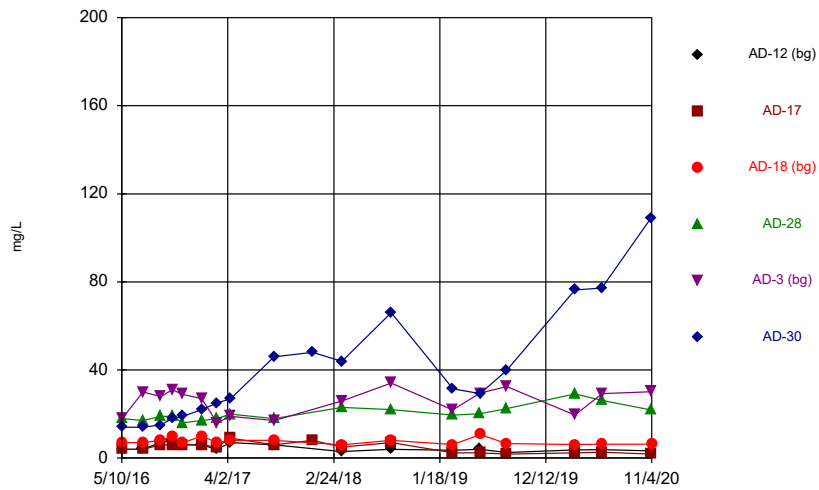
Constituent: pH, field Analysis Run 12/29/2020 2:07 PM
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



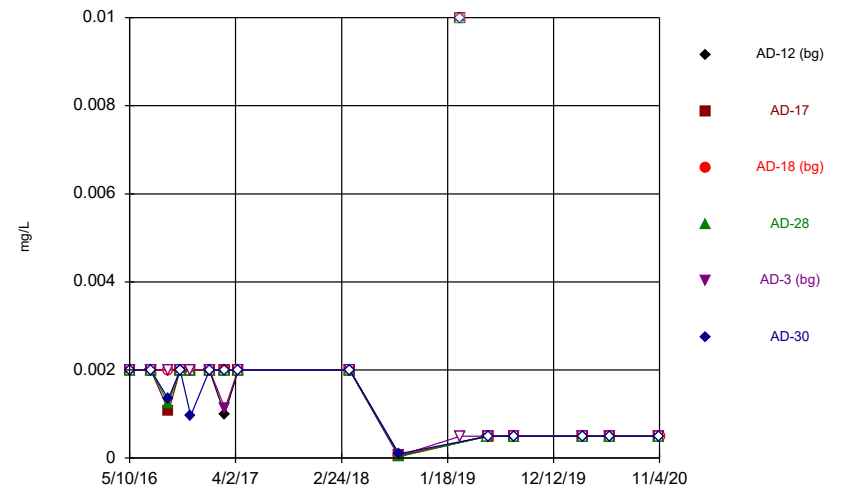
Constituent: Selenium, total Analysis Run 12/29/2020 2:07 PM
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Time Series



Constituent: Sulfate, total Analysis Run 12/29/2020 2:07 PM
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

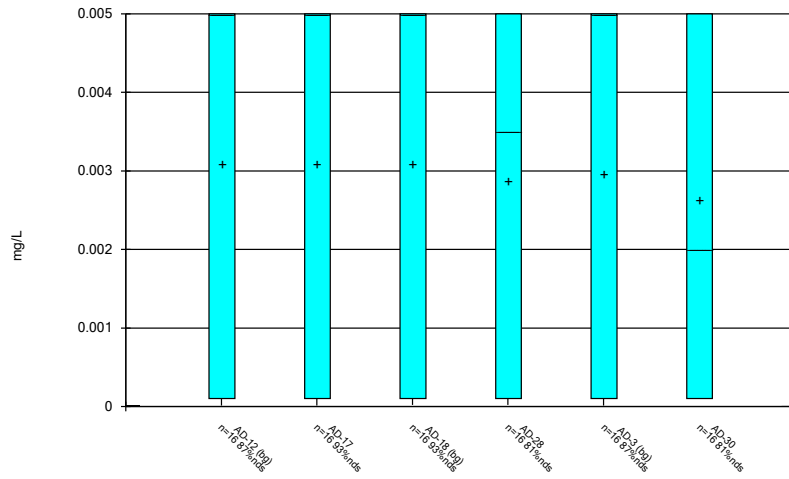
Time Series



Constituent: Thallium, total Analysis Run 12/29/2020 2:07 PM
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

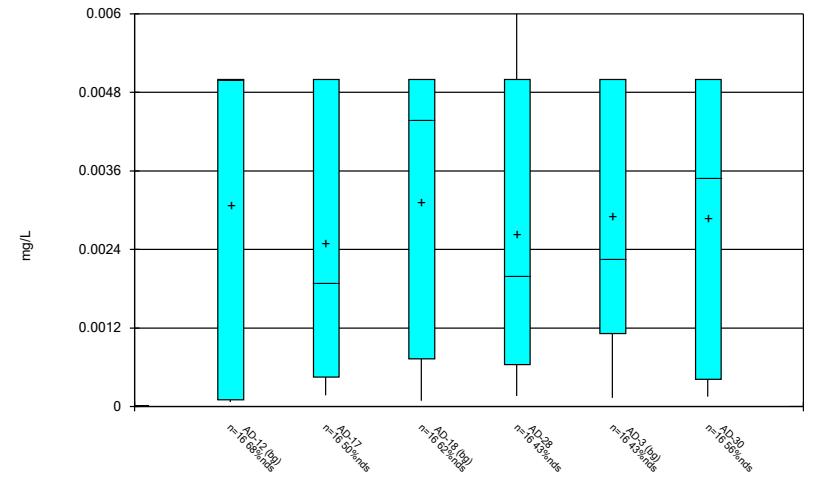
FIGURE B.

Box & Whiskers Plot



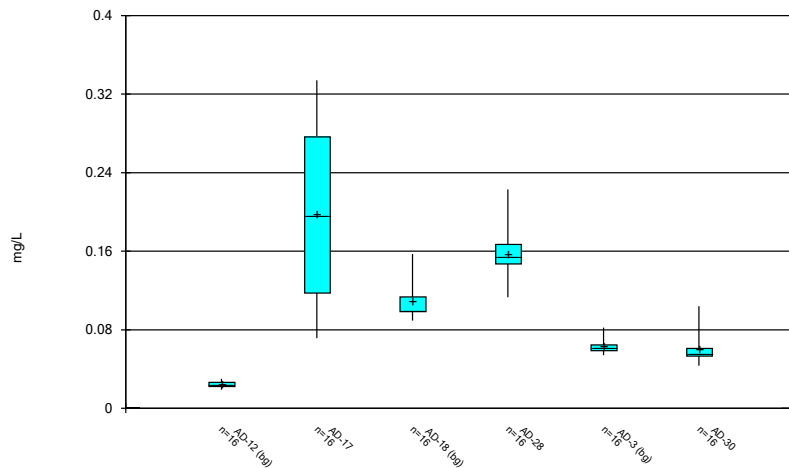
Constituent: Antimony, total Analysis Run 12/29/2020 4:29 PM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



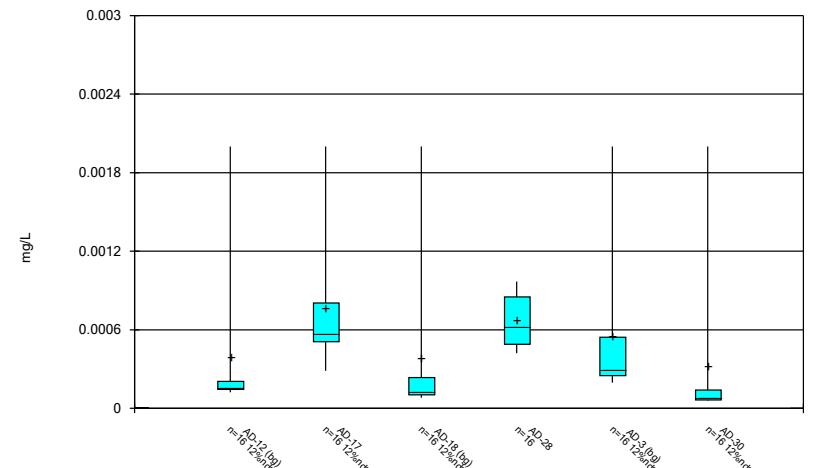
Constituent: Arsenic, total Analysis Run 12/29/2020 4:29 PM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



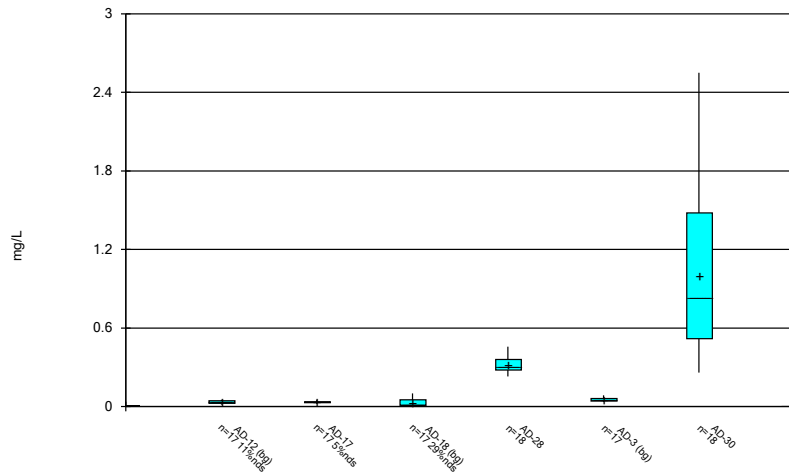
Constituent: Barium, total Analysis Run 12/29/2020 4:29 PM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



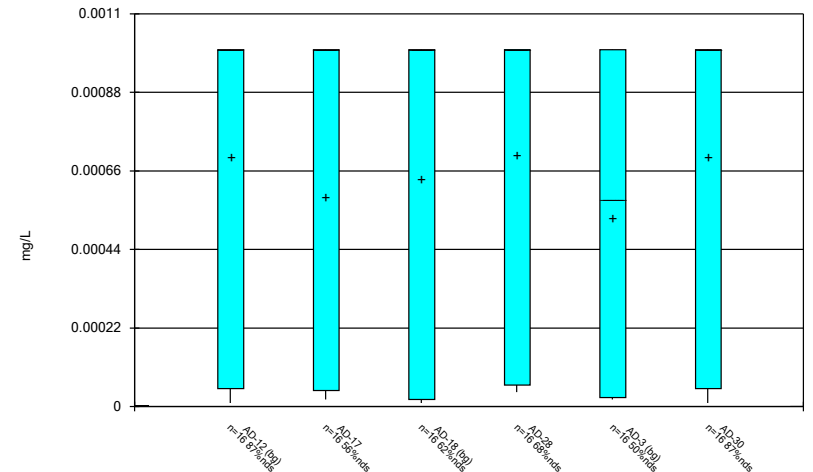
Constituent: Beryllium, total Analysis Run 12/29/2020 4:29 PM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



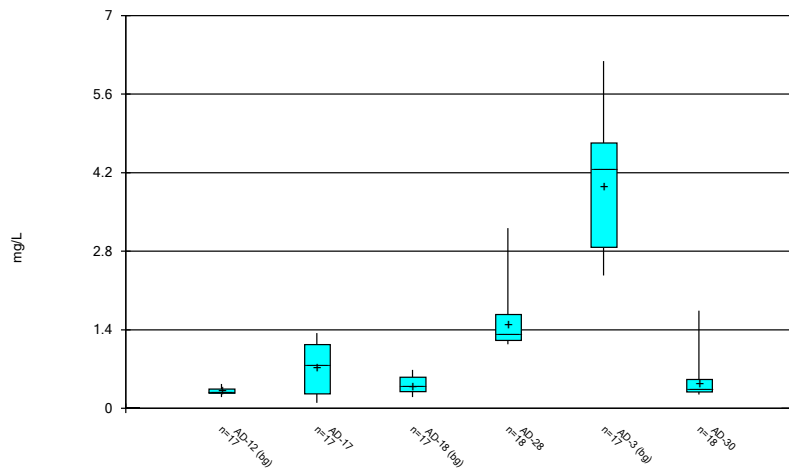
Constituent: Boron, total Analysis Run 12/29/2020 4:29 PM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



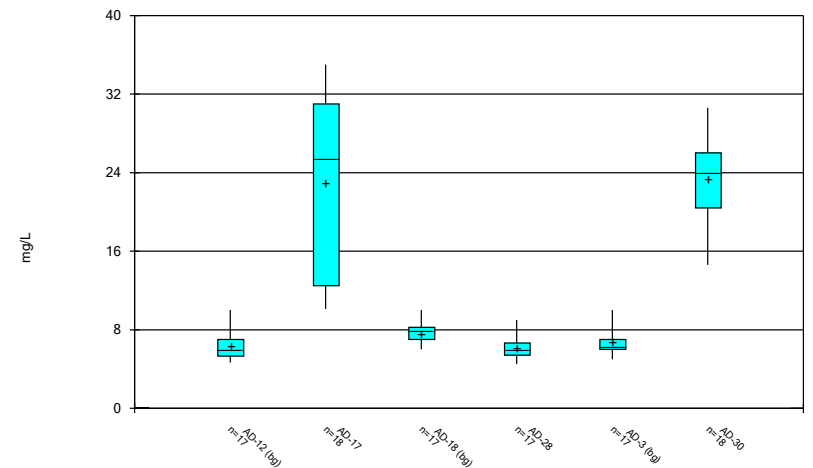
Constituent: Cadmium, total Analysis Run 12/29/2020 4:29 PM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



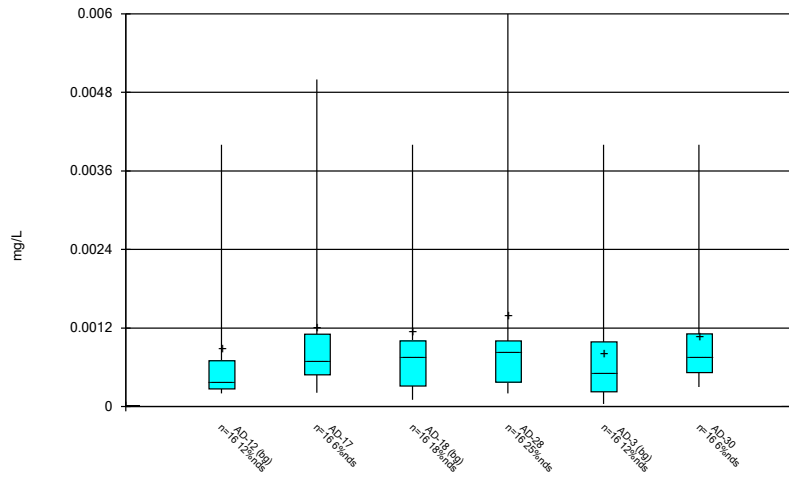
Constituent: Calcium, total Analysis Run 12/29/2020 4:29 PM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



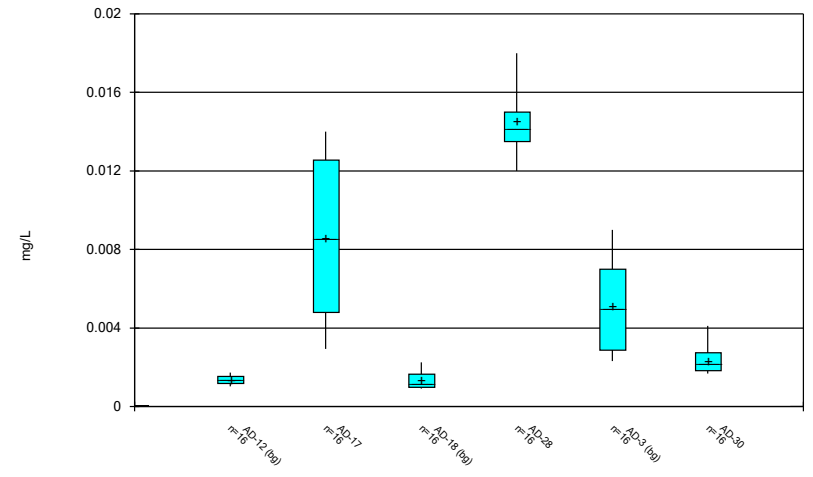
Constituent: Chloride, total Analysis Run 12/29/2020 4:29 PM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



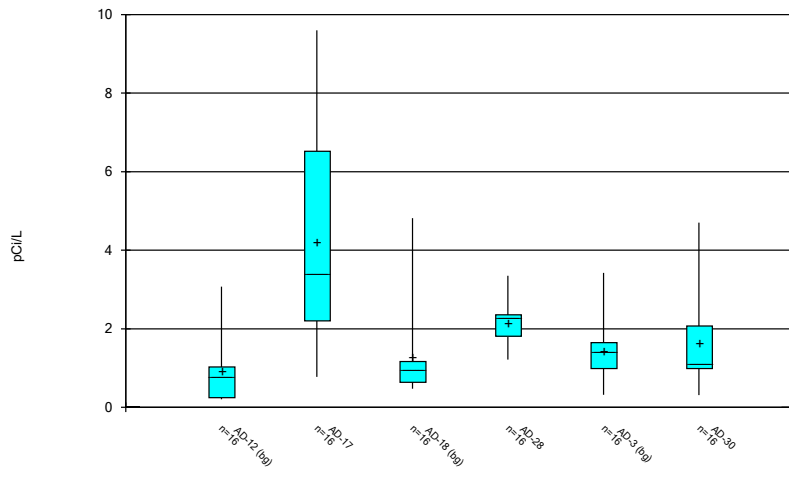
Constituent: Chromium, total Analysis Run 12/29/2020 4:29 PM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



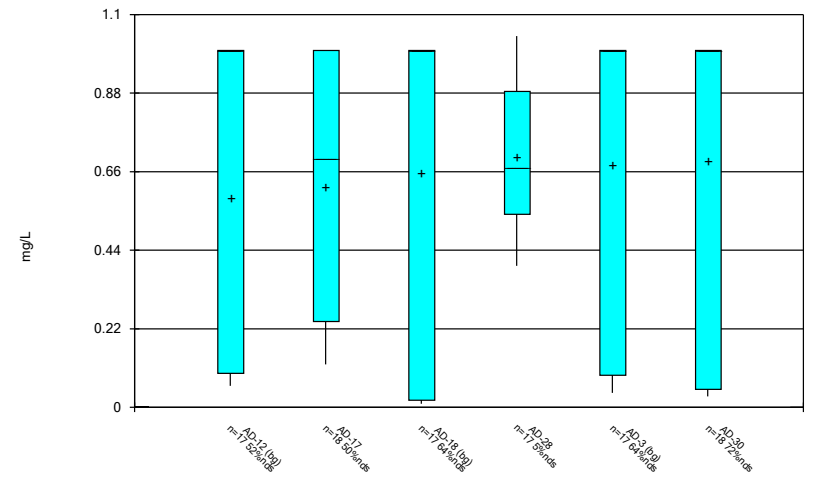
Constituent: Cobalt, total Analysis Run 12/29/2020 4:29 PM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



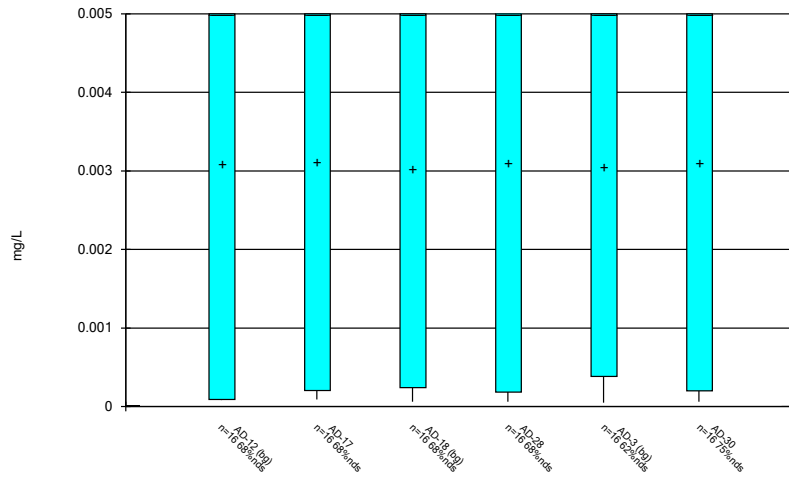
Constituent: Combined Radium 226 + 228 Analysis Run 12/29/2020 4:29 PM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



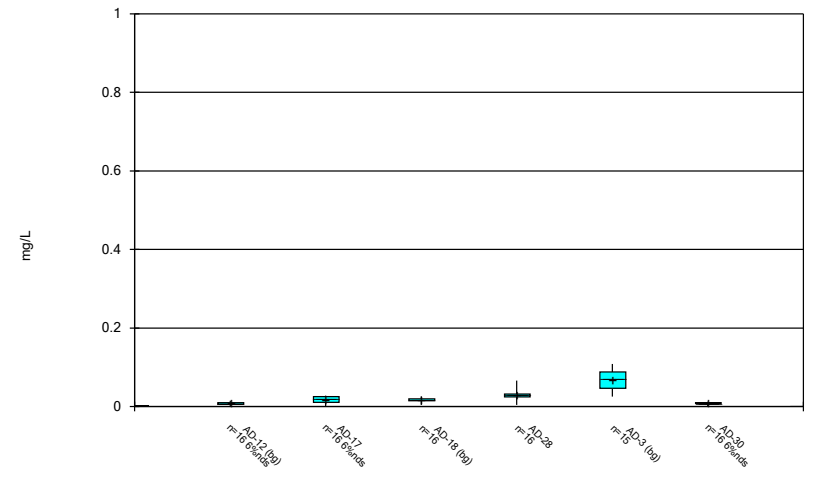
Constituent: Fluoride, total Analysis Run 12/29/2020 4:29 PM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



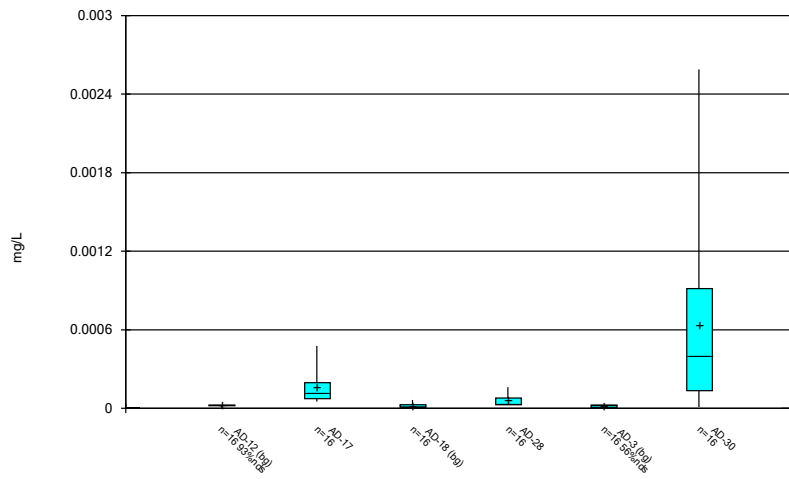
Constituent: Lead, total Analysis Run 12/29/2020 4:29 PM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



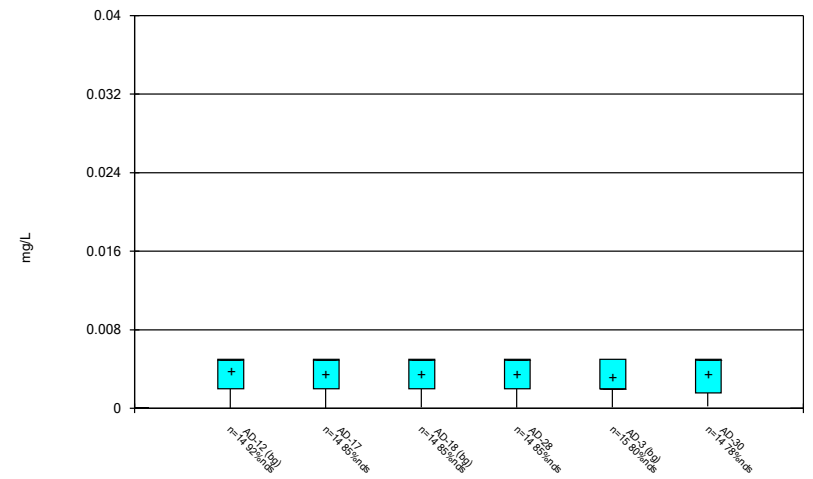
Constituent: Lithium, total Analysis Run 12/29/2020 4:29 PM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



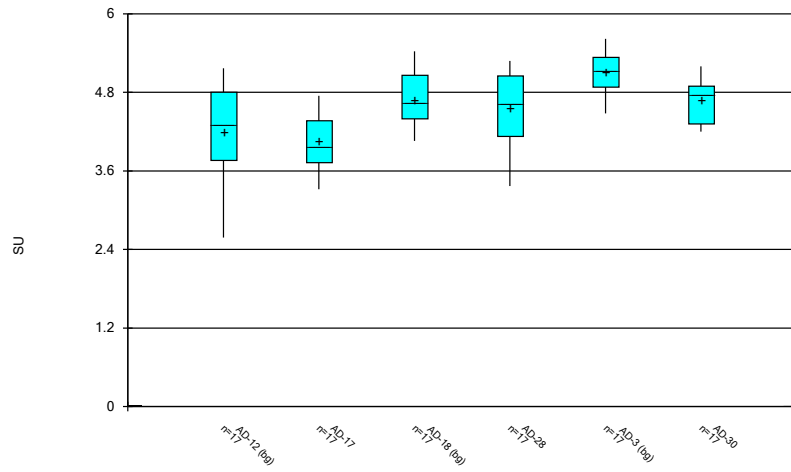
Constituent: Mercury, total Analysis Run 12/29/2020 4:29 PM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



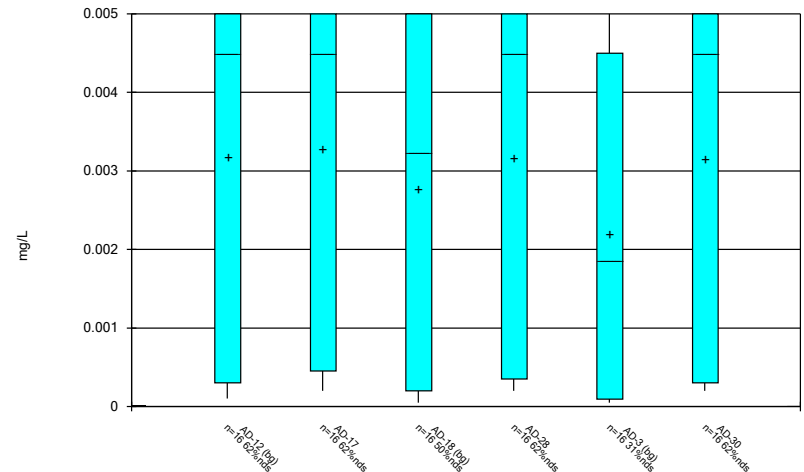
Constituent: Molybdenum, total Analysis Run 12/29/2020 4:29 PM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



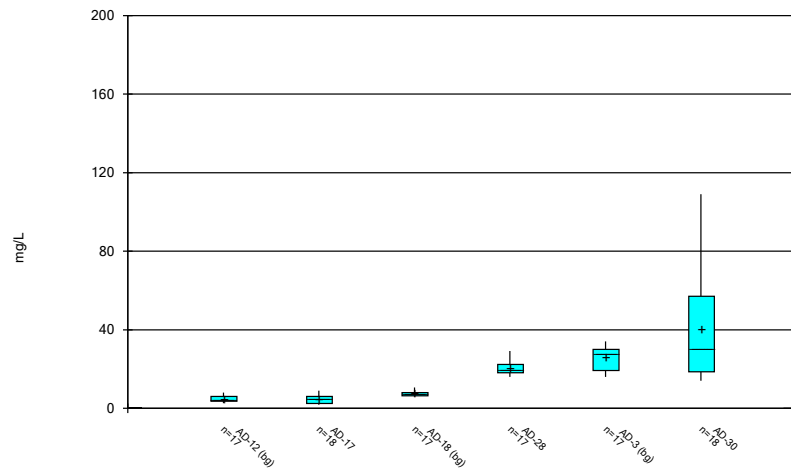
Constituent: pH, field Analysis Run 12/29/2020 4:29 PM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



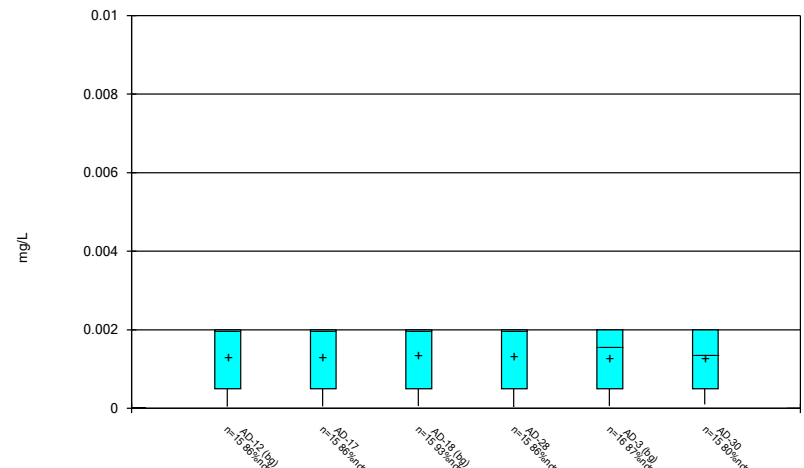
Constituent: Selenium, total Analysis Run 12/29/2020 4:29 PM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



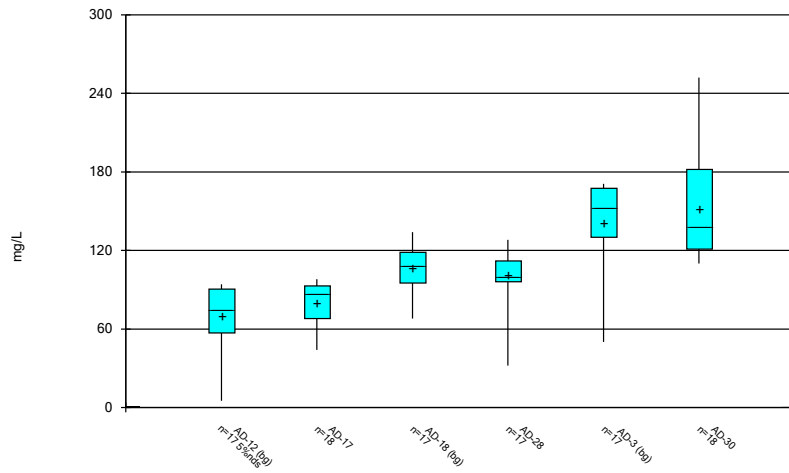
Constituent: Sulfate, total Analysis Run 12/29/2020 4:29 PM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



Constituent: Thallium, total Analysis Run 12/29/2020 4:29 PM
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



Constituent: Total Dissolved Solids [TDS] Analysis Run 12/29/2020 4:29 PM

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

FIGURE C.

Outlier Summary

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 12/29/2020, 4:20 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)
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		

Tukey's Outlier Analysis - Downgradient Wells - Significant Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 12/29/2020, 2:11 PM

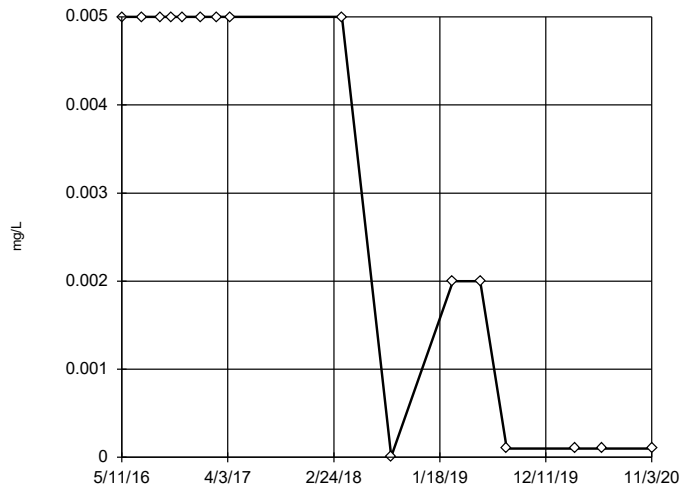
Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Barium, total (mg/L)	AD-30	Yes	0.104	11/2/2020	NP	NaN	16	0.06079	0.01503	In(x)	ShapiroWilk
Beryllium, total (mg/L)	AD-30	Yes	0.002,0.002	2/28/2019,5/23/2019	NP	NaN	16	0.0003262	0.0006541	In(x)	ShapiroWilk
Lithium, total (mg/L)	AD-28	Yes	0.004,0.066	5/11/2016,10/13/2016	NP	NaN	16	0.02965	0.01227	sqrt(x)	ShapiroWilk

Tukey's Outlier Analysis - Downgradient Wells - All Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 12/29/2020, 2:11 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Antimony, total (mg/L)	AD-17	n/a	n/a	n/a	NP	NaN	16	0.003088	0.002316	unknown	ShapiroWilk
Antimony, total (mg/L)	AD-28	n/a	n/a	n/a	NP	NaN	16	0.002871	0.00229	unknown	ShapiroWilk
Antimony, total (mg/L)	AD-30	n/a	n/a	n/a	NP	NaN	16	0.002638	0.002245	unknown	ShapiroWilk
Arsenic, total (mg/L)	AD-17	No	n/a	n/a	NP	NaN	16	0.002511	0.002069	ln(x)	ShapiroWilk
Arsenic, total (mg/L)	AD-28	No	n/a	n/a	NP	NaN	16	0.002642	0.002142	x^(1/3)	ShapiroWilk
Arsenic, total (mg/L)	AD-30	No	n/a	n/a	NP	NaN	16	0.00288	0.002253	ln(x)	ShapiroWilk
Barium, total (mg/L)	AD-17	No	n/a	n/a	NP	NaN	16	0.198	0.09264	normal	ShapiroWilk
Barium, total (mg/L)	AD-28	No	n/a	n/a	NP	NaN	16	0.1571	0.02331	ln(x)	ShapiroWilk
Barium, total (mg/L)	AD-30	Yes	0.104	11/2/2020	NP	NaN	16	0.06079	0.01503	ln(x)	ShapiroWilk
Beryllium, total (mg/L)	AD-17	No	n/a	n/a	NP	NaN	16	0.0007683	0.0005079	ln(x)	ShapiroWilk
Beryllium, total (mg/L)	AD-28	No	n/a	n/a	NP	NaN	16	0.000666	0.000195	ln(x)	ShapiroWilk
Beryllium, total (mg/L)	AD-30	Yes	0.002,0.002	2/28/2019,5/23/2019	NP	NaN	16	0.0003262	0.0006541	ln(x)	ShapiroWilk
Cadmium, total (mg/L)	AD-17	No	n/a	n/a	NP	NaN	16	0.0005844	0.000487	ln(x)	ShapiroWilk
Cadmium, total (mg/L)	AD-28	No	n/a	n/a	NP	NaN	16	0.0007031	0.0004548	ln(x)	ShapiroWilk
Cadmium, total (mg/L)	AD-30	n/a	n/a	n/a	NP	NaN	16	0.0007006	0.0004587	unknown	ShapiroWilk
Calcium, total (mg/L)	AD-17	No	n/a	n/a	NP	NaN	17	0.7416	0.4541	normal	ShapiroWilk
Calcium, total (mg/L)	AD-28	No	n/a	n/a	NP	NaN	18	1.504	0.5043	ln(x)	ShapiroWilk
Calcium, total (mg/L)	AD-30	No	n/a	n/a	NP	NaN	18	0.4519	0.3453	ln(x)	ShapiroWilk
Chromium, total (mg/L)	AD-17	No	n/a	n/a	NP	NaN	16	0.001212	0.001363	ln(x)	ShapiroWilk
Chromium, total (mg/L)	AD-28	No	n/a	n/a	NP	NaN	16	0.001393	0.001703	ln(x)	ShapiroWilk
Chromium, total (mg/L)	AD-30	No	n/a	n/a	NP	NaN	16	0.001082	0.001017	ln(x)	ShapiroWilk
Cobalt, total (mg/L)	AD-17	No	n/a	n/a	NP	NaN	16	0.008609	0.004114	normal	ShapiroWilk
Cobalt, total (mg/L)	AD-28	No	n/a	n/a	NP	NaN	16	0.01455	0.001755	ln(x)	ShapiroWilk
Cobalt, total (mg/L)	AD-30	No	n/a	n/a	NP	NaN	16	0.002359	0.0006692	ln(x)	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	AD-17	No	n/a	n/a	NP	NaN	16	4.215	2.713	ln(x)	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	AD-28	No	n/a	n/a	NP	NaN	16	2.135	0.5454	normal	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	AD-30	No	n/a	n/a	NP	NaN	16	1.639	1.323	ln(x)	ShapiroWilk
Fluoride, total (mg/L)	AD-17	No	n/a	n/a	NP	NaN	18	0.6168	0.3997	ln(x)	ShapiroWilk
Fluoride, total (mg/L)	AD-28	No	n/a	n/a	NP	NaN	17	0.699	0.1954	ln(x)	ShapiroWilk
Fluoride, total (mg/L)	AD-30	No	n/a	n/a	NP	NaN	18	0.69	0.4525	ln(x)	ShapiroWilk
Lead, total (mg/L)	AD-17	No	n/a	n/a	NP	NaN	16	0.003117	0.002275	x^(1/3)	ShapiroWilk
Lead, total (mg/L)	AD-28	No	n/a	n/a	NP	NaN	16	0.003099	0.002301	sqrt(x)	ShapiroWilk
Lead, total (mg/L)	AD-30	n/a	n/a	n/a	NP	NaN	16	0.003102	0.002296	unknown	ShapiroWilk
Lithium, total (mg/L)	AD-17	No	n/a	n/a	NP	NaN	16	0.01784	0.008135	normal	ShapiroWilk
Lithium, total (mg/L)	AD-28	Yes	0.004,0.066	5/11/2016,10/13/2016	NP	NaN	16	0.02965	0.01227	sqrt(x)	ShapiroWilk
Lithium, total (mg/L)	AD-30	No	n/a	n/a	NP	NaN	16	0.00836	0.0023	x^2	ShapiroWilk
Mercury, total (mg/L)	AD-17	No	n/a	n/a	NP	NaN	16	0.0001669	0.000137	ln(x)	ShapiroWilk
Mercury, total (mg/L)	AD-28	No	n/a	n/a	NP	NaN	16	0.00005875	0.0000436	ln(x)	ShapiroWilk
Mercury, total (mg/L)	AD-30	No	n/a	n/a	NP	NaN	16	0.0006331	0.0006973	x^(1/3)	ShapiroWilk
Molybdenum, total (mg/L)	AD-17	n/a	n/a	n/a	NP	NaN	16	0.008032	0.01261	unknown	ShapiroWilk
Molybdenum, total (mg/L)	AD-28	n/a	n/a	n/a	NP	NaN	16	0.008022	0.01261	unknown	ShapiroWilk
Molybdenum, total (mg/L)	AD-30	n/a	n/a	n/a	NP	NaN	16	0.008009	0.01262	unknown	ShapiroWilk
pH, field (SU)	AD-17	No	n/a	n/a	NP	NaN	17	4.054	0.3816	normal	ShapiroWilk
pH, field (SU)	AD-28	No	n/a	n/a	NP	NaN	17	4.565	0.5219	x^3	ShapiroWilk
pH, field (SU)	AD-30	No	n/a	n/a	NP	NaN	17	4.681	0.3401	x^3	ShapiroWilk
Selenium, total (mg/L)	AD-17	No	n/a	n/a	NP	NaN	16	0.003272	0.002128	x^2	ShapiroWilk
Selenium, total (mg/L)	AD-28	No	n/a	n/a	NP	NaN	16	0.003156	0.002224	x^3	ShapiroWilk
Selenium, total (mg/L)	AD-30	No	n/a	n/a	NP	NaN	16	0.00315	0.002236	x^3	ShapiroWilk
Sulfate, total (mg/L)	AD-17	No	n/a	n/a	NP	NaN	18	4.75	2.182	normal	ShapiroWilk
Sulfate, total (mg/L)	AD-28	No	n/a	n/a	NP	NaN	17	20.38	3.445	ln(x)	ShapiroWilk
Sulfate, total (mg/L)	AD-30	No	n/a	n/a	NP	NaN	18	40.06	26.65	ln(x)	ShapiroWilk
Thallium, total (mg/L)	AD-17	n/a	n/a	n/a	NP	NaN	16	0.001852	0.002303	unknown	ShapiroWilk
Thallium, total (mg/L)	AD-28	n/a	n/a	n/a	NP	NaN	16	0.001861	0.002301	unknown	ShapiroWilk
Thallium, total (mg/L)	AD-30	n/a	n/a	n/a	NP	NaN	16	0.001807	0.002306	unknown	ShapiroWilk
Total Dissolved Solids [TDS] (mg/L)	AD-17	No	n/a	n/a	NP	NaN	18	80.39	15.42	x^3	ShapiroWilk
Total Dissolved Solids [TDS] (mg/L)	AD-28	No	n/a	n/a	NP	NaN	17	100.5	21.38	x^3	ShapiroWilk
Total Dissolved Solids [TDS] (mg/L)	AD-30	No	n/a	n/a	NP	NaN	18	151.7	39.19	ln(x)	ShapiroWilk

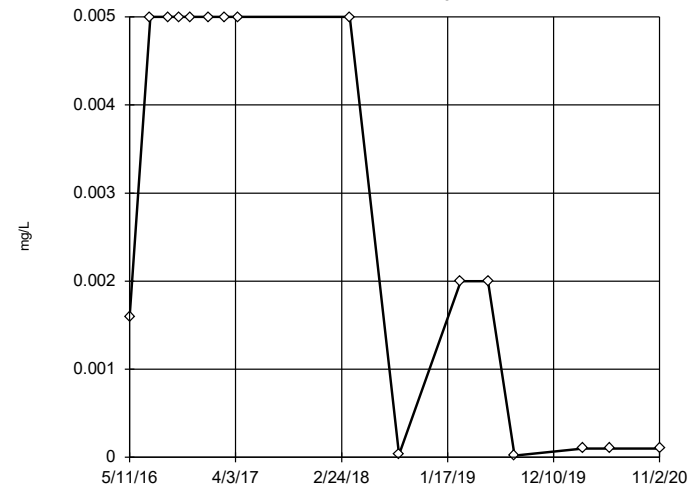
Tukey's Outlier Screening AD-17



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

Constituent: Antimony, total Analysis Run 12/29/2020 2:08 PM View: Outlier
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

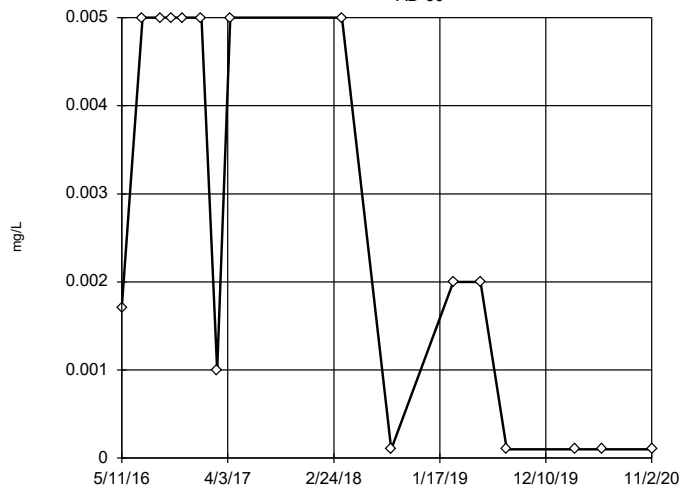
Tukey's Outlier Screening AD-28



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

Constituent: Antimony, total Analysis Run 12/29/2020 2:08 PM View: Outlier
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

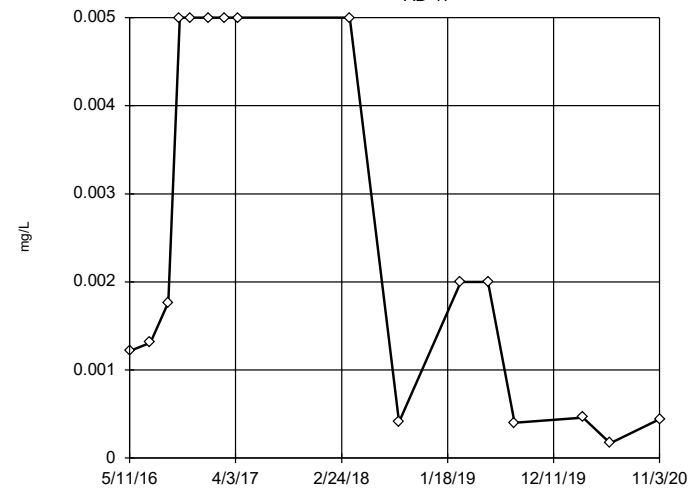
Tukey's Outlier Screening AD-30



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

Constituent: Antimony, total Analysis Run 12/29/2020 2:08 PM View: Outlier
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

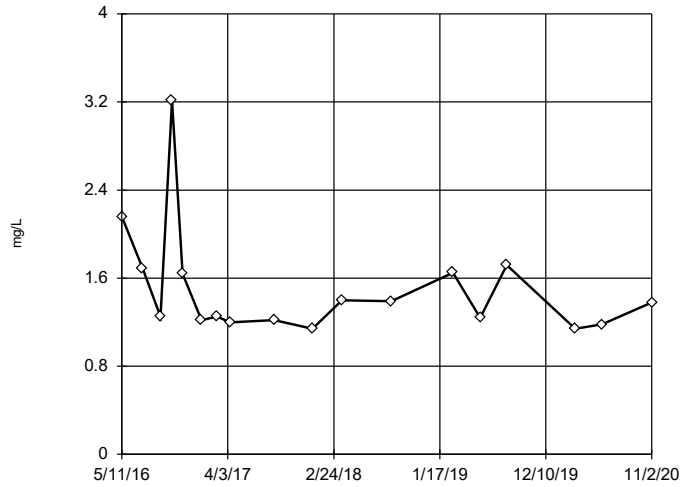
Tukey's Outlier Screening AD-17



n = 16
No outliers found. Tukey's method selected by user.
Data were natural log transformed to achieve best W statistic (graph shown in original units).
High cutoff = 6.864, low cutoff = 3.3e-7, based on IQR multiplier of 3.

Constituent: Arsenic, total Analysis Run 12/29/2020 2:08 PM View: Outlier
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

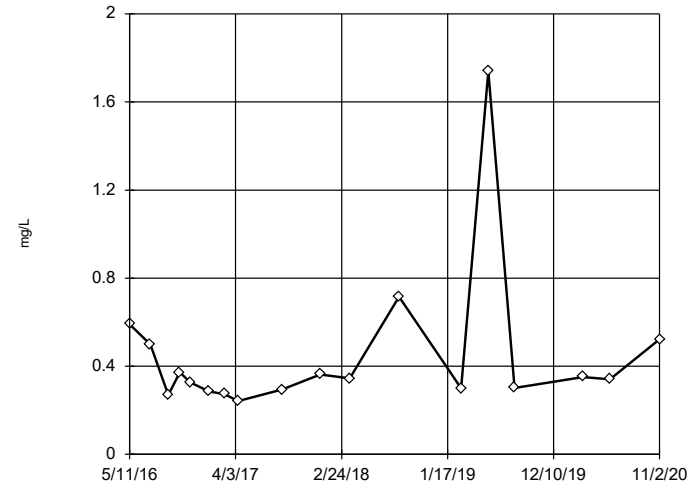
Tukey's Outlier Screening
AD-28



n = 18
No outliers found.
Tukey's method selected by user.
Data were natural log transformed to achieve best W statistic (graph shown in original units).
High cutoff = 4.39, low cutoff = 0.4603, based on IQR multiplier of 3.

Constituent: Calcium, total Analysis Run 12/29/2020 2:08 PM View: Outlier
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

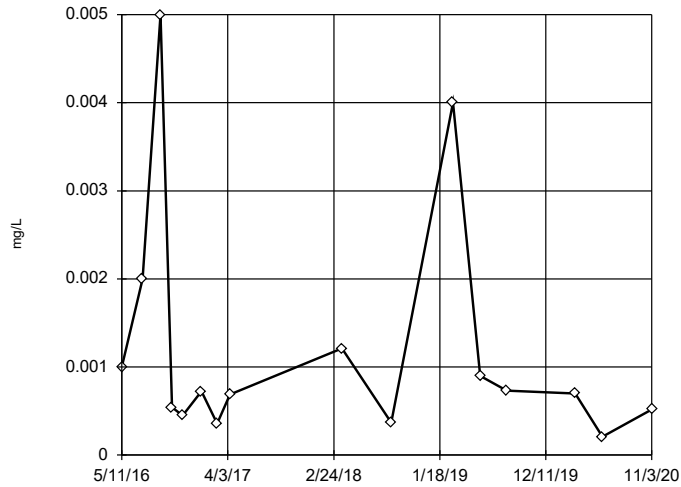
Tukey's Outlier Screening
AD-30



n = 18
No outliers found.
Tukey's method selected by user.
Data were natural log transformed to achieve best W statistic (graph shown in original units).
High cutoff = 2.793, low cutoff = 0.05303, based on IQR multiplier of 3.

Constituent: Calcium, total Analysis Run 12/29/2020 2:08 PM View: Outlier
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

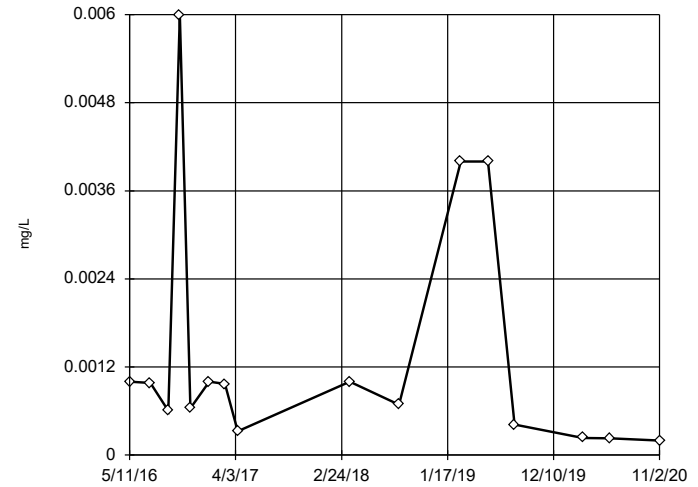
Tukey's Outlier Screening
AD-17



n = 16
No outliers found.
Tukey's method selected by user.
Data were natural log transformed to achieve best W statistic (graph shown in original units).
High cutoff = 0.01309, low cutoff = 0.0000405, based on IQR multiplier of 3.

Constituent: Chromium, total Analysis Run 12/29/2020 2:08 PM View: Outlier
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening
AD-28

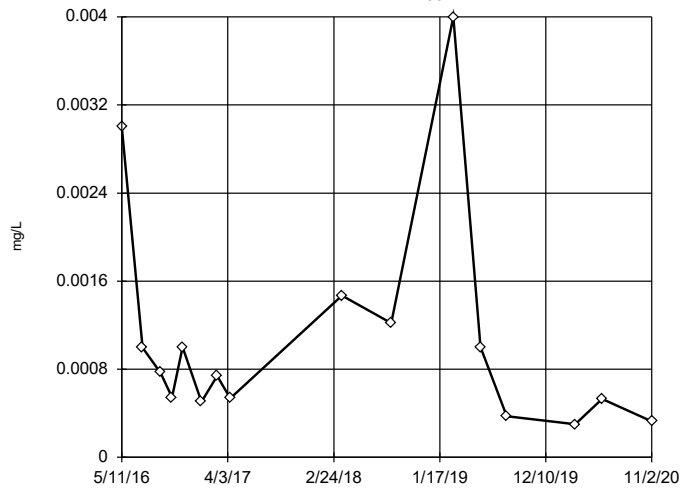


n = 16
No outliers found.
Tukey's method selected by user.
Data were natural log transformed to achieve best W statistic (graph shown in original units).
High cutoff = 0.02019, low cutoff = 0.00001818, based on IQR multiplier of 3.

Constituent: Chromium, total Analysis Run 12/29/2020 2:08 PM View: Outlier
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening

AD-30

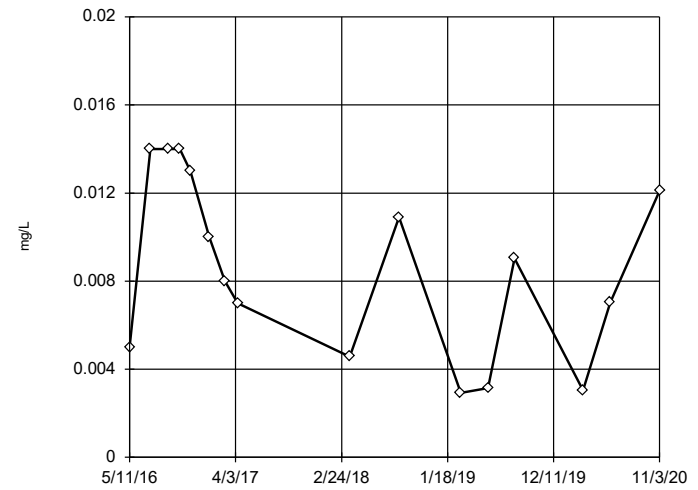


n = 16
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.01075,
 low cutoff = 0.00005318,
 based on IQR multiplier of 3.

Constituent: Chromium, total Analysis Run 12/29/2020 2:08 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening

AD-17

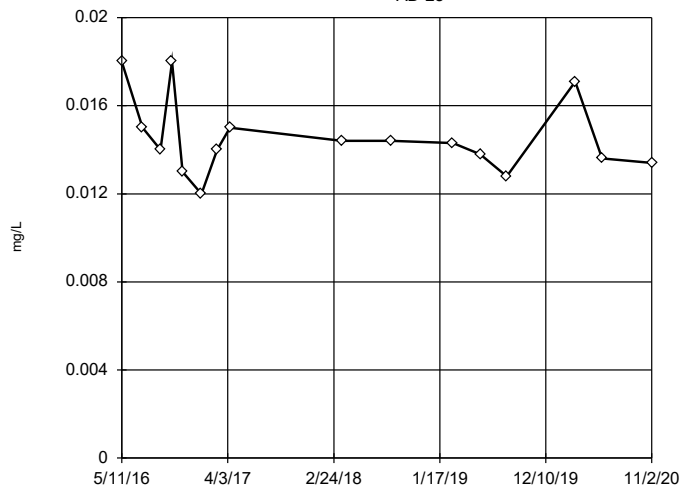


n = 16
 No outliers found.
 Tukey's method selected by user.
 Ladder of Powers transformations did not improve normality; analysis run on raw data.
 High cutoff = 0.03585,
 low cutoff = -0.01851,
 based on IQR multiplier of 3.

Constituent: Cobalt, total Analysis Run 12/29/2020 2:08 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening

AD-28

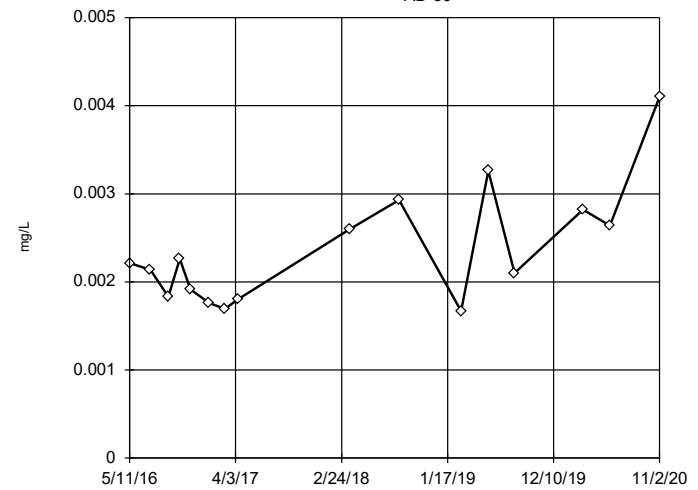


n = 16
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.02058,
 low cutoff = 0.00984,
 based on IQR multiplier of 3.

Constituent: Cobalt, total Analysis Run 12/29/2020 2:08 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening

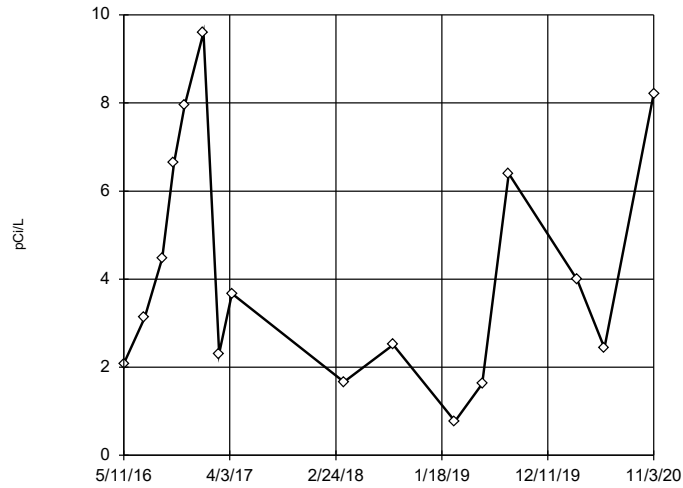
AD-30



n = 16
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.009217,
 low cutoff = 0.0005383,
 based on IQR multiplier of 3.

Constituent: Cobalt, total Analysis Run 12/29/2020 2:08 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

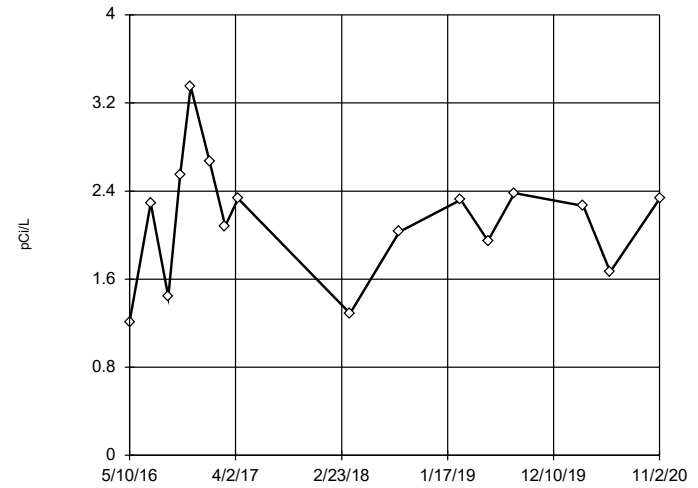
Tukey's Outlier Screening
AD-17



n = 16
No outliers found.
Tukey's method selected by user.
Data were natural log transformed to achieve best W statistic (graph shown in original units).
High cutoff = 171.2, low cutoff = 0.0835, based on IQR multiplier of 3.

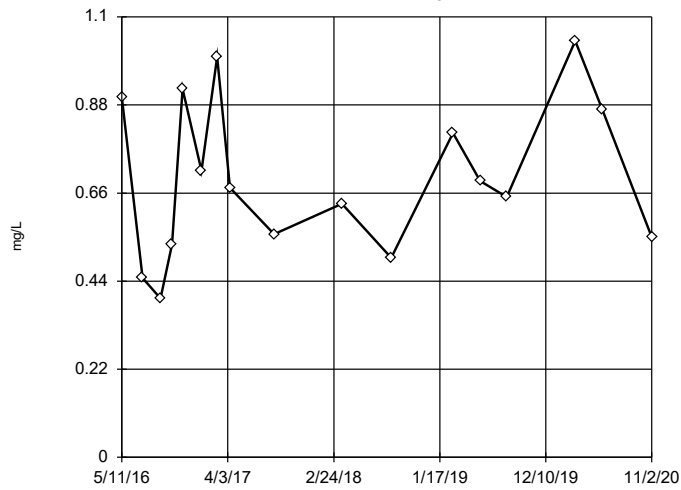
Constituent: Combined Radium 226 + 228 Analysis Run 12/29/2020 2:08 PM View: Outlier
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening
AD-28



Tukey's Outlier Screening

AD-28



n = 17

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

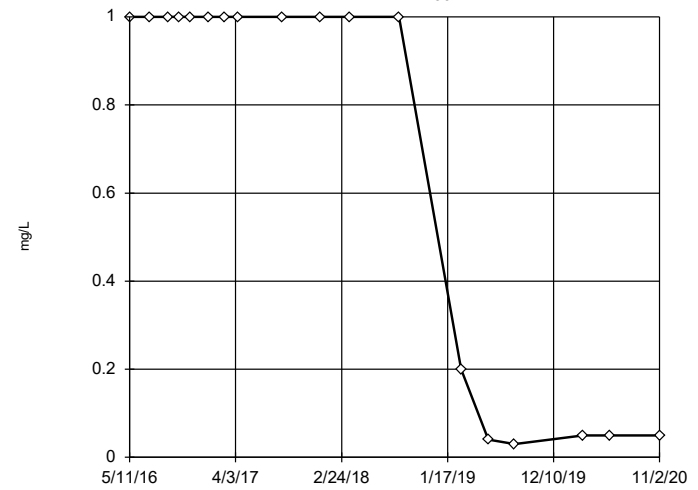
Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 3.878, low cutoff = 0.1235, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 12/29/2020 2:08 PM View: Outlier
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening

AD-30



n = 18

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

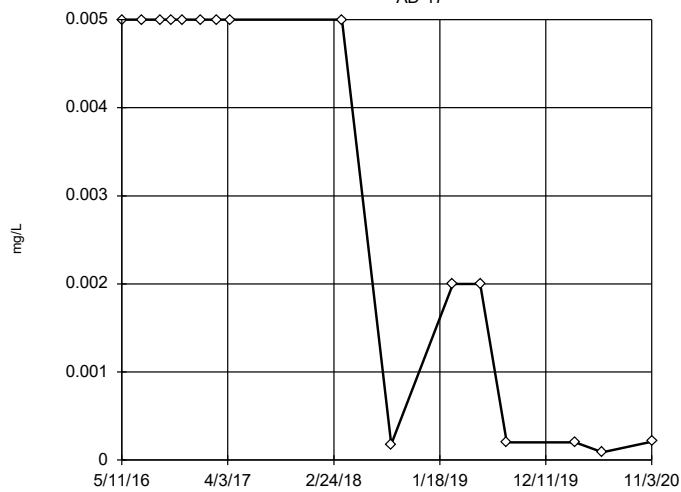
Data were natural log transformed to achieve best W statistic (graph shown in original units).

High cutoff = 8000, low cutoff = 0.0000625, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 12/29/2020 2:08 PM View: Outlier
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening

AD-17



n = 16

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

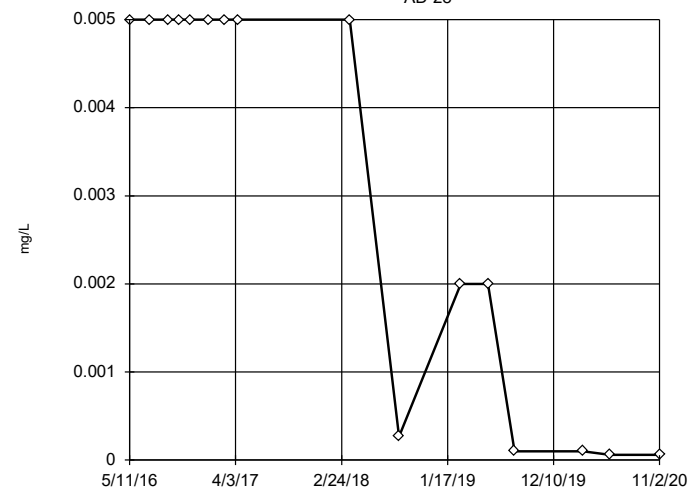
Data were cube root transformed to achieve best W statistic (graph shown in original units).

High cutoff = 0.1305, low cutoff = -0.02133, based on IQR multiplier of 3.

Constituent: Lead, total Analysis Run 12/29/2020 2:08 PM View: Outlier
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening

AD-28



n = 16

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

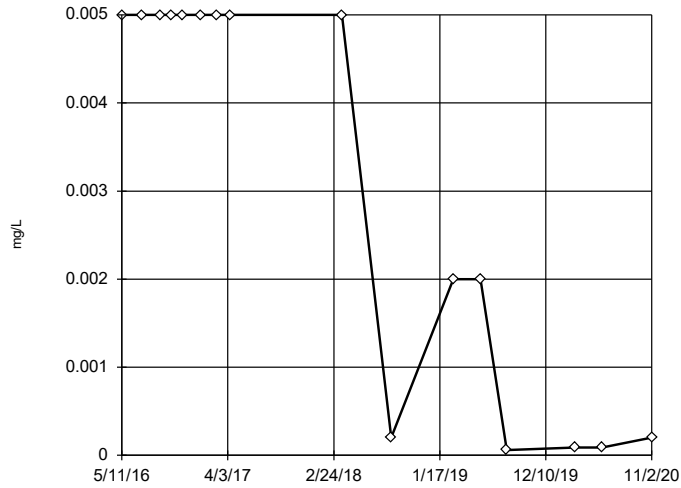
Data were square root transformed to achieve best W statistic (graph shown in original units).

High cutoff = 0.05923, low cutoff = -0.02544, based on IQR multiplier of 3.

Constituent: Lead, total Analysis Run 12/29/2020 2:09 PM View: Outlier
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening

AD-30

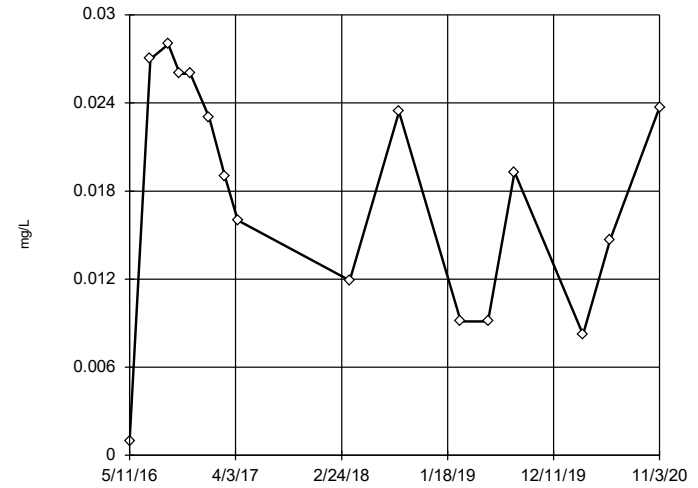


n = 16
 No outliers found. Tukey's method selected by user.
 Data were cube root transformed to achieve best W statistic (graph shown in original units).
 The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Constituent: Lead, total Analysis Run 12/29/2020 2:09 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening

AD-17

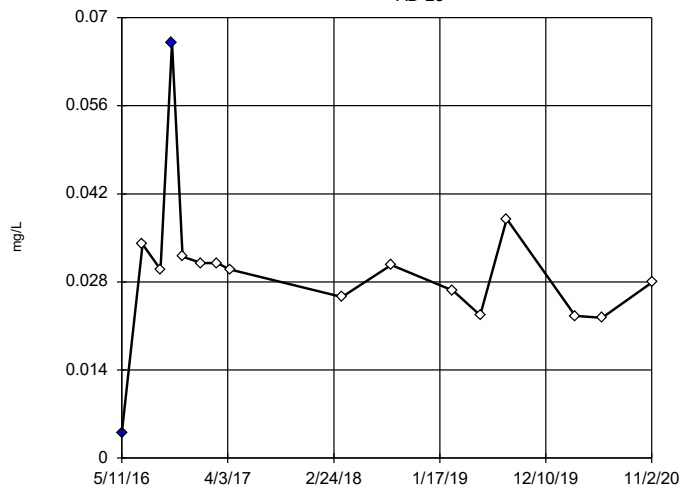


n = 16
 No outliers found. Tukey's method selected by user.
 Ladder of Powers transformations did not improve normality; analysis run on raw data.
 High cutoff = 0.06787, low cutoff = -0.03251, based on IQR multiplier of 3.

Constituent: Lithium, total Analysis Run 12/29/2020 2:09 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening

AD-28

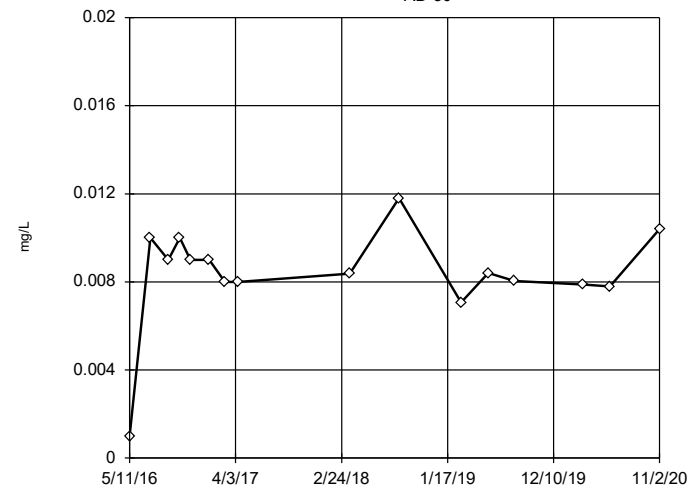


n = 16
 Outliers are drawn as solid.
 Tukey's method selected by user.
 Data were square root transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.05949, low cutoff = 0.007903, based on IQR multiplier of 3.

Constituent: Lithium, total Analysis Run 12/29/2020 2:09 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening

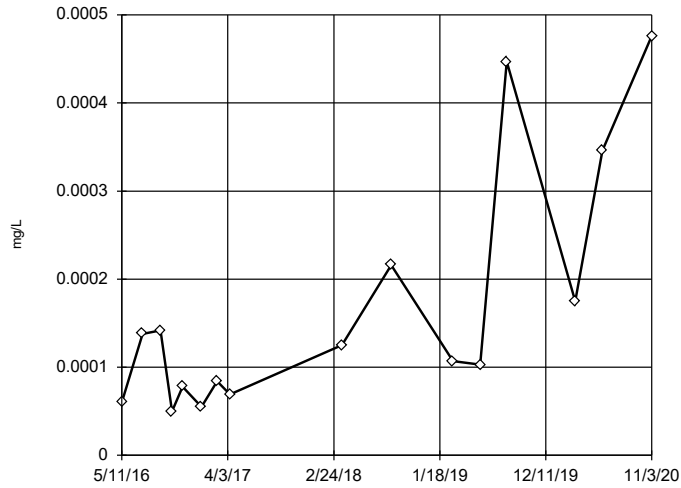
AD-30



n = 16
 No outliers found. Tukey's method selected by user.
 Data were square transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.01315, low cutoff = -0.004394, based on IQR multiplier of 3.

Constituent: Lithium, total Analysis Run 12/29/2020 2:09 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

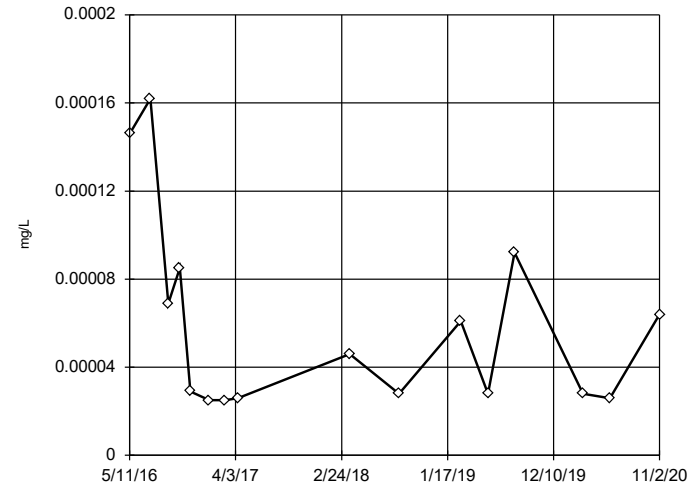
Tukey's Outlier Screening
AD-17



n = 16
No outliers found. Tukey's method selected by user.
Data were natural log transformed to achieve best W statistic (graph shown in original units).
High cutoff = 0.003619, low cutoff = 0.00003941, based on IQR multiplier of 3.

Constituent: Mercury, total Analysis Run 12/29/2020 2:09 PM View: Outlier
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

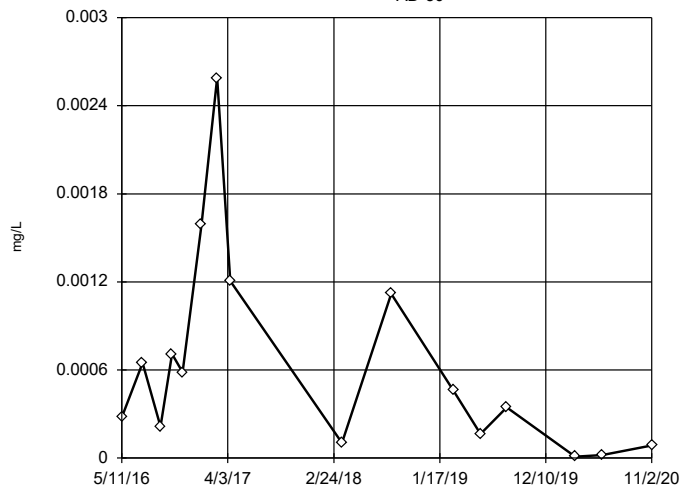
Tukey's Outlier Screening
AD-28



n = 16
No outliers found. Tukey's method selected by user.
Data were natural log transformed to achieve best W statistic (graph shown in original units).
High cutoff = 0.001751, low cutoff = 0.00000118, based on IQR multiplier of 3.

Constituent: Mercury, total Analysis Run 12/29/2020 2:09 PM View: Outlier
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

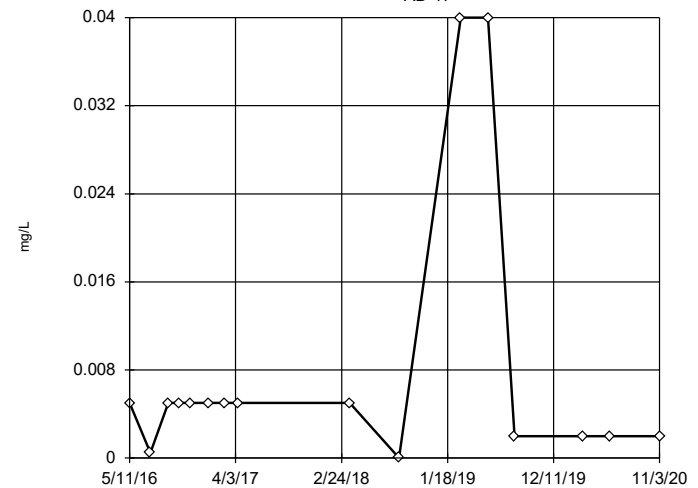
Tukey's Outlier Screening
AD-30



n = 16
No outliers found. Tukey's method selected by user.
Data were cube root transformed to achieve best W statistic (graph shown in original units).
High cutoff = 0.01269, low cutoff = -0.0006312, based on IQR multiplier of 3.

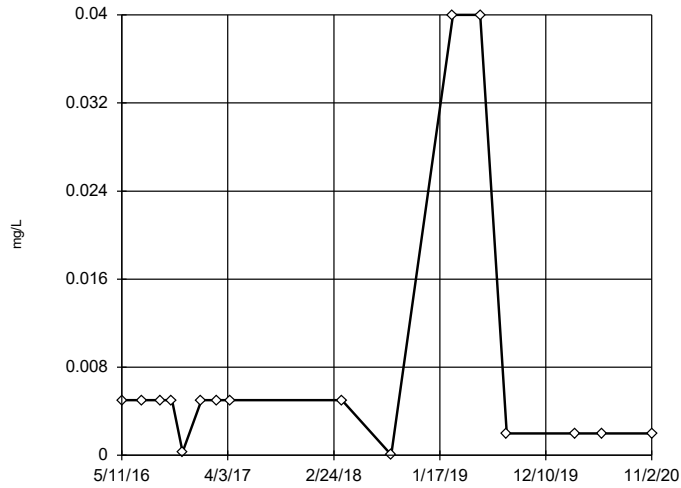
Constituent: Mercury, total Analysis Run 12/29/2020 2:09 PM View: Outlier
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening
AD-17



Tukey's Outlier Screening

AD-28



n = 16

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

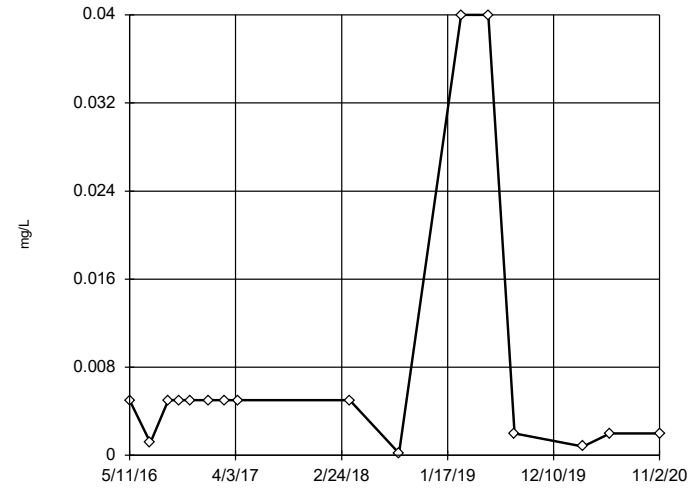
Data were natural log transformed to achieve best W statistic (graph shown in original units).

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

Constituent: Molybdenum, total Analysis Run 12/29/2020 2:09 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening

AD-30



n = 16

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

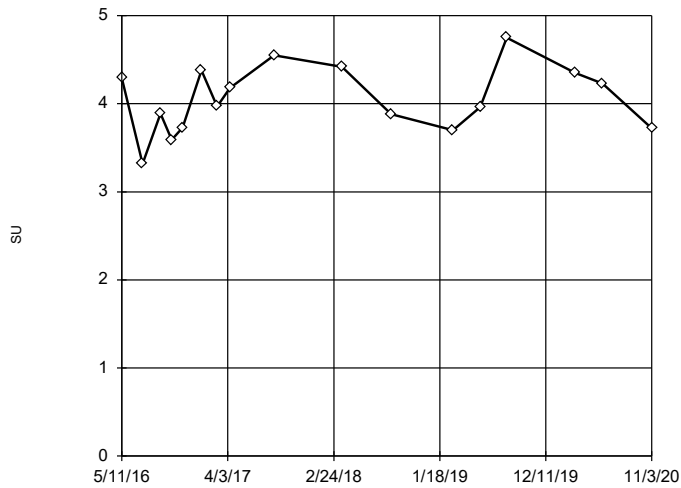
Data were natural log transformed to achieve best W statistic (graph shown in original units).

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

Constituent: Molybdenum, total Analysis Run 12/29/2020 2:09 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening

AD-17



n = 17

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

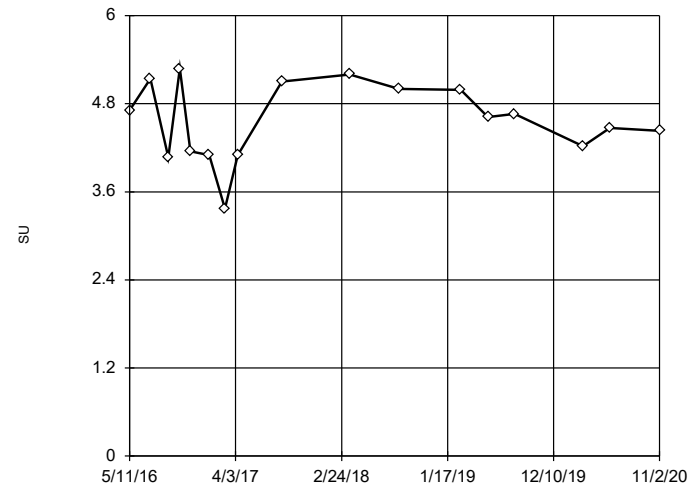
Ladder of Powers transformations did not improve normality; analysis run on raw data.

High cutoff = 6.285, low cutoff = 1.805, based on IQR multiplier of 3.

Constituent: pH, field Analysis Run 12/29/2020 2:09 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening

AD-28



n = 17

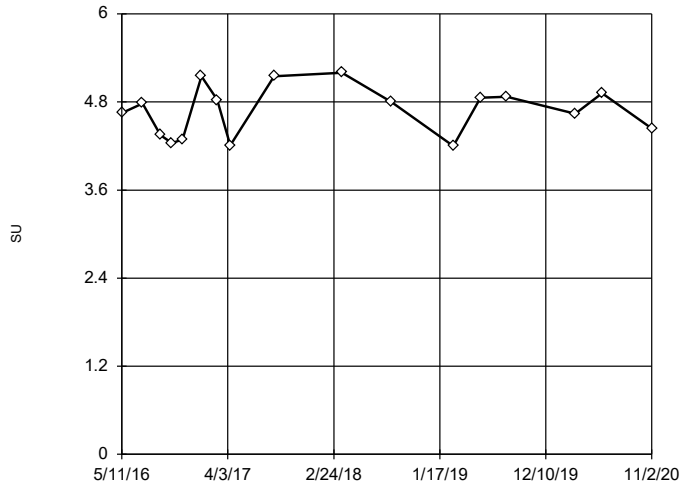
No outliers found. Tukey's method selected by user.

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

High cutoff = 6.729, low cutoff = -4.728, based on IQR multiplier of 3.

Constituent: pH, field Analysis Run 12/29/2020 2:09 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

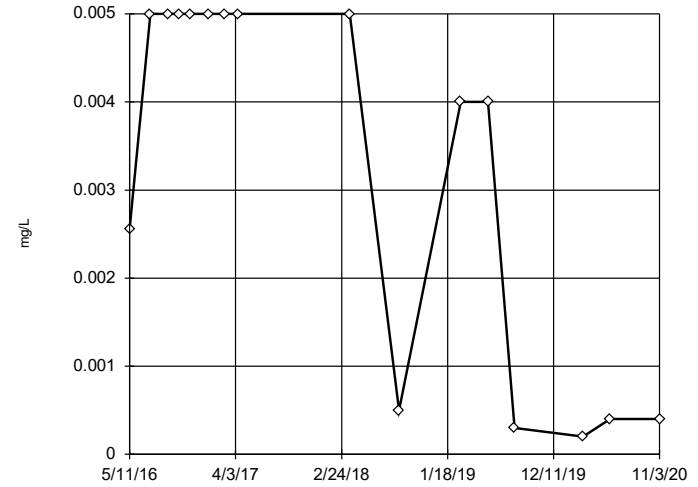
Tukey's Outlier Screening
AD-30



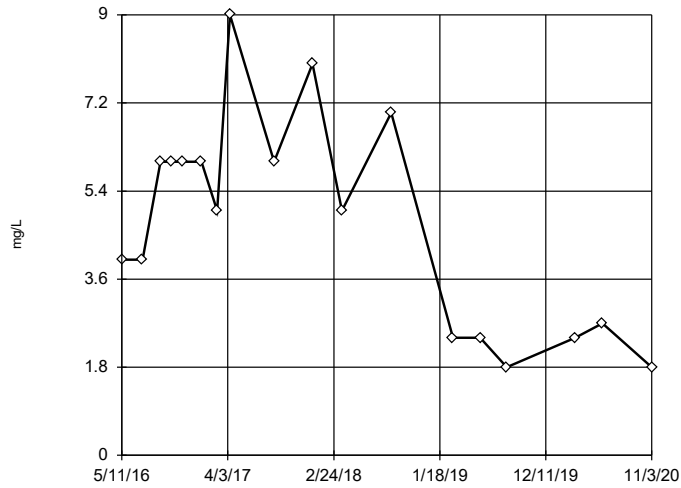
n = 17
No outliers found. Tukey's method selected by user.
Data were cube transformed to achieve best W statistic (graph shown in original units).
High cutoff = 6.103, low cutoff = -3.085, based on IQR multiplier of 3.

Constituent: pH, field Analysis Run 12/29/2020 2:09 PM View: Outlier
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening
AD-17



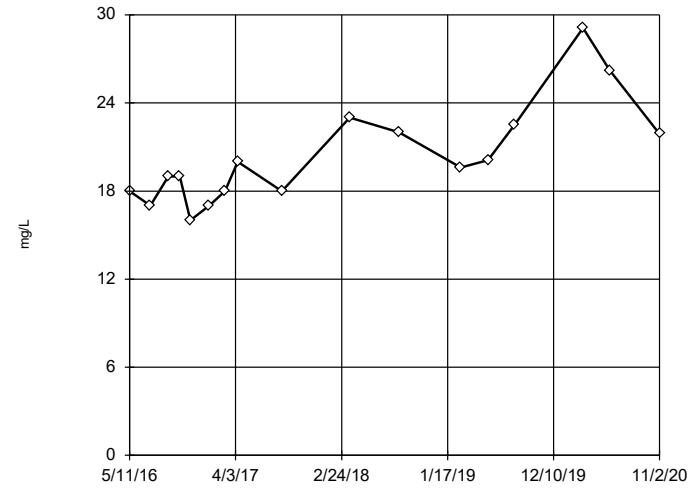
Tukey's Outlier Screening
AD-17



n = 18
No outliers found. Tukey's method selected by user.
Ladder of Powers transformations did not improve normality; analysis run on raw data.
High cutoff = 16.8, low cutoff = -8.4, based on IQR multiplier of 3.

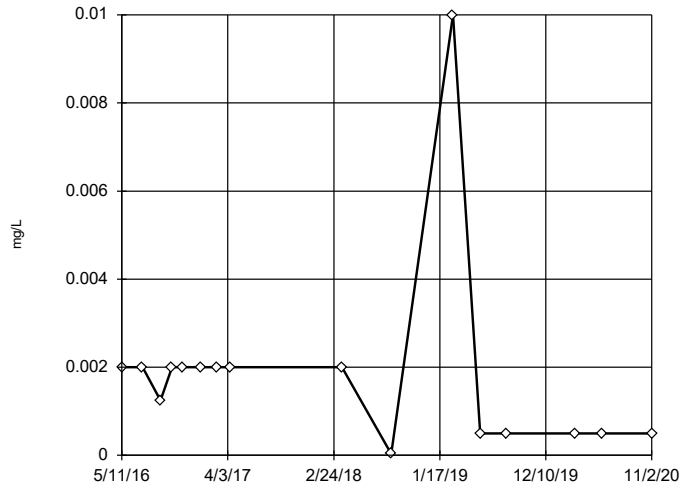
Constituent: Sulfate, total Analysis Run 12/29/2020 2:09 PM View: Outlier
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening
AD-28



Tukey's Outlier Screening

AD-28

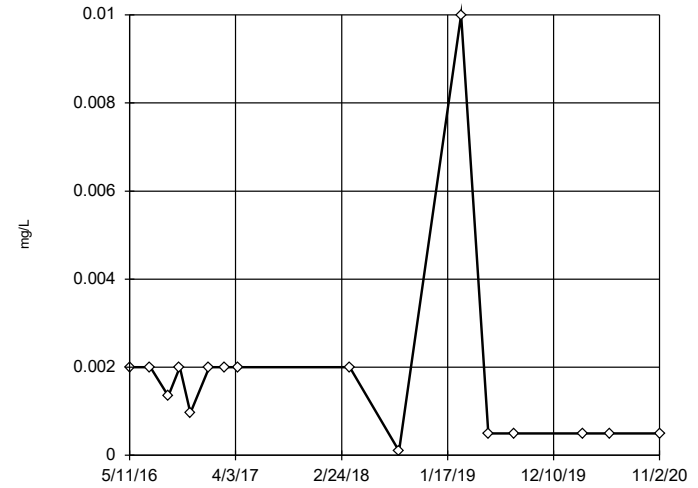


n = 16
 No outliers found. Tukey's method selected by user.
 Data were cube root transformed to achieve best W statistic (graph shown in original units).
 The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Constituent: Thallium, total Analysis Run 12/29/2020 2:09 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening

AD-30

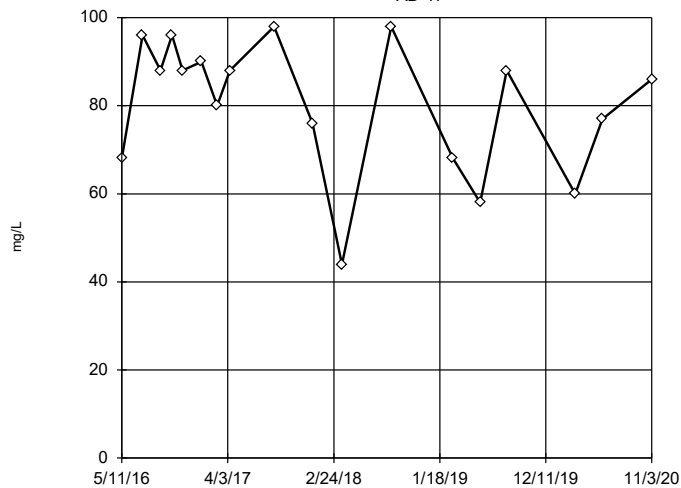


n = 16
 No outliers found. Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Constituent: Thallium, total Analysis Run 12/29/2020 2:09 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening

AD-17

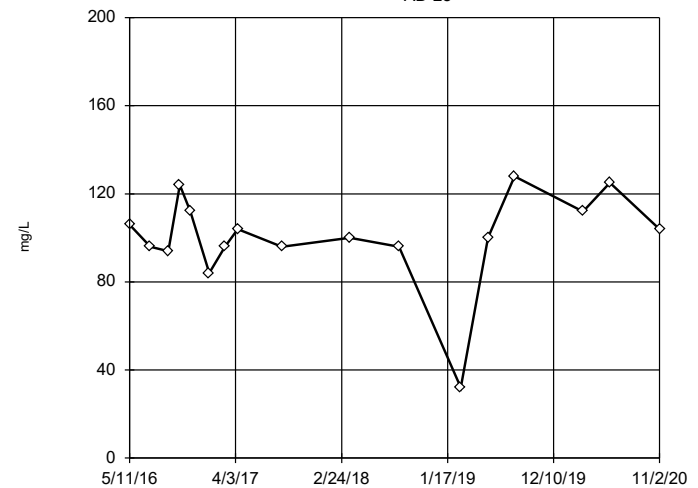


n = 18
 No outliers found. Tukey's method selected by user.
 Data were cube transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 131.7, low cutoff = -105.2, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids [TDS] Analysis Run 12/29/2020 2:09 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening

AD-28

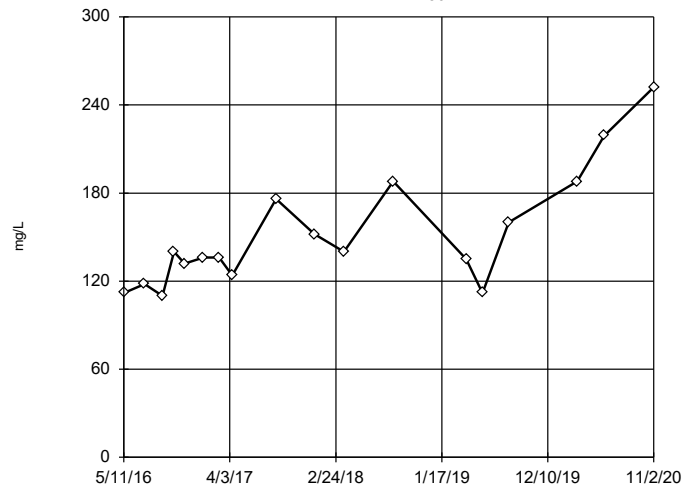


n = 17
 No outliers found. Tukey's method selected by user.
 Data were cube transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 143.7, low cutoff = -87.76, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids [TDS] Analysis Run 12/29/2020 2:09 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening

AD-30



n = 18

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

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

High cutoff = 618.6, low cutoff = 35.57, based on IQR multiplier of 3.

Constituent: Total Dissolved Solids [TDS] Analysis Run 12/29/2020 2:09 PM View: Outlier

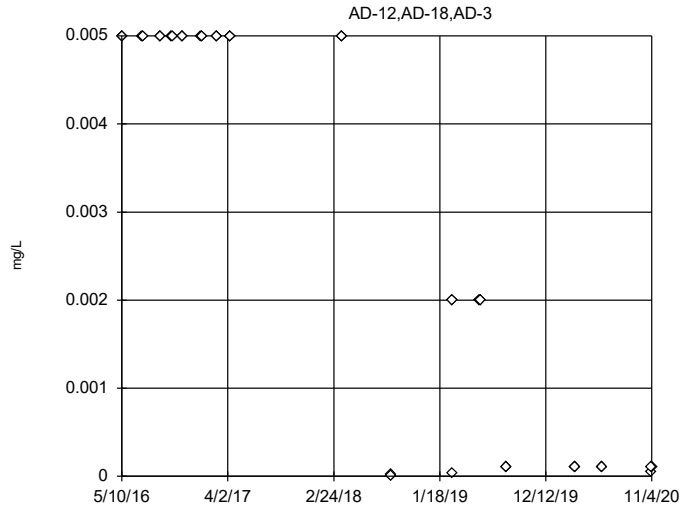
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

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

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 12/29/2020, 2:13 PM

Constituent	Well	Outlier	Value(s)	Date(s)	Method	Alpha	N	Mean	Std. Dev.	Distribution	Normality Test
Antimony, total (mg/L)	AD-12,AD-18,AD-3	n/a	n/a	n/a w/combined bg	NP	NaN	48	0.003046	0.002305	unknown	ShapiroWilk
Arsenic, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	n/a w/combined bg	NP	NaN	48	0.003038	0.002079	sqrt(x)	ShapiroWilk
Barium, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	n/a w/combined bg	NP	NaN	48	0.0654	0.03667	normal	ShapiroWilk
Beryllium, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	n/a w/combined bg	NP	NaN	48	0.0004373	0.0006076	ln(x)	ShapiroWilk
Boron, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	n/a w/combined bg	NP	NaN	51	0.03802	0.02028	sqrt(x)	ShapiroFrancia
Cadmium, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	n/a w/combined bg	NP	NaN	48	0.0006209	0.000474	ln(x)	ShapiroWilk
Chloride, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	n/a w/combined bg	NP	NaN	51	6.861	1.326	ln(x)	ShapiroFrancia
Chromium, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	n/a w/combined bg	NP	NaN	48	0.0009537	0.001165	ln(x)	ShapiroWilk
Cobalt, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	n/a w/combined bg	NP	NaN	48	0.002583	0.002176	ln(x)	ShapiroWilk
Combined Radium 226 + 228 (pCi/L)	AD-12,AD-18,AD-3	No	n/a	n/a w/combined bg	NP	NaN	48	1.204	0.9374	ln(x)	ShapiroWilk
Fluoride, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	n/a w/combined bg	NP	NaN	51	0.64	0.4546	ln(x)	ShapiroFrancia
Lead, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	n/a w/combined bg	NP	NaN	48	0.00306	0.002273	ln(x)	ShapiroWilk
Lithium, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	n/a w/combined bg	NP	NaN	48	0.0503	0.1417	ln(x)	ShapiroWilk
Mercury, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	n/a w/combined bg	NP	NaN	48	0.00001843	0.00001126	$x^{(1/3)}$	ShapiroWilk
Molybdenum, total (mg/L)	AD-12,AD-18,AD-3	n/a	n/a	n/a w/combined bg	NP	NaN	48	0.007262	0.01141	unknown	ShapiroWilk
Selenium, total (mg/L)	AD-12,AD-18,AD-3	No	n/a	n/a w/combined bg	NP	NaN	48	0.002714	0.002146	sqrt(x)	ShapiroWilk
Thallium, total (mg/L)	AD-12,AD-18,AD-3	n/a	n/a	n/a w/combined bg	NP	NaN	48	0.001673	0.001913	unknown	ShapiroWilk

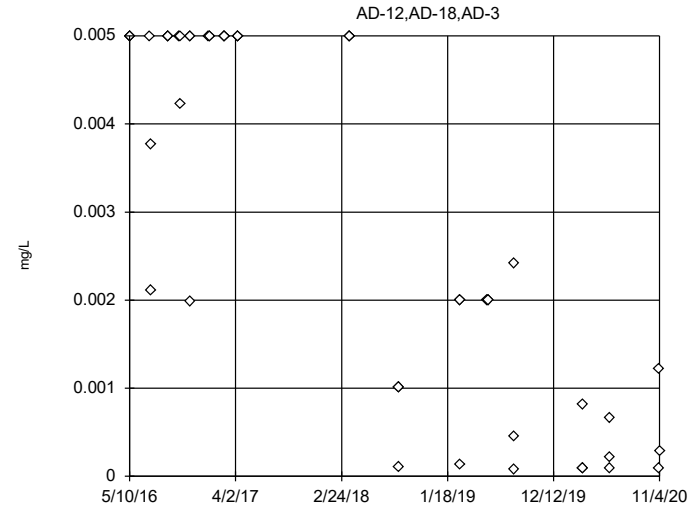
Tukey's Outlier Screening, Pooled Background



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

Constituent: Antimony, total Analysis Run 12/29/2020 2:12 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

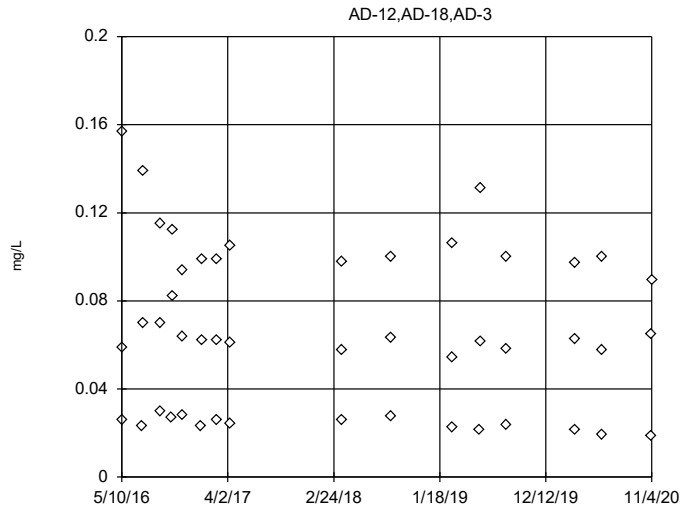
Tukey's Outlier Screening, Pooled Background



n = 48
 No outliers found.
 Tukey's method selected by user.
 Data were square root transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.03705, low cutoff = -0.0084, based on IQR multiplier of 3.

Constituent: Arsenic, total Analysis Run 12/29/2020 2:12 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

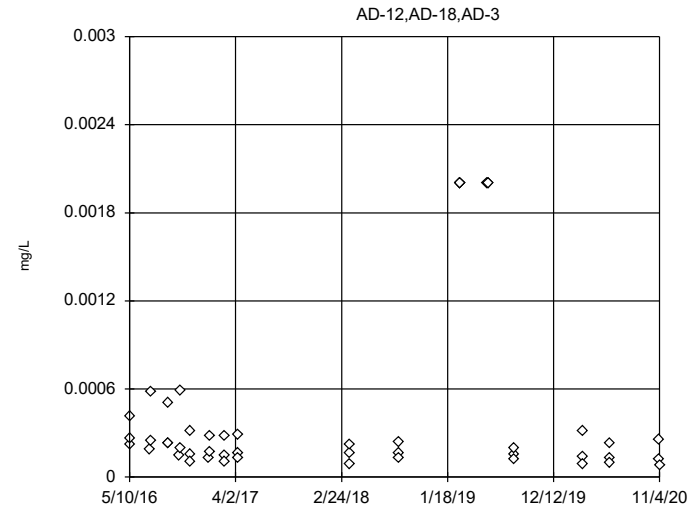
Tukey's Outlier Screening, Pooled Background



n = 48
 No outliers found.
 Tukey's method selected by user.
 Ladder of Powers transformations did not improve normality; analysis run on raw data.
 High cutoff = 0.3141, low cutoff = -0.1892, based on IQR multiplier of 3.

Constituent: Barium, total Analysis Run 12/29/2020 2:12 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

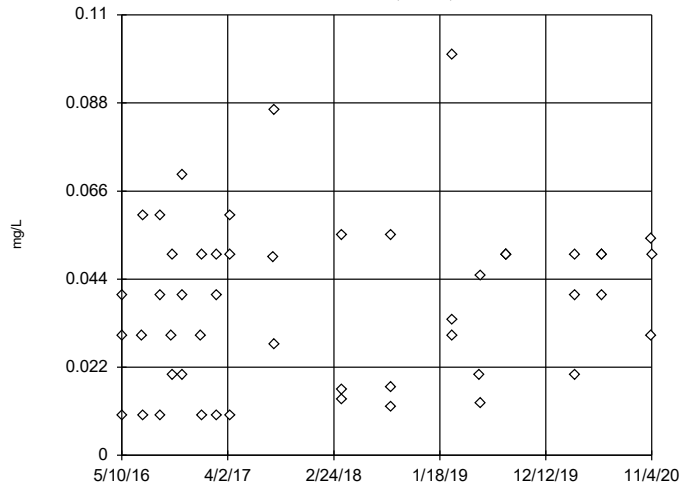


n = 48
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.003152, low cutoff = 0.00001278, based on IQR multiplier of 3.

Constituent: Beryllium, total Analysis Run 12/29/2020 2:12 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-3

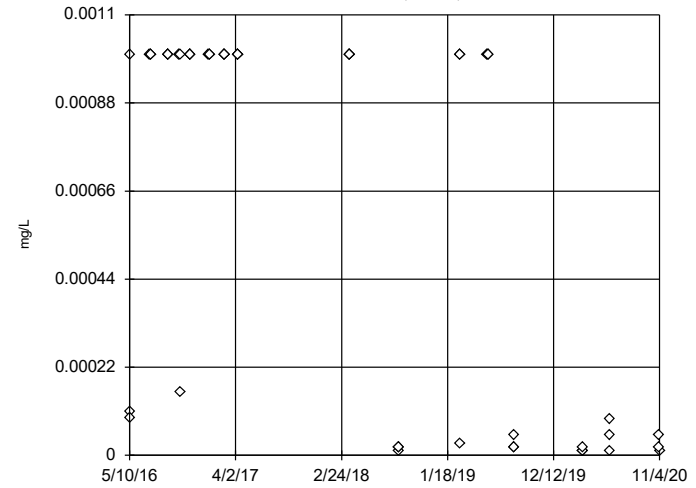


n = 51
 No outliers found.
 Tukey's method selected by user.
 Data were square root transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.2211, low cutoff = -0.01105, based on IQR multiplier of 3.

Constituent: Boron, total Analysis Run 12/29/2020 2:12 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-3

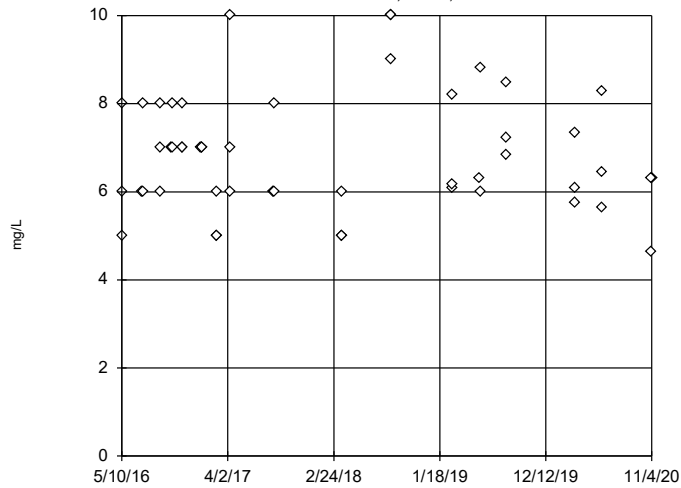


n = 48
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 17.21, low cutoff = 2.2e-9, based on IQR multiplier of 3.

Constituent: Cadmium, total Analysis Run 12/29/2020 2:12 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-3

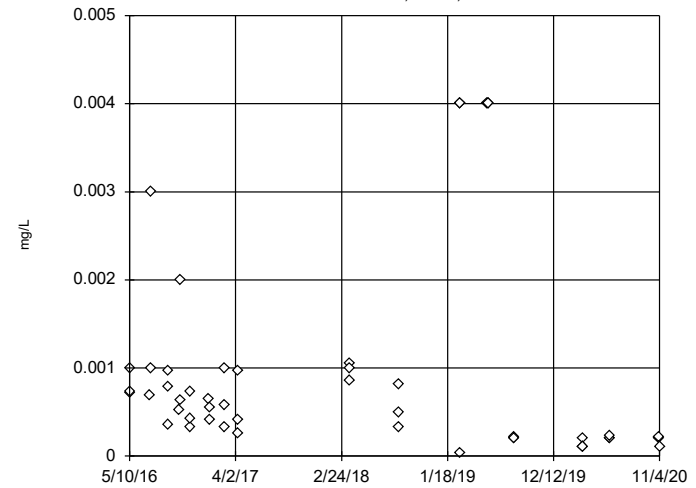


n = 51
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 18.96, low cutoff = 2.531, based on IQR multiplier of 3.

Constituent: Chloride, total Analysis Run 12/29/2020 2:12 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-3

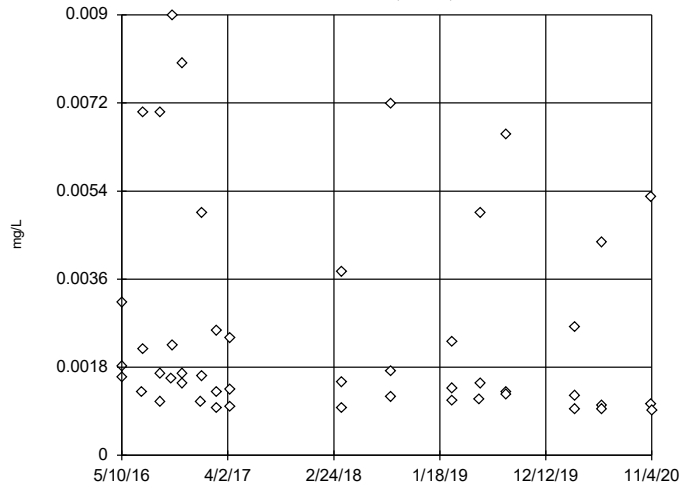


n = 48
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.08559, low cutoff = 0.000002571, based on IQR multiplier of 3.

Constituent: Chromium, total Analysis Run 12/29/2020 2:12 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-3

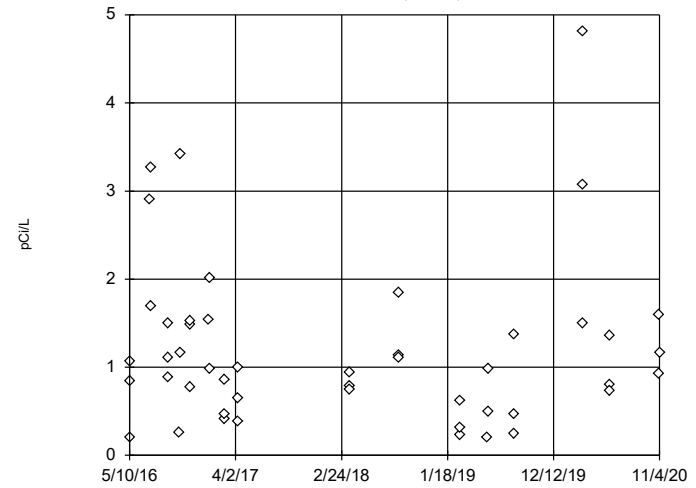


n = 48
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.04253, low cutoff = 0.00007844, based on IQR multiplier of 3.

Constituent: Cobalt, total Analysis Run 12/29/2020 2:12 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-3

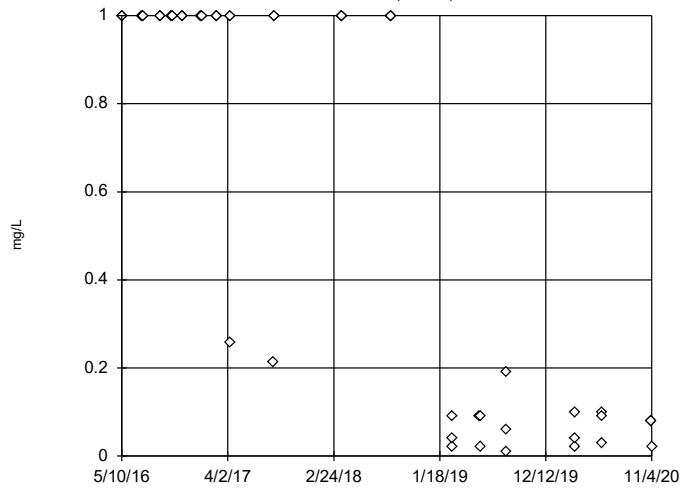


n = 48
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 19.99, low cutoff = 0.04729, based on IQR multiplier of 3.

Constituent: Combined Radium 226 + 228 Analysis Run 12/29/2020 2:12 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-3

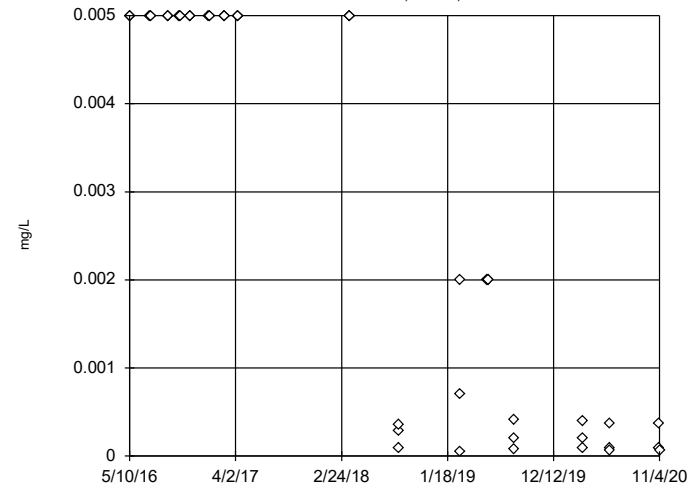


n = 51
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 1372, low cutoff = 0.00006561, based on IQR multiplier of 3.

Constituent: Fluoride, total Analysis Run 12/29/2020 2:12 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-3

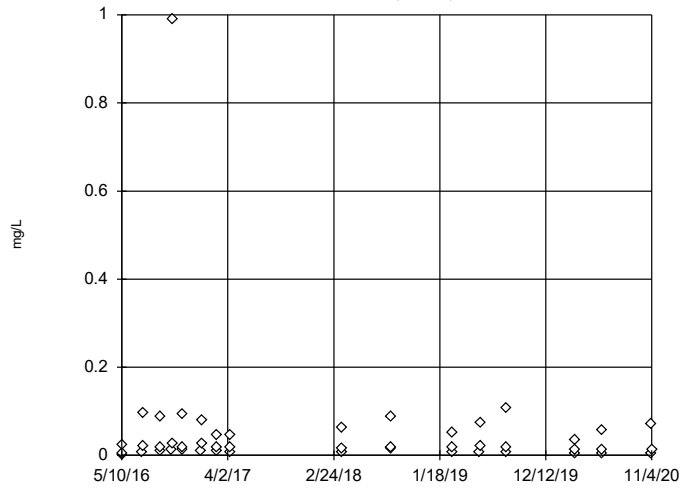


n = 48
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 13.46, low cutoff = 1.3e-7, based on IQR multiplier of 3.

Constituent: Lead, total Analysis Run 12/29/2020 2:12 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-3

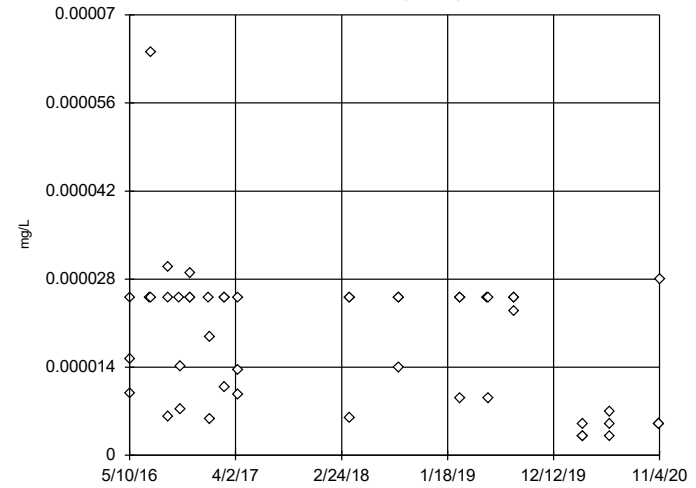


n = 48
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 6.831, low cutoff = 0.0006825, based on IQR multiplier of 3.

Constituent: Lithium, total Analysis Run 12/29/2020 2:12 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-3

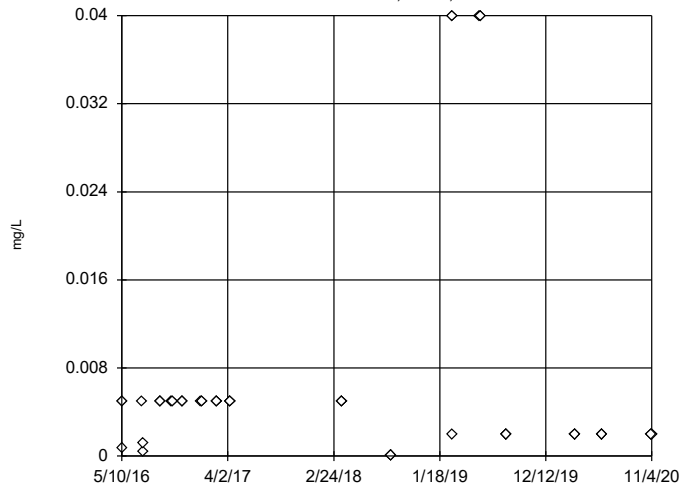


n = 48
 No outliers found.
 Tukey's method selected by user.
 Data were cube root transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.0001819, low cutoff = -3.9e-7, based on IQR multiplier of 3.

Constituent: Mercury, total Analysis Run 12/29/2020 2:12 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-3

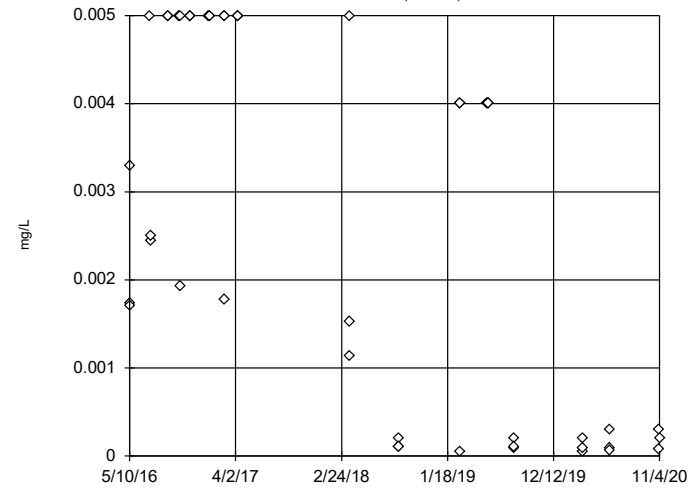


n = 48
 No outliers found.
 Tukey's method selected by user.
 Data were natural log transformed to achieve best W statistic (graph shown in original units).
 The results were invalidated, because both the lower and upper quartiles represent reporting limits.

Constituent: Molybdenum, total Analysis Run 12/29/2020 2:12 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-3



n = 48
 No outliers found.
 Tukey's method selected by user.
 Data were square root transformed to achieve best W statistic (graph shown in original units).
 High cutoff = 0.0578, low cutoff = -0.0242, based on IQR multiplier of 3.

Constituent: Selenium, total Analysis Run 12/29/2020 2:12 PM View: Outlier
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Tukey's Outlier Screening, Pooled Background

AD-12,AD-18,AD-3

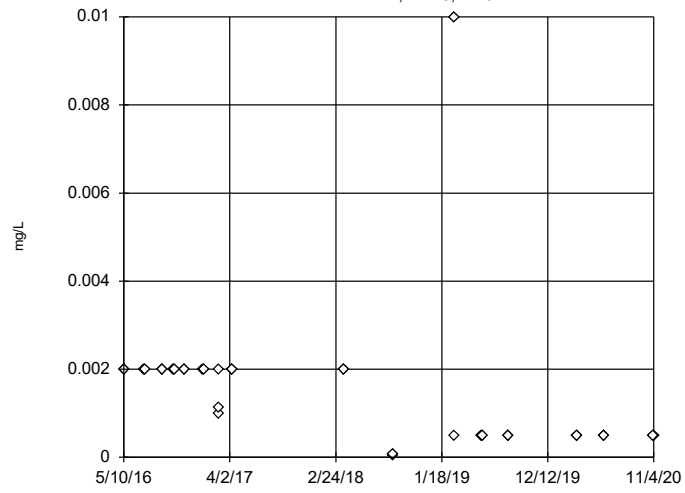


FIGURE D.

Welch's t-test/Mann-Whitney - Significant Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 1/4/2021, 11:32 AM

<u>Constituent</u>	<u>Well</u>	<u>Calc.</u>	<u>0.01</u>	<u>Method</u>
Sulfate, total (mg/L)	AD-17	-2.819	Yes	Mann-W

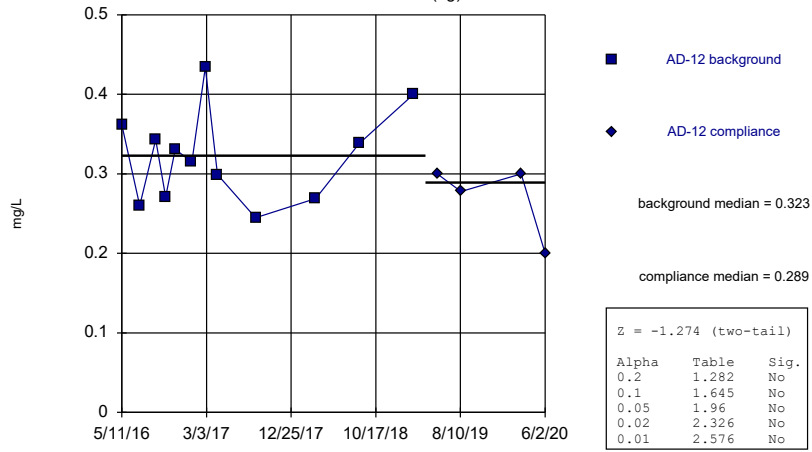
Welch's t-test/Mann-Whitney - All Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 1/4/2021, 11:32 AM

<u>Constituent</u>	<u>Well</u>	<u>Calc.</u>	<u>0.01</u>	<u>Method</u>
Calcium, total (mg/L)	AD-12 (bg)	-1.274	No	Mann-W
Calcium, total (mg/L)	AD-17	-1.82	No	Mann-W
Calcium, total (mg/L)	AD-18 (bg)	0.1819	No	Mann-W
Calcium, total (mg/L)	AD-28	-1.134	No	Mann-W
Calcium, total (mg/L)	AD-3 (bg)	1.273	No	Mann-W
Calcium, total (mg/L)	AD-30	0.8492	No	Mann-W
pH, field (SU)	AD-12 (bg)	0.9095	No	Mann-W
pH, field (SU)	AD-17	1.273	No	Mann-W
pH, field (SU)	AD-18 (bg)	0.6072	No	Mann-W
pH, field (SU)	AD-28	-0.5461	No	Mann-W
pH, field (SU)	AD-3 (bg)	-1.031	No	Mann-W
pH, field (SU)	AD-30	0.9102	No	Mann-W
Sulfate, total (mg/L)	AD-12 (bg)	-2.039	No	Mann-W
Sulfate, total (mg/L)	AD-17	-2.819	Yes	Mann-W
Sulfate, total (mg/L)	AD-18 (bg)	-0.8629	No	Mann-W
Sulfate, total (mg/L)	AD-28	2.497	No	Mann-W
Sulfate, total (mg/L)	AD-3 (bg)	1.031	No	Mann-W
Sulfate, total (mg/L)	AD-30	1.869	No	Mann-W
Total Dissolved Solids [TDS] (mg/L)	AD-12 (bg)	0.7287	No	Mann-W
Total Dissolved Solids [TDS] (mg/L)	AD-17	-1.598	No	Mann-W
Total Dissolved Solids [TDS] (mg/L)	AD-18 (bg)	-0.9108	No	Mann-W
Total Dissolved Solids [TDS] (mg/L)	AD-28	2.141	No	Mann-W
Total Dissolved Solids [TDS] (mg/L)	AD-3 (bg)	1.033	No	Mann-W
Total Dissolved Solids [TDS] (mg/L)	AD-30	1.004	No	Mann-W

Mann-Whitney (Wilcoxon Rank Sum)

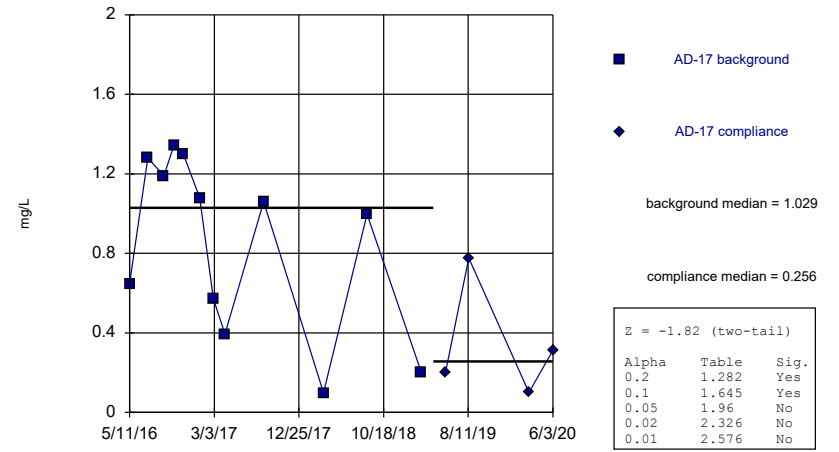
AD-12 (bg)



Constituent: Calcium, total Analysis Run 1/4/2021 11:29 AM View: Mann-Whitney
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Mann-Whitney (Wilcoxon Rank Sum)

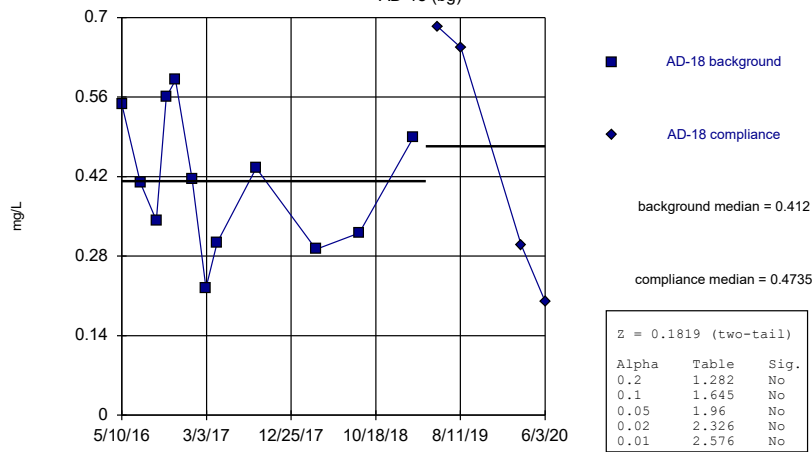
AD-17



Constituent: Calcium, total Analysis Run 1/4/2021 11:29 AM View: Mann-Whitney
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Mann-Whitney (Wilcoxon Rank Sum)

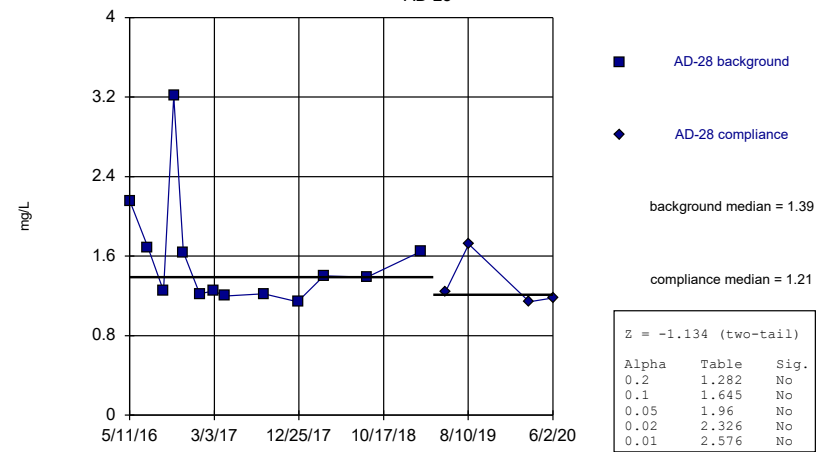
AD-18 (bg)



Constituent: Calcium, total Analysis Run 1/4/2021 11:29 AM View: Mann-Whitney
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

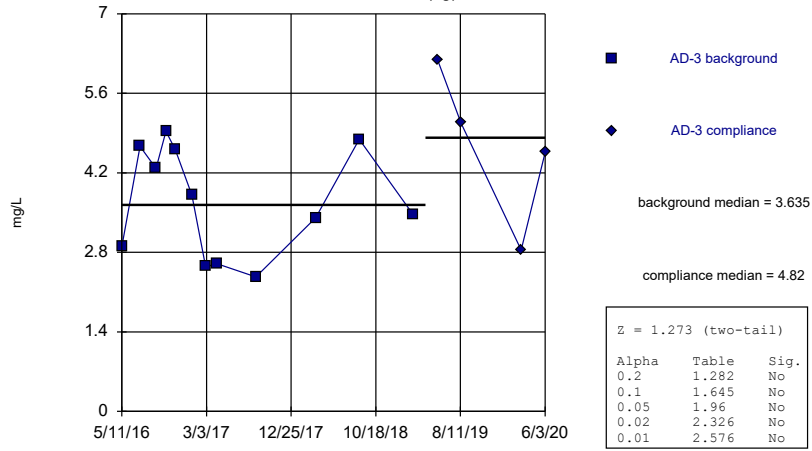
Mann-Whitney (Wilcoxon Rank Sum)

AD-28



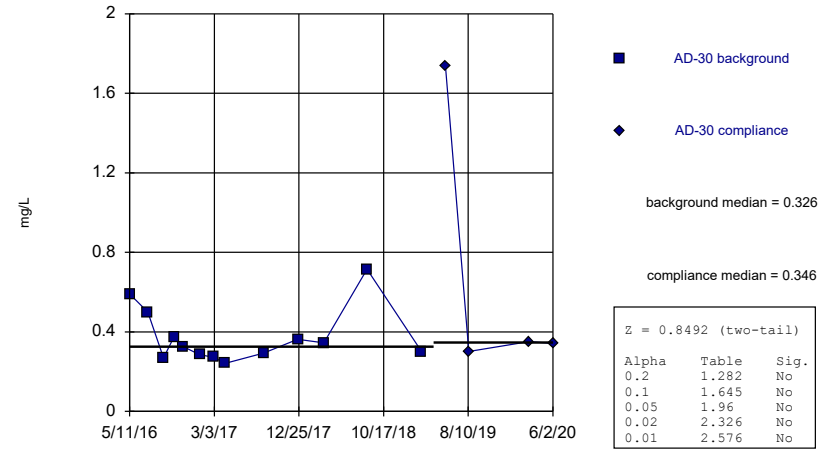
Constituent: Calcium, total Analysis Run 1/4/2021 11:29 AM View: Mann-Whitney
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Mann-Whitney (Wilcoxon Rank Sum)
AD-3 (bg)



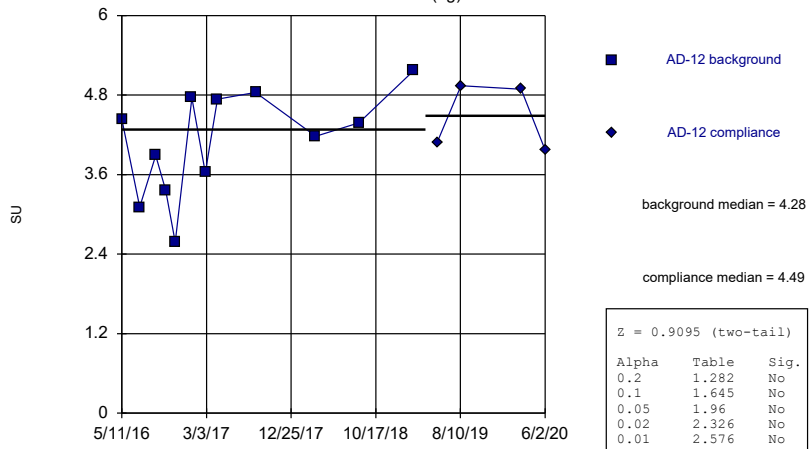
Constituent: Calcium, total Analysis Run 1/4/2021 11:29 AM View: Mann-Whitney
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Mann-Whitney (Wilcoxon Rank Sum)
AD-30



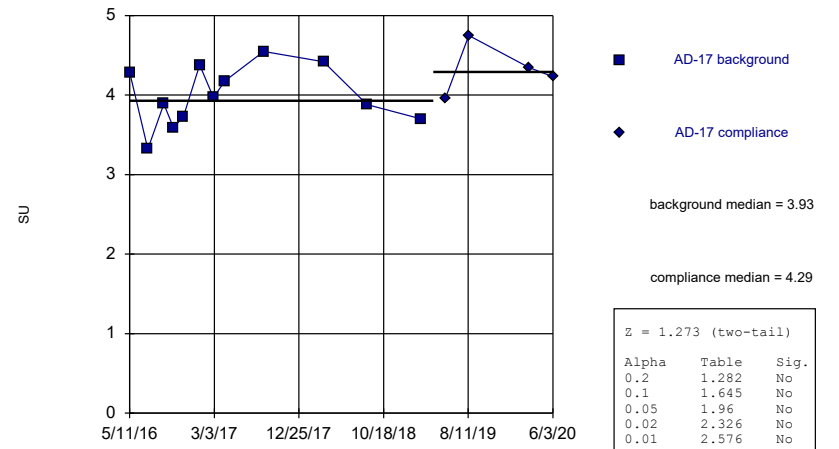
Constituent: Calcium, total Analysis Run 1/4/2021 11:29 AM View: Mann-Whitney
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Mann-Whitney (Wilcoxon Rank Sum)
AD-12 (bg)



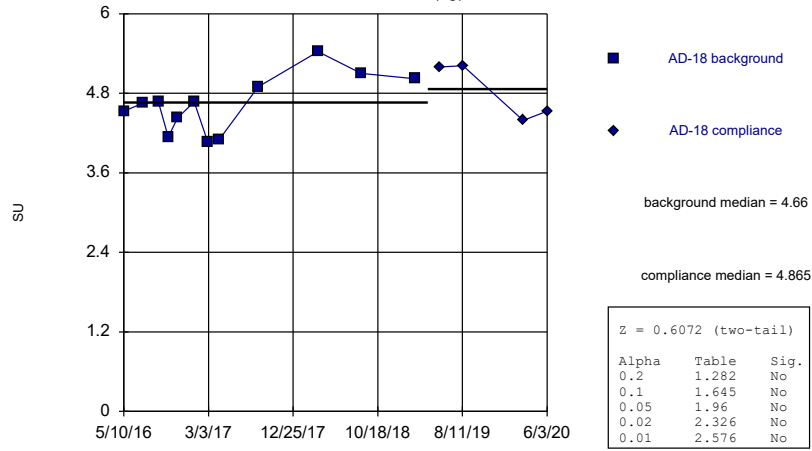
Constituent: pH, field Analysis Run 1/4/2021 11:29 AM View: Mann-Whitney
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Mann-Whitney (Wilcoxon Rank Sum)
AD-17



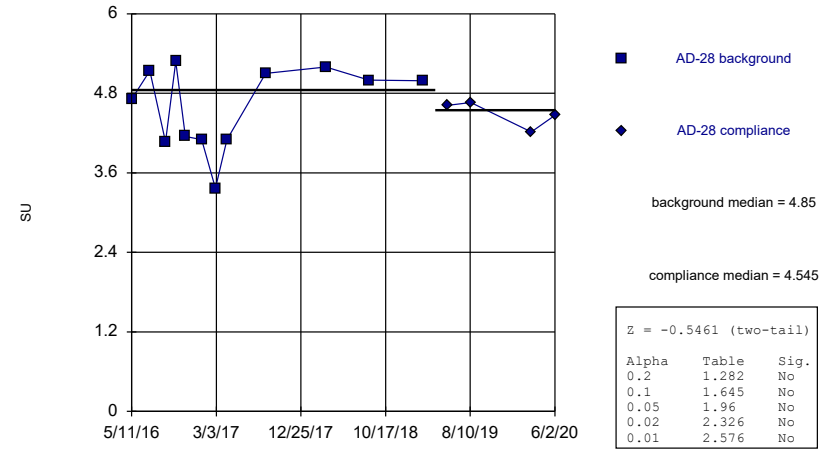
Constituent: pH, field Analysis Run 1/4/2021 11:29 AM View: Mann-Whitney
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Mann-Whitney (Wilcoxon Rank Sum)
AD-18 (bg)



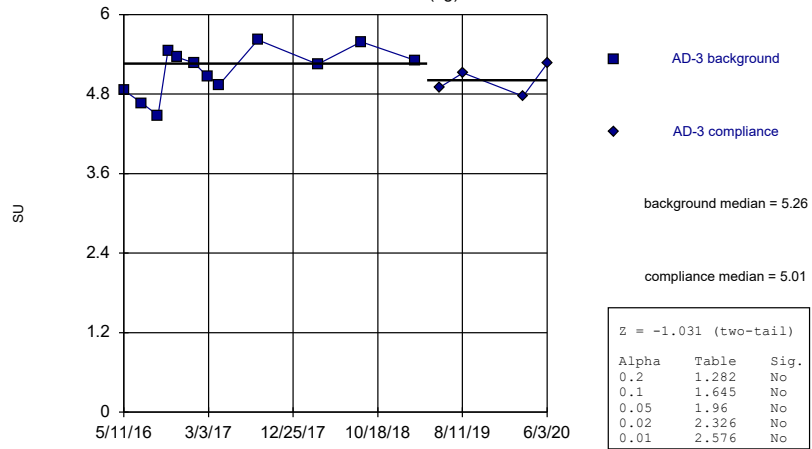
Constituent: pH, field Analysis Run 1/4/2021 11:29 AM View: Mann-Whitney
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Mann-Whitney (Wilcoxon Rank Sum)
AD-28



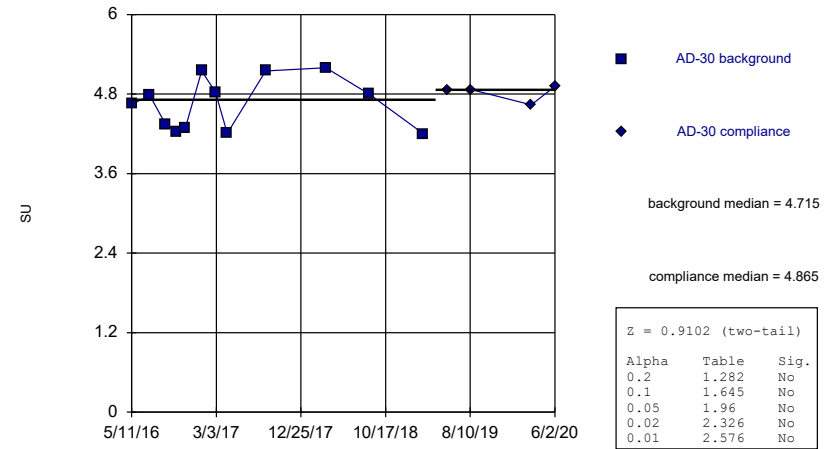
Constituent: pH, field Analysis Run 1/4/2021 11:29 AM View: Mann-Whitney
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Mann-Whitney (Wilcoxon Rank Sum)
AD-3 (bg)



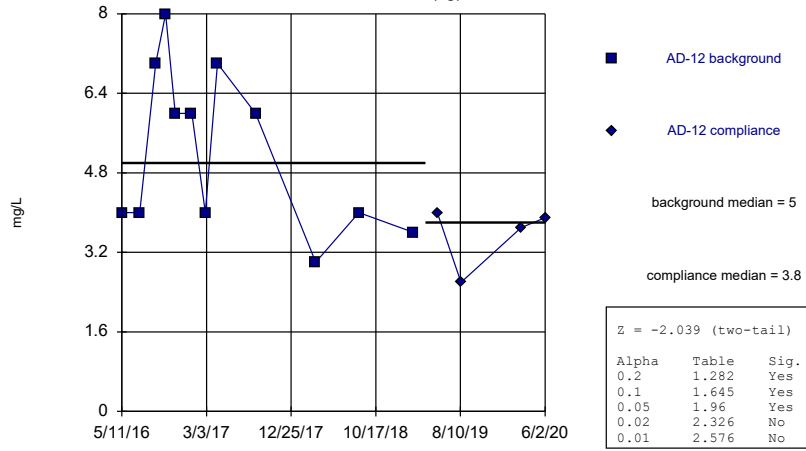
Constituent: pH, field Analysis Run 1/4/2021 11:29 AM View: Mann-Whitney
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Mann-Whitney (Wilcoxon Rank Sum)
AD-30



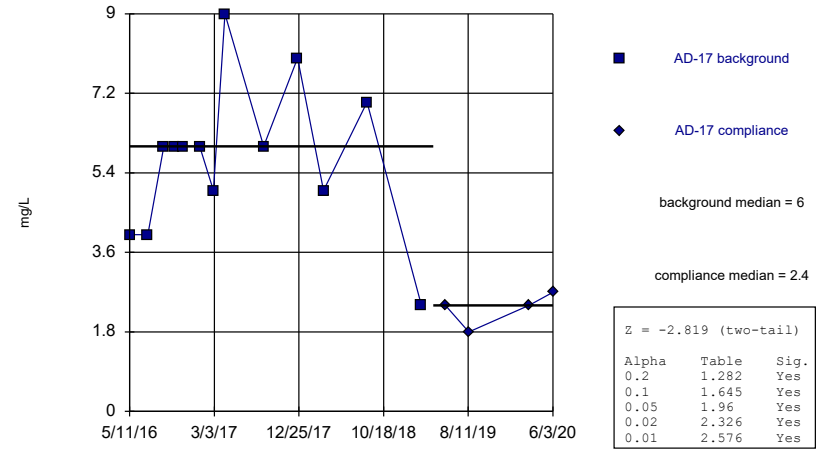
Constituent: pH, field Analysis Run 1/4/2021 11:29 AM View: Mann-Whitney
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Mann-Whitney (Wilcoxon Rank Sum)
AD-12 (bg)



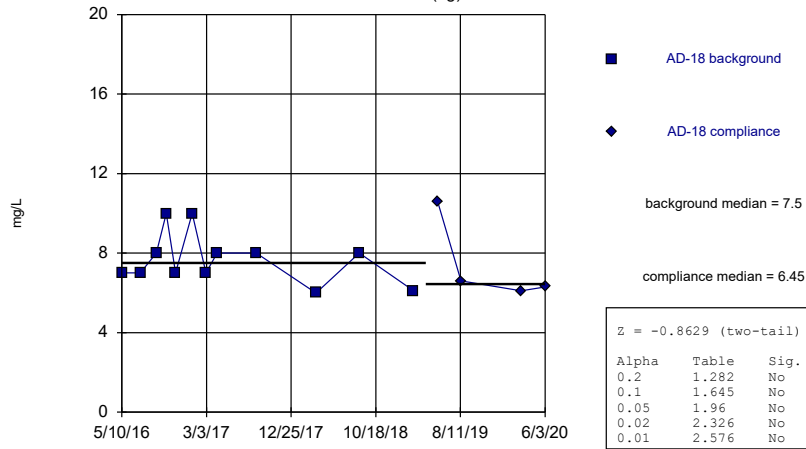
Constituent: Sulfate, total Analysis Run 1/4/2021 11:29 AM View: Mann-Whitney
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Mann-Whitney (Wilcoxon Rank Sum)
AD-17



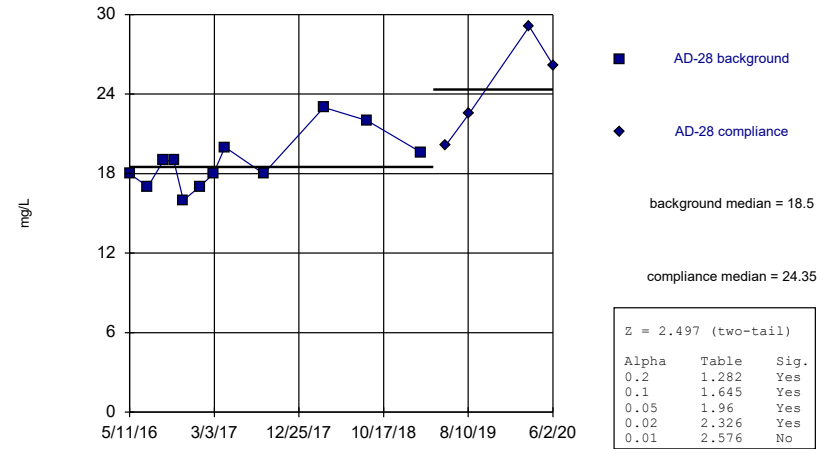
Constituent: Sulfate, total Analysis Run 1/4/2021 11:29 AM View: Mann-Whitney
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Mann-Whitney (Wilcoxon Rank Sum)
AD-18 (bg)



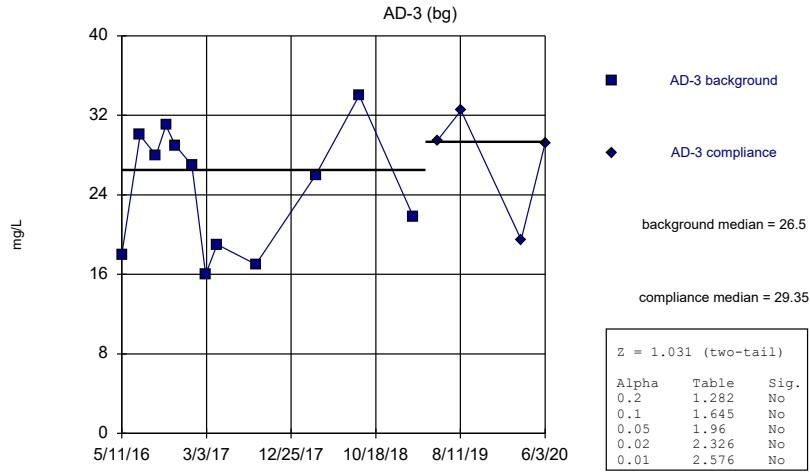
Constituent: Sulfate, total Analysis Run 1/4/2021 11:29 AM View: Mann-Whitney
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Mann-Whitney (Wilcoxon Rank Sum)
AD-28



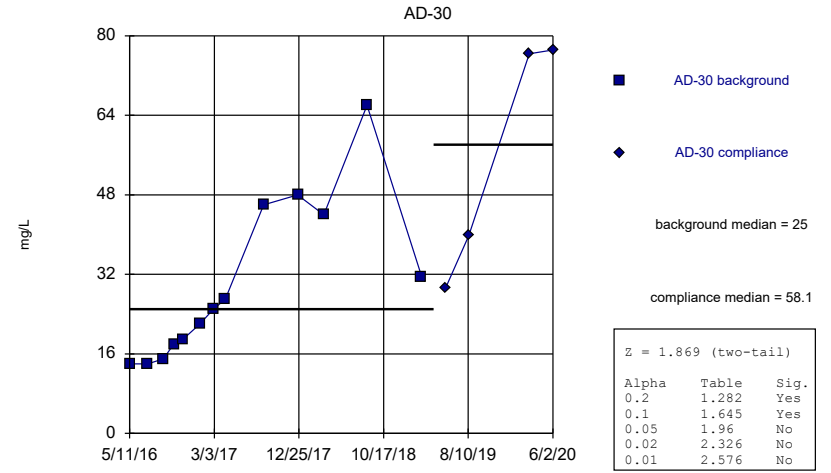
Constituent: Sulfate, total Analysis Run 1/4/2021 11:29 AM View: Mann-Whitney
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Mann-Whitney (Wilcoxon Rank Sum)



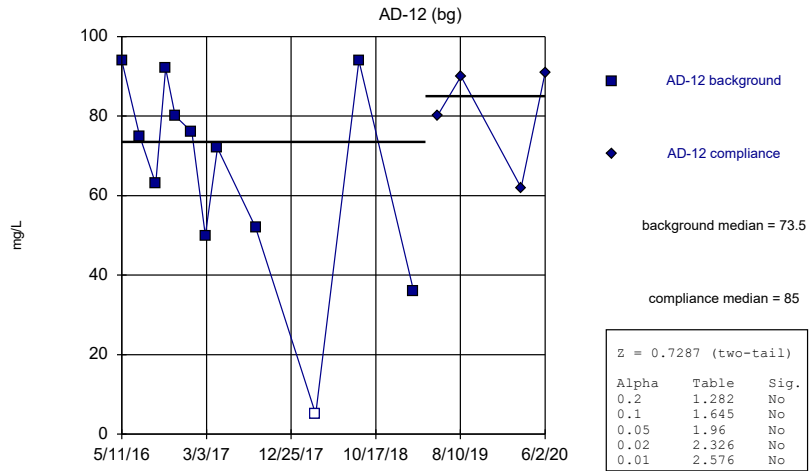
Constituent: Sulfate, total Analysis Run 1/4/2021 11:30 AM View: Mann-Whitney
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Mann-Whitney (Wilcoxon Rank Sum)



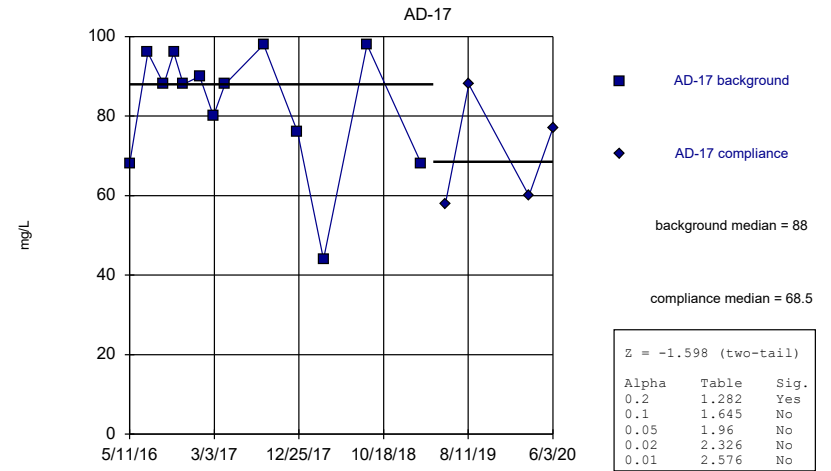
Constituent: Sulfate, total Analysis Run 1/4/2021 11:30 AM View: Mann-Whitney
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Mann-Whitney (Wilcoxon Rank Sum)



Constituent: Total Dissolved Solids [TDS] Analysis Run 1/4/2021 11:30 AM View: Mann-Whitney
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

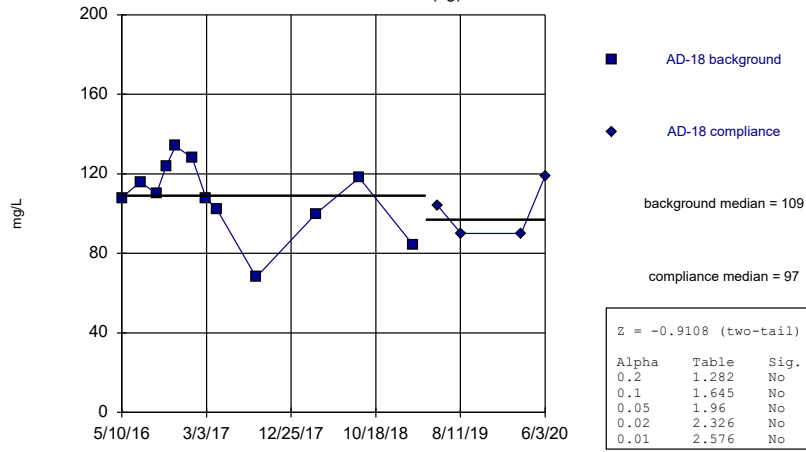
Mann-Whitney (Wilcoxon Rank Sum)



Constituent: Total Dissolved Solids [TDS] Analysis Run 1/4/2021 11:30 AM View: Mann-Whitney
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Mann-Whitney (Wilcoxon Rank Sum)

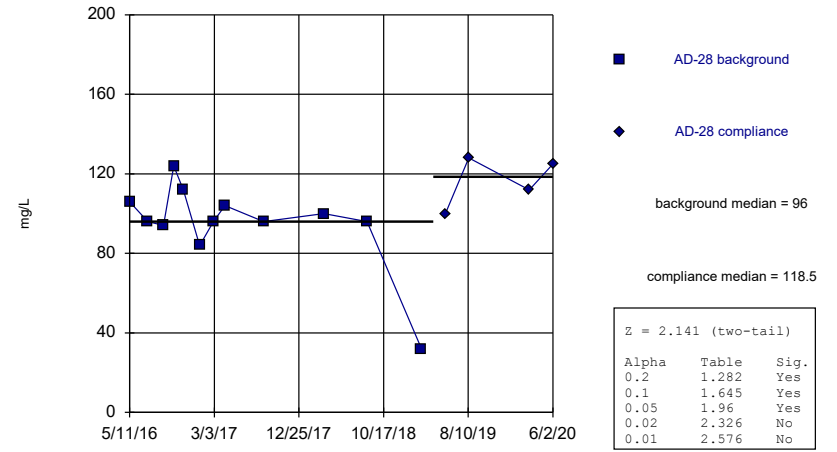
AD-18 (bg)



Constituent: Total Dissolved Solids [TDS] Analysis Run 1/4/2021 11:30 AM View: Mann-Whitney
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Mann-Whitney (Wilcoxon Rank Sum)

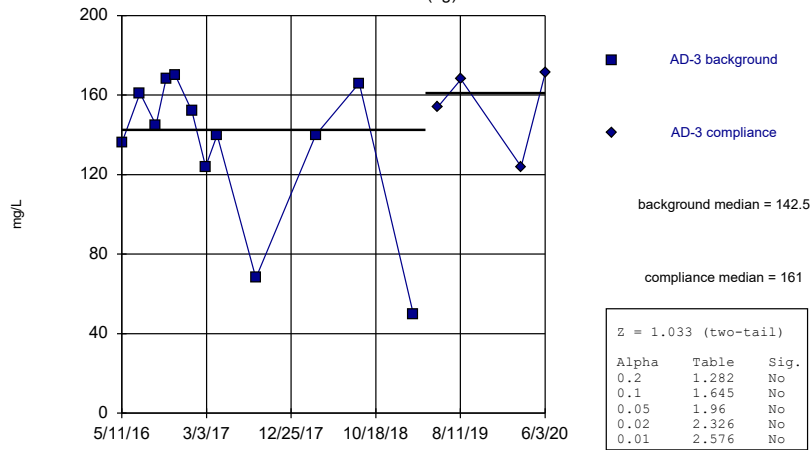
AD-28



Constituent: Total Dissolved Solids [TDS] Analysis Run 1/4/2021 11:30 AM View: Mann-Whitney
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Mann-Whitney (Wilcoxon Rank Sum)

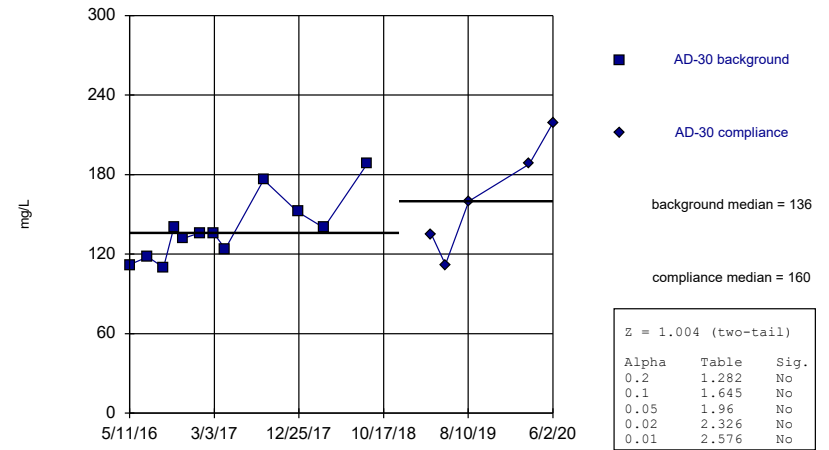
AD-3 (bg)



Constituent: Total Dissolved Solids [TDS] Analysis Run 1/4/2021 11:30 AM View: Mann-Whitney
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Mann-Whitney (Wilcoxon Rank Sum)

AD-30



Constituent: Total Dissolved Solids [TDS] Analysis Run 1/4/2021 11:30 AM View: Mann-Whitney
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

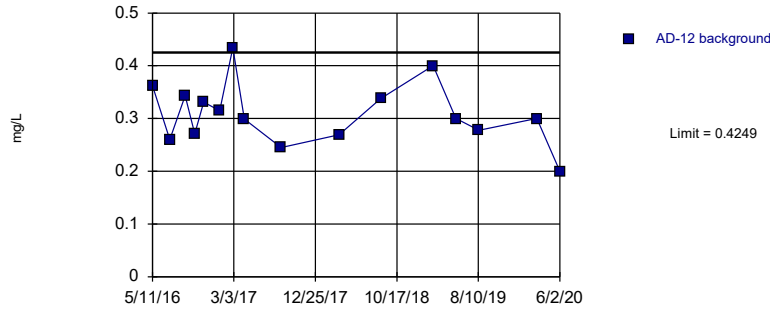
FIGURE E.

Appendix III - Intrawell Prediction Limits - All Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 1/4/2021, 1:05 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	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	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	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	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	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	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	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	0.001253	Param Intra 1 of 2
pH, field (SU)	AD-18	5.521	3.859	n/a	1 future	n/a	16	4.69	0.4218	0	None	No	0.001253	Param Intra 1 of 2
pH, field (SU)	AD-28	5.633	3.514	n/a	1 future	n/a	16	4.574	0.5378	0	None	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	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	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	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	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	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	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	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	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	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	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	0.002505	Param Intra 1 of 2

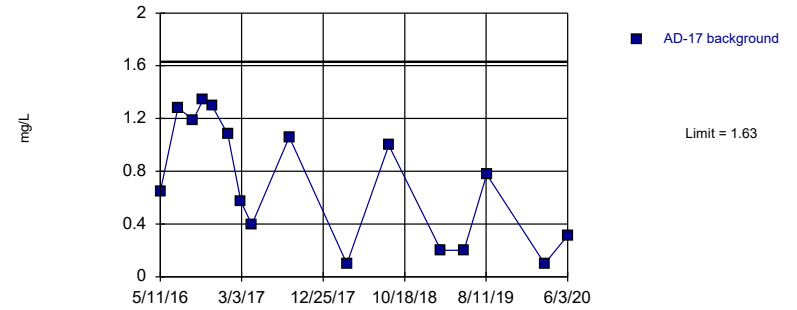
Prediction Limit
Intrawell Parametric, AD-12 (bg)



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 1/4/2021 1:03 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

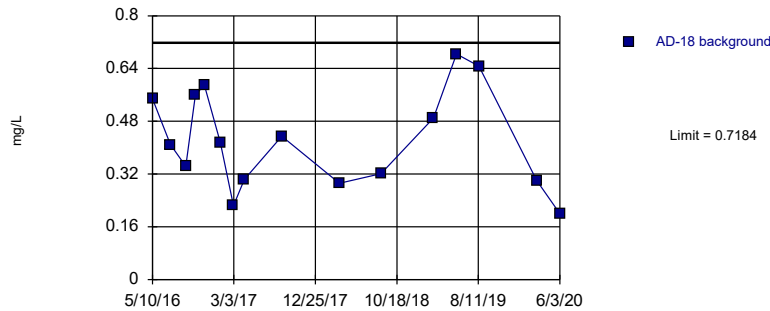
Prediction Limit
Intrawell Parametric, AD-17



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 1/4/2021 1:03 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

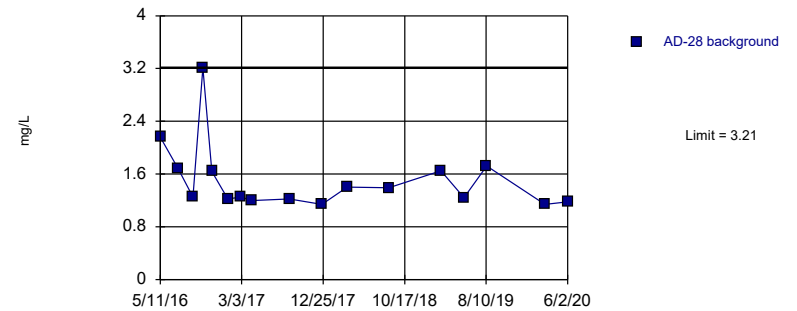
Prediction Limit
Intrawell Parametric, AD-18 (bg)



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 1/4/2021 1:03 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

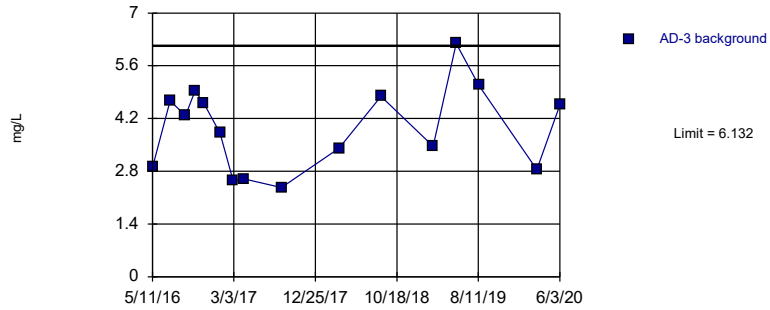
Prediction Limit
Intrawell Non-parametric, AD-28



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 1/4/2021 1:03 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

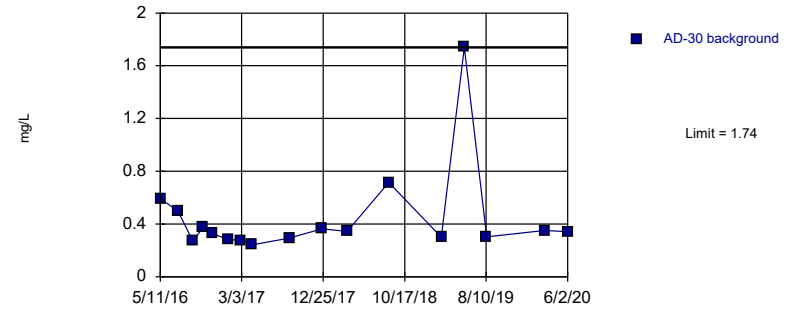
Prediction Limit
Intrawell Parametric, AD-3 (bg)



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 1/4/2021 1:03 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

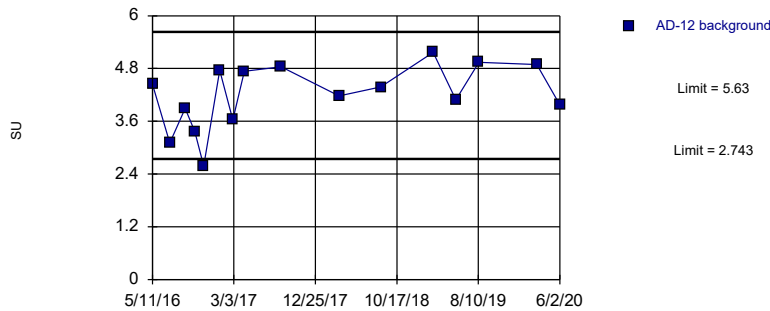
Prediction Limit
Intrawell Non-parametric, AD-30



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 1/4/2021 1:03 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

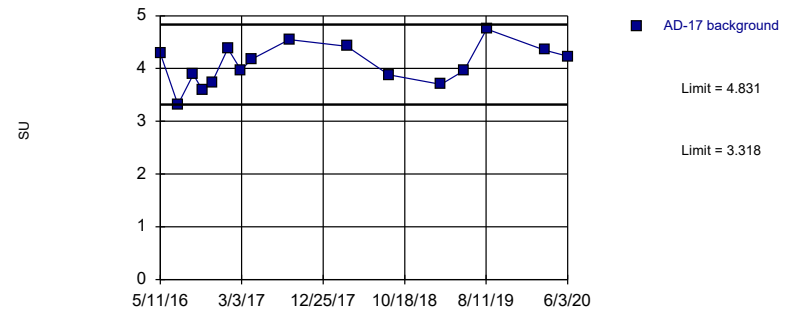
Prediction Limit
Intrawell Parametric, AD-12 (bg)



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 1/4/2021 1:03 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

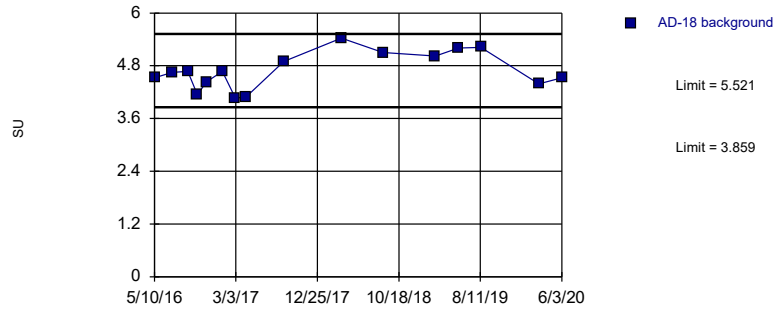
Prediction Limit
Intrawell Parametric, AD-17



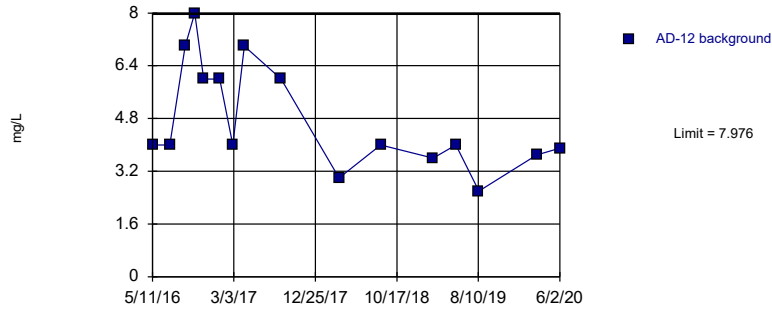
Background Data Summary: Mean=4.074, Std. Dev.=0.384, n=16. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9834, critical = 0.844. Kappa = 1.97 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505. Assumes 1 future value.

Constituent: pH, field Analysis Run 1/4/2021 1:03 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Prediction Limit
Intrawell Parametric, AD-18 (bg)



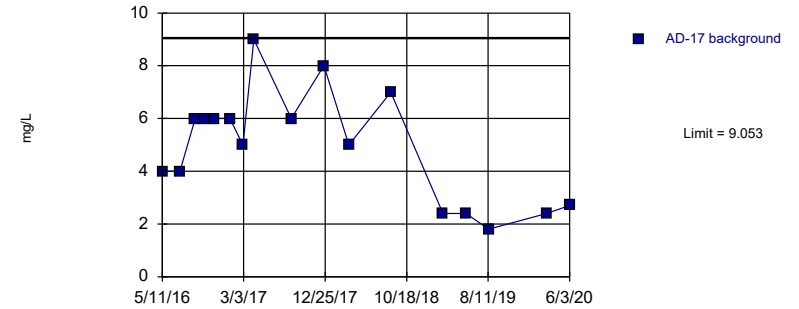
Prediction Limit
Intrawell Parametric, AD-12 (bg)



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 1/4/2021 1:03 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

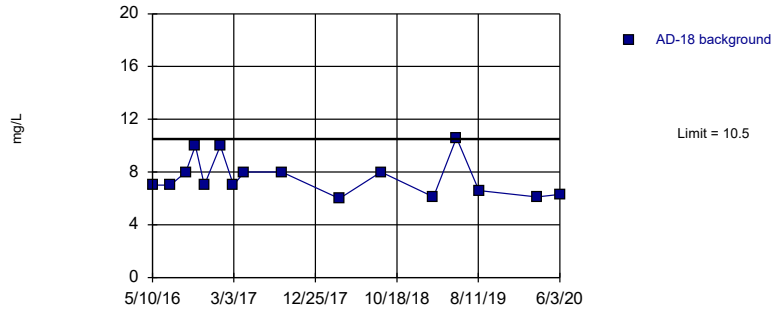
Prediction Limit
Intrawell Parametric, AD-17



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 1/4/2021 1:03 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

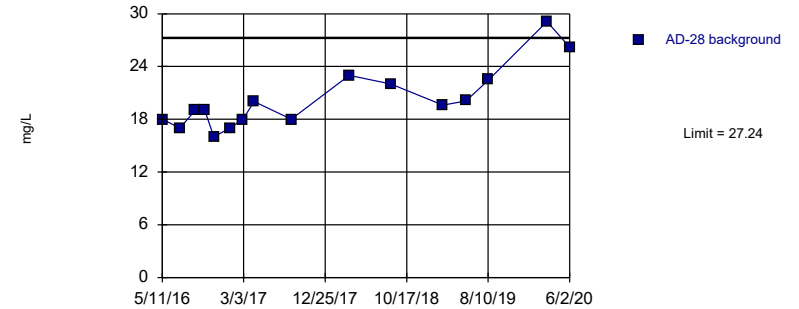
Prediction Limit
Intrawell Parametric, AD-18 (bg)



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 1/4/2021 1:03 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

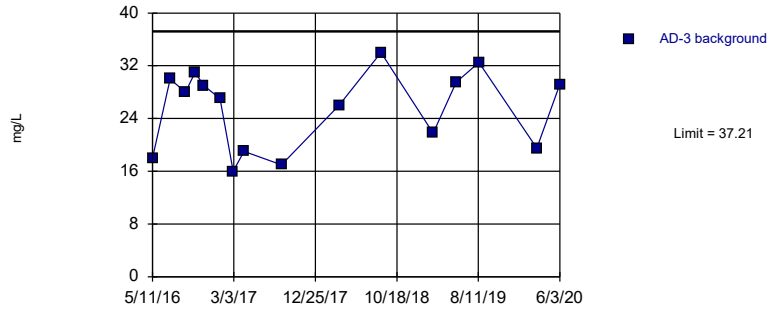
Prediction Limit
Intrawell Parametric, AD-28



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 1/4/2021 1:03 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

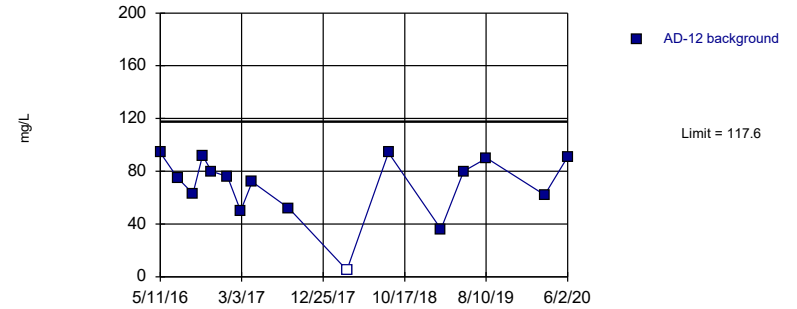
Prediction Limit
Intrawell Parametric, AD-3 (bg)



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 1/4/2021 1:03 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

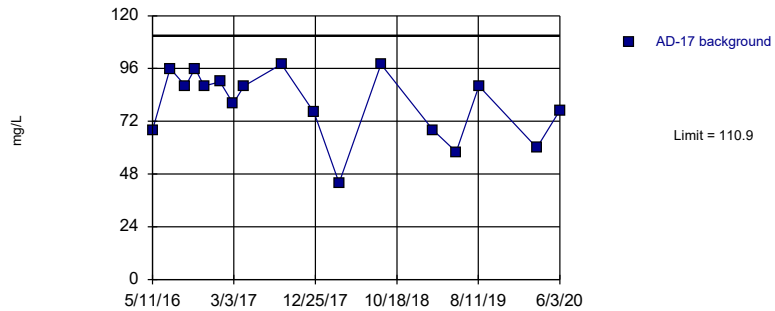
Prediction Limit
Intrawell Parametric, AD-12 (bg)



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 1/4/2021 1:03 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

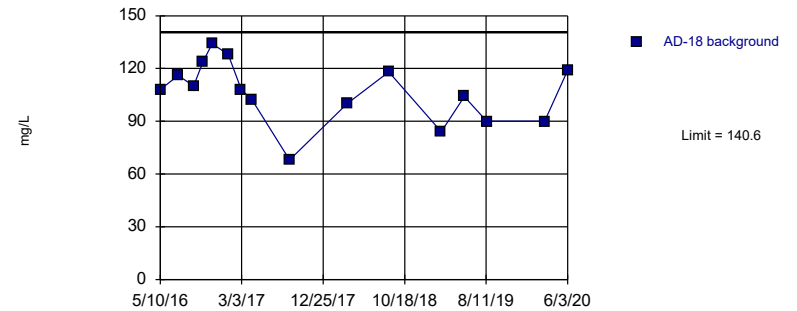
Prediction Limit
Intrawell Parametric, AD-17



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 1/4/2021 1:03 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

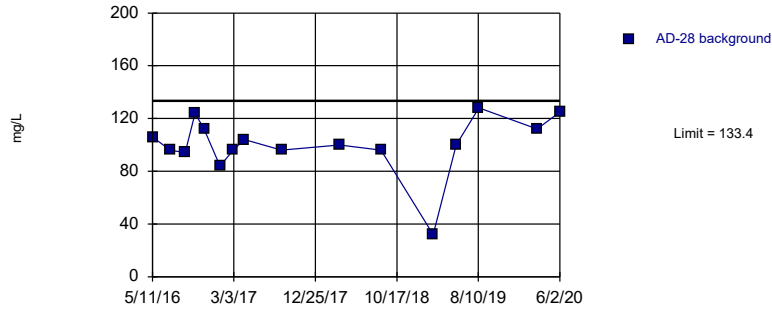
Prediction Limit
Intrawell Parametric, AD-18 (bg)



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 1/4/2021 1:03 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

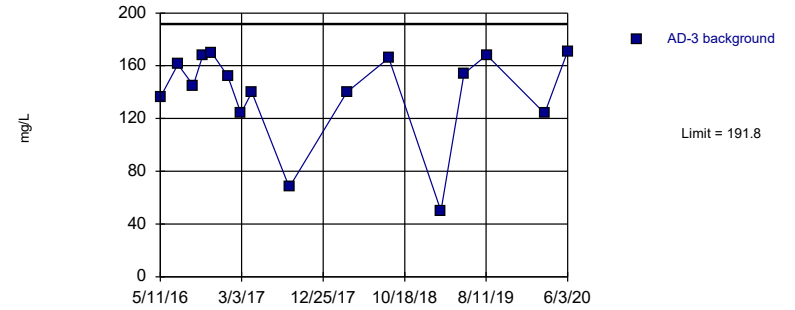
Prediction Limit
Intrawell Parametric, AD-28



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 1/4/2021 1:03 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

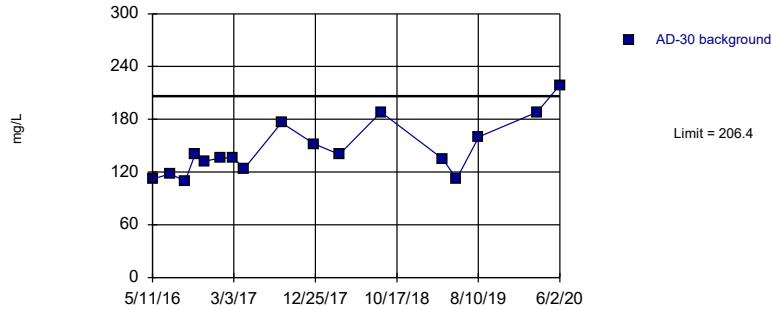
Prediction Limit
Intrawell Parametric, AD-3 (bg)



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 1/4/2021 1:03 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 1/4/2021 1:03 PM View: Intrawell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

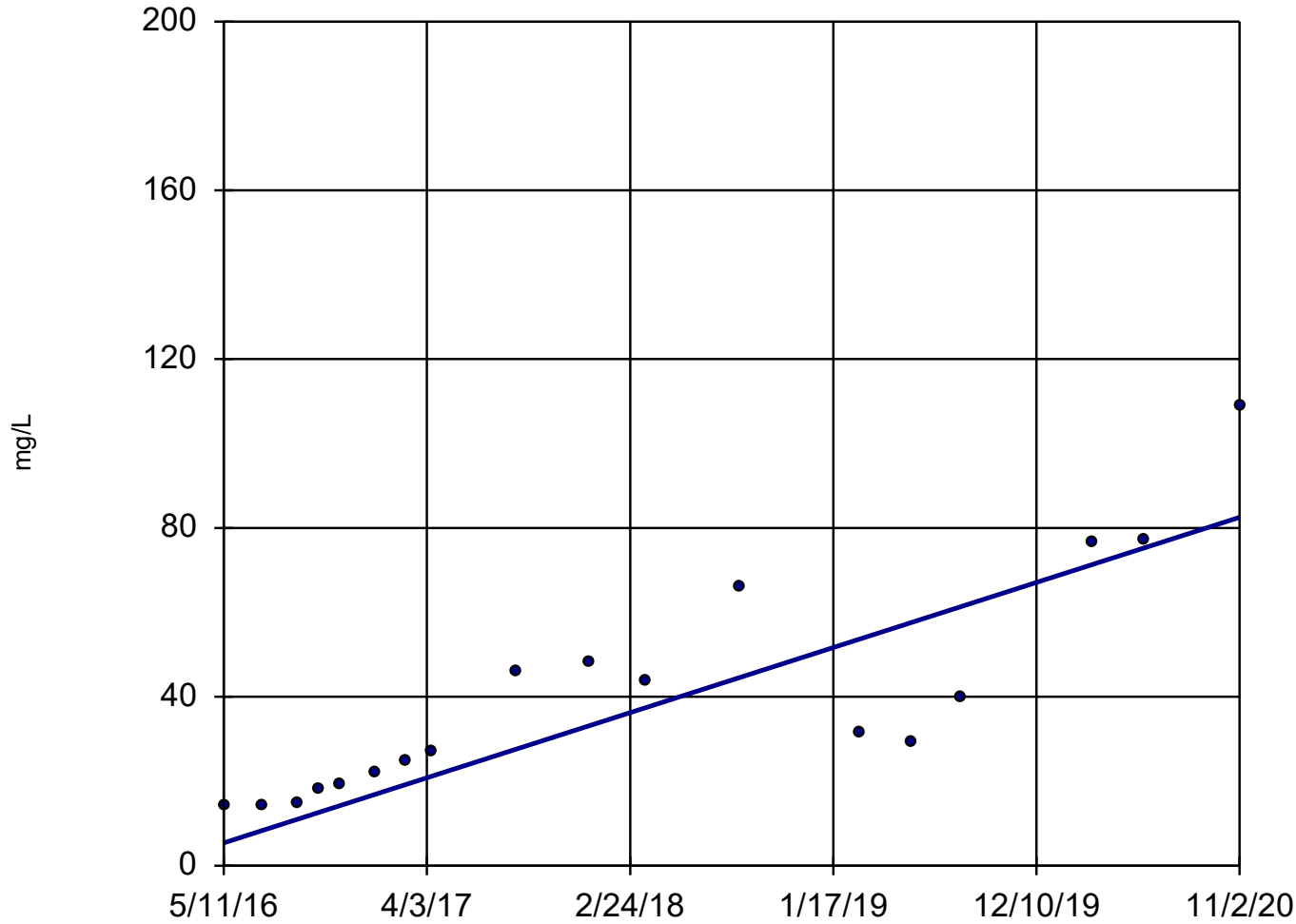
FIGURE F.

Appendix III Trend Tests - Sulfate AD-30

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 1/4/2021, 11:55 AM

<u>Constituent</u>	<u>Well</u>	<u>Slope</u>	<u>Calc.</u>	<u>Critical</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Normality</u>	<u>Xform</u>	<u>Alpha</u>	<u>Method</u>
Sulfate, total (mg/L)	AD-30	17.21	122	68	Yes	18	0	n/a	n/a	0.01	NP

Sen's Slope Estimator AD-30



n = 18
Slope = 17.21
units per year.
Mann-Kendall
statistic = 122
critical = 68
Increasing trend
significant at 99%
confidence level
($\alpha = 0.005$ per
tail).

Constituent: Sulfate, total Analysis Run 1/4/2021 11:54 AM View: Intrawell Trend Tests
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

FIGURE G.

Appendix III Trend Tests - Upgradient Wells - Significant Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 12/29/2020, 4:32 PM

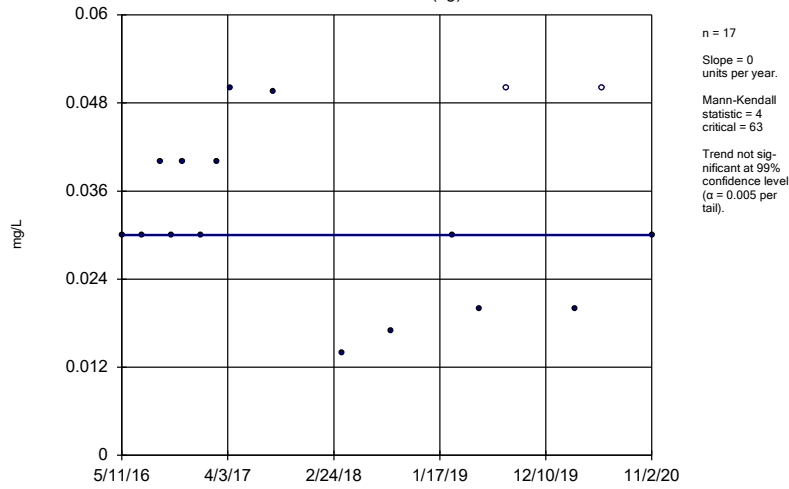
Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Boron, total (mg/L)	AD-18 (bg)	0.008344	70	63	Yes	17	29.41	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	AD-12 (bg)	-0.1686	-76	-63	Yes	17	52.94	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	AD-3 (bg)	-0.1067	-65	-63	Yes	17	64.71	n/a	n/a	0.01	NP

Appendix III Trend Tests - Upgradient Wells - All Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 12/29/2020, 4:32 PM

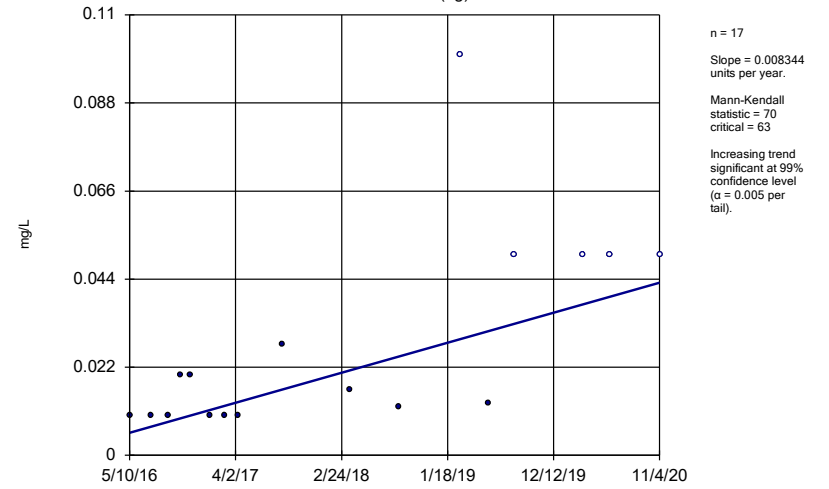
Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Boron, total (mg/L)	AD-12 (bg)	0	4	63	No	17	11.76	n/a	n/a	0.01	NP
Boron, total (mg/L)	AD-18 (bg)	0.008344	70	63	Yes	17	29.41	n/a	n/a	0.01	NP
Boron, total (mg/L)	AD-3 (bg)	-0.00247	-34	-63	No	17	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	AD-12 (bg)	0	-1	-63	No	17	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	AD-18 (bg)	0.03386	13	63	No	17	0	n/a	n/a	0.01	NP
Chloride, total (mg/L)	AD-3 (bg)	-0.03189	-13	-63	No	17	0	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	AD-12 (bg)	-0.1686	-76	-63	Yes	17	52.94	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	AD-18 (bg)	-0.02284	-63	-63	No	17	64.71	n/a	n/a	0.01	NP
Fluoride, total (mg/L)	AD-3 (bg)	-0.1067	-65	-63	Yes	17	64.71	n/a	n/a	0.01	NP

Sen's Slope Estimator
AD-12 (bg)



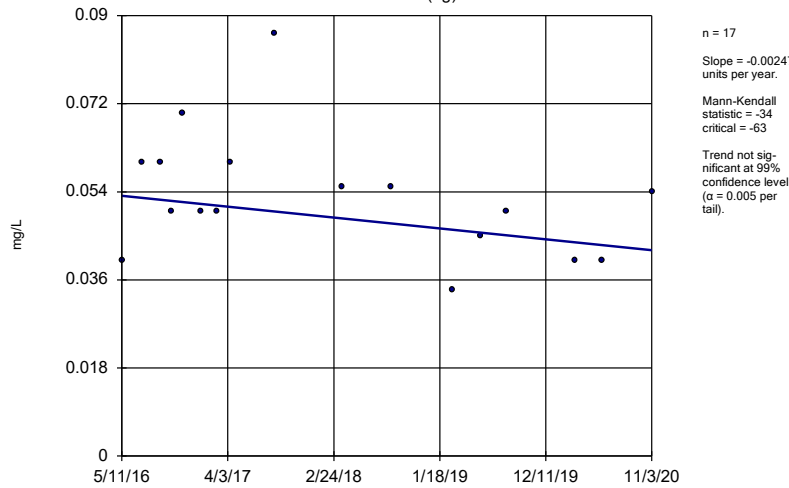
Constituent: Boron, total Analysis Run 12/29/2020 4:31 PM View: Interwell Trend Tests
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Sen's Slope Estimator
AD-18 (bg)



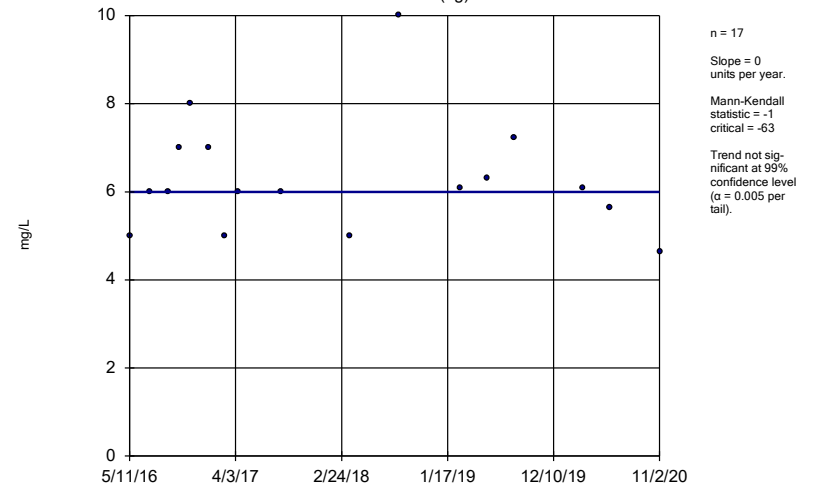
Constituent: Boron, total Analysis Run 12/29/2020 4:31 PM View: Interwell Trend Tests
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Sen's Slope Estimator
AD-3 (bg)



Constituent: Boron, total Analysis Run 12/29/2020 4:31 PM View: Interwell Trend Tests
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

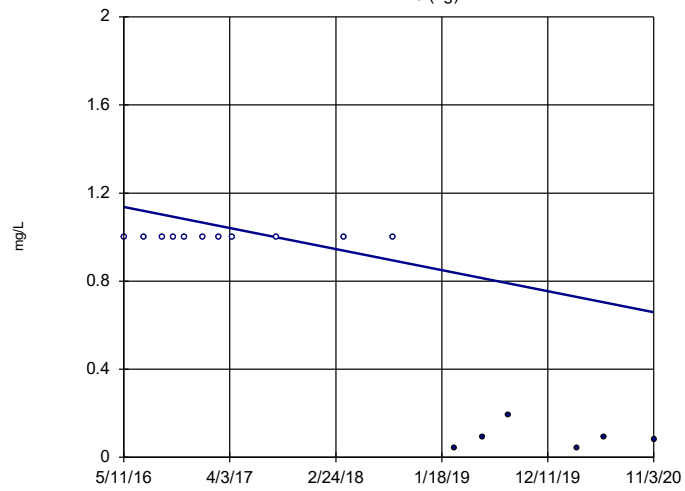
Sen's Slope Estimator
AD-12 (bg)



Constituent: Chloride, total Analysis Run 12/29/2020 4:31 PM View: Interwell Trend Tests
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Sen's Slope Estimator

AD-3 (bg)



n = 17
Slope = -0.1067
units per year.
Mann-Kendall
statistic = -65
critical = -63
Decreasing trend
significant at 99%
confidence level
($\alpha = 0.005$ per
tail).

Constituent: Fluoride, total Analysis Run 12/29/2020 4:31 PM View: Interwell Trend Tests
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

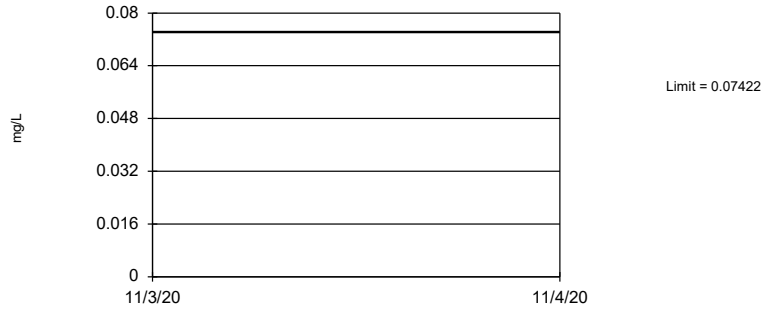
FIGURE H.

Appendix III - Interwell Prediction Limits - All Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 12/29/2020, 4:39 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	0.07422	n/a	n/a	3 future	n/a	45	0.03802	0.02085	11.11	None	No	0.002505	Param Inter 1 of 2
Chloride, total (mg/L)	n/a	9.22	n/a	n/a	3 future	n/a	45	2.597	0.2533	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	45	n/a	n/a	68.89	n/a	n/a	0.0009463	NP Inter (NDs) 1 of 2

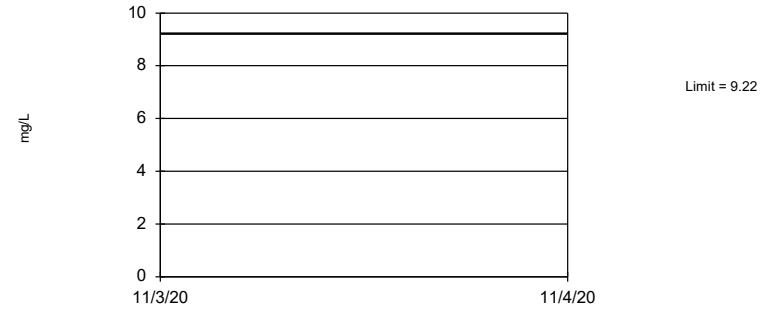
Prediction Limit
Interwell Parametric



Background Data Summary: Mean=0.03802, Std. Dev.=0.02085, n=45, 11.11% NDs. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9291, critical = 0.926. Kappa = 1.736 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.007498. Individual comparison alpha = 0.002505. Assumes 3 future values.

Constituent: Boron, total Analysis Run 12/29/2020 4:39 PM View: Interwell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Prediction Limit
Interwell Parametric



Background Data Summary (based on square root transformation): Mean=2.597, Std. Dev.=0.2533, n=45. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9341, critical = 0.926. Kappa = 1.736 (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 12/29/2020 4:39 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 45 background values. 68.89% NDs. Annual per-constituent alpha = 0.005664. Individual comparison alpha = 0.0009463 (1 of 2). Assumes 3 future values.

Constituent: Fluoride, total Analysis Run 12/29/2020 4:39 PM View: Interwell
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

FIGURE I.

Upper Tolerance Limit Summary Table

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 1/4/2021, 1:12 PM

Constituent	Upper Lim.	Lower Lim.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony, total (mg/L)	0.005	n/a	n/a	48	n/a	n/a	89.58	n/a	n/a	0.08526	NP Inter(NDs)
Arsenic, total (mg/L)	0.005	n/a	n/a	48	n/a	n/a	58.33	n/a	n/a	0.08526	NP Inter(NDs)
Barium, total (mg/L)	0.157	n/a	n/a	48	n/a	n/a	0	n/a	n/a	0.08526	NP Inter(normality)
Beryllium, total (mg/L)	0.002	n/a	n/a	48	n/a	n/a	12.5	n/a	n/a	0.08526	NP Inter(normality)
Cadmium, total (mg/L)	0.001	n/a	n/a	48	n/a	n/a	66.67	n/a	n/a	0.08526	NP Inter(NDs)
Chromium, total (mg/L)	0.00633	n/a	n/a	48	-7.517	1.066	14.58	None	ln(x)	0.01	Inter
Cobalt, total (mg/L)	0.009	n/a	n/a	48	n/a	n/a	0	n/a	n/a	0.08526	NP Inter(normality)
Combined Radium 226 + 228 (pCi/L)	3.663	n/a	n/a	48	1.029	0.3841	0	None	sqrt(x)	0.01	Inter
Fluoride, total (mg/L)	1	n/a	n/a	51	n/a	n/a	60.78	n/a	n/a	0.0731	NP Inter(NDs)
Lead, total (mg/L)	0.005	n/a	n/a	48	n/a	n/a	66.67	n/a	n/a	0.08526	NP Inter(NDs)
Lithium, total (mg/L)	0.108	n/a	n/a	47	n/a	n/a	2.128	n/a	n/a	0.08974	NP Inter
Mercury, total (mg/L)	0.000064	n/a	n/a	48	n/a	n/a	50	n/a	n/a	0.08526	NP Inter(normality)
Molybdenum, total (mg/L)	0.005	n/a	n/a	43	n/a	n/a	86.05	n/a	n/a	0.1102	NP Inter(NDs)
Selenium, total (mg/L)	0.005	n/a	n/a	48	n/a	n/a	47.92	n/a	n/a	0.08526	NP Inter(normality)
Thallium, total (mg/L)	0.002	n/a	n/a	46	n/a	n/a	89.13	n/a	n/a	0.09447	NP Inter(NDs)

FIGURE J.

PIRKEY WBAP GWPS				
Constituent Name	MCL	CCR Rule-Specified	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		0.0063	0.1
Cobalt, Total (mg/L)	n/a	0.006	0.009	0.009
Combined Radium, Total (pCi/L)	5		3.66	5
Fluoride, Total (mg/L)	4		1	4
Lead, Total (mg/L)	0.015		0.005	0.015
Lithium, Total (mg/L)	n/a	0.04	0.11	0.11
Mercury, Total (mg/L)	0.002		0.000064	0.002
Molybdenum, Total (mg/L)	n/a	0.1	0.005	0.1
Selenium, Total (mg/L)	0.05		0.005	0.05
Thallium, Total (mg/L)	0.002		0.002	0.002

**Grey cell indicates Background Limit is higher than MCL or CCR Rule-Specified Level*

**MCL = Maximum Contaminant Level*

**GWPS = Groundwater Protection Standard*

**CCR = Coal Combustion Residual*

FIGURE K.

Confidence Intervals - Significant Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 1/4/2021, 1:19 PM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Compliance</u>	<u>Sig. 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	0.01564	0.01341	0.009	Yes 16	0.01455	0.001755	0	None	sqrt(x)	0.01	Param.

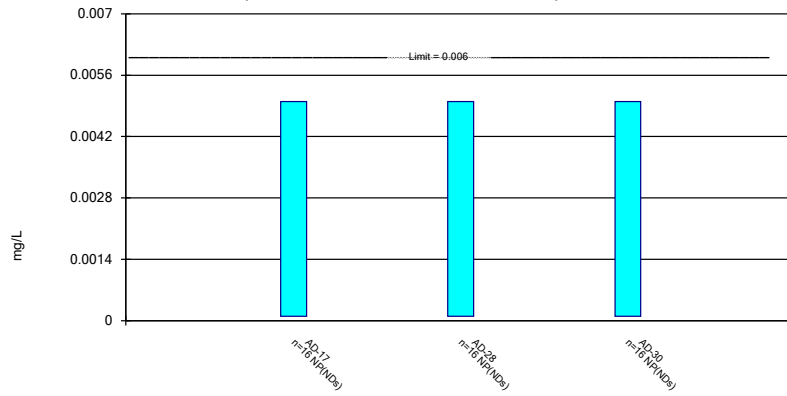
Confidence Intervals - All Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 1/4/2021, 1:19 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	16	0.003088	0.002316	93.75	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-28	0.005	0.0001	0.006	No	16	0.002871	0.00229	81.25	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-30	0.005	0.0001	0.006	No	16	0.002638	0.002245	81.25	None	No	0.01	NP (NDs)
Arsenic, total (mg/L)	AD-17	0.005	0.00041	0.01	No	16	0.002511	0.002069	50	None	No	0.01	NP (normality)
Arsenic, total (mg/L)	AD-28	0.005	0.00021	0.01	No	16	0.002642	0.002142	43.75	None	No	0.01	NP (normality)
Arsenic, total (mg/L)	AD-30	0.005	0.00021	0.01	No	16	0.00288	0.002253	56.25	None	No	0.01	NP (NDs)
Barium, total (mg/L)	AD-17	0.2583	0.1378	2	No	16	0.198	0.09264	0	None	No	0.01	Param.
Barium, total (mg/L)	AD-28	0.1714	0.1418	2	No	16	0.1571	0.02331	0	None	sqrt(x)	0.01	Param.
Barium, total (mg/L)	AD-30	0.0773	0.052	2	No	16	0.06079	0.01503	0	None	No	0.01	NP (normality)
Beryllium, total (mg/L)	AD-17	0.000948	0.0004991	0.004	No	16	0.0007683	0.0005079	12.5	None	No	0.01	NP (normality)
Beryllium, total (mg/L)	AD-28	0.0007928	0.0005391	0.004	No	16	0.000666	0.000195	0	None	No	0.01	Param.
Beryllium, total (mg/L)	AD-30	0.0001554	0.0000607	0.004	No	16	0.0003262	0.0006541	12.5	None	No	0.01	NP (normality)
Cadmium, total (mg/L)	AD-17	0.001	0.00004	0.005	No	16	0.0005844	0.000487	56.25	None	No	0.01	NP (NDs)
Cadmium, total (mg/L)	AD-28	0.001	0.00005	0.005	No	16	0.0007031	0.0004548	68.75	None	No	0.01	NP (NDs)
Cadmium, total (mg/L)	AD-30	0.001	0.00005	0.005	No	16	0.0007006	0.0004587	87.5	None	No	0.01	NP (NDs)
Chromium, total (mg/L)	AD-17	0.001417	0.0004694	0.1	No	16	0.001212	0.001363	6.25	None	ln(x)	0.01	Param.
Chromium, total (mg/L)	AD-28	0.0009802	0.0003318	0.1	No	16	0.001393	0.001703	25	Kaplan-Meier	ln(x)	0.01	Param.
Chromium, total (mg/L)	AD-30	0.001307	0.0005033	0.1	No	16	0.001082	0.001017	6.25	None	ln(x)	0.01	Param.
Cobalt, total (mg/L)	AD-17	0.01129	0.005932	0.009	No	16	0.008609	0.004114	0	None	No	0.01	Param.
Cobalt, total (mg/L)	AD-28	0.01564	0.01341	0.009	Yes	16	0.01455	0.001755	0	None	sqrt(x)	0.01	Param.
Cobalt, total (mg/L)	AD-30	0.002747	0.001927	0.009	No	16	0.002359	0.0006692	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-17	5.98	2.45	5	No	16	4.215	2.713	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-28	2.489	1.78	5	No	16	2.135	0.5454	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-30	2.267	0.7729	5	No	16	1.639	1.323	0	None	sqrt(x)	0.01	Param.
Fluoride, total (mg/L)	AD-17	1	0.24	4	No	18	0.6168	0.3997	50	None	No	0.01	NP (normality)
Fluoride, total (mg/L)	AD-28	0.8215	0.5766	4	No	17	0.699	0.1954	5.882	None	No	0.01	Param.
Fluoride, total (mg/L)	AD-30	1	0.05	4	No	18	0.69	0.4525	72.22	None	No	0.01	NP (NDs)
Lead, total (mg/L)	AD-17	0.005	0.0002	0.015	No	16	0.003117	0.002275	68.75	None	No	0.01	NP (NDs)
Lead, total (mg/L)	AD-28	0.005	0.0001	0.015	No	16	0.003099	0.002301	68.75	None	No	0.01	NP (NDs)
Lead, total (mg/L)	AD-30	0.005	0.0002	0.015	No	16	0.003102	0.002296	75	None	No	0.01	NP (NDs)
Lithium, total (mg/L)	AD-17	0.02313	0.01255	0.11	No	16	0.01784	0.008135	6.25	None	No	0.01	Param.
Lithium, total (mg/L)	AD-28	0.034	0.0226	0.11	No	16	0.02965	0.01227	0	None	No	0.01	NP (normality)
Lithium, total (mg/L)	AD-30	0.009712	0.007441	0.11	No	16	0.00836	0.0023	6.25	None	x^2	0.01	Param.
Mercury, total (mg/L)	AD-17	0.0002212	0.00008135	0.002	No	16	0.0001669	0.000137	0	None	x^(1/3)	0.01	Param.
Mercury, total (mg/L)	AD-28	0.000092	0.000026	0.002	No	16	0.00005875	0.0000436	0	None	No	0.01	NP (normality)
Mercury, total (mg/L)	AD-30	0.0009159	0.0001705	0.002	No	16	0.0006331	0.0006973	0	None	sqrt(x)	0.01	Param.
Molybdenum, total (mg/L)	AD-17	0.005	0.0004858	0.1	No	14	0.003465	0.001925	85.71	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-28	0.005	0.0002942	0.1	No	14	0.003453	0.001944	85.71	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-30	0.005	0.001142	0.1	No	14	0.003439	0.00193	78.57	None	No	0.01	NP (NDs)
Selenium, total (mg/L)	AD-17	0.005	0.0004	0.05	No	16	0.003272	0.002128	62.5	None	No	0.01	NP (NDs)
Selenium, total (mg/L)	AD-28	0.005	0.0003	0.05	No	16	0.003156	0.002224	62.5	None	No	0.01	NP (NDs)
Selenium, total (mg/L)	AD-30	0.005	0.0002	0.05	No	16	0.00315	0.002236	62.5	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-17	0.002	0.0005	0.002	No	15	0.001308	0.0007896	86.67	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-28	0.002	0.0005	0.002	No	15	0.001318	0.0007897	86.67	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-30	0.002	0.0005	0.002	No	15	0.00126	0.0007637	80	None	No	0.01	NP (NDs)

Non-Parametric Confidence Interval

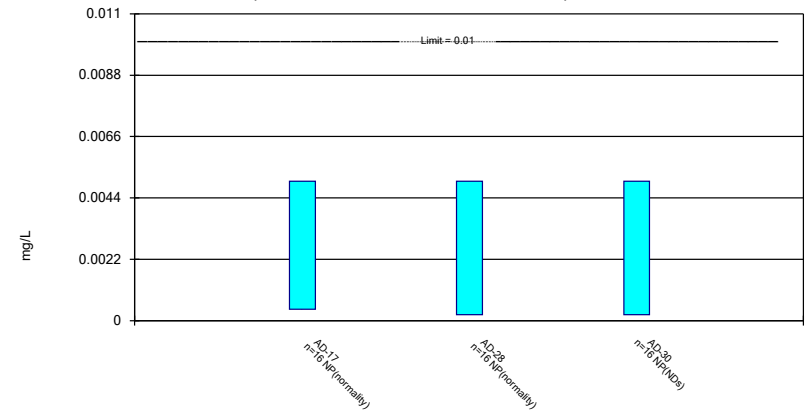
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Antimony, total Analysis Run 1/4/2021 1:18 PM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Non-Parametric Confidence Interval

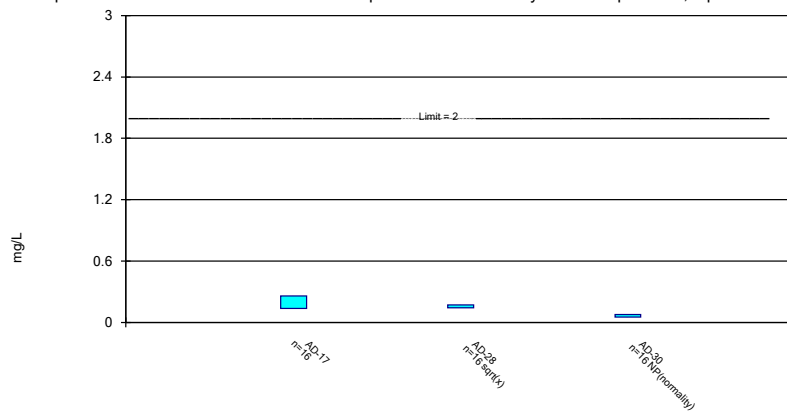
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Arsenic, total Analysis Run 1/4/2021 1:18 PM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric and Non-Parametric (NP) Confidence Interval

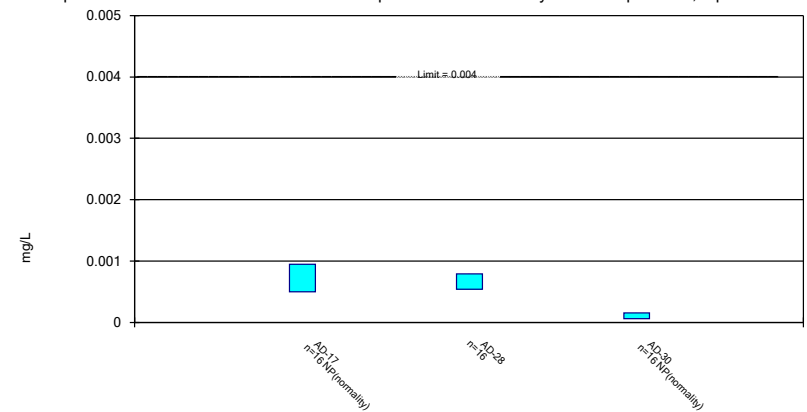
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Barium, total Analysis Run 1/4/2021 1:18 PM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric and Non-Parametric (NP) Confidence Interval

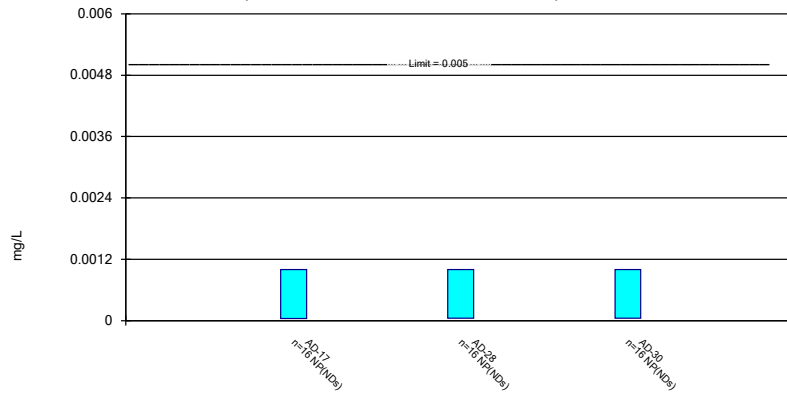
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Beryllium, total Analysis Run 1/4/2021 1:18 PM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Non-Parametric Confidence Interval

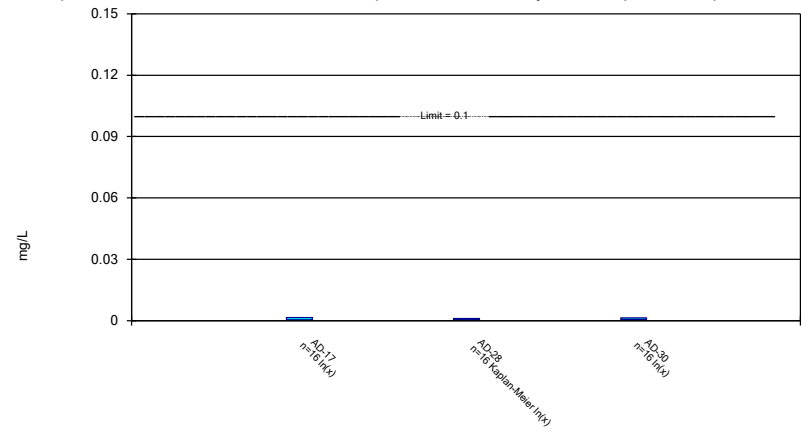
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Cadmium, total Analysis Run 1/4/2021 1:18 PM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric Confidence Interval

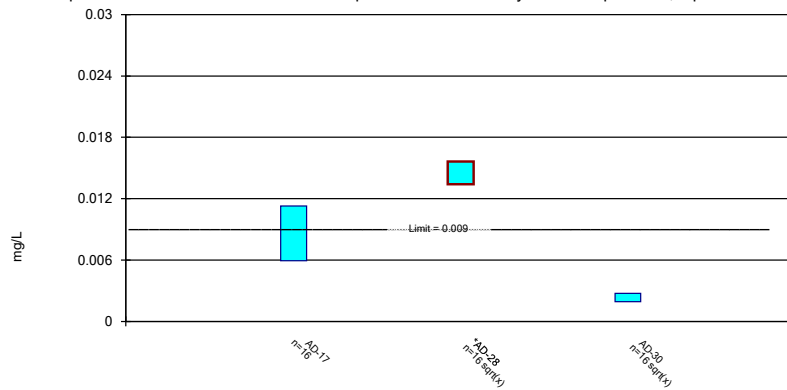
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Chromium, total Analysis Run 1/4/2021 1:18 PM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric Confidence Interval

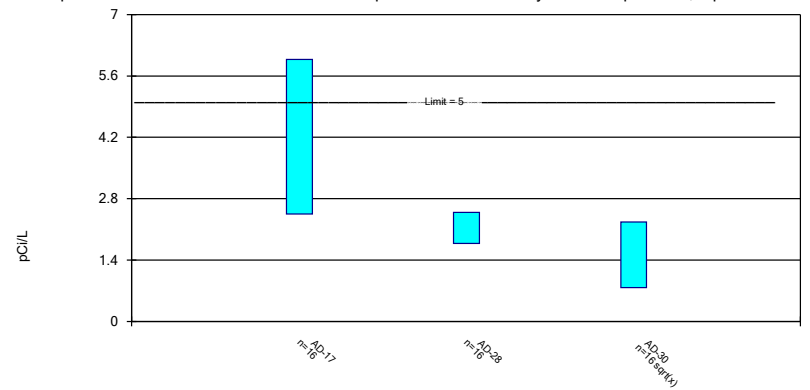
Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt, total Analysis Run 1/4/2021 1:18 PM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric Confidence Interval

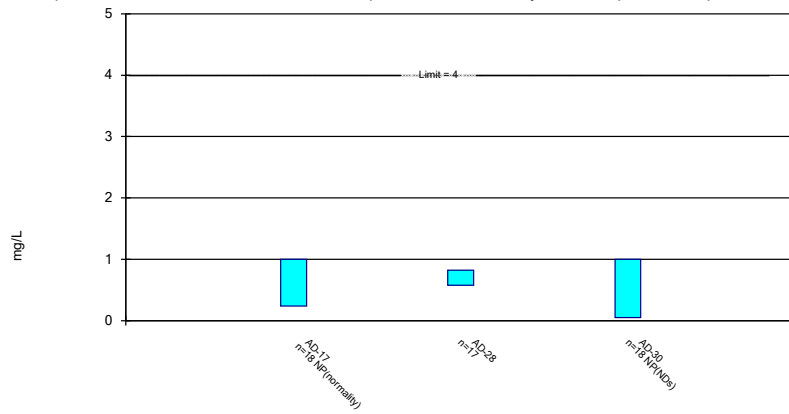
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Combined Radium 226 + 228 Analysis Run 1/4/2021 1:18 PM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric and Non-Parametric (NP) Confidence Interval

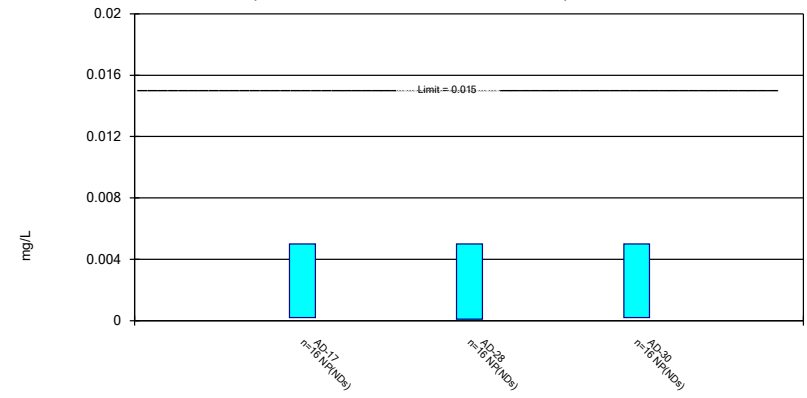
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Fluoride, total Analysis Run 1/4/2021 1:18 PM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Non-Parametric Confidence Interval

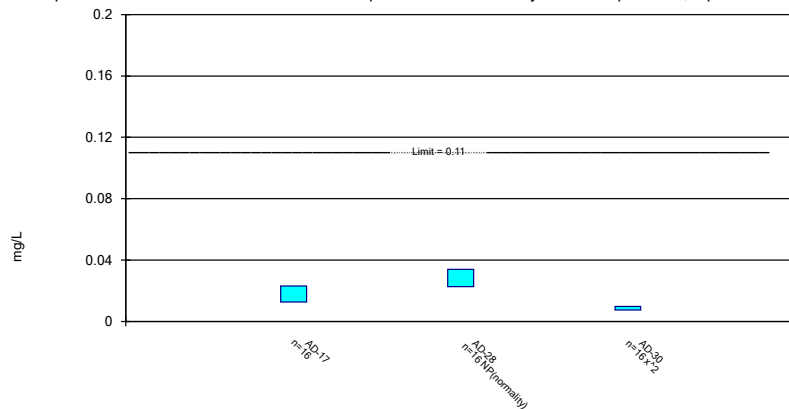
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Lead, total Analysis Run 1/4/2021 1:18 PM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric and Non-Parametric (NP) Confidence Interval

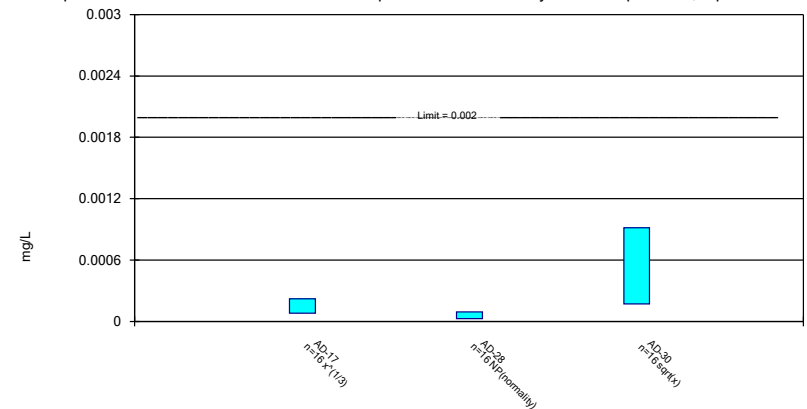
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Lithium, total Analysis Run 1/4/2021 1:18 PM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric and Non-Parametric (NP) Confidence Interval

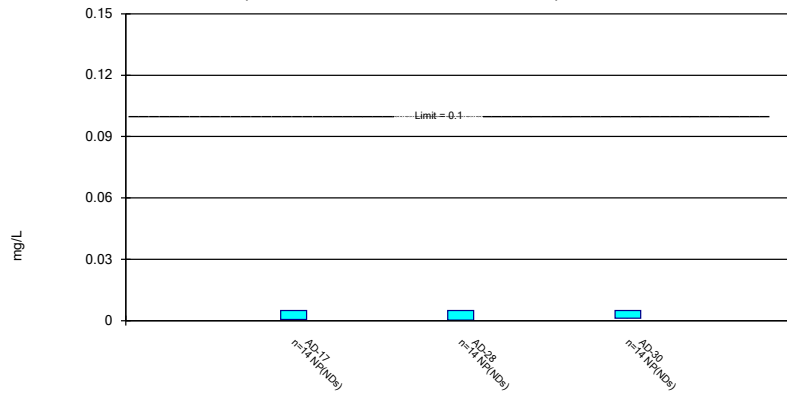
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Mercury, total Analysis Run 1/4/2021 1:18 PM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Non-Parametric Confidence Interval

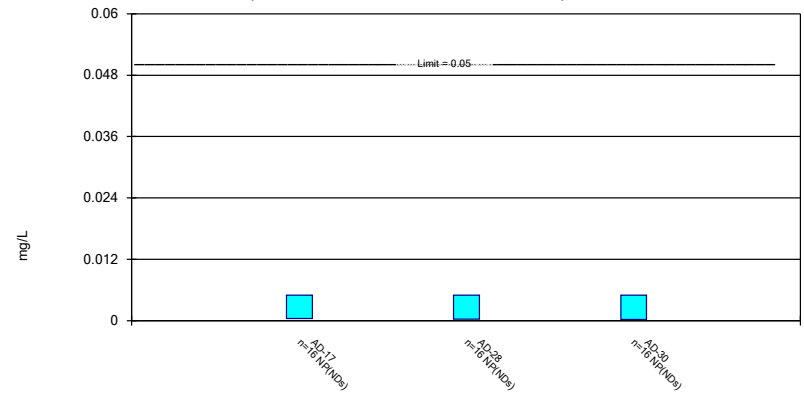
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Molybdenum, total Analysis Run 1/4/2021 1:19 PM View: Appendix IV
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Non-Parametric Confidence Interval

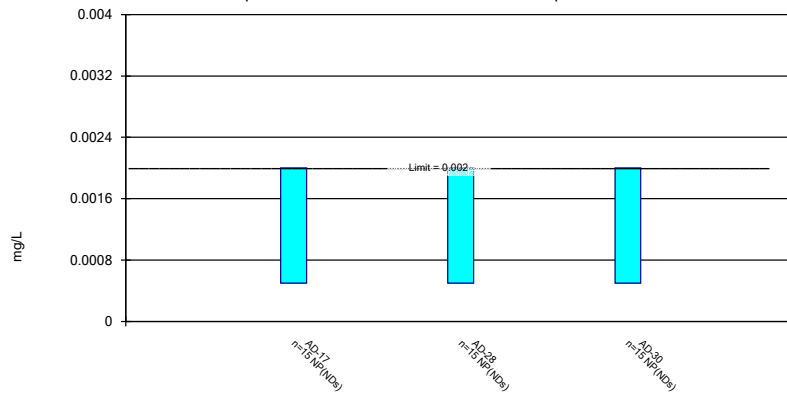
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Selenium, total Analysis Run 1/4/2021 1:19 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: Thallium, total Analysis Run 1/4/2021 1:19 PM View: Appendix IV
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

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

Submitted to



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CHA8500

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LIST OF ATTACHMENTS

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

LIST OF ACRONYMS AND ABBREVIATIONS

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

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 entered assessment monitoring. Groundwater protection standards (GWPS) were set in accordance with § 352.951(b) and a statistical evaluation of the assessment monitoring data was conducted. During the most recent assessment monitoring event, completed in November 2020, a statistically significant level (SSL) was identified for cobalt at well AD-28 (Geosyntec, 2021). A successful alternative source demonstration (ASD) was completed in accordance with § 352.951(e); therefore, the WBAP remained in assessment monitoring. Two assessment monitoring events were conducted at the WBAP in March and May 2021 in accordance with § 352.951(a). The results of these assessment events are documented in this report.

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

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

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

2.2 Statistical Analysis

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

2.2.1 Evaluation of Potential Appendix IV SSLs

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

The following SSL was identified at the Pirkey WBAP:

- The LCL for cobalt exceeded the GWPS of 0.0090 mg/L at AD-28 (0.0136 mg/L).

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

2.2.2 Evaluation of Potential Appendix III SSIs

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

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

- Boron concentrations exceeded the interwell UPL of 0.0742 mg/L at AD-28 (0.391 mg/L) and AD-30 (1.84 mg/L).
- Chloride concentrations exceeded the interwell UPL of 9.22 mg/L at AD-17 (9.30 mg/L) and AD-30 (22.8 mg/L).
- Sulfate concentrations exceeded the intrawell UPL of 27.2 mg/L at AD-28 (27.6 mg/L) and the intrawell UPL of 31.6 mg/L at AD-30 (113 mg/L).
- Total dissolved solids (TDS) concentrations exceeded the intrawell UPL of 206 mg/L at AD-30 (240 mg/L).

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

2.3 Conclusions

A semi-annual assessment monitoring event was conducted in accordance with the CCR Rule. The laboratory and field data were reviewed prior to statistical analysis, with no QA/QC issues identified that impacted data usability. A review of outliers identified no potential outliers in the March and May 2021 data. A confidence interval was constructed at each compliance well for each Appendix IV parameter; SSLs were concluded if the entire confidence interval exceeded the GWPS. 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 Summary – West Bottom Ash Pond, H.W. Pirkey Plant. March 3, 2021.

TABLES

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

Geosyntec Consultants, Inc.

Parameter	Unit	AD-12		AD-17		AD-18	
		3/8/2021	5/24/2021	3/9/2021	5/25/2021	3/9/2021	5/25/2021
Antimony	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Arsenic	µg/L	0.07 J	0.08 J	0.13	0.14	0.28	0.42
Barium	µg/L	22.9	23.1	76.7	74.5	88.7	103
Beryllium	µg/L	0.150	0.136	0.321	0.262	0.09 J	0.088
Boron	mg/L	0.01 J	0.032 J	0.02 J	0.031 J	0.009 J	0.021 J
Cadmium	µg/L	0.007 J	0.005 J	0.02 J	0.012 J	0.01 J	0.014 J
Calcium	mg/L	0.2 J	0.2 J	0.3 U	0.3 U	0.2 J	0.3
Chloride	mg/L	6.46	5.54	10.2	9.30	6.61	7.16
Chromium	µg/L	0.2 J	0.24	0.222	0.36	0.271	0.55
Cobalt	µg/L	1.19	1.19	3.05	2.85	0.827	0.964
Combined Radium	pCi/L	0.214	0.6	0.816	1.41	0.331	0.77
Fluoride	mg/L	0.11	0.12	0.17	0.17	0.02 J	0.02 J
Lead	µg/L	0.07 J	0.07 J	0.06 J	0.07 J	0.08 J	0.15 J
Lithium	mg/L	0.00570	0.00500	0.00924	0.00759	0.0131	0.0127
Mercury	µg/L	0.005 U	0.005 U	0.123	0.127	0.006	0.014
Molybdenum	µg/L	2 U	0.5 U	2 U	0.5 U	2 U	0.5 U
Selenium	µg/L	0.2 J	0.31 J	0.1 J	0.12 J	0.1 J	0.13 J
Sulfate	mg/L	3.8	5.46	2.3	2.66	6.6	7.46
Thallium	µg/L	0.5 U	0.2 U	0.5 U	0.2 U	0.5 U	0.05 J
Total Dissolved Solids	mg/L	68	70	83	60	113	100
pH	SU	4.1	4.2	4.3	3.9	4.5	4.4

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

SU: standard unit

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

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

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

Geosyntec Consultants, Inc.

Parameter	Unit	AD-28		AD-3		AD-30	
		3/9/2021	5/25/2021	3/9/2021	5/25/2021	3/9/2021	5/25/2021
Antimony	µg/L	0.1 U	0.02 J	0.1 U	0.1 U	0.1 U	0.1 U
Arsenic	µg/L	0.16	0.18	0.53	0.49	0.15	0.17
Barium	µg/L	153	153	60.7	66.4	115	104
Beryllium	µg/L	0.958	0.771	0.185	0.169	0.107	0.158
Boron	mg/L	0.358	0.391	0.03 J	0.051	1.91	1.84
Cadmium	µg/L	0.07	0.062	0.02 J	0.097	0.01 J	0.019 J
Calcium	mg/L	1.26	1.3	4.22	4.7	0.478	0.6
Chloride	mg/L	5.16	4.92	5.98	6.06	23.5	22.8
Chromium	µg/L	0.292	0.47	0.207	0.32	0.301	0.42
Cobalt	µg/L	15.3	15.0	3.63	3.98	3.87	4.95
Combined Radium	pCi/L	1.214	1.18	0.709	1.3	1.144	1.83
Fluoride	mg/L	1.03	1.0	0.06	0.08	0.07	0.08
Lead	µg/L	0.08 J	0.11 J	0.1 J	0.20	0.2 U	0.07 J
Lithium	mg/L	0.0223	0.0190	0.0445	0.0452	0.00939	0.00858
Mercury	µg/L	0.019	0.019	0.005 U	0.005 U	0.018	0.015
Molybdenum	µg/L	2 U	0.5 U	2 U	0.5 U	2 U	0.5 U
Selenium	µg/L	0.3	0.21 J	0.5 U	0.09 J	0.3	0.30 J
Sulfate	mg/L	28.3	27.6	27.1	28.8	122	113
Thallium	µg/L	0.5 U	0.2 U	0.5 U	0.05 J	0.5 U	0.2 U
Total Dissolved Solids	mg/L	117	110	158	150	264	240
pH	SU	4.2	3.9	5.0	4.6	4.5	4.1

Notes:

µg/L: micrograms per liter

mg/L: milligrams per liter

pCi/L: picocuries per liter

SU: standard unit

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

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

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

Geosyntec Consultants, Inc.

Constituent Name	MCL	Calculated UTL	GWPS
Antimony, Total (mg/L)	0.006	0.005	0.006
Arsenic, Total (mg/L)	0.01	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	0.0063	0.1
Cobalt, Total (mg/L)	n/a	0.009	0.009
Combined Radium, Total (pCi/L)	5	3.66	5
Fluoride, Total (mg/L)	4	1	4
Lead, Total (mg/L)	n/a	0.005	0.005
Lithium, Total (mg/L)	n/a	0.11	0.11
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

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 Evaluation
Pirkey - West Bottom Ash Pond**

Analyte	Unit	Description	AD-17	AD-28	AD-30
			5/25/2021	5/25/2021	5/25/2021
Boron	mg/L	Interwell Background Value (UPL)	0.0742		
		Analytical Result	0.031	0.391	1.84
Calcium	mg/L	Intrawell Background Value (UPL)	1.63	3.21	1.74
		Analytical Result	0.1	1.3	0.6
Chloride	mg/L	Interwell Background Value (UPL)	9.22		
		Analytical Result	9.30	4.92	22.8
Fluoride	mg/L	Interwell Background Value (UPL)	1.00		
		Analytical Result	0.17	1.0	0.08
pH	SU	Intrawell Background Value (UPL)	4.8	5.6	5.4
		Intrawell Background Value (LPL)	3.3	3.5	4.0
		Analytical Result	3.9	3.9	4.1
Sulfate	mg/L	Intrawell Background Value (UPL)	9.05	27.2	31.6
		Analytical Result	2.66	27.6	113
Total Dissolved Solids	mg/L	Intrawell Background Value (UPL)	111	133	206
		Analytical Result	60	110	240

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

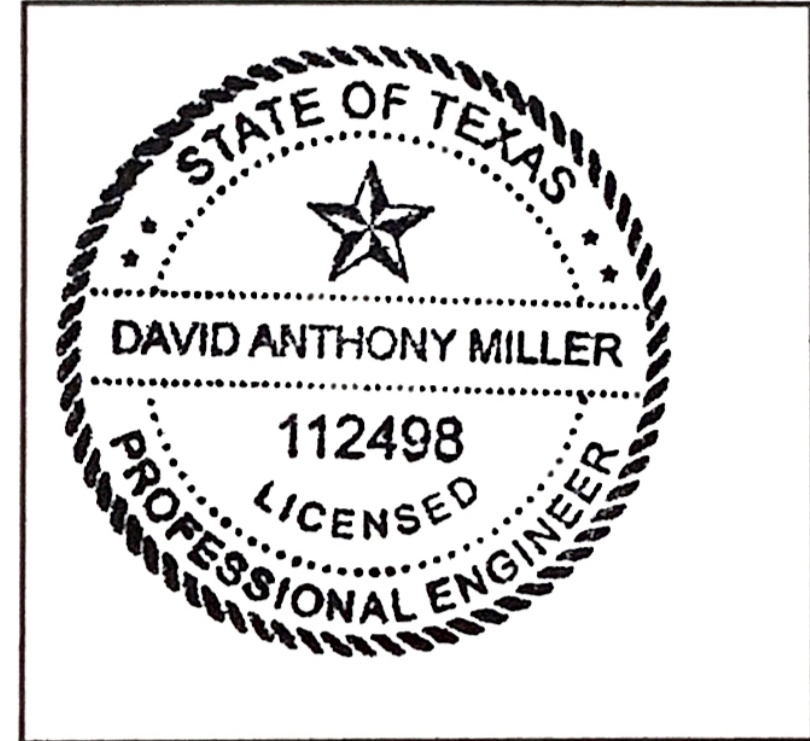
I certify that the selected and above described statistical method is appropriate for evaluating the groundwater monitoring data for the Pirkey West Bottom Ash Pond CCR management area and that the requirements of § 352.931(a) have been met.

DAVID ANTHONY MILLER

Printed Name of Licensed Professional Engineer

David Anthony Miller

Signature



112498

License Number

TEXAS

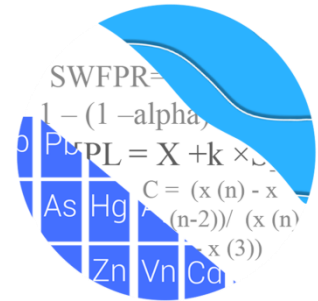
Licensing State

09.27.21

Date

ATTACHMENT B
Statistical Analysis Output

GROUNDWATER STATS CONSULTING



August 27, 2021

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

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

Dear Ms. Kreinberg,

Groundwater Stats Consulting, formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the Assessment Monitoring Event statistical analysis of groundwater data through May 2021 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 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 Groundwater Stats Consulting, 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 Groundwater Stats Consulting. The analysis was reviewed by Andrew Collins, Project Manager for 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). While the reporting limits may vary from well to well, a single reporting limit substitution is used across all wells for a given parameter in the time series plots since the wells are plotted as a group.

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 January 2021

Outlier Analysis

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

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 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. However, they are still lower than the GWPS of 0.1 mg/L.

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

Tolerance Limits

Interwell upper tolerance limits were established in the Fall 2020 using all available pooled upgradient well data for each Appendix IV parameter through November 2020 (Figure D). GWPS will be updated during the Fall 2021. When data followed a normal or transformed-normal distribution, parametric tolerance limits were used to calculate background limits for Appendix IV parameters with a target of 95% confidence and 95% coverage. Nonparametric tolerance limits are constructed when data do not follow a normal or

transformed-normal distribution or when there are greater than 50% non-detects. The confidence and coverage levels for nonparametric tolerance limits are dependent upon the number of background samples. These background limits were then compared to the Maximum Contaminant Levels (MCLs) to determine the highest limit for use as the GWPS in the confidence interval comparisons (Figure E).

Evaluation of Appendix IV Parameters – May 2021

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

For Groundwater Stats Consulting,

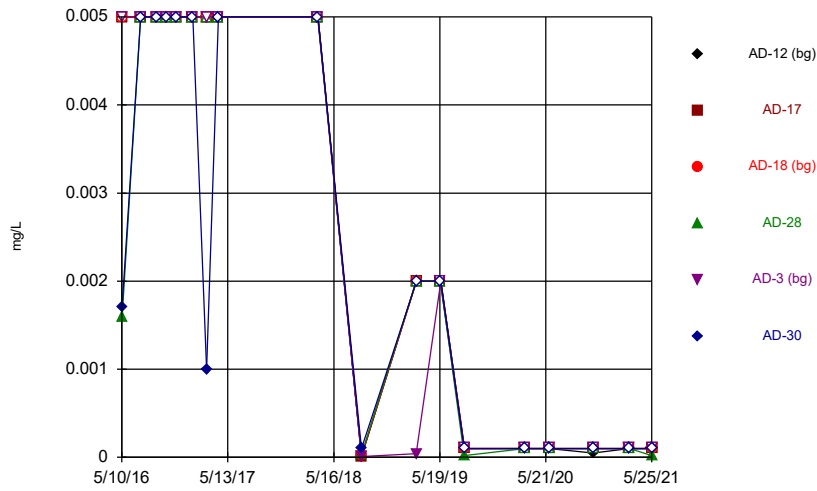


Abdul Diane
Groundwater Analyst



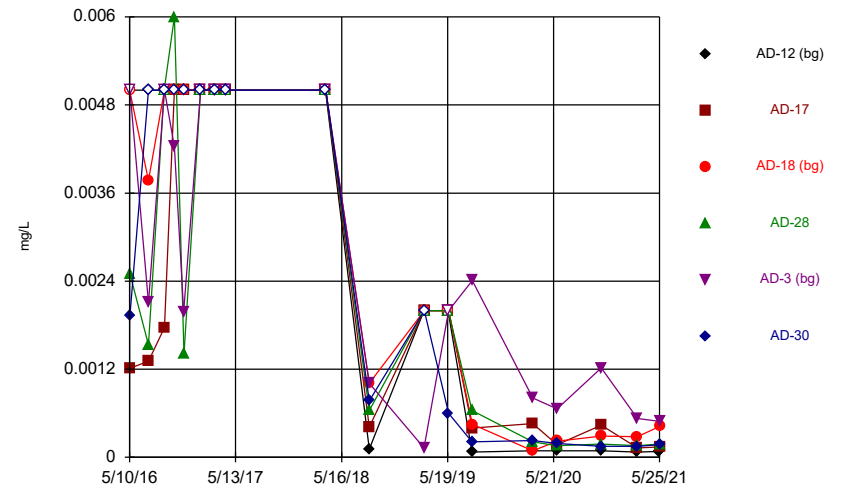
Andrew Collins
Project Manager

Time Series



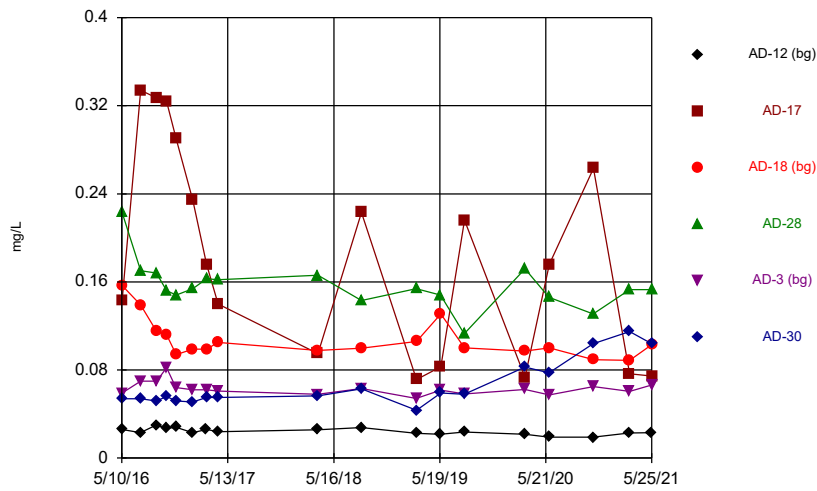
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Time Series



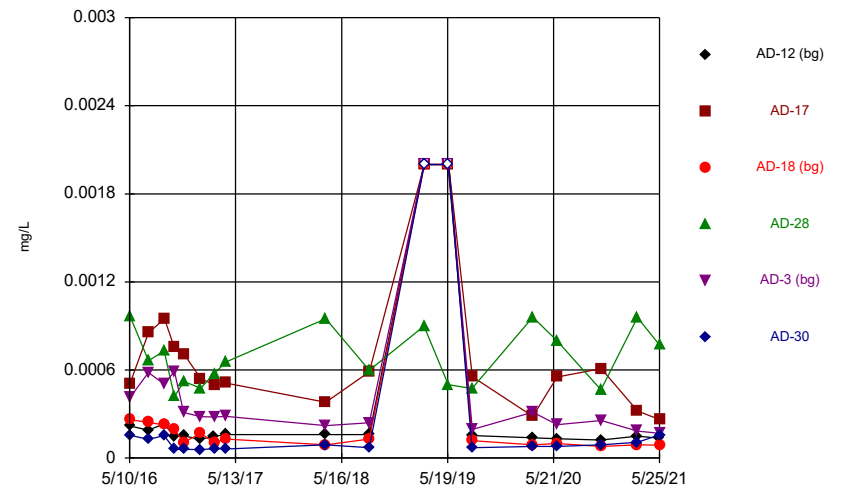
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Time Series



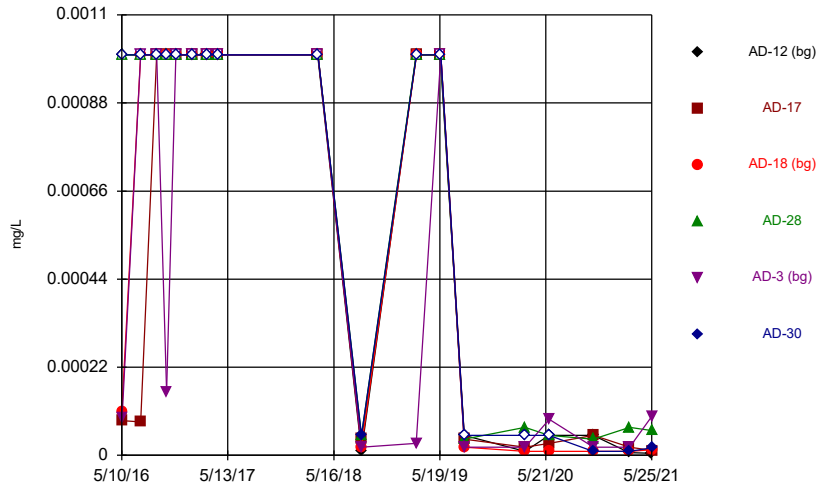
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Time Series



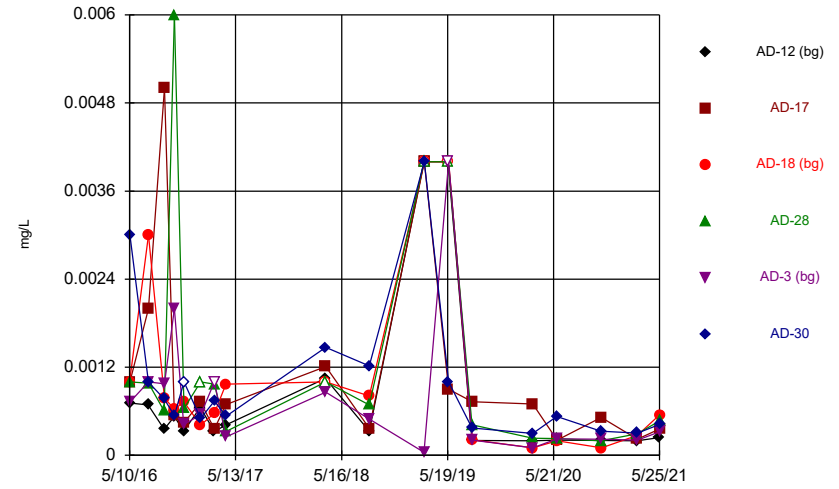
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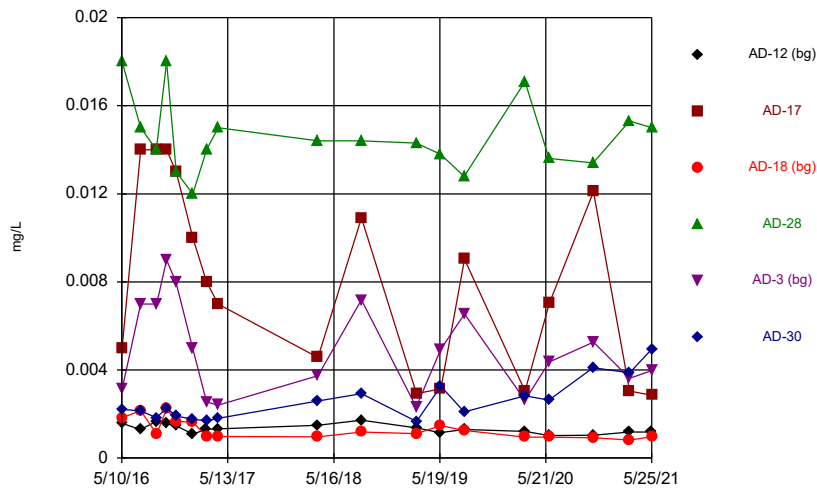
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Time Series



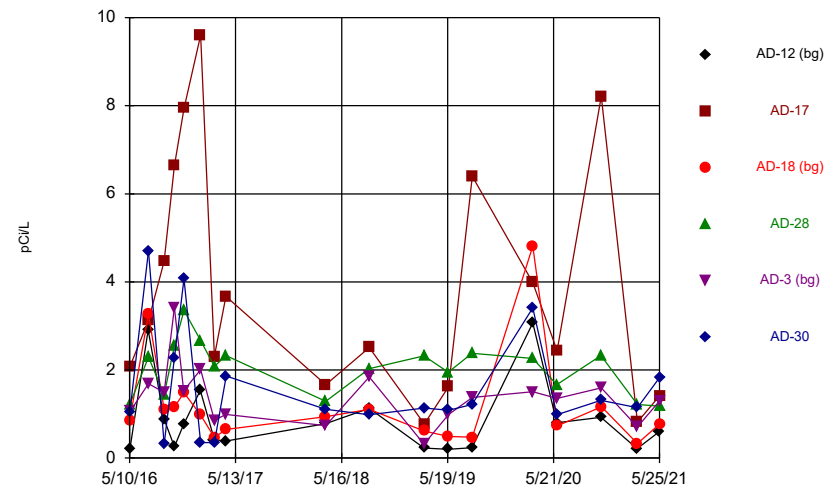
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Time Series



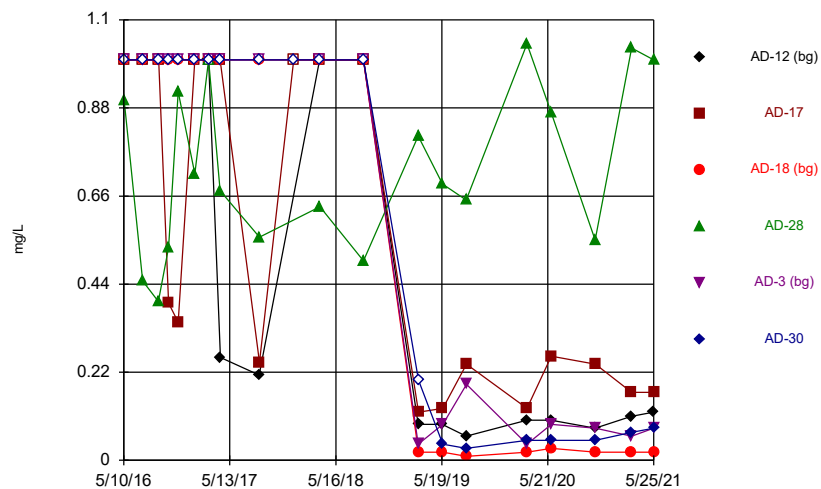
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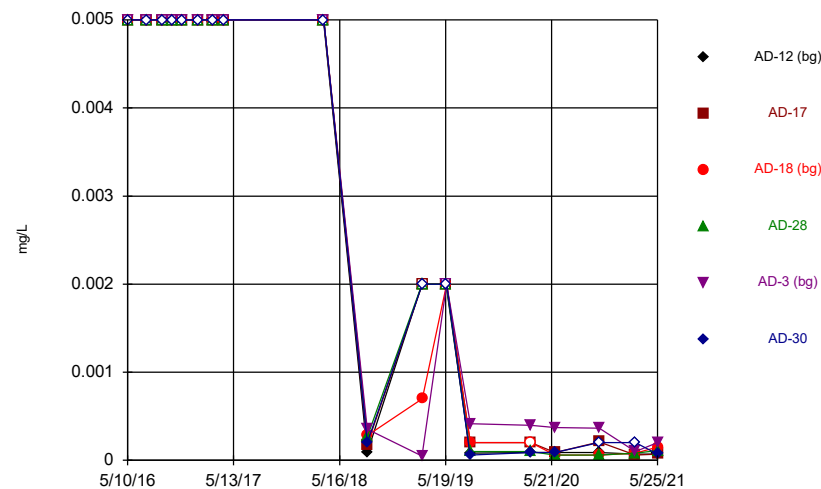
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Time Series



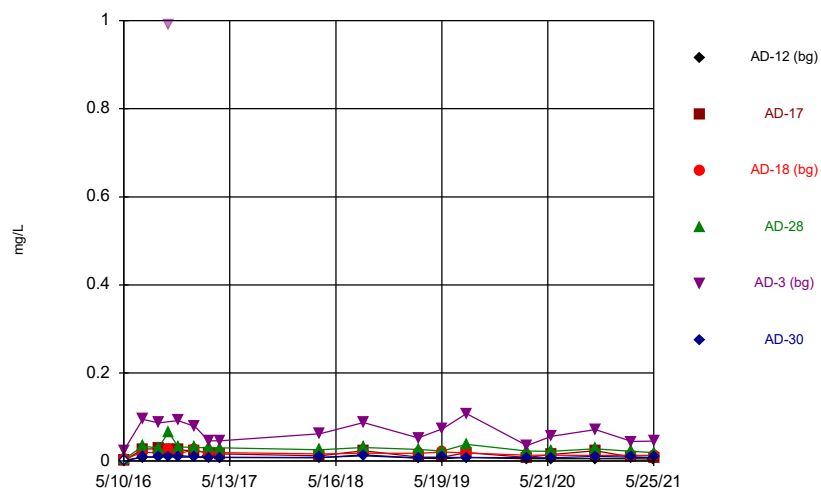
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Time Series



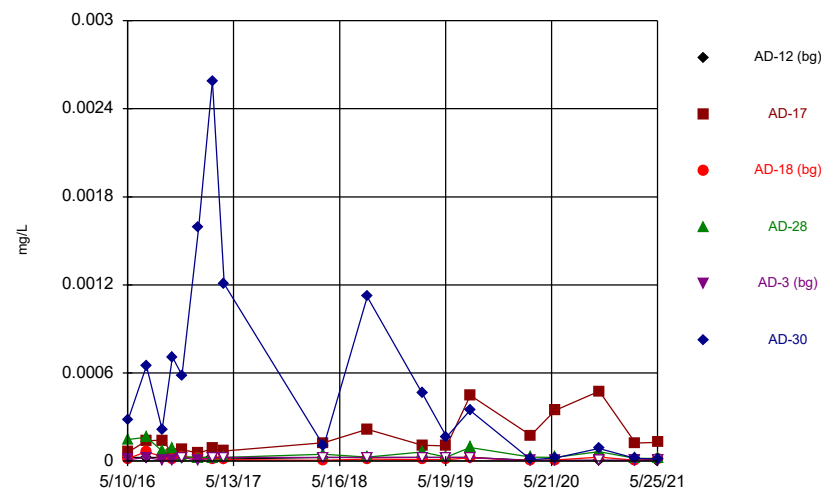
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Time Series



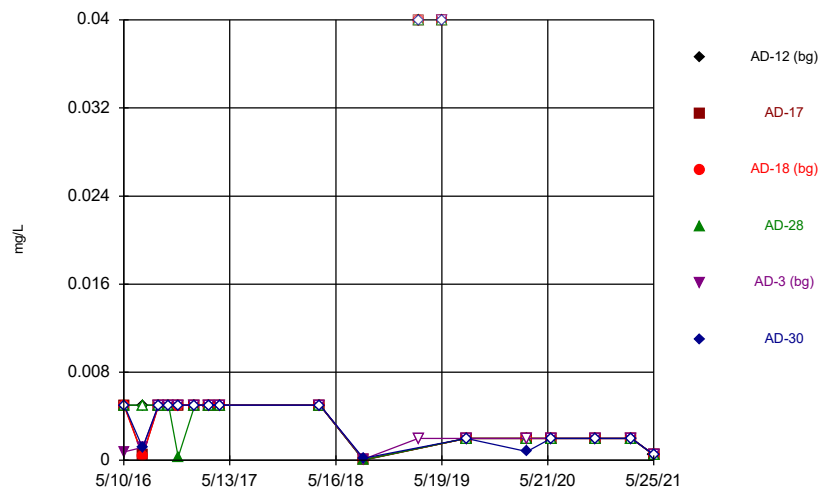
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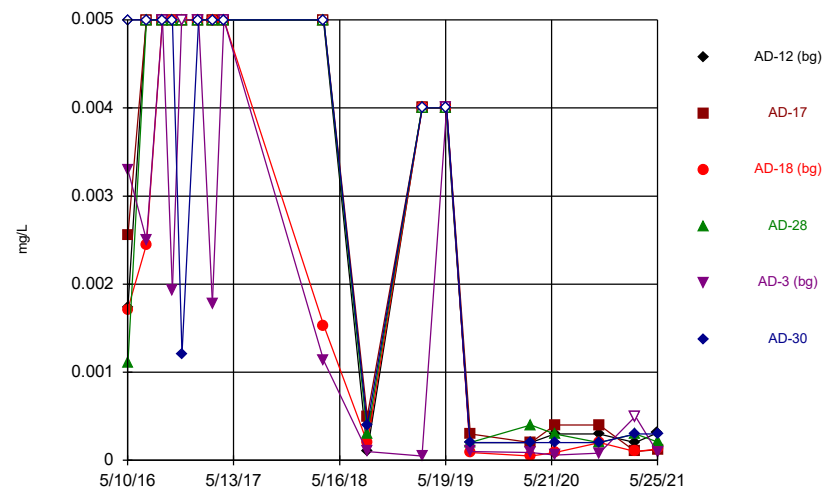
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Time Series



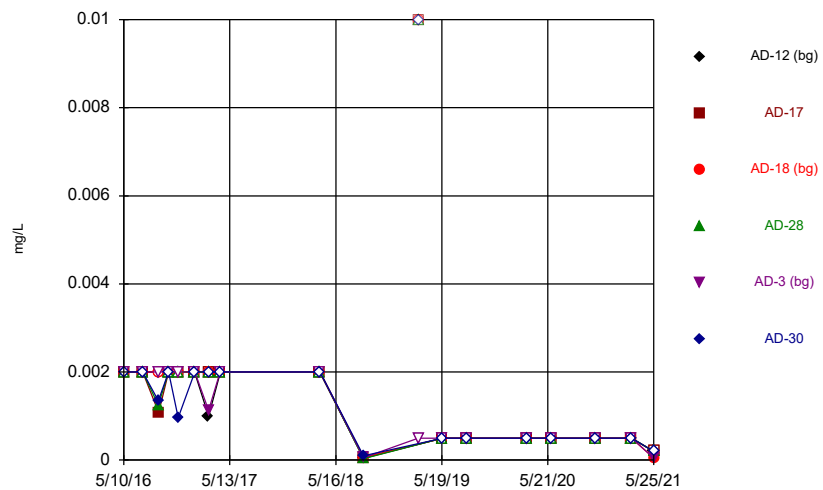
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Time Series



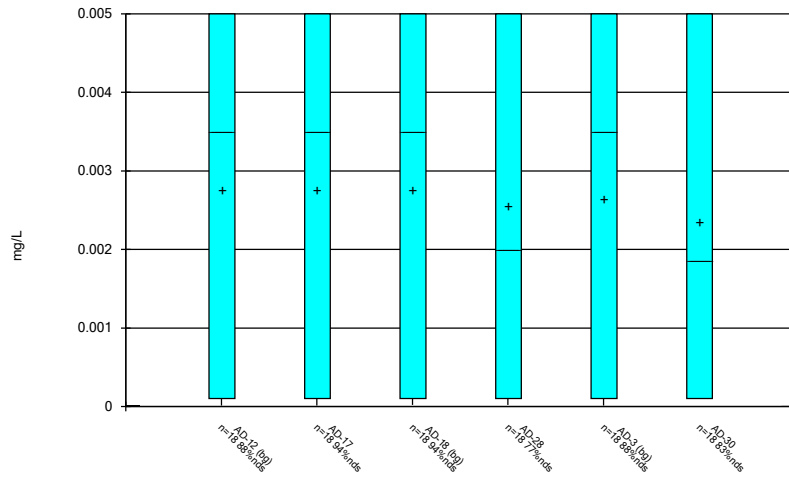
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Time Series



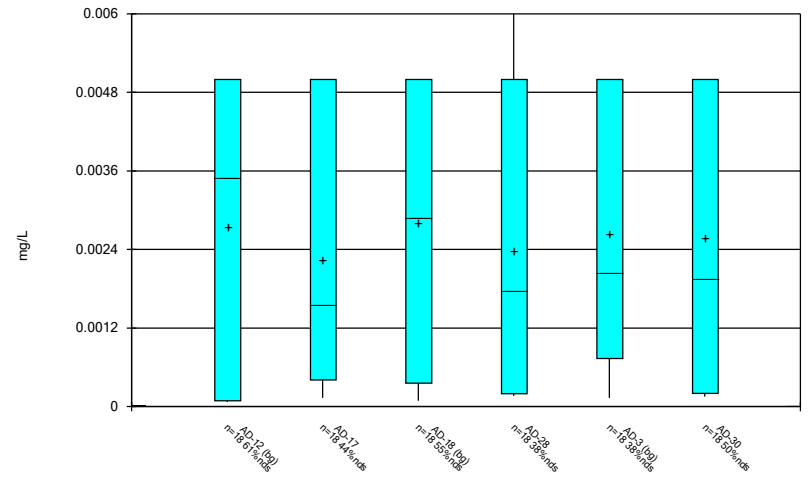
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Box & Whiskers Plot



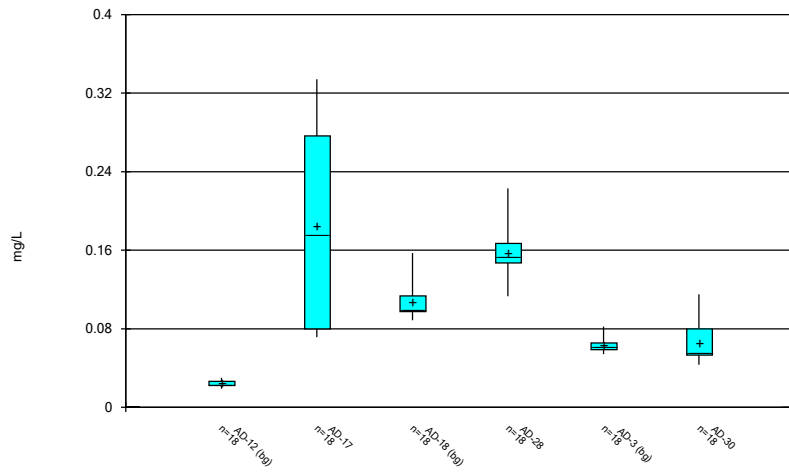
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Box & Whiskers Plot



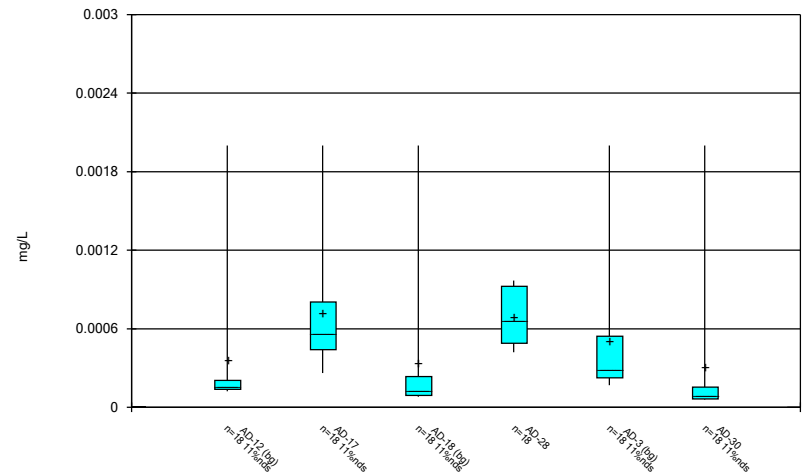
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Box & Whiskers Plot



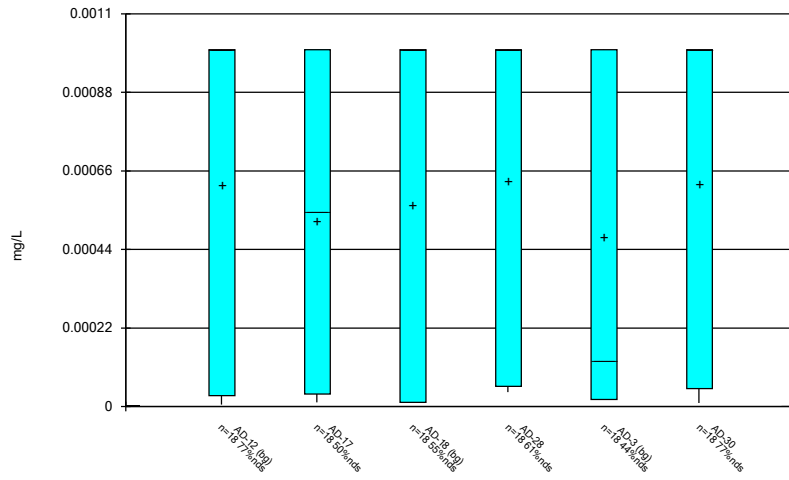
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Box & Whiskers Plot



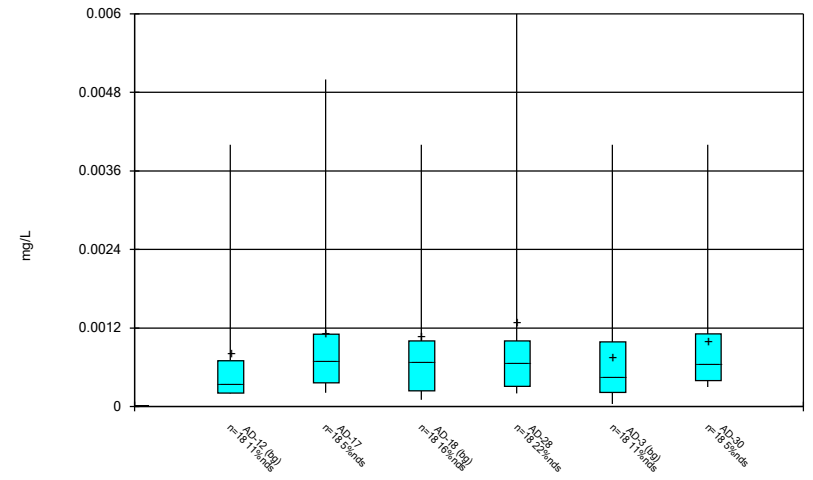
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Box & Whiskers Plot



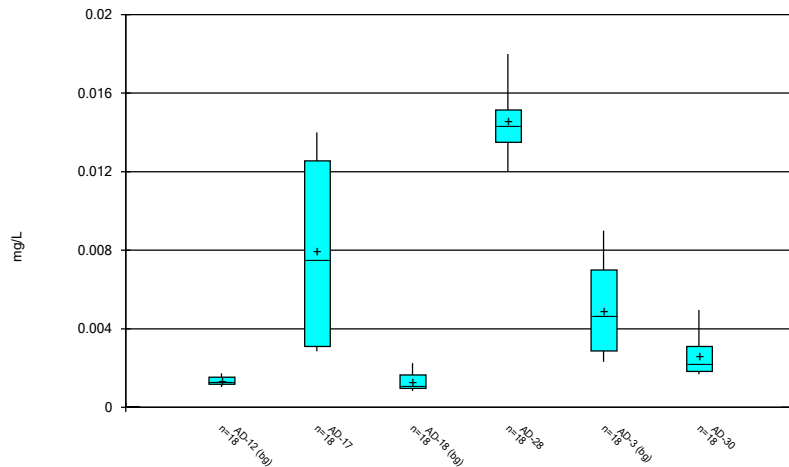
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Box & Whiskers Plot



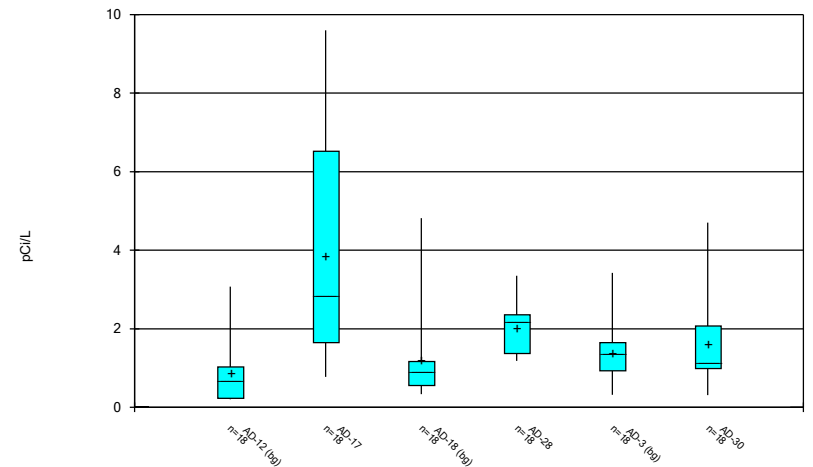
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Box & Whiskers Plot



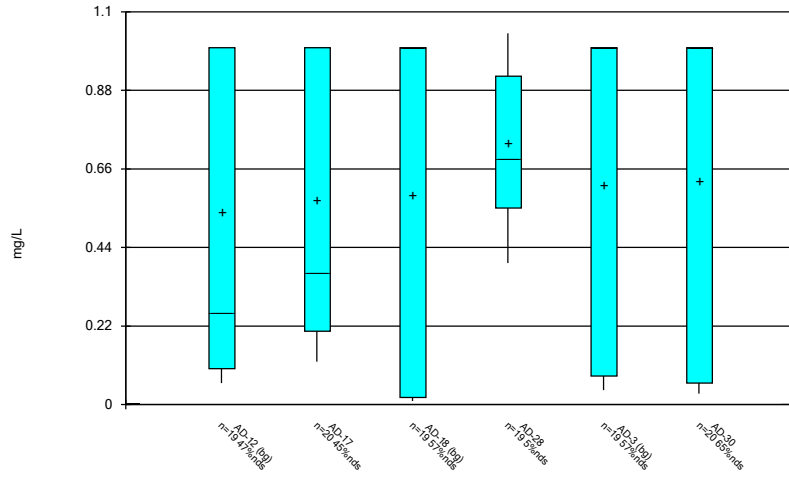
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Box & Whiskers Plot



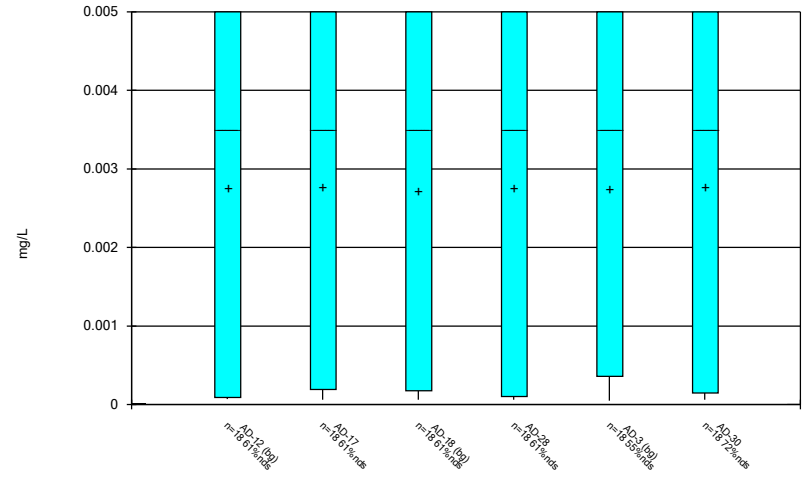
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Box & Whiskers Plot



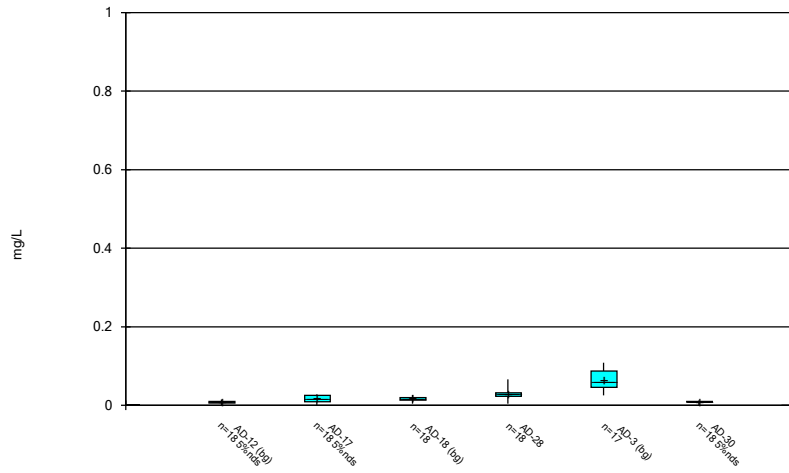
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Box & Whiskers Plot



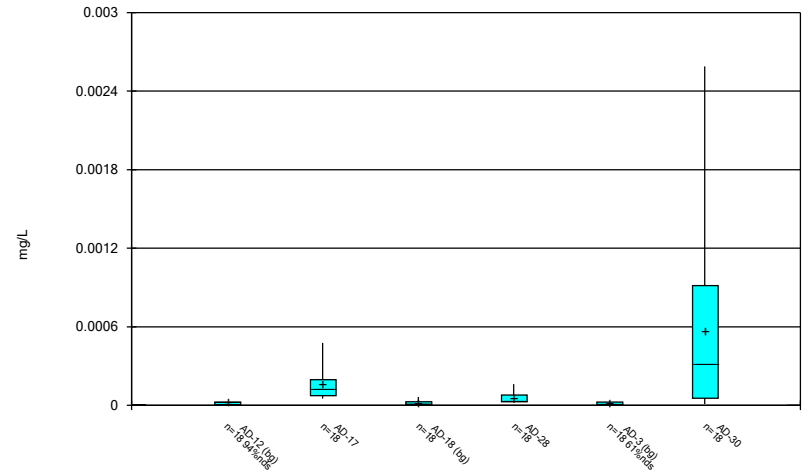
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Box & Whiskers Plot



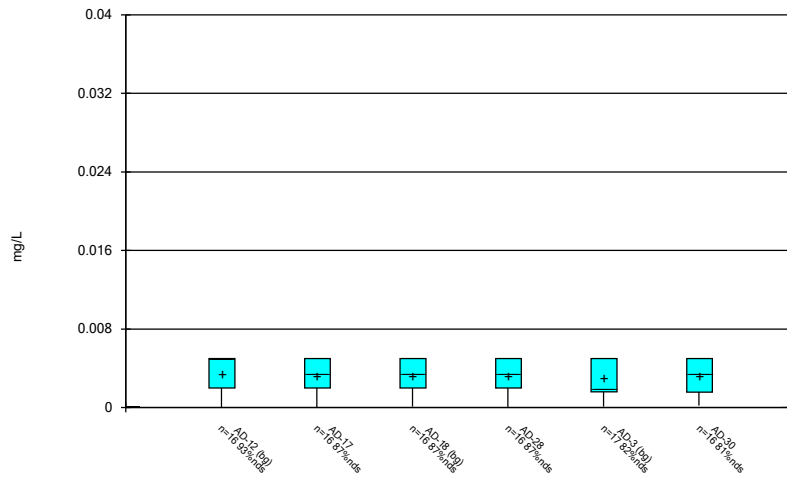
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Box & Whiskers Plot



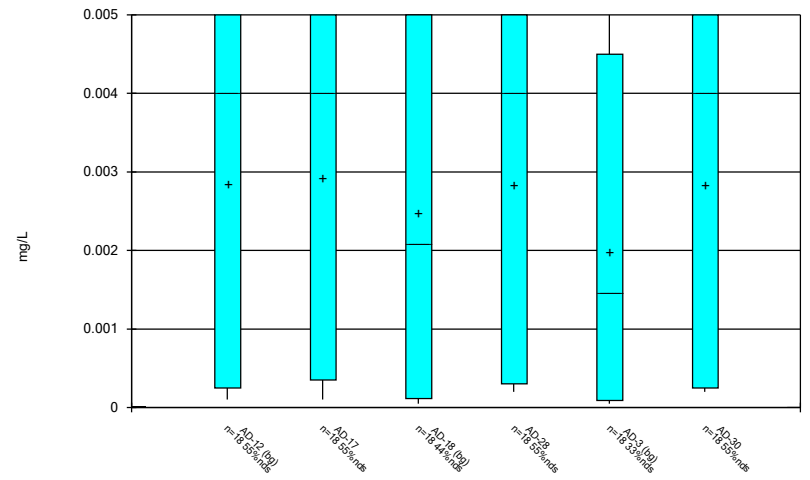
Constituent: Mercury, total Analysis Run 7/30/2021 11:48 AM View: Appendix IV
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



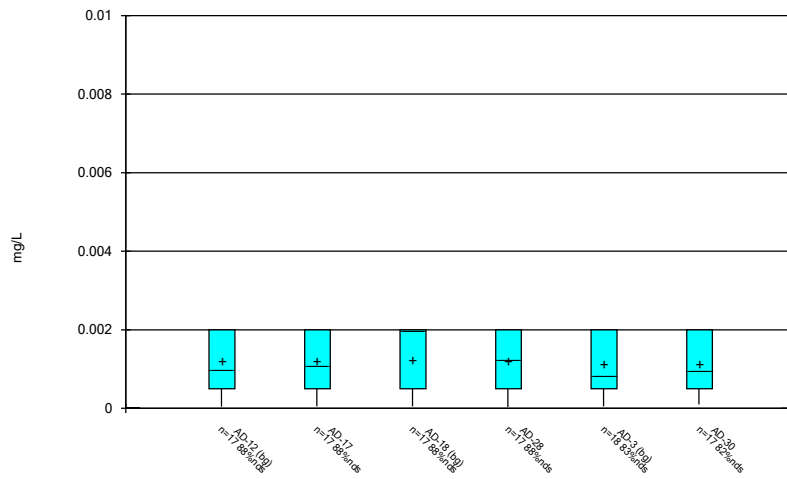
Constituent: Molybdenum, total Analysis Run 7/30/2021 11:48 AM View: Appendix IV
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



Constituent: Selenium, total Analysis Run 7/30/2021 11:48 AM View: Appendix IV
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Box & Whiskers Plot



Constituent: Thallium, total Analysis Run 7/30/2021 11:48 AM View: Appendix IV
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Outlier Summary

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 7/30/2021, 11:50 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)

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		

Upper Tolerance Limit Summary Table

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 1/4/2021, 1:12 PM

Constituent	Upper Lim.	Lower Lim.	Sig.	Bg N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Antimony, total (mg/L)	0.005	n/a	n/a	48	n/a	n/a	89.58	n/a	n/a	0.08526	NP Inter(NDs)
Arsenic, total (mg/L)	0.005	n/a	n/a	48	n/a	n/a	58.33	n/a	n/a	0.08526	NP Inter(NDs)
Barium, total (mg/L)	0.157	n/a	n/a	48	n/a	n/a	0	n/a	n/a	0.08526	NP Inter(normality)
Beryllium, total (mg/L)	0.002	n/a	n/a	48	n/a	n/a	12.5	n/a	n/a	0.08526	NP Inter(normality)
Cadmium, total (mg/L)	0.001	n/a	n/a	48	n/a	n/a	66.67	n/a	n/a	0.08526	NP Inter(NDs)
Chromium, total (mg/L)	0.00633	n/a	n/a	48	-7.517	1.066	14.58	None	ln(x)	0.01	Inter
Cobalt, total (mg/L)	0.009	n/a	n/a	48	n/a	n/a	0	n/a	n/a	0.08526	NP Inter(normality)
Combined Radium 226 + 228 (pCi/L)	3.663	n/a	n/a	48	1.029	0.3841	0	None	sqrt(x)	0.01	Inter
Fluoride, total (mg/L)	1	n/a	n/a	51	n/a	n/a	60.78	n/a	n/a	0.0731	NP Inter(NDs)
Lead, total (mg/L)	0.005	n/a	n/a	48	n/a	n/a	66.67	n/a	n/a	0.08526	NP Inter(NDs)
Lithium, total (mg/L)	0.108	n/a	n/a	47	n/a	n/a	2.128	n/a	n/a	0.08974	NP Inter
Mercury, total (mg/L)	0.000064	n/a	n/a	48	n/a	n/a	50	n/a	n/a	0.08526	NP Inter(normality)
Molybdenum, total (mg/L)	0.005	n/a	n/a	43	n/a	n/a	86.05	n/a	n/a	0.1102	NP Inter(NDs)
Selenium, total (mg/L)	0.005	n/a	n/a	48	n/a	n/a	47.92	n/a	n/a	0.08526	NP Inter(normality)
Thallium, total (mg/L)	0.002	n/a	n/a	46	n/a	n/a	89.13	n/a	n/a	0.09447	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	0.0063	0.1
Cobalt, Total (mg/L)	n/a	0.009	0.009
Combined Radium, Total (pCi/L)	5	3.66	5
Fluoride, Total (mg/L)	4	1	4
Lead, Total (mg/L)	n/a	0.005	0.005
Lithium, Total (mg/L)	n/a	0.11	0.11
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 Interval Summary Table - Significant Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 8/26/2021, 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	0.01562	0.01361	0.009	Yes	18	0.01462	0.00166	0	None	No	0.01	Param.

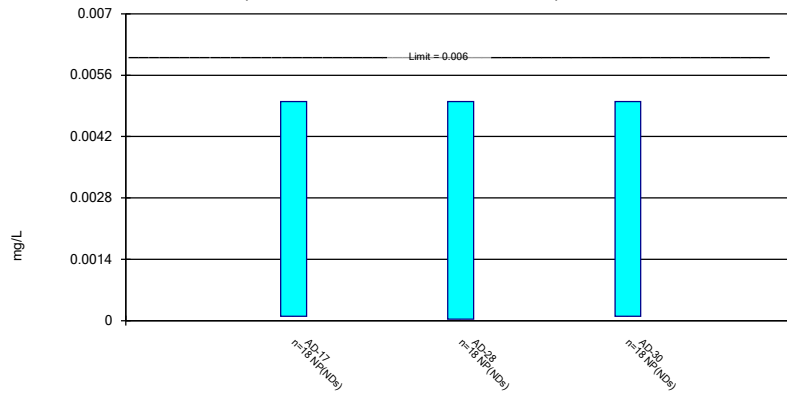
Confidence Interval Summary Table - Significant Results

Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP Printed 8/26/2021, 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	18	0.002756	0.00238	94.44	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-28	0.005	0.00003	0.006	No	18	0.002559	0.002335	77.78	None	No	0.01	NP (NDs)
Antimony, total (mg/L)	AD-30	0.005	0.0001	0.006	No	18	0.002356	0.002263	83.33	None	No	0.01	NP (NDs)
Arsenic, total (mg/L)	AD-17	0.005	0.0004	0.01	No	18	0.002247	0.00209	44.44	None	No	0.01	NP (normality)
Arsenic, total (mg/L)	AD-28	0.005	0.00018	0.01	No	18	0.002367	0.002165	38.89	None	No	0.01	NP (normality)
Arsenic, total (mg/L)	AD-30	0.005	0.00019	0.01	No	18	0.002578	0.002292	50	None	No	0.01	NP (normality)
Barium, total (mg/L)	AD-17	0.2423	0.1266	2	No	18	0.1844	0.0956	0	None	No	0.01	Param.
Barium, total (mg/L)	AD-28	0.1685	0.1431	2	No	18	0.1566	0.02193	0	None	ln(x)	0.01	Param.
Barium, total (mg/L)	AD-30	0.0826	0.052	2	No	18	0.06621	0.02124	0	None	No	0.01	NP (normality)
Beryllium, total (mg/L)	AD-17	0.0008485	0.0004328	0.004	No	18	0.0007153	0.0005015	11.11	None	ln(x)	0.01	Param.
Beryllium, total (mg/L)	AD-28	0.0008071	0.000569	0.004	No	18	0.000688	0.0001967	0	None	No	0.01	Param.
Beryllium, total (mg/L)	AD-30	0.0001554	0.0000611	0.004	No	18	0.0003047	0.0006177	11.11	None	No	0.01	NP (normality)
Cadmium, total (mg/L)	AD-17	0.001	0.00003	0.005	No	18	0.0005212	0.000493	50	None	No	0.01	NP (normality)
Cadmium, total (mg/L)	AD-28	0.001	0.00005	0.005	No	18	0.0006323	0.0004743	61.11	None	No	0.01	NP (NDs)
Cadmium, total (mg/L)	AD-30	0.001	0.00005	0.005	No	18	0.0006244	0.0004846	77.78	None	No	0.01	NP (NDs)
Chromium, total (mg/L)	AD-17	0.001229	0.0004278	0.1	No	18	0.00111	0.001314	5.556	None	ln(x)	0.01	Param.
Chromium, total (mg/L)	AD-28	0.0008723	0.0003325	0.1	No	18	0.001281	0.001634	22.22	Kaplan-Meier	ln(x)	0.01	Param.
Chromium, total (mg/L)	AD-30	0.001158	0.0004727	0.1	No	18	0.001002	0.0009833	5.556	None	ln(x)	0.01	Param.
Cobalt, total (mg/L)	AD-17	0.013	0.00305	0.009	No	18	0.00798	0.004276	0	None	No	0.01	NP (normality)
Cobalt, total (mg/L)	AD-28	0.01562	0.01361	0.009	Yes	18	0.01462	0.00166	0	None	No	0.01	Param.
Cobalt, total (mg/L)	AD-30	0.003039	0.00202	0.009	No	18	0.002587	0.0009323	0	None	x^(1/3)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-17	5.133	2.065	5	No	18	3.871	2.741	0	None	sqrt(x)	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-28	2.391	1.67	5	No	18	2.03	0.5953	0	None	No	0.01	Param.
Combined Radium 226 + 228 (pCi/L)	AD-30	2.16	0.845	5	No	18	1.622	1.249	0	None	sqrt(x)	0.01	Param.
Fluoride, total (mg/L)	AD-17	1	0.17	4	No	20	0.5721	0.4023	45	None	No	0.01	NP (normality)
Fluoride, total (mg/L)	AD-28	0.855	0.6096	4	No	19	0.7323	0.2095	5.263	None	No	0.01	Param.
Fluoride, total (mg/L)	AD-30	1	0.05	4	No	20	0.6285	0.468	65	None	No	0.01	NP (NDs)
Lead, total (mg/L)	AD-17	0.005	0.000181	0.005	No	18	0.002778	0.002354	61.11	None	No	0.01	NP (NDs)
Lead, total (mg/L)	AD-28	0.005	0.0001	0.005	No	18	0.002765	0.00237	61.11	None	No	0.01	NP (NDs)
Lead, total (mg/L)	AD-30	0.005	0.00009	0.005	No	18	0.002773	0.002361	72.22	None	No	0.01	NP (NDs)
Lithium, total (mg/L)	AD-17	0.02177	0.01181	0.11	No	18	0.01679	0.008231	5.556	None	No	0.01	Param.
Lithium, total (mg/L)	AD-28	0.032	0.0223	0.11	No	18	0.02865	0.0119	0	None	No	0.01	NP (normality)
Lithium, total (mg/L)	AD-30	0.009625	0.007642	0.11	No	18	0.008429	0.002174	5.556	None	x^2	0.01	Param.
Mercury, total (mg/L)	AD-17	0.0001928	0.00008527	0.002	No	18	0.0001623	0.0001294	0	None	ln(x)	0.01	Param.
Mercury, total (mg/L)	AD-28	0.000085	0.000025	0.002	No	18	0.00005433	0.00004292	0	None	No	0.01	NP (normality)
Mercury, total (mg/L)	AD-30	0.0007824	0.0001308	0.002	No	18	0.0005646	0.0006847	0	None	sqrt(x)	0.01	Param.
Molybdenum, total (mg/L)	AD-17	0.005	0.0005	0.005	No	16	0.003188	0.001964	87.5	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-28	0.005	0.0005	0.005	No	16	0.003178	0.001979	87.5	None	No	0.01	NP (NDs)
Molybdenum, total (mg/L)	AD-30	0.005	0.0008	0.005	No	16	0.003165	0.001965	81.25	None	No	0.01	NP (NDs)
Selenium, total (mg/L)	AD-17	0.005	0.0003	0.05	No	18	0.002921	0.002245	55.56	None	No	0.01	NP (NDs)
Selenium, total (mg/L)	AD-28	0.005	0.0003	0.05	No	18	0.002834	0.002291	55.56	None	No	0.01	NP (NDs)
Selenium, total (mg/L)	AD-30	0.005	0.0003	0.05	No	18	0.002834	0.002293	55.56	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-17	0.002	0.0002	0.002	No	17	0.001196	0.000806	88.24	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-28	0.002	0.0002	0.002	No	17	0.001205	0.0008074	88.24	None	No	0.01	NP (NDs)
Thallium, total (mg/L)	AD-30	0.002	0.0002	0.002	No	17	0.001153	0.0007775	82.35	None	No	0.01	NP (NDs)

Non-Parametric Confidence Interval

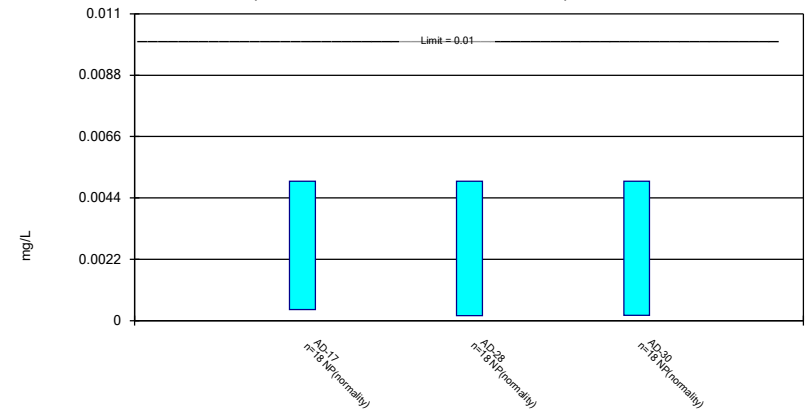
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Antimony, total Analysis Run 8/26/2021 3:22 PM View: Confidence Intervals
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Non-Parametric Confidence Interval

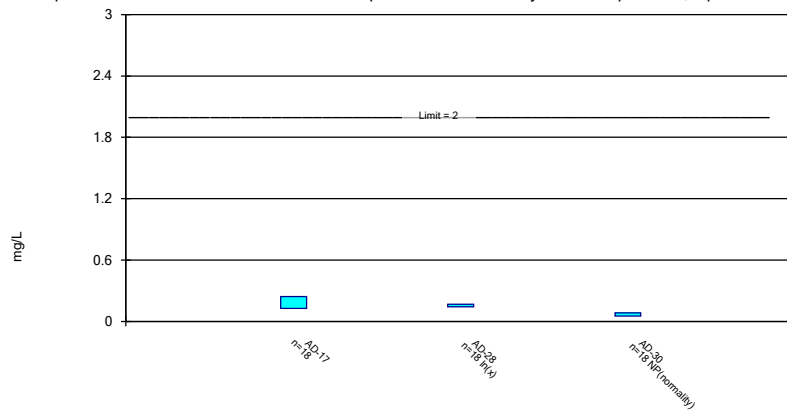
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Arsenic, total Analysis Run 8/26/2021 3:22 PM View: Confidence Intervals
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric and Non-Parametric (NP) Confidence Interval

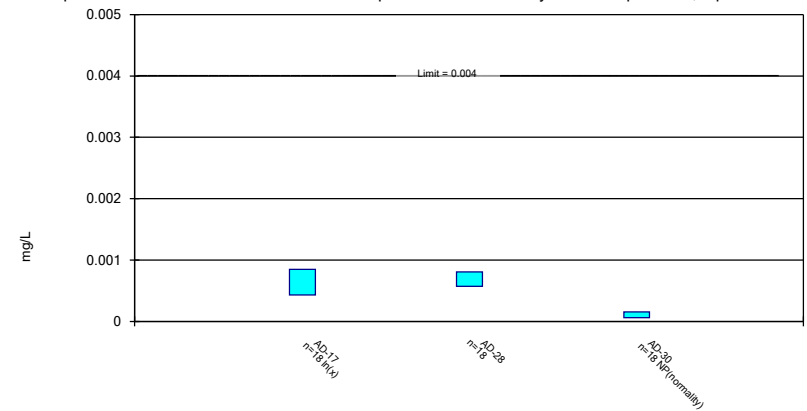
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Barium, total Analysis Run 8/26/2021 3:22 PM View: Confidence Intervals
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric and Non-Parametric (NP) Confidence Interval

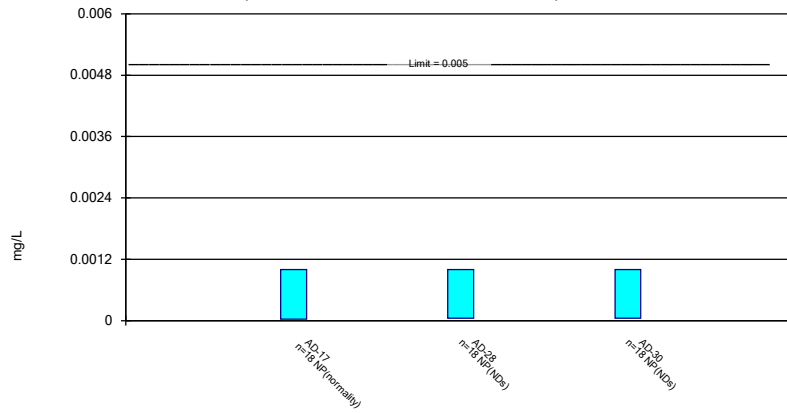
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Beryllium, total Analysis Run 8/26/2021 3:22 PM View: Confidence Intervals
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Non-Parametric Confidence Interval

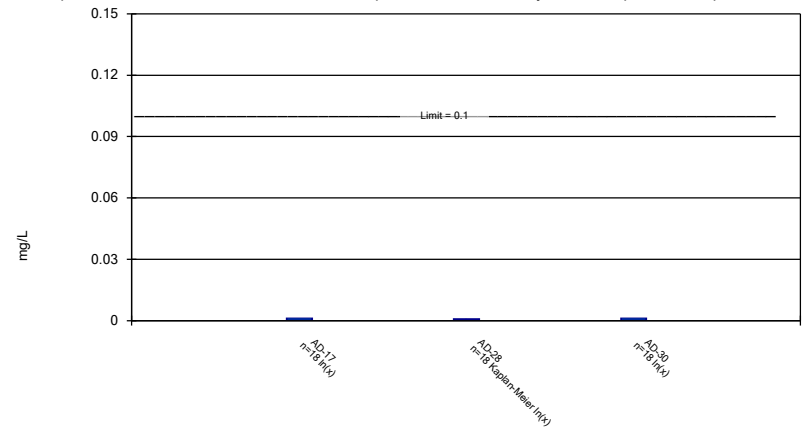
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Cadmium, total Analysis Run 8/26/2021 3:22 PM View: Confidence Intervals
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric Confidence Interval

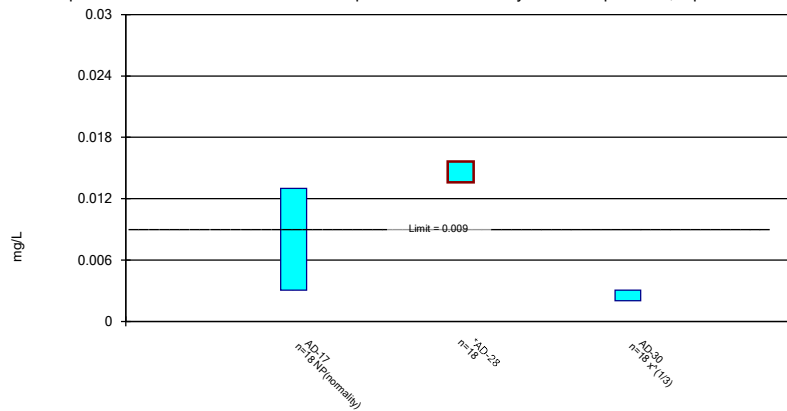
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Chromium, total Analysis Run 8/26/2021 3:22 PM View: Confidence Intervals
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric and Non-Parametric (NP) Confidence Interval

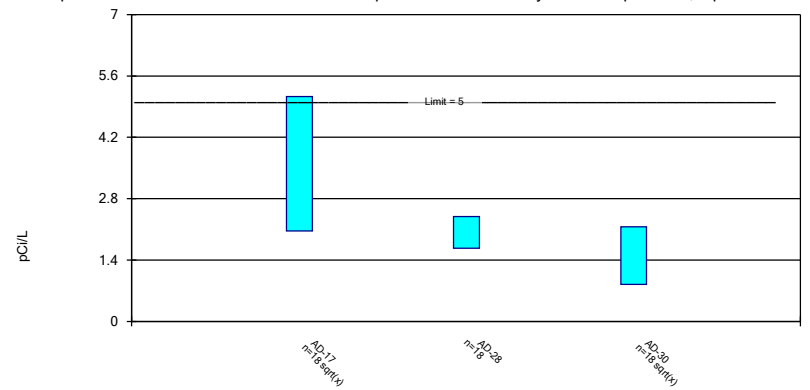
Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Cobalt, total Analysis Run 8/26/2021 3:22 PM View: Confidence Intervals
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric Confidence Interval

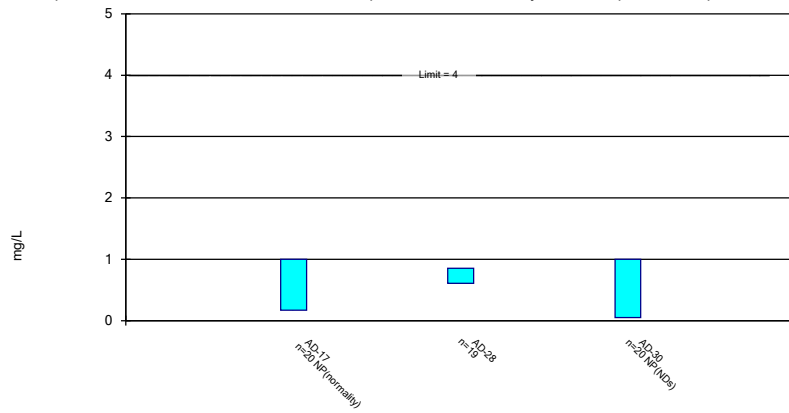
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Combined Radium 226 + 228 Analysis Run 8/26/2021 3:22 PM View: Confidence Intervals
 Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric and Non-Parametric (NP) Confidence Interval

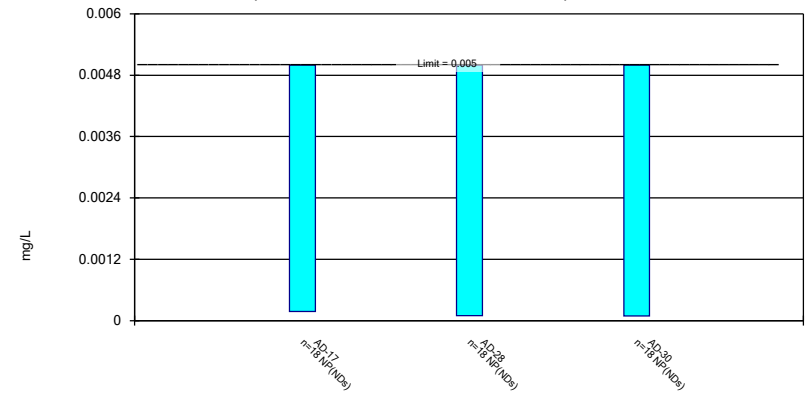
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



Constituent: Fluoride, total Analysis Run 8/26/2021 3:23 PM View: Confidence Intervals
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Non-Parametric Confidence Interval

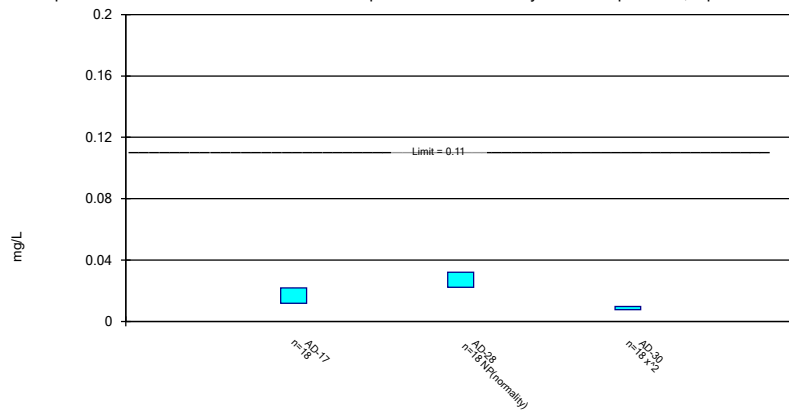
Compliance Limit is not exceeded. Per-well alpha = 0.01.



Constituent: Lead, total Analysis Run 8/26/2021 3:23 PM View: Confidence Intervals
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric and Non-Parametric (NP) Confidence Interval

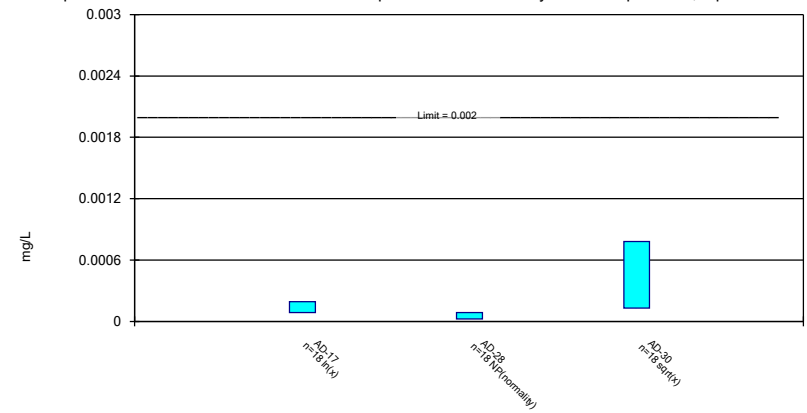
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



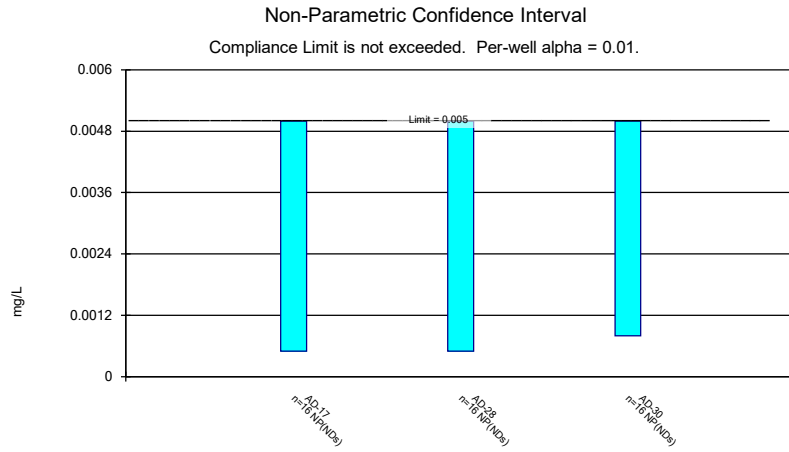
Constituent: Lithium, total Analysis Run 8/26/2021 3:23 PM View: Confidence Intervals
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

Parametric and Non-Parametric (NP) Confidence Interval

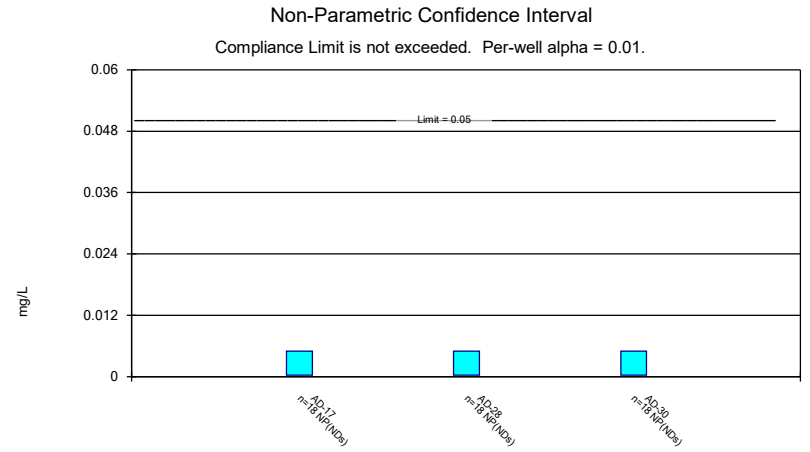
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk, alpha based on n.



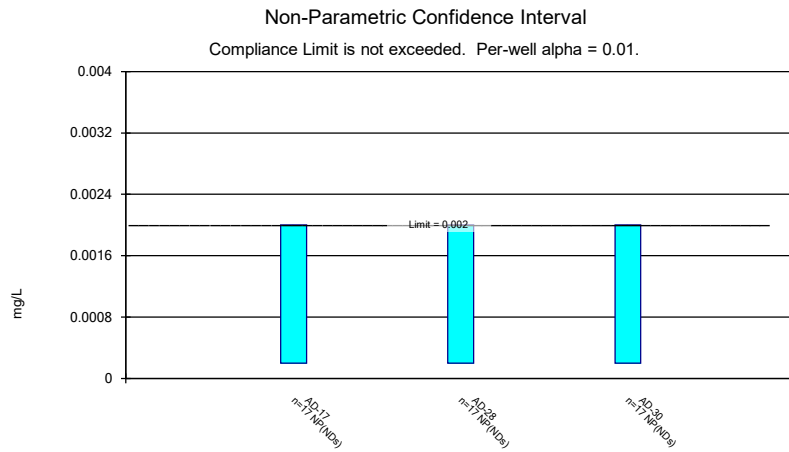
Constituent: Mercury, total Analysis Run 8/26/2021 3:23 PM View: Confidence Intervals
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP



Constituent: Molybdenum, total Analysis Run 8/26/2021 3:23 PM View: Confidence Intervals
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP



Constituent: Selenium, total Analysis Run 8/26/2021 3:23 PM View: Confidence Intervals
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP



Constituent: Thallium, total Analysis Run 8/26/2021 3:23 PM View: Confidence Intervals
Pirkey WBAP Client: Geosyntec Data: Pirkey WBAP

APPENDIX 3- Alternate Source Demonstrations

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

**ALTERNATIVE SOURCE
DEMONSTRATION REPORT
FEDERAL CCR RULE**

**H.W. Pirkey Power Plant
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
Columbus, OH 43221

May 2021

CHA8495

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Table 4	B-3 X-Ray Diffraction Results

FIGURES

Figure 1	Site Layout
Figure 2	Cobalt Distribution in Groundwater
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

AEP	American Electric Power
ASD	Alternative Source Demonstration
CCR	Coal Combustion Residuals
CFR	Code of Federal Regulations
EBAP	East Bottom Ash Pond
EDS	Energy Dispersive 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
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 detection monitoring event of 2020. The WBAP is registered as a surface impoundment under Texas Commission on Environmental Quality (TCEQ) Industrial and Hazardous Waste Solid Waste Registration No. 33240.

The H.W. Pirkey Plant has four regulated coal combustion residuals (CCR) storage units, including the WBAP (**Figure 1**). In November 2020, a semi-annual assessment monitoring event was conducted at the WBAP in accordance with 40 CFR 257.95(d)(1). The monitoring data were submitted to Groundwater Stats Consulting, LLC (GSC) for statistical analysis. Groundwater protection standards (GWPSs) were established for each Appendix IV parameter in accordance with the statistical analysis plan developed for the 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 the background concentration and the maximum contaminant level (MCL) or, for constituents without an MCL, the risk-based level specified in 40 CFR 257.95(h)(2). To determine background concentrations, an upper tolerance limit (UTL) was calculated using pooled data from the background wells collected during the background monitoring and assessment monitoring events.

Confidence intervals were re-calculated for 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 0.0134 milligrams per liter (mg/L) exceeded the calculated GWPS of 0.0090 mg/L (Geosyntec, 2021). No other SSLs were identified.

1.1 CCR Rule Requirements

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

Demonstrate that a source other than the CCR unit caused the contamination, or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. Any such demonstration must be supported by a report that includes the factual or evidentiary basis for any conclusions and must be certified to be accurate by a

qualified professional engineer or approval from the Participating State Director or approval from EPA where EPA is the permitting authority. If a successful demonstration is made, the owner or operator must continue monitoring in accordance with the assessment monitoring program pursuant to this section...

Pursuant to 40 CFR 257.95(g)(3)(ii), Geosyntec Consultants, Inc. (Geosyntec) has prepared this ASD report to document that the 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 Federal CCR Rule allows the owner or operator 90 days from the determination of an SSL to demonstrate that a source other than the CCR unit caused the SSL. The methodology used to evaluate the SSL identified for cobalt and the proposed alternative source are described below.

2.1 Proposed Alternative Source

An initial review of site geochemistry, site historical data, and laboratory quality assurance/quality control (QA/QC) data did not identify alternative sources for cobalt due to Type I (sampling), Type II (laboratory), or Type III (statistical evaluation) issues. Groundwater sampling, laboratory analysis, and statistical evaluations were generally completed in accordance with the Federal CCR Rule and draft TCEQ guidance for groundwater monitoring (TCEQ, 2020). As described below, the 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 (Geosyntec, 2019a; Geosyntec, 2019b; Geosyntec, 2020b; Geosyntec, 2020c). 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**).

A surface water sample was collected directly from the WBAP on November 4, 2020. Cobalt was detected at a concentration of 0.000501 mg/L in the WBAP sample (**Table 1**). This concentration is lower than all reported cobalt concentrations for in-network wells from the most recent sampling event, and over an order of magnitude lower than the average concentration 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 A**. 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 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 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) 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 transformation to iron oxide minerals.

As described in an ASD previously generated for the Pirkey Plant's East Bottom Ash Pond (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 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.

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 pyrite may be providing a source for aqueous cobalt in groundwater. Additionally, the pond was not identified as the source of cobalt at AD-28 based on the low concentrations of cobalt in the pond itself.

2.2 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 40 CFR 257.95(g)(3)(ii) and supports the position that the SSL for cobalt identified at AD-28 during assessment monitoring in November 2020 was not due to a release from the WBAP. The identified SSL was, instead, 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	2/11/2019	mg/kg	5.8
SPLP Leachate	2/11/2019	mg/L	<0.01
WBAP Pond Water	11/4/2020	mg/L	0.000501
AD-28 - Average	May 2016 - November 2020	mg/L	0.0145

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 components are shown in relative abundance.

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

Geosyntec Consultants, Inc.

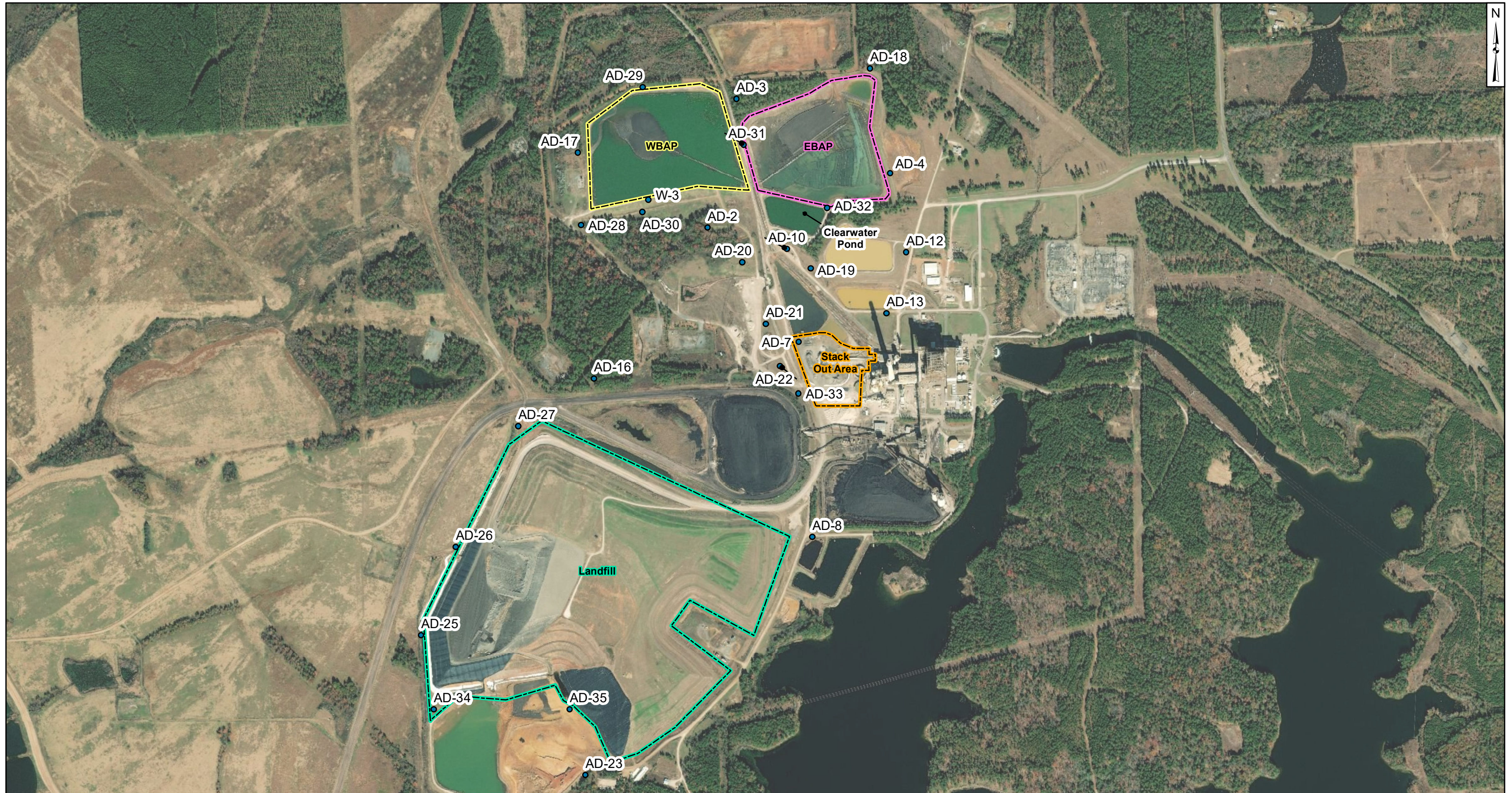
Constituent	VAP-B3-(40-45)
Quartz	15
Plagioclase Feldspar	0.5
Orthoclase	ND
Calcite	ND
Dolomite	ND
Siderite	0.5
Goethite	ND
Hematite	2
Pyrite	3
Kaolinite	42
Chlorite	4
Illite/Mica	6
Smectite	12
Amorphous	15

Notes:

ND: Not detected

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

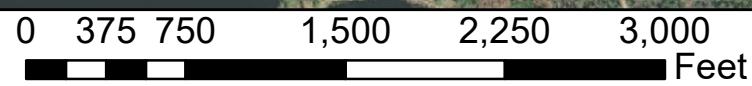
FIGURES



Legend

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

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



Site Layout

AEP Pirkey Power Plant
 Hallsville, Texas

Geosyntec
 consultants

Columbus, Ohio

2020/03/24

Figure

1

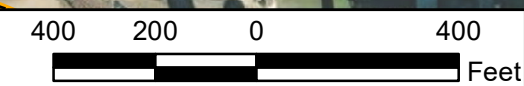


Legend

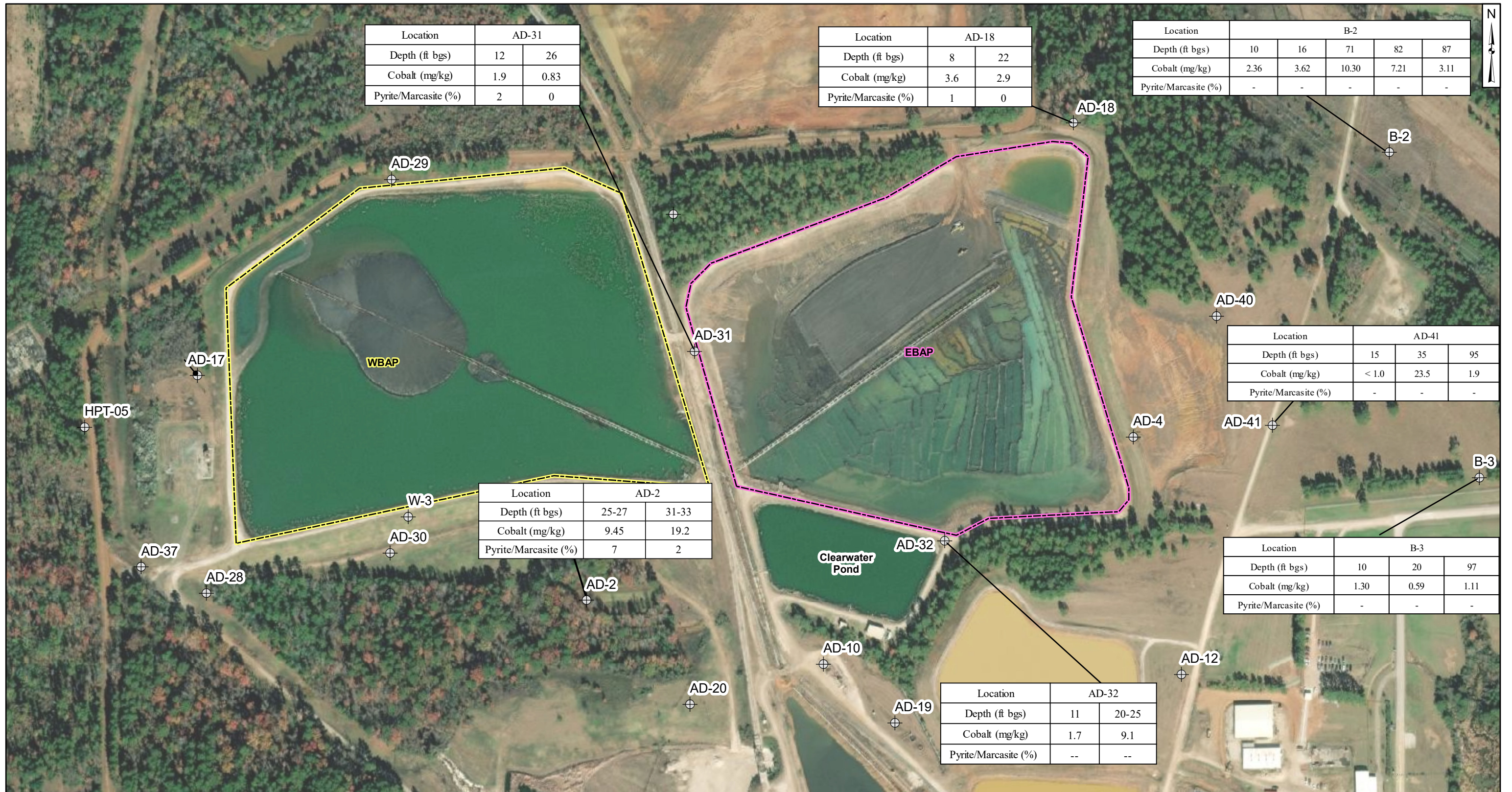
⊕ Out of Network	◆ Stackout Area	▭ EBAP
◆ EBAP	◆ EBAP and WBAP	▭ Stack Out Area
◆ WBAP	⊕ All CCR Unit Networks	▭ WBAP
◆ Landfill	▲ Piezometer	

Notes


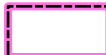

- Monitoring well coordinates, site features, and data provided by AEP.
- AD-15 location is approximated
- B2 and B3 samples collected in March 2021
- * - Well most recently sampled November 2020
- ** - Well most recently sampled August 2019
- AD-29 included in the well network for water level measurements only



Cobalt Distribution in Groundwater	
AEP Pirkey Power Plant Hallsville, Texas	
Geosyntec consultants	
Columbus, Ohio	2021/04/30
Figure 2	



Legend

-  Monitoring Wells
-  EBAP
-  WBAP

Notes

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



Cobalt Distribution in Soil

AEP Pirkey Power Plant
Hallsville, Texas

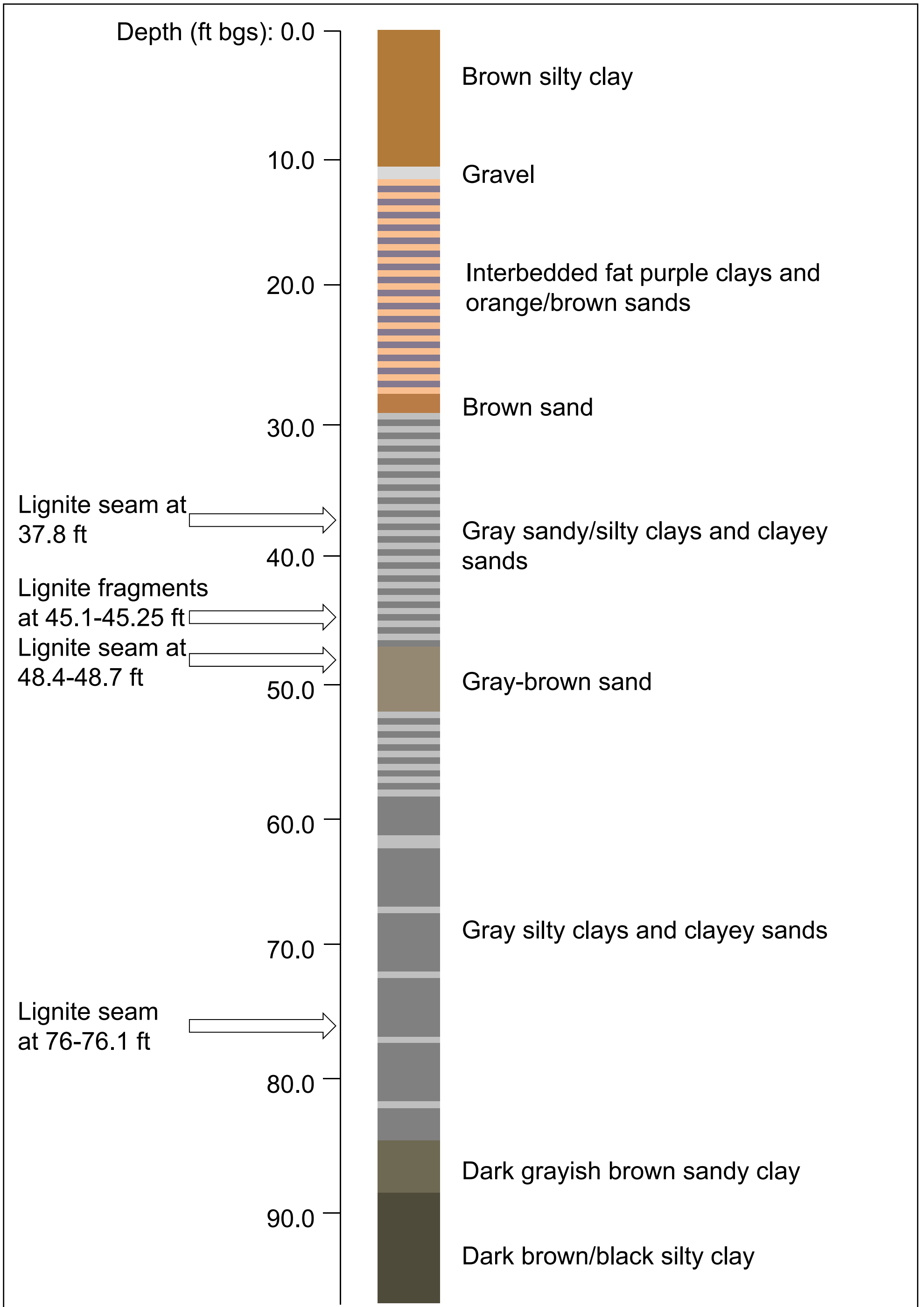
Geosyntec
consultants

Columbus, Ohio

2020/12/22

Figure

3



Notes:

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

B-3 Visual Boring Log

AEP Pirkey Powerplant
Hallsville, TX

Geosyntec
consultants

Figure

4

CHA8462

March 2020

ATTACHMENT A
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 ADJ.		CHARACTERISTICS	
CONDITION		CONSISTENCY		PENETROMETER	N - VALUE							
VLo Very Loose	0-4	Vso... Very Soft	0 - 0.25	0 - 0.25	< 2	Li ... Light	Br ... Brown	Cl ... Clay, Clayey	F.....Fine	Calc	Calcareous	
Lo Loose	4-10	So... Soft	0.25 - 0.5	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	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	1.0 - 2.0	8 - 15	T Tan	Gr Green	Ls ... Limestone	Si.....Silty	Lam	Laminate	
VDe Very Dense	>50	VSt... Very Stiff	2.0 - 4.0	2.0 - 4.0	15 - 30	R Red	Y Yellow	Gr ... Gravel		SlS	Slickensided	
		H..... Hard	> 4.0	> 4.0	>30	Rdish.Reddish	Wh ... White	SiS ... Siltstone		SL	Slightly	
								SS Sandstone		Sm(s) ...	Seam (s)	
								Sh..... Shale, Shaley		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"		
SM	4'	0-2	Br Lt Br	Si	Sa	Silty sand, trace clay & roots, trace fine iron ore gravel,						moist (0-2)	
		2-10	Rd Br, Yllw Br	Si, Gr	Cl	Clay - some silt, trace 1/4" sand, trace coarse iron ore concretions						moist (2-5)	
CL	1.5'	5-10				- some v.f. sand, ironstone layer @ 6-6.5'						moist (5-10)	
		10-15	10'- Rd Br, 16'- Lt Gr	Si Cl	Sa	clayey v.f. t.f. Silty Sand with clay in thin lenses, trace cemented clayey sand						v. moist (10-15)	
SC 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)	
SM	3"	20-25	Br, Lt. Rd Br	Si	Sa	Silty Sand - some ironstone - gray @ 20'						Saturated @ 16' to 40'	
	3'	25-30	Gray			= some cemented clayey sand (only recovery @ 25-30')							
	NR	30-35											
	NR	35-40											
						R.T. @ 40'							
						* Split Spoon Driven from 40-41'							
SC	1'	40-41	Gray, DK Gray	Cl	Sa	clayey sand w/ lenses of cemented sand @ 41.5-41.75' trace gypsum crystals @ 40-41'						v. moist 40-41'	
						* 6-6.5' collected @ 1140							
						* 15.5-16' collected @ 1215							
						* 25-30' 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 B
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.

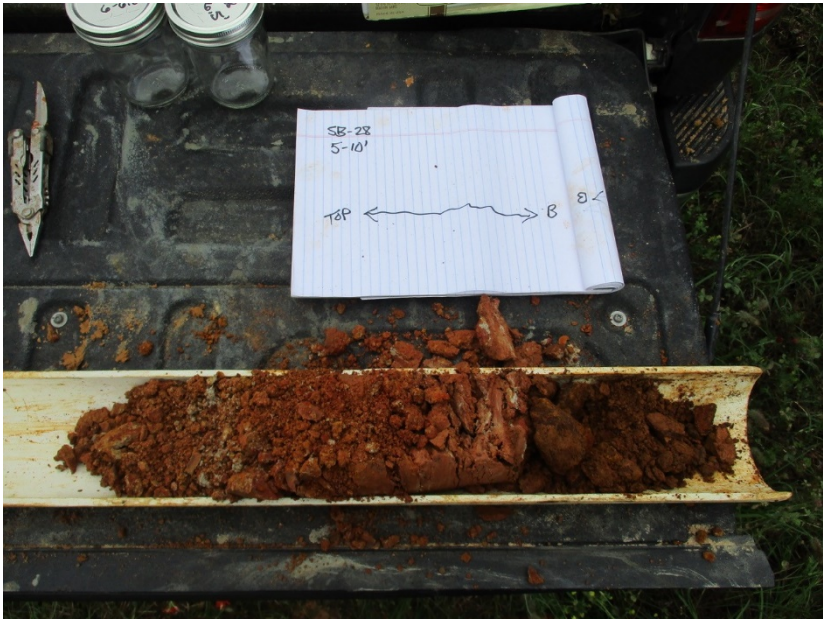


Photograph 3

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

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.

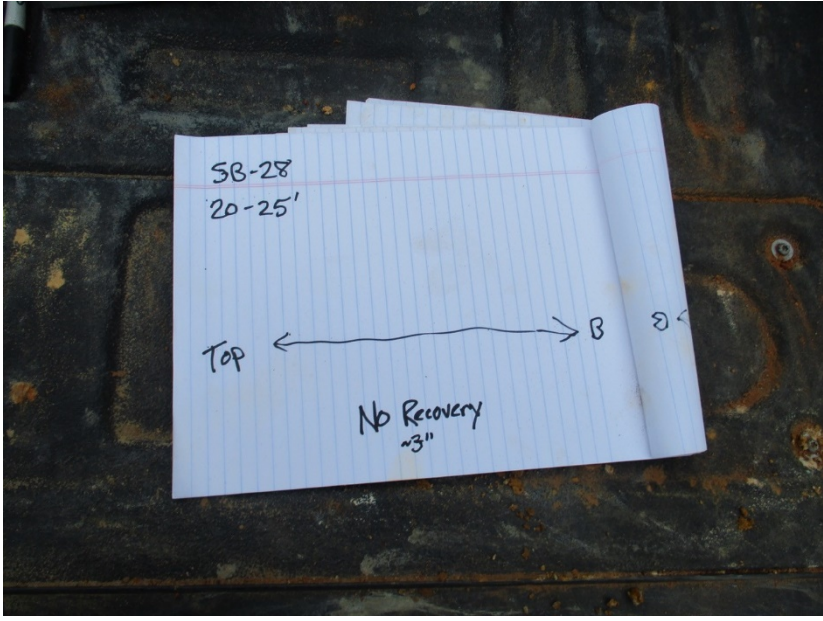


Photograph 6

Date: 4/21/2020

Direction: N/A

Comments:
 Field geologist's note indicating that very little of the 20-25 foot interval of SB-28 was recovered.



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:
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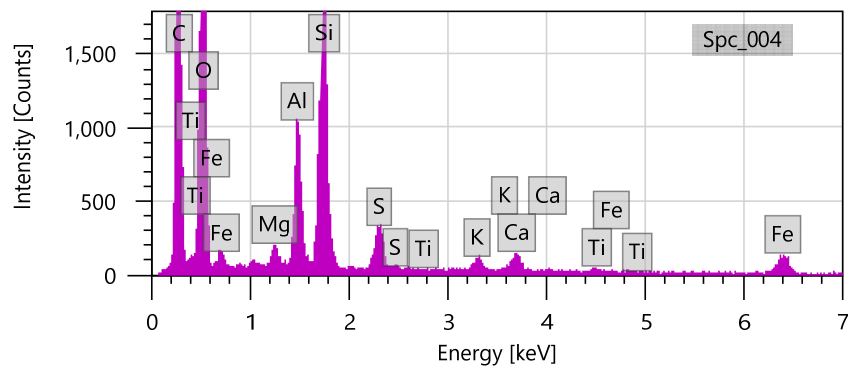
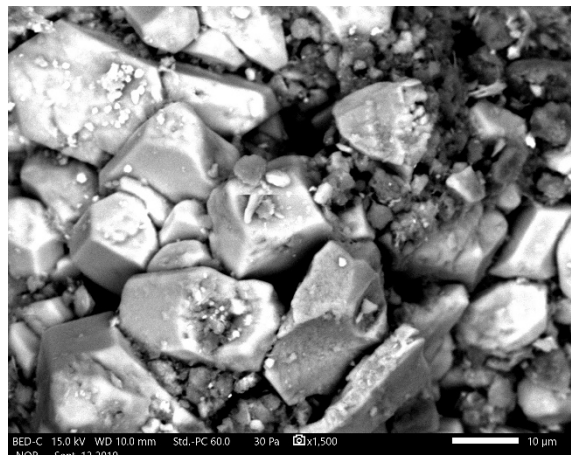
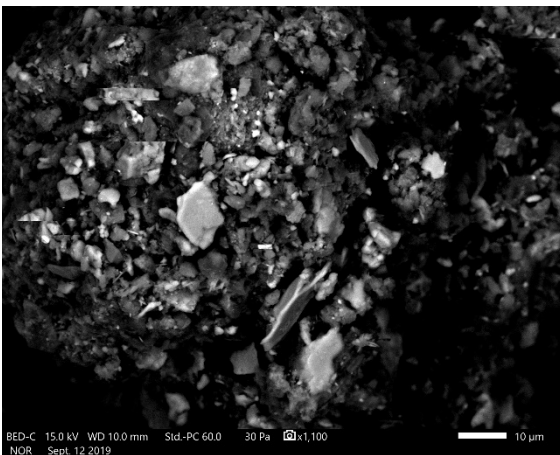
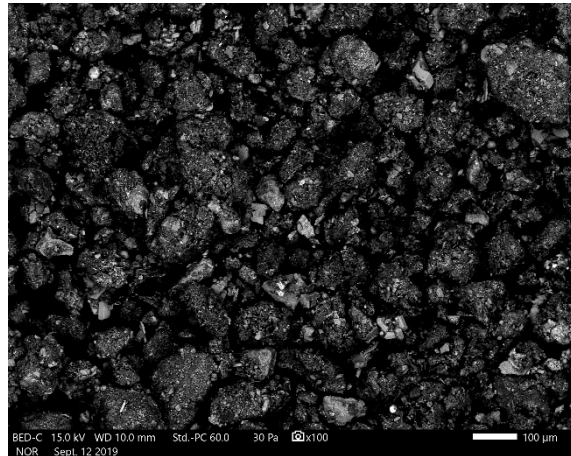
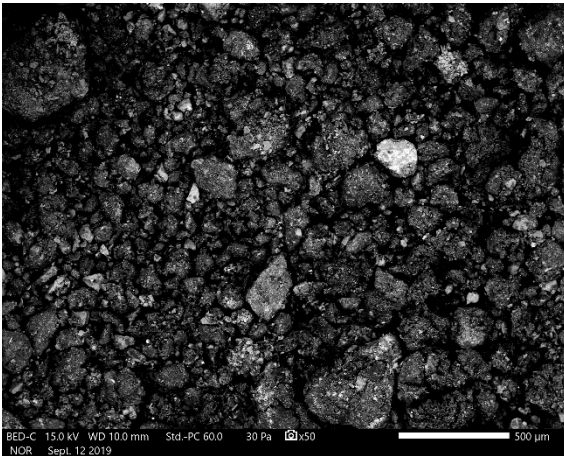


ATTACHMENT C
SEM/EDS Analysis

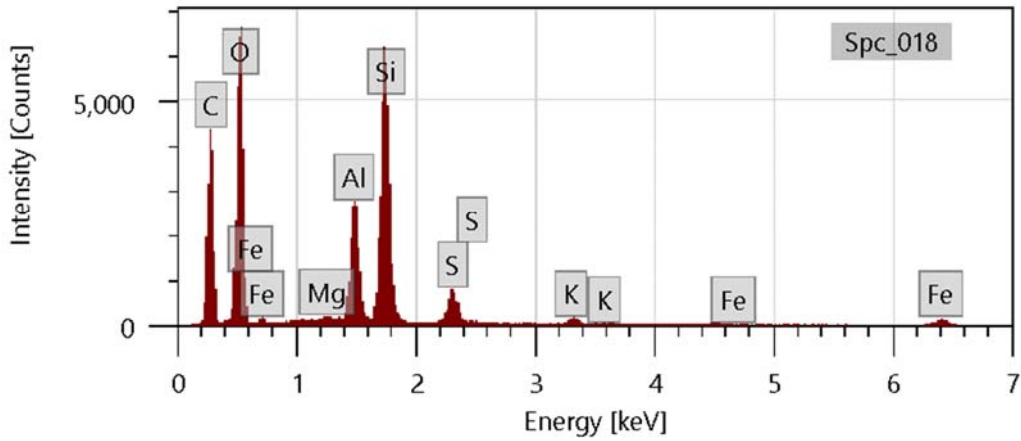
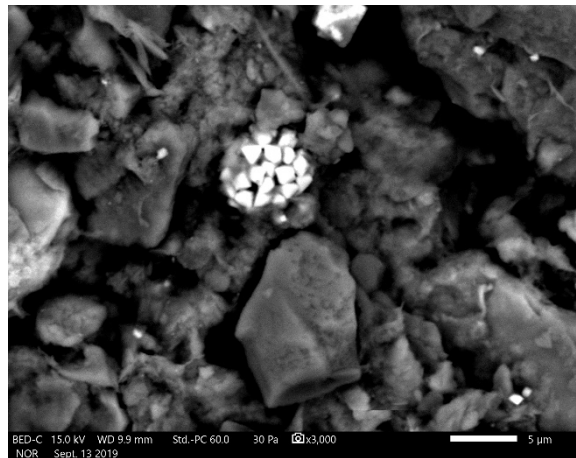
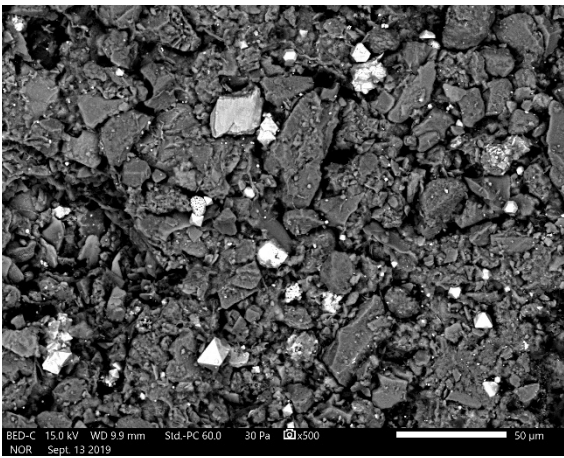
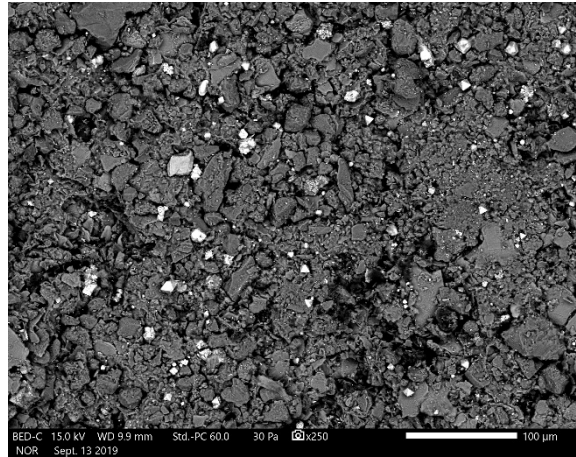
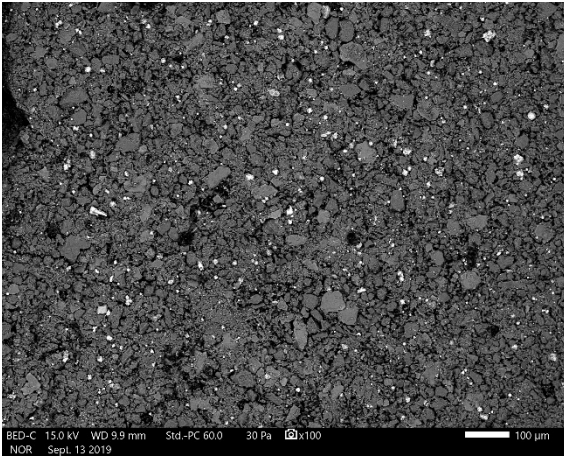
September 16, 2019

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

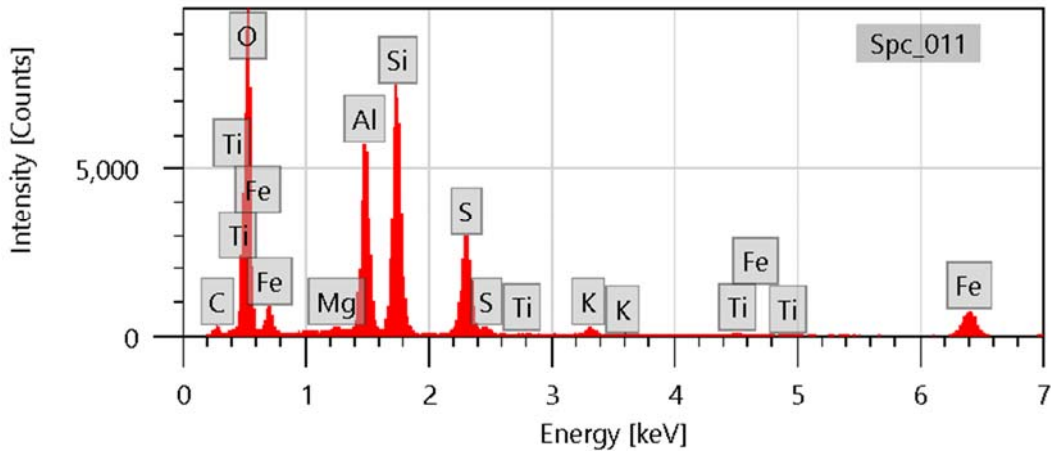
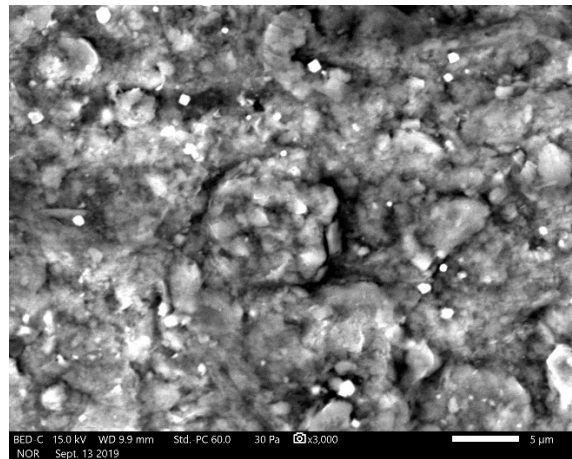
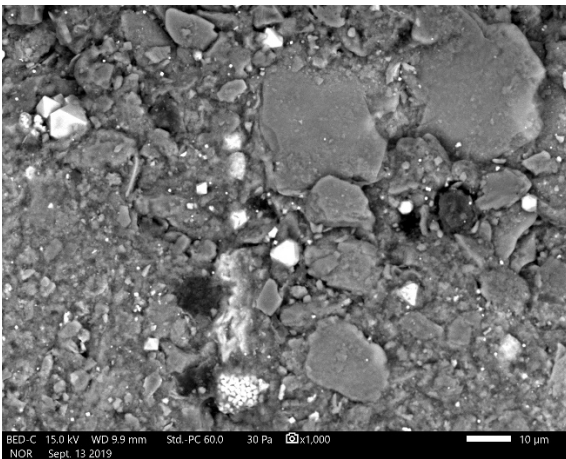
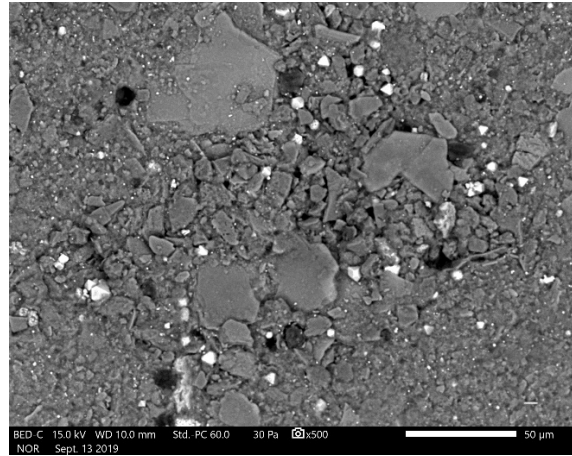
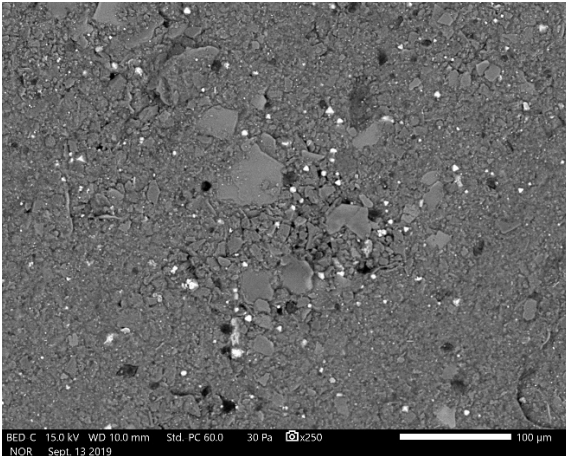
via Email: BSass@geosyntec.com



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 D

Certification by Qualified Professional Engineer

CERTIFICATION BY A QUALIFIED PROFESSIONAL ENGINEER

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

Beth Ann Gross

Printed Name of Licensed Professional Engineer

Beth Ann Gross
Signature



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

Texas Registered Engineering Firm
No. F-1182

79864
License Number

Texas
Licensing State

5/28/2021
Date

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

**H.W. Pirkey Power Plant
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
Columbus, OH 43221

December 2021

CHA8495

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Attachment B	SB-28 Boring Photographic Log
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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 first semi-annual detection monitoring event of 2021. The WBAP is registered as a surface impoundment under Texas Commission on Environmental Quality (TCEQ) Industrial and Hazardous Waste Solid Waste Registration No. 33240.

The H.W. Pirkey Plant has four regulated coal combustion residuals (CCR) storage units, including the WBAP (**Figure 1**). In May 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 0.0136 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 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 allows the owner or operator 90 days from the determination of an SSL to demonstrate that a source other than the CCR unit caused the SSL. The methodology used to evaluate the SSL identified for cobalt and the proposed alternative source are described below.

2.1 Proposed Alternative Source

An initial review of site geochemistry, site historical data, and laboratory quality assurance/quality control (QA/QC) data did not identify alternative sources for cobalt 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 were due to natural variation (Geosyntec, 2019a; Geosyntec, 2019b; Geosyntec, 2020b; Geosyntec, 2020c; Geosyntec, 2021b). 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**).

Surface water samples were previously collected from the East Bottom Ash Pond (EBAP) and WBAP to characterize the total cobalt concentrations. The EBAP and WBAP receive the same process water, with the use of each pond dependent on available freeboard and cleaning schedule; thus, there is a basis for the equivalency between these two surface water samples. Cobalt was detected at a concentration of 0.000501 mg/L in a sample collected from the WBAP on November 4, 2020. Cobalt was detected in a surface water sample collected on June 2, 2020 from the EBAP at an estimated concentration of 0.00008 mg/L (**Table 1**). These concentrations are lower than all reported cobalt concentrations for in-network wells from the most recent sampling event, and over an order of magnitude lower than the average concentration 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 A**. 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 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 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, 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 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.

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. Additionally, the pond was not identified as the source of cobalt at AD-28 based on the low concentrations of cobalt in the pond itself.

2.2 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 May 2021 was not due to a release from the WBAP. The identified SSL was, instead, 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
AD-28 - Average	May 2016 - May 2021	mg/L	0.0146

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 components are shown in relative abundance.

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

Geosyntec Consultants, Inc.

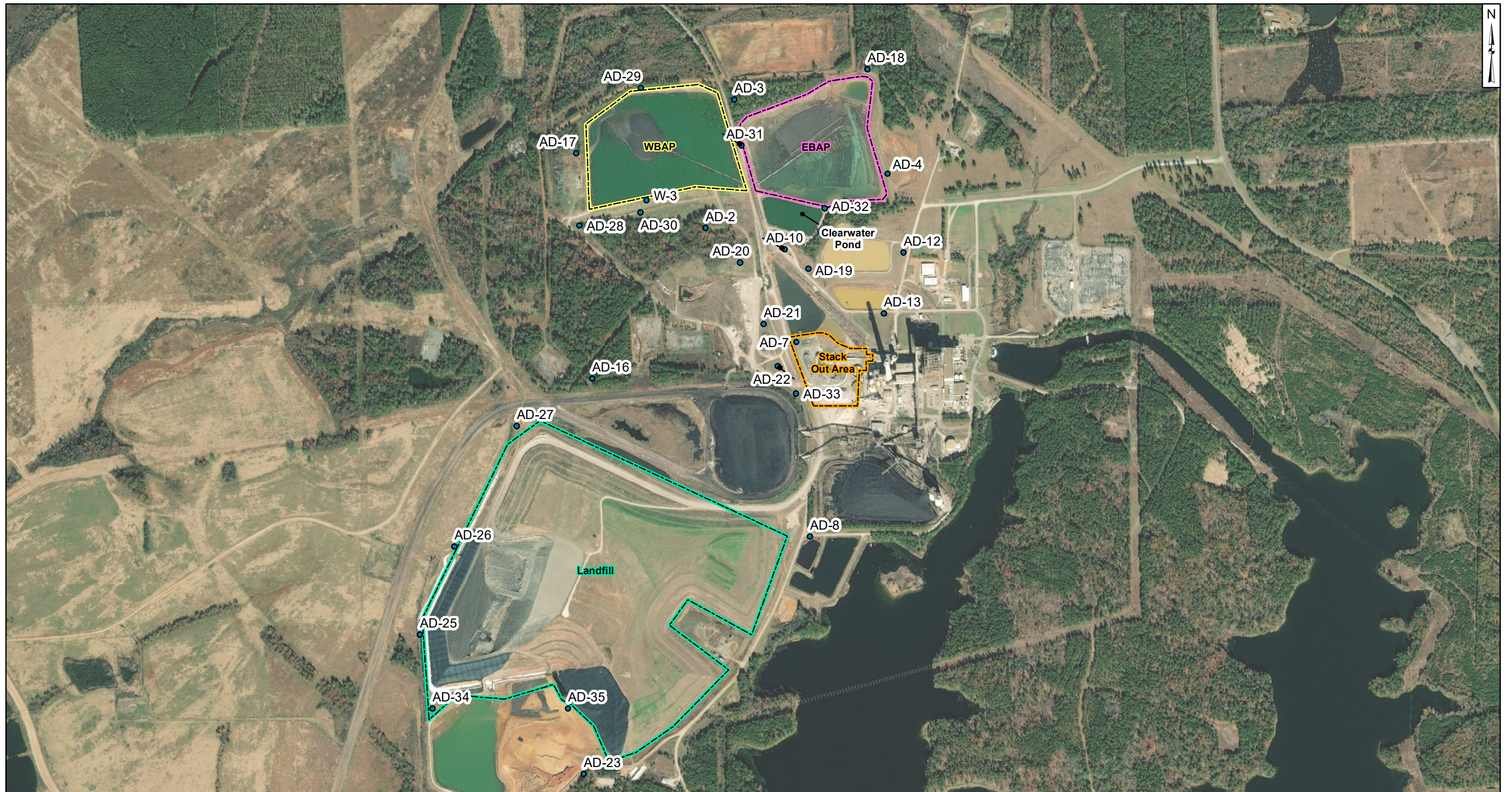
Constituent	VAP-B3-(40-45)
Quartz	15
Plagioclase Feldspar	0.5
Orthoclase	ND
Calcite	ND
Dolomite	ND
Siderite	0.5
Goethite	ND
Hematite	2
Pyrite	3
Kaolinite	42
Chlorite	4
Illite/Mica	6
Smectite	12
Amorphous	15

Notes:

ND: Not detected

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

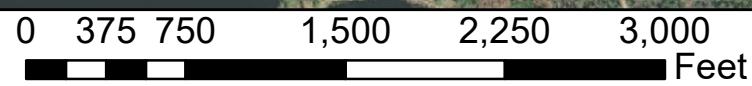
FIGURES



Legend

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

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



Site Layout

AEP Pirkey Power Plant
 Hallsville, Texas

Geosyntec
 consultants

Columbus, Ohio

2020/03/24

Figure

1

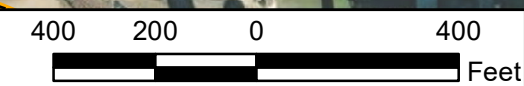


Legend

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

Notes

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



Cobalt Distribution in Groundwater	
AEP Pirkey Power Plant Hallsville, Texas	
Geosyntec consultants	
Columbus, Ohio	2021/12/15
Figure 2	



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

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

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

Location	AD-17	
Depth (ft bgs)	7	15
Cobalt (mg/kg)	3.1	1.5
Pyrite/Marcasite (%)	2	0

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

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


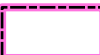

Location	B-3		
Depth (ft bgs)	10	20	97
Cobalt (mg/kg)	1.30	0.59	1.11
Pyrite/Marcasite (%)	-	-	-

Location	AD-28			
Depth (ft bgs)	6 - 6.5	15.5 - 16	25 - 30	40 - 41
Cobalt (mg/kg)	< 2.38	4.53	< 2.50	8.7
Pyrite/Marcasite (%)	0	0	3	3

Location	AD-30	
Depth (ft bgs)	7	23
Cobalt (mg/kg)	1	15
Pyrite/Marcasite (%)	3	1

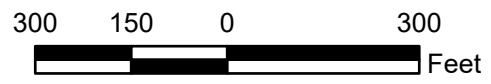
Location	AD-32	
Depth (ft bgs)	11	20-25
Cobalt (mg/kg)	1.7	9.1
Pyrite/Marcasite (%)	--	--

Legend

-  Monitoring Wells
-  EBAP
-  WBAP

Notes

- Monitoring well coordinates provided by AEP.
- AD-2 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

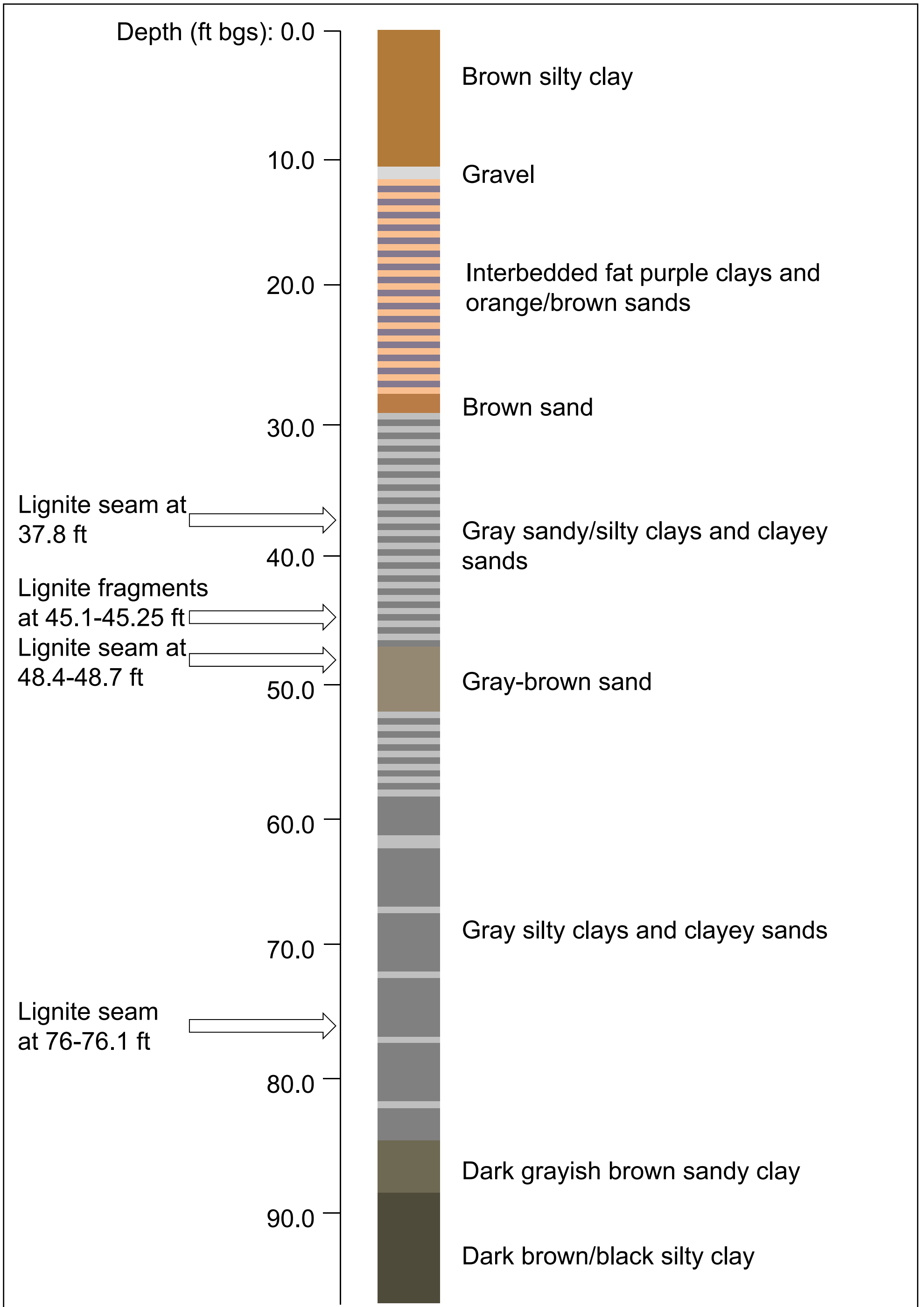
AEP Pirkey Power Plant
Hallsville, Texas

Geosyntec
consultants

Columbus, Ohio

2020/12/22

Figure
3



Notes:

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

B-3 Visual Boring Log

AEP Pirkey Powerplant
Hallsville, TX

Geosyntec
consultants

Figure

4

CHA8462

March 2020

ATTACHMENT A
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 ADJ.		CHARACTERISTICS					
CONDITION		CONSISTENCY		PENETROMETER	N - VALUE											
VLo	Very Loose	0-4	Vso	Very Soft	0 - 0.25	<2	Li	Light	Br	Brown	Cl	Clay, Clayey	F	Fine	Calc	Calcareous
Lo	Loose	4-10	So	Soft	0.25 - 0.5	2 - 4	Dk	Dark	Bk	Black	Si	Silt, Silty	Lig	Lignite	Org	Organic
MDe	Med. Dense	10-30	Mst	Stiff	0.5 - 1.0	4 - 8	G	Grey	Bl	Blue	Sa	Sand, Sandy	Ls	Limestone	Lam	Laminate
De	Dense	30-50	St	Stiff	1.0 - 2.0	8 - 15	T	Tan	Gr	Green	Gr	Gravel	Sl	Slickensided	SL	Slightly
VDe	Very Dense	>50	VSt	Very Stiff	2.0 - 4.0	15 - 30	R	Red	Y	Yellow	SiS	Siltstone	SS	Sandstone	Sm(s)	Seam(s)
			H	Hard	> 4.0	>30	Rd	Reddish	Wh	White	Sh	Shale, Shaley	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"		
SM	4'	0-2	Br Lt Br	Si	Sa	Silty sand, trace clay & roots, trace fine iron ore gravel,						moist (0-2)	
		2-10	Rd Br, Yllw Br	Si, Gr	Cl	Clay - some silt, trace 1/4" sand, trace coarse iron ore concretions						moist (2-5)	
CL	1.5'	5-10				- some v.f. sand, ironstone layer @ 6-6.5'						moist (5-10)	
		10-15	10'-16'	Rd Br, Lt Gr	Si Cl	Sa	Clayey v.f. t.f. Silty Sand with clay in thin lenses, trace cemented clayey sand					v. moist (10-15)	
SC 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)	
SM	3"	20-25	16'-40'	Br, Lt. Rd Br	Si	Sa	Silty Sand - some ironstone - gray @ 20'					Saturated @ 16' to 40'	
	3'	25-30		Gray			= some cemented clayey sand (only recovery) @ 25-30'						
	NR	30-35											
	NR	35-40											
							R.T. @ 40'						
							* Split Spoon Driven from 40-41'						
SC	1'	40-41	40-41	Gray, DK Gray	Cl	Sa	Clayey sand w/ lenses of cemented sand @ 41.5-41.75' trace gypsum crystals @ 40-41'					v. moist 40-41'	
							* 6-6.5' collected @ 1140 * 15.5-16' collected @ 1215 * 25-30' 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 B
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.

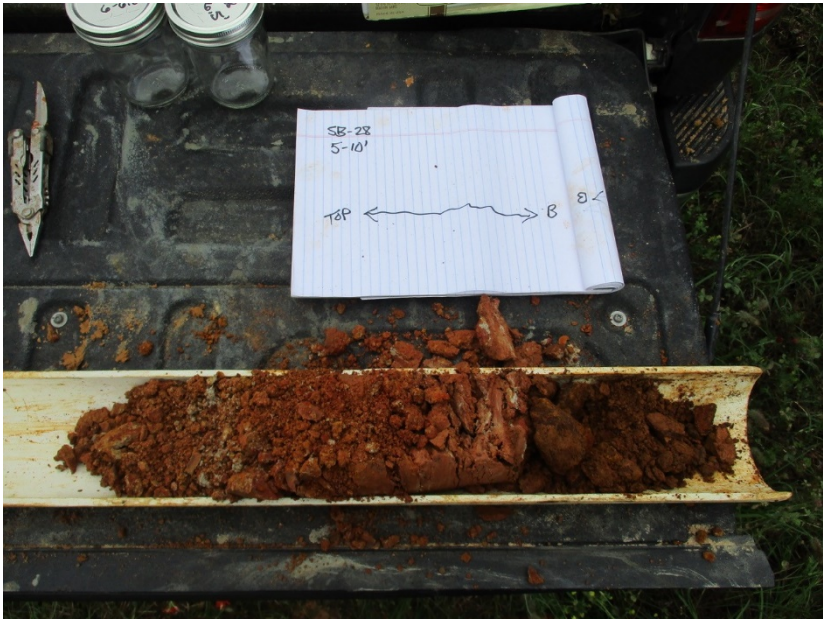


Photograph 3

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

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.

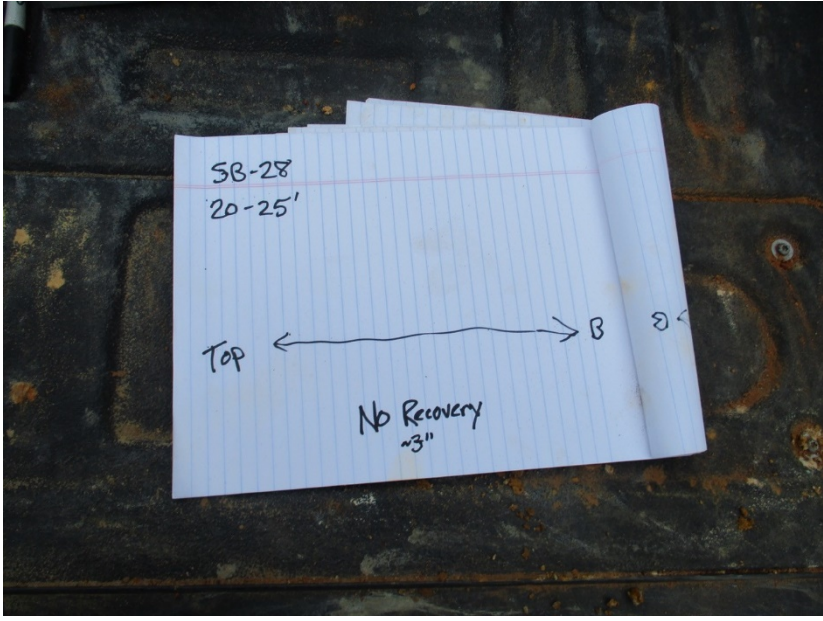


Photograph 6

Date: 4/21/2020

Direction: N/A

Comments:
 Field geologist's note indicating that very little of the 20-25 foot interval of SB-28 was recovered.



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.

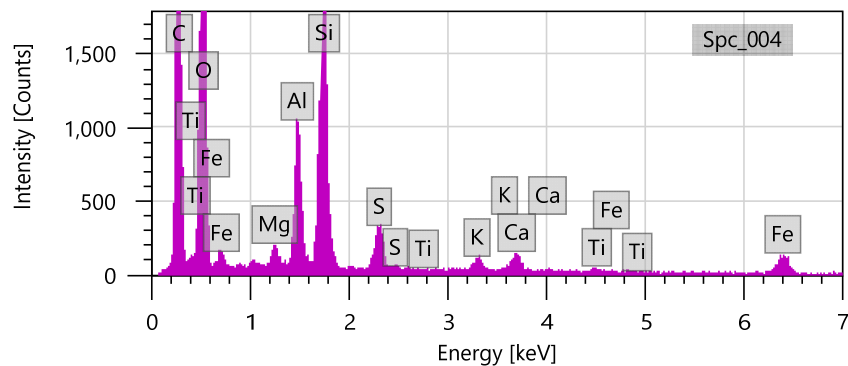
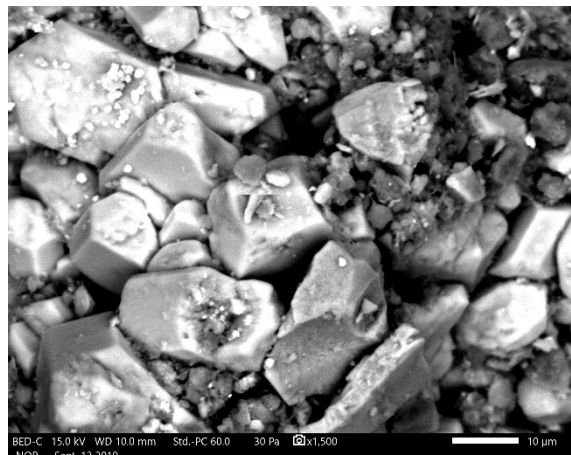
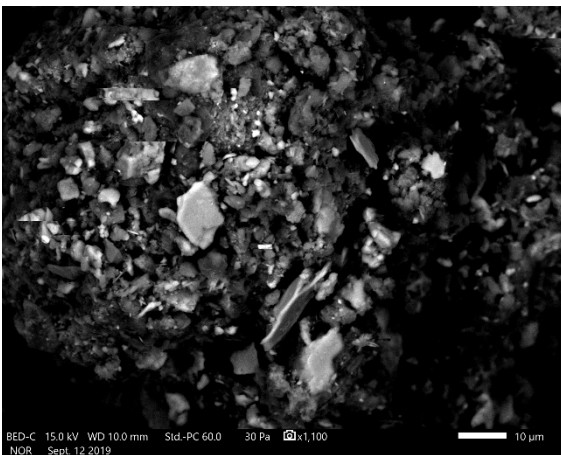
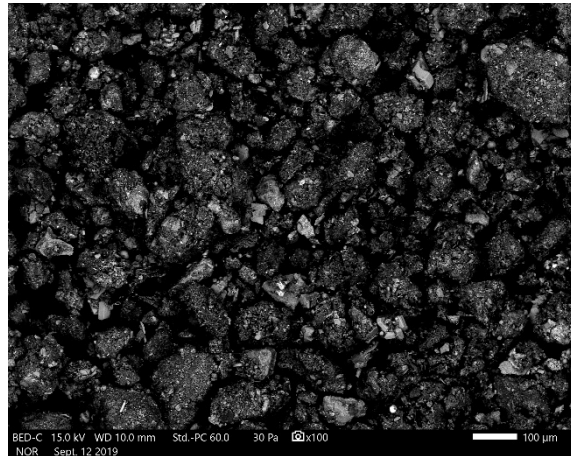
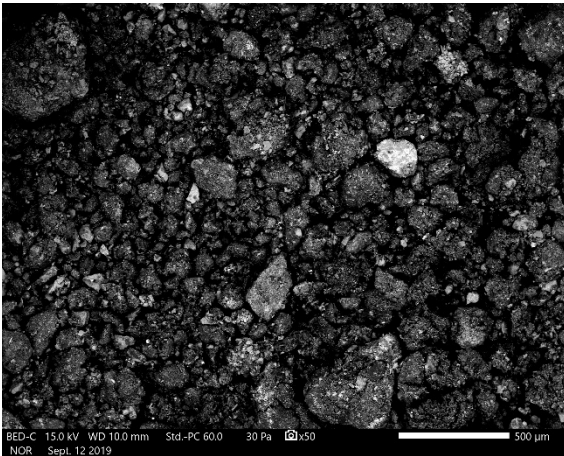


ATTACHMENT C
SEM/EDS Analysis

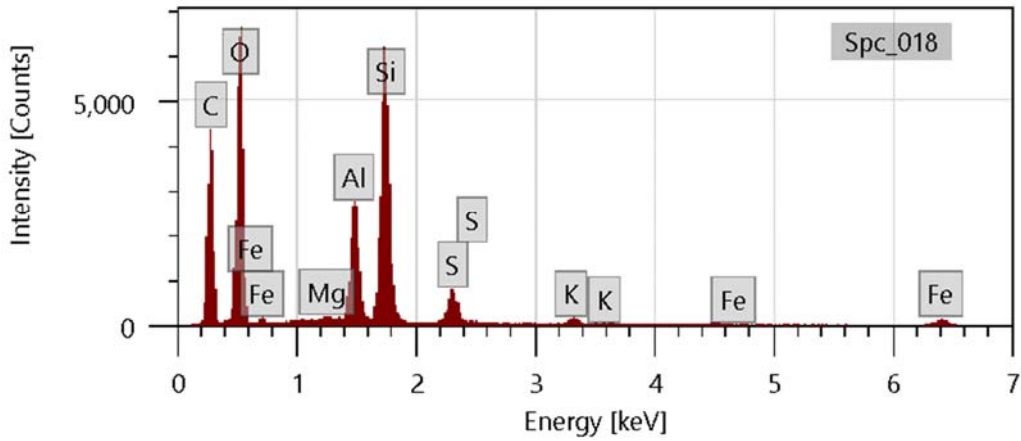
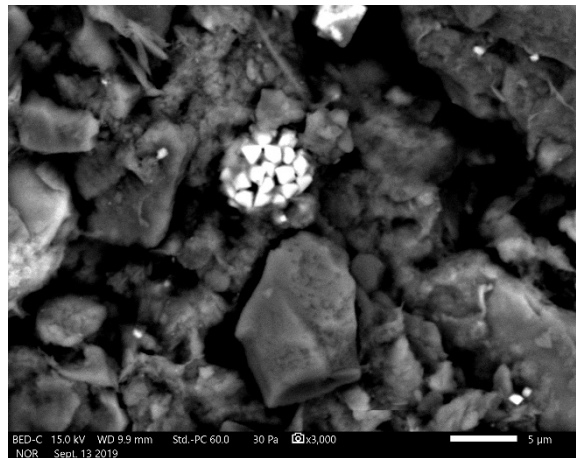
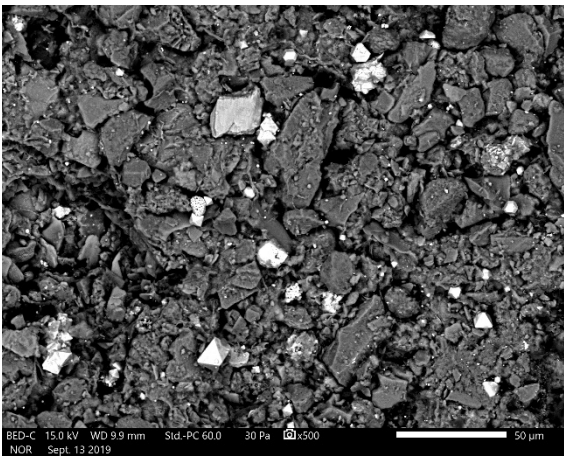
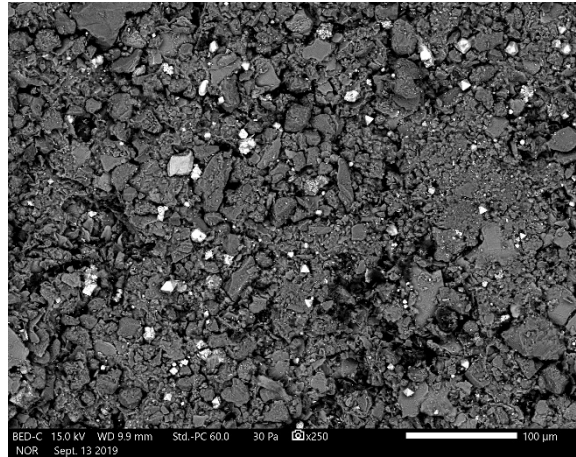
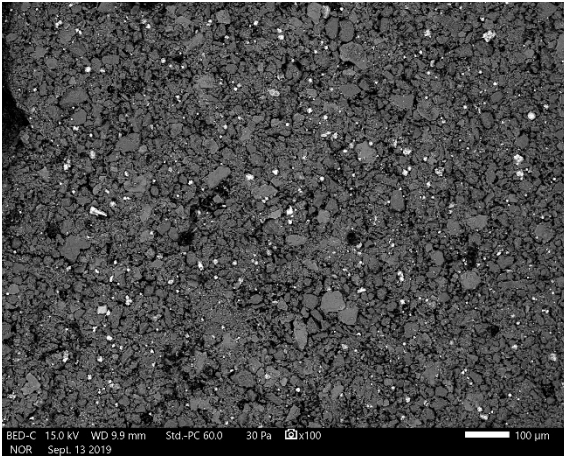
September 16, 2019

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

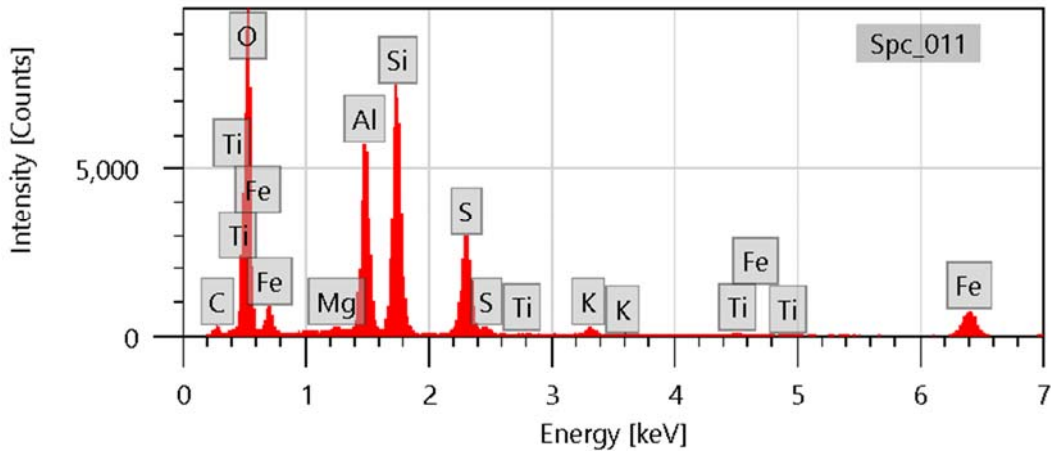
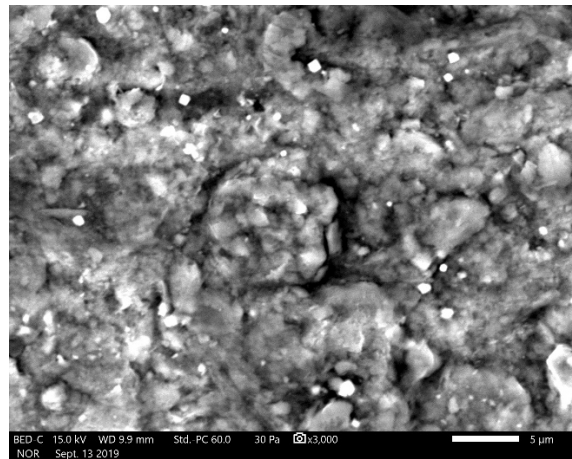
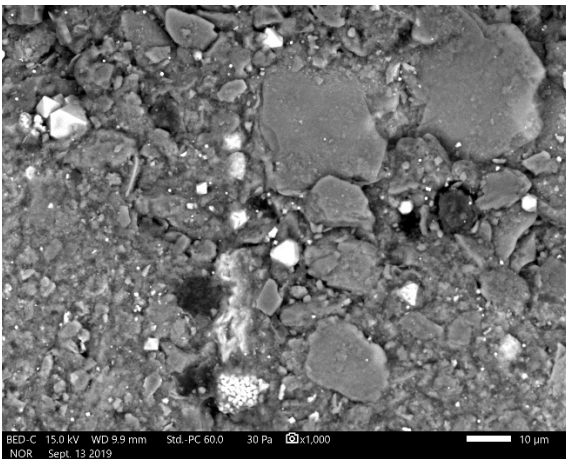
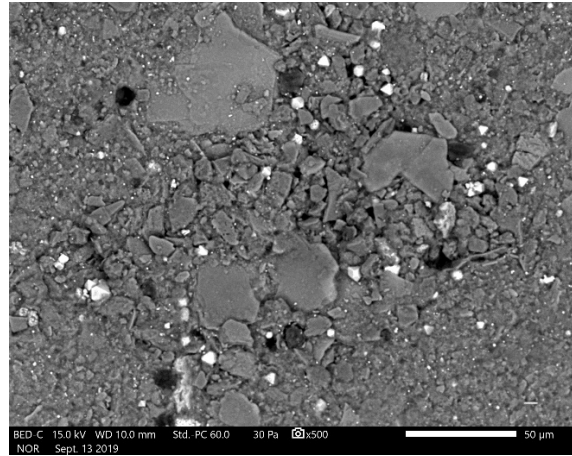
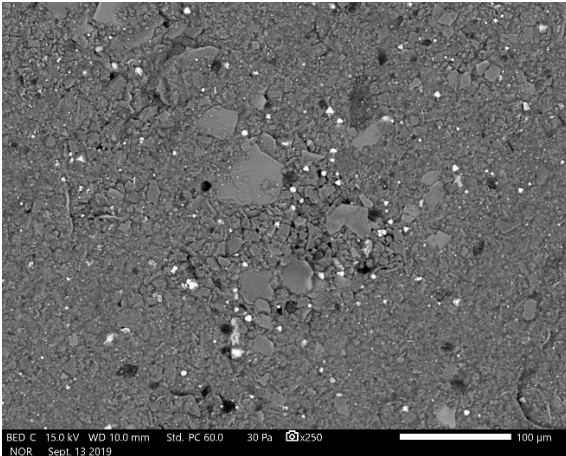
via Email: BSass@geosyntec.com



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 D

Certification by Qualified Professional Engineer

CERTIFICATION BY A QUALIFIED PROFESSIONAL ENGINEER

I certify that the selected and above described alternative source demonstration is appropriate for evaluating the groundwater monitoring data for the Pirkey 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

12/22/2021
Date

APPENDIX 4- Field Sheets

APPENDIX 5- Analytical Laboratory Reports



Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
T: 614-836-4221, Audinet 210-4221
F: 614-836-4168, Audinet 210-4168
<http://aepenv/labs>

Water Analysis

Location: Pirkey PS

Report Date: 3/26/2021

AD-2
Sample Number: 210572-001 **Date Collected: 03/09/2021 10:37** **Date Received: 3/11/2021**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.283	mg/L		0.2	0.04	CRJ	03/18/2021 18:59	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	30.2	mg/L		0.04	0.01	CRJ	03/18/2021 18:59	EPA 300.1-1997, Rev. 1.0
Fluoride, F	0.23	mg/L		0.06	0.01	CRJ	03/18/2021 18:59	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	450	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	209	mg/L		2	0.3	CRJ	03/18/2021 18:33	EPA 300.1-1997, Rev. 1.0

AD-3
Sample Number: 210572-002 **Date Collected: 03/09/2021 11:56** **Date Received: 3/11/2021**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.06	mg/L	J	0.2	0.04	CRJ	03/18/2021 17:17	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	5.98	mg/L		0.04	0.01	CRJ	03/18/2021 17:17	EPA 300.1-1997, Rev. 1.0
Fluoride, F	0.06	mg/L		0.06	0.01	CRJ	03/18/2021 17:17	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	158	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	27.1	mg/L		0.4	0.06	CRJ	03/18/2021 17:17	EPA 300.1-1997, Rev. 1.0

AD-4
Sample Number: 210572-003 **Date Collected: 03/09/2021 12:03** **Date Received: 3/11/2021**

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.2	mg/L	J	0.2	0.04	CRJ	03/18/2021 18:08	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	3.63	mg/L		0.04	0.01	CRJ	03/18/2021 18:08	EPA 300.1-1997, Rev. 1.0
Fluoride, F	0.12	mg/L		0.06	0.01	CRJ	03/18/2021 18:08	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	146	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	21.5	mg/L		0.4	0.06	CRJ	03/18/2021 18:08	EPA 300.1-1997, Rev. 1.0

AD-7

Sample Number: 210572-004

Date Collected: 03/09/2021 09:43

Date Received: 3/11/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	2.74	mg/L		0.2	0.04	CRJ	03/18/2021 19:50	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	29.3	mg/L		0.04	0.01	CRJ	03/18/2021 19:50	EPA 300.1-1997, Rev. 1.0
Fluoride, F	0.55	mg/L		0.06	0.01	CRJ	03/18/2021 19:50	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	283	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	71.5	mg/L		0.4	0.06	CRJ	03/18/2021 19:50	EPA 300.1-1997, Rev. 1.0

AD-12

Sample Number: 210572-005

Date Collected: 03/08/2021 10:27

Date Received: 3/11/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.05	mg/L	J	0.2	0.04	CRJ	03/18/2021 20:15	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	6.46	mg/L		0.04	0.01	CRJ	03/18/2021 20:15	EPA 300.1-1997, Rev. 1.0
Fluoride, F	0.11	mg/L		0.06	0.01	CRJ	03/18/2021 20:15	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	68	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	3.8	mg/L		0.4	0.06	CRJ	03/18/2021 20:15	EPA 300.1-1997, Rev. 1.0

AD-13

Sample Number: 210572-006

Date Collected: 03/08/2021 09:47

Date Received: 3/11/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.267	mg/L		0.2	0.04	CRJ	03/18/2021 23:38	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	41.2	mg/L		0.2	0.06	CRJ	03/18/2021 23:13	EPA 300.1-1997, Rev. 1.0
Fluoride, F	0.36	mg/L		0.06	0.01	CRJ	03/18/2021 23:38	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	229	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	74.6	mg/L		0.4	0.06	CRJ	03/18/2021 23:38	EPA 300.1-1997, Rev. 1.0

AD-17

Sample Number: 210572-007

Date Collected: 03/09/2021 11:06

Date Received: 3/11/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.1	mg/L	J	0.2	0.04	CRJ	03/18/2021 22:48	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	10.2	mg/L		0.04	0.01	CRJ	03/18/2021 22:48	EPA 300.1-1997, Rev. 1.0
Fluoride, F	0.17	mg/L		0.06	0.01	CRJ	03/18/2021 22:48	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	83	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	2.3	mg/L		0.4	0.06	CRJ	03/18/2021 22:48	EPA 300.1-1997, Rev. 1.0

AD-18

Sample Number: 210572-008

Date Collected: 03/09/2021 13:15

Date Received: 3/11/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.04	mg/L	J	0.2	0.04	CRJ	03/19/2021 00:29	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	6.61	mg/L		0.04	0.01	CRJ	03/19/2021 00:29	EPA 300.1-1997, Rev. 1.0
Fluoride, F	0.02	mg/L	J	0.06	0.01	CRJ	03/19/2021 00:29	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	113	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	6.6	mg/L		0.4	0.06	CRJ	03/19/2021 00:29	EPA 300.1-1997, Rev. 1.0

AD-22

Sample Number: 210572-009

Date Collected: 03/08/2021 10:56

Date Received: 3/11/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.376	mg/L		0.2	0.04	CRJ	03/19/2021 01:20	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	71.1	mg/L		0.2	0.06	CRJ	03/19/2021 00:55	EPA 300.1-1997, Rev. 1.0
Fluoride, F	1.03	mg/L		0.06	0.01	CRJ	03/19/2021 01:20	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	692	mg/L		100	40	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	337	mg/L		2	0.3	CRJ	03/19/2021 00:55	EPA 300.1-1997, Rev. 1.0

AD-28

Sample Number: 210572-010

Date Collected: 03/09/2021 10:18

Date Received: 3/11/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.07	mg/L	J	0.2	0.04	CRJ	03/19/2021 02:11	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	5.16	mg/L		0.04	0.01	CRJ	03/19/2021 02:11	EPA 300.1-1997, Rev. 1.0
Fluoride, F	1.03	mg/L		0.06	0.01	CRJ	03/19/2021 02:11	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	117	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	28.3	mg/L		0.4	0.06	CRJ	03/19/2021 02:11	EPA 300.1-1997, Rev. 1.0

AD-30

Sample Number: 210572-011

Date Collected: 03/09/2021 09:35

Date Received: 3/11/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.286	mg/L		0.2	0.04	CRJ	03/19/2021 03:02	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	23.5	mg/L		0.04	0.01	CRJ	03/19/2021 03:02	EPA 300.1-1997, Rev. 1.0
Fluoride, F	0.07	mg/L		0.06	0.01	CRJ	03/19/2021 03:02	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	264	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	122	mg/L		2	0.3	CRJ	03/19/2021 02:36	EPA 300.1-1997, Rev. 1.0

AD-31

Sample Number: 210572-012

Date Collected: 03/08/2021 12:23

Date Received: 3/11/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.291	mg/L		0.2	0.04	CRJ	03/19/2021 03:53	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	18.5	mg/L		0.04	0.01	CRJ	03/19/2021 03:53	EPA 300.1-1997, Rev. 1.0
Fluoride, F	0.17	mg/L		0.06	0.01	CRJ	03/19/2021 03:53	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	279	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	81.1	mg/L		0.4	0.06	CRJ	03/19/2021 03:53	EPA 300.1-1997, Rev. 1.0

AD-32

Sample Number: 210572-013

Date Collected: 03/08/2021 11:21

Date Received: 3/11/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.604	mg/L		0.2	0.04	CRJ	03/19/2021 07:16	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	33.5	mg/L		0.04	0.01	CRJ	03/19/2021 07:16	EPA 300.1-1997, Rev. 1.0
Fluoride, F	1.08	mg/L		0.06	0.01	CRJ	03/19/2021 07:16	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	1020	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
The %RPD between sample and duplicate exceeds 5%. Sdw031721								
Sulfate, SO4	714	mg/L		5	0.8	CRJ	03/19/2021 13:40	EPA 300.1-1997, Rev. 1.0

AD-33

Sample Number: 210572-014

Date Collected: 03/08/2021 11:59

Date Received: 3/11/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.260	mg/L		0.2	0.04	CRJ	03/19/2021 06:25	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	8.65	mg/L		0.04	0.01	CRJ	03/19/2021 06:25	EPA 300.1-1997, Rev. 1.0
Fluoride, F	0.42	mg/L		0.06	0.01	CRJ	03/19/2021 06:25	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	213	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	70.1	mg/L		0.4	0.06	CRJ	03/19/2021 06:25	EPA 300.1-1997, Rev. 1.0

Duplicate 1

Sample Number: 210572-015

Date Collected: 03/08/2021 11:21

Date Received: 3/11/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.610	mg/L		0.2	0.04	CRJ	03/19/2021 10:16	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	33.4	mg/L		0.04	0.01	CRJ	03/19/2021 10:16	EPA 300.1-1997, Rev. 1.0
Fluoride, F	1.07	mg/L		0.06	0.01	CRJ	03/19/2021 10:16	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	1020	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	727	mg/L		5	0.8	CRJ	03/19/2021 14:05	EPA 300.1-1997, Rev. 1.0

Duplicate 2

Sample Number: 210572-016

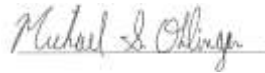
Date Collected: 03/09/2021 10:37

Date Received: 3/11/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Alkalinity, as CaCO3	< 5	mg/L	U	20	5	MGK	03/12/2021 15:11	SM 2320B-2011
Bromide, Br	0.279	mg/L		0.2	0.04	CRJ	03/19/2021 10:42	EPA 300.1-1997, Rev. 1.0
Chloride, Cl	30.1	mg/L		0.04	0.01	CRJ	03/19/2021 10:42	EPA 300.1-1997, Rev. 1.0
Fluoride, F	0.22	mg/L		0.06	0.01	CRJ	03/19/2021 10:42	EPA 300.1-1997, Rev. 1.0
Residue, Filterable, TDS	431	mg/L		50	20	SDW	03/12/2021	SM 2540C-2011
Sulfate, SO4	210	mg/L		2	0.3	CRJ	03/19/2021 08:35	EPA 300.1-1997, Rev. 1.0

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.



Michael Ohlinger, Chemist

Email msohlinger@aep.com Tel.

Fax 614-836-4168 Audinet 8-210-

THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED AND SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY. ALL TEST RESULTS MEET ALL OF THE REQUIREMENTS OF THE ACCREDITING AUTHORITY, UNLESS OTHERWISE NOTED.

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

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

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

Site Contact: _____ Date: _____
 For Lab Use Only:
 COC/Order #: _____

Analysis Turnaround Time (in Calendar Days)

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	# of Cont.	Analysis Turnaround Time (in Calendar Days)						Sample Specific Notes:						
					Matrix	Field-filter 250 mL bottle, then pH<2, HNO ₃	250 mL bottle, pH<2, HNO ₃	B, Ca, Li, Sb, As, Ba, Mo, Se, TL and Na, K, Mg, Sr	B, Cd, Cr, Co, Pb, Mn, Mo, Pb, Se, Tl and Na, K, Mg, Sr	1 L bottle, Cool, 0-5°C		Three (six every 10hr) 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-31	3/8/2021	1223	G	1	GW					X							
AD-32	3/8/2021	1121	G	1	GW					X							
AD-33	3/8/2021	1159	G	1	GW					X							
DUPLICATE 1	3/8/2021	1121	G	1	GW					X							
DUPLICATE 2	3/8/2021	1037	G	1	GW					X							
					Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____; F= filter in field												
* Six 1L Bottles must be collected for Radium for every 10th sample.																	

Special Instructions/QC Requirements & Comments:

Relinquished by: *[Signature]* Date/Time: 3/10/21 1430 Received by: _____ Date/Time: _____
 Relinquished by: *[Signature]* Date/Time: _____ Received by: _____ Date/Time: _____
 Relinquished by: *[Signature]* Date/Time: _____ Received in Laboratory by: *[Signature]* Date/Time: 5-11-21 11:30



WATER & WASTE SAMPLE RECEIPT FORM

Package Type				Delivery Type			
Cooler	Box	Bag	Envelope	PONY	UPS	FedEX	USPS
				Other _____			
Plant/Customer <u>Portkey</u>				Number of Plastic Containers: <u>16</u>			
Opened By <u>SM, MGK</u>				Number of Glass Containers: _____			
Date/Time <u>3-11-21 11:30</u>				Number of Mercury Containers: _____			
Were all temperatures within 0-6°C? <input checked="" type="radio"/> Y <input type="radio"/> N or N/A Initial: <u>MGK</u> <input checked="" type="radio"/> on ice <input type="radio"/> no ice							
1(IR Gun Ser# <u>200700311</u> , Expir. <u>11/06/22</u>) - If No, specify each deviation: _____							
Was container in good condition? <input checked="" type="radio"/> Y <input type="radio"/> N Comments _____							
Was Chain of Custody received? <input checked="" type="radio"/> Y <input type="radio"/> N Comments _____							
Requested turnaround: <u>Route</u> If RUSH, who was notified? _____							
pH (15 min)	Cr 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 3-11-21

pH paper (circle one): MQuant,PN1.09535.0001,LOT# HC904495 [OR] Lab Rat,PN4801,LOT# X000RWDG21

- Was Add'l Preservative needed? Y N If Yes: By whom & when: _____ (See Prep Book)

Is sample filtration requested? Y N Comments _____ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: _____

Lab ID# 210577 Initial & Date & Time: _____

Comments: _____

Logged by MSO

Reviewed by MGK

REMINDER: Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.



Dolan Chemical Laboratory
4001 Bixby Road
Groveport, OH 43125
T: 614-836-4221, Audinet 210-4221
F: 614-836-4168, Audinet 210-4168
<http://aepenv/labs>

Water Analysis

Location: Pirkey PS

Report Date: 4/12/2021

AD-2

Sample Number: 210586-001

Date Collected: 03/09/2021 10:37

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 12:58	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.68	ug/L		0.1	0.03	GES	03/17/2021 12:58	EPA 200.8-1994, Rev. 5.4
Barium, Ba	19.6	ug/L		0.2	0.05	GES	03/17/2021 12:58	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.564	ug/L		0.1	0.007	GES	03/17/2021 12:58	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.09	ug/L		0.05	0.004	GES	03/17/2021 12:58	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.280	ug/L		0.2	0.04	GES	03/17/2021 12:58	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	20.2	ug/L		0.05	0.003	GES	03/17/2021 12:58	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.517	ug/L		0.2	0.05	GES	03/17/2021 12:58	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.074	ug/L		0.01	0.004	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 12:58	EPA 200.8-1994, Rev. 5.4
Selenium, Se	2.3	ug/L		0.5	0.09	GES	03/17/2021 12:58	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.1	ug/L	J	0.5	0.04	GES	03/17/2021 12:58	EPA 200.8-1994, Rev. 5.4
Boron, B	2.76	mg/L		0.05	0.009	GES	03/17/2021 12:58	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	2.48	mg/L		0.3	0.1	SH	03/17/2021 14:58	EPA 200.7-1994, Rev. 4.4

dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Lithium, Li	0.0473	mg/L		0.0002	0.00005	GES	03/17/2021 12:58	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	5.54	mg/L		0.1	0.02	SH	03/17/2021 14:58	EPA 200.7-1994, Rev. 4.4

dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Potassium, K	1.22	mg/L		1	0.2	SH	03/17/2021 14:58	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Sodium, Na	94.2	mg/L		0.5	0.2	SH	03/17/2021 14:58	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Strontium, Sr	0.0395	mg/L		0.01	0.002	SH	03/17/2021 14:58	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	0.357	pCi/L	0.15	0.50	ttp	3/26/2021	SW-846 9320-2014, Rev. 1.0
The LFBF is outside of the acceptable limit of 75-125%.							
Radium-226	0.324	pCi/L	0.082	0.12		3/29/2021	SW-846 9315-1986, Rev. 0

The RPD between the sample and duplicate result exceeds 25%.

***The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.**

AD-2 Dissolved

Sample Number: 210586-001A

Date Collected: 03/09/2021 10:37

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	0.03	ug/L	J	0.1	0.02	GES	03/17/2021 13:03	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.68	ug/L		0.1	0.03	GES	03/17/2021 13:03	EPA 200.8-1994, Rev. 5.4
Barium, Ba	19.9	ug/L		0.2	0.05	GES	03/17/2021 13:03	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.559	ug/L		0.1	0.007	GES	03/17/2021 13:03	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.09	ug/L		0.05	0.004	GES	03/17/2021 13:03	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.728	ug/L		0.2	0.04	GES	03/17/2021 13:03	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	20.6	ug/L		0.05	0.003	GES	03/17/2021 13:03	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.516	ug/L		0.2	0.05	GES	03/17/2021 13:03	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 13:03	EPA 200.8-1994, Rev. 5.4
Selenium, Se	2.2	ug/L		0.5	0.09	GES	03/17/2021 13:03	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.1	ug/L	J	0.5	0.04	GES	03/17/2021 13:03	EPA 200.8-1994, Rev. 5.4
Boron, B	2.80	mg/L		0.05	0.009	GES	03/17/2021 13:03	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	2.59	mg/L		0.3	0.1	SH	03/17/2021 15:06	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Iron, Fe	0.144	mg/L		0.1	0.02	SH	03/17/2021 15:06	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0469	mg/L		0.0002	0.00005	GES	03/17/2021 13:03	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	5.59	mg/L		0.1	0.02	SH	03/17/2021 15:06	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Manganese, Mn	0.0772	mg/L		0.002	0.0005	SH	03/17/2021 15:06	EPA 200.7-1994, Rev. 4.4
Potassium, K	1.25	mg/L		1	0.2	SH	03/17/2021 15:06	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Sodium, Na	94.9	mg/L		0.5	0.2	SH	03/17/2021 15:06	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Strontium, Sr	0.0400	mg/L		0.01	0.002	SH	03/17/2021 15:06	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-3

Sample Number: 210586-002

Date Collected: 03/09/2021 11:56

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 11:36	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.53	ug/L		0.1	0.03	GES	03/17/2021 11:36	EPA 200.8-1994, Rev. 5.4
Barium, Ba	60.7	ug/L		0.2	0.05	GES	03/17/2021 11:36	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.185	ug/L		0.1	0.007	GES	03/17/2021 11:36	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.02	ug/L	J	0.05	0.004	GES	03/17/2021 11:36	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.207	ug/L		0.2	0.04	GES	03/17/2021 11:36	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	3.63	ug/L		0.05	0.003	GES	03/17/2021 11:36	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.1	ug/L	J	0.2	0.05	GES	03/17/2021 11:36	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 11:36	EPA 200.8-1994, Rev. 5.4
Selenium, Se	< 0.09	ug/L	U	0.5	0.09	GES	03/17/2021 11:36	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 11:36	EPA 200.8-1994, Rev. 5.4
Boron, B	0.03	mg/L	J	0.05	0.009	GES	03/17/2021 11:36	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	4.22	mg/L		0.3	0.1	SH	03/17/2021 15:44	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0445	mg/L		0.0002	0.00005	GES	03/17/2021 11:36	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	1.92	mg/L		0.1	0.02	SH	03/17/2021 15:44	EPA 200.7-1994, Rev. 4.4
Potassium, K	2.38	mg/L		1	0.2	SH	03/17/2021 15:44	EPA 200.7-1994, Rev. 4.4
Sodium, Na	9.34	mg/L		0.5	0.2	SH	03/17/2021 15:44	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.0307	mg/L		0.01	0.002	SH	03/17/2021 15:44	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	0.455	pCi/L	0.11	0.34	ttp	3/26/2021	SW-846 9320-2014,Rev. 1.0
The LFBD is outside of the acceptable limit of 75-125%.							
Radium-226	0.254	pCi/L	0.077	0.14		3/29/2021	SW-846 9315-1986,Rev. 0

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-3 Dissolved

Sample Number: 210586-002A

Date Collected: 03/09/2021 11:56

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 11:41	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.32	ug/L		0.1	0.03	GES	03/17/2021 11:41	EPA 200.8-1994, Rev. 5.4
Barium, Ba	59.0	ug/L		0.2	0.05	GES	03/17/2021 11:41	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.172	ug/L		0.1	0.007	GES	03/17/2021 11:41	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.02	ug/L	J	0.05	0.004	GES	03/17/2021 11:41	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.203	ug/L		0.2	0.04	GES	03/17/2021 11:41	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	3.59	ug/L		0.05	0.003	GES	03/17/2021 11:41	EPA 200.8-1994, Rev. 5.4
Lead, Pb	< 0.05	ug/L	U	0.2	0.05	GES	03/17/2021 11:41	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 11:41	EPA 200.8-1994, Rev. 5.4
Selenium, Se	< 0.09	ug/L	U	0.5	0.09	GES	03/17/2021 11:41	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 11:41	EPA 200.8-1994, Rev. 5.4
Boron, B	0.03	mg/L	J	0.05	0.009	GES	03/17/2021 11:41	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	4.18	mg/L		0.3	0.1	SH	03/17/2021 15:48	EPA 200.7-1994, Rev. 4.4
Iron, Fe	1.60	mg/L		0.1	0.02	SH	03/17/2021 15:48	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0445	mg/L		0.0002	0.00005	GES	03/17/2021 11:41	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	1.89	mg/L		0.1	0.02	SH	03/17/2021 15:48	EPA 200.7-1994, Rev. 4.4
Manganese, Mn	0.0433	mg/L		0.002	0.0005	SH	03/17/2021 15:48	EPA 200.7-1994, Rev. 4.4
Potassium, K	2.29	mg/L		1	0.2	SH	03/17/2021 15:48	EPA 200.7-1994, Rev. 4.4
Sodium, Na	9.15	mg/L		0.5	0.2	SH	03/17/2021 15:48	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.0303	mg/L		0.01	0.002	SH	03/17/2021 15:48	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-4

Sample Number: 210586-003

Date Collected: 03/09/2021 12:03

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 13:08	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.30	ug/L		0.1	0.03	GES	03/17/2021 13:08	EPA 200.8-1994, Rev. 5.4
Barium, Ba	87.9	ug/L		0.2	0.05	GES	03/17/2021 13:08	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.679	ug/L		0.1	0.007	GES	03/17/2021 13:08	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.01	ug/L	J	0.05	0.004	GES	03/17/2021 13:08	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.2	ug/L	J	0.2	0.04	GES	03/17/2021 13:08	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	6.50	ug/L		0.05	0.003	GES	03/17/2021 13:08	EPA 200.8-1994, Rev. 5.4
Lead, Pb	< 0.05	ug/L	U	0.2	0.05	GES	03/17/2021 13:08	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.002	ug/L	J	0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 13:08	EPA 200.8-1994, Rev. 5.4
Selenium, Se	< 0.09	ug/L	U	0.5	0.09	GES	03/17/2021 13:08	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.06	ug/L	J	0.5	0.04	GES	03/17/2021 13:08	EPA 200.8-1994, Rev. 5.4
Boron, B	0.02	mg/L	J	0.05	0.009	GES	03/17/2021 13:08	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	1.72	mg/L		0.3	0.1	SH	03/17/2021 15:52	EPA 200.7-1994, Rev. 4.4

dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Lithium, Li	0.0331	mg/L		0.0002	0.00005	GES	03/17/2021 13:08	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	1.32	mg/L		0.1	0.02	SH	03/17/2021 15:52	EPA 200.7-1994, Rev. 4.4

dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Potassium, K	2.44	mg/L		1	0.2	SH	03/17/2021 15:52	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Sodium, Na	9.42	mg/L		0.5	0.2	SH	03/17/2021 15:52	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Strontium, Sr	0.0162	mg/L		0.01	0.002	SH	03/17/2021 15:52	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	0.222	pCi/L	0.12	0.39	ttp	3/26/2021	SW-846 9320-2014, Rev. 1.0
The LFBD is outside of the acceptable limit of 75-125%.							
Radium-226	0.354	pCi/L	0.084	0.099		3/29/2021	SW-846 9315-1986, Rev. 0

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-4 Dissolved

Sample Number: 210586-003A

Date Collected: 03/09/2021 12:03

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 13:13	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.07	ug/L	J	0.1	0.03	GES	03/17/2021 13:13	EPA 200.8-1994, Rev. 5.4
Barium, Ba	90.6	ug/L		0.2	0.05	GES	03/17/2021 13:13	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.675	ug/L		0.1	0.007	GES	03/17/2021 13:13	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.01	ug/L	J	0.05	0.004	GES	03/17/2021 13:13	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.1	ug/L	J	0.2	0.04	GES	03/17/2021 13:13	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	6.74	ug/L		0.05	0.003	GES	03/17/2021 13:13	EPA 200.8-1994, Rev. 5.4
Lead, Pb	< 0.05	ug/L	U	0.2	0.05	GES	03/17/2021 13:13	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 13:13	EPA 200.8-1994, Rev. 5.4
Selenium, Se	< 0.09	ug/L	U	0.5	0.09	GES	03/17/2021 13:13	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.07	ug/L	J	0.5	0.04	GES	03/17/2021 13:13	EPA 200.8-1994, Rev. 5.4
Boron, B	0.02	mg/L	J	0.05	0.009	GES	03/17/2021 13:13	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	1.83	mg/L		0.3	0.1	SH	03/17/2021 15:56	EPA 200.7-1994, Rev. 4.4

dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Iron, Fe	0.257	mg/L		0.1	0.02	SH	03/17/2021 15:56	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0333	mg/L		0.0002	0.00005	GES	03/17/2021 13:13	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	1.34	mg/L		0.1	0.02	SH	03/17/2021 15:56	EPA 200.7-1994, Rev. 4.4

dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Manganese, Mn	0.0601	mg/L		0.002	0.0005	SH	03/17/2021 15:56	EPA 200.7-1994, Rev. 4.4
Potassium, K	2.49	mg/L		1	0.2	SH	03/17/2021 15:56	EPA 200.7-1994, Rev. 4.4

dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Sodium, Na	9.56	mg/L		0.5	0.2	SH	03/17/2021 15:56	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Strontium, Sr	0.0165	mg/L		0.01	0.002	SH	03/17/2021 15:56	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-7

Sample Number: 210586-004

Date Collected: 03/09/2021 09:43

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 13:19	EPA 200.8-1994, Rev. 5.4
Arsenic, As	1.32	ug/L		0.1	0.03	GES	03/17/2021 13:19	EPA 200.8-1994, Rev. 5.4
Barium, Ba	44.1	ug/L		0.2	0.05	GES	03/17/2021 13:19	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	4.80	ug/L		0.1	0.007	GES	03/17/2021 13:19	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.65	ug/L		0.05	0.004	GES	03/17/2021 13:19	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.402	ug/L		0.2	0.04	GES	03/17/2021 13:19	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	37.5	ug/L		0.05	0.003	GES	03/17/2021 13:19	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.997	ug/L		0.2	0.05	GES	03/17/2021 13:19	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.341	ug/L		0.02	0.007	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 13:19	EPA 200.8-1994, Rev. 5.4
Selenium, Se	4.9	ug/L		0.5	0.09	GES	03/17/2021 13:19	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.2	ug/L	J	0.5	0.04	GES	03/17/2021 13:19	EPA 200.8-1994, Rev. 5.4
Boron, B	2.12	mg/L		0.05	0.009	GES	03/17/2021 13:19	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	4.54	mg/L		0.3	0.1	SH	03/17/2021 16:00	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0684	mg/L		0.0002	0.00005	GES	03/17/2021 13:19	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	8.88	mg/L		0.1	0.02	SH	03/17/2021 16:00	EPA 200.7-1994, Rev. 4.4
Potassium, K	2.16	mg/L		1	0.2	SH	03/17/2021 16:00	EPA 200.7-1994, Rev. 4.4
Sodium, Na	18.5	mg/L		0.5	0.2	SH	03/17/2021 16:00	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.0660	mg/L		0.01	0.002	SH	03/17/2021 16:00	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	2.16	pCi/L	0.19	0.56	ttp	3/26/2021	SW-846 9320-2014, Rev. 1.0
The LFBD is outside of the acceptable limit of 75-125%.							
Radium-226	0.939	pCi/L	0.14	0.11		3/29/2021	SW-846 9315-1986, Rev. 0

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-7 Dissolved

Sample Number: 210586-004A

Date Collected: 03/09/2021 09:43

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 13:24	EPA 200.8-1994, Rev. 5.4
Arsenic, As	1.32	ug/L		0.1	0.03	GES	03/17/2021 13:24	EPA 200.8-1994, Rev. 5.4
Barium, Ba	43.9	ug/L		0.2	0.05	GES	03/17/2021 13:24	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	4.78	ug/L		0.1	0.007	GES	03/17/2021 13:24	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.65	ug/L		0.05	0.004	GES	03/17/2021 13:24	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.360	ug/L		0.2	0.04	GES	03/17/2021 13:24	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	37.0	ug/L		0.05	0.003	GES	03/17/2021 13:24	EPA 200.8-1994, Rev. 5.4
Lead, Pb	1.00	ug/L		0.2	0.05	GES	03/17/2021 13:24	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.056	ug/L		0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 13:24	EPA 200.8-1994, Rev. 5.4
Selenium, Se	4.8	ug/L		0.5	0.09	GES	03/17/2021 13:24	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.2	ug/L	J	0.5	0.04	GES	03/17/2021 13:24	EPA 200.8-1994, Rev. 5.4
Boron, B	2.10	mg/L		0.05	0.009	GES	03/17/2021 13:24	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	4.53	mg/L		0.3	0.1	SH	03/17/2021 16:04	EPA 200.7-1994, Rev. 4.4
Iron, Fe	0.121	mg/L		0.1	0.02	SH	03/17/2021 16:04	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0684	mg/L		0.0002	0.00005	GES	03/17/2021 13:24	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	8.80	mg/L		0.1	0.02	SH	03/17/2021 16:04	EPA 200.7-1994, Rev. 4.4
Manganese, Mn	0.0785	mg/L		0.002	0.0005	SH	03/17/2021 16:04	EPA 200.7-1994, Rev. 4.4
Potassium, K	2.17	mg/L		1	0.2	SH	03/17/2021 16:04	EPA 200.7-1994, Rev. 4.4
Sodium, Na	18.4	mg/L		0.5	0.2	SH	03/17/2021 16:04	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.0657	mg/L		0.01	0.002	SH	03/17/2021 16:04	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-12

Sample Number: 210586-005

Date Collected: 03/08/2021 10:27

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 13:29	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.07	ug/L	J	0.1	0.03	GES	03/17/2021 13:29	EPA 200.8-1994, Rev. 5.4
Barium, Ba	22.9	ug/L		0.2	0.05	GES	03/17/2021 13:29	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.150	ug/L		0.1	0.007	GES	03/17/2021 13:29	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.007	ug/L	J	0.05	0.004	GES	03/17/2021 13:29	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.2	ug/L	J	0.2	0.04	GES	03/17/2021 13:29	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	1.19	ug/L		0.05	0.003	GES	03/17/2021 13:29	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.07	ug/L	J	0.2	0.05	GES	03/17/2021 13:29	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 13:29	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.2	ug/L	J	0.5	0.09	GES	03/17/2021 13:29	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 13:29	EPA 200.8-1994, Rev. 5.4
Boron, B	0.01	mg/L	J	0.05	0.009	GES	03/17/2021 13:29	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	0.2	mg/L	J	0.3	0.1	SH	03/17/2021 16:08	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.00570	mg/L		0.0002	0.00005	GES	03/17/2021 13:29	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	0.395	mg/L		0.1	0.02	SH	03/17/2021 16:08	EPA 200.7-1994, Rev. 4.4
Potassium, K	0.2	mg/L	J	1	0.2	SH	03/17/2021 16:08	EPA 200.7-1994, Rev. 4.4
Sodium, Na	4.79	mg/L		0.5	0.2	SH	03/17/2021 16:08	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	< 0.002	mg/L	U	0.01	0.002	SH	03/17/2021 16:08	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	-0.0409	pCi/L	0.16	0.55	ttp	3/26/2021	SW-846 9320-2014,Rev. 1.0
The LFBD is outside of the acceptable limit of 75-125%.							
Radium-226	0.214	pCi/L	0.064	0.10		3/29/2021	SW-846 9315-1986,Rev. 0

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-12 Dissolved

Sample Number: 210586-005A

Date Collected: 03/08/2021 10:27

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 13:34	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.06	ug/L	J	0.1	0.03	GES	03/17/2021 13:34	EPA 200.8-1994, Rev. 5.4
Barium, Ba	21.7	ug/L		0.2	0.05	GES	03/17/2021 13:34	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.141	ug/L		0.1	0.007	GES	03/17/2021 13:34	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.008	ug/L	J	0.05	0.004	GES	03/17/2021 13:34	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.251	ug/L		0.2	0.04	GES	03/17/2021 13:34	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	1.14	ug/L		0.05	0.003	GES	03/17/2021 13:34	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.09	ug/L	J	0.2	0.05	GES	03/17/2021 13:34	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 13:34	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.1	ug/L	J	0.5	0.09	GES	03/17/2021 13:34	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 13:34	EPA 200.8-1994, Rev. 5.4
Boron, B	0.01	mg/L	J	0.05	0.009	GES	03/17/2021 13:34	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	0.3	mg/L	J	0.3	0.1	SH	03/17/2021 16:12	EPA 200.7-1994, Rev. 4.4
Iron, Fe	< 0.02	mg/L	U	0.1	0.02	SH	03/17/2021 16:12	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.00557	mg/L		0.0002	0.00005	GES	03/17/2021 13:34	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	0.393	mg/L		0.1	0.02	SH	03/17/2021 16:12	EPA 200.7-1994, Rev. 4.4
Manganese, Mn	0.0036	mg/L		0.002	0.0005	SH	03/17/2021 16:12	EPA 200.7-1994, Rev. 4.4
Potassium, K	0.2	mg/L	J	1	0.2	SH	03/17/2021 16:12	EPA 200.7-1994, Rev. 4.4
Sodium, Na	4.77	mg/L		0.5	0.2	SH	03/17/2021 16:12	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.003	mg/L	J	0.01	0.002	SH	03/17/2021 16:12	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-13

Sample Number: 210586-006

Date Collected: 03/08/2021 09:47

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 13:39	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.44	ug/L		0.1	0.03	GES	03/17/2021 13:39	EPA 200.8-1994, Rev. 5.4
Barium, Ba	56.7	ug/L		0.2	0.05	GES	03/17/2021 13:39	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	1.20	ug/L		0.1	0.007	GES	03/17/2021 13:39	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	< 0.004	ug/L	U	0.05	0.004	GES	03/17/2021 13:39	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.2	ug/L	J	0.2	0.04	GES	03/17/2021 13:39	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	46.3	ug/L		0.05	0.003	GES	03/17/2021 13:39	EPA 200.8-1994, Rev. 5.4
Lead, Pb	< 0.05	ug/L	U	0.2	0.05	GES	03/17/2021 13:39	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 13:39	EPA 200.8-1994, Rev. 5.4
Selenium, Se	< 0.09	ug/L	U	0.5	0.09	GES	03/17/2021 13:39	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 13:39	EPA 200.8-1994, Rev. 5.4
Boron, B	0.067	mg/L		0.05	0.009	GES	03/17/2021 13:39	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	13.2	mg/L		0.3	0.1	SH	03/17/2021 16:16	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Lithium, Li	0.132	mg/L		0.0002	0.00005	GES	03/17/2021 13:39	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	13.2	mg/L		0.1	0.02	SH	03/17/2021 16:16	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Potassium, K	4.93	mg/L		1	0.2	SH	03/17/2021 16:16	EPA 200.7-1994, Rev. 4.4
Sodium, Na	18.9	mg/L		0.5	0.2	SH	03/17/2021 16:16	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Strontium, Sr	0.165	mg/L		0.01	0.002	SH	03/17/2021 16:16	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit
 J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	0.537	pCi/L	0.16	0.53	ttp	3/26/2021	SW-846 9320-2014,Rev. 1.0
The LFBD is outside of the acceptable limit of 75-125%.							
Radium-226	0.817	pCi/L	0.13	0.12		3/29/2021	SW-846 9315-1986,Rev. 0

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-13 Dissolved

Sample Number: 210586-006A

Date Collected: 03/08/2021 09:47

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 13:44	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.17	ug/L		0.1	0.03	GES	03/17/2021 13:44	EPA 200.8-1994, Rev. 5.4
Barium, Ba	57.4	ug/L		0.2	0.05	GES	03/17/2021 13:44	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	1.28	ug/L		0.1	0.007	GES	03/17/2021 13:44	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	< 0.004	ug/L	U	0.05	0.004	GES	03/17/2021 13:44	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.1	ug/L	J	0.2	0.04	GES	03/17/2021 13:44	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	47.2	ug/L		0.05	0.003	GES	03/17/2021 13:44	EPA 200.8-1994, Rev. 5.4
Lead, Pb	< 0.05	ug/L	U	0.2	0.05	GES	03/17/2021 13:44	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 13:44	EPA 200.8-1994, Rev. 5.4
Selenium, Se	< 0.09	ug/L	U	0.5	0.09	GES	03/17/2021 13:44	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 13:44	EPA 200.8-1994, Rev. 5.4
Boron, B	0.068	mg/L		0.05	0.009	GES	03/17/2021 13:44	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	13.3	mg/L		0.3	0.1	SH	03/17/2021 16:20	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Iron, Fe	3.27	mg/L		0.1	0.02	SH	03/17/2021 16:20	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.141	mg/L		0.0002	0.00005	GES	03/17/2021 13:44	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	13.2	mg/L		0.1	0.02	SH	03/17/2021 16:20	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Manganese, Mn	0.476	mg/L		0.002	0.0005	SH	03/17/2021 16:20	EPA 200.7-1994, Rev. 4.4
Potassium, K	4.92	mg/L		1	0.2	SH	03/17/2021 16:20	EPA 200.7-1994, Rev. 4.4
Sodium, Na	18.9	mg/L		0.5	0.2	SH	03/17/2021 16:20	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Strontium, Sr	0.166	mg/L		0.01	0.002	SH	03/17/2021 16:20	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-17

Sample Number: 210586-007

Date Collected: 03/09/2021 11:06

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 15:37	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.13	ug/L		0.1	0.03	GES	03/17/2021 15:37	EPA 200.8-1994, Rev. 5.4
Barium, Ba	76.7	ug/L		0.2	0.05	GES	03/17/2021 15:37	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.321	ug/L		0.1	0.007	GES	03/17/2021 15:37	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.02	ug/L	J	0.05	0.004	GES	03/17/2021 15:37	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.222	ug/L		0.2	0.04	GES	03/17/2021 15:37	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	3.05	ug/L		0.05	0.003	GES	03/17/2021 15:37	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.06	ug/L	J	0.2	0.05	GES	03/17/2021 15:37	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.123	ug/L		0.05	0.02	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 15:37	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.1	ug/L	J	0.5	0.09	GES	03/17/2021 15:37	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 15:37	EPA 200.8-1994, Rev. 5.4
Boron, B	0.02	mg/L	J	0.05	0.009	GES	03/17/2021 15:37	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	< 0.1	mg/L	U	0.3	0.1	SH	03/17/2021 17:04	EPA 200.7-1994, Rev. 4.4

dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Lithium, Li	0.00924	mg/L		0.0002	0.00005	GES	03/17/2021 15:37	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	1.39	mg/L		0.1	0.02	SH	03/17/2021 17:04	EPA 200.7-1994, Rev. 4.4
Potassium, K	< 0.2	mg/L	U	1	0.2	SH	03/17/2021 17:04	EPA 200.7-1994, Rev. 4.4

dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Sodium, Na	5.14	mg/L		0.5	0.2	SH	03/17/2021 17:04	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Strontium, Sr	0.003	mg/L	J	0.01	0.002	SH	03/17/2021 17:04	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit
 J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	0.359	pCi/L	0.13	0.44	ttp	3/26/2021	SW-846 9320-2014,Rev. 1.0
The LFBD is outside of the acceptable limit of 75-125%.							
Radium-226	0.457	pCi/L	0.095	0.15		3/29/2021	SW-846 9315-1986,Rev. 0

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-17 Dissolved

Sample Number: 210586-007A

Date Collected: 03/09/2021 11:06

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 15:42	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.07	ug/L	J	0.1	0.03	GES	03/17/2021 15:42	EPA 200.8-1994, Rev. 5.4
Barium, Ba	74.0	ug/L		0.2	0.05	GES	03/17/2021 15:42	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.310	ug/L		0.1	0.007	GES	03/17/2021 15:42	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.01	ug/L	J	0.05	0.004	GES	03/17/2021 15:42	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.396	ug/L		0.2	0.04	GES	03/17/2021 15:42	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	2.97	ug/L		0.05	0.003	GES	03/17/2021 15:42	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.06	ug/L	J	0.2	0.05	GES	03/17/2021 15:42	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.101	ug/L		0.05	0.02	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 15:42	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.09	ug/L	J	0.5	0.09	GES	03/17/2021 15:42	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 15:42	EPA 200.8-1994, Rev. 5.4
Boron, B	0.02	mg/L	J	0.05	0.009	GES	03/17/2021 15:42	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	0.2	mg/L	J	0.3	0.1	SH	03/17/2021 17:24	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Iron, Fe	< 0.02	mg/L	U	0.1	0.02	SH	03/17/2021 17:24	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.00927	mg/L		0.0002	0.00005	GES	03/17/2021 15:42	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	1.37	mg/L		0.1	0.02	SH	03/17/2021 17:24	EPA 200.7-1994, Rev. 4.4
Manganese, Mn	0.0029	mg/L		0.002	0.0005	SH	03/17/2021 17:24	EPA 200.7-1994, Rev. 4.4
Potassium, K	0.3	mg/L	J	1	0.2	SH	03/17/2021 17:24	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Sodium, Na	5.16	mg/L		0.5	0.2	SH	03/17/2021 17:24	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Strontium, Sr	0.004	mg/L	J	0.01	0.002	SH	03/17/2021 17:24	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-18

Sample Number: 210586-008

Date Collected: 03/09/2021 13:15

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 15:47	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.28	ug/L		0.1	0.03	GES	03/17/2021 15:47	EPA 200.8-1994, Rev. 5.4
Barium, Ba	88.7	ug/L		0.2	0.05	GES	03/17/2021 15:47	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.09	ug/L	J	0.1	0.007	GES	03/17/2021 15:47	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.01	ug/L	J	0.05	0.004	GES	03/17/2021 15:47	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.271	ug/L		0.2	0.04	GES	03/17/2021 15:47	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.827	ug/L		0.05	0.003	GES	03/17/2021 15:47	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.08	ug/L	J	0.2	0.05	GES	03/17/2021 15:47	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.006	ug/L		0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 15:47	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.1	ug/L	J	0.5	0.09	GES	03/17/2021 15:47	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 15:47	EPA 200.8-1994, Rev. 5.4
Boron, B	0.009	mg/L	J	0.05	0.009	GES	03/17/2021 15:47	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	0.2	mg/L	J	0.3	0.1	SH	03/17/2021 17:28	EPA 200.7-1994, Rev. 4.4

dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Lithium, Li	0.0131	mg/L		0.0002	0.00005	GES	03/17/2021 15:47	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	0.341	mg/L		0.1	0.02	SH	03/17/2021 17:28	EPA 200.7-1994, Rev. 4.4

dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Potassium, K	0.8	mg/L	J	1	0.2	SH	03/17/2021 17:28	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Sodium, Na	6.12	mg/L		0.5	0.2	SH	03/17/2021 17:28	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Strontium, Sr	0.005	mg/L	J	0.01	0.002	SH	03/17/2021 17:28	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	0.088	pCi/L	0.12	0.42	ttp	3/26/2021	SW-846 9320-2014, Rev. 1.0
The LFBD is outside of the acceptable limit of 75-125%.							
Radium-226	0.243	pCi/L	0.067	0.10		3/29/2021	SW-846 9315-1986, Rev. 0

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-18 Dissolved

Sample Number: 210586-008A

Date Collected: 03/09/2021 13:15

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 15:53	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.07	ug/L	J	0.1	0.03	GES	03/17/2021 15:53	EPA 200.8-1994, Rev. 5.4
Barium, Ba	97.4	ug/L		0.2	0.05	GES	03/17/2021 15:53	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.1	ug/L	J	0.1	0.007	GES	03/17/2021 15:53	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.01	ug/L	J	0.05	0.004	GES	03/17/2021 15:53	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.220	ug/L		0.2	0.04	GES	03/17/2021 15:53	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.947	ug/L		0.05	0.003	GES	03/17/2021 15:53	EPA 200.8-1994, Rev. 5.4
Lead, Pb	< 0.05	ug/L	U	0.2	0.05	GES	03/17/2021 15:53	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 15:53	EPA 200.8-1994, Rev. 5.4
Selenium, Se	< 0.09	ug/L	U	0.5	0.09	GES	03/17/2021 15:53	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 15:53	EPA 200.8-1994, Rev. 5.4
Boron, B	0.009	mg/L	J	0.05	0.009	GES	03/17/2021 15:53	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	0.2	mg/L	J	0.3	0.1	SH	03/17/2021 17:32	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Iron, Fe	0.06	mg/L	J	0.1	0.02	SH	03/17/2021 17:32	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0150	mg/L		0.0002	0.00005	GES	03/17/2021 15:53	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	0.358	mg/L		0.1	0.02	SH	03/17/2021 17:32	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Manganese, Mn	0.0044	mg/L		0.002	0.0005	SH	03/17/2021 17:32	EPA 200.7-1994, Rev. 4.4
Potassium, K	0.8	mg/L	J	1	0.2	SH	03/17/2021 17:32	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Sodium, Na	6.33	mg/L		0.5	0.2	SH	03/17/2021 17:32	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Strontium, Sr	0.005	mg/L	J	0.01	0.002	SH	03/17/2021 17:32	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-22

Sample Number: 210586-009

Date Collected: 03/08/2021 10:56

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 15:58	EPA 200.8-1994, Rev. 5.4
Arsenic, As	3.05	ug/L		0.1	0.03	GES	03/17/2021 15:58	EPA 200.8-1994, Rev. 5.4
Barium, Ba	19.2	ug/L		0.2	0.05	GES	03/17/2021 15:58	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	8.52	ug/L		0.1	0.007	GES	03/17/2021 15:58	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	1.42	ug/L		0.05	0.004	GES	03/17/2021 15:58	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.395	ug/L		0.2	0.04	GES	03/17/2021 15:58	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	107	ug/L		0.05	0.003	GES	03/17/2021 15:58	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.277	ug/L		0.2	0.05	GES	03/17/2021 15:58	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.045	ug/L		0.02	0.007	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 15:58	EPA 200.8-1994, Rev. 5.4
Selenium, Se	11.7	ug/L		0.5	0.09	GES	03/17/2021 15:58	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.2	ug/L	J	0.5	0.04	GES	03/17/2021 15:58	EPA 200.8-1994, Rev. 5.4
Boron, B	0.069	mg/L		0.05	0.009	GES	03/17/2021 15:58	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	12.5	mg/L		0.3	0.1	SH	03/17/2021 17:36	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.164	mg/L		0.0002	0.00005	GES	03/17/2021 15:58	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	19.4	mg/L		0.1	0.02	SH	03/17/2021 17:36	EPA 200.7-1994, Rev. 4.4
Potassium, K	4.00	mg/L		1	0.2	SH	03/17/2021 17:36	EPA 200.7-1994, Rev. 4.4
Sodium, Na	81.9	mg/L		0.5	0.2	SH	03/17/2021 17:36	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.127	mg/L		0.01	0.002	SH	03/17/2021 17:36	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	5.05	pCi/L	0.19	0.42	ttp	3/26/2021	SW-846 9320-2014,Rev. 1.0
The LFBD is outside of the acceptable limit of 75-125%.							
Radium-226	0.957	pCi/L	0.14	0.096		4/5/2021	SW-846 9315-1986,Rev. 0

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-22 Dissolved

Sample Number: 210586-009A

Date Collected: 03/08/2021 10:56

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 16:03	EPA 200.8-1994, Rev. 5.4
Arsenic, As	2.99	ug/L		0.1	0.03	GES	03/17/2021 16:03	EPA 200.8-1994, Rev. 5.4
Barium, Ba	18.7	ug/L		0.2	0.05	GES	03/17/2021 16:03	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	8.33	ug/L		0.1	0.007	GES	03/17/2021 16:03	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	1.36	ug/L		0.05	0.004	GES	03/17/2021 16:03	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.387	ug/L		0.2	0.04	GES	03/17/2021 16:03	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	105	ug/L		0.05	0.003	GES	03/17/2021 16:03	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.266	ug/L		0.2	0.05	GES	03/17/2021 16:03	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.010	ug/L		0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 16:03	EPA 200.8-1994, Rev. 5.4
Selenium, Se	11.2	ug/L		0.5	0.09	GES	03/17/2021 16:03	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.2	ug/L	J	0.5	0.04	GES	03/17/2021 16:03	EPA 200.8-1994, Rev. 5.4
Boron, B	0.067	mg/L		0.05	0.009	GES	03/17/2021 16:03	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	12.5	mg/L		0.3	0.1	SH	03/17/2021 17:40	EPA 200.7-1994, Rev. 4.4
Iron, Fe	9.53	mg/L		0.1	0.02	SH	03/17/2021 17:40	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.162	mg/L		0.0002	0.00005	GES	03/17/2021 16:03	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	19.4	mg/L		0.1	0.02	SH	03/17/2021 17:40	EPA 200.7-1994, Rev. 4.4
Manganese, Mn	0.327	mg/L		0.002	0.0005	SH	03/17/2021 17:40	EPA 200.7-1994, Rev. 4.4
Potassium, K	3.95	mg/L		1	0.2	SH	03/17/2021 17:40	EPA 200.7-1994, Rev. 4.4
Sodium, Na	81.7	mg/L		0.5	0.2	SH	03/17/2021 17:40	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.127	mg/L		0.01	0.002	SH	03/17/2021 17:40	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-28

Sample Number: 210586-010

Date Collected: 03/09/2021 10:18

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 16:08	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.16	ug/L		0.1	0.03	GES	03/17/2021 16:08	EPA 200.8-1994, Rev. 5.4
Barium, Ba	153	ug/L		0.2	0.05	GES	03/17/2021 16:08	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.958	ug/L		0.1	0.007	GES	03/17/2021 16:08	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.07	ug/L		0.05	0.004	GES	03/17/2021 16:08	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.292	ug/L		0.2	0.04	GES	03/17/2021 16:08	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	15.3	ug/L		0.05	0.003	GES	03/17/2021 16:08	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.08	ug/L	J	0.2	0.05	GES	03/17/2021 16:08	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.019	ug/L		0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 16:08	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.3	ug/L		0.5	0.09	GES	03/17/2021 16:08	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 16:08	EPA 200.8-1994, Rev. 5.4
Boron, B	0.358	mg/L		0.05	0.009	GES	03/17/2021 16:08	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	1.26	mg/L		0.3	0.1	SH	03/17/2021 17:44	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0223	mg/L		0.0002	0.00005	GES	03/17/2021 16:08	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	3.57	mg/L		0.1	0.02	SH	03/17/2021 17:44	EPA 200.7-1994, Rev. 4.4
Potassium, K	0.7	mg/L	J	1	0.2	SH	03/17/2021 17:44	EPA 200.7-1994, Rev. 4.4
Sodium, Na	8.20	mg/L		0.5	0.2	SH	03/17/2021 17:44	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.0264	mg/L		0.01	0.002	SH	03/17/2021 17:44	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	0.617	pCi/L	0.14	0.45	ttp	3/22/2021	SW-846 9320-2014,Rev. 1.0
Radium-226	0.597	pCi/L	0.11	0.12		4/5/2021	SW-846 9315-1986,Rev. 0

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-28 Dissolved

Sample Number: 210586-010A

Date Collected: 03/09/2021 10:18

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 16:13	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.11	ug/L		0.1	0.03	GES	03/17/2021 16:13	EPA 200.8-1994, Rev. 5.4
Barium, Ba	152	ug/L		0.2	0.05	GES	03/17/2021 16:13	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.904	ug/L		0.1	0.007	GES	03/17/2021 16:13	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.07	ug/L		0.05	0.004	GES	03/17/2021 16:13	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.405	ug/L		0.2	0.04	GES	03/17/2021 16:13	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	15.3	ug/L		0.05	0.003	GES	03/17/2021 16:13	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.1	ug/L	J	0.2	0.05	GES	03/17/2021 16:13	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.014	ug/L		0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 16:13	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.4	ug/L		0.5	0.09	GES	03/17/2021 16:13	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 16:13	EPA 200.8-1994, Rev. 5.4
Boron, B	0.362	mg/L		0.05	0.009	GES	03/17/2021 16:13	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	1.28	mg/L		0.3	0.1	SH	03/17/2021 17:48	EPA 200.7-1994, Rev. 4.4
Iron, Fe	0.03	mg/L	J	0.1	0.02	SH	03/17/2021 17:48	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0222	mg/L		0.0002	0.00005	GES	03/17/2021 16:13	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	3.45	mg/L		0.1	0.02	SH	03/17/2021 17:48	EPA 200.7-1994, Rev. 4.4
Manganese, Mn	0.0432	mg/L		0.002	0.0005	SH	03/17/2021 17:48	EPA 200.7-1994, Rev. 4.4
Potassium, K	0.7	mg/L	J	1	0.2	SH	03/17/2021 17:48	EPA 200.7-1994, Rev. 4.4
Sodium, Na	7.97	mg/L		0.5	0.2	SH	03/17/2021 17:48	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.0256	mg/L		0.01	0.002	SH	03/17/2021 17:48	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-30

Sample Number: 210586-011

Date Collected: 03/09/2021 09:35

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 17:30	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.15	ug/L		0.1	0.03	GES	03/17/2021 17:30	EPA 200.8-1994, Rev. 5.4
Barium, Ba	115	ug/L		0.2	0.05	GES	03/17/2021 17:30	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.107	ug/L		0.1	0.007	GES	03/17/2021 17:30	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.01	ug/L	J	0.05	0.004	GES	03/17/2021 17:30	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.301	ug/L		0.2	0.04	GES	03/17/2021 17:30	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	3.87	ug/L		0.05	0.003	GES	03/17/2021 17:30	EPA 200.8-1994, Rev. 5.4
Lead, Pb	< 0.05	ug/L	U	0.2	0.05	GES	03/17/2021 17:30	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.018	ug/L		0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 17:30	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.3	ug/L		0.5	0.09	GES	03/17/2021 17:30	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 17:30	EPA 200.8-1994, Rev. 5.4
Boron, B	1.91	mg/L		0.05	0.009	GES	03/17/2021 17:30	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	0.478	mg/L		0.3	0.1	SH	03/17/2021 17:52	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.00939	mg/L		0.0002	0.00005	GES	03/17/2021 17:30	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	2.11	mg/L		0.1	0.02	SH	03/17/2021 17:52	EPA 200.7-1994, Rev. 4.4
Potassium, K	0.8	mg/L	J	1	0.2	SH	03/17/2021 17:52	EPA 200.7-1994, Rev. 4.4
Sodium, Na	71.7	mg/L		0.5	0.2	SH	03/17/2021 17:52	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.009	mg/L	J	0.01	0.002	SH	03/17/2021 17:52	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	0.593	pCi/L	0.16	0.51	ttp	3/22/2021	SW-846 9320-2014,Rev. 1.0
Radium-226	0.551	pCi/L	0.10	0.12		4/5/2021	SW-846 9315-1986,Rev. 0

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-30 Dissolved

Sample Number: 210586-011A

Date Collected: 03/09/2021 09:35

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 17:35	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.13	ug/L		0.1	0.03	GES	03/17/2021 17:35	EPA 200.8-1994, Rev. 5.4
Barium, Ba	112	ug/L		0.2	0.05	GES	03/17/2021 17:35	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.104	ug/L		0.1	0.007	GES	03/17/2021 17:35	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.01	ug/L	J	0.05	0.004	GES	03/17/2021 17:35	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.320	ug/L		0.2	0.04	GES	03/17/2021 17:35	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	3.81	ug/L		0.05	0.003	GES	03/17/2021 17:35	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.05	ug/L	J	0.2	0.05	GES	03/17/2021 17:35	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.015	ug/L		0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 17:35	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.3	ug/L		0.5	0.09	GES	03/17/2021 17:35	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 17:35	EPA 200.8-1994, Rev. 5.4
Boron, B	1.91	mg/L		0.05	0.009	GES	03/17/2021 17:35	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	0.536	mg/L		0.3	0.1	SH	03/17/2021 18:00	EPA 200.7-1994, Rev. 4.4
Iron, Fe	< 0.02	mg/L	U	0.1	0.02	SH	03/17/2021 18:00	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.00939	mg/L		0.0002	0.00005	GES	03/17/2021 17:35	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	2.09	mg/L		0.1	0.02	SH	03/17/2021 18:00	EPA 200.7-1994, Rev. 4.4
Manganese, Mn	0.0133	mg/L		0.002	0.0005	SH	03/17/2021 18:00	EPA 200.7-1994, Rev. 4.4
Potassium, K	0.8	mg/L	J	1	0.2	SH	03/17/2021 18:00	EPA 200.7-1994, Rev. 4.4
Sodium, Na	71.3	mg/L		0.5	0.2	SH	03/17/2021 18:00	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.009	mg/L	J	0.01	0.002	SH	03/17/2021 18:00	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-31

Sample Number: 210586-012

Date Collected: 03/08/2021 12:23

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 16:18	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.22	ug/L		0.1	0.03	GES	03/17/2021 16:18	EPA 200.8-1994, Rev. 5.4
Barium, Ba	33.6	ug/L		0.2	0.05	GES	03/17/2021 16:18	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.857	ug/L		0.1	0.007	GES	03/17/2021 16:18	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.07	ug/L		0.05	0.004	GES	03/17/2021 16:18	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.282	ug/L		0.2	0.04	GES	03/17/2021 16:18	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	9.78	ug/L		0.05	0.003	GES	03/17/2021 16:18	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.218	ug/L		0.2	0.05	GES	03/17/2021 16:18	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.095	ug/L		0.01	0.004	JAB	03/26/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 16:18	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.4	ug/L		0.5	0.09	GES	03/17/2021 16:18	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.08	ug/L	J	0.5	0.04	GES	03/17/2021 16:18	EPA 200.8-1994, Rev. 5.4
Boron, B	0.02	mg/L	J	0.05	0.009	GES	03/17/2021 16:18	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	2.69	mg/L		0.3	0.1	SH	03/17/2021 18:36	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0664	mg/L		0.0002	0.00005	GES	03/17/2021 16:18	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	4.10	mg/L		0.1	0.02	SH	03/17/2021 18:36	EPA 200.7-1994, Rev. 4.4
Potassium, K	1.59	mg/L		1	0.2	SH	03/17/2021 18:36	EPA 200.7-1994, Rev. 4.4
Sodium, Na	33.3	mg/L		0.5	0.2	SH	03/17/2021 18:36	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.0412	mg/L		0.01	0.002	SH	03/17/2021 18:36	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	1.16	pCi/L	0.14	0.41	ttp	3/22/2021	SW-846 9320-2014, Rev. 1.0
Radium-226	0.537	pCi/L	0.10	0.12		4/5/2021	SW-846 9315-1986, Rev. 0

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-31 Dissolved

Sample Number: 210586-012A

Date Collected: 03/08/2021 12:23

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 16:23	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.21	ug/L		0.1	0.03	GES	03/17/2021 16:23	EPA 200.8-1994, Rev. 5.4
Barium, Ba	33.0	ug/L		0.2	0.05	GES	03/17/2021 16:23	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.873	ug/L		0.1	0.007	GES	03/17/2021 16:23	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.07	ug/L		0.05	0.004	GES	03/17/2021 16:23	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.364	ug/L		0.2	0.04	GES	03/17/2021 16:23	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	9.94	ug/L		0.05	0.003	GES	03/17/2021 16:23	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.240	ug/L		0.2	0.05	GES	03/17/2021 16:23	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 16:23	EPA 200.8-1994, Rev. 5.4
Selenium, Se	0.4	ug/L		0.5	0.09	GES	03/17/2021 16:23	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.08	ug/L	J	0.5	0.04	GES	03/17/2021 16:23	EPA 200.8-1994, Rev. 5.4
Boron, B	0.02	mg/L	J	0.05	0.009	GES	03/17/2021 16:23	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	2.78	mg/L		0.3	0.1	SH	03/17/2021 18:40	EPA 200.7-1994, Rev. 4.4
Iron, Fe	0.132	mg/L		0.1	0.02	SH	03/17/2021 18:40	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0677	mg/L		0.0002	0.00005	GES	03/17/2021 16:23	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	4.11	mg/L		0.1	0.02	SH	03/17/2021 18:40	EPA 200.7-1994, Rev. 4.4
Manganese, Mn	0.0282	mg/L		0.002	0.0005	SH	03/17/2021 18:40	EPA 200.7-1994, Rev. 4.4
Potassium, K	1.57	mg/L		1	0.2	SH	03/17/2021 18:40	EPA 200.7-1994, Rev. 4.4
Sodium, Na	33.4	mg/L		0.5	0.2	SH	03/17/2021 18:40	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.0419	mg/L		0.01	0.002	SH	03/17/2021 18:40	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-32

Sample Number: 210586-013

Date Collected: 03/08/2021 11:21

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 17:40	EPA 200.8-1994, Rev. 5.4
Arsenic, As	5.54	ug/L		0.1	0.03	GES	03/17/2021 17:40	EPA 200.8-1994, Rev. 5.4
Barium, Ba	18.5	ug/L		0.2	0.05	GES	03/17/2021 17:40	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	5.78	ug/L		0.1	0.007	GES	03/17/2021 17:40	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.66	ug/L		0.05	0.004	GES	03/17/2021 17:40	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.754	ug/L		0.2	0.04	GES	03/17/2021 17:40	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	61.9	ug/L		0.05	0.003	GES	03/17/2021 17:40	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.970	ug/L		0.2	0.05	GES	03/17/2021 17:40	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	1.07	ug/L		0.5	0.2	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 17:40	EPA 200.8-1994, Rev. 5.4
Selenium, Se	22.2	ug/L		0.5	0.09	GES	03/17/2021 17:40	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.3	ug/L	J	0.5	0.04	GES	03/17/2021 17:40	EPA 200.8-1994, Rev. 5.4
Boron, B	2.87	mg/L		0.05	0.009	GES	03/17/2021 17:40	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	34.2	mg/L		0.3	0.1	SH	03/17/2021 18:44	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0618	mg/L		0.0002	0.00005	GES	03/17/2021 17:40	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	23.0	mg/L		0.1	0.02	SH	03/17/2021 18:44	EPA 200.7-1994, Rev. 4.4
Potassium, K	4.74	mg/L		1	0.2	SH	03/17/2021 18:44	EPA 200.7-1994, Rev. 4.4
Sodium, Na	127	mg/L		0.5	0.2	SH	03/17/2021 18:44	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.706	mg/L		0.01	0.002	SH	03/17/2021 18:44	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	2.91	pCi/L	0.19	0.52	ttp	3/22/2021	SW-846 9320-2014,Rev. 1.0
The RPD between the MS/MSD exceeds 25%.							
Radium-226	0.791	pCi/L	0.12	0.096		4/5/2021	SW-846 9315-1986,Rev. 0

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-32 Dissolved

Sample Number: 210586-013A

Date Collected: 03/08/2021 11:21

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 17:45	EPA 200.8-1994, Rev. 5.4
Arsenic, As	5.40	ug/L		0.1	0.03	GES	03/17/2021 17:45	EPA 200.8-1994, Rev. 5.4
Barium, Ba	18.3	ug/L		0.2	0.05	GES	03/17/2021 17:45	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	5.67	ug/L		0.1	0.007	GES	03/17/2021 17:45	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.66	ug/L		0.05	0.004	GES	03/17/2021 17:45	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.751	ug/L		0.2	0.04	GES	03/17/2021 17:45	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	61.6	ug/L		0.05	0.003	GES	03/17/2021 17:45	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.950	ug/L		0.2	0.05	GES	03/17/2021 17:45	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.712	ug/L		0.05	0.02	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 17:45	EPA 200.8-1994, Rev. 5.4
Selenium, Se	22.2	ug/L		0.5	0.09	GES	03/17/2021 17:45	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.3	ug/L	J	0.5	0.04	GES	03/17/2021 17:45	EPA 200.8-1994, Rev. 5.4
Boron, B	2.84	mg/L		0.05	0.009	GES	03/17/2021 17:45	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	33.5	mg/L		0.3	0.1	SH	03/17/2021 18:48	EPA 200.7-1994, Rev. 4.4
Iron, Fe	1.02	mg/L		0.1	0.02	SH	03/17/2021 18:48	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0615	mg/L		0.0002	0.00005	GES	03/17/2021 17:45	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	22.7	mg/L		0.1	0.02	SH	03/17/2021 18:48	EPA 200.7-1994, Rev. 4.4
Manganese, Mn	0.123	mg/L		0.002	0.0005	SH	03/17/2021 18:48	EPA 200.7-1994, Rev. 4.4
Potassium, K	4.65	mg/L		1	0.2	SH	03/17/2021 18:48	EPA 200.7-1994, Rev. 4.4
Sodium, Na	125	mg/L		0.5	0.2	SH	03/17/2021 18:48	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.693	mg/L		0.01	0.002	SH	03/17/2021 18:48	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-33

Sample Number: 210586-014

Date Collected: 03/08/2021 11:59

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 17:50	EPA 200.8-1994, Rev. 5.4
Arsenic, As	1.01	ug/L		0.1	0.03	GES	03/17/2021 17:50	EPA 200.8-1994, Rev. 5.4
Barium, Ba	47.5	ug/L		0.2	0.05	GES	03/17/2021 17:50	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	1.51	ug/L		0.1	0.007	GES	03/17/2021 17:50	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.06	ug/L		0.05	0.004	GES	03/17/2021 17:50	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.373	ug/L		0.2	0.04	GES	03/17/2021 17:50	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	12.4	ug/L		0.05	0.003	GES	03/17/2021 17:50	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.286	ug/L		0.2	0.05	GES	03/17/2021 17:50	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	3.13	ug/L		1	0.4	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 17:50	EPA 200.8-1994, Rev. 5.4
Selenium, Se	3.4	ug/L		0.5	0.09	GES	03/17/2021 17:50	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 17:50	EPA 200.8-1994, Rev. 5.4
Boron, B	0.159	mg/L		0.05	0.009	GES	03/17/2021 17:50	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	1.96	mg/L		0.3	0.1	SH	03/17/2021 18:52	EPA 200.7-1994, Rev. 4.4

dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Lithium, Li	0.0232	mg/L		0.0002	0.00005	GES	03/17/2021 17:50	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	4.97	mg/L		0.1	0.02	SH	03/17/2021 18:52	EPA 200.7-1994, Rev. 4.4

dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Potassium, K	0.3	mg/L	J	1	0.2	SH	03/17/2021 18:52	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Sodium, Na	20.5	mg/L		0.5	0.2	SH	03/17/2021 18:52	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

Strontium, Sr	0.0383	mg/L		0.01	0.002	SH	03/17/2021 18:52	EPA 200.7-1994, Rev. 4.4
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dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

Radiochemistry*	Result	Units	UNC* (+ / -)	MDA*	Analysis By	Analysis Date/Time	Method
Radium-228	0.984	pCi/L	0.15	0.45	ttp	3/26/2021	SW-846 9320-2014, Rev. 1.0
The LFBD is outside of the acceptable limit of 75-125%.							
Radium-226	0.328	pCi/L	0.081	0.11		4/5/2021	SW-846 9315-1986, Rev. 0

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

AD-33 Dissolved

Sample Number: 210586-014A

Date Collected: 03/08/2021 11:59

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 17:56	EPA 200.8-1994, Rev. 5.4
Arsenic, As	1.01	ug/L		0.1	0.03	GES	03/17/2021 17:56	EPA 200.8-1994, Rev. 5.4
Barium, Ba	47.8	ug/L		0.2	0.05	GES	03/17/2021 17:56	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	1.55	ug/L		0.1	0.007	GES	03/17/2021 17:56	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.07	ug/L		0.05	0.004	GES	03/17/2021 17:56	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.242	ug/L		0.2	0.04	GES	03/17/2021 17:56	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	12.7	ug/L		0.05	0.003	GES	03/17/2021 17:56	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.297	ug/L		0.2	0.05	GES	03/17/2021 17:56	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.064	ug/L		0.05	0.02	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 17:56	EPA 200.8-1994, Rev. 5.4
Selenium, Se	3.4	ug/L		0.5	0.09	GES	03/17/2021 17:56	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 17:56	EPA 200.8-1994, Rev. 5.4
Boron, B	0.160	mg/L		0.05	0.009	GES	03/17/2021 17:56	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	2.04	mg/L		0.3	0.1	SH	03/17/2021 18:56	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Iron, Fe	0.03	mg/L	J	0.1	0.02	SH	03/17/2021 18:56	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0240	mg/L		0.0002	0.00005	GES	03/17/2021 17:56	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	5.13	mg/L		0.1	0.02	SH	03/17/2021 18:56	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Manganese, Mn	0.0090	mg/L		0.002	0.0005	SH	03/17/2021 18:56	EPA 200.7-1994, Rev. 4.4
Potassium, K	0.3	mg/L	J	1	0.2	SH	03/17/2021 18:56	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Sodium, Na	20.9	mg/L		0.5	0.2	SH	03/17/2021 18:56	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								
Strontium, Sr	0.0393	mg/L		0.01	0.002	SH	03/17/2021 18:56	EPA 200.7-1994, Rev. 4.4
dissolved results are higher than total results. It was confirmed by testing total samples as received from bottle. Labels were checked as well to rule out any switching, all labels were confirmed to be correct.								

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

Duplicate 1

Sample Number: 210586-015

Date Collected: 03/08/2021 11:21

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 18:01	EPA 200.8-1994, Rev. 5.4
Arsenic, As	5.66	ug/L		0.1	0.03	GES	03/17/2021 18:01	EPA 200.8-1994, Rev. 5.4
Barium, Ba	19.0	ug/L		0.2	0.05	GES	03/17/2021 18:01	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	5.75	ug/L		0.1	0.007	GES	03/17/2021 18:01	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.69	ug/L		0.05	0.004	GES	03/17/2021 18:01	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.785	ug/L		0.2	0.04	GES	03/17/2021 18:01	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	64.2	ug/L		0.05	0.003	GES	03/17/2021 18:01	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.991	ug/L		0.2	0.05	GES	03/17/2021 18:01	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	1.09	ug/L		0.05	0.02	JAB	03/26/2021	EPA 245.7-2005, Rev. 2.0
Sample was slightly over the curve but within the Linear Dynamic Range. Sample was diluted at 10x after original run at 1x was above curve and LDR.								
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 18:01	EPA 200.8-1994, Rev. 5.4
Selenium, Se	22.7	ug/L		0.5	0.09	GES	03/17/2021 18:01	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.3	ug/L	J	0.5	0.04	GES	03/17/2021 18:01	EPA 200.8-1994, Rev. 5.4
Boron, B	2.93	mg/L		0.05	0.009	GES	03/17/2021 18:01	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	34.2	mg/L		0.3	0.1	SH	03/17/2021 19:00	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0616	mg/L		0.0002	0.00005	GES	03/17/2021 18:01	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	23.3	mg/L		0.1	0.02	SH	03/17/2021 19:00	EPA 200.7-1994, Rev. 4.4
Potassium, K	4.70	mg/L		1	0.2	SH	03/17/2021 19:00	EPA 200.7-1994, Rev. 4.4
Sodium, Na	128	mg/L		0.5	0.2	SH	03/17/2021 19:00	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.708	mg/L		0.01	0.002	SH	03/17/2021 19:00	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

Duplicate 1 Dissolved

Sample Number: 210586-015A

Date Collected: 03/08/2021 11:21

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 18:06	EPA 200.8-1994, Rev. 5.4
Arsenic, As	5.25	ug/L		0.1	0.03	GES	03/17/2021 18:06	EPA 200.8-1994, Rev. 5.4
Barium, Ba	18.2	ug/L		0.2	0.05	GES	03/17/2021 18:06	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	5.69	ug/L		0.1	0.007	GES	03/17/2021 18:06	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.65	ug/L		0.05	0.004	GES	03/17/2021 18:06	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.748	ug/L		0.2	0.04	GES	03/17/2021 18:06	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	60.6	ug/L		0.05	0.003	GES	03/17/2021 18:06	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.953	ug/L		0.2	0.05	GES	03/17/2021 18:06	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.746	ug/L		0.05	0.02	JAB	03/26/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 18:06	EPA 200.8-1994, Rev. 5.4
Selenium, Se	21.5	ug/L		0.5	0.09	GES	03/17/2021 18:06	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.3	ug/L	J	0.5	0.04	GES	03/17/2021 18:06	EPA 200.8-1994, Rev. 5.4
Boron, B	2.79	mg/L		0.05	0.009	GES	03/17/2021 18:06	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	33.6	mg/L		0.3	0.1	SH	03/17/2021 19:03	EPA 200.7-1994, Rev. 4.4
Iron, Fe	1.00	mg/L		0.1	0.02	SH	03/17/2021 19:03	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0618	mg/L		0.0002	0.00005	GES	03/17/2021 18:06	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	22.7	mg/L		0.1	0.02	SH	03/17/2021 19:03	EPA 200.7-1994, Rev. 4.4
Manganese, Mn	0.121	mg/L		0.002	0.0005	SH	03/17/2021 19:03	EPA 200.7-1994, Rev. 4.4
Potassium, K	4.65	mg/L		1	0.2	SH	03/17/2021 19:03	EPA 200.7-1994, Rev. 4.4
Sodium, Na	125	mg/L		0.5	0.2	SH	03/17/2021 19:03	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.694	mg/L		0.01	0.002	SH	03/17/2021 19:03	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

Duplicate 2

Sample Number: 210586-016

Date Collected: 03/09/2021 10:37

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 18:11	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.70	ug/L		0.1	0.03	GES	03/17/2021 18:11	EPA 200.8-1994, Rev. 5.4
Barium, Ba	20.2	ug/L		0.2	0.05	GES	03/17/2021 18:11	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.592	ug/L		0.1	0.007	GES	03/17/2021 18:11	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.08	ug/L		0.05	0.004	GES	03/17/2021 18:11	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.312	ug/L		0.2	0.04	GES	03/17/2021 18:11	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	20.6	ug/L		0.05	0.003	GES	03/17/2021 18:11	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.517	ug/L		0.2	0.05	GES	03/17/2021 18:11	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	0.059	ug/L		0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 18:11	EPA 200.8-1994, Rev. 5.4
Selenium, Se	2.3	ug/L		0.5	0.09	GES	03/17/2021 18:11	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.1	ug/L	J	0.5	0.04	GES	03/17/2021 18:11	EPA 200.8-1994, Rev. 5.4
Boron, B	2.87	mg/L		0.05	0.009	GES	03/17/2021 18:11	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	2.50	mg/L		0.3	0.1	SH	03/17/2021 19:07	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0506	mg/L		0.0002	0.00005	GES	03/17/2021 18:11	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	5.59	mg/L		0.1	0.02	SH	03/17/2021 19:07	EPA 200.7-1994, Rev. 4.4
Potassium, K	1.27	mg/L		1	0.2	SH	03/17/2021 19:07	EPA 200.7-1994, Rev. 4.4
Sodium, Na	95.6	mg/L		0.5	0.2	SH	03/17/2021 19:07	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.0403	mg/L		0.01	0.002	SH	03/17/2021 19:07	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

Duplicate 2 Dissolved

Sample Number: 210586-016A

Date Collected: 03/09/2021 10:37

Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 18:16	EPA 200.8-1994, Rev. 5.4
Arsenic, As	0.63	ug/L		0.1	0.03	GES	03/17/2021 18:16	EPA 200.8-1994, Rev. 5.4
Barium, Ba	19.5	ug/L		0.2	0.05	GES	03/17/2021 18:16	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	0.577	ug/L		0.1	0.007	GES	03/17/2021 18:16	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	0.09	ug/L		0.05	0.004	GES	03/17/2021 18:16	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.399	ug/L		0.2	0.04	GES	03/17/2021 18:16	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	19.7	ug/L		0.05	0.003	GES	03/17/2021 18:16	EPA 200.8-1994, Rev. 5.4
Lead, Pb	0.481	ug/L		0.2	0.05	GES	03/17/2021 18:16	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 18:16	EPA 200.8-1994, Rev. 5.4
Selenium, Se	2.1	ug/L		0.5	0.09	GES	03/17/2021 18:16	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	0.09	ug/L	J	0.5	0.04	GES	03/17/2021 18:16	EPA 200.8-1994, Rev. 5.4
Boron, B	2.74	mg/L		0.05	0.009	GES	03/17/2021 18:16	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	2.48	mg/L		0.3	0.1	SH	03/17/2021 19:11	EPA 200.7-1994, Rev. 4.4
Iron, Fe	0.136	mg/L		0.1	0.02	SH	03/17/2021 19:11	EPA 200.7-1994, Rev. 4.4
Lithium, Li	0.0494	mg/L		0.0002	0.00005	GES	03/17/2021 18:16	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	5.57	mg/L		0.1	0.02	SH	03/17/2021 19:11	EPA 200.7-1994, Rev. 4.4
Manganese, Mn	0.0772	mg/L		0.002	0.0005	SH	03/17/2021 19:11	EPA 200.7-1994, Rev. 4.4
Potassium, K	1.23	mg/L		1	0.2	SH	03/17/2021 19:11	EPA 200.7-1994, Rev. 4.4
Sodium, Na	95.2	mg/L		0.5	0.2	SH	03/17/2021 19:11	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	0.0400	mg/L		0.01	0.002	SH	03/17/2021 19:11	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*

Equipment Blank

Sample Number: 210586-017

Date Collected: 03/09/2021 11:42

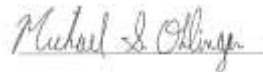
Date Received: 3/15/2021

Parameter	Result	Units	Data Qual	RL	MDL	Analysis By	Analysis Date/Time	Method
Antimony, Sb	< 0.02	ug/L	U	0.1	0.02	GES	03/17/2021 20:04	EPA 200.8-1994, Rev. 5.4
Arsenic, As	< 0.03	ug/L	U	0.1	0.03	GES	03/17/2021 20:04	EPA 200.8-1994, Rev. 5.4
Barium, Ba	< 0.05	ug/L	U	0.2	0.05	GES	03/17/2021 20:04	EPA 200.8-1994, Rev. 5.4
Beryllium, Be	< 0.007	ug/L	U	0.1	0.007	GES	03/17/2021 20:04	EPA 200.8-1994, Rev. 5.4
Cadmium, Cd	< 0.004	ug/L	U	0.05	0.004	GES	03/17/2021 20:04	EPA 200.8-1994, Rev. 5.4
Chromium, Cr	0.1	ug/L	J	0.2	0.04	GES	03/17/2021 20:04	EPA 200.8-1994, Rev. 5.4
Cobalt, Co	0.006	ug/L	J	0.05	0.003	GES	03/17/2021 20:04	EPA 200.8-1994, Rev. 5.4
Lead, Pb	< 0.05	ug/L	U	0.2	0.05	GES	03/17/2021 20:04	EPA 200.8-1994, Rev. 5.4
Mercury, Hg	< 0.002	ug/L	U	0.005	0.002	JAB	03/19/2021	EPA 245.7-2005, Rev. 2.0
Molybdenum, Mo	< 0.1	ug/L	U	2	0.1	GES	03/17/2021 20:04	EPA 200.8-1994, Rev. 5.4
Selenium, Se	< 0.09	ug/L	U	0.5	0.09	GES	03/17/2021 20:04	EPA 200.8-1994, Rev. 5.4
Thallium, Tl	< 0.04	ug/L	U	0.5	0.04	GES	03/17/2021 20:04	EPA 200.8-1994, Rev. 5.4
Boron, B	< 0.009	mg/L	U	0.05	0.009	GES	03/17/2021 20:04	EPA 200.8-1994, Rev. 5.4
Calcium, Ca	< 0.1	mg/L	U	0.3	0.1	SH	03/17/2021 19:54	EPA 200.7-1994, Rev. 4.4
Lithium, Li	< 0.00005	mg/L	U	0.0002	0.00005	GES	03/18/2021 12:39	EPA 200.8-1994, Rev. 5.4
Magnesium, Mg	< 0.02	mg/L	U	0.1	0.02	SH	03/17/2021 19:54	EPA 200.7-1994, Rev. 4.4
Potassium, K	< 0.2	mg/L	U	1	0.2	SH	03/17/2021 19:54	EPA 200.7-1994, Rev. 4.4
Sodium, Na	< 0.2	mg/L	U	0.5	0.2	SH	03/17/2021 19:54	EPA 200.7-1994, Rev. 4.4
Strontium, Sr	< 0.002	mg/L	U	0.01	0.002	SH	03/17/2021 19:54	EPA 200.7-1994, Rev. 4.4

U: Analyte was analyzed and not detected at or above adjusted Method Detection Limit

J: Analyte was positively identified, though the quantitation was below Reporting Limit.

**The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.*



Michael Ohlinger, Chemist

Email msohlinger@aep.com Tel.

Fax 614-836-4168

Audinet 8-210-

THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED AND SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY. ALL TEST RESULTS MEET ALL OF THE REQUIREMENTS OF THE ACCREDITING AUTHORITY, UNLESS OTHERWISE NOTED.



WATER & WASTE SAMPLE RECEIPT FORM

<u>Package Type</u>		<u>Delivery Type</u>	
Cooler	Box	Bag	Envelope
		PONY	UPS
		FedEX	USPS
		Other _____	
Plant/Customer <u>Parkey</u>		Number of Plastic Containers: <u>81</u>	
Opened By <u>MSO</u>		Number of Glass Containers: _____	
Date/Time <u>3-15-21 12:40</u>		Number of Mercury Containers: <u>23</u>	
Were all temperatures within 0-6°C? Y / N or <u>N/A</u> Initial: <u>SM</u> on ice / no ice			
1(IR Gun Ser# <u>200700311</u> , Expir. <u>11/06/22</u>) - If No, specify each deviation: _____			
Was container in good condition? <u>Y</u> / N Comments _____			
Was Chain of Custody received? <u>Y</u> / N Comments _____			
Requested turnaround: <u>Roller</u> If RUSH, who was notified? _____			
pH (15 min)	Cr ⁺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: JAB, SM MSO 3-15-21

pH paper (circle one): MQuant, PN1.09535.0001, LOT# HC904495 [OR] Lab Rat, PN4801, LOT# X000RWDG21

- Was Add'l Preservative needed? Y / N If Yes: By whom & when: Hg Lab (See Prep Book)

Is sample filtration requested? Y / N Comments _____ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: _____

Lab ID# 210586 Initial & Date & Time : _____

Logged by MSO Comments: _____

Reviewed by JAB _____

REMINDER: Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-001

Sampling Point: AD-2

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation:

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.55	µg/L	1	0.10	0.03		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Barium	18.9	µg/L	1	0.20	0.05		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.541	µg/L	1	0.050	0.007		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Boron	2.78	mg/L	1	0.050	0.009		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.094	µg/L	1	0.020	0.004		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Calcium	2.7	mg/L	1	0.3	0.1		DAM	06/08/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.38	µg/L	1	0.20	0.04		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	21.7	µg/L	1	0.020	0.003		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.08	mg/L	1	0.10	0.02	J1	DAM	06/08/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.46	µg/L	1	0.20	0.05		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0483	mg/L	1	0.00020	0.00005		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	5.83	mg/L	1	0.10	0.02		DAM	06/08/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0820	mg/L	1	0.0020	0.0005		DAM	06/08/2021	EPA 200.7-1994, Rev. 4.4
Mercury	57	ng/L	1	5	2		JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Potassium	1.4	mg/L	1	1.0	0.2		DAM	06/08/2021	EPA 200.7-1994, Rev. 4.4
Selenium	1.68	µg/L	1	0.50	0.09		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Sodium	95.3	mg/L	1	0.5	0.2		DAM	06/08/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.046	mg/L	1	0.010	0.003		DAM	06/08/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.09	µg/L	1	0.20	0.04	J1	GES	06/03/2021	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.43	pCi/L	0.09	0.11		TTP	06/22/2021	SW-846 9315-1986, Rev. 0
Carrier Recovery	91.7	%						
Radium-228	0.73	pCi/L	0.17	0.54		TTP	06/11/2021	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	74.4	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-001-01

Sampling Point: AD-2

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation: Dissolved

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.53	µg/L	1	0.10	0.03		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Barium	19.0	µg/L	1	0.20	0.05		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.532	µg/L	1	0.050	0.007		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Boron	2.85	mg/L	1	0.050	0.009		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.091	µg/L	1	0.020	0.004		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Calcium	2.6	mg/L	1	0.3	0.1		DAM	06/08/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.63	µg/L	1	0.20	0.04		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	22.2	µg/L	1	0.020	0.003		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.08	mg/L	1	0.10	0.02	J1	DAM	06/08/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.48	µg/L	1	0.20	0.05		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0472	mg/L	1	0.00020	0.00005		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	5.27	mg/L	1	0.10	0.02		DAM	06/08/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0840	mg/L	1	0.0020	0.0005		DAM	06/08/2021	EPA 200.7-1994, Rev. 4.4
Mercury	8	ng/L	1	5	2		JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Potassium	1.3	mg/L	1	1.0	0.2		DAM	06/08/2021	EPA 200.7-1994, Rev. 4.4
Selenium	1.73	µg/L	1	0.50	0.09		GES	06/03/2021	EPA 200.8-1994, Rev. 5.4
Sodium	86.5	mg/L	1	0.5	0.2		DAM	06/08/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.042	mg/L	1	0.010	0.003		DAM	06/08/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.1	µg/L	1	0.20	0.04	J1	GES	06/03/2021	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-002

Sampling Point: AD-3

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation:

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.49	µg/L	1	0.10	0.03		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	66.4	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.169	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.051	mg/L	1	0.050	0.009		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.097	µg/L	1	0.020	0.004		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	4.7	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.32	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	3.98	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	1.80	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.20	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0452	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	2.03	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0468	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	2.5	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	0.09	µg/L	1	0.50	0.09	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	9.4	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.033	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.62	pCi/L	0.11	0.16		TTP	06/22/2021	SW-846 9315-1986, Rev. 0
Carrier Recovery	93.5	%						
Radium-228	0.68	pCi/L	0.13	0.43		TTP	06/11/2021	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	96.3	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-002-01

Sampling Point: AD-3

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation: Dissolved

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.15	µg/L	1	0.10	0.03		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	64.6	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.161	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.052	mg/L	1	0.050	0.009		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.083	µg/L	1	0.020	0.004		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	4.8	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.29	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	4.08	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.55	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0463	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	2.10	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0503	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	2.6	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	9.6	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.034	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-003

Sampling Point: AD-4

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation:

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.13	µg/L	1	0.10	0.03		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	80.7	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.489	µg/L	1	0.050	0.007	M1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.032	mg/L	1	0.050	0.009	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.012	µg/L	1	0.020	0.004	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	1.7	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.24	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	6.86	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	2.98	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0335	mg/L	1	0.00020	0.00005	M1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	1.35	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0654	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	2.6	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	9.7	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.016	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.06	µg/L	1	0.20	0.04	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.47	pCi/L	0.09	0.11		TTP	06/22/2021	SW-846 9315-1986, Rev. 0
Carrier Recovery	95.1	%						
Radium-228	0.36	pCi/L	0.16	0.53		TTP	06/11/2021	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	72.4	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-003-01

Sampling Point: AD-4

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation: Dissolved

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.17	µg/L	1	0.10	0.03		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	79.8	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.442	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.032	mg/L	1	0.050	0.009	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.008	µg/L	1	0.020	0.004	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	1.6	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.24	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	7.07	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	4.29	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0335	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	1.37	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0617	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	2.6	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	9.8	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.015	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-004

Sampling Point: AD-7

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation:

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.82	µg/L	1	0.10	0.03		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	36.1	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	4.11	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	1.84	mg/L	1	0.050	0.009		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.642	µg/L	1	0.020	0.004		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	4.4	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.40	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	36.1	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.12	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.92	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0634	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	8.27	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0764	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	300	ng/L	100	500	200	J1	JAB	06/18/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	0.1	µg/L	1	0.5	0.1	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	2.2	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	2.91	µg/L	1	0.50	0.09		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	15.5	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.064	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.23	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.94	pCi/L	0.14	0.10		TTP	06/28/2021	SW-846 9315-1986, Rev. 0
Carrier Recovery	77.8	%						
Radium-228	2.36	pCi/L	0.14	0.38		TTP	06/11/2021	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	95.8	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-004-01

Sampling Point: AD-7

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation: Dissolved

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.81	µg/L	1	0.10	0.03		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	36.5	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	4.00	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	1.91	mg/L	1	0.050	0.009		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.656	µg/L	1	0.020	0.004		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	4.5	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.90	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	37.1	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.11	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.89	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0628	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	8.33	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0762	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	120	ng/L	10	50	20		JAB	06/18/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	2.3	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	3.05	µg/L	1	0.50	0.09		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	15.6	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.065	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.21	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-005

Sampling Point: AD-12

Date Collected: 05/24/2021

Date Received: 06/03/2021

Preparation:

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.08	µg/L	1	0.10	0.03	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	23.1	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.136	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.032	mg/L	1	0.050	0.009	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.005	µg/L	1	0.020	0.004	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	0.2	mg/L	1	0.3	0.1	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.24	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	1.19	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.03	mg/L	1	0.10	0.02	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.07	µg/L	1	0.20	0.05	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.00500	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	0.39	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0037	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	0.3	mg/L	1	1.0	0.2	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	0.31	µg/L	1	0.50	0.09	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	4.7	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	<0.003	mg/L	1	0.010	0.003	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.51	pCi/L	0.10	0.11		TTP	06/28/2021	SW-846 9315-1986, Rev. 0
Carrier Recovery	99.5	%						
Radium-228	0.09	pCi/L	0.13	0.45		TTP	06/11/2021	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	97.7	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-005-01

Sampling Point: AD-12

Date Collected: 05/24/2021

Date Received: 06/03/2021

Preparation: Dissolved

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.06	µg/L	1	0.10	0.03	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	23.0	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.127	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.030	mg/L	1	0.050	0.009	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.009	µg/L	1	0.020	0.004	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	0.3	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.31	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	1.14	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	<0.02	mg/L	1	0.10	0.02	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.08	µg/L	1	0.20	0.05	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.00498	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	0.38	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0036	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	0.3	mg/L	1	1.0	0.2	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	0.26	µg/L	1	0.50	0.09	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	4.7	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	<0.003	mg/L	1	0.010	0.003	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-006

Sampling Point: AD-13

Date Collected: 05/24/2021

Date Received: 06/03/2021

Preparation:

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.89	µg/L	1	0.10	0.03		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	36.6	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.119	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.078	mg/L	1	0.050	0.009		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	13.6	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.24	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	43.9	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	38.6	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.134	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	13.1	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.468	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	4.9	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	19.2	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.154	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.50	pCi/L	0.10	0.12		TTP	06/28/2021	SW-846 9315-1986, Rev. 0
Carrier Recovery	92.4	%						
Radium-228	0.94	pCi/L	0.18	0.58		TTP	06/11/2021	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	64.7	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-006-01

Sampling Point: AD-13

Date Collected: 05/24/2021

Date Received: 06/03/2021

Preparation: Dissolved

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.20	µg/L	1	0.10	0.03		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	36.3	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.084	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.077	mg/L	1	0.050	0.009		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	13.5	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.32	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	44.4	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	28.6	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.137	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	13.2	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.464	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	5.2	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	19.7	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.161	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-007

Sampling Point: AD-17

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation:

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.14	µg/L	1	0.10	0.03		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Barium	74.5	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.262	µg/L	1	0.050	0.007		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.031	mg/L	1	0.050	0.009	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.012	µg/L	1	0.020	0.004	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Calcium	<0.1	mg/L	1	0.3	0.1	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.36	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	2.85	µg/L	1	0.020	0.003		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.12	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.07	µg/L	1	0.20	0.05	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.00759	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	1.29	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0026	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	127	ng/L	4	20	7		JAB	06/18/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Potassium	<0.2	mg/L	1	1.0	0.2	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	0.12	µg/L	1	0.50	0.09	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Sodium	4.9	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	<0.003	mg/L	1	0.010	0.003	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.61	pCi/L	0.10	0.11		TTP	06/28/2021	SW-846 9315-1986, Rev. 0
Carrier Recovery	98.2	%						
Radium-228	0.80	pCi/L	0.20	0.66		TTP	06/11/2021	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	80.7	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-007-01

Sampling Point: AD-17

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation: Dissolved

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.07	µg/L	1	0.10	0.03	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	75.5	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.255	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.027	mg/L	1	0.050	0.009	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.013	µg/L	1	0.020	0.004	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	0.2	mg/L	1	0.3	0.1	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.35	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	2.87	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	<0.02	mg/L	1	0.10	0.02	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.06	µg/L	1	0.20	0.05	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.00840	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	1.27	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0028	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	0.2	mg/L	1	1.0	0.2	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	4.7	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.003	mg/L	1	0.010	0.003	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:	Customer Description:
Lab Number: 215084-008	Sampling Point: AD-18
Date Collected: 05/25/2021	Date Received: 06/03/2021
Preparation:	

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.42	µg/L	1	0.10	0.03		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	103	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.088	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.021	mg/L	1	0.050	0.009	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.014	µg/L	1	0.020	0.004	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	0.3	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.55	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	0.964	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.96	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.15	µg/L	1	0.20	0.05	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0127	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	0.38	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0044	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	14	ng/L	1	5	2		JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	0.9	mg/L	1	1.0	0.2	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	0.13	µg/L	1	0.50	0.09	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	6.6	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.005	mg/L	1	0.010	0.003	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.40	pCi/L	0.08	0.08		TTP	06/28/2021	SW-846 9315-1986, Rev. 0
Carrier Recovery	108	%						
Radium-228	0.37	pCi/L	0.17	0.56		TTP	06/11/2021	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	96.5	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-008-01

Sampling Point: AD-18

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation: Dissolved

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.04	µg/L	1	0.10	0.03	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	103	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.080	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.022	mg/L	1	0.050	0.009	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.013	µg/L	1	0.020	0.004	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	0.3	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.26	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	0.958	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.05	mg/L	1	0.10	0.02	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0130	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	0.37	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0043	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	3	ng/L	1	5	2	J1	JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	0.9	mg/L	1	1.0	0.2	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	6.7	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.005	mg/L	1	0.010	0.003	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-009

Sampling Point: AD-22

Date Collected: 05/24/2021

Date Received: 06/03/2021

Preparation:

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	2.05	µg/L	1	0.10	0.03		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	16.0	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	6.83	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.076	mg/L	1	0.050	0.009		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	1.25	µg/L	1	0.020	0.004		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	12.7	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.56	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	99.1	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	8.74	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.24	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.166	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	18.1	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.329	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	84	ng/L	1	5	2		JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	4.1	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	7.43	µg/L	1	0.50	0.09		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	74.9	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.114	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.21	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.97	pCi/L	0.14	0.12		TTP	06/28/2021	SW-846 9315-1986, Rev. 0
Carrier Recovery	79.0	%						
Radium-228	4.30	pCi/L	0.22	0.59		TTP	06/11/2021	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	79.2	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-009-01

Sampling Point: AD-22

Date Collected: 05/24/2021

Date Received: 06/03/2021

Preparation: Dissolved

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	2.22	µg/L	1	0.10	0.03		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	16.1	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	6.92	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.078	mg/L	1	0.050	0.009		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	1.26	µg/L	1	0.020	0.004		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	13.0	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.54	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	103	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	8.58	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.24	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.169	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	18.5	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.338	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	31	ng/L	1	5	2		JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	4.3	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	7.55	µg/L	1	0.50	0.09		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	75.6	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.116	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.21	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-010

Sampling Point: AD-28

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation:

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	0.02	µg/L	1	0.10	0.02	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.18	µg/L	1	0.10	0.03		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Barium	153	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.771	µg/L	1	0.050	0.007		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.391	mg/L	1	0.050	0.009		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.062	µg/L	1	0.020	0.004		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Calcium	1.3	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.47	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	15.0	µg/L	1	0.020	0.003		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.26	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.11	µg/L	1	0.20	0.05	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0190	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	3.32	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0414	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	19	ng/L	1	5	2		JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Potassium	0.7	mg/L	1	1.0	0.2	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	0.21	µg/L	1	0.50	0.09	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Sodium	7.8	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.024	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.56	pCi/L	0.10	0.11		TTP	06/28/2021	SW-846 9315-1986, Rev. 0
Carrier Recovery	87.5	%						
Radium-228	0.62	pCi/L	0.15	0.48		TTP	06/11/2021	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	87.8	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-010-01

Sampling Point: AD-28

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation: Dissolved

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.07	µg/L	1	0.10	0.03	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Barium	148	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.751	µg/L	1	0.050	0.007		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.377	mg/L	1	0.050	0.009		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.062	µg/L	1	0.020	0.004		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Calcium	1.3	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.84	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	14.5	µg/L	1	0.020	0.003		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Iron	<0.02	mg/L	1	0.10	0.02	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.12	µg/L	1	0.20	0.05	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0191	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	3.32	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0412	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	6	ng/L	1	5	2		JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Potassium	0.7	mg/L	1	1.0	0.2	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	0.27	µg/L	1	0.50	0.09	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Sodium	7.9	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.024	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:	Customer Description:
Lab Number: 215084-011	Sampling Point: AD-30
Date Collected: 05/25/2021	Date Received: 06/03/2021
Preparation:	

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.17	µg/L	1	0.10	0.03		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Barium	104	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.158	µg/L	1	0.050	0.007		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Boron	1.84	mg/L	1	0.050	0.009		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.019	µg/L	1	0.020	0.004	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Calcium	0.6	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.42	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	4.95	µg/L	1	0.020	0.003		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.06	mg/L	1	0.10	0.02	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.07	µg/L	1	0.20	0.05	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.00858	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	2.48	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0265	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	15	ng/L	1	5	2		JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Potassium	0.9	mg/L	1	1.0	0.2	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	0.30	µg/L	1	0.50	0.09	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Sodium	67.3	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.009	mg/L	1	0.010	0.003	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.86	pCi/L	0.13	0.11		TTP	06/28/2021	SW-846 9315-1986, Rev. 0
Carrier Recovery	87.9	%						
Radium-228	0.97	pCi/L	0.14	0.44		TTP	06/11/2021	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	84.2	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-011-01

Sampling Point: AD-30

Date Collected: 05/25/2021

Date Received: 06/03/2021

Preparation: Dissolved

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.14	µg/L	1	0.10	0.03		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Barium	104	µg/L	1	0.20	0.05		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.151	µg/L	1	0.050	0.007		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Boron	1.87	mg/L	1	0.050	0.009		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.021	µg/L	1	0.020	0.004		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Calcium	0.6	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.49	µg/L	1	0.20	0.04		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	4.85	µg/L	1	0.020	0.003		GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Iron	<0.02	mg/L	1	0.10	0.02	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.08	µg/L	1	0.20	0.05	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.00739	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	2.40	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0257	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	0.1	µg/L	1	0.5	0.1	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Potassium	0.9	mg/L	1	1.0	0.2	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	0.31	µg/L	1	0.50	0.09	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4
Sodium	66.2	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.009	mg/L	1	0.010	0.003	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.07	µg/L	1	0.20	0.04	J1	GES	06/07/2021	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-012

Sampling Point: AD-31

Date Collected: 05/24/2021

Date Received: 06/03/2021

Preparation:

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.23	µg/L	1	0.10	0.03		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Barium	33.2	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.723	µg/L	1	0.050	0.007		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.026	mg/L	1	0.050	0.009	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.066	µg/L	1	0.020	0.004		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Calcium	3.0	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.41	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	10.4	µg/L	1	0.020	0.003		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.17	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.20	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0638	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	4.35	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0288	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	59	ng/L	1	5	2		JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	0.1	µg/L	1	0.5	0.1	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Potassium	1.7	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	0.28	µg/L	1	0.50	0.09	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Sodium	35.7	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.042	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.09	µg/L	1	0.20	0.04	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.39	pCi/L	0.10	0.20		TTP	06/28/2021	SW-846 9315-1986, Rev. 0
Carrier Recovery	72.7	%						
Radium-228	1.21	pCi/L	0.17	0.55		TTP	06/11/2021	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	88.5	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-012-01

Sampling Point: AD-31

Date Collected: 05/24/2021

Date Received: 06/03/2021

Preparation: Dissolved

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.17	µg/L	1	0.10	0.03		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Barium	31.3	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	0.731	µg/L	1	0.050	0.007		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.026	mg/L	1	0.050	0.009	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.066	µg/L	1	0.020	0.004		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Calcium	2.9	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.65	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	9.85	µg/L	1	0.020	0.003		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.14	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.19	µg/L	1	0.20	0.05	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0642	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	4.20	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0287	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Potassium	1.7	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	0.34	µg/L	1	0.50	0.09	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Sodium	34.9	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.041	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.09	µg/L	1	0.20	0.04	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-013

Sampling Point: AD-32

Date Collected: 05/24/2021

Date Received: 06/03/2021

Preparation:

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	2.39	µg/L	1	0.10	0.03		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Barium	16.9	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	3.96	µg/L	1	0.050	0.007	M1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Boron	2.11	mg/L	1	0.050	0.009		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.529	µg/L	1	0.020	0.004		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Calcium	21.7	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.71	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	50.5	µg/L	1	0.020	0.003		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Iron	2.42	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.52	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0629	mg/L	1	0.00020	0.00005	M1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	17.7	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0924	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	800	ng/L	100	500	200		JAB	06/18/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Potassium	4.2	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	9.21	µg/L	1	0.50	0.09		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Sodium	87.0	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.406	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.21	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.98	pCi/L	0.12	0.11	P1	TTP	06/28/2021	SW-846 9315-1986, Rev. 0
Carrier Recovery	83.0	%						
Radium-228	4.40	pCi/L	0.24	0.62		TTP	06/11/2021	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	72.8	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-013-01

Sampling Point: AD-32

Date Collected: 05/24/2021

Date Received: 06/03/2021

Preparation: Dissolved

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	2.32	µg/L	1	0.10	0.03		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Barium	17.6	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	3.95	µg/L	1	0.050	0.007		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Boron	2.11	mg/L	1	0.050	0.009		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.552	µg/L	1	0.020	0.004		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Calcium	21.8	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	1.30	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	51.0	µg/L	1	0.020	0.003		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Iron	1.72	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.56	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0634	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	17.7	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0930	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	37	ng/L	1	5	2		JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	0.1	µg/L	1	0.5	0.1	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Potassium	4.2	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	9.20	µg/L	1	0.50	0.09		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Sodium	87.1	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.408	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.21	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-014

Sampling Point: AD-33

Date Collected: 05/24/2021

Date Received: 06/03/2021

Preparation:

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.43	µg/L	1	0.10	0.03		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Barium	43.8	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	1.04	µg/L	1	0.050	0.007		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.121	mg/L	1	0.050	0.009		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.048	µg/L	1	0.020	0.004		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Calcium	1.5	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.28	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	9.85	µg/L	1	0.020	0.003		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.05	mg/L	1	0.10	0.02	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.22	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0188	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	3.96	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0066	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	2000	ng/L	200	1000	400		JAB	06/18/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Potassium	0.3	mg/L	1	1.0	0.2	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	1.39	µg/L	1	0.50	0.09		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Sodium	20.2	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.029	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.05	µg/L	1	0.20	0.04	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.68	pCi/L	0.11	0.09		TTP	06/28/2021	SW-846 9315-1986, Rev. 0
Carrier Recovery	92.4	%						
Radium-228	0.72	pCi/L	0.19	0.62		TTP	06/24/2021	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	75.6	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID:

Customer Description:

Lab Number: 215084-014-01

Sampling Point: AD-33

Date Collected: 05/24/2021

Date Received: 06/03/2021

Preparation: Dissolved

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	0.42	µg/L	1	0.10	0.03		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Barium	44.5	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	1.06	µg/L	1	0.050	0.007		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.118	mg/L	1	0.050	0.009		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	0.057	µg/L	1	0.020	0.004		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Calcium	1.5	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.34	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	9.97	µg/L	1	0.020	0.003		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Iron	0.02	mg/L	1	0.10	0.02	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.27	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.0186	mg/L	1	0.00020	0.00005		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	3.94	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.0068	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	310	ng/L	20	100	40		JAB	06/18/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Potassium	0.3	mg/L	1	1.0	0.2	J1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	1.51	µg/L	1	0.50	0.09		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Sodium	20.3	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.029	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.04	µg/L	1	0.20	0.04	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID: Duplicate-1

Customer Description:

Lab Number: 215084-015

Sampling Point:

Date Collected: 05/24/2021

Date Received: 06/03/2021

Preparation:

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	2.03	µg/L	1	0.10	0.03		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Barium	15.3	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	6.91	µg/L	1	0.050	0.007		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.076	mg/L	1	0.050	0.009		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	1.18	µg/L	1	0.020	0.004		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Calcium	12.5	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.50	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	99.0	µg/L	1	0.020	0.003		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Iron	8.86	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.23	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.170	mg/L	1	0.00020	0.00005		GES	06/09/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	17.9	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.326	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	79	ng/L	1	5	2		JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Potassium	4.2	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	7.44	µg/L	1	0.50	0.09		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Sodium	75.7	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.113	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.21	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID: Duplicate-1

Customer Description:

Lab Number: 215084-015-01

Sampling Point:

Date Collected: 05/24/2021

Date Received: 06/03/2021

Preparation: Dissolved

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	2.13	µg/L	1	0.10	0.03		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Barium	16.0	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	6.96	µg/L	1	0.050	0.007		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.080	mg/L	1	0.050	0.009		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	1.24	µg/L	1	0.020	0.004		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Calcium	12.6	mg/L	1	0.3	0.1		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.64	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	102	µg/L	1	0.020	0.003		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Iron	8.51	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	0.26	µg/L	1	0.20	0.05		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.171	mg/L	1	0.00020	0.00005		GES	06/09/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	18.0	mg/L	1	0.10	0.02		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	0.328	mg/L	1	0.0020	0.0005		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	35	ng/L	1	5	2		JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Potassium	4.2	mg/L	1	1.0	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	7.43	µg/L	1	0.50	0.09		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Sodium	75.9	mg/L	1	0.5	0.2		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	0.114	mg/L	1	0.010	0.003		DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	0.21	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Customer Sample ID: Equipment Blank Lab Number: 215084-016 Date Collected: 05/24/2021 Preparation:	Customer Description: Sampling Point: Date Received: 06/03/2021
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Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Barium	0.09	µg/L	1	0.20	0.05	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Beryllium	<0.007	µg/L	1	0.050	0.007	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Boron	0.011	mg/L	1	0.050	0.009	J1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Calcium	<0.1	mg/L	1	0.3	0.1	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Chromium	0.25	µg/L	1	0.20	0.04		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Cobalt	0.039	µg/L	1	0.020	0.003		GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Iron	<0.02	mg/L	1	0.10	0.02	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Lithium	0.00024	mg/L	1	0.00020	0.00005		GES	06/09/2021	EPA 200.8-1994, Rev. 5.4
Magnesium	<0.02	mg/L	1	0.10	0.02	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Manganese	<0.0005	mg/L	1	0.0020	0.0005	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Mercury	<2	ng/L	1	5	2	U1	JAB	06/16/2021	EPA 245.7 -2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Potassium	<0.2	mg/L	1	1.0	0.2	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4
Sodium	<0.2	mg/L	1	0.5	0.2	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Strontium	<0.003	mg/L	1	0.010	0.003	U1	DAM	06/09/2021	EPA 200.7-1994, Rev. 4.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	06/08/2021	EPA 200.8-1994, Rev. 5.4

Customer Sample ID: Lab Number: 215084-016-01 Date Collected: 05/24/2021 Preparation: Dissolved	Customer Description: Sampling Point: Date Received: 06/03/2021
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Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
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Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Report Verification

This report and the above data have been confirmed by the following analyst.

A handwritten signature in black ink that reads "Michael S. Ohlinger". The signature is written in a cursive style and is positioned above a horizontal line.

Michael Ohlinger, Chemist

Email: msohlinger@aep.com

Phone: 614-836-4184

Audinet: 8-210-4184

THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED AND SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY. ALL TEST RESULTS MEET ALL OF THE REQUIREMENTS OF THE ACCREDITING AUTHORITY, UNLESS OTHERWISE NOTED.



Water Analysis Report

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

Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

Data Qualifier Legend

- B1 Analyte detected in method blank (MB) at or above the method criteria.
- B2 Analyte detected in initial calibration blank (ICB) at or above the method criteria.
- B3 Analyte detected in continuing calibration blank (CCB) at or above the method criteria.
- B4 The interference check standard (ICS) exceeded the method criteria on this parameter.
- H1 Sample was received past holding time.
- H2 Sample analysis performed past holding time.
- J1 Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.
- J2 Concentration estimated. Analyte exceeded calibration range.
- L1 The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.
- M1 The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
- M2 Analyzed by method of standard additions (MSA).
- O1 The reporting limit for oil and grease is directly affected by the collected sample volume.
- O2 Client did not provide additional bottles; therefore, the MS and duplicate are missing in this batch.
- O3 Client did not provide additional bottles; therefore, the duplicate is missing in this batch.
- O4 Sample was transferred to a different bottle due to excess fine particulate. The particulate was rinsed with hexane, and the hexane layer was transferred to the corresponding bottle. The hexane rinse was completed three times.
- P1 The precision between duplicate results was above acceptance limits.
- P2 The precision on the laboratory control sample duplicate (LCSD) was above acceptance limits.
- P3 The precision on the matrix spike duplicate (MSD) was above acceptance limits.
- P4 The field duplicate was used as a sample duplicate.
- P5 The precision on the inorganic efficiency check (IEC) exceeded the method criteria.
- Q1 Sample received in inappropriate sample container.
- Q2 Sample was received damaged. The sample was recoverable.
- Q3 Sample container was received damaged. Unable to recover the sample.
- Q4 Sample was received outside of thermal preservation range.
- Q5 Sample was received with improper chemical preservation.
- Q6 Insufficient sample was received by the laboratory to perform the requested analysis.
- Q7 Insufficient sample was received to meet method QC requirements.
- Q8 Sample was received with head space.
- Q9 Due to instrument malfunction, sample was invalidated.
- Q10 Analysis was performed by a contracted laboratory. See attached report.
- Q11 Sample contains free liquid.
- Q12 Sample does not contain free liquid.
- Q13 Sample did not ignite.
- Q14 This analyte and method are not included on the primary Laboratory Scope of TNI Accreditation.
- R1 Surrogate recovery was outside acceptance limits.
- R2 Carrier recovery was outside acceptance limits.
- R3 Internal standard recovery was outside acceptance limits.
- R4 The recovery of the reduction efficiency checks (REC) for nitrate or nitrite exceeded the method criteria.
- R5 The back calculation recovery of one or more calibration points exceeded the method criteria.
- S1 Residue weight is above or below the method criteria and needs to be re-analyzed at a different dilution.



Water Analysis Report

Dolan Chemical Laboratory
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Phone: 614-836-4221
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Job ID: 215084

Customer: Pirkey Power Station

Date Reported: 06/29/2021

- S2 Residue weight is above the method criteria but was already analyzed with the highest dilution factor.
- S3 Residue weight is below the method criteria but was already analyzed with 1000mL.
- S4 Sample and duplicate results vary due to large amounts of solids present.
- S5 Filtration time exceeds ten minutes.
- S6 Insufficient sample was received to meet the minimum volume of the method. Residue weight is below the method criteria and was analyzed with less than 1000mL.
- S7 Sample did not achieve constant weight.
- S8 Sample with low residue was selected for duplicate analysis.
- S9 Based on history, the sample residue was only measured twice and did not achieve constant weight.
- U1 Not detected at or above method detection limit (MDL).
- V1 The associated initial calibration verification (ICV) recovery was outside acceptance limits.
- V2 The associated continuing calibration verification (CCV) recovery was outside acceptance limits.

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Dolan Chemical Laboratory (DCL)
 4001 Bixby Road
 Groveport, Ohio 43125
 Michael Ohlinger (614-836-4184)
 Contacts: Dave Conover (614-836-4219)

Project Name: Pirkey PP CCR
 Contact Name: Leslie Fuerschbach
 Contact Phone: 318-673-2744

Sampler(s): Matt Hamilton Kenny McDonald

Site Contact: _____ Date: _____
 For Lab Use Only:
 COC/Order #: **215084**

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

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials				Field-filter 250 mL bottle, then pH<2, HNO ₃	Three (six every 10th) 1 L bottles, pH<2, HNO ₃	125 mL PTFE lined bottle, HCL ⁺ , pH<2	Field Filtered 125 mL PTFE lined bottle, HCL ⁺ , pH<2	Sample Specific Notes:
						B, Ca, Li, Sb, As, Ba, Mn, Mo, Pb, Se, TL	Disolved B, Ca, Li, and Na, K, Mg, Sr	Cr, Co, Fe, Mn, Mo, Pb, Se, TL	and Na, K, Mg, Sr					
AD-2	5/25/2021	929	G	GW	7				X	X	X	X	X	
AD-3	5/25/2021	1159	G	GW	7				X	X	X	X	X	
AD-4	5/25/2021	1024	G	GW	7				X	X	X	X	X	
AD-7	5/25/2021	828	G	GW	7				X	X	X	X	X	
AD-12	5/24/2021	1047	G	GW	7				X	X	X	X	X	
AD-13	5/24/2021	954	G	GW	7				X	X	X	X	X	
AD-17	5/25/2021	1115	G	GW	7				X	X	X	X	X	
AD-18	5/25/2021	1145	G	GW	7				X	X	X	X	X	
AD-22	5/24/2021	1046	G	GW	7				X	X	X	X	X	
AD-28	5/25/2021	1022	G	GW	7				X	X	X	X	X	
AD-30	5/25/2021	946	G	GW	7				X	X	X	X	X	
AD-31	5/24/2021	1230	G	GW	7				X	X	X	X	X	
										4	F4	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:

Relinquished by: RJ MW	Company: FAULK	Date/Time: 05/27/21 1400	Received by:
Relinquished by:	Company:	Date/Time:	Received by:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: Matthew Chy
			Date/Time: 6/1/21 2:00 PM

AEP WATER & WASTE SAMPLE RECEIPT FORM

Package Type			Delivery Type				
<input checked="" type="radio"/> Cooler	<input type="radio"/> Box	<input type="radio"/> Bag	<input type="radio"/> Envelope	PONY	UPS	<input checked="" type="radio"/> FedEX	USPS
				Other _____			
Plant/Customer <u>Pirkem</u>			Number of Plastic Containers: <u>33</u>				
Opened By <u>Mso</u>			Number of Glass Containers: <u>-</u>				
Date/Time <u>6/2/21</u>			Number of Mercury Containers: <u>31</u>				
Were all temperatures within 0-6°C? Y / N or <input checked="" type="radio"/> N/A Initial: _____ on ice <input checked="" type="radio"/> no ice							
1(IR Gun Ser# <u>200700311</u> , Expir. <u>06-11-22</u>) - If No, specify each deviation: _____							
Was container in good condition? <input checked="" type="radio"/> Y / N Comments _____							
Was Chain of Custody received? <input checked="" type="radio"/> Y / N Comments _____							
Requested turnaround: <u>Routine</u> If RUSH, who was notified? _____							
pH (15 min)	Cr ⁺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: JLB 6/2/21

pH paper (circle one): MQuant,PN1.09535.0001,LOT# HC904495 [OR] Lab Rat,PN4801,LOT# X000RWDG21

- Was Add'l Preservative needed? Y / N If Yes: By whom & when: _____ (See Prep Book)

Is sample filtration requested? Y / N Comments _____ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: _____

Lab ID# 215084 Initial & Date & Time : _____

Logged by Mso Comments: _____

Reviewed by SH _____

REMINDER: Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.



Water Analysis Report

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

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-001

Sampling Point: AD-2

Date Collected: 05/25/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.33	mg/L	2	0.10	0.02		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	29.8	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.22	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	215	mg/L	10	2.0	0.3		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	30	mg/L	1	50	20	J1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	430	mg/L	1	50	20		SDW	05/29/2021	SM 2540C-2011
TSS, Non-Filterable Residue	<0.3	mg/L	0.13	1.3	0.3	U1	SDW	05/29/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-002

Sampling Point: AD-3

Date Collected: 05/25/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.07	mg/L	2	0.10	0.02	J1	CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	6.06	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.08	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	28.8	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	6	mg/L	1	20	5	J1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	150	mg/L	1	50	20		SDW	05/29/2021	SM 2540C-2011
TSS, Non-Filterable Residue	4.9	mg/L	0.22	2.2	0.4		SDW	05/29/2021	SM 2540D-2011



Water Analysis Report

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

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-003

Sampling Point: AD-4

Date Collected: 05/25/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.23	mg/L	2	0.10	0.02		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	3.60	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.14	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	22.6	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO ₃ to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO ₃	8	mg/L	1	20	5	J1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	150	mg/L	1	50	20		SDW	05/29/2021	SM 2540C-2011
TSS, Non-Filterable Residue	4.7	mg/L	0.22	2.2	0.4		SDW	05/29/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-004

Sampling Point: AD-7

Date Collected: 05/25/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	2.62	mg/L	2	0.10	0.02		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	28.4	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.54	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	64.6	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO ₃ to pH 8.3	50	mg/L	1	50	20		GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO ₃	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	250	mg/L	1	50	20		SDW	05/29/2021	SM 2540C-2011
TSS, Non-Filterable Residue	<0.3	mg/L	0.14	1.4	0.3	U1	SDW	05/29/2021	SM 2540D-2011



Water Analysis Report

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

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-005

Sampling Point: AD-12

Date Collected: 05/24/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.04	mg/L	2	0.10	0.02	J1	CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	5.54	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.12	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	5.46	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	70	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	<0.3	mg/L	0.14	1.4	0.3	U1	HRF	05/28/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-006

Sampling Point: AD-13

Date Collected: 05/24/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.31	mg/L	2	0.10	0.02		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	41.6	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.48	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	78.6	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	30	mg/L	1	50	20	J1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	60	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	57.8	mg/L	0.20	2.0	0.4		HRF	05/28/2021	SM 2540D-2011



Water Analysis Report

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

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-007

Sampling Point: AD-17

Date Collected: 05/25/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.11	mg/L	2	0.10	0.02		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	9.30	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.17	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	2.66	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	60	mg/L	1	50	20		SDW	05/29/2021	SM 2540C-2011
TSS, Non-Filterable Residue	<0.6	mg/L	0.29	2.9	0.6	U1	SDW	05/29/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-008

Sampling Point: AD-18

Date Collected: 05/25/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.06	mg/L	2	0.10	0.02	J1	CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	7.16	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.02	mg/L	2	0.06	0.01	J1	CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	7.46	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	100	mg/L	1	50	20	P1	SDW	05/29/2021	SM 2540C-2011
TSS, Non-Filterable Residue	3.2	mg/L	0.17	1.7	0.3		SDW	05/29/2021	SM 2540D-2011



Water Analysis Report

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

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-009

Sampling Point: AD-22

Date Collected: 05/24/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.40	mg/L	2	0.10	0.02		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	60.6	mg/L	10	0.20	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	1.24	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	327	mg/L	10	2.0	0.3		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	120	mg/L	1	50	20		GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	290	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	4.7	mg/L	0.12	1.2	0.2		HRF	05/28/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-010

Sampling Point: AD-28

Date Collected: 05/25/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.09	mg/L	2	0.10	0.02	J1	CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	4.92	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	1.0	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	27.6	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	20	mg/L	1	50	20	J1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	110	mg/L	1	50	20		SDW	05/29/2021	SM 2540C-2011
TSS, Non-Filterable Residue	<0.3	mg/L	0.17	1.7	0.3	U1	SDW	05/29/2021	SM 2540D-2011



Water Analysis Report

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

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:	Customer Description:
Lab Number: 215073-011	Sampling Point: AD-30
Date Collected: 05/25/2021	Date Received: 05/28/2021
Preparation:	

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.37	mg/L	2	0.10	0.02		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	22.8	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.08	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	113	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	240	mg/L	1	50	20		SDW	05/29/2021	SM 2540C-2011
TSS, Non-Filterable Residue	<0.3	mg/L	0.17	1.7	0.3	U1	SDW	05/29/2021	SM 2540D-2011

Customer Sample ID:	Customer Description:
Lab Number: 215073-012	Sampling Point: AD-31
Date Collected: 05/24/2021	Date Received: 05/28/2021
Preparation:	

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.34	mg/L	2	0.10	0.02		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	18.1	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.17	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	86.4	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	30	mg/L	1	50	20	J1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	130	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	1.4	mg/L	0.14	1.4	0.3		HRF	05/28/2021	SM 2540D-2011



Water Analysis Report

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

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-013

Sampling Point: AD-32

Date Collected: 05/24/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.63	mg/L	2	0.10	0.02		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	25.4	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	1.25	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	452	mg/L	25	5.0	0.8		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	110	mg/L	1	50	20		GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	340	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	4.2	mg/L	0.14	1.4	0.3		HRF	05/28/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-014

Sampling Point: AD-33

Date Collected: 05/24/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.28	mg/L	2	0.10	0.02		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	8.56	mg/L	2	0.04	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.29	mg/L	2	0.06	0.01		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	60.4	mg/L	2	0.40	0.06		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	30	mg/L	1	50	20	J1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	100	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	<0.2	mg/L	0.11	1.1	0.2	U1	HRF	05/28/2021	SM 2540D-2011



Water Analysis Report

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

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID: Duplicate-1

Customer Description:

Lab Number: 215073-015

Sampling Point:

Date Collected: 05/24/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.40	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	63.8	mg/L	25	0.5	0.2		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	1.27	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	355	mg/L	25	5.0	0.8		CRJ	06/08/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	130	mg/L	1	50	20		GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	320	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	4.4	mg/L	0.13	1.3	0.3		HRF	05/28/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-016

Sampling Point: B-2

Date Collected: 05/24/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.06	mg/L	2	0.10	0.02	J1	CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	6.92	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.25	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	27.8	mg/L	2	0.40	0.06		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	160	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	20.6	mg/L	0.16	1.6	0.3		HRF	05/28/2021	SM 2540D-2011



Water Analysis Report

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

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-017

Sampling Point: B-3

Date Collected: 05/26/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.10	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	13.9	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.11	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	94.2	mg/L	2	0.40	0.06		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	13	mg/L	1	20	5	J1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	240	mg/L	1	50	20		SDW	06/01/2021	SM 2540C-2011
TSS, Non-Filterable Residue	1.3	mg/L	0.12	1.2	0.2	S6	SDW	06/01/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-018

Sampling Point: AD-7R

Date Collected: 05/24/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.59	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	15.3	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.20	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	81.6	mg/L	2	0.40	0.06		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	30	mg/L	1	50	20	J1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	240	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	11.8	mg/L	0.12	1.2	0.2		HRF	05/28/2021	SM 2540D-2011



Water Analysis Report

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

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-019

Sampling Point: AD-25

Date Collected: 05/26/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.08	mg/L	2	0.10	0.02	J1	CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	3.12	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	1.68	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	795	mg/L	25	5.0	0.8		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	400	mg/L	1	50	20		GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	1250	mg/L	1	50	20		SDW	06/01/2021	SM 2540C-2011
TSS, Non-Filterable Residue	1.6	mg/L	0.20	2.0	0.4	S6, J1	SDW	06/01/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-020

Sampling Point: AD-26

Date Collected: 05/26/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.46	mg/L	5	0.25	0.05		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	17.8	mg/L	5	0.10	0.03		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	4.01	mg/L	5	0.15	0.04		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	1460	mg/L	50	10	2		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	530	mg/L	1	50	20		GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	2100	mg/L	2	100	40		SDW	06/01/2021	SM 2540C-2011
TSS, Non-Filterable Residue	3.0	mg/L	0.20	2.0	0.4	S6	SDW	06/01/2021	SM 2540D-2011



Water Analysis Report

Dolan Chemical Laboratory
4001 Bixby Road
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Phone: 614-836-4221
Audinet: 210-4221

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID: Duplicate-2

Customer Description:

Lab Number: 215073-021

Sampling Point:

Date Collected: 05/24/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.61	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	15.1	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.20	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	80.4	mg/L	2	0.40	0.06		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	230	mg/L	1	50	20		HRF	05/28/2021	SM 2540C-2011
TSS, Non-Filterable Residue	10.6	mg/L	0.12	1.2	0.2		HRF	05/28/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-022

Sampling Point: AD-8

Date Collected: 05/26/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.11	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	3.28	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.35	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	168	mg/L	10	2.0	0.3		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	112	mg/L	1	20	5		GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	390	mg/L	1	50	20		SDW	06/01/2021	SM 2540C-2011
TSS, Non-Filterable Residue	8.8	mg/L	0.20	2.0	0.4		SDW	06/01/2021	SM 2540D-2011



Water Analysis Report

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

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-023

Sampling Point: AD-16

Date Collected: 05/26/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.19	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	23.2	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.13	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	7.36	mg/L	2	0.40	0.06		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	120	mg/L	1	50	20		SDW	06/01/2021	SM 2540C-2011
TSS, Non-Filterable Residue	3.8	mg/L	0.20	2.0	0.4		SDW	06/01/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-024

Sampling Point: AD-23

Date Collected: 05/26/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.19	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	6.94	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.06	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	7.90	mg/L	2	0.40	0.06		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	70	mg/L	1	50	20		SDW	06/01/2021	SM 2540C-2011
TSS, Non-Filterable Residue	632	mg/L	1	10	2		SDW	06/01/2021	SM 2540D-2011



Water Analysis Report

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

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-025

Sampling Point: AD-27

Date Collected: 05/26/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.31	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	13.5	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.25	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	50.8	mg/L	2	0.40	0.06		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO ₃ to pH 8.3	40	mg/L	1	50	20	J1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO ₃	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	230	mg/L	1	50	20		SDW	06/01/2021	SM 2540C-2011
TSS, Non-Filterable Residue	61.2	mg/L	0.20	2.0	0.4		SDW	06/01/2021	SM 2540D-2011

Customer Sample ID:

Customer Description:

Lab Number: 215073-026

Sampling Point: AD-34

Date Collected: 05/26/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.21	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	7.44	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	2.1	mg/L	25	0.8	0.2		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	1110	mg/L	25	5.0	0.8		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO ₃ to pH 8.3	840	mg/L	1	50	20		GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO ₃	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	1670	mg/L	1	50	20		SDW	06/01/2021	SM 2540C-2011
TSS, Non-Filterable Residue	0.3	mg/L	0.17	1.7	0.3	S6, J1	SDW	06/01/2021	SM 2540D-2011



Water Analysis Report

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

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Customer Sample ID:

Customer Description:

Lab Number: 215073-027

Sampling Point: AD-36

Date Collected: 05/26/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.59	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	10.6	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.10	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	4.08	mg/L	2	0.40	0.06		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	60	mg/L	1	50	20		SDW	06/01/2021	SM 2540C-2011
TSS, Non-Filterable Residue	<0.3	mg/L	0.17	1.7	0.3	S6, U1	SDW	06/01/2021	SM 2540D-2011

Customer Sample ID: Duplicate-3

Customer Description:

Lab Number: 215073-028

Sampling Point:

Date Collected: 05/26/2021

Date Received: 05/28/2021

Preparation:

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.10	mg/L	2	0.10	0.02		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Chloride	3.28	mg/L	2	0.04	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.35	mg/L	2	0.06	0.01		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0
Sulfate	172	mg/L	25	5.0	0.8		CRJ	06/09/2021	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	06/02/2021	SM 2310B-2011
Alkalinity, as CaCO3	109	mg/L	1	20	5		GES	06/03/2021	SM 2320B-2011
TDS, Filterable Residue	380	mg/L	1	50	20		SDW	06/01/2021	SM 2540C-2011
TSS, Non-Filterable Residue	8.2	mg/L	0.18	1.8	0.4		SDW	06/01/2021	SM 2540D-2011



Water Analysis Report

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

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Report Verification

This report and the above data have been confirmed by the following analyst.

A blue rectangular box containing a handwritten signature in black ink that reads "Jonathan Barnhill".

Jonathan Barnhill, Dolan Chemical Lab
Supervisor

Email: jdbarnhill@aep.com

Phone: 614-836-4256

Audinet: 8-210-4256

THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED AND SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY. ALL TEST RESULTS MEET ALL OF THE REQUIREMENTS OF THE ACCREDITING AUTHORITY, UNLESS OTHERWISE NOTED.



Water Analysis Report

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

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

Data Qualifier Legend

- B1 Analyte detected in method blank (MB) at or above the method criteria.
- B2 Analyte detected in initial calibration blank (ICB) at or above the method criteria.
- B3 Analyte detected in continuing calibration blank (CCB) at or above the method criteria.
- B4 The interference check standard (ICS) exceeded the method criteria on this parameter.
- H1 Sample was received past holding time.
- H2 Sample analysis performed past holding time.
- J1 Concentration estimated. Analyte was detected between the method detection limit and the reporting limit.
- J2 Concentration estimated. Analyte exceeded calibration range.
- L1 The associated laboratory control sample (LCS) or laboratory control sample duplicate (LCSD) recovery was outside acceptance limits.
- M1 The associated matrix spike (MS) or matrix spike duplicate (MSD) recovery was outside acceptance limits.
- M2 Analyzed by method of standard additions (MSA).
- O1 The reporting limit for oil and grease is directly affected by the collected sample volume.
- O2 Client did not provide additional bottles; therefore, the MS and duplicate are missing in this batch.
- O3 Client did not provide additional bottles; therefore, the duplicate is missing in this batch.
- O4 Sample was transferred to a different bottle due to excess fine particulate. The particulate was rinsed with hexane, and the hexane layer was transferred to the corresponding bottle. The hexane rinse was completed three times.
- P1 The precision between duplicate results was above acceptance limits.
- P2 The precision on the laboratory control sample duplicate (LCSD) was above acceptance limits.
- P3 The precision on the matrix spike duplicate (MSD) was above acceptance limits.
- P4 The precision on the inorganic efficiency check (IEC) exceeded the method criteria.
- Q1 Sample received in inappropriate sample container.
- Q2 Sample was received damaged. The sample was recoverable.
- Q3 Sample container was received damaged. Unable to recover the sample.
- Q4 Sample was received outside of thermal preservation range.
- Q5 Sample was received with improper chemical preservation.
- Q6 Insufficient sample was received by the laboratory to perform the requested analysis.
- Q7 Insufficient sample was received to meet method QC requirements.
- Q8 Sample was received with head space.
- Q9 Due to instrument malfunction, sample was invalidated.
- Q10 Analysis was performed by a contracted laboratory. See attached report.
- Q11 Sample contains free liquid.
- Q12 Sample does not contain free liquid.
- Q13 Sample did not ignite.
- Q14 This analyte and method are not included on the primary Laboratory Scope of TNI Accreditation.
- R1 Surrogate recovery was outside acceptance limits.
- R2 Carrier recovery was outside acceptance limits.
- R3 Internal standard recovery was outside acceptance limits.
- R4 The recovery of the reduction efficiency checks (REC) for nitrate or nitrite exceeded the method criteria.
- R5 The back calculation recovery of one or more calibration points exceeded the method criteria.
- S1 Residue weight is above or below the method criteria and needs to be re-analyzed at a different dilution.
- S2 Residue weight is above the method criteria but was already analyzed with the highest dilution factor.



Water Analysis Report

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

Job ID: 215073

Customer: Pirkey Power Station

Date Reported: 06/25/2021

- S3 Residue weight is below the method criteria but was already analyzed with 1000mL.
- S4 Sample and duplicate results vary due to large amounts of solids present.
- S5 Filtration time exceeds ten minutes.
- S6 Insufficient sample was received to meet the minimum volume of the method. Residue weight is below the method criteria and was analyzed with less than 1000mL.
- S7 Sample did not achieve constant weight.
- S8 Sample with low residue was selected for duplicate analysis.
- S9 Based on history, the sample residue was only measured twice and did not achieve constant weight.
- U1 Not detected at or above method detection limit (MDL).
- V1 The associated initial calibration verification (ICV) recovery was outside acceptance limits.
- V2 The associated continuing calibration verification (CCV) recovery was outside acceptance limits.

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Site Contact:

Date:

COC/Order #:

Dolan Chemical Laboratory (DCL)
4001 Bixby Road
Groveport, Ohio 43125
Michael Ohlinger (614-836-4184)
Contacts: Dave Conover (614-836-4219)

Project Name: Pirkey PP CCR

Contact Name: Leslie Fuerschbach

Contact Phone: 318-673-2744

Sampler(s): Matt Hamilton Kenny McDonald

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

Sampler(s) Initials

Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.
5/24/2021	957	G	GW	1
5/26/2021	1113	G	GW	1
5/24/2021	1140	G	GW	1
5/26/2021	1021	G	GW	1
5/26/2021	937	G	GW	1
5/24/2021	1230	G	GW	1

Sample Identification

B-2

B-3

AD-7R

AD-25

AD-26

Duplicate - 2

250 mL bottle, pH<2, HNO3

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

1 L bottle, Cool, 0-6C

Three (six every 10th*) 1 L bottles, pH<2, HNO3

Disolved Mercury

F, Cl, SO4, Br, TDS, TSS, alkalinity, acidity

Ra-226, Ra-228

Mercury

Sample Specific Notes:

X

X

X

X

X

X

Preservation Used: 1= Ice, 2= HCl, 3= H2SO4, 4=HNO3; 5=NaOH; 6= Other

* Six 1L Bottles must be collected for Radium for every 10th sample.

Special Instructions/QC Requirements & Comments:

Relinquished by:

Relinquished by:

Relinquished by:

Company: EAGLE

Company:

Company:

Date/Time: 05/27/21 1400

Date/Time:

Date/Time:

Received by:

Received by:

Received in Laboratory by:

Date/Time:

Date/Time:

Date/Time: 5-28-21 10:15

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Dolan Chemical Laboratory (DCL)
 4001 Bixby Road
 Groveport, Ohio 43125
 Michael Ohlinger (614-836-4184)
 Contacts: Dave Conover (614-836-4219)

Project Name: Pitkey PP CCR
 Contact Name: Leslie Fuerschbach
 Contact Phone: 318-673-2744

Sampler(s): Matt Hamilton Kenny McDonald

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	Three (six every 10th*) 1 L bottles, pH<2, HNO3
AD-8	5/26/2021	912	G	GW	1			X	
AD-16	5/26/2021	1312	G	GW	1			X	
AD-23	5/26/2021	1137	G	GW	1			X	
AD-27	5/26/2021	1237	G	GW	1			X	
AD-34	5/26/2021	1043	G	GW	1			X	
AD-36	5/26/2021	959	G	GW	1			X	
Duplicate - 3	5/26/2021	1200	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:

Relinquished by: <i>[Signature]</i>	Company: <i>EAGLE</i>	Date/Time: <i>05/27/21 1400</i>	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Date/Time: <i>5-28-21 10:15</i>

AEP WATER & WASTE SAMPLE RECEIPT FORM

Package Type				Delivery Type			
Cooler	Box	Bag	Envelope	PONY	UPS	FedEX	USPS
				Other _____			
Plant/Customer <u>Pitkey</u>				Number of Plastic Containers: <u>28</u>			
Opened By <u>SM, DGA</u>				Number of Glass Containers: _____			
Date/Time <u>5-27-21 10:15</u>				Number of Mercury Containers: _____			
Were all temperatures within 0-6°C? <input checked="" type="radio"/> Y / <input type="radio"/> N or N/A Initial: <u>SM</u> <input checked="" type="radio"/> on ice / <input type="radio"/> no ice							
2(IR Gun Ser# <u>200700321</u> , Expir. <u>06-11-22</u>) - If No, specify each deviation: _____							
Was container in good condition? <input checked="" type="radio"/> Y / <input type="radio"/> N Comments _____							
Was Chain of Custody received? <input checked="" type="radio"/> Y / <input type="radio"/> N Comments _____							
Requested turnaround: <u>Rollie</u> If RUSH, who was notified? _____							
pH (15 min)	Cr ⁺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: JAB 5-28-21

pH paper (circle one): MQuant,PN1.09535.0001,LOT# HC904495 [OR] Lab Rat,PN4801,LOT# X000RWDG21

- Was Add'l Preservative needed? Y N If Yes: By whom & when: _____ (See Prep Book)

Is sample filtration requested? Y N Comments _____ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: _____

Lab ID# 215073 Initial & Date & Time : _____

Logged by SM Comments: _____

Reviewed by MGO _____

REMINDER: Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.



Water Analysis Report

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

Job ID: 216283

Customer: Pirkey Power Station

Date Reported: 12/15/2021

Customer Sample ID: AD-2

Customer Description:

Lab Number: 216283-001

Preparation:

Date Collected: 11/16/2021 10:10

Date Received: 11/19/2021 12:00

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.24	mg/L	2	0.10	0.02		CRJ	12/02/2021 17:33	EPA 300.1 -1997, Rev. 1.0
Chloride	29.2	mg/L	2	0.04	0.02		CRJ	12/02/2021 17:33	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.15	mg/L	2	0.06	0.02		CRJ	12/02/2021 17:33	EPA 300.1 -1997, Rev. 1.0
Sulfate	200	mg/L	10	2.0	0.3		CRJ	12/02/2021 17:07	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO ₃ to pH 8.3	40	mg/L	1	50	20	J1	GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO ₃	<5	mg/L	1	20	5	U1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	410	mg/L	1	50	20		SDW	11/20/2021 10:33	SM 2540C-2011
TSS, Non-Filterable Residue	<0.5	mg/L	0.25	2.5	0.5	S6, U1	SDW	11/20/2021 10:33	SM 2540D-2011

Customer Sample ID: AD-3

Customer Description:

Lab Number: 216283-002

Preparation:

Date Collected: 11/16/2021 11:39

Date Received: 11/19/2021 12:00

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.04	mg/L	2	0.10	0.02	J1	CRJ	12/02/2021 16:42	EPA 300.1 -1997, Rev. 1.0
Chloride	6.42	mg/L	2	0.04	0.02		CRJ	12/02/2021 16:42	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.12	mg/L	2	0.06	0.02		CRJ	12/02/2021 16:42	EPA 300.1 -1997, Rev. 1.0
Sulfate	31.3	mg/L	2	0.40	0.06		CRJ	12/02/2021 16:42	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO ₃ to pH 8.3	<20	mg/L	1	50	20	U1	GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO ₃	10	mg/L	1	20	5	J1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	150	mg/L	1	50	20		SDW	11/20/2021 10:33	SM 2540C-2011
TSS, Non-Filterable Residue	23.6	mg/L	0.40	4.0	0.8		SDW	11/20/2021 10:33	SM 2540D-2011



Water Analysis Report

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

Job ID: 216283

Customer: Pirkey Power Station

Date Reported: 12/15/2021

Customer Sample ID: AD-4

Customer Description:

Lab Number: 216283-003

Preparation:

Date Collected: 11/16/2021 11:08

Date Received: 11/19/2021 12:00

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.13	mg/L	2	0.10	0.02		CRJ	12/02/2021 18:23	EPA 300.1 -1997, Rev. 1.0
Chloride	3.94	mg/L	2	0.04	0.02		CRJ	12/02/2021 18:23	EPA 300.1 -1997, Rev. 1.0
Fluoride	<0.02	mg/L	2	0.06	0.02	U1	CRJ	12/02/2021 18:23	EPA 300.1 -1997, Rev. 1.0
Sulfate	17.2	mg/L	2	0.40	0.06		CRJ	12/02/2021 18:23	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	20	mg/L	1	50	20	J1	GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	130	mg/L	1	50	20		SDW	11/20/2021 10:43	SM 2540C-2011
TSS, Non-Filterable Residue	0.8	mg/L	0.25	2.5	0.5	S6, J1	SDW	11/20/2021 10:43	SM 2540D-2011

Customer Sample ID: AD-7

Customer Description:

Lab Number: 216283-004

Preparation:

Date Collected: 11/16/2021 08:37

Date Received: 11/19/2021 12:00

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	2.66	mg/L	2	0.10	0.02		CRJ	12/02/2021 21:47	EPA 300.1 -1997, Rev. 1.0
Chloride	33.6	mg/L	2	0.04	0.02		CRJ	12/02/2021 21:47	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.44	mg/L	2	0.06	0.02		CRJ	12/02/2021 21:47	EPA 300.1 -1997, Rev. 1.0
Sulfate	62.6	mg/L	2	0.40	0.06		CRJ	12/02/2021 21:47	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	60	mg/L	1	50	20		GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	260	mg/L	1	50	20		SDW	11/20/2021 10:43	SM 2540C-2011
TSS, Non-Filterable Residue	5.0	mg/L	0.25	2.5	0.5	S6	SDW	11/20/2021 10:43	SM 2540D-2011



Water Analysis Report

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

Job ID: 216283

Customer: Pirkey Power Station

Date Reported: 12/15/2021

Customer Sample ID: AD-12

Customer Description:

Lab Number: 216283-005

Preparation:

Date Collected: 11/15/2021 10:29

Date Received: 11/19/2021 12:00

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.08	mg/L	2	0.10	0.02	J1	CRJ	12/02/2021 20:56	EPA 300.1 -1997, Rev. 1.0
Chloride	8.03	mg/L	2	0.04	0.02		CRJ	12/02/2021 20:56	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.07	mg/L	2	0.06	0.02		CRJ	12/02/2021 20:56	EPA 300.1 -1997, Rev. 1.0
Sulfate	2.90	mg/L	2	0.40	0.06		CRJ	12/02/2021 20:56	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	90	mg/L	1	50	20		SDW	11/20/2021 10:53	SM 2540C-2011
TSS, Non-Filterable Residue	<0.5	mg/L	0.25	2.5	0.5	U1	SDW	11/20/2021 10:53	SM 2540D-2011

Customer Sample ID: AD-13

Customer Description:

Lab Number: 216283-006

Preparation:

Date Collected: 11/15/2021 09:38

Date Received: 11/19/2021 12:00

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.20	mg/L	2	0.10	0.02		CRJ	12/02/2021 23:28	EPA 300.1 -1997, Rev. 1.0
Chloride	42.3	mg/L	10	0.2	0.1		CRJ	12/02/2021 23:03	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.26	mg/L	2	0.06	0.02		CRJ	12/02/2021 23:28	EPA 300.1 -1997, Rev. 1.0
Sulfate	70.8	mg/L	2	0.40	0.06		CRJ	12/02/2021 23:28	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	20	mg/L	1	50	20	J1	GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	220	mg/L	1	50	20		SDW	11/20/2021 10:53	SM 2540C-2011
TSS, Non-Filterable Residue	62.4	mg/L	0.40	4.0	0.8	P1	SDW	11/20/2021 10:53	SM 2540D-2011



Water Analysis Report

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

Job ID: 216283

Customer: Pirkey Power Station

Date Reported: 12/15/2021

Customer Sample ID: AD-17

Customer Description:

Lab Number: 216283-007

Preparation:

Date Collected: 11/16/2021 10:52

Date Received: 11/19/2021 12:00

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.15	mg/L	2	0.10	0.02		CRJ	12/02/2021 22:38	EPA 300.1 -1997, Rev. 1.0
Chloride	31.3	mg/L	2	0.04	0.02		CRJ	12/02/2021 22:38	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.29	mg/L	2	0.06	0.02		CRJ	12/02/2021 22:38	EPA 300.1 -1997, Rev. 1.0
Sulfate	2.58	mg/L	2	0.40	0.06		CRJ	12/02/2021 22:38	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	20	mg/L	1	50	20	J1	GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	90	mg/L	1	50	20		SDW	11/20/2021 11:08	SM 2540C-2011
TSS, Non-Filterable Residue	1.5	mg/L	0.25	2.5	0.5	S6, J1	SDW	11/20/2021 11:08	SM 2540D-2011

Customer Sample ID: AD-18

Customer Description:

Lab Number: 216283-008

Preparation:

Date Collected: 11/17/2021 08:25

Date Received: 11/19/2021 12:00

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.02	mg/L	2	0.10	0.02	J1	CRJ	12/03/2021 00:19	EPA 300.1 -1997, Rev. 1.0
Chloride	5.99	mg/L	2	0.04	0.02		CRJ	12/03/2021 00:19	EPA 300.1 -1997, Rev. 1.0
Fluoride	<0.02	mg/L	2	0.06	0.02	U1	CRJ	12/03/2021 00:19	EPA 300.1 -1997, Rev. 1.0
Sulfate	6.23	mg/L	2	0.40	0.06		CRJ	12/03/2021 00:19	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	<20	mg/L	1	50	20	U1	GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	100	mg/L	1	50	20		SDW	11/20/2021 11:08	SM 2540C-2011
TSS, Non-Filterable Residue	2.8	mg/L	0.25	2.5	0.5	S6	SDW	11/20/2021 11:08	SM 2540D-2011



Water Analysis Report

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

Job ID: 216283

Customer: Pirkey Power Station

Date Reported: 12/15/2021

Customer Sample ID: AD-22

Customer Description:

Lab Number: 216283-009

Preparation:

Date Collected: 11/15/2021 11:21

Date Received: 11/19/2021 12:00

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.75	mg/L	2	0.10	0.02		CRJ	12/03/2021 01:10	EPA 300.1 -1997, Rev. 1.0
Chloride	108	mg/L	10	0.2	0.1		CRJ	12/03/2021 00:45	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.35	mg/L	2	0.06	0.02		CRJ	12/03/2021 01:10	EPA 300.1 -1997, Rev. 1.0
Sulfate	236	mg/L	10	2.0	0.3		CRJ	12/03/2021 00:45	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	100	mg/L	1	50	20		GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	570	mg/L	2	100	40		SDW	11/20/2021 11:18	SM 2540C-2011
TSS, Non-Filterable Residue	1.1	mg/L	0.22	2.2	0.4	S6, J1	SDW	11/20/2021 11:18	SM 2540D-2011

Customer Sample ID: AD-28

Customer Description:

Lab Number: 216283-010

Preparation:

Date Collected: 11/16/2021 09:53

Date Received: 11/19/2021 12:00

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.06	mg/L	2	0.10	0.02	J1	CRJ	12/03/2021 02:01	EPA 300.1 -1997, Rev. 1.0
Chloride	4.79	mg/L	2	0.04	0.02		CRJ	12/03/2021 02:01	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.58	mg/L	2	0.06	0.02		CRJ	12/03/2021 02:01	EPA 300.1 -1997, Rev. 1.0
Sulfate	24.2	mg/L	2	0.40	0.06		CRJ	12/03/2021 02:01	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	20	mg/L	1	50	20	J1	GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	100	mg/L	1	50	20		SDW	11/20/2021 11:18	SM 2540C-2011
TSS, Non-Filterable Residue	1.5	mg/L	0.25	2.5	0.5	S6, J1	SDW	11/20/2021 11:18	SM 2540D-2011



Water Analysis Report

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

Job ID: 216283

Customer: Pirkey Power Station

Date Reported: 12/15/2021

Customer Sample ID: AD-30

Customer Description:

Lab Number: 216283-011

Preparation:

Date Collected: 11/15/2021 12:12

Date Received: 11/19/2021 12:00

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.39	mg/L	2	0.10	0.02		CRJ	12/03/2021 04:59	EPA 300.1 -1997, Rev. 1.0
Chloride	30.9	mg/L	2	0.04	0.02		CRJ	12/03/2021 04:59	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.05	mg/L	2	0.06	0.02	J1	CRJ	12/03/2021 04:59	EPA 300.1 -1997, Rev. 1.0
Sulfate	149	mg/L	10	2.0	0.3		CRJ	12/03/2021 04:34	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	20	mg/L	1	50	20	J1	GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	330	mg/L	1	50	20		SDW	11/20/2021 11:28	SM 2540C-2011
TSS, Non-Filterable Residue	1.0	mg/L	0.25	2.5	0.5	S6, J1	SDW	11/20/2021 11:28	SM 2540D-2011

Customer Sample ID: AD-31

Customer Description:

Lab Number: 216283-012

Preparation:

Date Collected: 11/16/2021 08:58

Date Received: 11/19/2021 12:00

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.24	mg/L	2	0.10	0.02		CRJ	12/03/2021 05:24	EPA 300.1 -1997, Rev. 1.0
Chloride	20.1	mg/L	2	0.04	0.02		CRJ	12/03/2021 05:24	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.13	mg/L	2	0.06	0.02		CRJ	12/03/2021 05:24	EPA 300.1 -1997, Rev. 1.0
Sulfate	76.6	mg/L	2	0.40	0.06		CRJ	12/03/2021 05:24	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	30	mg/L	1	50	20	J1	GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	250	mg/L	1	50	20		SDW	11/20/2021 11:28	SM 2540C-2011
TSS, Non-Filterable Residue	23.2	mg/L	0.25	2.5	0.5	S6	SDW	11/20/2021 11:28	SM 2540D-2011



Water Analysis Report

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

Job ID: 216283

Customer: Pirkey Power Station

Date Reported: 12/15/2021

Customer Sample ID: AD-32

Customer Description:

Lab Number: 216283-013

Preparation:

Date Collected: 11/15/2021 11:24

Date Received: 11/19/2021 12:00

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	2.08	mg/L	2	0.10	0.02		CRJ	12/03/2021 08:22	EPA 300.1 -1997, Rev. 1.0
Chloride	24.3	mg/L	2	0.04	0.02		CRJ	12/03/2021 08:22	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.78	mg/L	2	0.06	0.02		CRJ	12/03/2021 08:22	EPA 300.1 -1997, Rev. 1.0
Sulfate	334	mg/L	25	5.0	0.8		CRJ	12/03/2021 07:57	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	110	mg/L	1	50	20		GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	580	mg/L	1	50	20		SDW	11/20/2021 11:38	SM 2540C-2011
TSS, Non-Filterable Residue	5.3	mg/L	0.25	2.5	0.5	S6	SDW	11/20/2021 11:38	SM 2540D-2011

Customer Sample ID: AD-33

Customer Description:

Lab Number: 216283-014

Preparation:

Date Collected: 11/15/2021 12:18

Date Received: 11/19/2021 12:00

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	0.16	mg/L	2	0.10	0.02		CRJ	12/03/2021 09:27	EPA 300.1 -1997, Rev. 1.0
Chloride	8.60	mg/L	2	0.04	0.02		CRJ	12/03/2021 09:27	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.17	mg/L	2	0.06	0.02		CRJ	12/03/2021 09:27	EPA 300.1 -1997, Rev. 1.0
Sulfate	41.9	mg/L	2	0.40	0.06		CRJ	12/03/2021 09:27	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	30	mg/L	1	50	20	J1	GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	150	mg/L	1	50	20		SDW	11/20/2021 11:38	SM 2540C-2011
TSS, Non-Filterable Residue	1.8	mg/L	0.25	2.5	0.5	S6, J1	SDW	11/20/2021 11:38	SM 2540D-2011



Water Analysis Report

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

Job ID: 216283

Customer: Pirkey Power Station

Date Reported: 12/15/2021

Customer Sample ID: Duplicate - 2

Customer Description:

Lab Number: 216283-015

Preparation:

Date Collected: 11/16/2021 12:00

Date Received: 11/19/2021 12:00

Ion Chromatography

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Bromide	2.87	mg/L	2	0.10	0.02		CRJ	12/03/2021 07:06	EPA 300.1 -1997, Rev. 1.0
Chloride	38.3	mg/L	2	0.04	0.02		CRJ	12/03/2021 07:06	EPA 300.1 -1997, Rev. 1.0
Fluoride	0.42	mg/L	2	0.06	0.02		CRJ	12/03/2021 07:06	EPA 300.1 -1997, Rev. 1.0
Sulfate	61.6	mg/L	2	0.40	0.06		CRJ	12/03/2021 07:06	EPA 300.1 -1997, Rev. 1.0

Wet Chemistry

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Acidity, as CaCO3 to pH 8.3	60	mg/L	1	50	20		GES	11/23/2021 15:11	SM 2310B-2011
Alkalinity, as CaCO3	<5	mg/L	1	20	5	U1	MGK	11/22/2021 10:47	SM 2320B-2011
TDS, Filterable Residue	270	mg/L	1	50	20		SDW	11/20/2021 11:48	SM 2540C-2011
TSS, Non-Filterable Residue	<0.5	mg/L	0.25	2.5	0.5	S6, U1	SDW	11/20/2021 11:48	SM 2540D-2011

Report Verification

This report and the above data have been confirmed by the following analyst.

Michael Ohlinger, Chemist

Email: msohlinger@aep.com

Phone: 614-836-4184

Audinet: 8-210-4184

THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED AND SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY. ALL TEST RESULTS MEET ALL OF THE REQUIREMENTS OF THE ACCREDITING AUTHORITY, UNLESS OTHERWISE NOTED.



Water Analysis Report

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

Job ID: 216283

Customer: Pirkey Power Station

Date Reported: 12/15/2021

Data Qualifier Legend

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

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

S6 - Insufficient sample was received to meet the minimum volume of the method. Residue weight is below the method criteria and was analyzed with less than 1000mL.

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

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Dolan Chemical Laboratory (DCL)
 4001 Bixby Road
 Groveport, Ohio 43125
 Michael Ohlinger (614-836-4184)
 Contacts: Dave Conover (614-836-4219)

Project Name: Pikey PP CCR
 Contact Name: Leslie Fuerschbach
 Contact Phone: 318-673-2744

Sampler(s): Matt Hamilton Kenny McDonald

Site Contact: Date: For Lab Use Only:
 COC/Order #: **216283 (251)**

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

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials				Field-filter 250 mL bottle, then pH<2, HNO3	250 mL bottle, pH<2, HNO3	1 L bottle, Cool, 0-4C	Three (six every 10hr) L bottles, pH<2, HNO3	Sample Specific Notes:
AD-2	11/16/2021	1010	G	GW	1									
AD-3	11/16/2021	1139	G	GW	1									
AD-4	11/16/2021	1108	G	GW	1									
AD-7	11/16/2021	837	G	GW	1									
AD-12	11/15/2021	1029	G	GW	1									
AD-13	11/15/2021	938	G	GW	1									
AD-17	11/16/2021	1052	G	GW	1									
AD-18	11/17/2021	825	G	GW	1									
AD-22	11/15/2021	1121	G	GW	1									
AD-28	11/16/2021	953	G	GW	1									
AD-30	11/15/2021	1212	G	GW	1									
AD-31	11/16/2021	858	G	GW	1									

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ; F= filter in field 4 F4 1 4

* Six 1L Bottles must be collected for Radium for every 10th sample.

Special Instructions/QC Requirements & Comments:

Relinquished by: <i>[Signature]</i>	Company: <i>Engk</i>	Date/Time: 11-18-21	Received by: <i>[Signature]</i>	Date/Time: 12-19-21
Relinquished by:	Company:	Date/Time:	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: <i>[Signature]</i>	Date/Time: 11/19/21 12:30 PM

AEP WATER & WASTE SAMPLE RECEIPT FORM

<u>Package Type</u>				<u>Delivery Type</u>			
Cooler	Box	Bag	Envelope	PONY	UPS	FedEX	USPS
Other _____							
Plant/Customer <u>Priley</u>				Number of Plastic Containers: <u>15</u>			
Opened By <u>SM, Mkw</u>				Number of Glass Containers: _____			
Date/Time <u>11-19-21 12:30</u>				Number of Mercury Containers: _____			
Were all temperatures within 0-6°C? <u>Y</u> / N or N/A Initial: <u>SM</u> on ice / no ice							
1(IR Gun Ser# <u>200700311</u> , Expir. <u>06-11-22</u>) - If No, specify each deviation: _____							
Was container in good condition? <u>Y</u> / N Comments _____							
Was Chain of Custody received? <u>Y</u> / N Comments _____							
Requested turnaround: <u>2021</u> If RUSH, who was notified? _____							
pH (15 min)	Cr 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: 11-19-21

pH paper (circle one): MQuant,PN1.09535.0001,LOT# HC904495 [OR] Lab Rat,PN4801,LOT# X000RWDG21

- Was Add'l Preservative needed? Y / N If Yes: By whom & when: _____ (See Prep Book)

Is sample filtration requested? Y / N Comments _____ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: _____

Lab ID# 216283 Initial & Date & Time : _____

Logged by MSD Comments: Only 1 Liter bottles were sent for analysis. At least 2 bottles each would be needed.
Reviewed by M/M SM

REMINDER: Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-2

Customer Description:

Lab Number: 216298-001

Preparation:

Date Collected: 11/16/2021 10:10

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Arsenic	0.62	µg/L	1	0.10	0.03		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Barium	19.2	µg/L	1	0.20	0.05		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Beryllium	0.575	µg/L	1	0.050	0.007		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Boron	2.62	mg/L	1	0.050	0.009		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Cadmium	0.078	µg/L	1	0.020	0.004		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Calcium	2.63	mg/L	1	0.05	0.02		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Chromium	0.37	µg/L	1	0.20	0.04		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Cobalt	21.2	µg/L	1	0.020	0.003		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Iron	0.632	mg/L	1	0.020	0.006		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Lead	0.51	µg/L	1	0.20	0.05		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Lithium	0.0539	mg/L	1	0.00020	0.00005		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Magnesium	5.21	mg/L	1	0.10	0.02		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Manganese	0.0850	mg/L	1	0.0010	0.0002		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Mercury	49	ng/L	2	10	4		JAB	12/07/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Potassium	1.33	mg/L	1	0.10	0.02		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Selenium	1.75	µg/L	1	0.50	0.09		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Sodium	89.1	mg/L	1	0.20	0.05		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Strontium	0.0407	mg/L	1	0.0020	0.0004		GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4
Thallium	0.11	µg/L	1	0.20	0.04	J1	GES	11/23/2021 21:14	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.50	pCi/L	0.20	0.43		ST	12/15/2021 01:31	SW-846 9315-1986, Rev. 0
Carrier Recovery	89.3	%						
Radium-228	1.19	pCi/L	0.21	0.66		TTP	12/10/2021 12:44	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	83.1	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-2

Customer Description:

Lab Number: 216298-001-01

Preparation: Dissolved

Date Collected: 11/16/2021 10:10

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Arsenic	0.58	µg/L	1	0.10	0.03		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Barium	18.9	µg/L	1	0.20	0.05		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Beryllium	0.573	µg/L	1	0.050	0.007		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Boron	2.51	mg/L	1	0.050	0.009		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Cadmium	0.083	µg/L	1	0.020	0.004		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Calcium	2.56	mg/L	1	0.05	0.02		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Chromium	0.41	µg/L	1	0.20	0.04		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Cobalt	20.5	µg/L	1	0.020	0.003		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Iron	0.629	mg/L	1	0.020	0.006		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Lead	0.50	µg/L	1	0.20	0.05		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Lithium	0.0531	mg/L	1	0.00020	0.00005		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Magnesium	4.97	mg/L	1	0.10	0.02		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Manganese	0.0833	mg/L	1	0.0010	0.0002		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Mercury	14	ng/L	1	5	2		JAB	12/07/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Potassium	1.30	mg/L	1	0.10	0.02		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Selenium	1.69	µg/L	1	0.50	0.09		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Sodium	85.3	mg/L	1	0.20	0.05		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Strontium	0.0395	mg/L	1	0.0020	0.0004		GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4
Thallium	0.10	µg/L	1	0.20	0.04	J1	GES	11/23/2021 21:19	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-3

Customer Description:

Lab Number: 216298-002

Preparation:

Date Collected: 11/16/2021 11:39

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Arsenic	1.90	µg/L	1	0.10	0.03		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Barium	64.1	µg/L	1	0.20	0.05		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Beryllium	0.200	µg/L	1	0.050	0.007		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Boron	0.054	mg/L	1	0.050	0.009		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Cadmium	0.016	µg/L	1	0.020	0.004	J1	GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Calcium	4.92	mg/L	1	0.05	0.02		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Chromium	0.63	µg/L	1	0.20	0.04		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Cobalt	5.87	µg/L	1	0.020	0.003		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Iron	10.7	mg/L	1	0.020	0.006		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Lead	0.43	µg/L	1	0.20	0.05		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Lithium	0.0722	mg/L	1	0.00020	0.00005		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Magnesium	2.90	mg/L	1	0.10	0.02		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Manganese	0.0871	mg/L	1	0.0010	0.0002		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Mercury	6	ng/L	1	5	2		JAB	12/07/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Potassium	2.72	mg/L	1	0.10	0.02		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Sodium	9.49	mg/L	1	0.20	0.05		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Strontium	0.0359	mg/L	1	0.0020	0.0004		GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/23/2021 21:25	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.64	pCi/L	0.21	0.39		ST	12/15/2021 01:31	SW-846 9315-1986, Rev. 0
Carrier Recovery	93.9	%						
Radium-228	0.68	pCi/L	0.17	0.55		TTP	12/10/2021 12:44	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	84.6	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-3

Customer Description:

Lab Number: 216298-002-01

Preparation: Dissolved

Date Collected: 11/16/2021 11:39

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Arsenic	0.44	µg/L	1	0.10	0.03		GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Barium	60.0	µg/L	1	0.20	0.05		GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Beryllium	0.133	µg/L	1	0.050	0.007		GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Boron	0.042	mg/L	1	0.050	0.009	J1	GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Cadmium	0.018	µg/L	1	0.020	0.004	J1	GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Calcium	5.06	mg/L	1	0.05	0.02		GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Chromium	0.28	µg/L	1	0.20	0.04		GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Cobalt	5.82	µg/L	1	0.020	0.003		GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Iron	5.96	mg/L	1	0.020	0.006		GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Lithium	0.0737	mg/L	1	0.00020	0.00005		GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Magnesium	3.15	mg/L	1	0.10	0.02		GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Manganese	0.0865	mg/L	1	0.0010	0.0002		GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Mercury	3	ng/L	1	5	2	J1	JAB	12/07/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Potassium	2.73	mg/L	1	0.10	0.02		GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Sodium	10.2	mg/L	1	0.20	0.05		GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Strontium	0.0351	mg/L	1	0.0020	0.0004		GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/29/2021 17:59	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-4

Customer Description:

Lab Number: 216298-003

Preparation:

Date Collected: 11/16/2021 11:08

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Arsenic	0.25	µg/L	1	0.10	0.03		GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Barium	122	µg/L	1	0.20	0.05	M1, P3	GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Beryllium	0.280	µg/L	1	0.050	0.007		GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Boron	0.012	mg/L	1	0.050	0.009	J1	GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Cadmium	0.022	µg/L	1	0.020	0.004		GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Calcium	2.13	mg/L	1	0.05	0.02		GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Chromium	0.28	µg/L	1	0.20	0.04		GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Cobalt	3.08	µg/L	1	0.020	0.003		GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Iron	2.73	mg/L	1	0.020	0.006	P3	GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Lithium	0.0211	mg/L	1	0.00020	0.00005		GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Magnesium	0.53	mg/L	1	0.10	0.02		GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Manganese	0.0307	mg/L	1	0.0010	0.0002		GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Mercury	15	ng/L	1	5	2		JAB	12/07/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Potassium	1.96	mg/L	1	0.10	0.02		GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Sodium	5.95	mg/L	1	0.20	0.05		GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Strontium	0.0173	mg/L	1	0.0020	0.0004		GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4
Thallium	0.08	µg/L	1	0.20	0.04	J1	GES	11/29/2021 18:04	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.93	pCi/L	0.25	0.37		ST	12/15/2021 01:31	SW-846 9315-1986, Rev. 0
Carrier Recovery	95.9	%						
Radium-228	0.67	pCi/L	0.17	0.53		TTP	12/10/2021 12:44	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	83.3	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-4

Customer Description:

Lab Number: 216298-003-01

Preparation: Dissolved

Date Collected: 11/16/2021 11:08

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Arsenic	0.20	µg/L	1	0.10	0.03		GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Barium	129	µg/L	1	0.20	0.05		GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Beryllium	0.264	µg/L	1	0.050	0.007		GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Boron	0.013	mg/L	1	0.050	0.009	J1	GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Cadmium	0.022	µg/L	1	0.020	0.004		GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Calcium	2.25	mg/L	1	0.05	0.02		GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Chromium	0.22	µg/L	1	0.20	0.04		GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Cobalt	3.20	µg/L	1	0.020	0.003		GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Iron	2.62	mg/L	1	0.020	0.006		GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Lithium	0.0207	mg/L	1	0.00020	0.00005		GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Magnesium	0.55	mg/L	1	0.10	0.02		GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Manganese	0.0316	mg/L	1	0.0010	0.0002		GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Mercury	4	ng/L	1	5	2	J1	JAB	12/07/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Potassium	2.01	mg/L	1	0.10	0.02		GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Sodium	6.01	mg/L	1	0.20	0.05		GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Strontium	0.0181	mg/L	1	0.0020	0.0004		GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4
Thallium	0.13	µg/L	1	0.20	0.04	J1	GES	11/29/2021 18:19	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-7

Customer Description:

Lab Number: 216298-004

Preparation:

Date Collected: 11/16/2021 08:37

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Arsenic	1.05	µg/L	1	0.10	0.03		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Barium	37.3	µg/L	1	0.20	0.05		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Beryllium	4.86	µg/L	1	0.050	0.007		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Boron	2.24	mg/L	1	0.050	0.009		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Cadmium	0.734	µg/L	1	0.020	0.004		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Calcium	4.56	mg/L	1	0.05	0.02		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Chromium	0.37	µg/L	1	0.20	0.04		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Cobalt	38.3	µg/L	1	0.020	0.003		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Iron	0.147	mg/L	1	0.020	0.006		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Lead	0.80	µg/L	1	0.20	0.05		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Lithium	0.0760	mg/L	1	0.00020	0.00005		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Magnesium	8.22	mg/L	1	0.10	0.02		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Manganese	0.0898	mg/L	1	0.0010	0.0002		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Mercury	480	ng/L	20	100	40		JAB	12/10/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Potassium	2.37	mg/L	1	0.10	0.02		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Selenium	3.47	µg/L	1	0.50	0.09		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Sodium	15.4	mg/L	1	0.20	0.05		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Strontium	0.0619	mg/L	1	0.0020	0.0004		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4
Thallium	0.26	µg/L	1	0.20	0.04		GES	11/29/2021 18:24	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	1.99	pCi/L	0.39	0.47		ST	12/15/2021 01:31	SW-846 9315-1986, Rev. 0
Carrier Recovery	84.0	%						
Radium-228	3.60	pCi/L	0.19	0.48		TTP	12/10/2021 12:44	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	84.8	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-7

Customer Description:

Lab Number: 216298-004-01

Preparation: Dissolved

Date Collected: 11/16/2021 08:37

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Arsenic	1.02	µg/L	1	0.10	0.03		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Barium	37.2	µg/L	1	0.20	0.05		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Beryllium	4.80	µg/L	1	0.050	0.007		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Boron	2.31	mg/L	1	0.050	0.009		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Cadmium	0.737	µg/L	1	0.020	0.004		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Calcium	4.53	mg/L	1	0.05	0.02		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Chromium	0.30	µg/L	1	0.20	0.04		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Cobalt	37.5	µg/L	1	0.020	0.003		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Iron	0.488	mg/L	1	0.020	0.006		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Lead	0.76	µg/L	1	0.20	0.05		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Lithium	0.0776	mg/L	1	0.00020	0.00005		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Magnesium	7.99	mg/L	1	0.10	0.02		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Manganese	0.0903	mg/L	1	0.0010	0.0002		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Mercury	101	ng/L	2	10	4		JAB	12/10/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Potassium	2.35	mg/L	1	0.10	0.02		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Selenium	3.31	µg/L	1	0.50	0.09		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Sodium	15.4	mg/L	1	0.20	0.05		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Strontium	0.0599	mg/L	1	0.0020	0.0004		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4
Thallium	0.25	µg/L	1	0.20	0.04		GES	11/29/2021 18:29	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-12

Customer Description:

Lab Number: 216298-005

Preparation:

Date Collected: 11/15/2021 10:29

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Arsenic	0.05	µg/L	1	0.10	0.03	J1	GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Barium	26.5	µg/L	1	0.20	0.05		GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Beryllium	0.148	µg/L	1	0.050	0.007		GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Boron	0.012	mg/L	1	0.050	0.009	J1	GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Cadmium	0.01	µg/L	1	0.020	0.004	J1	GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Calcium	0.28	mg/L	1	0.05	0.02		GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Chromium	0.30	µg/L	1	0.20	0.04		GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Cobalt	1.38	µg/L	1	0.020	0.003		GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Iron	0.035	mg/L	1	0.020	0.006		GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Lead	0.07	µg/L	1	0.20	0.05	J1	GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Lithium	0.0110	mg/L	1	0.00020	0.00005		GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Magnesium	0.45	mg/L	1	0.10	0.02		GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Manganese	0.0052	mg/L	1	0.0010	0.0002		GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Potassium	0.55	mg/L	1	0.10	0.02		GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Selenium	0.10	µg/L	1	0.50	0.09	J1	GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Sodium	5.10	mg/L	1	0.20	0.05		GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Strontium	0.0027	mg/L	1	0.0020	0.0004		GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/29/2021 18:34	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.44	pCi/L	0.18	0.38		ST	12/15/2021 01:31	SW-846 9315-1986, Rev. 0
Carrier Recovery	98.7	%						
Radium-228	1.32	pCi/L	0.19	0.57		TTP	12/10/2021 12:44	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	85.9	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-12

Customer Description:

Lab Number: 216298-005-01

Preparation: Dissolved

Date Collected: 11/15/2021 10:29

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Arsenic	0.04	µg/L	1	0.10	0.03	J1	GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Barium	27.1	µg/L	1	0.20	0.05		GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Beryllium	0.146	µg/L	1	0.050	0.007		GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Boron	0.011	mg/L	1	0.050	0.009	J1	GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Cadmium	0.012	µg/L	1	0.020	0.004	J1	GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Calcium	0.32	mg/L	1	0.05	0.02		GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Chromium	0.45	µg/L	1	0.20	0.04		GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Cobalt	1.42	µg/L	1	0.020	0.003		GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Iron	0.019	mg/L	1	0.020	0.006	J1	GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Lead	0.07	µg/L	1	0.20	0.05	J1	GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Lithium	0.0112	mg/L	1	0.00020	0.00005		GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Magnesium	0.46	mg/L	1	0.10	0.02		GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Manganese	0.0054	mg/L	1	0.0010	0.0002		GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Potassium	0.58	mg/L	1	0.10	0.02		GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Selenium	0.11	µg/L	1	0.50	0.09	J1	GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Sodium	5.22	mg/L	1	0.20	0.05		GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Strontium	0.0029	mg/L	1	0.0020	0.0004		GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/29/2021 18:40	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-13

Customer Description:

Lab Number: 216298-006

Preparation:

Date Collected: 11/15/2021 09:38

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Arsenic	4.39	µg/L	1	0.10	0.03		GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Barium	41.7	µg/L	1	0.20	0.05		GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Beryllium	0.344	µg/L	1	0.050	0.007		GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Boron	0.063	mg/L	1	0.050	0.009		GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Calcium	8.61	mg/L	1	0.05	0.02		GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Chromium	0.34	µg/L	1	0.20	0.04		GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Cobalt	45.9	µg/L	1	0.020	0.003	M1	GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Iron	52.3	mg/L	2	0.04	0.01	M1, P3	GES	11/30/2021 09:21	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Lithium	0.135	mg/L	1	0.00020	0.00005	M1	GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Magnesium	12.6	mg/L	1	0.10	0.02	M1, P3	GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Manganese	0.436	mg/L	1	0.0010	0.0002	M1, P3	GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Potassium	4.97	mg/L	1	0.10	0.02		GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Sodium	16.8	mg/L	1	0.20	0.05	P3	GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Strontium	0.0392	mg/L	1	0.0020	0.0004		GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2021 09:04	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.55	pCi/L	0.11	0.13		ST	12/15/2021 08:15	SW-846 9315-1986, Rev. 0
Carrier Recovery	82.5	%						
Radium-228	1.01	pCi/L	0.18	0.58		TTP	12/14/2021 13:43	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	80.7	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-13

Customer Description:

Lab Number: 216298-006-01

Preparation: Dissolved

Date Collected: 11/15/2021 09:38

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Arsenic	1.39	µg/L	1	0.10	0.03		GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Barium	40.6	µg/L	1	0.20	0.05		GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Beryllium	0.167	µg/L	1	0.050	0.007		GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Boron	0.066	mg/L	1	0.050	0.009		GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Calcium	8.71	mg/L	1	0.05	0.02		GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Chromium	0.23	µg/L	1	0.20	0.04		GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Cobalt	46.3	µg/L	1	0.020	0.003		GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Iron	42.9	mg/L	2	0.04	0.01		GES	11/30/2021 09:42	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Lithium	0.139	mg/L	1	0.00020	0.00005		GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Magnesium	12.8	mg/L	1	0.10	0.02		GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Manganese	0.446	mg/L	1	0.0010	0.0002		GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Potassium	5.01	mg/L	1	0.10	0.02		GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Sodium	17.4	mg/L	1	0.20	0.05		GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Strontium	0.0399	mg/L	1	0.0020	0.0004		GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2021 09:37	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-17

Customer Description:

Lab Number: 216298-007

Preparation:

Date Collected: 11/16/2021 10:52

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Arsenic	0.21	µg/L	1	0.10	0.03		GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Barium	266	µg/L	1	0.20	0.05		GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Beryllium	0.686	µg/L	1	0.050	0.007		GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Boron	0.022	mg/L	1	0.050	0.009	J1	GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Cadmium	0.058	µg/L	1	0.020	0.004		GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Calcium	0.98	mg/L	1	0.05	0.02		GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Chromium	0.33	µg/L	1	0.20	0.04		GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Cobalt	11.8	µg/L	1	0.020	0.003		GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Iron	0.122	mg/L	1	0.020	0.006		GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Lead	0.13	µg/L	1	0.20	0.05	J1	GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Lithium	0.0236	mg/L	1	0.00020	0.00005		GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Magnesium	4.34	mg/L	1	0.10	0.02		GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Manganese	0.0409	mg/L	1	0.0010	0.0002		GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Mercury	350	ng/L	10	50	20		JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Potassium	1.14	mg/L	1	0.10	0.02		GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Selenium	0.35	µg/L	1	0.50	0.09	J1	GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Sodium	8.56	mg/L	1	0.20	0.05		GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Strontium	0.0204	mg/L	1	0.0020	0.0004		GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4
Thallium	0.04	µg/L	1	0.20	0.04	J1	GES	11/30/2021 09:47	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	2.65	pCi/L		0.24	0.12	ST	12/15/2021 08:15	SW-846 9315-1986, Rev. 0
Carrier Recovery	97.1	%						
Radium-228	3.77	pCi/L		0.20	0.50	TTP	12/14/2021 13:43	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	85.6	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-17

Customer Description:

Lab Number: 216298-007-01

Preparation: Dissolved

Date Collected: 11/16/2021 10:52

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Arsenic	0.15	µg/L	1	0.10	0.03		GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Barium	267	µg/L	1	0.20	0.05		GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Beryllium	0.690	µg/L	1	0.050	0.007		GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Boron	0.023	mg/L	1	0.050	0.009	J1	GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Cadmium	0.066	µg/L	1	0.020	0.004		GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Calcium	1.06	mg/L	1	0.05	0.02		GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Chromium	0.25	µg/L	1	0.20	0.04		GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Cobalt	11.7	µg/L	1	0.020	0.003		GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Iron	0.046	mg/L	1	0.020	0.006		GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Lead	0.15	µg/L	1	0.20	0.05	J1	GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Lithium	0.0241	mg/L	1	0.00020	0.00005		GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Magnesium	4.34	mg/L	1	0.10	0.02		GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Manganese	0.0411	mg/L	1	0.0010	0.0002		GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Mercury	270	ng/L	10	50	20		JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Potassium	1.15	mg/L	1	0.10	0.02		GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Selenium	0.33	µg/L	1	0.50	0.09	J1	GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Sodium	8.47	mg/L	1	0.20	0.05		GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Strontium	0.0207	mg/L	1	0.0020	0.0004		GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4
Thallium	0.04	µg/L	1	0.20	0.04	J1	GES	11/30/2021 09:52	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-18

Customer Description:

Lab Number: 216298-008

Preparation:

Date Collected: 11/17/2021 08:25

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Arsenic	0.19	µg/L	1	0.10	0.03		GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Barium	82.2	µg/L	1	0.20	0.05		GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Beryllium	0.078	µg/L	1	0.050	0.007		GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Boron	0.01	mg/L	1	0.050	0.009	J1	GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Cadmium	0.011	µg/L	1	0.020	0.004	J1	GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Calcium	0.20	mg/L	1	0.05	0.02		GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Chromium	0.31	µg/L	1	0.20	0.04		GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Cobalt	0.801	µg/L	1	0.020	0.003		GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Iron	0.290	mg/L	1	0.020	0.006		GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Lithium	0.0124	mg/L	1	0.00020	0.00005		GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Magnesium	0.30	mg/L	1	0.10	0.02		GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Manganese	0.0033	mg/L	1	0.0010	0.0002		GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Mercury	30	ng/L	1	5	2		JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Potassium	0.72	mg/L	1	0.10	0.02		GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Selenium	0.11	µg/L	1	0.50	0.09	J1	GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Sodium	5.69	mg/L	1	0.20	0.05		GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Strontium	0.0041	mg/L	1	0.0020	0.0004		GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2021 09:57	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.70	pCi/L	0.12	0.13		ST	12/15/2021 08:15	SW-846 9315-1986, Rev. 0
Carrier Recovery	92.8	%						
Radium-228	1.21	pCi/L	0.17	0.52		TTP	12/14/2021 13:43	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	82.3	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-18

Customer Description:

Lab Number: 216298-008-01

Preparation: Dissolved

Date Collected: 11/17/2021 08:25

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Arsenic	0.07	µg/L	1	0.10	0.03	J1	GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Barium	77.0	µg/L	1	0.20	0.05		GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Beryllium	0.073	µg/L	1	0.050	0.007		GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Boron	0.01	mg/L	1	0.050	0.009	J1	GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Cadmium	0.011	µg/L	1	0.020	0.004	J1	GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Calcium	0.20	mg/L	1	0.05	0.02		GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Chromium	0.19	µg/L	1	0.20	0.04	J1	GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Cobalt	0.749	µg/L	1	0.020	0.003		GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Iron	0.091	mg/L	1	0.020	0.006		GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Lithium	0.0122	mg/L	1	0.00020	0.00005		GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Magnesium	0.28	mg/L	1	0.10	0.02		GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Manganese	0.0031	mg/L	1	0.0010	0.0002		GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Mercury	13	ng/L	1	5	2		JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Potassium	0.69	mg/L	1	0.10	0.02		GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Sodium	5.32	mg/L	1	0.20	0.05		GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Strontium	0.0038	mg/L	1	0.0020	0.0004		GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2021 10:02	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-22

Customer Description:

Lab Number: 216298-009

Preparation:

Date Collected: 11/15/2021 11:21

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Arsenic	1.85	µg/L	1	0.10	0.03		GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Barium	17.9	µg/L	1	0.20	0.05		GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Beryllium	2.50	µg/L	1	0.050	0.007		GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Boron	0.030	mg/L	1	0.050	0.009	J1	GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Cadmium	0.502	µg/L	1	0.020	0.004		GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Calcium	11.7	mg/L	1	0.05	0.02		GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Chromium	0.27	µg/L	1	0.20	0.04		GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Cobalt	69.9	µg/L	1	0.020	0.003		GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Iron	36.9	mg/L	2	0.04	0.01		GES	11/30/2021 10:20	EPA 200.8-1994, Rev. 5.4
Lead	0.09	µg/L	1	0.20	0.05	J1	GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Lithium	0.122	mg/L	1	0.00020	0.00005		GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Magnesium	16.1	mg/L	1	0.10	0.02		GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Manganese	0.339	mg/L	1	0.0010	0.0002		GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Mercury	56	ng/L	4	20	7		JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Potassium	3.69	mg/L	1	0.10	0.02		GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Selenium	1.92	µg/L	1	0.50	0.09		GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Sodium	92.3	mg/L	1	0.20	0.05		GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Strontium	0.0883	mg/L	1	0.0020	0.0004		GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4
Thallium	0.14	µg/L	1	0.20	0.04	J1	GES	11/30/2021 10:08	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.84	pCi/L	0.14	0.15		ST	12/15/2021 08:15	SW-846 9315-1986, Rev. 0
Carrier Recovery	83.4	%						
Radium-228	2.04	pCi/L	0.20	0.57		TTP	12/14/2021 13:43	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	69.9	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-22

Customer Description:

Lab Number: 216298-009-01

Preparation: Dissolved

Date Collected: 11/15/2021 11:21

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Arsenic	1.70	µg/L	1	0.10	0.03		GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Barium	18.2	µg/L	1	0.20	0.05		GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Beryllium	2.48	µg/L	1	0.050	0.007		GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Boron	0.029	mg/L	1	0.050	0.009	J1	GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Cadmium	0.508	µg/L	1	0.020	0.004		GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Calcium	11.8	mg/L	1	0.05	0.02		GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Chromium	0.30	µg/L	1	0.20	0.04		GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Cobalt	70.5	µg/L	1	0.020	0.003		GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Iron	38.4	mg/L	2	0.04	0.01		GES	11/30/2021 10:25	EPA 200.8-1994, Rev. 5.4
Lead	0.08	µg/L	1	0.20	0.05	J1	GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Lithium	0.121	mg/L	1	0.00020	0.00005		GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Magnesium	16.2	mg/L	1	0.10	0.02		GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Manganese	0.339	mg/L	1	0.0010	0.0002		GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Mercury	23	ng/L	1	5	2		JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Potassium	3.72	mg/L	1	0.10	0.02		GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Selenium	1.95	µg/L	1	0.50	0.09		GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Sodium	93.1	mg/L	1	0.20	0.05		GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Strontium	0.0902	mg/L	1	0.0020	0.0004		GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4
Thallium	0.14	µg/L	1	0.20	0.04	J1	GES	11/30/2021 10:13	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-28

Customer Description:

Lab Number: 216298-010

Preparation:

Date Collected: 11/16/2021 09:53

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Arsenic	0.27	µg/L	1	0.10	0.03		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Barium	120	µg/L	1	0.20	0.05		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Beryllium	0.501	µg/L	1	0.050	0.007		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Boron	0.363	mg/L	1	0.050	0.009		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Cadmium	0.049	µg/L	1	0.020	0.004		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Calcium	1.22	mg/L	1	0.05	0.02		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Chromium	0.59	µg/L	1	0.20	0.04		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Cobalt	11.8	µg/L	1	0.020	0.003		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Iron	0.370	mg/L	1	0.020	0.006		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Lead	0.10	µg/L	1	0.20	0.05	J1	GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Lithium	0.0240	mg/L	1	0.00020	0.00005		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Magnesium	2.67	mg/L	1	0.10	0.02		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Manganese	0.0478	mg/L	1	0.0010	0.0002		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Mercury	24	ng/L	1	5	2		JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Potassium	0.79	mg/L	1	0.10	0.02		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Selenium	0.17	µg/L	1	0.50	0.09	J1	GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Sodium	6.74	mg/L	1	0.20	0.05		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Strontium	0.0180	mg/L	1	0.0020	0.0004		GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2021 10:30	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.92	pCi/L	0.14	0.12		ST	12/15/2021 08:15	SW-846 9315-1986, Rev. 0
Carrier Recovery	87.3	%						
Radium-228	1.25	pCi/L	0.15	0.46		TTP	12/14/2021 13:43	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	81.6	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-28

Customer Description:

Lab Number: 216298-010-01

Preparation: Dissolved

Date Collected: 11/16/2021 09:53

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Arsenic	0.06	µg/L	1	0.10	0.03	J1	GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Barium	116	µg/L	1	0.20	0.05		GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Beryllium	0.494	µg/L	1	0.050	0.007		GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Boron	0.362	mg/L	1	0.050	0.009		GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Cadmium	0.053	µg/L	1	0.020	0.004		GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Calcium	1.27	mg/L	1	0.05	0.02		GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Chromium	0.37	µg/L	1	0.20	0.04		GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Cobalt	11.4	µg/L	1	0.020	0.003		GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Iron	0.036	mg/L	1	0.020	0.006		GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Lead	0.07	µg/L	1	0.20	0.05	J1	GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Lithium	0.0243	mg/L	1	0.00020	0.00005		GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Magnesium	2.61	mg/L	1	0.10	0.02		GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Manganese	0.0464	mg/L	1	0.0010	0.0002		GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Mercury	11	ng/L	1	5	2		JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Potassium	0.77	mg/L	1	0.10	0.02		GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Selenium	0.14	µg/L	1	0.50	0.09	J1	GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Sodium	6.64	mg/L	1	0.20	0.05		GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Strontium	0.0178	mg/L	1	0.0020	0.0004		GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2021 10:35	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-30

Customer Description:

Lab Number: 216298-011

Preparation:

Date Collected: 11/15/2021 12:12

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Arsenic	0.21	µg/L	1	0.10	0.03		GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Barium	113	µg/L	1	0.20	0.05		GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Beryllium	0.107	µg/L	1	0.050	0.007		GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Boron	2.78	mg/L	1	0.050	0.009		GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Cadmium	0.008	µg/L	1	0.020	0.004	J1	GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Calcium	0.67	mg/L	1	0.05	0.02		GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Chromium	0.51	µg/L	1	0.20	0.04		GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Cobalt	4.55	µg/L	1	0.020	0.003		GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Iron	0.243	mg/L	1	0.020	0.006		GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Lead	0.06	µg/L	1	0.20	0.05	J1	GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Lithium	0.0113	mg/L	1	0.00020	0.00005		GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Magnesium	2.37	mg/L	1	0.10	0.02		GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Manganese	0.0216	mg/L	1	0.0010	0.0002		GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Mercury	60	ng/L	1	5	2		JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Potassium	0.93	mg/L	1	0.10	0.02		GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Selenium	0.33	µg/L	1	0.50	0.09	J1	GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Sodium	85.2	mg/L	1	0.20	0.05		GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Strontium	0.0107	mg/L	1	0.0020	0.0004		GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2021 11:32	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.84	pCi/L	0.15	0.16		ST	12/15/2021 08:15	SW-846 9315-1986, Rev. 0
Carrier Recovery	68.9	%						
Radium-228	0.64	pCi/L	0.17	0.55		TTP	12/14/2021 13:43	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	81.7	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-30

Customer Description:

Lab Number: 216298-011-01

Preparation: Dissolved

Date Collected: 11/15/2021 12:12

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Arsenic	0.15	µg/L	1	0.10	0.03		GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Barium	109	µg/L	1	0.20	0.05		GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Beryllium	0.104	µg/L	1	0.050	0.007		GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Boron	2.77	mg/L	1	0.050	0.009		GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Cadmium	0.011	µg/L	1	0.020	0.004	J1	GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Calcium	0.76	mg/L	1	0.05	0.02		GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Chromium	0.35	µg/L	1	0.20	0.04		GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Cobalt	4.48	µg/L	1	0.020	0.003		GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Iron	0.099	mg/L	1	0.020	0.006		GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Lead	0.05	µg/L	1	0.20	0.05	J1	GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Lithium	0.0114	mg/L	1	0.00020	0.00005		GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Magnesium	2.34	mg/L	1	0.10	0.02		GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Manganese	0.0215	mg/L	1	0.0010	0.0002		GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Mercury	34	ng/L	1	5	2		JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Potassium	0.94	mg/L	1	0.10	0.02		GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Selenium	0.31	µg/L	1	0.50	0.09	J1	GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Sodium	84.8	mg/L	1	0.20	0.05		GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Strontium	0.0107	mg/L	1	0.0020	0.0004		GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2021 11:37	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-31

Customer Description:

Lab Number: 216298-012

Preparation:

Date Collected: 11/16/2021 08:58

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Arsenic	0.26	µg/L	1	0.10	0.03		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Barium	32.1	µg/L	1	0.20	0.05		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Beryllium	0.801	µg/L	1	0.050	0.007		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Boron	0.024	mg/L	1	0.050	0.009	J1	GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Cadmium	0.063	µg/L	1	0.020	0.004		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Calcium	2.68	mg/L	1	0.05	0.02		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Chromium	0.39	µg/L	1	0.20	0.04		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Cobalt	9.18	µg/L	1	0.020	0.003		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Iron	0.183	mg/L	1	0.020	0.006		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Lead	0.34	µg/L	1	0.20	0.05		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Lithium	0.0648	mg/L	1	0.00020	0.00005		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Magnesium	3.82	mg/L	1	0.10	0.02		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Manganese	0.0258	mg/L	1	0.0010	0.0002		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Mercury	1790	ng/L	50	250	90		JAB	12/10/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Potassium	1.60	mg/L	1	0.10	0.02		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Selenium	0.33	µg/L	1	0.50	0.09	J1	GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Sodium	31.0	mg/L	1	0.20	0.05		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Strontium	0.0379	mg/L	1	0.0020	0.0004		GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4
Thallium	0.08	µg/L	1	0.20	0.04	J1	GES	11/30/2021 11:42	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.87	pCi/L	0.13	0.12		ST	12/15/2021 08:15	SW-846 9315-1986, Rev. 0
Carrier Recovery	89.5	%						
Radium-228	2.52	pCi/L	0.18	0.49		TTP	12/14/2021 13:43	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	78.5	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-31

Customer Description:

Lab Number: 216298-012-01

Preparation: Dissolved

Date Collected: 11/16/2021 08:58

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Arsenic	0.54	µg/L	1	0.10	0.03		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Barium	34.4	µg/L	1	0.20	0.05		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Beryllium	0.797	µg/L	1	0.050	0.007		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Boron	0.021	mg/L	1	0.050	0.009	J1	GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Cadmium	0.058	µg/L	1	0.020	0.004		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Calcium	2.53	mg/L	1	0.05	0.02		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Chromium	1.04	µg/L	1	0.20	0.04		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Cobalt	9.07	µg/L	1	0.020	0.003		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Iron	0.553	mg/L	1	0.020	0.006		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Lead	0.46	µg/L	1	0.20	0.05		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Lithium	0.0643	mg/L	1	0.00020	0.00005		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Magnesium	3.70	mg/L	1	0.10	0.02		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Manganese	0.0253	mg/L	1	0.0010	0.0002		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Mercury	239	ng/L	4	20	7		JAB	12/10/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Potassium	1.55	mg/L	1	0.10	0.02		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Selenium	0.37	µg/L	1	0.50	0.09	J1	GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Sodium	30.2	mg/L	1	0.20	0.05		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Strontium	0.0375	mg/L	1	0.0020	0.0004		GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4
Thallium	0.08	µg/L	1	0.20	0.04	J1	GES	11/30/2021 11:47	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-32

Customer Description:

Lab Number: 216298-013

Preparation:

Date Collected: 11/15/2021 11:24

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Arsenic	2.39	µg/L	1	0.10	0.03		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Barium	22.5	µg/L	1	0.20	0.05		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Beryllium	3.90	µg/L	1	0.050	0.007		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Boron	1.70	mg/L	1	0.050	0.009		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Cadmium	0.452	µg/L	1	0.020	0.004		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Calcium	16.8	mg/L	1	0.05	0.02		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Chromium	0.75	µg/L	1	0.20	0.04		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Cobalt	39.9	µg/L	1	0.020	0.003		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Iron	3.51	mg/L	1	0.020	0.006		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Lead	0.52	µg/L	1	0.20	0.05		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Lithium	0.0698	mg/L	1	0.00020	0.00005		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Magnesium	14.4	mg/L	1	0.10	0.02		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Manganese	0.0827	mg/L	1	0.0010	0.0002		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Mercury	1400	ng/L	100	500	200		JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Potassium	3.95	mg/L	1	0.10	0.02		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Selenium	7.70	µg/L	1	0.50	0.09		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Sodium	68.3	mg/L	1	0.20	0.05		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Strontium	0.337	mg/L	1	0.0020	0.0004		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4
Thallium	0.25	µg/L	1	0.20	0.04		GES	11/30/2021 11:52	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.70	pCi/L	0.12	0.12		ST	12/15/2021 08:15	SW-846 9315-1986, Rev. 0
Carrier Recovery	82.0	%						
Radium-228	3.90	pCi/L	0.24	0.69		TTP	12/14/2021 13:43	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	81.5	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-32

Customer Description:

Lab Number: 216298-013-01

Preparation: Dissolved

Date Collected: 11/15/2021 11:24

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Arsenic	2.25	µg/L	1	0.10	0.03		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Barium	21.8	µg/L	1	0.20	0.05		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Beryllium	3.85	µg/L	1	0.050	0.007		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Boron	1.68	mg/L	1	0.050	0.009		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Cadmium	0.455	µg/L	1	0.020	0.004		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Calcium	16.6	mg/L	1	0.05	0.02		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Chromium	0.52	µg/L	1	0.20	0.04		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Cobalt	39.3	µg/L	1	0.020	0.003		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Iron	2.42	mg/L	1	0.020	0.006		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Lead	0.50	µg/L	1	0.20	0.05		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Lithium	0.0694	mg/L	1	0.00020	0.00005		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Magnesium	14.1	mg/L	1	0.10	0.02		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Manganese	0.0818	mg/L	1	0.0010	0.0002		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Mercury	320	ng/L	10	50	20		JAB	12/09/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Potassium	3.88	mg/L	1	0.10	0.02		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Selenium	7.45	µg/L	1	0.50	0.09		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Sodium	67.0	mg/L	1	0.20	0.05		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Strontium	0.335	mg/L	1	0.0020	0.0004		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4
Thallium	0.24	µg/L	1	0.20	0.04		GES	11/30/2021 11:57	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-33

Customer Description:

Lab Number: 216298-014

Preparation:

Date Collected: 11/15/2021 12:18

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Arsenic	0.40	µg/L	1	0.10	0.03		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Barium	45.1	µg/L	1	0.20	0.05		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Beryllium	0.916	µg/L	1	0.050	0.007		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Boron	0.093	mg/L	1	0.050	0.009		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Cadmium	0.043	µg/L	1	0.020	0.004		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Calcium	0.98	mg/L	1	0.05	0.02		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Chromium	0.28	µg/L	1	0.20	0.04		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Cobalt	6.75	µg/L	1	0.020	0.003		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Iron	0.152	mg/L	1	0.020	0.006		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Lead	0.23	µg/L	1	0.20	0.05		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Lithium	0.0177	mg/L	1	0.00020	0.00005		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Magnesium	2.68	mg/L	1	0.10	0.02		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Manganese	0.0054	mg/L	1	0.0010	0.0002		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Mercury	14600	ng/L	400	2000	700		JAB	12/10/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Potassium	0.26	mg/L	1	0.10	0.02		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Selenium	1.0	µg/L	1	0.50	0.09		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Sodium	15.1	mg/L	1	0.20	0.05		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Strontium	0.0213	mg/L	1	0.0020	0.0004		GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2021 12:14	EPA 200.8-1994, Rev. 5.4

Radiochemistry

Parameter	Result	Units	UNC*(+/-)	MDA*	Data Qualifiers	Analyst	Analysis Date	Method
Radium-226	0.49	pCi/L		0.10	0.13	ST	12/15/2021 08:15	SW-846 9315-1986, Rev. 0
Carrier Recovery	87.8	%						
Radium-228	1.16	pCi/L		0.21	0.66	TTP	12/14/2021 13:43	SW-846 9320-2014, Rev. 1.0
Carrier Recovery	82.8	%						

* The Required Detection Limit (RDL) is equivalent to the RL and for Radium-226 and Radium-228, the RDL is calculated to be 1.0 pCi/L. The Minimal Detectable Activity (MDA) listed with these results is sample specific and empirical. The combined standard uncertainty (UNC) is a counting uncertainty representing "one-sigma" which has the same units of measurement as the result.



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: AD-33

Customer Description:

Lab Number: 216298-014-01

Preparation: Dissolved

Date Collected: 11/15/2021 12:18

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Arsenic	0.30	µg/L	1	0.10	0.03		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Barium	43.4	µg/L	1	0.20	0.05		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Beryllium	0.892	µg/L	1	0.050	0.007		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Boron	0.089	mg/L	1	0.050	0.009		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Cadmium	0.042	µg/L	1	0.020	0.004		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Calcium	0.97	mg/L	1	0.05	0.02		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Chromium	0.20	µg/L	1	0.20	0.04		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Cobalt	6.53	µg/L	1	0.020	0.003		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Iron	0.033	mg/L	1	0.020	0.006		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Lead	0.19	µg/L	1	0.20	0.05	J1	GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Lithium	0.0173	mg/L	1	0.00020	0.00005		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Magnesium	2.57	mg/L	1	0.10	0.02		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Manganese	0.0052	mg/L	1	0.0010	0.0002		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Mercury	3300	ng/L	100	500	200		JAB	12/10/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Potassium	0.25	mg/L	1	0.10	0.02		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Selenium	0.90	µg/L	1	0.50	0.09		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Sodium	14.5	mg/L	1	0.20	0.05		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Strontium	0.0205	mg/L	1	0.0020	0.0004		GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2021 12:19	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: Duplicate - 2

Customer Description:

Lab Number: 216298-015

Preparation:

Date Collected: 11/16/2021 12:00

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Arsenic	0.99	µg/L	1	0.10	0.03		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Barium	46.0	µg/L	1	0.20	0.05		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Beryllium	4.84	µg/L	1	0.050	0.007		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Boron	2.30	mg/L	1	0.050	0.009		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Cadmium	0.749	µg/L	1	0.020	0.004		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Calcium	4.67	mg/L	1	0.05	0.02		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Chromium	0.42	µg/L	1	0.20	0.04		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Cobalt	37.7	µg/L	1	0.020	0.003		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Iron	0.147	mg/L	1	0.020	0.006		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Lead	0.84	µg/L	1	0.20	0.05		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Lithium	0.0748	mg/L	1	0.00020	0.00005		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Magnesium	8.32	mg/L	1	0.10	0.02		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Manganese	0.0920	mg/L	1	0.0010	0.0002		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Mercury	510	ng/L	20	100	40		JAB	12/10/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Potassium	2.49	mg/L	1	0.10	0.02		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Selenium	3.20	µg/L	1	0.50	0.09		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Sodium	16.0	mg/L	1	0.20	0.05		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Strontium	0.0637	mg/L	1	0.0020	0.0004		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4
Thallium	0.25	µg/L	1	0.20	0.04		GES	11/30/2021 12:24	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: Duplicate - 2

Customer Description:

Lab Number: 216298-015-01

Preparation: Dissolved

Date Collected: 11/16/2021 12:00

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Arsenic	0.95	µg/L	1	0.10	0.03		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Barium	44.6	µg/L	1	0.20	0.05		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Beryllium	4.66	µg/L	1	0.050	0.007		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Boron	2.36	mg/L	1	0.050	0.009		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Cadmium	0.711	µg/L	1	0.020	0.004		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Calcium	4.64	mg/L	1	0.05	0.02		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Chromium	0.50	µg/L	1	0.20	0.04		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Cobalt	36.6	µg/L	1	0.020	0.003		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Iron	0.484	mg/L	1	0.020	0.006		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Lead	0.78	µg/L	1	0.20	0.05		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Lithium	0.0743	mg/L	1	0.00020	0.00005		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Magnesium	8.09	mg/L	1	0.10	0.02		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Manganese	0.0919	mg/L	1	0.0010	0.0002		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Mercury	113	ng/L	2	10	4		JAB	12/10/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Potassium	2.47	mg/L	1	0.10	0.02		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Selenium	3.26	µg/L	1	0.50	0.09		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Sodium	15.7	mg/L	1	0.20	0.05		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Strontium	0.0618	mg/L	1	0.0020	0.0004		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4
Thallium	0.27	µg/L	1	0.20	0.04		GES	11/30/2021 12:56	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Customer Sample ID: Equipment Blank

Customer Description:

Lab Number: 216298-016

Preparation:

Date Collected: 11/16/2021 10:46

Date Received: 11/22/2021 12:00

Metals

Parameter	Result	Units	Dilution	RL	MDL	Data Qualifiers	Analyst	Analysis Date	Method
Antimony	<0.02	µg/L	1	0.10	0.02	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Arsenic	<0.03	µg/L	1	0.10	0.03	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Barium	0.08	µg/L	1	0.20	0.05	J1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Beryllium	<0.007	µg/L	1	0.050	0.007	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Boron	<0.009	mg/L	1	0.050	0.009	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Cadmium	<0.004	µg/L	1	0.020	0.004	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Calcium	<0.02	mg/L	1	0.05	0.02	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Chromium	0.27	µg/L	1	0.20	0.04		GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Cobalt	0.012	µg/L	1	0.020	0.003	J1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Iron	<0.006	mg/L	1	0.020	0.006	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Lead	<0.05	µg/L	1	0.20	0.05	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Lithium	<0.00005	mg/L	1	0.00020	0.00005	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Magnesium	<0.02	mg/L	1	0.10	0.02	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Manganese	<0.0002	mg/L	1	0.0010	0.0002	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Mercury	<2	ng/L	1	5	2	U1	JAB	12/10/2021 00:00	EPA 245.7-2005, Rev. 2.0
Molybdenum	<0.1	µg/L	1	0.5	0.1	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Potassium	<0.02	mg/L	1	0.10	0.02	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Selenium	<0.09	µg/L	1	0.50	0.09	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Sodium	<0.05	mg/L	1	0.20	0.05	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Strontium	<0.0004	mg/L	1	0.0020	0.0004	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4
Thallium	<0.04	µg/L	1	0.20	0.04	U1	GES	11/30/2021 14:38	EPA 200.8-1994, Rev. 5.4



Water Analysis Report

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

Job ID: 216298

Customer: Pirkey Power Station

Date Reported: 12/20/2021

Report Verification

This report and the above data have been confirmed by the following analyst.

Michael Ohlinger, Chemist

Email: msohlinger@aep.com

Phone: 614-836-4184

Audinet: 8-210-4184

THIS TEST REPORT RELATES ONLY TO THE ITEMS TESTED AND SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY. ALL TEST RESULTS MEET ALL OF THE REQUIREMENTS OF THE ACCREDITING AUTHORITY, UNLESS OTHERWISE NOTED.

Data Qualifier Legend

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

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

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

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

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Dolan Chemical Laboratory (DCL)
 4001 Bixby Road
 Groveport, Ohio 43125
 Michael Ohlinger (614-936-4184)
 Dave Conover (614-936-4219)

Project Name: Pitkey PP CCR
 Contact Name: Leslie Fuerschbach
 Contact Phone: 318-673-2744

Sampler(s): Matt Hamilton Kenny McDonald

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

Site Contact:

Date:

COC/Order #:

For Lab Use Only:

216298
 (ppg)

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials	250 mL bottle, pH<2, HNO ₃	Field-filter 250 mL bottle, then pH<2, HNO ₃	Three (six every 10th) 1 L bottles, pH<2, HNO ₃	125 mL PTFE lined bottle, HCL =, pH<2	Field Filtered 125 mL PTFE lined bottle, HCL =, pH<2	Sample Specific Notes
							B, Ca, Li, Sb, As, Ba, Be, Cd, Cr, Co, Fe, Mn, Mo, Pb, Se, TL and Na, K, Mg, Sr	Dissolved B, Ca, Li, Sb, As, Ba, Be, Cd, Cr, Co, Fe, Mn, Mo, Pb, Se, TL and Na, K, Mg, Sr	Ra-226, Ra-228	Mercury	Dissolved Mercury	
AD-2	11/16/2021	1010	G	GW	7		X	X	X	X	X	
AD-3	11/16/2021	1139	G	GW	7		X	X	X	X	X	
AD-4	11/16/2021	1108	G	GW	7		X	X	X	X	X	
AD-7	11/16/2021	837	G	GW	10		X	X	X	X	X	
AD-12	11/16/2021	1029	G	GW	7		X	X	X	X	X	
AD-13	11/15/2021	938	G	GW	7		X	X	X	X	X	
AD-17	11/16/2021	1052	G	GW	7		X	X	X	X	X	
AD-18	11/17/2021	825	G	GW	7		X	X	X	X	X	
AD-22	11/15/2021	1121	G	GW	7		X	X	X	X	X	
AD-28	11/16/2021	953	G	GW	7		X	X	X	X	X	
AD-30	11/15/2021	1212	G	GW	7		X	X	X	X	X	
AD-31	11/16/2021	858	G	GW	7		X	X	X	X	X	

* Six 1L Bottles must be collected for Radium for every 10th sample.

Special Instructions/QC Requirements & Comments:

Relinquished by: <i>[Signature]</i>	Company: <i>Envt</i>	Date/Time: <i>11-18-21 1200</i>	Received by: <i>[Signature]</i>	Date/Time: <i>11/22/21 12:30PM</i>
Relinquished by: <i>[Signature]</i>	Company: <i>Envt</i>	Date/Time: <i>11-18-21</i>	Received by: <i>[Signature]</i>	Date/Time: <i>11/22/21 12:30PM</i>
Relinquished by: <i>[Signature]</i>	Company: <i>Envt</i>	Date/Time: <i>11-18-21</i>	Received in Laboratory by: <i>[Signature]</i>	Date/Time: <i>11/22/21 12:30PM</i>

Chain of Custody Record

Program: Coal Combustion Residuals (CCR)

Dolan Chemical Laboratory (DCL)
 4001 Bixby Road
 Groveport, Ohio 43125
 Michael Chlinger (614-836-4184)
 Contacts: Dave Conover (614-836-4219)

Project Name: Pitkey PP CCR
 Contact Name: Leslie Fuerschbach
 Contact Phone: 318-673-2744

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

Site Contact:

Date:

COC/Order #:

For Lab Use Only:

216298 (pg 2)

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Sampler(s) Initials	250 mL bottle, pH<2, HNO ₃	Field-filter 250 mL bottle, then pH<2, HNO ₃	Three (six every 100L) 1 L bottles, pH<2, HNO ₃	125 mL PTFE lined bottle, HCL, pH<2	Field Filtered 125 mL PTFE lined bottle, HCL, pH<2	Sample Specific Notes
							B, Ca, Li, Sb, As, Ba, Be, Cd, Cr, Co, Fe, Mn, Mo, Pb, Se, TL and Na, K, Mg, Sr	Unsoluble B, Ca, Li, Sb, As, Ba, Be, Cd, Cr, Co, Fe, Mn, Mo, Pb, Se, TL and Na, K, Mg, Sr	Ra-226, Ra-228	Mercury	Dissolved Mercury	
AD-32	11/15/2021	1124	G	GW	7		X	X	X	X	X	
AD-33	11/15/2021	1218	G	GW	7		X	X	X	X	X	
Duplicate - 2	11/16/2021	1200	G	GW	4		X	X		X	X	
Equipment Blank	11/16/2021	1046	G	GW	2		X					

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=N-NaOH; 6= Other : F= filter in field

Six 1L Bottles must be collected for Radium for every 10th sample.

Special Instructions/QC Requirements & Comments:

Relinquished by: <i>Pat MC</i>	Company: <i>Eask</i>	Date/Time: <i>11-18-21 1200</i>	Received by:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: <i>Pat MC</i>	Date/Time: <i>11/22/21 12:30 PM</i>



WATER & WASTE SAMPLE RECEIPT FORM

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 _____				Other _____			
Plant/Customer <u>Pirkey</u>				Number of Plastic Containers: <u>76</u>			
Opened By <u>MSJ</u>				Number of Glass Containers: <u>-</u>			
Date/Time <u>11/22/21 12:30PM</u>				Number of Mercury Containers: <u>31</u>			
Were all temperatures within 0-6°C? Y / N or <input checked="" type="radio"/> N/A Initial: <u>MSJ</u> on ice / <input checked="" type="radio"/> no ice							
1(IR Gun Ser# <u>200700311</u> , Expir. <u>06-11-22</u>) - If No, specify each deviation: _____							
Was container in good condition? <input checked="" type="radio"/> Y / <input type="radio"/> N Comments _____							
Was Chain of Custody received? <input checked="" type="radio"/> Y / <input type="radio"/> N Comments _____							
Requested turnaround: <u>Route</u> If RUSH, who was notified? _____							
pH (15 min)	Cr 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: JAB/JWB/MBK 11/22/21

pH paper (circle one): MQuant,PN1.09535.0001,LOT# HC904495 [OR] Lab Rat,PN4801,LOT# X000RWDG21

- Was Add'l Preservative needed? Y / N If Yes: By whom & when: _____ (See Prep Book)

Is sample filtration requested? Y / N Comments _____ (See Prep Book)

Was the customer contacted? If Yes: Person Contacted: _____

Lab ID# 216298 Initial & Date & Time: _____

Logged by MSJ Comments: _____

Reviewed by SM _____

REMINDER: Document the pertinent sample integrity information and deviations in sample receipt (as noted above) in the "Notes" field in the LIMS to be included on the report to the customer.